Mazda 626

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Workshop Manual





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7/87

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ECE and General

Mazda 626 Workshop Manual

FOREWORD

This workshop manual is intended for use by service technicians of authorized Mazda dealers to help them service Mazda vehicles. This manual can be also useful in diagnosing certain problems and performing some repair and maintenance on Mazda vehicles.

For proper repair and maintenance, it is important to be thoroughly familiarized with this manual. It is recommended that this manual always be kept in a handy place for quick and easy reference.

All the contents of this manual, including photographs, drawings, and specifications, are the latest available at the time of printing. As modifications affecting repair or maintenance occur, relevant information supplementary to this volume will be made available at Mazda dealers. This manual should be kept up-to-date.

Mazda Motor Corporation reserves the right to alter the specifications and contents of this manual without obligation or advance notice.

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Mazda Motor Corporation
HIROSHIMA JAPAN

Refer to the following wiring diagrams if necessary.

Refer to From No.
5095-10-87G..... L.H.D.
5096-10-87G ..... R.H.D.
5096-20-87I ..... Germany
5095-30-87I..... French

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GENERAL INFORMATION

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IMPORTANT INFORMATION

BASIC ASSUMPTIONS

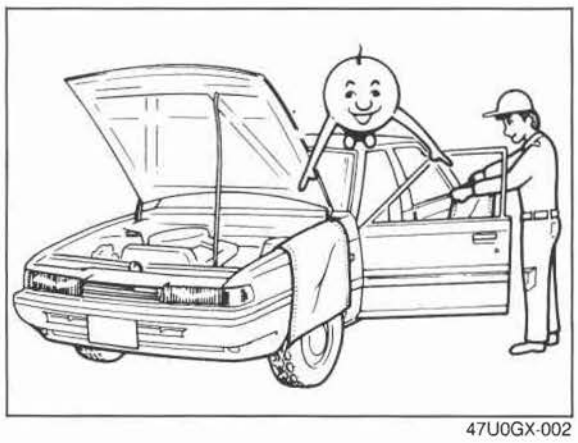
This workshop manual assumes that you have and know how to properly use certain special tools which are necessary for the safe and efficient performance of service operations on Mazda vehicles. The manual also assumes that you are familiar generally with automobile systems and basic service and repair procedures. You should not attempt to use this manual unless these assumptions are correct and you understand the consequences described below.

SAFETY RISK

This manual contains certain notes, warnings, etc., which you should carefully read and follow in order to eliminate the risk of personal injury to yourself or others and the risk of improper service which may damage the vehicle or render it unsafe. The fact that there are no such notes, etc., with respect to any specific service method does not mean that there is no possibility that personal safety or vehicle safety will be jeopardized by the use of incorrect methods or tools.

POSSIBLE LOSS OF WARRANTY

The manufacturer's warranty on Mazda vehicles and engines can be voided if improper service or repairs are performed by persons other than an authorized Mazda dealer.



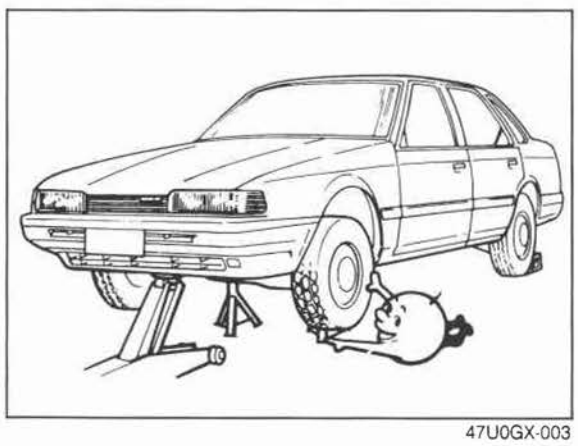
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FUNDAMENTAL PROCEDURES

As you read through the procedure, you will come across NOTES, CAUTIONS, and WARNINGS. Each one is there for a specific purpose. **NOTES** give you **added information** that will help you to complete a particular procedure. **CAUTIONS** are given to prevent you from making an error that could **damage the vehicle. WARNINGS** remind you to be especially careful in those areas where carelessness can cause **personal injury.** The following list contains some general WARNINGS that you should follow when you work on a vehicle.

PROTECTION OF THE VEHICLE

Always be sure to cover fenders, seats, and floor areas before starting work.



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A WORD ABOUT SAFETY

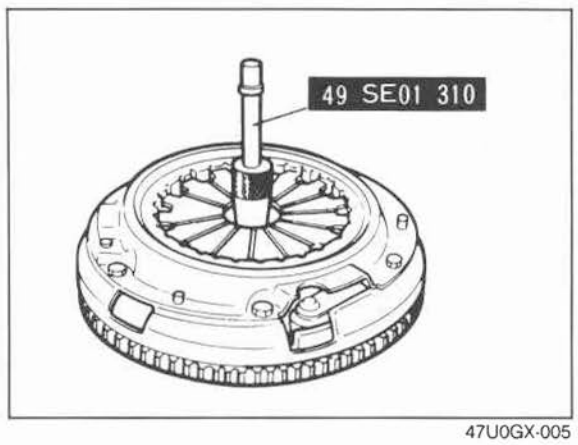
The following precautions must be followed when jacking up the vehicle.
1. Block wheels.
2. Use only specified jacking positions.
3. Support vehicle with safety stands (rigid racks).

Start the engine only after making certain the engine compartment is clear of tools and people.

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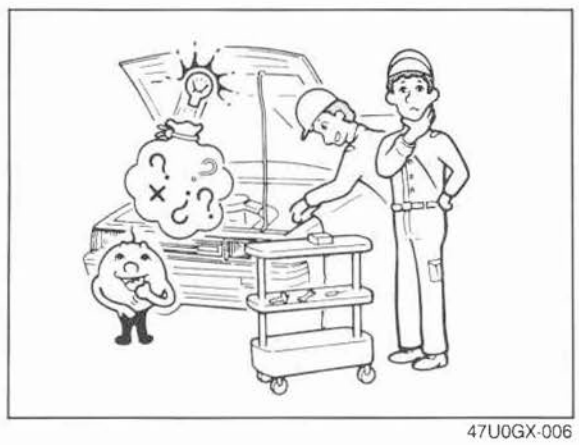
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PREPARATION OF TOOLS AND MEASURING EQUIPMENT
Be sure that all necessary tools and measuring equipment are available before starting any work activity.



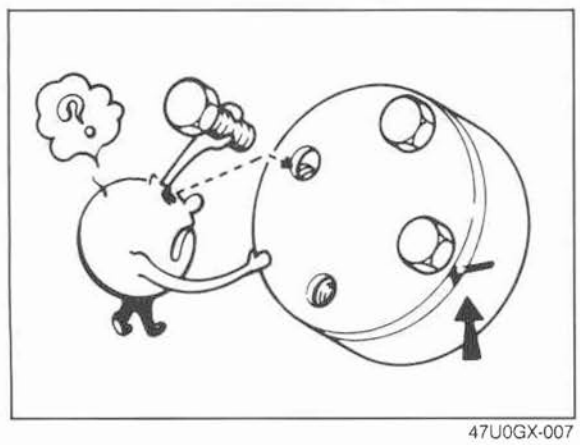
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SPECIAL TOOLS
Use special tools when they are required.



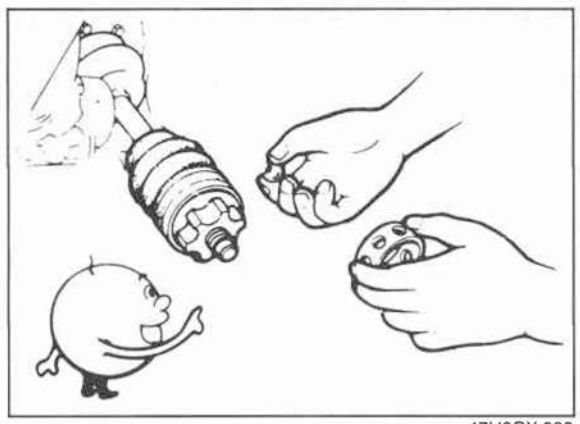
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REMOVAL OF PARTS
While correcting a problem, try also to determine its cause. Begin work only after first learning which parts and subassemblies must be removed and disassembled for replacement or repair.



47U0GX-007

DISASSEMBLY
If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be disassembled in a way that will not affect their performance or external appearance, and be identified so that reassembly can be performed easily and efficiently.

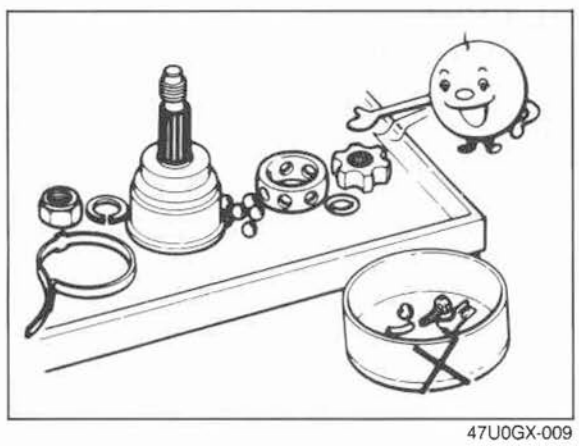


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DISASSEMBLY

1. Inspection of parts

Each part when removed should be carefully inspected for malfunctioning, deformation, damage, and other problems.

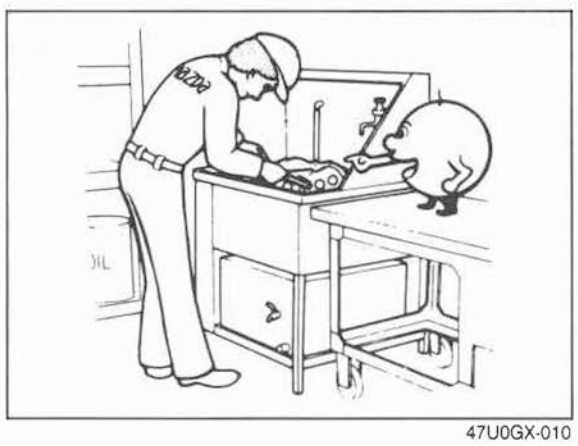


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2. Arrangement of parts

All disassembled parts should be carefully arranged for reassembly.

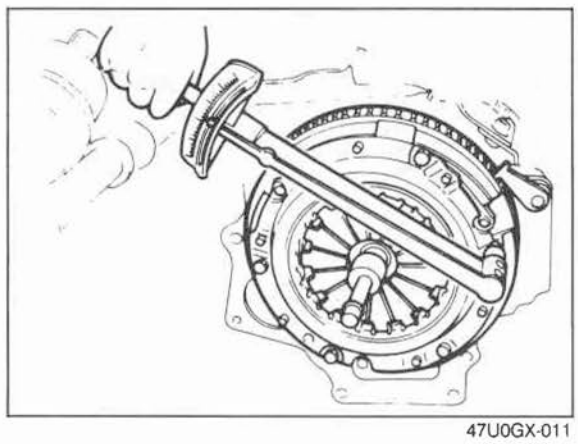
Be sure to separate or otherwise identify the parts to be replaced from those that will be reused.



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3. Cleaning parts for reuse

All parts to be reused should be carefully and thoroughly cleaned in the appropriate method.



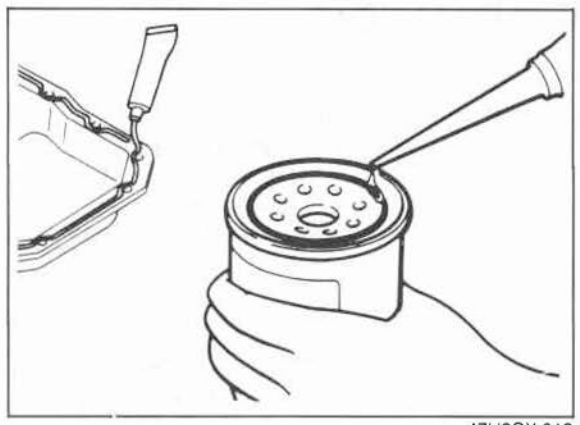
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REASSEMBLY

Standard values, such as torques and certain adjustments, must be strictly observed in the reassembly of all parts.

If removed, these parts should be replaced with new ones:

1. Oil seals
2. Gasket
3. O-rings
4. Lock washers
5. Cotter pins (split pins)
6. Nylon nuts



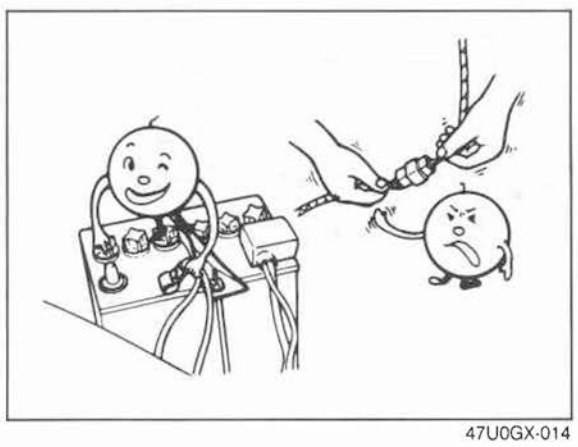
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Depending on where they are;
1. Sealant should be applied to gaskets
2. Oil should be applied to the moving components of parts
3. Specified oil or grease should be applied at the prescribed locations (oil seals, etc.) before assembly.



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ADJUSTMENTS
Use suitable gauges and/or testers when making various adjustments.



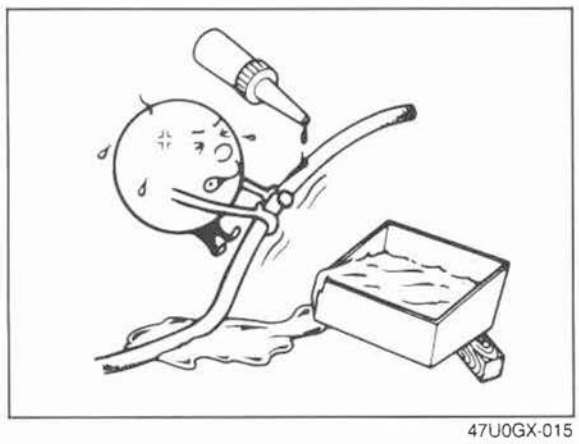
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ELECTRICAL SYSTEM
Be sure to disconnect the battery cable from the negative (–) terminal of the battery.

Never pull on the wiring when disconnecting connectors.

When locking connectors, make sure to listen for a click that will let you know they are securely locked.

Handle sensors and relays carefully. Be careful not to drop them or strike them against other parts.

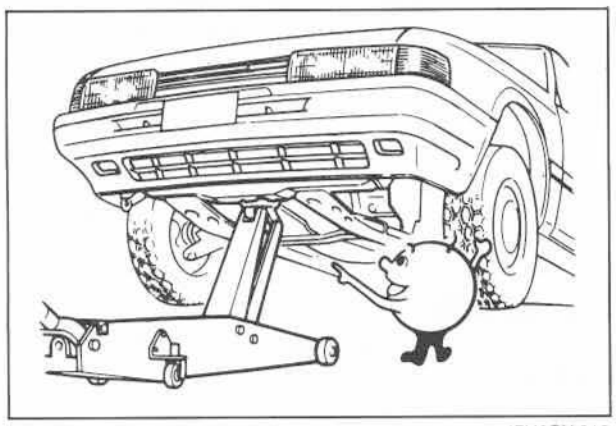


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RUBBER PARTS AND TUBING
Always prevent gasoline or oil from getting on rubber parts or tubing.

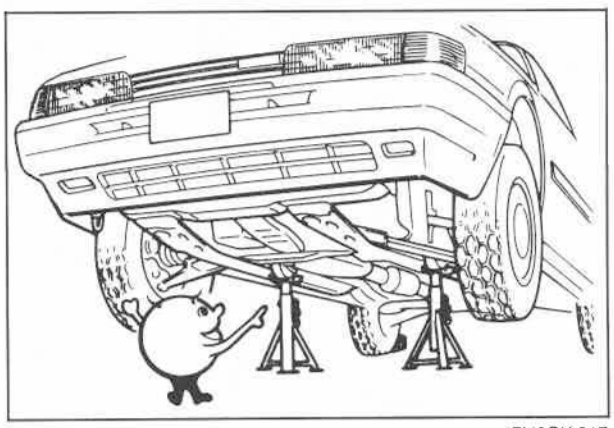
JACK AND SAFETY STAND (RIGID RACK) POSITIONS

FRONT END
Jack position:
At the center of the crossmember



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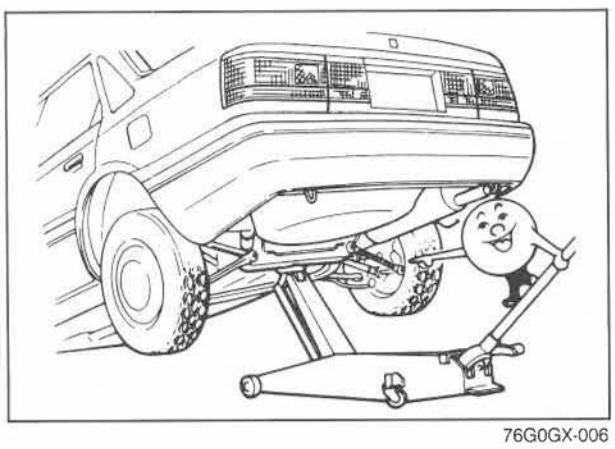
Safety stand positions:
On both sides of the body frame



47U0GX-017

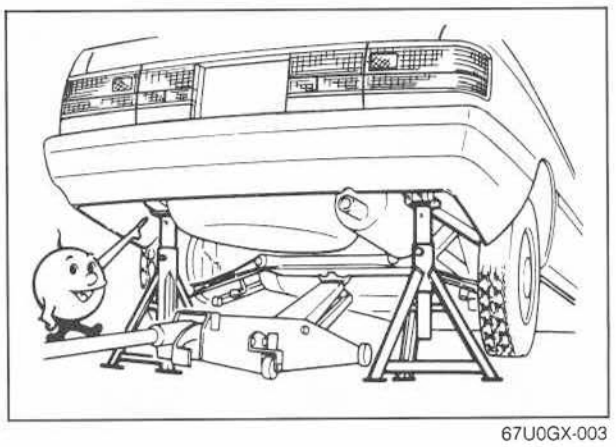
REAR END
Jack position:
At the center of the rear crossmember

2WS



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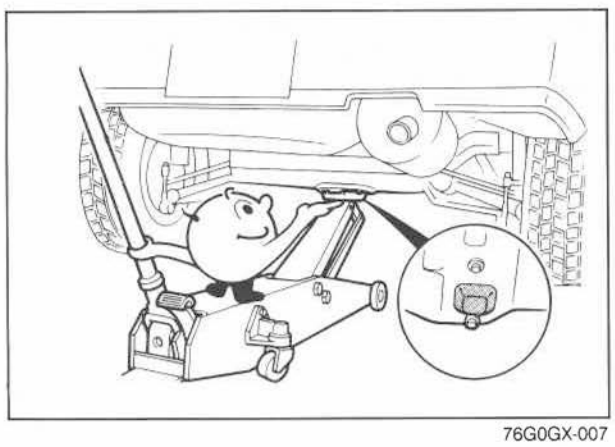
Safety stand positions:
On both sides of the body frame



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Jack position:
At the center of the rear crossmember

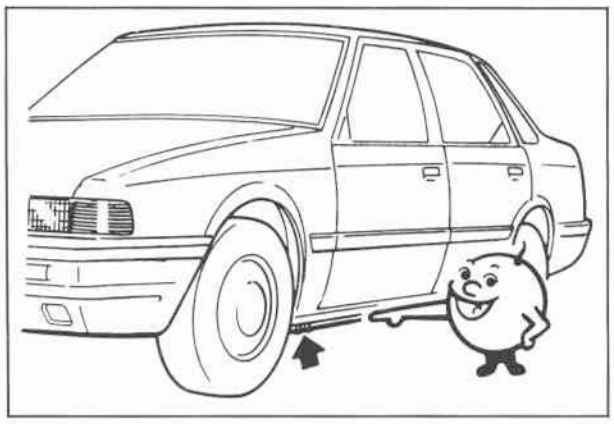
4WS



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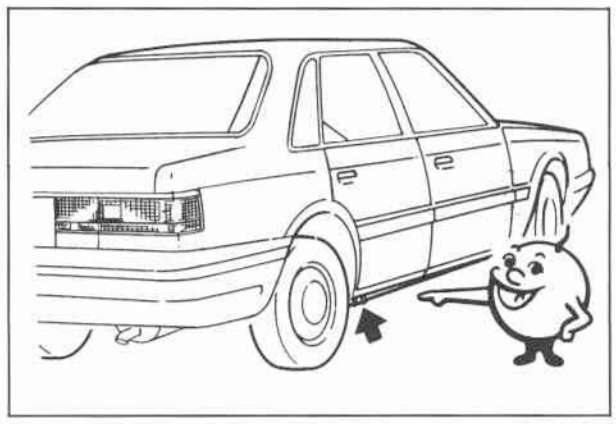
VEHICLE LIFT (2-SUPPORT TYPE) POSITIONS

FRONT END
Frame
Side sills (front)



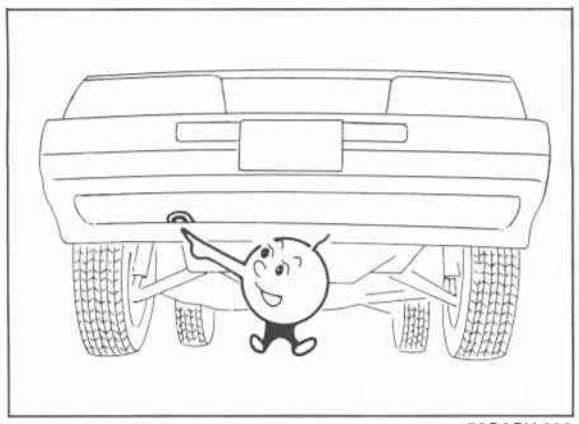
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REAR END
Frame
Side sills (rear)



47U0GX-021

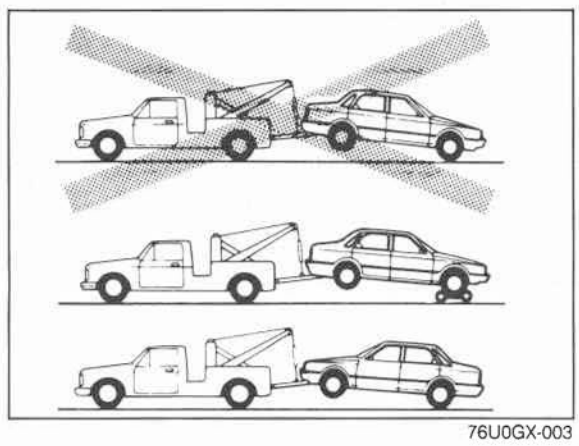
G TOWING



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TOWING

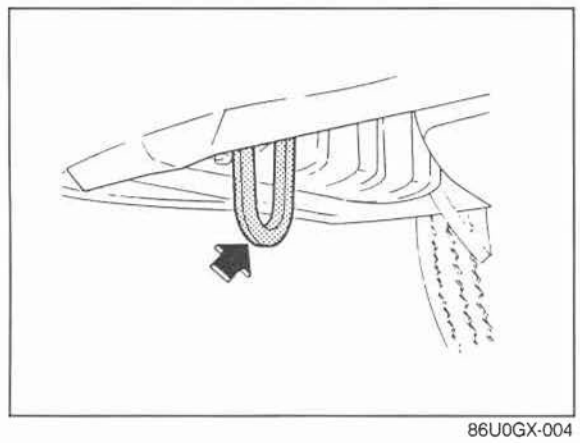
Proper towing equipment is necessary to prevent damage to the vehicle during any towing operation. Laws and regulations applicable to vehicles in tow must always be observed.
Whether the vehicle is equipped with either an automatic or manual transaxle, release the parking brake, place the selector lever (shift lever) in neutral, and set the ignition key in the "ACC" position. As a rule, towed vehicles should be pulled with their drive wheels off the ground.



76U0GX-003

If excessive vehicle damage or other conditions prevent towing a vehicle with its drive wheels up, use wheel dollies. With all four wheels on the ground, the vehicle may be towed only forward. In this case, it cannot be towed at a speed exceeding 56 km/h (35 mph) for more than 80 km (50 miles) without danger of damaging the transaxle.

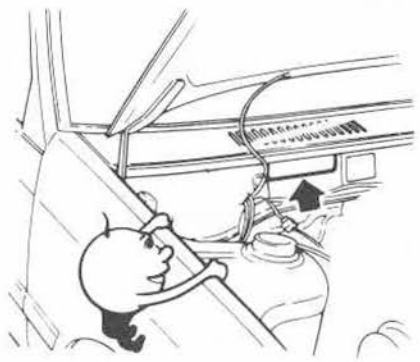
If the towing speed will exceed 56 km/h (35 mph), or if the towing distance will exceed 80 km (50 miles), use either of these two methods:
1. Place the front wheels on dollies.
2. Tow with the front wheels off the ground.



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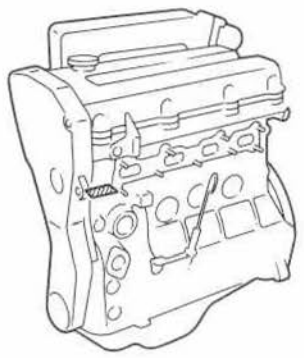
CAUTIONS
a) The power assist for the brakes and steering (if so equipped) will be inoperable while the engine is off.
b) When either of the towing hooks is used, always pull the cable or chain straight away from the hook and do not apply any sideways force to it. To further help prevent damage, do not take up slack too quickly in the cable or chain.
c) The rear towing hook should be used only in an emergency situation, (e.g., to pull the vehicle from a ditch, a snowbank, or mud).

CHASSIS NUMBER LOCATION



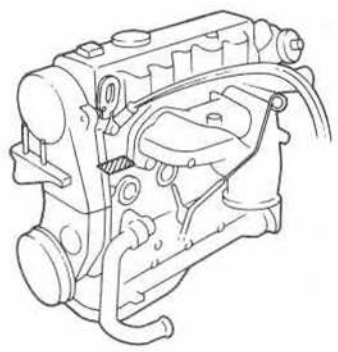
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ENGINE MODEL AND NUMBER LOCATION



FE

67U0GX-007



F6, F8

UNITS

N·m (m-kg, ft-lb or in-lb)	Torque
rpm	Revolutions per minute
A	Ampere(s)
V	Volt(s)
Ω	Ohm(s) (resistance)
kPa (psi)	Pressure (usually positive)
mmHg (in Hg)	Pressure (usually negative)
W	Watt

76G0GX-004

ABBREVIATIONS

AAS	Auto adjusting suspension
A/C	Air conditioner
ACC	Accessories
ABDC	After bottom dead center
ATDC	After top dead center
ATX	Automatic transaxle
ATF	Automatic transmission fluid
ABS	Anti-lock brake system
BBDC	Before bottom dead center
BTDC	Before top dead center
EX	Exhaust
EC-AT	Electronically controlled automatic transaxle
ESPS	Engine speed sensing power steering
ECPS	Electronically-controlled power steering
HLA	Hydraulic lash adjuster
IG	Ignition
IN	Intake
IC	Integrated circuit
INT	Intermittent
LH	Left hand
MTX	Manual transaxle
M	Motor
OFF	Switch off
ON	Switch on
PCV	Positive crankcase ventilation
P/S	Power steering
P/W	Power window
RH	Right hand
RF-CX	Comprex supercharged RF engine
RF-N	Normally aspirated RF engine
ST	Start
SW	Switch
SST	Special tools
4WS	4-wheel steering
2WS	2-wheel steering
4HAT	4-speed hydraulic automatic transaxle
FI	Fuel injection

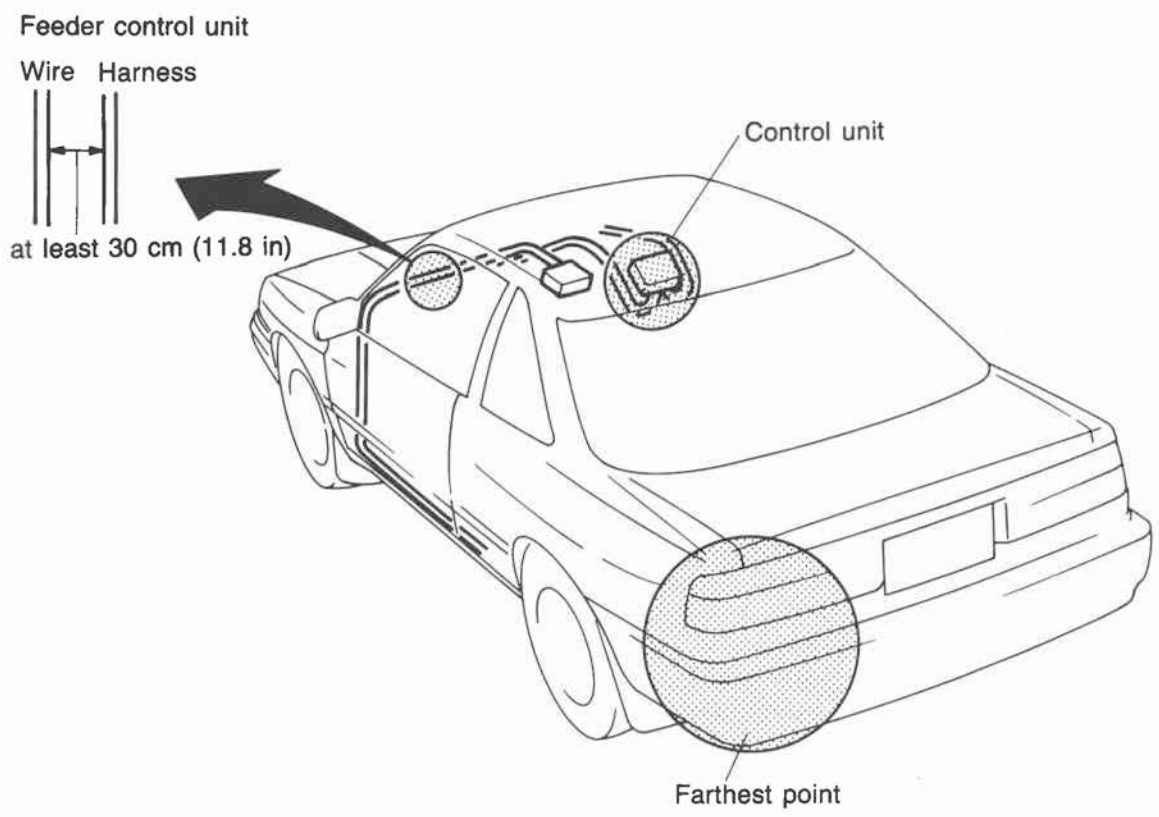
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CAUTION

INSTALLATION OF A MOBILE TWO-WAY RADIO SYSTEM

If a mobile two-way radio system is installed improperly, or if a wrong type is used, the Fuel Injection system and other systems may be affected.
When car is equipped with a mobile two-way radio system, observe the following precautions.

1. Install the antenna at the farthest point from the control unit.
2. Keep the antenna feeder away from the control unit harness as far as possible.
   (at least 30cm (11.8 in))
3. Insure that the antenna and feeder are properly adjusted.
4. Do not install a powerful mobile two-way radio system.



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PRE-DELIVERY INSPECTION AND SCHEDULED MAINTENANCE SERVICES

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PRE-DELIVERY INSPECTION TABLE ..... **0— 2**
SCHEDULED MAINTENANCE SERVICES .... **0— 3**
MAINTENANCE TABLE
(For ECE Leaded gasoline) ..... **0— 3**
MAINTENANCE TABLE
(For ECE Unleaded gasoline) ..... **0— 9**
MAINTENANCE TABLE (For General) ..... **0—15**

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0 PRE-DELIVERY INSPECTION

PRE-DELIVERY INSPECTION TABLE

EXTERIOR

INSPECT and **ADJUST**, if necessary, the following items to the specifications:
☐ Glass, exterior bright metal and paint for damage
☐ Wheel lug nuts
88—118 N·m (9—12 m-kg, 65—87 ft-lb)
☐ Tire pressures (Refer to section 12)
☐ All weatherstrips for damage or detachment
☐ Operation of bonnet release and lock
☐ Operation of fuel lid and trunk lid (Back door) opener
☐ Door operation and alignment
☐ Headlight aiming
INSTALL following parts:
☐ Wheel caps or rings (if equipped)
☐ Outside rear view mirror(s)

UNDER BONNET—ENGINE OFF

INSPECT and **ADJUST**, if necessary, the following items to the specifications:
☐ Fuel, coolant and hydraulic lines, fittings, connections and components for leaks
☐ Engine oil level
☐ Power steering fluid level (if equipped)
☐ Brake and clutch master cylinder fluid level (if equipped)
☐ Windshield washer reservoir fluid level
☐ Radiator coolant level and specific gravity

Protection °C (°F)	Specific gravity at 20°C (68°F)
–4 (25)	1.028
–16 (3)	1.054
–26 (–15)	1.066
–40 (–40)	1.078

☐ Tightness of water hose clamps (including heater hoses)
☐ Tightness of battery terminals
☐ Manual transaxle oil level
☐ Drive belt tensions (Refer to section 1)
☐ Accelerator cable and its linkage for free movement
☐ Headlight cleaner fluid level (if equipped)
CLEAN spark plugs

INTERIOR

INSTALL the following parts:
☐ Rubber stopper for inside rear view mirror
☐ Fuse for accessories
CHECK the operations of the following items:
☐ Seat controls (sliding and reclining) and head rest
☐ Door locks including childproof door locks (if equipped)
☐ Seat belts and warning system
☐ Ignition switch and steering lock
☐ Inhibitor switch (ATX only)
☐ All lights including warning and indicator lights
☐ Sound warning system
☐ Headlight cleaner (if equipped)
☐ Horn, wipers and washers (front and rear, if equipped)
☐ Radio and antenna (if equipped)
☐ Cigarette lighter and clock
☐ Remote control outside rear view mirrors (if equipped)
☐ Power windows (if equipped)
☐ Heater, defroster and air conditioner at various mode selection (if equipped)
☐ Sunroof (if equipped)
ADJUST antenna trimmer on radio (if equipped)
CHECK the following items:
☐ Presence of spare fuse
☐ Upholstery and interior finish
CHECK and **ADJUST**, if necessary, the following items:
☐ Operation and fit of windows
☐ Pedal height and free play of brake and clutch pedal

	Pedal height mm (in)	free play mm (in)
Clutch pedal	216.5–221.5 (8.52–8.72)	5—13 (0.2—0.51)
Brake pedal	222—227 (8.74—8.94)	4—7 (0.16—0.28)

☐ Parking brake
5—7 noches/98 N (10 kg, 22lb)

UNDER BONNET—ENGINE RUNNING AT OPERATING TEMPERATURE

CHECK the following items:
☐ Operation of idle-up system for air conditioner or power steering (if equipped)
☐ Automatic transaxle fluid level
☐ Operation of dash pot
☐ Initial ignition timing
☐ Idle speed

ON HOIST

CHECK the following items:
☐ Underside fuel, coolant and hydraulic lines, fittings, connections and components for leaks
☐ Tires for cuts or bruises
☐ Steering linkage, suspension, exhaust system and all underside hardware for looseness or damage
REMOVE protective cover from brake discs

ROAD TEST

CHECK the following items:
☐ Brake operation
☐ Clutch operation
☐ Steering control
☐ Operation of meters and gauge
☐ Squeaks, rattles or unusual noise
☐ Engine general performance (including turbo)
☐ Emergency locking retractors
☐ Cruise control system (if equipped)

AFTER ROAD TEST

REMOVE seat and floor mat protective covers
CHECK for necessary owner information materials, tools and spare tire in vehicle

76G00X-002

For ECE Leaded gasoline

Chart symbols:

I : Inspect: Visual examination or functional measurement of a system's operation (performance)
A : Adjust : Examination resuiting in adjustment or replacement
R : Replace or change
T : Tighten
O : Applicable
X : Not applicable
◎**1** : F8 engine with carbretor, MTX, ATX
◎**2** : FE engine with carbretor, MTX, ATX
◎**3** : FE DOHC engine with fuel injection, 4WS, MTX
◎**4** : RF-CX, RF-N engine with MTX

REMARKS:

Major service interval at 12 months/20,000 km (12,000 Miles), Lubrication service based on distance only 10,000 km (6,000 Miles) not time
After 80,000 km (48,000 Miles) or 48 months, continue to follow the described maintenance items and intervals periodically.
As for * marked items in this maintenance chart, please pay attention to the following points.

*1 Replacement of the timing belt is required at every 100,000 km (60,000 Miles). Failure to repace the timing belt may result in damage to the engine.
*2 If the vehicle is operatie under the following conditions, it is suggested that the engine oil and oil filter be changed more often than at usual recommended intervals.
  a) Driving in dusty conditions.
  b) Extended periods of idling or low speed operation.
  c) Driving for a prolonged period in cold temperatures or driving only short distances regulary.
*3. If the vehicle is operated in very dusty or sandy areas, inspect and, if necessary, replace more often than at usual recommended intervals.
*4. This is a full function check of all electrical systems, i.e., all lights, washers (including condition of blades) electrical windows, sunroof, horn, etc....
*5. Replace every two years.

If there has been continuous hard driving, mountain driving, or if the brakes are used extensively or the vehicle is operated in extremely humid climates, the brake fluid should be changed annually.

Emission Control and Related Systems

The ignition and fuel systems are vitally important to the proper operation of the emissions control and related systems, as well as for efficient engine operation. It is strongly recommended that all servicing related to these systems be done by your Authorized Mazda Dealer.

MAINTENANCE TABLE (For ECE Leaded gasoline)

Procedure & item \ Interval	Number of Months or km, whichever coms first										◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48						
	x 1000 Km	1	10	20	30	40	50	60	70	80						
	Miles x 1000	0.6	6	12	18	24	30	36	42	48						
Clutch pedal			I	I	I	I	I	I	I	I	○	○	○	○	• Operation • Pedal height: 216.5—221.5 mm (8.524—8.720 in) • Free play: 5—13 mm (0.20—0.51 in)	6—4
Brake pedal			I	I	I	I	I	I	I	I	○	○	○	○	• Operation • Pedal height: 222—227 mm (8.74—8.94 in) • Free play: 4—7 mm (0.16—0.28 in)	11—11 11—11
Parking brake			A		A		A		A		○	○	○	○	• Operation • Lever stroke: 5—7 notches	11—65
Power brake unit and hoses			I		I		I		I		○	○	○	○	• Operation • Check the vacuum hoses and connectors	11—27
Brake fluid *5		I	I	I	R	I	I	I	R		○	○	○	○	• Fluid level	11—6
Clutch fluid		I	I	I	I	I	I	I	I		○	○	○	○	• Fluid level	6—4
Power steering fluid		I	I	I	I	I	I	I	I		○	○	○	○	• Fluid level	10—11
Power steering system and hoses			I		I		I		I		○	○	○	○	• Fluid leakage or oozing	10—13
Air cleaner element *3			I		R		I		R						—	1A—6 1B—5 1C—5
Choke system			I		I		I		I		○	○	X	X	• Carburetor linkage • Choke diaphragm • Choke valve clearance • Choke Unloader system	4A—26 4A—34 4A—34 4A—33
Cooling system (including coolant level adjustment)			I		I		I		I		○	○	○	○	• Hoses for cracks or wear • Coolant level	3A—5 3B—4
Engine coolant	Replace every 2 years										○	○	○	○	—	3A—5 3B—4

MAINTENANCE TABLE (For ECE Leaded gasoline)

Interval / Procedure & item	Number of Months or km, whichever coms first										◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48						
	x 1000 Km	1	10	20	30	40	50	60	70	80						
	Miles x 1000	0.6	6	12	18	24	30	36	42	48						
Battery electrolyte level and specific gravity				A		A		A		A	○	○	○	○	• Electroyte level • Specific gravity	5—8
Drive belts	A		A		A		A		A		○	○	○	○	• Cracks or damage • Tension	1A—7 1B—6 1C—7
Engine timing belts *1	Replace every 100,000 Km										○	○	○	○	—	1A—14 1B—11 1C—11
Engine valve clearance	A		A		A		A		A		○	X	X	○	• Valve clearance: F8 (Hot engine) IN: 0.30 mm (0.012 in) EX: 0.30 mm (0.012 in) FE·12-valve, FE (DOHC) IN: 0; Maintenance free EX: 0; Maintenance free RF-CX, RF-N (Cold engine) IN: 0.25 mm (0.010 in) EX: 0.35 mm (0.014 in)	1A-10 1C—85
Intake and exhaust manifold nuts and bolts	T				T				T		○	○	X	X	• Retighten the intake and exhaust manifold nuts N·m (m-kg, ft-lb) F8, FE: IN 19—30 (1.9—3.1, 14—22); EX 22—28 (2.2—2.9, 16—21) RF-CX, RF-N: IN 16—23 (1.6—2.3, 12—17); EX 22—26 (2.2—2.7, 16—20)	1A—86 1B—68 1C—89
Engine oil *2	R	R	R	R	R	R	R	R	R		○	○	○	○	• Oil pan capacity F8, FE: 3.6 liters (3.8 US qt, 3.2 Imp qt) RF-CX, RF-N: 5.0 liters (5.3 US qt, 4.4 Imp qt)	2A—6 2B—6
Oil filter *2		R	R	R	R	R	R	R	R	R	○	○	○	○	• Oil filter capacity F8, FE 12-valve 0.3 liters (0.32 US qt, 0.26 Imp qt) FE (DOHC) 0.2 liters (0.21 US qt, 0.18 Imp qt) RF-CX, RF-N 0.4 liters (0.42 US qt, 0.35 Imp qt)	 2A—6 2B—6
Fuel filter (R) for carbretor model				(R)		R		(R)		R	○	○	○	○	—	4A—37

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MAINTENANCE TABLE (For ECE Leaded gasoline)

Interval / Procedure & item	Number of Months or km, whichever coms first										◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48						
	x 1000 Km	1	10	20	30	40	50	60	70	80						
	Miles x 1000	0.6	6	12	18	24	30	36	42	48						
Fuel lines and hoses				I		I		I		I	○	○	○	○	• Fittings, connections and components for leaks	4B–42
Spark plugs				A		A		A		A	○	○	○	X	• Plug gap: F8, FE (8-VALVE) 0.75—0.85 mm (0.030—0.033 in) FE (12-VALVE) FE (DOHC) 0.7—0.8 mm (0.028—0.031 in) • Recommended spark plugs NGK: F6,F8,FE 8-VALVE: BPR 5ES, BPR 6ES; FE 12-VALVE DOHC: BCPR 5E, BCPR 6E Nippon Denso: F6,F8,FE 8-VALVE: W16EXR-U, W20EXR-U; FE 12-VALVE DOHC: Q16PR-U*, Q20PR-U	5—9
Initial ignition timing					I				I		○	○	○	X	• Initial ignition timing 6 ± 1° BTDC 12 ± 1° BTDC (FE DOHC)	5—11
Idle speed				A		A		A		A	○	○	○	X	• Check the idle speed (rpm) FE DOHC 700—800 Carburetor MTX 800—850, ATX 900—950 (N range)	4A—38 4C—29
Idle mixture				A		A		A		A	○	○	○	X	• CO concentration FE DOHC 1.5 ±0.5 % Others 2.0 ± 0.5 % HC concentration FE DOHC Less than 1000 rpm	4A—38 4C—30
Dashpot (MTX)				A		A		A		A	○	○	X	X	• Operation	4A—50 4B—67

* Only FE 12-VALVE

MAINTENANCE TABLE (For ECE Leaded gasoline)

Interval / Procedure & item	Number of Months or km, whichever coms first										◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48						
	x 1000 Km	1	10	20	30	40	50	60	70	80						
	Miles x 1000	0.6	6	12	18	24	30	36	42	48						
Idle-up solenoid valve				I		I		I		I	○ MTX	○	X	X	—	4A—56
All electrical system *4			I	I	I	I	I	I	I	I	○	○	○	○	• Check the all electrical system	Section 15
Head light aligment				A		A		A		A	○	○	○	○	• Check the head light aiming	14—31
Steering and front suspension				I		I		I		I	○	○	○	○	• Damage	10—28
Front and rear power steering system and hoses (For 4WS)						I				I	X	X	○	X	• Operation and looseness • Fluid leakage or oozing	10—44 10—14
4-Wheel steering system operation and linkage (For 4WS)						I				I	X	X	○	X	• Operation and looseness • Fluid leakage or oozing	10—33 10—14
Rear wheel steering steering angle (For 4WS)						I				I	X	X	○	X	• Steering wheel angle: Inner 5°00' ± 45' Outer 5°00' ± 45'	13—54
Solenoid valve oil filter (For 4WS)						R				R	X	X	○	X	—	10—41
Rear suspension outer ball joints (For 4WS)						I				I	X	X	○	X	• Damage, looseness and grease leakage	13—37
Manual transaxle oil						A				R	○	○	○	○	• Oil capacity 3.35 liters (3.6 US qt, 3.0 Imp qt)	7A—6
Automatic transaxle fluid level						A				A	○	○	X	X	• Oil capacity 4-Speed 6.8 liters (7.2 US qt, 6.0 Imp qt) 3-Speed 6.2 liters (6.6 US qt, 5.5 Imp qt)	7B—2
Bolts and nuts on chasis and body	T		T		T		T		T		○	○	○	○	—	—
Disk brakes/Drum brakes				I		I		I		I	○	○	○	○	• Min. pad thickness: Front 2.0 mm (0.08 in) Rear 1.0 mm (0.04 in) • Min. disc thickness: Front 14 or 15 inch-wheel 22 mm (0.87 in) 13 inch-wheel 18 mm (0.71 in) Rear 8.0 mm (0.31 in) • Disc run out: Front 0.1 mm (0.004 in) Rear 0.1 mm (0.004 in) • Min. lining thickness: 1.0 mm (0.04 in) • Max, drum inner dia: 230.1 mm (9.06 in)	11—45 11—54 11—45 11—54 11—45 11—54 11—60 11—60

Interval / Procedure & item	Number of Months or km, whichever coms first										◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48						
	x 1000 Km	1	10	20	30	40	50	60	70	80						
	Miles x 1000	0.6	6	12	18	24	30	36	42	48						
Brake lines, Hoses, and connections				I		I			I	I	○	○	○	○	• Proper attachment and connections	11—8
Body condition	Inspect annually										○	○	○	○	—	—
Tyres (including spare tyre) Infration pressure adjustment				I		I		I		I	○	○	○	○	• Check the air pressure	12—2
Hinges and cathes				A		A		A		A	○	○	○	○	—	—
Underside of vehicle				I		I		I		I	○	○	○	○	—	—
Seat belt				I		I		I		I	○	○	○	○	• Opration and looseness	14—101
Road test				I		I		I		I	○	○	○	○	—	—

For ECE Unleaded gasoline

Chart symbols:

I : Inspect: Visual examination or functional measurement of a system's operation (performance)
A : Adjust: Examination resuiting in adjustment or replacement
R : Replace or change
T : Tighten
O : Applicable
X : Not applicable
◎**1**: FE engine with fuel injection, MTX, ATX
◎**2**: FE DOHC engine with fuel injection, 4WS, MTX
◎**3**: FE engine with carburetor, MTX, ATX
◎**4**: RF-CX, RF-N engine with MTX

REMARKS:

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After 80,000 km (48,000 Miles) or 48 months, continue to follow the described maintenance items and intervals periodically.
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If there has been continuous hard driving, mountain driving, or if the brakes are used extensively or the vehicle is operated in extremely humid climates, the brake fluid should be changed annually.

Emission Control and Related Systems

The ignition and fuel systems are vitally important to the proper operation of the emissions control and related systems, as well as for efficient engine operation. It is strongly recommended that all servicing related to these systems be done by your Authorized Mazda Dealer.

Interval / Procedure & item	Number of Months or km, whichever coms first										◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48						
	x 1000 Km	1	10	20	30	40	50	60	70	80						
	Miles x 1000	0.6	6	12	18	24	30	36	42	48						
Clutch pedal			I	I	I	I	I	I	I	I	○	○	○	○	• Operation • Pedal height: 216.5—221.5 mm (8.524—8.720 in) • Free play: 5—13 mm (0.20—0.51 in)	6—4
Brake pedal			I	I	I	I	I	I	I	I	○	○	○	○	• Operation • Pedal height: 222—227 mm (8.74—8.94 in) • Free play: 4—7 mm (0.16—0.28 in)	11—11 11—11
Parking brake				A		A		A		A	○	○	○	○	• Operation • Lever stroke: 5—7 notches	11—65
Power brake unit and hoses				I		I		I		I	○	○	○	○	• Operation • Check the vacuum hoses and connectors	11—27
Brake fluid *5			I	I	I	R	I	I	I	R	○	○	○	○	• Fluid level	11—6
Clutch fluid			I	I	I	I	I	I	I	I	○	○	○	○	• Fluid level	6—4
Power steering fluid			I	I	I	I	I	I	I	I	○	○	○	○	• Fluid level	10—11
Power steering system and hoses				I		I		I		I	○	○	○	○	• Fluid leakage or oozing	10—13
Air cleaner element *3				I		R		I		R	○	○	○	○	—	1A—6 1B—5 1C—5
Cooling system (including coolant level adjustment)				I		I		I		I	○	○	○	○	• Hoses for cracks or wear • Coolant level	3A—5 3B—4
Engine coolant	Replace every 2 years										○	○	○	○	—	3A—5 3B—4

Interval / Procedure & item	Number of Months or km, whichever coms first										◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48						
	x 1000 Km	1	10	20	30	40	50	60	70	80						
	Miles x 1000	0.6	6	12	18	24	30	36	42	48						
Battery electrolyte level and specific gravity				A		A		A		A	○	○	○	○	• Electroyte level • Specific gravity	5—8
Drive belts	A			A		A		A		A	○	○	○	○	• Cracks or damage • Tension	1A—7 1B—6 1C—7
Engine timing belts *1	Replace Severy 100,000 Km										○	○	○	○	—	1A—14 1B—11 1C—11
Engine valve clearance	A			A		A		A		A	○	X	○	○	• Valve clearance: FE·8-valve (Hot engine) IN: 0.30 mm (0.012 in) EX: 0.30 mm (0.012 in) FE (DOHC) IN: 0; Maintenance free EX: 0; Maintenance free RF-CX, RF-N (Cold engine) IN: 0.25 mm (0.010 in) EX: 0.35 mm (0.014 in)	1A—10 1C—85
Intake and exhaust manifold nuts and bolts	T					T				T	○	X	○	X	• Retighten the intake and exhaust manifold nuts N·m (m-kg, ft-lb) FE: IN 19–30 (1.9–3.1, 14–22); EX 22–28 (2.2–2.9 16–21) FE DOHC: IN 19–30 (1.9–3.1, 14–22); EX 22–28 (2.2–2.9 16–21)	1A—86 1B—68
Engine oil *2	R	R	R	R	R	R	R	R	R	R	○	○	○	○	• Oil pan capacity FE: 3.6 liters (3.8 US qt, 3.17 Imp qt) RF-CX, RF-N: 5.0 liters (5.3 US qt, 4.4 Imp qt)	2A—6 2B—6
Oil filter *2		R	R	R	R	R	R	R	R	R	○	○	○	○	• Oil filter capacity FE 8-valve 0.3 liters (0.32 US qt, 0.26 Imp qt) FE (DOHC) 0.2 liters (0.21 US qt, 0.18 Imp qt) RF-CX, RF-N 0.4 liters (0.42 US qt, 0.35 Imp qt)	2A—6 2B—6

MAINTENANCE TABLE (For ECE Unleaded gasoline)

Interval / Procedure & item	Number of Months or km, whichever coms first										◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48						
	x 1000 Km	1	10	20	30	40	50	60	70	80						
	Miles x 1000	0.6	6	12	18	24	30	36	42	48						
Fuel filter (R) for carbretor model				(R)		R		(R)		R	○	○	○	○	—	4A—37
Fuel lines and hoses				I		I		I		I	○	○	○	○	• Fittings, connections and components for leaks	4B—42
Spark plugs			A		A		A			A	○	○	○	X	• Plug gap: Carburetor, FE (DOHC) 1.0—1.1 mm (0.039—0.043 in) FE 0.75—0.85 mm (0.030—0.033 in) • Recommended spark plugs NGK: Carbureter — BPR5ES-11, BPR6ES-11 NGK: FE (Fuel injection) — BPR 5ES, BPR 6ES NGK: FE DOHC — BCPR 5E-11, BCPR 6E-11, BCPR 7E-11 Nippon Denso: Carbureter — W16EXR-U11, W20EXR-U11 Nippon Denso: FE (Fuel injection) — W16EXR-U, W20EXR-U Nippon Denso: FE DOHC — Q16PR-U	5—9
Initial ignition timing						I				I	○	○	○	X	• Initial ignition timing 6 ± 1° BTDC 12 ± 1° BTDC (FE DOHC)	5—11
Idle Speed			A		A		A			A	○	○	○	X	• Check the idle speed (rpm) Carburetor MTX 850—900, ATX 900—950 (N range) FE DOHC 700—800 FE MTX 800—850, ATX 900—950 (N range)	4A—38 4B—29 4C—29
E.G.R. System			I		I		I			I	○	○	○	X	• System inspection	4B—72 4A—64
Evaporative system (if equipped)			I		I		I			I	○	○	X	X	• System inspection	4B—76 4C—81
Choke system			I		I		I			I	X	X	○	X	• Carburetor linkage • Choke diaphragm • Choke valve clearance • Unloader system	4A—26 4A—34 4A—34 4A—33

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MAINTENANCE TABLE (For ECE Unleaded gasoline)

Procedure & item \ Interval	Number of Months or km, whichever coms first										◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48						
	x 1000 Km	1	10	20	30	40	50	60	70	80						
	Miles x 1000	0.6	6	12	18	24	30	36	42	48						
Dashpot (only for MTX)				I		I		I		I	X	X	○	X	• Operation	4A—50
Coast enrichment solenoid valve				I		I		I		I	X	X	○	X	—	4A—54
All electrical system *4			I	I	I	I	I	I	I	I	○	○	○	○	• Check the all electrical system	Section 15
Head light aligment				A		A		A		A	○	○	○	○	• Check the head light aiming	14—31
Steering and front suspension				I		I		I		I	○	○	○	○		10—28
Front and rear power steering system and hoses (For 4WS)						I				I	X	○	X	X	• Operation and looseness • Fluid leakage or oozing	10—44 10—14
4-Wheel steering system operation and linkage (For 4WS)						I				I	X	○	X	X	• Operation and looseness • Fluid leakage or oozing	10—33 10—14
Rear wheel steering angle (For 4WS)						I				I	X	○	X	X	• Steering wheel angle: Inner 5°00' ± 45' Outer 5°00' ± 45'	13—54
Solenoid valve oil filter (For 4WS)						R				R	X	○	X	X	—	10—41
Rear suspension outer ball joints (For 4WS)						I				I	X	○	X	X	• Damage, looseness and grease leakage	13—37
Manual transaxle oil						A				R	○	○	○	○	• Oil capacity 3.35 liters (3.6 US qt, 3.0 Imp qt)	7A—6
Automatic transaxle fluid level						A				A	○	○	○	X	• Oil capacity 4-Speed and EC-AT 6.8 liters (7.2 US qt, 6.0 Imp qt) 3-Speed 6.2 liter (6.6 US qt, 5.5 Imp qt)	7B—71 7C—25
Bolts and nuts on chasis and body	T		T		T		T		T		○	○	○	○	—	—
Brake lines, Hoses, and connections				I		I		I		I	○	○	○	○	• Proper attachment and connections	11—8
Disk brake/Drum brake				I		I		I		I	○	○	○	○	• Min. pad thickness: Front 2.0 mm (0.08 in) Rear 1.0 mm (0.04 in) • Min. disc thickness: Front 14 or 15 inch-wheel 22 mm (0.87 in) 13 inch-wheel 18 mm (0.71 in) Rear 8.0 mm (0.31 in) • Disc run out: Front 0.1 mm (0.004 in) Rear 0.1 mm (0.004 in) • Min. lining thickness: 1.0 mm (0.04 in) • Max. drum inner dia: 230.1 mm (9.06 in)	11—45 11—54 11—45 11—54 11—45 11—54 11—60 11—60

MAINTENANCE TABLE (For ECE Unleaded gasosline)

Interval / Procedure & item	Number of Months or km, whichever coms first												◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48								
	x 1000 Km	1	10	20	30	40	50	60	70	80								
	Miles x 1000	0.6	6	12	18	24	30	36	42	48								
Exhaust system heat shields (unlead)						I				I	○		○	○	○	○	• Clearance to body, and exhaust system	4A—97
Body condition visual only	Inspect annually										○		○	○	○	○	• Inspect annually	—
Tyres (including spare tyre) Infration pressure adjustment			I		I		I			I	○		○	○	○	○	• Check the air pressure	12—2
Hinges and cathes				A		A		A		A	○		—				—	—
Underside of vehicle				I		I		I		I	○		—				—	—
Seat belt				I		I		I		I	○		○	○	○	○	• Opration and looseness	14—101
Road test				I		I		I		I	○		—				—	—

76G00X-014

For General
Chart symbols:

I : Inspect: Visual examination and/or functional measurement of a system's operation or performance.
A : Adjust: Examination resuiting in adjustment or replacement.
R : Replace or change
T : Tighten
O : Applicable
X : Not applicable
◎**1** : F6, F8 engine with carburetor, MTX, ATX
◎**2** : FE engine with carbretor, MTX, ATX
◎**3** : FE DOHC engine with fuel injection, MTX
◎**4** : RF-N engine with MTX

NOTE:
As the result of visual examination or functional measurement of a system's operation(performance), correct, clean or replace as required.

REMARKS:
After 80,000 km (48,000 Miles) or 48 months, continue to follow the described maintenance items and intervals periodically.
As for * marked items in this maintenance chart, please pay attention to the following points.

*1. If the vehicle is operated under the following conditions, it is suggested that the engine oil and oil filter be changed more often than at usual recommended intervals.
   a) Driving in dusty conditions.
   b) Extended periods of idling or low speed operation.
   c) Driving for a prolonged period in cold temperatures or driving only short distances regularly.
*2. Replacement of the timing belt is required at every 100,000 km (60,000 Miles). Failure to repace the timing belt may result in damage to the engine.
*3 If the vehicle is operated in very dusty or sandy areas, inspect and, if necessary, replace more often than at usual recommended intervals.
*4 Adjust or inspect alternator and water pump drive belt, and power steering and air conditioner drive belt, vacuum pump belt, super charger belt if equipped.
*5 Replace every two years.
   If there has been continuous hard driving, mountain driving, or if the brakes are used extensively or the vehicle is operated in extremely humid climates, the brake fluid should be changed annually.
*6. Only F6 carbretor for singapore (MTX Model)

Emission Control and Related Systems
The ignition and fuel systems are vitally important to the proper operation of the emissions control and related systems, as well as for efficient engine operation. It is strongly recommended that all servicing related to these systems be done by your Authorized Mazda Dealer.

MAINTENANCE TABLE (For General)

Procedure & item \ Interval	Number of Months or km, whichever coms first										◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48						
	x 1000 Km	1	10	20	30	40	50	60	70	80						
	Miles x 1000	0.6	6	12	18	24	30	36	42	48						
Clutch pedal			I	I	I	I	I	I	I	I	O	O	O	O	• Operation • Pedal height: 216.5—221.5 mm (8.524—8.720 in) • Free play: 5—13 mm (0.20—0.51 in)	6—4
Brake pedal			I	I	I	I	I	I	I	I	O	O	O	O	• Operation • Pedal height: 222—227 mm (8.74—8.94 in) • Free play: 4—7 mm (0.16—0.28 in)	11—11 11—11
Parking brake			I	I	I	I	I	I	I	I	O	O	O	O	• Operation • Lever stroke 5—7 notches	11—65
Power brake unit and hoses				I		I		I		I	O	O	O	O	• Operation • Check the vacuum hoses and connectors	11—27
Brake fluid *5			I	I	I	R	I	I	I	R	O	O	O	O	• Fluid level	11—6
Clutch fluid			I	I	I	I	I	I	I	I	O	O	O	O	• Fluid level	6—4
Power steering fluid and line (if equipped)			I	I	I	I	I	I	I	I	O	O	O	O	• Fluid level • Fluid leakage or oozing	10—11 10—13
Steering operation and gear housing			I	I		I		I		I	O	O	O	O	• Free play: 0—30 mm (0—1.18 in) • Operation and looseness • Fluid leakage or oozing	10—10 10—28
Air Cleaner element *3			I	I	I	R	I	I	I	R	X	X	X	O	—	1C—5
Air Cleaner element *3 (I) For FE (DOHC)				(I)		R		(I)		R	O	O	O	X	—	1A—6 1B—5

Interval / Procedure & item	Number of Months or km, whichever coms first										◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48						
	x 1000 Km	1	10	20	30	40	50	60	70	80						
	Miles x 1000	0.6	6	12	18	24	30	36	42	48						
Choke system				I		I		I		I	○	○	X	X	• Carburetor linkage • Choke diaphragm • Choke valve clearance • Unloader system	4A—26 4A—34 4A—34 4A—33
Cooling system				I		I		I		I	○	○	○	○	• Hoses for cracks or wear	3A—5 3B—4
Engine coolant (with reservoir)	Reprace every 24 months										○	○	○	○	• Coolant level	3A—5 3B—4
Battery electrolyte level and specific gravity				I		I		I		I	○	○	○	○	• Electrolyte level • Specific gravity	5—8
Engine timing belts *2	Replace every 100,000 km										○	○	○	○	—	1A—14 1B—11 1C—11
Drive belts *4	A	I	I	I	I	I	I	I	I	I	○	○	○	○	• Cracks or damage • Tension	1A—7 1B—6 1C—7
Engine valve clearance (I) For Gasoline engine		(I)	I	(I)	I	(I)	I	(I)	I		○	○	X	○	• Valve clearance F6, F8, FE·8-valve (Hot engine) IN: 0.30 mm (0.012 in) EX: 0.30 mm (0.012 in) FE·12-valve, FE (DOHC) IN: 0; Maintenance free EX: 0; Maintenance free RF-N (Cold engine) IN: 0.25 mm (0.01 in) EX: 0.35 mm (0.014 in)	1A—10 1C—85
Exhaust manifold nuts and bolts	T					T				T	○	○	X	X	• Retighten the intake and exhaust manifold nuts N·m (m-kg, ft-lb) F6, F8, FE: IN 19—30 (1.9—3.1, 14—22); EX 22—28 (2.2—2.9, 16—21) RF-N: IN 16—23 (1.6—2.3, 12—17); EX 22—26 (2.2—2.7, 16—20)	1A—86 1B—68 1C—89
Engine oil *1	Replace every 5000 km or 6 months										X	X	○	○	• Oil pan capacity FE DOHC: 3.6 liters (3.8 US qt, 3.2 Imp qt) RF-N: 5.0 liters (5.3 US pt, 4.4 Imp qt)	2A—6 2B—6

Procedure & item \ Interval	Number of Months or km, whichever coms first										◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48						
	x 1000 Km	1	10	20	30	40	50	60	70	80						
	Miles x 1000	0.6	6	12	18	24	30	36	42	48						
Engine oil *1			R	R	R	R	R	R	R	R	○	○	X	X	• Oil pan capacity F6, F8, FE 3.6 liters (3.8 US qt, 3.2 Imp qt)	2A—6
Oil filter *1			R	R	R	R	R	R	R	R	○	○	○	○	• Oil filter capacity F8, FE 12-valve (SOHC) 0.3 liters (0.32 US qt, 0.26 Imp qt) FE (DOHC) 0.2 liters (0.21 US qt, 0.18 Imp qt) RF-N 0.4 liters (0.42 US qt, 0.35 Imp qt)	2A—6 2B—6
Fuel filter (R) only for carbretor				(R)		R		(R)		R	○	○	○	○	—	4D—21
Fuel lines and hoses (I) only for Diesel			(I)	I	(I)	I	(I)	I	(I)	I	○	○	○	○	• Fittings, connections and components for leaks	
Spark plugs			I	I	I	I	I	I	I	I	○	○	○	X	• Plug gap FE DOHC 0.7—0.8 mm (0.028—0.031 in) Others 0.75—0.85 mm (0.030—0.033 in) • Recommended spark plugs NGK: F6,F8,FE: BPR 5ES, BPR 6ES; FE 12 VALVE, DOHC: BCPR 5E, BCPR 6E Nippon Denso: F6,F8,FE: W16EXR-U, W20EXR-U; FE 12 VALVE, DOHC: Q16PR-U*, Q20PR-U	5—9
Initial ignition timing			I	I	I	I	I	I	I	I	○	○	○	X	• Initial ignition timing F6 F8 FE (8 VALVE) (12 VALVE) 6 ± 1° BTDC FE (DOHC) 12 ± 1° BTDC	5—11
Idle speed (I) only for carbretor	(I)		I		I		I		I		○	○	○	X	• Check the idle speed MTX 800$^{+50}_{-0}$ rpm ATX F6: 900 $^{+50}_{-0}$ rpm (in "N" range) ATX F8, FE: 900 $^{+50}_{-0}$ rpm (in "N" range) FE DOHC 700—800 rpm	4A—38 4C—29

*Only FE 12 VALVE

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PERIODIC MAINTENANCE TABLE (For General)

Procedure & item \ Interval	Number of Months or km, whichever coms first										◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48						
	x 1000 Km	1	10	20	30	40	50	60	70	80						
	Miles x 1000	0.6	6	12	18	24	30	36	42	48						
Idle mixture (I) only for carbretor		(I)		I		I		I		I	○	○	○	X	• CO concentration 2.0 ± 0.5 % CO concentration FE DOHC 1.5 ± 0.5 % HC concentration FE DOHC Less than 1000 rpm	4A—38 4C—30
Evaporative system (only for middle east)				I		I		I		I	X	○	X	X	—	4A—78
Dashpot (only for MTX)				I		I		I		I	○	X	X	X	• Operation	4A—50
Coasting leaner system *6				I		I		I		I	○	X	X	X	—	4A—56
Brake lines, hoses and connections				I		I		I		I	○	○	○	○	• Proper attachment and connections	11—8
Disc brakes			I	I	I	I	I	I	I	I	○	○	○	○	• Min. pad thickness: Front 2.0 mm (0.08 in) Rear 1.0 mm (0.04 in) • Min. disc thickness: Front 14 or 15 inch-wheel 22 mm (0.87 in) 13 inch-whel 18 mm (0.71 in) Rear 8.0 mm (0.31 in) • Disc run out: Front 0.1 mm (0.004 in) Rear 0.1 mm (0.004 in)	11—45 11—54 11—45 11—54 11—45 11—54
Drum brakes				I		I		I		I	○	○	X	○	• Min. lining thickness: 1.0 mm (0.004 in) • Max. drum inner dia: 14 or 15 inch-wheel 230.1 mm (9.06 in) 13 inch-wheel 201.5 mm (7.93 in)	11—60 11—60
Steering linkages, rack guide and tie rod ends			I	I		I		I		I	○	○	○	○	• Operation and looseness	10—11
Manual transaxle oil										R	○	○	○	○	• Oil capacity 3.35 liters (3.6 US qt, 3.0 Imp qt)	7A—6
Automatic transaxle fluid level				I		I		I		I	○	○	X	X	• Oil capacity 4-Speed 6.8 liters (7.2 US qt, 6.0 Imp qt) 3-Speed 6.2 liters (6.6 US qt, 5.5 Imp qt)	7B—71 7C—25

MAINTENANCE TABLE (For General)

Interval / Procedure & item	Number of Months or km, whichever coms first												◎1	◎2	◎3	◎4	Service data and inspection point	Page
	Months	—	6	12	18	24	30	36	42	48								
	x 1000 Km	1	10	20	30	40	50	60	70	80								
	Miles x 1000	0.6	6	12	18	24	30	36	42	48								
Front suspension ball joints						I				I	○		○	○	○	• Damage, looseness and grease leakage	13—20	
Drive shaft dust boots				I			I		I		○		○	○	○	• Cracking and damage	9—32	9—36
Bolts and nuts on chassis and body	T		T		T		T		T		○		○	○	○	—	—	

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1A

ENGINE (SOHC)

OUTLINE ..... **1A— 2**
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ON-VEHICLE INSPECTION ..... **1A—13**
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ON-VEHICLE MAINTENANCE ..... **1A—14**
TIMING BELT ..... **1A—14**
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VALVE SEAL ..... **1A—26**
REMOVAL ..... **1A—34**
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CYLINDER BLOCK ..... **1A—44**
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CYLINDER HEAD ..... **1A—73**
TIMING BELT ..... **1A—82**
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INSTALLATION ..... **1A—91**
TRANSAXLE ASSEMBLY ..... **1A—91**
ENGINE INSTALLATION ..... **1A—92**

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1A OUTLINE

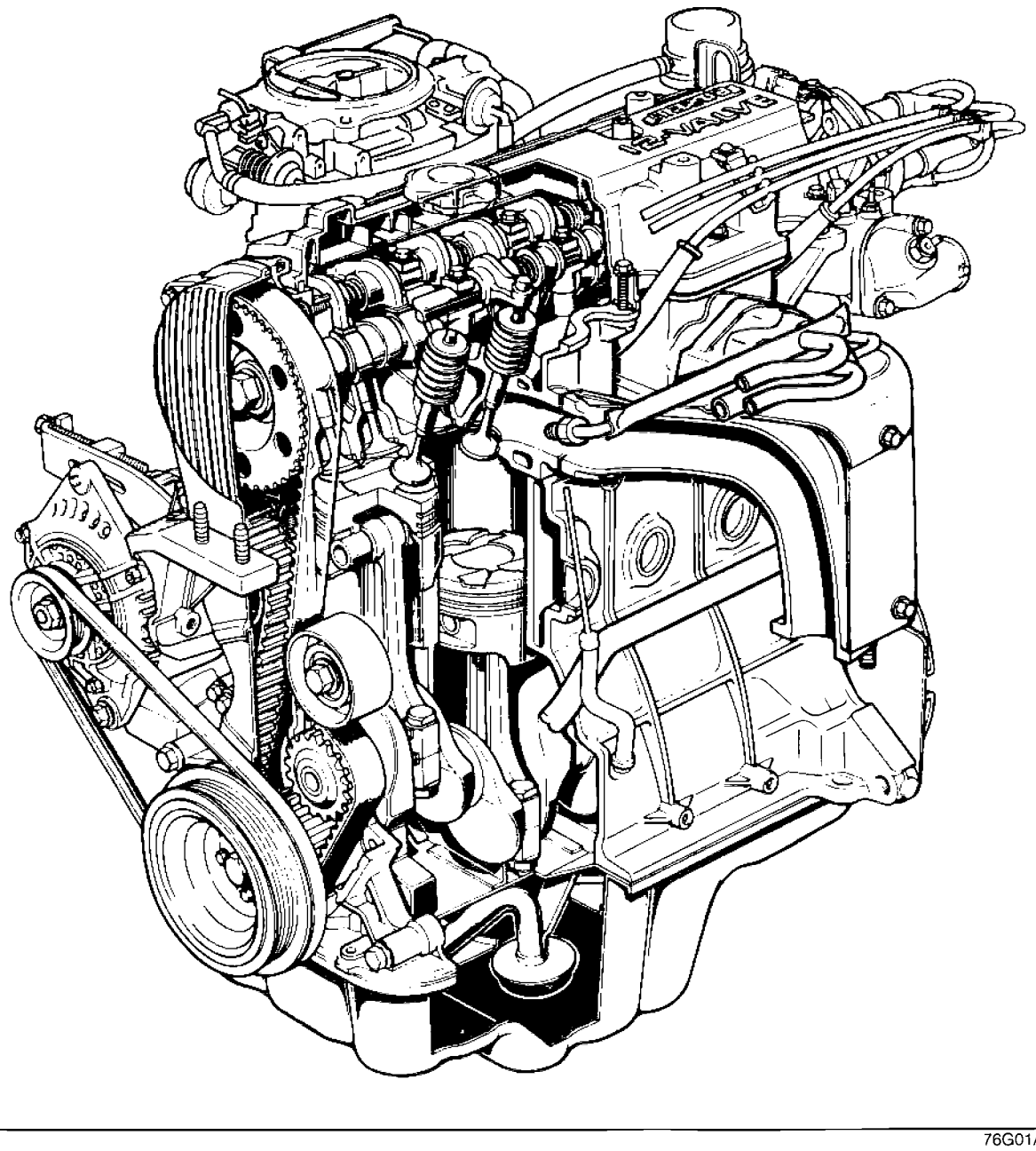
OUTLINE

The new 626 is equipped with F-series gasoline engine and R-series diesel engine. (R-series diesel engine — explained in section 1C.) F-series engine has following variations.

1. SOHC model
   (1) 12-valve model — 2.0 ℓ = FE engine
   (2) 8-valve model — 1.6 ℓ = F6 engine
   1.8 ℓ = F8 engine
   2.0 ℓ = FE engine
2. DOHC model (explained in section 1B)
   2.0 ℓ 16-valve = FE DOHC engine

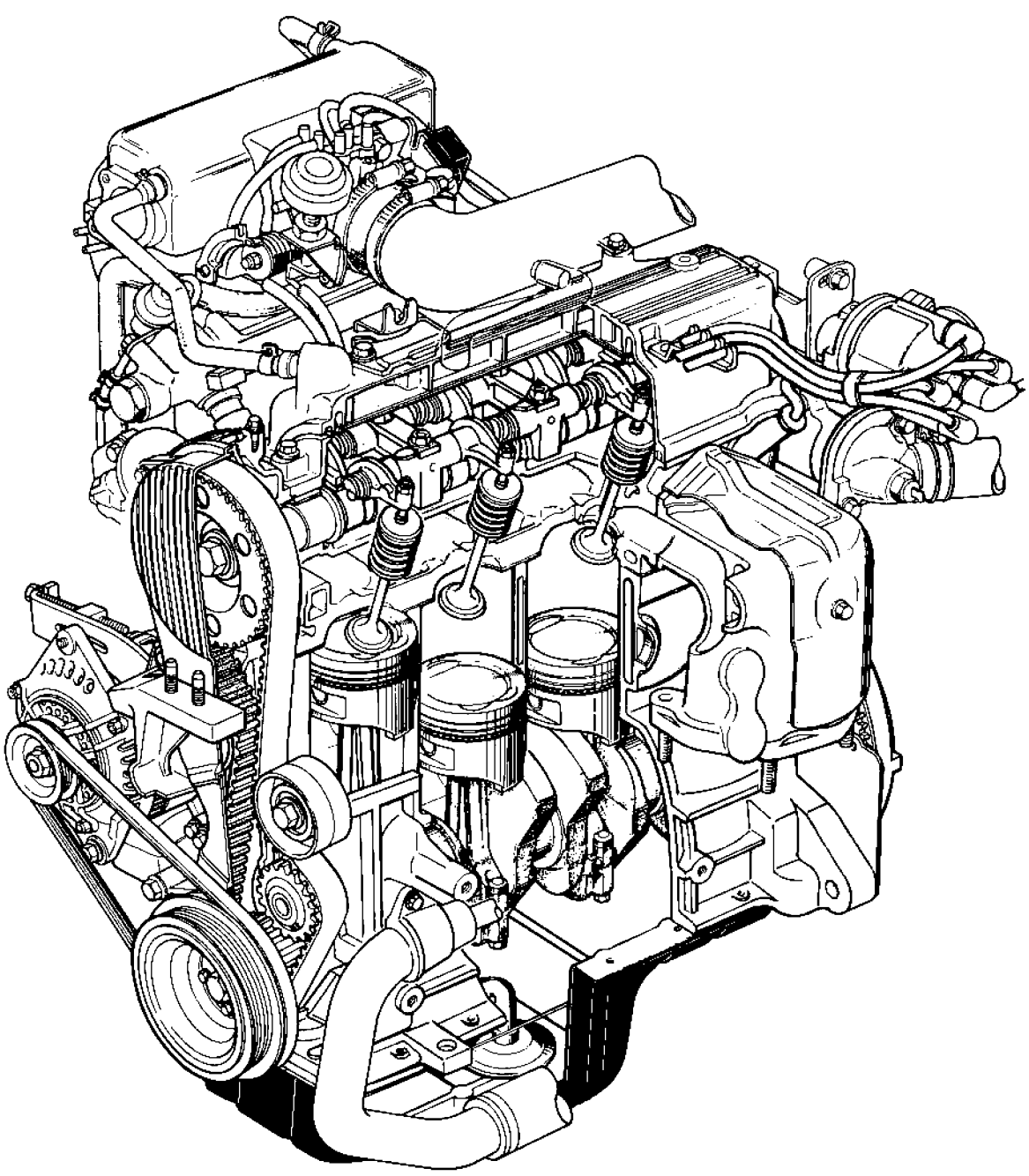
STRUCTURAL VIEW

12-valve



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8-valve



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1A TROUBLESHOOTING GUIDE

SPECIFICATIONS

Item \ Engine model		FE 12 -valve	FE 8-valve		F8		F6
			ECE	Except ECE	ECE	General	
Type		Gasoline, 4 cycle					
Cylinder arrangement and number		In line, 4 cylinders					
Combustion chamber		Pentroof	Multispherical				
Valve system		OHC, belt driven					
Displacement	cc (cu in)	1,998 (121.9)			1,789 (109.1)		1,587 (96.8)
Bore and stroke	mm (in)	86.0 x 86.0 (3.39 x 3.39)			86.0 x 77.0 (3.39 x 3.03)		81.0 x 77.0 (3.19 x 3.03)
Compression ratio		9.5 : 1	8.6 : 1				9.0 : 1
Compression pressure kPa (kg/cm², psi)—rpm	Standard	1,422 (14.5, 206)—280	1,275 (13.0, 185)—270				1,128 (11.5, 164)—270
	Minimum	996 (10.2, 144)—280	893 (9.1, 129)—270				790 (8.1, 114)—270
Valve timing	IN Open BTDC	14°	16°	20°	20°	17°	17°
	IN Close ABDC	56°	54°	65°	65°	56°	56°
	EX Open BBDC	69°	54°	65°	65°	64°	64°
	EX Close ATDC	13°	16°	20°	20°	15°	15°
Valve clearance mm (in)	IN	0; Maintenance-free	0.30 (0.012)				
	EX	0; Maintenance-free	0.30 (0.012)				
Idle speed rpm	MTX	800 $^{+50}_{0}$ ... carb., 850 ± 50 ... FI					
	ATX	900 $^{+50}_{0}$ ... carb., 850 ± 50 ... FI					950 $^{+50}_{0}$ carb. 850 ± 50 .FI
Ignition timing	BTDC	6° ± 1°					
Firing order		1—3—4—2					

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TROUBLESHOOTING GUIDE

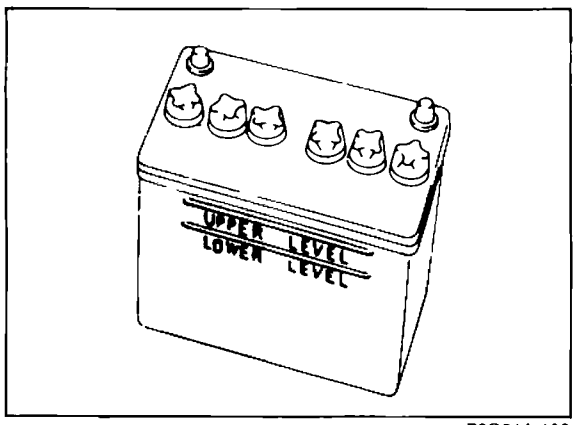
Problem	Possible Cause	Remedy	Page
Difficult starting	**Malfunction of engine-related components**		
	Burned valve	Replace	1A—49
	Worn piston, piston ring, or cylinder	Replace or repair	1A—57
	Failed cylinder head gasket	Replace	1A—20
	Malfunction of fuel system	Refer to Section 4	
	Malfunction of electrical system	Refer to Section 5	
Poor idling	**Malfunction of engine-related components**		
	Malfunction of HLA	Replace	1A—75
	Improper valve clearance	Adjust	1A—10
	Poor valve to valve seat contact	Repair or replace	1A—51
	Failed cylinder head gasket	Replace	1A—20
	Malfunction of fuel system	Refer to Section 4	
Excessive oil consumption	**Oil working up**		
	Worn piston ring groove or sticking piston ring	Replace	1A—57
	Worn piston or cylinder	Replace or repair	1A—57
	Oil working down		
	Worn valve seal	Replace	1A—26
	Worn valve stem or guide	Replace	1A—49
	Oil leakage	Refer to Section 2A	

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Problem	Possible Cause	Remedy	Page
Insufficient power	**Insufficient compression**		
	Malfunction of HLA	Replace	1A—75
	Improper valve clearance	Adjust	1A—10
	Compression leakage from valve seat	Repair	1A—51
	Seized valve stem	Replace	1A—49
	Weak or broken valve spring	Replace	1A—53
	Failed cylinder head gasket	Replace	1A—20
	Cracked or distorted cylinder head	Replace	1A—48
	Sticking, damaged, or worn piston ring	Replace	1A—57
	Cracked or worn piston	Replace	1A—57
	Malfunction of fuel system	Refer to Section 4	
	Others		
	Slipping clutch	Refer to Section 6	
	Dragging brakes	Refer to Section 11	
	Wrong size tires	Refer to Section 12	
Abnormal combustion	**Malfunction of engine-related components**		
	Malfunction of HLA	Replace	1A—75
	Improper valve clearance	Adjust	1A—10
	Sticking or burned valve	Replace	1A—49
	Weak or broken valve spring	Replace	1A—53
	Carbon accumulation in combustion chamber	Eliminate carbon	—
	Malfunction of fuel system	Refer to Section 4	
Engine noise	**Crankshaft or bearing related parts**		
	Excessive main bearing oil clearance	Replace or repair	1A—65
	Main bearing seized or heat-damaged	Replace	1A—65
	Excessive crankshaft end play	Replace or repair	1A—66
	Excessive connecting rod bearing oil clearance	Replace or repair	1A—67
	Connecting rod bearing seized or heat-damaged	Replace	1A—67
	Piston related parts		
	Worn cylinder	Replace or repair	1A—55
	Worn piston or piston pin	Replace	1A—57
	Seized piston	Replace	1A—57
	Damaged piston ring	Replace	1A—57
	Bent connecting rod	Replace	1A—59
	Valves or timing related parts		
	Malfunction of HLA*	Replace	1A—75
	Improper valve clearance	Adjust	1A—10
	Broken valve spring	Replace	1A—53
	Excessive valve guide clearance	Replace	1A—49
	Malfunction of timing belt tensioner	Replace	1A—61
	Malfunction of cooling system	Refer to Section 3A	
	Malfunction of fuel system	Refer to Section 4	
	Others		
	Malfunction of water pump bearing	Replace	—
	Improper drive belt tension	Adjust	1A— 7
	Malfunction of alternator bearing	Replace	—
	Exhaust gas leakage	Repair	1A—48

* Tappet noise may occur if the engine is not operated for an extended period of time. The noise should stop after the engine has reached normal operating temperature.

76G01A-005



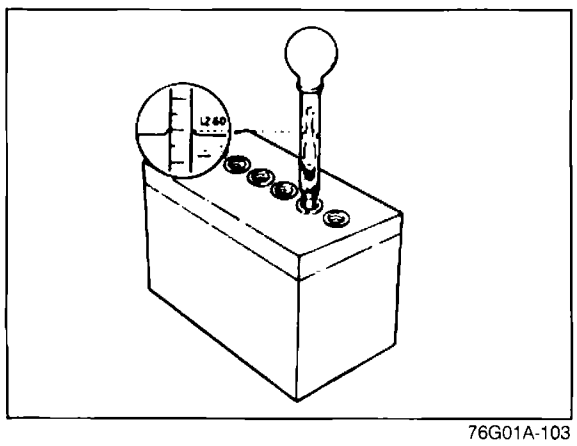
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TUNE-UP PROCEDURE

Tune the engine according to the procedures described below.

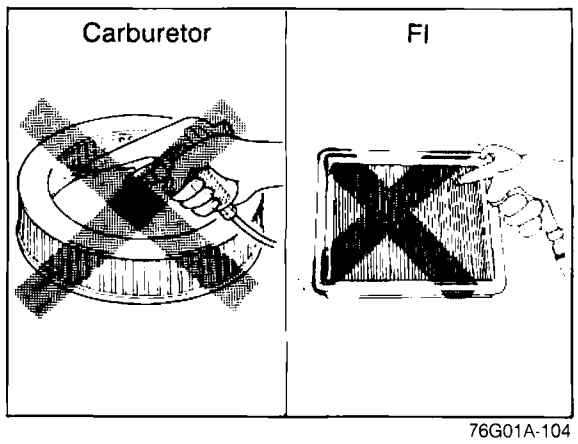
Battery

1. Check for corrosion on the terminals, or loose cable connections.
   If necessary, clean the clamps and tighten firmly.
2. Check that the electrolyte level is between the UPPER and LOWER marks.
   Add distilled water if necessary.



76G01A-103

3. Check the specific gravity by using a hydrometer.
   If the specific gravity reading is 1.200 or less, recharge the battery. (Refer to Section 5.)

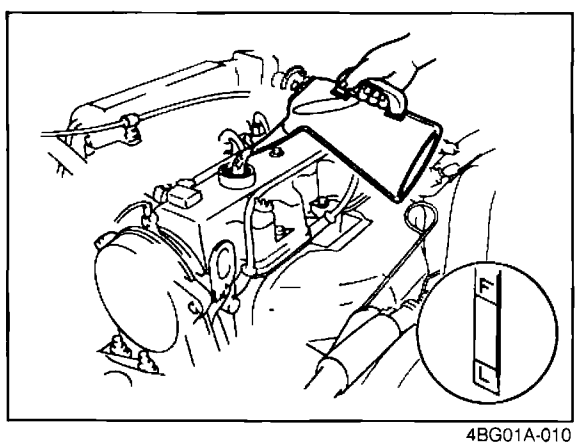


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Air Cleaner Element

Visually check the air cleaner element for excessive dirt, damage, or oil. Replace if necessary.

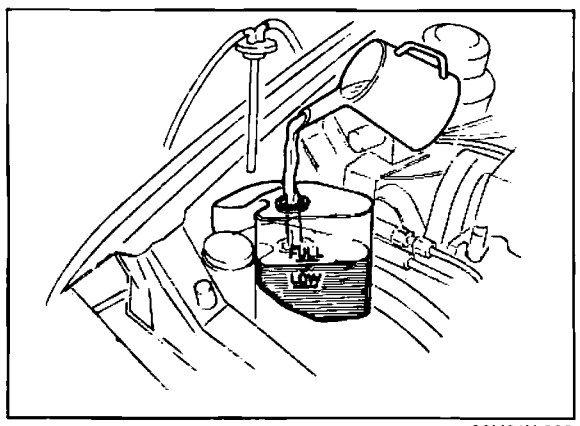
Caution
Do not clean the air cleaner element with compressed air, replace if necessary.



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Engine Oil

Check the engine oil level and condition with the oil level gauge.
Add oil, or change it, if necessary.



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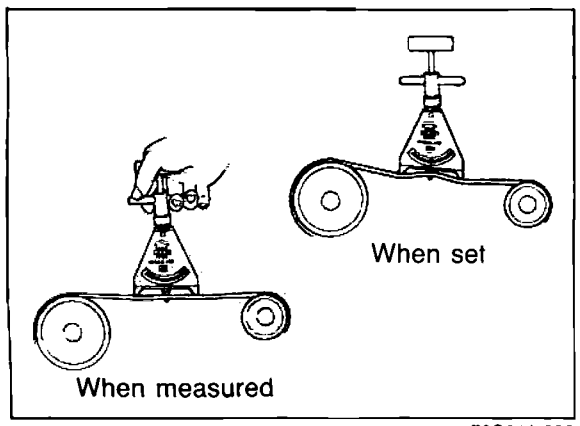
Coolant Level (Cold engine)

1. Check that the coolant level is near the radiator inlet port.
2. Check that the level in the coolant reservoir is between the FULL and LOW marks.
   Add coolant if necessary.

Warning

a) Never remove the radiator cap while the engine is hot.

b) Wrap a thick cloth around the cap and carefully remove it.



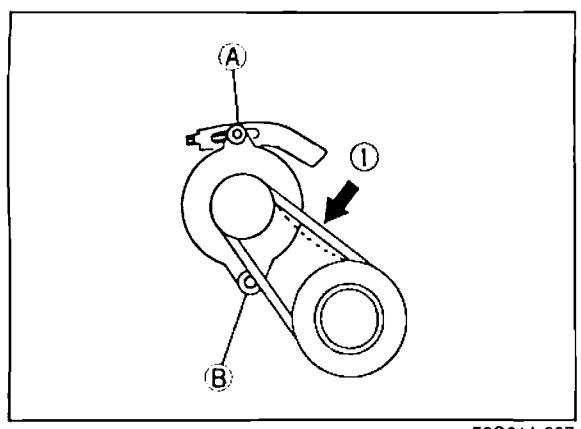
76G01A-006

Drive Belt

1. Check the drive belt for wear, cracks, or fraying. Replace if necessary.
2. Check the drive belt tension by using the tension gauge.

Standard belt tension **N (kg, lb)**

Belt	New	Used
Alternator	589—785 (60—80, 132—176)	491—687 (50—70, 110—154)
P/S	687—883 (70—90, 154—198)	589—785 (60—80, 132—176)
A/C	687—883 (70—90, 154—198)	589—785 (60—80, 132—176)



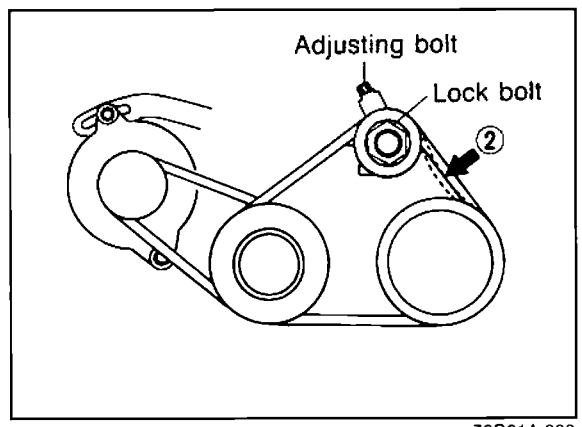
76G01A-007

3. Check the drive belt deflection by applying moderate pressure **(98 N, 10 kg, 22 lb)** midway between the pulleys.

   (1) Alternator belt deflection
   New : 6—8 mm (0.24—0.31 in)
   Used: 7—9 mm (0.27—0.35 in)

   If necessary, loosen the alternator mounting bolts and adjust the belt deflection by turning the adjusting bolt.

Tightening torque
Ⓐ: 31—46 N·m (3.2—4.7 m-kg, 23—34 ft-lb)
Ⓑ: 37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

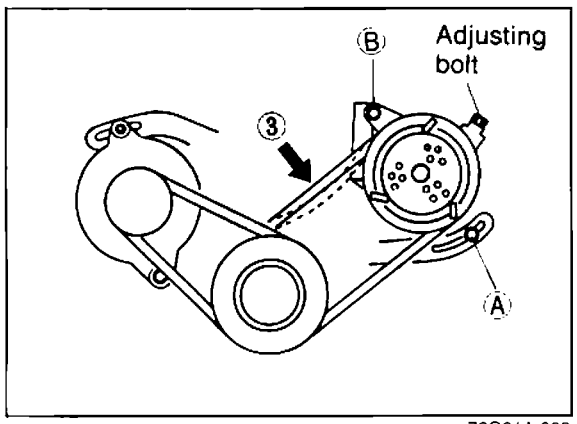


76G01A-008

(2) P/S belt deflection
New : 8—10 mm (0.31—0.39 in)
Used: 9—11 mm (0.35—0.43 in)

If necessary, loosen the idler pulley lock bolt and adjust the belt deflection by turning the adjusting bolt.

Tightening torque of lock bolt:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

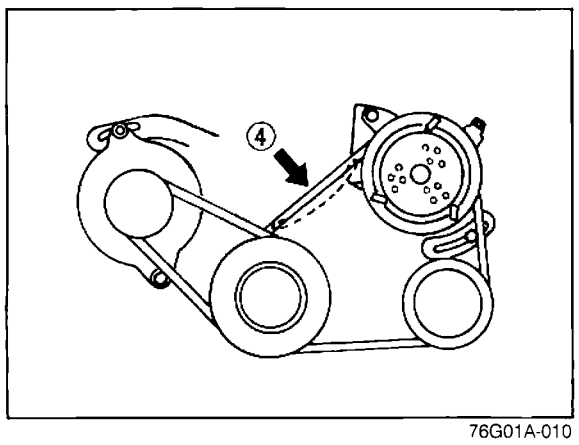


76G01A-009

(3) A/C belt deflection
New : 7—9 mm (0.27—0.35 in)
Used: 8—10 mm (0.31—0.39 in)

If necessary, loosen the A/C mounting bolts and adjust the belt deflection by turning the adjusting bolt.

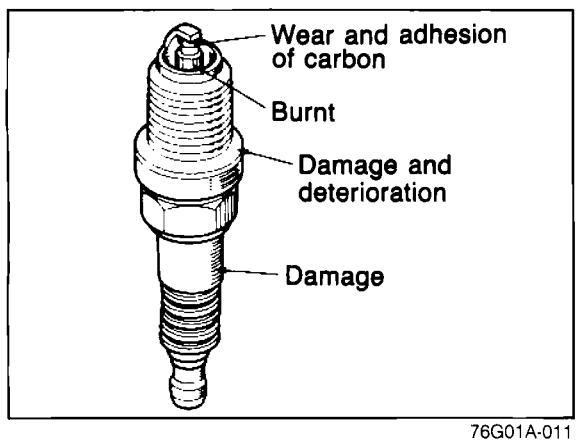
Tightening torque
Ⓐ: 37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)
Ⓑ: 37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)



76G01A-010

(4) P/S and A/C belt deflection
New : 7—9 mm (0.27—0.35 in)
Used: 8—10 mm (0.31—0.39 in)

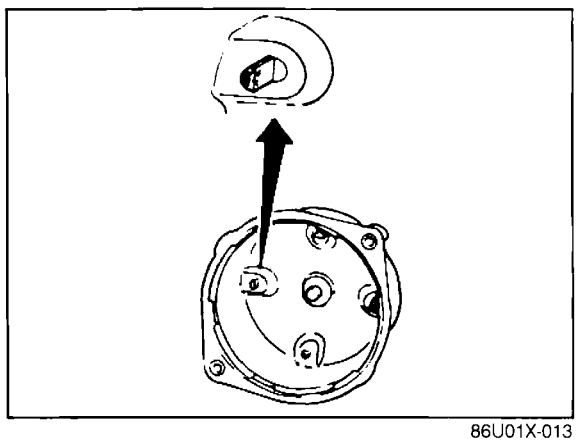
If necessary, adjust the belt deflection using the same procedure as used for the A/C belt deflection.



76G01A-011

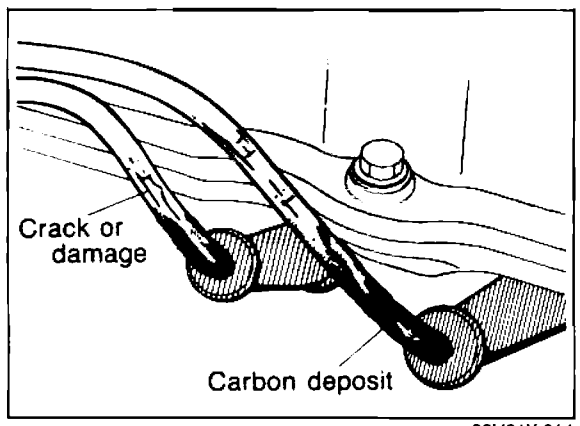
Spark Plug
Check the following points. Clean or replace if necessary.
1. Damaged insulation
2. Worn electrodes
3. Carbon deposits
4. Damaged gasket
5. Burnt spark insulator
6. Plug gap

Plug gap:
0.75—0.85 mm (0.030—0.033 in) ... 8-valve
0.70—0.80 mm (0.028—0.031 in) ... 12-valve



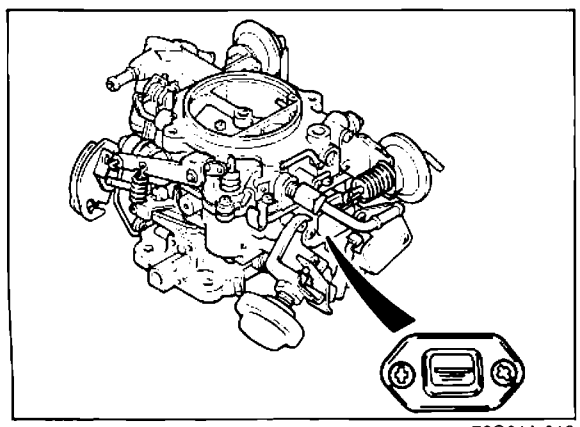
86U01X-013

Distributor Cap
Check the following points. Replace if necessary.
1. Cracks or carbon deposits
2. Burnt or corroded terminals
3. Worn distributor center contact



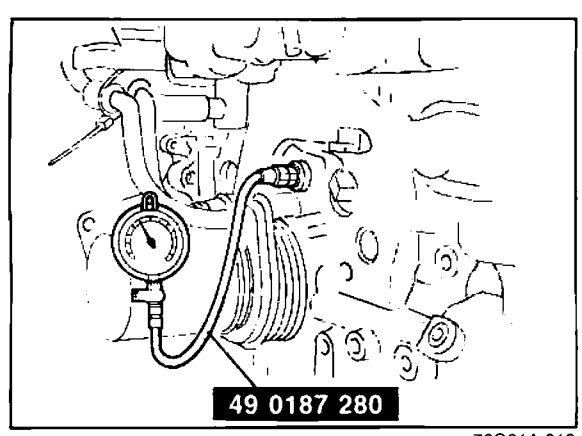
86U01X-014

High-Tension Lead
Check the following points. Clean or replace if necessary.
1. Damaged lead
2. Carbon deposits



76G01A-012

Carburetor Float Level (Carburetor)
1. Run the engine at idle.
2. Check that the fuel level is at the center of the float level indicator window.
   If necessary, adjust the fuel float level. (Refer to Section 4A.)

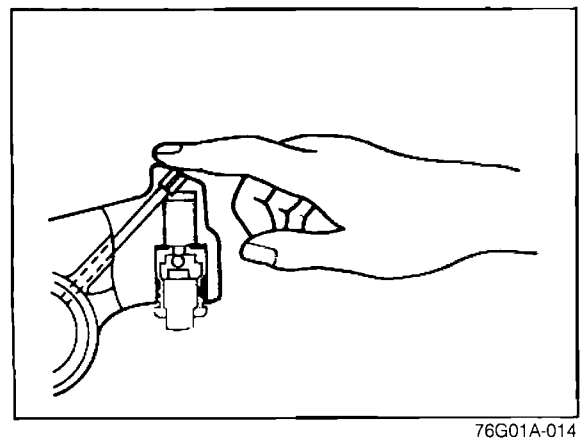


76G01A-013

Hydraulic Lash Adjuster (12 valve)

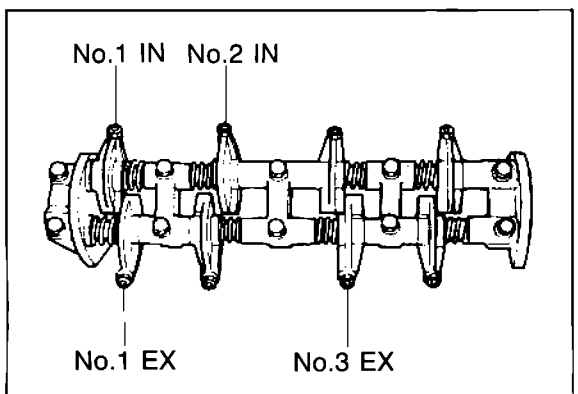
Note
Tappet noise may occur if the engine is not operated for an extended period of time. The noise should stop after the engine has reached normal operating temperature.

1. Check for tappet noise. If noise exsits, check the following points.
   (1) Engine oil condition and level
   (2) Engine oil pressure (Refer to Section 2A)



76G01A-014

2. If the noise does not stop, check for movement of each HLA by pushing down each rocker arm by hand while at TDC of compression stroke.
3. If the rocker arm moves down, replace the HLA. (Refer to page 1A—75.)

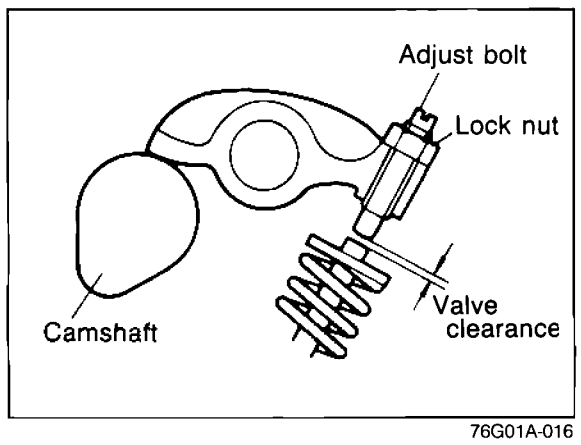


76G01A-015

Valve Clearance (8-valve)

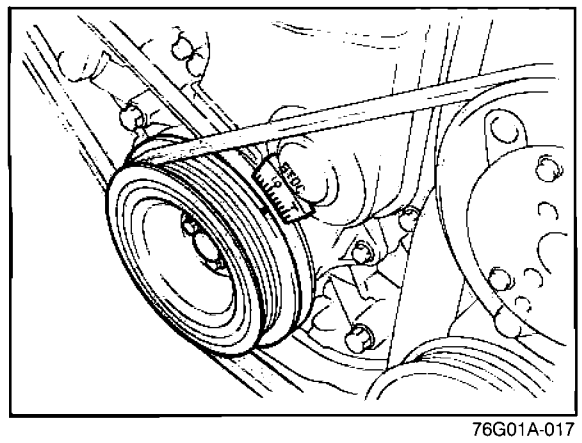
1. Warm up the engine to the normal operating temperature.
2. With the piston of the No.1 cylinder at TDC of compression stroke.
   Adjust the valve clearance as shown in the figure.

Valve clearance (valve side)
IN : 0.30 mm (0.012 in)
EX: 0.30 mm (0.012 in)



76G01A-016

3. Turn the crankshaft one full turn so that the piston of the No.4 cylinder is at TDC of compression stroke.
   Adjust the clearances of the remaining valves.

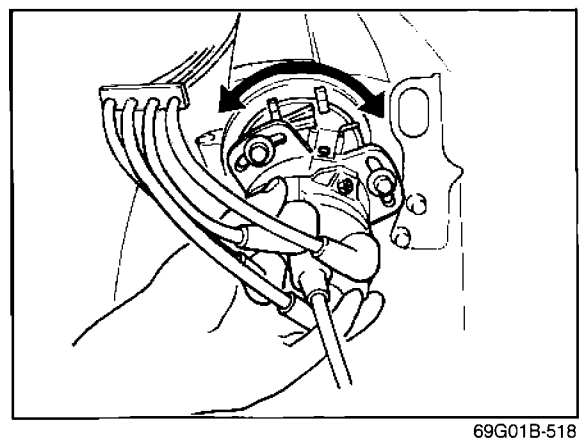


76G01A-017

Ignition Timing

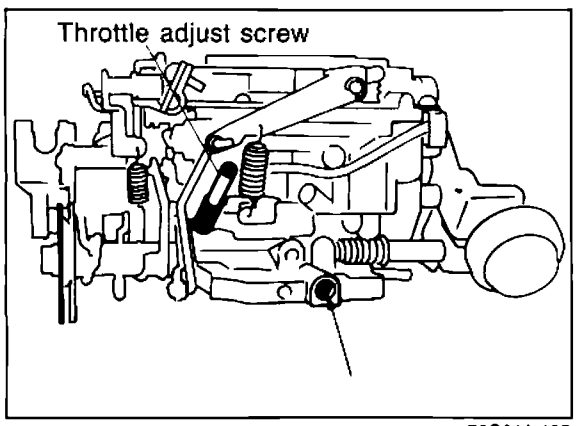
1. Warm up the engine and run it at idle.
2. Turn all electric loads OFF.
3. Connect a timing light tester.
4. Disconnect the vacuum hose from the vacuum control, and plug the hose.
5. Check that the ignition timing mark (yellow) on the crankshaft pulley and the timing mark on the timing belt cover are aligned.

Ignition timing: 6° ± 1° BTDC (at idle speed)



69G01B-518

6. If necessary adjust the ignition timing by turning the distributor.

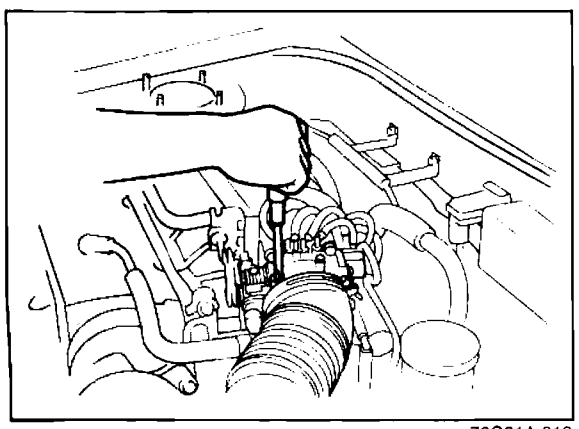


76G01A-105

Idle Speed (Carburetor)

1. Connect a tachometer to the engine.
2. Turn all electric loads OFF.
3. Confirm that the choke valve has fully returned at idling speed.
4. Check the idle speed. If necessary, turn the throttle adjust screw and adjust the idle speed.

Idle speed
MTX: 800 $^{+50}_{-0}$ rpm (in neutral)
ATX: 950 $^{+50}_{-0}$ rpm (in "N" range)..... F6
900 $^{+50}_{-0}$ rpm (in "N" range).. FE, F8



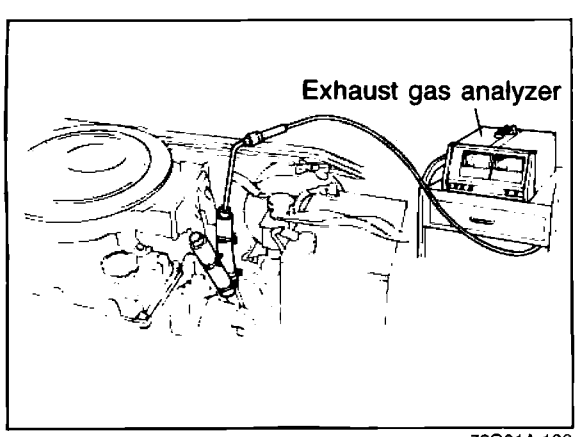
76G01A-018

Idle Speed (FI)

1. Connect the tachometer to the engine.
2. Check the idle speed.

Idle speed
MTX: 850 $^{+50}_{-50}$ rpm (in neutral)
ATX: 850 $^{+50}_{-50}$ rpm (in "N" range)

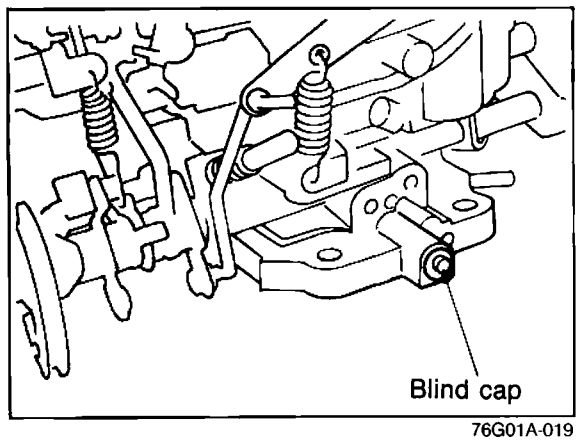
3. If necessary, remove the blind cap from the throttle body and adjust by turning the air adjust screw.
4. Install the blind cap.



76G01A-106

Idle Mixture (Carburetor)

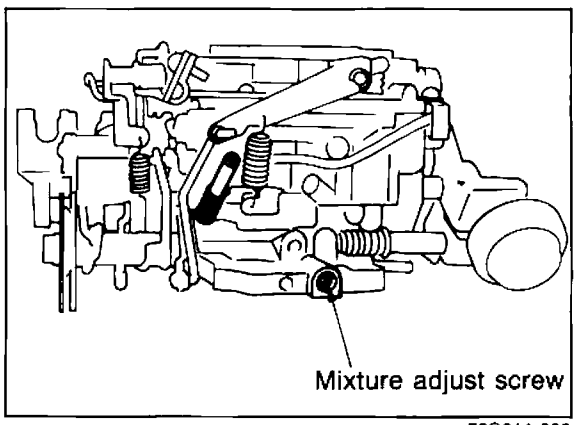
1. Disconnect the secondary air hoses from the reed valves and then plug the hoses (if equipped).
2. Connect an exhaust gas analyzer to the vehicle as shown in the figure and measure the CO concentration.



76G01A-019

3. Remove the blind cap from the mixture adjust screw.

Note
The blind cap will be broken when it is removed, do not attempt to reinstall it.

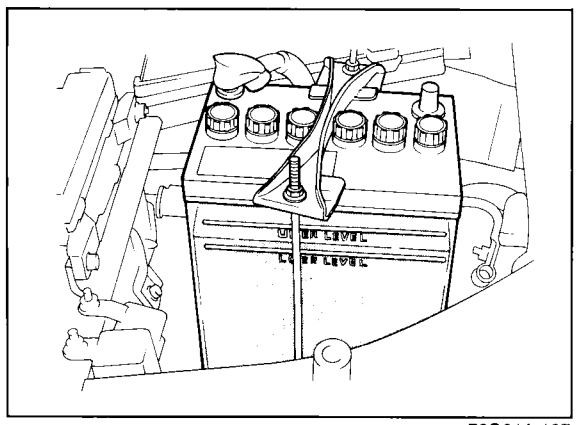


76G01A-020

4. Turn the mixture adjust screw and adjust the CO concentration to the specified level.

   CO concentration: 2.0 ± 0.5%

5. If the idle speed fails to meet the specification, adjust the idle speed again, then adjust the CO concentration.
6. Fit a new blind cap onto the mixture adjusting screw.
7. Connect the secondary air hoses (if equipped).



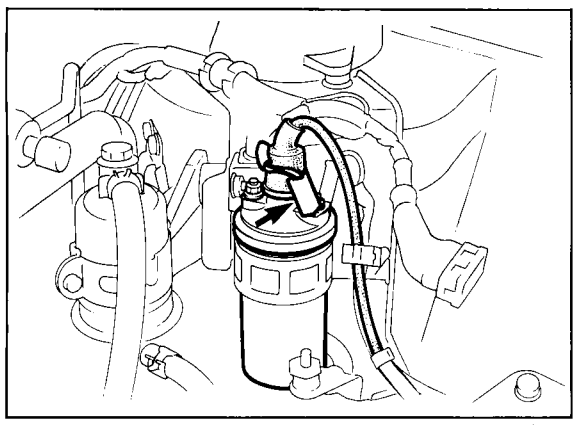
76G01A-107

ON-VEHICLE INSPECTION

If the engine exhibits low power, poor fuel economy, or poor idle, check the following points.
1. Ignition system (Refer to Section 5)
2. Compression
3. Fuel system (Refer to Section 4)

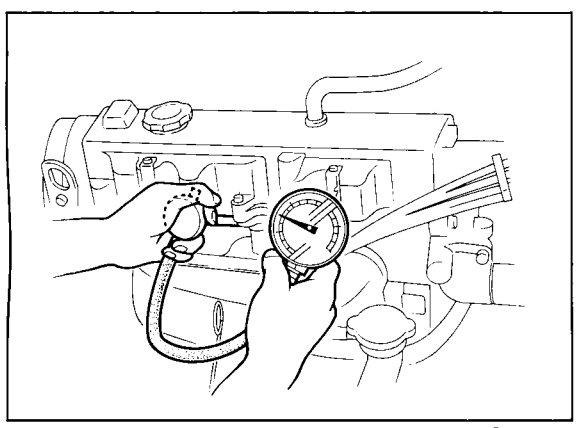
COMPRESSION

1. Check that the battery is fully charged. Recharge if necessary.



86U01X-020

2. Warm up the engine to the normal operating temperature.
3. Turn it off for about 10 minutes to allow the exhaust manifold to cool.
4. Remove all spark plugs.
5. Disconnect the primary wire connector from the ignition coil.



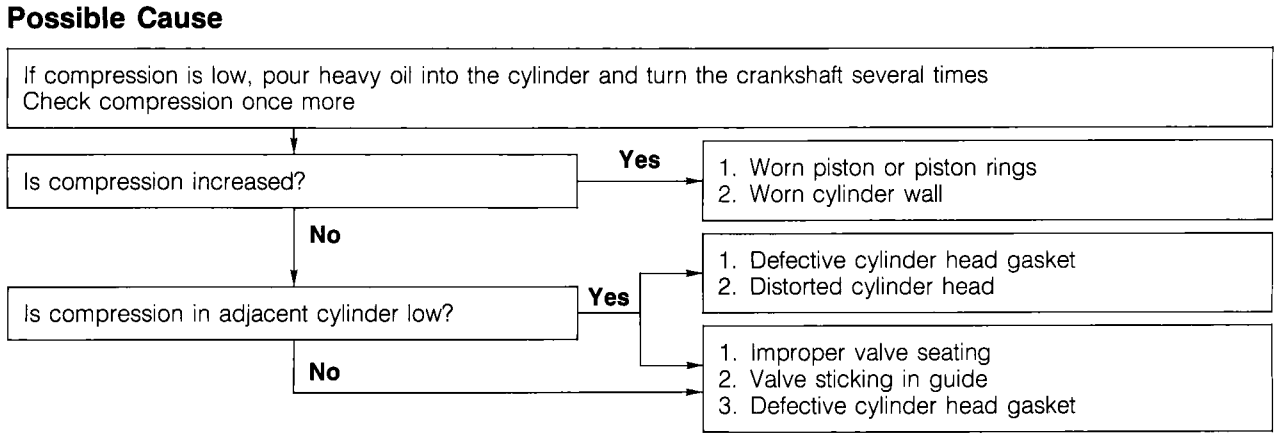
76G01A-023

6. Connect a compression gauge to No. 1 spark plug hole.
7. Fully depress the accelerator pedal and crank the engine.
8. Note the maximum gauge reading.
9. Check each cylinder.

Compression pressure kPa (kg/cm^2, psi)-rpm

	Standard	Minimum
F6	1,128 (11.5, 164)—270	790 (8.1, 114)—270
F8·FE	1,275 (13.0, 185)—270	893 (9.1, 129)—270
FE 12-valve	1,422 (14.5, 206)—280	996 (10.2, 144)—280

Possible Cause



86U01X-022

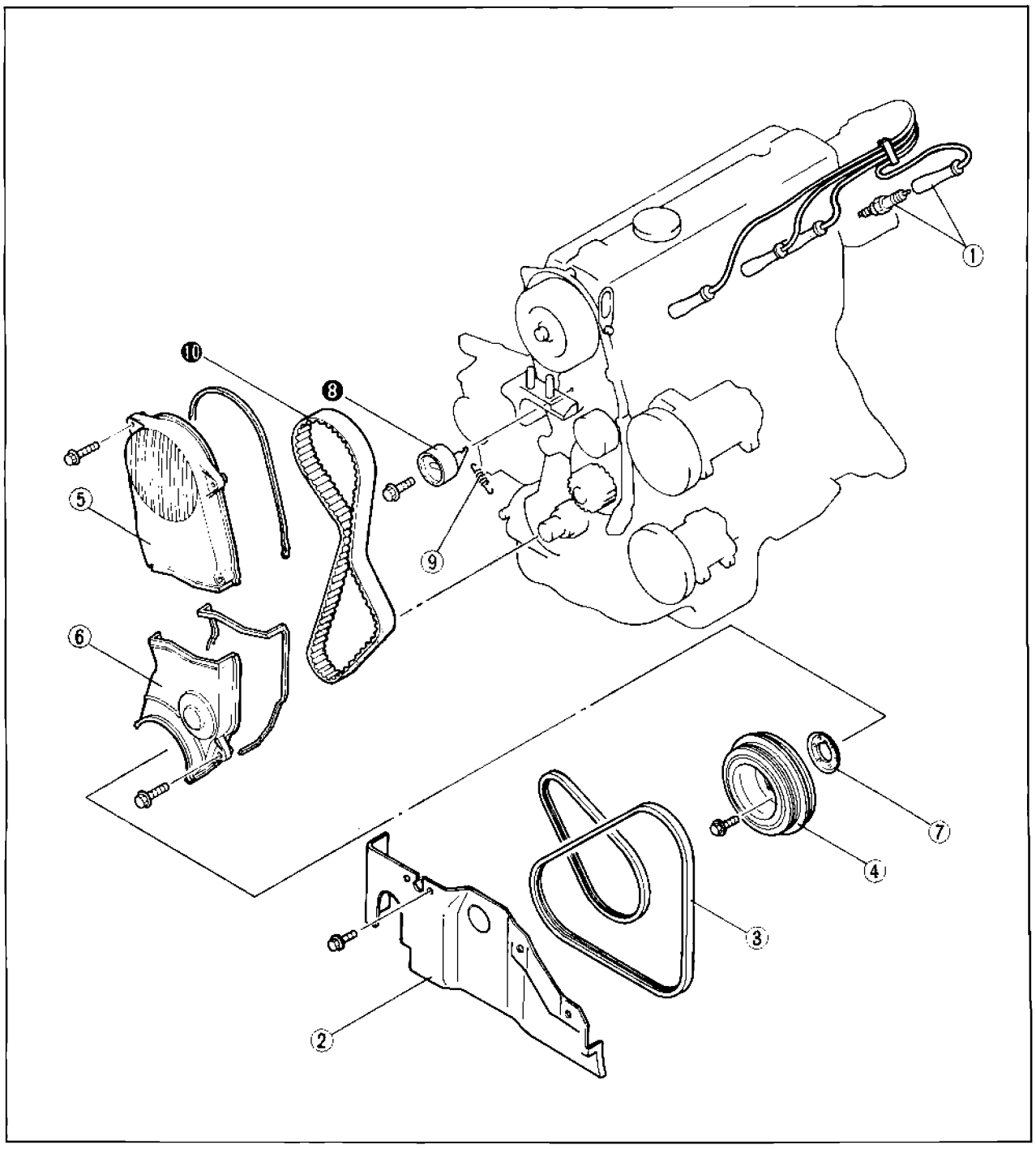
ON-VEHICLE MAINTENANCE

TIMING BELT

Removal

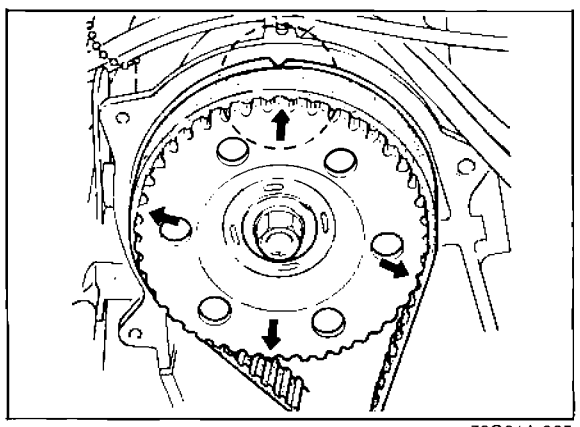
1. Disconnect the negative battery cable.
2. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.

76G01A-108



76G01A-024

1. High-tension lead and spark plug
2. Engine side cover
3. Drive belt
4. Crankshaft pulley
5. Upper timing belt cover
6. Lower timing belt cover
7. Baffle plate
8. Timing belt tensioner
9. Timing belt tensioner spring
10. Timing belt



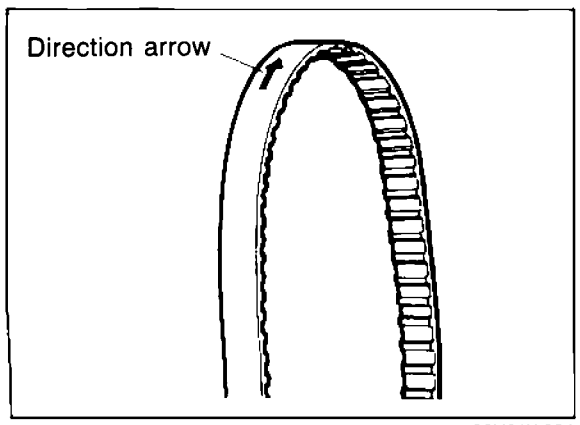
76G01A-025

Removal note
Timing belt tensioner

1. Turn the crankshaft to align the mating mark of the camshaft pulley with the front housing timing mark.

   Note
   For FE engine, align "2" mark.
   For F8, F6 engine, align "3" mark.

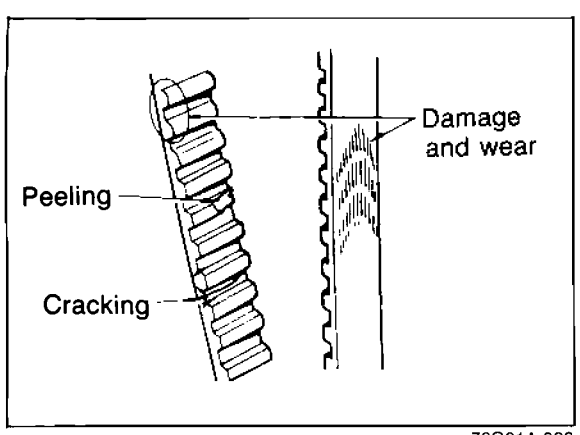
2. Remove the tensioner.



86U01X-024

Timing belt
Mark the timing belt rotation for proper reinstallation if it is reused.

Caution
Be careful not to allow oil, grease, or water on the belt.



76G01A-026

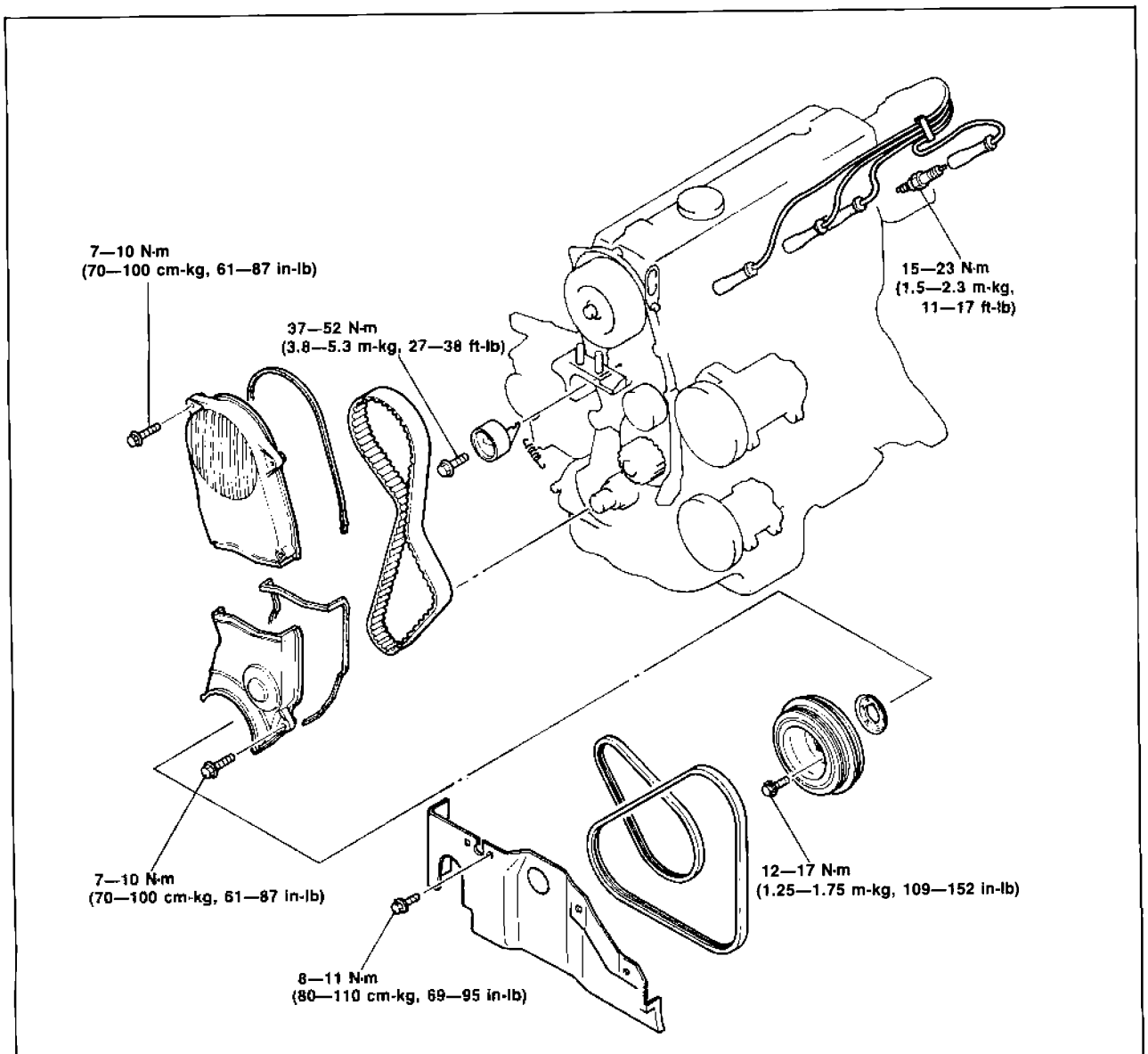
Inspection
Inspect the following parts.
(Refer to page 1A—60, 61.)
1. Timing belt
2. Timing belt tensioner and spring
3. Timing belt idler pulley
4. Timing belt pulley
5. Camshaft pulley

1A ON-VEHICLE MAINTENANCE (TIMING BELT)

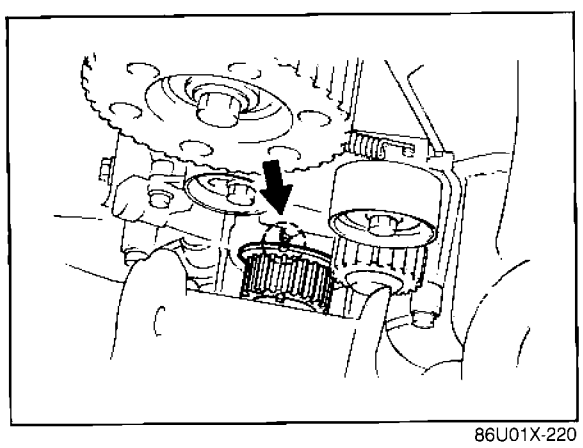
Installation
Install in the reverse order of removal referring to the installation note.

Torque Specifications

76G01A-109

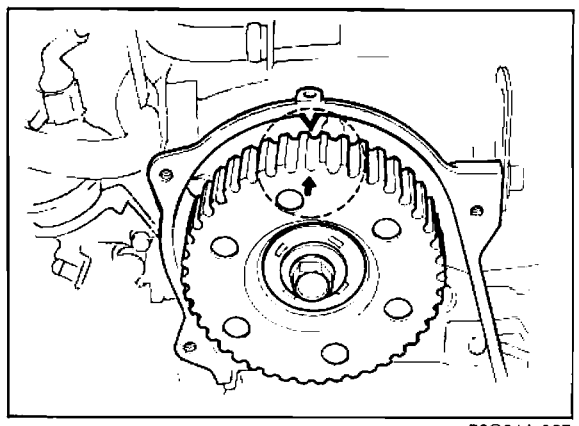


Installation note
Timing belt



86U01X-220

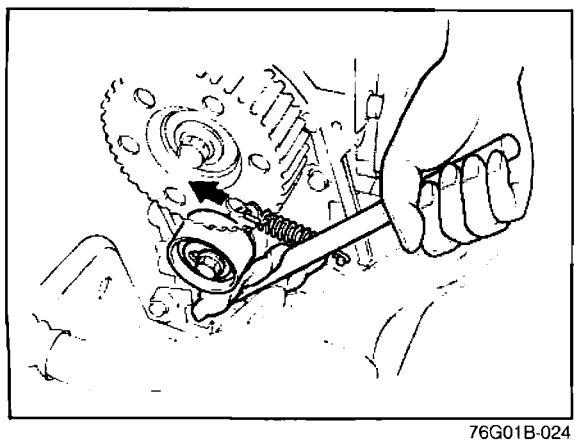
1. Check that the mark on the timing belt pulley is aligned with the mating mark.



76G01A-027

2. Check that the mating mark of the camshaft pulley is aligned with the timing mark. If it is not aligned, turn the camshaft to align.

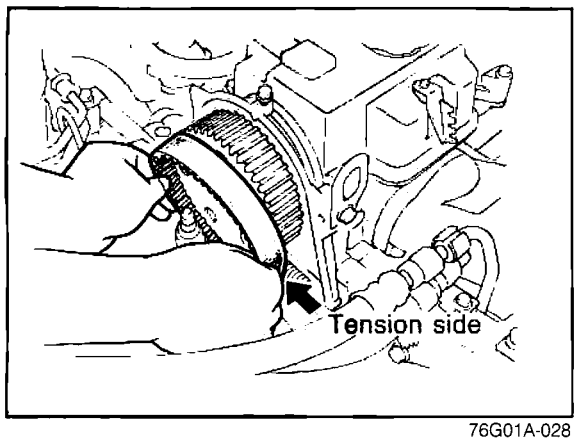
Note
For FE engine, align "2" mark.
For F8, F6 engine, align "3" mark.



76G01B-024

3. Install the timing belt tensioner and spring. Temporarily secure it with the spring fully extended.

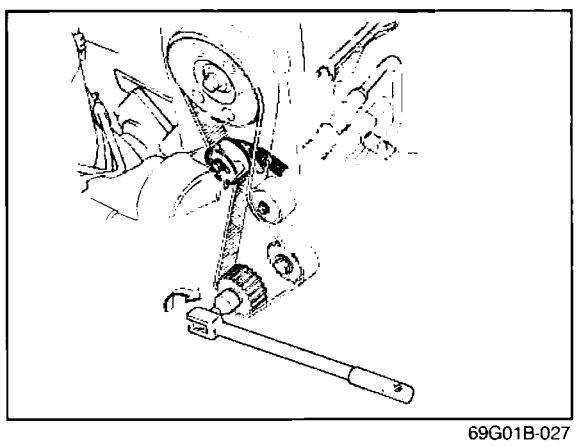
Caution
Do not damage the pulleys when securing the tensioner pulley.



76G01A-028

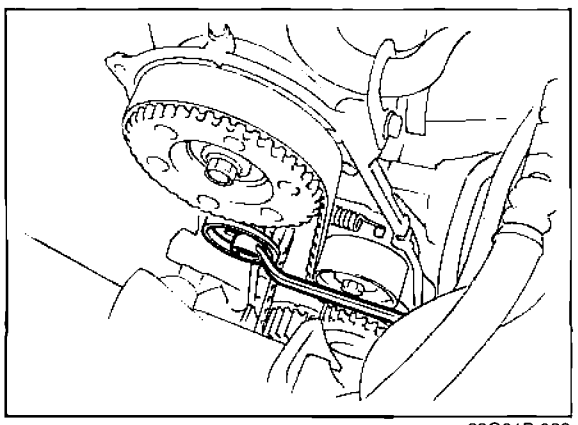
4. Install the timing belt. (Keep the tension side of belt as tight as possible).

Caution
a) If the timing belt is being reused, it must be reinstalled to rotate in the original direction.
b) Check that there is no oil, grease, or dirt on the timing belt.



69G01B-027

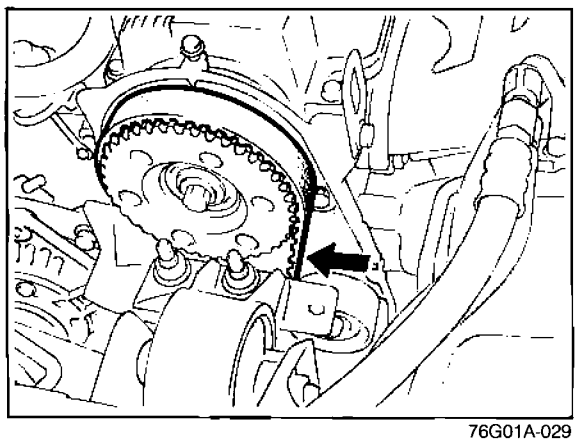
5. Loosen the tensioner lock bolt.
6. Turn the crankshaft twice in the direction of rotation, and align the mating marks.
7. Check that the timing marks are correctly aligned. If not aligned, remove the timing belt tensioner and timing belt, and repeat steps 1—6.



69G01B-028

8. Tighten the timing belt tensioner lock bolt.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

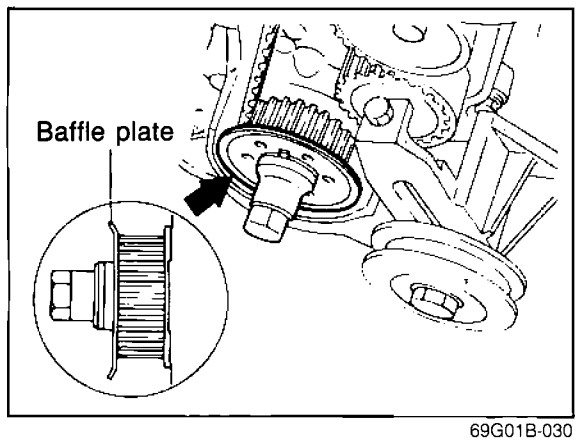


76G01A-029

9. Check the timing belt deflection. If the deflection is not correct, repeat the adjustment from step 5 above.

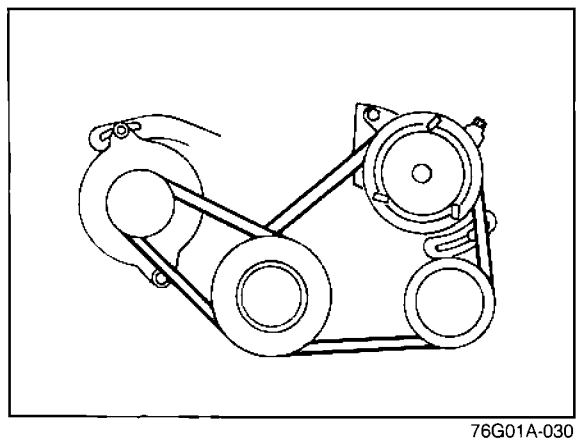
Timing belt deflection
FE: 5.5—6.5 mm (0.22—0.26 in)
F8, F6: 4.0—5.0 mm (0.16—0.20 in)
/98 N (10 kg, 22 lb)

Caution
Be sure not to apply tension other than that of the tensioner spring.



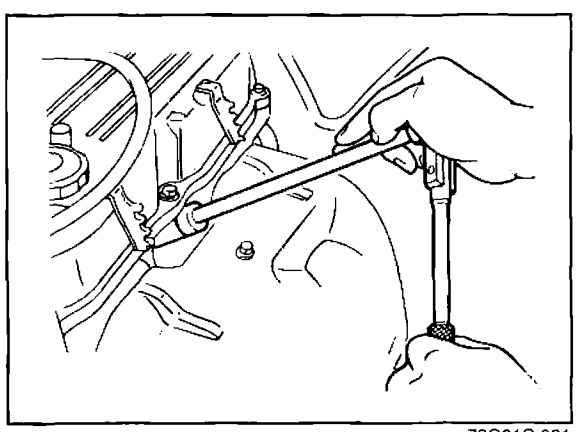
69G01B-030

Baffle plate
Install the baffle plate as shown in the figure.



76G01A-030

Drive belt
Install each drive belt, and check the belt deflection. (Refer to page 1A—7.)

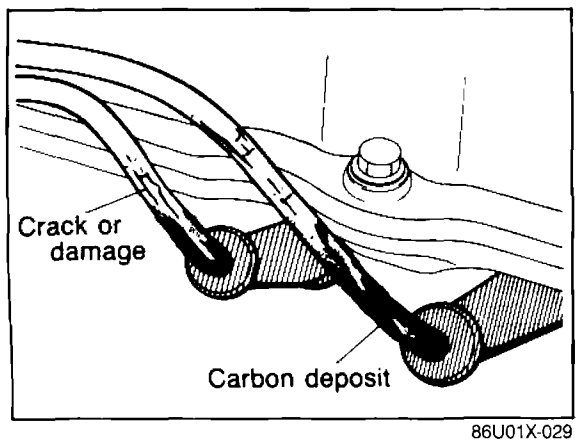


79G01C-021

Spark plug

1. Apply anti-seize compound or molybdenum-based lubricant to the spark plug threads.
2. Install the spark plugs.

Tightening torque:
15—23 N·m (1.5—2.3 m-kg, 11—17 ft-lb)



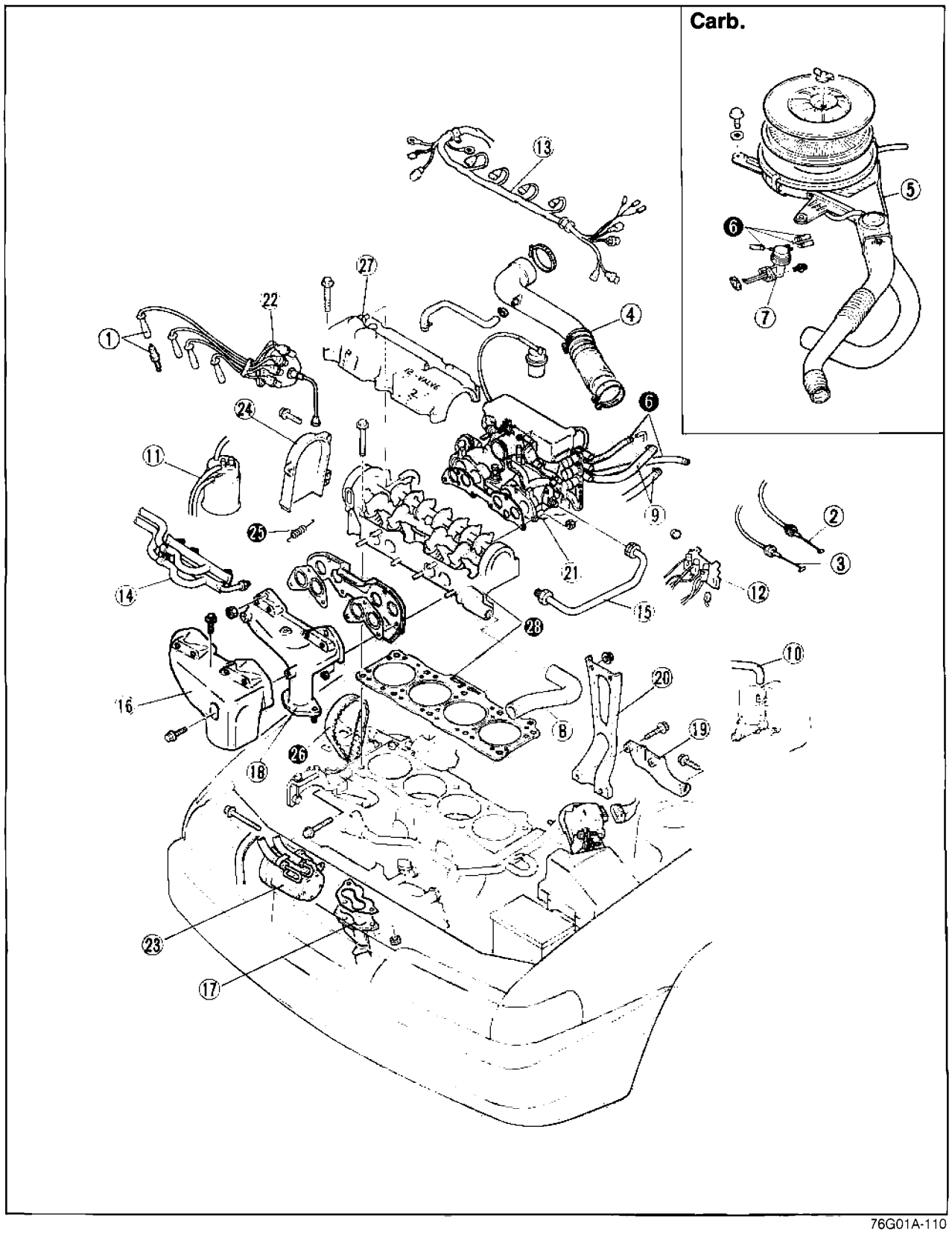
86U01X-029

Steps After Installation

Perform the necessary engine adjustment. (Refer to TUNE-UP PROCEDURE.)

1A ON-VEHICLE MAINTENANCE (CYLINDER HEAD)

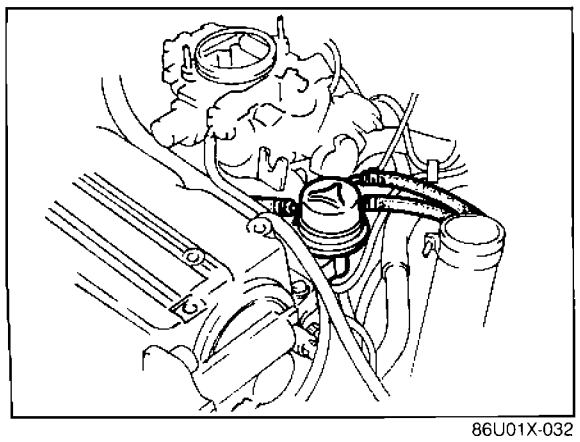
CYLINDER HEAD
Removal
Warning: Release the fuel pressure. (Refer to Section 4.)
1. Disconnect the negative battery cable.
2. Drain the engine coolant.
3. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.



76G01A-110

1. High-tension lead and spark plug
2. Accelerator cable
3. Throttle cable (ATX)
4. Air intake pipe (FI)
5. Air cleaner assembly (carb.)
6. Fuel hose
7. Fuel pump (carb.)
8. Upper radiator hose
9. Heater hose
10. Brake vacuum hose
11. Canister hose (FI, Middle East)
12. Three-way solenoid assembly
13. Engine harness connector and ground
14. Secondary air pipe assembly (except General)
15. EGR pipe (FI, Unleaded carb.)
16. Exhaust manifold insulator
17. Exhaust pipe
18. Exhaust manifold
19. Gusset plate (FI)
20. Intake manifold bracket (FI)
21. Intake manifold assembly
22. Distributor
23. A/C compressor and bracket
24. Upper timing belt cover
25. Timing belt tensioner spring
26. Timing belt
27. Cylinder head cover
28. Cylinder head and gasket

76G01A-031

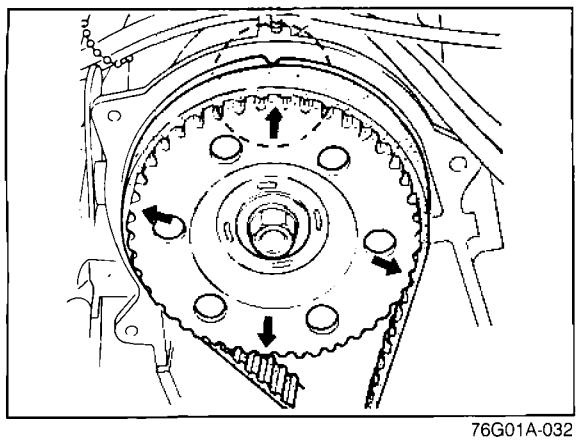


86U01X-032

Removal note
Fuel hose

Warning
a) Cover the hose with a rag because fuel will spray out when disconnecting.
b) Keep sparks and open flame away from the fuel area.

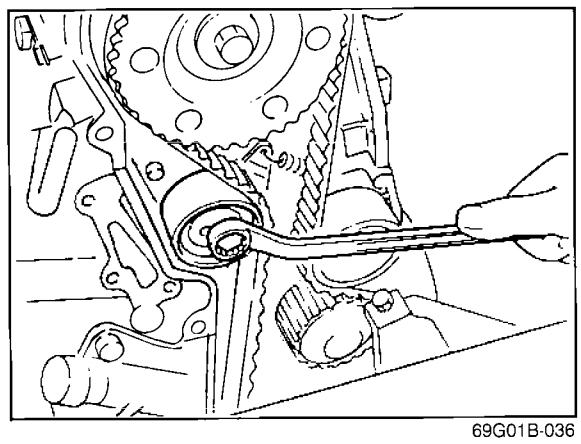
Plug the disconnected hoses to avoid fuel leakage.



76G01A-032

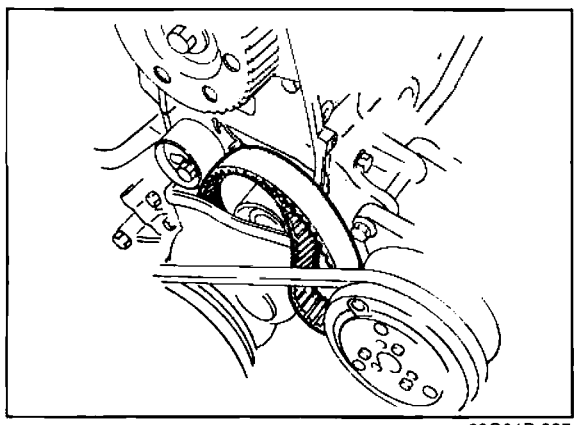
Timing belt
1. Before removing the timing belt, turn the crankshaft to align the mating mark of the camshaft pulley with the front housing timing mark.

Note
For FE engine, align "2" mark.
For F8, F6 engine, align "3" mark.



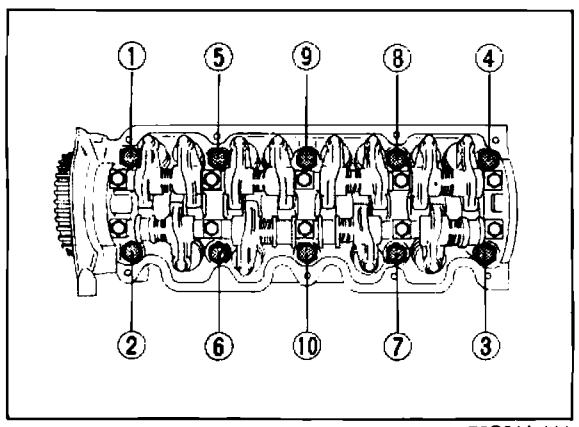
69G01B-036

2. Loosen the timing belt tensioner lock bolt.
3. Shift the tensioner outward as far as possible, then temporarily tighten it.



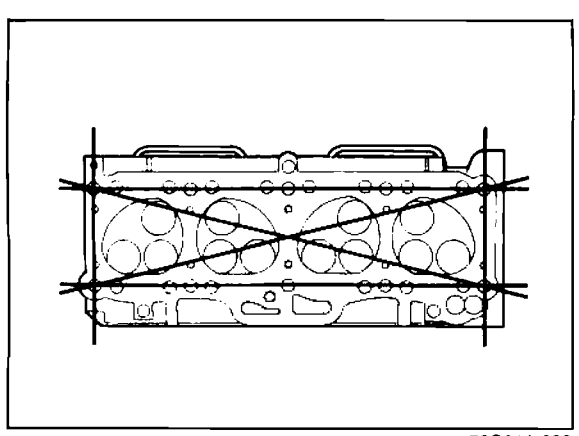
69G01B-037

4. Remove the timing belt and secure it out of the way to prevent damage during removal and installation of the cylinder head.



76G01A-111

Cylinder head bolt
Loosen the cylinder head bolts in two or three steps in the order shown in the figure.



76G01A-033

Disassembly of Cylinder Head
Refer to page 1A—40.

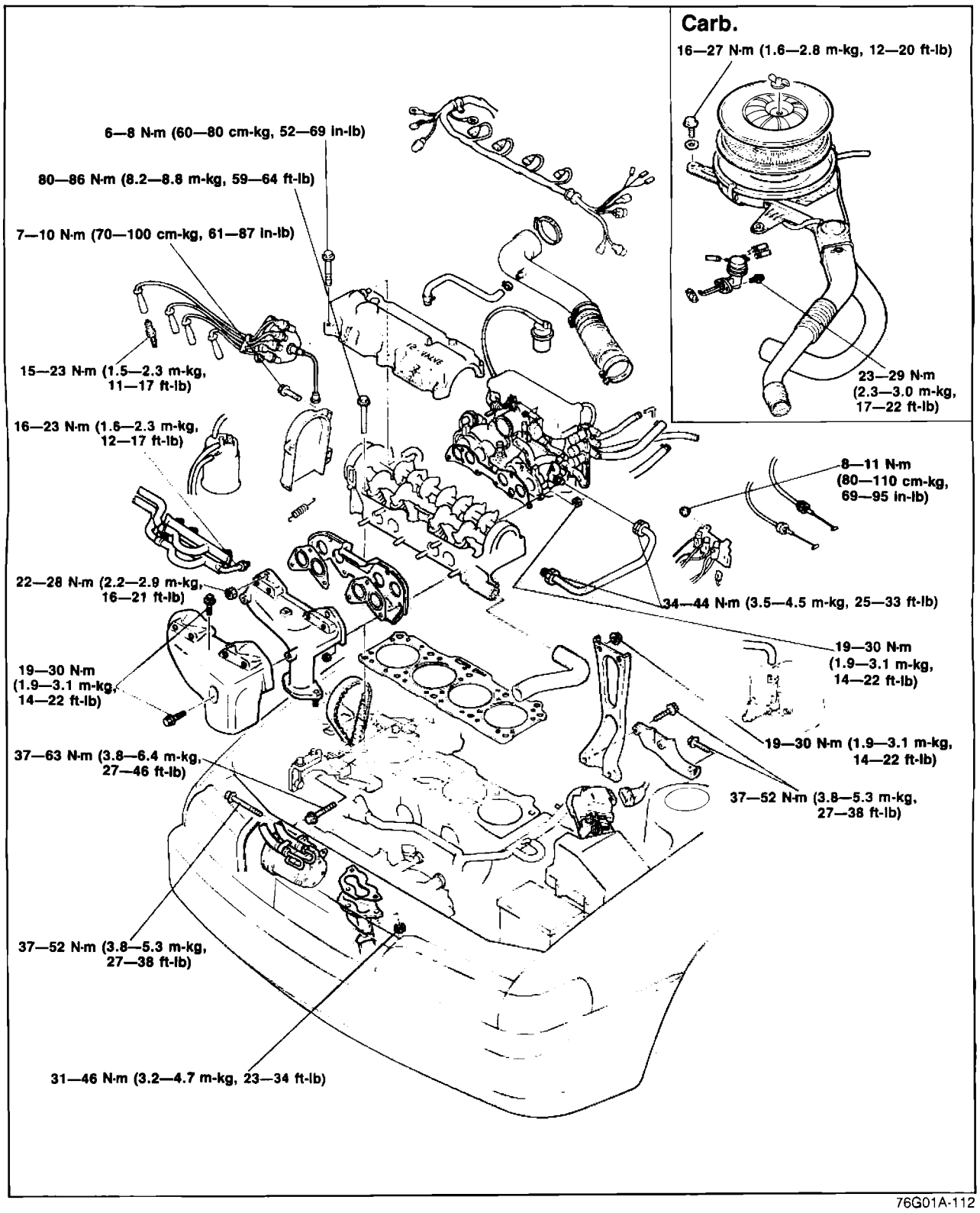
Inspection of Cylinder Head
Refer to page 1A—48.

Assembly of Cylinder Head
Refer to page 1A—73.

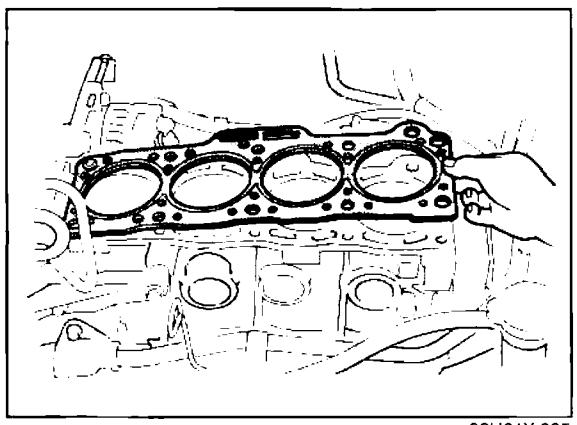
Installation
Install in the reverse order of removal referring to the installation note.

Note
a) Position the hose clamp in the original location on the hose.
b) Squeeze the clamp lightly with large pliers to ensure a good fit.

Torque Specifications

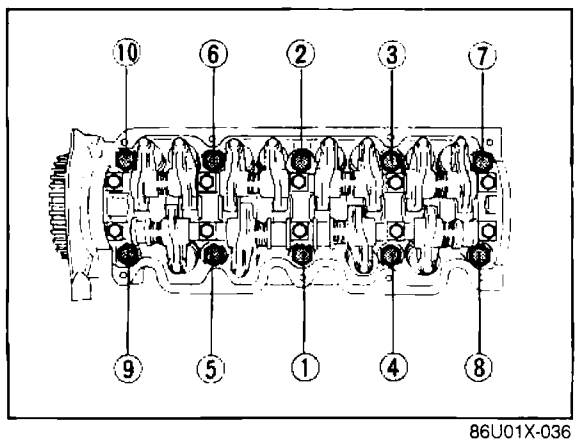


76G01A-112



86U01X-035

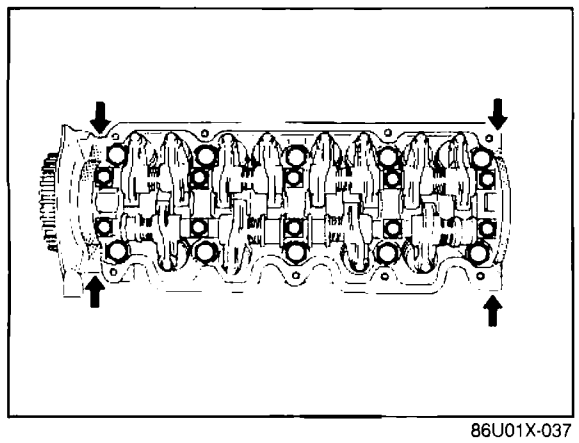
Installation note
Cylinder head
1. Thoroughly remove all dirt and oil from the top of the cylinder block with a rag.
2. Place a new cylinder head gasket in position.



86U01X-036

3. Set the cylinder head in place.
4. Apply engine oil to the bolt threads and seat faces.
5. Tighten the cylinder head bolts in two or three steps in the order shown in the figure.

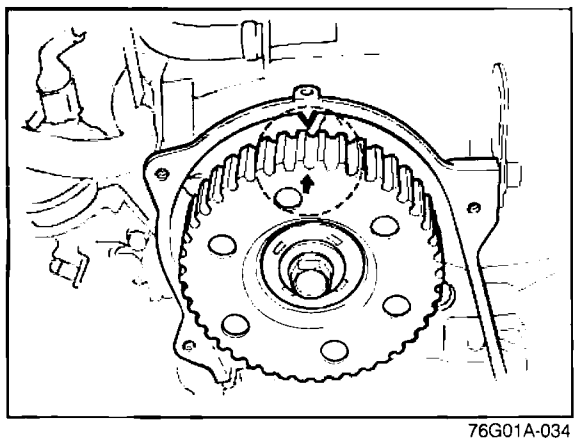
Tightening torque:
80—86 N·m (8.2—8.8 m-kg, 59—64 ft-lb)



86U01X-037

Cylinder head cover
1. Apply silicon sealant to the shaded area shown in the figure.
2. Install the cylinder head cover.

Tightening torque:
6—8 N·m (60—80 cm-kg, 52—69 in-lb)

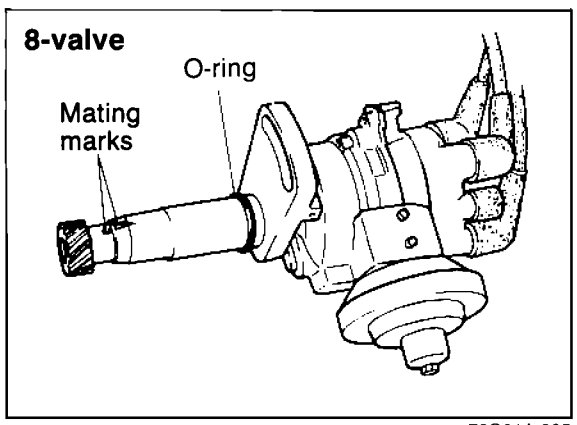


76G01A-034

Timing belt
1. Align the mating mark of the camshaft pulley with the front housing timing mark.

Note
For FE engine, align "2" mark.
For F8, F6 engine, align "3" mark.

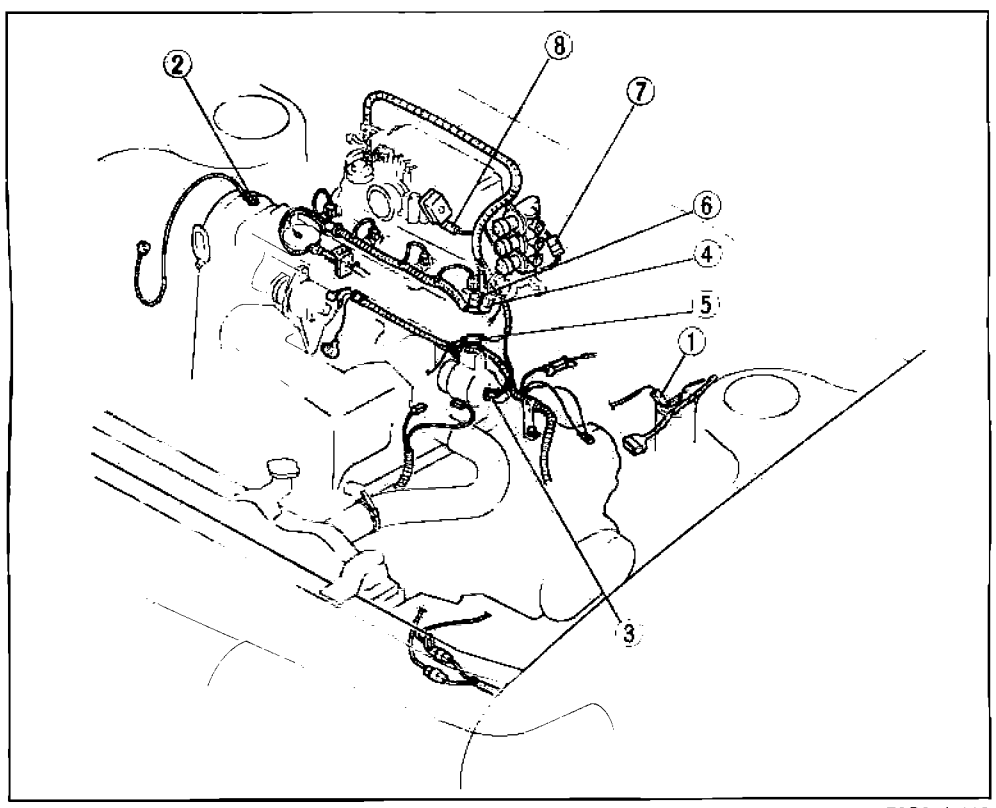
2. Install the timing belt. (Refer to TIMING BELT of ON-VEHICLE MAINTENANCE.)



76G01A-035

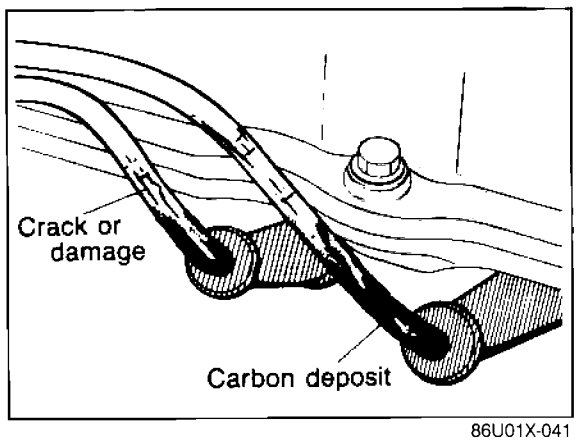
Distributor
1. Apply engine oil to the O-ring, and position it on the distributor.
2. Apply engine oil to the blade or gear.
3. Align the mating marks as shown in the figure ...8-valve.
4. Install the distributor with the marks facing straight up.
5. Loosely tighten the distributor mounting bolt.

Engine harness connector
Install the engine harness connectors.



76G01A-113

1. IG coil
2. Engine ground
3. Water temperature sensor
4. Water thermo switch
5. Oxygen sensor (FI)
6. Injection harness (FI)
7. F/I solenoid valve (FI)
8. Throttle sensor (FI)



86U01X-041

Steps After Installation
1. Fill the radiator with the specified amount and type of coolant.
2. Perform the necessary engine adjustments. (Refer to TUNE-UP PROCEDURE.)

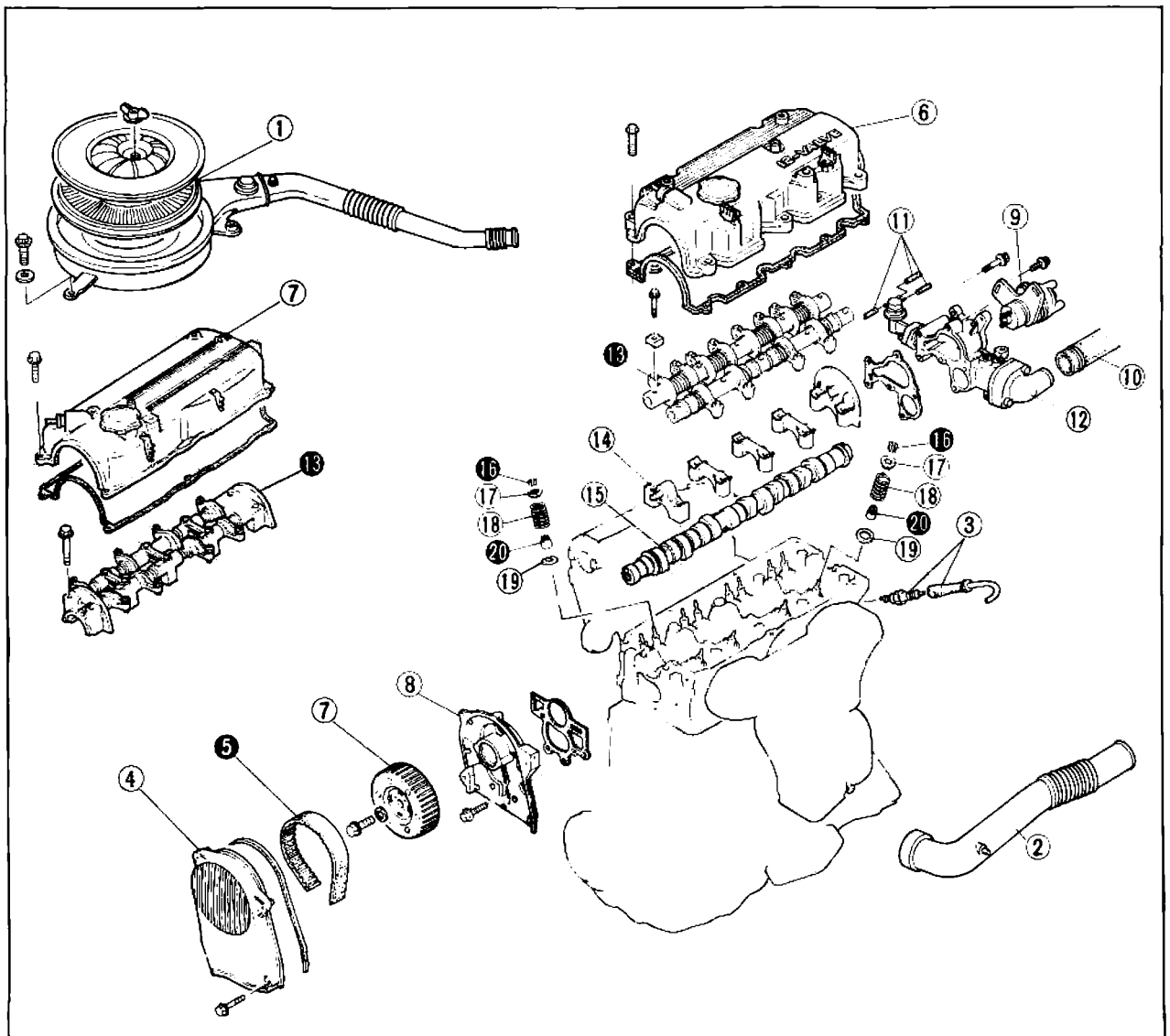
1A ON-VEHICLE MAINTENANCE (VALVE SEAL)

VALVE SEAL

Removal

1. Disconnect the negative battery cable.
2. Drain the engine coolant.
3. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.

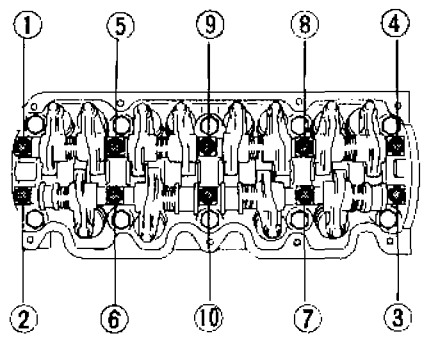
76G01A-114



76G01A-036

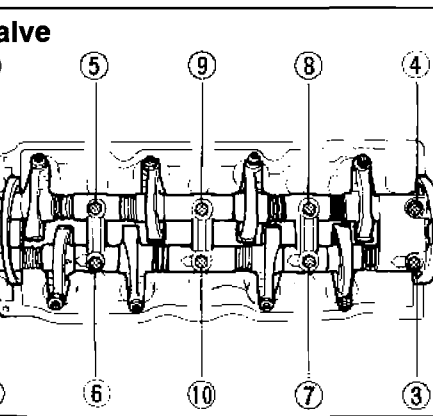
1. Air cleaner assembly (carb.)
2. Air intake pipe (FI)
3. High-tension lead and spark plug
4. Upper timing belt cover
5. Timing belt
6. Cylinder head cover
7. Camshaft pulley
8. Front housing
9. Distributor
10. Upper radiator hose
11. Fuel hose (carb.)
12. Rear housing
13. Rocker arm and shaft assembly
14. Camshaft cap (12-valve)
15. Camshaft
16. Valve keeper
17. Upper valve spring seat
18. Valve spring
19. Lower valve spring seat
20. Valve seal

12-valve

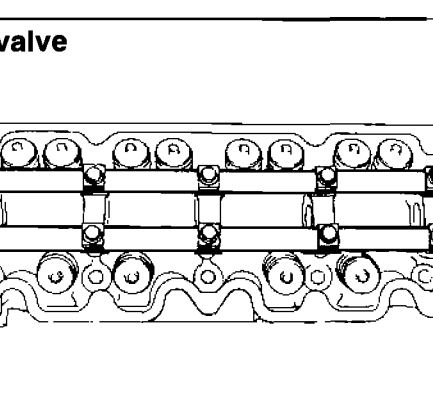


76G01A-037

8-valve

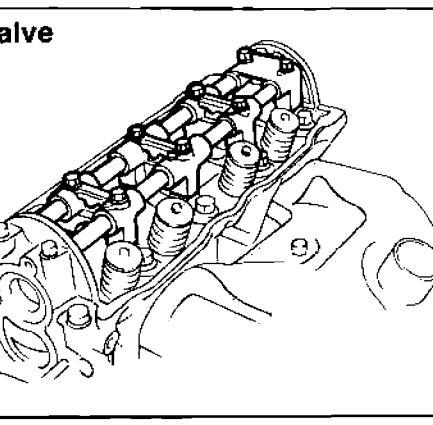


12-valve



86U01X-045

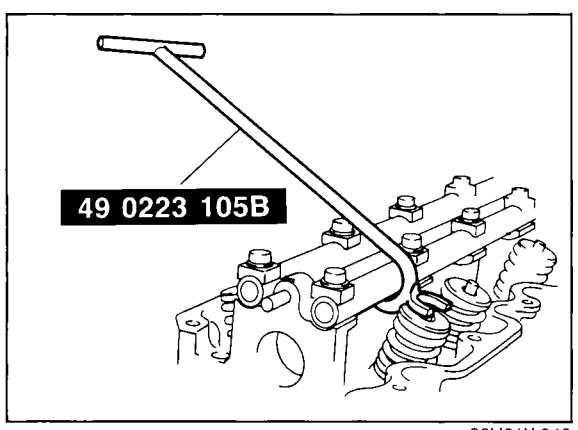
8-valve



Removal note
Timing belt
Remove the timing belt. (Refer to page 1A—14.)

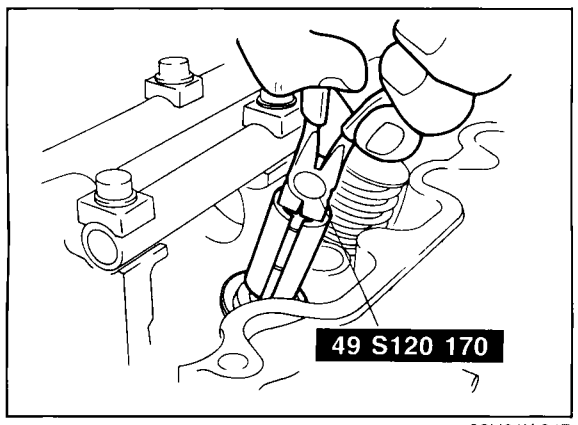
Rocker arm and shaft assembly
Loosen the rocker arm shaft bolts in two or three steps in the order shown in the figure.

Valve seal
1. Remove the rocker arms and springs from the rocker arm shaft.
2. Install the camshaft caps and rocker arm shafts onto the cylinder head.
3. Plug the oil drain hole with a rag to prevent the possibility of the valve keepers from falling into the oil pan.



86U01X-046

4. Turn the crankshaft to position the piston of the valve seal to be replaced at top dead center.
5. Remove the valve keepers with the **SST**.
6. Remove the valve spring and spring seats.



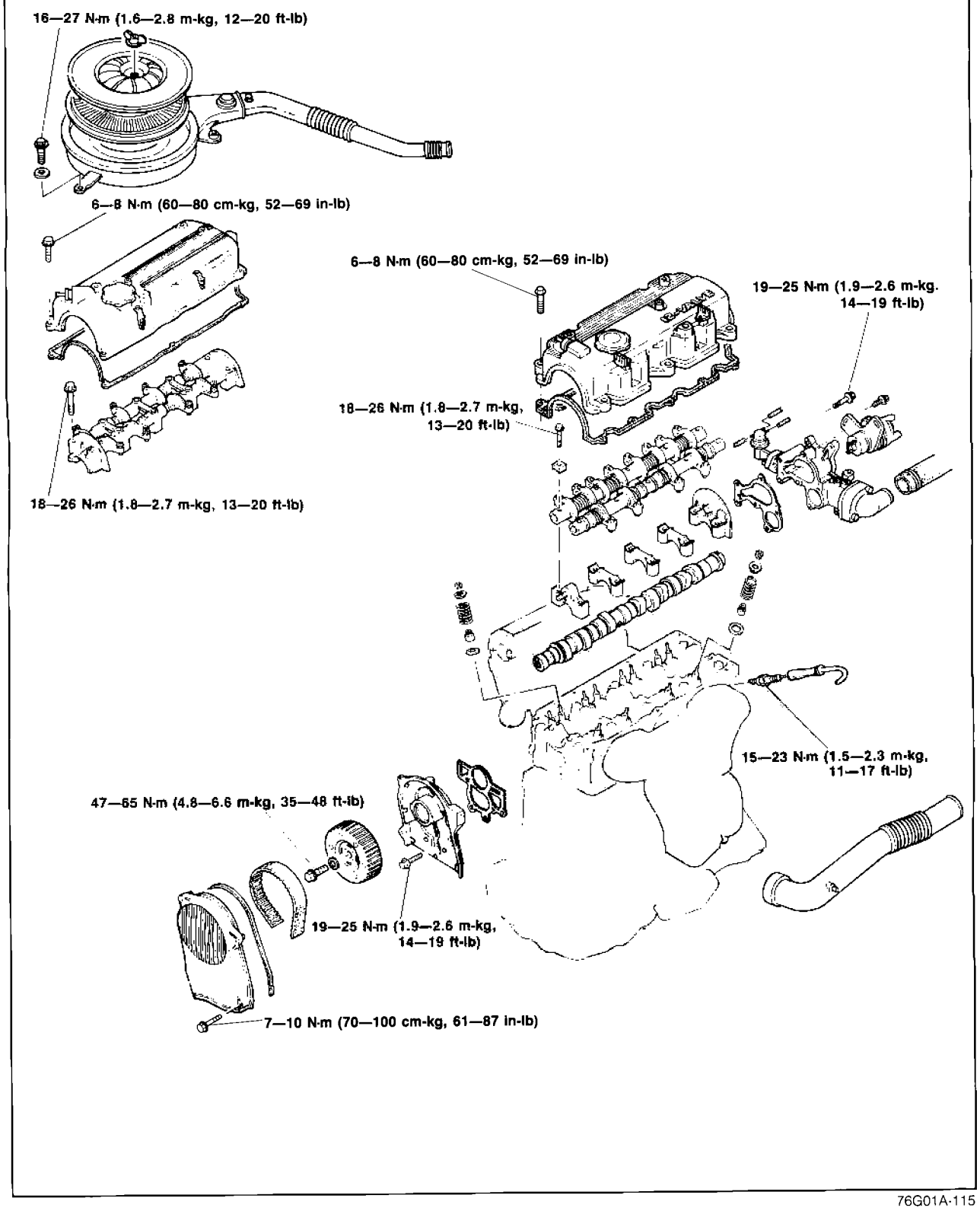
86U01X-047

7. Remove the valve seal from the valve guide with the **SST**.

Caution
Do not turn the crankshaft while the valve spring is removed.
Replace the valve seals at every cylinders.

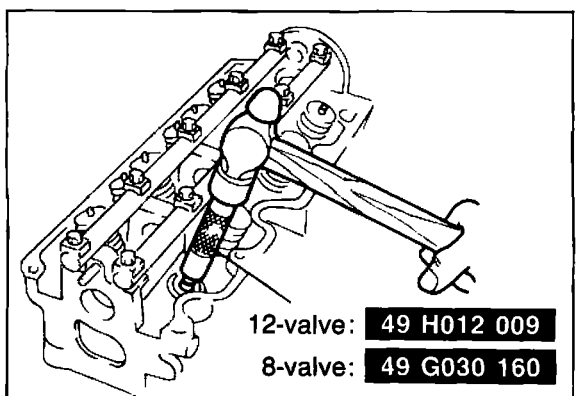
Installation
Install in the reverse order of removal referring to the installation note.

Torque Specifications



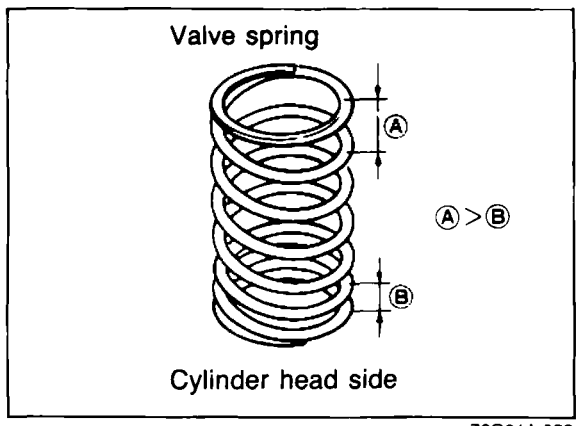
76G01A-115

1A ON-VEHICLE MAINTENANCE (VALVE SEAL)



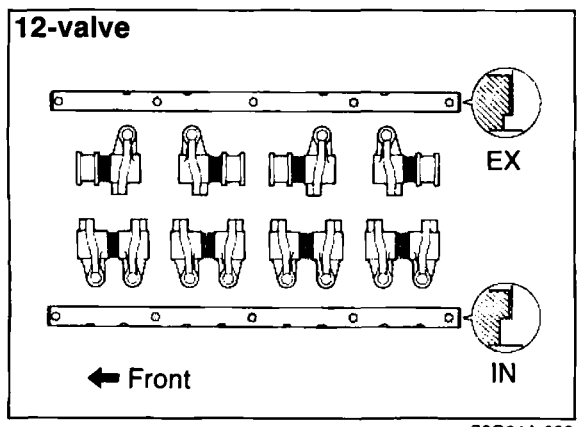
86U01X-049

Installation note
Valve seal
1. Apply engine oil to the inside of the new valve seal.
2. Push it on gently with the **SST**.



76G01A-038

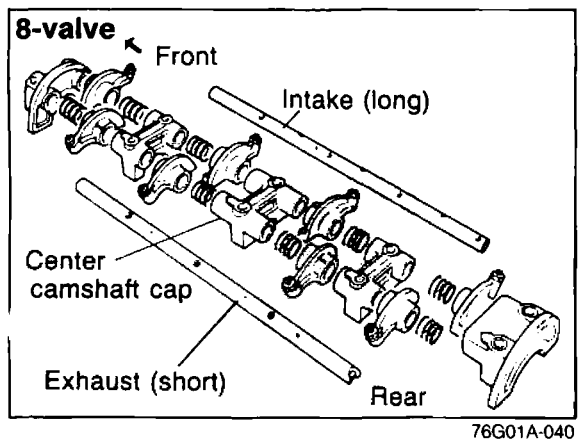
Valve spring
1. (12-valve)
   Install the valve spring with the narrower pitch toward the cylinder head side.
   (8-valve)
   Install the outer valve spring with the narrower pitch toward the cylinder head side.
2. Install the valve keepers, and tap the end of the valve stem lightly two or three times with a plastic hammer to confirm that the keepers are all fully seated.



76G01A-039

Rocker arm, rocker arm shaft
1. Remove the rocker arm shafts and camshaft caps.
2. (12-valve)
   Assemble the rocker arms and springs to the shaft.

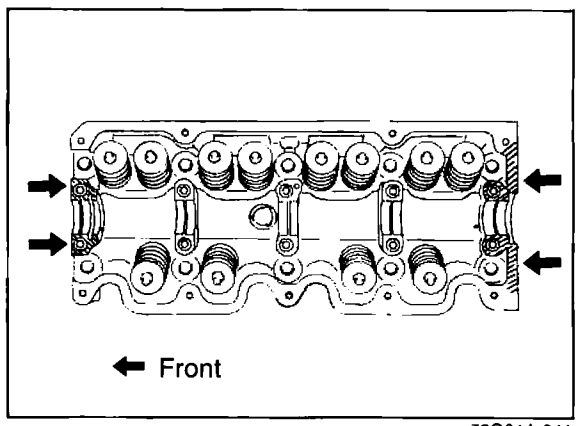
Note
a) The intake side shaft has twice as many oil holes as the exhaust side shaft.
b) The stepped ends are the rear sides of both intake and exhaust shafts.



76G01A-040

(8-valve)
Assemble the camshaft caps, rocker arms, and springs, to the shafts.

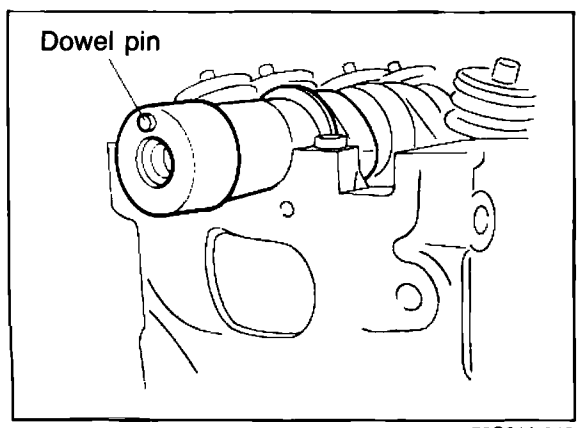
Caution
Be sure both rocker arm shaft oil holes (in the center camshaft cap) face each other.



76G01A-041

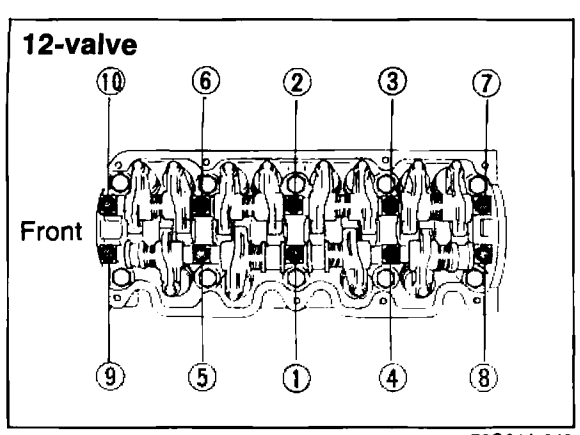
Camshaft

1. Apply sealant to the shaded areas as shown in the figure.



76G01A-042

2. Apply engine oil to the camshaft journals.
3. Install the camshaft with its dowel pin upward.



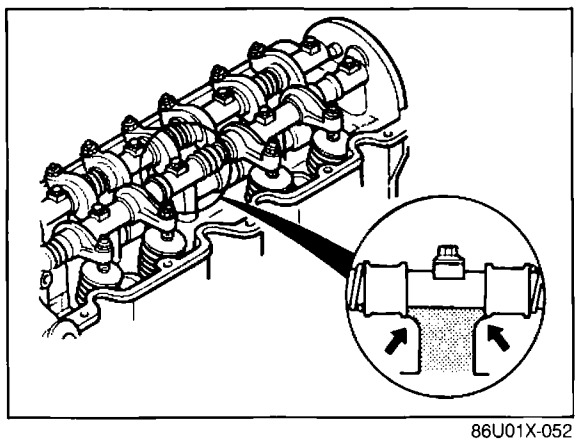
76G01A-043

Rocker arm and shaft assembly

(12-valve)

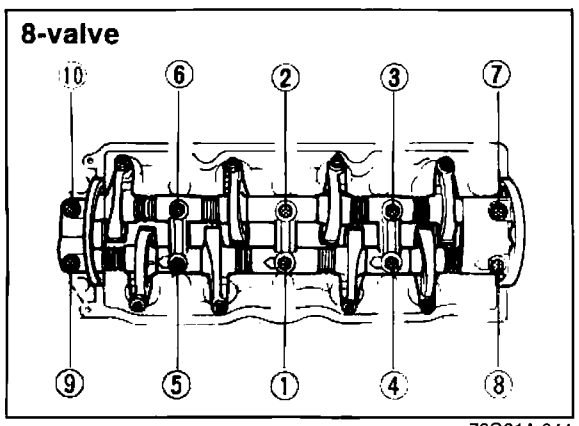
1. Install the camshaft caps.
2. Install the rocker arm and shaft assemblies on the cylinder head, and tighten them in three steps in the order shown in the figure.

Tightening torque:
18—26 N·m (1.8—2.7 m-kg, 13—20 ft-lb)



86U01X-052

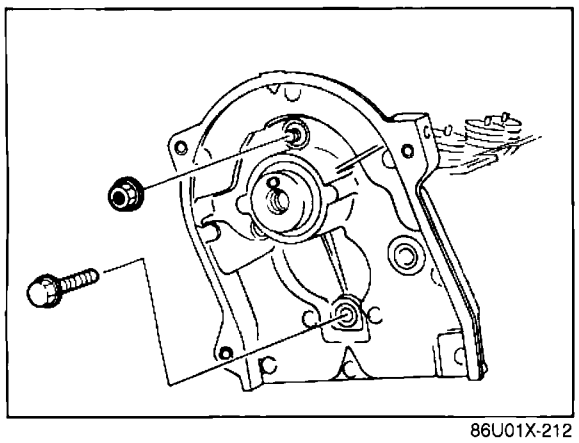
Caution
Be careful that the rocker arms or spacers do not get caught between the shaft and camshaft cap.



76G01A-044

(8-valve)
Install the rocker arm and shaft assemblies on the cylinder head and tighten them in three steps in the order shown in the figure.

Tightening torque:
18—26 N·m (1.8—2.7 m-kg, 13—20 ft-lb)



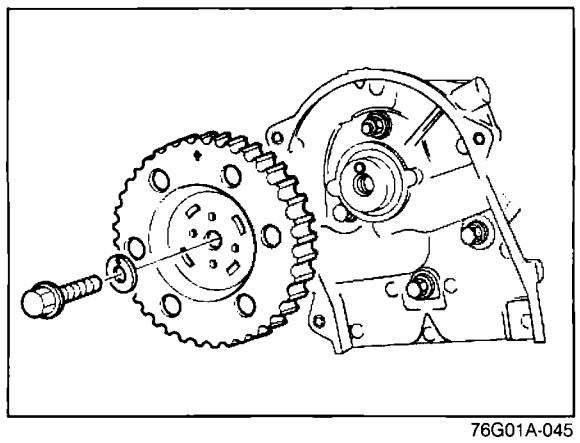
86U01X-212

Front housing
1. Replace the oil seal in the front housing.
2. Apply engine oil to the oil seal lip.
3. Install the front housing along with a new gasket.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

Rear housing
Install the rear housing along with a new gasket.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



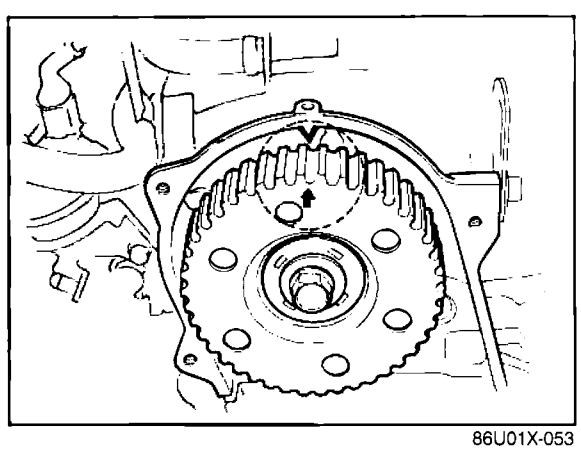
76G01A-045

Camshaft pulley
1. Install the camshaft pulley so that the mating mark is aligned with the camshaft dowel pin straight up.

Note
For FE engine, align "2" mark.
For F8, F6 engine, align "3" mark.

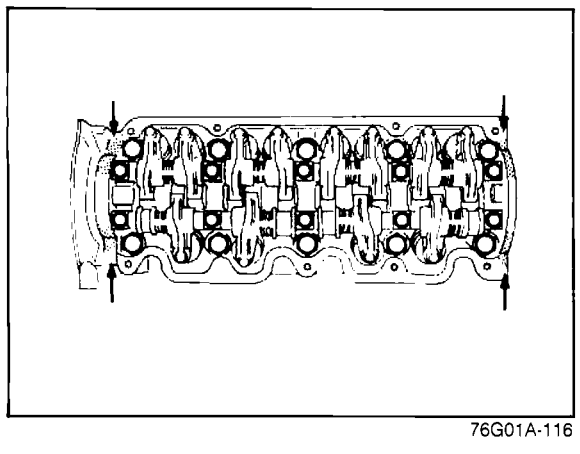
2. Tighten the lock bolt.

Tightening torque:
47—65 N·m (4.8—6.6 m-kg, 35—48 ft-lb)



86U01X-053

Timing belt
Install the timing belt. (Refer to TIMING BELT of ON-VEHICLE MAINTENANCE.)

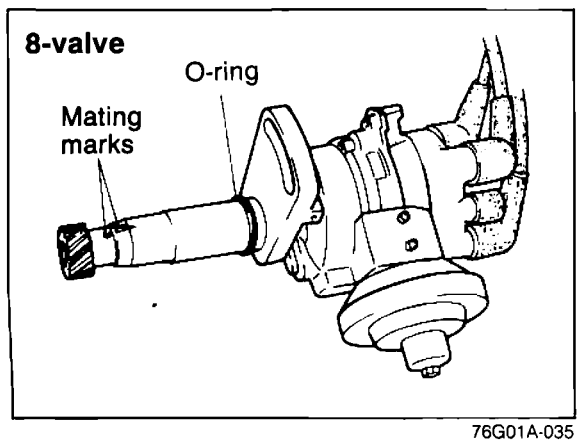


76G01A-116

Valve clearance (8-valve)
Adjust the valve clearance. (Refer to page 1A—10.)

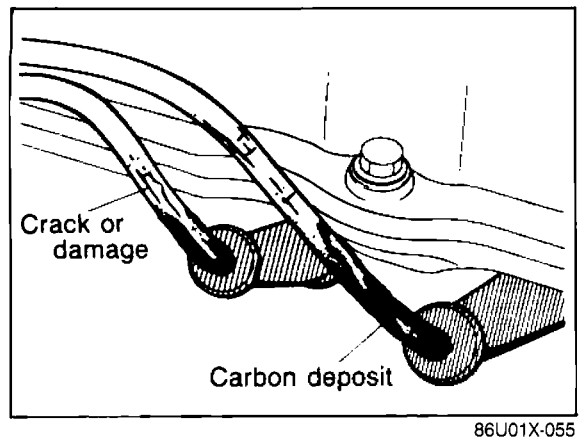
Cylinder head cover
1. Apply silicon sealant to the shaded areas shown in the figure.
2. Install the cylinder head cover.

Tightening torque:
6—8 N·m (60—80 cm-kg, 52—69 in-lb)



76G01A-035

Distributor
1. Apply engine oil to the O-ring, and position it on the distributor.
2. Apply engine oil to the blade or gear.
3. Align the mating marks as shown in the figure ...8-valve.
4. Install the distributor with the marks facing straight up.
5. Loosely tighten the distributor mounting bolt.

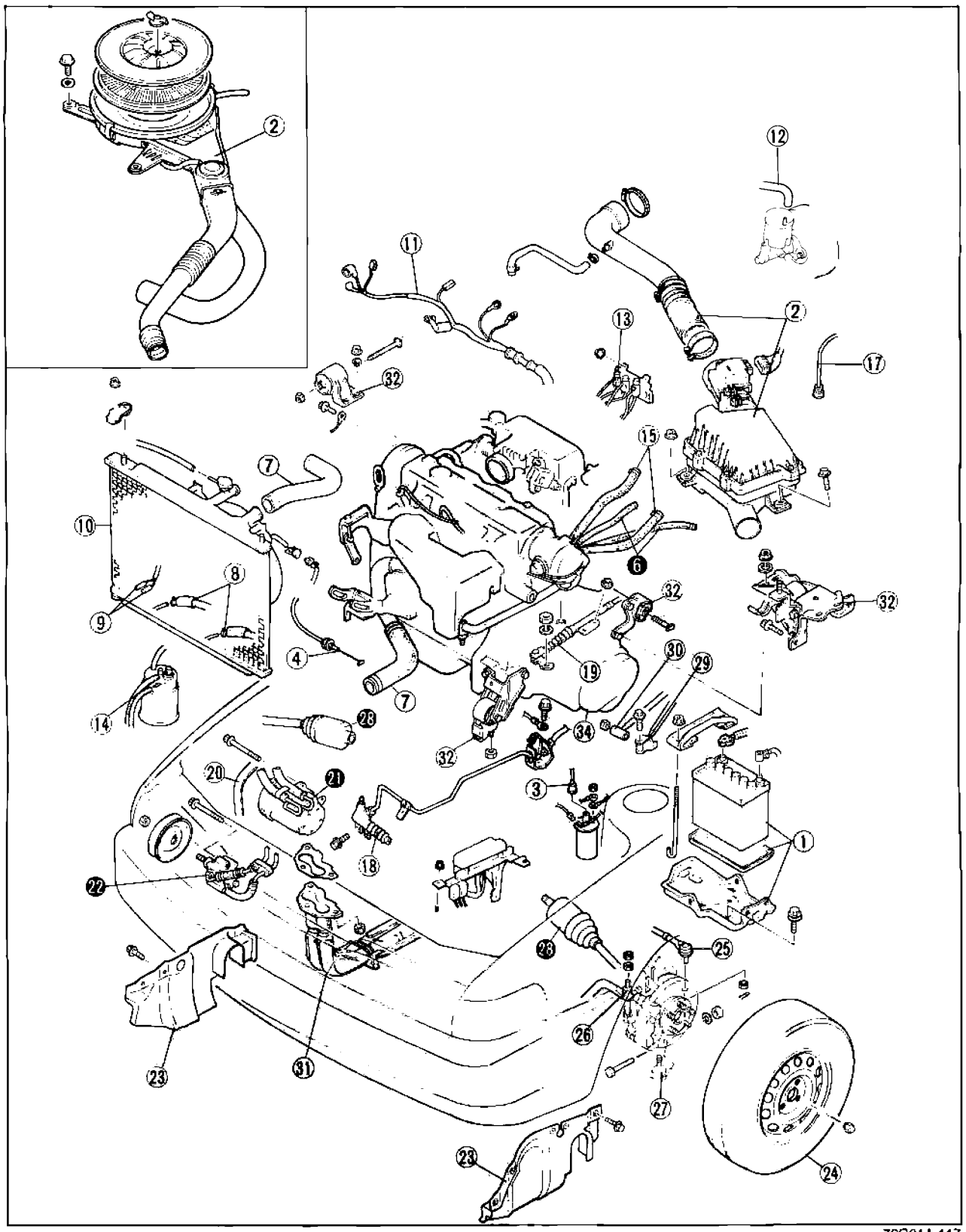


86U01X-055

Steps After Installation
1. Fill the radiator with the specified amount and type of coolant.
2. Perform the necessary engine adjustments. (Refer to TUNE-UP PROCEDURE.)

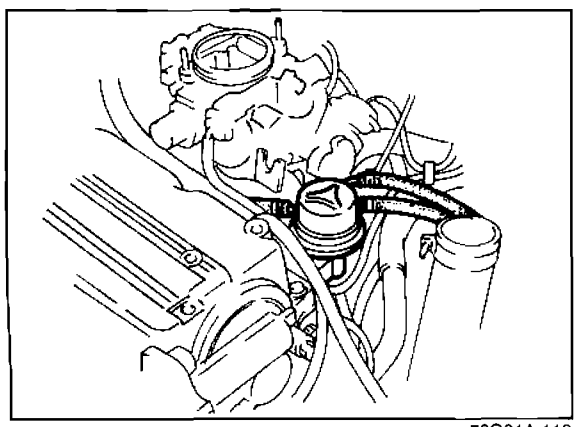
REMOVAL

Warning: Release the fuel pressure. (Refer to Section 4.)
1. Disconnect the negative battery cable.
2. Drain the engine oil and coolant.
3. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.



1. Battery and battery carrier
2. Air cleaner assembly
3. High-tension lead
4. Accelerator cable
5. Throttle cable (ATX)
6. Fuel hose
7. Radiator hose
8. ATF hose (ATX)
9. Radiator harness
10. Radiator and cooling fan
11. Engine harness
12. Brake vacuum hose
13. Three-way solenoid assembly
14. Canister hose (FI, Middle East)
15. Heater hose
16. Transaxle harness
17. Speedometer cable
18. Clutch release cylinder (MTX)
19. Control cable (ATX)
20. Drive belt
21. A/C compressor and bracket
22. P/S oil pump
23. Engine side cover
24. Front wheel
25. Tie-rod end
26. Stabilizer control rod
27. Lower arm bushing
28. Driveshaft
29. Change rod (MTX)
30. Extension bar (MTX)
31. Exhaust pipe
32. Engine mount
33. Engine and transaxle
34. Transaxle

76G01A-046

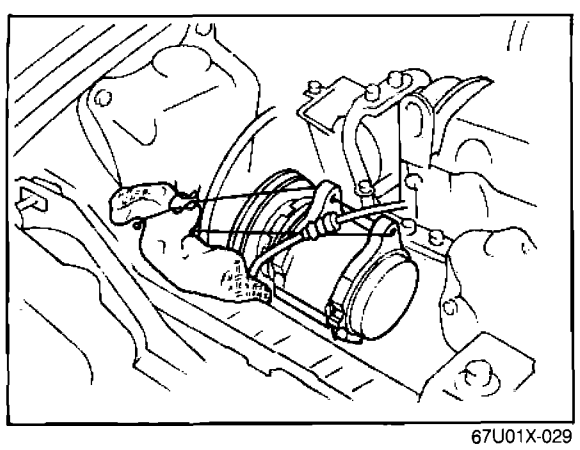


76G01A-118

Removal Note
Fuel hose

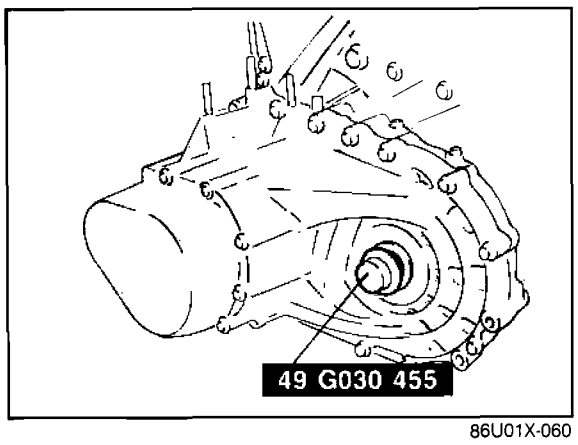
Warning
a) Cover the hose with a rag because fuel will spray out when disconnecting.
b) Keep sparks and open flame away from the fuel area.

Plug the disconnected hoses to avoid fuel leakage.



67U01X-029

P/S pump, A/C compressor
Remove the P/S pump and A/C compressor with the hoses still connected to them, secure the pump and compressor as shown in the figure.



86U01X-060

Driveshaft
Remove the driveshafts. (Refer to Section 9.) Slide the **SST** into the transaxle.

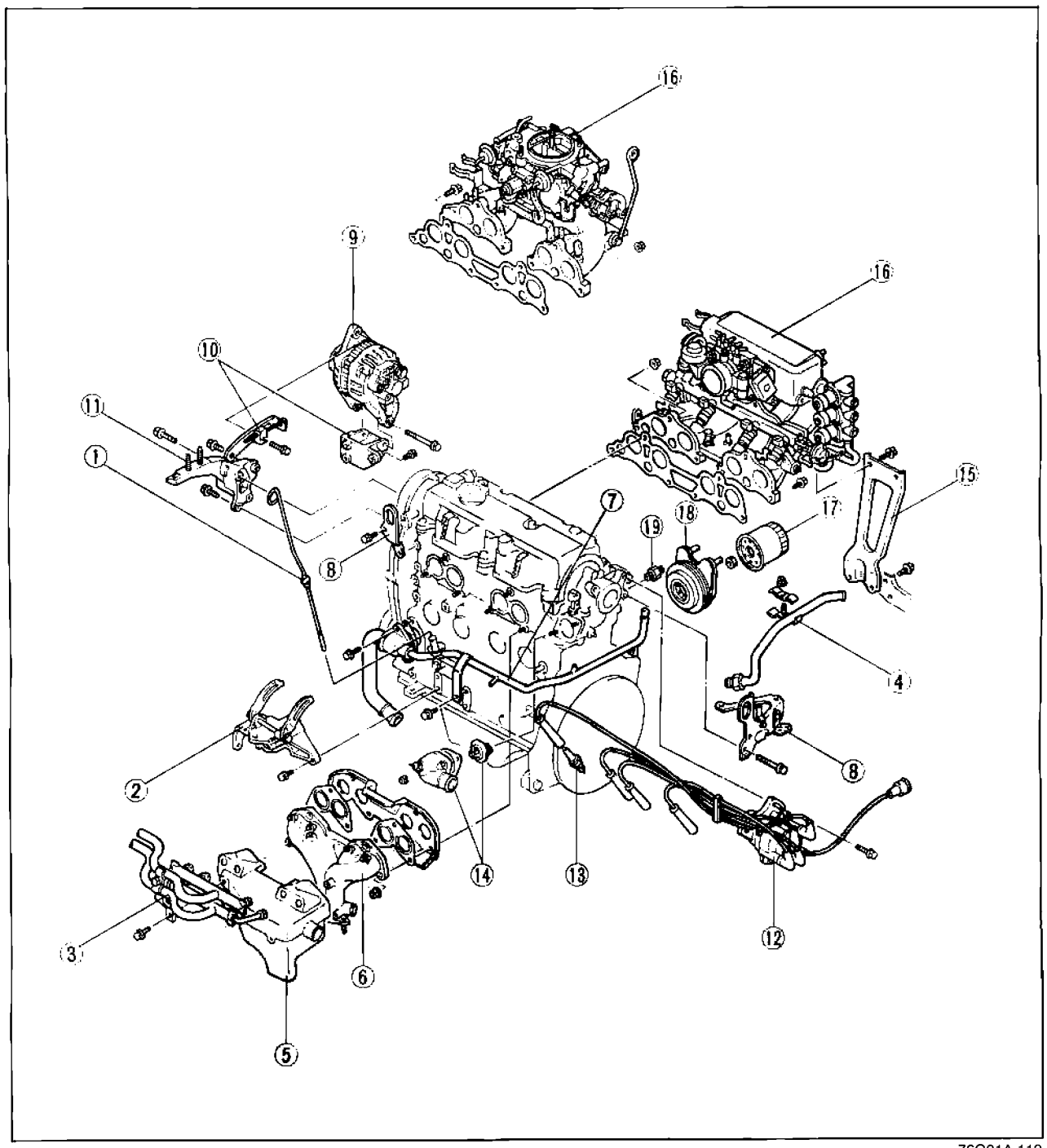
1A DISASSEMBLY (AUXILIARY PARTS)

DISASSEMBLY

1. Remove in the sequence shown in the figure referring to the disassembly note for specially marked parts.
2. Code all identical parts (such as pistons, piston rings, connecting rods, and valve springs) so that they can be reinstalled in the cylinder from which they were removed.
3. Clean the parts with steam, blow off any remaining water with compressed air.

Note
Care should be taken during the disassembly of any part or system to study its order of assembly. Any deformation, wear, or damage should also be noted.

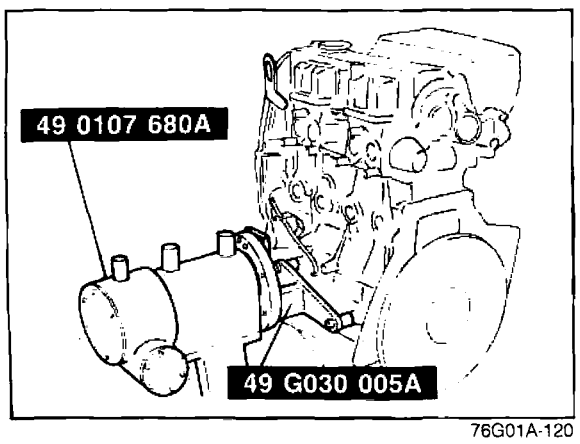
AUXILIARY PARTS



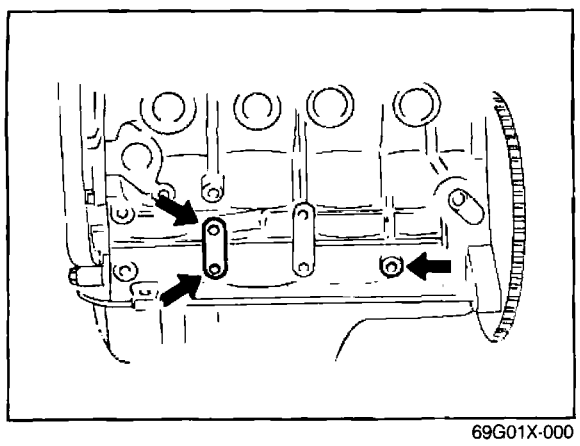
76G01A-119

1. Oil level gauge
2. P/S oil pump bracket
3. Secondary air pipe assembly (except General)
4. EGR pipe (FI, Unleaded carb.)
5. Exhaust manifold insulator
6. Exhaust manifold assembly
7. Coolant inlet pipe and bypass pipe
8. Engine hanger
9. Alternator
10. Alternator strap and bracket
11. Engine mount bracket
12. Distributor and high-tension lead
13. Spark plug
14. Thermostat and thermostat cover
15. Intake manifold bracket (FI)
16. Intake manifold assembly
17. Oil filter
18. Oil cooler (8-valve...only ECE, 12-valve)
19. Oil pressure switch

76G01A-047



76G01A-120

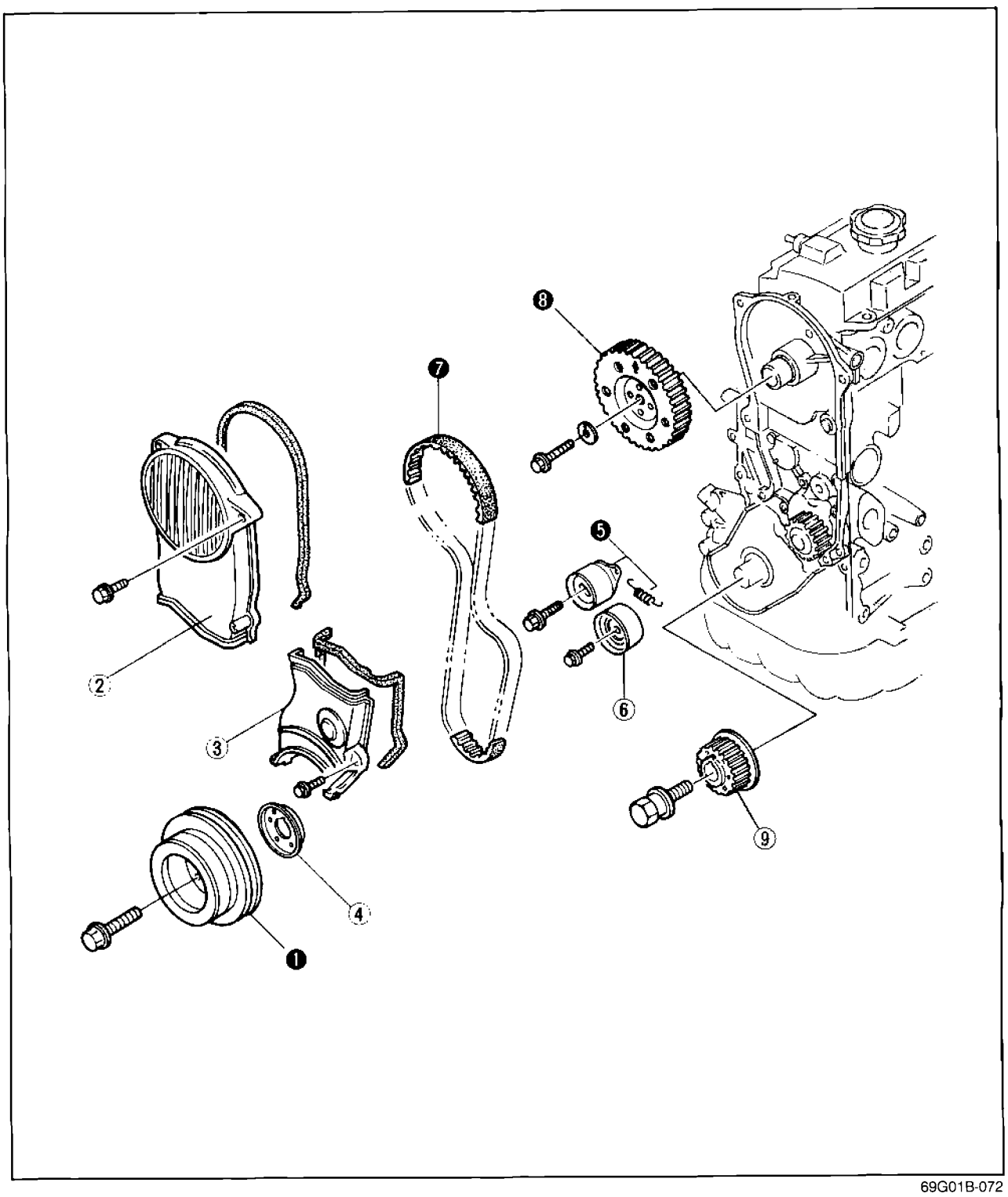


69G01X-000

Disassembly Note
Engine hanger
Remove the exhaust manifold; then connect the **SST** to the engine.

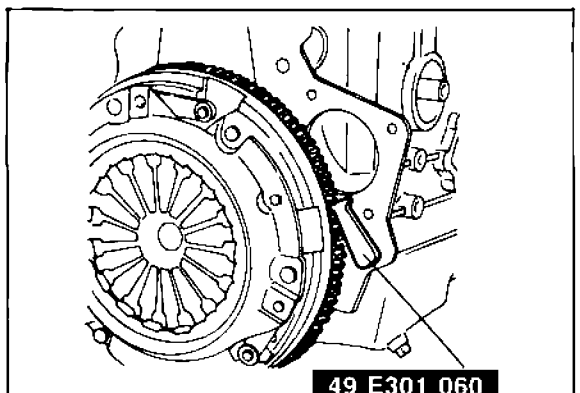
1A DISASSEMBLY (TIMING BELT)

TIMING BELT



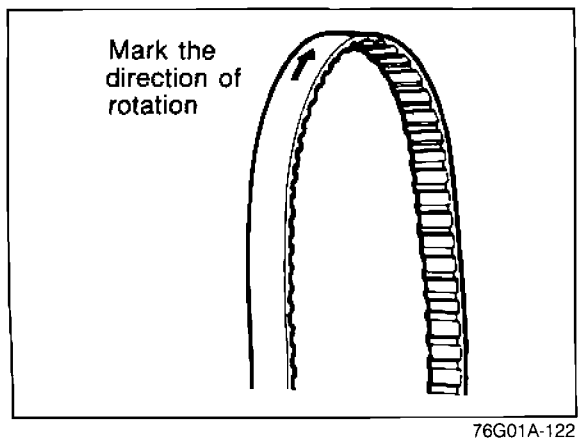
69G01B-072

1. Crankshaft pulley
2. Upper timing belt cover
3. Lower timing belt cover
4. Baffle plate
5. Timing belt tensioner and spring
6. Timing belt idler pulley
7. Timing belt
8. Camshaft pulley
9. Timing belt pulley



76G01A-121

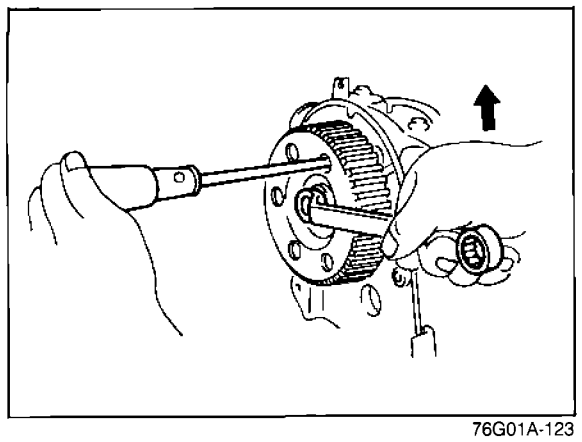
Disassembly Note
Crankshaft pulley
1. Set the **SST** against the flywheel.
2. Remove the crankshaft pulley.



76G01A-122

Timing belt
1. Loosen the tensioner lock bolt, and remove the tensioner spring.
2. Mark the timing belt rotation for proper reinstallation if it is reused.
3. Remove the timing belt.

Caution
Be careful not to allow oil or grease on the belt.

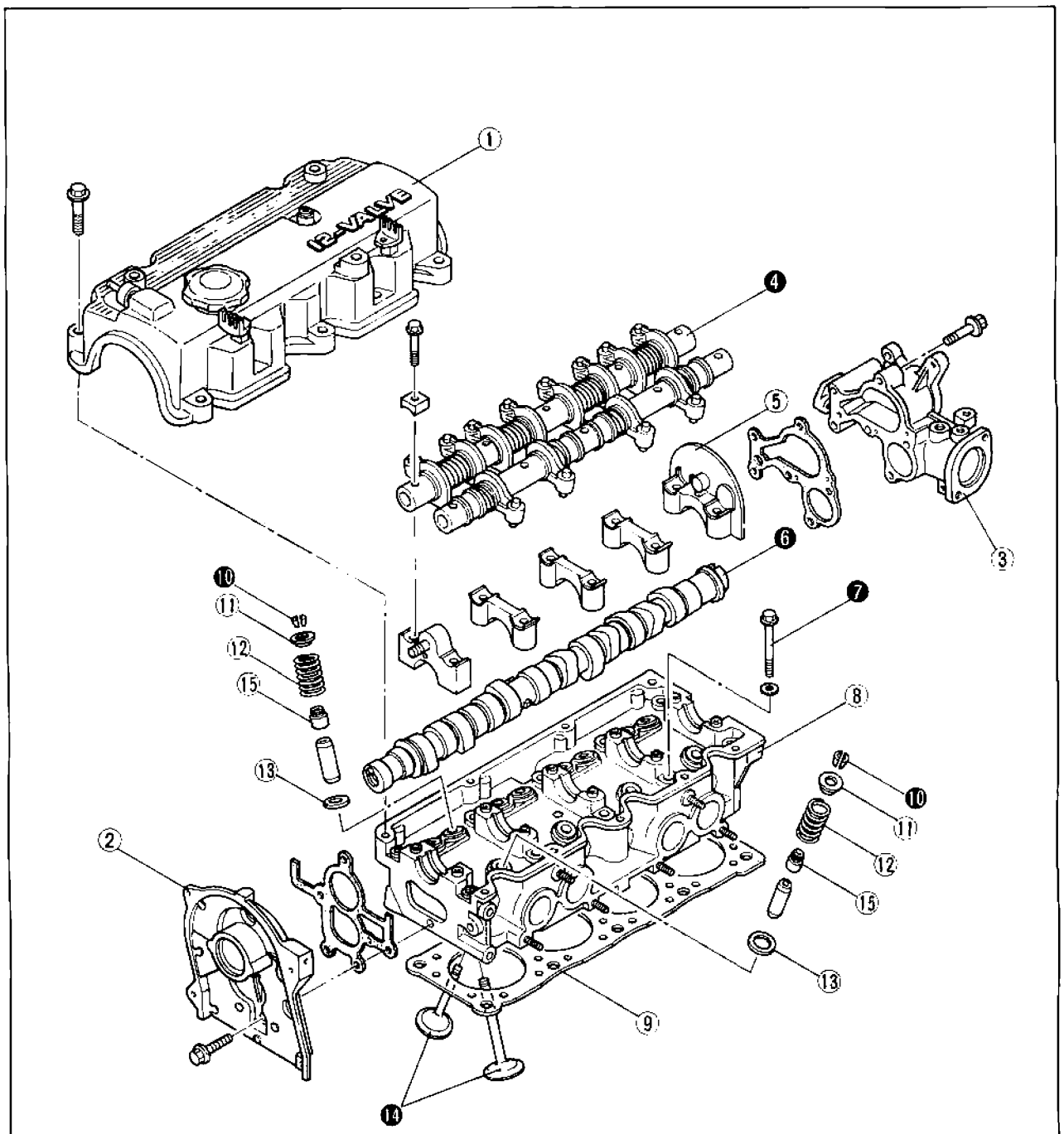


76G01A-123

Camshaft pulley
Remove the pulley lock bolt using a screw driver to prevent the camshaft from turning.

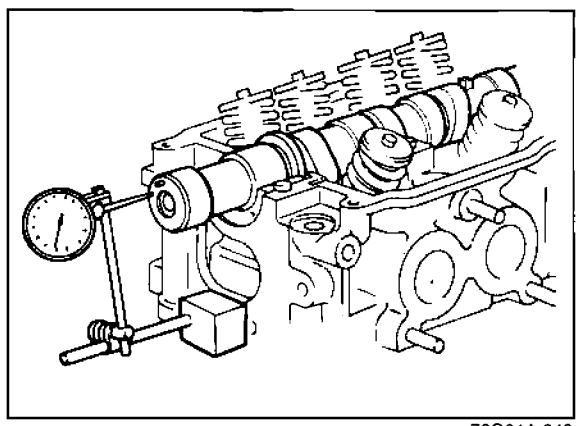
1A DISASSEMBLY (CYLINDER HEAD)

CYLINDER HEAD (12-valve)



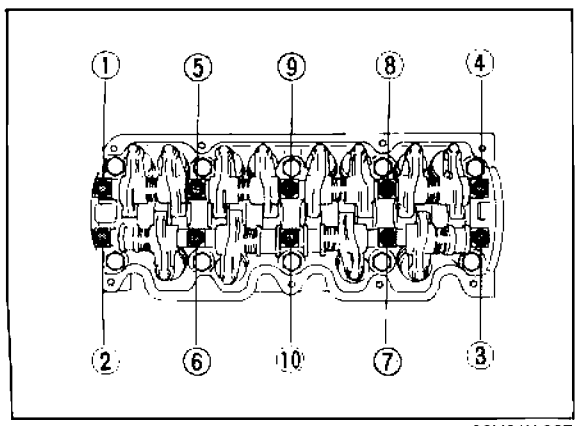
76G01A-048

1. Cylinder head cover
2. Front housing
3. Rear housing
4. Rocker arm and shaft assembly
5. Camshaft cap
6. Camshaft
7. Cylinder head bolt
8. Cylinder head
9. Cylinder head gasket
10. Valve keeper
11. Upper spring seat
12. Valve spring
13. Lower spring seat
14. Valve
15. Valve seal



76G01A-049

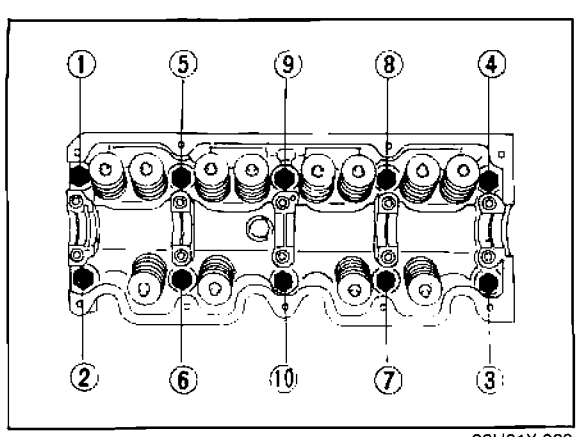
Disassembly Note
Camshaft
Before removing the rocker arm and shaft assembly, clean the bearings and journals, and measure the following points.
1. Camshaft end play. (Refer to page 1A—54.)
2. Camshaft journal oil clearance. (Refer to page 1A—54.)



86U01X-067

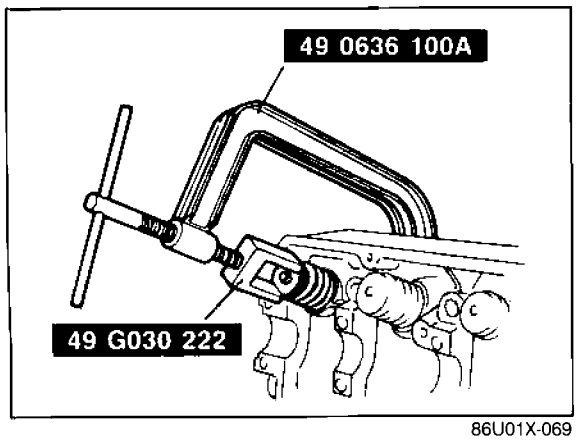
Rocker arm and shaft assembly
1. Loosen the bolts in two or three steps in the order shown in the figure.
2. Remove the rocker arm and shaft assembly together with the bolts.

Caution
a) Do not mix up the various parts of the rocker arm and shaft assembly.
b) Do not remove the HLA unless necessary.



86U01X-068

Cylinder head bolt
Loosen the cylinder head bolts in two or three steps in the order shown in the figure.

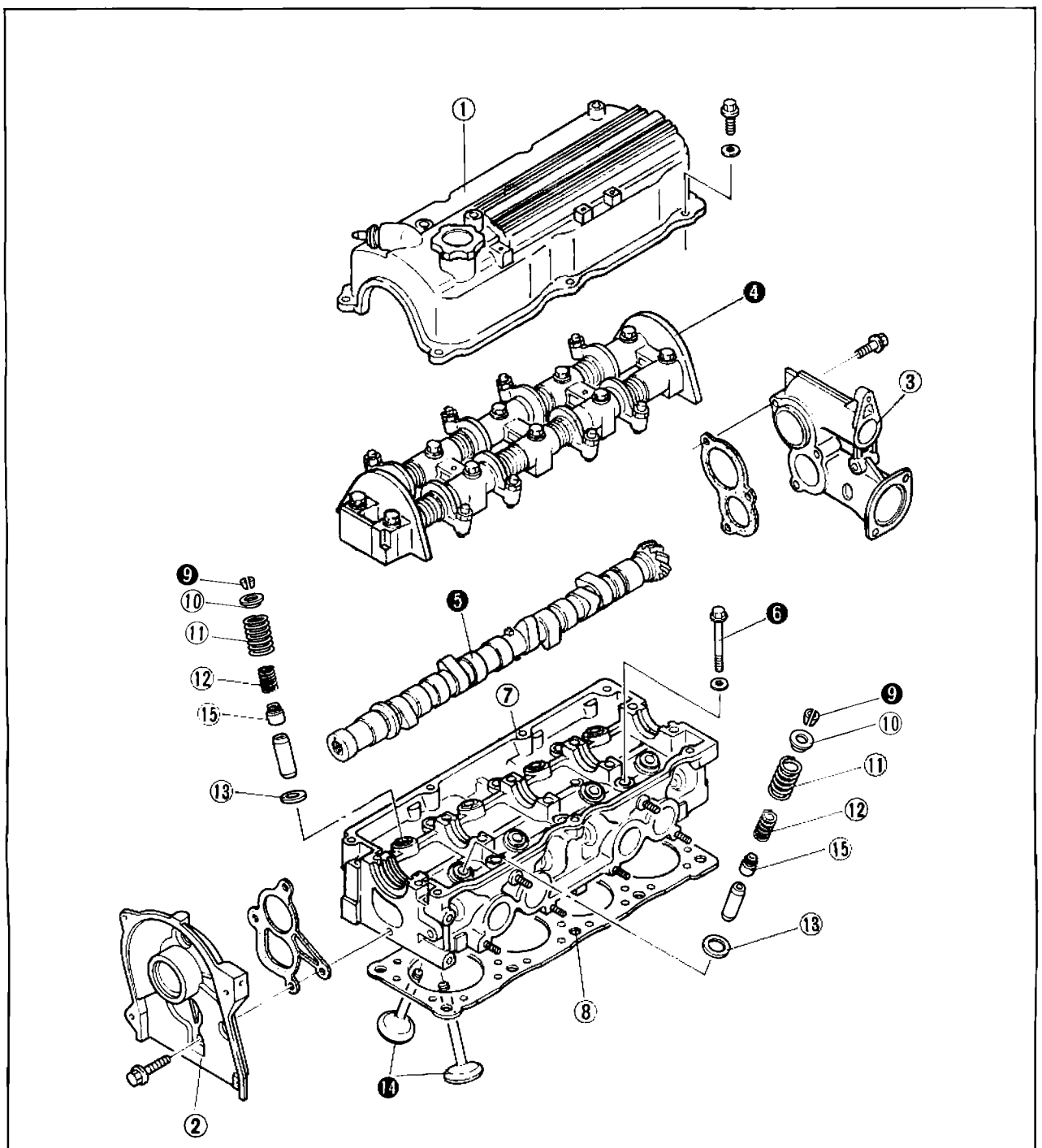


86U01X-069

Valve
Remove the valves from the cylinder head with the **SST**.

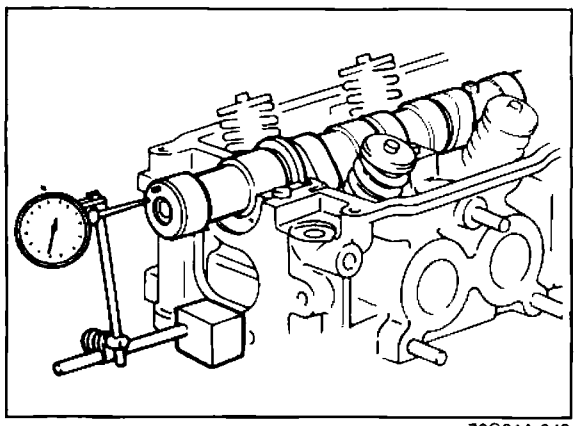
1A DISASSEMBLY (CYLINDER HEAD)

CYLINDER HEAD (8-valve)



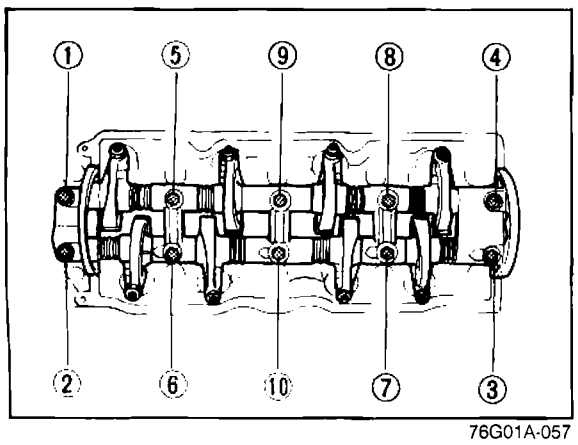
76G01A-050

1. Cylinder head cover
2. Front housing
3. Rear housing
4. Rocker arm and shaft assembly
5. Camshaft
6. Cylinder head bolt
7. Cylinder head
8. Cylinder head gasket
9. Valve keeper
10. Upper spring seat
11. Outer valve spring
12. Inner valve spring
13. Lower spring seat
14. Valve
15. Valve seal



76G01A-049

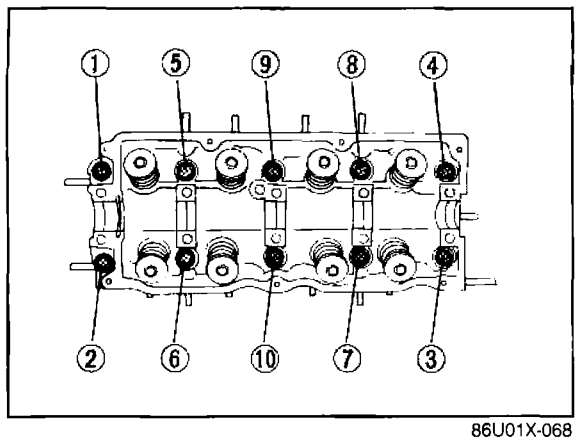
Disassembly Note
Camshaft
Before removing the rocker arm and shaft assembly, clean the bearings and journals, and measure the following points.
1. Camshaft end play. (Refer to page 1A—54.)
2. Camshaft journal oil clearance. (Refer to page 1A—54.)



76G01A-057

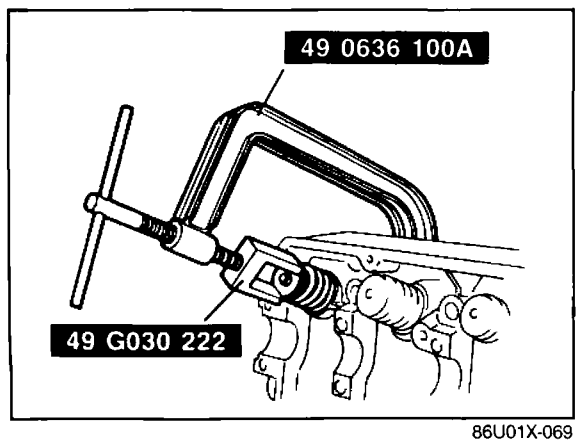
Rocker arm and shaft assembly
1. Loosen the bolts in two or three steps in the order shown in the figure.
2. Remove the rocker arm and shaft assembly together with the bolts.

Caution
Do not mix up the various parts of the rocker arm and shaft assembly.



86U01X-068

Cylinder head bolt
Loosen the cylinder head bolts in two or three steps in the order shown in the figure.

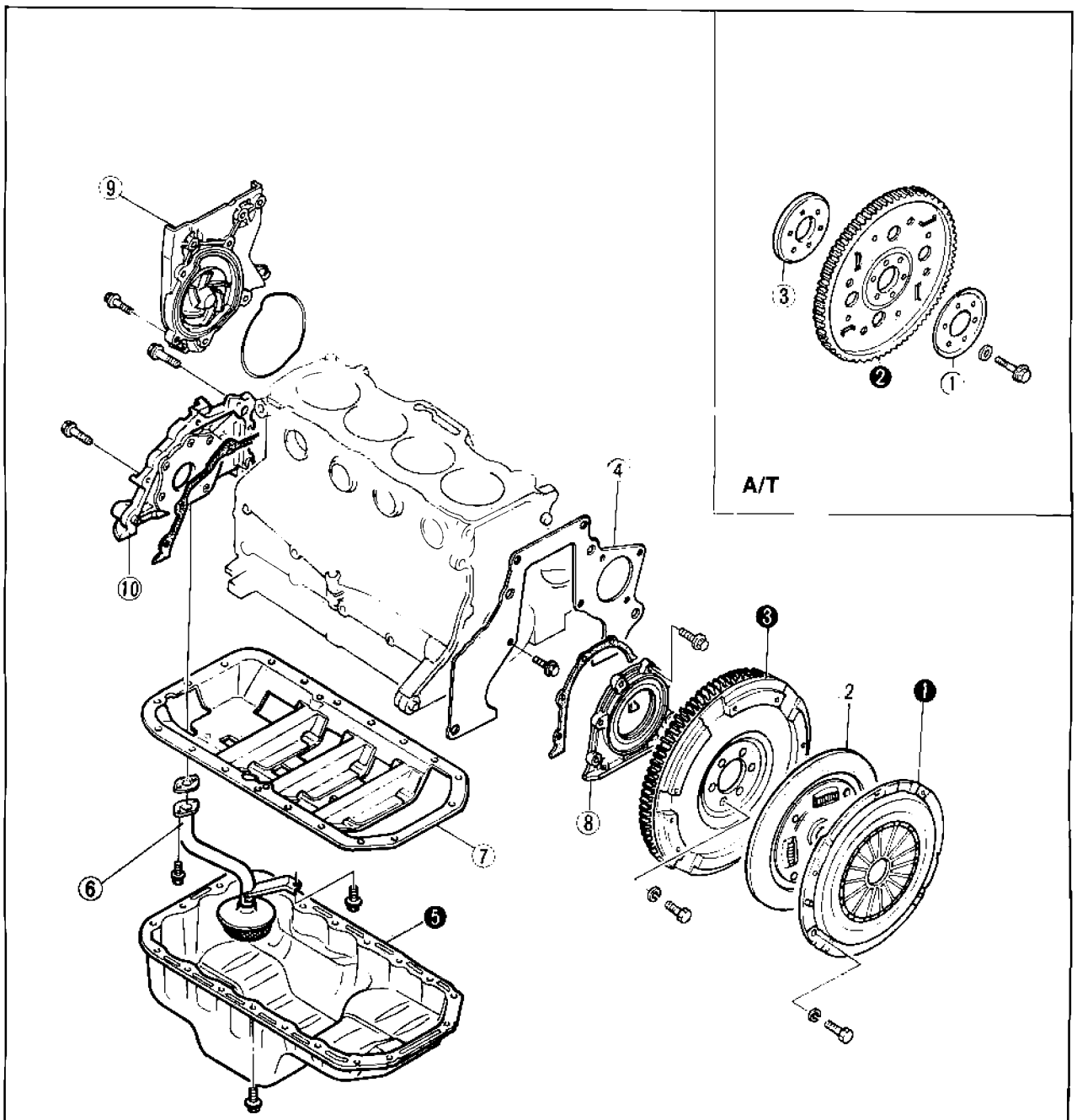


86U01X-069

Valve
Remove the valves from the cylinder head with the **SST**.

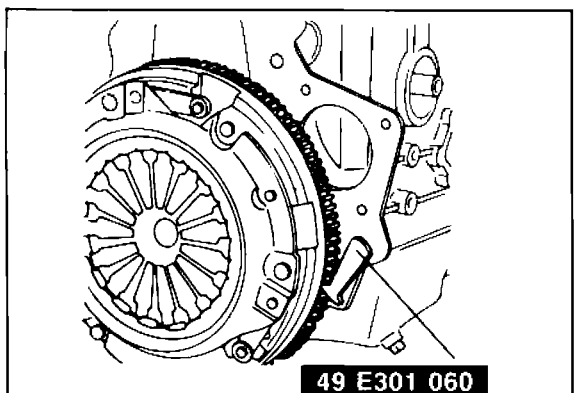
1A DISASSEMBLY (CYLINDER BLOCK)

CYLINDER BLOCK—I



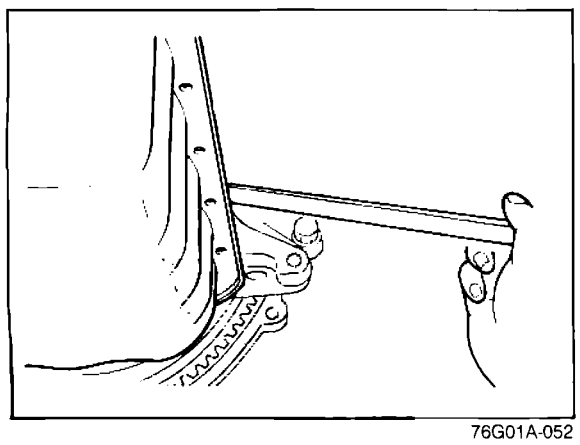
76G01A-051

1. Clutch cover (MTX), Backing plate (ATX)
2. Clutch disc (MTX), Drive plate (ATX)
3. Flywheel (MTX), Adaptor (ATX)
4. End plate
5. Oil pan
6. Oil strainer
7. Stiffener (FE 8-valve...only ECE, 12-valve)
8. Rear cover
9. Water pump assembly
10. Oil pump assembly



76G01A-125

Disassembly Note
Clutch cover, flywheel (MTX) or drive plate (ATX)
Remove the clutch cover and flywheel (MTX), or drive plate (ATX) with the **SST**.



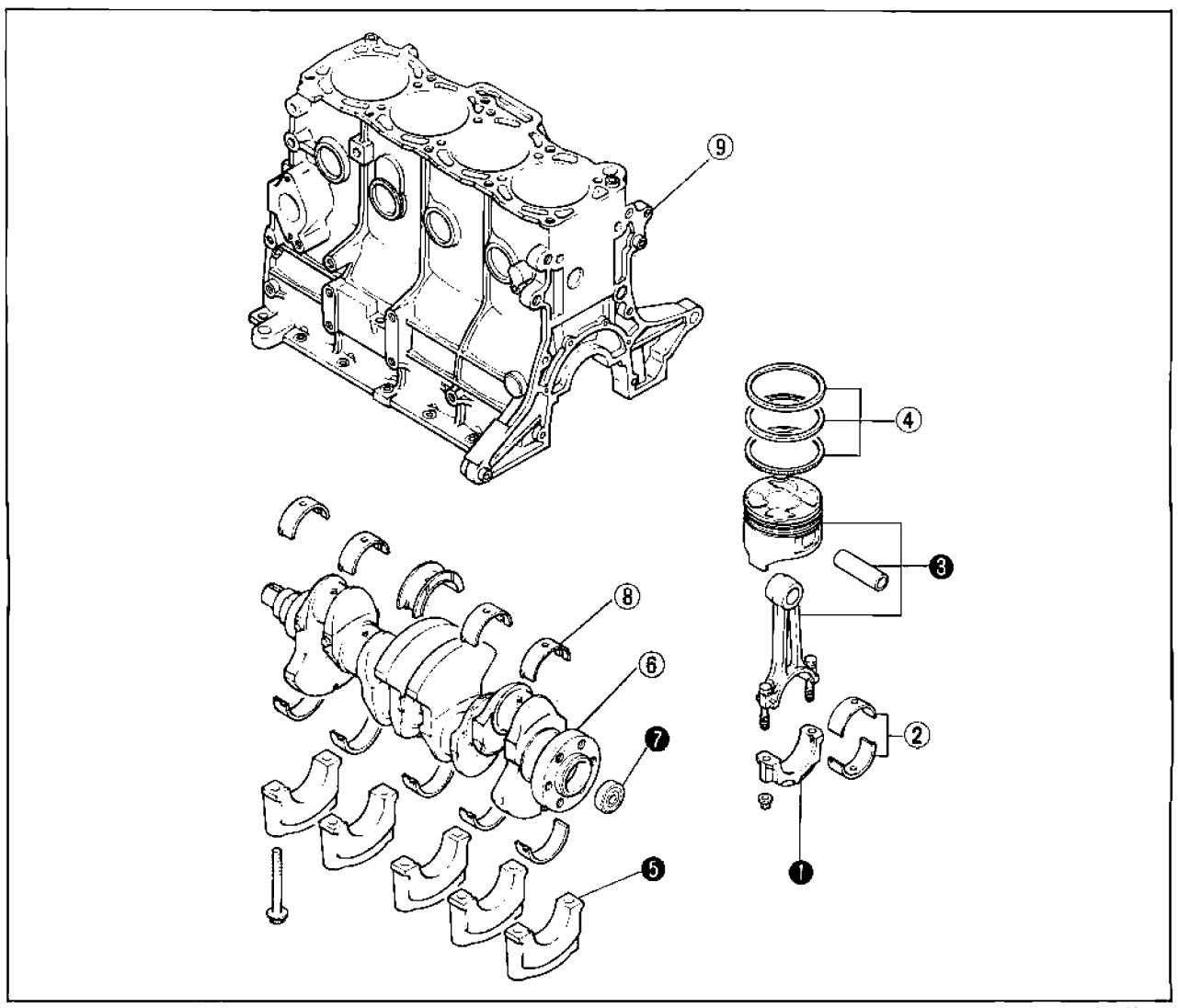
76G01A-052

Oil pan
1. Remove the oil pan mounting bolts.
2. Insert a scraper or a suitable tool between the oil pan and the stiffener or the cylinder block to separate them.
3. Remove the oil pan.

Caution
Do not bend the oil pan when prying loose.

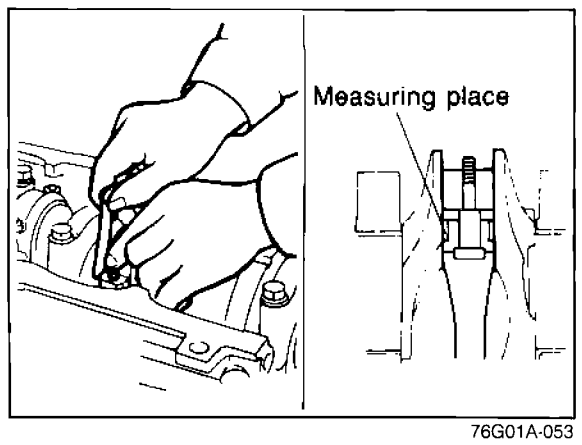
1A DISASSEMBLY (CYLINDER BLOCK)

CYLINDER BLOCK—II



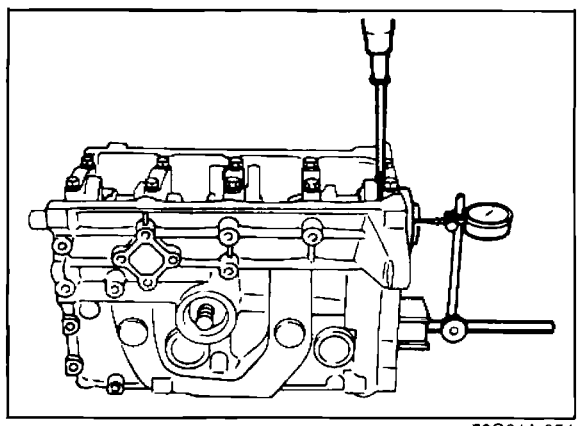
86U01X-073

1. Connecting rod cap
2. Connecting rod bearing
3. Connecting rod and piston
4. Piston ring
5. Main bearing cap
6. Crankshaft
7. Pilot bearing (MTX)
8. Main bearing
9. Cylinder block



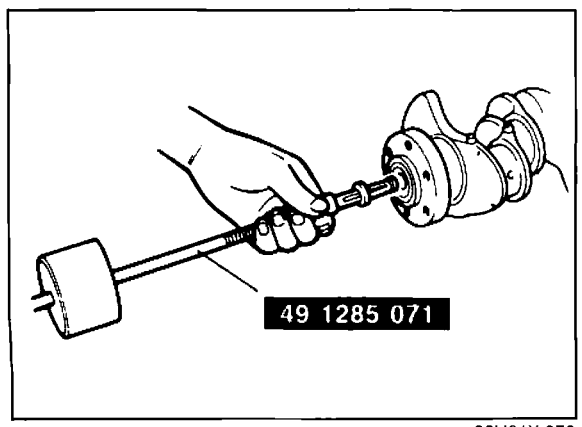
76G01A-053

Disassembly Note
Connecting rod and cap
Before removing the connecting rod, clean the bearing, connecting rod, and crankpin, and measure the following points.
1. Connecting rod side clearance. (Refer to page 1A—67.)
2. Crankpin oil clearance.(Refer to page 1A—67.)



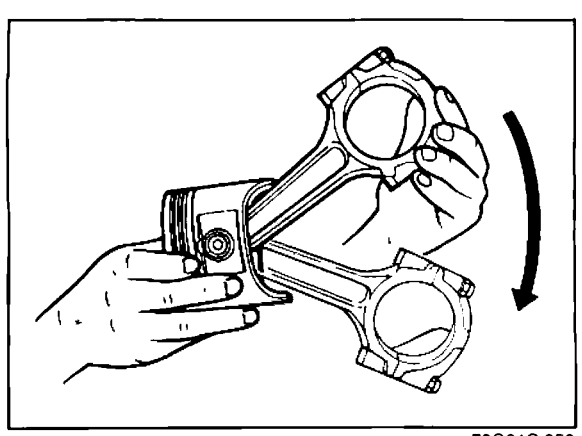
76G01A-054

Main bearing cap
Before removing the main bearing caps, clean the bearings, main journals, and caps, and measure the following points.
1. Crankshaft end play. (Refer to page 1A—66.)
2. Main journal oil clearance. (Refer to page 1A—65.)



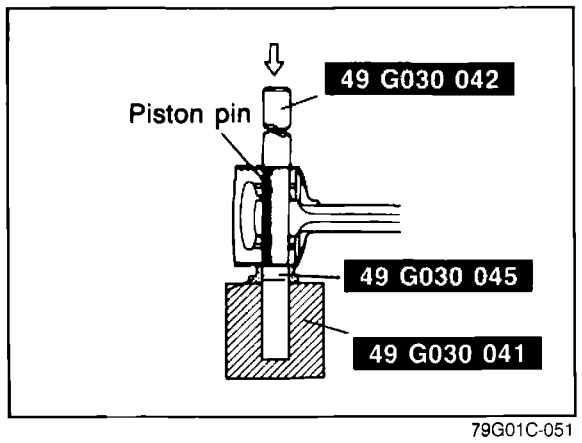
86U01X-076

Pilot bearing (MTX)
Remove the pilot bearing from the crankshaft with the **SST**.



79G01C-050

Piston and connecting rod
1. Before disassembling the piston and connecting rod, check the oscillation torque as shown in the figure.
   If the large end does not drop by its own weight, replace the piston or the piston pin.
2. Remove the piston pin with the **SST**.
   While removing the piston pin, check the pressure. If it is lower than **5kN (500kg, 1,100 lb)**, replace the piston pin or connecting rod.



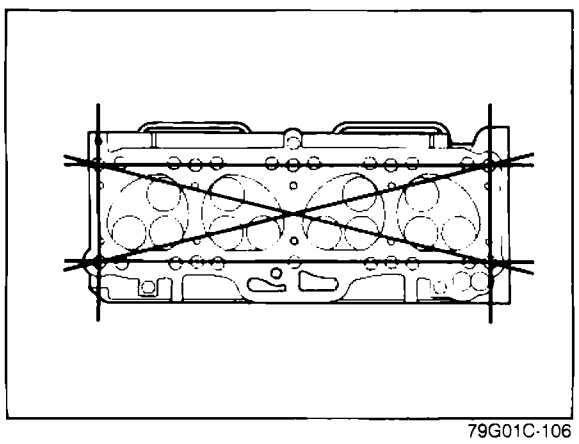
79G01C-051

INSPECTION AND REPAIR

1. Clean all parts, taking care to remove any gasket fragments, dirt, oil or grease, carbon, moisture residue, or other foreign materials.
2. Inspect and repair must be performed in the order specified.

Caution
Be careful not to damage the joints or friction surfaces of aluminum alloy components (such as the cylinder head or pistons).

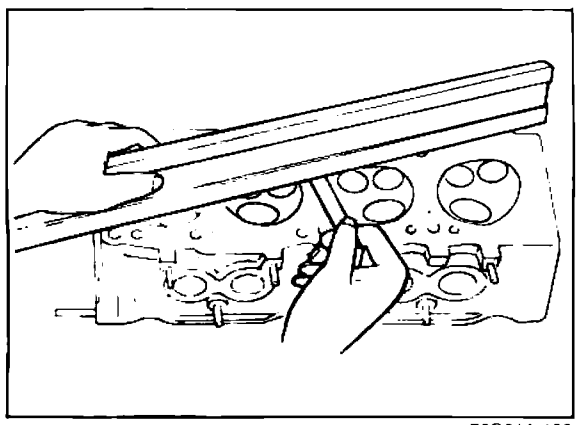
86U01X-077



79G01C-106

Cylinder Head
1. Inspect the cylinder head for damage, cracks, and leakage of water or oil. Replace if necessary.
2. Measure the cylinder head distortion in the six directions shown in the figure.

Distortion: 0.15 mm (0.006 in) max.

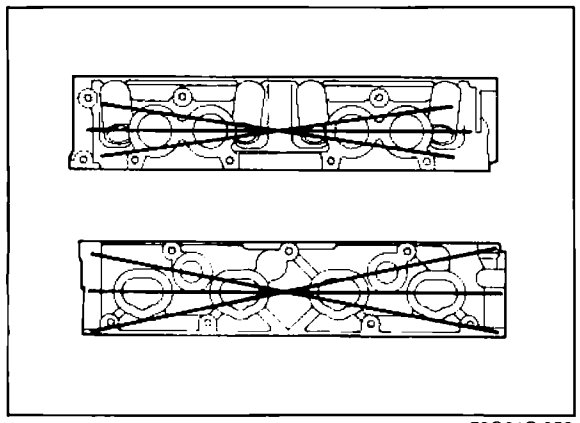


76G01A-126

3. If the cylinder head distortion exceeds specification, grind the cylinder head surface.
   If the cylinder head height is not within specification, replace it.

Height:
91.95—92.05 mm (3.620—3.624 in)
Grinding limit: 0.20 mm (0.008 in) max.

Note
Before grinding the cylinder head, first check the following. Replace if necessary.
- **Sinking of valve seat**
- **Damage of manifold contact surface**
- **Camshaft oil clearance and end play**

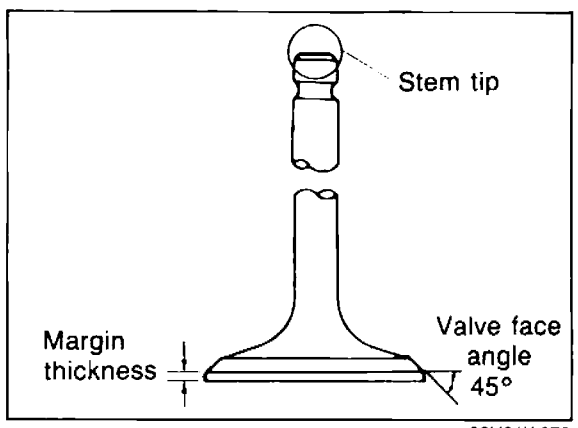


79G01C-053

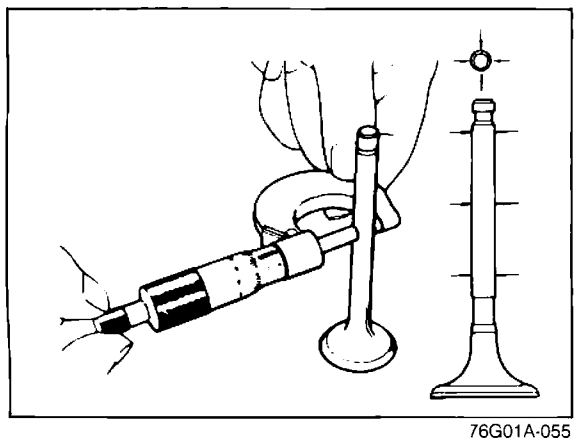
4. Measure the manifold contact surface distortion in the six directions shown in the figure.

Distortion: 0.15 mm (0.006 in) max.

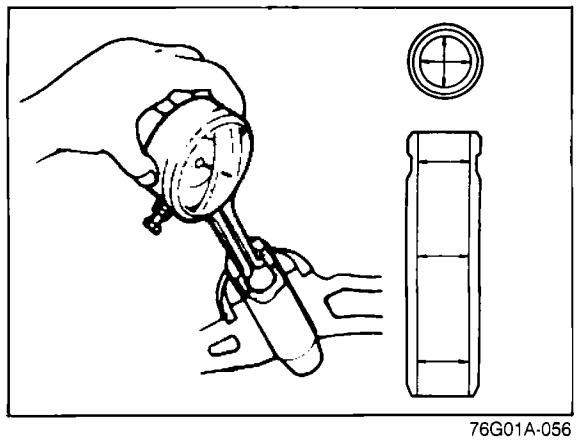
5. If distortion exceeds specification grind the surface or replace the cylinder head.



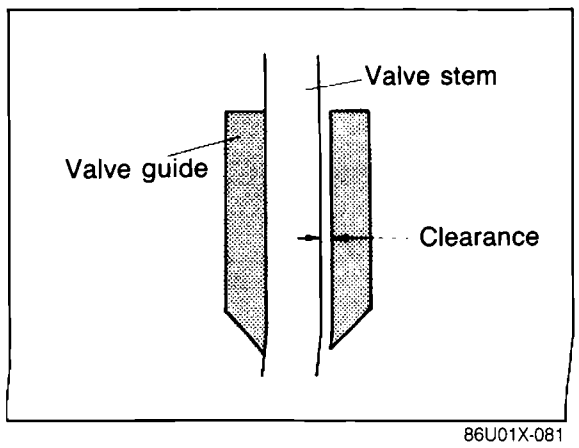
86U01X-078



76G01A-055



76G01A-056



86U01X-081

Valve and Valve Guide

1. Inspect each valve for the following. Replace or resurface if necessary.
   (1) Damaged or bent stem
   (2) Roughness or damage to face
   (3) Damage or uneven wear of stem tip
2. Check the valve head margin thickness. Replace if necessary

Margin thickness
IN : 0.5 mm (0.020 in) min.
EX: 1.0 mm (0.039 in) min.

3. Measure the valve length.

Length mm (in)

	12-valve	8-valve
IN	115.81 (4.5594)	111.89 (4.4051)
EX	116.21 (4.5752)	111.69 (4.3972)

4. Measure the valve stem diameter.

Diameter mm (in)

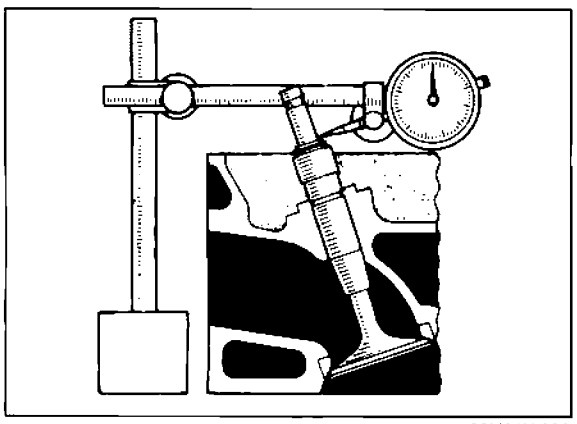
	12-valve	8-valve
IN	6.970—6 985 (0.2744—0.2750)	8.030—8.045 (0.3161—0.3167)
EX	6.965—6.980 (0.2742—0.2748)	8.025—8.040 (0.3159—0.3165)

5. Measure the valve guide inner diameter.

Inner diameter mm (in)

	12-valve	8-valve
IN	7.01—7.03 (0.2760—0.2768)	8.07—8.09 (0.3177—0.3185)
EX	7.01—7.03 (0.2760—0.2768)	8.07—8.09 (0.3177—0.3185)

6. Measure the valve stem to guide clearance.
   (1) Method No. 1
   Subtract the outer diameter of the valve stem from the inner diameter of the corresponding valve guide.

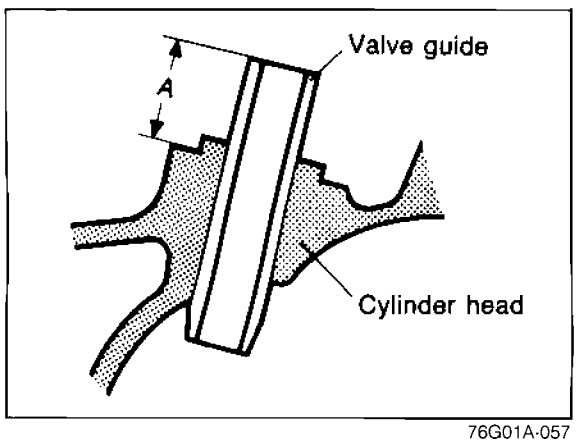


86U01X-082

(2) Method No. 2
Measure the valve stem play at a point close to the valve guide with the valve lifted slightly off the valve seat.

Clearance
IN : 0.025—0.060 mm (0.0010—0.0024 in)
EX: 0.030—0.065 mm (0.0012—0.0026 in)
Maximum: 0.20 mm (0.0079 in)

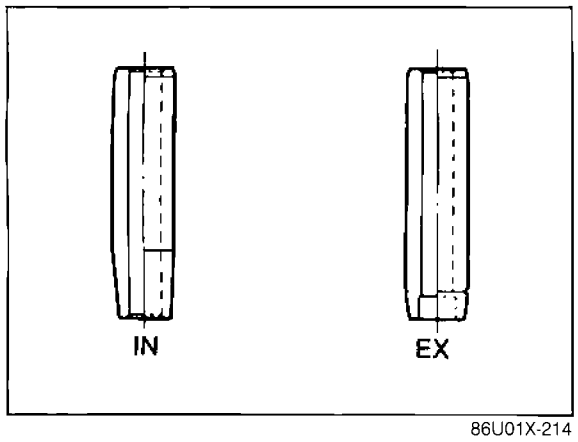
7. If the clearance exceeds the maximum, replace the valve and/or valve guide.



76G01A-057

8. Check that the valve guide projection height (dimension A in the figure). Replace if necessary.

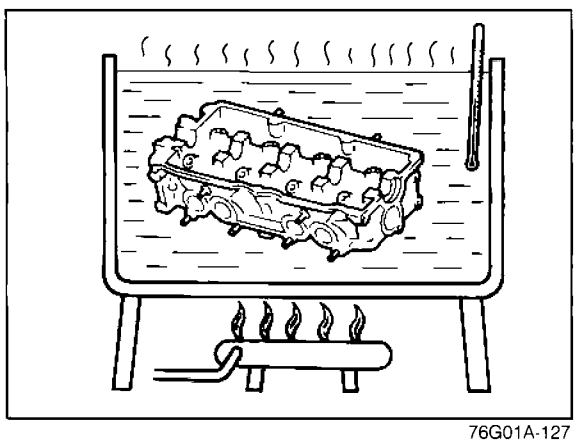
Height:
19.8—20.3 mm (0.780—0.799 in)...12-valve
19.1—19.6 mm (0.752—0.772 in)...8-valve



86U01X-214

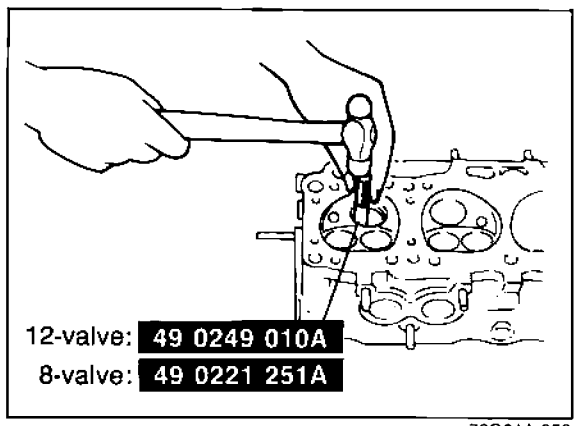
Replacement of valve guide

Note
Although the shapes of the intake and exhaust valve guides are different, use the exhaust valve guide on both sides as a replacement.



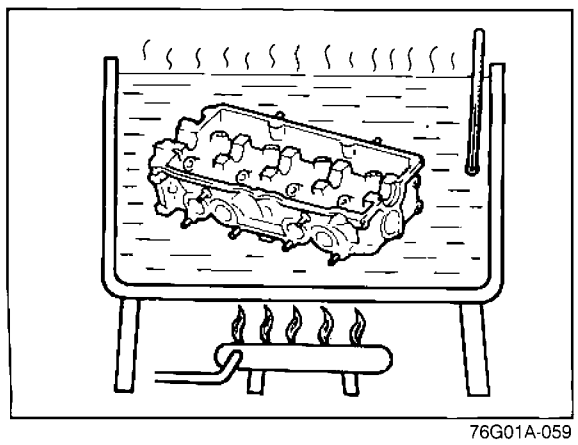
76G01A-127

Removal
1. Gradually heat the cylinder head in water to **approx. 90°C (194°F)**.



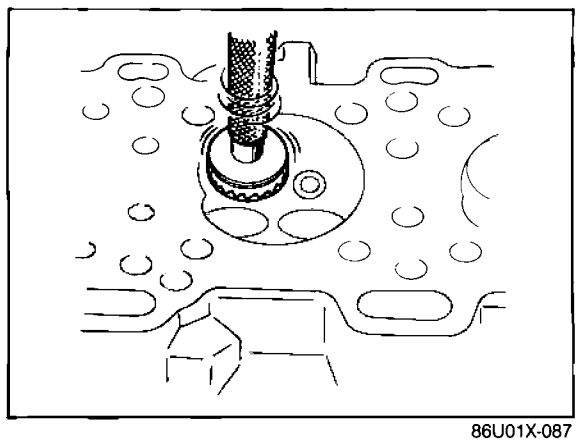
76G01A-058

2. Remove the valve guide from the side opposite the combustion chamber with the **SST**.
3. Remove the valve guide clip (8-valve).



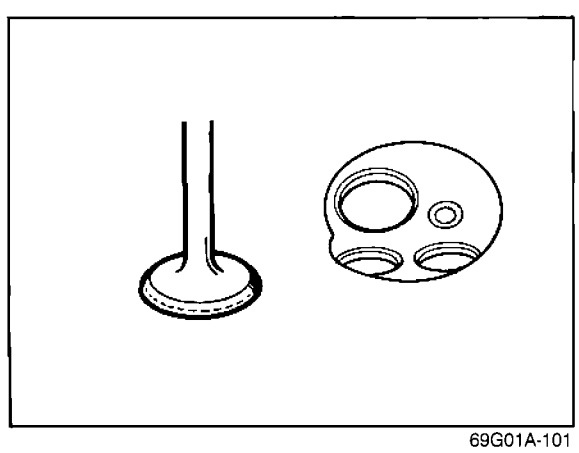
76G01A-059

Installation
1. Fit the clip onto the valve guide (8 valve).
2. Gradually heat the cylinder head in water to **approx. 90°C (194°F)**.
3. Tap the valve guide in from the side opposite the combustion chamber with the **SST** until the projection height is as specified.



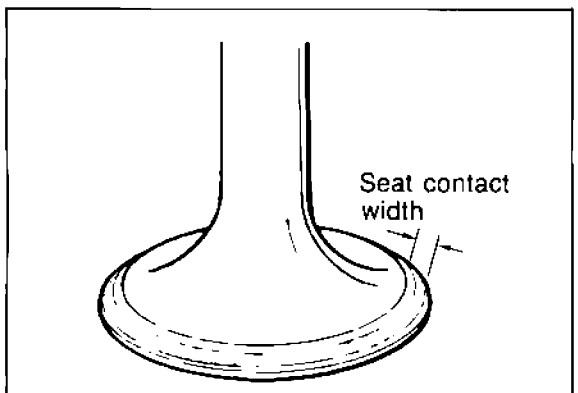
86U01X-087

Valve Seat
1. Inspect the contact surface of the valve seat and valve face for the following.
   (1) Roughness
   (2) Damage
2. If necessary, resurface the valve seat with a **45°** valve seat cutter and/or resurface the valve face.



69G01A-101

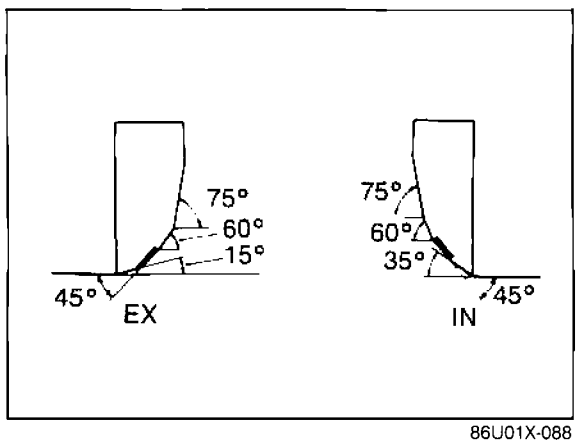
3. Apply a thin coat of prussian blue to the valve face.
4. Check the valve seating by rotating the valve against the seat.
   (1) If blue does not appear 360° around the valve face, replace the valve.
   (2) If blue does not appear 360° around the valve seat, resurface the seat.



76G01A-128

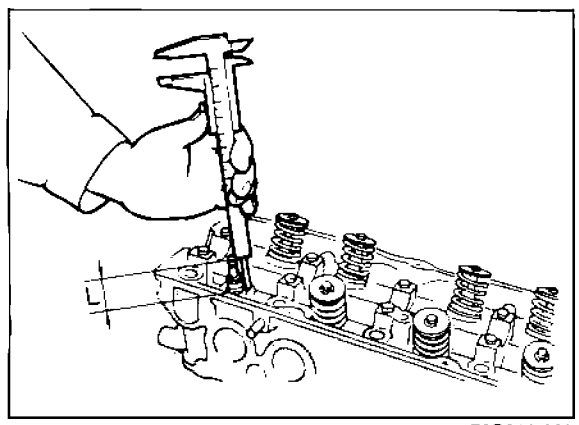
5. Check the seat contact width.

   Width: 1.2—1.6 mm (0.047—0.063 in)



86U01X-088

6. Check that the valve seating position is at the center of the valve face.
   (1) If the seating position is too high, correct the valve seat with a **60°** cutter and a **45°** cutter.
   (2) If the seating position is too low, correct the valve seat with a **35° (IN)** or **15° (EX)** cutter and a **45°** cutter.
7. Seat the valve to the valve seat with a lapping compound.



76G01A-060

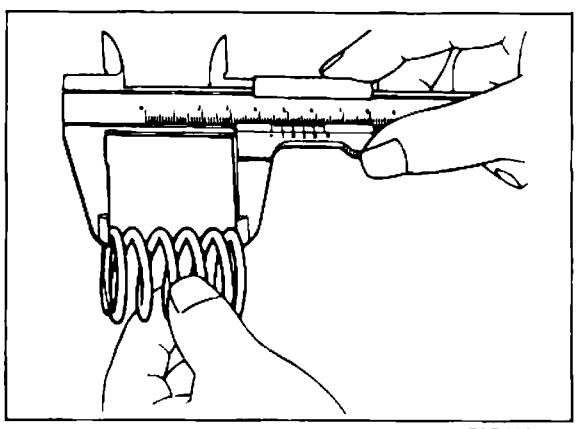
8. Check the sinking of the valve seat.
   Measure protruding length (dimension L) of each valve stem.

   Dimension L: 50.2 mm (1.976 in)....12-valve
   46.5 mm (1.831 in).... 8-valve

   (1) If **L** is as below, it can be used as it is.
   50.2—51.0 mm (1.976—2.008 in)..12-valve
   46.5—48.0 mm (1.831—1.890 in).. 8-valve

   (2) If **L** is as below, insert a spacer between the spring seat and cylinder head to adjust.
   51.0—51.7 mm (2.008—2.035 in)..12-valve
   48.0—48.7 mm (1.890—1.917 in).. 8-valve

   (3) If **L** is more than as below, replace the cylinder head.
   51.7 mm (2.035 in) or more.....12-valve
   48.7 mm (1.917 in) or more..... 8-valve



76G01A-062

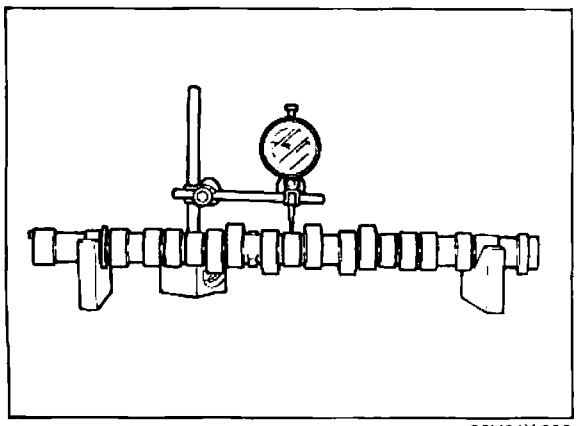
Valve Spring

1. Inspect each valve spring for cracks or damage.
2. Check the free length and angle. Replace if necessary.

Free length mm (in)

			Standard	Minimum
12-valve		IN	49.5 (1.949)	49.0 (1.929)
		EX	50.4 (1.984)	48.7 (1.917)
8-valve	FE.Middle East General	Outer	51.2 (2.016)	50.6 (1.992)
		Inner	45.7 (1.799)	43.7 (1.720)
	Others	Outer	52.0 (2.047)	51.5 (2.028)
		Inner	44.0 (1.732)	43.3 (1.705)

Angle: 1.8 mm (0.071 in) max.

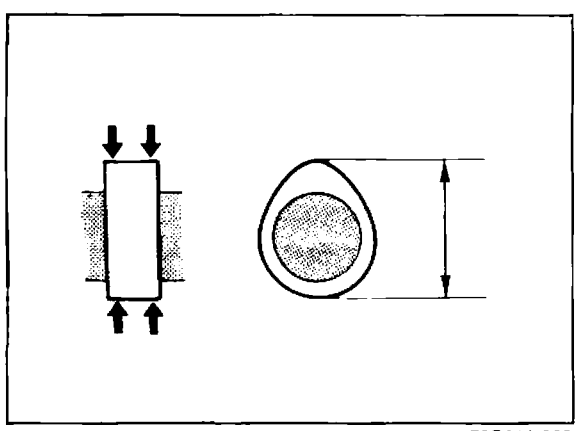


86U01X-092

Camshaft

1. Set the front and rear journals on V-blocks. Check the camshaft runout. Replace if necessary.

Runout: 0.03 mm (0.0012 in) max.

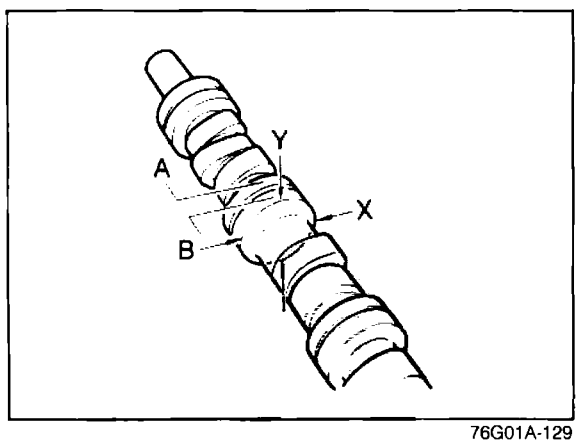


76G01A-063

2. Check the cam for wear or damage. Replace if necessary.
3. Check the cam lobe height at the two points as shown in the figure.

Height mm (in)

		Standard	Minimum
12-valve	IN	41.340 (1.6276)	41.14 (1.620)
	EX	41.847 (1.6476)	41.65 (1.640)
8-valve	IN	38.157 (1.5022)	37.96 (1.494)
	EX	38.160 (1.5024)	37.96 (1.494)



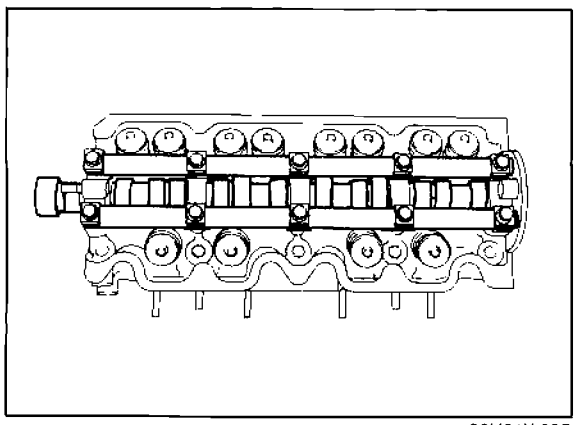
76G01A-129

4. Measure wear of the journals in X and Y directions at the two points as shown in the figure.

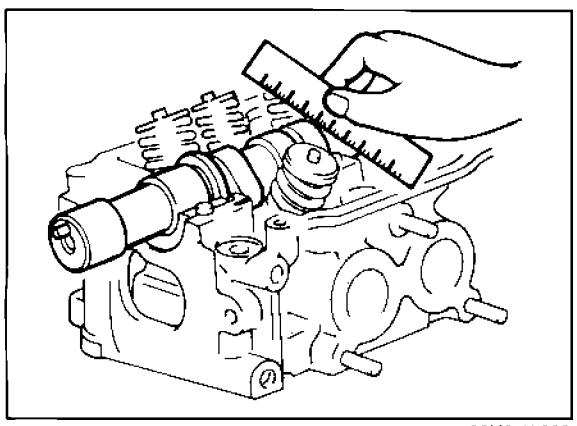
Diameter mm (in)

	12-valve	8-valve
No. 1,5	31.940—31.965 (1.2575—1.2585)	31.940—32.035 (1.2575—1.2612)
No. 2,3,4	31.910—31.935 (1.2563—1.2573)	31.910—32.065 (1.2563—1.2624)

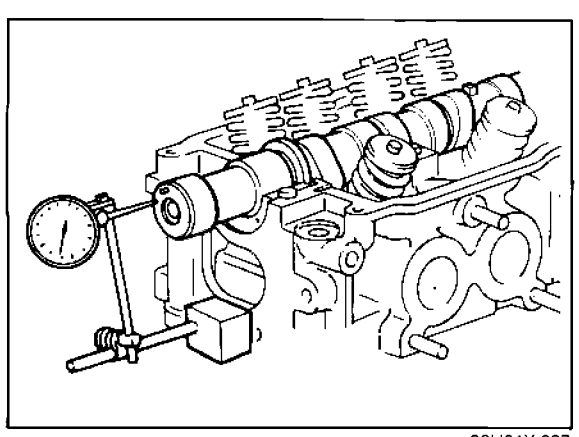
Out-of-round: 0.05 mm (0.002 in) max.



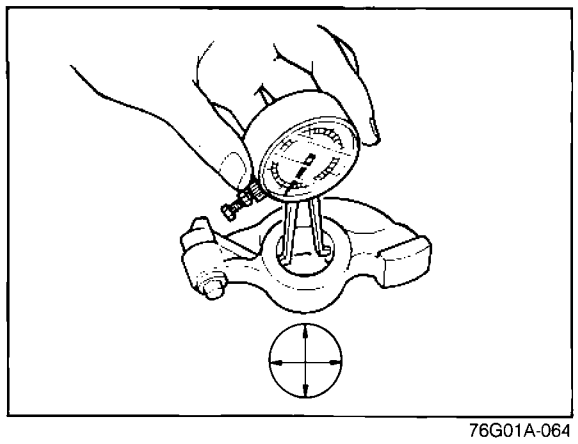
86U01X-095



86U01X-096



86U01X-097



76G01A-064

5. Measure the oil clearance of the camshaft and camshaft caps.
   (1) Remove any oil, or dirt from the journals and bearing surface.
   (2) Set the camshaft onto the cylinder head.
   (3) Position plasti-gauge on top of the journals in the axial direction.
   (4) Place the camshaft caps and rocker arm shafts in position, and tighten them to the specified torque.

Tightening torque:
18—26 N·m (1.8—2.7 m-kg, 13—20 ft-lb)

   (5) Remove the camshaft caps and measure the oil clearance at each cap.

Oil clearance
Front and rear:
0.035—0.085 mm (0.0014—0.0033 in)
Center three journals:
0.065—0.115 mm (0.0026—0.0045 in)
Maximum: 0.15 mm (0.0059 in)

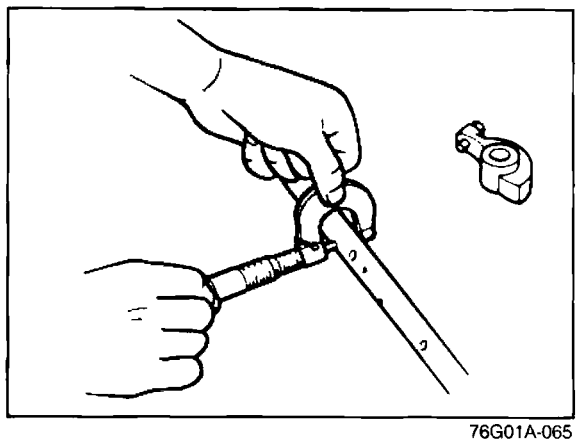
   (6) If the oil clearance exceeds the maximum, replace the cylinder head.

6. Measure the camshaft end play. If it exceeds the maximum, replace the camshaft and/or the cylinder head.

End play:
0.08—0.16 mm (0.003—0.006 in)
Maximum: 0.20 mm (0.008 in)

Rocker Arm and Rocker Arm Shaft
1. Check for wear or damage to the contact surface of the rocker arm shaft and the rocker arm. Replace if necessary.
2. Check the oil clearance between the rocker arm and shaft. Replace if necessary.
   (1) Measure the rocker arm inner diameter.

Diameter:
19.000—19.033 mm (0.7480—0.7493 in)
...12-valve
16.000—16.027 mm (0.6299—0.6310 in)
... 8-valve



76G01A-065

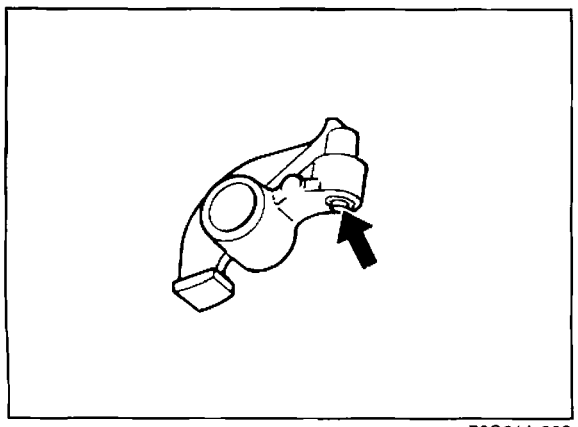
(2) Measure the rocker arm shaft diameter.

Diameter:
18.959—18.980 mm (0.7464—0.7472 in)
...12 valve
15.966—15.984 mm (0.6286—0.6293 in)
... 8 valve

(3) Subtract the shaft diameter from the rocker arm diameter.

Oil clearance mm (in)

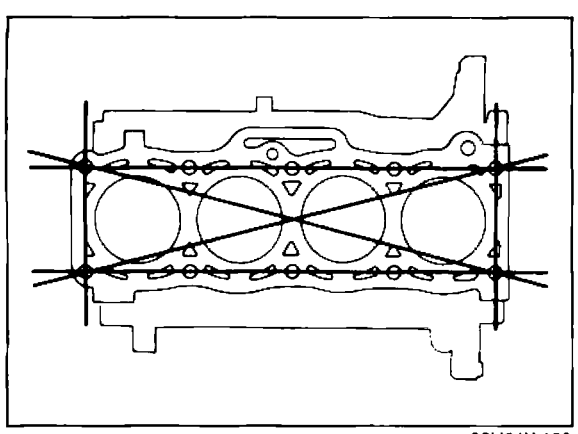
	Standard	Maximum
12-valve	0.020—0.074 (0.0008—0.0029)	0.10 (0.0039)
8-valve	0.016—0.061 (0.0006—0.0024)	0.10 (0.0039)



76G01A-066

Hydraulic Lash Adjuster (12-valve)
Check the HLA face for wear or damage. Replace if necessary.

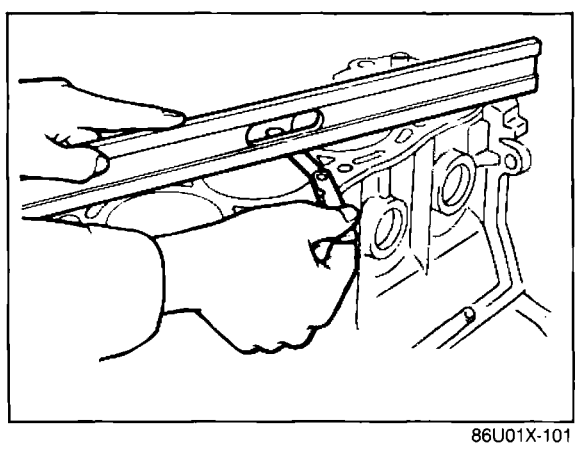
Caution
Do not remove the HLA unless necessary to prevent damaging the O-ring.



86U01X-100

Cylinder Block
1. Check the cylinder block. Repair or replace if necessary.
   (1) Leakage damage
   (2) Cracks
   (3) Scoring of wall
2. Measure the distortion of the top surface of the cylinder block in the six directions as shown in the figure.

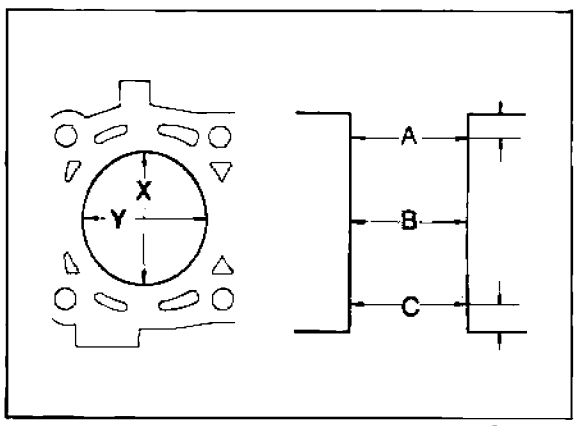
Distortion: 0.15 mm (0.006 in) max.



86U01X-101

3. If the distortion exceeds the maximum, repair by grinding, or replace the cylinder block.

Grinding limit: 0.20 mm (0.008 in) max.

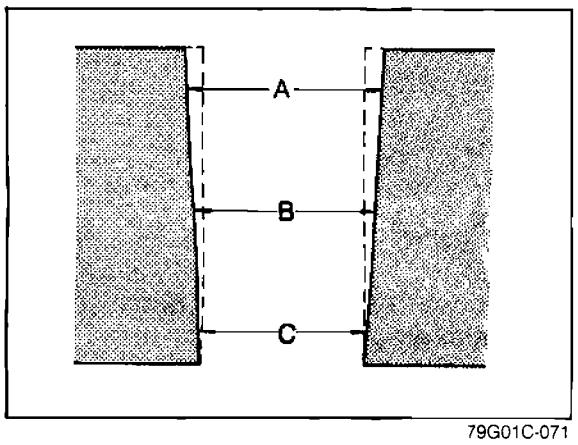


76G01A-067

4. Measure the cylinder bore in directions X and Y at three levels in each cylinder as shown.

Cylinder bore mm (in)

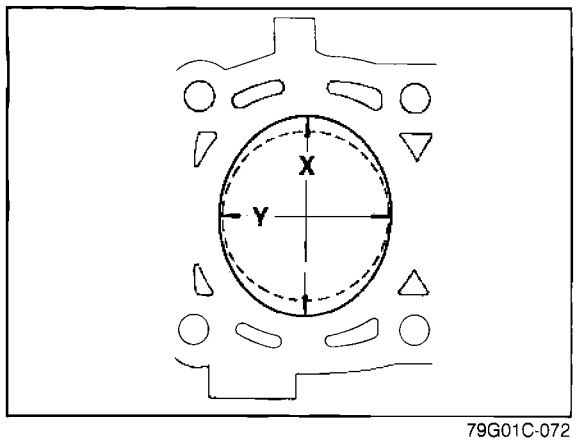
	Size	Bore
FE F8	Standard	86.000—86.019 (3.3858—3.3866)
	0.25 (0.010) oversize	86.250—86.269 (3.3957—3.3964)
	0.50 (0.020) oversize	86.500—86.519 (3.4055—3.4062)
F6	Standard	81.000—81.019 (3.1890—3.1897)
	0.25 (0.010) oversize	81.250—81.269 (3.1988—3.1996)
	0.50 (0.020) oversize	81.500—81.519 (3.2087—3.2094)
	0.75 (0.030) oversize	81.750—81.769 (3.2185—3.2192)
	1.00 (0.039) oversize	82.000—82.019 (3.2283—3.2291)



79G01C-071

(1) If the difference between the measurement A and C exceeds the maximum taper, rebore the cylinder to oversize.

Taper: 0.019 mm (0.0007 in) max.

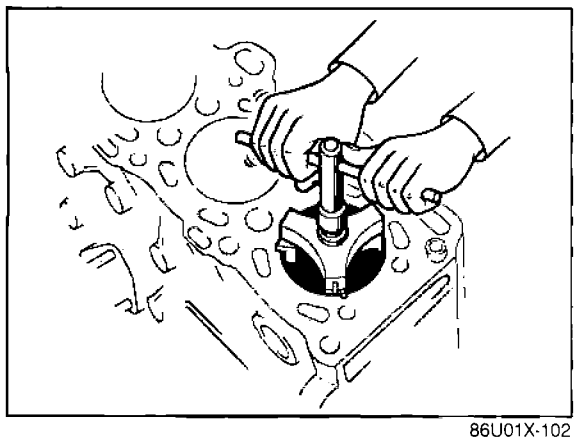


79G01C-072

(2) If the difference between the measurement X and Y exceeds the maximum out-of-round, rebore the cylinder to oversize.

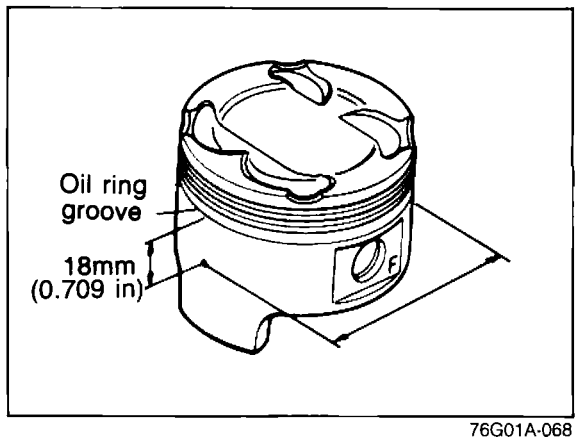
Out-of-round: 0.019 mm (0.0007 in) max.

Caution
The boring size should be based on the size of an oversize piston and be the same for all cylinders.



86U01X-102

5. If the upper part of the cylinder wall shows uneven wear, remove the ridge with a ridge reamer.



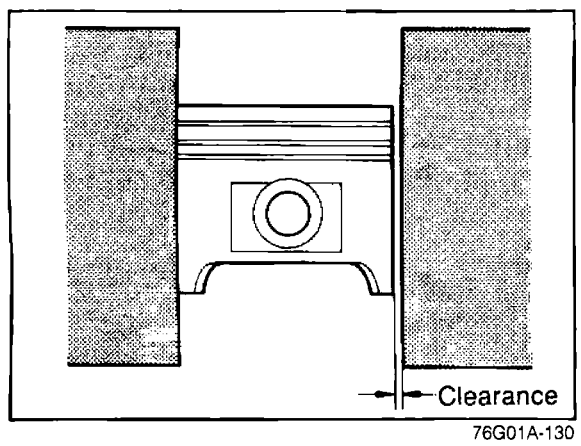
76G01A-068

Piston

1. Inspect the outer circumferences of all pistons for seizure or scoring. Replace if necessary.
2. Measure the outer diameter of each piston at a right angle (**90°**) to the piston pin, **18 mm (0.709 in) below** the oil ring land lower edge.

Piston diameter mm (in)

	Size	Diameter
FE F8	Standard	85.944—85.964 (3.3836—3.3844)
	0.25 (0.010) oversize	86.194—86.214 (3.3935—3.3942)
	0.50 (0.020) oversize	86.444—86.464 (3.4033—3.4041)
F6	Standard	80.944—80.964 (3.1868—3.1876)
	0.25 (0.010) oversize	81.194—81.214 (3.1966—3.1974)
	0.50 (0.020) oversize	81.444—81.464 (3.2065—3.2072)
	0.75 (0.030) oversize	81.694—81.714 (3.2163—3.2171)
	1.00 (0.039) oversize	81.944—81.964 (3.2261—3.2269)



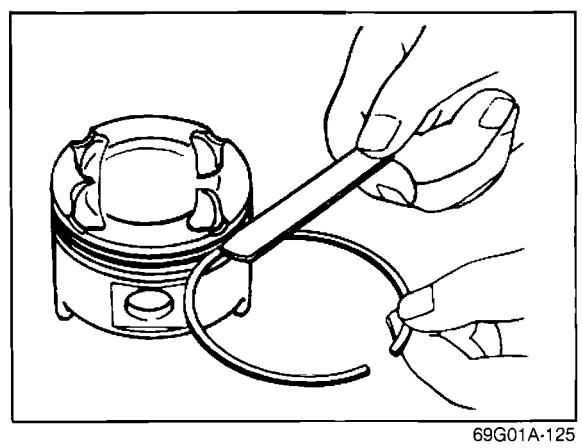
76G01A-130

3. Check the piston to cylinder clearance.

   Clearance:
   0.036—0.075 mm (0.0014—0.0030 in)
   Maximum: 0.15 mm (0.0059 in)

4. If the clearance exceeds the maximum, replace the piston or rebore the cylinders to fit oversize pistons.

   Caution
   If the piston is replaced, replace the piston rings also.



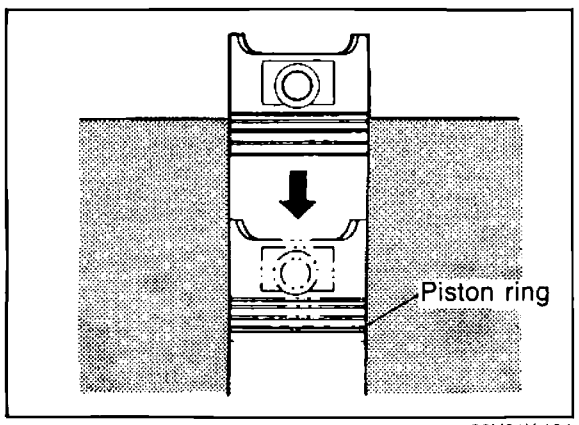
69G01A-125

Piston and Piston Ring

1. Measure the piston ring to ring land clearance around the entire circumference using a new piston ring.

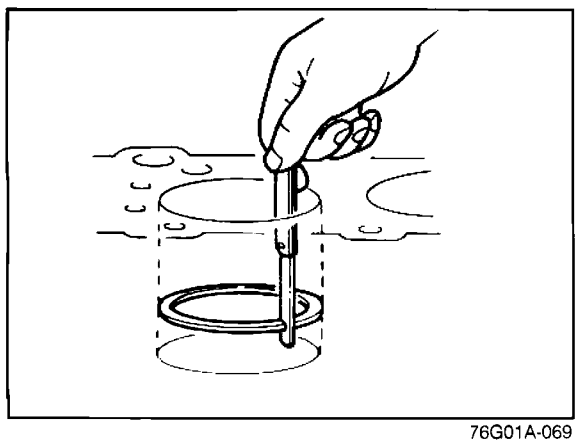
   Clearance (Top and Second):
   0.03—0.07 mm (0.001—0.003 in)
   Maximum: 0.15 mm (0.006 in)

2. If the clearance exceeds the maximum, replace the piston.



86U01X-104

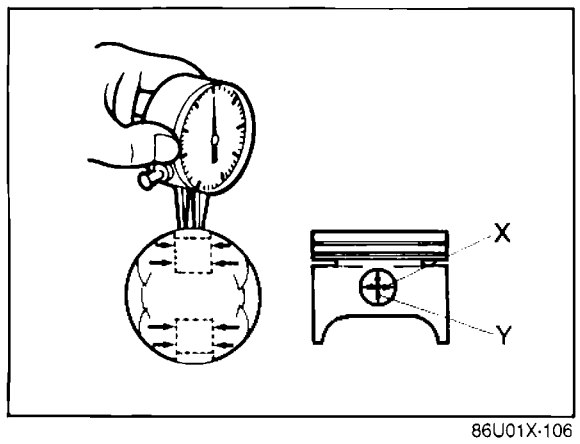
3. Inspect the piston rings for damage, abnormal wear, or breakage. Replace if necessary.
4. Insert the piston ring into the cylinder by hand and push it to the bottom of the ring travel in using the piston.



76G01A-069

5. Measure each piston ring end gap with a feeler gauge. Replace if necessary.

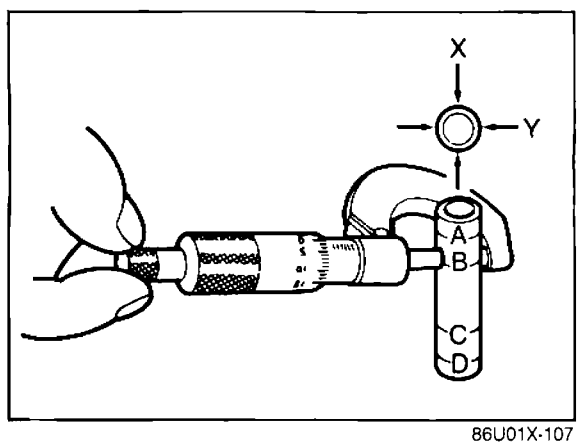
End gap
Top : 0.20—0.35 mm (0.008—0.014 in)
Second: 0.15—0.30 mm (0.006—0.012 in)
Oil rail : 0.20—0.70 mm (0.008—0.028 in)
Maximum: 1.0 mm (0.039 in)



86U01X-106

Piston and Piston Pin
1. Measure the piston pin hole diameter in X and Y directions at four points.

Diameter:
21.988—21.998 mm (0.8657—0.8661 in)



86U01X-107

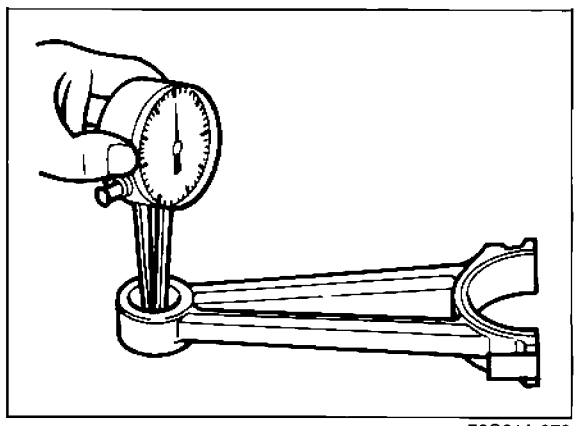
2. Measure the piston pin diameter.

Diameter:
21.974—21.980 mm (0.8651—0.8654 in)

3. Determine the piston pin to piston clearance by subtracting the two figures.

Clearance:
0.008—0.024 mm (0.0003—0.0009 in)

4. If the clearance exceeds the specification, replace the piston and/or piston pin.



76G01A-070

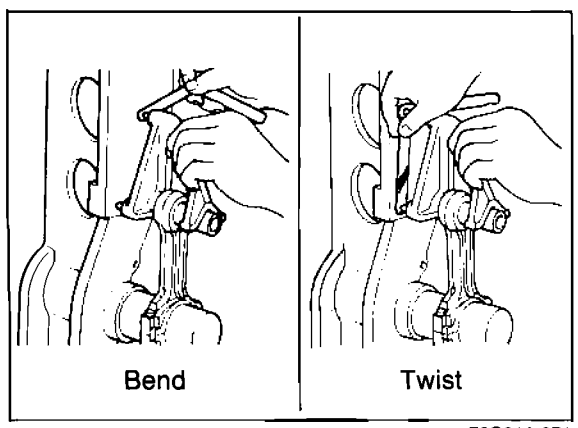
Connecting Rod

1. Measure the connecting rod small end bore.

   Diameter:
   21.943—21.961 mm (0.8640—0.8646 in)

2. Check the interference between the small end bore and piston pin.

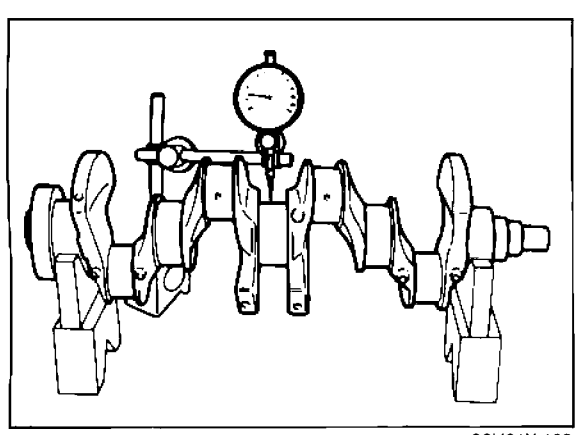
   Interference:
   0.013—0.037 mm (0.0005—0.0015 in)



76G01A-071

3. Check each connecting rod for bending or twisting. Repair or replace if necessary.

   Bend : 0.06 mm (0.0024 in) max.
   Twist: 0.06 mm (0.0024 in) max.

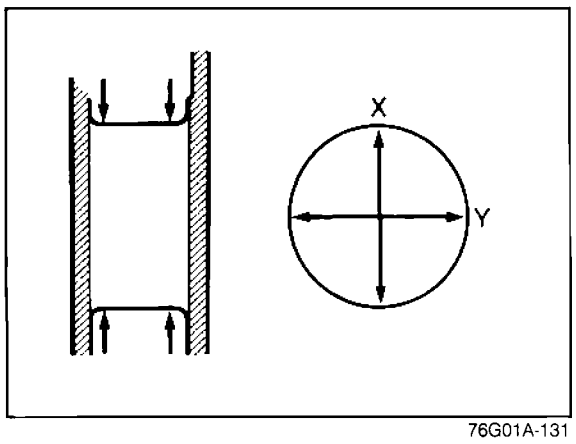


86U01X-109

Crankshaft

1. Check the journals and pins for damage, scoring, or oil hole clogging.
2. Set the crankshaft on V-blocks.
3. Check the crankshaft runout at the center journal. Replace if necessary.

   Runout: 0.03 mm (0.0012 in) max.

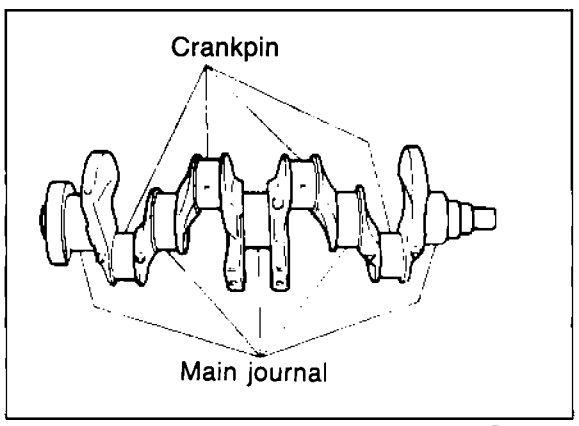


76G01A-131

4. Measure each journal diameter in X and Y directions at two points.

   Main journal
   Diameter:
   59.937—59.955 mm (2.3597—2.3604 in)
   Out-of-round: 0.05 mm (0.0020 in) max.

   Crankpin journal
   Diameter:
   50.940—50.955 mm (2.0055—2.0061 in)
   Out-of-round: 0.05 mm (0.0020 in) max.



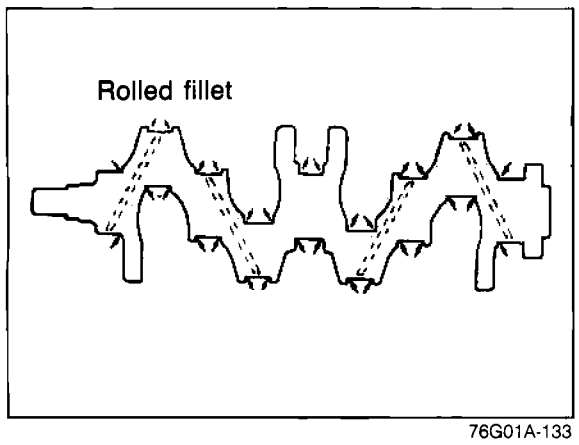
76G01A-132

5. If the diameter is less than the minimum, grind the journals to match undersize bearings.

Undersize bearing: 0.25 mm (0.010 in), 0.50 mm (0.020 in), 0.75 mm (0.030 in)

Main journal diameter undersize mm (in)

Bearing size		Journal diameter
0.25 (0.010) undersize	No.1,2,4,5	59.693—59.711 (2.3501—2.3508)
	No.3	59.687—59.705 (2.3499—2.3506)
0.50 (0.020) undersize	No.1,2,4,5	59.443—59.461 (2.3403—2.3410)
	No.3	59.437—59.455 (2.3400—2.3407)
0.75 (0.030) undersize	No.1,2,4,5	59.193—59.211 (2.3304—2.3311)
	No.3	59.187—59.205 (2.3302—2.3309)

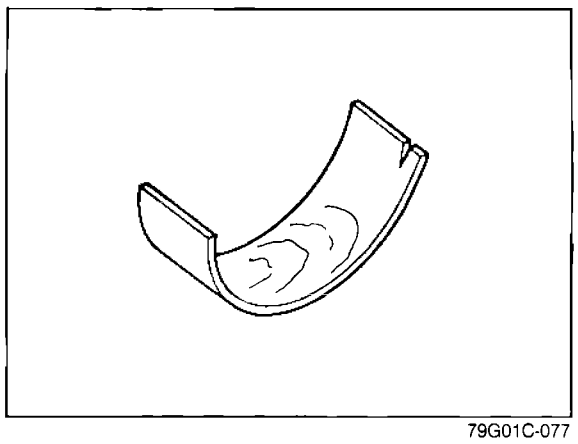


76G01A-133

Crankpin journal diameter undersize mm (in)

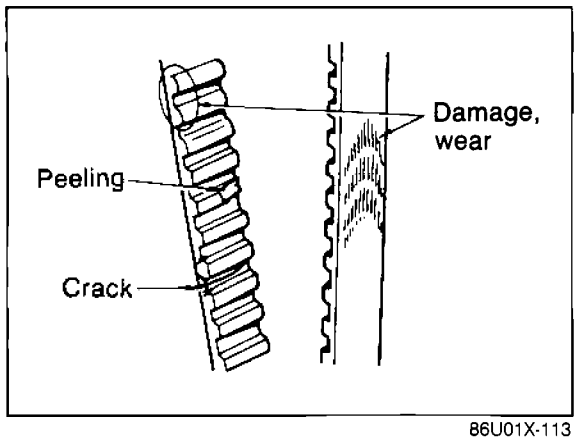
Bearing size	Journal diameter
0.25 (0.010) undersize	50.690—50.705 (1.9957—1.9963)
0.50 (0.020) undersize	50.440—50.455 (1.9858—1.9864)
0.75 (0.030) undersize	50.190—50.205 (1.9760—1.9766)

Caution
Do not grind the rolled fillet area.



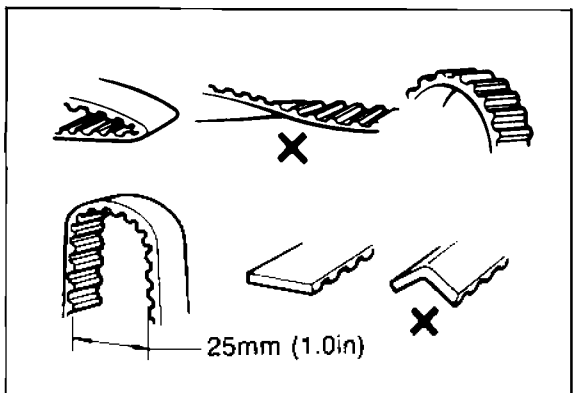
79G01C-077

Main Bearing and Connecting Rod Bearing
Check the main bearings and the connecting rod bearings for peeling, scoring, or other damage.



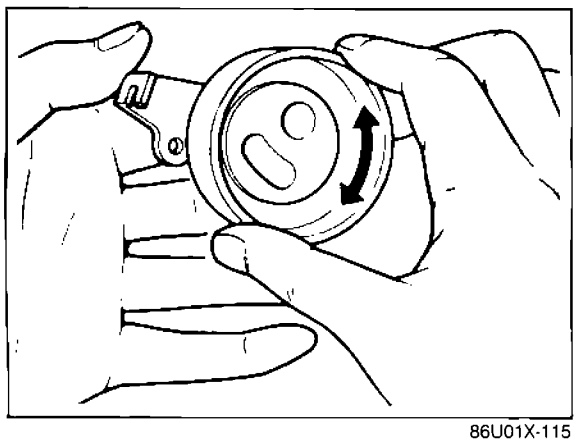
86U01X-113

Timing Belt
1. Replace the timing belt if there is any oil or grease on it.
2. Check the timing belt for damage, wear, peeling, cracks, or hardening. Replace if necessary.



86U01X-114

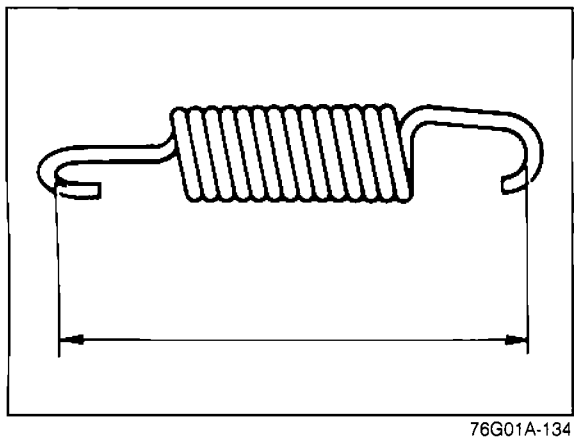
Caution
a) Never forcefully twist, turn inside out, or bend the timing belt.
b) Be careful not to allow oil or grease on the belt.



86U01X-115

Timing Belt Tensioner and Idler Pulley
Check the timing belt tensioner and idler pulley for smooth rotation and abnormal noise. Replace if necessary.

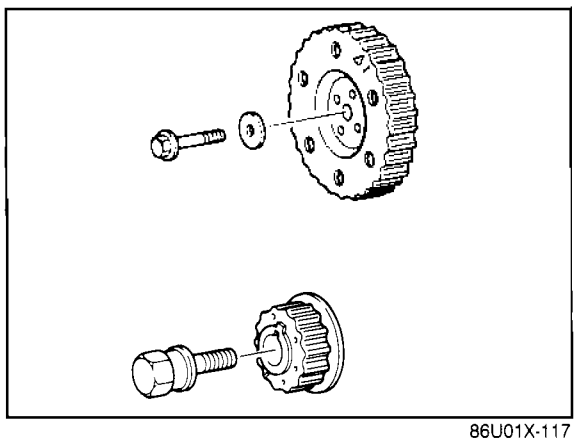
Caution
Do not clean the tensioner with cleaning fluids. If necessary, use a soft rag to wipe it clean, and avoid scratching it.



76G01A-134

Timing Belt Tensioner Spring
Check the free length of the tensioner spring. Replace if necessary.

Free length: 56.9 mm (2.240 in).....FE
64.1 mm (2.524 in).....F8, F6



86U01X-117

Timing Belt Pulley and Camshaft Pulley
Inspect the pulley teeth for wear, deformation, or other damage. Replace if necessary.

Caution
Do not clean the pulley with cleaning fluids. If necessary, use a rag to wipe it clean.

Timing Belt Cover (lower and upper)
Inspect the timing belt covers for damage or cracks. Replace if necessary.

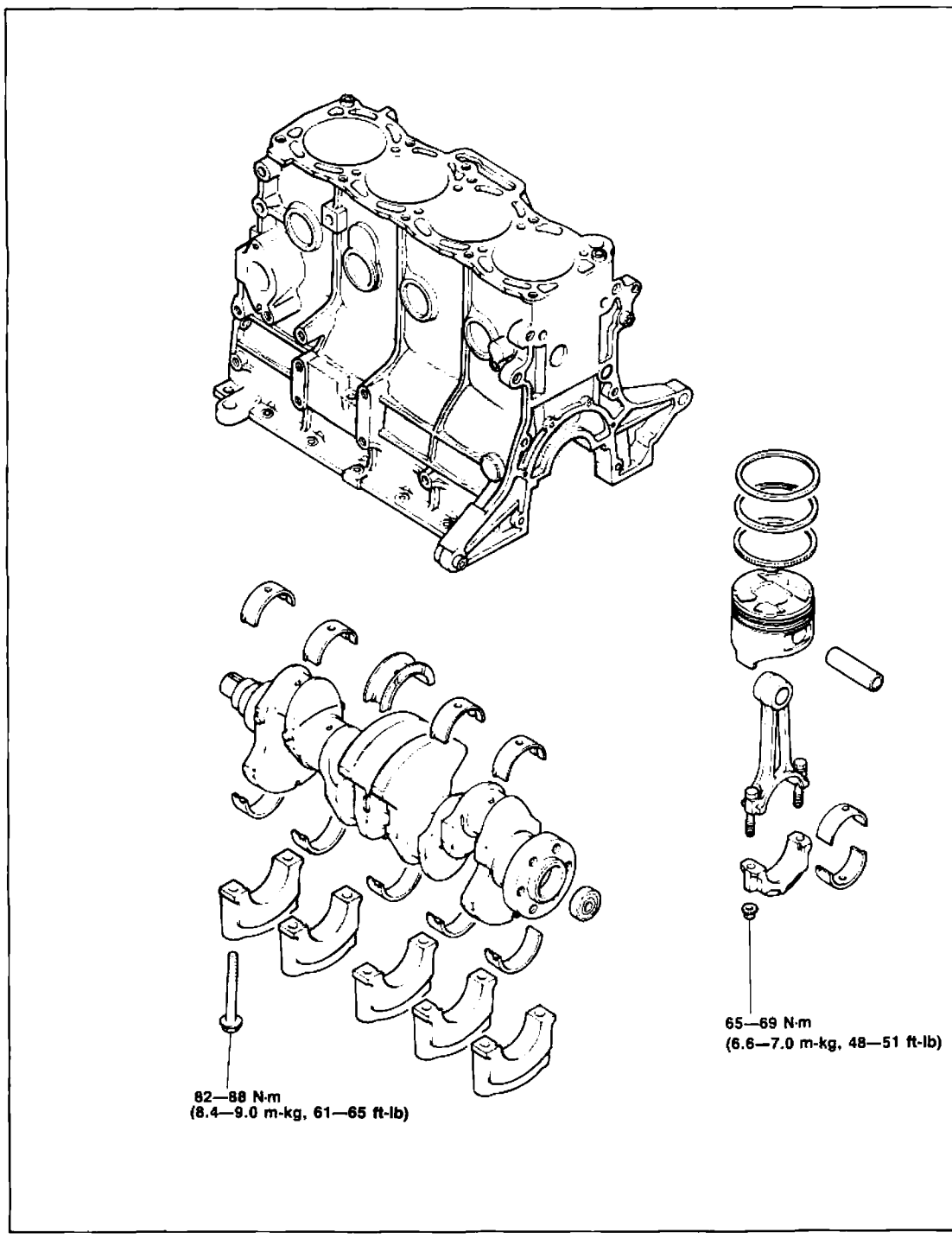
1A ASSEMBLY (CYLINDER BLOCK)

ASSEMBLY

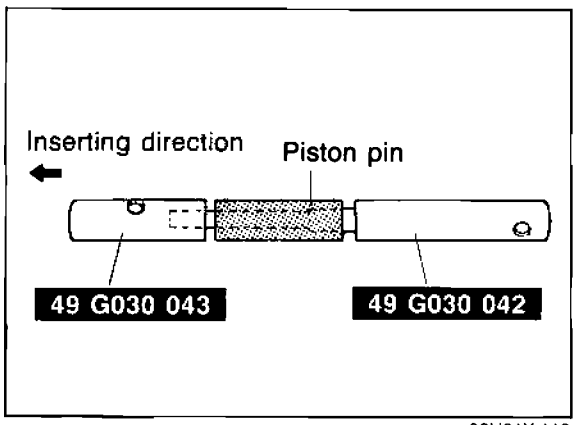
1. Clean all parts before reinstallation.
2. Apply new engine oil to all sliding and rotating parts.
3. Replace plain bearings if they are peeling, burned, or otherwise damaged.
4. Tighten all bolts and nuts to the specified torques.

Caution
Do not reuse gaskets or oil seals.

CYLINDER BLOCK—I
Torque Specifications

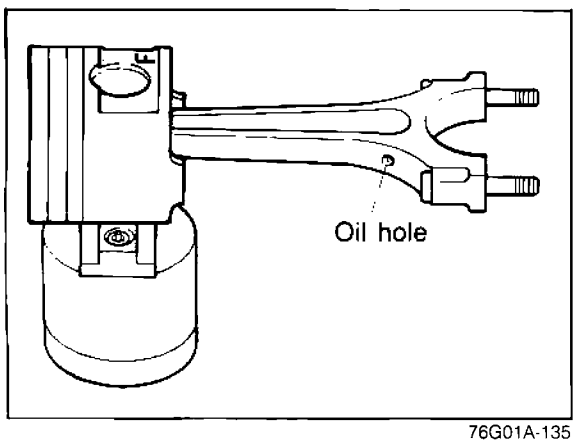


69G01A·139



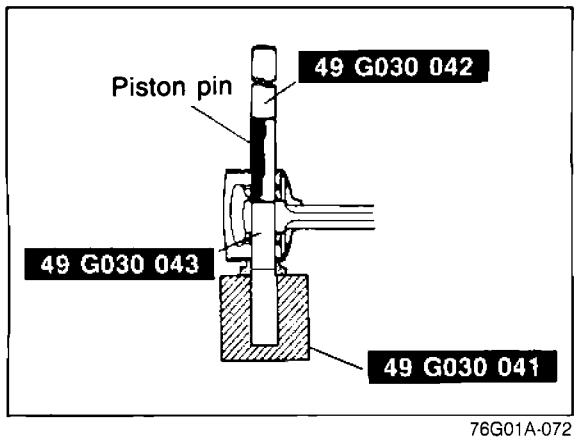
86U01X-118

Connecting Rod
1. Assemble the **SST** to the piston pin.
2. Apply engine oil to the piston pin.



76G01A-135

3. Set the piston on the **SST** with the **F** mark facing upward.
4. Set the connecting rod in piston with the oil hole in the large end opposite the **F** mark.

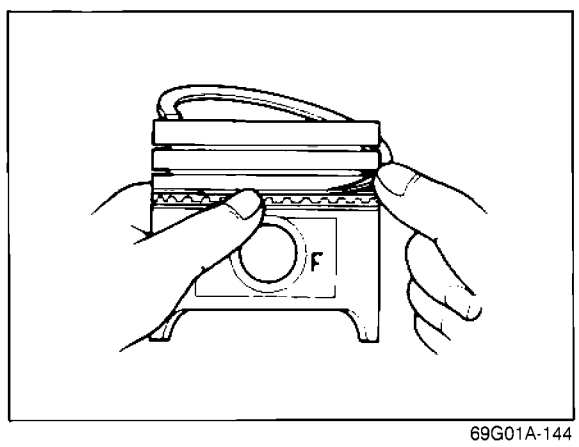


76G01A-072

5. Press the piston pin into the piston and connecting rod until the **SST** contacts the block.
6. While inserting the piston pin, check the pressure force. If it is less than specified, replace the piston pin or the connecting rod.

   Press force:
   5—15 kN (500—1,500 kg, 1,100—3,300 lb)

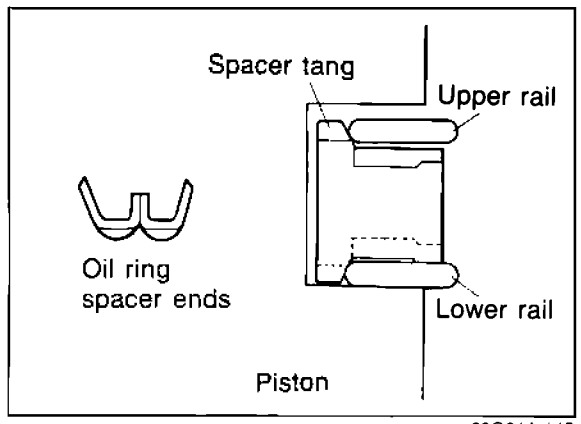
7. Check the oscillation torque of the connecting rod. (Refer to page 1A—47.)



69G01A-144

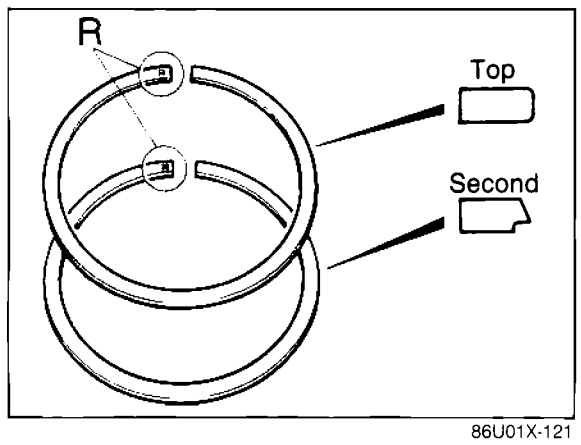
Piston Ring
1. Install the three-piece oil rings on the pistons.
   (1) Apply engine oil to the oil ring spacer and rails.
   (2) Install the oil ring spacer so that the opening faces upward.
   (3) Install the upper rail and lower rail.

   Note
   a) The upper rail and lower rail are the same.
   b) Each rail can be installed with either face upward.



69G01A-145

2. Check that both rails are expanded by the spacer tangs as shown in the figure by checking that both rails turn smoothly in both directions.

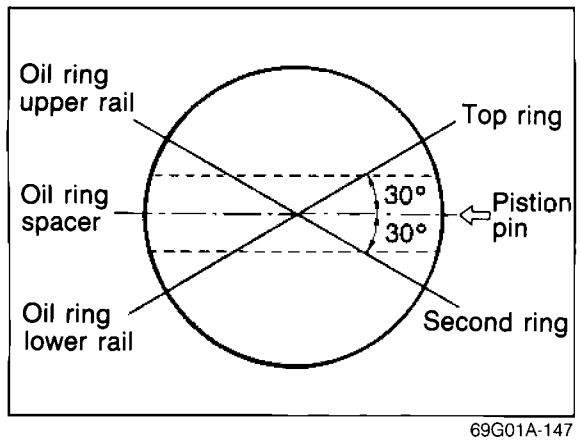


86U01X-121

3. Install the second ring to the piston first, then install the top ring. Use a piston ring expander.

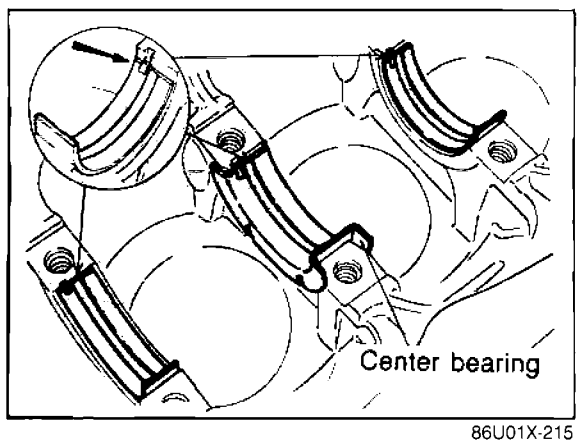
Caution
The rings must be installed with the "R" marks facing upward.

4. Apply a liberal amount of clean engine oil to the second and top piston rings.



69G01A-147

5. Position the opening of each ring as shown in the figure.

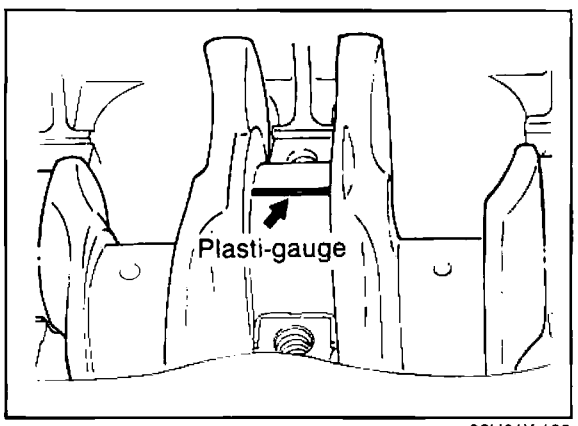


86U01X-215

Crankshaft

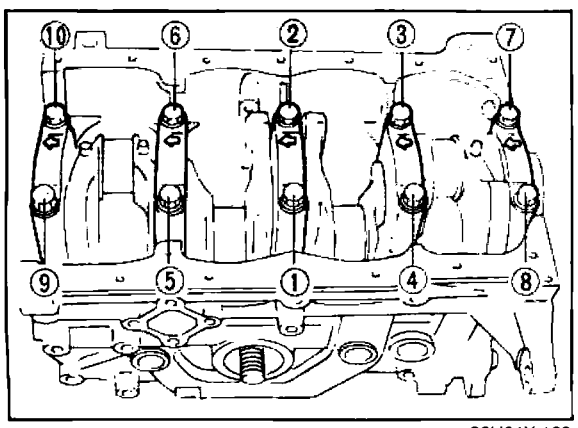
1. Before installing the crankshaft, inspect the main bearing oil clearances as described.

Note
The bearing with thrust shoulders is the center bearing in the cylinder block.



86U01X-122

Oil clearance inspection
(1) Remove any foreign material and oil from the journals and bearings.
(2) Install the upper main bearings in the cylinder block.
(3) Set the crankshaft into the cylinder block.
(4) Position the plasti-gauge on top of the journals in the axial direction.

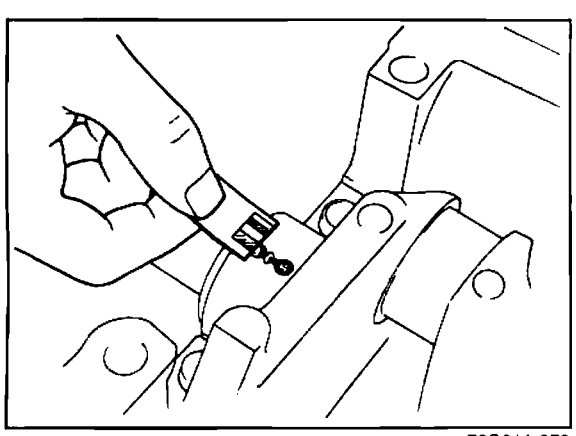


86U01X-123

(5) Install the main bearing caps along with the lower main bearings according to the cap number and ⬅ mark.
(6) Tighten the caps in two or three steps in the order in the figure.

Tightening torque:
82—88 N·m (8.4—9.0 m-kg, 61—65 ft-lb)

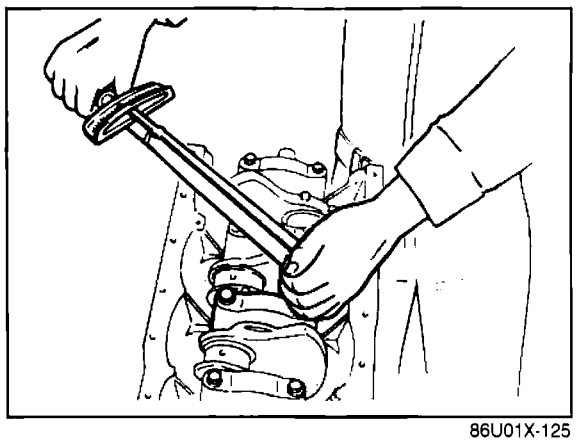
Caution
Do not rotate the crankshaft when measuring the oil clearances.



76G01A-073

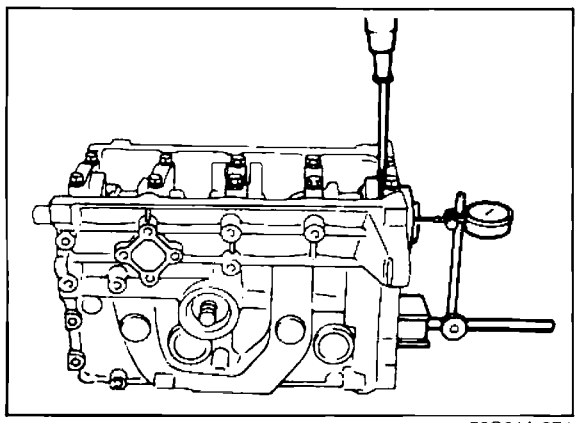
(7) Remove the main bearing caps, and measure the plasti-gauge at each journal at the widest point for the smallest clearance, and at the narrowest point for the largest clearance.
If the oil clearance exceeds specification, grind the crankshaft and use undersize main bearings. (Refer to page 1A—59.)

Oil clearance
No. 1, 2, 4, 5:
0.025—0.043 mm (0.0010—0.0017 in)
No. 3:
0.031—0.049 mm (0.0012—0.0019 in)
Maximum: 0.08 mm (0.0031 in)



86U01X-125

2. Apply a liberal amount of engine oil to the main bearings and main journals.
3. Install the crankshaft and the main bearing caps according to the cap number and ⬅ mark.

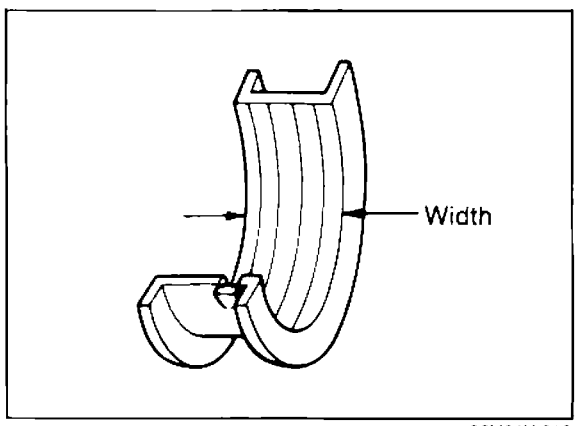


76G01A-074

4. Inspect the crankshaft end play.

End play:
0.08—0.18 mm (0.0031—0.0071 mm)
Maximum: 0.30 mm (0.012 in)

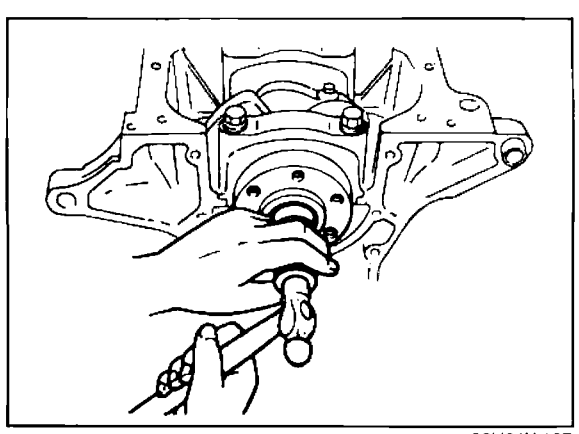
5. If the end play exceeds specification, grind the crankshaft and use undersize center main bearing.



86U01X-216

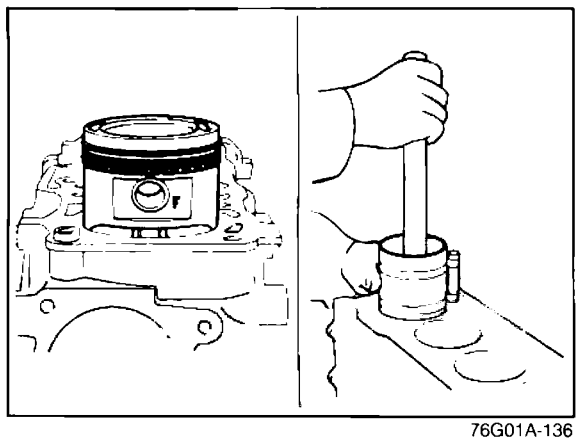
Center main bearing width
Standard:
27.94—27.99 mm (1.1000—1.1020 in)
0.25 mm (0.010 in) undersize:
28.04—28.09 mm (1.1040—1.1059 in)
0.50 mm (0.020 in) undersize:
28.12—28.17 mm (1.1071—1.1091 in)
0.75 mm (0.030 in) undersize:
28.20—28.25 mm (1.1102—1.1122 in)

Note
Wider thrust width is available only in undersize center main bearing.



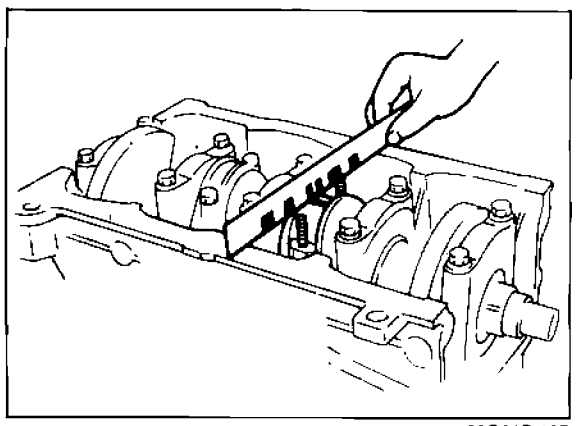
86U01X-127

Pilot Bearing (MTX)
1. Apply engine oil to the outer circumference of the bearing.
2. Set a piece of pipe (outer diameter 30—34 mm, 1.18—1.34 in) against the outer race of the bearing, then tap it evenly into the crankshaft.
3. Lubricate the bearing with grease.



76G01A-136

Piston and Connecting Rod Assembly
1. Apply a liberal amount of clean engine oil to the cylinder walls, piston, and rings.
2. Check the piston rings for the end gap alignment.
3. Insert each piston assembly into the cylinder block with the **F** mark facing the front of the engine. Use a piston installer tool (commercially available).



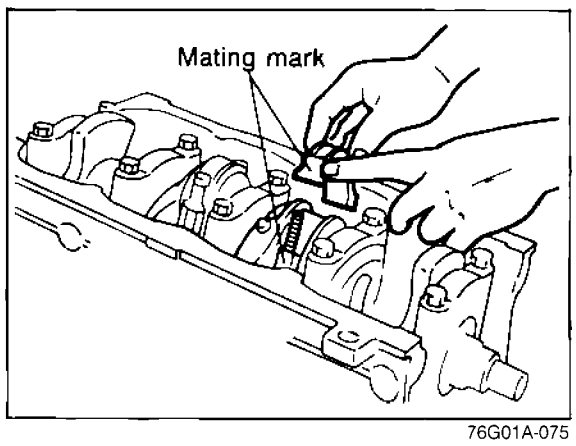
69G01B-137

Connecting Rod Cap

1. Check the connecting rod bearing clearances using the same procedure as used for the main bearing oil clearance.

Connecting rod cap tightening torque:
65—69 N·m (6.6—7.0 m-kg, 48—51 ft-lb)

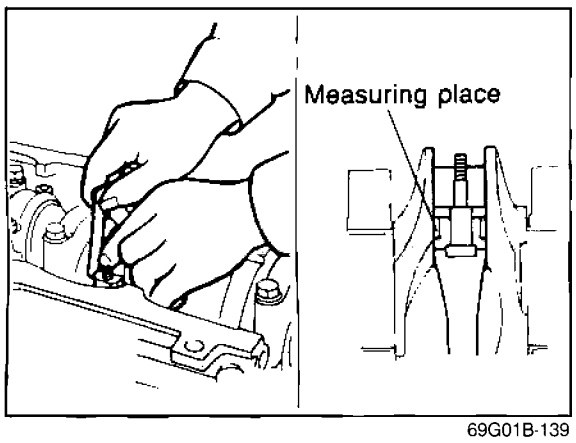
Oil clearance:
0.027—0.067 mm (0.0011—0.0026 in)
Maximum: 0.10 mm (0.0039 in)



76G01A-075

Caution
Align the alignment marks on the cap and on the connecting rod when installing the connecting rod cap.

2. If the oil clearance exceeds specification, grind the crankshaft and use undersize bearings. (Refer to page 1A—59.)

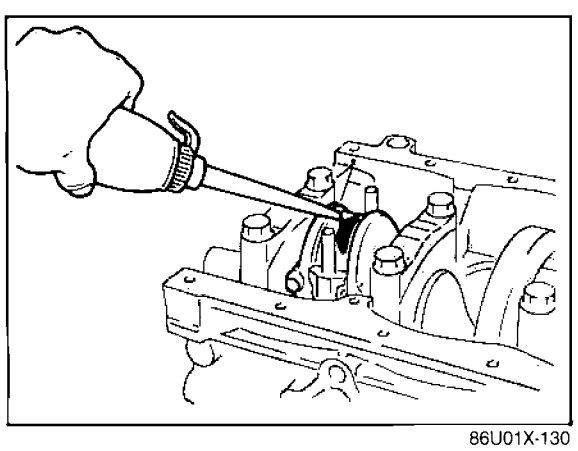


69G01B-139

3. Check the side clearance of each connecting rod without the cap installed.

Side clearance:
0.110—0.262 mm (0.004—0.0103 in)
Maximum: 0.30 mm (0.012 in)

If the clearance exceeds the maximum, replace the connecting rod.

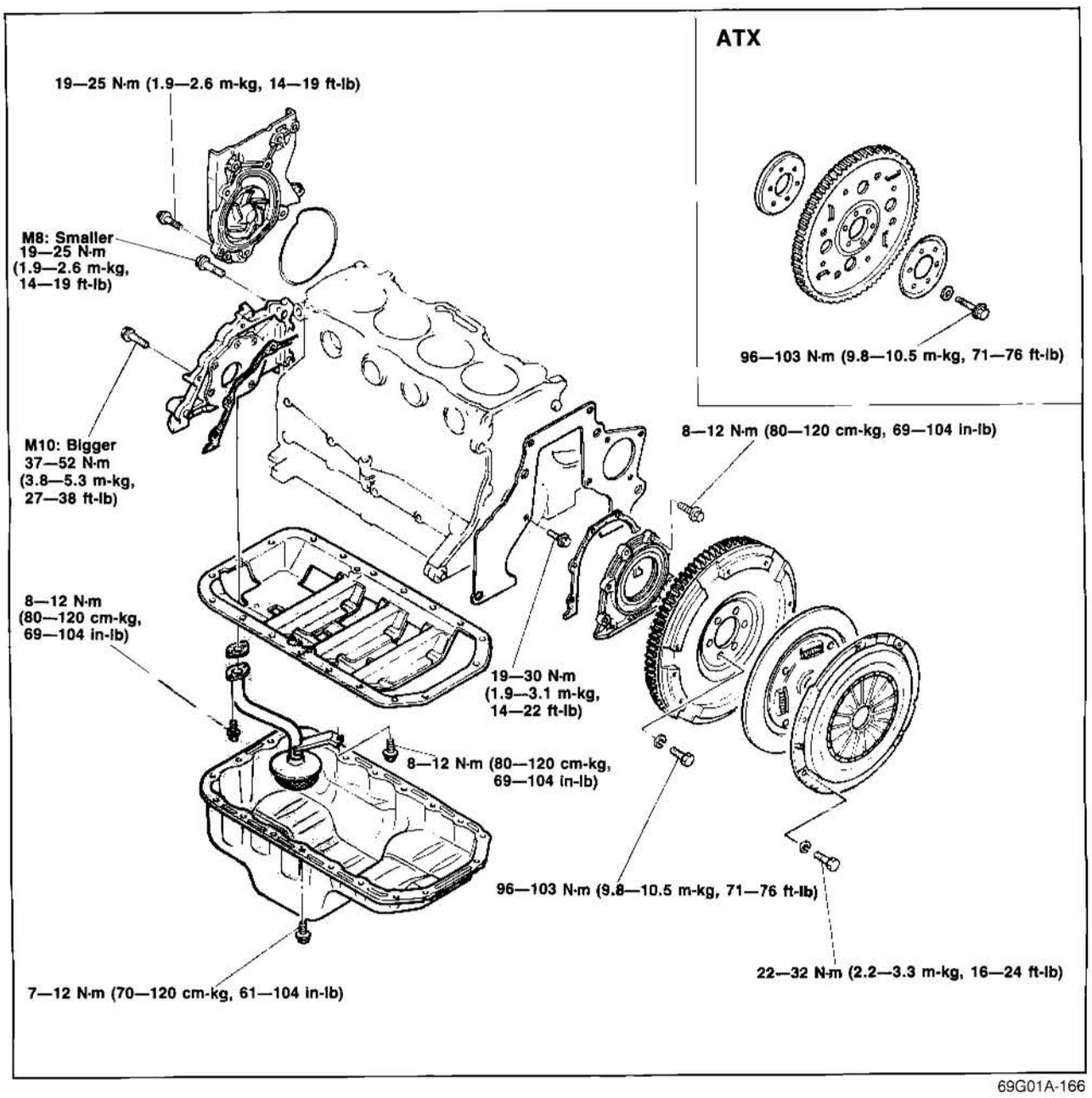


86U01X-130

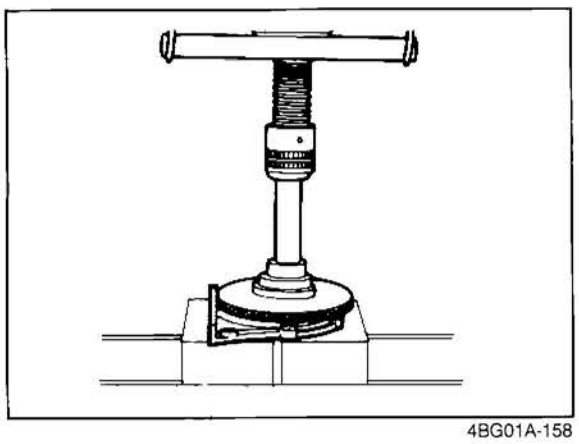
4. Apply a liberal amount of engine oil to the crankpin journal and connecting rod bearing.
5. Install the connecting rod cap with the alignment marks aligned.

Tightening torque:
65—69 N·m (6.6—7.0 m-kg, 48—51 ft-lb)

CYLINDER BLOCK—II
Torque Specifications



69G01A-166

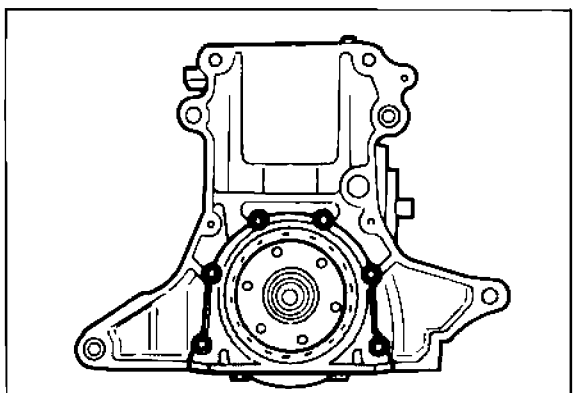


4BG01A-158

Rear Cover

1. Apply engine oil to the rear cover, oil seal and oil seal lip.
2. Press the oil seal into the rear cover.

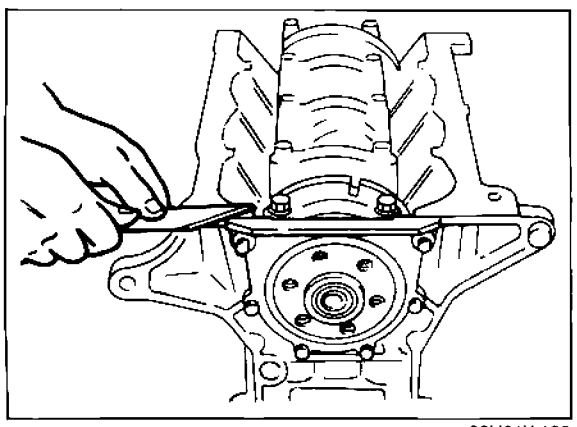
expert22 для http://rutracker.org



86U01X-131

3. Install the rear cover and a new gasket.

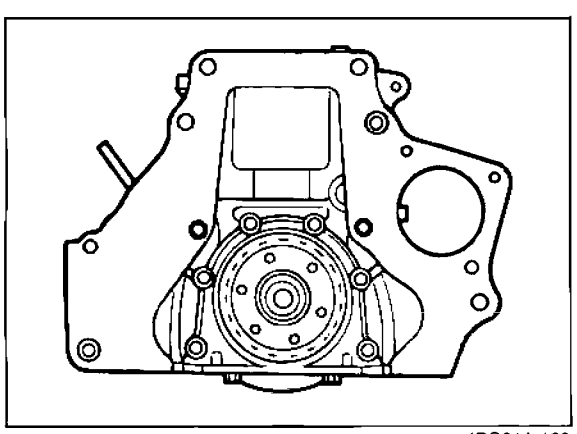
Tightening torque:
8—12 N·m (80—120 cm-kg, 69—104 in-lb)



86U01X-132

4. Cut away the portion of the gasket that projects out from the rear cover assembly toward the oil pan side.

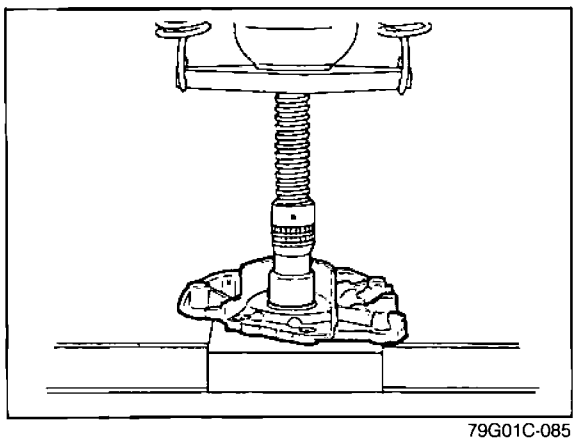
Caution
Do not scratch the rear cover assembly.



4BG01A-160

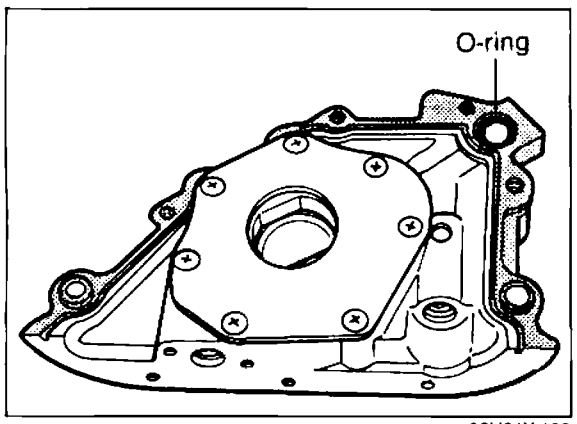
End Plate
Install the end plate.

Tightening torque:
19—30 N·m (1.9—3.1 m-kg, 14—22 ft-lb)



79G01C-085

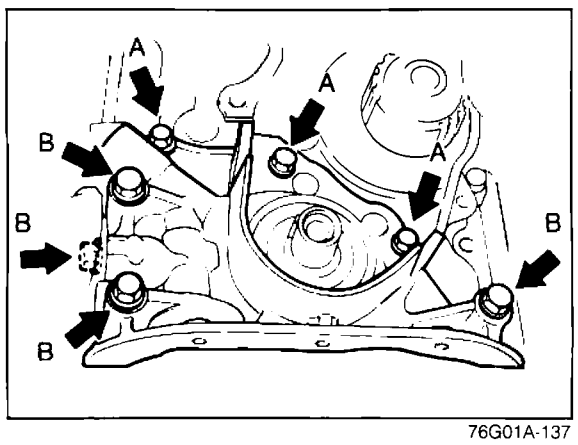
Oil Pump
1. Apply engine oil to a new oil pump oil seal and the oil pump body.
2. Press the oil seal into the oil pump body.



86U01X-133

3. Apply engine oil to the oil seal lip.
4. Remove any dirt or other material from the contact surfaces.
5. Apply a continuos bead of silicon sealant to the contact surface of the oil pump.

Caution
Do not allow any sealant to get into the oil hole.

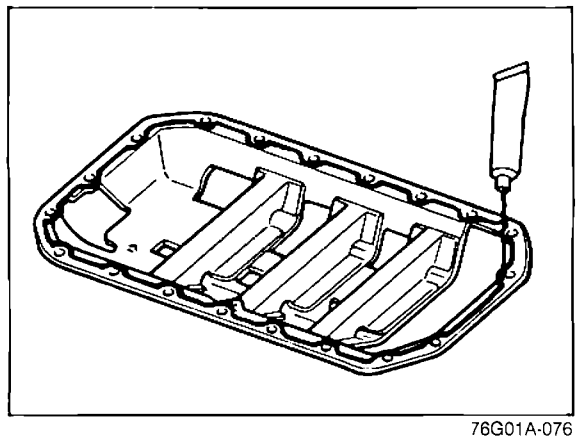


76G01A-137

6. Install a new O-ring into the pump body.
7. Install the oil pump.

Tightening torque
Ⓐ: 19—25 N·m
(1.9—2.6 m-kg, 14—19 ft-lb)
Ⓑ: 37—52 N·m
(3.8—5.3 m-kg, 27—38 ft-lb)

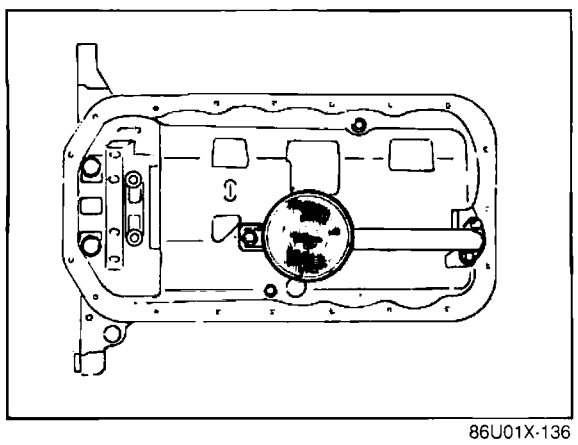
8. Remove any sealant which has been squeezed out.



76G01A-076

Stiffener (FE 8-valve...only ECE, 12-valve)
1. Remove any dirt or other material from the contact surface.
2. Apply a continuous bead of silicon sealant to the stiffener along the inside of the bolt holes, and overlap the ends.
3. Install the stiffener.

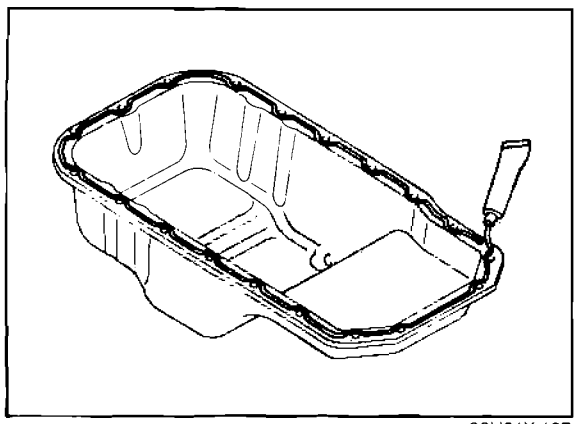
Tightening torque:
7—12 N·m (70—120 cm-kg, 61—104 in-lb)



86U01X-136

Oil Strainer
Install the oil strainer and a new gasket.

Tightening torque:
8—12 N·m (80—120 cm-kg, 69—104 in-lb)

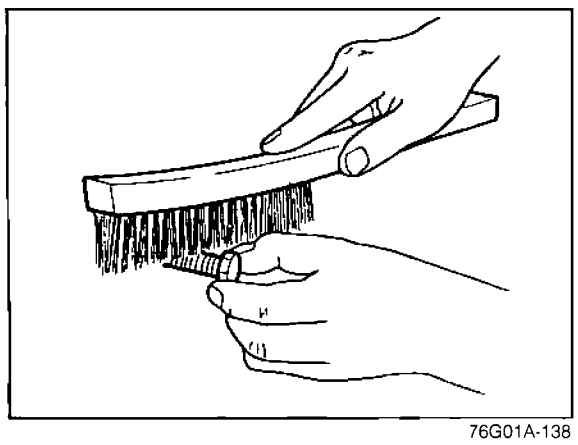


86U01X-137

Oil Pan

1. Apply a continuous bead of silicon sealant to the oil pan along the inside of the bolt holes, and overlap the ends.
2. Install the oil pan.

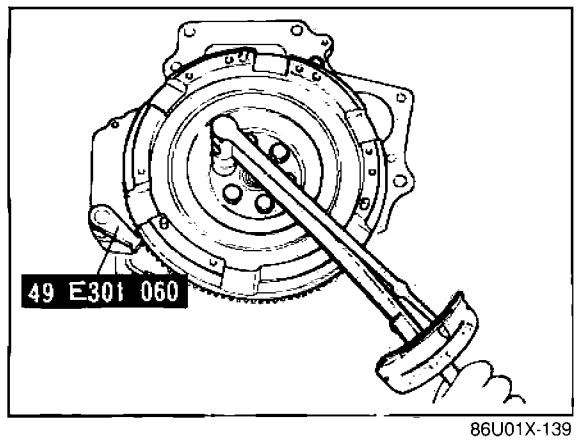
Tightening torque:
7—12 N·m (70—120 cm-kg, 61—104 in-lb)



76G01A-138

Flywheel (MTX), Drive Plate (ATX)

1. Remove any old sealant from the bolts and bolt holes. If old sealant can not be removed from the bolt, replace it.
2. Apply sealant to the bolt threads.

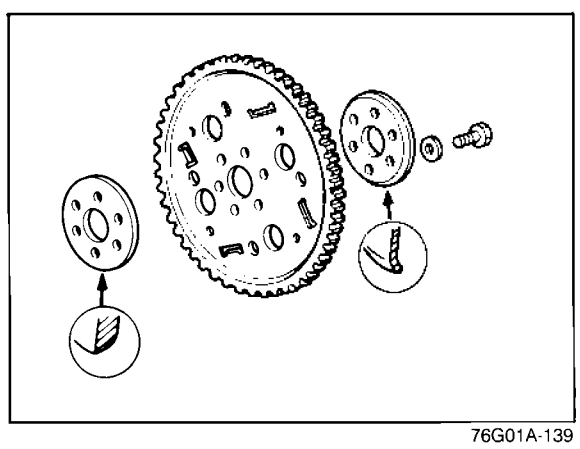


86U01X-139

(MTX)

3. Install, and tighten the flywheel with the **SST**.

Tightening torque:
96—103 N·m (9.8—10.5 m-kg, 71—76 ft-lb)

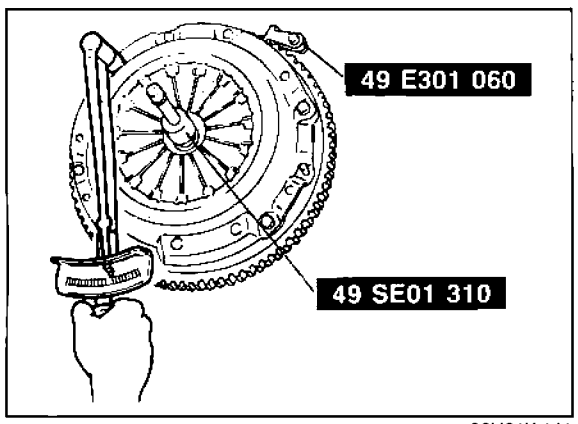


76G01A-139

(ATX)

3. Install, and tighten the drive plate adaptor, drive plate, and backing plate with the **SST**.

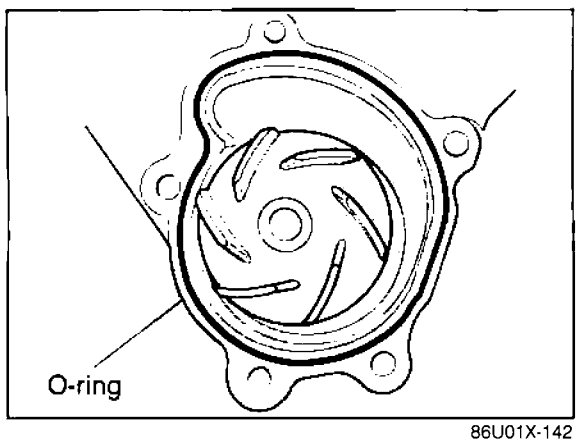
Tightening torque:
96—103 N·m (9.8—10.5 m-kg, 71—76 ft-lb)



86U01X-141

Clutch Disc and Clutch Cover (MTX)
Install the clutch disc and clutch cover using the **SST**. (Refer to Section 6.)

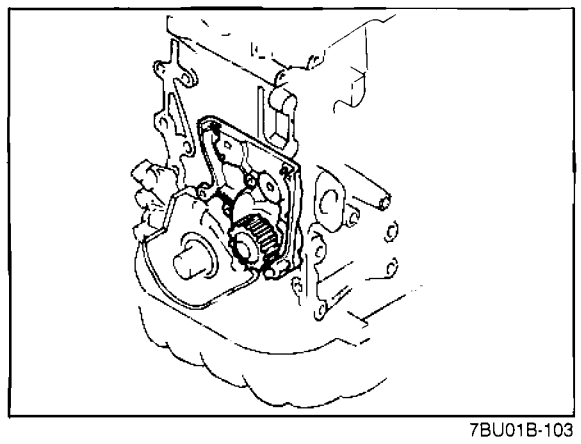
Tightening torque:
22—32 N·m (2.2—3.3 m-kg, 16—24 ft-lb)



86U01X-142

Water Pump
1. Remove all dirt, grease, and other material from the water pump mounting surface.
2. Place a new O-ring in position.

Caution
Do not reuse the original O-ring.

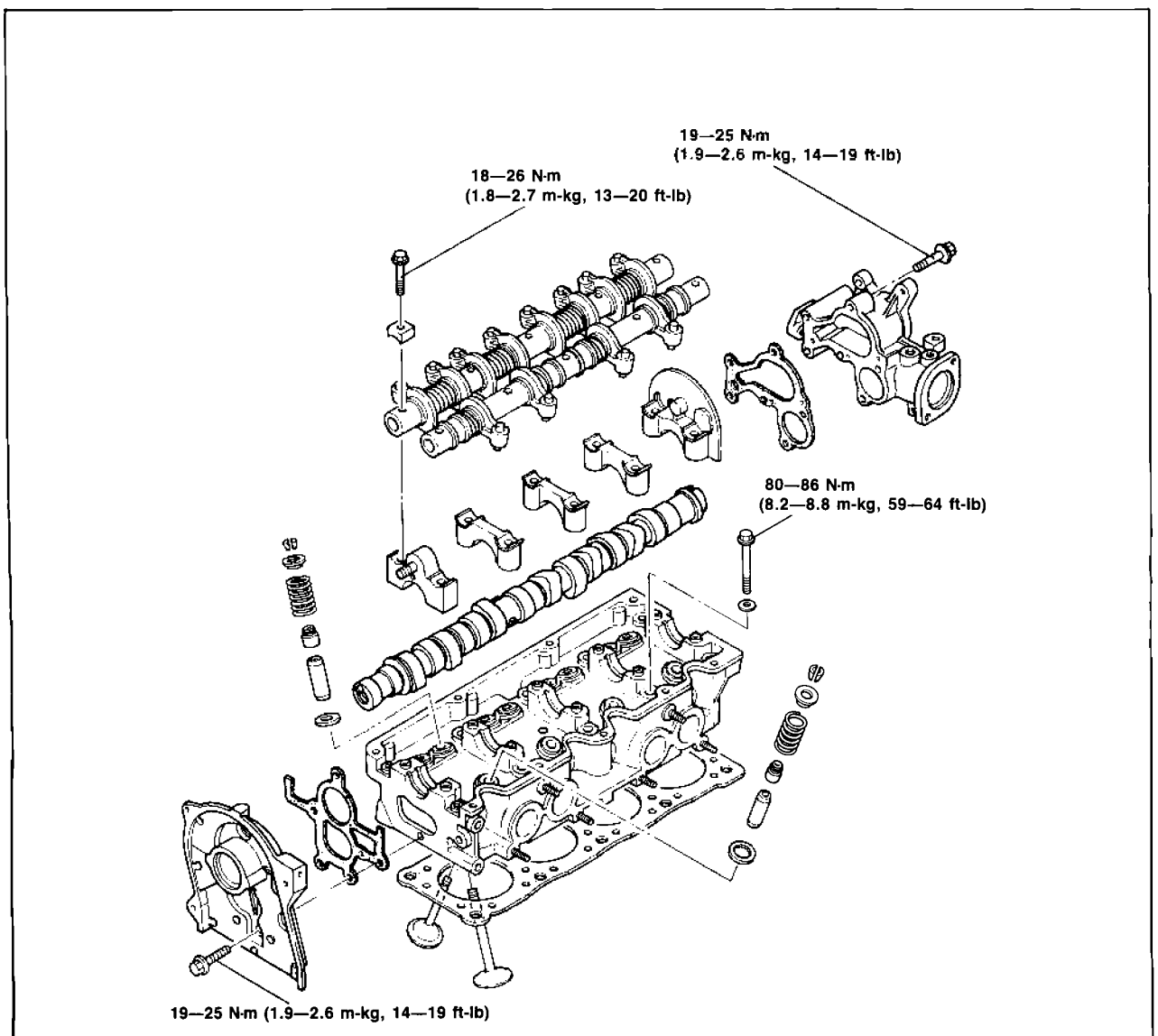


7BU01B-103

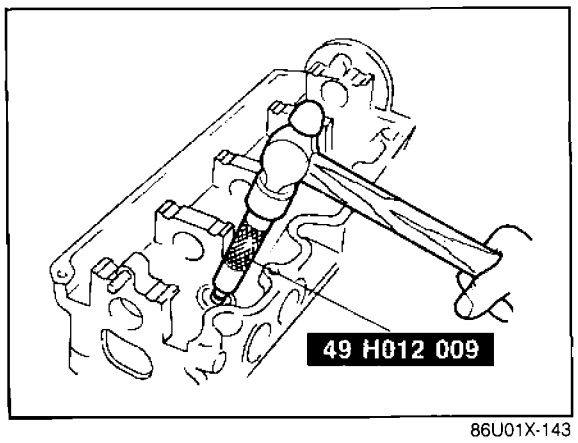
3. Install the water pump.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

CYLINDER HEAD (12-valve)
Torque Specifications



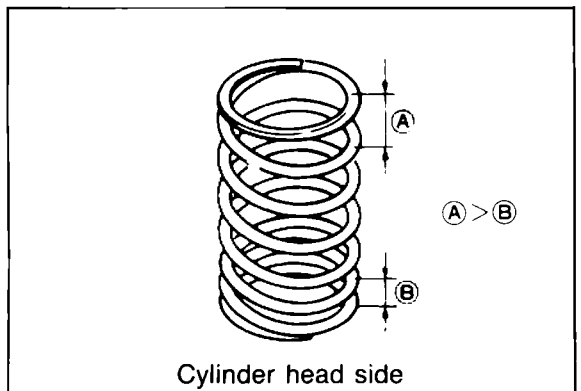
76G01A-077



86U01X-143

Valve Seal

1. Apply engine oil to the inside of the new valve seal.
2. Install the valve seal onto the valve guide with the **SST**.



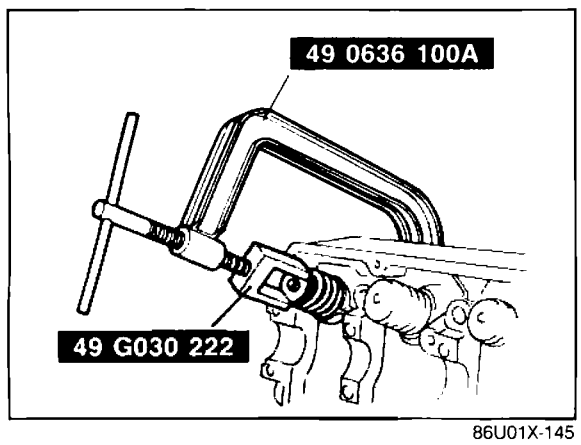
Cylinder head side

86U01X-144

Valve and Valve Spring

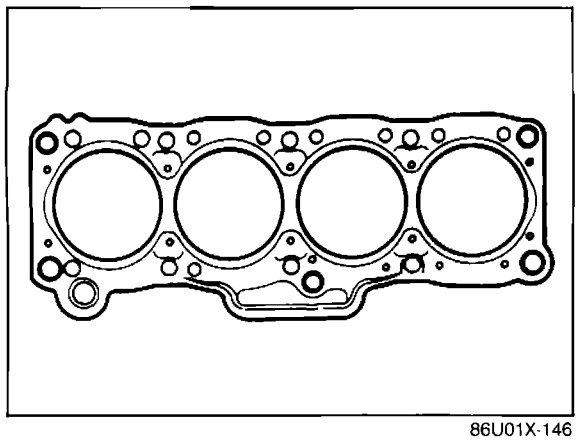
1. Install the lower spring seat.
2. Install the valve.
3. Install the valve springs and the upper spring seat.

Note
Install the valve spring with the closer pitch toward the cylinder head.



86U01X-145

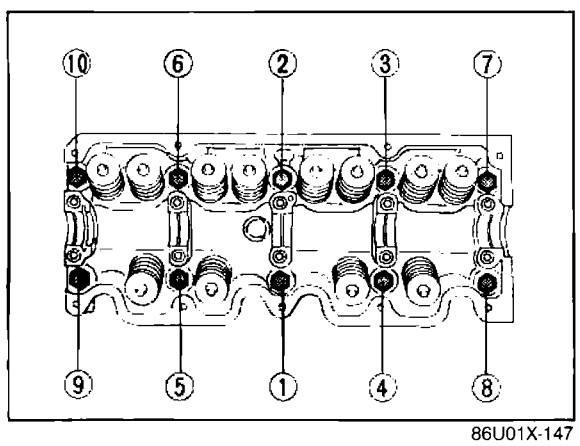
4. Compress the valve spring with the **SST**; then install the valve keepers.
5. Tap the end of the valve stem lightly two or three times with a plastic hammer to confirm that the keepers are all fully seated.



86U01X-146

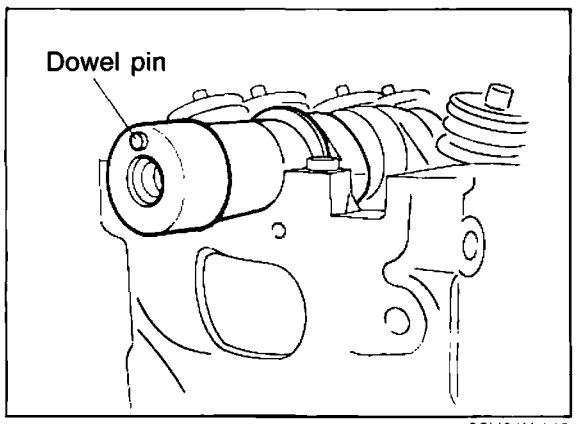
Cylinder Head

1. Thoroughly remove all dirt, oil, or other material from the top of the cylinder block.
2. Place the new cylinder head gasket in position.
3. Install the cylinder head.
4. Apply engine oil to the bolt threads and seat faces.
5. Tighten the cylinder head bolts in two or three steps in the order shown in the figure.



86U01X-147

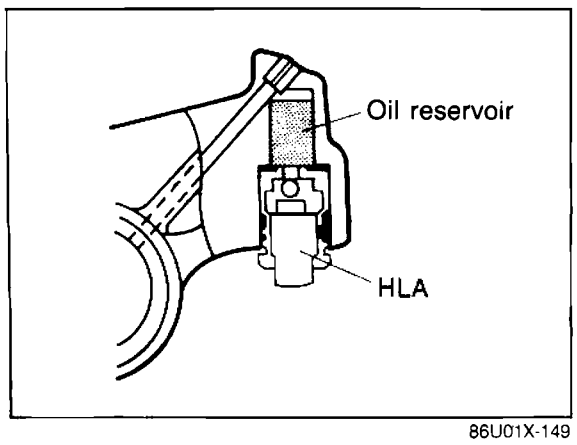
Tightening torque:
80—86 N·m (8.2—8.8 m-kg, 59—64 ft-lb)



86U01X-148

Camshaft

1. Apply a liberal amount of engine oil to the journals and bearings.
2. Place the camshaft in position with the dowel pin facing straight up.

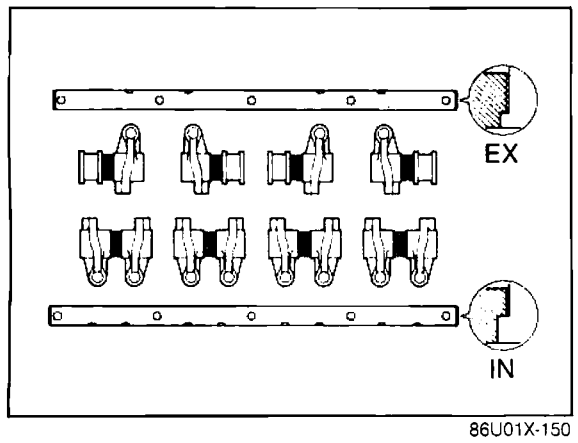


86U01X-149

Hydraulic Lash Adjuster (HLA)

1. Pour engine oil into the oil reservoir in the rocker arm.
2. Apply engine oil to the new HLA.
3. Carefully install the HLA into the rocker arm.

Caution
Be careful not to damage the O-ring when installing the HLA.

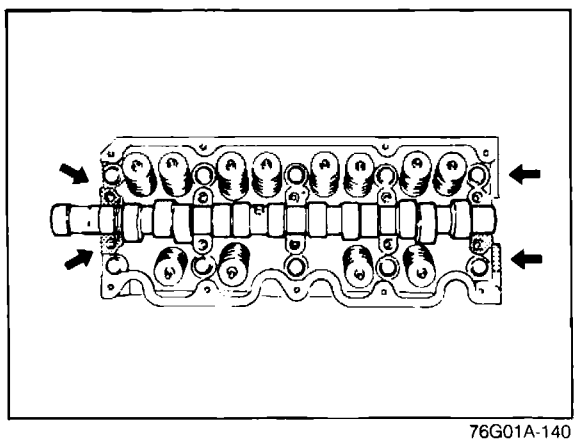


86U01X-150

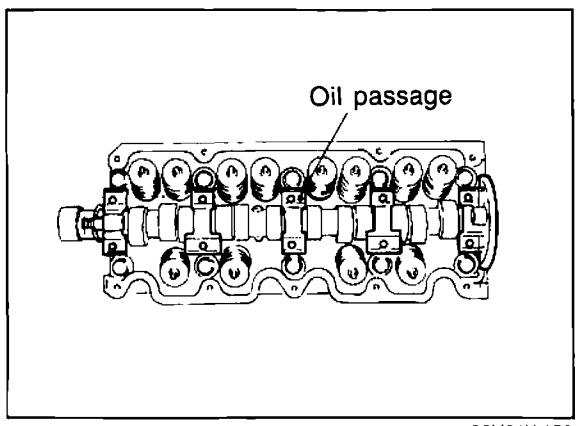
Camshaft Cap, Rocker Arm and Shaft Assembly

1. Assemble the rocker arm and shaft assembly as shown in the figure.

Note
a) The intake side shaft has twice as many oil holes as the exhaust side shaft.
b) The stepped ends are the rear of the shafts.


76G01A-140

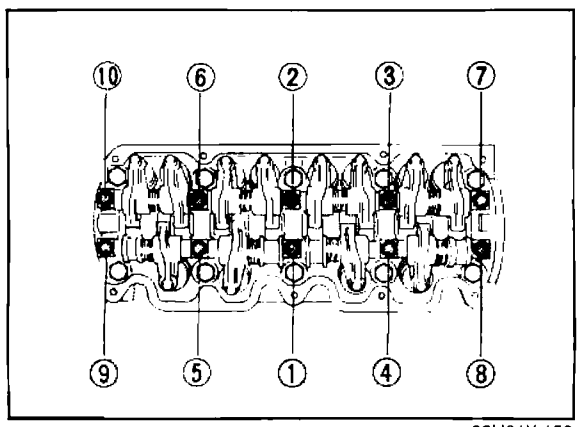
2. Apply silicon sealant to the shaded areas shown in the figure.



86U01X-152

3. Apply liberal amount of clean engine oil to the cam lobes and journals.
4. Position the camshaft caps according to the ⬅ mark.

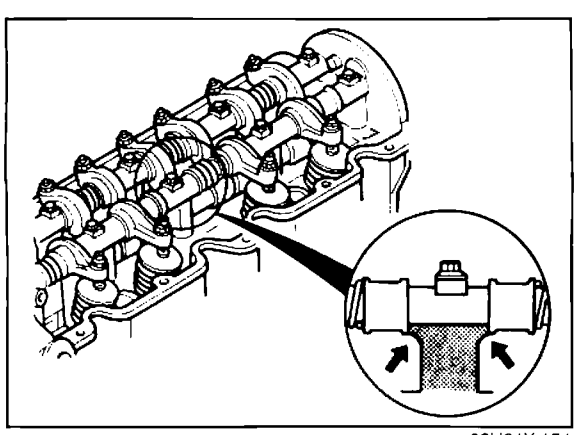
Note
The No. 3 camshaft cap has an oil passage from the cylinder head, be certain it is installed correctly.



86U01X-153

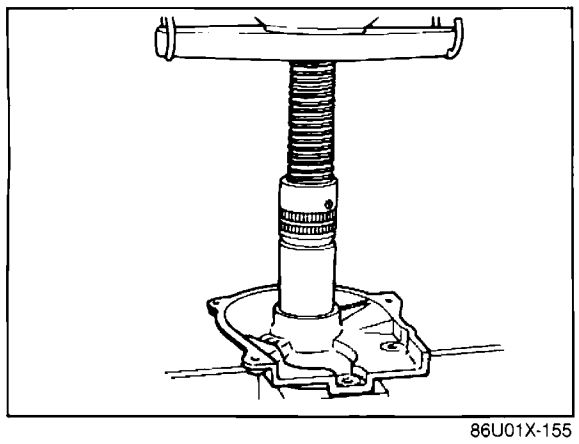
5. Install the rocker arm and shaft assemblies. Tighten the bolts in two or three steps in the order shown in the figure.

Tightening torque:
18—26 N·m (1.8—2.7 m-kg, 13—20 ft-lb)



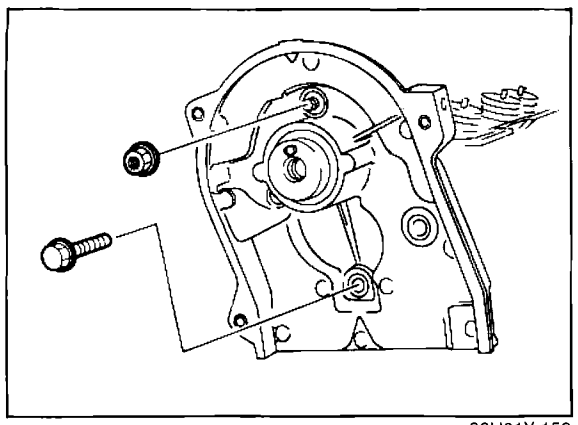
86U01X-154

Caution
Be careful that the rocker arms or spacers do not get caught between the shaft and camshaft cap.



86U01X-155

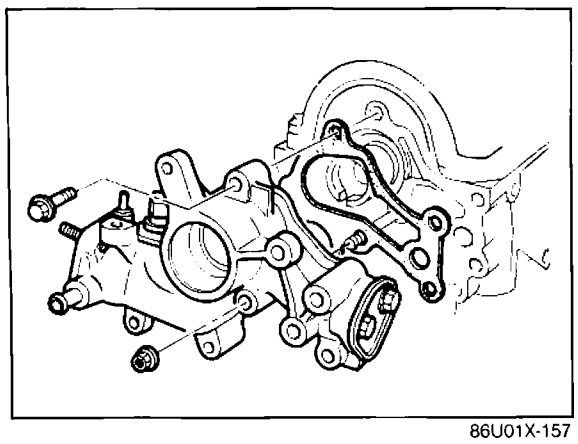
Front Housing
1. Apply engine oil to the front housing and a new oil seal.
2. Press the oil seal into the front housing.



86U01X-156

3. Apply engine oil to the oil seal lip.
4. Install the front housing and a new gasket.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



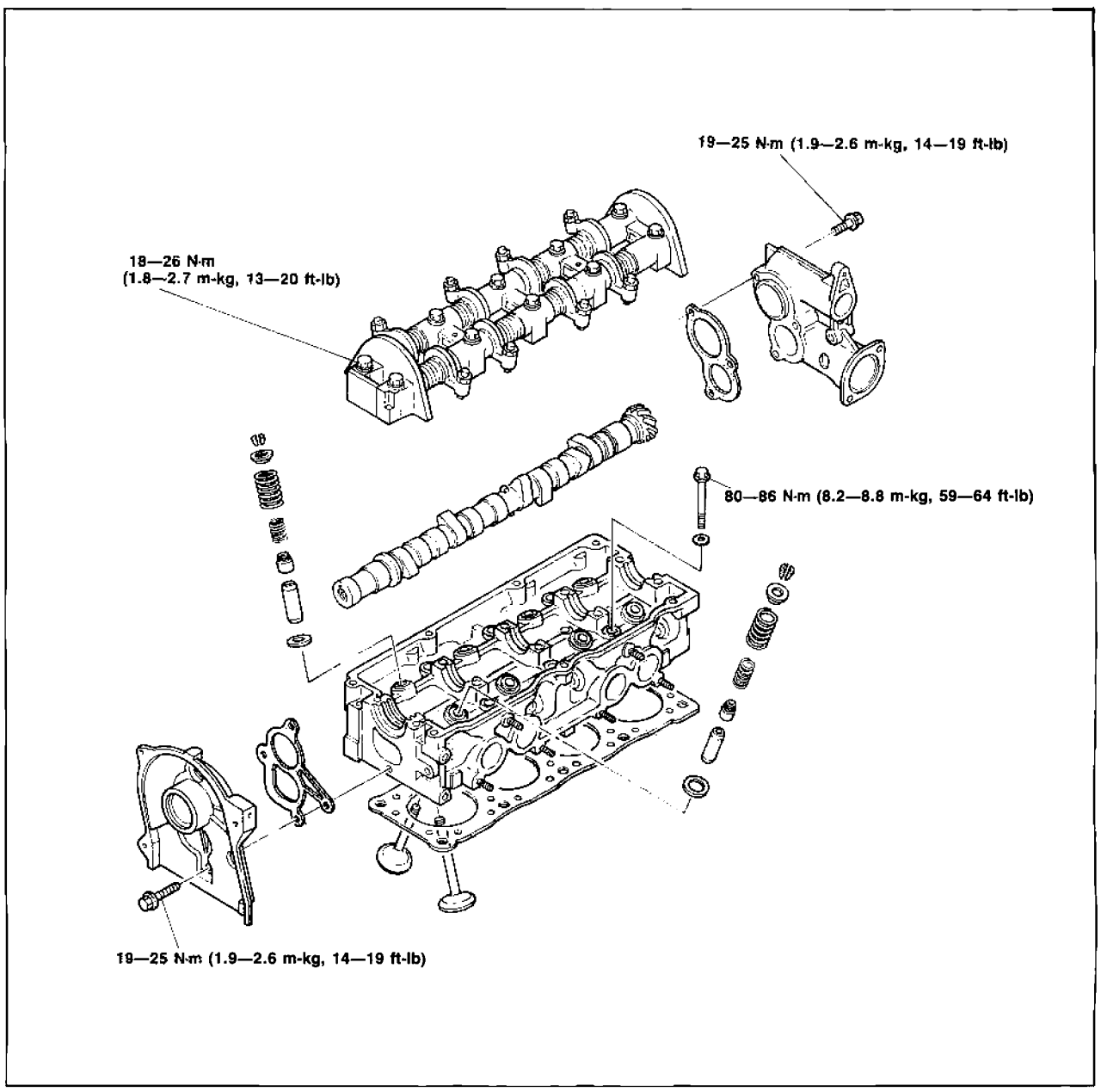
86U01X-157

Rear Housing
Install the rear housing and a new gasket.

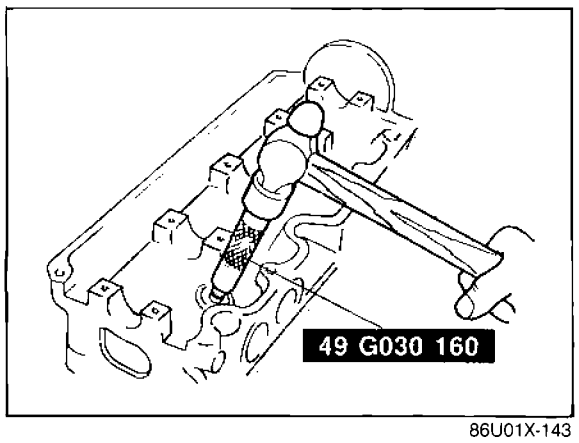
Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

1A ASSEMBLY (CYLINDER HEAD)

CYLINDER HEAD (8-valve)
Torque Specifications



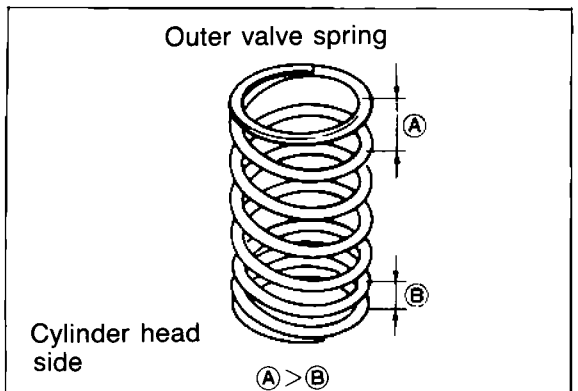
76G01A-078



86U01X-143

Valve Seal

1. Apply engine oil to the inside of the new valve seal.
2. Install the valve seal onto the valve guide with the **SST**.

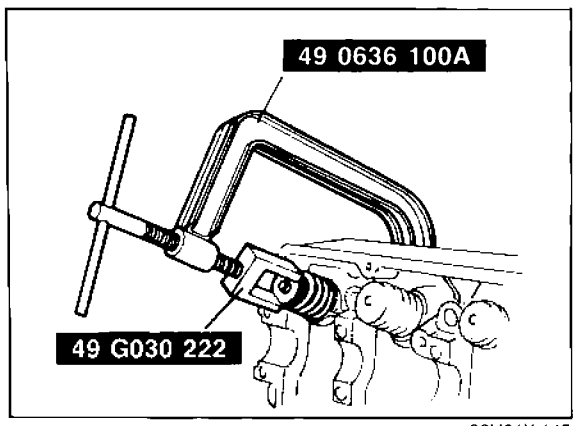


76G01A-079

Valve and Valve Spring

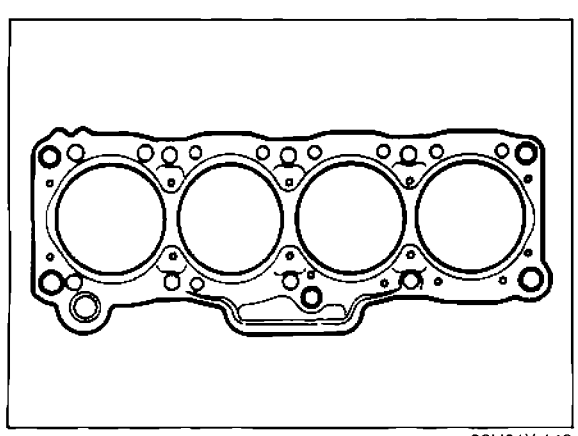
1. Install the lower spring seat.
2. Install the valve.
3. Install the valve springs and the upper spring seat.

Note
Install the outer valve spring with the closer pitch toward the cylinder head.



86U01X-145

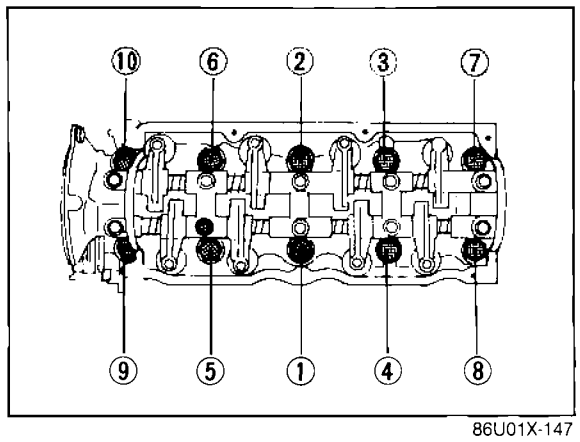
4. Compress the valve spring with the **SST**; then install the valve keepers.
5. Tap the end of the valve stem lightly two or three times with a plastic hammer to confirm that the keepers are all fully seated.



86U01X-146

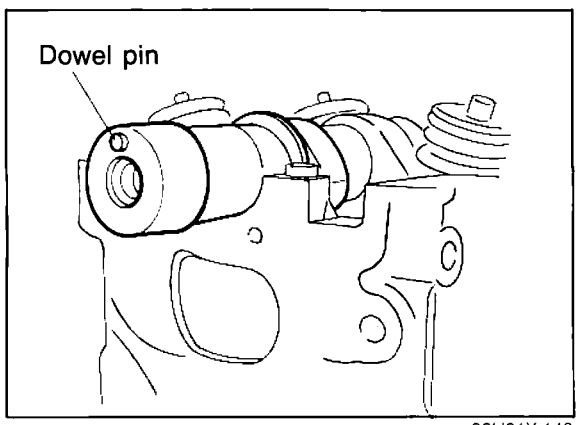
Cylinder Head

1. Thoroughly remove all dirt, oil, or other material from the top of the cylinder block.
2. Place the new cylinder head gasket in position.
3. Install the cylinder head.
4. Apply engine oil to the bolt threads and seat faces.
5. Tighten the cylinder head bolts in two or three steps in the order shown in the figure.



86U01X-147

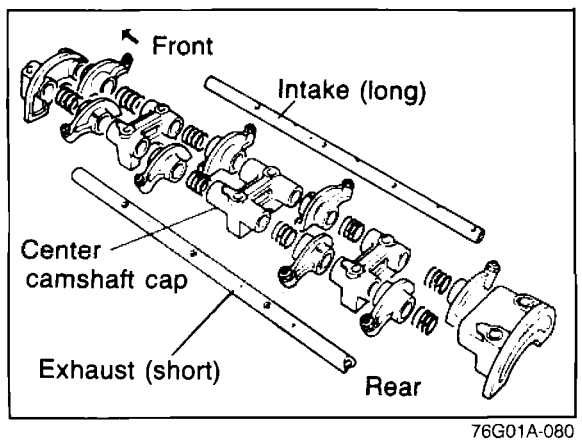
Tightening torque:
80—86 N·m (8.2—8.8 m-kg, 59—64 ft-lb)



86U01X-148

Camshaft

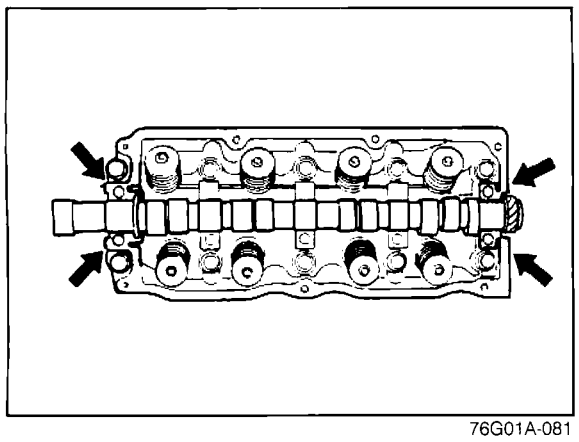
1. Apply a liberal amount of engine oil to the journals and bearings.
2. Place the camshaft in position with the dowel pin facing straight up.



76G01A-080

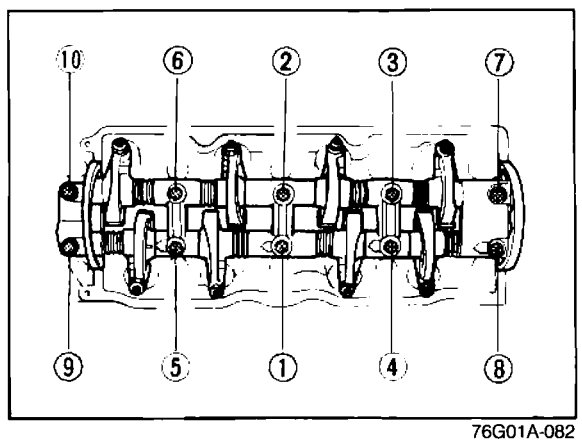
Rocker Arm and Shaft Assembly

1. Assemble the rocker arm and shaft assembly as shown in the figure.



76G01A-081

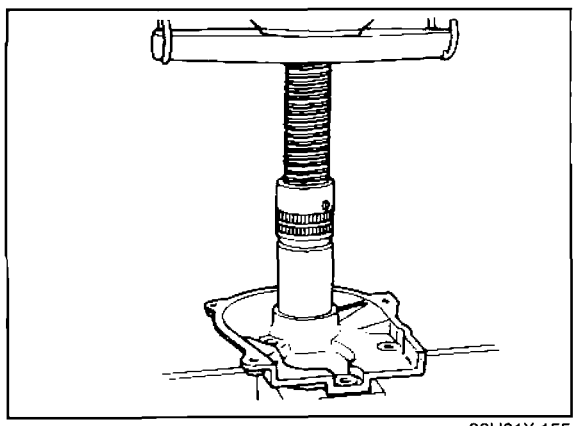
2. Apply silicon sealant to the shaded areas shown in the figure.
3. Apply liberal amount of clean engine oil to the cam lobes and journals.



76G01A-082

5. Install the rocker arm and shaft assembly. Tighten the bolts in two or three steps in the order shown in the figure.

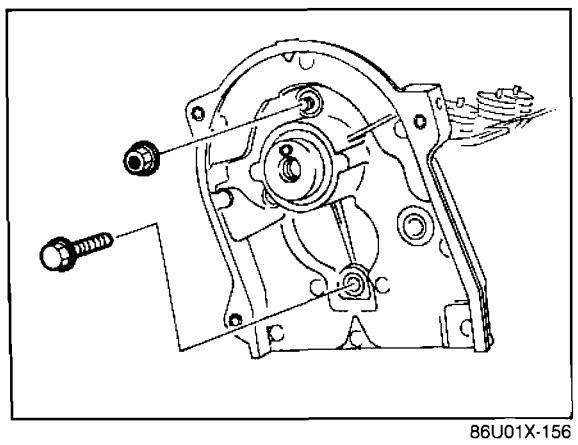
Tightening torque:
18—26 N·m (1.8—2.7 m-kg, 13—20 ft-lb)



86U01X-155

Front Housing

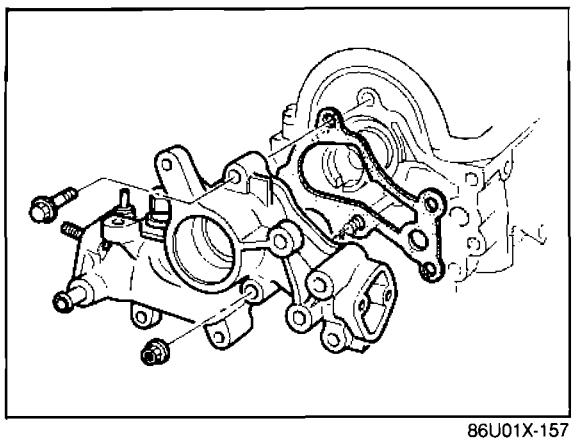
1. Apply engine oil to the front housing and a new oil seal.
2. Press the oil seal into the front housing.



86U01X-156

3. Apply engine oil to the oil seal lip.
4. Install the front housing and a new gasket.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



86U01X-157

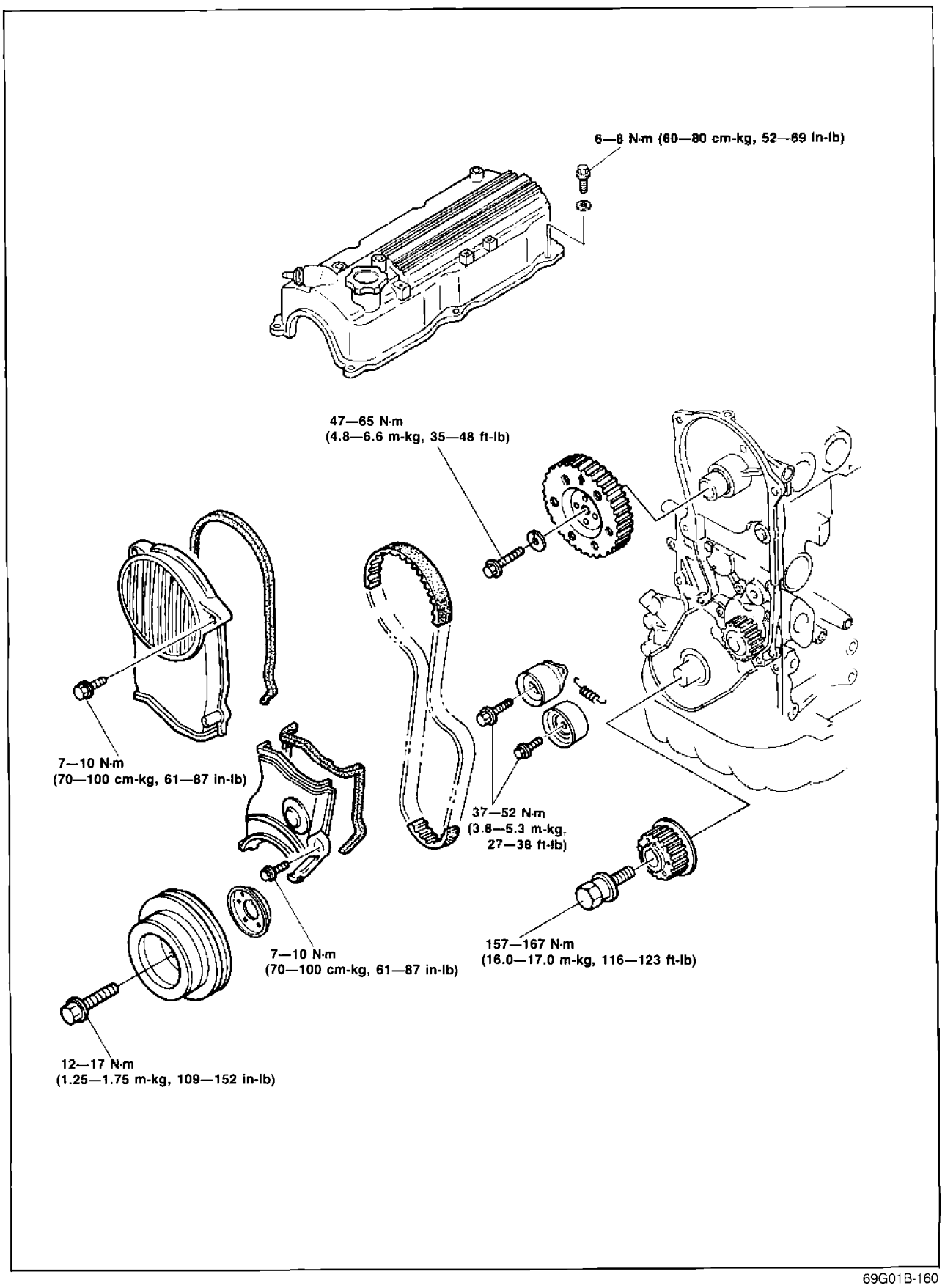
Rear Housing

Install the rear housing and a new gasket.

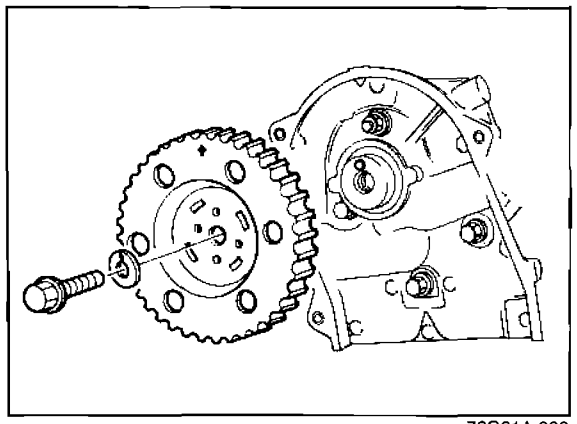
Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

1A ASSEMBLY (TIMING BELT)

TIMING BELT
Torque Specifications



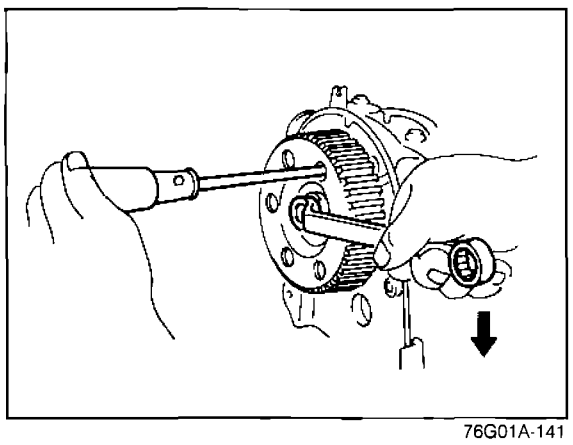
69G01B-160



76G01A-083

Camshaft Pulley

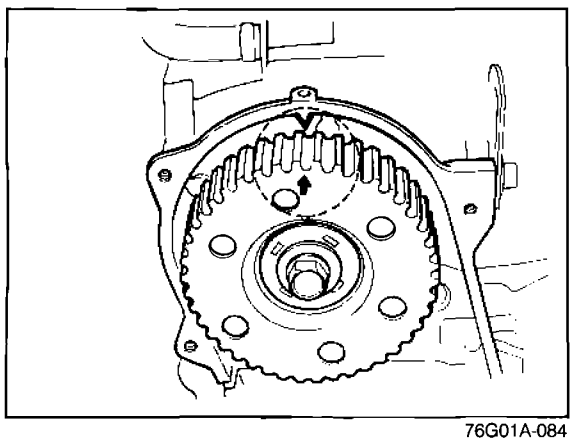
1. Install the camshaft pulley on the camshaft with the dowel pin fit into the hole at the **2** mark (FE) or **3** mark (F8, F6).



76G01A-141

2. Tighten the camshaft pulley lock bolt.

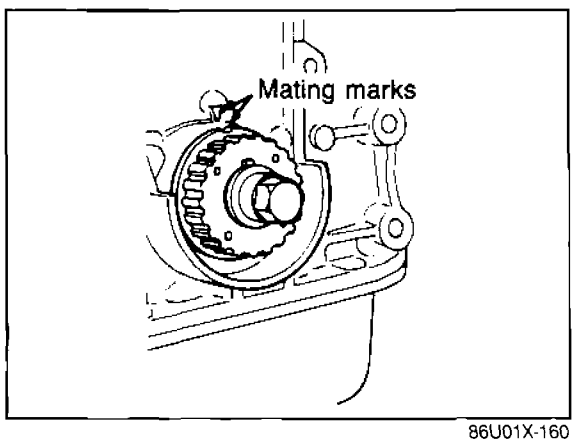
Tightening torque:
47—65 N·m (4.8—6.6 m-kg, 35—48 ft-lb)



76G01A-084

3. Align the mating mark on the pulley with the alignment mark on the front housing.

Note
For FE engine, align "2" mark.
For F8, F6 engine, align "3" mark.



86U01X-160

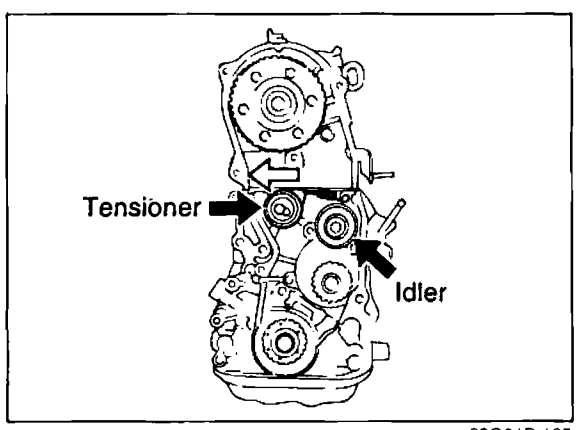
Timing Belt Pulley

1. Reverse the direction of the **SST** (ring gear brake).
2. Install the crankshaft key.
3. Install the timing belt pulley on the crankshaft.

Tightening torque: 157—167 N·m
(16.0—17.0 m-kg, 116—123 ft-lb)

4. Release the ring gear brake.
5. Align the timing belt pulley and the pump body alignment marks.

1A ASSEMBLY (TIMING BELT)

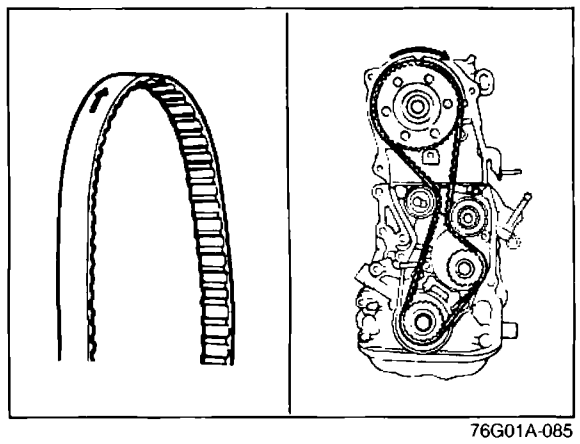


69G01B-165

Timing Belt Idler Pulley
Install the timing belt idler pulley.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

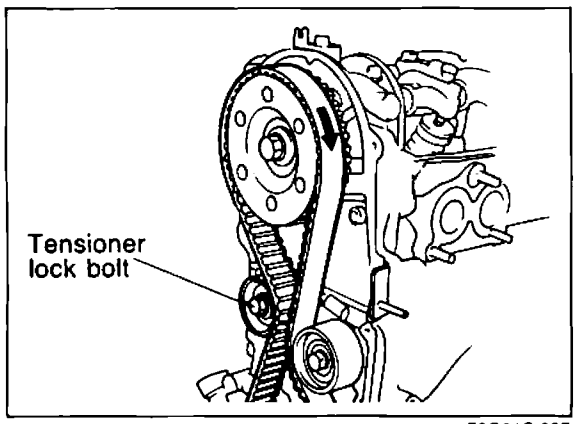
Timing Belt Tensioner
1. Install the timing belt tensioner and tensioner spring.
2. Tentatively secure the tensioner with the spring fully extended.



76G01A-085

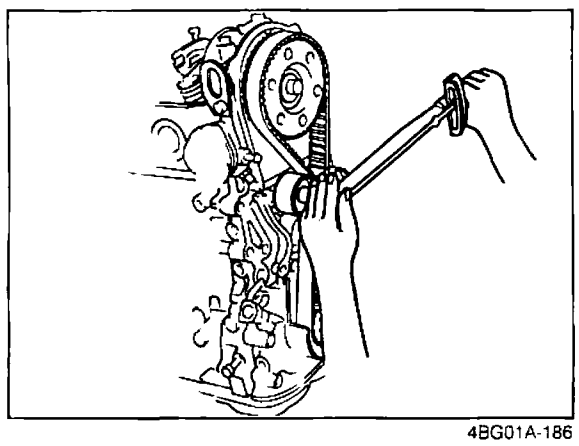
Timing Belt
1. Install the timing belt. (keep the tension side of belt as tight as possible.)

Caution
a) If the timing belt is being reused, it must be reinstalled to rotate in the original direction.
b) Check that there is no oil, grease, or dirt on the timing belt.



79G01C-097

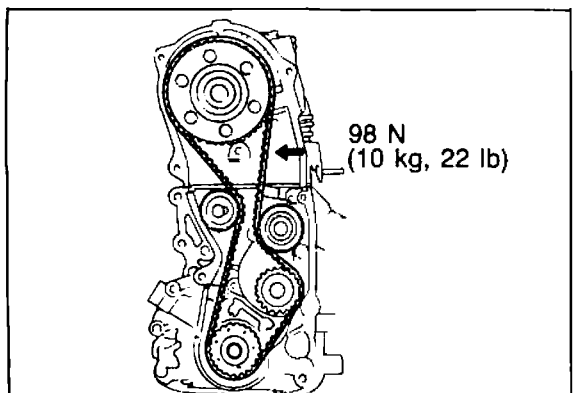
2. Loosen the tensioner lock bolt.
3. Turn the crankshaft twice in the direction of rotation.
4. Check that the mating marks are correctly aligned. If not aligned, remove the timing belt and tensioner, and repeat the above-mentioned procedure.



4BG01A-186

5. Tighten the timing belt tensioner lock bolt.

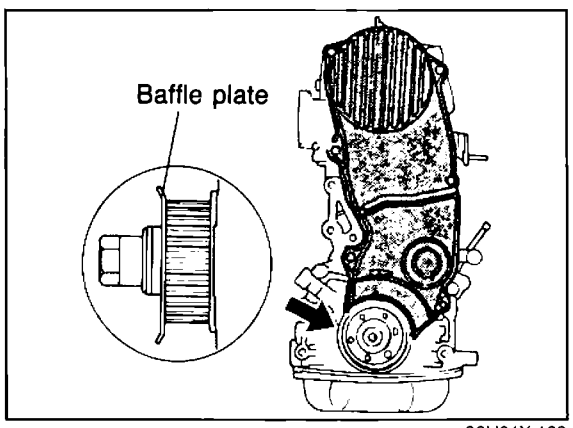
Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)



76G01A-086

6. Check the timing belt deflection. If the deflection is not correct, loosen the tensioner lock bolt and repeat steps 3—5 above. Replace the tensioner spring if necessary.

Belt deflection:
FE: 5.5—6.5 mm (0.22—0.26 in)
F8, F6: 4.0—5.0 mm (0.16—0.20 in)
/98 N (10kg, 22 lb)

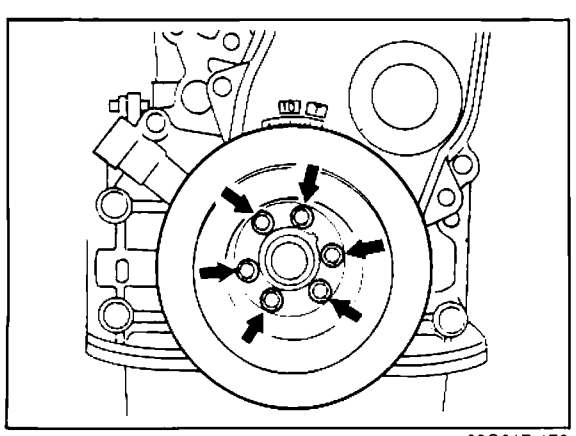


86U01X-163

Baffle Plate
Position the baffle plate on the timing belt pulley.

Timing Belt Cover
Install the lower timing belt cover, upper timing belt cover, and new gaskets.

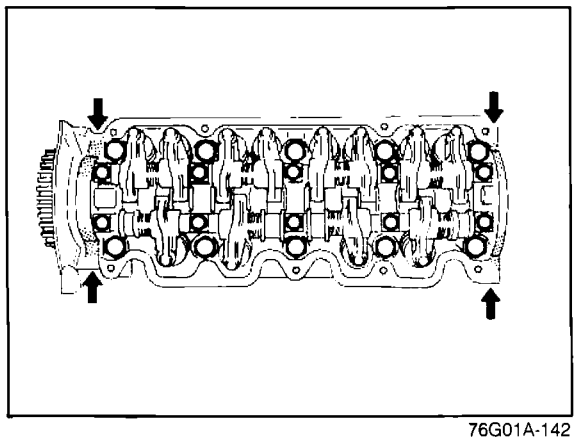
Tightening torque:
7—10 N·m (70—100 cm-kg, 61—87 in-lb)



69G01B-170

Crankshaft Pulley
Install the crankshaft pulley.

Tightening torque: 12—17 N·m
(1.25—1.75 m-kg, 109—152 in-lb)



76G01A-142

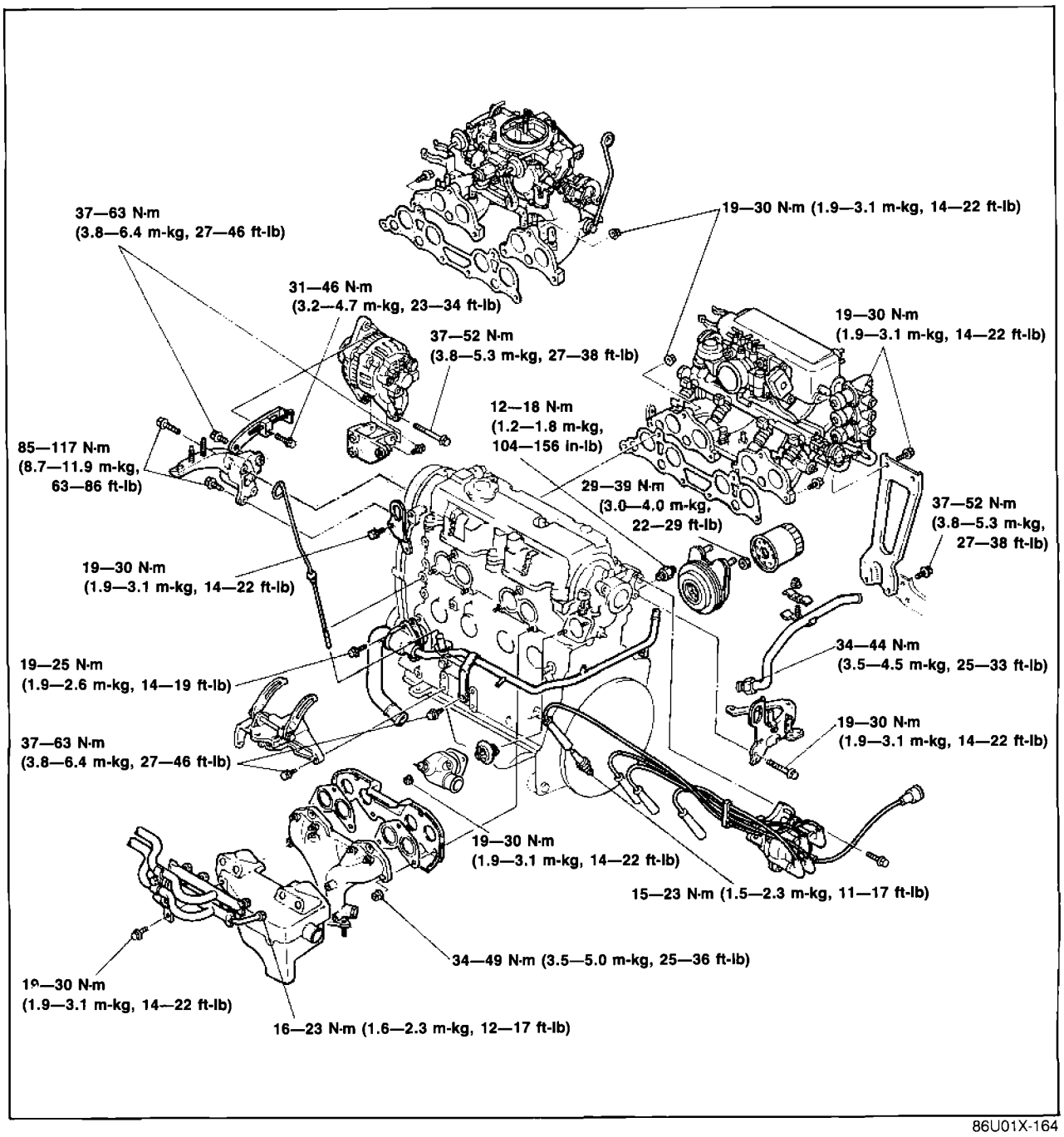
Valve Clearance (8-valve)
Adjust the valve clearance. (Refer to page 1A—10.)

Cylinder Head Cover
1. Apply silicon sealant to the shaded areas shown in the figure.
2. Install the cylinder head cover.

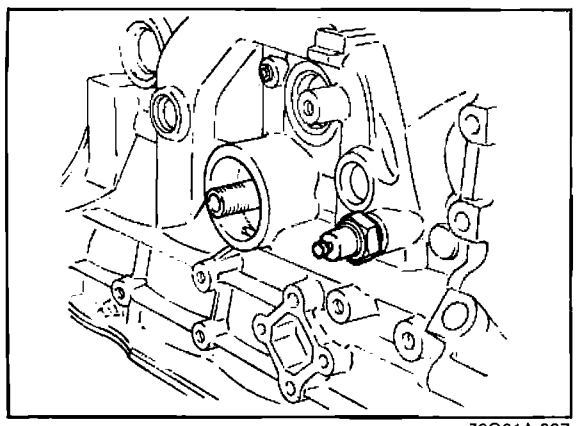
Tightening torque:
6—8 N·m (60—80 cm-kg, 52—69 in-lb)

1A ASSEMBLY (AUXILIARY PARTS)

AUXILIARY PARTS
Torque Specifications



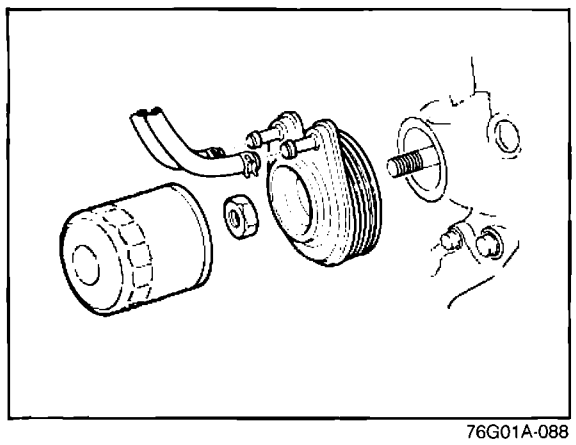
86U01X-164



76G01A-087

Oil Pressure Switch
Install the oil pressure switch.

Tightening torque: 12—18 N·m (1.2—1.8 m-kg, 104—156 in-lb)

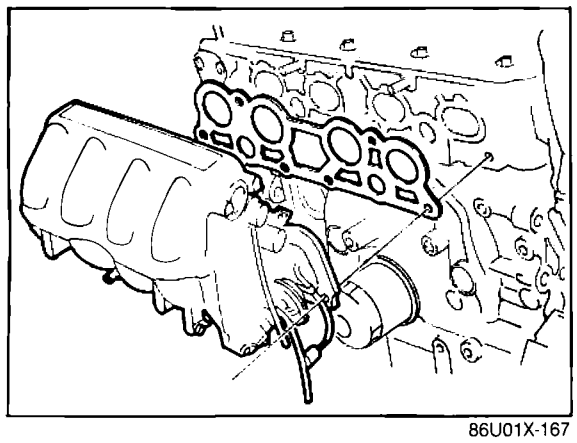


76G01A-088

Oil Cooler (8-valve...only ECE, 12-valve)
Install the oil cooler.

Tightening torque: 29—39 N·m (3.0—4.0 m-kg, 22—29 ft-lb)

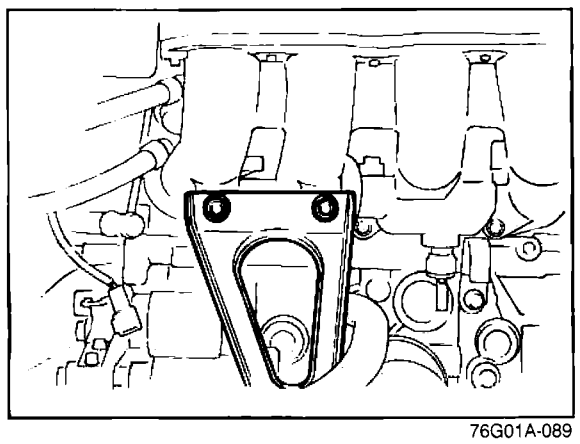
Oil Filter
1. Apply engine oil to the rubber gasket of the new filter.
2. Install the oil filter, and tighten it by hand only. Do not use a wrench.



86U01X-167

Intake Manifold Assembly
1. Place the new gasket in position.
2. Install the intake manifold assembly.
3. Tighten the nuts in two or three steps.

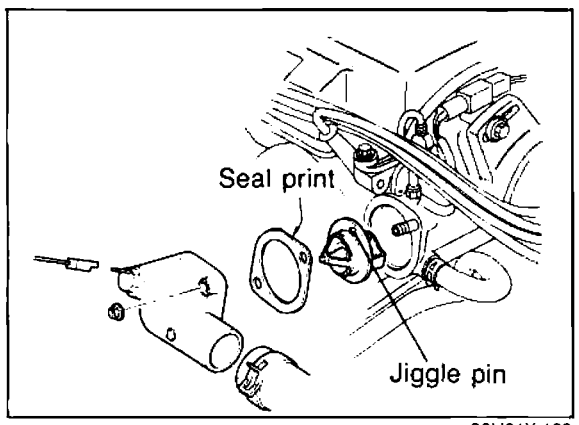
Tightening torque: 19—30 N·m (1.9—3.1 m-kg, 14—22 ft-lb)



76G01A-089

Intake Manifold Bracket (FI)
Install the intake manifold bracket.

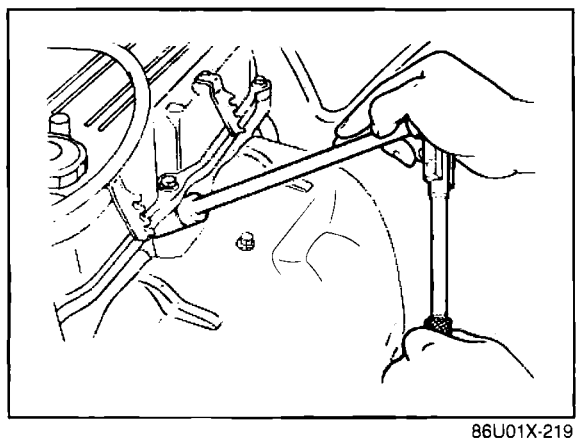
Tightening torque: 19—30 N·m (1.9—3.1 m-kg, 14—22 ft-lb)



86U01X-169

Thermostat and Thermostat Cover
1. Install the thermostat into the cylinder head with the jiggle pin at the top.
2. Position a new gasket with the printed side facing the cylinder head.
3. Install the thermostat cover.

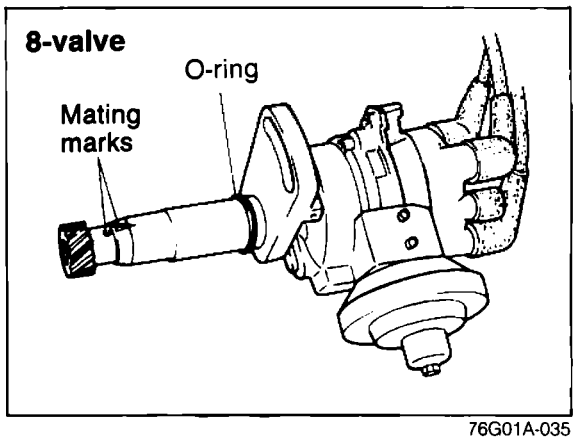
Tightening torque:
19—30 N·m (1.9—3.1 m-kg, 14—22 ft-lb)



86U01X-219

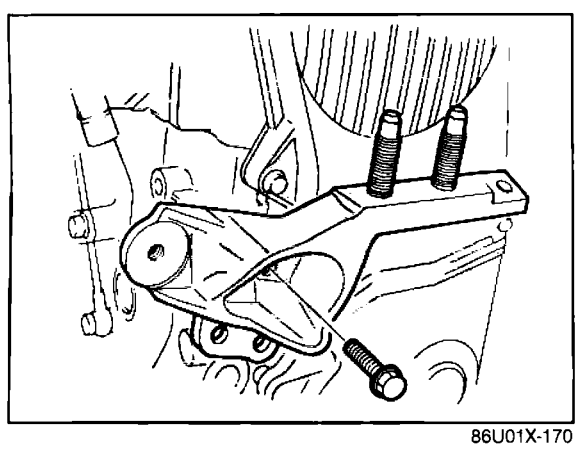
Spark Plug
1. Apply anti-seize compound or molybdenum-based lubricant to the spark plug threads.
2. Install the spark plugs.

Tightening torque:
15—23 N·m (1.5—2.3 m-kg, 11—17 ft-lb)



76G01A-035

Distributor
1. Apply engine oil to the O-ring, and position it on the distributor.
2. Apply engine oil to the blade or gear.
3. Align the mating marks as shown in the figure ...8-valve.
4. Install the distributor with the marks facing straight up.
5. Loosely tighten the distributor mounting bolt.

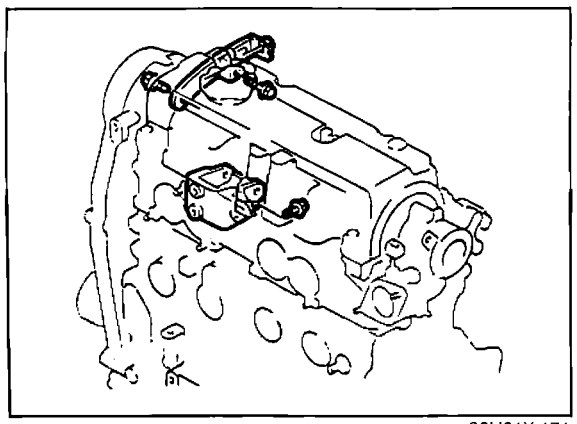


86U01X-170

High-Tension Lead
Install the high-tension leads.

Engine Mount Bracket
Install the engine mount.

Tightening torque:
85—117 N·m (8.7—11.9 m-kg, 63—86 ft-lb)

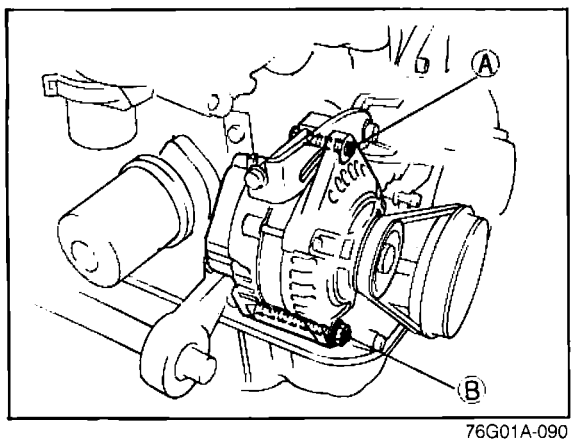


86U01X-171

Alternator

1. Install the alternator strap and bracket.

Tightening torque:
37—63 N·m (3.8—6.4 m-kg, 27—46 ft-lb)

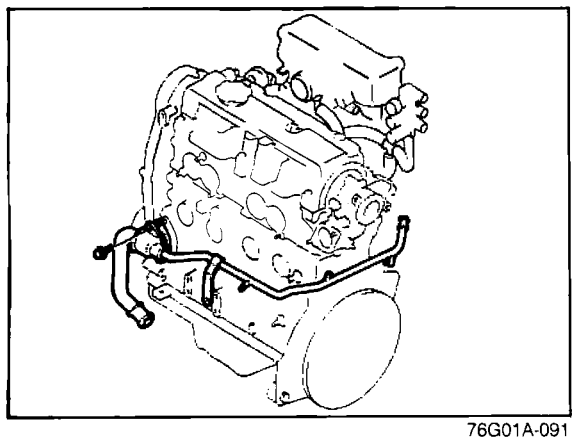


76G01A-090

2. Install the alternator.

Tightening torque
Ⓐ: 31—46 N·m
(3.2—4.7 m-kg, 23—34 ft-lb)
Ⓑ: 37—52 N·m
(3.8—5.3 m-kg, 27—38 ft-lb)

3. Install the alternator drive belt, and adjust the belt deflection. (Refer to page 1A—7.)



76G01A-091

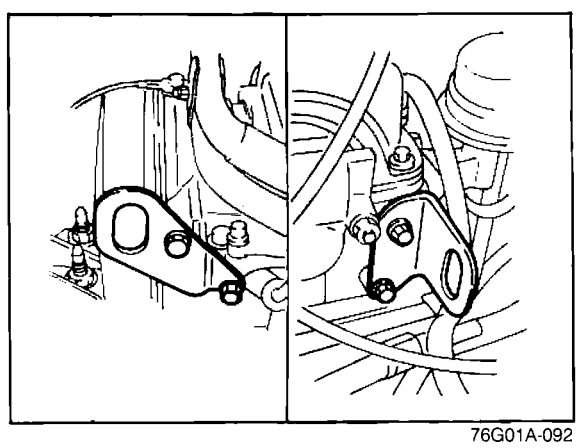
Coolant Inlet Pipe and Bypass Pipe

1. Install the coolant inlet pipe.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

2. Apply vegetable oil to the O-ring.
3. Install the coolant bypass pipe.

Tightening torque:
37—63 N·m (3.8—6.4 m-kg, 27—46 ft-lb)

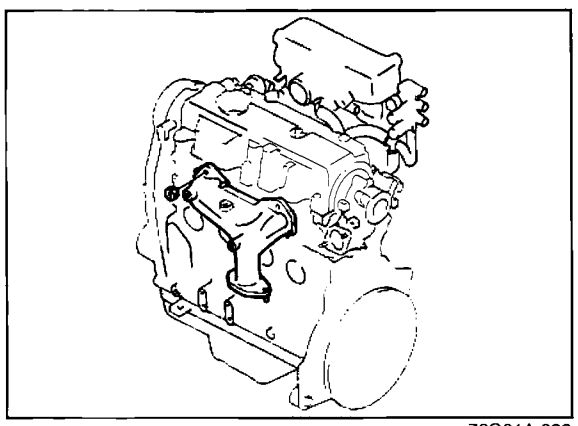


76G01A-092

Engine Hanger

Install the front and rear engine hangers.

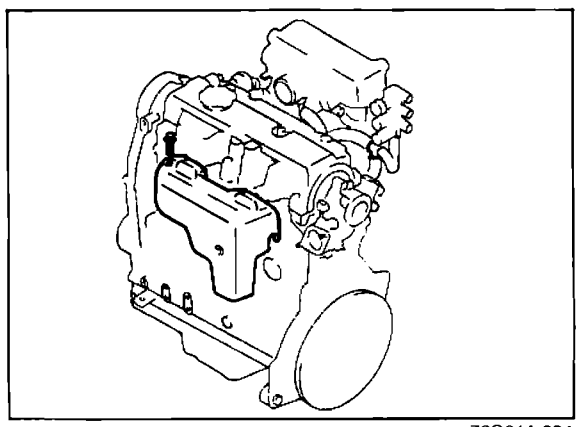
Tightening torque:
19—30 N·m (1.9—3.1 m-kg, 14—22 ft-lb)



76G01A-093

Exhaust Manifold Assembly
1. Place the new gaskets in position with the ridge facing the cylinder head.
2. Install the exhaust manifold assembly.
3. Tighten the nuts in two or three steps.

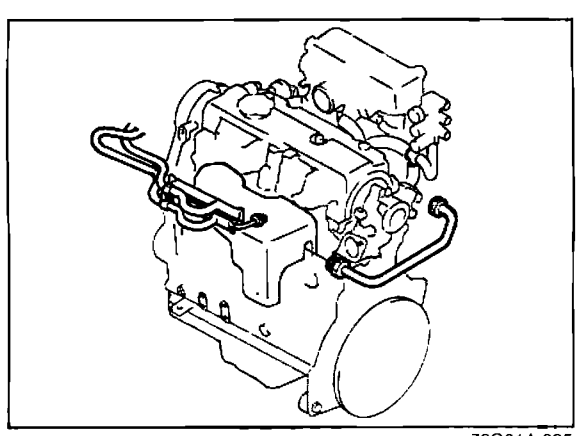
Tightening torque:
34—49 N·m (3.5—5.0 m-kg, 25—36 ft-lb)



76G01A-094

Exhaust Manifold Insulator
Install the exhaust manifold insulator.

Tightening torque:
19—30 N·m (1.9—3.1 m-kg, 14—22 ft-lb)



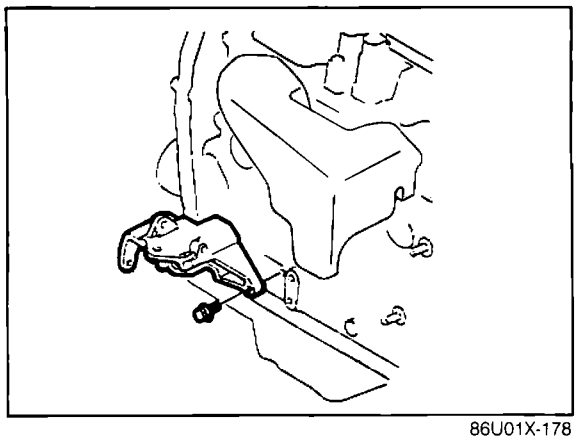
76G01A-095

EGR Pipe
Install the EGR pipe.

Tightening torque:
34—44 N·m (3.5—4.5 m-kg, 25—33 ft-lb)

Secondary Air Pipe Assembly
Install the secondary air pipe assembly.

Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)



86U01X-178

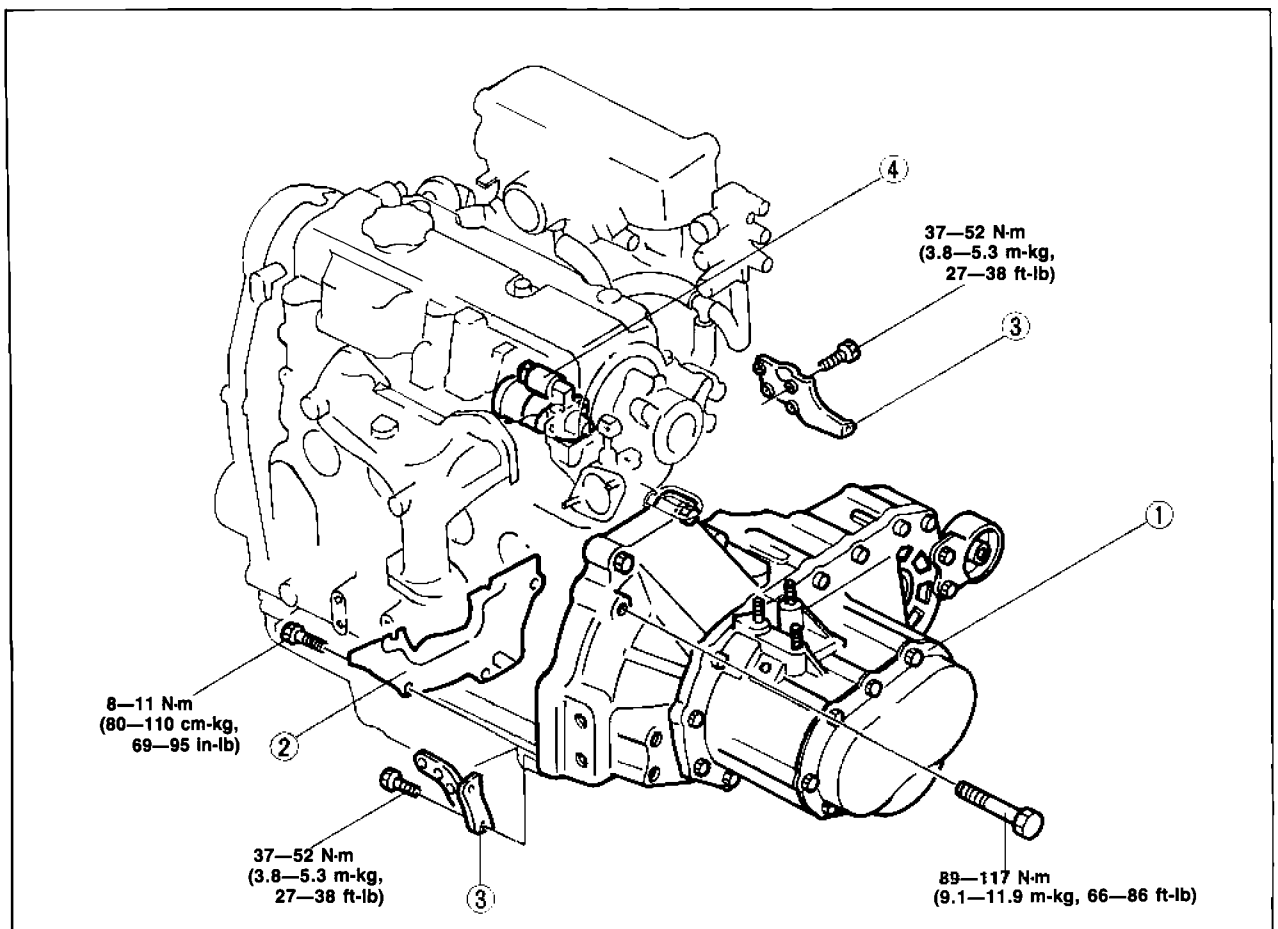
P/S Oil Pump Bracket
Install the P/S oil pump bracket.

Tightening torque:
37—63 N·m (3.8—6.4 m-kg, 27—46 ft-lb)

INSTALLATION

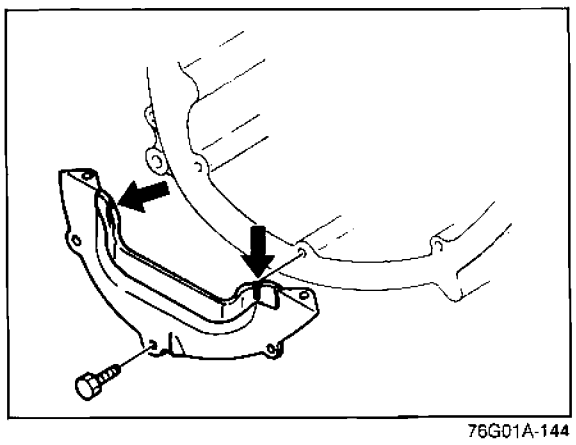
TRANSAXLE ASSEMBLY

Assemble the transaxle to the engine in the sequence shown in the figure referring to the installation note.



76G01A-143

1. Transaxle
2. Clutch under cover
3. Gusset plate
4. Starter



76G01A-144

Installation Note

Clutch under cover

Before installation, fill the notches with silicon as shown in the figure.

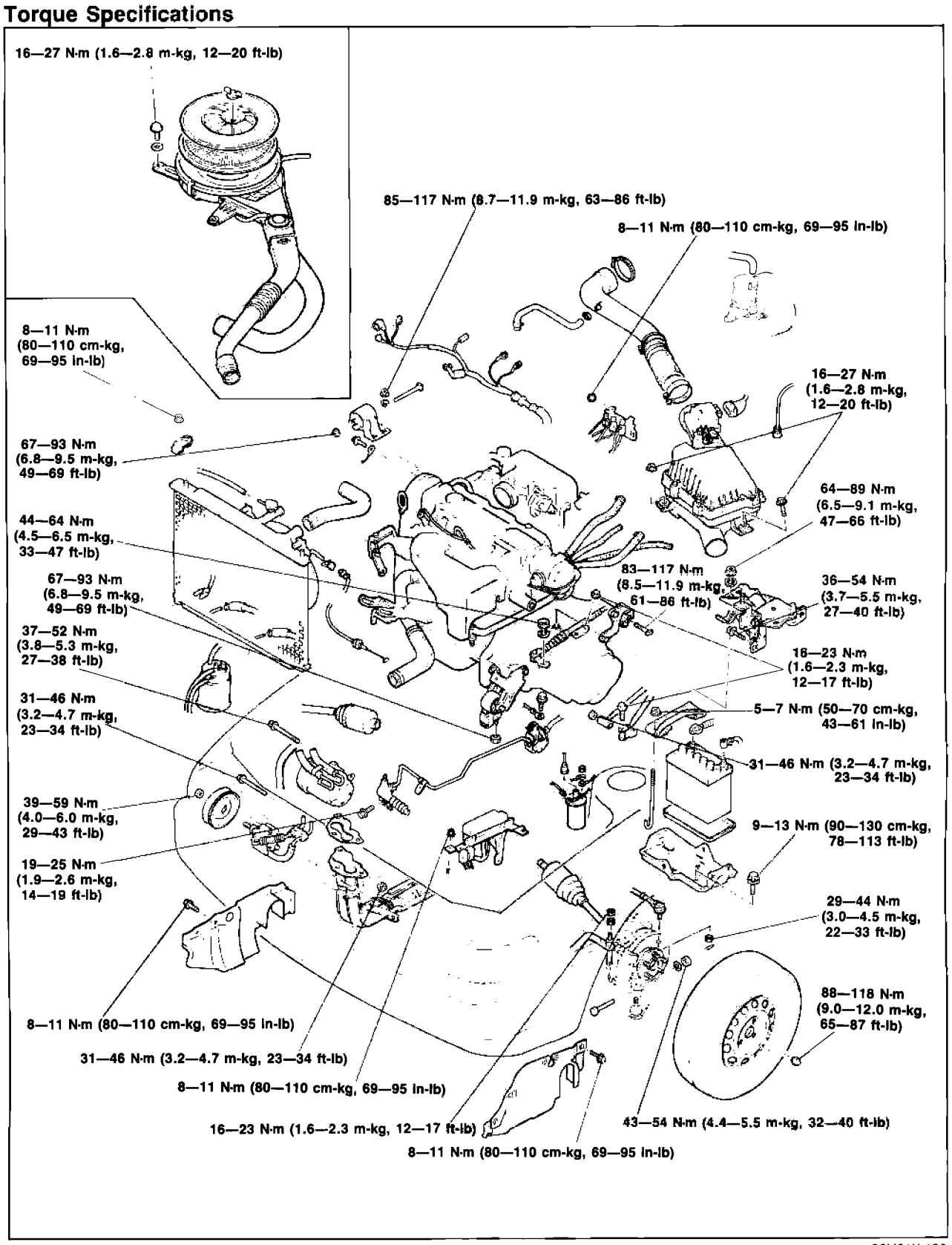
1A INSTALLATION

ENGINE INSTALLATION

Install the engine and transaxle assembly.

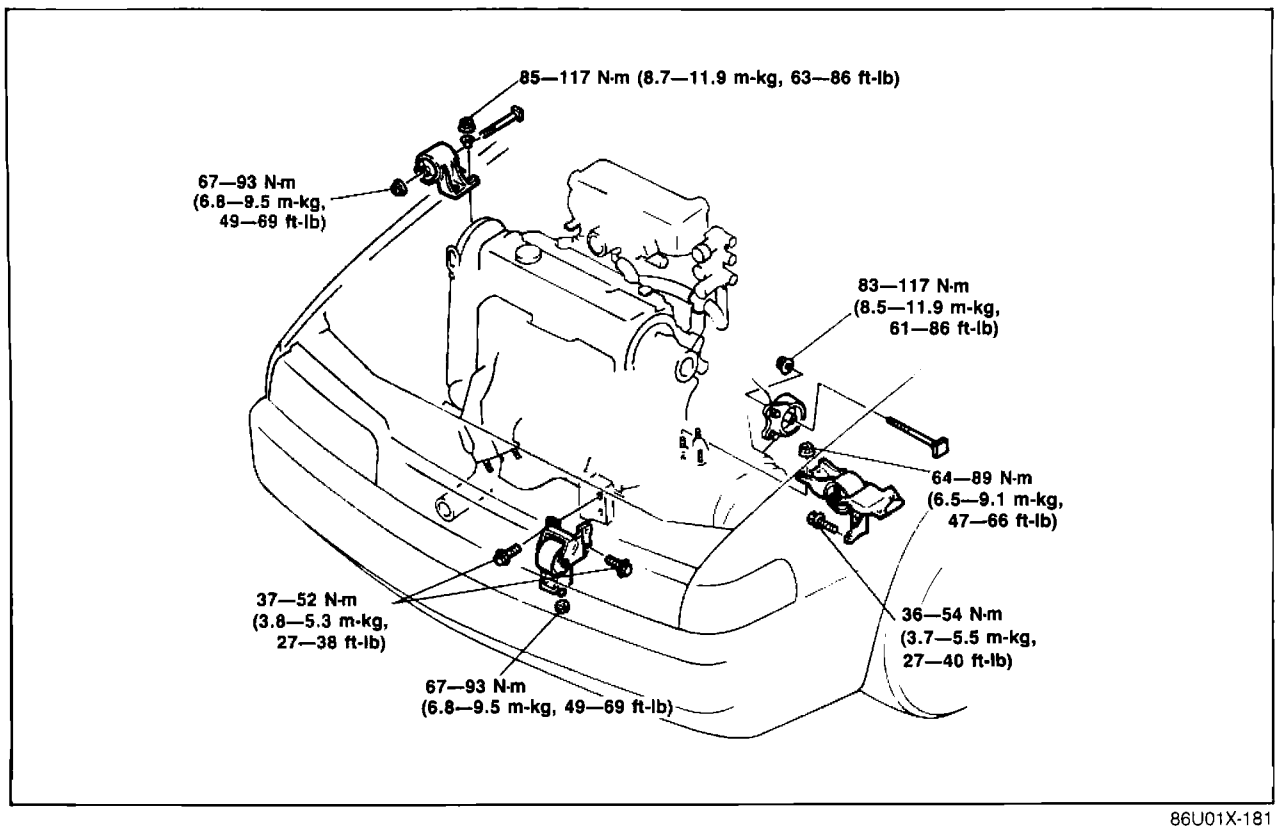
Warning: Be sure the vehicle is securely supported.

Torque Specifications

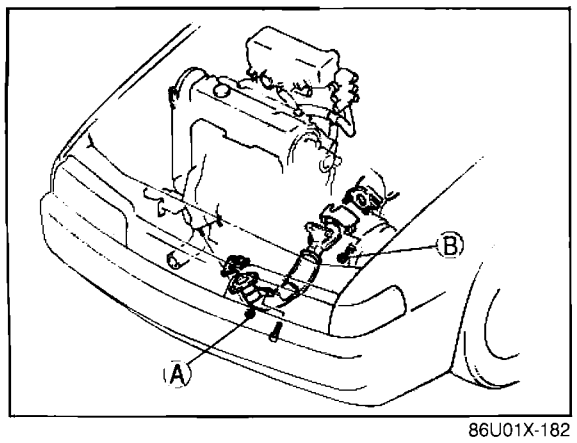


86U01X-180

Engine Mount
Install the engine mount.



86U01X-181



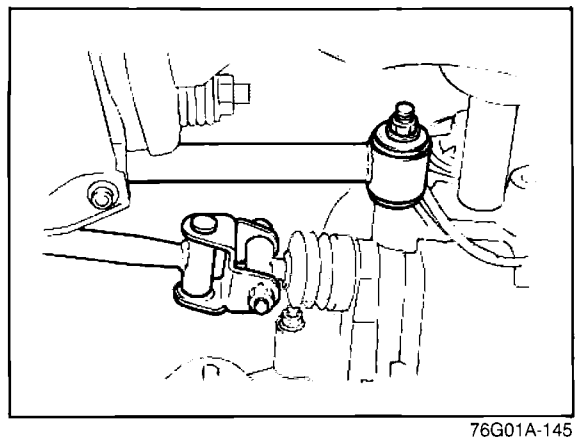
86U01X-182

Exhaust Pipe
1. Install the exhaust pipe.

Tightening torque
Ⓐ: 31—46 N·m (3.2—4.7 m-kg, 23—34 ft-lb)
Ⓑ: 64—89 N·m (6.5—9.1 m-kg, 47—66 ft-lb)

2. Tighten the bracket bolt.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



76G01A-145

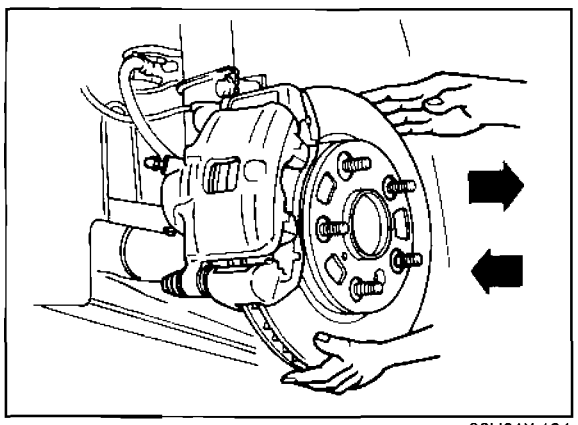
Extension Bar (MTX)
Install the extension bar to the transaxle.

Tightening torque:
31—46 N·m (3.2—4.7 m-kg, 23—34 ft-lb)

Change Rod (MTX)
Install the change rod to the transaxle.

Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

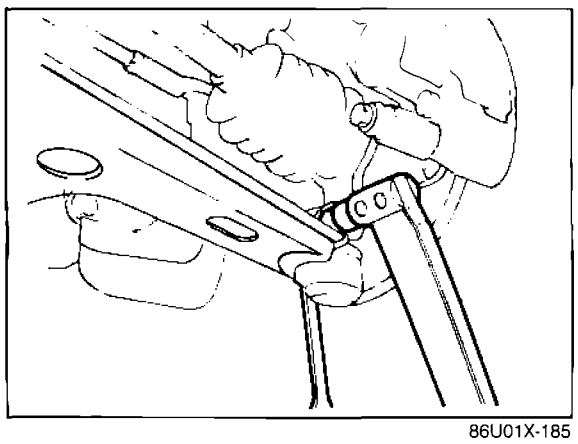
1A INSTALLATION



86U01X-184

Driveshaft
1. Apply grease to the end of the driveshaft.
2. Install the driveshaft and a new clip.

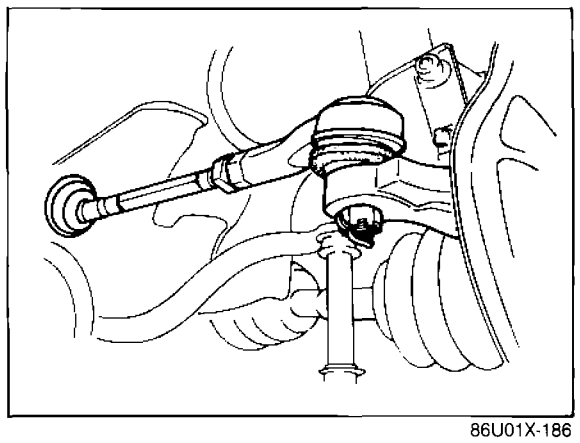
Caution
a) When installing the driveshaft, be careful not to damage the oil seal.
b) After installation, pull the front hub outward to confirm that the driveshaft is securely held by the clip.



86U01X-185

Lower Arm
Install the lower arm ball-joint to the knuckle; then tighten the lock nut.

Tightening torque:
43—54 N·m (4.4—5.5 m-kg, 32—40 ft-lb)

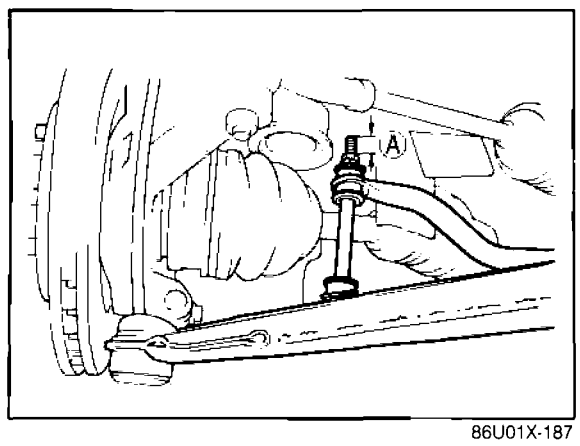


86U01X-186

Tie-Rod End
1. Install the tie-rod end to the knuckle.

Tightening torque:
29—44 N·m (3.0—4.5 m-kg, 22—33 ft-lb)

2. Install the cotter pin.



86U01X-187

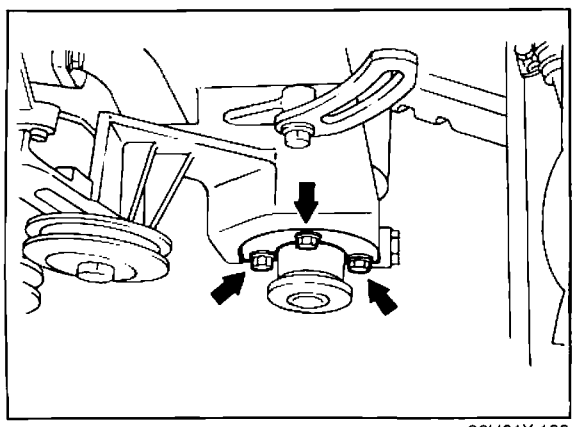
Stabilizer Control Rod
Install and adjust the front stabilizer control rods.

Dimension A: 20.1 mm (0.79 in)

Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

Install the front wheel.

Tightening torque:
88—118 N·m (9.0—12.0 m-kg, 65—87 ft-lb)



86U01X-188

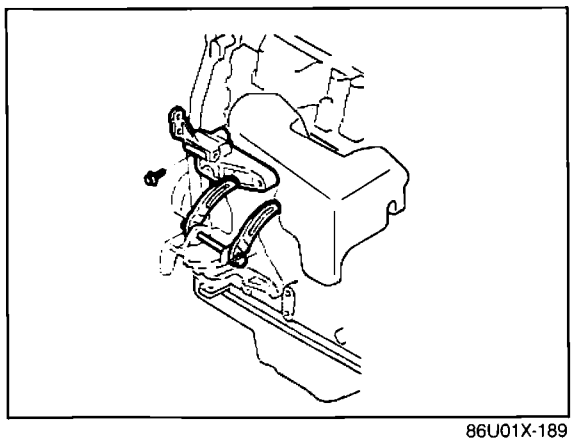
P/S Oil Pump

1. Install the P/S oil pump.

   Tightening torque:
   31—46 N·m (3.2—4.7 m-kg, 23—34 ft-lb)

2. Tighten the pulley lock nut.

   Tightening torque:
   39—59 N·m (4.0—6.0 m-kg, 29—43 ft-lb)



86U01X-189

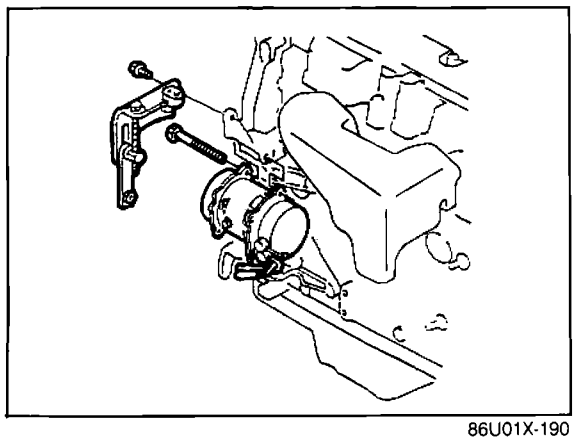
A/C Compressor

1. Install the A/C compressor strap to the P/S oil pump bracket.

   Tightening torque:
   19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

2. Install the A/C compressor bracket.

   Tightening torque:
   37—63 N·m (3.8—6.4 m-kg, 27—46 ft-lb)



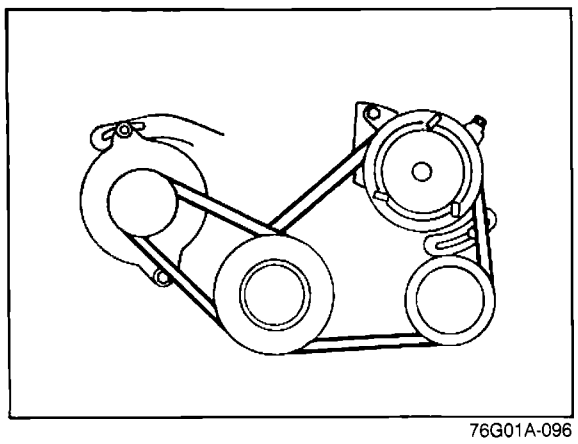
86U01X-190

3. Install the A/C compressor.
4. Install the A/C compressor upper bracket.

   Tightening torque:
   37—63 N·m (3.8—6.4 m-kg, 27—46 ft-lb)

5. Tighten to the lock nut and mounting bolts.

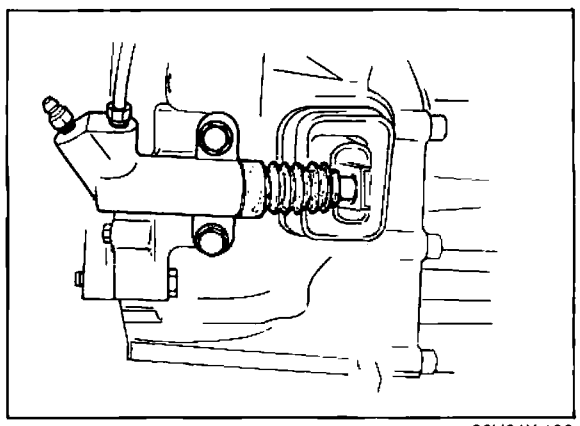
   Tightening torque:
   37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)



76G01A-096

Drive Belt

Install the drive belt and adjust the belt deflection. (Refer to page 1A—7.)



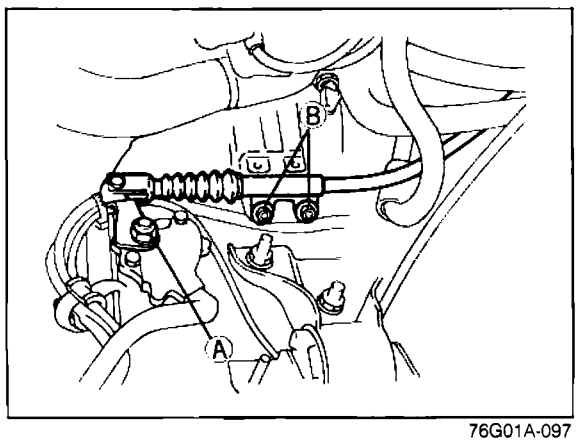
86U01X-192

Clutch Release Cylinder (MTX)
1. Set the pipe bracket in position.

   Tightening torque:
   8—11 N·m (80—110 cm-kg, 69—95 in-lb)

2. Install the clutch release cylinder.

   Tightening torque:
   19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

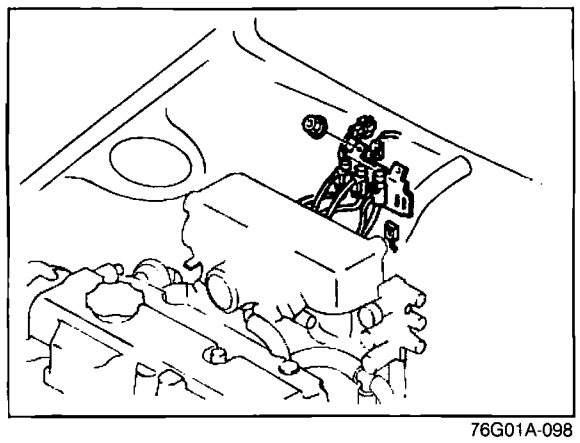


76G01A-097

Control Cable (ATX)
Install the control cable and adjust the shift selector position. (Refer to Section 7.)

Tightening torque
Ⓐ: 44—64 N·m
(4.5—6.5 m-kg, 33—47 ft-lb)
Ⓑ: 16—23 N·m
(1.6—2.3 m-kg, 12—17 ft-lb)

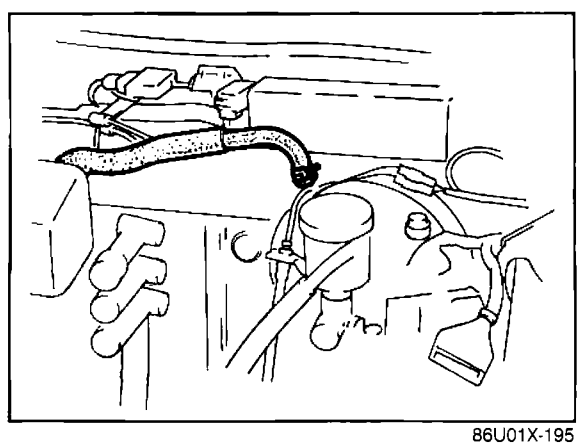
Speedometer Cable
Install the speedometer cable.



76G01A-098

Three-Way Solenoid Assembly
Install the three-way solenoid assembly.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



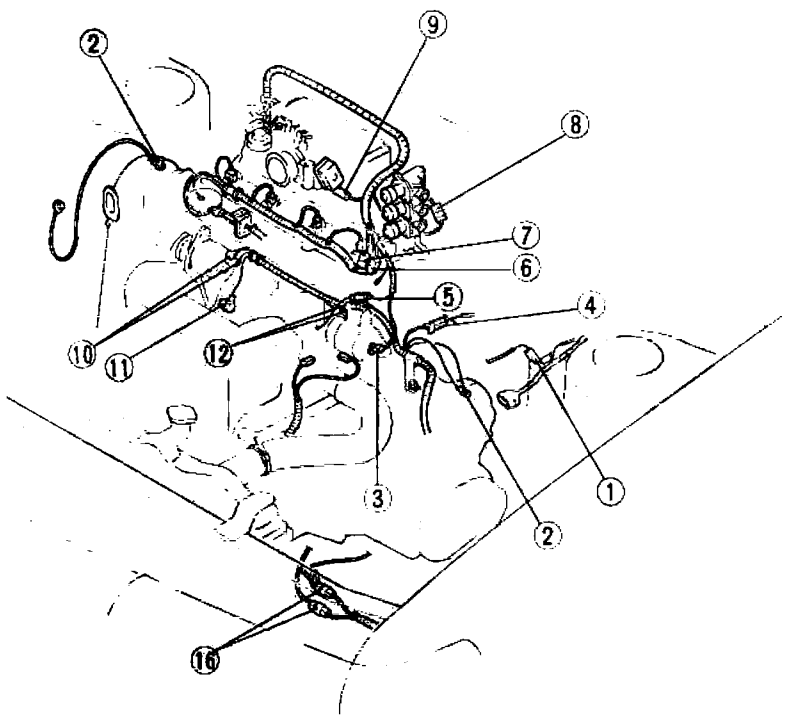
86U01X-195

Brake Vacuum Hose
Connect the brake vacuum hose.

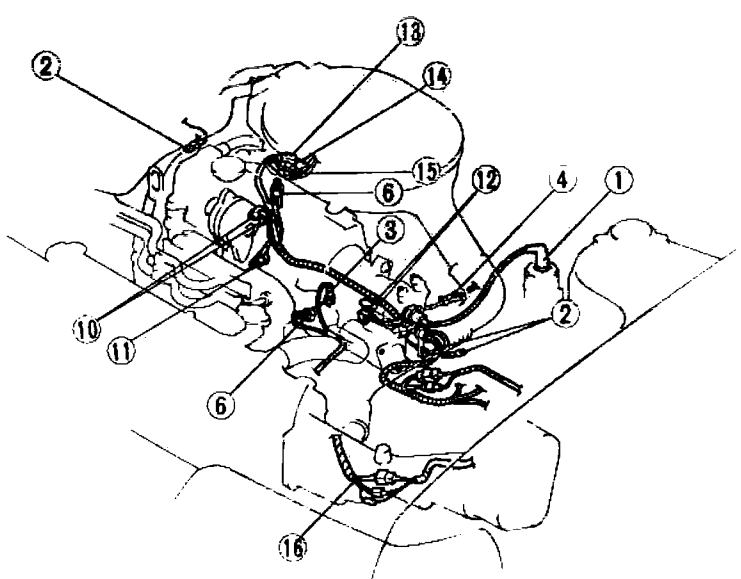
Canister Hose
Connect the canister hoses.

Connector Location
Install each harness as shown in the figure.

FI



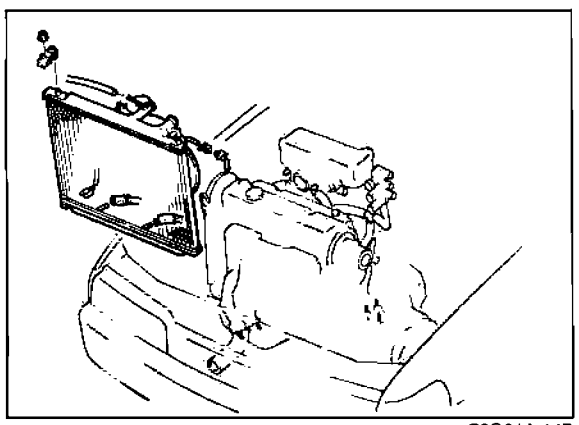
Carb.



76G01A-146

1. IG coil
2. Engine ground
3. Water temperature sensor
4. P/S switch
5. Oxygen sensor (FI)
6. Water thermo switch
7. Injection harness (FI)
8. F/I solenoid (FI)
9. Throttle position sensor (FI)
10. Alternator
11. Oil pressure switch
12. Starter
13. P.T.C. heater (carb.)
14. Solenoid valve (Slow cot) (carb.)
15. Solenoid valve (carb.)
16. Transmission harness

1A INSTALLATION

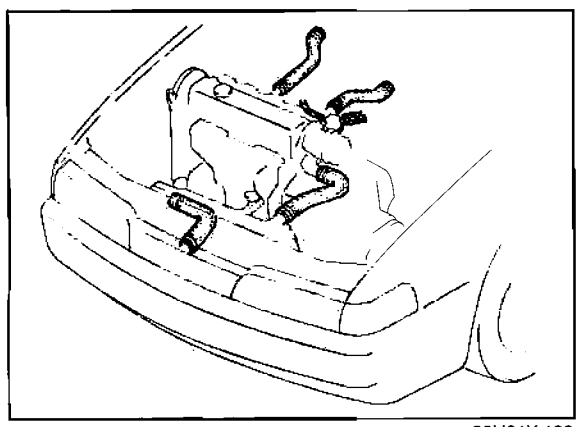


76G01A-147

Radiator
1. Install the radiator and cooling fan.

   Tightening torque:
   8—11 N·m (80—110 cm-kg, 69—95 in-lb)

2. Connect the radiator harness.
3. Connect the ATF hoses (ATX).

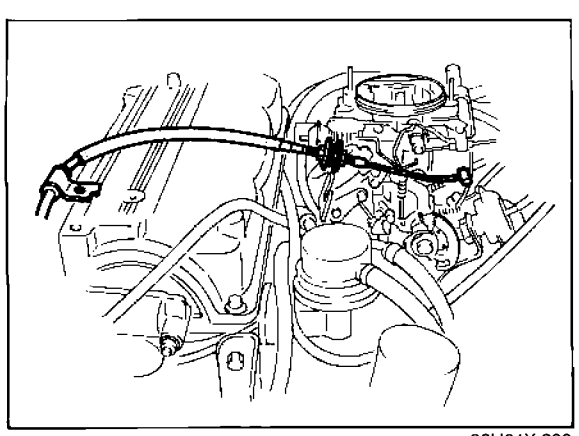


86U01X-199

4. Connect the upper and lower radiator hoses.

   Note
   a) Position the hose clamp in the original location on the hose.
   b) Squeeze the clamp lightly with large pliers to ensure a good fit.

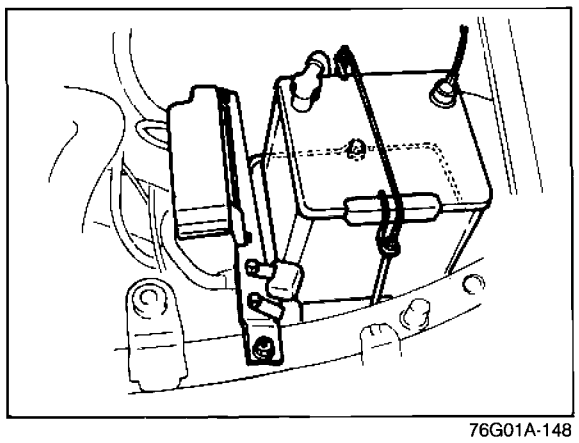
Heater Hose and Fuel Hose
Connect the heater hoses and the fuel hoses.



86U01X-200

High-Tension Lead
Connect the high-tension lead to the ignition coil.

Accelerator Cable
Install the accelerator cable and the throttle cable (ATX).



76G01A-148

Battery and Battery Carrier
1. Install the battery carrier.

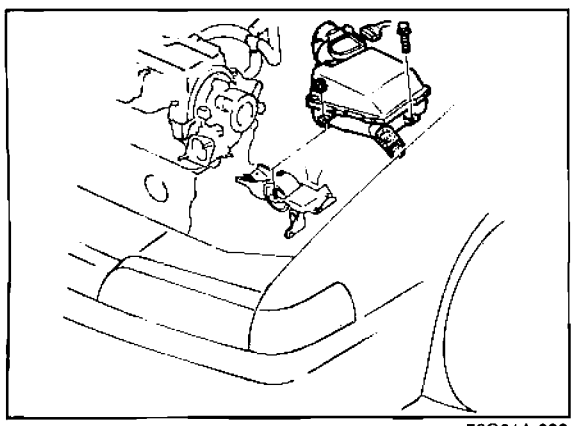
   Tightening torque:
   9—13 N·m (90—130 cm-kg, 78—113 in-lb)

2. Install the fuse box.

   Tightening torque:
   8—11 N·m (80—110 cm-kg, 69—95 in-lb)

3. Install the battery tray and battery.

   Tightening torque:
   5—7 N·m (50—70 cm-kg, 43—61 in-lb)

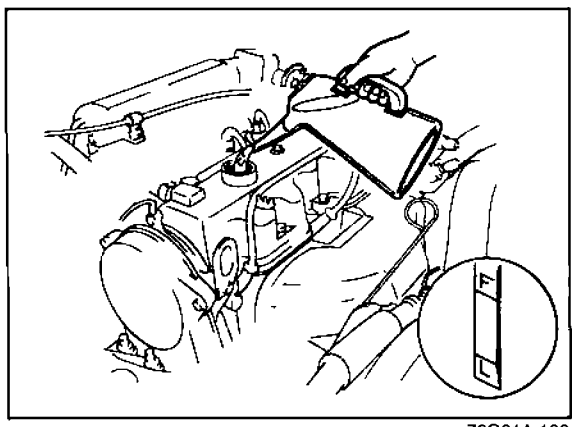


76G01A-099

Air Cleaner Assembly
1. Install the air cleaner assembly.

   Tightening torque:
   16—27 N·m (1.6—2.8 m-kg, 12—20 ft-lb)

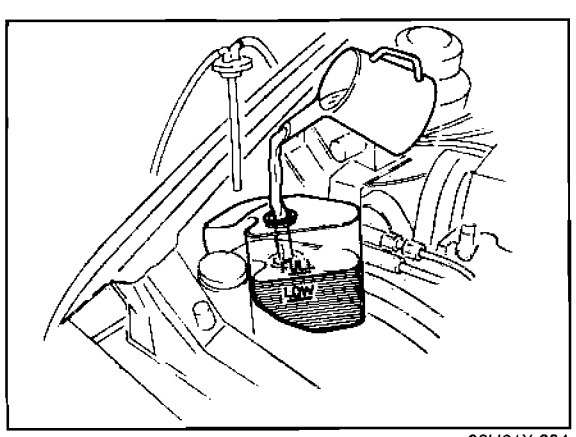
2. Connect the air flow sensor connector and air intake pipe (FI).



76G01A-100

Engine Oil
Add the specified amount and type of engine oil. (Refer to Section 2A.)

Coolant
Close the drain plug, fill the radiator and reservoir tank with the specified amount and type of coolant. (Refer to Section 3A.)



86U01X-204

Check Engine Condition
1. Check for leaks.
2. Perform engine adjustments if necessary.
3. Perform a road test.
4. Recheck the oil and coolant levels.

1B

ENGINE (DOHC)

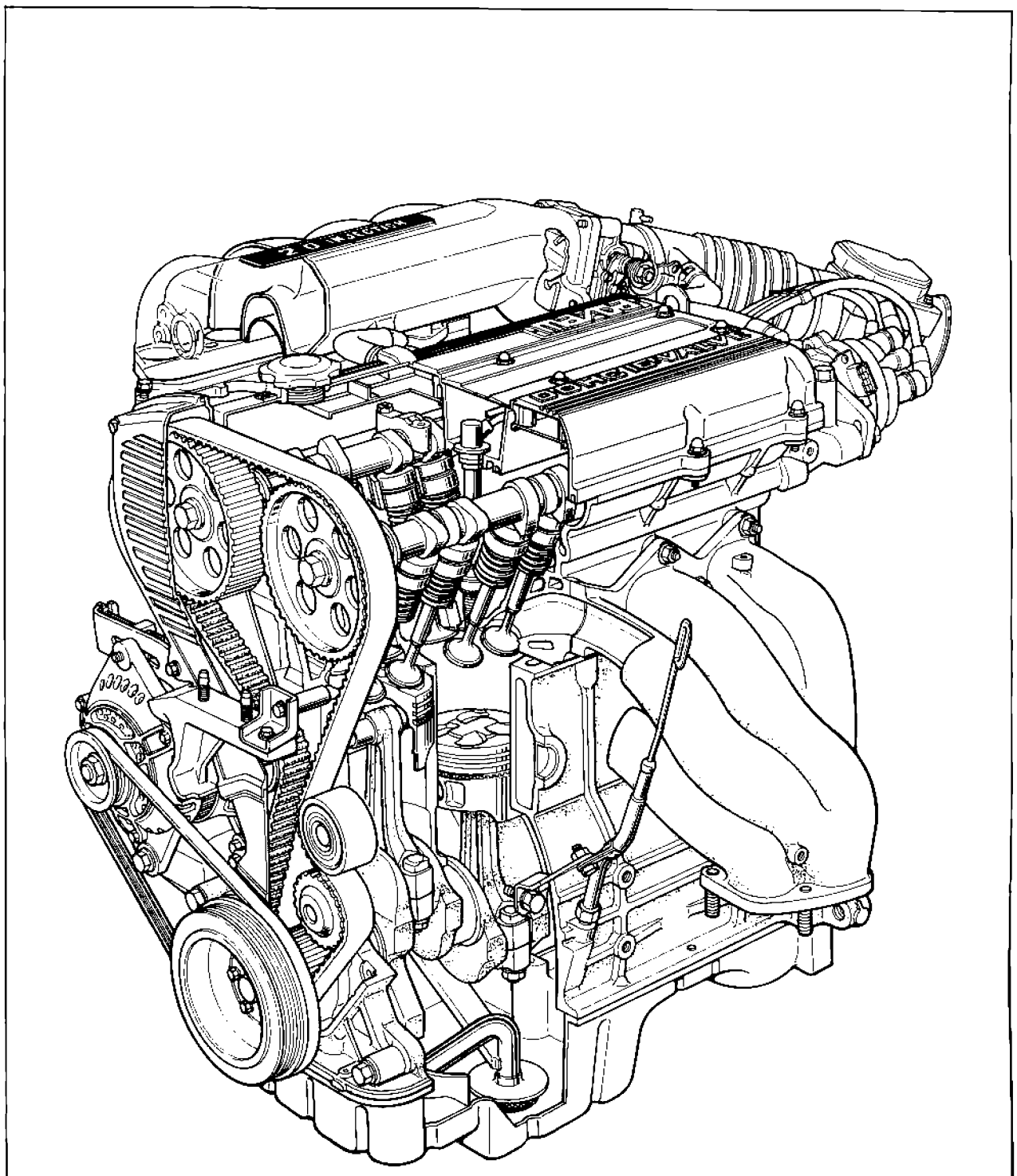
OUTLINE ..... 1B— 2
STRUCTURAL VIEW ..... 1B— 2
SPECIFICATIONS ..... 1B— 3
TROUBLESHOOTING GUIDE ..... 1B— 3
TUNE-UP PROCEDURE ..... 1B— 5
ON-VEHICLE INSPECTION ..... 1B—10
COMPRESSION ..... 1B—10
ON-VEHICLE MAINTENANCE ..... 1B—11
TIMING BELT ..... 1B—11
CYLINDER HEAD ..... 1B—16
REMOVAL ..... 1B—22
DISASSEMBLY ..... 1B—24
AUXILIARY PARTS ..... 1B—24
TIMING BELT ..... 1B—26
CYLINDER HEAD ..... 1B—28
CYLINDER BLOCK ..... 1B—30
INSPECTION AND REPAIR ..... 1B—34
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CYLINDER BLOCK ..... 1B—48
CYLINDER HEAD ..... 1B—59
TIMING BELT ..... 1B—64
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TRANSAXLE ASSEMBLY ..... 1B—73
ENGINE INSTALLATION ..... 1B—74

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1B OUTLINE

OUTLINE

STRUCTURAL VIEW



4BG01A-002

SPECIFICATIONS

Item \ Engine model			FE DOHC	
			Leaded fuel	Unleaded fuel
Type			Gasoline, 4 cycle	
Cylinder arrangement and number			In line, 4 cylinders	
Combustion chamber			Pentroof	
Valve system			OHC, belt driven	
Displacement cc (cu in)			1,998 (121.9)	
Bore and stroke mm (in)			86.0 x 86.0 (3.39 x 3.39)	
Compression ratio			10.0 : 1	9.2 : 1
Compression pressure kPa (kg/cm², psi)-rpm		Standard	1,422 (14.5, 206)—290	1,373 (14.0, 199)—310
		Minimum	996 (10.2, 144)—290	961 (9.8, 139)—310
Valve timing	IN	Open BTDC	10°	10°
		Close ABDC	60°	55°
	EX	Open BBDC	60°	55°
		Close ATDC	10°	10°
Valve clearance mm (in)		IN	0; Maintenance-free	
		EX	0; Maintenance-free	
Idle speed rpm			750 ± 50	
Ignition timing BTDC			12° ± 1°	
Firing order			1—3—4—2	

76G01B-002

TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Difficult starting	**Malfunction of engine-related components**		
	Burned valve	Replace	1B—35
	Worn piston, piston ring, or cylinder	Replace or repair	1B—43
	Failed cylinder head gasket	Replace	1B—16
	Malfunction of fuel system	Refer to Section 4C	
	Malfunction of electrical system	Refer to Section 5	
Poor idling	**Malfunction of engine-related components**		
	Malfunction of HLA	Replace	1B—60
	Poor valve to valve seat contact	Repair or replace	1B—37
	Failed cylinder head gasket	Replace	1B—16
	Malfunction of fuel system	Refer to Section 4C	
Excessive oil consumption	**Oil working up**		
	Worn piston ring groove or sticking piston ring	Replace	1B—43
	Worn piston or cylinder	Replace or repair	1B—43
	Oil working down		
	Worn valve seal	Replace	—
	Worn valve stem or guide	Replace	1B—35
	Oil leakage	Refer to Section 2A	

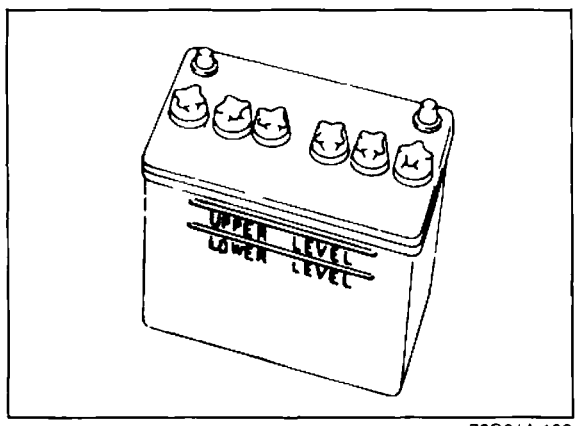
76G01B-003

1B TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Insufficient power	**Insufficient compression**		
	Malfunction of HLA	Replace	1B—60
	Compression leakage from valve seat	Repair	1B—37
	Seized valve stem	Replace	1B—35
	Weak or broken valve spring	Replace	1B—38
	Failed cylinder head gasket	Replace	1B—16
	Cracked or distorted cylinder head	Replace	1B—34
	Sticking, damaged, or worn piston ring	Replace	1B—43
	Cracked or worn piston	Replace	1B—43
	Malfunction of fuel system	Refer to Section 4C	
	Others		
	Slipping clutch	Refer to Section 6	
	Dragging brakes	Refer to Section 11	
	Wrong size tires	Refer to Section 12	
Abnormal combustion	**Malfunction of engine-related components**		
	Malfunction of HLA	Replace	1B—60
	Sticking or burned valve	Replace	1B—35
	Weak or broken valve spring	Replace	1B—38
	Carbon accumulation in combustion chamber	Eliminate carbon	—
	Malfunction of fuel system	Refer to Section 4C	
Engine noise	**Crankshaft or bearing related parts**		
	Excessive main bearing oil clearance	Replace or repair	1B—51
	Main bearing seized or heat-damaged	Replace	1B—51
	Excessive crankshaft end play	Replace or repair	1B—52
	Excessive connecting rod bearing oil clearance	Replace or repair	1B—53
	Connecting rod bearing seized or heat-damaged	Replace	1B—53
	Piston related parts		
	Worn cylinder	Replace or repair	1B—41
	Worn piston or piston pin	Replace	1B—44
	Seized piston	Replace	1B—43
	Damaged piston ring	Replace	1B—43
	Bent connecting rod	Replace	1B—44
	Valves or timing related parts		
	Malfunction of HLA*	Replace	1B—60
	Broken valve spring	Replace	1B—38
	Excessive valve guide clearance	Replace	1B—35
	Malfunction of timing belt tensioner	Replace	1B—47
	Malfunction of cooling system	Refer to Section 3A	
	Malfunction of fuel system	Refer to Section 4C	
	Others		
	Malfunction of water pump bearing	Replace	—
	Improper drive belt tension	Adjust	1B— 6
	Malfunction of alternator bearing	Replace	—
	Exhaust gas leakage	Repair	1B—34

* Tappet noise may occur if the engine is not operated for an extended period of time. The noise should stop after the engine has reached normal operating temperature.

76G01B-004



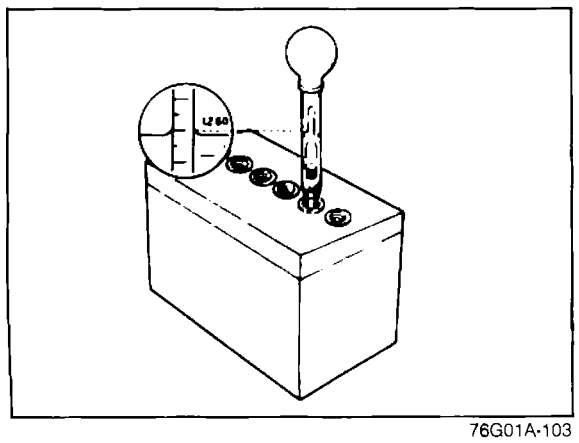
76G01A-102

TUNE-UP PROCEDURE

Tune the engine according to the procedures described below.

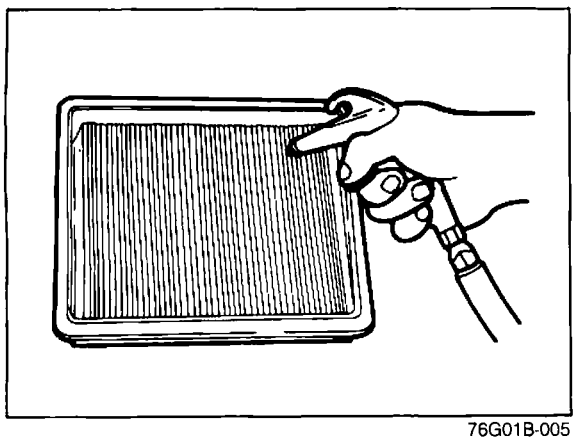
Battery

1. Check for corrosion on the terminals, or loose cable connections.
   If necessary, clean the clamps and tighten firmly.
2. Check that the electrolyte level is between the UPPER and LOWER marks.
   Add distilled water if necessary.



76G01A-103

3. Check the specific gravity by using a hydrometer.
   If the specific gravity reading is 1.200 or less, recharge the battery. (Refer to Section 5.)

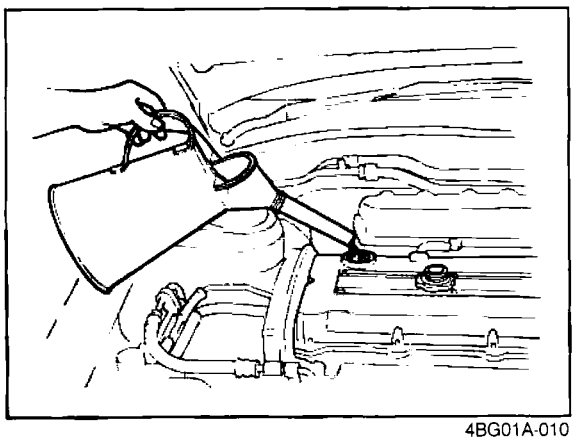


76G01B-005

Air Cleaner Element

Visually check the air cleaner element for excessive dirt, damage, or oil. Clean or replace if necessary.

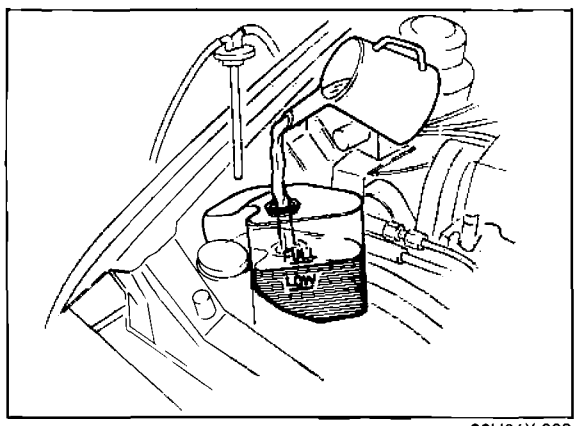
Caution
When cleaning the air cleaner element, blow dust off from the inside completely first, then blow from the outside.



4BG01A-010

Engine Oil

Check the engine oil level and condition with the oil level gauge.
Add oil, or change it, if necessary.



86U01X-008

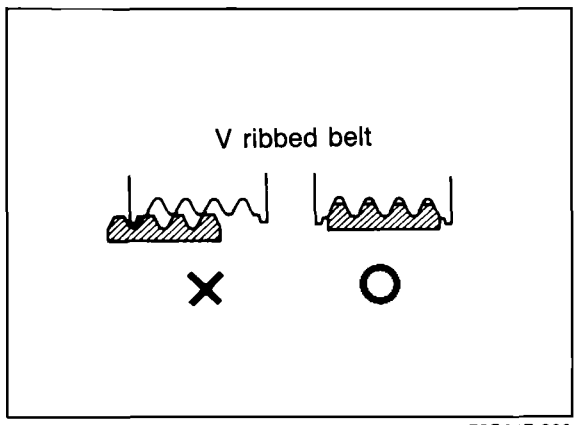
Coolant Level (Cold engine)

1. Check that the coolant level is near the radiator inlet port.
2. Check that the level in the coolant reservoir is between the FULL and LOW marks.
   Add coolant if necessary.

Warning

a) Never remove the radiator cap while the engine is hot.

b) Wrap a thick cloth around the cap and carefully remove it.



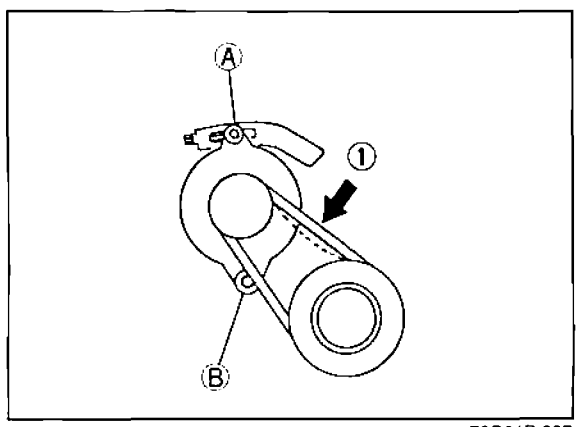
76G01B-006

Drive Belt

1. Check that the drive belt is positioned in the pulley groove.
2. Check the drive belt for wear, cracks, or fraying. Replace if necessary.
3. Check the drive belt tension by using the tension gauge.

Standard belt tension N (kg, lb)

Belt	New	Used
Alternator	589—785 (60—80, 132—176)	491—687 (50—70, 110—154)
P/S	687—883 (70—90, 154—198)	589—785 (60—80, 132—176)
A/C	687—883 (70—90, 154—198)	589—785 (60—80, 132—176)



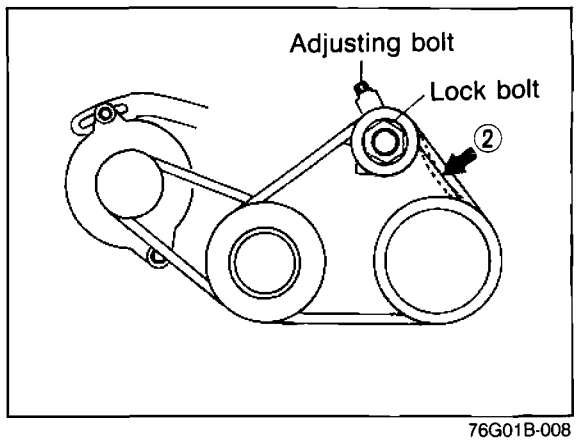
76G01B-007

4. Check the drive belt deflection by applying moderate pressure **(98 N, 10 kg, 22 lb)** midway between the pulleys.

   (1) Alternator belt deflection
   New : 6—8 mm (0.24—0.31 in)
   Used: 7—9 mm (0.27—0.35 in)

   If necessary, loosen the alternator mounting bolts and adjust the belt deflection by turning the adjusting bolt.

Tightening torque
Ⓐ: 31—46 N·m (3.2—4.7 m-kg, 23—34 ft-lb)
Ⓑ: 37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

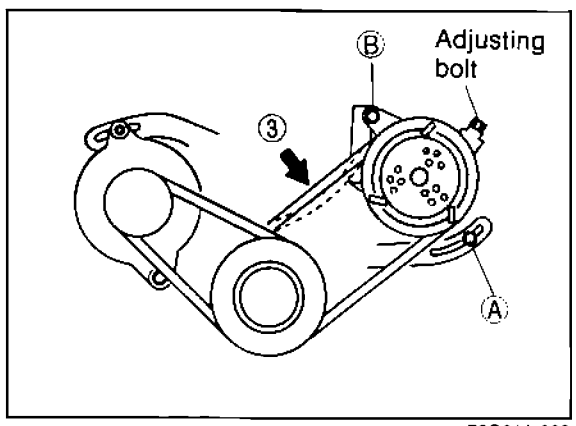


76G01B-008

(2) P/S belt deflection
New : 8—10 mm (0.31—0.39 in)
Used: 9—11 mm (0.35—0.43 in)

If necessary, loosen the idler pulley lock bolt and adjust the belt deflection by turning the adjusting bolt.

Tightening torque of lock bolt:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

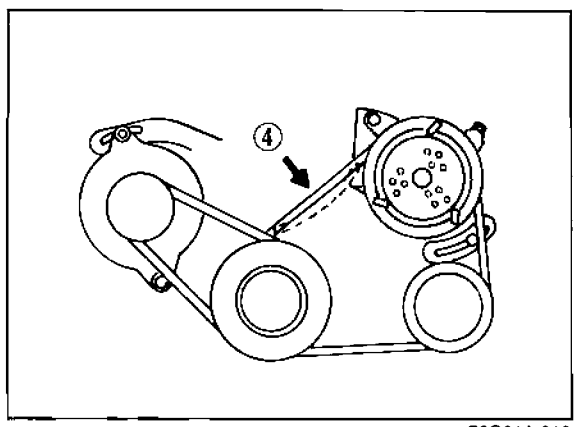


76G01A-009

(3) A/C belt deflection
New : 7—9 mm (0.27—0.35 in)
Used: 8—10 mm (0.31—0.39 in)

If necessary, loosen the A/C mounting bolts and adjust the belt deflection by turning the adjusting bolt.

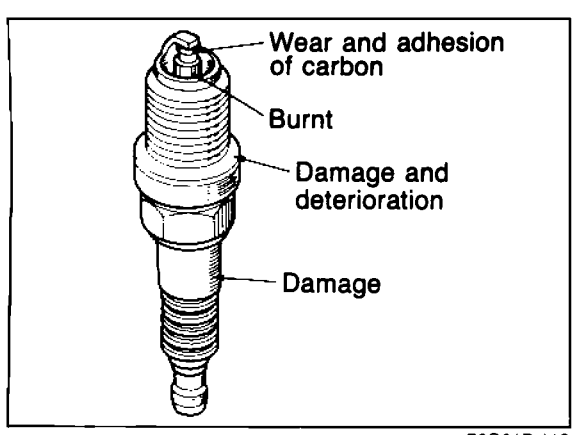
Tightening torque
Ⓐ: 37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)
Ⓑ: 37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)



76G01A-010

(4) P/S and A/C belt deflection
New : 7—9 mm (0.27—0.35 in)
Used: 8—10 mm (0.31—0.39 in)

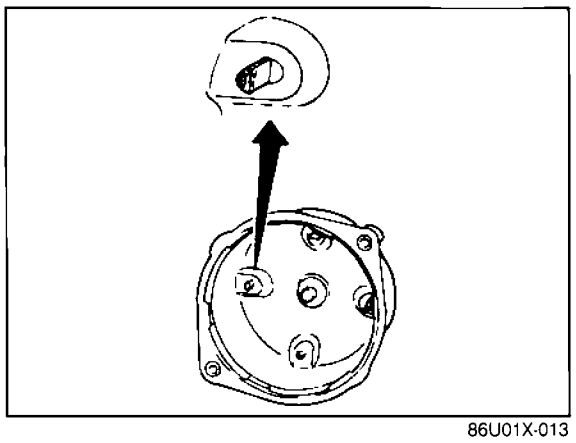
If necessary, adjust the belt deflection using the same procedure as used for the A/C belt deflection.



76G01B-118

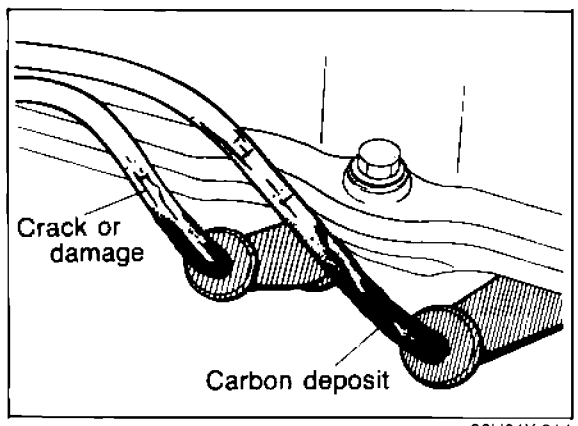
Spark Plug
Check the following points. Clean or replace if necessary.
1. Damaged insulation
2. Worn electrodes
3. Carbon deposits
4. Damaged gasket
5. Burnt spark insulator
6. Plug gap

Plug gap:
0.7—0.8 mm (0.028—0.031 in)



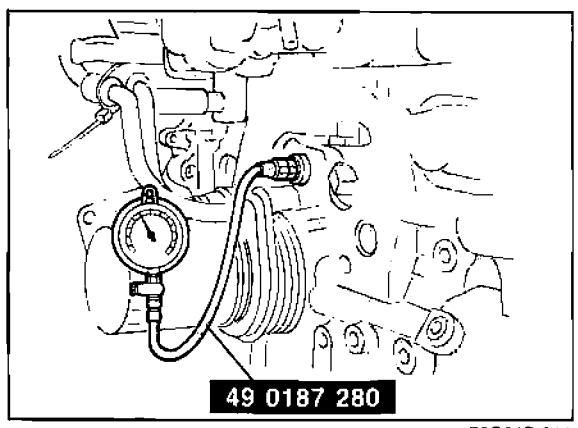
86U01X-013

Distributor Cap
Check the following points. Replace if necessary.
1. Cracks or carbon deposits
2. Burnt or corroded terminals
3. Worn distributor center contact



86U01X-014

High-Tension Lead
Check the following points. Clean or replace if necessary.
1. Damaged lead
2. Carbon deposits

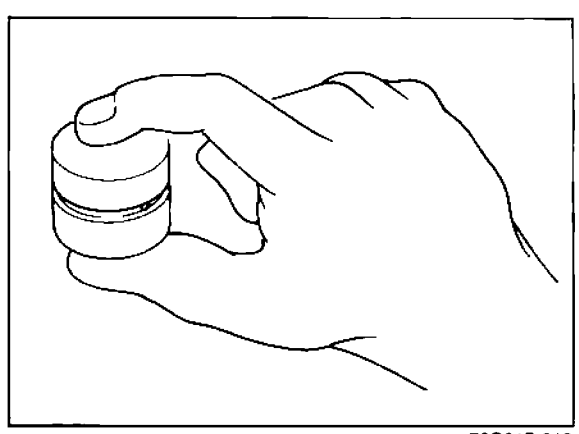


76G01B-011

Hydraulic Lash Adjuster (HLA)

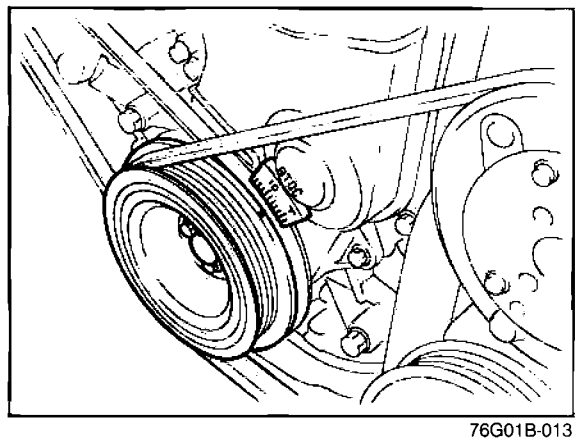
Note
Tappet noise may occur if the engine is not operated for an extended period of time. The noise should stop after the engine has reached normal operating temperature.

1. Check for tappet noise. If noise exists, check the following points.
   (1) Engine oil condition and level
   (2) Engine oil pressure (Refer to Section 2A)



76G01B-012

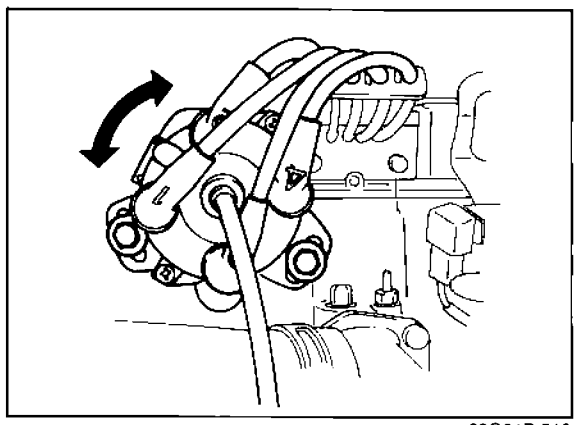
2. If the noise does not stop, check for movement of each HLA by pushing it during disassembly.
3. If the HLA moves, replace the HLA. (Refer to page 1B—60.)



76G01B-013

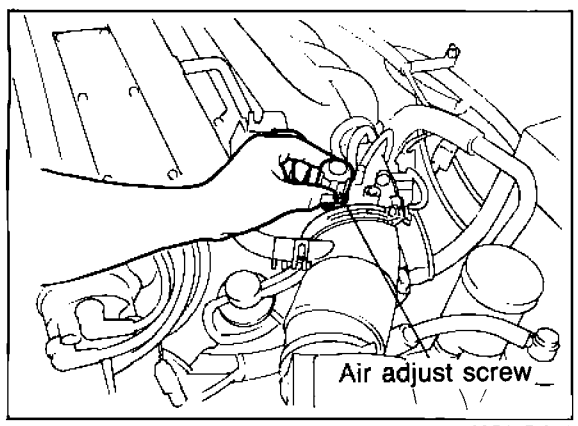
Ignition Timing
1. Warm up the engine and run it at idle.
2. Turn all electric loads OFF.
3. Connect a timing light tester.
4. Disconnect the vacuum hose from the vacuum control, and plug the hose.
5. Check that the ignition timing mark (yellow) on the crankshaft pulley and the timing mark on the timing belt cover are aligned.

Ignition timing: 12° ± 1° BTDC
(at idle speed)



69G01B-518

6. If necessary, adjust the ignition timing by turning the distributor.



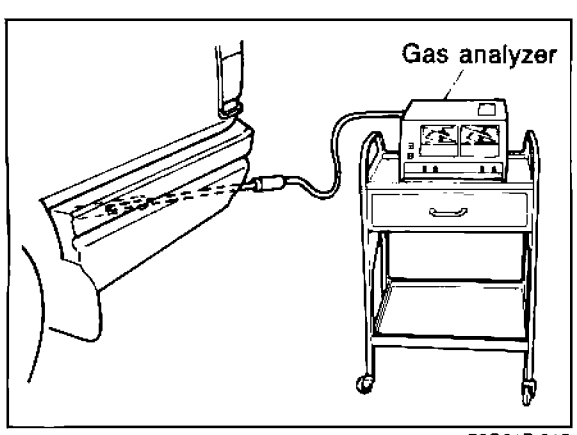
76G01B-014

Idle Speed

1. Ground the test connector to the vehicle with a jumper wire.
2. Connect a tachometer to the engine.
3. Check the idle speed.

Idle speed: 750 ± 50 rpm

4. If necessary, remove the blind cap from the throttle body and adjust by turning the air adjust screw.
5. Install the blind cap and disconnect the jumper wire from the test connector.

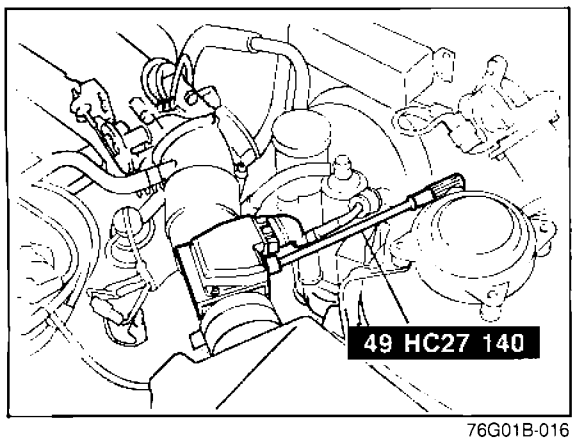


76G01B-015

Idle Mixture

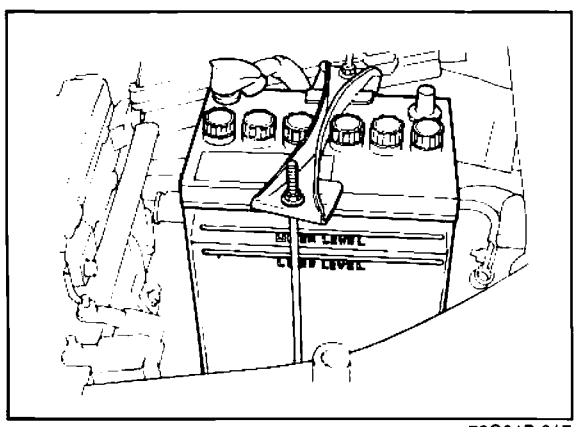
1. Connect an exhaust gas analyzer to the vehicle.
2. Measure the CO and HC concentration.

CO concentration: 1.5 ± 0.5%
HC concentration: Less than 1,000 ppm



76G01B-016

3. If necessary, remove the blind cap from the air flow meter and adjust by turning the bypass air adjust screw with **SST**.
4. Install the blind cap to the air flow meter and disconnect the jumper wire from the test connector.



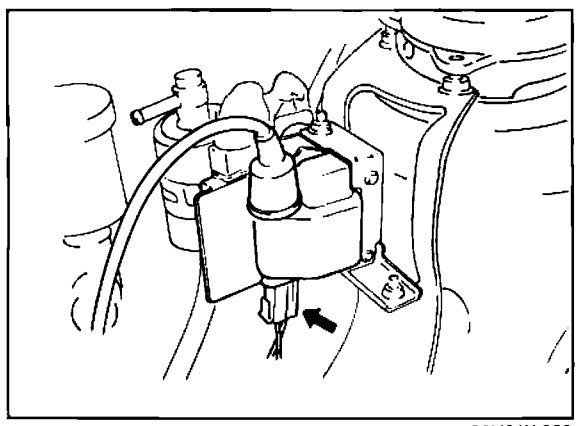
76G01B-017

ON-VEHICLE INSPECTION

If the engine exhibits low power, poor fuel economy, or poor idle, check the following points.
1. Ignition system (Refer to Section 5)
2. Compression
3. Fuel system (Refer to Section 4C)

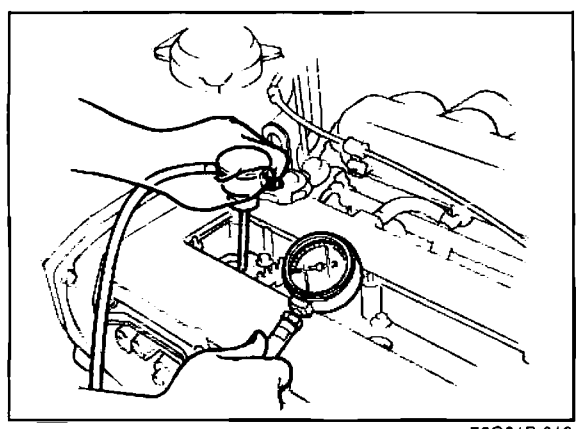
COMPRESSION

1. Check that the battery is fully charged. Recharge if necessary.



86U01X-020

2. Warm up the engine to the normal operating temperature.
3. Turn it off for about 10 minutes to allow the exhaust manifold to cool.
4. Remove all spark plugs.
5. Disconnect the primary wire connector from the ignition coil.



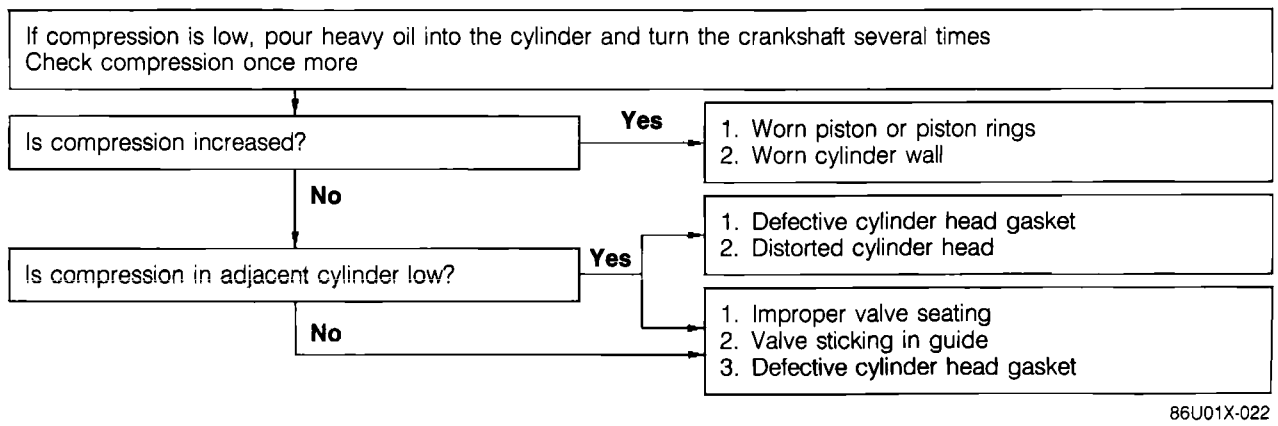
76G01B-018

6. Connect a compression gauge to No.1 spark plug hole.
7. Fully depress the accelerator pedal and crank the engine.
8. Note the maximum gauge reading.
9. Check each cylinder.

Standard compression:
1,422 kPa (14.5 kg/cm^2, 206 psi)—290 rpm ..... Leaded fuel
1,373 kPa (14.0 kg/cm^2, 199 psi)—310 rpm ... Unleaded fuel

Compression limit:
996 kPa (10.2 kg/cm^2, 144 psi)—290 rpm ..... Leaded fuel
961 kPa (9.8 kg/cm^2, 139 psi)—310 rpm ... Unleaded fuel

Possible Cause



86U01X-022

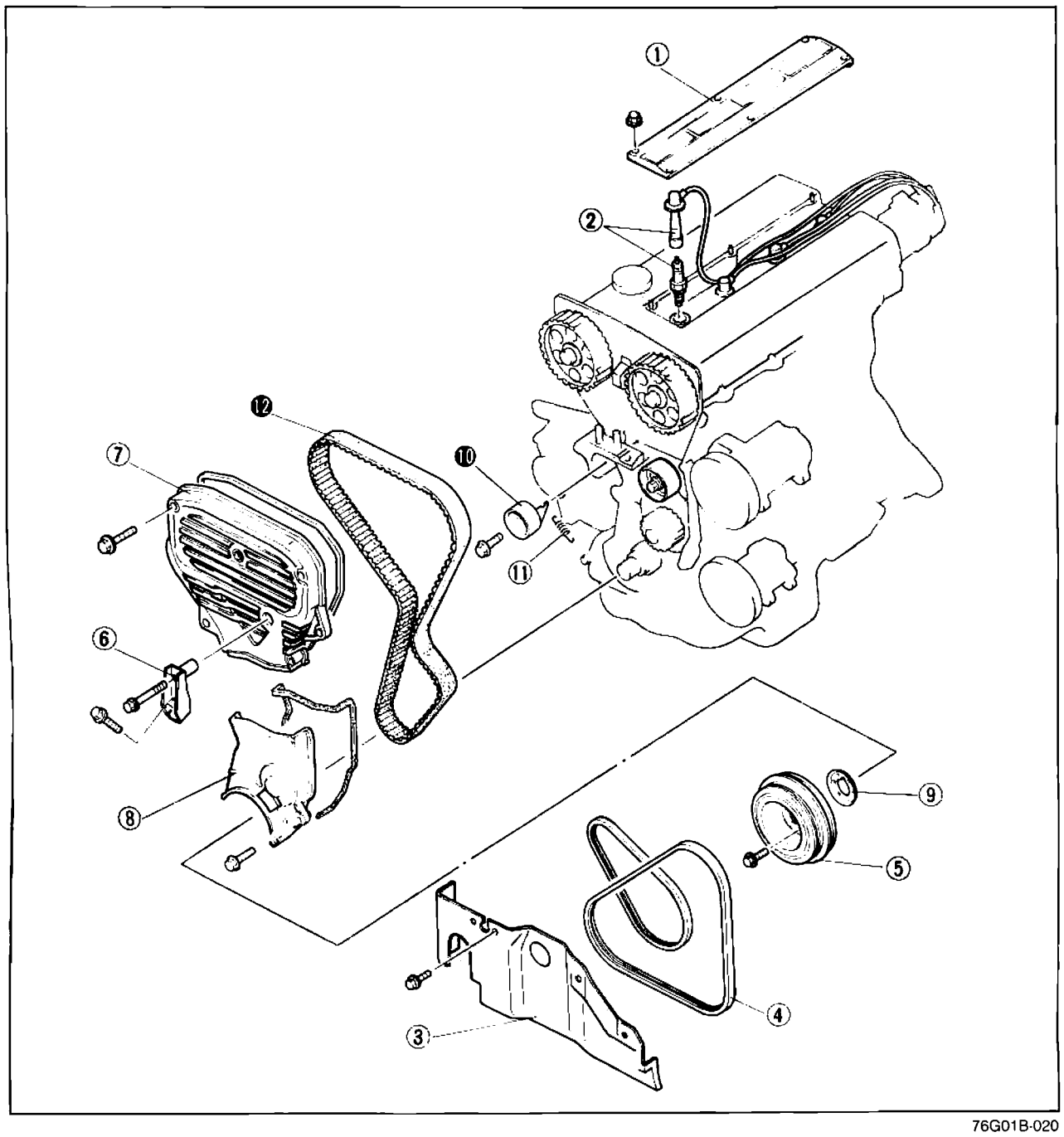
ON-VEHICLE MAINTENANCE

TIMING BELT

Removal

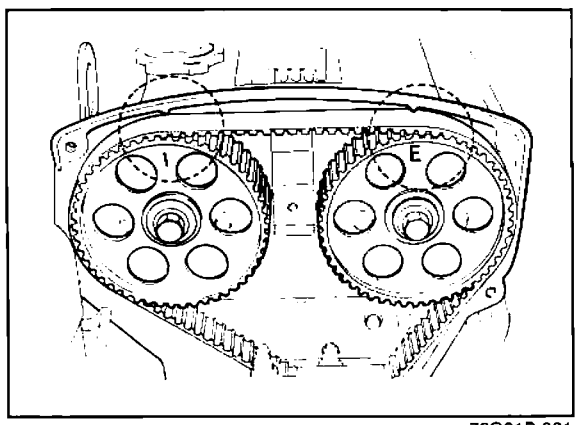
1. Disconnect the negative battery cable.
2. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.

76G01A-108



76G01B-020

1. Center cover
2. High-tension lead and spark plug
3. Engine side cover
4. Drive belt
5. Crankshaft pulley
6. Engine mount bracket
7. Upper timing belt cover
8. Lower timing belt cover
9. Baffle plate
10. Timing belt tensioner
11. Timing belt tensioner spring
12. Timing belt



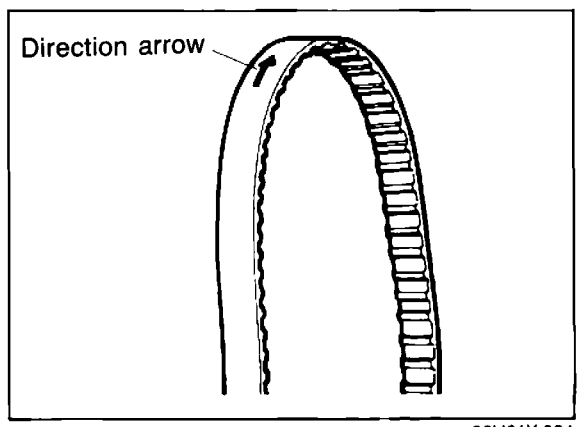
76G01B-021

Removal note
Timing belt tensioner

1. Turn the crankshaft to align the mating marks of the camshaft pulleys.

   Note
   For intake side camshaft pulley, align "I" mark.
   For exhaust side camshaft pulley, align "E" mark.

2. Remove the tensioner.

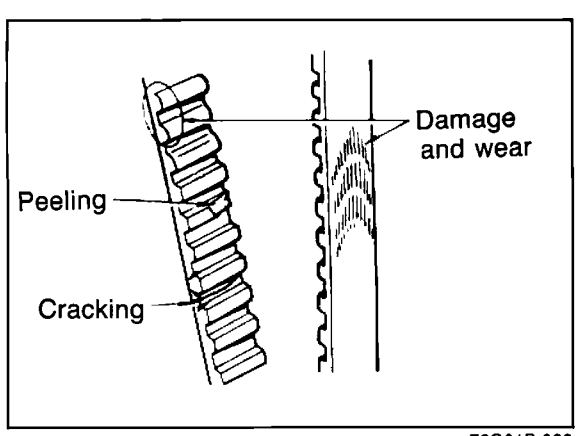


86U01X-024

Timing belt

Mark the timing belt rotation for proper reinstallation if it is reused.

Caution
Be careful not to allow oil, grease, or water on the belt.



76G01B-022

Inspection

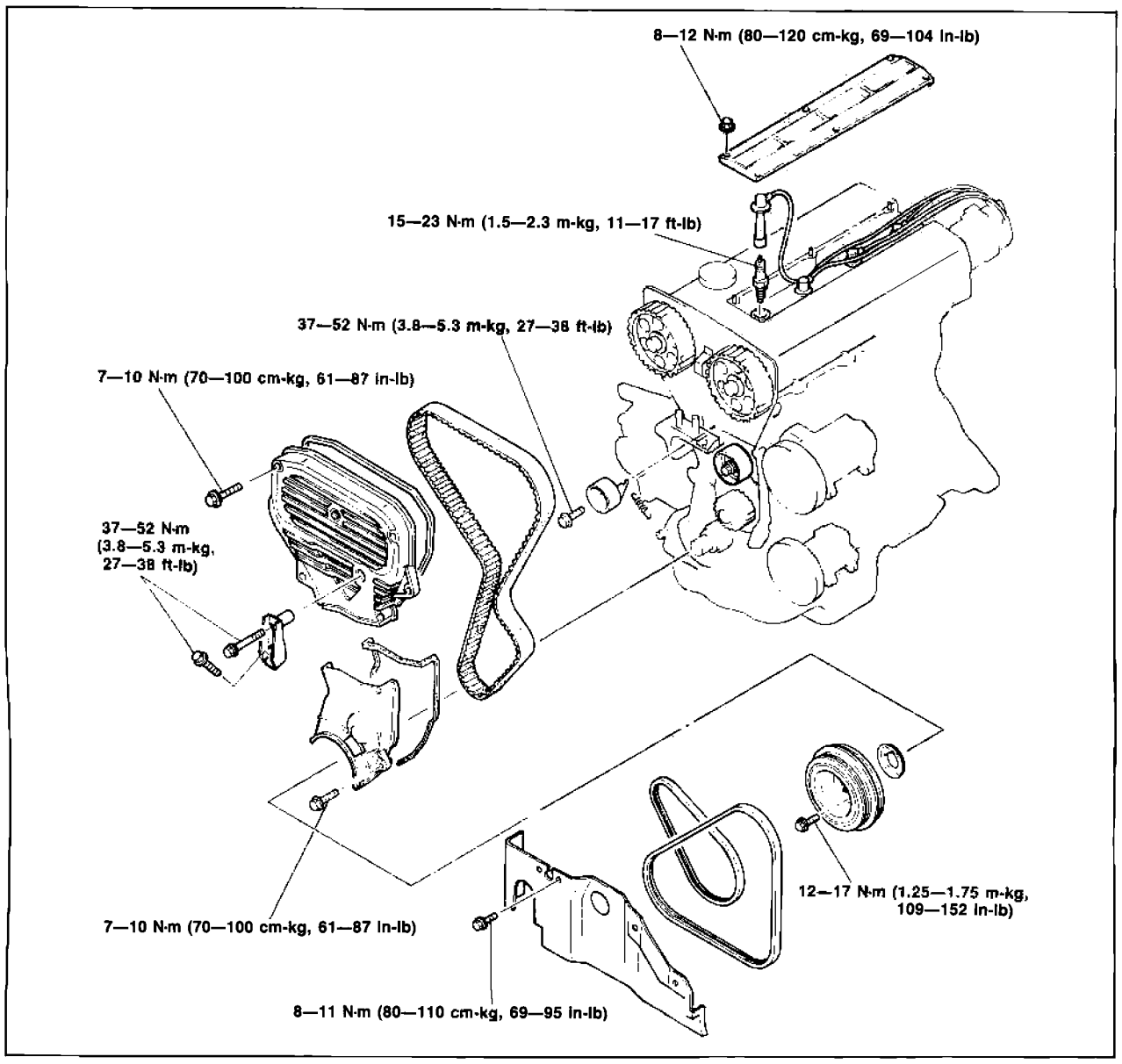
Inspect the following parts. (Refer to page 1B—46, 47.)

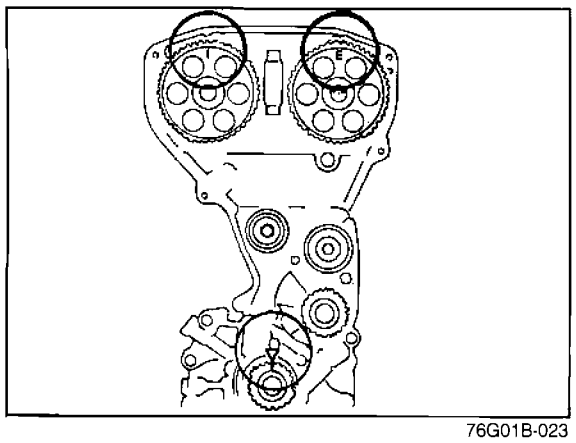
1. Timing belt
2. Timing belt tensioner and spring
3. Timing belt idler pulley
4. Timing belt pulley
5. Camshaft pulley

Installation
Install in the reverse order of removal referring to the installation note.

Torque Specifications

76G01A-109



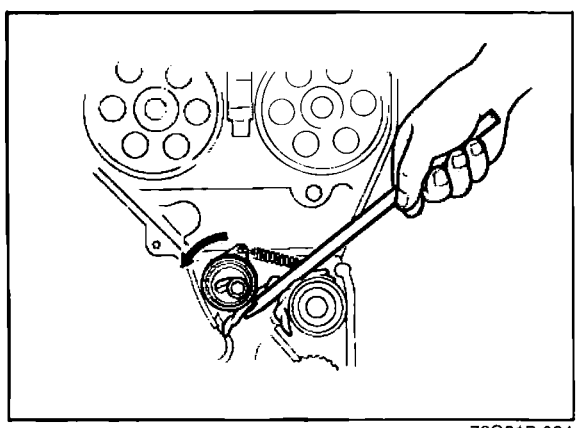


76G01B-023

Installation note
Timing belt

1. Check that the mark on the timing belt pulley is aligned with the mating mark.
2. Check that the mating mark of the camshaft pulleys are aligned with the seal plate mating marks.

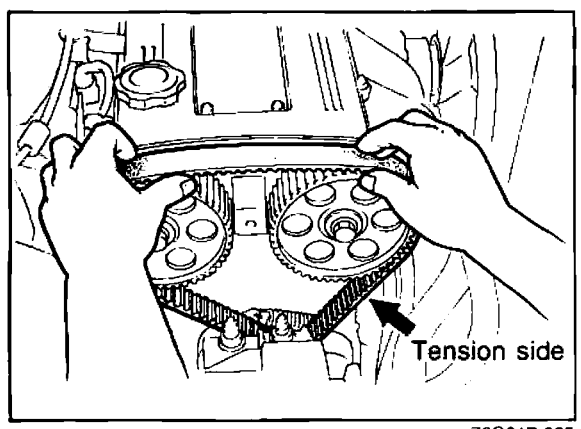
Note
For intake side camshaft pulley, align "I" mark.
For exhaust side camshaft pulley, align "E" mark.



76G01B-024

3. Install the timing belt tensioner and spring. Temporarily secure it with the spring fully extended.

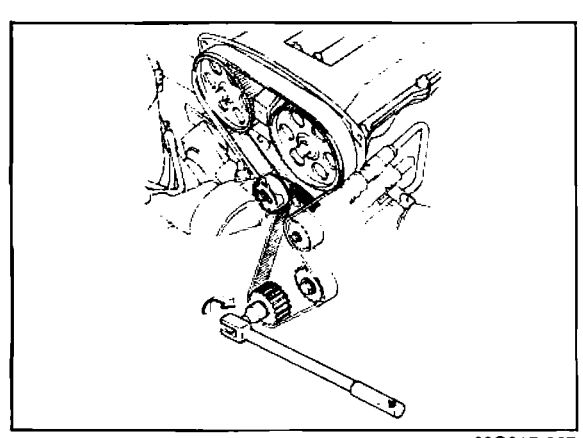
Caution
Do not damage the pulleys when securing the tensioner pulley.



76G01B-025

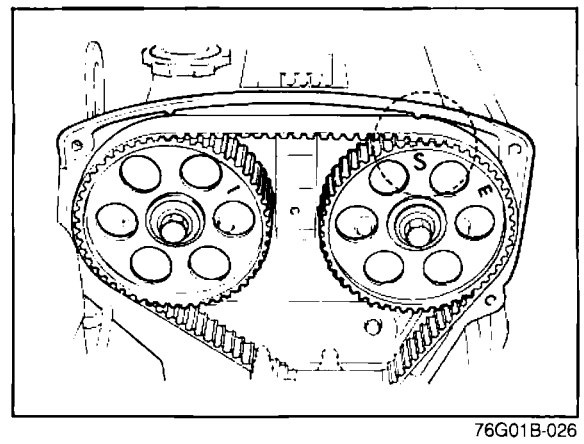
4. Install the timing belt so that there is no looseness at the tension side, and at the two camshaft pulleys.

Caution
a) If the timing belt is being reused, it must be reinstalled to rotate in the original direction.
b) Check that there is no oil, grease, or dirt on the timing belt.



69G01B-027

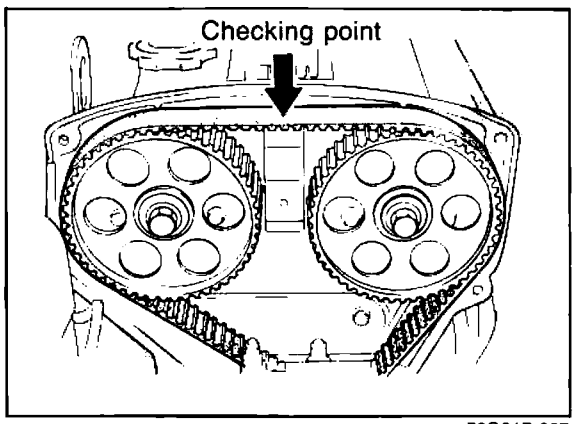
5. Loosen the tensioner lock bolt.
6. Turn the crankshaft twice in the direction of rotation, and align the mating marks.
7. Check that the timing marks are correctly aligned. If not aligned, remove the timing belt tensioner and timing belt, and repeat steps 1—6.



76G01B-026

8. Turn the crankshaft to align the **"S"** mark of the right side camshaft pulley with seal plate mating mark.
9. Tighten the timing belt tensioner lock bolt.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

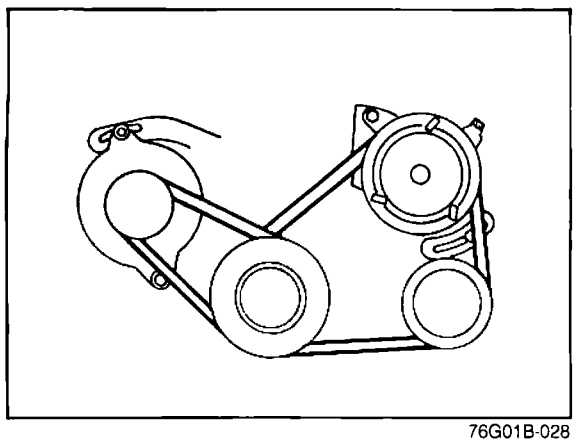


76G01B-027

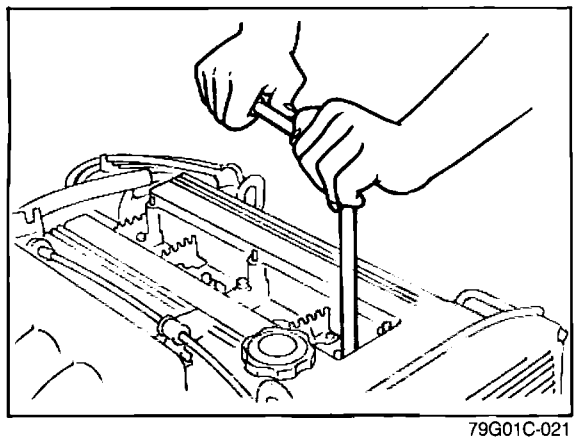
10. Check the timing belt deflection. If the deflection is not correct, repeat the adjustment from step 5 above.

Timing belt deflection: 7.5—8.5 mm (0.30—0.33 in) /98 N (10 kg, 22 lb)

Caution
Be sure not to apply tension other than that of the tensioner spring.

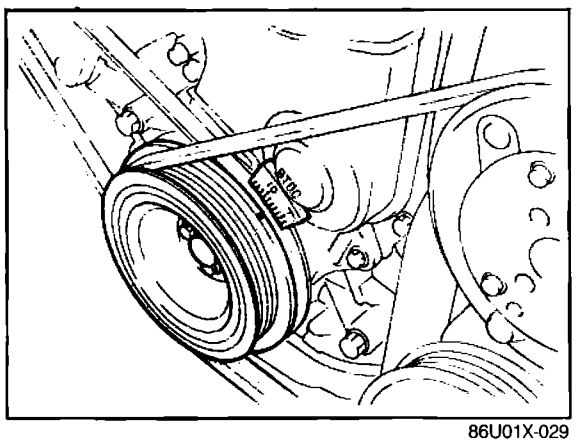

76G01B-028

Drive belt
Install each drive belt, and check the belt deflection. (Refer to page 1B—6.)


79G01C-021

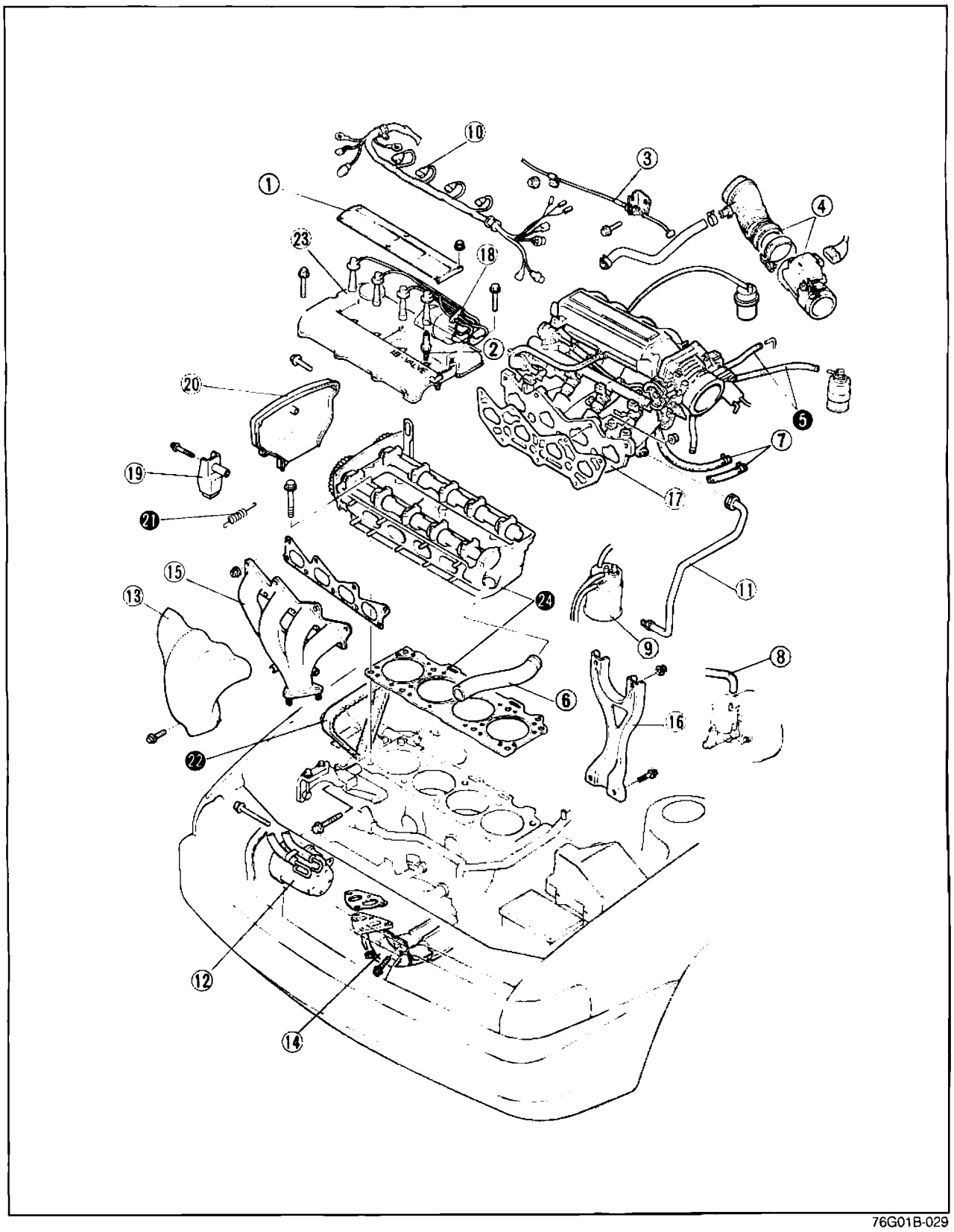
Spark plug
1. Apply anti-seize compound or molybdenum-based lubricant to the spark plug threads.
2. Install the spark plugs.

Tightening torque:
15—23 N·m (1.5—2.3 m-kg, 11—17 ft-lb)


86U01X-029

Steps After Installation
Perform the necessary engine adjustment. (Refer to TUNE-UP PROCEDURE.)

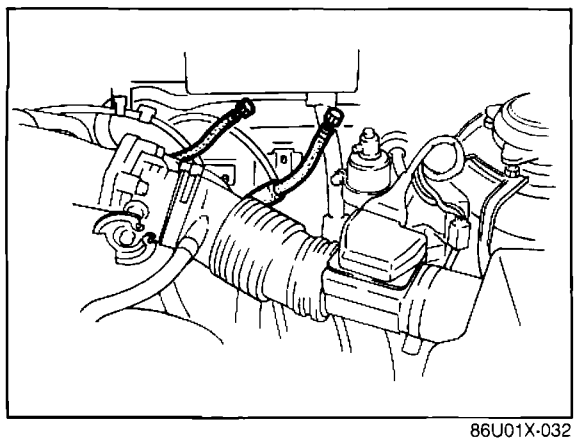
CYLINDER HEAD
Removal
Warning: Release the fuel pressure. (Refer to Section 4C.)
1. Disconnect the negative battery cable.
2. Drain the engine coolant.
3. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.



76G01B-029

1. Center cover
2. High-tension lead and spark plug
3. Accelerator cable
4. Air intake pipe assembly
5. Fuel hose
6. Upper radiator hose
7. Heater hose
8. Brake vacuum hose
9. Canister hose (Unleaded fuel)
10. Engine harness connector and ground
11. EGR pipe (Unleaded fuel)
12. A/C compressor and bracket
13. Exhaust manifold insulator
14. Exhaust pipe
15. Exhaust manifold
16. Intake manifold bracket
17. Intake manifold assembly
18. Distributor
19. Engine mount stay
20. Upper timing belt cover
21. Timing belt tensioner spring
22. Timing belt
23. Cylinder head cover
24. Cylinder head and gasket

76G01B-030

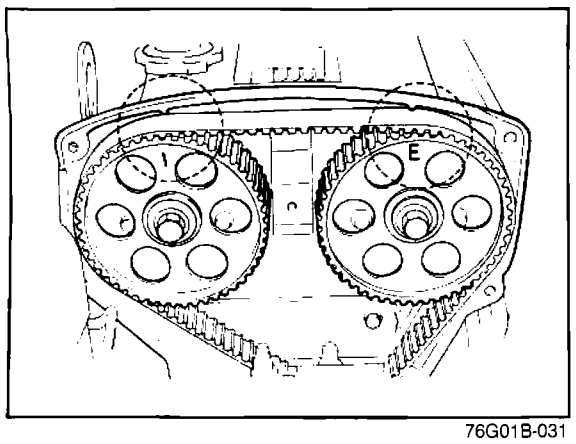


86U01X-032

Removal note
Fuel hose

Warning
a) Cover the hose with a rag because fuel will spray out when disconnecting.
b) Keep sparks and open flame away from the fuel area.

Plug the disconnected hoses to avoid fuel leakage.

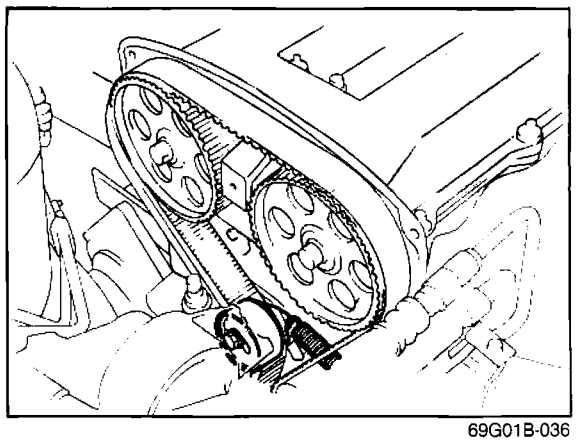


76G01B-031

Timing belt

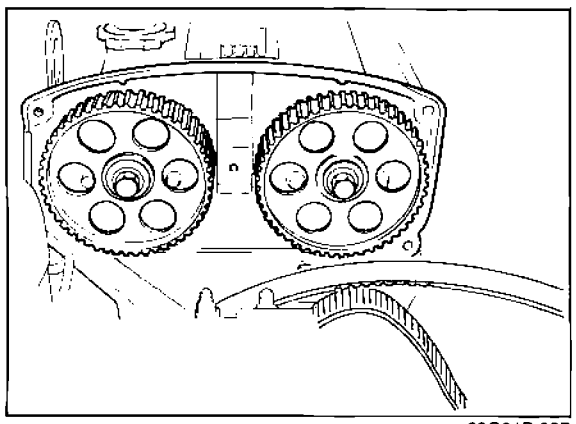
1. Before removing the timing belt, turn the crankshaft to align the mating marks of the camshaft pulleys with the seal plate timing mark.

Note
For intake side camshaft pulley, align "I" mark.
For exhaust side camshaft pulley, align "E" mark.



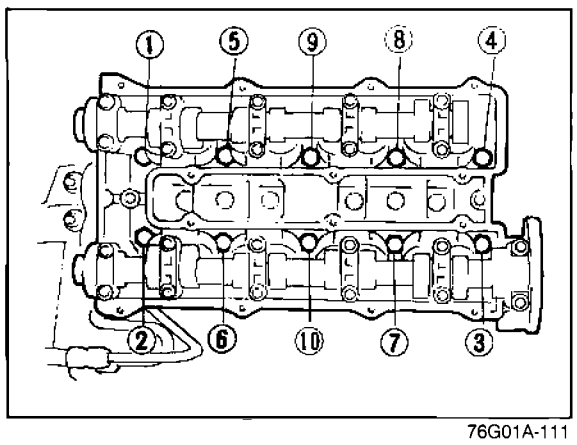
69G01B-036

2. Loosen the timing belt tensioner lock bolt.
3. Shift the tensioner outward as far as possible, then temporarily tighten it.



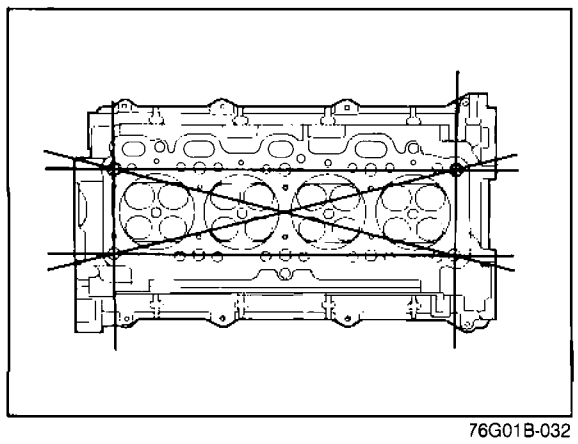
69G01B-037

4. Remove the timing belt and secure it out of the way to prevent damage during removal and installation of the cylinder head.



76G01A-111

Cylinder head bolt
Loosen the cylinder head bolts in two or three steps in the order shown in the figure.



76G01B-032

Disassembly of Cylinder Head
Refer to page 1B—28.

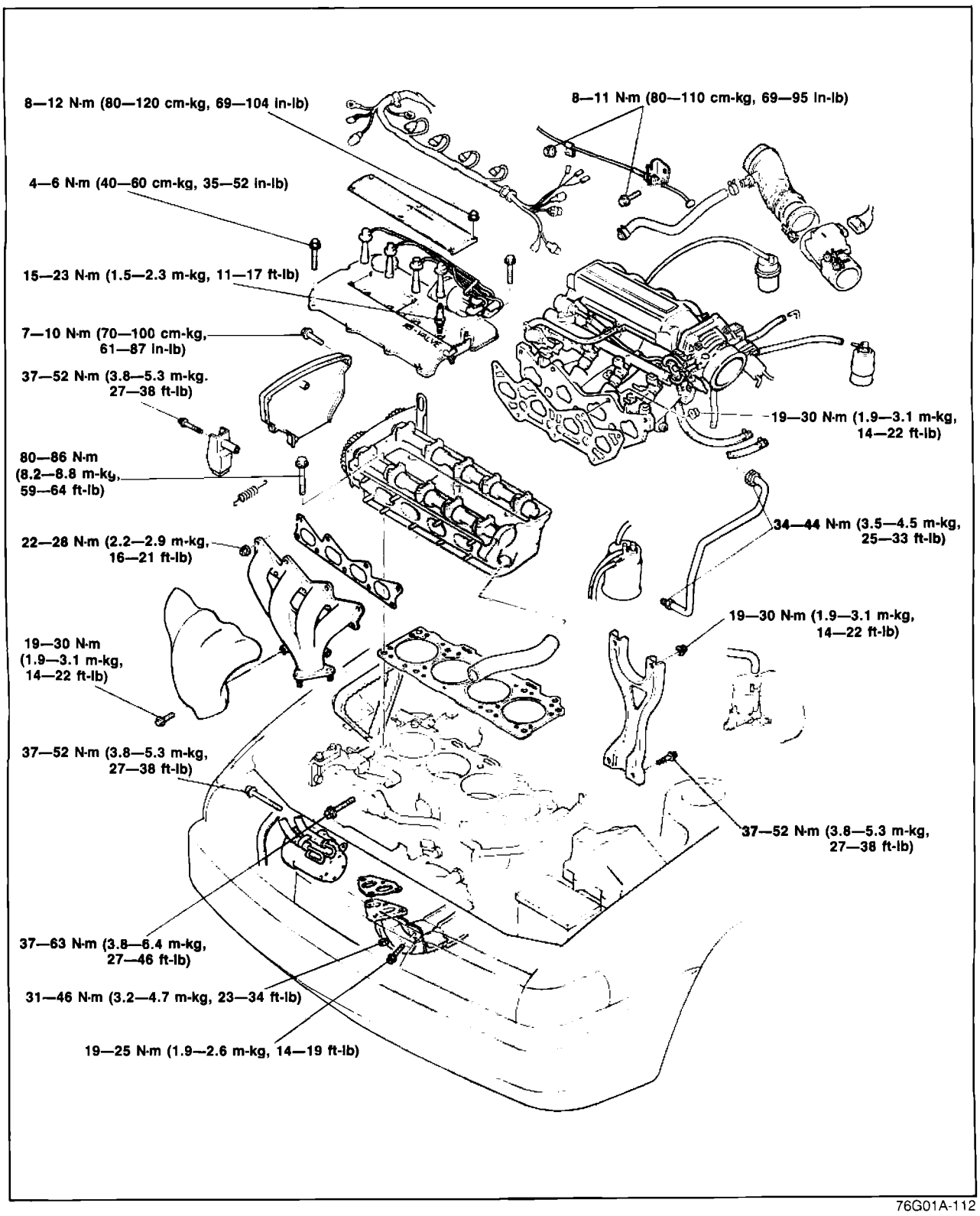
Inspection of Cylinder Head
Refer to page 1B—34.

Assembly of Cylinder Head
Refer to page 1B—59.

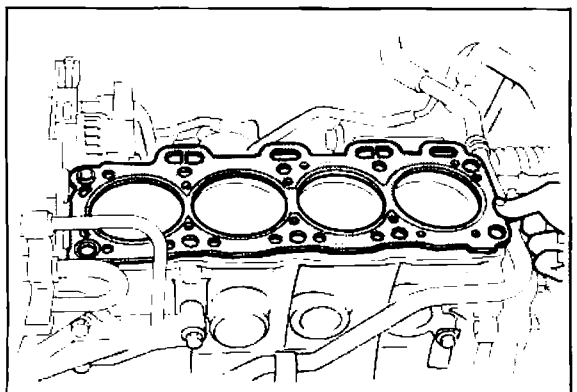
Installation
Install in the reverse order of removal referring to the installation note.

Note
a) Position the hose clamp in the original location on the hose.
b) Squeeze the clamp lightly with large pliers to ensure a good fit.

Torque Specifications

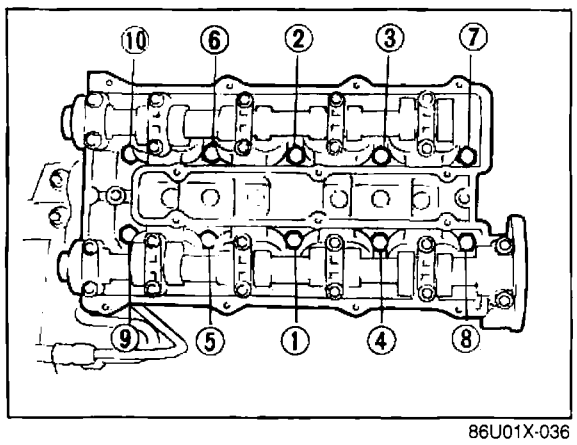


76G01A-112



86U01X-035

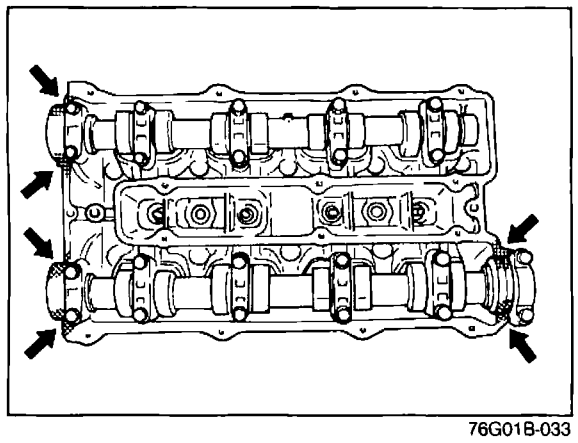
Installation note
Cylinder head
1. Thoroughly remove all dirt and oil from the top of the cylinder block with a rag.
2. Place a new cylinder head gasket in position.



86U01X-036

3. Set the cylinder head in place.
4. Apply engine oil to the bolt threads and seat faces.
5. Tighten the cylinder head bolts in two or three steps in the order shown in the figure.

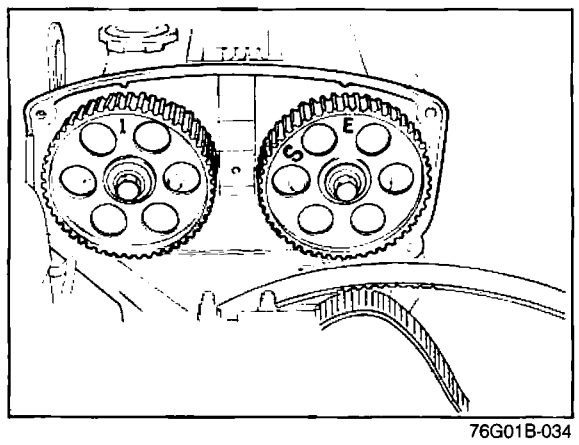
Tightening torque:
80—86 N·m (8.2—8.8 m-kg, 59—64 ft-lb)



76G01B-033

Cylinder head cover
1. Apply silicon sealant to the shaded area as shown in the figure.
2. Install the cylinder head cover and gasket.

Tightening torque:
4—6 N·m (40—60 cm-kg, 35—52 in-lb)

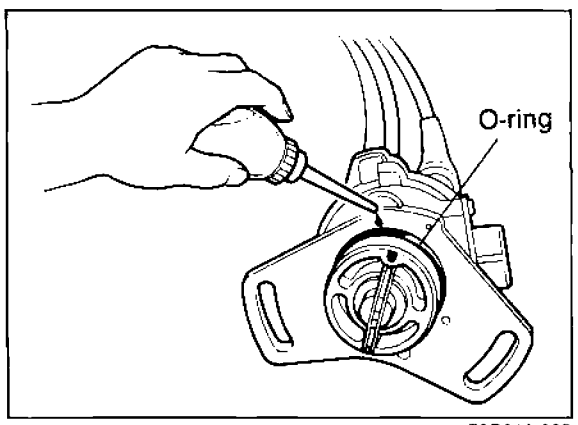


76G01B-034

Timing belt
1. Align the mating marks of the camshaft pulleys with the seal plate timing mark.

Note
For intake side camshaft pulley, align "I" mark.
For exhaust side camshaft pulley, align "E" mark.

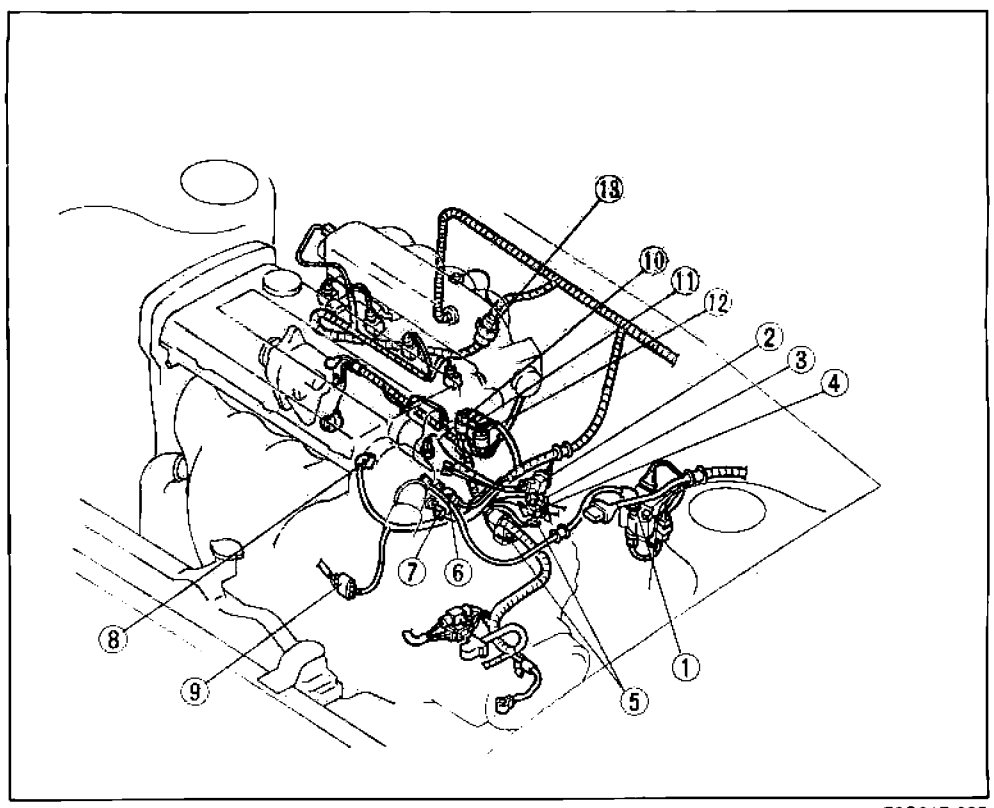
2. Install the timing belt. (Refer to TIMING BELT of ON-VEHICLE MAINTENANCE.)



Distributor
1. Apply engine oil to the O-ring, and position it on the distributor.
2. Apply engine oil to the blade.
3. Install the distributor.
4. Loosely tighten the distributor mounting bolt.

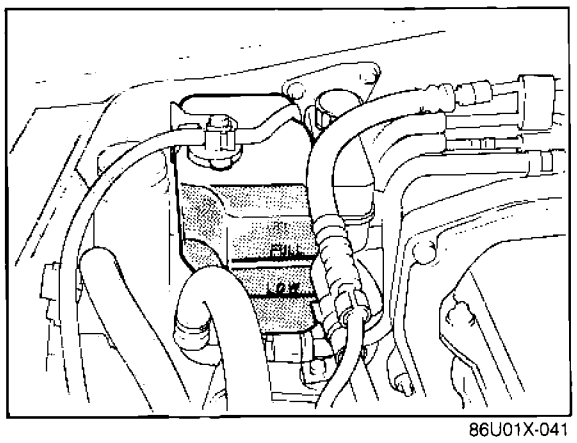
76G01A-035

Engine harness connector
Install the engine harness connectors.



76G01B-035

1. IG coil
2. Heat gauge unit
3. Speed sensor
4. P/S switch
5. Engine ground
6. Water temperature sensor
7. Water thermo switch
8. Crank angle sensor
9. Oxygen sensor
10. Linear solenoid
11. Solenoid valve (idle speed control)
12. Throttle position sensor
13. Injection harness

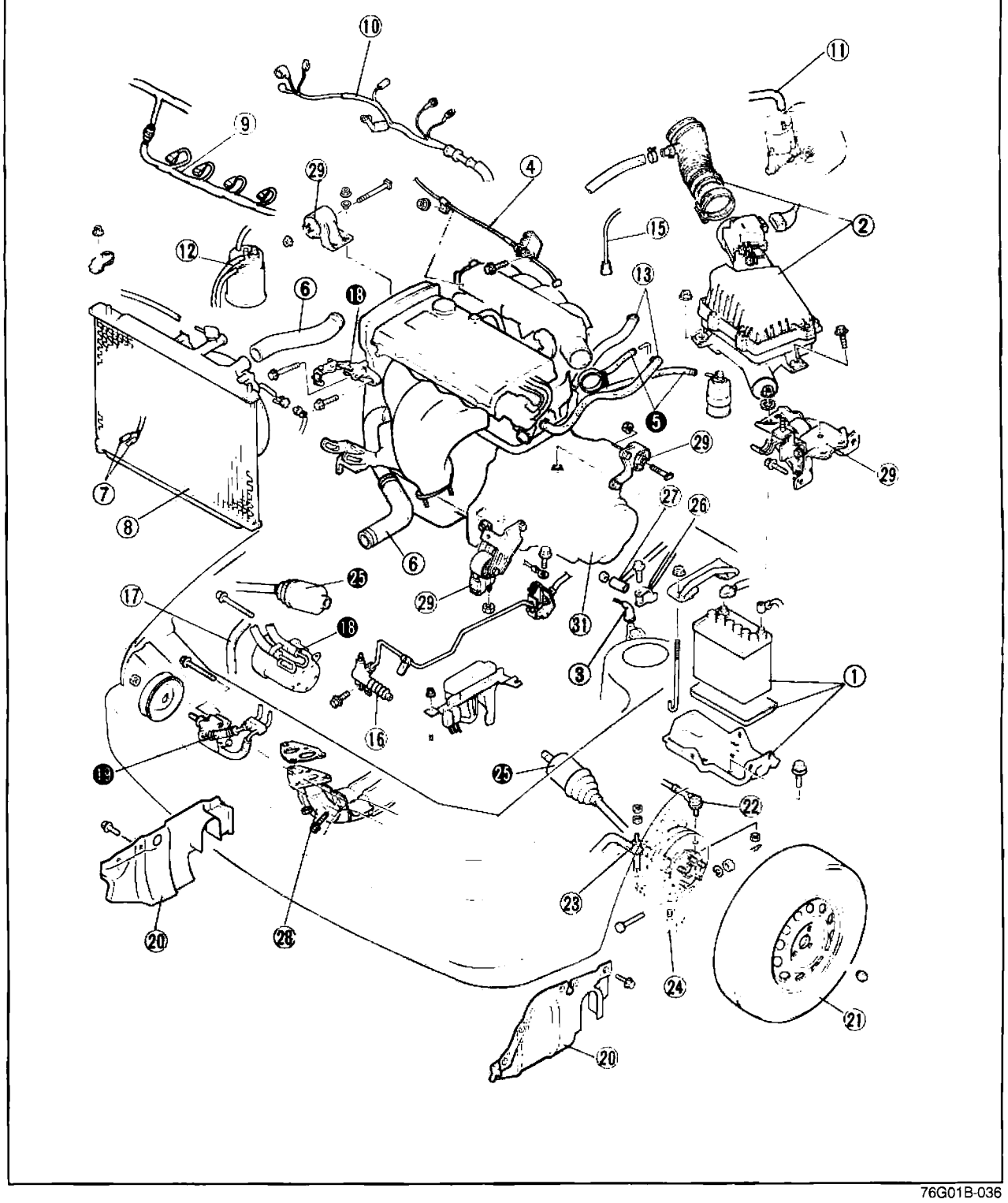


86U01X-041

Steps After Installation
1. Fill the radiator with the specified amount and type of coolant.
2. Perform the necessary engine adjustments. (Refer to TUNE-UP PROCEDURE.)

REMOVAL

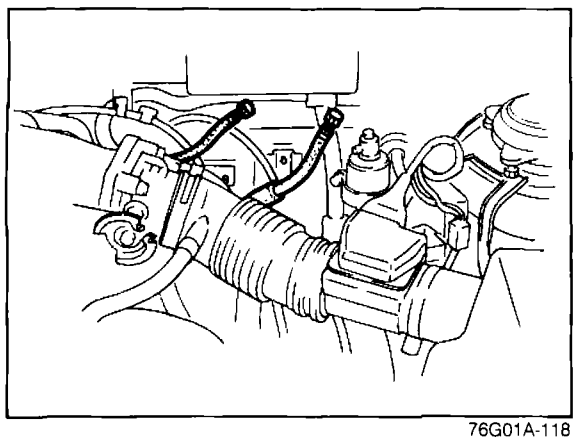
Warning: Release the fuel pressure. (Refer to Section 4C.)
1. Disconnect the negative battery cable.
2. Drain the engine oil and coolant.
3. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.



76G01B-036

1. Battery and battery carrier
2. Air cleaner assembly
3. High-tension lead
4. Accelerator cable
5. Fuel hose
6. Radiator hose
7. Radiator harness
8. Radiator and electric fan
9. EGI harness
10. Engine harness
11. Brake vacuum hose
12. Canister hose (Unleaded fuel)
13. Heater hose
14. Transaxle harness
15. Speedometer cable
16. Clutch release cylinder
17. Drive belt
18. A/C compressor and bracket
19. P/S oil pump
20. Engine side cover
21. Front wheel
22. Tie-rod end
23. Stabilizer control rod
24. Lower arm bushing
25. Driveshaft
26. Change rod
27. Extension bar
28. Exhaust pipe
29. Engine mount
30. Engine and transaxle
31. Transaxle

76G01B-037

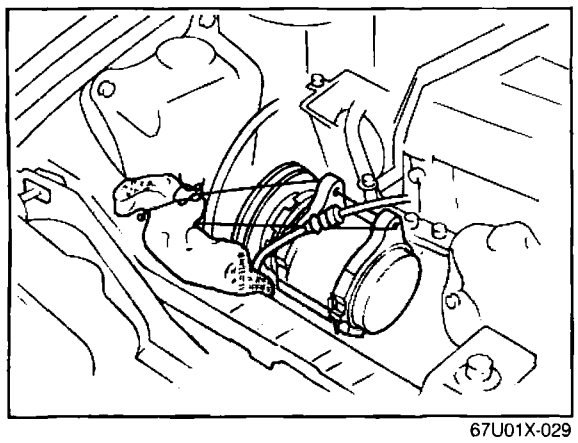


76G01A-118

Removal Note
Fuel hose

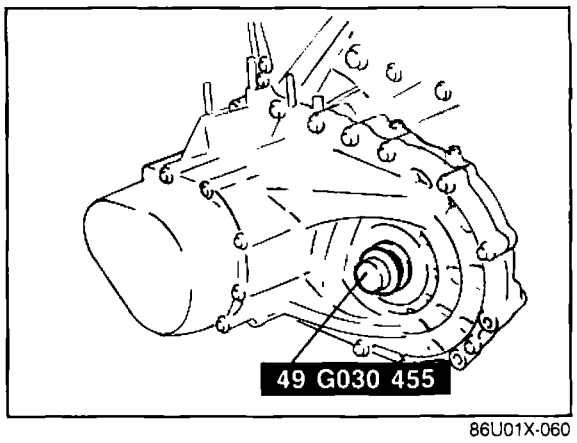
Warning
a) Cover the hose with a rag because fuel will spray out when disconnecting.
b) Keep sparks and open flame away from the fuel area.

Plug the disconnected hoses to avoid fuel leakage.



67U01X-029

P/S pump, A/C compressor
Remove the P/S pump and A/C compressor with the hoses still connected to them, secure the pump and compressor as shown in the figure.



86U01X-060

Driveshaft
Remove the driveshafts. (Refer to Section 9.) Slide the **SST** into the transaxle.

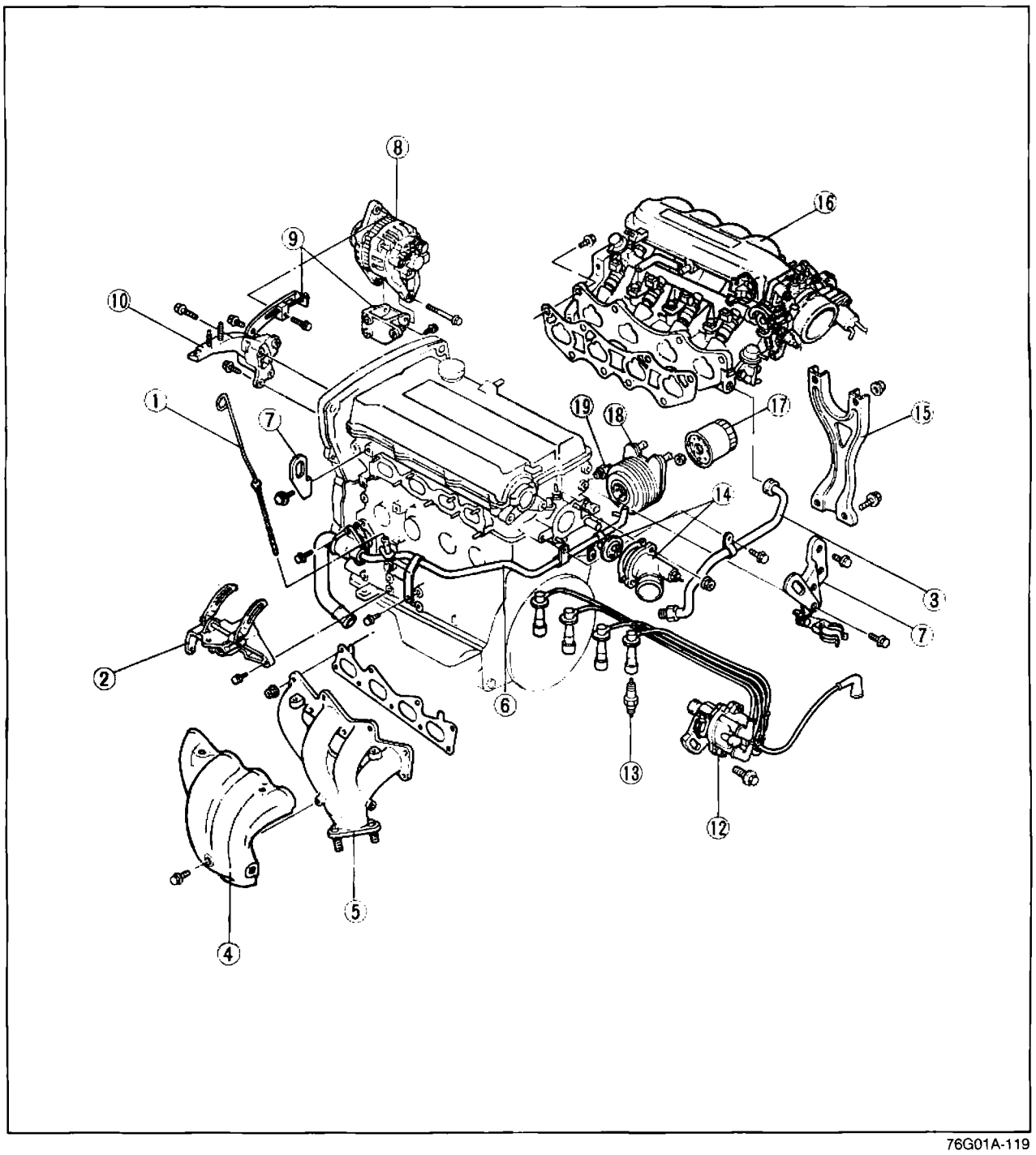
1B DISASSEMBLY (AUXILIARY PARTS)

DISASSEMBLY

1. Remove in the sequence shown in the figure referring to the disassembly note for specially marked parts.
2. Code all identical parts (such as pistons, piston rings, connecting rods, and valve springs) so that they can be reinstalled in the cylinder from which they were removed.
3. Clean the parts with steam, blow off any remaining water with compressed air.

Note
Care should be taken during the disassembly of any part or system to study its order of assembly. Any deformation, wear, or damage should also be noted.

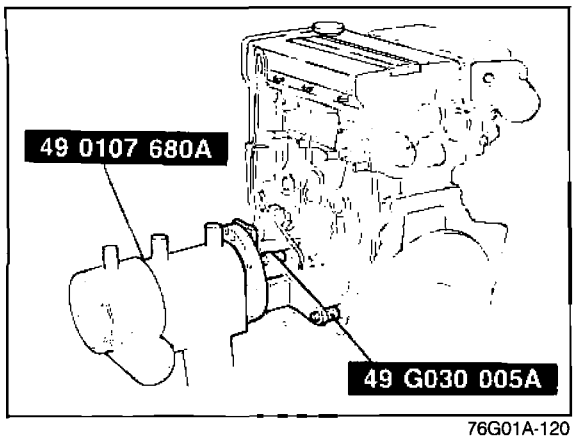
AUXILIARY PARTS



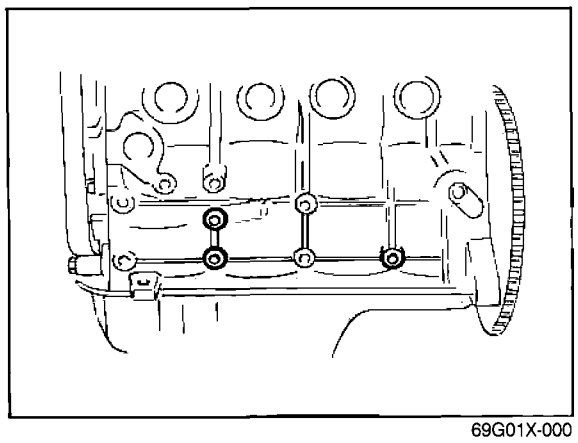
76G01A-119

1. Oil level gauge
2. P/S oil pump bracket
3. EGR pipe(Unleaded fuel)
4. Exhaust manifold insulator
5. Exhaust manifold assembly
6. Coolant inlet pipe and bypass pipe
7. Engine hanger
8. Alternator
9. Alternator strap and bracket
10. Engine mount bracket
11. Center cover
12. Distributor and high-tension lead
13. Spark plug
14. Thermostat and thermostat cover
15. Intake manifold bracket
16. Intake manifold assembly
17. Oil filter
18. Oil cooler
19. Oil pressure switch

76G01B-039



76G01A-120

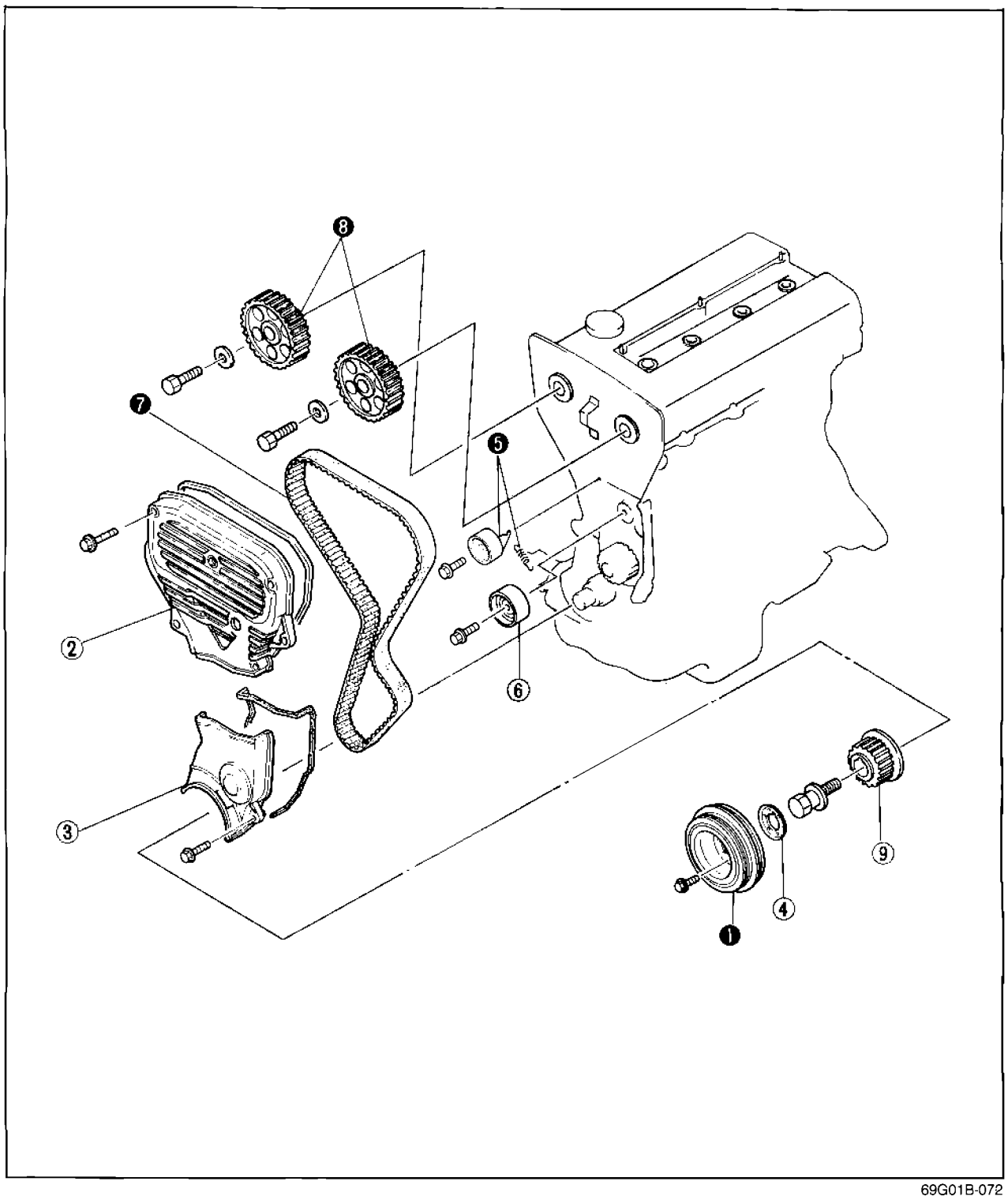


69G01X-000

Disassembly Note
Engine hanger
Remove the exhaust manifold; then connect the **SST** to the engine.

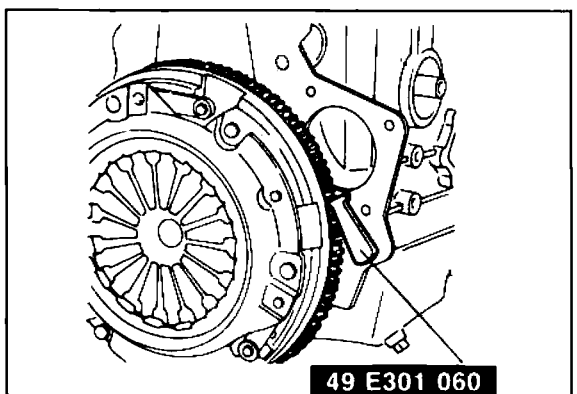
1B DISASSEMBLY (TIMING BELT)

TIMING BELT



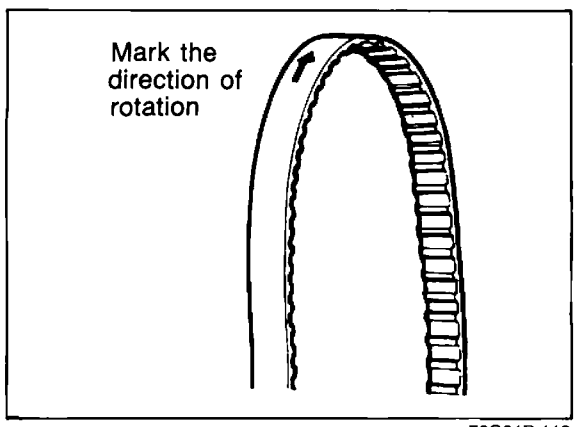
69G01B-072

1. Crankshaft pulley
2. Upper timing belt cover
3. Lower timing belt cover
4. Baffle plate
5. Timing belt tensioner and spring
6. Timing belt idler pulley
7. Timing belt
8. Camshaft pulley
9. Timing belt pulley



76G01A-121

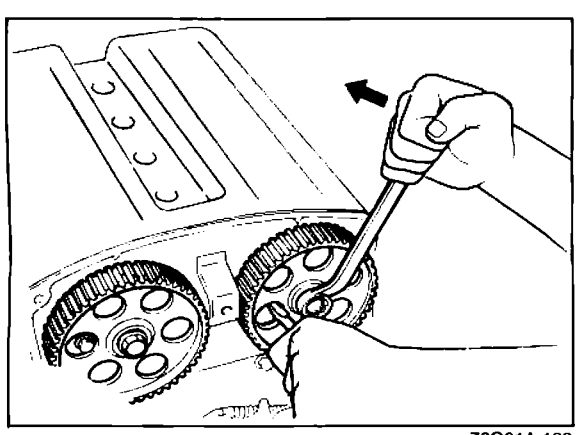
Disassembly Note
Crankshaft pulley
1. Set the **SST** against the flywheel.
2. Remove the crankshaft pulley.



76G01B-119

Timing belt
1. Loosen the tensioner lock bolt, and remove the tensioner spring.
2. Mark the timing belt rotation for proper reinstallation if it is reused.
3. Remove the timing belt.

Caution
Be careful not to allow oil or grease on the belt.

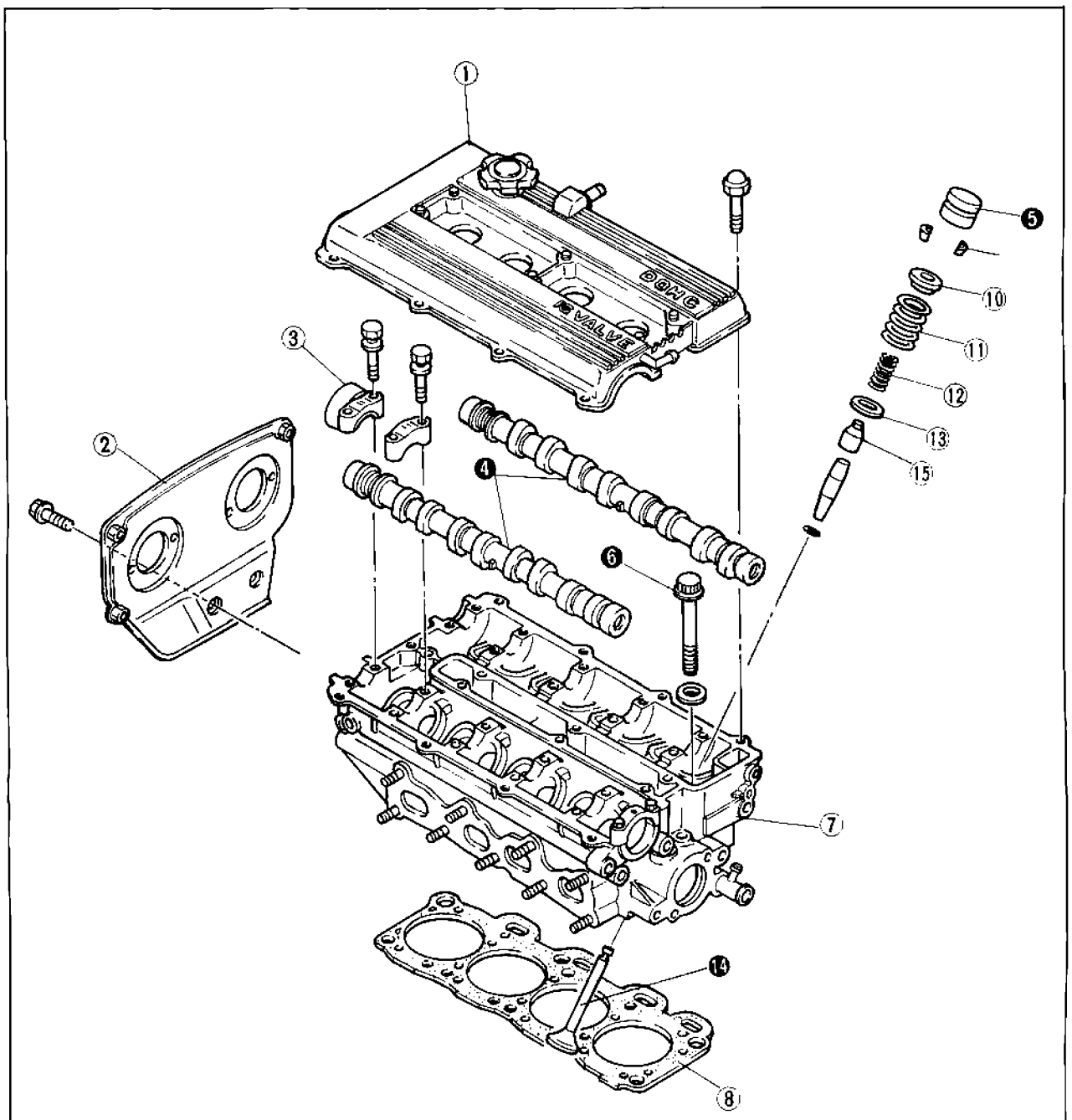


76G01A-123

Camshaft pulley
Remove the pulley lock bolt using a screw driver to prevent the camshaft from turning.

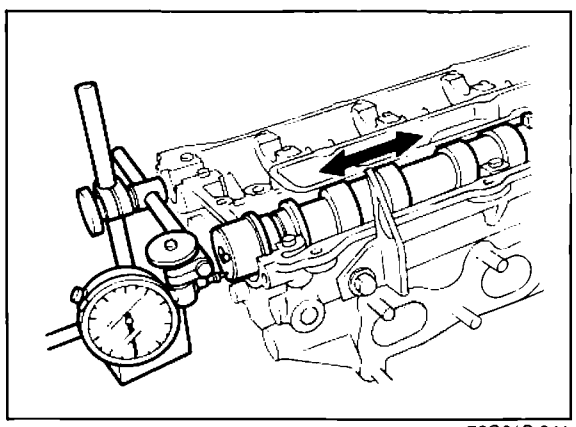
1B DISASSEMBLY (CYLINDER HEAD)

CYLINDER HEAD



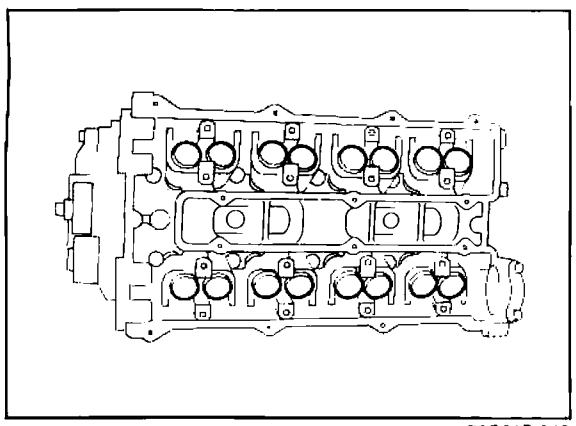
76G01B-040

1. Cylinder head cover
2. Seal plate
3. Camshaft cap
4. Camshaft
5. Hydraulic lash adjuster
6. Cylinder head bolt
7. Cylinder head
8. Cylinder head gasket
9. Valve keeper
10. Upper spring seat
11. Outer valve spring
12. Inner valve spring
13. Lower spring seat
14. Valve
15. Valve seal



76G01B-041

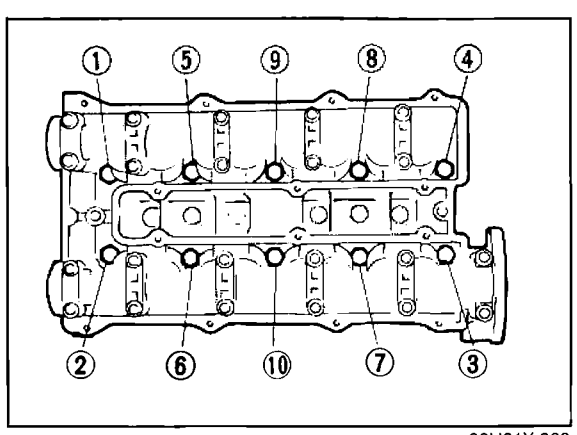
Disassembly Note
Camshaft
Before removing the camshaft, clean the bearings and journals, and measure the following points.
1. Camshaft end play. (Refer to page 1B—41.)
2. Camshaft journal oil clearance. (Refer to page 1B—40.)



76G01B-042

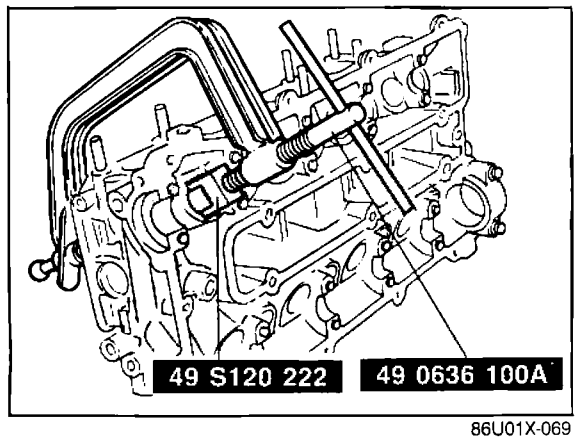
Hydraulic lash adjuster (HLA)
Remove the HLA from the cylinder head.

Note
Mark each HLA so that they can be reinstalled in the position from which they were removed.



86U01X-068

Cylinder head bolt
Loosen the cylinder head bolts in two or three steps in the order shown in the figure.

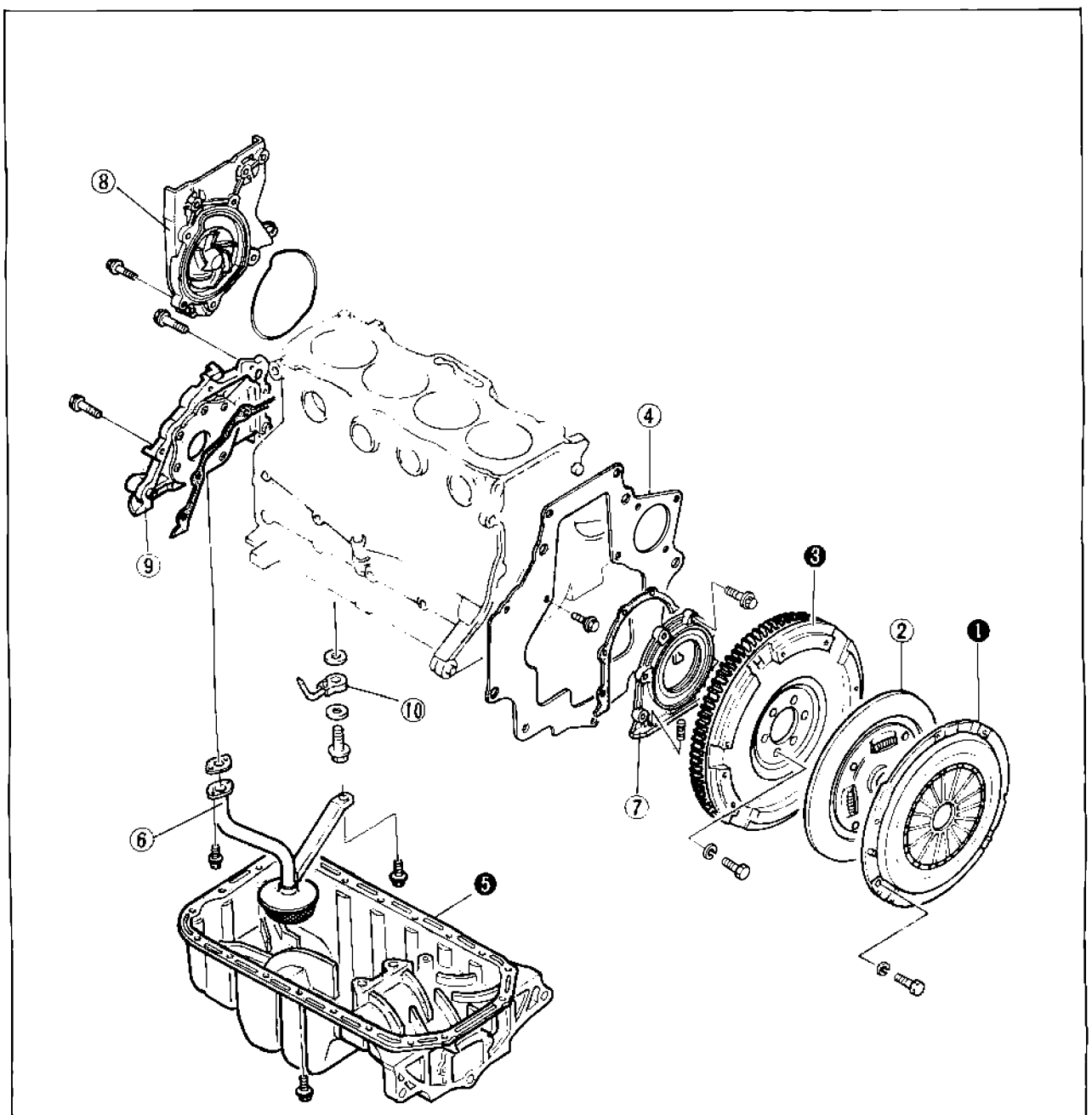


86U01X-069

Valve
Remove the valves from the cylinder head with the **SST**.

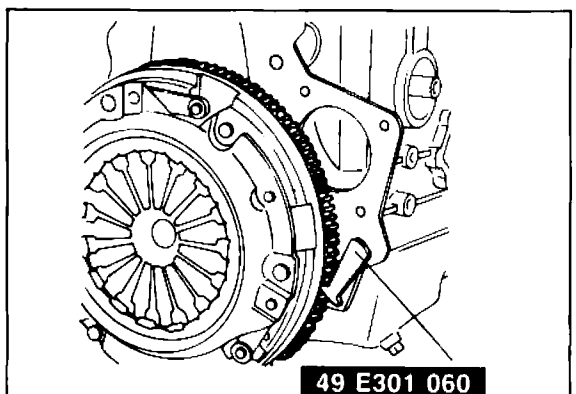
1B DISASSEMBLY (CYLINDER BLOCK)

CYLINDER BLOCK-I



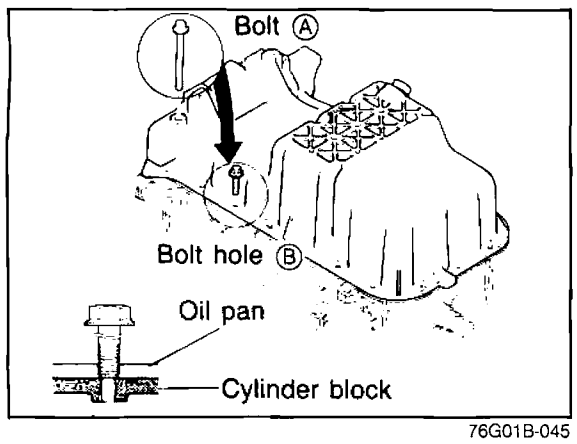
76G01B-043

1. Clutch cover
2. Clutch disc
3. Flywheel
4. End plate
5. Oil pan
6. Oil strainer
7. Rear cover
8. Water pump assembly
9. Oil pump assembly
10. Oil jet



76G01B-044

Disassembly Note
Clutch cover and flywheel
Remove the clutch cover and flywheel with the **SST**.



76G01B-045

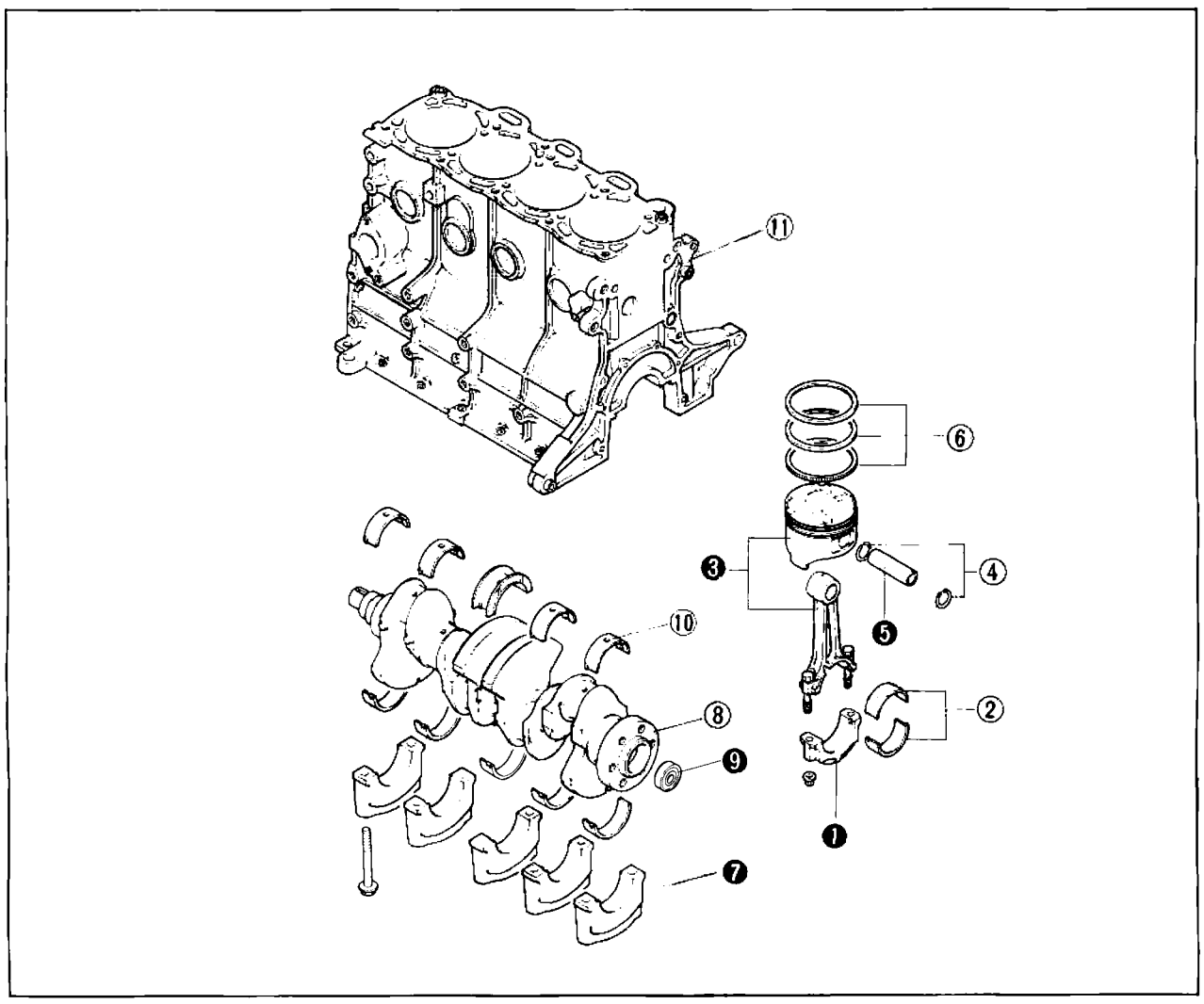
Oil pan
1. Remove the oil pan mounting bolts.
2. Install the bolt Ⓐfrom the mounting bolt or 10 mm (0.39 in) bolts in the specified bolt holes Ⓑ(both sides).
3. Screw in the bolts gradually and alternately to remove the oil pan.

Caution
a) Do not pry the oil pan to prevent damaging the contact surface.
b) Do not damage or scratch the contact surface when removing the oil sealant.

4. Remove the oil pan.

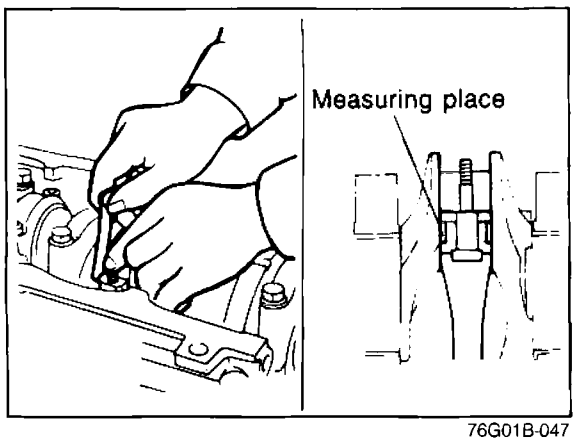
1B DISASSEMBLY (CYLINDER BLOCK)

CYLINDER BLOCK-II



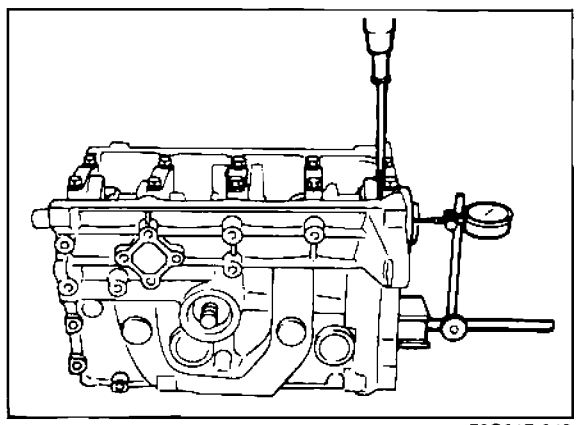
76G01B-046

1. Connecting rod cap
2. Connecting rod bearing
3. Connecting rod and piston
4. Clip
5. Piston pin
6. Piston ring
7. Main bearing cap
8. Crankshaft
9. Pilot bearing
10. Main bearing
11. Cylinder block



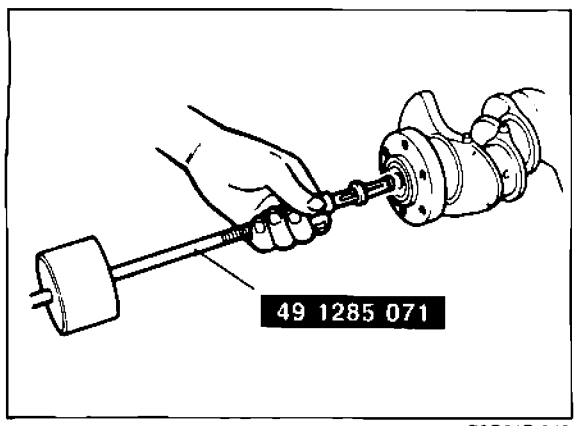
76G01B-047

Disassembly Note
Connecting rod and cap
Before removing the connecting rod, clean the bearing, connecting rod, and crank pin, and measure the following points.
1. Connecting rod side clearance. (Refer to page 1B—53.)
2. Crankpin oil clearance. (Refer to page 1B—53.)



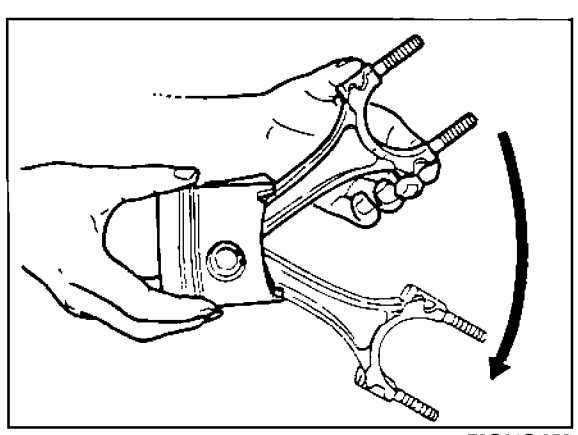
76G01B-048

Main bearing cap
Before removing the main bearing caps, clean the bearings, main journals, and caps, and measure the following points.
1. Crankshaft end play. (Refer to page 1B—52.)
2. Main journal oil clearance. (Refer to page 1B—51.)



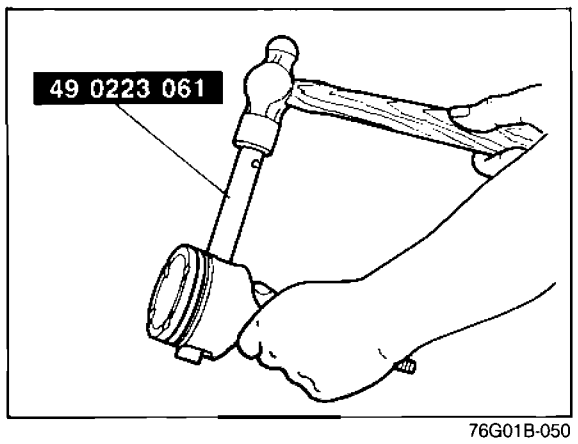
76G01B-049

Pilot bearing
Remove the pilot bearing from the crankshaft with the **SST**.



79G01C-050

Piston and connecting rod
1. Before disassembling the piston and connecting rod, check the oscillation torque as shown in the figure.
   If the large end does not drop by its own weight, replace the piston or the piston pin.



76G01B-050

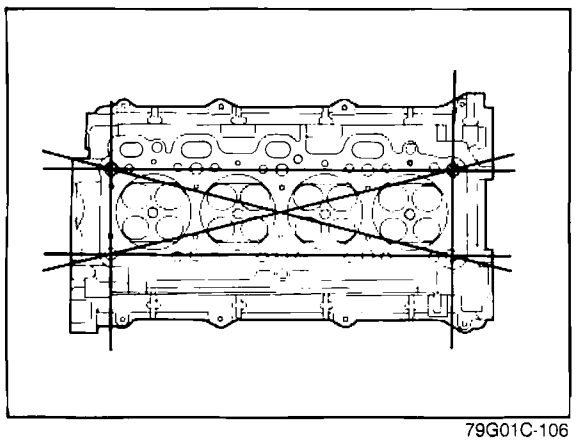
2. Remove the piston pin with the **SST**.

INSPECTION AND REPAIR

1. Clean all parts, taking care to remove any gasket fragments, dirt, oil or grease, carbon, moisture residue, or other foreign materials.
2. Inspect and repair must be performed in the order specified.

Caution
Be careful not to damage the joints or friction surfaces of aluminum alloy components (such as the cylinder head or pistons).

86U01X-077

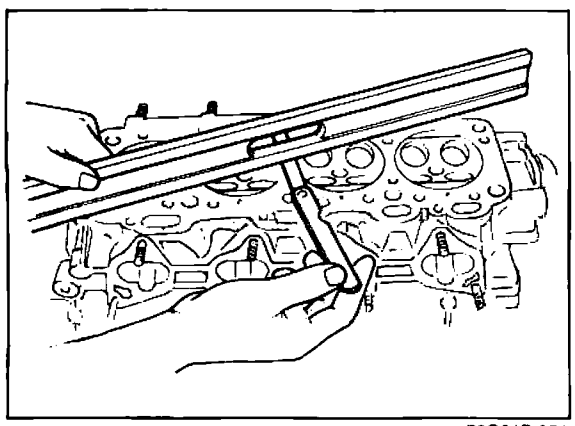


79G01C-106

Cylinder Head

1. Inspect the cylinder head for damage, cracks, and leakage of water or oil. Replace if necessary.
2. Measure the cylinder head distortion in the six directions shown in the figure.

Distortion: 0.15 mm (0.006 in) max.

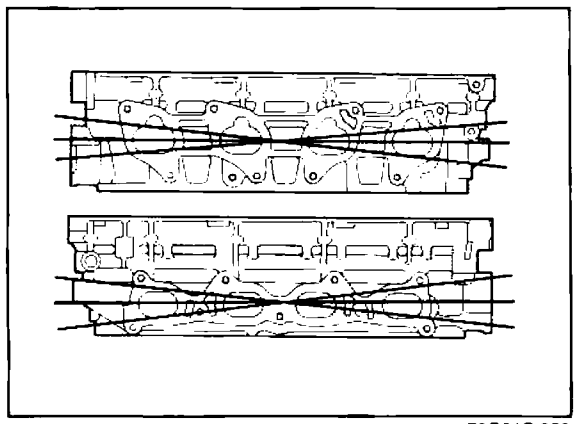


76G01B-051

3. If the cylinder head distortion exceeds specification, grind the cylinder head surface.
   If the cylinder head height is not within specification, replace it.

Height:
133.95—134.05 mm (5.274—5.278 in)
Grinding limit: 0.20 mm (0.008 in) max.

Note
Before grinding the cylinder head, first check the following. Replace if necessary.
- **Sinking of valve seat**
- **Damage of manifold contact surface**
- **Camshaft oil clearance and end play**

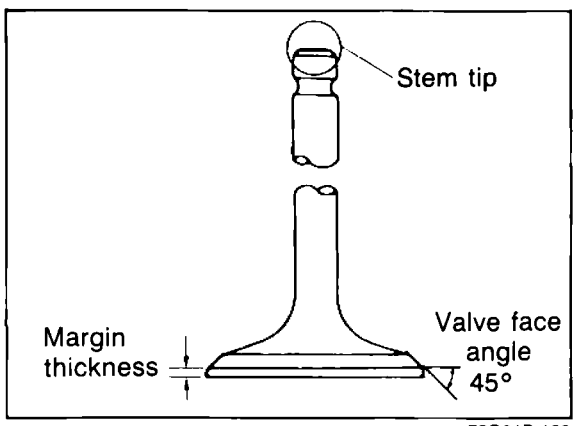


79G01C-053

4. Measure the manifold contact surface distortion in the six directions shown in the figure.

Distortion: 0.15 mm (0.006 in) max.

5. If distortion exceeds specification grind the surface or replace the cylinder head.

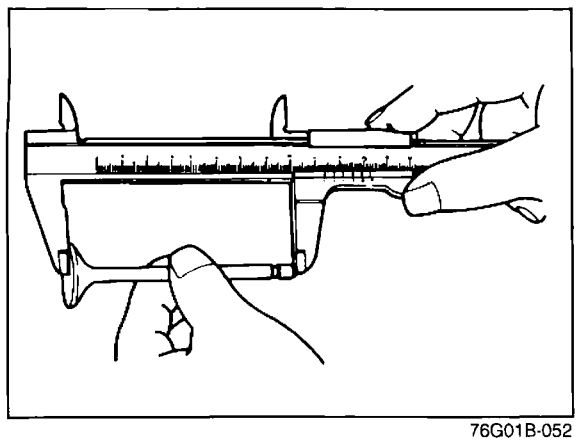


76G01B-120

Valve and Valve Guide

1. Inspect each valve for the following. Replace or resurface if necessary.
   (1) Damaged or bent stem
   (2) Roughness or damage to face
   (3) Damage or uneven wear of stem tip
2. Check the valve head margin thickness. Replace if necessary

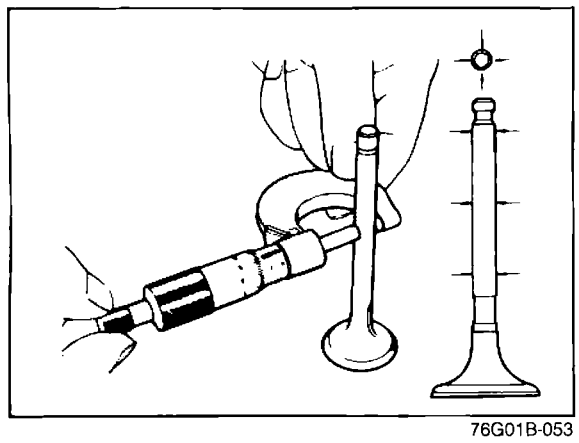
Margin thickness
IN : 0.85 mm (0.033 in) min.
EX: 0.9 mm (0.035 in) min.



76G01B-052

3. Measure the valve length.

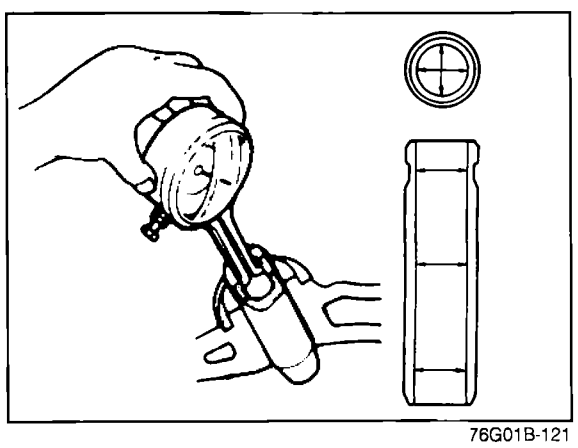
Length
IN : 103.18 mm (4.0622 in)
EX: 103.94 mm (4.0921 in)



76G01B-053

4. Measure the valve stem diameter.

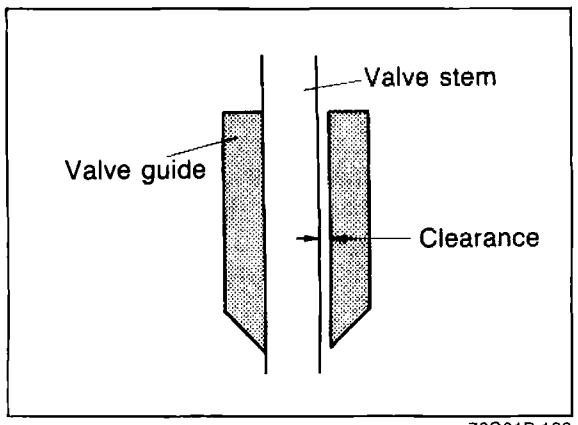
Diameter
IN : 5.970—5.985 mm (0.2350—0.2356 in)
EX: 5.965—5.980 mm (0.2348—0.2354 in)



76G01B-121

5. Measure the valve guide inner diameter.

Inner diameter
IN : 6.01—6.03 mm (0.2366—0.2374 in)
EX: 6.01—6.03 mm (0.2366—0.2374 in)

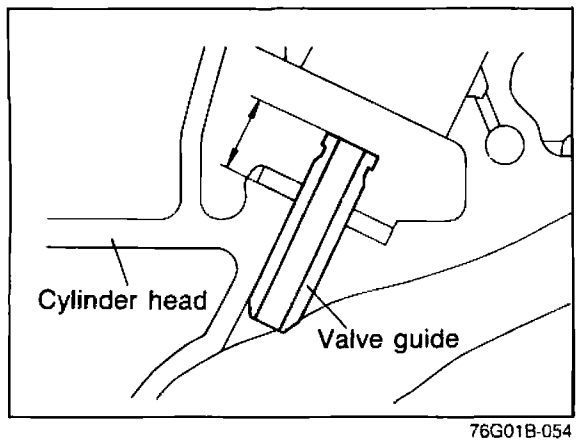


76G01B-122

6. Measure the valve stem to guide clearance by subtract the outer diameter of the valve stem from the inner diameter of the corresponding valve guide.

Clearance
IN : 0.025—0.060 mm (0.0010—0.0024 in)
EX: 0.030—0.065 mm (0.0012—0.0026 in)
Maximum: 0.20 mm (0.0079 in)

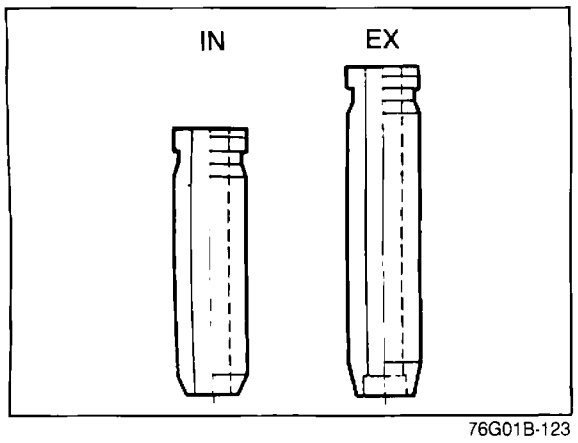
7. If the clearance exceeds the maximum, replace the valve and/or valve guide.



76G01B-054

8. Check that the valve guide projection height (dimension A in the figure). Replace if necessary.

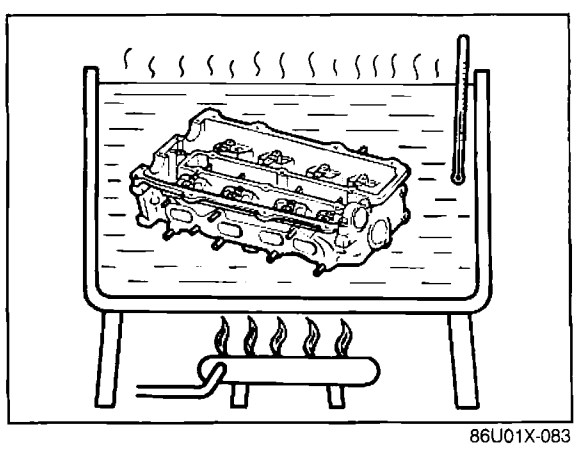
Height: 11.4—11.9 mm (0.449—0.469 in)



76G01B-123

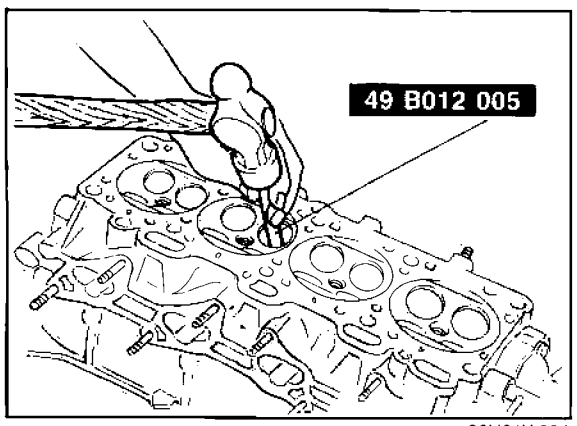
Replacement of valve guide

Note
Although the shapes of the intake and exhaust valve guides are different.



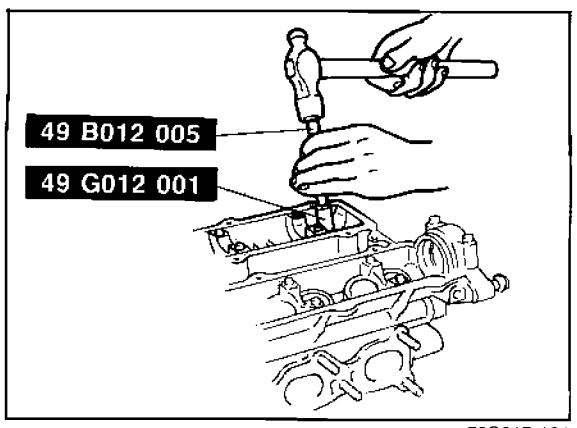
86U01X-083

Removal
1. Gradually heat the cylinder head in water to **approx. 90°C (194°F)**.



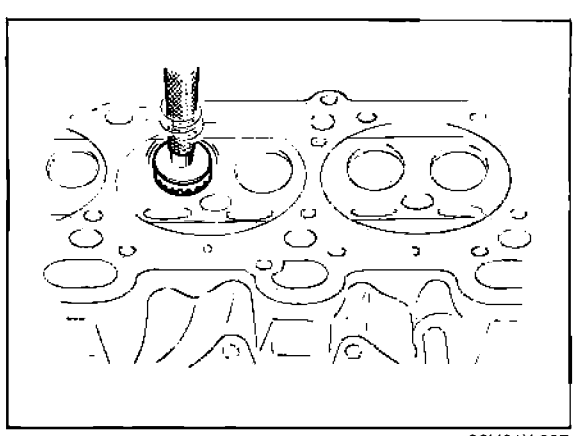
86U01X-084

2. Remove the valve guide from the side opposite the combustion chamber with the **SST**.



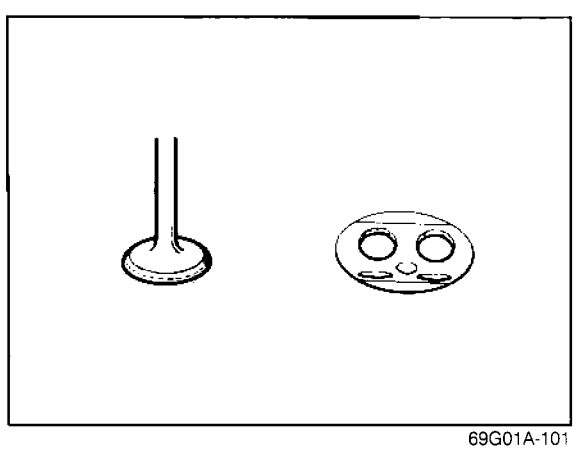
76G01B-124

Installation
1. Gradually heat the cylinder head in water to **approx. 90°C (194°F)**.
2. Tap the valve guide in from the side opposite the combustion chamber with the **SST** until the projection height is as specified.



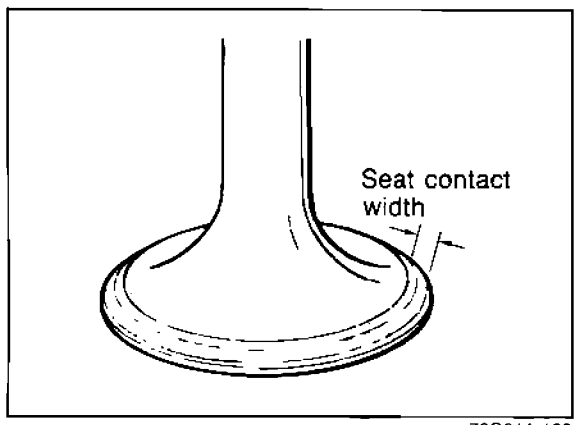
86U01X-087

Valve Seat
1. Inspect the contact surface of the valve seat and valve face for the following.
   (1) Roughness
   (2) Damage
2. If necessary, resurface the valve seat with a **45°** valve seat cutter and/or resurface the valve face.



69G01A-101

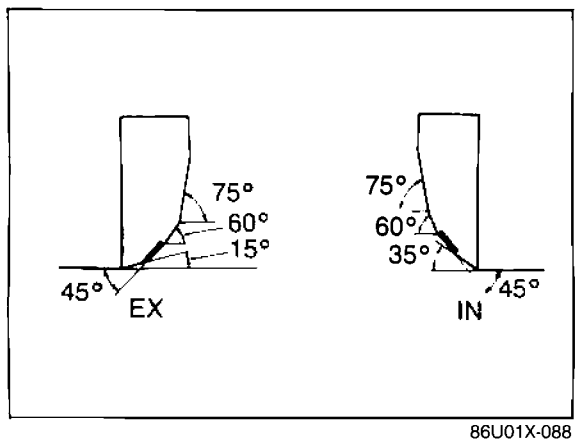
3. Apply a thin coat of prussian blue to the valve face.
4. Check the valve seating by rotating the valve against the seat.
   (1) If blue does not appear 360° around the valve face, replace the valve.
   (2) If blue does not appear 360° around the valve seat, resurface the seat.



76G01A-128

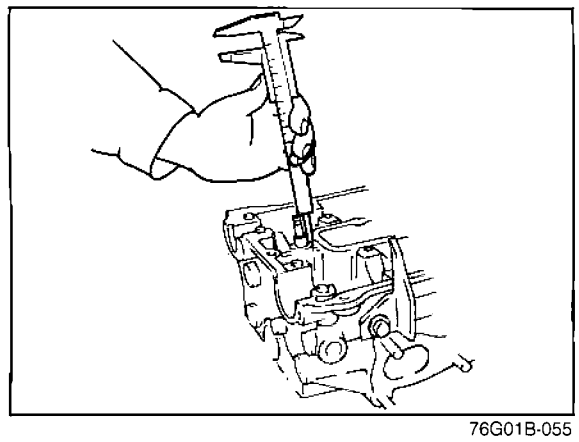
5. Check the seat contact width.

   Width: 1.2—1.6 mm (0.047—0.063 in)



86U01X-088

6. Check that the valve seating position is at the center of the valve face.
   (1) If the seating position is too high, correct the valve seat with a **60°** cutter and a **45°** cutter.
   (2) If the seating position is too low, correct the valve seat with a **35° (IN)** or **15° (EX)** cutter and a **45°** cutter.
7. Seat the valve to the valve seat with a lapping compound.



76G01B-055

8. Check the sinking of the valve seat.
   Measure protruding length (dimension L) of each valve stem.

   Dimension L: 36.8 mm (1.449 in)

   (1) If **L** is as below, it can be used as it is.

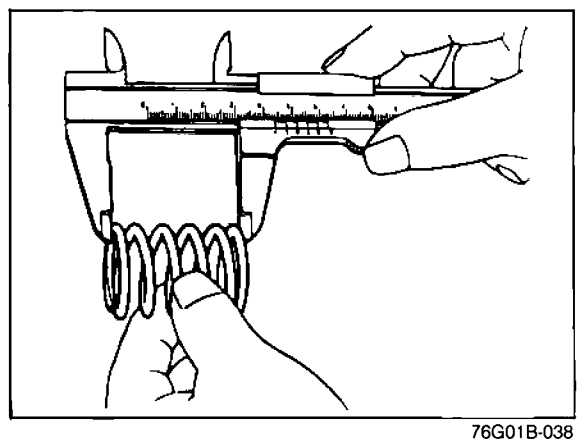
   36.8—37.6 mm (1.449—1.480 in)

   (2) If **L** is as below, insert a spacer between the spring seat and cylinder head to adjust.

   37.6—38.3 mm (1.480—1.508 in)

   (3) If **L** is more than as below, replace the cylinder head.

   38.3 mm (1.508 in) or more



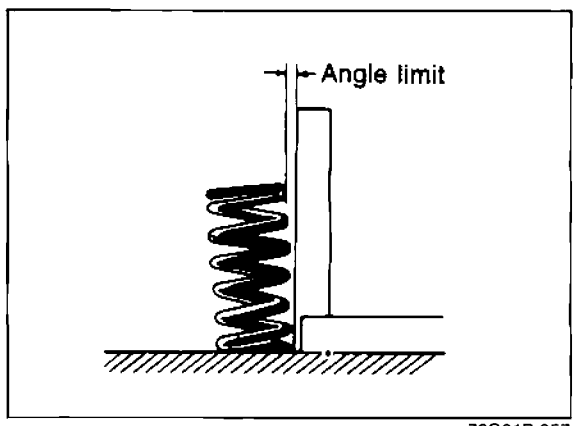
76G01B-038

Valve Spring

1. Inspect each valve spring for cracks or damage.
2. Check the free length and angle. Replace if necessary.

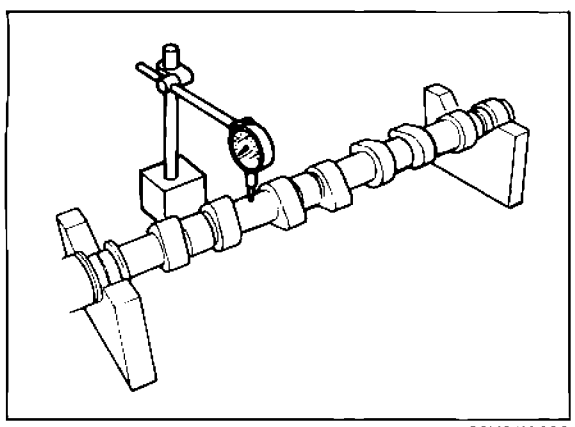
Free length

Outer Standard: 39.1 mm (1.539 in)
Minimum: 38.7 mm (1.524 in)
Inner Standard: 38.0 mm (1.496 in)
Minimum: 37.7 mm (1.484 in)



76G01B-057

Angle
Outer: 1.4 mm (0.055 in) max.
Inner : 1.3 mm (0.051 in) max.

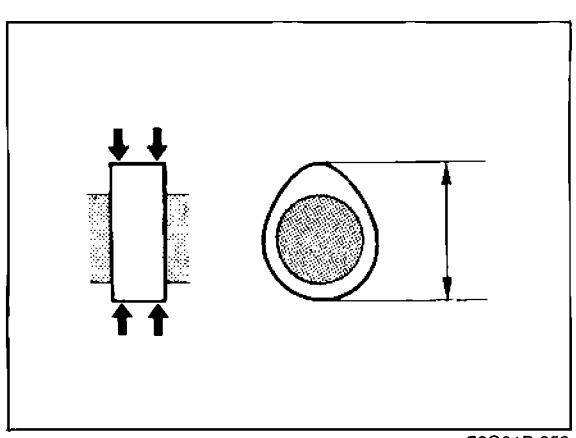


86U01X-092

Camshaft

1. Set the front and rear journals on V-blocks. Check the camshaft runout. Replace if necessary.

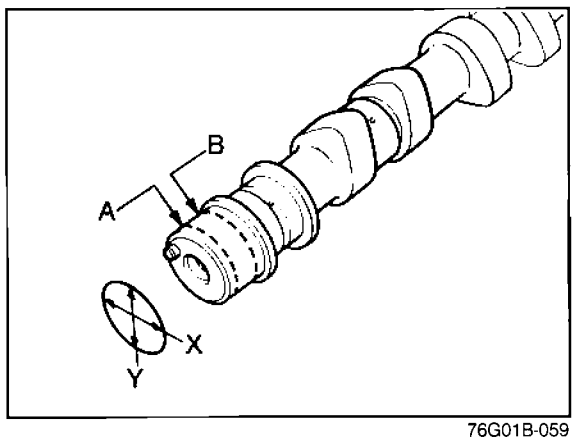
Runout: 0.03 mm (0.0012 in) max.



76G01B-058

2. Check the cam for wear or damage. Replace if necessary.
3. Check the cam lobe height at the two points as shown in the figure.

Height:
45.055 mm (1.7738 in)..... Leaded fuel
45.052 mm (1.7737 in) ..... Unleaded fuel
Minimum:
44.855 mm (1.7659 in)..... Leaded fuel
44.852 mm (1.7658 in) ..... Unleaded fuel

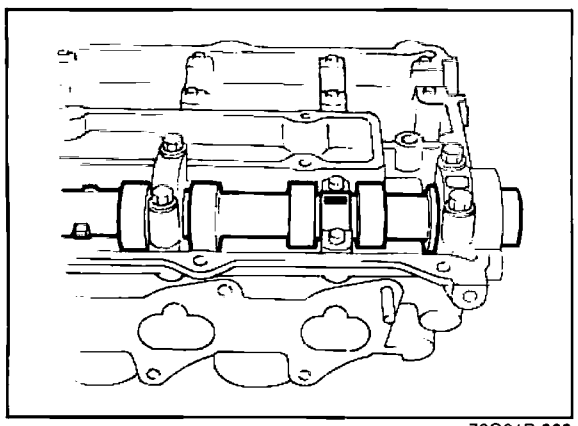


76G01B-059

4. Measure wear of the journals in X and Y directions at the two points as shown in the figure.

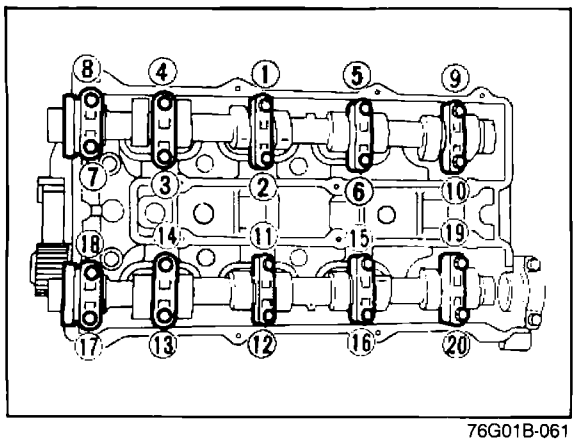
Diameter:
29.940—29.965 mm (1.1787—1.1797 in)

Out-of-round: 0.05 mm (0.002 in) max.



76G01B-060

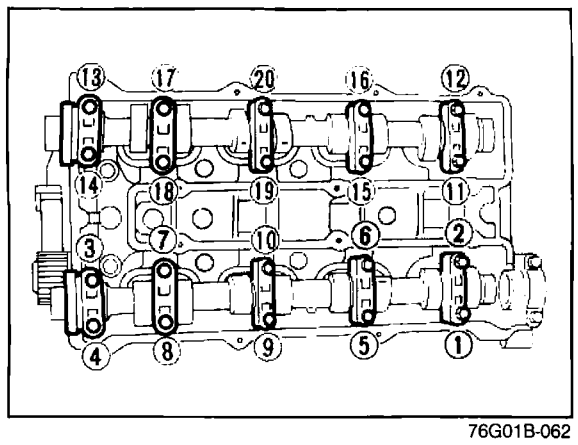
5. Measure the oil clearance of the camshaft and camshaft caps.
   (1) Remove any oil or dirt from the journals and bearing surface.
   (2) Set the camshaft onto the cylinder head.
   (3) Position plasti-gauge on top of the journals in the axial direction.



76G01B-061

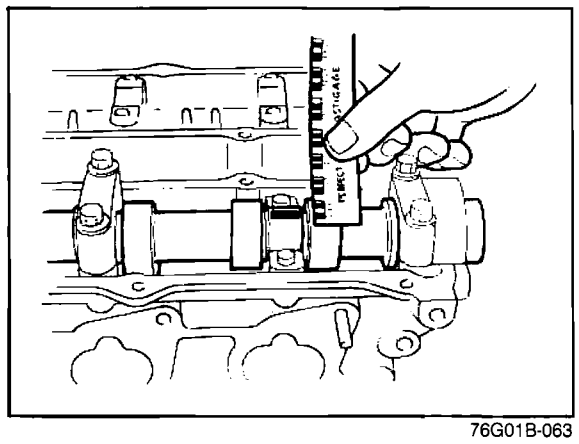
   (4) Place the camshaft caps according the cap number and arrow, and tighten them in the order shown in the figure.

Tightening torque:
18—26 N·m (1.8—2.7 m-kg, 13—20 ft-lb)



76G01B-062

   (5) Loosen the camshaft cap bolts in the order shown in the figure.

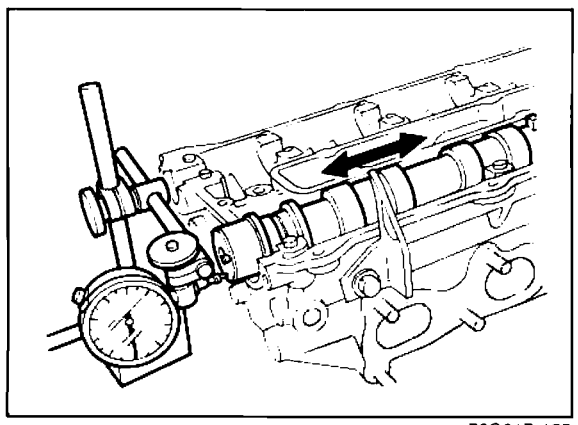


76G01B-063

   (6) Measure the oil clearance at each cap.

Oil clearance:
0.035—0.085 mm (0.0014—0.0033 in)
Maximum: 0.15 mm (0.0059 in)

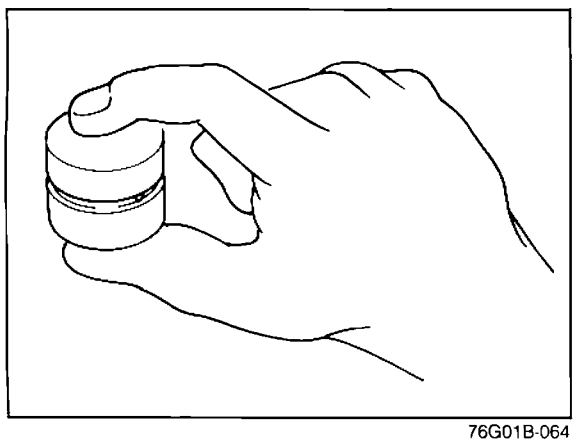
   (7) If the oil clearance exceeds the maximum, replace the camshaft and/ or the cylinder head.



76G01B-125

6. Measure the camshaft end play. If it exceeds the maximum, replace the camshaft and/or the cylinder head.

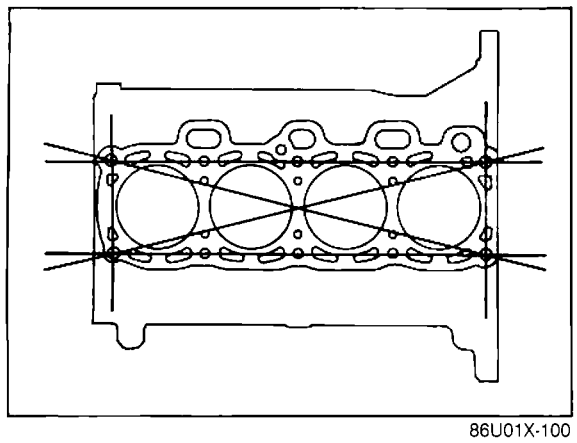
End play:
0.08—0.10 mm (0.003—0.004 in)
Maximum: 0.20 mm (0.008 in)



76G01B-064

Hydraulic Lash Adjuster (HLA)
1. Check the HLA face for wear or damage.
2. Hold the HLA between your fingers and press it. If the HLA moves, replace it.

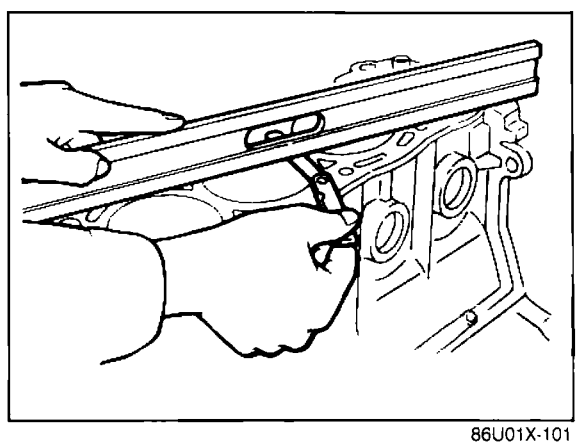
Caution
Do not disassemble the HLA.



86U01X-100

Cylinder Block
1. Check the cylinder block. Repair or replace if necessary.
   (1) Leakage damage
   (2) Cracks
   (3) Scoring of wall
2. Measure the distortion of the top surface of the cylinder block in the six directions as shown in the figure.

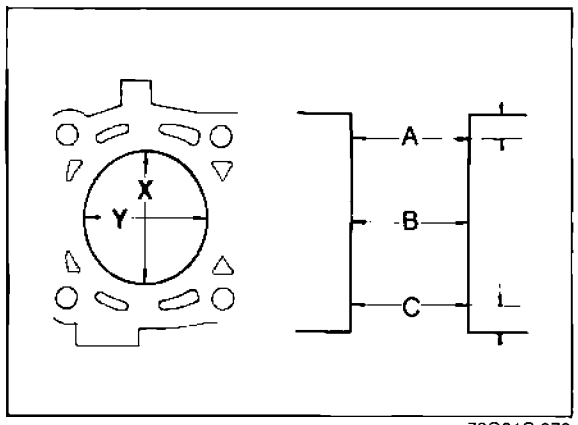
Distortion: 0.15 mm (0.006 in) max.



86U01X-101

3. If the distortion exceeds the maximum, repair by grinding, or replace the cylinder block.

Grinding limit: 0.20 mm (0.008 in) max.

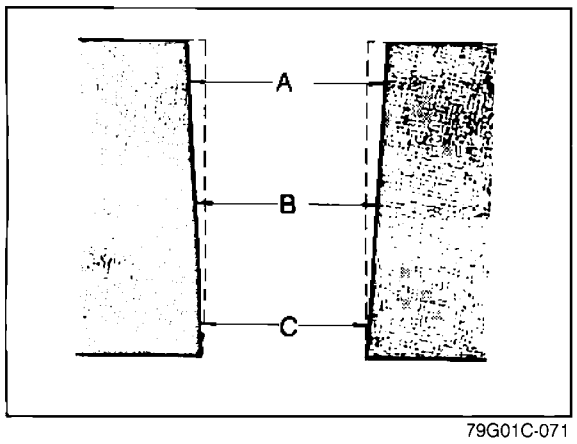


79G01C-070

4. Measure the cylinder bore in directions X and Y at three levels in each cylinder as shown.

Cylinder bore mm (in)

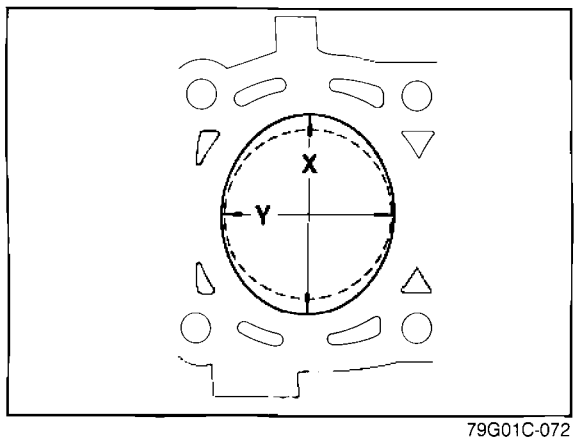
Size	Bore
Standard	86.000—86.019 (3.3858—3.3866)
0.25 (0.010) oversize	86.250—86.269 (3.3957—3.3964)
0.50 (0.020) oversize	86.500—86.519 (3.4055—3.4062)



79G01C-071

(1) If the difference between the measurement A and C exceeds the maximum taper, rebore the cylinder to oversize.

Taper: 0.019 mm (0.0007 in) max.

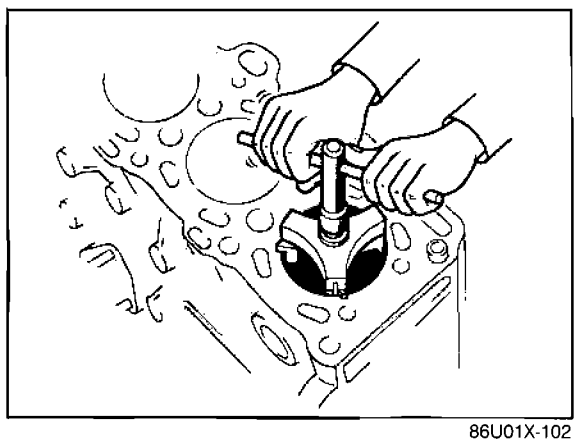


79G01C-072

(2) If the difference between the measurement X and Y exceeds the maximum out-of-round, rebore the cylinder to oversize.

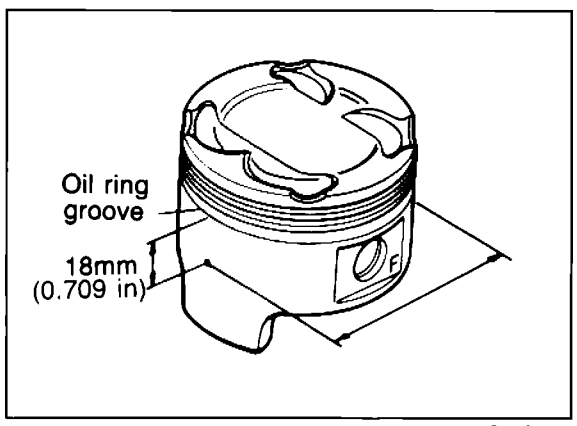
Out-of-round: 0.019 mm (0.0007 in) max.

Caution
The boring size should be based on the size of an oversize piston and be the same for all cylinders.



86U01X-102

5. If the upper part of the cylinder wall shows uneven wear, remove the ridge with a ridge reamer.



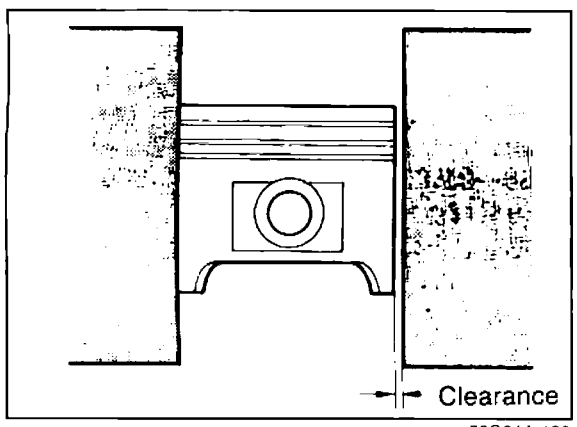
79G01C-073

Piston

1. Inspect the outer circumferences of all pistons for seizure or scoring. Replace if necessary.
2. Measure the outer diameter of each piston at a right angle (**90°**) to the piston pin, **18 mm (0.709 in) below** the oil ring land lower edge.

Piston diameter mm (in)

Size	Diameter
Standard	85.944—85.964 (3.3836—3.3844)
0.25 (0.010) oversize	86.194—86.214 (3.3935—3.3942)
0.50 (0.020) oversize	86.444—86.464 (3.4033—3.4041)



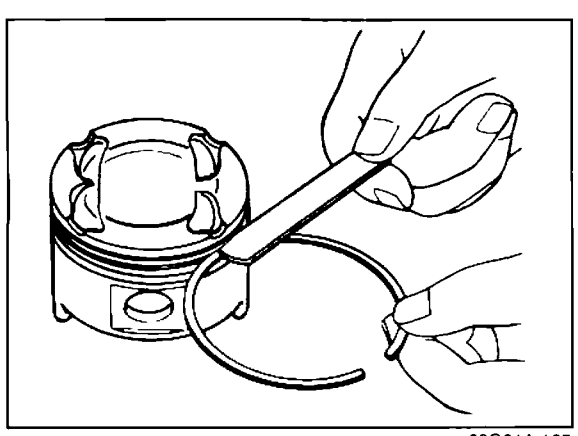
76G01A-130

3. Check the piston to cylinder clearance.

   Clearance:
   0.036—0.075 mm (0.0014—0.0030 in)
   Maximum: 0.15 mm (0.0059 in)

4. If the clearance exceeds the maximum, replace the piston or rebore the cylinders to fit oversize pistons.

   Caution
   If the piston is replaced, replace the piston rings also.



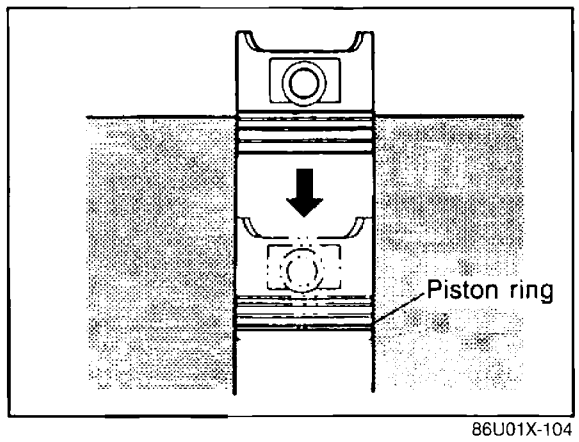
69G01A-125

Piston and Piston Ring

1. Measure the piston ring to ring land clearance around the entire circumference using a new piston ring.

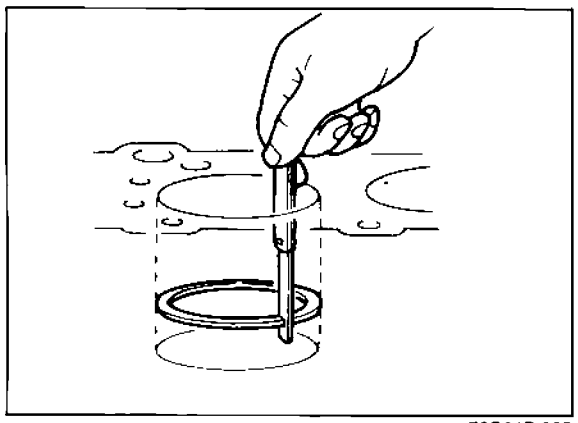
   Clearance (Top and Second):
   0.03—0.07 mm (0.001—0.003 in)
   Maximum: 0.15 mm (0.006 in)

2. If the clearance exceeds the maximum, replace the piston.



86U01X-104

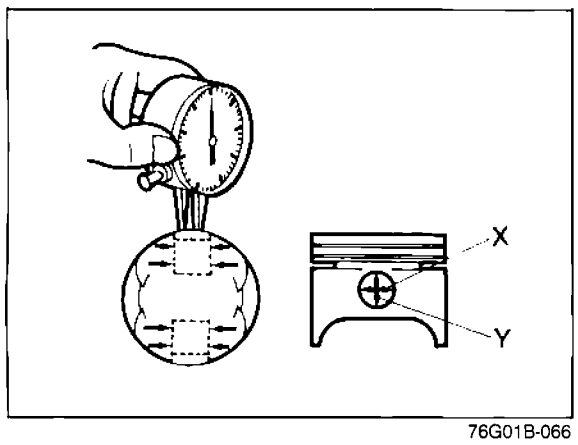
3. Inspect the piston rings for damage, abnormal wear, or breakage. Replace if necessary.
4. Insert the piston ring into the cylinder by hand and push it to the bottom of the ring travel in using the piston.



76G01B-065

5. Measure each piston ring end gap with a feeler gauge. Replace if necessary.

End gap
Top : 0.20—0.35 mm (0.008—0.014 in)
Second: 0.15—0.30 mm (0.006—0.012 in)
Oil rail : 0.20—0.70 mm (0.008—0.028 in)
Maximum: 1.0 mm (0.039 in)

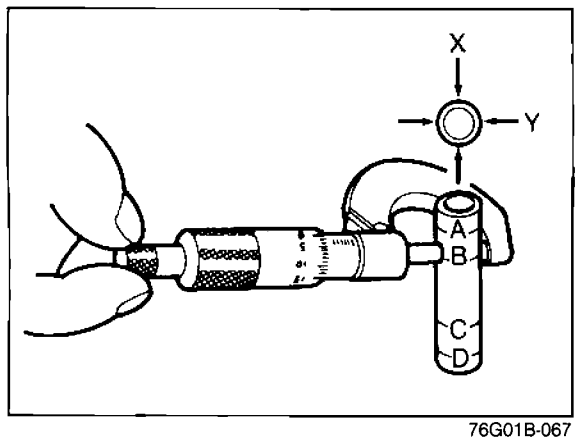


76G01B-066

Piston and Piston Pin

1. Measure the piston pin hole diameter in X and Y directions at four points.

Diameter:
21.988—21.998 mm (0.8657—0.8661 in)



76G01B-067

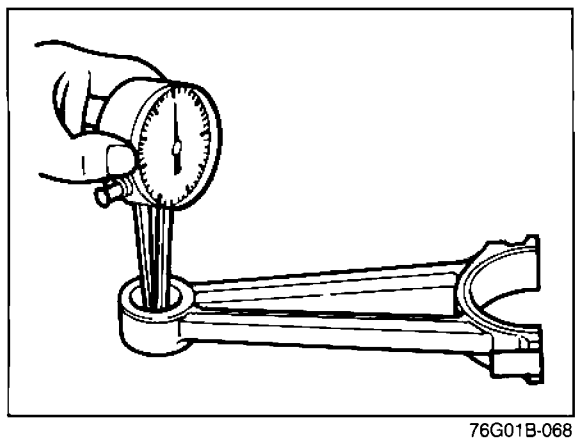
2. Measure the piston pin diameter.

Diameter:
21.987—21.993 mm (0.8656—0.8659 in)

3. Determine the piston pin to piston clearance by subtracting the two figures.

Clearance:
–0.005—0.011 mm (–0.0002—0.0004 in)

4. If the clearance exceeds the specification, replace the piston and/or piston pin.



76G01B-068

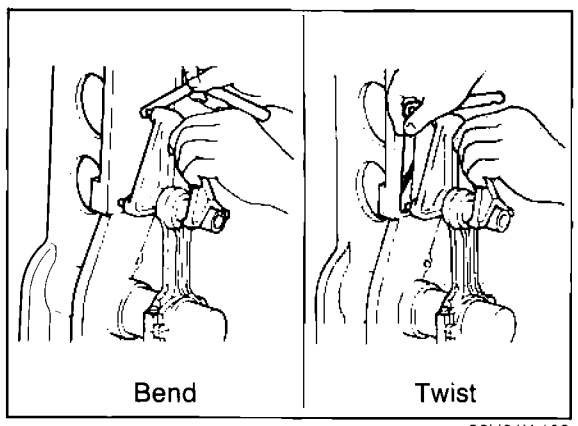
Connecting Rod

1. Measure the connecting rod small end bore.

Diameter:
22.003—22.014 mm (0.8663—0.8667 in)

2. Check the clearance between the small end bore and piston pin.

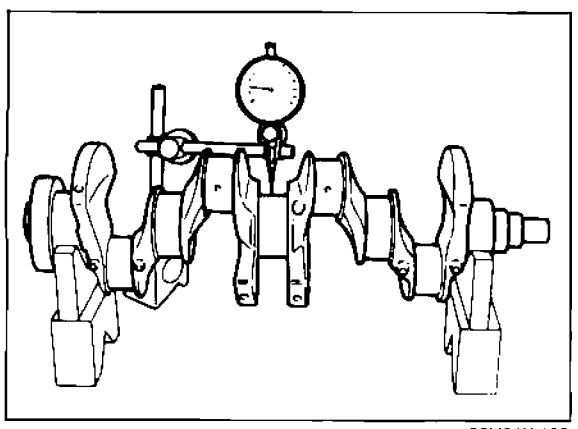
Clearance:
0.010—0.027 mm (0.0004—0.0011 in)



86U01X-108

3. Check each connecting rod for bending or twisting. Repair or replace if necessary.

Bend : 0.06 mm (0.0024 in) max.
Twist: 0.06 mm (0.0024 in) max.

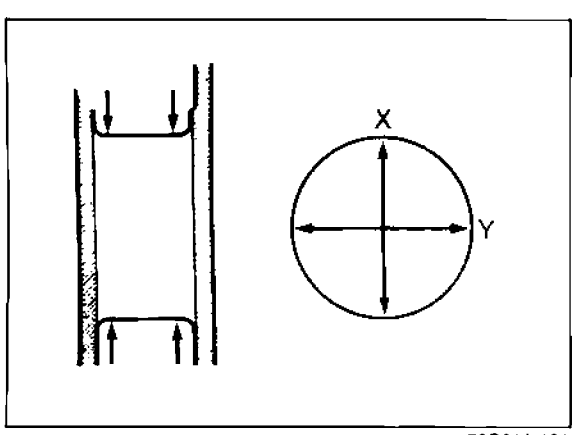


86U01X-109

Crankshaft

1. Check the journals and pins for damage, scoring, or oil hole clogging.
2. Set the crankshaft on V-blocks.
3. Check the crankshaft runout at the center journal. Replace if necessary.

Runout: 0.03 mm (0.0012 in) max.

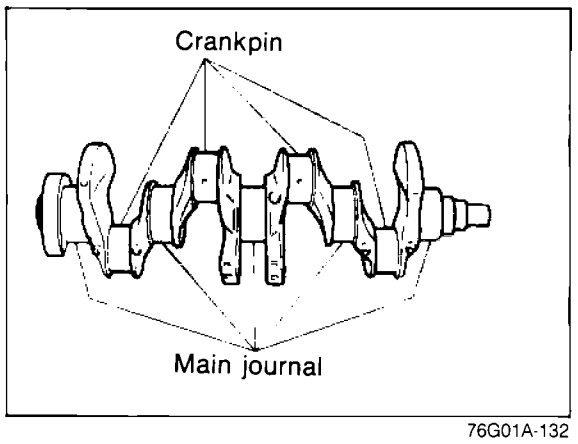


76G01A-131

4. Measure each journal diameter in X and Y directions at two points.

Main journal
Diameter:
59.937—59.955 mm (2.3597—2.3604 in)
Out-of-round: 0.05 mm (0.0020 in) max.

Crankpin journal
Diameter:
50.940—50.955 mm (2.0055—2.0061 in)
Out-of-round: 0.05 mm (0.0020 in) max.



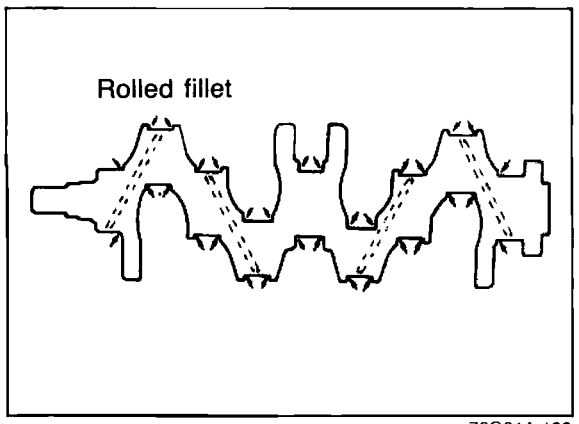
76G01A-132

5. If the diameter is less than the minimum, grind the journals to match undersize bearings.

Undersize bearing: 0.25 mm (0.010 in), 0.50 mm (0.020 in), 0.75 mm (0.030 in)

Main journal diameter undersize mm (in)

Bearing size		Journal diameter
0.25 (0.010) undersize	No.1,2,4,5	59.693—59.711 (2.3501—2.3508)
	No.3	59.687—59.705 (2.3499—2.3506)
0.50 (0.020) undersize	No.1,2,4,5	59.443—59.461 (2.3403—2.3410)
	No.3	59.437—59.455 (2.3400—2.3407)
0.75 (0.030) undersize	No.1,2,4,5	59.193—59.211 (2.3304—2.3311)
	No.3	59.187—59.205 (2.3302—2.3309)

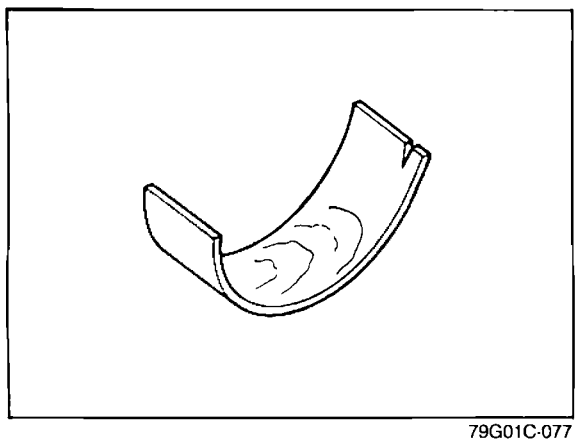


76G01A-133

Crankpin journal diameter undersize mm (in)

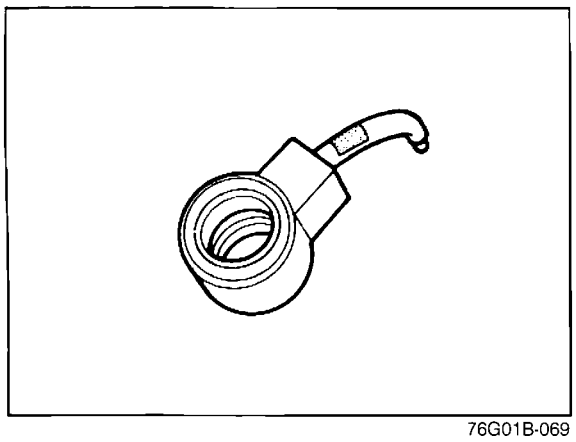
Bearing size	Journal diameter
0.25 (0.010) undersize	50.690—50.705 (1.9957—1.9963)
0.50 (0.020) undersize	50.440—50.455 (1.9858—1.9864)
0.75 (0.030) undersize	50.190—50.205 (1.9760—1.9766)

Caution
Do not grind the rolled fillet area.



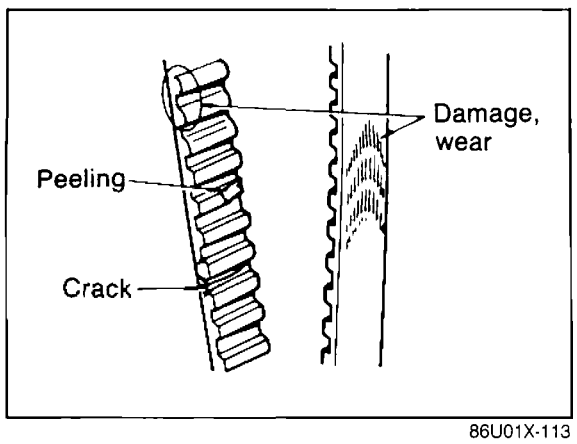
79G01C-077

Main Bearing and Connecting Rod Bearing
Check the main bearings and the connecting rod bearings for peeling, scoring, or other damage.



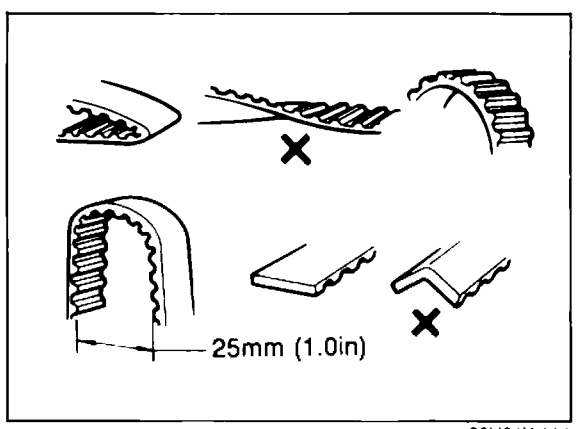
76G01B-069

Oil Jet
1. Check that the oil passage is not clogged.
2. Check that the check ball is not stuck.



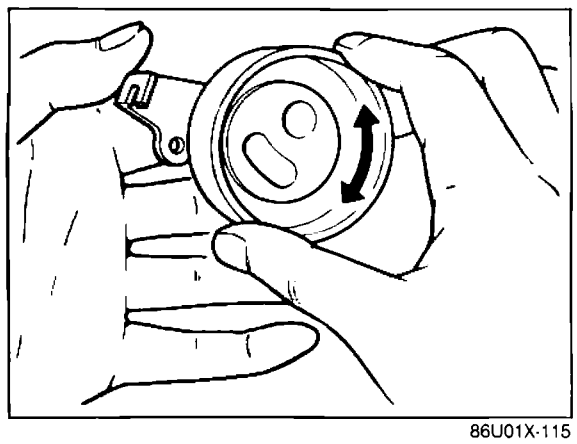
86U01X-113

Timing Belt
1. Replace the timing belt if there is any oil or grease on it.
2. Check the timing belt for damage, wear, peeling, cracks, or hardening. Replace if necessary.



86U01X-114

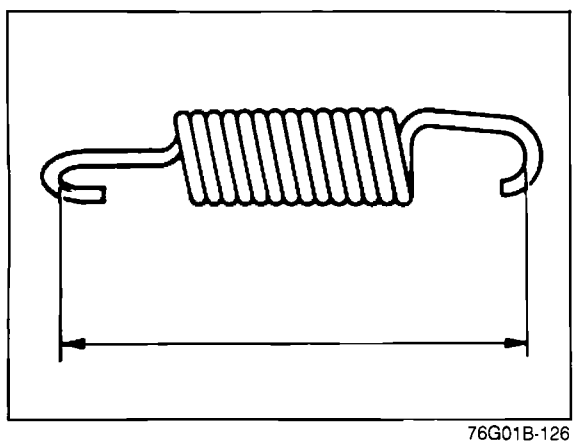
Caution
a) Never forcefully twist, turn inside out, or bend the timing belt.
b) Be careful not to allow oil or grease on the belt.



86U01X-115

Timing Belt Tensioner and Idler Pulley
Check the timing belt tensioner and idler pulley for smooth rotation and abnormal noise. Replace if necessary.

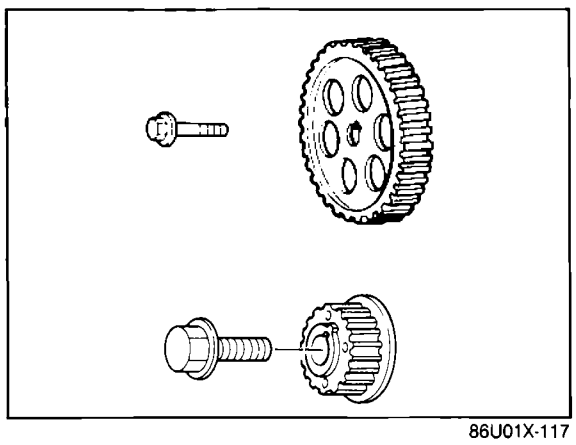
Caution
Do not clean the tensioner with cleaning fluids. If necessary, use a soft rag to wipe it clean, and avoid scratching it.



76G01B-126

Timing Belt Tensioner Spring
Check the free length of the tensioner spring. Replace if necessary.

Free length: 53.3 mm (2.098 in)



86U01X-117

Timing Belt Pulley and Camshaft Pulley
Inspect the pulley teeth for wear, deformation, or other damage. Replace if necessary.

Caution
Do not clean the pulley with cleaning fluids. If necessary, use a rag to wipe it clean.

Timing Belt Cover (lower and upper)
Inspect the timing belt covers for damage or cracks. Replace if necessary.

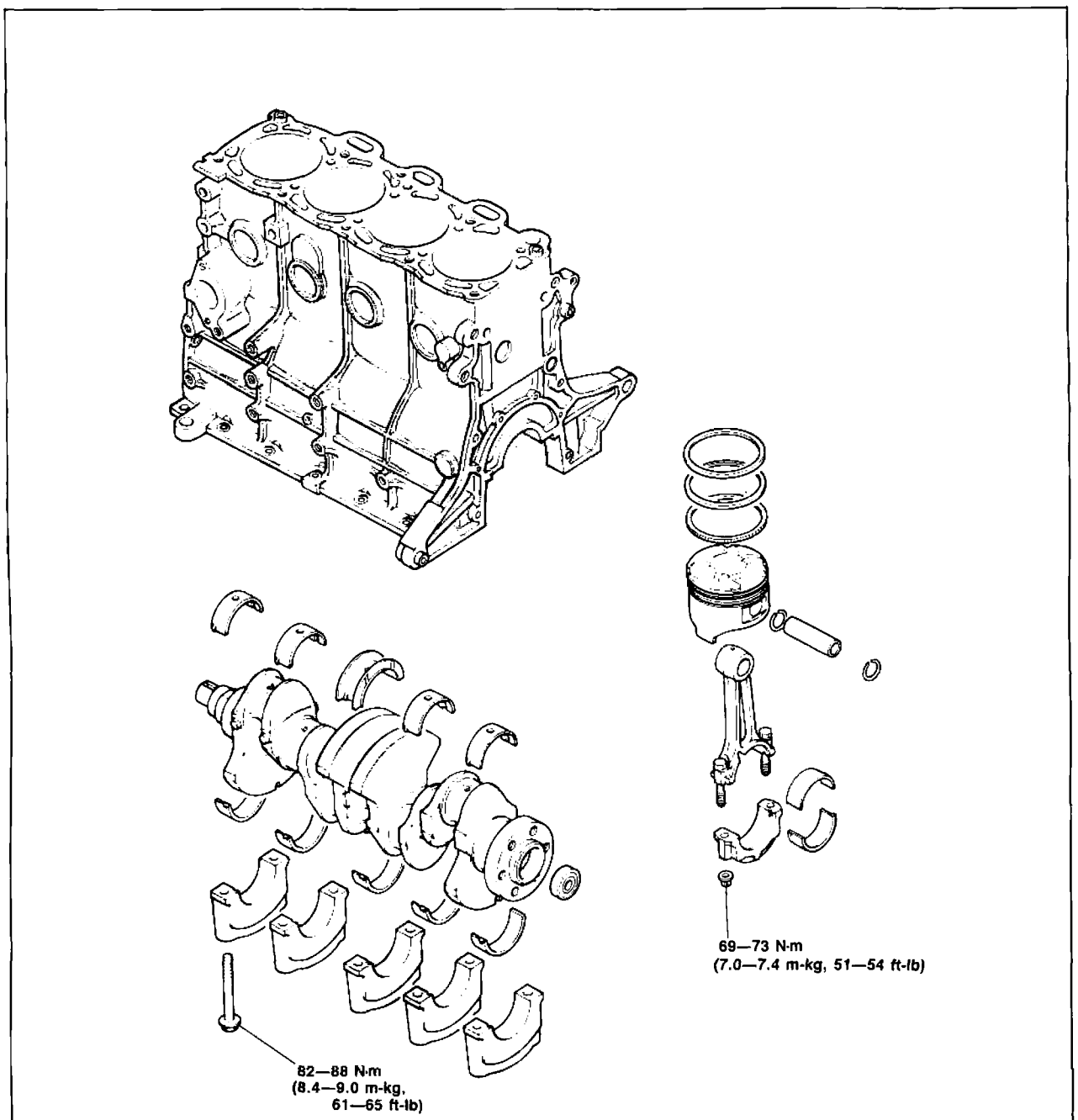
1B ASSEMBLY (CYLINDER BLOCK)

ASSEMBLY

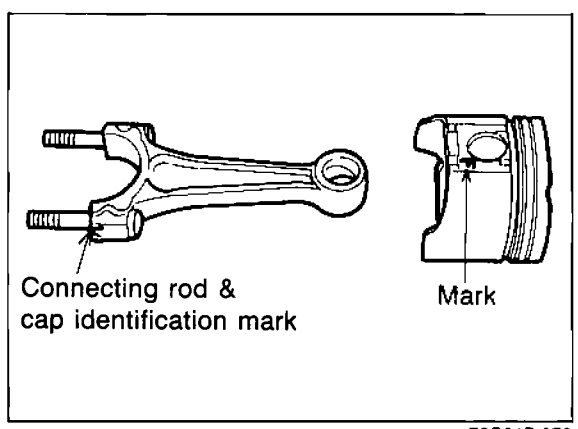
1. Clean all parts before reinstallation.
2. Apply new engine oil to all sliding and rotating parts.
3. Replace plain bearings if they are peeling, burned, or otherwise damaged.
4. Tighten all bolts and nuts to the specified torques.

Caution
Do not reuse gaskets or oil seals.

CYLINDER BLOCK—I
Torque Specifications



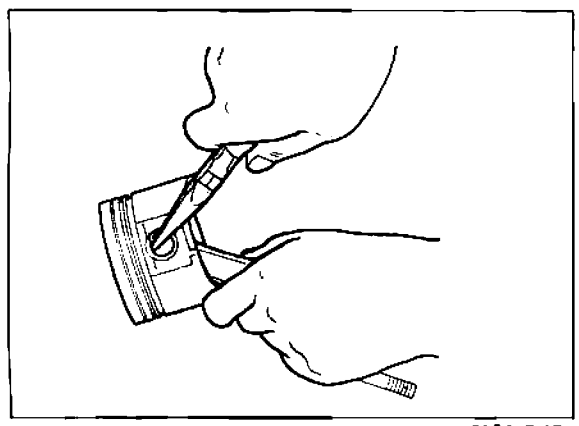
69G01A-139



76G01B-070

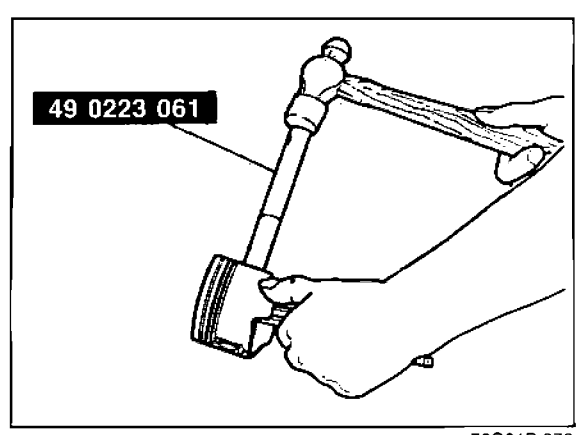
Connecting Rod

1. Align the identification mark to the cap of large end of connecting rod and **F** mark on the piston as shown in the figure.
2. Apply a coat of engine oil to the circumference of each piston pin and to the small end of each connecting rod.



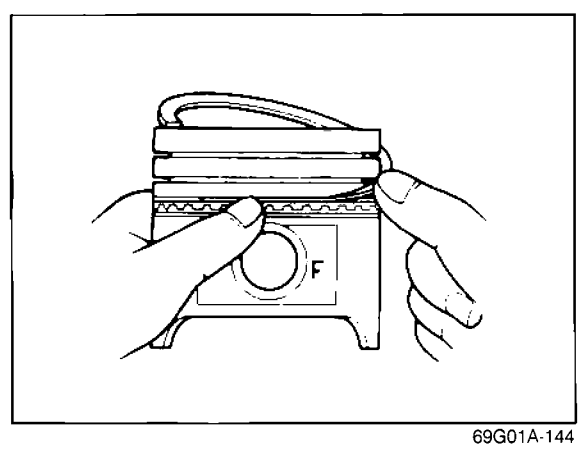
76G01B-071

3. Set a clip into the clip groove in one side of the piston.



76G01B-072

4. Insert the piston pin into the piston and connecting rod from the opposite side of the piston with the **SST** .
5. Tap the piston pin in until it touchs the clip. Install the other clip into the groove in the piston.
6. Check the oscillation torque of the connecting rod. (Refer to page 1B—33.)



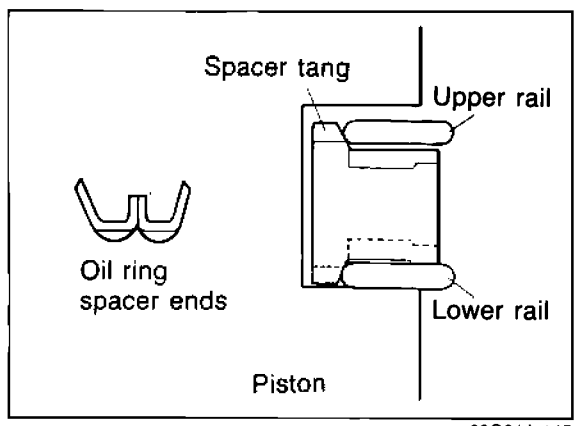
69G01A-144

Piston Ring

1. Install the three-piece oil rings on the pistons.
   (1) Apply engine oil to the oil ring spacer and rails.
   (2) Install the oil ring spacer so that the opening faces upward.
   (3) Install the upper rail and lower rail.

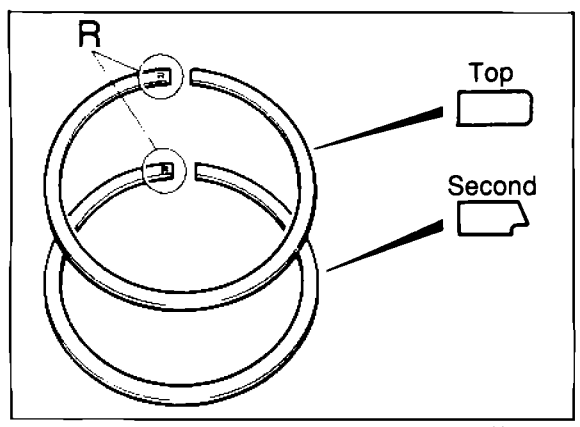
Note

a) The upper rail and lower rail are the same.
b) Each rail can be installed with either face upward.



69G01A-145

2. Check that both rails are expanded by the spacer tangs as shown in the figure by checking that both rails turn smoothly in both directions.

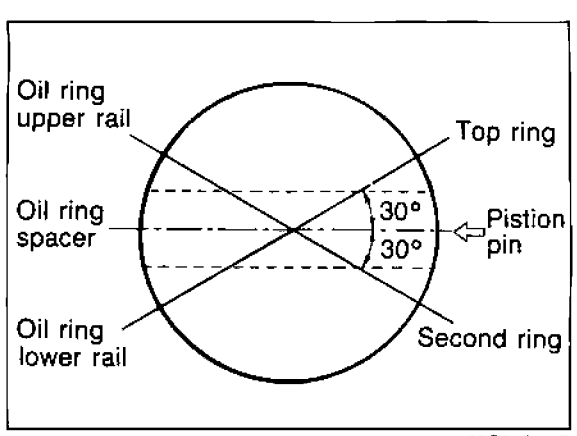


86U01X-121

3. Install the second ring to the piston first, then install the top ring. Use a piston ring expander.

Caution
The rings must be installed with the "R" marks facing upward.

4. Apply a liberal amount of clean engine oil to the second and top piston rings.



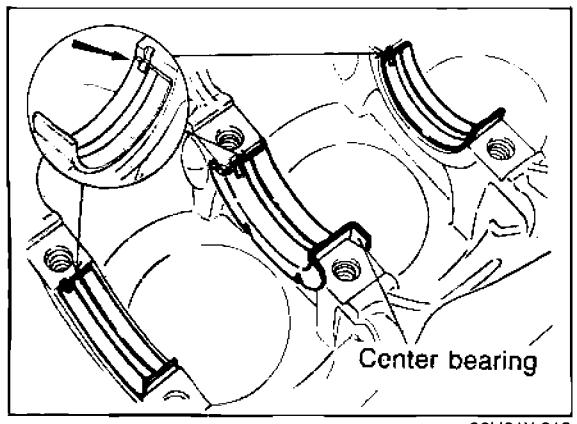
69G01A-147

5. Position the opening of each ring as shown in the figure.

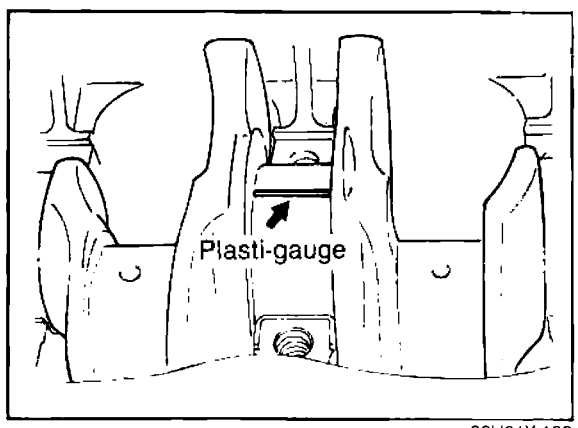
Crankshaft

1. Before installing the crankshaft, inspect the main bearing oil clearances as described.

Note
The bearing with thrust shoulders is the center bearing in the cylinder block.

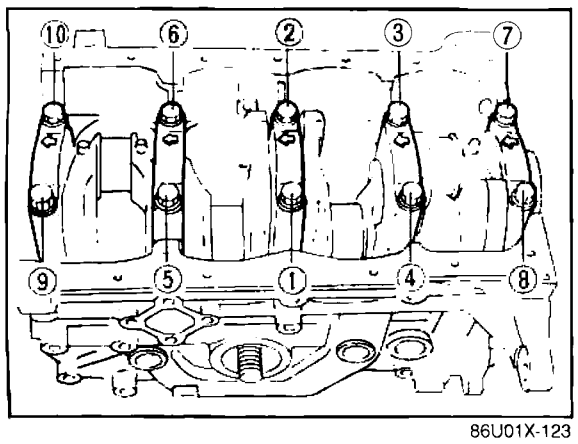


86U01X-215



86U01X-122

Oil clearance inspection
(1) Remove any foreign material and oil from the journals and bearings.
(2) Install the upper main bearings in the cylinder block.
(3) Set the crankshaft into the cylinder block.
(4) Position the plasti-gauge on top of the journals in the axial direction.

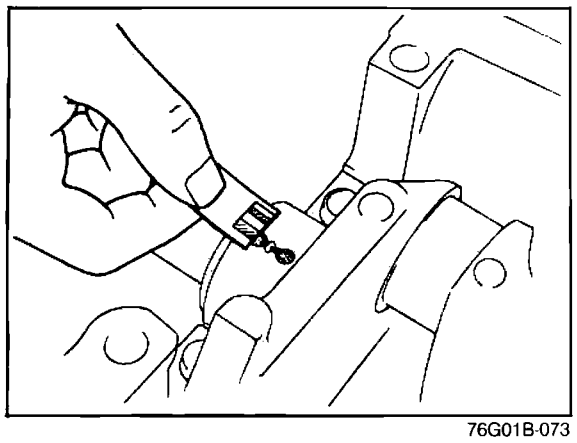


86U01X-123

(5) Install the main bearing caps along with the lower main bearings according to the cap number and ⬅ mark.
(6) Tighten the caps in two or three steps in the order in the figure.

Tightening torque:
82—88 N·m (8.4—9.0 m-kg, 61—65 ft-lb)

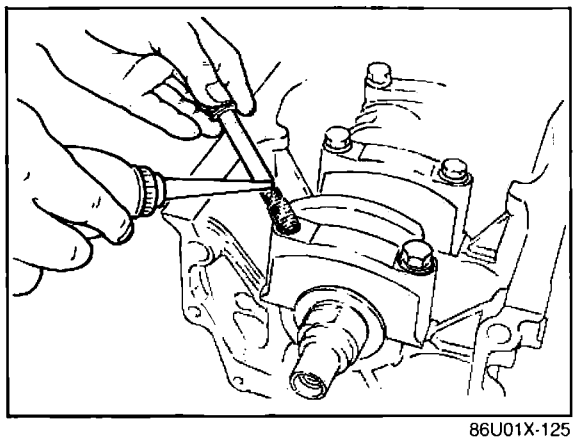
Caution
Do not rotate the crankshaft when measuring the oil clearances.



76G01B-073

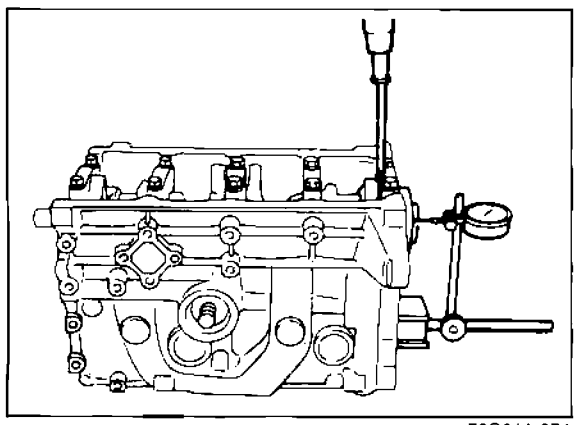
(7) Remove the main bearing caps, and measure the plasti-gauge at each journal at the widest point for the smallest clearance, and at the narrowest point for the largest clearance.
If the oil clearance exceeds specification, grind the crankshaft and use undersize main bearings. (Refer to page 1B—45.)

Oil clearance
No. 1, 2, 4, 5:
0.025—0.043 mm (0.0010—0.0017 in)
No. 3:
0.031—0.049 mm (0.0012—0.0019 in)
Maximum: 0.08 mm (0.0031 in)



86U01X-125

2. Apply a liberal amount of engine oil to the main bearings and main journals.
3. Install the crankshaft and the main bearing caps according to the cap number and ⬅ mark.

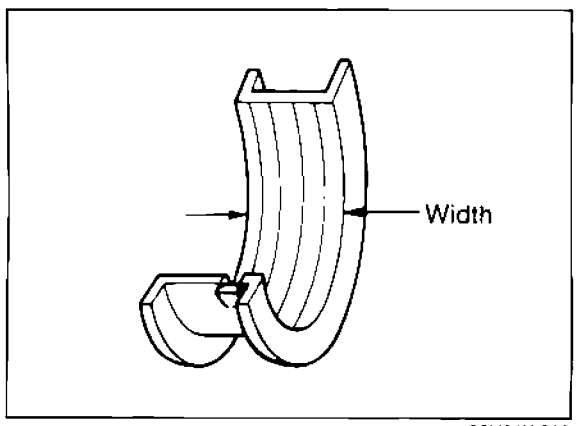


76G01A-074

4. Inspect the crankshaft end play.

End play:
0.08—0.18 mm (0.0031—0.0071 mm)
Maximum: 0.30 mm (0.012 in)

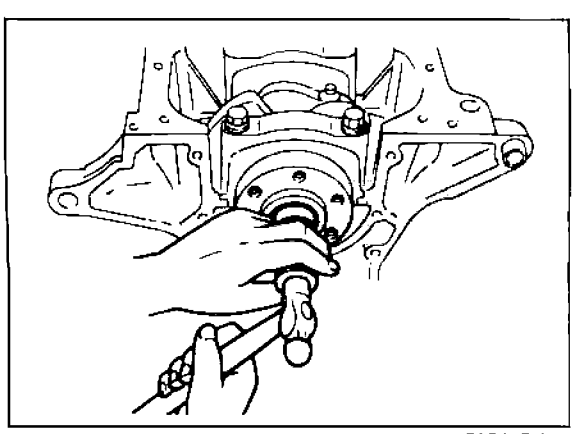
5. If the end play exceeds specification, grind the crankshaft and use undersize center main bearing.



86U01X-216

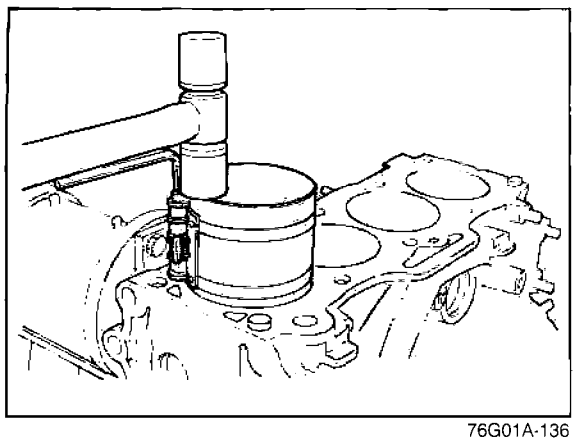
Center main bearing width
Standard:
27.94—27.99 mm (1.1000—1.1020 in)
0.25 mm (0.010 in) undersize:
28.04—28.09 mm (1.1040—1.1059 in)
0.50 mm (0.020 in) undersize:
28.12—28.17 mm (1.1071—1.1091 in)
0.75 mm (0.030 in) undersize:
28.20—28.25 mm (1.1102—1.1122 in)

Note
Wider thrust width is available only in undersize center main bearing.



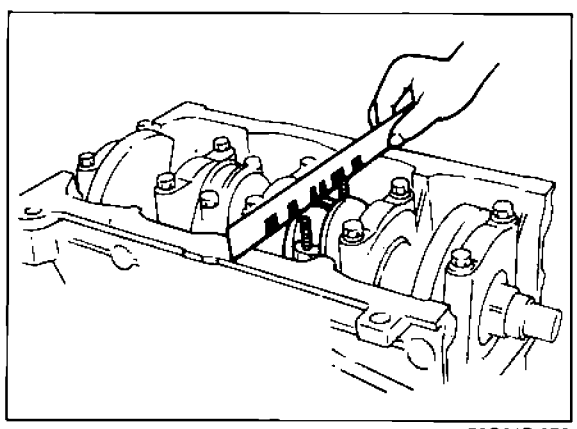
76G01B-075

Pilot Bearing
1. Apply engine oil to the outer circumference of the bearing.
2. Set a piece of pipe (outer diameter 30—34 mm, 1.18—1.34 in) against the outer race of the bearing, then tap it evenly into the crankshaft.
3. Lubricate the bearing with grease.



76G01A-136

Piston and Connecting Rod Assembly
1. Apply a liberal amount of clean engine oil to the cylinder walls, piston, and rings.
2. Check the piston rings for the end gap alignment.
3. Insert each piston assembly into the cylinder block with the **F** mark facing the front of the engine. Use a piston installer tool (commercially available).



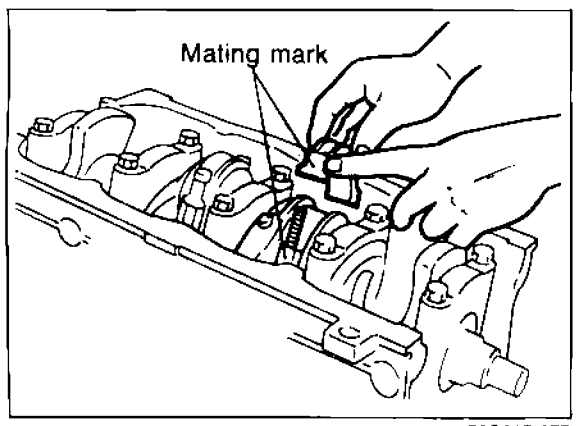
76G01B-076

Connecting Rod Cap

1. Check the connecting rod bearing clearances using the same procedure as used for the main bearing oil clearance.

Connecting rod cap tightening torque:
69—73 N·m (7.0—7.4 m-kg, 51—54 ft-lb)

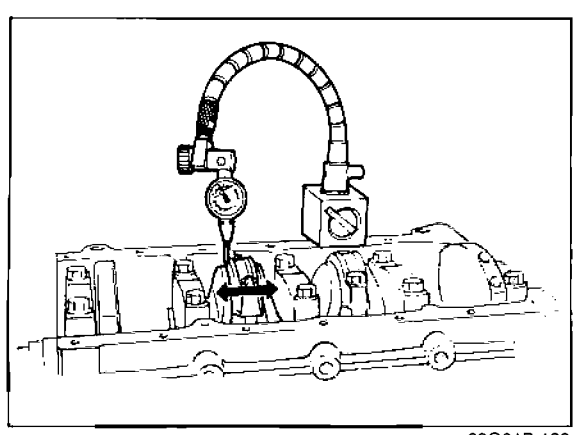
Oil clearance:
0.027—0.067 mm (0.0011—0.0026 in)
Maximum: 0.10 mm (0.0039 in)



76G01B-077

Caution
Align the alignment marks on the cap and on the connecting rod when installing the connecting rod cap.

2. If the oil clearance exceeds specification grind the crankshaft and use undersize bearings. (Refer to page 1B—46.)

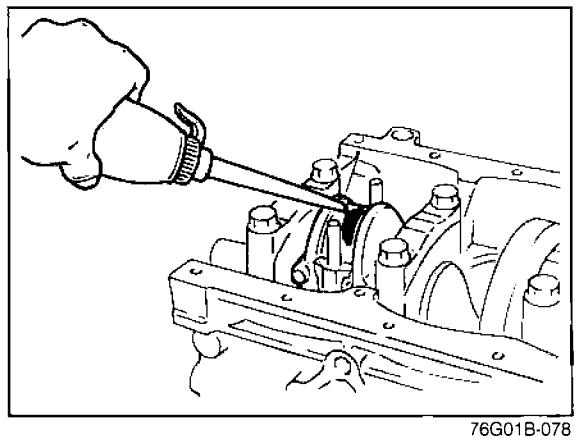


69G01B-139

3. Check the side clearance of each connecting rod without the cap installed.

Side clearance:
0.110—0.262 mm (0.004—0.0103 in)
Maximum: 0.30 mm (0.012 in)

If the clearance exceeds the maximum, replace the connecting rod.



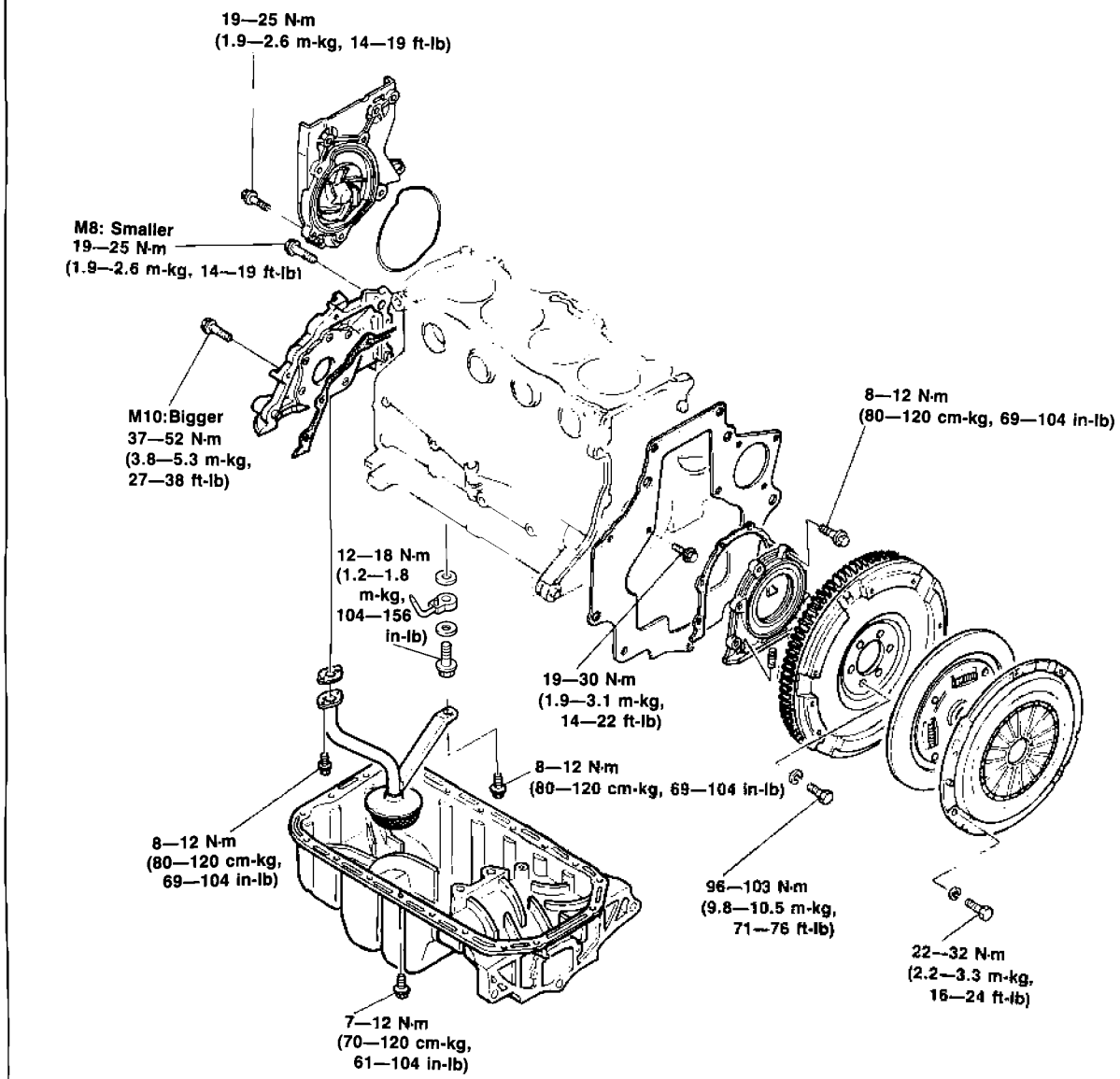
76G01B-078

4. Apply a liberal amount of engine oil to the crankpin journal and connecting rod bearing.
5. Install the connecting rod cap with the alignment marks aligned.

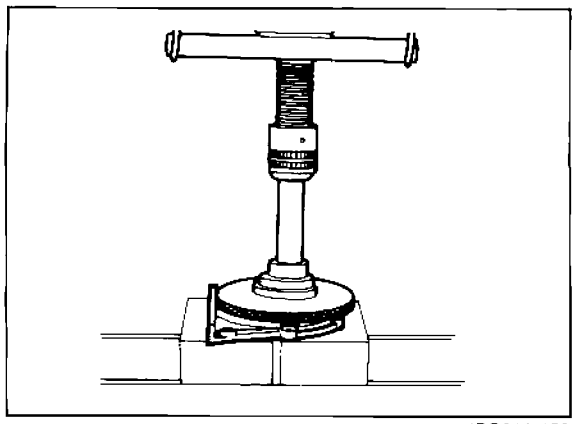
Tightening torque:
69—73 N·m (7.0—7.4 m-kg, 51—54 ft-lb)

1B ASSEMBLY (CYLINDER BLOCK)

CYLINDER BLOCK—II
Torque Specifications



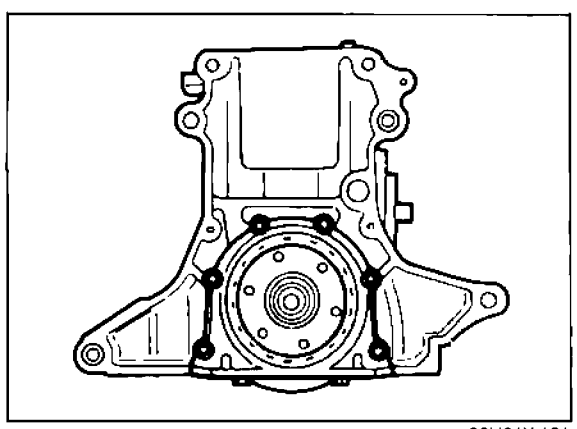
69G01A-166



4BG01A-158

Rear Cover

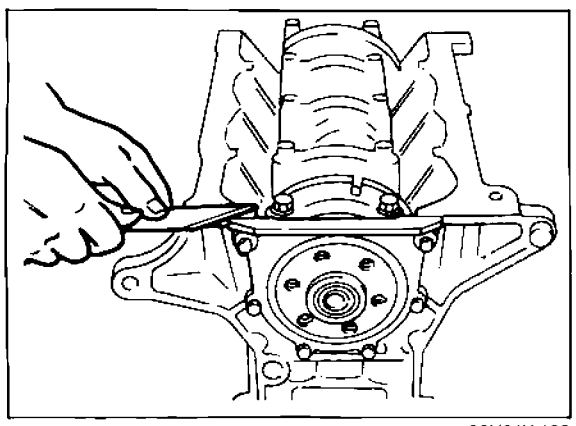
1. Apply engine oil to the rear cover, oil seal and oil seal lip.
2. Press the oil seal into the rear cover.



86U01X-131

3. Install the rear cover and a new gasket.

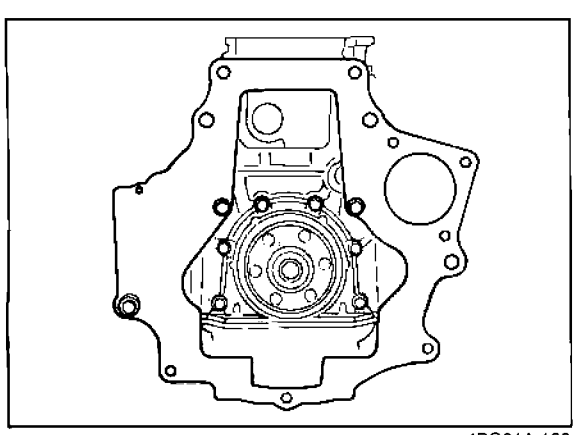
Tightening torque:
8—12 N·m (80—120 cm-kg, 69—104 in-lb)



86U01X-132

4. Cut away the portion of the gasket that projects out from the rear cover assembly toward the oil pan side.

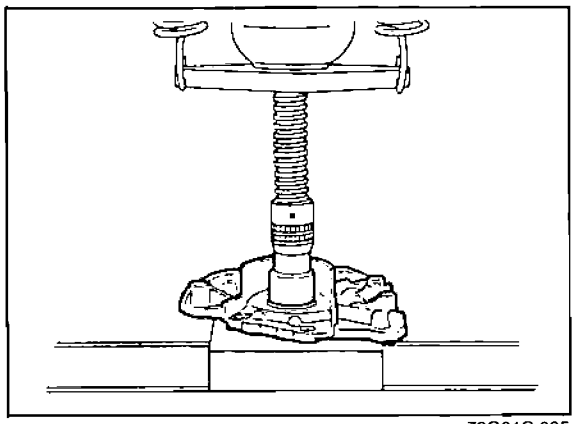
Caution
Do not scratch the rear cover assembly.



4BG01A-160

End Plate
Install the end plate.

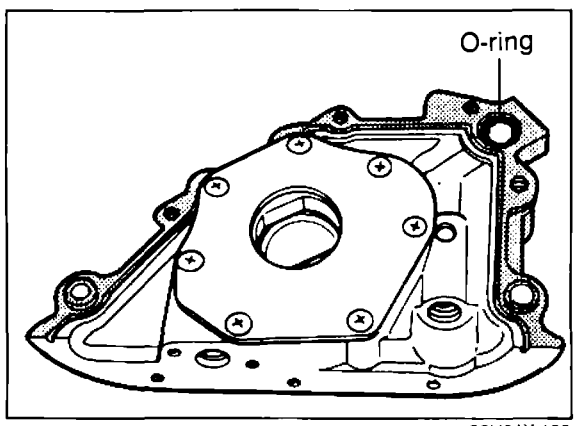
Tightening torque:
19—30 N·m (1.9—3.1 m-kg, 14—22 ft-lb)



79G01C-085

Oil Pump
1. Apply engine oil to a new oil pump oil seal and the oil pump body.
2. Press the oil seal into the oil pump body.

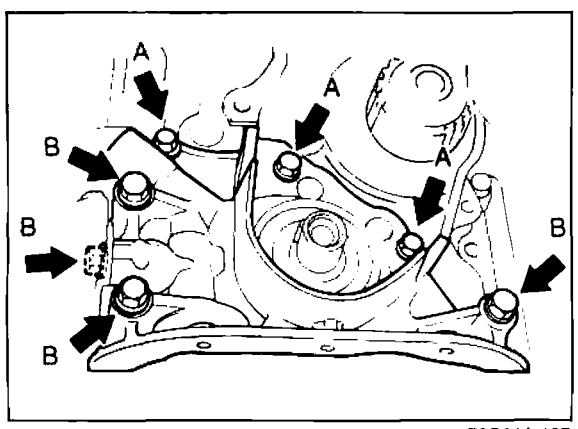
1B ASSEMBLY (CYLINDER BLOCK)



86U01X-133

3. Apply engine oil to the oil seal lip.
4. Remove any dirt or other material from the contact surfaces.
5. Apply a continuos bead of silicon sealant to the contact surface of the oil pump.

Caution
Do not allow any sealant to get into the oil hole.

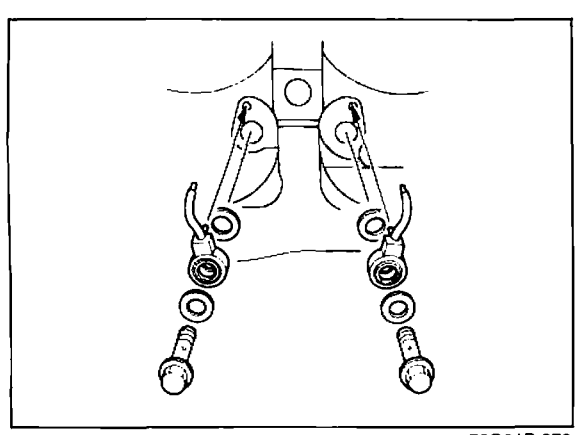


76G01A-137

6. Install a new O-ring into the pump body.
7. Install the oil pump.

Tightening torque
Ⓐ: 19—25 N·m
(1.9—2.6 m-kg, 14—19 ft-lb)
Ⓑ: 37—52 N·m
(3.8—5.3 m-kg, 27—38 ft-lb)

8. Remove any sealant which has been squeezed out.

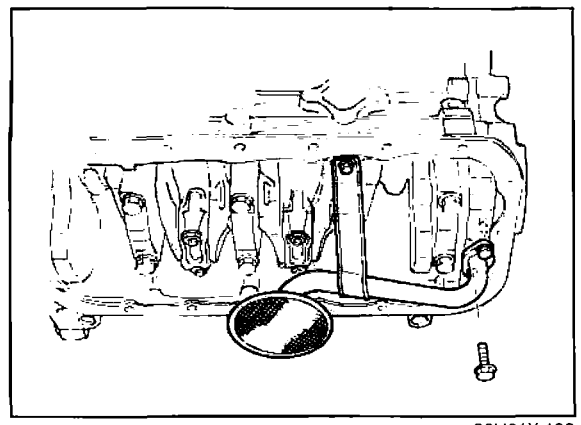


76G01B-079

Oil Jet
Install the oil jet as shown in the figure.

Tightening torque: 12—18 N·m
(1.2—1.8 m-kg, 104—156 in-lb)

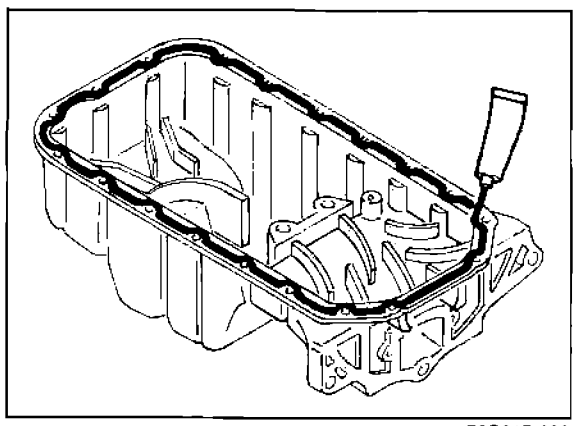
Caution
The shapes of the No.1, 3 cylinders jet valves and No.2, 4 jet valves are different.



86U01X-136

Oil Strainer
Install the oil strainer and a new gasket.

Tightening torque:
8—12 N·m (80—120 cm-kg, 69—104 in-lb)



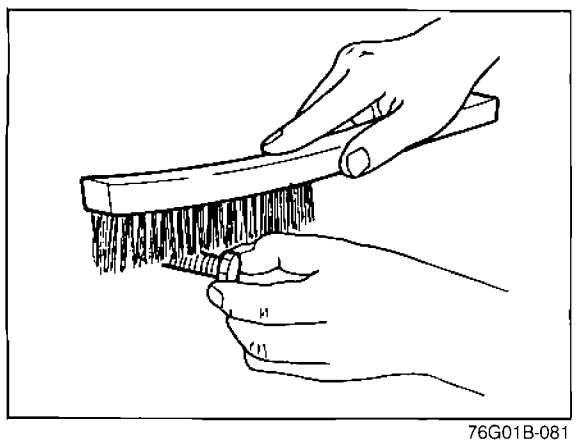
76G01B-080

Oil Pan

1. Apply a continuous bead of silicon sealant to the oil pan around inside of the bolt holes and overlap the ends.
2. Install the oil pan.

Tightening torque:
7—12 N·m (70—120 cm-kg, 61—104 in-lb)

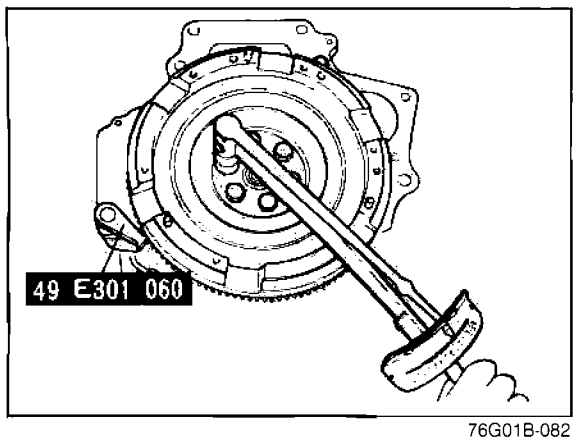
Caution
Oil pan projection and recession from the end of the cylinder block must not be more than 1.5 mm (0.06 in).



76G01B-081

Flywheel

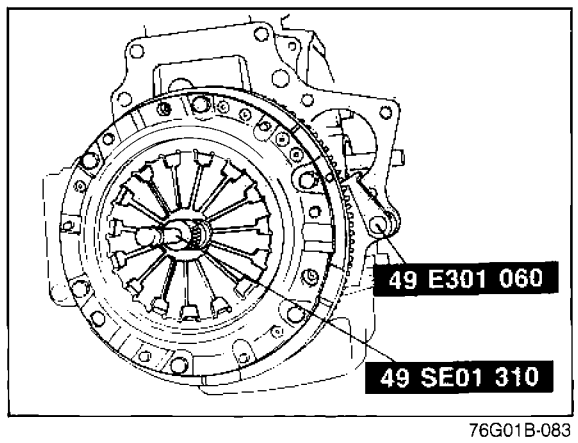
1. Remove any old sealant from the bolts and bolt holes. If old sealant can not be removed from the bolt, replace it.
2. Apply sealant to the bolt threads.



76G01B-082

3. Install, and tighten the flywheel with the **SST**.

Tightening torque:
96—103 N·m (9.8—10.5 m-kg, 71—76 ft-lb)

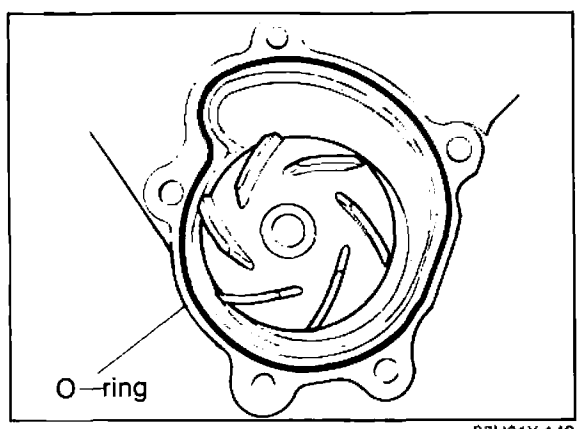


76G01B-083

Clutch Disc and Clutch Cover

Install the clutch disc and clutch cover using the **SST**. (Refer to Section 6.)

Tightening torque:
22—32 N·m (2.2—3.3 m-kg, 16—24 ft-lb)

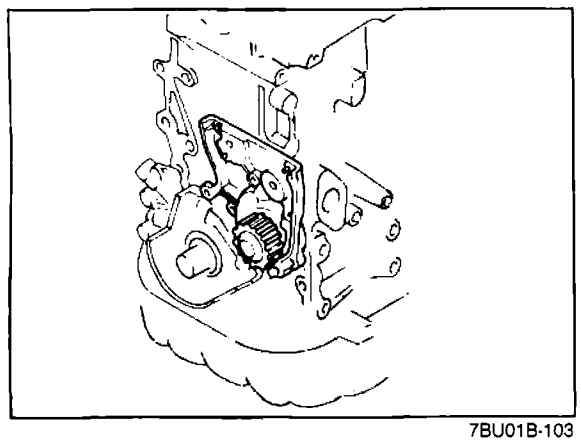


86U01X-142

Water Pump

1. Remove all dirt, grease, and other material from the water pump mounting surface.
2. Place a new O-ring in position.

Caution
Do not reuse the original O-ring.

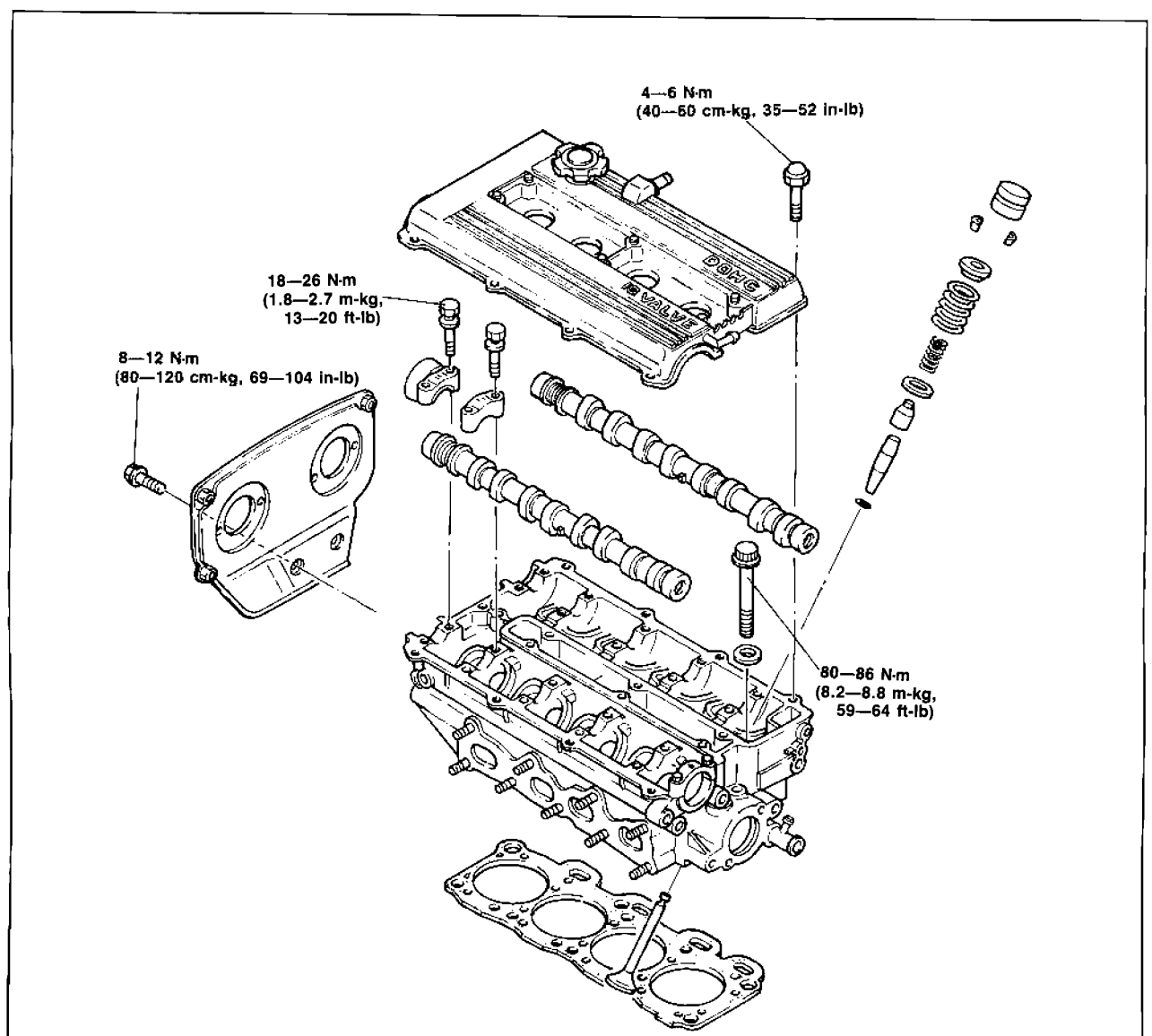


7BU01B-103

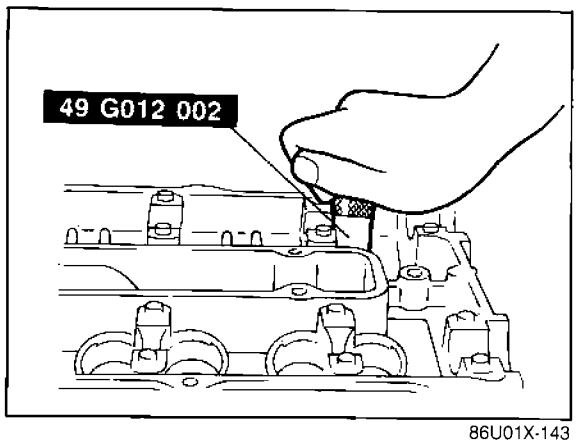
3. Install the water pump.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

CYLINDER HEAD
Torque Specifications



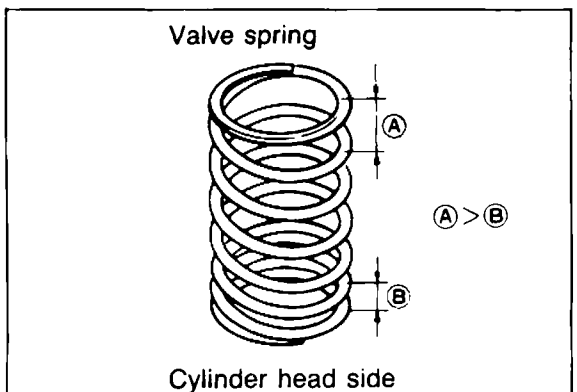
69G01B-152



86U01X-143

Valve Seal

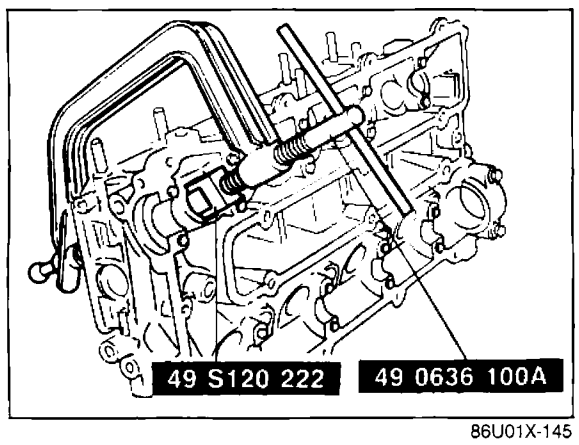
1. Apply engine oil to the inside of the new valve seal.
2. Install the valve seal onto the valve guide with the **SST**.



76G01B-084

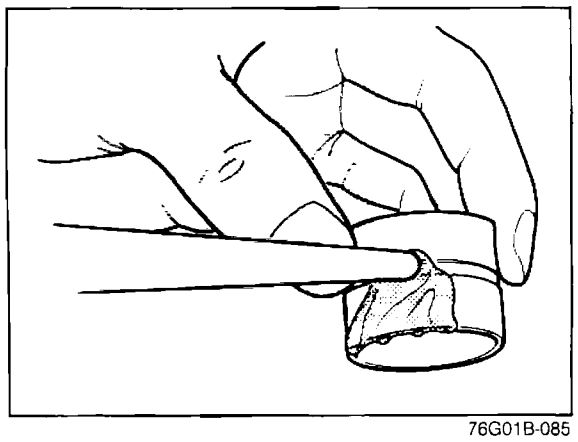
Valve and Valve Spring
1. Install the lower spring seat.
2. Install the valve.
3. Install the valve springs and the upper spring seat.

Note
Install the outer and inner valve spring with the closer pitch toward the cylinder head.



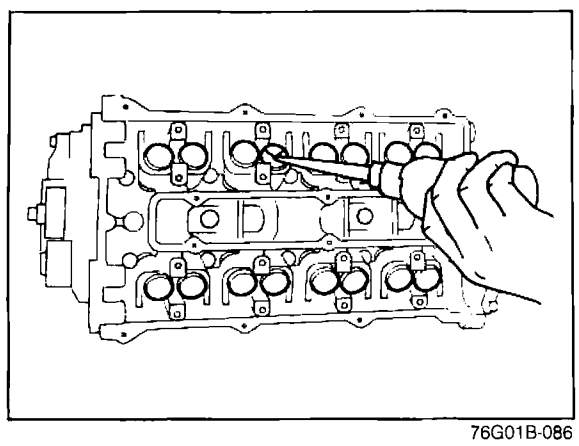
86U01X-145

4. Compress the valve spring with the **SST**; then install the valve keepers.
5. Tap the end of the valve stem lightly two or three times with a plastic hammer to confirm that the keepers are all fully seated.



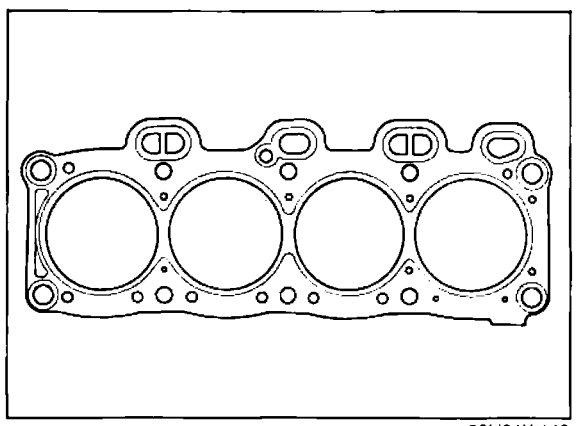
76G01B-085

Hydraulic Lash Adjuster (HLA)
1. Apply engine oil to the sliding surface.



76G01B-086

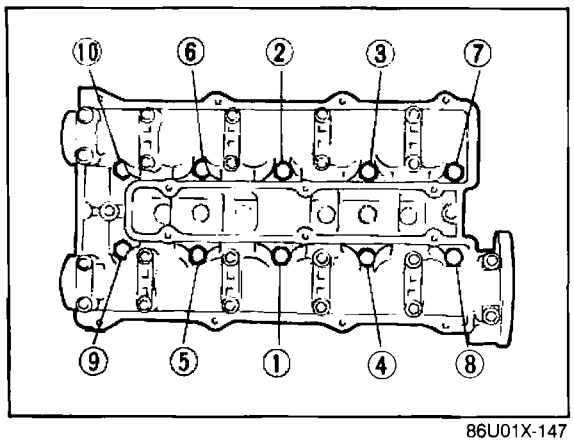
2. Install the HLA in the position from which they were removed.
3. Check for free movement.



86U01X-146

Cylinder Head

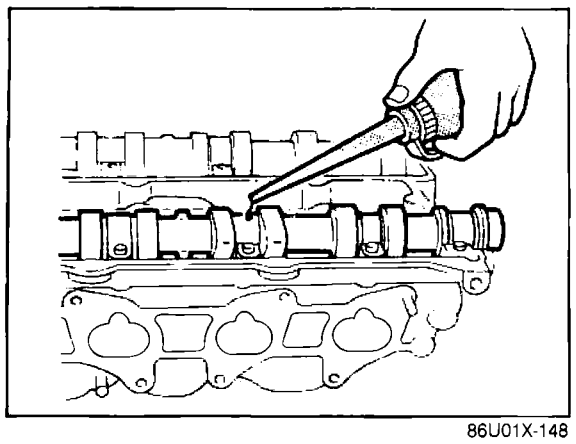
1. Thoroughly remove all dirt, oil, or other material from the top of the cylinder block.
2. Place the new cylinder head gasket in position.



86U01X-147

3. Install the cylinder head.
4. Apply engine oil to the bolt threads and seat faces.
5. Tighten the cylinder head bolts in two or three steps in the order shown in the figure.

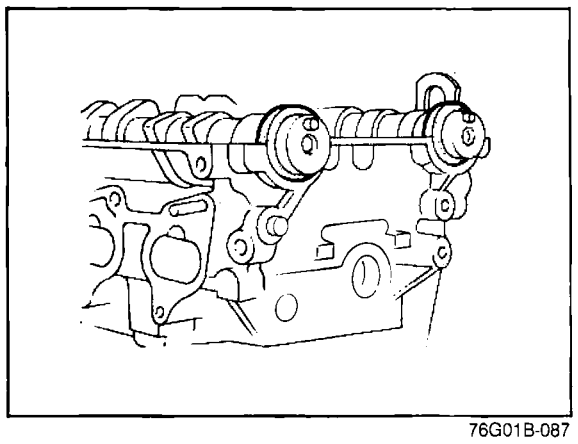
Tightening torque:
80—86 N·m (8.2—8.8 m-kg, 59—64 ft-lb)



86U01X-148

Camshaft

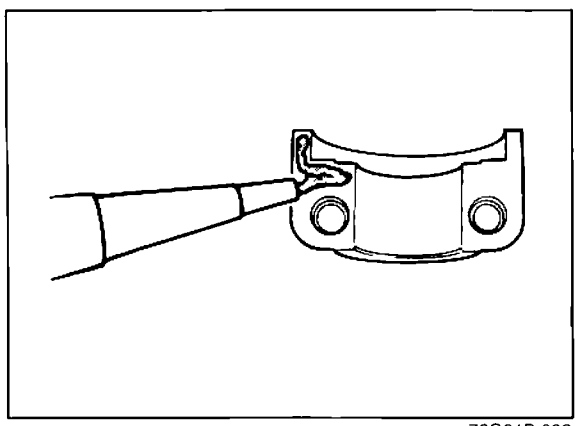
1. Apply a liberal amount of engine oil to the journals and bearings.
2. Place the camshaft in position with the dowel pin facing straight up.



76G01B-087

Camshaft Oil Seal

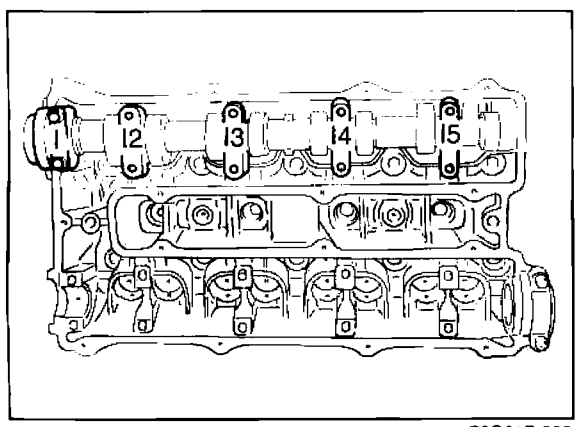
1. Apply liberal amount of clean engine oil to the camshaft oil seal and cylinder head.
2. Install the camshaft oil seal.



76G01B-088

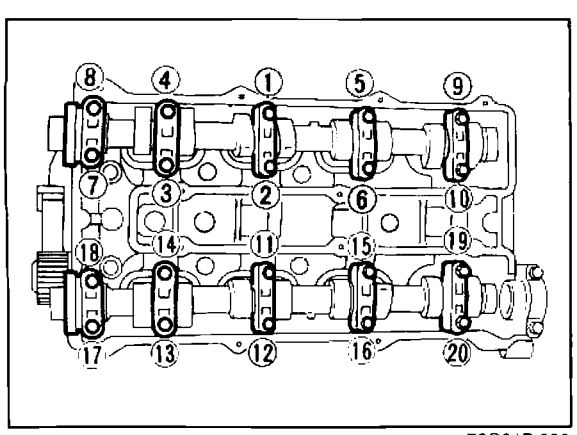
Camshaft Cap

1. Apply liberal amount of clean engine oil to the cam lobes and journals.
2. Apply silicon sealant to the front camshaft cap surface.



76G01B-089

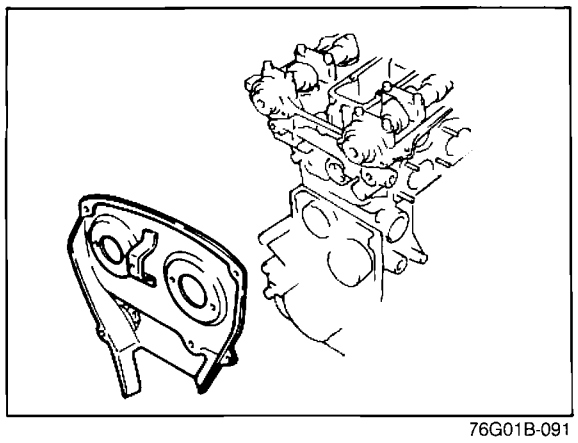
3. Position the camshaft caps according to the cap number and mark.



76G01B-090

4. Install the camshaft caps. Tighten the bolts in two or three steps in the order shown in the figure.

Tightening torque:
18—26 N·m (1.8—2.7 m-kg, 13—20 ft-lb)

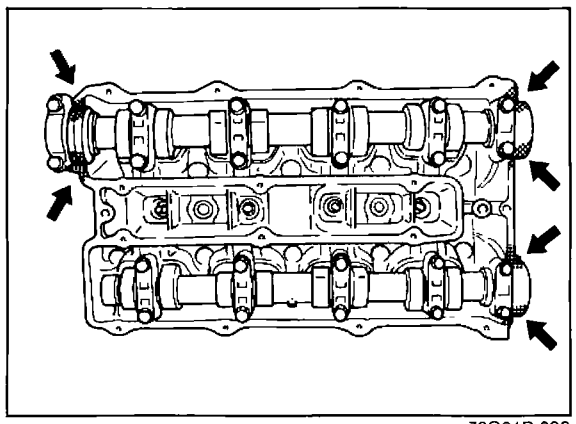


76G01B-091

Seal Plate

Install the seal plate.

Tightening torque:
8—12 N·m (80—120 cm-kg, 69—104 in-lb)



76G01B-092

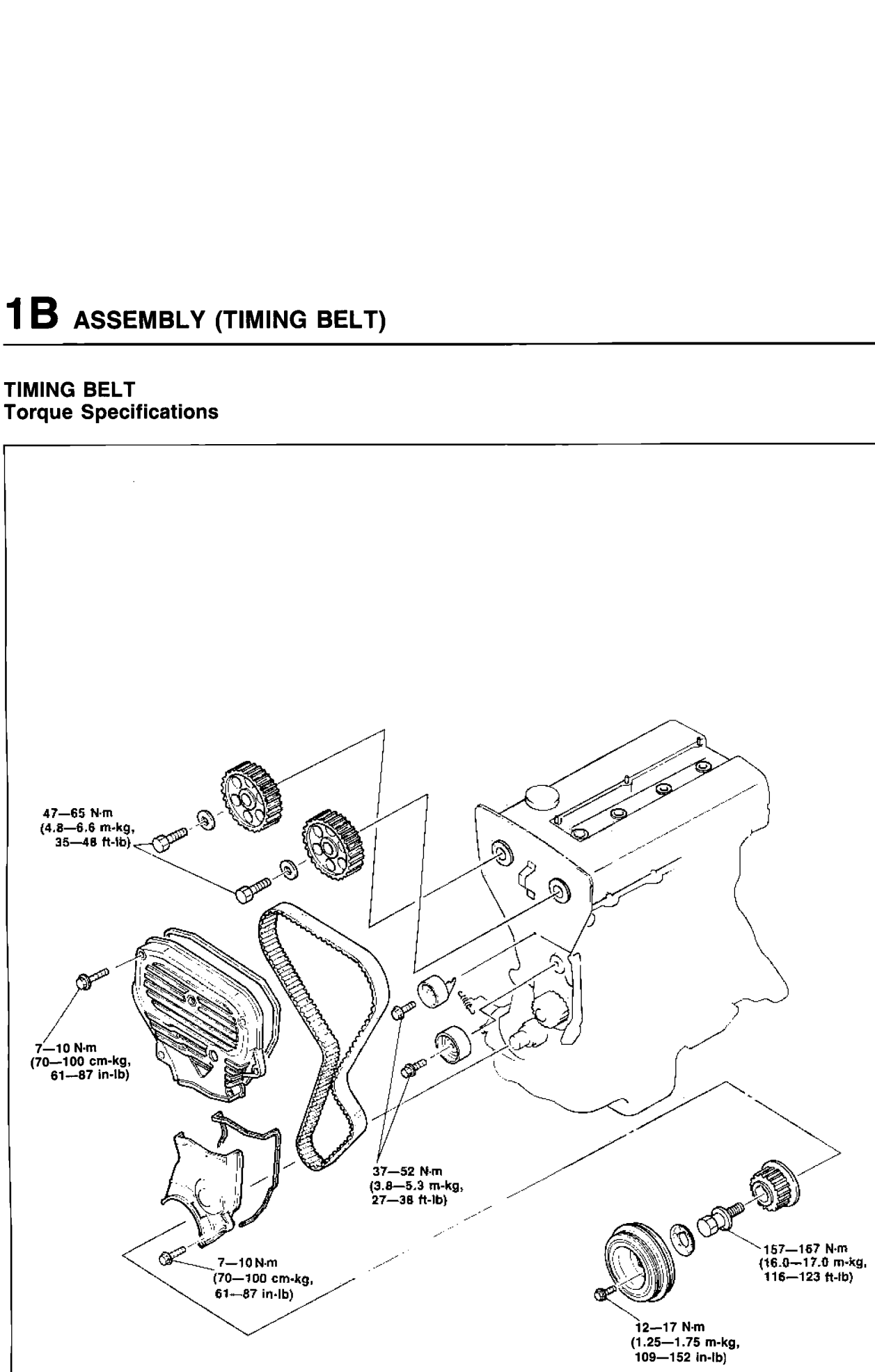
Cylinder Head Cover

1. Apply silicon sealant to the shaded area shown in the figure.
2. Install the cylinder head cover.

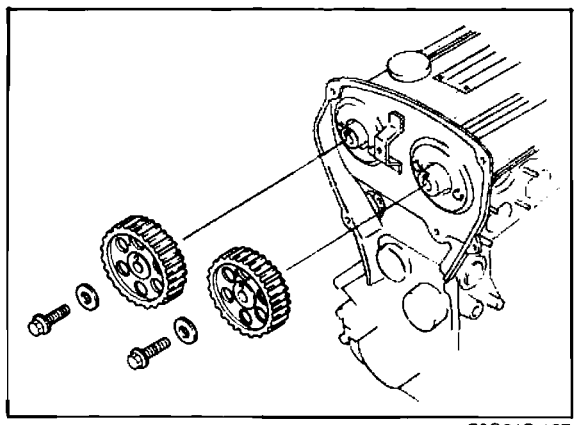
Tightening torque:
4—6 N·m (40—60 cm-kg, 35—52 in-lb)

1B ASSEMBLY (TIMING BELT)

TIMING BELT
Torque Specifications



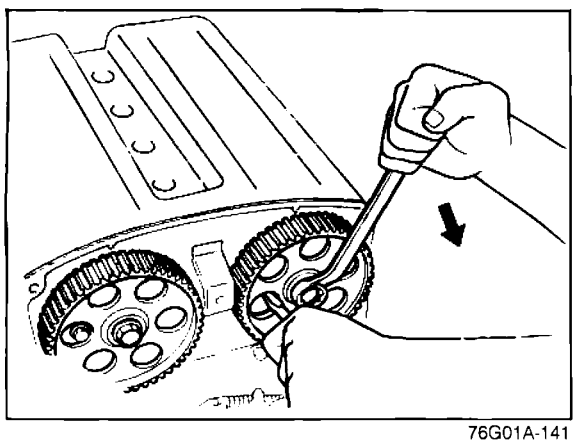
69G01B-160



76G01B-127

Camshaft Pulley

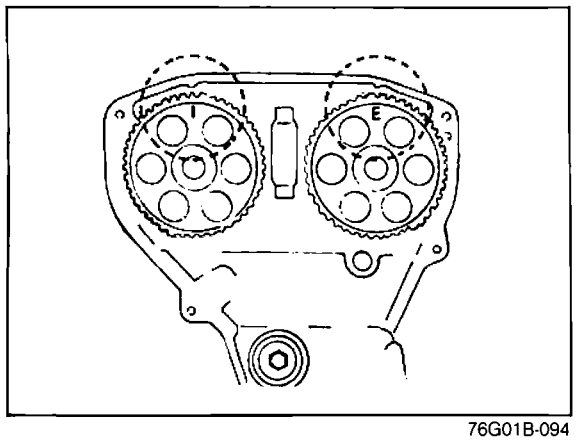
1. Install the camshaft pulley on the camshaft with the dowel pin fit into the hole at the **I** mark (intake side) and **E** mark (exhanst side).



76G01A-141

2. Tighten the camshaft pulley lock bolt.

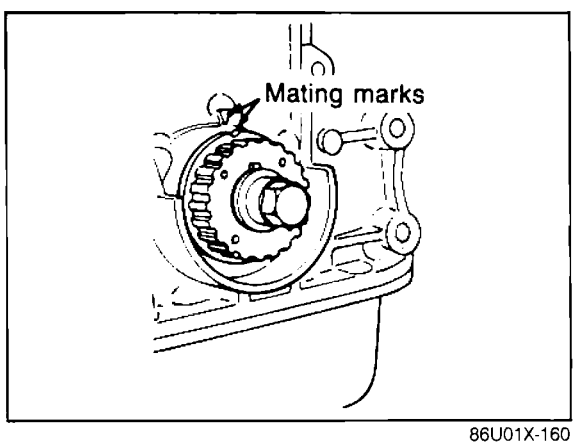
Tightening torque:
47—65 N·m (4.8—6.6 m-kg, 35—48 ft-lb)



76G01B-094

3. Align the mating mark on the camshaft pulleys with the alignment mark on the seal plate.

Note
For intake side camshaft pulley, align "I" mark.
For exhanst side camshaft pulley, align "E" mark.



86U01X-160

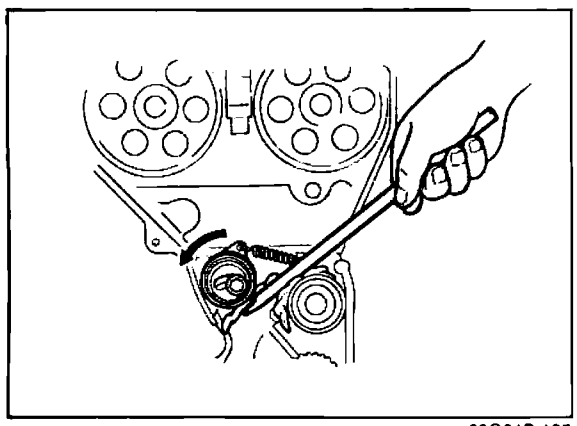
Timing Belt Pulley

1. Reverse the direction of the **SST** (ring gear brake).
2. Install the crankshaft key.
3. Install the timing belt pulley on the crankshaft.

Tightening torque: 157—167 N·m
(16.0—17.0 m-kg, 116—123 ft-lb)

4. Release the ring gear brake.
5. Align the timing belt pulley and the pump body alignment marks.

1B ASSEMBLY (TIMING BELT)

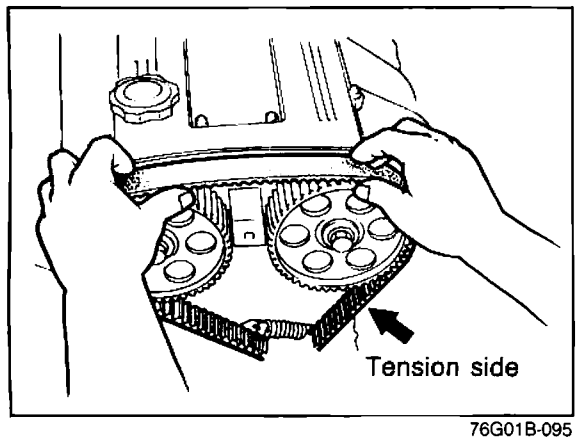


69G01B-165

Timing Belt Idler Pulley
Install the timing belt idler pulley.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

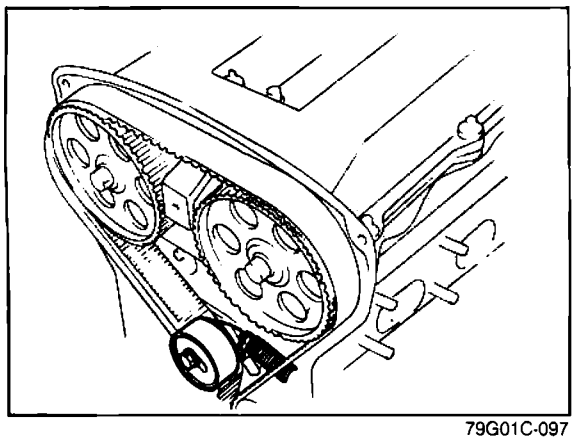
Timing Belt Tensioner
1. Install the timing belt tensioner and tensioner spring.
2. Tentatively secure the tensioner with the spring fully extended.



76G01B-095

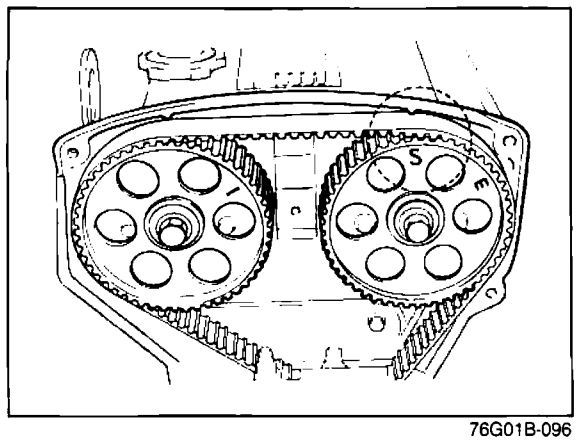
Timing Belt
1. Install the timing belt so that there is no looseness at the tension side, and at the two camshaft pulleys.

Caution
a) If the timing belt is being reused, it must be reinstalled to rotate in the original direction.
b) Check that there is no oil, grease, or dirt on the timing belt.



79G01C-097

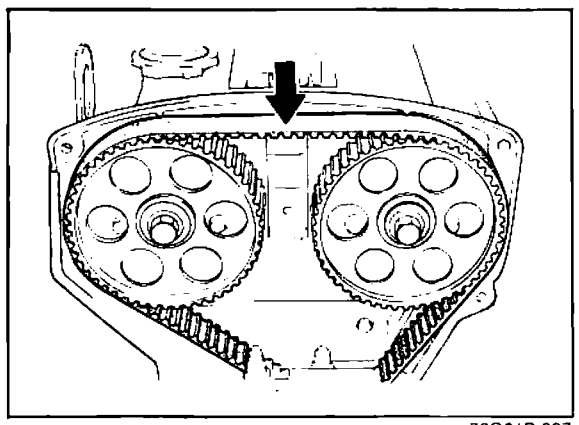
2. Loosen the tensioner lock bolt.
3. Turn the crankshaft twice in the direction of rotation.
4. Check that the mating marks are correctly aligned. If not aligned, remove the timing belt and tensioner, and repeat the above-mentioned procedure.



76G01B-096

5. Turn the crankshaft to align the **S** mark of the right side camshaft pulley with seal plate mating mark.
6. Tighten the timing belt tensioner lock bolt.

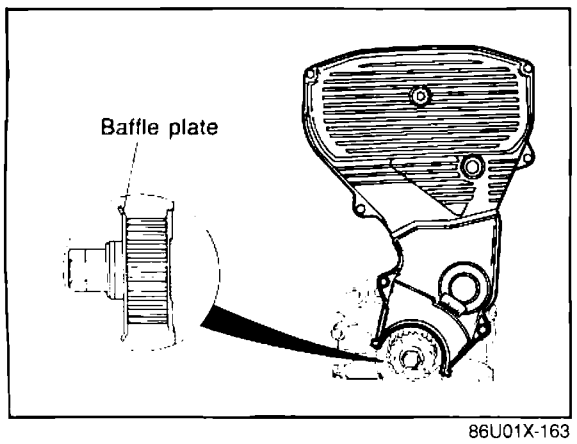
Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)



76G01B-097

7. Check the timing belt deflection. If the deflection is not correct, loosen the tensioner lock bolt and repeat steps 3—5 above. Replace the tensioner spring if necessary.

Belt deflection:
7.5—8.5 mm (0.30—0.33 in)
/ 98 N (10 kg, 22 lb)

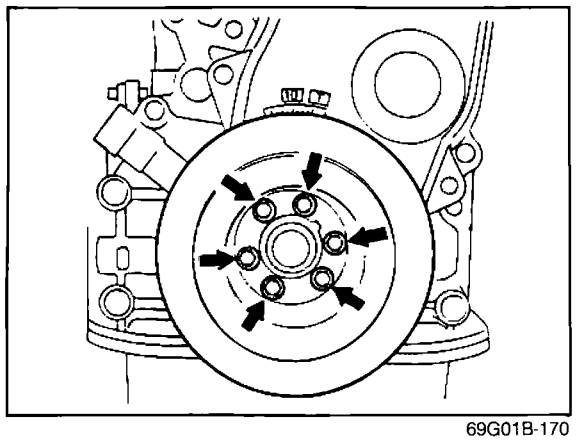


86U01X-163

Baffle Plate
Position the baffle plate on the timing belt pulley.

Timing Belt Cover
Install the lower timing belt cover, upper timing belt cover, and new gaskets.

Tightening torque:
7—10 N·m (70—100 cm-kg, 61—87 in-lb)

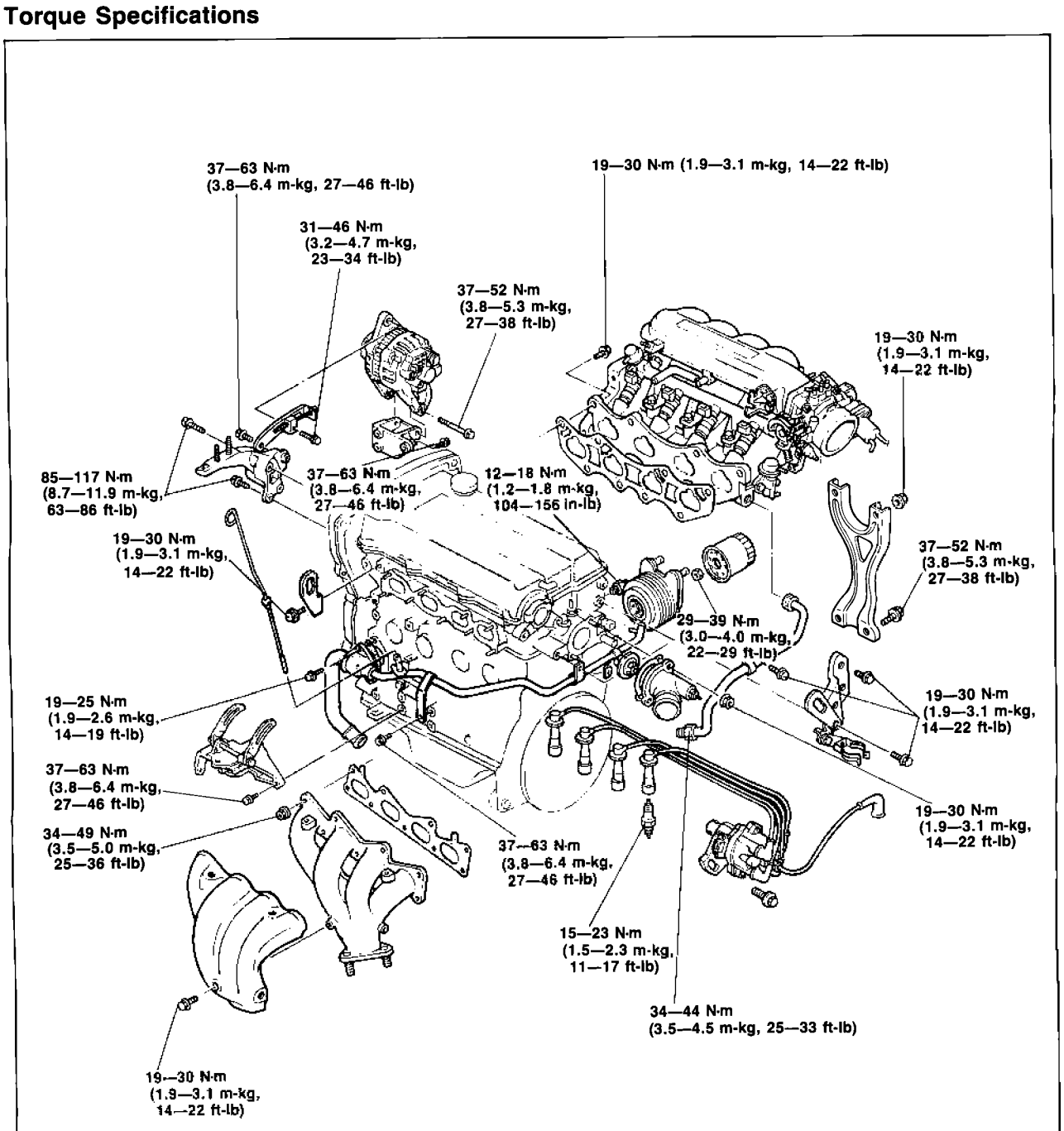


69G01B-170

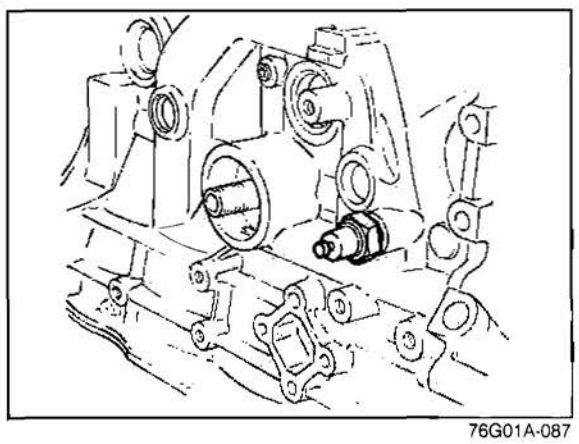
Crankshaft Pulley
Install the crankshaft pulley.

Tightening torque: 12—17 N·m
(1.25—1.75 m-kg, 109—152 in-lb)

AUXILIARY PARTS
Torque Specifications



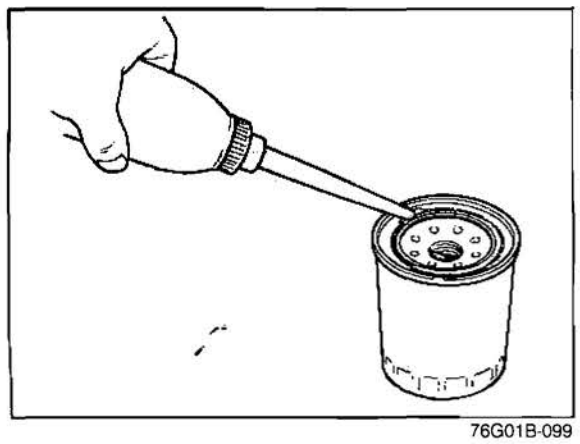
86U01X-164



76G01A-087

Oil Pressure Switch
Install the oil pressure switch.

Tightening torque: 12—18 N·m (1.2—1.8 m-kg, 104—156 in-lb)

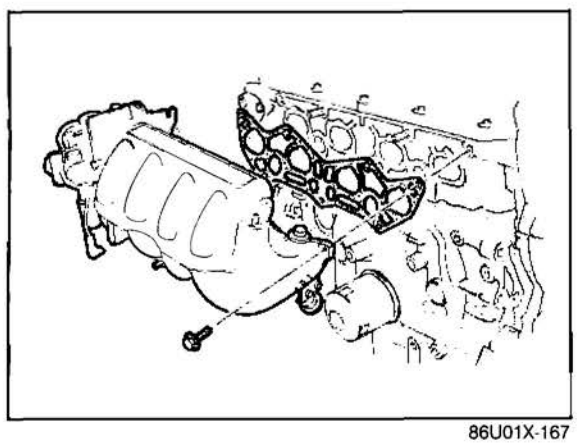


76G01B-099

Oil Cooler
Install the oil cooler.

Tightening torque: 29—39 N·m (3.0—4.0 m-kg, 22—29 ft-lb)

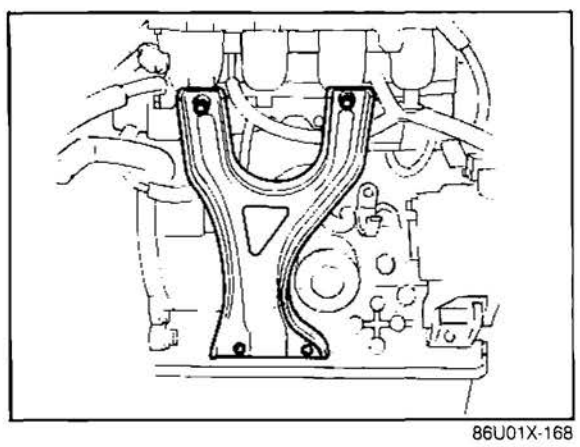
Oil Filter
1. Apply a small amount of engine oil to the rubber seal of the new filter.
2. Install the oil filter and tighten it by hand until the rubber seal contacts the base.
3. Then tighten the filter 1 and 1/6 turn with a wrench.



86U01X-167

Intake Manifold Assembly
1. Place the new gasket in position.
2. Install the intake manifold assembly.
3. Tighten the nuts in two or three steps.

Tightening torque: 19—30 N·m (1.9—3.1 m-kg, 14—22 ft-lb)



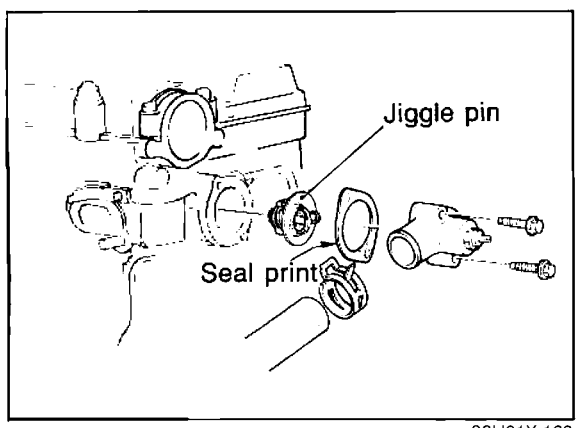
86U01X-168

Intake Manifold Bracket
Install the intake manifold bracket.

Tightening torque: 19—30 N·m (1.9—3.1 m-kg, 14—22 ft-lb)

expert22 для http://rutracker.org

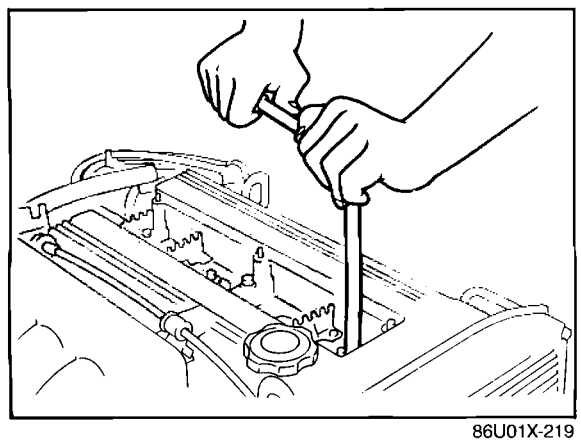
1B ASSEMBLY (AUXILIARY PARTS)



86U01X-169

Thermostat and Thermostat Cover
1. Install the thermostat into the cylinder head with the jiggle pin at the top.
2. Position a new gasket with the printed side facing the cylinder head.
3. Install the thermostat cover.

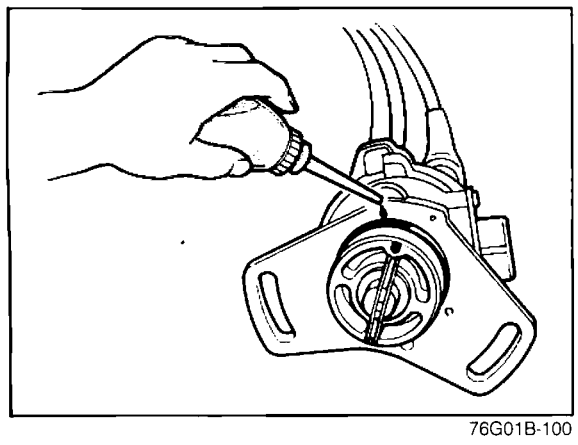
Tightening torque:
19—30 N·m (1.9—3.1 m-kg, 14—22 ft-lb)



86U01X-219

Spark Plug
1. Apply anti-seize compound or molybdenum-based lubricant to the spark plug threads.
2. Install the spark plugs.

Tightening torque:
15—23 N·m (1.5—2.3 m-kg, 11—17 ft-lb)



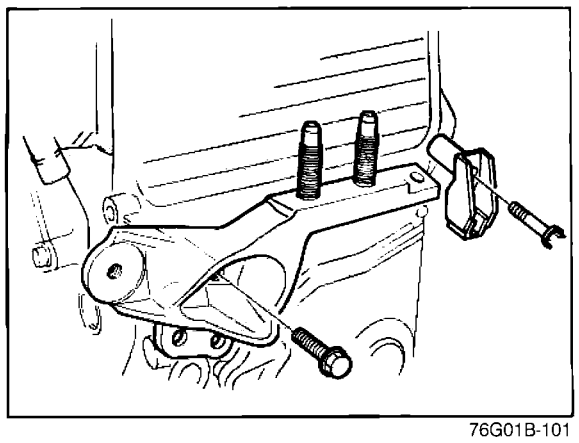
76G01B-100

Distributor
1. Apply engine oil to the O-ring, and position it on the distributor.
2. Apply engine oil to the blade.
3. Install the distributor.
4. Loosely tighten the distributor mounting bolt.

High-Tension Lead
Install the high-tension leads.

Center Cover
Install the center cover.

Tightening torque:
8—12 N·m (80—120 cm-kg, 69—104 in-lb)



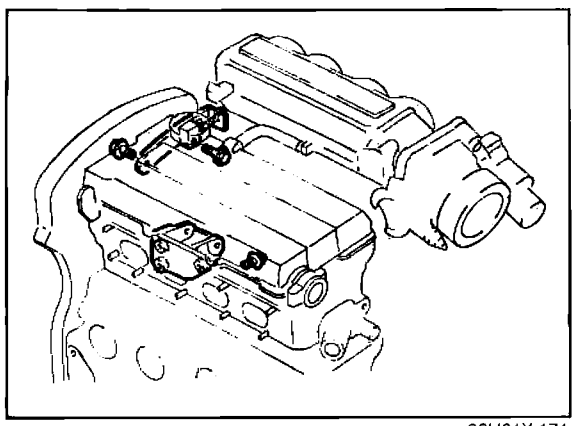
76G01B-101

Engine Mount Bracket
1. Install the engine mount bracket.

Tightening torque:
85—117 N·m (8.7—11.9 m-kg, 63—86 ft-lb)

2. Install the stay to the engine mount bracket.

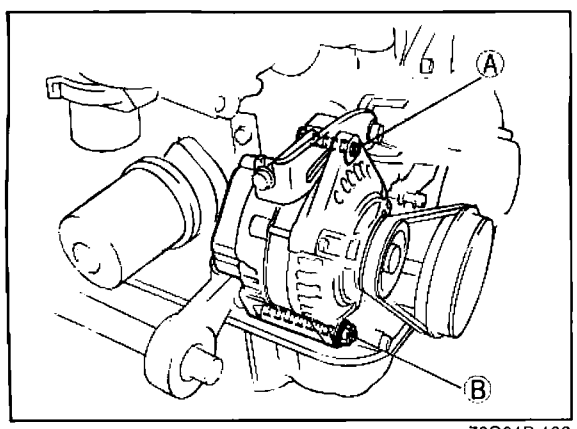
Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)



86U01X-171

Alternator
1. Install the alternator strap and bracket.

Tightening torque:
37—63 N·m (3.8—6.4 m-kg, 27—46 ft-lb)

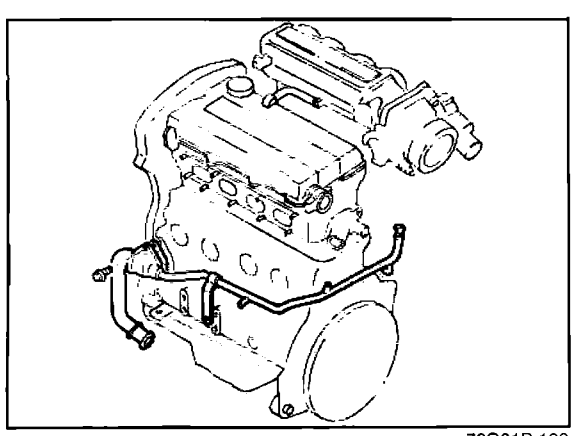


76G01B-102

2. Install the alternator.

Tightening torque
Ⓐ: 31—46 N·m
(3.2—4.7 m-kg, 23—34 ft-lb)
Ⓑ: 37—52 N·m
(3.8—5.3 m-kg, 27—38 ft-lb)

3. Install the alternator drive belt, and adjust the belt deflection. (Refer to page 1B—6.)



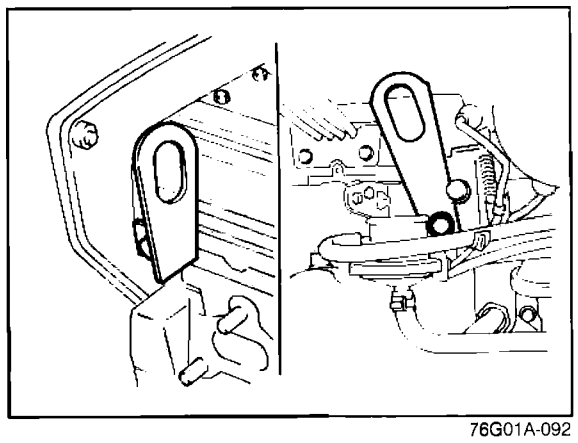
76G01B-103

Coolant Inlet Pipe and Bypass Pipe
1. Install the coolant inlet pipe.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

2. Apply vegetable oil to the O-ring.
3. Install the coolant bypass pipe.

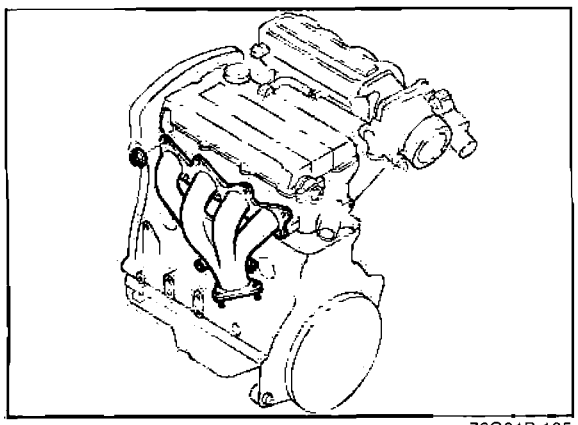
Tightening torque:
37—63 N·m (3.8—6.4 m-kg, 27—46 ft-lb)



76G01A-092

Engine Hanger
Install the front and rear engine hangers.

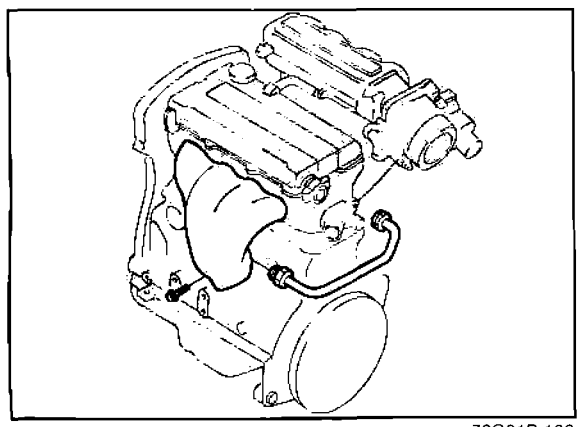
Tightening torque:
19—30 N·m (1.9—3.1 m-kg, 14—22 ft-lb)



76G01B-105

Exhaust Manifold Assembly
1. Place the new gaskets in position with the ridge facing the cylinder head.
2. Install the exhaust manifold assembly.
3. Tighten the nuts in two or three steps.

Tightening torque:
34—49 N·m (3.5—5.0 m-kg, 25—36 ft-lb)



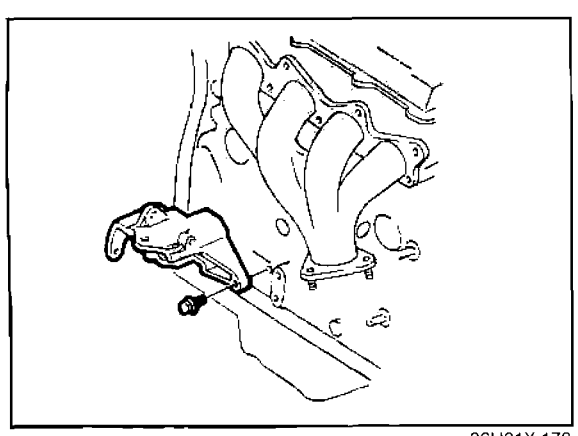
76G01B-106

Exhaust Manifold Insulator
Install the exhaust manifold insulator.

Tightening torque:
19—30 N·m (1.9—3.1 m-kg, 14—22 ft-lb)

EGR Pipe (Unleaded fuel)
Install the EGR pipe.

Tightening torque:
34—44 N·m (3.5—4.5 m-kg, 25—33 ft-lb)



86U01X-178

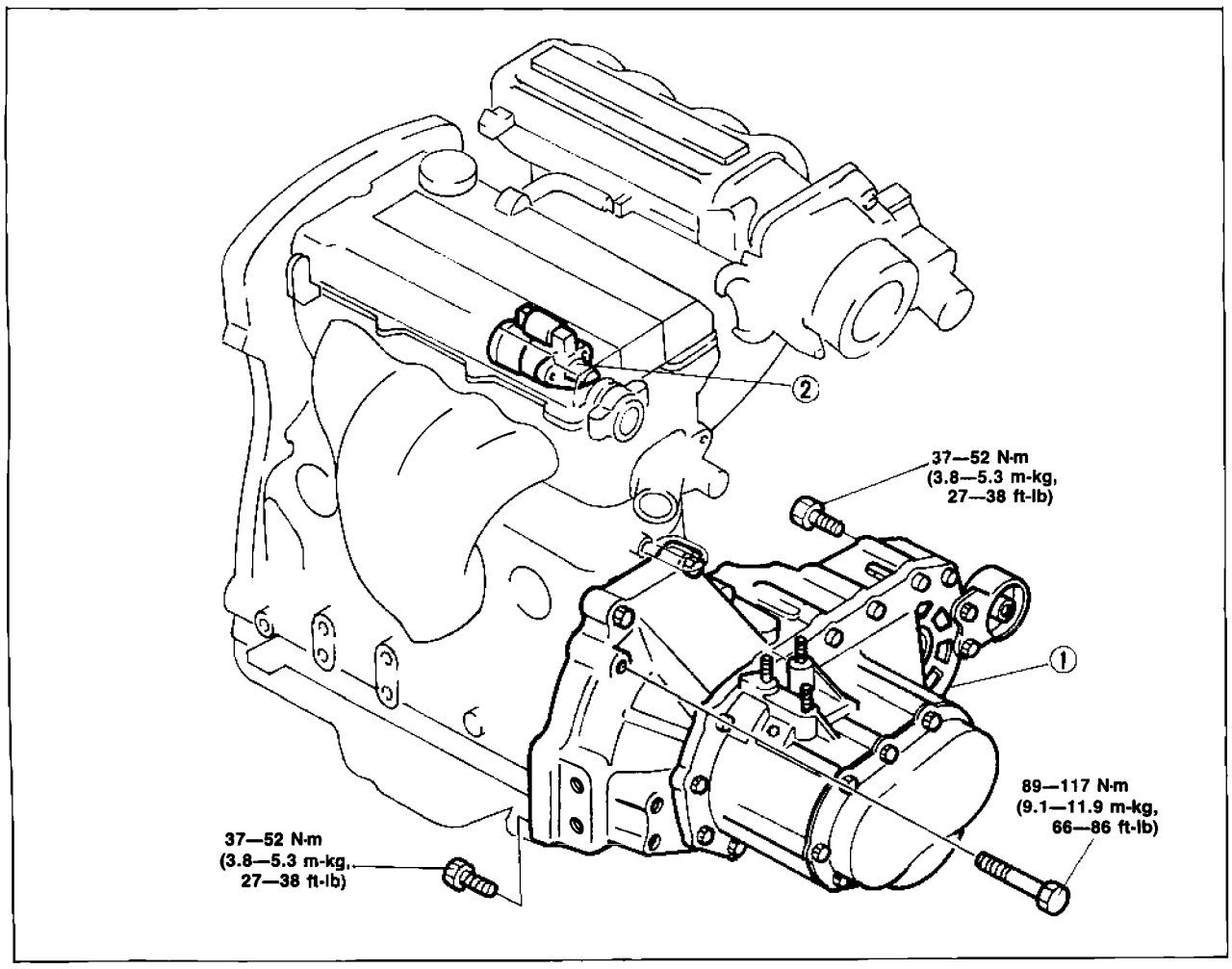
P/S Oil Pump Bracket
Install the P/S oil pump bracket.

Tightening torque:
37—63 N·m (3.8—6.4 m-kg, 27—46 ft-lb)

INSTALLATION

TRANSAXLE ASSEMBLY

Assemble the transaxle to the engine in the sequence shown in the figure.



76G01B-107

1. Transaxle
2. Starter

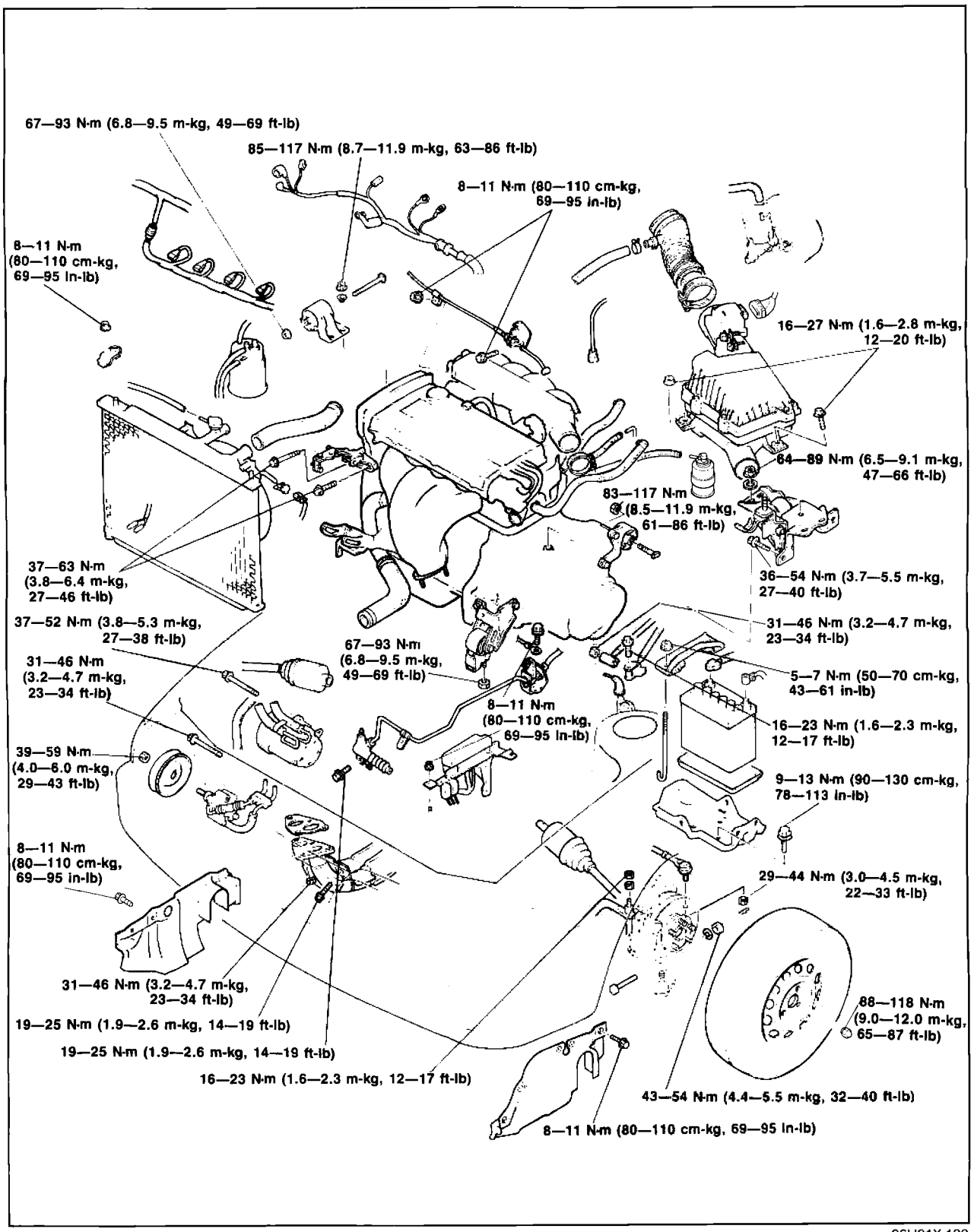
1B INSTALLATION

ENGINE INSTALLATION

Install the engine and transaxle assembly.

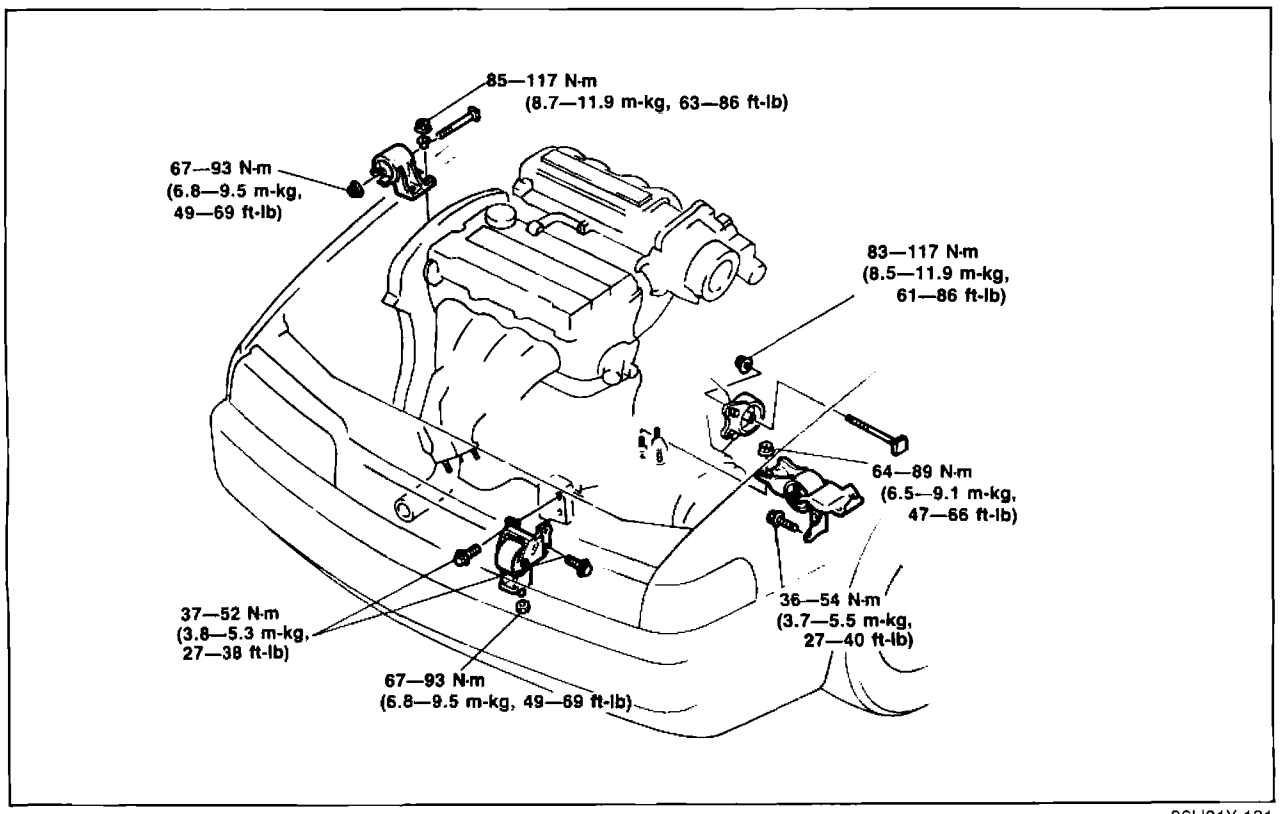
Warning: Be sure the vehicle is securely supported.

Torque Specifications

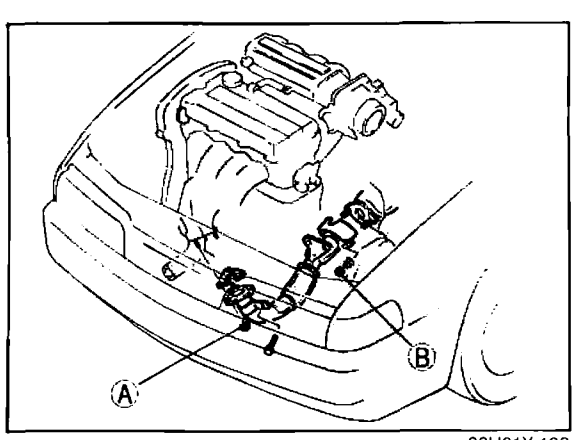


86U01X-180

Engine Mount
Install the engine mount.



86U01X-181



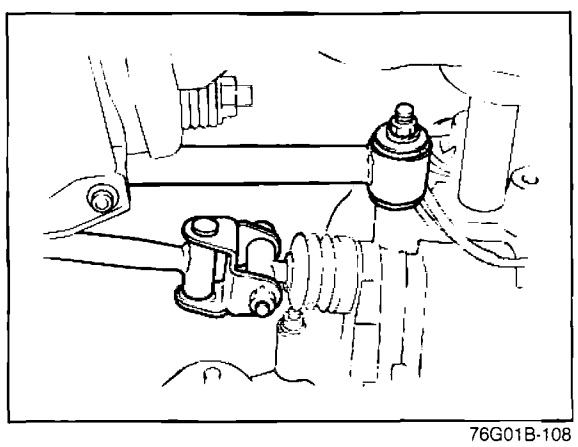
86U01X-182

Exhaust Pipe
1. Install the exhaust pipe.

Tightening torque
Ⓐ : 31—46 N·m
(3.2—4.7 m-kg, 23—34 ft-lb)
Ⓑ : 64—89 N·m
(6.5—9.1 m-kg, 47—66 ft-lb)

2. Tighten the bracket bolt.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



76G01B-108

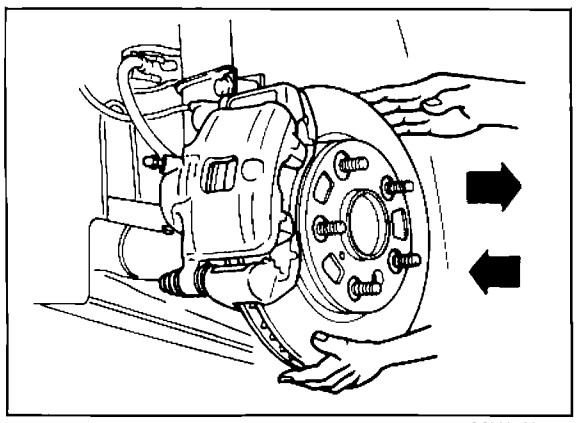
Extension Bar
Install the extension bar to the transaxle.

Tightening torque:
31—46 N·m (3.2—4.7 m-kg, 23—34 ft-lb)

Change Rod
Install the change rod to the transaxle.

Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

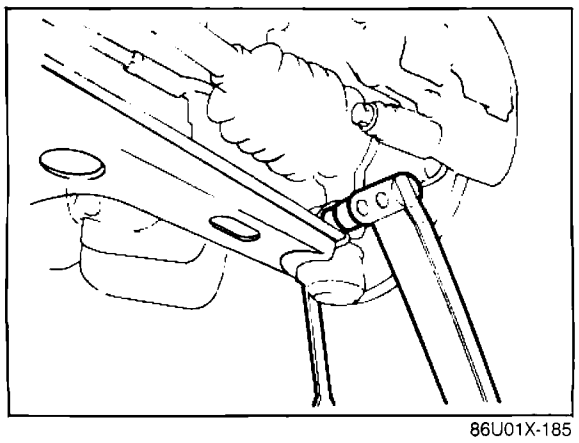
1B INSTALLATION



86U01X-184

Driveshaft
1. Apply grease to the end of the driveshaft.
2. Install the driveshaft and a new clip.

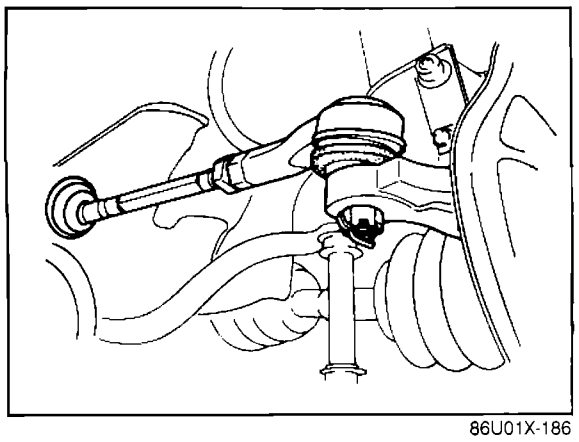
Caution
a) When installing the driveshaft, be careful not to damage the oil seal.
b) After installation, pull the front hub outward to confirm that the driveshaft is securely held by the clip.



86U01X-185

Lower Arm
Install the lower arm ball-joint to the knuckle; then tighten the lock nut.

Tightening torque:
43—54 N·m (4.4—5.5 m-kg, 32—40 ft-lb)

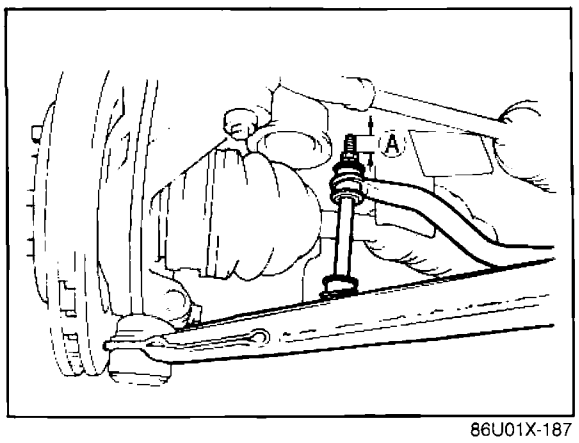


86U01X-186

Tie-Rod End
1. Install the tie-rod end to the knuckle.

Tightening torque:
29—44 N·m (3.0—4.5 m-kg, 22—33 ft-lb)

2. Install the cotter pin.



86U01X-187

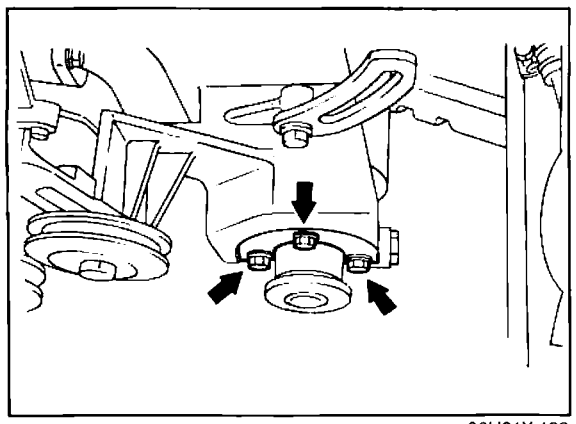
Stabilizer Control Rod
Install and adjust the front stabilizer control rods.

Dimension A: 20.1 mm (0.79 in)

Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

Install the front wheel.

Tightening torque:
88—118 N·m (9.0—12.0 m-kg, 65—87 ft-lb)



86U01X-188

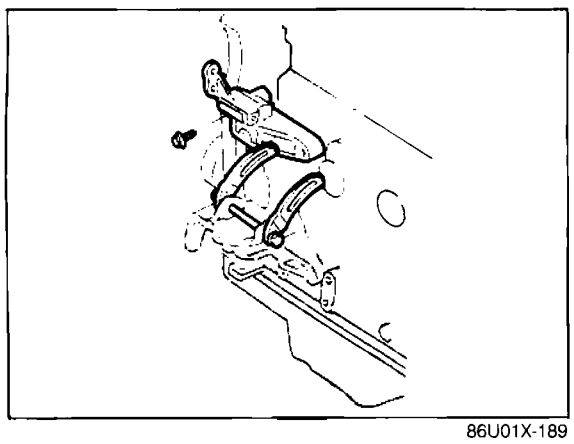
P/S Oil Pump

1. Install the P/S oil pump.

   Tightening torque:
   31—46 N·m (3.2—4.7 m-kg, 23—34 ft-lb)

2. Tighten the pulley lock nut.

   Tightening torque:
   39—59 N·m (4.0—6.0 m-kg, 29—43 ft-lb)



86U01X-189

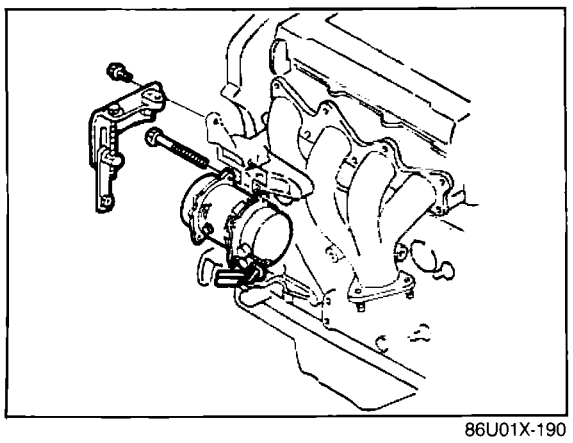
A/C Compressor

1. Install the A/C compressor strap to the P/S oil pump bracket.

   Tightening torque:
   19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

2. Install the A/C compressor bracket.

   Tightening torque:
   37—63 N·m (3.8—6.4 m-kg, 27—46 ft-lb)



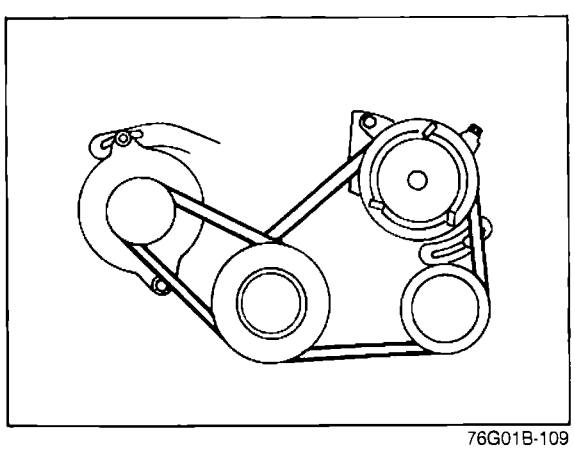
86U01X-190

3. Install the A/C compressor.
4. Install the A/C compressor upper bracket.

   Tightening torque:
   37—63 N·m (3.8—6.4 m-kg, 27—46 ft-lb)

5. Tighten to the lock nut and mounting bolts.

   Tightening torque:
   37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

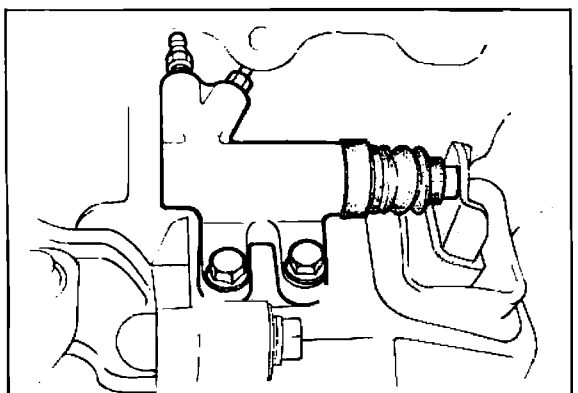


76G01B-109

Drive Belt

Install the drive belt and adjust the belt deflection. (Refer to page 1B—6.)

1B INSTALLATION



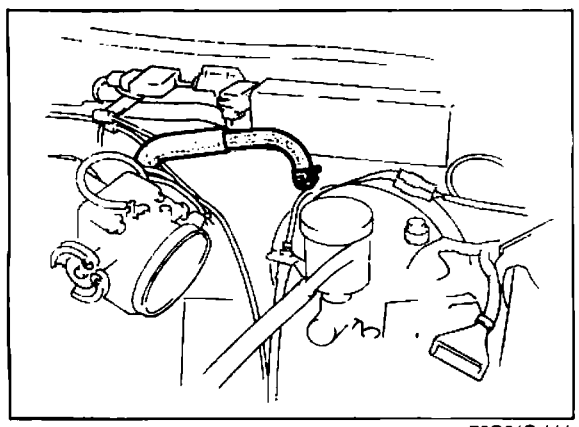
76G01B-110

Clutch Release Cylinder
1. Set the pipe bracket in position.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

2. Install the clutch release cylinder.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



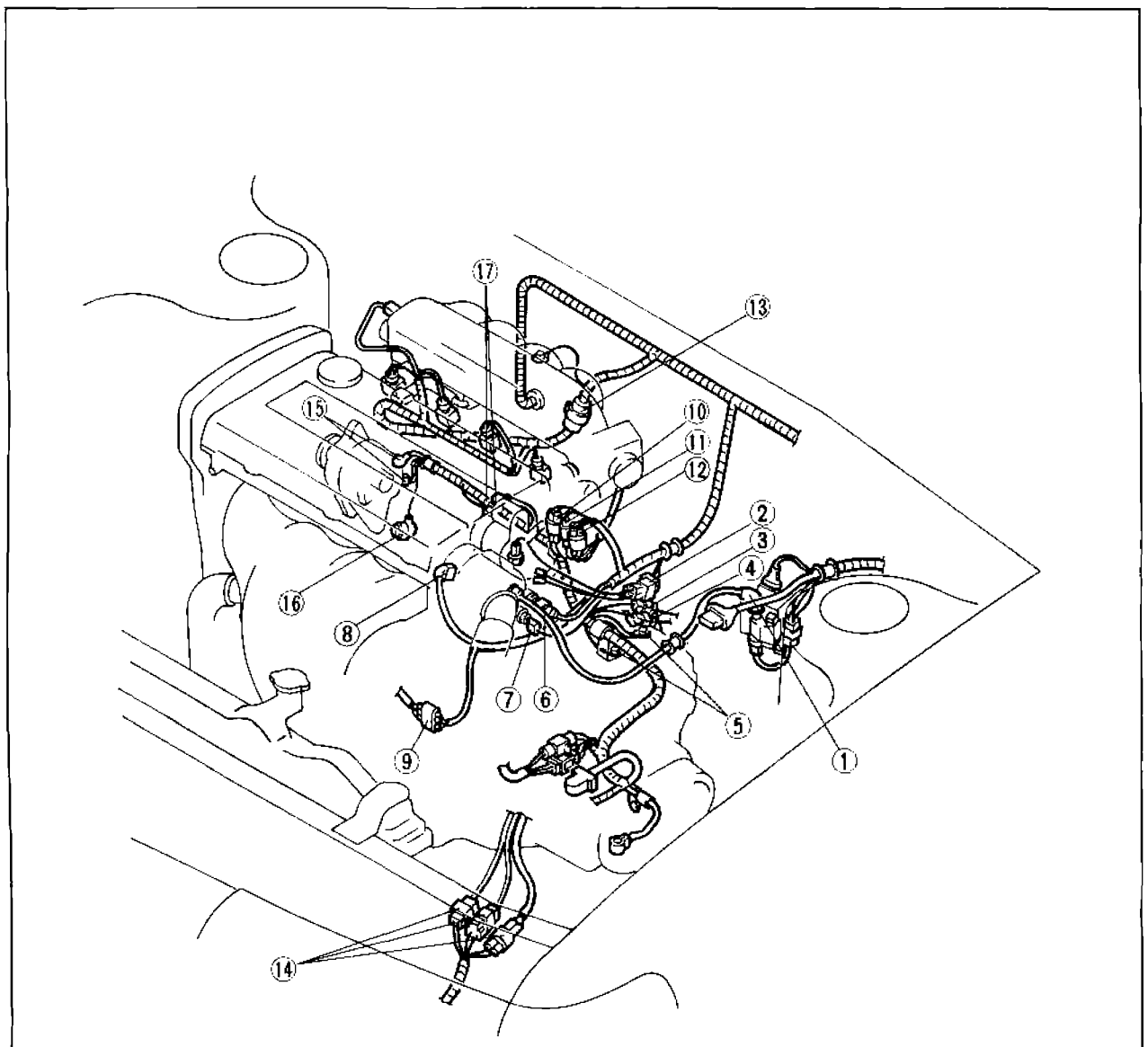
76G01B-111

Speedometer Cable
Install the speedometer cable.

Brake Vacuum Hose
Connect the brake vacuum hose.

Canister Hose (Unleaded fuel)
Connect the canister hoses.

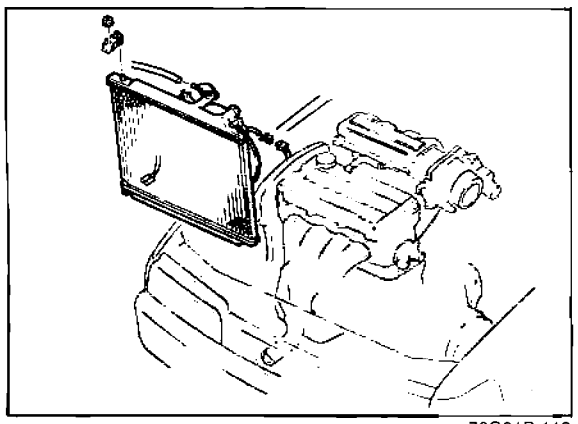
Connector Location
Install each harness as shown in the figure.



76G01B-112

1. IG coil
2. Heat gauge unit
3. Speed sensor
4. P/S switch
5. Engine ground
6. Water temperature sensor
7. Water thermo switch
8. Crank angle sensor
9. Oxygen sensor
10. Linear solenoid
11. Solenoid valve (idle speed control)
12. Throttle position sensor
13. Injection harness
14. Transmission harness
15. Alternator
16. Oil pressure switch
17. Starter

1B INSTALLATION

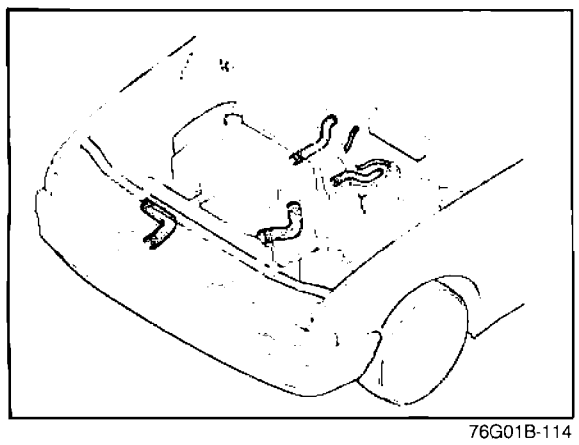


76G01B-113

Radiator
1. Install the radiator and cooling fan.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

2. Connect the radiator harness.

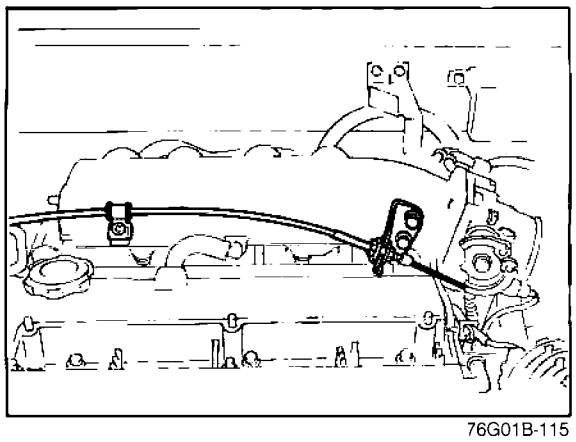


76G01B-114

3. Connect the upper and lower radiator hoses.

Note
a) Position the hose clamp in the original location on the hose.
b) Squeeze the clamp lightly with large pliers to ensure a good fit.

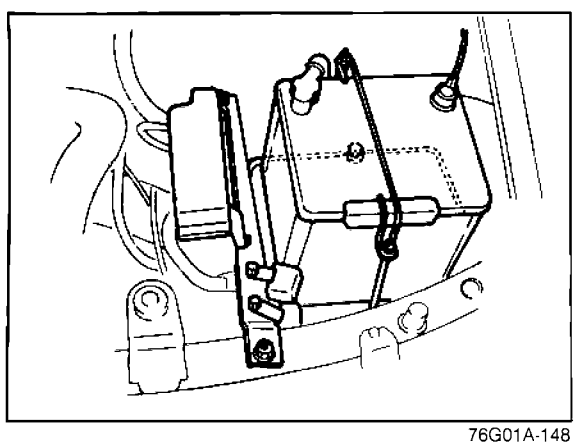
Heater Hose and Fuel Hose
Connect the heater hoses and the fuel hoses.



76G01B-115

High-Tension Lead
Connect the high-tension lead to the ignition coil.

Accelerator Cable
Install the accelerator cable.



76G01A-148

Battery and Battery Carrier
1. Install the battery carrier.

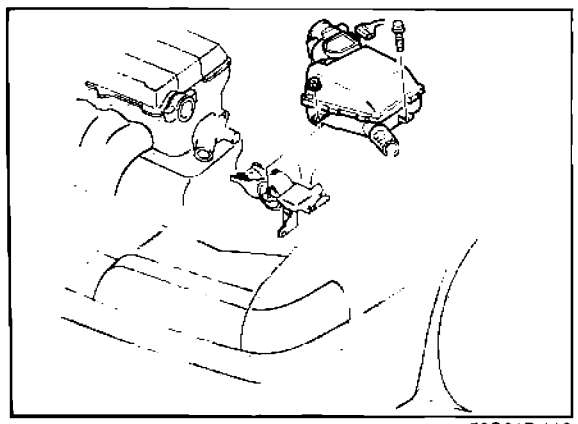
Tightening torque:
9—13 N·m (90—130 cm-kg, 78—113 in-lb)

2. Install the fuse box.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

3. Install the battery tray and battery.

Tightening torque:
5—7 N·m (50—70 cm-kg, 43—61 in-lb)

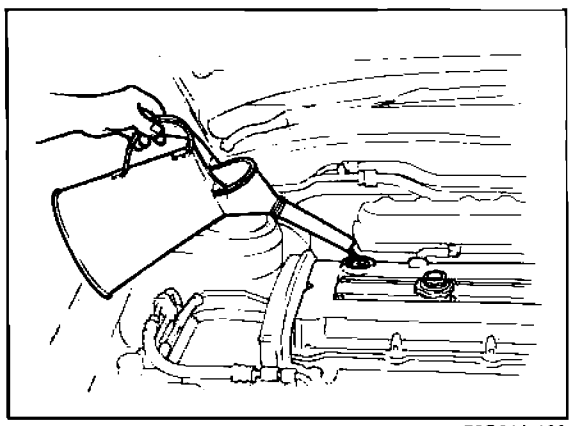


76G01B-116

Air Cleaner Assembly
1. Install the air cleaner assembly.

   Tightening torque:
   16—27 N·m (1.6—2.8 m-kg, 12—20 ft-lb)

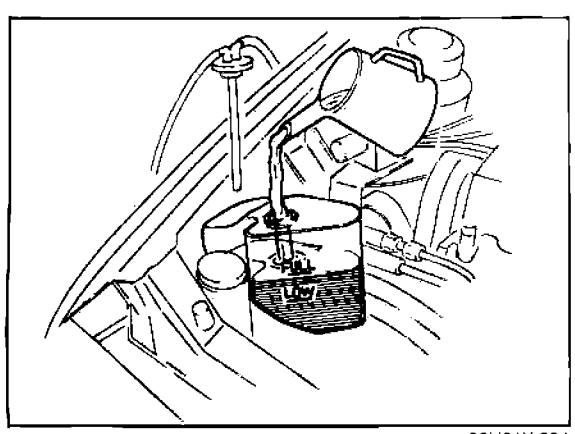
2. Connect the air flow sensor connector and air intake pipe.



76G01A-100

Engine Oil
Add the specified amount and type of engine oil. (Refer to Section 2A.)

Coolant
Close the drain plug, fill the radiator and reservoir tank with the specified amount and type of coolant. (Refer to Section 3A.)



86U01X-204

Check Engine Condition
1. Check for leaks.
2. Perform engine adjustments if necessary.
3. Perform a road test.
4. Recheck the oil and coolant levels.

1C

ENGINE (DIESEL)

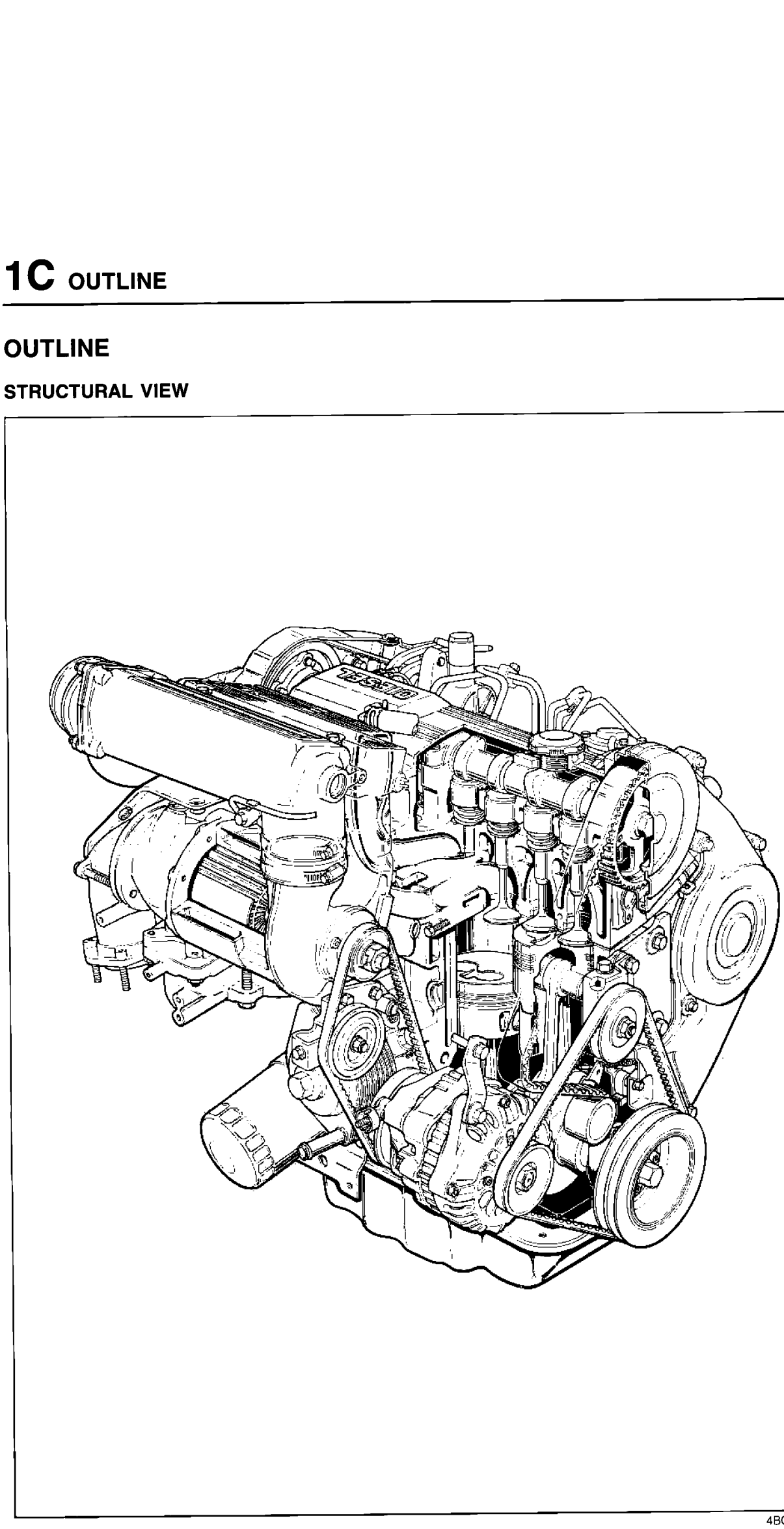
OUTLINE ..... 1C— 2
STRUCTURAL VIEW ..... 1C— 2
SPECIFICATIONS ..... 1C— 3
TROUBLESHOOTING GUIDE ..... 1C— 3
TUNE-UP PROCEDURE ..... 1C— 5
ON-VEHICLE INSPECTION ..... 1C—10
COMPRESSION ..... 1C—10
ON-VEHICLE MAINTENANCE ..... 1C—11
TIMING BELT ..... 1C—11
CYLINDER HEAD ..... 1C—16
VALVE SEAL ..... 1C—24
REMOVAL ..... 1C—31
DISASSEMBLY ..... 1C—34
AUXILIARY PARTS ..... 1C—34
TIMING BELT ..... 1C—36
INJECTION PUMP ..... 1C—39
CYLINDER HEAD ..... 1C—40
CYLINDER BLOCK ..... 1C—43
INSPECTION AND REPAIR ..... 1C—47
ASSEMBLY ..... 1C—62
CYLINDER BLOCK ..... 1C—62
CYLINDER HEAD ..... 1C—73
INJECTION PUMP ..... 1C—78
TIMING BELT ..... 1C—81
AUXILIARY PARTS ..... 1C—87
INSTALLATION ..... 1C—91
TRANSAXLE ASSEMBLY ..... 1C—91
ENGINE INSTALLATION ..... 1C—92

76G01C-001

1C OUTLINE

OUTLINE

STRUCTURAL VIEW



4BG01A-002

SPECIFICATIONS

Item \ Engine model			RF-CX	RF-N
Type			Diesel, 4 cycle	
Cylinder arrangement and number			In line, 4 cylinders	
Combustion chamber			Swirl chamber	
Valve system			OHC, belt driven	
Displacement cc (cu in)			1,998 (121.9)	
Bore and stroke mm (in)			86.0 x 86.0 (3.39 x 3.39)	
Compression ratio			21.1 : 1	22.7 : 1
Compression pressure kPa (kg/cm², psi)-rpm		Standard	2.943 (30, 427)-200	
		Minimum	2.649 (27, 384)-200	
Valve timing	IN	Open BTDC	13°	13°
		Close ABDC	15°	39°
	EX	Open BBDC	60°	60°
		Close ATDC	8°	8°
Valve clearance mm (in)	Cold	IN	0.25 (0.010)	
		EX	0.35 (0.014)	
	Warm (for ref.)	IN	0.30 (0.012)	
		EX	0.40 (0.016)	
Idle speed (MTX in neutral) rpm			720 $^{+30}_{-20}$	
Injection timing			ATDC 1°	TDC 0°
Injection order			1—3—4—2	

76G01C-002

TROUBLESHOOTING GUIDE

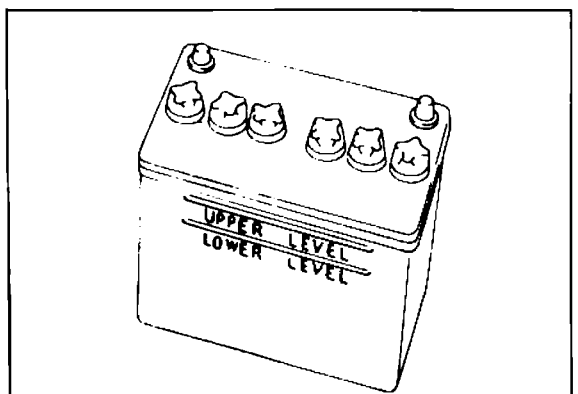
Problem	Possible Cause	Remedy	Page
Difficult starting	**Malfunction of engine-related components**		
	Burned valve	Replace	1C—48
	Worn piston, piston ring, or cylinder	Replace or repair	1C—55,56
	Failed cylinder head gasket	Replace	1C—16
	Malfunction of fuel system	Refer to Section 4D	
	Malfunction of Comprex supercharger	Refer to Section 4D	
	Malfunction of electrical system	Refer to Section 5	
Poor idling	**Malfunction of engine-related components**		
	Improper valve clearance	Adjust	1C—85
	Poor valve to valve seat contact	Repair or replace	1C—50
	Failed cylinder head gasket	Replace	1C—16
	Malfunction of fuel system	Refer to Section 4D	
	Malfunction of Comprex supercharger	Refer to Section 4D	
Excessive oil consumption	**Oil working up**		
	Worn piston ring groove or sticking piston ring	Replace	1C—57
	Worn piston or cylinder	Replace or repair	1C—55,56
	Oil working down		
	Worn valve seal	Replace	1C—24
	Worn valve stem or guide	Replace	1C—48
	Oil leakage	Refer to Section 2B	

76G01C-003

1C TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Insufficient power	**Insufficient compression**		
	Improper valve clearance	Adjust	1C—85
	Compression leakage from valve seat	Repair	1C—50
	Seized valve stem	Replace	1C—48
	Weak or broken valve spring	Replace	1C—52
	Failed cylinder head gasket	Replace	1C—16
	Cracked or distorted cylinder head	Replace	1C—47
	Sticking, damaged, or worn piston ring	Replace	1C—57
	Cracked or worn piston	Replace	1C—56
	Malfunction of fuel system	Refer to Section 4D	
	Malfunction of Comprex supercharger	Refer to Section 4D	
	Others		
	Slipping clutch	Refer to Section 6	
	Dragging brakes	Refer to Section 11	
	Wrong size tires	Refer to Section 12	
Abnormal combustion	**Malfunction of engine-related components**		
	Improper valve clearance	Adjust	1C—85
	Sticking or burned valve	Replace	1C—48
	Weak or broken valve spring	Replace	1C—52
	Carbon accumulation in combustion chamber	Eliminate carbon	—
	Malfunction of fuel system	Refer to Section 4D	
	Malfunction of Comprex supercharger	Refer to Section 4D	
Engine noise	**Crankshaft or bearing related parts**		
	Excessive main bearing oil clearance	Replace or repair	1C—64
	Main bearing seized or heat-damaged	Replace	1C—64
	Excessive crankshaft end play	Replace or repair	1C—65
	Excessive connecting rod bearing oil clearance	Replace or repair	1C—66
	Connecting rod bearing seized or heat-damaged	Replace	1C—66
	Piston related parts		
	Worn cylinder	Replace or repair	1C—55
	Worn piston or piston pin	Replace	1C—58
	Seized piston	Replace	1C—56
	Damaged piston ring	Replace	1C—57
	Bent connecting rod	Replace	1C—59
	Valves or timing related parts		
	Excessive valve clearance	Adjust	1C—85
	Broken valve spring	Replace	1C—52
	Excessive valve guide clearance	Replace	1C—48
	Malfunction of timing belt tensioner	Replace	1C—61
	Malfunction of cooling system	Refer to Section 3B	
	Malfunction of fuel system	Refer to Section 4D	
	Malfunction of Comprex supercharger	Refer to Section 4D	
	Others		
	Malfunction of water pump bearing	Replace	—
	Improper drive-belt tension	Adjust	1C—7
	Malfunction of alternator bearing	Replace	—
	Exhaust gas leakage	Repair	1C—47

76G01C-004



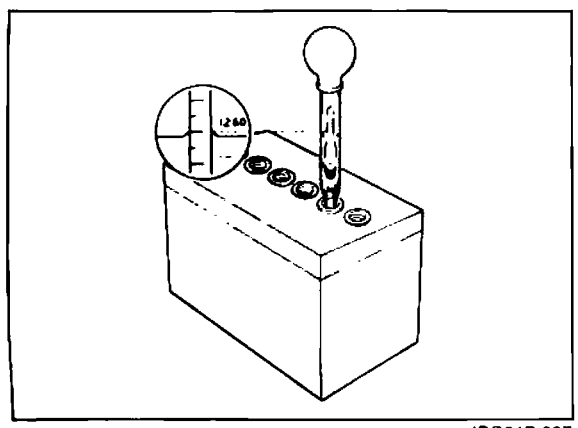
4BG01B-006

TUNE-UP PROCEDURE

Turn the engine according to the procedures described below.

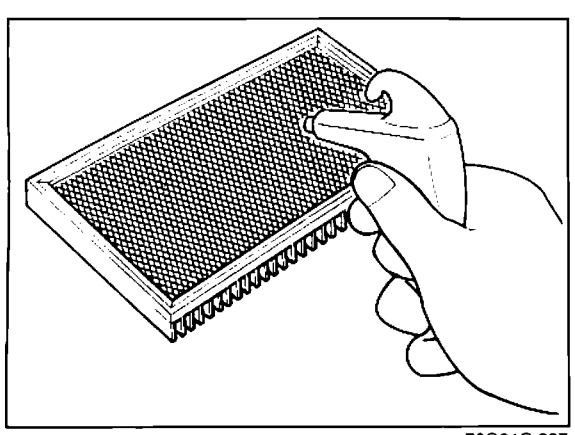
Battery

1. Check for corrosion on the terminals, or loose cable connections.
   If necessary, clean the clamps and tighten firmly.
2. Check the electrolyte level.
   If the level is too low, add distilled water to the "UPPER LEVEL" mark.



4BG01B-007

3. Check the specific gravity by using a hydrometer.
   If the specific gravity reading is **1.200 or less,** recharge the battery, by referring to Section 5.



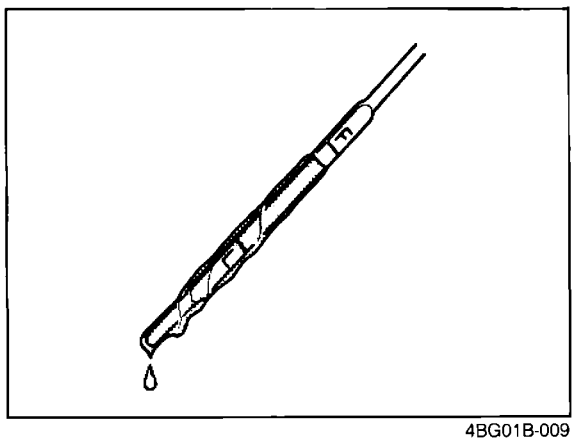
76G01C-237

Air Cleaner Element

Visually check the air cleaner element for being excessively dirty, damaged or oil.
Clean or replace it if necessary.

Caution
(Wet type)
Do not clean the air cleaner element with compressed air, replace if necessary.

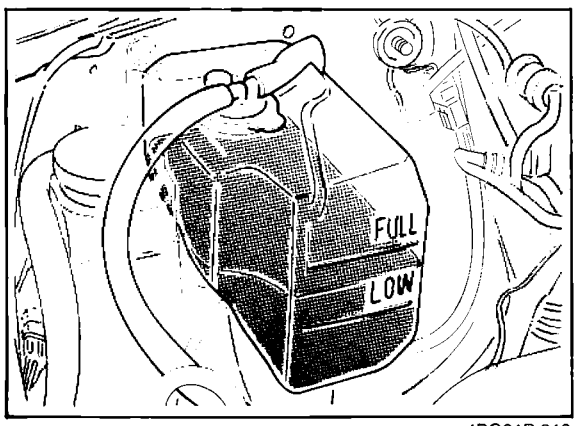
(Dry type)
When cleaning the air cleaner element, blow dust off from the inside first, then blow off the outside.



4BG01B-009

Engine Oil

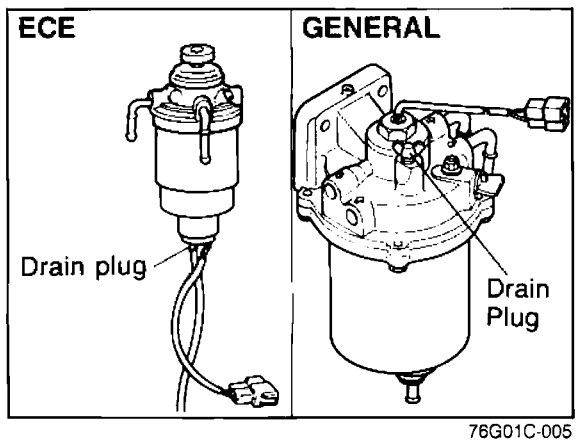
Check the engine oil level and condition with the oil level gauge.
Add oil, or change it, if necessary.



4BG01B-010

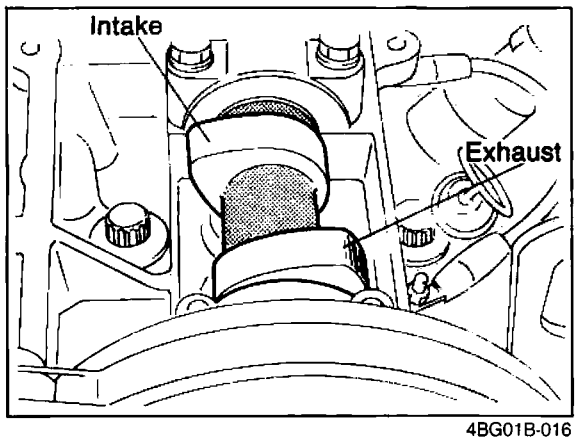
Coolant Level
Check that the coolant level is near the radiator inlet port, and that the level in the reserve tank is between the FULL and LOW marks.
Add coolant up if the level is low.

Warning
Never remove the radiator cap when the engine is hot.
Wrap a thick cloth around cap and carefully remove the cap.



76G01C-005

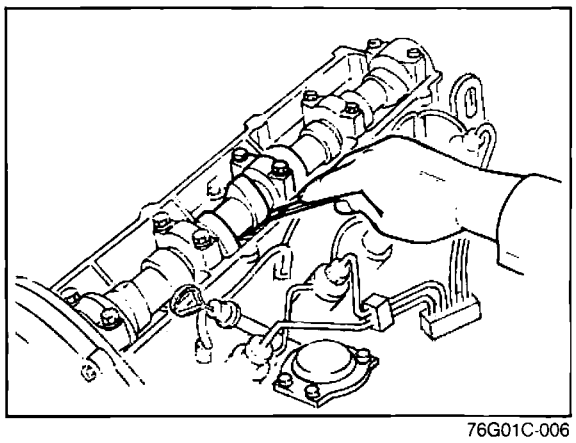
Water Draining
1. Drain the water from the sedimenter or fuel filter. If it is difficult to drain the water from the drain plug, loosen the air bleeding plug.
2. Bleed the air from the sedimenter or fuel filter. (Refer to Section 4D)



4BG01B-016

Valve Clearance
1. Remove the cylinder head cover.
2. Set the No. 1 cylinder to compression TDC.

Note
Turn the crankshaft so that the intake and exhaust cam lobes face upward.

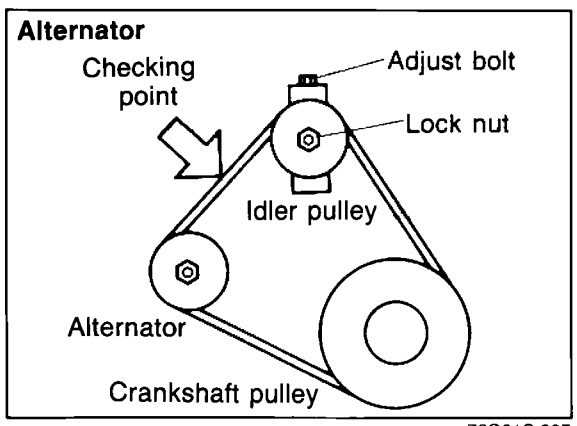


76G01C-006

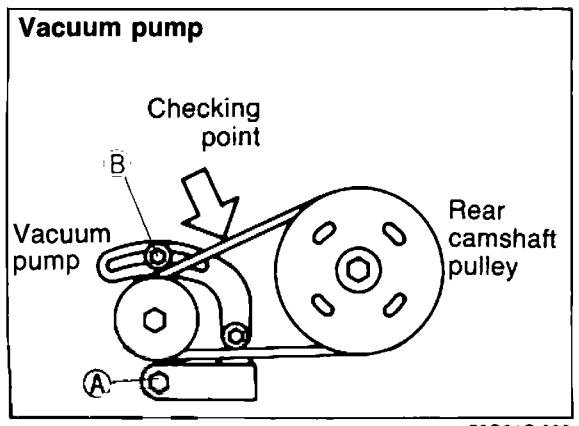
3. Measure the valve clearance of No. 1 cylinder by using a thickness gauge.

Valve clearance (cold engine)
0.20—0.30 mm (0.008—0.012 in)
0.30—0.40 mm (0.012—0.016 in)

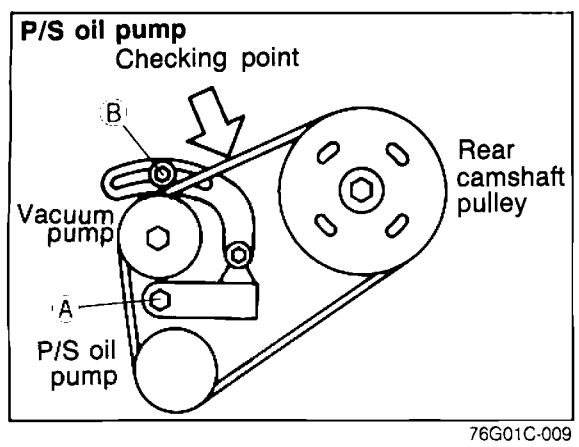
If necessary, adjust the valve clearance referring to the page 1C—85.



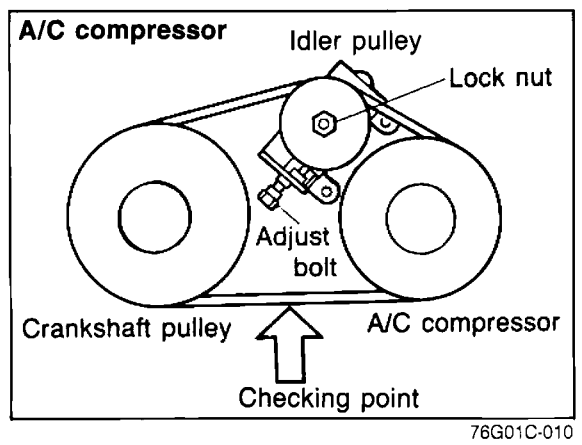
76G01C-007



76G01C-008



76G01C-009



76G01C-010

Drive Belt

1. Check the drive belt for wear, cracks, or fraying. Replace if necessary.
2. Check the drive belt deflection by applying moderate pressure **(98 N, 10 kg, 22 lb)** midway between the pulleys.

Alternator

Deflection — mm (in)

New	8.0—10.0 (0.31—0.39)
Used	9.0—11.0 (0.35—0.43)

If necessary, loosen the idler lock nut and adjust the belt deflection by turning the adjust bolt.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

Vacuum pump and P/S oil pump

Deflection — mm (in)

Vacuum pump	New	7.5—8.5 (0.30—0.33)
	Used	8.5—9.5 (0.33—0.37)
P/S oil pump	New	6.5—7.5 (0.26—0.30)
	Used	7.0—8.0 (0.28—0.31)

If necessary, adjust the belt deflection as follows.

(1) Loosen the vacuum pump bolts Ⓐ and Ⓑ.
(2) Lever the vacuum pump outward and apply tension to the belt.
(3) Tighten the adjust bolt Ⓑ.

Tightening torque:
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

(4) Tighten the mounting bolt Ⓐ.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

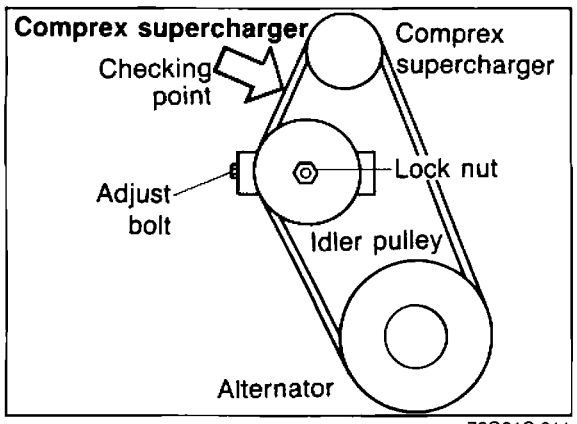
A/C compressor

Deflection — mm (in)

New	8.5—9.5 (0.33—0.37)
Used	9.5—10.5 (0.37—0.41)

If necessary, loosen the idler lock nut and adjust the belt deflection by turning the adjust bolt.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)



76G01C-011

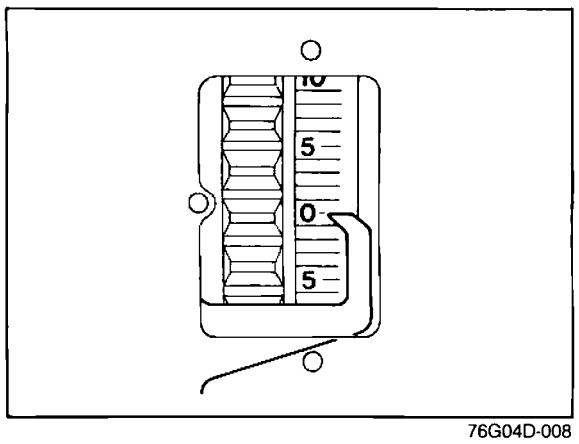
Comprex supercharger

Deflection mm (in)

New	4.0—6.0 (0.16—0.23)
Used	8.0—10.0 (0.31—0.39)

If necessary, loosen the idler lock nut and adjust the belt deflection by turning the adjust bolt.

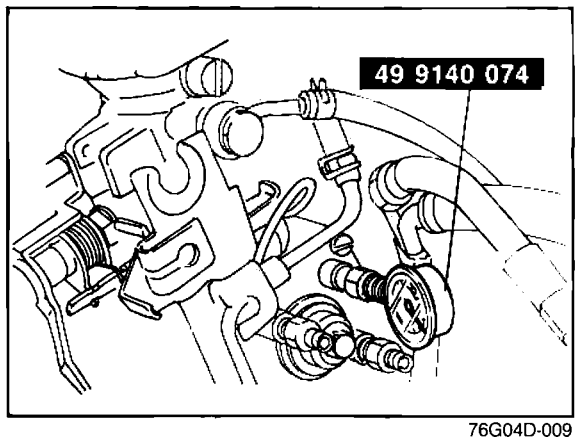
Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)



76G04D-008

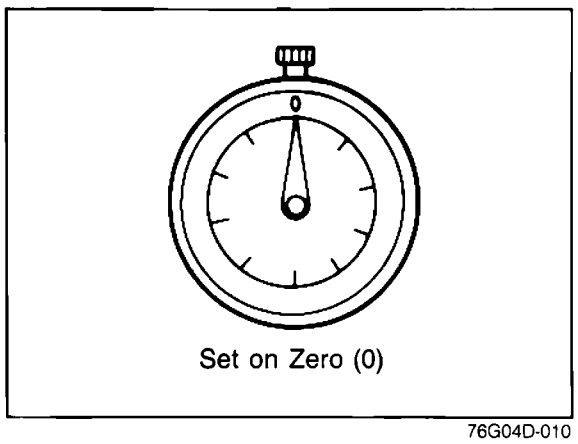
INJECTION TIMING

1. Disconnect the negative battery cable.
2. Release the CSD using the screw driver.
3. Remove the cover on the clutch housing.
4. Turn the flywheel and set the indicator at **ATDC**.
5. Disconnect the injection pipes from the injection pump.



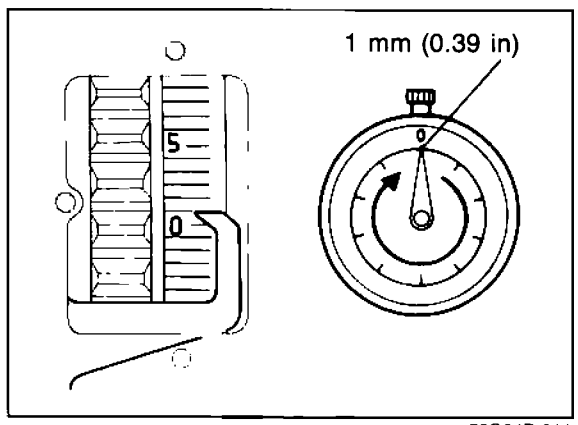
76G04D-009

6. Remove the hydraulic head plug from the injection pump.
7. Mount the **SST** into the plug hole on the hydraulic head so the tip of the dial gauge pointer touches the plunger end of the pump and the dial gauge indicates **approx. 2.0 mm (0.08 in).**



76G04D-010

8. Turn the crankshaft slowly counterclockwise to 30—50° BTDC.
9. Make sure the dial indicator pointer no longer moves by slightly turning the crankshaft.
10. Set the dial gauge scale to Zero at the pointer.

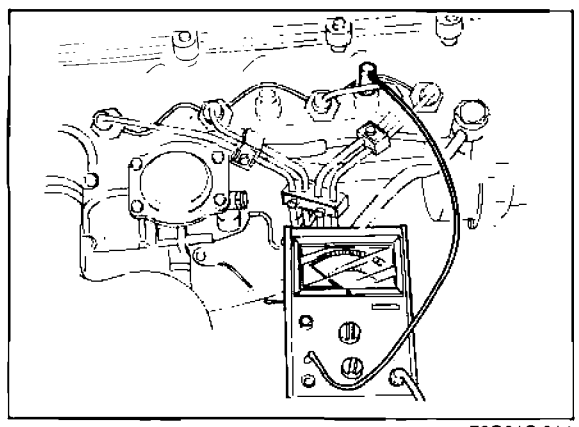


76G04D-011

11. Turn the crankshaft clockwise to align the indicator pin at **ATDC 1° (RF-CX), ATDC 2° (RF-N)**.
12. Read the dial gauge.

    Cam lift: 0.98—1.02 mm (0.038—0.040 in)

13. If not within the specification, adjust the injection timing. (Refer to page 4D—24.)



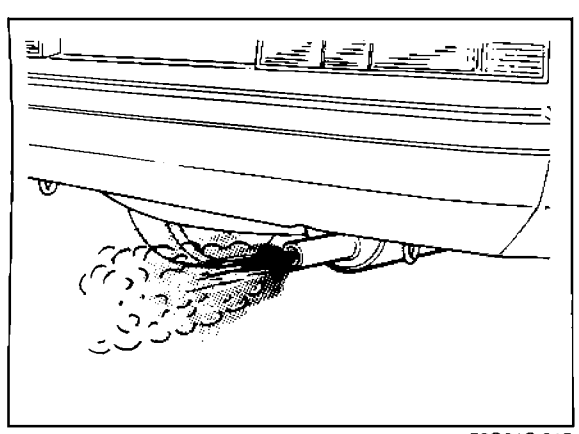
76G01C-014

Idle Speed

1. Warm up the engine to normal operating temperature.
2. Be sure the A/C switch is OFF.
3. Connect a tachometer and check the engine speed.

   Idle speed: 720 $^{+30}_{-20}$ rpm

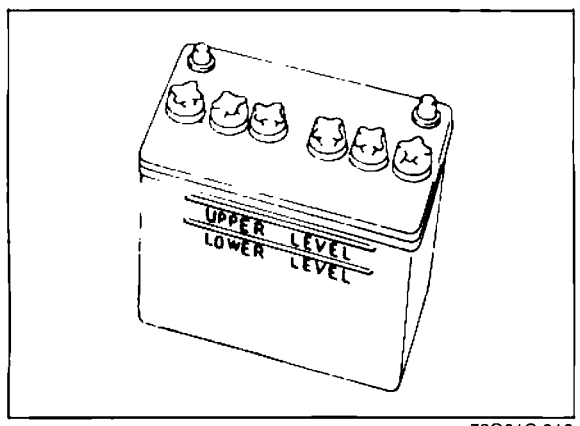
If the idle speed is not within the specification, adjust the idle speed referring to Section 4D.



76G01C-015

Exhaust Smoke

Increase and decrease the engine speed several times and check that black smoke is not emitted. If there is, refer to Section 4D for the appropriate procedure.



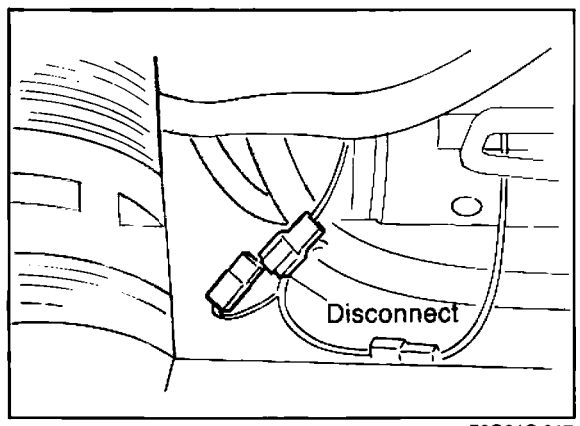
76G01C-016

ON-VEHICLE INSPECTION

If the engine exhibits low power, poor fuel economy, or poor idle, check the following:
1. Compression
2. Fuel system (Refer to Section 4D)

COMPRESSION

1. Check that the battery is fully charged. Recharge it if necessary.

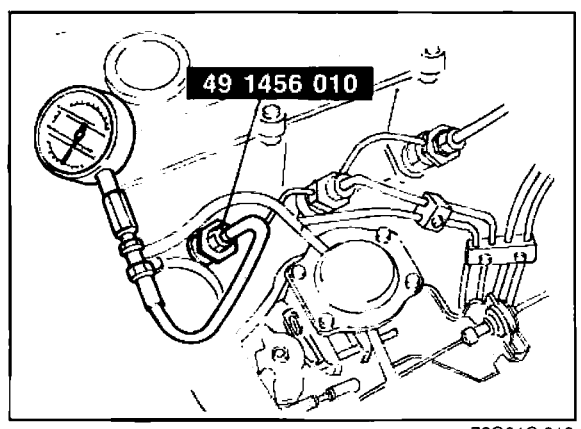


76G01C-017

2. Warm up the engine to the normal operating temperature.
3. Turn it off for about 10 minutes to allow the exhaust manifold to cool.
4. Remove all the fuel injection pipes, nozzles, washers, and corrugate washers.
5. Disconnect the fuel cut valve connector.

Caution
If this is not done, fuel will be injected from the injection pump while cranking.

6. Connect a suitable cap to the fuel return pipe on the injection pump.



76G01C-018

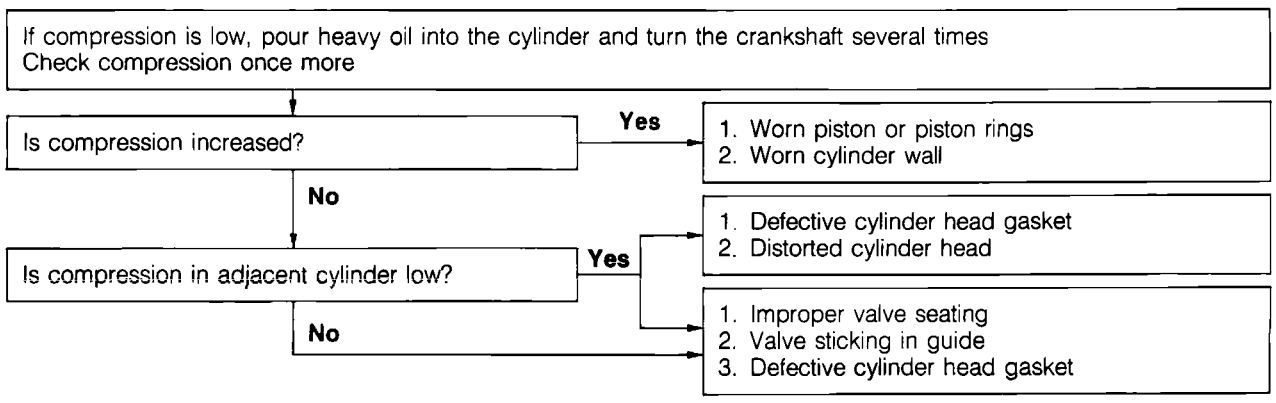
7. Connect a compression gauge with **SST** to injection nozzle hole.
8. Fully depress the accelerator pedal and crank the engine.
9. Note the maximum gauge reading.
10. Check each cylinder.

Compression pressure

kPa (kg/cm², psi)-rpm

Standard	Minimum
2.943 (30, 427)—200	2.649 (27, 384)—200

Possible Cause



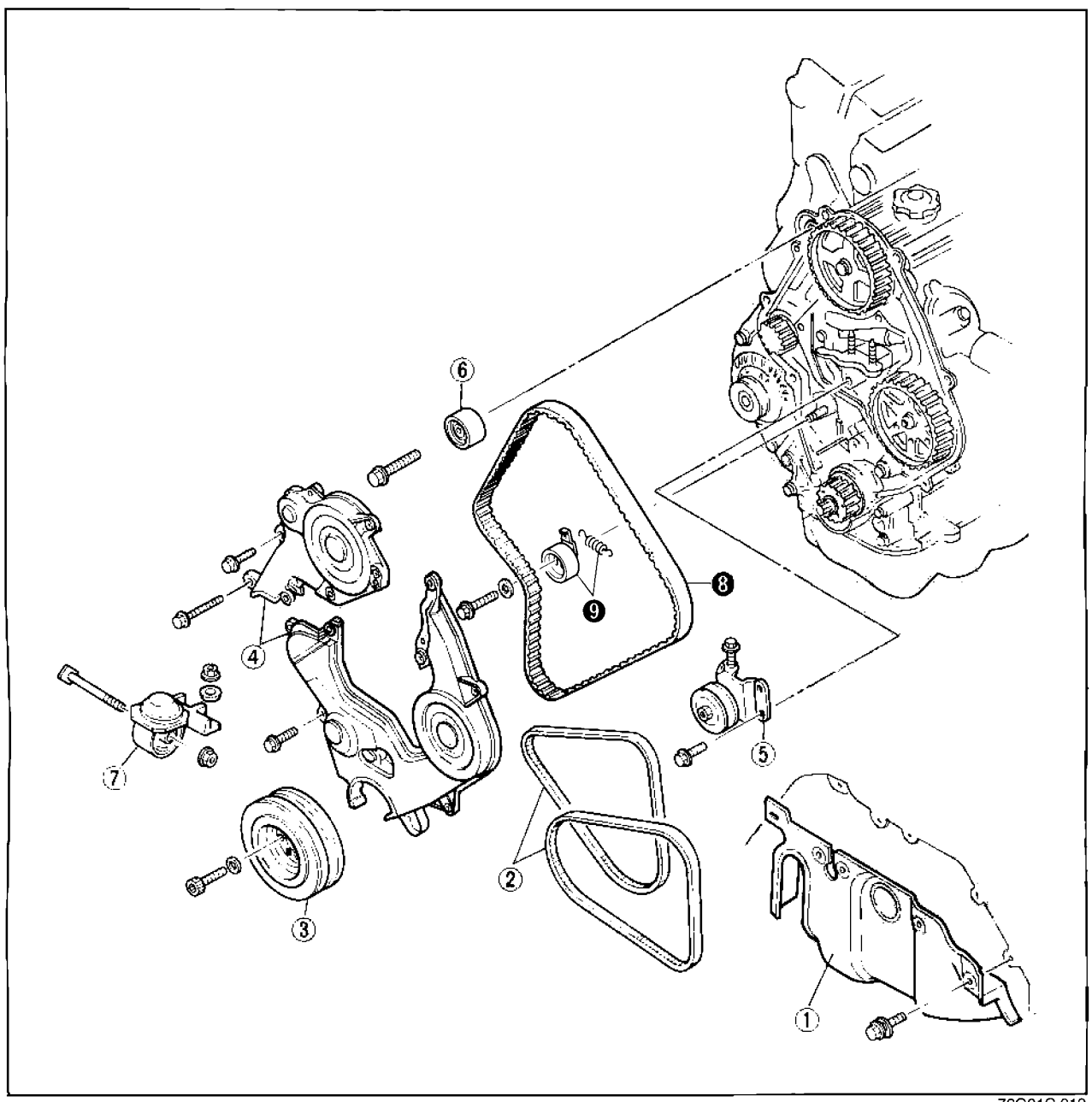
86U01X-022

ON-VEHICLE MAINTENANCE

TIMING BELT

Removal

1. Disconnect the nagative battery cable.
2. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.

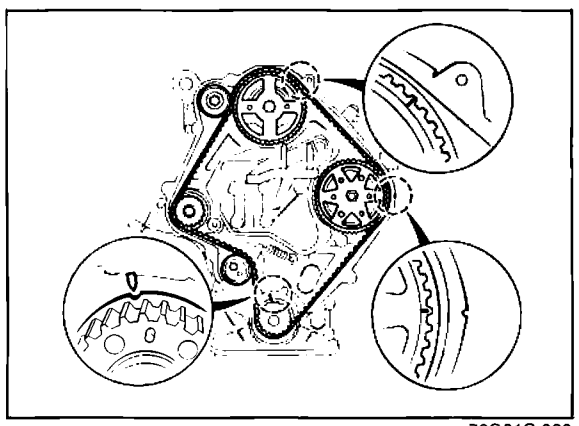


76G01C-019

1. Engine side cover
2. A/C and alternator drive belt
3. Crankshaft pulley
4. Left and right timing belt cover
5. Alternator idle pulley
6. Idler pulley
7. No.3 engine mount
8. Timing belt
9. Timing belt tensioner and spring

Note
Loosen the No.3 engine mount nuts and lower the engine to remove the crankshaft pulley.

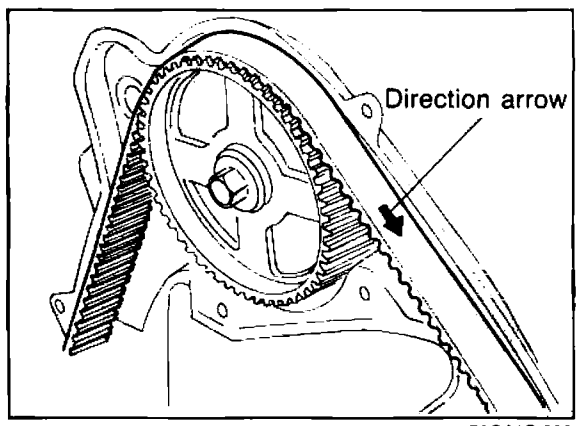
1C ON-VEHICLE MAINTENANCE (TIMING BELT)



76G01C-020

Removal note
Timing belt
1. Aligh the timing marks of each pulleys.
2. Affix the injection pump pulley to the bracket using two bolts (35—40 mm, 1.4—1.6 in).

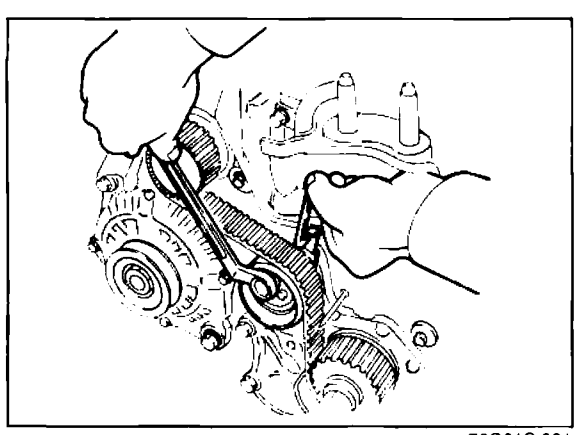
Caution
a) Do not turn in the reverse direction of engine revolution.
b) After removing the timing belt, do not rotate the crankshaft pulley or camshaft pulley.



76G01C-238

3. Make the forward direction arrow on the timing belt.

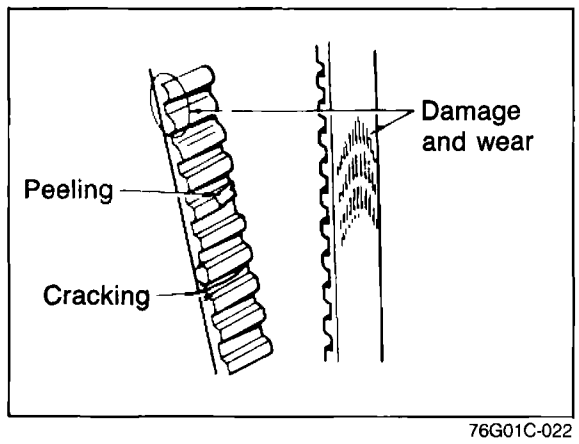
Note
Direction arrow is to reassemble the timing belt in the same direction.



76G01C-021

4. Loosen the timing belt tensioner bolt.
5. Shift the tensioner outwards as far as possible, and temporarily tighten it.
6. Suspend the engine with chain block on the front engine hanger.
7. Remove the No.3 engine mount.
8. Remove the timing belt.

Caution
Do not allow any oil or grease on the timing belt.



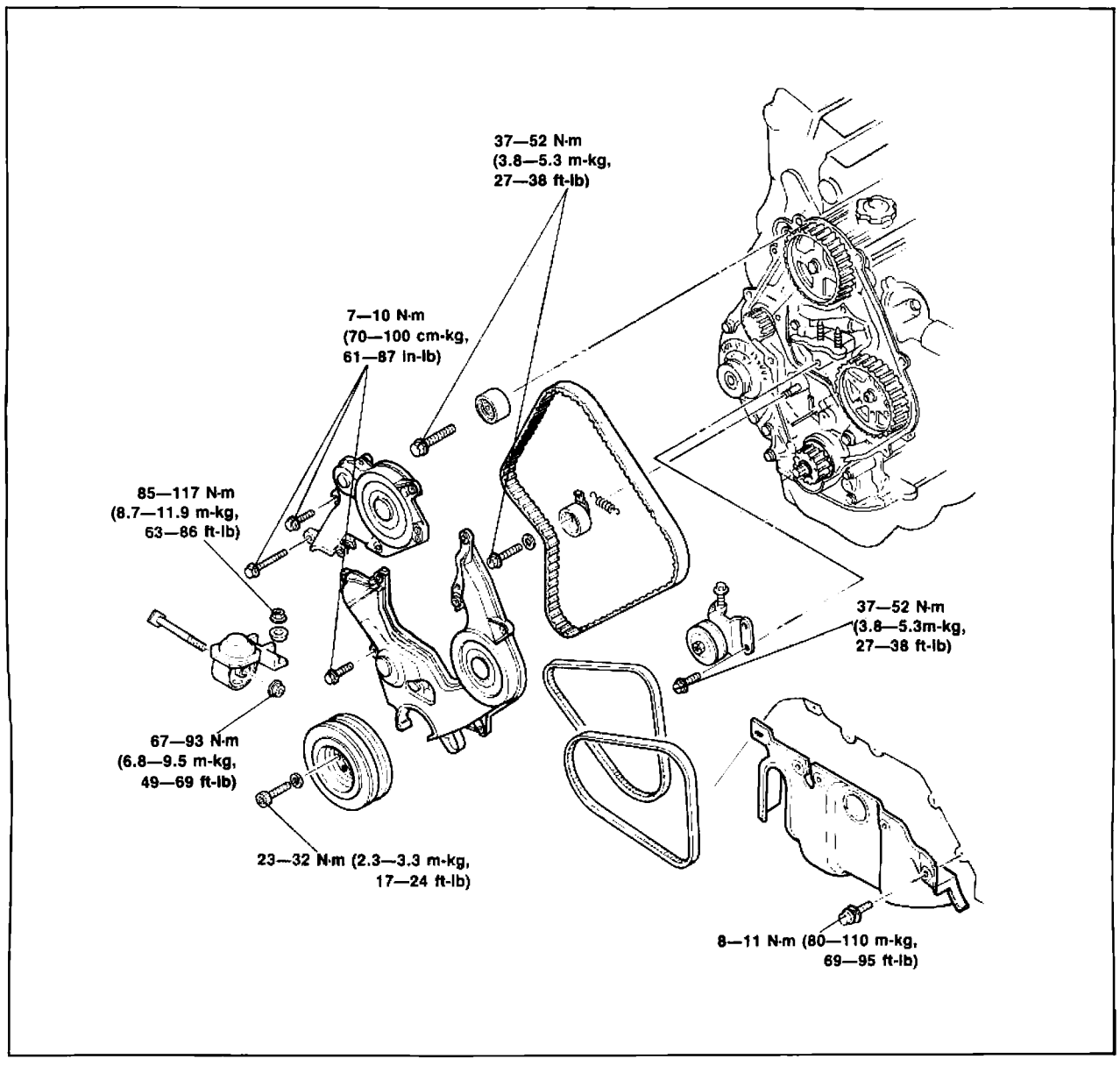
76G01C-022

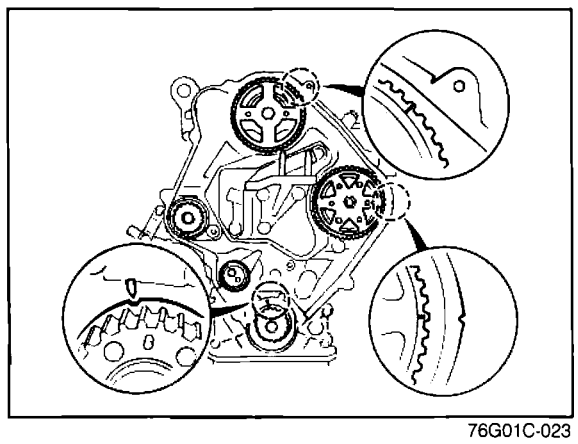
Inspection and Repair
Inspect the following parts. (Refer to page 1C—60, 61).
1. Timing belt
2. Timing belt tensioner and spring
3. Timing belt idler pulley
4. Timing belt pulley

Installation
Install in the reverse order of removal referring to the installation note.

Torque Specifications

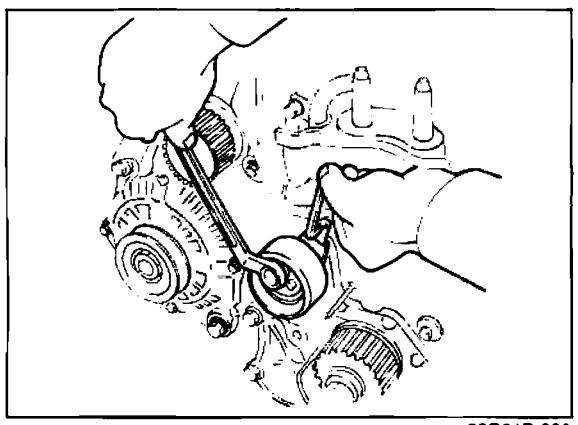
76G01C-239





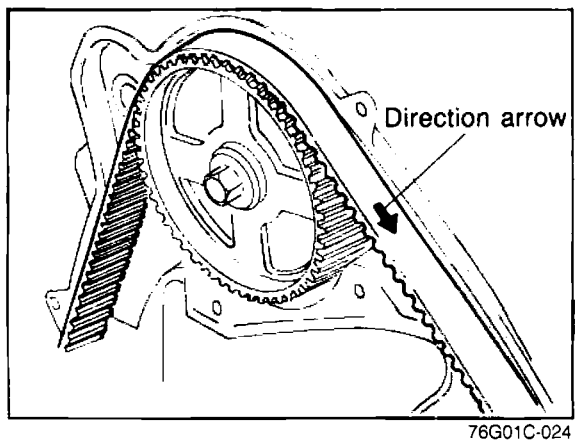
76G01C-023

Installation note
Timing belt
1. Check that the timing marks of camshaft pulley, timing belt pulley and injection pump pulley align with the timing marks.



63G01D-330

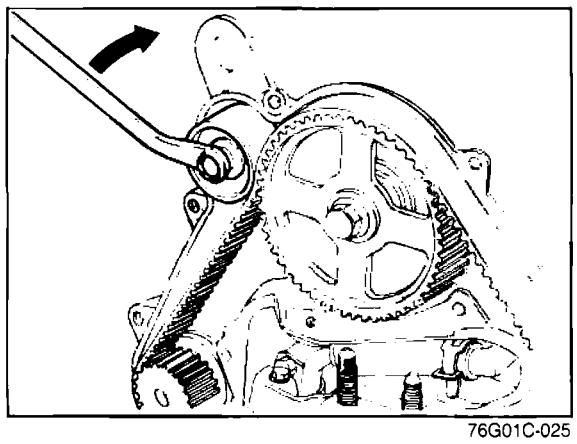
2. Install the timing belt tensioner and spring.
3. Temporarily secure the tensioner with it shifted outwards.



76G01C-024

4. Install the timing belt.

Caution
a) The timing belt must be reinstalled in the same direction of previous rotation, if it is to be reused.
b) Be sure that there is no oil, grease, or dirt on the timing belt.

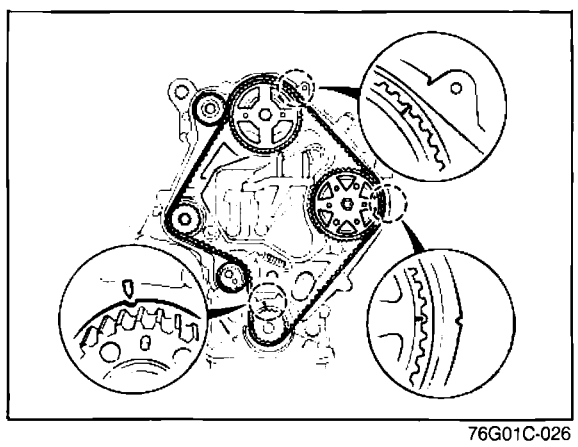


76G01C-025

5. Install the idler pulley.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

6. Remove the affixing bolts from the injection pulley.

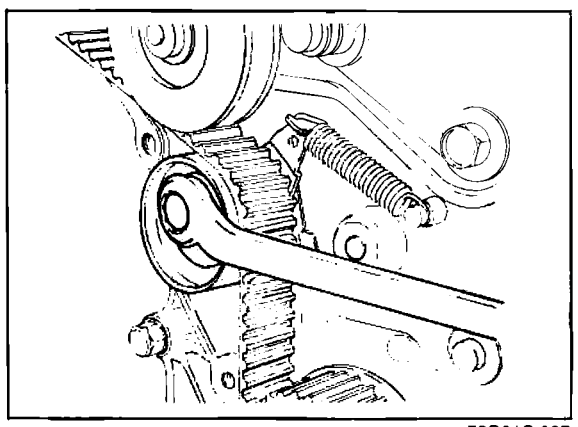


76G01C-026

7. Loosen the tensioner lock bolt.
8. Turn the crankshaft twice in the direction of rotation (clockwise).

Caution
Do not rotate reverse direction.

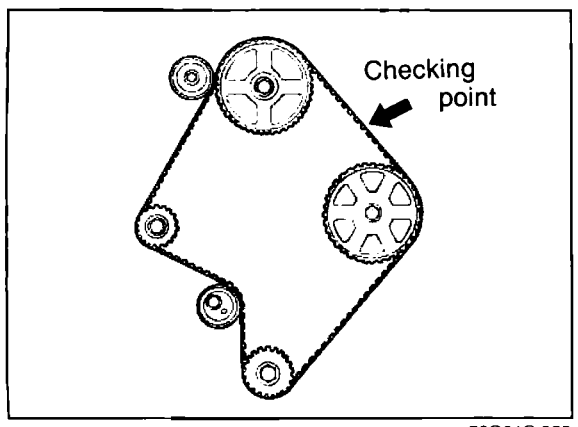
9. Check that each timing mark is correcty aligned. If not aligned, remove the timing belt. Repeat step 1—8.



76G01C-027

10. Tighten the timing belt tensioner lock bolt.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

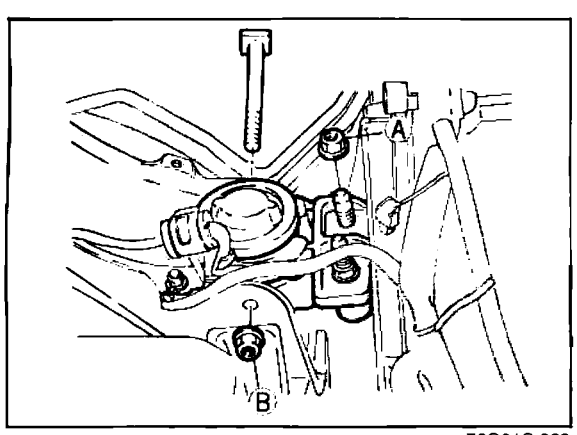


76G01C-028

11. Check the timing belt tension.
If the tension is not correct, loosen the tensioner lock bolt and repeat step 7—10, or replace the tensioner spring.

Deflection: 9.0—11.5 mm
(0.35—0.45 in) /98 N (10 kg, 22 lb)

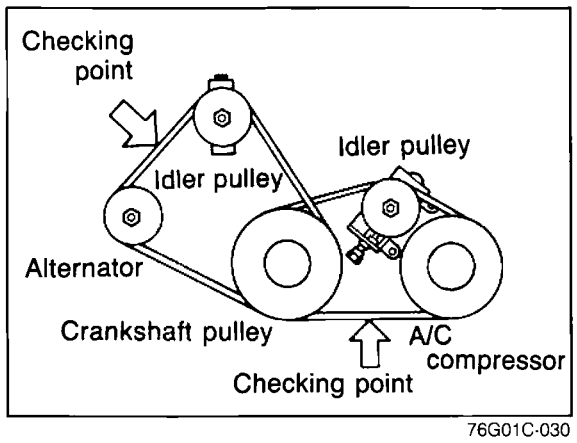
Caution
Be sure not to apply tension other than that of the tensioner spring.



76G01C-029

No.3 engine mount
Install the No.3 engine mount.

Tightening torque:
Nut A: 85—117 N·m
(8.7—11.9 m-kg, 63—86 ft-lb)
Nut B: 67—93 N·m
(6.8—9.5 m-kg, 49—69 ft-lb)



76G01C-030

Drive belt
Install each drive belt, and check the belt deflection. (Refer to page 1C—7.)

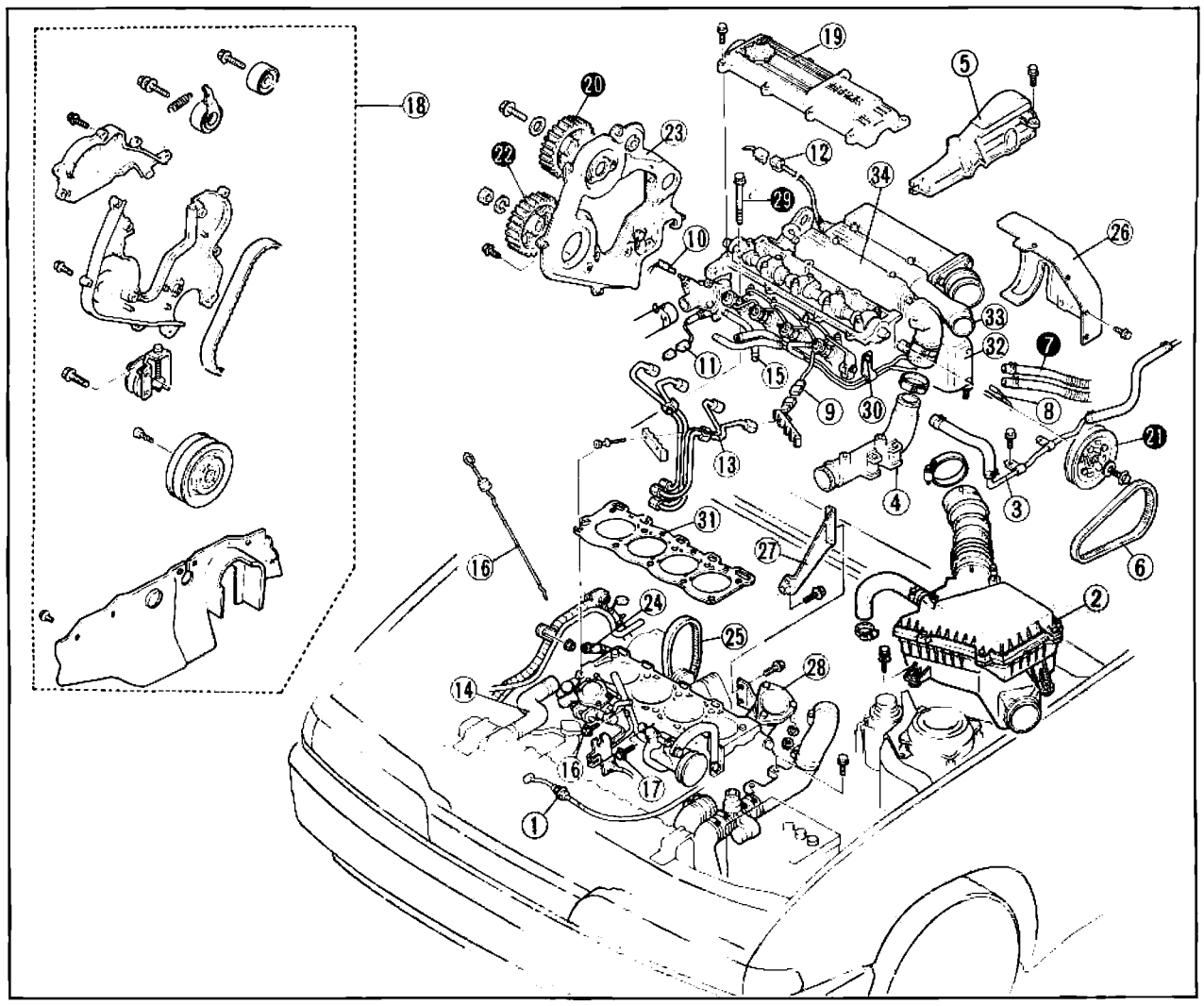
Steps after installation
Perform the necessary engine adjustment. (Refer to TUNE-UP PROCEDURE.)

CYLINDER HEAD

Removal

1. Disconnect the negative battery cable.
2. Drain the engine coolant.
3. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.

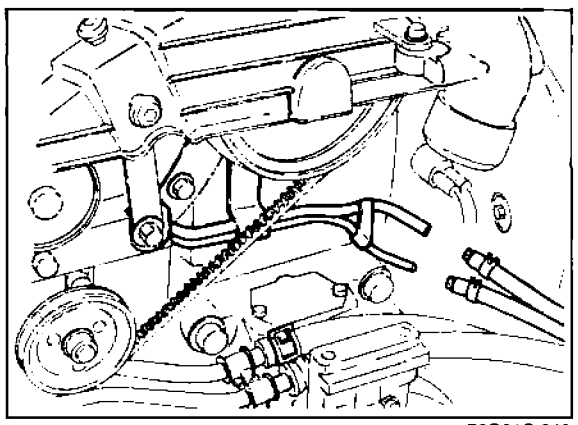
76G01C-031



76G01C-032

1. Accelerator cable
2. Air cleaner
3. Brake vacuum pipe
4. Intercooler pipe and hose*
5. Drive belt cover
6. Vacuum pump drive belt
7. Fuel hose
8. Water temperature switch connector
9. Glow plug connector
10. Water thermo switch connector
11. Heat gauge unit connector
12. Boost air temperature sensor connector*
13. Injection pipes
14. Upper radiator hose
15. Water hose (thermostat—FIP)
16. Oil level gauge and stay bolt
17. Oil pipe bolt
18. Timing belt (Refer to page 1C—11)
19. Cylinder head cover
20. Camshaft pulley
21. Rear camshaft pulley
22. Injection pump pulley
23. Seal plate
24. Water hose and pipe
25. Comprex supercharger drive belt*
26. Heat insulator*
27. Exhaust manifold stay
28. Front exhaust pipe
29. Cylinder head bolt
30. Cylinder head
31. Cylinder head gasket
32. Comprex supercharger*
33. Exhaust manifold
34. Intake manifold

Note
*** marked parts are equipped only for the RF-CX.**

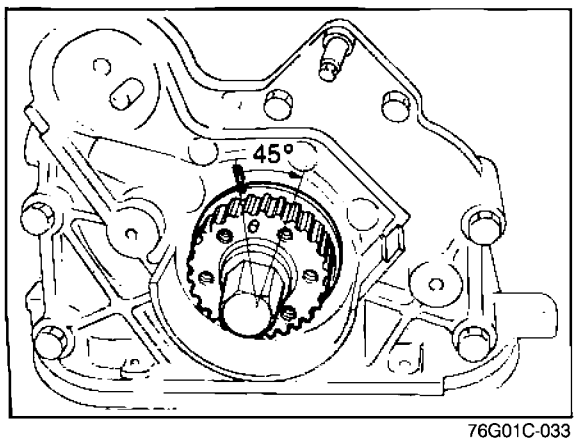


76G01C-240

Removal note
Fuel hose

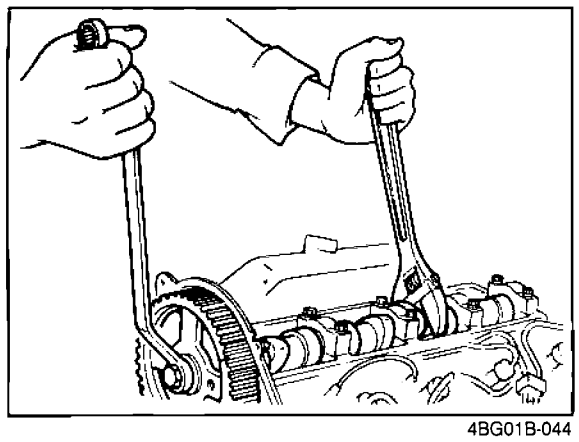
Warning
a) Cover the hose with a rag because fuel will spray out when disconnecting.
b) Keep fire and open flame away from the fuel area.

Plug the disconnected hoses to avoid fuel leakage.



76G01C-033

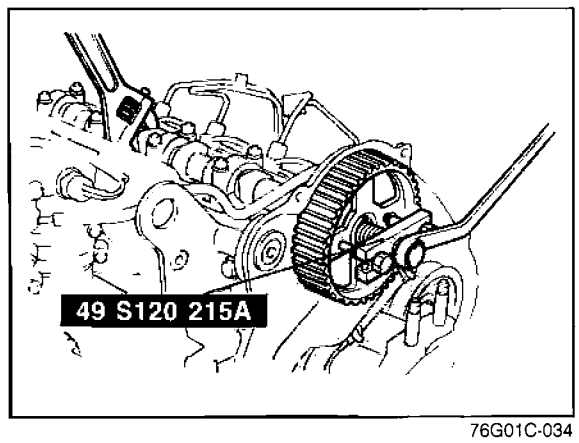
Camshaft pulley
1. After removing the timing belt, turn the crankshaft 45° clockwise.



4BG01B-044

2. Hold the camshaft with a wrench (29 mm, 1.14 in) and loosen the camshaft pulley lock bolt.

Caution
Do not damage the cylinder head edge with the wrench.

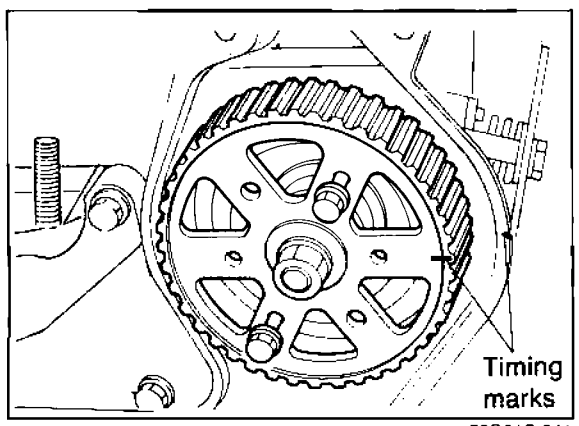


76G01C-034

3. Separate the camshaft pulley from the camshaft with the **SST**.

Caution
Do not hit the camshaft pulley with a hammer.

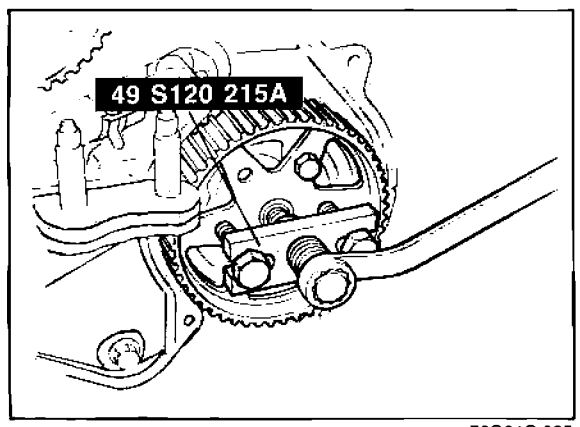
Rear camshaft pulley
Remove the rear camshaft pulley in the same manner used for camshaft pulley.



76G01C-241

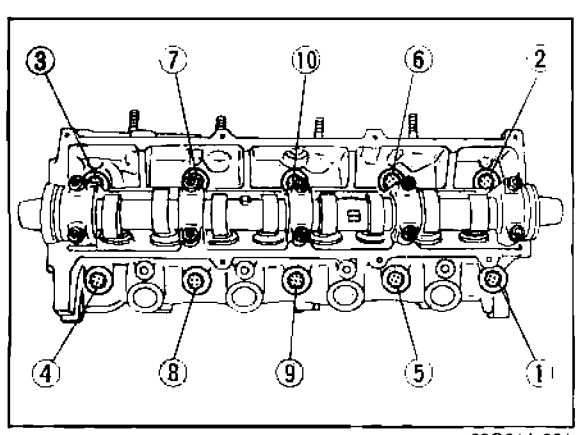
Injection pump pulley

1. Put two bolts of 35—40 mm (1.4—1.6 in) length into the arms of the injection pump pulley and affix them in the threaded hole of the injection pump bracket.
2. Loosen the injection pump pulley lock bolt.



76G01C-035

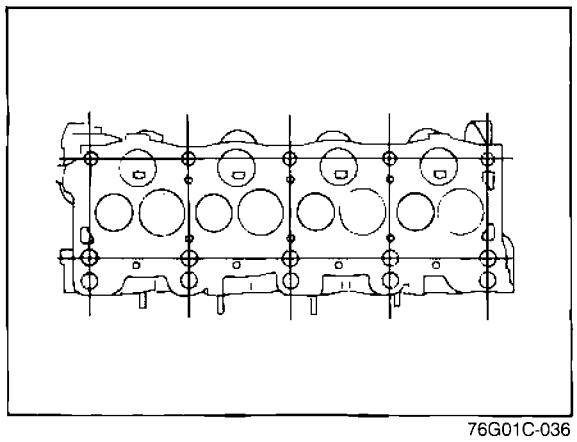
3. Separate the injection pump pulley from the injection pump shaft with the **SST**.



69G01A-031

Cylinder head bolt

Loosen the cylinder head bolts in two or three steps, and in the order shown in the figure.



76G01C-036

Disassembly of Cylinder Head

Refer to page 1C—40.

Inspection of Cylinder Head

Refer to page 1C—47.

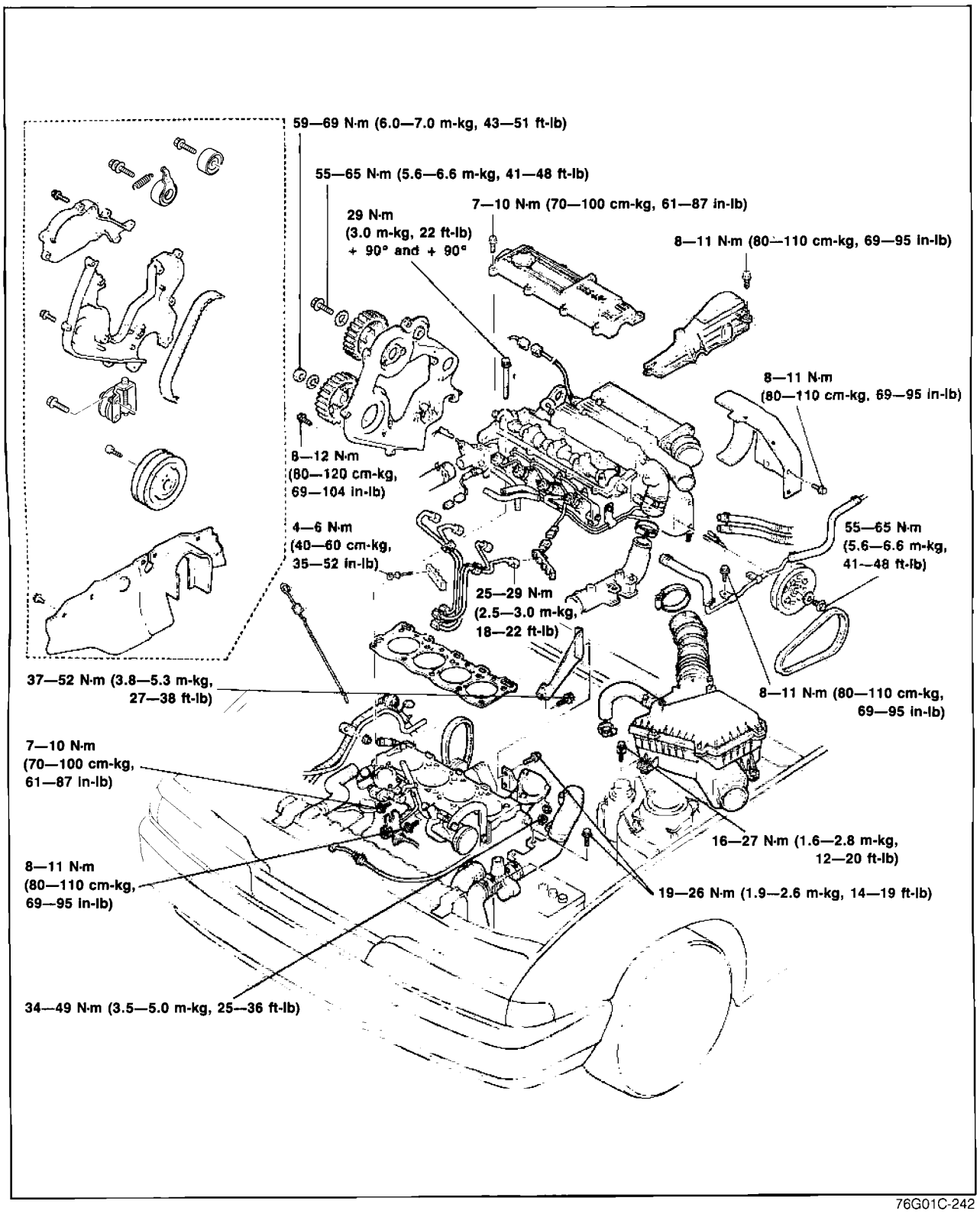
Assembly of Cylinder Head

Refer to page 1C—73.

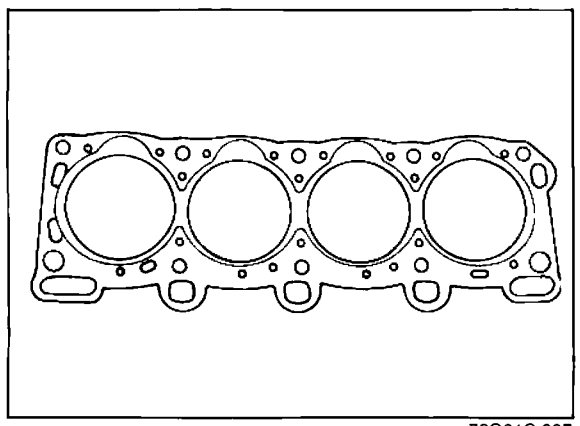
Installation
Install in the reverse order of removal referring to the installation note.

Note
a) Position the hose clamp in the original location on the hose.
b) Squeeze the clamp lightly with large pliers to ensure a good fit.

Torque Specifications



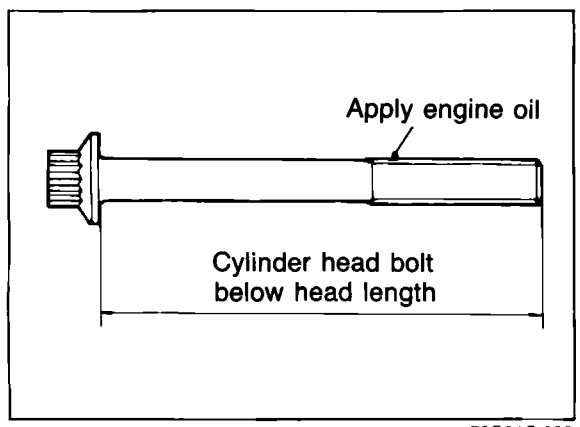
76G01C-242



76G01C-037

Installation
Cylinder head

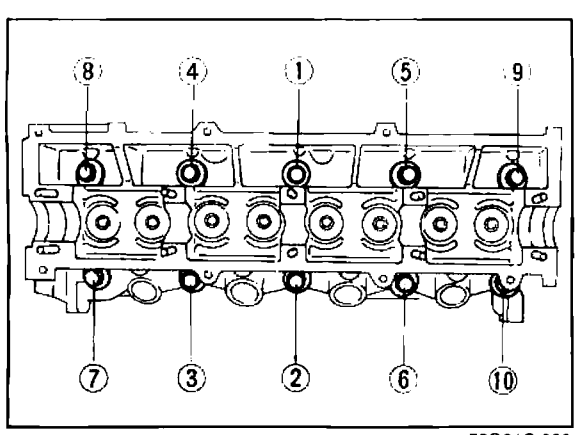
1. Throughly remove all dirt and grease from the top of the cylinder block with a rag.
2. Place the new cylinder head gasket in position.
3. Remove any dirt and grease from the bottom surface of the cylinder head.
4. Place the cylinder head in position.



76G01C-038

5. Measure the length of the cylinder head bolt below the head. If the length exceeds the maximum, replace the bolt.

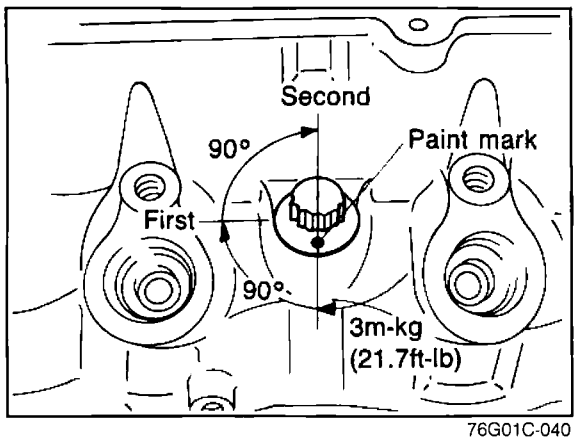
Length: 113.2—113.8 mm (4.457—4.480 in)
Maximum: 114.5 mm (4.508 in)



76G01C-039

6. Apply engine oil to the threads and the seat face of the cylinder head bolts.
7. Tighten the cylinder head bolts.
   (1) Tighten the bolts to the specified torque, in the order shown in the figure.

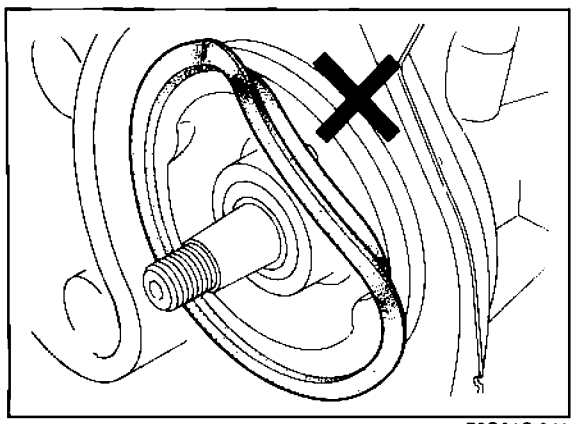
Tightening torque:
29 N·m (3.0 m-kg, 22 ft-lb)



76G01C-040

   (2) Make paint marks on the bolt heads, as shown in the figure.
   (3) With the paint marks as a reference point, turn the cylinder head bolts **another 90° (90°—105°)** in the tightening direction. Tighten them in the order.
   (4) Then tighten them **once again 90° (90°—105°)** in the tightening order.

Caution
Be absolutely sure that the bolts are tightened in the proper order.



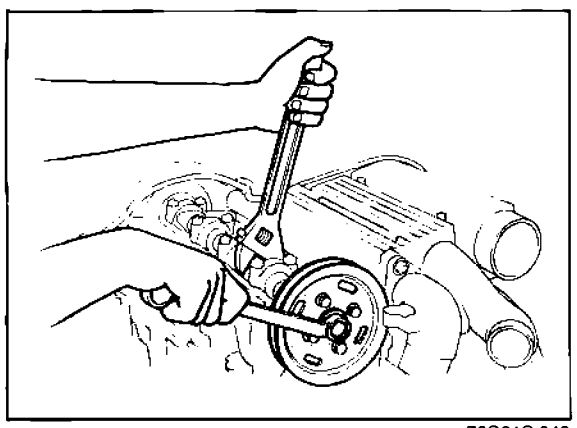
76G01C-041

Seal plate

1. Install the seal plate.

   Tightening torque:
   8—12 N·m (80—120 cm-kg, 69—104 in-lb)

2. Check that the seal plate sealing rubbers are installed in position.

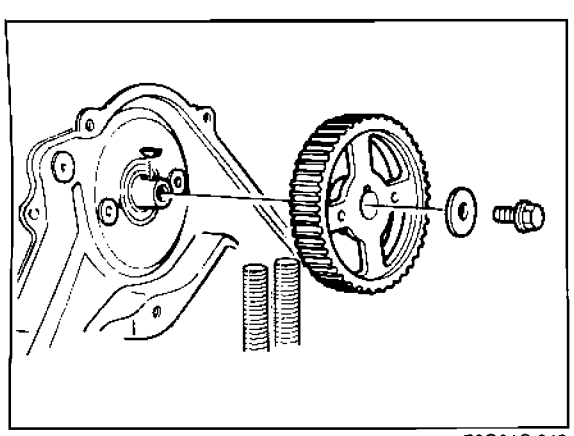


76G01C-042

Rear camshaft pulley

1. Install the rear camshaft pulley.
2. Hold the camshaft with a wrench (29 mm, 1.14 in), and tighten to the specification.

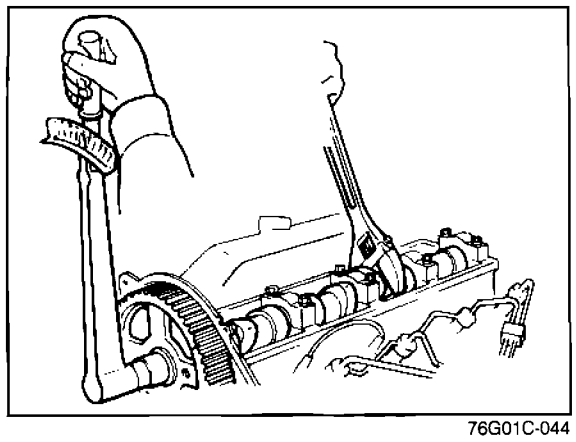
   Tightening torque:
   55—65 N·m (5.6—6.6 m-kg, 41—48 ft-lb)



76G01C-043

Camshaft pulley

1. Connect the camshaft pulley onto the camshaft with the semicircular (woodruff) key.

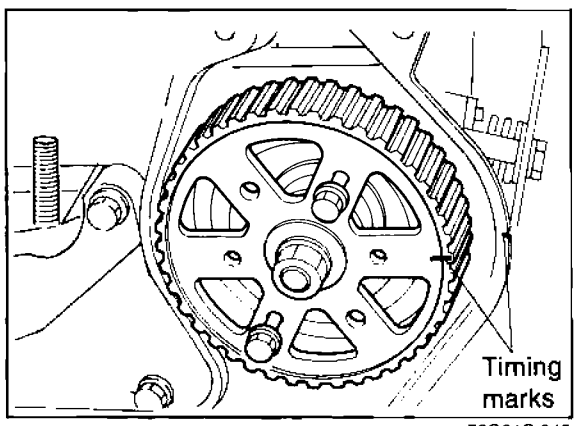


76G01C-044

2. Hold the camshaft with a wrench (29 mm, 1.14 in), tighten the camshaft pulley lock bolt.

   Tightening torque:
   55—65 N·m (5.6—6.6 m-kg, 41—48 ft-lb)

3. Align the mark on the camshaft pulley with the mark on the seal plate.

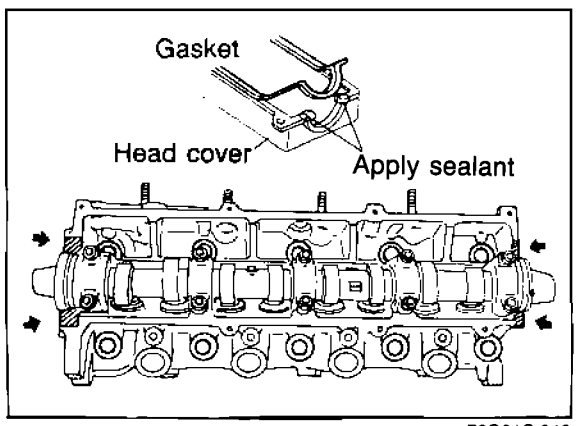


76G01C-045

Injection pump pulley

1. Install the injection pump pulley with the semicircular (woodruff) key to the injection pump shaft.
2. Rotate the injection pump pulley until the timing marks are aligned.
3. Affix the injection pump pulley to the bracket using two bolts (35—40 mm, 1.4—1.6 in).
4. Tighten the lock nut.

Tightening torque:
59—69 N·m (6.0—7.0 m-kg, 43—51 ft-lb)



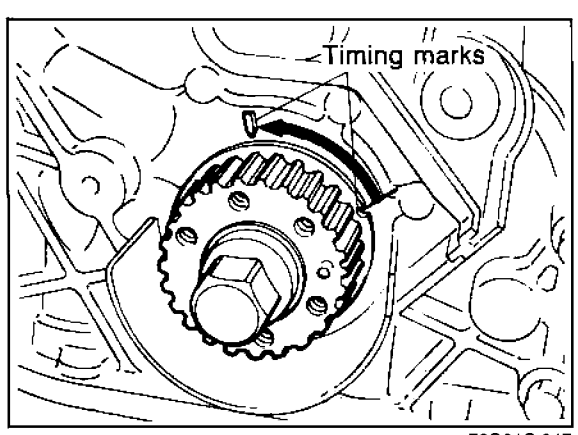
76G01C-046

Cylinder head cover

1. Apply sealant to the shaded areas.
2. Install the cylinder head cover.

Tightening torque:
7—10 N·m (70—100 cm-kg, 61—87 in-lb)

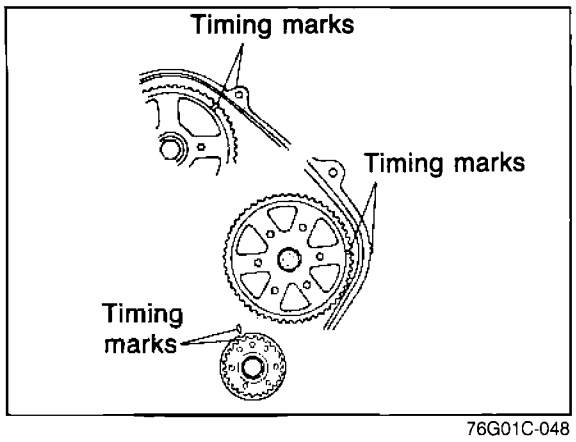
3. Install the PCV hose.



76G01C-047

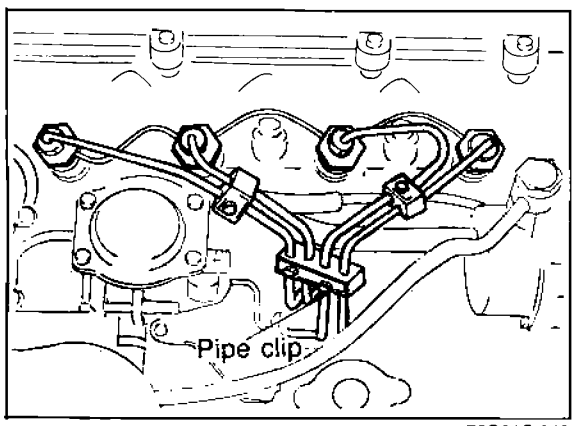
Timing belt

1. Return the crankshaft about 45° to the timing mark on the oil pump housing.



76G01C-048

2. Check that the timing marks of the camshaft pulley and the injection pump pulley align with the timing marks on the seal plate.
3. Install the timing belt. (Refer to TIMING BELT of ON-VEHICLE MAINTENANCE)



76G01C-049

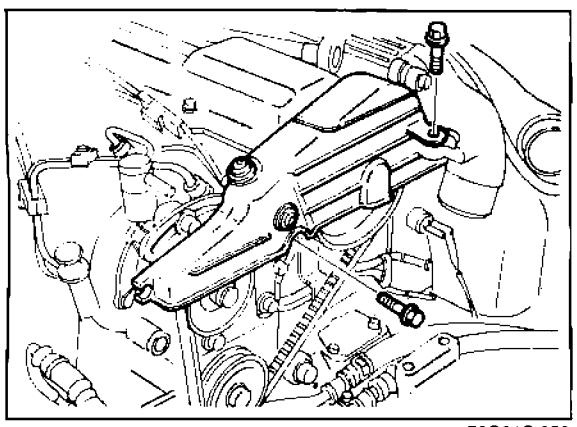
Injection pipe

1. Check that no dirt or other foreign material is on the pipe coupling.
2. Install the injection pipes.

   Tightening torque:
   25—29 N·m (2.5—3.0 m-kg, 18—22 ft-lb)

3. Install the pipe clip.

   Tightening torque:
   4—6 N·m (40—60 cm-kg, 35—52 in-lb)



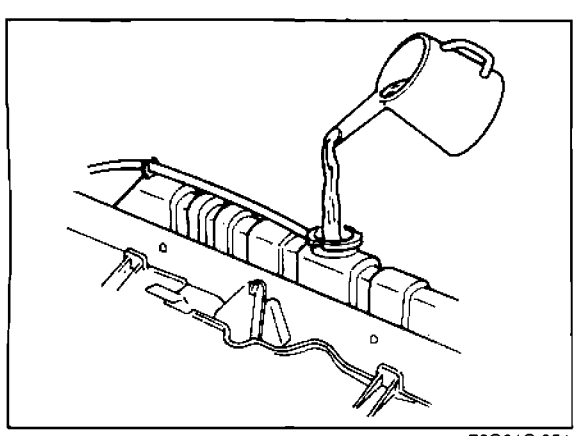
76G01C-050

Vacuum pump drive belt

1. Install the vacuum pump drive belt, and adjust the belt deflection. (Refer to 1C—7)
2. Install the drive belt cover.

   Tightening torque:
   8—11 N·m (80—110 cm-kg, 69—95 in-lb)

3. Connect the vacuum hose securely and squeeze the clamp lightly with pliers to ensure a good fit.



76G01C-051

Steps after installation

1. Fill the radiator with the specified amount and type of coolant.
2. Perform the necessary engine adjustments. (Refer to TUNE-UP PROCEDURE.)

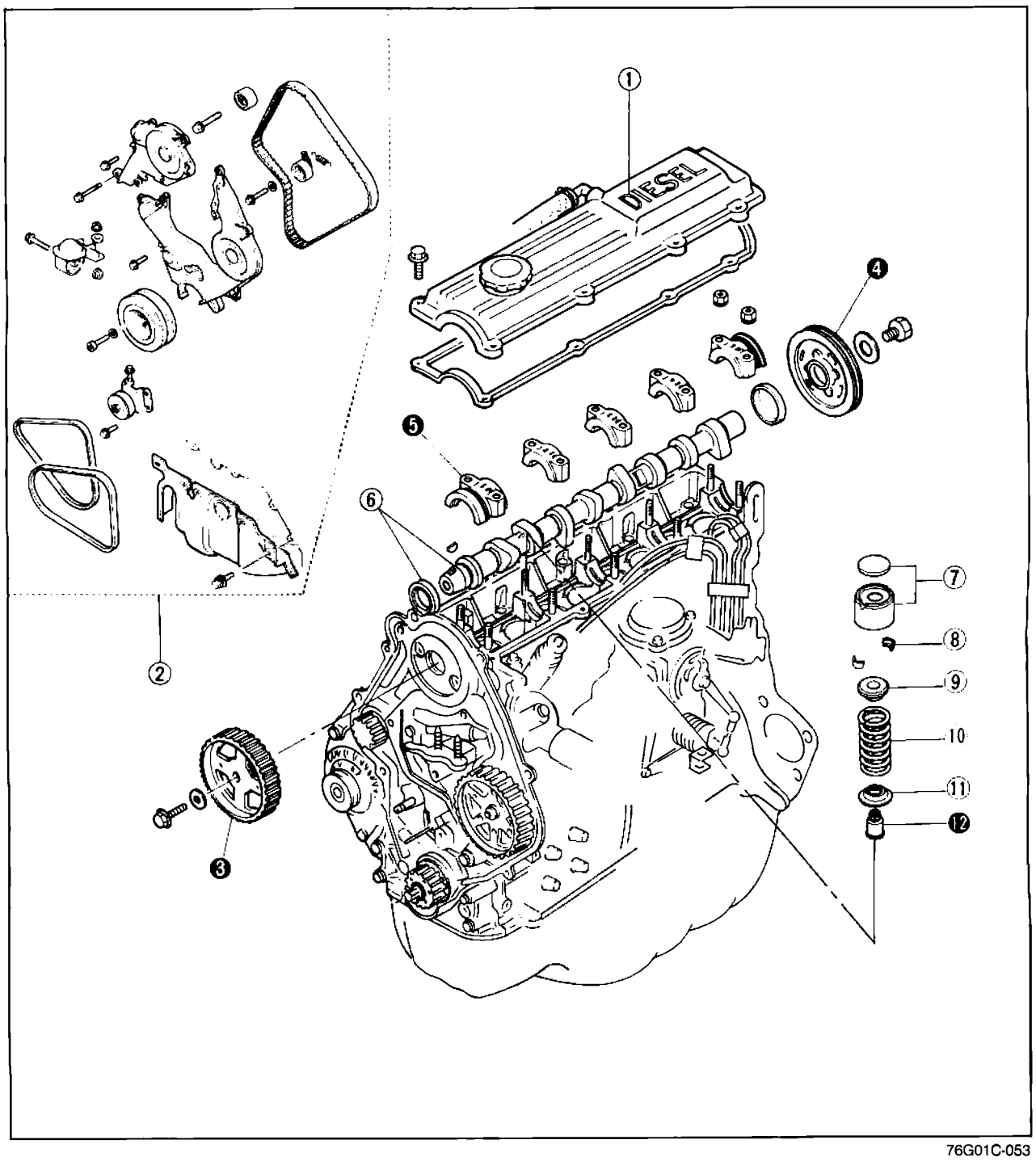
1C ON-VEHICLE MAINTENANCE (VALVE SEAL)

VALVE SEAL

Removal

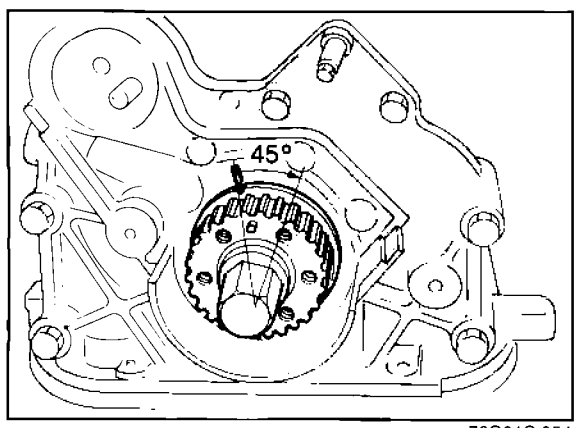
1. Disconnect the negative battery cable.
2. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.

76G01C-052



76G01C-053

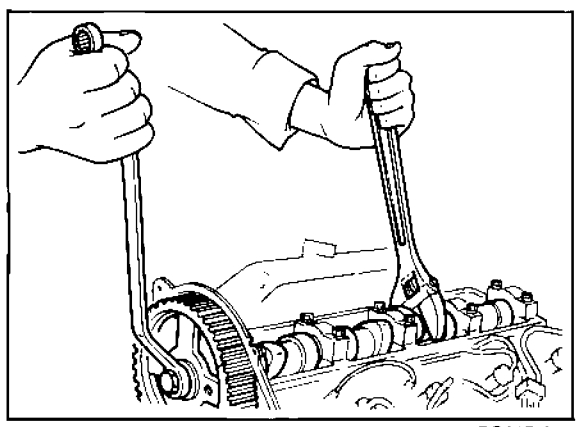
1. Cylinder head cover
2. Timing belt (Refer to page 1C—11)
3. Camshaft pulley
4. Rear camshaft pulley
5. Camshaft cap
6. Camshaft and oil seal
7. Tappet and adjusting disc
8. Valve keeper
9. Upper valve spring seat
10. Valve spring
11. Lower valve spring seat
12. Valve seal



76G01C-054

Removal note
Camshaft pulley

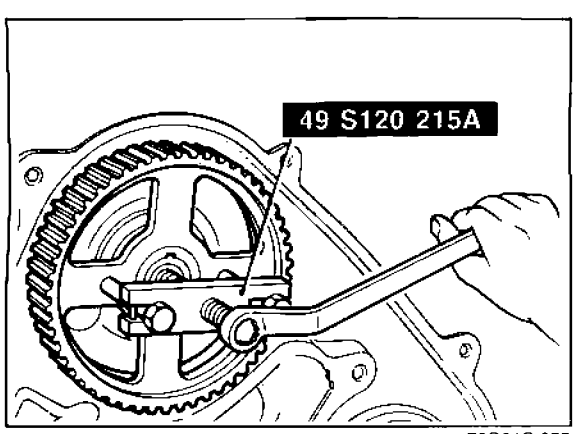
1. After removing the timing belt, turn the crankshaft 45° clockwise.



4BG01B-044

2. Hold the camshaft with a wrench (29 mm, 1.14 in) and loosen the camshaft pulley lock bolt.

Caution
Do not damage the cylinder head edge with the wrench.



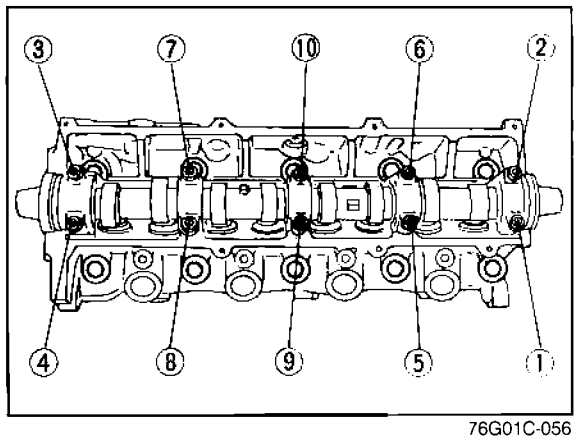
76G01C-055

3. Separate the camshaft pulley from the camshaft with the **SST**.

Caution
Do not hit the camshaft pulley with a hammer.

Rear camshaft pulley

Remove the rear camshaft pulley in the same manner used for camshaft pulley.

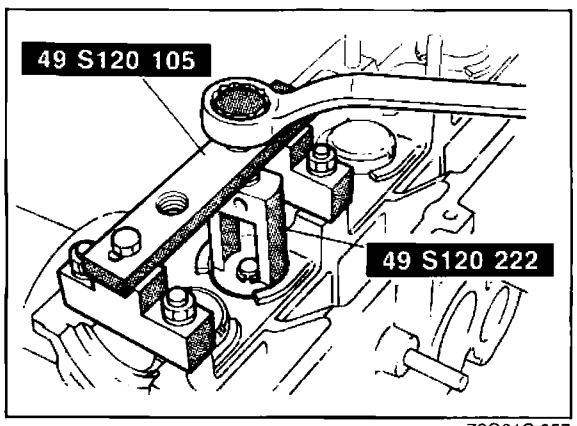


76G01C-056

Camshaft cap

Loosen the camshaft nuts in two or three steps in the order shown in the figure.

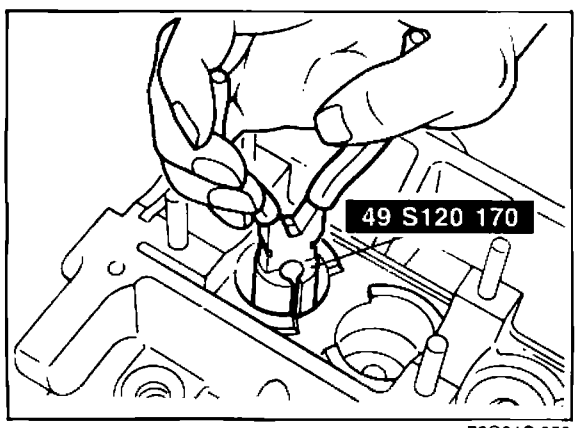
1C ON-VEHICLE MAINTENANCE (VALVE SEAL)



76G01C-057

Valve seal

1. Plug the oil drain hole with a rag to prevent the possibility of the valve keepers from falling into the oil pan.
2. Turn the crankshaft to position the piston of the valve seal to be replaced at top dead center.
3. Remove the valve keepers with the **SST**.



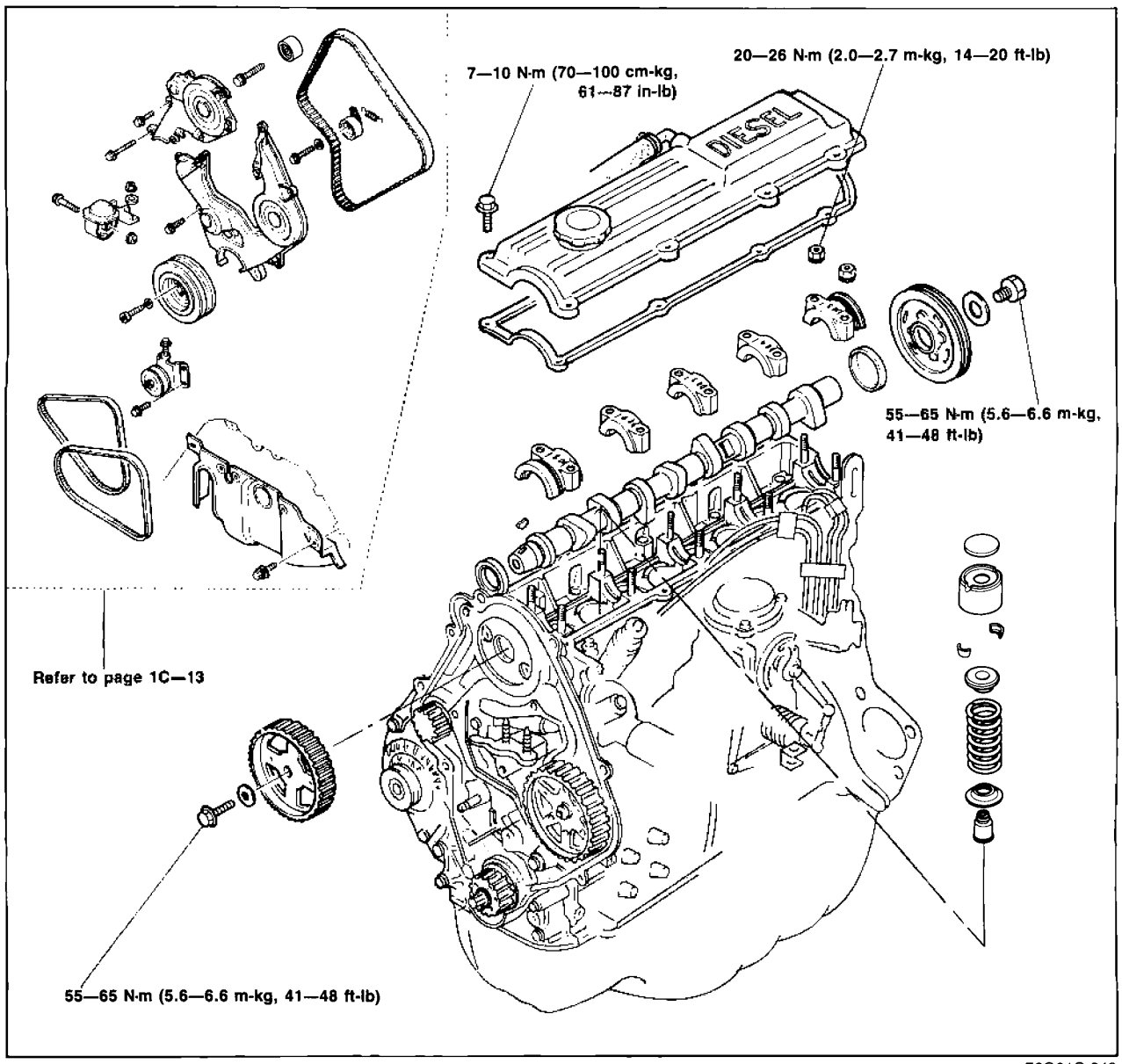
76G01C-058

4. Remove the valve spring and spring seats.
5. Remove the valve seal with the **SST**.

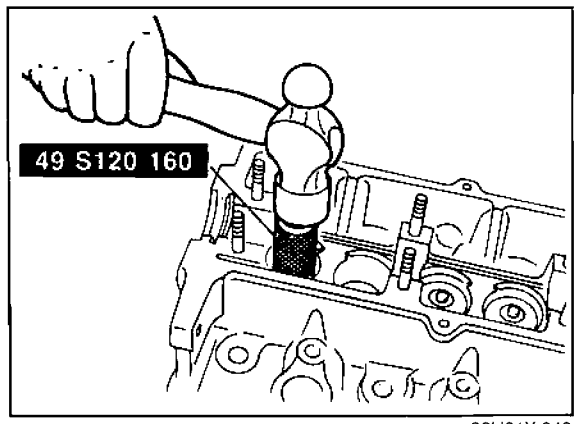
Caution
Do not turn the crankshaft while the valve spring is removed. Replace the valve seals at every cylinders.

Installation
Install in the reverse order of removal referring to the installation note.

Torque Specifications

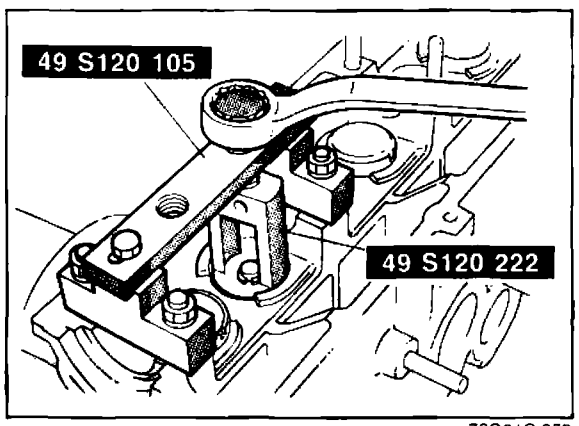


76G01C-243



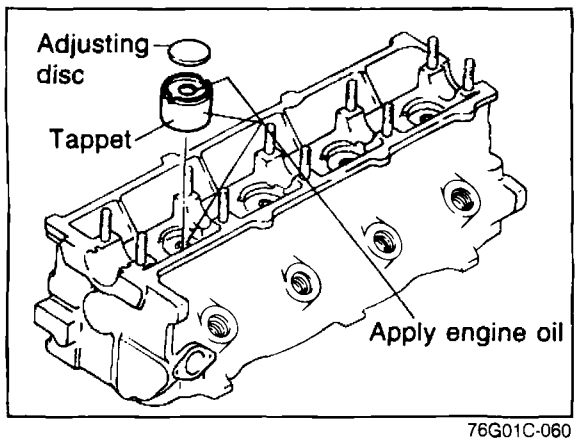
86U01X-049

Installation note
Valve seal
1. Apply engine oil to the inside of the new valve seal.
2. Push it on gently with the **SST**.



76G01C-059

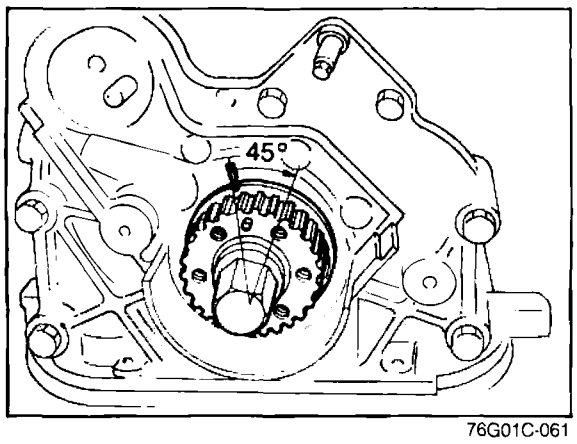
3. Install the spring seat, valve springs and valve keepers with the **SST**.



76G01C-060

Tappet and adjusting disc

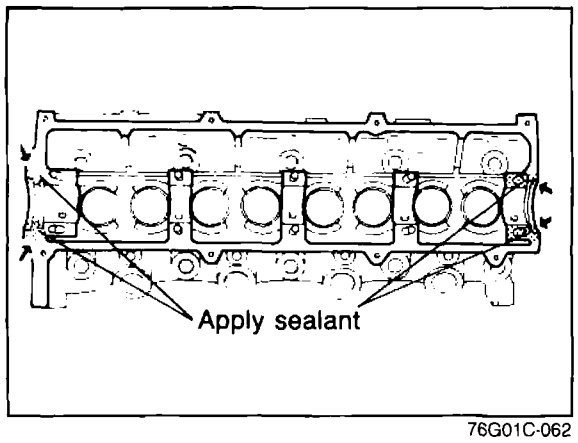
1. Apply engine oil to the tappets.
2. Install the tappets in the hole.
3. Install the adjusting discs.



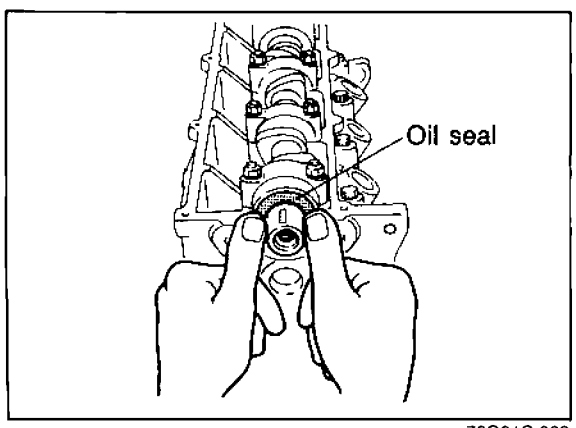
76G01C-061

Camshaft and camshaft cap

1. Move the **No.1 piston to TDC**, and then rotate the crankshaft approximately 45°
2. Apply engine oil to the camshaft and the journals.
3. Apply a coat of sealant to the shaded areas as shown in the figure.

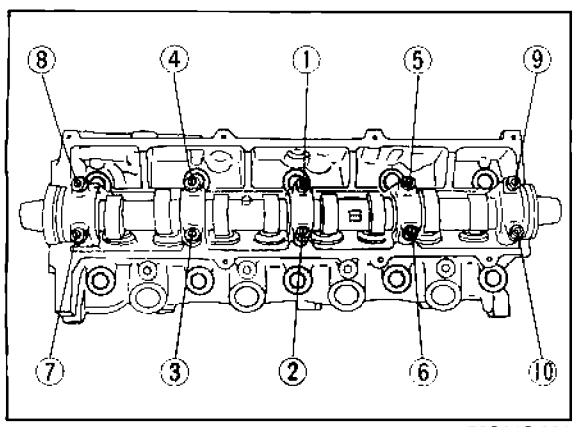


76G01C-062



76G01C-063

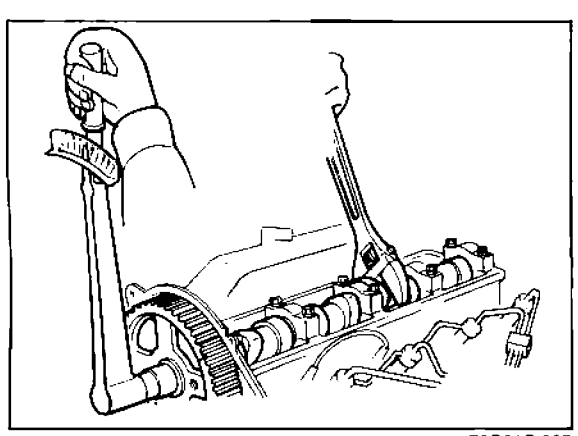
4. Set the camshaft and camshaft cap so that the key groove faces directly upward.
   And tighten the cap nuts loosely.
5. Apply a coat of engine oil to the new oil seal lip and insert it.



76G01C-064

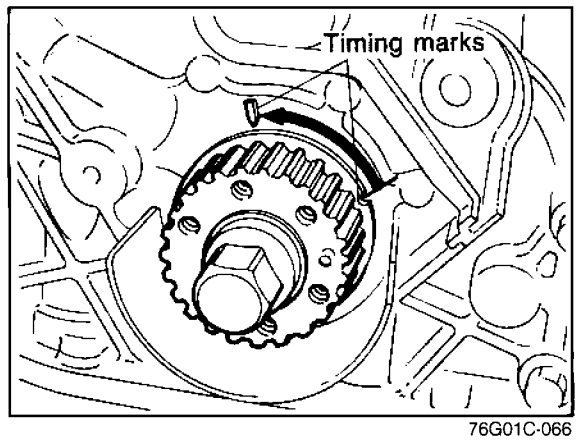
6. Tighten the camshaft cap nuts gradually and in the order shown in the figure.

Tightening torque:
20—26 N·m (2.0—2.7 m-kg, 14—20 ft-lb)


76G01C-065

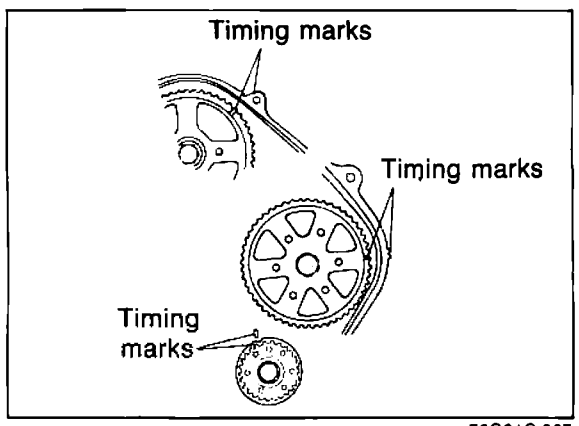
Camshaft pulley and rear camshaft pulley
Hold the camshaft with a wrench (29 mm, 1.14 in), tighten the camshaft pulley and rear camshaft pulley lock bolts.

Tightening torque:
55—65 N·m (5.6—6.6 m-kg, 41—48 ft-lb)



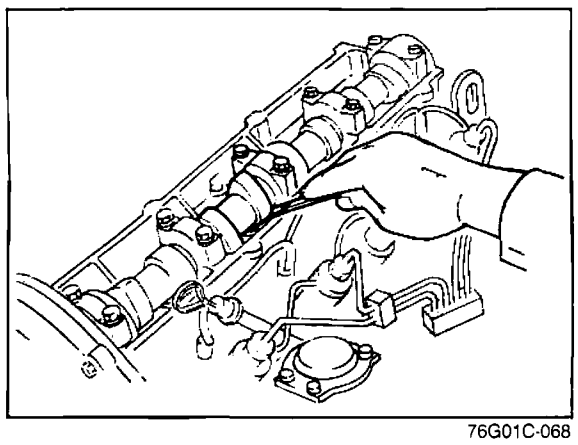
76G01C-066

Timing belt
1. Return the crankshaft about 45° to the timing mark on the oil pump housing.



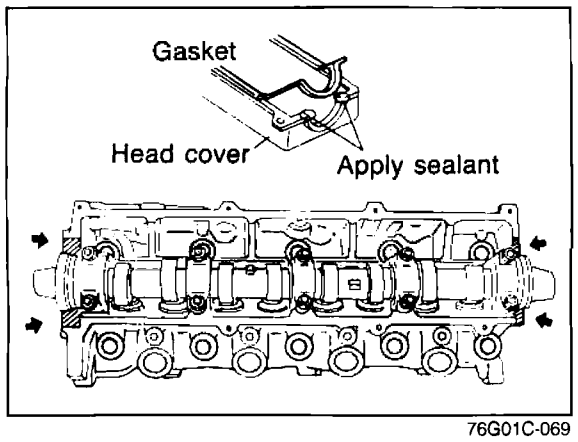
76G01C-067

2. Check that the timing marks of the camshaft pulley and the injection pump pulley align with the timing marks on the seal plate.
3. Install the timing belt. (Refer to TIMING BELT of ON-VEHICLE MAINTENANCE)



76G01C-068

Valve clearance
Measure the valve clearance, and adjust if necessary. (Refer to page 1C—85).



76G01C-069

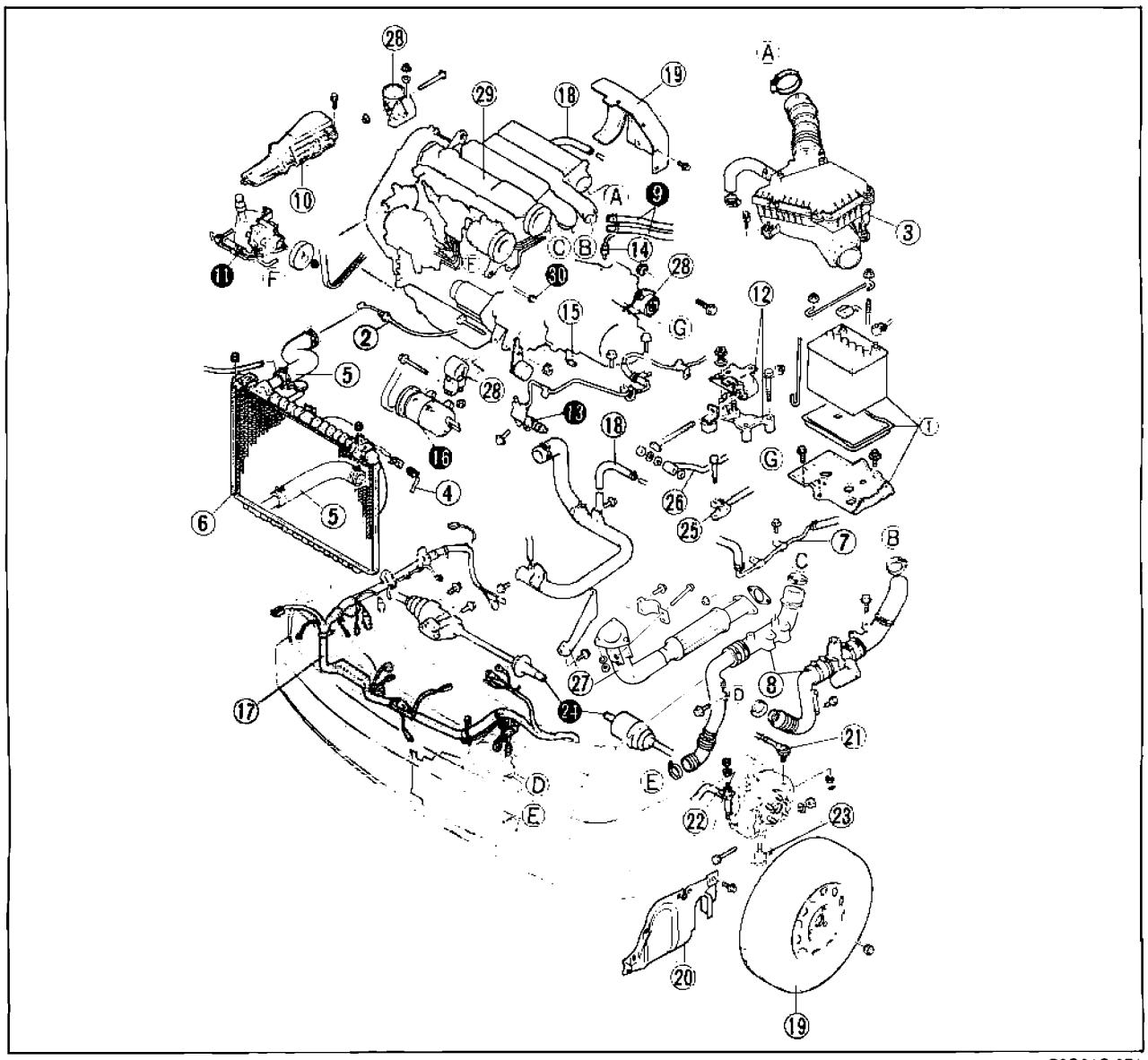
Cylinder head cover
1. Remove the rag pluged oil return hole.
2. Apply sealant to the shaded areas as shown in the figure.
3. Install the cylinder head cover.

Tightening torque:
7—10 N·m (70—100 cm-kg, 61—87 in-lb)

4. Perform the necessary engine adjustments by referring to TUNE-UP PROCEDURE section.

REMOVAL

1. Disconnect the negative battery cable.
2. Drain the engine oil and coolant.
3. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.

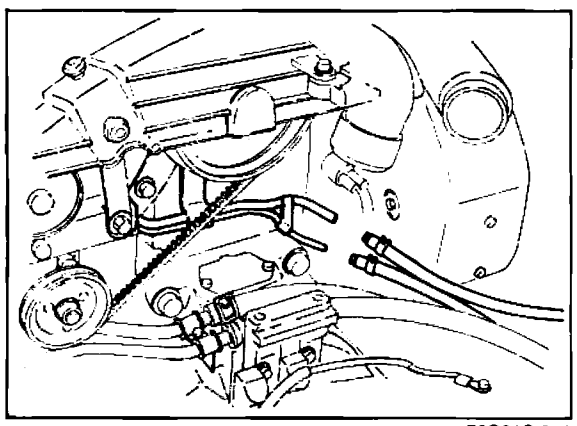


76G01C-071

1. Battery and battery carrier
2. Accelerator cable
3. Air cleaner assembly
4. Radiator harness
5. Radiator hose
6. Radiator and cooling fan
7. Brake vacuum hose
8. Intercooler pipe and hose*
9. Fuel hose
10. Drive belt cover
11. P/S pump
12. No.4 engine mount
13. Clutch release cylinder
14. Speedometer cable
15. Transaxle harness
16. A/C compressor
17. Engine harness
18. Heater hose
19. Front wheel
20. Engine side cover
21. Tie-rod end
22. Stabilizer control rod
23. Lower arm bushing
24. Driveshaft
25. Change rod
26. Extension bar
27. Exhaust pipe and stay
28. Engine mount
29. Engine and transaxle
30. Transaxle

Note
*** marked parts are equipped only for RF-CX.**

1C REMOVAL

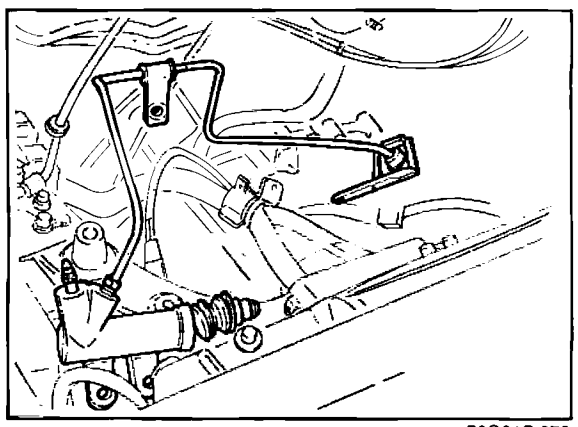


76G01C-244

Removal Note
Fuel hose

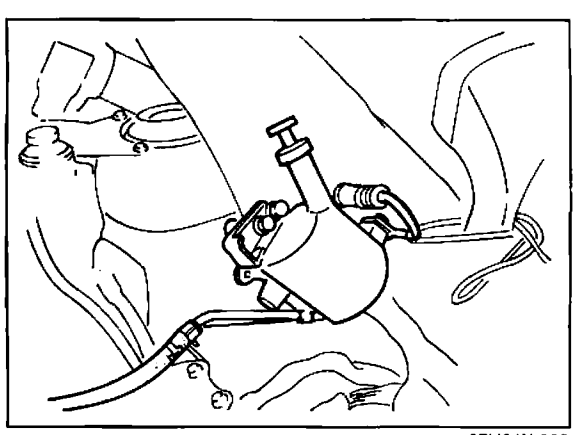
Warning
a) Cover the hose with a rag because fuel will spray out when disconnecting.
b) Keep fire and open flame away from the fuel area.

After disconnecting the fuel hoses, plug them to avoid fuel leakage.



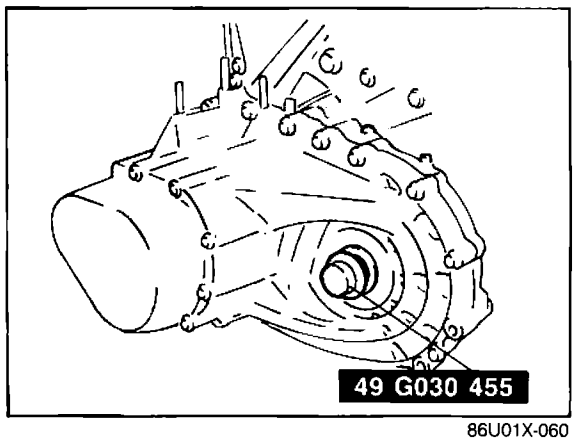
76G01C-072

Clutch release cylinder
Remove the clutch release cylinder with the pipe still connected; then avoid the cylinder.



67U01X-029

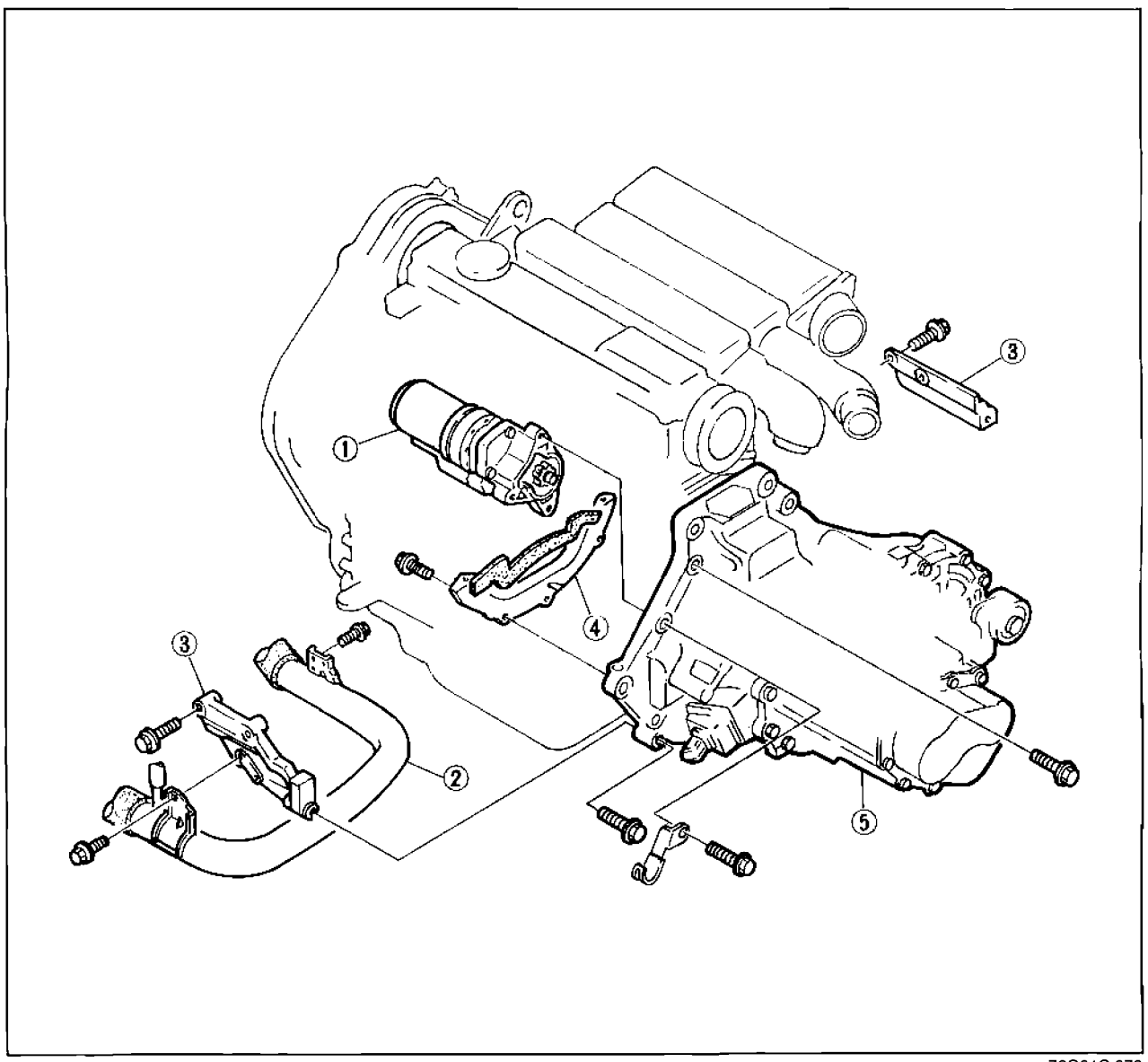
P/S pump, A/C compressor
Remove the P/S pump and A/C compressor with the hoses still connected to them, secure the pump and compressor as shown in the figure.



86U01X-060

Driveshaft
Remove the driveshafts. (Refer to Section 9.) Slide the **SST** into the transaxle.

Transaxle
Separate the transaxle from the engine in the sequence shown in the figure.



76G01C-073

1. Starter
2. Water pipe
3. Gusset plate
4. Clutch under cover
5. Transaxle

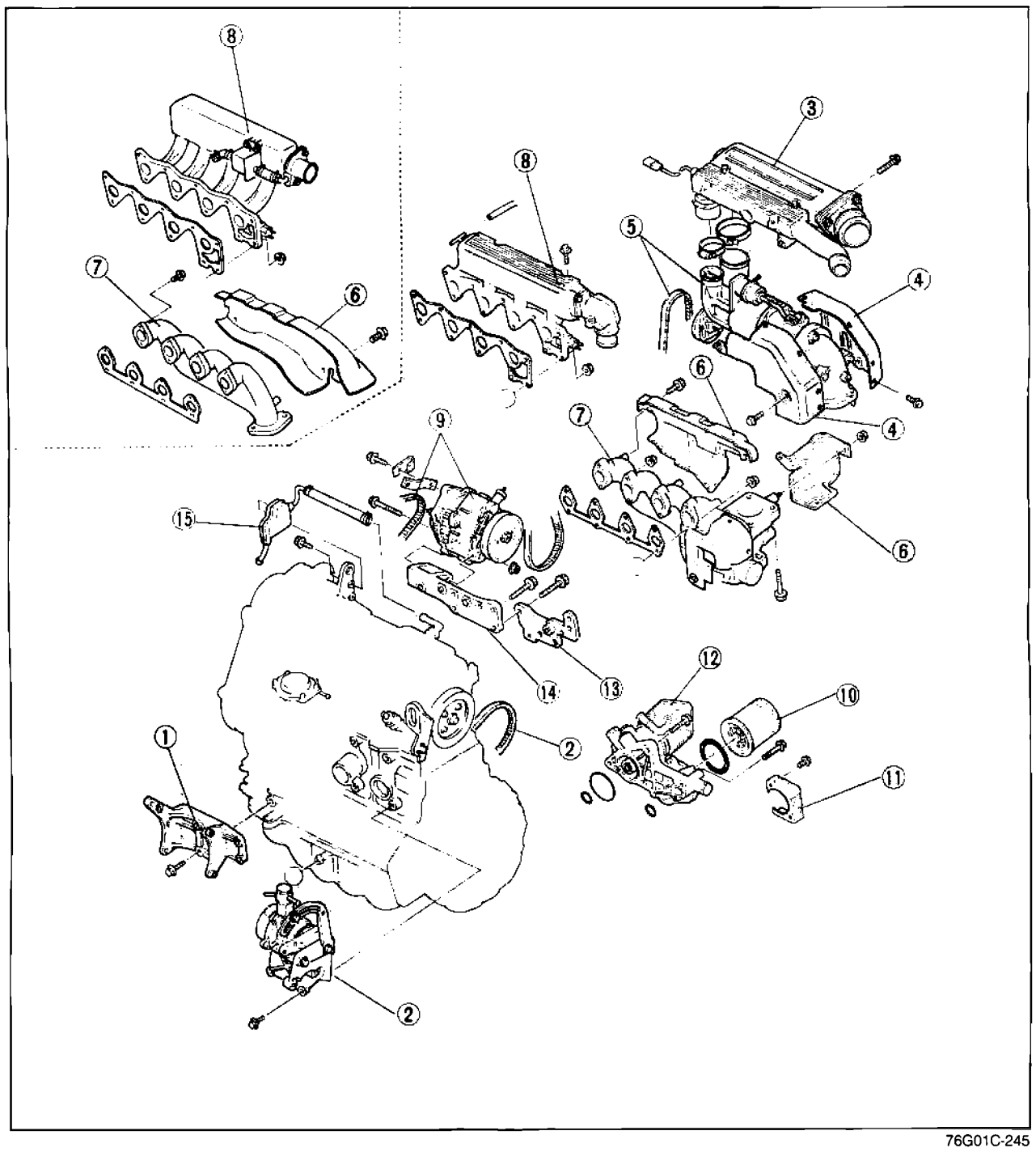
1C DISASSEMBLY (AUXILIARY PARTS)

DISASSEMBLY

1. Remove in the sequence shown in the figure referring to the disassembly note for specially marked parts.
2. Code all identical parts (such as pistons, piston rings, connecting rods, and valve springs) so that they can be reinstalled in the cylinder from which they were removed.
3. Clean the parts with steam, blow off any remaining water with compressed air.

Note
Care should be taken during the disassembly of any part or system to study its order of assembly. Any deformation, wear, or damage should also be noted.

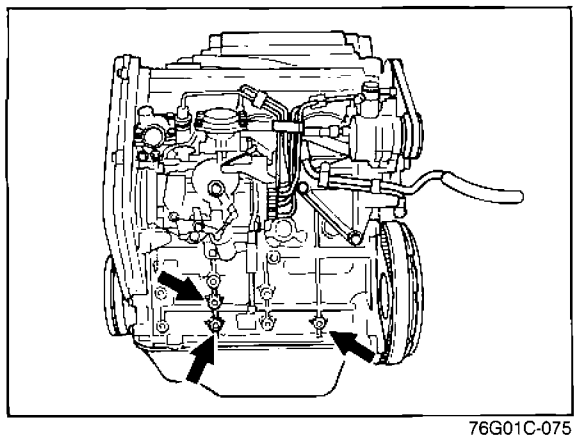
AUXILIARY PARTS



76G01C-245

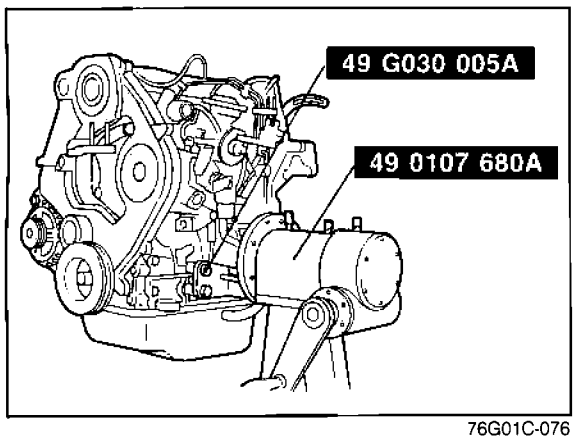
1. A/C compressor bracket
2. Vacuum pump and drive belt
3. Air funnel assembly
4. Comprex supercharger insulator
5. Comprex supercharger and drive belt
6. Exhaust manifold insulator
7. Exhaust manifold
8. Intake manifold
9. Alternator and drive belt
10. Oil filter
11. Oil filter cover
12. Oil cooler assembly
13. Exhaust pipe bracket
14. Alternator bracket
15. Blow-by chamber

76G01C-074



76G01C-075

Disassembly Note
Engine hanger
1. Remove the CSD hose.
2. Loosen the vacuum pump oil pipe bolts.

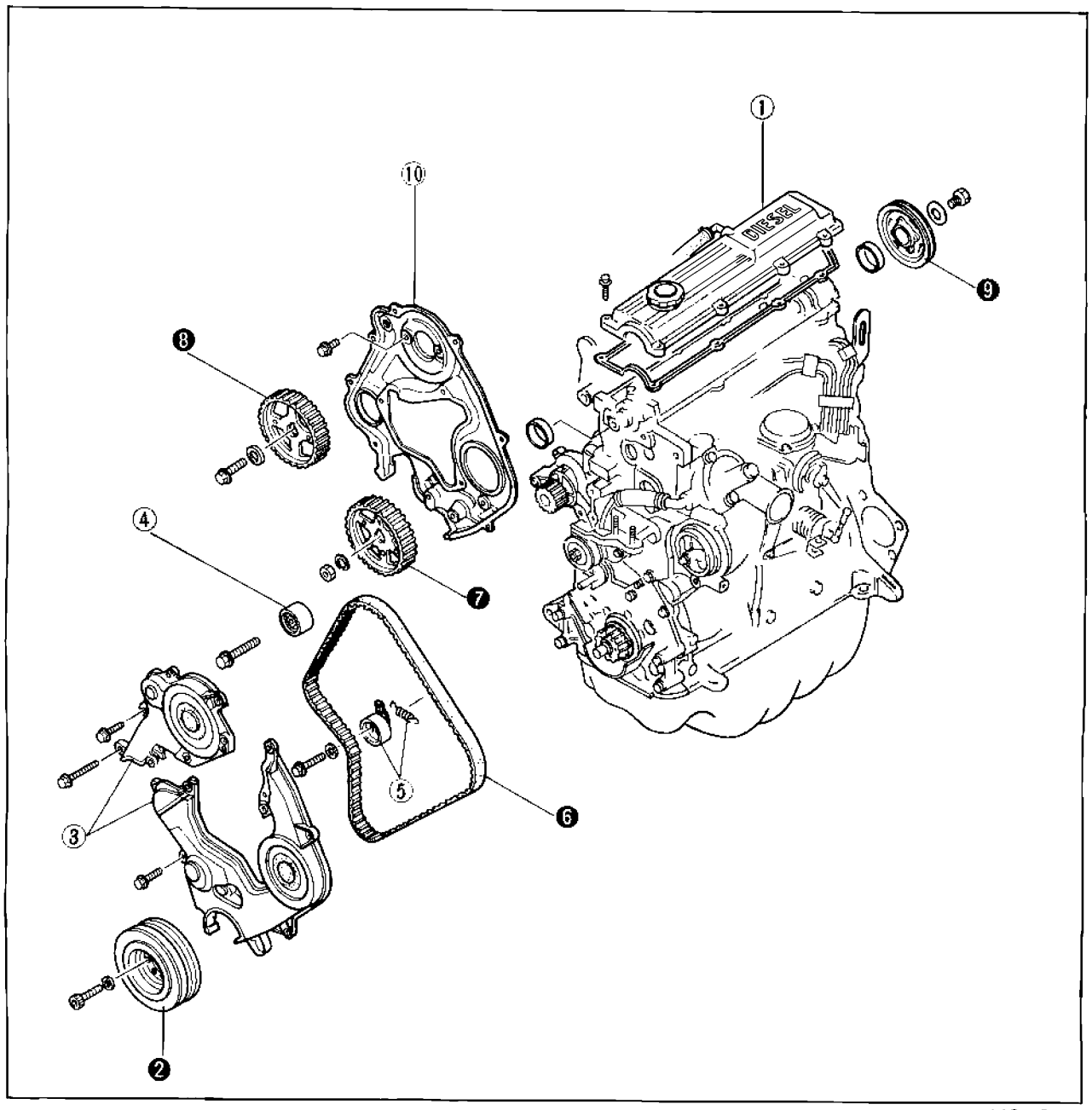


76G01C-076

3. Install the engine on the **SST**.

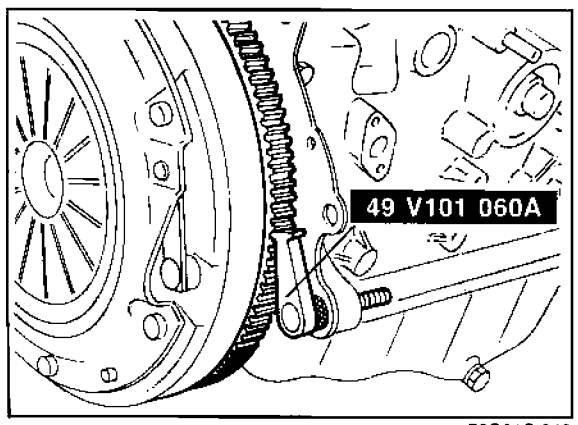
1C DISASSEMBLY (TIMING BELT)

TIMING BELT



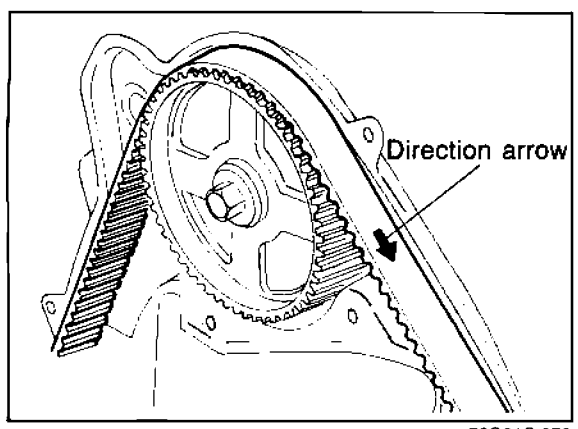
76G01C-077

1. Cylinder head cover
2. Crankshaft pulley
3. Left and right timing belt covers
4. Idler pulley
5. Timing belt tensioner and spring
6. Timing belt
7. Injection pump pulley
8. Camshaft pulley
9. Rear camshaft pulley
10. Seal plate



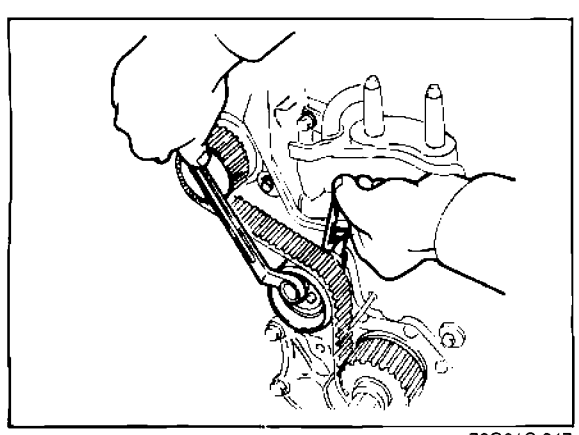
76G01C-246

Disassembly Note
Crankshaft pulley
1. Set the **SST** against the flywheel.
2. Remove the crankshaft pulley.



76G01C-078

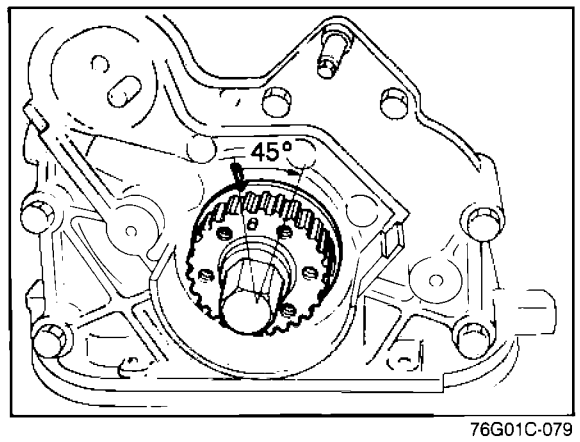
Timing belt
1. Draw a direction arrow in the direction of engine revolution on the timing belt, if the timing belt is to be reused.



76G01C-247

2. Loosen the timing belt tensioner bolt.
3. Shift the tensioner outward as far as possible and temporarily tighten it.
4. Remove the timing belt, tensioner and spring.

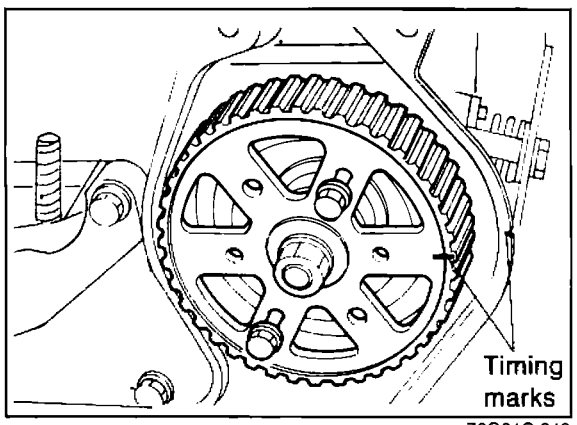
Caution
Do not allow any oil or grease on the timing belt.



76G01C-079

5. Turn the crankshaft about 45° from the timing mark which is marked on the oil pump housing.

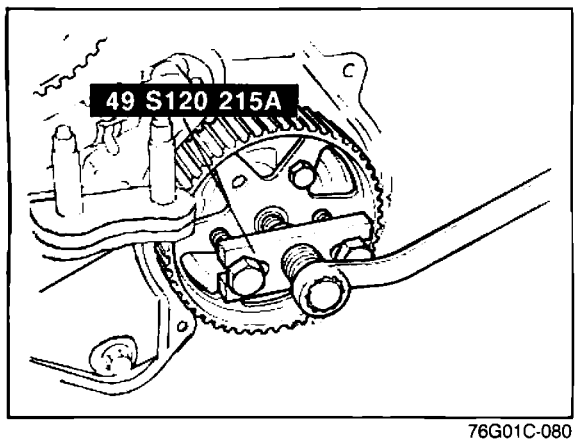
1C DISASSEMBLY (TIMING BELT)



76G01C-248

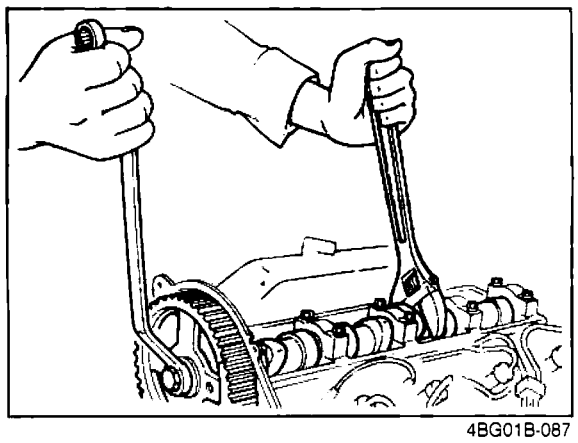
Injection pump pulley

1. Put two bolts of 35—40 mm (1.4—1.6 in) length into the arms of the injection pump pulley and affix them in the threaded hole of the injection pump bracket.
2. Loosen the injection pump pulley lock bolt.



76G01C-080

3. Separate the injection pump pulley from the injection pump shaft with the **SST**.

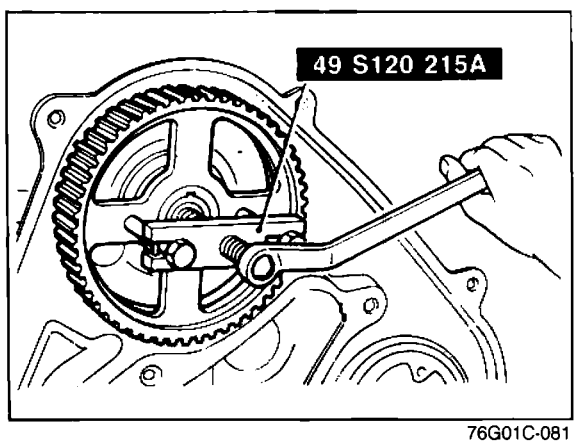


4BG01B-087

Camshaft pulley

1. Hold the camshaft with a wrench (29 mm, 1.14 in) and loosen the camshaft pulley lock bolt.

Caution
Do not damage the cylinder head edge with the wrench.



76G01C-081

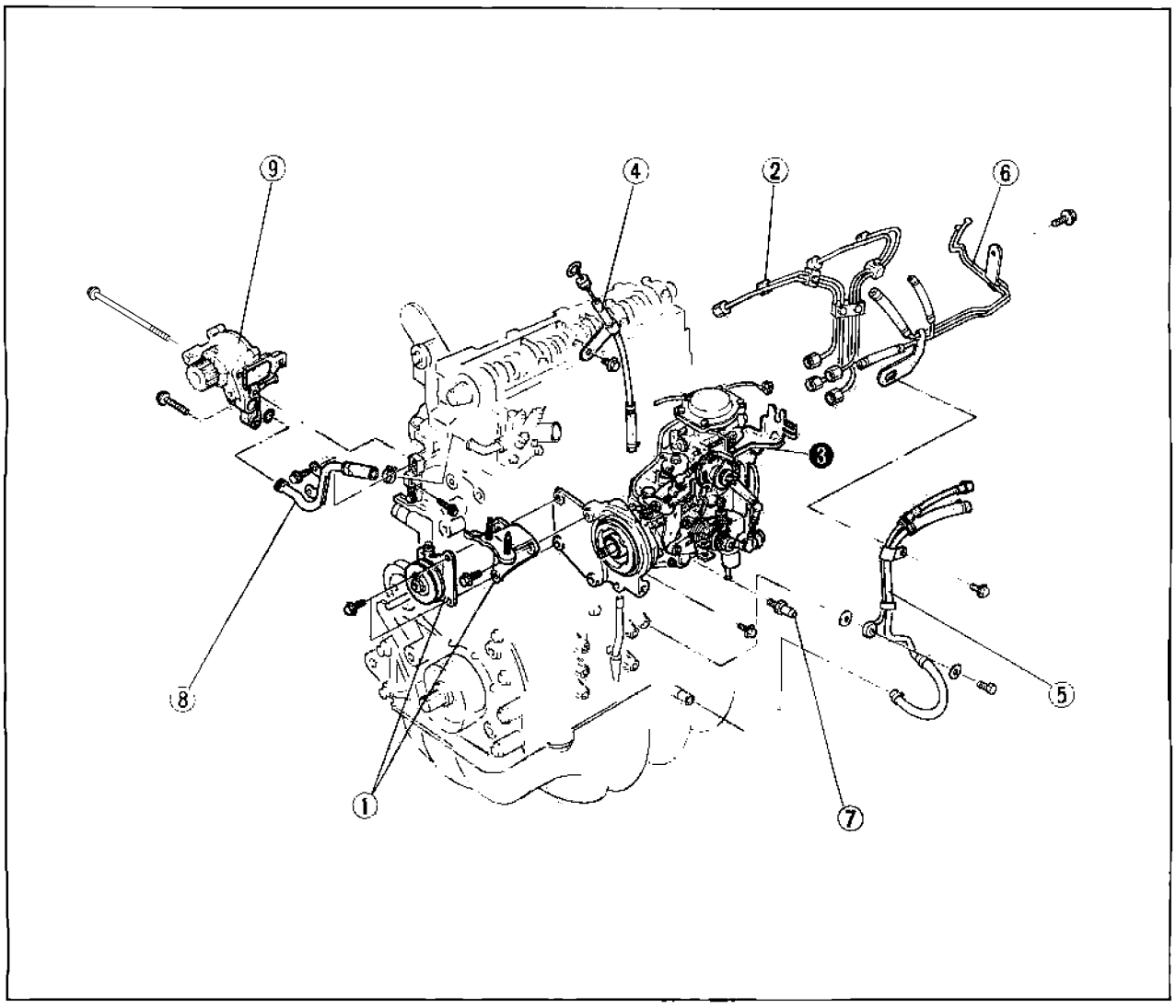
2. Separate the camshaft pulley from the camshaft with the **SST**.

Caution
Do not hit the camshaft pulley with a hammer.

Rear camshaft pulley

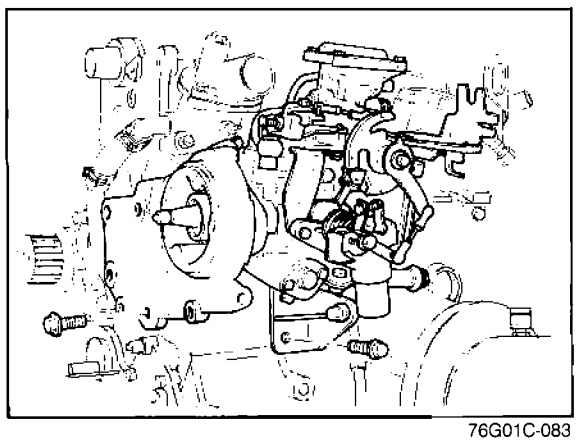
Remove the rear camshaft pulley in the same manner used for camshaft pulley.

INJECTION PUMP



76G01C-082

1. No.3 engine mount and idler
2. Injection pipe
3. Injection pump
4. Oil level gauge and stay
5. Oil pipe
6. Fuel feed pipe
7. Oil pressure switch
8. Water pipe
9. Water pump

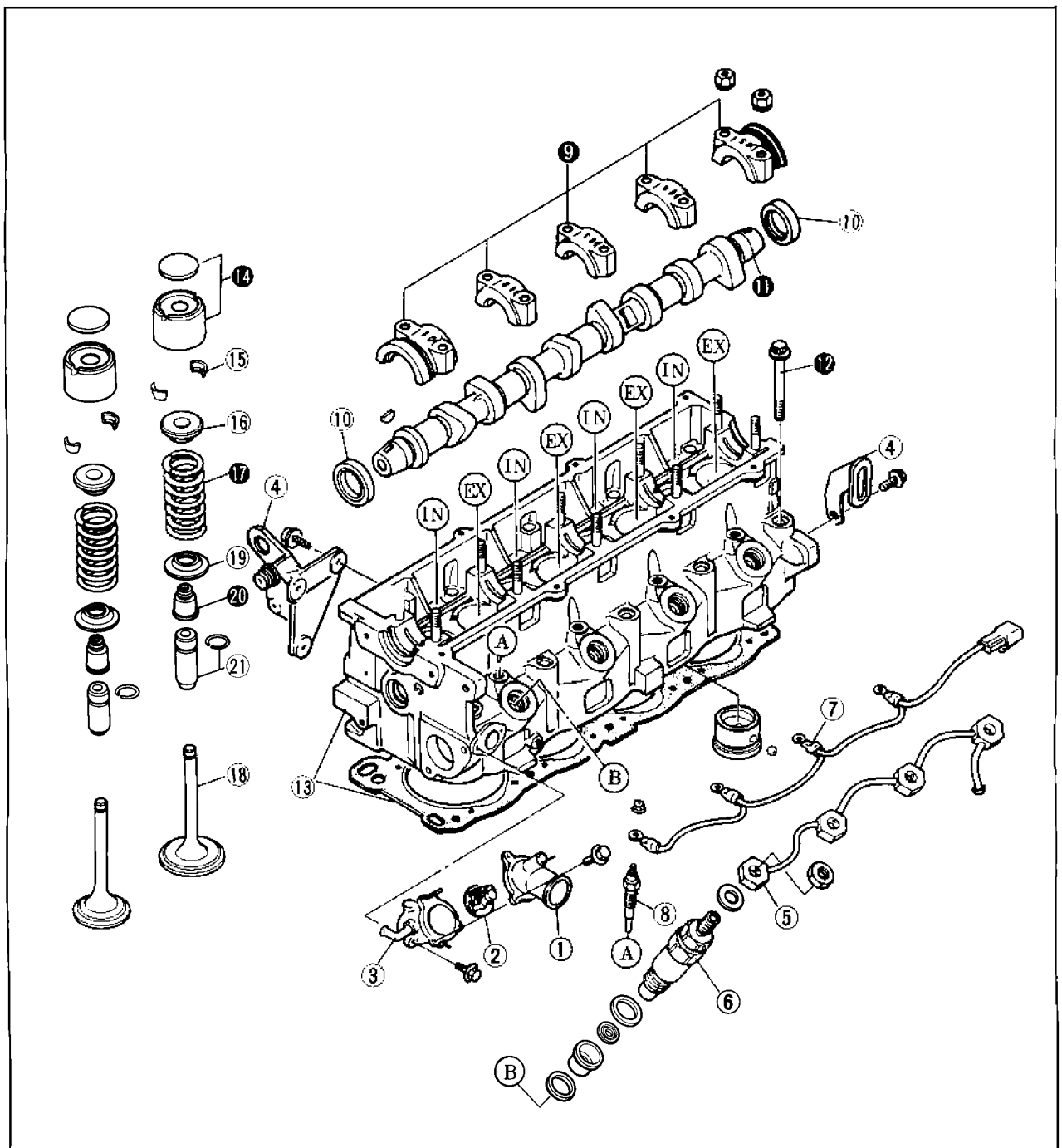


76G01C-083

Disassembly Note
Injection pump
Remove the injection pump with its brackets.
If separate them, adjust the injection timing after installing the timing belt referring to Section 4D.

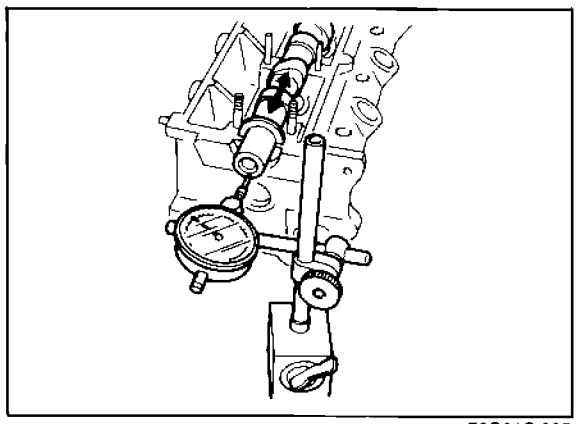
1C DISASSEMBLY (CYLINDER HEAD)

CYLINDER HEAD



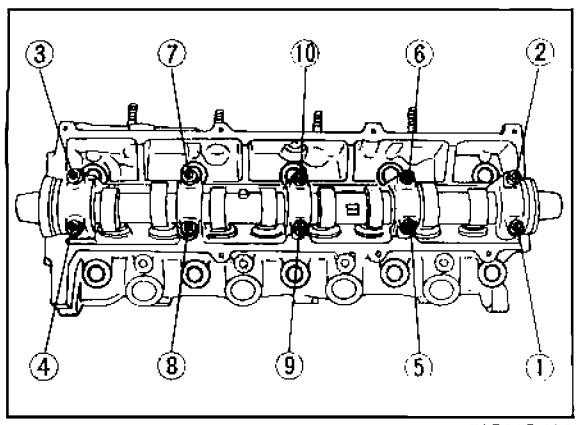
76G01C-079

1. Thermostat cover
2. Thermostat
3. Thermostat case
4. Front and rear engine hanger
5. Fuel leak pipe
6. Injection nozzle
7. Glow cord
8. Glow plug
9. Camshaft cap
10. Oil seal
11. Camshaft
12. Cylinder head bolt
13. Cylinder head and gasket
14. Tappet and adjusting disc
15. Valve keepers
16. Upper spring seat
17. Valve spring
18. Valve
19. Lower spring seat
20. Valve seal
21. Valve guide and clip



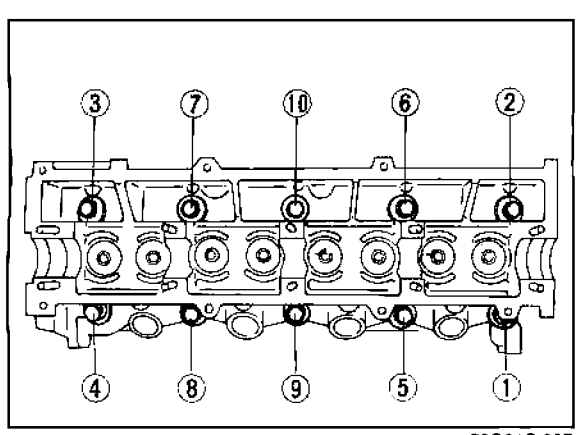
76G01C-085

Disassembly Note
Camshaft
During disassembly, clean the bearings and journals, and measure the following:
1. Camshaft end play. (Refer to page 1C—55)
2. Camshaft journal oil clearance . (Refer to page 1C—54)



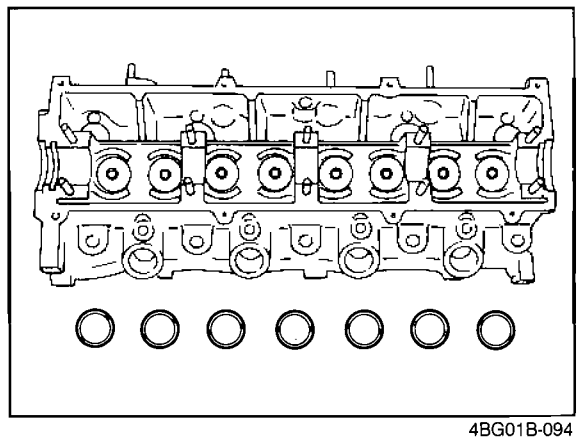
76G01C-086

Camshaft cap
Loosen the camshaft cap nuts in two or three steps in the order shown in the figure.



76G01C-087

Cylinder head bolt
1. Loosen the cylinder head bolts in two or three steps in the order shown in the figure.
2. Remove the cylinder head by tapping the cylinder head with a plastic hammer.

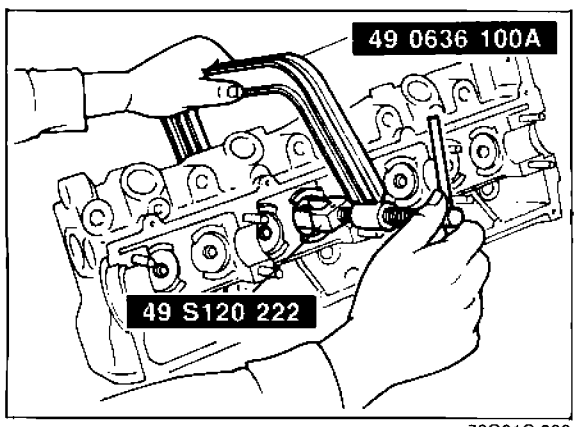


4BG01B-094

Adjusting disc and tappet
Remove the adjusting discs and tappets as a set.

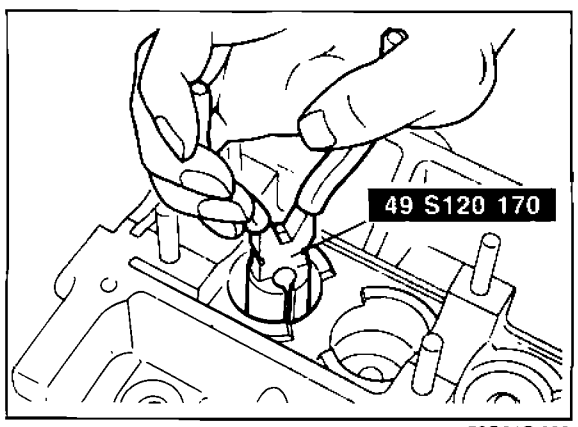
Caution
All adjusting discs and tappets should be disassembled in a way so that correct reassembly can be performed.

1C DISASSEMBLY (CYLINDER HEAD)



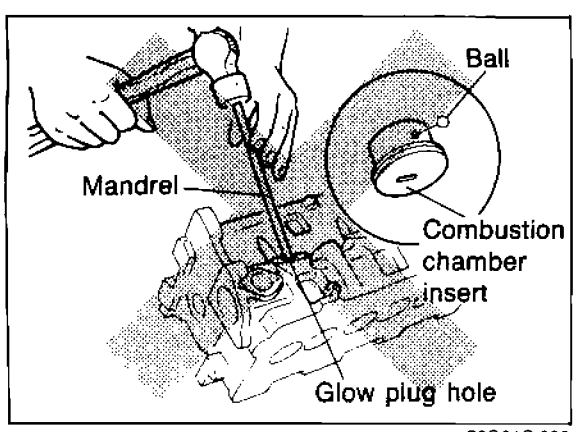
76G01C-088

Valve spring
Remove the valve, spring seats and valve keepers from the cylinder head with the **SST**.



76G01C-089

Valve seal
After removing the lower spring seats, remove the valve seals with the **SST**.

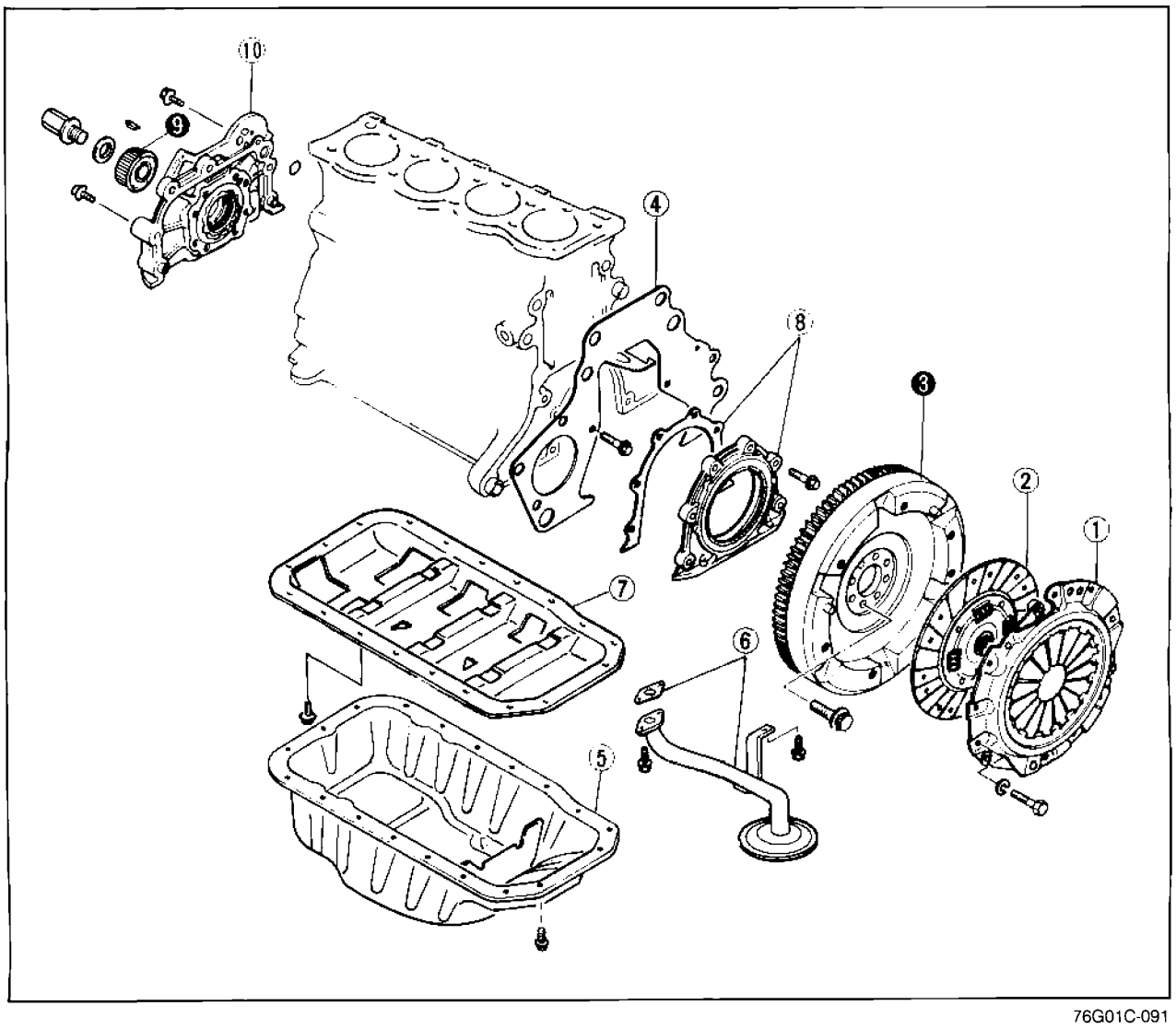


76G01C-090

Combustion chamber insert

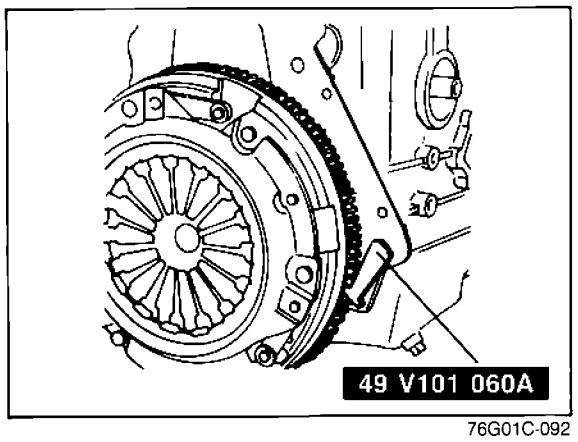
Caution
Do not remove the combustion chamber insert as the cylinder head and the combustion chamber insert are machined together, replace the combustion chamber insert and cylinder head as an assembly.

CYLINDER BLOCK—I



76G01C-091

1. Clutch cover
2. Clutch disc
3. Flywheel
4. End plate
5. Oil pan
6. Oil strainer
7. Stiffener (RF-CX)
8. Rear cover
9. Timing belt pulley
10. Oil pump assembly



76G01C-092

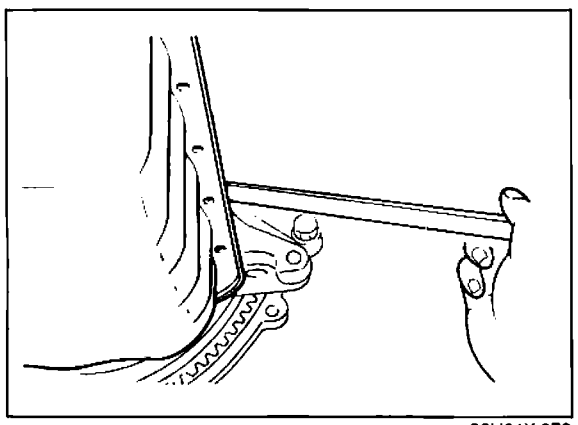
Flywheel

1. Install the **SST** to the flywheel.
2. Remove the clutch cover, clutch disc and flywheel.

Timing belt pulley

1. Reverse the direction of the **SST**.
2. Remove the timing belt pulley.

1C DISASSEMBLY (CYLINDER BLOCK)



86U01X-072

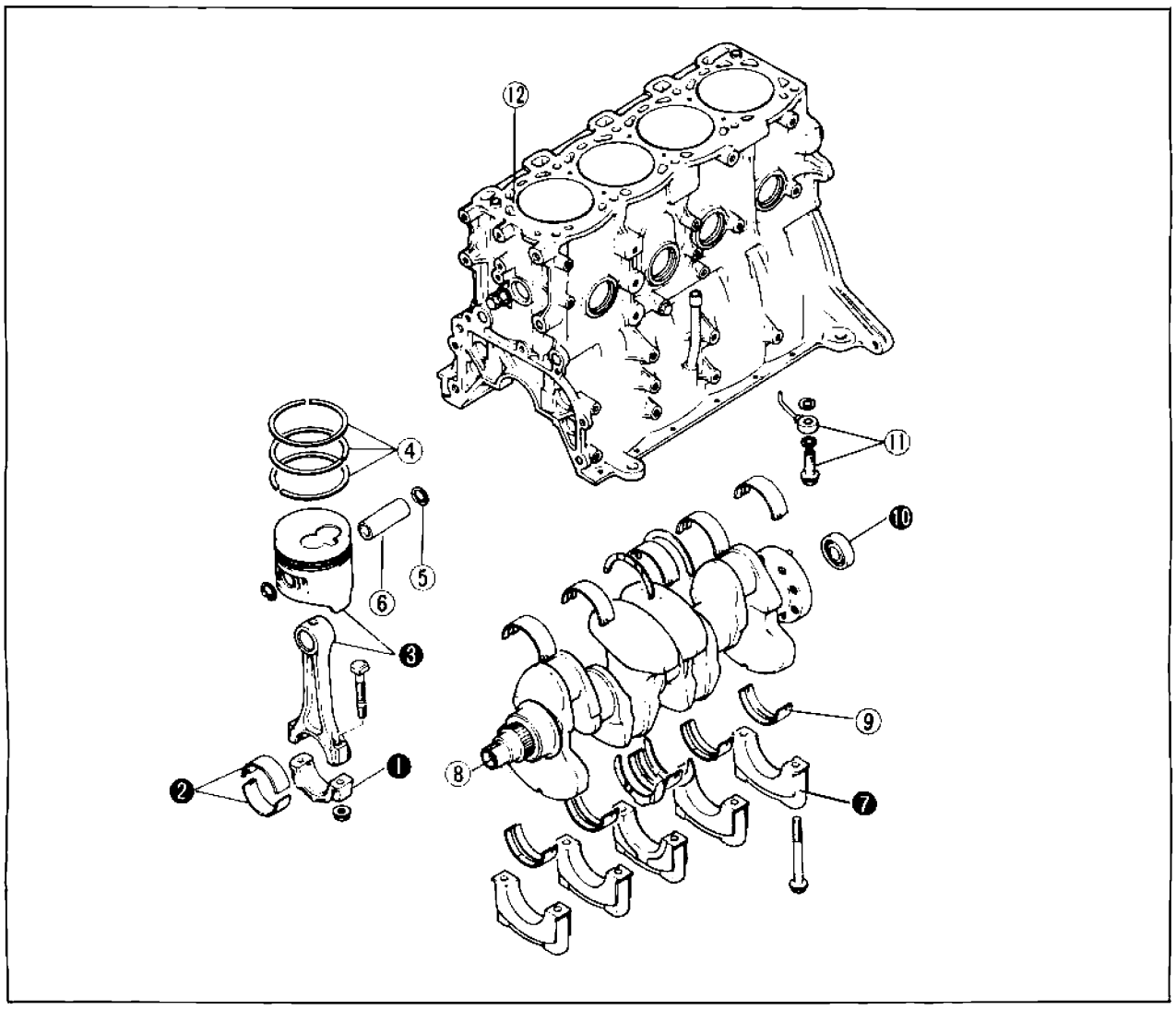
Oil pan

1. Remove the oil pan mounting bolts.
2. Insert a scraper or a suitable tool between the oil pan and the stiffener to separate them.

Caution
Do not bend the oil pan when prying loose.

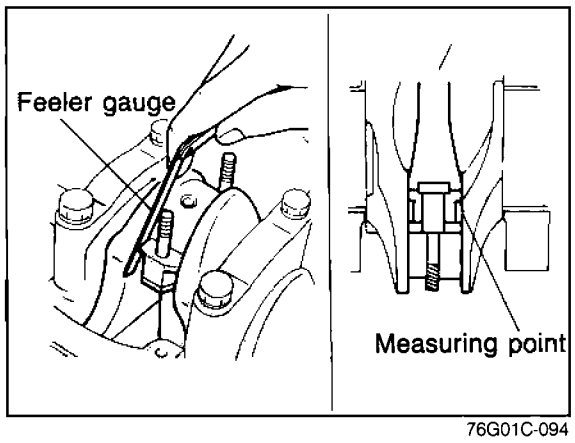
3. Remove the oil pan.

CYLINDER BLOCK—II



76G01C-093

1. Connecting rod cap
2. Connecting rod bearing
3. Connecting rod and piston
4. Piston ring
5. Snap ring
6. Piston pin
7. Main bearing cap
8. Crankshaft
9. Main bearing
10. Pilot bearing
11. Oil jet
12. Cylinder block



76G01C-094

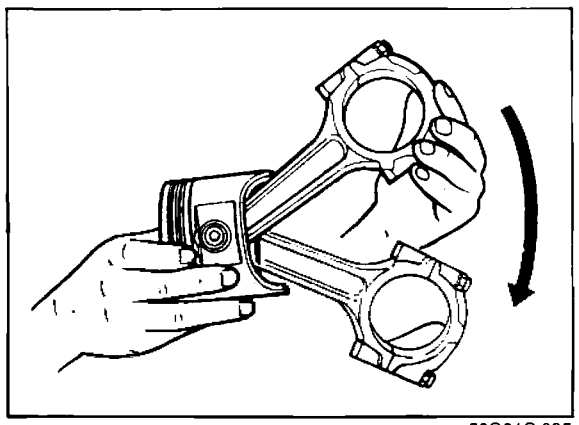
Disassembly Note

Connecting rod and cap

During disassembly, clean the bearing, connecting rod, and crankpin, and measure the following:

1. Connecting rod side clearance. (Refer to page 1C—67.)
2. Crankpin oil clearance.(Refer to page 1C—66.)

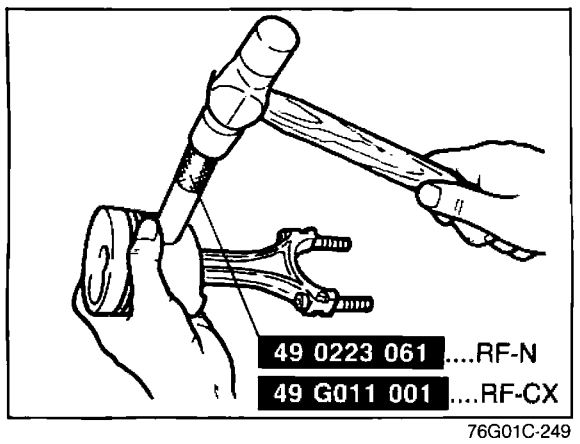
1C DISASSEMBLY (CYLINDER BLOCK)



76G01C-095

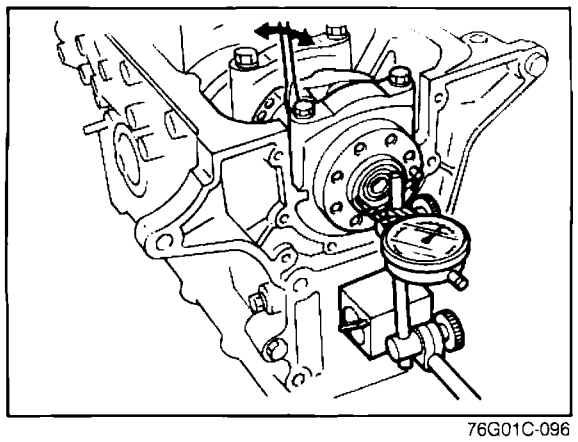
Piston and connecting rod

1. Before disassembling the piston and connecting rod, check the oscillation torque as shown in the figure. If the large end does not drop by its own weight, replace the piston or the piston pin.



76G01C-249

2. Remove the snap rings from the piston.
3. Remove the piston pin with the **SST**.

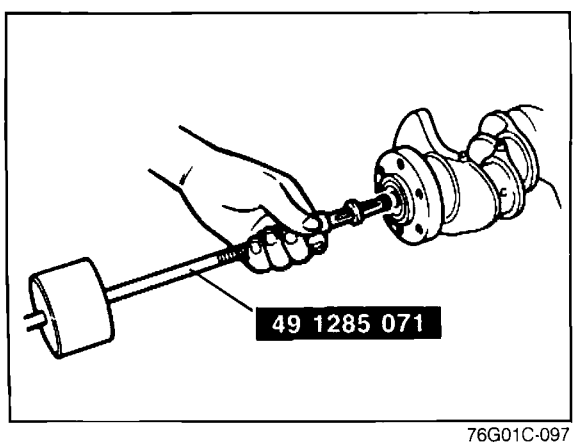


76G01C-096

Main bearing cap

During disassembly, clean the bearings, main journals, and caps, and measure the following:

1. Crankshaft end play. (Refer to page 1C—65.)
2. Main journal oil clearance. (Refer to page 1C—64.)



76G01C-097

Pilot bearing

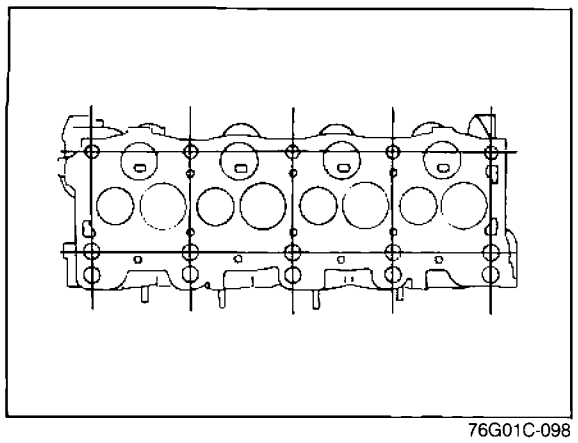
Remove the pilot bearing from the crankshaft with the **SST**.

INSPECTION AND REPAIR

1. Clean all parts, taking care to remove any gasket fragments, dirt, oil or grease, carbon, moisture residue, or other foreign materials.
2. Inspect and repair must be performed in the order specified.

Caution
Be careful not to damage the joints or friction surfaces of aluminum alloy components (such as the cylinder head or pistons).

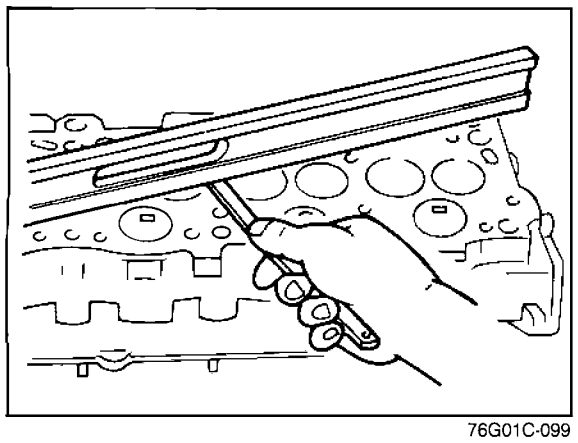
86U01X-077



76G01C-098

Cylinder Head
1. Inspect the cylinder head for damage, cracks, and leakage of water or oil. Replace if necessary.
2. Measure the cylinder head distortion in the seven directions shown in the figure.

Distortion: 0.10 mm (0.004 in) max.

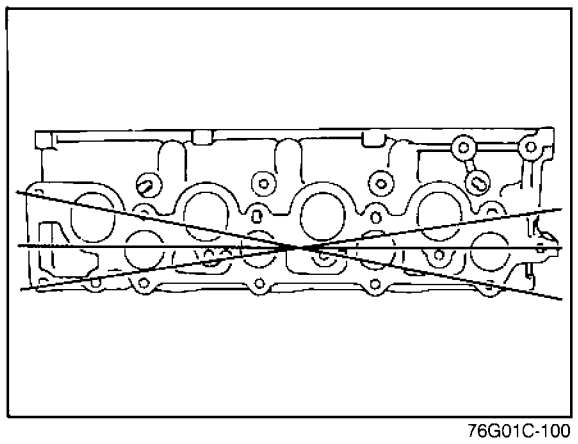


76G01C-099

3. If the cylinder head distortion exceeds specificafion replace the cylinder head.

Height:
133.9—134.1 mm (5.272—5.280 in)

Caution
Do not attempt to repair a cylinder head by milling or grinding.

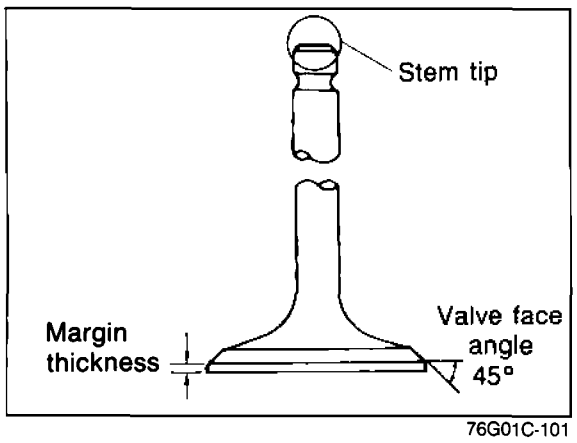


76G01C-100

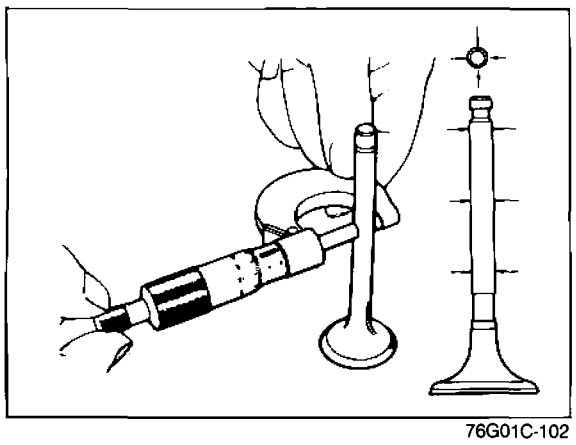
4. Measure the manifold contact surface distortion in the three directions shown in the figure.

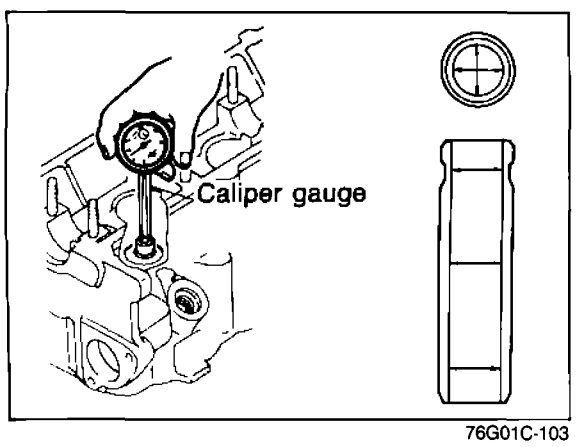
Distortion: 0.20 mm (0.008 in) max.

5. If distortion exceeds specification replace the cylinder head.

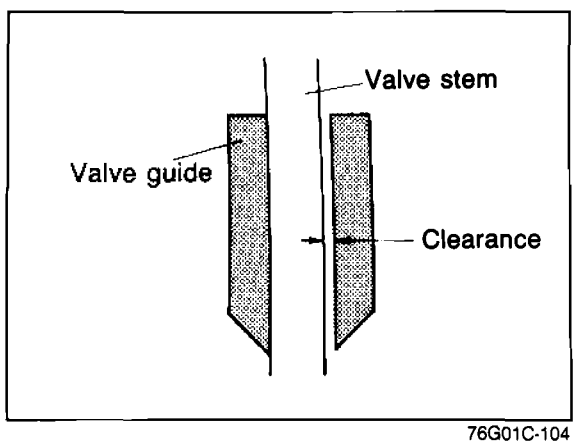


76G01C-101


76G01C-102



76G01C-103



76G01C-104

Valve and Valve Guide

1. Inspect each valve for the following. Replace or resurface if necessary.
   (1) Damaged or bent stem
   (2) Roughness or damage to face
   (3) Damage or uneven wear of stem tip
2. Check the valve head margin thickness. Replace if necessary.

Margin thickness mm (in)

RF-CX	IN	1.80 (0.071)
	EX	1.65 (0.065)
RF-N	IN	0.80 (0.031)
	EX	0.80 (0.031)

3. Measure the valve length.

Length
IN : 106.9 mm (4.209 in)
EX: 106.8 mm (4.205 in)

4. Measure the valve stem diameter.

Diameter
IN : 7.970—7.985 mm (0.3138—0.3144 in)
EX: 7.965—7.980 mm (0.3136—0.3142 in)

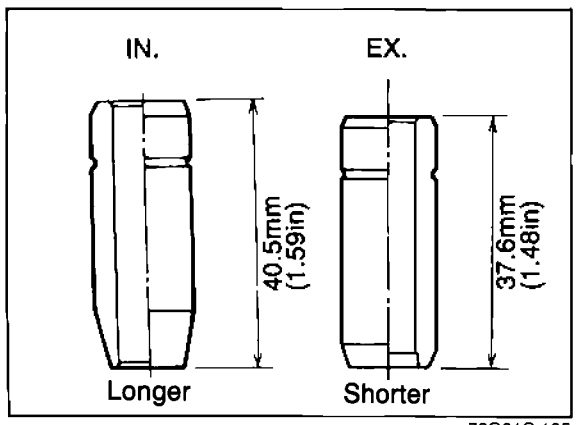
5. Measure the valve guide inner diameter.

Inner diameter
IN : 8.025—8.045 mm (0.3159—0.3167 in)
EX: 8.025—8.045 mm (0.3159—0.3167 in)

6. Measure the valve stem to guide clearance.
   (1) Method No. 1
   Subtract the outer diameter of the valve stem from the inner diameter of the corresponding valve guide.

Clearance
IN : 0.040—0.075 mm (0.0016—0.0030 in)
EX: 0.045—0.080 mm (0.0018—0.0031 in)
Maximum: 0.10 mm (0.004 in)

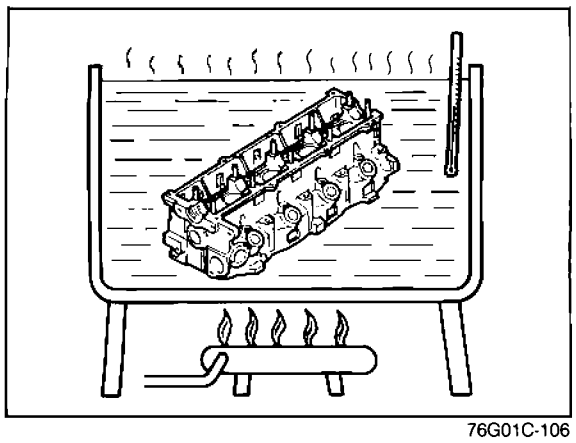
7. If the clearance exceeds the maximum, replace the valve and/or valve guide.



76G01C-105

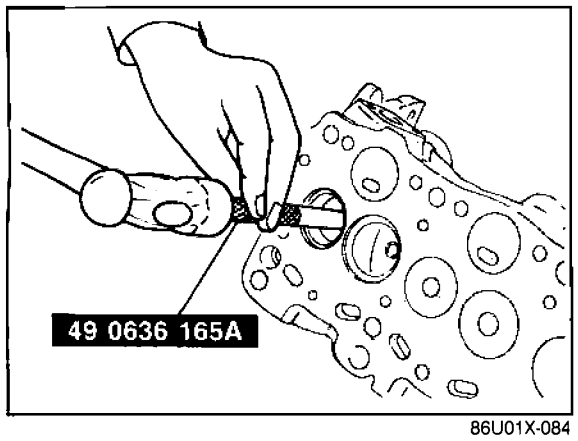
Replacement of valve guide

Caution
When the valve guide is replaced, check the gap between the valve and guide once again.
The valve seal should be installed after inspection and repair of the valve seat.
Don't misassemble the valve guides because intake and exhaust valve guides have a different seat.
Intake side valve guide ..... longer
Exhaust side valve guide ..... shorter



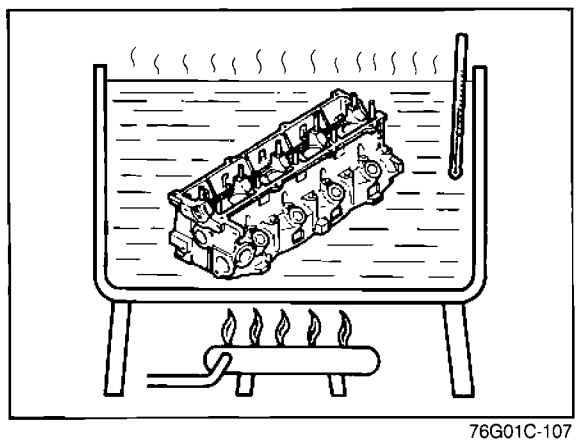
76G01C-106

Removal
1. Gradually heat the cylinder head in water to **approx. 90°C (194°F)**.



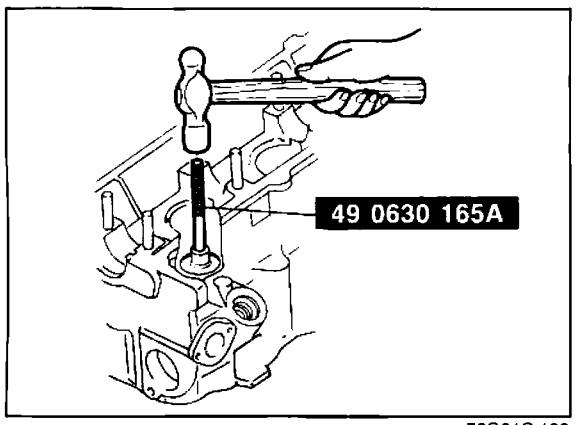
86U01X-084

2. Remove the valve guide from the side opposite the combustion chamber with the **SST**.



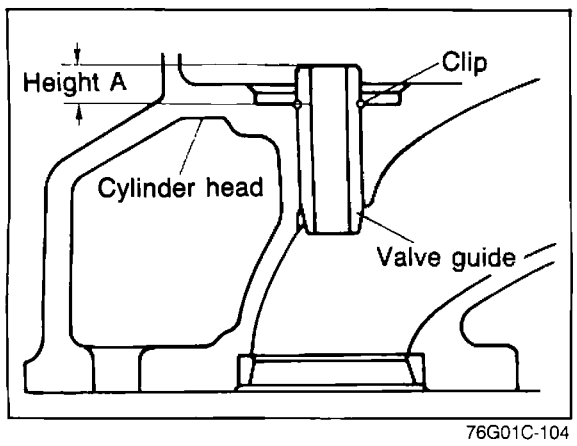
76G01C-107

Installation
1. Gradually heat the cylinder head in water to **approx. 90°C (194°F)**.



76G01C-103

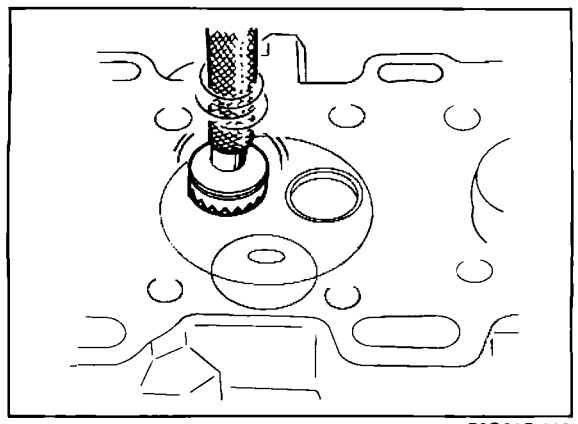
2. Fit the clip onto the valve guide.
3. Tap the valve guide in from the side opposite the combustion chamber with the **SST** until the clip contacts the cylindrical head.



76G01C-104

4. Check the guide protrusion height (dimension A in the figure) is as specified.

Height:
8.3—8.8 mm (0.327—0.346 in)



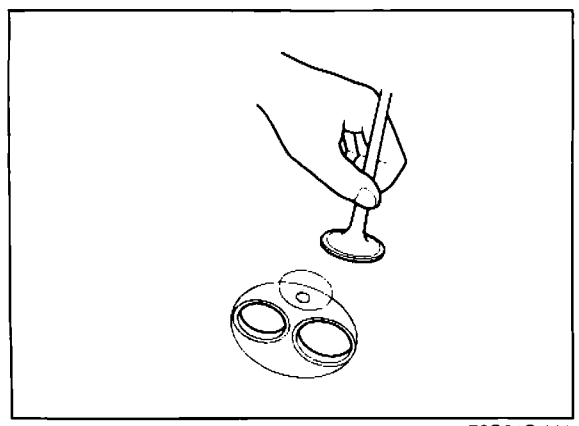
76G01C-110

Valve Seat

1. Inspect the contact surface of the valve seat and valve face for the following.
   (1) Roughness
   (2) Damage
2. If necessary, resurface the valve seat to the specified angle with valve seat cutter and/or resurface the valve face.

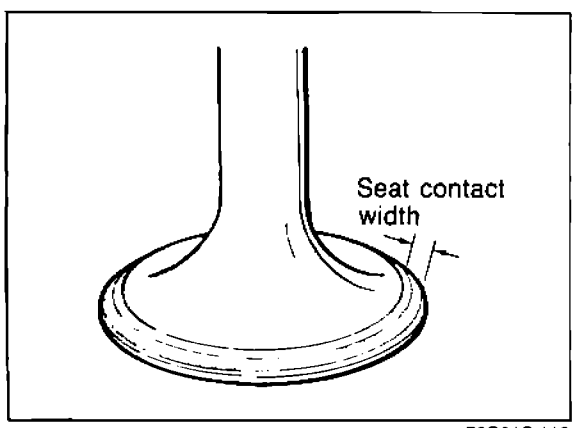
Angle

RF-CX	IN	60°
	EX	45°
RF-N	IN	45°
	EX	45°



76G01C-111

3. Apply a thin coat of prussian blue to the valve face.
4. Check the valve seating by pressing the valve against the seat.
   (1) If blue does not appear 360° around the valve face, replace the valve.
   (2) If blue does not appear 360° around the valve seat, resurface the seat.

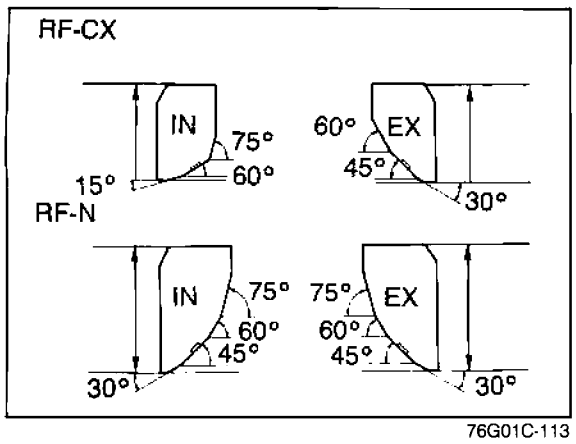


76G01C-112

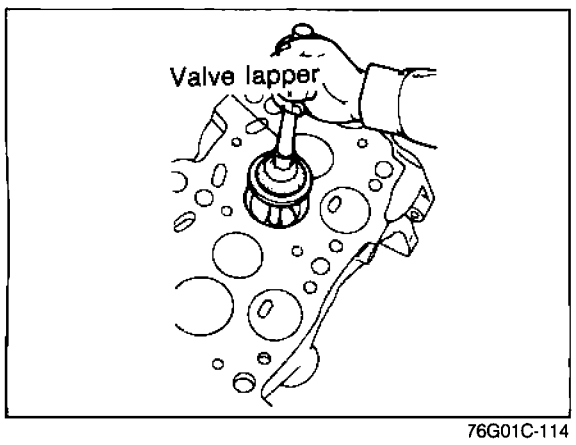
5. Check the seat contact width.

Width mm (in)

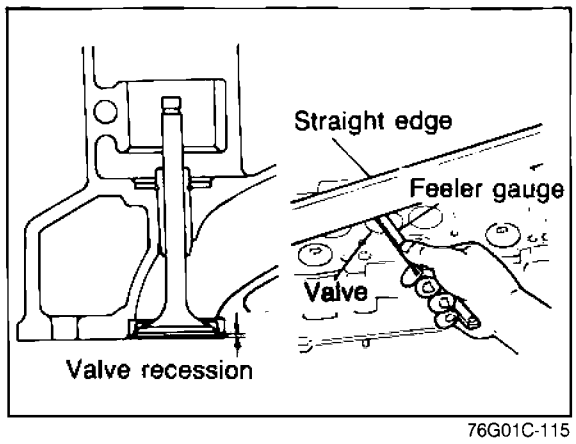
RF-CX	IN	1.4—1.8 (0.055—0.071)
	EX	1.64—2.04 (0.065—0.080)
RF-N	IN	1.7—2.3 (0.067—0.091)
	EX	1.7—2.3 (0.067—0.091)



76G01C-113



76G01C-114



76G01C-115

6. Check that the valve seating position is at the center of the valve face.
   (1) If the seating position is too high, correct the valve seat as below.

Angle

		1st	2nd
RF-CX	IN	75°	60°
	EX	60°	45°
RF-N	IN	60°	45°
	EX	60°	45°

   (2) If the seating position is too low, correct the valve seat as below.

Angle

		1st	2nd
RF-CX	IN	15°	45°
	EX	30°	45°
RF-N	IN	30°	45°
	EX	30°	45°

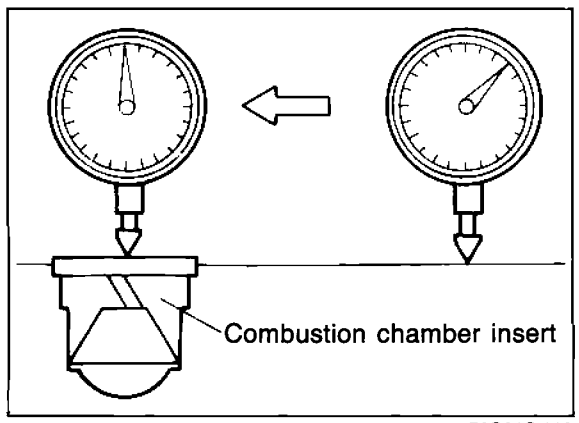
7. Seat the valve to the valve seat with a lapping compound.

Caution
Do not let compound adhere to the valve stem.

8. Measure the receded amount from the cylinder head surface by using a feeler gauge.

Recession:
0.75—1.05 mm (0.030—0.041 in)
Maximum: 2.55 mm (0.100 in)

   (1) If the receded amount is **1.55—2.55 mm (0.061—0.100 in)**, install the washer into the valve spring seat area.
   The washer thickness should be equal to the amount subtracted **1 mm (0.04 in)** from the receded amount.
   (2) If the receded amount exceeds **2.55 mm (0.100 in)**, replace the cylinder head.



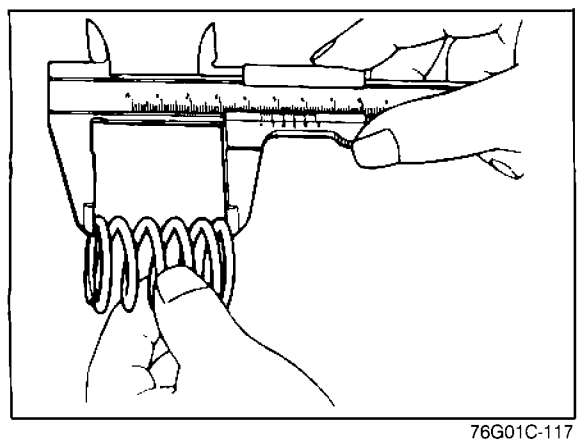
76G01C-116

Combustion Chamber Insert

1. Inspect the combustion chamber insert for damage or crack, replace if necessary.
2. Mesure the receded or projected amount of combustion chamber insert from cylinder head surface.

Recession: 0.020 mm (0.0008 in) max.
Projection: 0.005 mm (0.0001 in) max.

If it exceeds the specification, replace the combustion chamber insert and the cylinder head as an assembly.

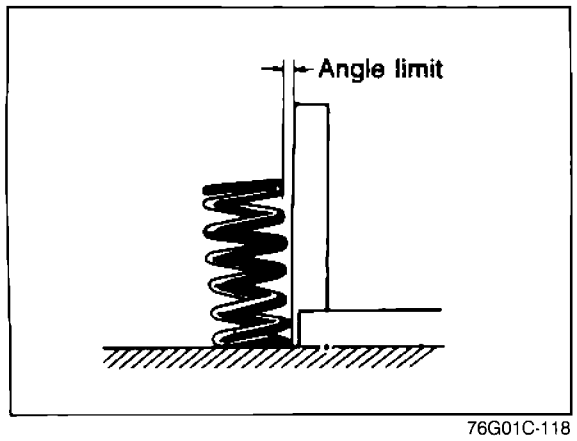


76G01C-117

Valve Spring

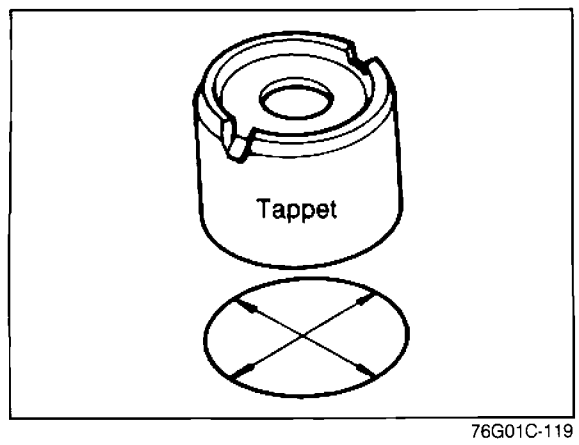
1. Inspect each valve spring for cracks or damage.
2. Check the free length and angle. Replace if necessary.

Free length: 45.11 mm (1.776 in)
Minimum: 44.8 mm (1.764 in)



76G01C-118

Angle: 1.6 mm (0.06 in) max.

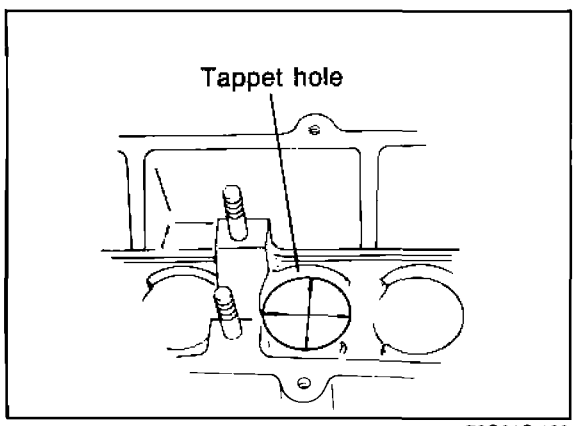


76G01C-119

Tappet

1. Check the tappet to tappet hole clearance.
   (1) Measure the tappet outer diameter.

Diameter:
34.95—34.97 mm (1.3764—1.3768 in)



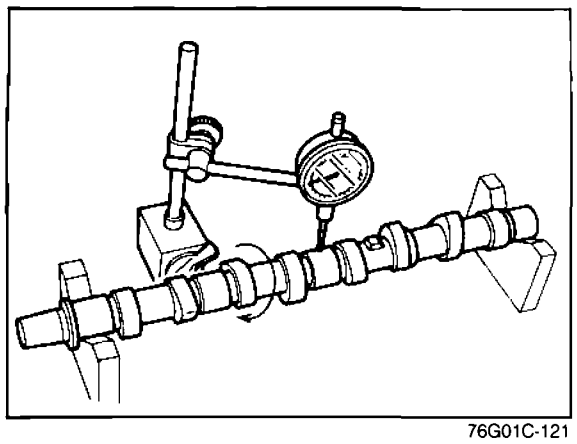
76G01C-120

(2). Measure the inner diameter of the tappet hole in the cylinder head.

Hole diameter:
34.99—35.01 mm (1.3776—1.3787 in)

2. Calculate the difference (clearance) between the tappet diameter and hole inner diameter.
If the clearance exceeds the specification , replace the tappet or the cylinder head.

Clearance: 0.10 mm (0.004 in) max.

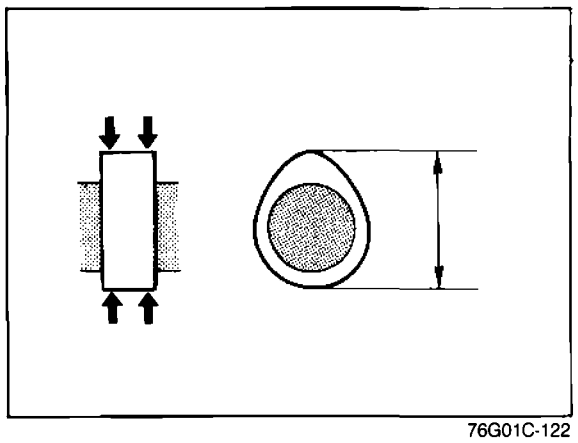


76G01C-121

Camshaft

1. Set the front and rear journals on V-blocks. Check the camshaft runout. Replace if necessary.

Runout: 0.10 mm (0.004 in) max.

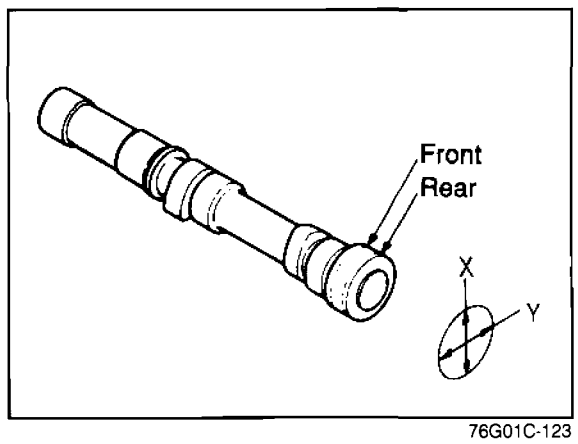


76G01C-122

2. Check the cam for wear or damage. Replace if necessary.
3. Check the cam lobe height at the two points as shown in the figure.

Height mm (in)

		Standard	Mimimum
RF-CX	IN	42.521 (1.6741)	42.11 (1.658)
	EX	45.300 (1.7835)	44.90 (1.768)
RF-N	IN	44.306 (1.7443)	43.90 (1.728)
	EX	45.300 (1.7835)	44.90 (1.768)

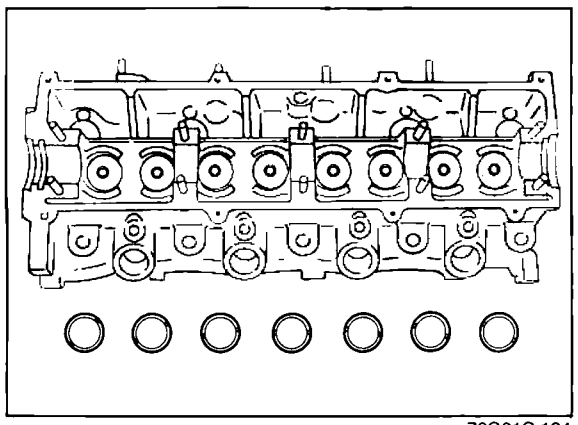


76G01C-123

4. Measure wear of the journals in X and Y directions at the two points as shown in the figure.

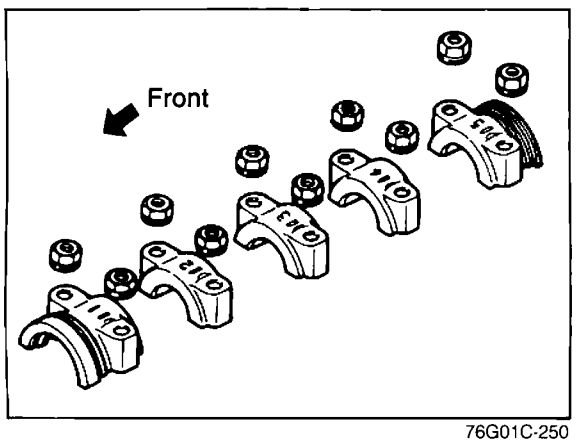
Diameter:
31.959—31.975 mm (1.2582—1.2589 in)

Out-of-round: 0.05 mm (0.002 in) max.



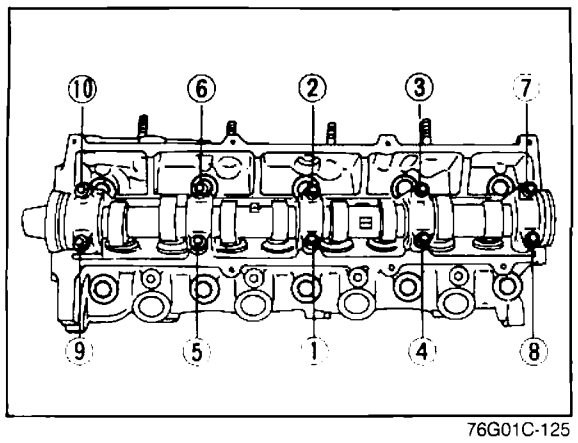
76G01C-124

5. Measure the oil clearance of the camshaft.
   (1) Remove the tappets and adjusting discs from the cylinder head, and separate them by cylinder.



76G01C-250

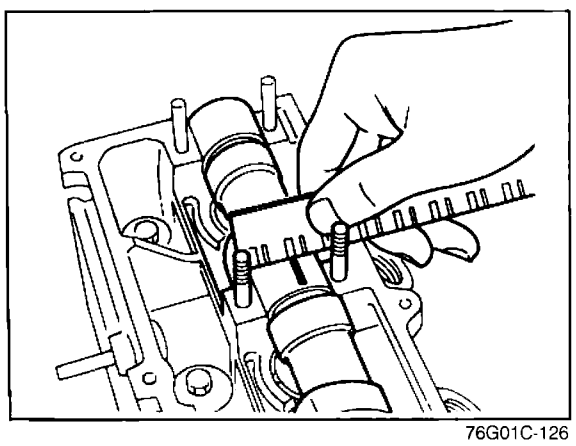
   (2) Clean the camshaft and cylinder head journal.
   (3) Install the camshaft into position.
   (4) Set a Plasti-gauge on the camshaft journal in the axial direction.
   (5) Install the camshaft caps according to the number and arrow marks.



76G01C-125

   (6) Tighten the camshaft caps evenly and in order shown in the figure.

Tighten torque:
20—26 N·m (2.0—2.7 m-kg, 14—20 ft-lb)

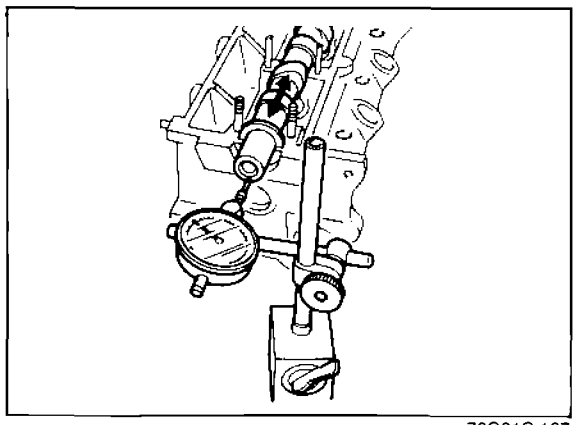


76G01C-126

   (7) Remove the camshaft caps and measure the oil clearance.

Oil clearance:
0.025—0.066 mm (0.0010—0.0026 in)
Maximum: 0.10 mm (0.004 in)

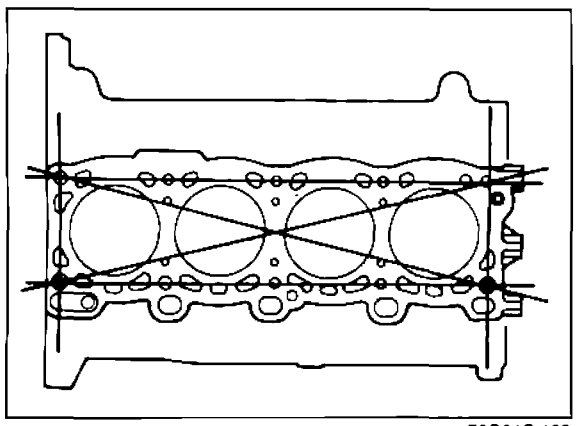
   (8) If the oil clearance exceeds the maximum, replace the cylinder head or camshaft.



76G01C-127

6. Measure the camshaft end play. If it exceeds the maximum, replace the camshaft and/or the cylinder head.

End play:
0.02—0.15 mm (0.0008—0.0059 in)
Maximum: 0.20 mm (0.008 in)

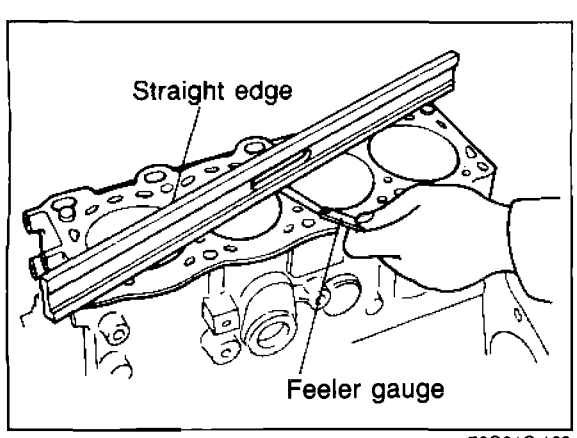


76G01C-128

Cylinder Block

1. Check the cylinder block. Repair or replace if necessary.
   (1) Leakage damage
   (2) Cracks
   (3) Scoring of wall
2. Measure the distortion of the top surface of the cylinder block in the six directions as shown in the figure.

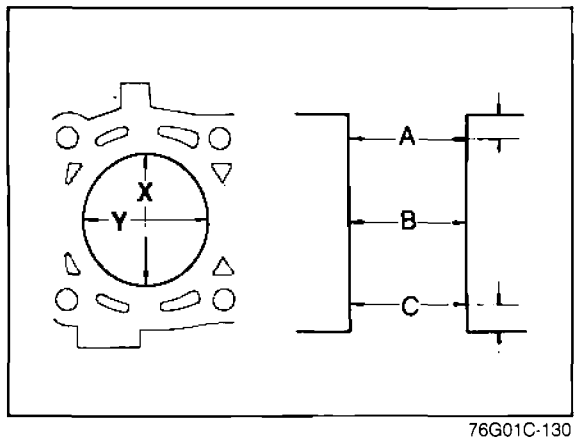
Distortion: 0.10 mm (0.004 in) max.



76G01C-129

3. If the distortion exceeds the maximum, replace the cylinder block.

Caution
Do not grind the surface of the cylinder block.

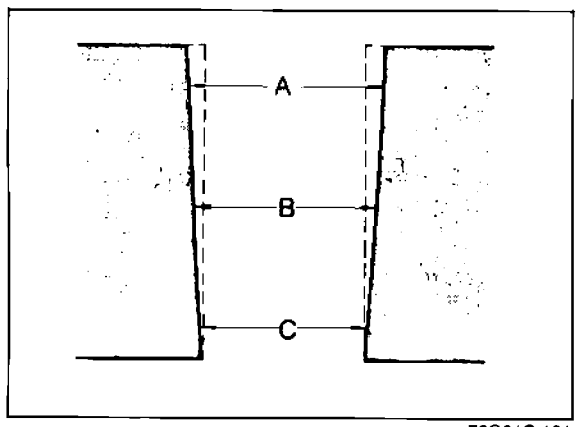


76G01C-130

4. Measure the cylinder bore in directions X and Y at three levels in each cylinder as shown.

Cylinder bore mm (in)

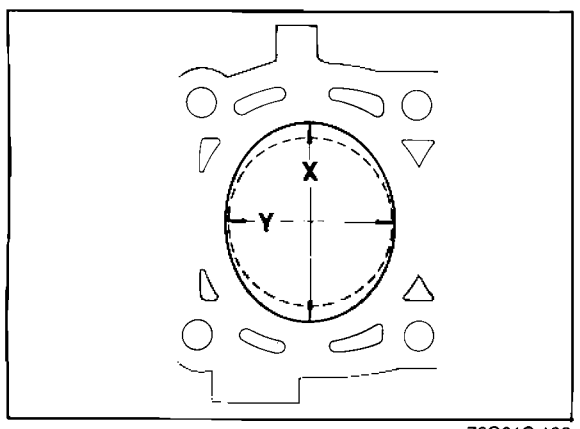
Size	Bore
Standard	86.000—86.022 (3.3858—3.3867)
0.25 (0.010) oversize	86.250—86.272 (3.3957—3.3965)
0.50 (0.020) oversize	86.500—86.522 (3.4055—3.4064)



76G01C-131

(1) If the difference between the measurement A and C exceeds the maximum taper, rebore the cylinder to oversize.

Taper: 0.022 mm (0.0009 in) max.

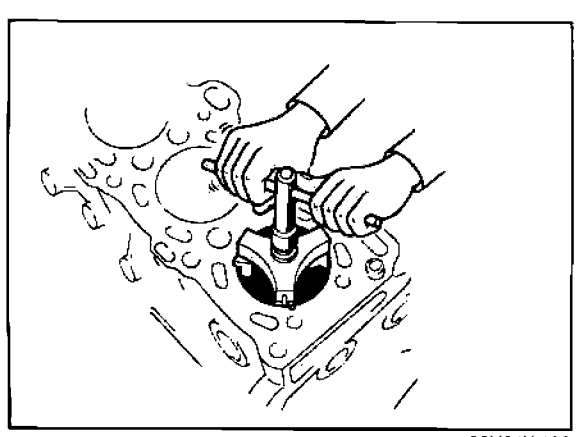


76G01C-132

(2) If the difference between the measurement X and Y exceeds the maximum out-of-round, rebore the cylinder to oversize.

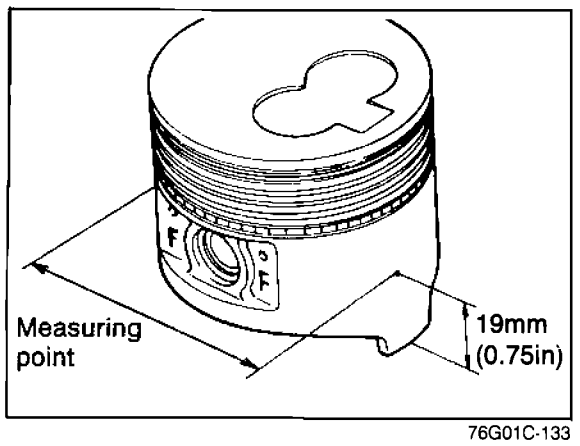
Out-of-round: 0.022 mm (0.0009 in) max.

Caution
The boring size should be based on the size of an oversize piston and be the same for all cylinders.



86U01X-102

5. If the upper part of the cylinder wall shows uneven wear, remove the ridge with a ridge reamer.



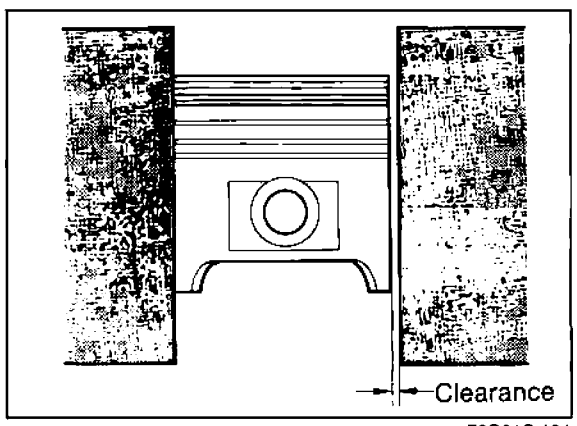
76G01C-133

Piston

1. Inspect the outer circumferences of all pistons for seizure or scoring. Replace if necessary.
2. Measure the outer diameter of each piston at a right angle (**90°**) to the piston pin, **19 mm (0.75 in)** above the bottom of piston.

Piston diameter mm (in)

Size	Diameter
Standard	85.957—85.983 (3.3841—3.3852)
0.25 (0.010) oversize	86.207—86.233 (3.3940—3.3950)
0.50 (0.020) oversize	86.457—86.483 (3.4038—3.4048)



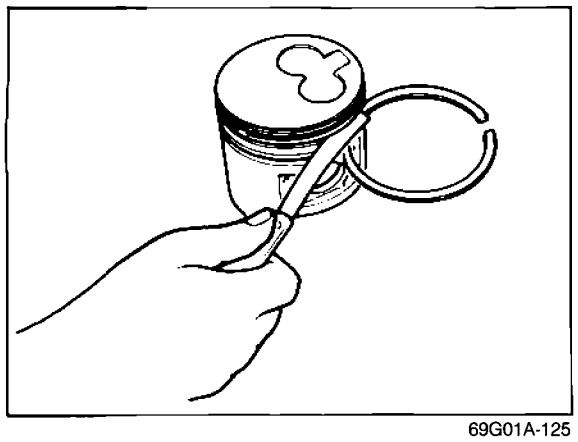
76G01C-134

3. Check the piston to cylinder clearance.

Clearance:
0.032—0.050 mm (0.0013—0.0020 in)
Maximum: 0.15 mm (0.0059 in)

4. If the clearance exceeds the maximum, replace the piston or rebore the cylinders to fit oversize pistons.

Note
If the piston is replaced, replace the piston rings also.



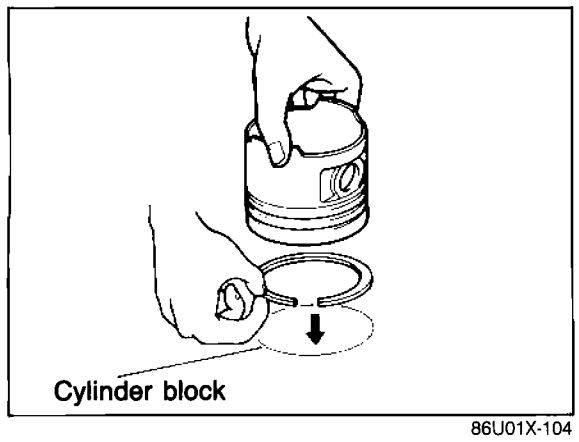
69G01A-125

Piston and Piston Ring

1. Measure the piston ring to ring land clearance around the entire circumference using a new piston ring.

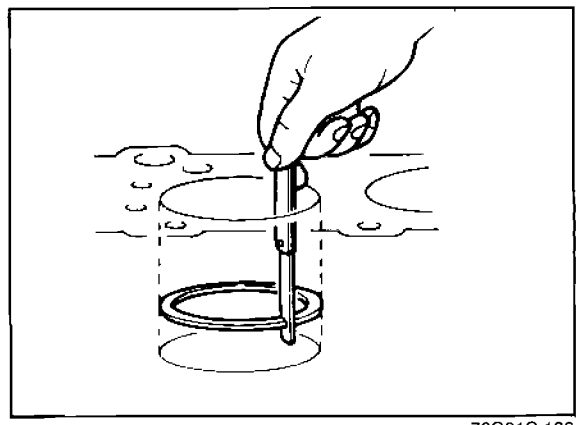
Clearance (Top)
RF-CX: 0.18—0.22 mm (0.0071—0.0087 in)
RF-N : 0.05—0.09 mm (0.0020—0.0035 in)
Clearance (Second):
0.04—0.08 mm (0.0016—0.0031 in)
Maximum: 0.2 mm (0.008 in)

2. If the clearance exceeds the maximum, replace the piston.



86U01X-104

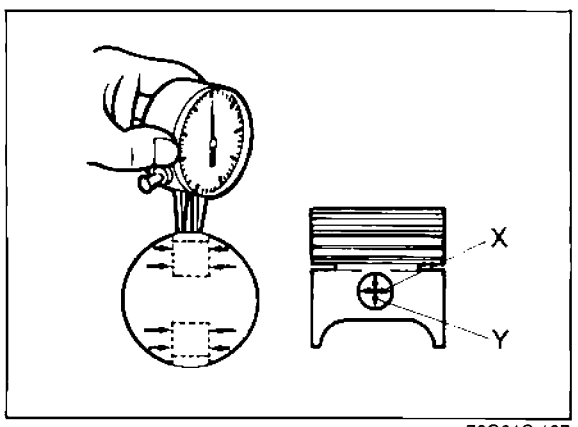
3. Inspect the piston rings for damage, abnormal wear, or breakage. Replace if necessary.
4. Insert the piston ring into the cylinder by hand and push it to the bottom of the ring travel in using the piston.



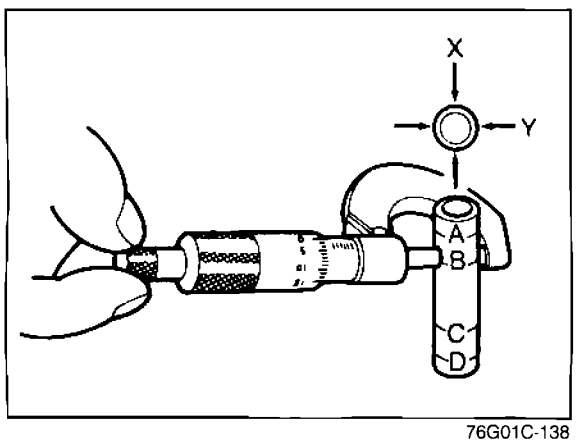
76G01C-136

5. Measure each piston ring end gap with a feeler gauge. Replace if necessary.

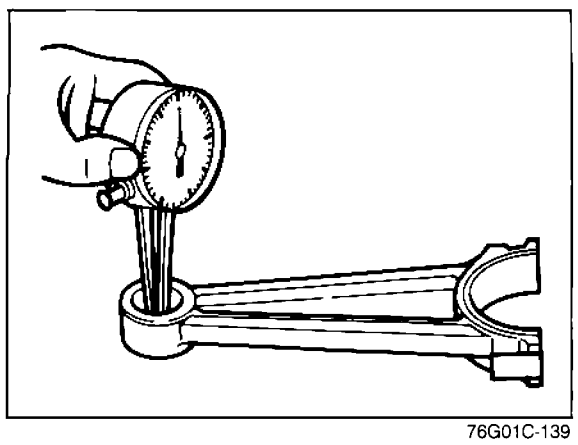
End gap (Top and second)
RF-CX: 0.20—0.35 mm (0.008—0.014 in)
RF-N : 0.20—0.40 mm (0.008—0.016 in)
End gap (Oil rail):
0.20—0.40 mm (0.008—0.016 in)
Maximum: 1.0 mm (0.039 in)



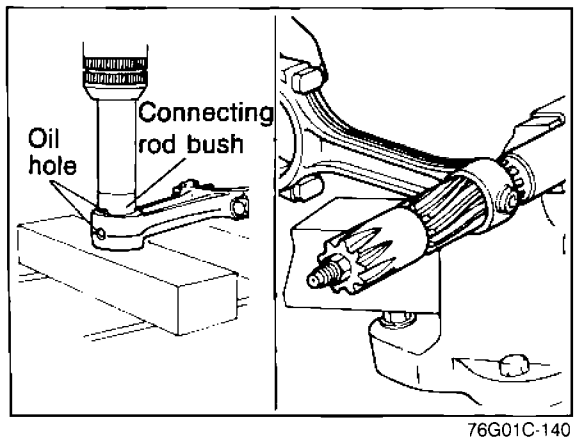
76G01C-137



76G01C-138



76G01C-139



76G01C-140

Piston and Piston Pin

1. Measure the piston pin hole diameter in X and Y directions at four points.

Diameter mm (in)

RF-CX	29.997—30.007 (1.1810—1.1814)
RF-N	24.997—25.007 (0.9841—0.9845)

2. Measure the piston pin diameter.

Diameter mm (in)

RF-CX	29.994—30.000 (1.1809—1.1811)
RF-N	24.994—25.000 (0.9840—0.9843)

3. Determine the piston pin to piston clearance by subtracting the two figures.

Clearance:
–0.003—0.013 mm (0.0001—0.0005 in)

4. If the clearance exceeds the specification, replace the piston and/or piston pin.

Connecting Rod

1. Measure the connecting rod small end bore.

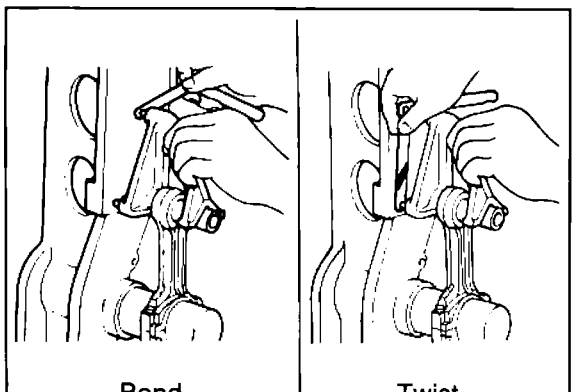
Diameter mm (in)

RF-CX	30.014—30.030 (1.1817—1.1823)
RF-N	25.014—25.030 (0.9848—0.9854)

2. Check the clearance between the small end bore and piston pin.

Clearance:
0.014—0.036 mm (0.0005—0.0015 in)
Maximum: 0.05 mm (0.002 in)

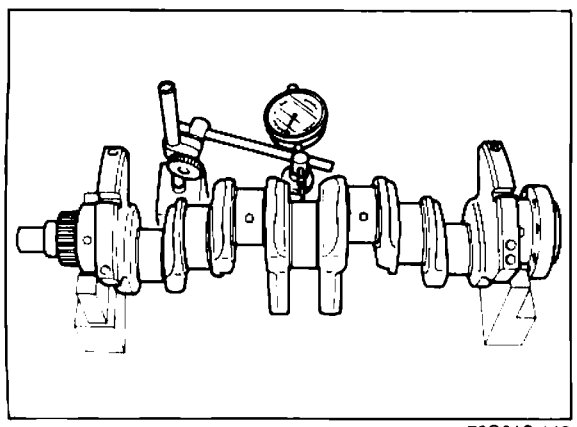
3. If the clearance exceeds the maximum, replace the connecting rod bushing.
   (1) Apply engine oil to the connecting rod and the bushing.
   (2) Align the oil holes of the connecting rod and the bushing, and press the bushing in.
   (3) Correct the bushing inner diameter, so that the clearance is within the specification, by using a spiral expansion reamer.



76G01C-141

4. Check each connecting rod for bending or twisting. Repair or replace if necessary.

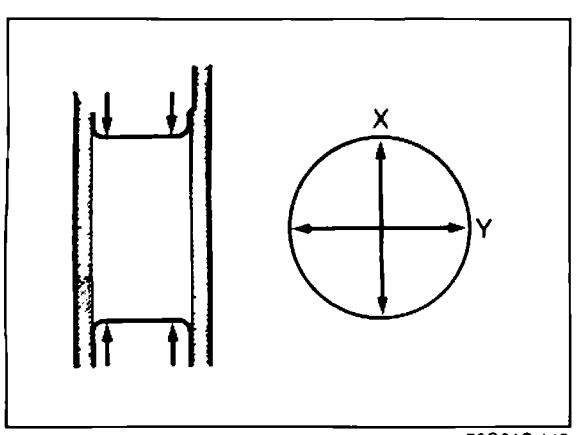
Bend :
0.080 mm (0.0031 in) max.
/50 mm (1.969 in)
Twist:
0.080 mm (0.0031 in) max.
/50 mm (1.969 in)



76G01C-142

Crankshaft
1. Check the journals and pins for damage, scoring, or oil hole clogging.
2. Set the crankshaft on V-blocks.
3. Check the crankshaft runout at the center journal. Replace if necessary.

Runout: 0.05 mm (0.002 in) max.

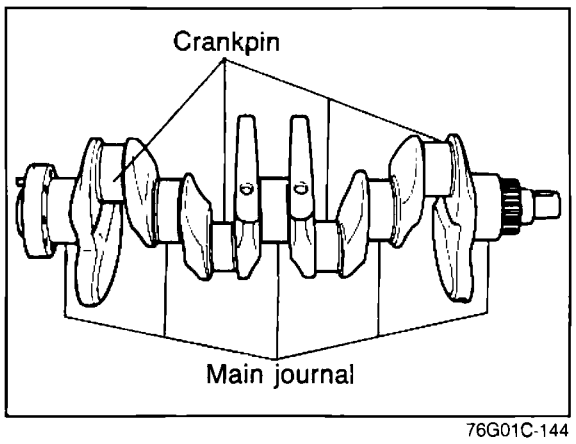


76G01C-143

4. Measure each journal diameter in X and Y directions at two points.

Main journal
Diameter:
59.937—59.955 mm (2.3597—2.3604 in)
Minimum: 59.89 mm (2.358 in)
Out-of-round: 0.05 mm (0.002 in) max.

Crankpin journal
Diameter:
50.940—50.955 mm (2.0055—2.0061 in)
Minimum: 50.89 mm (2.004 in)
Out-of-round: 0.05 mm (0.002 in) max.



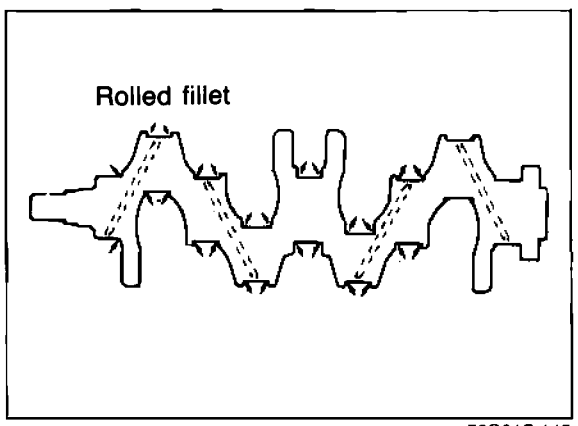
76G01C-144

5. If the diameter is less than the minimum, grind the journals to match undersize bearings.

Undersize bearing: 0.25 mm (0.010 in), 0.50 mm (0.020 in), 0.75 mm (0.030)

Main journal diameter undersize mm (in)

Bearing size	Journal diameter
0.25 undersize	59.687—59.705 (2.3499—2.3506)
0.50 undersize	59.437—59.455 (2.3400—2.3407)
0.75 undersize	59.187—59.205 (2.3302—2.3309)

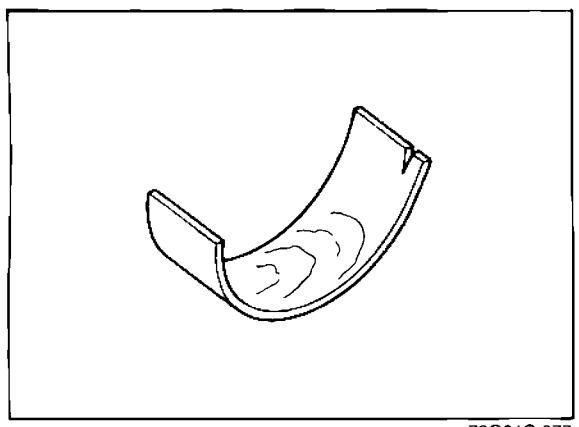


76G01C-145

Crankpin journal diameter undersize mm (in)

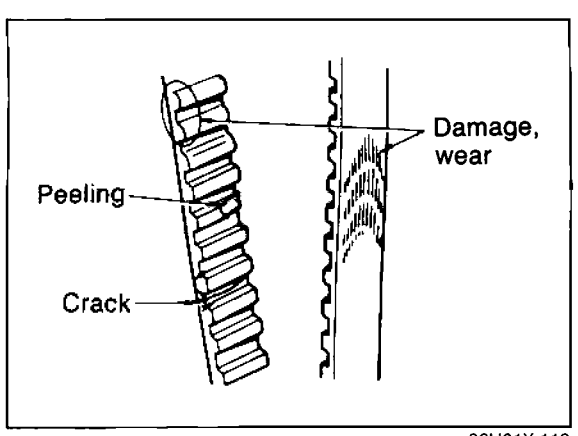
Bearing size	Journal diameter
0.25 undersize	50.690—50.705 (1.9957—1.9963)
0.50 undersize	50.440—50.455 (1.9858—1.9864)
0.75 undersize	50.190—50.205 (1.9760—1.9766)

Caution
Do not grind the rolled fillet area.



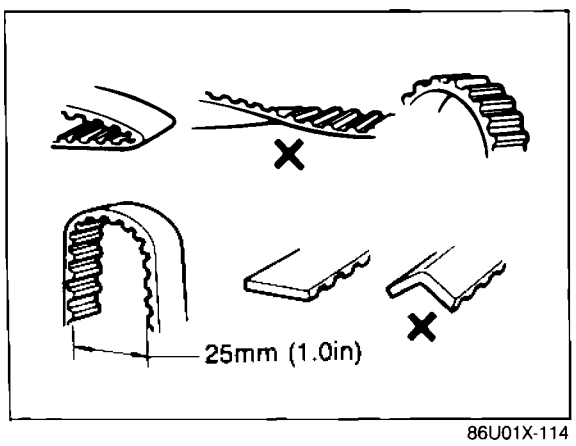
79G01C-077

Main Bearing and Connecting Rod Bearing
Check the main bearings and the connecting rod bearings for peeling, scoring, or other damage.



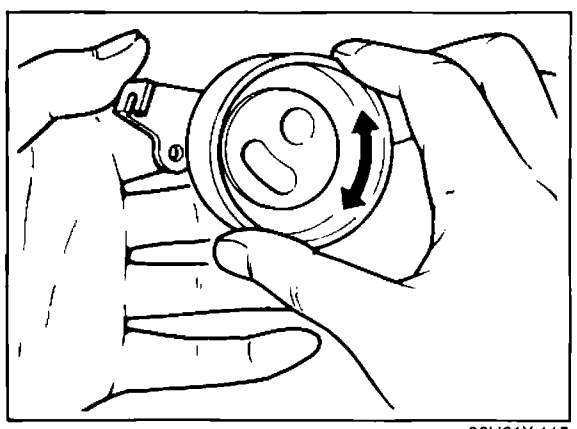
86U01X-113

Timing Belt
1. Replace the timing belt if there is any oil or grease on it.
2. Check the timing belt for damage, wear, peeling, cracks, or hardening. Replace if necessary.



86U01X-114

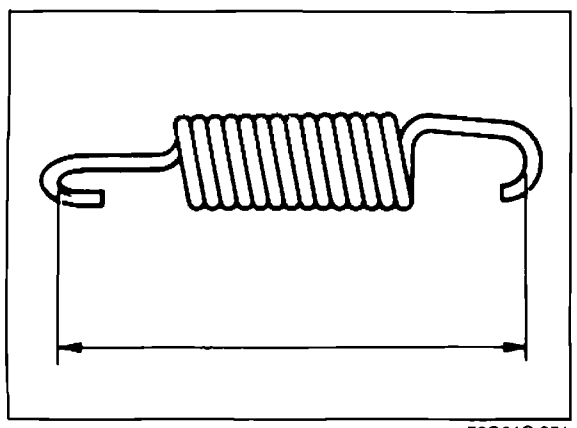
Caution
a) Never forcefully twist, turn inside out, or bend the timing belt.
b) Be careful not to allow oil or grease on the belt.



86U01X-115

Timing Belt Tensioner and Idler Pulley
Check the timing belt tensioner and idler pulley for smooth rotation and abnormal noise. Replace if necessary.

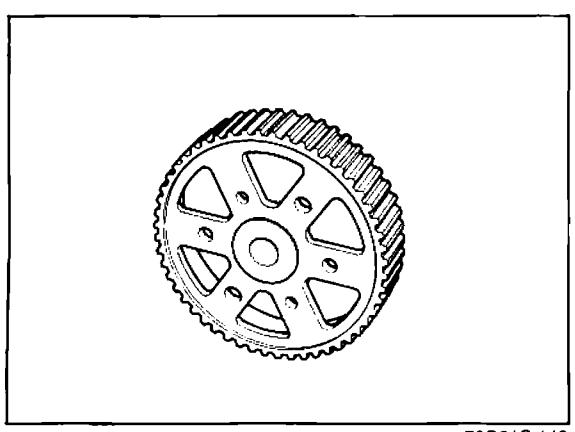
Caution
Do not clean the tensioner with cleaning fluids. If necessary, use a soft rag to wipe it clean, and avoid scratching it.



76G01C-251

Timing Belt Tensioner Spring
Check the free length of the tensioner spring. Replace if necessary.

Free length:
52.6 mm (2.071 in)



76G01C-146

Timing Belt Pulley and Camshaft Pulley
Inspect the pulley teeth for wear, deformation, or other damage. Replace if necessary.

Caution
Do not clean the pulley with cleaning fluids. If necessary, use a rag to wipe it clean.

Timing Belt Cover
Inspect the timing belt covers for damage or cracks. Replace if necessary.

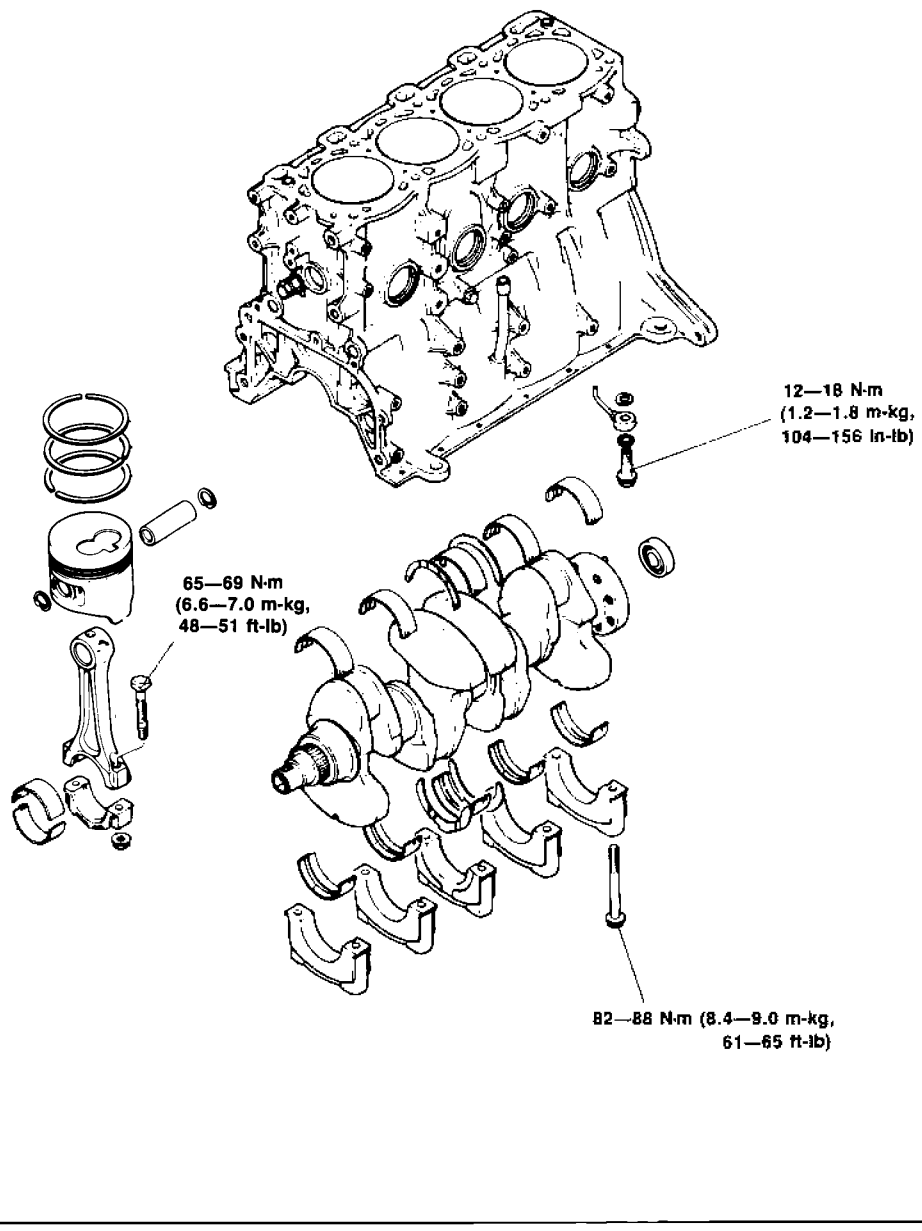
1C ASSEMBLY (CYLINDER BLOCK)

ASSEMBLY

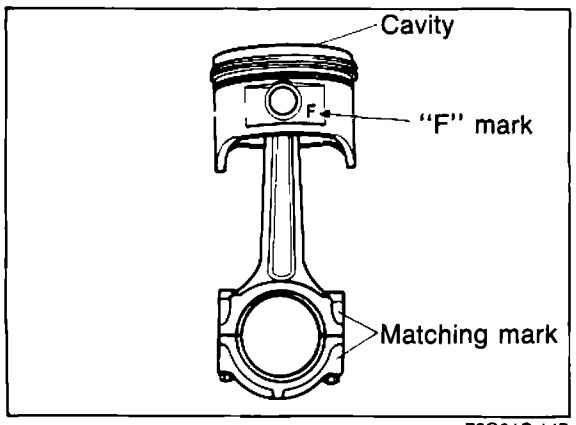
1. Clean all parts before reinstallation.
2. Apply new engine oil to all sliding and rotating parts.
3. Replace plain bearings if they are peeling, burned, or otherwise damaged.
4. Tighten all bolts and nuts to the specified torques.

Caution
Do not reuse gaskets or oil seals.

CYLINDER BLOCK—I
Torque Specifications



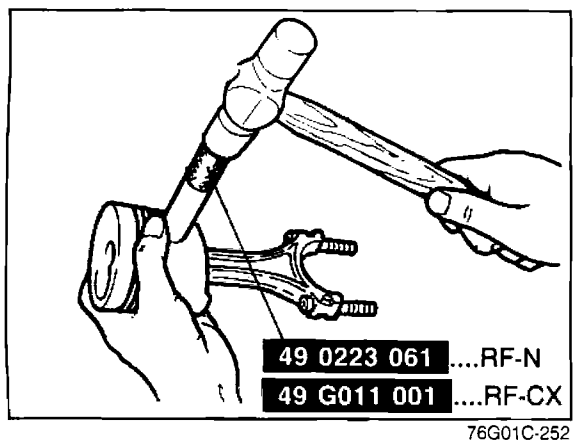
69G01A-139



76G01C-147

Connecting Rod

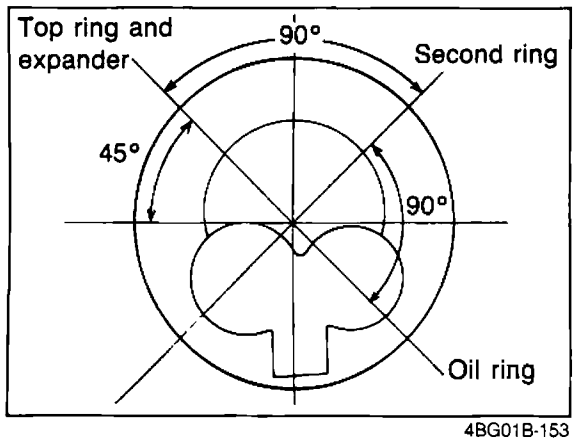
1. Align the piston cavity and matching mark in the large end of the connecting rod.
2. Apply engine oil to the circumference of each piston pin and to the small end of each connecting rod.



76G01C-252

3. Insert a snap ring into one of the piston pin holes in the piston.
4. Install the piston pin using the **SST**.
5. Connect the piston and connecting rod by the piston pin, and lock the snap ring.

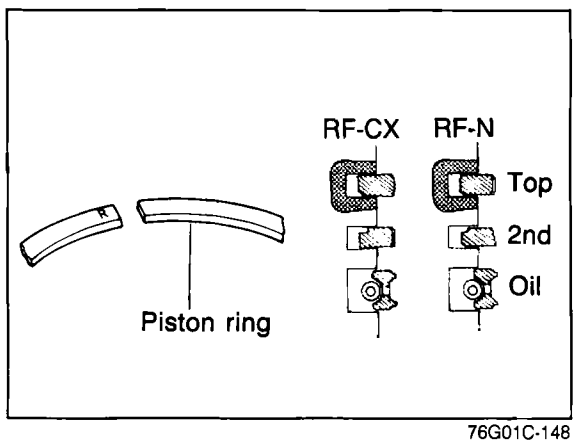
Note
Heat the piston to 50—70°C (120—170°F) for installation.



4BG01B-153

Piston Ring

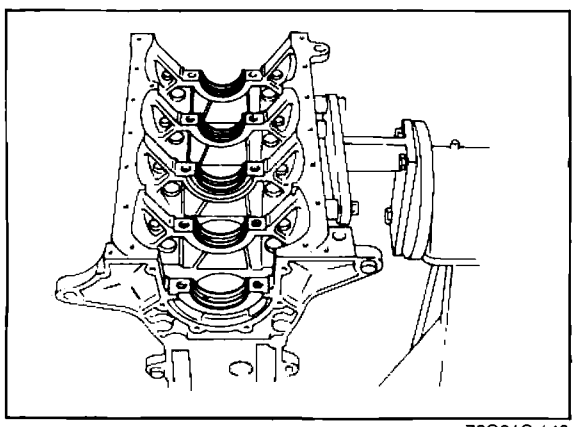
1. Apply a liberal coat of engine oil to the piston rings.
2. Install the oil ring expander and the oil ring.
3. Install the second ring.
4. Install the top ring.
5. Align the piston ring end gaps, as shown in the figure.



76G01C-148

Caution
The rings must be mounted so the "R" or "N" marks face upward.

1C ASSEMBLY (CYLINDER BLOCK)



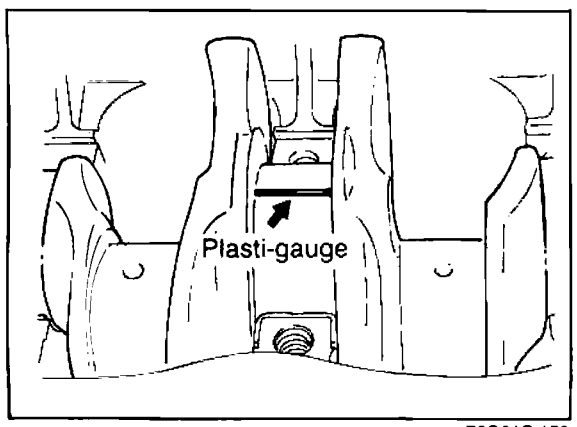
76G01C-149

Crankshaft

1. Before installing the crankshaft, inspect the main bearing oil clearances as described.

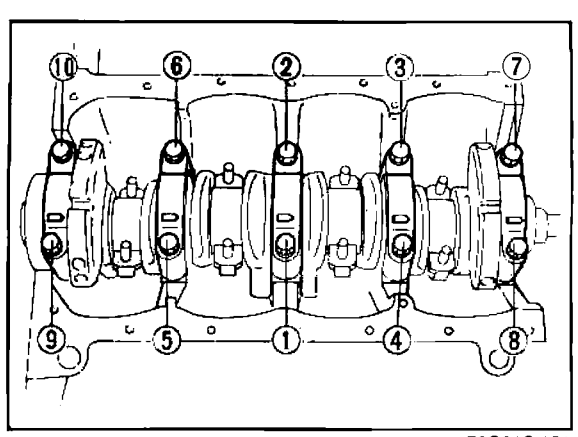
Oil clearance inspection

(1) Remove any foreign material and oil from the journal and bearing.
(2) Install the upper main bearings in the cylinder block.
(3) Set the crankshaft into the cylinder block.



76G01C-150

(4) Position the plasti-gauge on top of the journals in the axial direction.

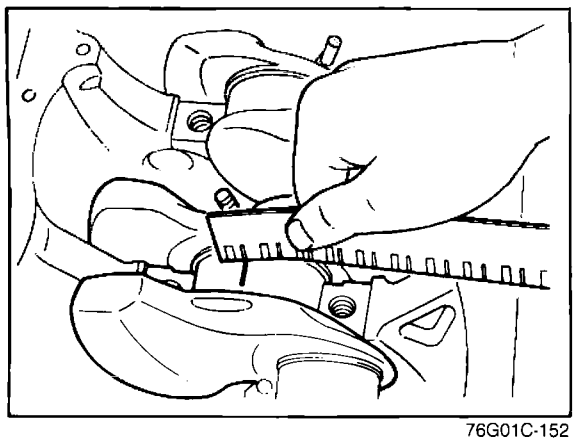


76G01C-151

(5) Install the main bearing caps along with the lower main bearings according to the cap number and ◀ mark.
(6) Tighten the caps in two or three steps in the order in the figure.

Tightening torque:
82—88 N·m (8.4—9.0 m-kg, 61—65 ft-lb)

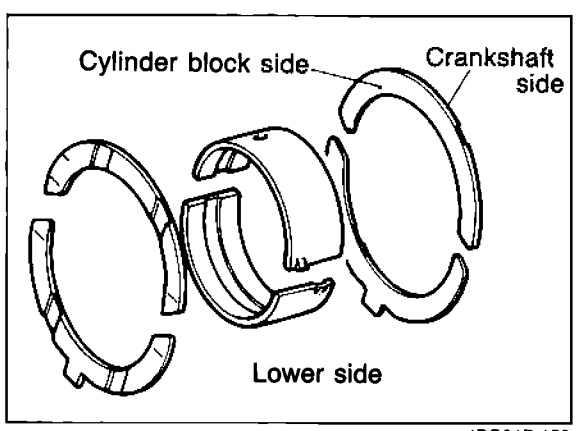
Caution
Do not rotate the crankshaft when measuring the oil clearances.



76G01C-152

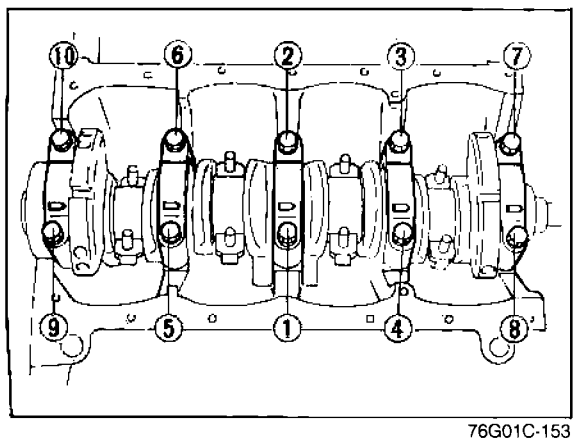
(7) Remove the main bearing caps, and measure the plasti-gauge at each journal at the widest point for the smallest clearance, and at the narrowest point for the largest clearance.
If the oil clearance exceeds specification, grind the crankshaft and use undersize main bearings. (Refer to page 1C—59.)

Oil clearance:
0.031—0.050 mm (0.0012—0.0020 in)
Maximum: 0.08 mm (0.0031 in)



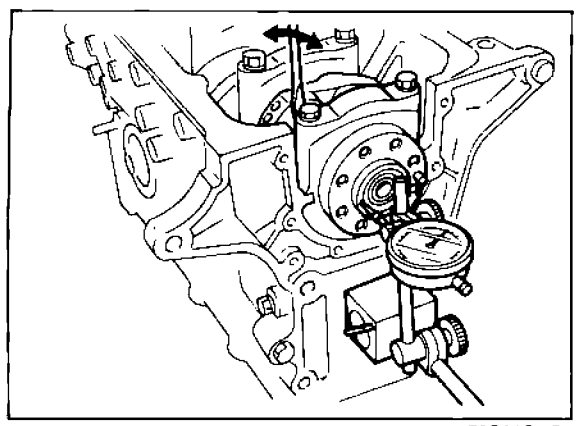
4BG01B-159

2. Apply engine oil to the main bearings and main journals.
3. Install the crankshaft and bearings.



76G01C-153

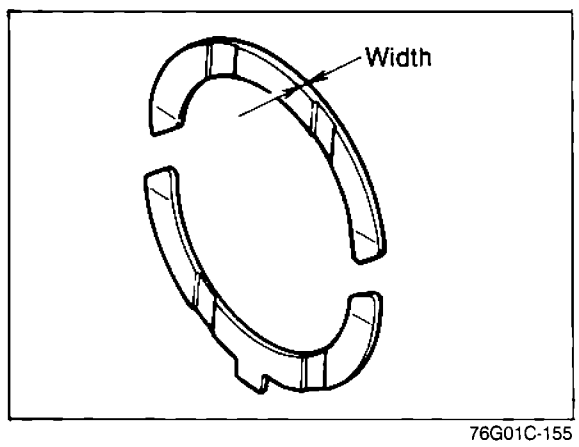
4. Install the main bearing cap according to the cap number and ◀ mark, and tighten it evenly in order shown in the figure.
5. Check that the crankshaft turns easily.



76G01C-154

6. Inspect the crankshaft end play.

End play:
0.040—0.282 mm (0.0016—0.0111 in)
Maximum: 0.30 mm (0.012 in)

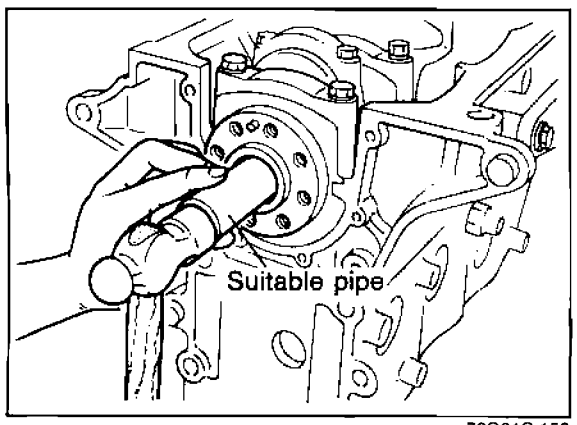


76G01C-155

7. If the end play is not within the specification, adjust the end play with an oversize thrust bearing.

Standard width:
2.00—2.05 mm (0.0787—0.0807 in)
Oversize width:
2.175—2.225 mm (0.0856—0.0876 in)

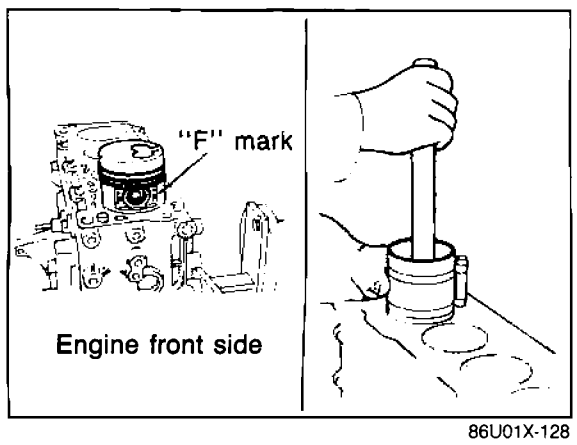
Note
First replace the rear thrust bearings, if still not within the specification, replace the front thrust bearings also.



76G01C-156

Pilot Bearing

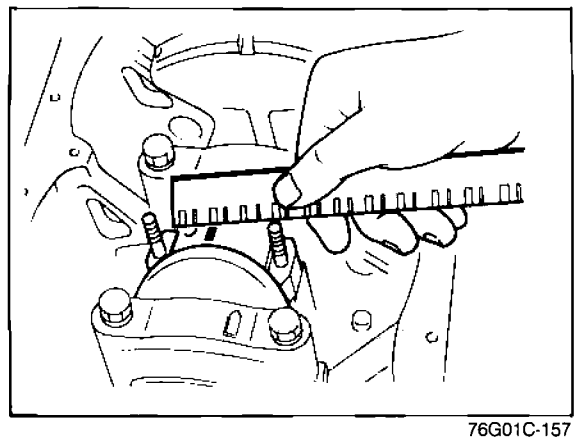
1. Apply engine oil to the outer circumference of the bearing.
2. Set a piece of pipe (outer diameter 30—34 mm, 1.18—1.34 in) against the outer race of the bearing, then tap it evenly into the crankshaft.
3. Lubricate the bearing with grease.



86U01X-128

Piston and Connecting Rod Assembly

1. Apply a liberal amount of clean engine oil to the cylinder walls, piston, and rings.
2. Check the piston rings for the end gap alignment.
3. Insert each piston assembly into the cylinder block with the "**F**" mark facing the front of the engine. Use a piston installer tool (commercially available).



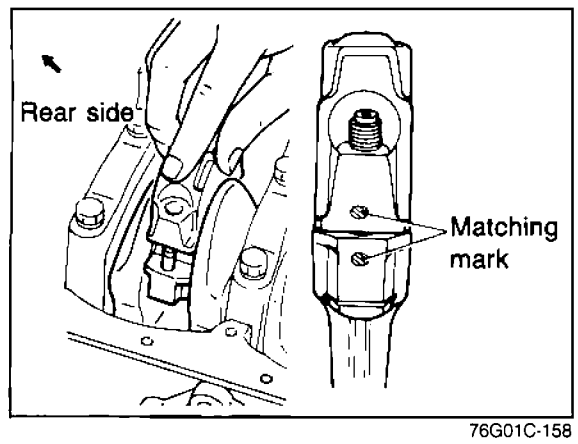
76G01C-157

Connecting Rod Cap

1. Check the connecting rod bearing clearances using the same procedure as used for the main bearing oil clearance.

   Connecting rod cap tightening torque:
   65—69 N·m (6.6—7.0 m-kg, 48—51 ft-lb)

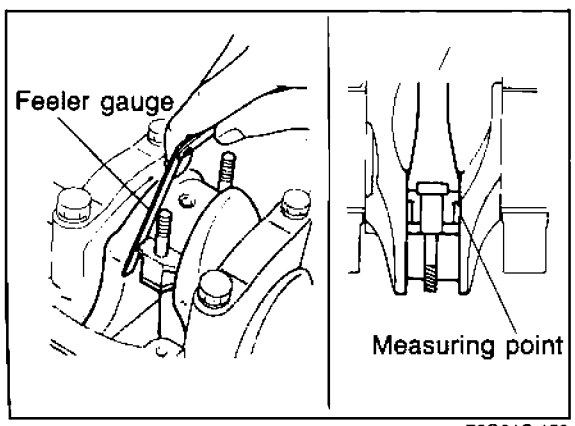
   Oil clearance:
   0.027—0.055 mm (0.0011—0.0022 in)
   Maximum: 0.08 mm (0.0031 in)



76G01C-158

Caution
Align the alignment marks on the cap and on the connecting rod when installing the connecting rod cap.

2. If the oil clearance exceeds the maximum, grind the crankshaft and use undersize bearings. (Refer to page 1C—60.)

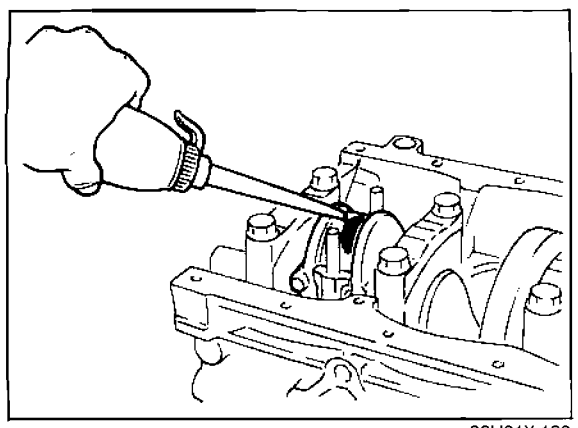


76G01C-159

3. Check the side clearance of each connecting rod without the cap installed.

Side clearance:
0.11—0.262 mm (0.0043—0.0103 in)
Maximum: 0.30 mm (0.012 in)

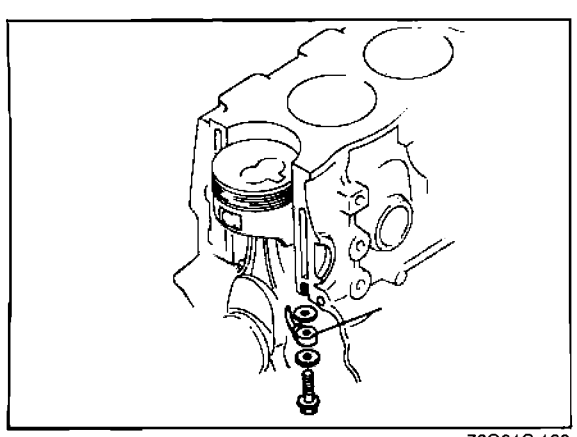
If the clearance exceeds the maximum, replace the connecting rod.



86U01X-130

4. Apply a liberal amount of engine oil to the crankpin journal and connecting rod bearing.
5. Install the connecting rod cap with the alignment marks aligned.

Tightening torque:
65—69 N·m (6.6—7.0 m-kg, 48—51 ft-lb)



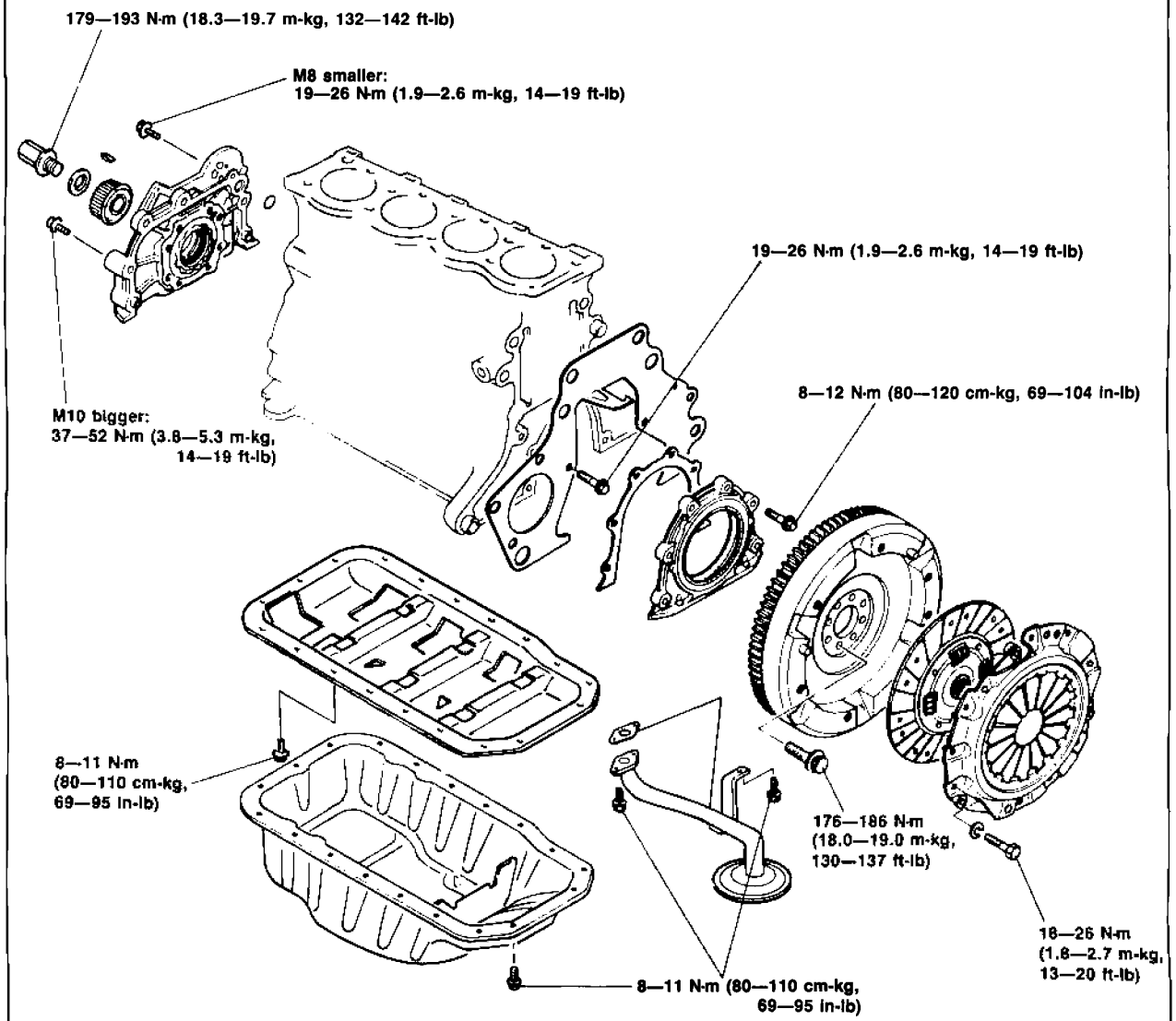
76G01C-160

Oil jet
Install the oil jet into the cylinder block.

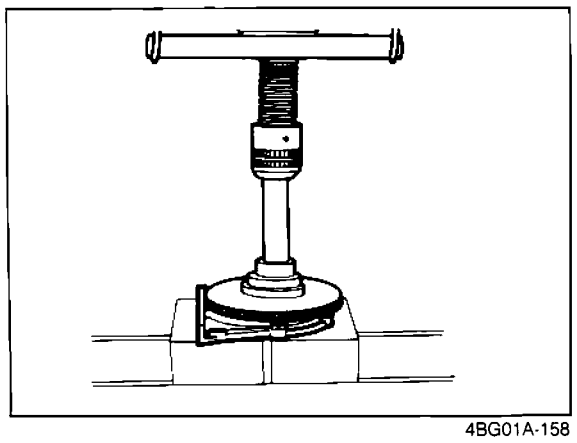
Tightening torque: 12—18 N·m
(1.2—1.8 m-kg, 104—156 in-lb)

1C ASSEMBLY (CYLINDER BLOCK)

CYLINDER BLOCK—II
Torque Specifications



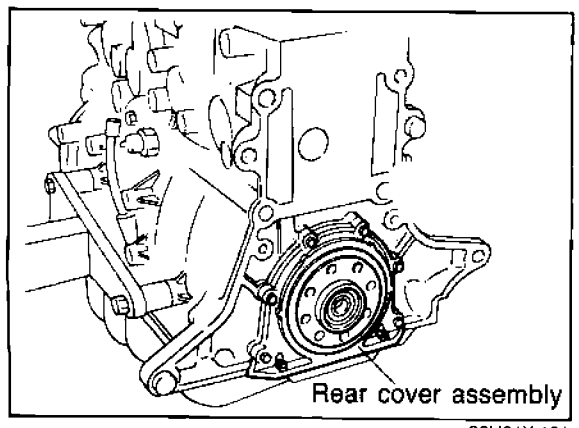
69G01A-166



4BG01A-158

Rear Cover

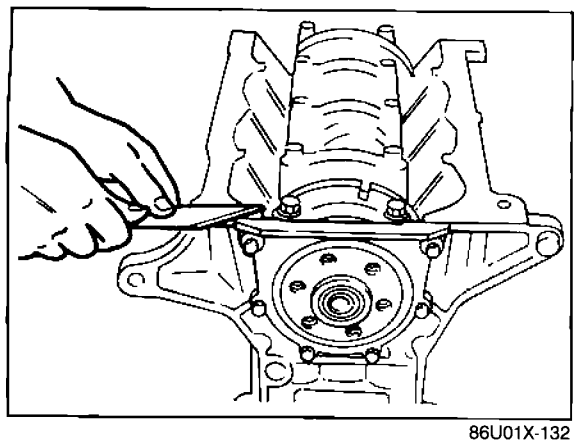
1. Apply engine oil to the rear cover, oil seal and oil seal lip.
2. Press the oil seal into the rear cover.



86U01X-131

3. Install the rear cover and a new gasket.

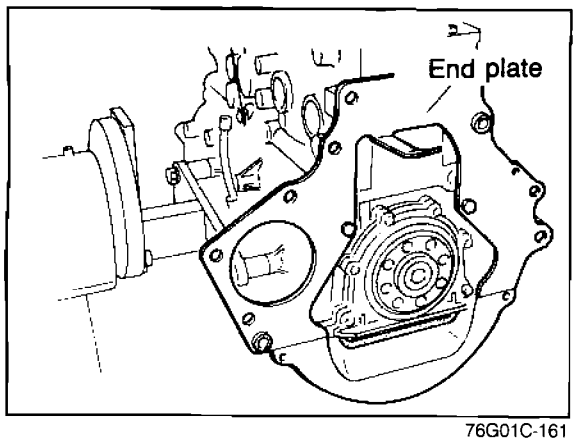
Tightening torque:
8—12 N·m (80—120 cm-kg, 69—104 in-lb)



86U01X-132

4. Cut away the portion of the gasket that projects out from the rear cover assembly toward the oil pan side.

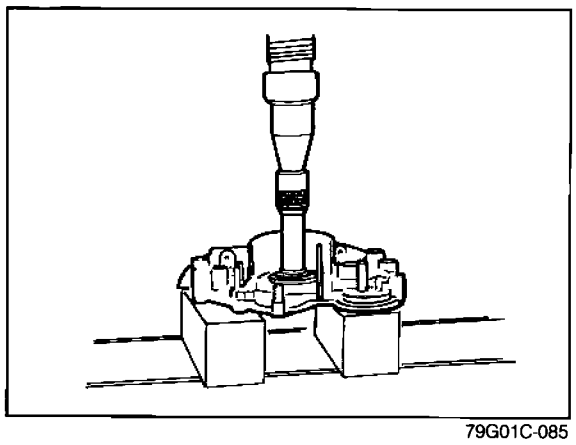
Caution
Do not scratch the rear cover assembly.



76G01C-161

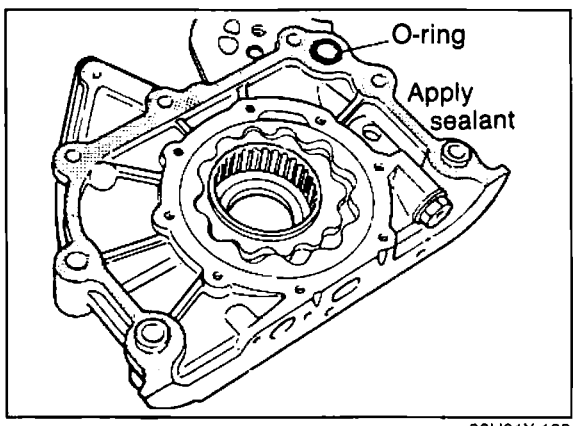
End Plate
Install the end plate.

Tightening torque:
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



79G01C-085

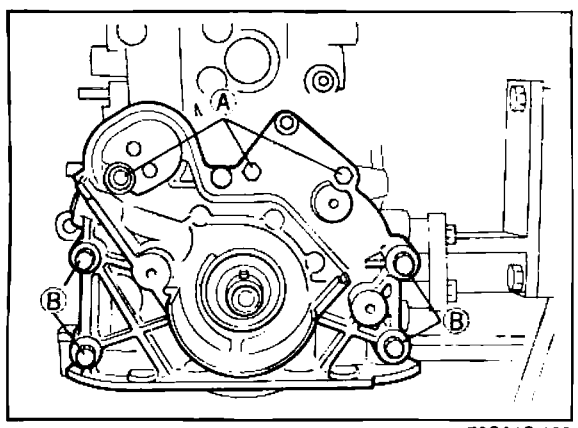
Oil Pump
1. Apply engine oil to a new oil pump oil seal and the oil pump body.
2. Press the oil seal into the oil pump body.



86U01X-133

3. Apply engine oil to the oil seal lip.
4. Remove any dirt or other material from the contact surfaces.
5. Apply a continuous bead of silicon sealant to the contact surface of the oil pump.

Caution
Do not allow any sealant to get into the oil hole.

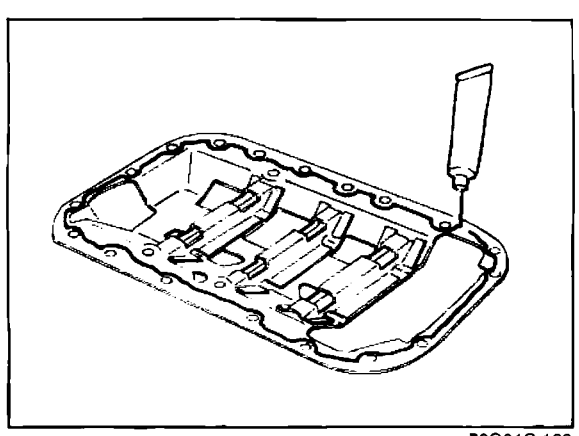


76G01C-162

6. Install a new O-ring into the pump body.
7. Install the oil pump.

Tightening torque:
Bolt A:
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)
Bolt B:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

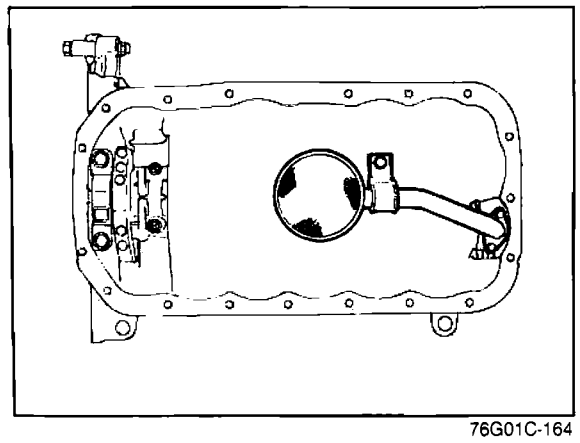
8. Remove any sealant which has been squeezed out.



76G01C-163

Stiffener (RF-CX)
1. Remove any dirt or other material from the contact surface.
2. Apply a continuous bead of silicone sealant to the stiffener along the inside of the bolt holes, and overlap the ends.
3. Install the stiffener.

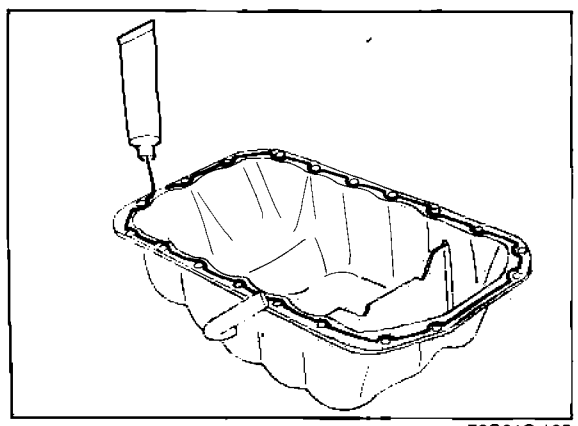
Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



76G01C-164

Oil Strainer
Install the oil strainer and a new gasket.

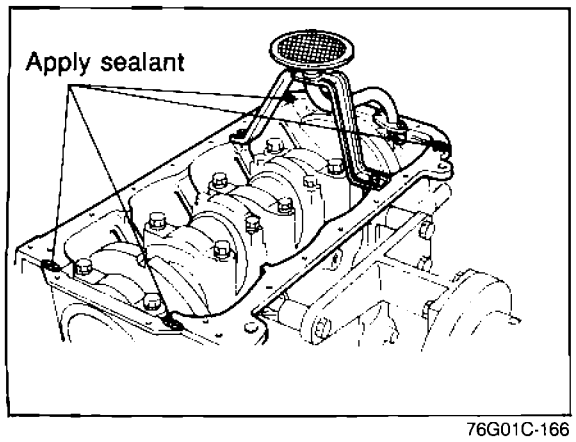
Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)


76G01C-165

Oil Pan
Remove any old sealant from the bolts and bolt holes. If old sealant can not be removed from the bolt, replace it.

Without gasket
(1) Remove any dirt or grease from the contact surfaces with a rag.
(2) Apply continuous bead of silicon sealant to the oil pan along the inside of the bolt holes, and overlap the ends.
(3) Install the oil pan.

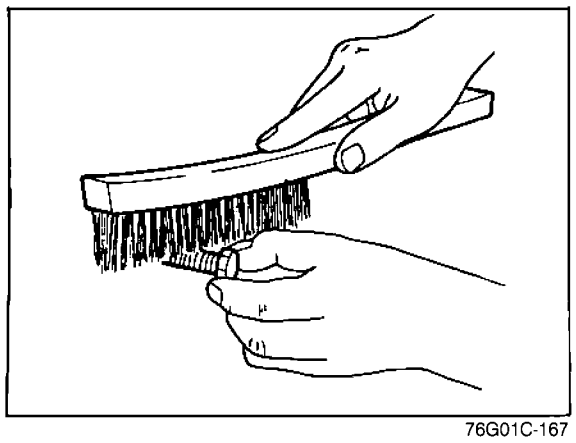
Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



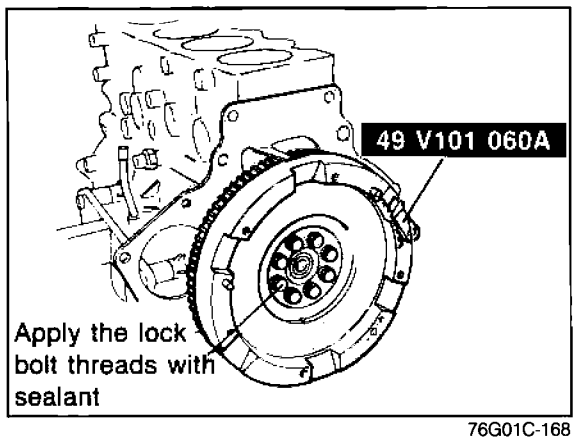
76G01C-166

With gasket
(1) Apply sealant to the shaded areas in the figure.
(2) Install the gasket and the oil pan.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)


76G01C-167

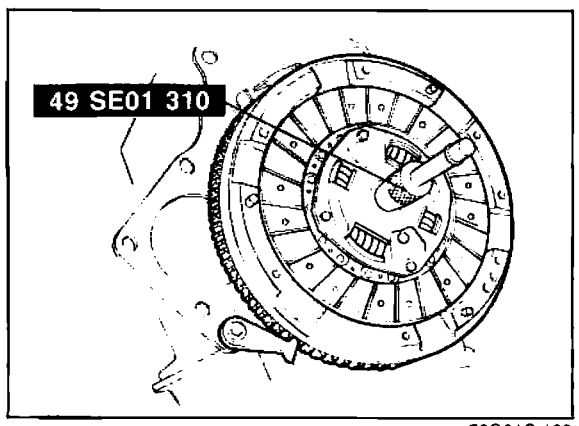
Flywheel
1. Remove any old sealant from the bolts and bolt holes. If old sealant can not removed from the bolt, replace it.
2. Apply sealant to the bolt threads.



76G01C-168

3. Install, and tighten the flywheel with the **SST**.

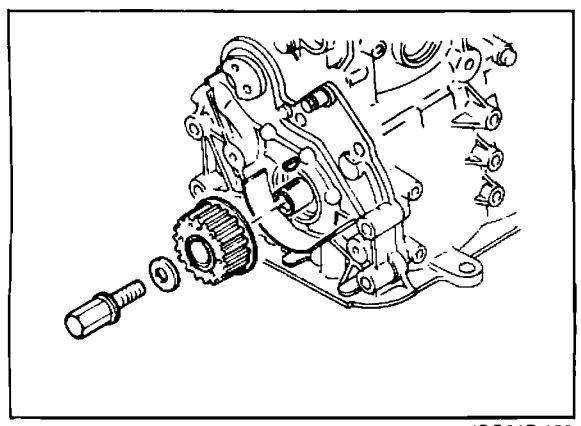
Tightening torque: 176—186 N·m (18.0—19.0 m-kg, 130—137 ft-lb)



76G01C-169

Clutch Disc and Clutch Cover
Install the clutch disc and clutch cover using the **SST**. (Refer to Section 6.)

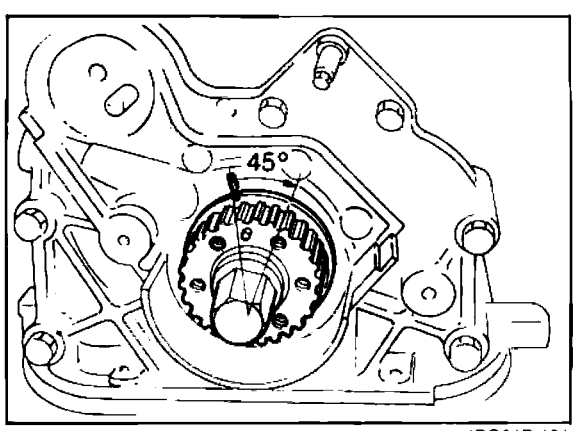
Tightening torque:
18—26 N·m (1.8—2.7 m-kg, 13—20 ft-lb)



4BG01B-180

Timing Belt Pulley
1. Install the timing belt pulley with the semicircular (woodruff) key.

Tightening torque:
179—193 N·m (18.3—19.7 m-kg, 132—142 ft-lb)

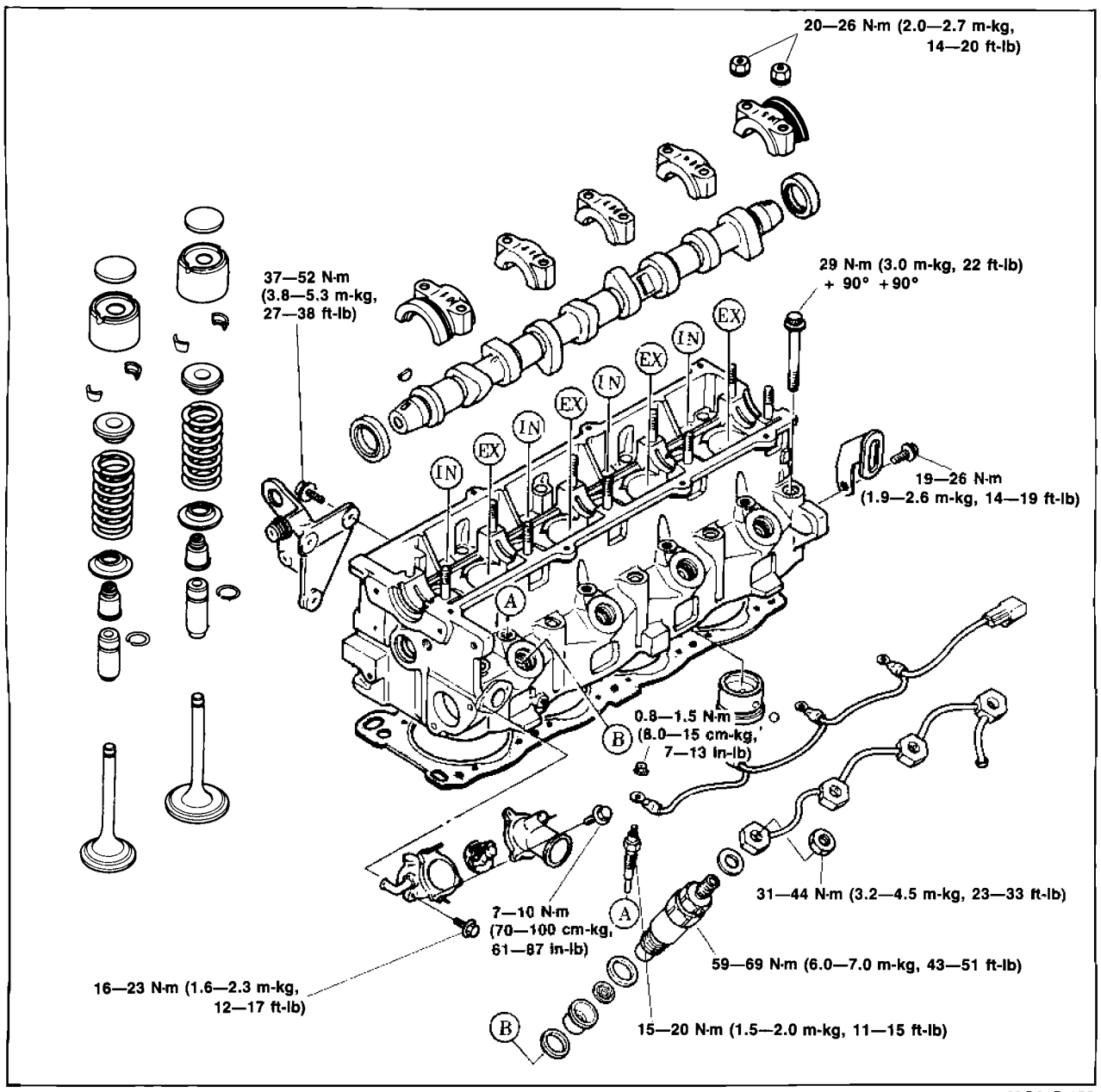


4BG01B-181

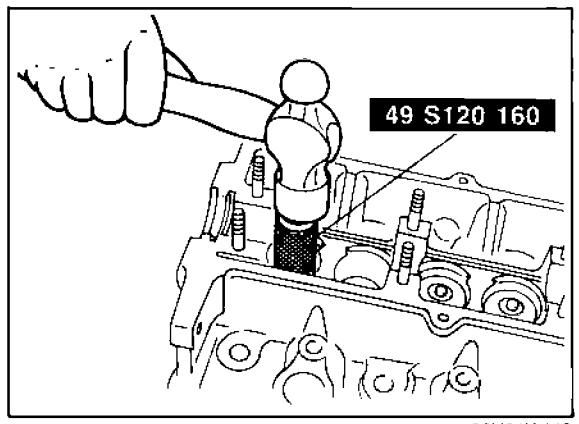
2. Release the ring gear brake, turn the flywheel, move the No. 1 piston to the top position, and then turn it approximately 45° in the forward direction.

Caution
This is to prevent damage to the pistons and valves when the cylinder head is installed.

CYLINDER HEAD
Torque Specifications



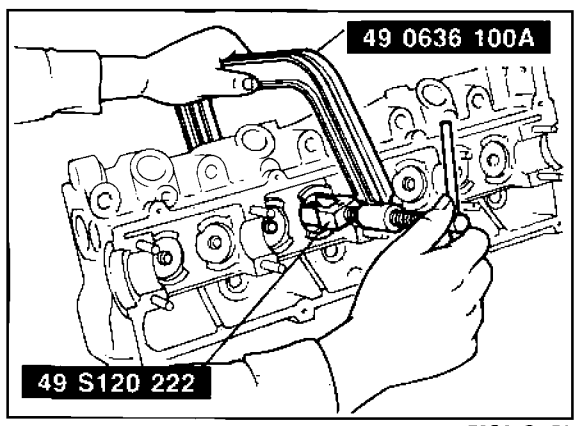
69G01B-152



86U01X-143

Valve Seal

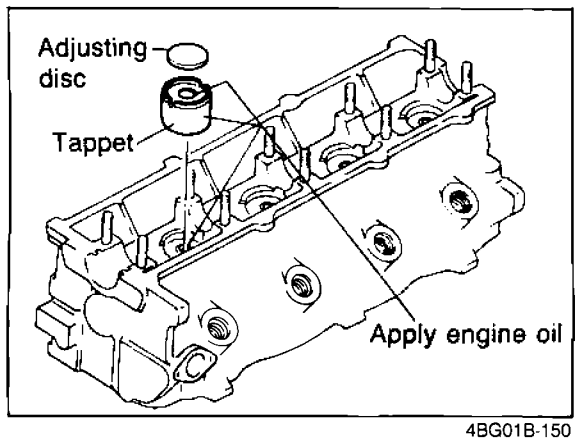
1. Apply engine oil to the inside of the new valve seal.
2. Install the valve seal onto the valve guide with the **SST**.



76G01C-170

Valve and Valve Spring

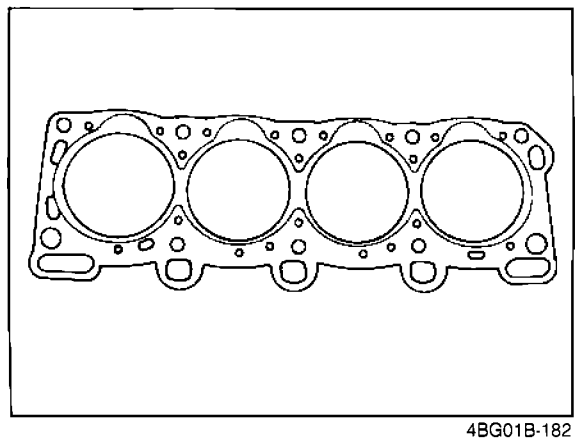
1. Install the lower spring seat.
2. Apply molybdenum disulphide grease to the valve stem.
3. Install the valve.
4. Install the valve springs and the upper spring seat.
5. Compress the valve spring with the **SST**; then install the valve keepers.
6. Tap the end of the valve stem lightly two or three times with a plastic hammer to confirm that the keepers are all fully seated.



4BG01B-150

Tappet and Adjusting Disc

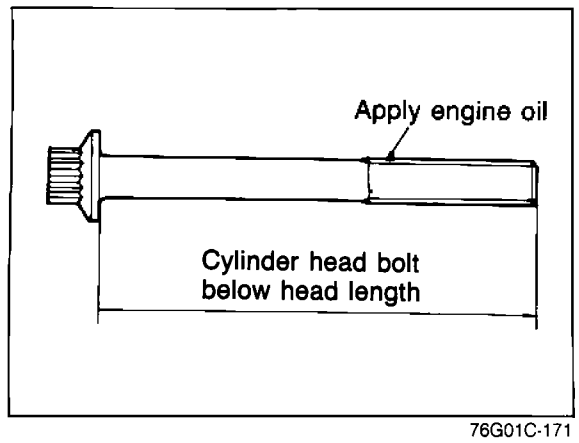
1. Apply engine oil to the tappets.
2. Install the tappets in the hole.
3. Install the adjusting discs.



4BG01B-182

Cylinder Head

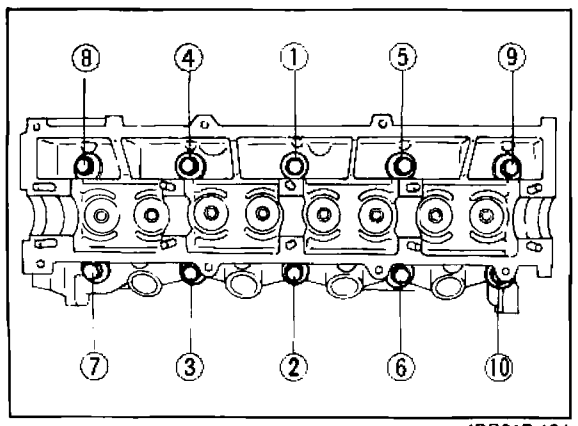
1. Thoroughly remove all dirt and grease from the top of the cylinder block with a rag.
2. Place the new cylinder head gasket in position.
3. Remove any dirt or grease from the bottom surface of the cylinder head.
4. Place the cylinder head in position.



76G01C-171

5. Measure the length of the cylinder head bolt below the head. If the length exceeds the maximum, replace the bolt.

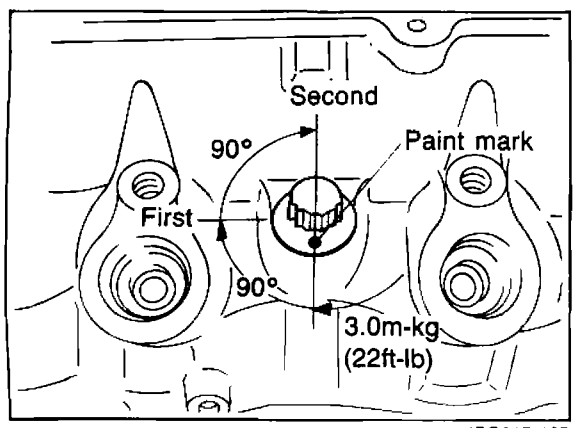
Length: 113.2—113.8 mm (4.457—4.480 in)
Maximum: 114.5 mm (4.508 in)



4BG01B-184

6. Apply engine oil to the cylinder head bolts.
7. Tighten the cylinder head bolts.
   (1) Tighten the bolts to the specified torque, in order shown in the figure.

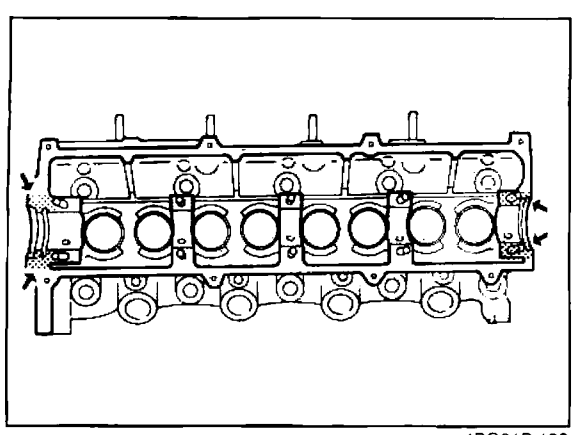
Tightening torque:
29 N·m (3.0 m-kg, 22 ft-lb)



4BG01B-185

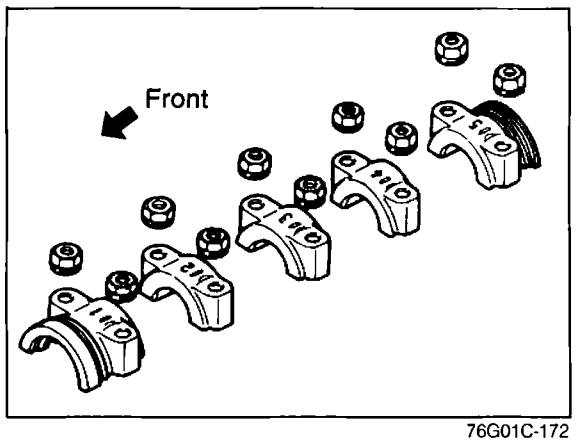
(2)Make paint marks on the bolt heads, as shown in the figure.
(3)With the paint marks as a reference point, turn the cylinder head bolts **another 90° (90°—105°)** in the tightening direction. Tighten them in the order.
(4)Then tighten them **once again 90° (90°—105°) in the tightening order.**

Caution
Be absolutely sure to tighten all bolts in the order.



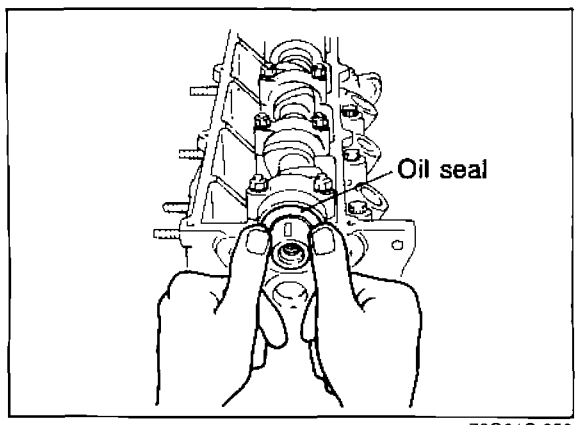
4BG01B-186

Camshaft
1. Apply engine oil to the camshaft and journal part of the cylinder head.
2. Set the seal cap.
3. Apply a coat of sealant (1016 77 739) to the area shown in the figure.
4. Install the camshaft so that the key groove faces directly upward.

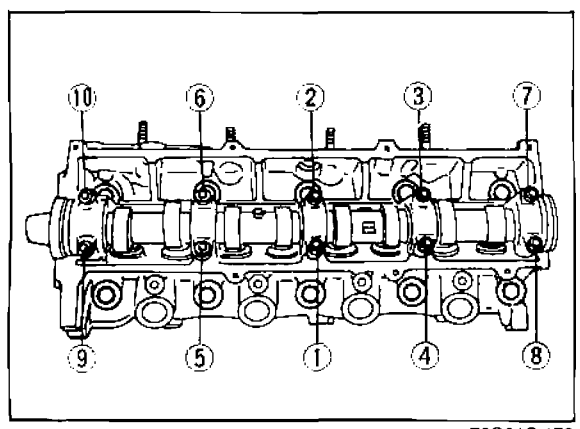


76G01C-172

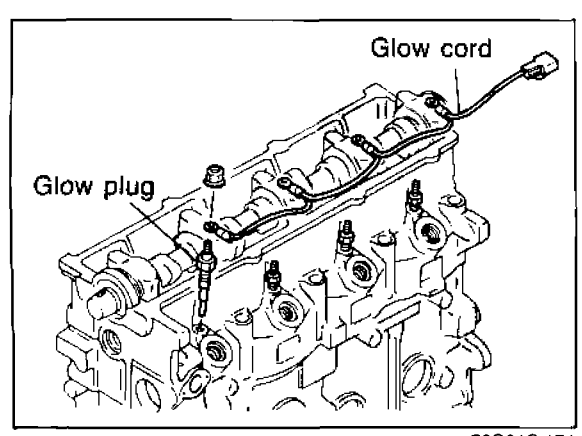
5. Install the camshaft caps according to the number and ◀ mark, and loosely tighten the camshaft cap nuts.



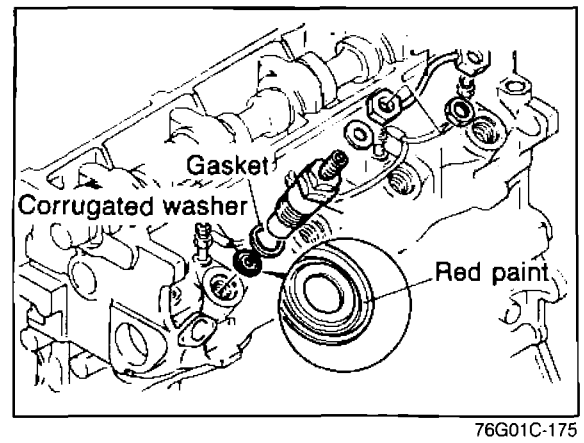
76G01C-253



76G01C-173



76G01C-174



76G01C-175

6. Apply a coat of engine oil to the new oil seal lip and insert it.

7. Tighten the camshaft cap nuts evenly in order shown in the figure.

Tighten torque:
20—26 N·m (2.0—2.7 m-kg, 14—20 ft-lb)

Note
The adjustment of the valve clearance should be made only after the camshaft pulley injection pump pulley and timing belt have been installed.

Glow Plug and Glow Cord

1. Install the glow plugs.

Tightening torque:
15—20 N·m (1.5—2.0 m-kg, 11—15 ft-lb)

2. Install the glow cord.

Tightening torque:
0.8—1.5 N·m (8.0—15 cm-kg, 7—13 in-lb)

Injection Nozzle and Leak Pipe

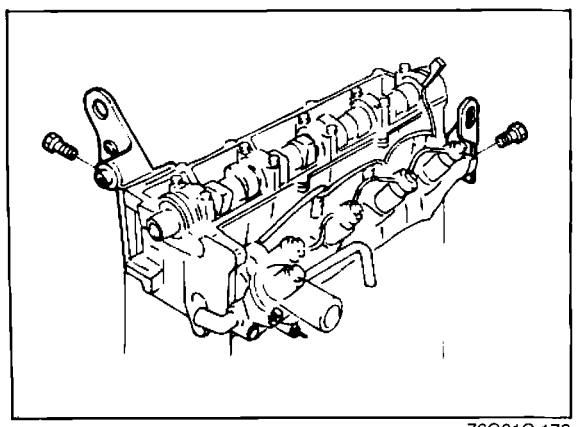
1. Install the new corrugated washers and the new copper gaskets in position.
2. Install the injection nozzles.

Tightening torque:
59—69 N·m (6.0—7.0 m-kg, 43—51 ft-lb)

Note
The corrugated washers and copper gaskets must be replaced with new ones each time the injection nozzles are removed.

3. Install the leak pipe.

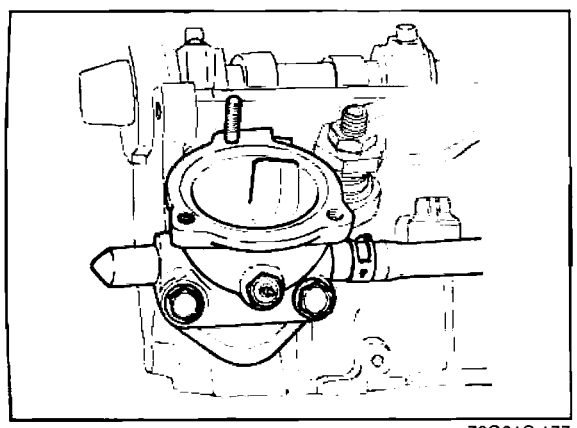
Tightening torque:
31—44 N·m (3.2—4.5 m-kg, 23—33 ft-lb)



76G01C-176

Engine Hanger
Install the front and rear engine hanger.

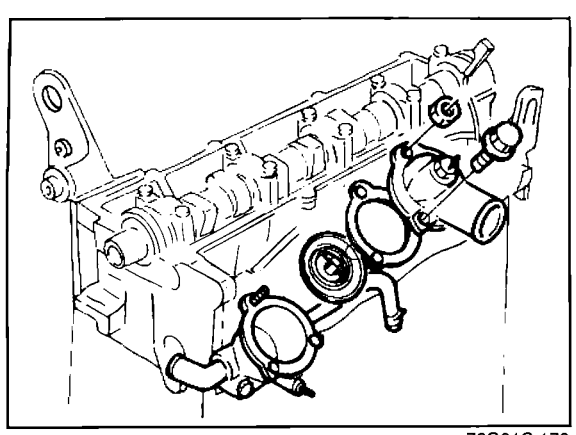
Tightening torque:
Front: 37—52 N·m
(3.8—5.3 m-kg, 27—38 ft-lb)
Rear : 19—26 N·m
(1.9—2.6 m-kg, 14—19 ft-lb)



76G01C-177

Thermostat Case
Install the thermostat case with gasket.

Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

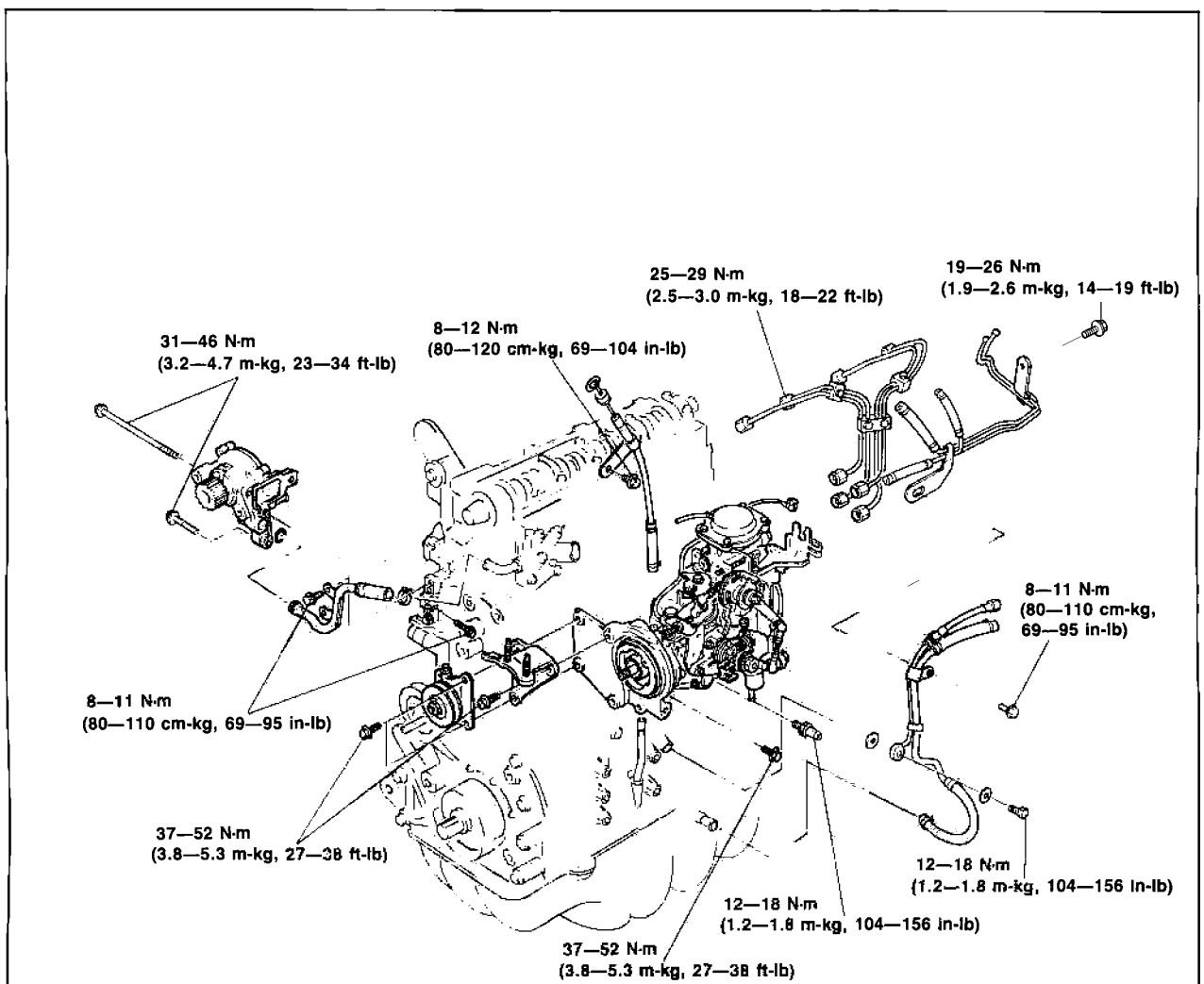


76G01C-178

Thermostat and Thermostat Cover
1. Install the thermostat into the thermostat case with the jiggle pin at the top.
2. Position a new gasket with the printed side facing the thermostat case.
3. Install the thermostat cover.

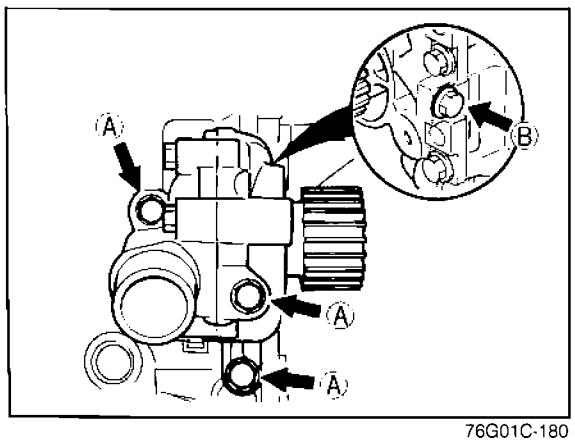
Tightening torque:
7—10 N·m (70—100 cm-kg, 61—87 in-lb)

INJECTION PUMP
Torque Specifications



76G01C-179

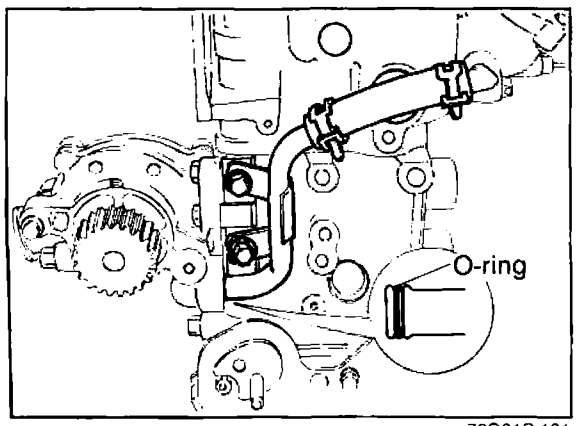
Water Pump



76G01C-180

1. Remove the dirt or old gasket from the water pump mounting surface.
2. Install the water pump and new gasket so that the printed side of the gasket faces the water pump.

Tightening torque:
Bolt A: 31—46 N·m
(3.2—4.7 m-kg, 23—34 ft-lb)
Bolt B: 8—11 N·m
(80—110 cm-kg, 69—95 in-lb)

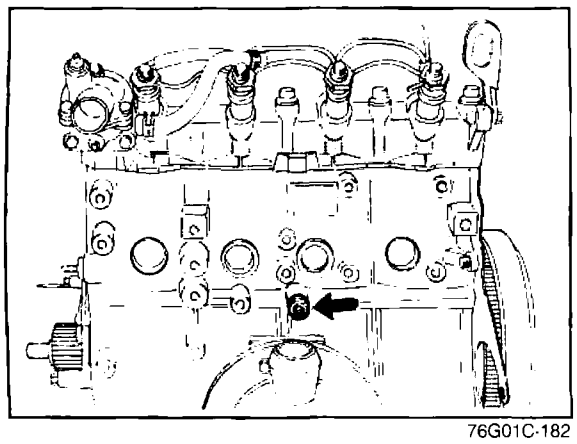


76G01C-181

Water Pipe
1. Apply a coat of vegetable oil to the O-ring.
2. Install the water pipe.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

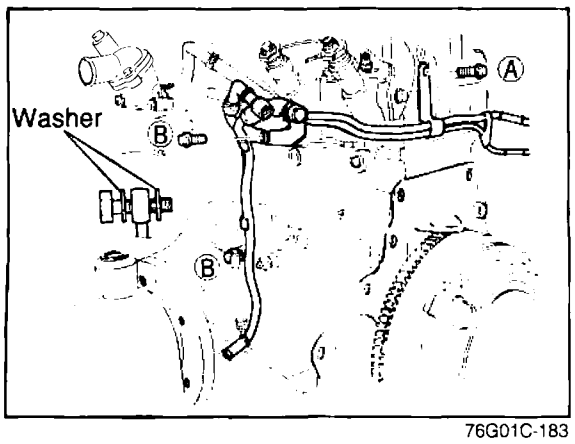
3. Connect the water hose.



76G01C-182

Oil Pressure Switch
Install the oil pressure switch.

Tightening torque: 12—18 N·m
(1.2—1.8 m-kg, 104—156 in-lb)

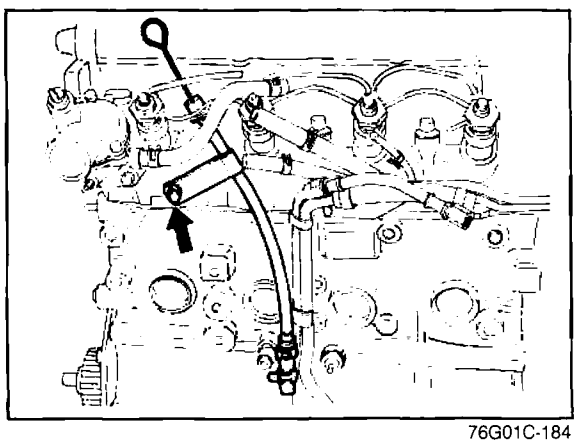


76G01C-183

Fuel Feed Pipe and Oil Pipe
1. Install the fuel feed pipe and tighten bolt Ⓐ.

Tightening torque:
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

2. Install the oil pipe and loosely tighten the bolts Ⓑ.

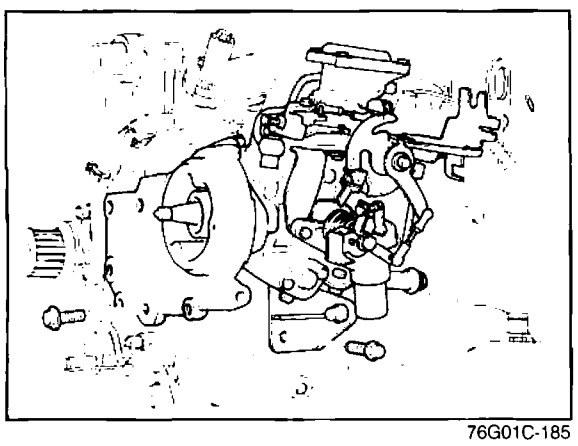


76G01C-184

Oil Level Gauge
Install the oil level gauge and stay.

Tightening torque:
8—12 N·m (80—120 cm-kg, 69—104 in-lb)

1C ASSEMBLY (INJECTION PUMP)



76G01C-185

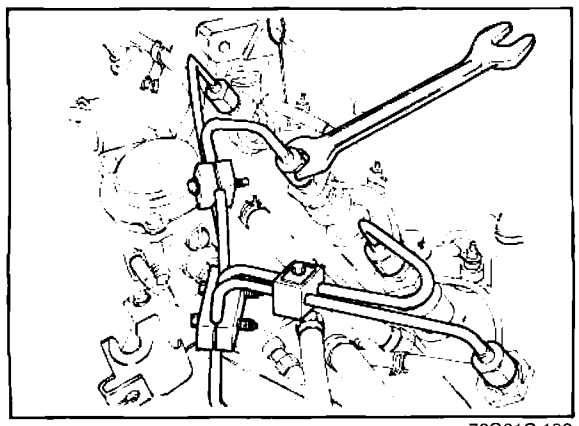
Injection Pump

1. Install the injection pump with the injection pump brakcet.

   Tightening torque:
   37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

   Note
   If the injection pump bracket and the injection pump are separated, injection timing adjustment is necessary after installing the timing belt.

2. Connect the CSD water hose and fuel hoses.

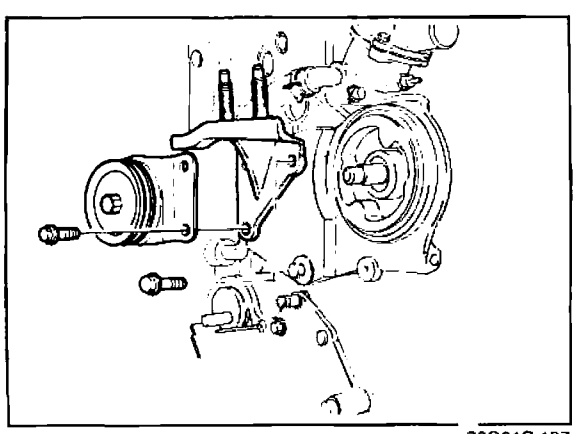


76G01C-186

Injection Pipe

1. Check that no dirt or other foreign material is on the pipe coupling.
2. Install the fuel injection pipes.

   Tightening torque:
   25—29 N·m (2.5—3.0 m-kg, 18—22 ft-lb)



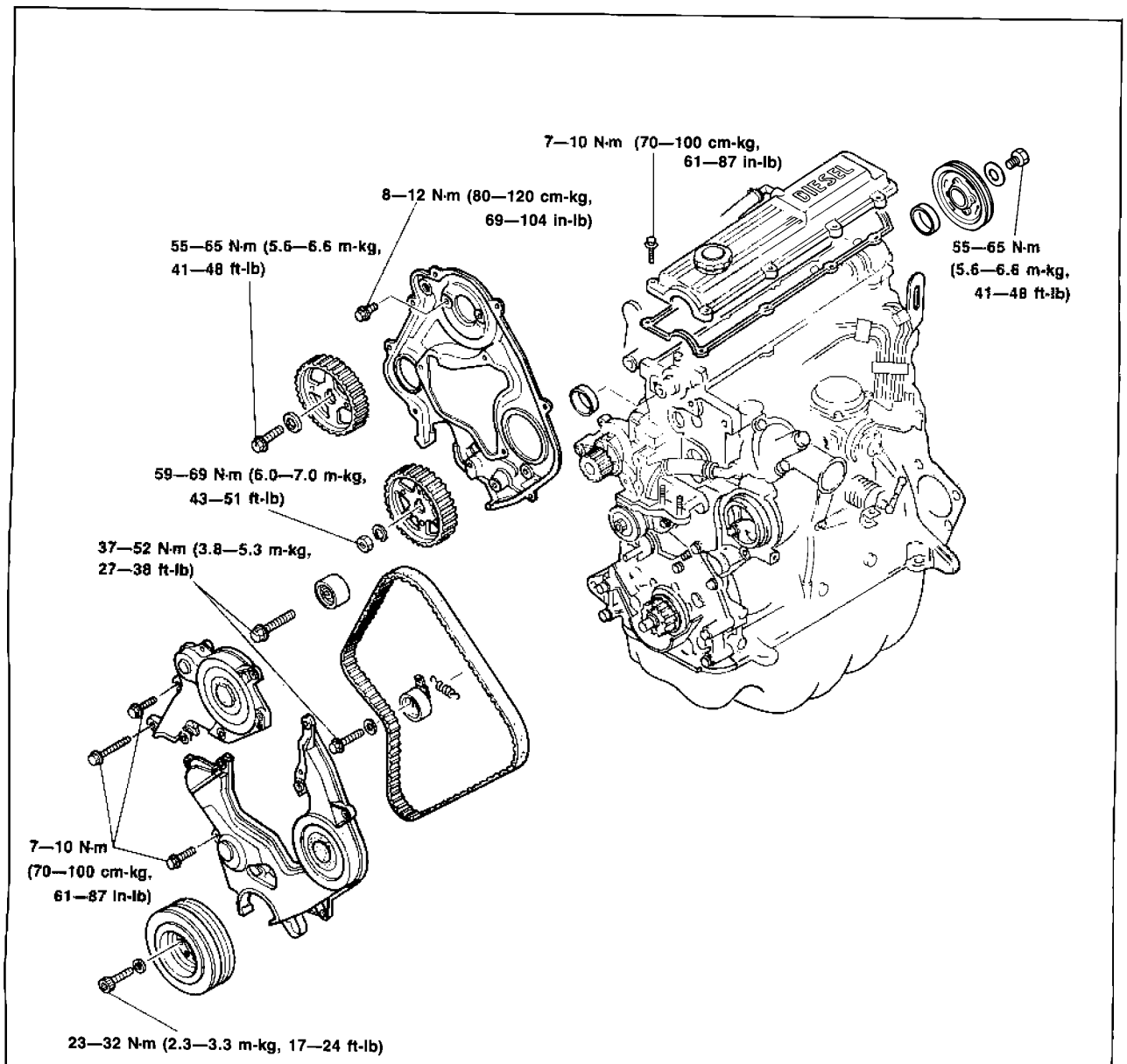
76G01C-187

No.3 Engine Mount and Idler

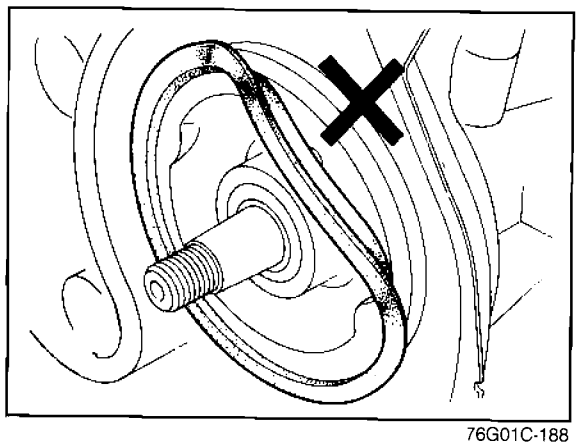
Install the No.3 engine mount and idler.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

TIMING BELT
Torque Specifications



69G01B-160



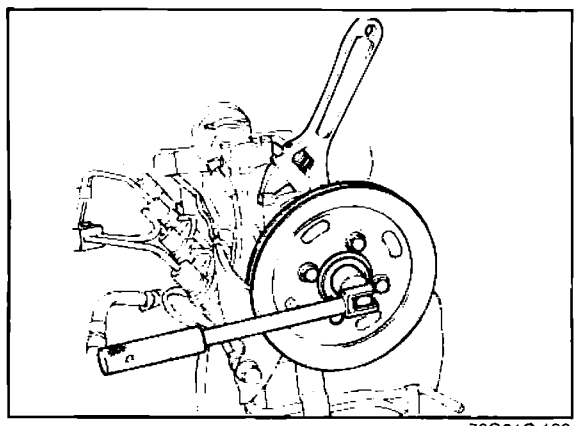
76G01C-188

Seal Plate

1. Install the seal plate.

   Tightening torque:
   8—12 N·m (0.8—1.2 m-kg, 69—104 in-lb)

2. Check that the seal plate sealing rubbers are installed in position.

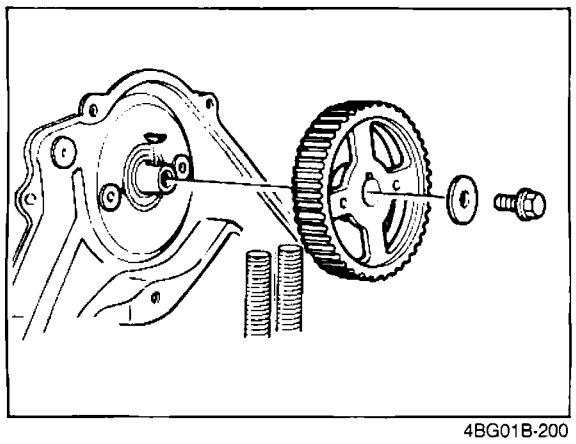


76G01C-189

Rear Camshaft Pulley

1. Install the rear camshaft pulley.
2. Hold the camshaft with a wrench (29 mm, 1.14 in) and tighten to the specification.

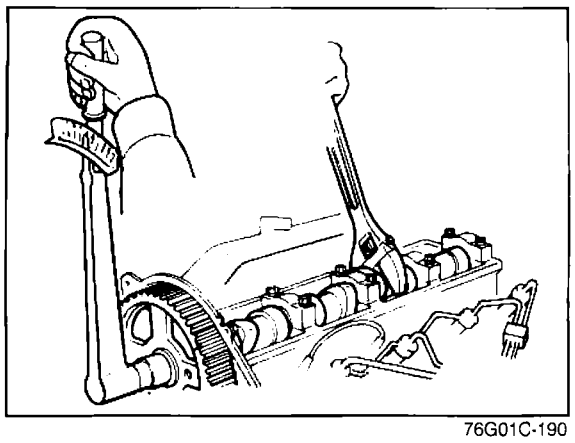
Tightening torque:
55—65 N·m (5.6—6.6 m-kg, 41—48 ft-lb)



4BG01B-200

Camshaft Pulley

1. Connect the camshaft pulley onto the camshaft with the semicircular (woodruff) key.

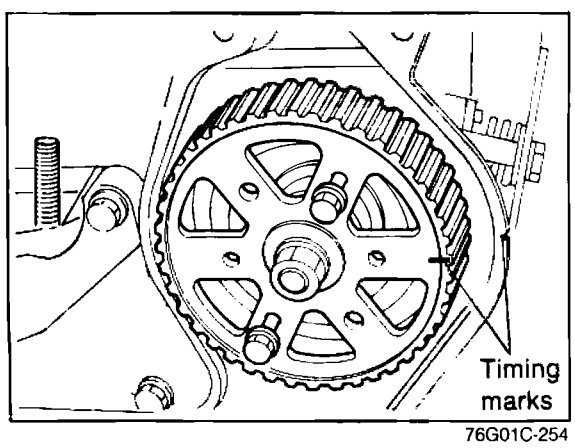


76G01C-190

2. Hold the camshaft with a wrench (29 mm, 1.14 in), tighten the camshaft pulley lock bolt.

Tightening torque:
55—65 N·m (5.6—6.6 m-kg, 41—48 ft-lb)

3. Align the mark on the camshaft pulley with the mark on the seal plate.

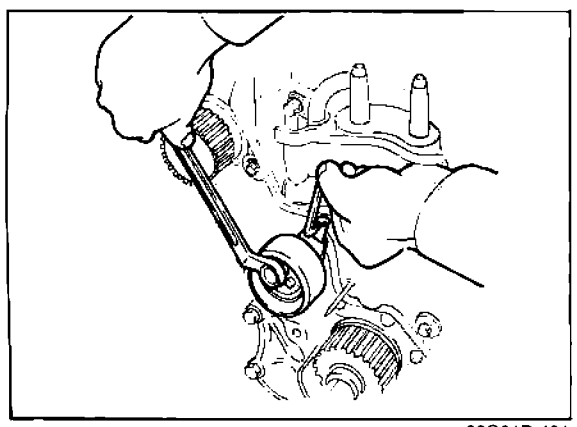


76G01C-254

Injection Pump Pulley

1. Install the injection pump pulley with the semicircular (woodruff) key to the injection pump shaft.
2. Rotate the injection pump pulley until the timing marks are aligned.
3. Affix the injection pump pulley to the bracket using two bolts (35—40 mm, 1.4—1.6 in).
4. Tighten the lock nut.

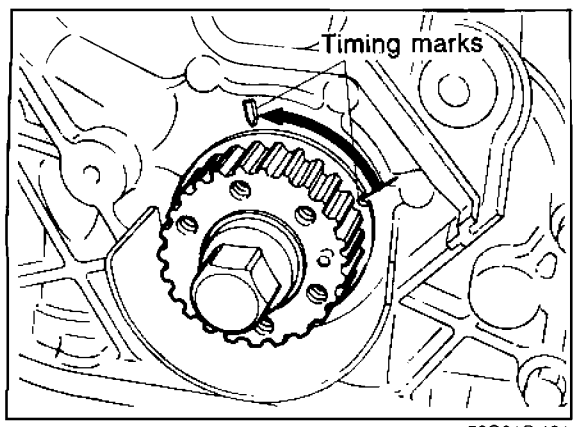
Tightening torque:
59—69 N·m (6.0—7.0 m-kg, 43—51 ft-lb)



63G01D-431

Timing Belt Tensioner

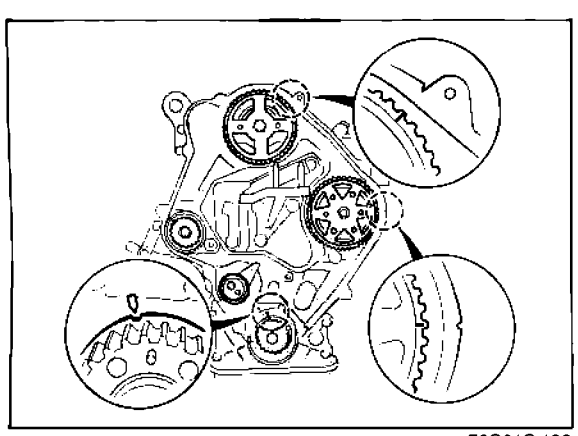
1. Install the tensioner spring onto the tensioner.
2. Install the tensioner assembly.
3. Temporarily secure it so the tensioner is shifted outward.



76G01C-191

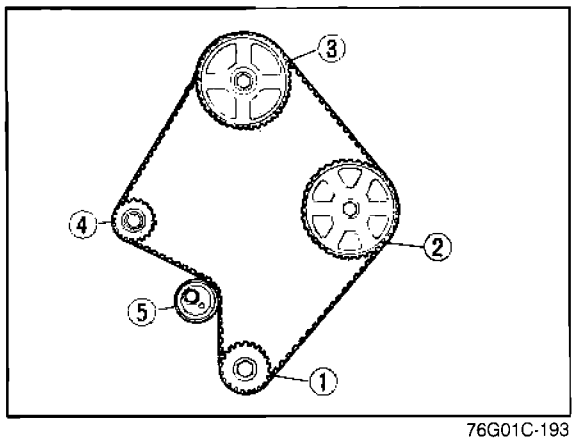
Timing Belt

1. Return the crankshaft about 45° to the timing mark on the oil pump housing.



76G01C-192

2. Check that the timing marks of the camshaft pulley and the injection pump pulley align with the timing marks on the seal plate.

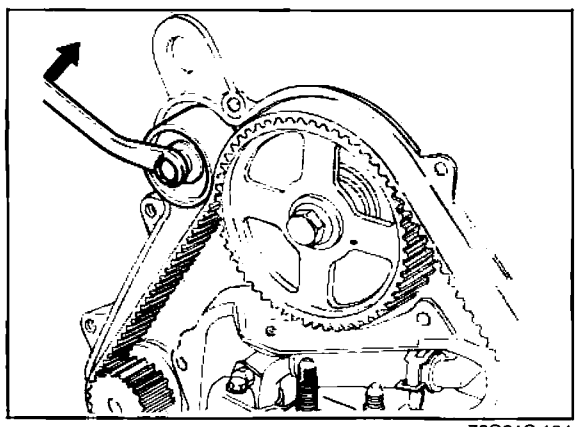


76G01C-193

3. Install the timing belt in the sequence shown in the figure.

Caution
The timing belt must be reinstalled in the same direction of rotation for continued durability.

1C ASSEMBLY (TIMING BELT)

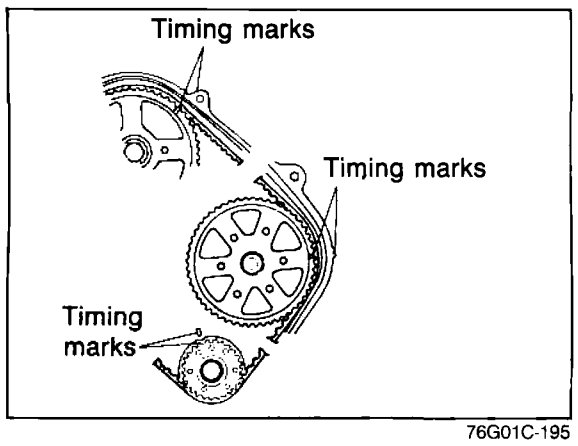


76G01C-194

4. Install the idler pulley.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

5. Remove the two affixing bolts from the injection pump pulley.

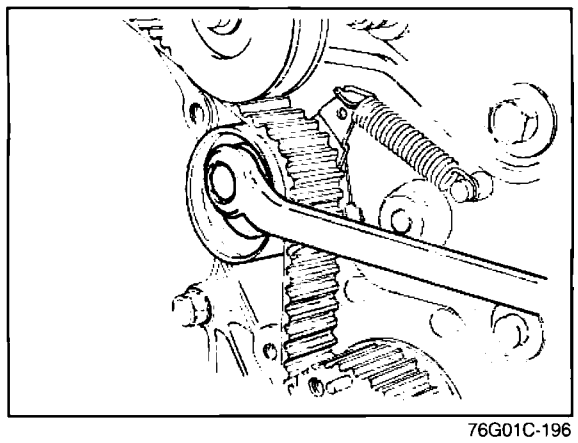


76G01C-195

6. Loosen the tensioner lock bolt.
7. Turn the crankshaft twice in the direction of rotation (clockwise).

Caution
Do not rotate in reverse direction.

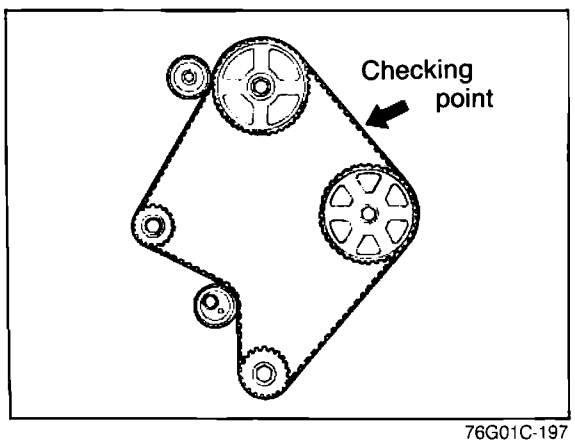
8. Check that each timing mark is correctly aligned. If not aligned, remove the timing belt. Repeat step 2—9.



76G01C-196

9. Tighten the timing belt tensioner lock bolt.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

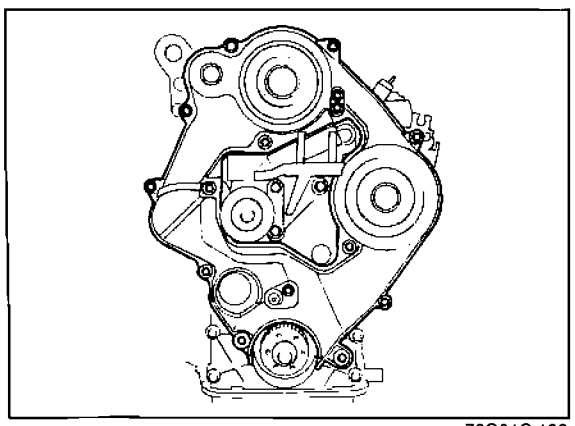


76G01C-197

10. Check the timing belt tension.
If the tension is not correct, loosen the tensioner lock bolt and repeat step 6—9, or replace the tensioner spring.

Standard deflection:
9.0—11.5 mm (0.35—0.45 in)
/98 N (10 kg, 22 lb)

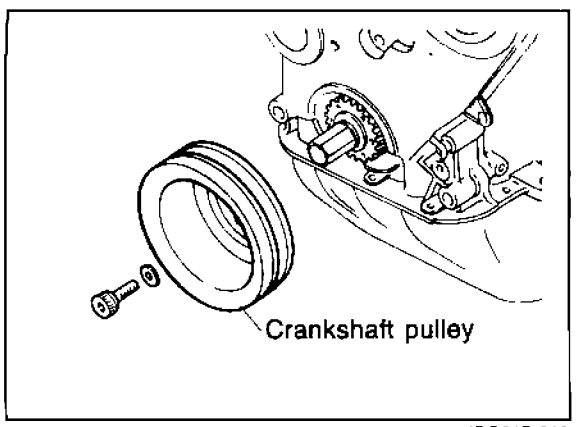
Caution
Be sure not to apply tension other than that of the tensioner spring.



76G01C-198

Timing Belt Cover
Install the left and right timing belt covers.

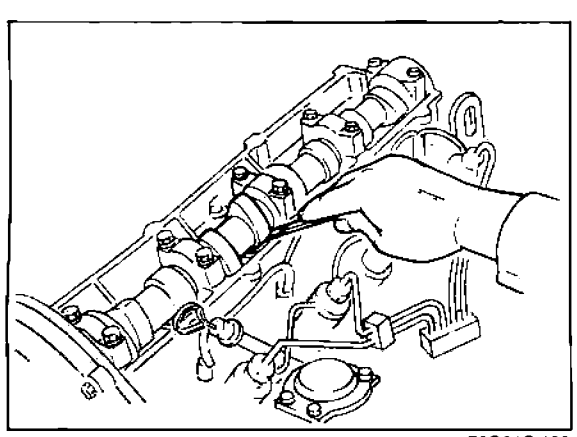
Tightening torque:
7—10 N·m (70—100 cm-kg, 61—87 in-lb)



4BG01B-210

Crankshaft Pulley
Install the crankshaft pulley.

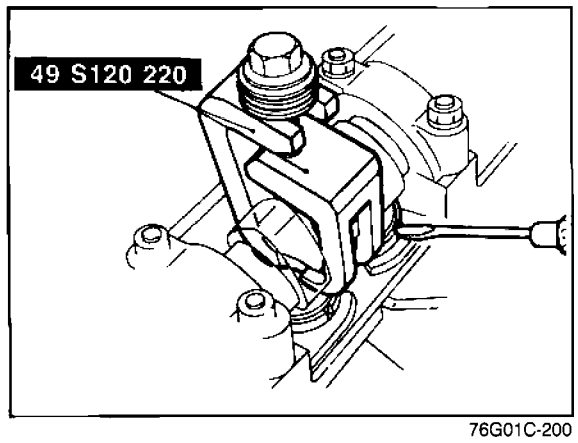
Tightening torque:
23—32 N·m (2.3—3.3 m-kg, 17—24 ft-lb)



76G01C-199

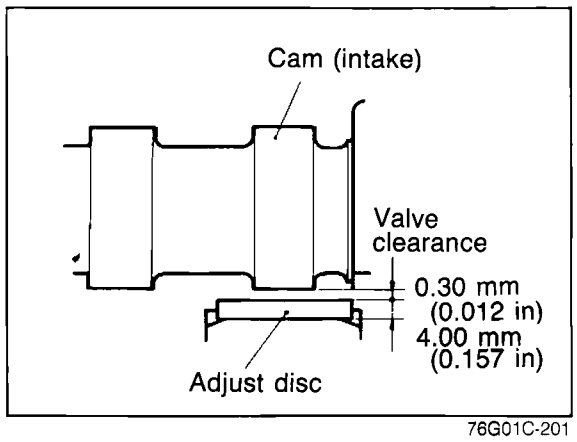
Valve Clearance
1. Set the No.1 cylinder to compression TDC.
2. Measure the valve clearance at No.1, No.2 (intake), and No.1, No.3 (exhaust).

Clearance (cold engine)
IN : 0.20—0.30 mm (0.008—0.012 in)
EX: 0.30—0.40 mm (0.012—0.016 in)

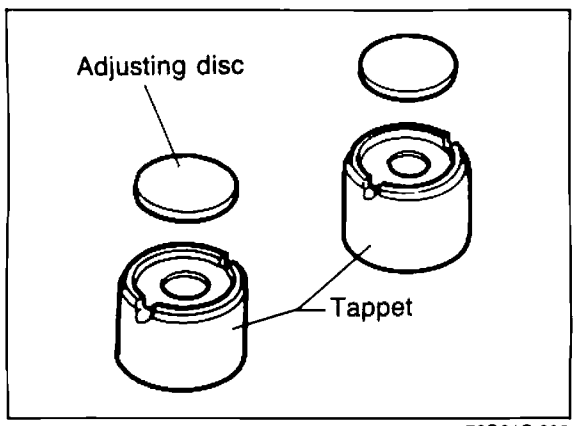


76G01C-200

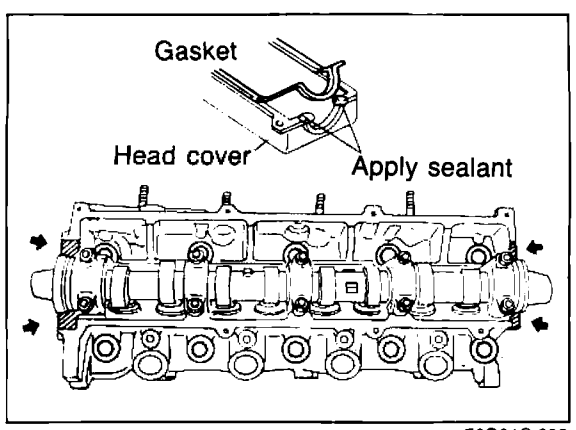
3. If the valve clearance is not within the specification, adjust the valve clearance.
   (1) Face the intake cam lobe straight upward.
   (2) Move the tappet so that its notch is at the manifold side.
   (3) Press the tappet down until the adjusting disc is accessible with the **SST**.
   (4) Take out the adjusting disc.



76G01C-201



76G01C-202



76G01C-203

(5) Select an appropriate disc depending on the valve clearance measured. And install it.

Example (intake valve):
Thickness of original adjusting disc + (measured clearance — standard clearance) = **thickness of new adjusting disc**.
4.00 + (0.30 – 0.25) = 4.05 mm
0.157 + (0.012 – 0.010) = 0.159 in

Note
a) The disc thickness is indicated by the number marked on the disc. For example, 3825 means 3.825 mm (0.1056 in).
b) Adjusting discs are available in 25 different thicknesses within the 3.40—4.60 mm (0.134—0.181 in) range, at intervals of 0.05 mm (0.002 in).

(6) Inspect the clearance again.

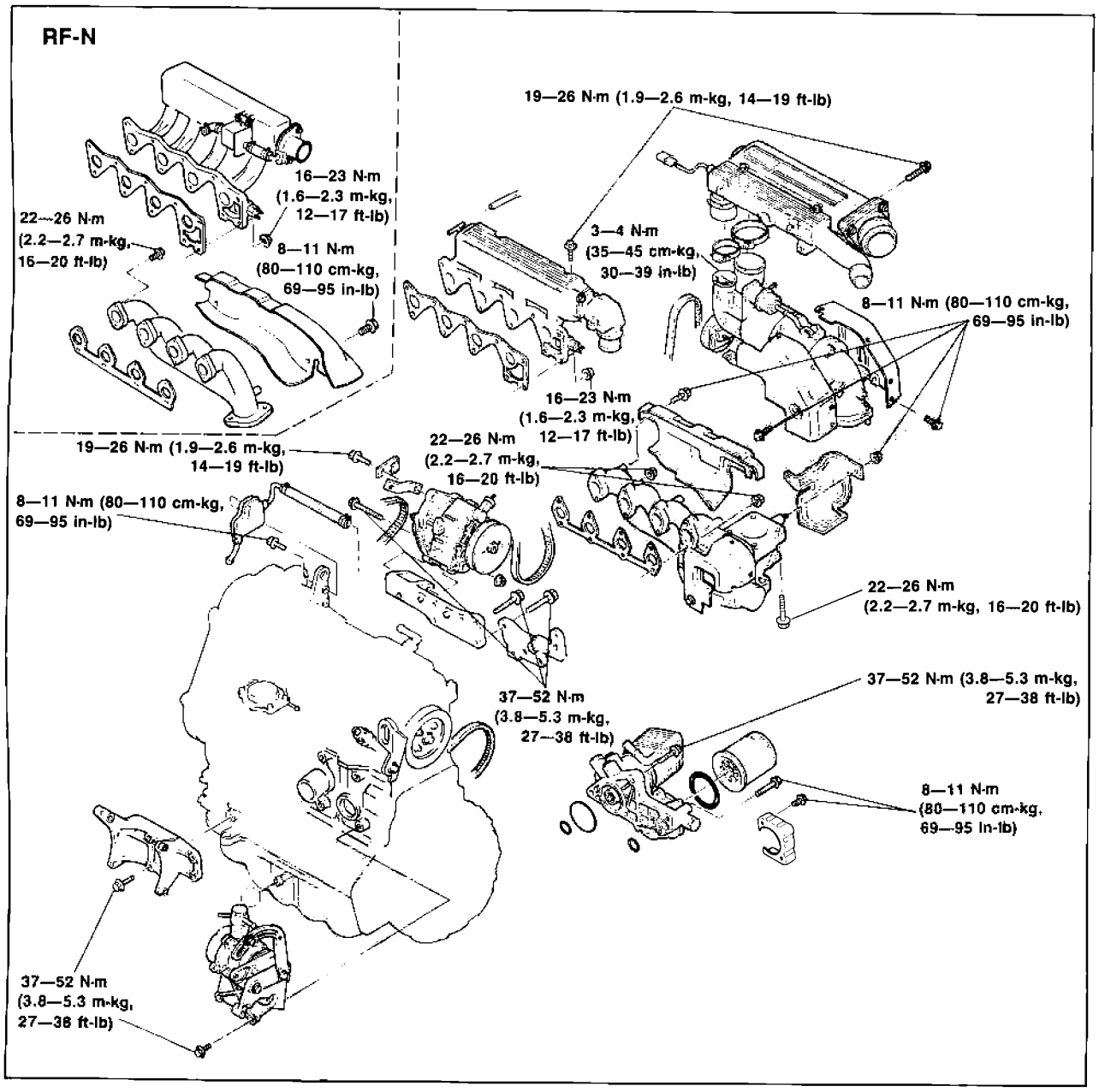
4. Set the No.4 cylinder to compression TDC.
5. Measure and adjust the valve clearance at No.3, No.4 (intake), and No.2, No.4 (exhaust) in the same way.

Cylinder Head Cover
1. Apply sealant to the shaded areas.
2. Install the cylinder head cover.

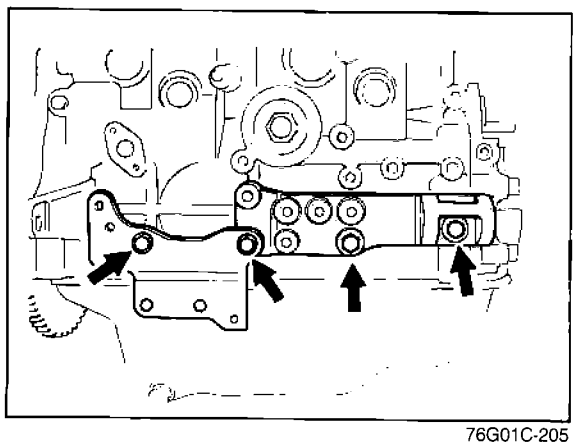
Tightening torque:
7—10 N·m (70—100 cm-kg, 61—89 in-lb)

3. Install the PVC hose.

AUXILIARY PARTS
Torque Specifications



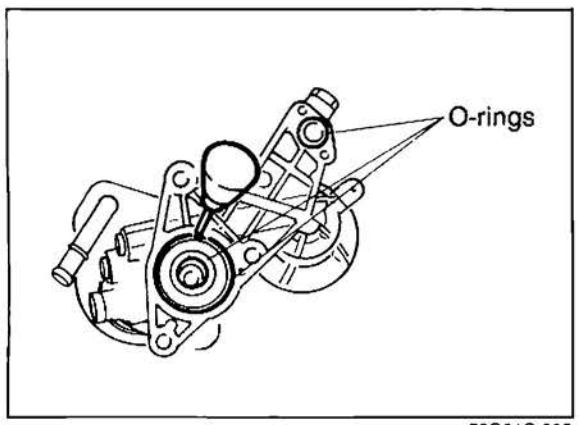
86U01X-164



76G01C-205

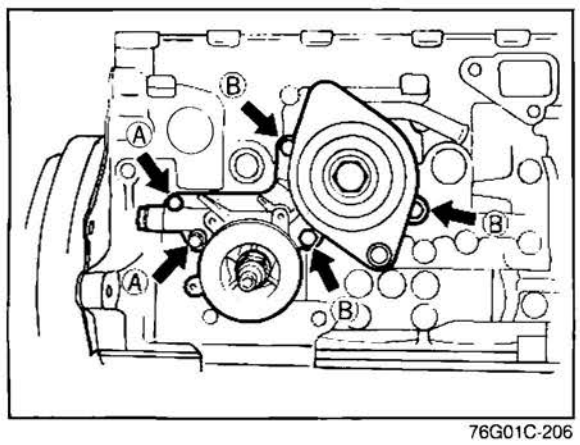
Alternator Bracket and Exhaust Pipe Bracket
Install the alternator bracket and exhaust pipe stay.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)



76G01C-205

Oil Cooler Assembly
1. Clean the contact surfaces of the cylinder block and oil filter assembly.
2. Install new O-rings, and apply a coat of engine oil.

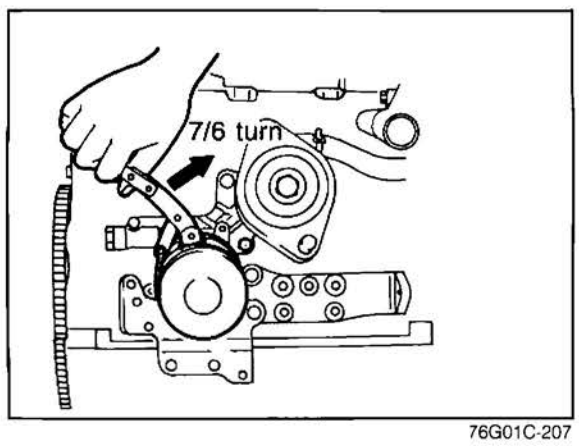


76G01C-206

3. Install the oil cooler assembly.

Tightening torque:
Bolt A: 8—11 N·m (80—110 cm-kg, 69—95 in-lb)
Bolt B: 37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

4. Connect the water hose.

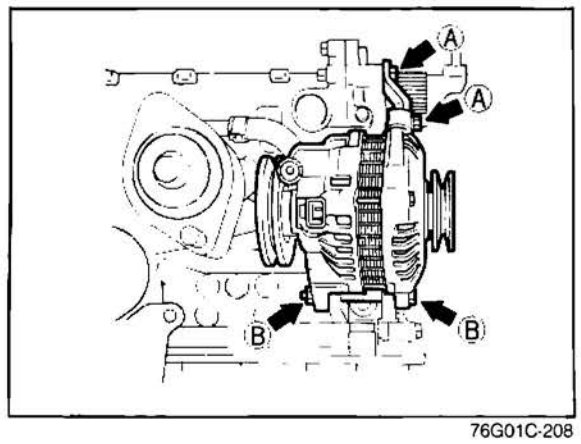


76G01C-207

Oil Filter
1. Install the oil filter cover.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

2. Apply a coat of engine oil to the filter rubber seal.
3. Install the oil filter until the rubber seal contacts the oil cooler by hand. Then tighten it a **7/6 turn further** with a band type wrench.



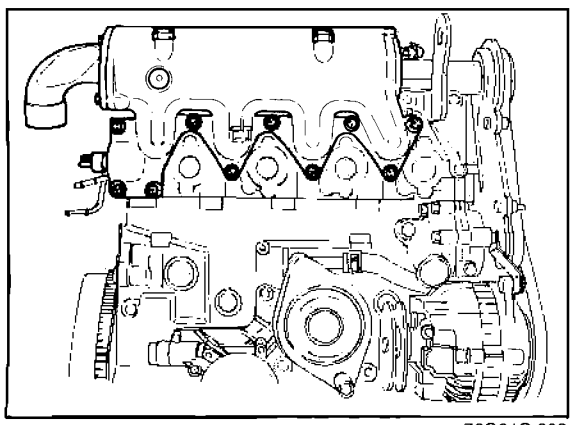
76G01C-208

Alternator
1. Install the alternator.

Tightening torque:
Bolt A: 19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)
Bolt B: 37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

2. Install the alternator drive belt, and adjust the belt deflection. (Refer to page 1C—7)

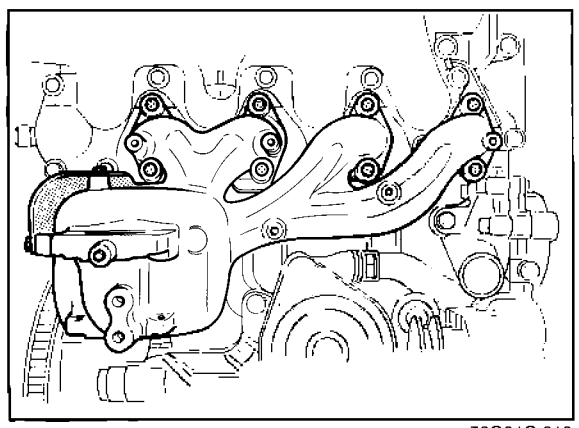
expert22 для http://rutracker.org



76G01C-209

Intake Manifold
Install the intake manifold and gasket.

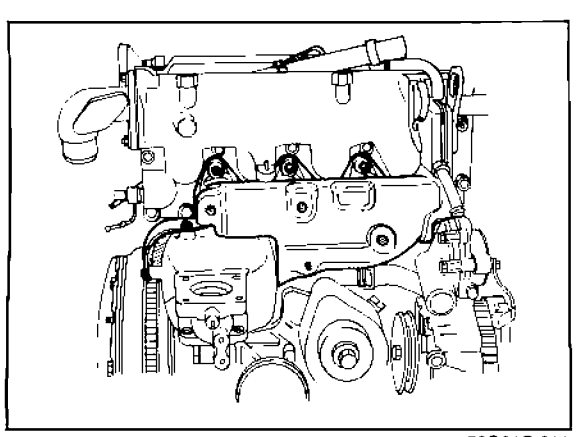
Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)



76G01C-210

Exhaust Manifold
1. Place the exhaust manifold gasket in position.
2. Install the exhaust manifold.

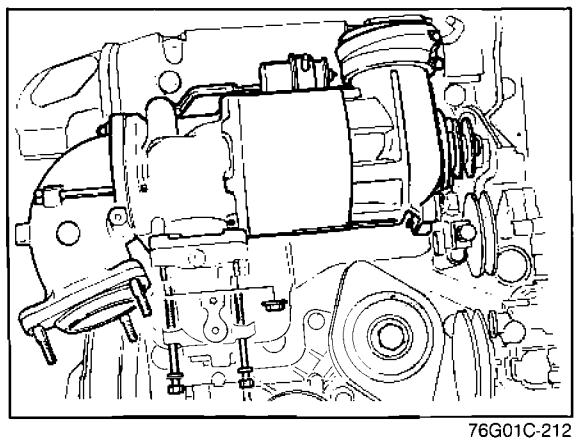
Tightening torque:
22—26 N·m (2.2—2.7 m-kg, 16—20 ft-lb)



76G01C-211

Exhaust Manifold Insulator
Install the exhaust manifold insulator.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

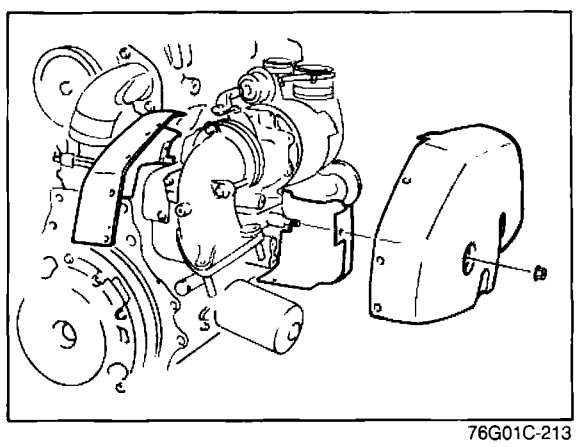


76G01C-212

Comprex Supercharger
1. Install the Comprex supercharger with new gasket.

Tightening torque:
22—26 N·m (2.2—2.7 m-kg, 16—20 ft-lb)

2. Install the Comprex supercharger drive belt, and adjust the belt deflection. (Refer to page 1C—7)

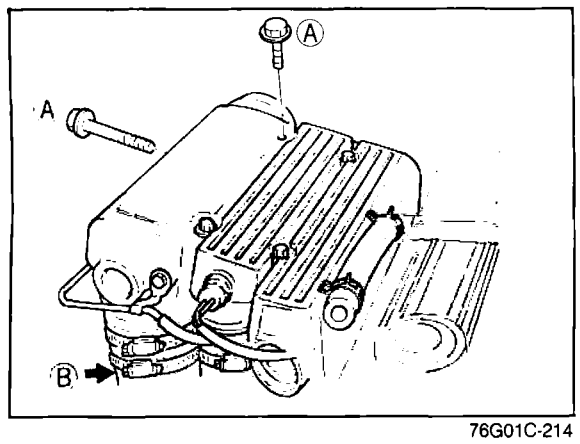


76G01C-213

Comprex Supercharger Insulator
Install the comprex supercharger insulator.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

Air Funnel Assembly
1. Install the air funnel assembly.

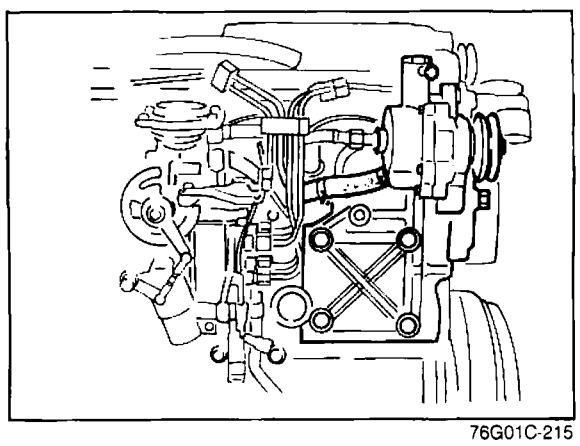


76G01C-214

Tightening torque:
Bolt A: 19—26 N·m
(1.9—2.6 m-kg, 14—19 ft-lb)
Bolt B: 3—4 N·m
(35—45 cm-kg, 30—39 ft-lb)

2. Connect the actuator vacuum tube.

Vacuum Pump
1. Install the vacuum pump with bracket.



76G01C-215

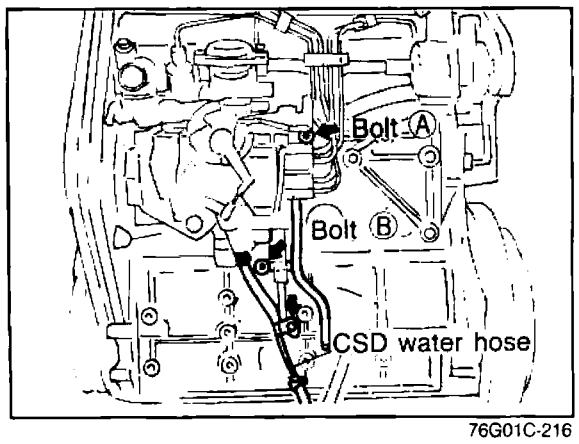
Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

2. Connect the oil pipe and hose.

Tightening torque:
12—18 N·m (1.2—1.8 m-kg, 104—156 ft-lb)

3. Install the drive belt, and adjust the belt deflection.
(Refer to page 1C—7)

PCV Hose
Install the PCV hose.



76G01C-216

CSD Water Hose
1. Remove the engine from the engine hanger.
2. Tighten the oil pipe mounting bolts.

Bolt A: 8—11 N·m
(80—110 cm-kg, 69—95 in-lb)
Bolt B: 12—18 N·m
(1.2—1.8 m-kg, 104—156 ft-lb)

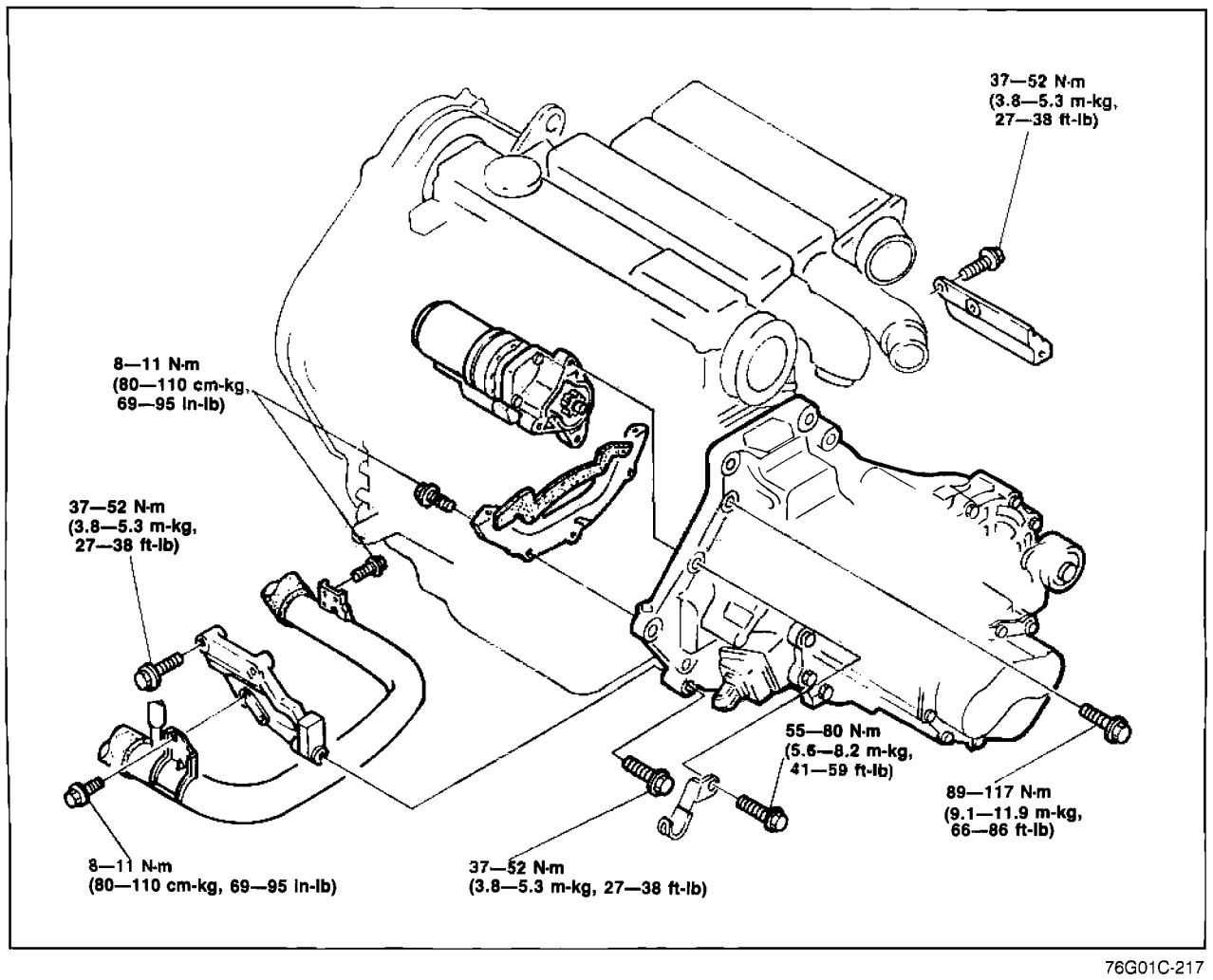
3. Install the CSD water hose.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

INSTALLATION

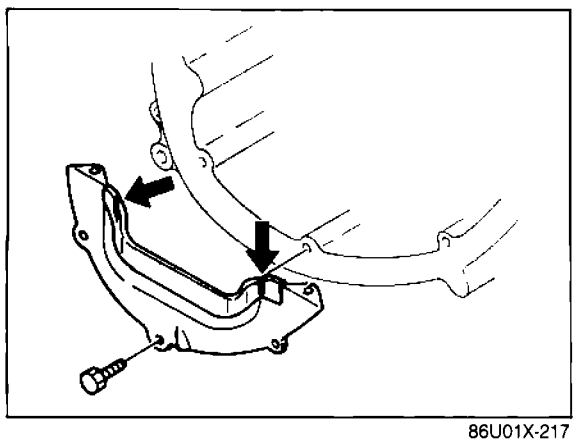
TRANSAXLE ASSEMBLY

Assemble the transaxle to the engine in the sequence shown in the figure referring to the installation note.



76G01C-217

1. Transaxle
2. Clutch under cover
3. Gusset plate
4. Water pipe
5. Starter



86U01X-217

Installation Note

Clutch under cover

Before installation, fill the notches with silicon as shown in the figure.

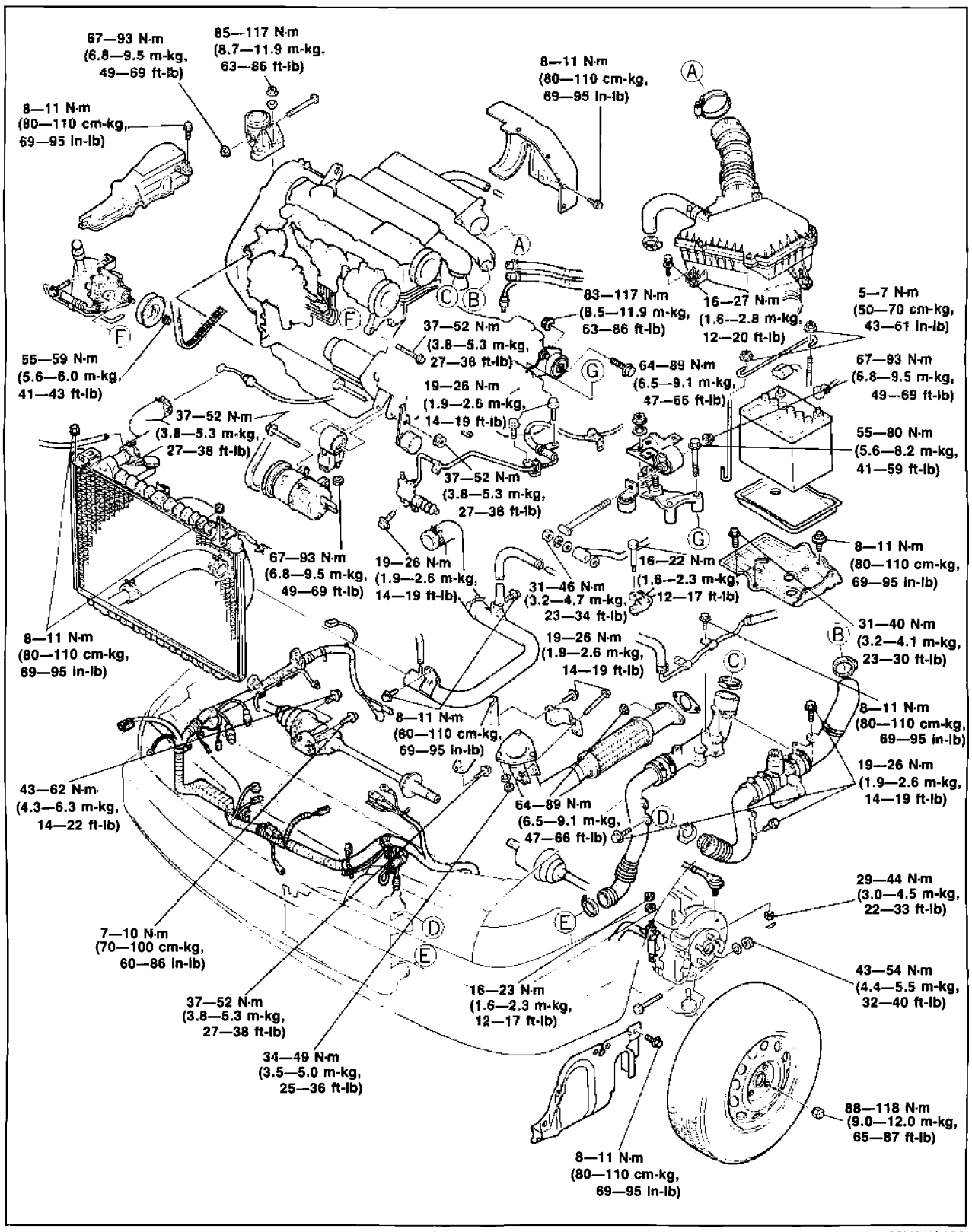
1C INSTALLATION

ENGINE INSTALLATION

Install the engine and transaxle assembly.

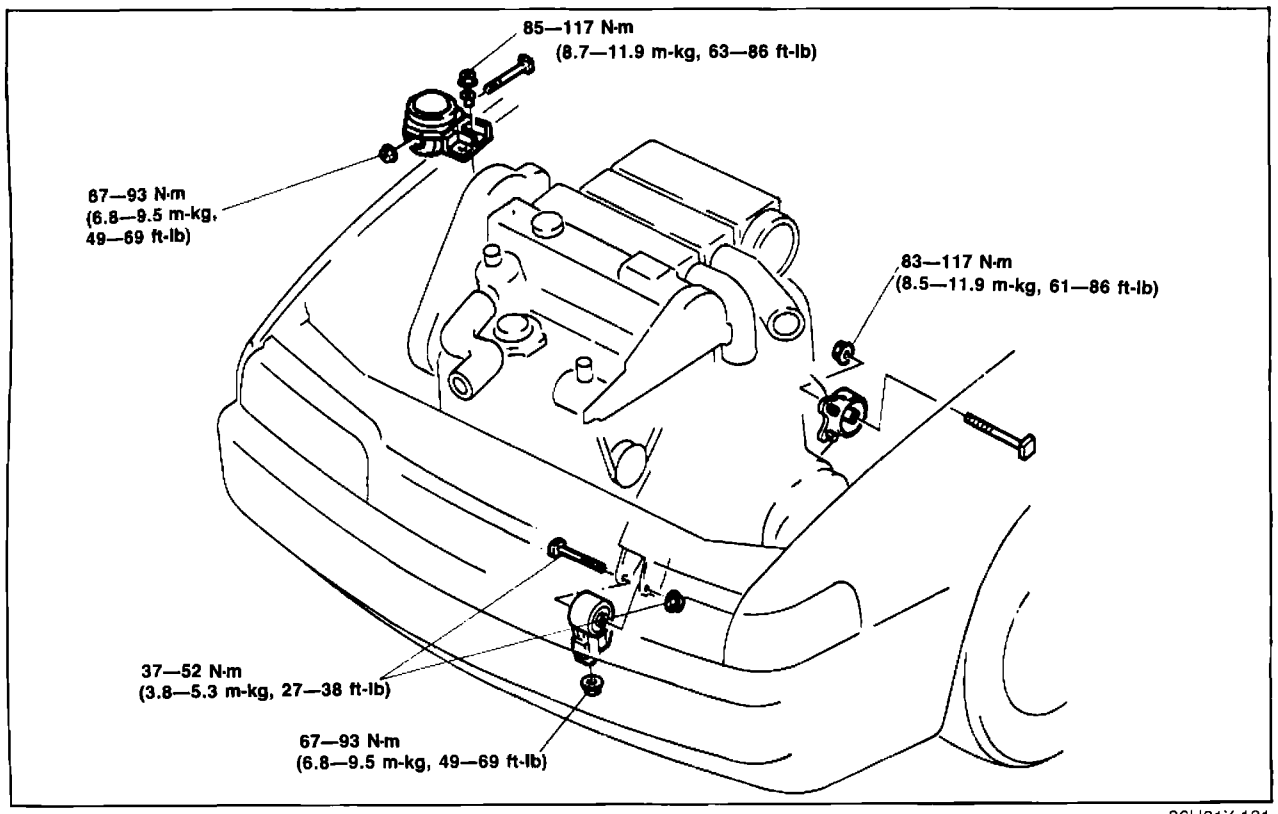
Warning: Be sure the vehicle is securely supported.

Torque Specifications

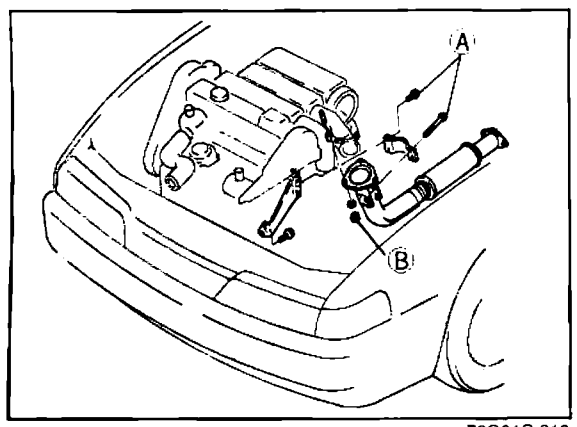


86U01X-180

Engine Mount
Install the engine mount.



86U01X-181



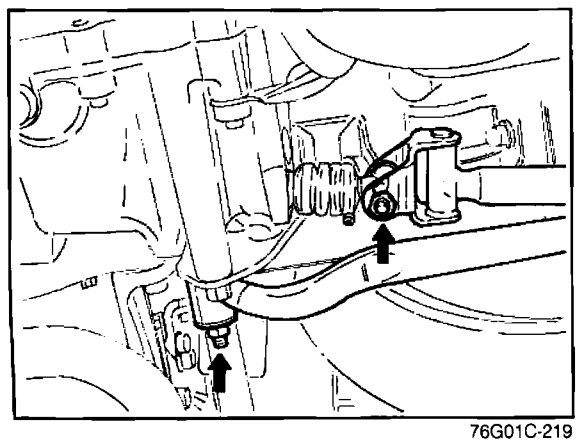
76G01C-218

Exhaust Pipe
1. Tighten exhaust pipe stay.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

2. Install the exhaust pipe.

Tightening torque:
Ⓐ: 19—26 N·m
(1.9—2.6 m-kg, 14—19 ft-lb)
Ⓑ: 34—49 N·m
(3.5—5.0 m-kg, 25—36 ft-lb)



76G01C-219

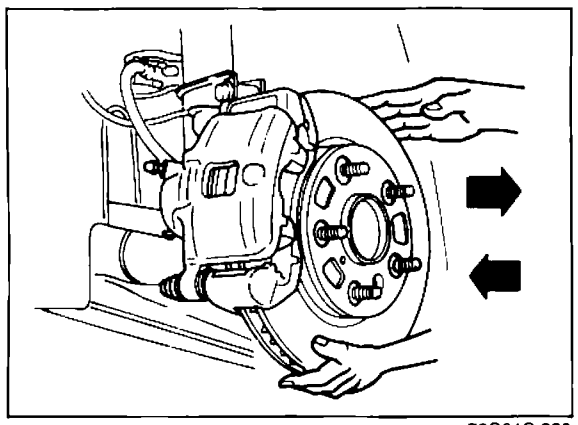
Extension Bar
Install the extension bar to the transaxle.

Tightening torque:
31—46 N·m (3.2—4.7 m-kg, 23—34 ft-lb)

Change Rod
Install the change rod to the transaxle.

Tightening torque:
16—22 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

1C INSTALLATION

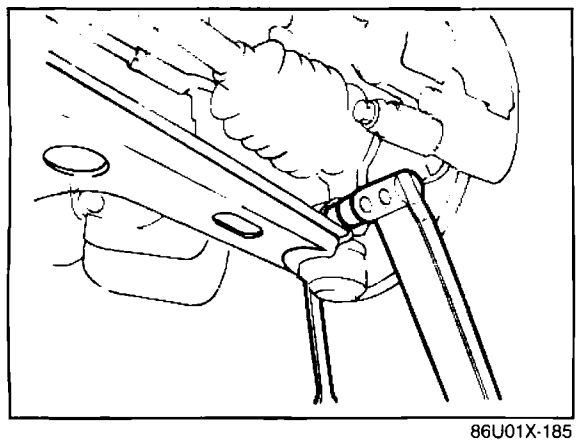


76G01C-220

Driveshaft
1. Apply grease to the end of the driveshaft.
2. Install the driveshaft and a new clip.

Caution
a) When installing the driveshaft, be careful not to damage the oil seal.
b) After installation, pull the front hub outward to confirm that the driveshaft is securely held by the clip.

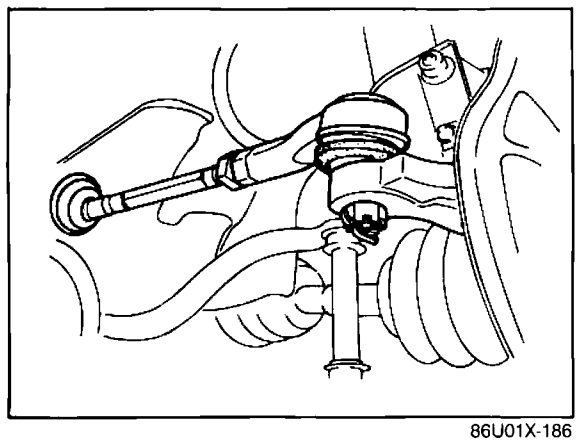
Water Hose
Connect the water hose.



86U01X-185

Lower Arm
Install the lower arm ball-joint to the knuckle; then tighten the lock nut.

Tightening torque:
43—54 N·m (4.4—5.5 m-kg, 32—40 ft-lb)

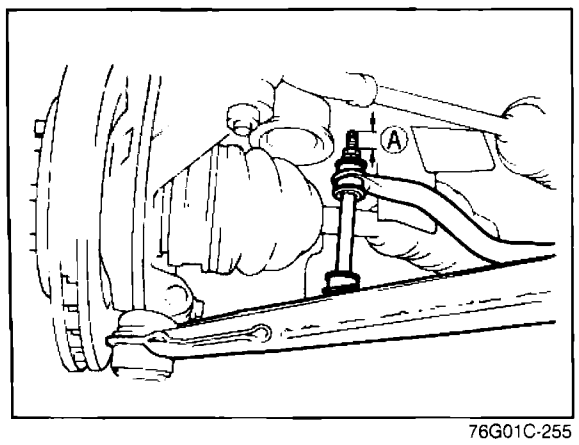


86U01X-186

Tie-Rod End
1. Install the tie-rod end to the knuckle.

Tightening torque:
29—44 N·m (3.0—4.5 m-kg, 22—33 ft-lb)

2. Install the cotter pin.



76G01C-255

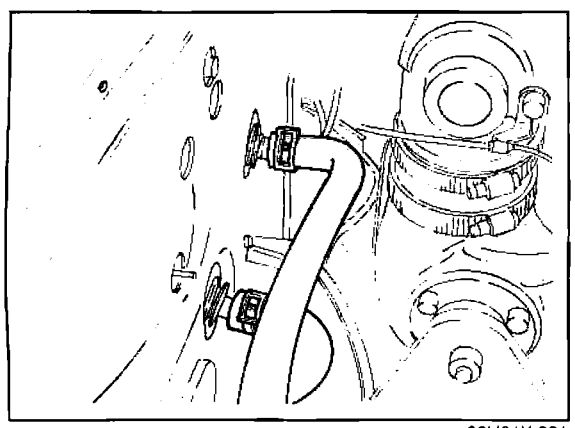
Stabilizer Control Rod
Install and adjust the front stabilizer control rods.

Dimension A: 20.1 mm (0.79 in)

Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

Front Wheel
Install the front wheel.

Tightening torque:
88—118 N·m (9.0—12.0 m-kg, 65—87 ft-lb)

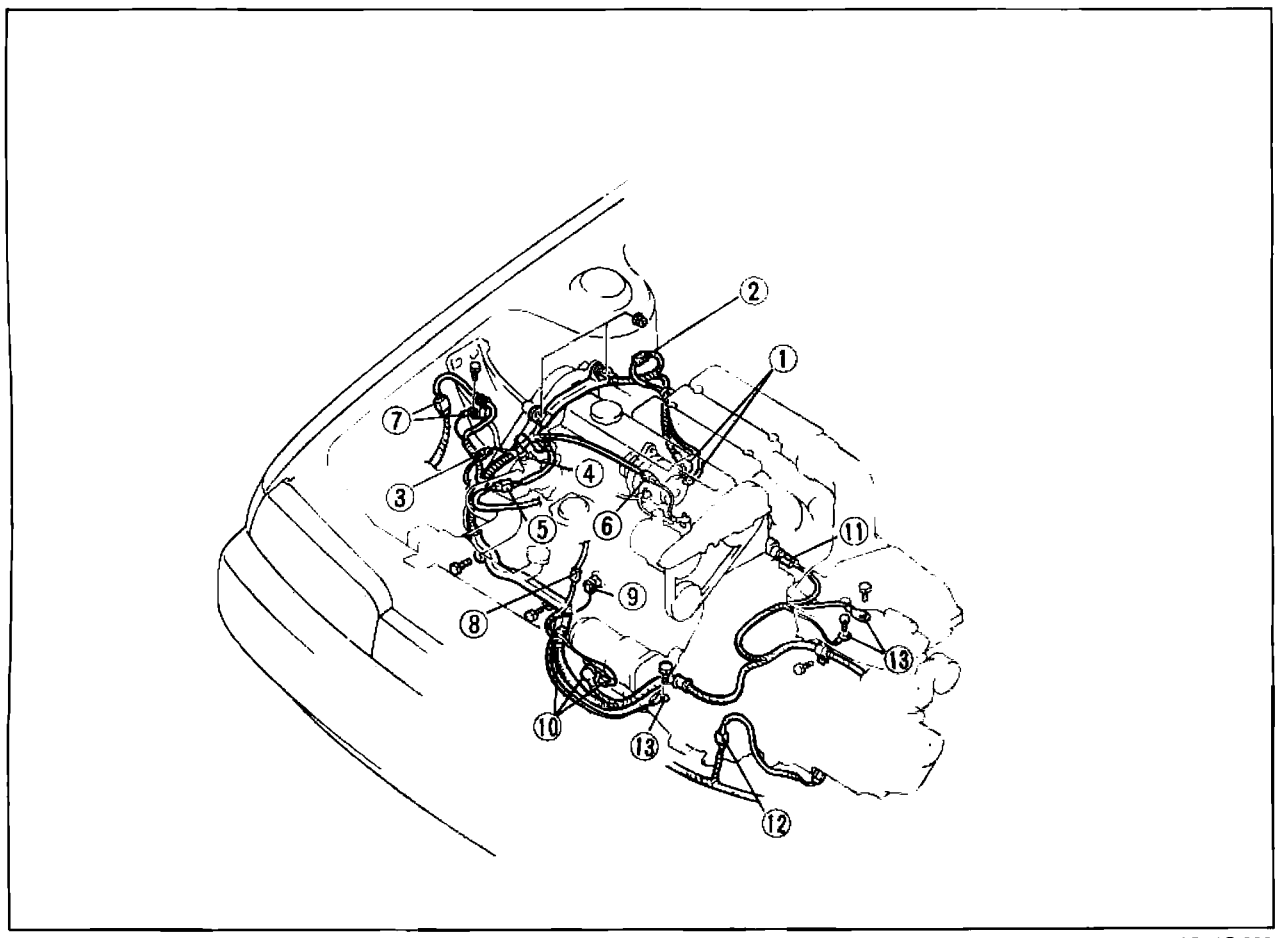


Heater Hose
Connect the heater hoses.

Note
Position the hose clamp in the original location on the hose and squeeze the clamp lightly with large pliers to ensure a good fit.

86U01X-221

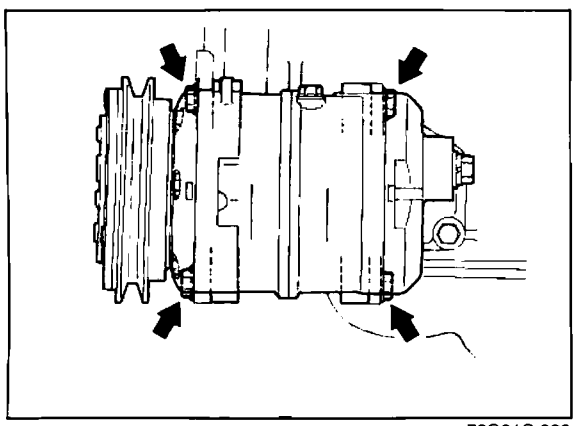
Connector Location
Install each harness as shown in the figure.



76G01C-222

1. Alternator
2. Boost air temperature sensor (RF-CX)
3. Heat gauge unit
4. Water thermo switch
5. Pick up coil
6. Glow cord
7. Front harness connector and ground
8. Fuel cut valve
9. Oil pressure switch
10. Starter
11. Water temperature switch
12. Transaxle harness
13. Grounds

1C INSTALLATION

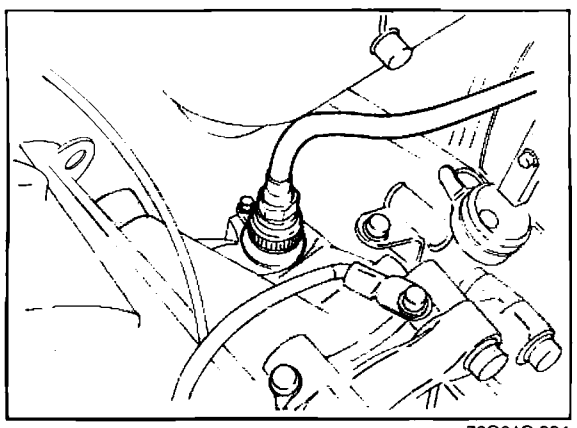


76G01C-223

A/C Compressor
1. Install the A/C compressor.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

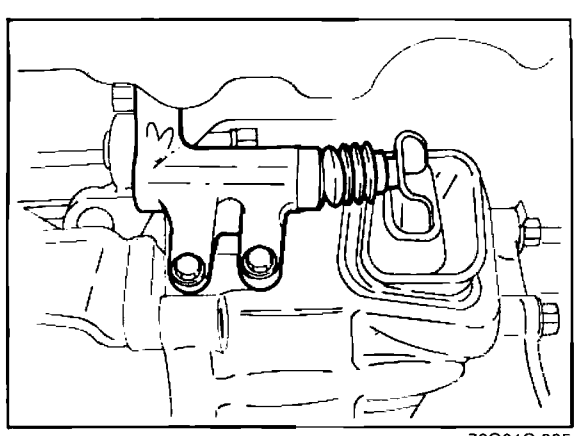
2. Install the drive belt and adjust the belt deflection. (Refer to page 1C—7)



76G01C-224

Speedometer Cable
Install the speedometer cable.

Transaxle harness
Install the transaxle harness.



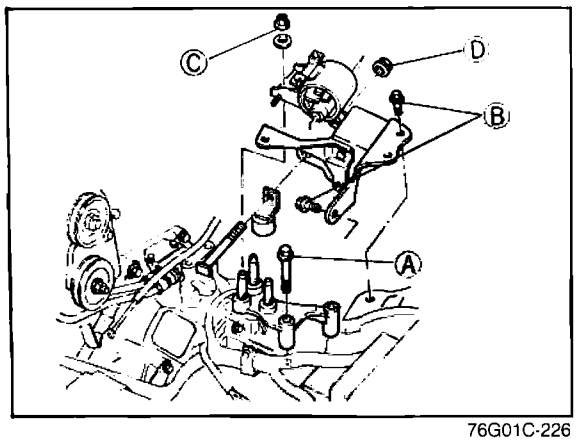
76G01C-225

Clutch Release Cylinder
1. Set the pipe bracket in position.

Tightening torque:
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

2. Install the clutch release cylinder.

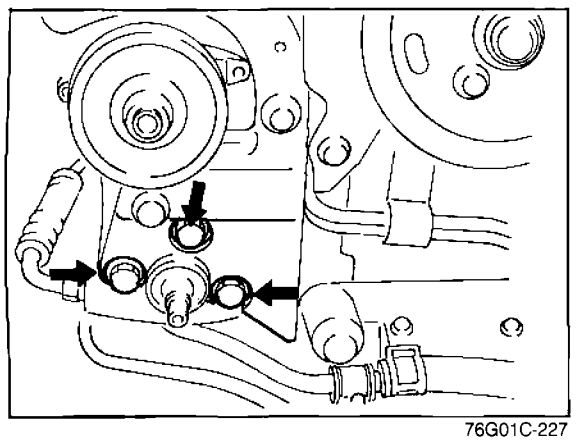
Tightening torque
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



76G01C-226

No.4 Engine Mount
Install the No.4 engine mount.

Tightening torque:
Ⓐ: 55—80 N·m
(5.6—8.2 m-kg, 41—59 ft-lb)
Ⓑ: 36—54 N·m
(3.7—5.5 m-kg, 27—40 ft-lb)
Ⓒ: 64—89 N·m
(6.5—9.1 m-kg, 47—66 ft-lb)
Ⓓ: 67—93 N·m
(6.8—9.5 m-kg, 49—69 ft-lb)



76G01C-227

P/S Oil Pump

1. Install the P/S oil pump.

   Tightening torque:
   37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

2. Install the P/S oil pump pully. (Refer to section 10)

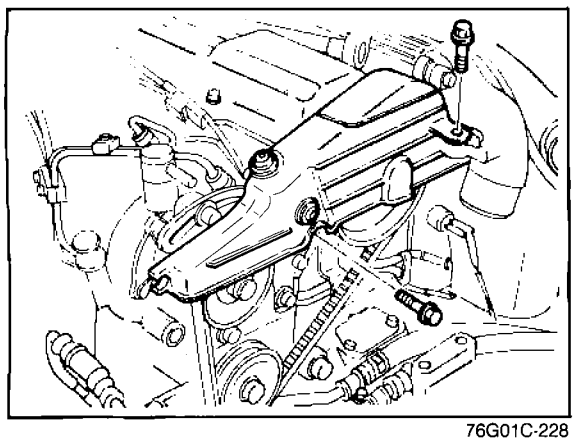
   Tightening torque:
   55—59 N·m (5.6—6.0 m-kg, 41—43 ft-lb)

3. Set the pipe bracket in position.

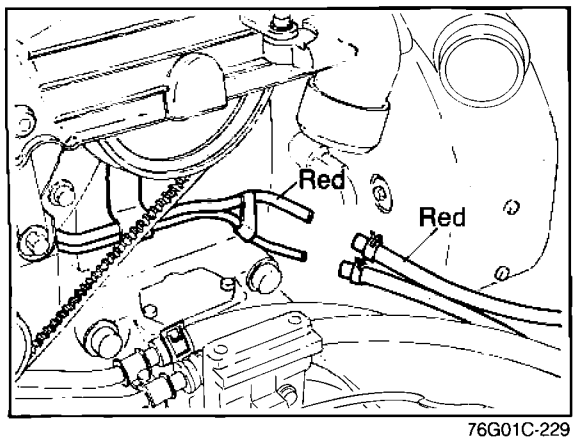
   Tightening torque:
   8—11 N·m (80—110 cm-kg, 69—95 in-lb)

4. Install the drive belt and adjust the belt deflection. (Refer to page 1C—7)
5. Install the drive belt cover.

   Tightening torque:
   8—11 N·m (80—110 cm-kg, 69—95 in-lb)



76G01C-228

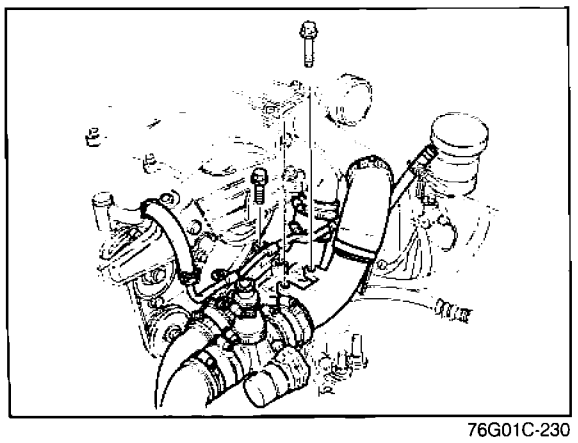


76G01C-229

Fuel Hose

Install the fuel hose.

Note
Be careful of the red marks on the hose.



76G01C-230

Intercooler Pipe and Hose

1. Install the intercooler pipe and hose.

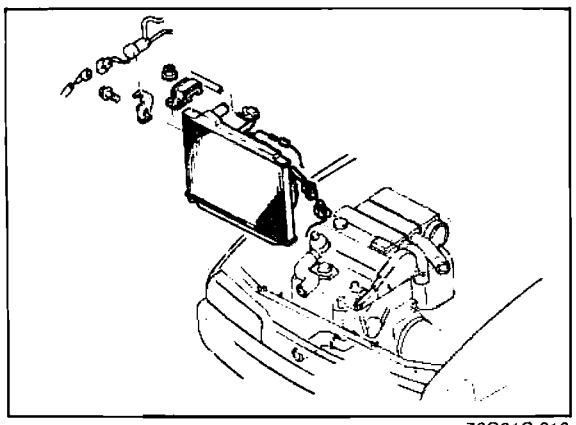
   Tightening torque:
   19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

2. Install the brake vacuum pipe.

   Tightening torque:
   8—11 N·m (80—110 cm-kg, 69—95 in-lb)

3. Connect the brake vacuum hose securely and squeeze the clamp lightly with pliers to ensure a good fit.

1C INSTALLATION

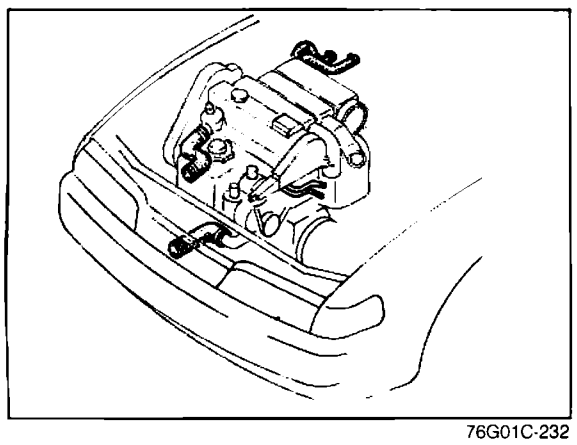


76G01C-213

Radiator
1. Install the radiator and cooling fan.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

2. Connect the radiator harness.



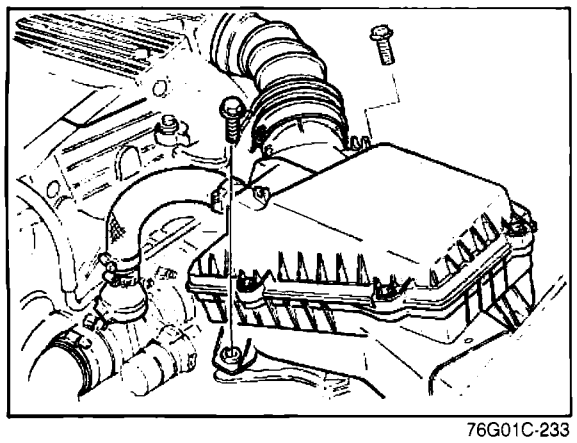
76G01C-232

3. Connect the upper and lower radiator hoses.

Note
a) Position the hose clamp in the original location on the hose.
b) Squeeze the clamp lightly with large pliers to ensure a good fit.

4. Install the solenoid valve and ground.

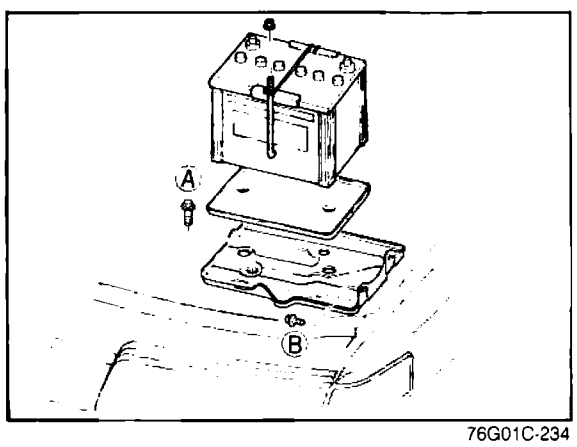
Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



76G01C-233

Air Cleaner Assembly
Install the air cleaner assembly.

Tightening torque:
16—27 N·m (1.6—2.8 m-kg, 12—20 ft-lb)



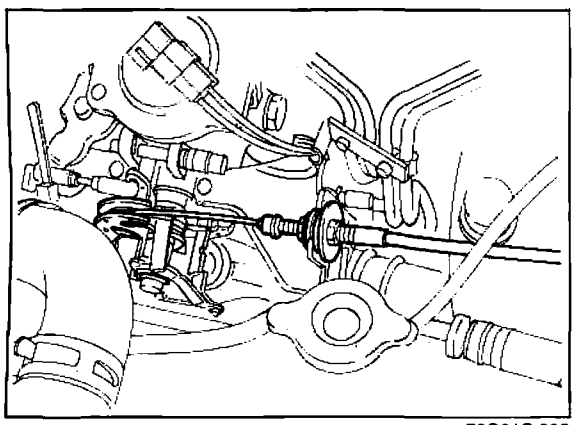
76G01C-234

Battery and Battery Carrier
1. Install the battery carrier.

Tightening torque:
Bolt A: 31—40 N·m
(3.2—4.1 m-kg, 23—30 ft-lb)
Bolt B: 8—11 N·m
(80—110 cm-kg, 69—95 in-lb)

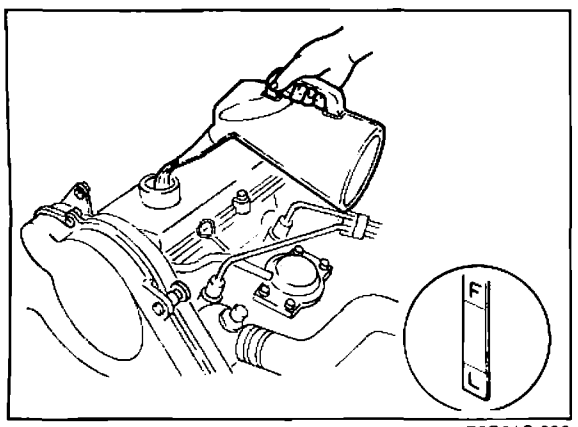
2. Install the battery tray and battery.

Tightening torque:
5—7 N·m (50—70 cm-kg, 43—61 in-lb)



76G01C-235

Accelerator Cable
Install the accelerator cable.



76G01C-236

Engine Oil
Add the specified amount and type of engine oil. (Refer to Section 2B)

Coolant
Close the drain plug, fill the radiator and reservoir tank with the specified amount and type of coolant. (Refer to Section 3B)

Check Engine Condition
1. Check for leaks.
2. Perform engine adjustments if necessary.
3. Perform a road test.
4. Recheck the oil and coolant levels.

2A

LUBRICATION SYSTEM (GASOLINE ENGINE)

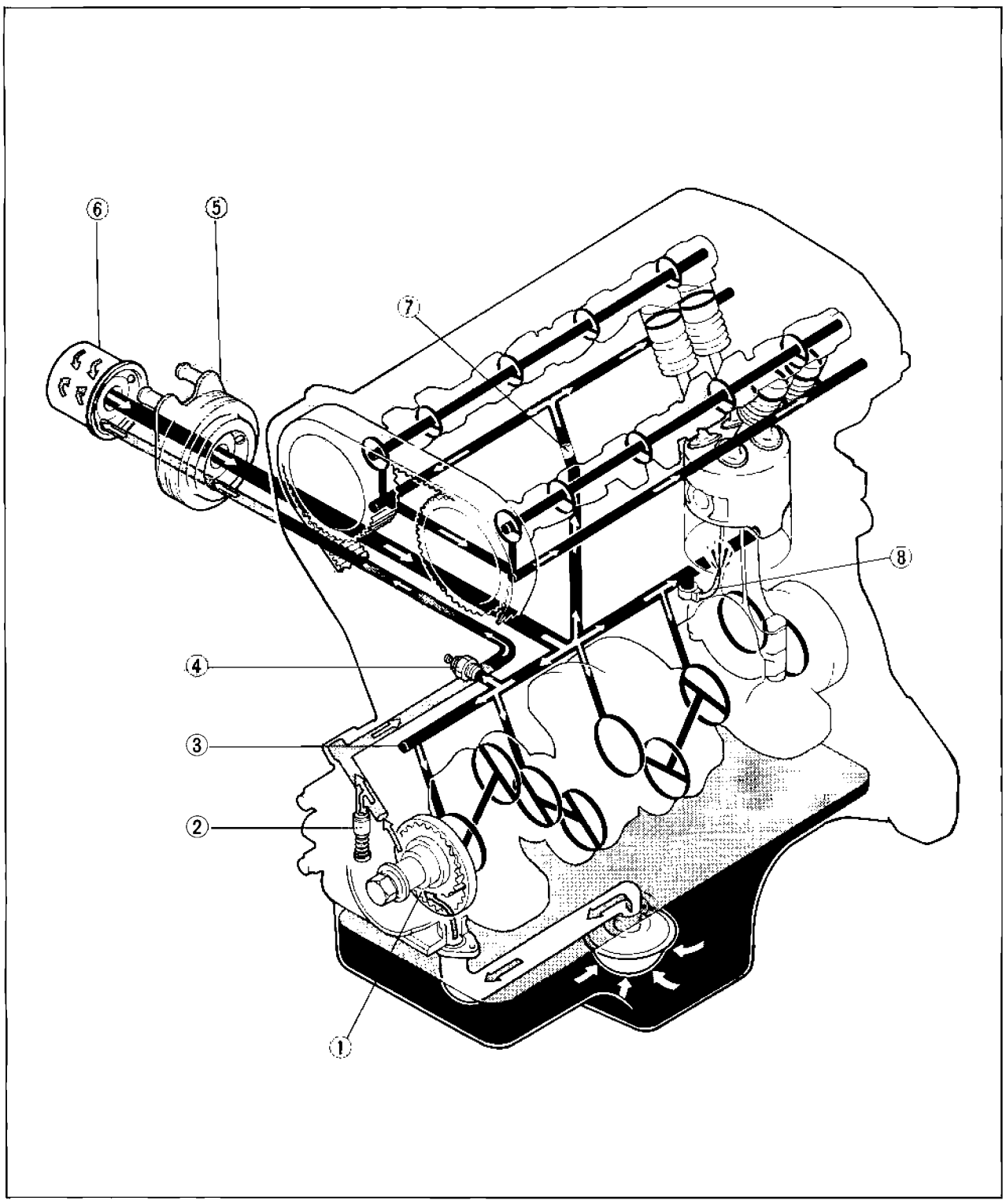
OUTLINE ..... **2A— 2**
LUBRICATION CIRCUIT (DOHC) ..... **2A— 2**
LUBRICATION CIRCUIT (SOHC) ..... **2A— 3**
SPECIFICATIONS ..... **2A— 4**
TROUBLESHOOTING GUIDE ..... **2A— 4**
INSPECTION ..... **2A— 5**
ENGINE OIL ..... **2A— 5**
OIL PRESSURE ..... **2A— 5**
ENGINE OIL ..... **2A— 5**
REPLACEMENT ..... **2A— 5**
OIL FILTER ..... **2A— 6**
REPLACEMENT ..... **2A— 6**
OIL COOLER ..... **2A— 6**
REMOVAL AND INSTALLATION ..... **2A— 6**
OIL PAN ..... **2A— 7**
REMOVAL ..... **2A— 7**
INSPECTION ..... **2A— 8**
INSTALLATION ..... **2A— 8**
OIL PUMP ..... **2A— 9**
REMOVAL ..... **2A— 9**
DISASSEMBLY ..... **2A—11**
INSPECTION ..... **2A—11**
ASSEMBLY ..... **2A—13**
INSTALLATION ..... **2A—13**

76G02A-001

2A OUTLINE

OUTLINE

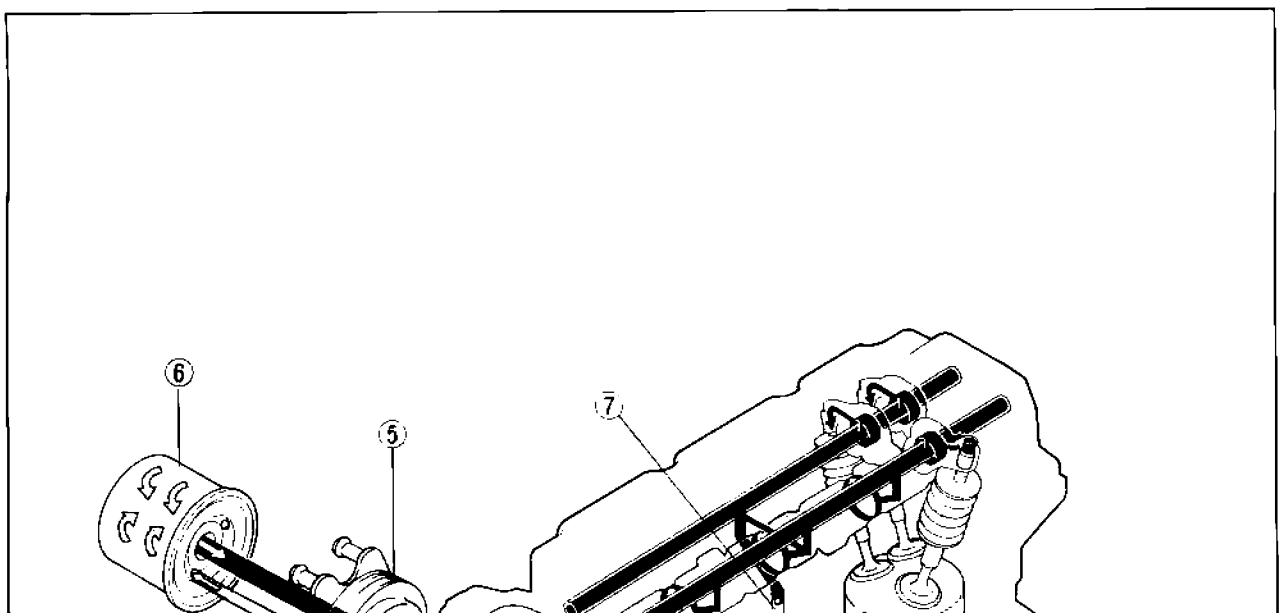
LUBRICATION CIRCUIT (DOHC)



76G02A-002

1. Oil pump
2. Pressure regulator valve
3. Main gallery
4. Oil pressure switch
5. Oil cooler
6. Oil filter
7. Oil control plug
8. Oil jet

LUBRICATION CIRCUIT (SOHC)



76G02A-025

1. Oil pump
2. Pressure regulator valve
3. Main gallery
4. Oil pressure switch
5. Oil cooler (8-valve...only ECE, 12-valve)
6. Oil filter
7. Oil control plug

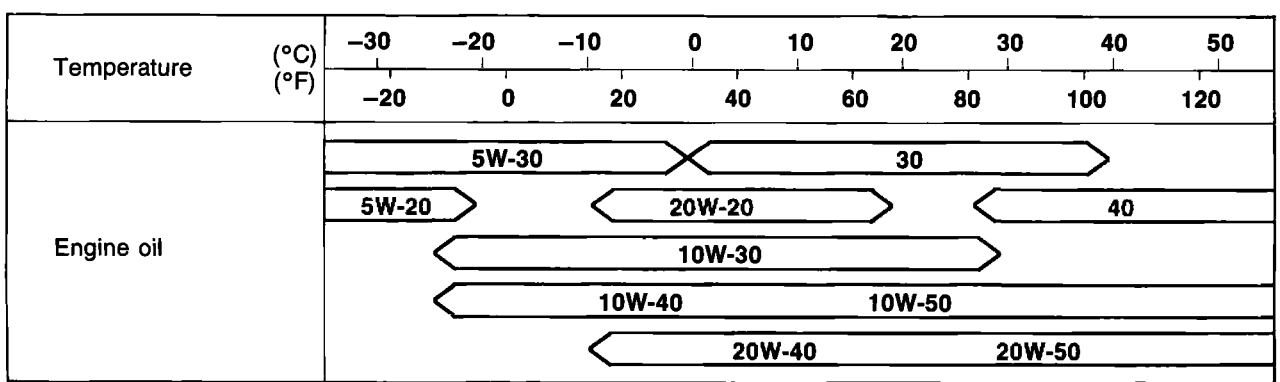
2A TROUBLESHOOTING GUIDE

SPECIFICATIONS

Item \ Engine model			FE·DOHC	F6, F8, FE·SOHC
Lubrication system			Force-fed	
Oil pump	Type		Trochoid gear	Crescent gear
	Regulated pressure kPa (kg/cm², psi)		490 (5.0, 71)	392 (4.0, 57)
	Oil pressure kPa (kg/cm², psi)	1,000 rpm	147—245 (1.5—2.5, 21—36)	
		3,000 rpm	343—441 (3.5—4.5, 50—64)	294—392 (3.0—4.0, 43—57)
Oil filter	Type		Full-flow, paper element	
	Relief pressure differential kPa (kg/cm², psi)		98 (1.0, 14)	
Oil cooler	Type		Water cooled, 6-layer	Water cooled, 4-layer
Oil warning pressure kPa (kg/cm², psi)			29 (0.3, 4.3)	
Oil capacity	Total (dry engine) liters (US qt, Imp qt)		4.3 (4.5, 3.8)	
	Oil pan liters (US qt, Imp qt)		3.6 (3.8, 3.2)	
	Oil filter liters (US qt, Imp qt)		0.2 (0.21, 0.18)	0.3 (0.32, 0.26)
Engine oil (API service)			SD, SE, or SF	

76G02A-003

Recommended SAE Viscosity



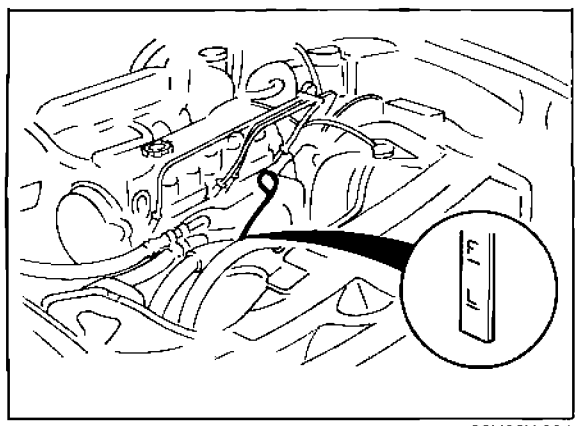
Temperature range anticipated before next oil change, °C(°F)

63G02D-303

TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Engine hard starting	Improper engine oil	Replace	2A— 5
	Insufficient engine oil	Add oil	2A— 5
Excessive oil consumption	Oil working up or working down	Refer to Section 1	
	Oil leakage	Repair	—
Oil pressure drop	Insufficient oil	Add oil	2A— 5
	Oil leakage	Repair	—
	Worn or damaged oil pump gear	Replace	2A—11
	Worn plunger (inside oil pump) or weak spring	Replace	2A—11
	Clogged oil strainer	Clean	—
	Excessive main bearing or connecting rod bearing clearance	Refer to Section 1	
Warning lamp illuminated while engine running	Oil pressure drop	As described above	—
	Malfunction of oil pressure switch	Refer to Section 15	
	Malfunction of electrical system	Refer to Section 15	

76G02A-004


86U02X-004

INSPECTION

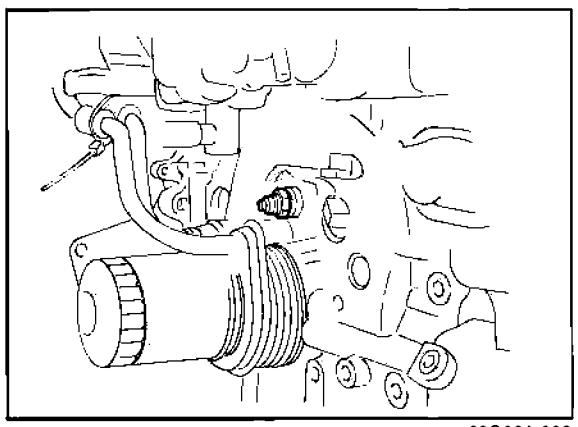
ENGINE OIL

1. Be sure the vehicle is on level ground.
2. Warm up the engine to normal operating temperature and stop it.
3. Wait for five minutes.
4. Remove the oil level gauge and check the oil level and condition.
5. Add or replace oil if necessary.

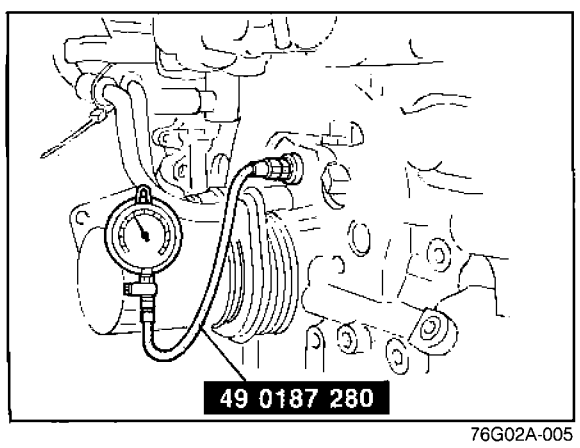
Note
The distance between the L and F marks on the level gauge represents 1.0 liter (1.06 US qt, 0.88 Imp qt).

OIL PRESSURE

1. Remove the oil pressure switch.


69G02A-006

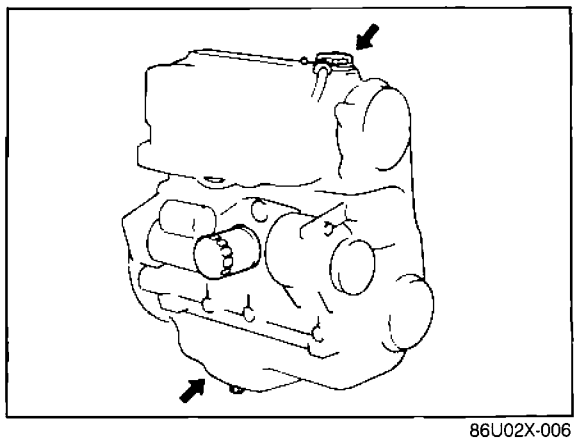
2. Screw the **SST** into the pressure switch installation hole.
3. Warm up the engine to normal operating temperature.
4. Run the engine at **3,000 rpm**, and note the gauge reading.



76G02A-005

Oil pressure:
343—441 kPa
(3.5—4.5 kg/cm^2, 50—64 psi)...DOHC
294—392 kPa
(3.0—4.0 kg/cm^2, 43—57 psi)...SOHC

5. If the pressure is not as specified, check for the cause, and repair if necessary.
(Refer to Troubleshooting Guide.)


86U02X-006

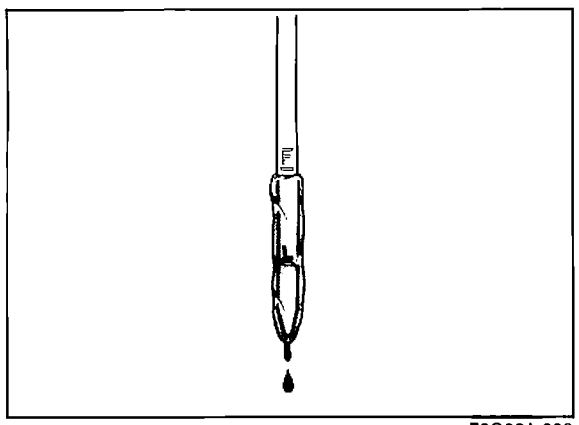
ENGINE OIL

REPLACEMENT

1. Warm up the engine to the normal operating temperature and stop it.
2. Remove the oil filler cap and the oil pan drain plug.
3. Drain the oil into a suitable container.

Warning
Be careful when draining, the oil is very hot.

2A OIL FILTER, OIL COOLER



76G02A-006

4. Install the drain plug and a new gasket.
5. Refill the engine with the specified type and amount of oil.
6. Refit the oil filler cap.

Oil pan capacity:
3.6 liters (3.8 US qt, 3.2 Imp qt)

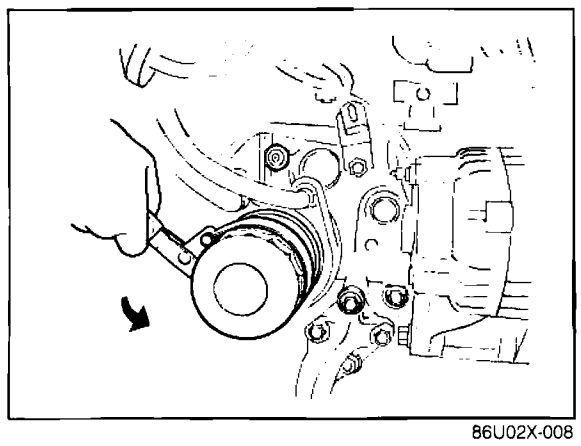
7. Recheck the oil level after the engine has been run.

OIL FILTER

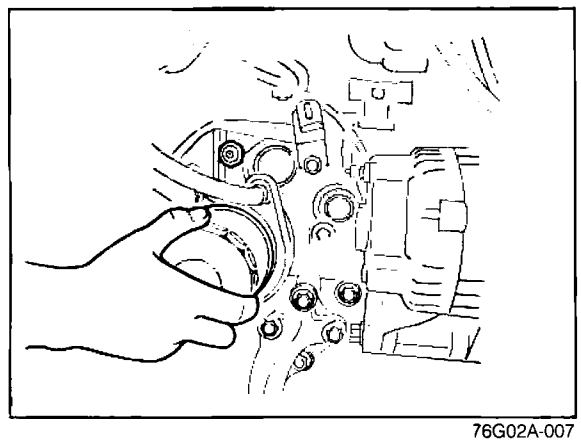
REPLACEMENT

1. Remove the oil filter with a suitable wrench.
2. Use a clean rag to wipe off the mounting surface on the engine.
3. Apply a small amount of engine oil to the rubber seal of the new filter.

Warning
Be careful that the engine and filter are very hot.



86U02X-008

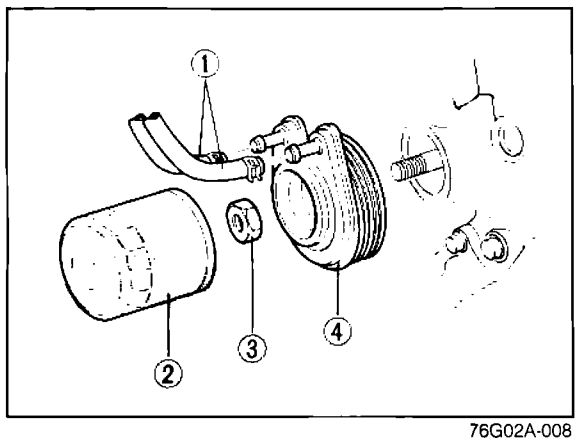


76G02A-007

4. (DOHC)
   Install the oil filter until the rubber seal contacts the base and then tighten the filter 1 and 1/6 turn with a wrench.
   (SOHC)
   Install the oil filter and tighten it by hand only. Do not use a wrench.
5. Start the engine and inspect around the filter seal for leaks.
6. Check the oil level and add oil if necessary.

Oil filter capacity:
0.20 liters (0.21 US qt, 0.18 Imp qt)...DOHC
0.30 liters (0.32 US qt, 0.26 Imp qt)...SOHC

OIL COOLER (DOHC, 12-valve, ECE 8-valve)



76G02A-008

REMOVAL AND INSTALLATION

Remove in the sequence shown in the figure.
Install in the reverse order of removal.
1. Water hose
2. Oil filter
3. Nut
4. Oil cooler

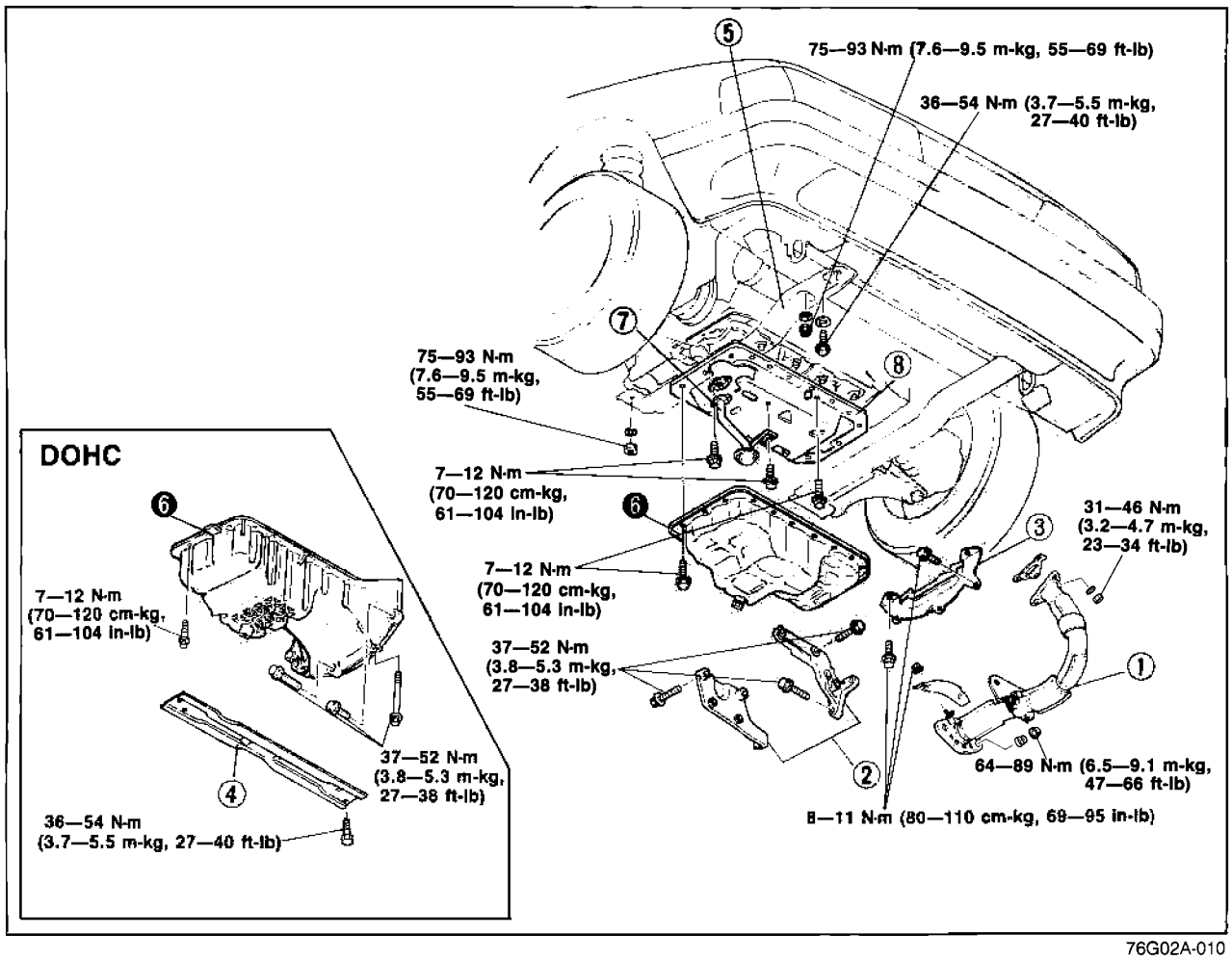
Nut tightening torque:
29—39 N·m (3.0—4.0 m-kg, 22—29 ft-lb)

OIL PAN

REMOVAL

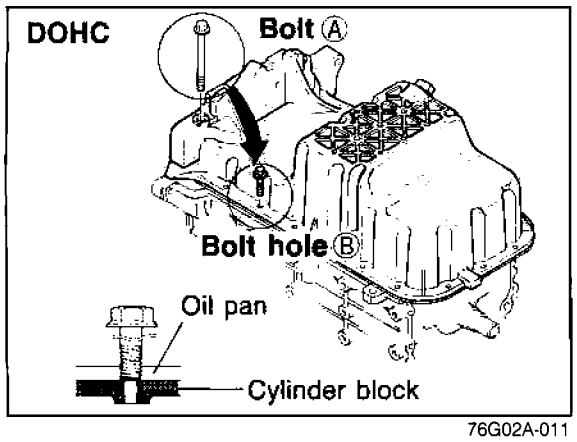
1. Disconnect the negative battery cable.
2. Drain the engine oil.
3. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.

76G02A-009



76G02A-010

1. Exhaust pipe
2. Gusset plate (SOHC)
3. Clutch housing under cover (SOHC)
4. Performance plate (4WS)
5. Sub frame (RH)
6. Oil pan
7. Oil strainer
8. Stiffener (FE 8-valve...only ECE, 12-valve)



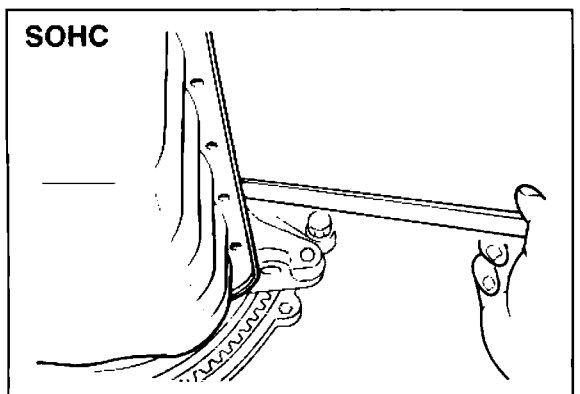
76G02A-011

Removal Note
Oil pan
(DOHC)

1. Remove the oil pan mounting bolts.
2. Install the bolt Ⓐ from the mounting bolt or 10 mm (0.39 in) bolts in the specified bolt holes Ⓑ (both sides).
3. Screw in the bolts gradually and alternately to remove the oil pan.

Caution
Do not pry the oil pan to prevent damaging the contact surface.

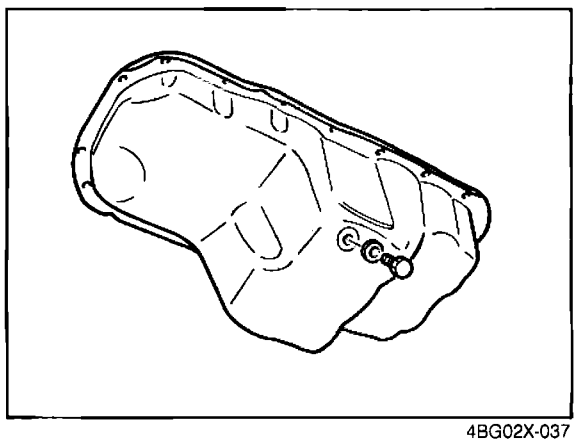
2A OIL PAN



76G02A-012

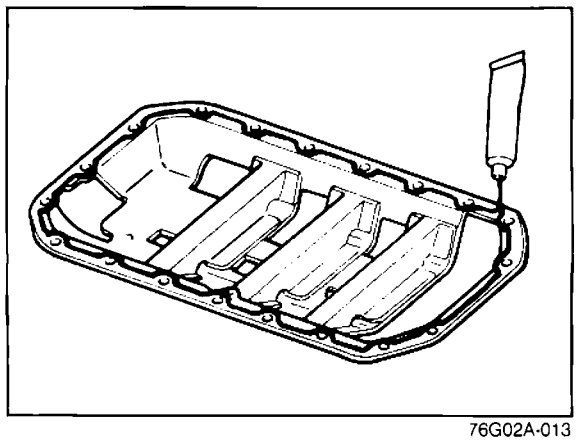
(SOHC)
1. Remove the oil pan mounting bolts.
2. Insert a scraper or a suitable tool between the oil pan and the stiffener or the cylinder block to separate them.
3. Remove the oil pan.

Caution
Do not bend the oil pan when prying loose.



4BG02X-037

INSPECTION
Check the following points. Repair or replace if necessary.
1. Cracks, deformation, damage
2. Damaged drain plug threads

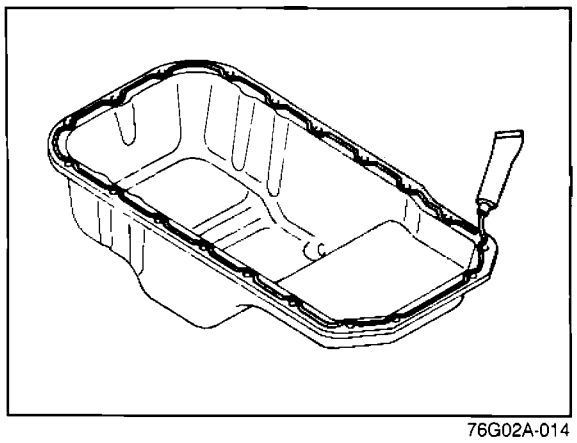


76G02A-013

INSTALLATION
Install in the reverse order of removal referring to the installation note.

Installation Note
Stiffener (FE 8-valve...only ECE, 12-valve)
1. Remove any dirt or other material from the contact surface.
2. Apply silicon sealant to the stiffener around inside of the bolt holes and overlap the ends.
3. Install the stiffener.

Tightening torque:
7—12 N·m (70—120 cm-kg, 61—104 in-lb)



76G02A-014

Oil pan
1. Apply silicon sealant to the oil pan around inside of the bolt holes and overlap the ends.
2. Install the oil pan.

Tightening torque:
7—12 N·m (70—120 cm-kg, 61—104 in-lb)

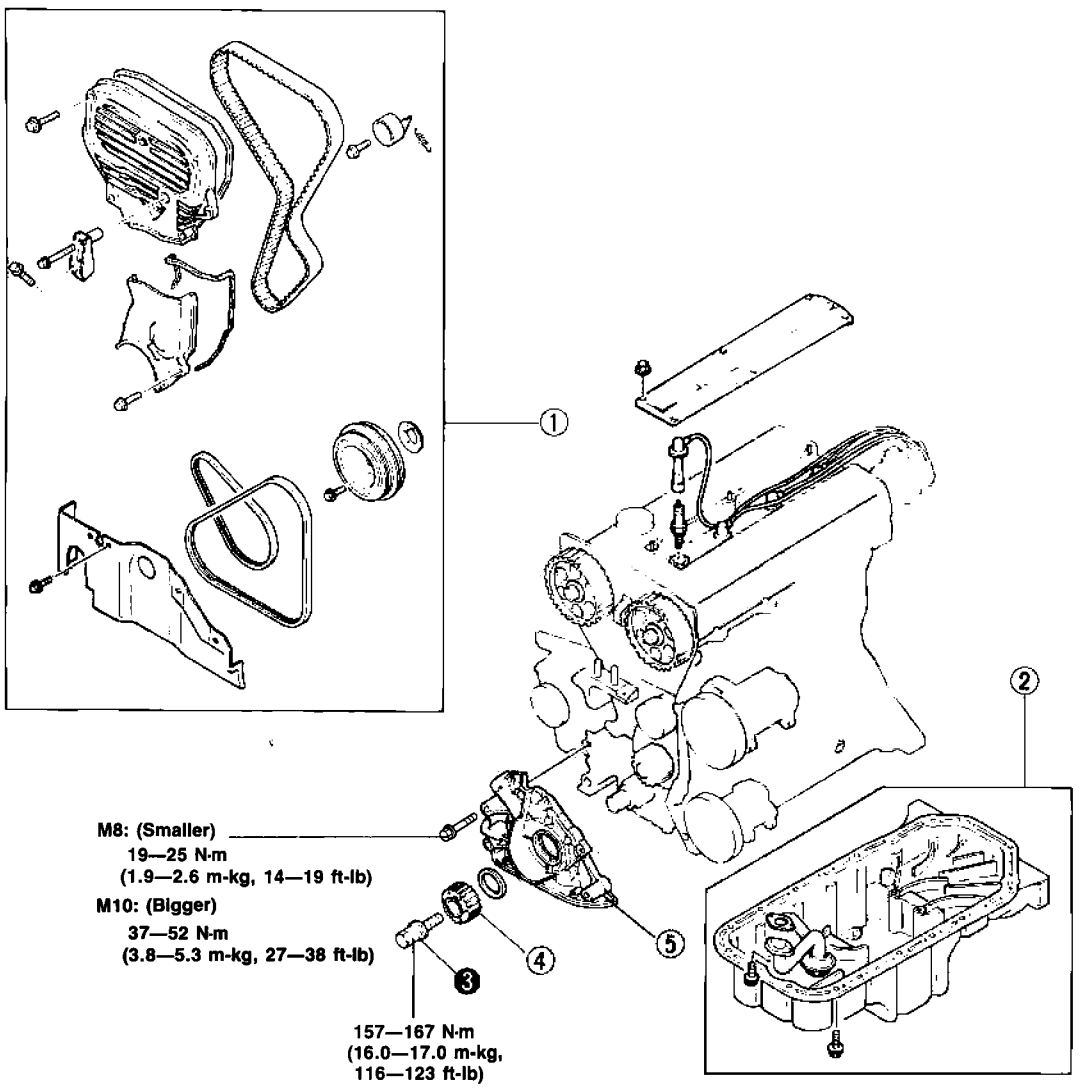
Caution (DOHC)
Oil pan projection and recession from the end of the cylinder block must not be more than 1.5 mm (0.06 in).

OIL PUMP

REMOVAL
1. Disconnect the negative battery cable.
2. Drain the engine oil.
3. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.

76G02A-015

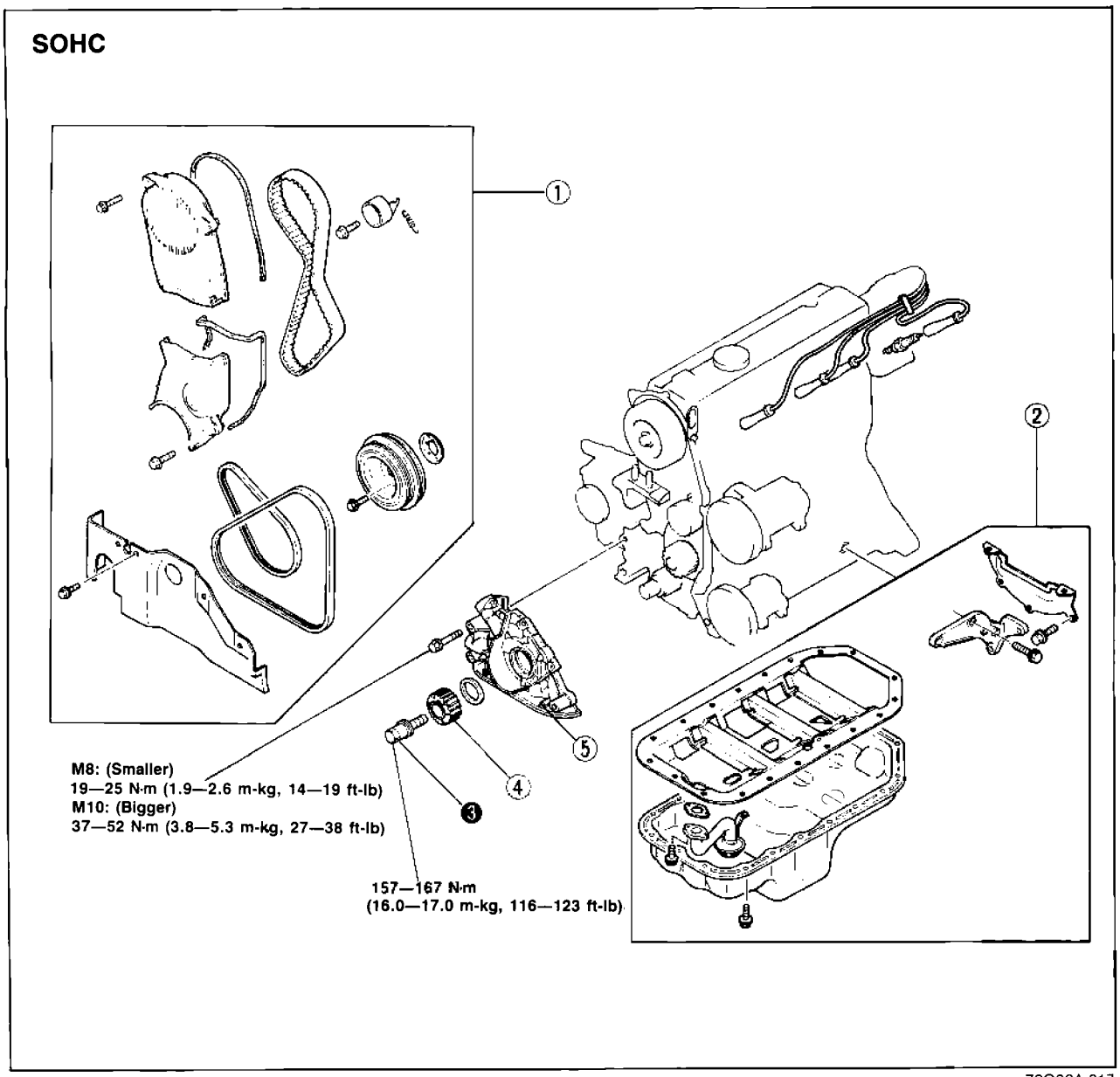
DOHC



76G02A-016

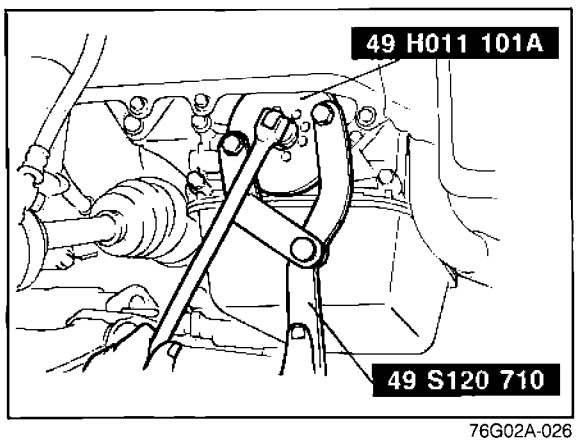
1. Timing belt (Refer to Section 1B)
2. Oil pan (Refer to page 2A—7.)
3. Timing belt pulley lock bolt
4. Timing belt pulley
5. Oil pump

2A OIL PUMP



76G02A-017

1. Timing belt (Refer to Section 1A)
2. Oil pan (Refer to page 2A—7.)
3. Timing belt pulley lock bolt
4. Timing belt pulley
5. Oil pump



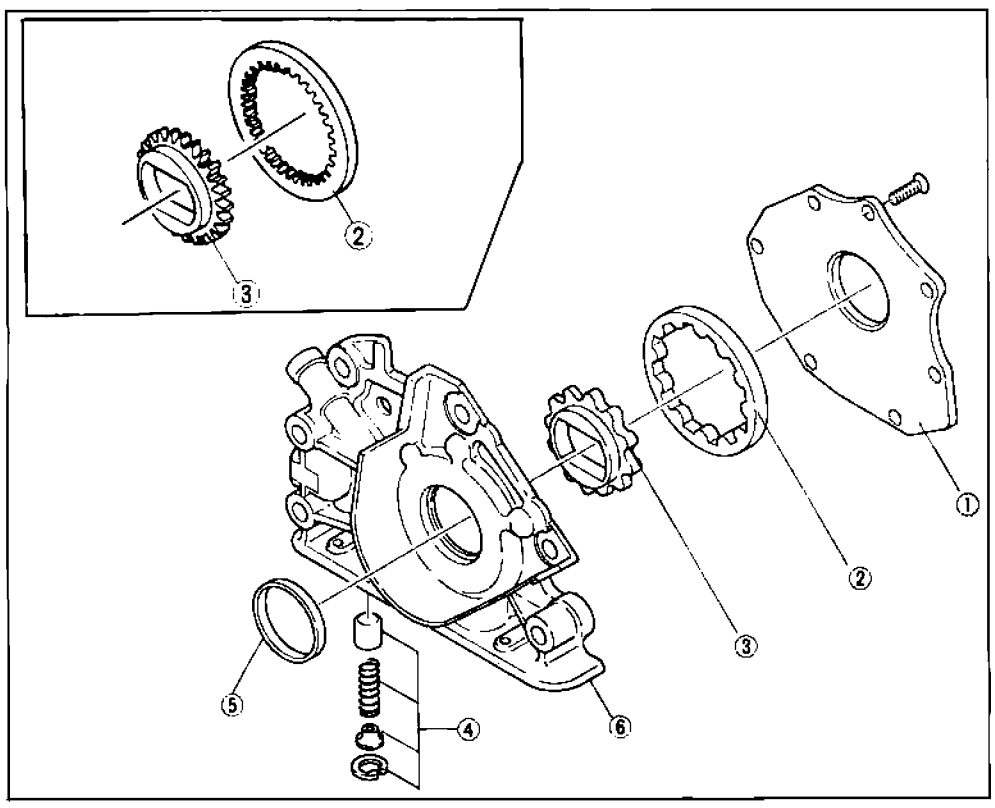
76G02A-026

Removal Note
Timing belt pulley lock bolt
Hold the timing belt pulley with the **SST** and remove the lock bolt.

DISASSEMBLY

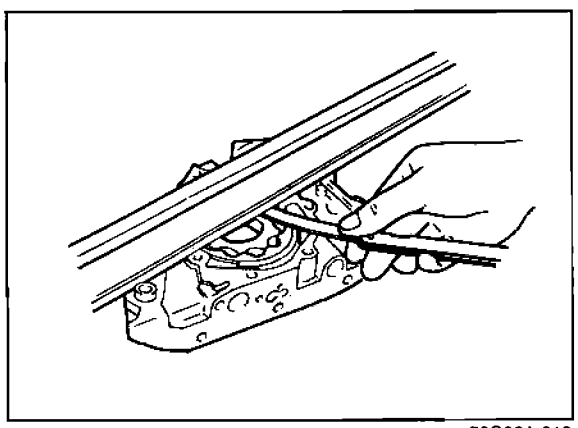
Disassemble in the sequence shown in the figure.

69G02B-012



1. Pump cover
2. Outer gear
3. Inner gear
4. Pressure relief valve
5. Oil seal
6. Oil pump body

76G02A-018



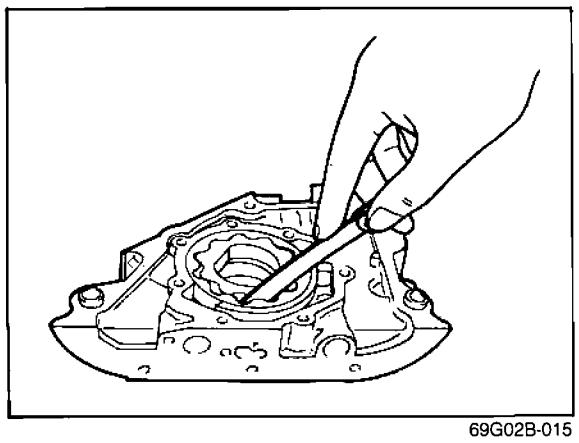
76G02A-019

INSPECTION

(DOHC)

1. Check the following and replace any faulty parts.
   (1) Distorted or damaged oil pump body or cover
   (2) Worn or damaged plunger
   (3) Weak or broken plunger spring
2. Measure the side clearance.

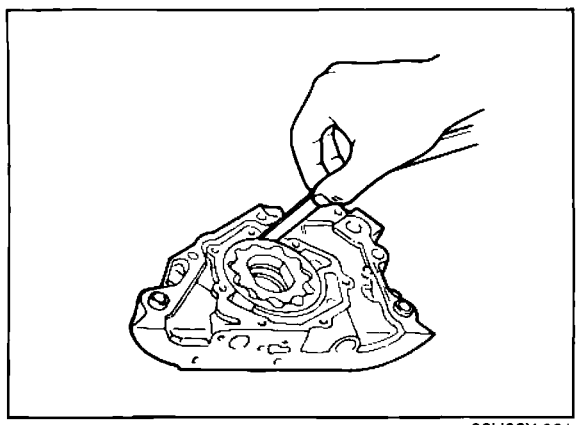
Clearance: 0.10 mm (0.004 in) max.



69G02B-015

3. Measure the tooth tip clearance.

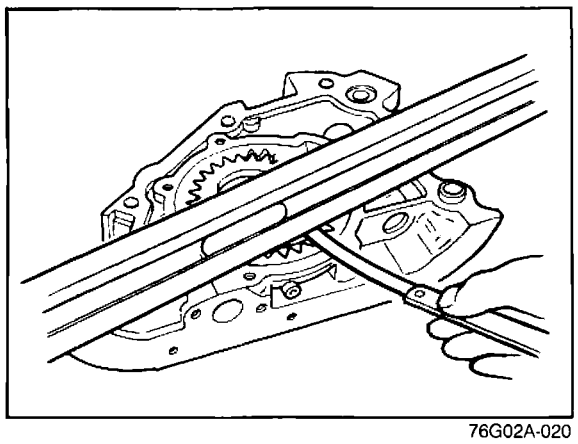
Clearance: 0.18 mm (0.007 in) max.



86U02X-021

4. Measure the outer gear to pump body clearance.

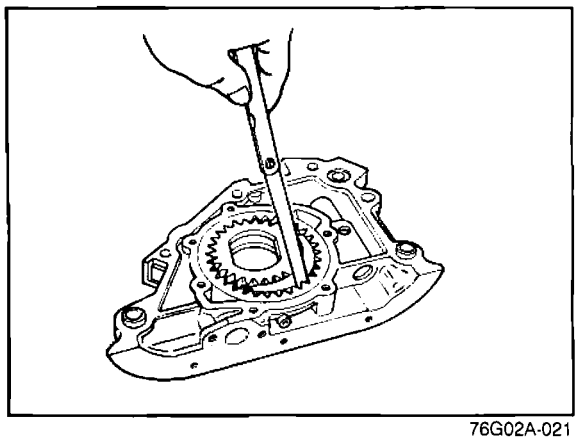
Clearance: 0.20 mm (0.008 in) max.



76G02A-020

(SOHC)
1. Check the following and replace any faulty parts.
   (1) Distorted or damaged oil pump body or cover
   (2) Worn or damaged plunger
   (3) Weak or broken plunger spring
2. Measure the side clearance.

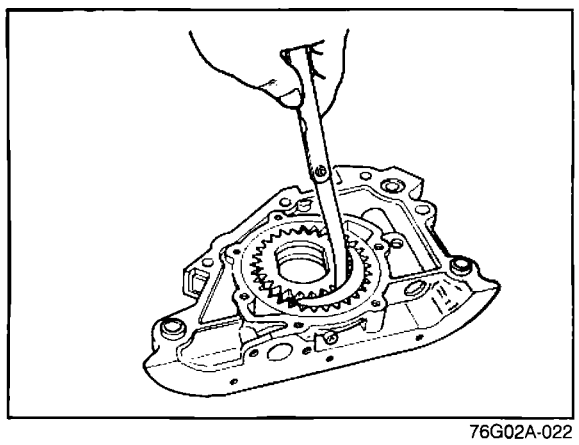
Clearance: 0.10 mm (0.004 in) max.



76G02A-021

3. Measure the outer gear tooth tip and crescent clearance.

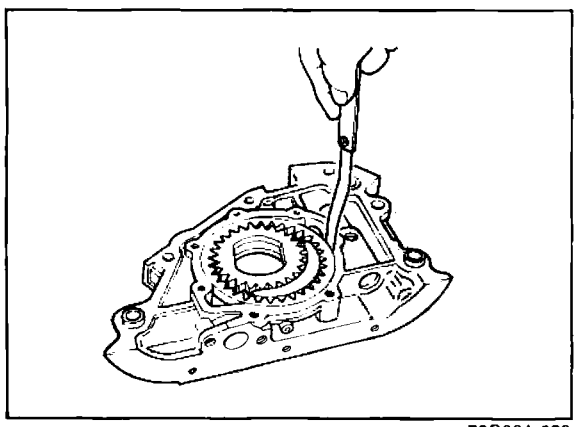
Clearance: 0.35 mm (0.014 in) max.



76G02A-022

4. Measure the inner gear tooth tip and crescent clearance.

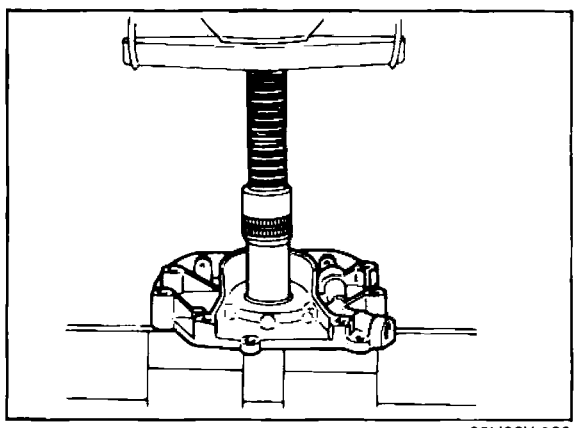
Clearance: 0.40 mm (0.016 in) max.



76G02A-023

5. Measure the outer gear to pump body clearance.

Clearance: 0.20 mm (0.008 in) max.

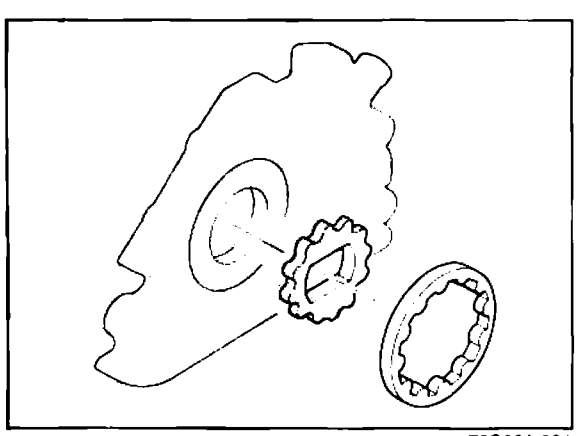


86U02X-022

ASSEMBLY
Assemble the pump as follows.

Oil Seal
1. Apply engine oil to the pump body and the outside of the new oil seal.
2. Press in the oil seal.

Pressure Relief Valve
1. Install the plunger and spring in the pump body.
2. Fit the snap ring.

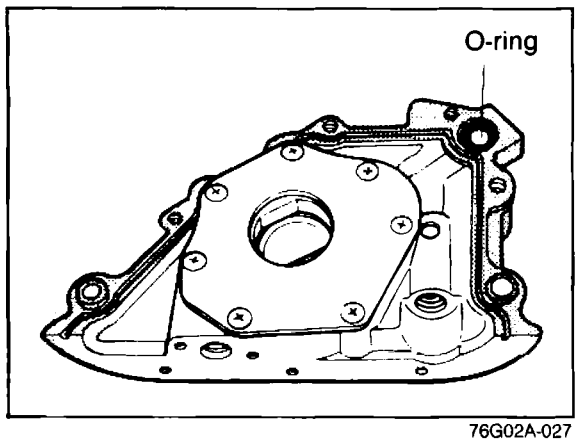


76G02A-024

Outer and Inner Gear
Install the gears to the pump body.

Oil Pump Cover
1. Apply thread locking compound to the cover mounting screws' threads.
2. Attach the oil pump cover to the body.

Tightening torque:
6—9 N·m (60—90 cm-kg, 52—78 in-lb)



76G02A-027

INSTALLATION
Install in the reverse order of removal referring to the installation note.

Installation Note
Oil pump
1. Apply grease to a new O-ring and install it in the oil pump body.
2. Apply silicon sealant to the shaded area as shown in the figure.
3. Apply engine oil to the oil seal lip.

2B

LUBRICATION SYSTEM (DIESEL)

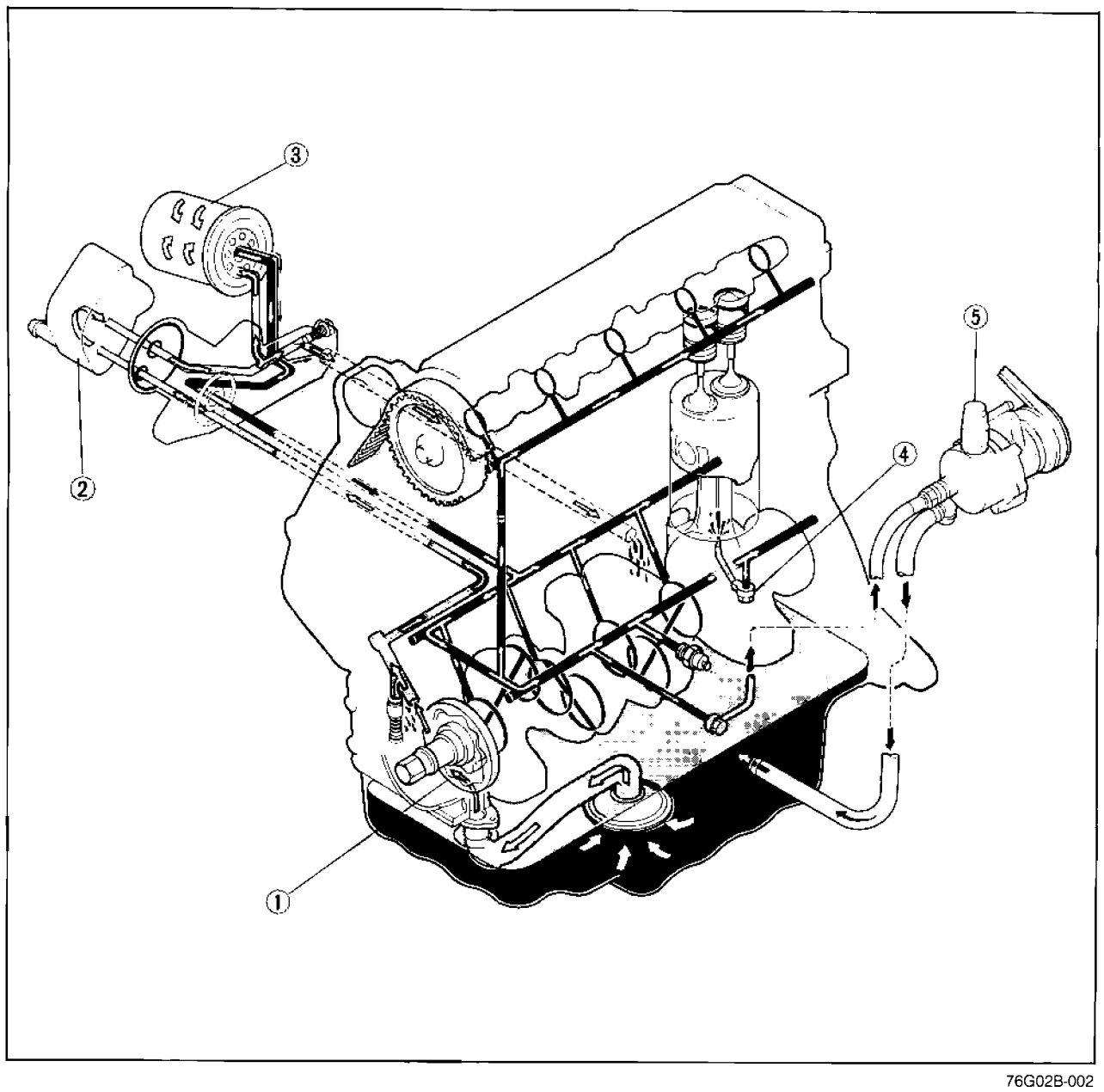
OUTLINE ..... **2B— 2**
LUBRICATION CIRCUIT ..... **2B— 2**
SPECIFICATIONS ..... **2B— 3**
TROUBLESHOOTING GUIDE ..... **2B— 4**
INSPECTION ..... **2B— 5**
ENGINE OIL ..... **2B— 5**
OIL PRESSURE ..... **2B— 5**
ENGINE OIL ..... **2B— 6**
REPLACEMENT ..... **2B— 6**
OIL FILTER ..... **2B— 6**
REPLACEMENT ..... **2B— 6**
OIL COOLER AND OIL FILTER BODY ..... **2B— 7**
REMOVAL ..... **2B— 7**
INSPECTION ..... **2B— 7**
INSTALLATION ..... **2B— 8**
OIL PAN ..... **2B— 9**
REMOVAL ..... **2B— 9**
INSPECTION ..... **2B—10**
INSTALLATION ..... **2B—10**
OIL PUMP ..... **2B—12**
REMOVAL ..... **2B—12**
DISASSEMBLY ..... **2B—13**
INSPECTION ..... **2B—13**
ASSEMBLY ..... **2B—14**
INSTALLATION ..... **2B—14**
OIL JET ..... **2B—15**
REMOVAL ..... **2B—15**
INSPECTION ..... **2B—15**
INSTALLATION ..... **2B—15**

76G02B-001

2B OUTLINE

OUTLINE

LUBRICATION CIRCUIT



76G02B-002

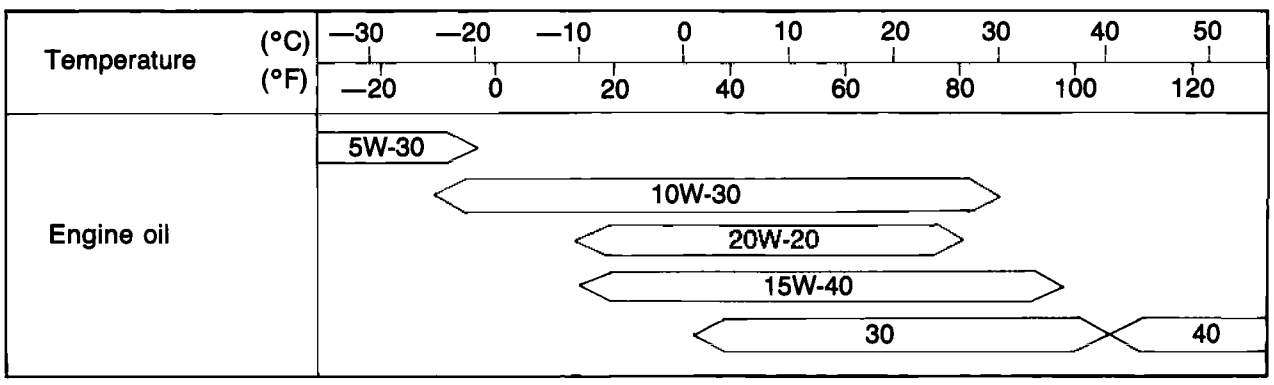
1. Oil pump
2. Oil cooler
3. Combined oil filter
4. Oil jet
5. Vacuum pump

SPECIFICATIONS

Item / Engine model			RF-CX	RF-N
Lubrication system			Force-fed	
Oil pump	Type		Trochoid gear	
	Gear width	mm (in)	7 (0.28)	
	Regulated pressure	kPa (kg/cm², psi)	510—618 (5.2—6.3, 74—90)	
Oil filter	Type		Combined, paper element	
	Relief pressure differential	kP (kg/cm², psi)	78—118 (0.8—1.2, 11—17)	
Oil cooler	Type		Water cooled,10 layer	Water coold, 4 layer
Oil filter body	Regulated pressure	kPa (kg/cm², psi)	402—481 (4.1—4.9, 58—70)	
	Oil cooler relief pressure differential	kPa (kg/cm², psi)	177—216 (1.8—2.2, 26—31)	
Oil warning lamp activation pressure		kPa (kg/cm², psi)	29 (0.3, 4.3)	
Oil capacity	Total (dry engine)	liters (US qt, Imp qt)	6.1 (6.4, 5.4)	
	Oil pan	liters (US qt, Imp qt)	5.0 (5.3, 4.4)	
	Oil filter	liters (US qt, Imp qt)	0.5 (0.52, 0.44)	
Engine oil type		API service	CD	CC, CD

76G02B-003

Recommended SAE Viscosity



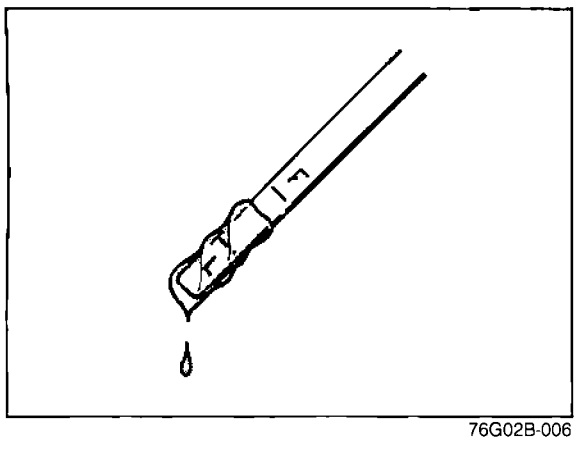
Temperature range anticipated before next oil change, °C(°F)

76G02B-004

TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Engine hard starting	Improper engine oil	Replace	2B— 6
	Insufficient engine oil	Add oil	2B— 5
Excessive oil consumption	Oil working up or working down	Refer to Section 1C	
	Oil leakage	As described below	
Oil leakage	Loose drain plug or damaged washer	Tighten or replace	2B—10
	Faulty seal at oil pan and cylinder block	Repair	2B—10
	Damaged cylinder head cover and its seal	Replace	—
	Loose oil pump body bolt, cylinder head cover bolt, or oil pan bolt	Tighten	—
	Damaged front housing gasket, or cylinder head gasket	Replace	—
	Faulty oil seal(s)	Replace	—
	Loose oil filter	Tighten	2B— 6
	Loose or damaged oil pressure switch	Tighten or replace	—
Oil pressure drop	Oil leakage	As described above	
	Insufficient oil	Add oil	2B— 5
	Worn and/or damaged oil pump gear	Replace	2B—13
	Worn plunger (inside oil pump) or weak spring	Replace	2B—14
	Clogged oil strainer	Clean	—
	Excessive oil clearance between main bearing or connecting rod bearing	Refer to Section 1C	
Warning lamp illuminates while engine running	Oil pressure drop	As described above	—
	Malfunction of oil pressure switch	Refer to Section 15	
	Malfunction of electrical system	Refer to Section 15	

76G02B-005


76G02B-006

INSPECTION

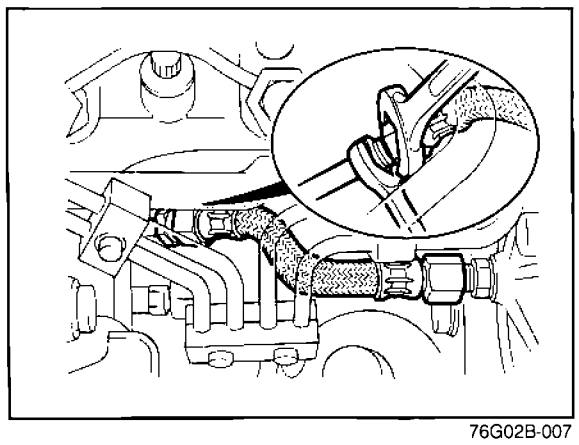
ENGINE OIL

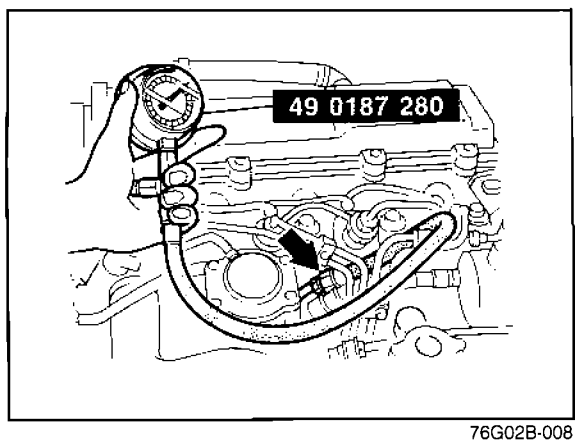
1. Be sure the vehicle is on level ground.
2. Warm up the engine to normal operating temperature and stop it.
3. Wait for five minutes.
4. Remove the oil level gauge and check the oil level and condition.
5. Add or replace oil if necessary.

Note
The distance between the L and F marks on the level gauge represents 1.2 liters (1.26 US qt, 1.05 Imp qt).

OIL PRESSURE

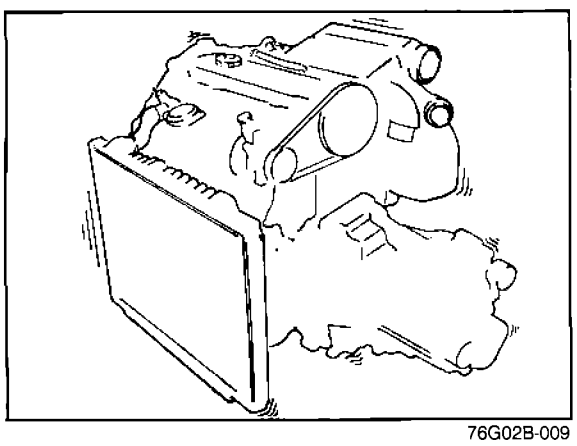
1. Disconnect the oil hose (vacuum pump—cylinder block).


76G02B-007



76G02B-008

2. Set the **SST** as shown.
3. Remove the vacuum pump drive belt to prevent heat damage to bearing.
4. Warm up the engine to normal operating temperature.


76G02B-009

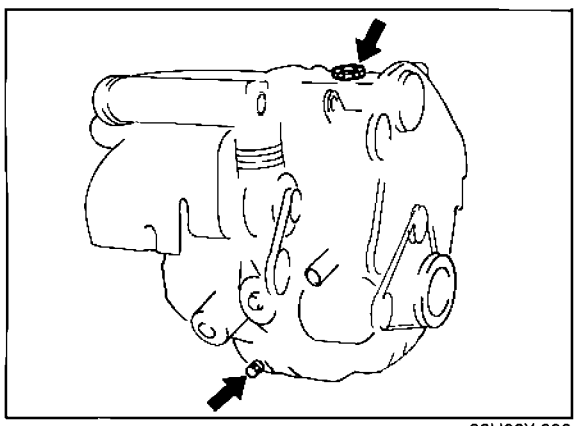
5. Run the engine first at **1,000 rpm**, then at **3,000 rpm** and note the gauge reading.

Standard oil pressure kPa (kg/cm^2, psi)

1,000 rpm	147—245 (1.5—2.5, 21—36)
3,000 rpm	343—441 (3.5—4.5, 50—64)

6. If the pressure is not as specified, check for the cause, and repair if necessary.
(Refer to Troubleshooting Guide.)

2B ENGINE OIL, OIL FILTER



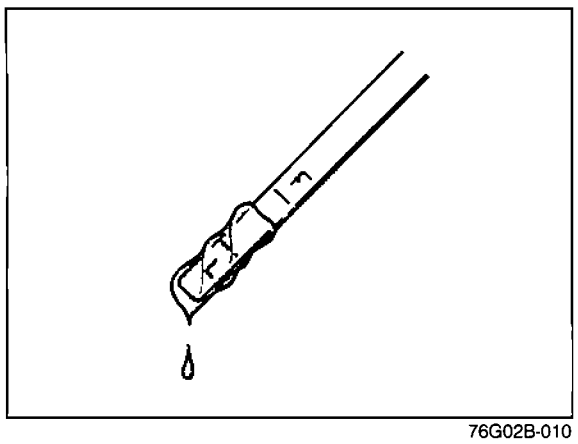
86U02X-006

ENGINE OIL

REPLACEMENT

1. Warm up the engine to the normal operating temperature and stop it.
2. Remove the oil filler cap and the oil pan drain plug.
3. Drain the oil into a suitable container.

Warning
Be careful when draining, the oil is very hot.



76G02B-010

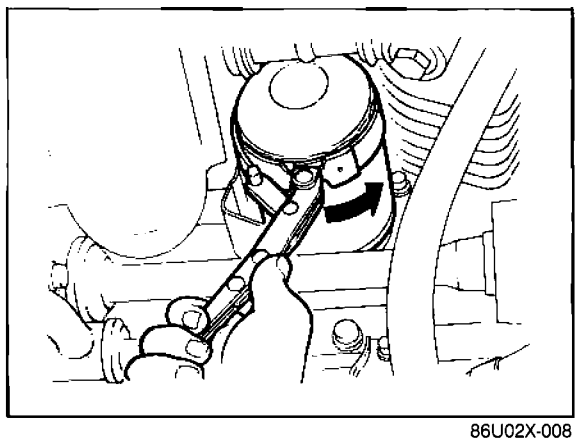
4. Install the drain plug and a new gasket.

Tightening torque:
29—41 N·m (3.0—4.2 m-kg, 22—30 ft-lb)

5. Refill the engine with the specified type and amount of oil.
6. Refit the oil filler cap.

Oil pan capacity:
5.0 liters (5.3 US qt, 4.4 Imp qt)

7. Recheck the oil level after the engine has been run.

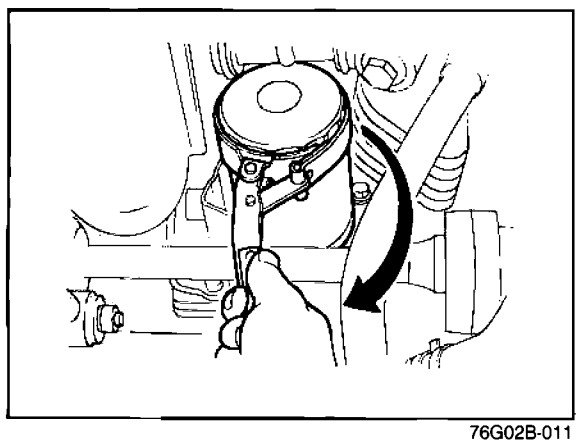


86U02X-008

OIL FILTER

REPLACEMENT

1. Remove the oil filter with a suitable wrench.
2. Use a clean rag to wipe off the mounting surface on the engine.



76G02B-011

3. Apply a coat of engine oil to the filter rubber seal.
4. Install the oil filter until the rubber seal contacts the oil cooler by hand. Then tighten it a **7/6 turn further** with a band type wrench.
5. Start the engine and inspect around the filter seal for leaks.
6. Check the oil level and add oil if necessary.

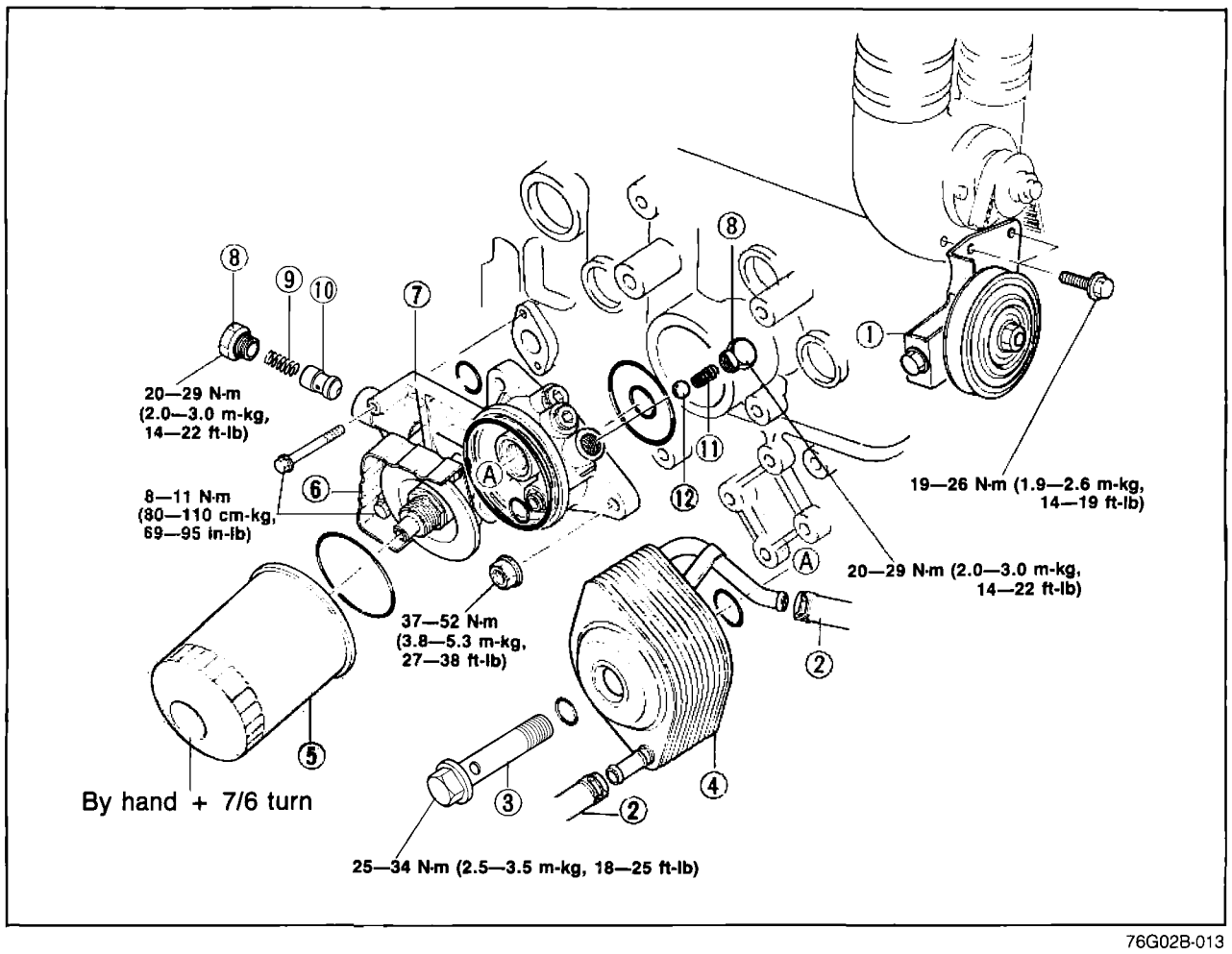
Oil filter capacity:
0.50 liters (0.52 US qt, 0.44 Imp qt)

OIL COOLER AND OIL FILTER BODY

REMOVAL

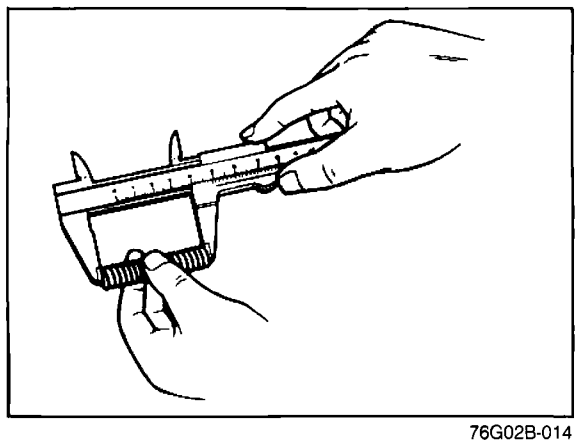
1. Disconnect the battery negative cable.
2. Drain the engine oil and coolant.
3. Remove in the sequence shown in the figure.

76G02B-012



76G02B-013

1. Idler pulley
2. Water hose
3. Connector bolt
4. Oil cooler
5. Oil filter
6. Oil filter cover
7. Oil filter body
8. Plug
9. Pressure spring
10. Plunger control
11. Relief valve spring
12. Steel ball

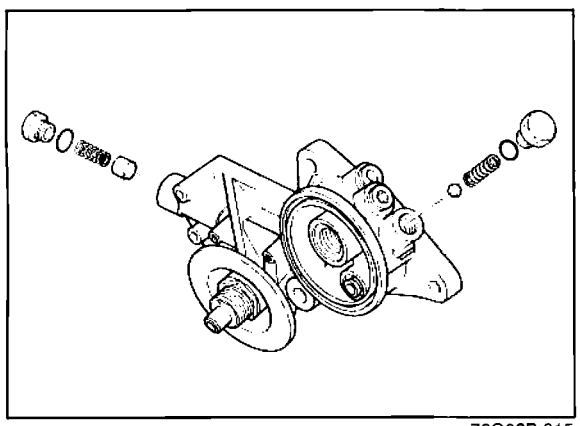


76G02B-014

INSPECTION

1. Inspect the oil cooler body for cracks or corroded. If necessary replace it.
2. Check the valves for damage or scoring if necessary replace it.
3. Measure free length of each valve spring. If necessary replace it.

Free length
Relief valve spring: 45.5 mm (1.79 in)
Pressure spring : 54.6 mm (2.15 in)

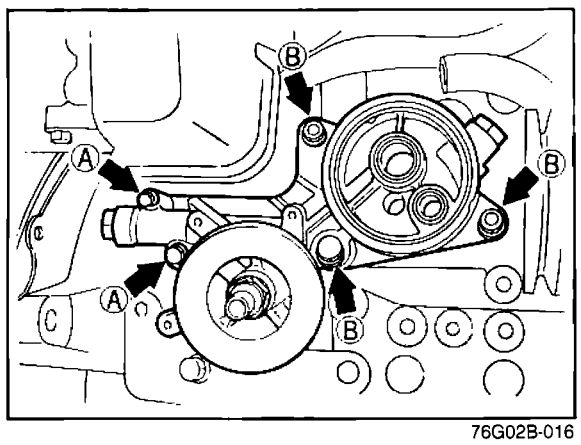


76G02B-015

INSTALLATION

1. Apply a coat of engine oil to the valve holes.
2. Install the relief valve spring and pressure spring.

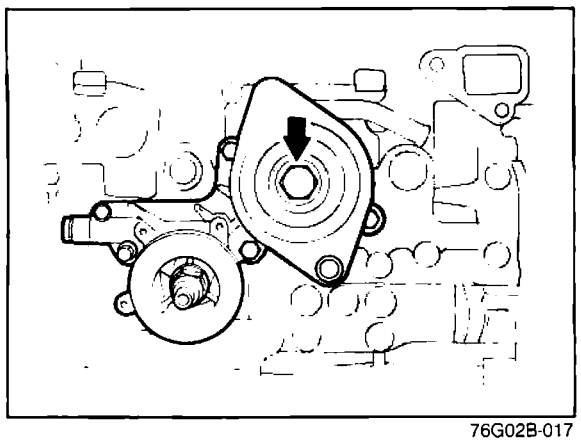
Tightening torque:
20—29 N·m (2.0—3.0 m-kg, 14—22 ft-lb)



76G02B-016

3. Clean the contact surfaces of the cylinder block and oil filter body.
4. Install new O-rings and apply a coat of engine oil.
5. Install the oil filter body.

Tightening torque:
Bolt A: 8—11 N·m
(80—110 cm-kg, 69—95 in-lb)
Bolt B: 37—52 N·m
(3.8—5.3 m-kg, 27—38 ft-lb)



76G02B-017

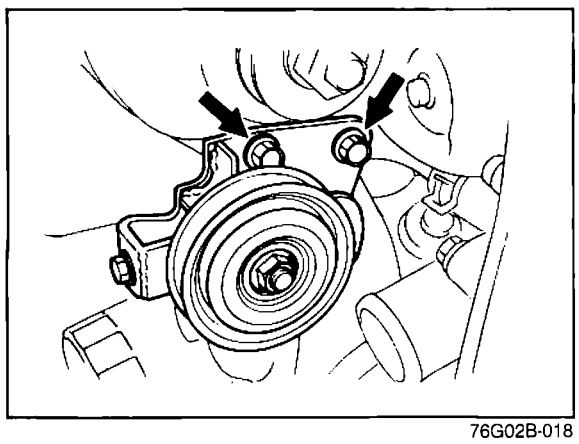
6. Apply a coat of engine oil to the O-rings.
7. Install the oil cooler with new O-ring on the connector bolt.

Tightening torque:
25—34 N·m (2.5—3.5 m-kg, 18—25 ft-lb)

8. Connect the water hoses.
9. Install the oil filter cover.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

10. Install the oil filter. (Refer to page 2B—6)



76G02B-018

11. Install the idler pulley.

Tightening torque:
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

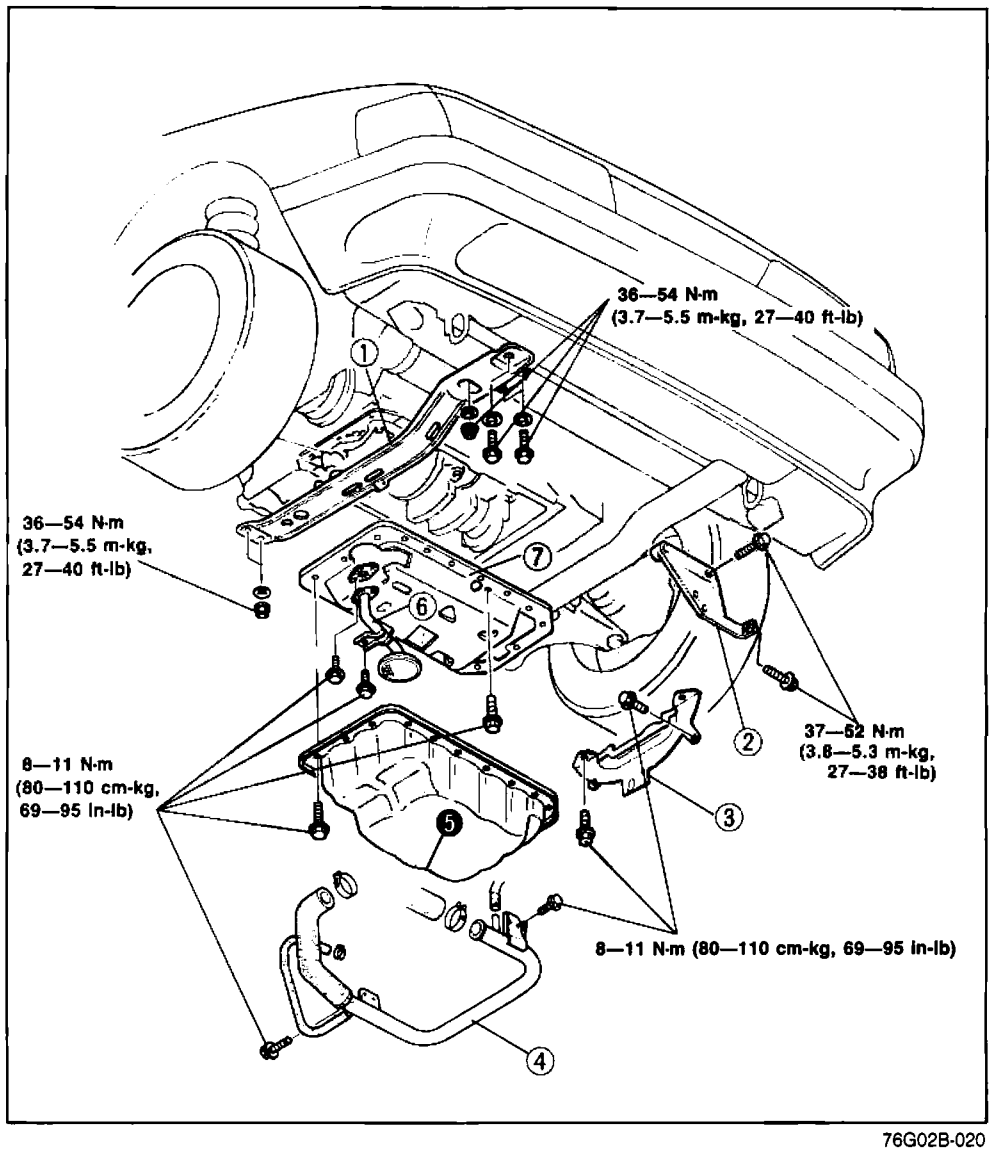
12. Install the Comprex supercharger drive belt and adjust the belt deflection. (Refer to page 1C—7)
13. Add specified amount of coolant and engine oil.
14. Check for leaks.

OIL PAN

REMOVAL

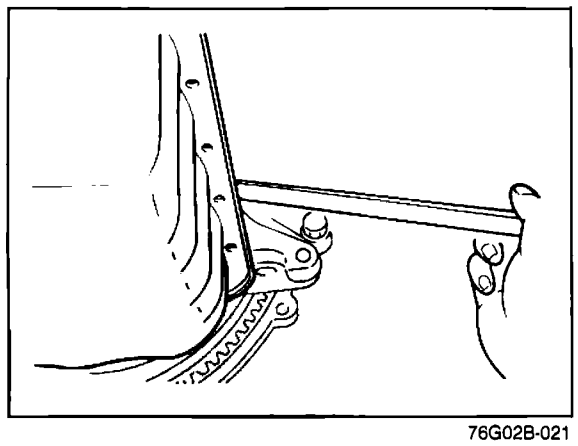
1. Disconnect the negative battery cable.
2. Drain the engine oil and coolant.
3. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.

76G02B-019



76G02B-020

1. Sub frame
2. Gusset plate
3. Clutch housing under cover
4. Water pipe
5. Oil pan
6. Oil strainer
7. Stiffener (RF-CX)



76G02B-021

Removal Note

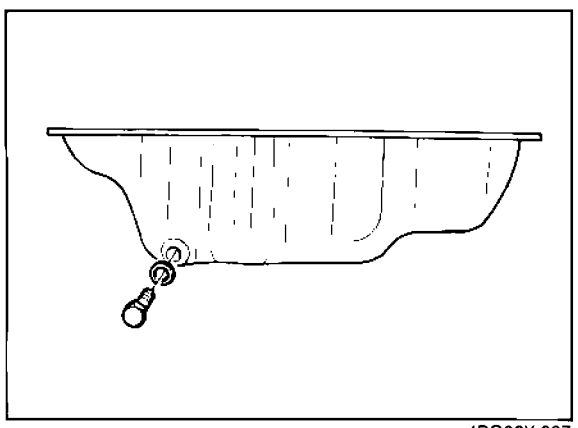
Oil pan

1. Remove the oil pan mounting bolts.
2. Insert a scraper or a suitable tool between the oil pan and the stiffener to separate them.
3. Remove the oil pan.
4. Remove the oil strainer and stiffener from the engine.

Caution

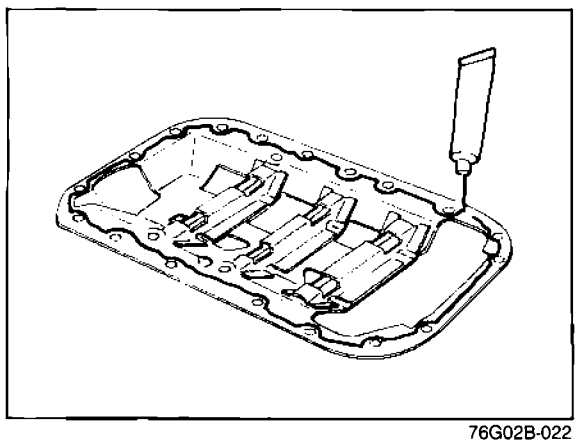
Do not bend the oil pan when prying loose.

2B OIL PAN



4BG02X-037

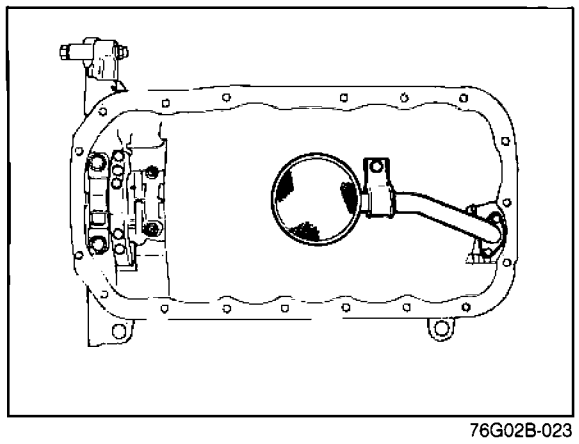
INSPECTION
Check the following points. Repair or replace if necessary.
1. Cracks, deformation, damage
2. Damaged drain plug threads



76G02B-022

INSTALLATION
Install in the reverse order of removal referring to installation note.

Installation Note
Stiffener (RF-CX)
1. Remove any dirt or other material from the contact surfaces.
2. Apply a continuous bead of silicone sealant to the stiffener along the inside of the bolt holes, and overlap the end.
3. Install the stiffener.

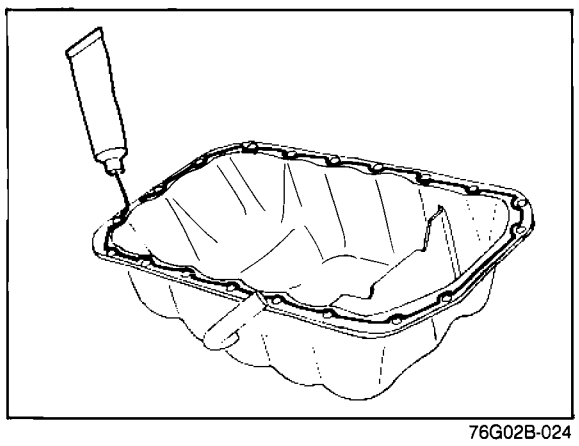


76G02B-023

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

Oil Strainer
Install the oil strainer and a new gasket.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

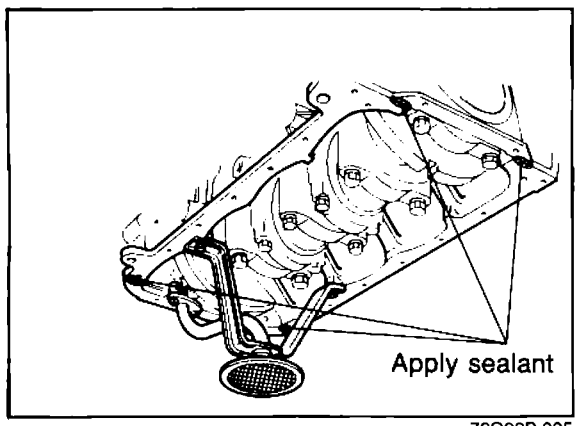


76G02B-024

Oil Pan
Remove any old sealant from the bolts and bolt holes. If old sealant can not be removed from the bolt, replace it.

Without gasket
(1) Remove any dirt or grease from the contact surfaces with a rag.
(2) Apply continuous bead of silicon sealant to the oil pan along the inside of the bolt holes, and overlap the ends.
(3) Install the oil pan.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



76G02B-025

With gasket

(1) Apply sealant to the shaded areas in the figure.
(2) Install the gasket and the oil pan.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

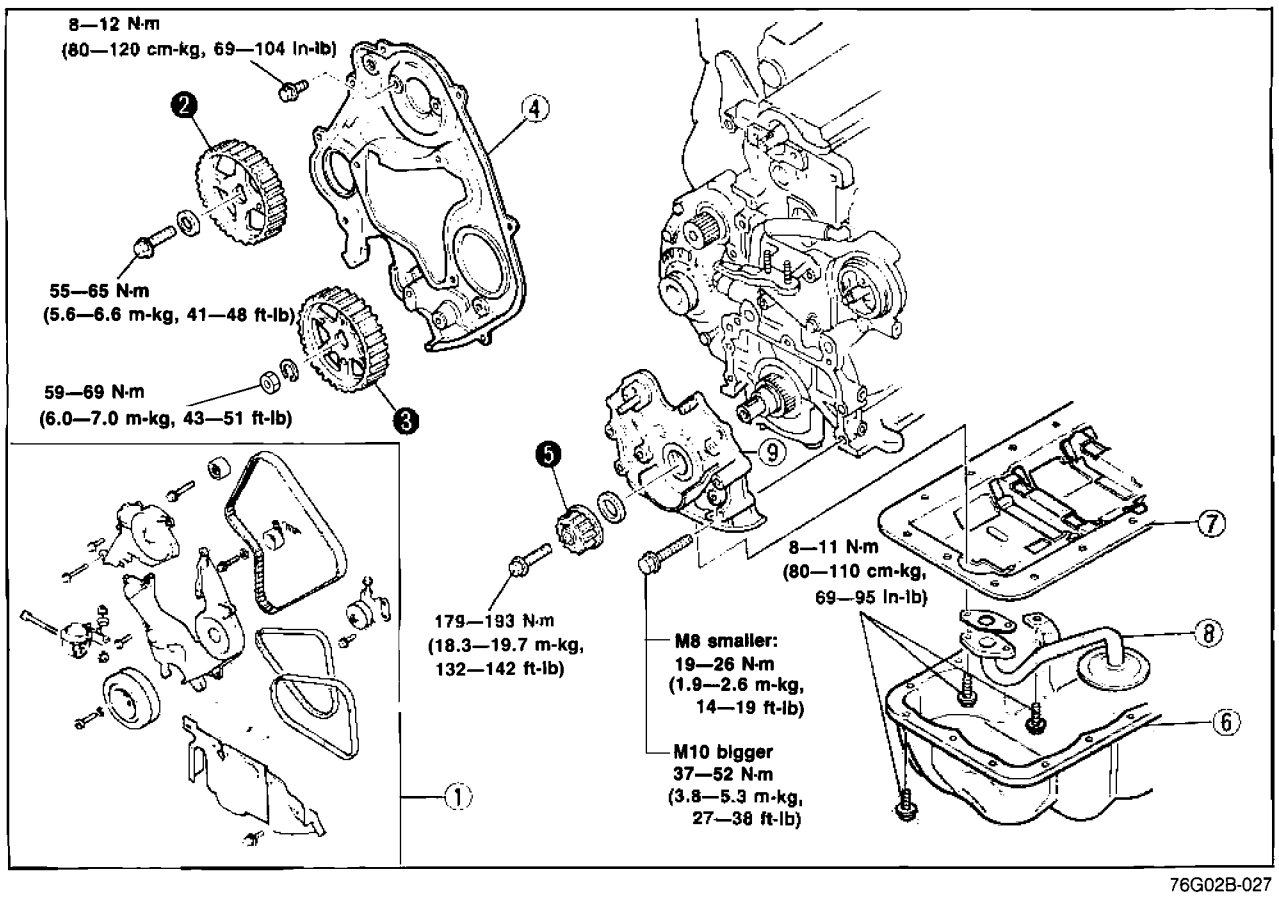
2B OIL PUMP

OIL PUMP

REMOVAL

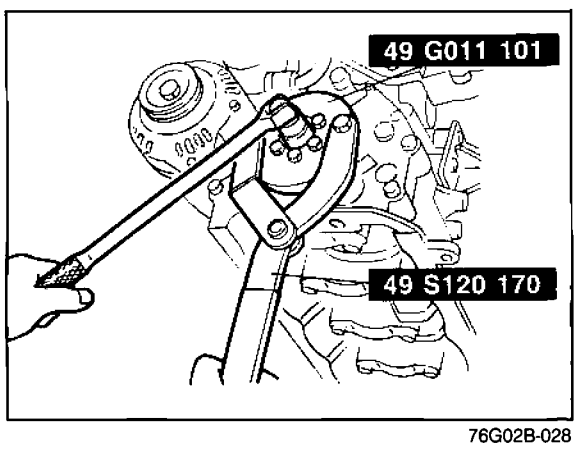
1. Disconnect the negative battery cable.
2. Drain the engine oil and coolant.
3. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.

76G02B-026



76G02B-027

1. Timing belt (Refer to page 1C—11)
2. Camshaft pulley (Refer to page 1C—36)
3. Injection pump pulley (Refer to page 1C—36)
4. Seal plate
5. Timing belt pulley
6. Oil pan (Refer to page 2B—9)
7. Stiffener (RF-CX)
8. Oil strainer
9. Oil pump



76G02B-028

Removal Note

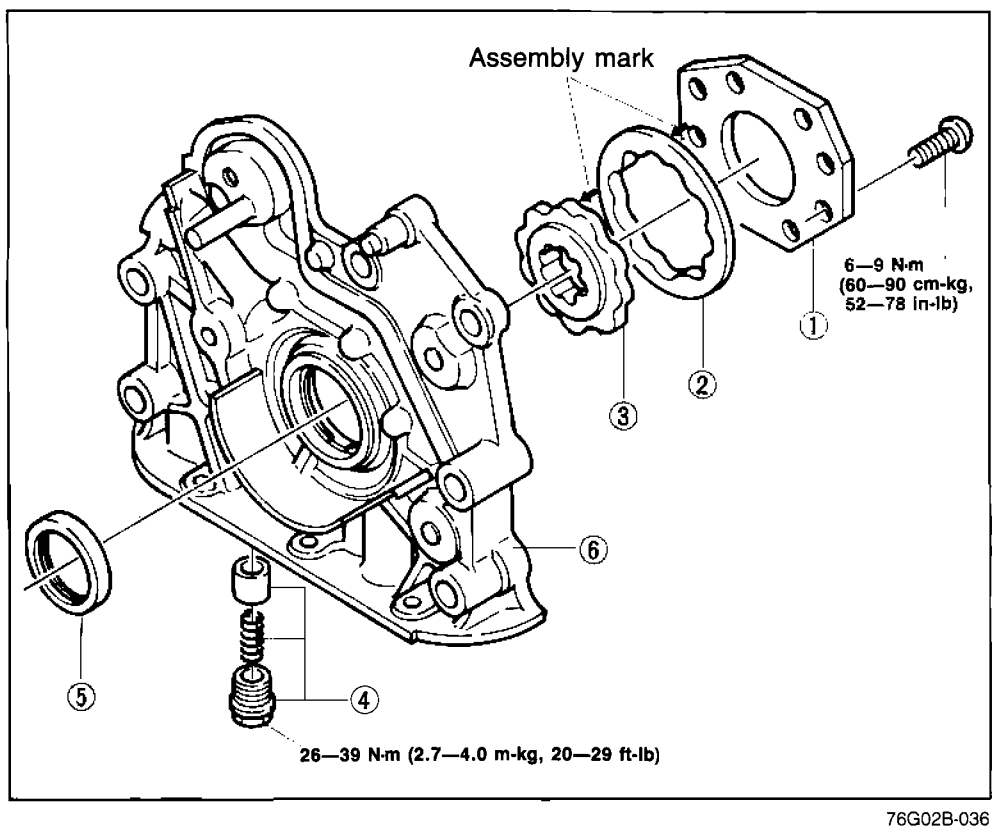
Timing belt pulley lock bolt

Hold the timing belt pulley with the **SST** and remove the lock bolt.

DISASSEMBLY

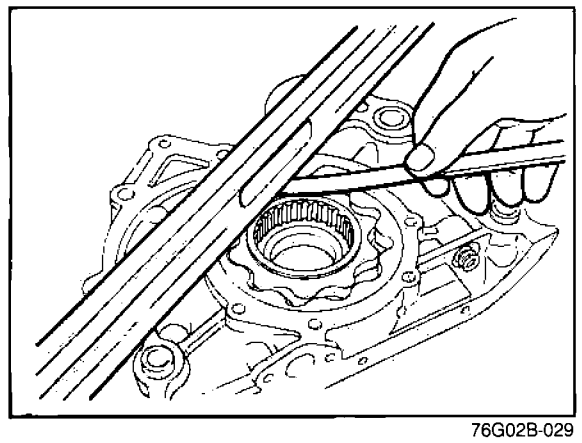
Disassemble in the sequence shown in the figure.

69G02B-012



1. Pump cover
2. Outer rotor
3. Inner rotor
4. Pressure regulator
5. Oil seal
6. Oil pump body

76G02B-036

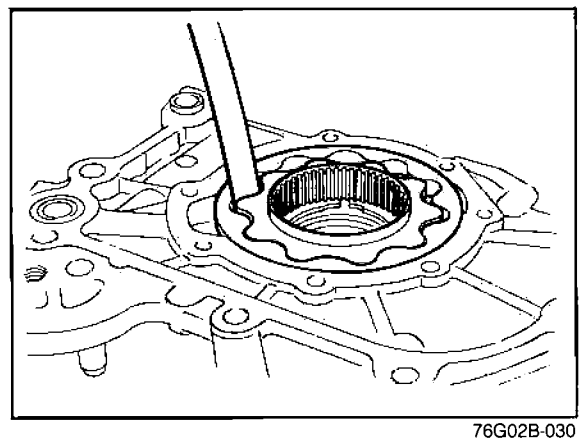


76G02B-029

INSPECTION

1. Check the following and replace any faulty parts.
   (1) Distorted or damaged oil pump body or cover
   (2) Worn or damaged plunger
   (3) Weak or broken plunger spring
2. Measure the side clearance.

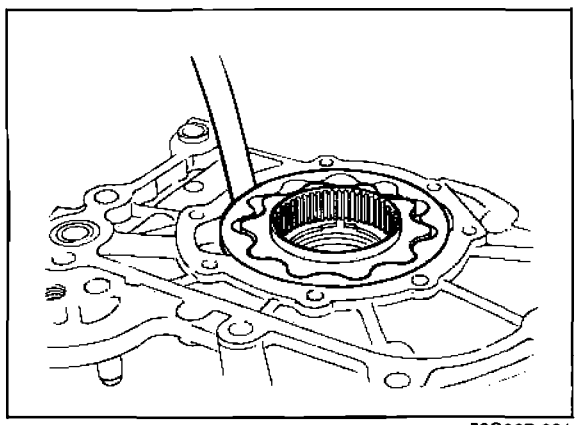
   Clearance:
   0.14 mm (0.006 in) max.



76G02B-030

3. Measure the tooth tip clearance.

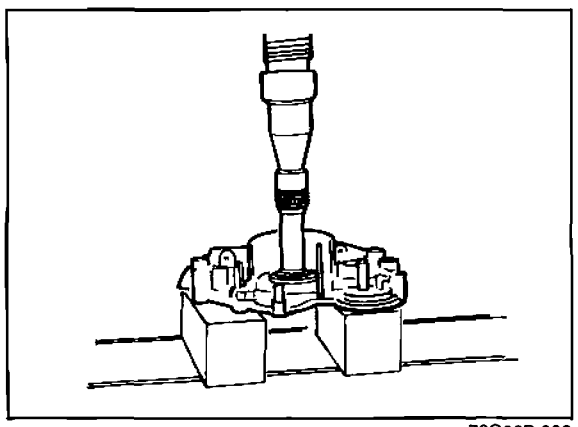
   Clearance: 0.24 mm (0.009 in) max.



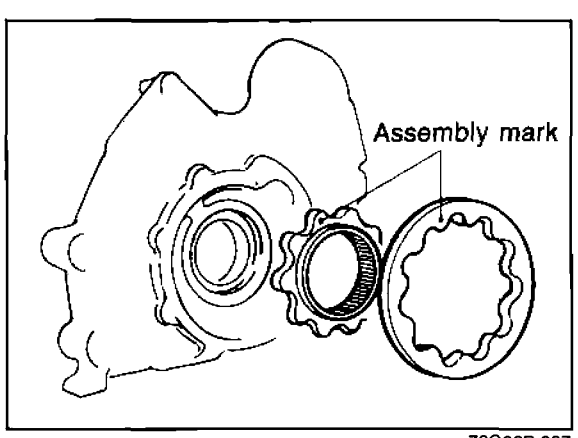
76G02B-031

4. Measure the outer rotor to pump body clearance.

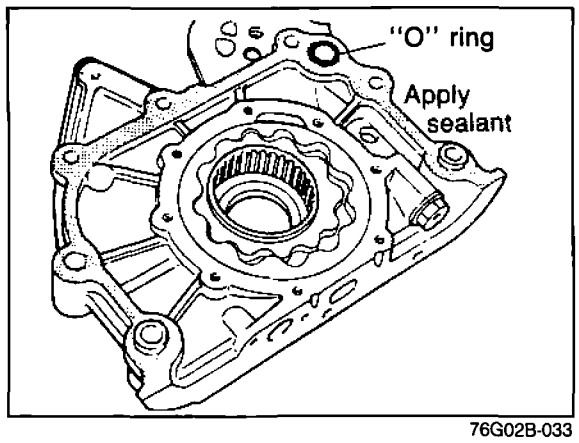
Clearance: 0.22 mm (0.009 in) max.



76G02B-032



76G02B-037



76G02B-033

ASSEMBLY
Assemble the pump as follows.

Oil Seal
1. Apply engine oil to the pump body and the outside of the new oil seal.
2. Press in the oil seal.

Pressure Relief Valve
1. Install the plunger and spring in the pump body.
2. Install the spring seat plug and tighten to specification.

Tightening torque:
26—39 N·m (2.7—4.0 m-kg, 20—29 ft-lb)

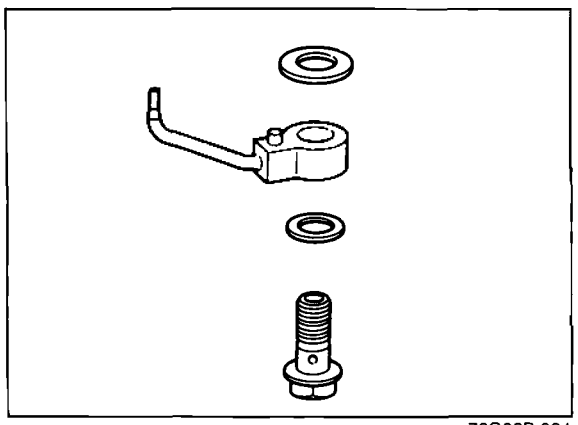
Outer and Inner Rotor
Install the rotors with the assembly mark facing the pump cover.

Oil Pump Cover
1. Apply thread locking compound to the cover mounting screws' threads.
2. Attach the oil pump cover to the body.

Tightening torque:
6—9 N·m (60—90 cm-kg, 52—78 in-lb)

INSTALLATION
Install in the reverse order of removal referring to installation note.

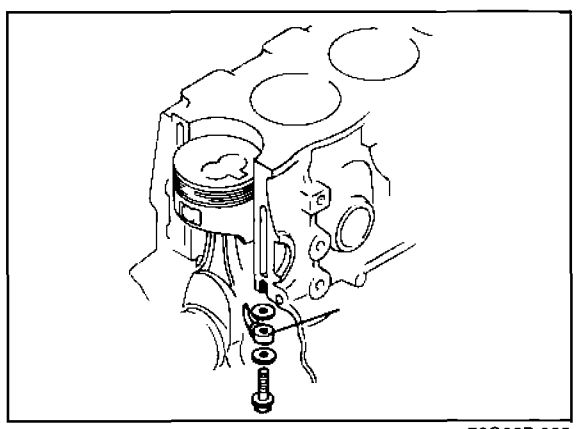
Installation Note
Oil pump
1. Apply grease to a new O-ring and install it in the oil pump body.
2. Apply silicon sealant to the shaded area as shown in the figure.
3. Apply engine oil to the oil seal lip.



76G02B-034

OIL JET

REMOVAL
Remove each part in the following order.
1. Remove the oil pan. (Refer to page 2B—9).
2. Remove the oil jet valve.
3. Remove the oil jet.



76G02B-035

INSPECTION
1. Make sure that the oil passage is not clogged.
2. Check that the oil jet valve is not stuck or damaged.

INSTALLATION
Install in the reverse order of removal.

Tightening torque: 12—18 N·m (1.2—1.8 m-kg, 104—156 in-lb)

3A

COOLING SYSTEM (GASOLINE ENGINE)

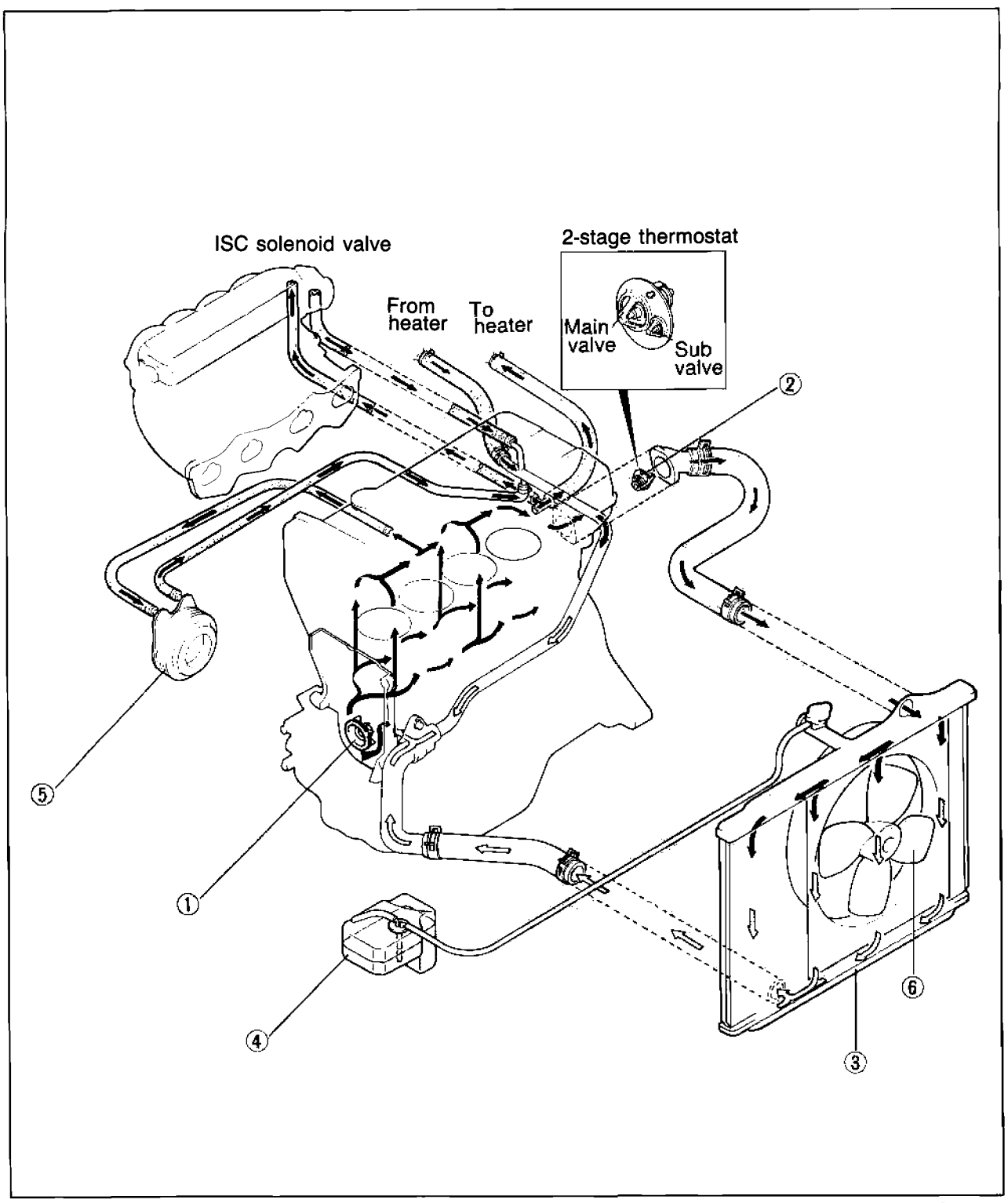
OUTLINE ..... **3A— 2**
COOLANT FLOW CHART (DOHC) ..... **3A— 2**
COOLANT FLOW CHART (SOHC) ..... **3A— 3**
SPECIFICATIONS ..... **3A— 4**
TROUBLESHOOTING GUIDE ..... **3A— 4**
COOLANT ..... **3A— 5**
INSPECTION ..... **3A— 5**
REPLACEMENT ..... **3A— 5**
RADIATOR CAP ..... **3A— 6**
INSPECTION ..... **3A— 6**
RADIATOR ..... **3A— 7**
REMOVAL AND INSTALLATION ..... **3A— 7**
INSPECTION ..... **3A— 7**
WATER PUMP ..... **3A— 8**
REMOVAL ..... **3A— 8**
INSPECTION ..... **3A—10**
INSTALLATION ..... **3A—10**
THERMOSTAT ..... **3A—11**
REMOVAL ..... **3A—11**
INSPECTION ..... **3A—11**
INSTALLATION ..... **3A—11**
COOLING FAN ..... **3A—12**
SYSTEM CIRCUIT ..... **3A—12**
CIRCUIT INSPECTION ..... **3A—12**
FAN MOTOR ..... **3A—13**
WATER THERMO SWITCH ..... **3A—14**

76G03A-001

3A OUTLINE

OUTLINE

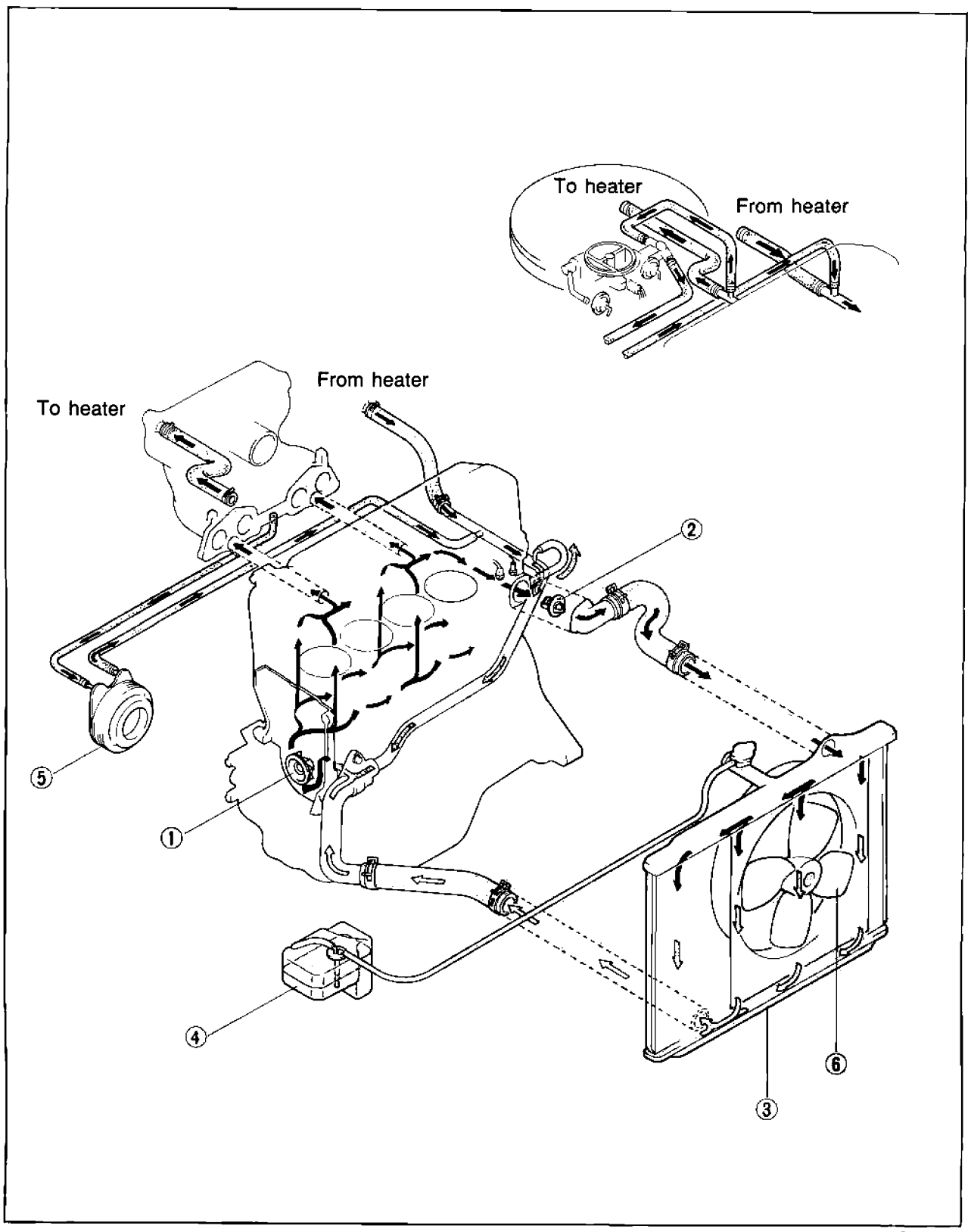
COOLANT FLOW CHART (DOHC)



76G03A-002

1. Water pump
2. Thermostat
3. Radiator
4. Coolant reservoir
5. Oil cooler
6. Cooling fan

COOLANT FLOW CHART (SOHC)



76G03A-015

1. Water pump
2. Thermostat
3. Radiator
4. Coolant reservoir
5. Oil cooler (8-valve...only ECE, 12-valve)
6. Cooling fan

3A TROUBLESHOOTING GUIDE

SPECIFICATIONS

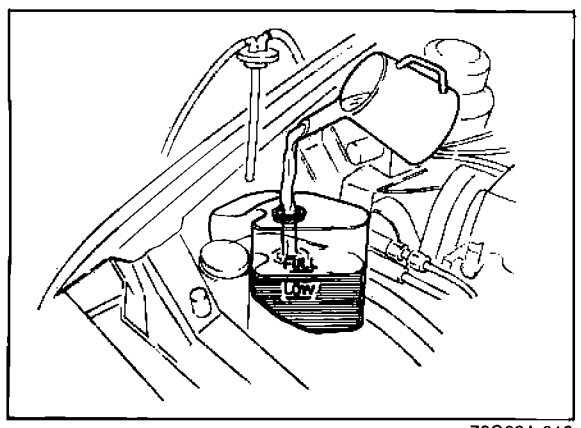
Item \ Engine model			FE·DOHC	FE 8-valve, F8, F6...except Middle East ,General FE 12-valve	FE 8-valve F8, F6...only Middle East General
Cooling system			Water cooled, forced circulation		
Coolant capacity liters (US qt, Imp qt)		With heater	7.5 (7.9, 6.6)		
		Without heater	7.0 (7.4, 6.2)		
Water pump	Type		Centrifugal, timing belt driven		
	Water seal		Unified seal		
Thermostat	Type		Wax, 2-stage	Wax	
	Opening temperature °C(°F)		Sub . 83.5—86.5 (182—188) Main: 86.5—89.5 (188—193)	86.5—89.5 (188—193)	80.5—83.5 (177—182)
	Full-open temperature °C(°F)		100 (212)		95 (203)
	Full-open lift mm (in)		Sub: 1.5 (0.06) min. Main: 8.0 (0.31) min.	8.5 (0.33) min.	
Radiator	Type		Corrugated		
	Cap valve opening pressure kPa (kg/cm², psi)		74—103 (0.75—1.05, 11—15)		
Cooling fan	Capacity W	MTX	80		
		ATX	120		
	Number of blade		4		
	Outer diameter of blade mm (in)	MTX	320 (12.6)		
		ATX	340 (13.4)		

76G03A-003

TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Overheating	Insufficient coolant	Add	3A— 5
	Coolant leakage	Repair	—
	Radiator fins clogged	Clean	3A— 7
	Radiator cap malfunction	Replace	3A— 6
	Cooling fan malfunction	Repair	3A—12
	Thermostat malfunction	Replace	3A—11
	Water passage clogged	Clean	3A— 5
	Water pump malfunction	Repair or replace	3A— 8
Corrosion	Impurities in coolant	Replace	3A— 5

76G03A-004



76G03A-016

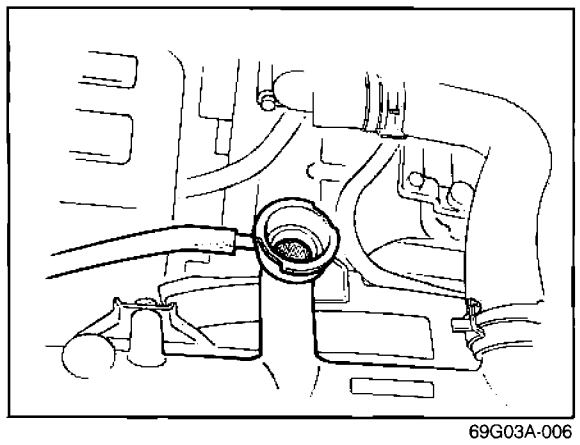
COOLANT

INSPECTION

Coolant Level (Engine cold)

1. Check that the coolant level is near the radiator inlet port.
2. Check that the coolant level in the coolant reservoir is between the FULL and LOW marks. Add coolant if necessary.

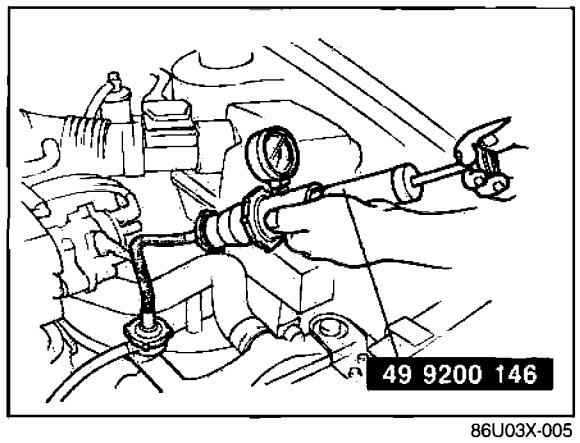
Warning
a) Never remove the radiator cap while the engine is hot.
b) Wrap a thick cloth around the cap when removing it.



69G03A-006

Coolant Quality

1. Check that there is no build-up of rust or scales around the radiator cap or radiator filler neck.
2. Check that coolant is free from oil.
3. Replace the coolant, if necessary.

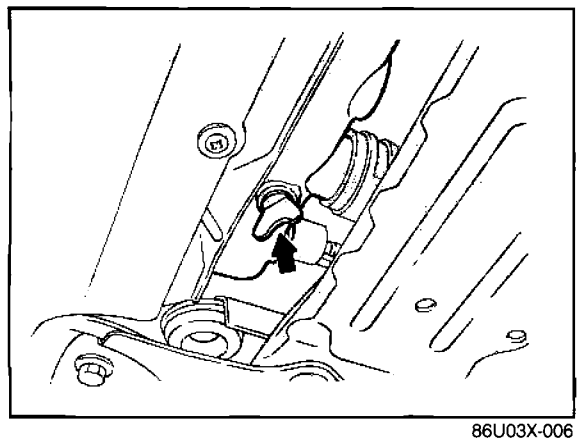


86U03X-005

Coolant Leakage

1. Connect a tester and **SST** to the radiator inlet port.
2. Apply **103 kPa (1.05 kg/cm^2, 15 psi)** pressure to the system.
3. Check that the pressure is held. If not, check for coolant leakage.

Warning
When removing either the radiator cap or the tester, loosen it slowly until the pressure in the radiator is released, and then remove it.

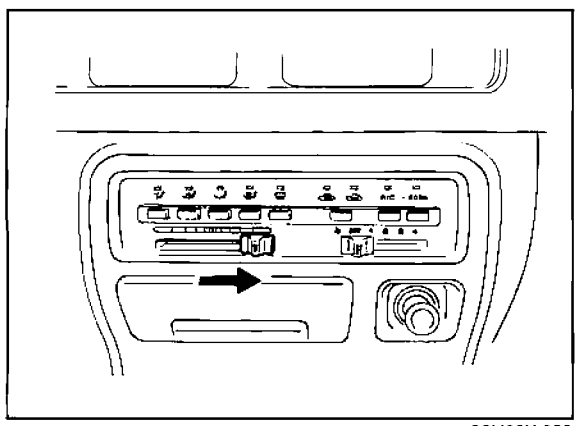


86U03X-006

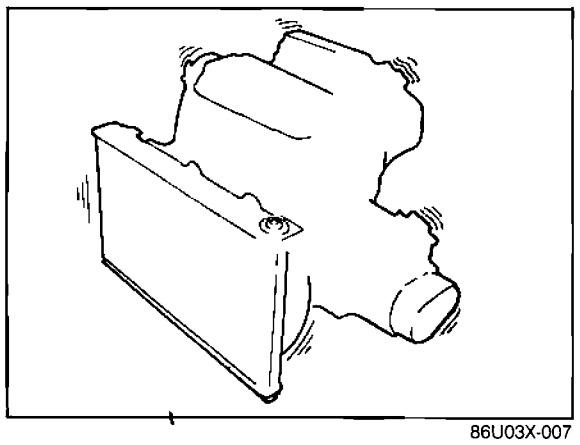
REPLACEMENT

1. Remove the radiator cap and loosen the drain plug.
2. Drain the coolant into a suitable container.

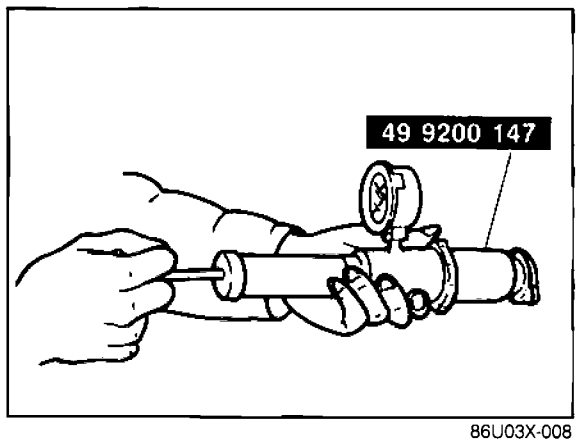
Warning
a) Never open the radiator cap while the engine is hot.
b) Wrap a thick cloth around the cap when loosening.
c) Use caution when draining hot coolant.



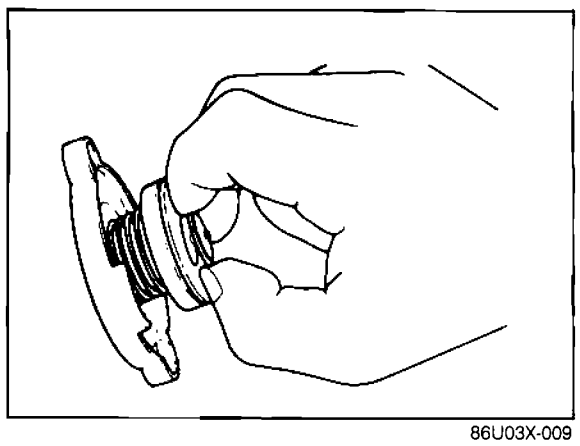
86U03X-028



86U03X-007



86U03X-008



86U03X-009

3. Set the heater control switch to the maximum heat position.
4. Flush the cooling system with water until all traces of color are gone, then let the system drain completely.
5. Fill with the proper mixture and amount of ethylene glycol-based coolant.

Caution

a) Do not use alcohol- or methanol-based coolant.

b) Use only soft (demineralized) water in the coolant mixture.

Anti-freeze solution mixture percentage

Protection	Volume percentage		Gravity at 20°C (68°F)
	Solution	Water	
Above −16°C (3°F)	35	65	1.054
Above −26°C (−15°F)	45	55	1.066
Above −40°C (−40°F)	55	45	1.078

6. Run the engine at idle with the radiator cap removed. Let any air bleed from the system, and add more coolant.
7. Install the radiator cap, and inspect all connections for leakage.

RADIATOR CAP

INSPECTION

Radiator Cap Valve

1. Remove foreign material (such as water residue) from between the radiator cap valve and the valve seat.
2. Attach the radiator cap to a tester with the **SST**. Apply pressure gradually to **74—103 kPa (0.75—1.05 kg/cm^2, 11—15 psi)**.
3. Wait about 10 seconds; then check that the pressure has not decreased.

Negative Pressure Valve

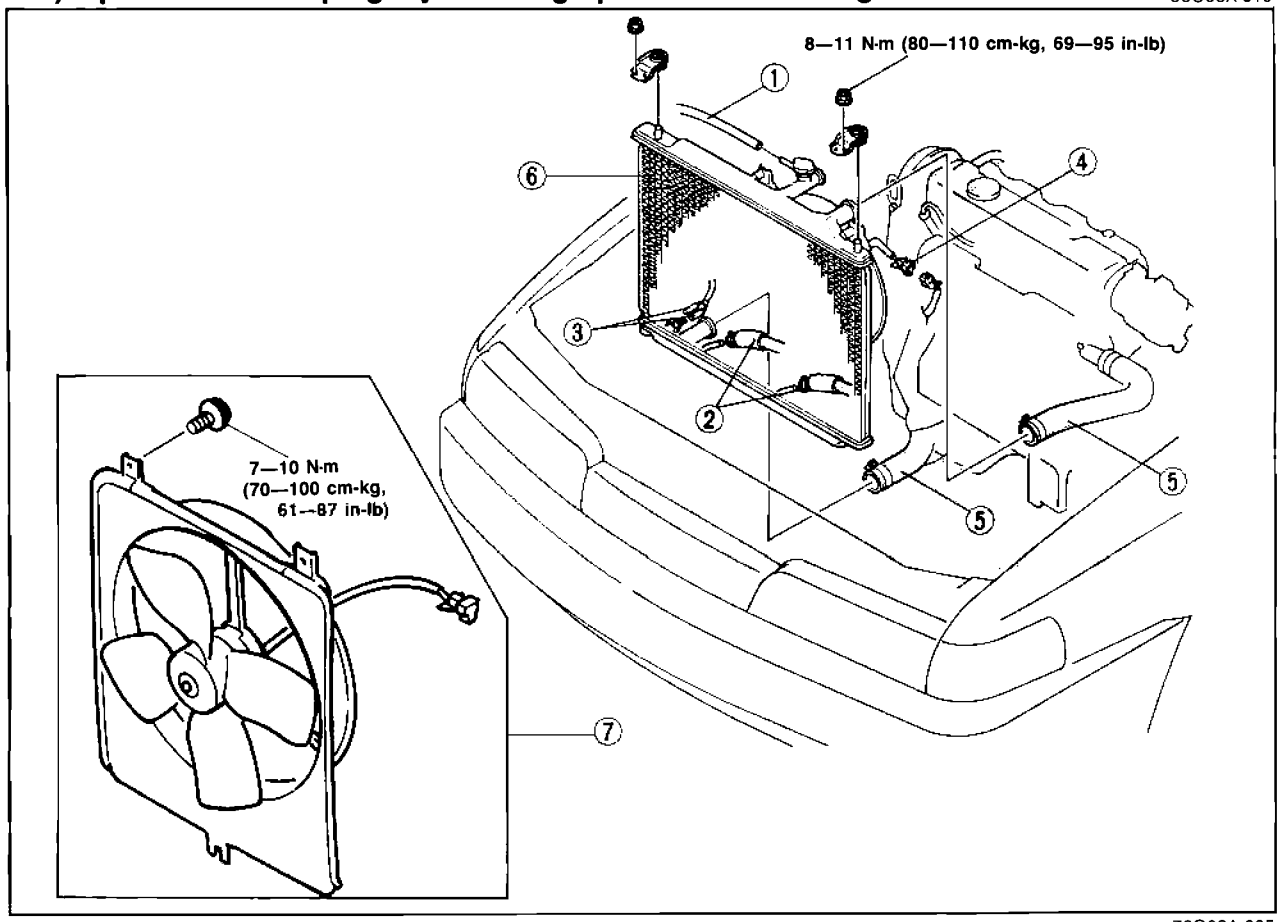
1. Pull the negative-pressure valve to open it. Check that it closes completely when released.
2. Check for damage on the contact surfaces, and for cracked or deformed seal packing.
3. Replace the radiator cap if necessary.

RADIATOR

REMOVAL AND INSTALLATION

1. Drain the engine coolant.
2. Remove in the sequence shown in the figure.
3. Install in the reverse order of removal.

Note
a) Position the hose clamp in the original location on the hose.
b) Squeeze the clamp lightly with large pliers to ensure a good fit.



86U03X-010

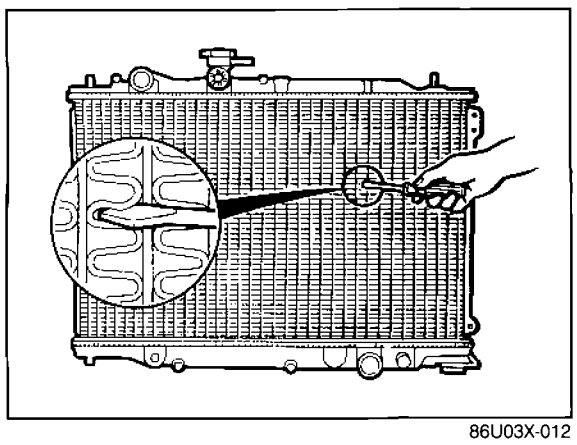
76G03A-005

1. Coolant reservoir hose
2. ATF hose (ATX)
3. Water thermo switch connector
4. Cooling fan connector
5. Upper and lower radiator hose
6. Cooling fan and radiator assembly
7. Cooling fan

INSPECTION

Check the following points. Repair or replace if necessary.

1. Cracks, damage, or water leakage
2. Bent fins (Repair with a screwdriver)
3. Distorted or bent radiator inlet.



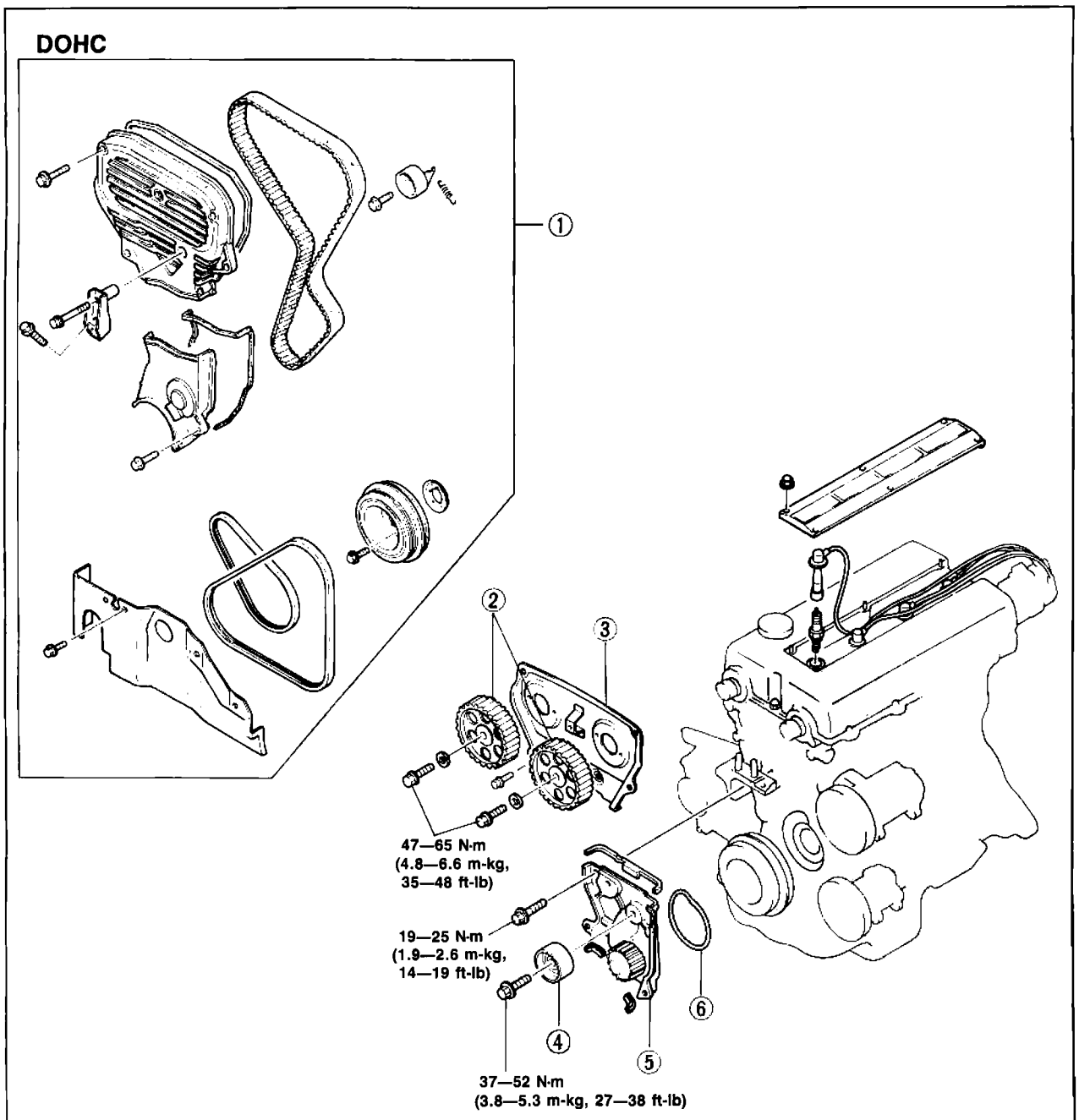
86U03X-012

WATER PUMP

REMOVAL

1. Disconnect the negative battery cable.
2. Turn the crankshaft so that the No. 1 cylinder is at TDC of compression.
3. Drain the engine coolant.
4. Remove in the sequence shown in the figure.

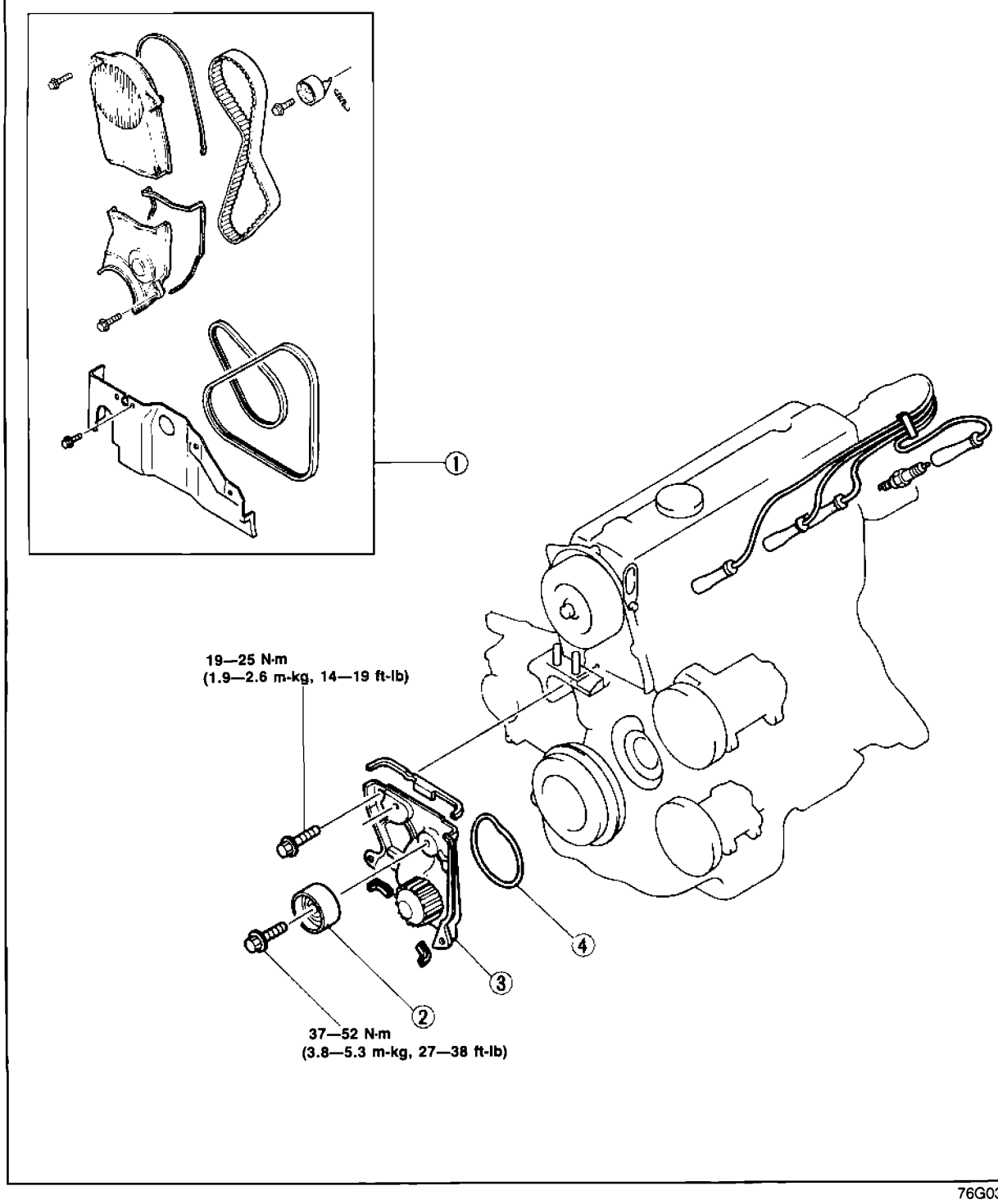
69G03A-025



76G03A-006

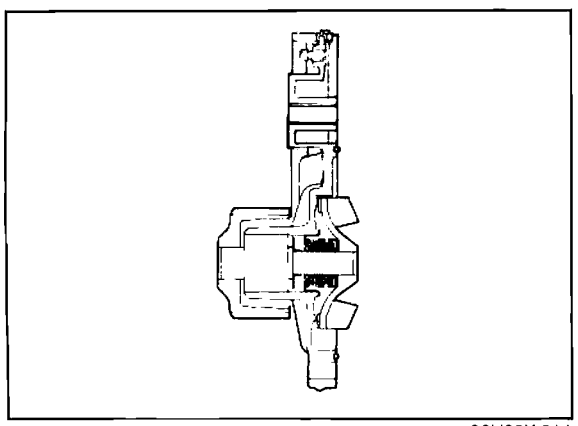
1. Timing belt (Refer to Section 1B)
2. Camshaft pulley (Refer to Section 1B)
3. Seal plate
4. Idler pulley
5. Water pump
6. O-ring

SOHC



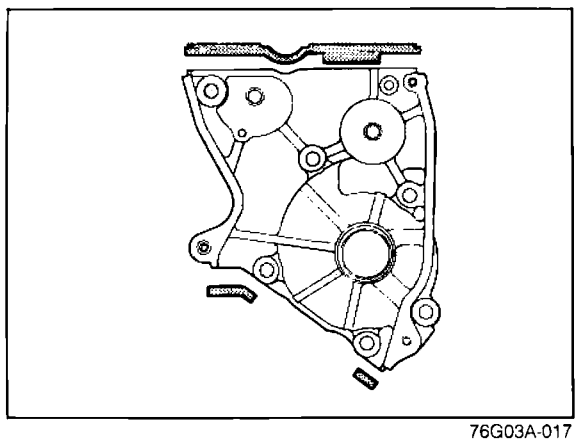
76G03A-007

1. Timing belt (Refer to Section 1A)
2. Idler pulley
3. Water pump
4. O-ring



86U03X-014

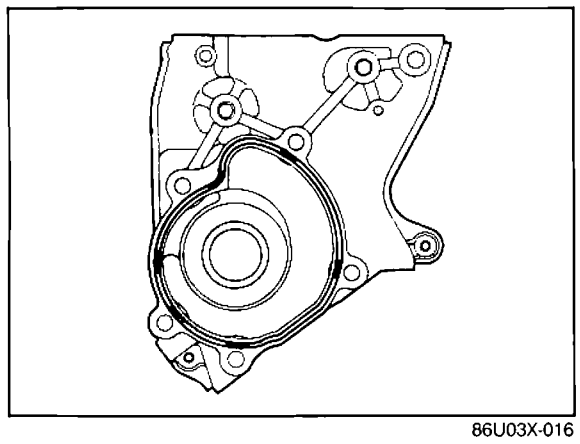
INSPECTION
Check the following. Replace the pump if necessary.
1. Cracks or damage
2. Abnormal noise, bearing sticking or loose.



76G03A-017

INSTALLATION
Install in the reverse order of removal referring to the installation note.

Installation Note
Rubber seal
Install the rubber seals on the water pump.

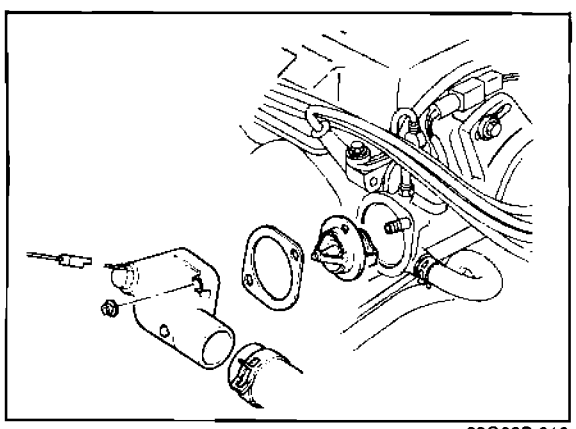


86U03X-016

Water pump
1. Remove any gasket fragments, dirt, or oil from the contact surfaces.
2. Install a new O-ring on the water pump.
3. Install the water pump.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

Note
To prevent dropping the O-ring when installing, put silicon sealant in the O-ring groove (shaded areas) as shown. Do not apply it to the contact surfaces.

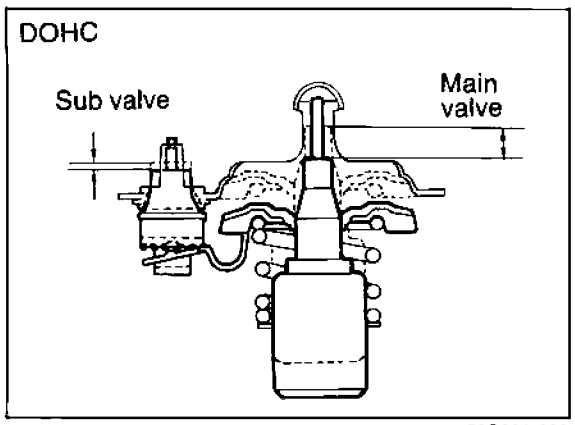


69G03B-010

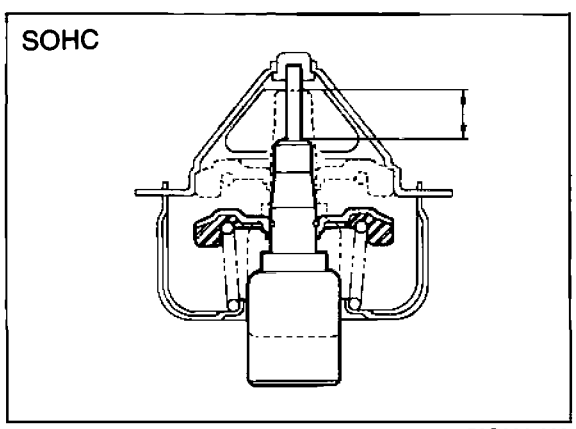
THERMOSTAT

REMOVAL

1. Drain the engine coolant.
2. Remove the thermostat cover.
3. Remove the thermostat.



76G03A-008



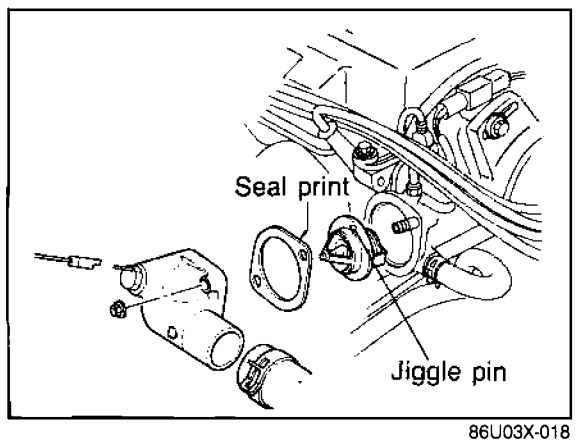
76G03A-009

INSPECTION

Check the thermostat. Replace if necessary.

1. Visually check that the valve is airtight.
2. Place the thermostat and a thermometer in water.
3. Gradually heat the water and check the following:

Model / Item	FE·DOHC	FE 8-valve F8,F6...except Middle East General FE 12-valve	FE 8-valve, F8,F6...only Middle East General
Initial opening temperature	Sub valve 83.5—86.5°C (182—188°F) Main valve 86.5—89.5°C (188—193°F)	86.5—89.5°C (188—193°F)	80.5—83.5°C (177—182°F)
Full-open temperature	100°C (212°F)		95°C (203°F)
Full-open lift	Sub valve 1.5 mm (0.06 in) min. Main valve 8.0 mm (0.31 in) min.	8.5 mm (0.33 in)min.	



86U03X-018

INSTALLATION

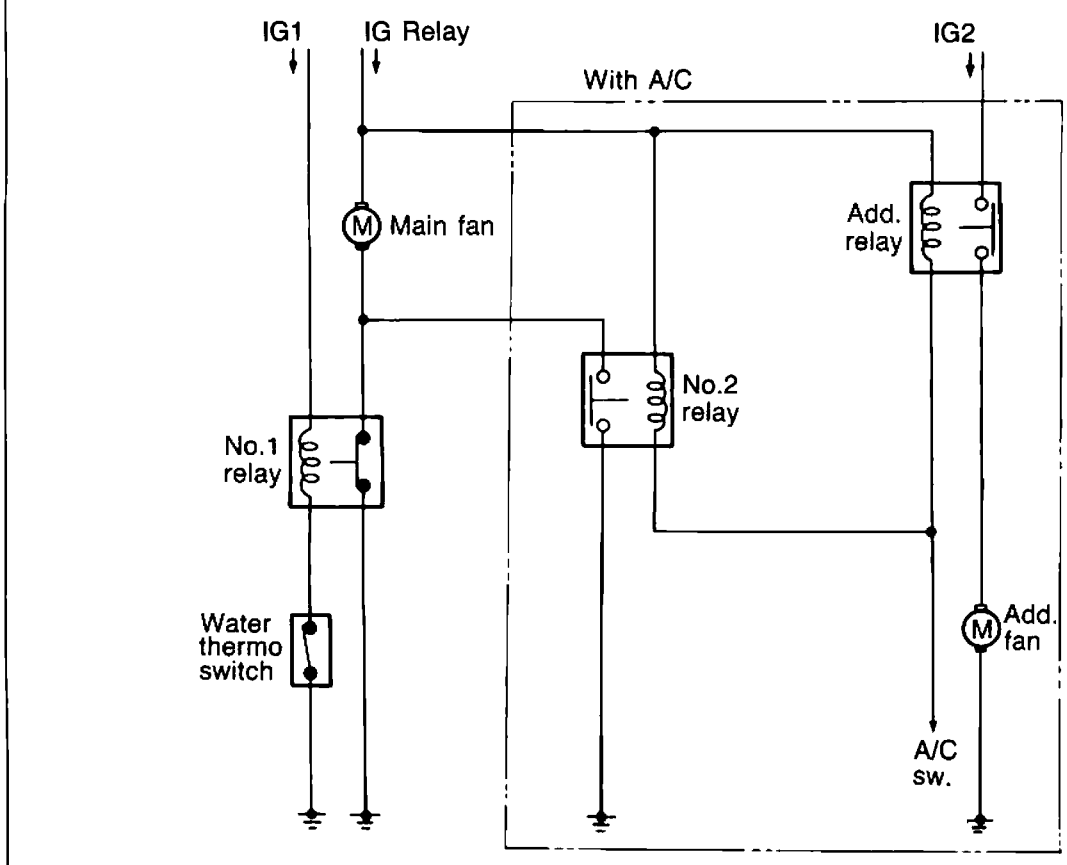
1. Install the thermostat into the cylinder head with jiggle pin at the top.
2. Install a new gasket with the seal print side facing the cylinder head.
3. Install the thermostat cover.

Tightening torque:
19—30 N·m (1.9—3.1 m-kg, 14—22 ft-lb)

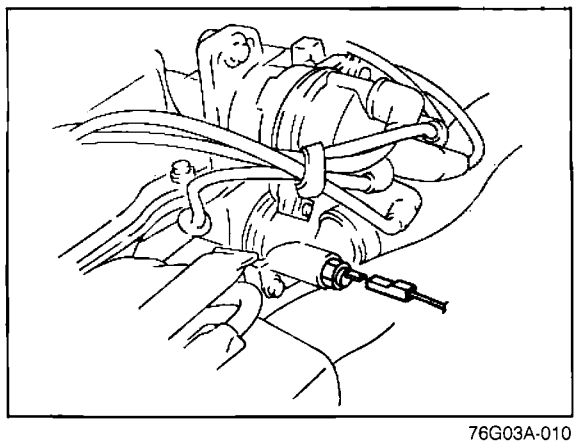
4. Replenish the coolant.
5. Start the engine and check for leaks.

COOLING FAN

SYSTEM CIRCUIT



86U03X-019



76G03A-010

CIRCUIT INSPECTION

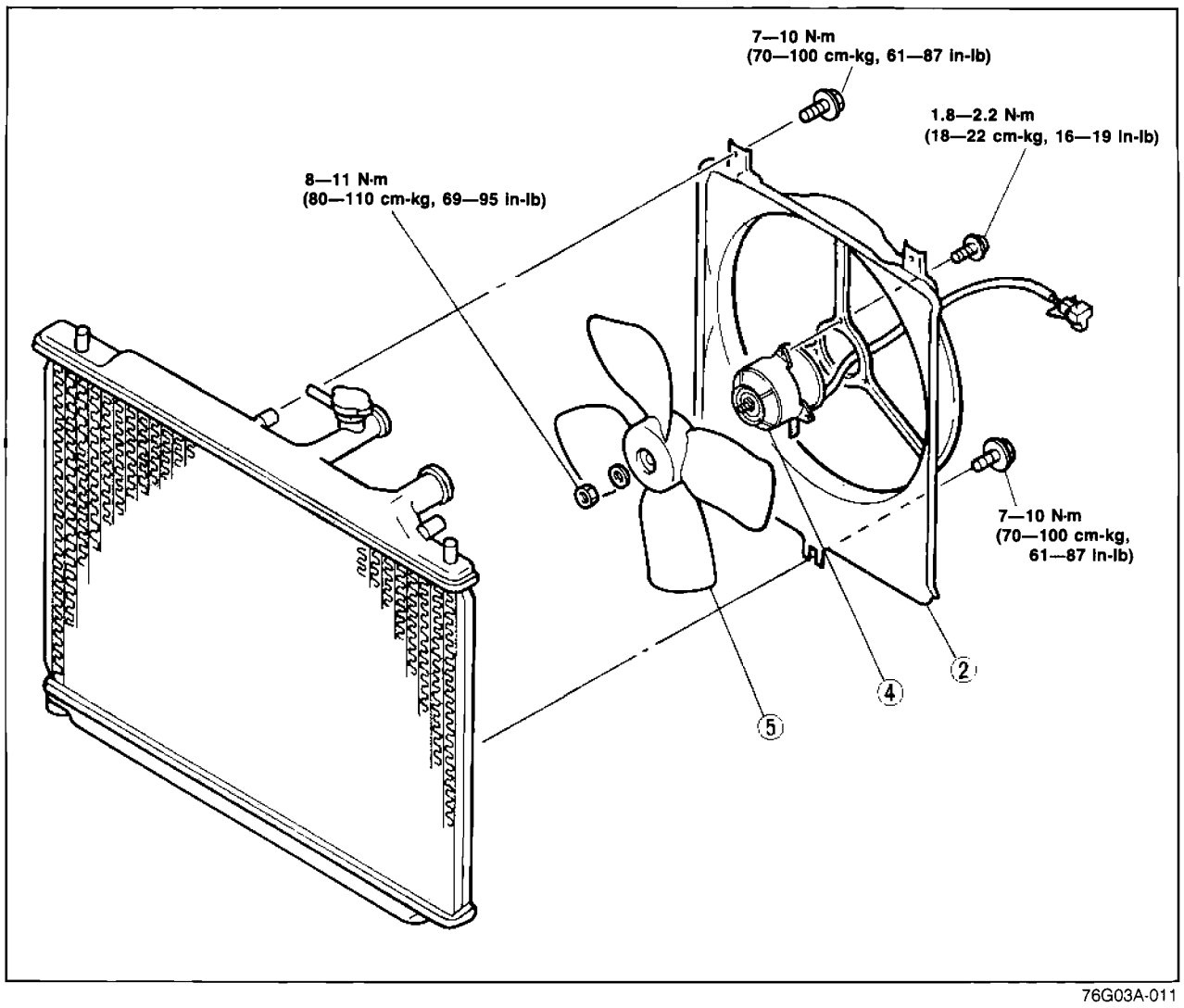
1. Turn the ignition switch ON.
2. Disconnect the water thermo switch connector, and check that the fan operates.
3. If the fan doesn't operate, check the fuse, fan relay, fan motor, thermo switch and wiring harness.

FAN MOTOR

Removal and Installation

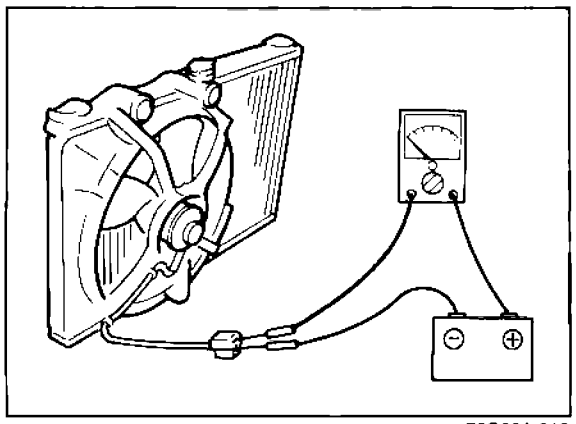
1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.

86U03X-021



76G03A-011

1. Cooling fan assembly (Refer to page 3A—7)
2. Cowling
3. Fan
4. Fan motor



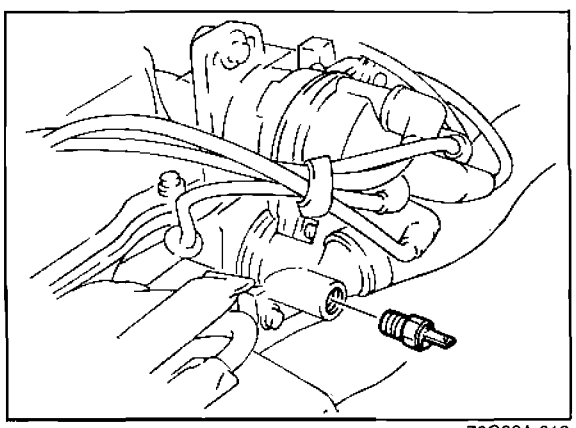
76G03A-012

Inspection

1. Connect an ammeter and battery to the fan motor connectors.
2. Check that the fan motor operates smoothly at the specified current or less.

Current
MTX: 5.6—7.6 A
ATX: 8.0—11.0 A

3. Replace the fan motor if necessary.

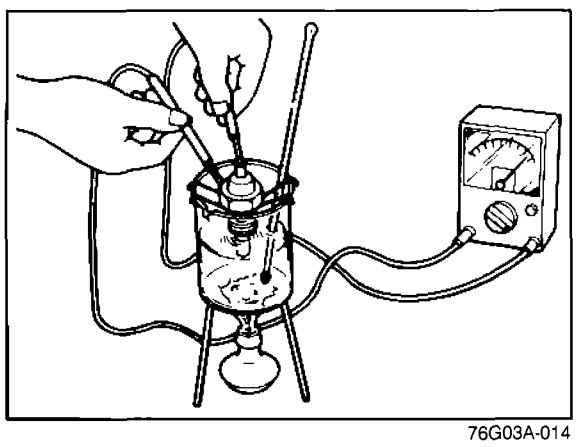


76G03A-013

WATER THERMO SWITCH

1. Remove the cooling fan water thermo switch.

Note
Make sure that the ignition switch is OFF. If not, the fan will operate when the connector is removed.



76G03A-014

2. Place the water thermo switch in water.
3. Heat the water gradually, and check for continuity of the switch with an ohmmeter. Replace if necessary.

Water thermo switch (ON → OFF):
97°C (207°F)....ECE, Hong Kong, Singapore
91°C (196°F)....General, Middle East

4. Install the water thermo switch and a new O-ring.

Caution
Do not use sealing tape.

3B

COOLING SYSTEM (DIESEL)

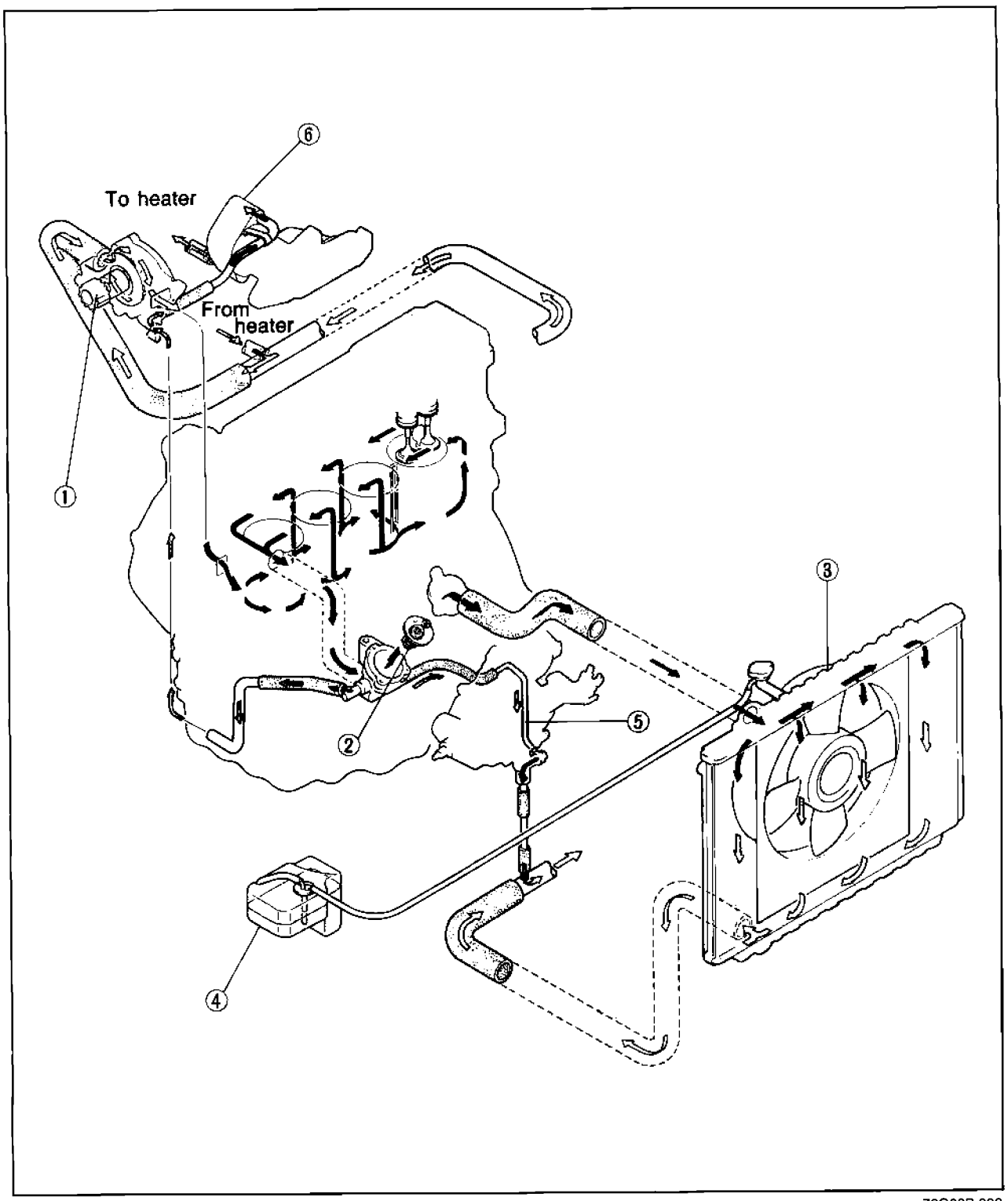
OUTLINE ..... **3B— 2**
COOLANT FLOW CHART ..... **3B— 2**
SPECIFICATIONS ..... **3B— 3**
TROUBLESHOOTING GUIDE ..... **3B— 3**
COOLANT ..... **3B— 4**
INSPECTION ..... **3B— 4**
REPLACEMENT ..... **3B— 4**
RADIATOR CAP ..... **3B— 5**
INSPECTION ..... **3B— 5**
RADIATOR ..... **3B— 6**
REMOVAL AND INSTALLATION ..... **3B— 6**
INSPECTION ..... **3B— 6**
WATER PUMP ..... **3B— 7**
REMOVAL ..... **3B— 7**
INSPECTION ..... **3B— 8**
INSTALLATION ..... **3B— 8**
THERMOSTAT ..... **3B— 9**
REMOVAL ..... **3B— 9**
INSPECTION ..... **3B— 9**
INSTALLATION ..... **3B— 9**
COOLING FAN ..... **3B—10**
SYSTEM CIRCUIT ..... **3B—10**
CIRCUIT INSPECTION ..... **3B—10**
FAN MOTOR ..... **3B—11**
WATER THERMO SWITCH ..... **3B—12**

76G03B-001

3B OUTLINE

OUTLINE

COOLANT FLOW CHART



76G03B-002

1. Water pump
2. Thermostat
3. Radiator
4. Coolant reservoir
5. CSD coolant passage
6. Oil cooler

SPECIFICATIONS

Cooling system			Water-cooled, forced circulation	
Coolant capacity liters (US qt, Imp qt)		With heater	9.5 (10.0, 8.4)	
		Without heater	9.0 (9.5, 7.9)	
Water pump	Type		Centrifugal, timing belt driven	
	Water seal		Unified mechanical seal	
Thermostat	Type		Wax, two stage	
	Opening temperature °C(°F)		Main	Sub
			86.5—89.5 (188—193)	78.5—81.5 (173—179)
	Full-open temperature °C(°F)		100 (212)	100 (212)
	Full-open lift mm (in)		8.0 (0.31) min.	1.5 (0.06) min.
Radiator	Type		Corrugated fin	
	Cap valve opening pressure kPa (kg/cm², psi)		74—103 (0.75—1.05, 11—15)	
Cooling fan	Type		Electric	
	Capacity W		120	
	Switching temprature OFF → ON °C(°F)		91 (196)	
	Number of blade		4	
	Outer diameter mm (in)		340 (13.4)	

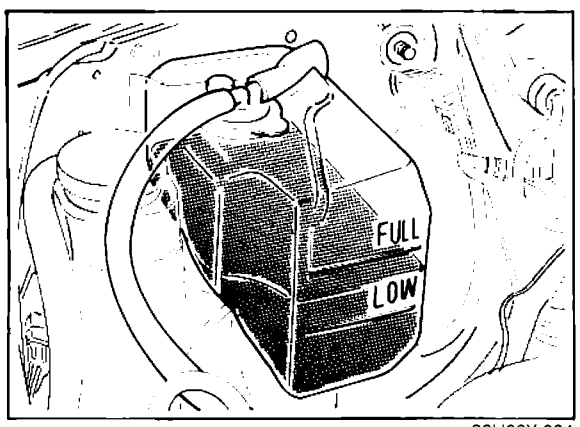
76G03B-003

TROUBLESHOOTING GUIDE

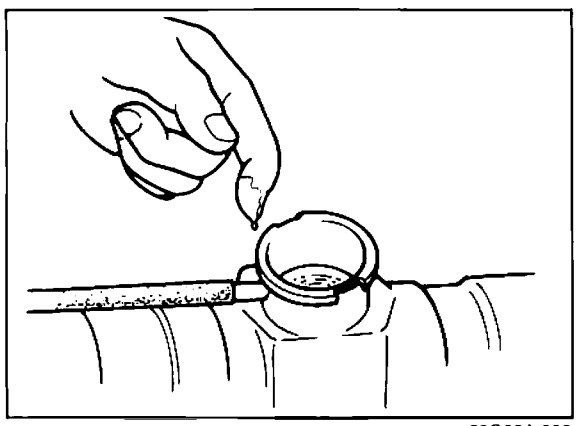
Problem	Possible Cause	Remedy	Page
Overheating	Insufficient coolant	Add	3B— 4
	Coolant leakage	Repair	—
	Radiator fins clogged	Clean	3B— 6
	Radiator cap malfunction	Replace	3B— 5
	Cooling fan malfunction	Repair	3B—11
	Thermostat malfunction	Replace	3B— 9
	Water passage clogged	Clean	3B— 4
	Water pump malfunction	Repair or replace	3B— 7
Corrosion	Impurities in coolant	Replace	3B— 4

76G03B-004

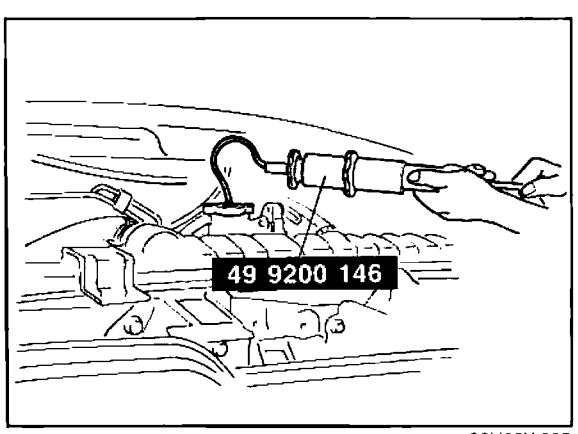
3B COOLANT



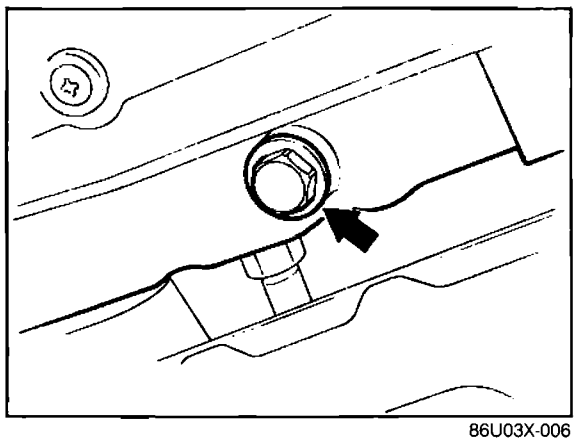
86U03X-004



69G03A-006



86U03X-005



86U03X-006

COOLANT

INSPECTION

Coolant Level (Engine cold)

1. Check that the coolant level is near the radiator inlet port.
2. Check that the coolant level in the coolant reservoir is between the FULL and Low marks.
   Add coolant if necessary.

Warning

a) Never remove the radiator cap while the engine is hot.

b) Wrap a thick cloth around the cap when removing it.

Coolant Quality

1. Check that there is no build-up of rust or scales around the radiator cap or radiator filler neck.
2. Check that coolant is free from oil.
3. Replace the coolant, if necessary.

Coolant Leakage

1. Connect a tester and **SST** to the radiator inlet port.
2. Apply **103 kPa (1.05 kg/cm^2, 15 psi)** pressure to the system.
3. Check that the pressure is held.
   If not, check for coolant leakage.

Warning

When removing either the radiator cap or the tester, loosen it slowly until the pressure in the radiator is released, and then remove it.

REPLACEMENT

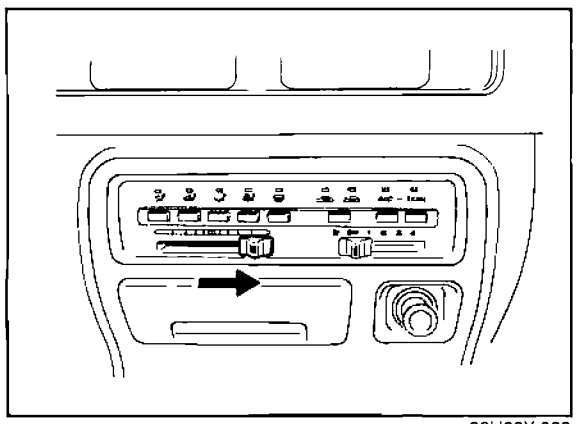
1. Remove the radiator cap and loosen the drain plug.
2. Drain the coolant into a suitable container.

Warning

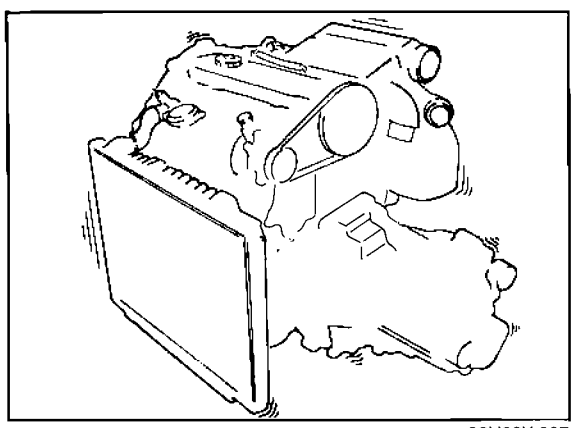
a) Never open the radiator cap while the engine is hot.

b) Wrap a thick cloth around the cap when loosening.

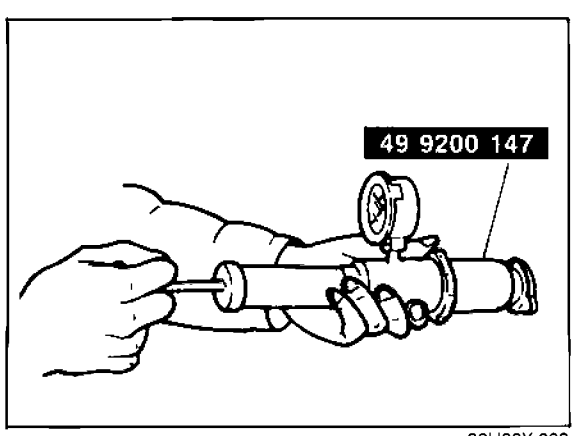
c) Use caution when draining hot coolant.



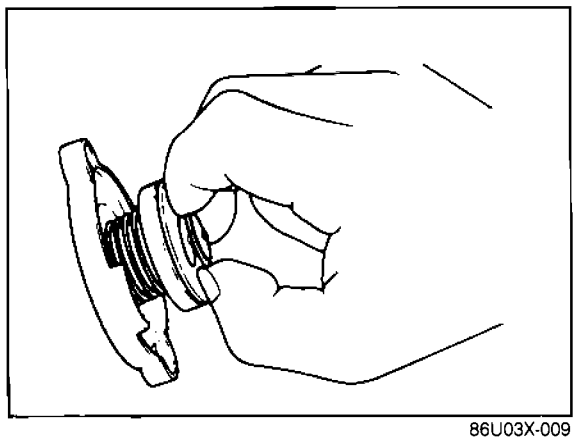
86U03X-028



86U03X-007



86U03X-008



86U03X-009

3. Set the heater control switch to the maximum heat position.
4. Flush the cooling system with water until all traces of color are gone, then let the system drain completely.
5. Fill with the proper mixture and amount of ethylene glycol-based coolant.

Caution

a) Do not use alcohol- or methanol-based coolant.

b) Use only soft (demineralized) water in the coolant mixture.

Anti-freeze solution mixture percentage

Protection	Volume percentage		Gravity at 20°C (68°F)
	Solution	Water	
Above –16°C (3°F)	35	65	1.054
Above –26°C (–15°F)	45	55	1.066
Above –40°C (–40°F)	55	45	1.078

6. Run the engine at idle with the radiator cap removed. Let any air bleed from the system, and add more coolant.
7. Install the radiator cap, and inspect all connections for leakage.

RADIATOR CAP

INSPECTION

Radiator Cap Valve

1. Remove foreign material (such as water residue) from between the radiator cap valve and the valve seat.
2. Attach the radiator cap to a tester with the **SST**. Apply pressure gradually to **74—103 kPa (0.75—1.05 kg/cm^2, 11—15 psi)**.
3. Wait about 10 seconds; then check that the pressure has not decreased.

Negative Pressure Valve

1. Pull the negative-pressure valve to open it. Check that it closes completely when released.
2. Check for damage on the contact surfaces, and for cracked or deformed seal packing.
3. Replace the radiator cap if necessary.

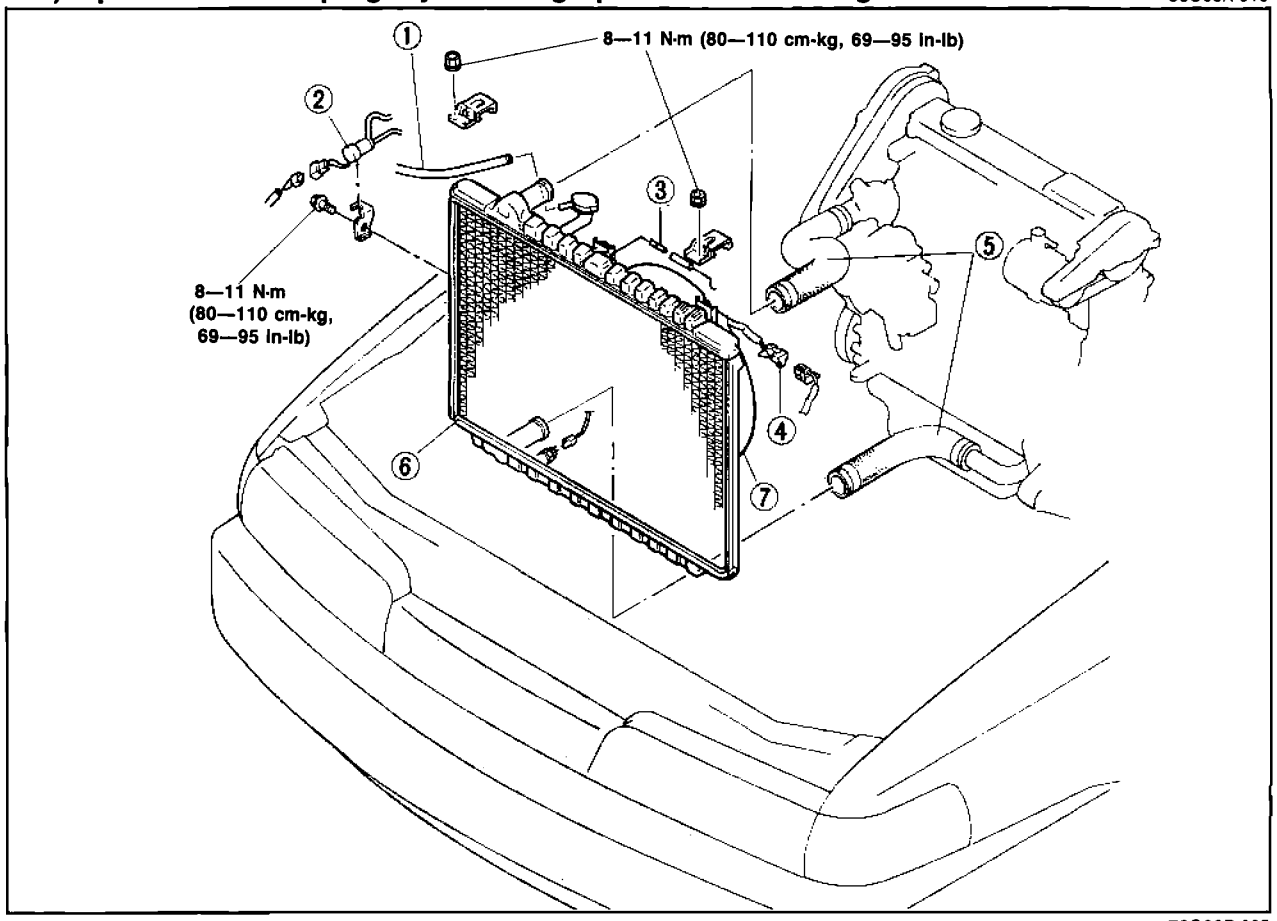
RADIATOR

REMOVAL AND INSTALLATION

1. Drain the engine coolant.
2. Remove in the sequence shown in the figure.
3. Install in the reverse order of removal.

Note
a) Position the hose clamp in the original location on the hose.
b) Squeeze the clamp lightly with large pliers to ensure a good fit.

86U03X-010



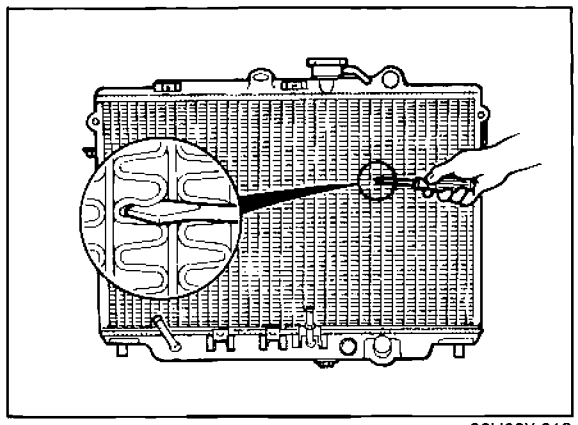
76G03B-005

1. Coolant reservoir hose
2. Fast idle solenoid
3. Coolant level sensor connector
4. Cooling fan connector
5. Upper and lower radiator hose
6. Cooling fan and radiator assembly
7. Cooling fan

INSPECTION

Check the following points. Repair or replace if necessary.

1. Cracks, damage, or water leakage
2. Bent fins (Repair with a screwdriver)
3. Distorted or bent radiator inlet



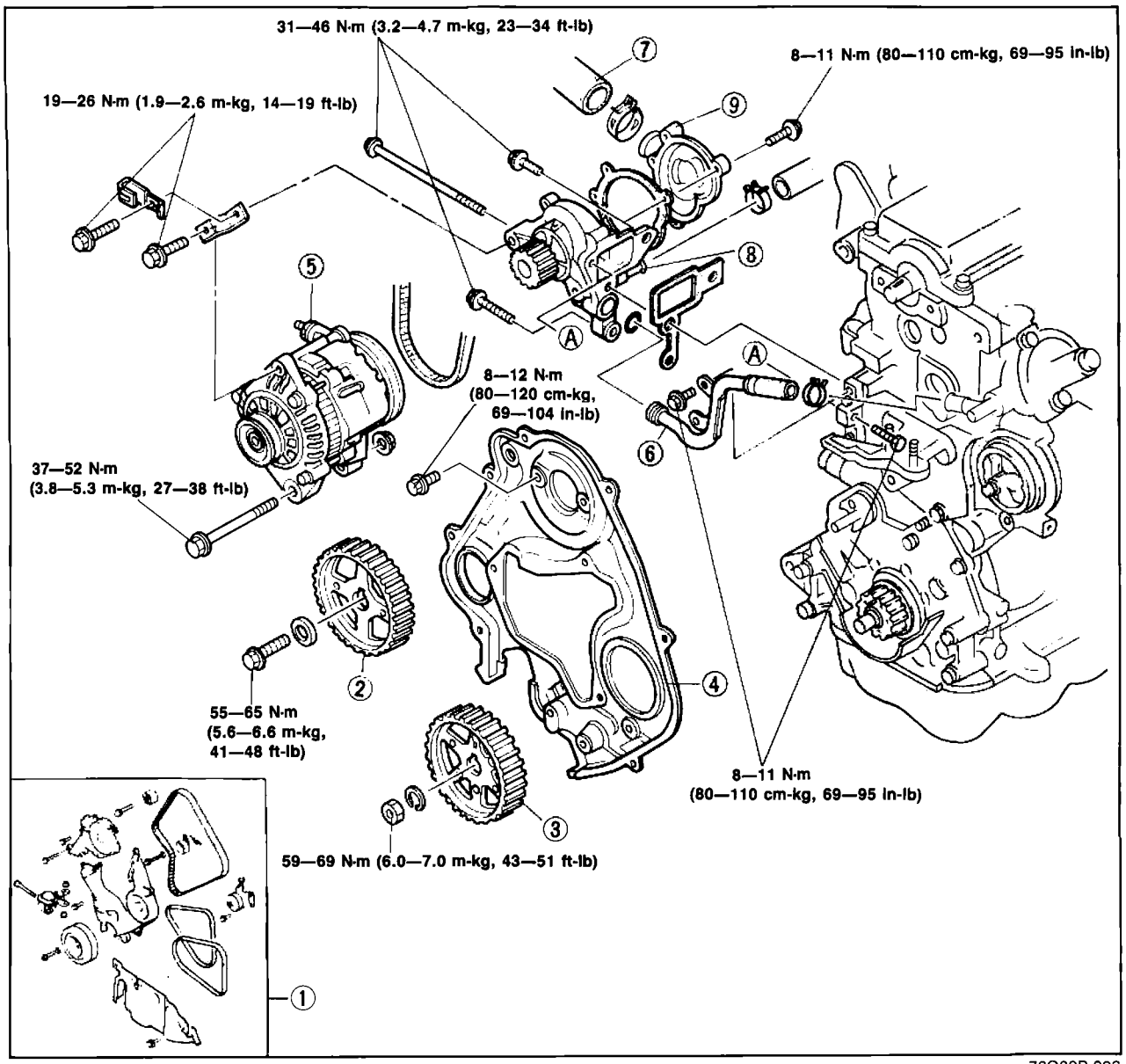
86U03X-012

WATER PUMP

REMOVAL

1. Disconnect the negative battery cable.
2. Turn the crankshaft so that the No. 1 cylinder is at TDC of compression.
3. Drain the engine coolant.
4. Remove in the sequence shown in the figure.

69G03A-025

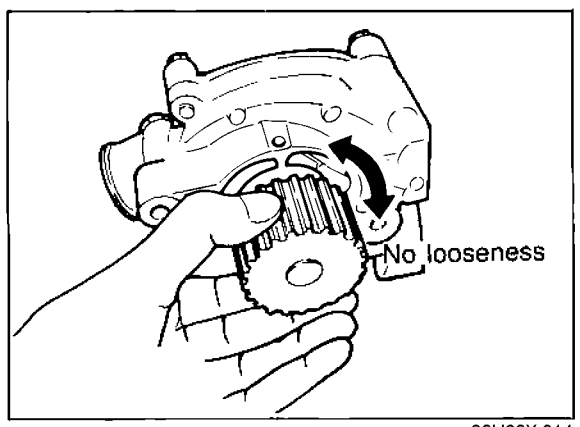


76G03B-006

1. Timing belt (Refer to page 1C—11)
2. Camshaft pulley (Refer to page 1C—36)
3. Injection pump pulley (Refer to page 1C—36)
4. Seal plate
5. Alternator
6. Water pipe
7. Water hose
8. Water pump body
9. Water pump inlet

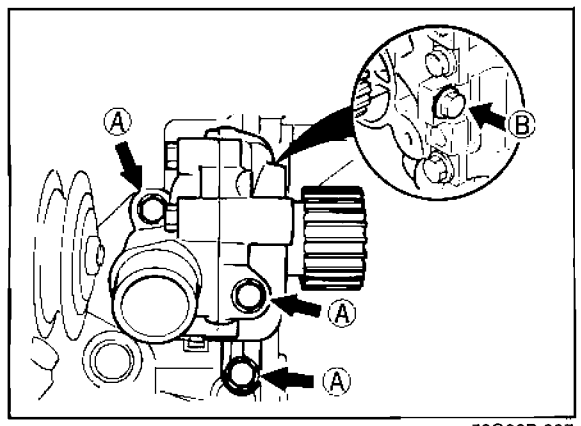
Note
Do not disassemble the water pump body, if a problem is found replace it as a unit.

3B WATER PUMP

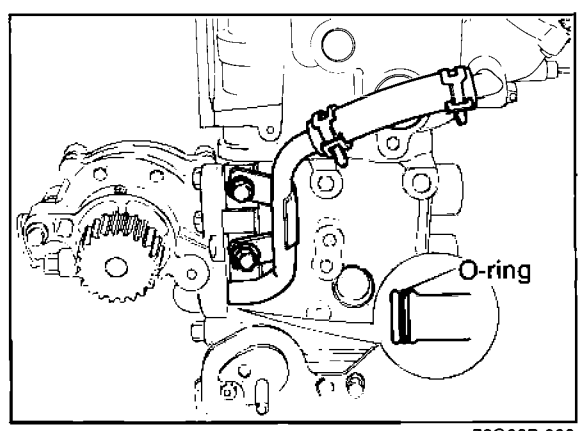


86U03X-014

INSPECTION
Check the following. Replace the pump if necessary.
1. Cracks or damage
2. Abnormal noise, bearing sticking or loose



76G03B-007



76G03B-008

INSTALLATION
Install in the reverse order of removal referring to the installation note.

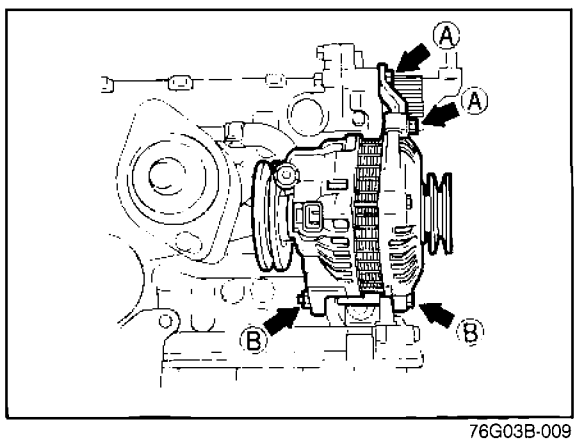
Installation Note
Water pump
1. Remove any gasket fragments, dirt or oil from the contact surfaces.
2. Install the water pump and new gasket so that the printed side of the gasket faces the water pump.

Tightening torque:
Bolt A: 31—46 N·m
(3.2—4.7 m-kg, 23—34 ft-lb)
Bolt B: 8—11 N·m
(80—110 cm-kg, 69—95 in-lb)

Water pipe
1. Apply a coat of vegetable oil to the O-ring.
2. Install the water pipe.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

3. Connect the water hose.

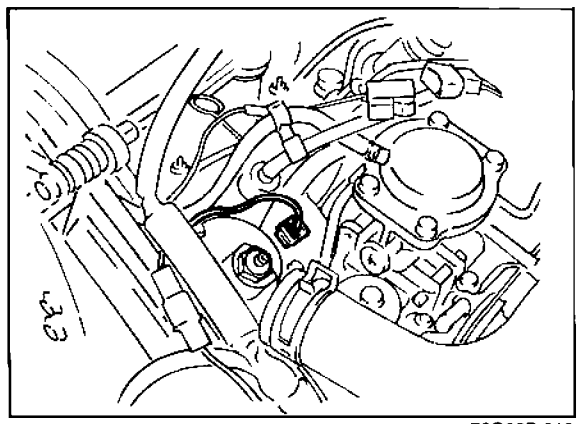


76G03B-009

Alternator
1. Install the alternator.

Tightening torque:
Bolt A: 19—26 N·m
(1.9—2.6 m-kg, 14—19 ft-lb)
Bolt B: 37—52 N·m
(3.8—5.3 m-kg, 27—38 ft-lb)

2. Install the alternator drive belt and Comprex supercharger drive belt, and adjust the belt deflection. (Refer to page 1C—7)

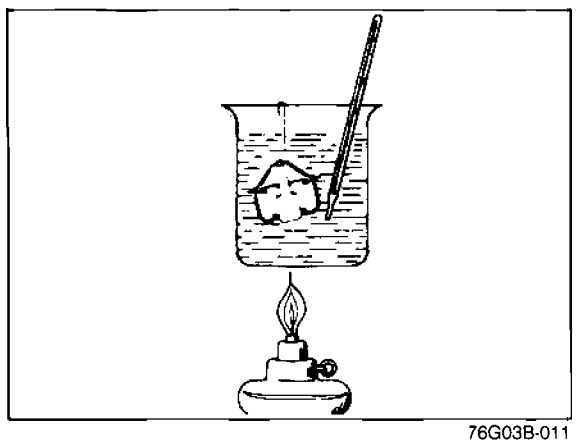


76G03B-010

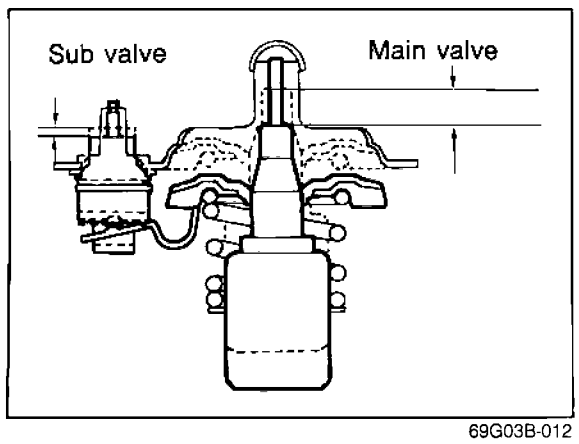
THERMOSTAT

REMOVAL

1. Drain the engine coolant.
2. Disconnect the upper radiator hose, and water thermo switch connector.
3. Remove the thermostat cover.
4. Remove the thermostat.



76G03B-011



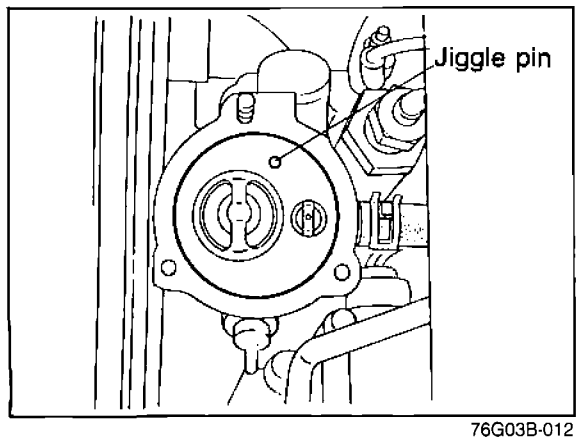
69G03B-012

INSPECTION

Check the thermostat. Replace if necessary.

1. Visually check that the valve is airtight.
2. Place the thermostat and a thermometer in water.
3. Gradually heat the water and check the following:

Valve opening temperature
Sub valve : 78.5—81.5°C (173—179°F)
Main valve : 86.5—89.5°C (188—193°F)
Full open lift
Sub valve : 1.5 mm (0.06 in) min. at 100°C (212°F)
Main valve : 8 mm (0.31 in) min. at 100°C (212°F)
Valve closing temperature
Sub valve : 75°C (167°F)
Main valve : 83°C (181°F)



76G03B-012

INSTALLATION

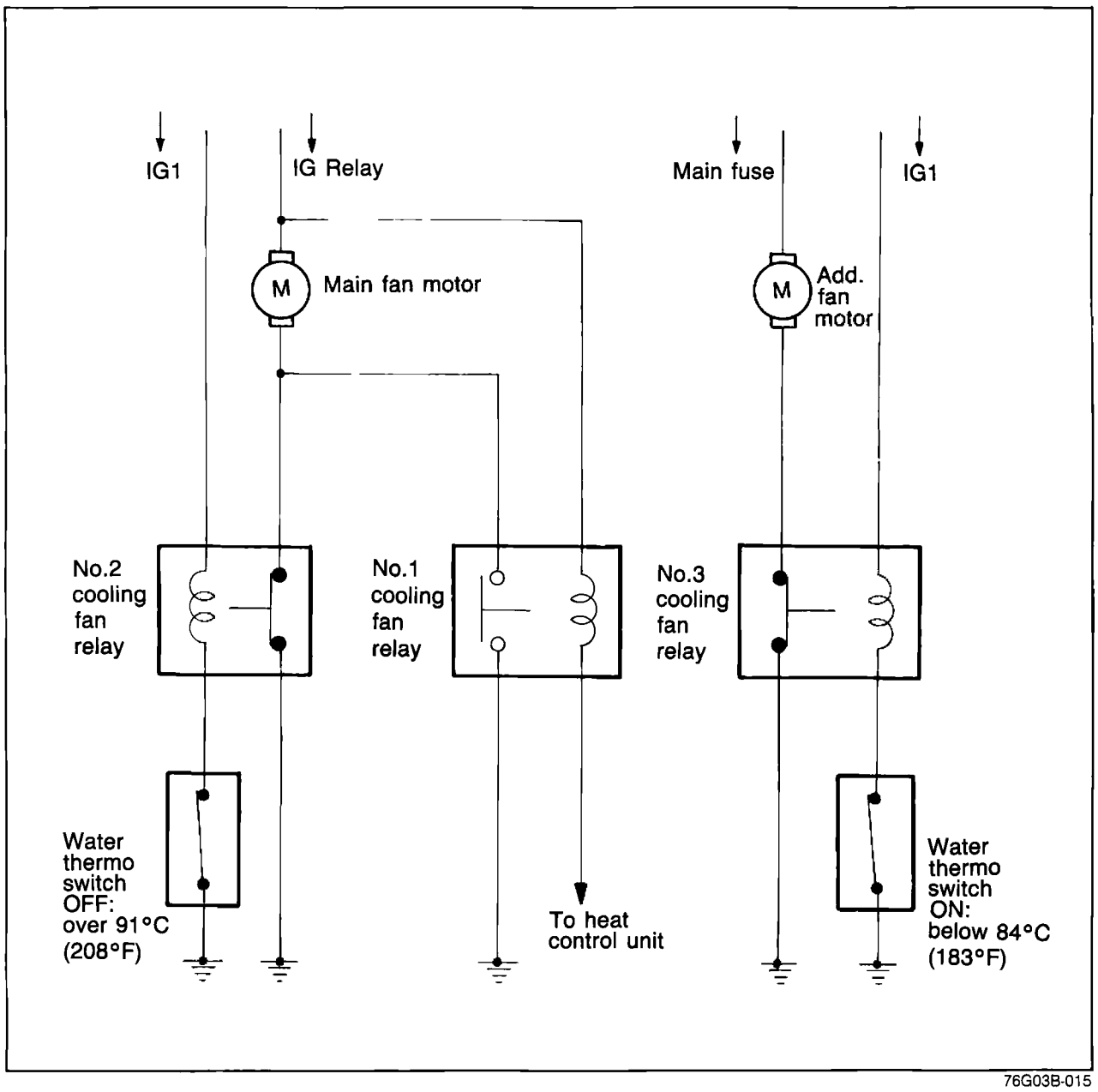
1. Install the thermostat into the thermostat case with jiggle pin at the top.
2. Install a new gasket with the seal print side facing the thermostat case.
3. Install the thermostat cover.

Tightening torque:
7—10 N·m (70—100 cm-kg, 61—87 in-lb)

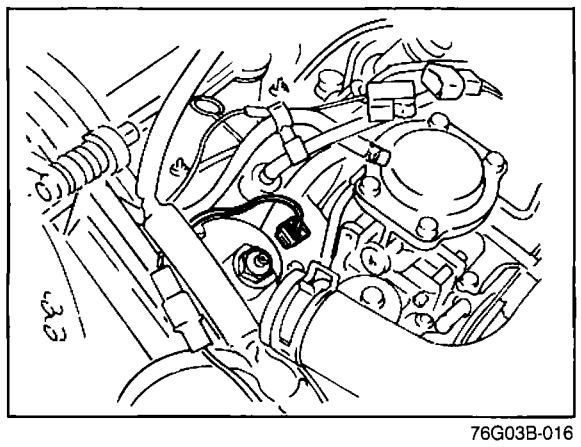
4. Install the upper radiator hose and water thermo switch connector.
5. Replenish the coolant.
6. Start the engine and check for leaks.

COOLING FAN

SYSTEM CIRCUIT



76G03B-015



76G03B-016

CIRCUIT INSPECTION

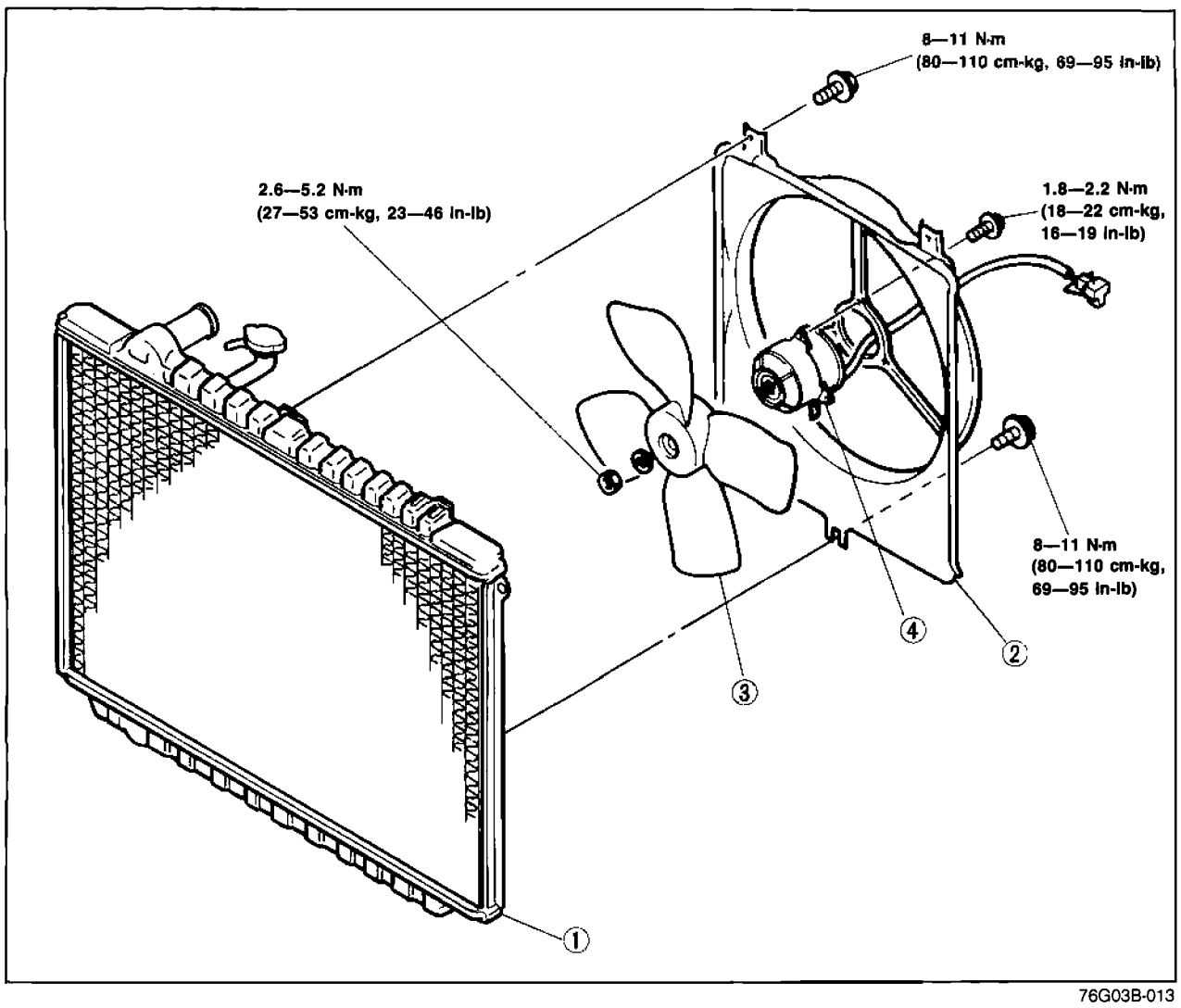
1. Turn the ignition switch ON.
2. Disconnect the water thermo switch connector, and check that the fan begins to operate.
3. If the fan doesn't operate, check the fuse, fan relay, fan motor, thermo switch, and wiring harness.

FAN MOTOR

Removal and Installation

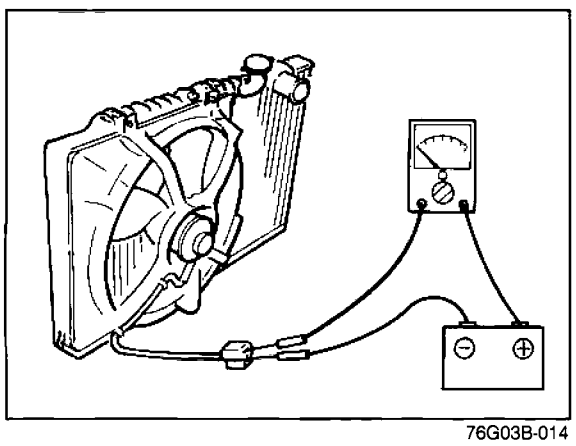
1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.

86U03X-021



76G03B-013

1. Cooling fan assembly (Refer to page 3B—6)
2. Cowling
3. Fan
4. Fan motor



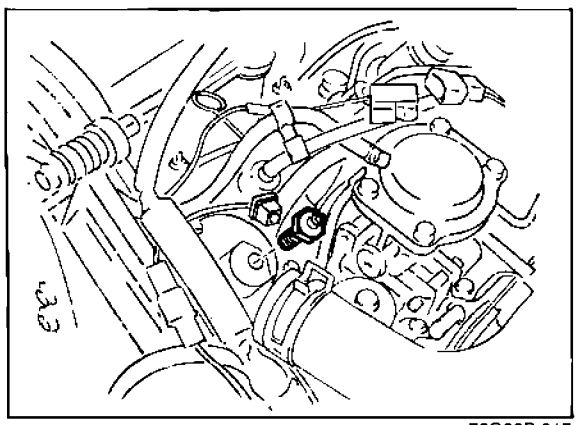
76G03B-014

Inspection

1. Connect an ammeter and battery to the fan motor connectors.
2. Check that the fan motor operates smoothly at the specified current or less.

   Current
   8.0—11.0 Amperes

3. Replace the fan motor if necessary.

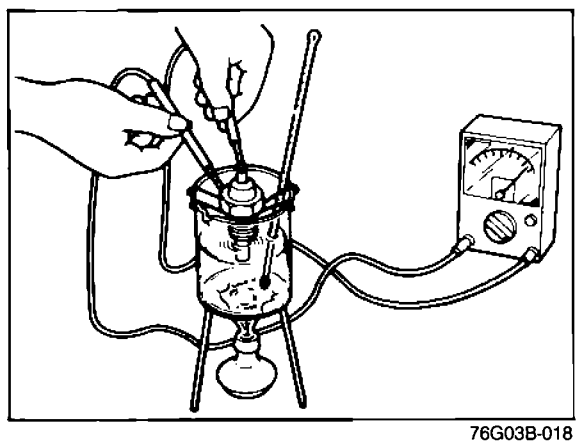


76G03B-017

WATER THERMO SWITCH

1. Remove the cooling fan water thermo switch.

Note
Make sure that the ignition switch is OFF. If not, the fan will operate when the connector is removed.



76G03B-018

2. Place the water thermo switch in water.
3. Heat the water gradually, and check for continuity of the switch with an ohmmeter. Replace if necessary.

Temperature	Continuity
Above 91°C (208°F)	No
Below 84°C (183°F)	Yes

4. Install the water thermo switch and a new O-ring.

Tightening torque:
6—9 N·m (60—90 cm-kg, 52—78 in-lb)

Caution
Do not use sealing tape.

4A

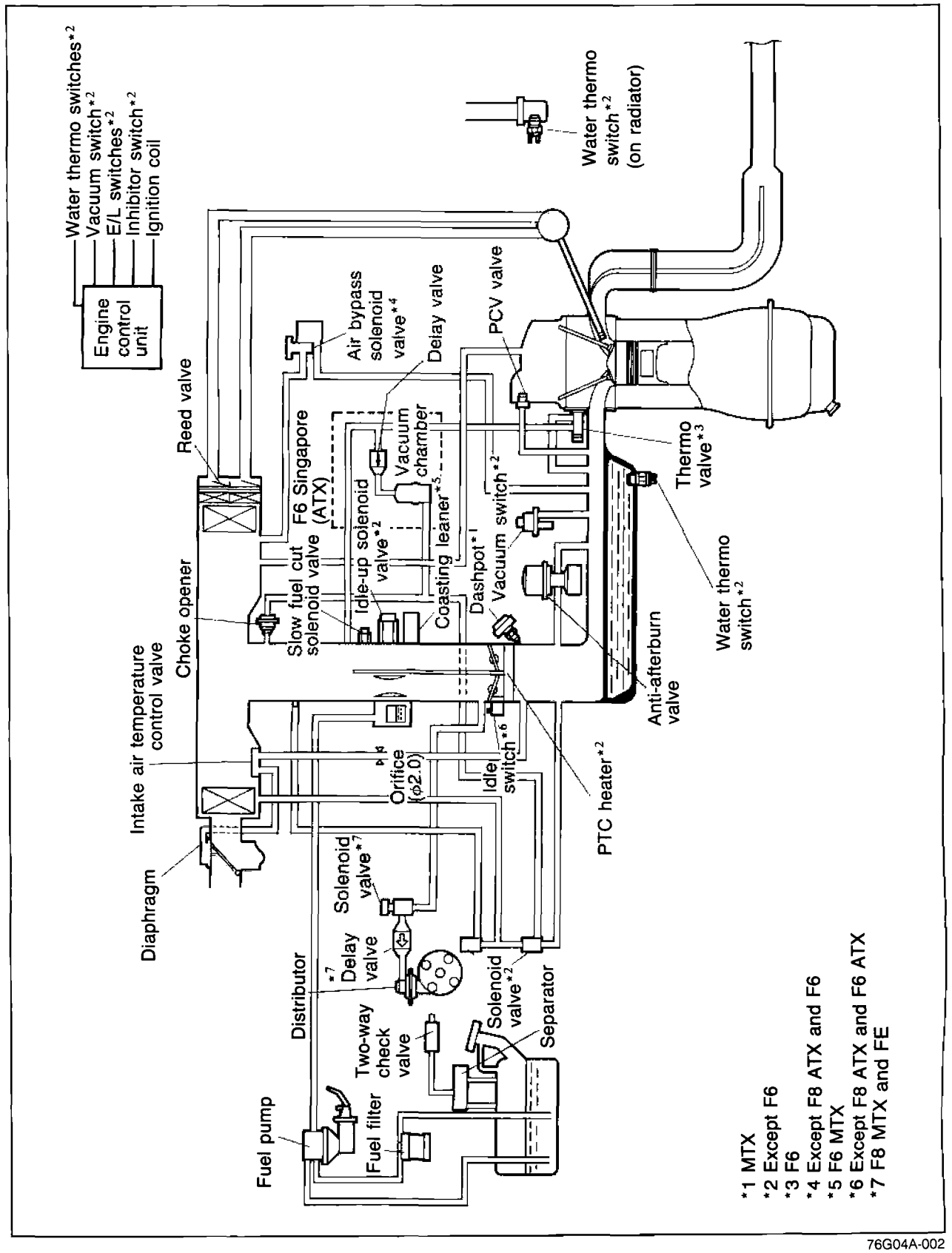
FUEL AND EMISSION CONTROL SYSTEMS (CARBURETOR)

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76G04A-001

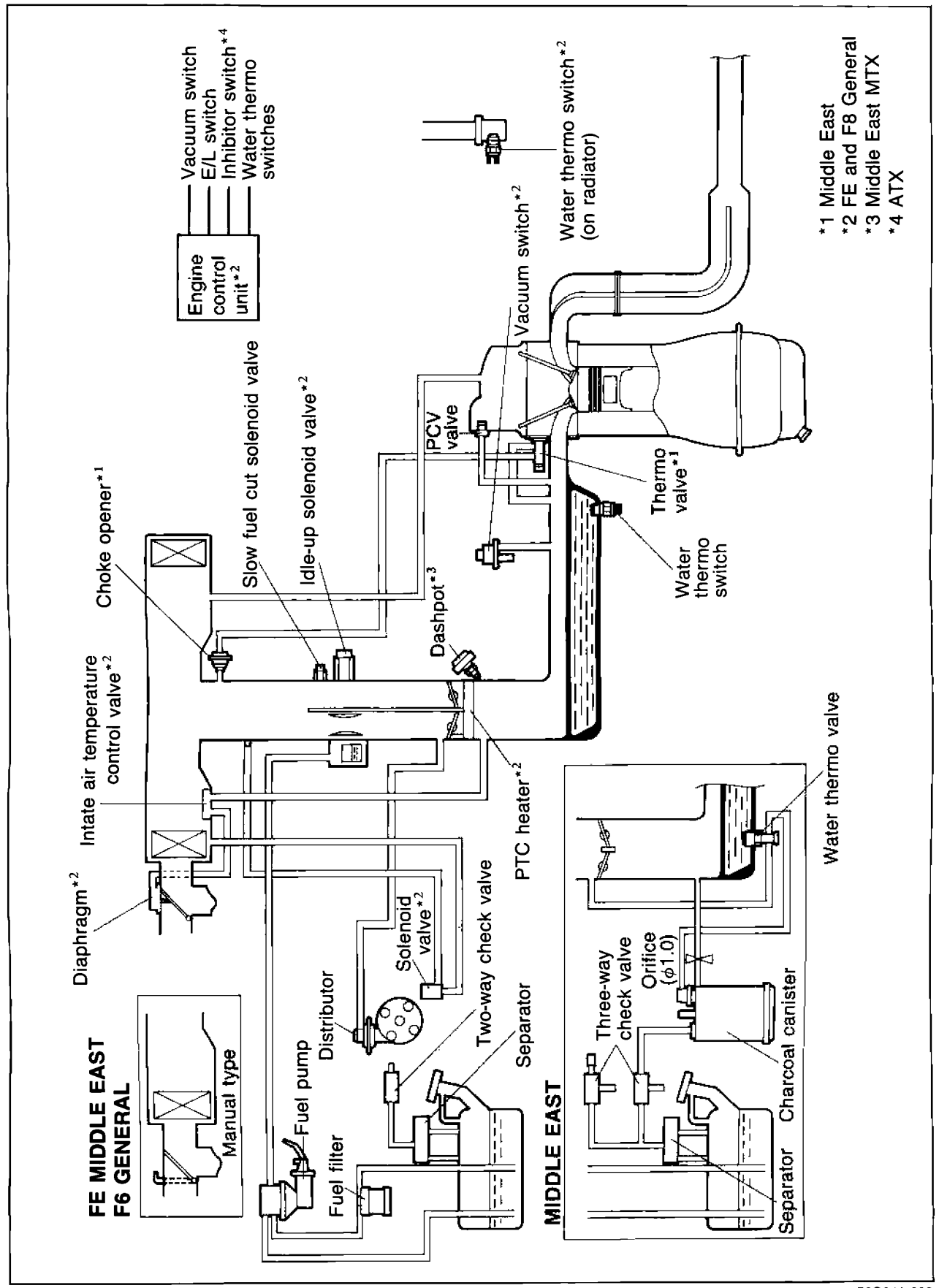
OUTLINE

SYSTEM DIAGRAM
ECE, Hong Kong, and Singapore



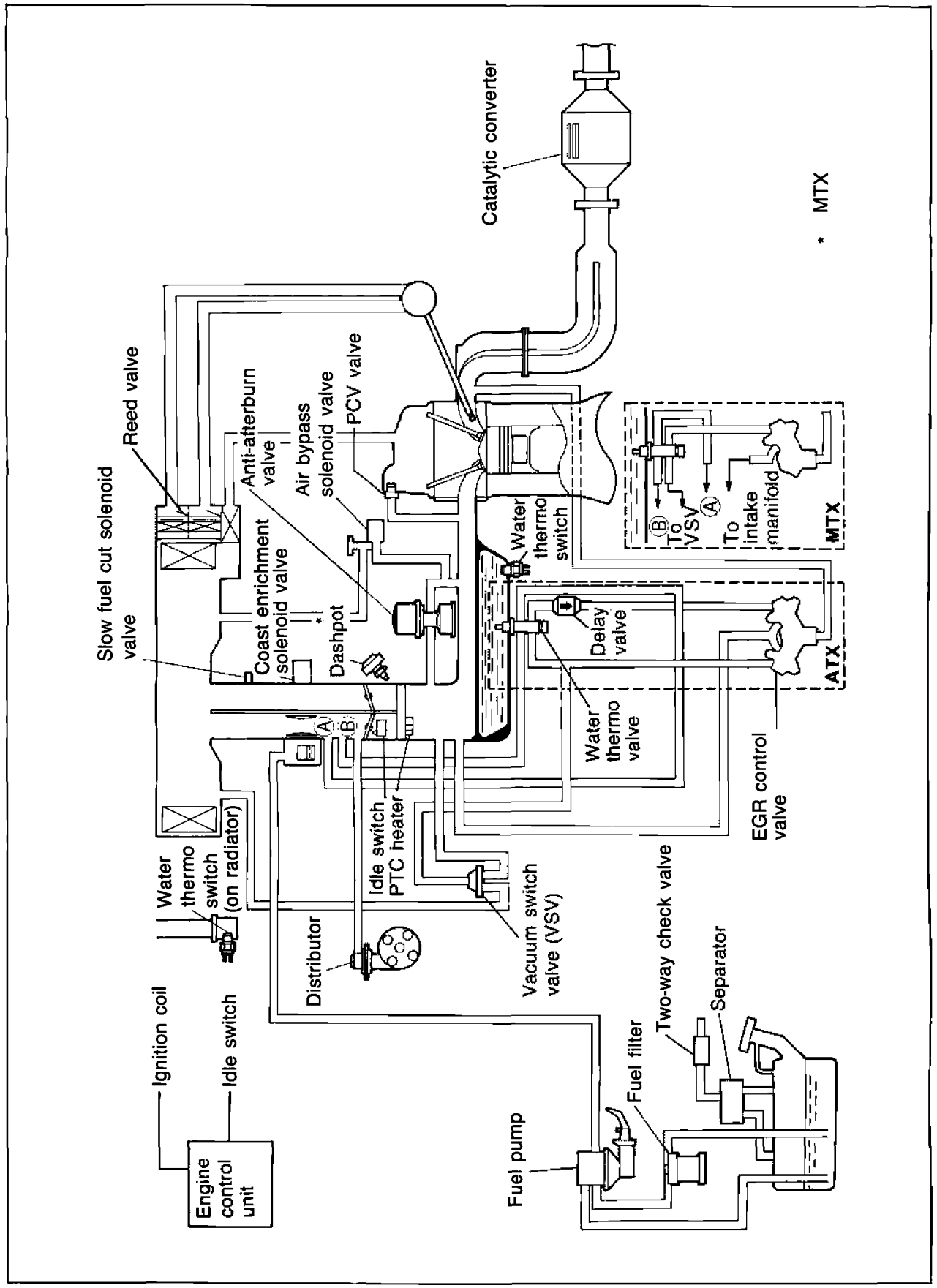
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General and Middle East



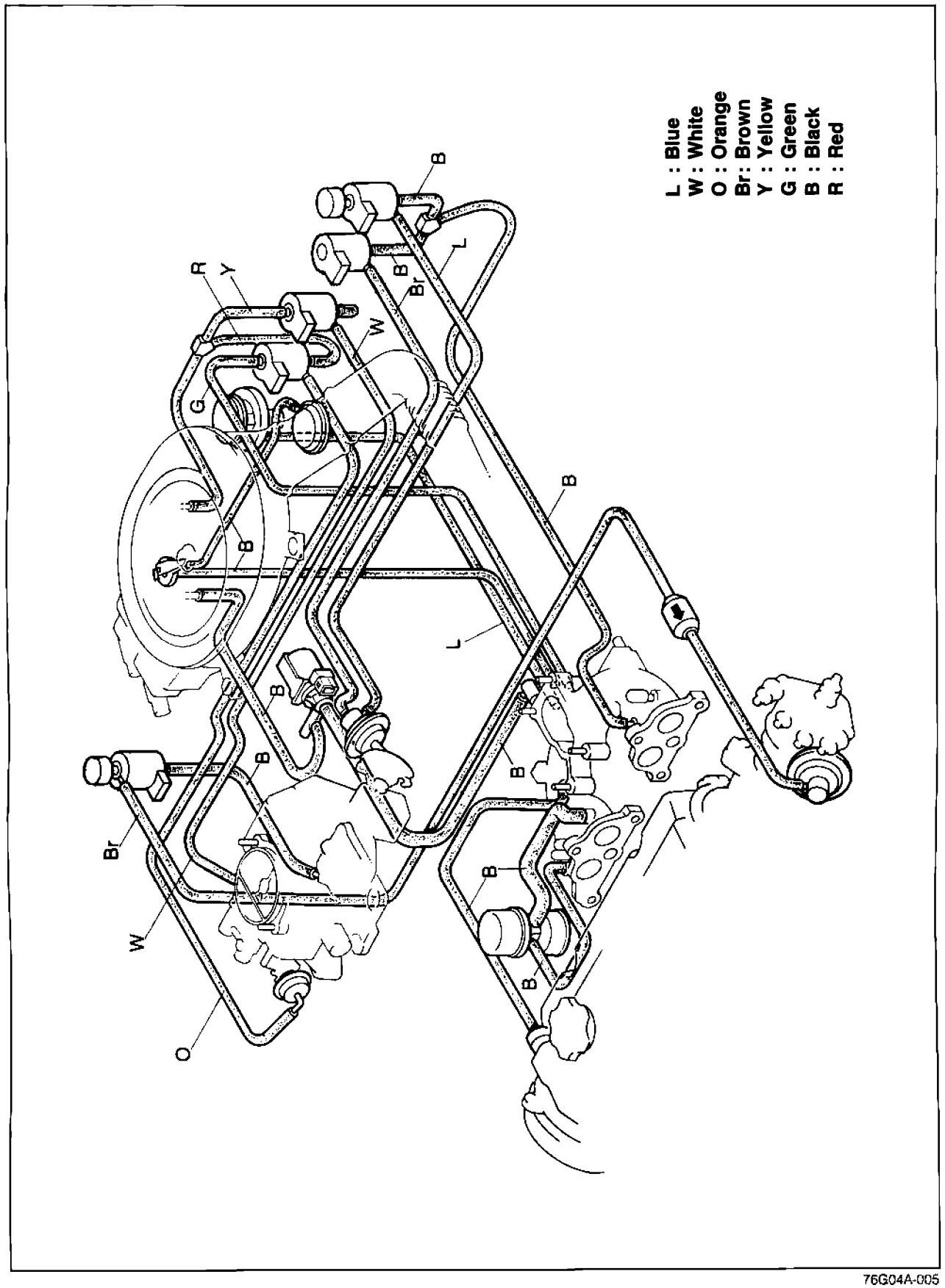
76G04A-003

FE 8Valve—Unleaded Fuel



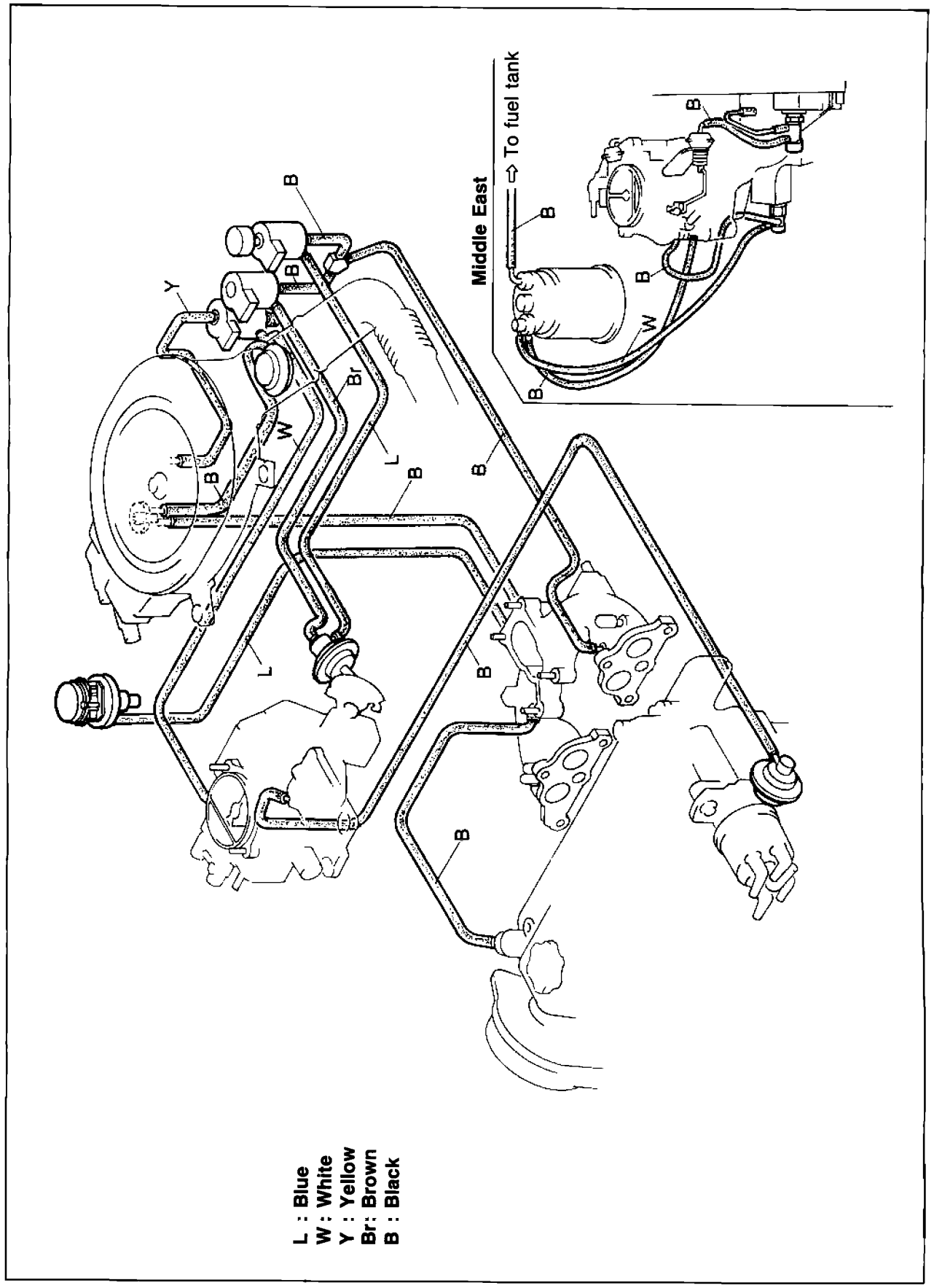
76G04A-004

VACUUM HOSE ROUTING DIAGRAM
ECE, Hong Kong, and Singapore



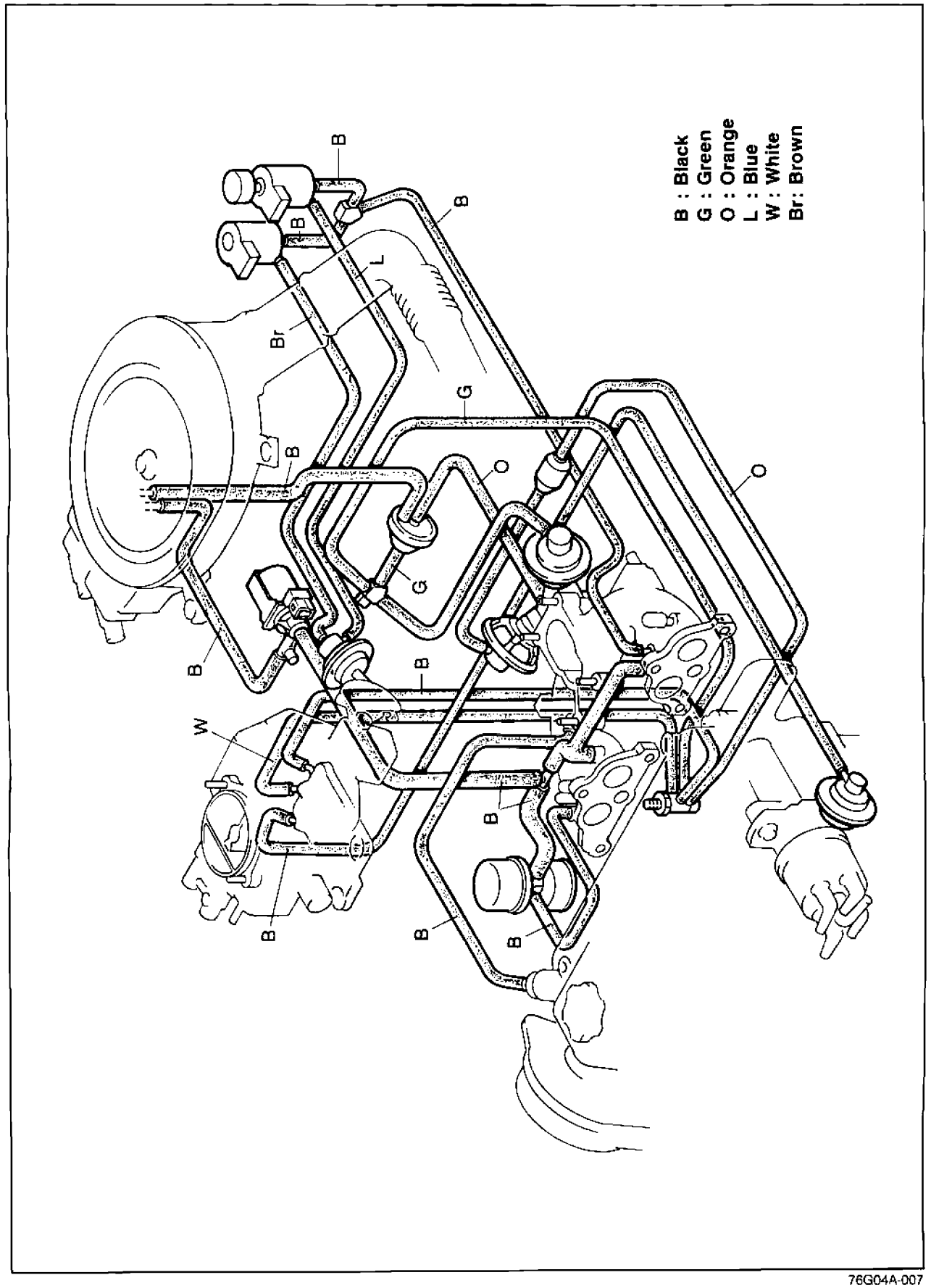
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General and Middle East



76G04A-006

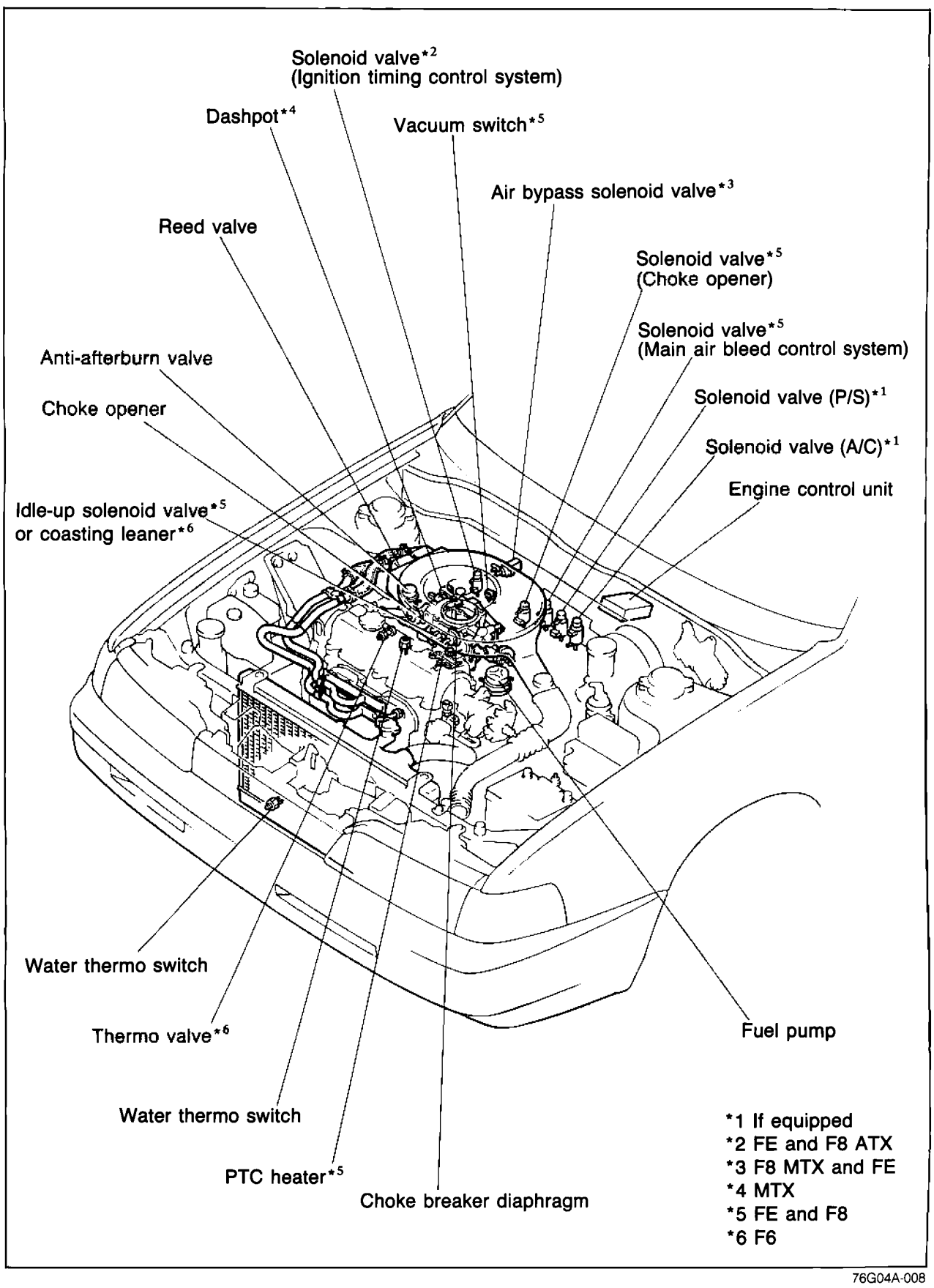
FE 8Valve—Unleaded Fuel



76G04A-007

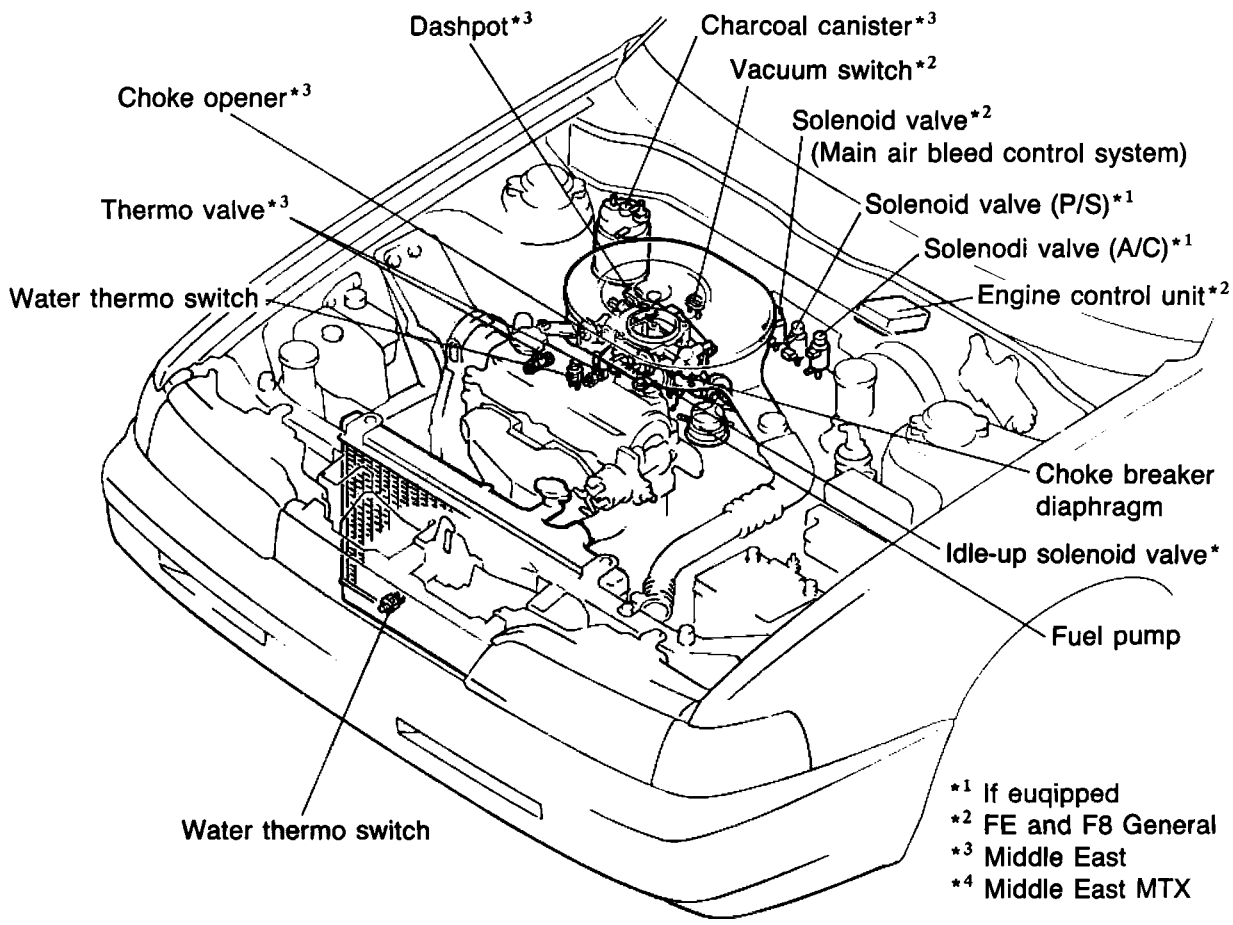
4A OUTLINE

EMISSION COMPONENTS LOCATION
ECE, Hong Kong, and Singapore



76G04A-008

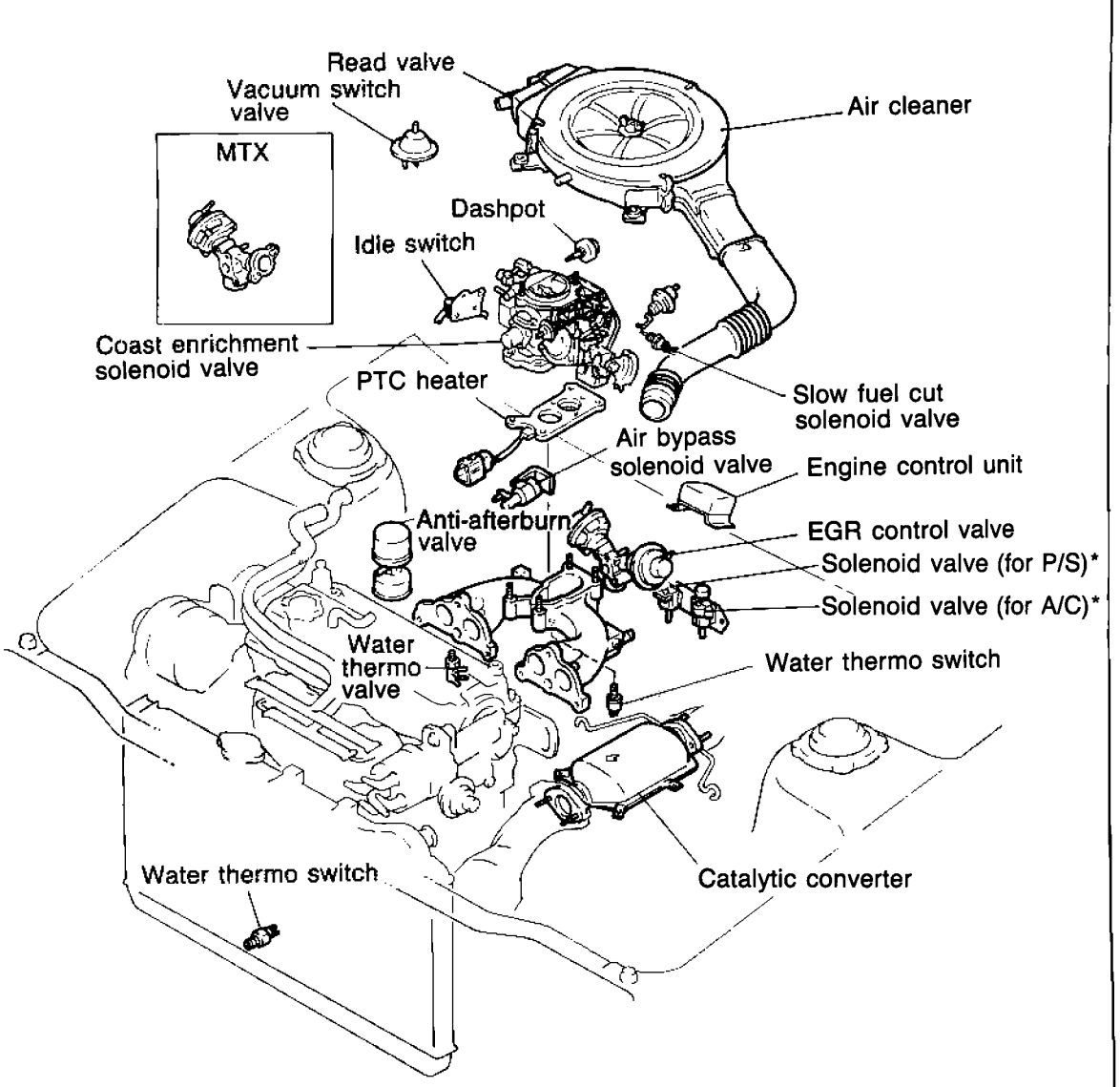
General and Middle East



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4A OUTLINE

FE 8Valve—Unleaded Fuel

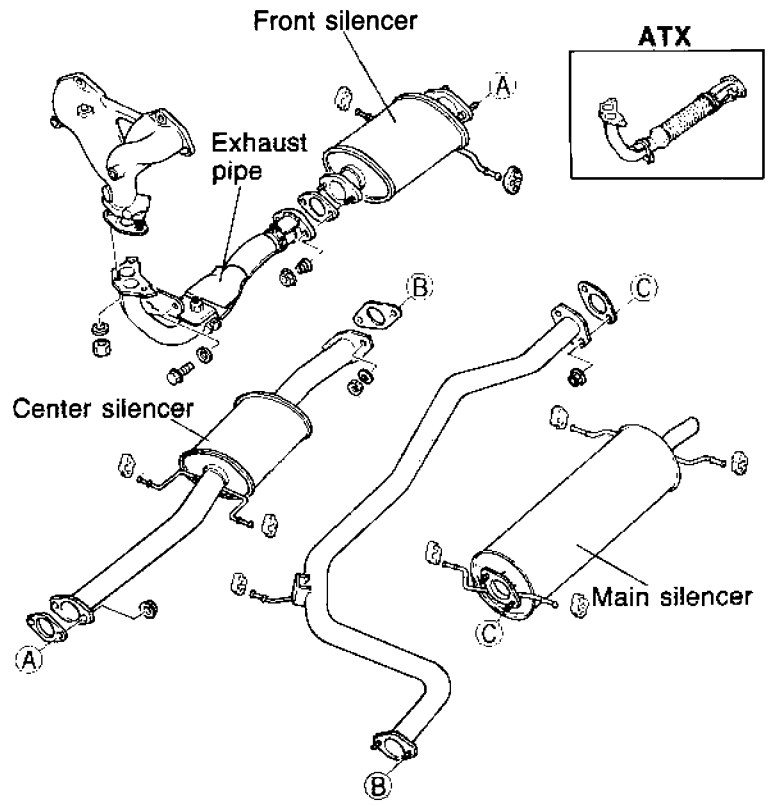


*** If equipped**

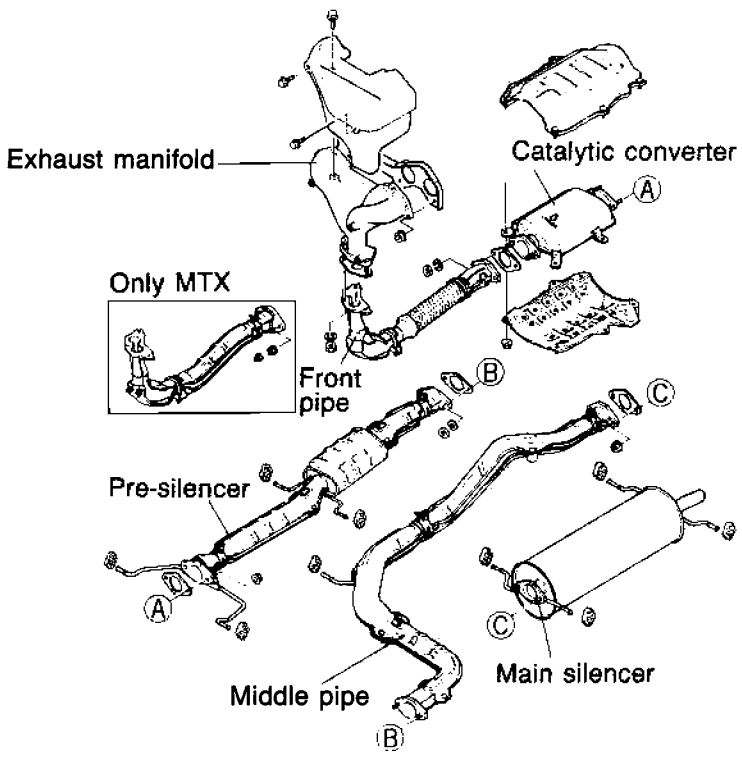
76G04A-010

Exhaust System

Except FE 8Valve—Unleaded Fuel



FE 8Valve—Unleaded Fuel



76G04A-011

Component	Function	Remark	New 626					Previous 626	
			ECE & Hong Kong	General	Middle East	Sin-gapore	FE 8 Valve Unlead-ed fuel	Leaded fuel	Unlead-ed fuel
Anti-afterburn Valve	Supplies fresh air to intake manifold during deceleration to prevent afterburn in exhaust system	Operated by intake manifold vacuum	○	X	X	○	○	○	○
Air Bypass Solenoid Valve	Supplies fresh air to intake manifold during deceleration.		○*1	X	X	○*1	○	X	○
Catalytic Converter	Reduce HC, CO and NOx by chemical reaction.	Monolithic type	X	X	X	X	○	X	○
Charcoal Canister	Stores fuel tank and carburetor vapors while engine stopped.		X	X	○	X	X	X	X
Choke Opener	Opens choke valve to prevent over-rich air/fuel mixture.		○	X	○	○	X	○	X
Choke Magnet	Cancels manual choke to prevent over-rich air/fuel mixture.	• Operation: Coolant temperature more than **67°C (153°F)**	X	○ (F6)	○	X	○	X	○
Coasting Leaner	Supplies fresh air to under secondary throttle valve to prevent afterburn in exhaust system.	Operation: Engine speed more than **approx. 2,100 rpm** and idle switch ON.	X	X	X	○ (F6 MTX)	X	○	X
Choke Braker Diaphragm	Opens choke valve to prevent over-rich air/fuel mixture.	Operation: While engine running.	○	○	○	○	○	○	○
Coast Enrichment Solenoid valve	Opens fuel passage to secondary stage of carburetor during deceleration to prevent catalytic converter overheating.	• Operation: Idle switch ON and engine speed during**1,500—2,300 rpm**	X	X	X	X	○	X	○

***1 F8 MTX and FE**

○: Equipped
X : Not equipped

Component	Function	Remark	New 626					Previous 626	
			ECE & Hong Kong	General	Middle East	Sin-gapore	FE 8 Valve Unlead-ed fuel	Leaded fuel	Unlead-ed fuel
Dashpot	Allows throttle to gradually close during deceleration. Reduces CO and HC emission.	• Adjustment speed: **2,200 ± 100 rpm** (in neutral). • MTX	○	X	○	○	○	○	○
Engine Contorol Unit	Detects electrical signal from input devices and controls output devices.		○	○ (FE & F8)	X	○	○	X	○
EGR Control Valve	Supplies exhaust gas to intake manifold to reduce NOx	• Operation: Coolant temperature more than **50°C (122°F).**	X	X	X	X	○	X	○
Fuel Filter	Filters fuel		○	○	○	○	○	○	○
Fuel Pump	Provides fuel to carburetor.	Mechanical type	○	○	○	○	○	○	○
Idle Switch	Detects when throttle valve fully closed.	Installed on carburetor.	○*1	X	X	○3	○	○ (MTX)	○
Idle-up Solenoid Valve	Opens fuel passage to secondary stage of carburetor.		○	○ (FE & F8)	X	○ (FE & F8)	X	X	X
Intake Air Temperature Control Valve	Controls shutter valve by intake air temperature.	Improvement of product quality.	○	○ (FE & F8)	X	○	X	X	○
PTC Heater	Prevents carburetor icing.		○	○ (FE & F8)	X	○ (FE & F8)	○	X	○
Reed Valve	Supplies fresh air to exhaust manifold to reduce CO and HC emissions.		○	X	X	○	○	○	○
Separator	Prevents fuel from flowing into two-way or three-way check valve		○	○	○	○	○	X	X

***1 F8 MTX and FE**
***2 Except F6 ATX**
***3 F6 MTX, F8 MTX, and FE**

○: Equipped
X : Not equipped

Component	Function		Remark	New 626					Previous 626	
				ECE & Hong Kong	General	Middle East	Singapore	FE 8 Valve Unleaded fuel	Leaded fuel	Unleaded fuel
Slow Fuel Cut Solenoid Valve	Closes primary fuel line	Prevents run-on.	Operation: Ignition switch OFF.	○	○	○	○	X	X	X
		• Prevents run-on. • Prevents catalytic converter overheating.	Operation: • Ignition switch OFF. • Engine speed more than **2,300 rpm** on deceleration.	X	X	X	X	○	X	○
Two-way Check Valve	Releases excessive pressure or vacuum in fuel tank to atmosphere.			○	○	X	○	○	X	○
Thermo Valve	Opens vacuum port based on engine coolant temperature.		Opens when: More than **50°C (122°F)**	X	X	○	X	○	X	○
	Opens vacuum port by engine compartment temperature.		Opens when: More than **17°C (63°F)**	X	X	○	○ (F6)	X	○	X
Three-way Check Valve	Controls pressure in fuel tank.			X	X	○	X	X	X	X
Vacuum Chamber	Stores vacuum to stabilize intake manifold vacuum.			X	X	X	○ (F6 ATX)	X	○	X
Vacuum Switch	Detects intake manifold vacuum.		Controls operation of main air bleed control system.	○	○	X	○ (FE & F8)	X	X	X
Solenoid Valve (Ignition timing control system)	Controls vacuum to distributor vacuum advance diaphragm.		Operation: Radiator coolant temperature more than **17°C (63°F)**; engine coolant temperature less than **72°C (162°F)**; engine speed less than **approx. 2,300 rpm**, and ingear condition.	○ (ATX)	X	X	○ (FE & F8 ATX)	X	X	X
Solenoid Valve (Main air bleed control system)	Opens vacuum port to primary main air bleed.		Opens when: Radiator coolant temperature **more than 17°C (63°F)** and intake manifold vacuum **more than 300 mmHg (11.8 inHg)...MTX, 200 mmHg (7.9 inHg)...ATX)**	○	○	X	○ (FE & F8)	X	X	X
Water Thermo Switch (Intake manifold)	Detects engine coolant temperature.		Turned off when: More than **67°C (153°F)**[*4], or More than **72°C (162°F)**[*5]	○	○	○	○ (FE & F8)	○	X	○
Water Thermo Switch (Radiator)	Detects radiator coolant temperature		Turned off when: More than **17°C (63°F)**	○	○ (FE & F8)	X	○ (FE & F8)	○	X	○

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[*4] Middle East, F6 General, and FE 8 Valve—Unleaded fuel
[*5] FE and F8 (General, ECE, Hong Kong, and Singapore)

○: Equipped
X : Not equipped

SPECIFICATIONS
F6 & F8 Engine

Engine			F6		F8	
Specification			**General**	**Singapore**	**General**	**ECE, Hong Kong, & Singapore**
Idle speed rpm		MTX	800 $^{+50}_{0}$			
		ATX		950 $^{+50}_{0}$ (in N range)	900 $^{+50}_{0}$ (in N range)	
CO concentration %			2.0 ± 0.5 (Without secondary air injection)			
Carburetor						
Type			Down draft, two barrel			
Throat diameter mm (in)		Primary	30 (1.18)			
		Secondary	34 (1.34)			
Venturi diameter mm (in)		Primary	23.5 (0.93)			
		Secondary	29.0 (1.14)			
Main nozzle mm (in)		Primary	2.6 (0.10)			
		Secondary	2.8 (0.11)			
Main jet mm (in)	Primary	MTX	1.10 (0.0433)	1.09 (0.0429)	1.14 (0.045)	
		ATX		1.08 (0.0425)	1.12 (0.044)	
	Secondary		1.50 (0.059)			
Main air bleed mm (in)	Primary	MTX	0.60 (0.024)	0.60 (0.024)	0.55 (0.022)	
		ATX		0.80 (0.031)	0.60 (0.024)	
	Secondary		0.50 (0.020)			
Slow jet mm (in)		Primary	0.48 (0.019)	0.46 (0.018)		
		Secondary	1.00 (0.039)		1.10 (0.043)	
Slow air bleed mm (in)	Primary	No.1	0.80 (0.031)			
		No.2	1.90 (0.075)			
	Secondary	No.1	1.00 (0.039)		0.80 (0.031)	
		No.2	0.50 (0.020)			
Power jet mm (in)			0.50 (0.020)			
Fast idle adjustment mm (in) Clearance between primary throttle valve and bore			1.40—1.76 (0.055—0.069)		MTX: 0.48—0.64 (0.019—0.025) ATX: 0.56—0.72 (0.022—0.028)	
Float level adjustment mm (in)	Max. fuel flow "L" Clearance between float and air horn without gasket		44 (17.3)			
	Fuel stop "H" Clearance between float and air horn without gasket; float lowered by own weight		12.5 (0.49)			
Choke breaker diaphragm mmHg (inHg)		Start	180—240 (7.1—9.5)		100—160 (3.9—6.3)	
		Stop	290—350 (11.4—13.8)		220—280 (8.7—11.0)	
Choke opener mmHg (inHg)		Start		35—65 (1.4—2.6)		35—65 (1.4—2.6)
		Stop		130—190 (5.1—7.5)		130—190 (5.1—7.5)
Fuel tank capacity Liters (US gal, Imp gal)			60 (15.9, 13.2)			
Fuel pump						
Delivery pressure kPa (kg/cm², psi)			20—26 (0.20—0.27, 2.8—3.8)			
Feeding capacity cc/min (cu in/min)			More than 860 (52.5) at idle			
Fuel filter						
Type			Paper element with magnet			
Air cleaner						
Fresh-Hot switching			Manual	Diaphragm type		
Element type			Oil permeated paper			
Fuel specification			Leaded regular			

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4A OUTLINE

FE Engine

Engine			FE 8Valve		FE 12Valve	FE 8Valve
Specification			**General**	**Middle East**	**ECE, Hong Kong, & Singapore**	**Unleaded fuel**
Idle speed	rpm	MTX	800 $^{+50}_{0}$			850 $^{+50}_{0}$
		ATX	900 $^{+50}_{0}$ (in N range)			
CO concentration		%	2.0 ± 0.5 (Without secondary air injection)			
Carburetor						
Type			Down draft, two barrel			
Throat diameter	mm (in)	Primary	30 (1.18)			
		Secondary	34 (1.34)			
Venturi diameter	mm (in)	Primary	23.5 (0.93)			
		Secondary	29.0 (1.14)			
Main nozzle	mm (in)	Primary	2.6 (0.10)			
		Secondary	2.8 (0.11)			
Main jet	mm (in)	Primary MTX	1.14 (0.045)	1.09 (0.0429)	1.14 (0.045)	1.09 (0.0429)
		Primary ATX	1.12 (0.044)	1.08 (0.0425)	1.12 (0.044)	
		Secondary	1.55 (0.061)	1.50 (0.059)	1.55 (0.061)	1.50 (0.059)
Main air bleed	mm (in)	Primary MTX	0.50 (0.020)	0.60(0.024)	0.50 (0.020)	0.50 (0.020)
		Primary ATX	0.55 (0.022)	0.80 (0.031)	0.55 (0.022)	
		Secondary	0.50 (0.020)			
Slow jet	mm (in)	Primary	0.46 (0.018)			
		Secondary MTX	1.10 (0.043)	1.00 (0.039)	1.10 (0.043)	0.90 (0.035)
		Secondary ATX				1.00 (0.039)
Slow air bleed	mm (in)	Primary No.1	0.80 (0.031)			
		Primary No.2	1.90 (0.075)			
		Secondary No.1	0.80 (0.031)	1.00 (0.039)	0.80 (0.031)	1.00 (0.039)
		Secondary No.2	0.50 (0.020)			
Power jet	mm (in)	MTX	0.50 (0.020)			0.50 (0.020)
		ATX				0.40 (0.016)
Fast idle adjustment Clearance between primary throttle valve and bore	mm (in)	MTX	0.48—0.64 (0.019—0.025)	1.40—1.76 (0.055—0.069)	0.48—0.64 (0.019—0.025)	1.40—1.76 (0.055—0.069)
		ATX	0.56—0.72 (0.022—0.028)		0.56—0.72 (0.022—0.028)	
Float level adjustment	mm (in)	Max. fuel flow "L" Clearance between float and air horn without gasket	44 (17.3)			
		Fuel stop "H" Clearance between float and air horn without gasket; float lowered by own weight	12.5 (0.49)			
Choke breaker diaphragm	mm-Hg (in-Hg)	Start	100—160 (3.9—6.3)	180—240 (7.1—9.4)	100—160 (3.9—6.3)	180—240 (7.1—9.4)
		Stop	220—280 (8.7—11.0)	290—350 (11.4—13.8)	220—280 (8.7—11.0)	290—350 (11.4—13.8)
Choke opener	mmHg (inHg)	Start		80—120 (3.1—8.7)	30—70 (1.2—2.8)	
		Stop		220—280 (8.7—11.0)	130—190 (5.1—7.5)	
Fuel tank capacity	Liters (US gal, Imp gal)		60 (15.9, 13.2)			
Fuel pump						
Delivery pressure	kPa (kg/cm^2, psi)		20—26 (0.20—0.27, 2.8—3.8)		20—29 (0.20—0.30, 2.8—4.3)	20—26 (0.20—0.27, 2.8—3.8)
Feeding capacity	cc/min (cu in/min)		More than 860 (52.5) at idle			
Fuel filter						
Type			Paper element with magnet			
Air cleaner						
Fresh-Hot switching			Diaphragm	Manual	Diaphragm	Bimetal
Element type			Oil permeated paper			
Fuel specification			Leaded super Unleaded super	Leaded regular	Leaded super Unleaded super	Unleaded regular

76G04G-514

TROUBLESHOOTING GUIDE

F6 (GENERAL)

The Troubleshooting Guide lists the systems most likely to cause a given symptom. After finding the system(s) to check, refer to the pages shown for detailed guides for each system.

POSSIBLE CAUSE / PAGE / SYMPTOM			Air cleaner (Air cleaner element)	Intake air temperature control system	Idle adjustment	Fuel system (Carburetor, Fuel pump)	Idle-up control system	Exhaust system	Positive crankcase ventilation system	Auto-return choke system
			4A—23	4A—60	4A—38	4A—24	4A—68	4A—96	4A—67	4A—40
1	Hard start or won't start (Cranks OK)		1			2				
2	Engine stalls	During warm up	3	2	1	4				
		After warm up	4		2	5			1	3
3	Rough idle	During warm up	3	2	1	4				
		After warm up	3		2	5			1	4
4	High idle speed after warm up				1	3	2			
5	Poor acceleration, hesitation, or lack of power		1			2		3		
6	Runs rough on deceleration					1				
7	Afterburn in exhaust system					1				
8	Poor fuel consumption		2		1	4				3
9	Fails emission test		2		1	4		5		3

76G04A-015

The numbers of the list show the priorities of inspections from the most possible to that with the lowest possibility.
These were determined on the following basis:

- Ease of inspection
- Most possible system
- Most Possible point in system

TROUBLESHOOTING PROCEDURE:

1st Check the following items:

Electrical system
1) Battery condition
2) Fuses

Ignition system
1) Spark plugs
2) Ignition timing

Fuel system
1) Fuel level
2) Fuel leakage
3) Fuel filter
4) Idle speed

Intake air system
1) Vacuum or air leakage
2) Vacuum hose routing
3) Accelerator cable
4) Choke cable

Engine
1) Compression
2) Overheating

Others
1) Clutch slippage
2) Brake dragging

2nd Check Fuel and Emission Control Systems

F6 (SINGAPORE)
The Troubleshooting Guide lists the systems most likely to cause a given symptom. After finding the system(s) to check, refer to the pages shown for detailed guides for each system.

POSSIBLE CAUSE / PAGE / SYMPTOM			Air cleaner (Air cleaner element)	Intake air temperature control system	Idle adjustment	Fuel system (Carburetor, Fuel pump)	Air injection system	Deceleration control system	Positive crankcase ventilation system	Exhaust system	Idle-up control system
			4A—23	4A—60	4A—38	4A—24	4A—58	4A—45	4A—67	4A—96	4A—68
1	Hard start or won't start (Cranks OK)		1			2					
2	Engine stalls	During warm up	3	2	1	4					
		After warm up	3		2	4			1		
3	Rough idle	During warm up	3	2	1	4					
		After warm up	3		2	4			1		
4	High idle speed after warm up				1	4		3*			2
5	Poor acceleration, hesitation, or lack of power		1			2				3	
6	Runs rough on deceleration					2		1			
7	Afterburn in exhaust system					2		1			
8	Poor fuel consumption		2		1	4					3
9	Fails emission test		6		4	5	3	2		1	

* Only MTX

76G04A-016

The numbers of the list show the priorities of inspections from the most possible to that with the lowest possibility.
These were determined on the following basis:
- Ease of inspection
- Most possible system
- Most possible point in system

TROUBLESHOOTING PROCEDURE:
1st *Check the following items:*

Electrical system
1) Battery condition
2) Fuses

Ignition system
1) Spark plugs
2) Ignition timing

Fuel system
1) Fuel level
2) Fuel leakage
3) Fuel filter
4) Idle speed

Intake air system
1) Vacuum or air leakage
2) Vacuum hose routing
3) Accelerator cable

Engine
1) Compression
2) Overheating

Others
1) Clutch slippage
2) Brake dragging

2nd Check the Fuel and Emission Control Systems

FE 12 VALVE and F8 (EXCEPT MIDDLE EAST and GENERAL)
The Troubleshooting Guide lists the systems most likely to cause a given symptom. After finding the system(s) to check, refer to the pages shown for detailed guides for each system.

	POSSIBLE CAUSE / SYMPTOM		Air cleaner (Air cleaner element)	Intake air temperature control system	Idle adjustment	Fuel system (Carburetor, Fuel pump)	PTC heater system	Air injection system	Positive crankcase ventilation system	Deceleration control system	Idle-up control system	Ignition control system
	PAGE		4A—23	4A—60	4A—38	4A—24	4A—42	4A—58	4A—67	4A—45	4A—68	4A—80
1	Hard start or won't start (Cranks OK)		1			2						
2	Engine stalls	During warm up	5	4	1	6	2			3		
		After warm up	3		2	4			1			
3	Rough idle	During warm up	5	4	1	6	2			3		
		After warm up	3		2	4			1			
4	High idle speed after warm up				1	4				3	2	
5	Poor acceleration, hesitation, or lack of power		1			4				2		3
6	Runs rough on deceleration					2				1		
7	Afterburn in exhaust system					2				1		
8	Poor fuel consumption		3		1	4				2		
9	Fails emission test		6		2	5		3		1		4

76G04A-017

The numbers of the list show the priorities of inspections from the most possible to that with the lowest possibility.
These were determined on the following basis:
- Ease of inspection
- Most possible system
- Most possible point in system

TROUBLESHOOTING PROCEDURE:
1st Check the following items:

Electrical system
1) Battery condition
2) Fuses

Ignition system
1) Spark plugs
2) Ignition timing

Fuel system
1) Fuel level
2) Fuel leakage
3) Fuel filter
4) Idle speed

Intake air system
1) Vacuum or air leakage
2) Vacuum hose routing
3) Accelerator cable

Engine
1) Compression
2) Overheating

Others
1) Clutch slippage
2) Brake dragging

2nd Check the Fuel and Emission Control Systems

4A TROUBLESHOOTING GUIDE

FE and F8 (GENERAL)
The Troubleshooting Guide lists the systems most likely to cause a given symptom. After finding the system(s) to check, refer to the pages shown for detailed guides for each system.

	POSSIBLE CAUSE / SYMPTOM		Air cleaner (Air cleaner element)	Intake air temperature control system	Idle adjustment	Fuel system (Carburetor, Fuel pump)	Idle-up control system	PTC heater system	Positive crankcase ventilation system	Deceleration control system
	PAGE		4A—23	4A—60	4A—38	4A—24	4A—68	4A—42	4A—67	4A—45
1	Hard start or won't start (Cranks OK)		1			2				
2	Engine stalls	During warm up	5	4	1	6		2		3
		After warm up	3		2	4			1	
3	Rough idle	During warm up	5	4	1	6		2		3
		After warm up	3		2	4			1	
4	High idle speed after warm up				1	4	2			3
5	Poor acceleration, hesitation, or lack of power		1			4		3		2
6	Runs rough on deceleration					2				1
7	Afterburn in exhaust system					2				1
8	Poor fuel consumption		2		1	3				
9	Fails emission test		3		2	4				1

76G04A-018

The numbers of the list show the priorities of inspections from the most possible to that with the lowest possibility.
These were determined on the following basis:
- Ease of inspection
- Most possible system
- Most possible point in system

TROUBLESHOOTING PROCEDURE:
1st Check the following items:

Electrical system
1) Battery condition
2) Fuses

Ignition system
1) Spark plugs
2) Ignition timing

Fuel system
1) Fuel level
2) Fuel leakage
3) Fuel filter
4) Idle speed

Intake air system
1) Vacuum or air leakage
2) Vacuum hose routing
3) Accelerator cable

Engine
1) Compression
2) Overheating

Others
1) Clutch slippage
2) Brake dragging

2nd Check the Fuel and Emission Control Systems

FE (MIDDLE EAST)

The Troubleshooting Guide lists the systems most likely to cause a given symptom. After finding the system(s) to check, refer to pages shown for detailed guides for each system.

	POSSIBLE CAUSE / SYMPTOM		Air cleaner (Air cleaner element)	Intake air temperature control system	Idle adjustment	Fuel system (Carburetor, Fuel pump)	Idle-up control system	Dashpot (Only MTX)	Positive crankcase ventilation system	Exhaust system	Evaporative emission control system	Auto-return choke system
	PAGE		4A—23	4A—60	4A—38	4A—24	4A—68	4A—50	4A—67	4A—96	4A—78	4A—40
1	Hard start or won't start (Cranks OK)		1			2						3
2	Engine stalls	During warm up	3	2	1	4						
		After warm up	3		2	4			1			
3	Rough idle	During warm up	3	2	1	4						
		After warm up	3		2	4			1			
4	High idle speed after warm up				1	5	3	4				2
5	Poor acceleration, hesitation, or lack of power		1			2				3		
6	Runs rough on deceleration					2					1	
7	Afterburn in exhaust system					3		1				2
8	Poor fuel consumption		5		1	6		2			3	4
9	Fails emission test		5		4	6		3		1	2	

76G04A-019

The numbers of the list show the priorities of inspections from the most possible to that with the lowest possibility.
These were determined on the following basis:

- Ease of inspection
- Most possible system
- Most possible point in system

TROUBLESHOOTING PROCEDURE:

1st Check the following items:

Electrical system
1) Battery condition
2) Fuses

Ignition system
1) Spark plugs
2) Ignition timing

Fuel system
1) Fuel level
2) Fuel leakage
3) Fuel filter
4) Idle speed

Intake air system
1) Vacuum or air leakage
2) Vacuum hose routing
3) Accelerator cable
4) Choke cable

Engine
1) Compression
2) Overheating

Others
1) Clutch slippage
2) Brake dragging

2nd Check the Fuel and Emission Control Systems

4A TROUBLESHOOTING GUIDE

FE 8VALVE—UNLEADED FUEL

The Troubleshooting Guide lists the systems most likely to cause a given symptom. After finding the system(s) to check, refer to the pages shown for detailed guides for each system.

	POSSIBLE CAUSE / SYMPTOM		Air cleaner (Air cleaner element)	Idle adjustment	Fuel system (Carburetor, Fuel pump)	PTC heater system	Air injection system	Positive crankcase ventilation system	Deceleration control system	Exhaust gas recirculation (EGR) system	Exhaust system	Intake air temperature control system	Idle-up control system	Purge control system	Auto-return choke system
	PAGE		4A–23	4A–38	4A–24	4A–42	4A–58	4A–67	4A–45	4A–96	4A–97	4A–60	4A–68	4A–63	4A–40
1	Hard start or won't start (Cranks OK)		1		2										
2	Engine stalls	During warm up	6	1	2	5						3		4	
		After warm up	4	2	3			1							
3	Rough idle	During warm up	5	1	2	4						3		6	
		After warm up	4	2	3			1							
4	High idle speed after warm up			1	5				4				3		2
5	Poor acceleration, hesitation, or lack of power		1		2	5				3	4				
6	Runs rough on deceleratio				2				1						
7	Afterburn in exhaust system				2				1						
8	Poor fuel consumption		4	1	2				3						5
9	Fails emission test		5	1	6		4		3		2				

76G04A-020

The numbers of the list show the priorities of inspections from the most possible to that with the lowest possibility.
These were determined on the following basis:

- Ease of inspection
- Most possible system
- Most possible point in system

TROUBLESHOOTING PROCEDURE:

1st Check the following items:

Electrical system
1) Battery condition
2) Fuses

Ignition system
1) Spark plugs
2) Ignition timing

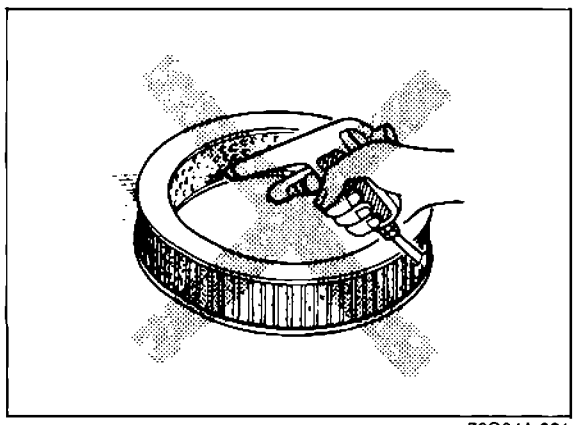
Fuel system
1) Fuel level
2) Fuel leakage
3) Fuel filter
4) Idle speed

Intake air system
1) Vacuum or air leakage
2) Vacuum hose routing
3) Accelerator cable
4) Choke cable

Engine
1) Compression
2) Overheating

Others
1) Clutch slippage
2) Brake dragging

2nd Check the Fuel and Emission Control Systems

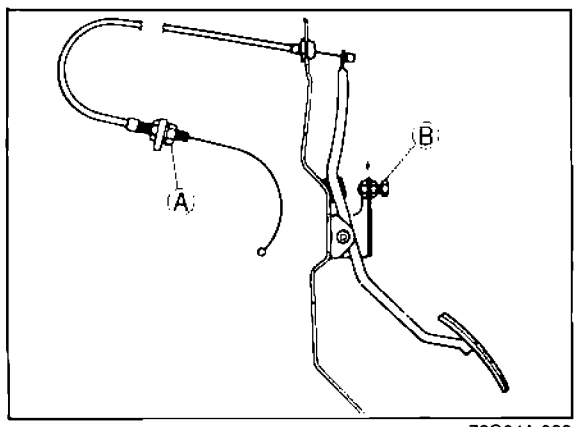


76G04A-021

PARTS INSPECTION

AIR CLEANER ELEMENT
Visually check the air cleaner element for excessive dirt, damage, or oil. Replace, if necessary.

Caution
Do not clean the element with compressed air.

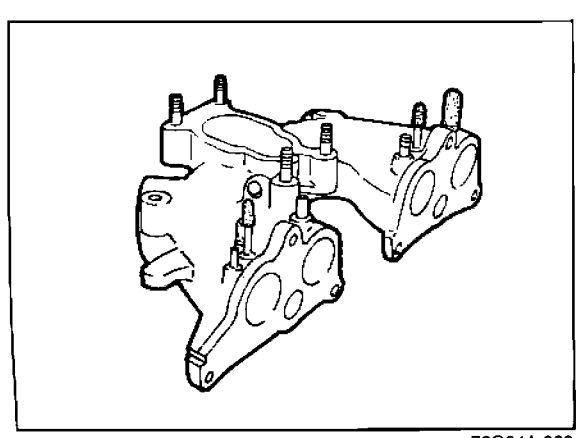


76G04A-022

ACCELERATOR LINKAGE

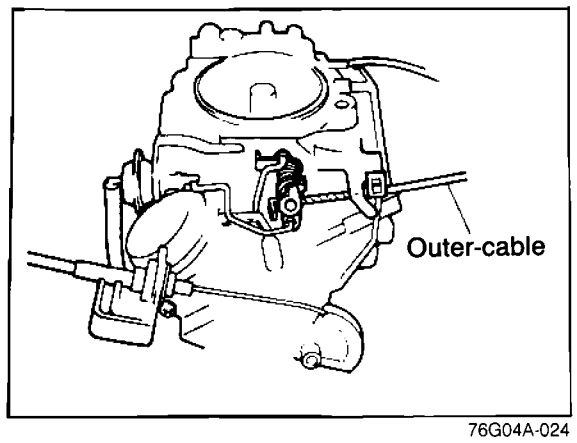
Caution
Confirm that the choke valve is fully open and that the throttle valve is set to the correct idle opening.

1. Inspect the deflection of the cable. If the deflection is not within **1—3 mm (0.039—0.118 in)**, adjust nuts A.
2. Depress the accelerator pedal to the floor and verify that the throttle valve is fully opened. Adjust bolt B if necessary.



76G04A-023

INTAKE MANIFOLD
1. Visually check the intake manifold for damage.
2. Replace it if necessary.



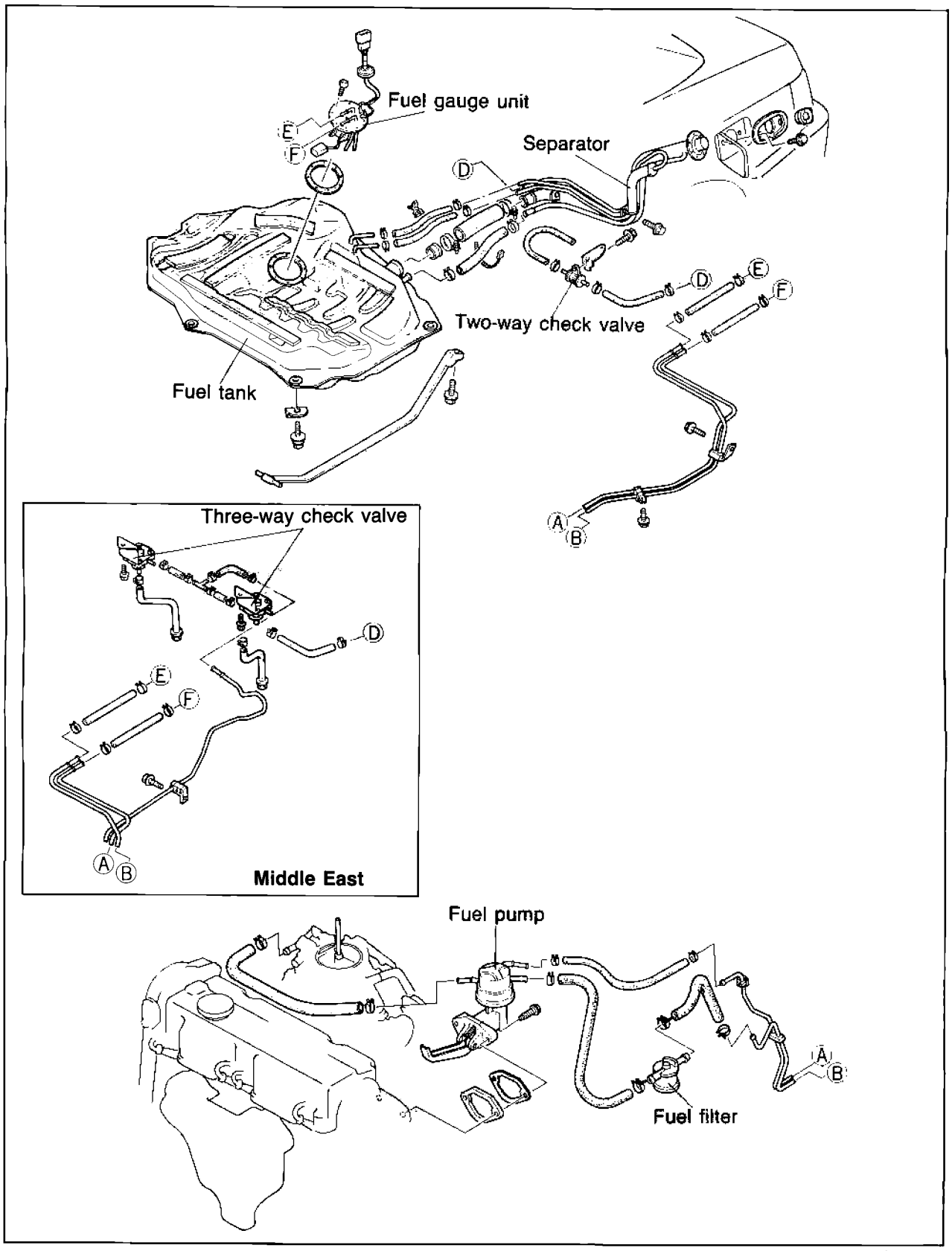
76G04A-024

CHOKE CABLE
Except FE and F8 (General, ECE, Hong Kong, and Singapore)
1. Pull the choke knob and confirm that the choke valve is fully closed.
2. Return the choke knob and confirm that the choke valve is fully opened.
3. Adjust the position of the outer cable, if necessary.

4A FUEL SYSTEM

FUEL SYSTEM

This system consists of the fuel pump, fuel filters, and carburetor, and supplies the necessary fuel for operation of the engine.



76G04A-025

TROUBLESHOOTING

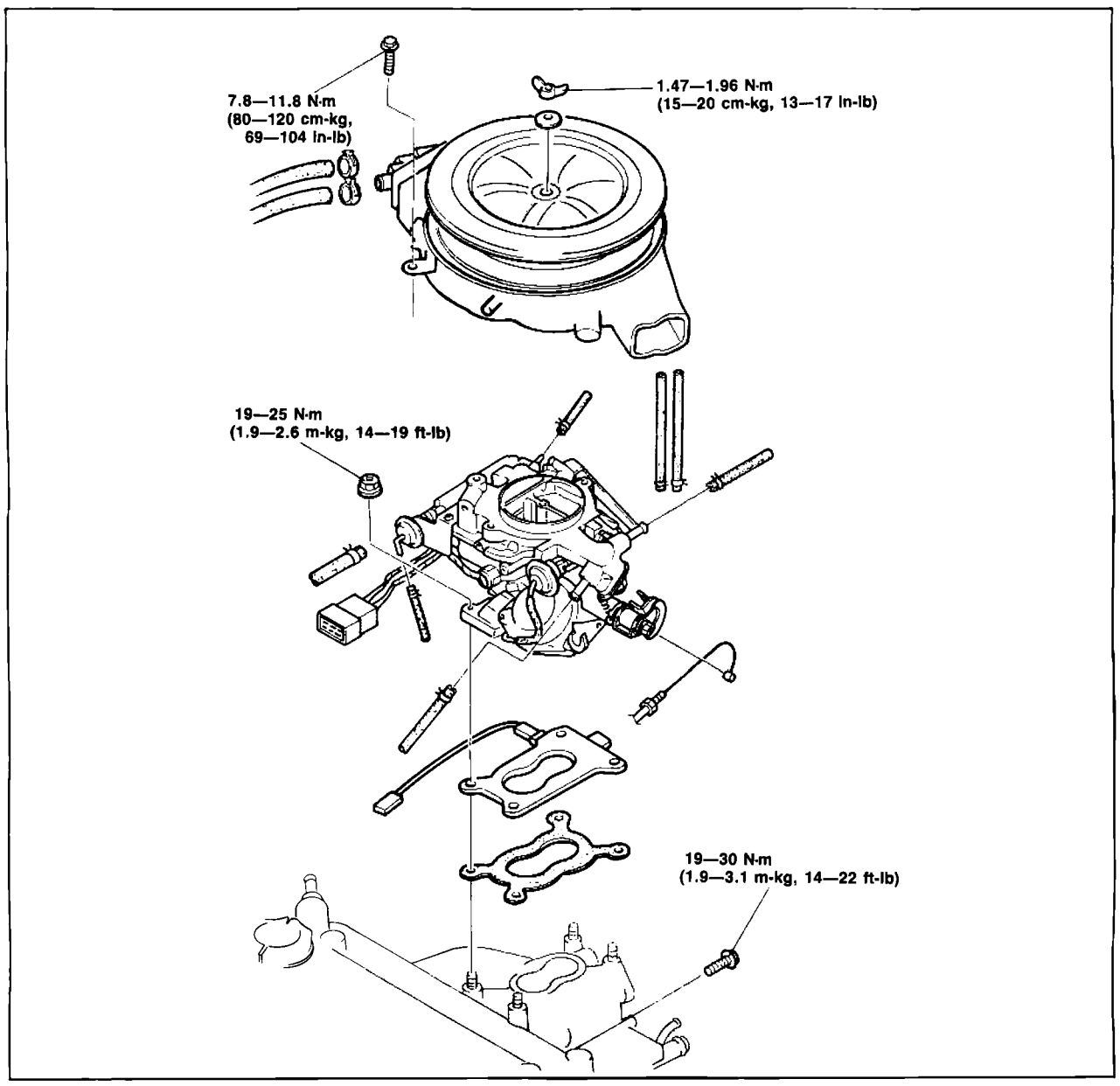
	SYMPTOM		Carburetor 4A—26	Fuel pump 4A—35	Separator 4A—37	Two-way check valve (Except Middle East) Three-way check valve (Middle East) 4A—37
1	Hard start or won't start (Cranks OK)		2	1		
2	Engine stalls	During warm up	2	1		
		After warm up	2	1		
3	Rough idle	During warm up	2	1		
		After warm up	2	1		
4	High idle speed after warm up		1			
5	Poor acceleration, hesitation, or lack of power		2	1		
6	Runs rough on deceleration		1			
7	Afterburn in exhaust system		1			
8	Poor fuel consumption		1		2	3
9	Fails emission test		1			

76G04A-026

CARBURETOR

Removal

Remove in the sequence shown in the figure.



76G04A-027

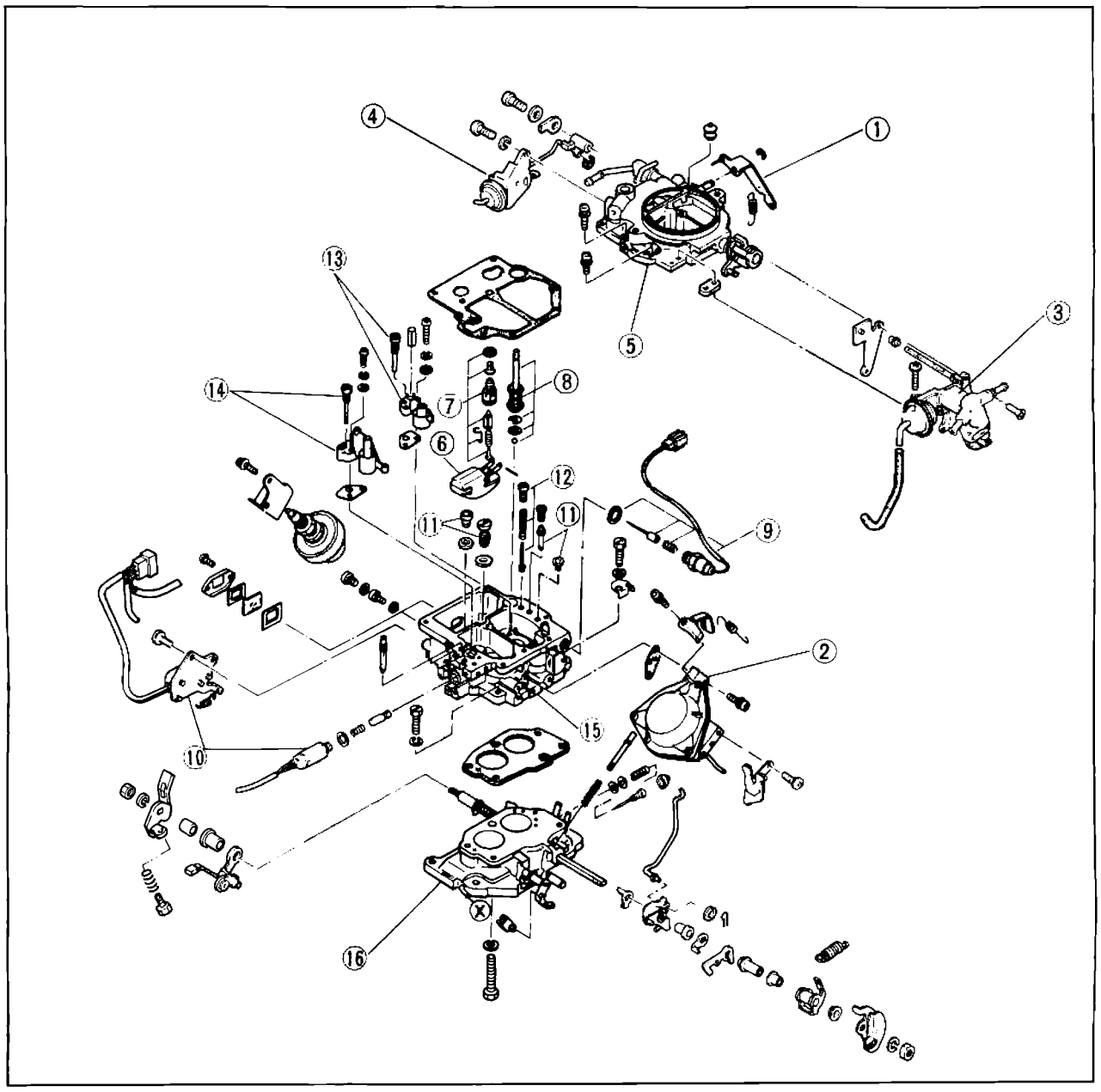
1. Secondary air hoses (If equipped) and air cleaner
2. Water hoses
3. Fuel hose
4. Vacuum hoses
5. Accelerator cable
6. Connector
7. Carburetor
8. PTC heater (If equipped)
9. Gasket (If equipped)

Installation

Install the reverse order of removal, referring following points.

1. Check for fuel leaks.
2. Check the vacuum hose installation.
3. Check the idle speed and idle mixture (Refer to page 4A—38).
4. Warm up the engine to the normal operating temperature and check that fuel level is at the center of the float level indicator window.

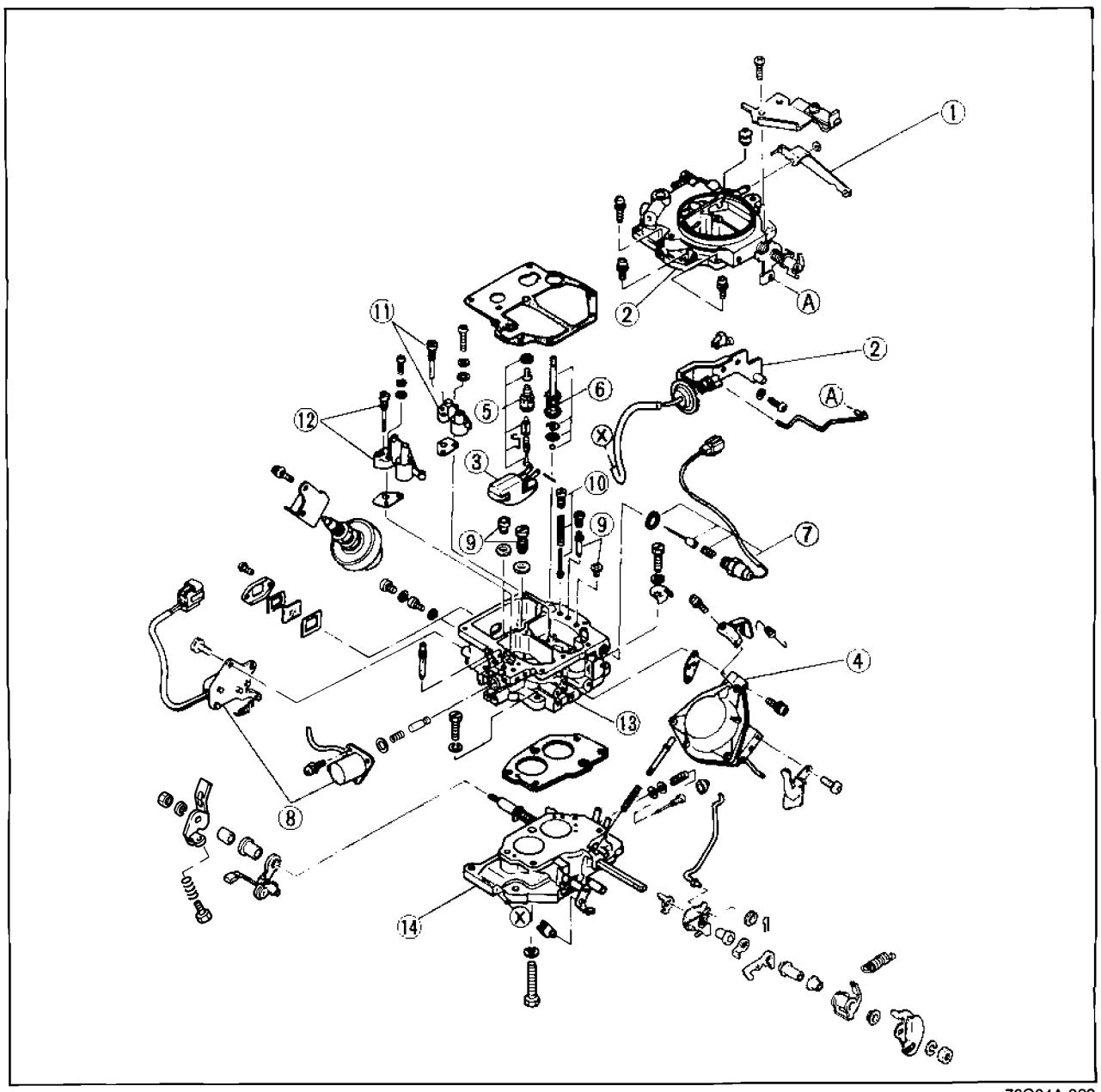
Disassembly
FE and F8 (General, ECE, Hong Kong, and Singapore)



Disassemble in the sequence shown in the figure.

1. Lever
2. Secondary diaphragm
3. Choke breaker diaphragm and thermo wax (If equipped)
4. Choke opener and bracket (If equipped)
5. Air horn
6. Float
7. Needle valve
8. Accelerator pump
9. Slow fuel cut solenoid valve
10. Idle-up solenoid valve and idle switch (If equipped)
11. Air bleeds and jets
12. Injector weight
13. Primary venturi and nozzle
14. Secondary venturi and nozzle
15. Main body
16. Throttle body

FE 8Valve (Except General) and F6



76G04A-029

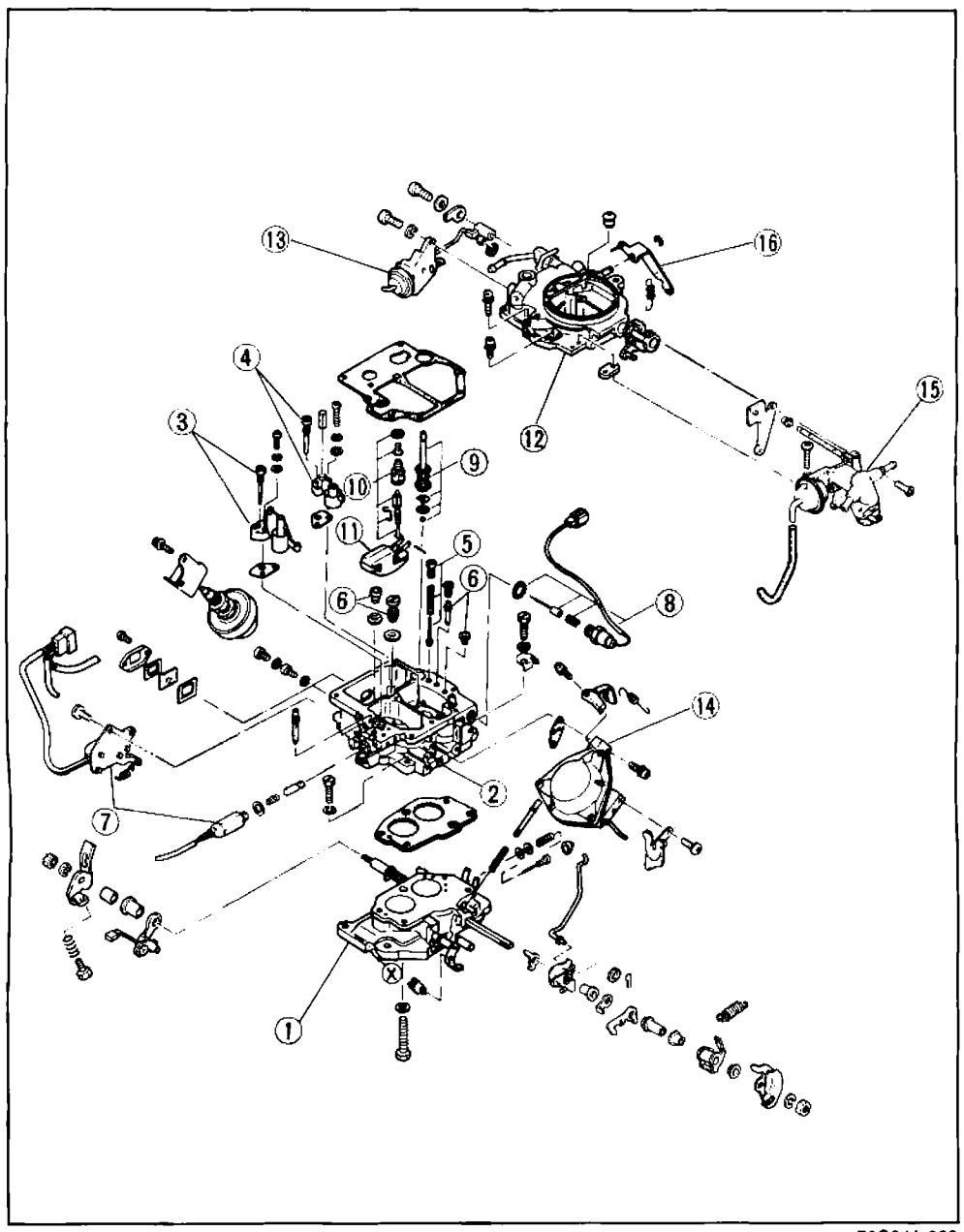
Disassemble in the sequence shown in the figure.

1. Lever
2. Air horn, choke breaker diaphragm, and choke opener (If equipped)
3. Float
4. Secondary diaphragm
5. Needle valve
6. Accelerator pump
7. Slow fuel cut solenoid valve
8. Solenoid valve* and idle switch (If equipped)
9. Air bleeds and jets
10. Injector weight
11. Primary venturi and nozzle
12. Secondary venturi and nozzle
13. Main body
14. Throttle body

***Solenoid valve:**

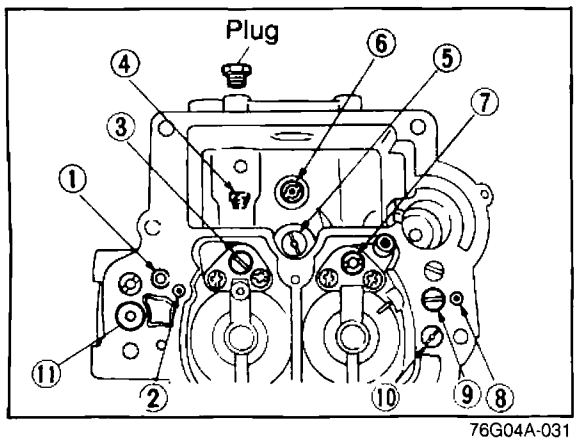
Coast enrichment solenoid valve	FE 8 Valve—Unleaded fuel
Coasting leaner	F6 Singapore

Assembly [FE and F8 (General, ECE, Hong Kong, and Singapore)]
Assemble in the sequence shown in the figure, referring to the assembly note for specially marked parts.



76G04A-030

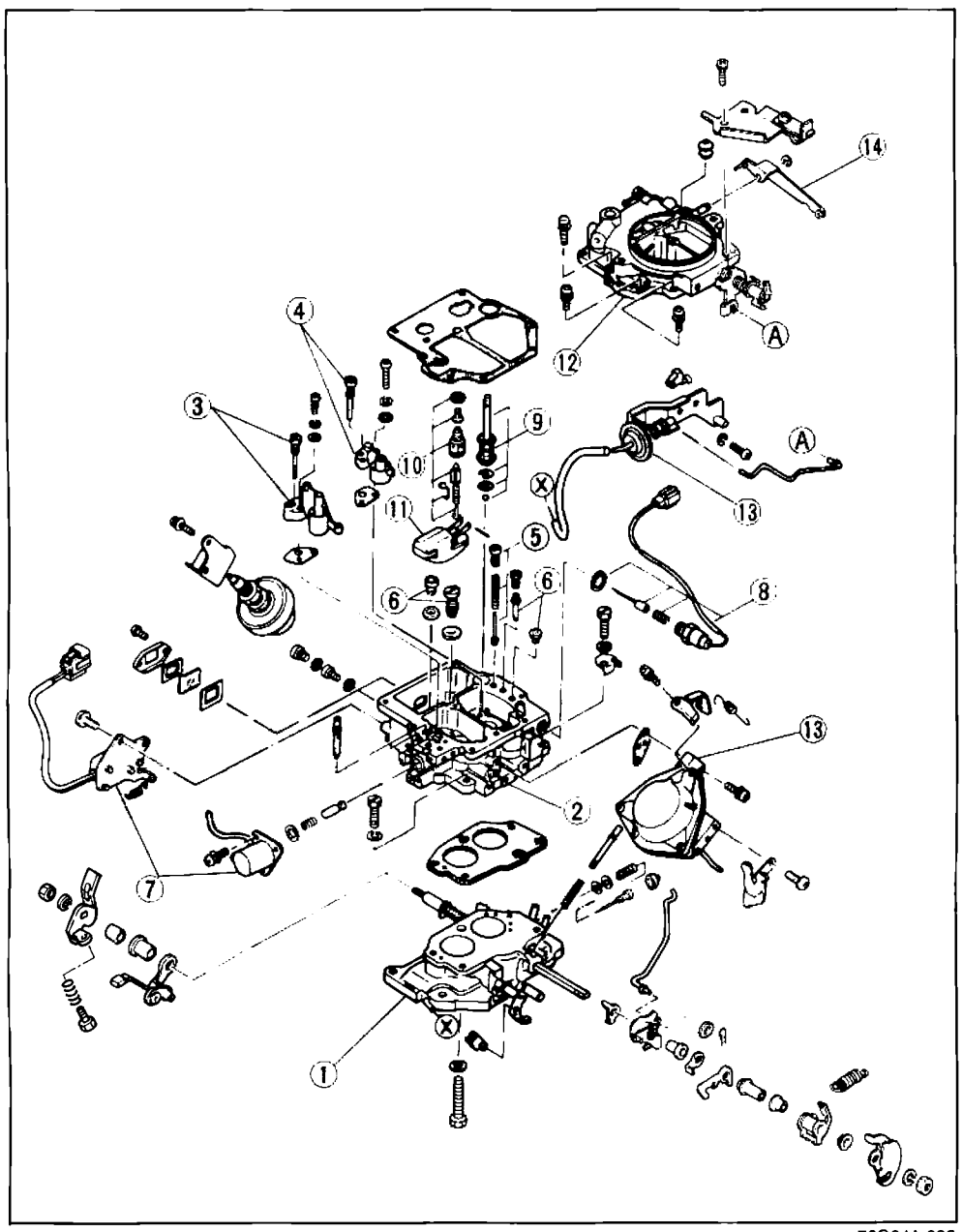
1. Throttle body
2. Main body
3. Secondary venturi and nozzle
4. Primary venturi and nozzle
5. Injector weight
6. Air bleeds and jets
7. Idle-up solenoid valve and idle switch (If equipped)
8. Slow fuel cut solenoid valve
9. Accelerator pump
10. Needle valve
11. Float
12. Air horn
13. Choke opener and bracket (If equipped)
14. Choke breaker diaphragm and thermo wax (If equipped)
15. Secondary diaphragm
16. Lever



76G04A-031

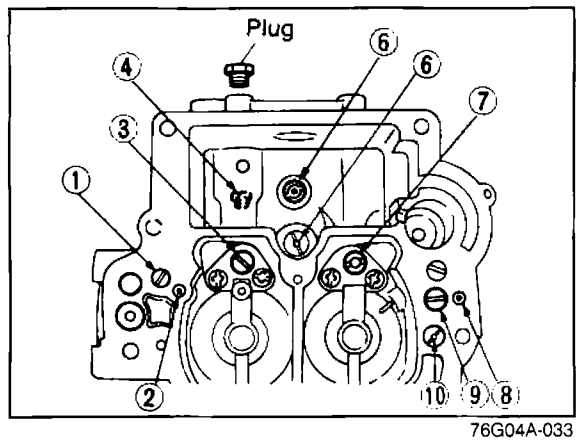
Assembly note
Air bleeds and jets
1. Step jet and plug
2. Secondary step air bleed (No. 1) (Fixed type)
3. Secondary main air bleed
4. Secondary main jet
5. Power jet
6. Primary main jet
7. Primary main air bleed
8. Primary slow air bleed (No. 1)
9. Primary slow jet and plug
10. Primary slow air bleed (No. 2)

[FE 8Valve (Except General) and F6]
Assemble in the sequence shown in the figure, referring to the assembly note for specially marked parts.



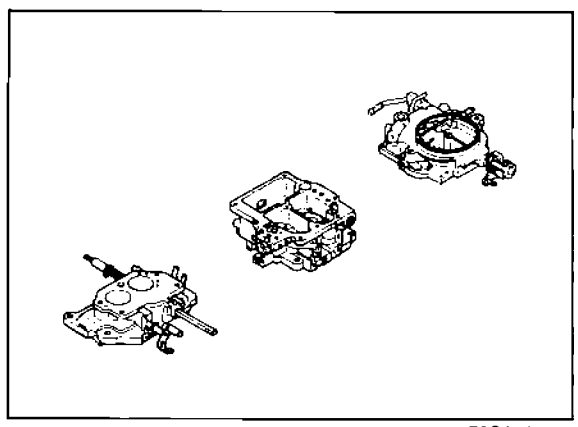
76G04A-032

1. Throttle body
2. Main body
3. Secondary venturi and nozzle
4. Primary venturi and nozzle
5. Injector weight
6. ● Air bleeds and jets
7. Solenoid valve and idle switch (If equipped)
8. Slow fuel cut solenoid valve
9. Accelerator pump
10. Needle valve
11. Secondary diaphragm
12. Float
13. Air horn, choke breaker diaphragm, and choke opener (If equipped)
14. Lever

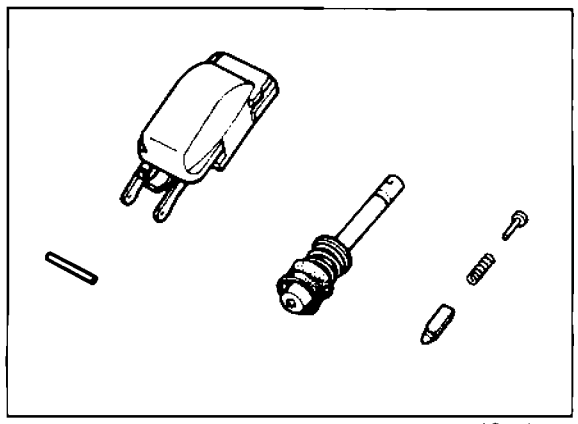


76G04A-033

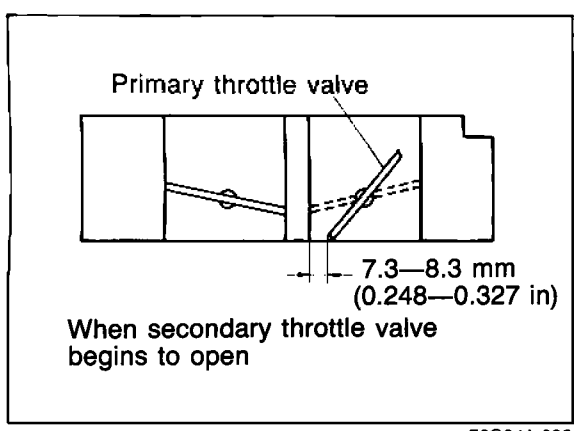
Assembly note
Air bleeds and jets
1. Step jet and plug
2. Secondary step air bleed (No. 1) (Fixed type)
3. Secondary main air bleed
4. Secondary main jet
5. Power jet
6. Primary main jet
7. Primary main air bleed
8. Primary slow air bleed (No. 1)
9. Primary slow jet and plug
10. Primary slow air bleed (No. 2)



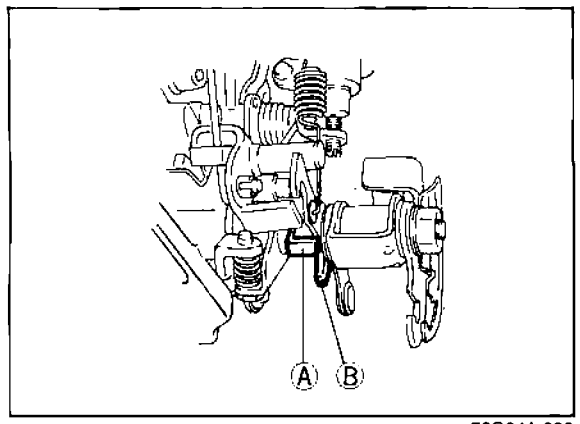
76G04A-034



76G04A-191



76G04A-035



76G04A-036

Inspection

Note
a) Clean all parts with carburetor cleaner and dry with compressed air.
b) Do not use a wire to clean the jets.

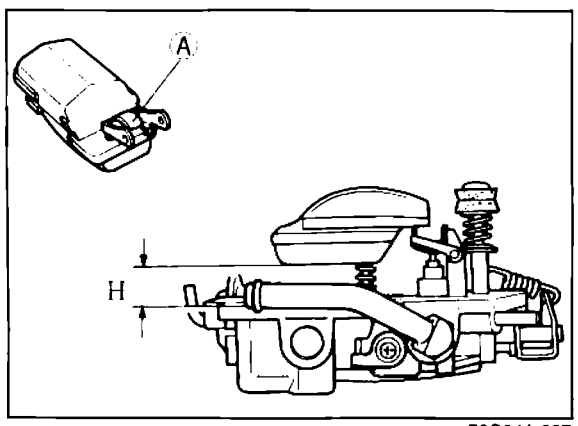
Check the following and replace any faulty parts.
1. Damaged air horn, main body, or throttle body
2. Improper operation of the choke valve or throttle valve
3. Damaged float
4. Needle valve damage or improper seating
5. Clogged or damaged jet or air bleed
6. Damaged piston cup in the accelerator pump
7. Weakened or broken spring
8. Damaged diaphragm
9. Improper solenoid operation

Secondary Throttle Valve

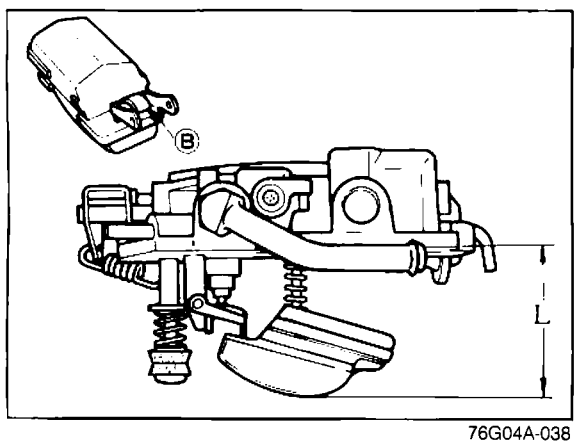
1. Check the clearance between the primary throttle valve and wall when lever A contacts lever B.

Clearance:
7.3—8.3 mm (0.248—0.327 in)

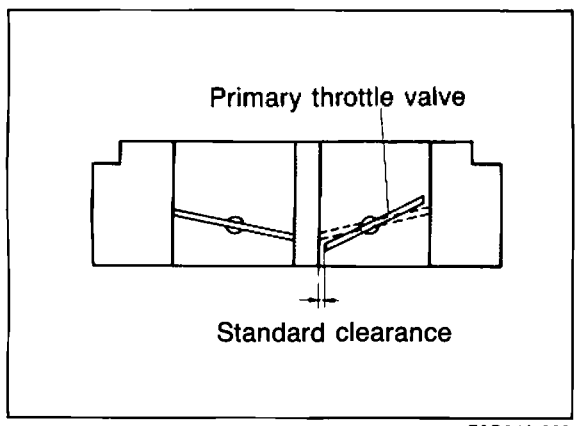
3. If not within specification, adjust it by bending lever A.



76G04A-037



76G04A-038



76G04A-039

Float Level

Caution
This adjustment must be made without the gasket on the air horn.

1. Turn the air horn upside-down and allow the float to lower by its own weight.
2. Measure clearance H between the float and the air horn.

Clearance H: 12.5 mm (0.49 in)

3. If not as specified, bend the float seat lip A to adjust.
4. Turn the air horn to the normal position and allow the float to lower by its own weight.
5. Measure clearance L between the bottom of the float and the air horn.

Clearance L: 44 mm (1.73 in)

6. If not as specified, bend the float stop B to adjust.

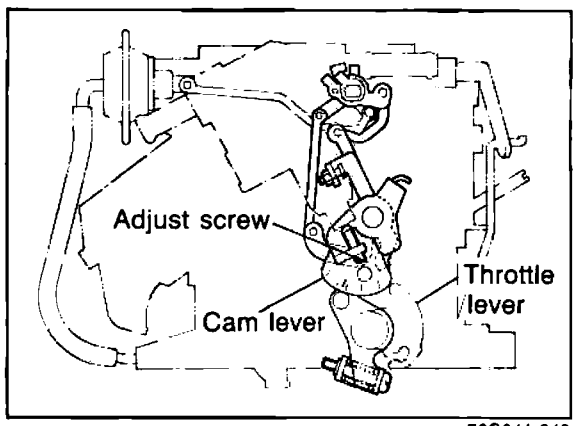
Fast Opening
F6 and FE 8Valve (Except General)

1. With the choke valve fully closed, measure the clearance between the primary throttle valve and the wall of the throttle bore.

Specification:

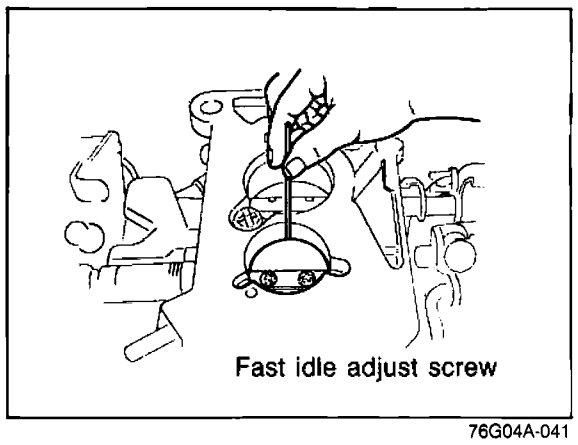
Engine	Spec.	Clearance mm (in)
F6	General and Singapore	1.40—1.76 (0.055—0.069)
FE 8Valve	Middle East and Unleaded Fuel	

2. If not within specification, carefully bend the connecting rod to adjust.



76G04A-040

Fast Idle Opening
FE and F8 (General, ECE, Hong Kong, and Singapore)
Adjustment of fast idle opening is normally unnecessary.
But if it is necessary, adjust it as shown.
1. Before adjustment, let the carburetor set at **25°C (77°F)** for at least 1 hour.
2. Check that the center of the cam lever aligns with the mark (25°) on the fast idle cam.
3. If not as specified, adjust it by turning the adjust screw.



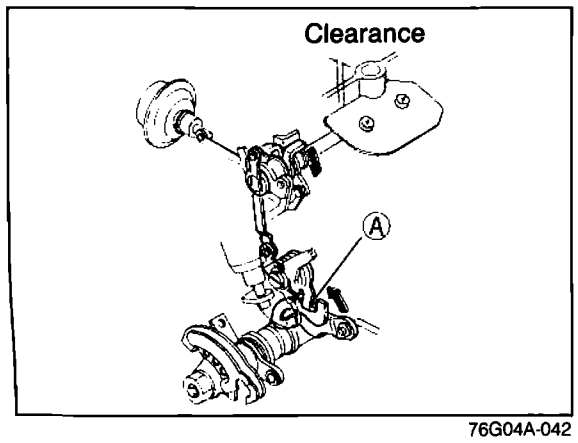
76G04A-041

4. Measure the throttle valve clearance between the throttle valve and wall with a wire gage.

Specification

Spec.	General, ECE, Hong Kong, and Singapore	
Transmission	MTX	ATX
Clearance mm (in)	0.48—0.64 (0.019—0.025)	0.56—0.72 (0.022—0.028)

5. If not as specified, adjust it by turning the fast idle adjust screw.

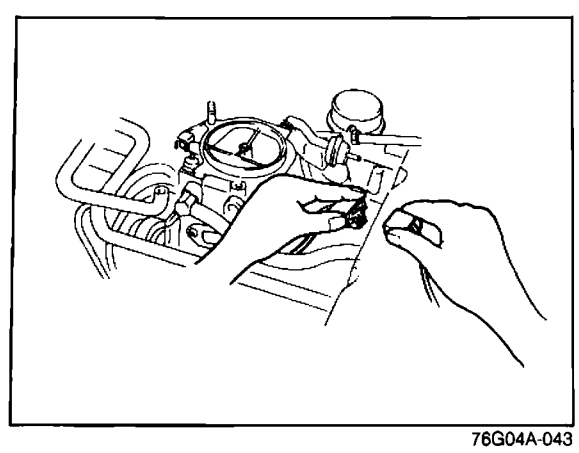


76G04A-042

Unloader System
Only FE and F8 (General, ECE, Hong Kong, and Singapore)
1. Open the primary throttle valve fully.
2. Measure the choke valve clearance.

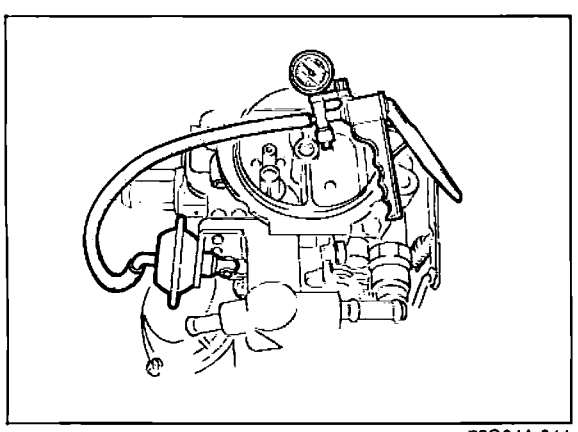
Clearance:
1.68—2.14 mm (0.066—0.084 in)

3. If not as specified, adjust it by bending tab A.

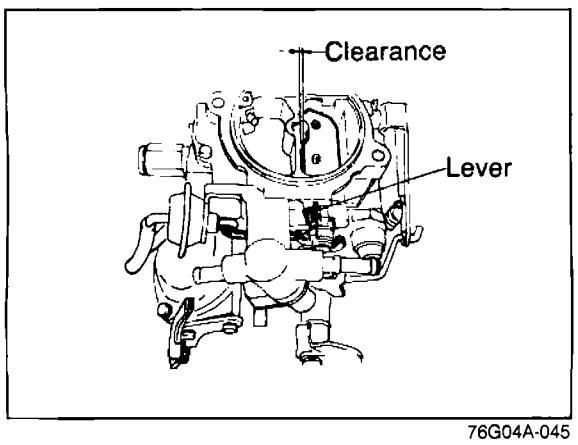


76G04A-043

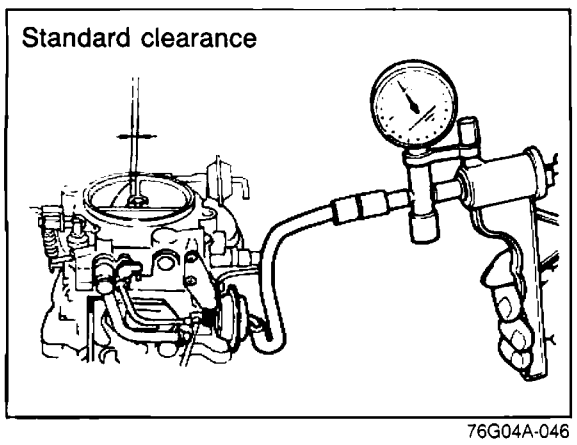
Slow Fuel Cut Solenoid Valve
1. Start the engine, and run it at idle.
2. Disconnect the connector of the carburetor.
3. Check that the engine stops.
4. If the engine does not stop, replace the slow fuel cut solenoid valve.



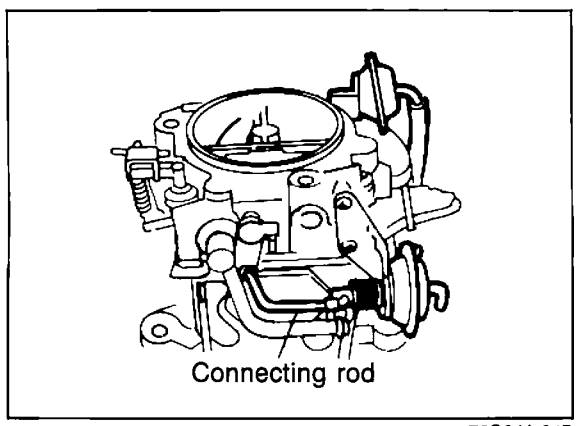
76G04A-044



76G04A-045



76G04A-046



76G04A-047

Choke Breaker Diaphragm

1. Warm up the engine to the normal operating temperature, then stop the engine.
2. Set the choke valve to the fully closed position.
3. Apply **400 mmHg (15.7 inHg)** vacuum to the diaphragm.
4. Measure the clearance between the choke valve and air horn with a wire gauge.

Clearance:
2.45—3.11 mm (0.096—0.122)..... FE, F8
1.68—2.14 mm (0.066—0.084 in)..... F6

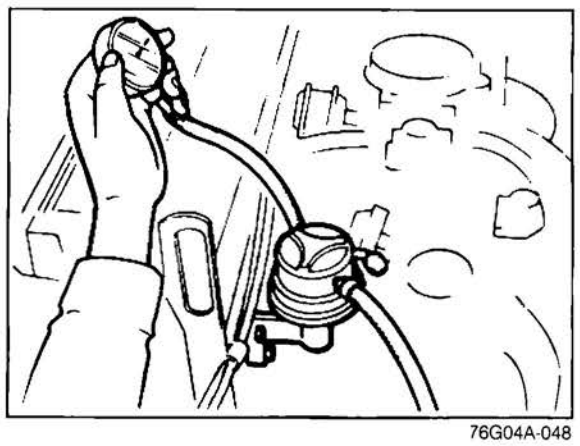
5. If not within specification, adjust by bending the lever.

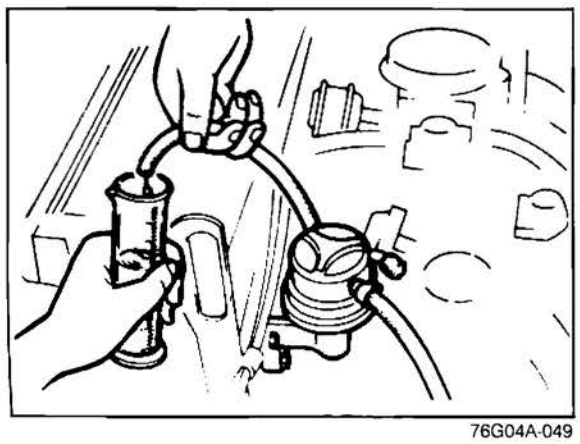
Choke Opener
ECE, Hong Kong, Singapore, and Middle East

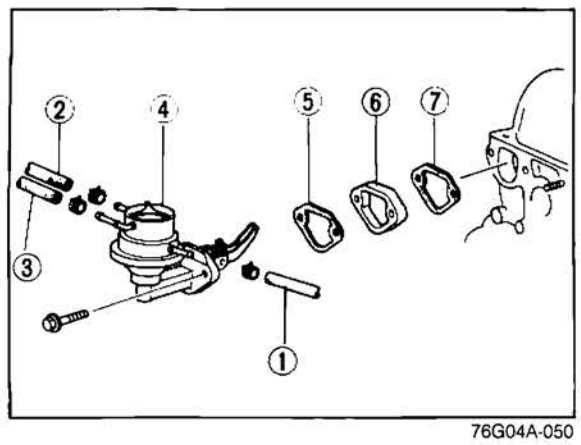
1. Warm up the engine to the normal operating temperature, then stop the engine.
2. Set the choke valve to the fully closed position.
3. Apply **400 mmHg (15.7 inHg)** vacuum to the diaphragm.
4. Measure the clearance between the choke valve and air horn with a wire gauge.

Specification	Clearance mm (in)
ECE, Hong Kong, and Singapore (Except F6 MTX)	3.7—4.0 (0.15—0.16)
Middle East	3.3—3.6 (0.13—0.14)
F6 Singapore MTX	3.2—3.5 (0.13—0.14)

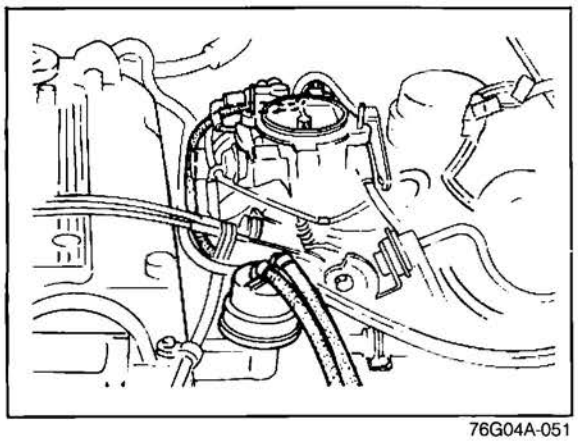
5. If not within specification, adjust by bending the connecting rod.


76G04A-048


76G04A-049



76G04A-050


76G04A-051

FUEL PUMP

Inspection

Fuel pressure

1. Disconnect the hose at the carburetor and connect a fuel pressure gauge.
2. Disconnect the fuel return hose from the fuel pump and plug the fuel pump return pipe as shown in the figure.
3. Measure the pressure while the engine is idling. Replace the pump, if necessary.

	FE & F8 (ECE, Hong Kong, Singapore)	Others
Pressure kPa (kg/cm^2, psi)	20—29 (0.2—0.3, 2.8—4.3)	20—26 (0.20—0.27, 2.8—3.8)

Flow rate (volume)

1. Disconnect the carburetor fuel hose and insert the end into a measuring breaker.
2. Disconnect the fuel return hose from the fuel pump and plug the fuel pump return pipe as shown in the figure.
3. Start the engine and measure the amount of fuel pumped per minute.

Volume: More than 860 cc (52.5 cuin)/min

Removal

1. Remove in the following order.
   (1) Fuel outlet hose
   (2) Fuel inlet hose
   (3) Fuel return hose
   (4) Fuel pump
   (5) Gasket
   (6) Insulator
   (7) Gasket

Installation

Install in the reverse order of removal.

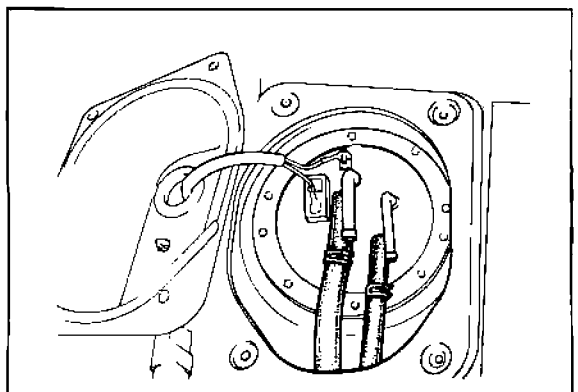
Caution

a) Replace the gasket whenever the fuel pump is replaced.

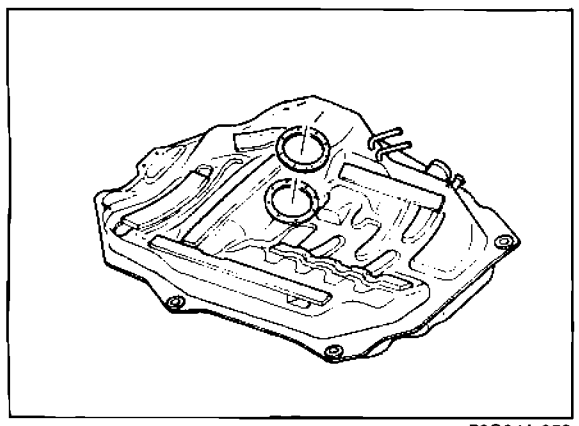
b) Be sure to connect the hoses in the correct positions.
Check for leaks.

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4A FUEL SYSTEM



76G04A-052



76G04A-053

FUEL TANK

Removal

1. Remove the rear seat cushion.
2. Remove the cover and disconnect the fuel tank gauge unit connector.
3. Disconnect the fuel main and return hoses.
4. Raise the vehicle and support it with safety stands.
5. Remove the fuel level gauge unit assembly.

Warning

a) When repairing the fuel tank, clean it thoroughly with steam to remove all explosive gasoline and fumes.

b) Use of fire is strictly prohibited while working on the fuel tank.

6. Drain the fuel.
7. Disconnect the remaining hoses.
8. Remove the fuel tank.

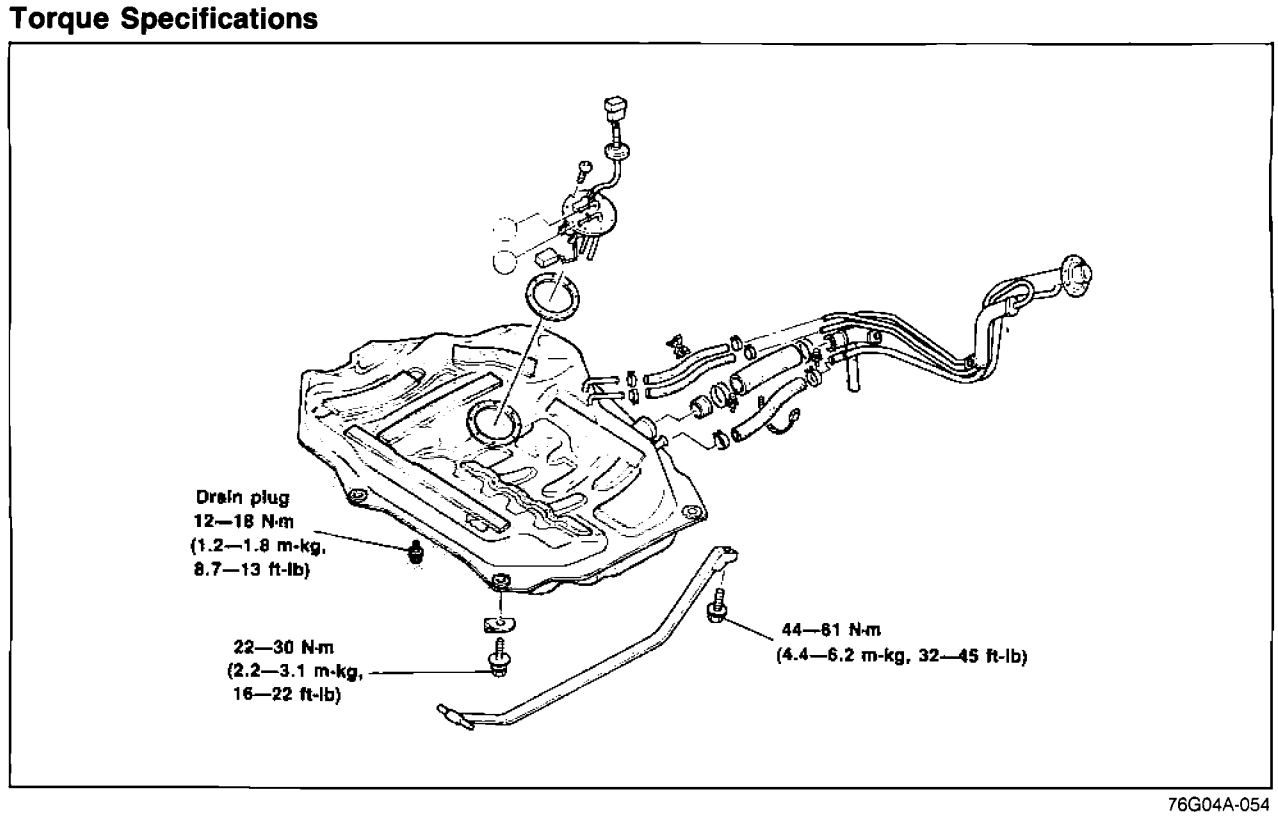
Inspection

1. Check the fuel tank for cracks and corrosion.
2. If any defect is found, repair or replace the tank.
3. Check for leaks.

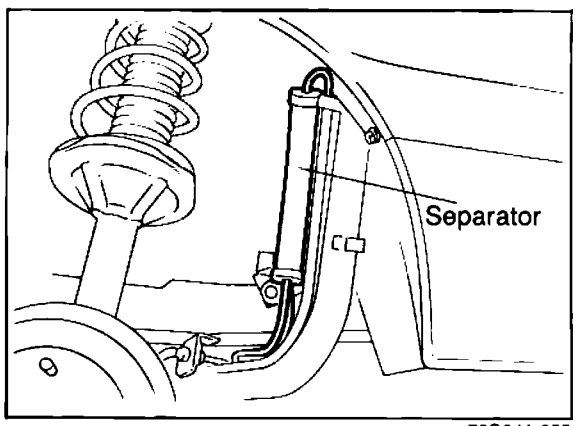
Installation

Install in the reverse order of removal.

Torque Specifications

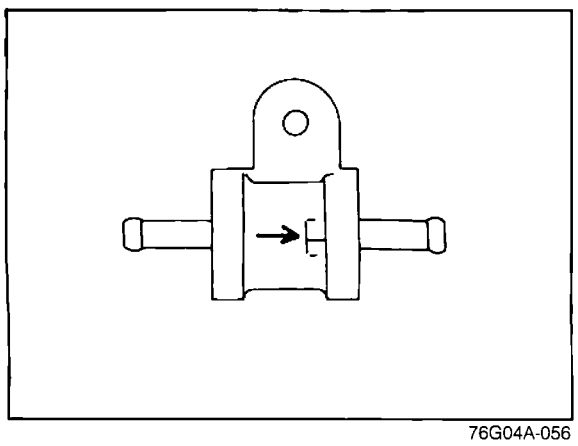


76G04A-054



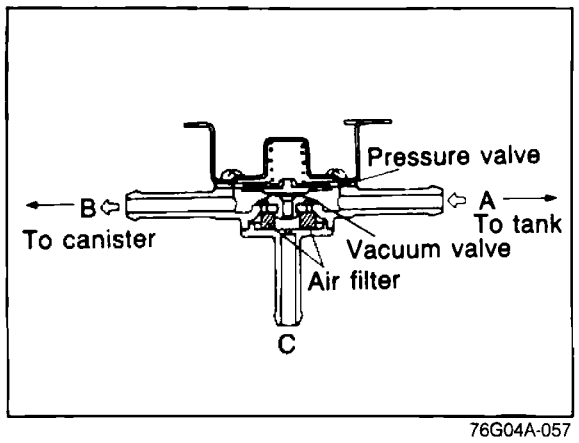
76G04A-055

SEPARATOR
Inspection
Visually check the separator for fuel leakage and damage. Replace, if necessary.



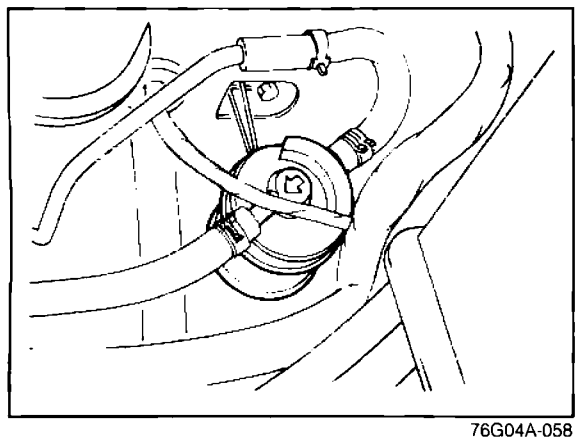
76G04A-056

TWO-WAY CHECK VALVE
(Except Middle East)
Inspection
1. Disconnect the hoses, and remove the check valve.
2. Check that air flows in both directions through the valve.
3. If not as specified, replace the two-way check valve.



76G04A-057

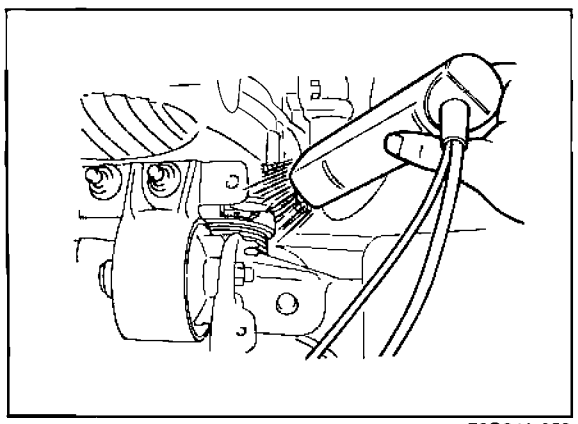
THREE-WAY CHECK VALVE
(Middle East)
1. Blow through the valve from port Ⓐ, and check that air comes out of port Ⓑ.
   Next, block port Ⓑ and check that air comes of port Ⓒ.
2. Block port Ⓑ and apply vacuum with a vacuum pump through port Ⓐ.
3. Check that no vacuum is held.



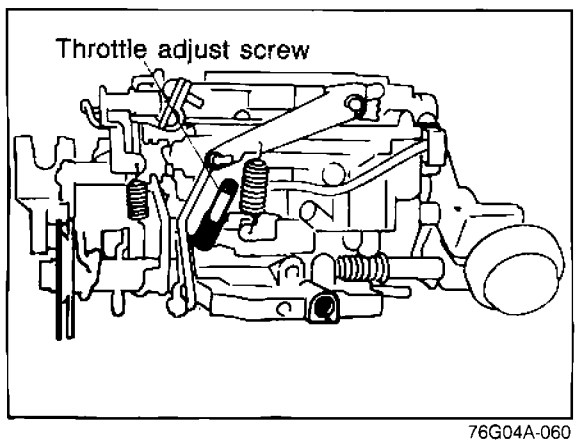
76G04A-058

FUEL FILTER
Replacement
The fuel filter is mounted on the left side of the frame.

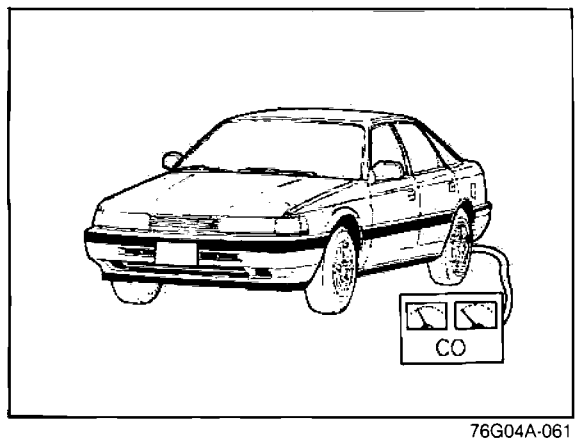
Caution
a) To prevent gasoline from draining during removal, first disconnect and plug the inlet hose.
b) During installation be sure to install the fuel filter in the correct direction of flow.



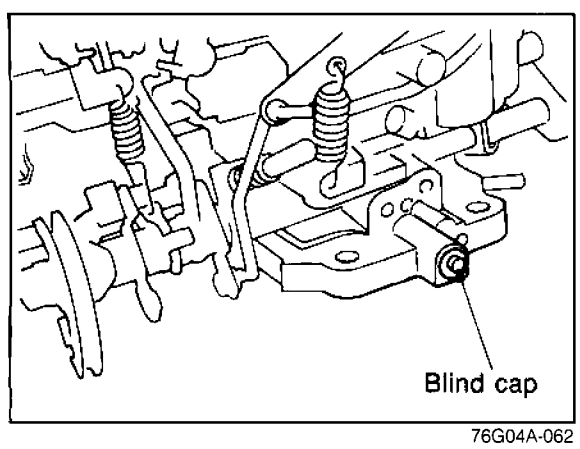
76G04A-059



76G04A-060



76G04A-061



76G04A-062

IDLE SPEED AND IDLE MIXTURE

ADJUSTMENT

Note
a) Before adjusting the idle speed and idle mixture, be sure the ignition timing, spark plugs, carburetor float level, etc., are all in normal operation condition.
b) Turn off all electrical loads.
c) This adjustment must be done while the fan motor is not operating.

Idle Speed
1. Connect a tachometer to the engine.
2. Warm up the engine, and check that the choke valve has fully opened.
3. Check the idle speed.

Specification	MTX		ATX (in N range)	
	Others	FE 8Valve Unleaded fuel	F6	F8 & FE
Idle speed rpm	800 $^{+50}_{0}$	850 $^{+50}_{0}$	950 $^{+50}_{0}$	900 $^{+50}_{0}$

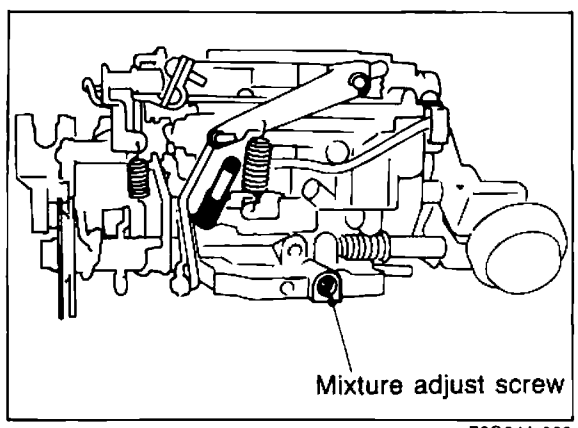
4. If not within specification, adjust the idle speed by turning the throttle adjust screw.

Caution
After adjusting the idle speed, the dashpot adjustment should be checked and adjusted if necessary.

Idle Mixture
[Except FE 8Valve—Unleaded Fuel]
Adjust the idle mixture as follows, after adjusting the idle speed.
1. Disconnect the secondary air hoses from the reed valves and plug them. (If equipped.)
2. Insert an exhaust gas analyzer into the tail pipe and measure the CO concentration.

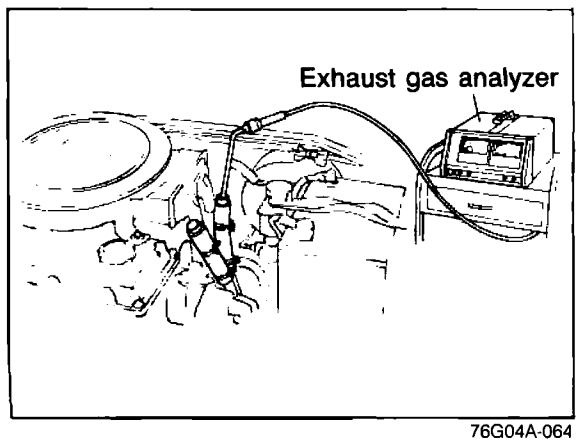
CO concentration: 2.0 ± 0.5%

3. If not within the specification, remove the blind cap from the mixture adjust screw.

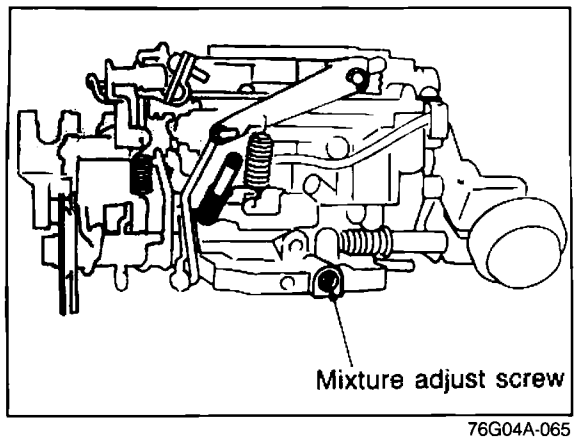


76G04A-063

4. Turn the mixture adjust screw to adjust the CO concentration.
5. Recheck the idle speed.
6. Fit a new blind cap onto the mixture adjust screw.



76G04A-064



76G04A-065

Idle Mixture [FE 8Valve—Unleaded Fuel]
Adjustment of the idle mixture is normally unnecessary.
But if it is necessary, adjust it as follows.

Note
Do not insert the exhaust gas analyzer into the tail pipe.
Before adjust the idle mixture, check and set the idle speed.

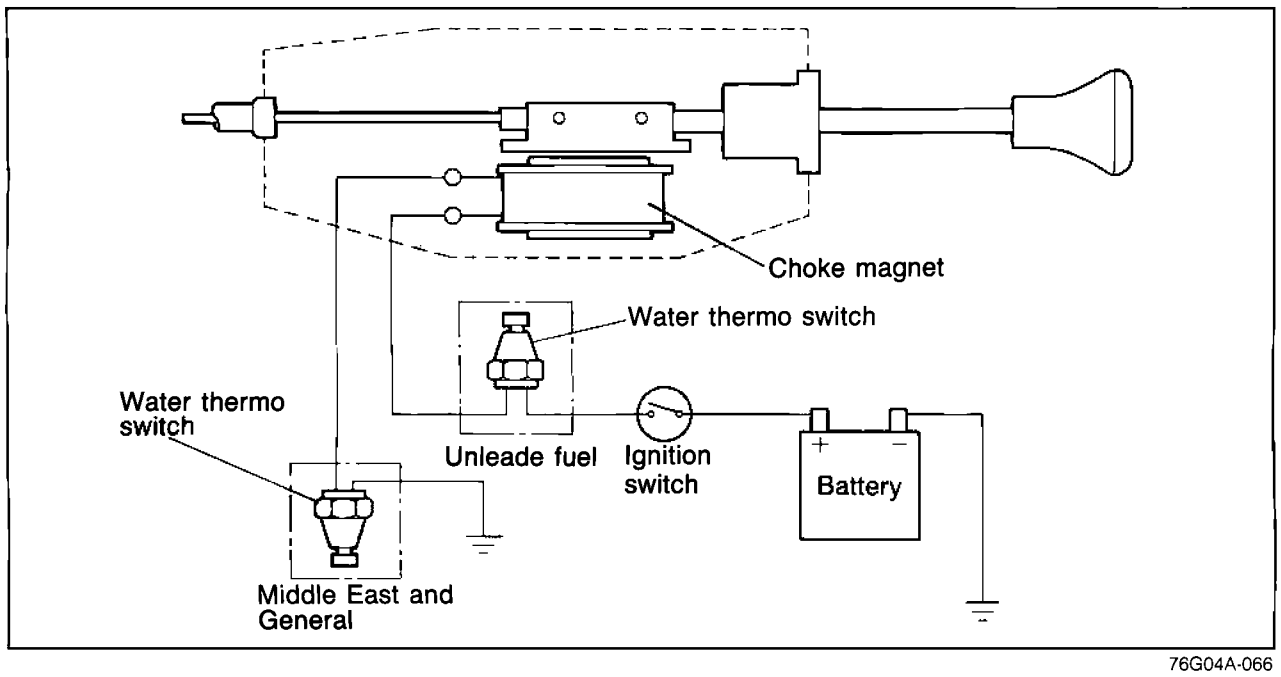
1. Disconnect the secondary air hoses.
2. Insert an exhaust gas analyzer into the hose and plug it to prevent leakage.
3. Start the engine and run it at idle.
4. Measure the CO concentration.
5. Remove the blink cap from the mixture adjust screw.
6. Turn the mixture adjust screw and adjust the CO level.

CO concentration: 2.0 ± 0.5%

7. If the idle speed fails to meet specification as the result of the above steps, adjust the idle.
8. Reconnect the secondary air hoses.
9. Fit a new blind cap onto the mixture adjust screw.

AUTO-RETURN CHOKE SYSTEM

[FE 8VALVE—UNLEADED FUEL, MIDDLE EAST, and F6—GENERAL]



76G04A-066

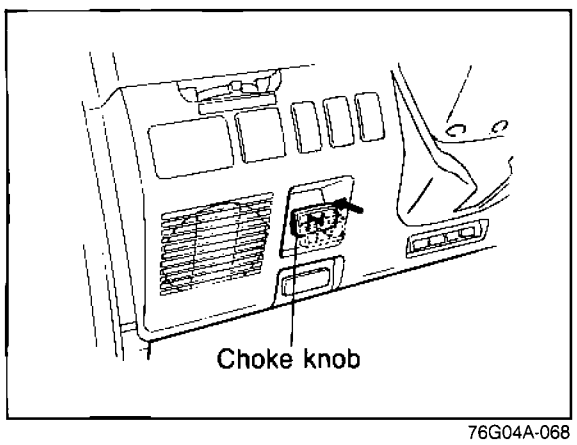
An auto-return choke is adopted to prevent the catalytic converter from over-heating because of over use of the choke. This system opens the choke valve by causing the choke knob to return when the engine coolant temperature is **more than 67°C (153°F)**.

TROUBLESHOOTING

Note
Make the system inspection first. If no problem is found, continue with the next inspection of the Troubleshooting Guide. (Refer to pages 4A—16, 21, or 22)

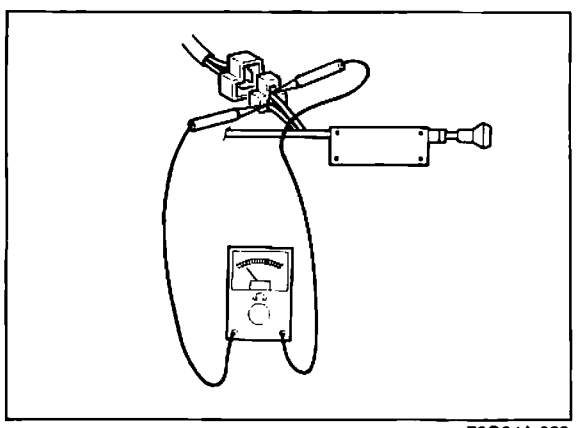
Possible cause / Page / Symptom	System inspection	Choke magnet	Water thermo switch
	4A—40	4A—41	4A—41
Checking order	1	2	3

76G04A-067



76G04A-068

System Inspection
1. Make sure that the engine is cold and turn the ignition switch ON.
2. Pull out the choke knob and check that it is held on.
3. Start the engine and check that the choke knob returns during warming-up.



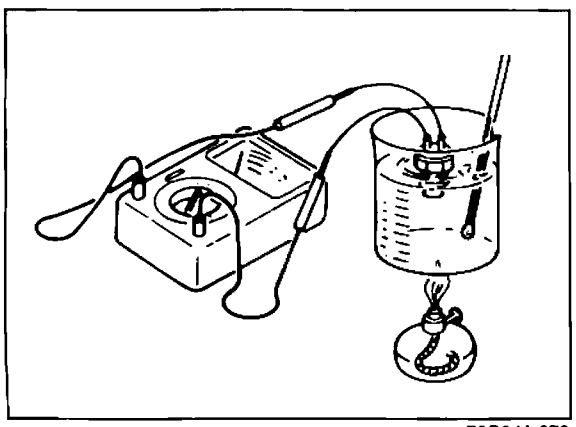
76G04A-069

Choke Magnet

1. Remove the under dash cover.
2. Disconnect the choke magnet connector.
3. Turn the ignition switch on and check the resistance using an ohmmeter.

   Resistance: Approx. 35Ω

4. If it is not within the specification, the choke magnet is malfunction.



76G04A-070

Water thermo switch

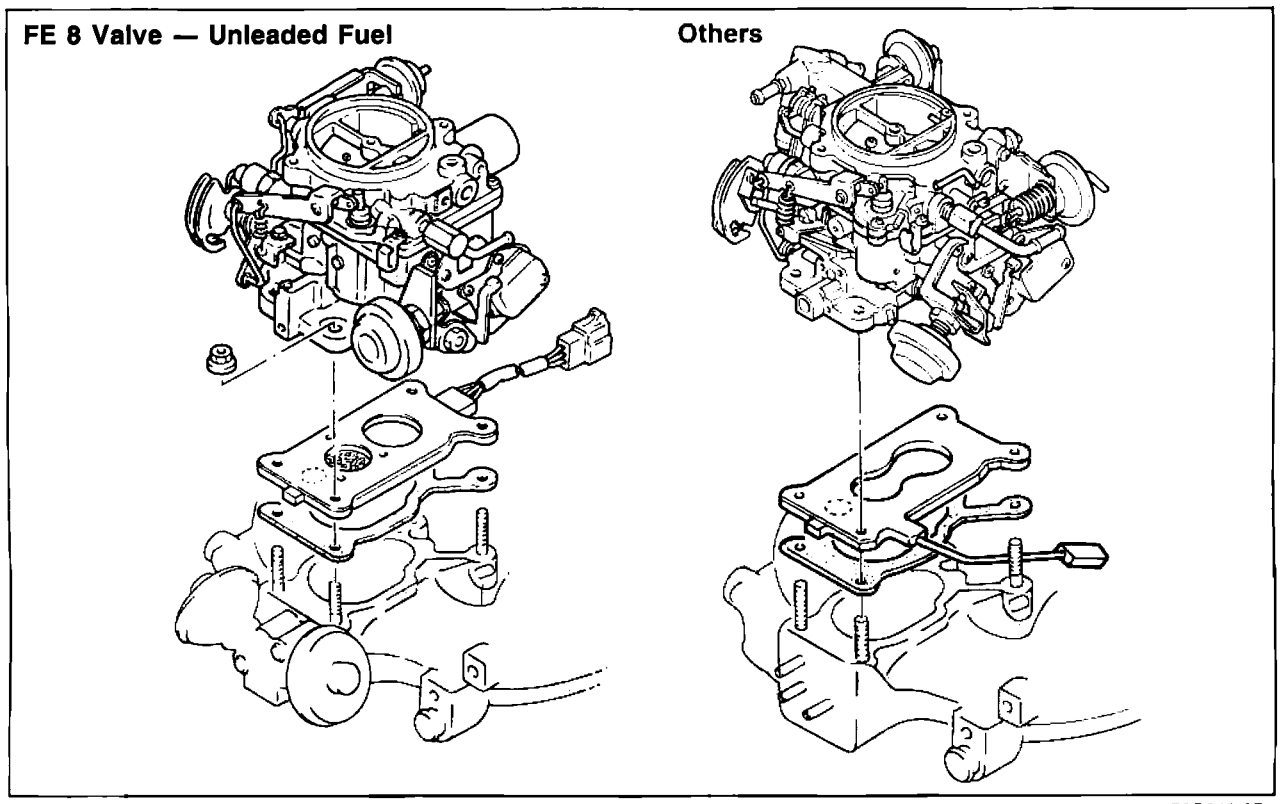
1. Remove the switch from the intake manifold.
2. Place the switch in a container of water with a thermometer.
3. Connect an ohmmeter to the switch.
4. Heat the water slowly and check that the switch has continuity at **67°C (152°F)**.
5. Replace if necessary.

Note

a) Apply sealing tape to the threads of the switch.

b) After installing, check the coolant level and check for leaks.

PTC HEATER SYSTEM [FE and F8 engine (except Middle East)]



76G04A-071

The PTC heater system consists of the PTC heater, relay, and water thermo switch. The system is designed to prevent carburetor icing when the engine operating temperature is low t assure optimum driveability.

TROUBLESHOOTING

Note
Make the system inspection first. If no problem is found, continue with the next inspection of the Troubleshooting Guide. (Refer to pages 4A—19, —20, or—22)

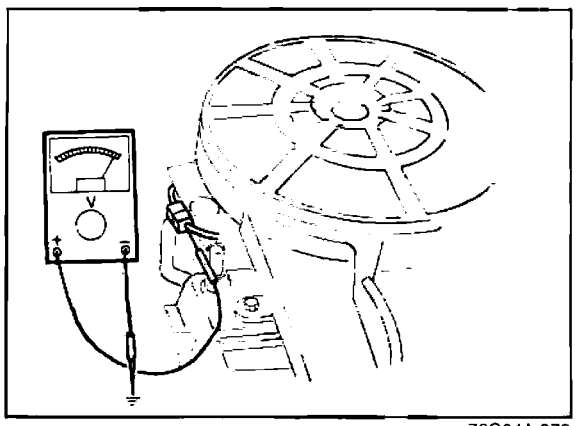
FE 8Valve—Unleaded Fuel

Possible cause	System inspection	Water thermo switch (Intake manifold)	PTC heater	Water thermo switch (Radiator)	PTC heater relay
Page	4A—43	4A—41	4A—43	4A—95	4A—44
Checking order	1	2	3	4	5

Except FE 8Valve—Unleaded Fuel

Possible cause	System inspection	Water thermo switch (Radiator)	PTC heater	PTC heater relay
Page	4A—43	4A—95	4A—43	4A—44
Checking order	1	2	3	4

76G04A-072



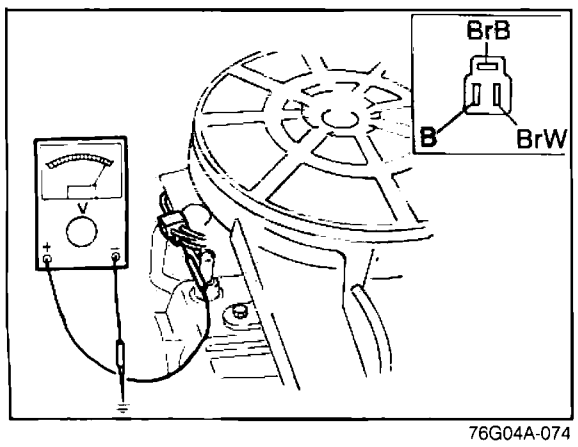
76G04A-073

System Inspection
Except FE 8Valve—Unleaded Fuel

1. Connect a voltmeter to the PTC heater connector.
2. Start the engine and measure the voltage.

Specification

Radiator coolant temperature	Below 17°C (63°F)	Above 17°C (63°F)
Voltage	**Approx. 12V**	**0V**



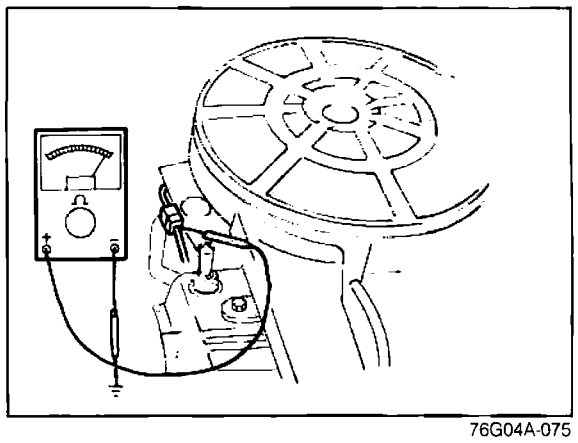
76G04A-074

FE 8Valve—Unleaded Fuel

1. Start the engine.
2. Connect a voltmeter to the PTC heater connector terminals and measure the voltage.

Voltage

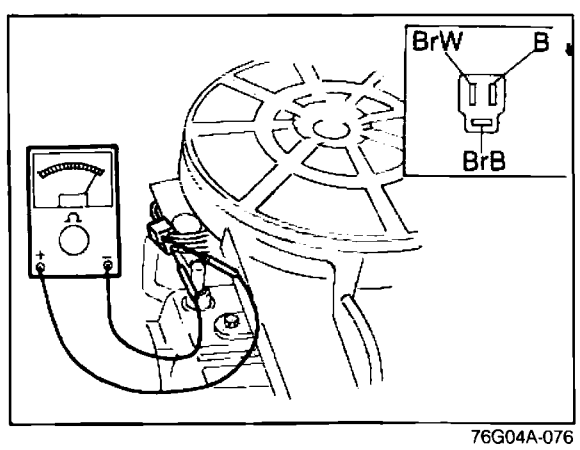
Engine coolant temperature		Below 67°C (152°F)		Above 67°C (152°F)
Radiator coolant temperature		Below 17°C (63°F)	Above 17°C (63°F)	—
Terminal	BrB	**Approx. 12V**	**0V**	**0V**
	BrW		**Approx. 12V**	



76G04A-075

PTC Heater
Except FE 8Valve—Unleaded Fuel

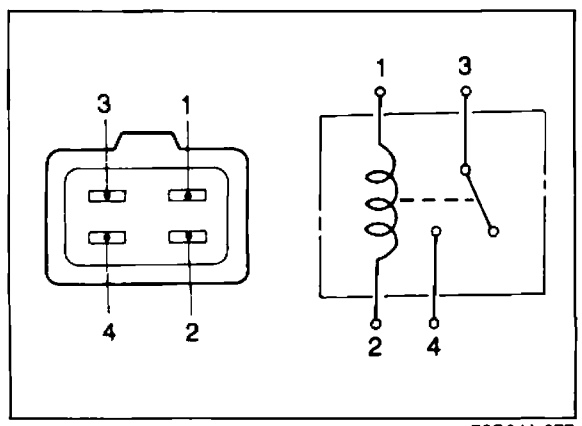
1. Disconnect the PTC heater connector.
2. Check for continuity of the heater with an ohmmeter.



76G04A-076

FE 8Valve—Unleaded Fuel

1. Disconnect the PTC heater connector.
2. Check for continuity between terminal wire **(BrW)** and a ground.
3. Check for continuity between terminal wire **(BrB)** and **(B)**.



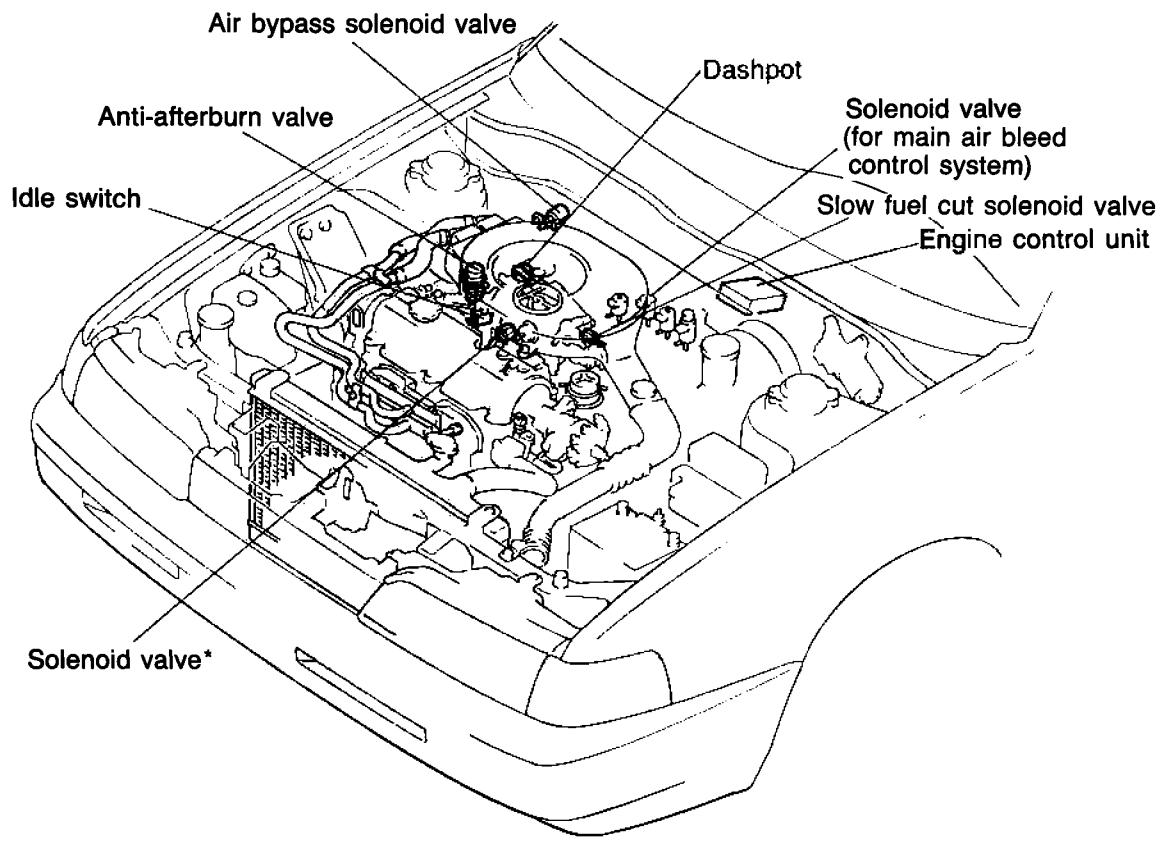
76G04A-077

PTC Heater Relay

1. Apply 12V to No. 1 terminal and ground No. 2 terminal).
2. Check for continuity at terminals 3 and 4 with an ohmmeter.

Operation	0V	12V
Terminals 3—4	No continuity	Continuity

DECELERATION CONTROL SYSTEM



*Solenoid valve

Specification	Solenoid valve
F6 Singapore	Coasting leaner
FE 8 Valve	Coast enrichment solenoid valve

76G04A-078

This system improves driveability during deceleration.

4A DECELERATION CONTROL SYSTEM

TROUBLESHOOTING

Check the condition of the wiring harness and connectors before checking the engine control unit or switches.

FE 12Valve and F8 (ECE, Hong Kong and Singapore)—MTX

Possible cause / Page / Symptom	Anti-afterburn valve	Dashpot	Bypass air control system	Idle switch	main air bleed control system	Engine control unit terminal		
						E	L	M
	4A—50	4A—50	4A—48	4A—93	4A—51	4A—88		
Runs rough on deceleration			2	1	3	5	4	
Afterburn in exhaust system	1	2	4	3			5	6
Poor fuel consumption		1	2					3
Fails emission test	7		6	1	2	3	4	5
High idle speed after warm up		1			2	3		
Engine stalls during warm up					1			
Rough idle during warm up					1			
Poor acceleration, hesitation, or lack of power					1			

76G04A-079

FE 12Valve and F8 (ECE, Hong Kong and Singapore)—ATX

Possible cause / Page / Symptom	Anti-afterburn valve	Bypass air control system (Only FE)	Main air bleed control system	Idle switch (Only FE)	Engine control unit terminal		
					B	D	2N
	4A—50	4A—48	4A—51	4A—93	4A—86		
Runs rough on deceleration		2	3	1	5		4
Afterburn in exhaust system	1	2		3		4	5
Poor fuel consumption		1				2	
Fails emission test	7	6	2	1	3	4	5
High idle speed after warm up			1		2		
Engine stall during warm up			1				
Rough idle during warm up			1				
Poor acceleration, hesitation, or lack of power			1				

76G04A-080

FE 8Valve—Unleaded Fuel

Possible cause / Page / Symptom	Slow fuel cut system	Coast enrichment system	Idle switch	Anti-afterburn valve	Bypass air control system	Dashpot (only MTX)	Engine control unit terminal			
							A	C	G	I
	4A—53	4A—54	4A—93	4A—50	4A—48	4A—50	4A—91			
Runs rough on deceleration	8	6	1		7		3	4	5	2
Afterburn in exhaust system	7		3	1	4	2		5	8	6
Poor fuel consumption		2	1		6		5	4		3
High idle speed after warm up		2				1	3			
Fails emission test	4	2	1	5	3		6	7	8	9

76G04A-081

FE 8Valve (General)

Possible cause	main air bleed control solenoid valve	Engine control unit terminal				
		MTX		ATX		
		E	F	B	2F	2I
Page	4A—51	4A—90		4A—89		
Checking order	1	2				

76G04A-082

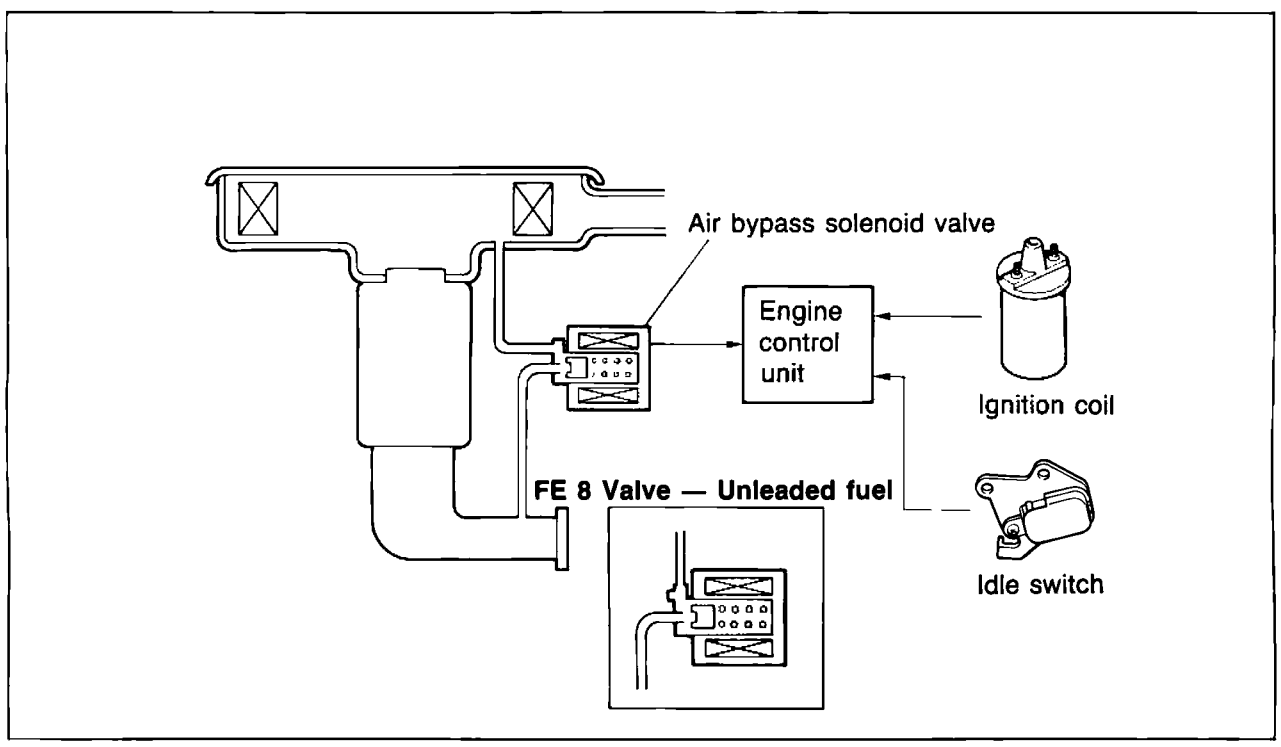
F6 (Singapore)

Possible cause / Page / Symptom	Dashpot (Only MTX)	Anti-afterburn valve	Idle switch	Coasting leaner solenoid valve	Engine control unit terminal	
					B	D
	4A—50	4A—50	4A—93	4A—56	4A—92	
High idle speed after warm up	1					
Runs rough on deceleration			1	2	3	
Afterburn in exhaust system	5	4	1	2	3	
Fails emission test		4	1	2	3	

76G04A-083

4A DECELERATION CONTROL SYSTEM

BYPASS AIR CONTROL SYSTEM
FE and F8 [Except General and Middle East]



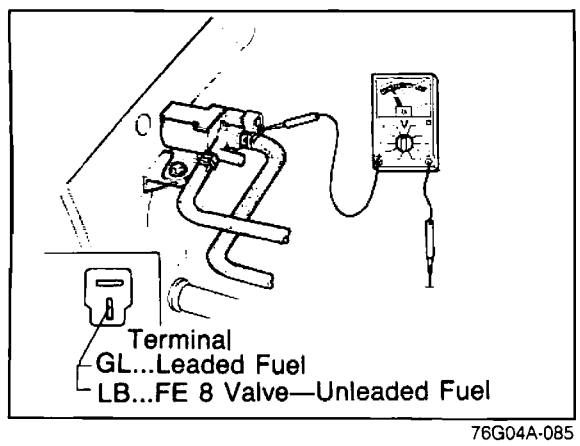
76G04A-084

The bypass air control system consists of the bypass solenoid valve, idle switch, ignition coil, and engine control unit.
This system opens the bypass air passage to the intake manifold during deceleration above approx. **2,300 rpm** (ECE, Hong Kong, and Singapore), or above **approx. 3,500 rpm** (FE 8 Valve—Unleaded fuel).

Note
Make the system inspection first. If no problem is found, continue with the next inspection of the Troubleshooting. (Refer to page 4A—46 or 47.)

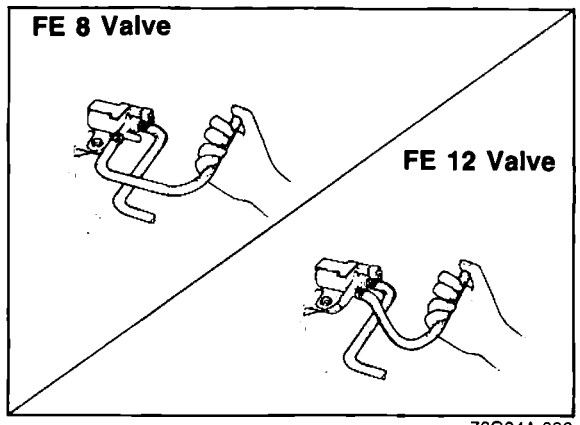
Troubleshooting

Possible cause	System inspection	Air bypass solenoid valve
Page	4A—48	4A—49
Checking order	1	2



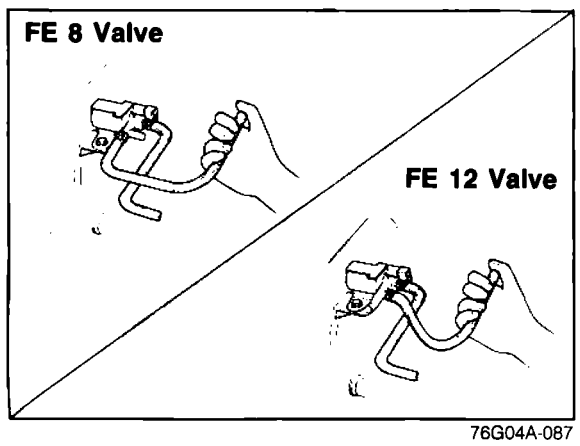
76G04A-085

System Inspection
1. Warm up the engine and run it at idle.
2. Connect a tachometer.
3. Disconnect the bypass air hose from the air cleaner and place a finger over the hose opening.



76G04A-086

5. Increase the engine speed to 4,000 rpm.
6. Check that no vacuum is felt.

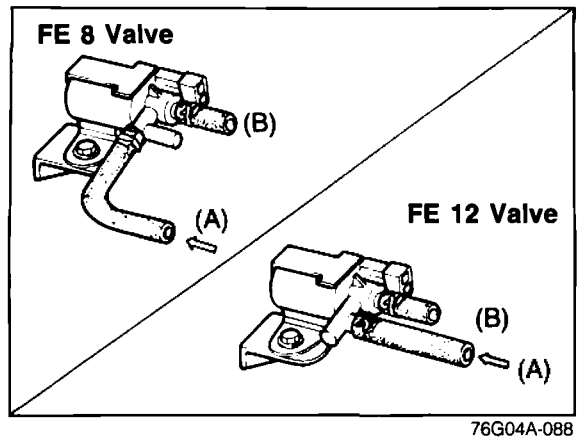


76G04A-087

7. Quickly decrease the engine speed and check that vacuum is felt during above specified engine speed.

Specification

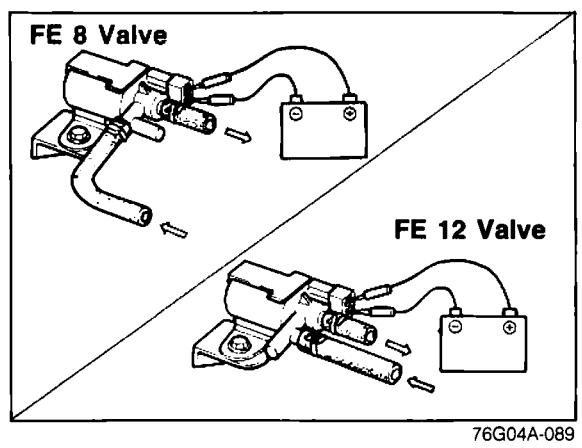
FE 8 Valve	Approx. 3,500 rpm
Others	Approx. 2,100 rpm



76G04A-088

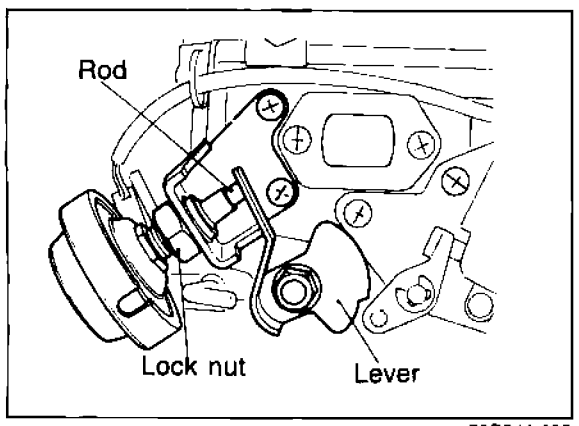
Air Bypass Solenoid Valve

1. Disconnect air hose (A) from the air cleaner.
2. Disconnect air hose (B) from the intake manifold.
3. Disconnect the connector from the solenoid valve.
4. Blow air through the solenoid valve from (A) and check that air does not come out from (B).



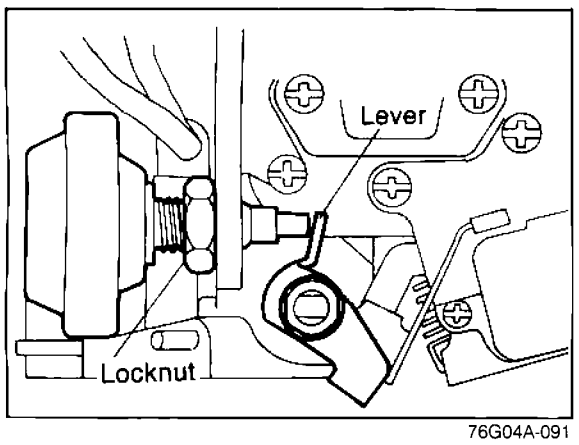
76G04A-089

5. Apply 12V to the connector terminal with jumper wire.
6. Blow air through the solenoid valve from (A) and check that air comes out from (B).
7. If the solenoid valve does not operate properly, replace it with a new one.



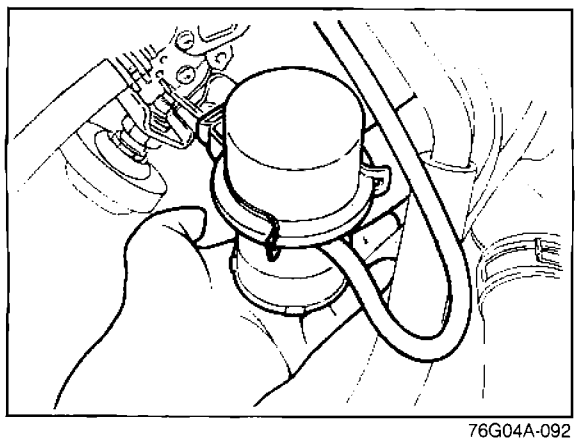
76G04A-090

DASHPOT (MTX)
Inspection
1. Suddenly move the throttle lever and check that the dashpot rod comes out to its full stroke with the throttle lever.
2. Release the throttle lever and check that it returns slowly to the idle position after contacting the dashpot rod.



76G04A-091

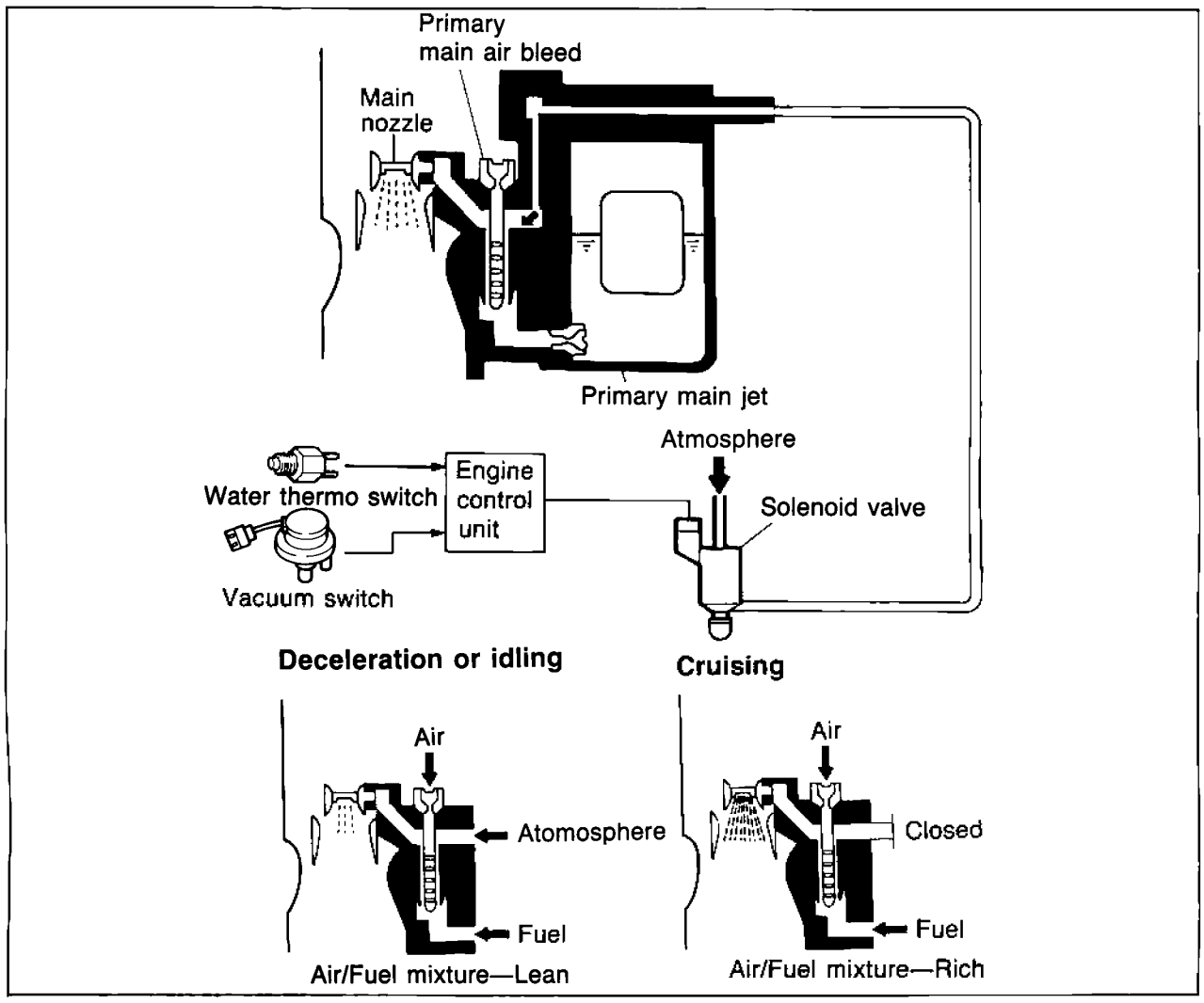
Adjustment
1. Warm up the engine to the normal operating temperature and run it at idle.
2. Connect a tachometer to the engine.
3. Increase the engine speed to **3,000 rpm**.
4. Slowly decrease the engine speed and check that the dashpot rod touches the lever at **2,200 ± 100 rpm**.
5. If not within specification, loosen the locknut and turn the dash pot to adjust.



76G04A-092

ANTI-AFTERBURN VALVE
Inspection
1. Start the engine and let it idle.
2. Block the intake port of the anti-afterburn valve and check that the engine speed does not change.
3. In crease the engine speed and quickly decelerate.
4. Check that air is pulled into the intake port for **1—2 seconds** after the accelerator is released.

MAIN AIR BLEED CONTROL SYSTEM
FE and F8 (ECE, Hong Kong, Singapore, and General)



76G04A-093

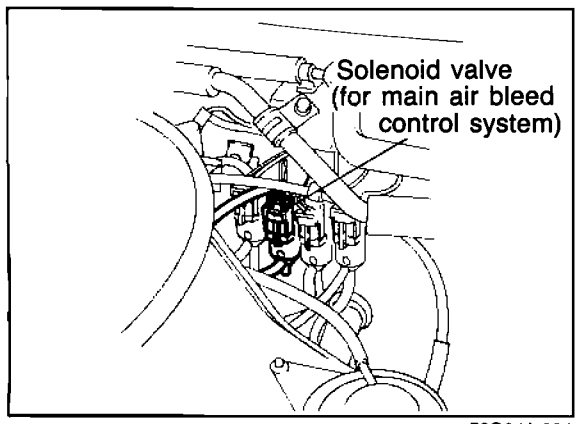
This system prevents the additional air from being fed to the primary air bleed circuit and causes the air/fuel mixture to become rich, improving acceleration.

Troubleshooting

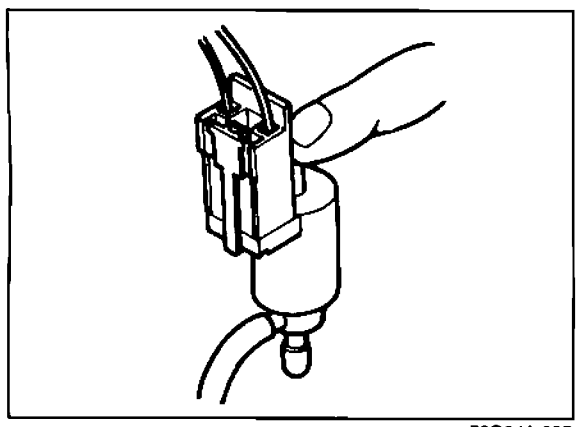
Possible cause	System inspection	Solenoid valve	Vacuum switch	Water thermo switch (Radiator)
Page	4A—52	4A—52	4A—94	4A—95
Checking order	1	2	3	4

Note
Make the system inspection first. If no problem is found, continue with the next inspection of the Troubleshooting. (Refer to pages 4A—46 or —47.)

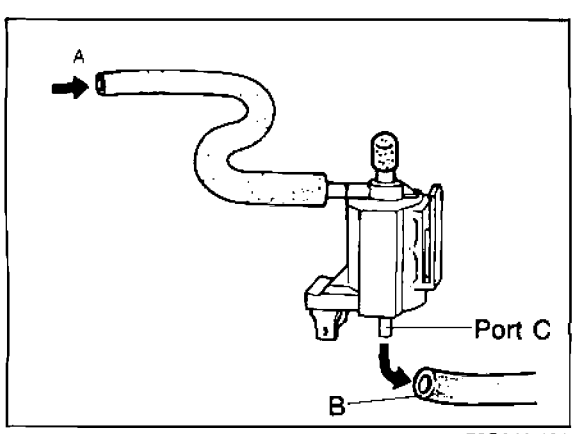
4A DECELERATION CONTROL SYSTEM



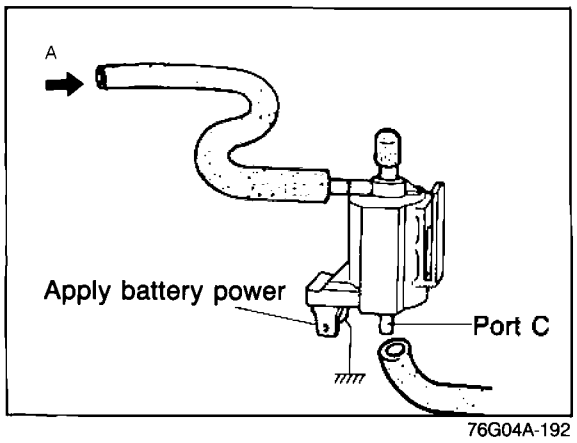
76G04A-094



76G04A-095



76G04A-191



76G04A-192

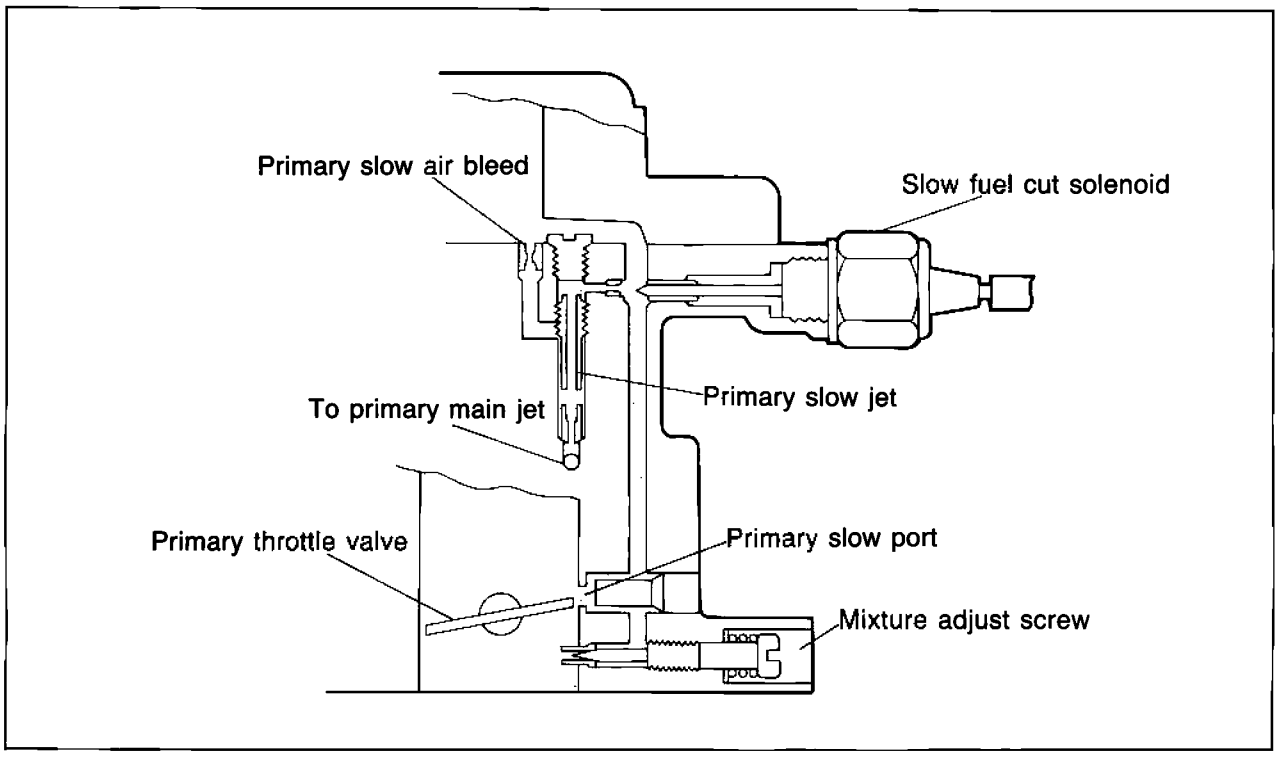
System Inspection

1. Disconnect the vacuum switch connector.
2. Make sure that radiator coolant temperature is below 17°C (63°F).
3. Disconnect the upper vacuum hose from the solenoid valve.
4. Place a finger over the solenoid valve open port and check that vacuum is not felt when engine is running.
5. Warming up the engine.
6. Place a finger over the same open port of the solenoid valve and check that weak vacuum is felt.
7. Reconnect the vacuum switch connector.
8. Check that weak vacuum is felt at the open port of the solenoid valve at idle.
9. Accelerate the engine rapidly and check that vacuum is not felt.

Solenoid Valve (A/C)

1. Disconnect vacuum hose A (White) from the carburetor.
2. Disconnect vacuum hose B from the solenoid valve.
3. Disconnect the solenoid valve connector.
4. Blow air through the valve from hose A and check that it comes out of port C.
5. Apply 12V and ground to the solenoid valve with jumper wires.
6. Blow air through the valve from hose A and check that air not come out.
7. Replace if necessary.

SLOW FUEL CUT SYSTEM [FE 8VALVE—UNLEADED FUEL]



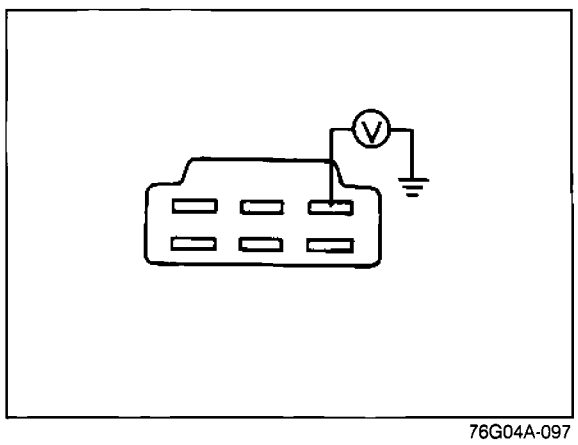
76G04A-096

This system shuts the primary slow fuel passage to prevent run-on and overheating of the exhaust system when the ignition switch is turned OFF or during deceleration (engine speed **above 2,300 rpm** and idle switch ON). The slow fuel cut solenoid is actuated by the engine control unit and ignition switch.

Troubleshooting

Note
Make the system inspection first. If no problem is found, continue with the next inspection of the Troubleshooting Guide. (Refer to page 4A—47.)

Possible cause	System inspection	Slow fuel cut solenoid valve
Page	4A—53	4A—34
Check order	1	2



76G04A-097

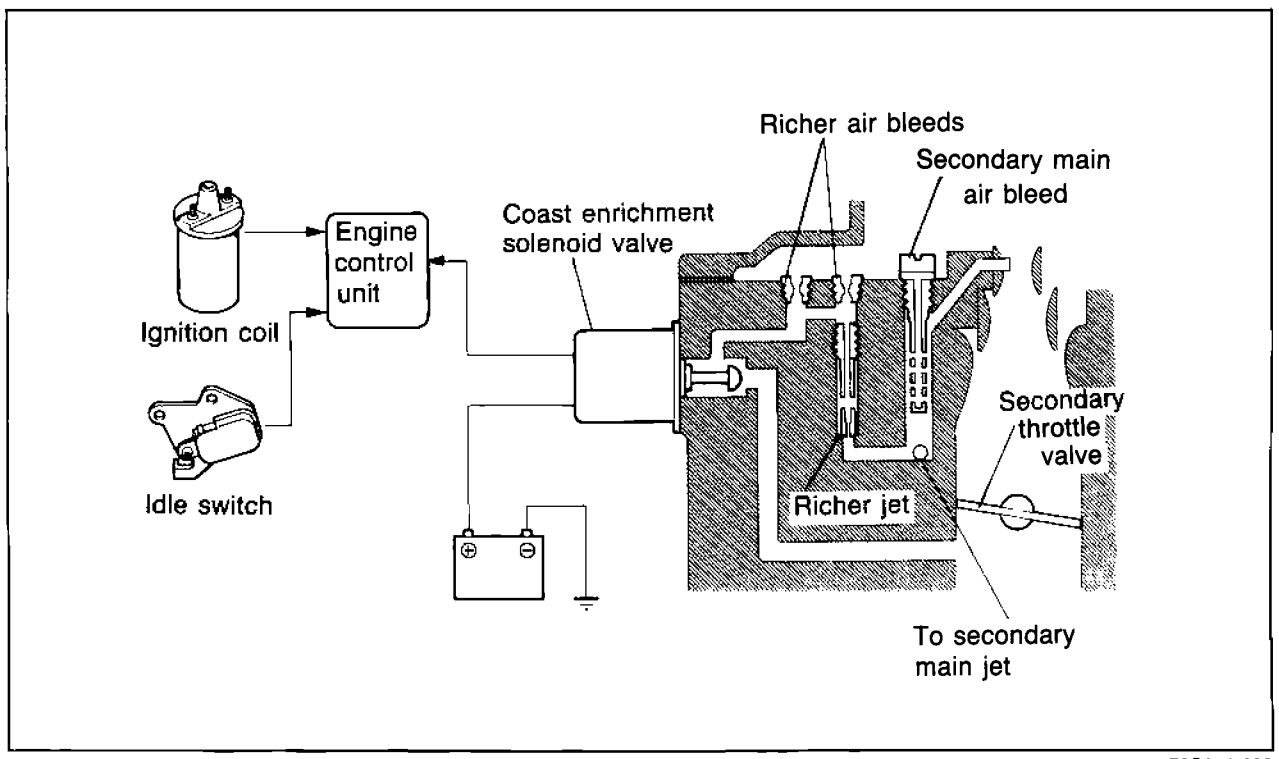
System Inspection

1. Warm up the engine and run it at idle.
2. Connect a tachometer to the engine.
3. Connect a voltmeter to the carburetor connector terminal (**BW** wire).
4. Increase the engine speed to 4,000 rpm; then release the throttle lever.
5. Measure the terminal voltage.

Engine speed	Voltage
Above approx. 2,300 rpm	Approx. 12V
Below approx. 2,300 rpm	Below 1.5V

4A DECELERATION CONTROL SYSTEM

COAST ENRICHMENT SYSTEM [FE 8VALVE—UNLEADED FUEL]

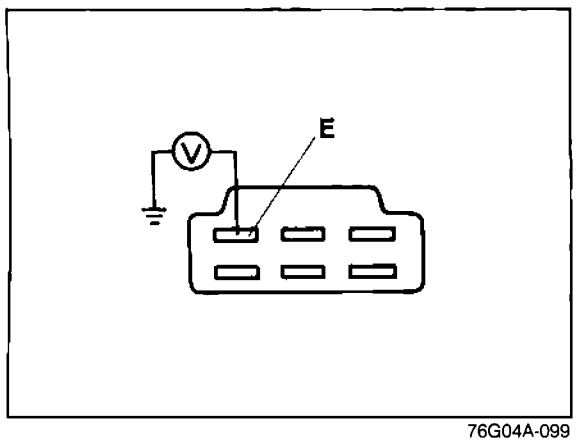


76G04A-098

This system opens the fuel passage to the secondary stage of the carburetor during deceleration at engine speeds of **2,300—1,500 rpm**. The coast enrichment solenoid valve is actuated by the engine control unit.

Troubleshooting

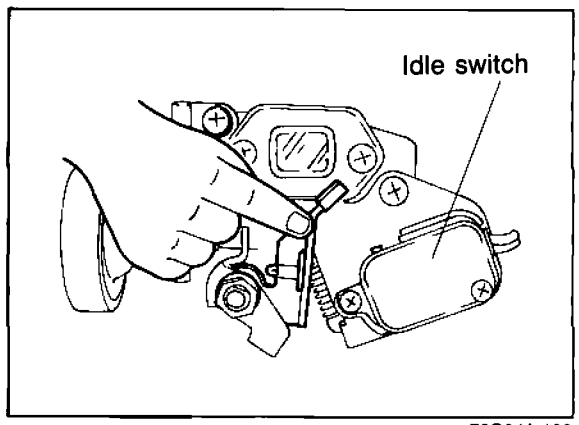
Possible cause	System inspection	Coast enrichment solenoid valve	Engine control unit terminal			
			A	B	D	I
Page	4A—54	4A—55	4A—91			
Checking order	1	3	2			



76G04A-099

System Inspection

1. Warm up the engine to the normal operating temperature and run it at idle.
2. Connect a voltmeter to the carburetor connector terminal **E**.
3. Connect a tachometer to the engine.

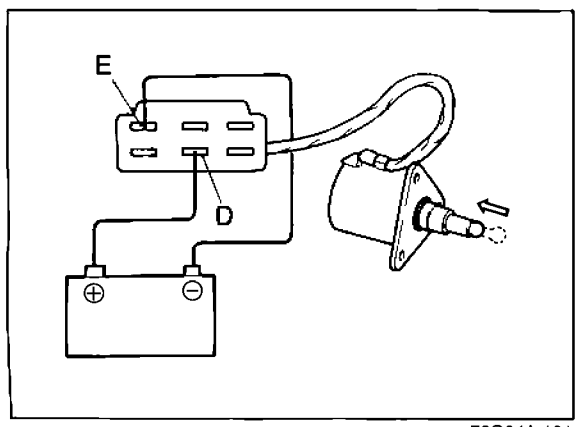


76G04A-100

4. Lift the idle switch lever. (Idle switch ON.)
5. Increase the engine speed to 3,000 rpm then decelerate.
6. Check the terminal voltage as shown.

Voltage:

Above approx. 2,300 rpm	**Approx. 12V**
Approx. 2,300 rpm—1,500 rpm	**Below 1.5V**
Below approx. 1,500 rpm	**Approx. 12V**



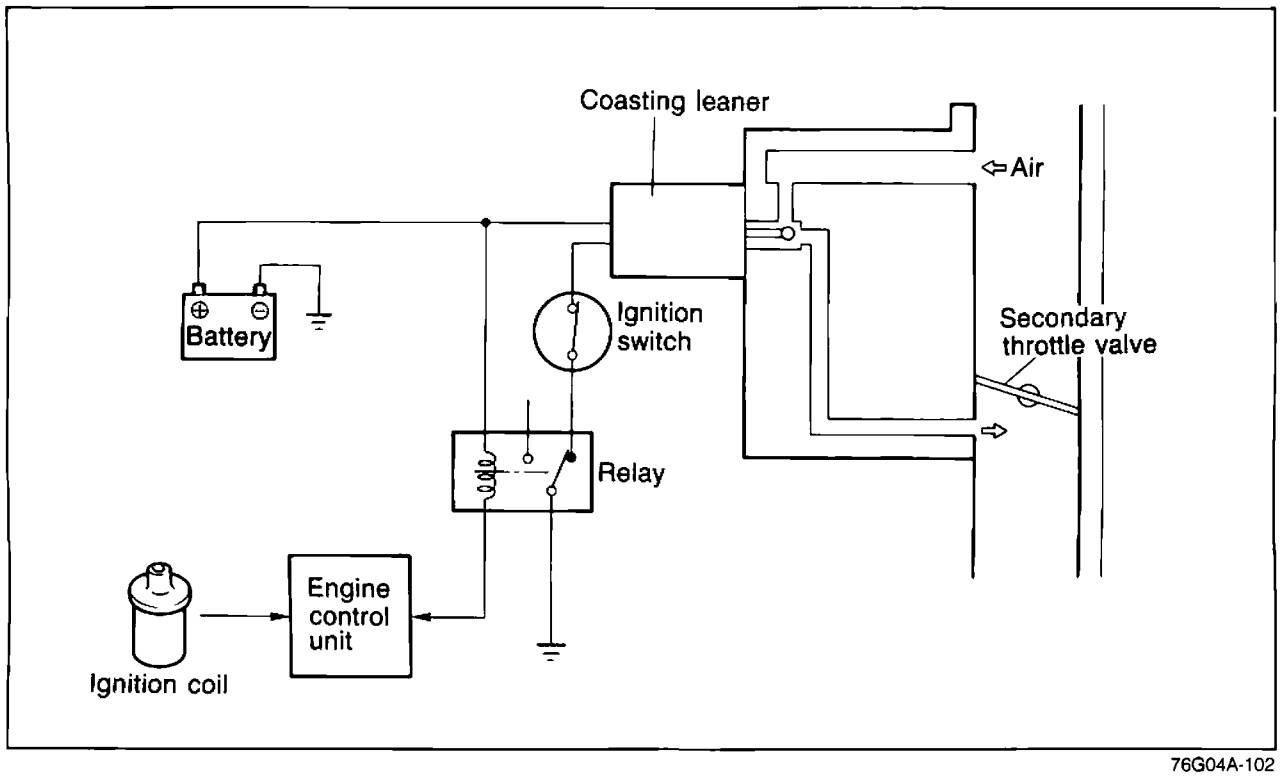
76G04A-101

Coast Enrichment Solenoid Valve

1. Disconnect the connector of the coast enrichment solenoid valve.
2. Apply 12V to the carburetor connector terminal **D** and ground terminal **E** as shown in the illustration.
3. Check that the coast enrichment solenoid valve "clicks" when making and breaking the circuit. Replace, if necessary.

4A DECELERATION CONTROL SYSTEM

COASTING LEANER SYSTEM (F6 SINGAPORE MTX)



76G04A-102

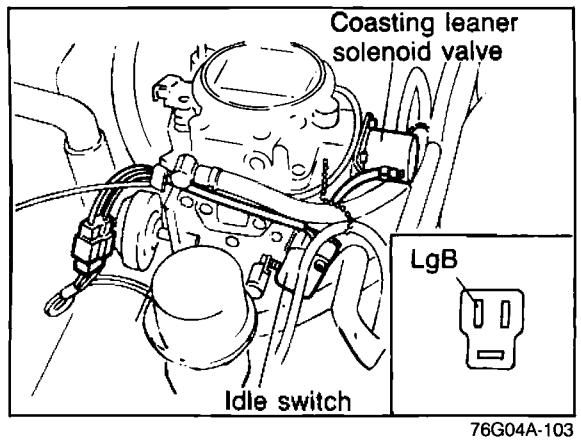
This system consists of the coasting leaner solenoid valve, engine control unit, ignition coil, and idle switch. When the idle switch is ON and the engine speed is more than approx. **2,100 rpm** (deceleration), the coasting leaner solenoid valve opens the air passage port to prevent afterburn in the exhaust system.

Troubleshooting

Note

Make the system inspection first. If no problem is found, continue with the next inspection of the Troubleshooting. (Refer to page 4A—47)

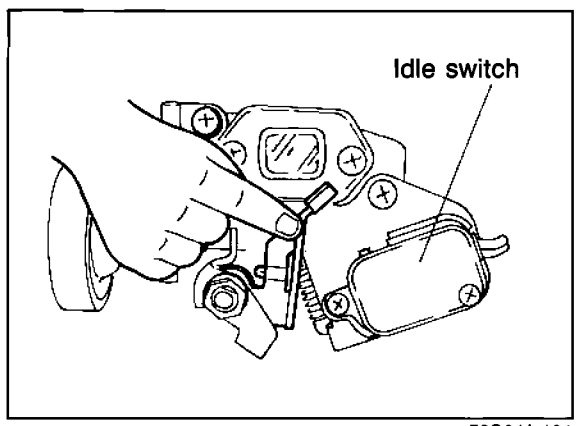
Possible cause	System inspection	Coasting leaner solenoid valve	Relay
Page	4A—56	4A—57	4A—57
Checking order	1	2	3



76G04A-103

System Inspection

1. Warm up the engine and run it at idle.
2. Connect a tachometer to the engine.
3. Connect a voltmeter to the coasting leaner solenoid valve connector **(LgB wire)**.

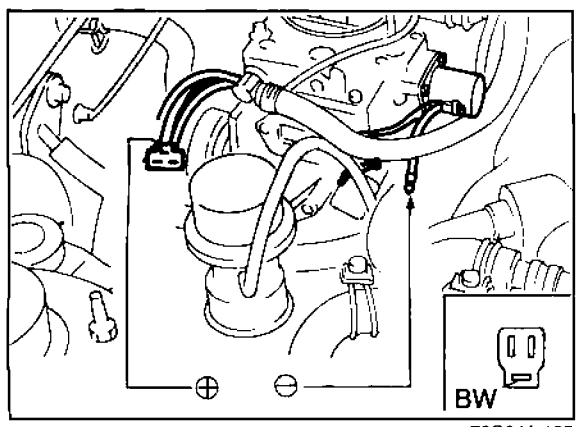


76G04A-104

4. lift the idle switch lever. (Idle switch ON).
5. Increase the engine speed to 3,000 rpm and then decelerate.
6. Check the terminal voltage.

Voltage:

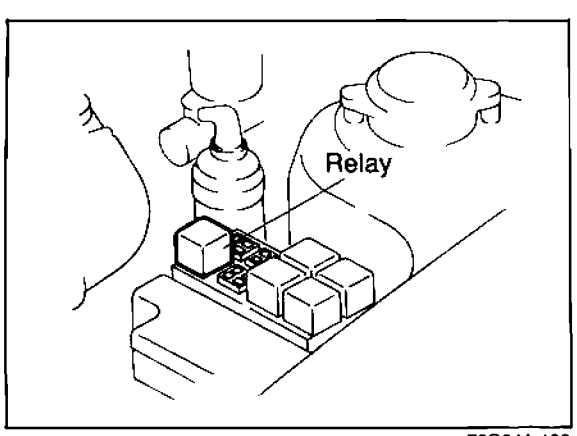
Above approx. 2,100 rpm	**Below 1.5V**
Below approx 2,100 rpm	**Approx. 12V**



76G04A-105

Coasting Leaner Solenoid Valve

1. Disconnect the connector of the coasting leaner solenoid valve.
2. Disconnect the connector of the idle switch.
3. Apply 12V to terminal **(BW wire)** and ground with a jumper wires as shown in the illustration.
4. Check that the coasting leaner solenoid valve "clicks" when making and breaking the circuit. Replace, if necessary.

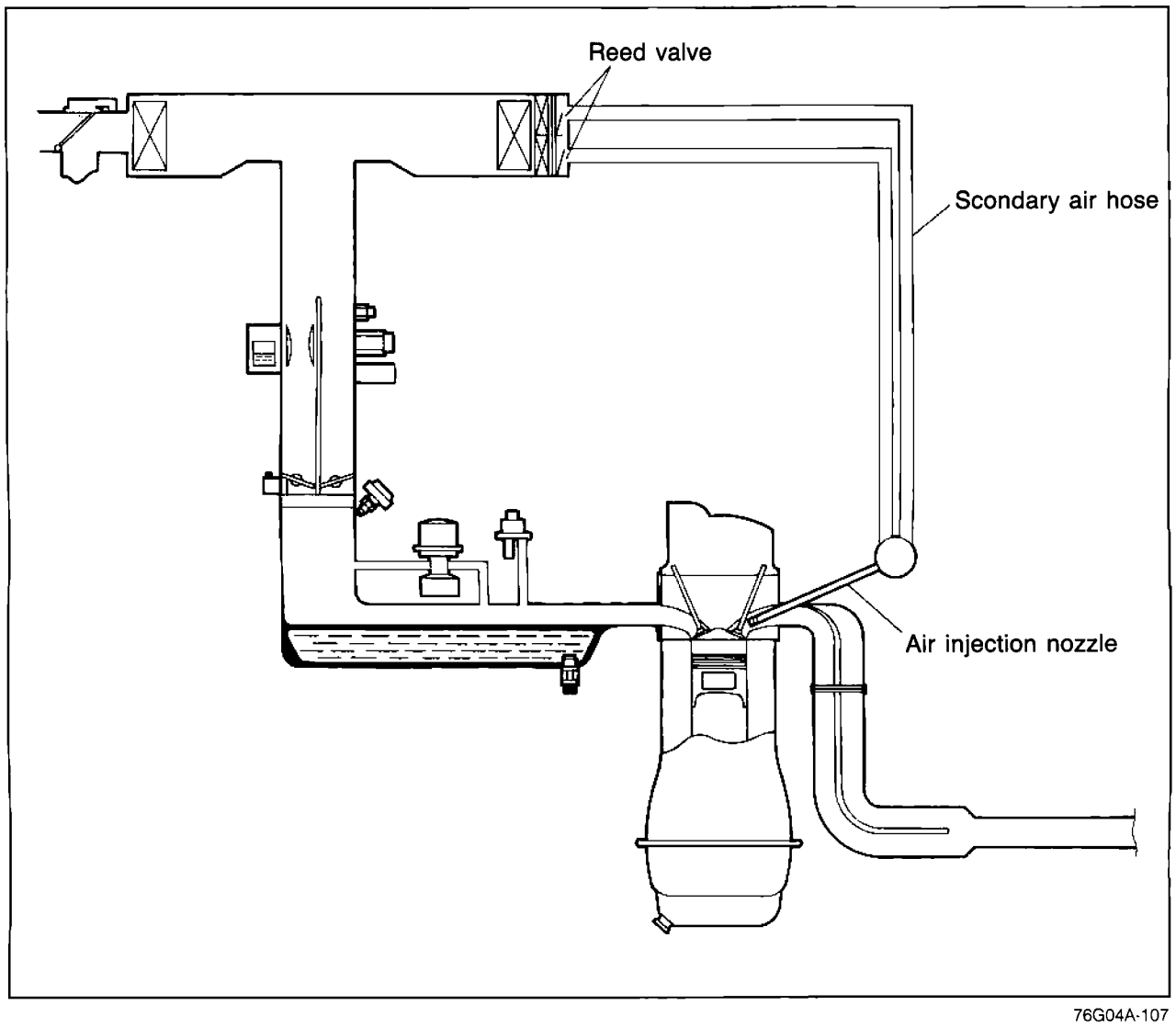


76G04A-106

Relay

1. Warm up the engine and run it at idle.
2. Connect a tachometer to the engine.
3. Increase and decrease the engine speed between **1,900—2,300 rpm** and check that the relay "clicks".
4. Replace if necessary.

AIR INJECTION SYSTEM (EXCEPT GENERAL AND MIDDLE EAST)



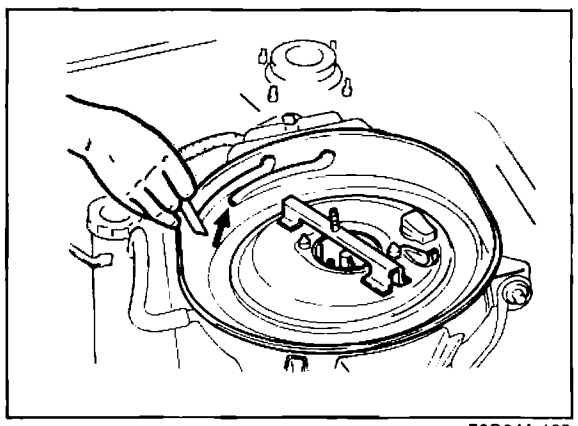
76G04A-107

To achieve oxidization of CO and HC, the reed valve injects secondary air into the exhaust manifold.

TROUBLESHOOTING

Possible cause / Page / Symptom	Reed valve	Air injection pipe
	4A—59	4A—59
Fails emission test	1	2

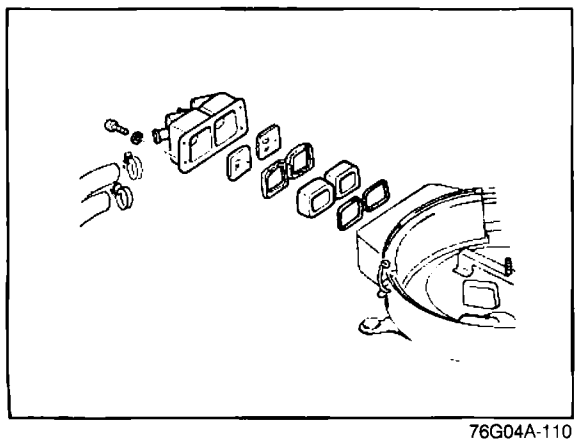
76G04A-108



76G04A-109

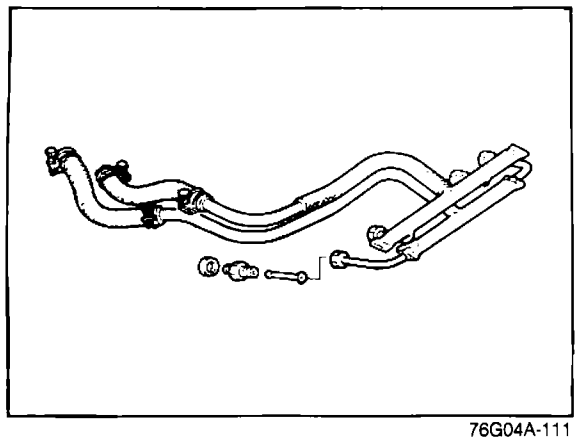
Reed Valve

1. Warm up the engine to the normal operating temperature, and then stop the engine.
2. Remove the air cleaner cover and element.
3. Start the engine and run it at idle.
4. Place a thin paper over the reed valve inlet port and check that air is pulled in.
5. Increase the engine speed to **1,500 rpm** and check that there is no exhaust gas leakage at the inlet by placing a thin paper over the port.



76G04A-110

6. Replace the reed valve, if necessary.

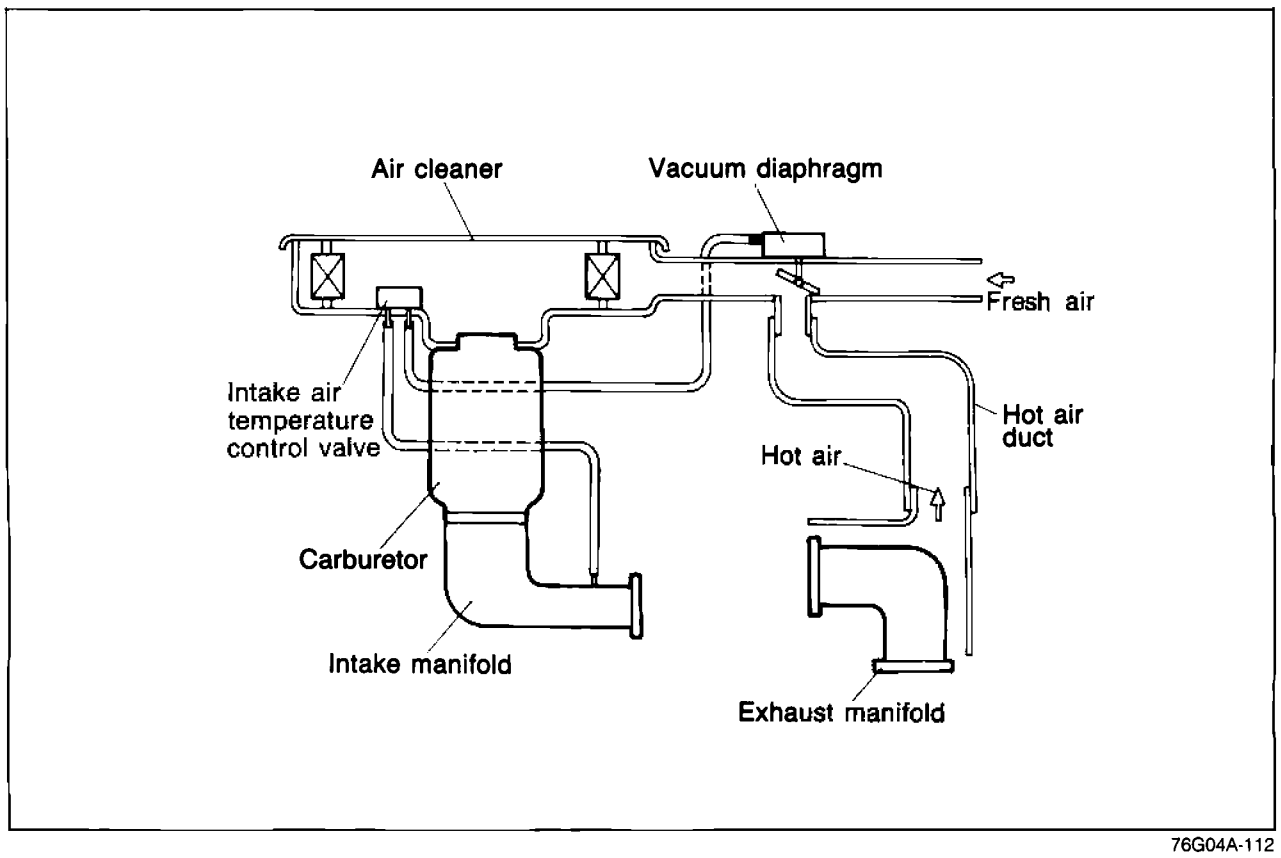


76G04A-111

Air Injection Nozzle and Pipe

1. Disconnect the hoses from the air cleaner.
2. Loosen the nuts and remove the air injection nozzle and air pipe.
3. Visually check the air injection nozzle and pipe.
4. Replace if necessary.

INTAKE AIR TEMPERATURE CONTROL SYSTEM



76G04A-112

This system controls air intake temperature to prevent icing and operates depending on air temperature around the control valve.

TROUBLESHOOTING

Note
Make the system inspection first. If no problem is found, continue with the next inspection of the Troubleshooting Guide. (Refer to pages from 4A—17 to 4A—22.)

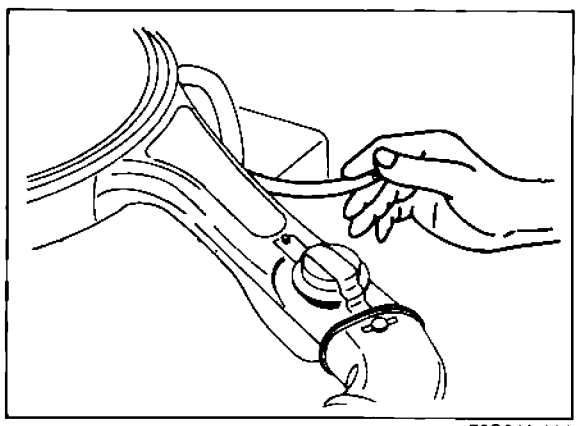
FE and F8 (General, ECE, and Hong Kong) and Singapore

Possible cause / Page	System inspection	Vacuum control diaphragm	Intake air temperature control valve
Symptom	4A—61	4A—61	4A—61
Checking order	1	2	3

FE 8 Valve—Unleaded Fuel, Middle East, and F6—General

Possible cause	System inspection
Page	4A—62
Checking order	1

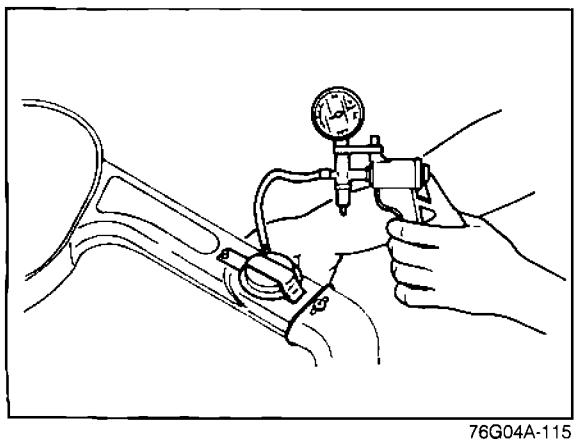
76G04A-113



76G04A-114

System Inspection
[Except Manual and Bimetal Type]

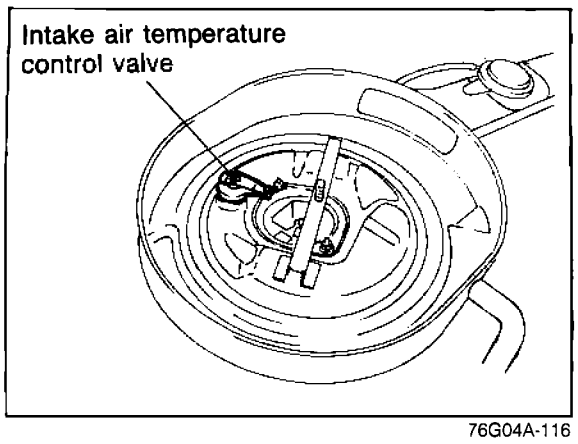
1. Disconnect the vacuum hose from the vacuum control diaphragm.
2. Start the engine and check that vacuum is felt while the engine is still cold.
3. Warm up the engine to the normal operating temperature and check that vacuum is not felt.



76G04A-115

Vacuum Control Diaphragm

1. Remove the air cleaner.
2. Connect the vacuum pump to the vacuum control diaphragm.
3. Apply **160 mmHg (6.3 inHg)** vacuum and check that the shutter valve is opened to the hot position.
4. Replace the air cleaner if necessary.



76G04A-116

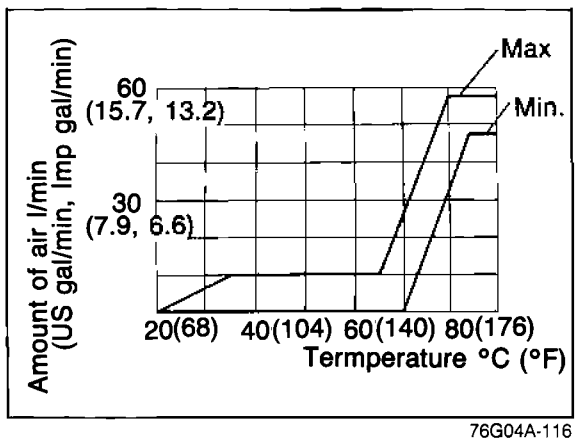
Intake air temperature control valve

1. Check that the valve is closed when the bimetal temperature is lower than specified.

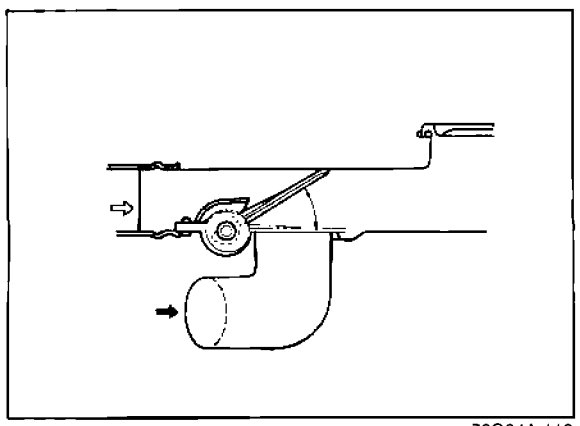
   Operating temperature: 30°C (86°F)

2. To check, suck air through the tube. If excessive air leakage is found, replace the valve as an assembly.

3. Check that the valve opens when heated.
4. Replace if necessary.

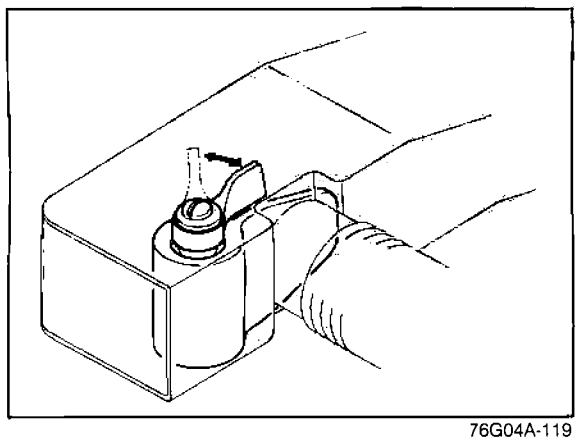


76G04A-116



76G04A-118

System Inspection
Bimetal type
[FE 8Valve—Unleaded Fuel]
Move the control valve inside the air cleaner, and check that it moves freely and that spring force is felt.

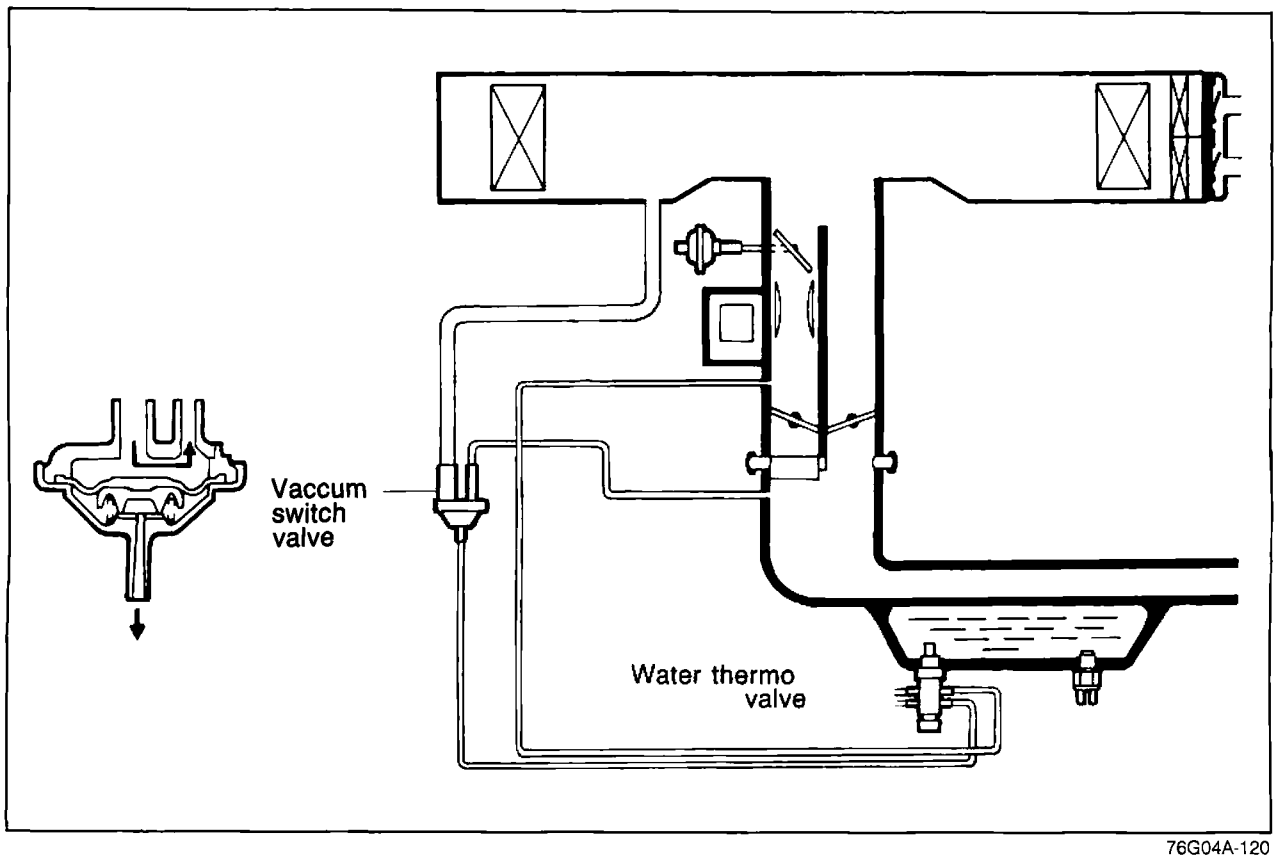


76G04A-119

System Inspection
Manual type
[Middle East and F6—General]
Change the summer-winter change lever and check that it moves smoothly.

PURGE CONTROL SYSTEM

[FE 8VALVE—UNLEADED FUEL]

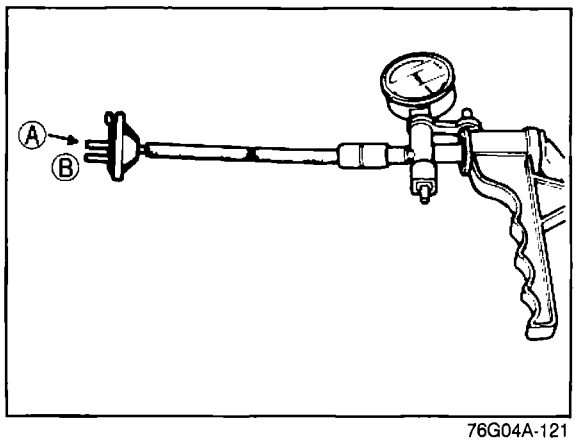


76G04A-120

This system supplies additional air to the intake manifold to improve the driveability when the engine coolant temperature is above **50°C (122°F)**.

TROUBLESHOOTING

Possible cause	Vacuum switch valve	Water thermo valve
Page	4A—63	4A—66
Checking order	1	2



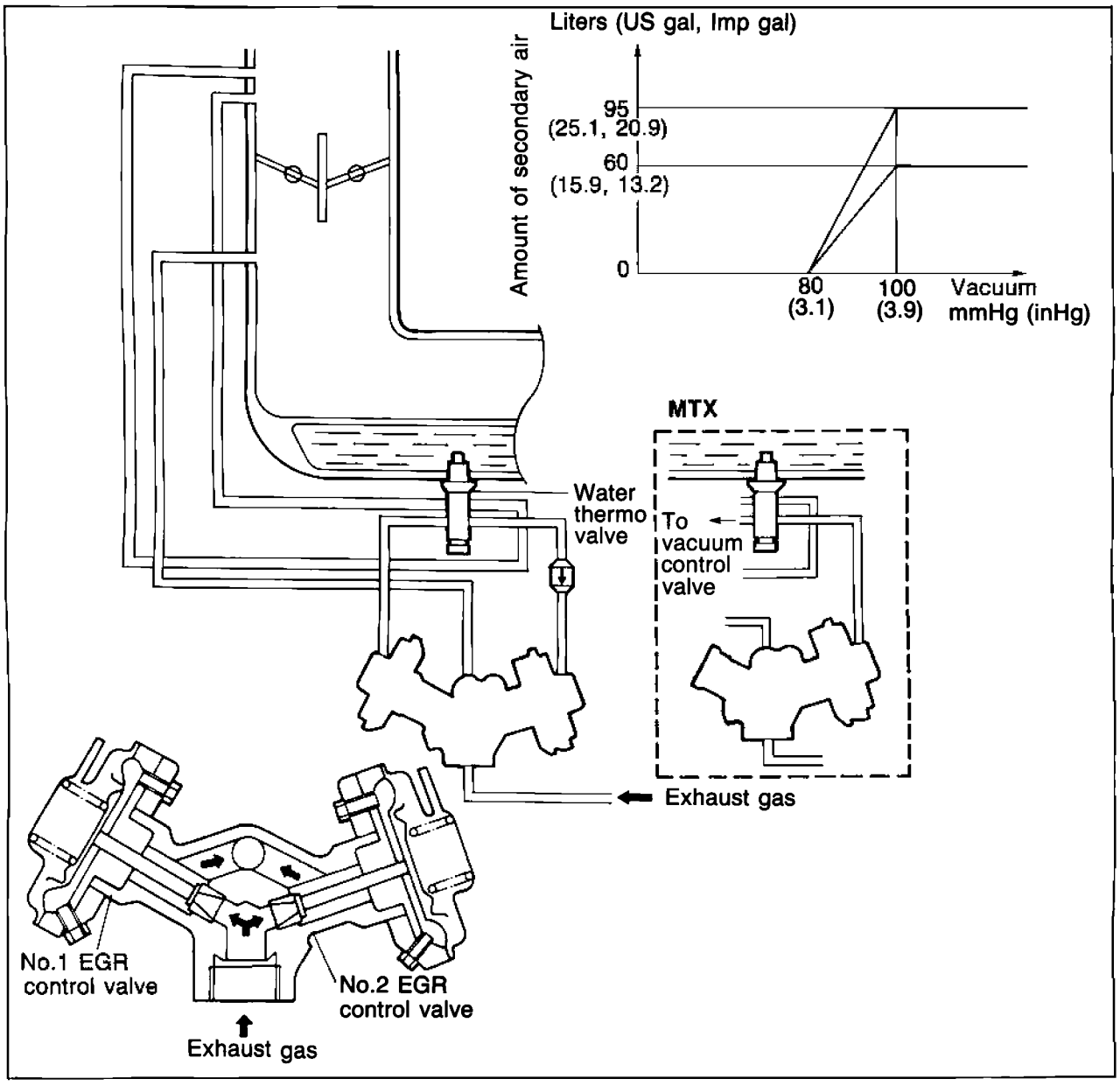
76G04A-121

VACUUM SWITCH VALVE

1. Connect a vacuum pump to the purge control valve as shown in the figure.
2. Blow through the valve from port A and check that air does not come out of port B.
3. Apply **100 mm-Hg (3.94 inHg)** vacuum.
4. Blow through port A and check that air comes out of port B.
5. Replace if necessary.

EXHAUST GAS RECIRCULATION (EGR) SYSTEM

FE 8VALVE—UNLEADED FUEL



76GJ4A-122

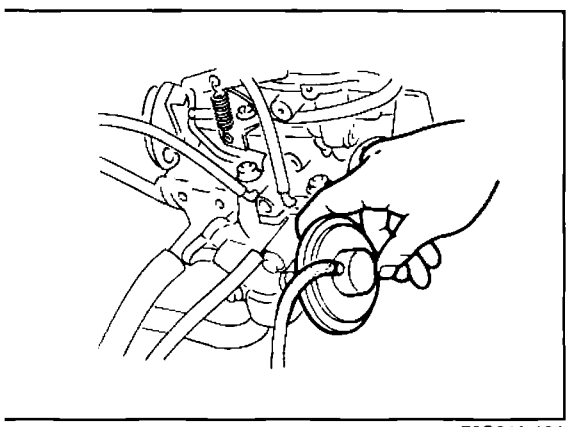
This system introduces exhaust gas into the intake manifold to reduce NOx emissions.

TROUBLESHOOTING

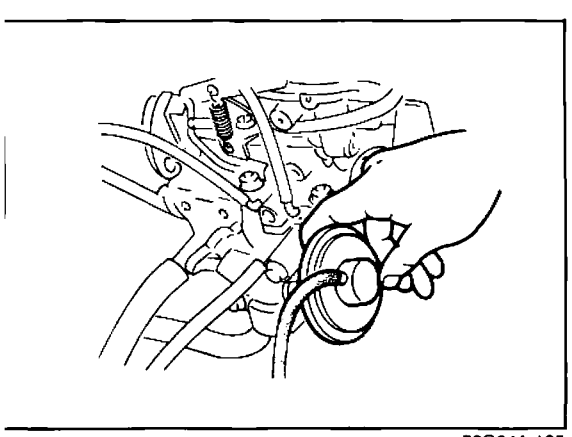
Note
Make the system inspection first. If no problem is found, continue with the next inspection of the Troubleshooting Guide. (Refer to pages 4A—22.)

Possible cause	System inspection	EGR control valve	Water thermo valve
Page	4A—65	4A—65	4A—66
Checking order	1	2	3

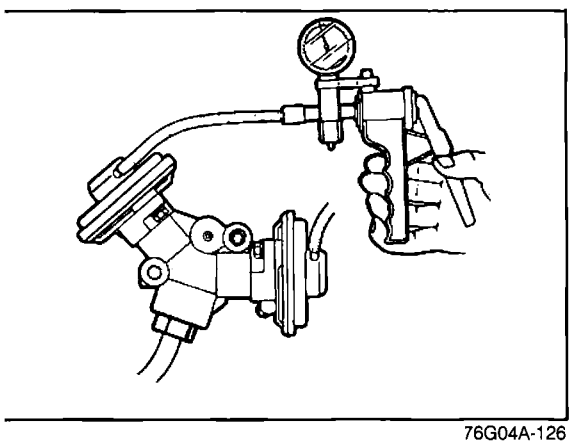
76G04A-123



76G04A-124



76G04A-125



76G04A-126

System Inspection

1. Start the engine.
2. Accelerate the engine while it is still cold and check that the diaphragm of the EGR control valve does not move.
3. Warm up the engine to normal operating temperature and run it at idle.

Warning
Be careful when checking the EGR control valve, the surrounding area is very hot.

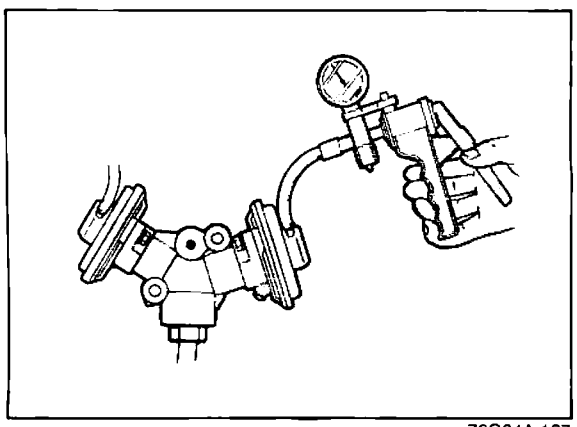
4. Accelerate the engine and check that the diaphragm of the EGR control valve moves.

EGR Control Valve (ATX) (No. 1)

1. Manually actuate the valves by pushing on the diaphragm with finger.
2. Check that the spring resistance is present and the diaphragm moves freely with no sticking or binding.
3. Warm up the engine and run it at idle.
4. Connect a vacuum pump to the valve and apply vacuum.
5. Check that the engine runs roughly or stalls at more than the specified vacuum.

Specification:
70—90 mmHg (2.8—3.5 inHg)

6. If not correct, replace the EGR control valve.

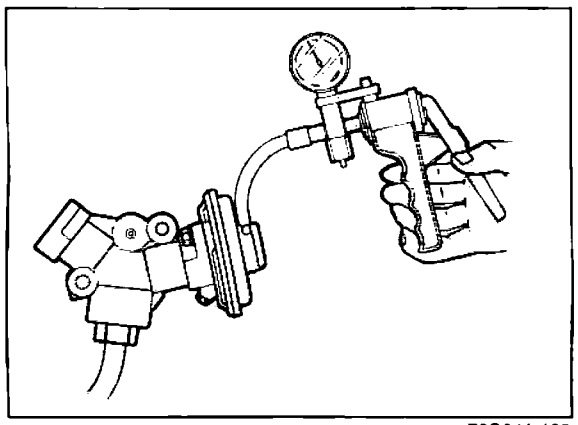


76G04A-127

(No. 2)
1. Check the EGR control valve manually (same as No. 1 valve).
2. Warm up the engine and run it at idle.
3. Connect a vacuum pump to the valve and apply vacuum.
4. Check that the engine runs roughly or stalls at more than the specified vacuum.

   Specification:
   70—90 mmHg (2.8—3.5 inHg)

5. If not correct, replace the EGR control valve.

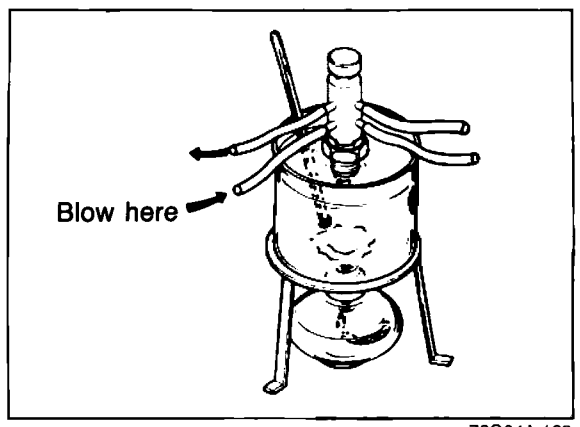


76G04A-128

EGR Control Valve (MTX)
1. Check the EGR control valve manually (same as above).
2. Warm up the engine and run it at idle.
3. Connect a vacuum pump to the valve and apply vacuum.
4. Check that the engine runs roughly or stalls at more than the specified vacuum.

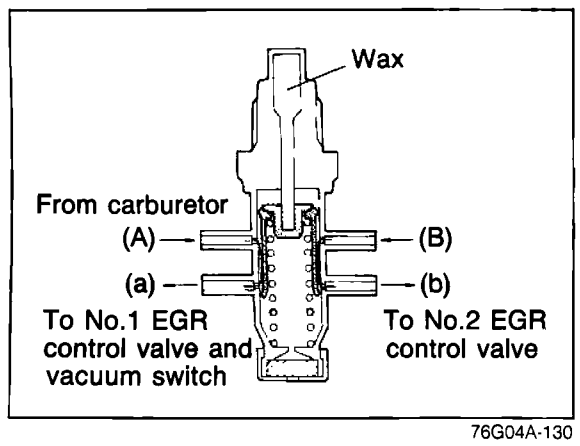
   Specification:
   70—90 mmHg (2.8—3.5 inHg)

5. If not correct, replace the EGR control valve.



76G04A-129

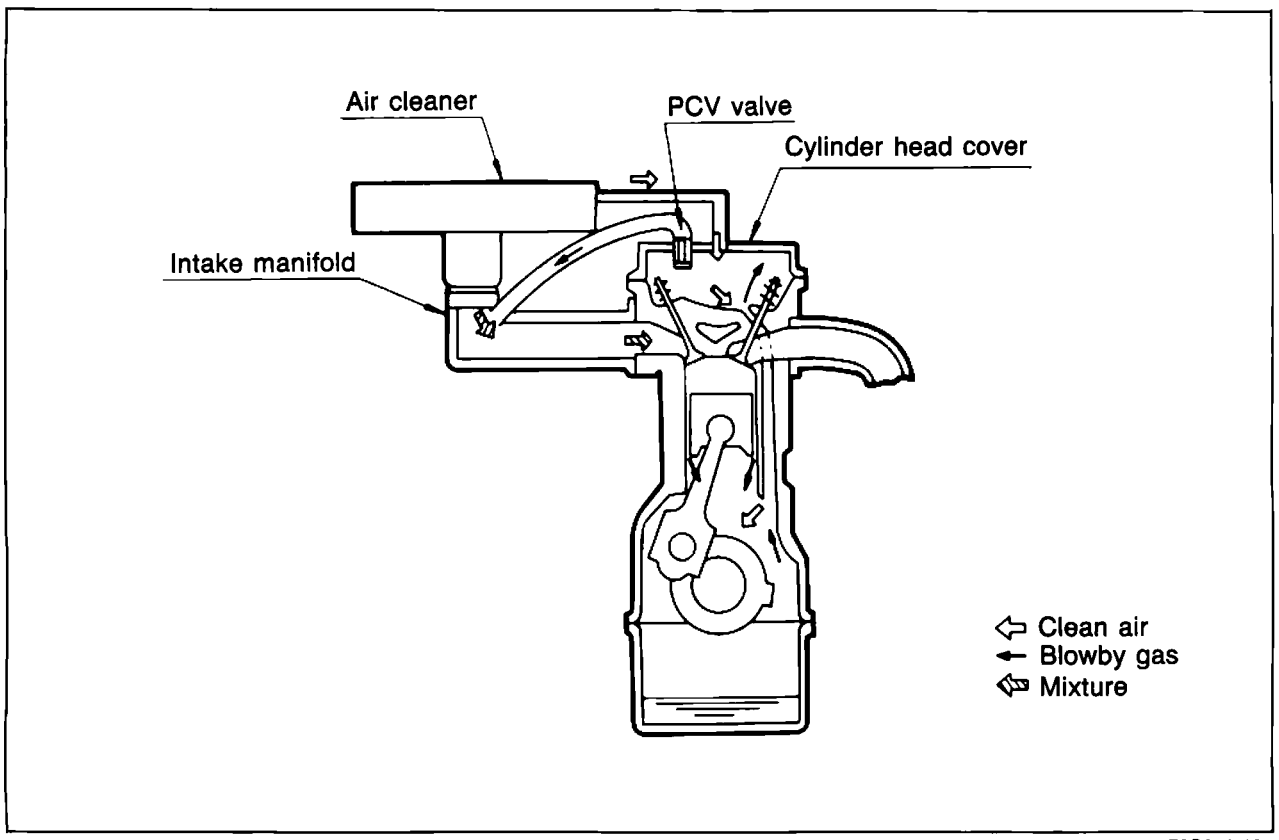
Water Thermo Valve
1. Remove the water thermo valve from the bottom of the inlet manifold.
2. Place the water thermo valve in a container with water and a thermometer.
3. Gradually heat the water to **50°C (122°F)**.



76G04A-130

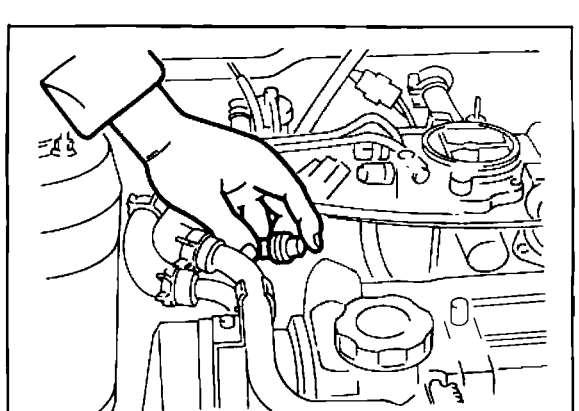
4. Blow air through the water thermo valve from (A), and check that air comes out from (a).
5. Blow air through the water thermo valve from (B) and check that air comes out from (b).
6. Replace if necessary.

POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM



76G04A-131

This system reburns the blow-by gases and operates while the engine is running to reduce emissions.



76G04A-132

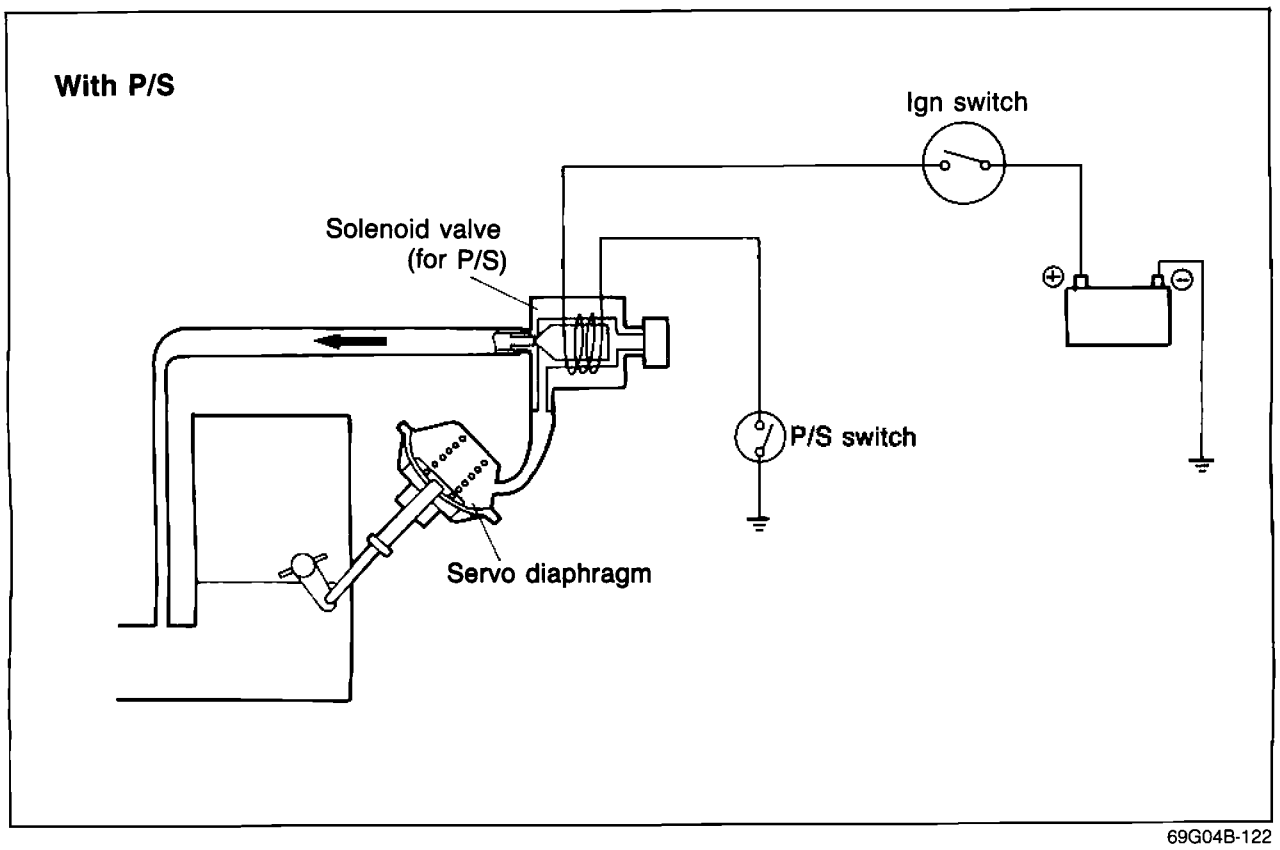
PCV VALVE

Inspection

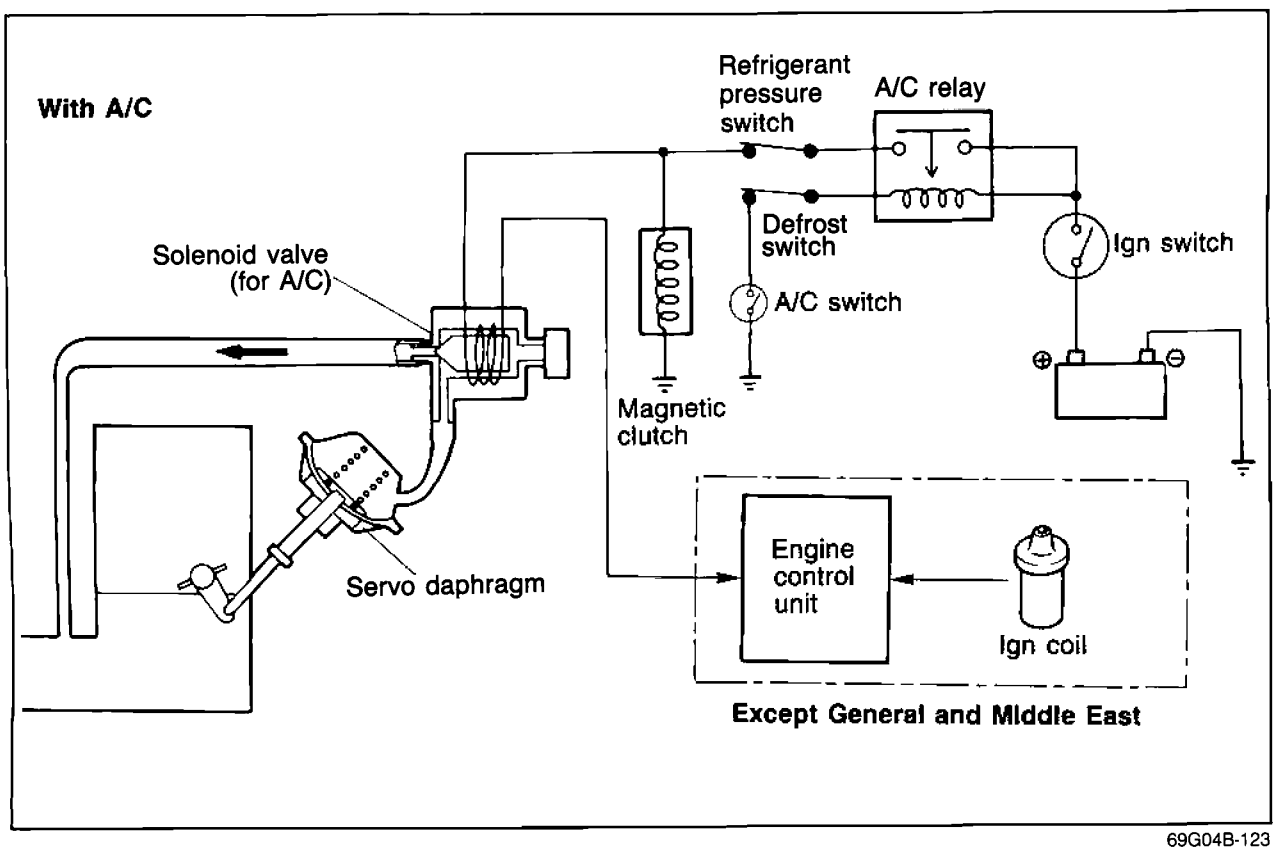
1. Warm up the engine to the normal operating temperature and run it at idle.
2. Disconnect the PCV valve and the ventilation hose from the cylinder head cover.
3. Block the PCV valve and check that the engine speed drops.
4. Replace the PCV valve if necessary.

IDLE-UP CONTROL SYSTEM

SINGLE-SERVO DIAPHRAGM TYPE



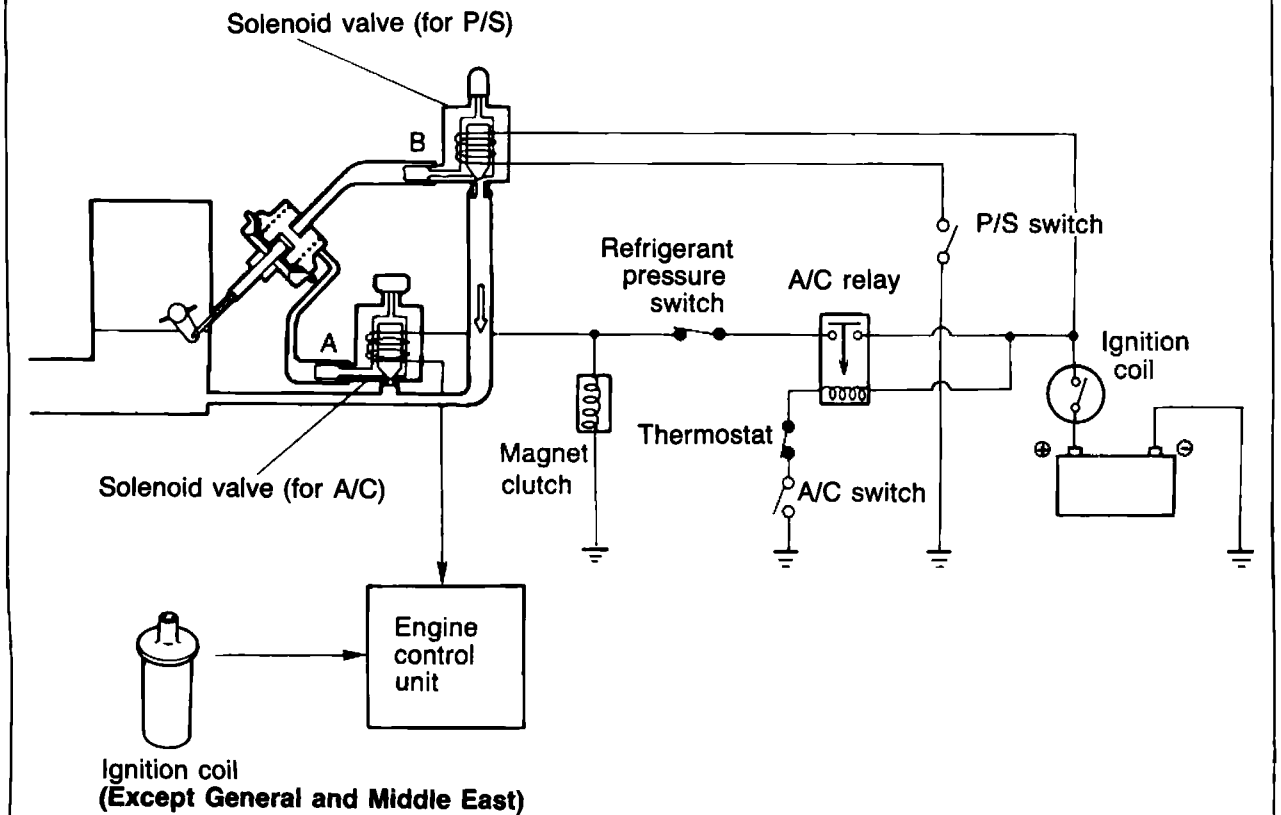
69G04B-122



69G04B-123

DUAL-SERVO DIAPHRAGM TYPE

With P/S and A/C



69G04B-124

Operation

A/C ON and compressor operating

Current flows through the A/C relay to the two-way solenoid valve for the A/C. Vacuum port A is opened, and vacuum is applied to the servo diaphragm, which in turn pulls the throttle plates slightly open at low speeds.

P/S operating

Current flows through the P/S switch to the three-way solenoid valve for power steering. Vacuum port B is opened and vacuum is applied to the servo diaphragm, which in turn pulls the throttle plates slightly open.

Relationship

Equipment / Type	P/S	A/C	P/S & A/C
Single-servo diaphragm type	○	○	
Dual-servo diaphragm type			○

4A IDLE-UP CONTROL SYSTEM

TROUBLESHOOTING
FE and F8 (ECE, Hong Kong, and Singapore)

Possible cause	Engine control unit terminal		Servo diaphragm	Vacuum signal	Solenoid valve	P/S switch	Idle-up solenoid valve	Relay (for A/C)	Thermostat	Refrigerant pressure switch
	ATX	MTX								
	H	P								
Page	4A—86	4A—88	4A—72	4A—74	4A—74	4A—75	4A—76	Section 16		
Checking order	9		2	3	4	5	1	6	7	8

76G04A-133

F6 (Singapore)

Possible cause	Relay	Engine control unit	Servo diaphragm	Vacuum signal	Solenoid valve	A/C switch	P/S switch	Relay (for A/C)	Thermostat	Refrigerant pressure switch
		All terminal								
Page	4A—57	4A—92	4A—72	4A—74	4A—74	Section 15	4A—75	Section 16		
Checking order	9	10	1	2	3	4	5	6	7	8

76G04A-134

FE and F8 (General)

Possible cause	Engine control unit terminal		Servo diaphragm	Vacuum signal	Solenoid valve	P/S switch	Idle-up solenoid valve	Relay (for A/C)	Thermostat	Refrigerant pressure switch
	ATX	MTX								
	H	P								
Page	4A—89	4A—90	4A—72	4A—74	4A—74	4A—75	4A—76	Section 16		
Checking order	9		2	3	4	5	1	6	7	8

76G04A-135

FE (Middle East) and F6 (General)

Possible cause	Servo diaphragm	Vacuum signal	Solenoid valve	A/C switch	P/S switch	Relay (for A/C)	Thermostat	Refrigerant pressure switch
Page	4A—72	4A—74	4A—74	Section 15	4A—75	Section 16		
Checking order	1	2	3	4	5	6	7	8

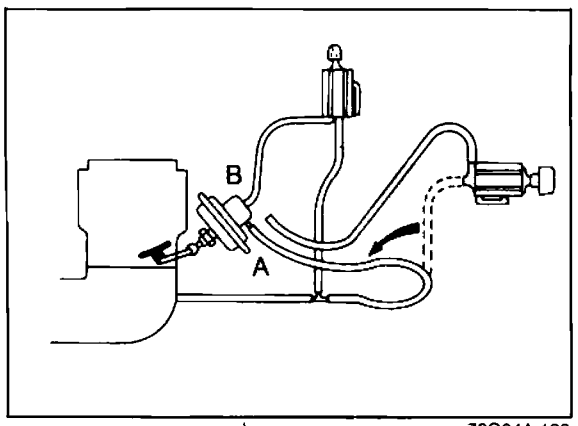
76G04A-136

FE 8Valve—Unleaded Fuel

Posible cause	Engine control unit terminal			Servo diaphragm	Vacuum signal	Solenoid valve	A/C switch	P/S switch	Relay (for A/C)	Thermostat	Refrigerant pressure switch
	H	D	I								
Page	4A—91			4A—72	4A—74	4A—74	Section 15	4A—75	Section 16		
Checking order	9			1	2	3	4	5	6	7	8

76G04A-137

4A IDLE-UP CONTROL SYSTEM

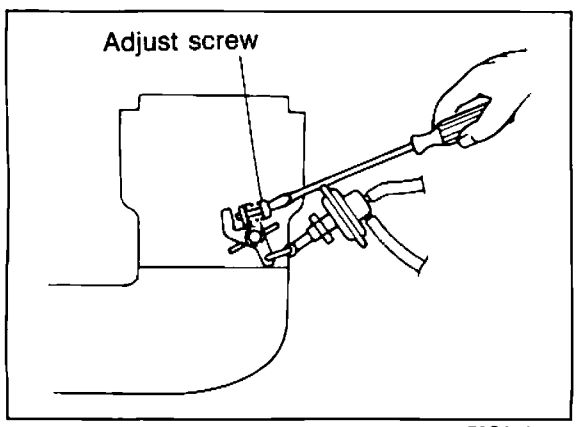


76G04A-138

Servo Diaphragm
Dual servo diaphragm type

1. Warm up the engine and run it at idle.
2. Connect a tachometer to the engine.
3. Disconnect the vacuum hose from the servo diaphragm port A.
4. Apply intake manifold vacuum directly to the diaphragm.

Caution
All accessories must be OFF.

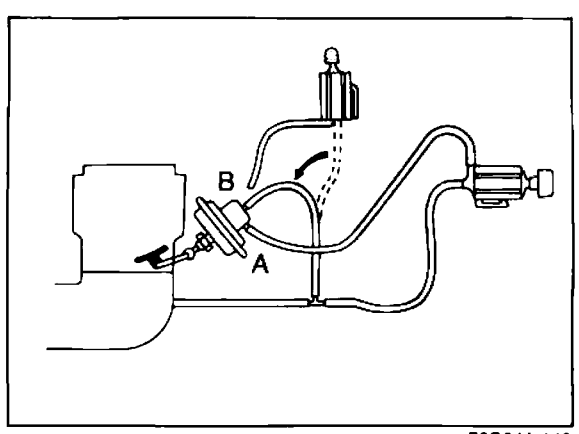


76G04A-139

5. Check that the engine speed is within the specification.

Engine speed: 1,200—1,400 rpm

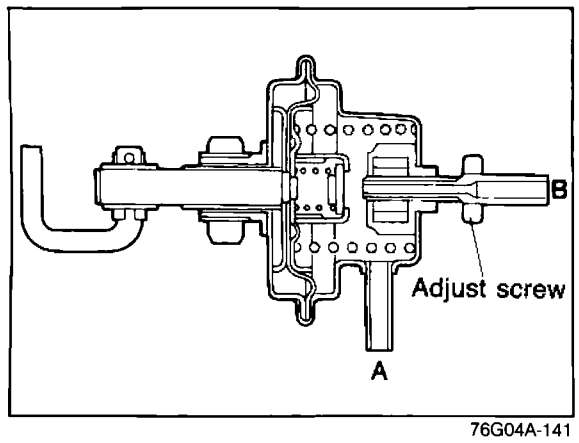
6. If not within specification, turn the adjust screw to adjust.
7. Reconnect the vacuum hoses.



76G04A-140

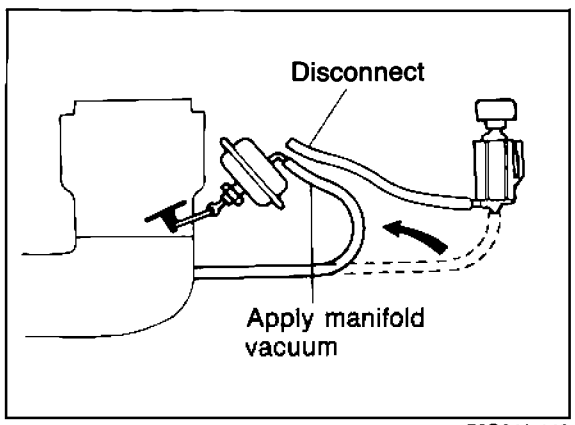
8. Disconnect the solenoid valve vacuum hose from the servo diaphragm port B.
9. Apply intake manifold vacuum directly to the diaphragm.
10. Check that the engine speed is within specification.

Engine speed: 800—1,000 rpm (MTX)
1,050—1,250 rpm (ATX)
(in N range)



76G04A-141

11. If not within specification, turn the adjust screw to adjust.
12. Reconnect the vacuum hoses.



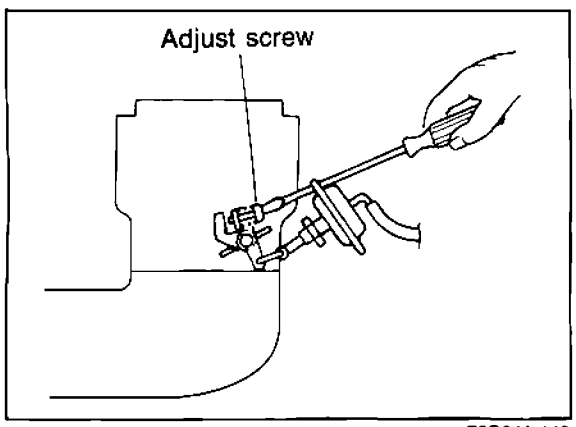
76G04A-142

Single servo diaphragm type

1. Warm up the engine and run it at idle.
2. Connect a tachometer to the engine.
3. Disconnect the vacuum hose from the servo diaphragm.
4. Check that the engine speed is within specification.

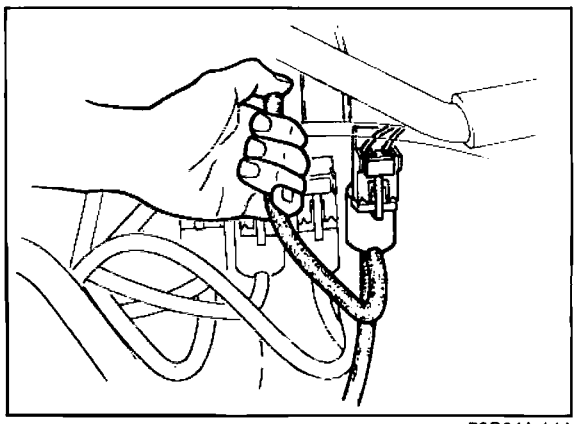
Engine speed:

P/S operated	**800—1,000 rpm (MTX)**
	1,050—1,250 rpm (ATX) (in N range)
A/C operated	**1,200—1,400 rpm**

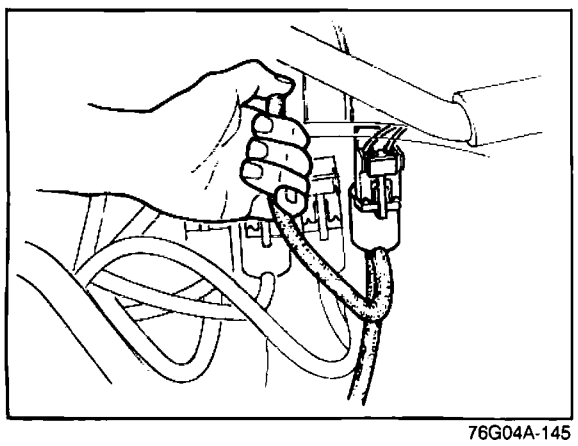


76G04A-143

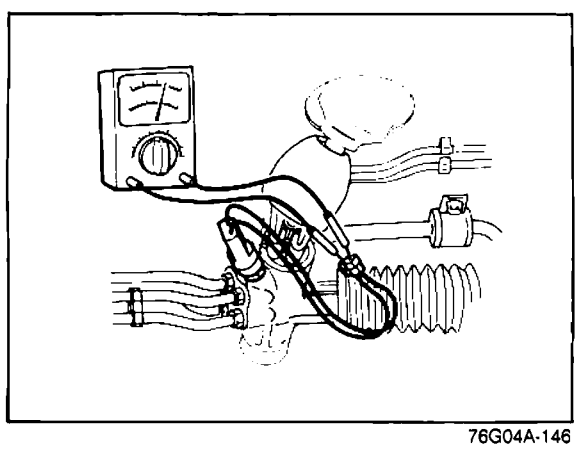
6. If not within specification, turn the adjust screw to adjust.



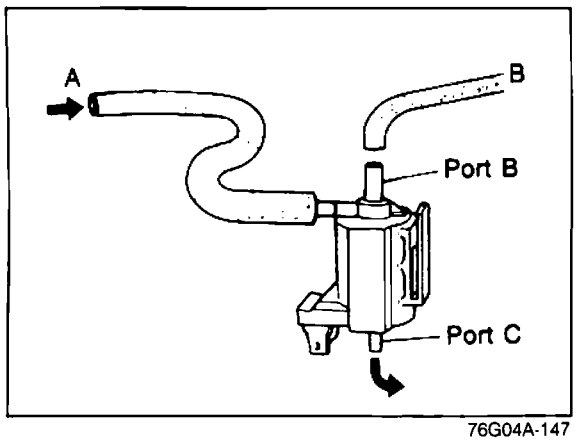
76G04A-144



76G04A-145



76G04A-146



76G04A-147

Vacuum Signal [Equipped with A/C, only FE and F8 (Except Middle East and General)]

1. Start the engine and run it at idle.
2. Disconnect the vacuum hose from the servo diaphragm.
3. Place a finger over the hose.
4. Increase the engine speed, and check for vacuum.

Engine model	Engine speed	Vacuum
FE F8 (Except Middle)	Below 2,300 rpm	Yes
	Above 2,300 rpm	No
FE (Unleaded fuel)	Below 1,500 rpm	Yes
	Above 1,500 rpm	No
F6 (Singapore)	Below 2,100 rpm	Yes
	Above 2,100 rpm	No

General and Middle East

1. Start the engine and run it at idle.
2. Disconnect the vacuum hose from the servo diaphragm.
3. Place a finger over the hose.
4. Operate the A/C or P/S.
5. Check that vacuum is felt.

P/S Switch

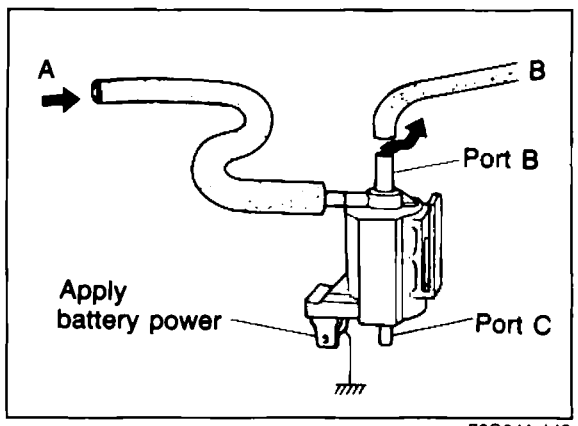
1. Start the engine and run it at idle.
2. Disconnect the power steering switch connector.
3. Connect an ohmmeter to the power steering switch.
4. Turn the steering wheel all the way to either the right or left, and check for continuity.

P/S	Continuity
Operated	Yes
Not operated	No

5. Replace if necessary.

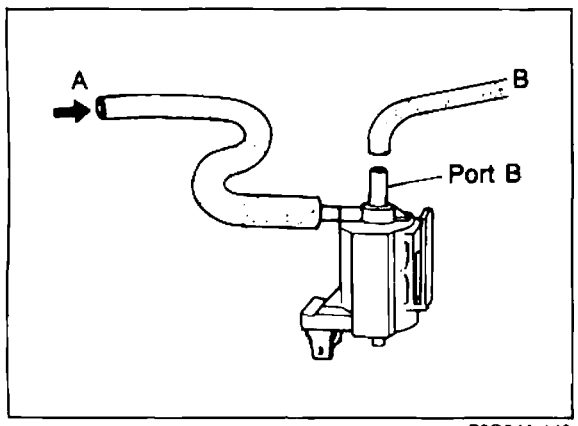
Solenoid Valve (A/C)

1. Disconnect vacuum hose A from the servo diaphragm.
2. Disconnect vacuum hose B from the solenoid valve.
3. Disconnect the solenoid valve connector.
4. Blow air through the valve from hose A and check that it comes out of port C.



76G04A-148

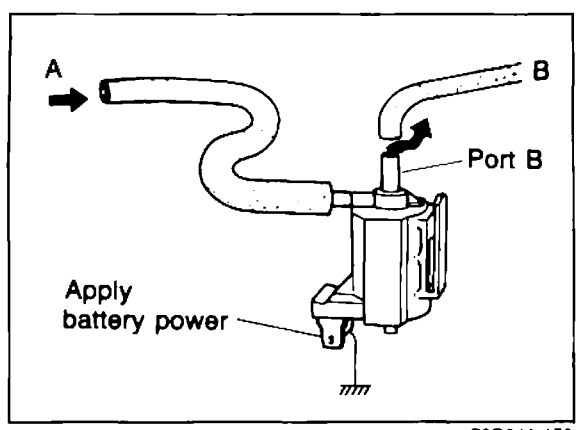
5. Apply 12V and ground to the solenoid valve with jumper wires.
6. Blow air through the valve from hose A and check that it comes out of port B.
7. Replace if necessary.



76G04A-149

Solenoid Valve (P/S)

1. Disconnect vacuum hose A from the servo diaphragm.
2. Disconnect vacuum hose B from the solenoid valve.
3. Disconnect the solenoid valve connector.
4. Blow air through the valve from hose A and check that it not come out of port B.

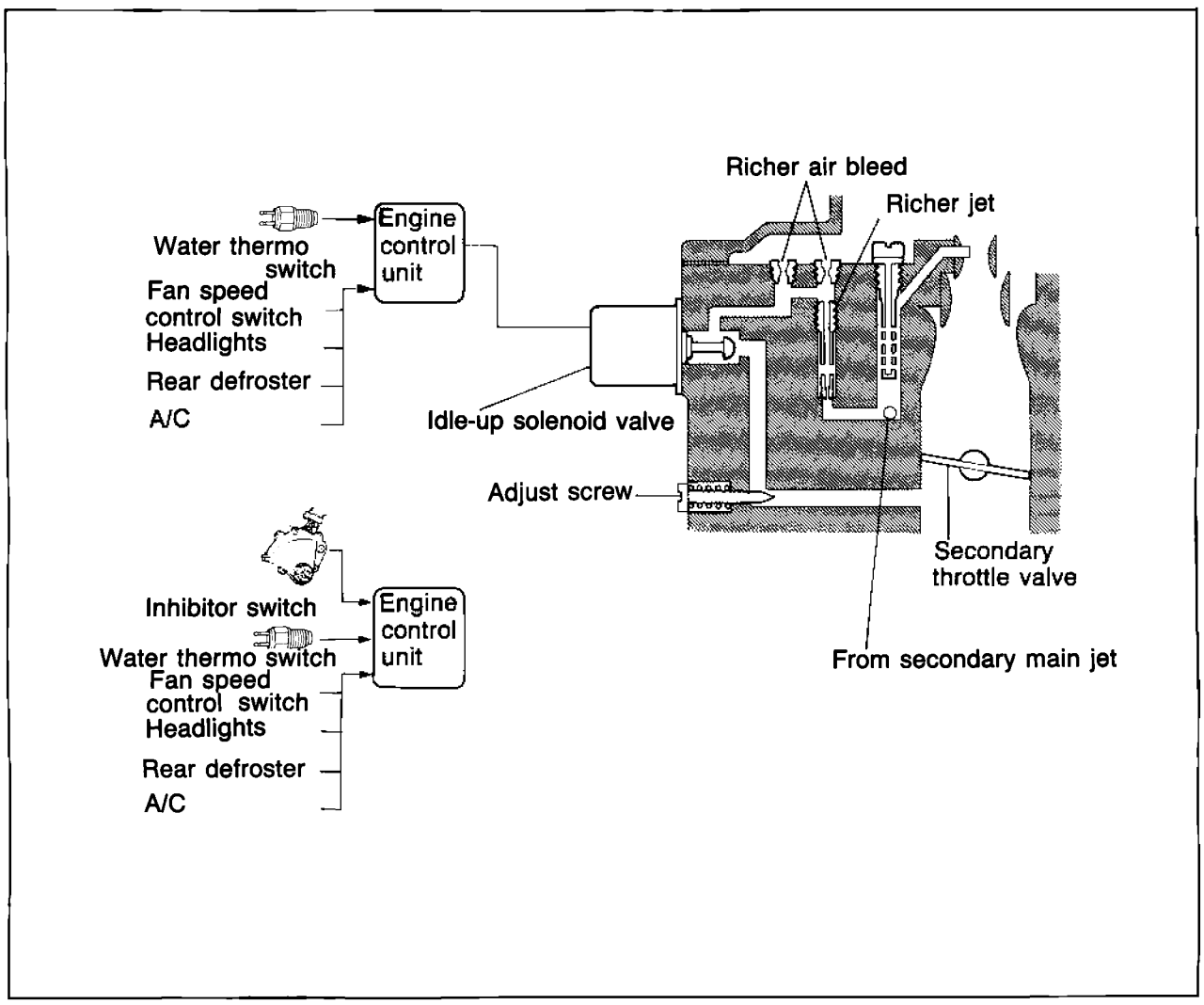


76G04A-150

5. Apply 12V and a ground to the solenoid valve with jumper wires.
6. Blow air through the valve from hose A and check that it comes out of port B.
7. Replace if necessary.

4A IDLE-UP CONTROL SYSTEM

IDLE-UP SOLENOID VALVE
FE and F8 (General, ECE, Hong Kong, and Singapore)



76G04A-151

The idle-up solenoid valve opens when the following conditions are met.

Condition
When inhibitor switch is OFF (ATX—other than "P" and "N" range) and any of the following:
- **Engine coolant temperature less than 72°C (162°F).**
- **A/C operated.**
- **Fan speed control switch 3rd or 4th position.**
- **Headlights turned on.**
- **Rear defroster turned on.**

Troubleshooting

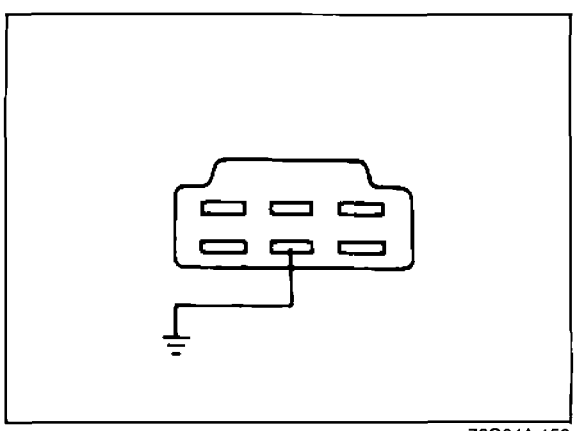
Note
Make the system inspection first. If no problem is found, continue with the next inspection of the Troubleshooting. (Refer to page 4A—70.)

Possible cause / Symptom	Combination switch	Rear defroster switch	Fan speed control switch	Water thermo switch	Inhibitor switch (ATX)	A/C switch	idle-up solenoid valve	Engine control unit terminal	System inspection
Page	Section 15	Section 15		4A—95	4A—93	Section 15	4A—77	4A—86—4A—91	4A—77
Checking order	3	4	5	6	7	8	2	9	1

76G04A-152

***Engine control unit terminal**
Check the following terminal voltages

Transmission	Terminal
MTX	A, C, D, H, Q, R
ATX	I, 2B, 2C, 2D, 2E, 2H, 2M

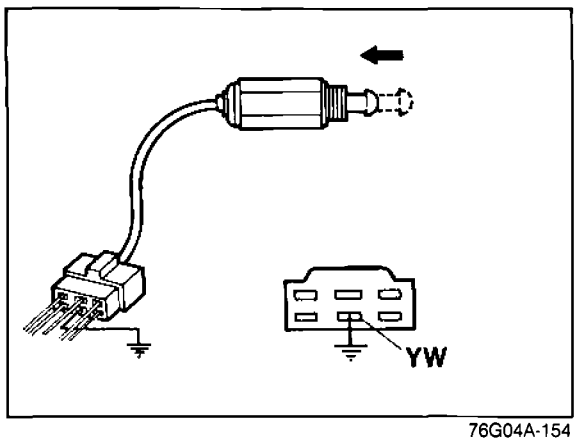


76G04A-153

System Inspection
1. Warm up the engine and run it at idle.
2. Connect a jumper wire to the carburetor connector terminal wire **(YW)** and ground.
3. Connect a tachometer to the engine.
4. Turn all accessories off.
5. Verify that the engine speed is within specification.

   Engine speed: 900—950 rpm (MTX)
   Engine speed: 1,000—1,050 rpm (ATX; in N range)

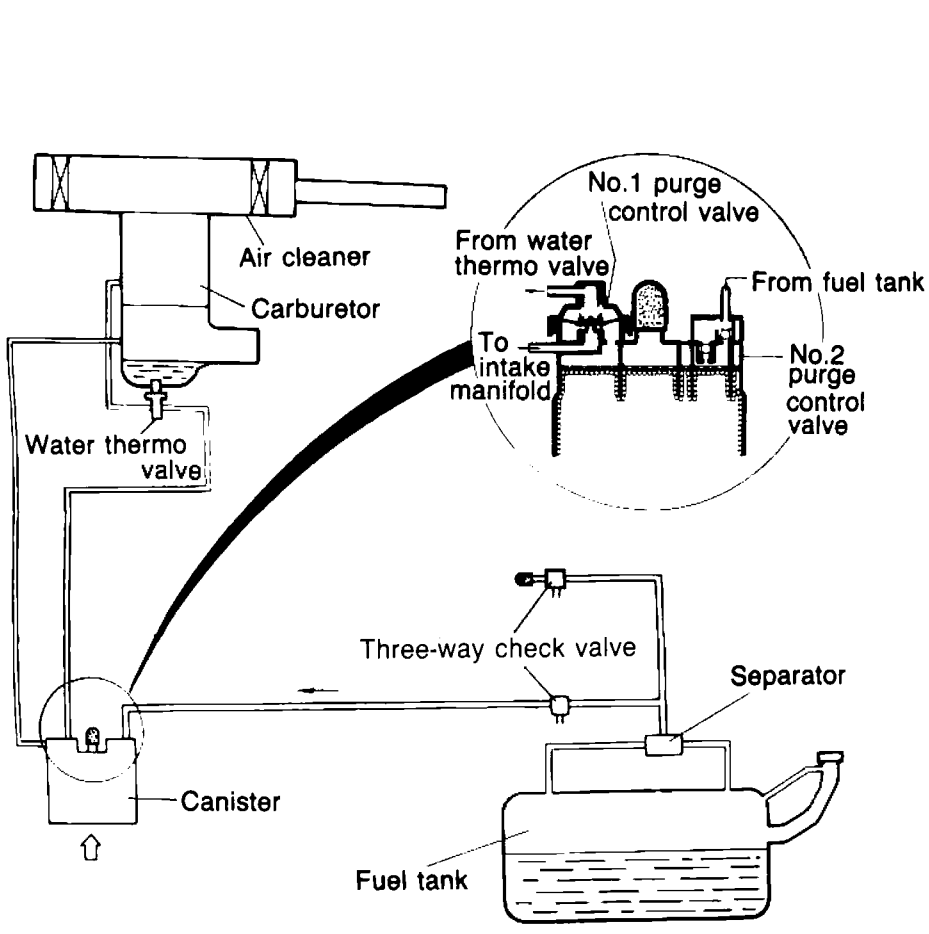
6. Disconnect the tachometer.



76G04A-154

Idle-up Solenoid Valve
1. Turn all accessories OFF and turn the ignition switch ON.
2. Disconnect the idle-up solenoid valve connector.
3. Ground the carburetor connector terminal wire **(YW)** using with a jumper wire.
4. Check the rod is drawn into the valve.
5. Replace if necessary.

EVAPORATIVE EMISSION CONTROL SYSTEM (MIDDLE EAST)



76G04A-155

Operation

Cold engine — below 50°C (122°F)

The No. 1 purge control valve does not operate because the vacuum passage of the water thermo valve is opened to the atmospheric air side.

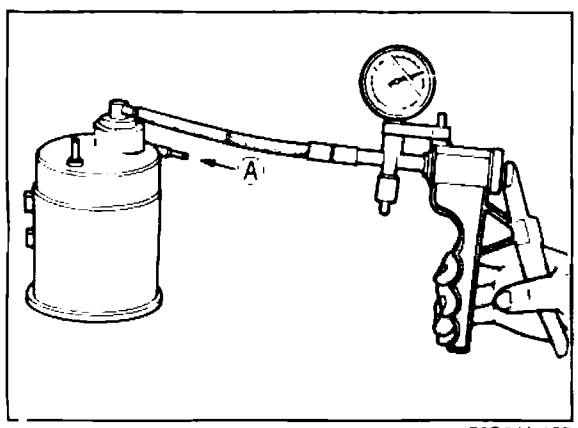
Warm engine — above 50°C (122°F)

1. During normal driving, the carburetor vacuum signal is led to the No. 1 purge control valve with the result that fuel vapors are drawn into the intake manifold.

Troubleshooting

Possible cause	No. 1 purge control valve	No. 2 purge control valve	Water thermo valve	Three-way check valve
Page	4A—79	4A—79	4A—79	4A—37
Checking order	1	2	3	4

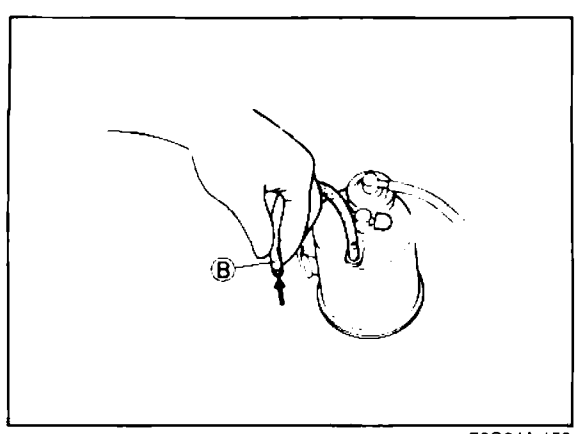
76G04A-156



76G04A-157

No. 1 Purge Control Valve

1. Blow through the purge control valve from port A and check that air does not flow.
2. Connect a vacuum pump to the purge control valve.
3. Apply **110 mmHg (4.29 inHg)** vacuum with a vacuum pump, and blow through port A again; air should flow.

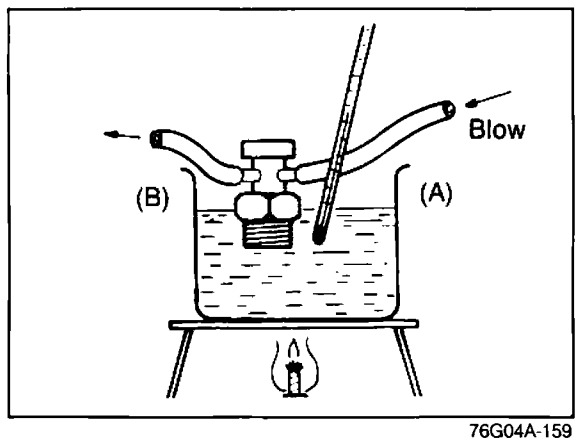


76G04A-158

No. 2 Purge Control Valve

1. Disconnect vacuum hose A from the pipe.
2. Check the air flow of the No. 2 purge control valve.

Specification:
15—35 mmHg (0.6—1.4 inHg): Below
-8—-18 mmHg (0.3—0.7 inHg): Suck



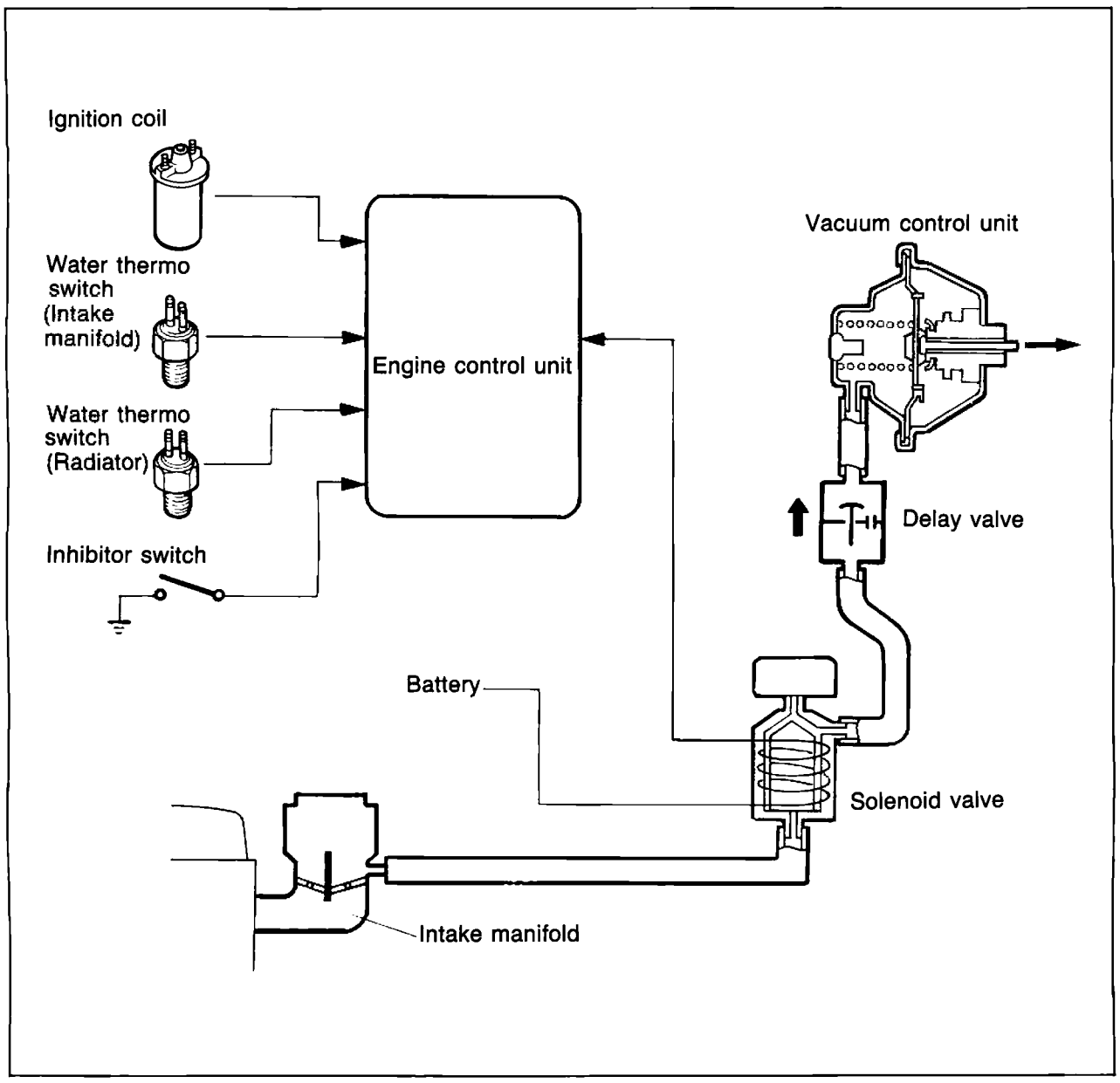
76G04A-159

Water Thermo Valve

1. Remove the water thermo valve.
2. Place the valve in water with a thermometer.
3. Heat the water gradually to **50°C (122°F)**.
4. Blow through the valve from hose A and check that air comes out of port B.

IGNITION TIMING CONTROL SYSTEM

F8 and FE (12-VALVE)—ATX (ECE, Singapore, and Hong Kong)



76G04A-160

This system consists of the distributor, solenoid valve, and several switches, vacuum to the vacuum control unit of the distributor is cut when the conditions below are met.

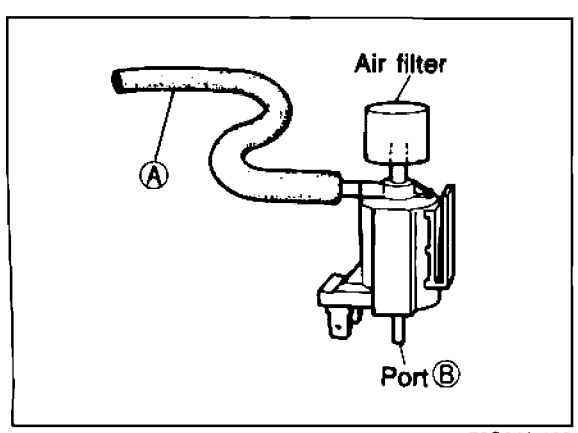
Item	Condition
Engine speed	**Below 2,300 rpm**
Selector lever position	Other than P and N range
Coolant temperature	Engine coolant: **below 72°C (162°F)** Radiator coolant: **above 17°C (65°F)**

TROUBLESHOOTING

Check the condition of the wiring harness and components before checking the sensors or switches.

Possible cause / Page / Symptom	Water thermo switch (Intake manifold)	Water thermo switch (Radiator)	Inhibitor switch	Solenoid valve (Ignition timing control)	Delay valve	Vacuum control unit (Distributor)	Engine control unit terminal				
							1F	2A	2F	2H	2M
	4A—95	4A—95	4A—93	4A—81	4A—82	Section 5	4A—85	4A—86			
Poor acceleration, hesitation, or lack of power	5	6	4	2	3	1	11	7	8	9	10
Fails emission test	4	5	3	2	—	1	10	6	7	8	9

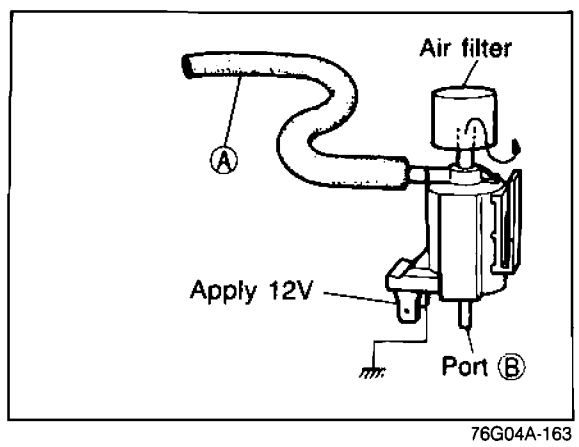
76G04A-161



76G04A-162

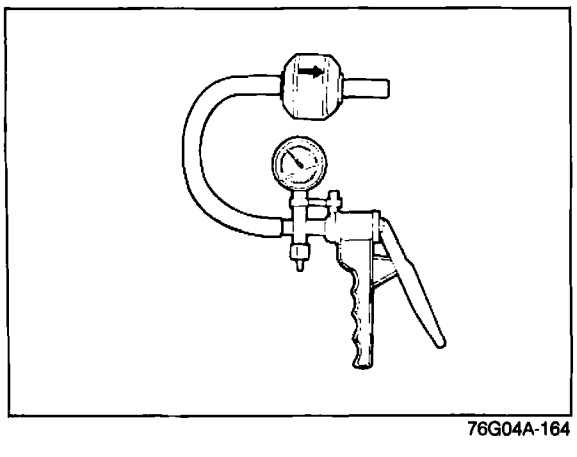
Solenoid Valve (Ignition Timing Control)

1. Disconnect the vacuum hose from the solenoid valve and vacuum pipe.
2. Blow through the solenoid valve from vacuum hose A.
3. Check that air flows from port B.



76G04A-163

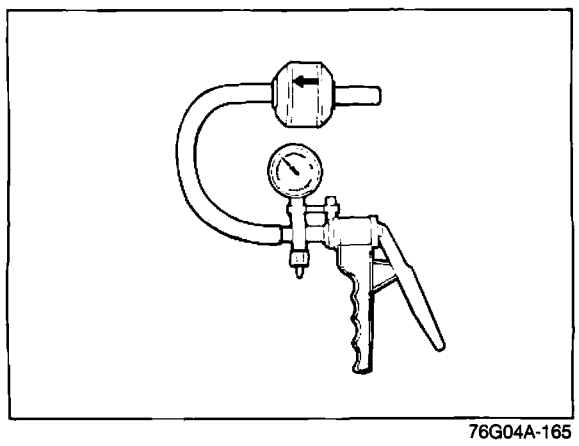
4. Disconnect the solenoid valve connector.
5. Connect 12V and a ground to the terminals of the solenoid valve.
6. Blow through the solenoid valve from vacuum hose A.
7. Check that air flows from the valve air filter.



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Delay Valve

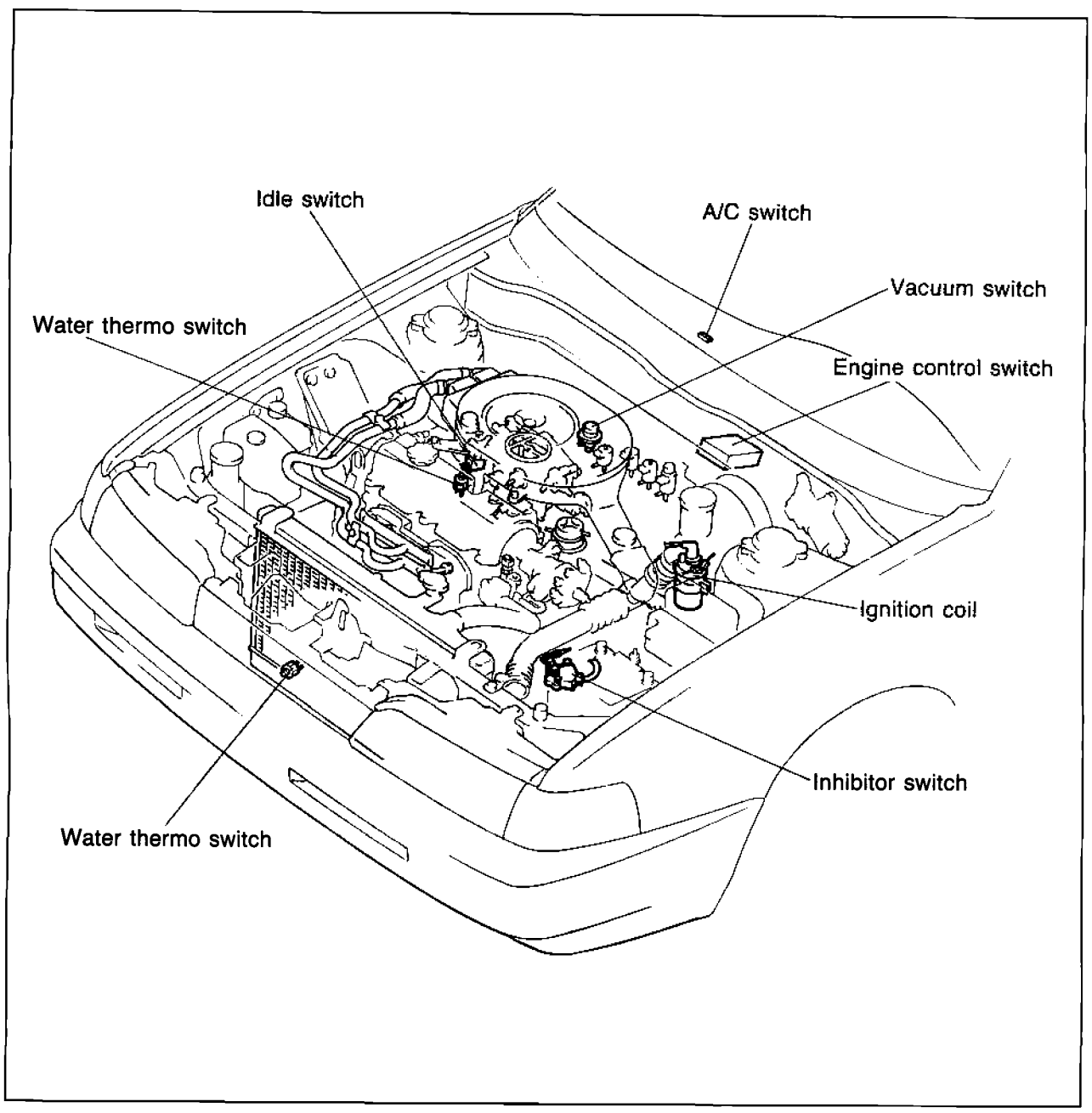
1. Remove the delay valve.
2. Connect a vacuum pump to the valve as shown in the figure.
3. Apply vacuum and check that it is released gradually.
4. If not correct, replace the delay valve.



76G04A-165

5. Connect a vacuum pump to the valve as shown in the figure.
6. Apply vacuum and check that it is not held.
7. If not correct, replace the delay valve.

CONTROL SYSTEM



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The control system consists of the engine control unit, water thermo switches, A/C switch, P/S switch, inhibitor switch, vacuum switch, and idle switch.

RELATIONSHIP CHART
○: Related
X : Not related

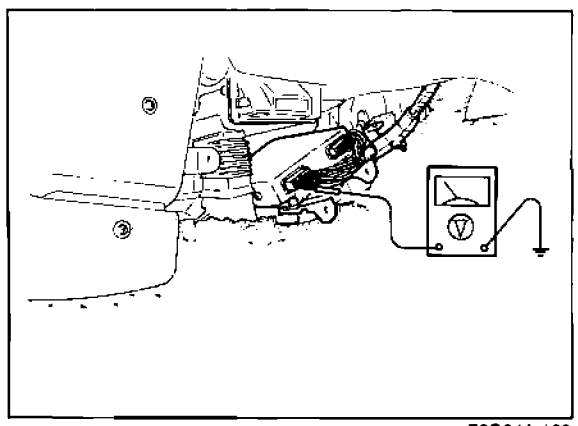
INPUT DEVICE AND ENGINE CONTROL UNIT / OUTPUT DEVICE		PTC HEATER	CHOKE OPENER (FE and F8 — ECE, Hong Kong, & Singapore)	COASTING LEANER	COAST ENRICHMENT SOLENOID VALVE	AIR BYPASS SOLENOID VALVE	IDLE-UP SOLENOID VALVE	IGNITION TIMING CONTROL SYSTEM	MAIN AIR BLEED CONTROL SYSTEM
IGNITION COIL		×	×	○	○	○	×	○	×
WATER THERMO SWITCH	RADIATOR	○	○	×	×	×	×	○	○
	INTAKE MANIFOLD	*○	×	×	×	×	○	○	×
VACUUM SWITCH		×	×	×	×	×	×	×	○
IDLE SWITCH		×	×	○	○	○	×	×	×
A/C SWITCH		×	×	×	×	×	○	×	×
P/S SWITCH		×	×	×	×	×	×	×	×
E/L SWITCHES (Headlight Switch, Rear defroster switch, Fan speed control switch)		×	×	×	×	×	○	×	×
INHIBITOR SWITCH		×	×	×	×	×	○	○	×
ENGINE CONTROL UNIT		×	○	○	○	○	○	○	○

* FE 8Valve—Unleaded Fuel: ○ (Related)
General and FE 12Valve—ECE, Hong Kong, Singapore: X (Not related)

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ENGINE CONDITION / OUTPUT DEVICE	CRANKING (COLD ENGINE)	WARMING UP (DURING IDLE)	MEDIUM LOAD		ACCELERATION	HEAVY-LOAD	DECELERATION	IDLE (THROTTLE VALVE FULLY CLOSED)	IGN: ON (ENGINE NOT RUNNING)	REMARK
			COLD	WARM						
PTC HEATER	ON*1	OFF	ON*1	OFF					OFF	*1 Radiator coolant temperature less than 17°C (63°F)
SOLENOID VALVE (CHOKE OPENER)	ON	OFF	ON*1	OFF						
COASTING LEANER	OFF						ON*2 (Mixture lean)	OFF		*2 Engine speed more than approx. 2,100 rpm
COAST ENRICHMENT SOLENOID VALVE	OFF						ON*3 (Mixture rich)	OFF		*3 Engine speed 1,500 — 2,300 rpm
AIR BYPASS SOLENOID VALVE	OFF						ON*4	OFF		*4 Engine speed more than approx. 2,100 rpm*8 or approx. 3,500 rpm*9
SOLENOID VALVE (IGNITION TIMING CONTROL SYSTEM)	OFF	ON*5 (Vacuum cut)	OFF							*5 Engine coolant temperature less than 72°C (162°F), radiator coolant temperature more than 17°C (63°F), engine speed less than approx. 2,300 rpm, and in gear condition
EGR CONTROL VALVE	CLOSED	OPEN*6	CLOSED	OPEN (Supplies exhaust gas into intake manifold)					CLOSED	*6 Engine coolant more than 50°C (122°F)
MAIN AIR BLEED CONTROL SOLENOID VALVE	CLOSED	OPEN*7	CLOSED (Mixture rich)				OPEN (Mixture lean)		DOES NOT OPERATE	*7 Radiator coolant temperature less than 17°C (63°F)

*8 FE 12 Valve and F8
*9 FE 8 Valve



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ENGINE CONTROL UNIT
Check the engine control unit terminal voltages with a voltmeter.

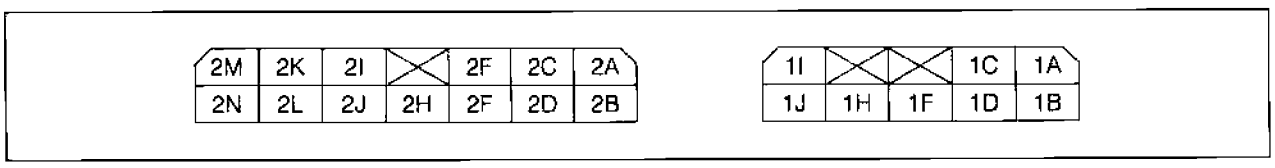
Caution
a) Warm up the engine before checking the control unit.
b) If the proper voltage is not obtained, check the wiring, connections and finally, check the component.

FE and F8 Engine — ATX (ECE, Hong Kong, and Singapore)

Terminal (Wire color)	Connected to	Condition	Voltage
1A (BW)	Ignition switch	Ignition switch ON.	Battery voltage
1B (GR)	Solenoid valve (Main air bleed control)	Others	Battery voltage
		Radiator coolant temperature below 17°C (63°F) or intake manifold vacuum more than 200 mmHg (7.9 inHg)	Below 1.5V
1C (GO)	Solenoid valve (Choke opener)	Radiator coolant temperature below 17°C (63°F) or during cranking and 27 sec. after engine starts	Below 1.5V
		Others	Battery voltage
1D (GL)	Air bypass solenoid valve	Idle switch OFF and engine speed above approx. 2,100 rpm	Below 1.5V
		Others	Battery voltage
1E	—	—	—
1F (G)	Solenoid valve (Ignition timing control system)	Radiator coolant temperature above 17°C (63°F), engine coolant temperature below 72°C (162°F), inhibitor switch OFF and engine speed below 2,300 rpm	Below 1.5V
		Others	Battery voltage
1G	—	—	—
1H (LW)	Solenoid valve (A/C)	A/C switch ON and engine speed below approx. 2,300 rpm	Below 1.5V
		Others	Battery voltage
1I (YW)	Idle-up solenoid valve	Inhibitor switch OFF and, headlight switch ON, rear defroster switch ON, fan speed control switch is 3rd or 4th position, A/C operated, or engine coolant temperature below 72°C (162°F)	Below 1.5V
		Others	Battery voltage
1J (B)	Ground	—	Below 1.5V

Terminal (Wire color)	Connected to	Condition	Voltage
2A (YL)	Ignition coil	Ignition switch ON or engine running	Battery voltage
2B (LB)	Fan speed control switch	Fan speed control switch in 3rd or 4th position	Below 1.5V
		Fan speed control switch OFF	Battery voltage
2C (BL)	Rear defroster switch	Rear defroster switch ON	Below 1.5V
		Rear defroster switch OFF	Battery voltage
2D (LG)	A/C switch	A/C operated	Below 1.5V
		A/C not operated	Battery voltage
2E (RG)	Headlight switch	Headlight switch OFF	Below 1.5V
		Headlight switch ON	Battery voltage
2F (GW)	Water thermo switch (Radiator)	Radiator coolant temperature below 17°C (63°F)	Below 1.5V
		Radiator coolant temperature above 17°C (63°F)	Battery voltage
2G	—	—	—
2H (L)	Water thermo switch (Intake manifold)	Engine coolant temperature below 72°C (162°F)	Below 1.5V
		Engine coolant temperature above 72°C (162°F)	Battery voltage
2I (LY)	Vacuum switch	Vacuum less than 200 mmHg (7.9 inHg)	Below 1.5V
		Vacuum more than 200 mmHg (7.9 inHg)	Battery voltage
2J (RL)	OD release solenoid valve	Engine coolant temperature below 72°C (162°F)	Below 1.5V
		Engine coolant temperature above 72°C (162°F)	Battery voltage
2K (—)	—	—	—
2L (BR)	Inhibitor switch	"N" or "P" range	Below 1.5V
		Others	Battery voltage
2M (BY)	Ignition switch (START position)	Ignition switch ON	Below 1.5V
		Cranking	Battery voltage
2N (LsB)	Idle switch	Idling	Battery voltage
		Accelerator pedal depressed	Below 1.5V

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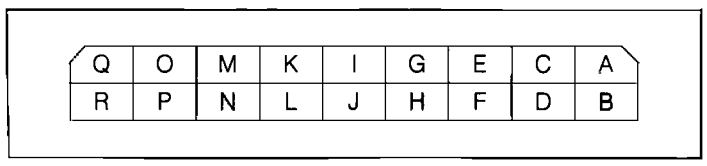


FE and F8 Engine — MTX (ECE, Hong Kong, and Singapore)

Terminal (Wire color)	Connected to	Condition	Voltage
A (RG)	Headlight switch	Headlight switch ON	Below 1.5V
		Headlight switch OFF	Battery voltage
B (B)	Ground	—	Below 1.5V

Terminal (Wire color)	Connected to	Condition	Voltage
C (BL)	Rear defroster switch	Rear defroster switch ON	Below 1.5V
		Rear defroster switch OFF	Battery voltage
D (LG)	A/C switch	A/C operated	Below 1.5V
		A/C not operated	Battery voltage
E (LY)	Solenoid valve (Main air bleed control)	Intake manifold vacuum more than 300 mmHg (11.8 inHg), and radiator coolant temperature above 17°C (63°F)	Battery voltage
		Others	Below 1.5V
F (GW)	Water thermo switch (Radiator)	Radiator coolant temperature below 17°C (63°F)	Below 1.5V
		Radiator coolant temperature above 17°C (63°F)	Battery voltage
G (YL)	Ignition coil	Ignition switch ON or engine running	Battery voltage
H (L)	Water thermo switch (Intake manifold)	Engine coolant temperature below 72°C (162°F)	Below 1.5V
		Engine coolant temperature above 72°C (162°F)	Battery voltage
J (BW)	Ignition switch	Ignition switch ON	Battery voltage
K (GO)	Solenoid valve (Choke opener)	Radiator temperature below 17°C (63°F) or during cranking and 27 sec. after engine starts	Below 1.5V
		Others	Battery voltage
L (LsB)	Idle switch	Idling	Battery voltage
		Accelerator pedal depressed	Below 1.5V
M (GL)	Air bypass solenoid valve	Idle switch OFF and engine speed above approx. 2,100 rpm	Below 1.5V
		Others	Battery voltage
O (BY)	Ignition switch (START position)	Ignition switch ON	Below 1.5V
		Cranking	Battery voltage
P (LW)	Solenoid valve (A/C)	A/C switch ON and engine speed below approx. 2,300 rpm	Below 1.5V
		Others	Battery voltage
Q (YW)	Idle-up solenoid valve	Headlight switch ON, rear defroster switch ON, fan speed control switch is 3rd or 4th position, A/C operated, or engine coolant temperature below 72°C (162°F)	Below 1.5V
		Others	Battery voltage
R (LB)	Fan speed control switch	Fan speed control switch in 3rd or 4th position	Below 1.5V
		Fan speed control switch OFF	Battery voltage

76G04A-171

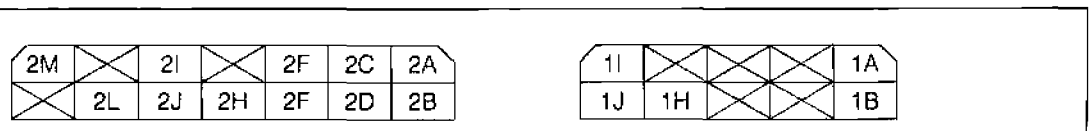


FE and F8 Engine — ATX (General)

Terminal (Wire color)	Connected to	Condition	Voltage
1A (BW)	Ignition switch	Ignition switch ON	Battery voltage
1B (GR)	Solenoid valve (Main air bleed control)	Others	Battery voltage
		Radiator coolant temperature below 17°C (63°F) or intake manifold vacuum more than 200 mmHg (7.9 inHg)	Below 1.5V
1C	—	—	—
1D	—	—	—
1E	—	—	—
1F	—	—	—
1G	—	—	—
1H (LW)	Solenoid valve (A/C)	A/C operated	Below 1.5V
		Others	Battery voltage
1I (LW)	Idle-up solenoid valve	Inhibitor switch OFF and, headlight switch ON, rear defroster switch ON, fan speed control switch is 3rd or 4th position, A/C operated, or engine coolant temperature below 72°C (162°F)	Below 1.5V
		Others	Battery voltage
1J (B)	Ground	—	Below 1.5V
2A (YL)	Ignition coil	Ignition switch ON or engine running	Battery voltage
2B (LB)	Fan speed control switch	Fan speed control switch in 3rd or 4th position	Below 1.5V
		Fan speed control switch OFF	Battery voltage
2C (BL)	Rear defroster switch	Rear defroster switch ON	Below 1.5V
		Rear defroster switch OFF	Battery voltage
2D (LG)	A/C switch	A/C operated	Below 1.5V
		A/C not operated	Battery voltage
2E (RG)	Headlight switch	Headlight switch ON	Below 1.5V
		Headlight switch OFF	Battery voltage
2F (GW)	Water thermo switch (Radiator)	Radiator coolant temperature below 17°C (63°F)	Below 1.5V
		Radiator coolant temperature above 17°C (63°F)	Battery voltage
2G	—	—	—
2H (L)	Water thermo switch (Intake manifold)	Engine coolant temperature below 72°C (162°F)	Below 1.5V
		Engine coolant temperature above 72°C (162°F)	Battery voltage
2I (LB)	Vacuum switch	Vacuum less than 200 mmHg (7.9 inHg)	Below 1.5V
		Vacuum more than 200 mmHg (7.9 inHg)	Battery voltage
2J (RL)	OD release solenoid	Engine coolant temperature below 72°C (162°F)	Below 1.5V
		Engine coolant temperature above 72°C (162°F)	Battery voltage

Terminal (Wire color)	Connected to	Condition	Voltage
2K	—	—	—
2L (BR)	Inhibitor switch	"P" or "N" range	Below 1.5V
		Others	Battery voltage
2M (BY)	Ignition switch (START position)	Ignition switch ON	Below 1.5V
		Cranking	Battery voltage
2N	—	—	—

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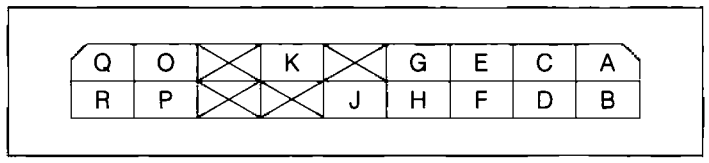
FE and F8 Engine — MTX (General)

Terminal (Wire color)	Connected to	Condition	Voltage
A (W)	Headlight switch	Headlight switch ON	Below 1.5V
		Headlight switch OFF	Battery voltage
B (B)	Ground	—	Below 1.5V
C (BL)	Rear defroster switch	Rear defroster switch ON	Below 1.5V
		Rear defroster switch OFF	Battery voltage
D (LG)	A/C switch	A/C operated	Below 1.5V
		A/C not operated	Battery voltage
E (LB)	Solenoid valve (Main air bleed control)	Intake manifold vacuum more than 300 mmHg (11.8 inHg), and radiator coolant temperature above 17°C (63°F)	Battery voltage
		Others	Below 1.5V
F (GW)	Water thermo switch (Radiator)	Radiator coolant temperature below 17°C (63°F)	Below 1.5V
		Radiator coolant temperature above 17°C (63°F)	Battery voltage
G (YL)	Ignition coil	Ignition switch ON or engine running	Battery voltage
H (L)	Water thermo switch (Intake manifold)	Engine coolant temperature below 72°C (162°F)	Below 1.5V
		Engine coolant temperature above 72°C (162°F)	Battery voltage
I	—	—	—
J (BW)	Ignition switch	Ignition switch ON	Battery voltage
K	—	—	—
L	—	—	—
M	—	—	—
N	—	—	—

Terminal (Wire color)	Connected to	Condition	Voltage
O (BY)	Ignition switch* (START position)	Ignition switch ON	Below 1.5V
		Cranking	Battery voltage
P (LW)	Solenoid valve (A/C)	A/C switch ON and engine speed below approx. 2,300 rpm	Below 1.5V
		Others	Battery voltage
Q (YW)	Idle-up solenoid valve	Headlight switch ON, rear defroster switch ON, fan speed control switch is 3rd or 4th position, A/C operated, or engine coolant temperature below 72°C (162°F)	Below 1.5V
		Others	Battery voltage
R (LB)	Fan speed control switch	Fan speed control switch in 3rd or 4th position	Below 1.5V
		Fan speed control switch OFF	Battery voltage

* Not used

76G04A-173

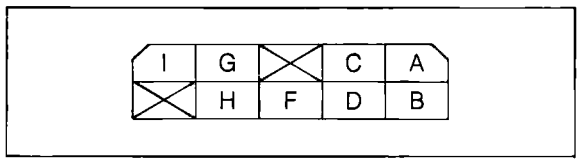


FE 8Valve — Unleaded Fuel

Terminal (Wire color)	Connected to	Condition	Voltage
A (L)	Coast enrichment solenoid valve	Engine speed approx. 1,500—2,300 rpm and idle switch ON	Below 1.5V
		Others	Battery voltage
B (B)	Ground	—	Below 1.5V
C (LB)	Air bypass solenoid valve	Engine speed above approx. 3,500 rpm and idle switch ON	Below 1.5V
		Others	Battery voltage
D (YL)	Ignition coil	Ignition switch ON or engine running	Battery voltage
E	—	—	—
F (BW)	Ignition switch	Ignition switch ON	Battery voltage
G (YW)	Slow fuel cut solenoid valve	Engine speed above approx. 2,300 rpm and idle switch ON	Battery voltage
		Others	Below 1.5V
H (LW)	A/C switch	A/C operated and engine speed above approx. 1,500 rpm	Battery voltage
		A/C not operated or engine speed below approx. 1,500 rpm	Below 1.5V

Terminal (Wire color)	Connected to	Condition	Voltage
I (LgB)	Idle switch	Idle switch ON	Below 1.5V
		Idle switch OFF	Battery voltage
J	—	—	—

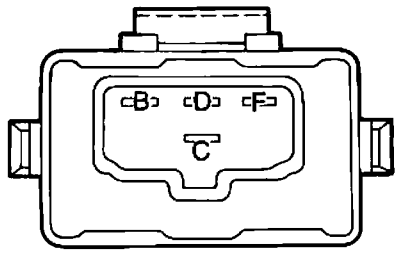
76G04A-174

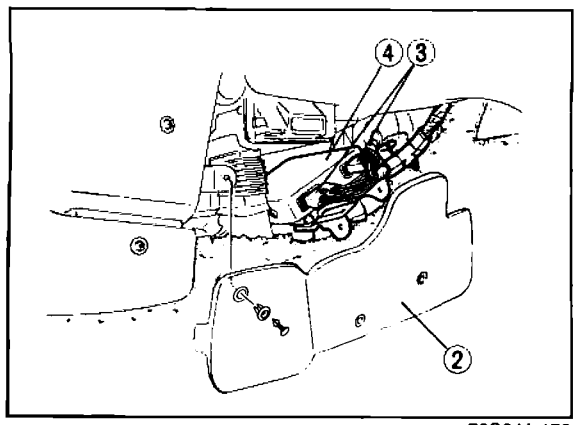


F6 Engine (Singapore)

Terminal (Wire color)	Connected to	Condition	Voltage
A	—	—	—
B (YL)	Ignition coil	Ignition switch ON and engine running	Battery voltage
C (B)	Ground	—	—
D (GB)	Relay	Engine speed below approx. 2,100 rpm	Below 1.5V
		Engine speed above approx. 2,100 rpm	Battery voltage
F (BW)	Ignition switch	Ignition switch ON	Battery voltage

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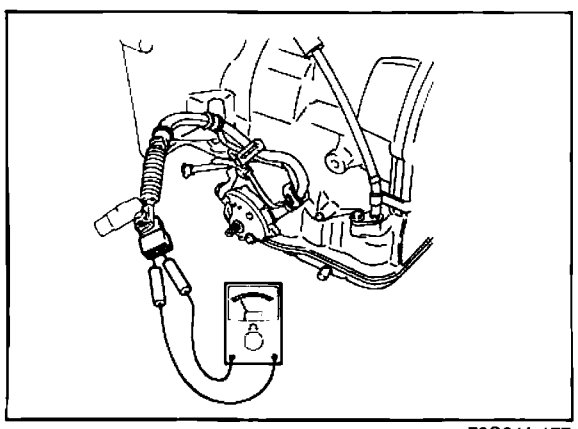




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Replacement

1. Disconnect the negative battery cable.
2. Remove the front console covers (right or left).
3. Disconnect the connectors from the control unit.
4. Remove and replace the control unit.



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INHIBITOR SWITCH

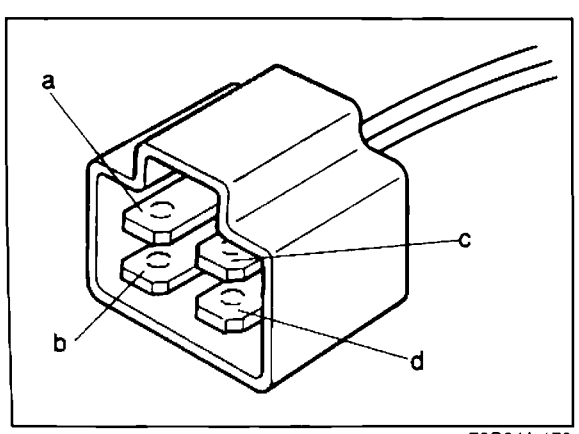
Inspection

1. Verify that the starter operates with the ignition switch at START position in P and N positions only.
2. Check that the back-up lights illuminate when R position selected and the ignition switch is ON.
3. If not as specified, check the following:
   (1) Jack up the vehicle and support it with safety stands.
   (2) Disconnect the inhibitor switch connector.
   (3) Check continuity of the switch with an ohmmeter.

Connecting guide

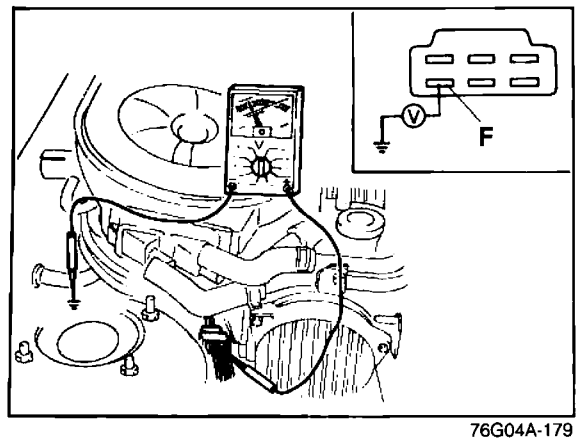
Position	Connector terminal			
	a	b	c	d
P			○—○	
R	○—○			
N			○—○	
D,1,2				

○—○: indicates continuity



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4. Replace if necessary.

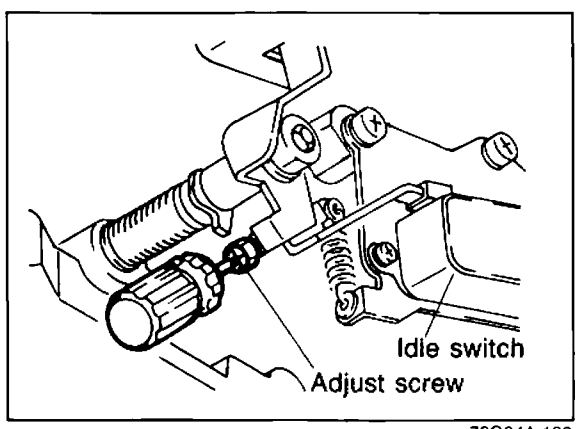


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IDLE SWITCH

Inspection

1. Warm up the engine and run it at idle.
2. Turn all accessories OFF.
3. Connect a tachometer to the engine.
4. Connect a voltmeter to the carburetor connector **F** terminal.

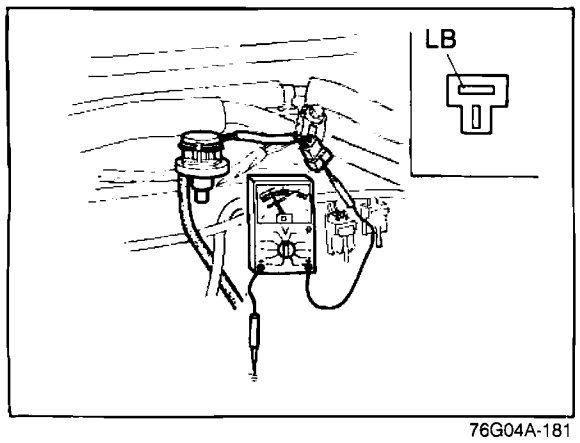


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5. Increase the engine speed to more than **2,000 rpm** and decelerate gradually.
6. Check the voltage.

Specification / Engine speed	FE 8Valve—Unleaded Fuel & F6 Singapore	Others
At idle	below 1.5V	Battery voltage
Above 1,000—1,100 rpm	Battery voltage	below 1.5V

7. If the voltage is not within specification, turn the adjust screw to adjust.



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VACUUM SWITCH

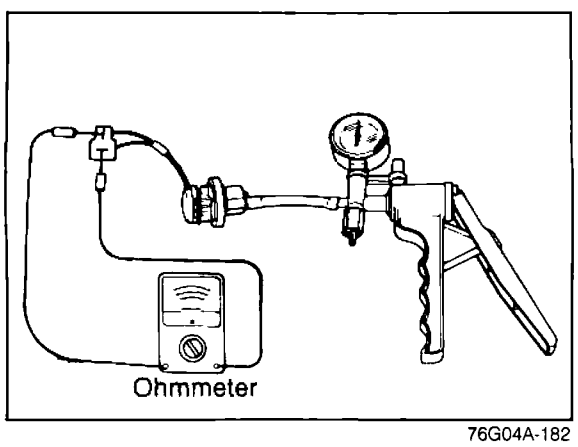
On-Vehicle Inspection

1. Run the engine at idle.
2. Connect a voltmeter to the vacuum switch connector terminal wire (LB).

Voltage: Approx. 12V

3. Disconnect the vacuum hose from the vacuum switch, and plug it.
4. Check the voltage.

Voltage: Less than 1.5V



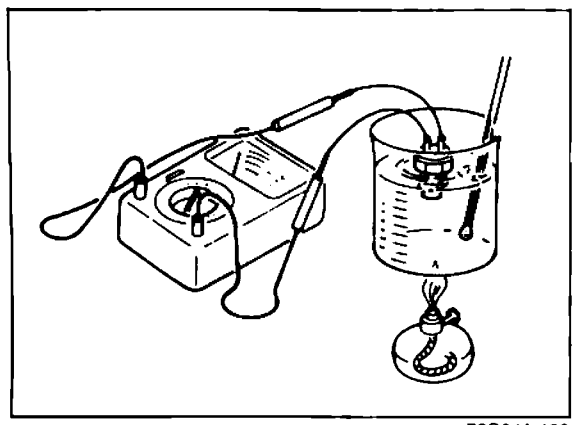
76G04A-182

Off-Vehicle Inspection

Inspection

1. Remove the vacuum switch.
2. Connect a vacuum pump to the vacuum switch.
3. Connect an ohmmeter to the vacuum switch, and check the continuity between the switch terminals.

Vacuum	Continuity
MTX: More than 300 mmHg (11.8 inHg)	No
ATX: More than 200 mmHg (7.9 inHg)	
Others	Yes



76G04A-183

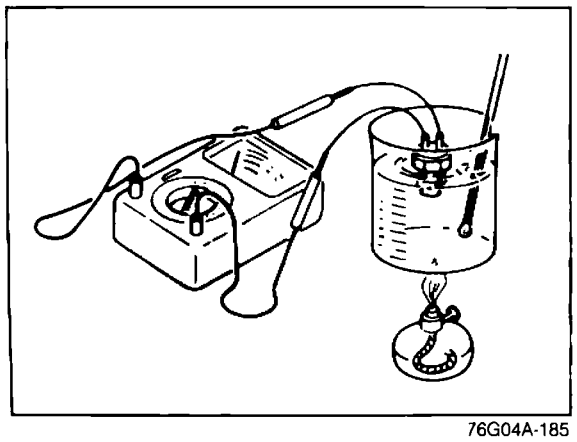
WATER THERMO SWITCH (RADIATOR)
Inspection
1. Remove the switch from the radiator.
2. Place the switch in water with a thermometer and gradually heat the water.
3. Check for continuity of the switch with an ohmmeter.

Coolant temp.	Continuity
More than approx. **17°C (63°F)**	Yes
Less than approx. **17°C (63°F)**	No

4. If not as specified, replace the water thermo switch.

Note
a) Apply sealing tape to the threads of the switch before installing it.
b) After installation, check the coolant level and check for leaks.

76G04A-184



76G04A-185

WATER THERMO SWITCH (INTAKE MANIFOLD)
Inspection
1. Remove the switch from the intake manifold.
2. Place the switch in water with a thermometer and gradually heat the water.
3. Check for continuity of the switch with an ohmmeter.

Coolant temp.	Continuity
More than approx. **72°C (162°F)**	Yes
Less than approx. **72°C (162°F)**	No

4. If not as specified, replace the water thermo switch.

Note
a) Apply sealing tape to the threads of the switch before installing it.
b) After installation, check the coolant level and check for leaks.

76G04A-186

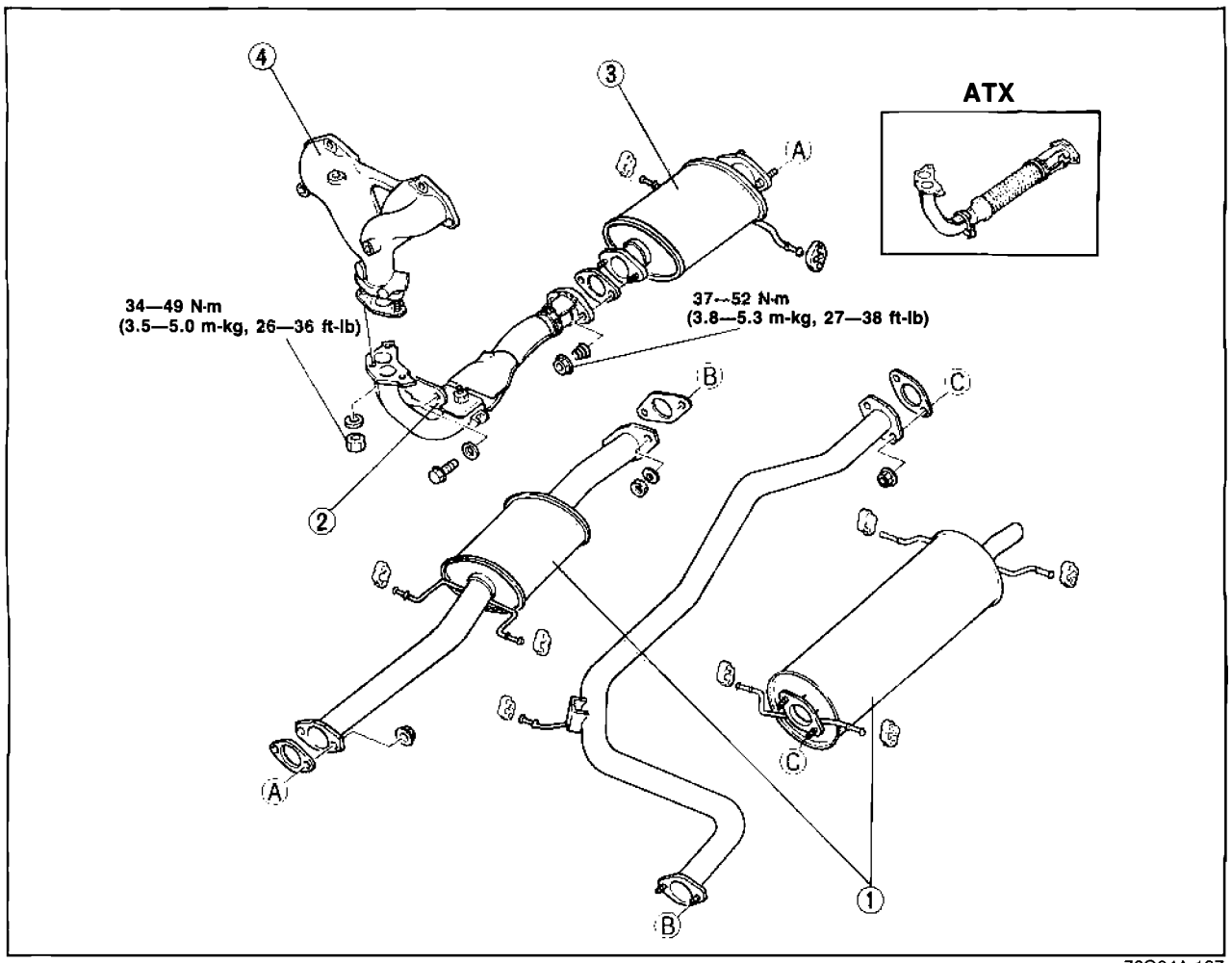
EXHAUST SYSTEM

EXCEPT FE 8VALVE—UNLEADED FUEL

Removal and Installation

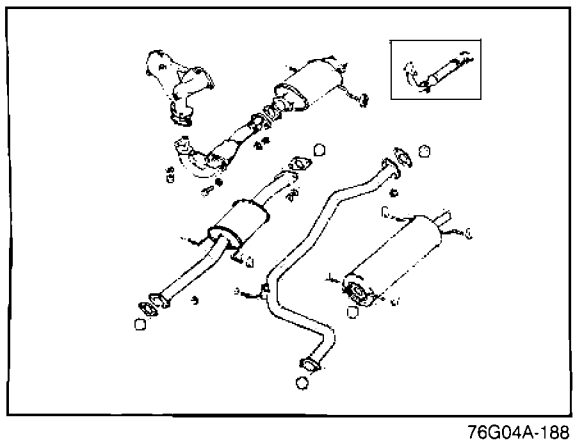
1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.

Torque specifications



76G04A-187

1. Center silencer and main silencer
2. Brackets
3. Front silencers
4. Exhaust manifolds



76G04A-188

Inspection

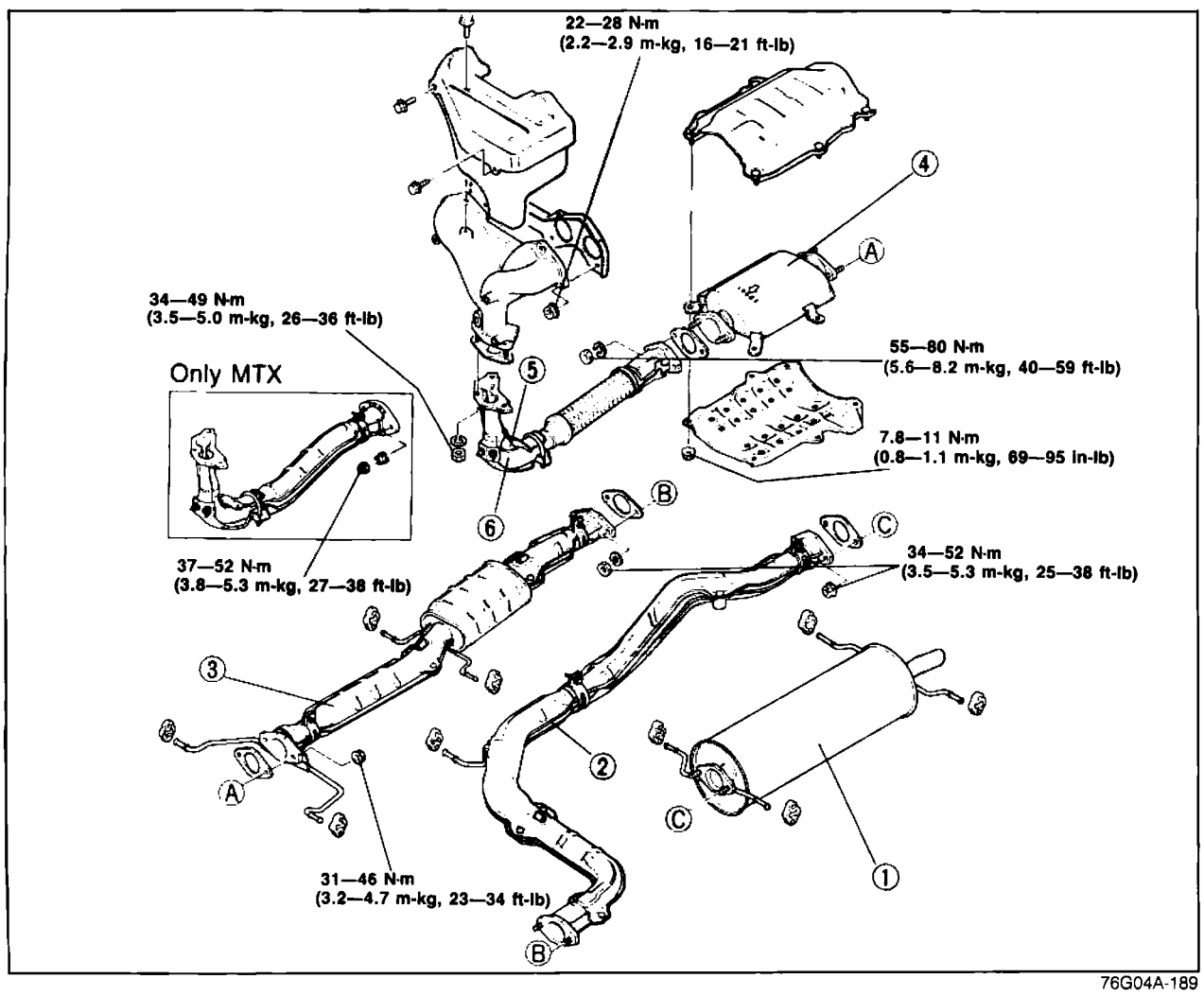
Visually check the exhaust system for cracks or damage.

FE 8 VALVE-UNLEADED FUEL

Removal and Inspection

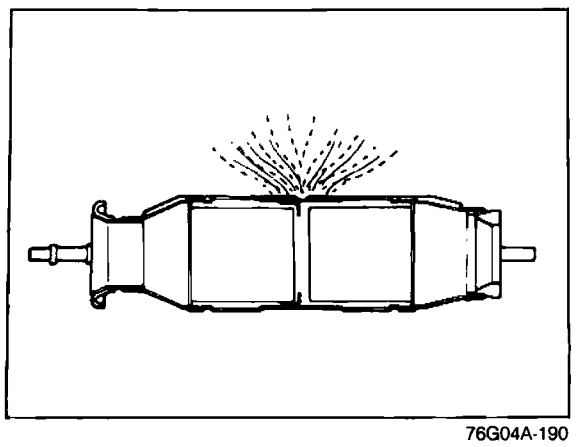
1. Remove in the sequence shown in the figure
2. Install in the reverse order of removal.

Torque Specifications



76G04A-189

1. Main silencer
2. Middle pipe
3. Pre-silencer
4. Catalytic converter
5. Bracket
6. Front pipe



76G04A-190

Inspection

1. Check the catalytic converter and exhaust pipe for deterioration or restriction.
2. Check the insulation covers welded onto the catalytic converter for damage.

Note
If the insulation cover is touching the catalytic converter housing, excessive heat at the floor will occur.

FUEL AND EMISSION CONTROL SYSTEMS (FUEL INJECTION FE)

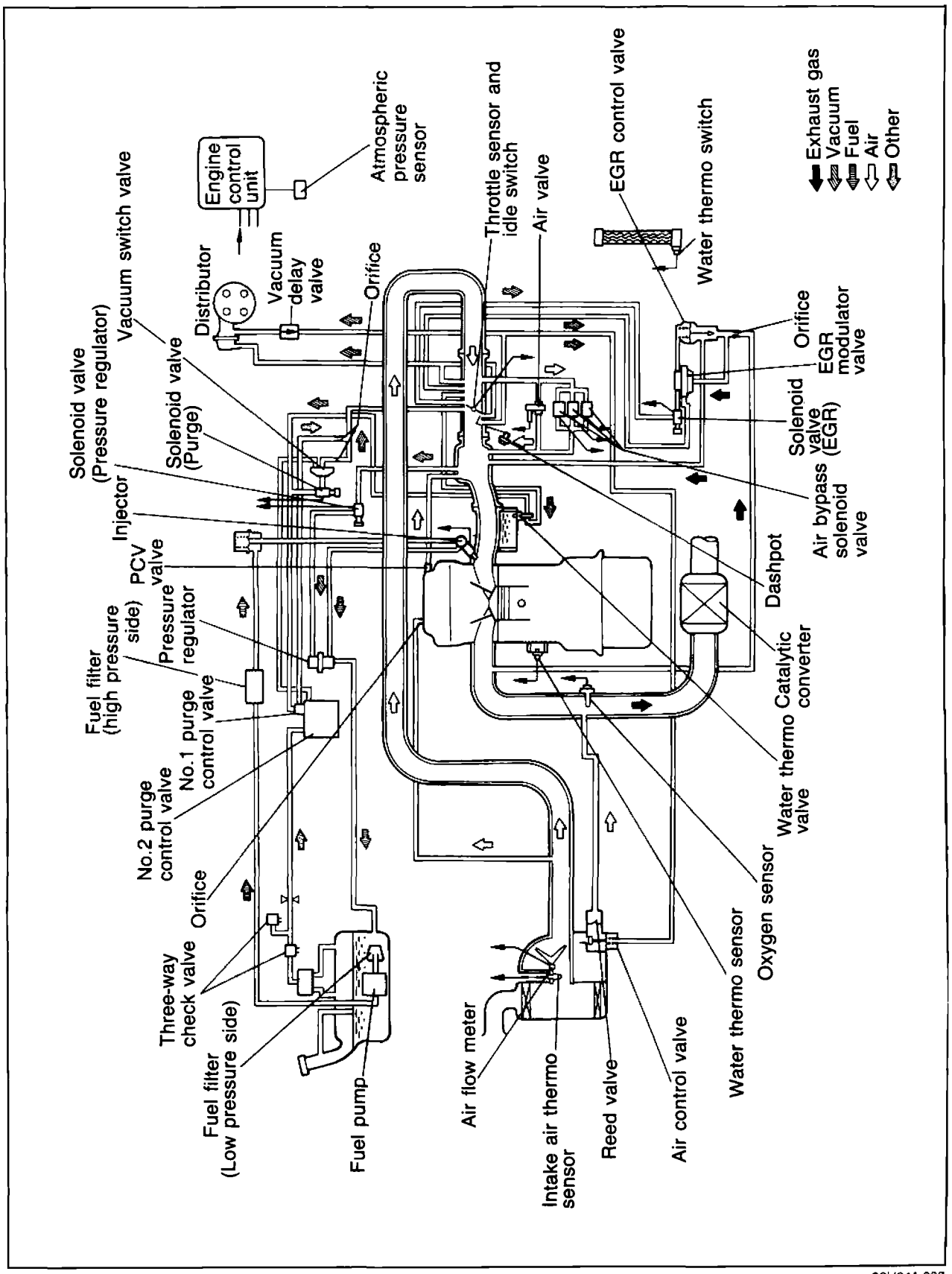
OUTLINE ..... **4B— 2**
SYSTEM DIAGRAM ..... **4B— 2**
COMPONENT LOCATION ..... **4B— 3**
VACUUM HOSE ROUTING DIAGRAM ..... **4B— 5**
SPECIFICATIONS ..... **4B— 6**
TROUBLESHOOTING GUIDE ..... **4B— 7**
TROUBLESHOOTING PROCEDURE ..... **4B— 7**
TROUBLESHOOTING WITH SST .... **4B— 9**
INSPECTION PROCEDURE ..... **4B—10**
AFTER-REPAIR PROCEDURE ..... **4B—10**
PRINCIPLE OF CODE CYCLE ..... **4B—12**
CODE NUMBER ..... **4B—13**
SWITCH MONITOR FUNCTION ..... **4B—25**
INSPECTION PROCEDURE ..... **4B—26**
IDLE SPEED ..... **4B—29**
IDLE MIXTURE ..... **4B—29**
INTAKE AIR SYSTEM ..... **4B—30**
COMPONENT DESCRIPTIONS ..... **4B—30**
REMOVAL ..... **4B—31**
PARTS INSPECTION ..... **4B—32**
INSTALLATION ..... **4B—34**
IDLE-UP SYSTEM ..... **4B—35**
COMPONENT DESCRIPTIONS ..... **4B—36**
TROUBLESHOOTING ..... **4B—37**
AIR VALVE ..... **4B—38**
AIR BYPASS SOLENOID VALVE ... **4B—39**
FUEL SYSTEM ..... **4B—42**
COMPONENT DESCRIPTIONS ..... **4B—43**
TROUBLESHOOTING ..... **4B—44**
FUEL PRESSURE RELEASE AND SERVICING FUEL SYSTEM ..... **4B—45**
MULTI-PRESSURE TESTER ..... **4B—46**
FUEL PRESSURE ..... **4B—48**
FUEL PUMP ..... **4B—49**
PULSATION DAMPER ..... **4B—50**
INJECTOR ..... **4B—51**
PRESSURE REGULATOR CONTROL SYSTEM ..... **4B—53**
COMPONENT DESCRIPTIONS ..... **4B—54**
TROUBLESHOOTING ..... **4B—55**
REPLACEMENT ..... **4B—57**
FUEL TANK ..... **4B—61**
DECELERATION CONTROL SYSTEM ..... **4B—64**
COMPONENT DESCRIPTIONS ..... **4B—65**
TROUBLESHOOTING ..... **4B—66**
AIR INJECTION SYSTEM ..... **4B—68**
COMPONENT DESCRIPTIONS ..... **4B—68**
TROUBLESHOOTING ..... **4B—69**
EXHAUST GAS RECIRCULATION (EGR) SYSTEM ..... **4B—71**
COMPONENT DESCRIPTIONS ..... **4B—71**
TROUBLESHOOTING ..... **4B—72**
EVAPORATIVE EMISSION CONTROL (EEC) SYSTEM ..... **4B—74**
COMPONENT DESCRIPTIONS ..... **4B—74**
TROUBLESHOOTING ..... **4B—75**
POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM ..... **4B—80**
COMPONENT DESCRIPTION ..... **4B—80**
EXHAUST SYSTEM ..... **4B—81**
REMOVAL AND INSTALLATION ... **4B—82**
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RELATIONSHIP CHART ..... **4B—84**
EGI MAIN FUSE ..... **4B—86**
MAIN RELAY ..... **4B—86**
CIRCUIT OPENING RELAY ..... **4B—86**
ENGINE CONTROL UNIT ..... **4B—87**
NEUTRAL SWITCH ..... **4B—91**
CLUTCH SWITCH ..... **4B—91**
BRAKE LIGHT SWITCH ..... **4B—91**
P/S PRESSURE SWITCH ..... **4B—92**
INHIBITOR SWITCH ..... **4B—92**
E/L CONTROL UNIT ..... **4B—93**
AIR FLOW METER ..... **4B—94**
THROTTLE SENSOR ..... **4B—95**
WATER THERMO SENSOR ..... **4B—97**
WATER THERMO SWITCH ..... **4B—97**
OXYGEN SENSOR ..... **4B—98**
ATMOSPHERIC PRESSURE SENSOR ..... **4B—99**

76G04B-001

4B OUTLINE

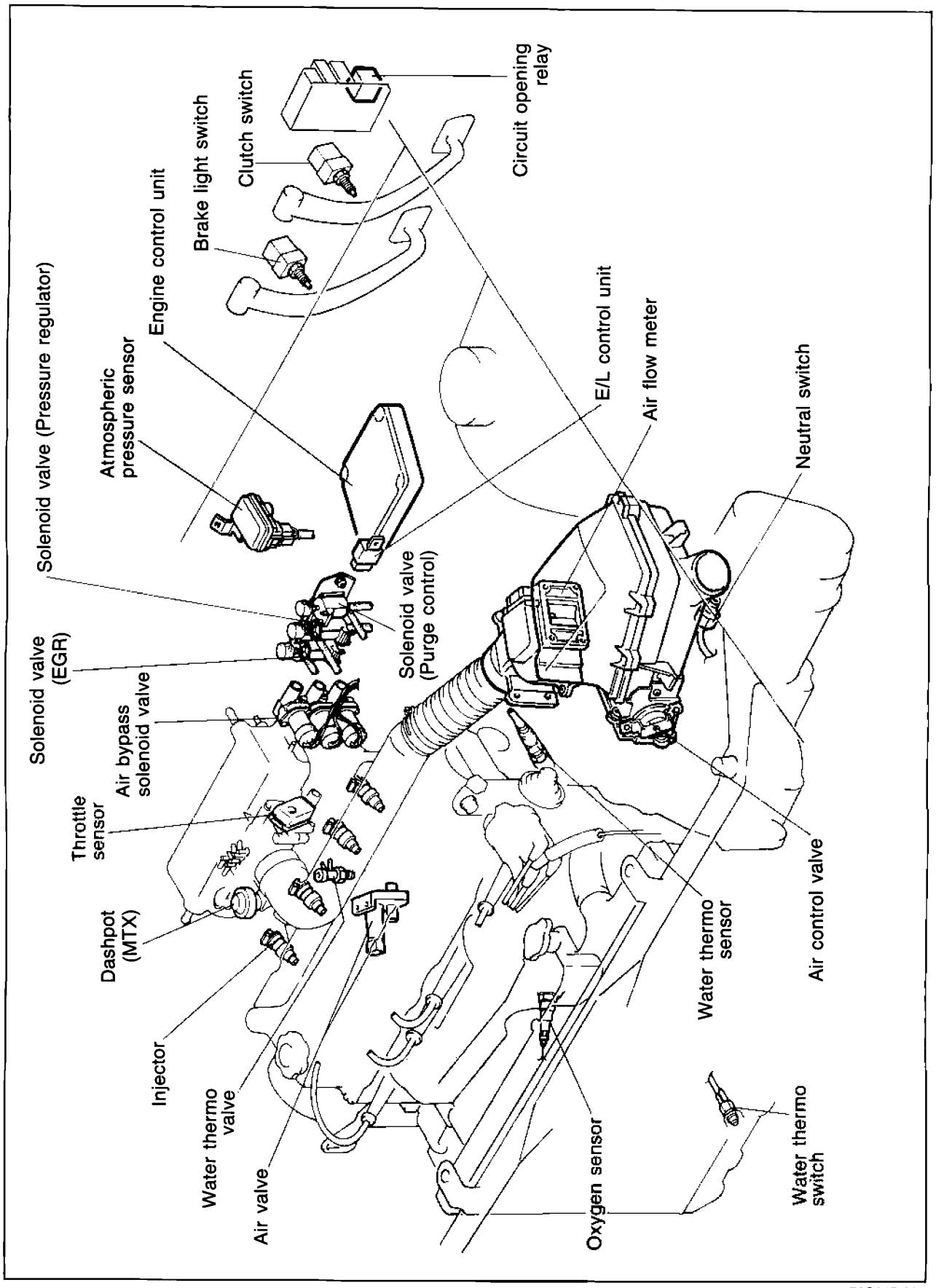
OUTLINE

SYSTEM DIAGRAM



86U04A-002

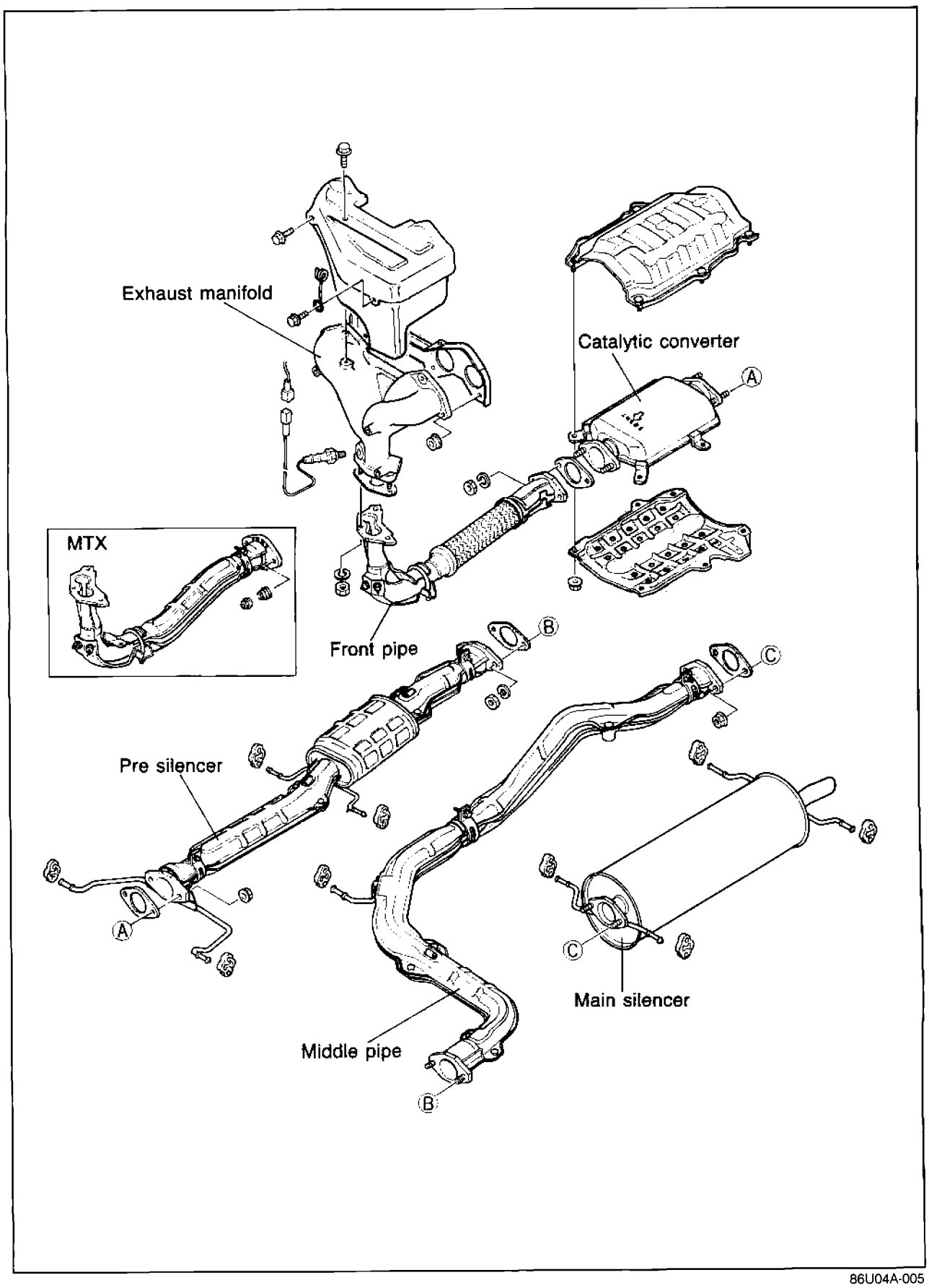
COMPONENT LOCATION



76G04B-002

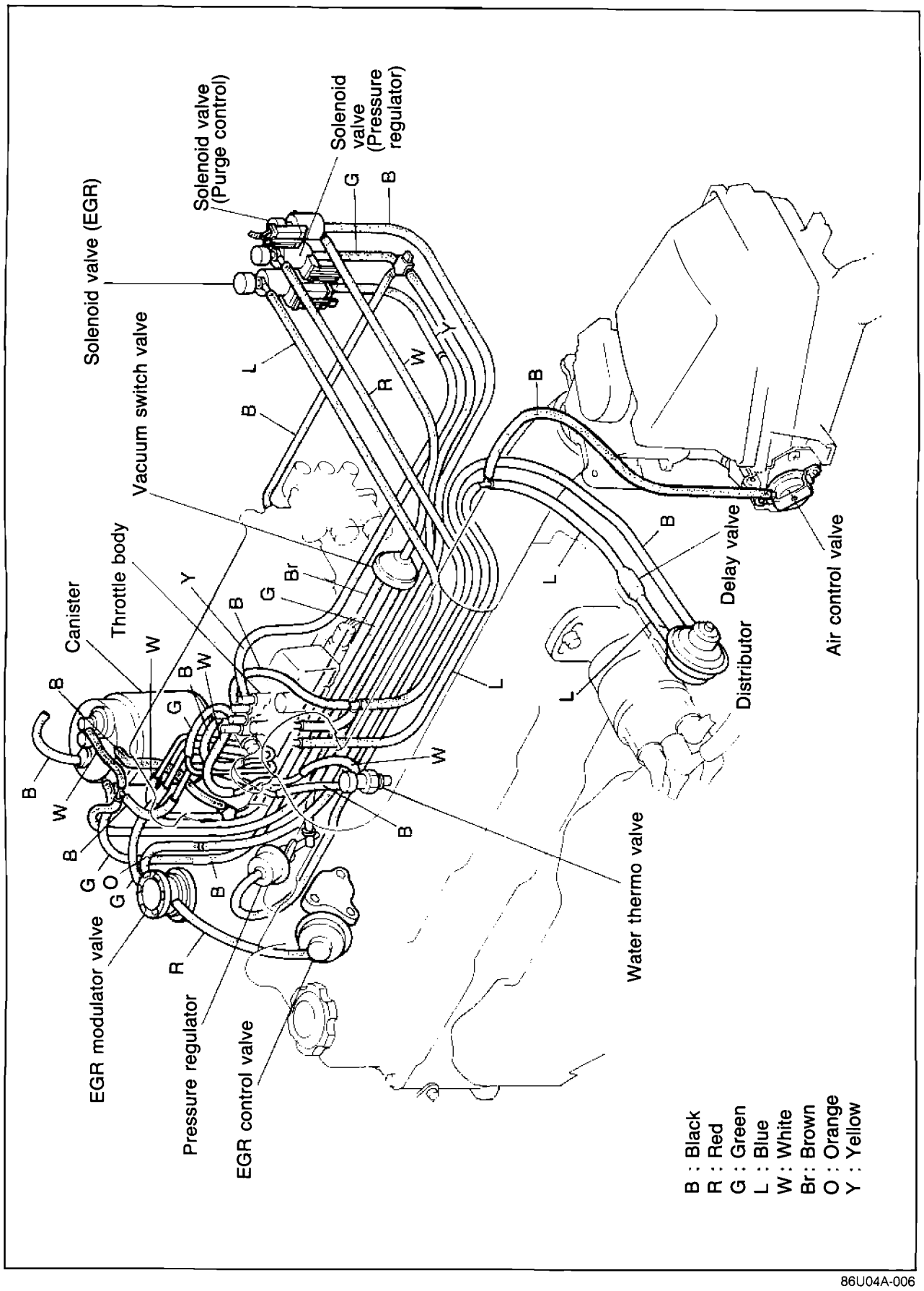
4B OUTLINE

Exhaust System



86U04A-005

VACUUM HOSE ROUTING DIAGRAM



86U04A-006

4B OUTLINE

SPECIFICATIONS

Item		Specification
Idle speed rpm		MTX: 800 $^{+50}_{0}$ (Neutral), ATX: 900 $^{+50}_{0}$ (P range)
Throttle body		
Type		Horizontal draft (1-barrel)
Throat diameter mm (in)		50 (2.0)
Air flow meter		
Resistor Ω	E2—VS	More than 20
	E2—VC	100—300
	E2—VB	200—400
	E2—THA	−20°C (−4°F) 13,600—18,400 20°C (68°F) 2,210— 2,690 60°C (140°F) 493— 667
Air cleaner		
Element type		Oil permeated
Fuel pump		
Type		Impeller (in tank)
Output pressure kPa (kg/cm², psi)		441—588 (4.5—6.0, 64—85)
Feeding capacity cc (cu in)/10 sec.		220 (13.4) minmum
Fuel filter		
Type	Low pressure side	Nylon element
	High pressure side	Paper element
Pressure regulator		
Type		Diaphragm
Regulating pressure kPa (kg/cm², psi)		235—275 (2.4—2.8, 34—40)
Injector		
Type		High-ohmic
Type of drive		Voltage
Resistance Ω		12—16
Injection amount cc (cu in) 15 seconds		38—53 (2.3—3.2)
Fuel tank		
Capacity liters (US gal, Imp gal)		60 (15.9, 13.2)
Fuel		
Specification		Unleaded regular

76G04B-506

TROUBLESHOOTING GUIDE

This troubleshooting guide shows the malfunction numbers and the symptoms of various failures. Perform troubleshooting as described below.

Symptom \ Possible cause			Ignition pulse	Air flow meter	Water thermo sensor	Intake air thermo sensor	Throttle sensor	Atmospheric pressure sensor	Oxygen sensor	Feedback system	Solenoid valve (Pressure regulator)	Solenoid valve (Purge)	Solenoid valve (EGR)	Air bypass solenoid valve (Idle-up C)	Air bypass solenoid valve (Idle-up B)
		Page	4B—14	4B—15	4B—16	4B—17	4B—18	4B—19	4B—20	4B—21	4B—22	4B—23	4B—23	4B—23	4B—24
1	Fault Indicated by SST Code No.		01	08	09	10	12	14	15	17	25	26	28	34	35
2	Hard start or won't start (Cranks OK)														
3	Engine stalls	While warming up													
		After warming up													
4	Rough idle	While warming up													
		After warming up													
5	High idle speed after warming up														
6	Poor acceleration, hesitation or lack of power														
7	Runs rough on deceleration														
8	Afterburn in exhaust system														
9	Poor fuel consumption														
10	Engine stalls *or rough* after hot starting														
11	Fails emission test														

TROUBLESHOOTING PROCEDURE

Note
Step 1 under symptom is to quickly determine what system or unit may be at fault by use of the SST. (Self-Diagnosis Checker 49 H018 9A1)

1st: Check input sensors and output solenoid valves with the **SST**. (Refer to page 4B—10.)

2nd: Check other switches with the **SST**. (Refer to page 4B—26.)

3rd: Check the following items:

Electrical system
1) Battery condition
2) Fuses

Ignition system
1) Ignition spark
2) Ignition timing

Fuel system
1) Fuel level
2) Fuel leakage
3) Fuel filter
4) Idle speed

Intake air system
1) Air cleaner element
2) Vacuum or air leakage
3) Vacuum hose routing
4) Accelerator cable

Engine
1) Compression
2) Overheating

Others
1) Clutch slippage
2) Brake dragging

4th: Check Fuel and Emission Control Systems. (Refer to page 4B—8.)

76G04B-003

4B TROUBLESHOOTING GUIDE

The Troubleshooting Guide lists the systems most likely to cause a given symptom. After finding systems to check, refer to the pages shown for detailed guides for each system.

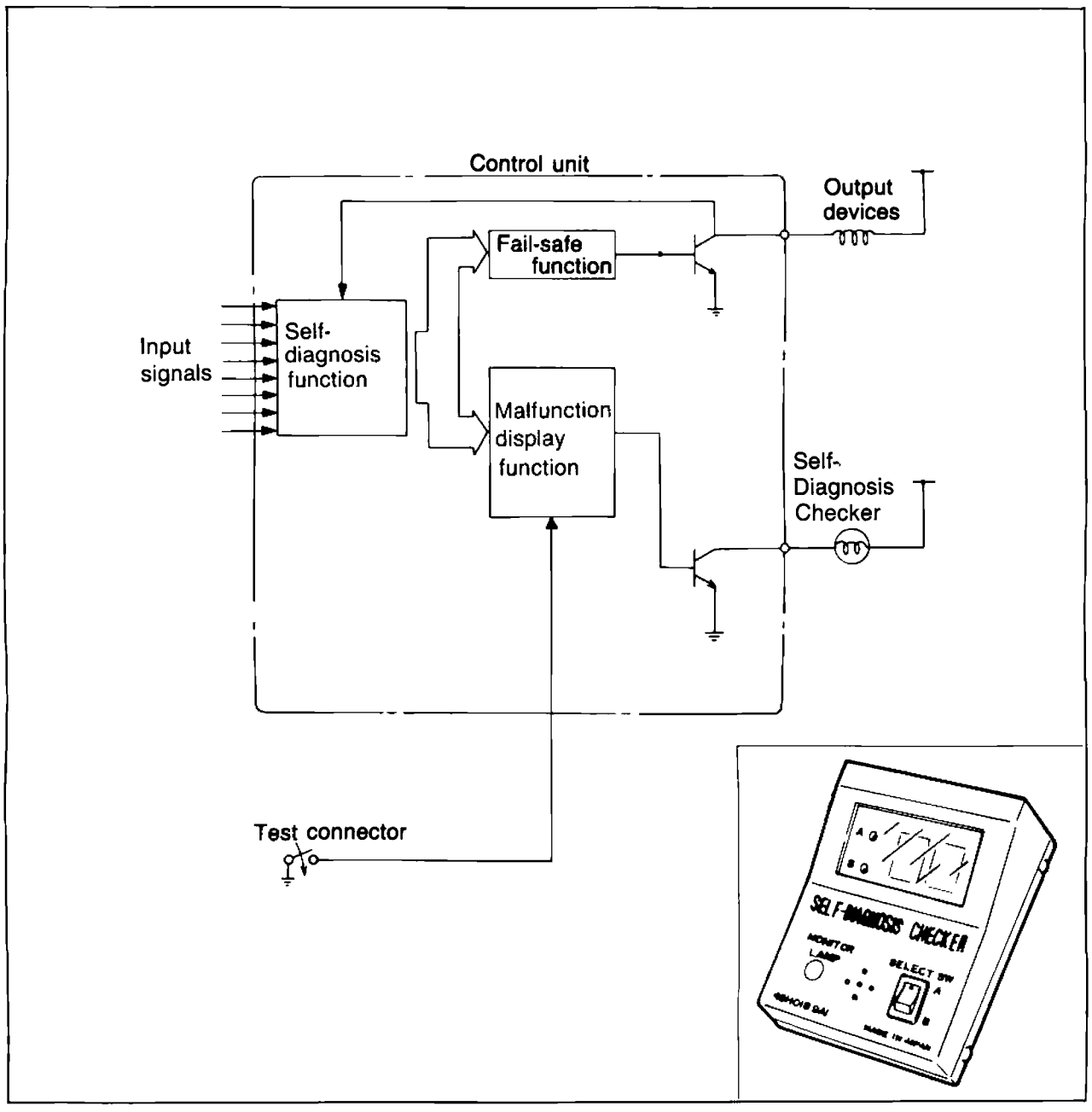
Possible cause		Fuel and Emission Control Systems									
		Intake Air System (Poor connection of components, throttle body)	Fuel System (Fuel injection, Fuel pressure)	Pressure Regulator Control System	Idle-up System (Air valve, solenoid valve malfunction)	EGR System (EGR control valve stuck and open)	EEC system (Vacuum switch valve, No.1 purge control valve malfunction)	PCV System (System clogged)	Deceleration System (Dashpot, fuel cut operation malfunction)	Air injection system (Reed valve malfunction)	Exhaust system (System clogged)
Page		4B—30	4B—42	4B—53	4B—35	4B—71	4B—74	4B—80	4B—64	4B—68	4B—81
Symptom	2	2	1								
	3	4	3		1	2					
		5	4		2	3		1			
	4	6	5		1	4		2		3	
		7	6		2	4	5	1		3	
	5	3			1				2		
	6	3	4			1	2				5
	7		3		2				1		
	8	3	4		1				2		
	9		2			3			1		4
	10		2	1							
	11	7	8		5	2	6		3	4	1

76G04B-004

The numbers of the list show the priorities of inspections from the most possible to that with the lowest possibility.
These were determined on the following basis:

- Ease of inspection
- Most possible system
- Most possible point in system

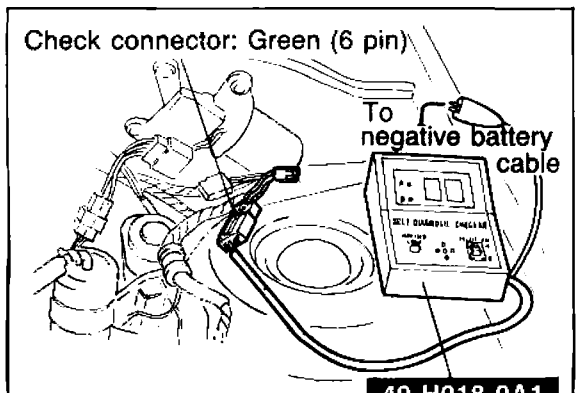
TROUBLESHOOTING WITH SST



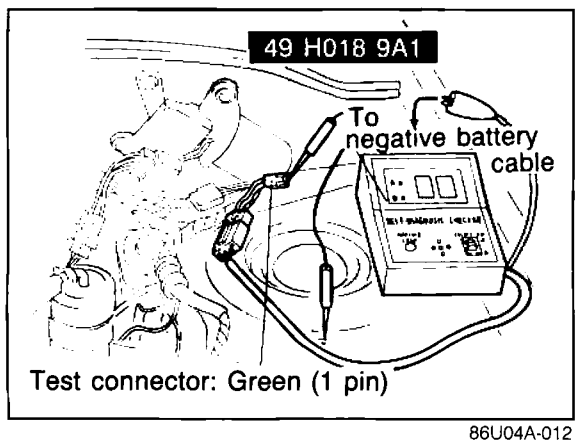
86U04A-010

When troubles occur in the main input devices or output devices, check for the cause using the **SST**. Failures of each input and output device are indicated and retrieved from the control unit as malfunction code numbers.

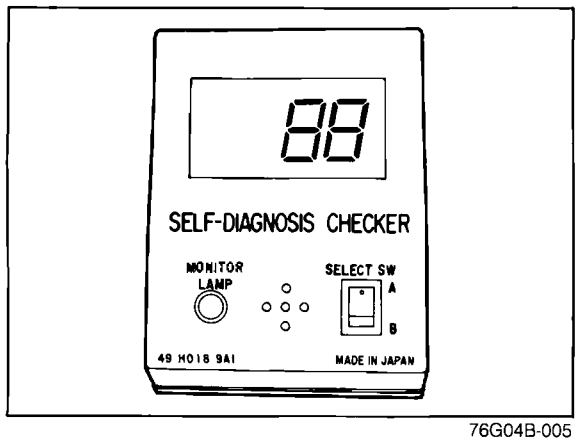
Note
The control unit constantly checks for malfunction of the input devices. But, the control unit checks for malfunction of output devices only in a 3 second period after the ignition switch is turned ON and the test connector is grounded.



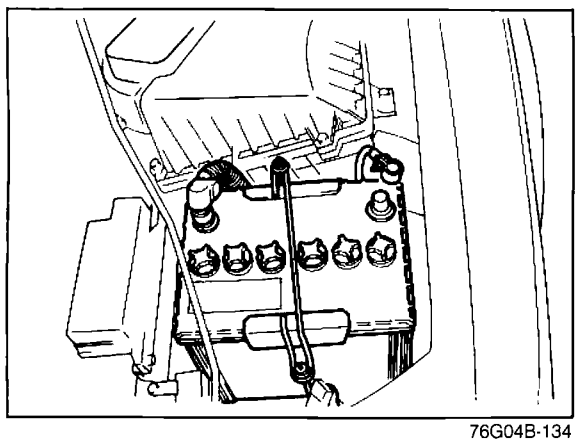
86U04A-011



86U04A-012



76G04B-005



76G04B-134

INSPECTION PROCEDURE

1. Connect the **SST** to the check connector, (Green, 6-pin) and the negative battery terminal.
2. Set the select switch to position A.

Note
The check connector is located at the rear of the left side wheel housing.

3. Ground the test connector (Green, 1-pin) with a jumper wire.

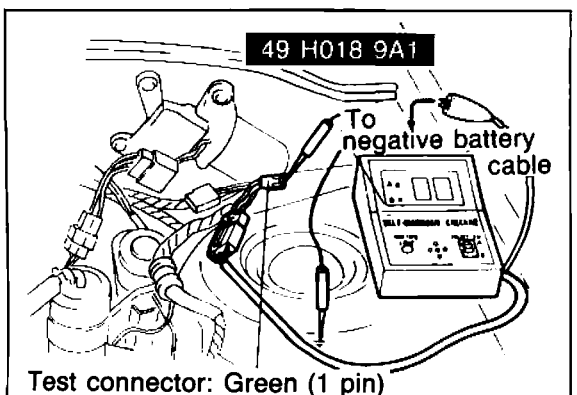
Note
The test connector is located near the Self-Diagnosis Checker check connector.

4. Turn the ignition switch ON.
5. Verify that **88** flashes on the digital display and that the buzzer sounds for **three seconds** after turning the ignition switch ON.
6. If **88** does not flash, check the main relay (Refer to page 4B—86), power supply circuit, and check connector wiring.
7. If **88** flashes and the buzzer sounds continuously for more than **20 seconds**, replace the engine control unit and perform steps 3 and 4 again.
8. Note the code numbers and check for the causes by referring to the check sequences shown on pages **from 4B—14 to 4B—24**. Repair as necessary.

Note
Cancel the code numbers by performing the after-repair procedure after repairing.

AFTER-REPAIR PROCEDURE

1. Cancel the memory of malfunctions by disconnecting the negative battery cable and depressing the brake pedal for **at least 2 seconds**; then reconnect the negative battery cable.



86U04A-015

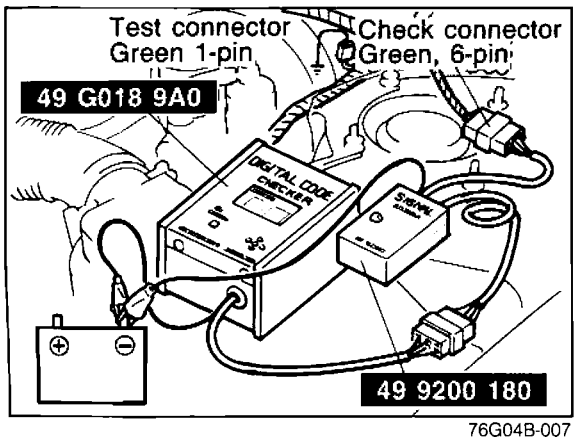
2. Connect the **SST** to the check connector.
3. Ground the test connector (Green, 1-pin) with a jumper wire.

Ignition switch: ON

for six seconds

76G04B-006

4. Turn the ignition switch ON, but do not start the engine for **six seconds**.
5. Start and warm up the engine, then run it at **2,500—3,000 rpm** for **three** minutes in neutral.
6. Verify that no code numbers are displayed.



76G04B-007

Note
The Digital Code Checker (49 G018 9A0) with the Signal Adapter (49 9200 180) may be used in place of the Self-Diagnosis Checker (49 H018 9A1).

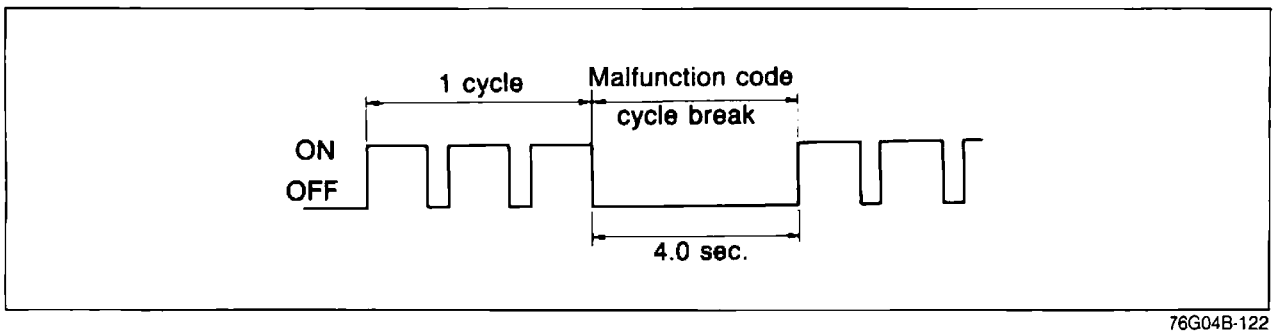
4B TROUBLESHOOTING WITH SST

PRINCIPLE OF CODE CYCLE

Malfunction codes are determined as shown below

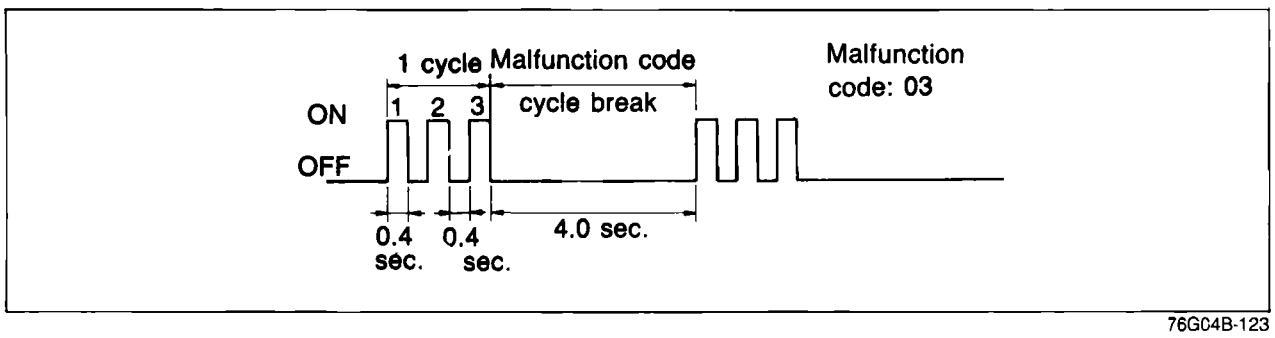
86U04A-017

1. Code cycle break
The time between malfunction code cycles is 4.0 sec (the time the light is off).



76G04B-122

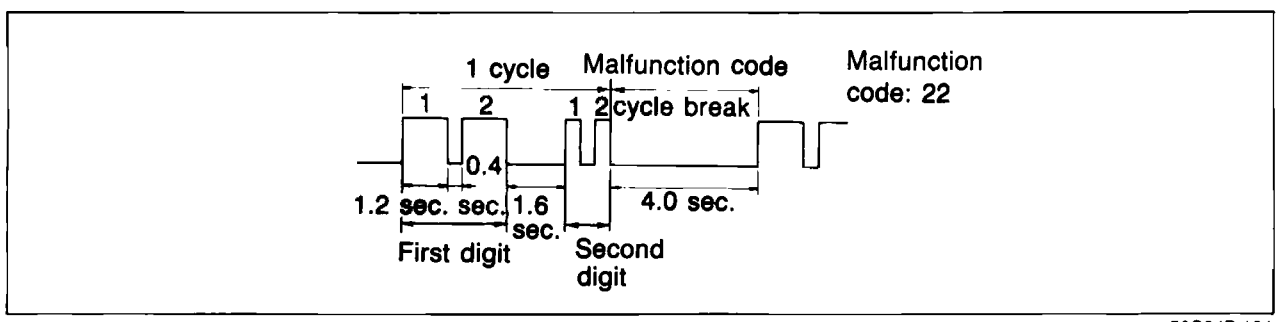
2. Second digit of malfunction code (ones position)
The digit in the ones position of the malfunction code represents the number of times the buzzer is on 0.4 sec during one cycle.



76G04B-123

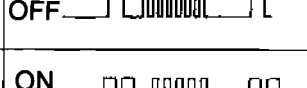
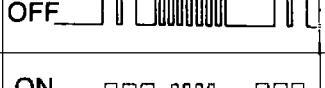
3. First digit of malfunction code (tens position)
The digit in the tens position of the malfunction code represents the number of times the buzzer is on 1.2 sec during one cycle.

It should also be noted that the light goes off for 1.6 sec. between the long and short pulses of the buzzer.



76G04B-124

CODE NUMBER

Malfunction display		Sensor or subsystem	Self-diagnosis	Fail-safe
Code No.	Output signal pattern			
01		Ignition pulse	No ignition signal	—
08		Air flow meter	Open or short circuit	Maintains basic signal at preset value
09		Water thermo sensor	Open or short circuit	Maintains constant command 35°C (95°F)
10		Intake air thermo sensor (air flow meter)	Open or short circuit	Maintains constant 20°C (68°F) command
12		Throttle sensor	Open or short circuit	Maintains constant command of throttle valve fully open
14		Atmospheric pressure sensor	Open or short circuit	Maintains constant command of sea level pressure
15		Oxygen sensor	Sensor output continues less than 0.55V 120 sec. after engine starts (1,500 rpm)	Cancels EGI feedback operation
17		Feedback system	Sensor output not changed 20 sec. after engine exceeds 1,500 rpm	Cancels EGI feedback operation
25		Solenoid valve (pressure regulator)	Open or short circuit	—
26		Solenoid valve (purge control)		—
28		Solenoid valve (EGR)		—
34		Air bypass solenoid valve (Idle-up C)		—
35		Air bypass solenoid valve (Idle-up B)		—

76G04B-008

Caution

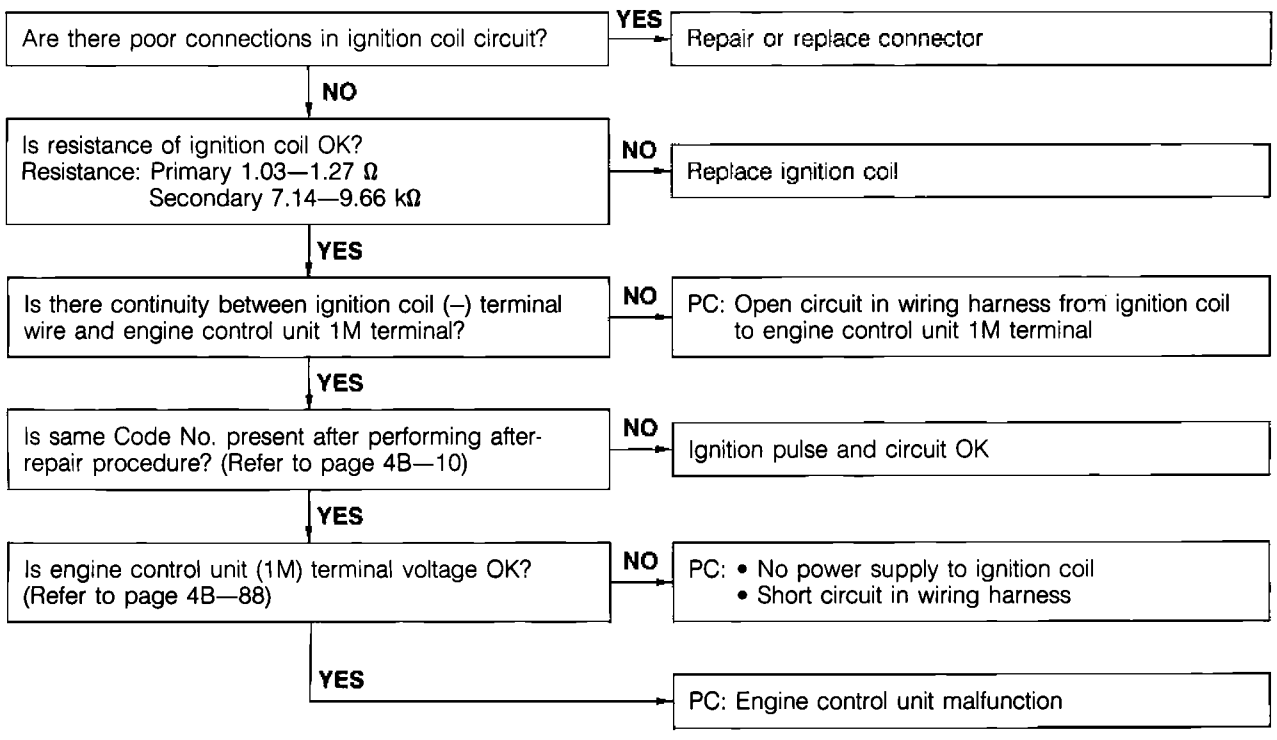
a) If there is more than one failure present, the lowest number malfunction code is displayed first, the remaining codes are displayed sequentially.

b) After repairing a failure, turn off the ignition switch and disconnect the negative battery cable and depress the brake pedal for at least 2 seconds to erase the memory of a malfunction code.

4B TROUBLESHOOTING WITH SST

If a malfunction code number is shown on the **SST**, check the following chart along with the wiring diagram.

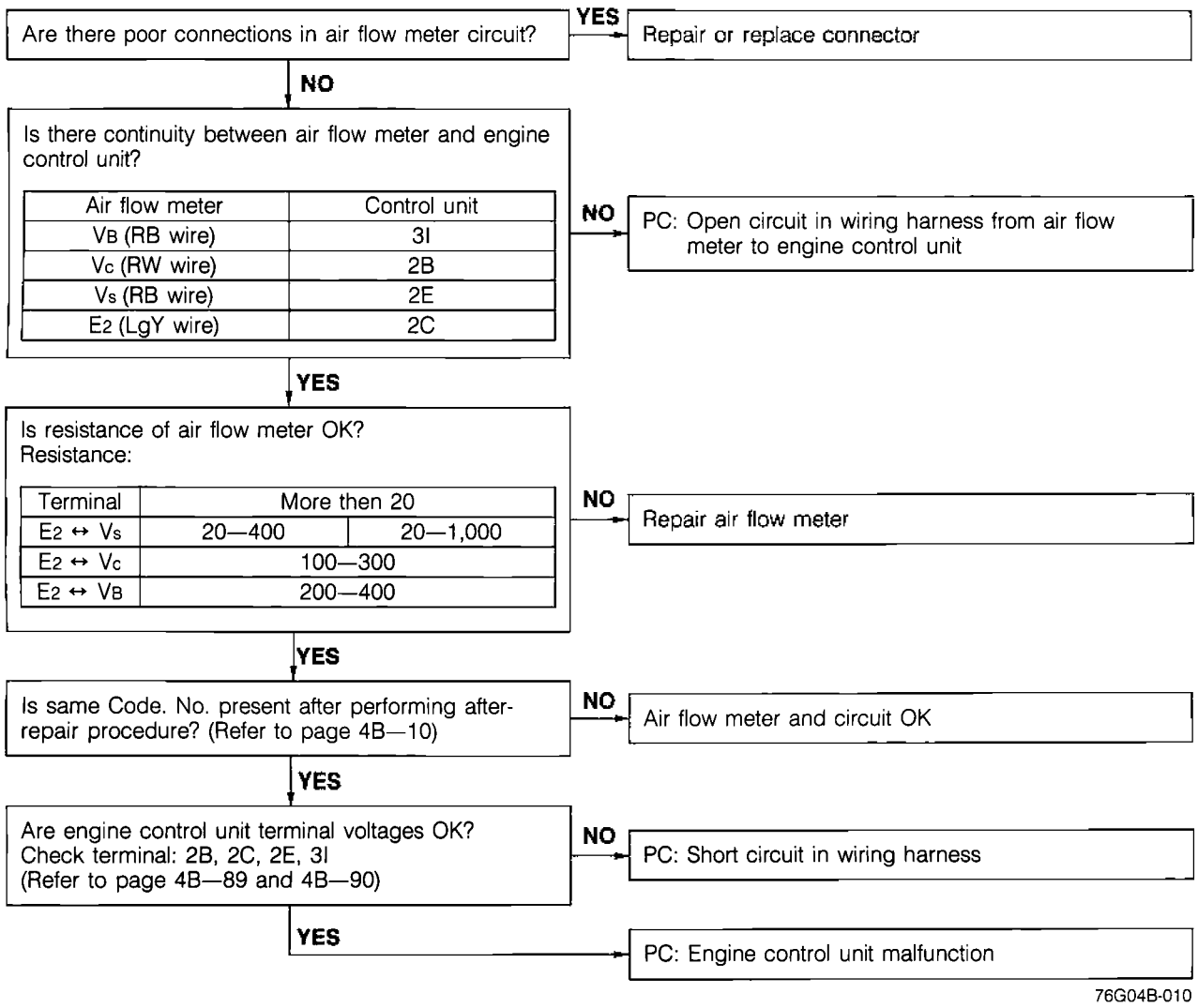
Code No. 01 (Ignition pulse) **PC: Possible Cause**



76G04B-009

Code No. 08 (Air flow meter)

PC: Possible Cause



76G04B-010

Code No. 09 (Water thermo sensor) **PC: Possible Cause**

Are there poor connections at water thermo sensor circuit?
- YES → Repair or replace connector
- NO ↓

Is there continuity between water thermo sensor and control unit?

Water thermo sensor	Control unit
A (YB wire)	2I
B (LgY wire)	2C

- NO → PC: Open circuit in wiring harness from water thermo sensor to engine control unit
- YES ↓

Is resistance of the water thermo sensor OK?
Resistance:

Coolant temp	Resistance
–20°C (–4°F)	14.5—17.8 kΩ
20°C (68°F)	2.2— 2.7 kΩ
40°C (104°F)	1.0— 1.3 kΩ
60°C (140°F)	500—640 Ω
80°C (176°F)	280—350 Ω

- NO → Replace water thermo sensor
- YES ↓

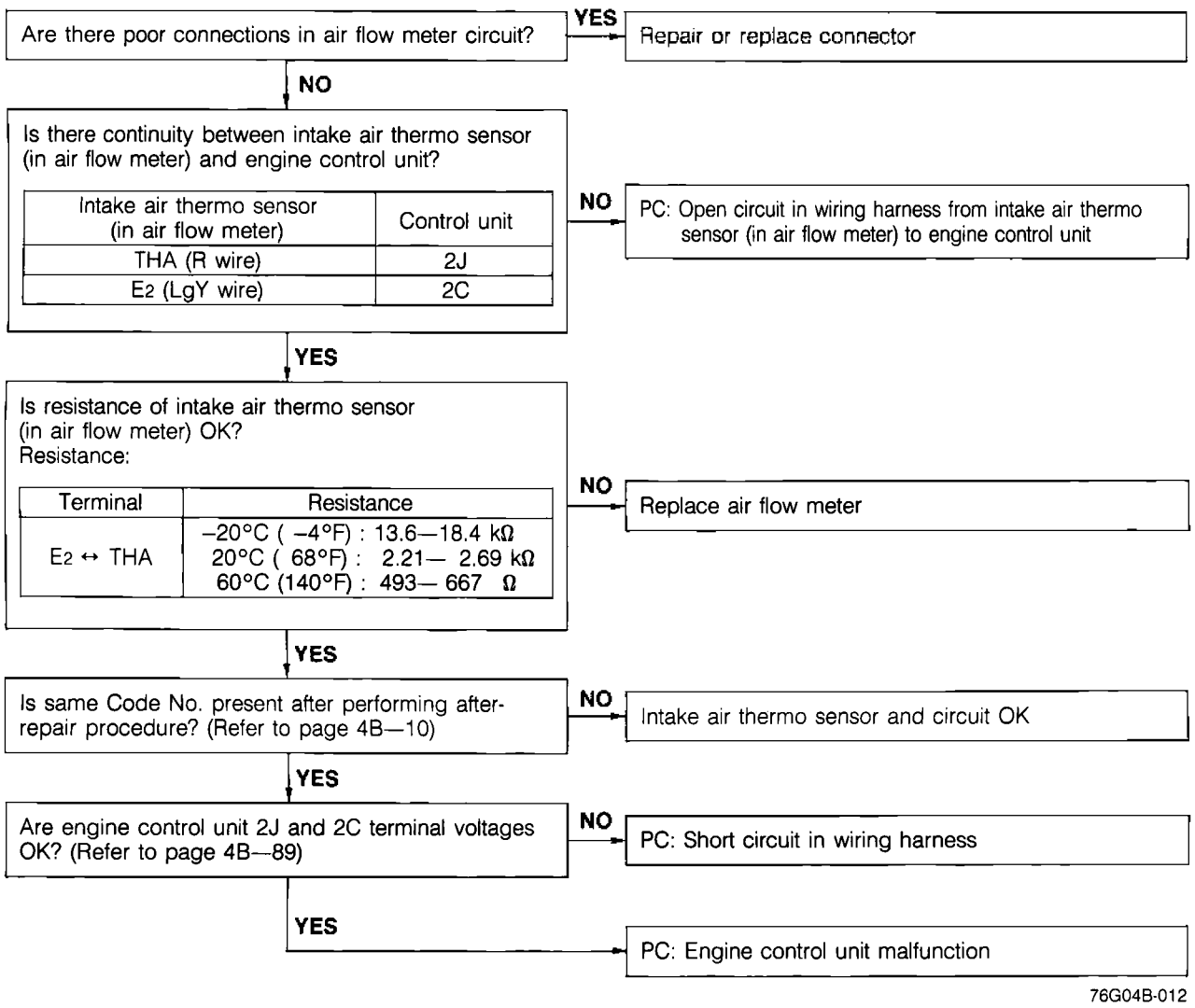
Is same Code No. present after performing after-repair procedure? (Refer to page 4B—10)
- NO → Water thermo sensor and circuit OK
- YES ↓

Are engine control unit 2I and 2C terminal voltages OK? (Refer to page 4B—89)
- NO → PC: Engine short circuit in wiring harness
- YES → PC: Engine control unit malfunction

76G04B-011

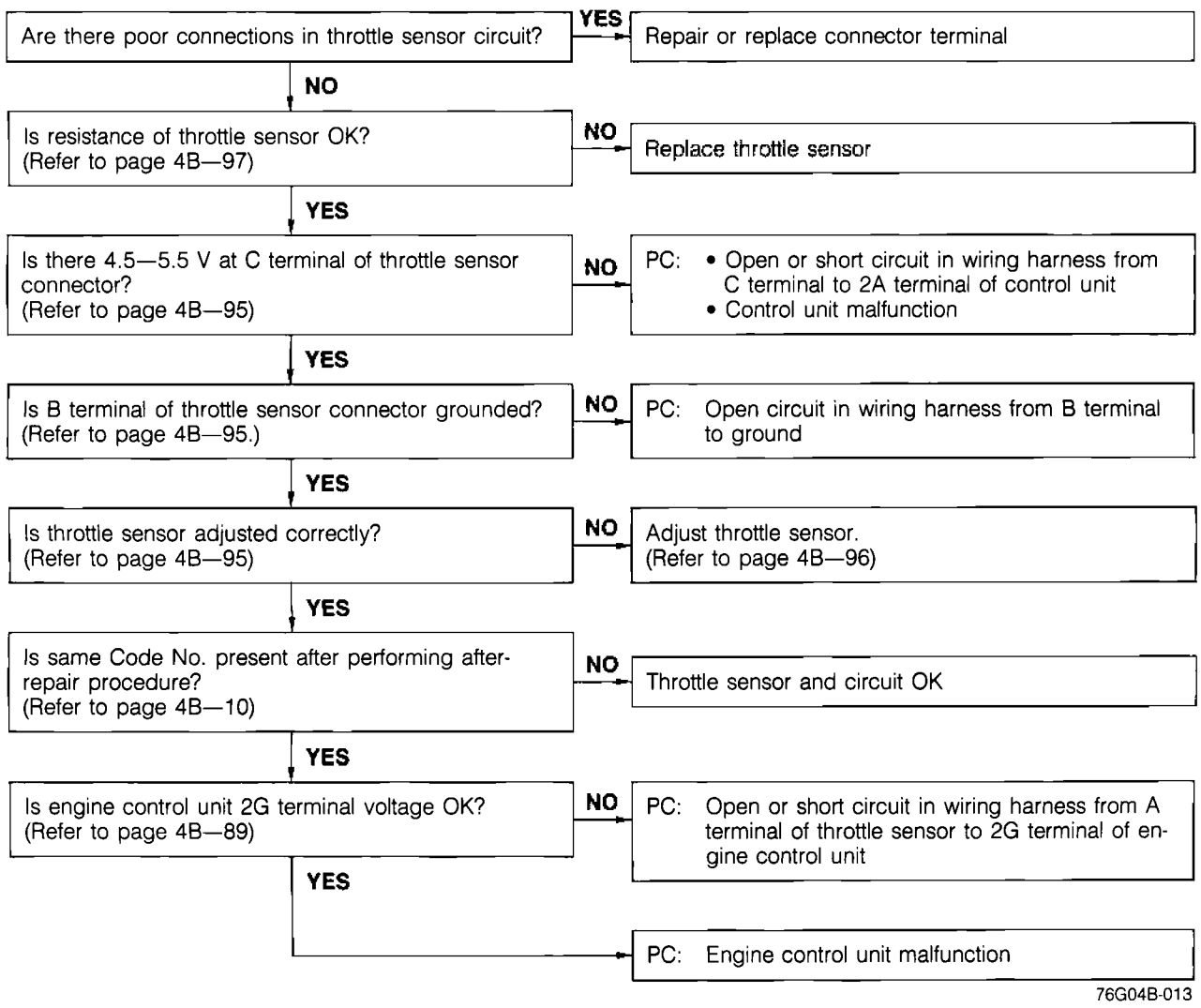
Code No. 10 (Intake air thermo sensor)

PC: Possible Cause



76G04B-012

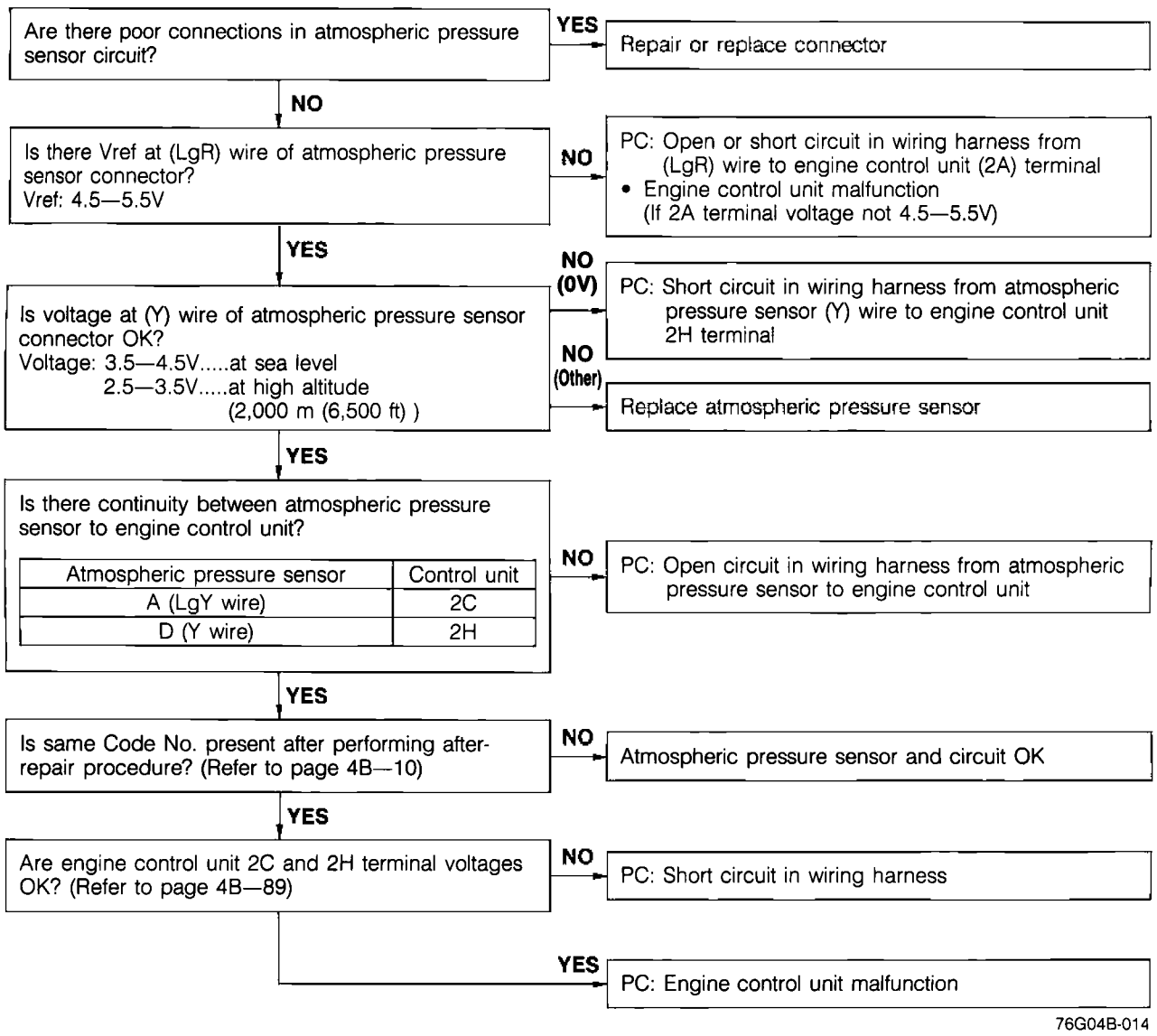
Code No. 12 (Throttle sensor) **PC: Possible cause**



76G04B-013

Code No. 14 (Atmospheric pressure sensor)

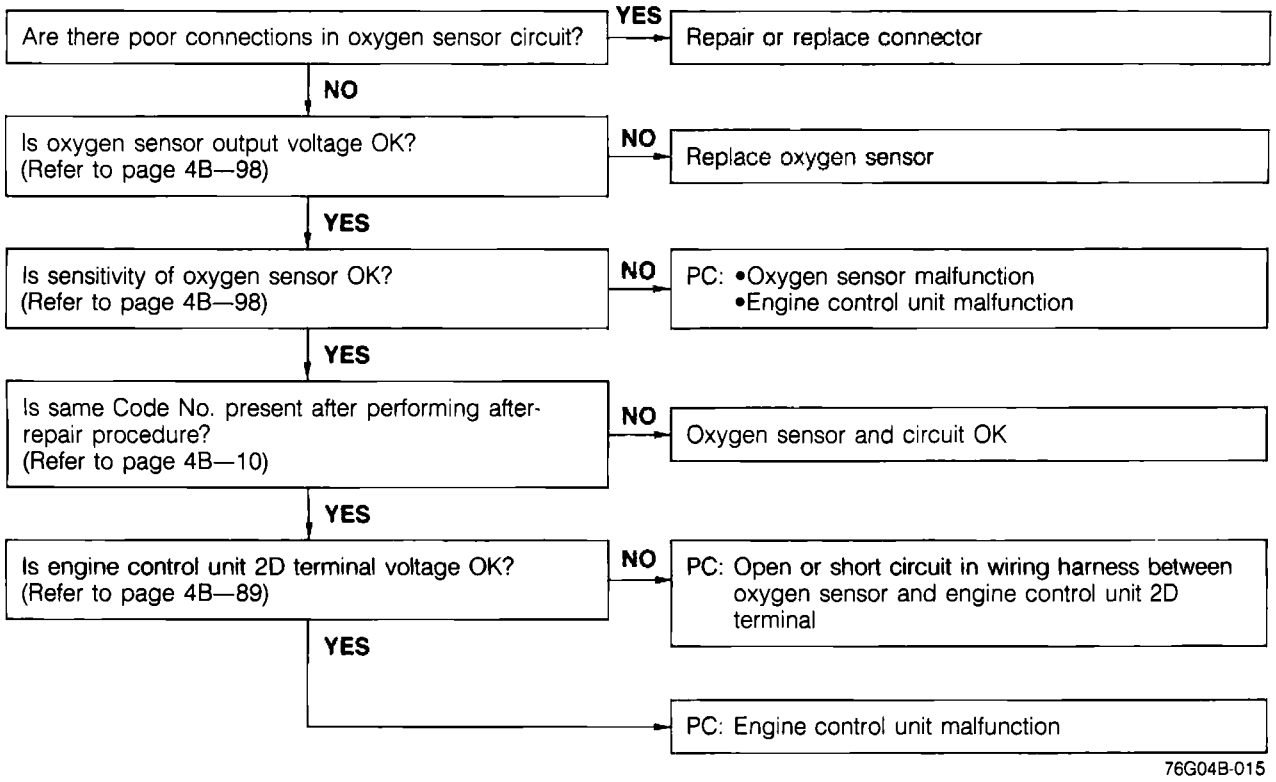
PC: Possible cause



76G04B-014

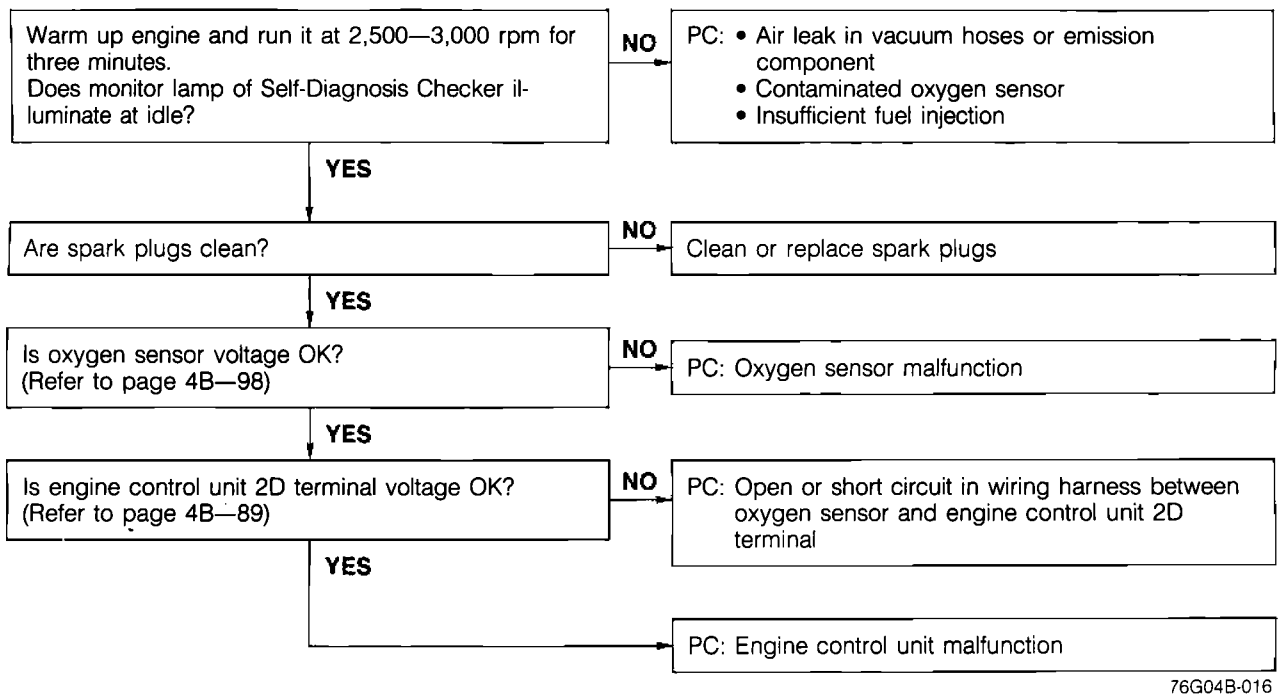
Code No. 15 (Oxygen sensor) **PC: Possible Cause**

Note
When Codes No.15 and 17 are present at the same time, first perform the checking procedure for Code No.17. (Refer to page 4B—21.)



76G04B-015

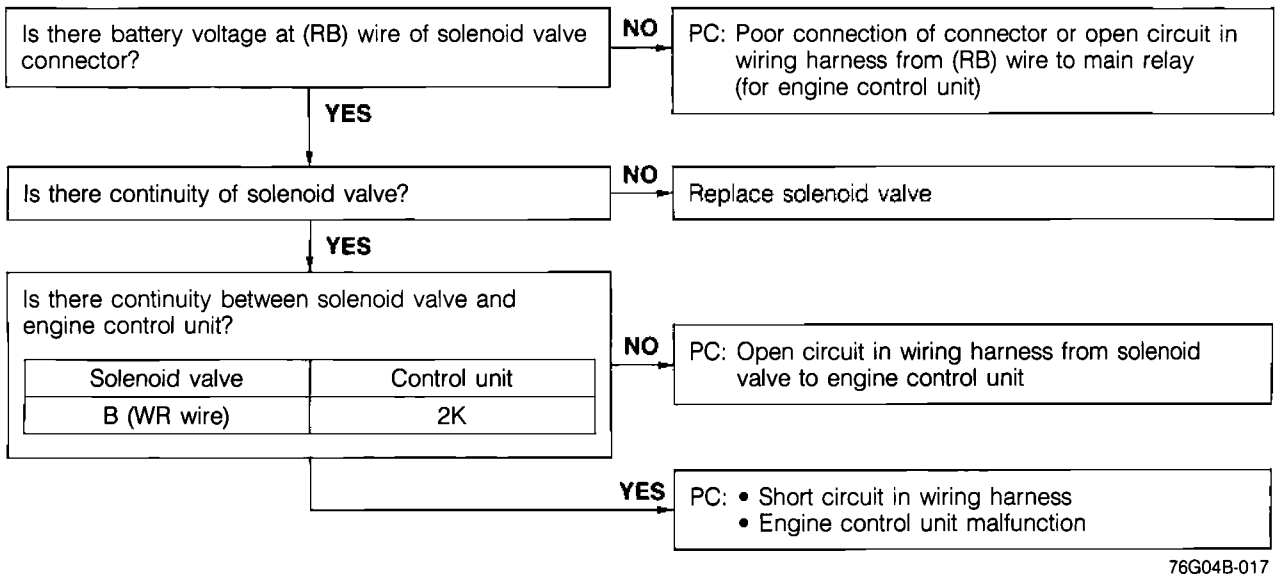
Code No. 17 (Feedback system) **PC: Possible Cause**



76G04B-016

Code No. 25 (Solenoid valve-Pressure regulator)

PC: Possible Cause



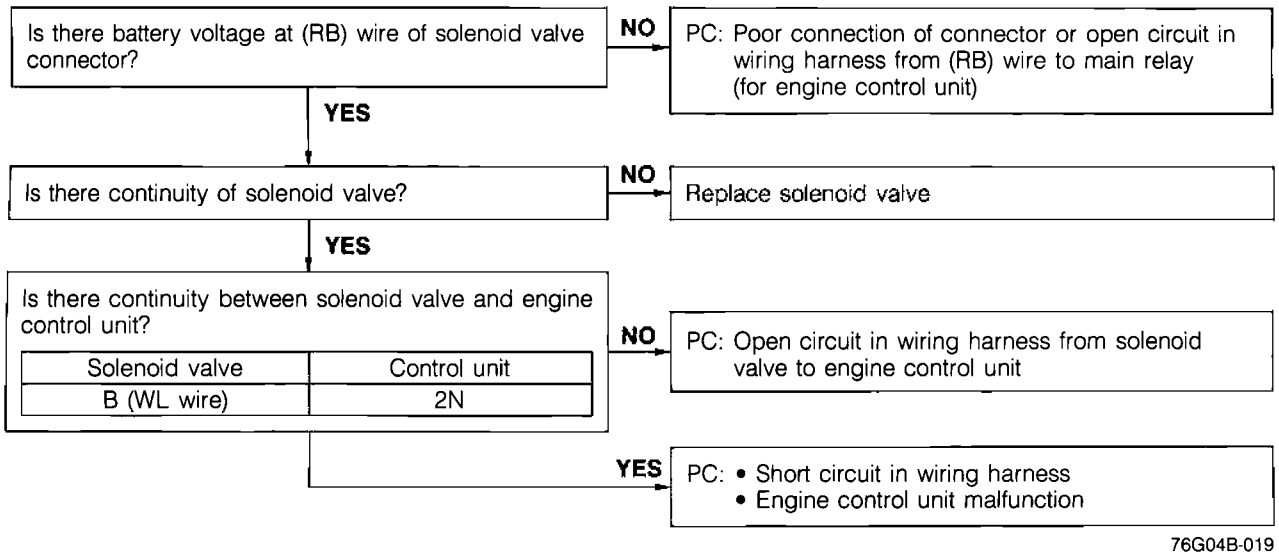
76G04B-017

Code No. 26 (Solenoid valve-Purge)

76G04B-018

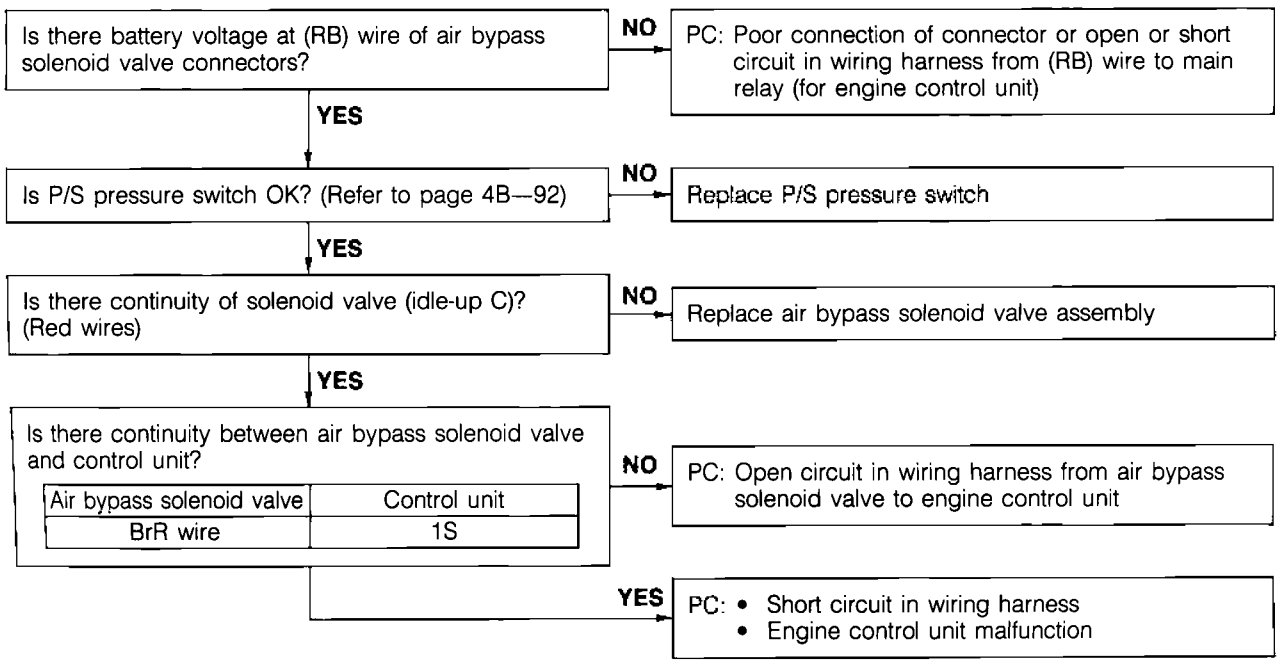
Code No. 28 (Solenoid valve—EGR)

PC: Possible Cause



76G04B-019

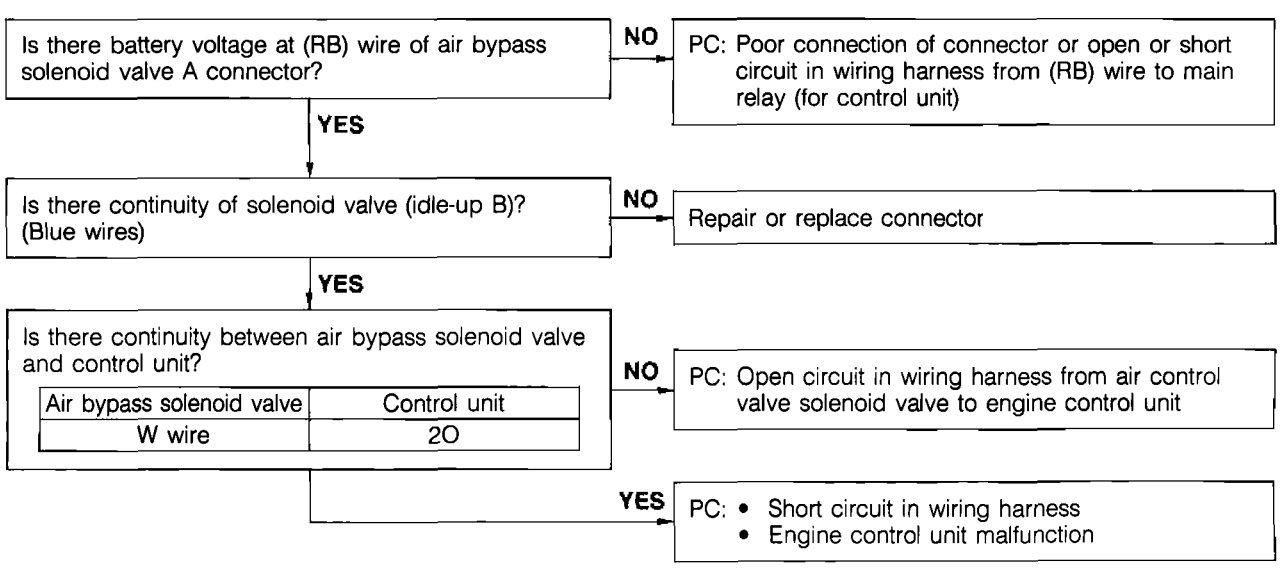
Code No. 34 (Air bypass solenoid valve—Idle-up C)



76G04B-020

No. 35 Code (Air bypass solenoid valve—Idle-up B)

PC: Possible Cause

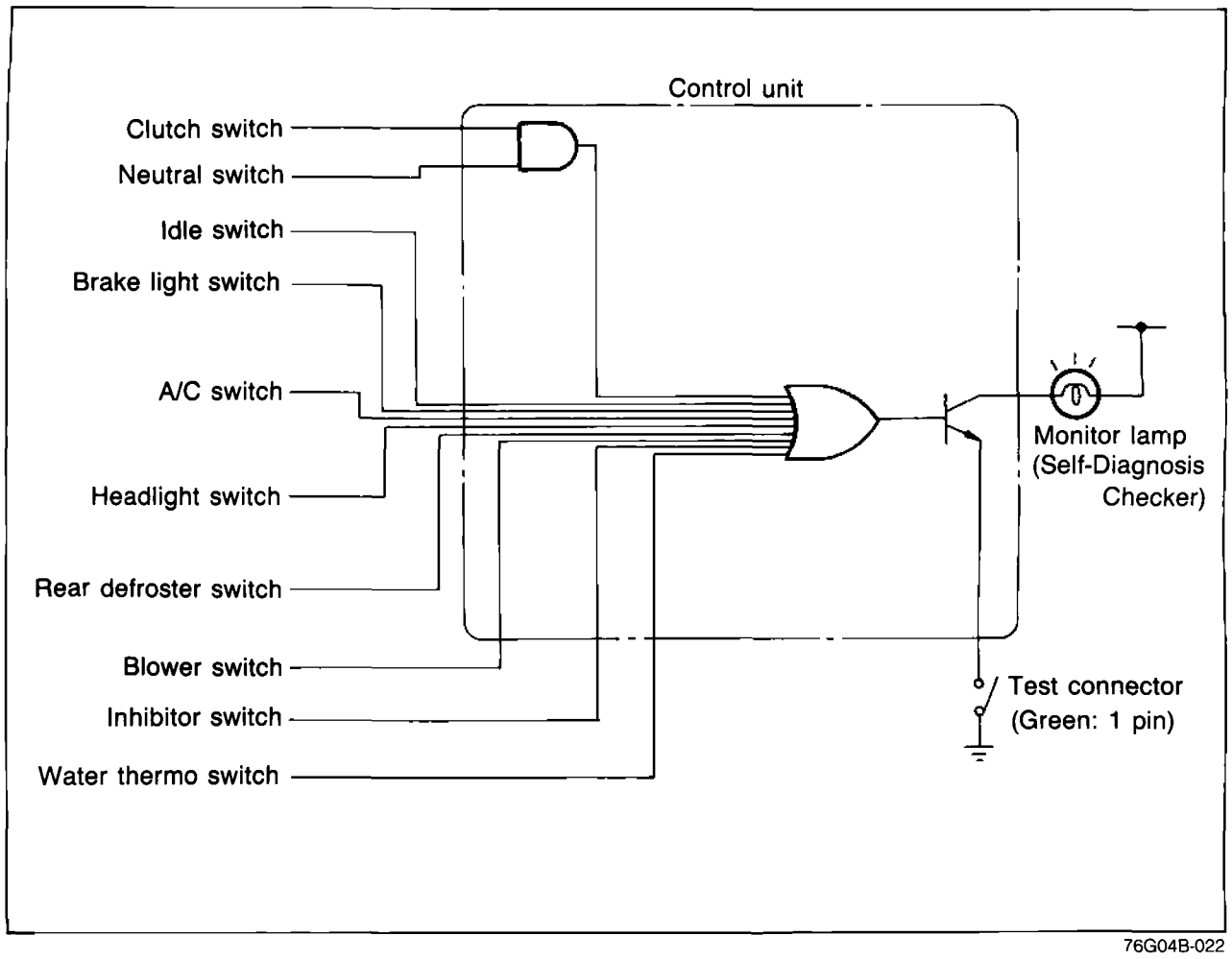


76G04B-021

SWITCH MONITOR FUNCTION

Individual switches can be monitored by the SST.

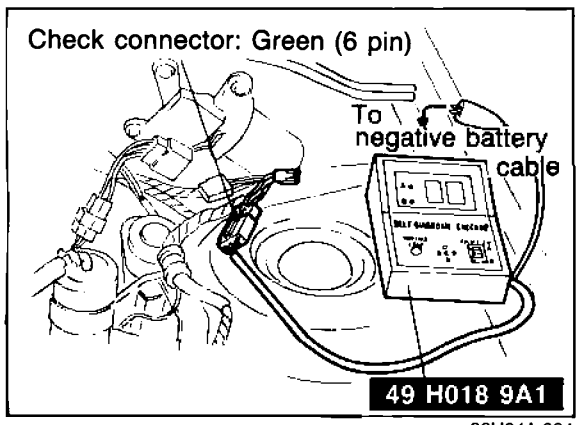
Note
The test connector must be grounded and the ignition switch ON (engine stopped).



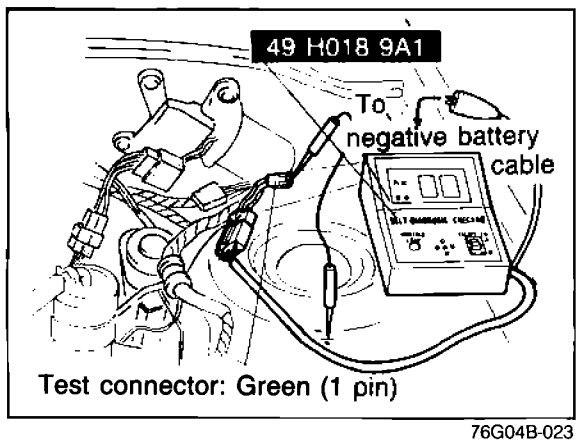
76G04B-022

Switch	Self-Diagnosis Checker (Monitor lamp)		Remarks
	Light ON	Light OFF	
Clutch switch	Pedal released	Pedal depressed	Gear: IN
Neutral switch	In gear	Neutral	Clutch pedal released
Idle switch	Pedal depressed	Pedal released	—
Brake light switch	Pedal depressed	Pedal released	—
A/C switch	ON	OFF	Blower motor position: "1" position
Headlight switch	ON	OFF	—
Rear defroster switch	ON	OFF	—
Blower switch	ON	OFF	Blower motor position: "3" or "4" position
Inhibitor switch	D, 1, 2 and R range	P and N range	—
Water thermo switch (Electrical fan)	Terminal disconnected	Terminal connected	While fan not operating

4B SWITCH MONITOR FUNCTION



86U04A-034



76G04B-023

INSPECTION PROCEDURE

1. Warm up the engine to normal operating temperature and stop it.
2. Connect the **SST** to the check connector (Green, 6-pin) and the negative battery terminal.
3. Connect a jumper wire between the test connector (Green, 1-pin) and a ground.
4. Turn the ignition switch ON. Check if monitor lamp illuminates when each switch is made to function as described below.

Caution

a) If any one of the switches is activated, the monitor lamp will stay on.
b) Do not start the engine.

Note

The Digital Code Checker (49 G018 9A0) with the Signal Adapter (49 9200 180) may be used in place of the Self-Diagnosis Checker.

Procedure

Set conditions to deactivate each switch
•All accessories OFF
•Transmission in neutral
•All pedals released
Verify that monitor lamp does not illuminate

NO →
Check each switch and related wiring harness
- Clutch and Neutral switch :Refer to page 4B—91
- Throttle sensor (Idle switch) :Refer to page 4B—95
- Brake light switch :Refer to page 4B—91
- A/C switch :Refer to section 15
- Headlight switch :Refer to section 15
- Rear defroster switch :Refer to section 15
- Blower switch :Refer to section 15
- Inhibitor switch :Refer to page 4B—92
- Water thermo switch :Refer to section 3A

YES ↓

Check each switch as described

76G04B-024

Neutral and Clutch switch (MTX)

Shift transmission into gear
Check that monitor lamp illuminates with clutch pedal released

NO →
PC:
- Neutral or clutch switch malfunction (Refer to page 4B—91)
- Open circuit in related wiring harness
- Engine control unit (1V) terminal malfunction (Refer to page 4B—89)

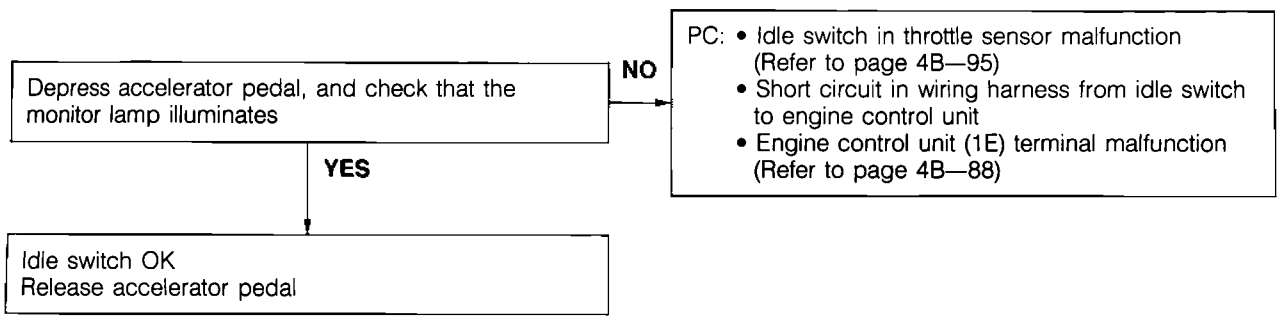
YES ↓

Depress clutch pedal
Check that monitor lamp does not illuminate
Return transmission to neutral

NO →
PC:
- Clutch switch malfunction (Refer to page 4B—91)

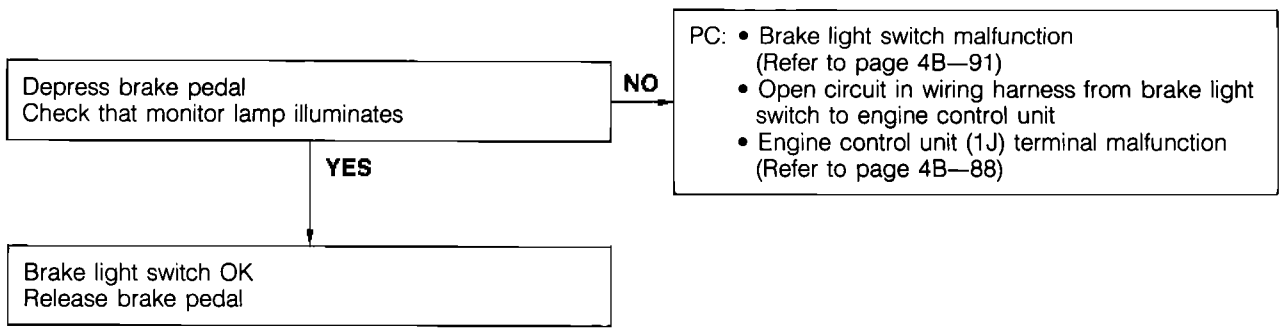
76G04B-025

Idle switch



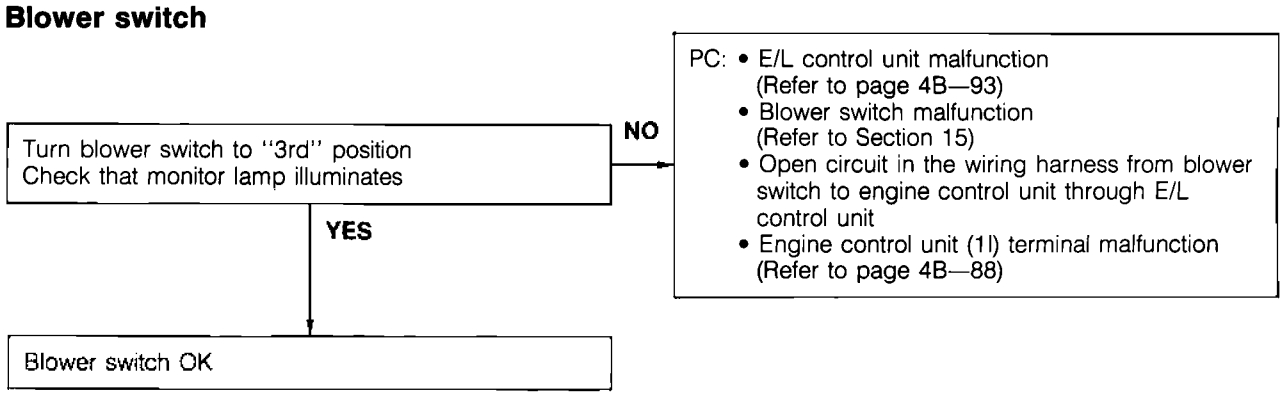
76G04B-026

Brake light switch



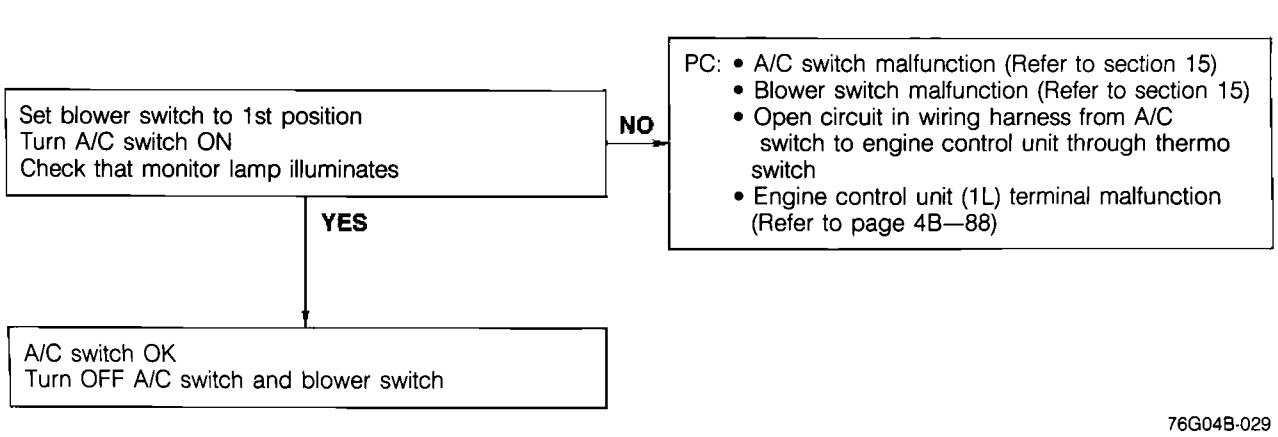
76G04B-027

Blower switch



76G04B-028

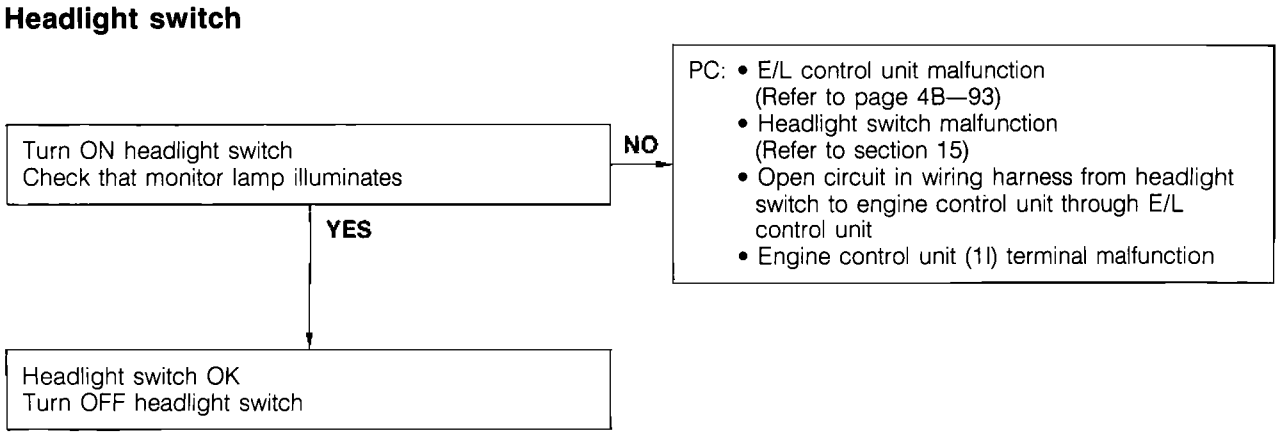
A/C switch



76G04B-029

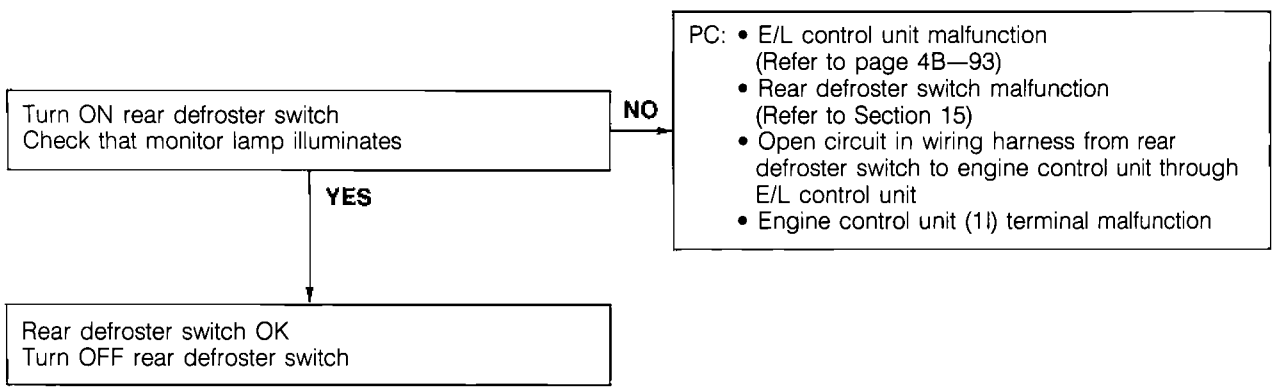
4B SWITCH MONITOR FUNCTION

Headlight switch



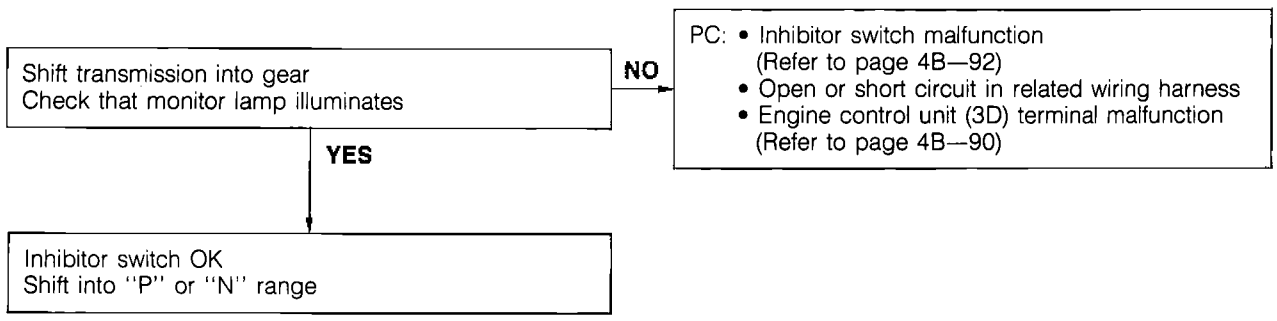
76G04B-030

Rear defroster switch



76G04B-031

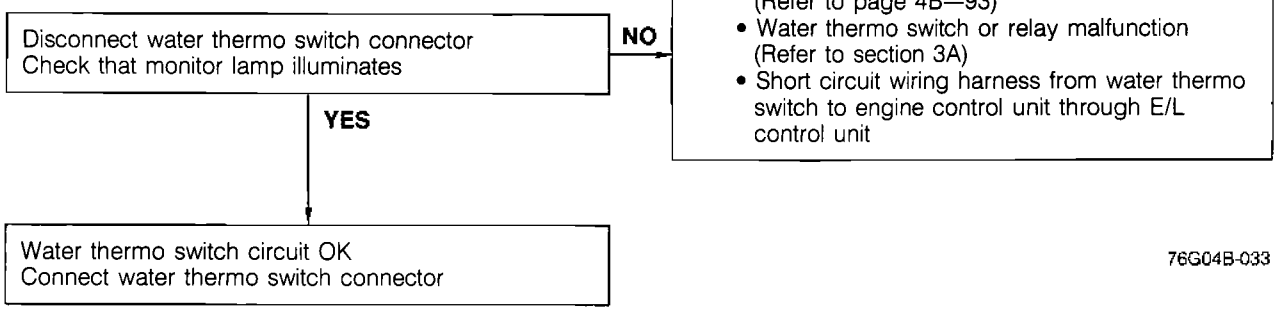
Inhibitor switch



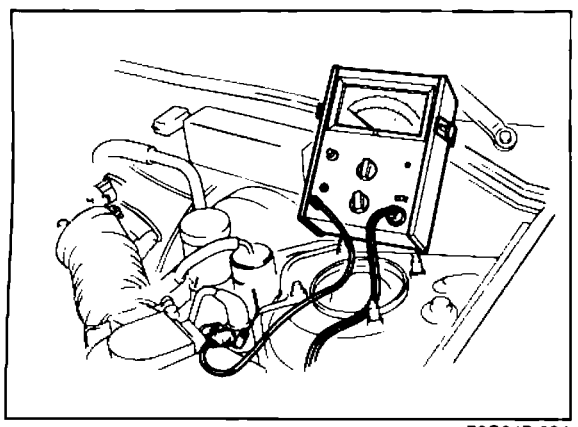
76G04B-032

Water thermo switch circuit (not included in switch inspection)

Warning
The electrical fan operates when the connector is disconnected. Use caution.



76G04B-033



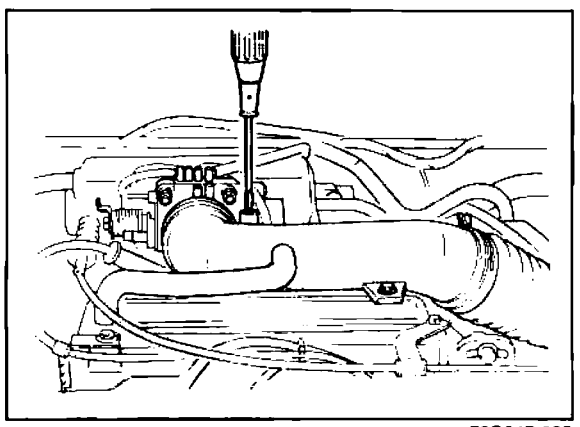
76G04B-034

IDLE ADJUSTMENT

IDLE SPEED

Preparation

1) Check the condition of the engine (plugs, leaks in hoses, etc.).
2) Make sure all accessories are OFF.
3) Warm up the engine and run it for **three minutes at 2,500—3,000 rpm** in neutral.
4) Check the initial ignition timing and adjust if necessary.



76G04B-035

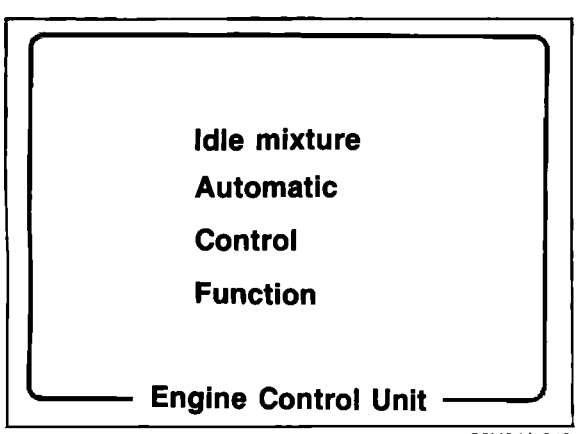
Inspection and Adjustment

Caution
Disconnect the air bypass solenoid connector when checking and adjusting the idle speed.

1. Check that the idle speed is within specification.

Specification:
MTX—800 $^{+50}_{0}$ rpm
ATX—900 $^{+50}_{0}$ rpm (P range)

2. If the idle speed is not within specification, remove the blind cap from the throttle body and adjust it by turning the air adjust screw.



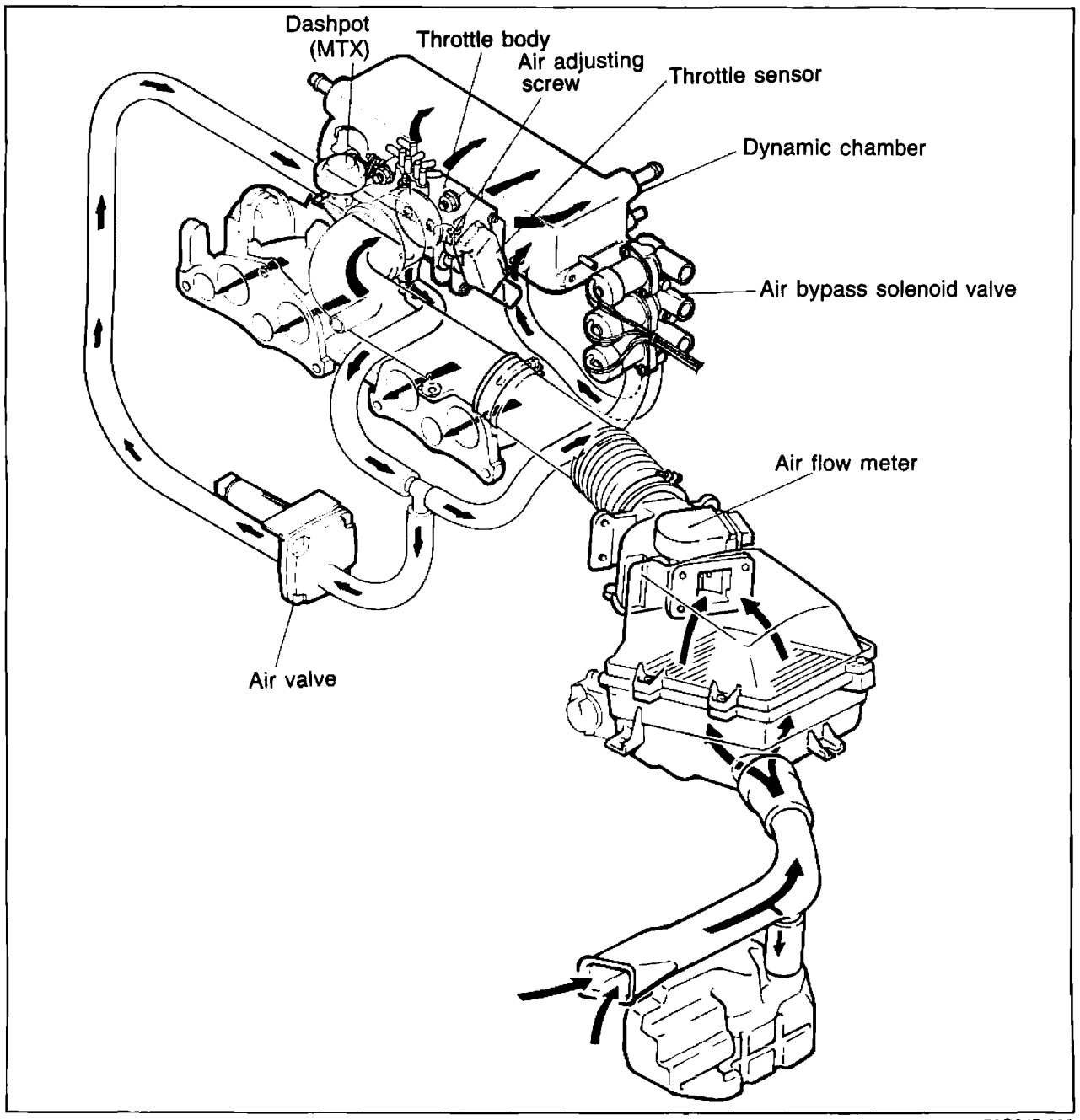
86U04A-049

IDLE MIXTURE

Because an automatic compensation function for air/fuel mixture is built into the engine control unit, it is not necessary to check and adjust the idle mixture.

4B INTAKE AIR SYSTEM

INTAKE AIR SYSTEM



76G04B-036

This system controls the air required by the engine for operation. The system consists of the air duct, air cleaner, air flow meter, throttle body, dynamic chamber, and intake manifold.

COMPONENT DESCRIPTIONS

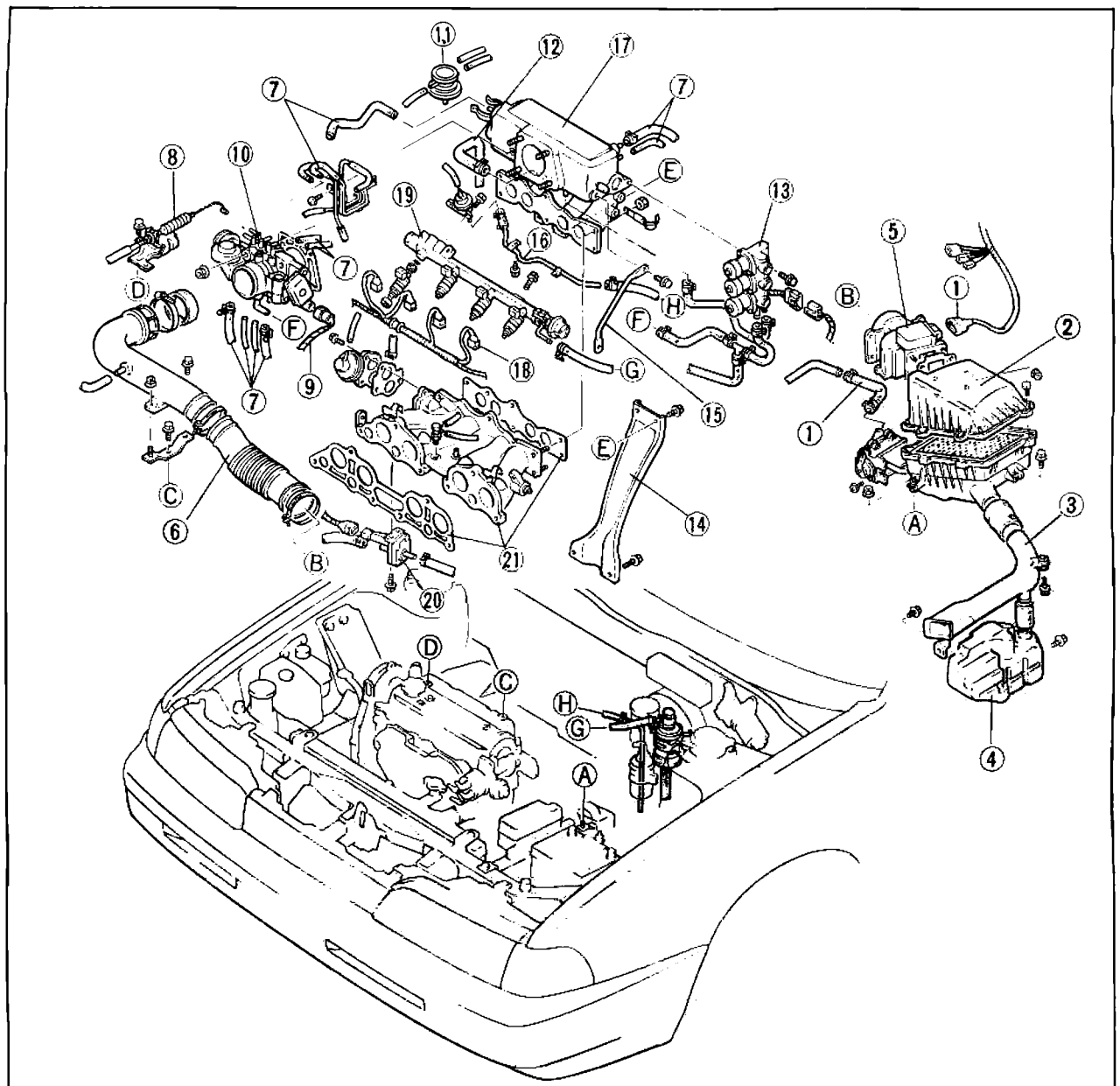
Component	Function	Remarks
Air cleaner	Filters air into throttle body	
Air flow meter	Detects amount of intake air; sends signal to engine control unit	Intake air thermo sensor and fuel pump switch are integrated
Throttle body	Controls intake air quantity	Integrated throttle sensor and idle switch

76G04B-037

REMOVAL

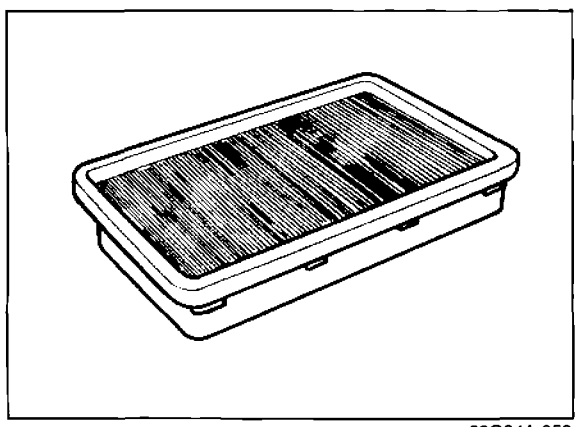
Caution
Before removing the following parts, release the fuel pressure from fuel system to reduce the possibility of injury or fire. (Refer to page 4B—45.)

Remove in the sequence shown in the figure.



76G04B-038

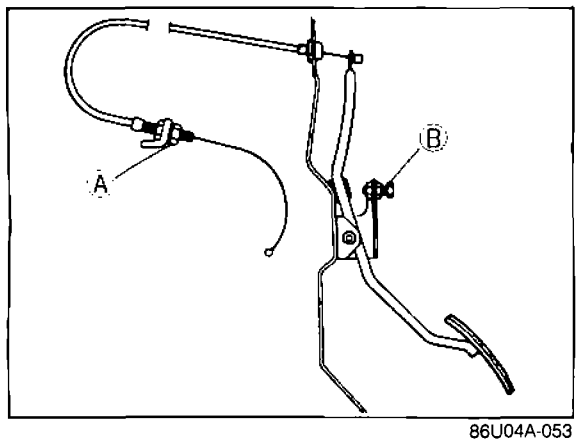
1. Air flow meter connector and secondary air hose
2. Air cleaner
3. Air duct
4. Resonance chamber
5. Air flow meter
6. Air hose
7. Vacuum hoses, air hoses, and water hoses
8. Accelerator cable
9. Throttle sensor connector
10. Throttle body
11. EGR modulator valve
12. Air hose
13. Air bypass solenoid valve
14. Intake manifold bracket
15. Dynamic chamber bracket
16. Fuel return pipe
17. Dynamic chamber
18. Injector connector
19. Delivery pipe assembly
20. Air valve
21. Intake manifold and gaskets



69G04A-059

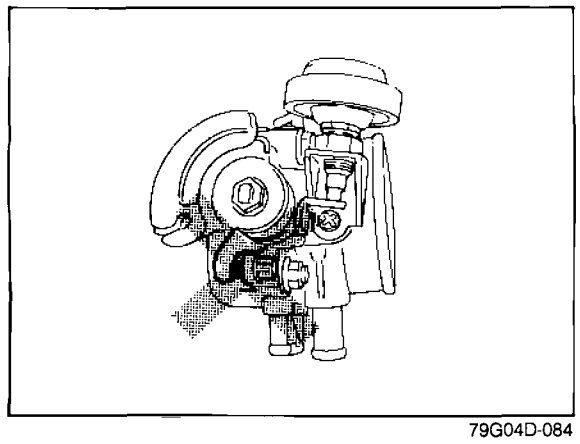
PARTS INSPECTION
Air Cleaner Element
1. Check the condition of the air cleaner element.
2. Replace, if necessary.

Caution
Do not use the compressed air to clean the air cleaner element.



86U04A-053

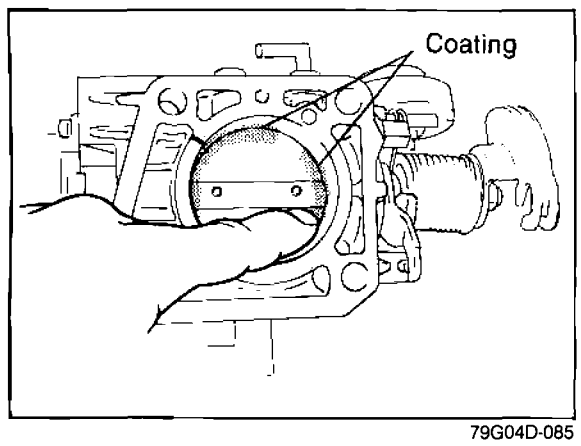
Accelerator Cable
1. Inspect the deflection of the cable. If the deflection is not within **1—3 mm (0.04—0.12 in.)**, adjust by turning nuts A.
2. Depress the accelerator pedal to the floor and confirm that the throttle valve is fully opened. Adjust by turning bolt B if necessary.



79G04D-084

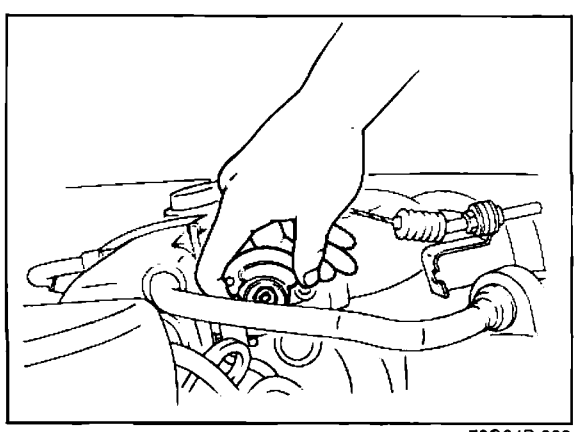
Throttle Body

Caution
a) The throttle adjust screw is preset and sealed.
Do not attempt to adjust it.
If there is a malfunction of the throttle adjust screw, lever, or throttle valve, replace the throttle body as an assembly.



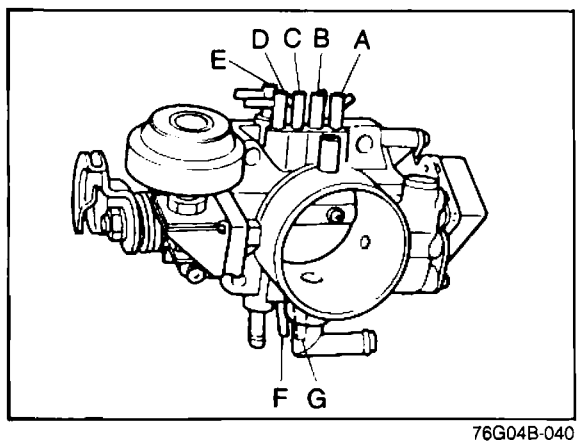
79G04D-085

b) Do not remove the thin sealing coating from the throttle valve or bore.



76G04B-039

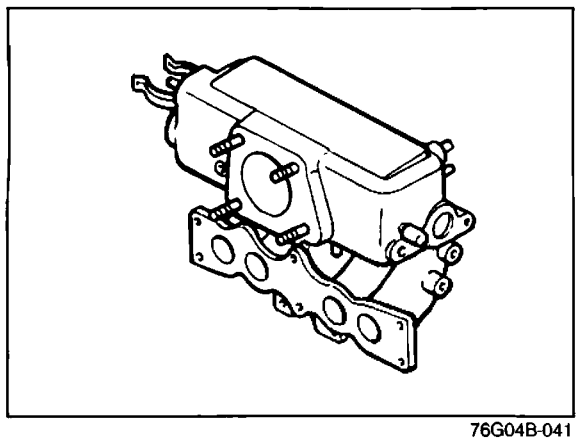
1. Check that the throttle valve moves smoothly when the throttle lever is moved from fully closed to fully open.



76G04B-040

2. Warm up the engine and run at idle.
3. Check the vacuum generated at each port as shown in the following table.

Port (Connected to) \ Condition	Idle	Other
A (solenoid valve, EGR)	No	Yes
B (distributor, advance)	No	Yes
C (EGR modulator valve)	No	Yes
D (water thermo valve)	No	Yes
E (vacuum switch valve & charcoal canister)	Yes	
F (distributor, retard & air control valve)	Yes	
G (distributor, advance)	Yes	

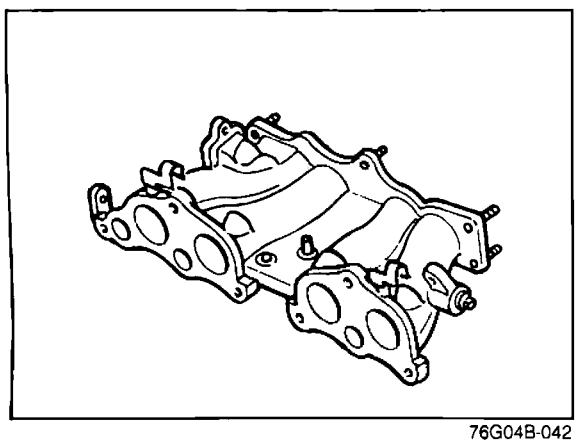


76G04B-041

4. If vacuum is not obtained as in the table, clean the necessary port.

Dynamic Chamber

1. Visually check the dynamic chamber for damage.
2. Replace, if necessary.



76G04B-042

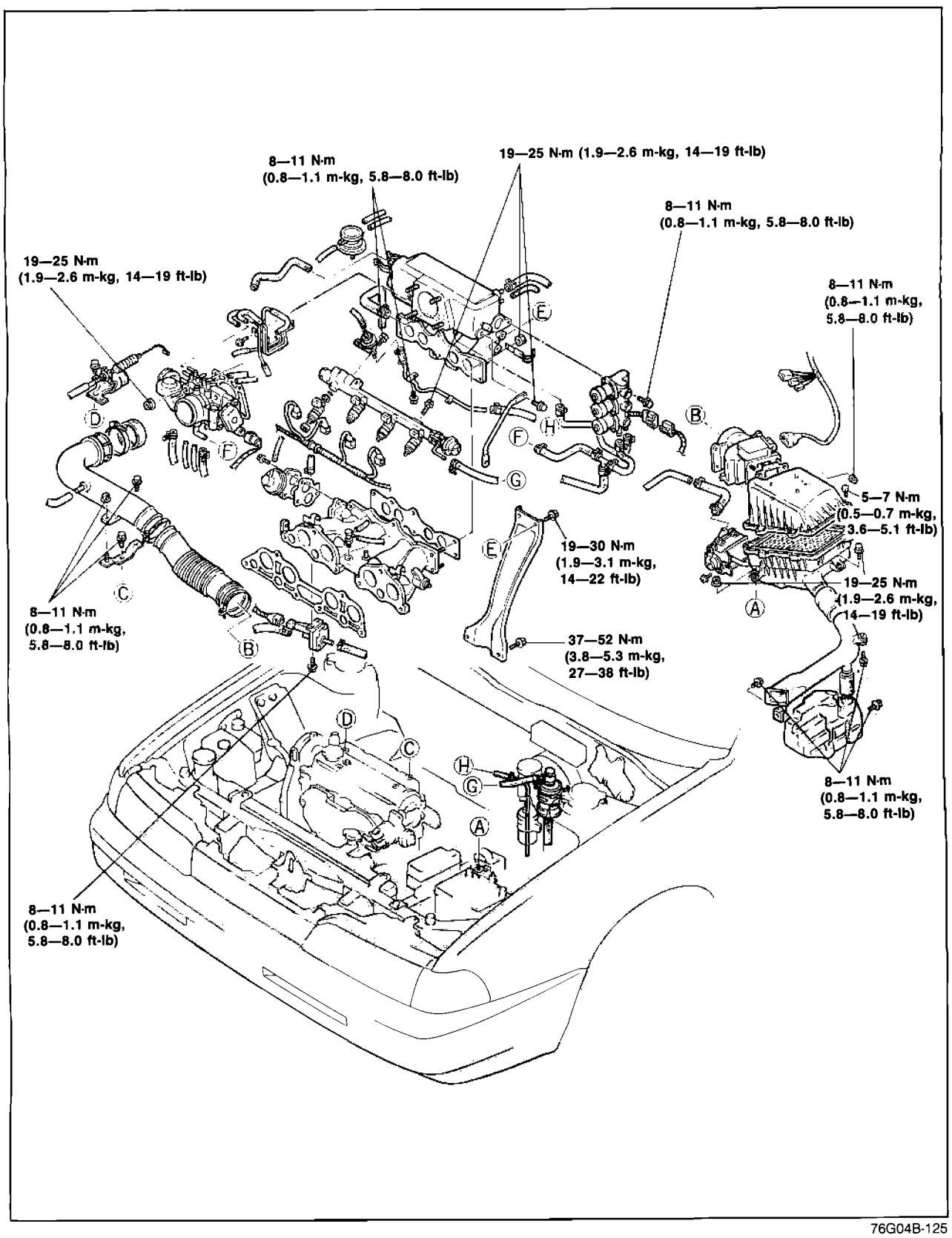
Intake Manifold

1. Visually check the intake manifold for damage.
2. Replace, if necessary.

INSTALLATION

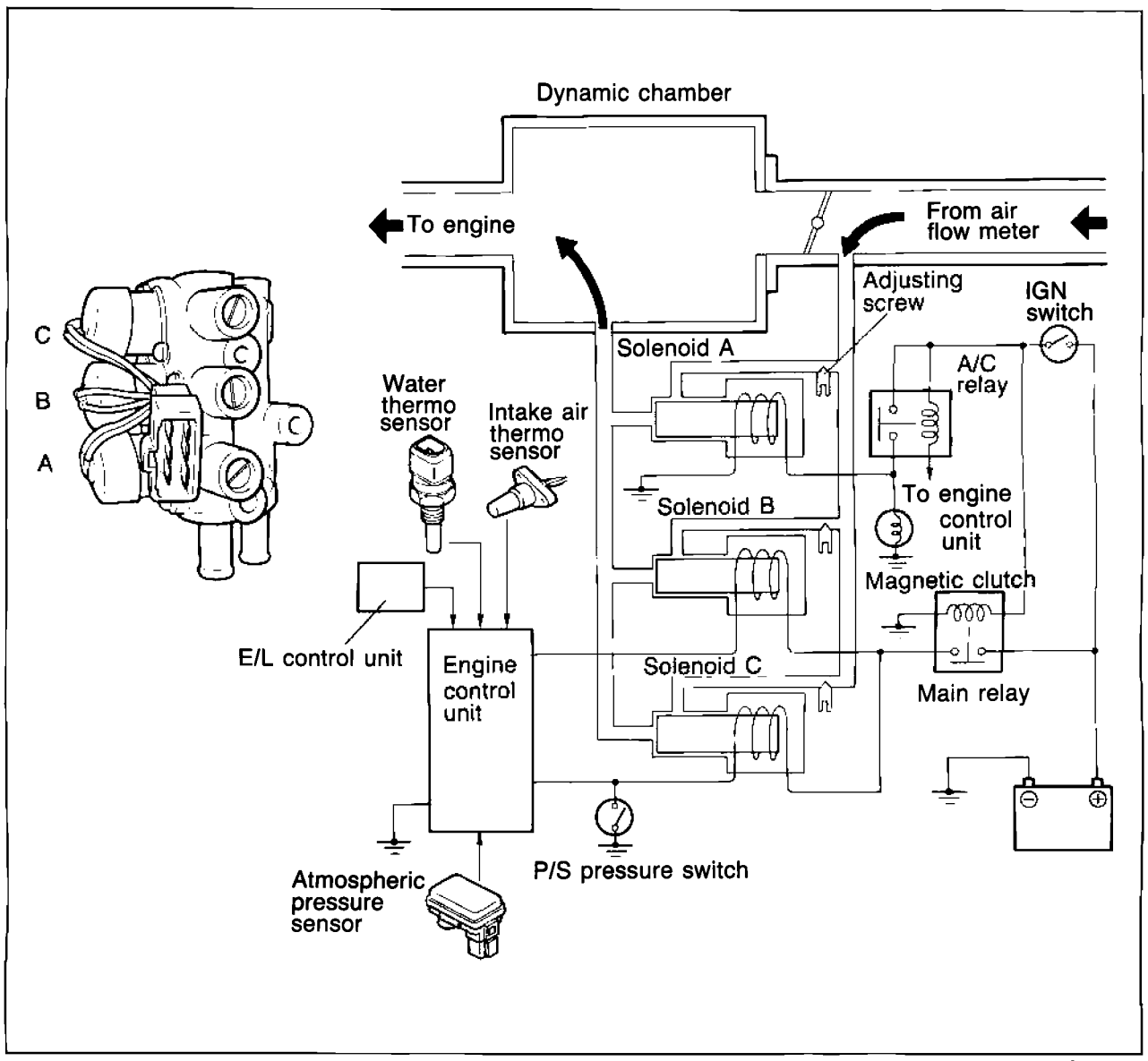
Install in the reverse order of removal.

Torque Specification



76G04B-125

IDLE-UP SYSTEM



76G04B-043

Air Valve
This valve is constructed so that the gate valve is opened and closed by means of a bimetal strip and heat coil. It acts as a fast idle mechanism by opening the gate valve to increase intake air by bypassing the throttle valve while engine is cold, therefore engine speed is increased to shorten the warm up period.

Air Bypass Solenoid Valve
This valve incorporates three solenoid valves. They operate according to the signal from the engine control unit or A/C switch in order to achieve idling stability and the optimum idle speed.
The operating conditions of each solenoid valve are as shown below.

Solenoid valve	Operating condition
A	A/C operated
B	Intake air temp. above 55°C (131°F) or vehicle at above 1,000 m (3,280 ft)
C	P/S operated, E/L applied, intake air temp. above 55°C (131°F), pressure regulator solenoid ON or vehicle at above 1,900 m (6,232 ft)

4B IDLE-UP SYSTEM

COMPONENT DESCRIPTIONS

Component	Function	Remarks
Air bypass solenoid valve	Controls bypass air amount	Operates A: A/C : ON B: Intake air temp. high or at high altitude C: P/S : ON, E/L applied or hot start
Air valve	When cold, supplies bypass air into dynamic chamber	• Engine speed increased to shorten warm-up period • Bimetal type
Atmospheric pressure sensor	Detects atmospheric pressure; sends signal to engine control unit	
E/L control unit	Detects electrical load applied; sends signal to engine control unit	
Engine control unit	Detects signals from input sensors and switches; controls air bypass solenoid valve	
Intake air thermo sensor	Detects intake air temperature; sends signal to engine control unit	Installed in air flow meter
P/S pressure switch	Detects P/S operation; sends signal to engine control unit	P/S: ON when steering wheel turned right or left

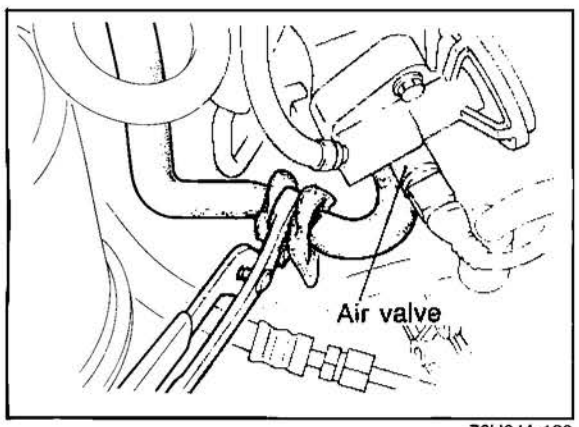
76G04B-044

TROUBLESHOOTING

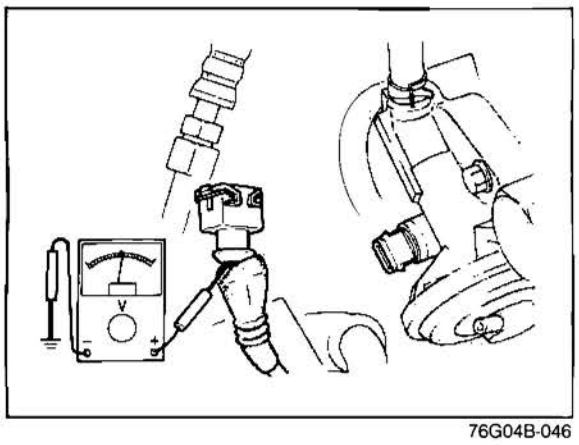
Check the condition of the wiring harness and connectors before checking the sensors or switch.

Possible cause / Page / Symptom		Air valve	Air bypass solenoid valve		Engine control unit terminal	
			Idle-up singal	Adjustment	1S	20
		4B—38	4B—39	4B—40	4B—89	4B—90
Engine stalls	While warming up	1	2	3	4	5
	After warming up		1	2	3	4
Rough idle	While warming up	1	2	3	4	5
	After warming up		1	2	3	4
High idle speed after warming up		1	2	3	4	5
Runs rough on deceleration			1	2	3	4
Afterburn in exhaust system		1	2	3	4	5
Fails emission test		1	2	3	4	5

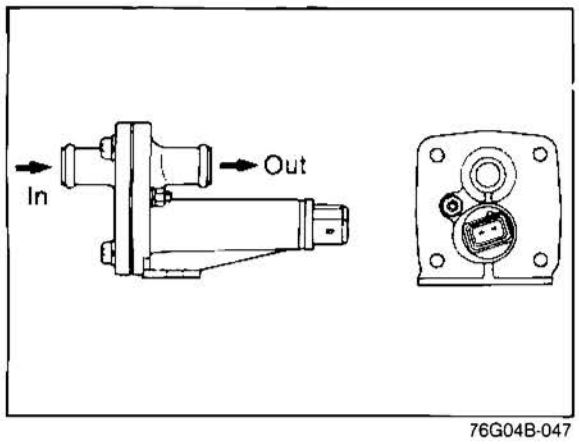
76G04B-045



76U04A-120



76G04B-046



76G04B-047

AIR VALVE

Pre-inspection

1. Start the engine and run it at idle.
2. Pinch the bypass air hose and check that the engine rpm drops.

When engine still cool ..... RPM reduced
After warming-up..... RPM drop within 200 rpm

3. If the speed is not reduced when cold, check the air valve, or check for vacuum leaks at the bypass air hose.
4. If the speed drop is **more than 200 rpm** when warm, check the air valve and current to the valve.

Inspection of Terminal Voltage

1. Disconnect the connector from the valve.
2. Remove the rubber boot from the connector.
3. Start the engine and run it at idle.
4. Check that there is battery voltage at terminal (WY), using a voltmeter.
5. If not correct, check the circuit opening relay and wiring harness.

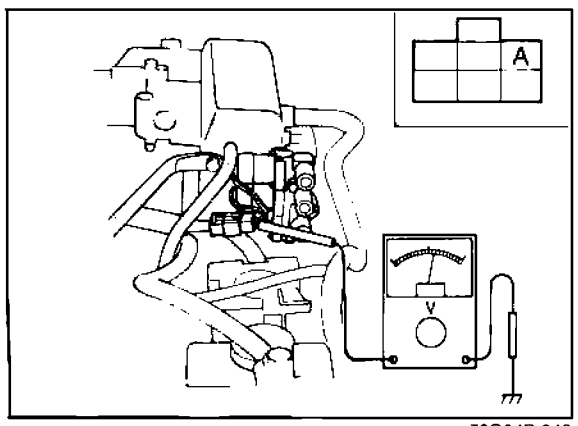
Inspection of Air Valve

1. Check the valve for operation.

Temperature 20°C (68°F) ..... Valve open
(When engine cool)
After warming-up ..... Valve closed

2. Replace valve if faulty.

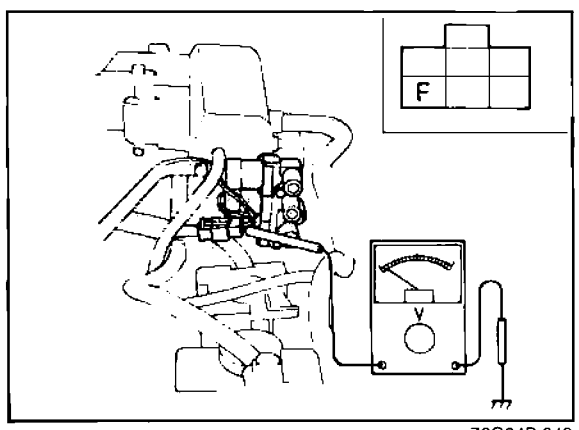
expert22 для http://rutracker.org



76G04B-048

AIR BYPASS SOLENOID VALVE
Inspection of Idle-up Signal
A/C

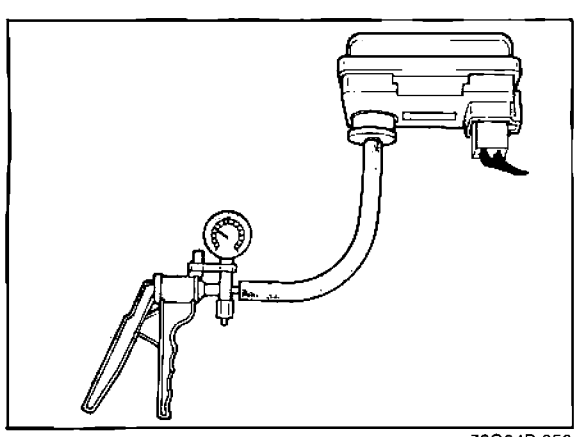
1. Warm up the engine and run it at idle.
2. Connect a voltmeter between terminal **A** and ground.
3. Turn the A/C and blower motor switches ON.
4. Check that the meter shows **battery voltage**.
5. If not correct, check the A/C relay, A/C switch, blower motor switch, fuse,and wiring harness.



76G04B-049

P/S

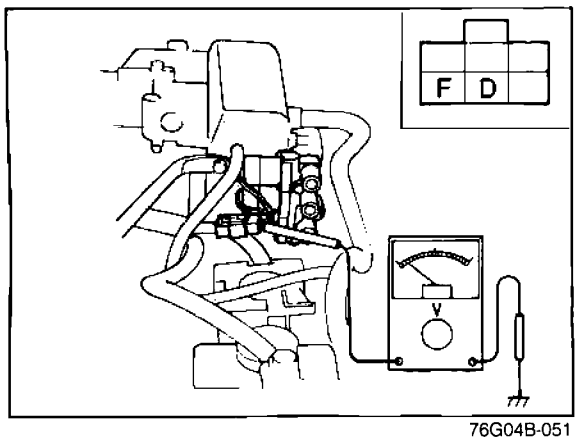
1. Warm up the engine and run it at idle.
2. Attach a voltmeter between the terminal **F** and ground.
3. Turn the steering wheel all the way to either the right or left.
4. Check that the meter shows **0V**.
5. Release the steering wheel.
6. Check that the meter shows battery voltage.
7. If not correct, check the P/S pressure switch (Refer to page 4B—92) and wiring harness.



76G04B-050

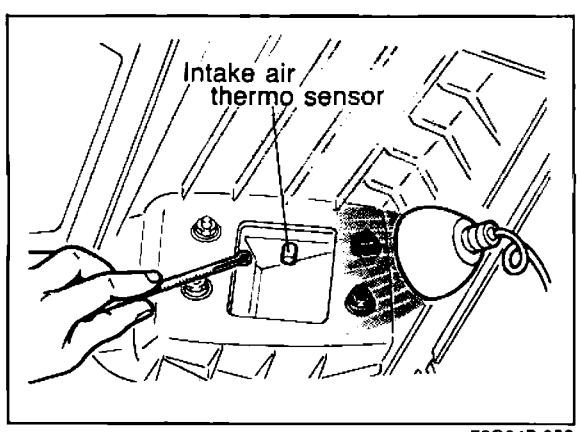
High altitude compensation

1. Warm up the engine and run it at idle.
2. Connect a vacuum pump to the atmospheric pressure sensor.
3. Connect a voltmeter between the terminals shown in the following table and ground.
4. Apply vacuum to the atmospheric pressure sensor as shown in the table using a vacuum pump.
5. Check that the voltmeter shows **0V**.
6. Release the vacuum.
7. Check that the voltmeter shows battery voltage.
8. If not correct, check the atmospheric pressure sensor (Refer to page 4B—99) and wiring harness.



76G04B-051

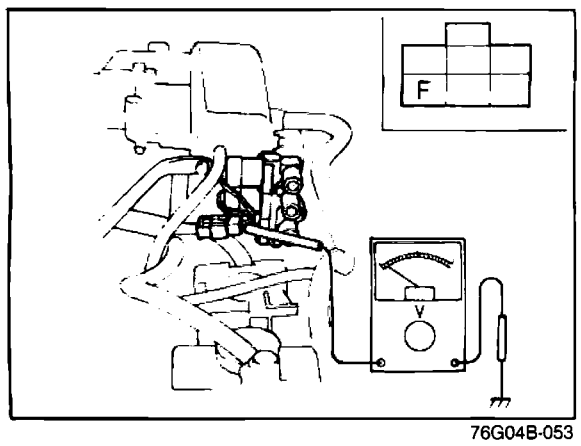
Terminal	Vacuum Amount
F	Approx. 155 mmHg (6.10 inHg)
D	Approx. 85 mmHg (3.35 inHg)



76G04B-052

Hot idle compensation

1. Warm up the engine and run it at idle.
2. Connect a voltmeter between the terminal **F, D** and ground.
3. Remove the air cleaner upper case assembly.
4. Heat the intake air thermo sensor to more than **55°C (131°F)**.
5. Check that the meter shows **0V**.
6. If not correct, check the intake air thermo sensor (Refer to page 4B—94).



76G04B-053

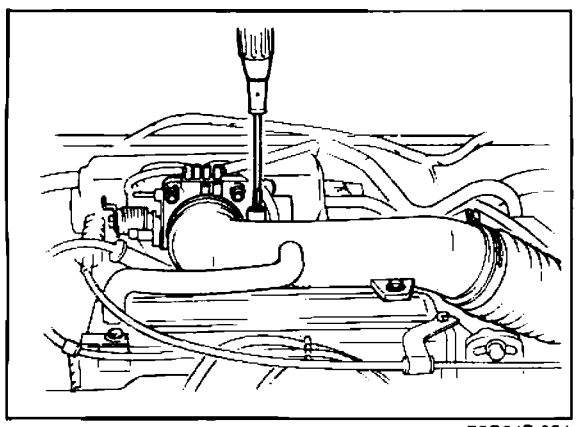
E/L (Electrical load)

1. Warm up the engine and run it at idle.
2. Connect a voltmeter between the **F** terminal and ground.
3. Apply the E/L.

E/L:

- **Headlight**
- **Rear defroster**
- **Electrical fan motor**
- **Blower motor (3rd or 4th position)**

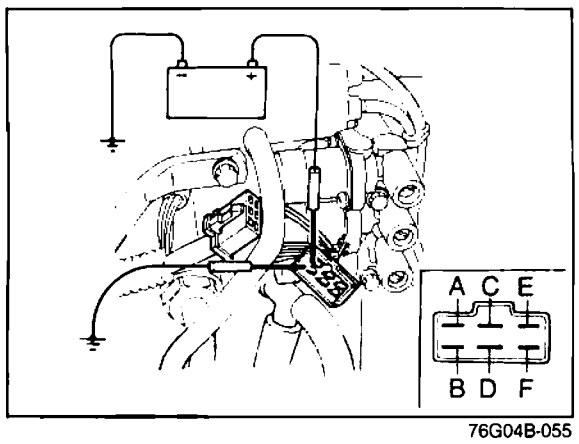
4. Check that the meter shows **0V**.
5. If not correct, check the electrical load control unit (Refer to page 4B—93).



76G04B-054

Adjustment

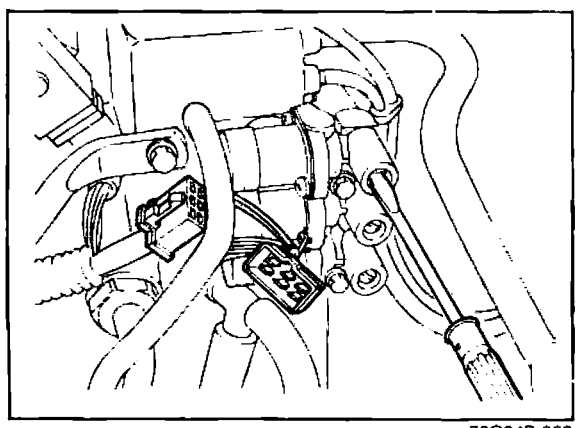
1. Warm up the engine and run it at idle.
2. Turn all accessories OFF.
3. Connect a tachometer to the engine.
4. Disconnect the air bypass solenoid valve connector.
5. Check the idle speed and adjust it if necessary.



76G04B-055

6. Apply battery power to each BAT terminal and ground each GRD terminal as shown in the table.
7. Check that the engine speed is within specification.

Valve	BAT	GRD	Engine speed
A (for A/C)	A	B	1,250—1,350 rpm
B (for high altitude and high intake air temp.)	C	D	900—1,000 rpm (MTX)
C (for P/S, E/L, high intake air temp., high altitude and hot idle compensations)	E	F	1,000—1,100 rpm (ATX)

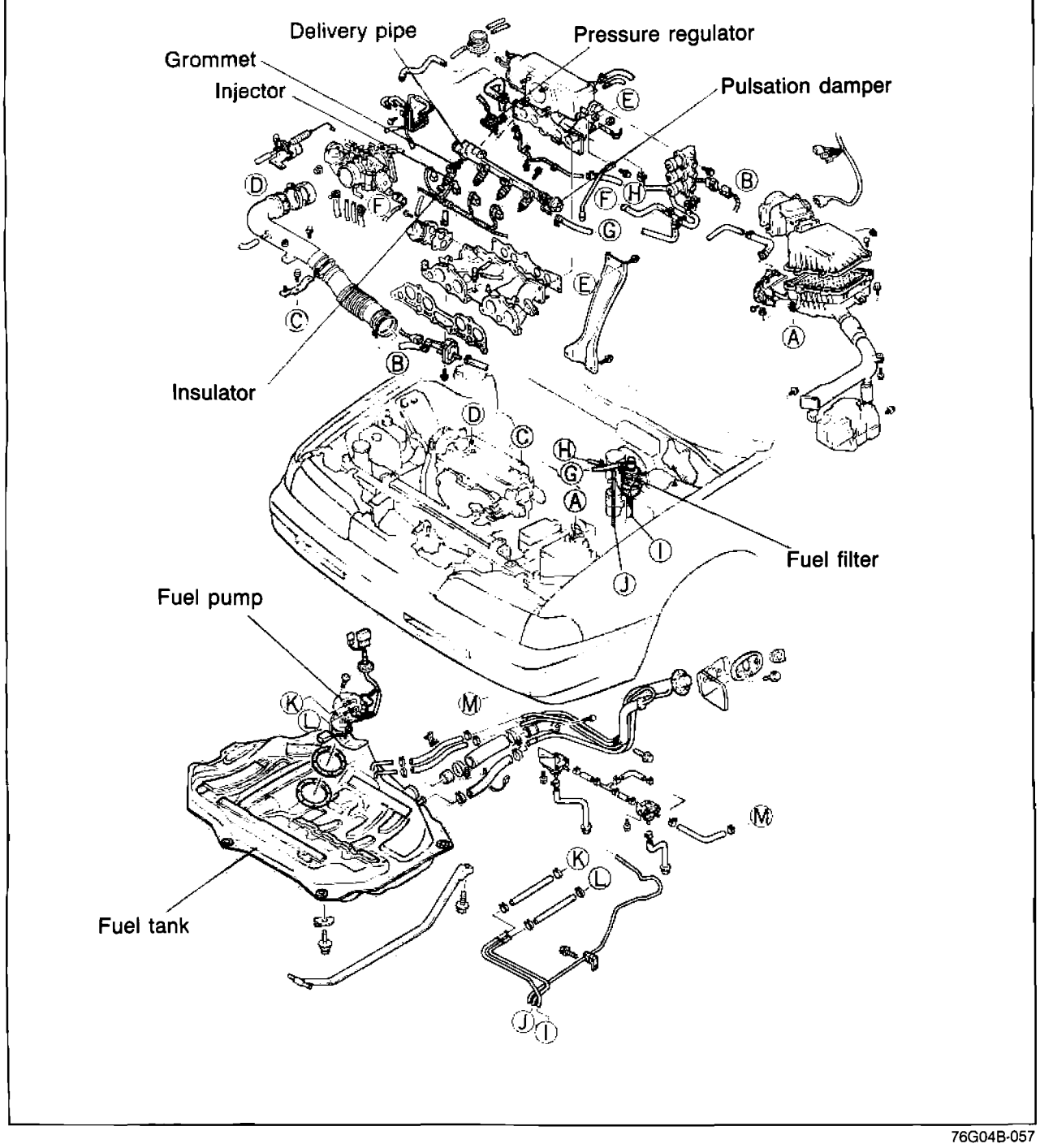


76G04B-056

8. If not correct, adjust by adjusting the respective adjusting screw.
9. If there is no idle-up, replace the air bypass solenoid valve.
10. Reconnect the connector to the valves.

4B FUEL SYSTEM

FUEL SYSTEM



76G04B-057

This system supplies the fuel necessary for combustion at a constant pressure to the injectors. Fuel is metered and injected into the intake manifold according to the injection control signals from the engine control unit. It consists of the fuel pump, fuel filters, delivery pipe, pulsation damper, pressure regulator, injectors, fuel pump switch (incorporated in the air flow meter), and the circuit opening relay. The fuel pump is mounted in the fuel tank to minimize the operating noise of the fuel pump. The injectors are directly supplied with battery voltage through the main relay.

COMPONENT DESCRIPTIONS

Component	Function	Remarks
Air flow meter	Detects amount of intake air; sends signal to engine control unit	Intake air thermo sensor and fuel pump switch are integrated
Atmospheric pressure sensor	Detects atmospheric pressure; sends signal to engine control unit	
Circuit opening relay	Voltage for fuel pump while engine running	
Clutch switch	Detects in-gear condition; sends signal to engine control unit	Switch ON when clutch pedal released
Engine control unit	Detects signals from input sensors and switches; controls injector operation	
Fuel filter	Filters particles from fuel	
Fuel pump	Provides fuel to injectors	• Operates while engine running • Installed in fuel tank
Idle switch	Detects when throttle valve fully closed; sends signal to engine control unit	Installed in throttle sensor
Ignition coil (–) terminal	Detects engine speed; sends signal to engine control unit	
Ignition switch (ST position)	Sends engine cranking signal to engine control unit	
Inhibitor switch	Detects in-gear condition; sends signal to engine control unit	Switch ON in "N" or "P" range
Injector	Injects fuel into intake port	• Controlled by signals from engine control unit • High-ohmic injector
Intake air thermo sensor	Detects intake air temperature; sends signal to engine control unit	Installed in air flow meter
Main relay	Supplies electric current to injectors and engine control unit	
Neutral switch	Detects in-gear condition; sends signal to engine control unit	Switch ON in-gear
Oxygen sensor	Detects Oxygen concentration; sends signal to engine control unit	Zirconia ceramic and platinum coating
Pressure regulator	Adjusts fuel pressure supplied to injectors	
Pulsation damper	Absorbs fuel pulsation	
Throttle sensor	Detects throttle valve opening angle; sends signal to engine control unit	Integrated idle switch
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	
Water thermo switch	Detects radiator coolant temperature; sends signal to engine control unit	ON: above 17°C (63°F)

76G04B-058

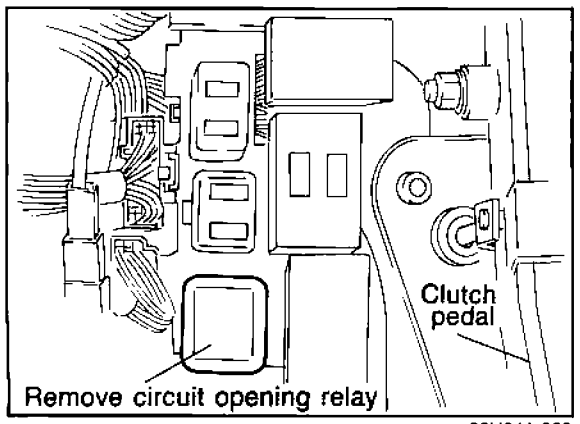
4B FUEL SYSTEM

TROUBLESHOOTING

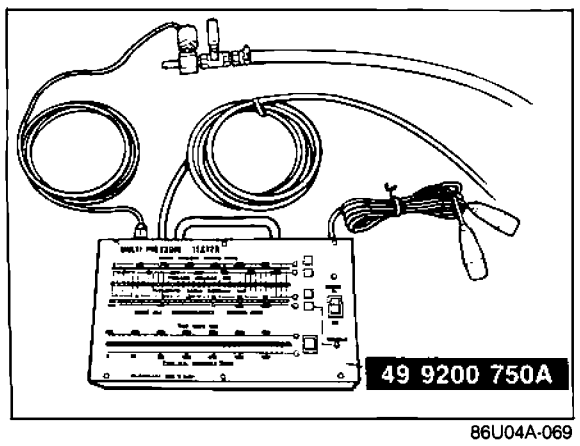
Check the condition of the wiring harness and connectors before checking the sensors or switches.

Symptom \ Possible cause		Air flow meter	Atmospheric pressure sensor	Oxygen sensor	Throttle sensor	Water thermo sensor	Water thermo switch	Fuel pump	Injector	Fuel pressure	Engine control unit terminal	
											3C 3E	3B
		4B—94	4B—99	4B—98	4B—95	4B—97	4B—97	4B—49	4B—51	4B—48	4B—90	4B—90
Hard start or won't start (Cranks OK)			5			4		1	3			2
Engine stalls	While warming up	4				3			2	1	5	
	After warming up	1							3	2	4	
Rough idle	While warming up	4				3			2	1		
	After warming up	1	2						4	3		
Poor acceleration, hesitation, or lack of power		1			3				4	2		
Runs rough on deceleration		1							2			
Afterburn in exhaust system		1							2			
Poor fuel consumption		5	6	4		3			2	1		
Fails emission test				1			2					
Engine stalls or rough after hot starting		1							3	2		

76G04B-059



86U04A-068



86U04A-069

FUEL PRESSURE RELEASE AND SERVICING FUEL SYSTEM

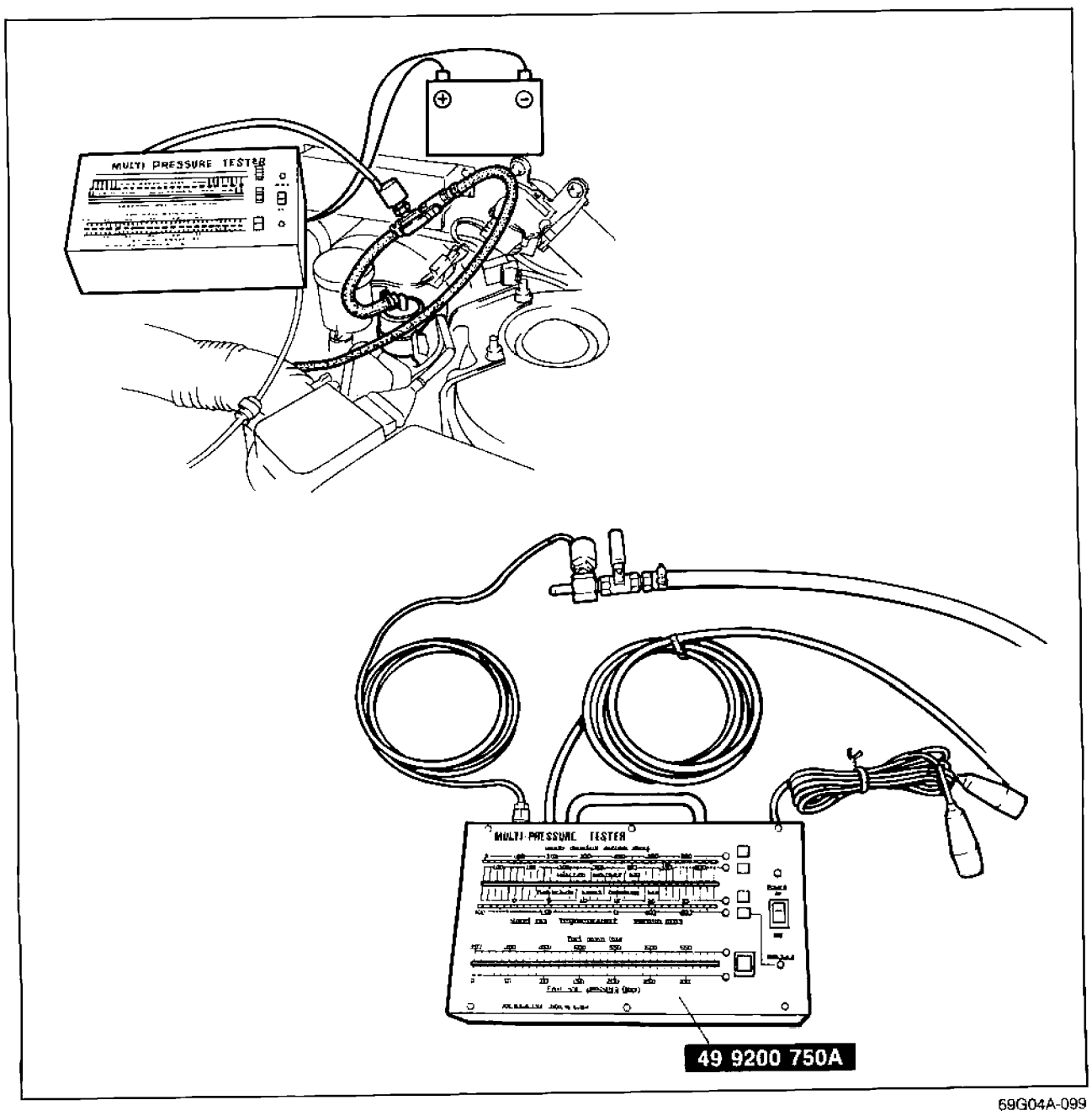
Fuel in the fuel system remains under high pressure even when the engine is not running.

a) Before disconnecting any fuel line, release the fuel pressure from the fuel system to reduce the possibility of injury or fire.
   1. Start the engine.
   2. Disconnect the circuit opening relay.
   3. After the engine stalls, turn OFF the ignition switch.
   4. Reconnect the circuit opening relay.

b) Use a rag as protection from fuel spray when disconnecting the hoses.
   Plug the hoses after removal.

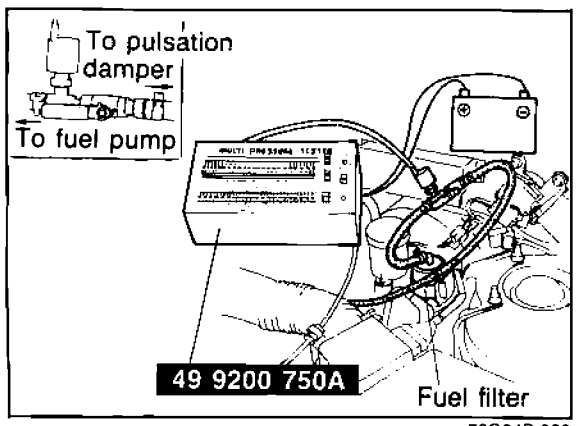
c) When inspecting the fuel system, use the **SST**.

MULTI-PRESSURE TESTER (49 9200 750A)



69G04A-099

The **MULTI-PRESSURE TESTER** (49 9200 750A) has been developed to check the fuel pressure and intake manifold vacuum. These can easily be inspected by setting the buttons on the tester.



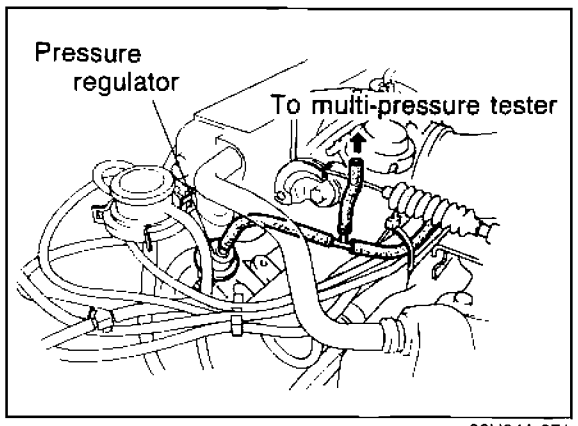
76G04B-060

How to Connect Multi-Pressure Tester

Warning
Before connecting the SST, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page 4B—45.)

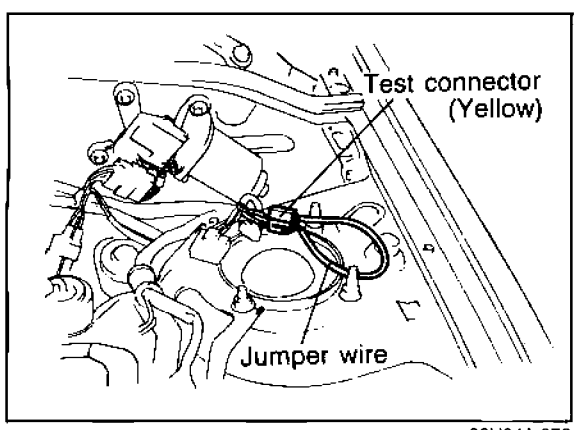
1. Disconnect the negative battery terminal.
2. Disconnect the fuel main hose from the fuel filter.
3. Connect the **SST** between the fuel main hose and fuel pump with the adapter.

Caution
Do not reverse the adapter connection.



86U04A-071

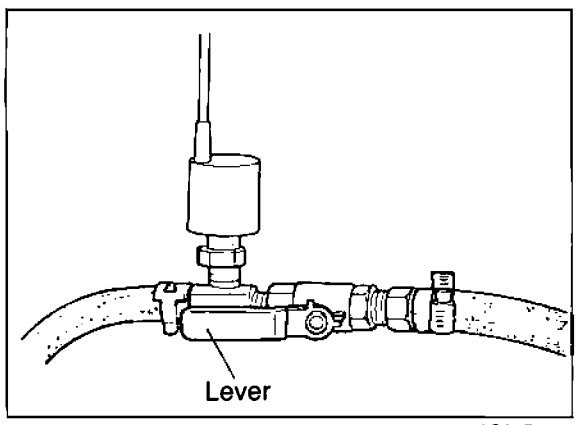
4. Disconnect the vacuum hose from the pressure regulator control solenoid valve. Connect the **SST** vacuum hose with a three-way joint.
5. Connect the negative battery terminal.
6. Connect the **SST** to the battery.



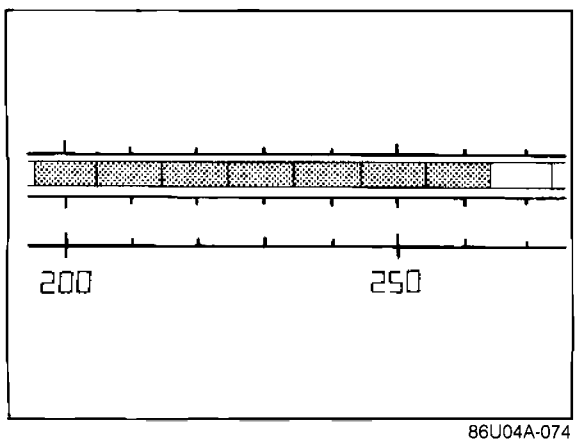
86U04A-072

7. Connect the terminals of the test connector (Yellow) with a jumper wire. Turn the ignition switch ON to operate the fuel pump.
8. Check for fuel leaks.

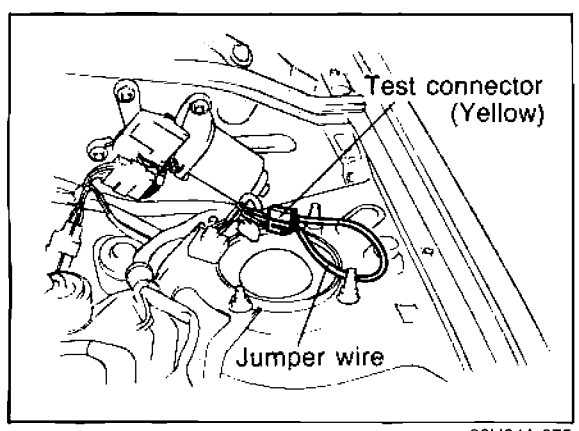
Caution
After checking for fuel leakage, turn the ignition switch OFF and disconnect the jumper wire from the test connector.



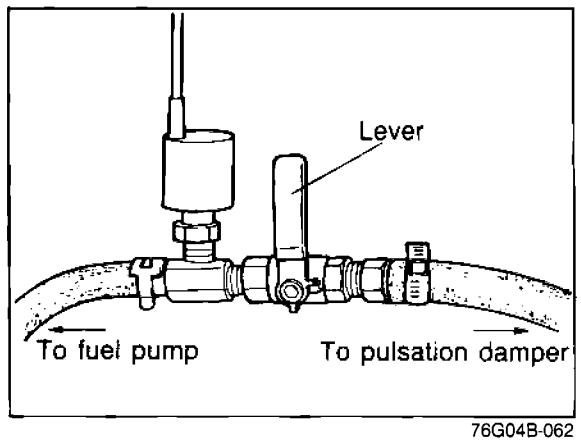
76G04B-061



86U04A-074



86U04A-075



76G04B-062

FUEL PRESSURE

Note
a) When inspecting fuel pressure, use the SST. (Refer to page 4B—47).
b) Warm up the engine to normal operating temperature.

Injection Pressure
1. Set the lever on the adapter as shown in the figure.
2. Run the engine and measure the injection pressure at various speeds.

   Injection pressure: Approx. 235—275 kPa (2.4—2.8 kg/cm^2, 34—40 psi)

3. If not within specification, check the fuel pump pressure and fuel line pressure.

Fuel Pump Pressure
1. Connect the terminals of the test connector (Yellow) with a jumper wire.
2. Turn the ignition switch ON to operate the fuel pump.
3. Set the lever on the adapter as shown in the figure.
4. Check the fuel pump pressure.

   Fuel pump pressure: 441—588 kPa (4.5—6.0 kg/cm^2, 64—85 psi)

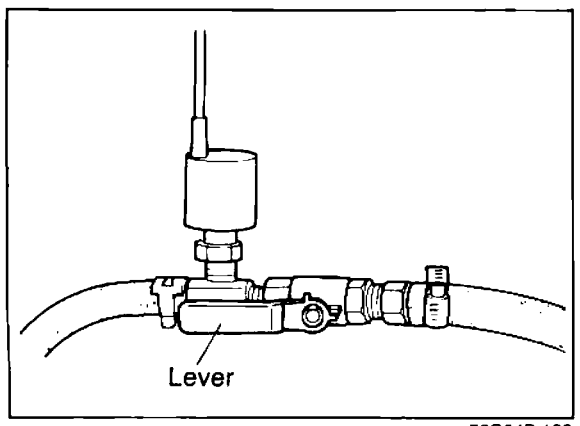
5. If the fuel pump pressure is not within specification, check the following;

No pressure
- **Fuel pump operation (Refer to page 4B—49.)**

Low pressure
- **Fuel pump feeding capacity (Refer to page 4B—50.)**

High pressure
- **Replace the fuel pump**

6. After checking the fuel pump pressure, disconnect the jumper wire from the test connector.



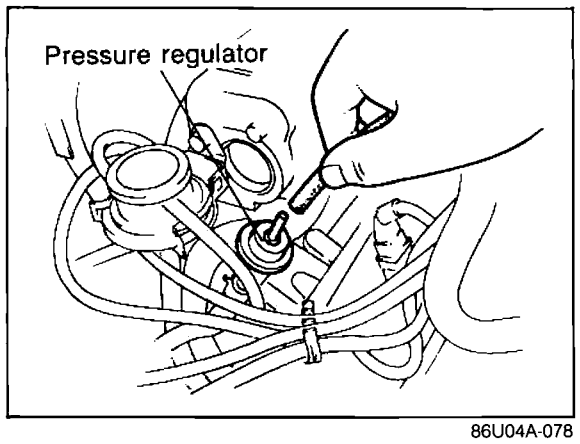
76G04B-126

Fuel Line Pressure

1. Start the engine and run it at idle.
2. Set the lever on the adapter as shown in the figure.
3. Check the fuel line pressure.

Fuel line pressure: Approx. 186—226 kPa (1.9—2.3 kg/cm^2, 27—33 psi)

4. If not within specification, check the vacuum hose.

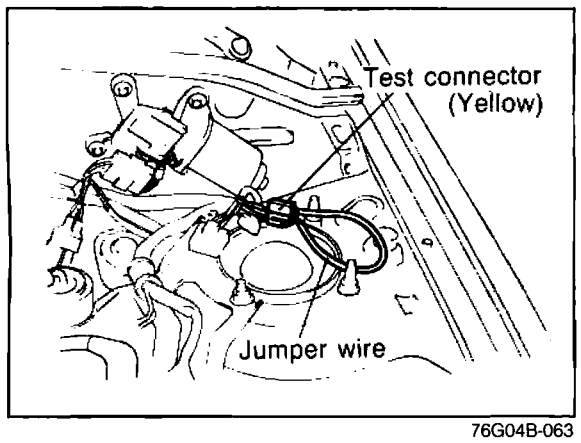


86U04A-078

5. Disconnect the vacuum hose from pressure regulator, and place a finger over the end of the hose.
6. Check the fuel line pressure.

Fuel line pressure: 235—275 kPa (2.4—2.8 kg/cm^2, 34—40 psi)

7. If not within specification, replace the pressure regulator.
8. Connect the vacuum hose to pressure regulator.

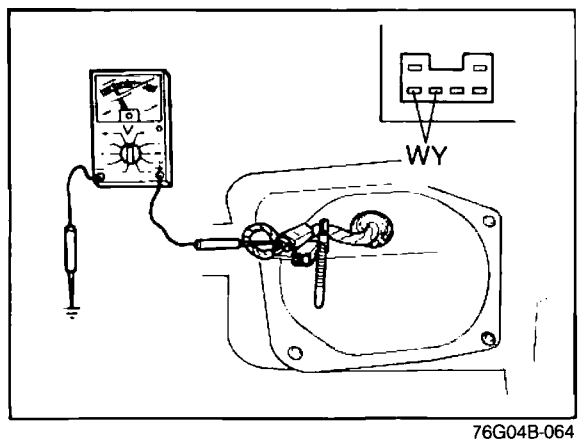


76G04B-063

FUEL PUMP

Operation Test

1. Connect a jumper wire to the test connector (Yellow).
2. Remove the fuel filler cap.
3. Turn the ignition switch ON.
4. Listen for operational sound of the fuel pump at the filler inlet.
5. Install the fuel filler cap.

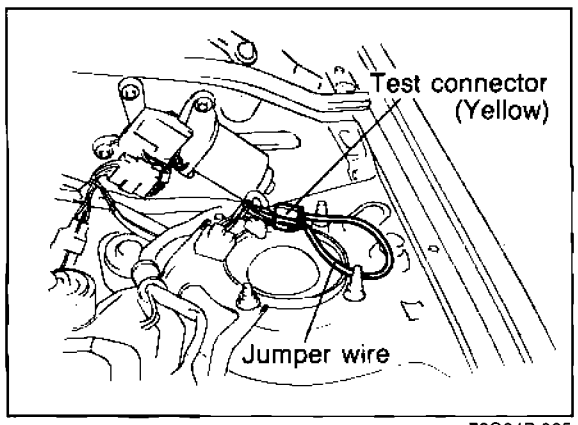


76G04B-064

6. If no sound is heard, check the voltage at the fuel pump connector (WY wire and a ground).

Voltage: 12V

7. If the voltage is normal, replace the fuel pump.
8. If not correct, check the circuit opening relay (Refer to page 4B—86) and its circuits.
9. Disconnect the jumper wire.

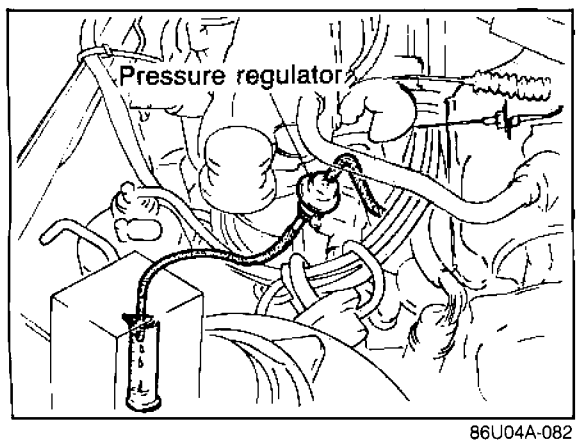


76G04B-065

Volume Test

Warning
Before performing following procedures, release the fuel pressure to reduce the possibility of injury or fire. (Refer to page 4B—45)

1. Connect a jumper wire to test connector (Yellow).
2. Disconnect the fuel return hose from fuel return pipe.

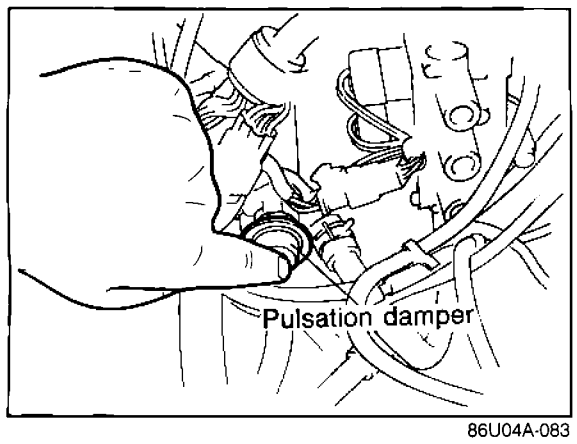


86U04A-082

3. Turn the ignition switch ON for 10 seconds, and check the feeding capacity with graduated cylinder.

Feeding capacity:
220 cc (13.4 cu in)/10 sec. min.

4. If not within specification, check the fuel filter, and fuel line.
5. Turn the ignition switch OFF and disconnect the jumper wire.

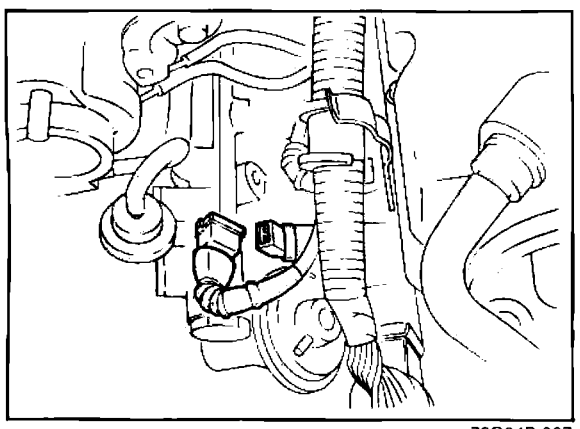


86U04A-083

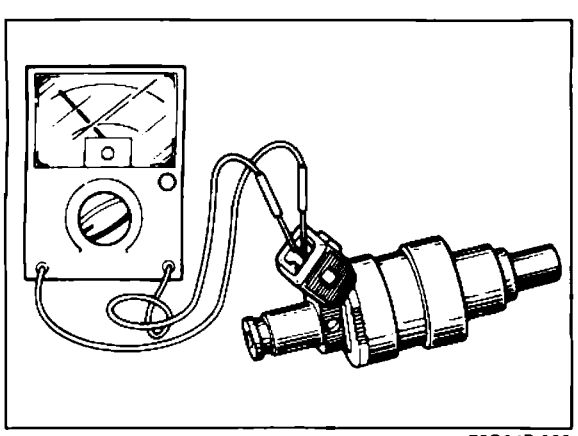
PULSATION DAMPER
1. Run the engine at idle.
2. Place a finger on the screw of the pulsation damper head.
3. Check that pulsation is felt.



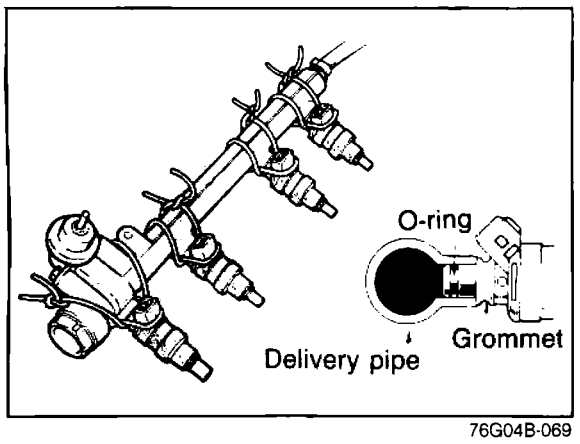
76G04B-066



76G04B-067



76G04B-068



76G04B-069

INJECTOR
On-vehicle Inspection
If engine runs
1. Warm up the engine and run it at idle.
2. Listen for operational sound of the injector with a screwdriver or a sound scope.
3. If no operational sound is heard, check the main relay and injector resistance.
4. Disconnect the connector from each injector respectively.
5. Check that the engine speed decreases about **100—200 rpm** each time.
6. If not correct, check the injector resistance and injection volume of the injector.

Inspection
There are 3 inspections which must be performed for the injectors.

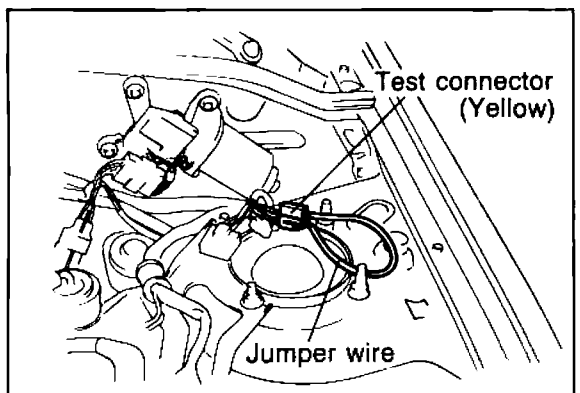
Resistance
1. Remove the injectors from the engine. (Refer to page 4B—58.)
2. Check the resistance of each injector with an ohmmeter.
3. If not correct, replace the injector.

Resistance: 12—16 Ω

Fuel leakage test and volume test
1. Lift the dynamic chamber upward.
2. Remove the injectors and delivery pipe. (Refer to pages 4B—58 and 59.)
3. Affix the injectors, pressure regulator, and pulsation damper to the delivery pipe with wire.

Caution
Affix the injectors firmly to the delivery pipe so that no movement of the injectors is possible.

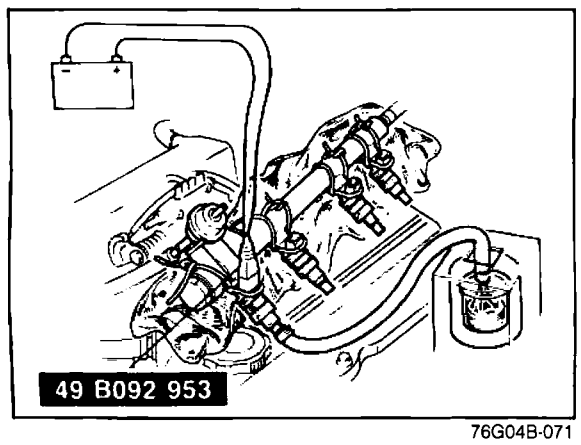
Warning
Be extremely careful when working with fuel. Always work away from sparks or open flames.



76G04B-070

4. Connect the fuel return hose and vacuum hose to the pressure regulator.
5. Connect the terminals of the fuel pump test connector with a jumper wire. Turn the ignition switch ON.
6. Check that no fuel leaks from the injector nozzles.

Note
After 1 minute a drop of fuel from the injector is acceptable.



76G04B-071

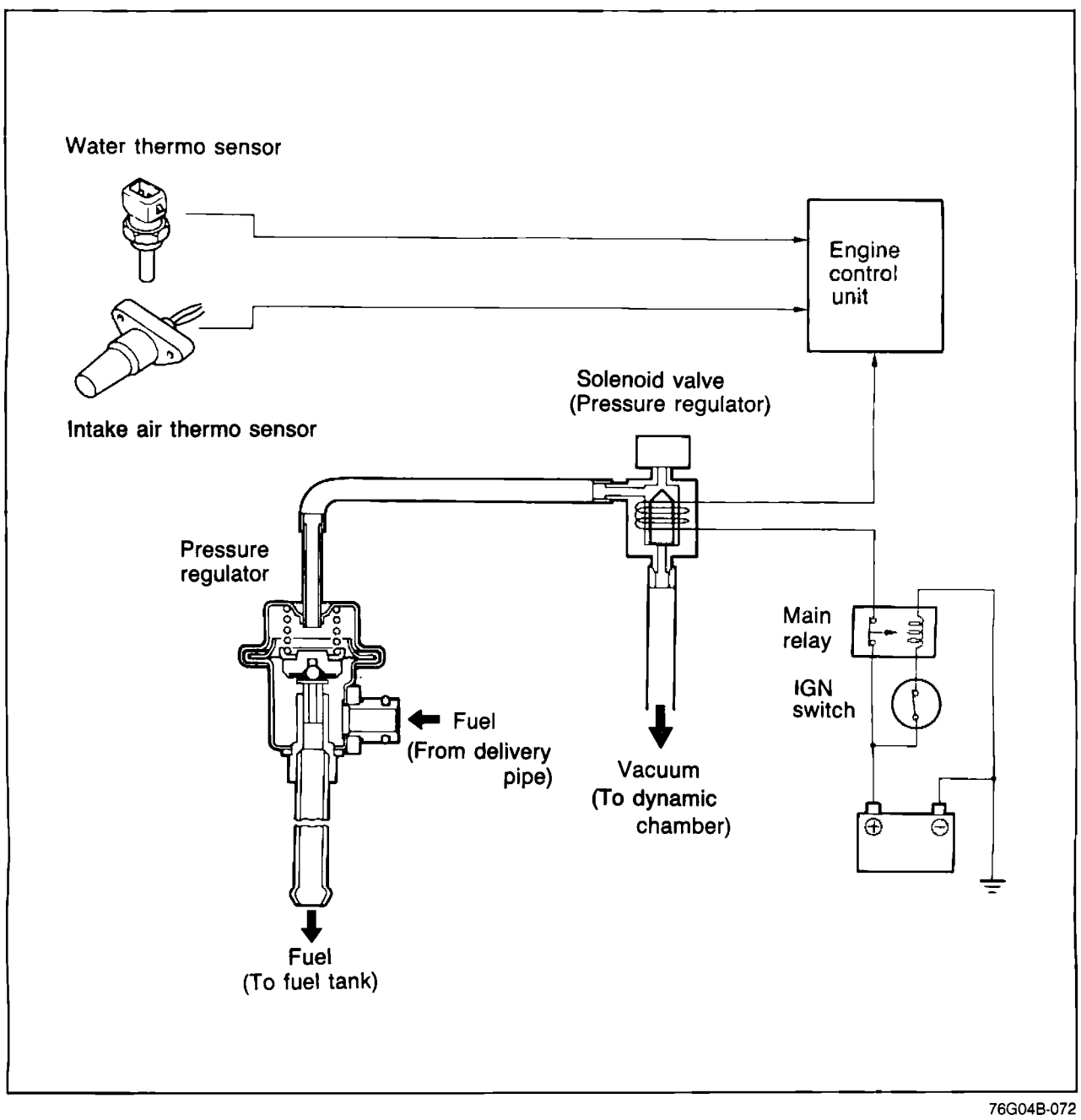
7. Connect the **SST** to the battery and injector.
8. Check the injection volume with a graduated container.

Injection volume:
Approx. 38—53 cc (2.3—3.2 cu in) /15 sec.

Caution
When using the SST, make sure of the SST number and use correct one.

9. If not correct, replace the injectors.

PRESSURE REGULATOR CONTROL SYSTEM



76G04B-072

To prevent percolation of the fuel during idle after the engine is restarted, vacuum is cut to the pressure regulator, increasing the fuel pressure.

Specified time: Approx. 120 sec.
Operating condition: Coolant temperature — above 70°C (158°F)
Intake air temperature — above 10°C (50°F)

COMPONENT DESCRIPTIONS

Component	Function	Remarks
Engine control unit	Detects signals from input sensors and switches; controls solenoid valve (Pressure regulator control)	
Idle switch	Detects when throttle valve fully closed; sends signal to engine control unit	Installed in throttle sensor
Ignition coil (–) terminal	Detects engine speed; sends signal to engine control unit	
Ignition switch (ST position)	Sends engine cranking signal to engine control unit	
Intake air thermo sensor	Detects intake air temperature; sends signal to engine control unit	Installed in air flow meter
Pressure regulator	Adjusts fuel pressure supplied to injectors	
Solenoid valve (Pressure regulator control)	Controls vacuum line to pressure regulator	Closes vacuum line when hot
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	

76G04B-073

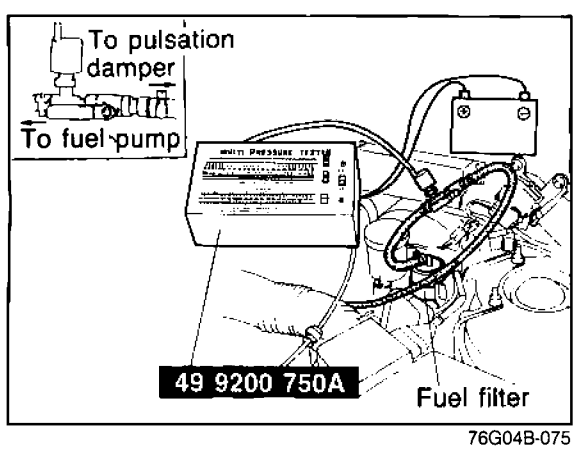
TROUBLESHOOTING

Check the condition of the wiring harness and connections before checking the sensors or switches below.

Note
Make the system inspection first. If no problem is found, continue with the next system inspection of the Troubleshooting Guide. (Refer to pages 4B—7 and 8.)

Possible cause / Page / Symptom	Solenoid valve (Pressure regulator control)	Water thermo sensor	Intake air thermo sensor	Engine control unit terminal 2K	System inspection
	4B—56	4B—97	4B—94	4B—89	4B—55
Engine stalls or rough after hot starting	2	3	4	5	1

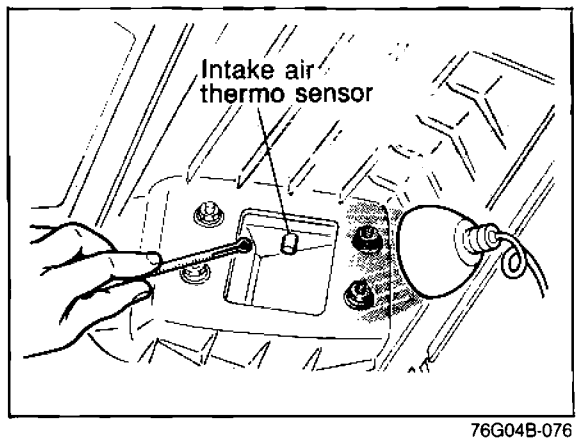
76G04B-074



76G04B-075

System Inspection

1. Connect the **SST** to the engine. (Refer to page 4B—47.)
2. Start the engine.



76G04B-076

3. Warm up the engine to normal operating temperature and stop the engine.

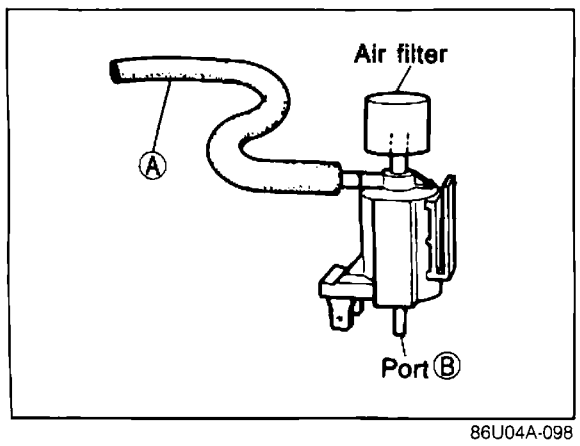
Warning
Be careful when disconnecting the water thermo sensor connector because the surrounding area is very hot.

4. Lift the air cleaner upper cover assembly.
5. Heat the intake air thermo sensor to **above 10°C (50°F)**.

Operating time	Fuel line pressure kPa (kg/cm², psi)
After starting: for 120 sec.	235—275 (2.4—2.8, 34—40)
After 120 sec.	186—226 (1.9—2.3, 27—33)

76G04B-127

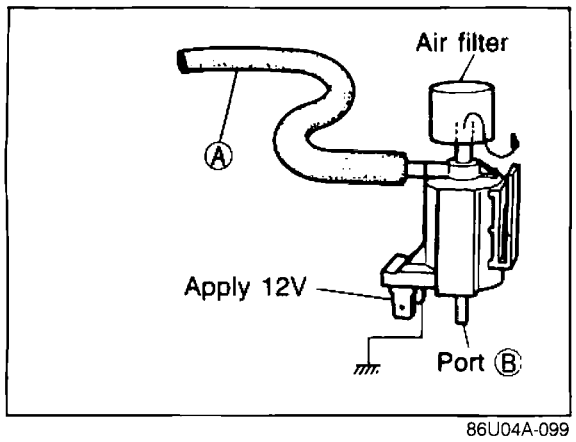
6. Restart the engine.
7. Check the fuel line pressure and operating times as shown in the chart.



86U04A-098

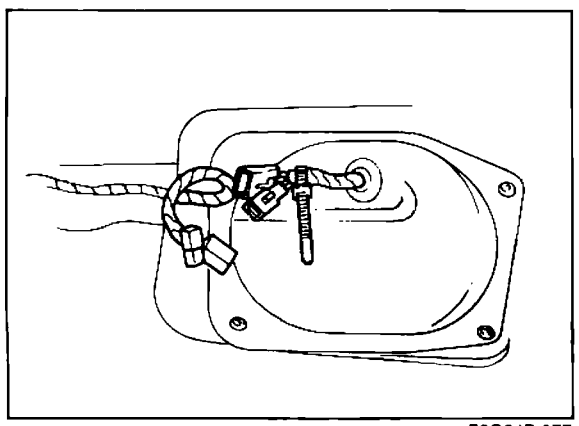
Solenoid Valve (Pressure Regulator Control) Inspection

1. Disconnect the vacuum hose from the solenoid valve and vacuum pipe.
2. Blow through the solenoid valve from vacuum hose A.
3. Check that air flows from port B.



86U04A-099

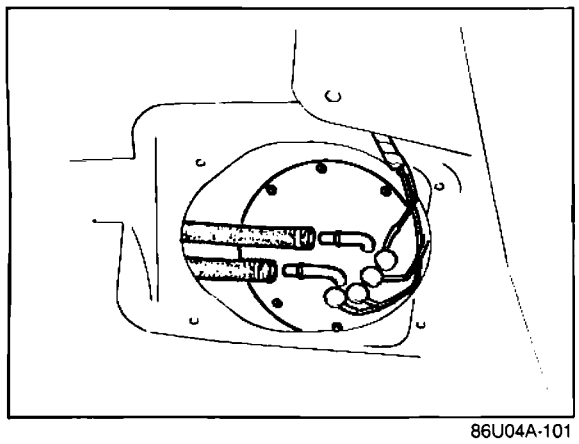
4. Disconnect the solenoid valve connector.
5. Connect 12V and a ground to the terminals of the solenoid valve.
6. Blow through the solenoid valve from the vacuum hose A.
7. Check that air flows from the valve air filter.



76G04B-077

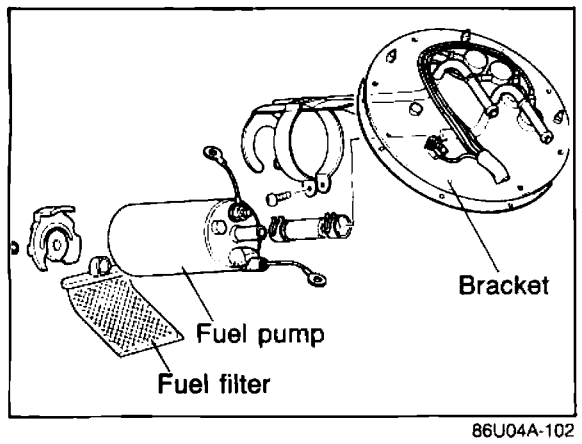
REPLACEMENT

Caution
a) Before performing the following procedure, release the fuel pressure from the fuel system to reduce the possibility of injury or fire (Refer to page 4B—45).
b) When servicing the fuel system, keep sparks, cigarettes, and open flames away from the fuel.



86U04A-101

Fuel Pump
1. Remove the rear seat and disconnect the fuel pump connector.
2. Remove the service hole cover.
3. Disconnect the fuel hoses.
4. Remove the fuel pump and fuel tank gauge assembly.

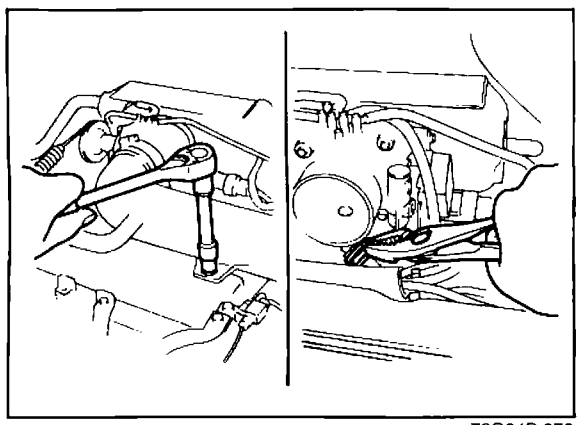


86U04A-102

5. Replace the fuel pump.

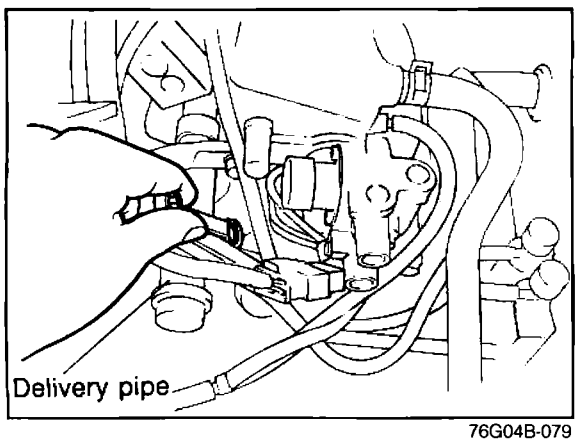
Caution
Secure the fuel pump terminals and fuel hoses securely.

6. Install in the reverse order of removal.



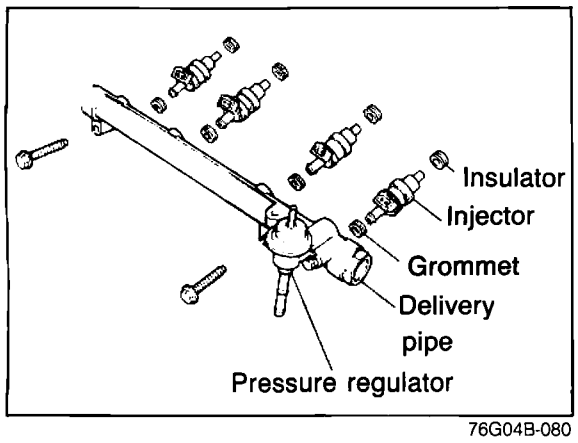
76G04B-078

Injector
1. Disconnect the air pipe from the throttle body.
2. Disconnect the air hose from the throttle body.



76G04B-079

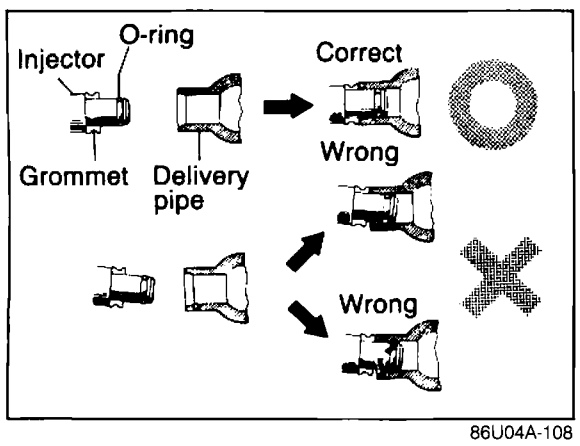
3. Disconnect the delivery pipe from the intake manifold.



76G04B-080

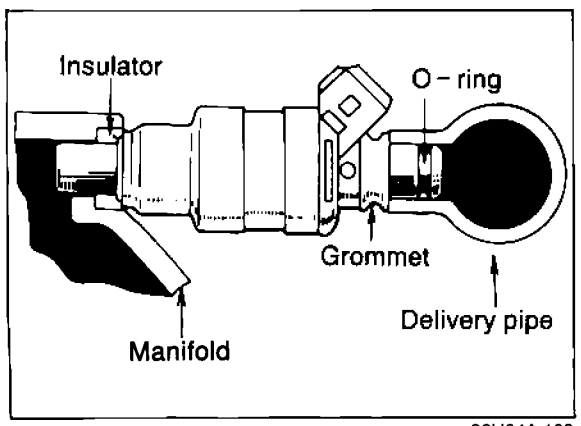
4. Lift the delivery pipe along with the pressure regulator and pulsation damper.
5. Remove the grommets, injectors, and insulators.
6. Install in the reverse order of removal, referring to installation note.

Tightening torque:
Delivery pipe 19—25 N·m
(1.9—2.6 m-kg, 14—19 ft-lb)



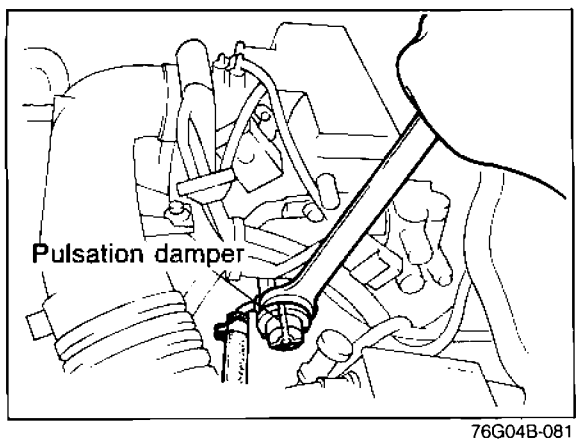
86U04A-108

Installation note
Injector
1. Use new O-rings.
2. Apply a small amount of engine oil to the O-rings when installing.



86U04A-109

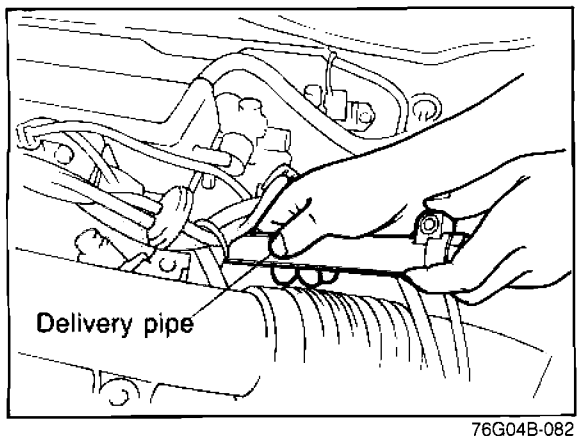
3. Install the injectors and the injector insulators.



76G04B-081

Delivery Pipe

1. Remove the pulsation damper and pressure regulator from the delivery pipe.
2. Remove the injectors (Refer to page 4B—58).



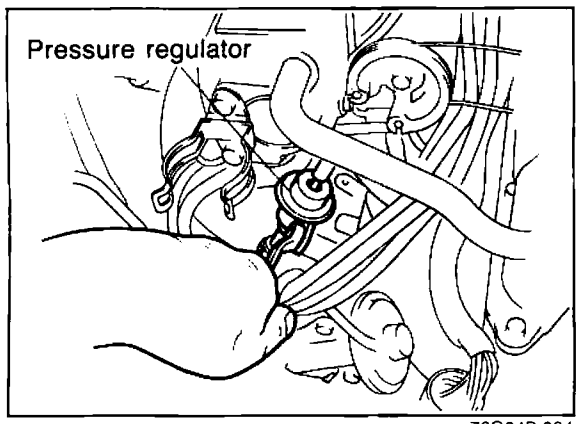
76G04B-082

3. Replace the delivery pipe.
4. Install in the reverse order of removal, referring to installation note.

Tightening torque:
Pressure regulator
8—11 N·m (0.8—1.1 m-kg, 69—95 in-lb)
Delivery pipe
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

Installation note
Injector
Refer to page 4B—58.

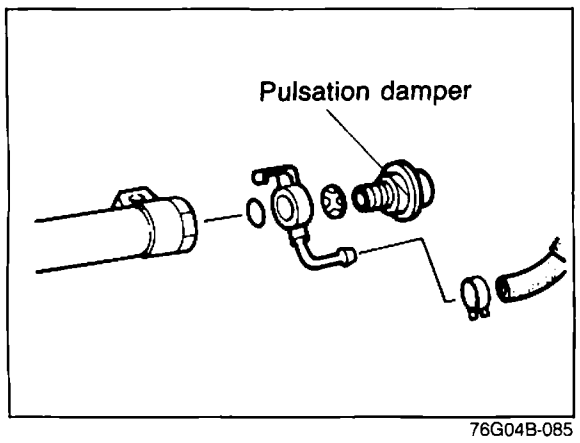
76G04B-083



76G04B-084

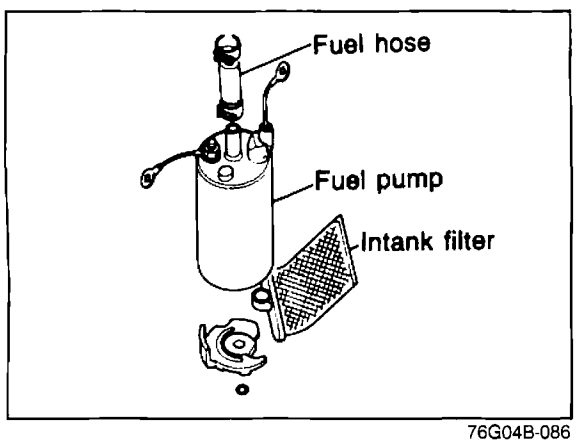
Pressure Regulator
1. Disconnect the vacuum hose and fuel return hose.
2. Remove the pressure regulator.
3. Install in the reverse order of removal.

Tightening torque:
8—11 N·m (0.8—1.1 m-kg, 69—95 in-lb)



76G04B-085

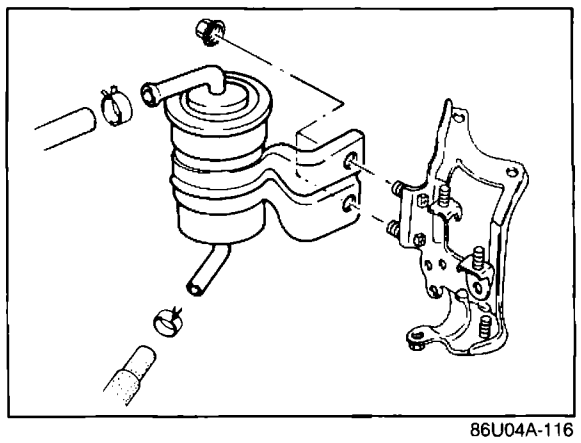
Pulsation Damper
1. Loosen the pulsation damper and remove it.
2. Install in the reverse order of removal.



76G04B-086

Fuel Filter
Low pressure side
Refer to page 4B—57.

High pressure side
The fuel filter must be replaced at the intervals outlined in the maintenance schedule.



86U04A-116

Warning
Always work away from sparks or open flames.

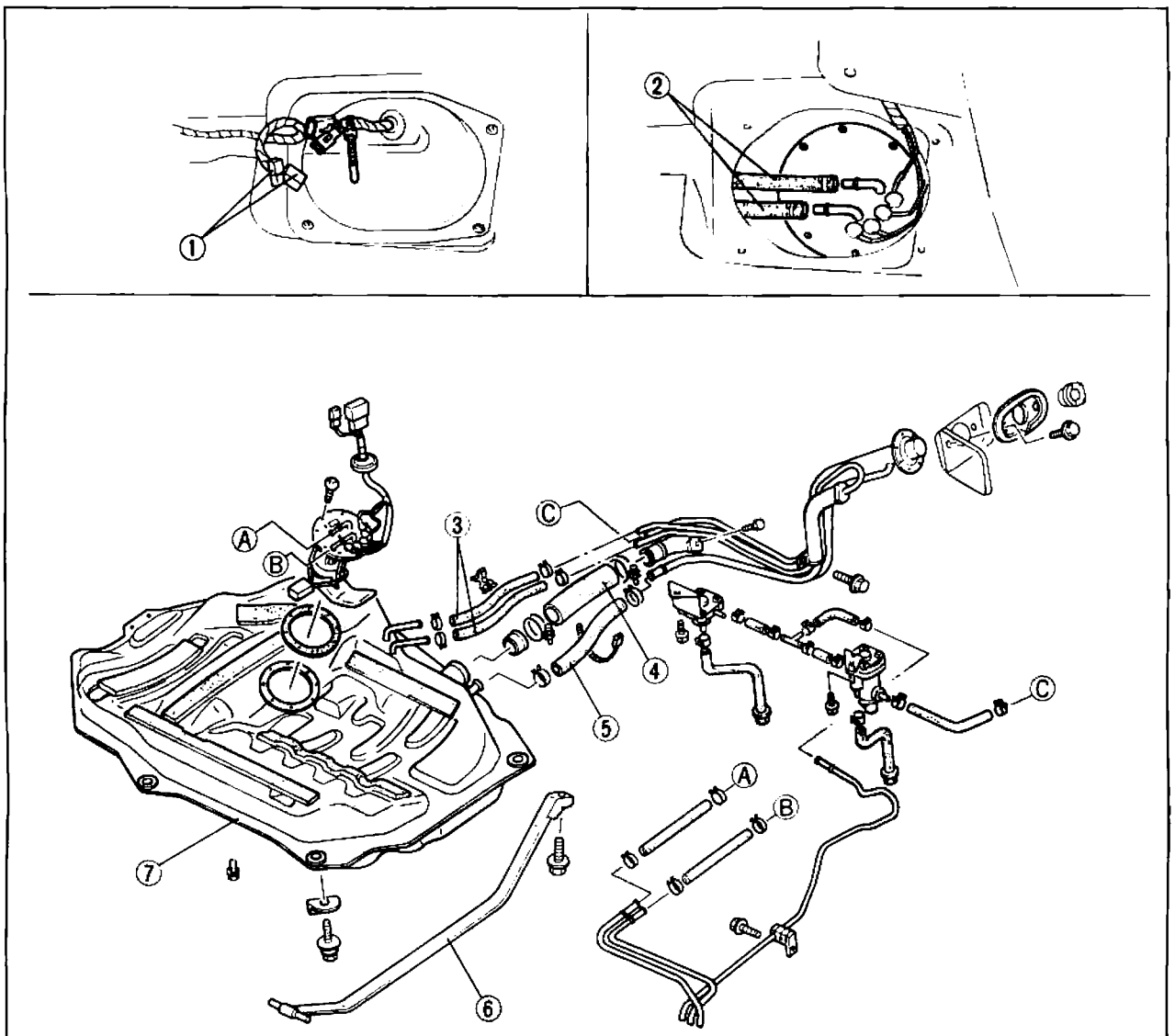
1. Disconnect the fuel hoses from the fuel filter.
2. Remove the fuel filter and the bracket.
3. Install a new filter and the bracket.
4. Connect the fuel hoses.

Note
When installing the filter, push the fuel hoses fully onto the fuel filter and secure the hoses with spring clamps.

FUEL TANK
Removal

Caution
a) Before performing the following procedure, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page 4B—45)
b) When removing the fuel tank, keep sparks, cigarettes, and open flames away from the fuel tank.

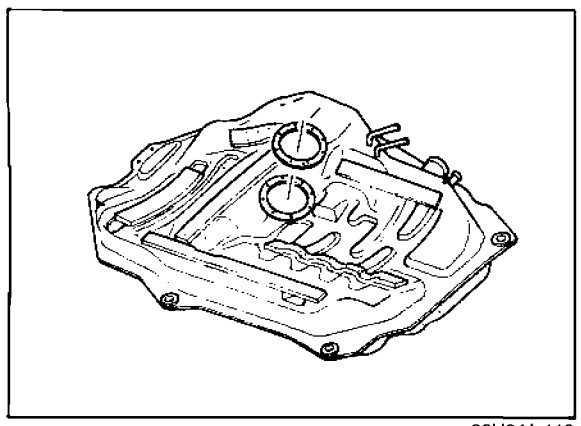
Remove in the sequence shown in the figure.



76G04B-087

Note
Drain the fuel from the fuel tank before removing the tank.

1. Fuel pump connectors
2. Fuel hoses
3. Evaporative hoses
4. Fuel filler hose
5. Breather hose
6. Fuel tank strap
7. Fuel tank



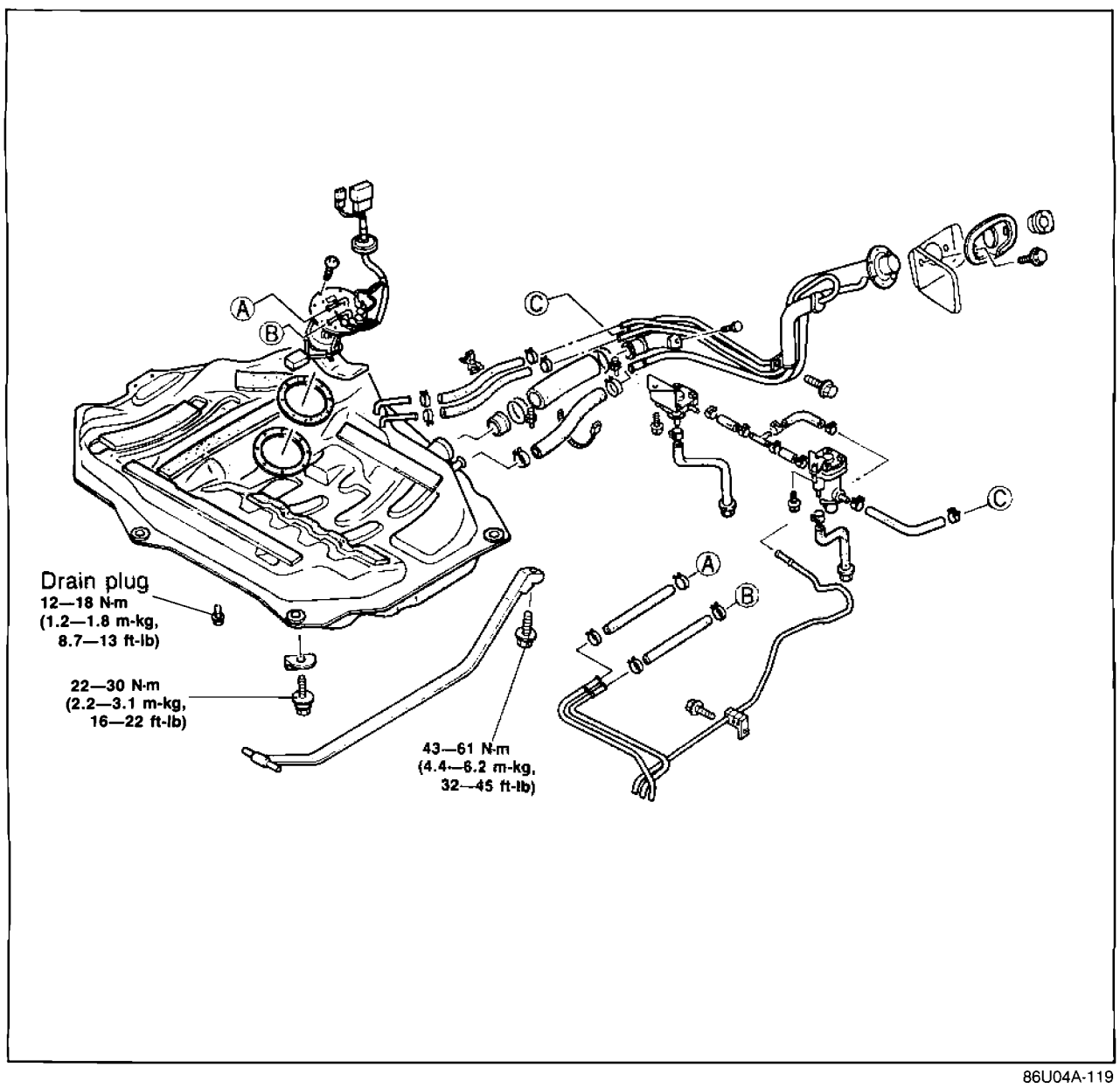
86U04A-118

Inspection
1. Check the fuel tank for cracks and corrosion.
2. If any defect is found, repair or replace the tank.

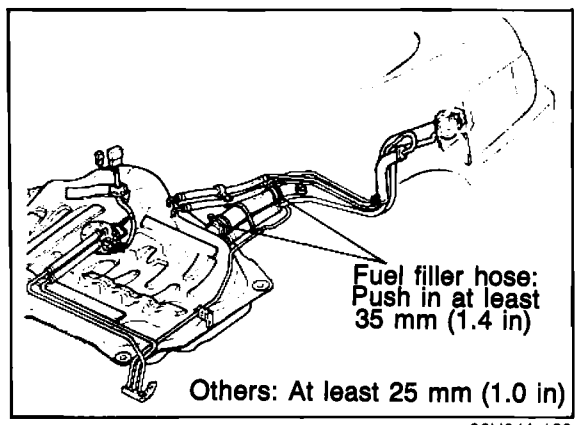
Warning
Before repairing, clean the fuel tank thoroughly with steam to sufficiently remove all explosive gas.

Installation
Install in the reverse order of removal, referring to the installation note.

Torque Specifications



86U04A-119

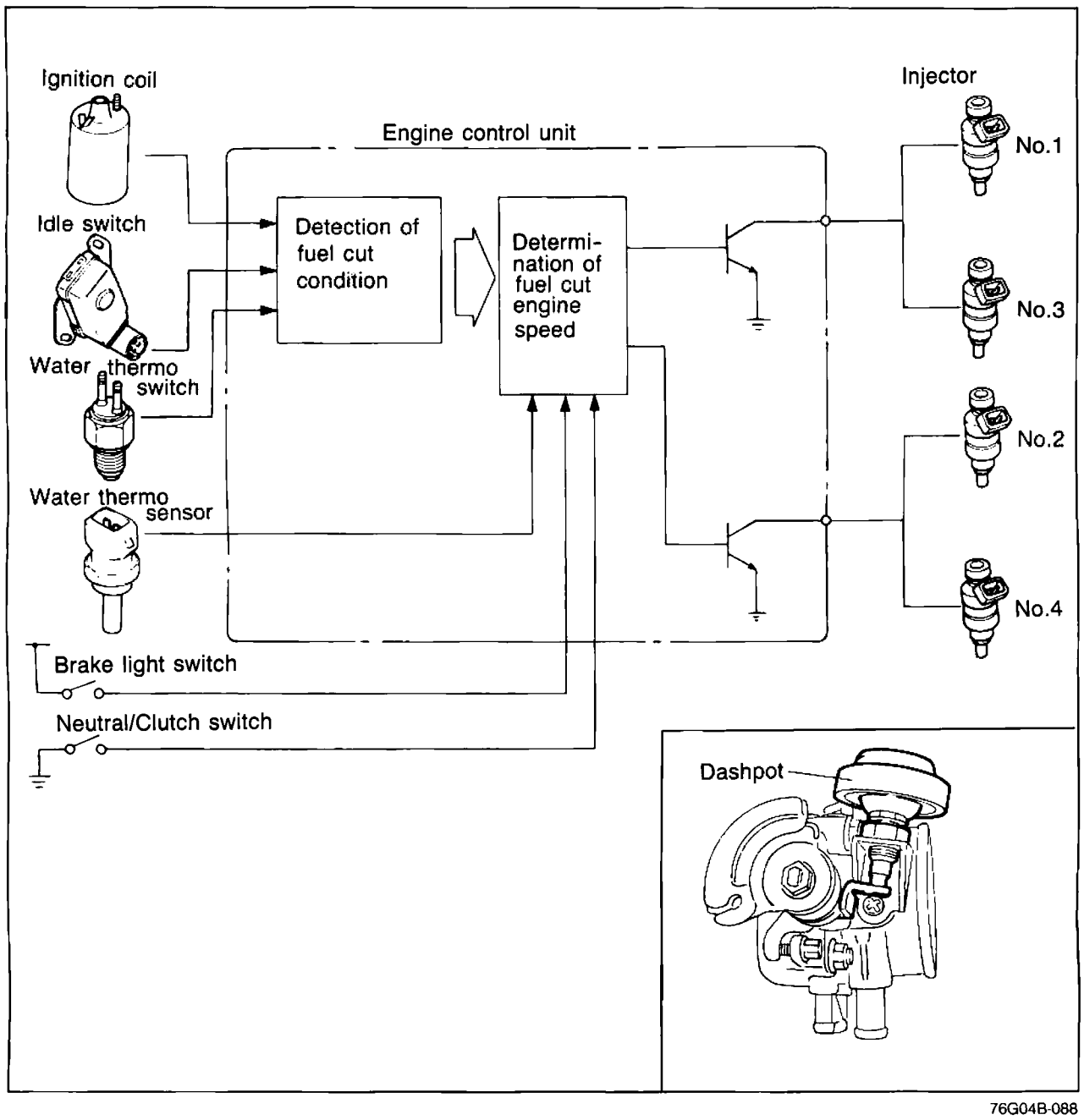


86U04A-120

Installation note

1. Push the hose ends of the main fuel hose, fuel return hose and evaporation hoses onto the fuel tank fittings **at least 25 mm (1.0 in)**.
2. Push the fuel filler hose ends onto the fuel tank pipe and filler pipe **at least 35 mm (1.4 in)**.

DECELERATION CONTROL SYSTEM



76G04B-088

This system consists of the dashpot and fuel cut system. The dashpot is to prevent after-burn so that the throttle valve gradually closes during deceleration.
The control unit detects engine deceleration judging from the engine speed and the idle switch, and signals a fuel cut operation to match the engines need, based on the coolant temperature and the driving condition.

COMPONENT DESCRIPTIONS

Component	Function	Remarks
Brake light switch	Detects braking operation (deceleration); sends signal to engine control unit	
Clutch switch	Detects in-gear condition; sends signal to engine control unit	Switch ON when clutch pedal released
Dashpot (MTX)	Prevents sudden closing of throttle valve during deceleration or shifting	Adjustment speed: 1,900—2,100 rpm
Engine control unit	Detects signals from input sensors and switches; cuts fuel injection	
Idle switch	Detects when throttle valve fully closed; sends signal to engine control unit	Installed in throttle sensor
Ignition coil (–) terminal	Detects engine speed; sends signal to engine control unit	
Neutral switch	Detects in-gear condition; sends signal to engine control unit	Switch ON when in-gear
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	
Water thermo switch	Detects radiator coolant temperature; sends signal to engine control unit	ON: above 17°C (63°F)

76G04B-089

4B DECELERATION CONTROL SYSTEM

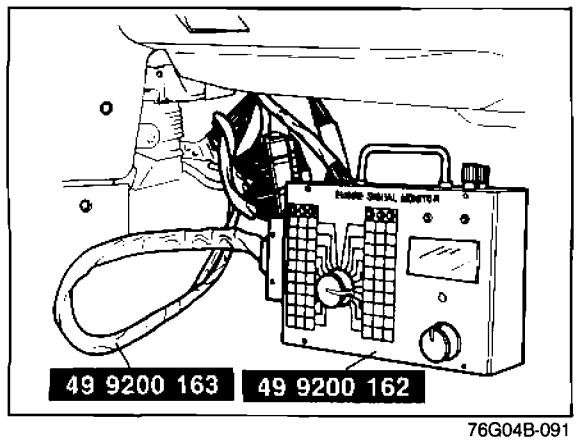
TROUBLESHOOTING

Check the condition of the wiring harness and connectors before checking the sensor or switches below.

Note
Make the system inspection first. If no problem is found, continue with the next system inspection of the Troubleshooting Guide. (Refer to page 4B—7 and 8.)

Possible cause / Page / Symptom	Dashpot	Water thermo sensor	Electrical signal inspection (Injector)
	4B—67	4B—97	4B—66
High idle speed after warming up	1		
Runs rough on deceleration	1	3	2
Afterburn in exhaust system	1	3	2
Poor fuel consumption	1	3	2
Fails emission test	1	3	2

76G04B-090

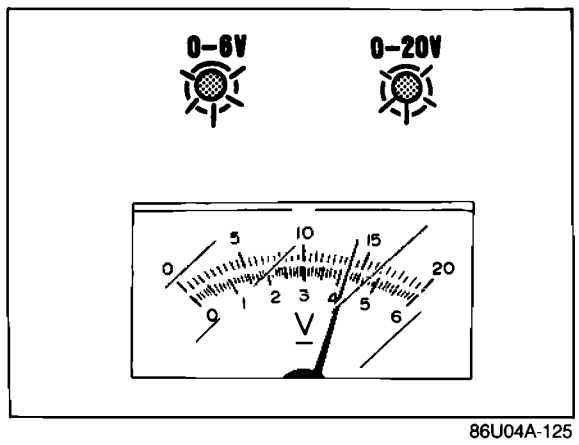


76G04B-091

Electrical Signal Inspection (Injector)

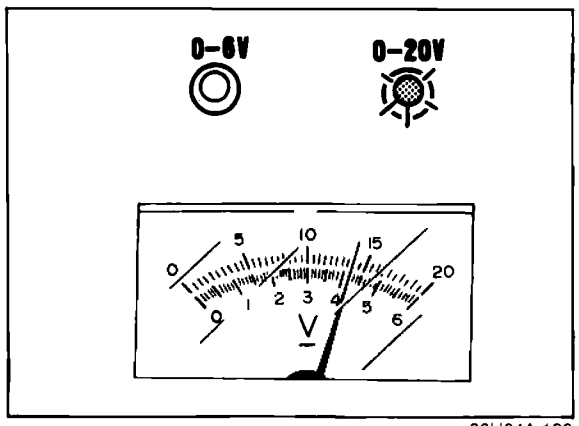
1. Connect the **SST** between the wiring harness and engine control unit.
2. Set 3C or 3E position on the **SST**.

Note
3C — For No. 2 and No. 4 injectors
3E — For No. 1 and No. 3 injectors



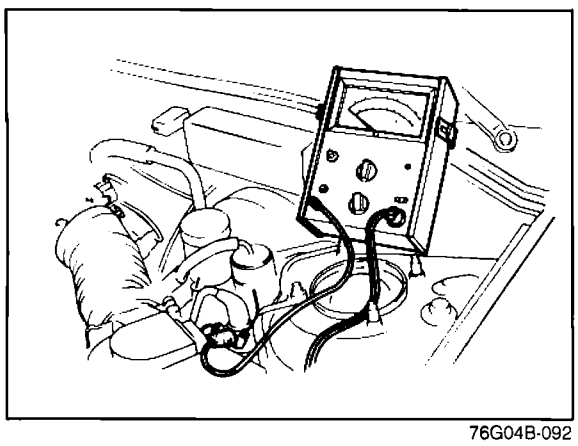
86U04A-125

3. Check that the indicator lamps alternately flash at idle.



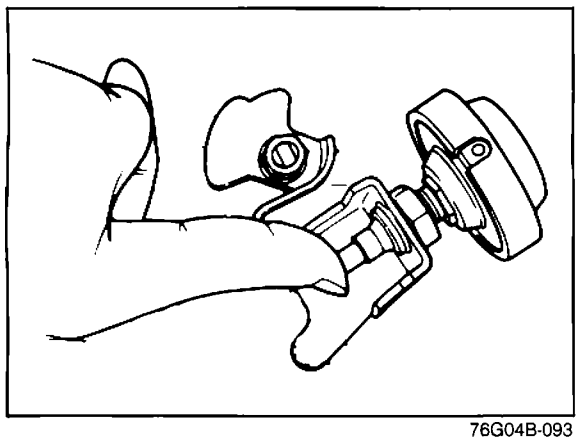
86U04A-126

4. Increase the engine speed to **4,000 rpm**, then suddenly decrease the engine speed.
5. Check that the red indicator lamp stays illuminated during deceleration.



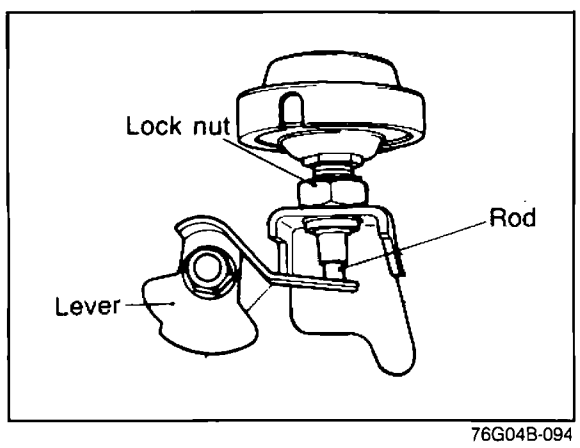
76G04B-092

Dashpot
Preparation
Before checking this system, follow these directions.
- Switch OFF all accessories.
- Connect a tachometer to the check connector.
- Warm up the engine to normal operating temperature.



76G04B-093

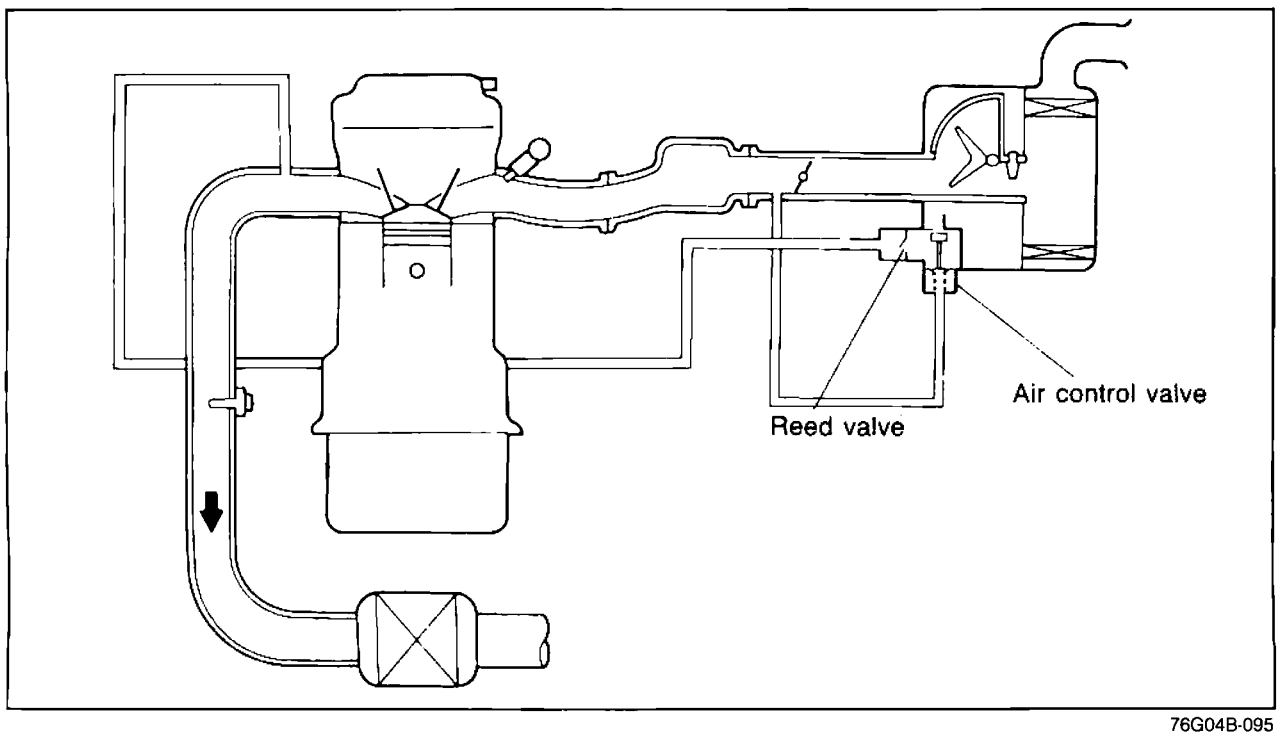
Inspection
1. Open the throttle valve fully and push the dashpot rod with a finger. Check that the rod goes into the dashpot slowly.
2. Release the rod and check that it comes out quickly.



76G04B-094

Adjustment
1. Warm up the engine and run it at idle.
2. Connect a tachometer to the engine.
3. Increase the engine speed to **2,500 rpm**.
4. Slowly decrease the engine speed and check that the dashpot rod touches the lever at **1,900—2,100 rpm**.
5. If not within specification, loosen the lock nut and adjust by turning the dashpot.

AIR INJECTION SYSTEM



76G04B-095

This system supplies secondary air into the exhaust system to improve idle stability.

COMPONENT DESCRIPTIONS

Component	Function	Remark
Air cleaner	Filters air entering throttle body	
Air control valve	Directs air to reed valve	Installed on air cleaner
Reed valve	Directs air to exhaust manifold	Improves idle stability

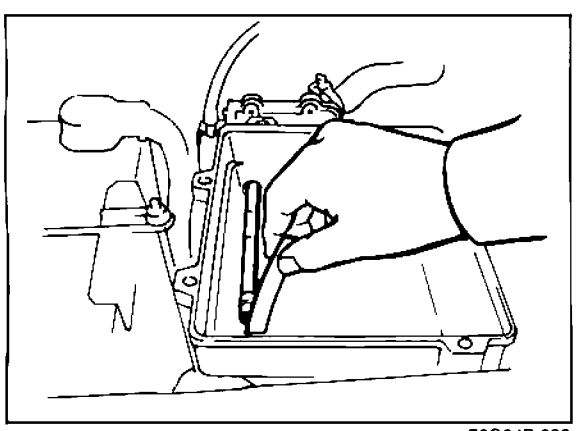
76G04B-096

TROUBLESHOOTING
Check the condition of the wiring harness and connectors before checking the sensors or switch.

Note
Make the system inspection first. If no problem is found, continue with the next system inspection of the Troubleshooting Guide. (Refer to pages 4B—7 and 8.)

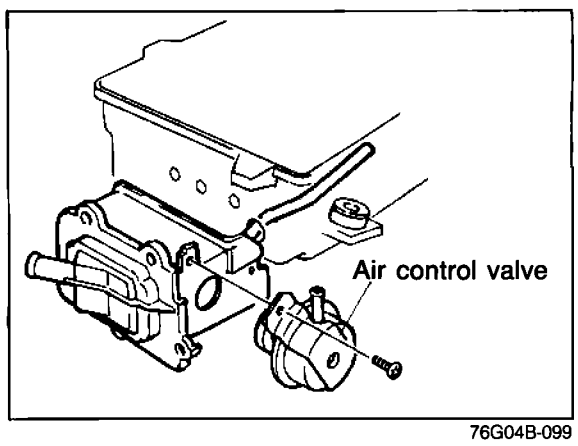
Possible cause	Air control valve	Reed valve	System inspection
Page	4B—69	4B—70	4B—69
Checking order	2	3	1

76G04B-097



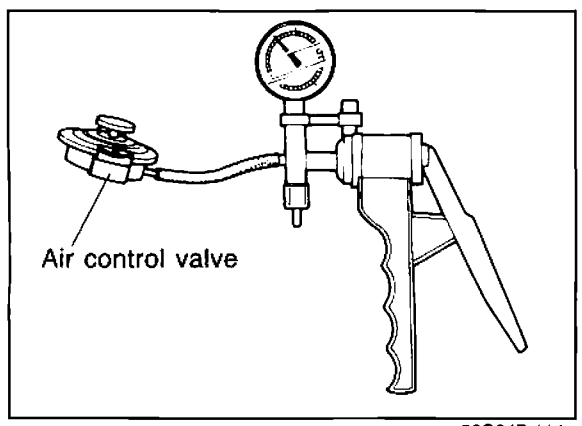
76G04B-098

System Inspection
1. Warm up the engine and run it at idle.
2. Lift up the air cleaner upper case.
3. Check that air is sucked into the air passage.
4. Increase the engine speed to **2,500 rpm** and check that no air is sucked into the passage.



76G04B-099

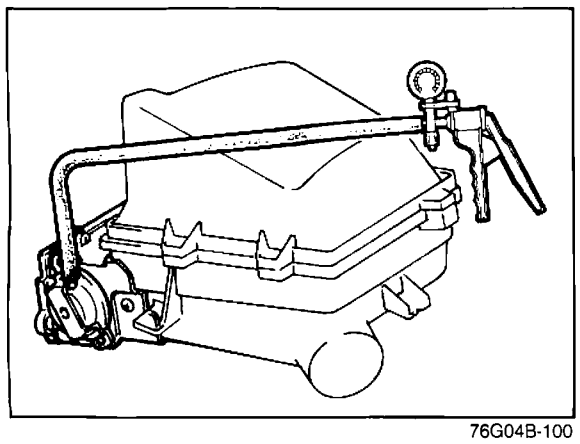
Air Control Valve
Inspection
1. Remove the air control valve.



56G04B-114p

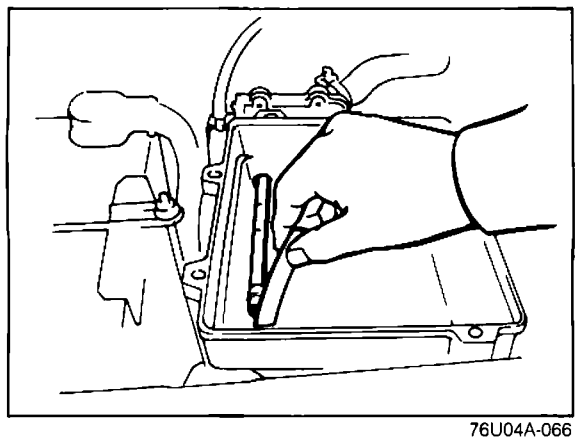
2. Connect a vacuum pump to the valve.
3. Apply vacuum gradually and check that the stem starts to move as specified.

Specification:
180—280 mmHg (7.1—11.0 inHg)



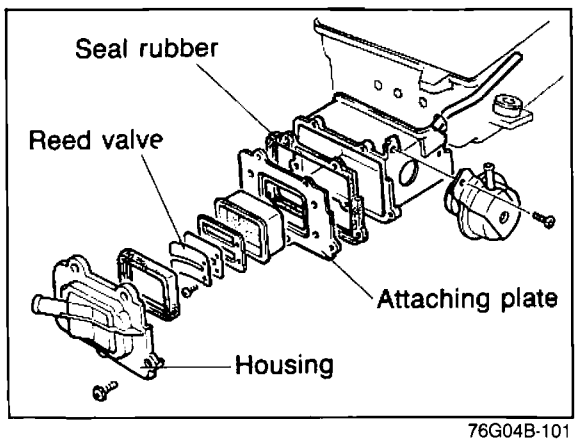
76G04B-100

Reed Valve
Inspection
1. Warm up the engine and run it at idle.
2. Disconnect the vacuum hose from the air control valve and plug it.
3. Attach a vacuum pump to the air control valve and apply **500 mmHg (19.7 inHg)** vacuum.



76U04A-066

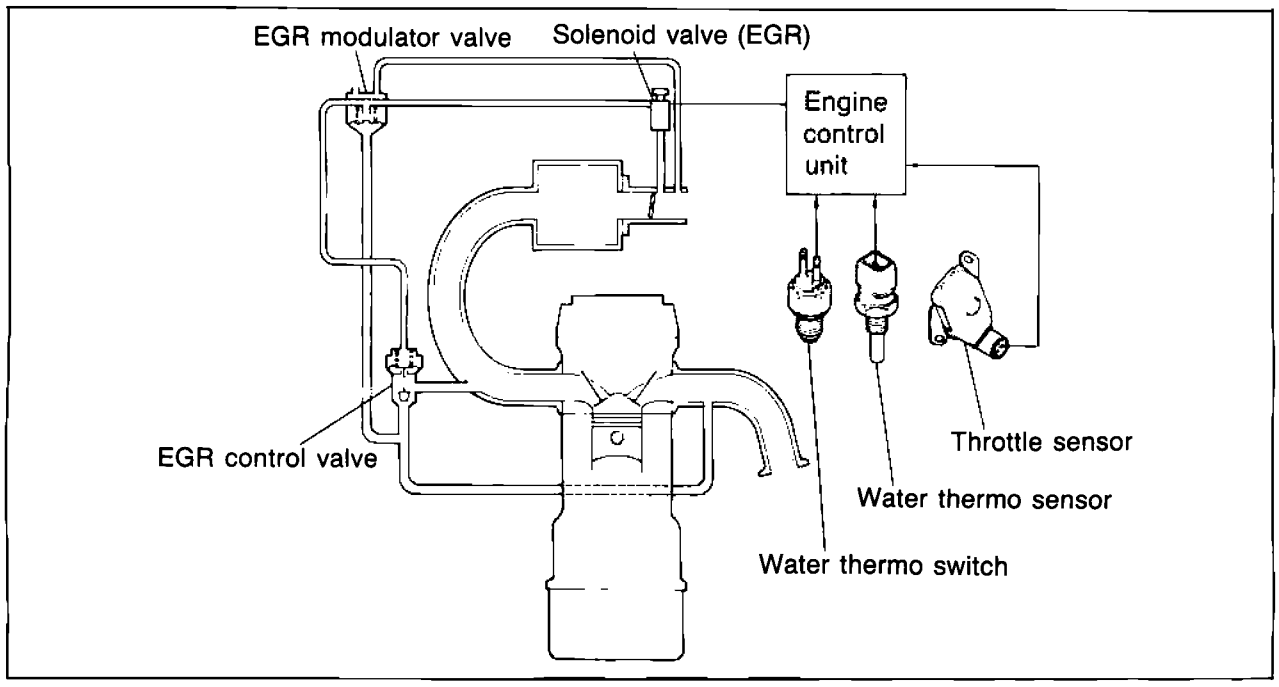
4. Check that air is sucked into the air passage.
5. Increase the engine speed to **2,500 rpm**.
6. Check that exhaust gas is not emitted from the passage.
7. If not correct, replace the reed valve.



76G04B-101

Replacement
1. Remove in the sequence shown in the figure.
   1) Housing
   2) Attaching plate
   3) Reed valve
   4) Seal rubber
2. Install in the reverse order of removal.

EXHAUST GAS RECIRCULATION (EGR) SYSTEM



86U04A-127

This system introduces exhaust gas into the intake manifold to reduce NOx in the exhaust gas. It operates depending on the engine load, engine speed **(above 1,500 rpm)**, engine coolant temperature **(above 70°C, 158°F)**, and radiator coolant temperature **(above 17°C, 63°F)**.

COMPONENT DESCRIPTIONS

Component	Function	Remarks
EGR control valve	Recirculates portion of exhaust gas	
EGR modulator valve	Controls vacuum acting on EGR control valve	
Engine control unit	Detects signals from input sensors and switches; controls solenoid valve (EGR)	
Ignition coil (–) terminal	Detects engine speed; sends signal to engine control unit	
Solenoid valve (EGR)	Controls vacuum line to EGR control valve	
Throttle sensor	Detects throttle valve opening angle; sends signal to engine control unit	Integrated idle switch
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	
Water thermo switch	Detects radiator coolant temperature; sends signal to engine control unit	ON: above 17°C (63°F)

76G04B-102

4B EGR SYSTEM

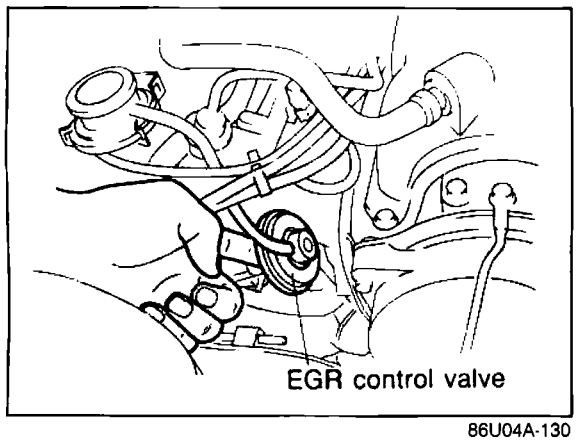
TROUBLESHOOTING

Check the condition of the wiring harness and connectors before checking the sensors or switches below.

Note
Make the system inspection first. If no problem is found, continue with the next system inspection of the Troubleshooting Guide. (Refer to pages 4B—7 and 8.)

Possible cause	Solenoid valve (EGR)	EGR modulator valve	EGR control valve	Water thermo sensor	Water thermo switch	Engine control unit terminal 2N	System inspection
Page	4B—72	4B—73	4B—73	4B—97	4B—97	4B—90	4B—72
Checking order	3	2	4	6	5	7	1

76G04B-103



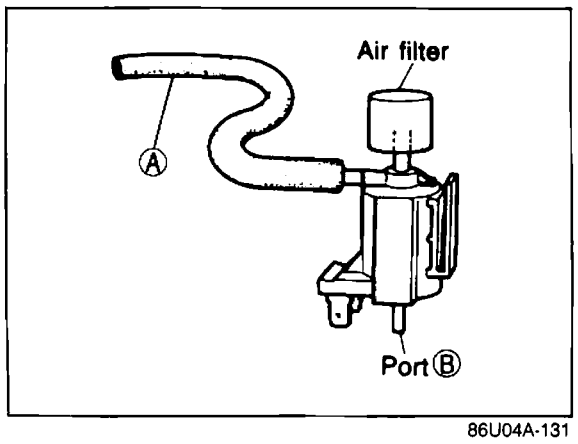
86U04A-130

System Inspection

1. Start the engine.
2. Accelerate the engine and verify that the diaphragm of the EGR control valve does not move while the engine is still cold.
3. Warm up the engine to normal operating temperature and run it at idle.

Warning
Be careful when checking the EGR control valve because the surrounding area is very hot.

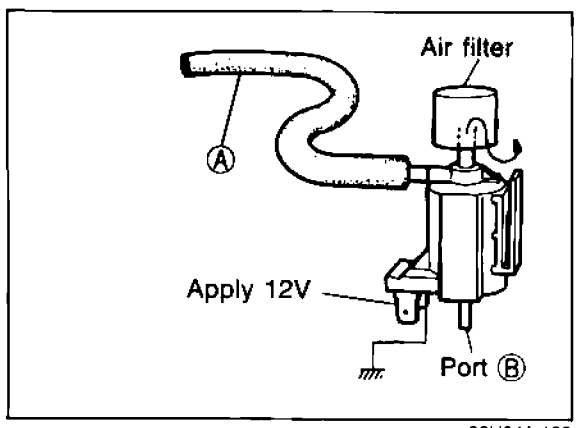
4. Accelerate the engine and check that the diaphragm of the EGR control valve moves upward.



86U04A-131

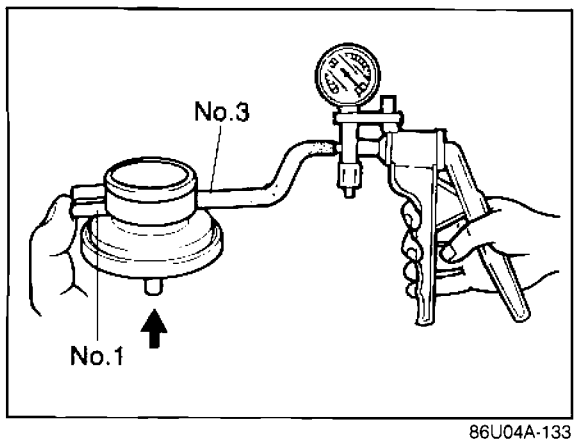
Solenoid Valve (EGR)

1. Disconnect the vacuum hose from the solenoid valve and vacuum pipe.
2. Blow through the solenoid valve from vacuum hose A.
3. Check that air flows from port B.



86U04A-132

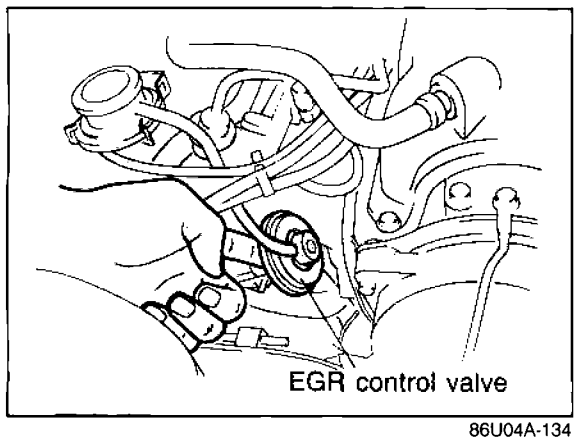
4. Disconnect the solenoid valve connector.
5. Connect 12V and a ground to the terminals of the solenoid valve.
6. Blow through the solenoid valve from vacuum hose A.
7. Check that air flows from the valve air filter.



86U04A-133

EGR Modulator Valve

1. Remove the EGR modulator valve.
2. Plug the No. 1 port and connect a vacuum pump to the No. 3 port.
3. Blow into the exhaust gas port. Operate the vacuum pump and verify that vacuum is held.
4. Release the exhaust gas port and confirm that vacuum is released.

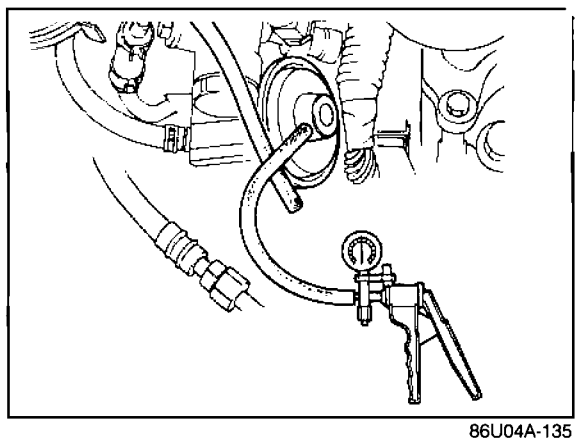


86U04A-134

EGR Control Valve

1. Manually actuate the valve by pushing on the diaphragm with finger.
2. Check that the spring resistance is present and the diaphragm moves freely with no sticking or binding.

Note
Before replacing the EGR control valve, check the intake air and control systems.



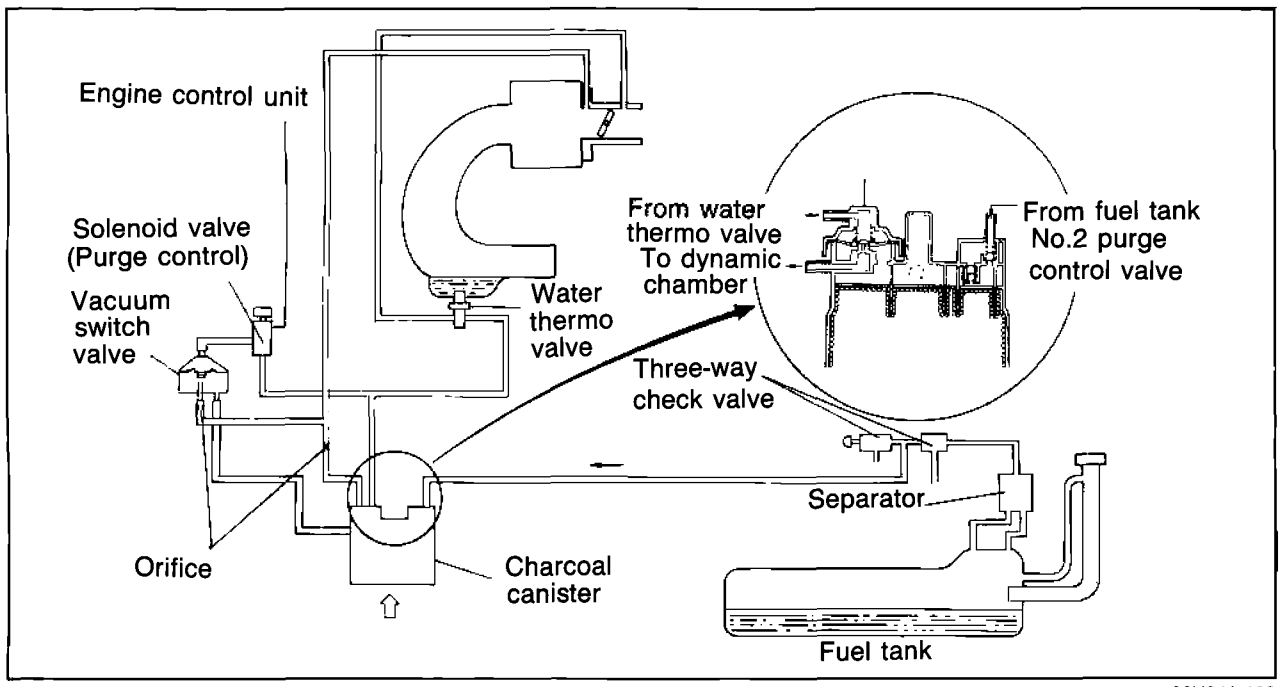
86U04A-135

3. Warm up the engine and run it at idle.
4. Connect a vacuum pump to the valve and apply vacuum.
5. Check that the engine runs roughly or stalls at more than the specified vacuum.

Specification:
40—60 mmHg (1.6—2.4 inHg)

6. If not correct, replace the EGR control valve.

EVAPORATIVE EMISSION CONTROL (EEC) SYSTEM



86U04A-136

This system stores fuel vapor generated in the fuel tank in the canister when the engine is not running. The fuel vapor is stored in the canister until it is drawn into the dynamic chamber and burned when the engine is started.

COMPONENT DESCRIPTIONS

Component	Function	Remarks
Air flow meter	Detects amount of intake air; sends signal to engine control unit	Intake air thermo sensor and fuel pump switch are integrated
Charcoal canister	Stores fuel tank fumes when engine stopped	
Engine control unit	Detects signals from input sensors and switches; controls solenoid valve (Purge control)	
Ignition coil (–) terminal	Detects engine speed; sends signal to engine control unit	
Separator	Prevents fuel from flowing into charcoal canister	
Solenoid valve (Purge control)	Controls vacuum line to vacuum switch valve	
Three-way check valve	Controls pressure in fuel tank	
Vacuum switch valve	Regulates evaporative fumes from canister to intake manifold	
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	
Water thermo valve	Controls vacuum applied to No.1 purge control valve and solenoid valve (Purge control)	Opens vacuum line above 54°C (129°F)

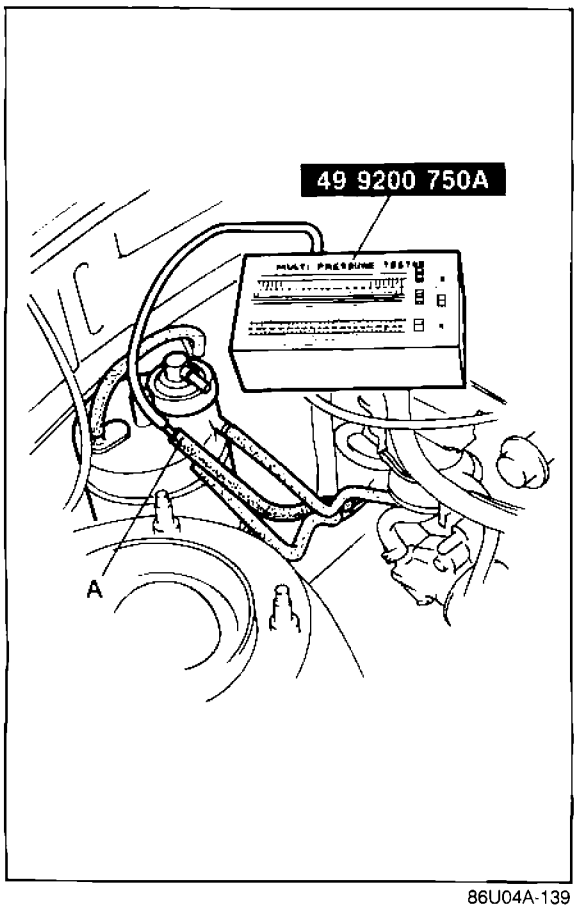
76G04B-104

TROUBLESHOOTING
Check the condition of the wiring harness or connectors, before checking the sensors or switches.

Note
Make the system inspection first. If no problem is found, continue with the next system inspection of the Troubleshooting Guide. (Refer to pages 4B—7 and 8.)

Possible cause	Vacuum switch valve	Solenoid valve (Purge control)	Three-way check valve	Separator	No.1 purge control valve	No.2 purge control valve	Water thermo valve	Water thermo valve	Engine control unit terminal 2P	System inspection
Page	4B—77	4B—78	4B—78	4B—79	4B—77	4B—77	4B—78	4B—97	4B—90	4B—76
Checking order	3	2	9	10	4	5	6	7	8	1

76G04B-105



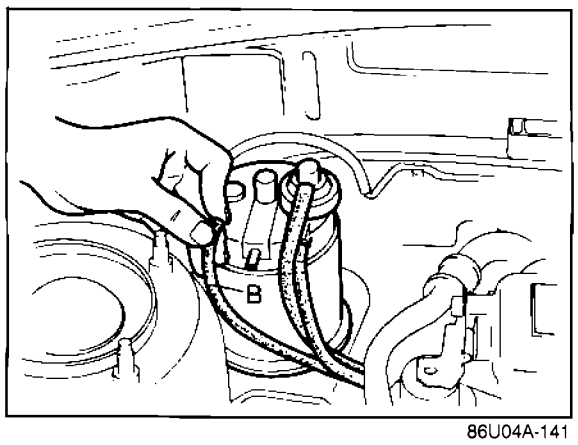
86U04A-139

System Inspection

1. Check the vacuum hose routing.
2. If there is a poor connection, clog, or leak, repair or replace as necessary.
3. Warm up the engine and run it at idle.
4. Disconnect vacuum hose A from No. 1 purge control valve and connect the **SST** to the hose.

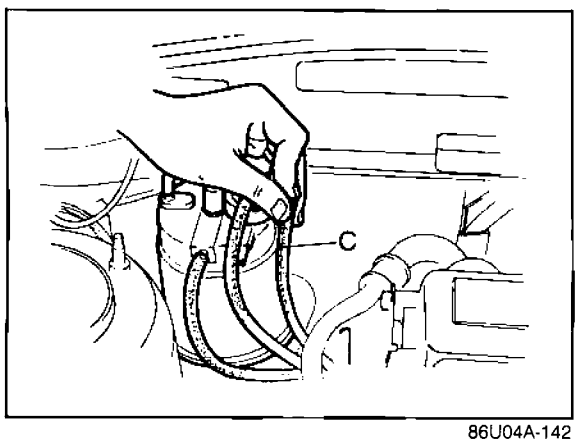
86U04A-140

5. Increase the engine speed to above **2,500 rpm** and verify that the gauge shows more than **150 mmHg (5.9 inHg)**.
6. If not correct, check the water thermo valve.
7. Reconnect hose A to No. 1 purge control valve.



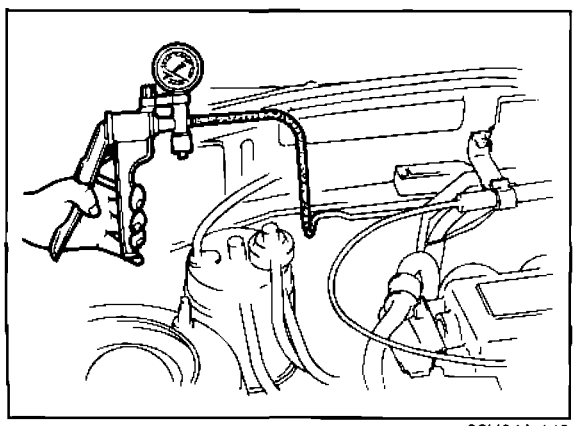
86U04A-141

8. Disconnect vacuum hose B from the canister and place a finger over the end of the hose.
9. Accelerate the engine rapidly and check that vacuum is felt at **above 1,500 rpm**.
10. Reconnect hose B to the canister.



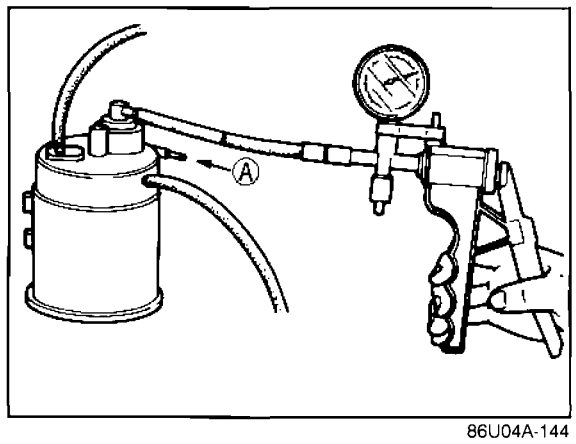
86U04A-142

11. Disconnect vacuum hose C from the canister and place a finger over the end of the hose.
12. Check that vacuum is felt.
13. If not correct, check the vacuum line between the canister and the dynamic chamber for clogging.



86U04A-143

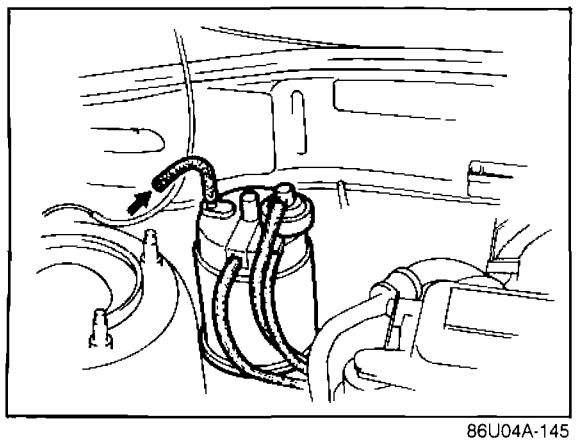
14. Disconnect the evaporation hose from the evaporation pipe.
15. Connect the vacuum pump to the evaporation pipe.
16. Operate the vacuum pump and verify that no vacuum is held.
17. If vacuum is held, check the evaporation pipe for clogging.



86U04A-144

No. 1 Purge Control Valve

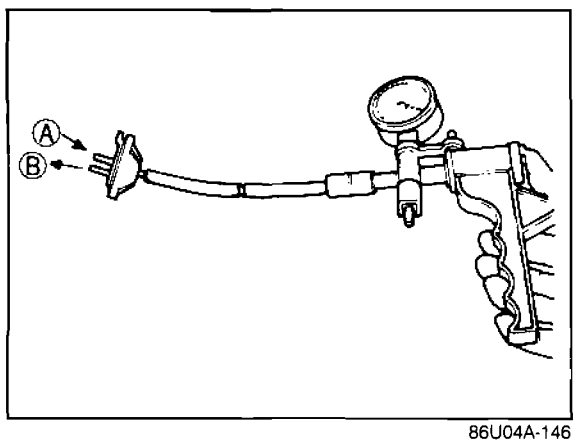
1. Blow through the purge control valve from port A and check that air does not flow.
2. Connect a vacuum pump to the purge control valve.
3. Apply **110 mmHg (4.33 inHg)** vacuum, and blow through port A again; air should flow.



86U04A-145

No. 2 Purge Control Valve

1. Disconnect vacuum hose B from the evaporation pipe.
2. Blow through the hose and verify that air flows freely.

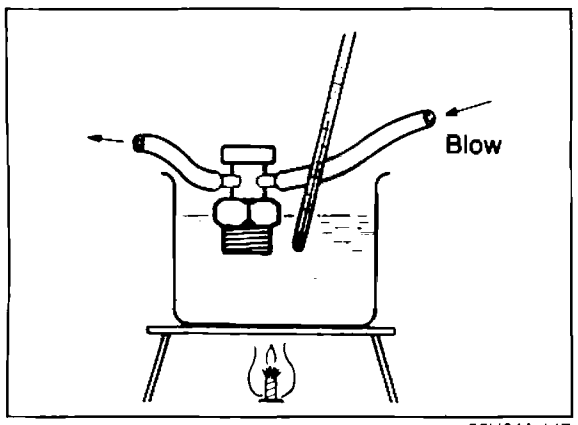


86U04A-146

Vacuum Switch Valve

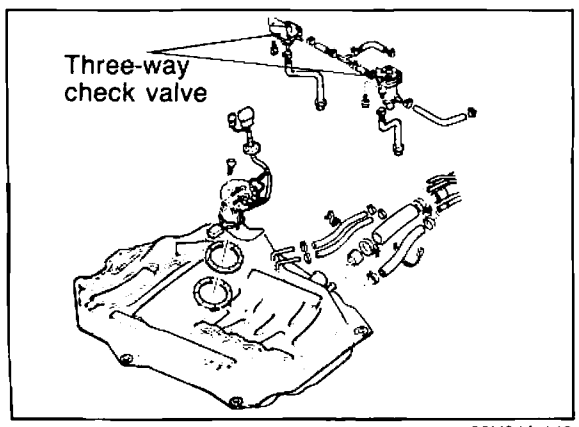
1. Remove vacuum switch valve.
2. Connect a vacuum pump to the valve.
3. Blow through the valve from port A and verify that air comes out of port B when vacuum is applied.

Specified vacuum:
66—106 mmHg (2.6—4.2 inHg)



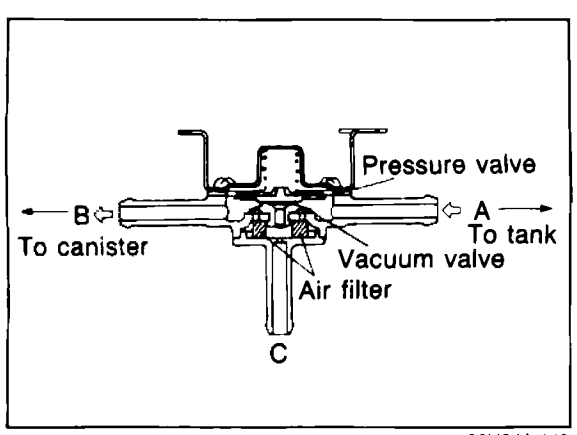
86U04A-147

Water Thermo Valve
1. Remove the water thermo valve.
2. Immerse the valve in a water-filled container.
3. Heat the water gradually and observe the temperature.
4. Blow through the valve from one vacuum port and verify that air comes out of the other port at **46—54°C (115—129°F)**.



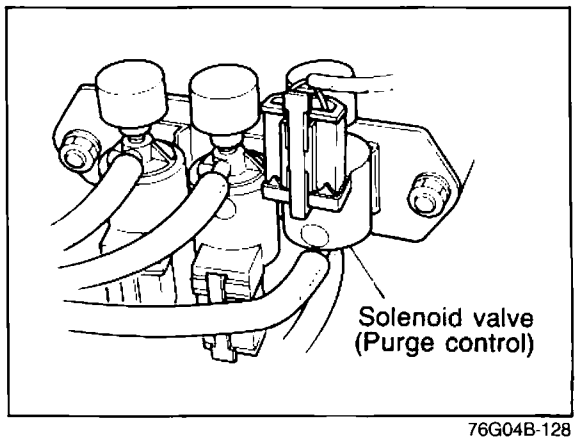
86U04A-148

Three-Way Check Valve
1. Remove the check valve.



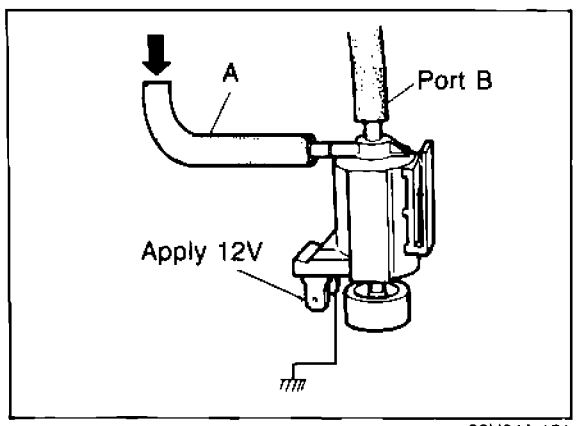
86U04A-149

2. Blow through the valve from port A, and check that air comes out of port B.
   Next, block port B and check that air comes out of port C.
3. Block port B.
4. Connect a vacuum pump to port A and verify that no vacuum is held.



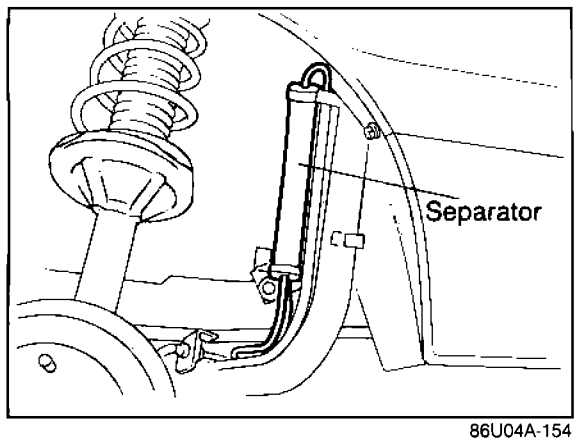
76G04B-128

Solenoid Valve (Purge control)
1. Remove the solenoid valve.



86U04A-151

2. Connect vacuum hoses to the valve as shown in the figure.
3. Blow air through the valve from hose A and check that air comes out of the valve air filter.
4. Apply 12V and ground the solenoid valve with jumper wires.
5. Blow air through the valve from hose A and check that the air comes out of port B.
6. Replace, if necessary.

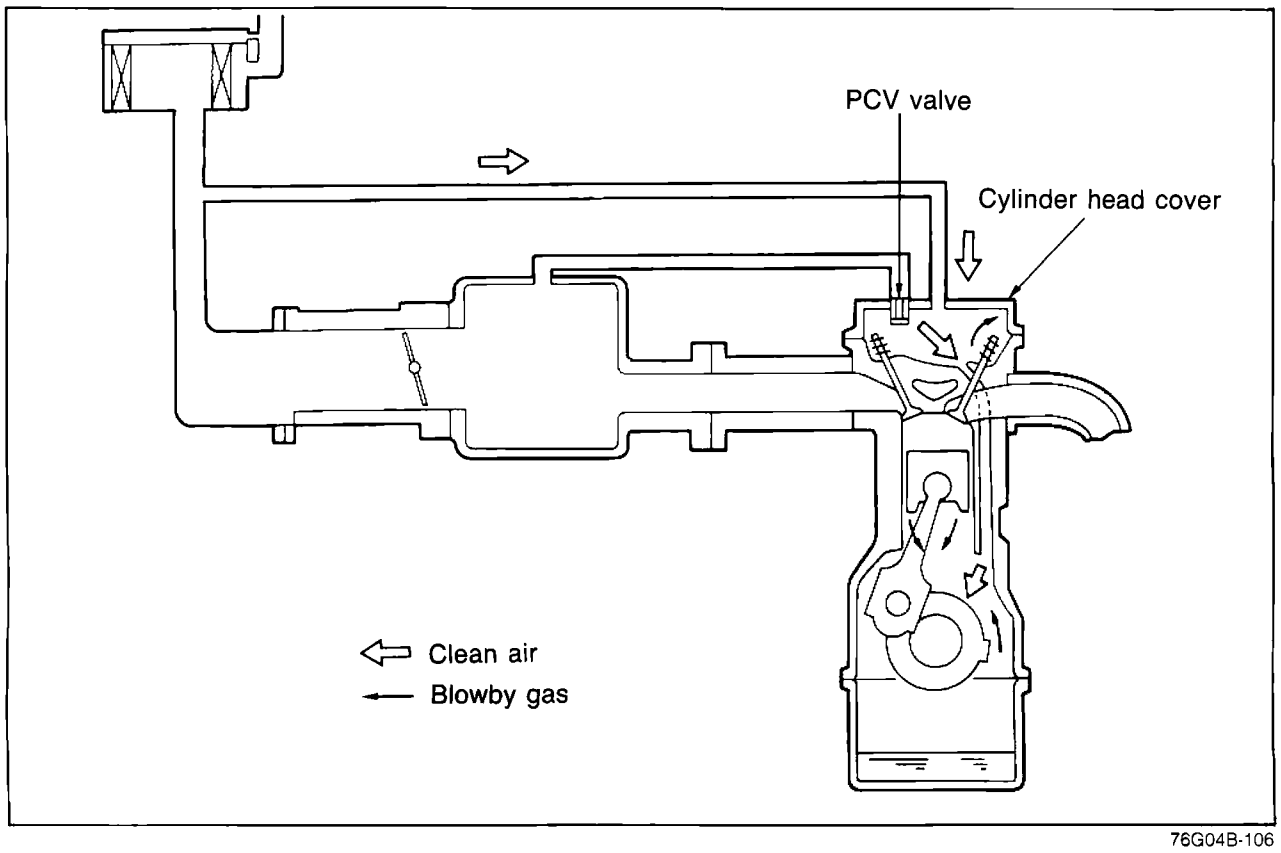


86U04A-154

Separator

1. Remove the separator.
2. Visually check the separator for damage.
3. Replace, if necessary.

POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

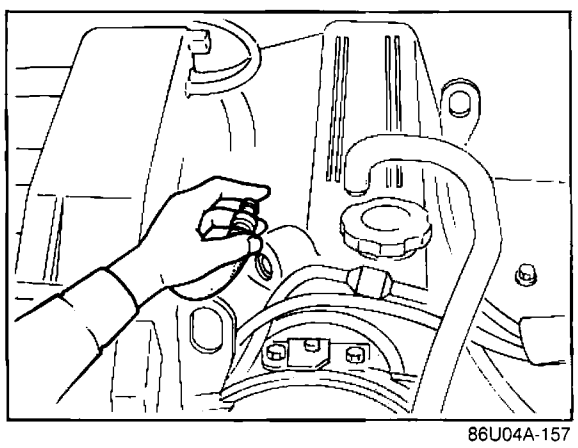


76G04B-106

The PCV valve is operated by the intake manifold vacuum.
When the engine is running at idle, the PCV valve is opened slightly and a small amount of blowby gas is drawn into the dynamic chamber.
At high engine speeds, the PCV valve is further opened and a larger amount of blowby gas is drawn into the dynamic chamber.

COMPONENT DESCRIPTION

Component	Function
PCV valve	Controls blowby gas amount pulled into engine

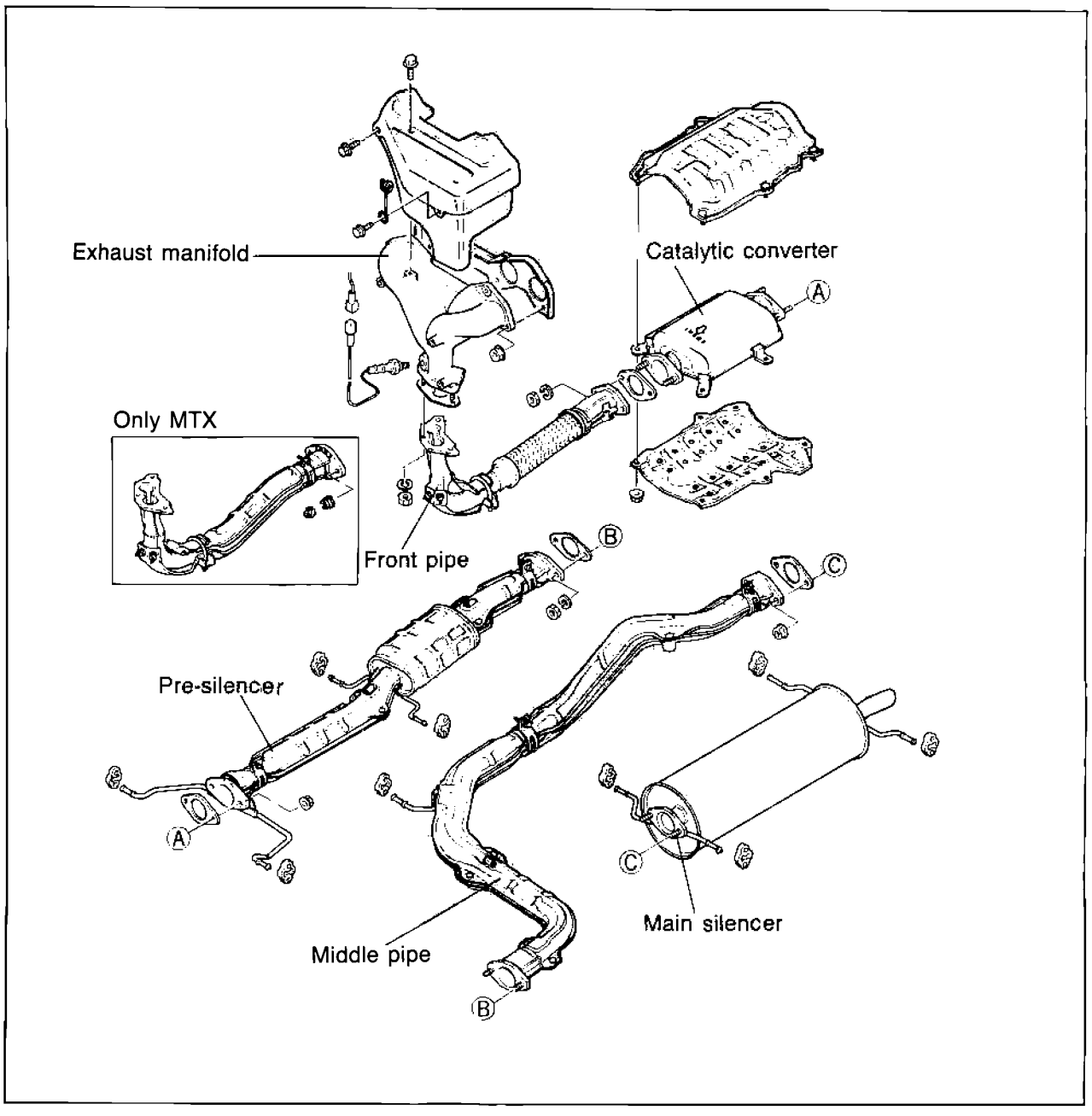


86U04A-157

PCV VALVE

1. Warm up the engine to the normal operating temperature and run it at idle.
2. Disconnect the PCV valve and the ventilation hose from the cylinder head cover.
3. Close the PCV valve opening.
4. Check that vacuum is felt.

EXHAUST SYSTEM



76G04B-107

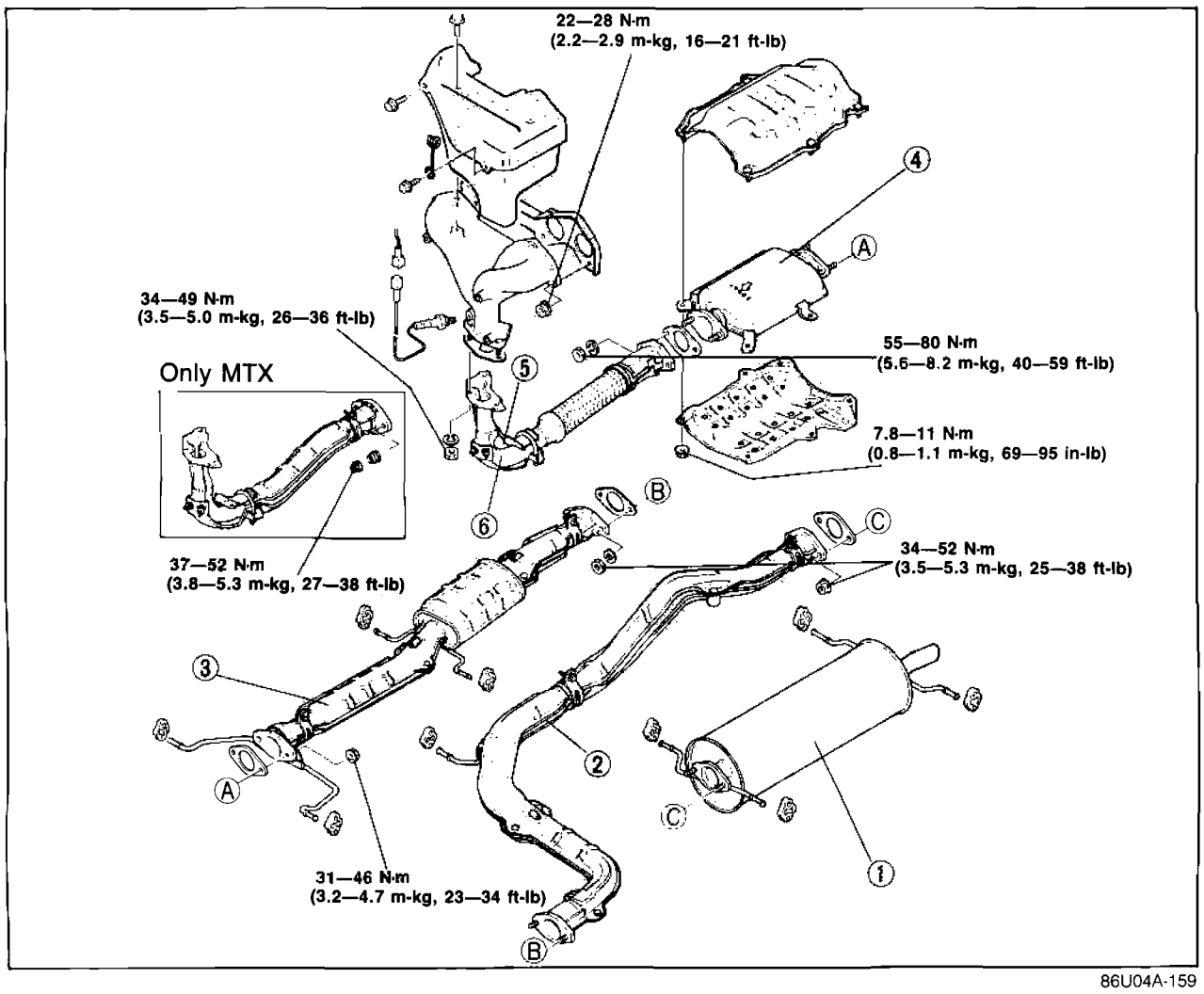
The catalytic converter is used to reduce CO, HC and NOx. The converter contains a compound of platinum and rhodium. It is a three-way catalyst type with a volume of **1,600 cc (98 cu in)**.

4B EXHAUST SYSTEM

REMOVAL AND INSTALLATION

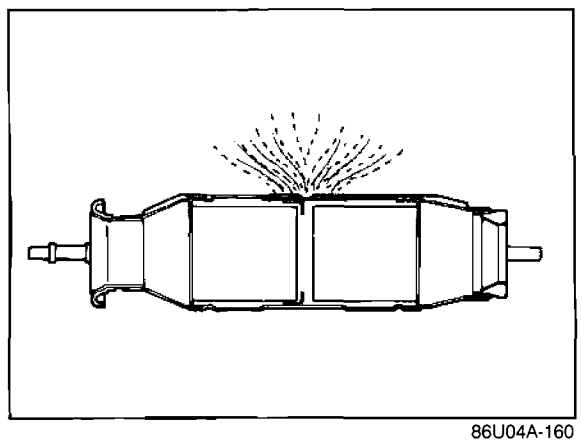
1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.

Torque Specifications



86U04A-159

1. Main silencer
2. Middle pipe
3. Pre-silencer
4. Catalytic converter
5. Bracket
6. Front pipe



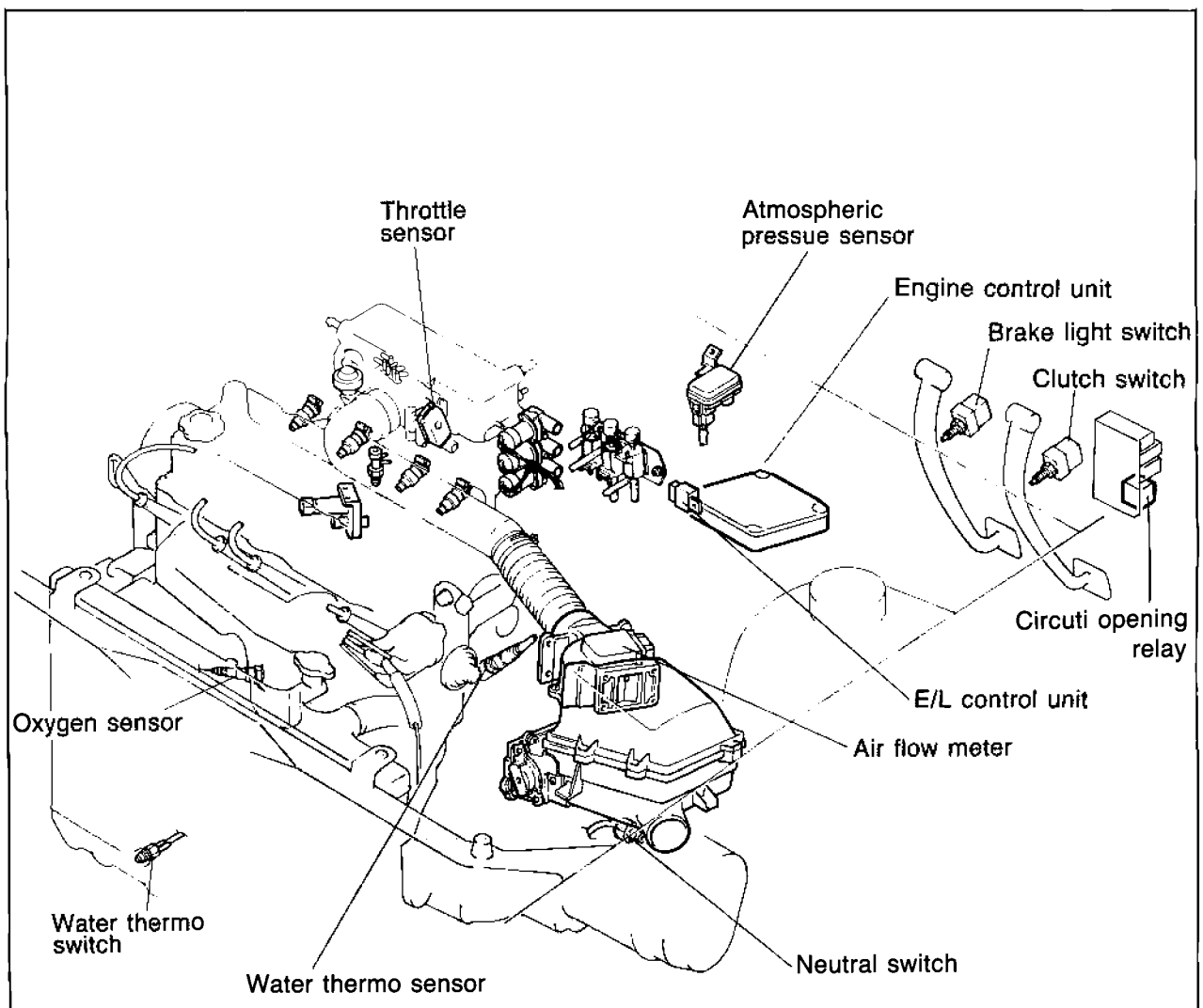
86U04A-160

INSPECTION

1. Check the catalytic converter and exhaust pipe for deterioration or restriction.
2. Check the insulation covers welded onto the catalytic converter for damage.

Note
If the insulation cover is touching the catalytic converter housing, excessive heat at the floor will occur.

CONTROL SYSTEM



76G04B-129

The control system consists of the input devices and the engine control unit. The engine control unit controls the fuel injection amount (EGI), fuel injection pressure, bypass air amount, switch monitor function, and fail-safe function.

RELATIONSHIP CHART
Input Devices and Output Devices

INPUT DEVICES / OUTPUT DEVICES	FUEL INJECTION AMOUNT	FUEL INJECTION TIMING	AIR VALVE	PRESSURE REGULATOR	EGR	PURGE	IDLE-UP (A)*	IDLE-UP (B)	IDLE-UP (C)	AIR CONDITIONER
BRAKE LIGHT SWITCH	○	×	×	×	×	×	×	×	×	×
ELECTRICAL LOAD CONTROL UNIT	×	×	×	×	×	×	×	×	○	×
P/S PRESSURE SWITCH*	×	×	×	×	×	×	×	×	○	×
A/C SWITCH	○	×	×	×	×	○	○	×	×	○
IGNITION SWITCH (STA POSITION)	○	○	×	○	×	×	×	×	○	○
INHIBITOR SWITCH	○	×	×	×	○	×	×	×	×	○
NEUTRAL AND CLUTCH SWITCH	○	×	×	×	×	×	×	×	×	○
OXYGEN SENSOR	○	×	×	×	×	×	×	×	×	×
WATER THERMO SWITCH (RADIATOR)	○	×	×	×	○	×	×	×	×	×
ATMOSPHERIC PRESSURE SENSOR	○	×	×	×	×	○	×	○	○	×
INTAKE AIR THERMO SENSOR	○	×	×	○	×	×	×	○	○	×
WATER THERMO SENSOR	○	×	×	○	○	○	×	×	○	×
IDLE SWITCH	○	○	×	○	×	×	×	×	○	×
THROTTLE SENSOR	○	○	×	×	○	×	×	×	×	○
AIR FLOW METER	○	×	×	×	×	○	×	×	×	×
IGNITION COIL	○	○	×	○	○	○	×	×	○	○

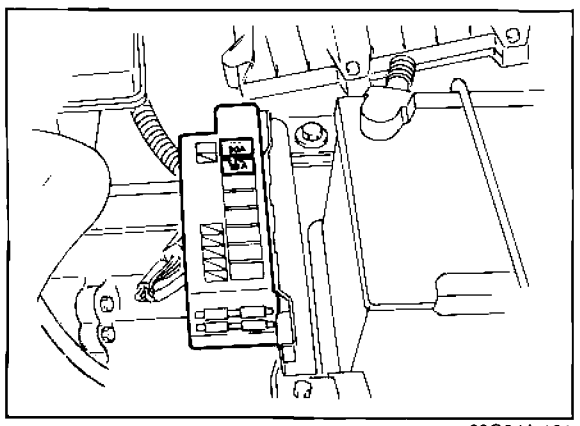
○: Related
×: Not related

* It does not have a relationship with the engine control unit

76G04B-108

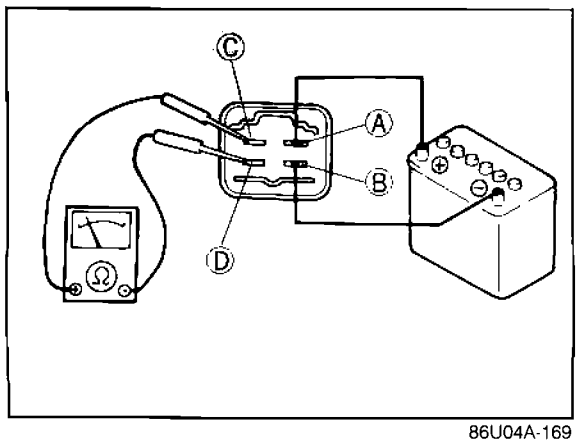
ENGINE CONDITIONS / OUTPUT DEVICES		CRANKING (COLD ENGINE)	WARMING UP (DURING IDLE)	MEDIUM LOAD		ACCEL-ERATION	HEAVY LOAD	DECEL-ERATION	IDLE (THROT-TLE VALVE FULLY CLOSED)	IGN: ON (ENGINE NOT RUNNING)	REMARK
				COLD	WARM						
INJEC-TOR	FUEL INJECTION AMOUNT	Rich			Rich and lean	Rich		Fuel cut	Rich and lean	No injection	
	FUEL INJECTION TIMING	1 group (once per revolution)							1 group (once per revolution)		
AIR VALVE		Open		Closed*							*After warming up
SOLE-NOID VALVE	PRESSURE REGULATOR	OFF (Vacuum to pressure regulator)							After start ON* (Vacu-um cut)	OFF	*Hot start only
	EGR	ON (EGR cut)		OFF (EGR)	ON (EGR cut)	OFF (EGR)		ON (EGR cut)		ON	
	PURGE	OFF (2nd stage not operated)		ON (2nd stage operates)				OFF (2nd stage not operated)		OFF	1st stage: controlled by water thermo valve
AIR BYPASS SOLEN-OID VALVE	IDLE-UP (A)	Open*								No bypass	*With A/C ON
	IDLE-UP (B)	Open (When intake air temp. above 55°C (131°F) or vehicle at above 1,000 m (3,280 ft)									
	IDLE-UP (C)	Open (When E/L applied, P/S operated, intake air temp. above 55°C (131°F), solenoid valve (pressure regulator) ON or vehicle at above 1,900 m (6,232 ft)							After start open*		*Hot start only
AIR CONDITIONER		Operates				Not operate*		Operates		Does not operate	*Full throttle

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69G04A-161

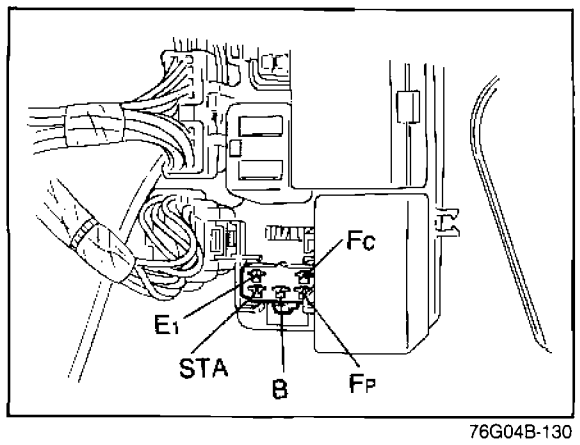
EGI MAIN FUSE
Inspection
Check the continuity of EGI main fuse.



86U04A-169

MAIN RELAY
1. Check that a "clicking" sound is heard at the main relay when turning the ignition switch ON and OFF.
2. Apply 12V and a ground to (A) and (B) terminals of the main relay.
3. Check continuity at terminals using an ohmmeter.

Terminals \ Operation	12V Not applied	12V Applied
Ⓒ — Ⓓ	No continuity	Continuity



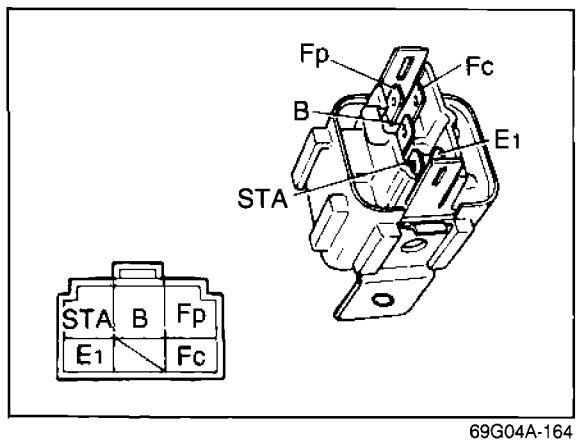
76G04B-130

CIRCUIT OPENING RELAY
Relay Circuit
1. Remove the circuit opening relay.
2. Check the circuit as described.

Terminal	Checking item	Correct result
Fp	Resistance	0.2—30Ω
Fc	Continuity (cranking)	∞
B	Voltage (Ign: ON)	Battery voltage
STA	Voltage (Cranking)	Approx. 9V
E1	Continuity	∞

Circuit Opening Relay
Apply 12V and a ground to the terminals below and check the circuit opening relay as described.

12V	Grounded	Correct result
STA	E1	B ↔ FP: Continuity
B	Fc	Fp: Battery voltage

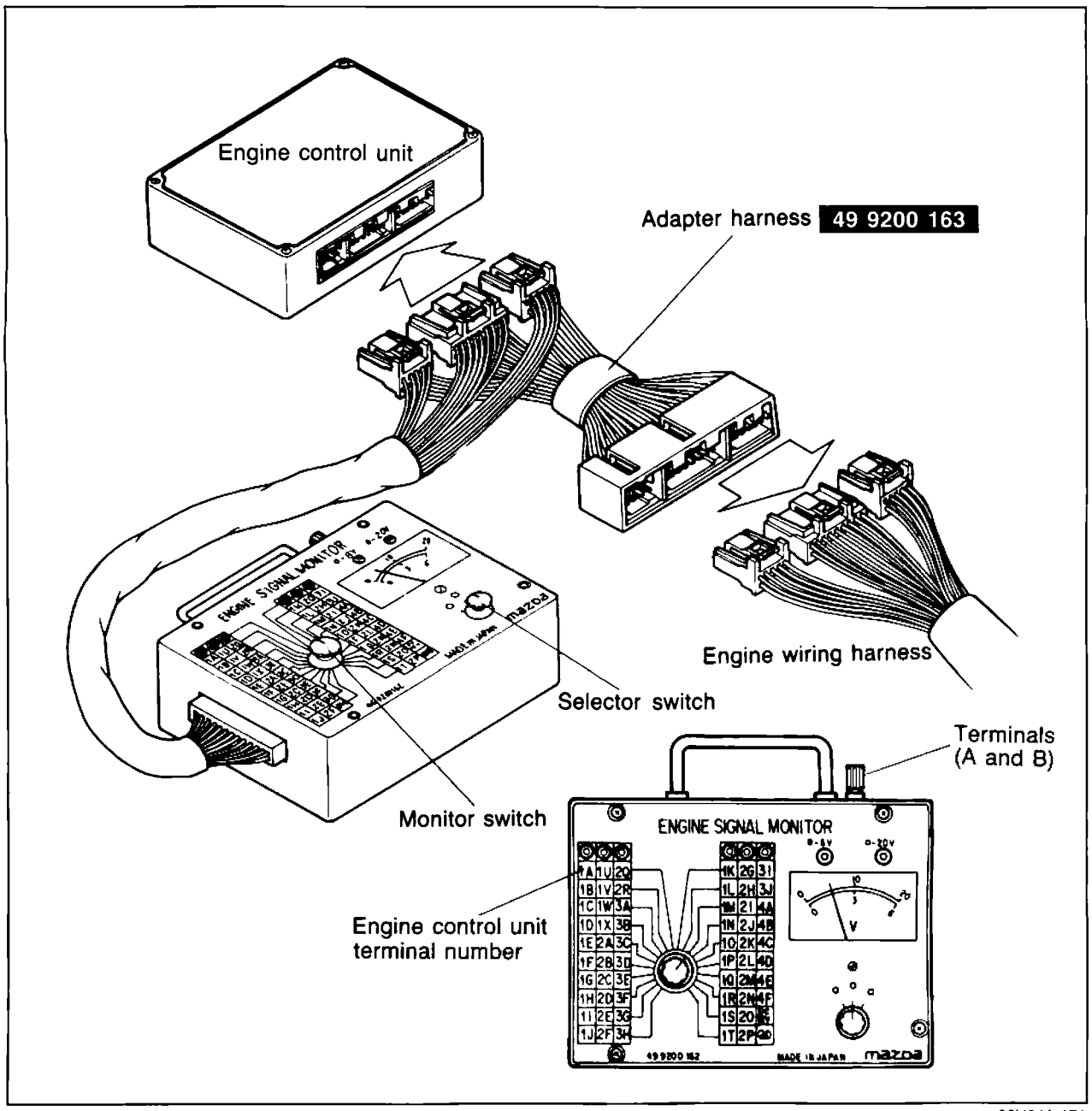


69G04A-164

Resistance
Check the resistance between the terminals using an ohmmeter.

Between terminals	Resistance (Ω)
STA ↔ E1	15 ~ 30
B ↔ Fc	80 ~ 150
B ↔ Fp	∞

ENGINE CONTROL UNIT
Engine Signal Monitor (49 9200 162) and Adapter (49 9200 163).



86U04A-171

The **Engine Signal Monitor** (49 9200 162) was developed to check the control unit terminal voltages. This monitor easily inspects the individual terminal voltages through selection of the monitor switch.

How to Use the Engine Signal Monitor

1. Connect the **Engine Signal Monitor** (49 9200 162) between the engine control unit and the engine harness using the **adapter** (49 9200 163).
2. Turn the selector switch and monitor switch to select the terminal number.
3. Check the terminal voltage.

Caution
Never apply voltage to terminals A and B.

Terminal Voltage

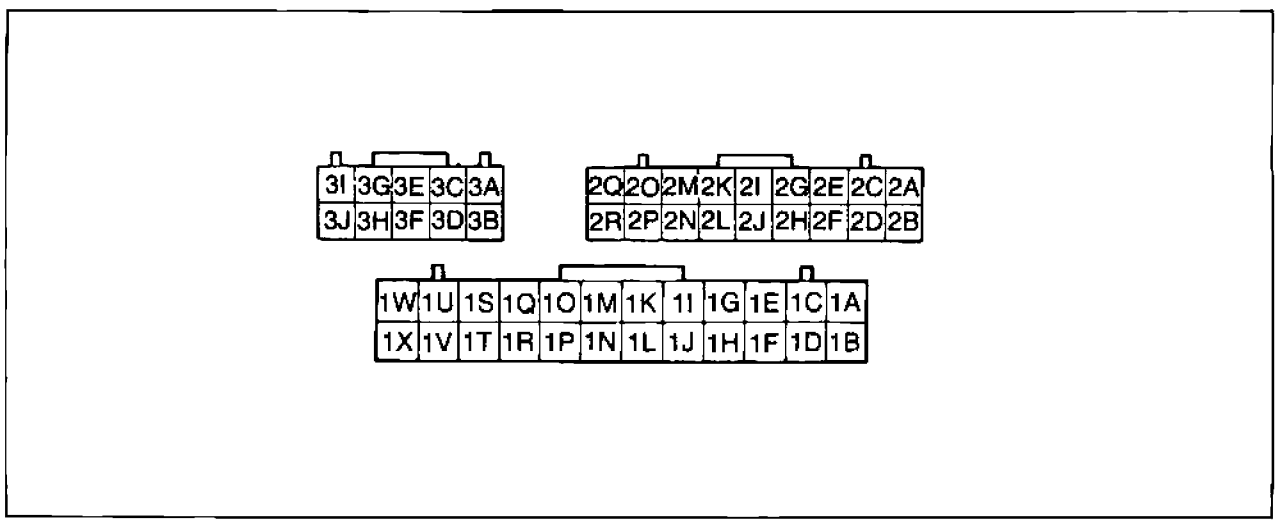
If the input and output devices and related wiring are normal, but the engine control unit terminal voltage is incorrect, replace the engine control unit.

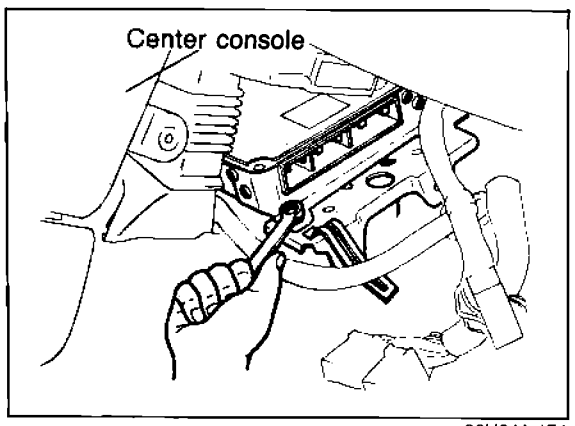
Terminal	Input	Output	Connection to	Voltage (After warming-up)		Remarks
				IGN: ON	Idle	
1A	—	—	—	—		—
1B		○	Self-Diagnosis Checker (Code number)	For 3sec. after ignition switch OFF → ON: below 6.2V (Buzzer sounds) After 3sec.: Battery voltage (Buzzer does not sound)		• Using Self-Diagnosis Checker and test connector grounded • Buzzer sounds: below 6.2V • Buzzer does not sound: Battery voltage
1C	—	—	—	—		—
1D		○	Self-Diagnosis Checker (Monitor lamp)	Test connector grounded For 3sec. after ignition switch OFF → ON: below 6.2V (light illuminates) After 3sec.: Battery voltage (light does not illuminate)	(Test connector grounded) approx. 10V (Test connector not grounded) Monitor lamp ON: below 6.2V Monitor lamp OFF: Battery voltage	With Self-Diagnosis Checker
1E	○		Idle switch	Accelerator pedal released: below 1.5V Accelerator pedal depressed: Battery voltage		
1F		○	A/C relay	A/C switch ON: below 2.5V A/C switch OFF: Battery voltage		Blower motor ON
1G	—	—	—	—		—
1H	○		Water thermo switch	Below 1.5V		Radiator temp.: above 17°C (63°F)
1I	○		Electrical load control unit	Electrical load ON: below 1.5V Electrical load OFF: Battery voltage		Electrical load: Rear defroster Headlight Blower motor (3rd & 4th position) Electrical fan
1J	○		Brake light switch	Brake pedal released: below 1.5V Brake pedal depressed: battery voltage		
1K	—	—	—	—	—	—
1L	○		A/C switch	A/C switch ON: below 1.5V A/C switch OFF: battery voltage		Blower motor: ON
1M	○		Ignition coil ⊖ terminal	Battery voltage	*1 Battery voltage	*1 Engine Signal Monitor: green and red lights flash
1N	—	—	—	—		—
1O	—	—	—	—		—

Terminal	Input	Output	Connection to	Voltage (After warming-up)		Remarks
				IGN: ON	Idle	
1P	—	—	—	—		—
1Q	—	—	—	—		—
1R	—	—	—	—		—
1S		○	Air bypass solenoid valve (Idle-up C) and P/S pressure switch	Battery voltage		While solenoid ON (Refer to page 4B—35): below 1.5V
1T	—	—	—	—		—
1U	—	—	—	—		—
1V	○		MTX Neutral and clutch switch	In-gear condition Clutch pedal depressed: battery voltage Clutch pedal released: below 1.5V		Neutral: constant battery voltage
1W	○		Test connector	Test connector grounded: below 1.5V Test connector not grounded: battery voltage		Green connector, 1-pin
1X	—	—	—	—		—
2A		○	V ref	4.5—5.5V		
2B	○		Air flow meter (Vc)	6—10V		
2C	—	—	Ground (E2)	Approx. 0V		
2D	○		Oxygen sensor	0V	0—1.0V	• Cold engine: 0V at idle • After warming-up: Increase engine speed: 0.5—1.0V Deceleration: 0—0.4V
2E	○		Air flow meter (Vs)	Approx. 1.7V	Approx. 3—5V	Increase engine speed: voltage increases
2F	—	—	—	—		—
2G	○		Throttle sensor	Accelerator pedal released: 0.4—0.6 V		
2H	○		Atmospheric pressure sensor	At sea level: approx. 4.0V		
2I	○		Water thermo sensor	0.3—0.6 V		Engine coolant temp. 20°C (68°F): approx. 2.5V
2J	○		Air flow meter (Intake air thermo sensor)	Approx. 2.3V at 20°C (68°F)		
2K		○	Solenoid valve (Pressure regulator control)	For 120 sec. after ignition switch OFF → ON: below 1.5V	For 120 sec. after starting: below 1.5V	Hot condition: Coolant temp. above 70°C (158°F) Intake air temp. above 10°C (50°F)
				Battery voltage		Other conditions
2L	—	—	—	—		—
2M	—	—	—	—		—

Terminal	Input	Output	Connection to	Voltage (After warming-up)		Remarks
				IGN: ON	Idle	
2N		○	Solenoid valve (EGR)	Below 1.5V		• Cold engine: below 1.5V Radiator coolant temp.—below 17°C (63°F) or Engine coolant temp.—below 70°C (158°F) • Engine above approx. 1,500 rpm: Battery voltage
2O		○	Air bypass solenoid valve (Idle-up B)	Battery voltage		While solenoid ON (Refer to page 4B—35): below 1.5 V
2P		○	Solenoid valve (Purge control valve)	Battery voltage		• Medium and high load: below 1.5V
2Q	—	—	—	—		
2R	—	—	Ground (E_{02})	Below 1.5V		
3A	—	—	Ground (E_{01})	Below 1.5V		
3B	○		Ignition switch (Start position)	Below 1.5V		While cranking: battery voltage
3C		○	Injector (No. 4 and No. 2)	Battery voltage	*1 Battery voltage	*1 Engine Signal Monitor green and red lights flash
3D	○		Inhibitor switch	"N" or "P" range: below 2.0V Other ranges: battery voltage		ATX
3E		○	Injector (No. 1 and No. 3)	Battery voltage	*1 Battery voltage	*1 Engine Signal Monitor: green and red lights flash
3F	—	—	—	—		—
3G	—	—	Ground (E_1)	Below 1.5V		
3H	—	—	—	—		—
3I	○	—	Main relay	Battery voltage		
3J	—	—	Battery	Battery voltage		For back-up

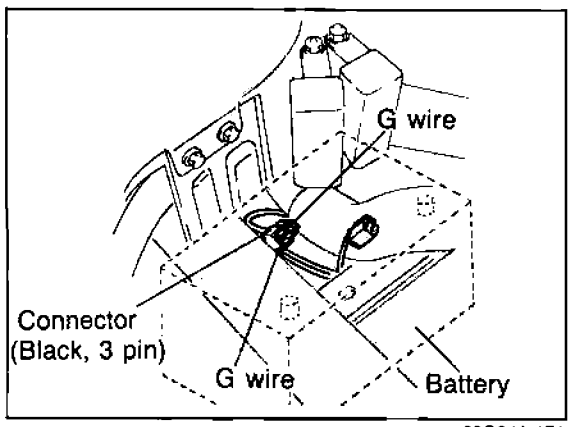
76G04B-110





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Replacement
1. Disconnect the negative battery cable.
2. Remove the front console covers (right and left).
3. Disconnect the connectors from the control unit.
4. Replace the control unit.



69G04A-171

NEUTRAL SWITCH

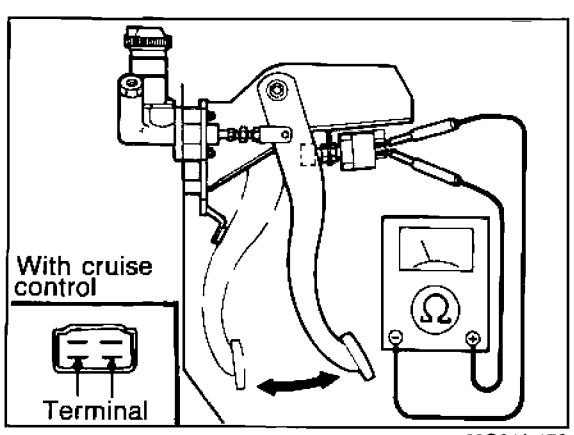
Inspection

1. Disconnect the neutral switch connector.
2. Connect an ohmmeter to the switch.
3. Check continuity of the switch.

Transmission	Continuity
In neutral	No
In other ranges	Yes

4. After checking, connect the switch connector.

Note
Refer to section 7A for replacement of the neutral switch.



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CLUTCH SWITCH

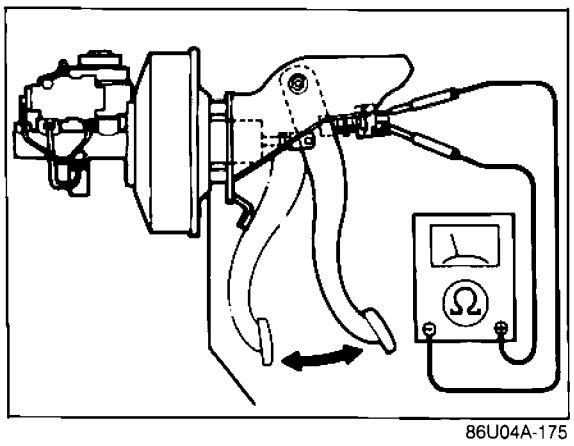
Inspection

1. Disconnect the clutch switch connector.
2. Connect an ohmmeter to the switch.
3. Check continuity of the switch.

Pedal	Continuity
Depressed	No
Released	Yes

4. After checking, connect the switch connector.

Note
Refer to section 6 for replacement of the clutch switch.



86U04A-175

BRAKE LIGHT SWITCH

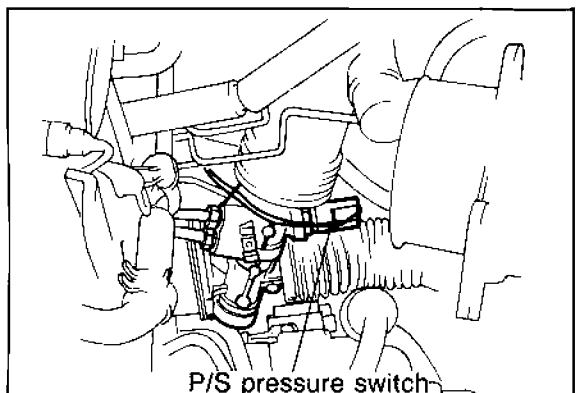
Inspection

1. Disconnect the brake light switch connector.
2. Connect an ohmmeter to the switch.
3. Check the continuity of the switch.

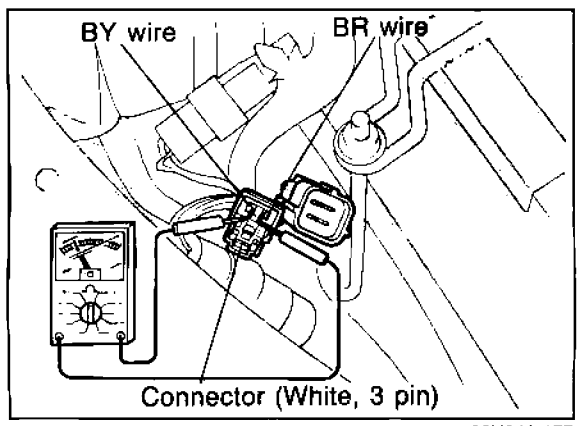
Pedal	Continuity
Depressed	Yes
Released	No

4. After checking, connect the switch connector.

Note
Refer to section 11 for replacement of the brake switch.



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P/S PRESSURE SWITCH
Inspection

1. Disconnect the P/S pressure switch connector.
2. Connect an ohmmeter to the switch.
3. Start the engine. Check continuity of the switch while turning the steering wheel at idle.

P/S	Continuity
Turning	Yes
Not turning	No

4. Connect the switch connector after checking.

Note
Refer to section 10 for replacement of the P/S pressure switch.

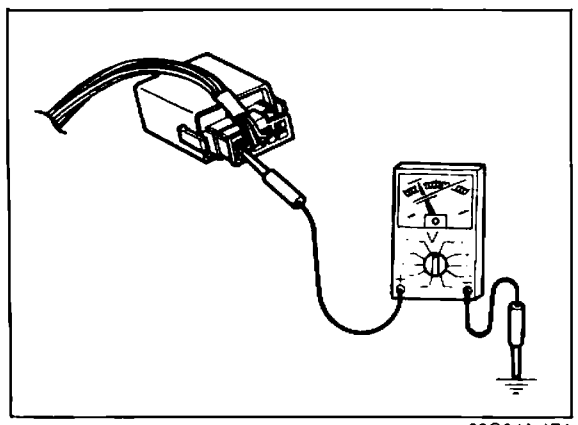
INHIBITOR SWITCH
Inspection

1. Disconnect the inhibitor switch connector.
2. Connect an ohmmeter to the switch.
3. Check continuity of the switch.

Position	Continuity
P and N ranges	Yes
Other ranges	No

4. Connect the switch connector after checking.

Note
Refer to Section 7B for replacement of the inhibitor switch.



69G04A-174

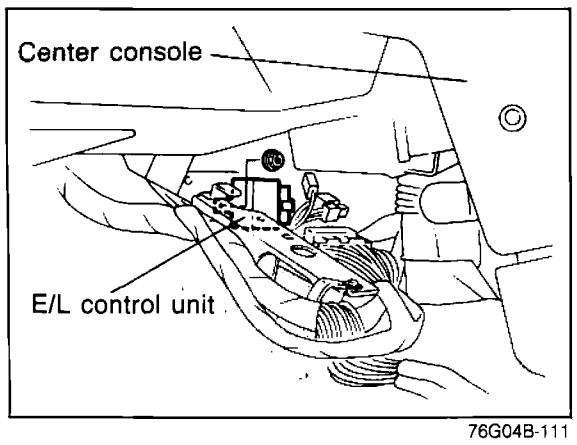
E/L CONTROL UNIT

Inspection

1. Connect a voltmeter between the E/L control unit and ground.
2. Start the engine and check the terminal voltages as described below.

Terminal	Input	Output	Connection to	Voltage (after warm-up)		Remarks
				Ignition switch: ON	Idle	
A (BW)	—	—	Ignition switch	Battery voltage		
B	—	—	—	—	—	—
C (B)	—	—	Ground	0V		
D (LY)	○		Electrical fan relay	Battery voltage		Coolant temp.: below 97°C (207°F)
				Below 1.5V		Coolant temp.: above 97°C (207°F)
E (GY)		○	Engine control unit (11)	0V		E/L: ON
				Battery voltage		E/L: OFF
F (RB)	○		Headlight switch	Battery voltage		Headlight switch: ON
				Below 1.5V		Headlight switch: OFF
G (LB)	○		Blower motor switch	Below 1.5V		Blower motor switch: ON (3rd or 4th position)
				Approx. 5V		Others
H (BL)	○		Rear defroster switch	Below 1.5V		Rear defroster switch: ON
				Battery voltage		Rear defroster switch: OFF

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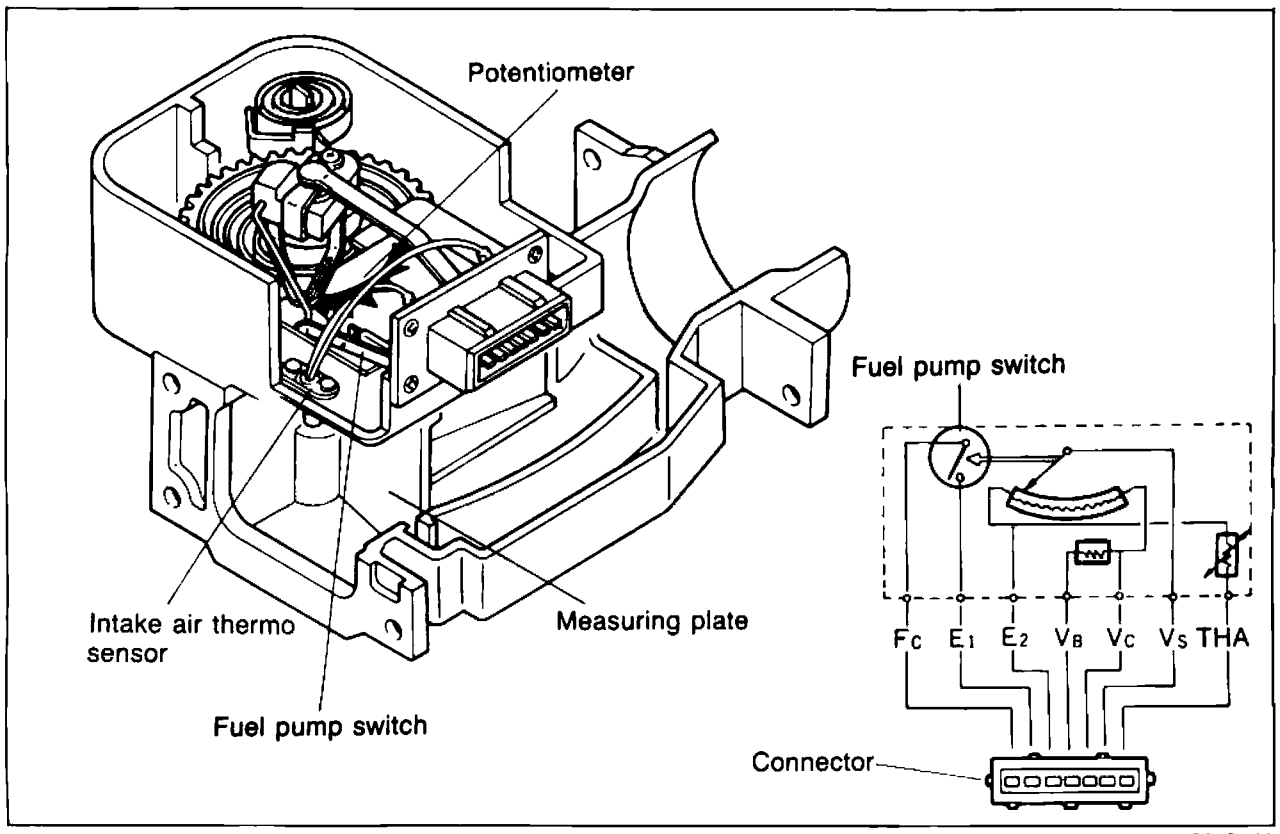


76G04B-111

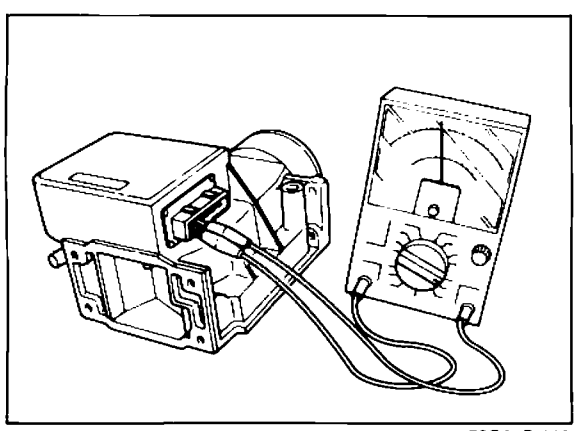
Replacement

1. Remove the engine control unit. (Refer to page 4B—91)
2. Replace the E/L control unit.
3. Install in the reverse order of removal.

AIR FLOW METER



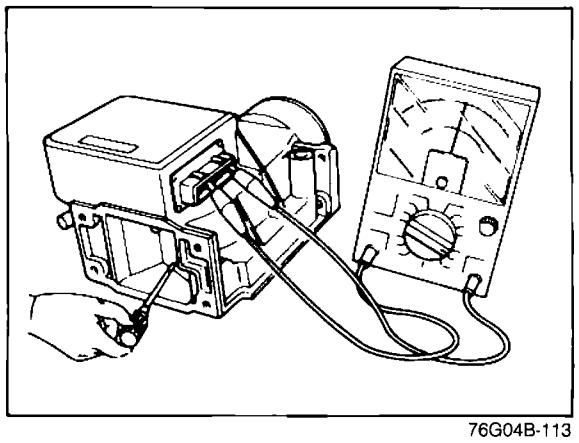
69G04C-100



76G04B-112

Inspection

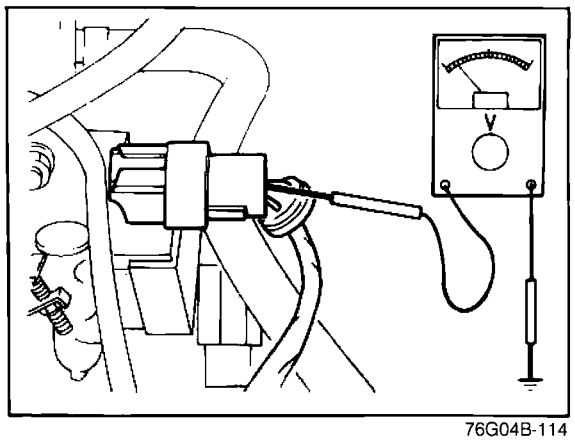
1. Remove the air flow meter. (Refer to page 4B—31)
2. Check the air flow meter body for cracks.
3. Verify that the measuring plate moves smoothly.
4. Disconnect the connector from the air flow meter.
5. Using an ohmmeter, check resistance between the terminals with the measuring plate fully closed and fully open.
6. Connect the connector to the air flow meter after inspecting.



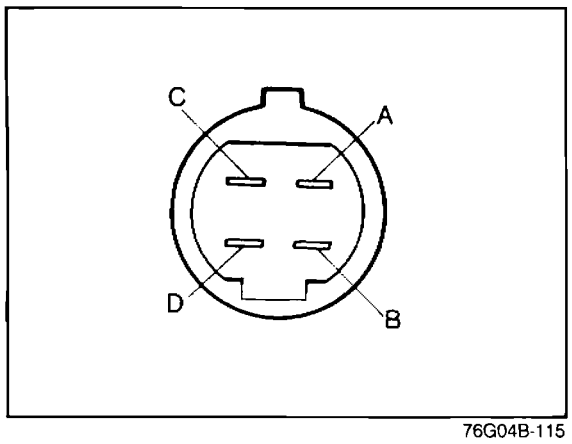
76G04B-113

Terminal	Resistance (Ω)	
	Fully closed	Fully open
E2↔Vs	More than 20	
E2↔Vc	100—300	
E2↔VB	200—400	
E2↔THA (Intake air thermo sensor)	−20°C (−4°F) 20°C (68°F) 60°C (140°F)	13.6—18.4 kΩ 2.21—2.69 kΩ 493—667 Ω
E1↔Fc	∞	0

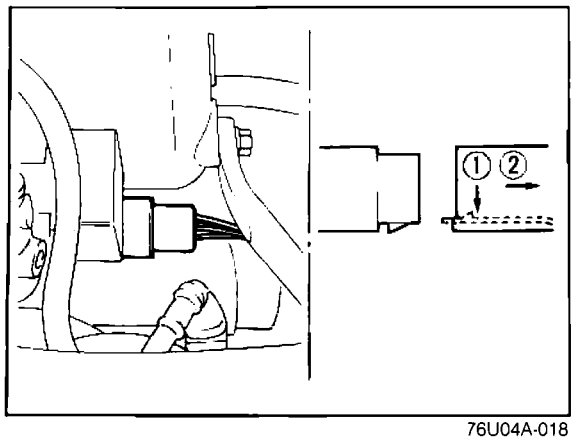
Note
Refer to page 4B—31 for replacement of the air flow meter.



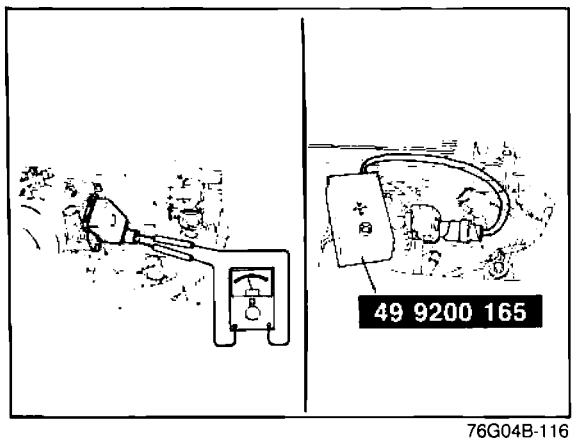
76G04B-114



76G04B-115



76U04A-018



76G04B-116

THROTTLE SENSOR

Inspection of Terminal Voltage

1. Remove the rubber boot from the connector.
2. Turn the ignition switch ON.
3. Check voltage between each terminal and a ground.
4. Open the throttle valve and again check voltage between each terminal and a ground.

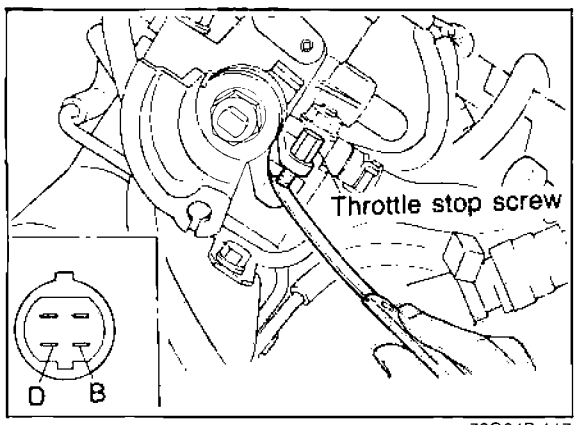
Condition / Terminal	Closed	Fully open
A (V_T)	0.4—0.6V	Approx. 4.0V
B (GND)	Below 1.5 V	
C (V ref)	4.5—5.5 V	
D (IDL)	Below 1.5 V	Approx. 12 V

5. If not correct at the D terminal only, check the throttle sensor setting.
6. If not correct on other terminals, check resistance at the throttle sensor (Refer to page 4B—97) and terminals (2A, 2C, 1E and 2G) (Refer to page 4B—88 and 89) of the engine control unit and wiring harness.
7. Install the rubber boot on the connector.

Throttle Sensor Setting

Inspection

1. Disconnect the connector from the throttle sensor.
2. Connect the **SST** to the throttle sensor or connect an ohmmeter between terminals B and D.

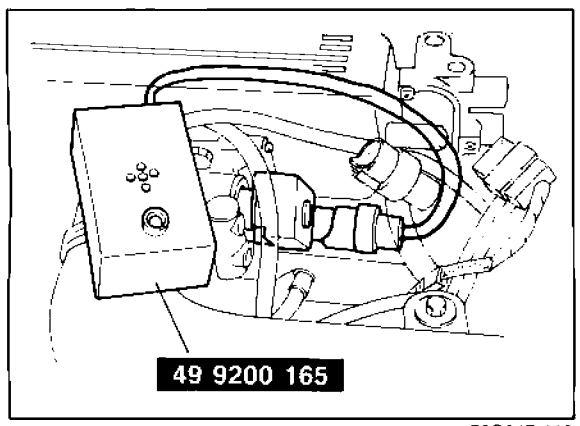


76G04B-117

3. Place a feeler gauge between the lever and the throttle stop screw and check that the **SST** buzzer sounds or that there is continuity between terminals B and D.

Feeler gauge	0 mm (0 in)	0.7 mm (0.028 in)
Buzzer	Sounds	Does not sound
Lamp	ON	OFF
Continuity	YES	NO

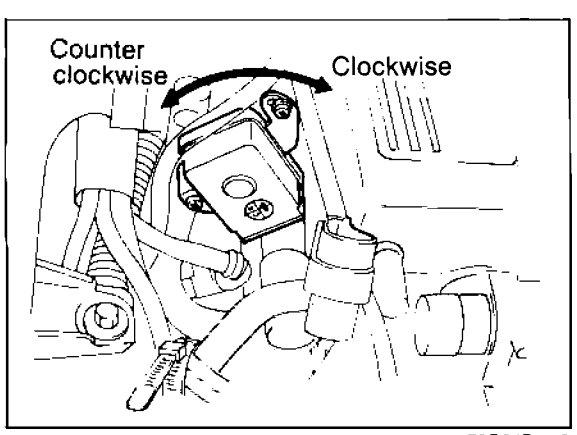
4. If not correct, adjust the throttle sensor as outlined below.



76G04B-118

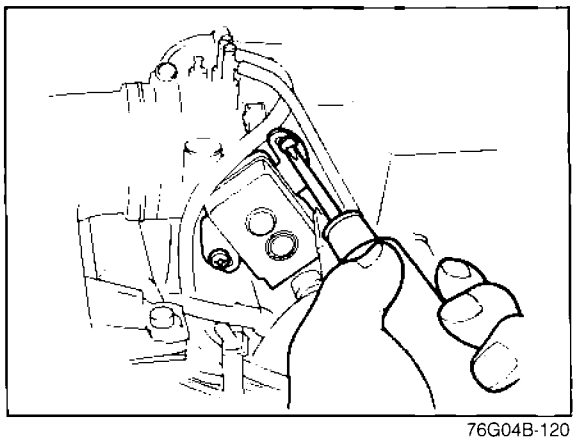
Adjustment

1. Disconnect the connector and connect the **SST** to the throttle sensor.
2. Place a **0.40 mm (0.016 in)** feeler gauge between the lever and the throttle stop screw.



76G04B-119

3. Loosen the two attaching screws.
4. Rotate the throttle sensor clockwise about 30°, then rotate it counterclockwise until the buzzer sounds.
5. If it does not buzz, replace the throttle sensor.
6. If it does buzz, substitute the feeler gauge with a **0.55 mm (0.022 in)** gauge.
7. Check that the buzzer does not sound.
8. If it buzzes, repeat steps 3 to 7.
   If it still buzzes, replace the throttle sensor.

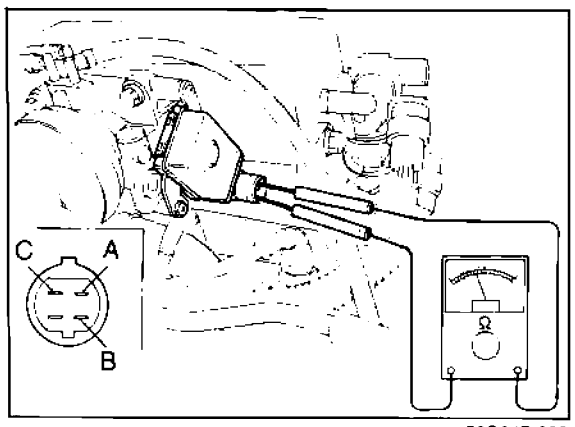


76G04B-120

9. Tighten the two attaching screws.

Note
Be careful not to disturb the throttle sensor position when tightening the screws.

10. Open the throttle valve fully a few times; then recheck the adjustment of the throttle sensor.
11. Disconnect the **SST** from the throttle sensor and reconnect the connector.



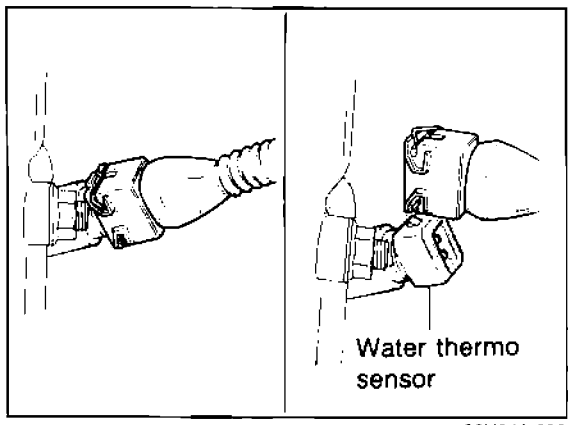
56G04B-038

Inspection of Resistance

1. Disconnect the connector from the sensor.
2. Check resistance between the terminals as shown in the table.
3. Open the throttle valve fully and check resistances between terminals.

Condition / Terminal	Closed	Fully open
A ↔ B	Approx. 500 Ω	Approx. 4.5 kΩ
B ↔ C	4—6 kΩ	

4. If not correct, replace the throttle sensor.

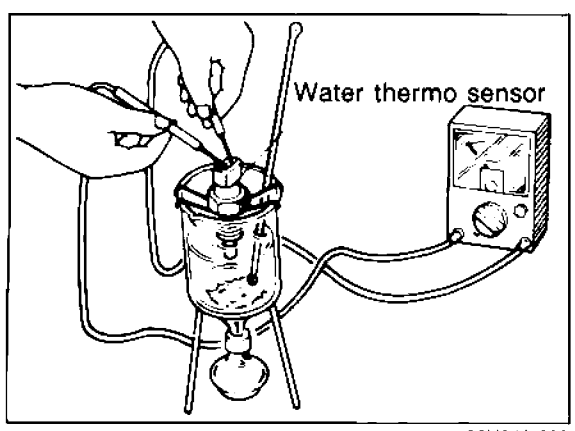


86U04A-202

WATER THERMO SENSOR

Inspection

1. Remove the water thermo sensor from the cylinder head.

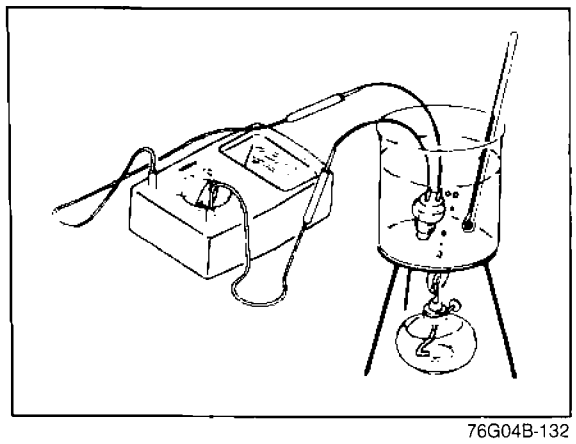


86U04A-203

2. Place the sensor in water with a thermometer and heat the water gradually.
3. Check resistance of the sensor with an ohmmeter.

Coolant	Resistance
–20°C (–4°F)	14.5—17.8 kΩ
20°C (68°F)	2.2—2.7 kΩ
40°C (104°F)	1.0—1.3 kΩ
60°C (140°F)	500—640 Ω
80°C (176°F)	280—350 Ω

4. If not correct, replace the water thermo sensor.


76G04B-132

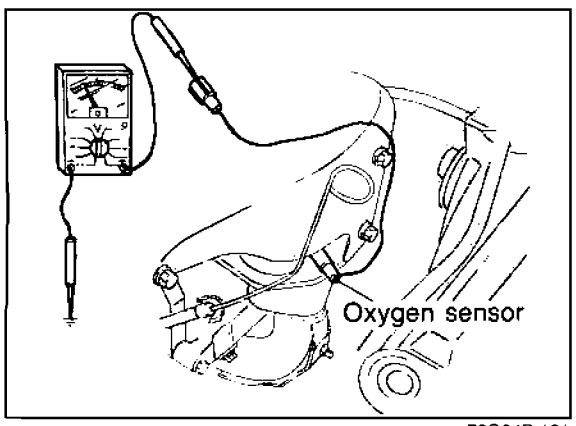
WATER THERMO SWITCH

Inspection

1. Remove the switch from the radiator.
2. Place the switch in water with a thermometer, and heat the water gradually.
3. Check for continuity of the switch with an ohmmeter.

Coolant temp.	Continuity
More than approx. 17°C (63°F)	Yes
Less than approx. 17°C (63°F)	No

4. If not correct, replace the water thermo switch.

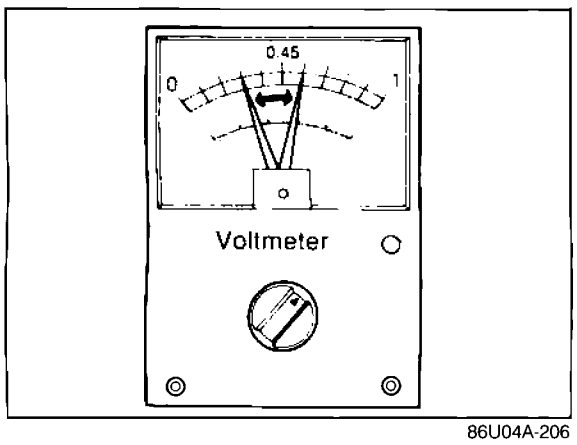


76G04B-121

OXYGEN SENSOR

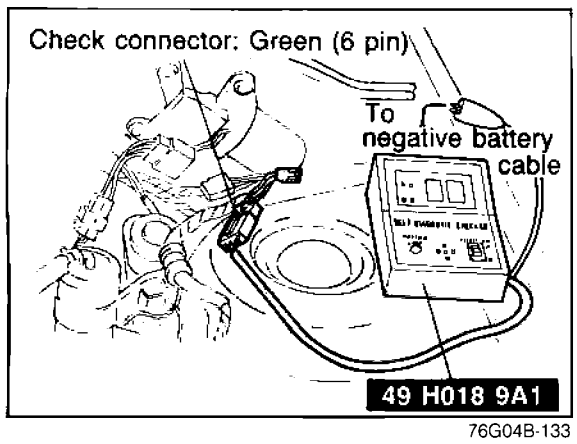
Inspection of Output Voltage

1. Warm up the engine and run it at idle.
2. Disconnect the oxygen sensor connector.
3. Connect a voltmeter between the oxygen sensor and ground.
4. Run the engine at **4,000 rpm** until the voltmeter indicates **approx. 0.55V**.



86U04A-206

5. Increase and decrease the engine speed suddenly several times. Check to see that when the speed is increased the meter reads between **0.5V—1.0V**, and when the speed is decreased it reads between **0V—0.4V**.
6. If the voltmeter doesn't indicate as specified, replace the oxygen sensor.

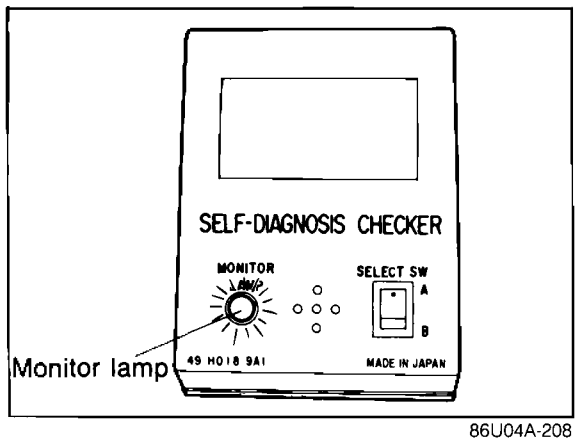


76G04B-133

Inspection of Sensitivity

Caution
Do not ground the test connector (Green, 1-pin).

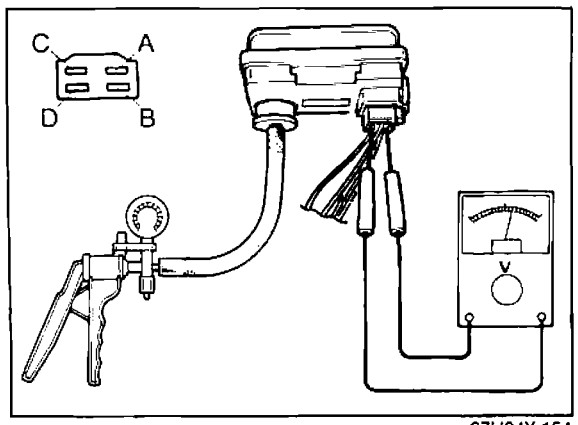
1. Warm up the engine to the normal operating temperature and run it at idle.
2. Connect the **SST** to the check connector.



86U04A-208

3. Increase the engine speed to between **2,000 and 3,000 rpm**, and check that the monitor lamp flashes for 10 seconds.

Monitor lamp: Flashes ON and OFF more than 8 times/10 sec



67U04X-154

ATMOSPHERIC PRESSURE SENSOR
Inspection

1. Connect a voltmeter to the atmospheric pressure sensor (D) terminal.
2. Turn the ignition switch on and take a voltage reading.

   Voltage: 3.5—4.5V at sea level
   2.5—3.5V at high altitude
   [2,000m (6,500 ft)]

3. Replace the sensor if necessary.

FUEL AND EMISSION CONTROL SYSTEMS (FUEL INJECTION FE DOHC)

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76G04C-001

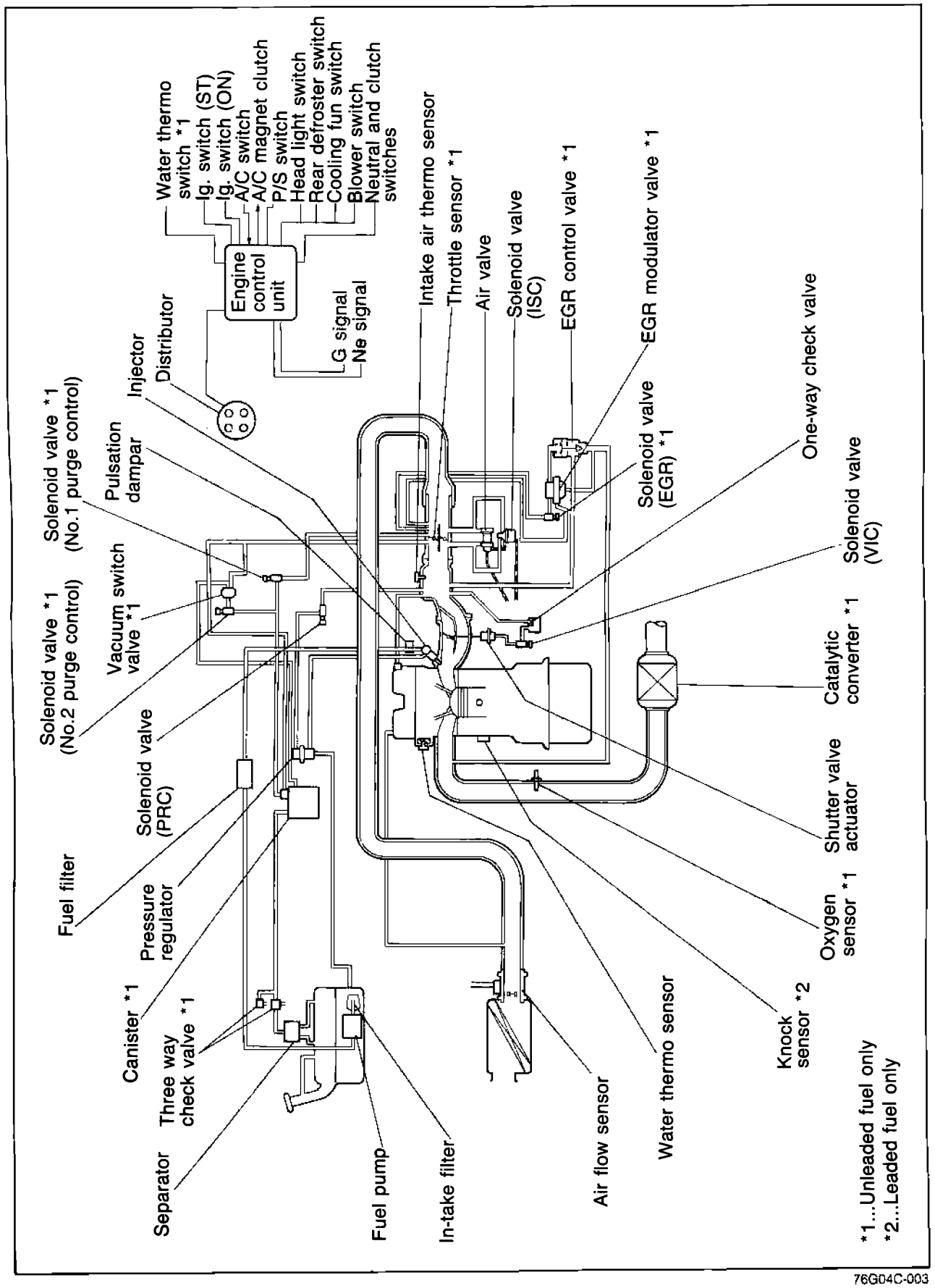
OUTLINE

COMPONENT APPLICATION

Item		Unleaded fuel	Leaded fuel
INTAKE AIR SYSTEM	Air flow sensor (Hot wire type)	○	○
	Dynamic chamber with vacuum chamber	○	○
	Throttle body (Two bore)	○	○
	Throttle sensor	○	X
	Idle switch	○	○
	Resonance chamber	○	○
VARIABLE INERTIA CONTROL SYSTEM		○	○
IDLE SPEED CONTROL SYSTEM		○	○
FUEL SYSTEM	Injector	○	○
	Pressure regulator	○	○
	Pulsation damper	○	○
	Intank filter	○	○
	Transfer pump	○ (4WS)	○ (4WS)
	Transfer pump switch	○ (4WS)	○ (4WS)
	Fuel pump control unit	○ (4WS)	○ (4WS)
PRESSURE REGULATOR CONTROL SYSTEM		○	○
EVAPORATIVE EMISSION CONTROL SYSTEM	Canister	○	X
	Three-way check valve	○	X
	Two-way check valve	X	○
	Separator	○	○
	Solenoid valves	○	X
EGR SYSTEM	EGR control valve	○	X
	EGR modulator valve	○	X
	Solenoid valve	○	X
ELECTRONIC SPARK ADVANCE CONTROL SYSTEM	Igniter	○	○
	Knock control function	X	○
CONTROL SYSTEM	Water thermo sensor	○	○
	Water thermo switch	○	X
	Intake air thermo sensor	○	○
	Oxygen sensor	○	X
	Distributor	○	○
	Ne signal	○	○
	G signal	○	○
	Clutch switch	○	○
	Neutral switch	○	○
	Knock sensor	X	○
FAIL-SAFE CONTROL SYSTEM		○	○
MONITOR FUNCTION		○	○

76G04C-002

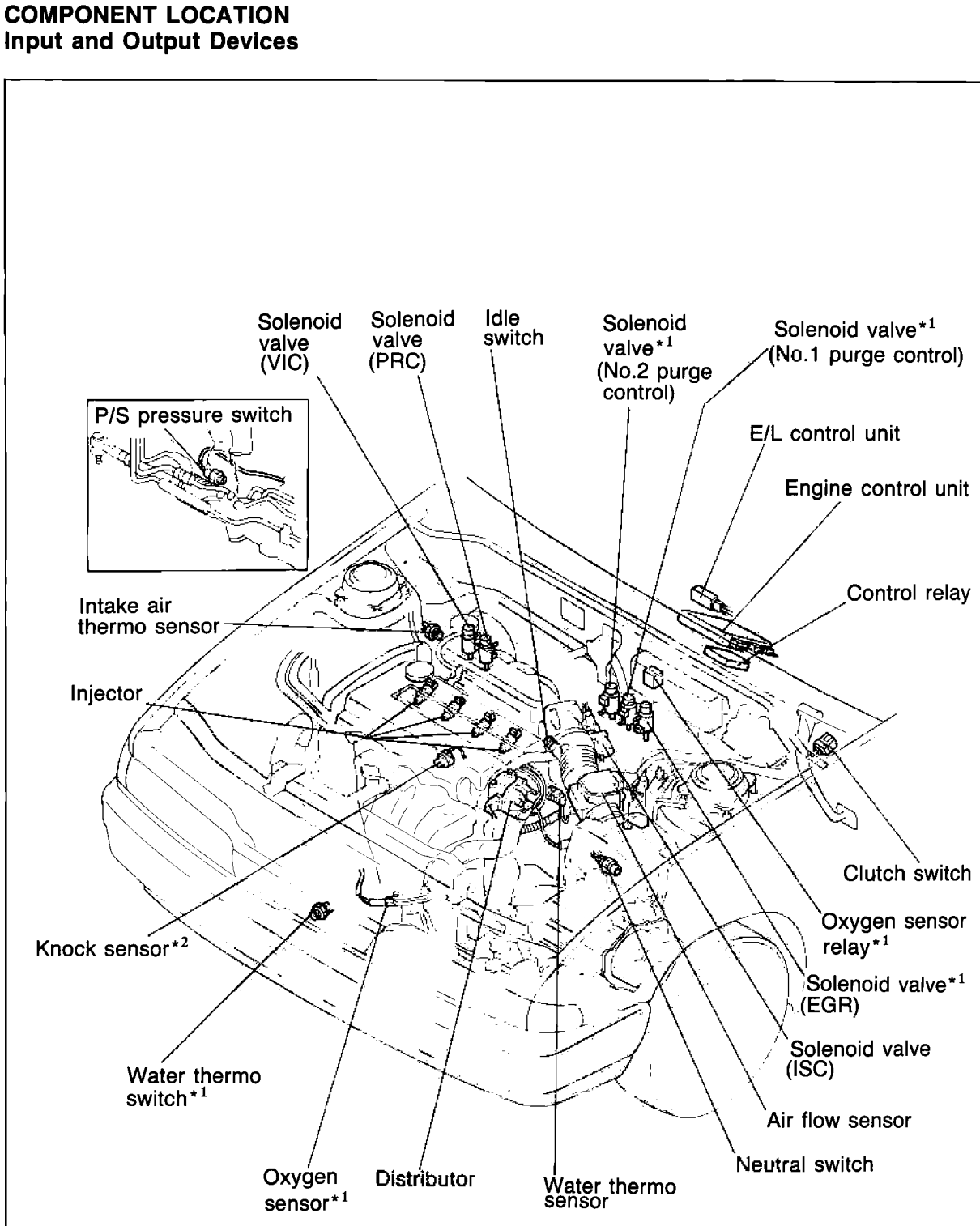
SYSTEM DIAGRAM



76G04C-003

4C OUTLINE

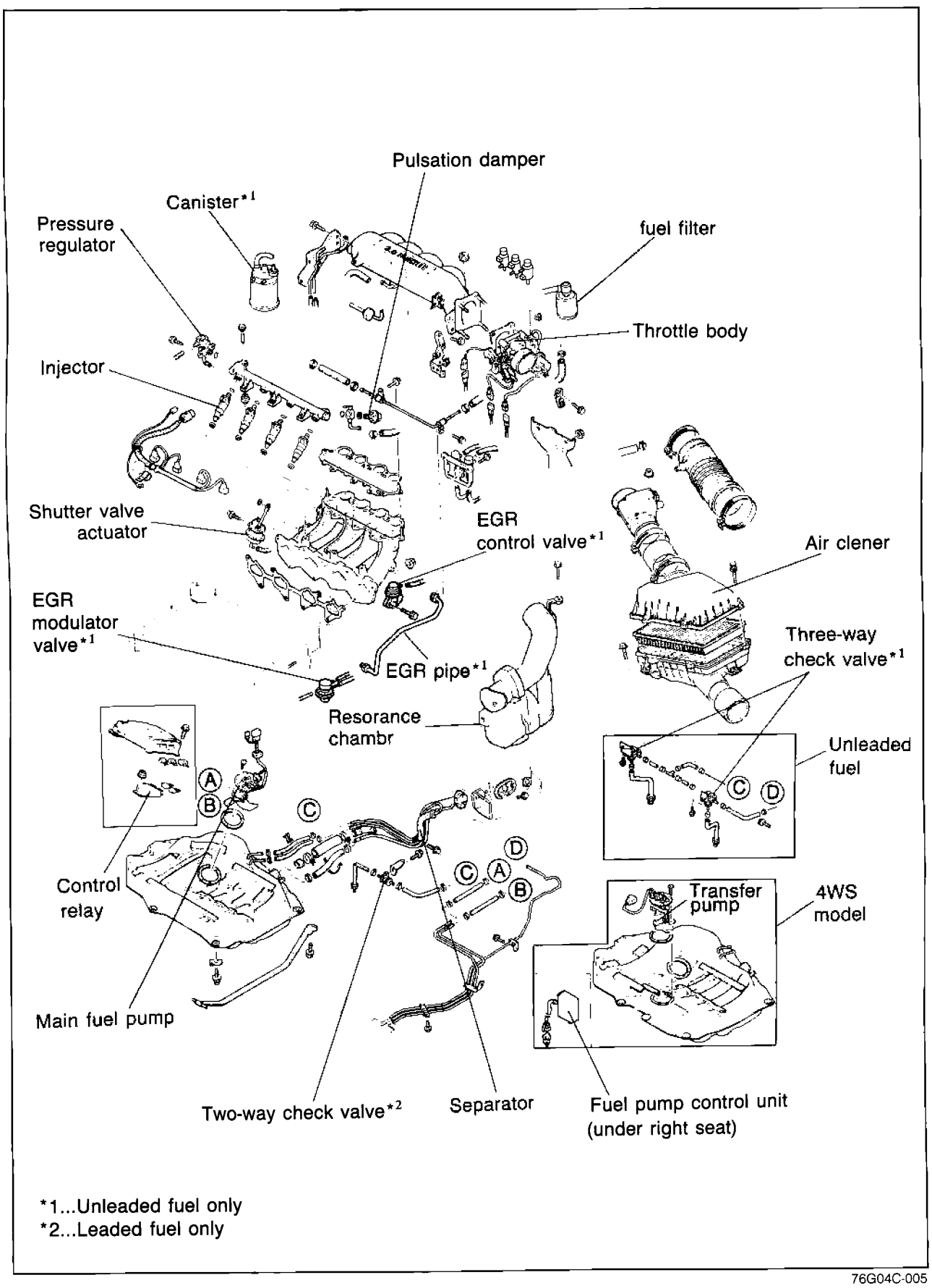
COMPONENT LOCATION
Input and Output Devices



*1...Unleade fuel only
*2...Leaded fuel only

76G04C-004

Fuel System

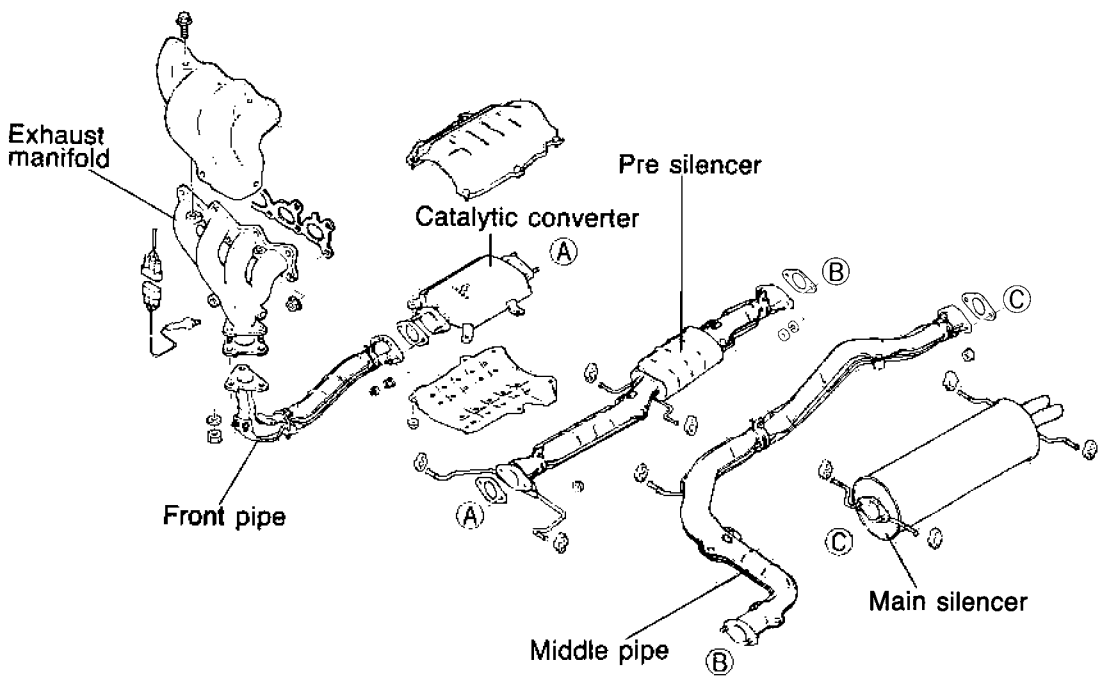


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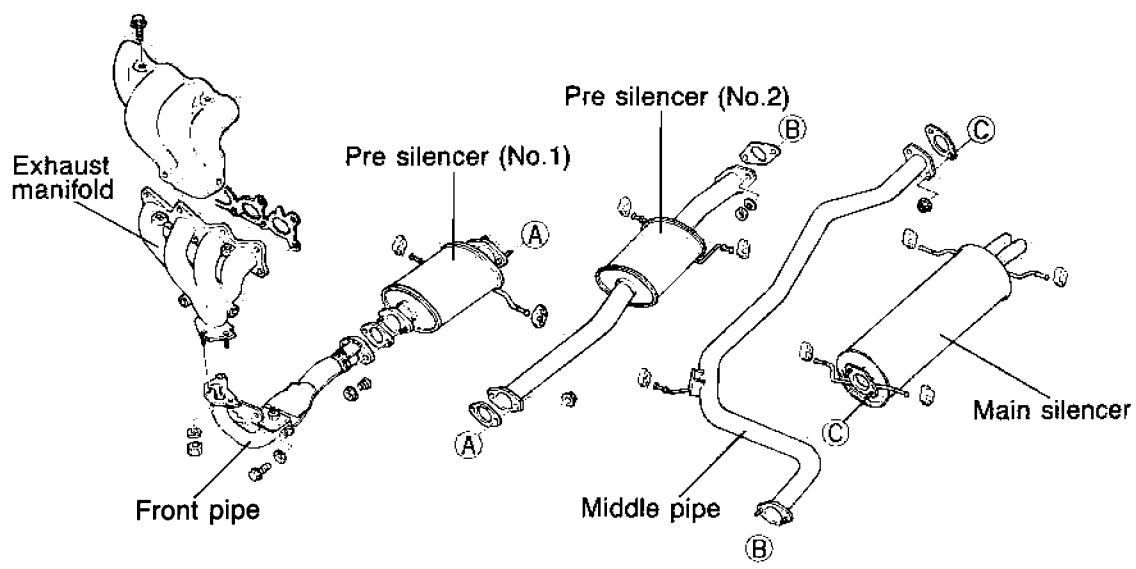
4C OUTLINE

Exhaust System

Unleaded Fuel

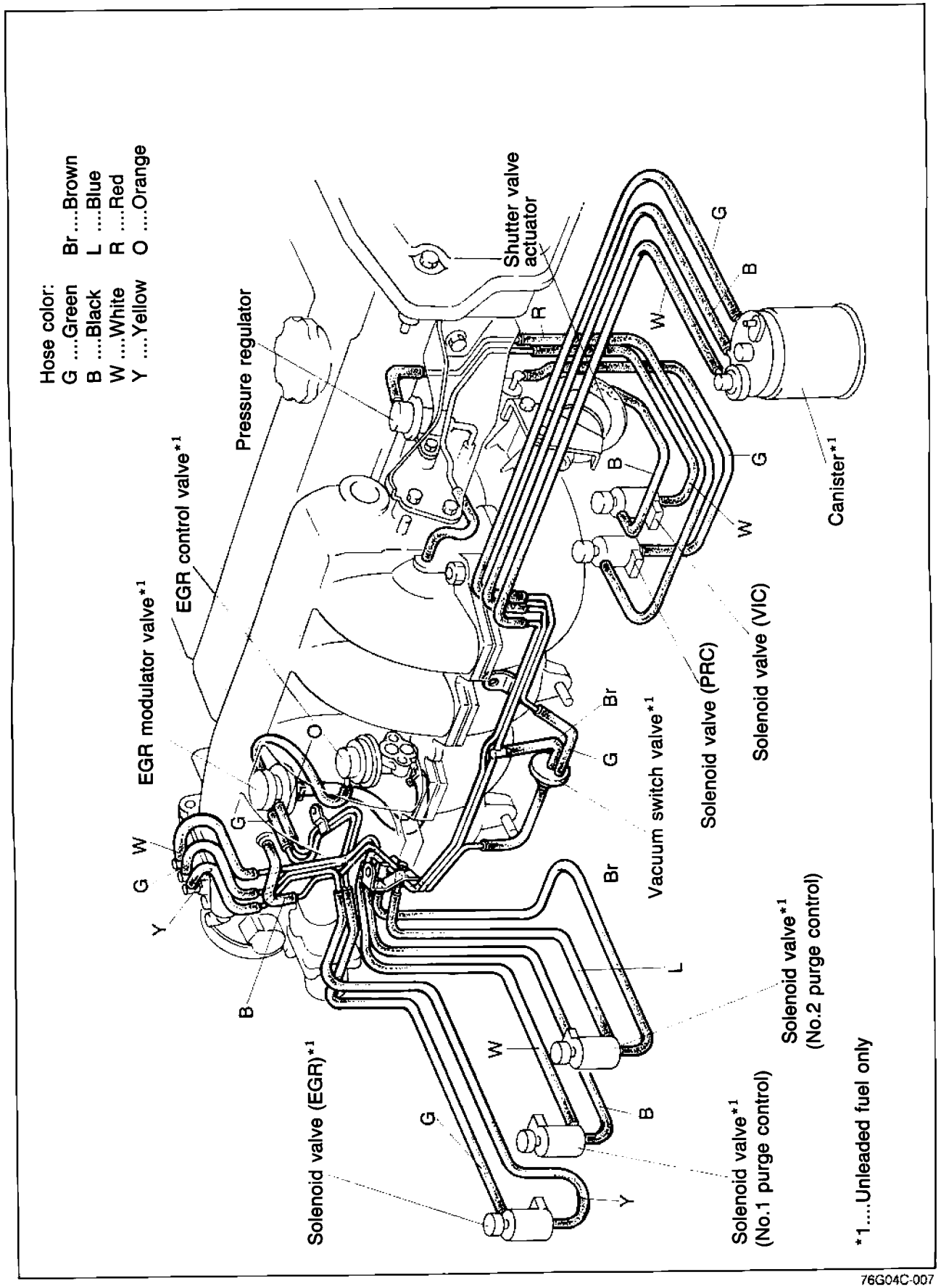


Leaded Fuel



76G04C-006

VACUUM HOSE ROUTING DIAGRAM



76G04C-007

4C OUTLINE

SPECIFICATIONS

Item \ Engine type			Unleaded Fuel	Leaded Fuel
Idle speed		rpm	750 ± 50	
Throttle body				
Type			Horizontal draft (2-barrel)	
Throat diameter	mm (in)	No. 1	46 (1.8)	
		No. 2	40 (1.6)	
Fuel pump				
Type			Impeller (in tank)	
Output pressure		kPa (kg/cm², psi)	Main pump: 441—588 (4.5—6.0, 64—85) Transfer pump: 20—25 (0.20—0.25, 2.8—3.6)	
Feeding capacity		cc (cu in)/10 sec.	Main pump: More than 220 (13.4) Transfer pump: More than 190 (11.6)	
Fuel filter				
Type	Low pressure side		Nylon element	
	High pressure side		Paper element	
Pressure regulator				
Type			Diaphragm	
Regulating pressure		kPa (kg/cm², psi)	235—275 (2.4—2.8, 34—40)	
Injector				
Type			High-ohmic	
Type of drive			Voltage	
Resistance		Ω	12—16	
Injection amount		cc (cu in)/15 sec.	66—91 (4.03—5.55)	
Idle speed control valve				
Solenoid resistance		Ω	6.3—9.9	
Fuel tank				
Capacity		liters (US gal, Imp gal)	60 (15.9, 13.2), 57 (15.0, 12.5): 4-wheel steering vehicle	
Air cleaner				
Element type			Dry	
Fuel				
Specification			Unleaded (95 RON or more)	Leaded or unleaded fuel (95 RON or more)

76G04C-008

TROUBLESHOOTING GUIDE

This troubleshooting guide shows the malfunction numbers and the symptoms of various failures. Perform troubleshooting as described below.

Symptom and No. (Possible cause / Page)			Input sensors and switches									Output solenoid valve						
			Ne signal	G signal	Knock sensor	Air flow sensor	Water thermo sensor	Intake air thermo sensor (Dynamic chamber)	Throttle sensor	Oxygen sensor	Feedback system	Solenoid valve (Pressure regulator control)	Solenoid valve (No. 1 purge control)	Solenoid valve (No. 2 purge control)	Solenoid valve (EGR)	Solenoid valve (Idle speed control)	Oxygen sensor relay	Solenoid valve (Variable inertia charging system)
			4C—16	4C—16	4C—17	4C—17	4C—18	4C—19	4C—19	4C—20	4C—21	4C—21	4C—22	4C—22	4C—23	4C—23	4C—24	4C—24
1	Fault indicated by SST Code No.		02	03	05 *1	08	09	11	12 *2	15 *2	17 *2	25	26 *2	27 *2	28 *2	34	36 *2	41
2	Hard start or won't start (Cranks OK)																	
3	Engine stalls	During warm up																
		After warm up																
4	Rough idle	During warm up																
		After warm up																
5	High idle speed after warm up																	
6	Poor acceleration, hesitation or lack of power																	
7	Runs rough on deceleration																	
8	Afterburn in exhaust system																	
9	Poor fuel consumption																	
10	Engine stalls or runs rough after hot starting																	
11	Knocking																	
12	Fails emission test																	

TROUBLESHOOTING PROCEDURE

Note
Code No. is to quickly determine which system or unit may be at fault by use of the SST. (Self-Diagnosis Checker 49 H018 9A1 or Digital Code Checker 49 G018 9A0 with Adaptor harness 49 9200 180)

1st: Check input sensors and output solenoid valves with the **SST**. (Refer to page 4C—11.)

2nd: Check other switches with the **SST**. (Refer to page 4C—25.)

3rd: Check the following items:

Electrical system
1) Battery condition
2) Fuses

Ignition system
1) Ignition spark
2) Ignition timing (with test connector grounded)

Fuel system
1) Fuel level
2) Fuel leakage
3) Fuel filter
4) Idle speed (with test connector grounded)

Intake air system
1) Air cleaner element
2) Vacuum or air leakage
3) Vacuum hose routing
4) Accelerator cable

Engine
1) Compression
2) Overheating

Others
1) Clutch slippage
2) Brake dragging

4th: Check Fuel and Emission Control Systems. (Refer to page 4C—10.)

76G04C-009

*1.....Leaded fuel
*2.....Unleaded fuel

4C TROUBLESHOOTING GUIDE

The Troubleshooting Guide lists the systems most likely to cause a given symptom. After finding which system(s) to check, refer to the pages shown for detailed guides.

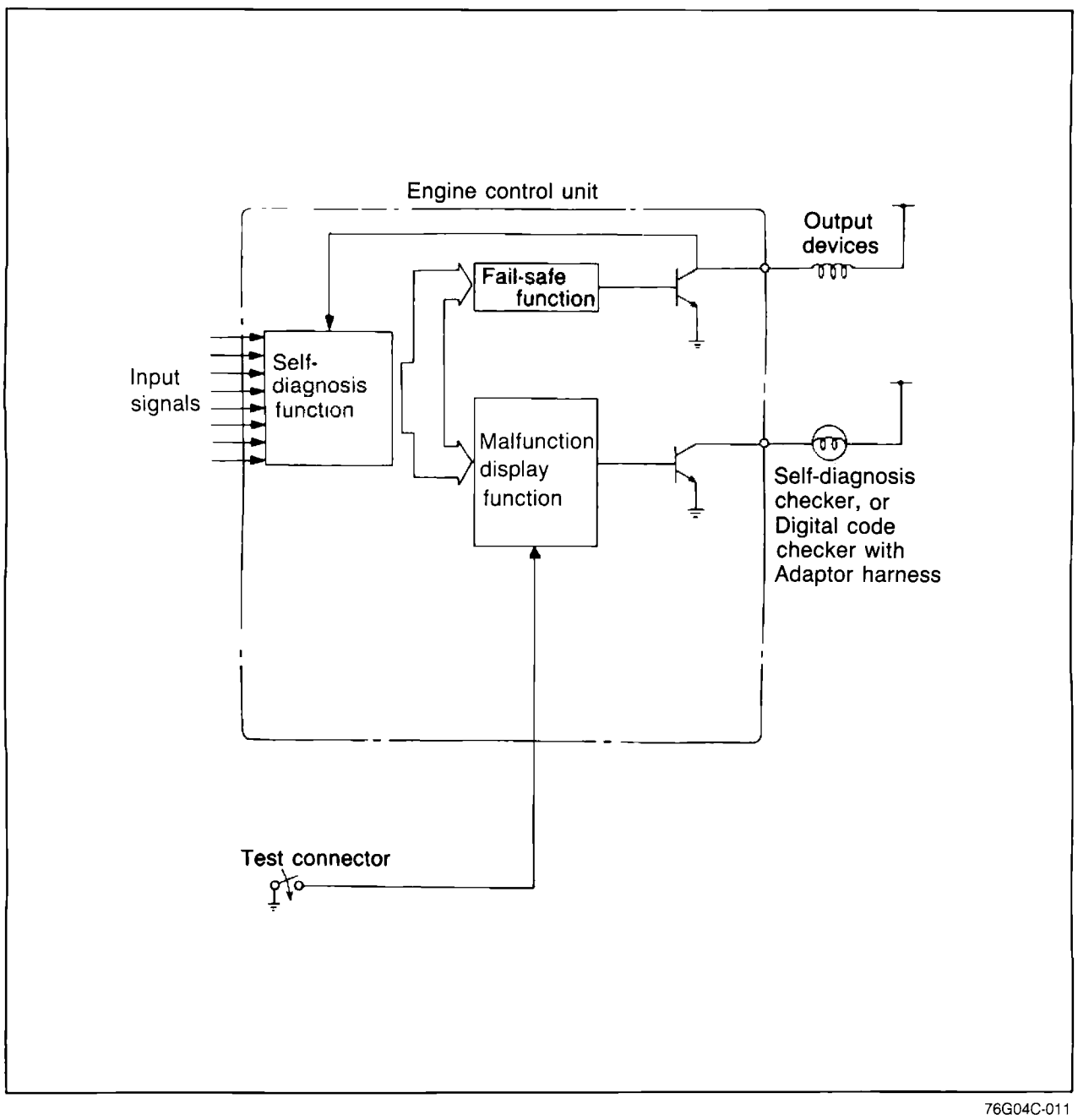
Symptom No.	System	INTAKE AIR SYSTEM	FUEL SYSTEM	PRESSURE REGULATOR CONTROL (PRC) SYSTEM	IDLE SPEED CONTROL (ISC) SYSTEM	ELECTRONIC SPARK ADVANCE (ESA) CONTROL SYSTEM	EXHAUST GAS RECIRCULATION (EGR) SYSTEM	EVAPORATIVE EMISSION CONTROL (EEC) SYSTEM	POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM	DECELERATION CONTROL SYSTEM	EXHAUST SYSTEM	VARIABLE INERTIA CONTROL (VIC) SYSTEM
	Page	4C—31	4C—49	4C—68	4C—44	4C—75	4C—77	4C—80	4C—86	4C—72	4C—87 & 89	4C—39
2		3	2	—	—	1	—	—	—	—	—	—
3		4	3	—	1	—	2	—	—	—	—	—
		5	4	—	2	—	3	—	1	—	—	—
4		5	4	—	1	—	3	—	2	—	—	—
		6	5	—	2	—	3	4	1	—	—	—
5		2	3	—	1	—	—	—	—	—	—	—
6		3	4	—	—	—	1	2	—	—	6	5
7		4	3	—	2	—	—	—	—	1	—	—
8		3	4	—	1	—	—	—	—	2	—	—
9		—	2	—	—	—	3	—	—	1	5	4
10		—	2	1	—	—	—	—	—	—	—	—
11		—	—	—	—	1	—	—	—	—	—	—
12		6	7	—	4	—	2	5	—	3	1	—

76G04C-010

The numbers of the list show the priorities of inspections, from the most possible system to that with the lowest possibility.
These were determined on the following basis:

- Ease of inspection
- Most possible system
- Most possible point in system

TROUBLESHOOTING WITH SST

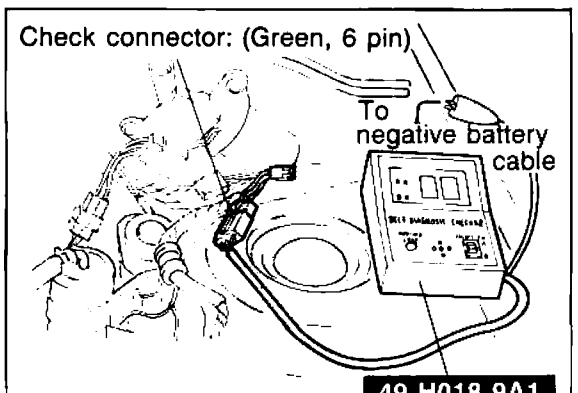


76G04C-011

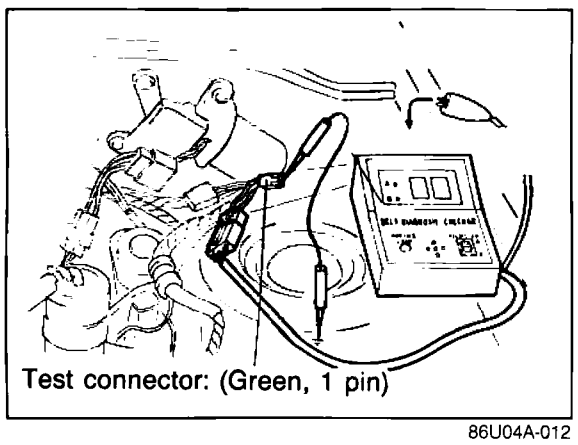
When troubles occur in the main input devices or output devices, check for the cause with the **SST (Self-Diagnosis checker 49 H018 9A1 or Digital code checker 49 G018 9A0 with Adaptor harness 49 9200 180)**.
Failure of individual input and output devices is indicated and retrieved from the control unit as malfunction code numbers.

Note
The control unit constantly checks for malfunction of the input devices. But, the control unit checks for malfunction of output devices only in a 3 second period after the ignition switch is turned ON and the test connector is grounded.

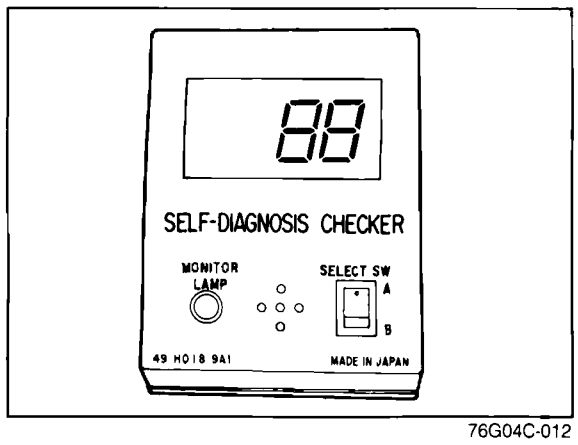
4C TROUBLESHOOTING WITH SST



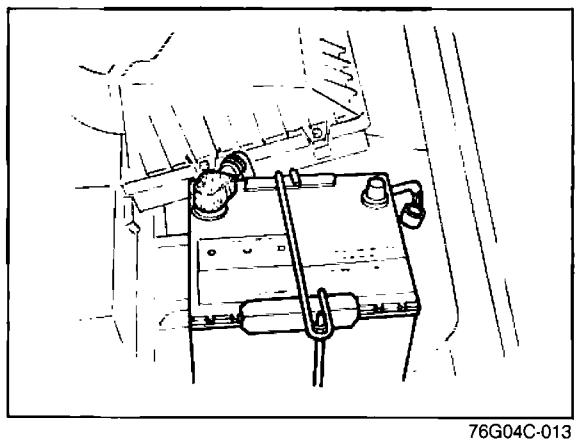
86U04A-011



86U04A-012



76G04C-012



76G04C-013

INSPECTION PROCEDURE

1. Connect the **SST** to the check connector. (Green, 6-pin) and the negative battery terminal.
2. Set the select switch to position A.

Note
The check connector is located at the rear of the left side wheel housing.

3. Ground the test connector (Green, 1-pin) with a jumper wire.

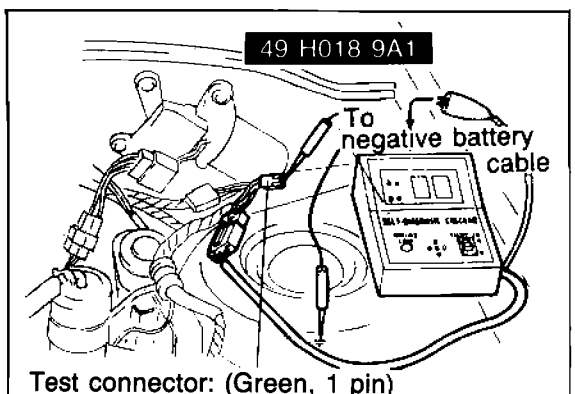
Note
The test connector is located near the Self-Diagnosis Checker check connector.

4. Turn the ignition switch ON.
5. Verify that **88** flashes on the digital display and that the buzzer sounds for **three seconds** after turning the ignition switch ON.
6. If **88** does not flash, check the control relay (refer to page 4C—96), power supply circuit, and check connector wiring.
7. If **88** flashes and the buzzer sounds continuously for more than **20 seconds** check the check connector wiring, then replace the engine control unit and perform steps 3 and 4 again.
8. Note the code numbers and check for the causes by referring to the check sequences shown on pages **4C—16 to 4C—24**. Repair as necessary.

Note
Cancel the code numbers by performing the after-repair procedure after repairing.

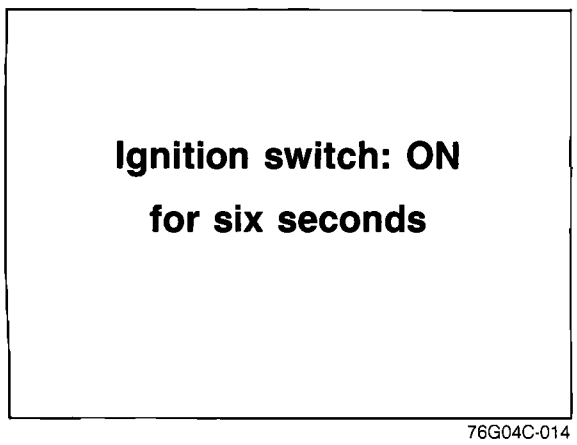
AFTER-REPAIR PROCEDURE

1. Cancel the memory of malfunctions by disconnecting the negative battery cable and depress the brake pedal for at least **five** seconds.



86U04A-015

2. Connect the **SST** to the check connector.
3. Ground the test connector (Green, 1-pin) with a jumper wire.



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4. Turn the ignition switch ON for **six seconds** (do not start the engine).
5. Start and warm up the engine, then run it at **2,000 rpm** for **two** minutes.
6. Verify that no code numbers are displayed.

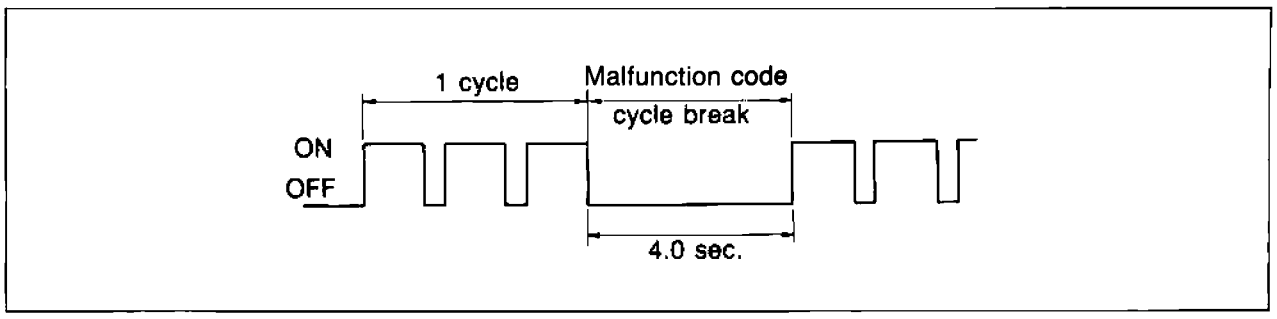
PRINCIPLE OF CODE CYCLE

Malfunction codes are determined as shown below

86U04A-017

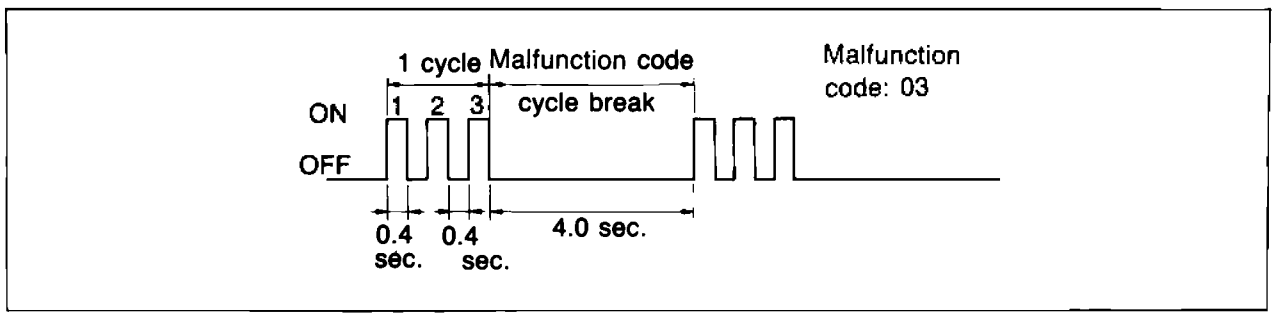
1. Code cycle break

The time between warning code cycles is 4.0 sec (the time the light is off).



86U04A-018

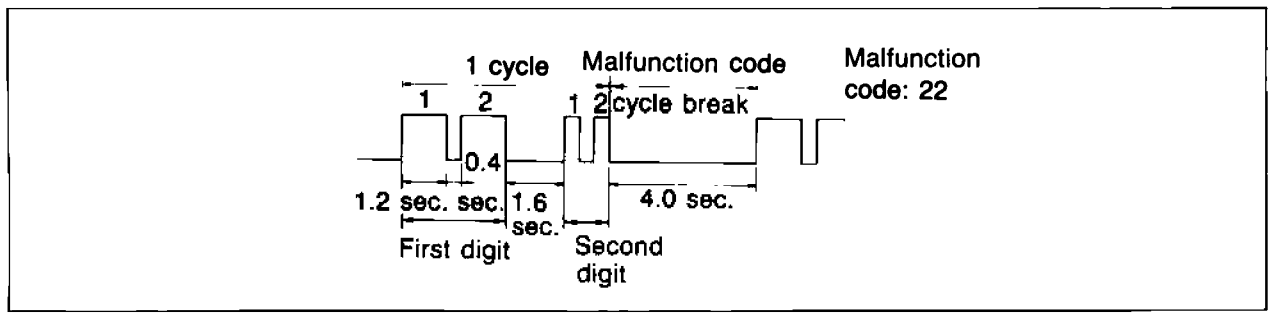
2. Second digit of malfunction code (ones position)
The digit in the ones position of the malfunction code represents the number of times the buzzer is on 0.4 sec during one cycle.



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3. First digit of malfunction code (tens position)
The digit in the tens position of the malfunction code represents the number of times the buzzer is on 1.2 sec during one cycle.

It should also be noted that the light goes off for 1.6 sec. between the long and short pulses of the buzzer.

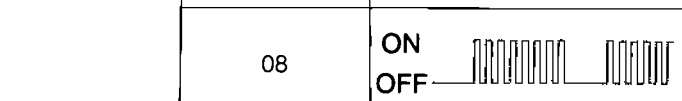
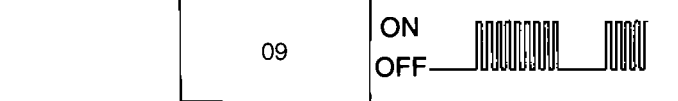
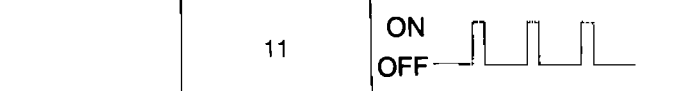
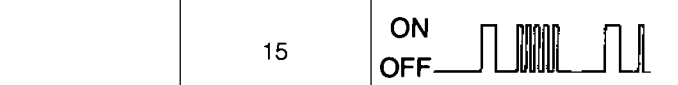
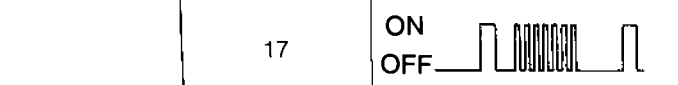
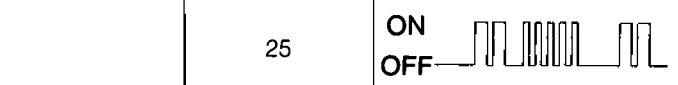
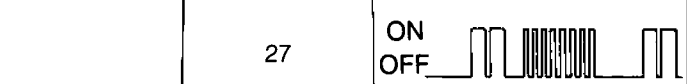
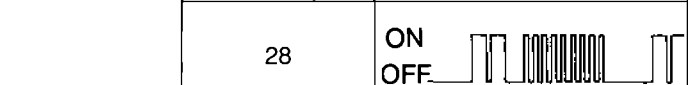
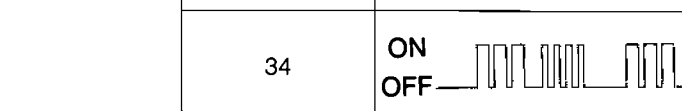
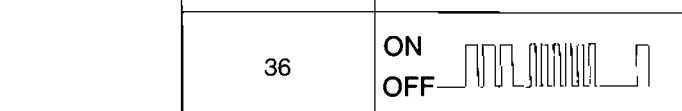
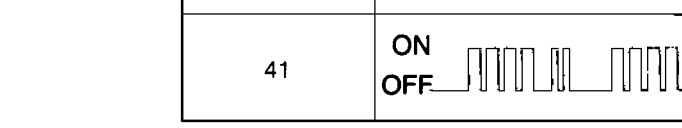


76G04C-016

CODE NUMBER

Malfunction display		Sensor or subsystem	Self-diagnosis	Fail-safe
Malfunction code no.	**Malfunction code output signal pattern**			
02	ON / OFF	Ne signal	No Ne signal from crank angle sensor during craking	—
03	ON / OFF	G signal	No G signal	Cancels sequencial injection
05	ON / OFF	Knock sensor (only leaded fuel)	Open or short circuit	• Retards ignition timing 4°

76G04C-017

Malfunction display		Sensor or subsystem	Self-diagnosis	Fail-safe
Malfunction code no.	Malfunction code output signal pattern			
08		Air flow sensor	Open or short circuit	Maintains basic signal at preset value
09		Water thermo sensor	Open or short circuit	Maintains constant 35°C (95°F) command
11		Intake air thermo sensor (dynamic chamber)	Short circuit	Maintains constant 20°C (68°F) command
12		Throttle sensor	Open or short circuit	Maintains constant command of throttle valve fully open
15		Oxygen sensor	Sensor output continues less than 0.55V 120 sec. after engine starts (1,500 rpm or over)	Cancels EGI feedback operation
17		Feedback system	Sensor output not changed 20 sec. after engine starts (1,500 rpm or over)	Cancels EGI feedback operation
25		Solenoid valve (pressure regulator control)	Open or short circuit	—
26		Solenoid valve (No.1 purge control)		—
27		Solenoid valve (No.2 purge control)		—
28		Solenoid valve (EGR)		—
34		Solenoid valve (Idle speed control)		—
36		Oxygen sensor relay		—
41		Solenoid valve (Variable inertia control)		—

76G04C-018

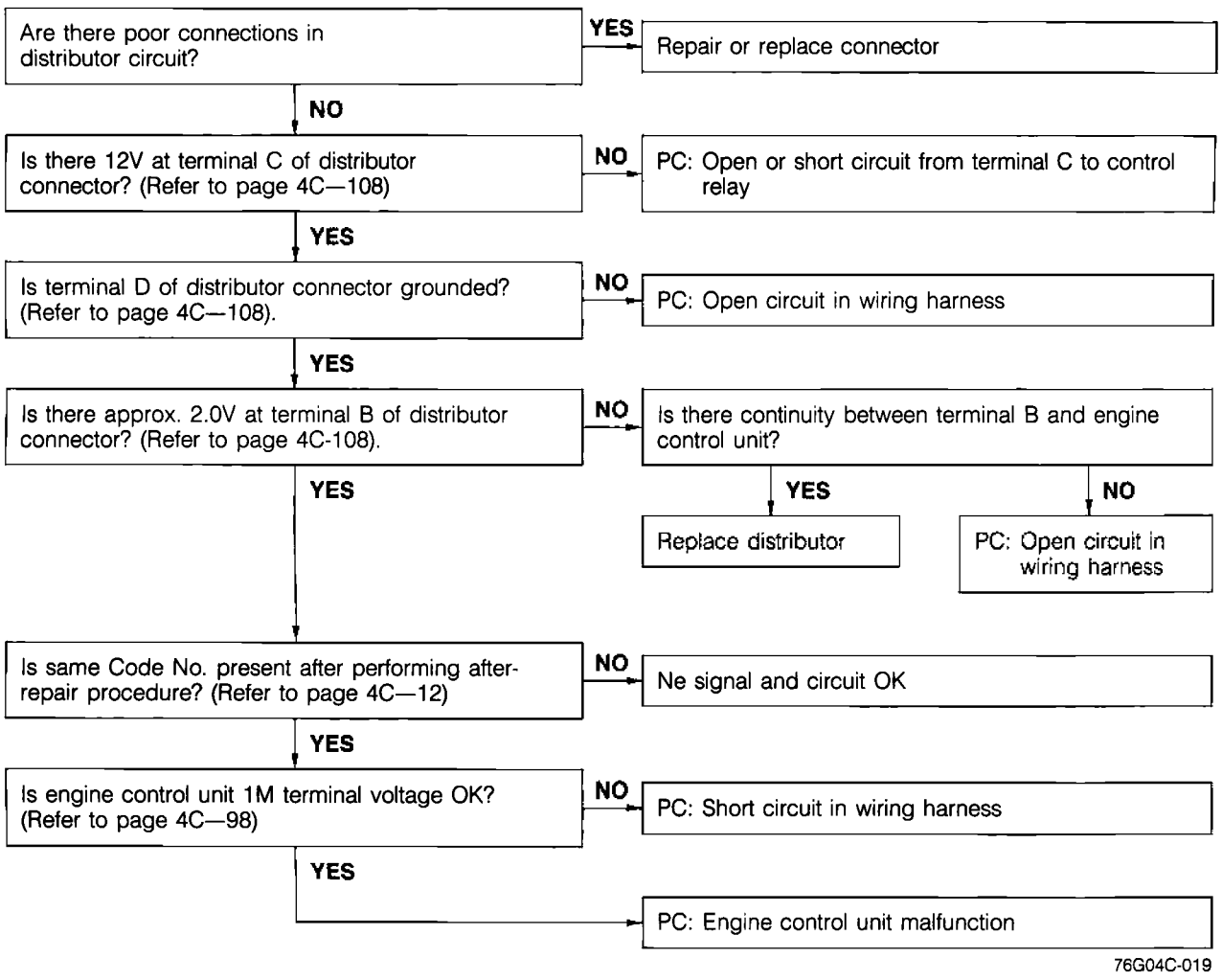
Caution

a) If there is more than one failure present, the lowest number malfunction code is displayed first, the remaining codes are displayed sequentially.

b) After repairing a failure, turn off the ignition switch and disconnect the negative battery cable and depress the brake pedal for at least 5 seconds to erase the memory of a malfunction code.

Code No.2 (Ne signal)

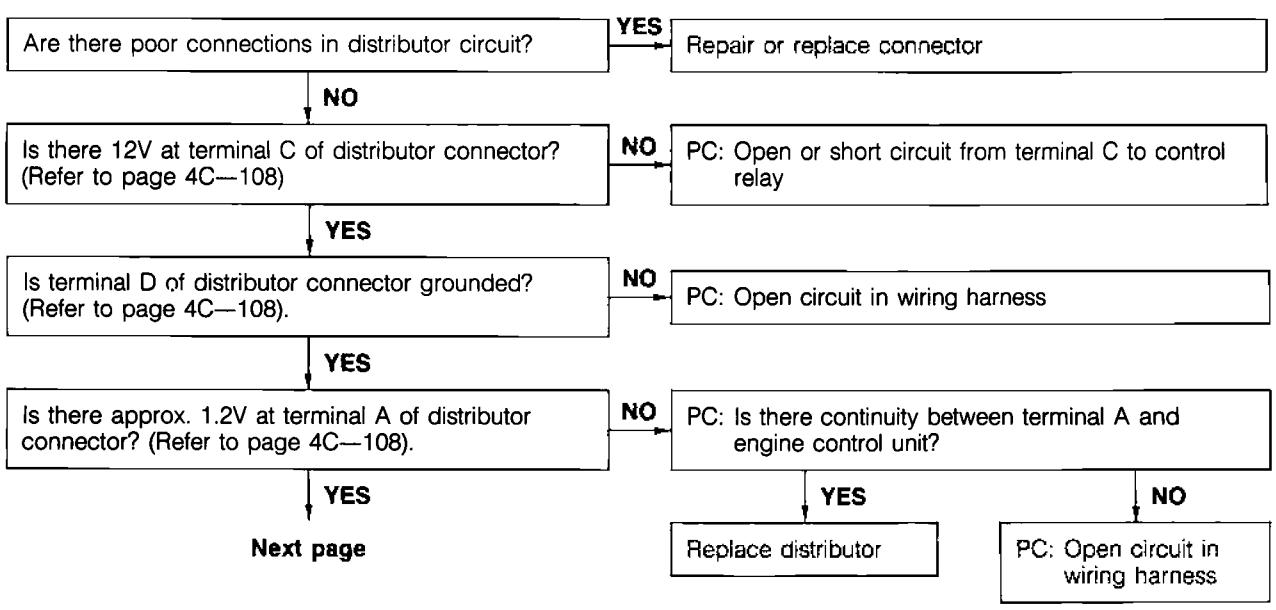
PC: Possible Cause

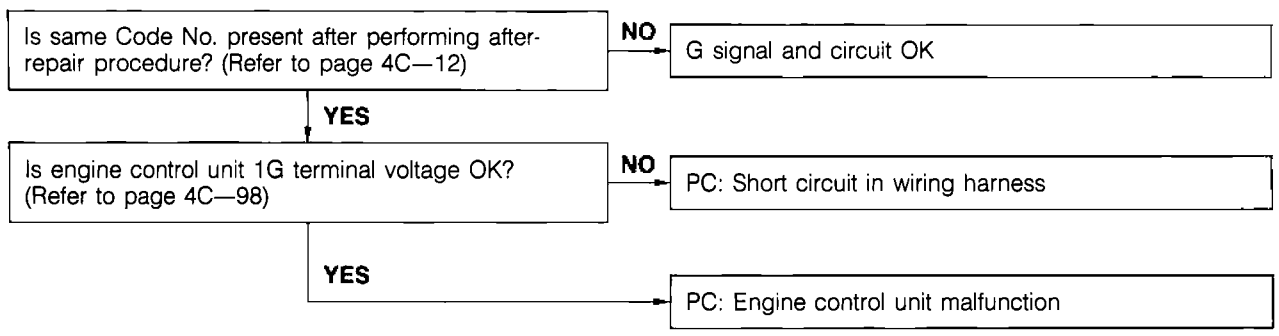


76G04C-019

Code No.3 (G signal)

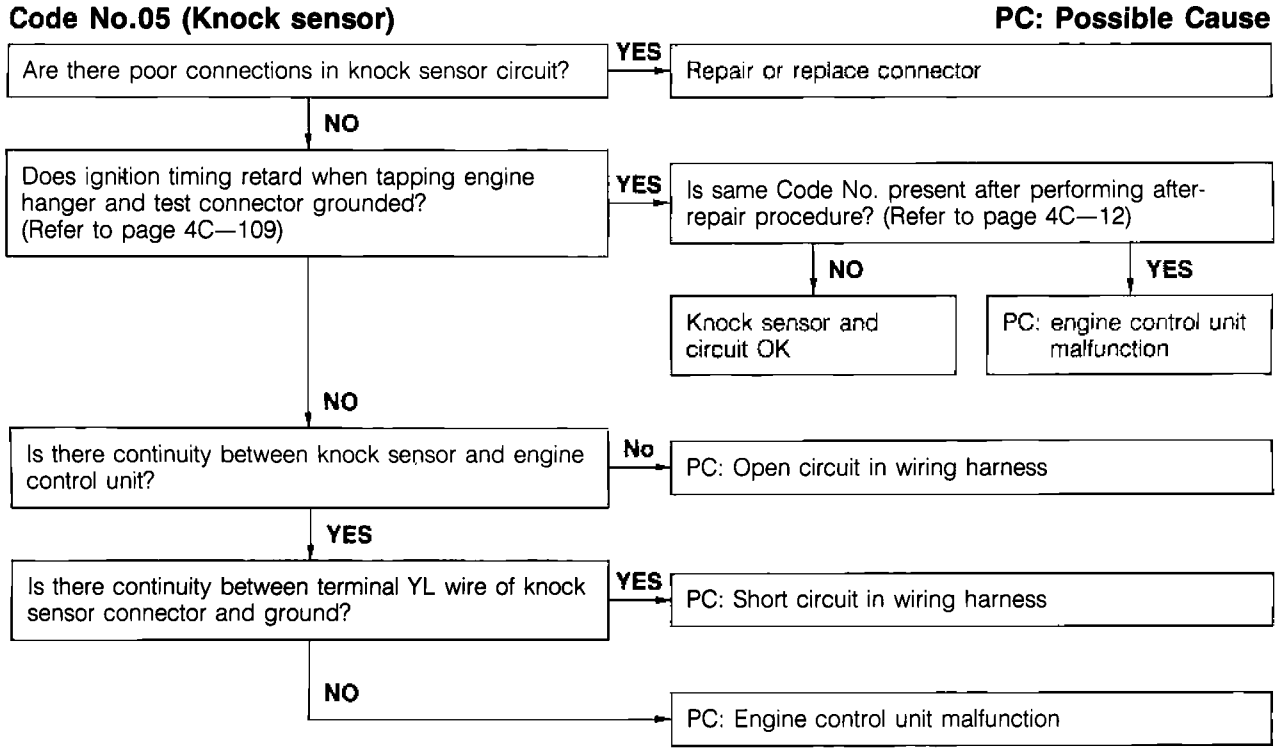
PC: Possible Cause





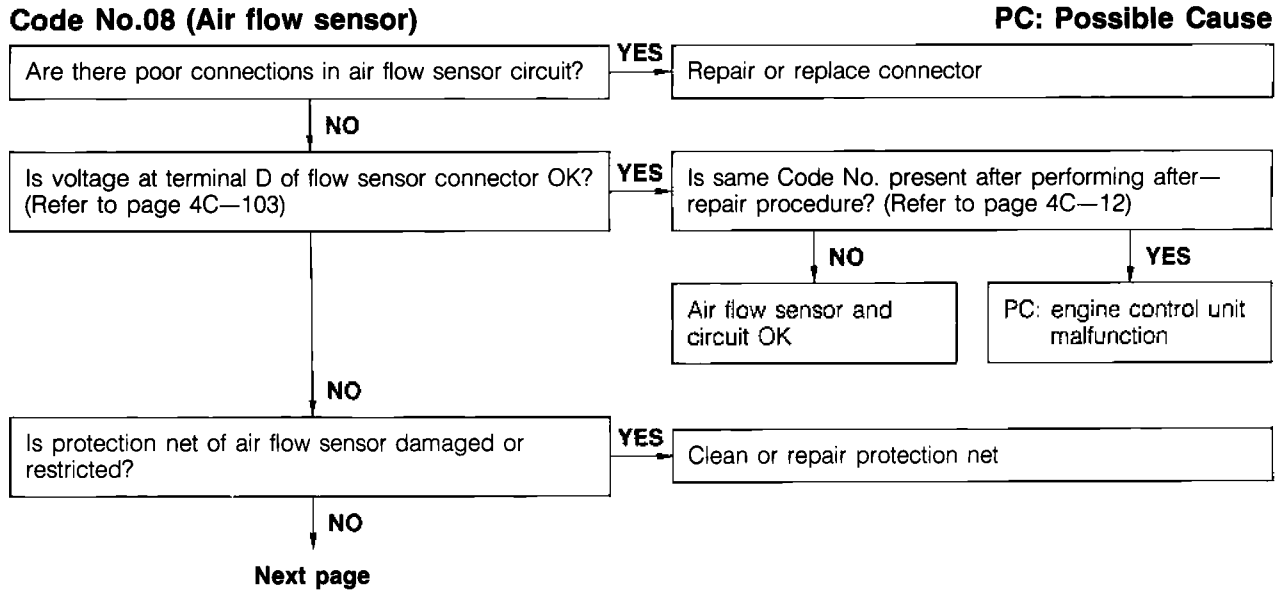
76G04C-020

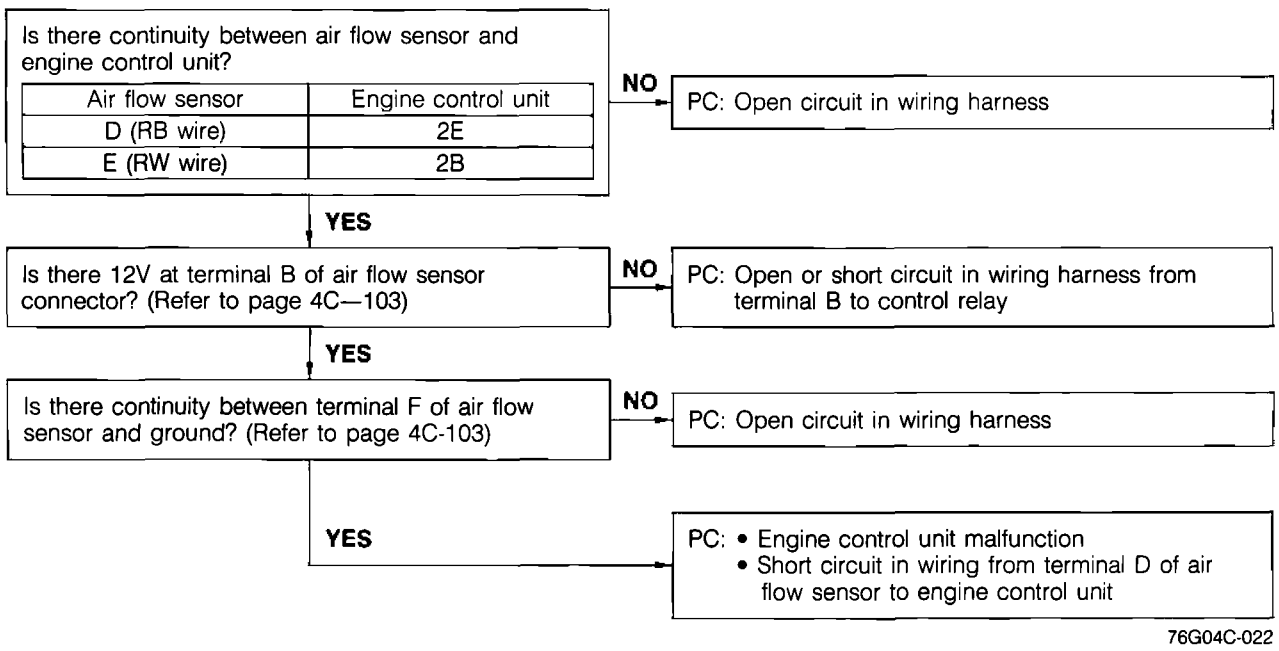
Code No.05 (Knock sensor) **PC: Possible Cause**



76G04C-021

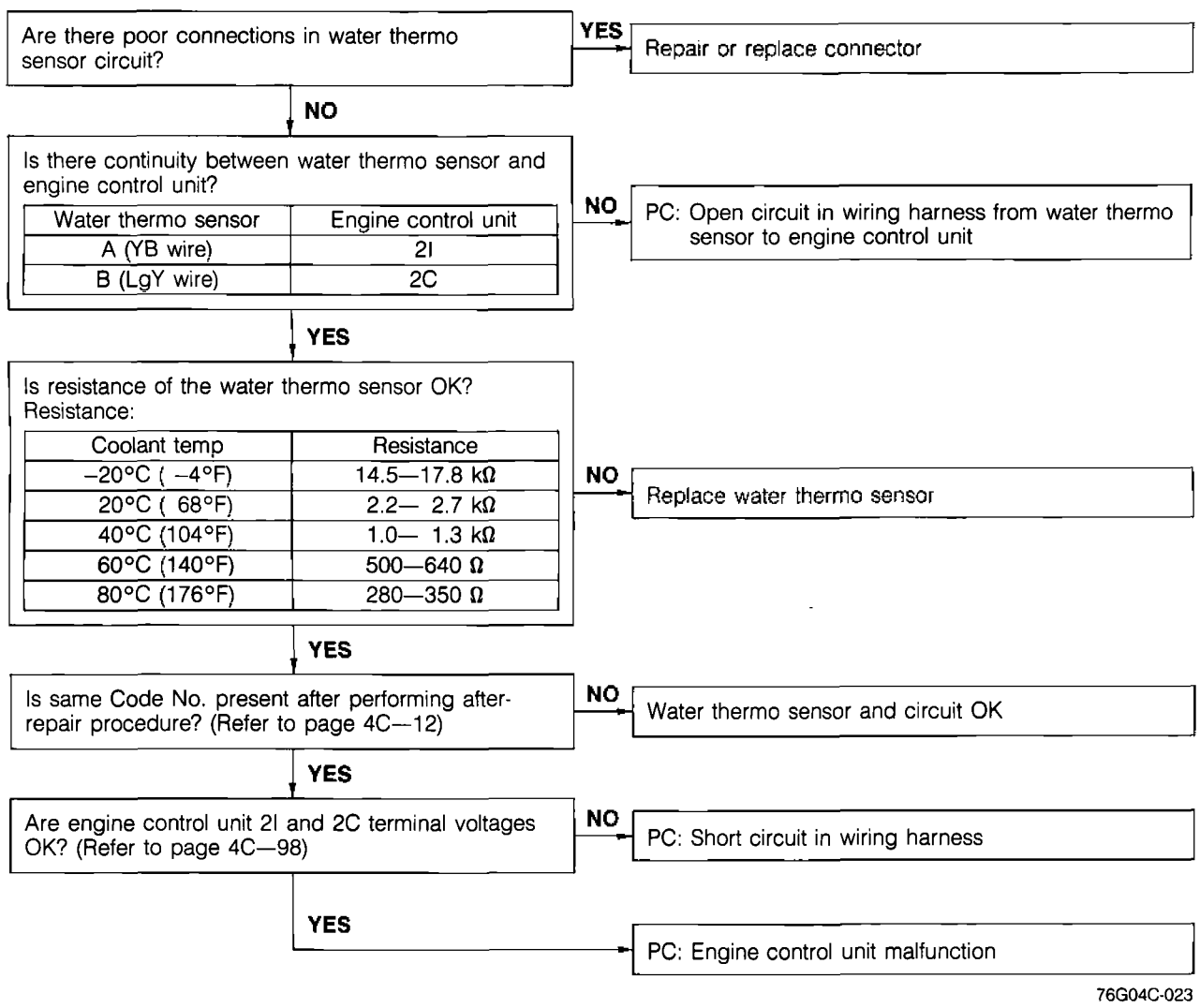
Code No.08 (Air flow sensor) **PC: Possible Cause**





76G04C-022

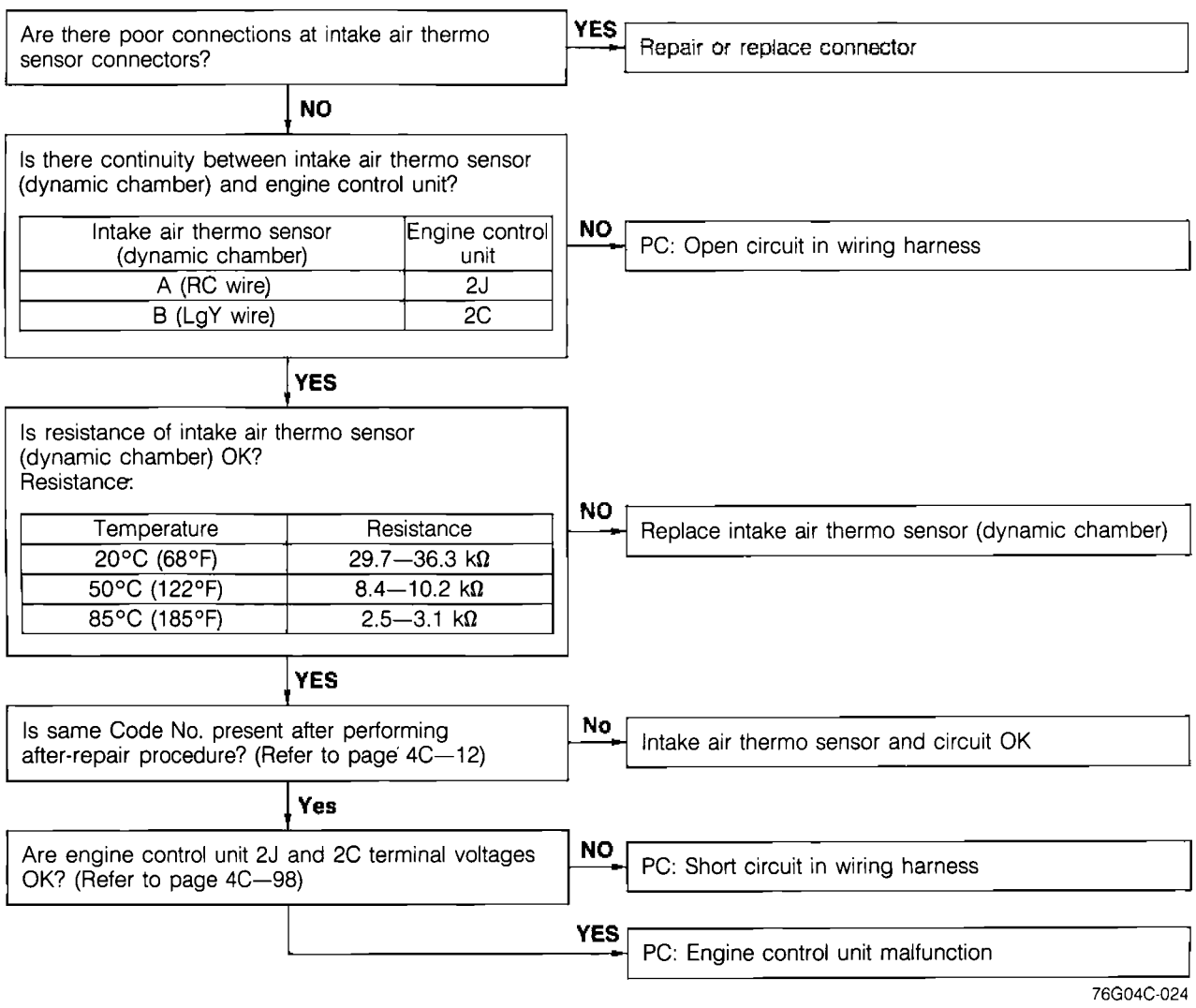
Code No. 09 (Water thermo sensor) **PC: Possible Cause**



76G04C-023

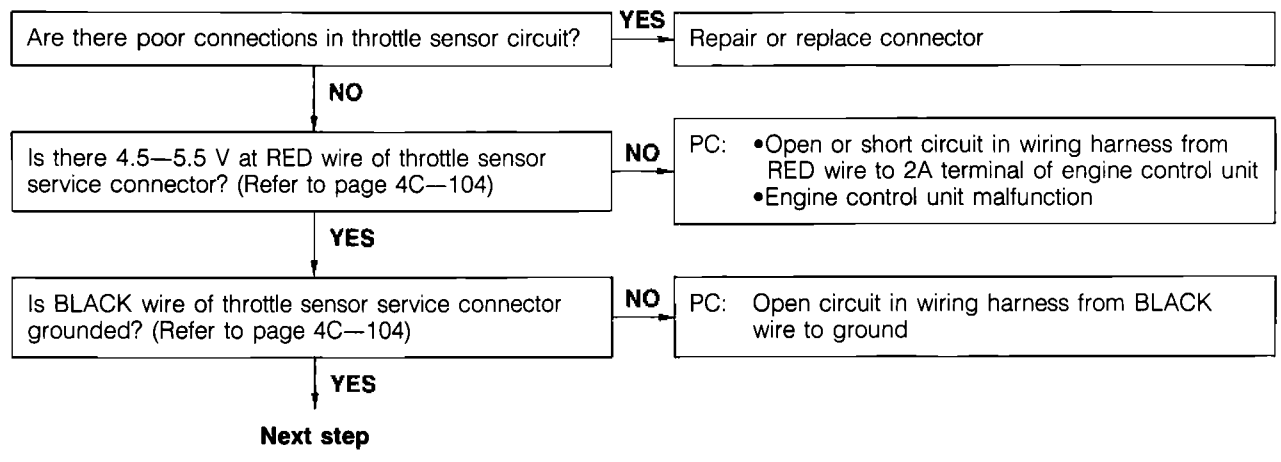
No. 11 Code (Intake air thermo sensor)

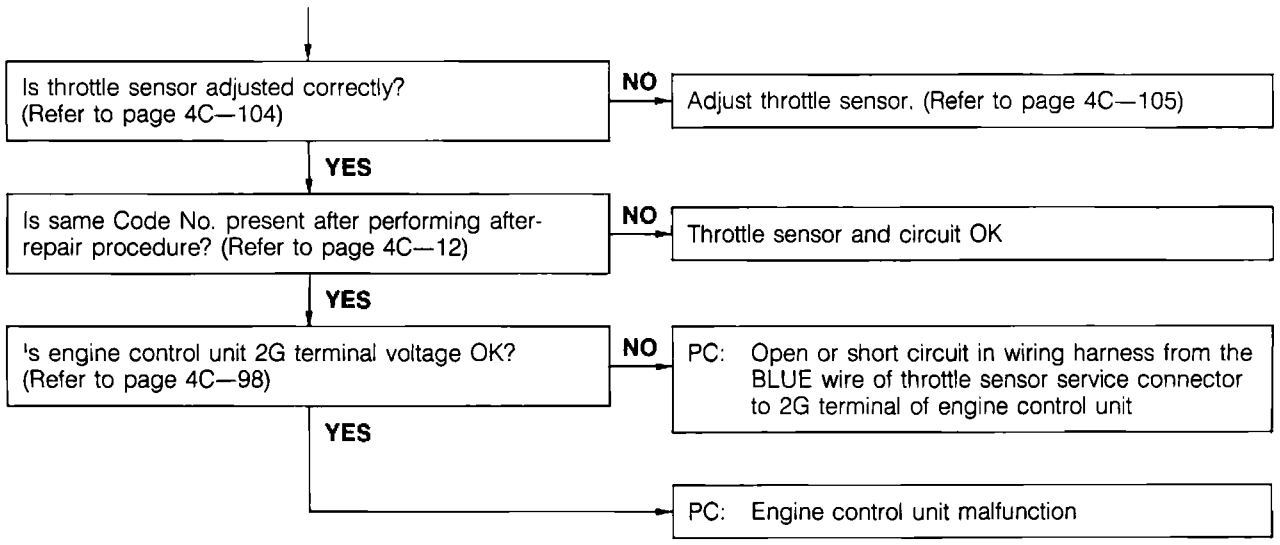
PC: Possible Cause



Code No. 12 (Throttle sensor)

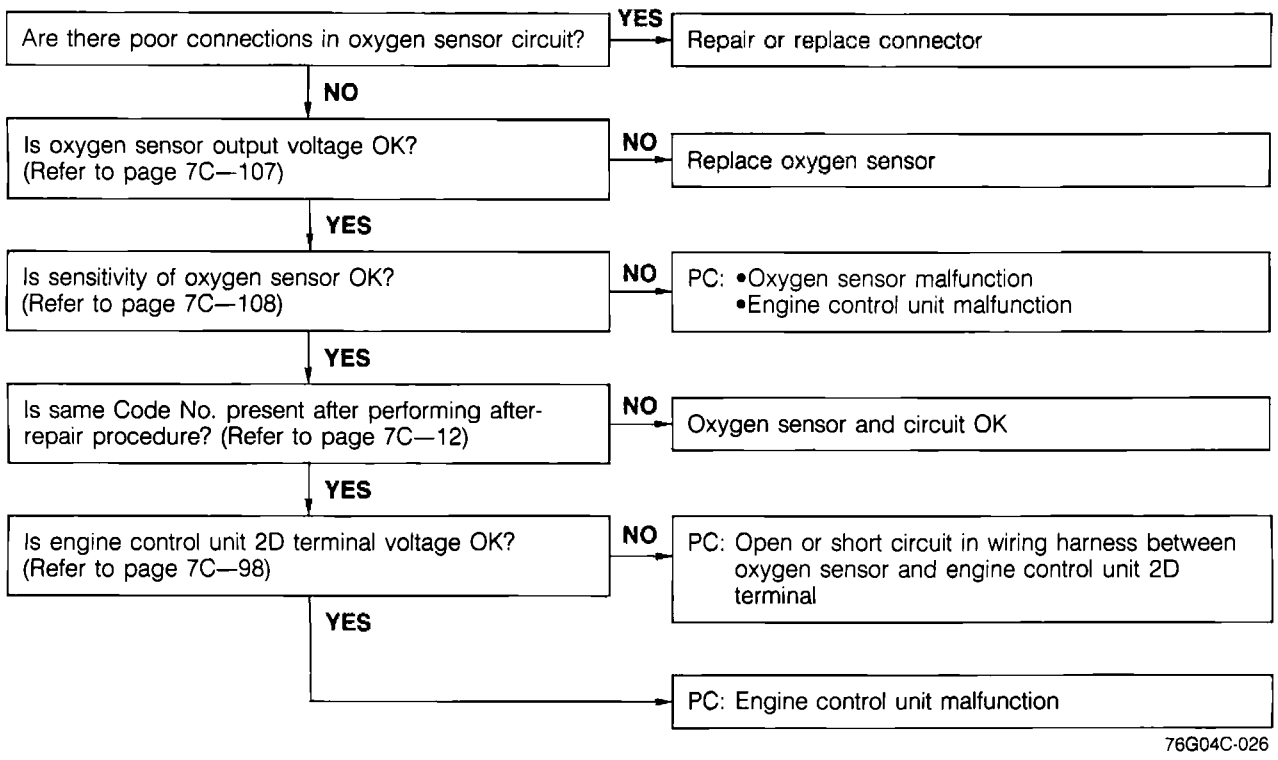
PC: Possible cause





76G04C-025

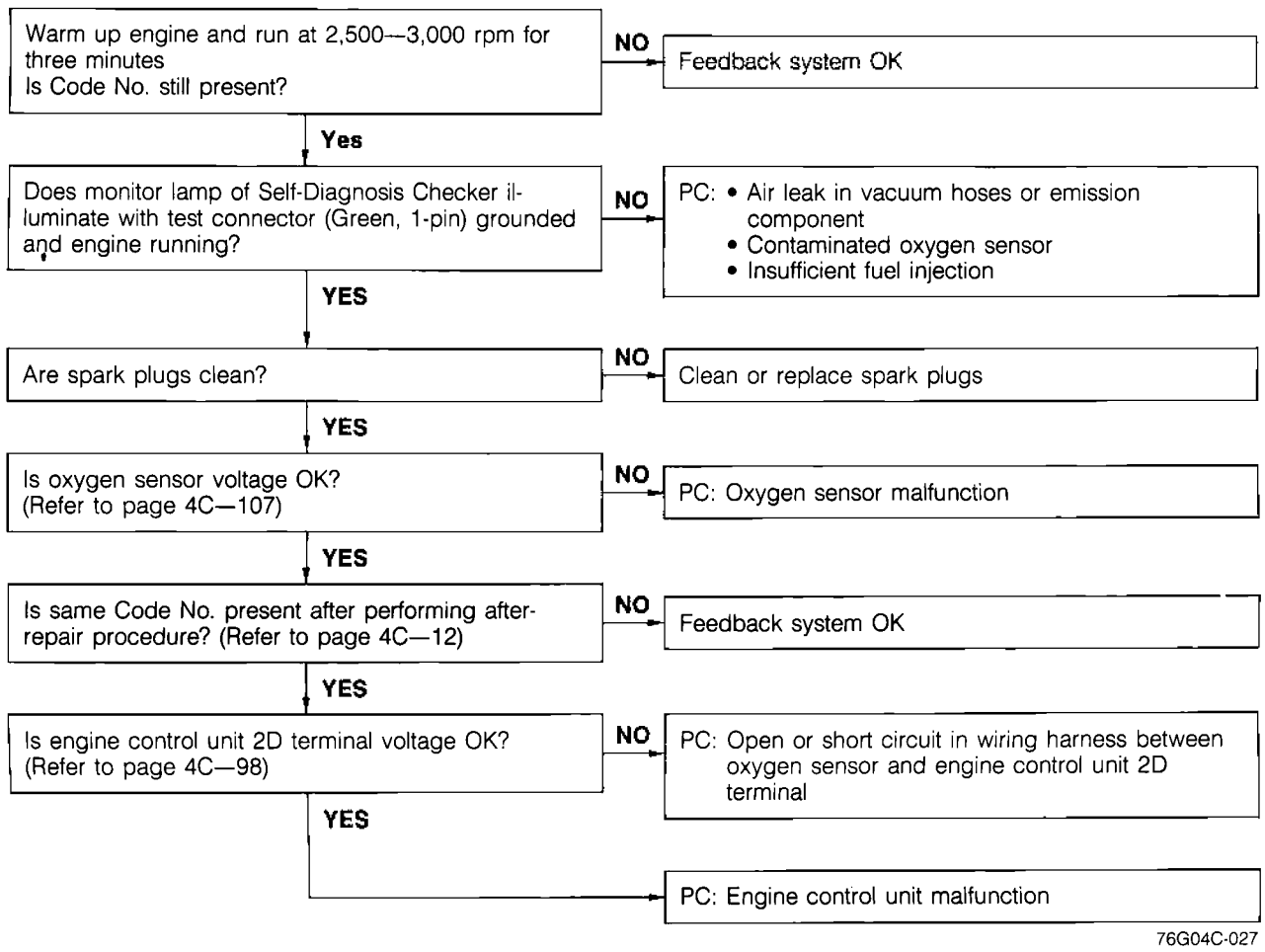
Code No. 15 (Oxygen sensor) **PC: Possible Cause**



76G04C-026

Code No. 17 (Feedback system)

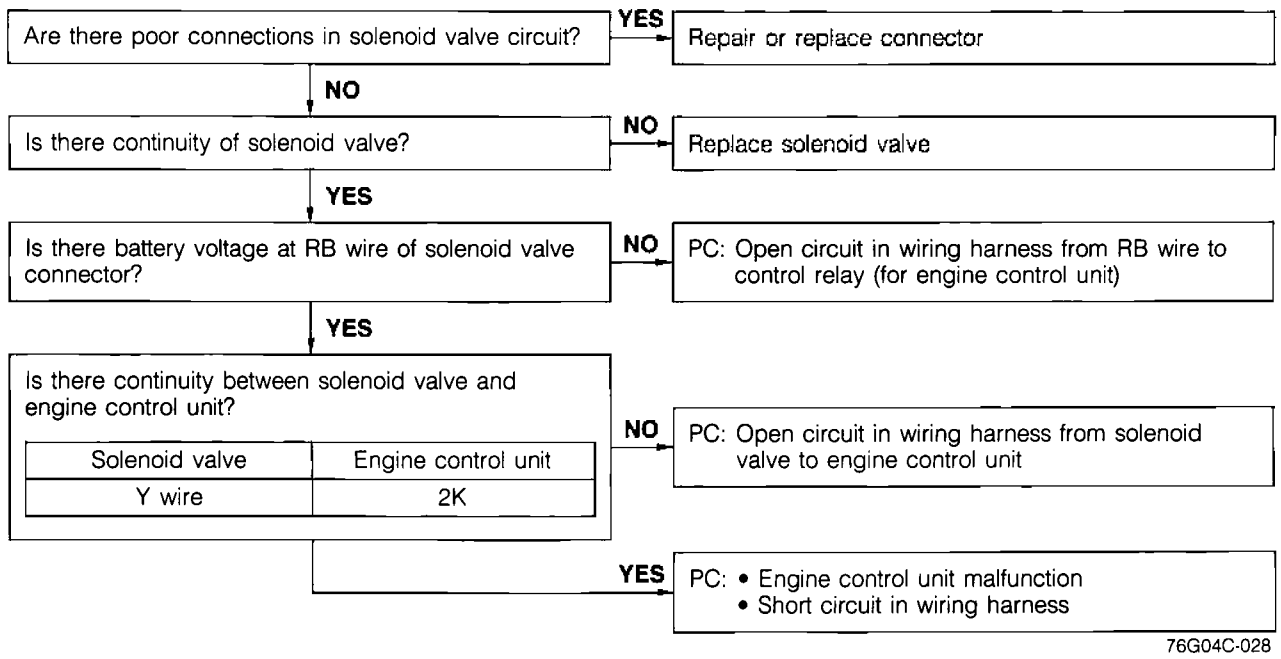
PC: Possible Cause



76G04C-027

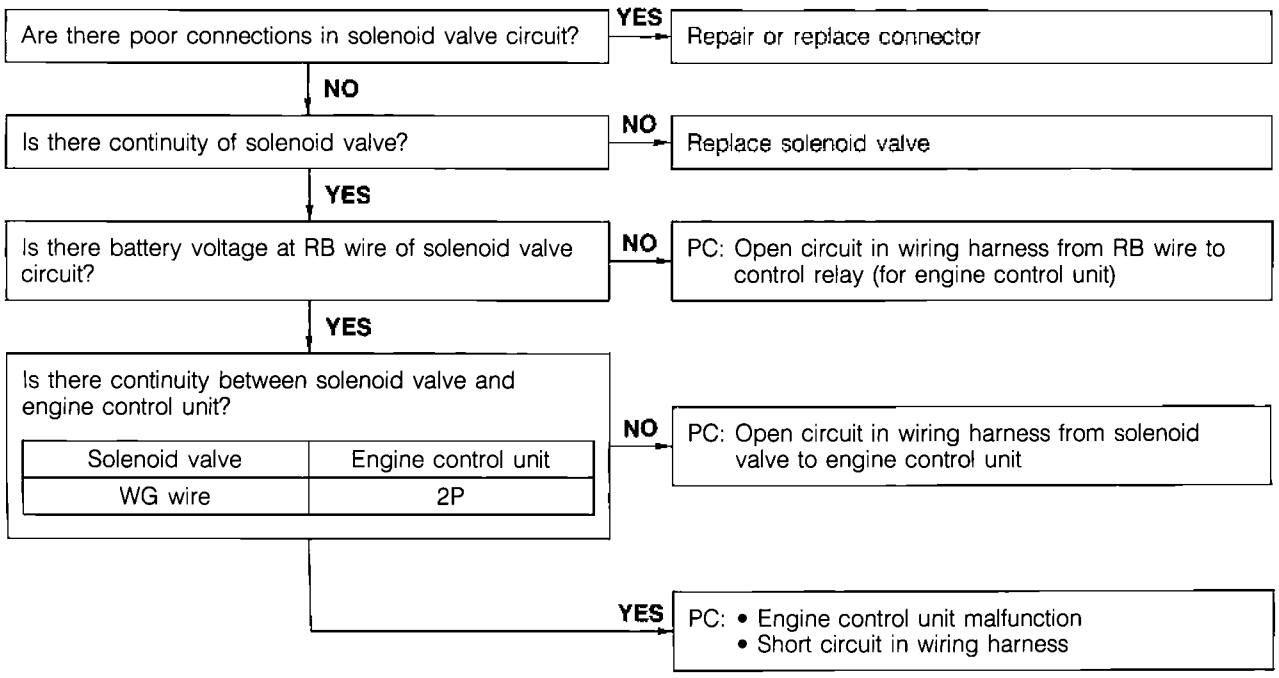
Code No. 25 (Solenoid valve-Pressure regulator control (PRC))

PC: Possible Cause



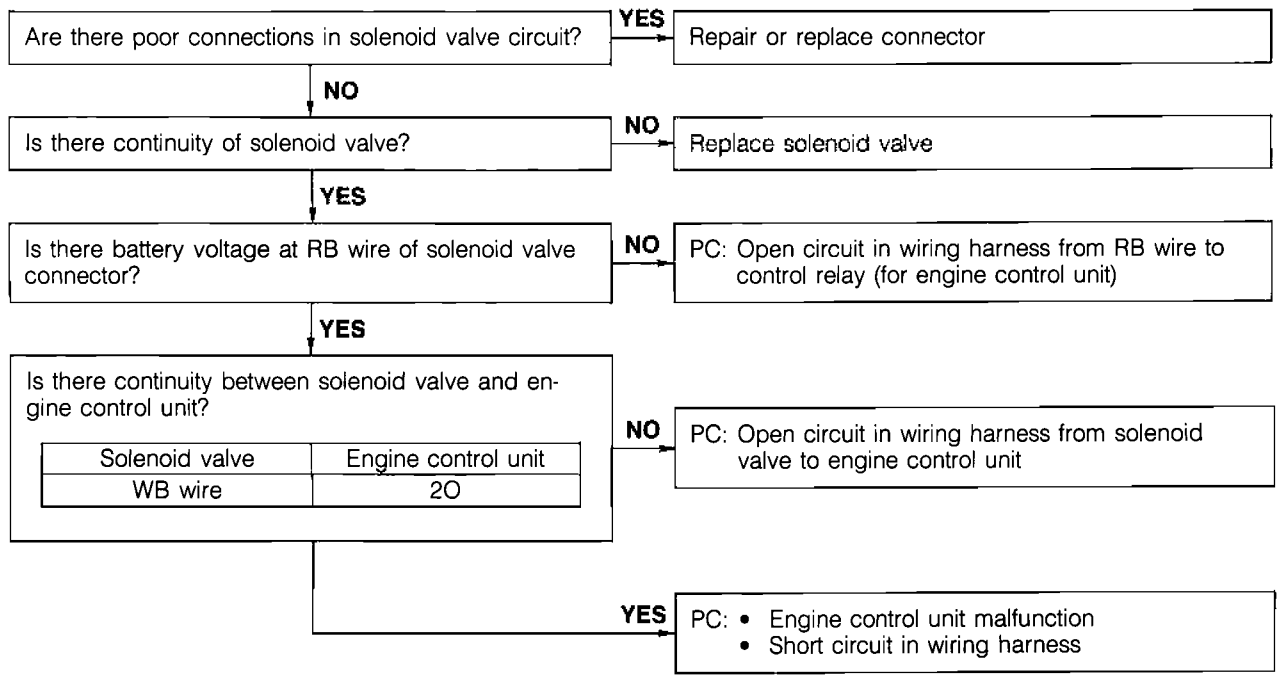
76G04C-028

Code No. 26 (Solenoid valve—No. 1 purge control) **PC: Possible Cause**



76G04C-029

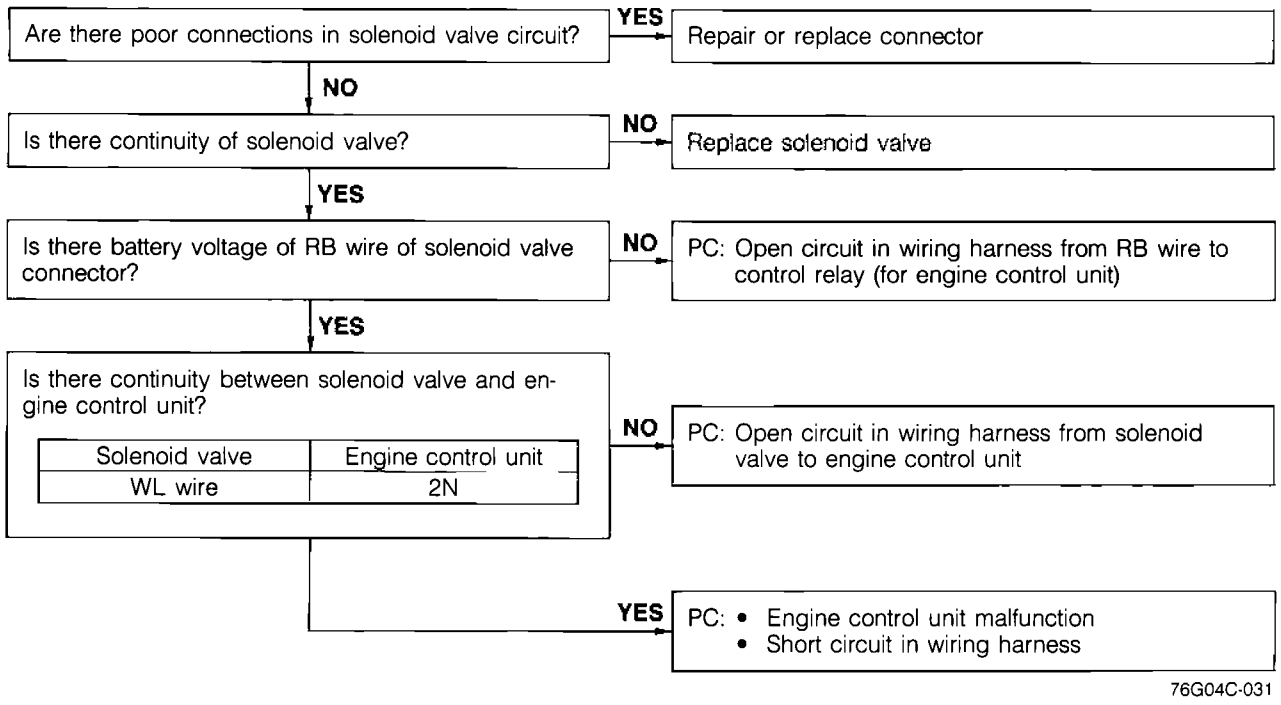
Code No. 27 (Solenoid valve—No. 2 purge control) **PC: Possible Cause**



76G04C-030

Code No. 28 (Solenoid valve—EGR)

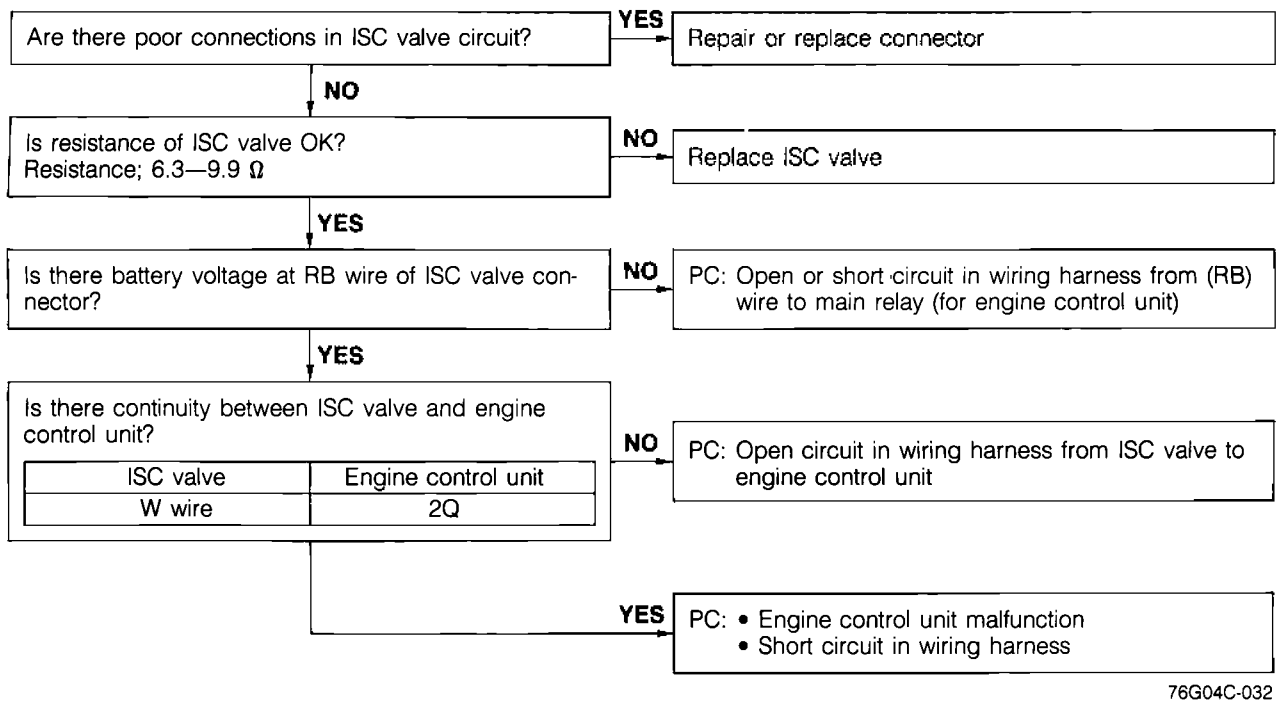
PC: Possible Cause



76G04C-031

Code No. 34 (Solenoid valve—Idle speed control (ISC))

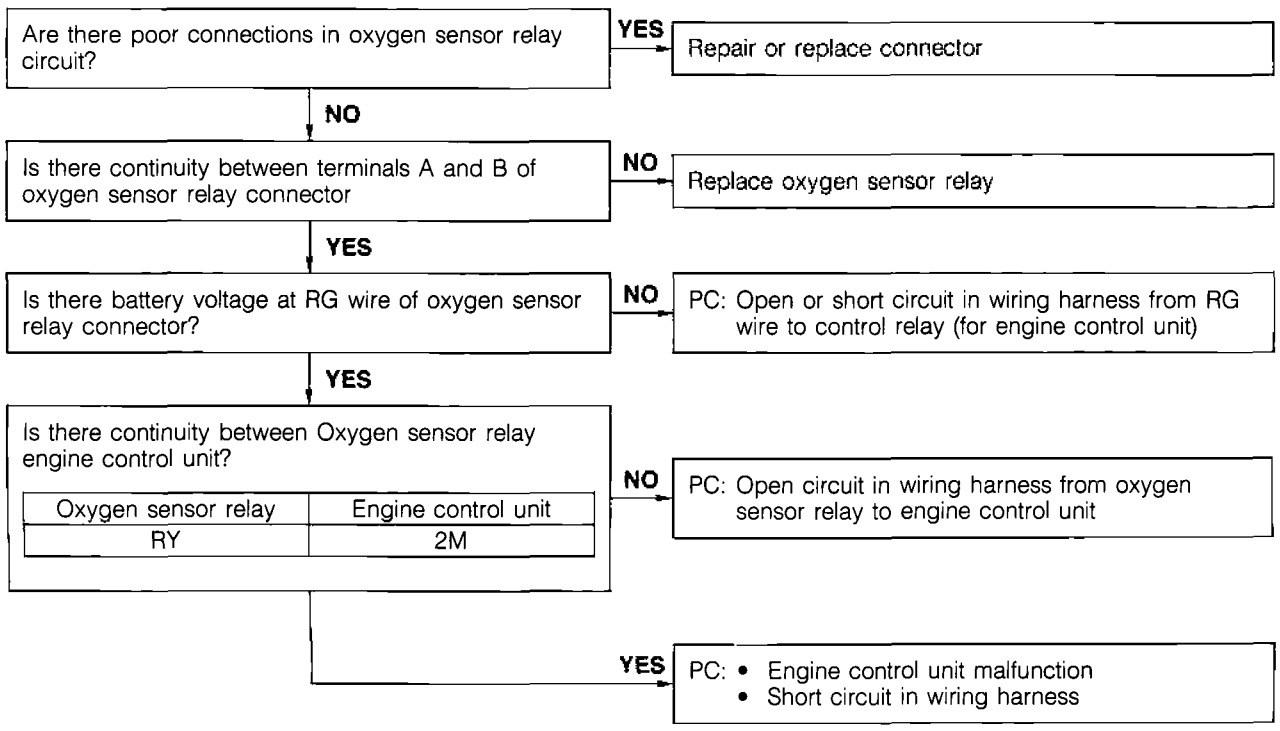
PC: Possible Cause



76G04C-032

No.36 Code (Oxygen sensor relay)

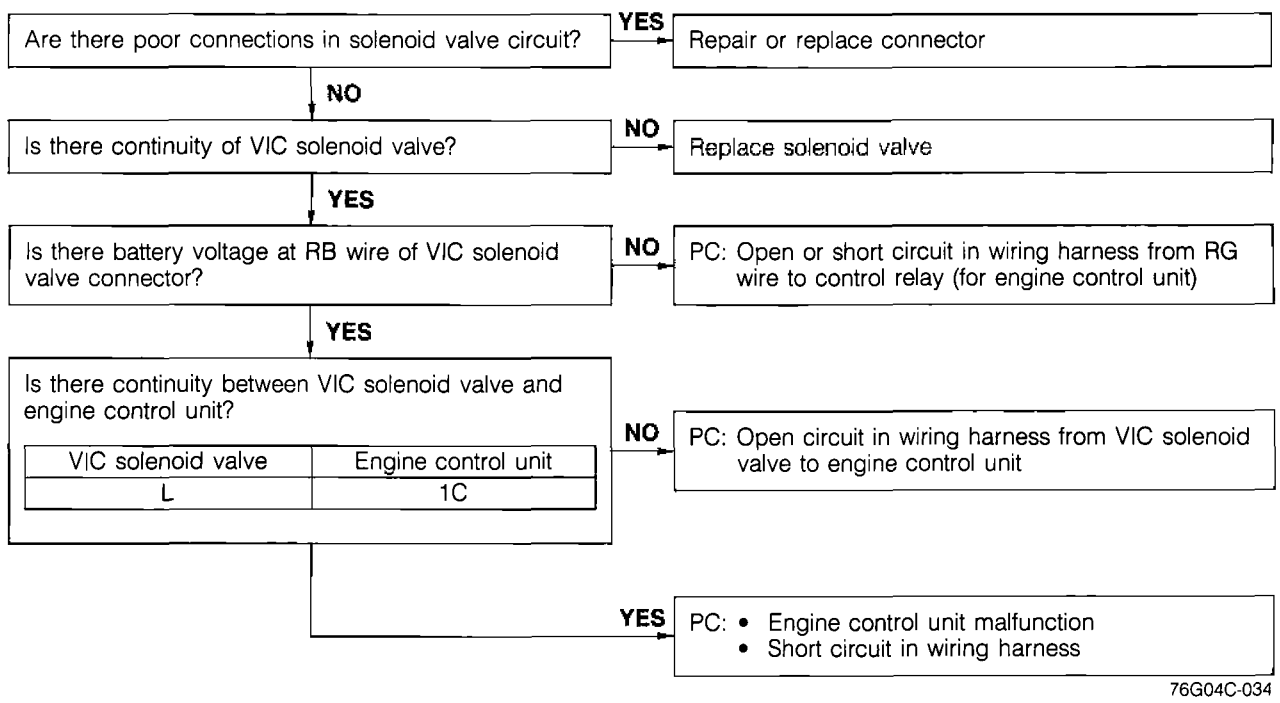
PC: Possible Cause



76G04C-033

No.41 Code (Solenoid valve—Variable inertia control (VIC))

PC: Possible Cause

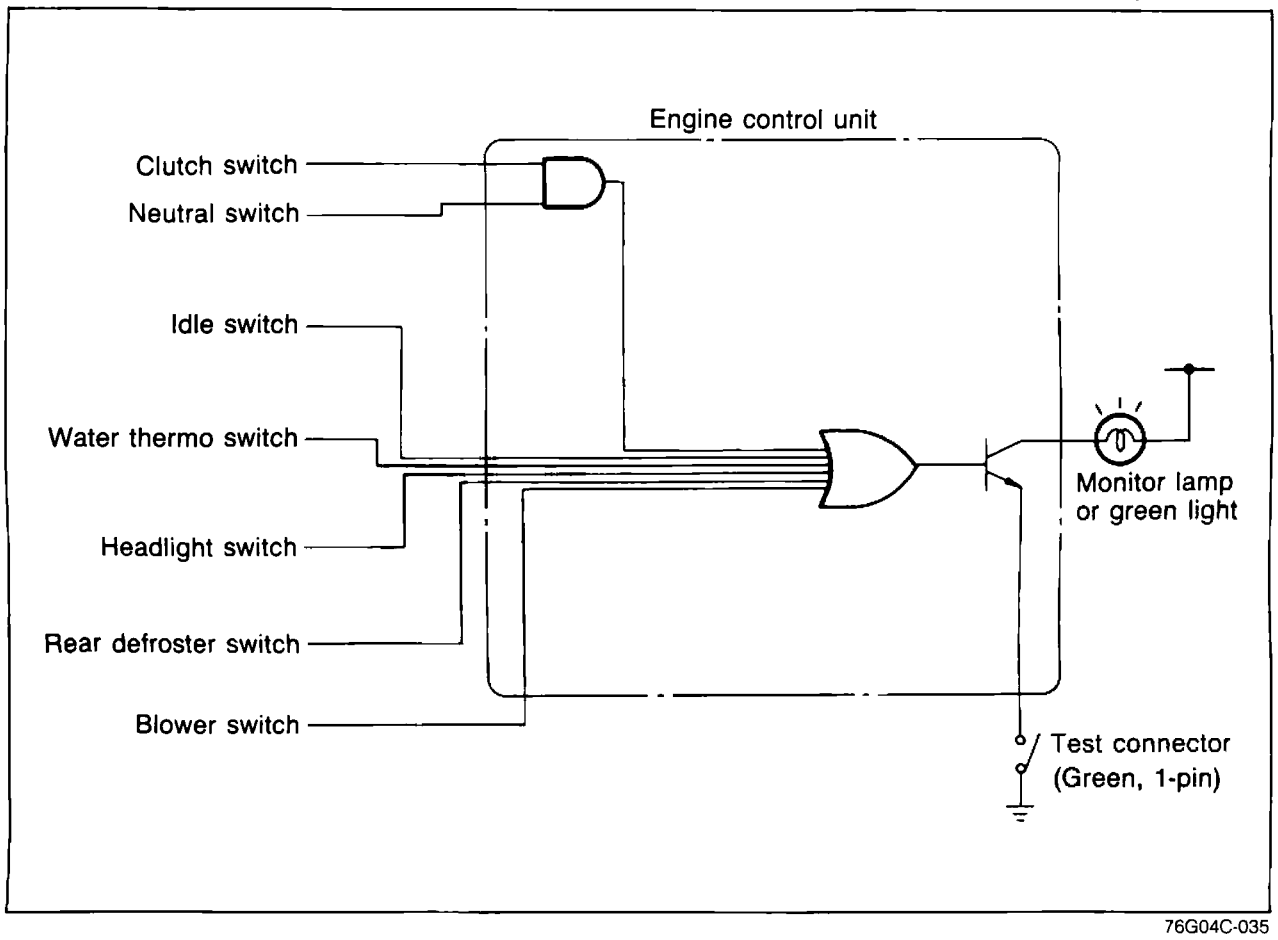


76G04C-034

SWITCH MONITOR FUNCTION

Individual switches can be monitored by the **SST (Self-Diagnosis checker 49 G018 9A0 or Digital code checker 49 9200 180)**.

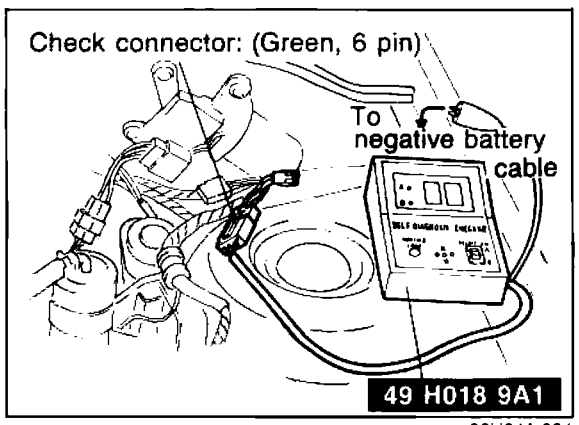
Note
The test connector must be grounded and the ignition switch ON (engine stopped).



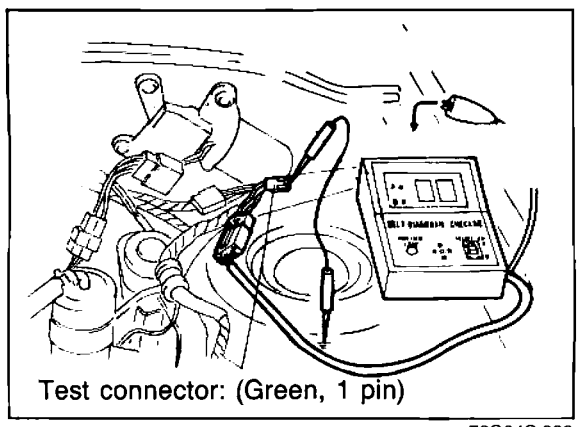
76G04C-035

Switch	Self-Diagnosis Checker (Monitor lamp)		Remark
	Light ON	Light OFF	
Clutch switch	Pedal released	Pedal depressed	In gear
Neutral switch	In gear	Neutral	Clutch pedal released
Idle switch	Pedal depressed	Pedal released	—
Headlight switch	ON	OFF	—
Rear defroster switch	ON	OFF	—
Blower switch	ON	OFF	Blower motor position: "3" or "4"
Water thermo switch (Electrical fan)	Terminal disconnected	Terminal connected	While fan not operating

4C SWITCH MONITOR FUNCTION



86U04A-034



76G04C-036

INSPECTION PROCEDURE

1. Warm up the engine to normal operating temperature and stop it.
2. Connect the **SST** to the check connector (Green, 6-pin) and the negative battery terminal.
3. Connect a jumper wire between the test connector (Green, 1-pin) and a ground.
4. Turn the ignition switch ON. Check if monitor lamp illuminates as each switch is made to function as described below.

Caution

a) If any one of the switches is activated, the monitor lamp will stay on.
b) Do not start the engine.

Procedure

Set conditions to deactivate each switch
•Transmission in neutral
•All pedals released
Verify that monitor lamp does not illuminate

NO →

Check each switch and related wiring harness
- Clutch and Neutral switch :Refer to page 4C—97
- Idle switch :Refer to page 4C—106
- Headlight switch :Refer to section 15
- Rear defroster switch :Refer to section 15
- Blower switch :Refer to section 15
- Water thermo switch :Refer to section 3

YES ↓

Check each switch as described

76G04C-037

Neutral and Clutch switch

Shift transmission into gear
Check that monitor lamp illuminates with clutch pedal released

NO →

PC:
- Neutral or clutch switch malfunction (Refer to 4C—97)
- Open circuit in related wiring harness
- Engine control unit 1G terminal malfunction (Refer to page 4C—98)

YES ↓

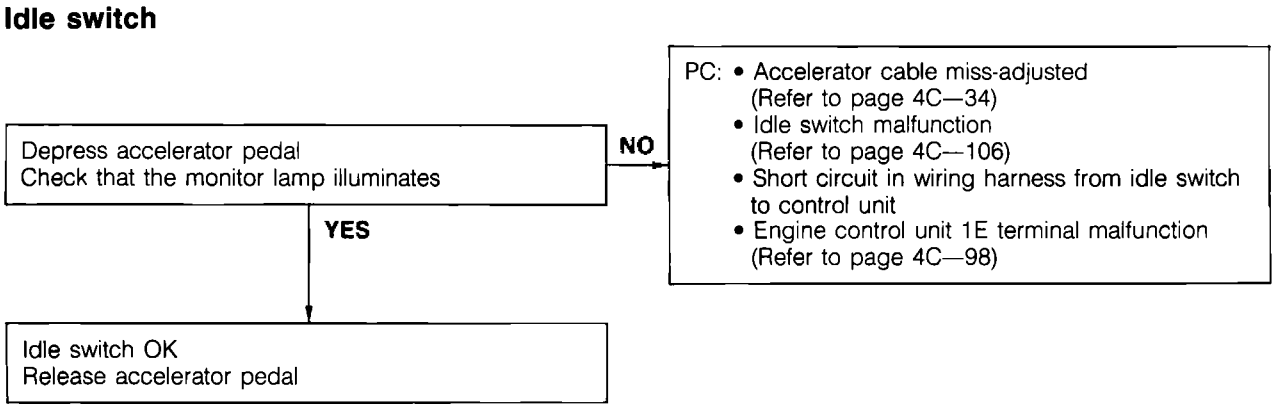
Depress clutch pedal
Check that monitor lamp does not illuminate
Return transmission to neutral

NO →

PC:
- Clutch switch malfunction (Refer to page 4C—97)

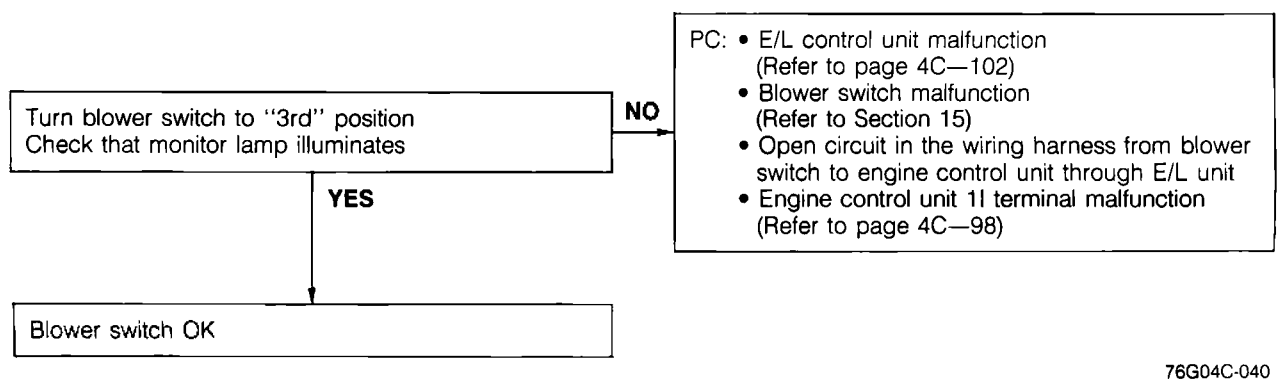
76G04C-038

Idle switch



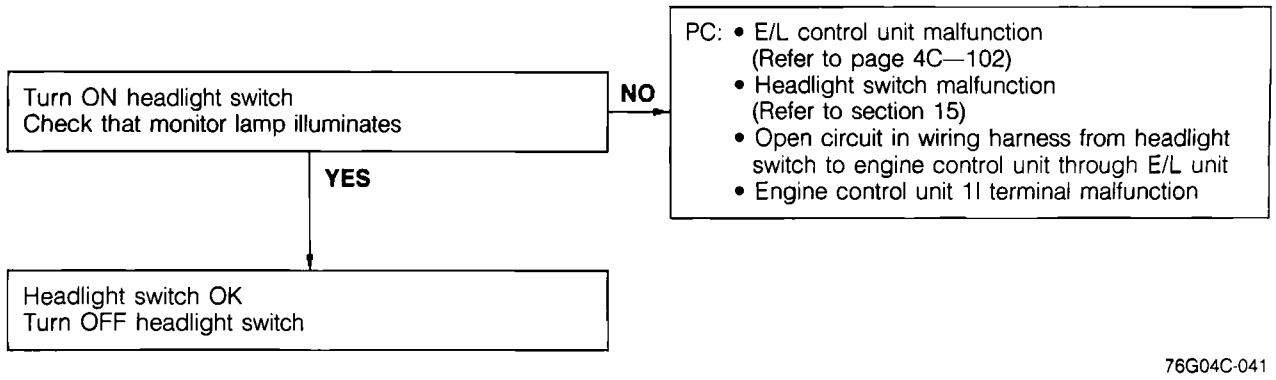
76G04C-039

Blower switch



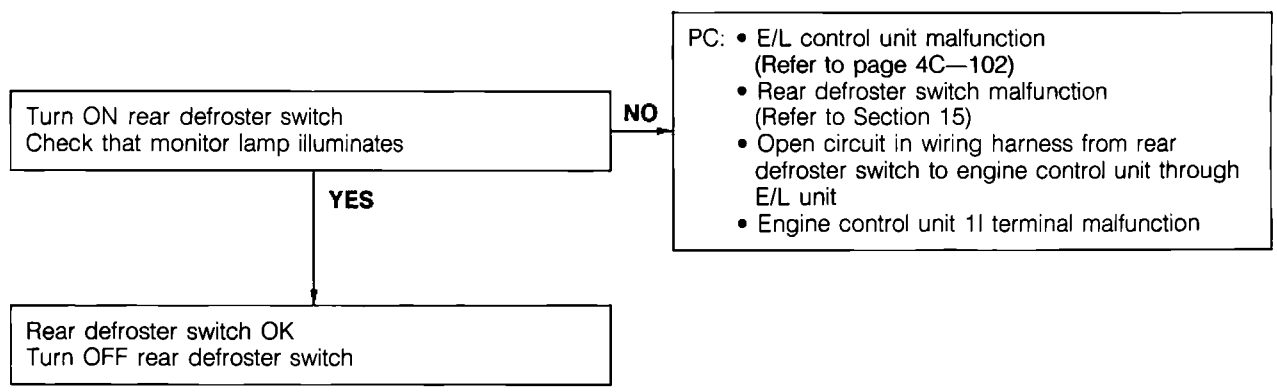
76G04C-040

Headlight switch



76G04C-041

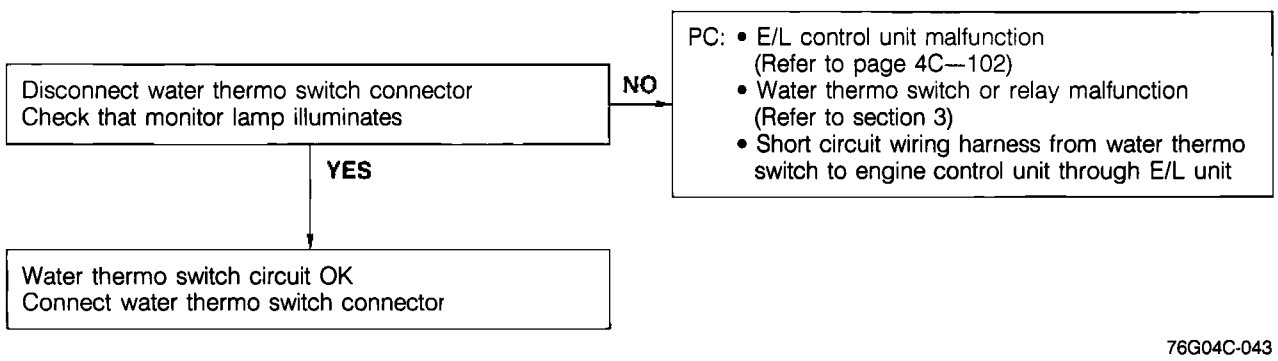
Rear defroster switch



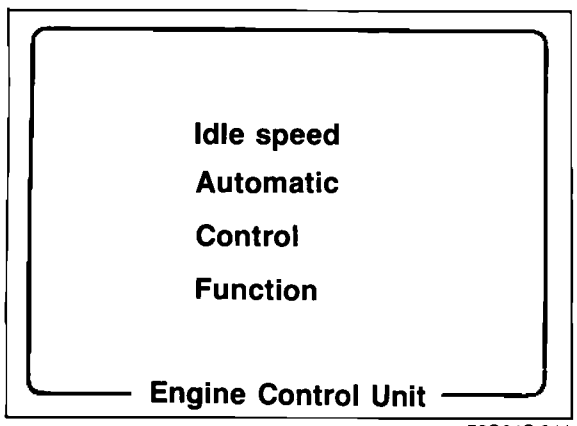
76G04C-042

4C SWITCH MONITOR FUNCTION

Water thermo switch circuit



76G04C-043

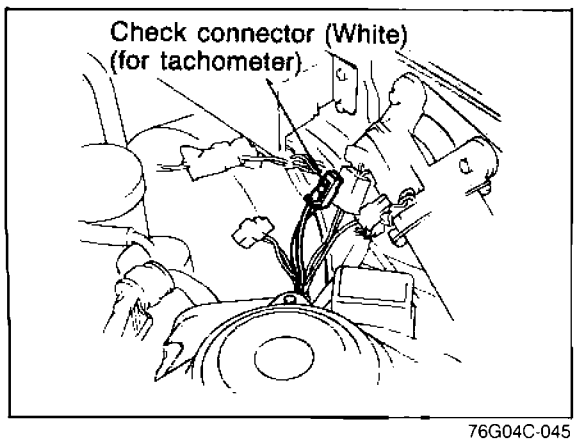


76G04C-044

IDLE ADJUSTMENT

IDLE SPEED

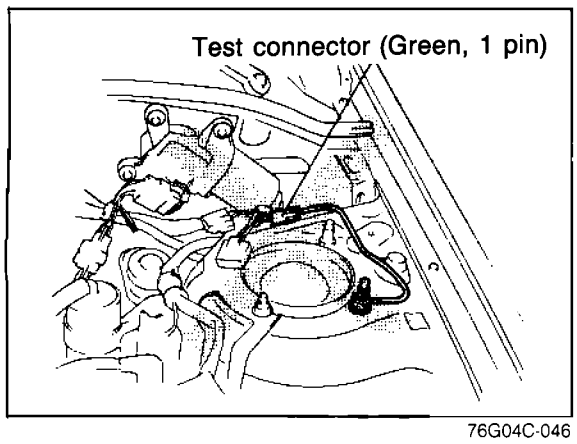
The idle speed is controlled automatically by the engine control unit through the idle speed control (ISC) solenoid valve, it is not necessary to adjust the idle speed.
However, if the idle speed is not within specification, the idle speed must be adjusted.



76G04C-045

Preparation

1) Check the condition of the engine (plugs, leaks in hoses, etc.).
2) Make sure all accessories are OFF.
3) Warm up the engine and run it for **three minutes at 2,500—3,000 rpm** in neutral.
4) Check the initial ignition timing and adjust it if necessary.



76G04C-046

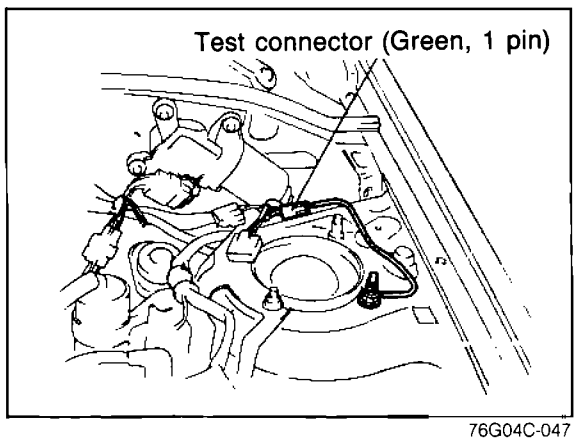
Inspection

1. Check that the idle speed is within specification without grounding the test connector (Green, 1-pin).

Specification:

Applied load	Idle speed
No load	750 ± 50 rpm
P/S load	750 ± 50 rpm
A/C and/or E/L load	800 ± 50 rpm

2. If not correct, adjust the initial idle speed.

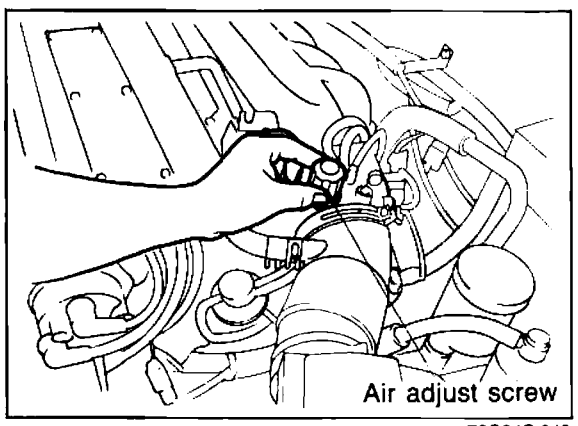


76G04C-047

Adjustment

1. Ground the test connector (Green, 1-pin) with a jumper wire.
2. Turn all accessories and loads OFF.

4C IDLE ADJUSTMENT

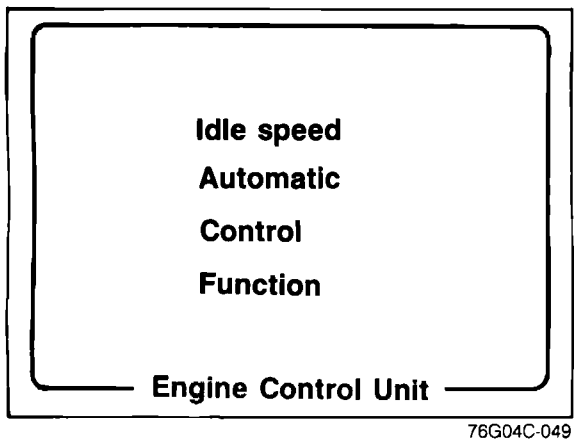


76G04C-048

3. Remove the blind cap and adjust the initial idle speed to specification by turning the air adjust screw.

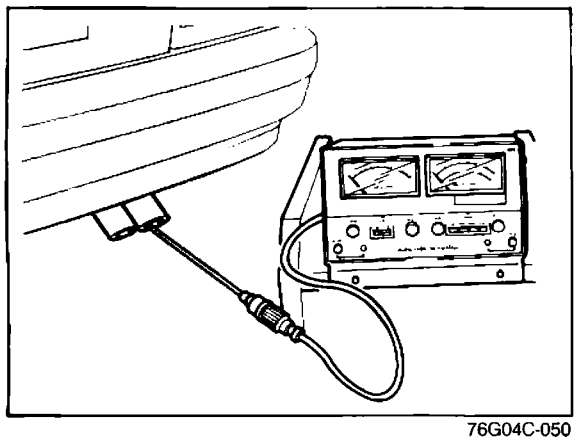
   Initial idle speed: 750 ± 50 rpm

4. After adjusting the idle speed, install the blind cap and disconnect the jumper wire from the test connector.
5. Recheck the idle speed.
6. If not within specification, check the idle speed control (ISC) system.



76G04C-049

IDLE MIXTURE (Unleaded Fuel)
An automatic compensation function for air/fuel mixture is built into the engine control unit, it is not necessary to check and adjust the idle mixture.

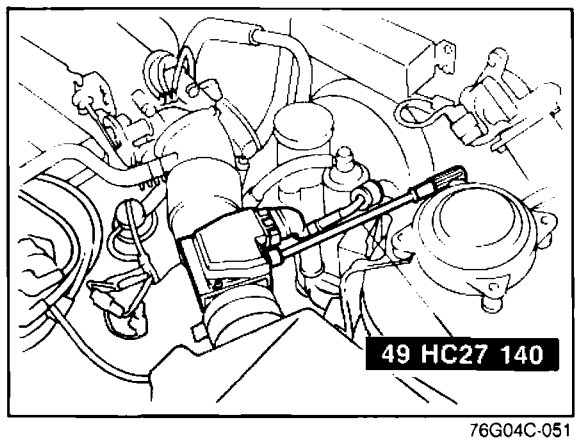


76G04C-050

IDLE MIXTURE (Leaded Fuel)

Note
Before checking or adjusting the idle mixture, check and adjust the idle speed, if necessary.

1. Insert a gas analyzer pick-up into the tail pipe.



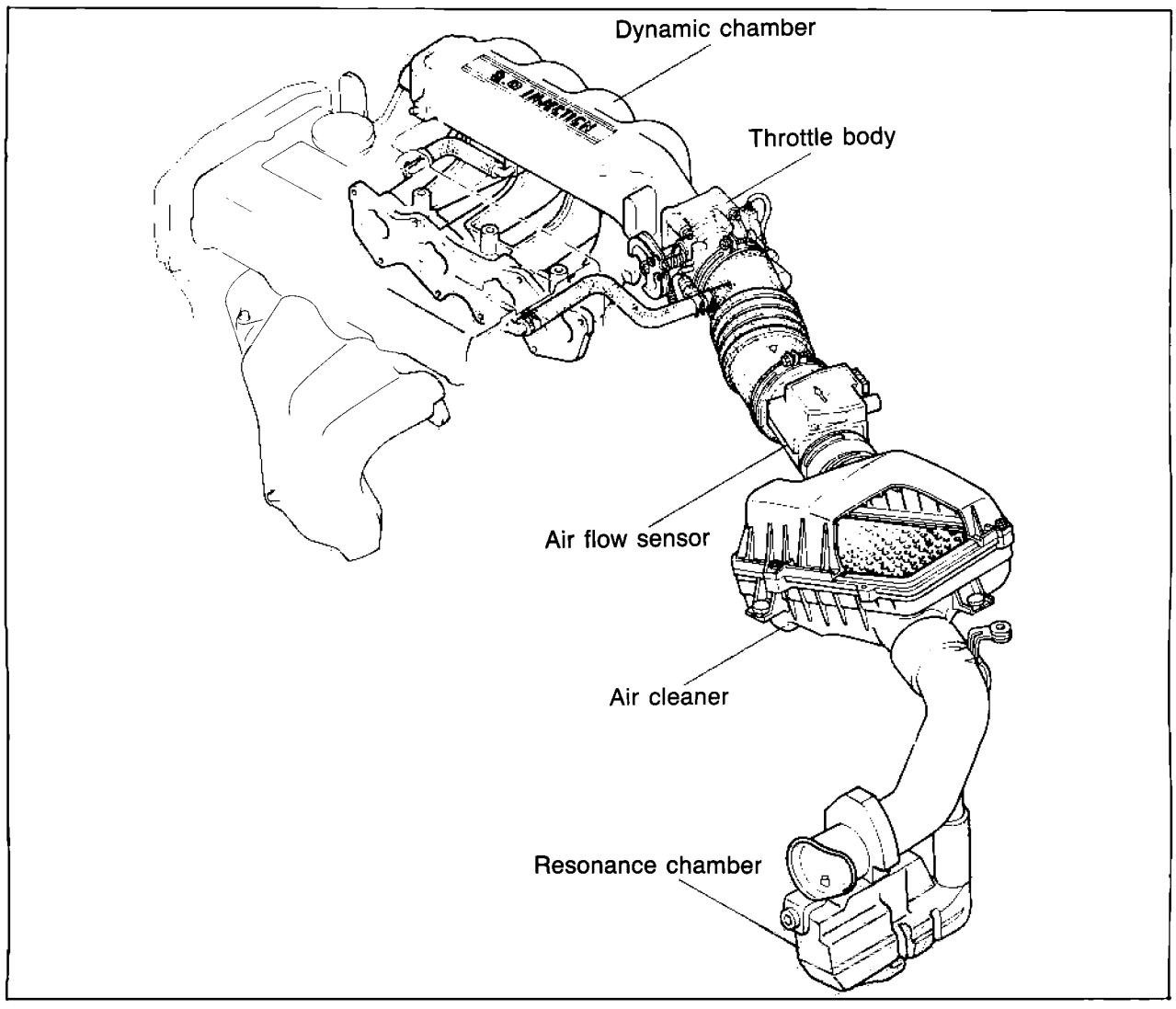
76G04C-051

2. Check that the CO and HC concentrations are within specification.

   CO concentration: 1.5 ± 0.5%
   HC concentration: Less than 1,000 PPM

3. If the CO or HC concentration is not within specification, turn the adjust screw with the **SST** to adjust.

INTAKE AIR SYSTEM



76G04C-052

This system controls the air required by the engine for operation. The system consists of the air duct, resonance chamber, air cleaner, air flow sensor, throttle body, dynamic chamber, and intake manifold.

COMPONENT DESCRIPTION

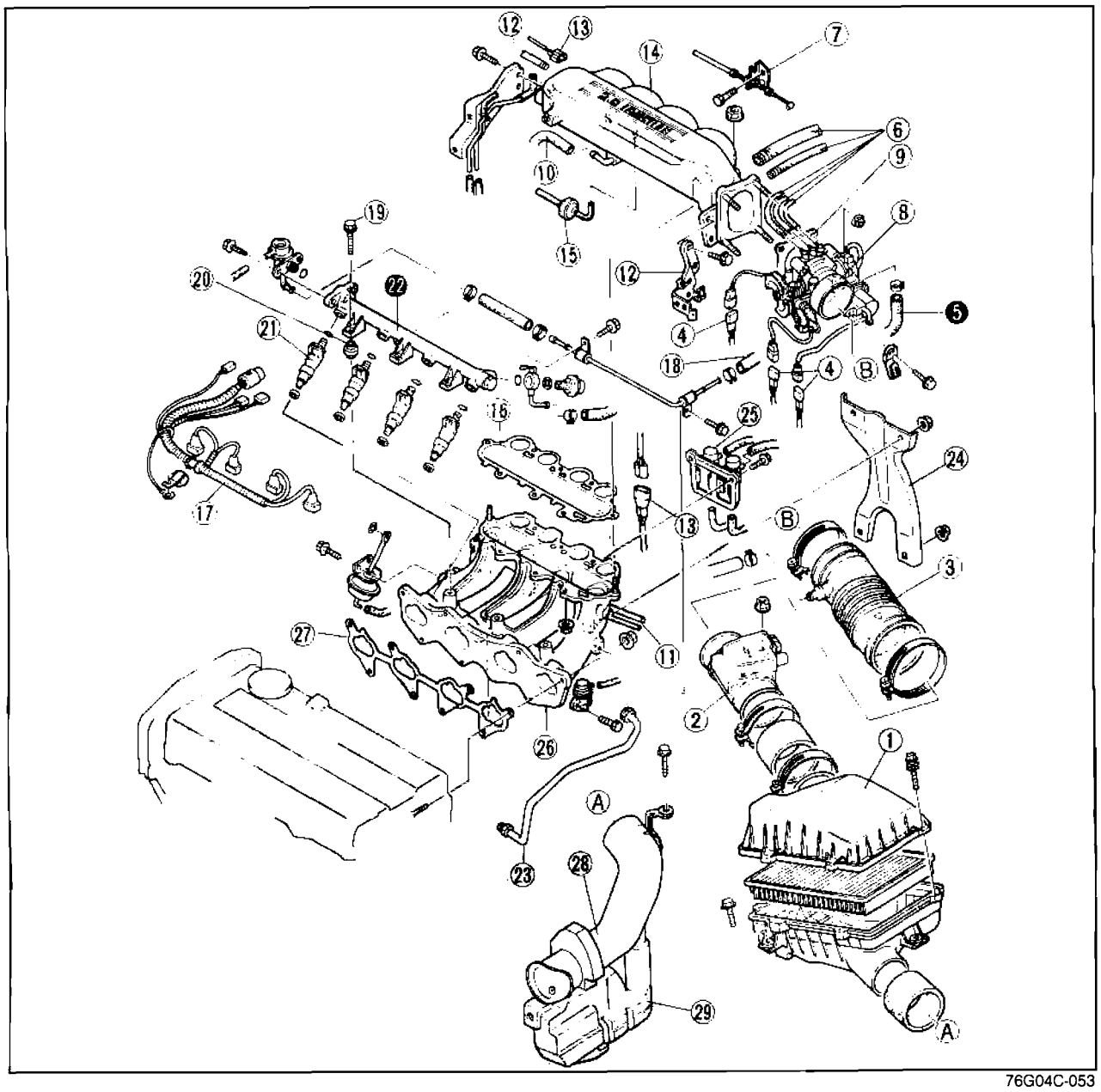
Component	Function	Remark
Air cleaner	Filters air entering throttle body	Dry type
Air flow sensor	Detects amount of intake air; sends signal to engine control unit	Hot-wire type
Resonance chamber	Minimizes intake air noise	
Throttle body	Controls intake air quantity	Integrated throttle sensor and idle switch

4C INTAKE AIR SYSTEM

REMOVAL

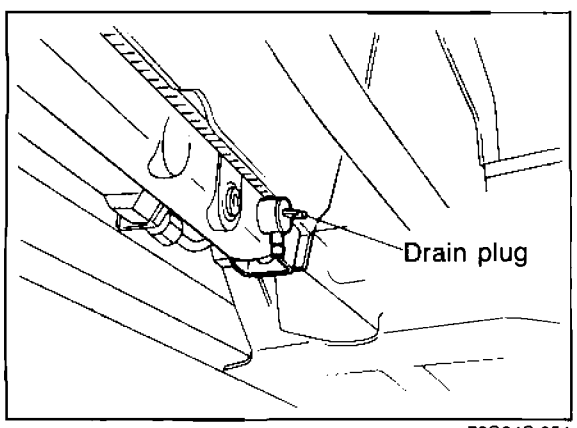
Caution
Before removing the following parts, release the fuel pressure from fuel system to reduce the possibility of injury or fire. (Refer to page 4C—52.)

Remove in the sequence shown in the figure, referring to the removal note.



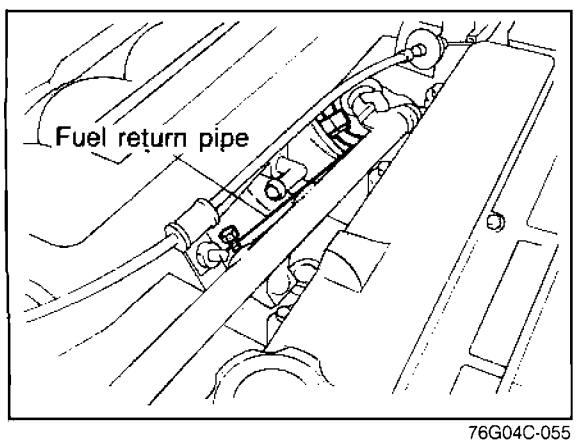
76G04C-053

1. Air cleaner
2. Air flow sensor
3. Air hoses
4. Connectors (Idle switch, ISC, Throttle sensor)
5. Water hoses
6. Vacuum hoses
7. Accelerator cable
8. Throttle body
9. Gasket
10. PCV hose
11. Vacuum pipe assembly (Unleaded fuel)
12. Dynamic chamber brackets
13. Connectors (Knock sensor, Intake air thermo sensor)
14. Dynamic chamber
15. One-way check valve
16. Gasket
17. Wiring harness (for injectors)
18. Fuel hoses
19. Delivery pipe assembly mounting bolt.
20. Heat insulator
21. Injectors
22. Delivery pipe assembly
23. EGR pipe
24. Intake manifold bracket
25. Solenoid valve
26. Intake manifold
27. Gasket
28. Air duct
29. Resonance chamber



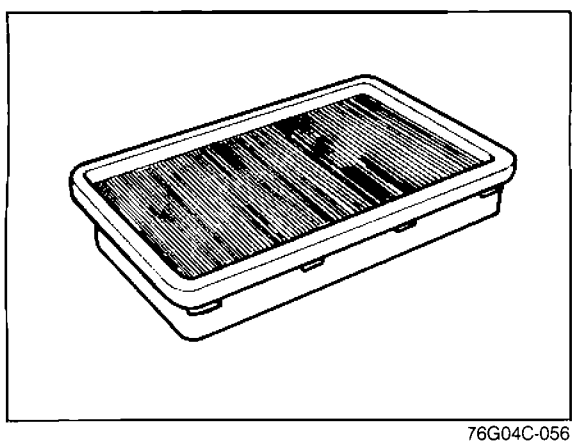
76G04C-054

Removal Note
Water hose
Before disconnecting the water hose, drain two liters of engine coolant.



76G04C-055

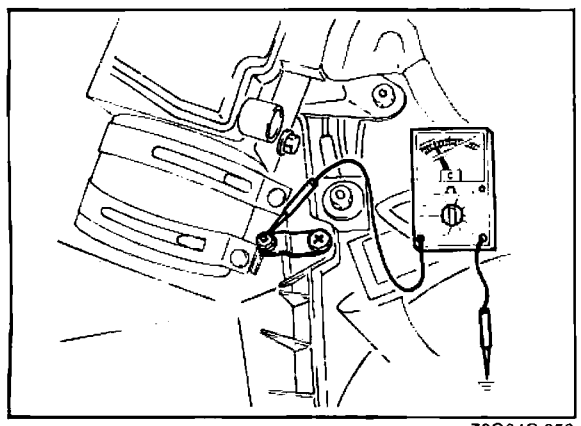
Delivery pipe assembly.
1. Separate the fuel return pipe from the delivery pipe assembly.
2. Remove the delivery pipe assembly and the fuel return pipe.



76G04C-056

PARTS INSPECTION
Air Cleaner Element
1. Check the condition of the air cleaner element.
2. Blow out the dust with compressed air, if necessary.

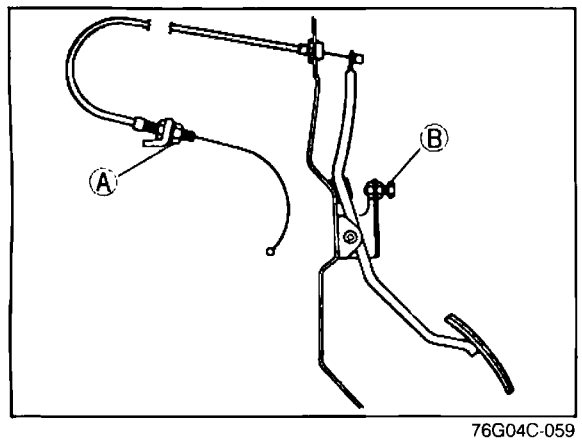
Caution
a) The air cleaner must be replaced at the intervals outlined in the maintenance schedule.
b) Never drive the vehicle without the air cleaner element, otherwise, damage to the air flow sensor (hot wire) will occur.
c) Never use an oil permeated air cleaner element, otherwise, contamination of the hot wire will occur.



76G04C-058

Air Cleaner Case

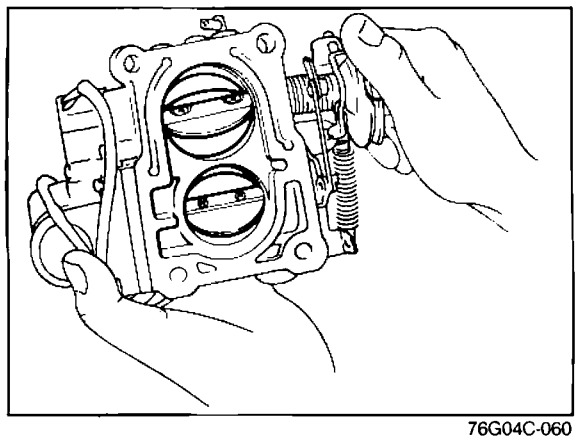
1. Check that the steel plate mounted on the upper case is grounded.
2. Replace, if necessary.



76G04C-059

Accelerator Cable

1. Inspect the deflection of the cable. If it is not within **1—3 mm (0.04—0.12 in.)**, adjust by turning nuts A.
2. Depress the accelerator pedal to the floor and confirm that the throttle valve is fully opened. Adjust by turning bolt B if necessary.

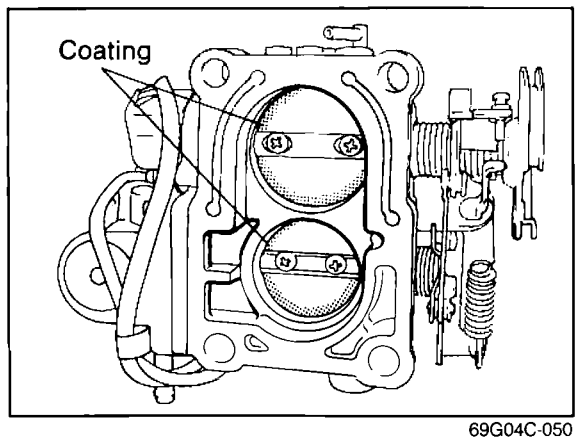


76G04C-060

Throttle Body

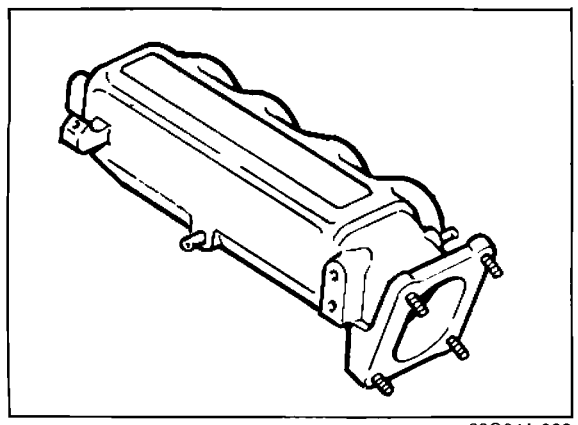
Note
The No. 2 throttle valve is preset at the factory to begin opening after the No. 1 throttle valve has opened approx. 25 degrees.

1. Check that the No. 1 and No. 2 throttle valves move smoothly when the throttle lever is moved from fully closed to fully open.
2. Replace, if necessary.



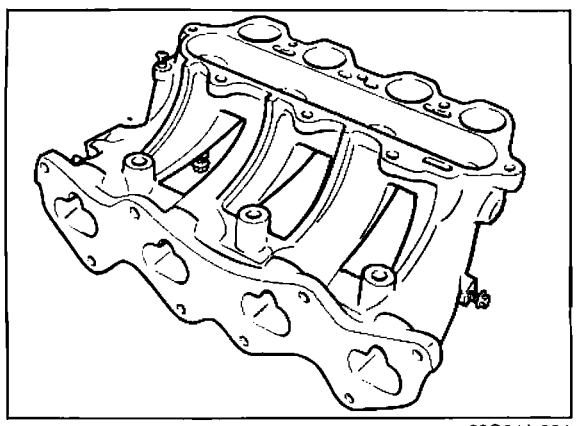
69G04C-050

Caution
Do not remove the thin sealing coating from the throttle valve or bore.



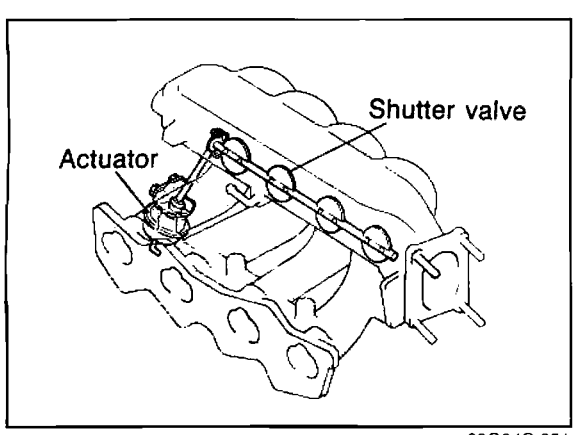
69G04A-062

Dynamic Chamber
1. Visually check the dynamic chamber for damage.
2. Replace, if necessary.



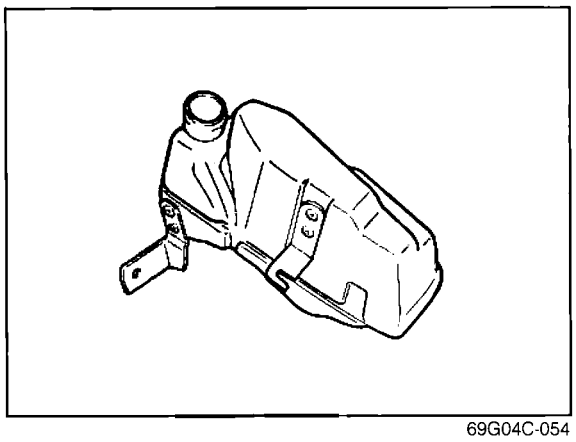
69G04A-064

Intake Manifold
1. Visually check the intake manifold for damage.
2. Replace, if necessary.



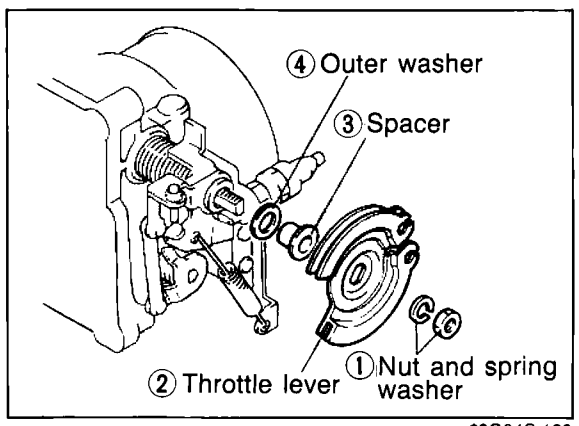
69G04C-051

Shutter Valves
1. Visually check the shutter valves for damage.
2. Check that the shutter valves close and open fully.
3. Adjust or replace them if necessary.

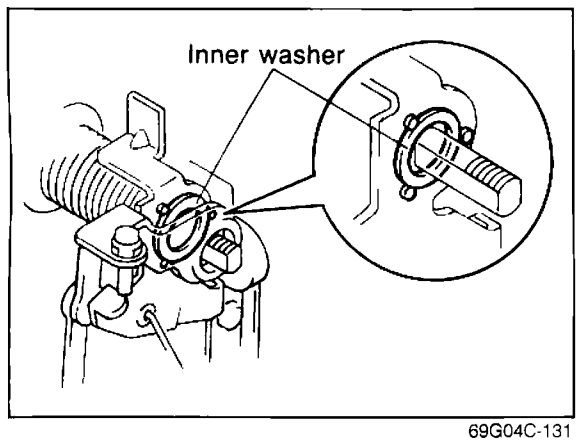


69G04C-054

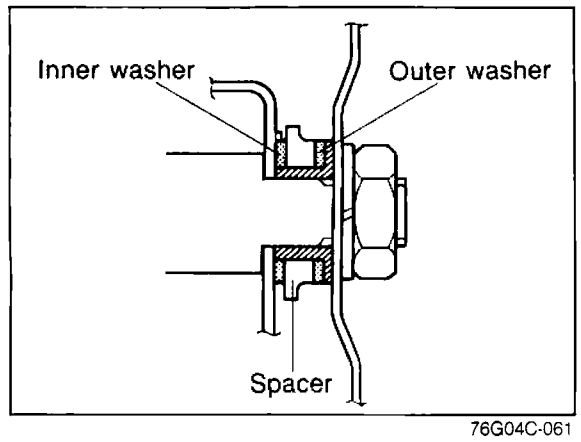
Resonance Chamber
1. Visually check the resonance chamber for damage.
2. Replace if necessary.



69G04C-130



69G04C-131



76G04C-061

REPLACEMENT
Throttle Lever
Removal

Caution
When loosening the throttle lever nut, hold the throttle valves fully open to prevent damaging the idle switch.

Remove the throttle lever in the sequence shown in the figure.

Installation
1. Check that the inner washer is in the proper position as shown in the figure.
2. Assemble the spacer and outer washer and install them onto the throttle shaft.
3. Install the throttle lever onto the throttle shaft.

Caution
When tightening the throttle lever nut, hold the throttle valves fully closed to prevent bending the stopper lever.

4. Tighten the throttle lever nut.

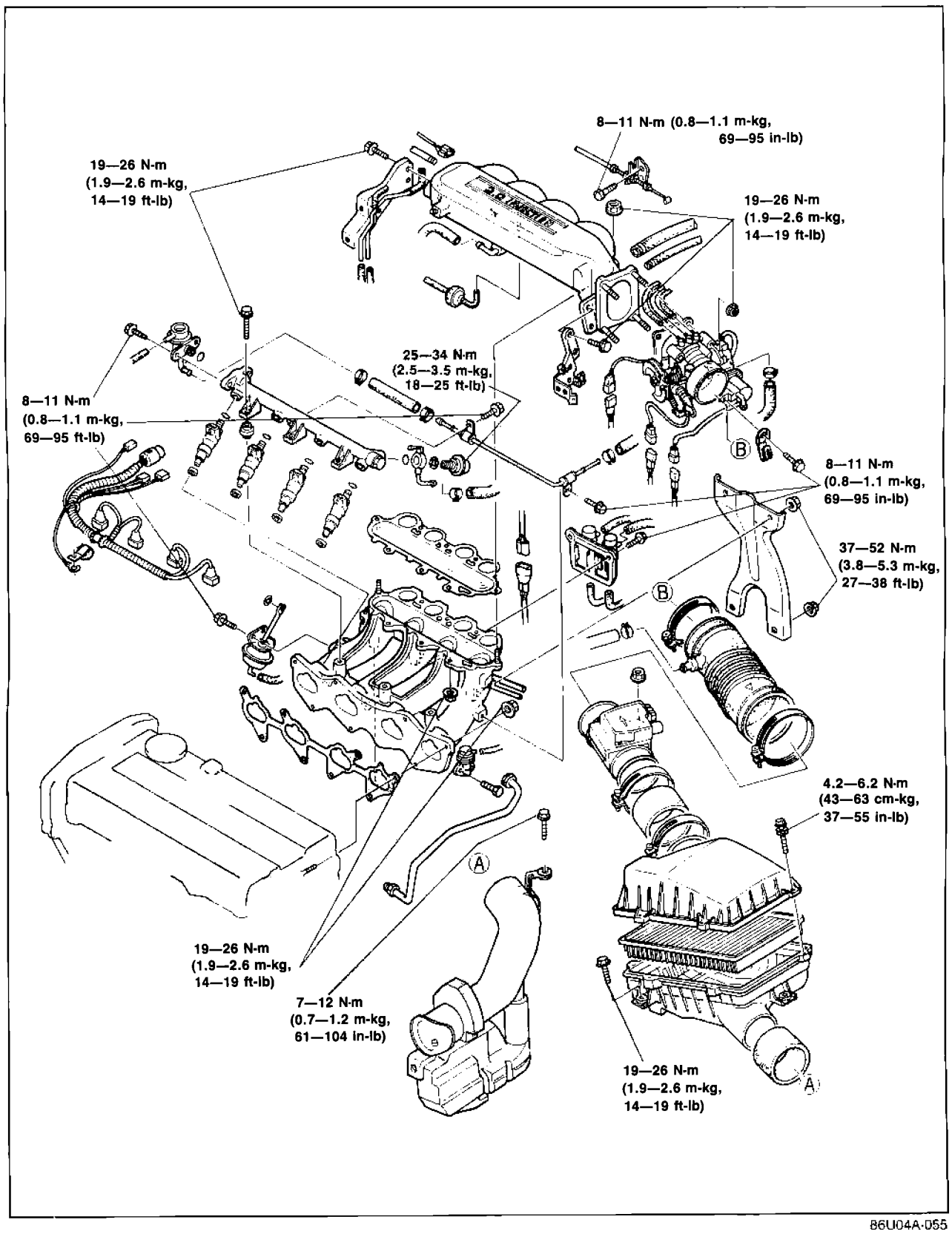
Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

5. Check that the inner and outer washer and spacer are assembled correctly as shown.
6. Check that No.1 and No.2 throttle valves move smoothly and that No.2 throttle valve is closed completely when the No.1 throttle valve is closed.
7. Check the operation of the idle switch. (Refer to page 4C—106.)

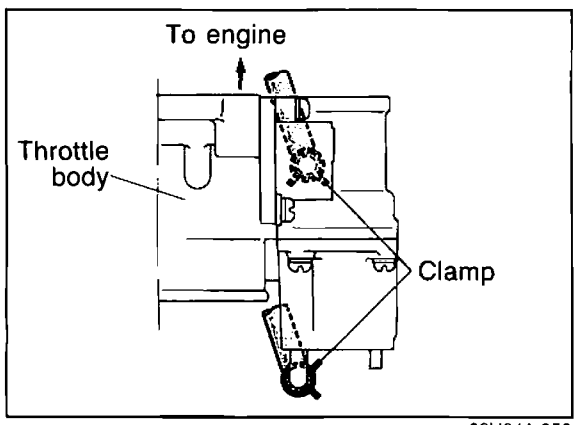
INSTALLATION

Install in the reverse order of removal, referring to the installation note.

Torque Specification



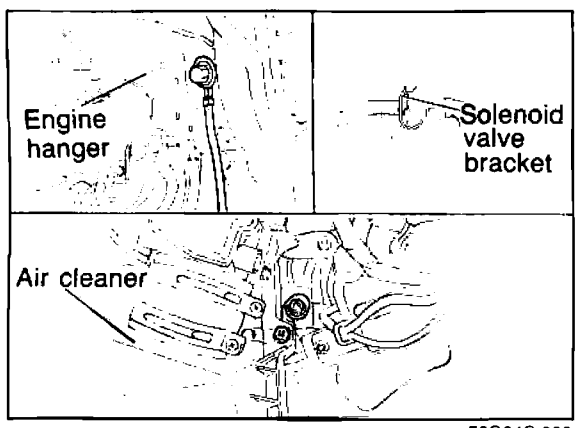
86U04A-055



86U04A-056

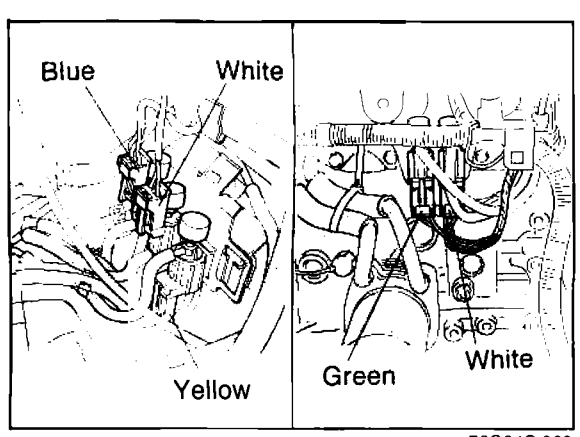
Installation Note
Water hose spring clamps
Face the clamp end as shown in the figure.

Gasket
Use new gaskets at the intake manifold, dynamic chamber, and throttle body.



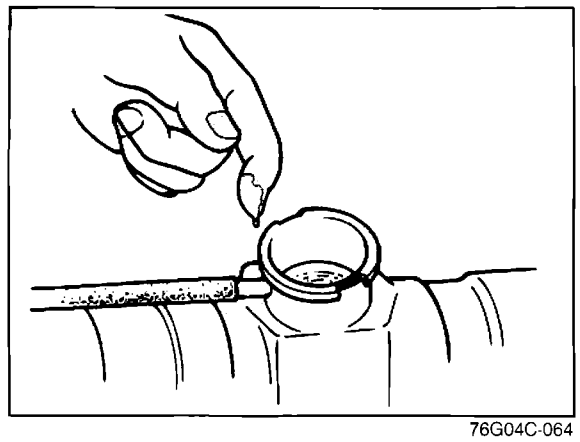
76G04C-062

Ground harnesses
Make sure that the ground harnesses are tightened securely at the following positions.
(1) Air cleaner upper case
(2) Solenoid valve braket
(3) Engine hanger



76G04C-063

Solenoid valve connectors
Connect the solenoid valve connectors at the positions shown in the figure.

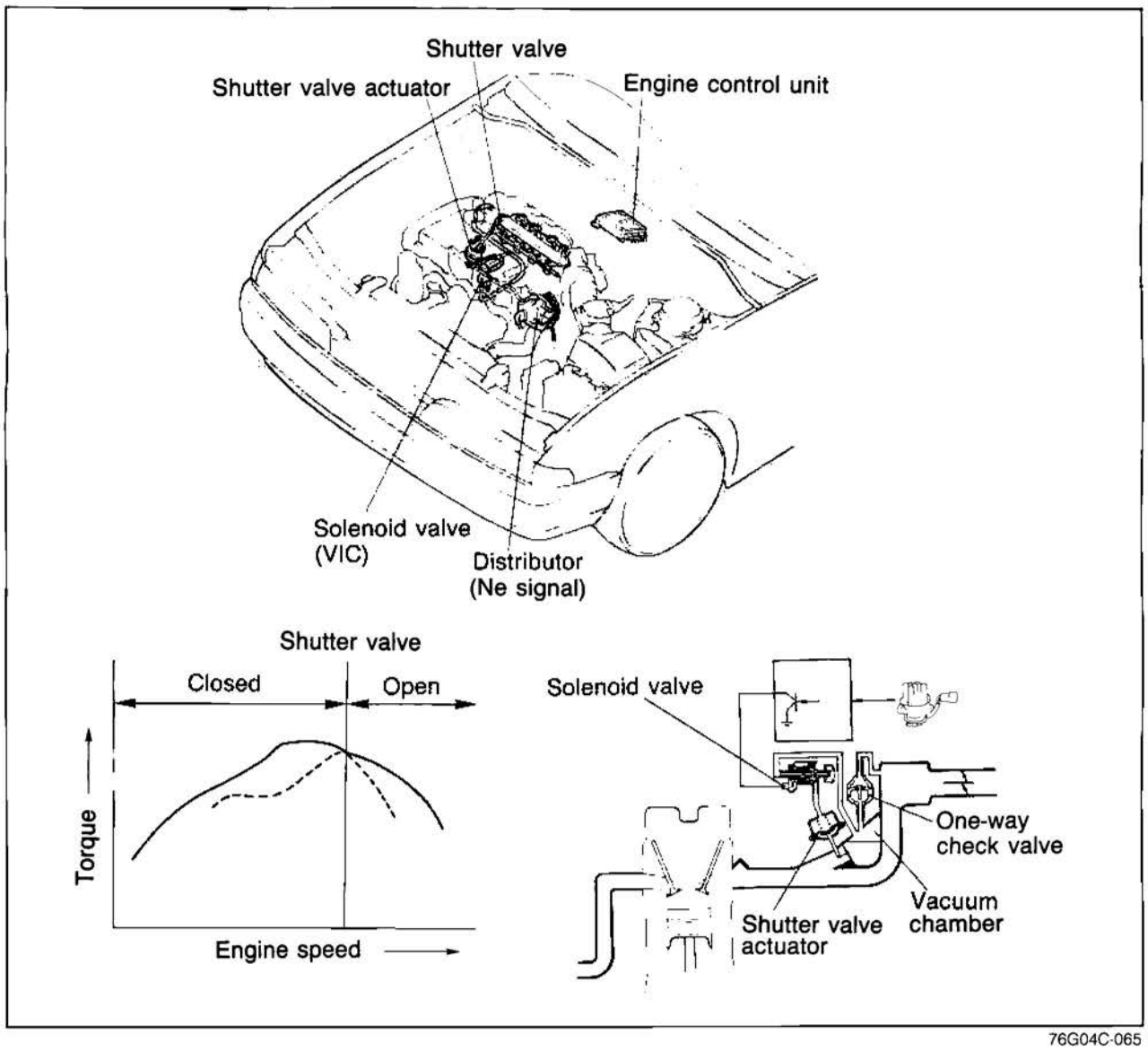


76G04C-064

Inspection after installation
1. After completing installation, fill up the engine with the specified engine coolant.
2. Warm up the engine and run it at idle.
3. Check for any vacuum, coolant, or fuel leaks.

VARIABLE INERTIA CONTROL (VIC) SYSTEM

The VIC system supplements the intake air's inertial effect to create a torque band that runs from low rpm through the high rpm range.
The system consists of the intake manifold, shutter valves, dynamic chambers, actuator, one-way check valve, three-way solenoid valve, and engine control unit.



76G04C-065

Intake Inertia Effect
The air within the dynamic chamber and intake manifold begins to flow during the first half of the air intake process. This air flow pushes air into the cylinder by its own inertial force during the second half of the air intake process. This improves the charging of the cylinder.
To most effectively put this inertia charging to use, the length of the manifold leading to the dynamic chamber needs to be changed in response to the engine rpm.

Length of intake manifold	Intake inertia effect
Long	Effective at low and middle speed
Short	Effective at high speed

The VIC system controls the length of the intake manifold travel by switching the shutter valve either open or closed at the specified engined rpm.

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7C VIC SYSTEM

COMPONENT DESCRIPTION

Component	Function	Remark
Dynamic chamber	Provides chamber for VIC system operation	Integrates one-way check valve
Engine control unit	Monitors engine rpm, controls solenoid valve	Unleaded fuel: ON at above 5200 rpm Leaded fuel: ON at above 5400 rpm
Intake manifold	Provides short and long length of intake travel	Integrates shutter valve
One-way check valve	Holds vacuum in vacuum chamber	Installed between dynamic chamber and vacuum chamber
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to control unit	Installed in distributor
Solenoid valve (VIC)	Controls vacuum to shutter valve actuator	
Shutter valve	Closes short intake port	
Shutter valve actuator	Actuates shutter valve according to vacuum from solenoid valve	

76G04C-066

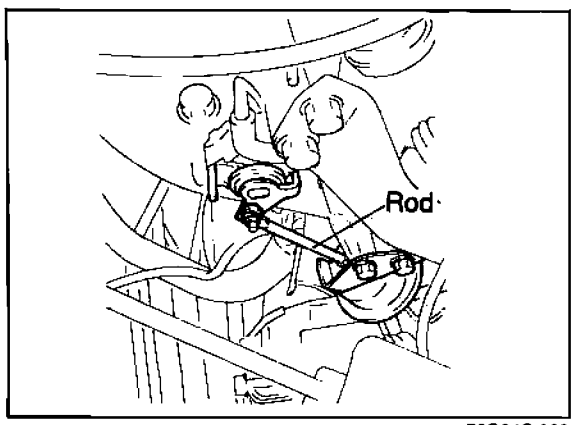
TROUBLESHOOTING

Check the condition of the wiring harness and connectors before checking the sensor or switches.

Note
Make the system inspection first. If no problem is found, continue with inspection of the next system of the Troubleshooting Guide. (Refer to pages 4C—10 and 11.)

Possible cause / Page / Symptom		Vacuum chamber (Vacuum leak)	Shutter valve actuator	One-way check valve	Solenoid valve (VIC)		Engine control unit (1C)	System inspection
					Vacuum signal	Electric signal		
		4C—42	4C—41	4C—43	4C—42		4C—98	4C—41
Rough idle	During warm up	2	3	4	—	—	—	1
	After warming up	2	3	4	—	—	—	1
Poor acceleration, hesitation, or lack of power		6	5	7	2	3	4	1
Poor fuel consumption		6	5	7	2	3	4	1

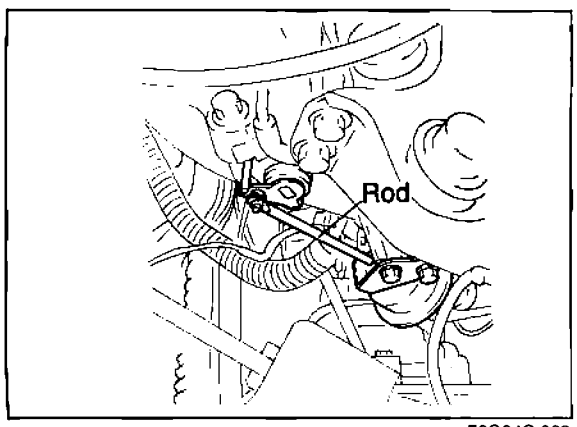
76G04C-067



76G04C-068

System Inspection

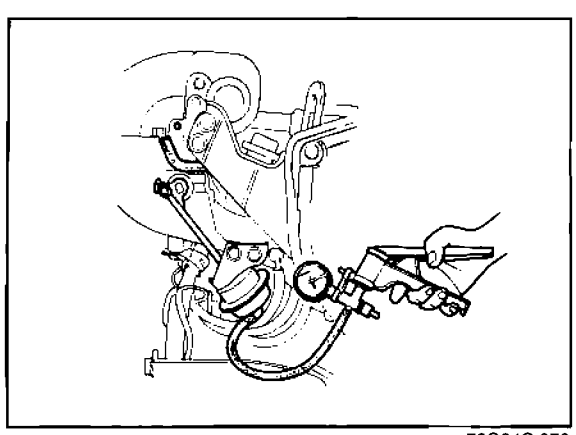
1. Warm up the engine to normal operating temperature and run it at idle.
2. Check that the rod has been pulled into the actuator.



76G04C-069

3. Increase the engine speed and check that the rod is released above specification.

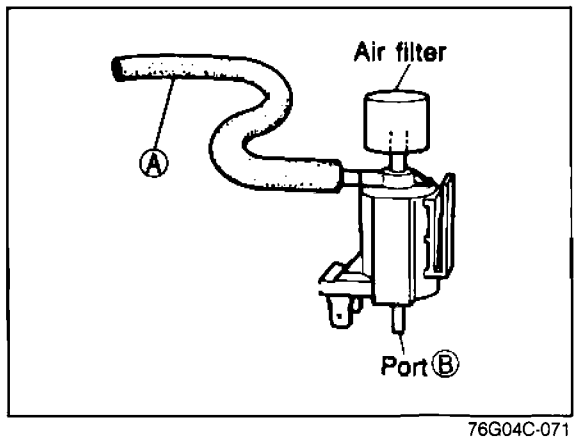
Specification:
Approx. 5,200 rpm....Unleaded fuel
Approx. 5,400 rpm....Leaded fuel



76G04C-070

Shutter Valve Actuator

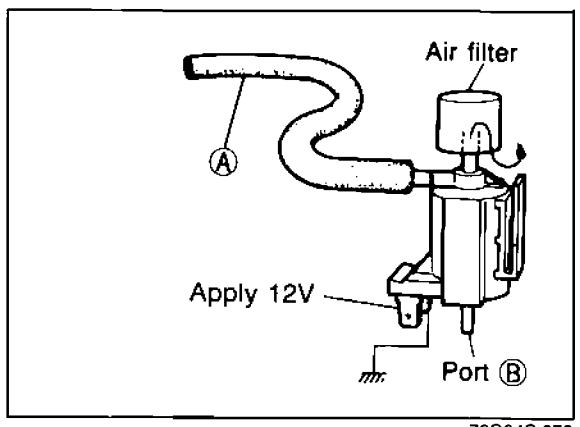
1. Disconnect the vacuum hose from the actuator, and connect a vacuum pump to the actuator.
2. Apply **approx. 200 mmHg (7.9 inHg)** vacuum and check that the rod is pulled into the actuator.



76G04C-071

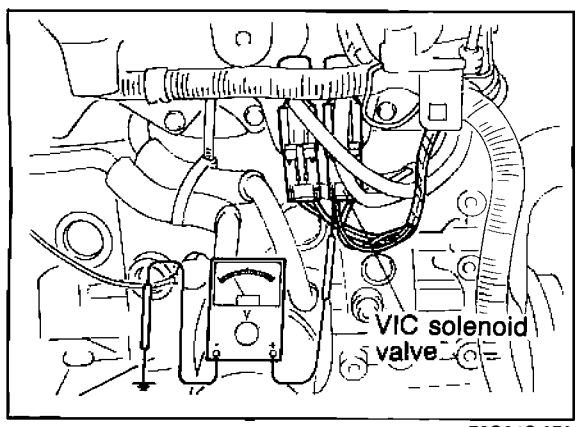
VIC Solenoid Valve

1. Disconnect the vacuum hoses from the solenoid valve.
2. Blow through the valve from port A and check that air flows from port B.



76G04C-072

3. Disconnect the solenoid valve connector and connect 12V and a ground to the terminals of the solenoid valve.
4. Blow through the valve from port A and check that air flows from the air filter.

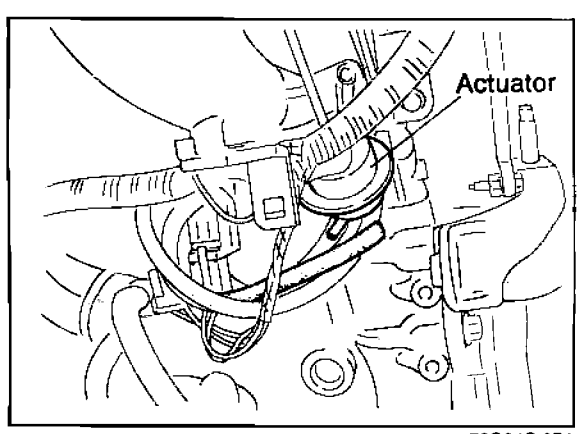


76G04C-073

Electrical Signal

1. Connect a voltmeter to the VIC solenoid valve (O wire).
2. Increase the engine speed and note the voltmeter reading.

Voltmeter reading	Unleaded fuel	Leaded fuel
Approx. 12V	Below 5,200 rpm	Below 5,400 rpm
Below 2.0V	Approx. 5,100 rpm	Approx. 5,300 rpm



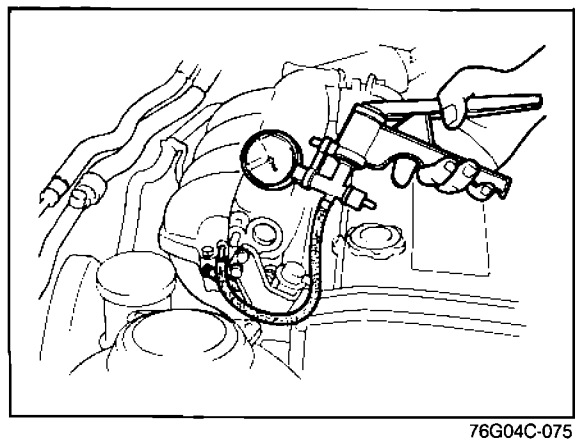
76G04C-074

Vacuum Signal

1. Disconnect the vacuum hose from the actuator.
2. Place a finger over the port opening and check that air is pulled in at idle.
3. Increase the engine speed above specification and check that air is not pulled in.

Specification:
Approx. 5,200 rpm.....Unleaded fuel
Approx. 5,400 rpm.....Leaded fuel

4. Connect the vacuum hose.



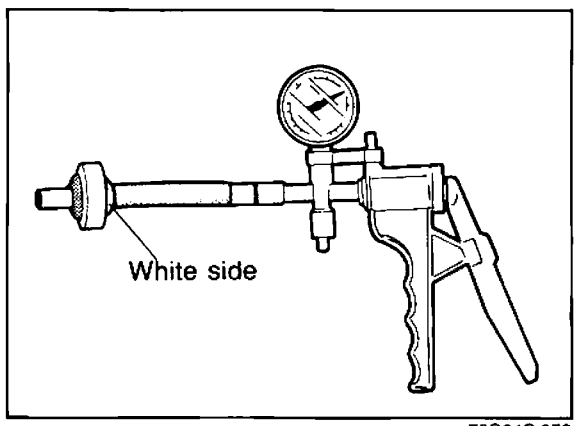
76G04C-075

Vacuum Chamber

1. Disconnect vacuum hose A from the dynamic chamber.
2. Connect the vacuum pump to the dynamic chamber.
3. Apply vacuum and check that it is held.
4. If not correct, check the one-way check valve for vacuum leakage. (Refer to page 4C—43.)

Note
10 mm Hg (0.39 inHg) drop per 30 seconds is allowable.

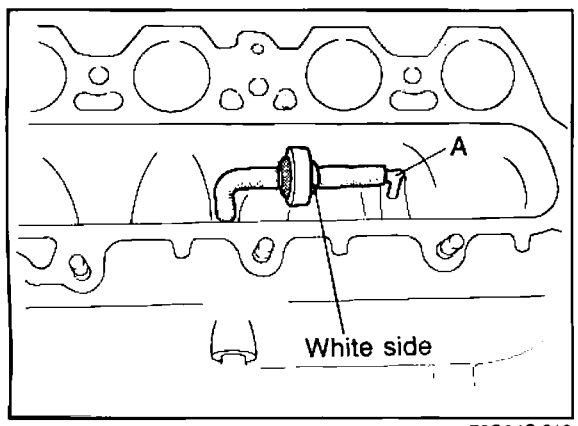
5. If the one-way check valve is good, check the dynamic chamber.



76G04C-076

One-way Check Valve
Inspection

1. Remove the dynamic chamber.
2. Remove the one-way check valve.
3. Connect a vacuum pump as shown in the illustration.
4. Apply vacuum and check that it is held.
5. Connect the vacuum pump to the opposite port.
6. Apply vacuum and check that it is not held.
7. If not correct, replace the valve.

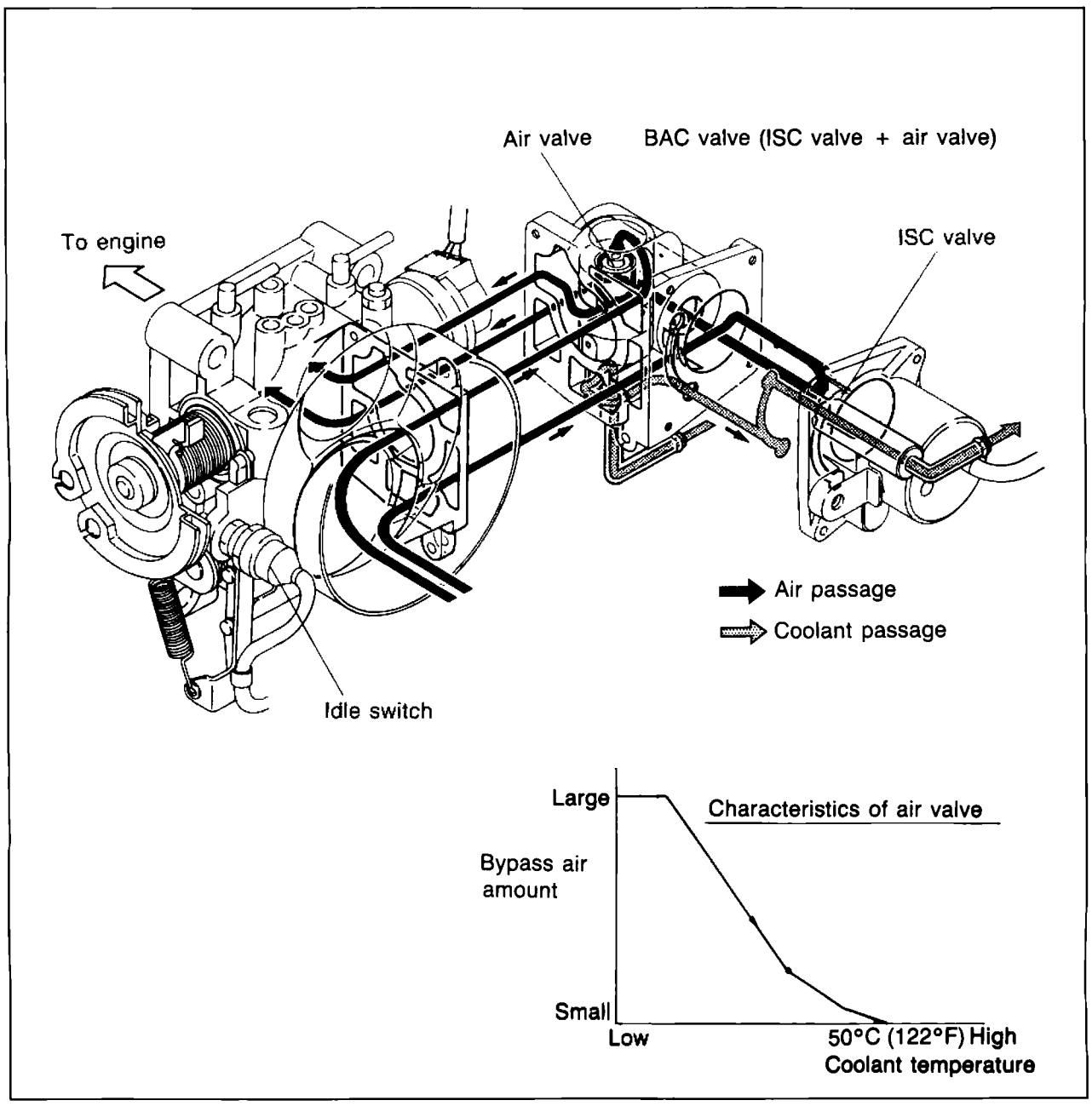


76G04C-210

Replacement

1. Remove the dynamic chamber. (Refer to page 4C—32)
2. Remove the one-way check valve.
3. Install a new valve so that the white side of the valve faces to the port A.

IDLE SPEED CONTROL (ISC) SYSTEM



76G04C-077

To improve idle smoothness, the ISC system controls the intake air amount by regulating the bypass air amount that passes through the throttle body.
This system consists of the BAC valve and the control system.

The BAC valve consists of the air valve which functions only when the engine is cold **(below 50°C (122°F))** and the ISC valve which works throughout the entire engine speed range.

COMPONENT DESCRIPTION

Component	Function	Remark
A/C switch	Detects air conditioner operation; sends signal to engine control unit	Switch ON when air conditioner operating
Air valve	When cold, supplies bypass air into dynamic chamber	• Engine speed increased to shorten warm-up period • Thermo wax type • Installed in BAC valve
Clutch switch	Detects in-gear condition; sends signal to engine control unit	Switch ON when clutch pedal released
E/L control unit	Detects that E/L is being applied; sends signal to engine control unit	
Engine control unit	Detects signals from input sensors and switches; controls solenoid valve (Idle speed control)	
Idle switch	Detects when throttle valve fully closed; sends signal to engine control unit	Installed on throttle body
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor
Neutral switch	Detects in-gear condition; sends signal to engine control unit	Switch ON when in gear
P/S pressure switch	Detects P/S operation; sends signal to engine control unit	Switch ON when steering wheel turned right or left
Solenoid valve (Idle speed control)	Controls bypass air amount	• Controlled by duty signal from engine control unit • Installed in BAC valve • Operates idle-up
Test connector	For initial idle speed adjustment	• Gerrn, 1-pin • Idle speed feedback control cancelled when connector grounded
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	

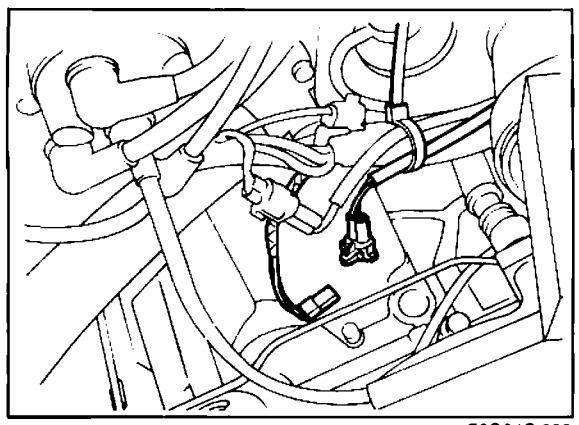
76G04C-078

TROUBLESHOOTING
Check the condition of the wiring harness and connectors before checking the sensors or switches.

Note
Make the system inspection first. If no problem is found, continue with inspection of the next system of the Troubleshooting Guide. (Refer to pages 4C—10 and 11.)

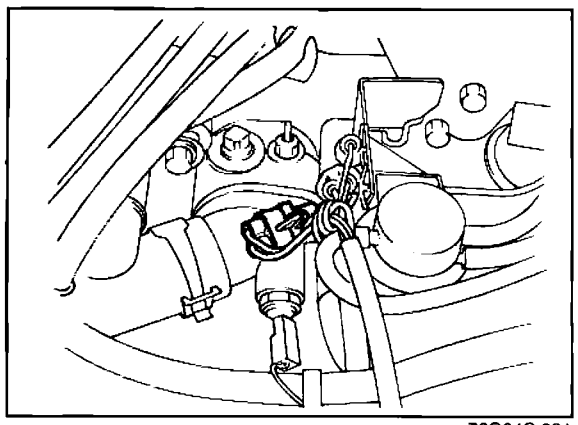
Possible cause / Page / Symptom		Air valve	P/S pressure switch	Solenoid valve (Idle speed control)	Water thermo sensor	Engine control unit terminal			System inspection
						1L	1W	2Q	
		4C—47	4C—97	4C—48	4C—107	4C—98			4C—46
Engine stalls	During warm up	2	—	3	4	—	5	6	1
	After warm up	—	4	2	—	3	5	6	1
Rough idle	During warm up	2	—	3	—	—	4	5	1
	After warm up	—	4	2	—	3	5	6	1
High idle speed after warm up		2	5	3	—	4	6	7	1
Runs rough on deceleration		—	—	2	—	—	3	4	1
Afterburn in exhaust system		2	—	3	—	—	4	5	1
Fails emission test		2	—	3	—	—	4	5	1

76G04C-079



76G04C-080

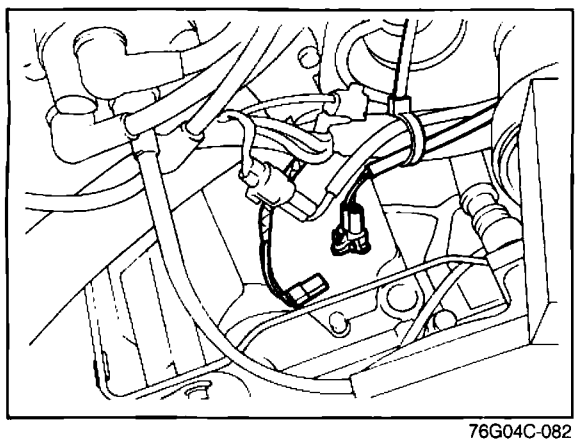
System Inspection
(Air valve)
1. Ground the test connector (Green, 1-pin) with a jumper wire.
2. Disconnect the ISC valve connector (Gray, 2-pin) at idle while the engine is cold.
3. Note the engine speed and reconnect the connector.
4. Warm up the engine to the normal operating temperature and disconnect the connector again.
5. Check that the engine speed is lower than that when cold.



76G04C-081

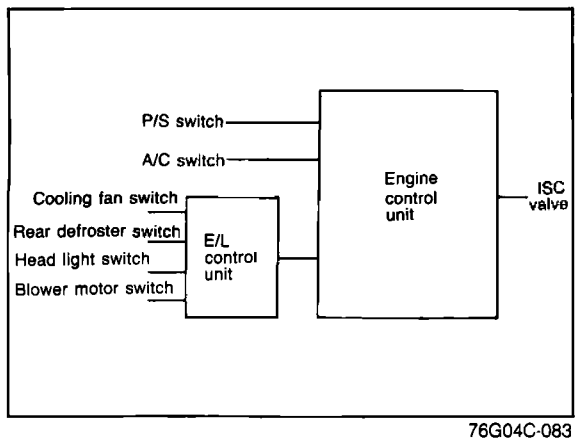
(ISC valve)
6. Connect the ISC valve connector.

Note
a) Make sure that the initial idle speed is set to specification.
b) All accessory must be OFF.



76G04C-082

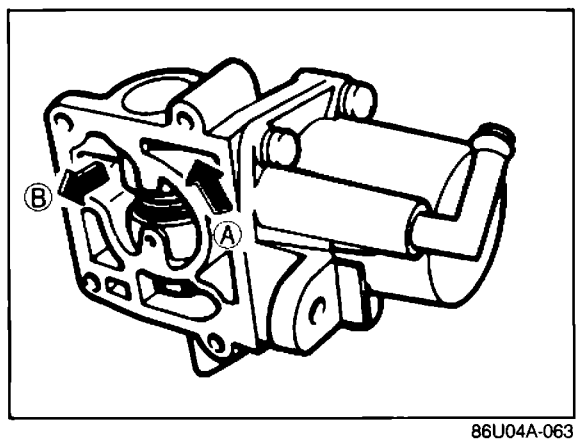
7. Again disconnect the ISC valve connector (engine at normal operating temperature).
8. Check that the engine speed decreases.
9. Reconnect the ISC valve connector.
10 Remove the jumper wire from the test connector and make sure that the idle speed is within specifications.



76G04C-083

(Load Test)
11. Apply power steering, electrical, and air conditioner loads and check that the idle speed is controlled to within specifications.

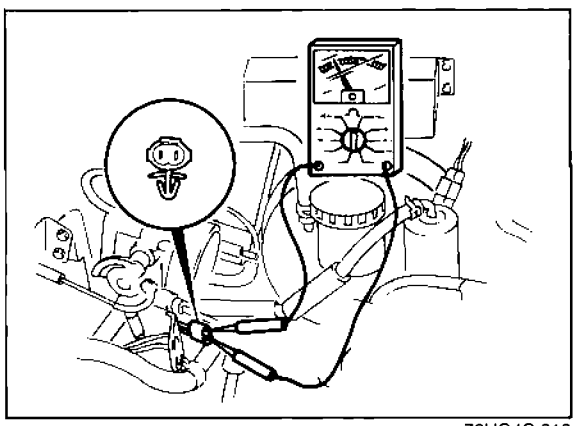
Load	Idle speed
P/S	750 ± 50
E/L	800 ± 50
A/C	800 ± 50
E/L and A/C	800 ± 50



86U04A-063

BAC Valve
Air valve
1. Remove the BAC valve from the throttle body.
2. Blow air through the valve from port A and check that air comes out of port B when the BAC valve is cold..
3. If not correct, replace the BAC valve.

Note
Refer to "Installation" on this page for the BAC valve installation.



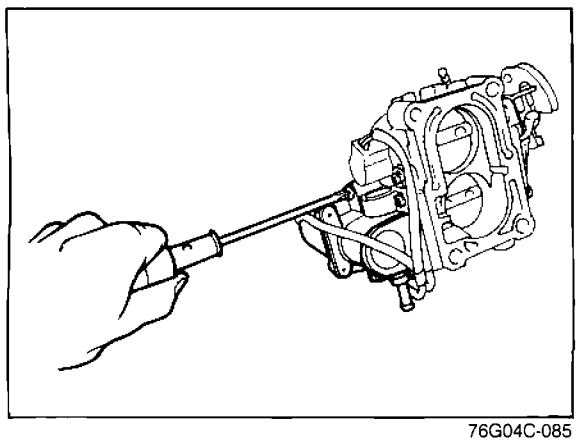
76UG4C-212

ISC valve

1. Disconnect the ISC valve connector.
2. Connect an ohmmeter to the terminals of the ISC valve.
3. Check the resistance.

   Resistance (at 20°C (68°C)): 6.3—9.9 Ω

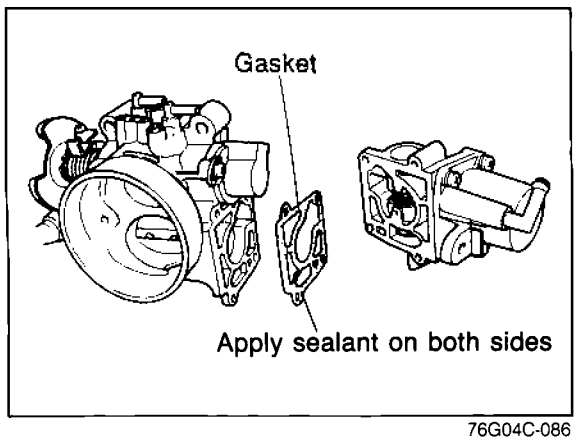
4. If not correct, replace the BAC valve.



76G04C-085

REMOVAL

1. Remove the screws.
2. Remove the BAC valve from the throttle body.



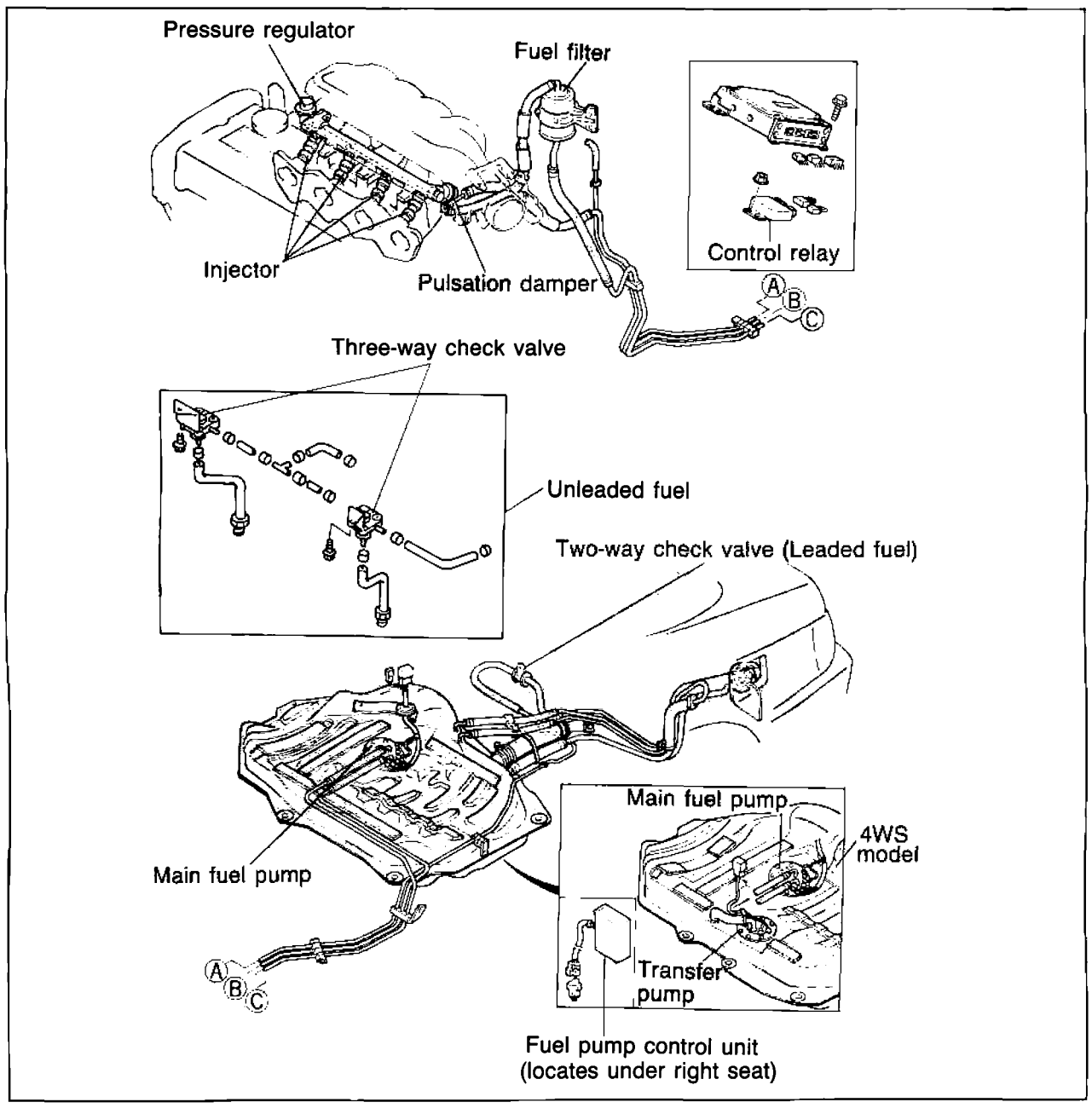
76G04C-086

Installation

Caution
Install a new gasket.

1. Remove any dirt or old sealant from the contact surfaces.
2. Apply sealant to both sides of the gasket.
3. Tighten the screws.

FUEL SYSTEM



76G04C-087

This system supplies the necessary fuel for combustion at a constant pressure to the injectors. Fuel is metered and injected into the intake manifold according to the injection control signals from the engine control unit. It consists of the fuel pump, fuel filters, delivery pipe, pulsation damper, pressure regulator, injectors, fuel pump control unit, and the control relay.
The fuel pump is mounted in the fuel tank to minimize the operating noise of the fuel pump. The injectors directly supplied with battery voltage through the control relay. The connector of the injectors is white to distinguish the injectors for FE DOHC from those of other engines.
Due to the installation of the steering angle transfer shaft for the 4-wheel steering (4WS) the fuel tank of 4WS vehicles is designed with separate right and left sections. A transfer pump is used to pump fuel from the left side to the right side.

COMPONENT DESCRIPTION

Component	Function	Remark
Air flow sensor	Detects amount of intake air; sends signal to engine control unit	
Clutch switch	Detects in-gear condition; sends signal to engine control unit	Switch ON when clutch pedal released
Engine control unit	Detects signals from input sensors and switches; controls injector and fuel pump operations	
Fuel filter	Filters fuel	
Fuel pump	Provides fuel to injectors	• Operates while engine running • Installed in fuel tank
Fuel pump control unit (4WS)	Monitors fuel level in left section; controls transfer pump operation	
G signal pick-up	Detects No.1 cylinder TDC; sends signal to engine control unit	Installed in distributor
Idle switch	Detects when throttle valve fully closed; sends signal to engine control unit	Installed on throttle body
Ignition switch (ST position)	Sends engine cranking signal to engine control unit	
Injector	Injects fuel into intake port	• Controlled by signals from engine control unit • High-ohmic injector
Intake air thermo sensor	Detects intake air temperature; send signal to engine control unit	
Control relay	Supplies electric current to injectors fuel pump and engine control unit	
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor
Neutral switch	Detects in-gear condition; sends signal to engine control unit	Switch ON when in gear
Oxygen sensor (Unleaded fuel)	Detects oxygen concentration; sends signal to engine control unit	• Zirconia ceramic and platinum coating • Integrated heater coil
Pressure regulator	Adjusts fuel pressure supplied to injectors	
Pulsation damper	Absorbs fuel pulsation	
Throttle sensor	Detects throttle valve opening angle; sends signal to engine control unit	Installed on throttle body
Transfer pump (4WS)	Pumps fuel from the left to the right side	Controlled by fuel pump control unit
Transfer pump switch (4WS)	Detects fuel level in left section; sends signal to control unit	
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	
Water thermo switch (Unleaded fuel)	Detects radiator coolant temperature; sends signal to engine control unit	ON: above 17°C (63°F)

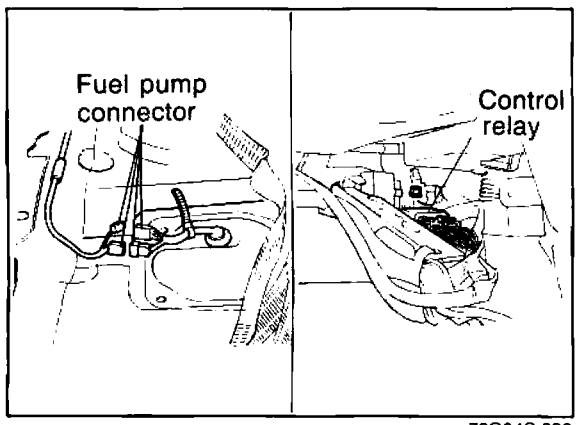
76G04C-088

TROUBLESHOOTING
Checking the condition of the wiring harness and connectors before checking the sensors or switches.

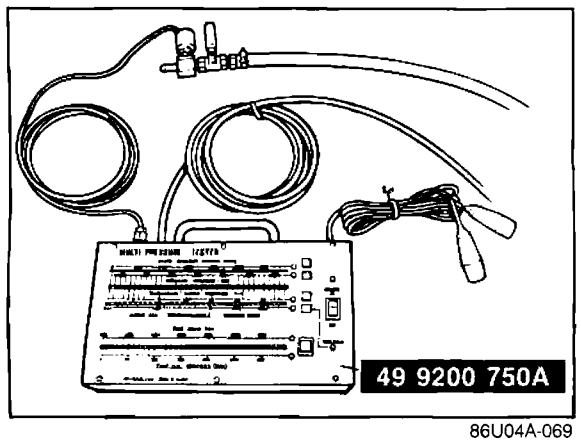
Note
If no problem is found, continue with inspection of the next system of Troubleshooting Guide. (Refer to page 4C—10, and 11)

Possible cause / Page / Symptom			Air flow sensor	Intake air thermo sensor	Oxygen sensor	Throttle sensor	Water thermo sensor	Water thermo switch	Fuel pump	Injector	Fuel pressure	Engine control unit terminal			Transfer pump (4WS)	Transfer pump switch (4WS)	Fuel pump control unit (4WS)
												1Q	3C,3E 3F,3H	3B			
			4C–103	4C–110	4C–107	4C–104	4C–107	4C–106	4C–56	4C–57	4C–54	4C–98			4C–59		
Unleaded fuel	Hard start or won't start (Cranks OK)		—	—	—	—	9	—	1	7	—	2	8	6	3	4	5
	Engine stalls	During warm up	4	—	—	—	3	—	—	2	1	—	5	—	—	—	—
		After warm up	1	—	—	—	—	—	—	3	2	—	4	—	—	—	—
	Rough idle	During warm up	5	—	—	—	3	—	—	2	1	—	4	—	—	—	—
		After warm up	1	6	—	—	4	—	—	3	2	—	5	—	—	—	—
	Poor acceleration, hesitation, or lack of power		1	—	—	3	5	—	—	4	2	—	6	—	—	—	—
	Runs rough on deceleration		1	—	—	—	—	—	—	2	—	—	3	—	—	—	—
	Afterburn on deceleration		1	—	—	—	—	—	—	2	—	—	3	—	—	—	—
	Poor fuel consumption		6	—	5	—	4	—	—	2	1	—	3	—	—	—	—
	Engine stalls or runs rough after hot starting		1	5	—	—	—	—	—	3	2	—	4	—	—	—	—
	Fails emission test		—	—	1	—	—	2	—	3	—	—	4	—	—	—	—
Leaded fuel	Hard start or won't start (Cranks OK)		—	—	—	—	9	—	1	7	—	2	8	6	3	4	5
	Engine stalls	During warm up	4	—	—	—	3	—	—	2	1	—	5	—	—	—	—
		After warm up	1	—	—	—	—	—	—	3	2	—	4	—	—	—	—
	Rough idle	During warm up	5	—	—	—	3	—	—	2	1	—	4	—	—	—	—
		After warm up	1	6	—	—	4	—	—	3	2	—	5	—	—	—	—
	Poor acceleration, hesitation, or lack of power		1	—	—	—	4	—	—	3	2	—	5	—	—	—	—
	Runs rough on deceleration		1	—	—	—	—	—	—	2	—	—	3	—	—	—	—
	Afterburn on deceleration		1	—	—	—	—	—	—	2	—	—	3	—	—	—	—
	Poor fuel consumption		5	—	—	—	4	—	—	2	1	—	3	—	—	—	—
	Engine stalls or runs rough after hot staring		1	5	—	—	—	—	—	3	2	—	4	—	—	—	—
	Fails emission test		—	—	—	—	—	—	—	1	—	—	2	—	—	—	—

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76G04C-090



86U04A-069

FUEL PRESSURE RELEASE AND SERVICING FUEL SYSTEM

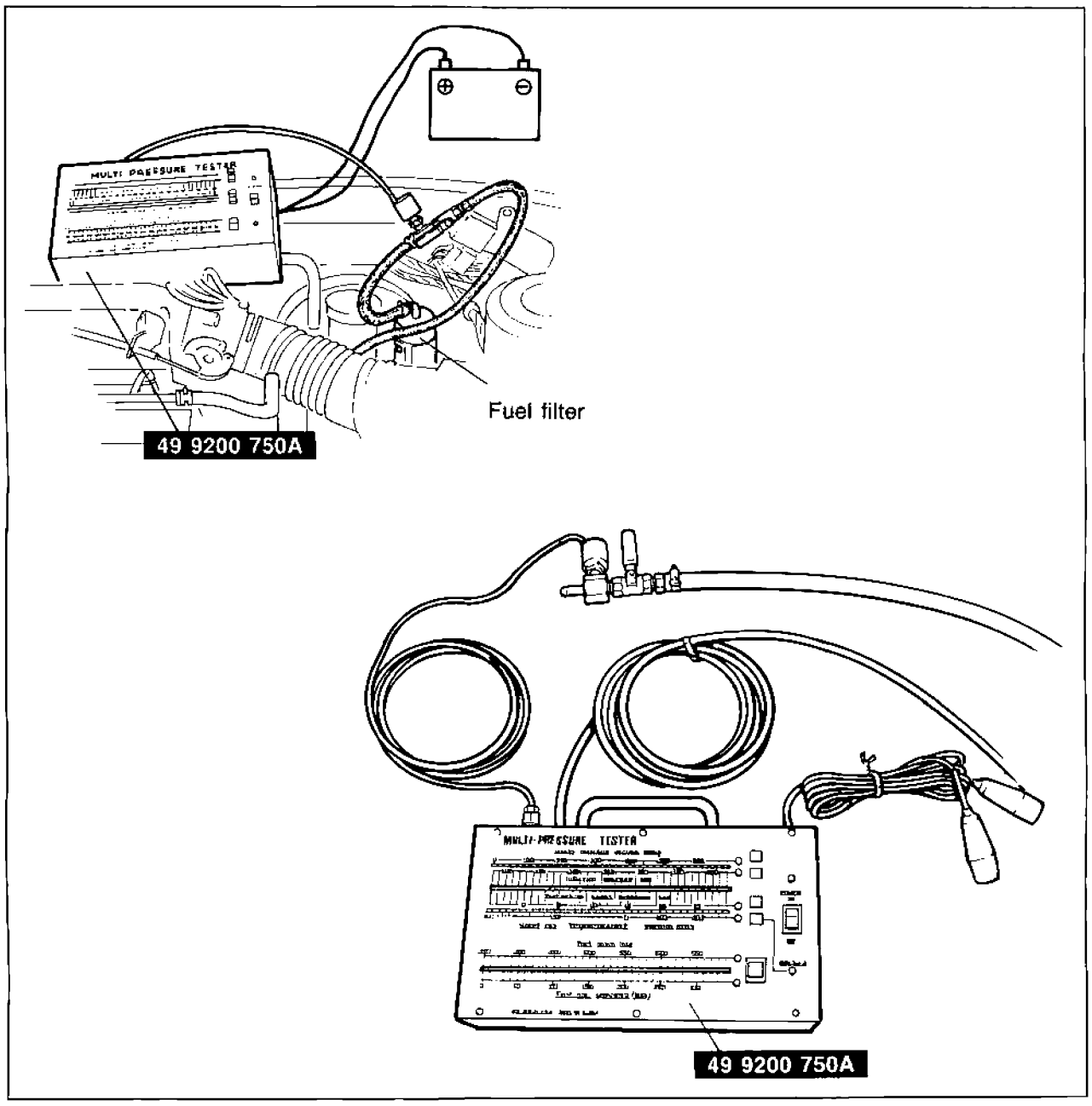
Fuel in the fuel system remains under high pressure even when the engine is not running.

a) Before disconnecting any fuel line, release the fuel pressure from the fuel system to reduce the possibility of injury or fire.
   1. Start the engine.
   2. Disconnect the 4-pin connector from the control relay or the fuel pump connector (5-pin or 6-pin).
   3. After the engine stalls, turn OFF the ignition switch.
   4. Reconnect the relay or fuel pump connector.

b) Use a rag as protection from fuel spray when disconnecting the hoses.
   Plug the hoses after removal.

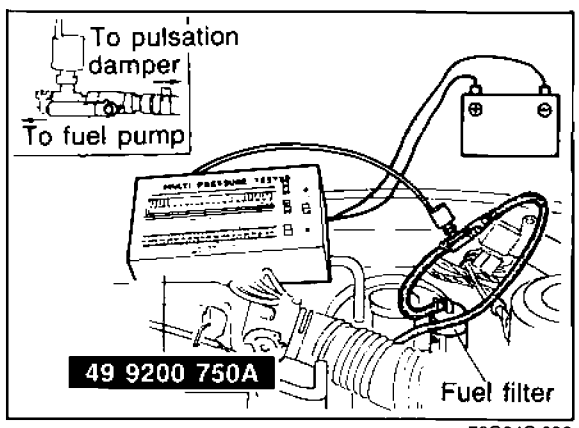
c) When inspecting the fuel system, use the **SST**.

MULTI-PRESSURE TESTER (49 9200 750A)



76G04C-091

The **MULTI-PRESSURE TESTER** (49 9200 750A) has been developed to check the fuel pressure and the intake manifold vacuum.



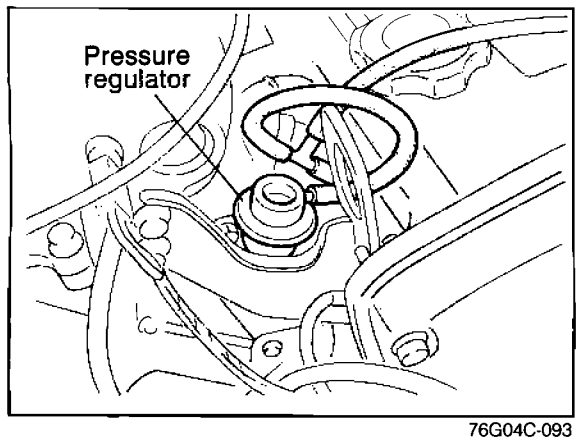
76G04C-092

How to Connect Multi-Pressure Tester

Warning
Before connecting the SST, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page 4C—52.)

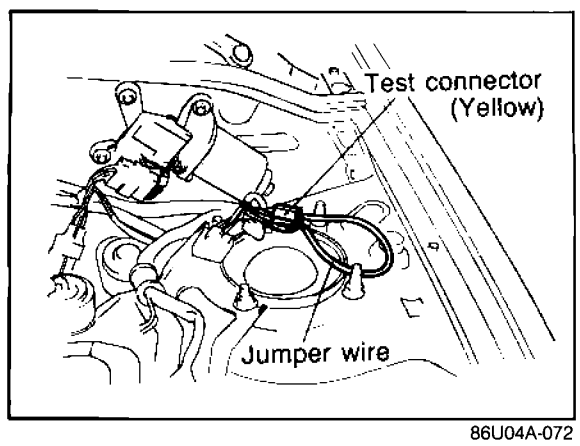
1. Disconnect the negative battery terminal.
2. Disconnect the fuel main hose from the fuel filter.
3. Connect the **SST** and adapter between the fuel main hose and the fuel pump.

Caution
Do not reverse the adapter connection.



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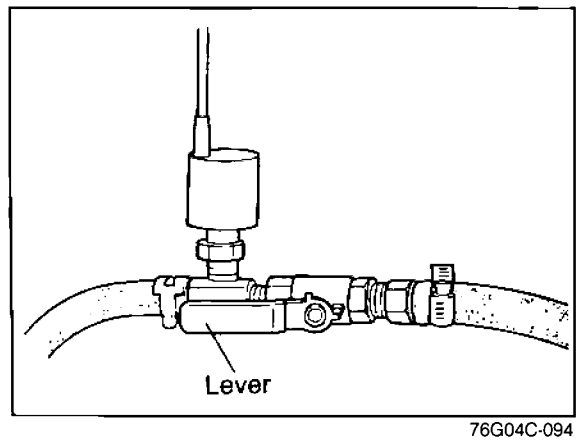
4. Disconnect the vacuum hose from the pressure regulator. Connect the **SST** to the vacuum hose with a three-way joint.
5. Connect the negative battery terminal.
6. Connect the **SST** to the battery.



86U04A-072

7. Connect the terminals of the test connector (Yellow) with a jumper wire. Turn the ignition switch ON to operate the fuel pump.
8. Check for fuel leaks.

Caution
After checking for fuel leakage, turn the ignition switch OFF and disconnect the jumper wire from the test connector.

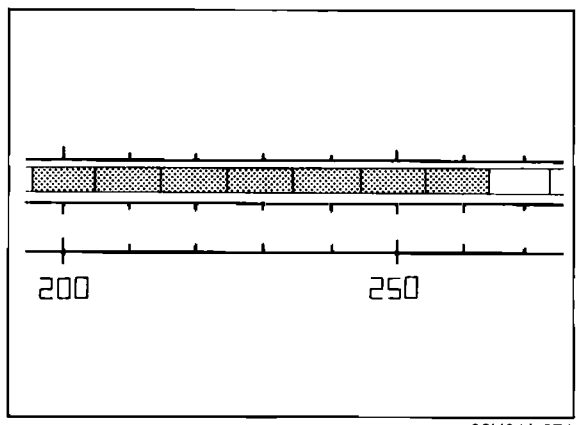


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FUEL PRESSURE

Note
Warm up the engine to normal operating temperature.

Injection Pressure
1. Set the lever on the adapter as shown in the figure.

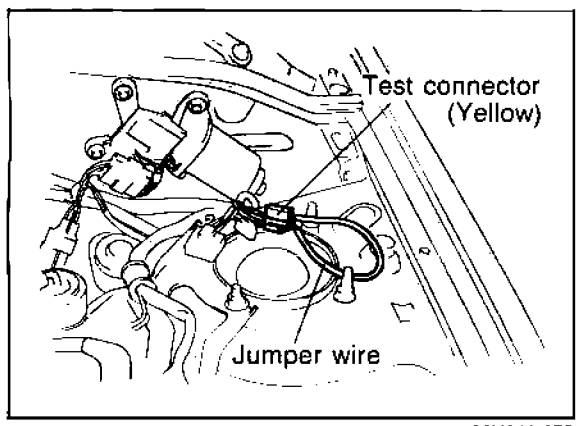


86U04A-074

2. Run the engine and measure the injection pressure at various speeds.

Injection pressure: Approx. 235—275 kPa (2.4—2.8 kg/cm^2, 34—40 psi)

3. If not within specification, check the fuel pump pressure and fuel line pressure.



86U04A-075

Fuel Pump Pressure

1. Connect the terminals of the test connector (Yellow) with a jumper wire.
2. Turn the ignition switch ON to operate the fuel pump.
3. Set the lever on the adapter as shown in the figure.
4. Check the fuel pump pressure.

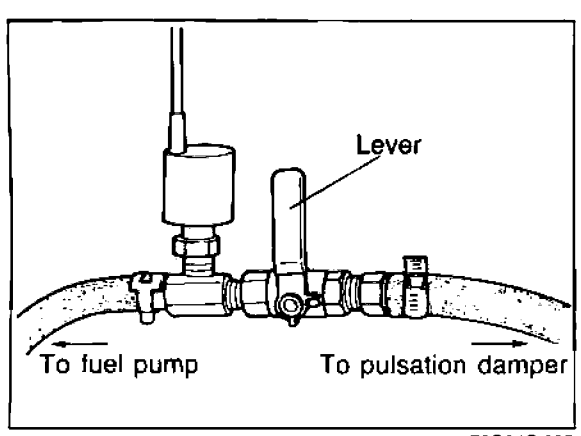
Fuel pump pressure: 441—588 kPa (4.5—6.0 kg/cm^2, 64—85 psi)

5. If the fuel pump pressure is not within specification, check the following;

No pressure
- **Fuel pump operation (Refer to page 4C—56.)**

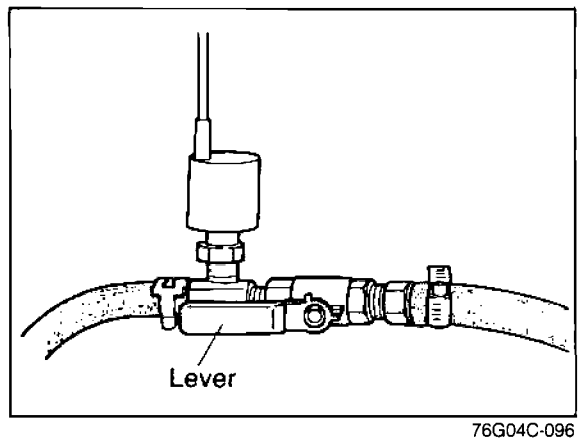
Low pressure
- **Fuel pump feeding capacity (Refer to page 4C—56.)**

High pressure
- **Replace the fuel pump**



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6. After checking the fuel pump pressure, disconnect the jumper wire from the test connector.



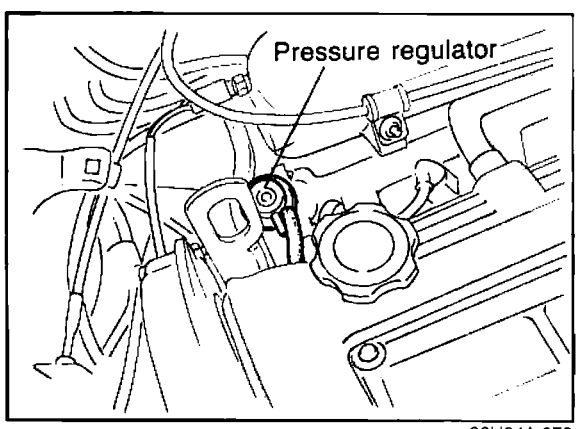
76G04C-096

Fuel Line Pressure

1. Start the engine and run it idle.
2. Set the lever on the adapter as shown in the figure.
3. Check the fuel line pressure.

Fuel line pressure: Approx. 186—226 kPa (1.9—2.3 kg/cm^2, 27—33 psi)

4. If not within specification, check the pressure regulator vacuum hose.

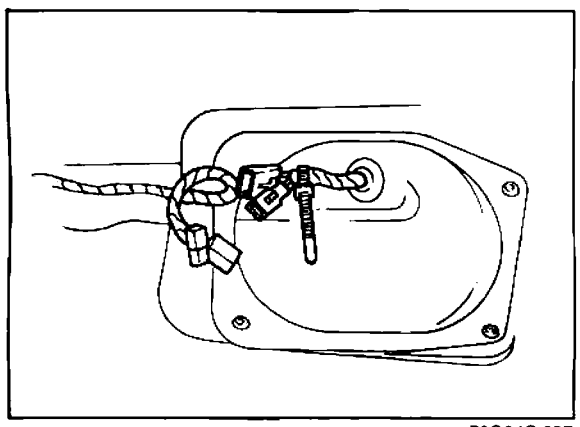


86U04A-078

5. Disconnect the vacuum hose from pressure regulator, and place a finger over the end of the hose.
6. Check the fuel line pressure.

Fuel line pressure: 235—275 kPa (2.4—2.8 kg/cm^2, 34—40 psi)

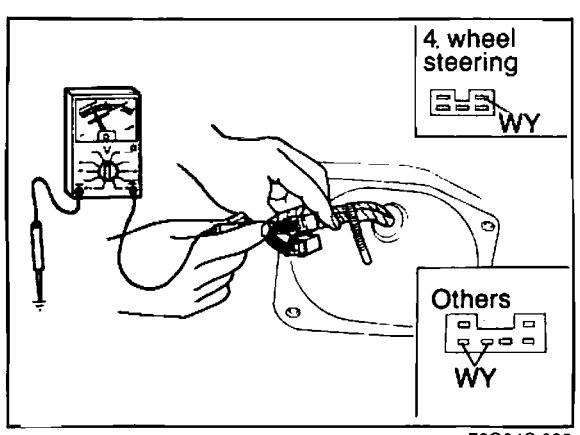
7. If not within specification, replace the pressure regulator.
8. Connect the vacuum hose to pressure regulator.



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FUEL PUMP
Operation Test

1. Connect a jumper wire to the test connector (Yellow).
2. Remove the fuel filler cap.
3. Disconnect transfer pump connector (8-pin).
4. Turn the ignition switch ON.
5. Listen for operational sound of the fuel pump at the filler inlet.
6. Install the fuel filler cap.

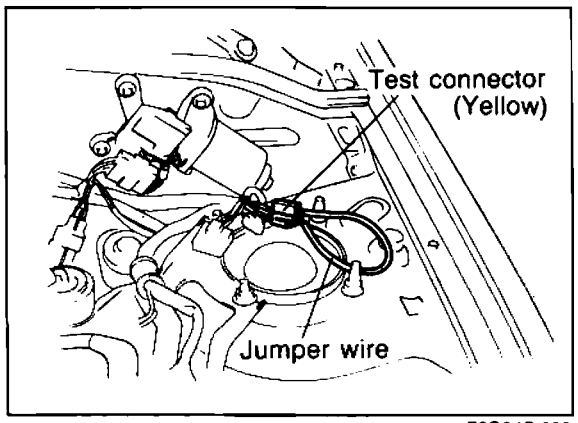


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7. If no sound was heard, check the voltage at the fuel pump connector (WY wire and a ground).

Voltage: 12V

8. If the voltage is normal, replace the fuel pump.
9. If not correct, check the control relay and circuit (Refer to page 4C—96.)
10. Disconnect the jumper wire.

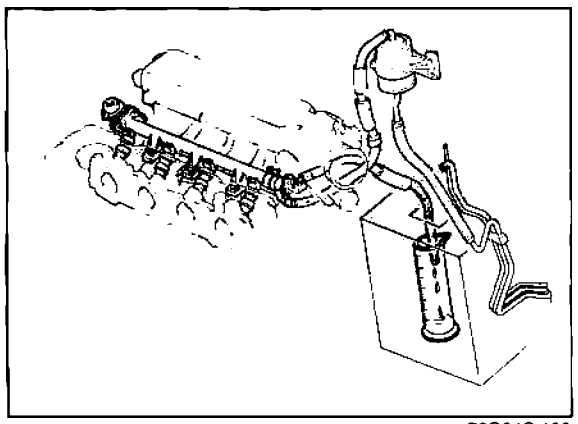


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Volume Test

Warning
Before performing the following procedures, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page 4C—52)

1. Connect a jumper wire to test connector (Yellow).
2. Disconnect the fuel return hose from fuel return pipe.

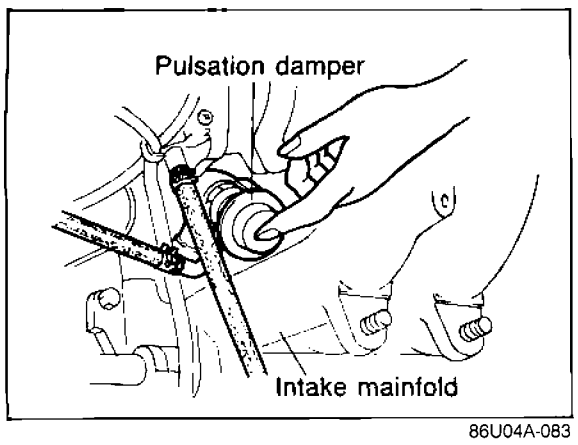


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3. Turn the ignition switch ON for 10 seconds, and check the feeding capacity with graduated cylinder.

   Feeding capacity:
   Minimum 220 cc (13.4 cu in)/10 sec.

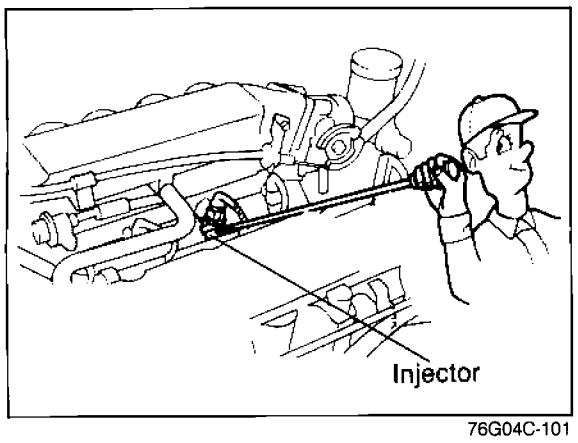
4. If not within specification, check the fuel filter, fuel lines and fuel pump.
5. Turn the ignition switch OFF and disconnect the jumper wire.



86U04A-083

PULSATION DAMPER

1. Run the engine at idle.
2. Place a finger on the screw of the pulsation damper head.
3. Check that pulsation is felt.

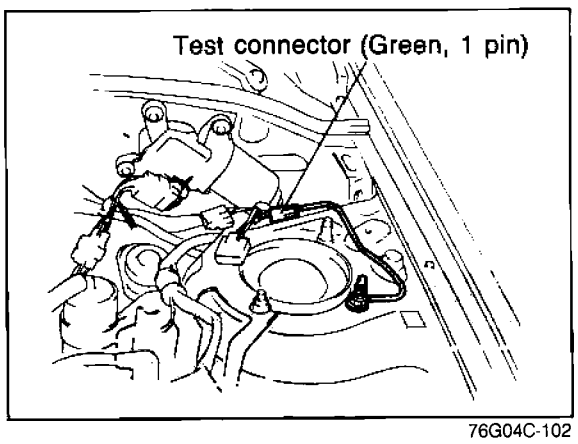


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INJECTOR

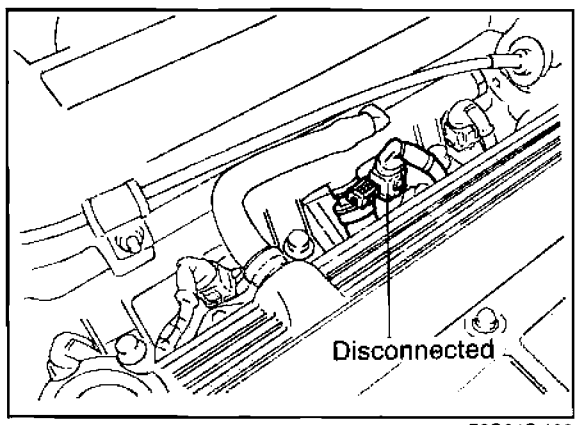
On-vehicle Inspection

1. Warm up the engine and run it at idle.
2. Listen for operational sound of the injector with a screwdriver or a sound scope.



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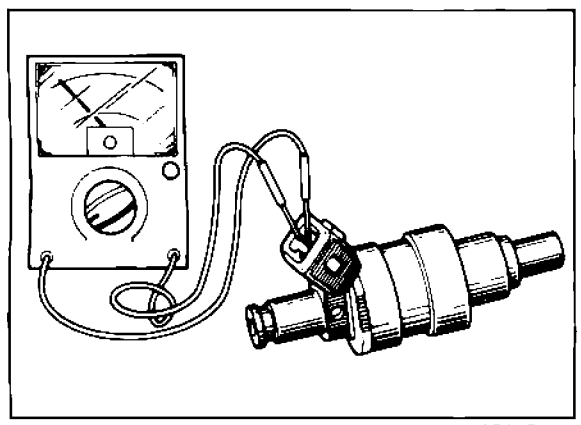
3. Ground the test connector (Green, 1-pin).



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4. Disconnect the connector from each injector respectively.
5. Check that the engine speed decreases about **100—200 rpm** each time.
6. If not correct, check the following:

No operating sound and no speed drop
Check injector wiring harness
No speed drop only
Injector resistance
Injection volume of injector

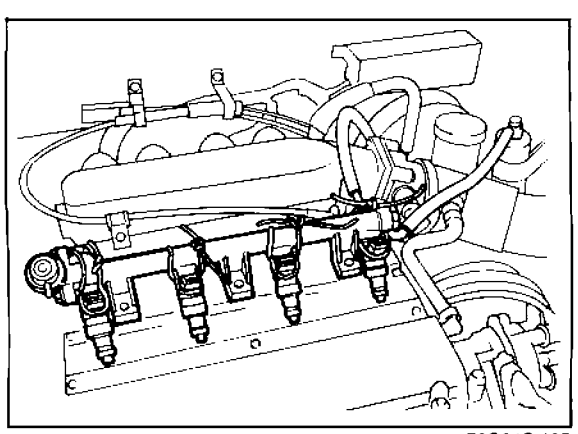


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Inspection
Perform the following inspections.

Resistance
1. Remove the injectors from the engine. (Refer to page 4C—61.)
2. Check the resistance of each injector with an ohmmeter.
3. If not correct, replace the injector.

Resistance: 12—16 Ω

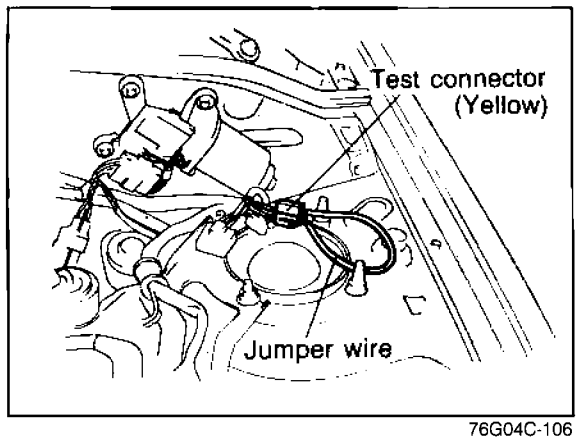


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Fuel leakage test and volume test
1. Remove the injectors and delivery pipe. (Refer to pages 4C—61 and 63.)
2. Affix the injectors to the delivery pipe with wire.

Caution
Affix the injectors firmly so that no movement is possible.

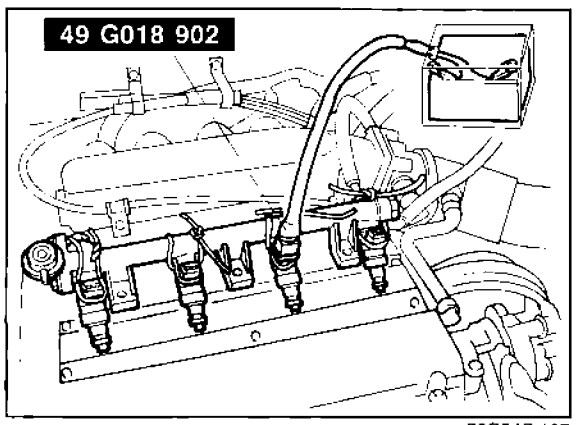
Warning
Be extremely careful when working with fuel. Always work away from sparks or open flames.



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3. Connect the terminals of the test connector (Yellow) with a jumper wire. Turn the ignition switch ON.
4. Check that no fuel leaks from the injector nozzles.

Note
After 1 minute, a drop of fuel from the injector is acceptable.



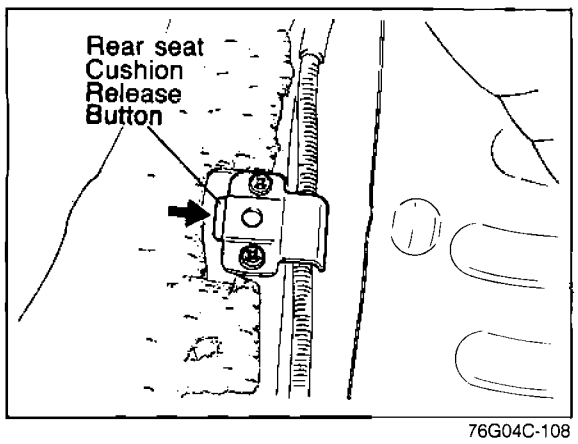
76G04C-107

5. Connect the **SST** to the battery and injector.
6. Check the injection volume with a graduated container.

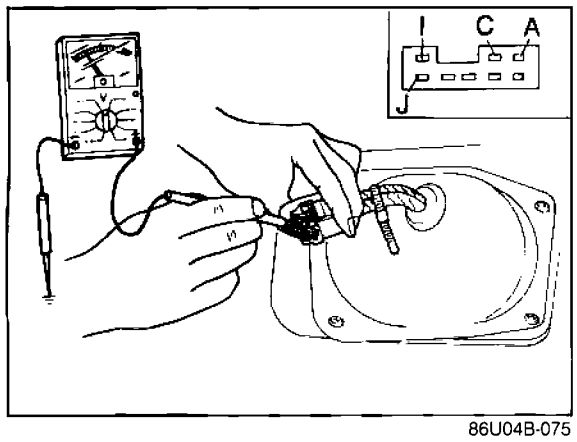
Injection volume:
Approx. 66—91 cc (4.03—5.55 cu in) /15 sec.

Caution
When using the SST, make sure of the SST number and use correct one.

7. If not correct, replace the injector.



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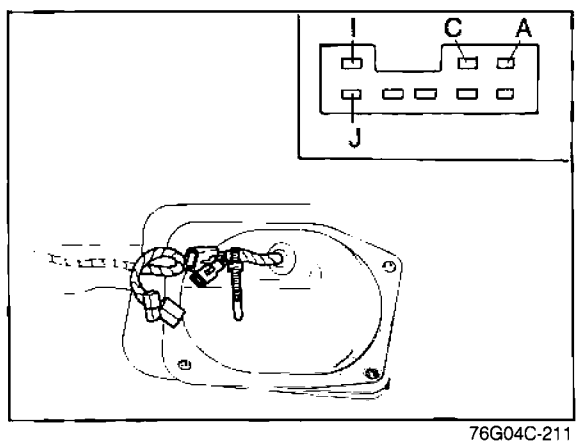
TRANSFER PUMP CONTROL SYSTEM (4 WHEEL STEERING)

1. Remove the rear seat. (Refer to 14 section.)
2. Remove the fuel filler cap.
3. Turn the ignition switch ON.

Note
a) The tank should be more than 1/3 full.
b) Due to the delay timer, transfer pump operation begins approx. 10 sec. after the ignition switch is turned ON.

4. Listen for the operational sound of the transfer pump.
5. Install the fuel filler cap.
6. If no sound was heard, check the voltage at the transfer pump connector.

Terminal (wire)	Voltage
A, C (WG)	Approx. 12V
I, J (B)	0V

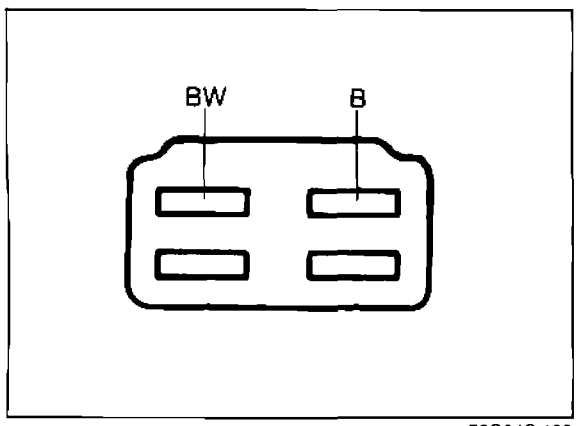


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7. If the voltages are correct, replace the transfer pump.
8. If not correct, disconnect the transfer pump connector.
9. Check the voltage at the terminals below.

Terminal (wire)	Voltage
A, C (WG)	Approx. 12V
I, J (B)	0V

10. If the voltages are correct, replace the transfer pump.

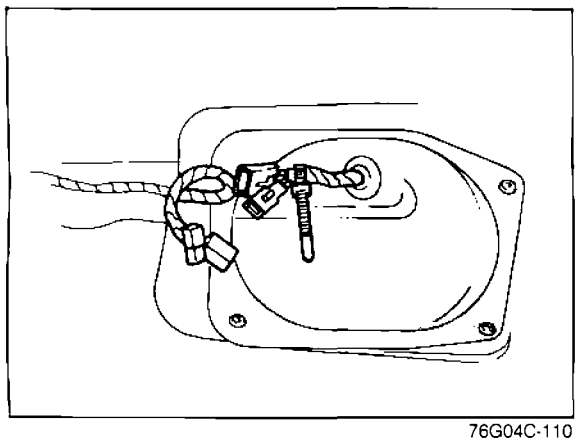


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11. If not correct, check the voltage at terminals of the fuel pump control unit.

Terminal (wire)	Voltage
A (B)	Approx. 12V
C (BW)	0V

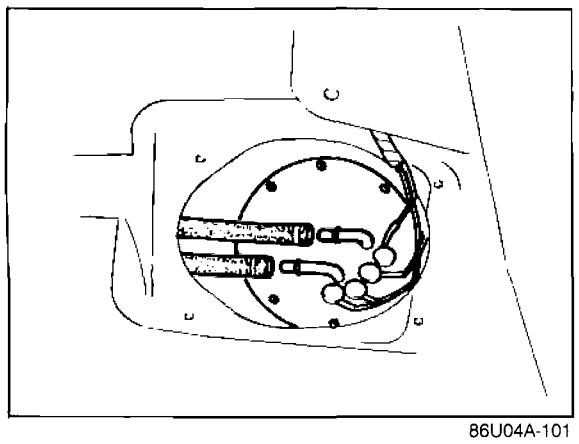
12. If the voltages are correct, replace the fuel pump control unit.
13. If not correct, repair the power supply circuit or the ground circuit for the fuel pump control unit.



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REPLACEMENT

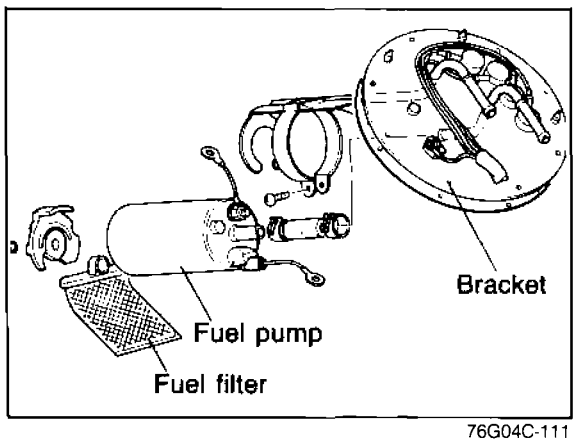
Caution
A) Before performing the following procedure, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page 4C—52.)
b) When servicing the fuel system, keep sparks, cigarettes, and open flames away from the fuel.



86U04A-101

Fuel Pump

1. Remove the rear seat and disconnect the fuel pump connector.
2. Remove the service hole cover.
3. Disconnect the fuel hoses.
4. Remove the fuel pump and fuel tank gauge assembly.

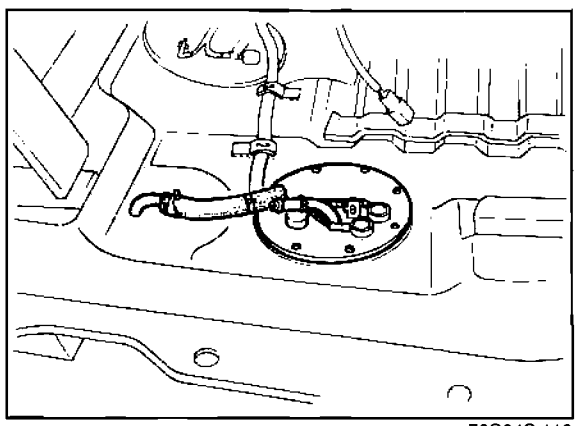


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5. Replace the fuel pump.

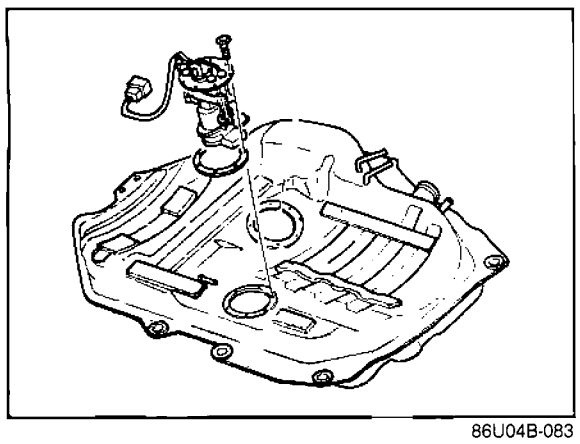
Caution
Secure the fuel pump terminals and fuel hoses tightly.

6. Install in the reverse order of removal.



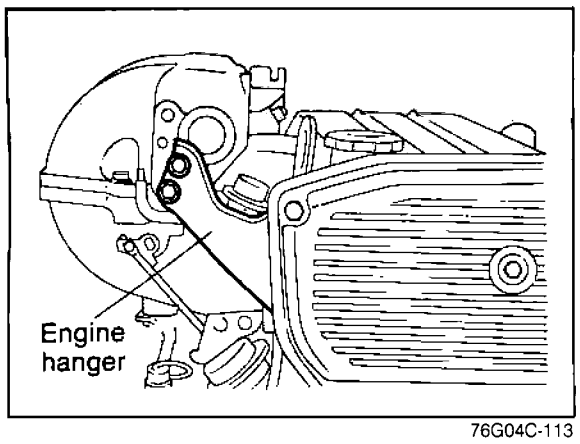
76G04C-112

Transfer Pump
1. Remove the fuel tank. (Refer to page 4C—65.)
2. Disconnect the fuel hoses from the transfer pump.



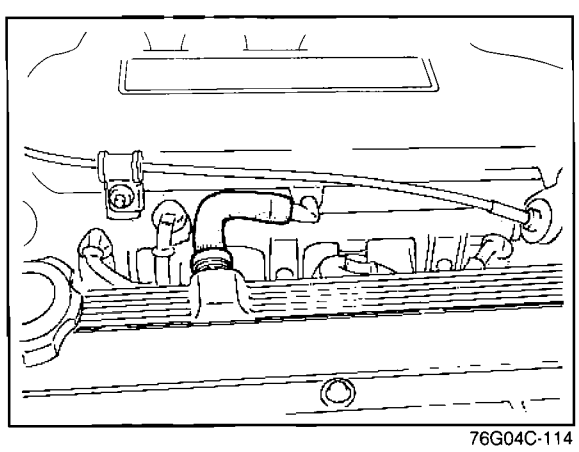
86U04B-083

3. Remove the transfer pump.
4. Install in the reverse order of removal.



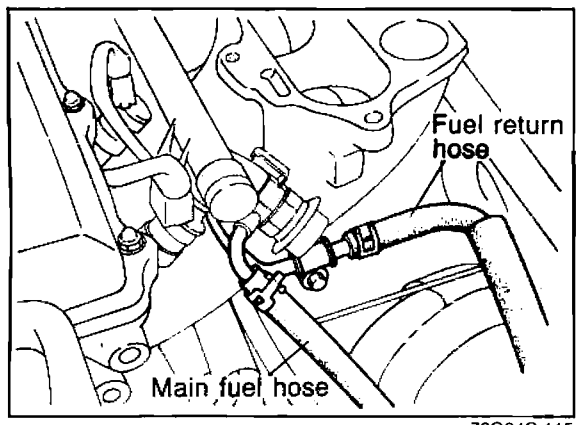
76G04C-113

Injector
1. Remove the engine hanger.
2. Remove the wiring harness bracket.



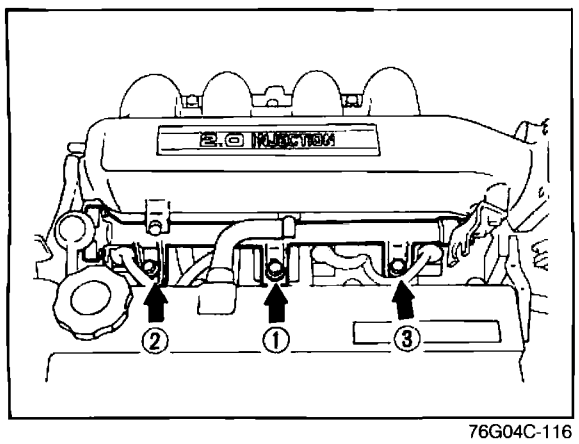
76G04C-114

3. Disconnect the PCV valve and hose from the dynamic chamber.



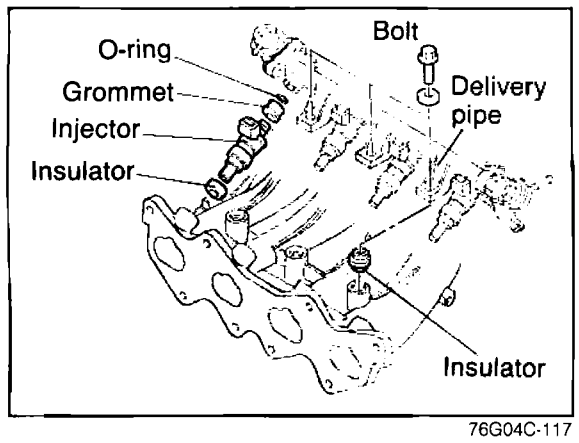
76G04C-115

4. Disconnect the main fuel hose from the delivery pipe assembly.
5. Disconnect the fuel return hose from the fuel return pipe.
6. Remove fuel return pipe mounting bolt.



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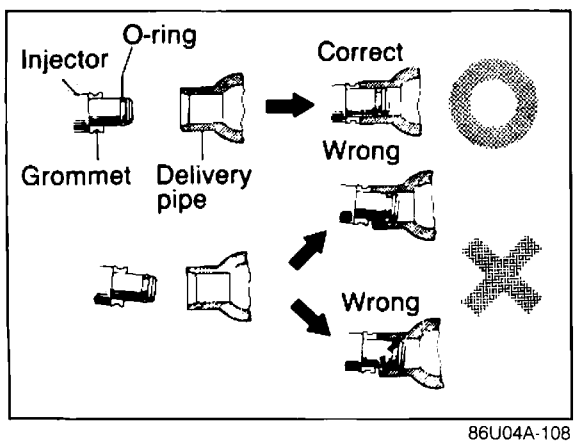
7. Remove the delivery pipe assembly mounting bolts and insulators.



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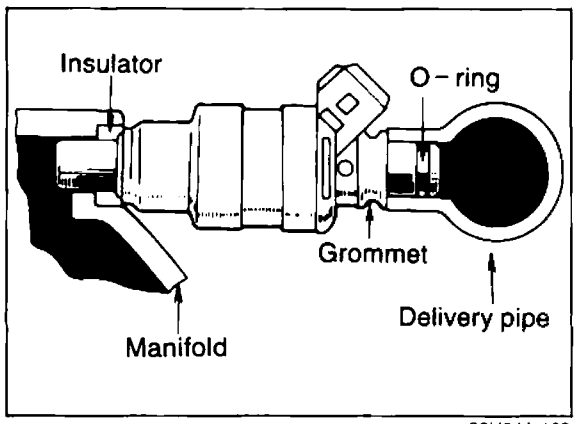
8. Remove the grommets, injectors, and insulators.
9. Install in the reverse order of removal, referring to the installation note.

Tightening torque:
Delivery pipe, dynamic chamber, and engine hanger
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



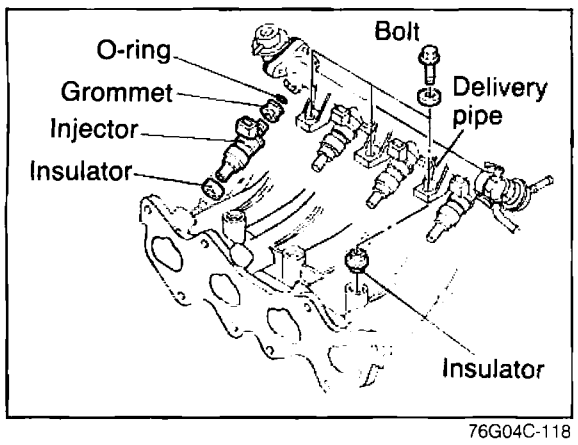
86U04A-108

Installation note
Injector
1. Use new O-rings.
2. Apply a small amount of engine oil to the O-rings when installing.



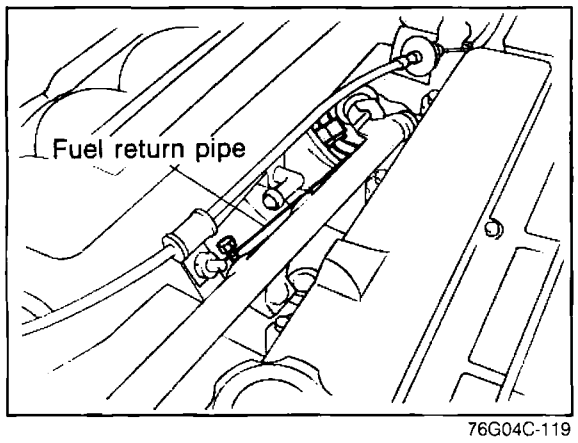
86U04A-109

3. Install the injectors and the injector insulators.



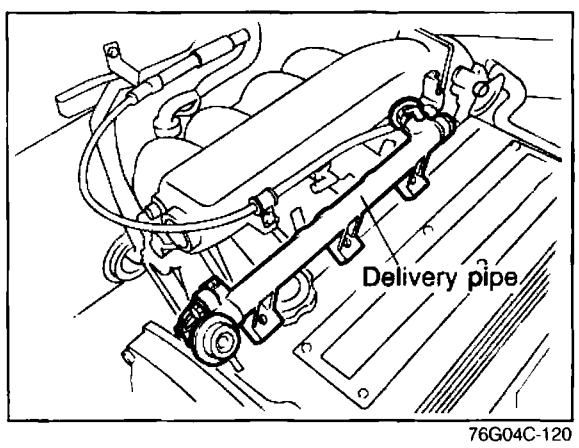
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Insulator
Install the insulators between the intake manifold and the delivery pipe.



76G04C-119

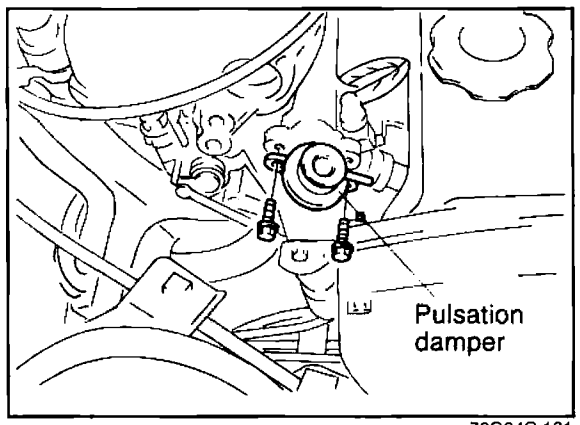
Delivery Pipe
1. Remove the injectors. (Refer to page 4C—61.)
2. Separate the fuel return pipe from the delivery pipe assembly.



76G04C-120

3. Replace the delivery pipe.
4. Install in the reverse order of removal, referring to the installation note.

Tightening torque:
Fuel return pipe 8—11 N·m (0.8—1.1 m-kg, 69—95 in-lb)

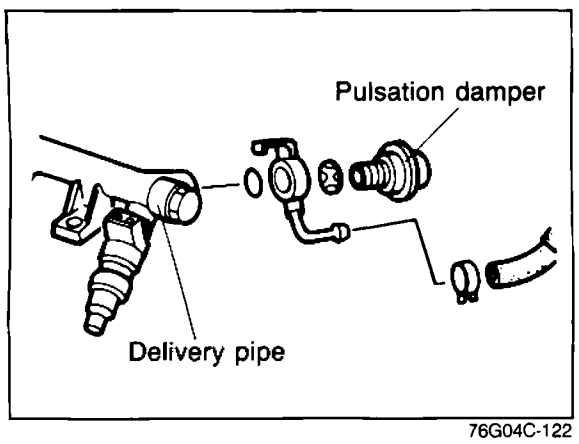


76G04C-121

Pressure Regulator

1. Remove the engine hanger.
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the pressure regulator.
4. Install in the reverse order of removal.

Tightening torque:
8—11 N·m (0.8—1.1 m-kg, 69—95 in-lb)

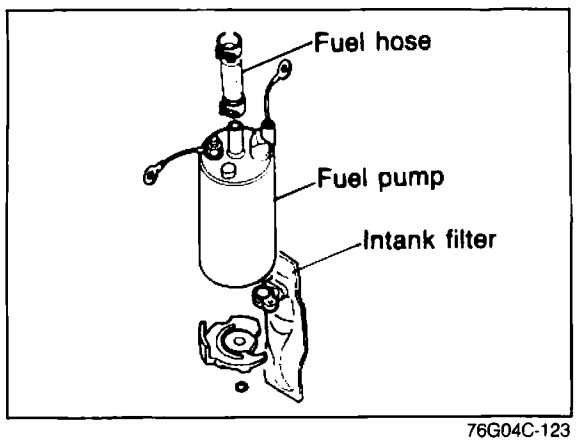


76G04C-122

Pulsation Damper

1. Remove the delivery pipe assembly. (Refer to page 4C—63.)
2. Remove the pulsation damper.
3. Install in the reverse order of removal.

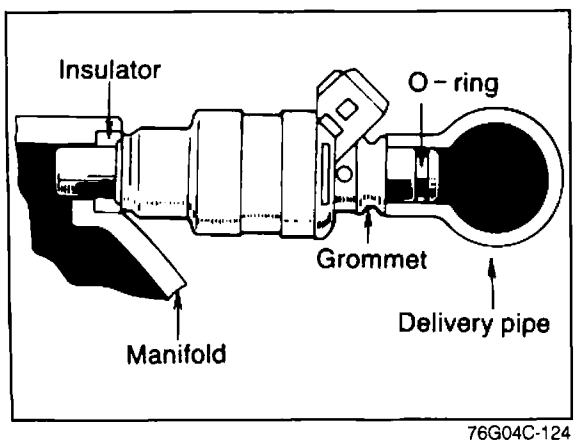
Tightening torque:
25—34 N·m (2.5—3.5 m-kg, 18—25 ft-lb)



76G04C-123

Fuel Filter
Low pressure side (In-tank filter)
Refer to page 4C—60.

High pressure side
The fuel filter must be replaced at the intervals outlined in the maintenance schedule.



76G04C-124

Warning
Always work away from sparks or open flames.

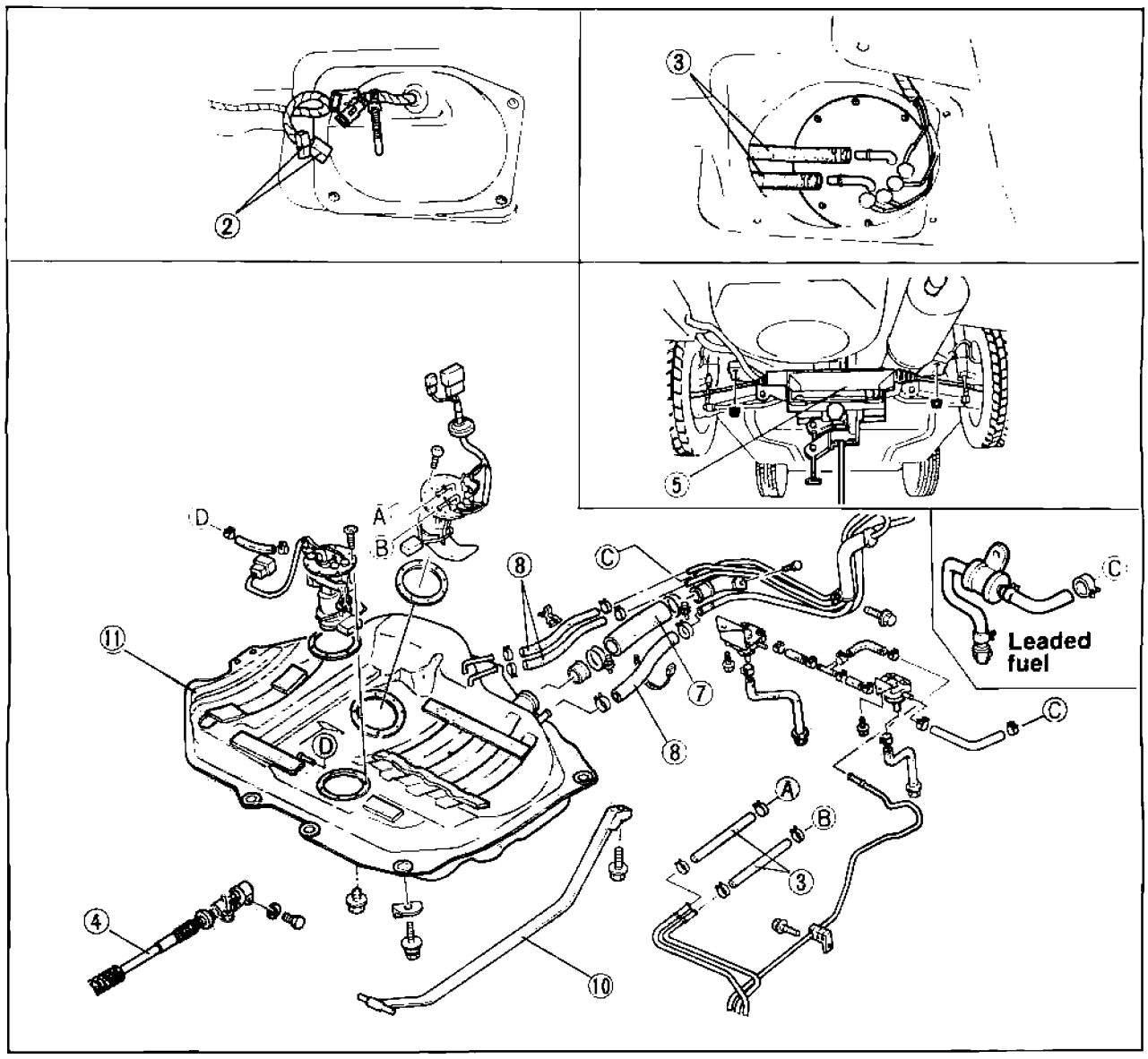
1. Disconnect the fuel hoses from the fuel filter.
2. Remove the fuel filter and the bracket.
3. Install a new filter and the bracket.
4. Connect the fuel hoses.

Note
When installing the filter, push the fuel hoses fully onto the fuel filter and secure them with spring clamps.

FUEL TANK
Removal

Caution
a) Before performing the following procedure, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page 4C—52.)
b) When removing the fuel tank, keep sparks, cigarettes, and open flames away from the fuel tank.

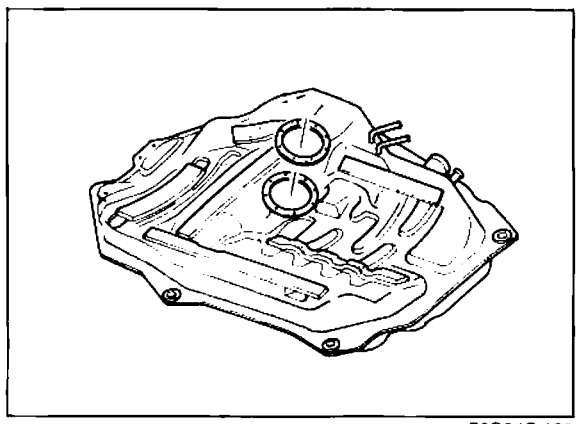
Remove in the sequence shown in the figure.



76G04C-125

Note
Drain the fuel from the fuel tank before removing the tank.

1. Remove fuel filler cap.
2. Fuel pump connectors
3. Fuel hoses
4. Steering angle transfer shaft (4-wheel steering) (Refer to section 10)
5. Cross member (4-wheel steering)
6. Evaporative hoses
7. Fuel filler hose
8. Breather hose
9. Parking cable bracket
10. Fuel tank strap
11. Fuel tank



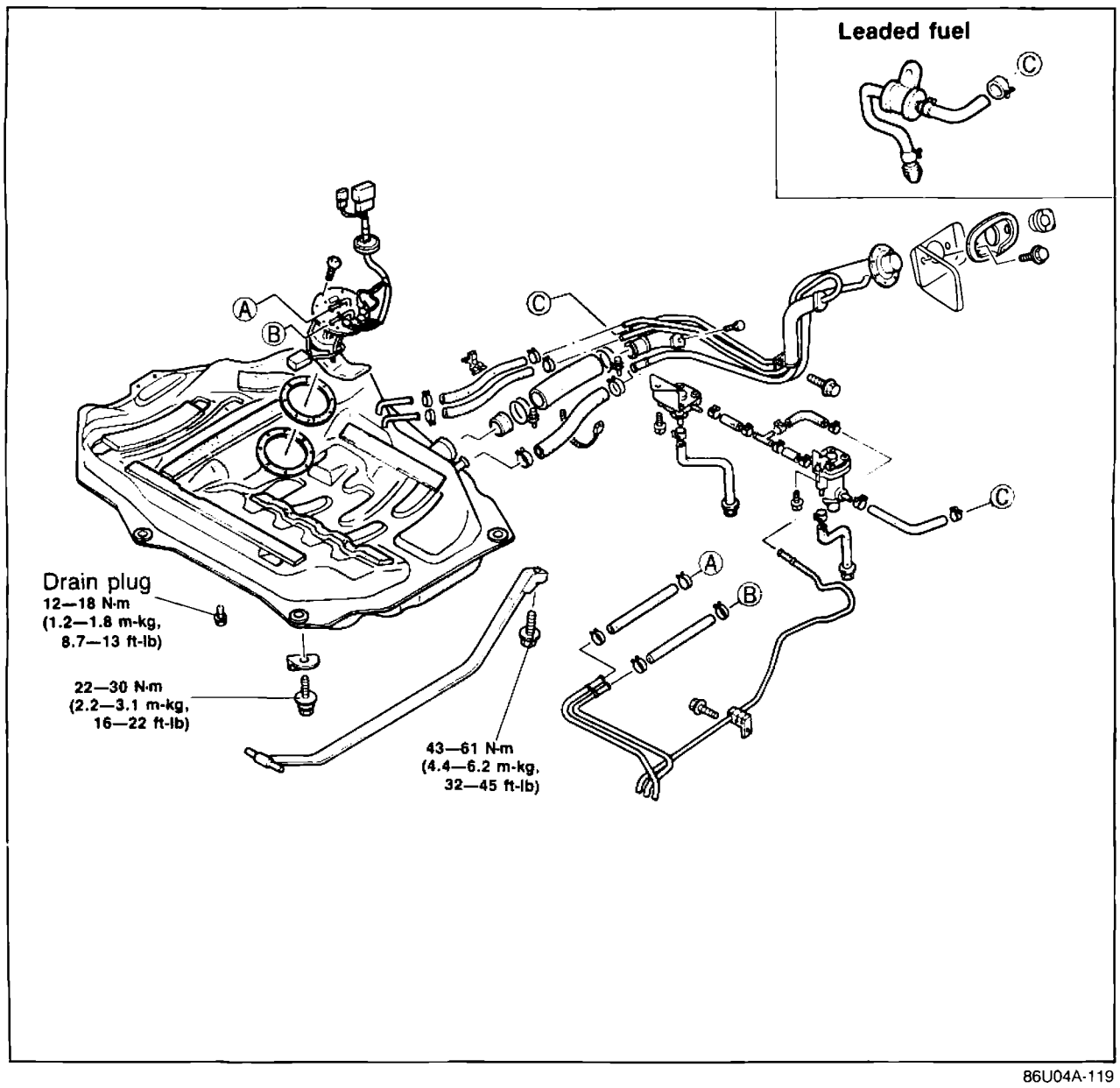
76G04C-126

Inspection
1. Check the fuel tank for cracks and corrosion.
2. If any defect is found, repair or replace the tank.

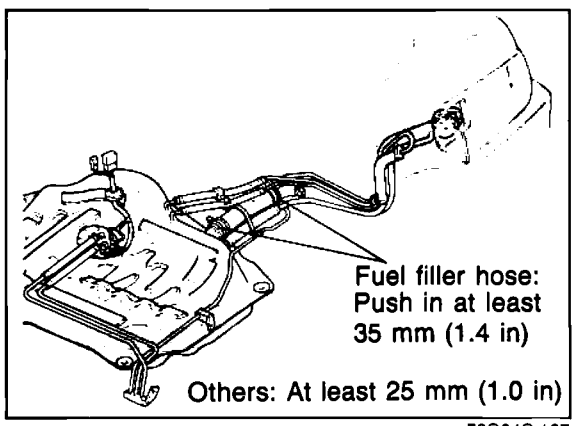
Warning
Before repairing, clean the fuel tank thoroughly with steam to remove all explosive fuel and fumes.

Installation
Install in the reverse order of removal, referring to the installation note.

Torque Specifications



86U04A-119

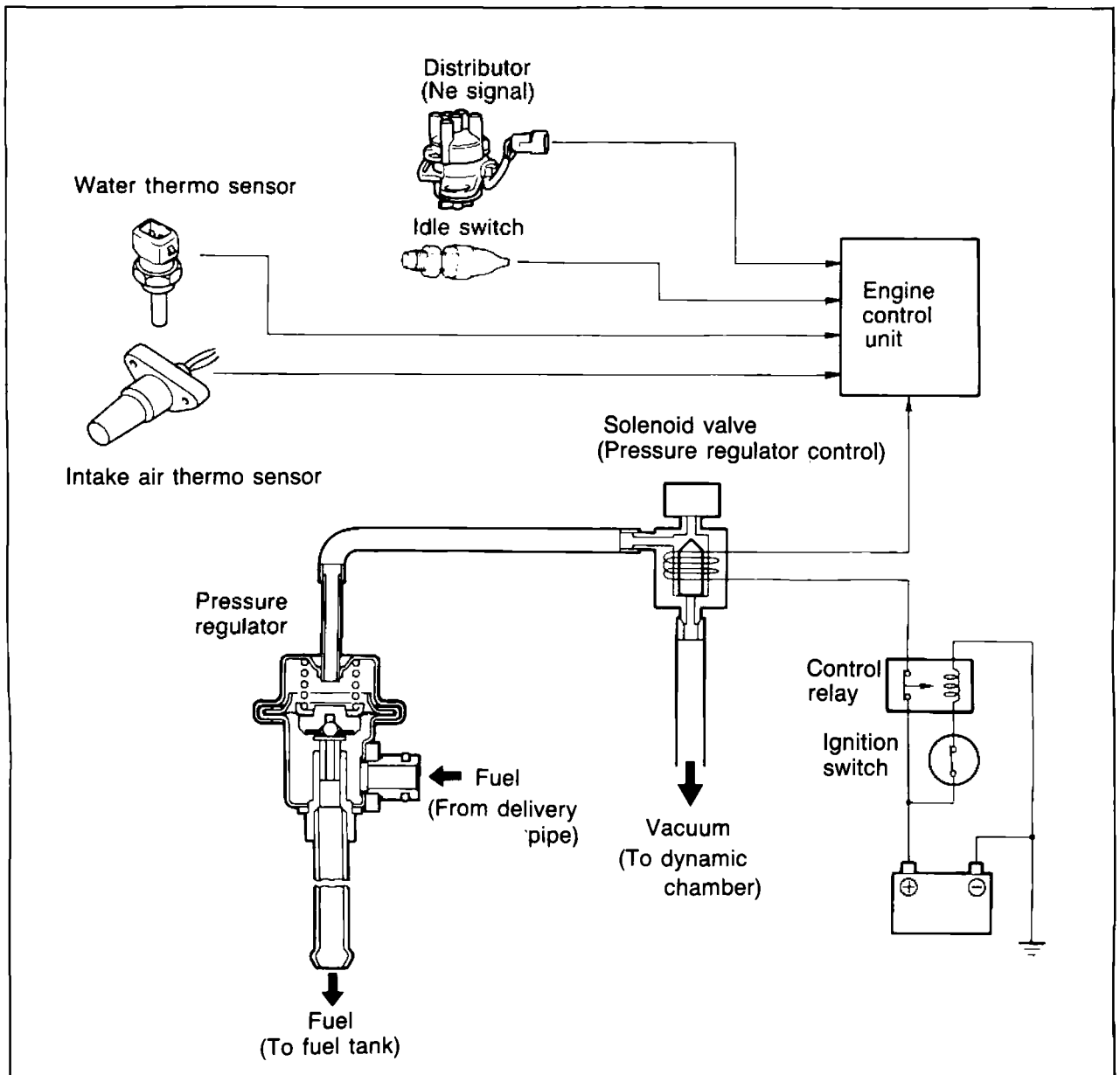


76G04C-127

Installation note
Hoses
1. Push the ends of the main fuel hose, fuel return hose, and evaporation hoses onto the fuel tank fittings **at least 25 mm (1.0 in)**.
2. Push the fuel filler hose onto the fuel tank pipe and filler pipe **at least 35 mm (1.4 in)**.

Steering angle transfer shaft
(4-wheel steering)
Refer to section 10

PRESSURE REGULATOR CONTROL (PRC) SYSTEM



76G04C-128

To prevent percolation of the fuel during idle after the engine is restarted, vacuum is cut to the pressure regulator, increasing the fuel pressure.

Specified time: Approx. 120 sec.
Operating condition: Coolant temperature — above 70°C (158°F)
Intake air temperature — above 30°C (86°F)....Unleaded fuel
above 50°C (122°F)....Leaded fuel

COMPONENT DESCRIPTION

Component	Function	Remark
Engine control unit	Detects signals from input sensors and switches; controls solenoid valve (Pressure regulator control)	
Ignition switch (ST position)	Sends engine cranking signal to engine control unit	
Intake air thermo sensor	Detects intake air temperature; sends signal to engine control unit	
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor
Pressure regulator	Adjusts fuel pressure supplied to injectors	
Solenoid valve (Pressure regulator control)	Controls vacuum to pressure regulator	Cuts vacuum when hot
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	
Idle switch	Detects when throttle valve closed; sends signal to engine control unit	ON at idle

76G04C-129

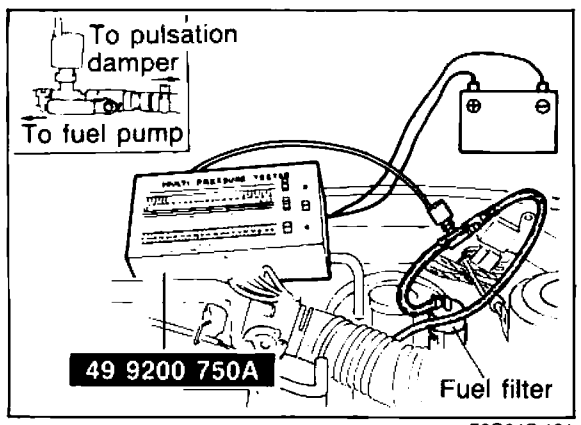
TROUBLESHOOTING

Check the condition of the wiring harness and connections before checking the sensors or switches.

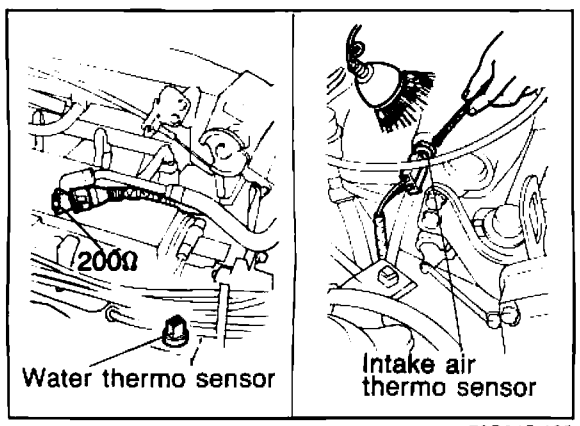
Note
Make the system inspection first. If no problem is found, continue with inspection of the next system of the Troubleshooting Guide. (Refer to pages 4C—10 and 11.)

Possible cause / Page / Sympton	Solenoid valve (Pressure regulator control)	Water thermo sensor	Intake air thermo sensor	Engine control unit terminal	System inspection
				2K	
	4C—70	4C—107	4C—110	4C—98	4C—70
Engine stalls or runs rough after hot starting	2	3	4	5	1

76G04C-130



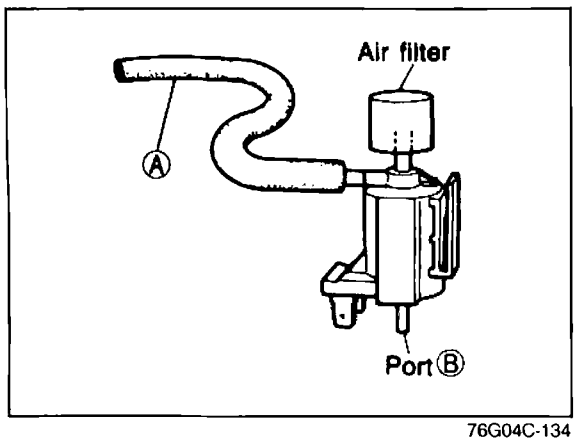
76G04C-131



76G04C-132

Operating time	Fuel line pressure kPa (kg/cm², psi)
After starting: for 120 sec.	235—275 (2.4—2.8, 34—40)
After 120 sec.	186—226 (1.9—2.3, 27—33)

76G04C-133



76G04C-134

System Inspection

1. Connect the **SST** to the engine. (Refer to page 4C—53.)
2. Start the engine.
3. Warm up the engine to normal operating temperature and stop the engine.

Warning
Be careful when disconnecting the water thermo sensor connector because the surrounding area is very hot.

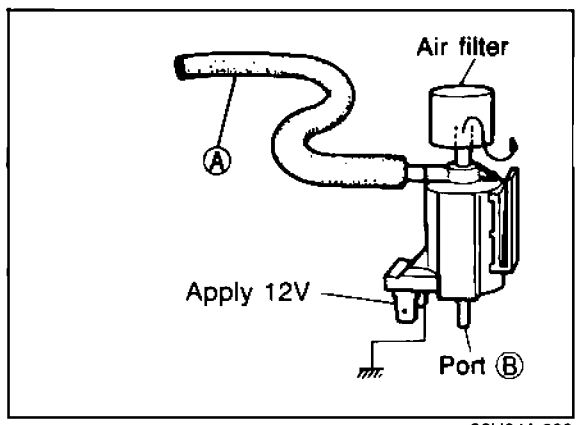
4. Disconnect the water thermo sensor connector. Connect a resistor (**200 Ω**) to the sensor connector.
5. Heat the intake air thermo sensor to above specification.

Specification: 30°C (86°F)....unleaded fuel
50°C (122°F)....leaded fuel

6. Restart the engine.
7. Check the fuel line pressure and operating times as shown in the chart.

Solenoid Valve (Pressure Regulator Control) Inspection

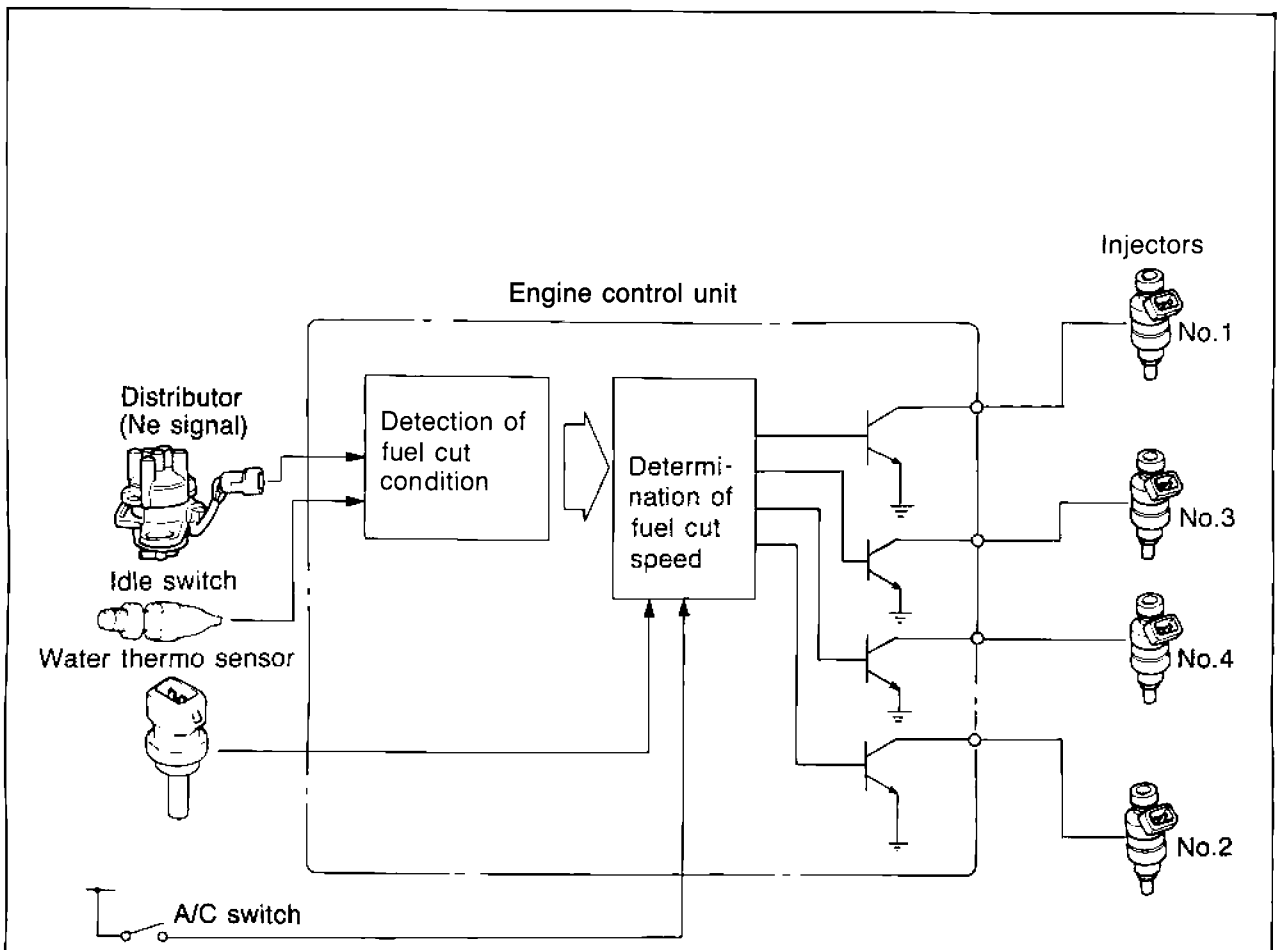
1. Disconnect the vacuum hose from the vacuum pipe.
2. Blow through the solenoid valve from vacuum hose A.
3. Check that air flows from port B.



86U04A-099

4. Disconnect the solenoid valve connector.
5. Connect 12V and a ground to the terminals of the solenoid valve.
6. Blow through the solenoid valve from the vacuum hose A.
7. Check that air flows from the valve air filter.

DECELERATION CONTROL SYSTEM



86U04A-121

The fuel cut system is provided as a deceleration control system.
This system is to improve fuel consumption.

COMPONENT DESCRIPTION

Component	Function	Remarks
Engine control unit	Detects signals from input sensors and switches; cuts fuel injection	
Idle switch	Detects when throttle valve fully closed; sends signal to engine control unit	ON at idle
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	

76G04C-135

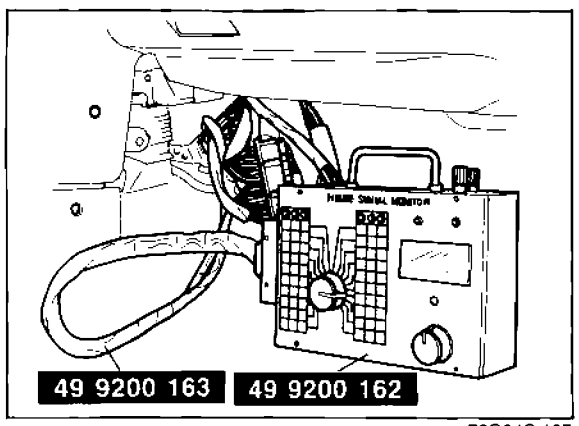
TROUBLESHOOTING

Check the condition of the wiring harness and connectors before checking the sensor or switches.

Note
Make the system inspection first. If no problem is found, continue with inspection of the next system of the Troubleshooting Guide. (Refer to page 4C—10 and 11.)

Possible cause	Water thermo sensor	System inspection
Page	**4C—107**	**4C—74**
Checking order	2	1

76G04C-136

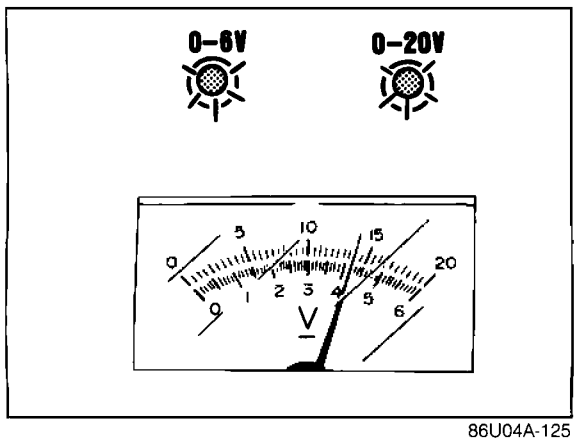


76G04C-137

System Inspection (Electrical Signal)

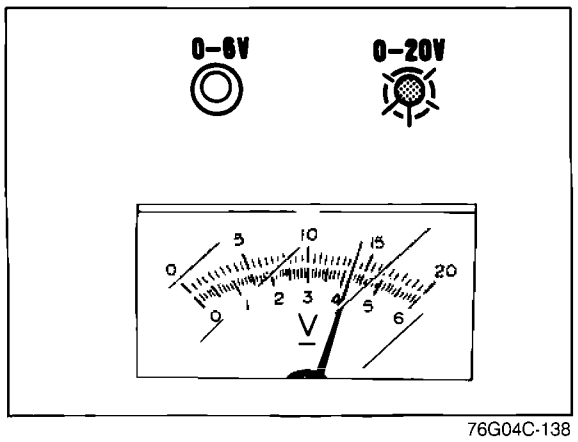
1. Connect the **SST** between the wiring harness and control unit.
2. Set 3C, 3E 3F, or 3H position on the **SST**.

Note
3C — For No. 2 injector
3E — For No. 1 injector
3F — For No. 4 injector
3H — For No. 3 injector



86U04A-125

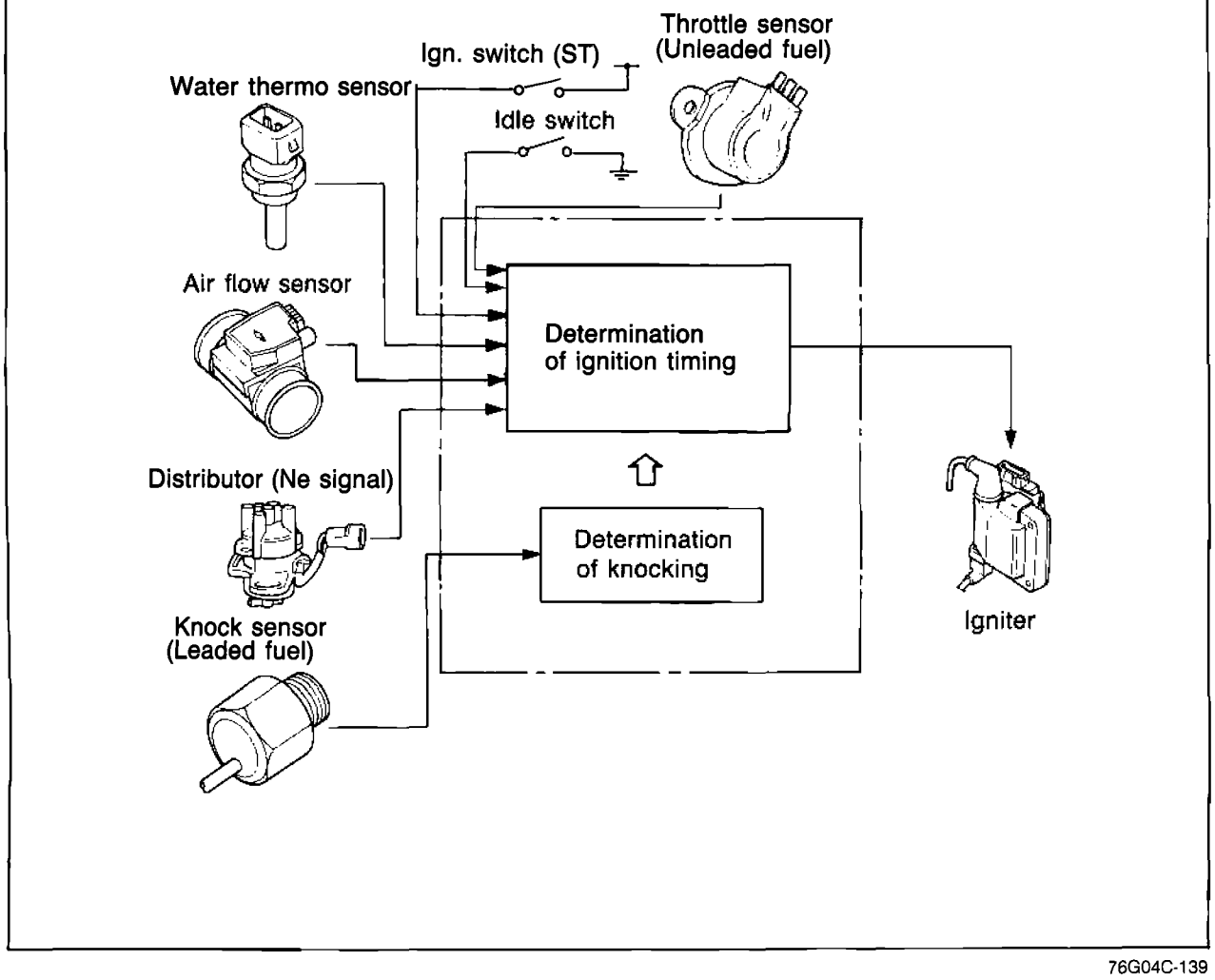
3. Check that the indicator lamps alternately flash at idle.



76G04C-138

4. Increase the engine speed to **4,000 rpm**, then suddenly decrease the engine speed.
5. Check that the green indicator lamp is OFF during deceleration.
6. Accelerate and check that the voltage decreases.

ELECTRONIC SPARK ADVANCE (ESA) CONTROL SYSTEM



76G04C-139

This system electronically controls the ignition timing to obtain better engine performance.
The best ignition timing is determined and set within the engine control unit based on signals from the various sensors and switches.
The knock control function is used only with leaded fuel engines.

COMPONENT DESCRIPTION

Component	Function	Remark
Air flow sensor	Detects amount of intake air; sends signal to engine control unit	
Distributor	Has Ne and G signal pick-up and distributes high voltage to spark plugs	
Engine control unit	Detects signals from input sensors and switches; decides best ignition timing	
Idle switch	Detects when throttle valve fully closed; sends signal to engine control unit	Installed on throttle body
Igniter	Receives spark signal from engine control unit and generates high voltage in ignition coil	
Ignition switch (ST position)	Sends engine cranking signal to engine control unit	
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor
Knock sensor (leaded fuel)	Detects engine knocking; sends signal to knock control unit	
Throttle sensor	Detects throttle opening angle; sends signal to engine control unit	Installed on throttle body

76G04C-140

TROUBLESHOOTING

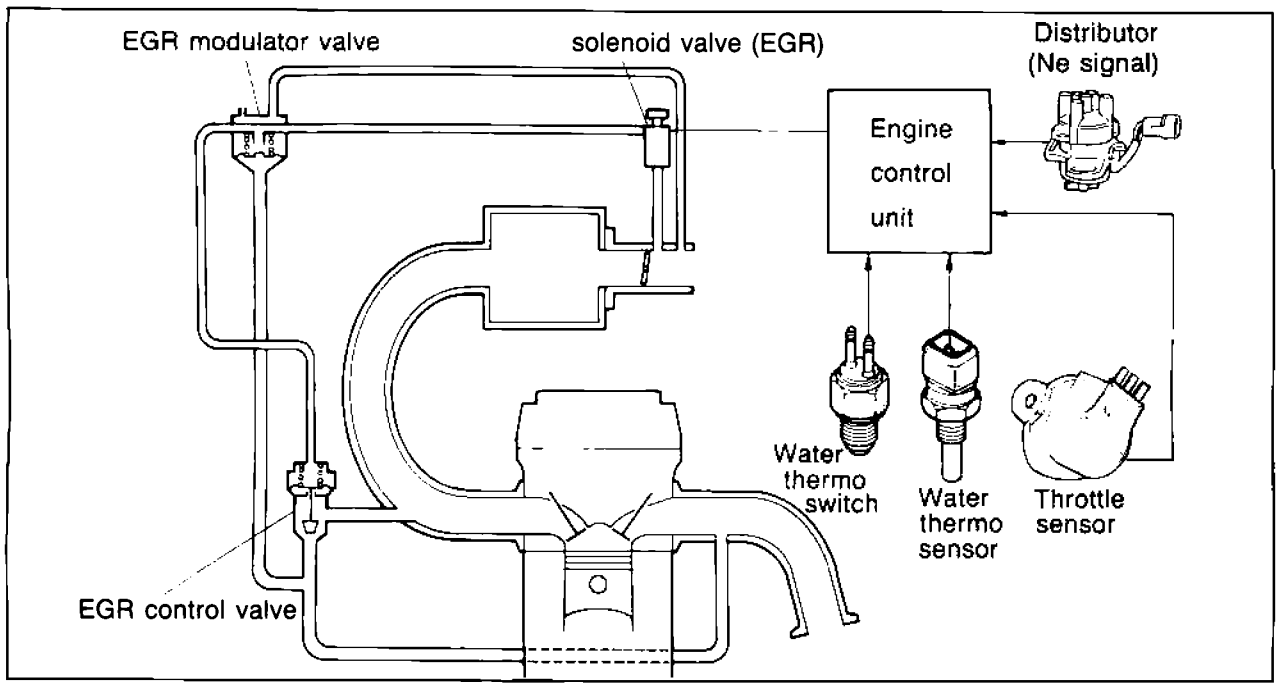
Check the condition of the wiring harness and connectors before checking the sensors or switches.

Note
If no problem is found, continue with inspection of the next system of the troubleshooting Guide. (Refer to page 4C—10 and 11)

Possible cause / Page / Symptom	Air flow sensor	Igniter	Engine control unit terminal	Knock sensor
			1X	
	4C—103	Refer to section 5	4C—98	4C—109
Hard start or won't start (Cranks OK)	3	1	2	—
Knocking	—	—	—	1

76G04C-141

EXHAUST GAS RECIRCULATION (EGR) SYSTEM (UNLEADED FUEL)



76G04C-142

This system introduces exhaust gas into the intake manifold to reduce NOx emissions. It operates depending on the engine load, engine speed **(1,500—3,500 rpm)**, engine coolant temperature **(above 70°C, 158°F)**, and radiator coolant temperature **(above 17°C, 63°F)**.

COMPONENT DESCRIPTION

Component	Function	Remark
EGR control valve	Recirculates portion of exhaust gas	
EGR modulator valve	Controls vacuum acting on EGR control valve	
Engine control unit	Detects signals from input sensors and switches; controls solenoid valve (EGR)	
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	
Solenoid valve (EGR)	Controls vacuum to EGR control valve	
Throttle sensor	Detects throttle valve opening angle; sends signal to engine control unit	Installed on throttle body
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	
Water thermo switch	Detects radiator coolant temperature; sends signal to engine control unit	ON: above 17°C (63°F)

76G04C-143

4C EGR SYSTEM (UNLEADED FUEL)

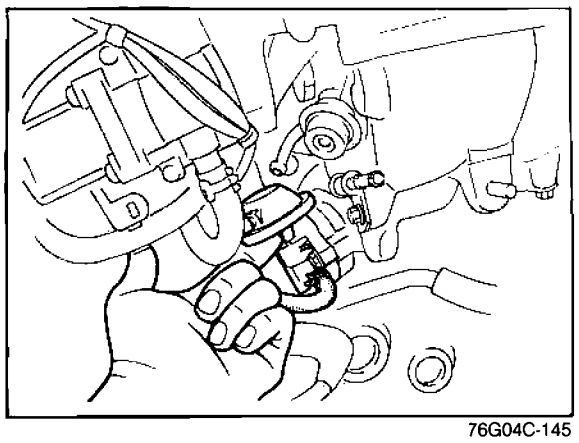
TROUBLESHOOTING

Check the condition of the wiring harness and connectors before checking the sensors or switches.

Note
Make the system inspection first. If no problem is found, continue with inspection of the next system of the Troubleshooting Guide. (Refer to pages 4C—10 and 11.)

Possible cause	Throttle sensor	Solenoid valve (EGR)	EGR modulator valve	EGR control valve	Water thermo sensor	Water thermo switch	Engine control unit terminal	System inspection
							2N	
Page	4C—104	4C—78	4C—79	4C—79	4C—107	4C—106	4C—98	4C—78
Checking order	8	2	4	3	6	5	7	1

76G04C-144



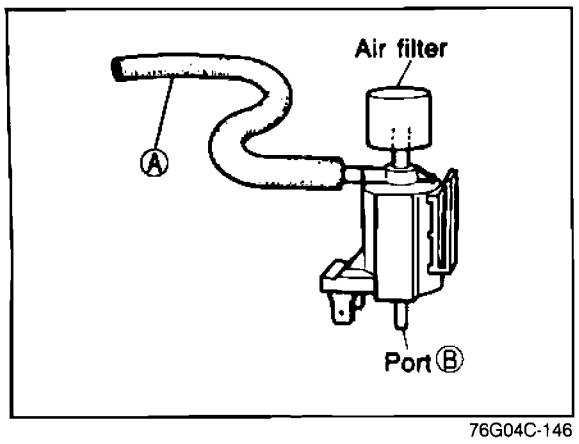
76G04C-145

System Inspection

1. Start the engine.
2. Accelerate the engine while still cold and verify that the diaphragm of the EGR control valve does not move.
3. Warm up the engine to normal operating temperature and run it at idle.

Warning
Be careful when checking the EGR control valve, the surrounding area is very hot.

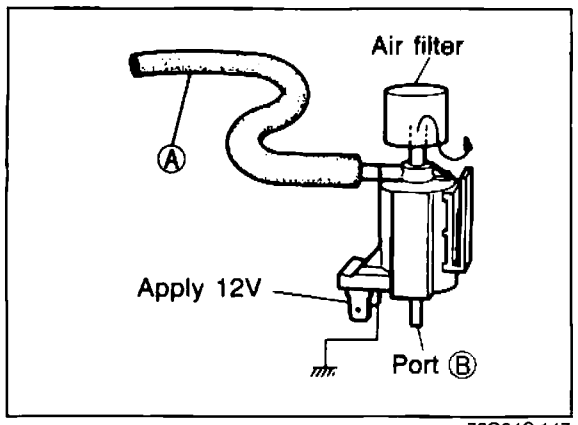
4. Accelerate the engine and check that the diaphragm of the EGR control valve moves.



76G04C-146

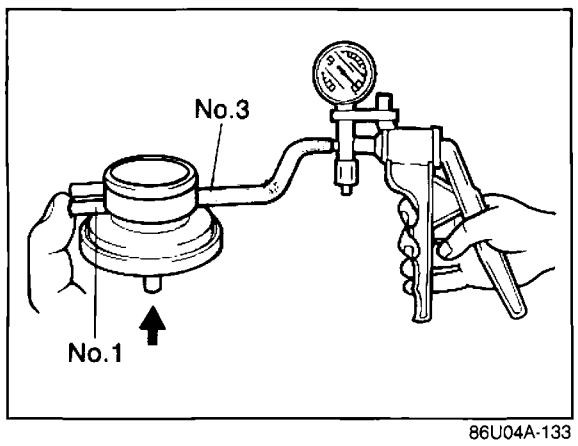
Solenoid Valve (EGR)

1. Disconnect the vacuum hose from the vacuum pipe.
2. Blow through the solenoid valve from vacuum hose A.
3. Check that air flows from port B.



76G04C-147

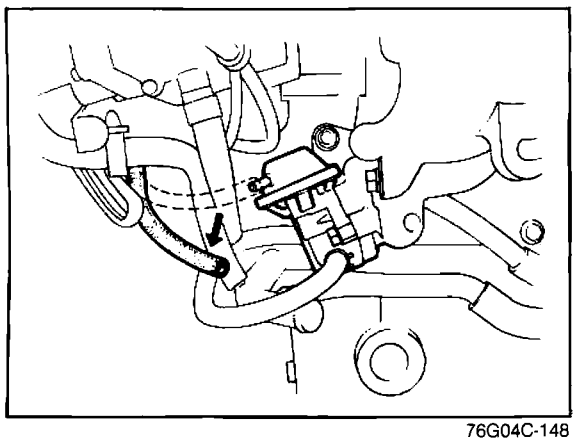
4. Disconnect the solenoid valve connector.
5. Connect 12V and a ground to the terminals of the solenoid valve.
6. Blow through the solenoid valve from vacuum hose A.
7. Check that air flows from the air filter.



86U04A-133

EGR Modulator Valve

1. Remove the EGR modulator valve.
2. Plug the No. 1 port and connect a vacuum pump to the No. 3 port.
3. Blow into the exhaust gas port. Operate the vacuum pump and verify that vacuum is held.
4. Release the exhaust gas port and confirm that vacuum is released.

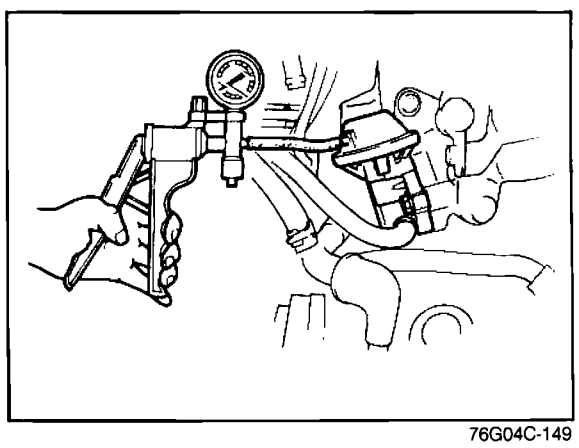


76G04C-148

EGR Control Valve

1. Warm up the engine and run at idle.
2. Disconnect the vacuum hose from the EGR control valve and plug it.
3. Verify that the engine runs smoothly.
4. If not correct, clean the exhaust gas passage in the valve or replace the valve.

Note
Before replacing the EGR control valve, check the intake air and control systems.



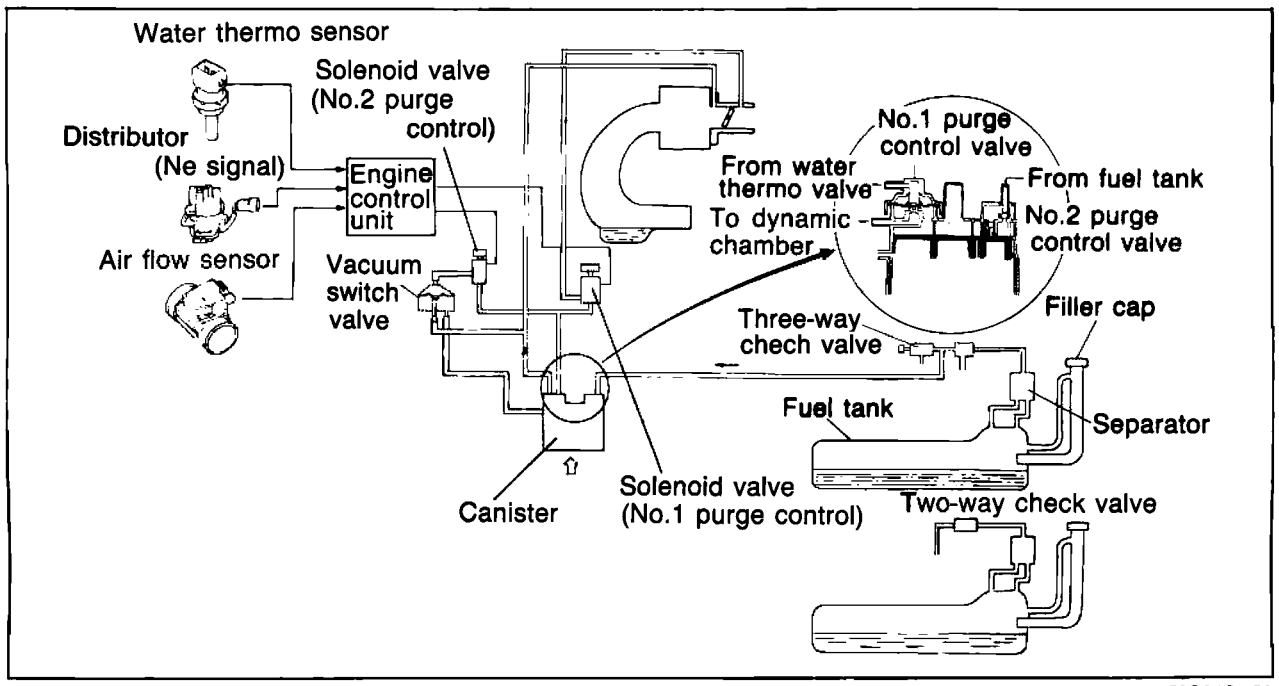
76G04C-149

5. Connect a vacuum pump to the valve and apply vacuum.
6. Verify that the engine runs roughly or stalls at more than the specified vacuum.

Specification:
40—60 mmHg (1.6—2.4 inHg)

7. If not correct, replace the EGR control valve.

EVAPORATIVE EMISSION CONTROL (EEC) SYSTEM



76G04C-150

Unleaded fuel:
This system stores fuel vapor generated in the fuel tank in the canister when the engine is not running. The fuel vapor is stored in the canister until it is drawn into the dynamic chamber and burned when the engine is started.

Leaded fuel:
Fuel vapor generated in the fuel tank flows out to the atmosphere.

COMPONENT DESCRIPTION

Component	Function	Remark	Application	
			New model	Previous model
Air flow sensor	Detects amount of intake air; sends signal to engine control unit		O	X
Charcoal canister	Stores fuel tank fumes while engine stopped		O	X
Engine control unit	Detects signals from input sensors and switches; controls solenoid valves (Purge control)		O	X
Ne signal pick-up	Detect crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor	O	X
Separator	Prevents fuel from flowing into charcoal canister		O	O
Solenoid valve (No.1 purge control)	Controls vacuum to solenoid valve (No.2 purge control) and vacuum switch valve		O	X
Solenoid valve (No.2 Purge control)	Controls vacuum to vacuum switch valve		O	X
Three-way check valve	Controls pressure in fuel tank		O	X
Two-way check valve	Controls pressure in fuel tank		X	O
Vacuum switch valve	Regulates evaporative fumes from canister to intake manifold		O	X
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit		O	X

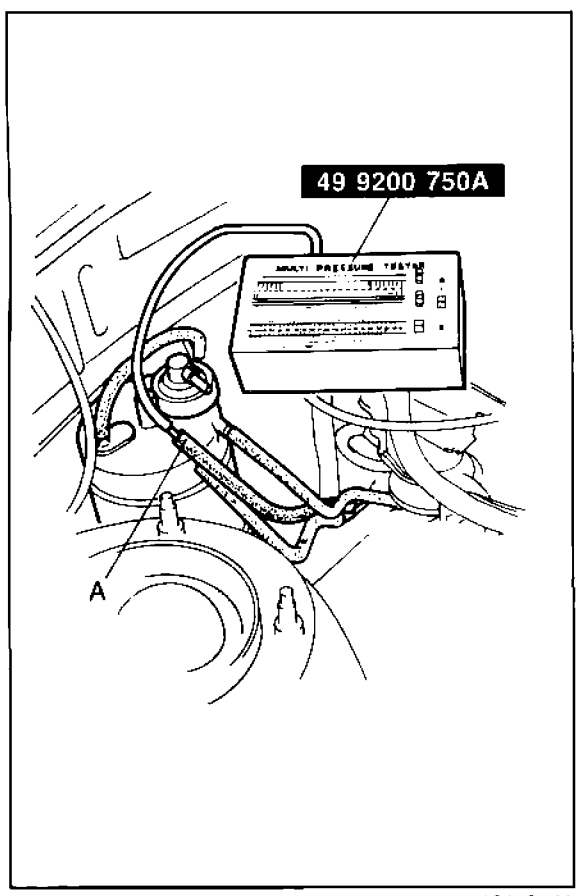
76G04C-151

TROUBLESHOOTING
Check the condition of the wiring harness and connectors before checking the sensors or switches.

Note
Make the system inspection first. If no problem is found, continue with inspection of the next system of the Troubleshooting Guide. (Refer to pages 4C—10 and 11.)

Possible cause	Vacuum switch valve	Solenoid valve (No. 1 purge control)	Solenoid valve (No. 2 purge control)	Two-way check valve	Three-way check valve	Separator	No.1 purge control valve	No.2 purge control valve	Water thermo switch	Water thermo sensor	Engine control unit terminal 2P,2O	System inspection
Page	4C—83	4C—84	4C—84	4C—84	4C—83	4C—85	4C—82	4C—83	4C—106	4C—107	4C—98	4C—81
Checking order (Unleaded fuel)	4	2	3	—	10	11	5	6	7	8	9	1
Checking order (Leaded fuel)	—	—	—	1	—	2	—	—	—	—	—	—

76G04C-152

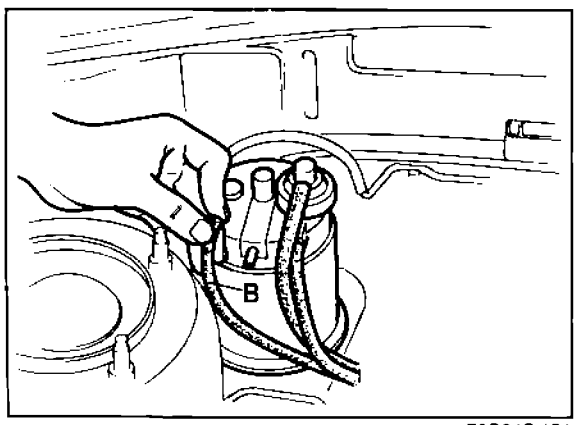


76G04C-153

System Inspection
1. Check the vacuum hose routing.
2. If there is a poor connection, clog, or leak, repair or replace as necessary.
3. Warm up the engine and run it at idle.
4. Disconnect vacuum hose A from No. 1 purge control valve and connect the **SST** to the hose.

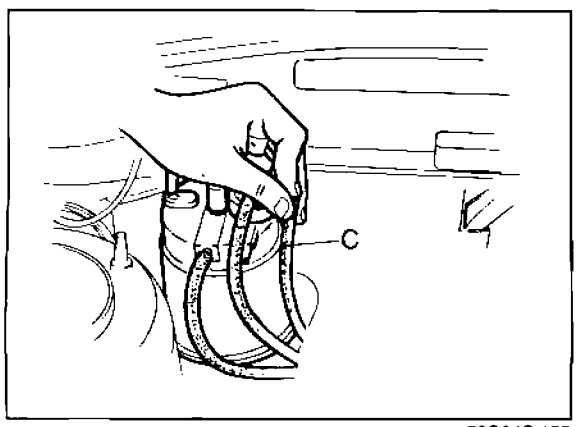
86U04A-140

5. Increase the engine speed to above **2,500 rpm** and verify that the gauge shows more than **150 mmHg (5.9 inHg)**.
6. If not correct, check the solenoid valve (No. 1 purge control).
7. Reconnect hose A to No. 1 purge control valve.



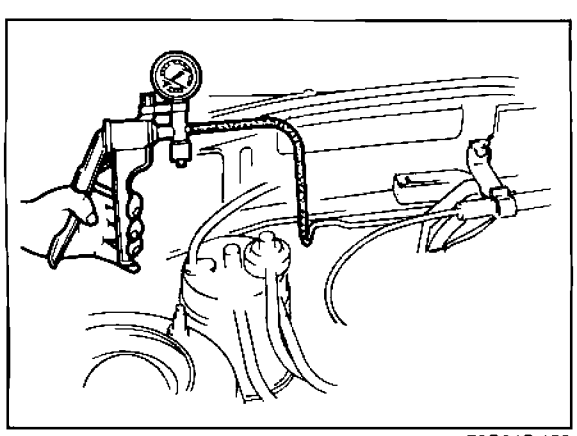
76G04C-154

8. Disconnect vacuum hose B from the canister and place a finger over the end of the hose.
9. Accelerate the engine rapidly and check that vacuum is felt at **above 1,700 rpm**.
10. Reconnect hose B to the canister.
11. If not correct, check the vacuum switch valve and the solenoid valve (No. 2 purge control).



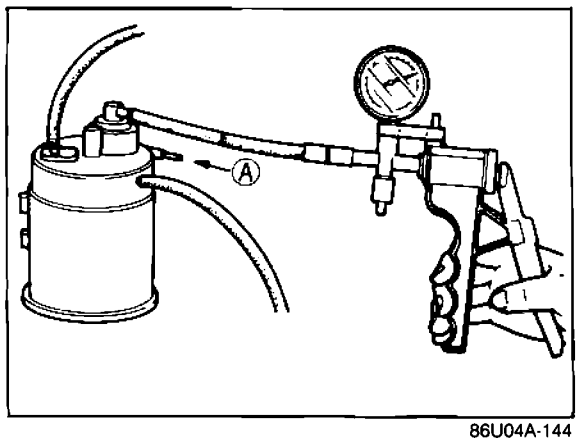
76G04C-155

12. Disconnect vacuum hose C from the canister and place a finger over the end of the hose.
13. Check that vacuum is felt.
14. If not correct, check the vacuum line between the canister and the dynamic chamber for clogging.



76G04C-156

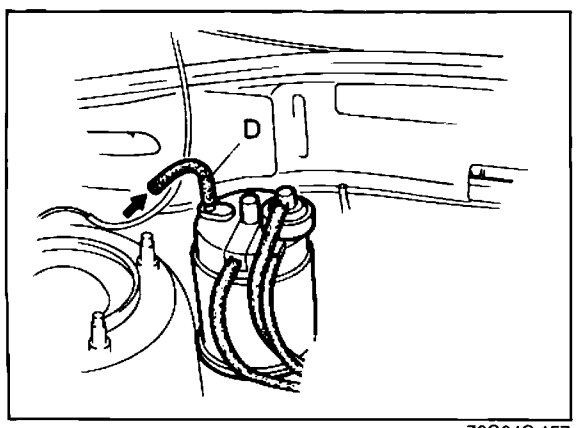
15. Disconnect the evaporation hose from the evaporation pipe.
16. Connect a vacuum pump to the evaporation pipe.
17. Operate the vacuum pump and verify that no vacuum is held.
18. If vacuum is held, check the evaporation pipe for clogging.



86U04A-144

No. 1 Purge Control Valve

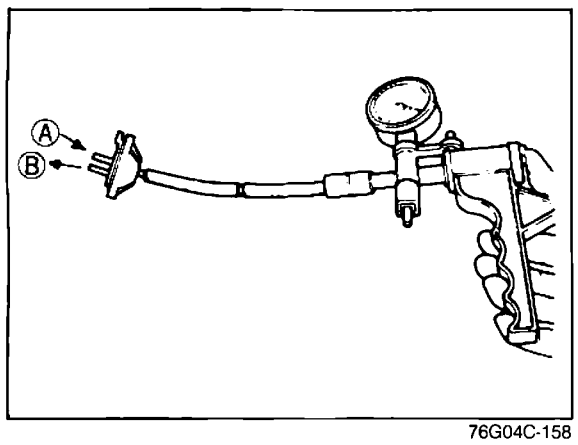
1. Blow through the purge control valve from port A and check that air does not flow.
2. Connect a vacuum pump to the purge control valve.
3. Apply **110 mmHg (4.33 inHg)** vacuum, and blow through port A again; air should flow.



76G04C-157

No. 2 Purge Control Valve

1. Disconnect vacuum hose D from the evaporation pipe.
2. Blow through the hose and verify that air flows freely.

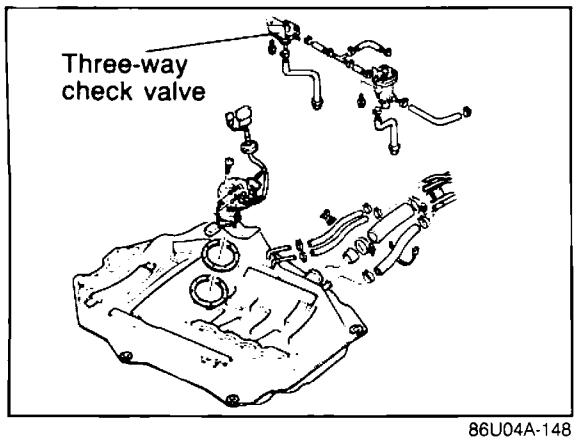


76G04C-158

Vacuum Switch Valve

1. Remove the vacuum switch valve.
2. Connect a vacuum pump to the valve.
3. Blow through the valve from port A and verify that air comes out of port B when vacuum is applied.

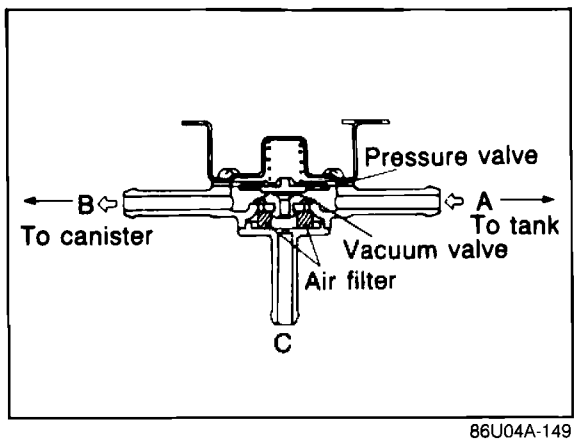
Specified vacuum:
66—106 mmHg (2.6—4.2 inHg)



86U04A-148

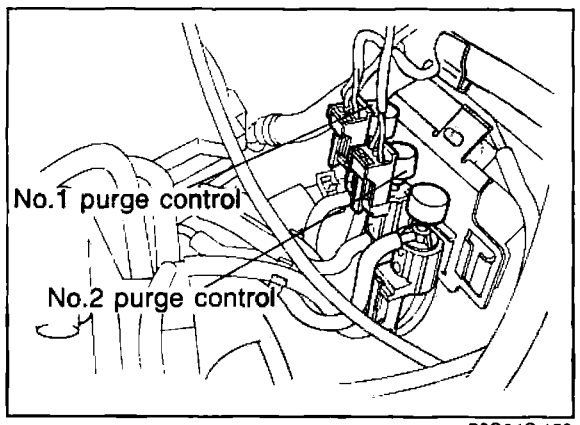
Three-Way Check Valve

1. Remove the check valve.



86U04A-149

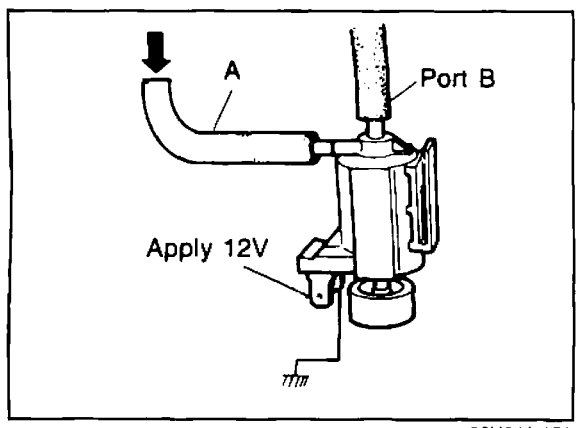
2. Blow through the valve from port A, and check that air comes out of port B.
   Next, block port B and check that air comes out of port C.
3. Block port B.
4. Connect a vacuum pump to port A and verify that no vacuum is held.



76G04C-159

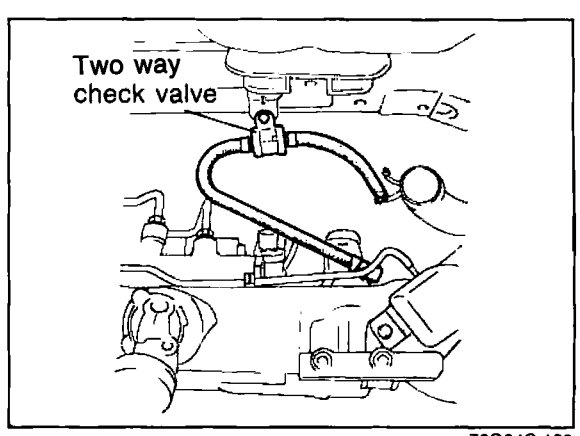
Solenoid Valve

1. Remove the solenoid valve.



86U04A-151

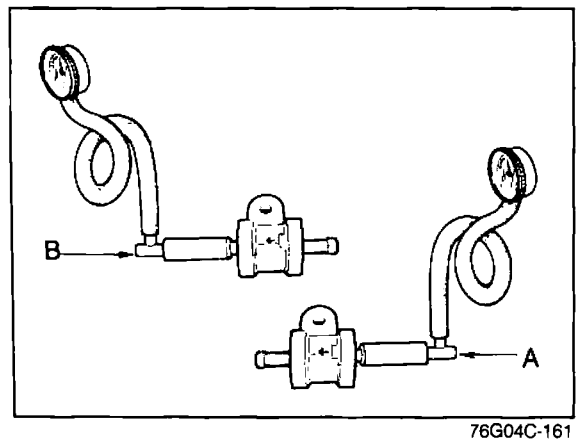
2. Connect vacuum hoses to the valve as shown in the figure.
3. Blow air through the valve from hose A and check that air comes out of the valve air filter.
4. Apply 12V and ground the solenoid valve with jumper wires.
5. Blow air through the valve from hose A and check that the air comes out of port B.
6. Replace, if necessary.



76G04C-160

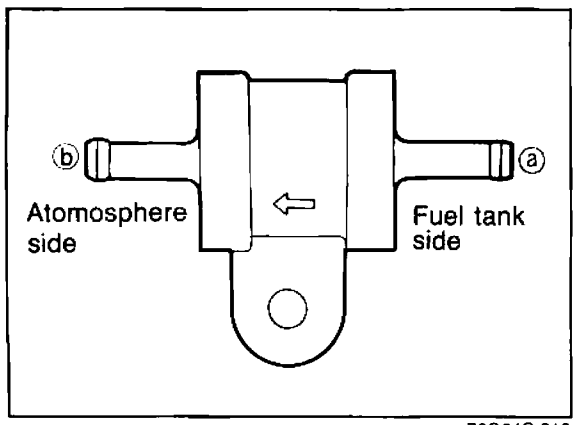
Two-way check valve
Inspection

1. Remove the two-way check valve.



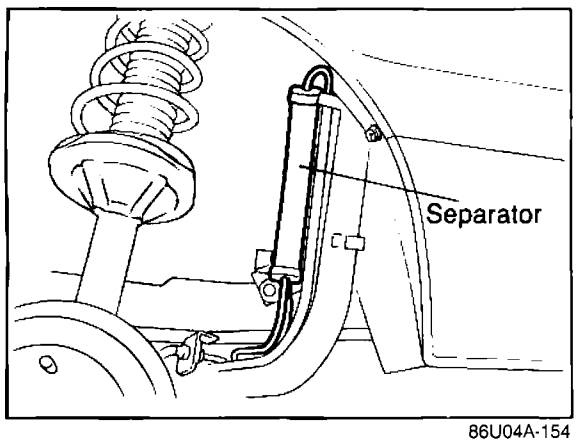
76G04C-161

2. Connect a pressure gauge to the passage that normally is connected to the fuel tank.
3. Blow through the valve from port A. Verify that the valve opens at **2.94 kPa (0.03 kg/cm^2, 0.43 psi)**.
4. Remove the pressure gauge and connect it to the passage to atmosphere.
5. Blow through the valve from port B. Verify that the valve opens at **0.98 kPa (0.01 kg/cm^2, 0.14 psi)**.



76G04C-212

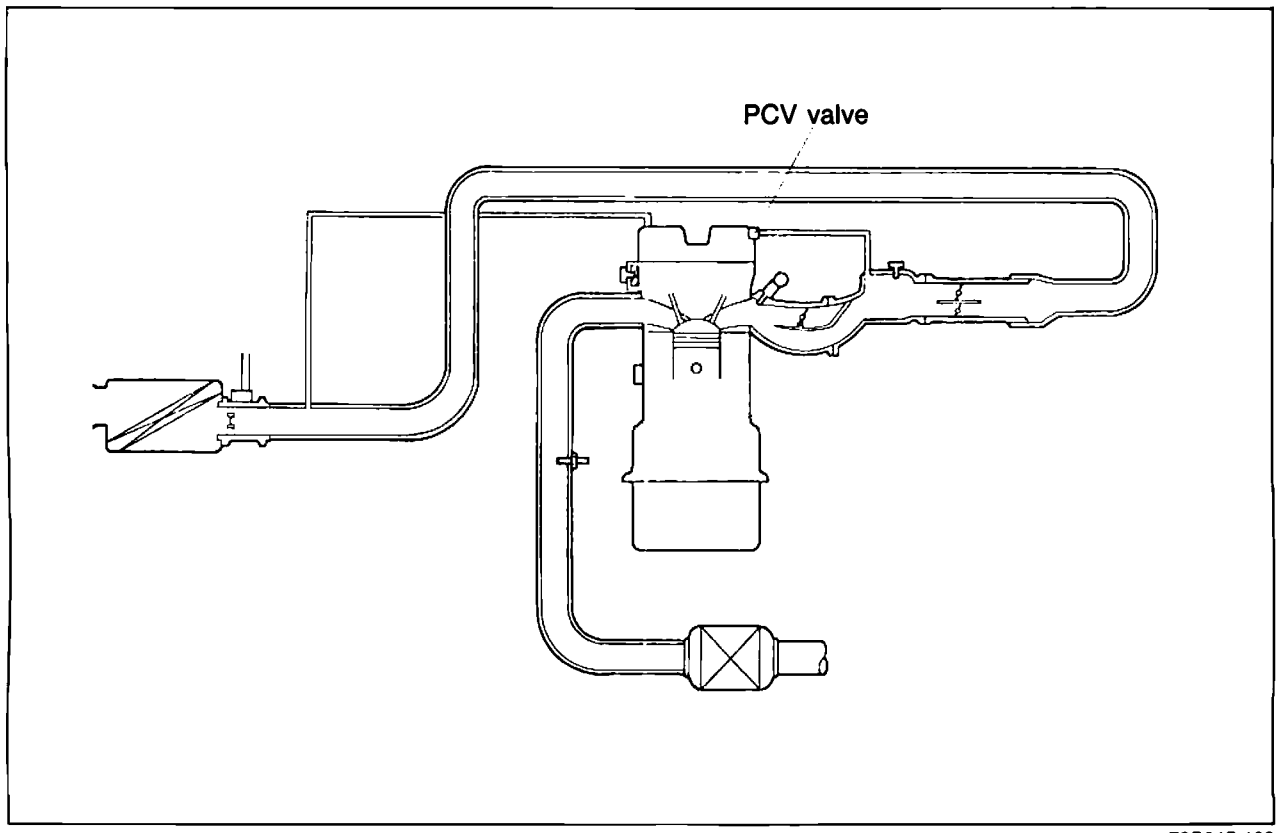
Replacement
1. Remove the two-way check valve.
2. Install a new valve so that the arrow on the valve faces atmosphere side.



86U04A-154

Separator
1. Remove the separator.
2. Visually check the separator for damage.
3. Replace, if necessary.

POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

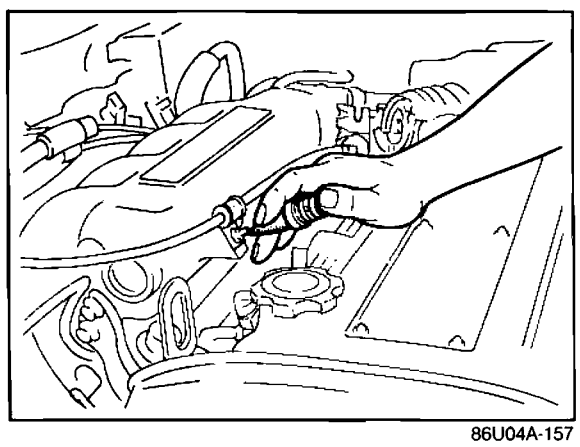


76G04C-162

The PCV valve is operated by the intake manifold vacuum.
When the engine is running at idle, the PCV valve is opened slightly and a small amount of blow-by gas is drawn into the dynamic chamber.
At high engine speeds, the PCV valve is further opened and a larger amount of blow-by gas is drawn into the dynamic chamber.

COMPONENT DESCRIPTION

Component	Function	Remark
PCV valve	Controls blowby gas amount pulled into engine	

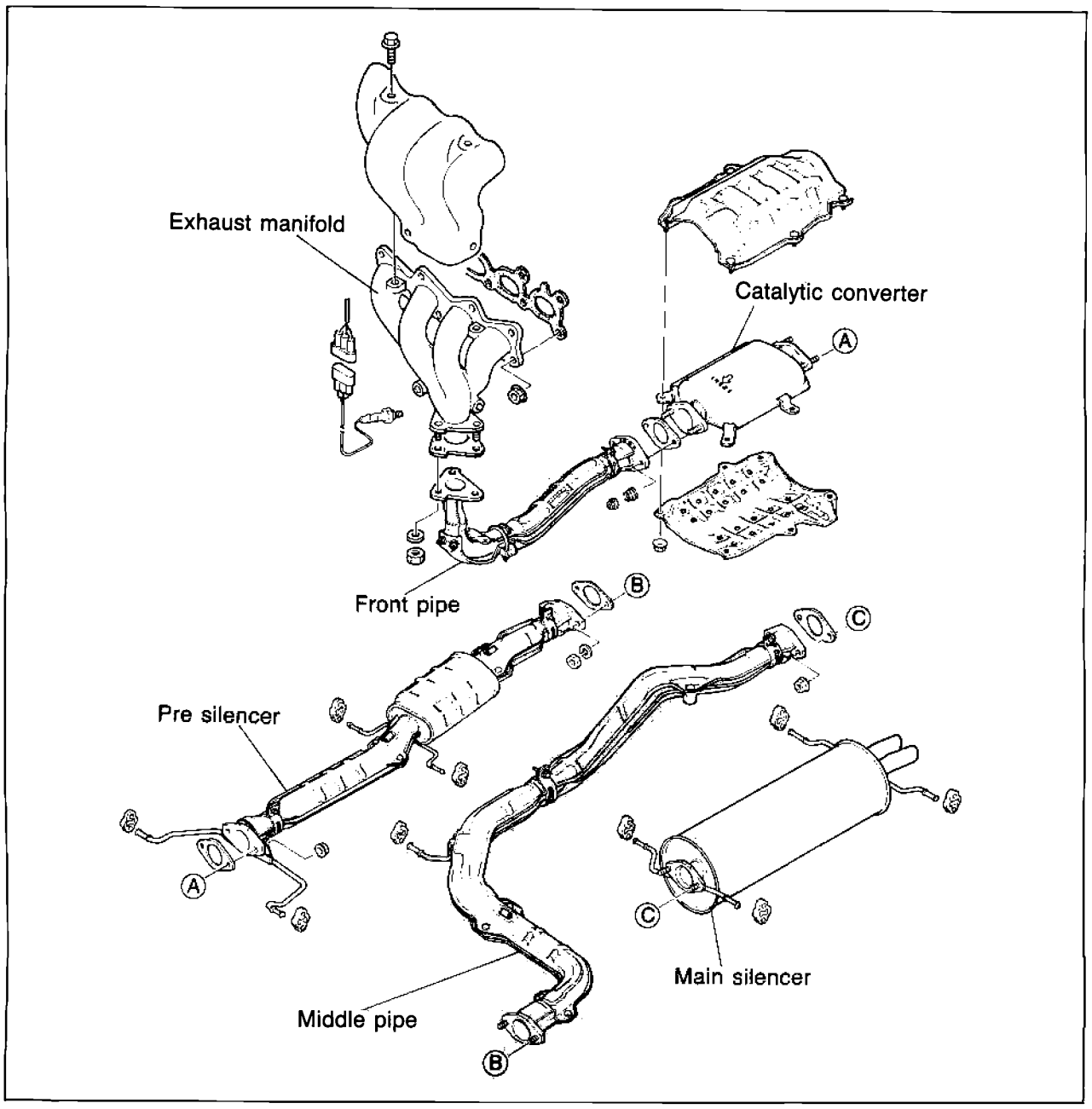


86U04A-157

PCV VALVE

1. Warm up the engine to the normal operating temperature and run it at idle.
2. Disconnect the PCV valve and the ventilation hose from the cylinder head cover.
3. Close the PCV valve opening.
4. Check that vacuum is felt.

EXHAUST SYSTEM (UNLEADED FUEL)



76G04C-163

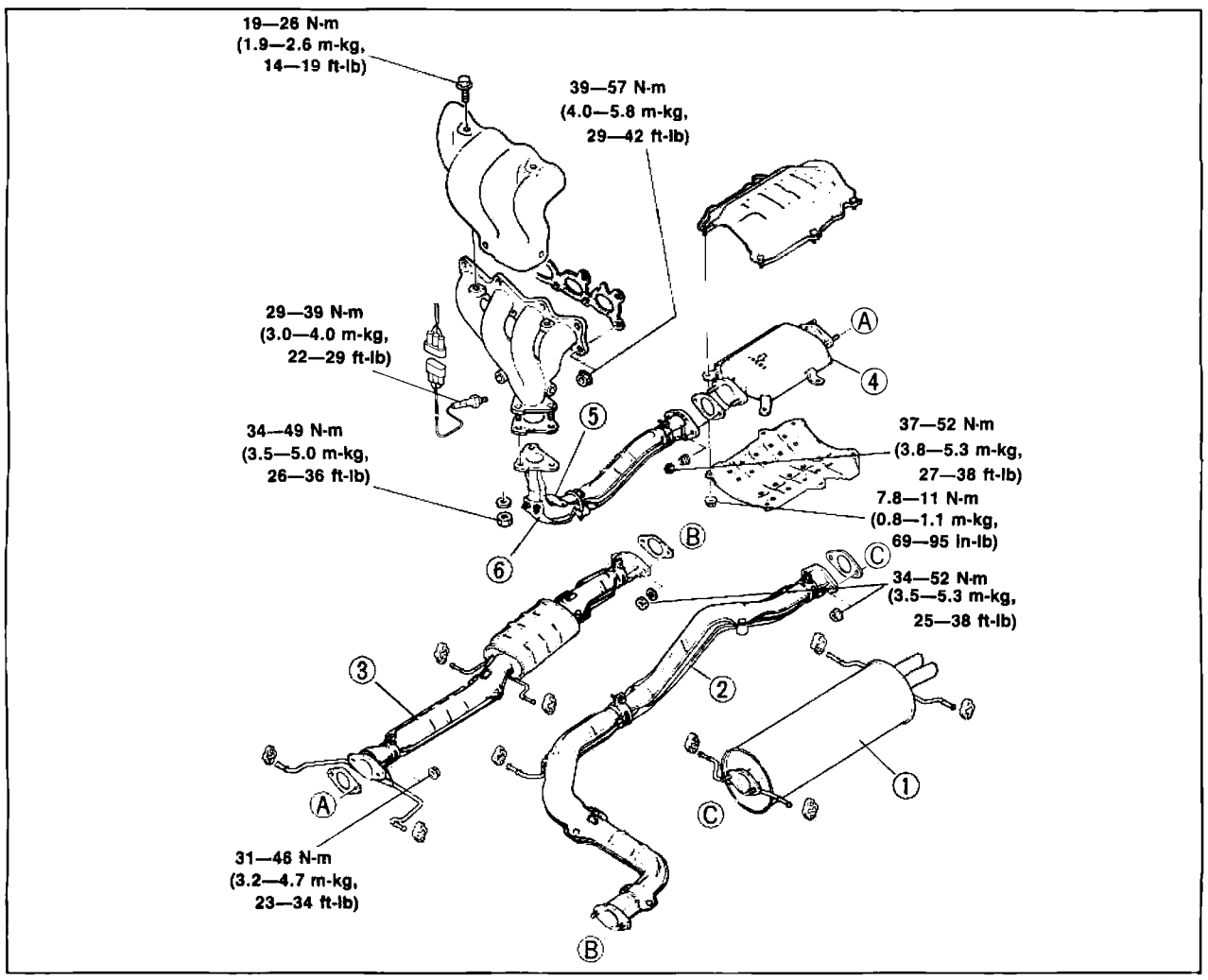
The catalytic converter is used to reduce CO and HC. The converter contains a compound of platinum and rhodium. It is a two-way catalyst type with a volume of **2,300 cc (140 cu in)**.

4C EXHAUST SYSTEM (UNLEADED FUEL)

REMOVAL AND INSTALLATION

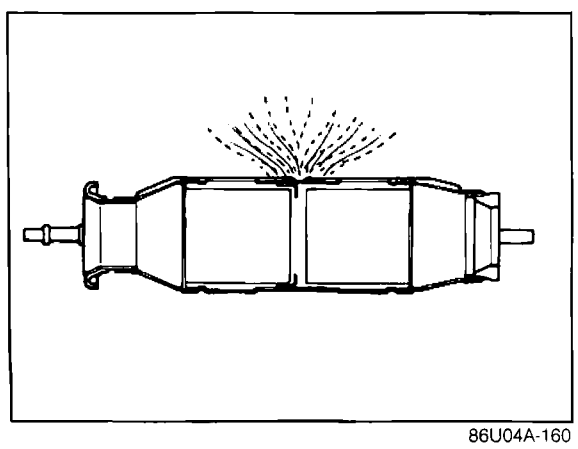
1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.

Torque Specifications



86U04A-159

1. Main silencer
2. Middle pipe
3. Pre-silencer
4. Catalytic converter
5. Bracket
6. Front pipe



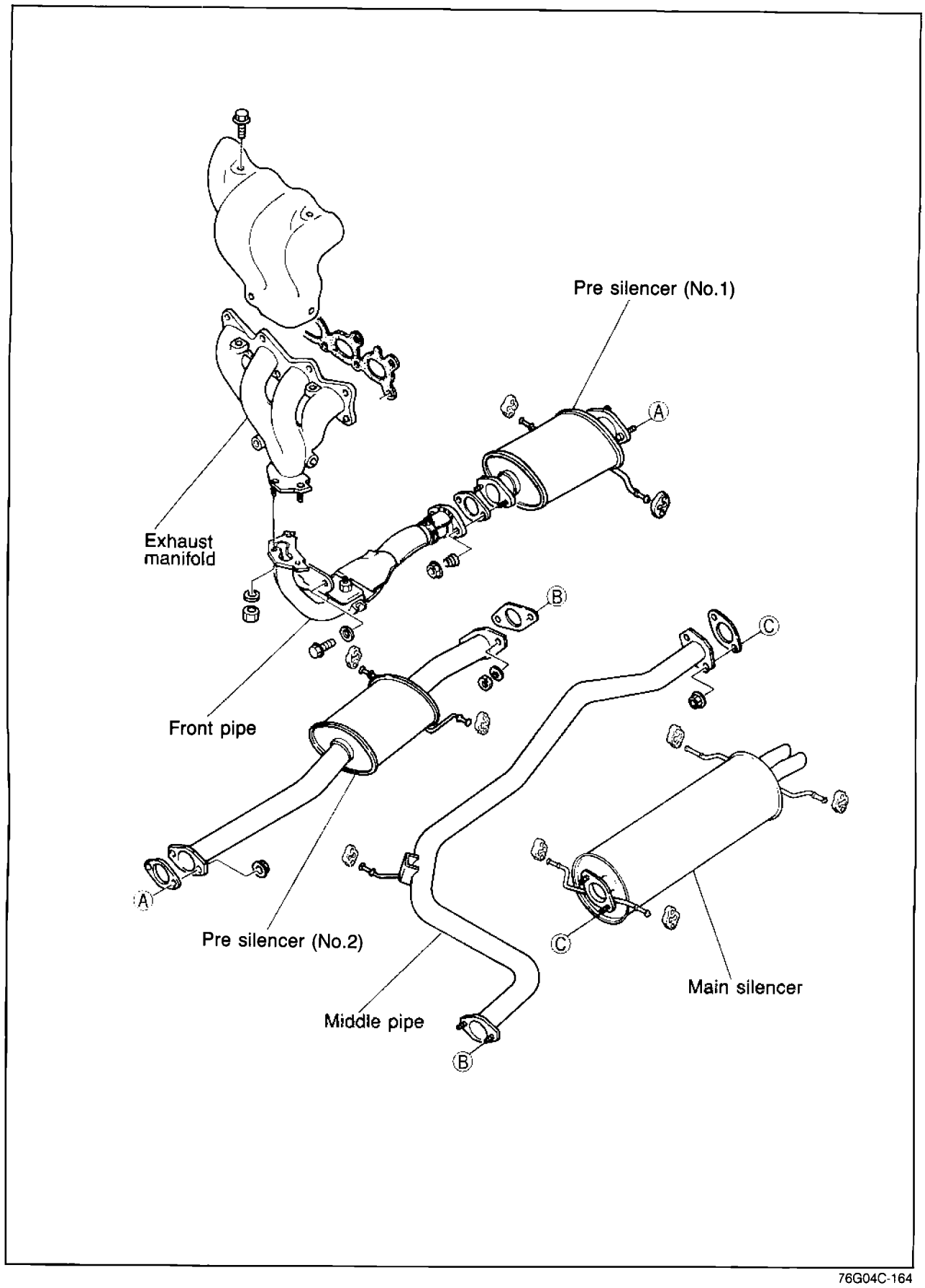
86U04A-160

INSPECTION

1. Check the catalytic converter and exhaust pipe for deterioration or restriction.
2. Check the insulation covers welded onto the catalytic converter for damage.

Note
If the insulation cover is touching the catalytic converter housing, excessive heat at the floor will occur.

EXHAUST SYSTEM (LEADED FUEL)



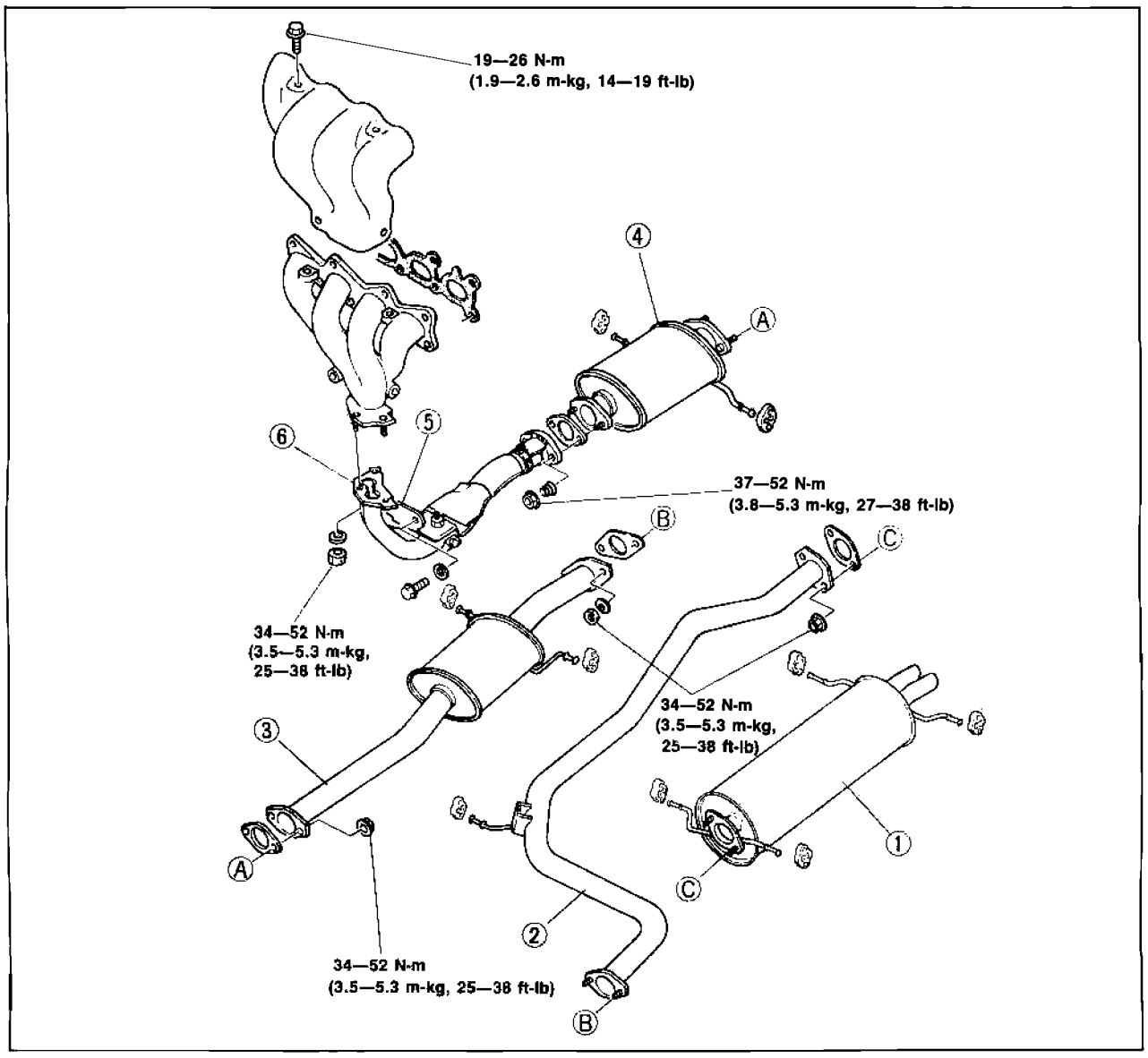
76G04C-164

4C EXHAUST SYSTEM (LEADED FUEL)

REMOVAL AND INSTALLATION

1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.

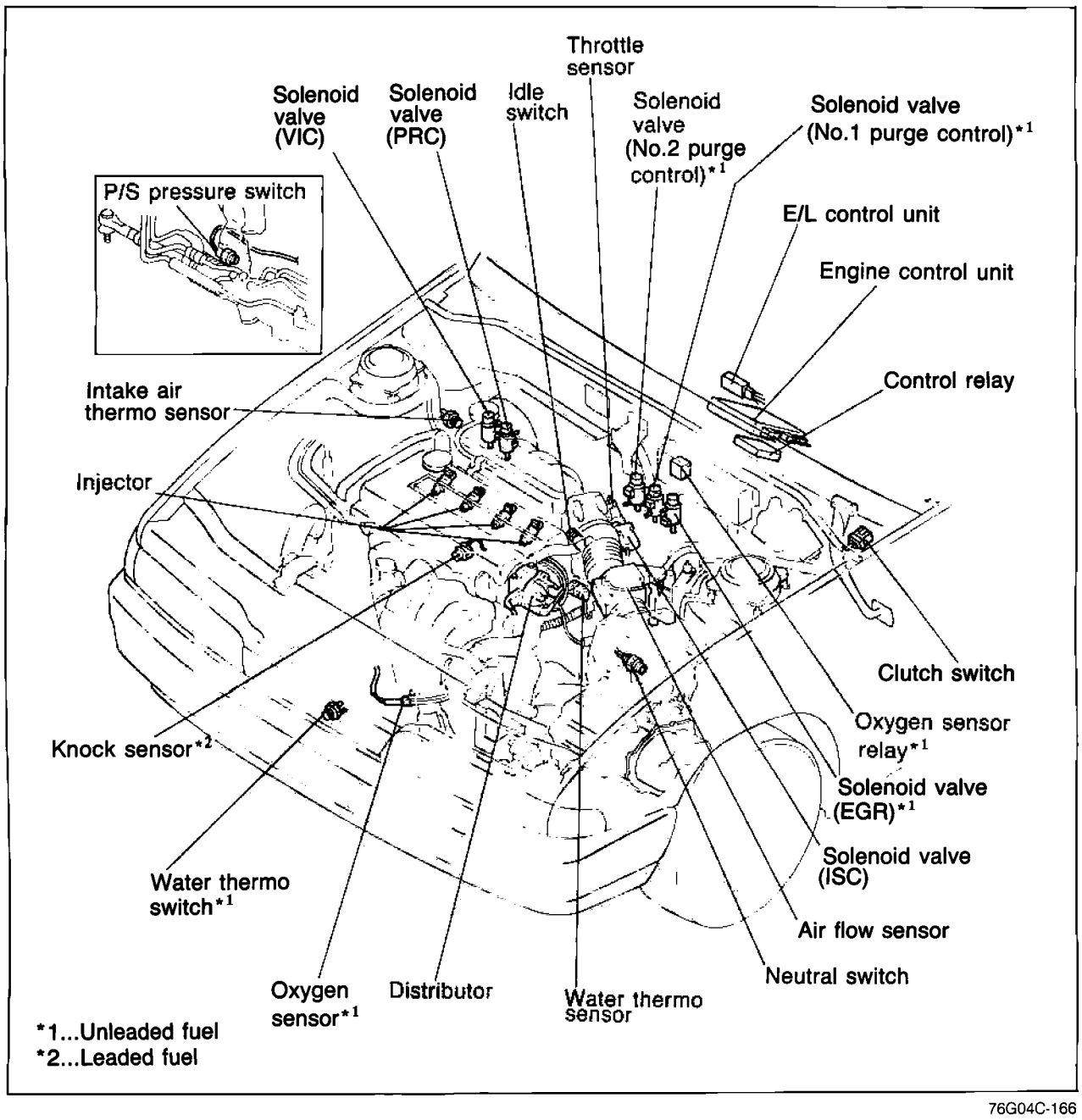
Torque Specifications



76G04C-165

1. Main silencer
2. Middle pipe
3. No. 2 pre-silencer
4. No. 1 pre-silencer
5. Bracket
6. Front pipe

CONTROL SYSTEM



76G04C-166

The control system consists of the input devices and the engine control unit. The control unit controls the fuel injection amount (EGI), fuel injection pressure, bypass air amount, ignition timing, switch monitor function, and fail-safe function.

RELATIONSHIP CHART
Output Devices and Input Devices (Unleaded fuel)

OUTPUT DEVICE \ INPUT DEVICE		IGNITION SWITCH (ON POSION)	TEST CONNECTOR	ELECTRICAL LOAD CONTROL UNIT	P/S PRESSURE SWITCH	A/C SWITCH	IGNITION SWITCH (STA POSITION)	NEUTRAL AND CLUTCH SWITCH	OXYGEN SENSOR	WATER THERMO SWITCH (RADIATOR)	INTAKE AIR THERMO SENSOR	WATER THERMO SENSOR	IDLE SWITCH	THROTTLE SENSOR	AIR FLOW SENSOR	Ne SIGNAL	G SIGNAL
INJECTOR	FUEL INJECTION AMOUNT	×	×	×	×	×	○	×	×	×	×	×	×	×	×	×	×
	FUEL INJECTION TIMING	○	×	×	×	×	○	×	×	×	×	×	×	×	×	○	×
BAC VALVE	AIR VALVE	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	ISC VALVE	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CONTROL RELAY	FUEL PUMP CONTROL	×	×	×	×	×	×	×	×	○	×	×	×	○	×	×	×
	MAIN POWER CONTROL	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
SOLENOID VALVE (No.1 PURGE)		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
SOLENOID VALVE (No.2 PURGE)		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
SOLENOID VALVE (EGR)		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
SOLENOID VALVE (PRESSURE REGULATOR CONTROL)		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
SOLENOID VALVE (VARIABLE INERTIA CONTROL)		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
OXYGEN SENSOR RELAY		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
A/C RELAY		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
IGNITER		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
AIR FLOW SENSOR (BURN-OFF)		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×

76G04C-167

Output Devices and Input Devices (Leaded fuel)

INPUT DEVICE / OUTPUT DEVICE	FUEL INJECTION AMOUNT	FUEL INJECTION TIMING	AIR VALVE	ISC VALVE	FUEL PUMP CONTROL	MAIN POWER CONTROL	SOLENOID VALVE (PRESSURE REGULATOR CONTROL)	SOLENOID VALVE (VARIABLE INERTIA CONTROL)	A/C RELAY	IGNITER	AIR FLOW SENSOR (BURN-OFF)
IGNITION SWITCH (ON POSITION)	×	×	×	×	×	○	×	×	×	×	○
TEST CONNECTOR	×	×	×	○	×	×	×	×	×	○	×
KNOCK SENSOR	×	×	×	×	×	×	×	×	×	○	×
ELECTRICAL LOAD CONTROL UNIT	×	×	×	○	×	×	×	×	×	×	×
P/S PRESSURE SWITCH	×	×	×	○	×	×	×	×	×	×	×
A/C SWITCH	×	×	×	○	×	×	×	×	○	×	×
IGNITION SWITCH (STA POSITION)	○	○	×	○	○	×	○	×	×	○	×
NEUTRAL AND CLUTCH SWITCH	○	×	×	○	×	×	×	×	×	×	×
INTAKE AIR THERMO SENSOR	×	×	×	×	×	×	○	×	×	×	×
WATER THERMO SENSOR	○	×	×	○	×	×	○	×	×	○	○
IDLE SWITCH	○	×	×	○	×	×	○	×	×	○	×
VARIABLE RESISTOR (IN AIR FLOW SENSOR)	○	×	×	×	×	×	×	×	×	×	×
AIR FLOW SENSOR	○	×	×	×	×	×	×	×	×	○	○
Ne SIGNAL	○	○	×	○	○	×	○	○	×	○	○
G SIGNAL	×	○	×	×	×	×	×	×	×	×	×

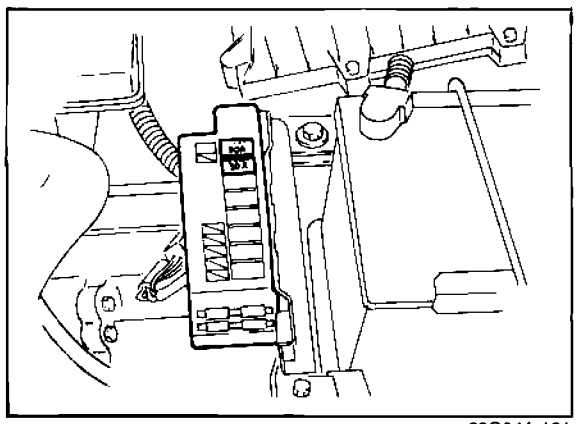
76G04C-168

Output Devices and Engine Conditions (Unleaded fuel)

OUTPUT DEVICE \ ENGINE CONDITION		CRANKING (COLD ENGINE)	WARMING UP (DURING IDLE)	MEDIUM LOAD		ACCELE-RATION	HEAVY LOAD	DECELE-RATION	IDLE (THROTTLE VALVE FULLY CLOSED)	IGN: ON (ENGINE NOT RUNNING)	REMARK
				COLD	WARM						
INJECTOR	**FUEL INJECTION AMOUNT**	Rich			Rich and lean	Rich		*Fuel cut	Rich and lean	No injection	* Above 7,000 rpm: fuel cut
	FUEL INJECTION TIMING	1 group (twice per revolution)	Sequential (once per two revolutions)						Sequential (once per two revolutions)		
BAC VALVE	**AIR VALVE**	*Open			Closed						*Coolant temp.: below 50°C (122°F)
	ISC VALVE	Large amount of bypass air		Small amount of bypass air						No bypass	
CONTROL RELAY	**FUEL PUMP CONTROL**	ON (main fuel pump operates)								OFF (main fuel pump not operated)	
	MAIN POWER CONTROL	ON									
SOLENOID VALVE (No.1 PURGE)		*OFF (1st stage not operated)		ON (1st stage operates)							*1 Coolant temp: below 70°C (158°F) *2 Engine speed above 1,700 rpm *3 Engine speed: 1,500—3,500 rpm
SOLENOID VALVE (NO.2 PURGE)		*1 OFF (2nd stage not operated)		*2 ON (2nd stage operates)				OFF			
SOLENOID VALVE (EGR)		*1 ON (EGR cut)		*3 OFF (EGR)	ON (EGR cut)	*3 OFF (EGR)		ON (EGR cut)			
SOLENOID VALVE (PRESSURE REGULATOR CONTROL)		OFF (Vacuum to pressure regulator)							*After starting: ON (Vacuum cut)	OFF	* During hot start only
SOLENOID VALVE (VARIABLE INERTIA CONTROL)		OFF		*ON (Vacuum to shutter valve actuator)					OFF		* Engine speed: above 5,200 rpm
OXYGEN SENSOR RELAY		ON		*OFF(current to oxygen sensor relay)					ON		*Engine speed: above 3,000 rpm
A/C RELAY		OFF	*ON								*Delays 0.5 second
IGNITER		Fixed at BTDC 6°	Fixed at BTDC 12°	Advanced: depends on engine conditions						—	
AIR FLOW SENSOR (BURN-OFF)		OFF (Burn-off does not function)									

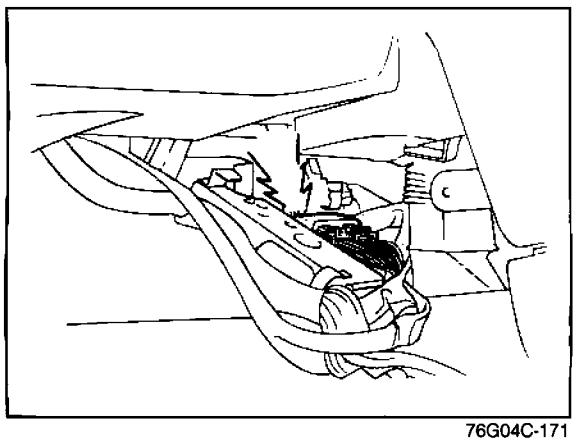
76G04C-169

OUTPUT DEVICE \ ENGINE CONDITION		CRANKING (COLD ENGINE)	WARMING UP (DURING IDLE)	MEDIUM LOAD		ACCELE-RATION	HEAVY LOAD	DECELE-RATION	IDLE (THROTTLE VALVE FULLY CLOSED)	IGN: ON (ENGINE NOT RUNNING)	REMARK
				COLD	WARM						
INJECTOR	**FUEL INJECTION AMOUNT**	Rich			Normal	Rich		*Fuel cut	Rich	No injection	Above 7,000 rpm: fuel cut
	FUEL INJECTION TIMING	1 group (twice per revolution)	Sequential (once per two revolutions)						Sequential (once per two revolutions)		
BAC VALVE	**AIR VALVE**	*Open		Closed							*Coolant temp.: below 50° (122°F)
	ISC VALVE	Large amount of bypass air		Small amount of bypass air						No bypass	
CONTROL RELAY	**FUEL PUMP CONTROL**	ON (main fuel pump operates)								OFF (main fuel pump not operated)	
	MAIN POWER CONTROL	ON									
SOLENOID VALVE (PRESSURE REGULATOR CONTROL)		OFF(Vacuum to pressure regulator)							*After starting: ON (vacuum cut)	OFF	* During hot starting only
SOLENOID VALVE (VARIABLE INERTIA CONTROL)		OFF		*ON (Vacuum to shutter valve actuator.)					OFF		* Engine speed: above 5,400 rpm
A/C RELAY		OFF		*ON							*Delays 0.5 seconds
IGNITER		Fixed at BTDC 6°	Fixed at BTDC 12°	Advanced: depends on engine conditions						—	
AIR FLOW SENSOR (BURN-OFF)		OFF (Burn-off does not function)									



69G04A-161

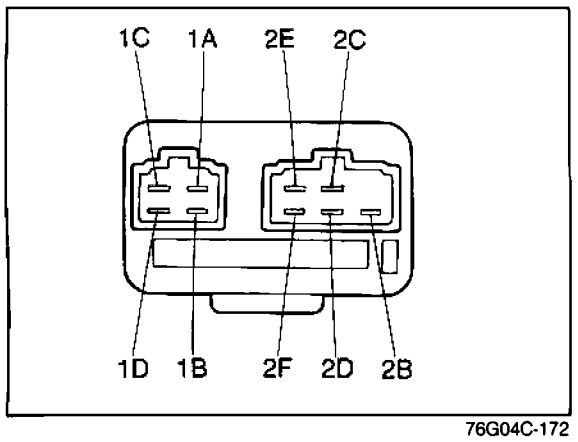
EGI MAIN FUSE
Inspection
Check the continuity of EGI main fuse.



76G04C-171

CONTROL RELAY
Power Supply Circuit
1. Check that a "clicking" sound is heard at the control relay when turning the ignition switch ON and OFF.

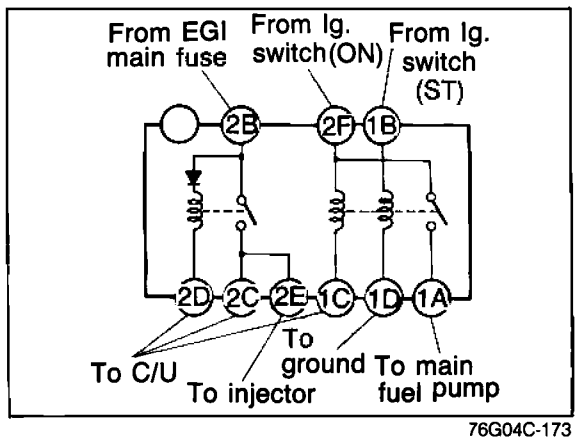
Note
The control relay is located under the center console.



76G04C-172

2. Apply 12V to the 2B terminal and ground the 2D terminal of the control relay.
3. Check voltage at the terminals with an voltmeter.

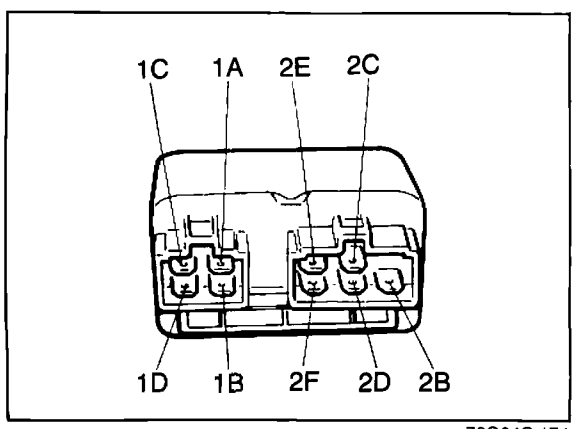
2D terminal / Terminals	Grounded	Not grounded
2C	12V	0V
2E	12V	0V



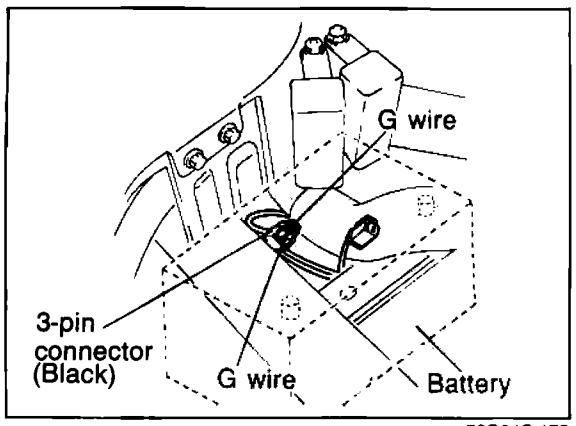
76G04C-173

Fuel Pump Circuit
1. Apply 12V and a ground to the terminals described below and check the terminals with an ohmmeter or voltmeter.

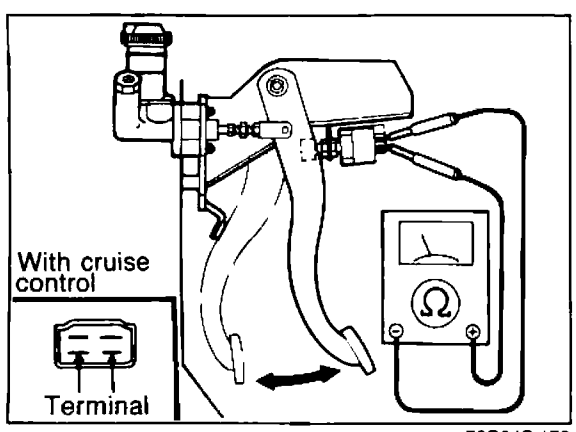
Terminal applied 12V	Terminal grounded	Terminal checked	Correct condition
1B	1D	2F-1A	Continuity
2F	1C	1A	Approx.12V



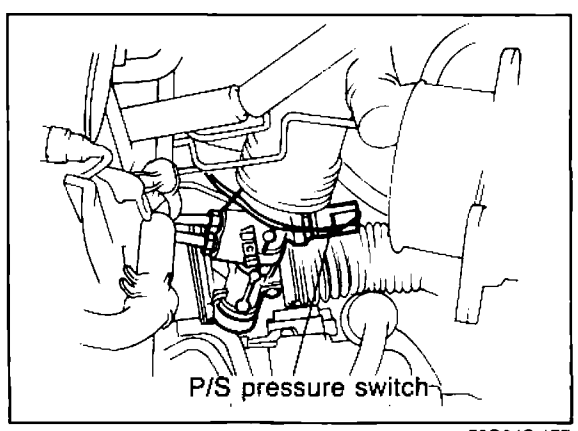
76G04C-174



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76G04C-177

Resistance
Check resistance between the terminals with an ohmmeter.

Between terminals	Resistance (Ω)
1B ↔ 1D	More than approx. 20
2F ↔ 1C	More than approx. 60
2F ↔ 1A	∞
2B ↔ 2D	More than approx. 60
2B ↔ 2C	∞

NEUTRAL SWITCH

Inspection
1. Disconnect the neutral switch connector.
2. Connect an ohmmeter to the switch.
3. Check continuity of the switch.

Transmission	Continuity
In neutral	No
In other ranges	Yes

4. Reconnect the switch connector.

Note
Refer to Section 7A for replacement of the neutral switch.

CLUTCH SWITCH

Inspection
1. Disconnect the clutch switch connector.
2. Connect an ohmmeter to the switch.
3. Check continuity of the switch.

Pedal	Continuity
Depressed	No
Released	Yes

4. Reconnect the switch connector.

Note
Refer to Section 6 for replacement of the clutch switch.

P/S PRESSURE SWITCH

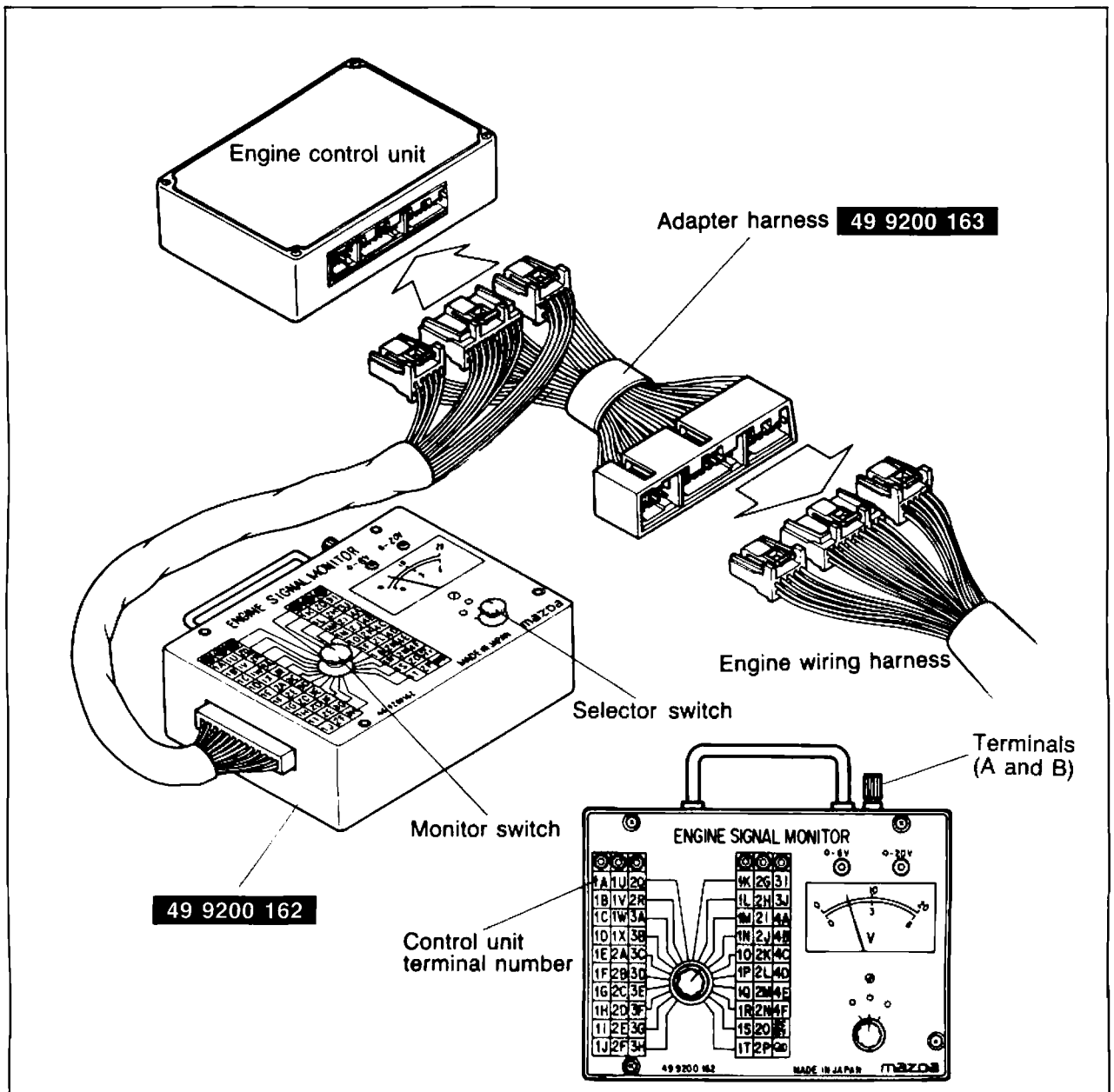
Inspection
1. Disconnect the P/S pressure switch connector.
2. Connect an ohmmeter to the switch.
3. Start the engine. Check continuity of the switch while turning the steering wheel at idle.

P/S	Continuity
Turning	Yes
Not turning	No

4. Reconnect the switch connector.

Note
Refer to Section 10 for replacement of the P/S pressure switch.

ENGINE CONTROL UNIT
Engine Signal Monitor (49 9200 162) and Adapter (49 9200 163).



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The **Engine Signal Monitor** (49 9200 162) is used to check the control unit terminal voltages.

How to Use the Engine Signal Monitor
1. Connect the **Engine Signal Monitor** (49 9200 162) between the engine control unit and the engine harness using the **adapter** (49 9200 163).
2. Turn the selector switch and monitor switch to select the terminal number.
3. Check the terminal voltage.

Caution
Never apply voltage to terminals A and B.

Terminal Voltage

If the input and output devices wiring are normal, but the engine control unit terminal voltage is incorrect, replace the engine control unit.

Terminal	Input	Output	Connection to	Voltage (After warming-up)		Remark
				Ign: ON	Idle	
1A	—	—	—	—	—	—
1B		○	Self-Diagnosis Checker (Code No.)	For 3sec. after ignition switch OFF → ON: below 2.5V (Buzzer sounds) After 3sec.: approx. 12V (Buzzer does not sound)		• Using Self-Diagnosis Checker and test connector grounded • Buzzer sounds: below 2.5V • Buzzer does not sound: approx. 12V
1C		○	Solenoid valve (Variable inertia control)	Approx. 12V		Above 5200 rpm (Unleaded fuel) or 5400 rpm (Leaded fuel): Below 2.5V
1D		○	Self-Diagnosis Checker (Monitor lamp)	For 3sec.after ignition switch OFF → ON: approx. 5V (light illuminates) After 3sec.: approx. 12V (light does not illuminate)	(Test connector grounded) approx. 5V (Test connector not grounded) Monitor lamp ON: approx. 5V Monitor lamp OFF: approx. 12V	With Self-Diagnosis Checker
1E	○		Idle switch	Accelerator pedal released: 0V Accelerator pedal depressed: approx. 12V		
1F		○	A/C relay	A/C switch ON: below 2.5V A/C switch OFF: approx. 12V		Blower motor ON
1G	○		Neutral or clutch switch	In-gear condition Clutch pedal depressed: approx. 12V Clutch pedal released: 0V		MTX (Neutral: constant approx. 12V)
1H (U/F)	○		Water thermo switch	Approx.12V		Radiator temp.: below 17°C (63°F)
				0V		Radiator temp.: above 17°C (63°F)
1I	○		Electrical load control unit	E/L switch ON: below 2.5V E/L switch OFF: approx. 10—12V		Electrical load: Rear defroster switch Headlight switch Blower motor switch (3rd & 4th position) Electrical fan switch
1J	—	—	—	—		—
1K	○		P/S pressure switch	Constant approx. 12V	P/S ON: below 2.5V P/S OFF: approx. 12V	
1L	○		A/C switch	A/C switch ON: below 2.5V A/C switch OFF: approx. 12V		Blower motor: ON
1M	○		Distributor (Ne signal)	0V or 5V	Approx. 2.0V	
1N	○		Distributor (G signal)	0V or 5V	Approx. 1.2V	

Note
Terminals labeled "U/F" are only for unleaded fuel.

Terminal	Input	Output	Connection to	Voltage (After warming-up) Ign: ON	Voltage (After warming-up) Idle	Remark
1O		○	Air flow sensor (Burn-off control)	Below 2.5V		White burning off: Approx. 8—12V
1P		○	Control relay (Power supply circuit)	Below 2.5V		Ignition switch OFF: Approx. 12V
1Q		○	Control relay (Fuel pump circuit)	Approx. 12V	Below 2.5V	
1R (L/F)	○		Knock sensor	0V or 2—7V		While knocking: Approx. 0.001
1S	—	—	—	—		—
1T	○		Ignition switch (ON position)	Approx. 12V		
1U	—	—	—	—		—
1V	—	—	—	—		—
1W	○		Test connector	Test connector grounded: 0V Test connector not grounded: approx. 12V		Green connector, 1-pin
1X		○	Igniter	Approx. 12V	*Approx.1V	*Engine Signal Monitor: green and red lights flash
2A (U/F)		○	V ref	4.5—5.5V		
2B	○		Air flow sensor (Ground)	0V		
2C	—	—	Ground (E2)	0V		
2D (U/F)	○		Oxygen sensor	0V	0—1.0V	• Cold engine: 0V at idle • After warming-up: Increase engine speed: 0.7—1.0V Deceleration: 0—0.2V
2E	○		Air flow sensor (Intake air mass)	1.0—1.6V	1.7—2.3V	Increase engine speed: voltage increases
2F	—	—	—	—		—
2G (U/F)	○		Throttle sensor	Accelerator pedal released: approx. 0.5V		Max. voltage (Throttle valve fully opened): approx. .4.3V
2H (L/F)	○		Air flow sensor (Variable resister)	0—5V		Depends on adjustment
2I	○		Water thermo sensor	Approx. 0.4V		Engine coolant temp. 20°C (68°F): approx. 2.5
2J	○		Intake air thermo sensor (Dynamic chamber)	Approx. 2.5V at 20°C (68°F)		
2K		○	Solenoid valve (Pressure regulator control)	For 120 sec. after ignition switch OFF → ON: below 2.5V	For 120. sec after starting: below 2.5V	During hot condition: Coolant temp. above 70°C (158°F) Intake air temp. above 30°C (86°F) ...Unleaded fuel above 50°C (122°F) ...Leaded fuel
				Approx. 12V		Other conditions
2L	—	—	—	—		—

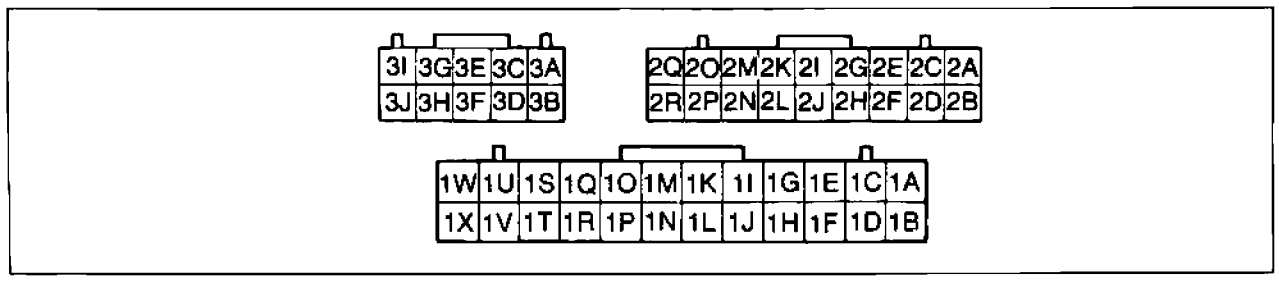
Note
a) Terminal labeled "U/F" are only for unleaded fuel.
b) Terminal labeled "L/F" are only for leaded fuel.

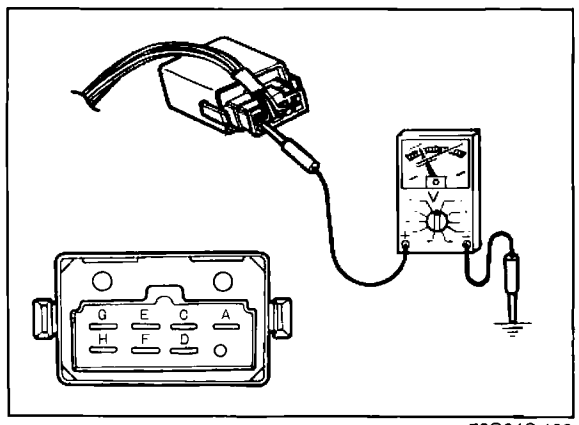
Terminal	Input	Output	Connection to	Voltage (After warming-up)		Remark
				Ign: ON	Idle	
2M (U/F)		○	Oxygen sensor heater	Below 2.5V		Above 3000 rpm: Approx. 12V
2N (U/F)		○	Solenoid valve (EGR)	Below 2.5V		• Radiator temp. below 17°C (62.6°F) or coolant temp. below 70°C (158°F): constant below 2.5V • 1,500—3,500 rpm: approx. 12V
2O (U/F)		○	Solenoid valve (No.2 purge control)	Approx. 12V		• Coolant temp. below 75°C (167°F): constant approx. 12V • During medium and high load of above 1,700 rpm: below 2.5V
2P (U/F)		○	Solenoid valve (No.1 purge control)	Below 2.5V		Coolant temp. below 70°C (158°F): approx. 12V
2Q		○	Solenoid valve (Idle speed control)	Approx. 9—11V		
2R	—	—	Ground (E_{02})	0V		
3A	—	—	Ground (E_{01})	0V		
3B	○		Ignition switch (Start position)	Below 2.5V		While cranking: approx. 10V
3C		○	Injector (No.2)	Approx. 12V	*1 Approx. 12V	*1 Engine Signal Monitor green and red lights flash
3D	—	—	—	—		—
3E		○	Injector (No.1)	Approx. 12V	*1 Approx. 12V	*1 Engine Signal Monitor: gree and red lights flash
3F		○	Injector (No.4)	Approx. 12V	*1 Approx. 12V	*1 Engine Signal Monitor: gree and red lights flash
3G	—	—	Ground (E1)	0V		
3H		○	Injector (No.3)	Approx. 12V	*Approx. 12V	*1 Engine Signal Monitor: green and red lights flash
3I	○	—	Control relay	Approx. 12V		
3J	—	—	Battery	Approx.12V		For back-up

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Note
Terminals labeled "U/F" are only for unleaded fuel.

Terminal Location





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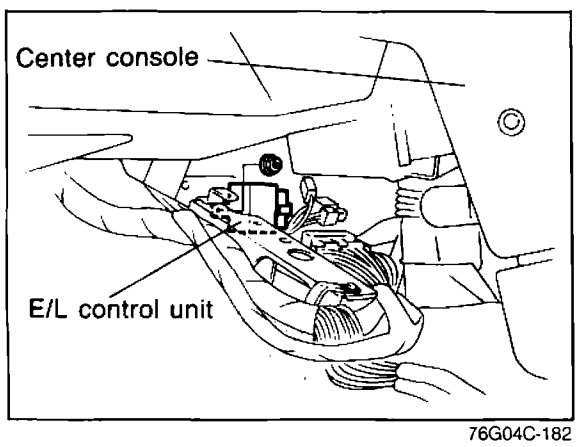
E/L CONTROL UNIT

Inspection

1. Connect a voltmeter between the E/L control unit and a ground.
2. Start the engine and check the terminal voltages as described below.

Terminal	Input	Output	Connection to	Voltage (after warm-up)		Remarks
				Ignition switch: ON	Idle	
A (BW)	—	—	Ignition switch	Approx. 12V		
B	—	—	—	—	—	—
C (B)	—	—	Ground	0V		
D (LY)	○		Electrical fan relay	Approx. 12V		Coolant temp.: below 97°C (207°F)
				Below 1.5V		Coolant temp.: above 97°C (207°F)
E (GY)		○	Control unit (1I)	0V		E/L: ON
				Approx. 12V		E/L: OFF
F (W)	○		Headlight switch	Approx. 12V		Headlight switch: ON
				Below 1.5V		Headlight switch: OFF
G (LB)	○		Blower motor switch	Below 1.5V		Blower motor switch: ON (3rd or 4th position)
				Approx. 5V		Others
H (BL)	○		Rear defroster switch	Below 1.5V		Rear defroster switch: ON
				Approx. 12V		Rear defroster switch: OFF

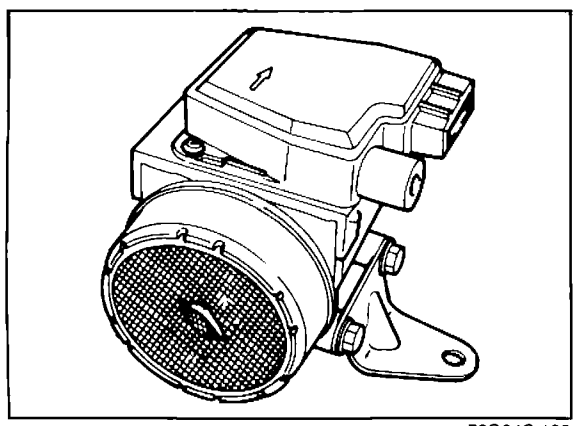
76G04C-181



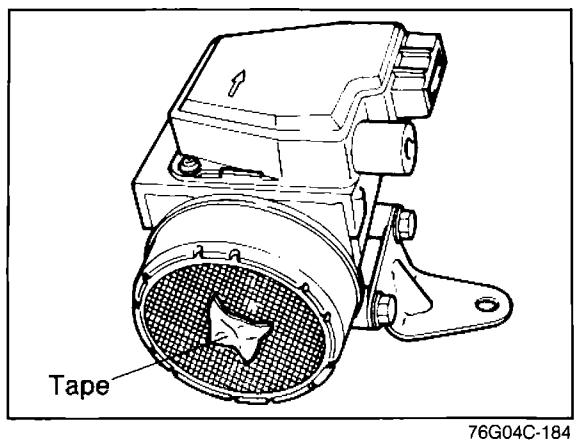
76G04C-182

Replacement

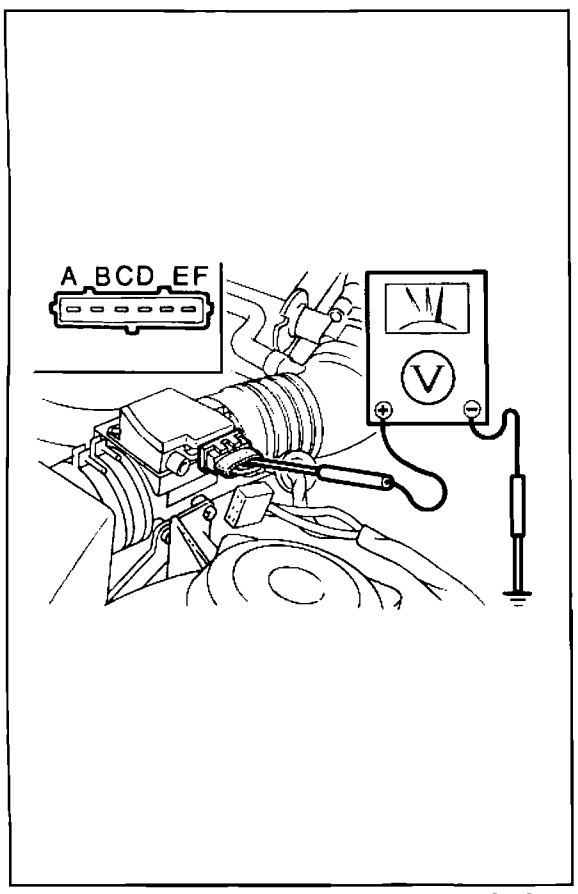
1. Replace the E/L control unit.
2. Install in the reverse order of removal.



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AIR FLOW SENSOR

Visual Inspection

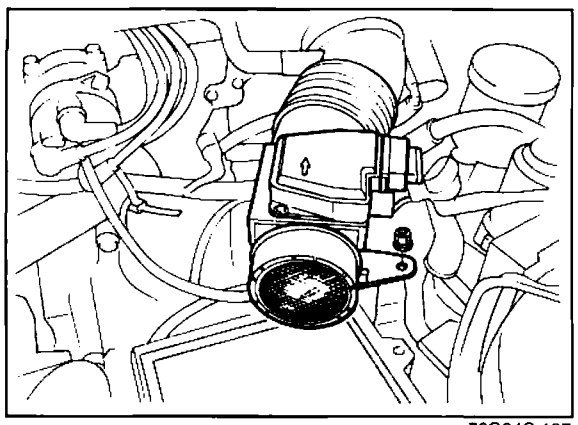
1. Remove the air hose.
2. Check the air flow sensor visually for the following:
   a) Torn protection net (air cleaner side)
   b) Restricted protection net

Output Voltage Inspection

1. Remove the rubber boot from the air flow sensor connector.
2. Check terminal voltage with a voltmeter.

Terminal \ Condition	Ign. switch:ON	Engine running
A (Idle mixture)	0—5V	
B (Power supply)	Approx. 12V	
C (Burn-off)	0V	
D (Air flow mass)	1.0—1.6V	1.7V—5V
E (Ground)	0V	
F (Ground)	0V	

6. If not correct, check the wiring harness for an open or short circuit
7. If the wiring harness is OK, replace the air flow sensor.



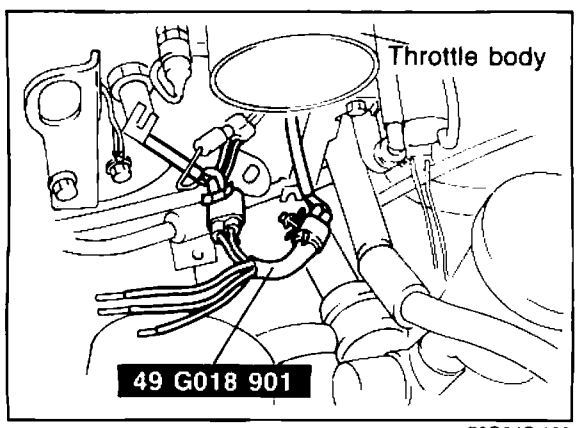
76G04C-187

Replacement

1. Disconnect the connector.
2. Loosen the air hose clamps.
3. Replace the air flow sensor.

Caution
Install the air flow sensor so that the arrow on the sensor aligns with air flow direction.

4. Tighten the hose clamps.
5. Reconnect the connector to the sensor.



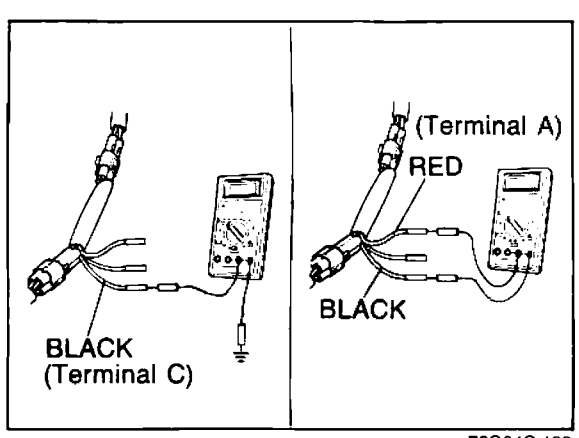
76G04C-188

THROTTLE SENSOR

Caution
Use a precision voltmeter with a scale of 0.01V to inspect or adjust the throttle sensor. If it is not available, replace the throttle sensor and throttle body as an assembly.

Inspection

1. Disconnect the throttle sensor connector (3-pin).
2. Connect the **SST** between the throttle sensor and the wiring harness.
3. Turn the ignition switch ON.

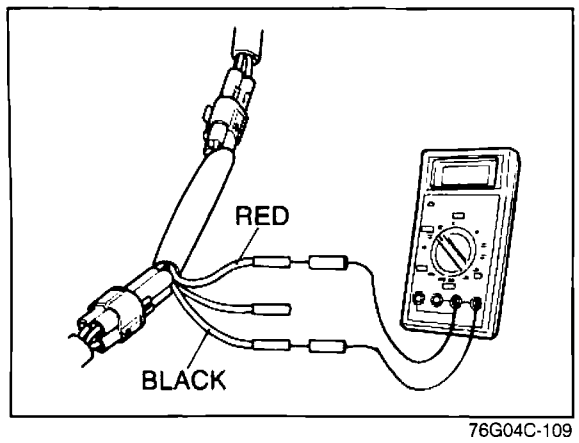


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4. Measure **BLACK** and **RED** wire voltages.

Specifications:
BLACK—Approx. 0V
RED—4.5—5.5V

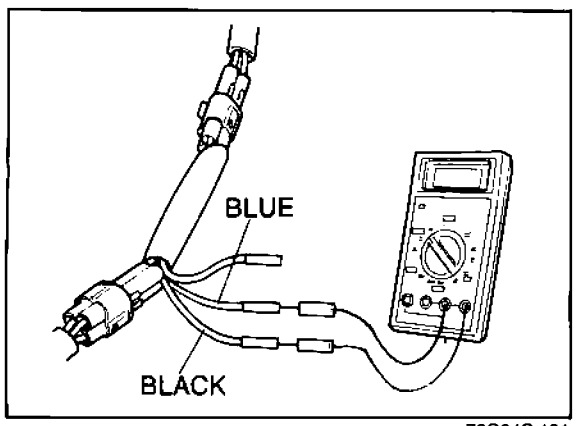
5. If not correct, check the battery voltage and wiring harness. If these are OK, replace the engine control unit.



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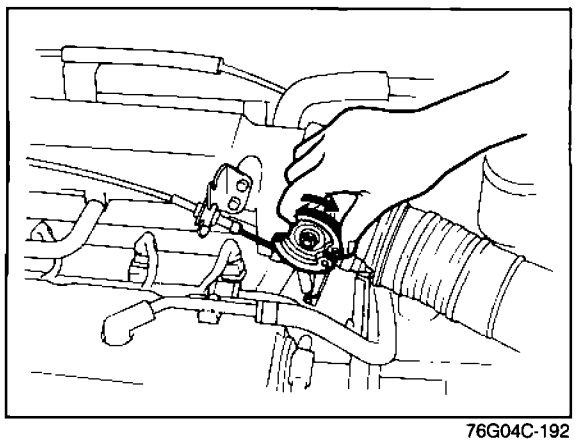
6. Using the RED wire voltage as a guide, find the specified BLUE wire voltage ranges in the table.

RED wire voltage	Specified range (V)	
	Fully close	Fully open
4.90—4.99V	0.40—0.58	3.90—4.60
5.00—5.09V	0.41—0.60	3.97—4.70
5.10—5.19V	0.42—0.61	4.05—4.79



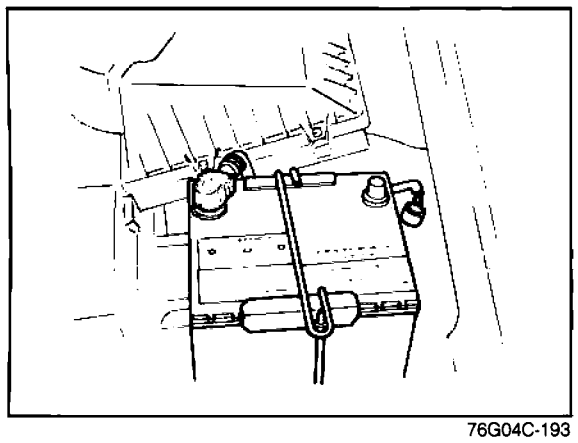
76G04C-191

7. Make sure that the throttle valve is fully closed.
8. Check that the **BLUE** wire voltage is within the specified range.
9. Adjust the throttle sensor if necessary



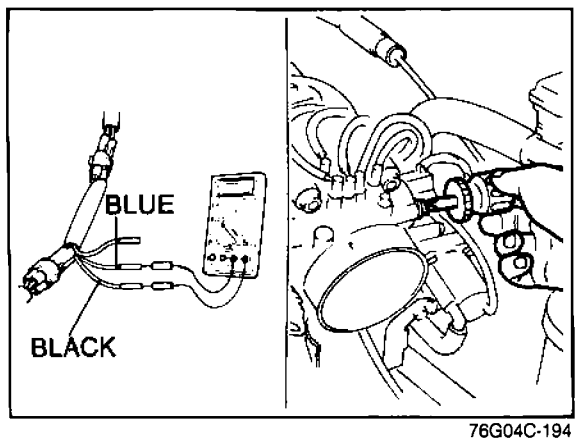
76G04C-192

10. Open the throttle valve fully.
11. Check that **BLUE** wire voltage is within the specified range.
12. If not correct, replace the throttle sensor.



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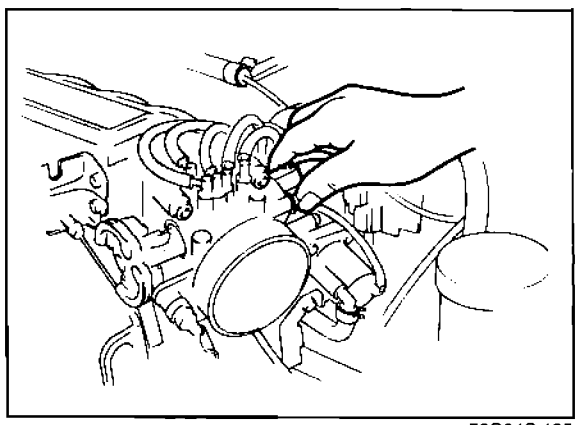
13. Turn the ignition switch OFF.
14. Disconnect the SST and reconnect the throttle sensor connector.
15. Disconnect the negative battery terminal and depress the brake pedal for **5 seconds** to eliminate the malfunction memory from the control unit.



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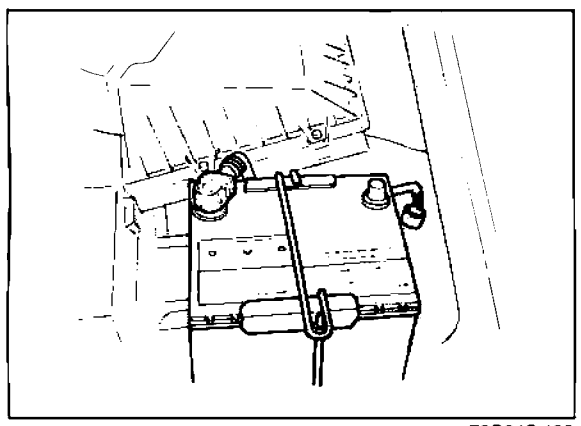
Adjustment

1. Perform steps 1 to 7 in the inspection procedure.
2. Connect the voltmeter to the **BLUE** wire.
3. Loosen the throttle sensor mounting screw.



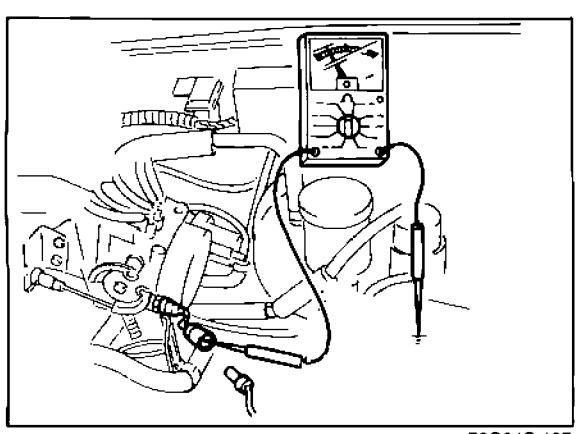
76G04C-195

4. Make sure that the throttle valve is fully closed.
5. Turn the throttle sensor so that the **BLUE** wire voltage indicates within the specified closed range.
6. Tighten the throttle sensor mounting screw.
7. Recheck that the **BLUE** wire voltage is within the specified range.



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8. Turn the ignition switch OFF.
9. Disconnect the SST and reconnect the throttle sensor connector.
10. Disconnect the negative battery terminal and depress the brake pedal for **5 seconds** to eliminate the from the malfunction memory from the control unit.



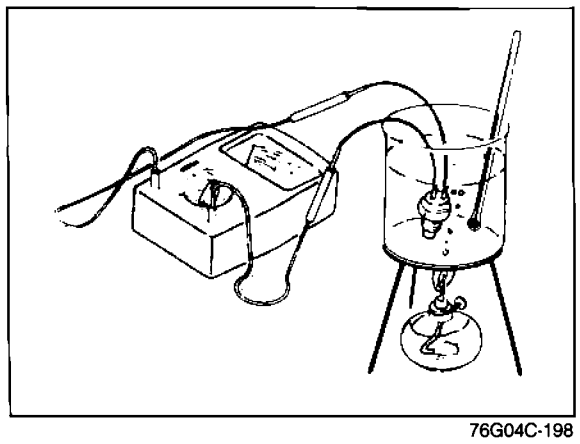
76G04C-197

IDLE SWITCH
Inspection

1. Disconnect the idle switch connector.
2. Check continuity between the switch and a ground.

Throttle valve condition	Continuity
Fully closed	Yes
Open	No

3. If not correct, check condition of the wiring harness of the idle switch. Replace the idle switch and throttle body as an assembly, if necessary.



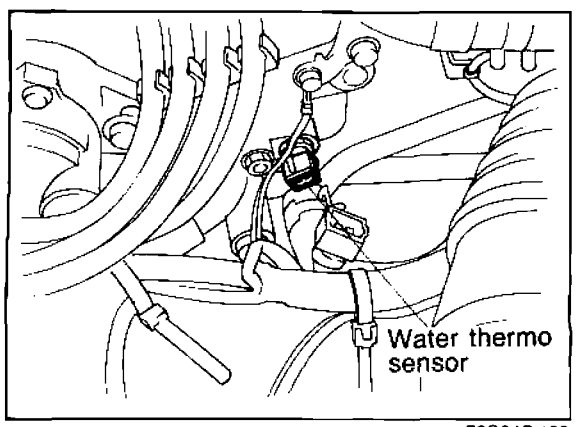
76G04C-198

WATER THERMO SWITCH
Inspection

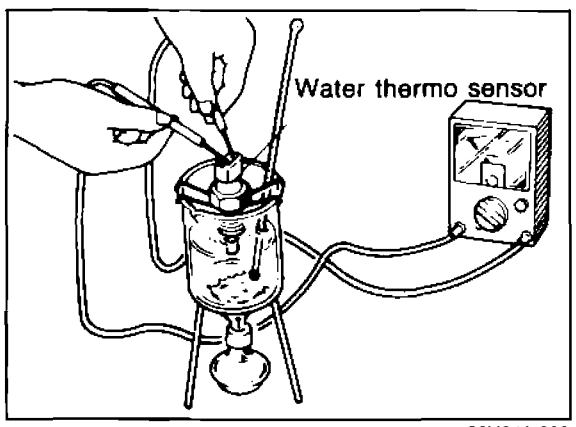
1. Remove the switch from the radiator.
2. Place the switch in water with a thermometer and heat the water gradually.
3. Check for continuity of the switch with an ohmmeter.

Coolant temp.	Continuity
More than approx. 17°C (63°F)	Yes
Less than approx. 10°C (63°F)	No

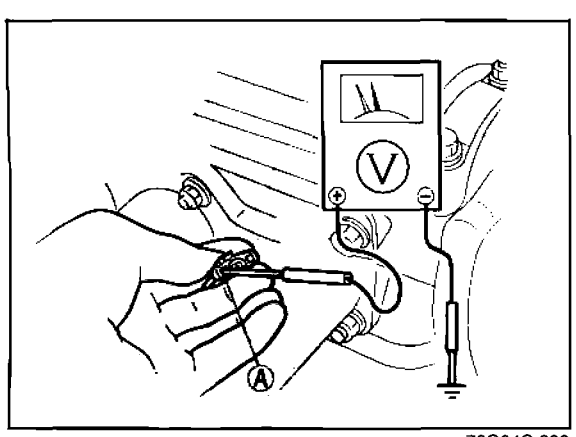
4. If not correct, replace the water thermo switch.



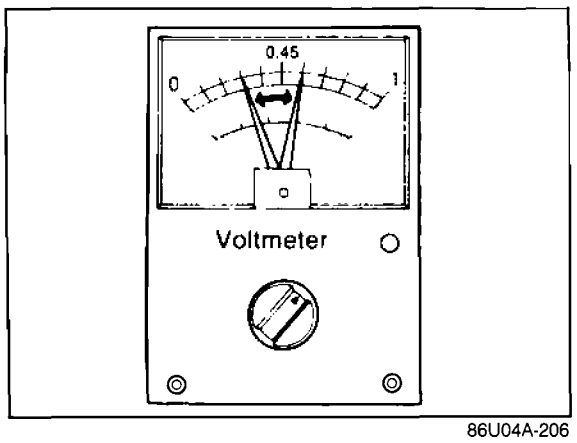
76G04C-199



86U04A-203



76G04C-200



86U04A-206

WATER THERMO SENSOR

Inspection

1. Remove the water thermo sensor.
2. Place the sensor in water with a thermometer and heat the water gradually.
3. Check resistance of the sensor with an ohmmeter.

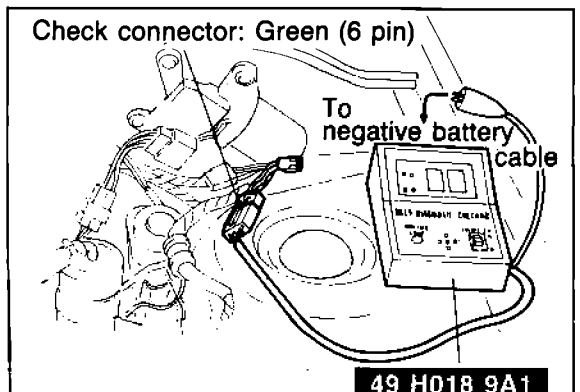
Coolant	Resistance
–20°C (–4°F)	14.5—17.8 kΩ
20°C (68°F)	2.2—2.7 kΩ
40°C (104°F)	1.0—1.3 kΩ
60°C (140°F)	500—640 Ω
80°C (176°F)	280—350 Ω

4. If not correct, replace the water thermo sensor.

OXYGEN SENSOR

Inspection of Output Voltage

1. Warm up the engine and run it at idle.
2. Disconnect the oxygen sensor connector.
3. Connect a voltmeter between the oxygen sensor and a ground.
4. Run the engine at **4,500 rpm** until the voltmeter indicates **approx. 0.7V**.
5. Increase and decrease the engine speed suddenly several times. Check to see that when the speed is increased the meter reads between **0.5V—1.0V**, and when the speed is decreased it reads between **0V—0.4V**.
6. If the voltmeter dosen't indicate as specified, replace the oxygen sensor.

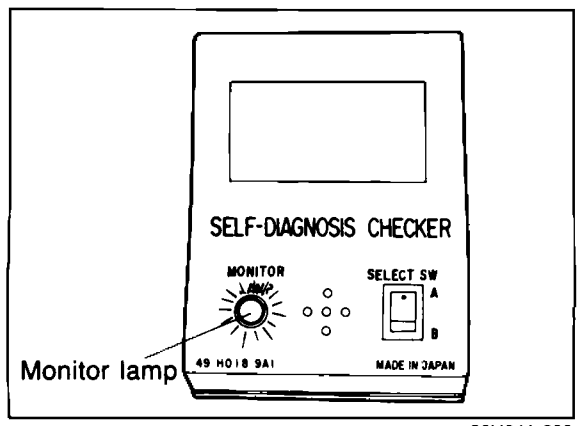


76G04C-213

Inspection of Sensitivity

1. Warm up the engine to the normal operating temperature and run it at idle.
2. Connect the **SST** to the check connector.

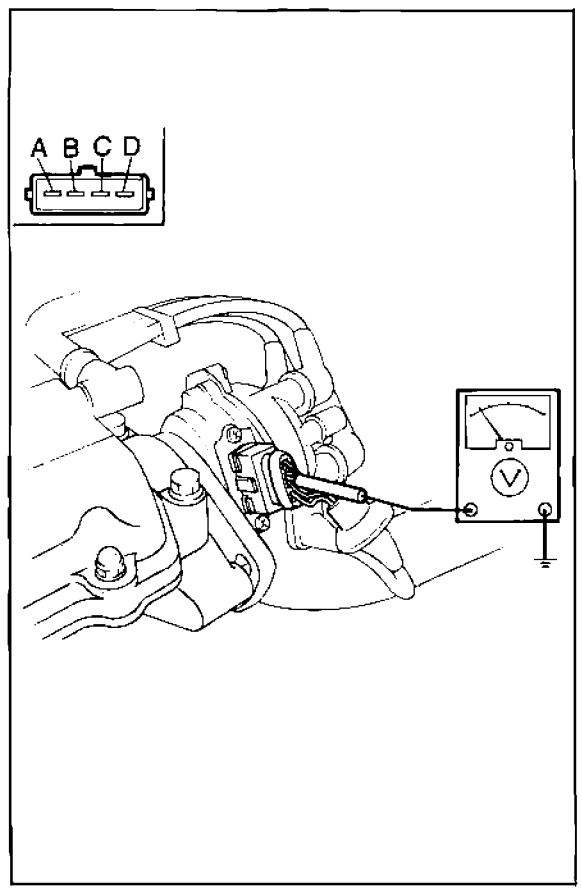
Note
Digital code checker (49 G018 9A0) can be used.



86U04A-208

3. Increase the engine speed to between **2,000 and 3,000 rpm**, and check that the monitor lamp flashes for 10 seconds.

Monitor lamp: Flashes ON and OFF more than 8 times/10 sec



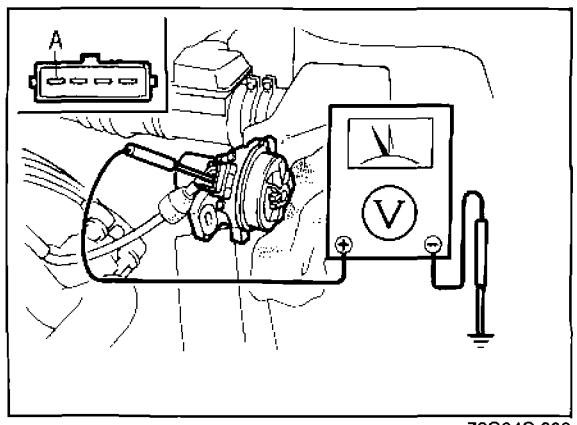
76G04C-201

DISTRIBUTOR
On-vehicle Inspection

1. Remove the rubber boot from the distributor connector.
2. Run the engine at idle.
3. Check terminal voltage with a voltmeter.

Terminal	Voltage
A (G signal)	1.0—2.4
B (Ne signal)	1.8—2.2
C (Power supply)	Approx. 12V
D (Ground)	0V

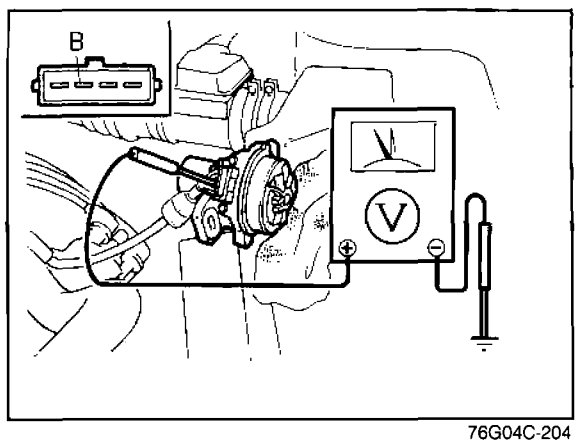
4. If not correct, check the wiring harness for an open or short circuit, then check the distributor for G signal or Ne signal.



76G04C-203

G Signal Inspection

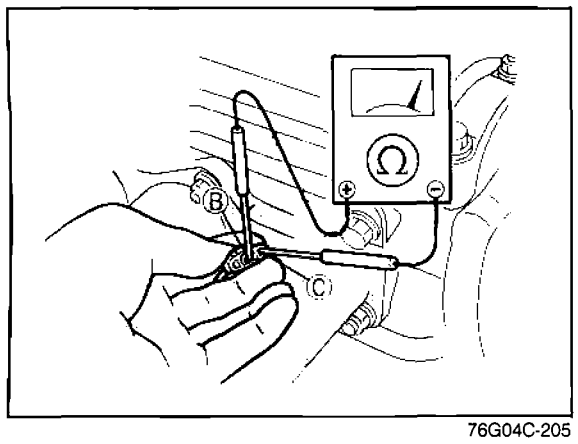
1. Remove the distributor. (Refer to section 5.)
2. Reconnect the distributor to the wiring harness.
3. Remove the rubber boot from the distributor connector.
4. Connect a volt meter between the A terminal and a ground.
5. Turn the shaft and check that the distributor generates one pulse signal I per one turn.



76G04C-204

Ne signal Inspection

1. Remove the distributor. (Refer to Section 5.)
2. Reconnect the distributor to the wiring harness.
3. Remove the rubber boot from the distributor connector.
4. Connect a voltmeter between the B terminal and a ground.
5. Turn the shaft and check that the distributor generates four pulse signals per one turn.

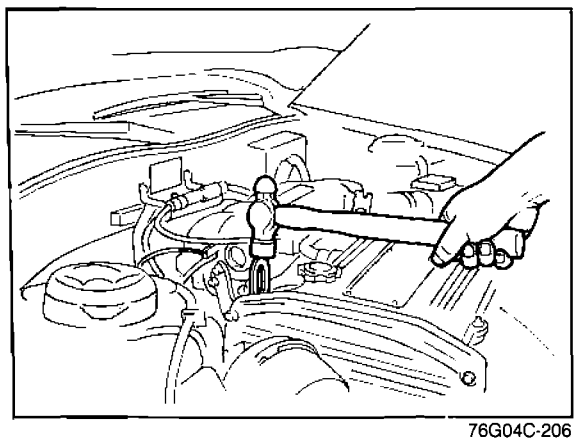


76G04C-205

Oxygen Sensor Heater

1. Disconnect the oxygen sensor connector.
2. Check resistance between terminals B and C.

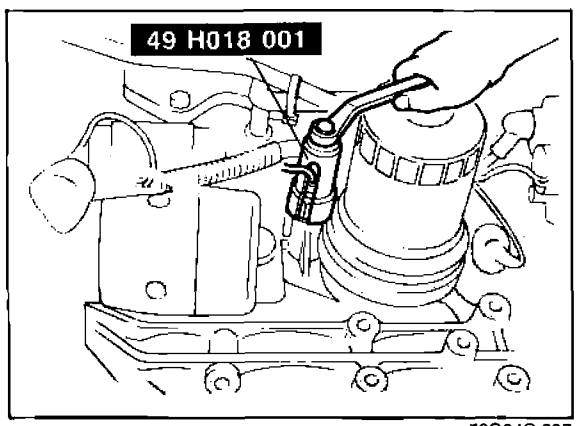
Specification: approx. 6 Ω



76G04C-206

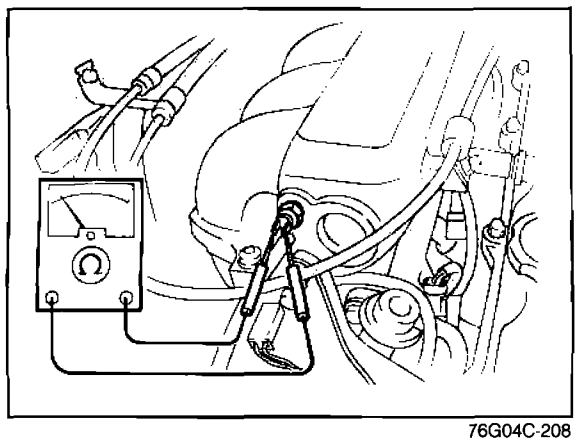
Knock Sensor (Leaded fuel)

1. Warm up the engine and rum it at idle.
2. Ground the test connector (Green, 1-pin) with a jumper wire.
3. Tap the engine hanger with a hammer and verify that the ignition timing retards.
4. If not correct, check the knock sensor.



76G04C-207

Replacement
1. Disconnect the knock sensor connector.
2. Lift the vehicle and remove the intake manifold bracket.
3. Remove the knock sensor with the **SST**.
4. Install the knock sensor in the reverse order of removal.

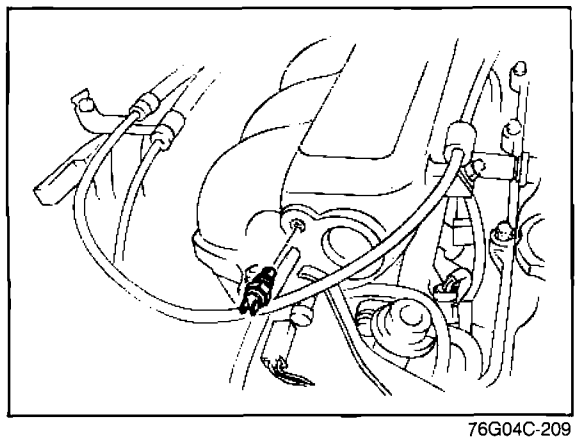


76G04C-208

INTAKE AIR THERMO SENSOR (DYNAMIC CHAMBER)
Inspection
1. Disconnect the intake air thermo sensor connector.
2. Connect an ohmmeter to the sensor terminals.
3. Check the resistance of the sensor.

Temperature	Resistance (kΩ)
20°C (68°F)	29.7—36.3
50°C (122°F)	8.4—10.2
85°C (185°F)	2.5—3.1

4. Reconnect the sensor connector.



76G04C-209

Replacement
1. Disconnect the intake air thermo sensor connector.
2. Remove the sensor.
3. Install the sensor.

Note
When installing the sensor, tighten to the specified torque.

Specified torque:
6.9—8.8 N·m (0.7—0.9 m-kg, 72 in-lb)

4D

FUEL AND EMISSION CONTROL SYSTEM (DIESEL)

OUTLINE ..... **4D— 2**
SPECIFICATIONS ..... **4D— 2**
TROUBLESHOOTING GUIDE ..... **4D— 3**
ON-VEHICLE MAINTENANCE ..... **4D— 4**
AIR CLEANER ELEMENT ..... **4D— 4**
WATER DRAINING ..... **4D— 4**
AIR BLEEDING ..... **4D— 4**
INJECTION TIMING ..... **4D— 5**
IDLE SPEED ..... **4D— 6**
EXHAUST SMOKE ..... **4D— 6**
INTAKE AIR SYSTEM ..... **4D— 7**
STRUCTURAL VIEW ..... **4D— 7**
AIR DUCT AND AIR CLEANER ..... **4D— 8**
INTAKE MANIFOLD ..... **4D— 9**
SUPERCHARGING SYSTEM (RF-CX) ..... **4D—10**
TROUBLESHOOTING GUIDE ..... **4D—10**
ON-VEHICLE INSPECTION ..... **4D—11**
COMPREX SUPERCHARGER ..... **4D—13**
STARTING VALVE ..... **4D—15**
INTERCOOLER ..... **4D—16**
BOOST AIR TEMPERATURE SENSOR ..... **4D—17**
EXHAUST SYSTEM ..... **4D—18**
STRUCTURAL VIEW ..... **4D—18**
EXHAUST MANIFOLD ..... **4D—19**
EXHAUST PIPE AND MAIN SILENCER ..... **4D—20**
FUEL SYSTEM ..... **4D—21**
STRUCTURAL VIEW ..... **4D—21**
FUEL FILTER ..... **4D—22**
SEDIMENTER (GENERAL) ..... **4D—22**
WATER LEVEL SENSOR ..... **4D—23**
INJECTION PUMP ..... **4D—24**
INJECTION NOZZLE ..... **4D—31**
FUEL TANK ..... **4D—34**

76G04D-001

4D OUTLINE

OUTLINE

The Mazda 626 offers two diesel engines; a Comprex supercharged RF-CX engine, and a normally aspirated RF-N engine.

SPECIFICATIONS

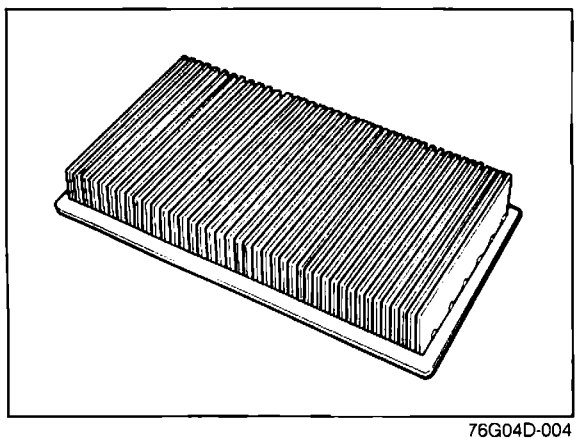
Item \ Engine model		ECE		UK, GENERAL
		RF-CX	RF-N	
Fuel tank	Capacity liters (US gal, Imp gal)	60 (15.9, 13.2)		
Fuel filter	Type	Cartridge, paper element		
Sedimenter	Type	With detector		
Injection pump	Type	Bosch VE distributor		
	Manufacturer	Diesel Kiki Co., Ltd.		
	Direction of rotation	Clockwise		
	Drive method	Timing belt		
	Plunger diameter mm (in)	9.0 (0.35)	8.0 (0.31)	
	Cam lift mm (in)	2.2 (0.087)		
Injection nozzle	Type	Throttle		
	Injection pressure kPa (kg/cm^2, psi)	13,240 (135 , 1,920)		
Injection timing		ATDC 1°	TDC 0°	
Idle speed rpm		720 $^{+30}_{-20}$		
Fast idle speed (A/C ON) rpm		700—750		
Cold start device	Engine speed rpm	1.100		
	Advance degree	6°		
Air cleaner	Type	Cartridge, paper element		
		Wet	Dry	
PCV system	Type	Open	Closed	

76G04D-002

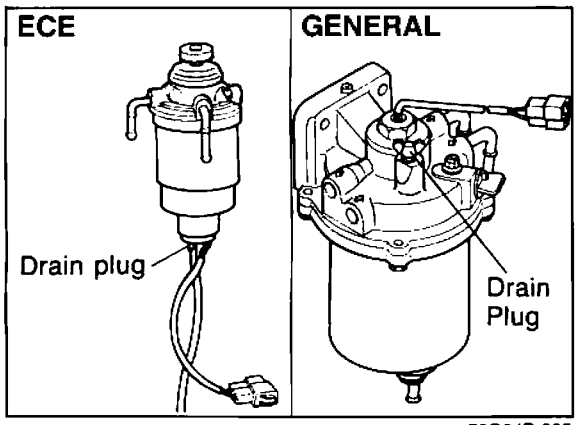
TROUBLESHOOTING GUIDE

Condition	Condition Cause	Remedy
Hard starting	**Fuel filter**	
	Clogged	Replace
	Water or air in filter	Repair
	Fuel injection pump	
	Faulty fuel cut solenoid	Replace
	Incorrect injection timing	Adjust
	Air in pump	Bleed
	Faulty pump	Replace
	Fuel injection nozzle	
	Seized needle valve	Replace
	Fuel dripping from nozzle	Replace
	Incorrect valve opening pressure	Adjust
	Faulty glow plug	Replace
	Faulty cold start device	Adjust or replace
	Faulty supercharging system	Refer to page 4D—10
Rough idle	**Fuel filter** (Refer to "Hard starting")	
	Fuel injection pump (Refer to "Hard starting")	
	Fuel injection nozzle	
	Seized needle valve	Replace
	Incorrect valve opening pressure	Adjust
	Improper mounting to nozzle holder	Repair
	Leakage of nozzle holder copper washer	Replace
	Fuel injection pipe	
	Cranks	Replace
	Leaking from joint	Repair
	Improper idle speed adjustment	Adjust
Engine knocking	Incorrect injection timing	Adjust
	Low quality fuel	Replace
	Incorrect injection nozzle opening pressure	Ajust
	Seized injection nozzle needle valve	Replace
	Fuel dripping from injection nozzle	Replace
	Faulty supercharging system	Refer to page 4D—10
High fuel consumption	**Fuel injection pump**	
	Incorrect injection timing	Adjust
	High idle speed	Adjust, Inspect the dashpot
	Fuel injection nozzle	
	Incorrect valve opening pressure	Repair
	Fuel dripping from nozzle	Replace
	Leakage of nozzle holder copper washer	Replace
	Fuel leaking from connection	Repair
	Clogged fuel filter	Replace
	Clogged air cleaner	Replace
Poor acceleration	**Fuel injection nozzle** (Refer to "Hard starting")	
	Fuel injection pump (Refer to "Hard starting")	
	Fuel injection pipe (Refer to "Rough idle")	
	Fuel filter (Refer to "Hard starting")	
	Clogged air cleaner	Clean or replace
	Faulty supercharging system	Refer to page 4D—10
Excessive exhaust smoke	Clogged air cleaner	Clean or replace
	Improper injection timig	Adjust
	Faulty nozzle or nozzle holder	Adjust or replace
	Faulty supercharging system	Refer to page 4D—10

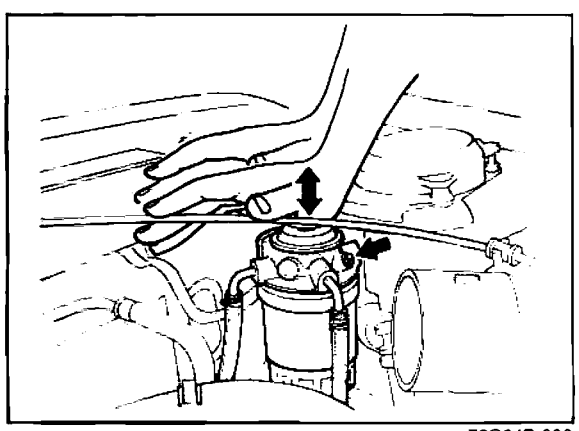
76G04D-003



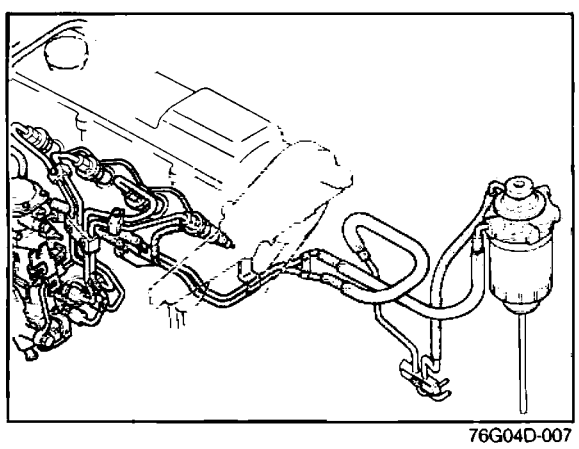
76G04D-004



76G04D-005



76G04D-006



76G04D-007

ON-VEHICLE MAINTENANCE

AIR CLEANER ELEMENT

Check the air cleaner element for excessive dirt, damage, or oil. Replace if necessary.

Caution
(Wet type)
Do not clean the air cleaner element with compressed air, replace if necessary.

(Dry type)
When cleaning the air cleaner element, blow dust off from the inside first, then blow off the outside.

WATER DRAINING

(ECE)

1. Loosen the drain plug of the fuel filter.
2. Pump the priming pump.
3. Bleed air from the fuel filter.

(General)

1. Loosen the drain plug of the sedimenter and let the water drain. If necessary loosen the air bleeding plug.
2. Bleed air from the sedimenter.

AIR BLEEDING

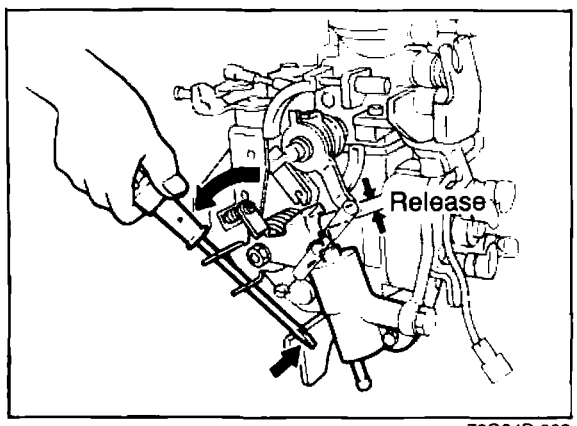
From Fuel Tank to Fuel Filter

1. Loosen the air bleeding plug of the fuel filter.
2. Pump the priming pump until no air bubbles flow from the air bleeding plug hole.
3. Depress the priming pump and tighten the air bleeding plug.

Note
Open only the air bleeding plug of the filter.

From Fuel Filter to Injection Pump

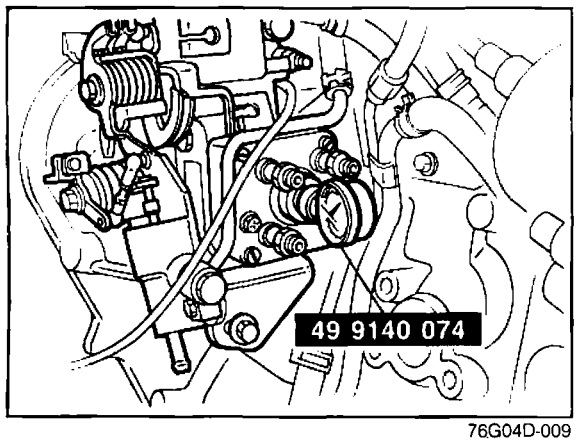
Pump the priming pump until it becomes hard to pump.



76G04D-008

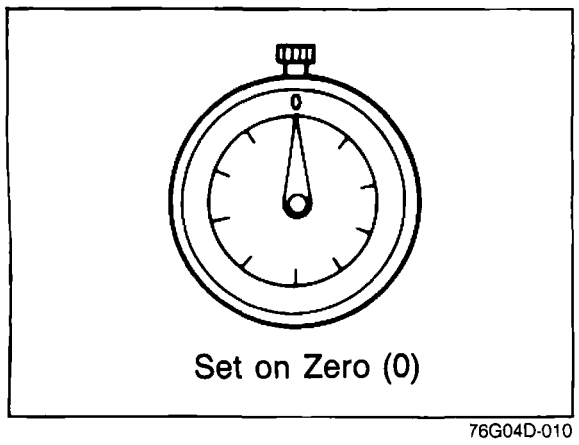
INJECTION TIMING

1. Disconnect the negative battery cable.
2. Release the CSD using the screw driver.
3. Remove the cover on the clutch housing.
4. Turn the flywheel and set the indicator at **TDC**.
5. Disconnect the injection pipes from the injection pump.



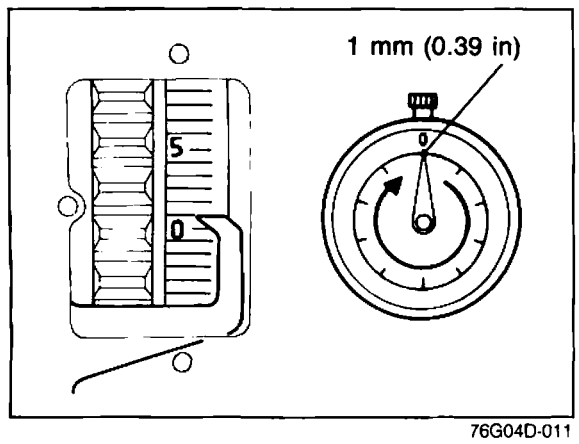
76G04D-009

6. Remove the hydraulic head plug from the injection pump.
7. Mount the **SST** into the plug hole on the hydraulic head so the tip of the dial gauge pointer touches the plunger end of the pump and the dial gauge indicates **approx. 2.0 mm (0.08 in).**



76G04D-010

8. Turn the crankshaft slowly counterclockwise to 30—50° BTDC.
9. Make sure the dial indicator pointer no longer moves by slightly turning the crankshaft.
10. Set the dial gauge scale to Zero at the pointer.

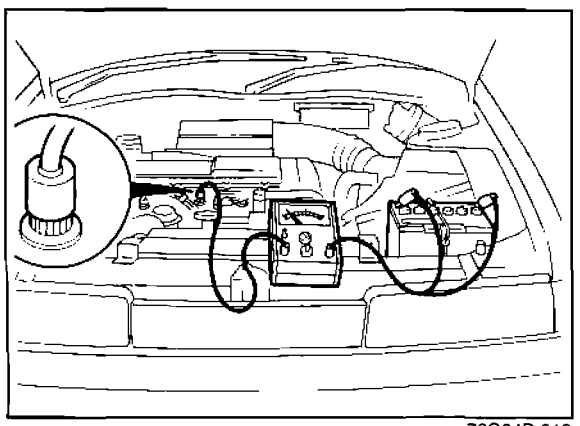


76G04D-011

11. Turn the crankshaft clockwise to align the indicator pin at **ATDC 1° (RF-CX), TDC 0° (RF-N)**.
12. Read the dial gauge.

    Cam lift: 0.98—1.02 mm (0.038—0.040 in)

13. If not within the specification, adjust the injection timing. (Refer to page 4D—24.)

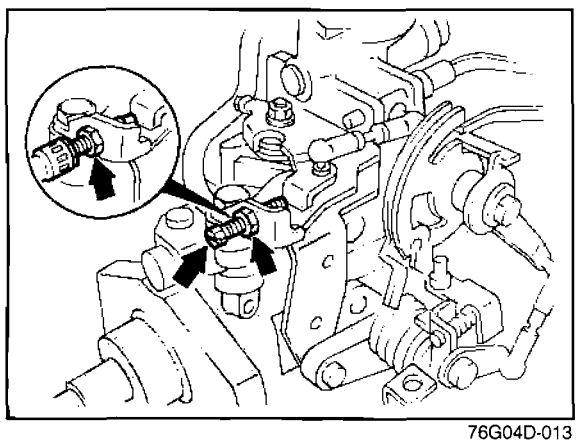


76G04D-012

IDLE SPEED

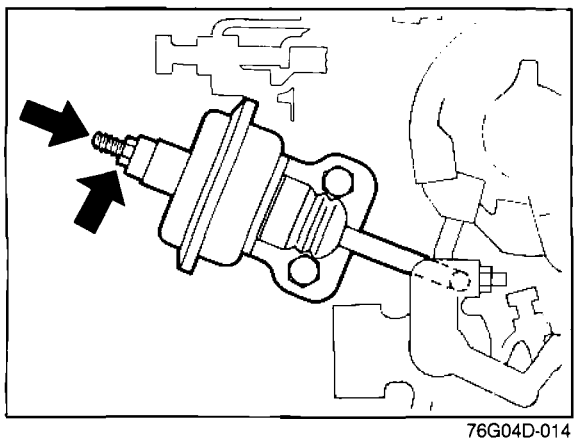
1. Warm up the engine to normal operating temperature.
2. Be sure the A/C switch is OFF.
3. Connect a tachometer and check the engine speed.

   Idle speed: 720 $^{+30}_{-20}$ rpm



76G04D-013

4. If necessary, adjust the idle by turning the idle adjusting screw.



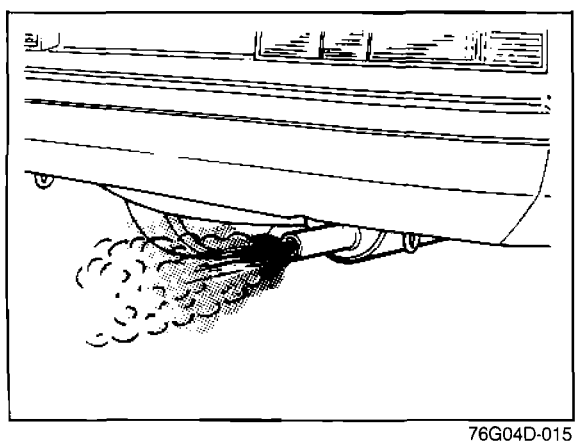
76G04D-014

Fast Idle Speed (A/C equipped model)

1. Turn ON the A/C switch and blower motor switch.
2. Check the engine speed.

   Fast idle speed: 725 ± 25 rpm

3. If necessary, turn the adjusting screw on the idle-up actuator, and adjust the fast idle speed.



76G04D-015

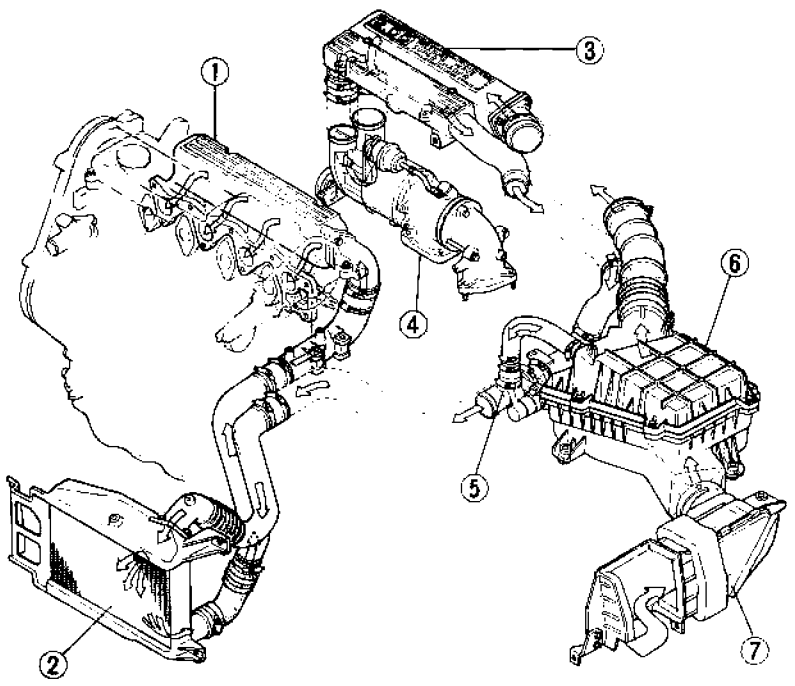
EXHAUST SMOKE

Increase and decrease the engine speed several times and check that there is no black smoke. If there is, refer to the Troubleshooting Guide.

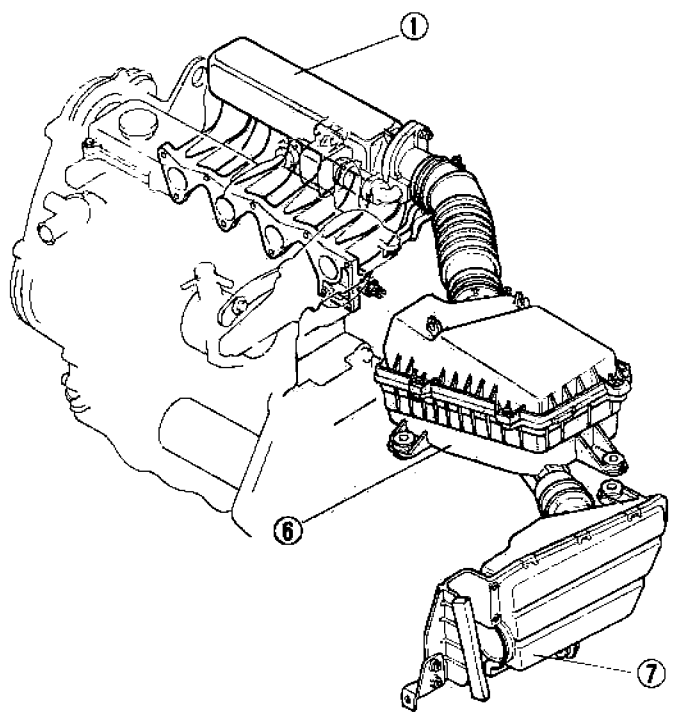
INTAKE AIR SYSTEM

STRUCTURAL VIEW

RF-CX



RF-N



76G04D-016

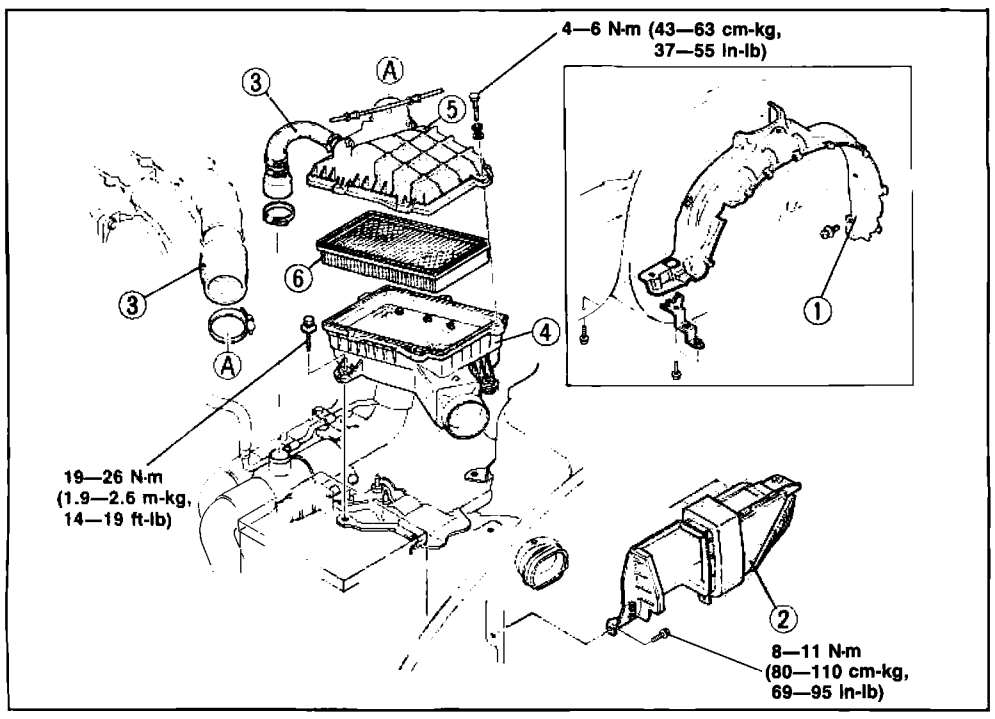
1. Intake manifold
2. Intercooler
3. Air funnel assembly
4. Comprex supercharger
5. Starting valve
6. Air cleaner
7. Air duct

4D INTAKE AIR SYSTEM

AIR DUCT AND AIR CLEANER

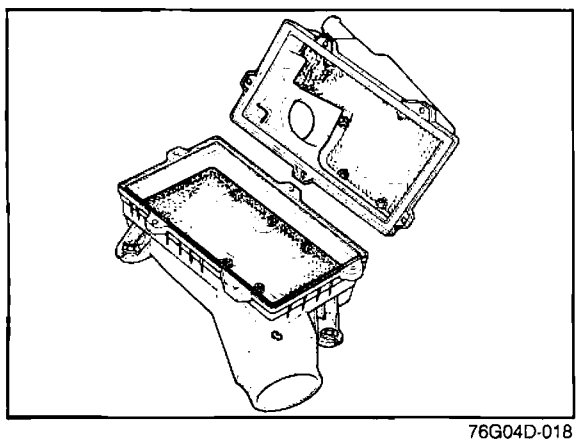
Removal and Installation

1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.
3. Check for air leakage.



76G04D-017

1. Tire house cover
2. Air duct
3. Air hose
4. Air cleaner case
5. Air cleaner cover
6. Air cleaner element



76G04D-018

Inspection

Air cleaner

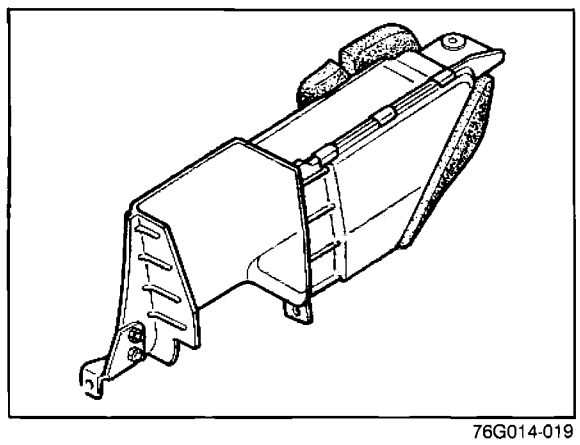
1. Inspect the silencer in the air cleaner cover for damage.
2. Inspect the air cleaner element for excessive dirt, damage, or oil. Replace if necessary.

Caution
(Wet type)
Do not clean the air cleaner element with compressed air, replace it if necessary.

(Dry type)
When cleaning the air cleaner element, blow dust off from the inside first, then blow off the outside.

Air duct

Inspect the silencer in the air duct for damage. Replace if necessary.

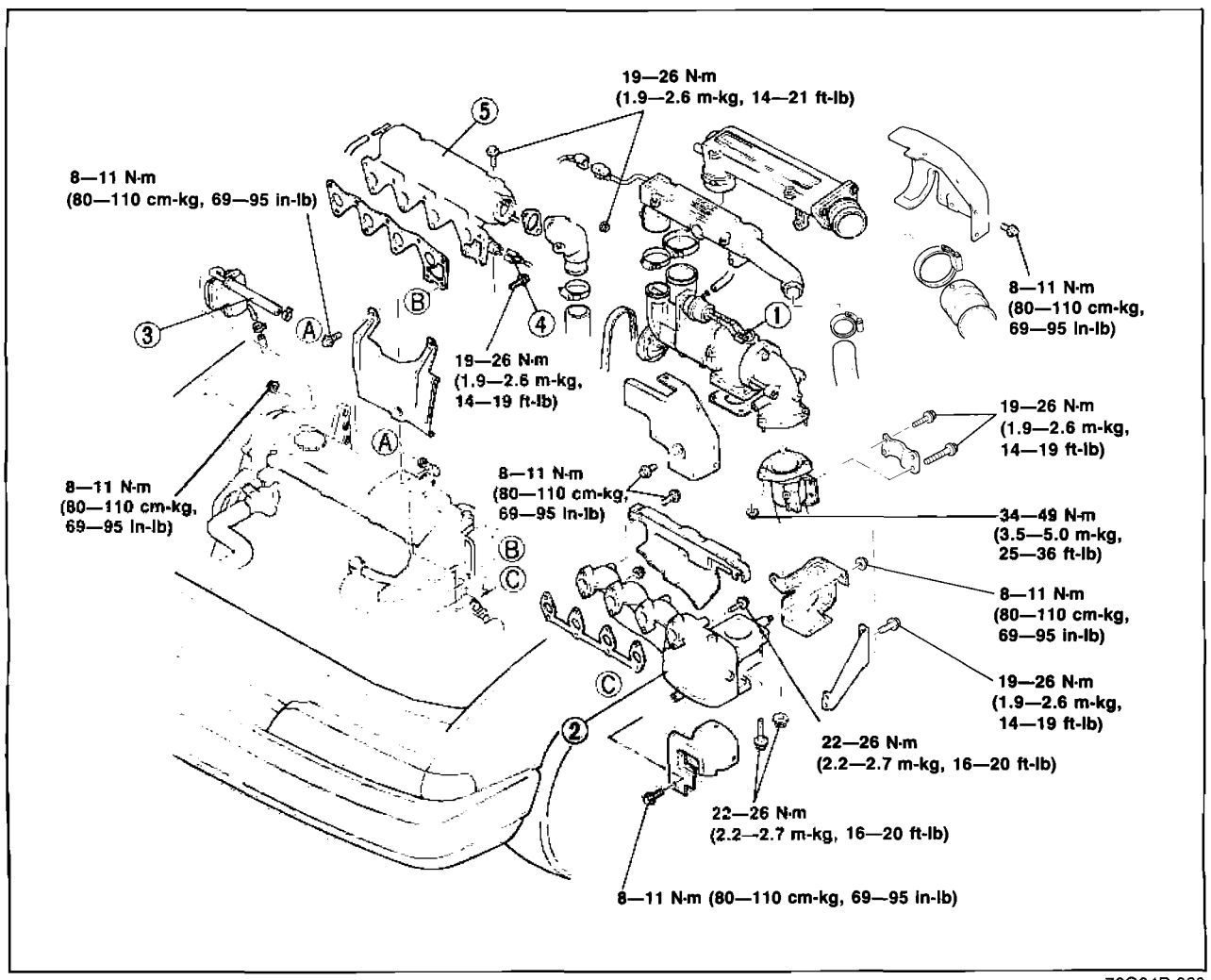


76G014-019

INTAKE MANIFOLD

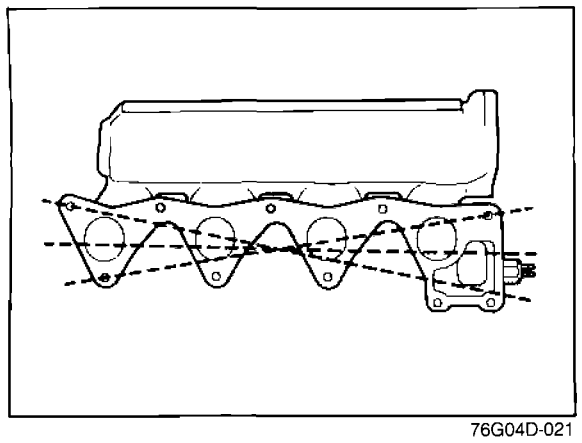
Removal and Installation

1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.
3. Check for air/exhaust leakage.



76G04D-020

1. Comprex supercharger
   (Refer to page 4D—13.: RF-CX)
2. Exhaust manifold
   (Refer to page 4D—19.: RF-CX)
3. Vacuum hose (RF-CX)
4. Water thermo switch connector
5. Intake manifold



76G04D-021

Inspection

1. Check the intake manifold for cracks and damage.
2. Inspect the flatness of the mounting surface using a straight edge and a feeler gauge. Replace if necessary.

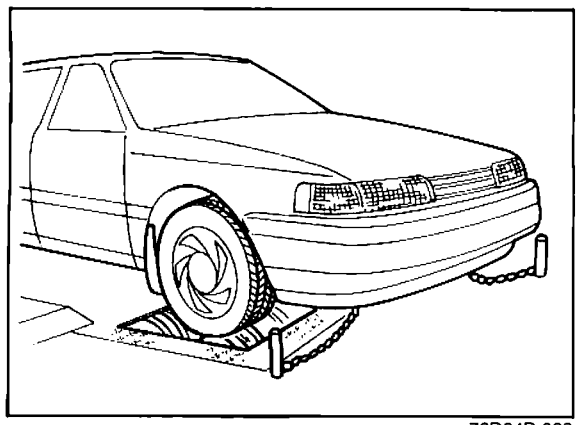
Distortion: 0.05 mm (0.002 in) max.

SUPERCHARGING SYSTEM (RF-CX)

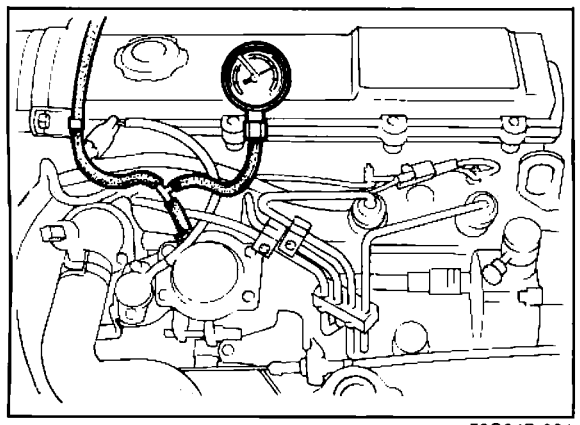
TROUBLESHOOTING GUIDE

Engine hard starting	Poor acceleration	Excessive blue smoke	Excessive black smoke	Excessive compressed air temperature (Buzzser sounds)	Excessive noise	Possible Cause	Remedy (reference page)
*	*					Comprex supercharger Rotor stuck Casing damaged Rotor bearing damaged	Replace (4D—14)
*	*		*			Drive system of Comprex supercharger Drive belt loose or worn	Repair or replace (4D—12)
*						Idler pulley damaged	
*						Pulley bolt loose or worn	
				*		Wastegate Valve not open	Clean or repace (4D—12)
	*		*			Valve not closed	
	*		*			Starting valve Valve not open	Repair or replace (4D—15)
*		*				Valve not closed	
*						Bypass valve not open	
	*		*			Bypass valve not closed	
	*					Intercooler dirty	Clean or replace (4D—16)
*	*	*	*			Intake air system Fresh air side clogged (Air cleaner element, etc.)	Repair or replace
				*		Compressed air side clogged (Intercooler, etc.)	
					*	Fresh air side leaks	
	*		*		*	Compressed air side leaks	
					*	Exhaust system Exhaust gas breaked	Repair
*	*	*	*		*	Exhaust pipe clogged	
					*	Silencer damaged (in fender, in air cleaner, in air funnel, Comprex insulator)	Repair or replace
					*	Bolt and nut loosend	Repair

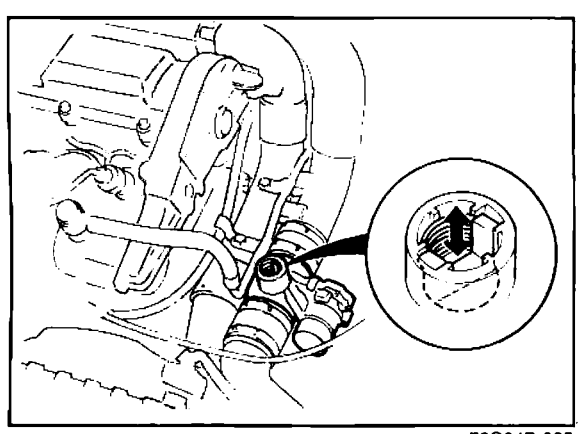
76G04D-022



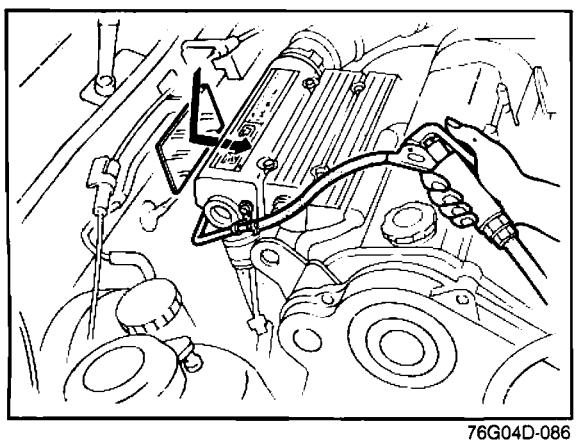
76D04D-023



76G04D-024



76G04D-025



76G04D-086

ON-VEHICLE INSPECTION

Boost Pressure

1. Connect a pressure gauge to the hose from the intake manifold.
2. (On chassis dynomometer, full load)
   (1) Set the vehicle on a chassis dynomometer.
   (2) Run the vehicle in gear at **3,000 rpm** with the acceleration pedal fully depressed.
   (3) Measure the boost pressure.

   Boost pressure:
   82 kPa (0.87 kg/cm^2, 8.1 psi)

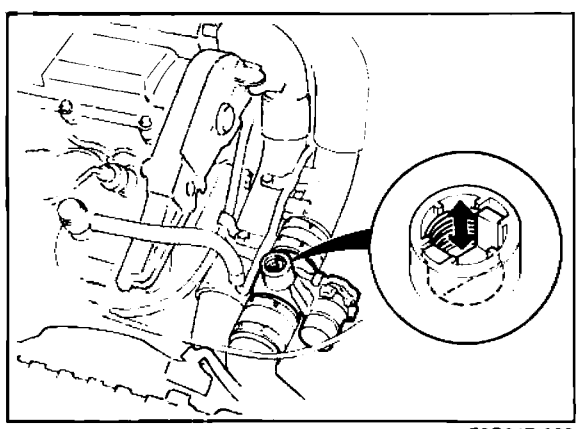
   Note
   The above inspection should be done on a chassis dynomometer. If a dynomometer is not available follow the below procedure.

3. (Off chassis dynomometer, no load)
   (1) Shift the transaxle out off gear.
   (2) Run the engine in neutral at **3,000 rpm** of the engine no load.
   Measure the boost pressure.

   Boost pressure:
   5 kPa (0.05 kg/cm^2, 0.7 psi)

   Note
   The boost pressure is varied by engine speed and engine load.

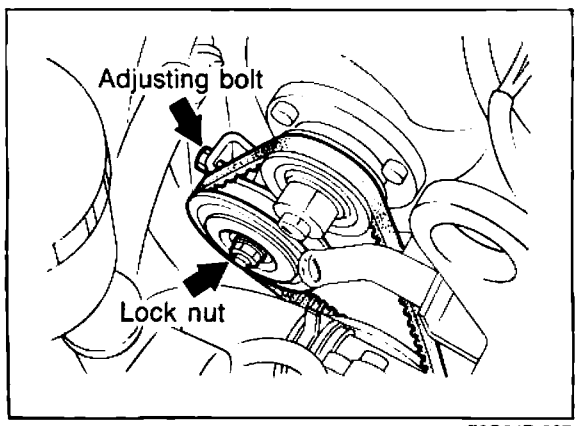
   (3) Remove the starting valve bypass hose.
   (4) Check that the bypass valve is closed at 3,000 rpm.
4. If the pressure is below specification, check the following. Replace the Comprex supercharger if necessary.
   (1) Intake air and exhaust passages leakage
   (2) Intake air and exhaust passages clogged
   (3) Wastegate (Refer to 4D—12.)
   (4) Starting valve (Refer to 4D—15.)
   (5) Fuel system (Injection nozzle... refer to page 4D—31, injection pump...refer to page 4D—24, etc.)
5. If the pressure exceeds specification, check the wastegate operation. (Refer to page 4D—12.)



76G04D-026

Starting Valve

1. Remove the bypass hose from the starting valve.
2. Check that the bypass valve in the starting valve opens and closes repeatedly at idle.
3. Check that the bypass valve is closed when the accelerator pedal is fully depressed when the engine speed is more than 3,000 rpm.
4. If necessary replace the starting valve.



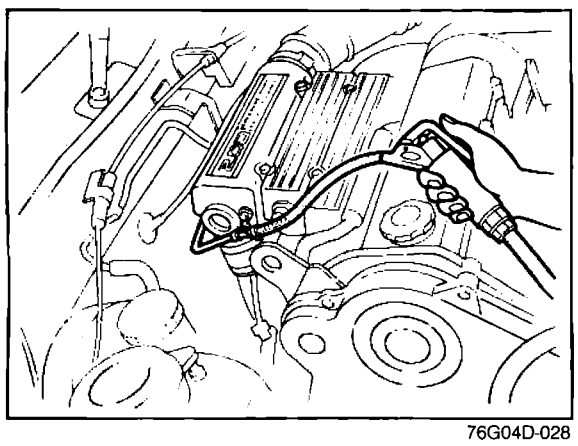
76G04D-027

Comprex Supercharger Drive Belt

1. Check the drive belt for wear, cracks, or fraying.
2. Check the drive belt deflection by applying moderate pressure **(98 N, 10 kg, 22 lb)** midway between the pulleys.
3. If necessary, loosen the bolt and adjust the belt deflection by turning the adjusting bolt.

New : 4.0—5.0 mm (0.16—0.20 in)
Used: 4.5—5.5 mm (0.18—0.22 in)

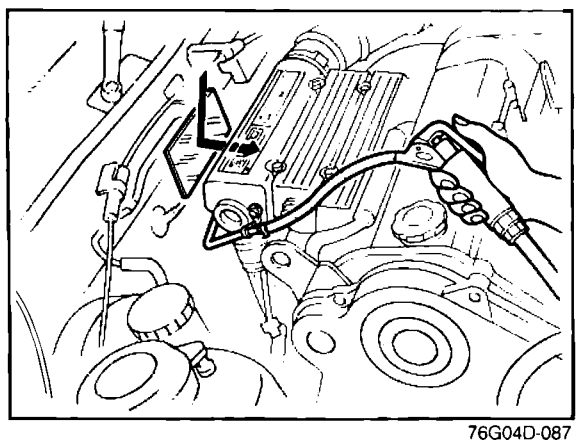
Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)



76G04D-028

Wastegate

1. Disconnect the boost air hose from wastegate to the intake manifold, and apply compressed air.



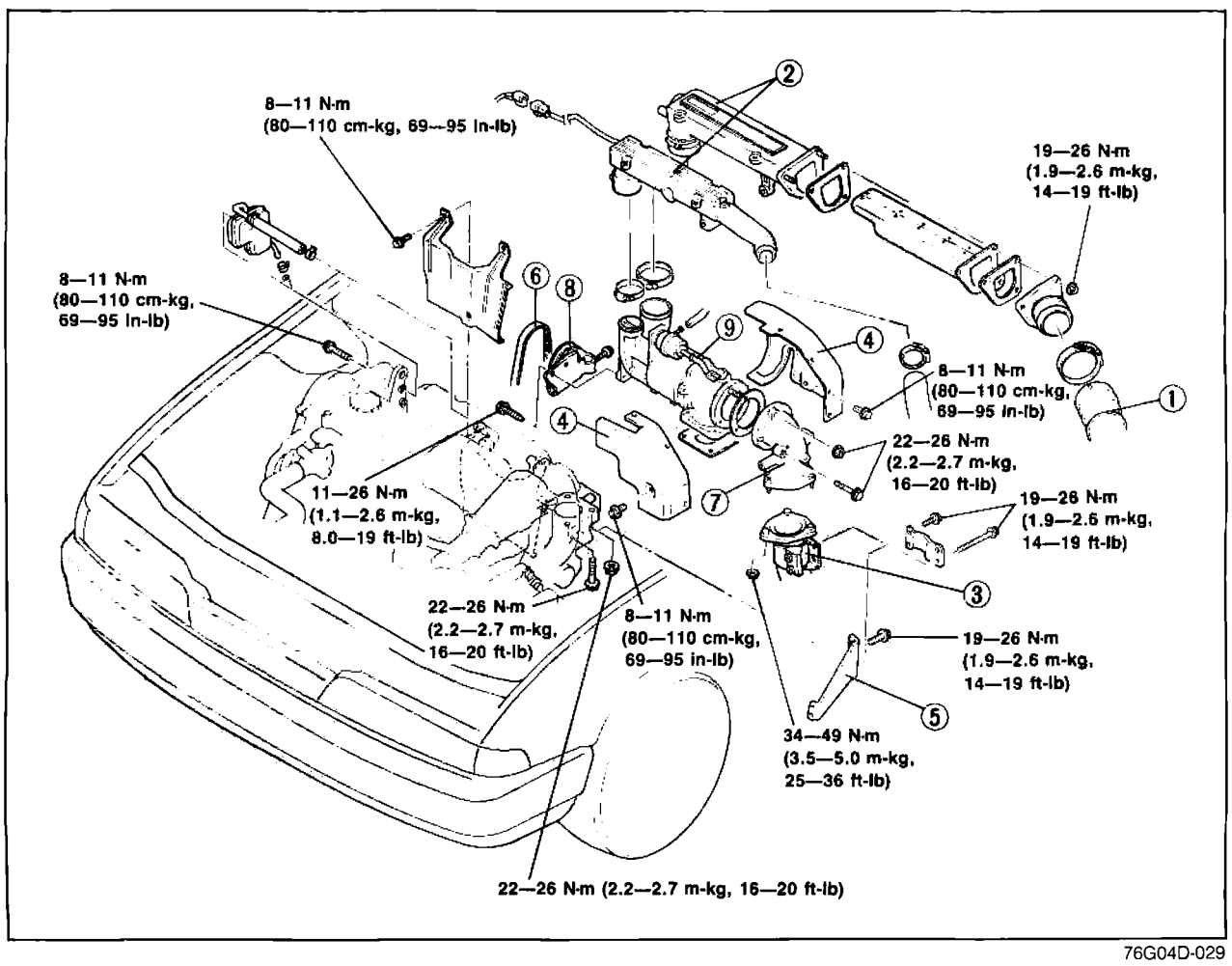
76G04D-087

2. Check that the wastegate actuator pulls the rod at the specified pressure.

Pressure: 137 kPa (1.4 kg/cm^2, 20 psi)

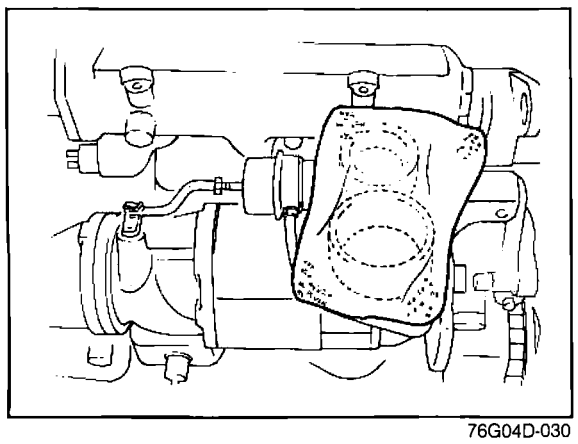
Caution
Do not apply more than 196 kPa (2.0 kg/cm^2, 28 psi) pressure.

COMPREX SUPERCHARGER
Removal and Installation
1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.
3. Check for air/exhaust leakage.



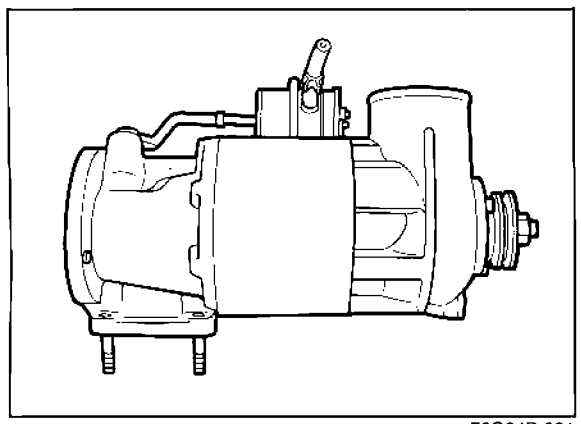
76G04D-029

1. Air hose
2. Air funnel assembly
3. Exhaust pipe
4. Supercharger insulator
5. Exhaust manihold stay
6. Drive belt
7. Exhaust joint pipe
8. Idle pulley
9. Comprex supercharger



76G04D-030

Caution
a) Be careful not to bend the rod or bracket of the wastegate.
b) Cover the intake and exhaust ports to prevent dirt or other material from entering.

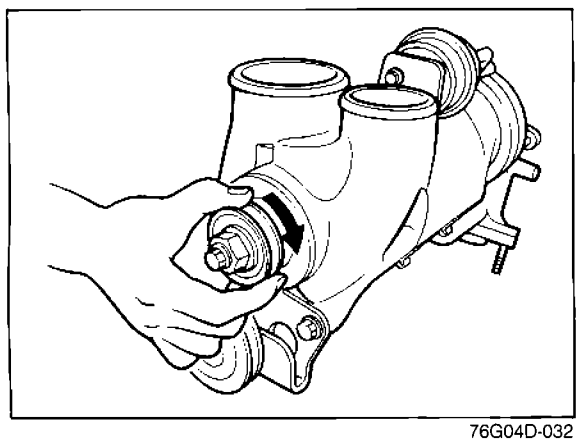


76G04D-031

Inspection

Air casing, exhaust casing, rotor housing

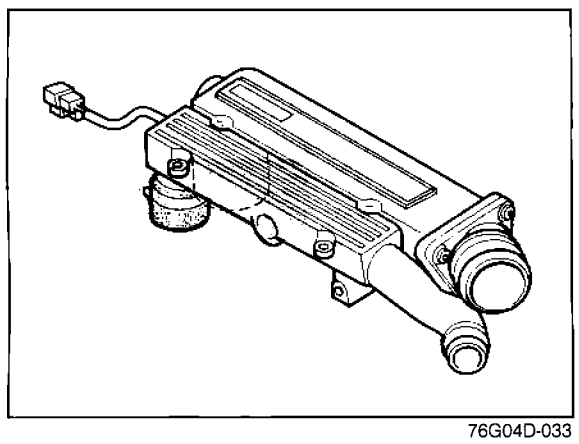
Check the air casing, exhaust casing, and rotor housing for cracks or damage. Replace the Comprex supercharger if necessary.



76G04D-032

Rotor and rotor bearing

Check that the rotor turns smoothly. Replace the Comprex supercharger if necessary.



76G04D-033

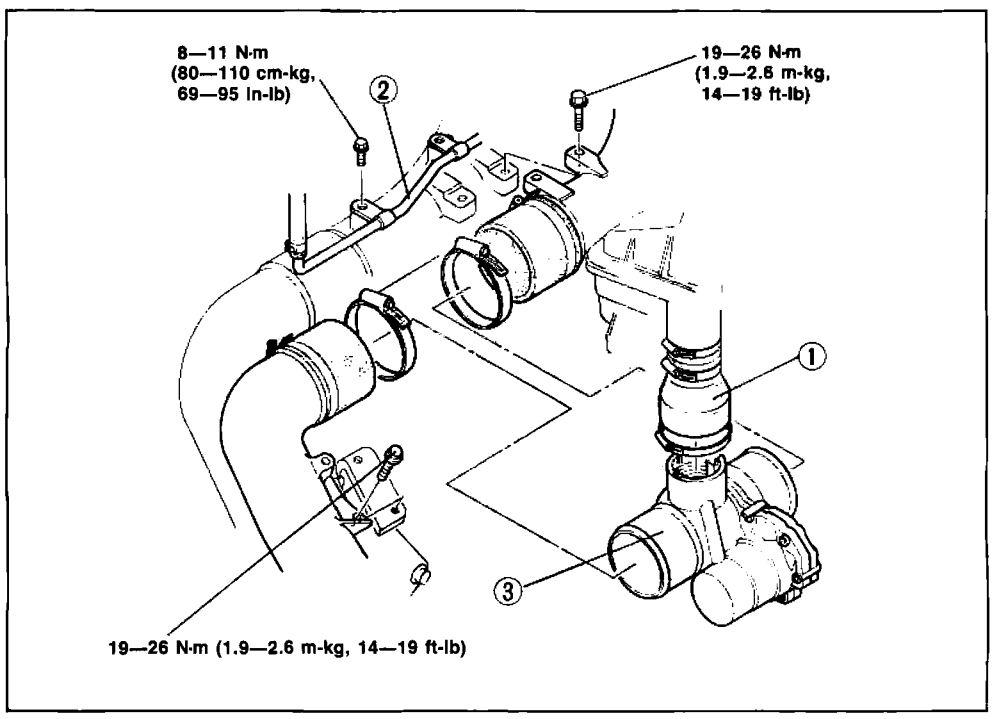
Air funnel

Check the air funnel and insulator for cracks or damaged. Replace if necessary.

STARTING VALVE

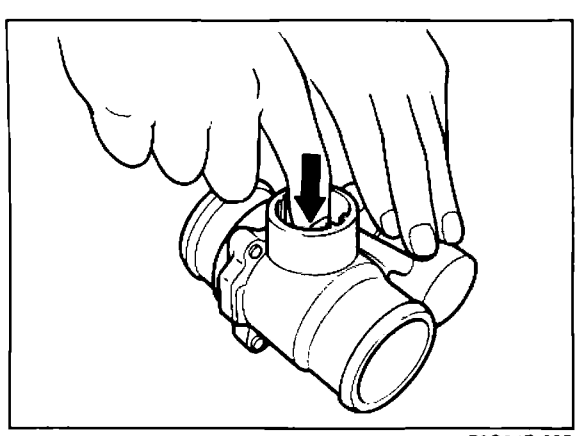
Removal and Installation

1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.
3. Check for air leakage.



76G04D-034

1. Air hose
2. Vacuum pipe
3. Starting valve

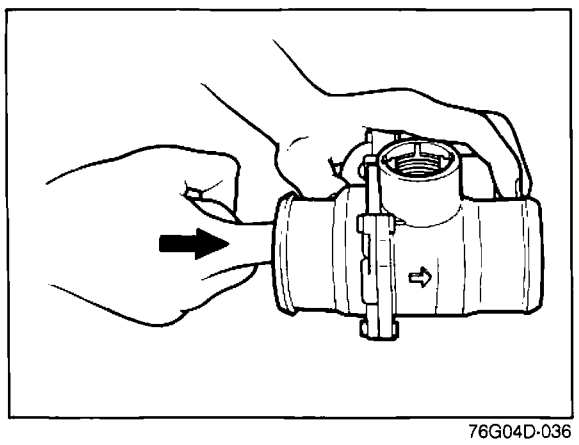


76G04D-035

Inspeciton

Bypass valve

Check that the bypass valve opens smoothly. Replace the starting valve if necessary.



76G04D-036

Starting valve

Check that the starting valve opens smoothly. Replace the starting valve if necessary.

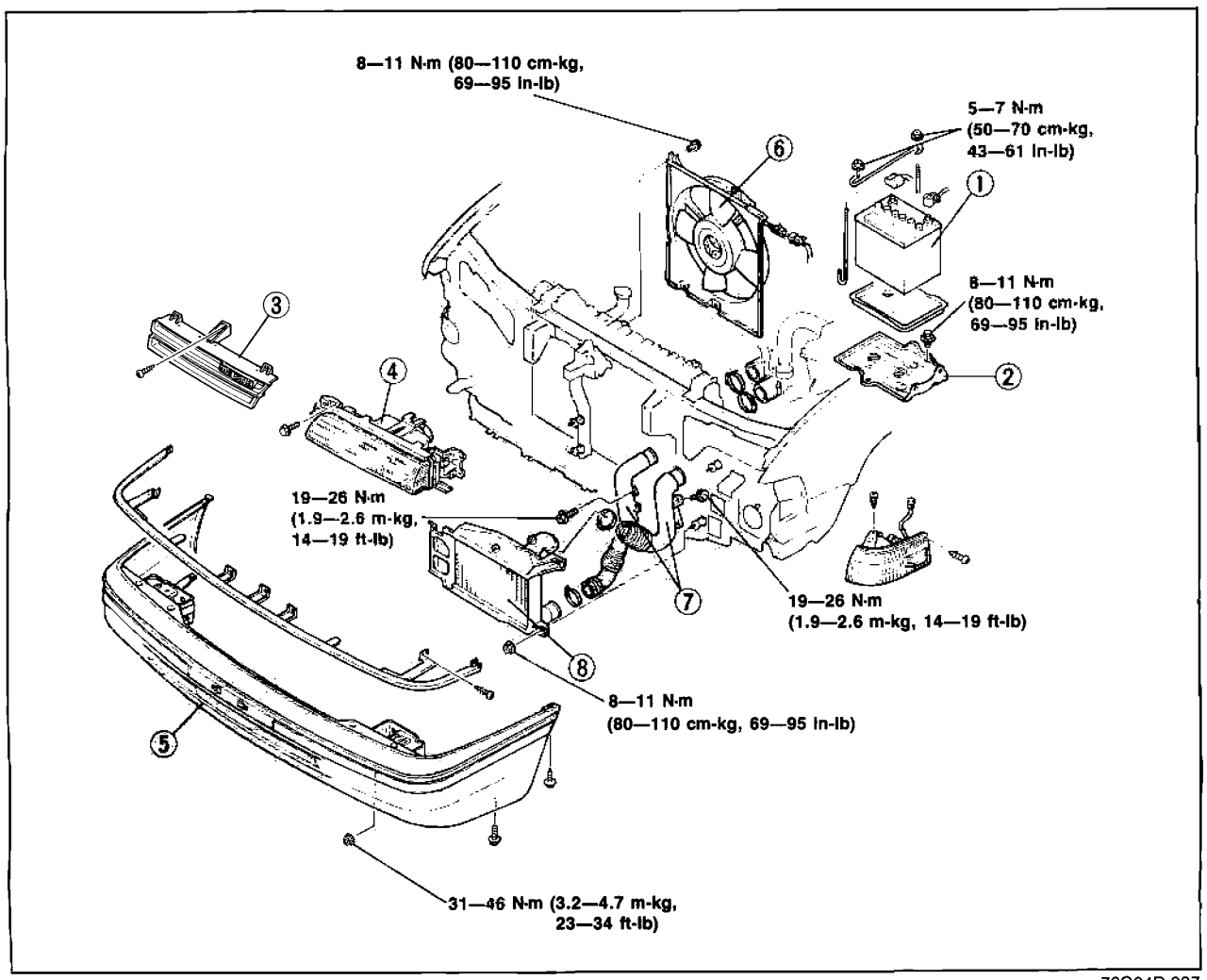
Note

Resistance will be felt because of the magnet when opening the valve.

INTERCOOLER

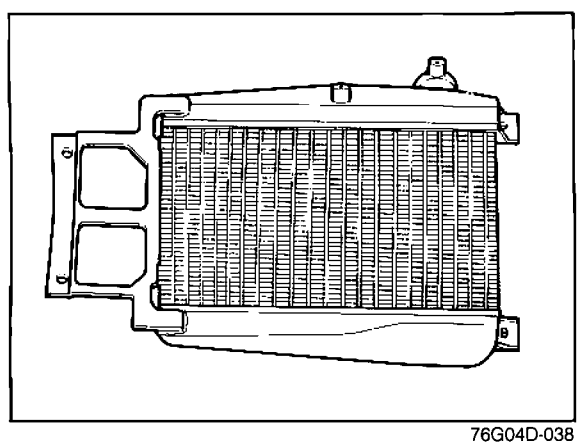
Removal and Installation

1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.
3. Check for air leakage.



76G04D-037

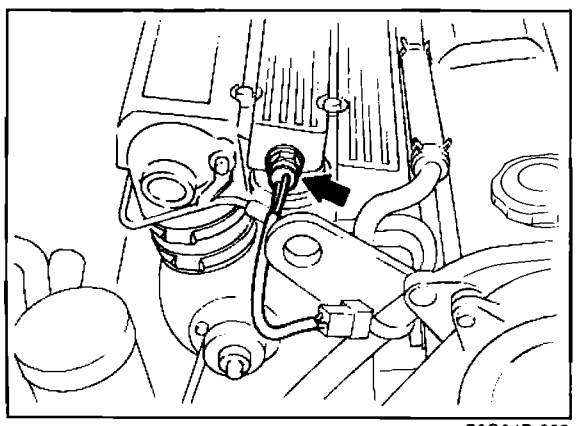
1. Battery
2. Battery carrier
3. Front grille (Refer to Section 14.)
4. Headlight (Refer to Section 14.)
5. Front bumper (Refer to Section 14.)
6. Cooling fan
7. Air pipe
8. Intercooler



76G04D-038

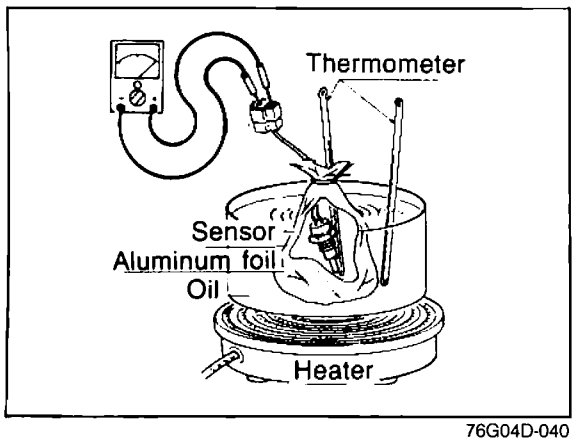
Inspection

Check the intercooler for cracks or damage. Replace if necessary.



76G04D-039

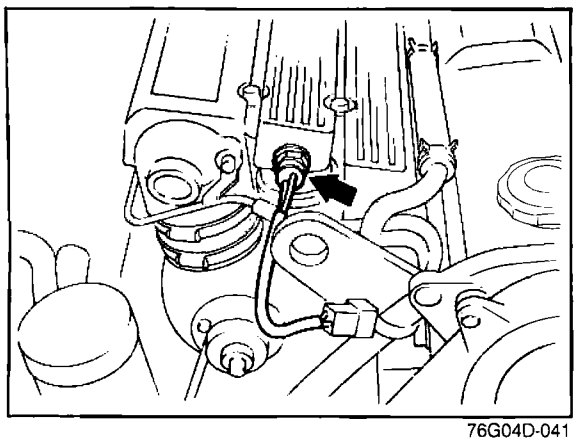
BOOST AIR TEMPERATURE SENSOR
Removal
Remove the boost air temperature sensor from the compressed air funnel.



76G04D-040

Inspection
1. Place the boost air temperature sensor in oil.
2. Heat the oil and check continuity of the sensor with an ohmmeter. Replace if necessary.

Continuity : over 150°C (302°F)
No continuity: below 143°C (289°F)



76G04D-041

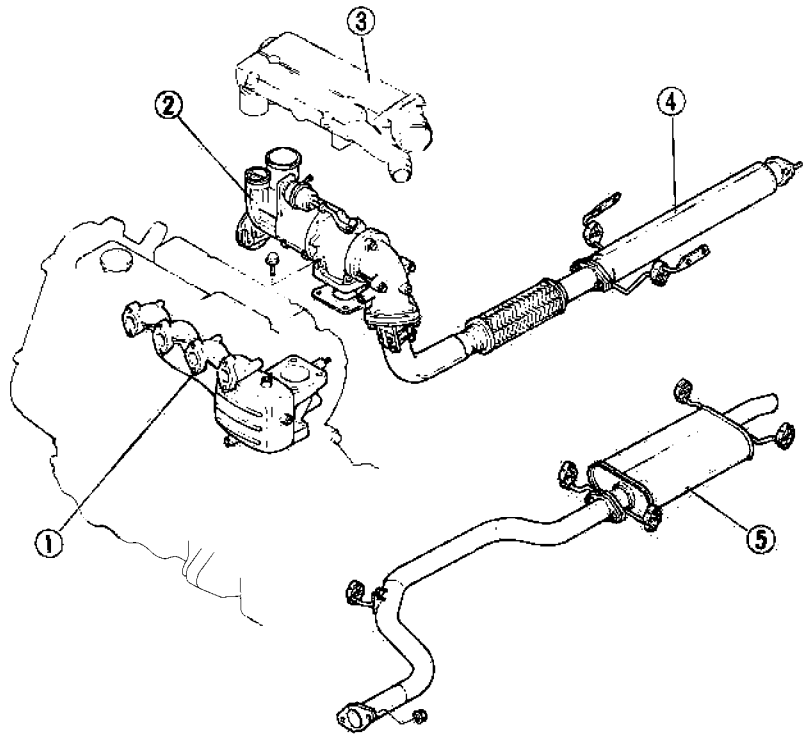
Installation
Install the boost air temperature sensor in the compressed air funnel.

Tightening torque:
29—39 N·m (3.0—4.0 m-kg, 22—29 ft-lb)

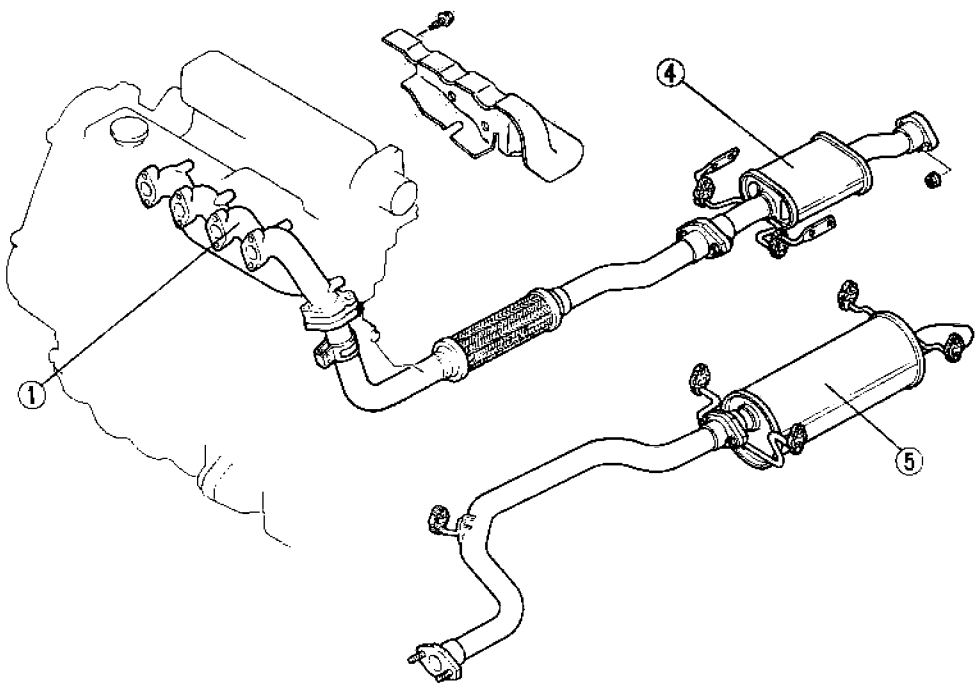
EXHAUST SYSTEM

STRUCTURAL VIEW

RF-CX



RF-N



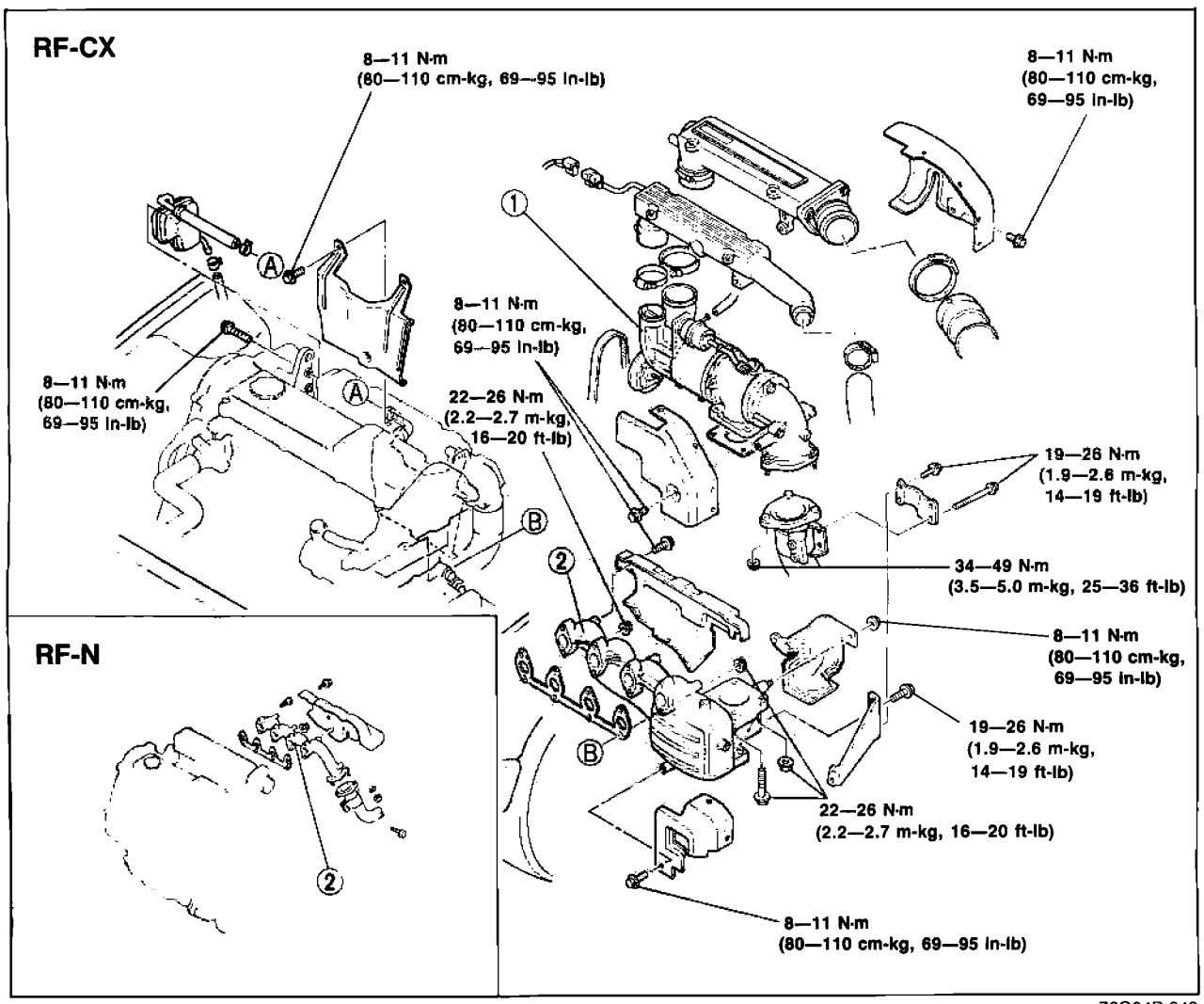
76G04D-042

1. Exhaust manifold
2. Comprex supercharger (RF-CX)
3. Air funnel assembly
4. Pre-silencer
5. Main silencer

EXHAUST MANIFOLD

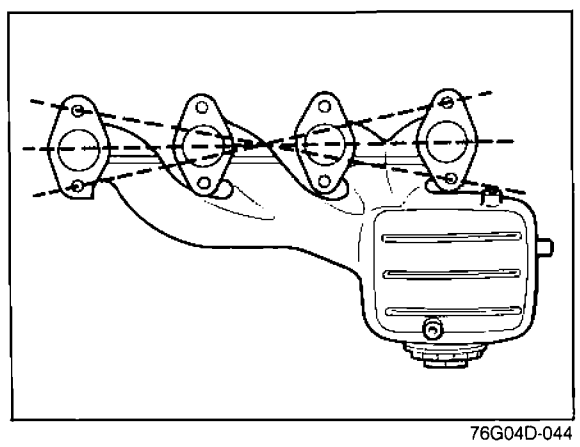
Removal and Installation

1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.
3. Check for exhaust leakage.



76G04D-043

1. Comprex supercharger (Refer to page 4D—13.: only RF-CX)
2. Exhaust manifold



76G04D-044

Inspection

1. Check the exhaust manifold for cracks and damage.
2. Inspect the flatness of the mounting surface using the straight edge and a feeler gauge. Replace if necessary.

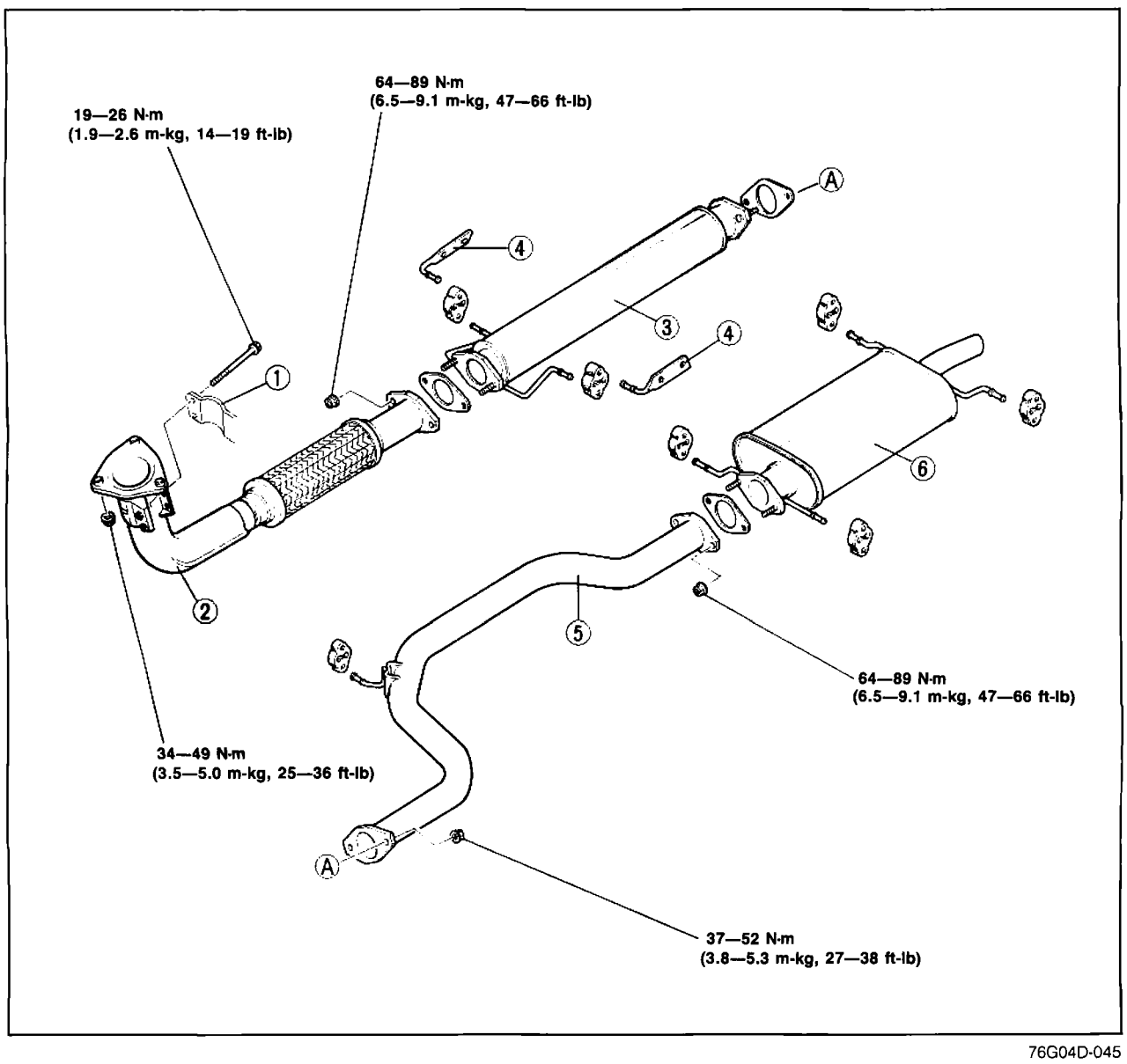
Distortion: 0.05 mm (0.002 in) max.

4D EXHAUST SYSTEM

EXHAUST PIPE AND MAIN SILENCER

Removal and Installation

1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.
3. Check for exhaust leakage.



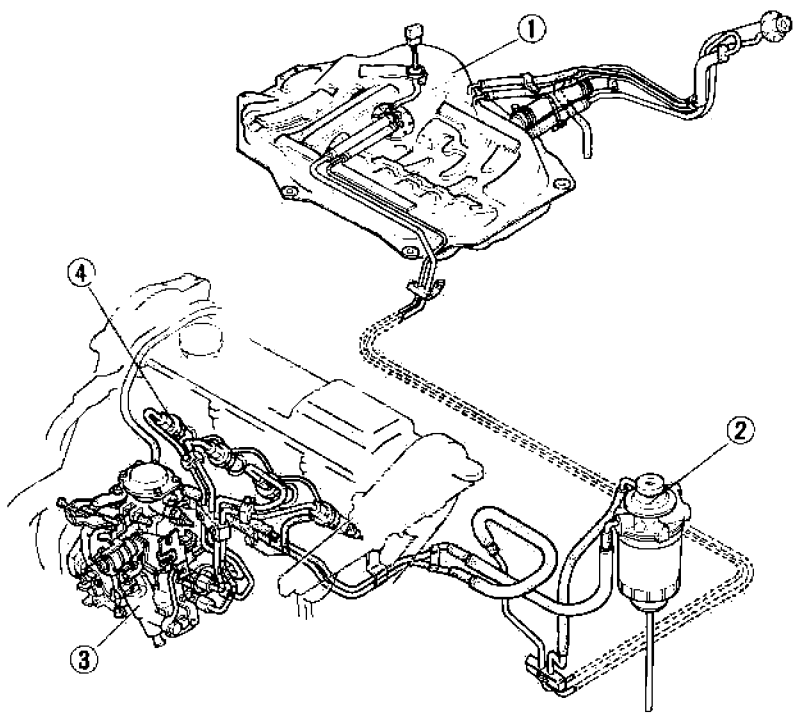
76G04D-045

1. Front exhaust pipe bracket
2. Front exhaust pipe
3. Pre-silencer
4. Silencer hanger
5. Middle pipe
6. Main silencer

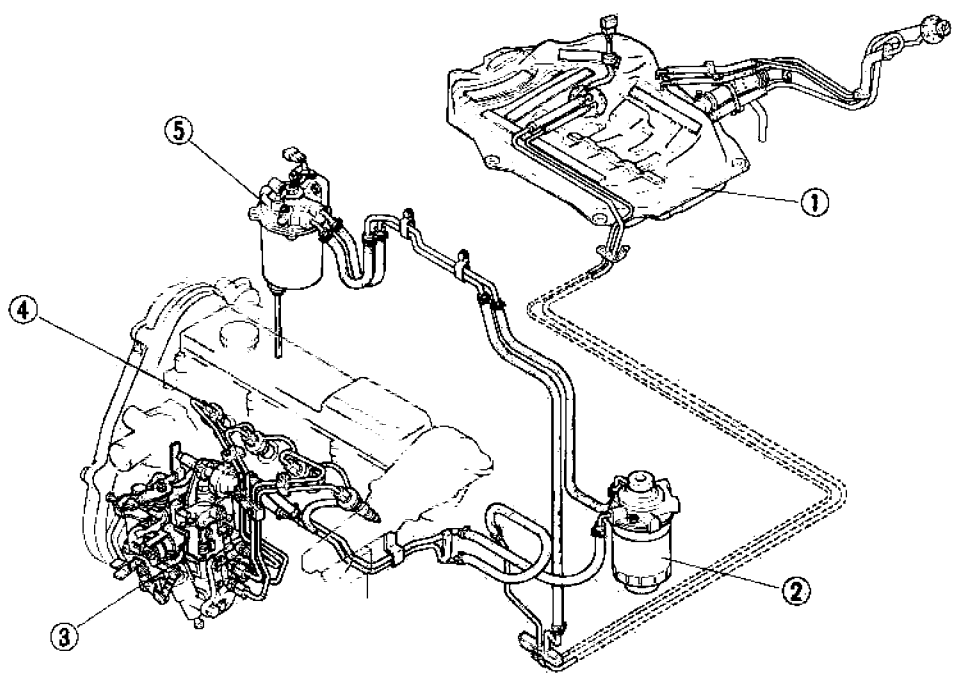
FUEL SYSTEM

STRUCTURAL VIEW

RF-CX

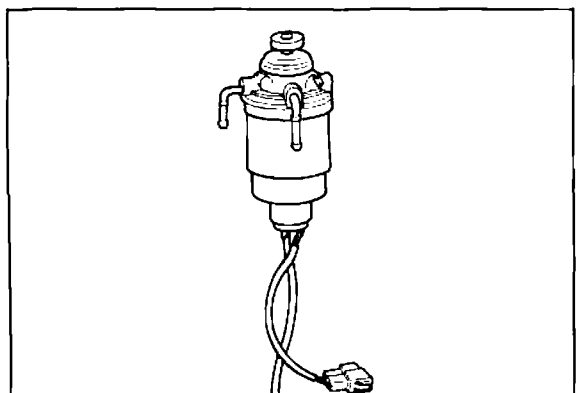


RF-N



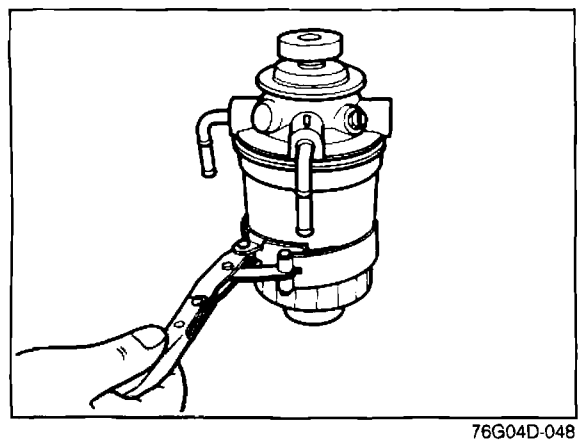
76G04D-046

1. Fuel tank
2. Fuel filter
3. Fuel injection pump
4. Fuel injection nozzle
5. Sedimenter



76G04D-047

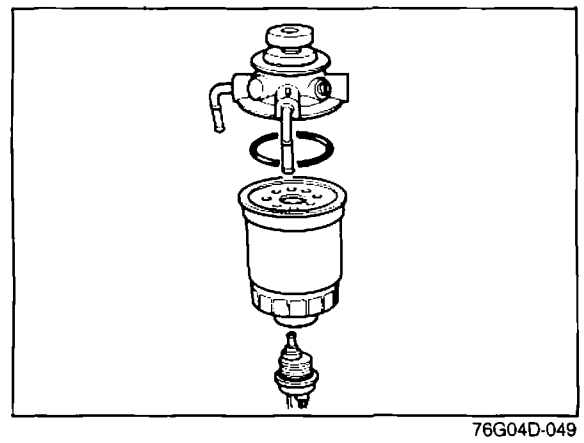
FUEL FILTER
On-Vehicle Inspection
Check for water in the fuel filter. If present drain the water. (Refer to page 4D—4.)



76G04D-048

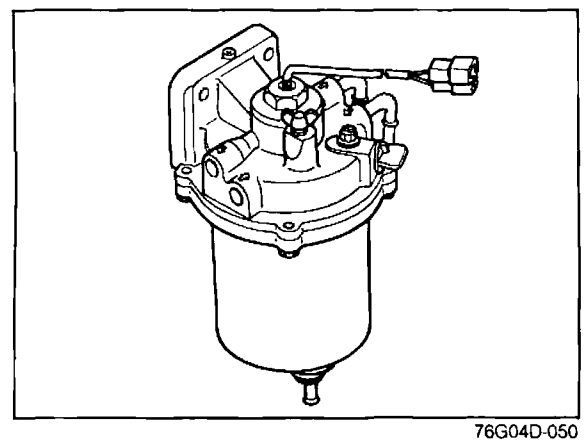
Replacement
Removal
1. Disconnect the water level sensor connector (ECE).
2. Remove the water level sensor. (ECE).
3. Remove the fuel filter cartridge.

Warning
Keep fire and open flame away from the fuel area.



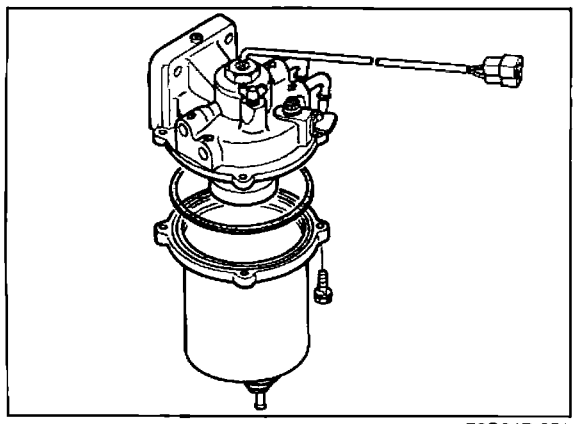
76G04D-049

Installation
1. Apply fuel to the O-ring of the fuel filter cartridge and install it onto the filter body.
2. Install the water level sensor (ECE).
3. Connect the water level sensor connector (ECE).
4. Bleed air from fuel filter. (Refer to page 4D—4.)
5. Check for fuel leakage.



76G04D-050

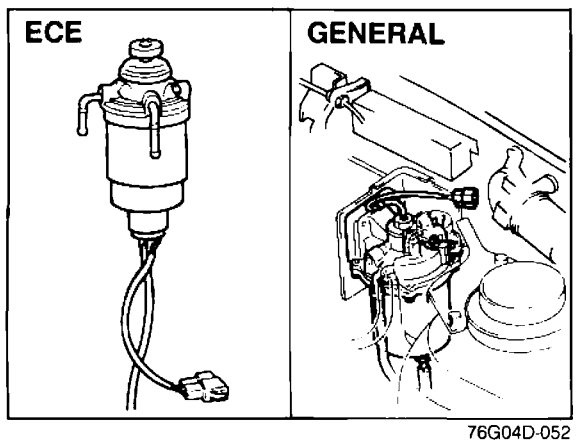
SEDIMENTER (GENERAL)
On-Vehicle Inspection
Check for water in the sedimenter. If present, drain the water. (Refer to page 4D—4.)



76G04D-051

Replacement

1. Remove the sedimenter from the body.
2. Apply fuel to a new O-ring, and install it onto the sedimenter body with water level sensor.

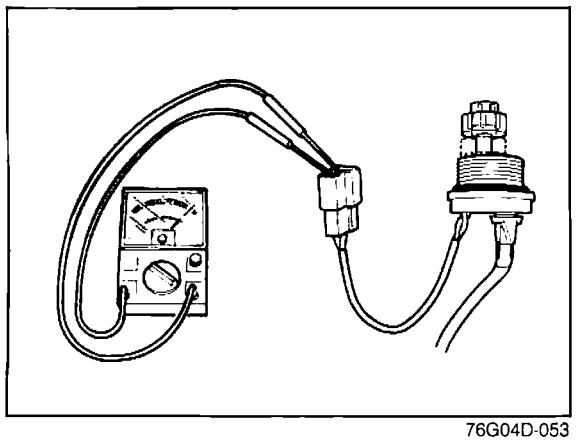


76G04D-052

WATER LEVEL SENSOR

Inspection

1. Remove the water level sensor.
   (ECE)
   Remove the water level sensor from the fuel filter.
   (GENERAL)
   Remove the water level sensor from the sedimenter body.

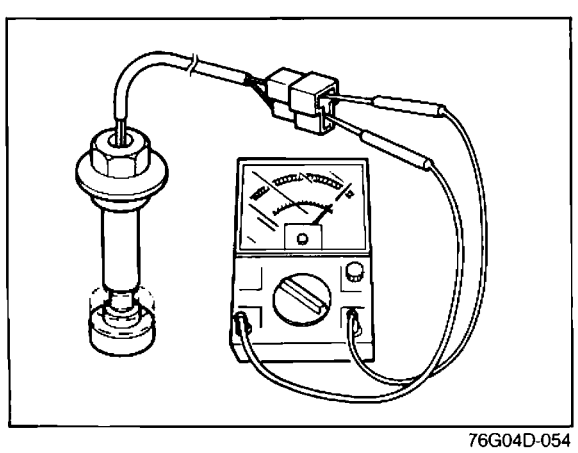


76G04D-053

2. Check the water level sensor for continuity with an ohmmeter. Replace if necessary.

   ECE

   Continuity : Pulled condition
   No continuity: Pushed condition

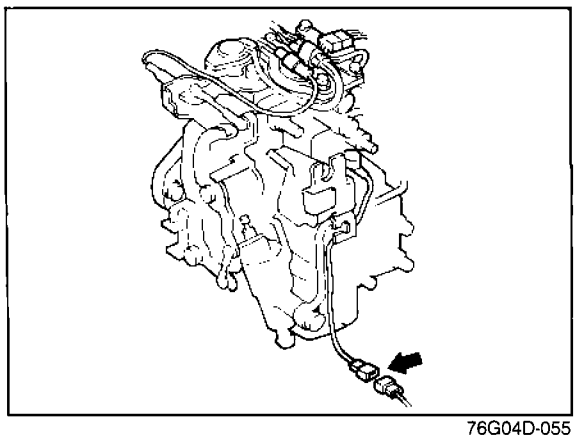


76G04D-054

   GENERAL

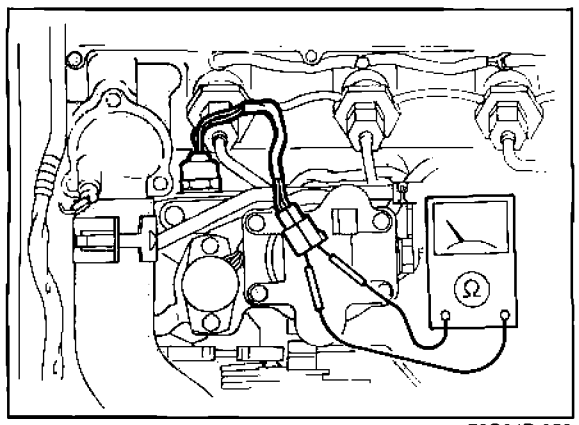
   Continuity : Pushed condition
   No continuity: Pulled condition

3. Apply fuel to a new O-ring and install it onto the sensor.
4. Install the water level sensor to the fuel filter (ECE) or the sedimenter (General).
5. Check for fuel leakage.



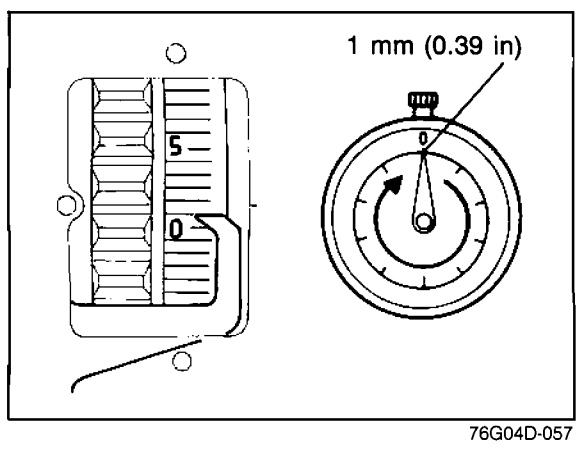
76G04D-055

INJECTION PUMP
On-Vehicle Inspection
Fuel cut solenoid valve
1. Run the engine at idle.
2. Disconnect the solenoid valve connector, and let the engine stop.
3. If the engine does not stop, replace the fuel cut solenoid valve.



76G04D-056

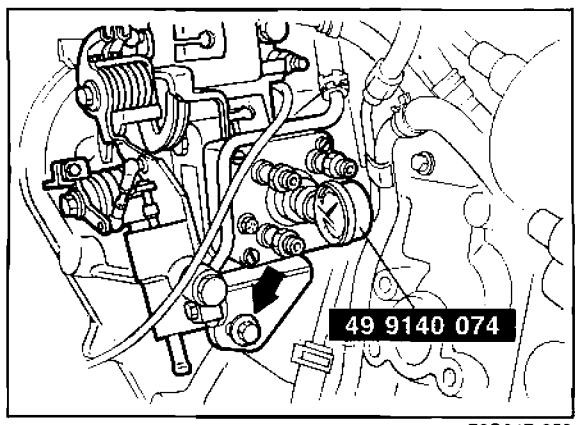
Pick up coil
1. Disconnect the pick up coil connector.
2. Check for continuity of the coil using an ohmmeter.
3. Replace it if there is not continuity.



76G04D-057

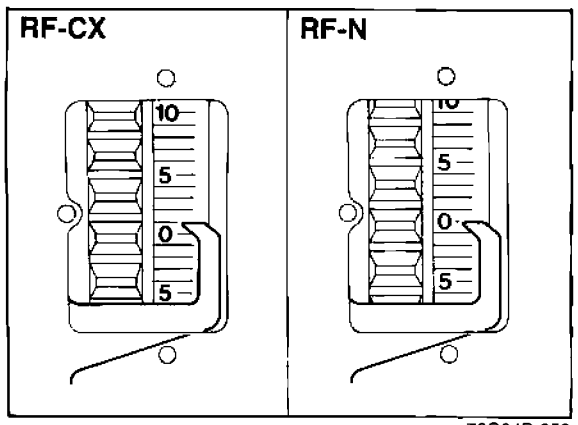
Injection Timing Adjustment
Inspection
Check the injection timing. (Refer to page 4D—5.)

Injection timing
RF-CX: ATDC 1°
RF-N : TDC 0°



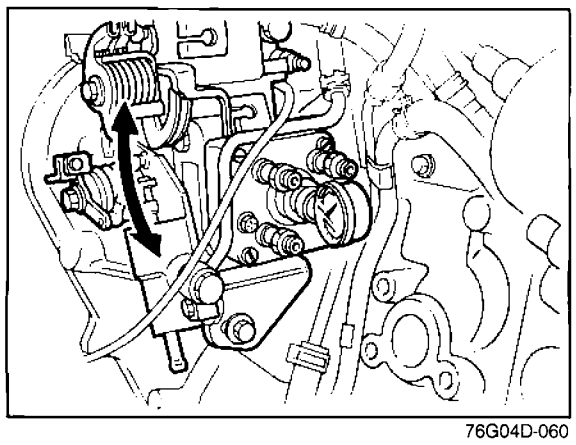
76G04D-058

Adjustment
1. Loosen the injection pump mounting nut.
2. Loosen the injection pump bracket bolt.



76G04D-059

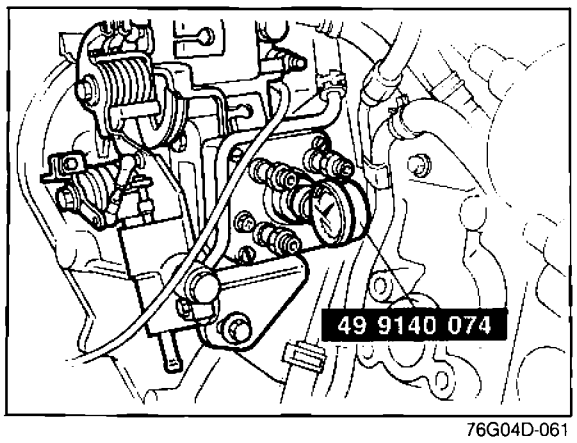
3. Turn the crankshaft, and align the flywheel indicator pin at ATDC 1° (RF-CX), or TDC 0° (RF-N).



76G04D-060

4. Turn the injection pump until the dial indicator indicates **1 mm (0.04 in)**.

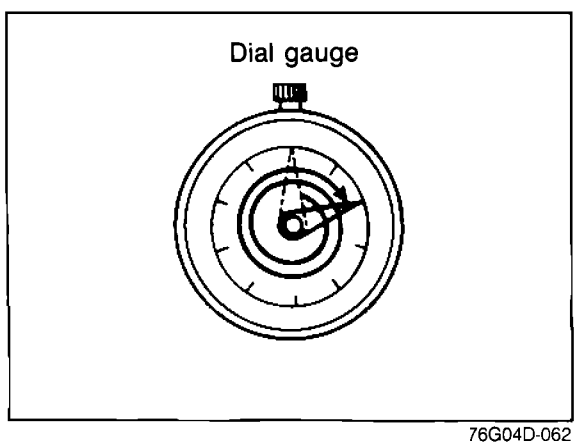
Note
Refer to page 4D—4 for initial setting of the dial indicator.



76G04D-061

Cam Height Inspection

1. Set the **SST** into the injection pump as for injection timing adjustment. (Refer to page 4D—4.)

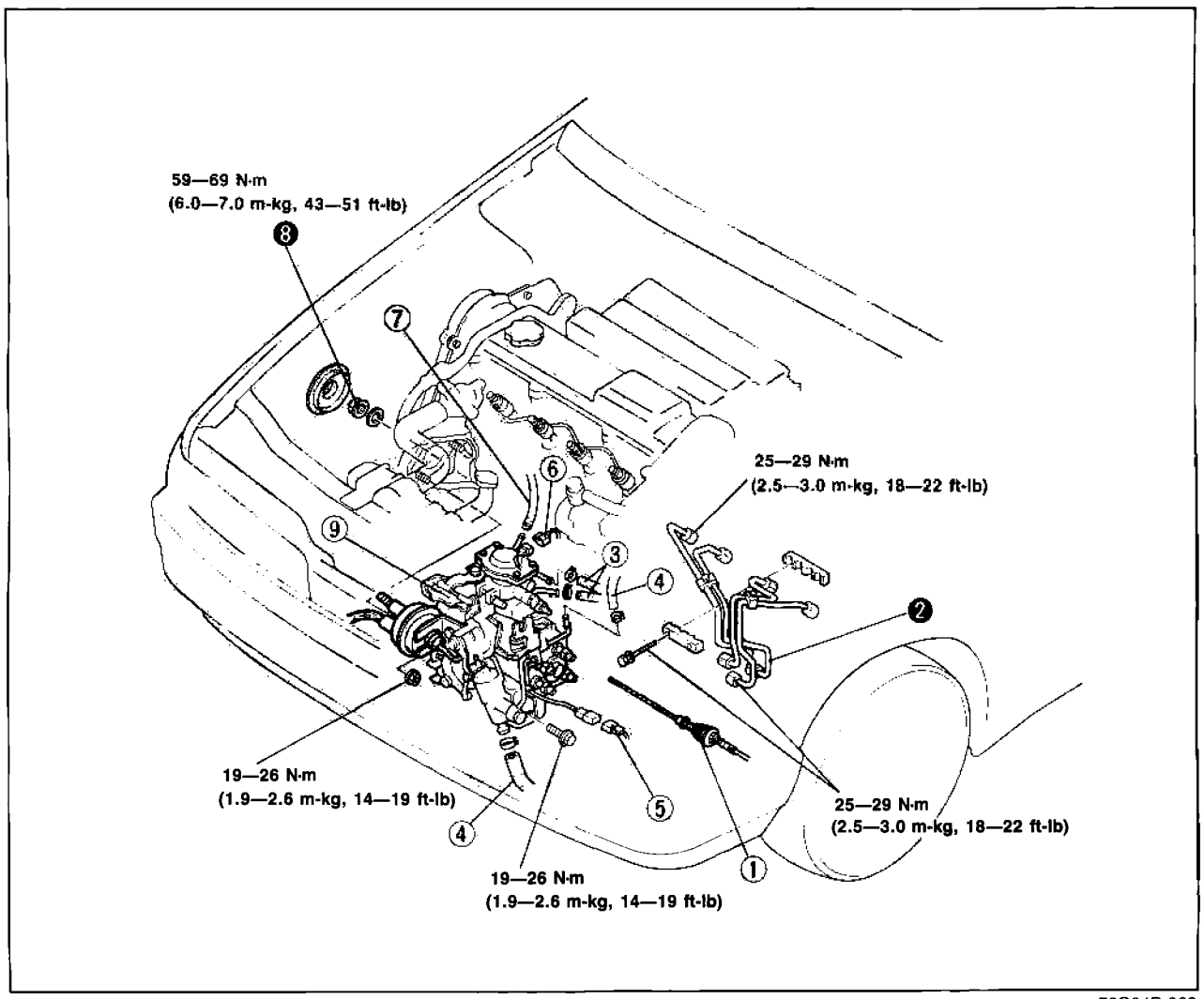


76G04D-062

2. Turn the crankshaft clockwise and read the maximum difference of the indicator value, which gives the cam height.

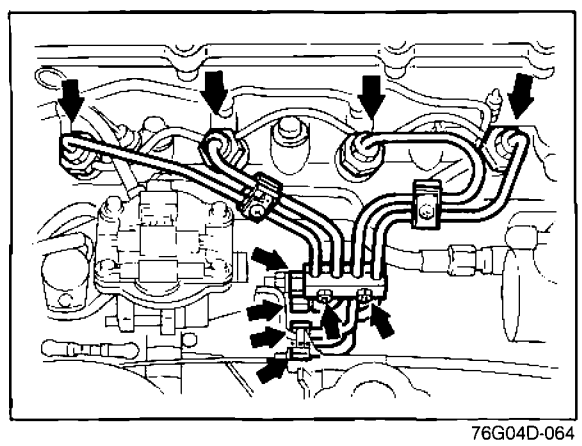
Cam height: 2.2 mm (0.08 in)

Removal and Installation
1. Remove in the sequence shown in the figure, referring to the removal note for specially marked parts.
2. Install in the reverse order of removal.



76G04D-063

1. Accelerator cable
2. Injection pipe
3. Fuel hose
4. Water hose
5. Fuel cut solenoid valve connector
6. Pick-up coil connector
7. Boost air hose (RF-CX)
8. Injection pump pulley lock nut
9. Injection pump

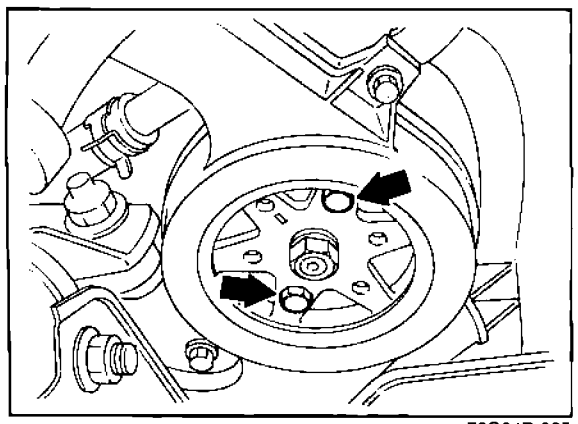


76G04D-064

Removal note
Injection pipe

Warning
a) Catch leaking fuel with a rag when removing the injection pipes.
b) Keep fire and open flame away from the fuel area.

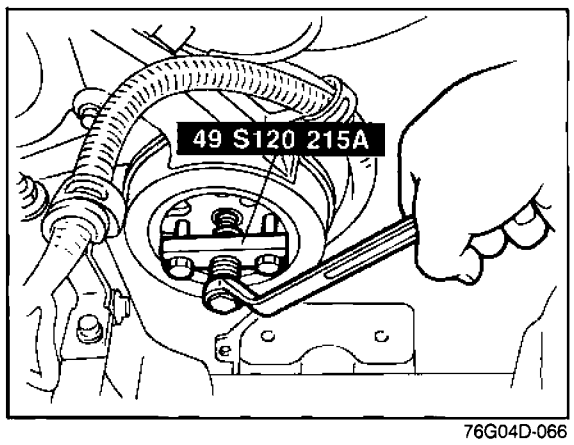
Remove the injection pipes.



76G04D-065

Injection pump pulley

1. Put two 35—40 mm (1.3—1.6 in) long bolts through the injection pump pulley and affix them in the threaded holes of the injection pump bracket.
2. Loosen the injection pump pulley bolt.



76G04D-066

3. Separate the injection pump pulley from the injection pump shaft with the **SST**.

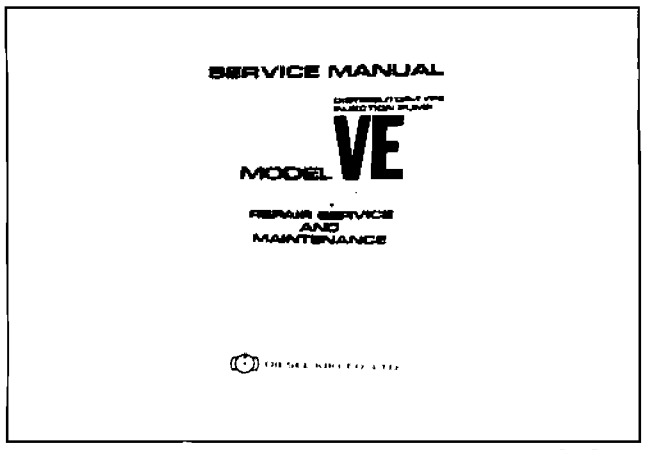
Steps after installation

1. After installation adjust the injection timing. (Refer to page 4D—24.)
2. Bleed air from the fuel line.
3. Check for fuel leakage.

76G04D-067

Overhaul
Service point
1. For overhauling the injection pump, see the "Repair Service and Maintenance" manual prepared by the manufacturer of the pump.
2. If the inside of the injection pump is disassembled for maintenance, be sure to properly use the checking device such as the pump tester.

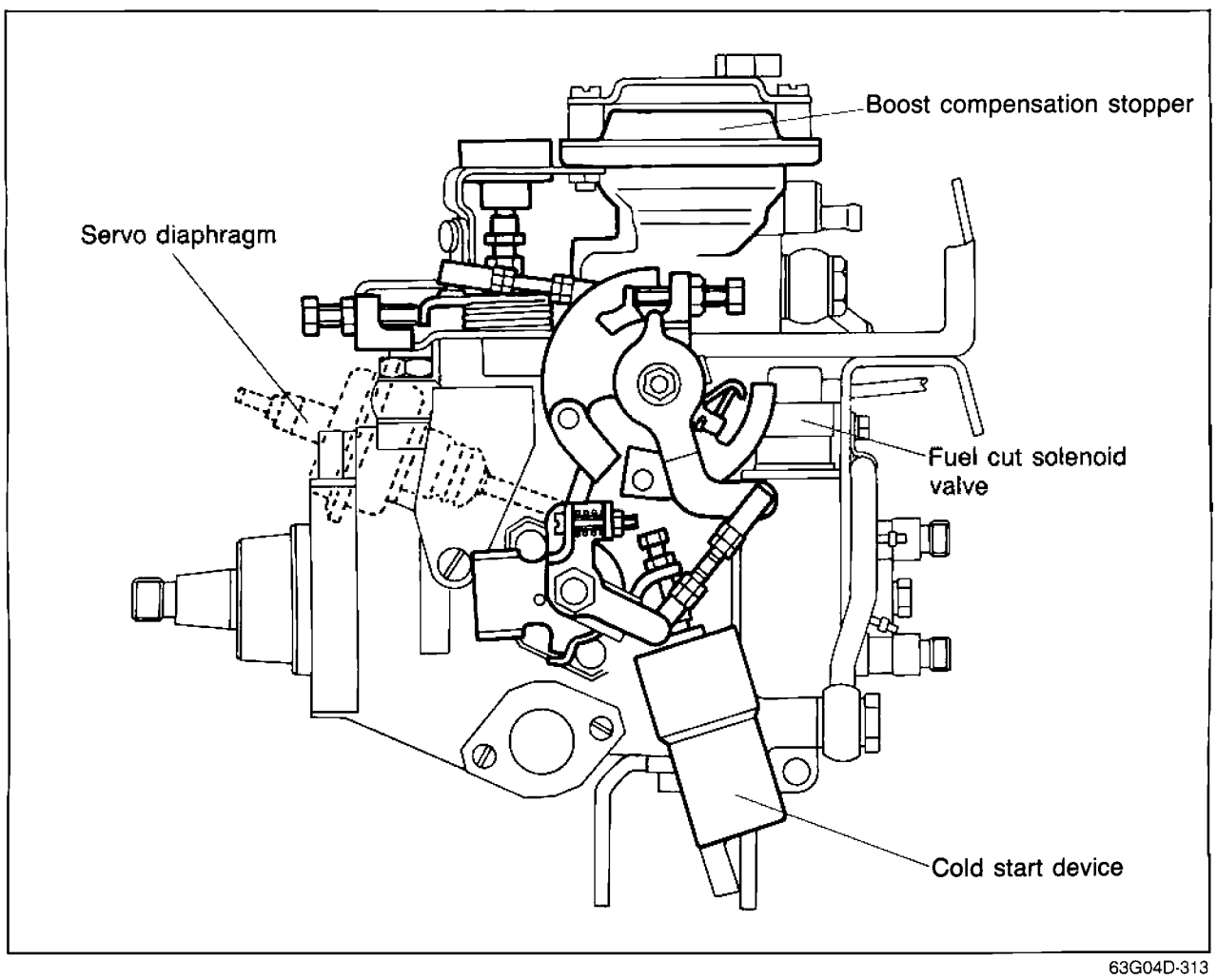
76G04D-068



63G04D-312

Manufacturer of Injection Pump:
Diesel Kiki Co., Ltd.

Construction of VE Injection Pump



63G04D-313

VE-TYPE RF71 13 800C: 104749-0343 For RF-CX
☆ TEST OIL SAE Standard test oil (SEA 967C)

Fuel injection amount

Item	Pump speed (RPM)	Fuel injection amount (cm^3/stroke)
Start	100	More than 55/1,000
Full load	600	33.9—38.9/1,000
	1,000	48 9—50.9/1,000
	2,150	39.7—44.7/1,000
	2,250	32.7—37.7/1,000
	2,550	8.0—15.0/1,000
Idling	360	7.6—10.6/1,000

Chamber pressure and timer stroke

Pump speed (RPM)	Chamber pressure (kg/cm^2)	Timer stroke (mm)
500	———	———
1,250	4.5—5.1	2.7—3.9
1,500	5.2—5.8	4 3—4.9
2,150	6.8—7 4	7.6—8.8

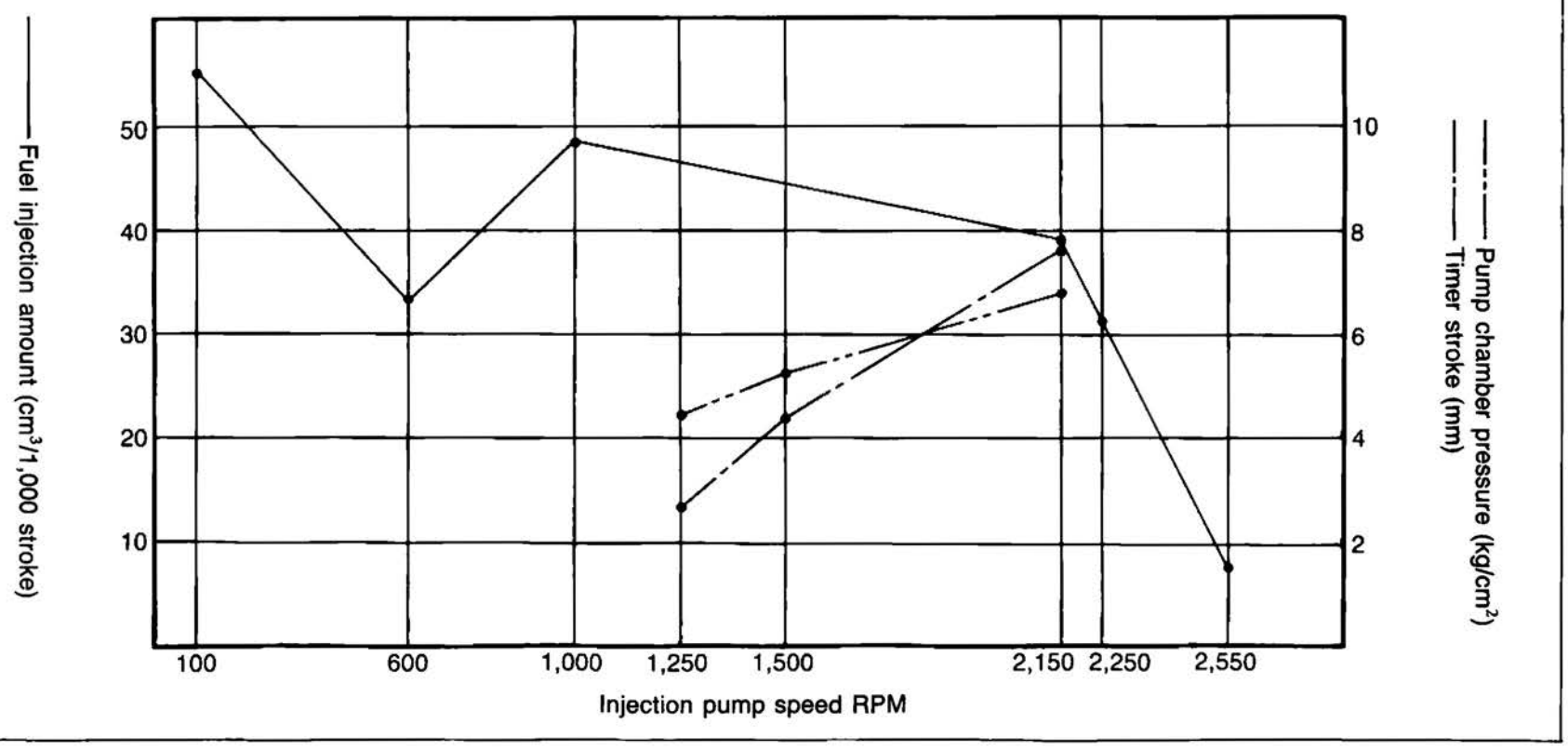
Load sensing timer and overflowing quantity

Item		Fuel injectioon amount (cm^3/stroke)
Load sensing timer	Start	37.2—39.2/1,000
	End	32.2—34.2/1,000
Overflowing quantity		41.0—85.0/1,000

*Checking condition
Pump speed: 1,500 rpm
Lever: Full load

Measurenment

Measuring place	Dimension (mm)
KF	5.7—5.9
K	3.2—3.4
MS	1.6—1.8



76G04D-069

expert22 для http://rutracker.org

VE-TYPE RF79 13 800A: 104748-0343 For RF-N ENGINE
☆ TEST OIL SAE Standard test oil (SEA 967C)

Fuel injection amount

Item	Pump speed (RPM)	Fuel injection amount (cm^3/stroke)
Start	100	More than 42/1,000
Full load	600	29.0—33.0/1,000
	1,375	34.9—36.9/1,000
	2,325	30.2—34.2/1,000
	2,600	9.8—15.8/1,000
	2,700	Max. 6.0/1,000
Idling	360	8—12/1,000

Chamber pressure and timer stroke

Pump speed (RPM)	Chamber pressure (kg/cm^2)	Timer stroke (mm)
600	2.2—2.8	———
1,375	4.4—5.0	3.9—4.5
1,800	5.6—6.2	6.1—7.3
2,325	6.9—7.5	7.2—8.4
———	———	———

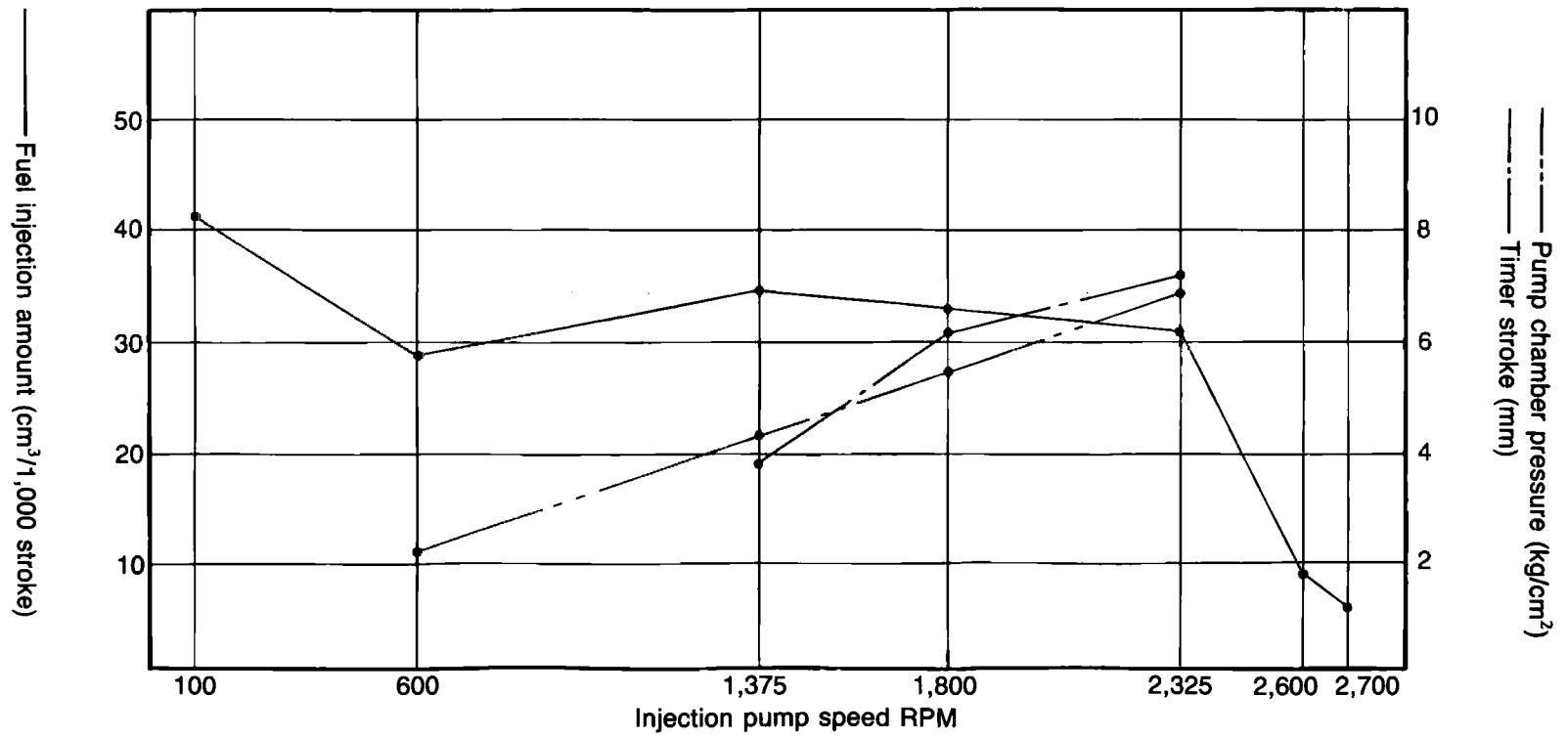
Load sensing timer and overflowing quantity

Item		Fuel injectioon amount (cm^3/stroke)
Load sensing timer	Start	26.7—29.7/1,000
	End	14.6—17.6/1,000
Overflowing quantity		46.3—90.3/1,000

*Checking condition
Pump speed: 1,375 rpm
Lever: Full load

Measurenment

Measuring place	Dimension (mm)
KF	5.8—5.9
K	3.2—3.4
MS	1.4—1.6

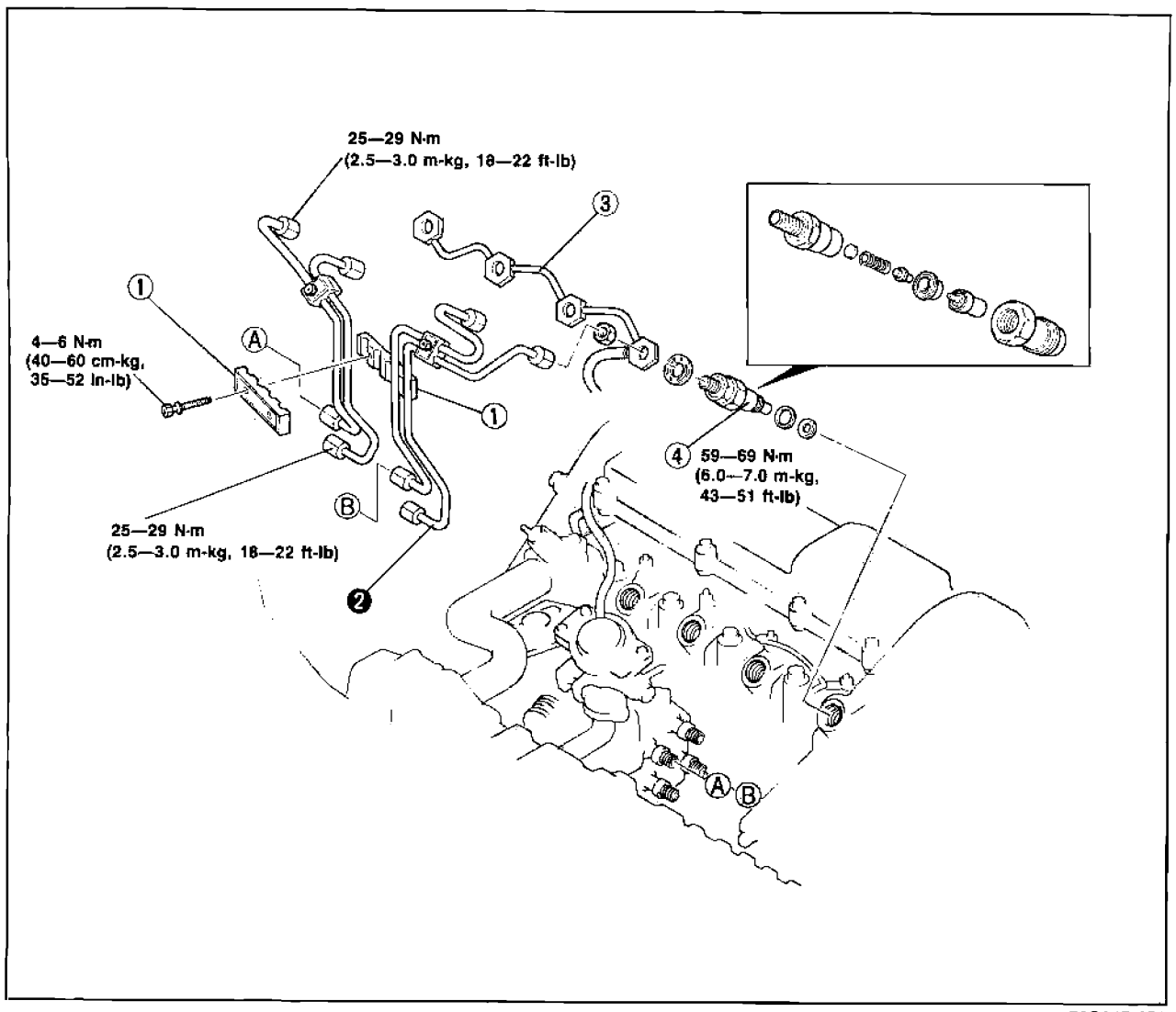


76G304D-070

INJECTION NOZZLE

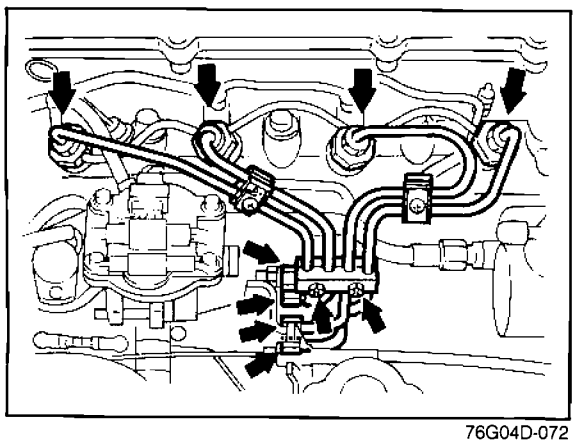
Removal

Remove in the sequence shown in the figure, referring to the removal note for the specially marked parts.



76G04D-071

1. Injection pipe bracket
2. Injection pipe
3. Fuel leak pipe
4. Fuel injection nozzle

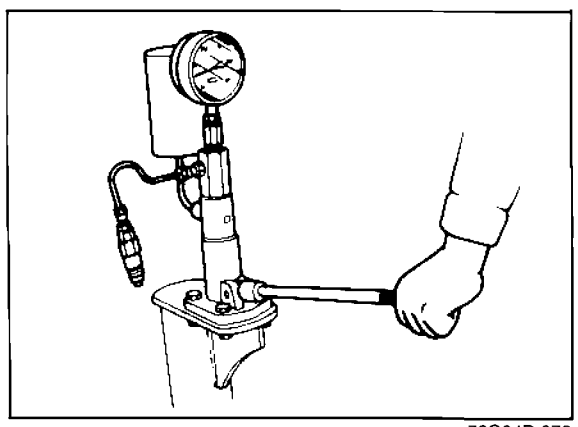


76G04D-072

Removal note
Injection pipe

Warning
a) Catch leaking fuel leakage with a rag when removing the injection pipes.
b) Keep fire and open flame away from the fuel area.

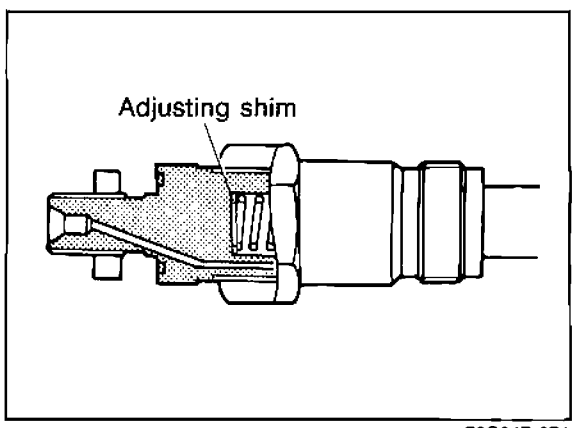
Remove the injection pipes.



76G04D-073

Inspection
Injection starting pressure
1. Set the nozzle on the nozzle tester.
2. Bleed the air by pumping the nozzle tester handle several times.
3. Slowly lower the nozzle tester handle and check the pressure when injection starts.

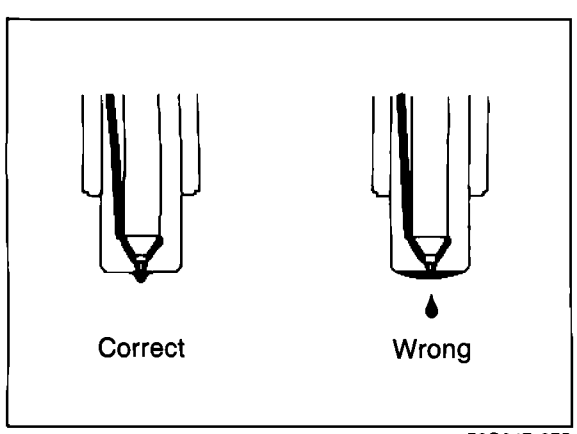
Injection starting pressure:
13,200 kPa (135 kg/cm^2, 1,920 lb/in^2) at 20°C (36°F) of fuel temperature



76G04D-074

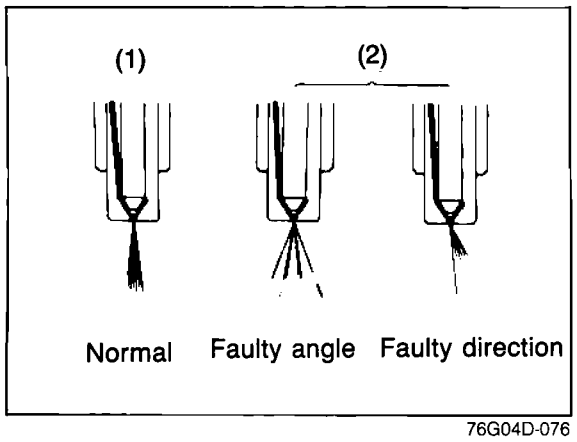
4. If the injection starting pressure is higher than specification, increase the shim thickness. If the injection starting pressure is lower than specification, decrease the shim thickness.

Note
Adjusting shims are availabe in 0.05 mm (0.0197 in) thicknesses, from 1.0 mm (0.039 in) to 1.95 mm (0.077 in). When 0.05 mm (0.0197 in) is added, injection pressure increases approx. 490 kPa (5.0 kg/cm^2, 70 psi).



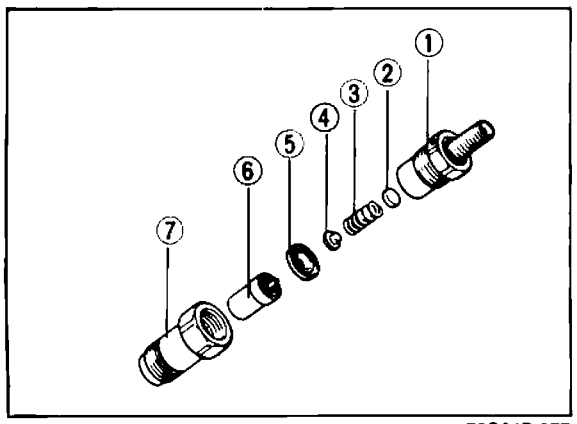
76G04D-075

Nozzle leakage
1. Apply **11,300 kPa (115 kg/cm^2, 1.640 psi)** pressure to the injection nozzle, and check for fuel leaks from the injection hole.
2. If fuel leaks, overhaul or replace the injection nozzle.



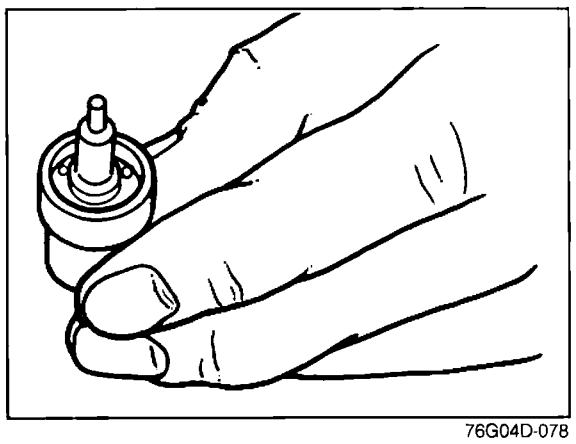
76G04D-076

Atomization (spray pattern)
1. Set the injection nozzle on the nozzle tester.
2. Bleed the air by operating the nozzle tester handle several times.
3. Lower the handle several times as quickly as possible so that a pulsating whistling sound is heard, and check the atomization.
   (1) Uniform and proper atomization
   (2) Incorrect injection angle and direction
4. If necessary, overhaul or replace the injection nozzle.



76G04D-077

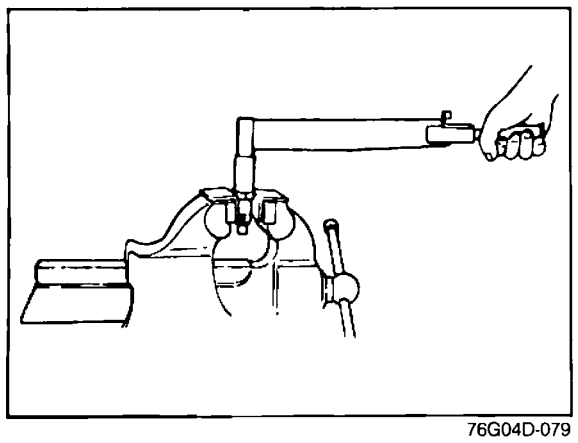
Injection Nozzle Disassembly
Disassemble the injection nozzle.
1. Nozzle holder
2. Adjusting shim
3. Pressure spring
4. Pressure pin
5. Distance piece
6. Nozzle
7. Retaining ring



76G04D-078

Cleaning
Clean the parts in clean test oil.

Injection Nozzle Inspection
1. Check the needle valve, nozzle body, and other parts for damage.
2. Hold the nozzle body upright and insert approximately two thirds of the needle valve, and check that the needle valve drops to the valve seat by its own weight.

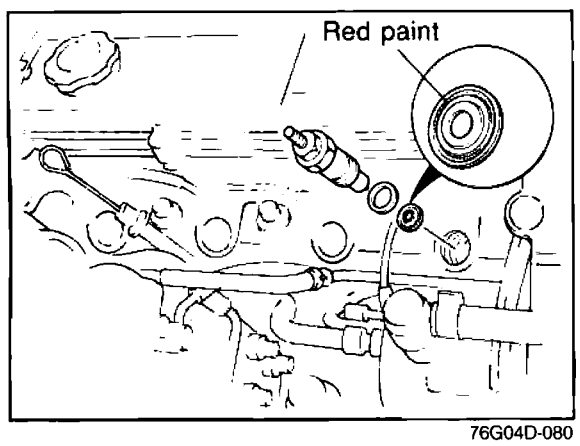


76G04D-079

Injection Nozzle Assembly
1. Assemble the injection nozzle.

   Tightening torque of nozzle body:
   29—49 N·m (3.0—5.0 m-kg, 22—36 ft-lb)

2. Check the injection starting pressure, and atomization. (Refer to page 4D—32.)



76G04D-080

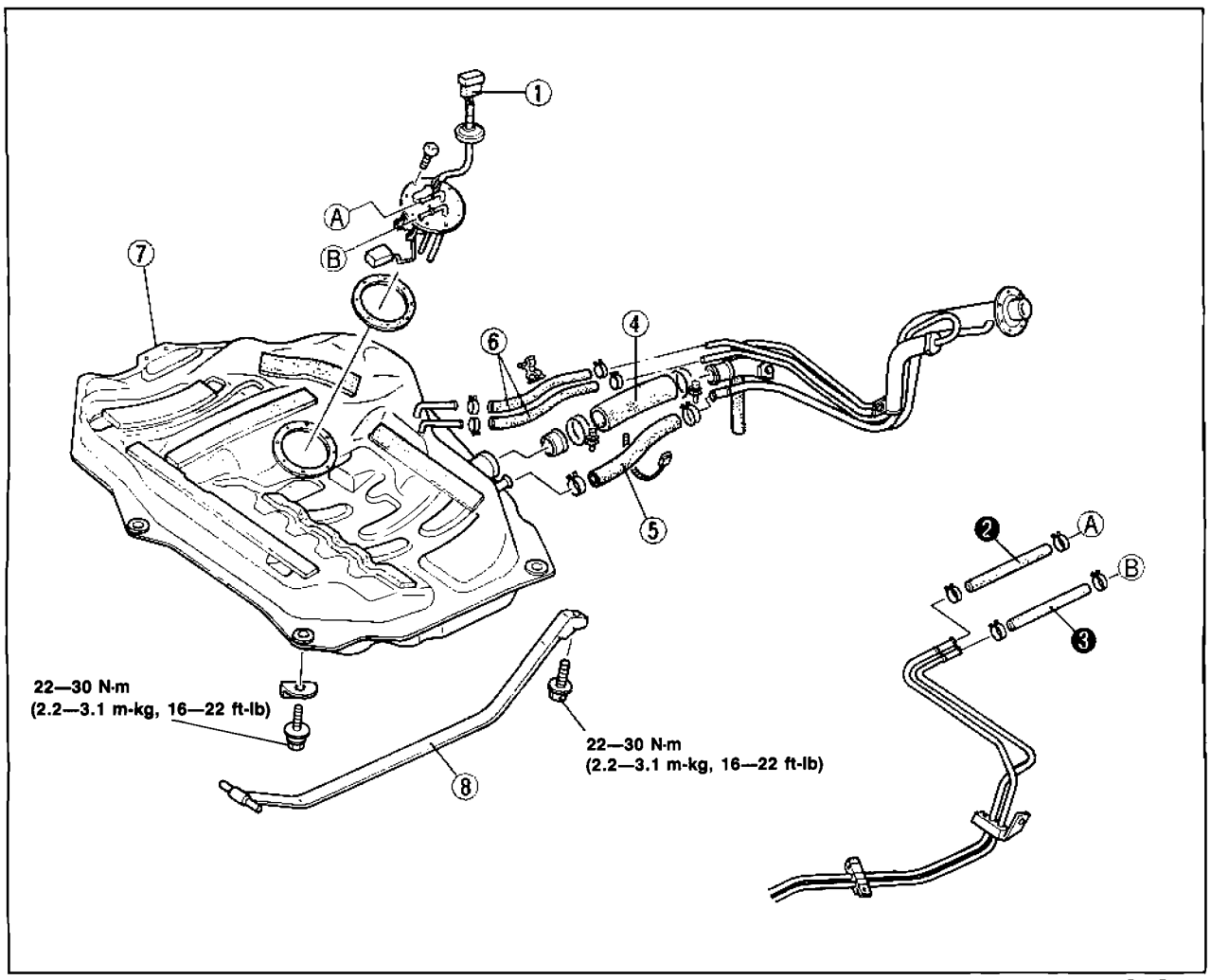
Injection Nozzle Installation
1. Install in the reverse order of removal, referring to the installation note.
2. Check for fuel leakage.

Installation note
Nozzle gasket
Install a new gasket with the red face toward the nozzle.

FUEL TANK

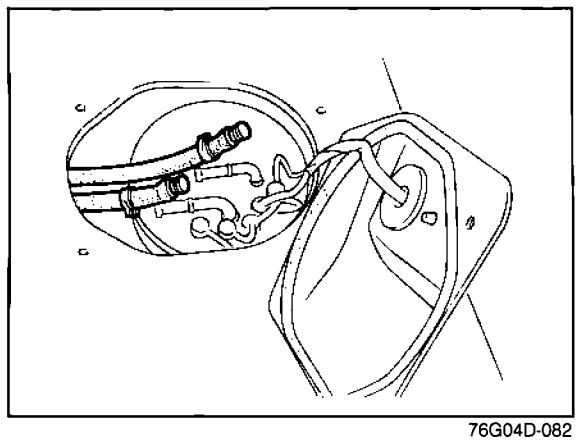
Removal and Installation

1. Drain the fuel from the fuel tank.
2. Remove in the sequence shown in the figure, referring to the removal note for the specially marked parts.



76G04D-081

1. Fuel level gauge connector
2. Fuel main hose
3. Fuel return hose
4. Joint hose
5. Ventilation hose
6. Breather hose
7. Fuel tank
8. Fuel tank pad



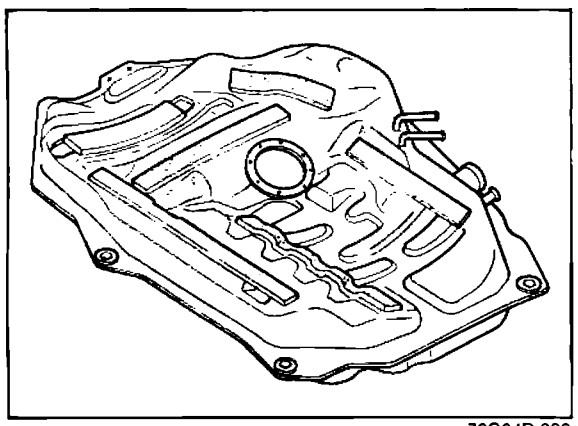
76G04D-082

Removal note

Fuel main and return hoses

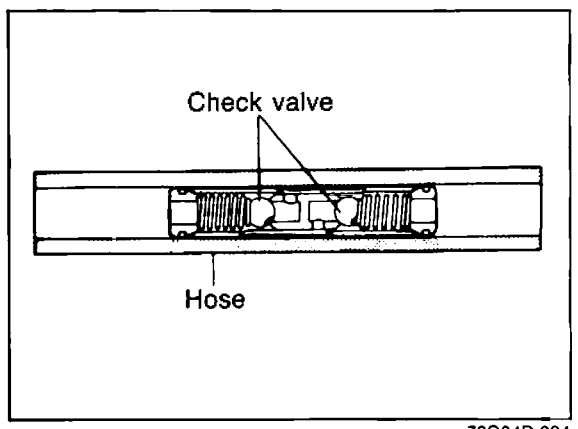
1. Remove the service hole cover from the body.
2. Disconnect the fuel main and return hoses and plug them.

Warning
Keep fire and open flame away from the fuel area.



76G04D-083

Inspection
Fuel tank
Check the fuel tank for cracks or damage. Replace if necessary.



76G04D-084

Two way check valve
1. Diconncect the hose from the fuel tank.
2. Check that the air flows in both directions through the valve.
3. Replace the fuel vent hose if necessary.

Installation
1. Install in the reverse order of removal.
2. Bleed air from fuel line.
3. Check for fuel leakage.

76G04D-085

5

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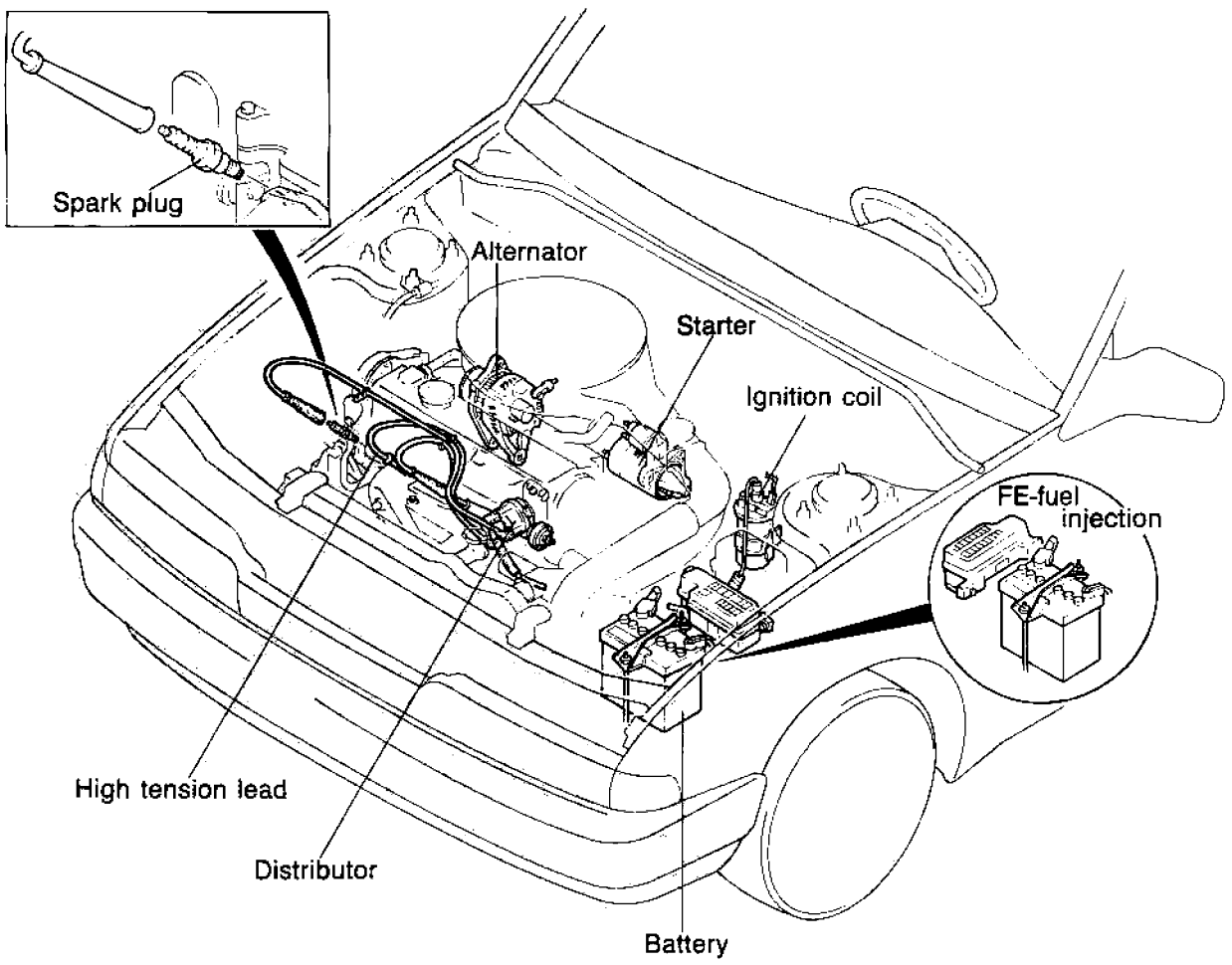
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5 OUTLINE

OUTLINE

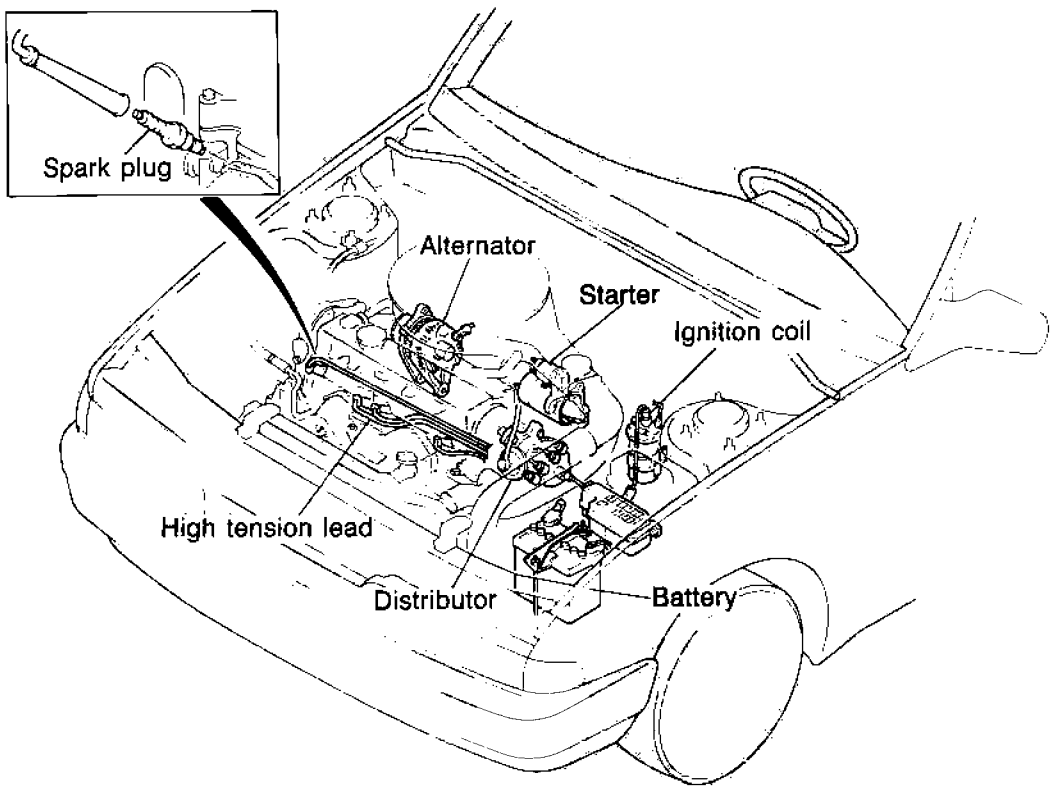
STRUCTURAL VIEW

F6, F8, FE (8 VALVE)

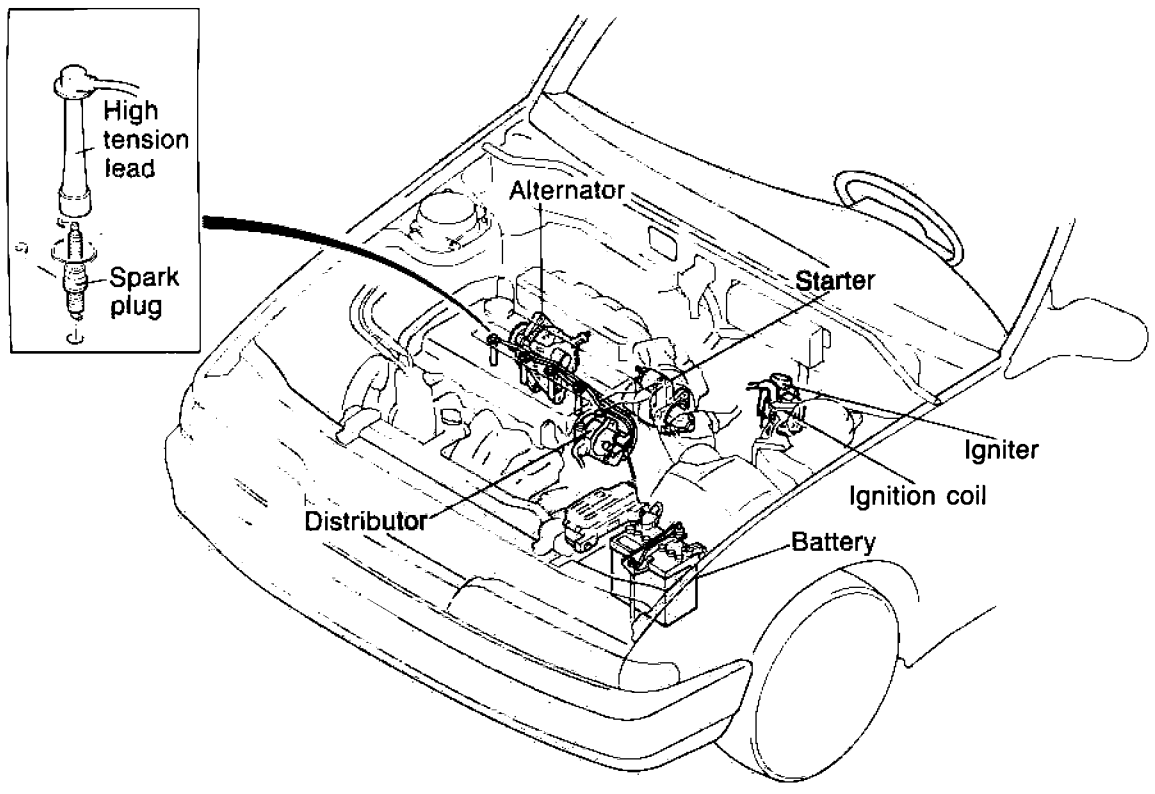


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FE (12 VALVE)

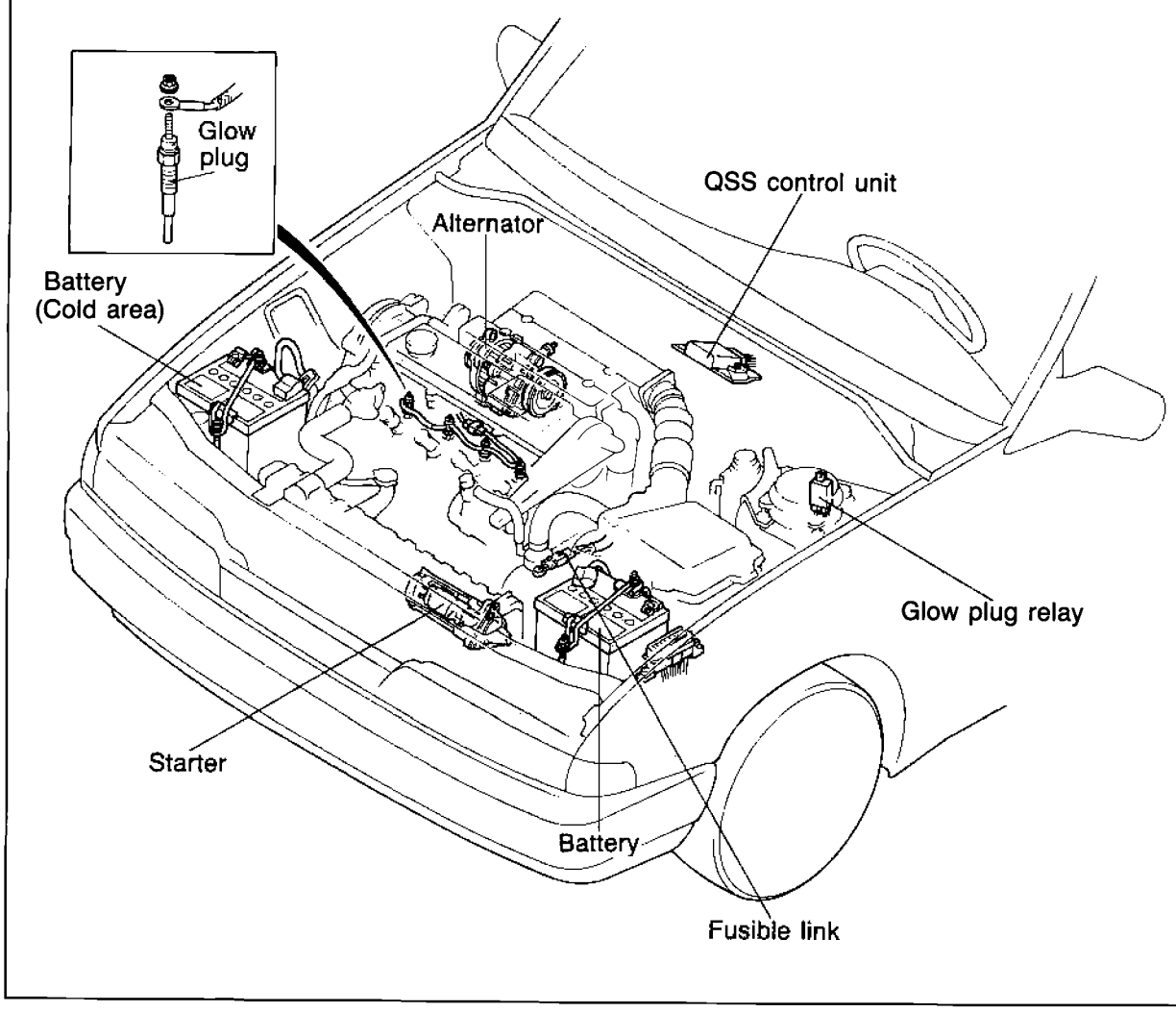


FE (DOHC)



5 OUTLINE

Diesel



SPECIFICATIONS
Gasoline Engine

Item \ Engine			F6	F8	FE (8 VALVE)	FE (12 VALVE)	FE (DOHC)
Battery	Voltage V		12, Negative ground				
	Type and capacity (20 hour rate)		34B19L(S) (33 Ah): General 50D20L (50 Ah), 55D23L (60 Ah): ECE				
Alternator	Type		A.C.				
	Output V—A		12—70				
	Regulator type		Transistorized (built-in IC regulator)				
	Regulated voltage V		14.1—14.7				
	Brush length mm (in)	Standard	16.5 (0.650)				
		Minimum	8.0 (0.315)				
	Drive belt tension mm (in)/98 N (10 kg, 22 lb)		New: 6—8 (0.24—0.32), Used: 7—9 (0.28—0.35)				
Starter	Type		Coaxial reduction: Middle East & General (FE · carburetor) Non-reduction: Others				
	Output V—kW		12—0.85	12—0.95		12—1.4	12—0.95
	Brush length mm (in)	Standard	17.0 (0.669)		Unleaded fuel 17.0 (0.669) Others 17.5 (0.689)	17.0 (0.669)	
		Minimum	11.5 (0.453)		Unleaded fuel 11.5 (0.453) Others 10.0 (0.394)	11.5 (0.453)	
Ignition timing			6 ± 1° BTDC (Vacuum hose disconnected)				12 ± 1° BTDC (Test connector grounded)
Distributor	Type		Fully transistorized (HEI)				Electronic spark advance
	Centrifugal spark advance (crank angle/engine speed) degree/rpm		F6 –2—2/1,000 6—10/2,100 14—18/6,100 F8 –2—2/1,000 10—14/2,100 18—22/6,100 FE (8 VALVE)—Carburetor Unleaded fuel (MTX) –2—2/1,760 12—16/3,360 22—26/5,320 (ATX) –2—2/1,300 12—16/3,360 22—26/5,320 Others –2—2/1,460 10—14/2,540 22—26/5,540 FE (12 VALVE)—Carburetor –2—2/1,200 10—14/2,400 10—14/4,000 16—20/5,000 FE—Fuel injection (except FE DOHC) –2—2/1,000 10—14/2,600 10—14/4,600 16—20/5,800				

* Unleaded fuel model

76G05X-503

5 OUTLINE

Item \ Engine		F6	F8	FE (8 VALVE)	FE (12 VALVE)	FE (DOHC)
Distributor	Vacuum spark advance (Crank angle/Vacuum) degree/mmHg (inHg)	F6 and F8 –2—2/100 6—10/300 FE (8 VALVE)—Carburetor Unleaded fuel –2—2/120 8—12/245 Others (MTX) –2—2/100 16—20/250 (ATX) –2—2/100 10—14/200 FE (12 VALVE)—Carburetor –2—2/120 11—15/300 FE—Fuel injection (except FE DOHC) [A chamber] –2—2/125 18—22/300 [B chamber] –2—2/125 –6—–10/200				
Spark plug	Type	FE (8 VALVE)*1 NGK: BPR5ES-11, BPR6ES-11 Nippon Denso: W16EXR-U11, W20EXR-U11 Others NGK: BPR5ES, BPR6ES Nippon Denso: W16EXR-U, W20EXR-U		NGK: BCPR5E, BCPR6E Nippon Denso: Q16PR-U, Q20PR-U		Unleaded fuel NGK: BCPR5E-11 BCPR6E-11 BCPR7E-11 Leaded fuel NGK: BCPR5E BCPR6E
	Plug gap mm (in)	0.75—0.85 (0.030—0.033), FE (8 VALVE)*1 1.0—1.1 (0.039—0.043)		0.7—0.8 (0.028—0.031)		1.0—1.1 *1 (0.039—0.043) 0.7—0.8 *2 (0.028—0.031)
Firing order		1—3—4—2				

76G05X-504

Diesel Engine

Item \ Engine			RF-N	RF-CX
Battery	Voltage V		12, Negative ground	
	Type and capacity (20 hour rate)		80D26L (65) 50D20L, 50D20R (50)—ECE	80D26L (65) 65D23L, 65D23R (55)
Alternator	Type		A.C.	
	Output V—A		12—70	12—75
	Regulator type		Transistorized (built-in IC regulator)	
	Regulated voltage V		14.1—14.7	
	Brush length mm (in)	Standard	16.5 (0.650)	21.5 (0.846)
		Minimum	8.0 (0.315)	8.0 (0.315)
	Drive belt tension mm (in)/98 N (10 kg. 92 lb)		New: 9—11 (0.35—0.43), Used: 12—14 (0.47—0.55)	
Starter	Type		Reduction	
	Output V—kW		12—2.0, 12—2.2 (Cold area)	
	Brush length mm (in)	Standard	2.0 kW: 17.0 (0.669), 2.2 kW: 18.0 (0.709)	
		Minimum	2.0 kW: 11.0 (0.453), 2.2 kW: 11.0 (0.453)	
Firing order			1—3—4—2	

76G05X-505

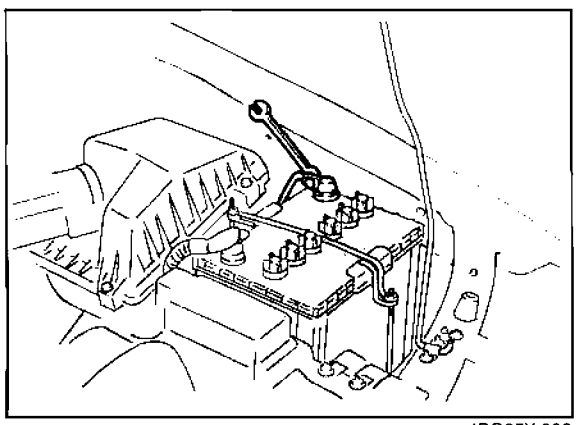
*1 Unleaded fuel model
*2 Leaded fuel model

TROUBLESHOOTING GUIDE

Problem	Possible cause	Remedy	Page
Starter does not turn at all, or its turning speed is too slow to start the engine.	Battery and related parts		
	Poor contact of battery terminals	Clean and tighten	5— 8
	Poor grounding of negative cable	Clean and repair	—
	Voltage drop caused by discharged battery	Recharge	5— 8
	Insufficient voltage caused by battery malfunction	Replace	5— 8
	Ignition switch and related parts		
	Poor contact of ignition switch	Replace	—
	Loose ignition switch wiring or connector	Repair	—
	Broken wire between ignition switch and magnetic switch	Repair or replace	5—38,45,56,66
	Magnetic switch and related parts		
	Loose wiring and/or connectors	Repair	5—38,45,56,66
	Burnt magnetic switch contact plate or improper contact	Replace	5—43,54,64,74
	Broken wire in magnetic switch pull-in coil	Replace	5—43,54,64,74
	Broken wire magnetic switch holding coil	Replace	5—43,54,64,74
	Starter		
	Poor contact of brushes	Adjust contact or replace	5—43,54,64,74
	Fatigued brush spring	Replace	
	Poor grounding of field coil	Replace	
	Poor soldering of field coil	Repair	
	Commutator mulfunction	Repair or Replace	
	Grounded armature	Replace	—
	Worn parts	Replace	—
Starting problem	Gasoline engine		
	Insufficient battery capacity	Recharge	5— 8
	Malfunction of spark plug (s)	Clean, adjust or replace	5— 9
	Loose positive terminal	Tighten	—
	Damaged distributor cap or rotor	Replace	5—16
	Ignition coil malfunction	Replace	5—10
	Igniter malfunction	Replace	5—16,20
	Diesel engine		
	Insufficient battery capacity	Recharge	5— 8
	QSS system malfunction	Replace	5—76
Starter turns but pinion gear does not mesh with ring gear	Starter		
	Tip of overrunning clutch pinion is worn	Replace	—
	Weakened overrunning clutch drive spring	Replace	—
	Worn overrunning clutch	Replace	—
	Improper sliding of spline	Adjust contact and repair, or replace	5—40,54,70
	Worn bushing	Replace	—
	Worn ring gear	Replace	—
Starter turns continuously (does not stop)	Magnetic switch		
	Sticking contact place of magnetic switch	Replace	5—43,54,64,74
	Layer shorting coil of magnetic switch	Replace	5—43,54,64,74
	Ignition switch does not return	Replace	—
Misfiring	Dirty or damaged spark plug (s)	Clean or replace	5— 9
	Malfunction of wiring, or open circuit	Repair or Replace	5—10
	Damaged distributor cap	Replace	5—16
Discharging of battery	Alternator		
	Loose drive belt	Adjust	5—37
	Grounded or broken stator coil	Replace	5—32
	Broken rotor coil	Replace	5—32
	Poor contact of brush and slip ring	Clean, repair or replace	5—32
	Malfunction of rectifier	Replace	5—34
	Malfunction of IC regulator	Replace	—
	Battery and related parts		
	Insufficient or unsuitable battery electrolyte	Adjust	5— 8
	Malfunction of battery electrode (internal short-circuit)	Replace	5— 8
	Poor contact of battery terminal (s)	Clean and tighten	5— 8
	Excessive electric load	Check power consumption and short circuit	—
Overcharging of battery	IC regulator malfunction	Replace	—
	Operating in extremely high temperature	Repair	—
Poor acceleration	Mis-adjusted ignition timing	Adjust	5—11
	Distributor malfunction	Repair or replace	5—11
Knocking	Mis-adjusted ignition timing	Adjust	5—11
	Distributor malfunction	Repair or replace	5—11

76G05X-003

5 BATTERY

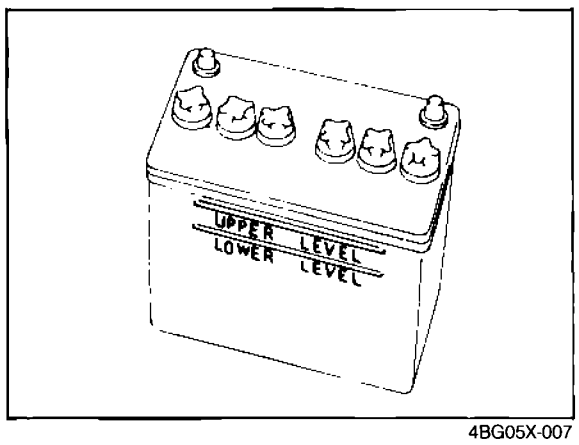


4BG05X-006

BATTERY

INSPECTION
Terminal and Cable

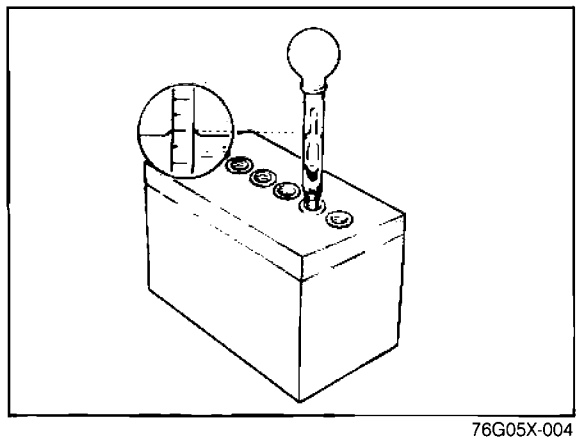
1. Check the tightness of the terminals to ensure good electrical connections. Clean the terminals and coat them with grease after tightening the terminal.
2. Inspect for corroded or frayed battery cables.
3. Check the rubber protector on the positive terminal for proper coverage.



4BG05X-007

Electrolyte Level

1. Check whether or not the electrolyte level lies between the "UPPER LEVEL" and the "LOWER LEVEL" lines.
2. If low, add distilled water by the "UPPER LEVEL". Do not overfill.

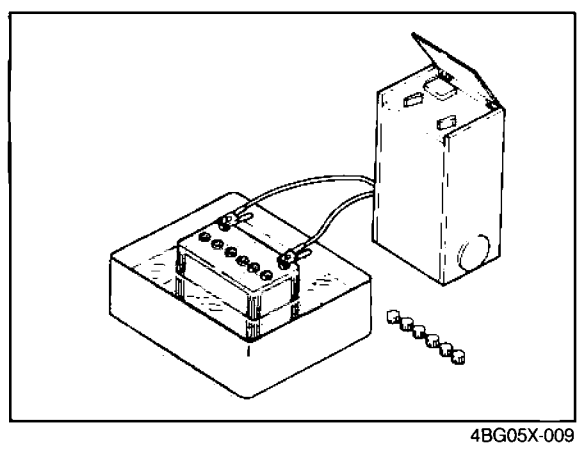


76G05X-004

Specific Gravity

1. Measure the specific gravity by using a hydrometer.
2. If the specific gravity reading is standard or less, recharge the battery.

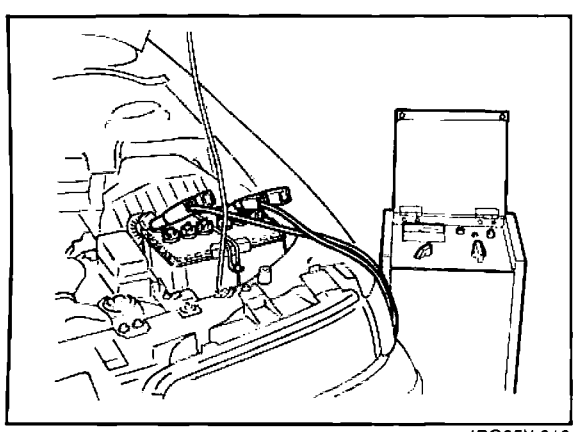
Standard gravity: 1.22
Fully charged gravity: 1.27—1.29



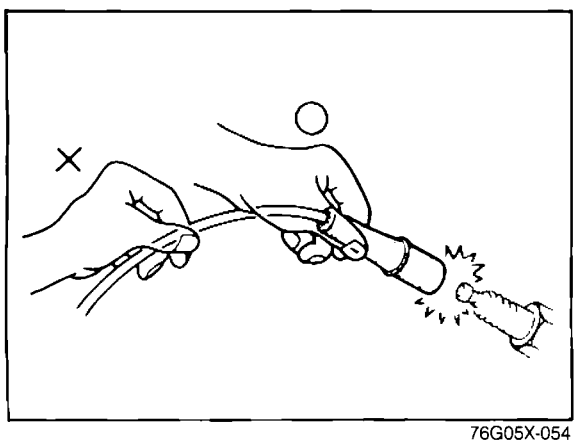
4BG05X-009

RECHARGE
Quick Charge

1. Remove the battery from the vehicle.
2. Remove all the vent caps.
3. Perform a quick charge (6A or above, but max. 20A).
4. Add distilled water if necessary while charging.
5. Cool the battery not to exceed the electrolyte temperature over 55°C (131°F) while charging.
6. Charge once more if the specific gravity is under fully charged gravity.


4BG05X-010

Slow Charge
1. Stop the engine
2. Turn all the accessories off.
3. Remove the negative battery cable.
4. Perform a slow charge (3.5A to 4.5A).
5. Add distilled water if necessary while charging.
6. Charge once more if the specific gravity is under fully charged gravity.

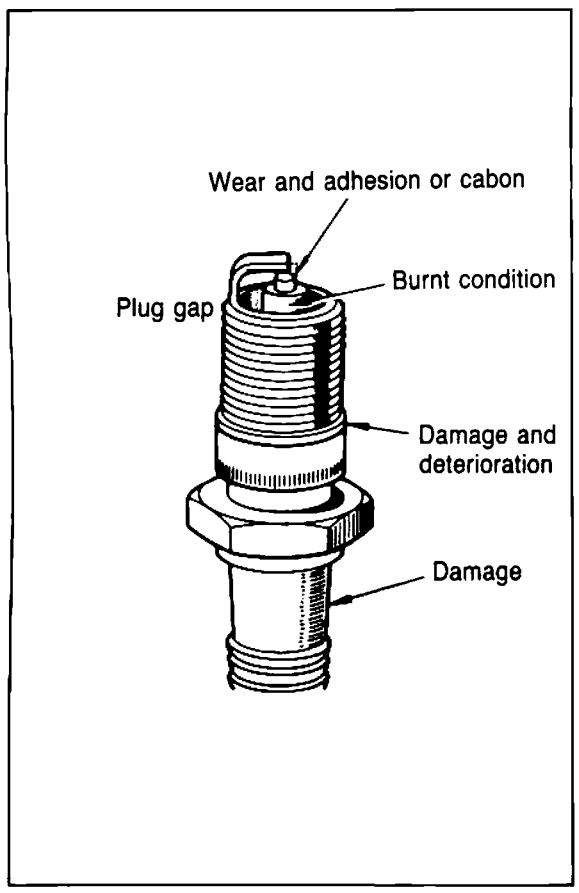

76G05X-054

SPARK PLUG

REMOVAL AND INSTALLATION

Note the following points:
1. When the high-tension lead is to be pulled off, be sure to pull the boot itself, and not the wire.
2. Tighten the spark plugs to the specified torque.

Tightening torque: 15—23 N·m (1.5—2.3 m-kg, 10.8—16.6 ft-lb)



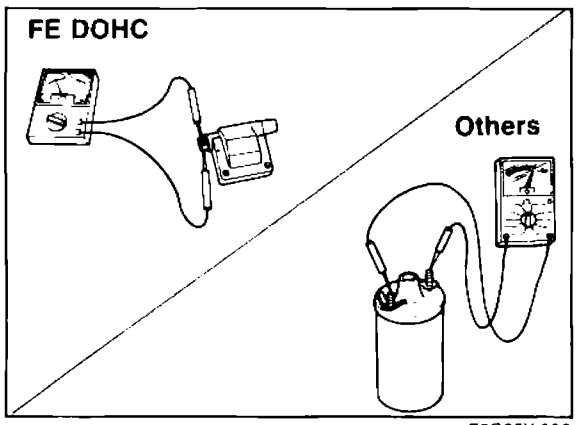
76G05X-005

INSPECTION

Check the following points. If a problem is found, replace the spark plug.
1. Damaged insulation
2. Worn electrodes
3. Carbon deposits
   If cleaning is necessary, use a plug cleaner or a wire brush. Clean the upper insulator also.
4. Damaged gasket
5. Burnt condition of spark insulator
6. If it is black with carbon deposits, either misfiring due to improper proportions of gas and air or overheating of the plug may have occurred.

Plug gap:
FE (12VALVE) and FE DOHC Leaded fuel model:
0.70—0.80 mm (0.028—0.031 in)
FE (8VALVE) and FE DOHC Unleaded fuel model:
1.0—1.10 mm (0.039—0.043 in)
Others:
0.75—0.85 mm (0.030—0.034 in)

5 IGNITION COIL, HIGH-TENSION LEAD



76G05X-006

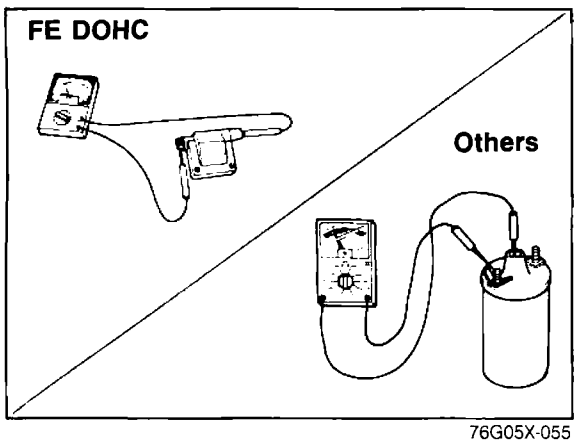
IGNITION COIL

INSPECTION

Primary Coil

Use an ohmmeter and check for resistance in the primary coil. If it is not within the specification, replace the coil.

Primary coil resistance: (at 20°C 68°F)
FE DOHC...0.72—0.88 Ω
Others.....1.04—1.27 Ω

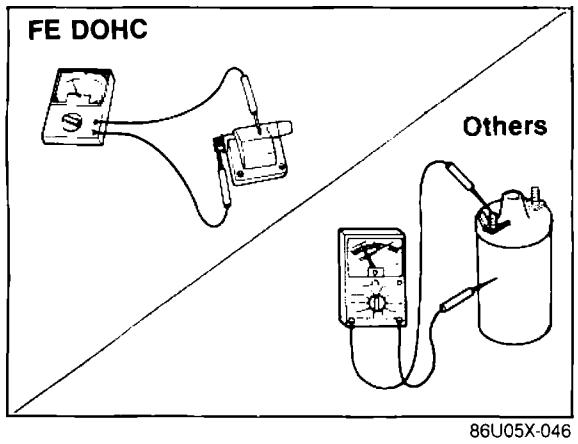


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Secondary Coil

Use a ohmmeter to measure the resistance of the secondary coil. If it is not within specification, replace the coil.

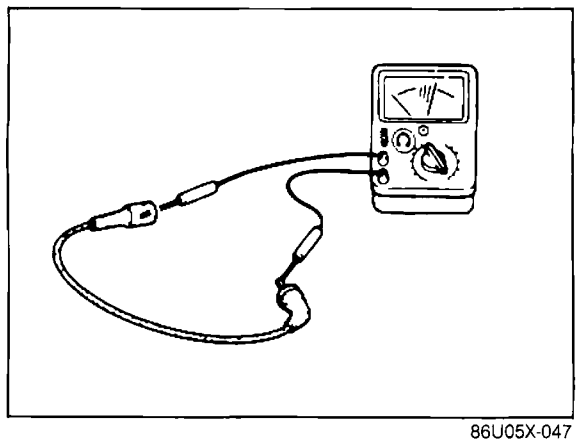
Secondary coil resistance: (at 20°C 68°F)
FE DOHC.....10.3—13.9 kΩ
Others..... 7.1— 9.7 kΩ



86U05X-046

Insulation of Case

Use a **500V megger** tester to measure the insulation resistance between the primary terminal and the case.
The standard reading is **10 MΩ or more.**



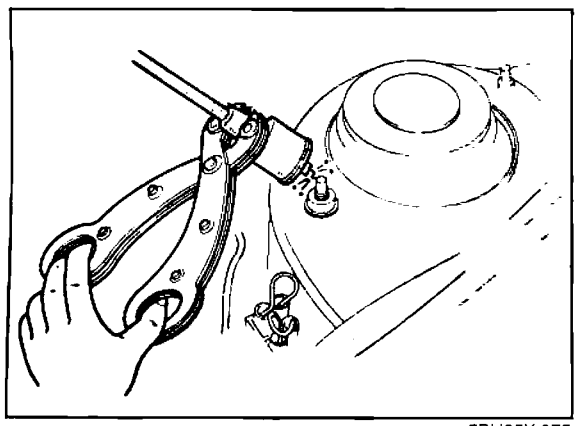
86U05X-047

HIGH-TENSION LEAD

INSPECTION

Measure the resistance using an ohmmeter.

Resistance: 16 kΩ per 1m (3.28 ft)

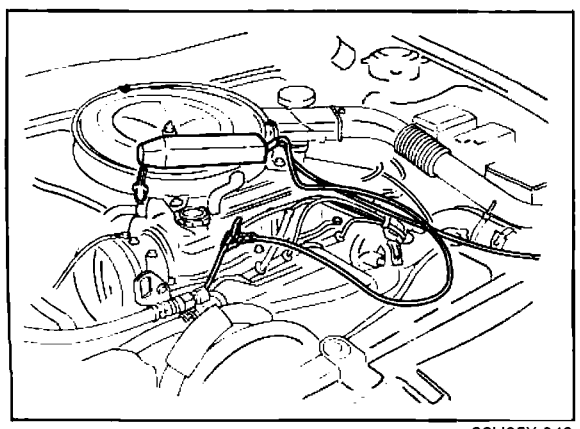


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DISTRIBUTOR

SPARK TEST

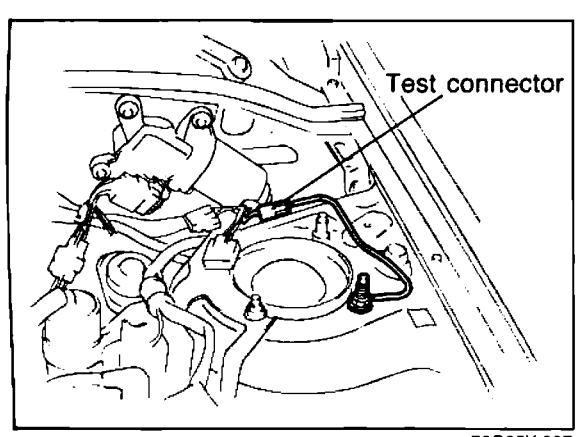
1. Disconnect the distributor lead from the distributor.
2. Hold it with insulated pliers approx. 5—10 mm (0.20—0.39 in) from a ground.
3. Crank the engine and check that a strong blue spark is visible.
4. If there is no spark, the ignition coil or pick-up coil may be bad.
   Check once again after replacing the ignition coil or pick-up coil.



86U05X-048

IGNITION TIMING

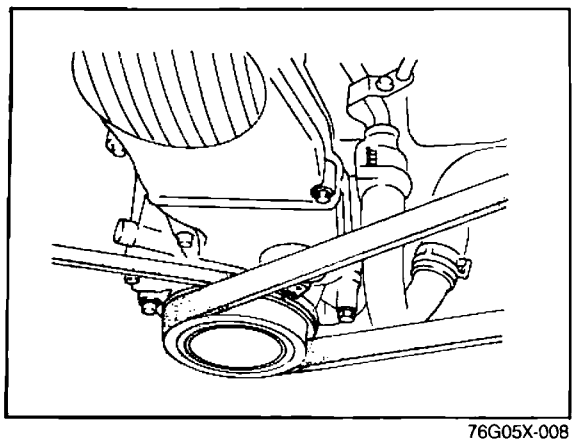
1. Warm up the engine to the normal operating temperature.
2. Turn all electric loads OFF.
3. Connect a tachometer and timing light to the engine.



76G05X-007

4. Connect a jumper wire between the test connector and ground. (Only for FE DOHC)
5. Check the idle speed. Set to the specified speed if necessary.

Idle speed: 750 ± 50 rpm (FE DOHC)
800 $^{+50}_{-0}$ rpm (F6, F8 FE—MTX)
900 $^{+50}_{-0}$ rpm (F8, FE—ATX in "P" range)
950 $^{+50}_{-0}$ rmp (F6—ATX in "P" range)

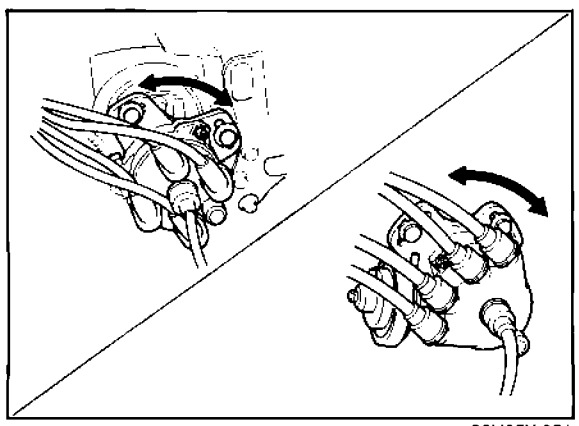


76G05X-008

6. Check that the timing mark (Yellow) on the crankshaft pulley and the mark on the timing belt cover are aligned.

Ignition timing:
FE DOHC: 12 ± 1° BTDC
(Test connector grounded)
Others: 6 ± 1°
(Vacuum hoses disconnected and plugged)

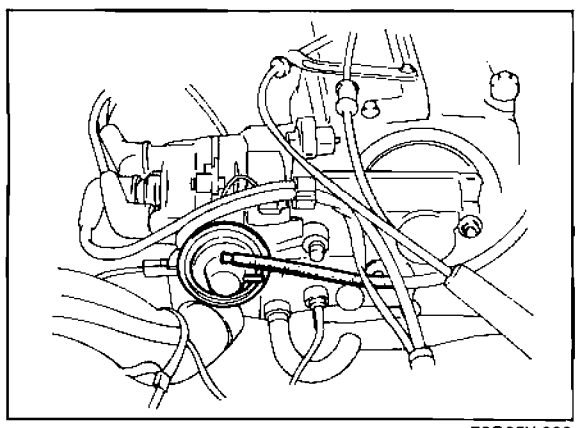
5 DISTRIBUTOR



86U05X-051

8. If the mark is not aligned, loosen the distributor lock bolt, and turn the distributor housing to make the adjustment.
9. Reconnect the vacuum hoses, or disconnect the jumper wire from the test connector.
10. Tighten the distributor lock bolt to specified torque.

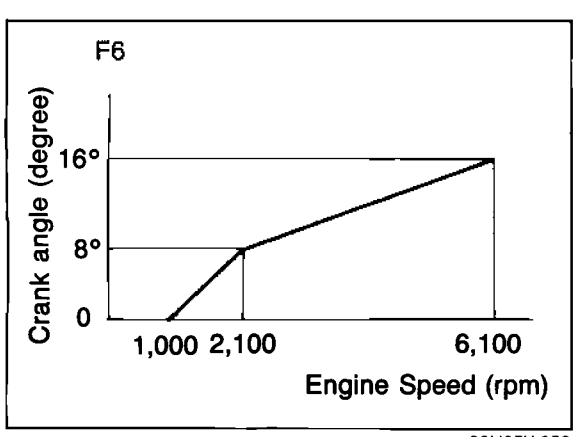
Tightening torque:
18.6—25.5 N·m
(1.9—2.6 m-kg, 13.7—18.8 ft-lb)



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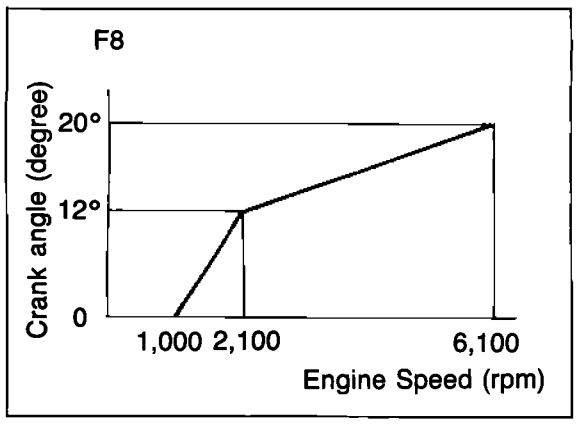
SPARK CONTROL (Except FE DOHC)
Centrifugal Advance

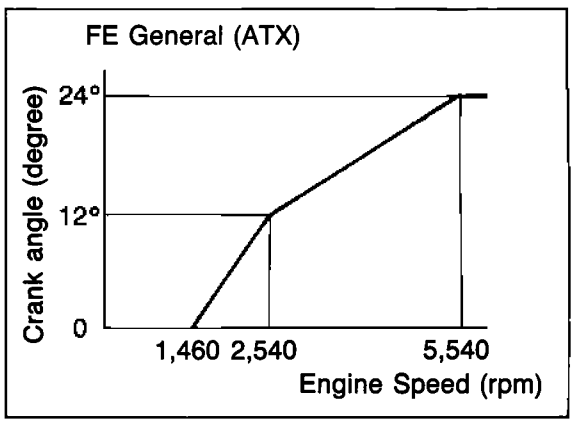
1. Warm up the engine to the normal operating temperature.
2. Check that the idle speed and initial ignition timing are correct.
3. Disconnect the vacuum hoses from the vacuum control unit and plug them.

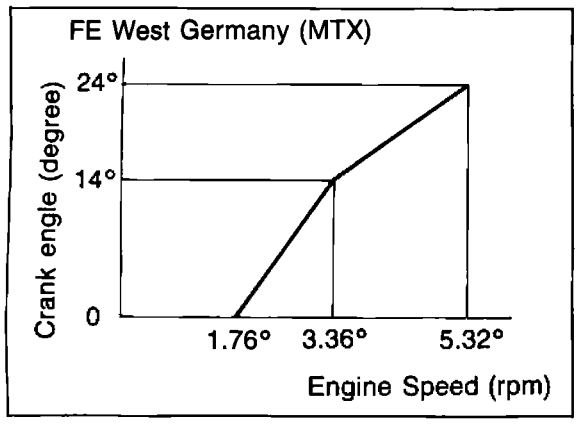


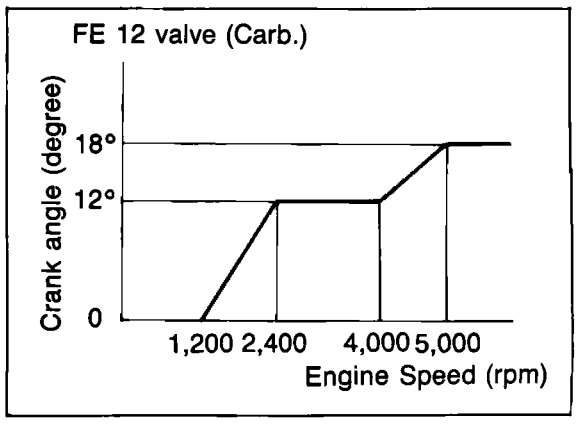
86U05X-053

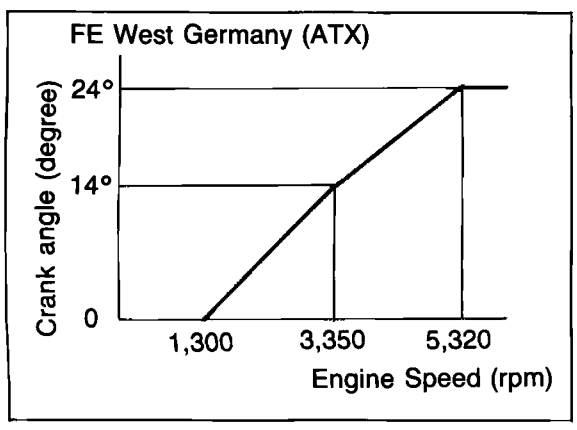
4. While gradually increasing the engine speed, use a timing light to check the advance on the pulley.
   Excess advance..... weak governor spring
   (If the governor spring is broken, the advance will rise very high)
   Insufficient advance...governor weight or cam malfunction

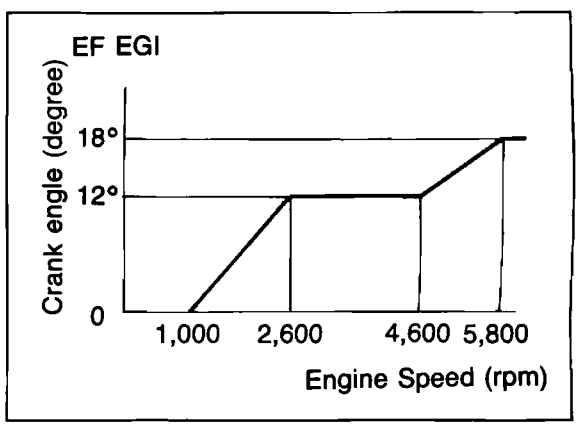


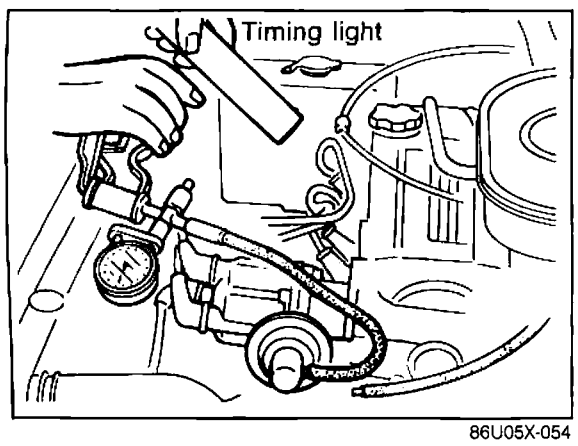








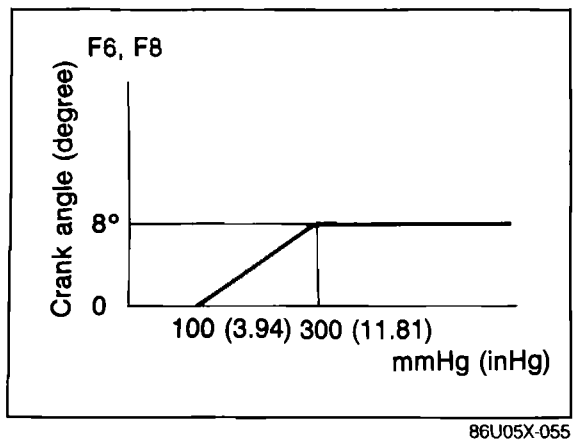




86U05X-054

Vacuum Advance

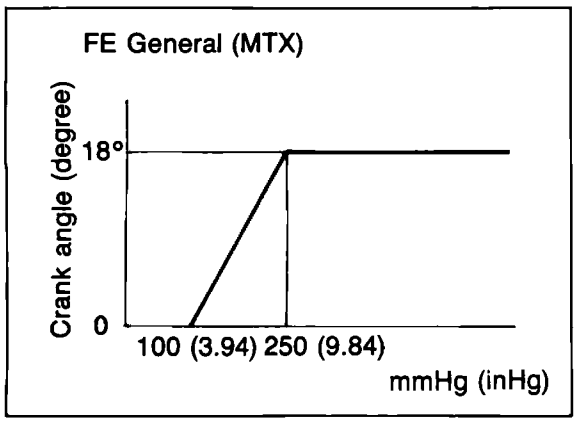
1. Warm up the engine to the normal operating temperature.
2. Check that the idle speed and ignition timing are correct.
3. Disconnect the vacuum hoses from the vacuum control unit, and plug them.
4. Connect a vacuum pump to the vacuum control unit.

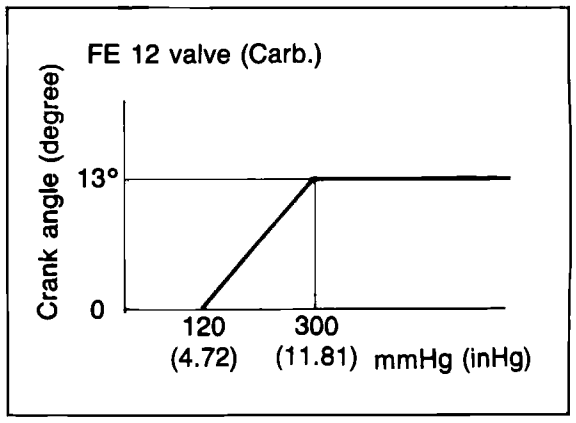


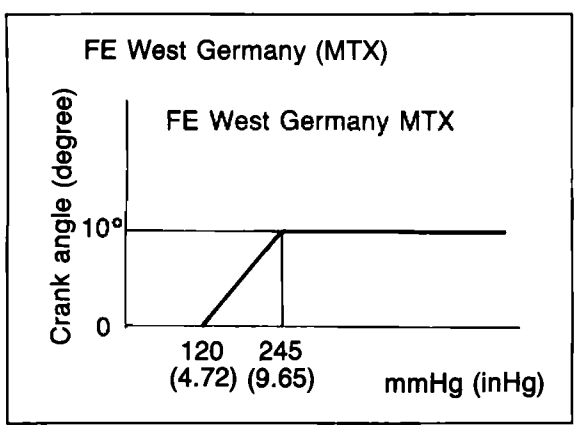
86U05X-055

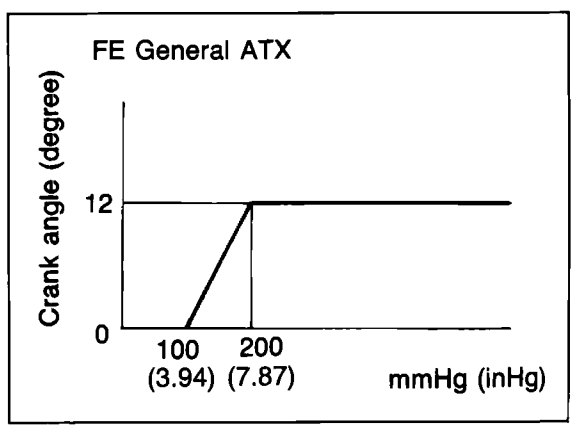
5. Apply vacuum and check the advance with the timing light.

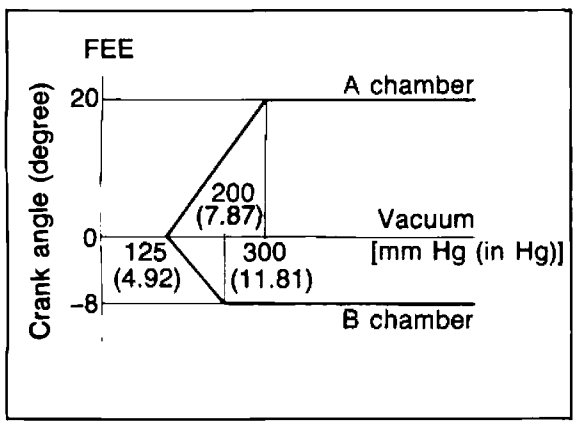
5 DISTRIBUTOR

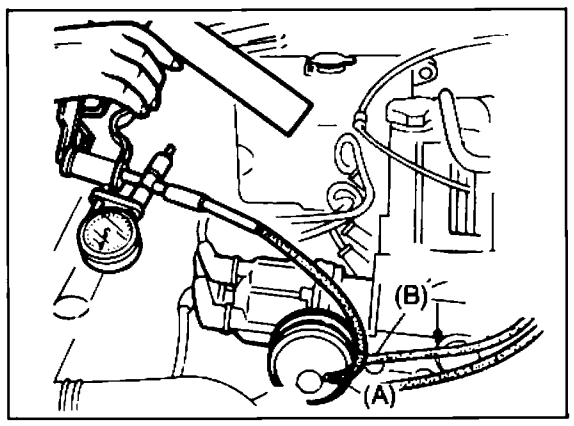


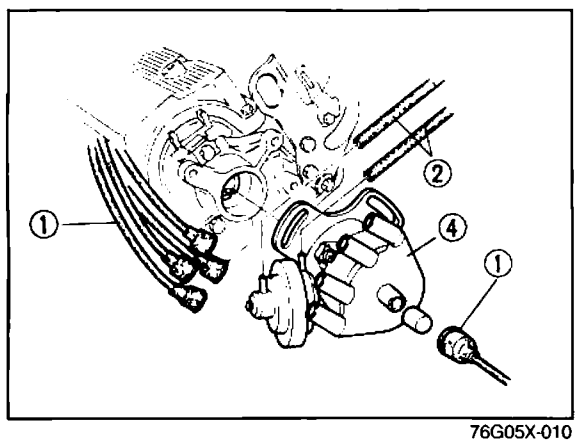












76G05X-010

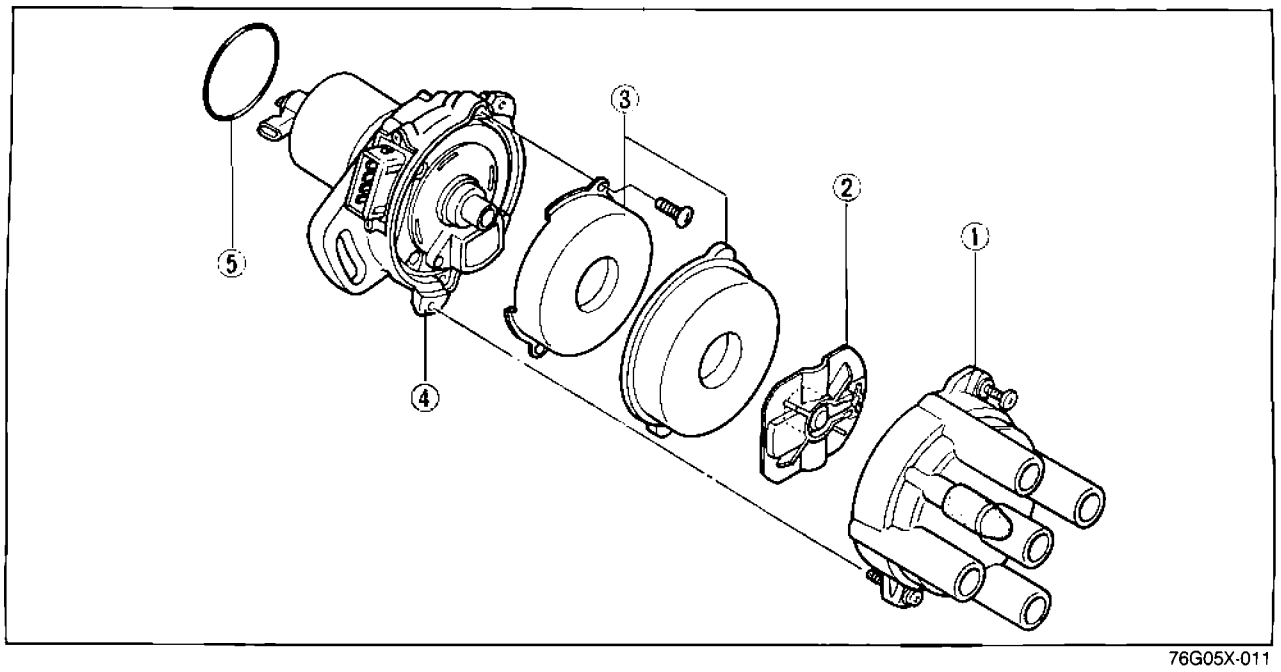
REMOVAL

1. Remove the high-tension leads.
2. Disconnect the vacuum hose(s) and wiring.
3. Loosen the distributor lock bolt(s).
4. Remove the distributor.

Note
Do not turn the crankshaft after the distributor has been removed.

DISASSEMBLY
Disassemble in the order shown in the figure.

FE DOHC

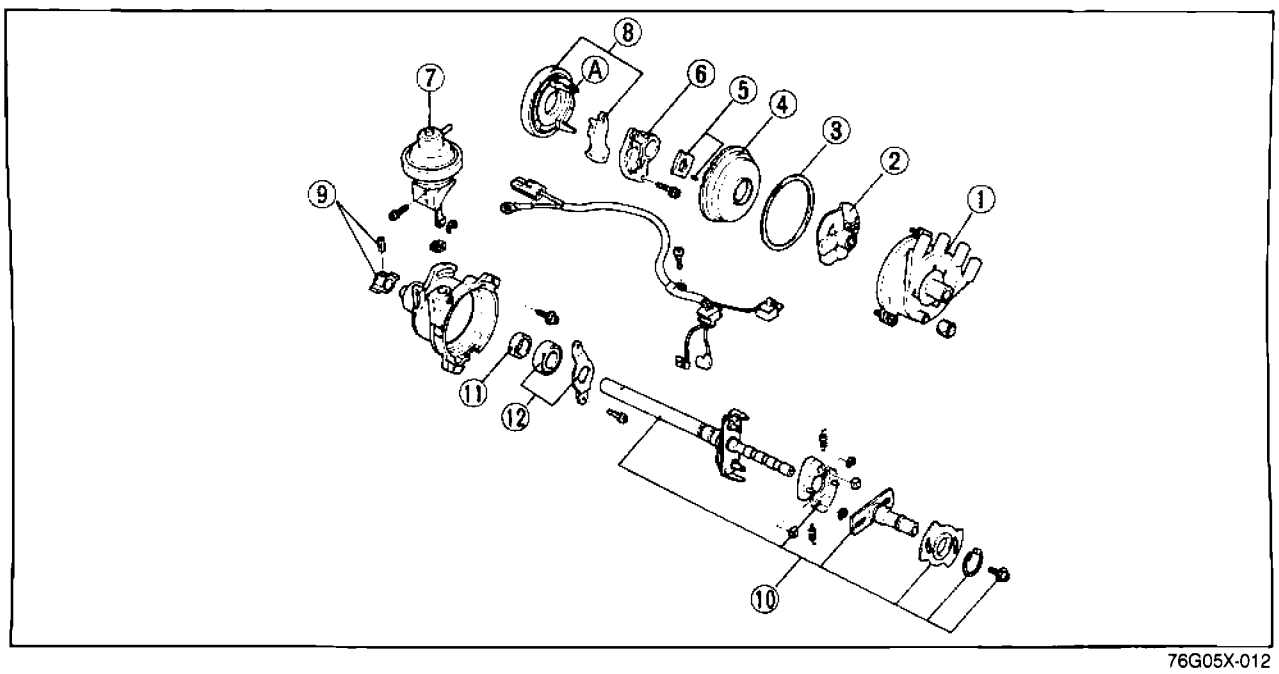


76G05X-011

1. Cap
2. Distributor rotor
3. Cover
4. Distributor set
5. O-ring

Caution
Do not disassemble the distributor set.

FE 12 Valve Caburetor Engine

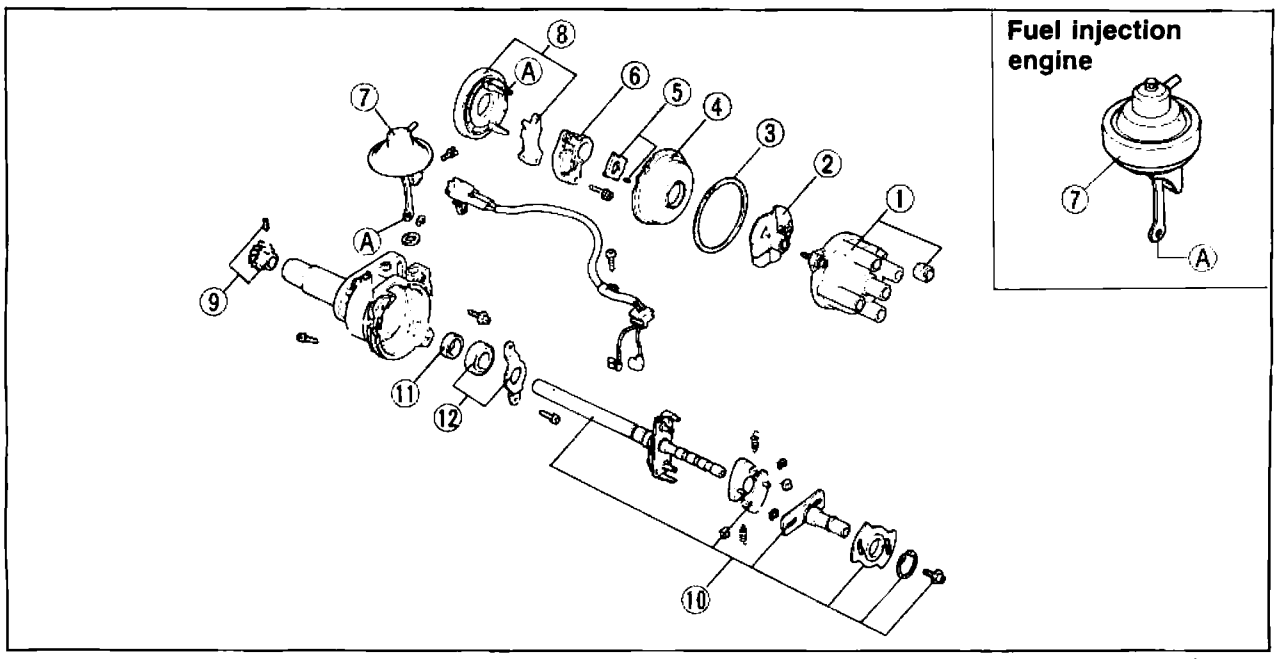


76G05X-012

1. Cap
2. Rotor
3. Gasket
4. Cover
5. Signal rotor and pin
6. Pick-up coil with igniter
7. Vacuum control unit
8. Breaker
9. Coupling set
10. Governor set
11. Oil seal
12. Bearing

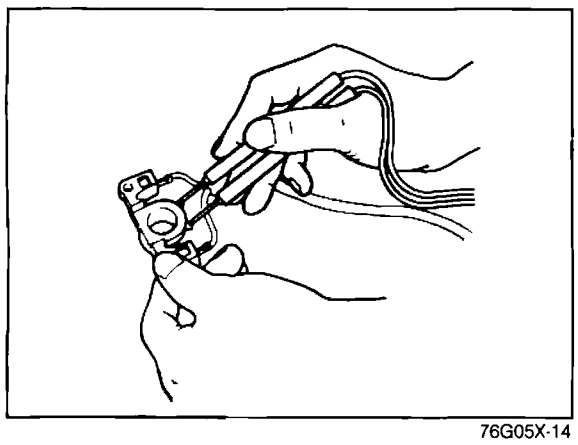
5 DISTRIBUTOR

Others



76G05X-013

1. Cap
2. Rotor
3. Gasket
4. Cover
5. Signal rotor
6. Pick-up coil with ignitor
7. Vacuum control unit
8. Breaker
9. Coupling set
10. Governor set
11. Oil seal
12. Bearing



76G05X-14

INSPECTION

Pick-up Coil with Igniter (Except FE DOHC)

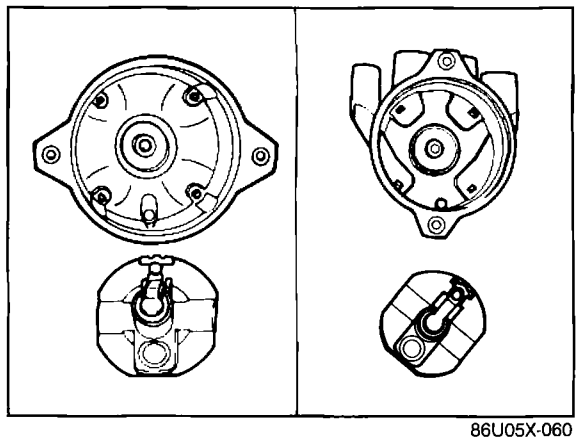
1. Connect an ohmmeter to the pick-up coil.
2. Measure the resistance.

Resistance: 900—1,200 Ω

3. If it is not within specification, replace it.

Control Module (FE DOHC)

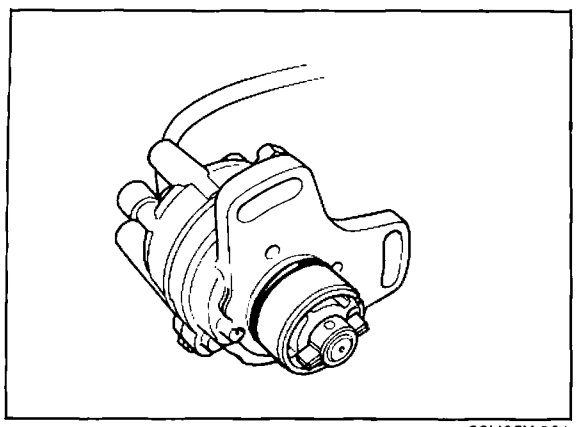
Refer to page 4C—108.



86U05X-060

Cap and Rotor

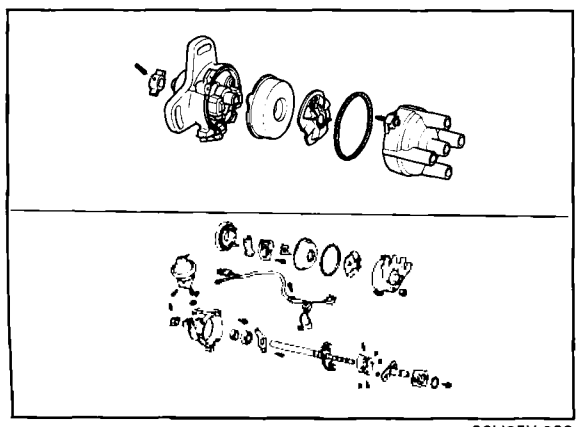
1. Check for corrosion, damage, and cracks.
2. Replace if necessary.



86U05X-061

Distributor Shaft, O-Ring, and Oil Seal

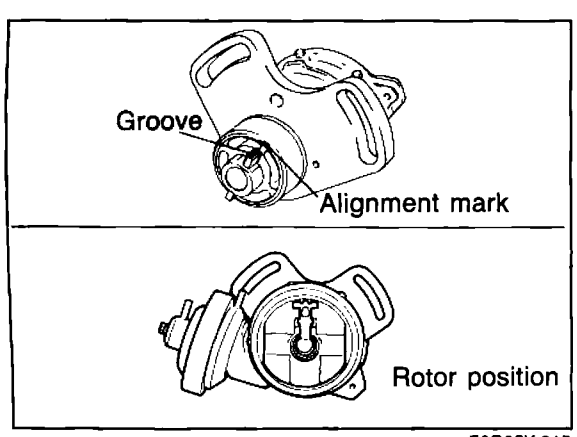
1. Check for damage to the distributor shaft, O-ring, and oil seal.



86U05X-062

ASSEMBLY

Assemble in the reverse order of disassembly, referring to the assembly note.

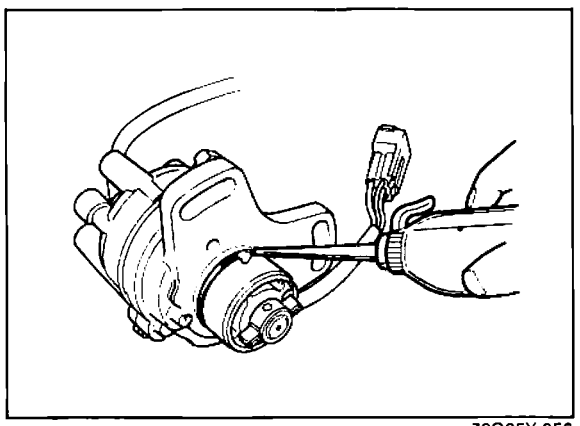


76G05X-015

Assembly Note (FE DOHC and FE 12 Valve Caburetor)

Align the coupling set blade with the alignment mark and check that the rotor is aligned as shown in the illustration.

5 DISTRIBUTOR

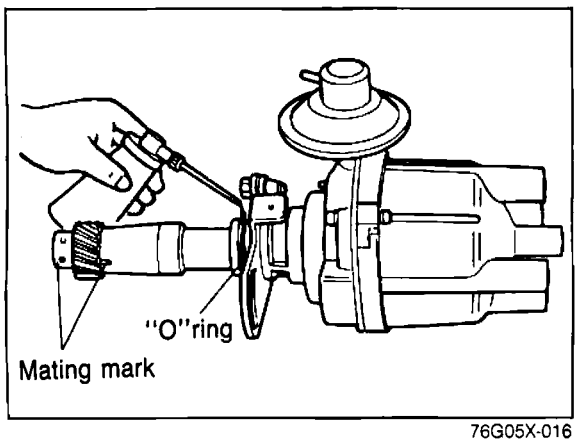


76G05X-056

INSTALLATION

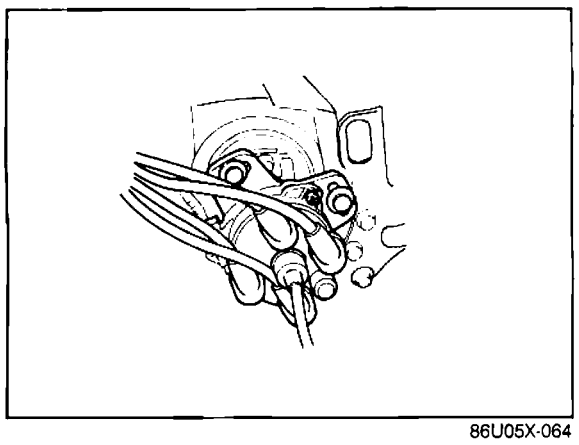
Note
After installing the distributor, adjust the ignition timing (Refer to 5—11).

1. Apply engine oil to the O-ring and driven gear.



76G05X-016

Note
Gear driven type, check that the No.1 cylinder is at top dead center and aline the distributor matching marks.

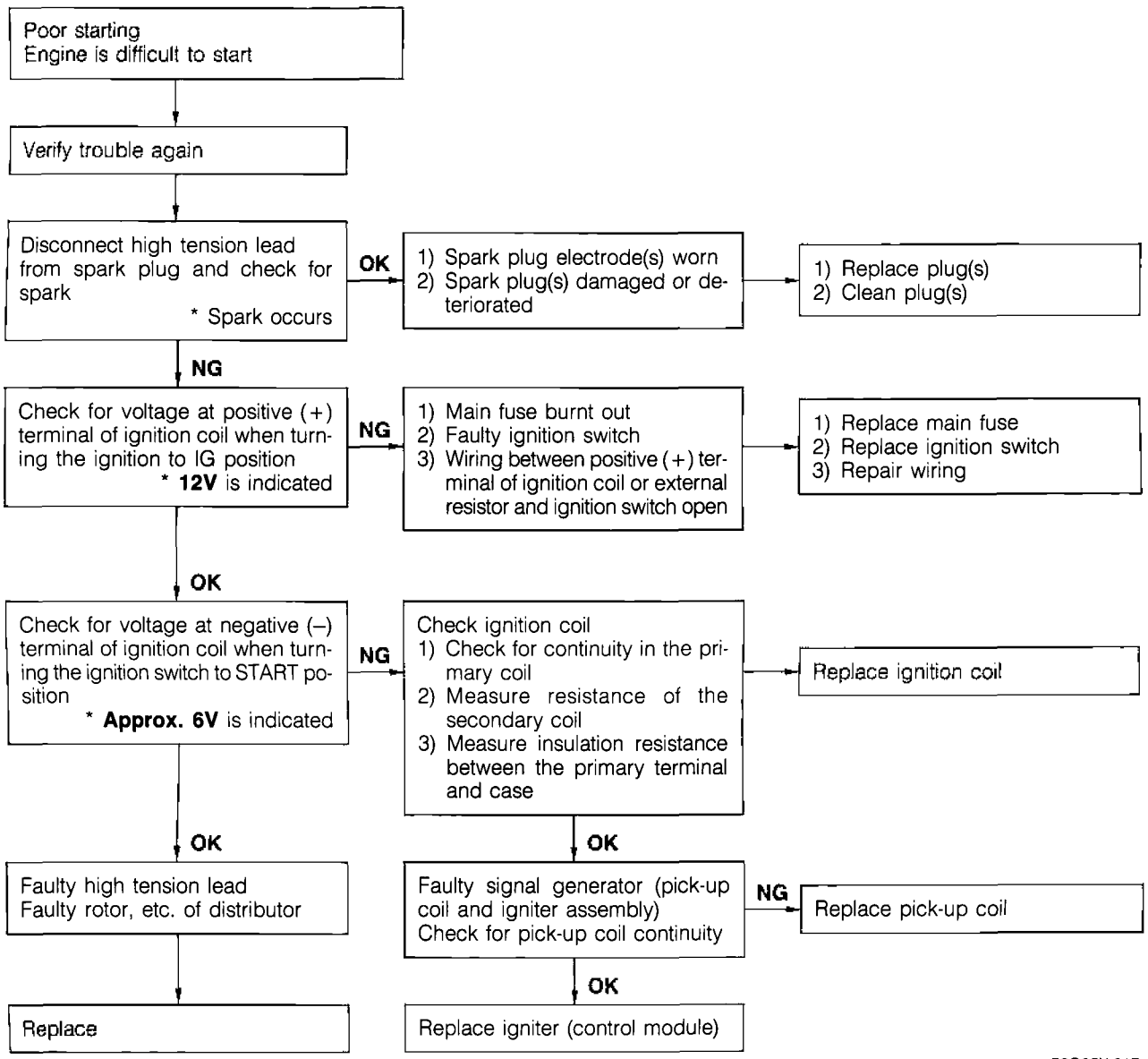


86U05X-064

2. Install the distributor and connect the high-tension leads and distributor connector.
3. Tighten lock bolt to the specified torque.

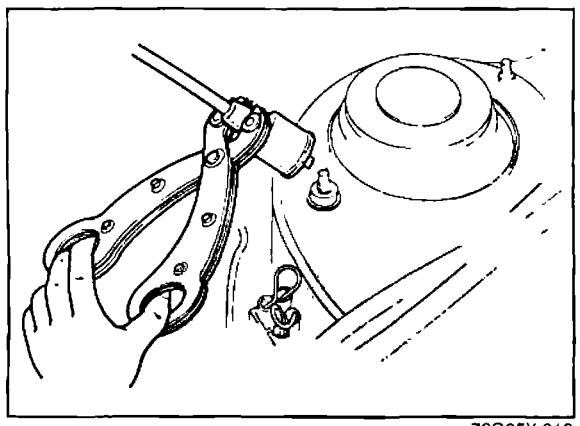
Torque specification:
19—25 N·m (1.9—2.6 m-kg, 14—18 ft-lb)

H.E.I. TROUBLESHOOTING (Except FE DOHC)



76G05X-017

5 IGNITER (FE DOHC)

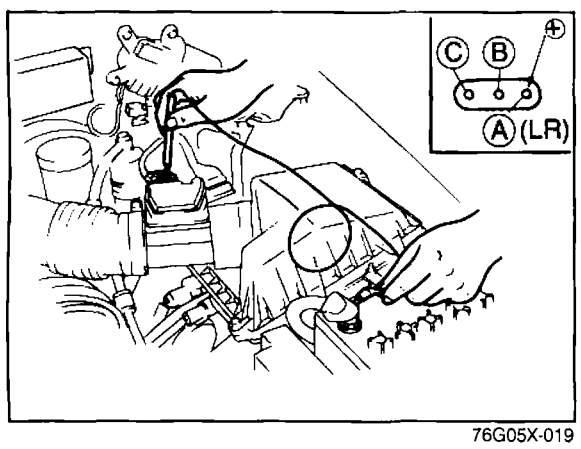


76G05X-018

IGNITER

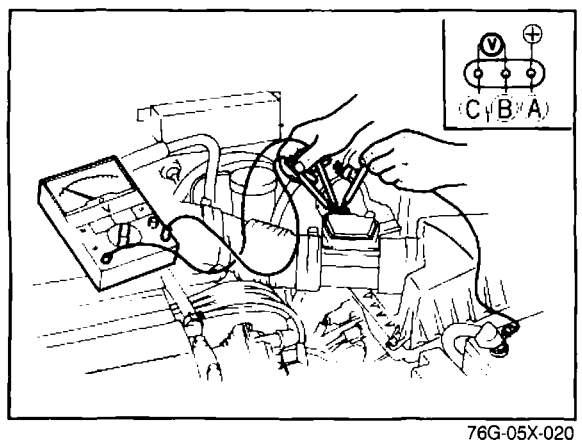
INSPECTION

1. Disconnect the center high tension lead from the distributor cap.
2. Hold it with insulated pliers **approx. 5—10 mm (0.20—0.39 in)** from a ground.
3. Turn th ignition switch ON.



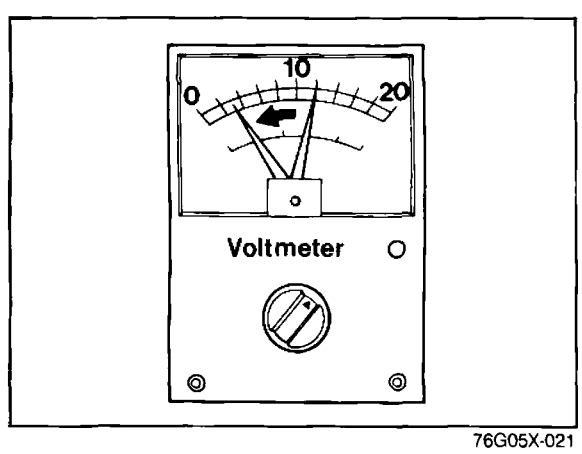
76G05X-019

4. Remove the rubber seal from the igniter connector.
5. Apply battery voltage to terminal A (LR) with a jumper wire.
6. Check that a strong blue spark is visible when the wire is disconnected.



76G-05X-020

7. If no spark is seen, connect a voltmeter between terminal B (B) and terminal C (YL), and check for battery voltage.



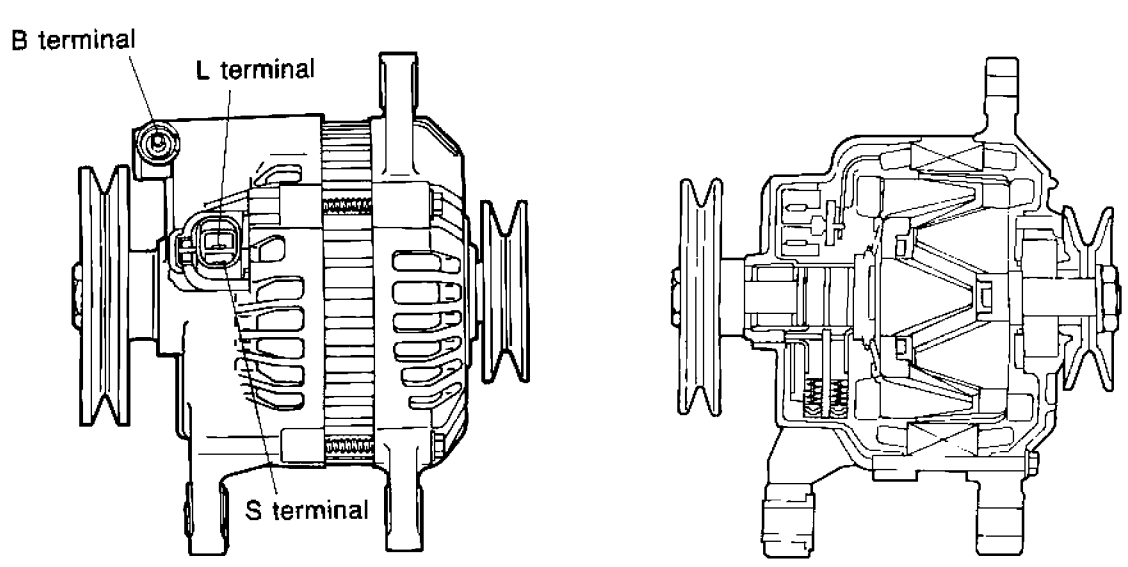
76G05X-021

8. Repeat steps 5 and check that the voltage changes to **2—3V**.
9. If the voltage is not as specified, replace the igniter.
10. If the voltage is as specified, check the ignition coil and high tension lead.

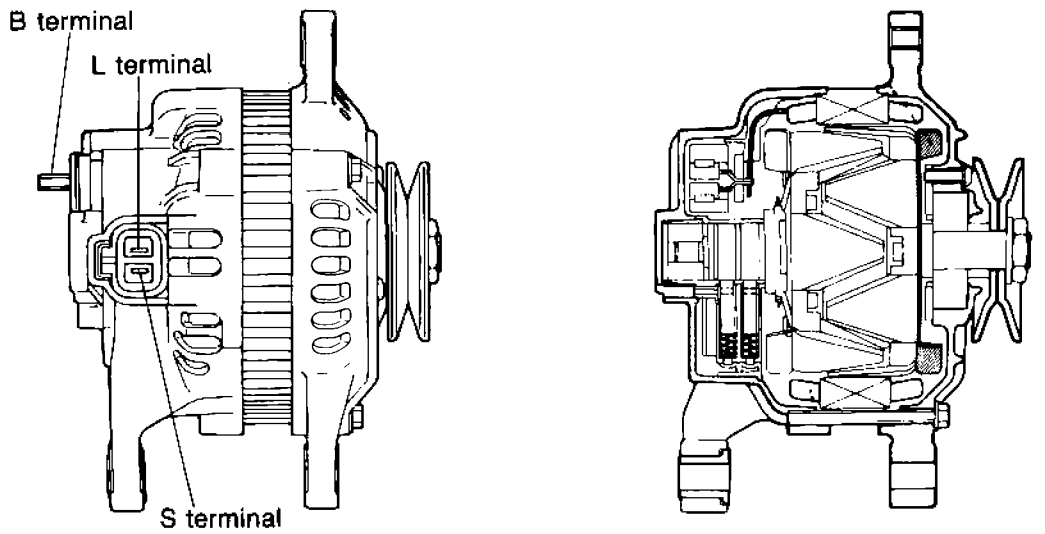
ALTERNATOR

CROSS-SECTIONAL VIEW

RF-CX Model



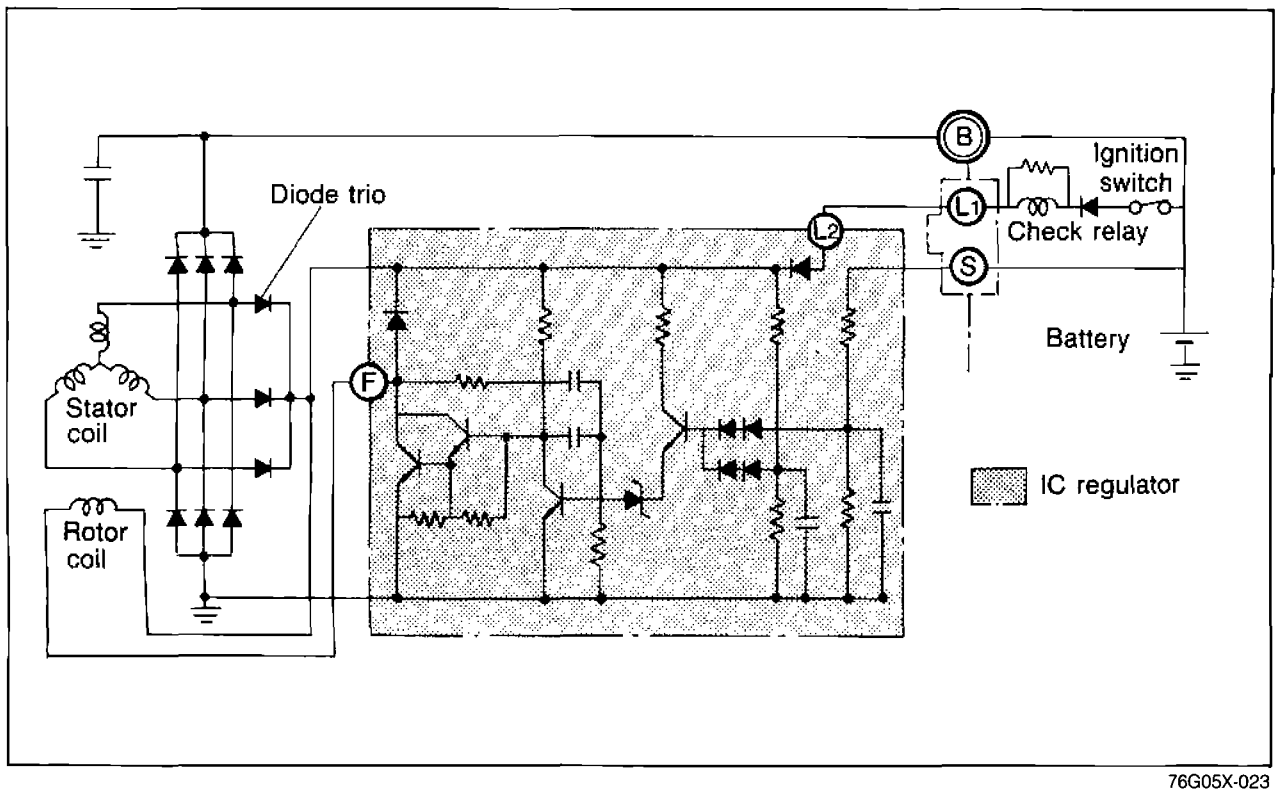
Except RF-CX Model



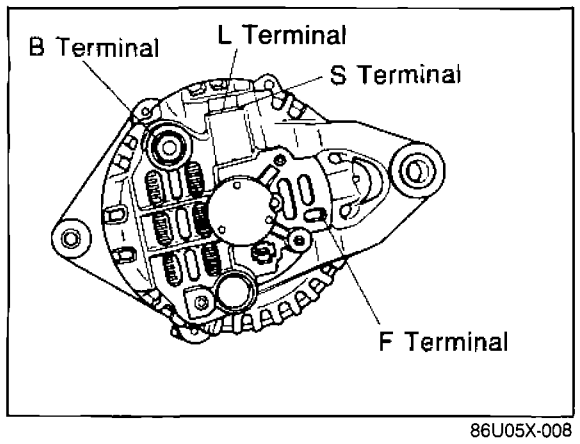
76G05X-022

5 ALTERNATOR

CHARGING SYSTEM



76G05X-023



86U05X-008

Caution

a) Be sure the battery connections are not reversed, because this will damage the rectifier.

b) Do not use high-voltage testers such as a megger, because they will damage the rectifier.

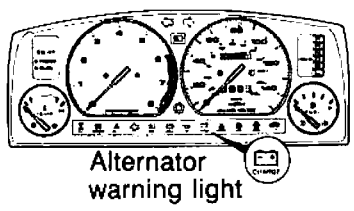
c) Remember that battery voltage is always applied to the alternator B terminal.

d) Do not ground the L terminal while the engine is running.

e) Do not start the engine while the connector is disconnected from the L and S terminals.

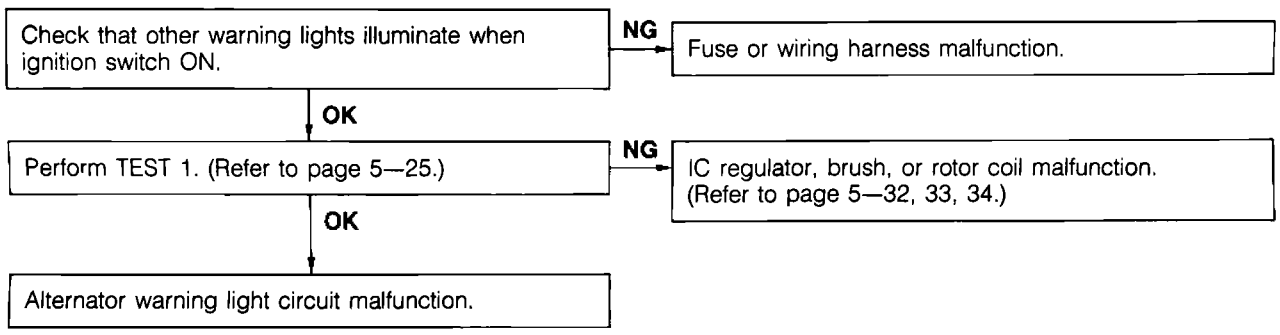
TROUBLESHOOTING
Preliminary Check

1. Turn the ignition switch ON, and check that the alternator warning light illuminates.
2. Start the engine, and check that the alternator warning light goes off.



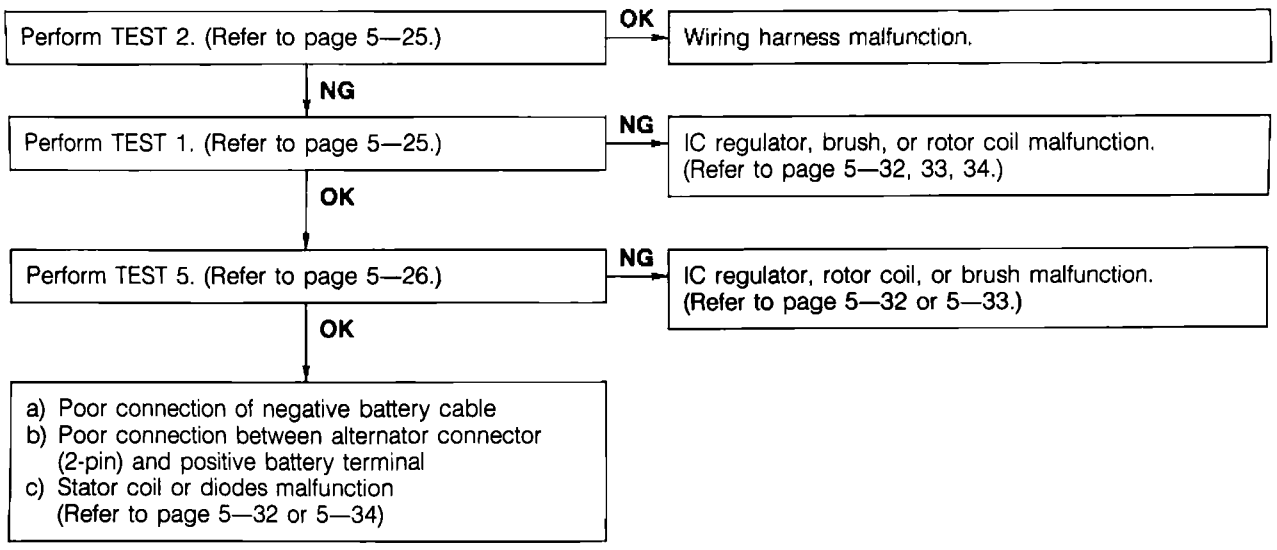
76G05X-024

1. Alternator warning light always not illuminate



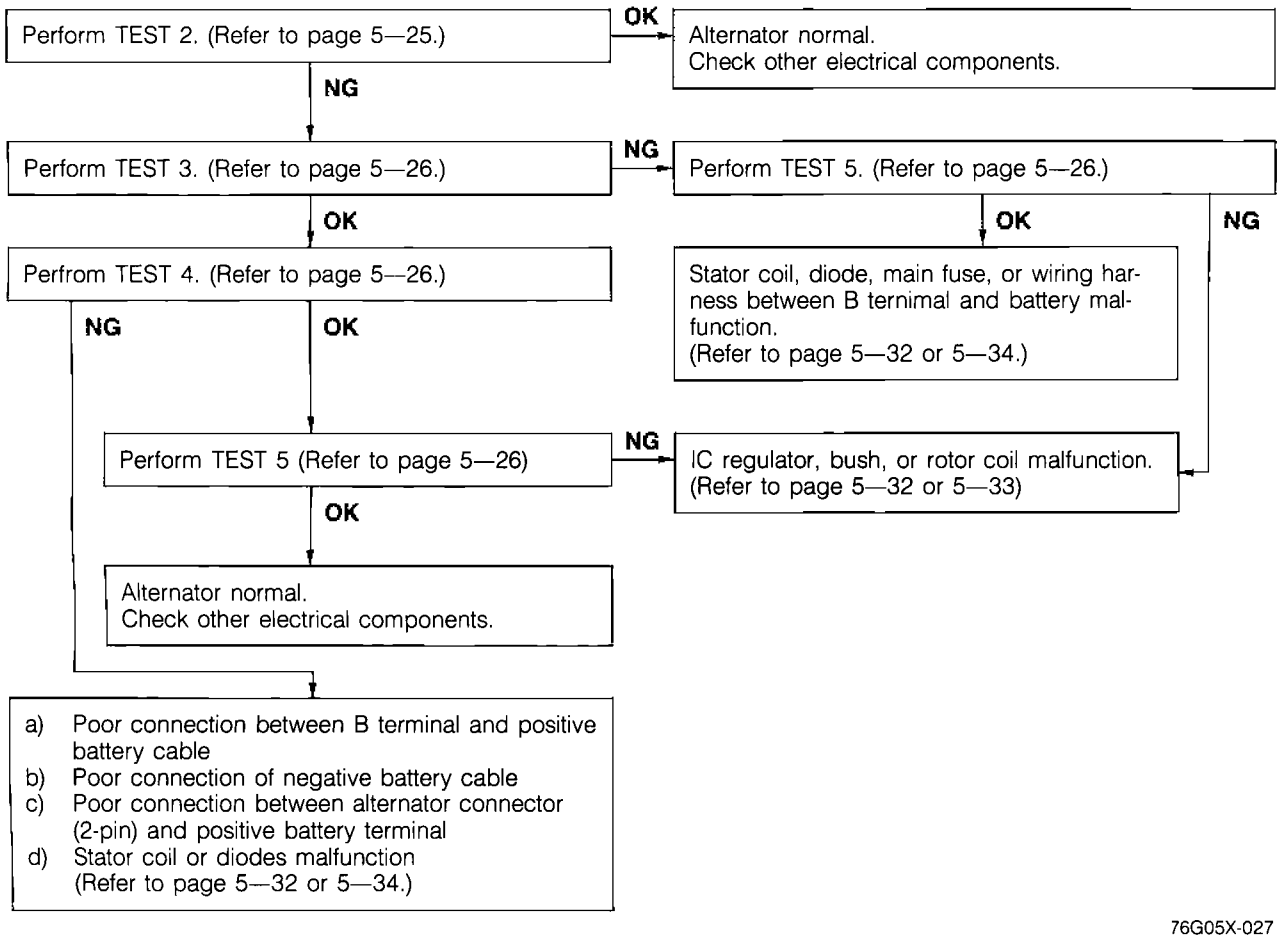
76G05X-025

2. Alternator warning light illuminates when engine running



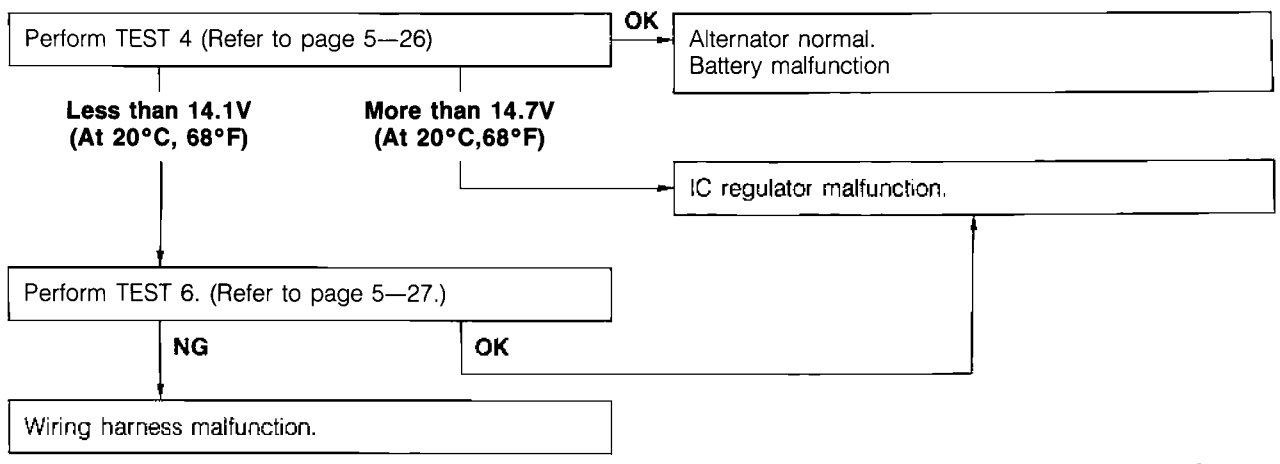
76G05X-026

3. Alternator warning light operates properly, but battery discharged



76G05X-027

4. Battery overcharged

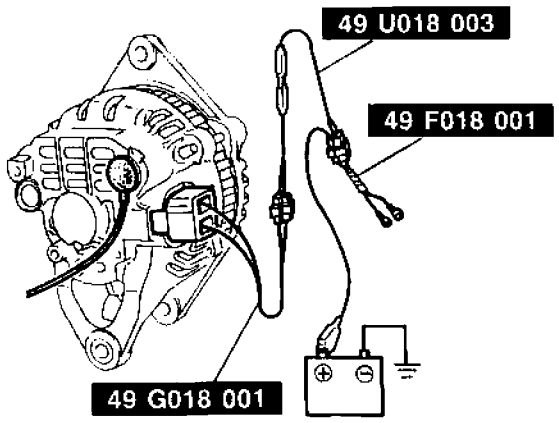


76G05X-028

Warning
Disconnect the nagative battery terminal when disconnect or reconnect B terminal.

TEST 1

1. Disconnect the alternator connector (2-pin).
2. Connect the **SST**.



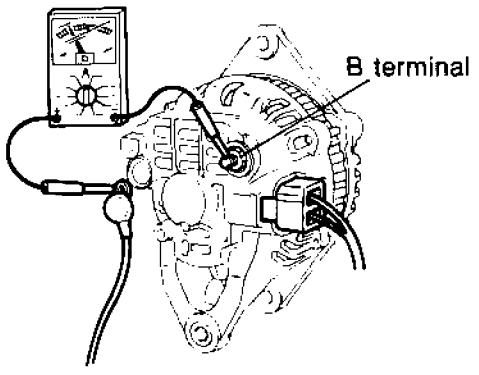
4. Connect the red clip of the adapter harness to the battery (+), and check that the red lamp and green lamp illuminate.
5. Start the engine and check that both lamps go off.

86U05X-010

TEST 2

1. Connect an ammeter **(75A min.)** between the wire and the B terminal.
2. Turn all headlights and accessories on, and depress the brake pedal.
3. Start the engine and check that output current is **70A (RF-CX: 75A) or more** at **2,500—3,000 rpm** of the engine speed.

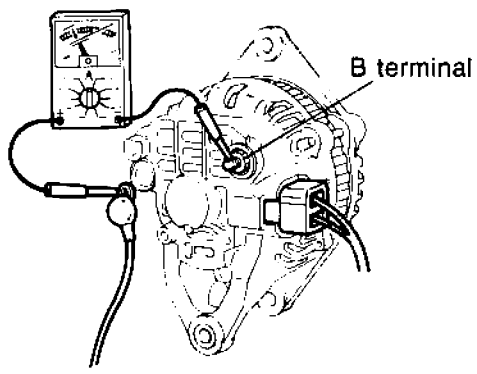
Caution
Do not ground the B terminal.



76G05X-029

TEST 3

1. Turn all electric loads off and release the brake pedal.
2. Check that output current is **5A or more** at **2,500—3,000 rpm** of the engine speed.

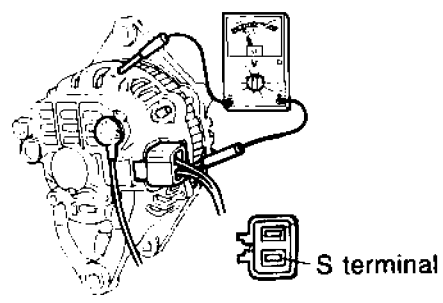


86U05X-013

TEST 4

1. Turn all electric loads off and release the brake pedal.
2. Check that output voltage between S terminal and ground is within specification at **2,500—3,000 rpm** of the engin speed.

Voltage: 14.1—14.7V

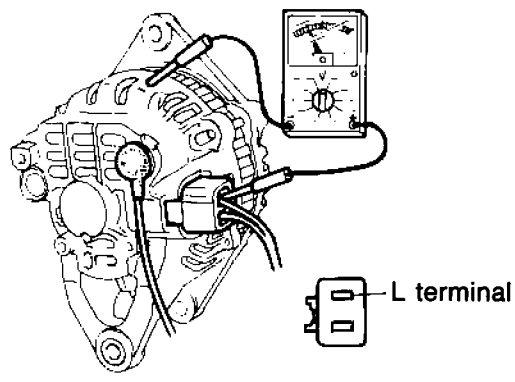


86U05X-072

TEST 5

1. Turn the ignition switch ON.
2. Check that L terminal voltage is within specification.

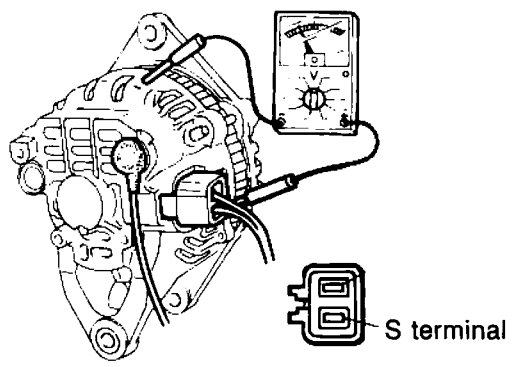
Voltage: 1—5V



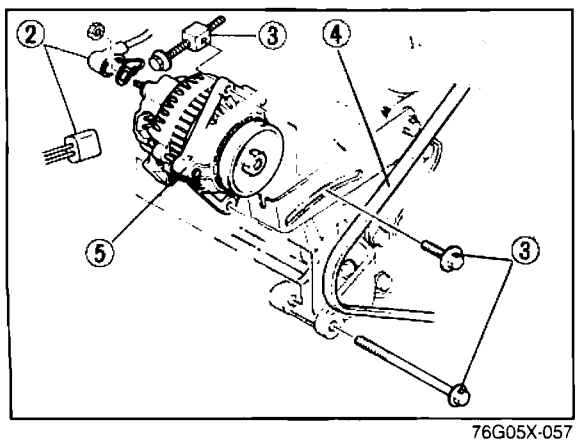
86U05X-073

TEST 6

1. Turn the ignition switch ON.
2. Turn all electric loads off and release the brake pedal.
3. Check that voltage between S terminal and ground is battery voltage.



86U05X-074

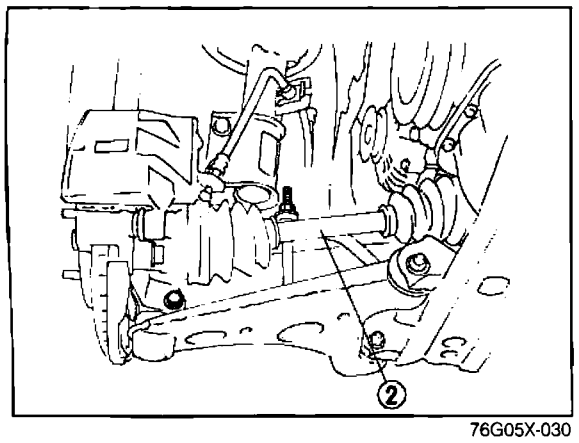


76G05X-057

REMOVAL (GASOLINE)

Remove in the sequence shown in the figure.

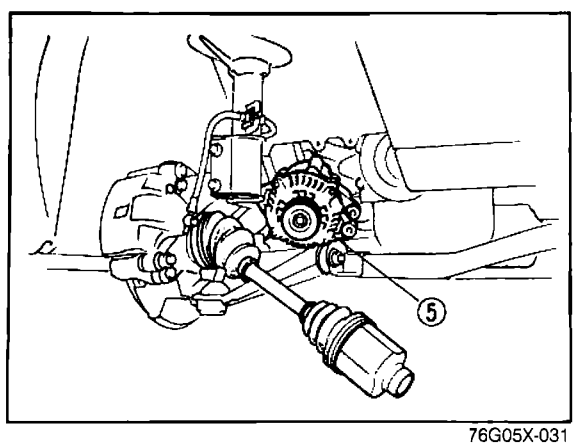
1. Disconnect the negative battery terminal.
2. Disconnect the wire and connector from the alternator.
3. Remove the bolts.
4. Remove the V-belt.
5. Remove the alternator to upper side (LHD) or lower side (RHD).



76G05X-030

REMOVAL (DIESEL)

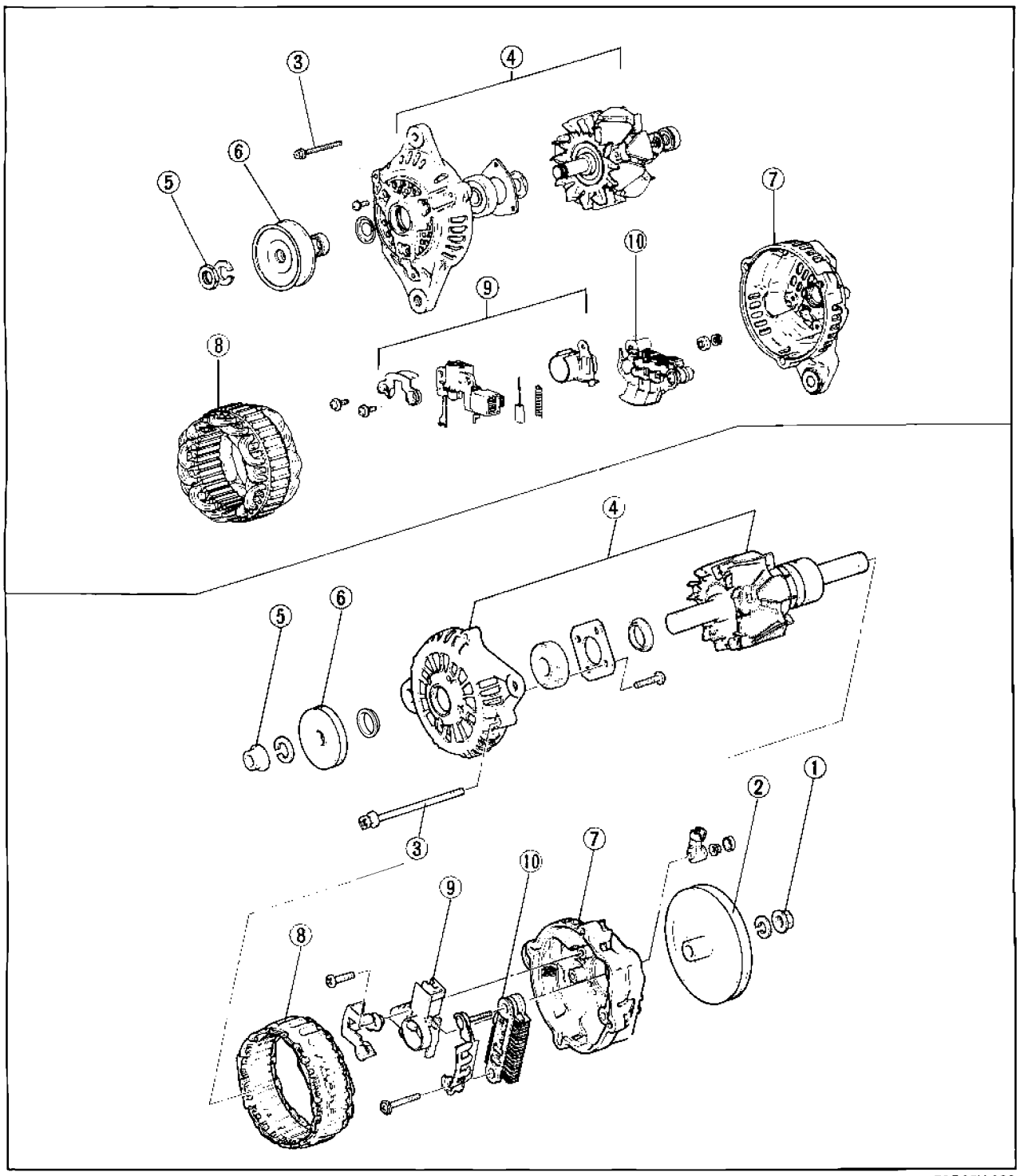
1. Disconnect the negative battery terminal.
2. Remove the right hand driveshaft (Refer to Section 9).
3. Disconnect the wire and connector from the alternator.
4. Loosen the idle pulley nuts and remove the drive belts.
5. Remove the bolts and remove the alternator from under the vehicle.



76G05X-031

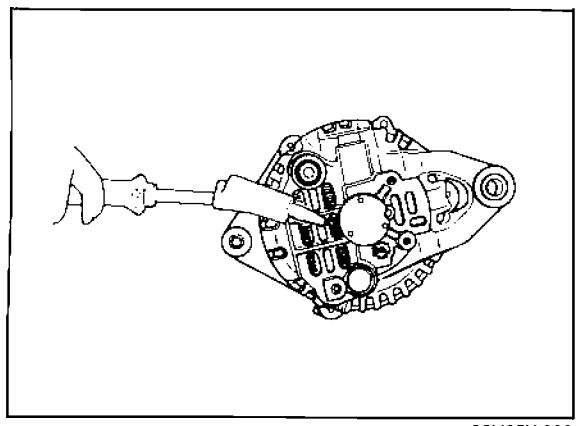
5 ALTERNATOR

DISASSEMBLY
Disassemble in the sequence shown in the figure.



76G05X-033

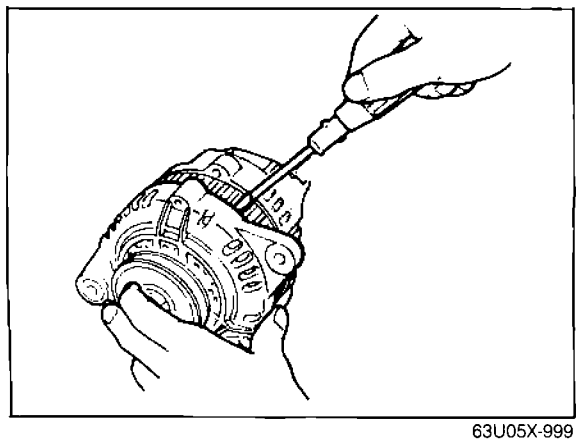
1. Lock nut (RF-CX)
2. Pulley (RF-CX)
3. Bolt
4. Front bracket and rotor
5. Lock nut
6. Pulley
7. Rear bracket
8. Stator
9. Brush holder assembly
10. Rectifier



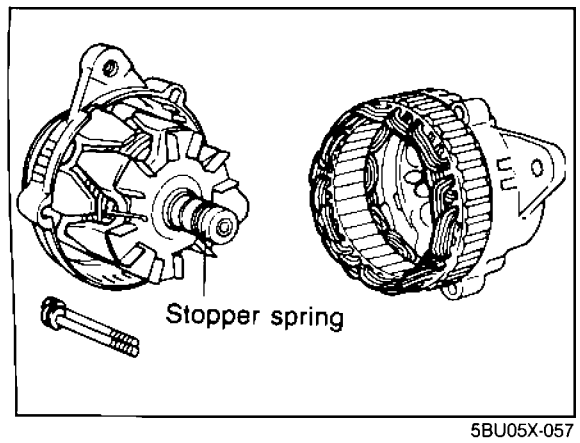
86U05X-020

1. Place a soldering iron (200W) on the bearing box for **3 or 4 minutes** to heat it to about **50—60°C (122—140°F).**
   Pull out the three bolts, and then insert a screwdriver between the stator and front bracket and separate them.

   Note
   a) If the bearing box is not heated, the bearing cannot be pulled out because the rear bearing and rear bracket fit together very tightly.
   b) Be careful not to force the screwdriver in too far. The stator may become scratched.



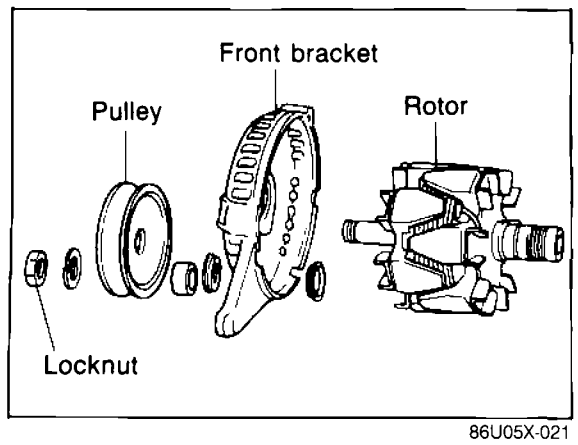
63U05X-999



5BU05X-057

2. Separate the rear and front sections.

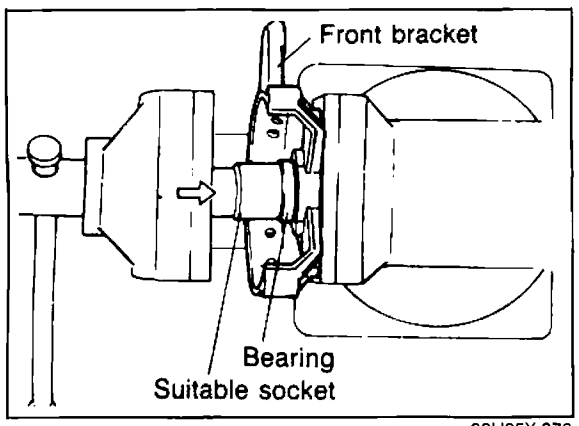
   Note
   Be careful not to lose the stopper spring that fits around the circumference of the rear bearing.



86U05X-021

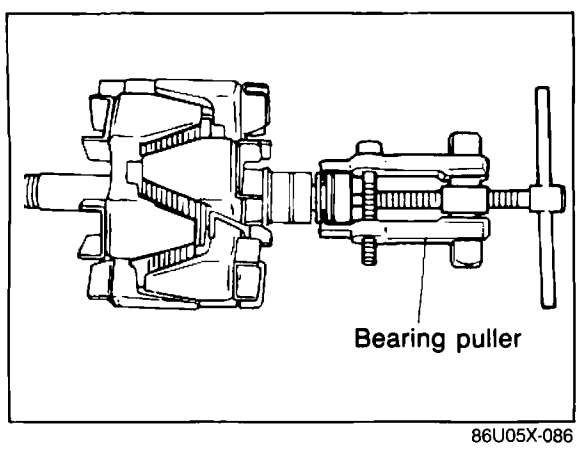
3. Place the rotor in a vise and loosen the pulley nut, then disassemble the pulley, rotor, and front bracket.

5 ALTERNATOR



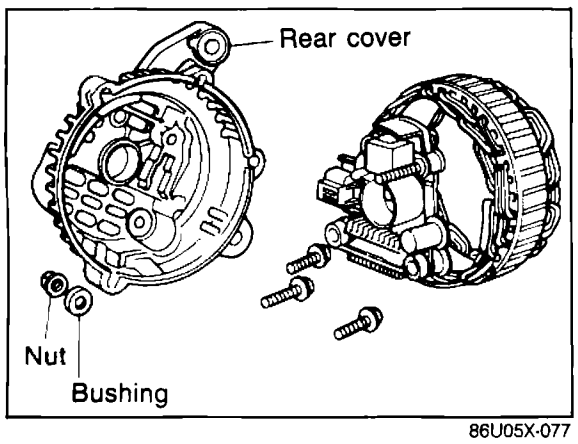
86U05X-076

4. Replace the front bearing
   Using a socket which exactly fits on the outer race of the bearing, carefully press in the bearing. Use a hand press or a vise.



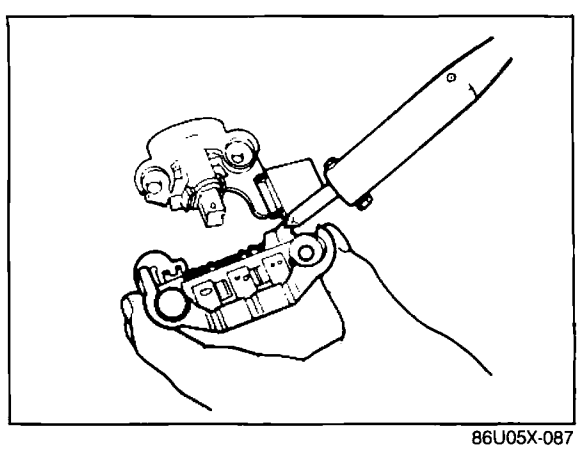
86U05X-086

5. Replace the rear bearing
   The bearing can be pulled off by using a bearing puller.
   When it is pressed on, press it on so that the groove at the bearing circumference is at the slip ring side.



86U05X-077

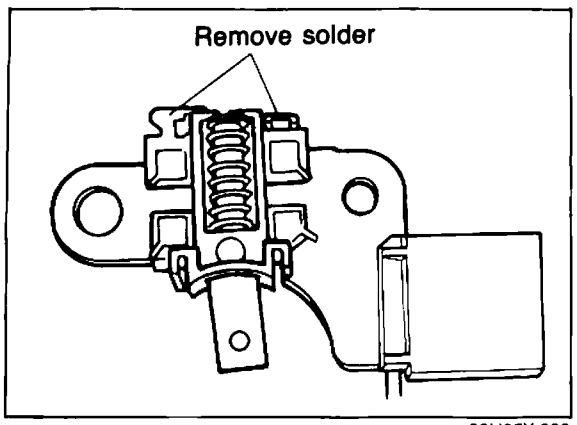
6. Remove the nut of the B terminal and the insulation bushing.
7. Remove the rectifier holding screws and the brush holder holding screw.
8. Separate the rear bracket and the stator.



86U05X-087

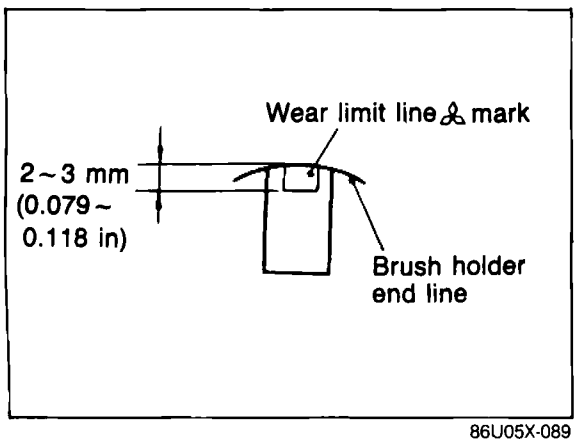
9. Use a soldering iron to remove the solder from the rectifier and the stator leads, and then remove the IC regulator.

Caution
Disconnect quickly, use the soldering iron no more than about 5 seconds because the rectifier may be damaged if it is overheated.



86U05X-088

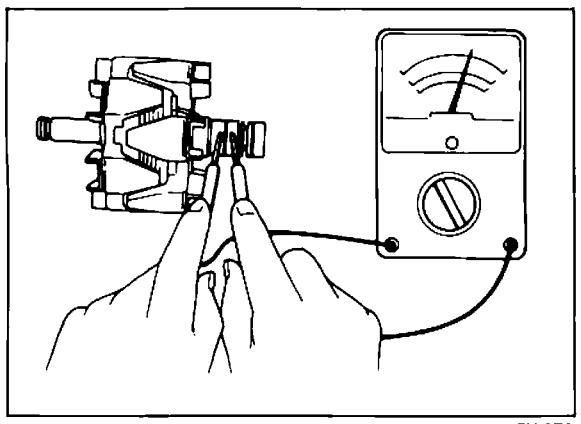
10. Replace the brushes
    Remove the solder from the pigtail, and then remove the brush.



86U05X-089

11. When soldering the brush, solder the pigtail so that the wear limit line of the brush projects **2—3 mm (0.079—0.118 in)** out from the end of the brush holder.

5 ALTERNATOR



86U05X-078

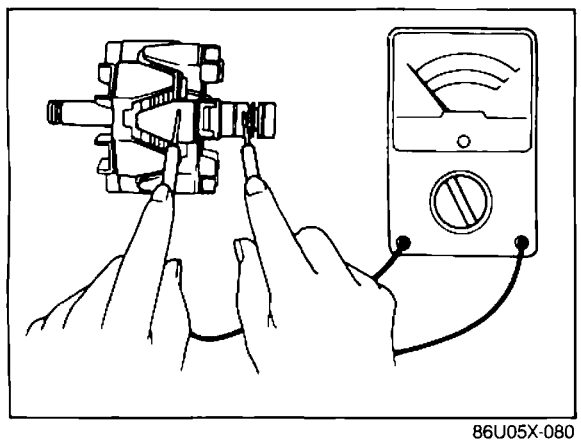
INSPECTION

Rotor

1. Wiring damage
   (1) Check the resistance between the slip rings using an ohmmeter.

   Specification: 2—6 Ω

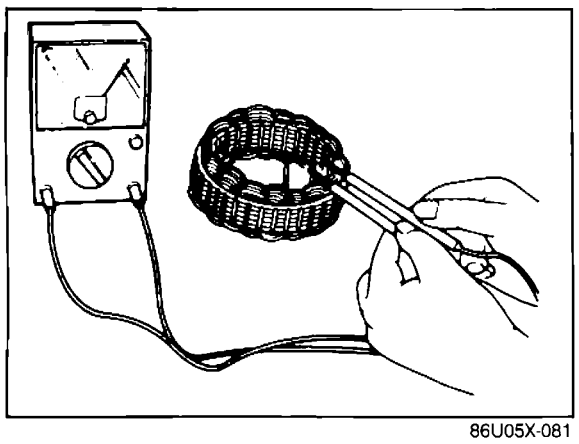
   (2) If it is not within specification, replace the rotor



86U05X-080

2. Ground of the field coil
   (1) Check for continuity between the slip ring and the core using an ohmmeter.
   (2) Replace the rotor if there is continuity.

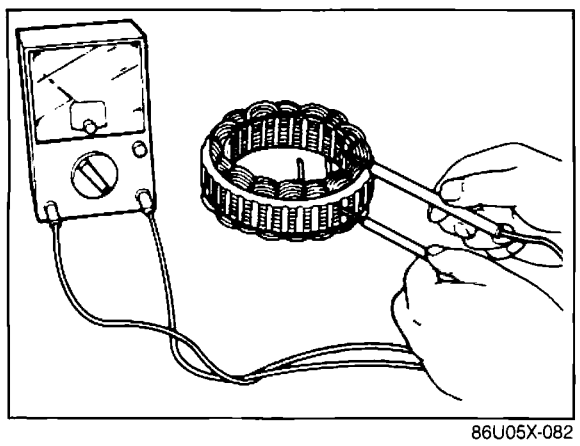
3. Slip ring surface
   If the slip ring surface is rough, use a lathe or fine sandpaper to repair it.



86U05X-081

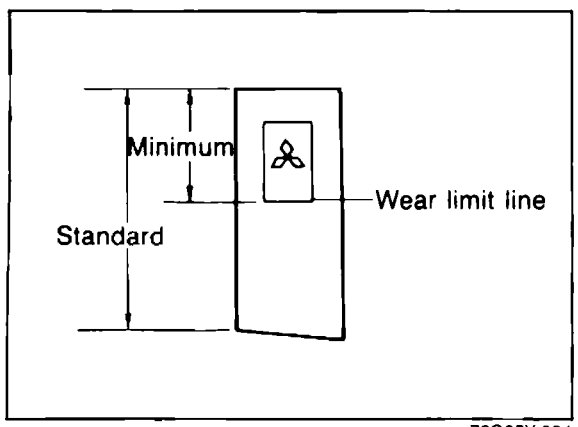
Stator

1. Wiring damage
   (1) Check for continuity between the stator coil leads using an ohmmeter.
   (2) Replace the stator if there is no continuity.



86U05X-082

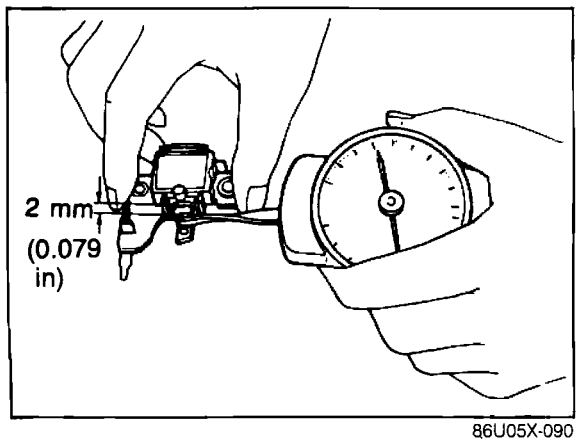
2. Ground of the stator coil
   (1) Check for continuity between the stator coil leads and the core using a circuit tester.
   (2) Replace the stator if there is continuity.



76G05X-034

Brush
If the brushes are worn almost to or beyond the limit, replace them.

Standard: 16.5 mm (0.650 in)
21.5 mm (0.846 in)—RF-CX
Minimum: 8 mm (0.315 in)

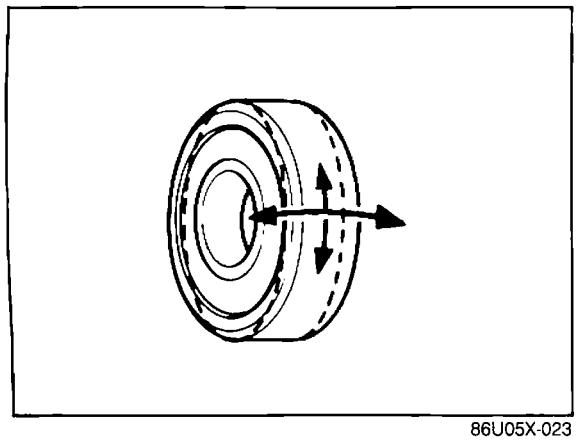


86U05X-090

Brush Spring
1. Measure the force of the brush spring using a spring pressure gauge.
2. Replace the spring if necessary.

Standard force: 3.0—4.2 N
(310—430 g, 10.9—15.2 oz)
Minimum: 1.7—2.5 N
(170—250 g, 6.0—8.8 oz)

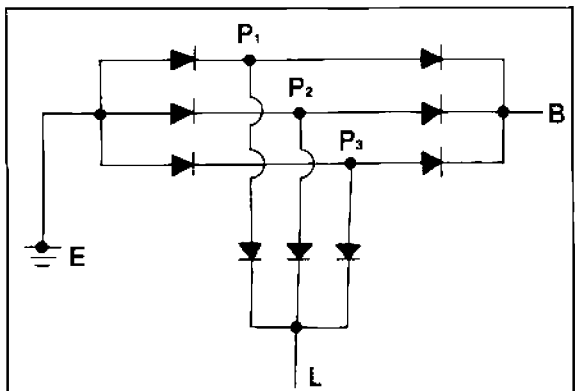
Note
Read the spring pressure gauge at the brush tip projection of 2 mm (0.079 in).



86U05X-023

Bearing
1. Check for abnormal noise, looseness, or insufficient lubrication.
2. Replace the bearing(s) if there is any abnormality.

5 ALTERNATOR

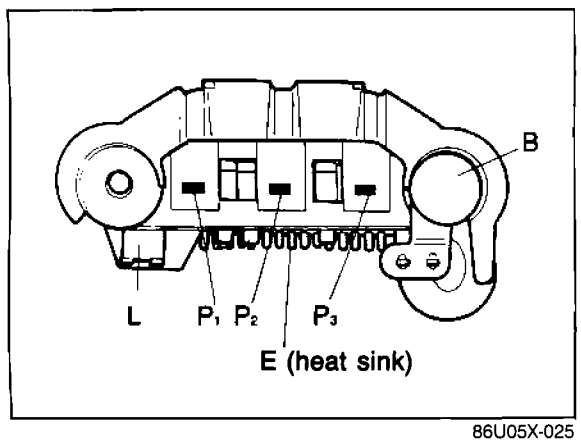


86U05X-024

Rectifier

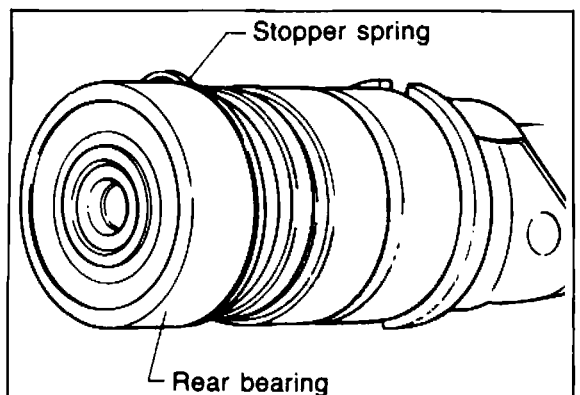
1. Check for continuity of the diodes using an ohmmeter.

Negative (Black)	Positive (Red)	Continuity
E	P_1, P_2, P_3	Yes
B		No
L		No
P_1, P_2, P_3	E	No
	B	Yes
	L	Yes



86U05X-025

2. Replace the rectifier.



86U05X-026

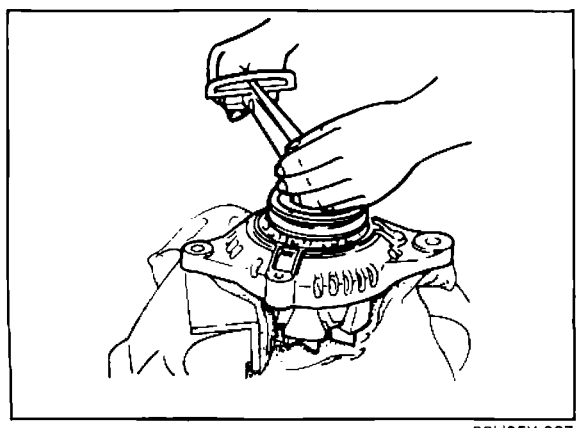
ASSEMBLY

Assemble in the reverse order of disassembly, referring to assembly note.

Assembly Note

Stopper spring installation

1. Fit the stopper spring into the eccentric groove of the rear bearing circumference.
2. Check that the protruding part of the spring is fitted into the deepest part of the groove.

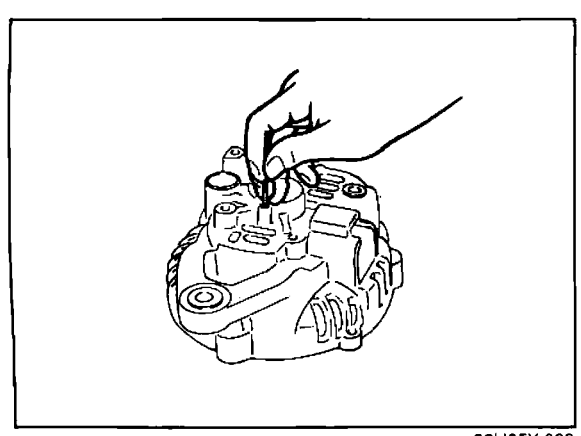


86U05X-027

Front bracket and rotor

When assembling the front bracket and rotor, tighten the locknut to the specified torque.

Tightening torque:
49—88 N·m (5—9 m-kg, 36—65 ft-lb)

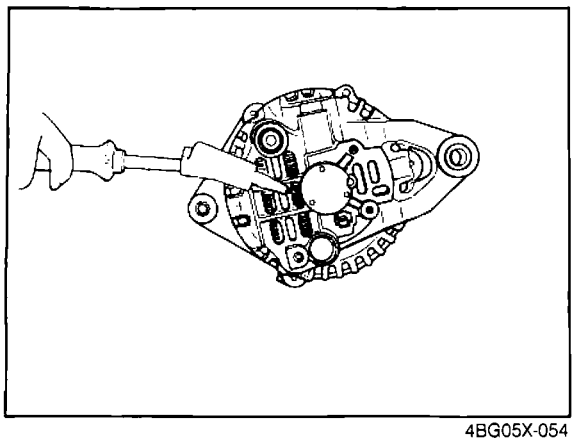


86U05X-028

Brush lifting

1. Before assembly, use a finger to hold the brushes into the brush holder; then pass a wire (**ϕ2 mm, 40—50 mm, ϕ0.08 in, 1.6—2.0 in**) through the hole shown in the figure.
2. Secure the brushes in position.

Note
Be sure to remove wire after assembly is completed.

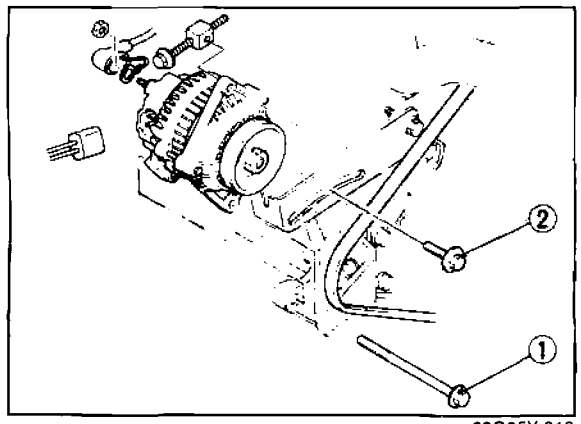


4BG05X-054

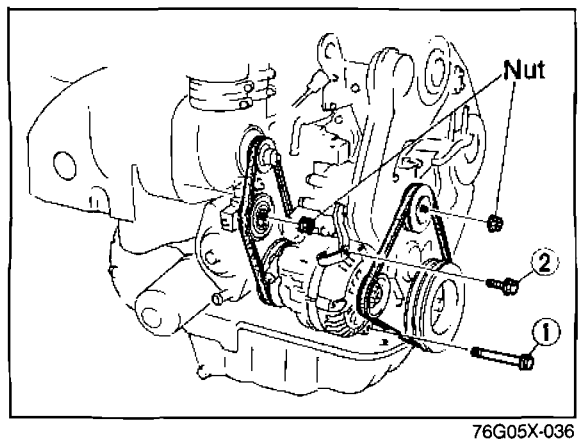
Rear bearing installation

1. Heat the rear bracket.
2. Press the rear bearing into the rear bracket.
3. Check that the rotor turns easily.

5 ALTERNATOR



69G05X-018



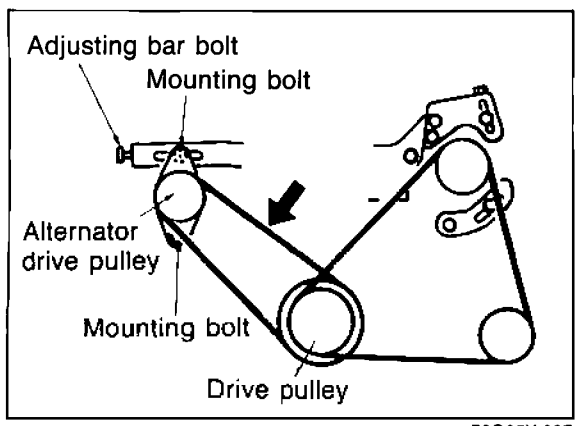
76G05X-036

INSTALLATION

Note
When installing the alternator, tighten the bolts to the specified torque.

Install in the reverse order of removal.

Tightening torque:
Bolt (1).....37.3—52 N·m
(3.8—5.3 m-kg, 27.5—38.3 ft-lb)
Bolt (2).....18.6—25.5 N·m
(1.9—2.6 m-kg, 13.7—18.8 ft-lb)
Nut..... 37—52 N·m
(3.8—5.3 m-kg, 27.5—38.3 ft-lb)

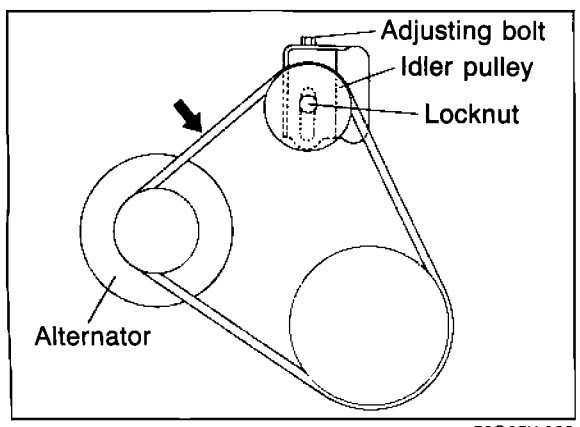


76G05X-037

V-BELT TENSION (GASOLINE)
Adjustment
1. Loosen the alternator mounting bolt and adjusting bar bolt.
2. Adjust the alternator belt deflection while pushing the V-belt with a force of 98 N (10 kg, 22 ft-lb).

Deflection:
New: 6—8 mm (0.24—0.31 in)
Used: 7—9 mm (0.27—0.35 in)

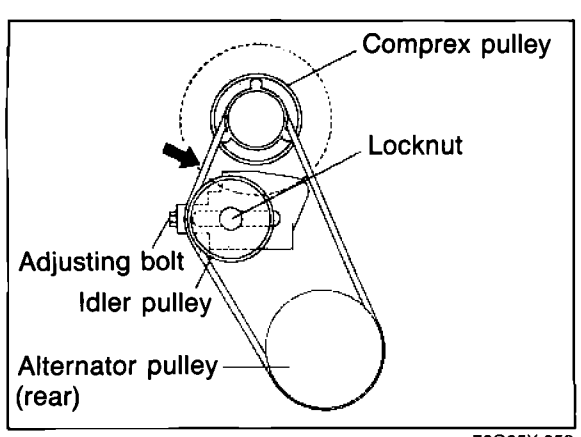
3. Tighten the bolts and recheck the tension.



76G05X-038

V-BELT TENSION (DIESEL)
Adjustment
1. Looson the alternator idler pulley locknut.
2. Adjust the alternator belt deflection while pushing the V-belt with a force of **98 N (10 kg, 22 ft-lb)**.

Deflection:
Alternator
New: 8—10 mm (0.31—0.39 in)
Used: 9—11 mm (0.35—0.43 in)



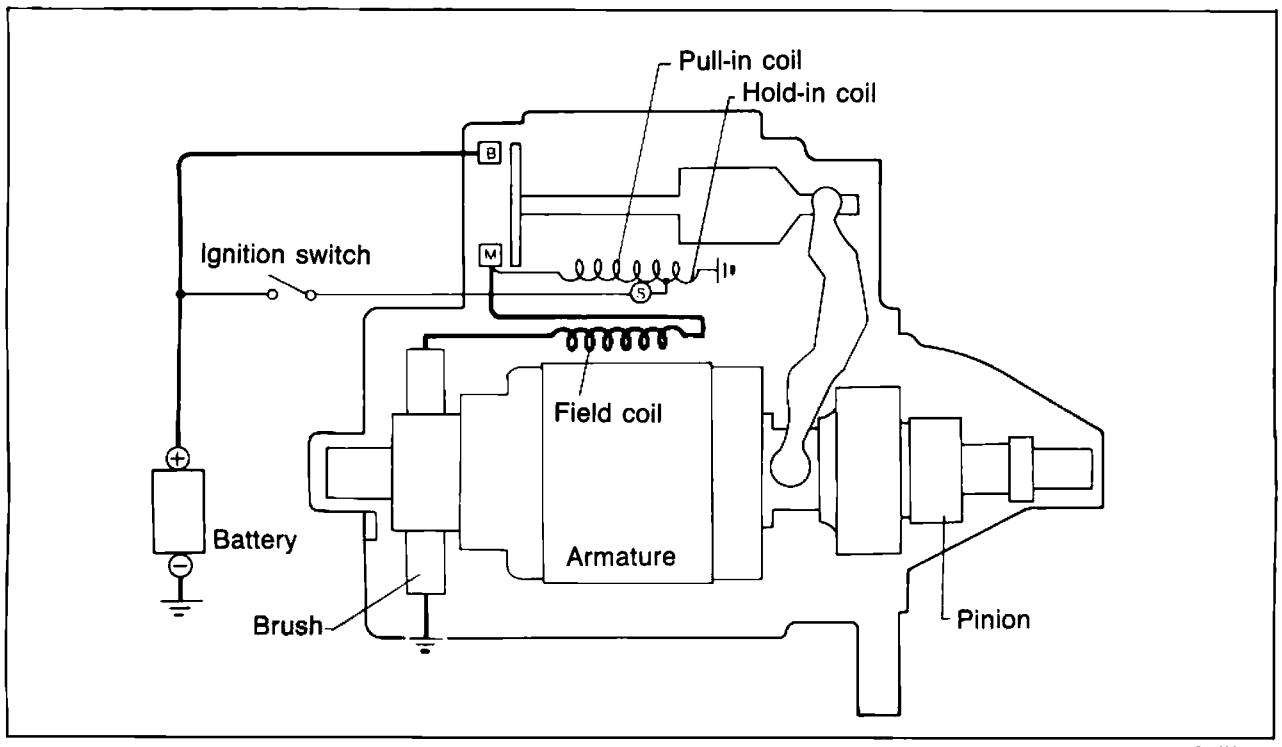
76G05X-058

Comprex
New: 4.0—5.0 mm (0.16—0.20 in)
Used: 4.5—5.5 mm (0.18—0.21 in)

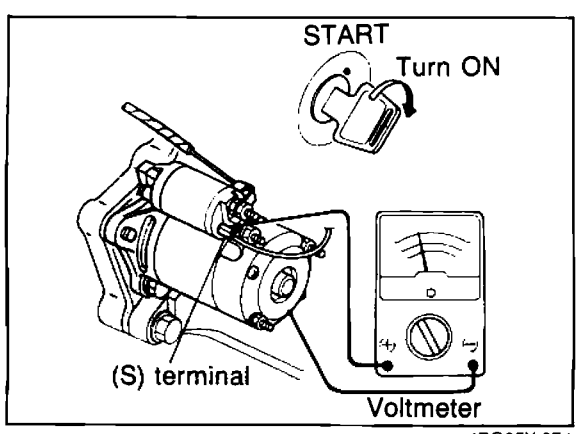
3. Tighten the bolts and nuts and recheck the tension.

STARTER (GASOLINE ENGINE, 0.85, 0.95 KW TYPE)

STARTING SYSTEM CIRCUIT



76G05X-039



4BG05X-074

ON-VEHICLE INSPECTION

Charge the battery fully before starting the following inspections.

A. If the magnetic switch dose not function during starting.

1. Turn the ignition switch to the start position.
2. Measure the voltage between the S terminal and ground.
3. If the measured value is standard voltage or more, there is starter malfunction.
4. If it is less than standard voltage, there is a malfunction in the wiring.

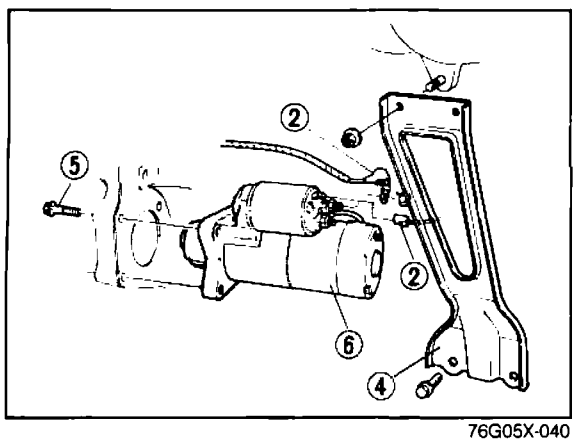
Standard voltage: 8 V

Caution
If the magnetic switch is hot, it may not function even though the voltage is standard voltage or more.

B. If the starter won't crank, or if the cranking speed is slow.

The problem may be a malfunction of the starter or in the wiring.

Note
The cranking speed is greatly affected by the viscosity of the engine oil.



76G05X-040

REMOVAL AND INSTALLATION

1. Disconnect the negative battery cable.
2. Disconnect the wiring from the starter.
3. Raise the front of the vehicle and support it with safety stands.
4. Remove the intake manifold bracket. (Fuel Injection Engine)
5. Remove the starter bolts.
6. Draw out the starter from lower side of the vehicle.

Installation in the revers order of removal.

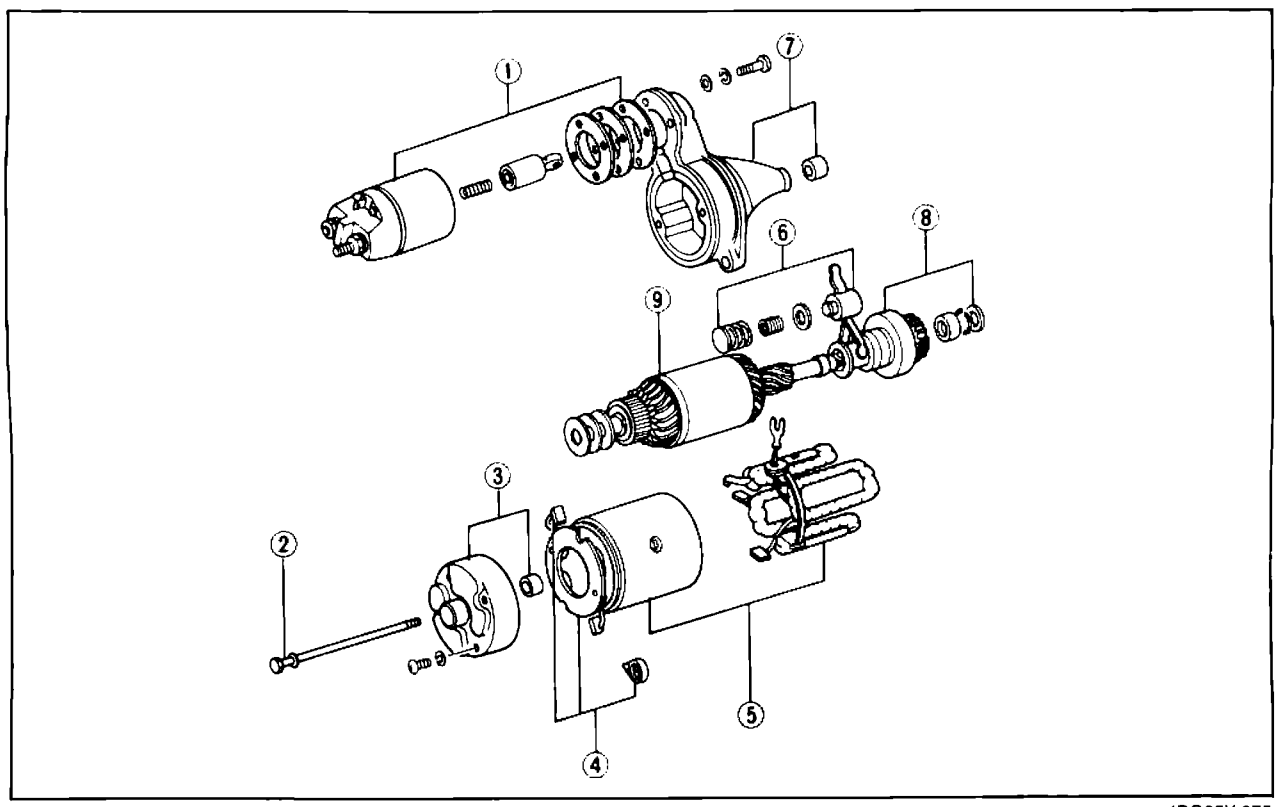
Tightening torque
Bolts.....37—52 N·m
(3.8—5.3 m-kg, 27—38 ft-lb)
B terminal.....9.8—11.8 N·m
(1.0—1.2 m-kg, 87—104 in-lb)

Intake manifold bracket bolt
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)
Nut.....
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

DISASSEMBLY AND ASSEMBLY

1. Disassemble in the numbered order shown in the figure.
2. Assembly is the reverse order of disassembly.

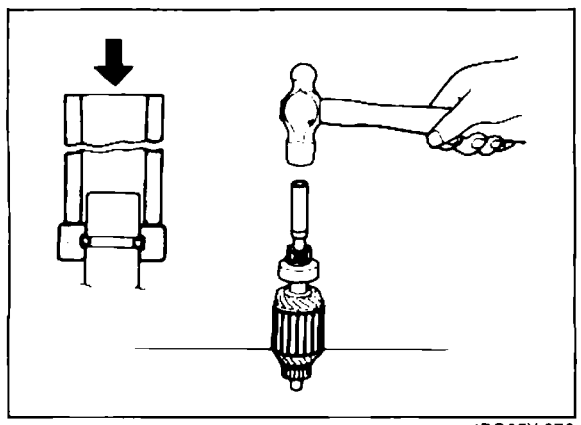
4BG05X-049



4BG05X-075

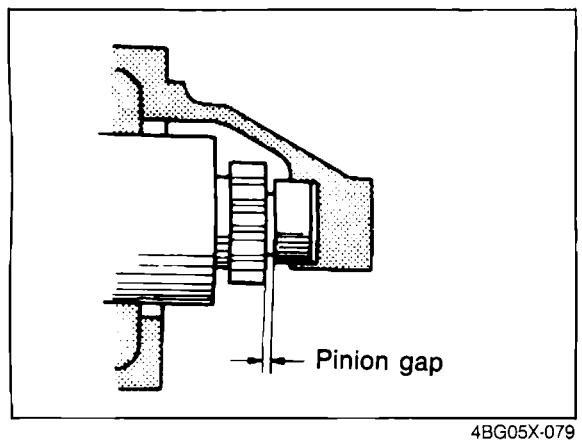
1. Magnetic switch
2. Bolt
3. Rear cover
4. Brush-holder assembly
5. Yoke
6. Lever
7. Drive housing (front cover)
8. Drive pinion
9. Armature

5 STARTER (GASOLINE ENGINE, 0.85, 0.95 KW TYPE)



4BG05X-078

Drive Pinion
Remove the stopper for the overrunning clutch by using a pipe as shown in the figure.

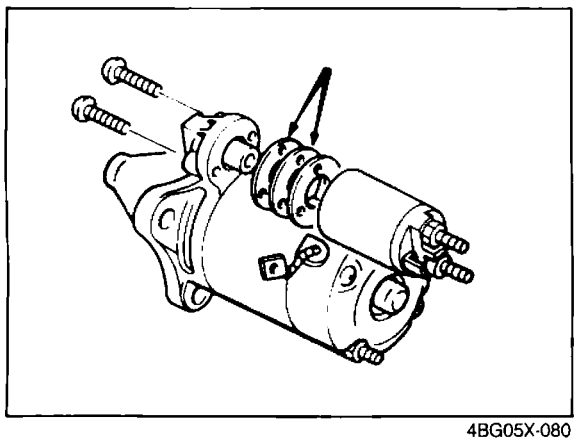


4BG05X-079

Adjustment of Pinion Gap
1. Disconnect the wiring from terminal (M).
2. Apply battery power to the terminal (S) and ground the starter motor body, the pinion will eject outward and then stop.
3. Measure the clearance (pinion gap) between the pinion and the stopper.

Pinion gap: 0.5—2.0 mm (0.020—0.079 in)

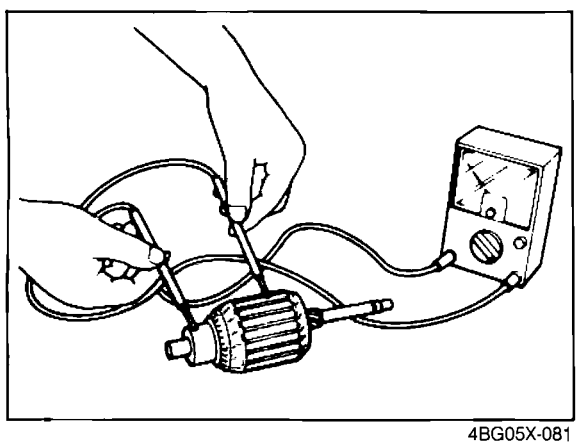
Caution
Do not let electricity flow continuously for more than 10 seconds.



4BG05X-080

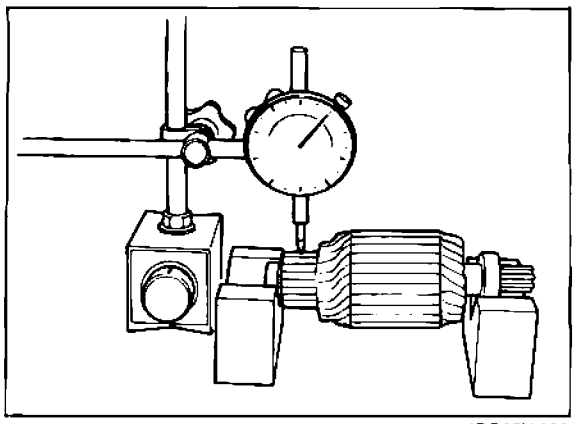
4. If the pinion gap is not within the specified range, make the adjustment by increasing or decreasing the number of washers used between the magnetic switch and the drive housing. The gap will become smaller if the number of washers is increased.

Caution
Do not use the washers more than 2 mm (0.079 in) in all.



4BG05X-081

INSPECTION
Armature Coil
1. Ground of the armature coil
   (1) Check for continuity between the commutator and the core by using a circuit tester.
   (2) Replace the armature if there is continuity.

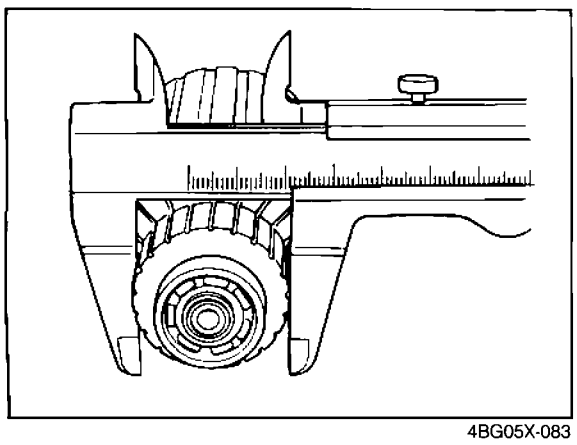


4BG05X-082

2. Vibration of the commutator
   (1) Place the armature on V blocks, and measure the vibration by using a dial gauge.
   (2) If the vibration is Limit or more, repair so that it becomes standard by using a lathe, or replace the armature.

Standard vibration: 0.05 mm (0.002 in)
Limit: 0.4 mm (0.018 in)

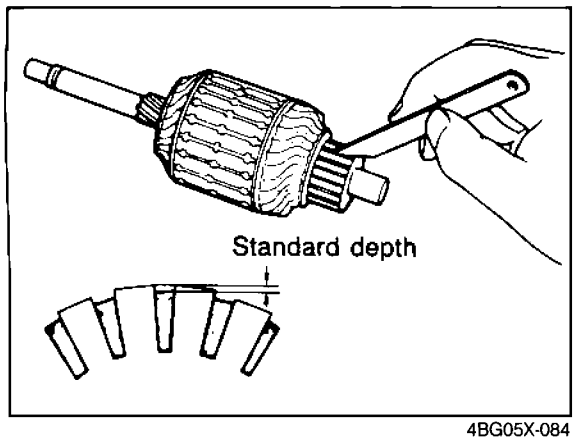
Note
Before checking, be sure that there is no play in the bearings.



4BG05X-083

3. Outer diameter of the commutator
   Replace the armature if the outer diameter of the commutator is grind limit or less.
4. Roughness of the commutator surface
   (1) If the commutator surface is dirty, wipe it with a cloth.
   (2) If it is rough, repair it by using a lathe or fine sandpaper.

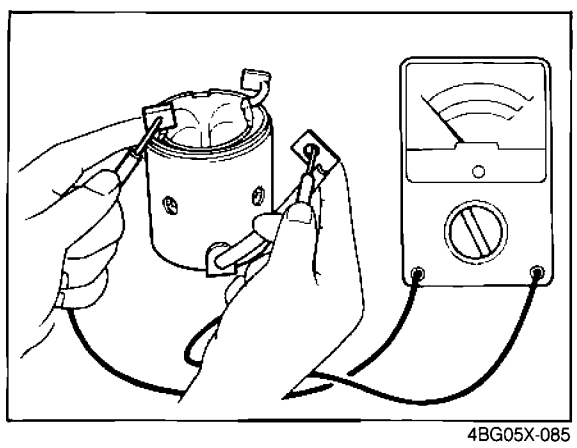
Grind limit: 31 mm (1.22 in)



4BG05X-084

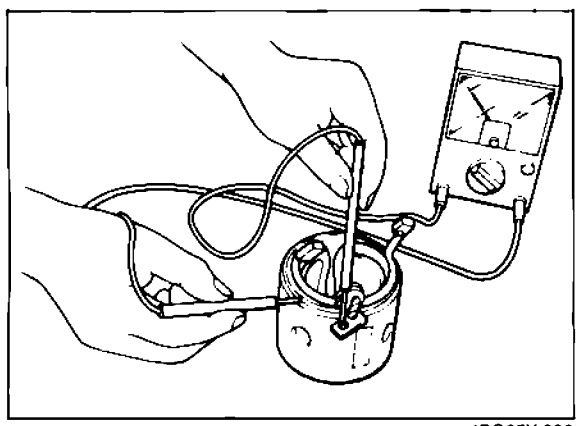
5. Segment groove depth
   If the depth of the mold between segments is limit depth or less, undercut the grooves by standard depth.

Standard depth:
0.5—0.8 mm (0.020—0.031 in)
Limit depth: 0.2 mm (0.008 in)



4BG05X-085

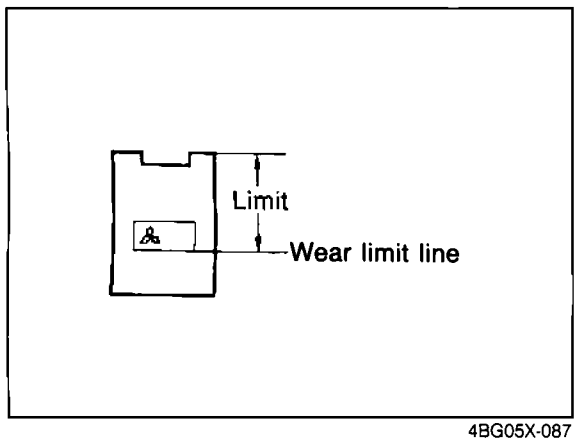
Field Coil
1. Wiring damage
   (1) Check for continuity between the connector and brushes by using a circuit tester.
   (2) Replace the yoke assembly if there is no continuity.



4BG05X-086

2. Ground of the field coil
   (1) Check for continuity between the connector and yoke by using a circuit tester.
   (2) Repair, or replace the yoke assembly if there is continuity.

3. Installation of the field coil
   Replace the yoke assembly if the field coil is loose.

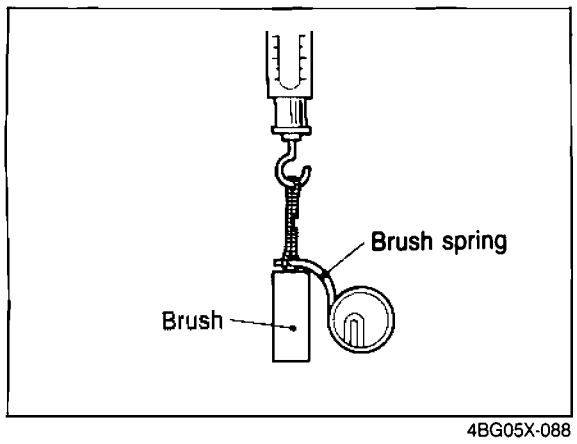


4BG05X-087

Brush and Brush Holder

1. Brush
   If the brushes are worn beyond the wear limit, or if the wear is near the limit, replace the brushes.

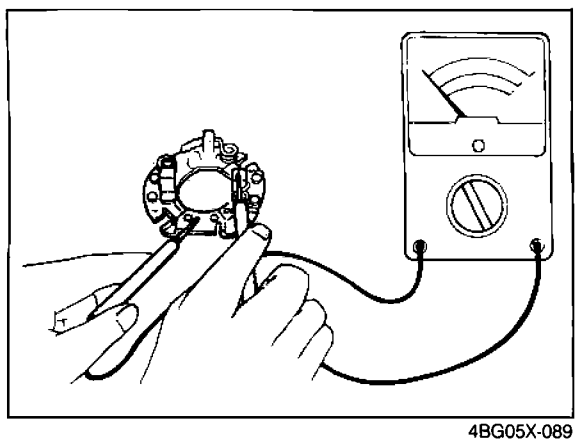
   Standard: 17 mm (0.669 in)
   Wear limit: 11 mm (0.433 in)



4BG05X-088

2. Brush spring
   (1) Measure the force of the brush spring by using a spring balance.
   (2) Replace the brush spring if the force is Limit or less.

   Limit: 9 N (900 g, 31.75 oz)



4BG05X-089

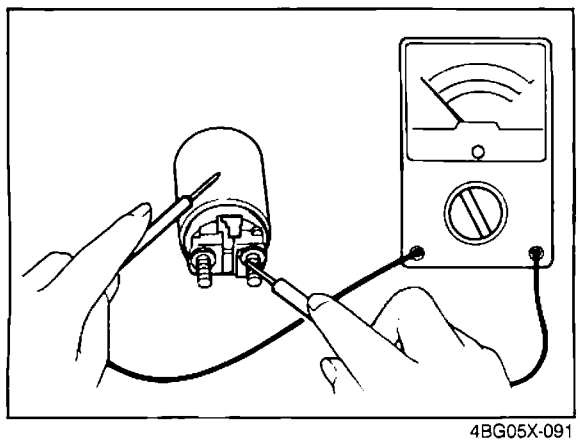
3. Brush holder
   (1) Check for continuity between the insulated brush and the plate by using a circuit tester.
   (2) Repair or replace if there is continuity.
   (3) Also check to be sure that the brush slides smoothly inside the brush holder.

4BG05X-090

Drive Pinion and Housing

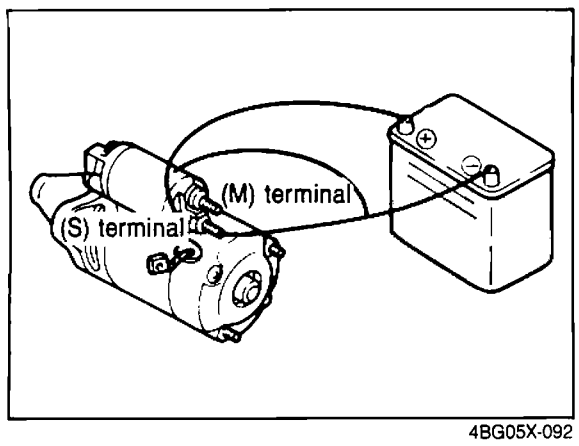
1. Pinion gear
   (1) Check for wear or damage of the pinion gear.
   (2) Replace if necessary.
   (3) If the pinion gear is seriously damaged, also check the flywheel ring gear.

2. Bushing
   (1) Check for wear or damage.
   (2) Replace if necessary.



4BG05X-091

3. Switch coil
   (1) Check for continuity between the M terminal and the body by using a circuit tester.
   (2) Replace the switch if there is no continuity.



4BG05X-092

PERFORMANCE INSPECTION

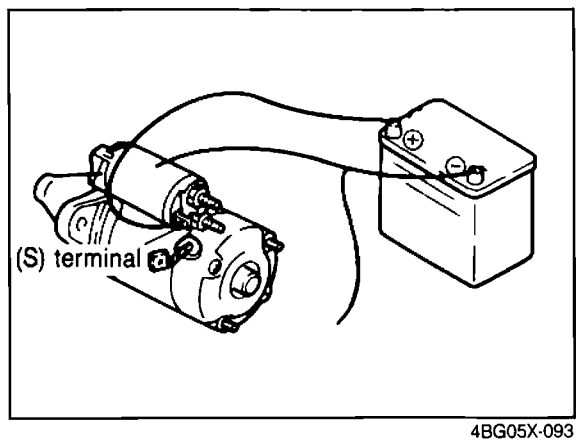
Magnetic Switch

Disconnect the terminal **M wire**, and make the following tests.

Pull-in Test

The switch is normal if the pinion ejects outward when the battery is connected as shown in the figure.

Caution
Do not supply power continuously for more than 10 seconds.

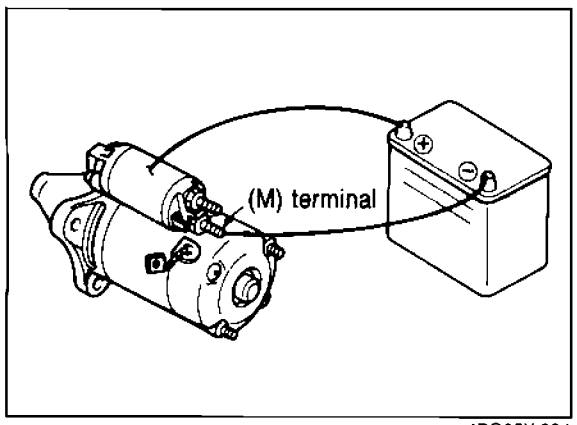


4BG05X-093

Hold-in Test

1. After completing the pull-in test, disconnect the wire from terminal M (with the pinion left ejected).
2. The hold-in coil is functioning properly if the pinion does not return.

5 STARTER (GASOLINE ENGINE, 0.85, 0.95 KW TYPE)



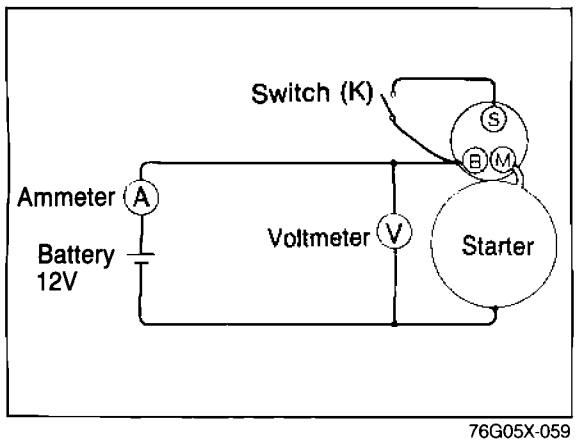
4BG05X-094

Return Test

1. Connect the battery between terminal M of the magnetic switch and the body, as shown in the figure.
2. Pull the pinion out manually to the pinion stopper position.
3. The pinion should immediately return to its original position when it is released.

No-load Test

1. After adjusting the pinion gap, form a test circuit with a voltmeter and an ammeter.



76G05X-059

Note
Use wires as thick as possible and tighten each terminal fully.

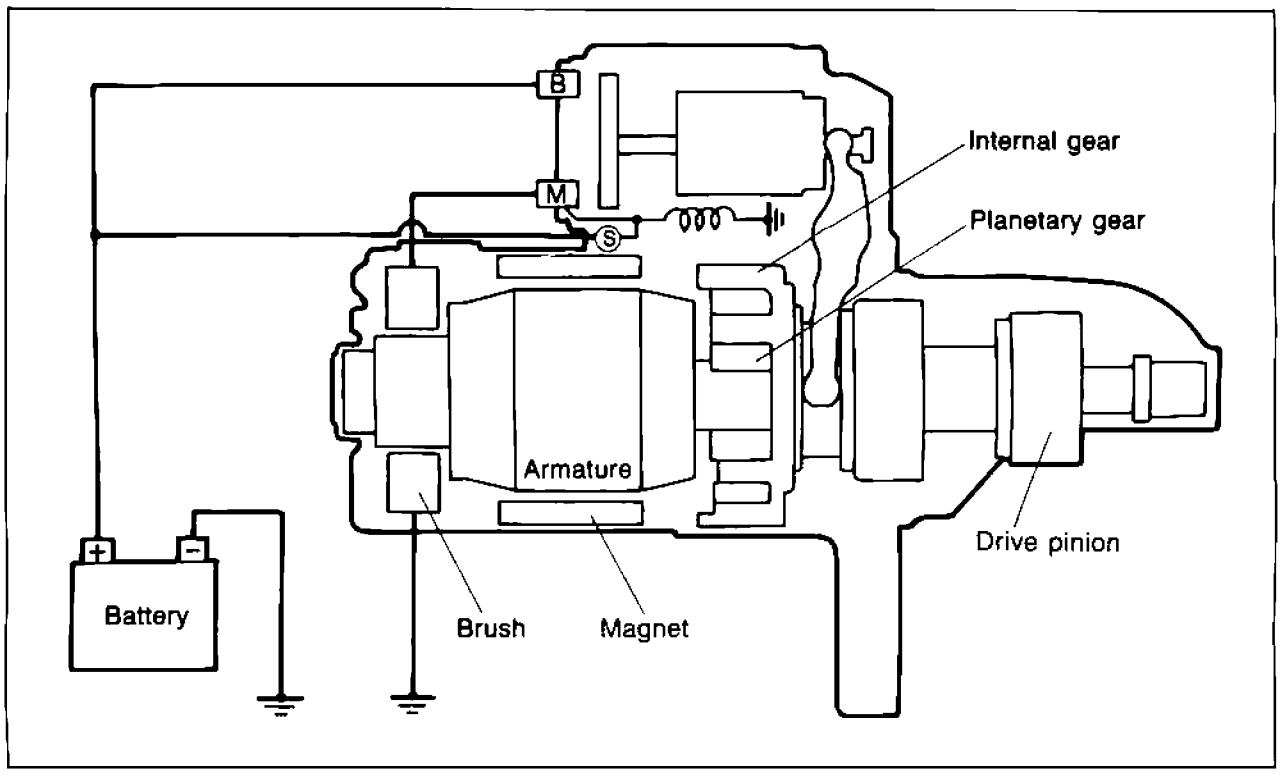
2. Close switch "K" to run the starter.
3. If the voltmeter and ammeter show the following values while the starter is running, it is normal.

	0.85 kW type	0.95 kW type
Battery voltage (volt)	11.5	
Current (ampere)	60 or less	
Gear shaft speed (rpm)	6,500 or more	6,600 or more

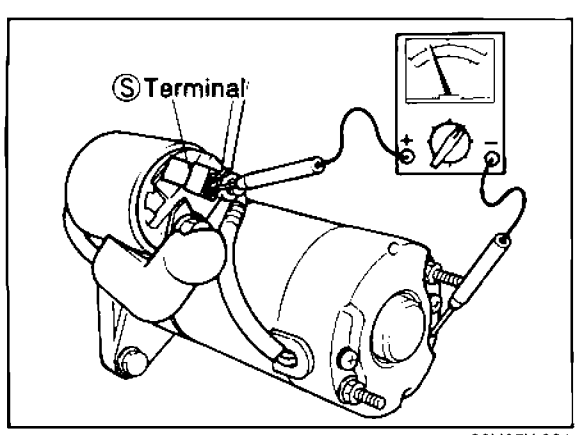
4. If any abnormality is noted, check it according to "INSPECTION"

STARTER (GASOLINE ENGINE, 1.4 KW TYPE)

STARTING SYSTEM



76G05X-041



86U05X-031

ON-VEHICLE INSPECTION

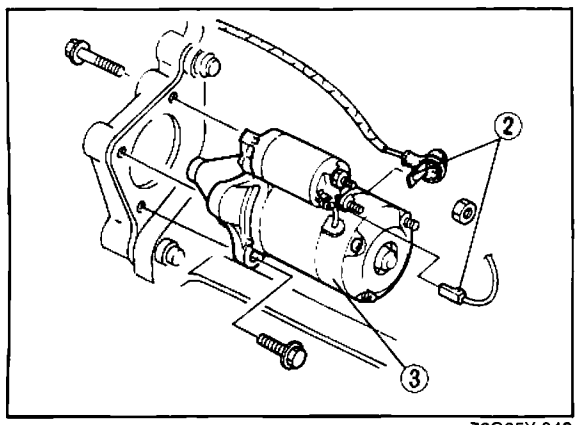
Charge the battery fully before starting the following inspection.

1. Turn the ignition switch to the start position.
2. Check that the starter motor operates.
3. If the starter does not operate, check the voltage between S terminal and ground using a voltmeter.
4. If the voltage is 8V or more, the starter is malfunction.
5. If less than 8V, the wiring harness is malfunction.

Caution
If the magnetic switch is hot, it may not function even though the voltage is standard voltage or more.

Note
The cranking speed is greatly affected by the viscosity of the engine oil.

5 STARTER (GASOLINE ENGINE, 1.4 KW TYPE)



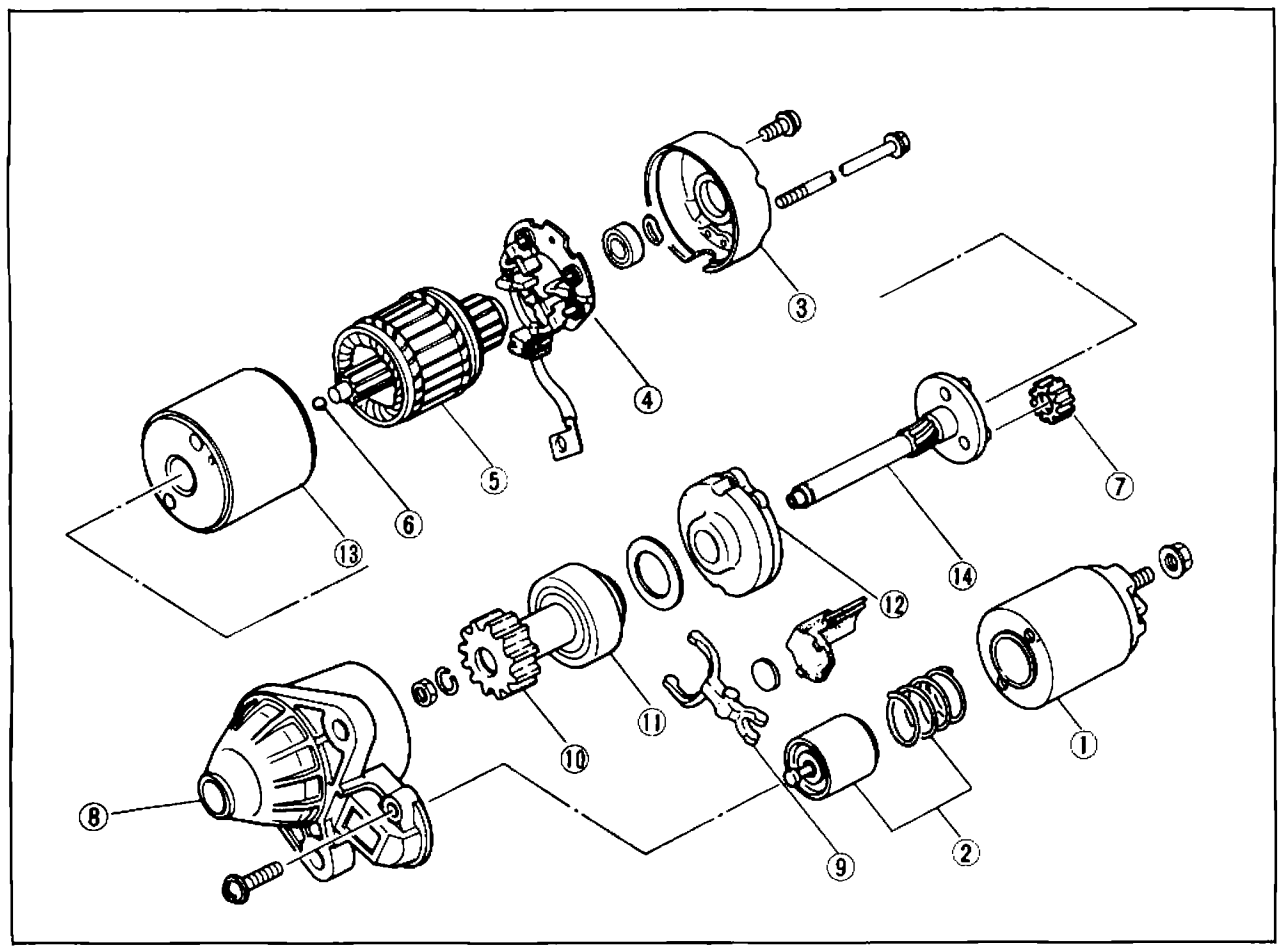
76G05X-042

REMOVAL

1. Disconnect the negative battery cable.
2. Disconnect the wiring from the starter.
3. Raise the front of the vehicle and support it with safety stands.
4. Remove the starter bolts.
5. Draw out the starter from lower side of the vehicle.

Note
Remove the lowest starter bolt last.

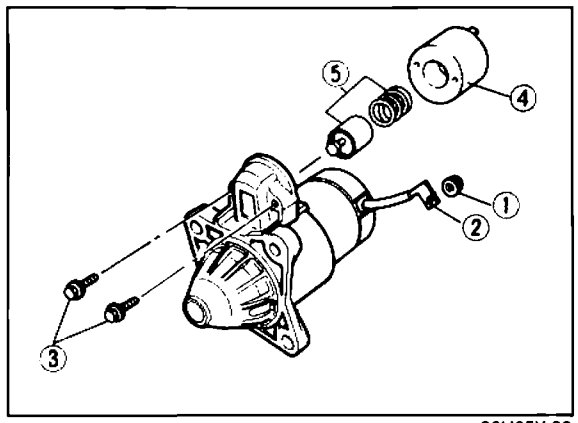
DISASSEMBLY



86U05X-083

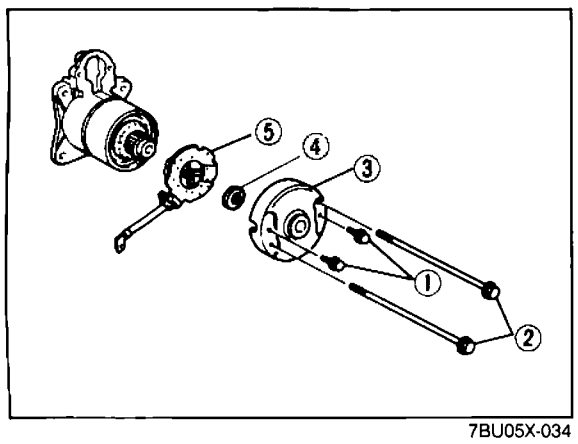
1. Magnetic switch
2. Plunger and spring
3. Rear housing
4. Brush holder assembly
5. Armature
6. Ball
7. Planetary gear
8. Drive housing front cover
9. Lever
10. Drive pinion
11. Overrunning clutch
12. Internal gear
13. Yoke assembly
14. Gear shaft

Caution
Do not strike the yoke with a hammer, drop it or put it in a vise when disassembling the starter.



86U05X-33

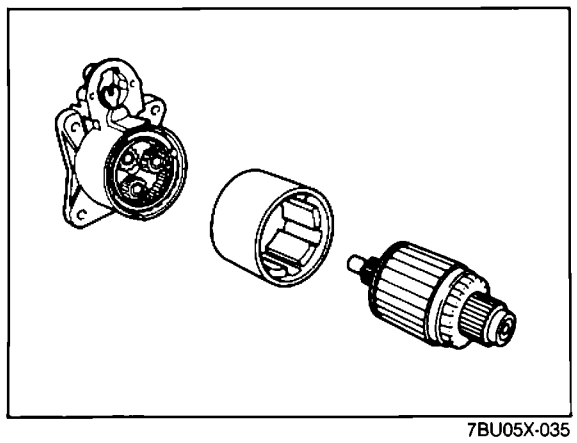
Magnetic Switch
Remove the following parts:
(1) M terminal nut
(2) Wire
(3) Switch installation screws
(4) Magnetic switch
(5) Plunger and plunger spring



7BU05X-034

Rear Bracket and Brush Holder
Remove the following parts:
(1) Brush holder installation screws
(2) Through bolts
(3) Rear cover
(4) Wave washer
(5) Brush holder assembly

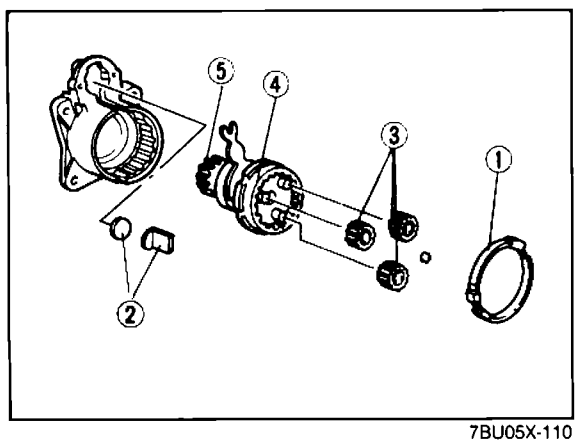
Note
Put an aligning mark on the yoke and rear bracket for reassembly before removing the rear bracket.



7BU05X-035

Yoke and Armature
Remove the armature and yoke.

Note
Put an aligning mark on the yoke and front bracket for reassembly before removing the front bracket.

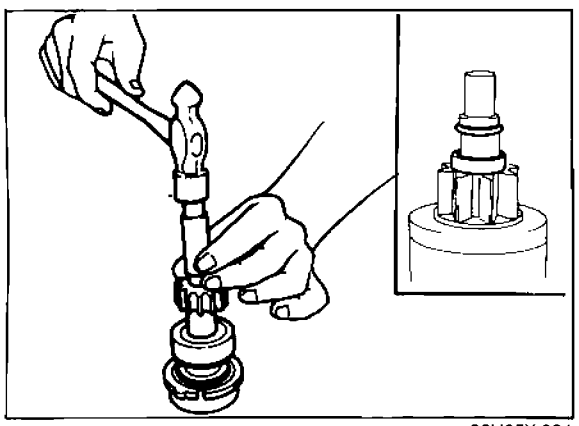


7BU05X-110

Overrunning Clutch, Planetary Gears, and Internal Gear.
Remove the following parts:
(1) Gasket
(2) Plate
(3) Planetary gears
(4) Internal gear
(5) Drive pinion

Note
Do not lose the ball.

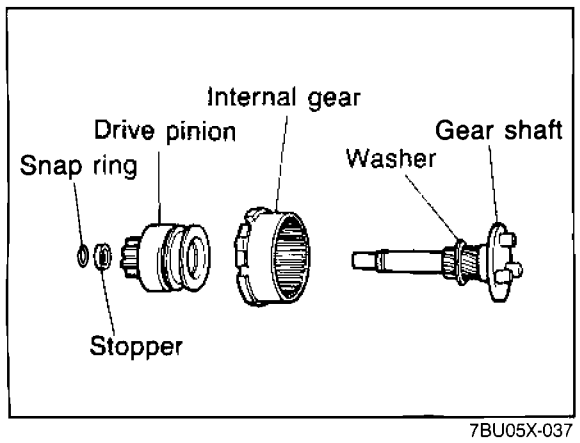
5 STARTER (GASOLINE ENGINE, 1.4 KW TYPE)



86U05X-034

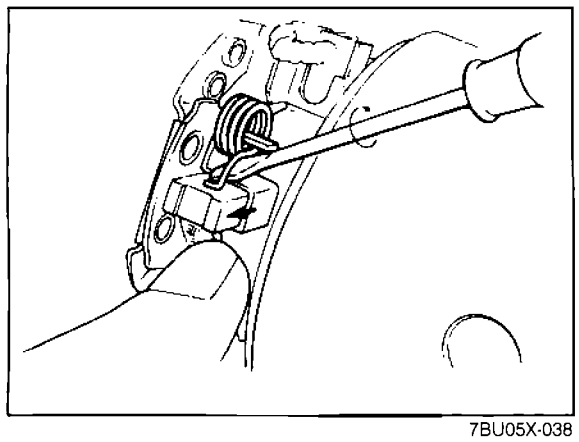
Overrunning Clutch Stopper

1. Remove the overrunning clutch stopper using a pipe.



7BU05X-037

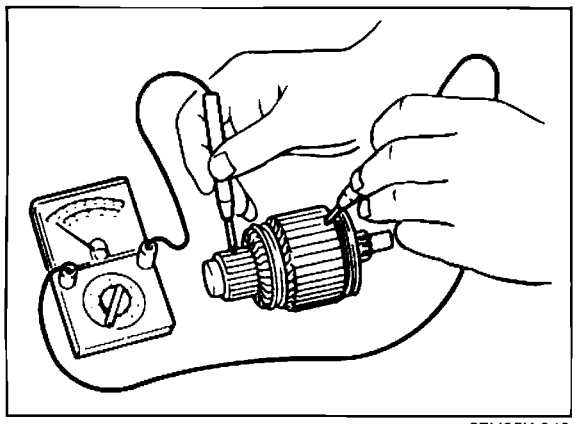
2. Disassemble the drive pinion, internal gear and washer from the gear shaft.



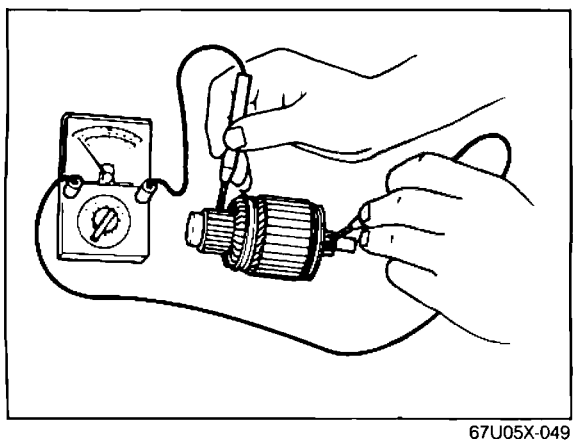
7BU05X-038

Brush and Brush Holder

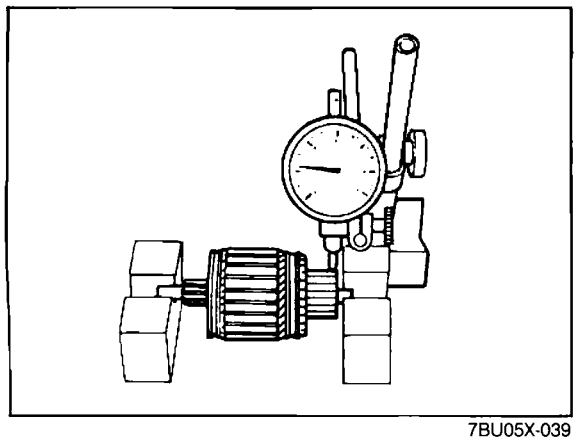
Remove the brush from the brush holder using a flat-tip screwdriver.


67U05X-048

INSPECTION
Armature
1. Ground of armature coil
   Check for continuity between the commutator and the core using a circuit tester. Replace the armature if there is continuity.

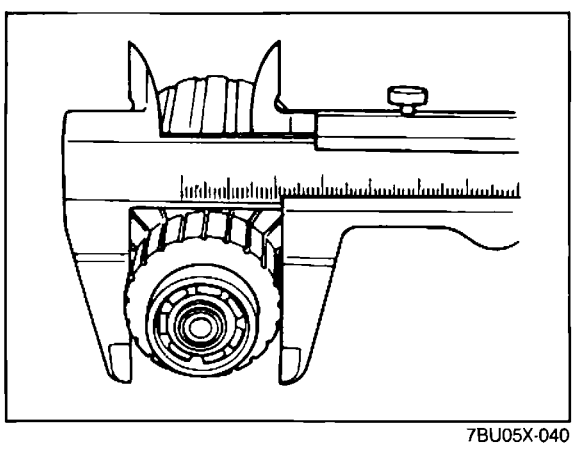

67U05X-049

2. Insulation of armature coil
   Check for continuity between the commutator and the shaft using a circuit tester. Replace the armature if there is continuity.


7BU05X-039

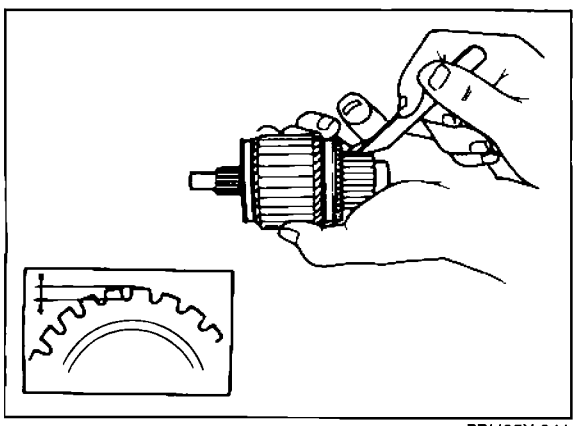
3. Runout of commutator
   (1) Place the armature on V blocks, and measure the runout using a dial gauge.
   (2) If the runout is excessive, replace the armature.

   Runout: 0.05 mm (0.002 in)
   Maximum: 0.1 mm (0.004 in)


7BU05X-040

4. Outer diameter of commutator
   Replace the armature if the outer diameter of the commutator is less than the grind limit.
5. Roughness of commutator surface
   Repair using a lathe or fine sandpaper if it is rough; wipe it with a rag if it is dirty.

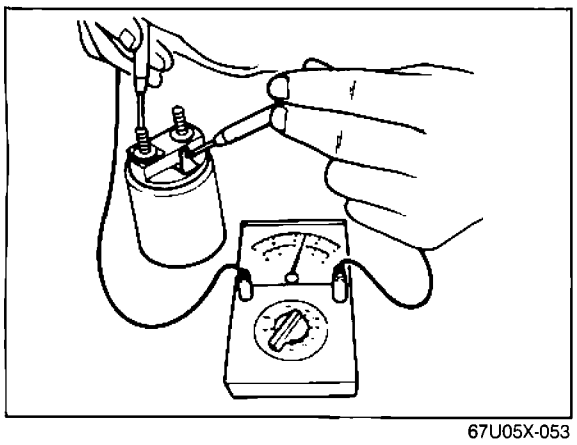
   Grind limit: 28.8 mm (1.13 in)



7BU05X-041

6. Segments groove depth
   If the depth of the groove is less than standard, undercut the grooves to the standard depth.

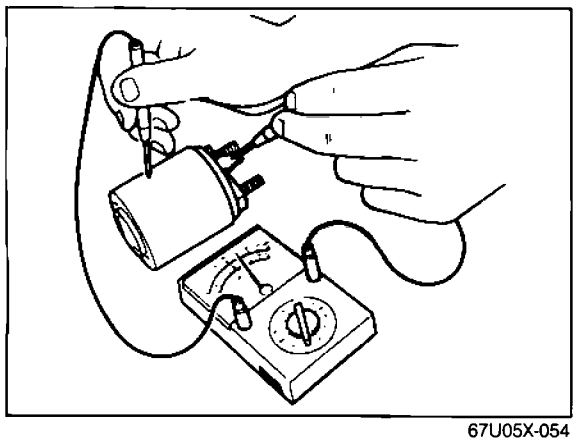
   Standard depth: 0.5—0.8 mm (0.02—0.03 in)
   Minimum depth: 0.2 mm (0.008 in).



67U05X-053

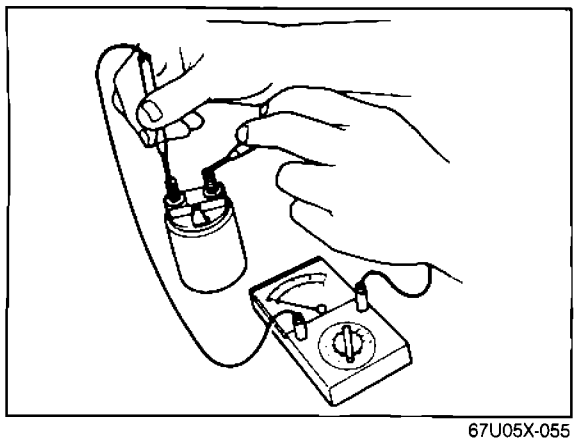
Magnetic Switch

1. Wiring damage (Ⓢ terminal — Ⓜ terminal).
   Check for continuity between the Ⓢ terminal and the Ⓜ terminal using a circuit tester. Replace the magnetic switch if there is no continuity.



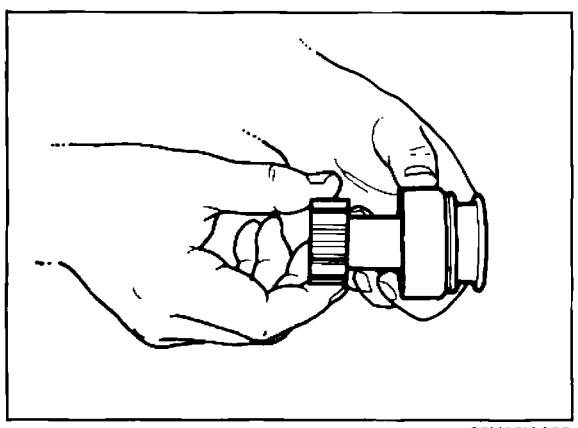
67U05X-054

2. Wiring damage (Ⓢ terminal — body)
   Check for continuity between Ⓢ terminal and body using a circuit tester.
   Replace the magnetic switch if there is no continuity.



67U05X-055

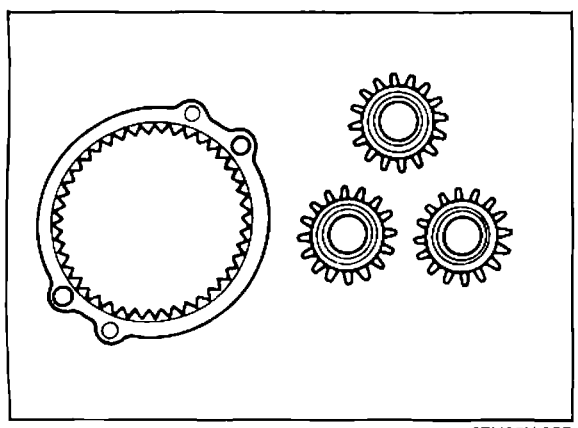
3. Ground of magnetic switch
   Check for continuity between Ⓜ and Ⓑ terminals using a circuit tester. Replace the magnetic switch if there is continuity.



86U05X-035

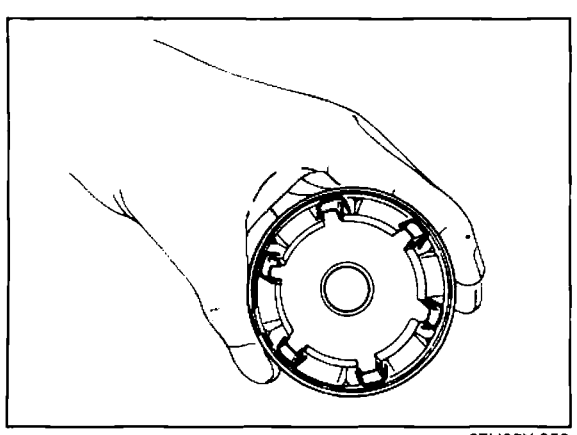
Overrunning Clutch
Turn the pinion shaft by hand and hold the overrunning clutch.
Replace the overrunning clutch if the pinion turns in both directions or in neither direction.

Note
Do not wash the overrunning clutch with solvent; it is packed with grease and sealed.



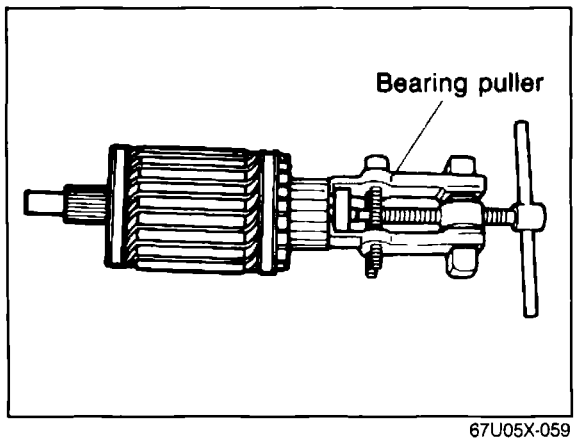
67U05X-057

Internal Gear and Planetary Gears
1. Internal gear
   Check for wear or damage. Replace if necessary.
2. Planetary gears
   Check for wear or damage. Replace if necessary.



67U05X-058

Yoke
Check for damage. Replace if necessary.

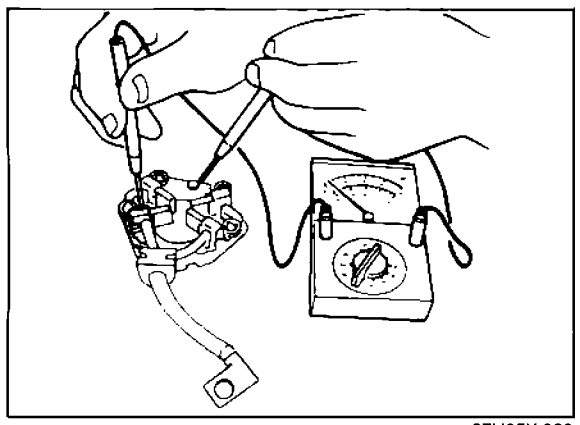


67U05X-059

Bearing
Check for abnormal noise, looseness, binding.
Replace the bearing if there is any problem.

Note
Use a bearing puller to remove the bearings.

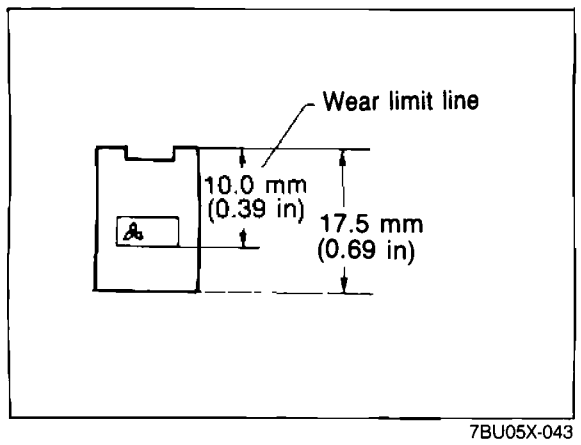
5 STARTER (GASOLINE ENGINE, 1.4 KW TYPE)



67U05X-060

Brush and Brush Holder

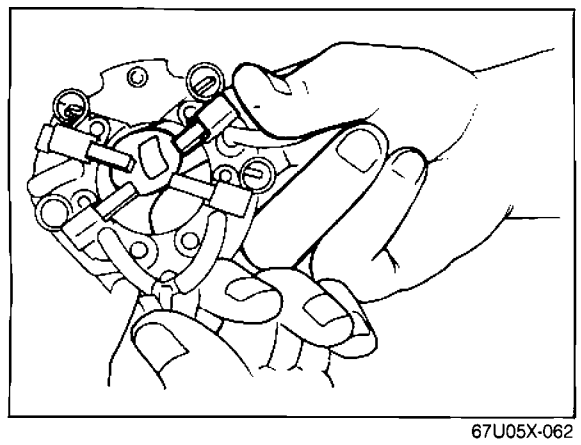
1. Insulation of brush holder
   Check for continuity between the insulated brush and the plate using a circuit tester. Replace the brush holder if there is continuity.



7BU05X-043

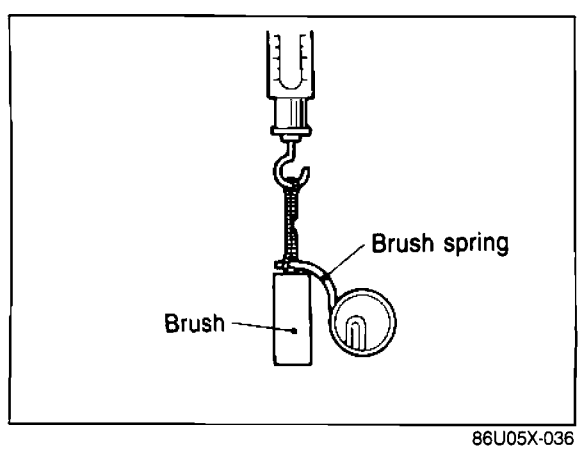
2. Brush
   Replace the brushes if they are worn beyond the wear limit, or if the wear is near the limit.

   Wear limit: 10.0 mm (0.394 in)
   New brush: 17.5 mm (0.689 in)



67U05X-062

3. Brush holder
   Check that the brush slides smoothly inside the brush holder.

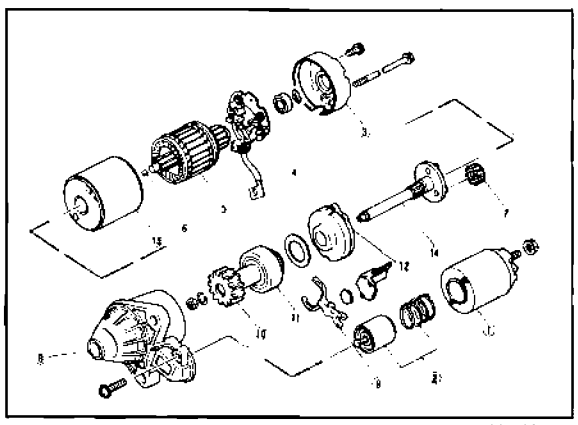


86U05X-036

4. Brush spring
   (1) Measure the force of the brush spring using a spring balance.
   (2) Replace the brush spring if the force is below specification.

   Specification: 7 N (0.7 kg, 1.5 lb)

   Note
   a) The force is measured at the moment the brush spring separates from the brush.
   b) The force must be 18—24 N (1.8—2.4 kg, 4.0—5.3 lb) for a new brush spring.



86U05X-037

ASSEMBLY

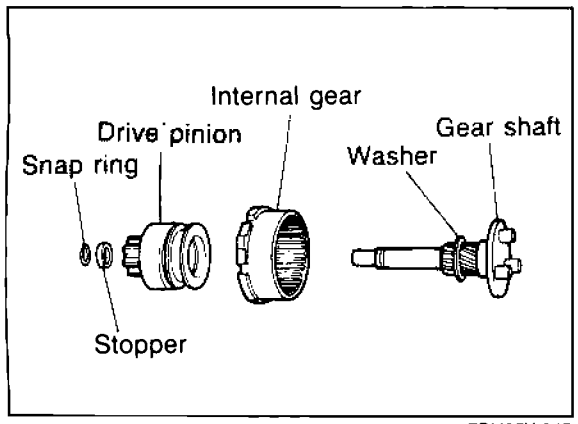
Assemble in the reverse order of disassembly, referring to the assembly note.

Assembly Note

Lubricate

During assembly lubricate the following points:

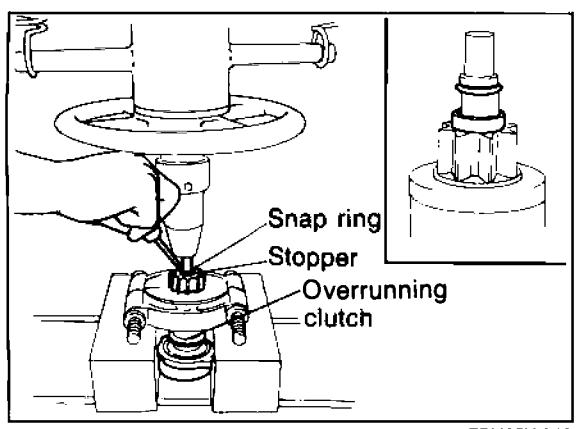
1. Gear of armature shaft
2. Internal gear and planetary gears
3. Plunger circumference
4. Lever
5. Ball
6. Gear shaft spline
7. Front bracket housing



7BU05X-045

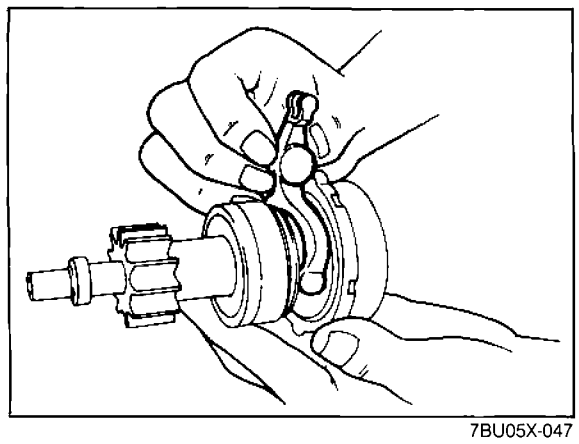
Installation of Overrunning Clutch

1. Install the washer, internal gear, drive pinion stopper, and the snap ring on the gear shaft.



7BU05X-046

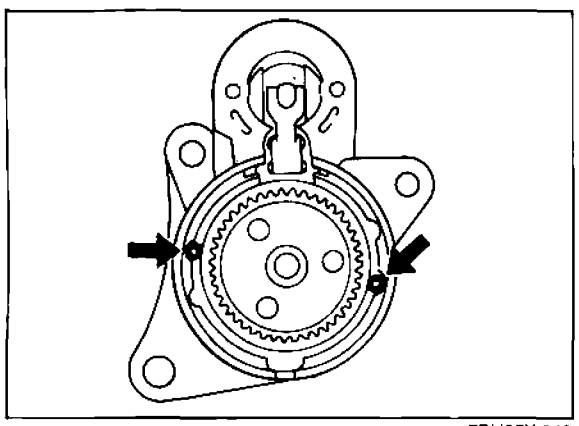
2. Press the stopper and the snap ring into position as shown in the figure.



7BU05X-047

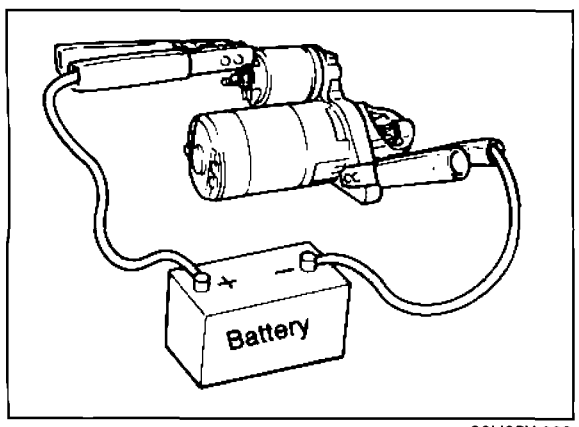
Installation of lever

Check the lever faces in the correct direction.



7BU05X-048

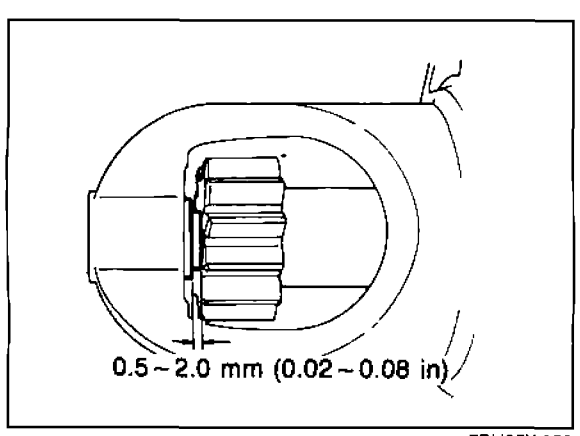
Installation of Brush Holder
Install the brush holder assembly and rear cover and align the through bolts.



86U05X-038

CHECKING OPERATION
Magnetic Switch
Make the following tests:

Pull-out test
1. Check that the pinion is pulled out when 12V is connected to the S terminal and the body is grounded.

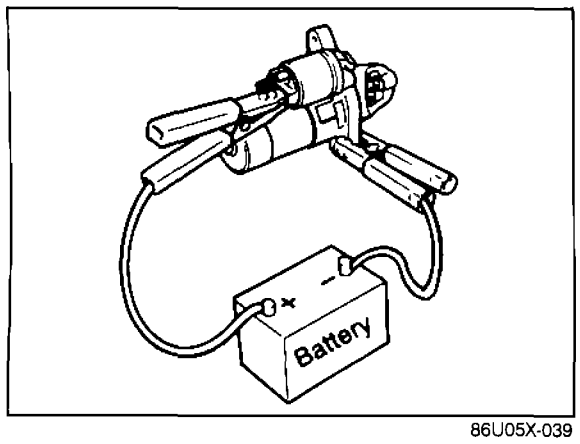


7BU05X-050

2. Measure the pinion gap while the pinion is pulled out.

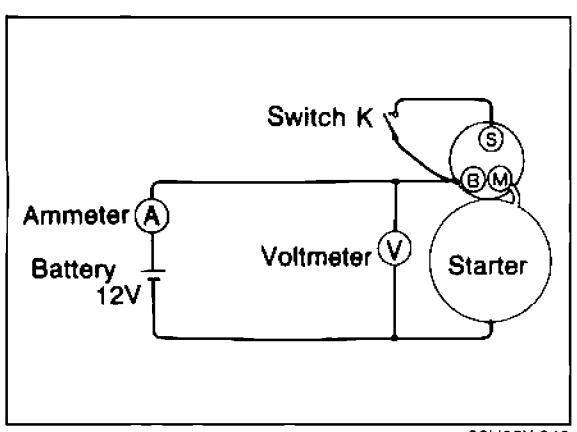
   Specification: 0.5—2.0 mm (0.02—0.08 in)

3. Adjust the pinion gap with an adjust washer (drive housing front cover—magnetic switch) if it is not within specification.



86U05X-039

Return test
1. Disconnect the motor wire from the M terminal, and then connect the battery power to the M terminal and ground the body.
2. Pull out the overrunning clutch with a flat-tip screwdriver. Check that the overrunning clutch returns to its original position when released.



86U05X-040

No-Load Test

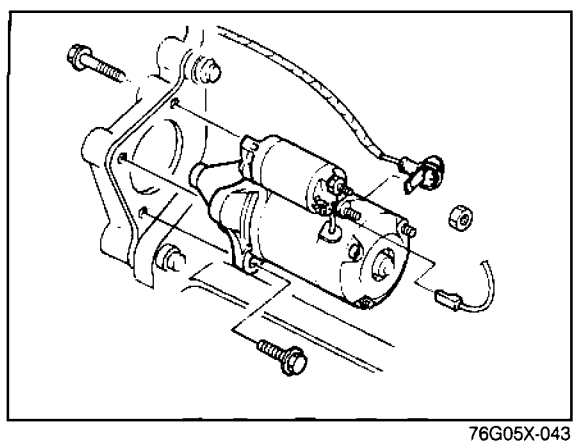
1. After adjusting the pinion gap, form a test circuit with a voltmeter and an ammeter.

Note
Use heavy gauge wires and tighten each terminal fully.

2. Close switch K to run the starter.
3. Check for the following:

Voltage	(V)	11.0
Current	(A)	90 max.
Gear shaft speed	(rpm)	3,000 min.

4. If any abnormality is noted, check for the cause according to ''Inspection''.



76G05X-043

INSTALLATION

Install in the reverse order of removal.

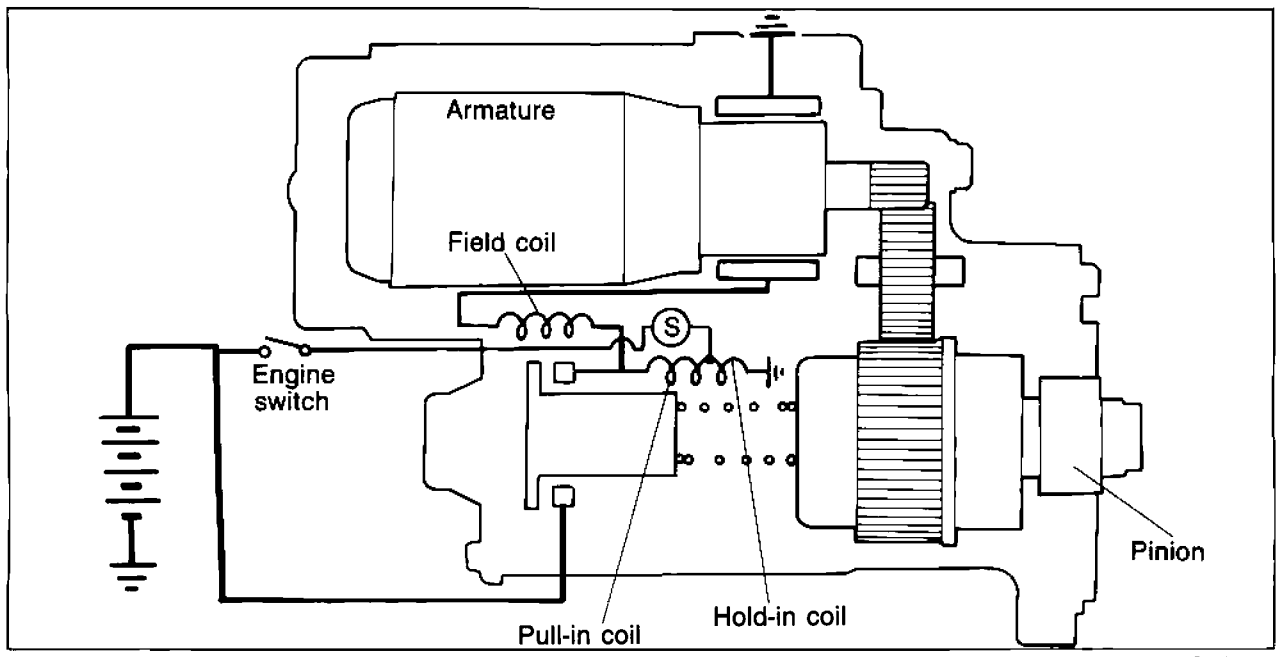
Note
When installing the starter, tighten the bolts to the specified torque.

Tightening torque:
Bolts..... 37—52 N·m
(3.8—5.3 m-kg, 27—38 ft-lb)
B terminal.....9.8—11.8 N·m
(1.0—1.2 m-kg, 87—104 in-lb)

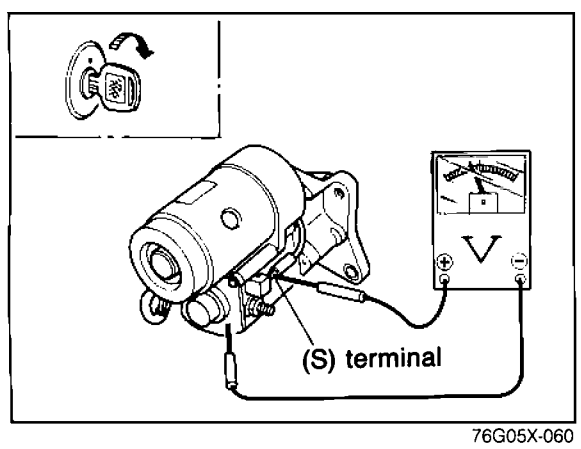
5 STARTER (DIESEL ENGINE, 2.0 KW TYPE)

STARTER (DIESEL ENGINE, 2.0 KW TYPE)

STARTING SYSTEM CIRCUIT



4BG05X-096



76G05X-060

ON-VEHICLE INSPECTION

Charge the battery fully before starting the following inspections.

A. If the magnetic switch dose not function during starting.

1. Turn the ignition switch to the start position.
2. Measure the voltage between the S terminal and ground.
3. If the measured value is standard voltage or more, there is starter malfunction.
4. If it is less than standard voltage, there is a malfunction in the wiring.

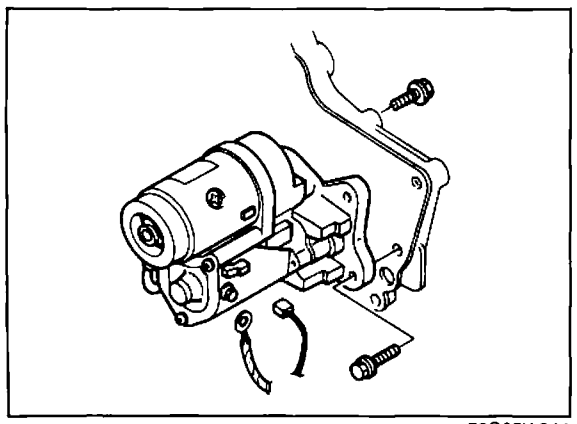
Standard voltage: 8 V

Caution
If the magnetic switch is hot, it may not function even though the voltage is standard voltage or more.

B. If the starter won't crank, or if the cranking speed is slow.

The problem may be a malfunction of the starter or in the wiring.

Note
The cranking speed is greatly affected by the viscosity of the engine oil.



76G05X-044

REMOVAL AND INSTALLATION

Removal is as follows:
1. Disconnect the negative battery cable.
2. Disconnect the wiring from the starter.
3. Remove the starter.

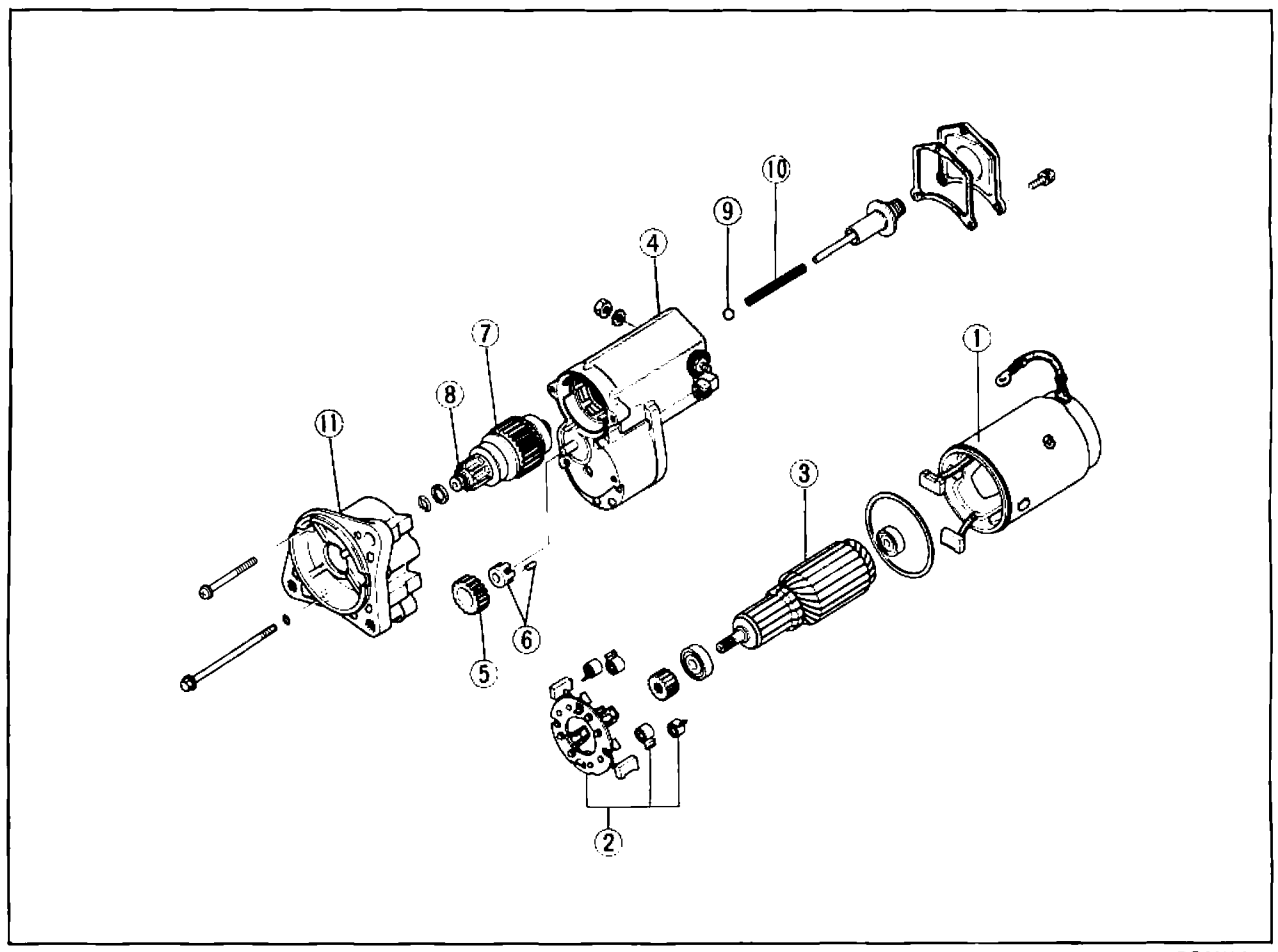
Install in the reverse order of removal.

Tightening torque:
Bolts..... 64—89 N·m (6.5—9.1 m-kg, 47—66 ft-lb)
B terminal.....9.8—11.8 N·m (1.0—1.2 m-kg, 87—104 in-lb)

DISASSEMBLY AND ASSEMBLY

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.

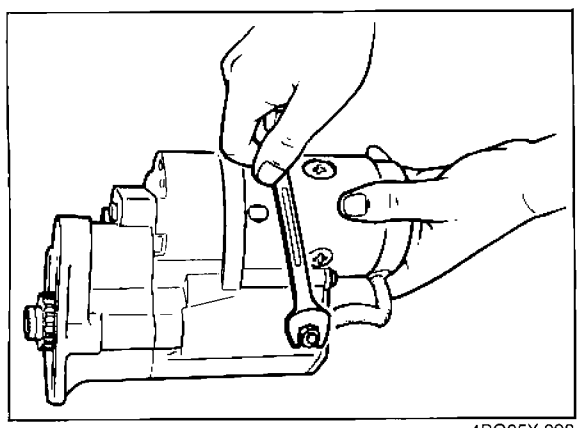
76G05X-045



4BG05X-047

1. Yoke assembly
2. Brush holder
3. Armature
4. Magnetic switch assembly
5. Idler gear
6. Retainer and rollers
7. Over-running clutch assembly
8. Pinion gear
9. Steel ball
10. Coil spring
11. Housing

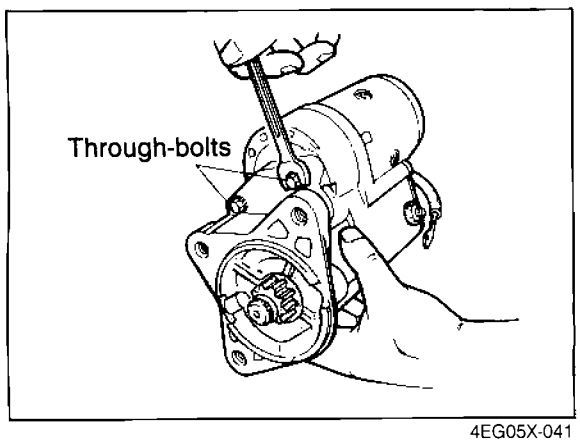
5 STARTER (DIESEL ENGINE, 2.0 KW TYPE)



4BG05X-098

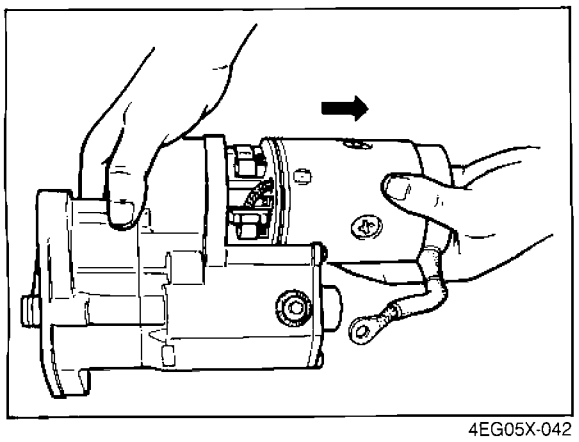
Disassembly

1. Remove the lead wire connected to the magnetic switch.



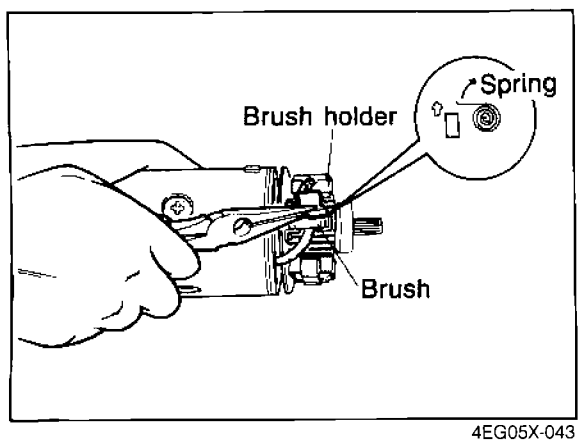
4EG05X-041

2. Remove the two through-bolts.



4EG05X-042

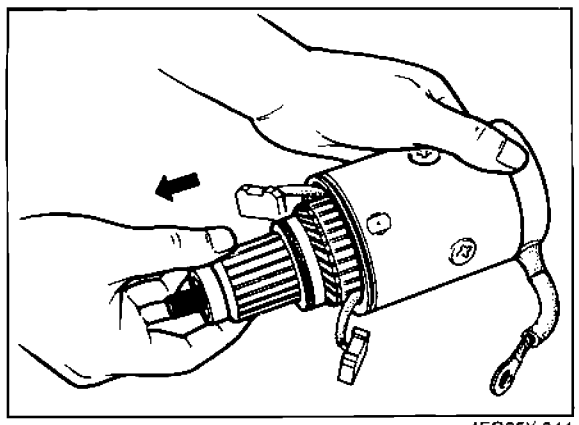
3. Remove the yoke from the magnetic switch.



4EG05X-043

4. Using radio pliers or a similar tool, raise the + side brush spring and remove the brush.

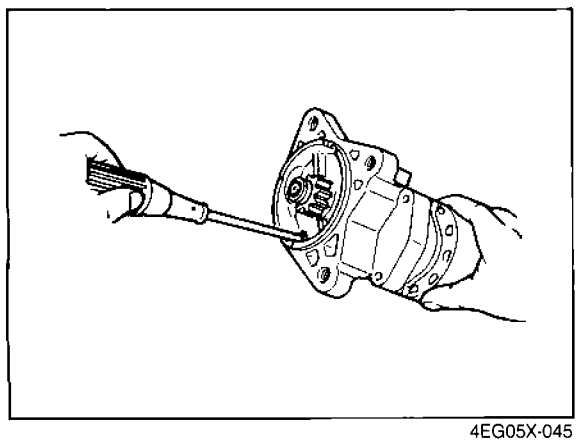
Caution
Be careful not to scratch the brush or commutator.



4EG05X-044

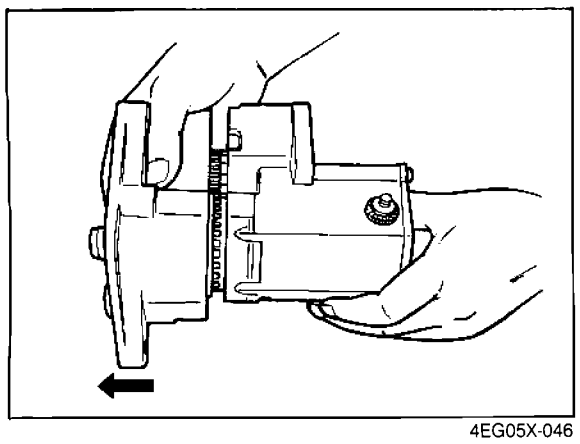
5. Remove the armature from the yoke.

Caution
Be careful not to drop the armature.



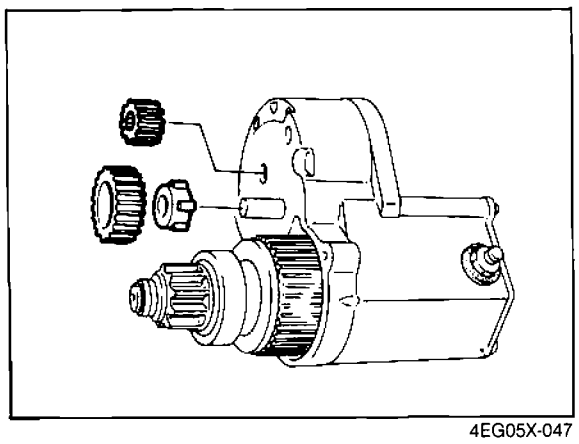
4EG05X-045

6. Remove the two screws which hold the housing and the magnetic switch.



4EG05X-046

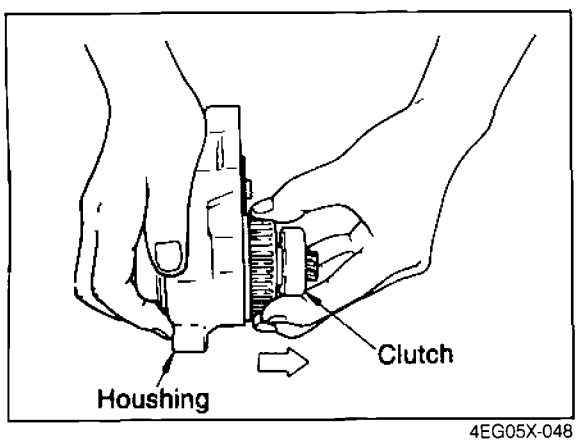
7. Remove the housing from the magnetic switch.



4EG05X-047

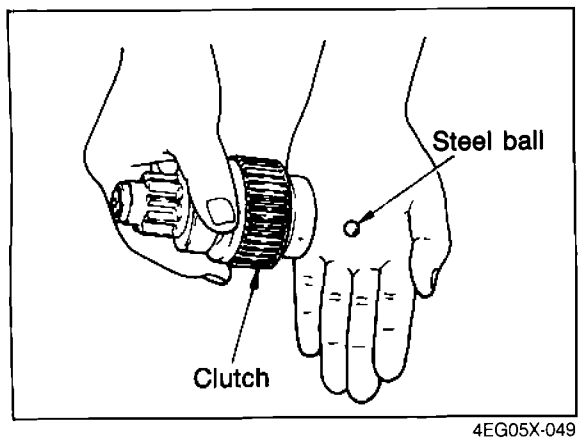
8. Remove the idle gear, retainer and roller.

Caution
Be careful not to lose the roller.



4EG05X-048

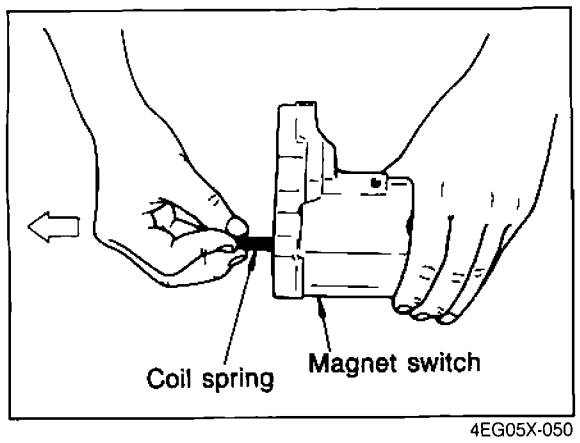
9. Remove the over-running clutch assembly from the housing.



4EG05X-049

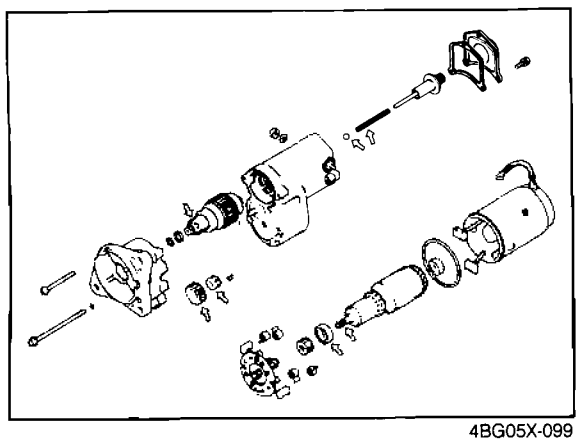
10. Remove the steel ball from the over-running clutch assembly.

Caution
Be careful not to lose the steel ball.

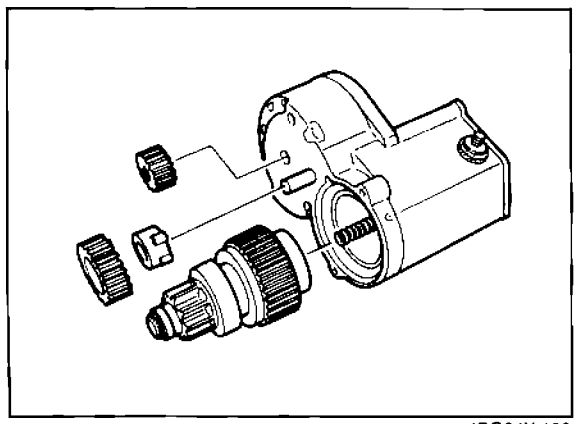


4EG05X-050

11. Remove the coil spring from the magnetic switch.

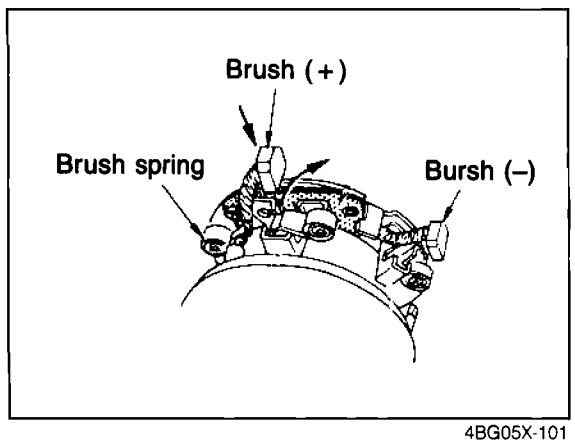

4BG05X-099

Assembly (main point)
Greasing
Apply grease (lithium base, NLGI No. 2) to the places shown in the figure.



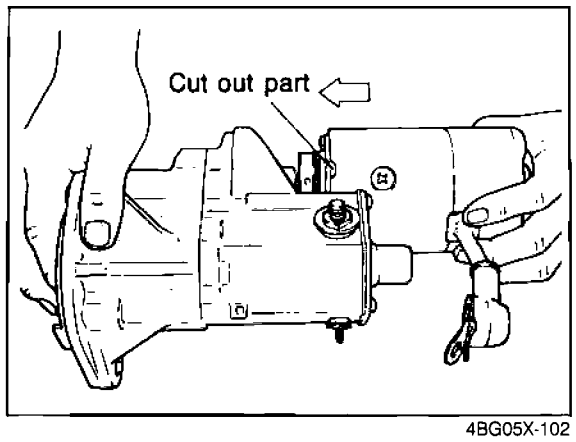
4BG04X-100

Coil spring and steel ball installation
1. Install the coil spring and steel ball to the magnetic switch before installing the over-running clutch assembly.
2. Assemble the retainer and roller to the idler gear.



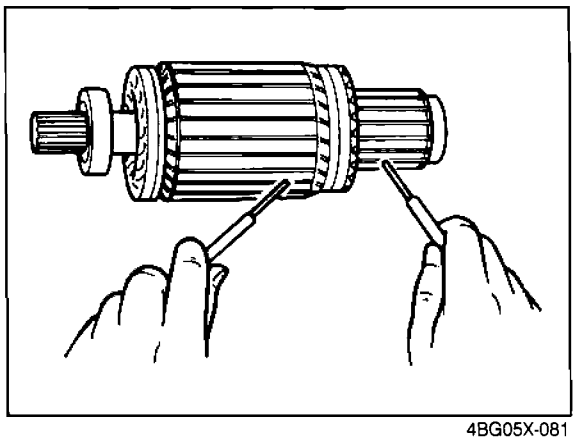
4BG05X-101

Brush installation
1. Assemble the brush holder to the yoke.
2. Assemble the two brushes on the yoke side to the brush holder.



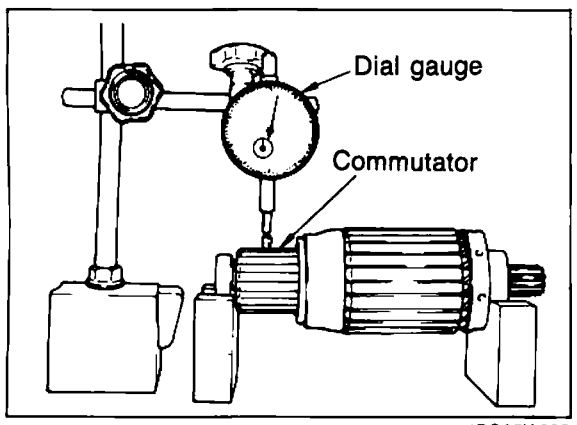
4BG05X-102

Magnetic switch installation
Align the cut out part with the projection of the magnetic switch.



4BG05X-081

INSPECTION
Armature Coil
1. Ground of the armature coil
   (1) Check for continuity between the commutator and the core by using a circuit tester.
   (2) Replace the armature if there is continuity.

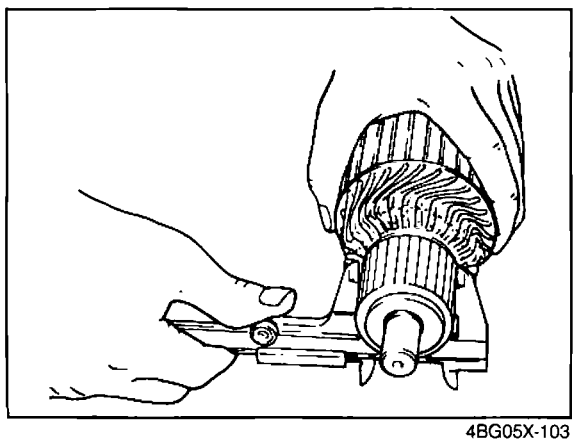


4BG05X-082

2. Vibration of the commutator
   (1) Place the armature on V blocks, and measure the vibration by using a dial gauge.
   (2) If the vibration is Limit or more, repair so that it becomes standard by using a lathe, or replace the armature.

Standard vibration: 0.05 mm (0.002 in)
Limit: 0.4 mm (0.018 in)

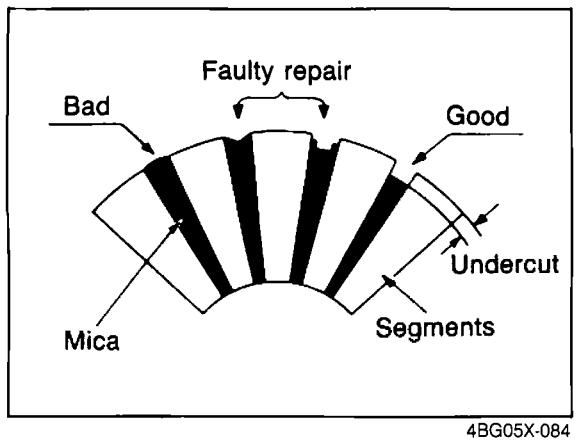
Note
Before checking, be sure that there is no play in the bearings.



4BG05X-103

3. Outer diameter of the commutator
   Replace the armature if the outer diameter of the commutator is grind limit or less.
4. Roughness of the commutator surface
   (1) If the commutator surface is dirty, wipe it with a cloth.
   (2) If it is rough, repair it by using a lathe or fine sandpaper.

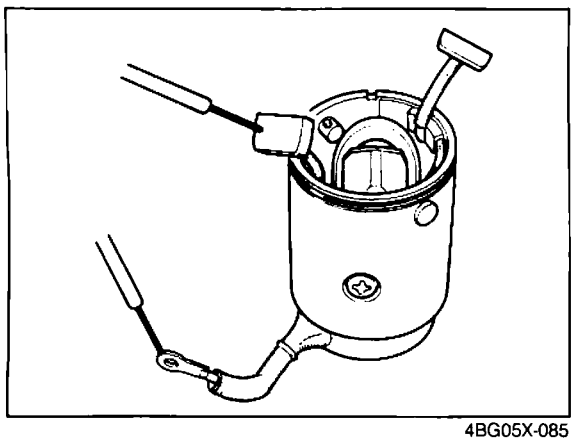
Grind limit: 34 mm (1.34 in)



4BG05X-084

5. Segment groove depth
   If the depth of the mold between segments is limit depth or less, undercut the grooves by standard depth.

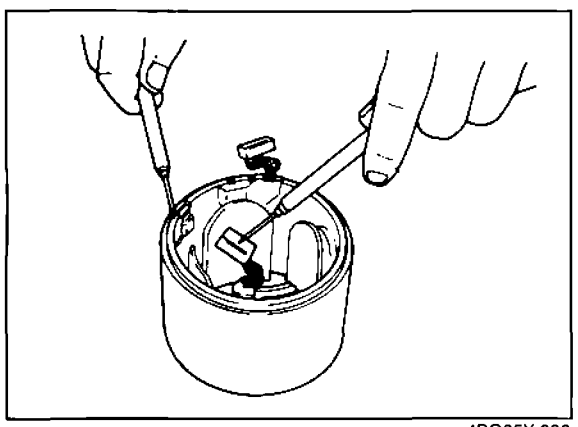
Standard depth:
0.5—0.8 mm (0.020—0.031 in)
Limit depth: 0.2 mm (0.008 in)



4BG05X-085

Field Coil

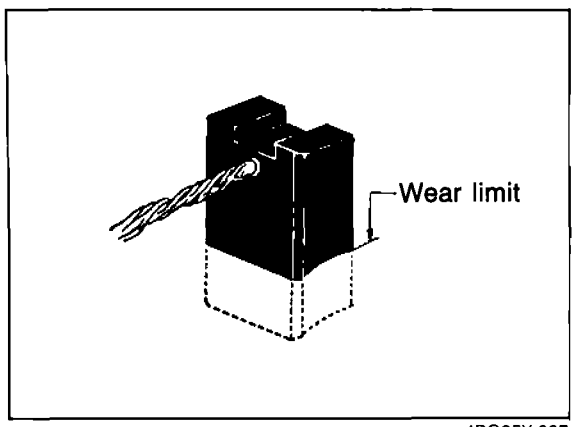
1. Wiring damage
   (1) Check for continuity between the connector and brushes by using a circuit tester.
   (2) Replace the yoke assembly if there is no continuity.



4BG05X-086

2. Ground of the field coil
   (1) Check for continuity between the connector and yoke by using a circuit tester.
   (2) Repair, or replace the yoke assembly if there is continuity.

3. Installation of the field coil
   Replace the yoke assembly if the field coil is loose.

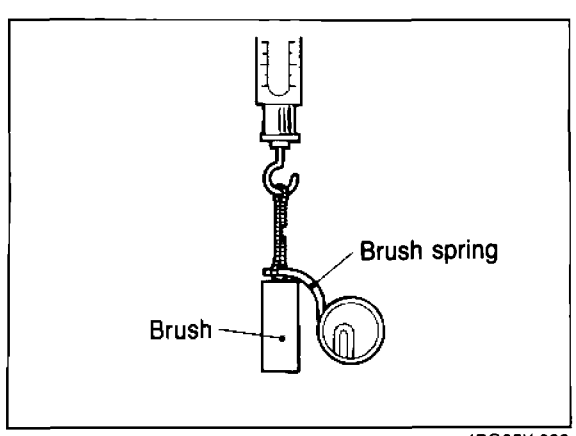


4BG05X-087

Brush and Brush Holder

1. Brush
   If the brushes are worn beyond the wear limit, or if the wear is near the limit, replace the brushes.

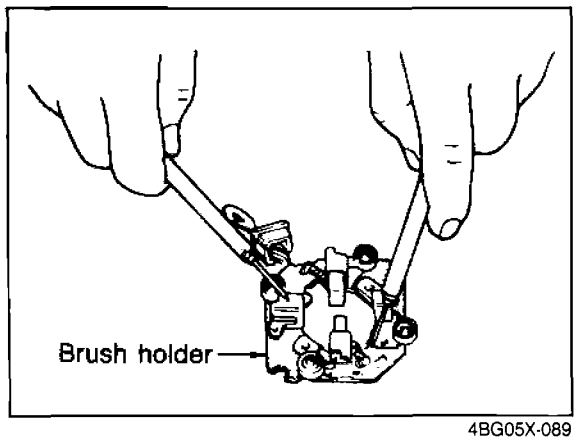
   Standard: 17 mm (0.669 in)
   Wear limit: 11 mm (0.433 in)



4BG05X-088

2. Brush spring
   (1) Measure the force of the brush spring by using a spring balance.
   (2) Replace the brush spring if the force is limit or less.

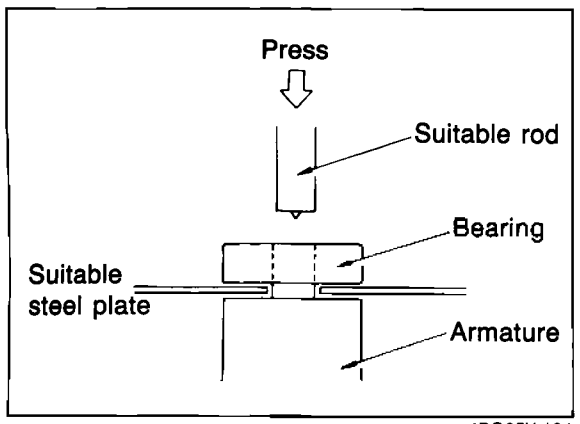
   Limit: 9 N (900 g, 31.75 oz)



4BG05X-089

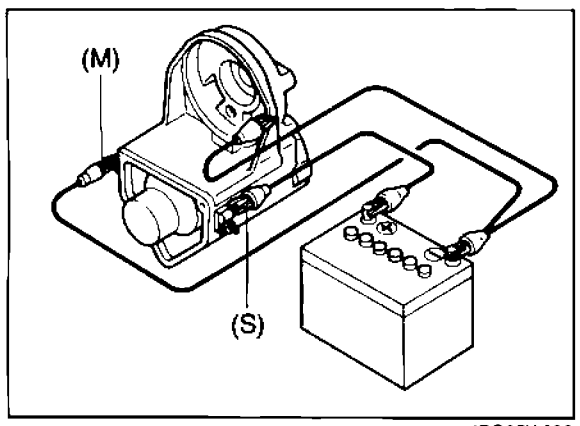
3. Brush holder
   (1) Check for continuity between the insulated brush and the plate by using a circuit tester.
   (2) Repair or replace if there is continuity.
   (3) Also check to be sure that the brush slides smoothly inside the brush holder.

5 STARTER (DIESEL ENGINE, 2.0 KW TYPE)



4BG05X-104

Bearing
Check for abnormal noise, looseness, insufficient lubrication, etc. Replace the bearing if there is any abnormality.
Take out the bearing, as shown in the figure, by using the suitable tools.

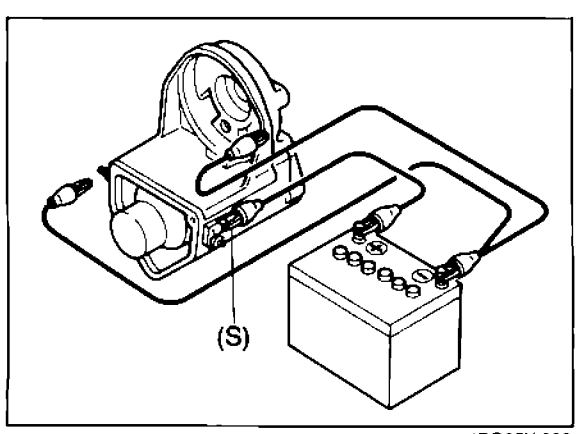


4BG05X-092

PERFORMANCE INSPECTION
Magnetic Switch
Disconnect the terminal **M wire**, and make the following tests.

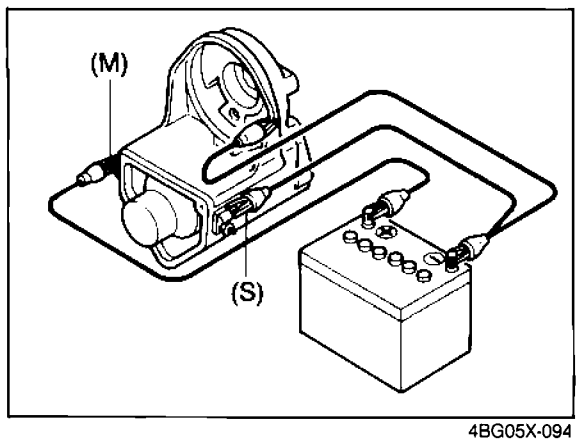
Pull-in Test
The switch is normal if the pinion ejects outward when the battery is connected as shown in the figure.

Caution
Do not supply power continuously for more than 10 seconds.



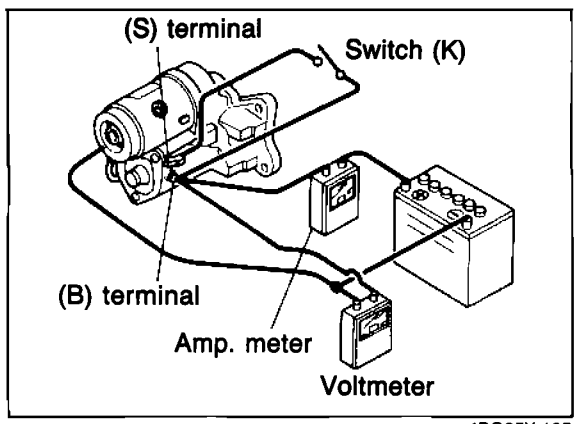
4BG05X-093

Hold-in Test
1. After completing the pull-in test, disconnect the wire from terminal M (with the pinion left ejected).
2. The hold-in coil is functioning properly if the pinion does not return.



4BG05X-094

Return Test
1. Connect the battery between terminal M of the magnetic switch and the body, as shown in the figure.
2. Pull the pinion out manually to the pinion stopper position.
3. The pinion should immediately return to its original position when it is released.



4BG05X-105

No-load Test

1. After adjusting the pinion gap, form a test circuit with a voltmeter and an ammeter.

   Note
   Use wires as thick as possible and tighten each terminal fully.

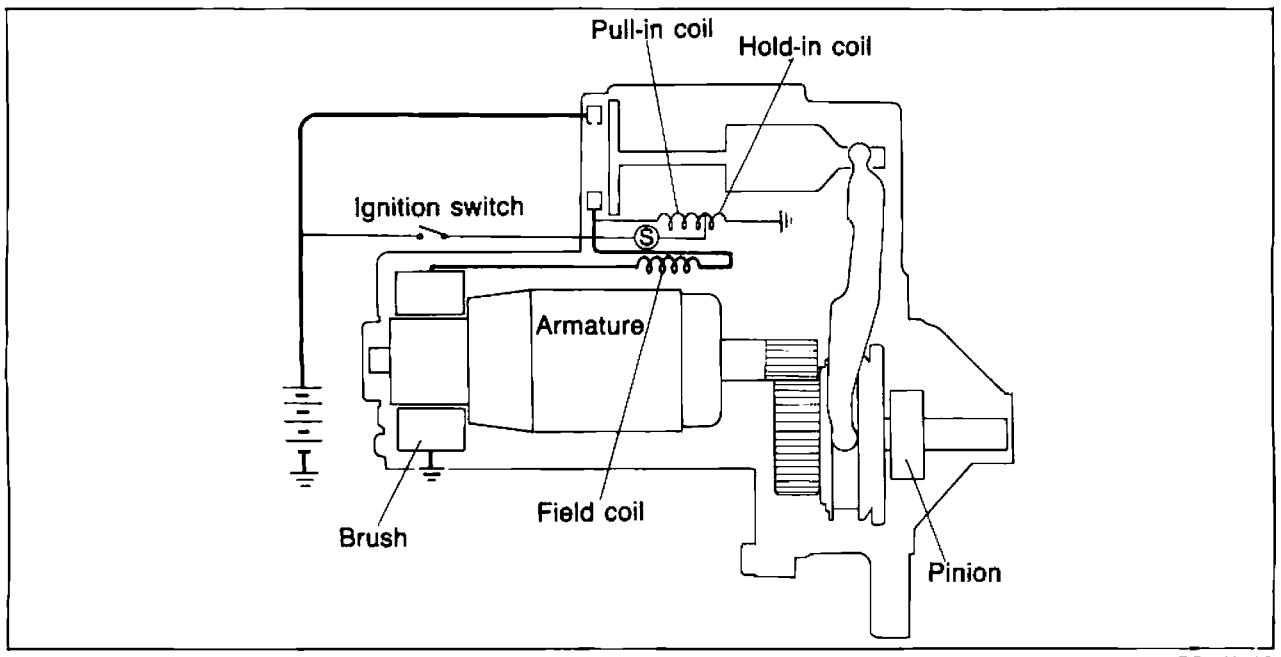
2. Close switch "K" to run the starter. If the voltmeter and ammeter show the following values while the starter is running, it is normal.

   Battery voltage: 11.5 volts
   Current: 120 amperes or less
   Gear shaft speed: at 4,000 or more

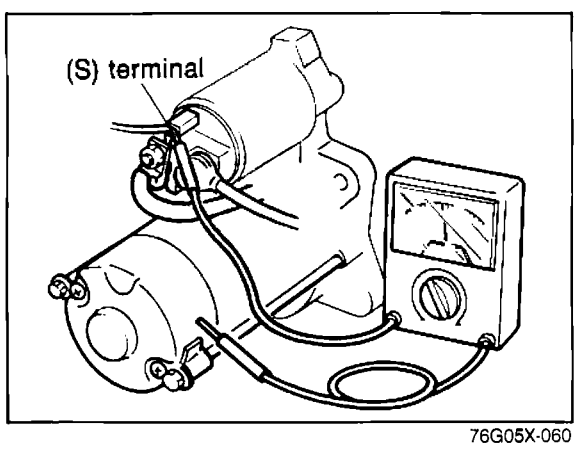
3. If any abnormality is noted, check it according to "INSPECTION"

STARTER (DIESEL ENGINE, 2.2 KW TYPE)

STARTING SYSTEM CIRCUIT



4BG05X-106



76G05X-060

ON-VEHICLE INSPECTION

Charge the battery fully before starting the following inspections.

A. If the magnetic switch dose not function during starting.

1. Turn the ignition switch to the start position.
2. Measure the voltage between the S terminal and ground.
3. If the measured value is standard voltage or more, there is starter malfunction.
4. If it is less than standard voltage, there is a malfunction in the wiring.

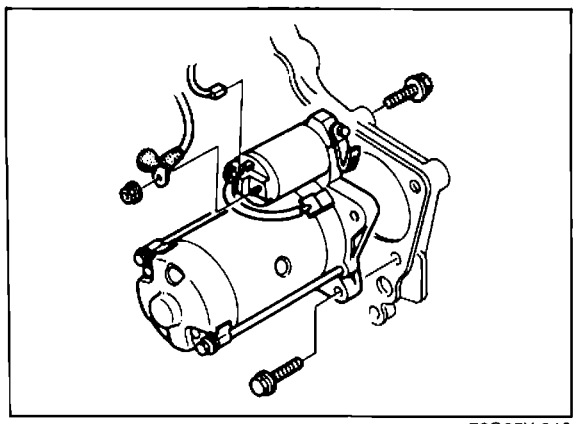
Standard voltage: 8 V

Caution
If the magnetic switch is hot, it may not function even though the voltage is standard voltage or more.

B. If the starter won't crank, or if the cranking speed is slow.

The problem may be a malfunction of the starter or in the wiring.

Note
The cranking speed is greatly affected by the viscosity of the engine oil.



76G05X-046

REMOVAL AND INSTALLATION

Removal is as follows:
1. Disconnect the negative battery cable.
2. Disconnect the wiring from the starter.
3. Remove the starter.

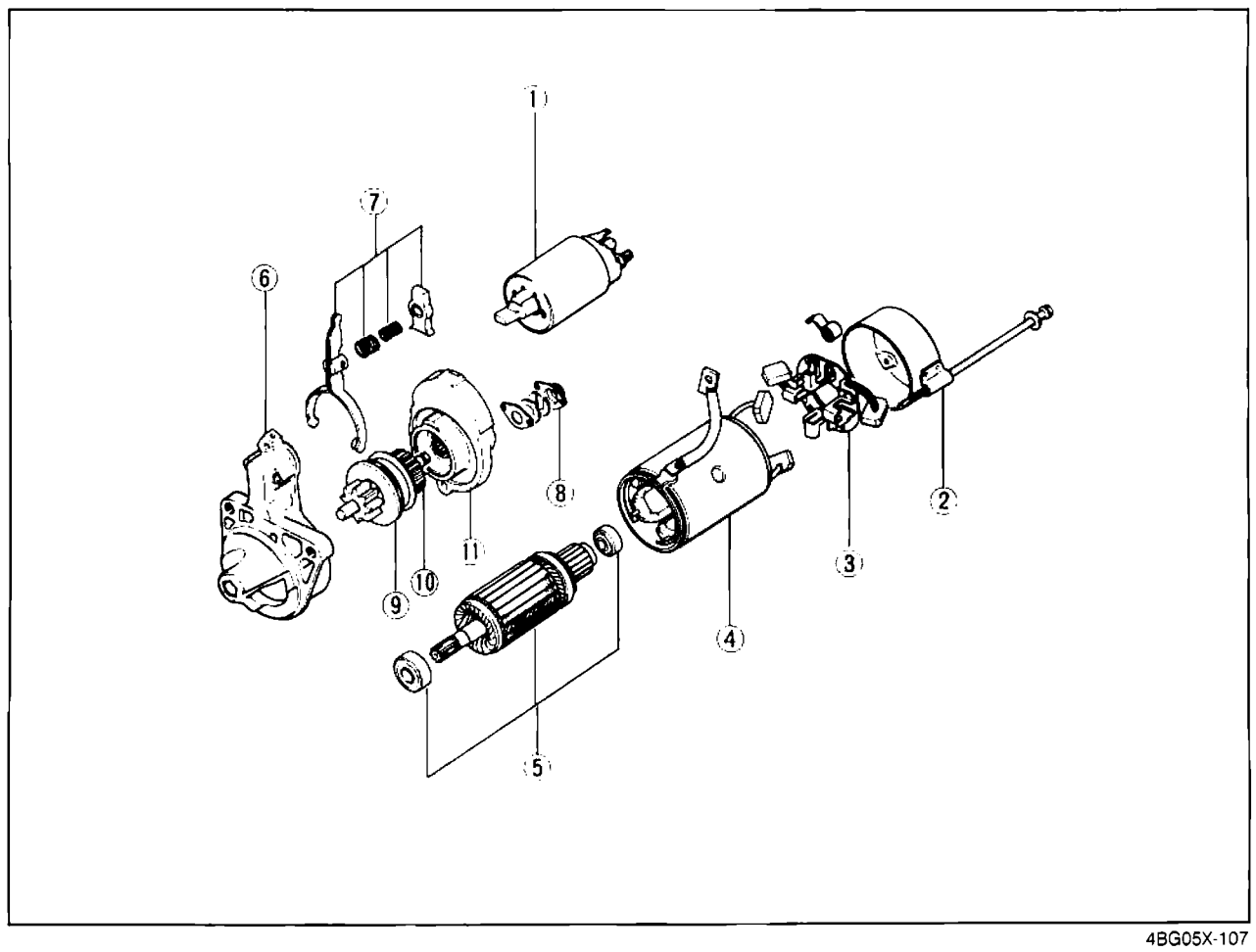
Install in the reverse order of removal.

Tightening torque:
Bolts..... 64—89 N·m
(6.5—9.1 m-kg, 47—66 ft-lb)
B terminal.....9.8—11.8 N·m
(1.0—1.2 m-kg, 87—104 in-lb)

DISASSEMBLY AND ASSEMBLY

1. Disassemble in the numbered order shown in the figure.
2. Assembly in the reverse order of disassembly.

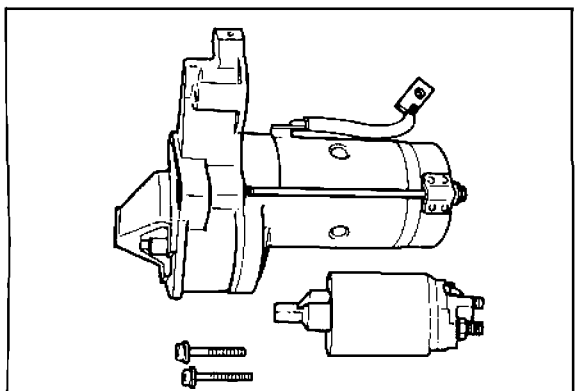
4BG05X-049



4BG05X-107

1. Magnetic switch
2. Rear cover
3. Brush-holder assembly
4. Yoke
5. Armature
6. Front housing
7. Lever
8. Cover
9. Drive pinion and over-running clutch assembly
10. Reduction gear
11. Center bracket

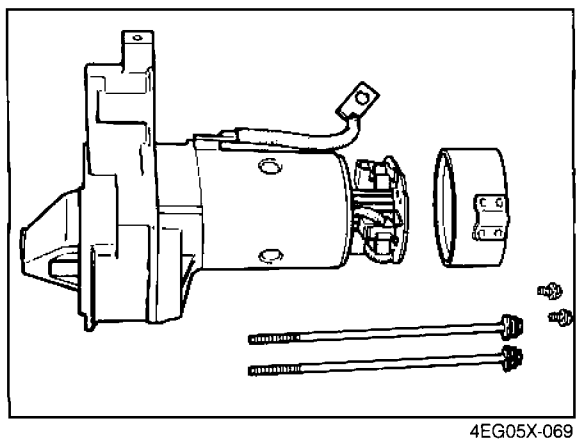
5 STARTER (DIESEL ENGINE, 2.2 KW TYPE)



4BG05X-108

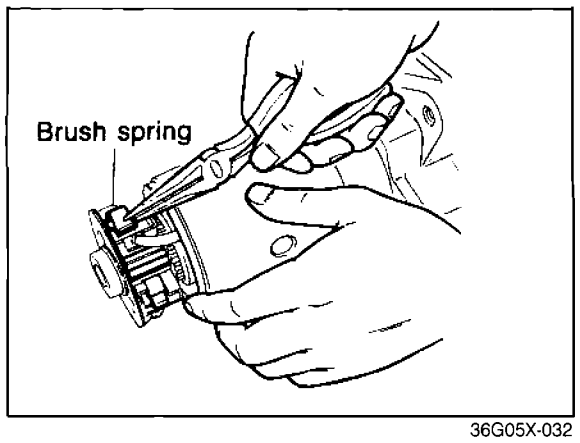
Disassembly

1. Remove the magnetic switch.



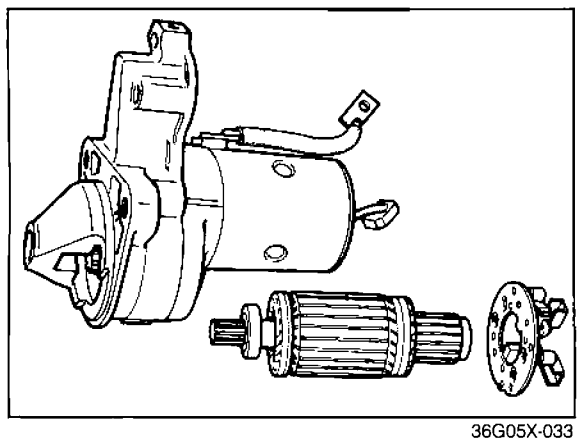
4EG05X-069

2. Remove the rear housing.



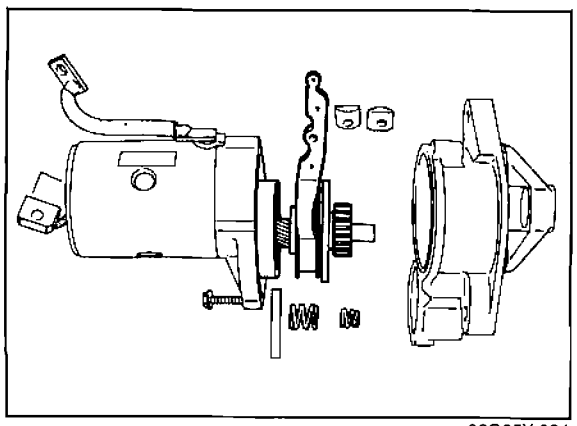
36G05X-032

3. Using radio pliers or a similar tool, raise the positive (+) side brush spring, and remove the brush.



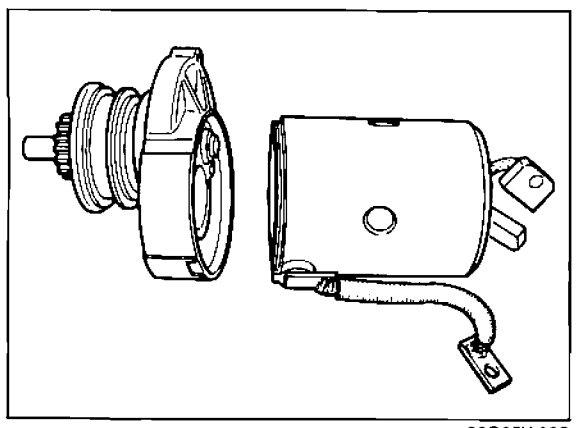
36G05X-033

4. Remove the brush holder assembly and the armature.



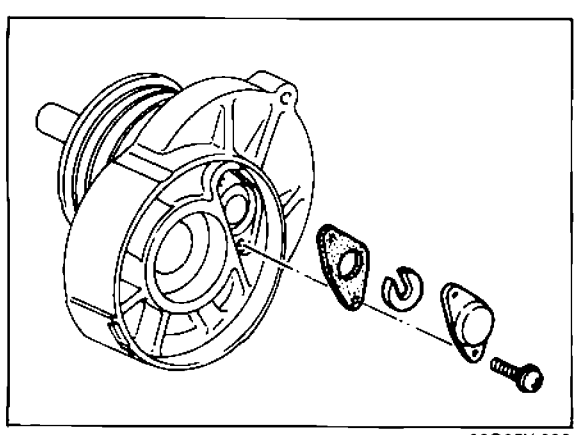
36G05X-034

5. Remove the front cover, and remove the lever and springs (two).



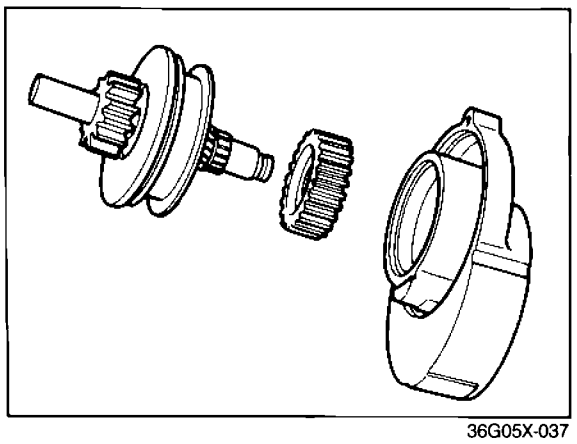
36G05X-035

6. Separate the yoke and center bracket.



36G05X-036

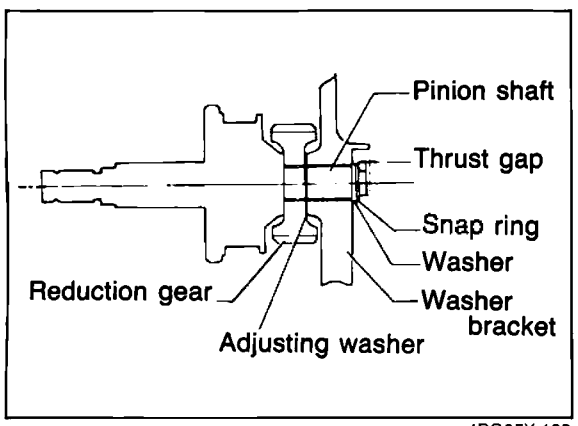
7. Remove the cover and pull out the snap ring and washer.



36G05X-037

8. Remove the pinion, over-running clutch assembly and reduction gear from the center bracket.

5 STARTER (DIESEL ENGINE, 2.2 KW TYPE)

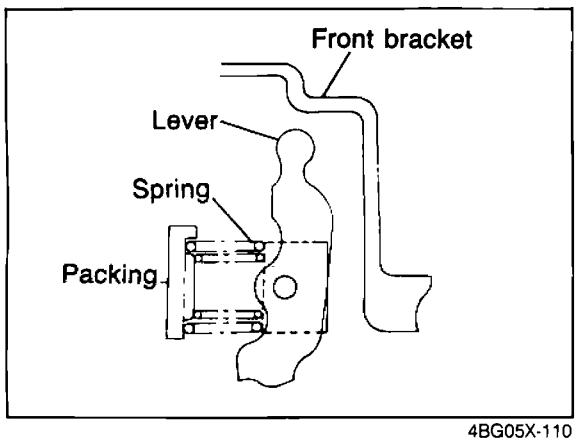


4BG05X-109

Assembly (main point)
Pinion shaft play
1. Measure the thrust gap by moving the pinion shaft axial direction.

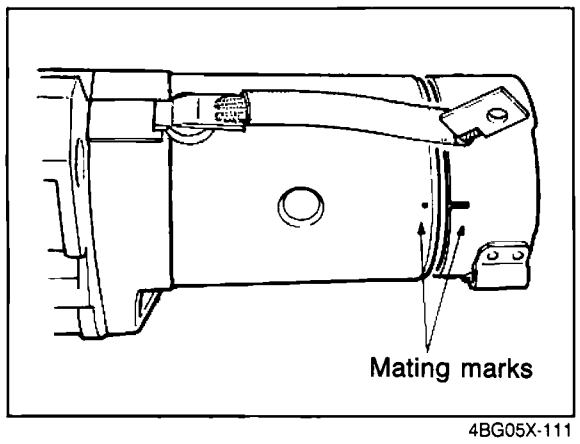
   Standard play: Less than 0.5 mm (0.02 in)

2. Adjust the play with the adjusting washer.



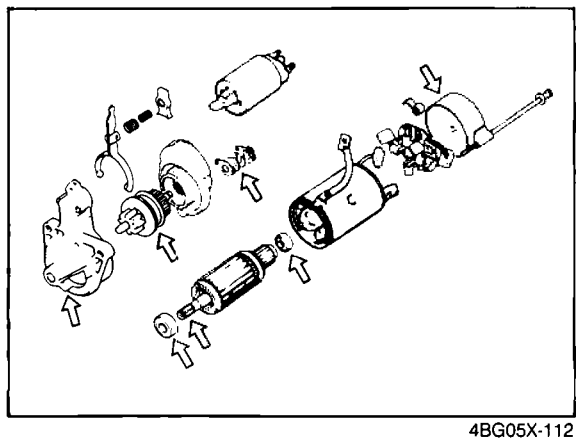
4BG05X-110

Lever installation
Install the lever as shown in figure.



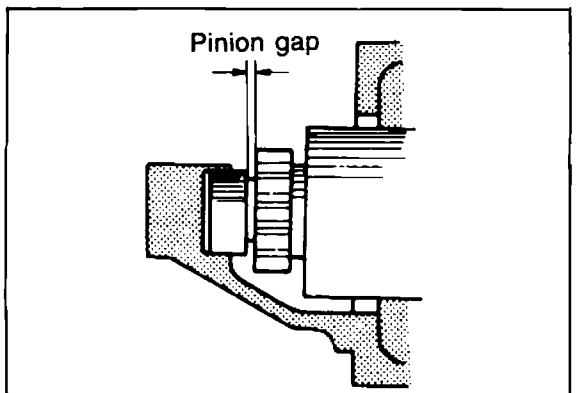
4BG05X-111

Rear bracket installation
Align the matching marks when assembling the rear bracket.



4BG05X-112

Greasing
When disassembling or assembling the starter, grease each sliding part, gear and bearing.
(1) Armature shaft gear
(2) Reduction gear
(3) Ball bearings (both ends of armature)
(4) Bearing box of rear bracket
(5) Snap ring of pinion shaft
(6) Sleeve bearing, pinion lever sliding part, others



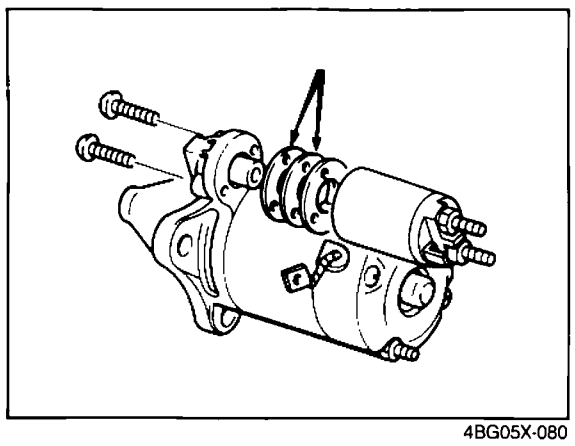
4BG05X-113

Adjustment of pinion gap

1. Disconnect the wiring from terminal (M).
2. Apply battery power to the terminal (S) and ground the starter motor body, the pinion will eject outward and then stop.
3. Measure the clearance (pinion gap) between the pinion and the stopper.

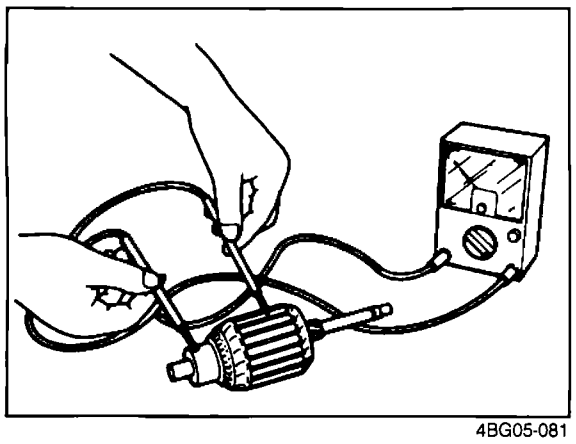
Note
Be careful not to let electricity flow continuously for more than 10 seconds.

Pinion gap: 0.5—2.0 mm (0.020—0.079 in)


4BG05X-080

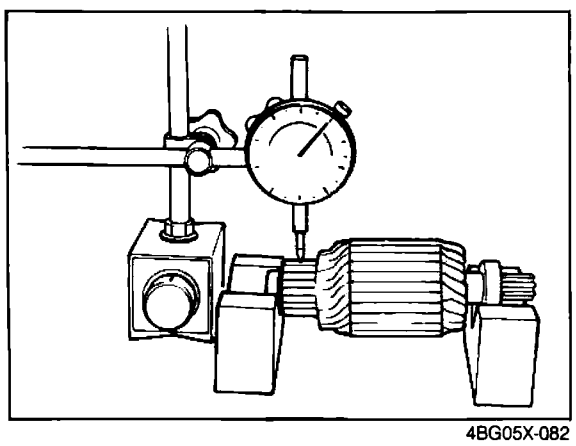
4. If the pinion gap is not within the specified range, make the adjustment by increasing or decreasing the number of washers used between the magnetic switch and the drive housing. The gap will become smaller if the number of washers is increased.

Caution
Do not use the washers more than plates.


4BG05-081

INSPECTION
Armature Coil

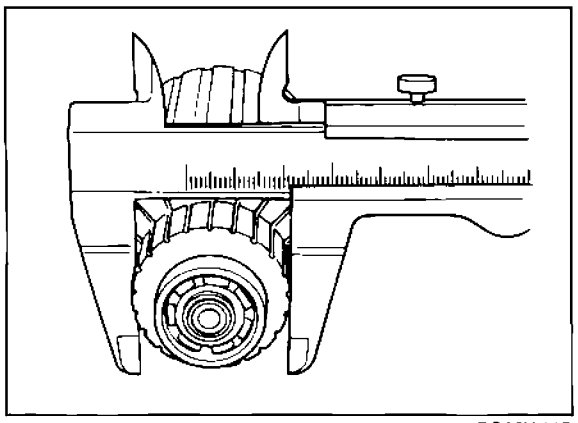
1. Ground of the armature coil
   Check for continuity between the commutator and the core by using a circuit tester. Replace the armature if there is continuity.


4BG05X-082

2. Vibration of the commutator
   Plate the armature on V blocks, and measure the vibration by using a dial gauge. If the vibration is Limit or more, repair so that is standard by using a lathe, or replace the armature.

Standard vibration: 0.05 mm (0.002 in)
Limit: 0.4 mm (0.018 in)

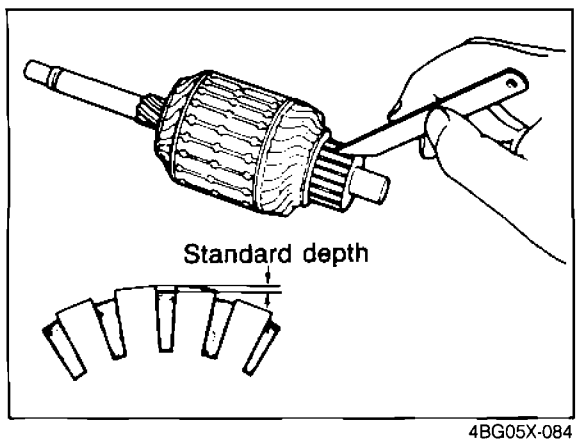
Note
Before checking, be sure than there is no play in the bearings.



4BG05X-115

3. Outer diameter of the commutator
   Replace the armature if the outer diameter of the commutator is grind limit or less.
4. Roughness of the commutator surface
   If the commutator surface is dirty, wipe it with a cloth; if is is rough, repair it by using a lathe or fine sandpaper.

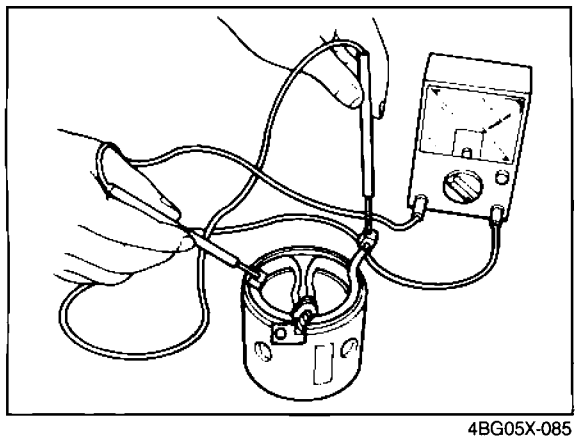
   Grind limit: 31 mm (1.22 in)



4BG05X-084

5. Segments groove depth
   If the depth of the mold between segments is limit depth or less, undercut the grooves by standard depth.

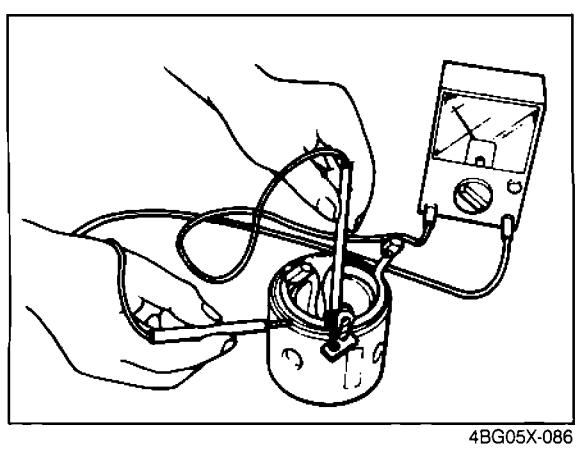
   Standard depth:
   0.5—0.8 mm (0.020—0.031 in)
   Limit depth: 0.2 mm (0.008 in)



4BG05X-085

Field Coil

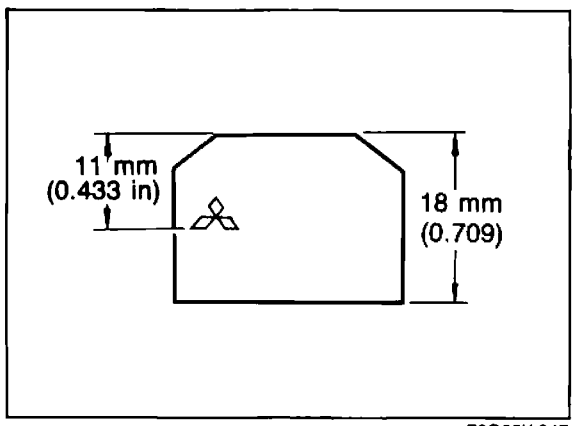
1. Wiring damage
   Check for continuity between the connector and brushes by using a circuit tester. Replace the yoke assembly if there is no continuity.



4BG05X-086

2. Ground of the field coil
   Check for continuity between the connector and yoke by using a circuit tester. Repair, or replace the yoke assembly if there is continuity.

3. Installation of the field coil
   Replace the yoke assembly if the field coil is loose.

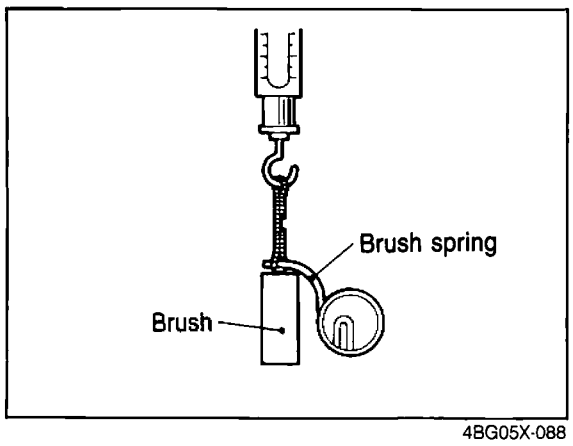


76G05X-047

Brush and Brush Holder

1. Brush
   If the brushes are worn beyond the wear limit, or if the wear is near the limit, replace the brushes.

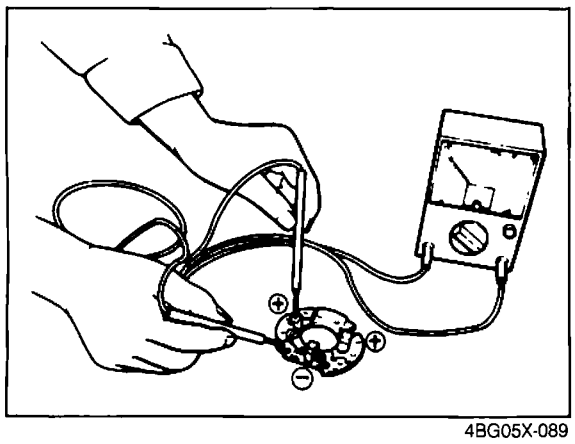
   Standard: 18 mm (0.709 in)
   Wear limit: 11 mm (0.433 in)



4BG05X-088

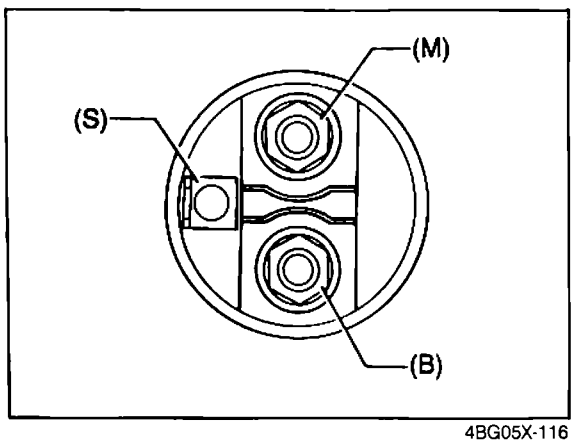
2. Brush spring
   (1) Measure the force of the brush spring by using a spring balance.
   (2) Replace the brush spring if the force is Limit or less.

   Limit: 9 N (900 g, 31.75 oz)



4BG05X-089

3. Brush holder
   (1) Check for continuity between the insulated brush and the plate by using a circuit tester.
   (2) Repair or replace if there is continuity.
   (3) Also check to be sure that the brush slides smoothly inside the brush holder.

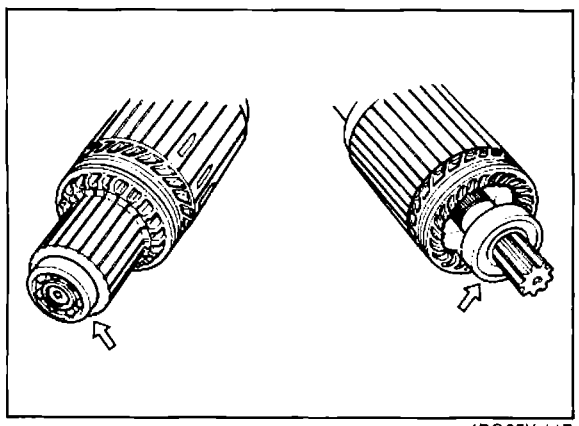


4BG05X-116

Magnetic Switch

1. Check continuity between (S) terminal and (M) terminal, and between (S) terminal and ground (body).
2. If there is no continuity, the wire is broken so replace the magnetic switch.

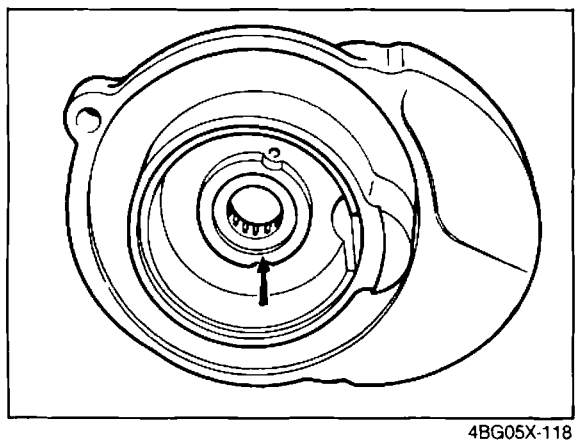
5 STARTER (DIESEL ENGINE, 2.2 KW TYPE)



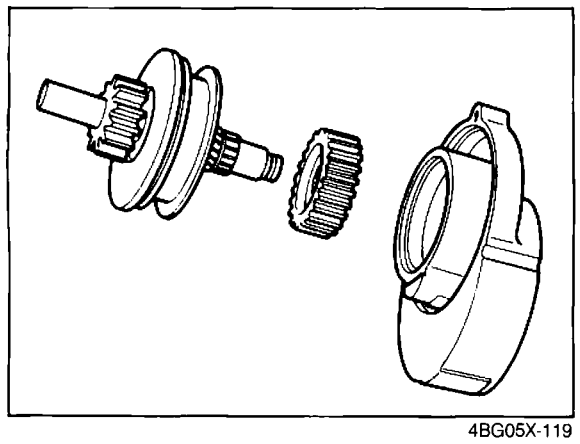
4BG05X-117

Gear
Wear and damage

Bearing
Replace the bearing when it is noisy or does not rotate smoothly.



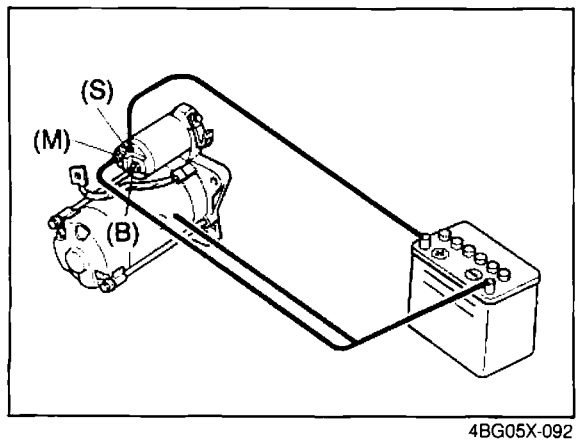
4BG05X-118



4BG05X-119

Over-running Clutch
1. Replace the pinion when a worn pinion or damaged pinion are found.
2. If the pinion does not rotate in both directions when rotating the pinion by hand, replace it.

Note
Do not wash the over-running clutch in gas or kerosene, this will destroy the grease packing.

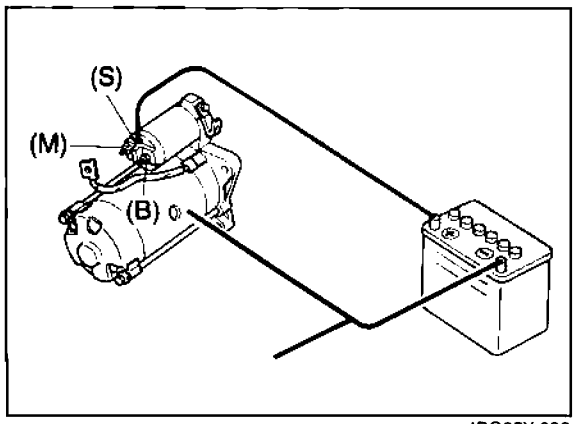


4BG05X-092

PERFORMANCE INSPECTION
Magnetic Switch
Disconnect the terminal **M wire**, and make the following tests.

Pull-in Test
The switch is normal if the pinion ejects outward when the battery is connected as shown in the figure.

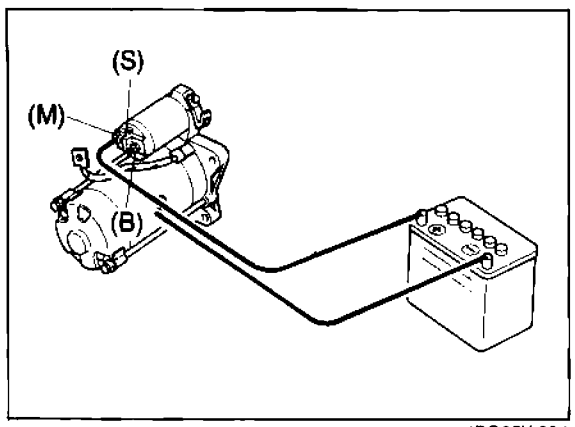
Caution
Do not supply power continuously for more than 10 seconds.



4BG05X-093

Hold-in Test

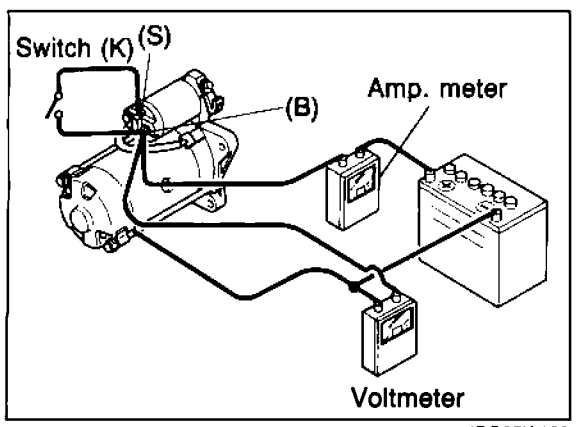
1. After completing the pull-in test, disconnect the wire from terminal M (with the pinion left ejected).
2. The hold-in coil is functioning properly if the pinion does not return.



4BG05X-094

Return Test

1. Connect the battery between terminal M of the magnetic switch and the body, as shown in the figure.
2. Pull the pinion out manually to the pinion stopper position.
3. The pinion should immediately return to its original position when it is released.



4BG05X-120

No-load Test

1. After adjusting the pinion gap, form a test circuit with a voltmeter and an ammeter.

   Note
   Use wires as thick as possible and tighten each terminal fully.

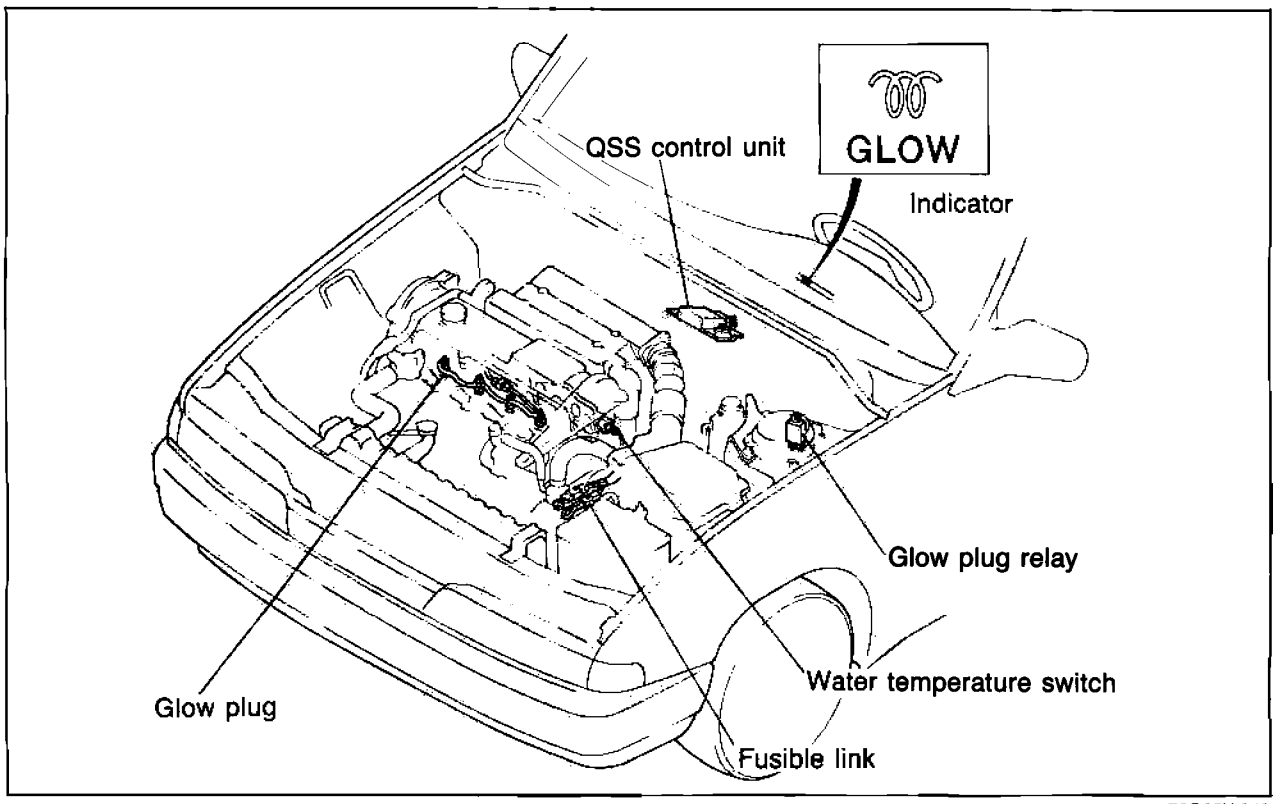
2. Close switch "K" to run the starter. If the voltmeter and ammeter show the following values while the starter is running, it is normal.

   Battery voltage: 11.0 volts
   Current: 130 amperes or less
   Gear shaft speed: at 4,500 rpm or more

3. If any abnormality is noted, check it according to "INSPECTION".

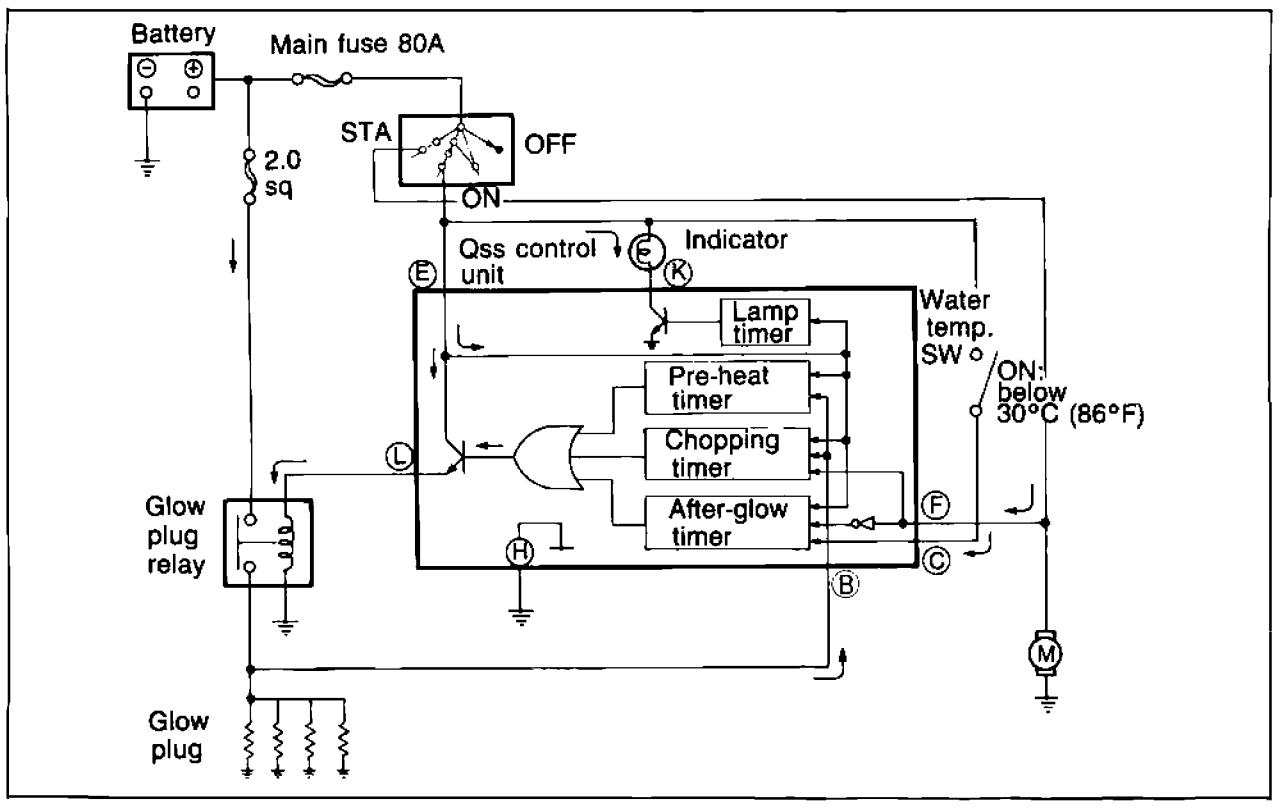
QUICK START SYSTEM (QSS)

COMPONENT LOCATION



76G05X-048

CIRCUIT DIAGRAM



76G05X-049

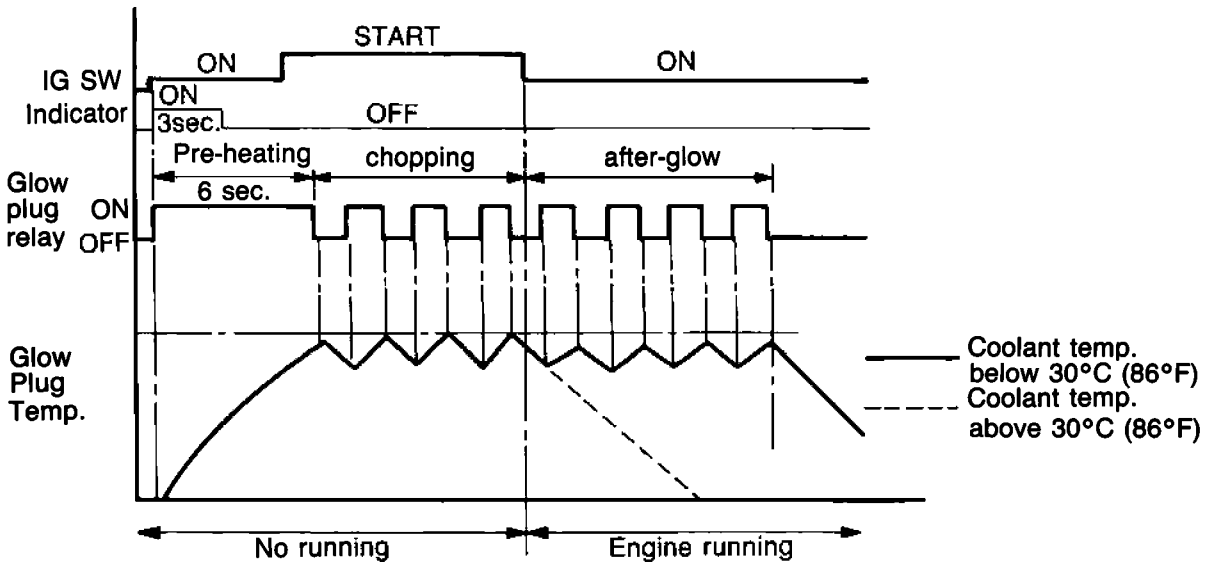
SYSTEM OPERATION

The Quick Start System has three functions: **Pre-heating**, **Chopping**, and **After-glow**; as used in the previous model. Each function operates as follows:

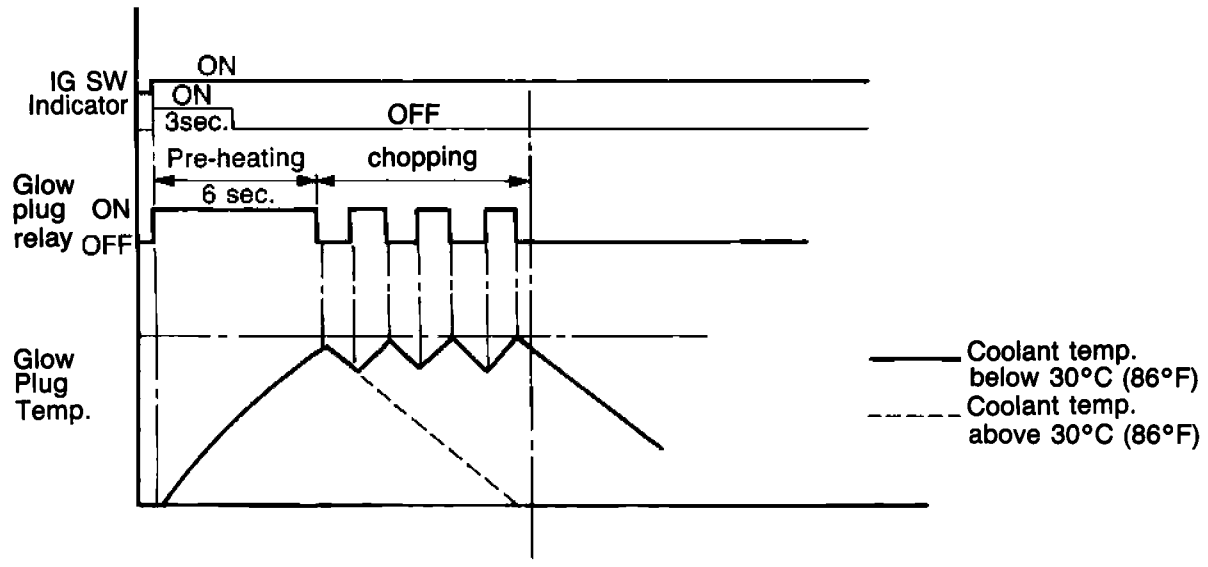
1. Pre-heating : After ignition switch is turned to ON position, current flows to glow plug for 6 sec.
2. Chopping : While engine switch is in START position, current flows to glow plug continuously.
3. After-glow (coolant temperature below 30°C (86°F):
   a) When engine switch is kept in ON position after pre-heating, current flows to glow plug continuously for 15 sec.
   b) After engine has stared, current flows to glow plug continuously for 15 sec.

Indicator lamp : Indicator illuminates for 3 sec. after ignition is ON position.

When ignition switch is ON-START-ON position



When ignition switch is kept in ON position

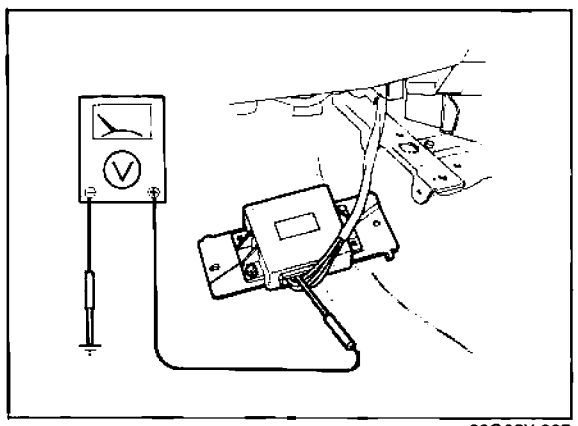


76G05X-050

TROUBLESHOOTING GUIDE
Preliminary Checks
When troubleshooting, check below first.
1. Main fuse
2. Fuses
3. Connectors
4. Ground circuit
5. Wiring harness

Condition	Cause
Glow plug relay does not close.	1. Faulty glow plug relay 2. Faulty control unit internal circuit 3. Poor contact or disconnection between control unit terminal Ⓛ and harness 4. Faulty START harness (open circuit at Ⓕ terminal in control unit) 5. Poor contact or disconnection between glow plug relay terminal and harness 6. Faulty glow plug
Glow plug relay does not open	1. Faulty glow plug relay 2. Faulty control unit internal circuit
Glow plug relay does not repeat ON and OFF.	1. Faulty poor contact of engine switch 2. Poor contact or disconnection of starter harness 3. Faulty control unit internal circuit
Glow plug relay does not repeat ON and OFF within 15 sec. after turning the engine switch ON.	1. Faulty water temperature switch 2. Faulty control unit internal circuit 3. Faulty glow plug relay 4. Poor contact or disconnection between control unit Ⓒ and water temperature switch

76G05X-051



63G05X-337

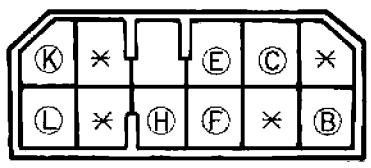
CONTROL UNIT
Inspection
1. Connect a voltmeter to the control unit as shown in the figure.
2. Check the voltage of the terminal.
3. Replace the control unit if necessary.

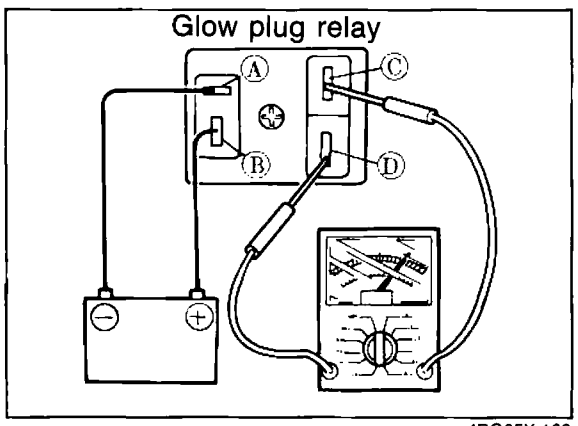
Caution
If the proper voltage is not indicated on the voltmeter, check all wiring connections and finally, check that component.

Control Unit Connector

Terminal	Input	Output	Connection to	Operation condition		Voltage	Remark
L (GW)		○	Glow plug relay	Engine switch: ON (No cranking)	for 6 sec.	approx. 12V	
					after 6 sec.	0V ↔ 12V	Coolant temperature; below 30°C (86°F)
						0V	Coolant temperature; above 30°C (86°F)
H (B)	—	—	Ground	—		0V	
E (BW)	○		Engine switch (ON)	Engine switch: ON		approx. 12V	
F (BR)	○		Engine switch (START)	Engine switch: START		approx. 12V	
C (BrB)	○		Water temperature switch	Engine switch: ON (No cranking)		approx. 12V	Coolant temperature; below 30°C (86°F)
						approx. 0V	Coolant temperature; above 30°C (86°F)
B (Gr)		○	Glow plug	At cranking		0V ↔ 12V	
				For 15 sec. after engine has started		0V ↔ 12V	Coolant temperature; below 30°C (86°F)
				After 15 sec.		0V	
				After engine has started		0V	Coolant temperature; above 30°C (86°F)
K (WR)		○	Indicator	Engine switch: ON	For 3 sec.	0V	
					after 3 sec.	approx. 12V	

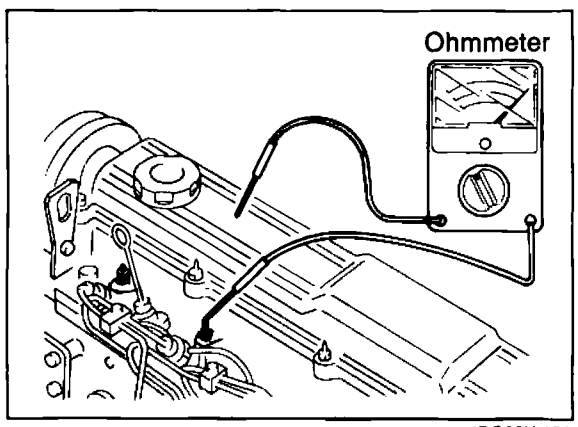
76G05X-052





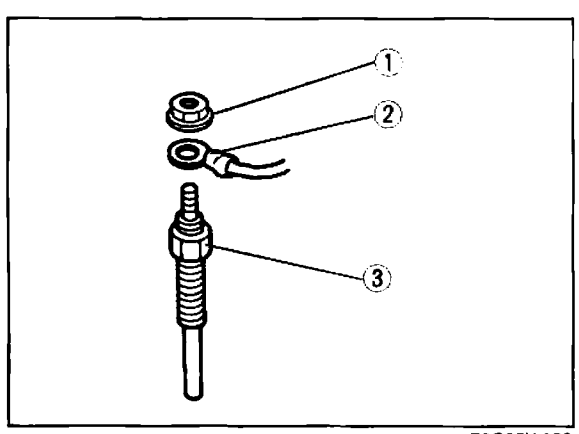
4BG05X-123

GLOW PLUG RELAY
Inspection
1. As shown in the figure, connect the battery and an ohmmeter to the relay.
2. If the ohmmeter shows continuity when the battery is connected, and no continuity when the battery is disconnected, the relay is good.
3. Replace the relay if it fails this test.



4BG05X-121

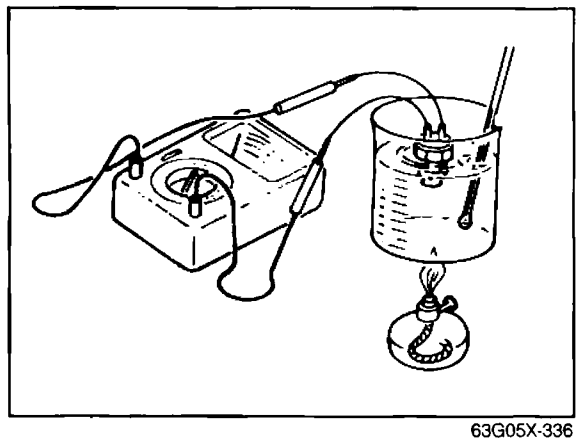
GLOW PLUG
Inspection
1. Check the continuity between the positive terminal of the glow plug and cylinder head with a circuit tester.
2. If there is no continuity, replace the glow plug.



76G05X-053

Removal
Remove in the following order:
1. Glow plug connector attaching nut.
2. Glow plug connector.
3. Glow plug

Installation
Install the glow plug, reverse order of removal.



63G05X-336

WATER TEMPERATURE SWITCH
Removal
Remove the water temperature switch from the radiator.

Installation
Install in the reverse order of removal.

Inspection
1. Place the water temperature switch in water with a thermometer and heat the water gradually.
2. Check the temperature at which continuity exists between the terminals.
3. Replace the switch, if necessary.

Specified temperature: above 28—32°C (82—90°F)

6

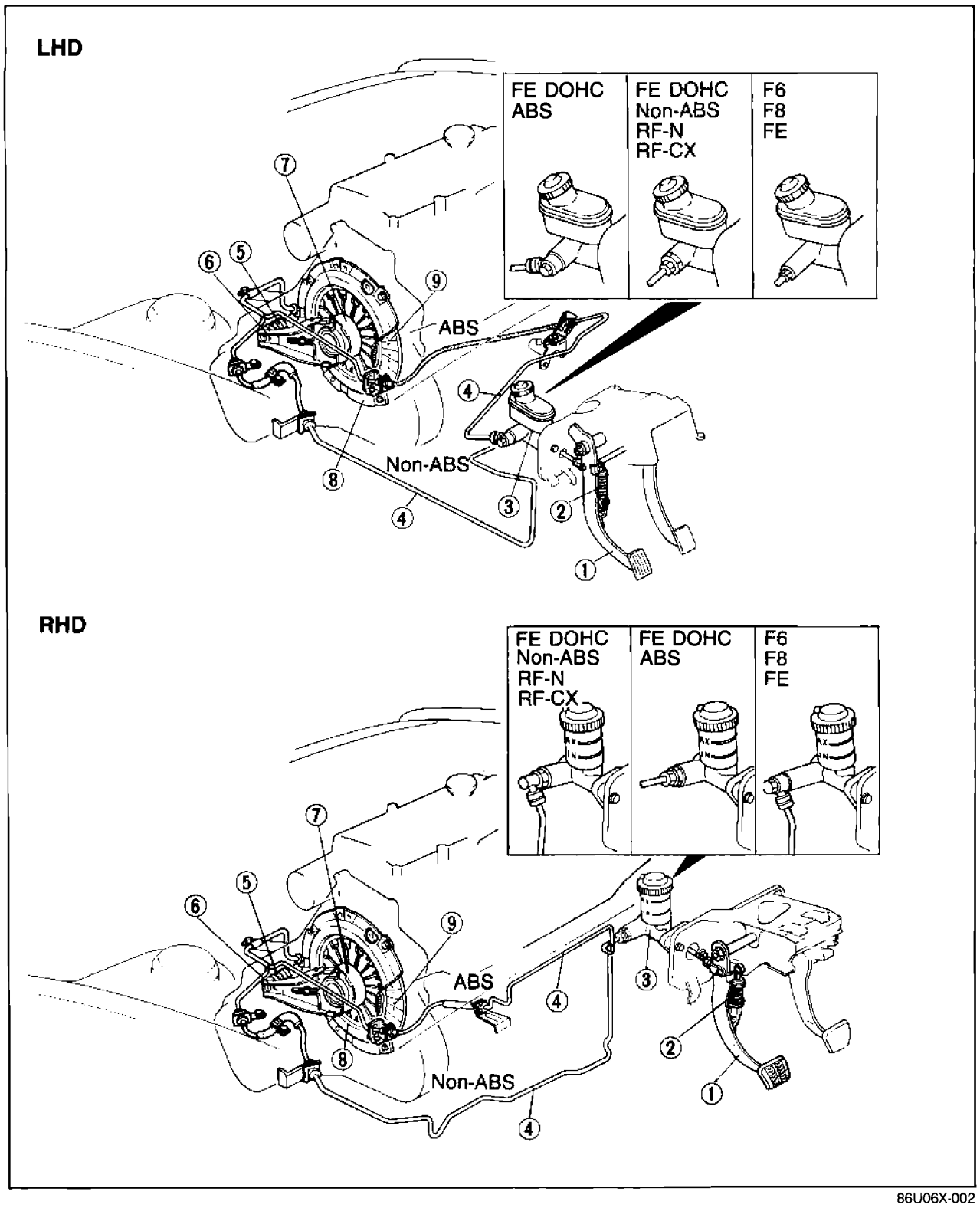
CLUTCH

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ON-VEHICLE MAINTENANCE ..... 6— 4
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6 OUTLINE

OUTLINE

STRUCTURAL VIEW



86U06X-002

1. Clutch pedal
2. Assist spring
3. Clutch master cylinder
4. Clutch pipe
5. Clutch release cylinder
6. Clutch release fork
7. Clutch release bearing
8. Clutch cover
9. Clutch disc

SPECIFICATIONS

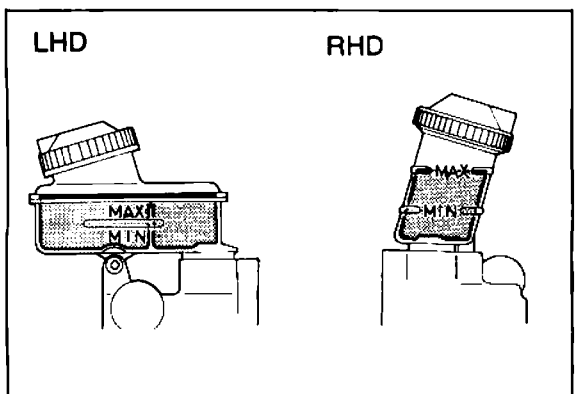
Item \ Engine model				F6	F8	FE	FE DOHC	RF-N	RF-CX
Clutch control type				Hydraulic					
Clutch cover type				Diaphragm spring					
Clutch disc	Set load N (kg, lb)		General	3,434 (350,770)	3,846 (392,862)	4,316 (440,968)		3,846 (392,862)	—
			ECE (Except UK)	—	4,022 (410,902)	4,611 (470, 1,034)		4,022 (410, 902)	
			UK	—	3,846 (392,862)	4,611 (470,1,034)	4,316 (440,968)	3,846 (392,862)	4,022 (410,902)
	Outer diameter mm (in)			200 (7.874)	215 (8.465)	225 (8.858)			
	Inner diameter mm (in)			130 (5.118)	150 (5.906)				
	Thickness mm(in)	Pressure plate side	General	4.1 (0.16)					—
			ECE (Except UK)	—	3.8 (0.15)				
			UK	—	4.1 (0.16)	3.8 (0.15)	4.1 (0.16)		3.8 (0.15)
		Flywheel side		3.5 (0.14)					
Clutch pedal	Type			Suspended					
	Pedal ratio	LHD		6.00					
		RHD		5.96					
	Full stroke mm (in)			135 (5.31)					
	Height mm (in)			216.5—221.5 (8.524—8.720)					
Master cylinder inner diameter mm (in)				15.87 (0.625)					
Release cylinder inner diameter mm (in)				19.05 (0.750)					
Clutch fluid type				DOT-3 or DOT-4, FMVSS 116, or SAE J1703					

76G06X-002

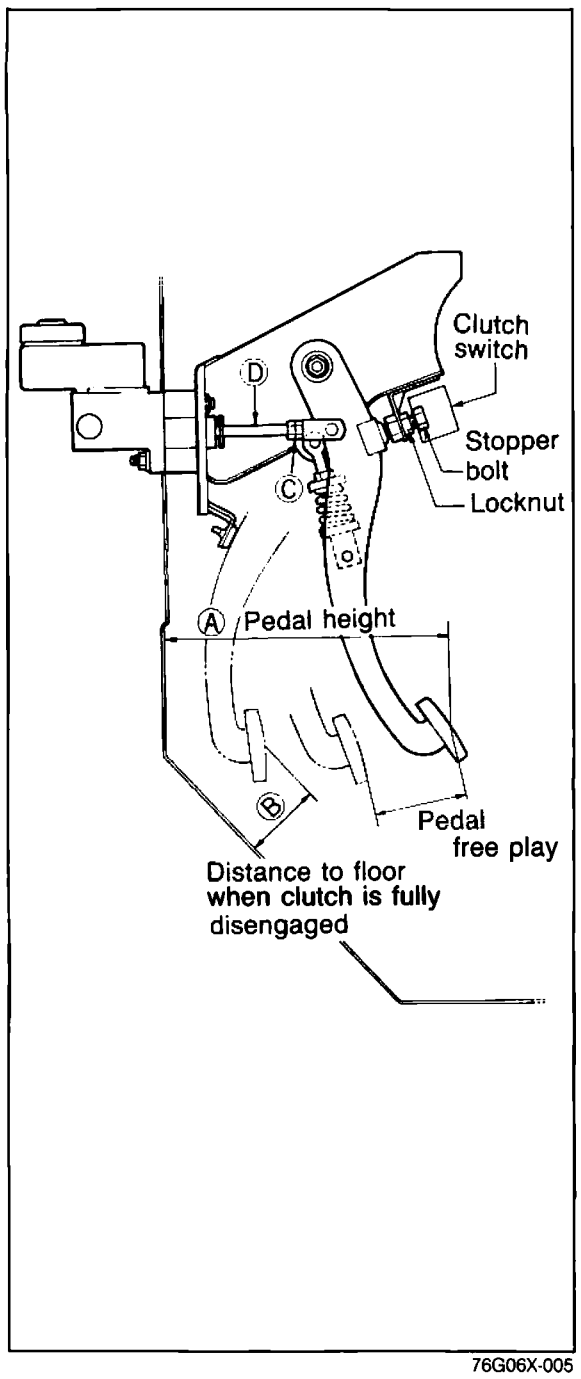
TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Slipping	Clutch disc facing worn excessively	Replace	6—17
	Clutch disc facing surface hardened or oil on surface	Repair or replace	6—17
	Pressure plate deformed	Repair or replace	6—16
	Diaphragm spring damaged or weakened	Replace	6—16
	Insufficient clutch pedal play	Adjust	6—4
	Clutch pedal does not function smoothly	Repair or replace	6—4, 5
	Flywheel deformed	Repair or replace	6—18
Faulty disengagement	Excessive runout or deformity of clutch disc	Replace	6—17
	Clutch disc splines rusted or worn	Remove rust or replace	6—17
	Oil on clutch cover facing surface	Repair or replace	6—16
	Diaphragm spring weakened	Replace	6—16
	Excessive clutch pedal play	Adjust	6—4, 5
	Insufficient clutch fluid	Add fluid	6—4
	Leakage of clutch fluid	Repair or replace	—
Clutch vibrates when starting	Oil on clutch disc facing surface	Repair or replace	6—17
	Torsion spring weakened	Replace	6—17
	Clutch disc facing surface hardened or deformed	Repair or replace	6—17
	Clutch disc facing rivets loose	Replace	6—17
	Pressure plate deformed	Replace	6—16
	Flywheel surface hardened or deformed	Repair or replace	6—18
	Loose or worn engine mount	Tighten or replace	—
Clutch pedal does not function smoothly	Pedal shaft not properly lubricated	lubricate or replace	6—5
Abnormal noise	Clutch release bearing damaged	Replace	6—17
	Poor lubrication of clutch release bearing sleeve	Lubricate or replace	6—17
	Torsion spring weakened	Replace	6—17
	Excessive crankshaft end play	Repair	Refer to Section 1
	Pilot bearing worn or damaged by heat	Replace	6—16
	Worn pivot points of release fork	Repair or replace	6—18

76G06X-003



76G06X-004



76G06X-005

ON-VEHICLE MAINTENANCE

FLUID LEVEL

1. Clean the area around the reservoir and the reservoir cap.
2. Check the fluid level. If the level is near or below the "MIN" mark, add clutch fluid to the "MAX" mark.

Fluid specification:
DOT-3 or DOT-4
(FMVSS 116, or SAE J1703)

PEDAL HEIGHT

Inspection

Measure the distance from the upper center of the pedal pad to the firewall and ensure that the distance is within specification.

Pedal height A:
216.5—221.5 mm (8.524—8.720 in)

Adjustment

To adjust the pedal height, loosen locknut and turn stopper bolt or clutch switch.

PEDAL FREEPLAY

Inspection

Depress the pedal lightly by hand and measure the freeplay to ensure that it is within specification.

Pedal freeplay: 5—13 mm (0.20—0.51 in)

Adjustment

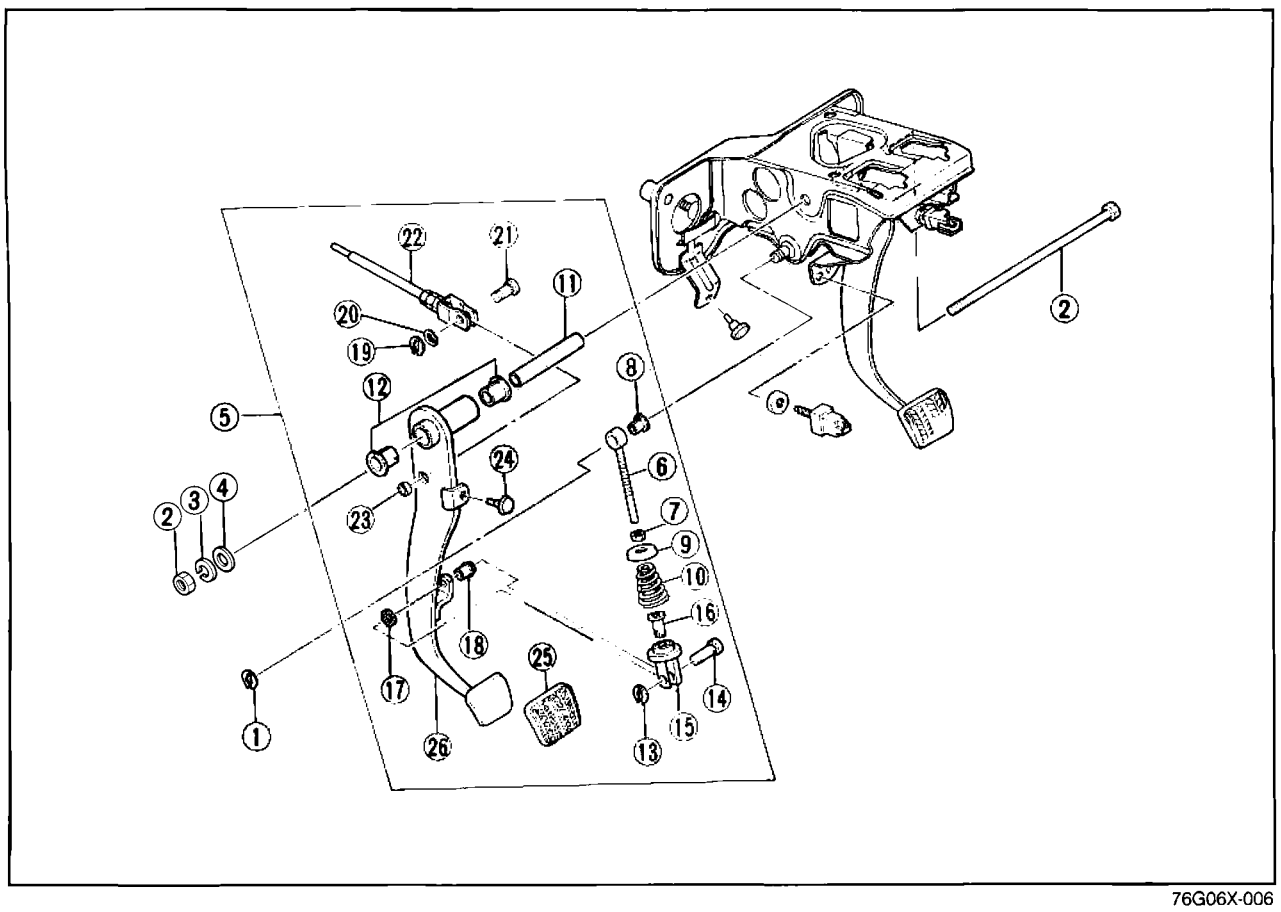
1. Adjust the free play by loosening locknut C and turning push rod D.
2. Check that the distance from the floor to the center of the upper surface of the pedal pad is as specified or more when the clutch is fully disengaged.

Disengagement height B:
LHD 68 mm (2.7 in)
RHD 85 mm (3.3 in)

3. Tighten locknut C after adjustment.

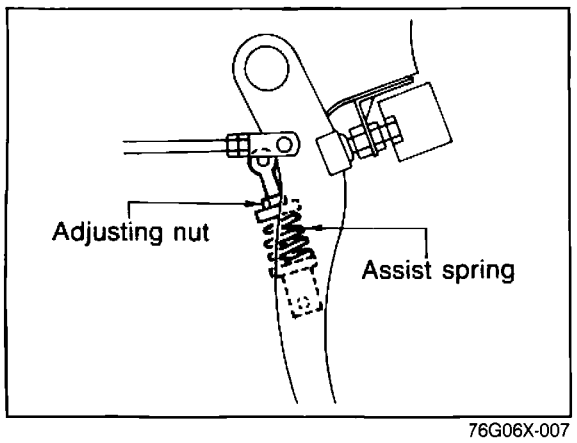
CLUTCH PEDAL

REMOVAL
Remove in the sequence shown in the figure referring to the removal note.



76G06X-006

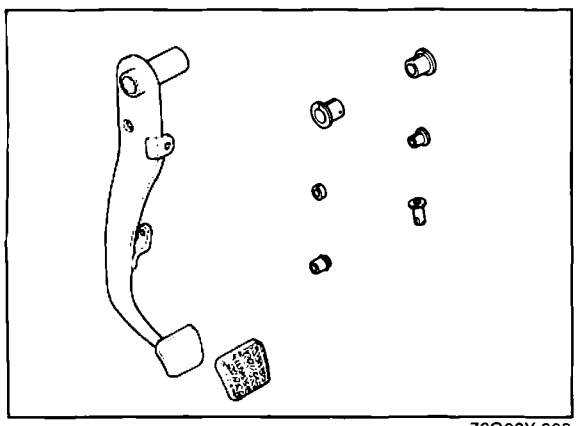
1. Clip
2. Bolt and nut
3. Spring washer
4. Flat washer
5. Clutch pedal Assembly
6. Rod
7. Adjusting nut
8. Bushing
9. Spring seat
10. Assist spring
11. Spacer
12. Bushings
13. Clip
14. Pin
15. Spring seat
16. Bushing
17. Spacer
18. Bushing
19. Clip
20. Wave washer
21. Pin
22. Push rod
23. Bushing
24. Stopper rubber
25. Pad
26. Clutch pedal



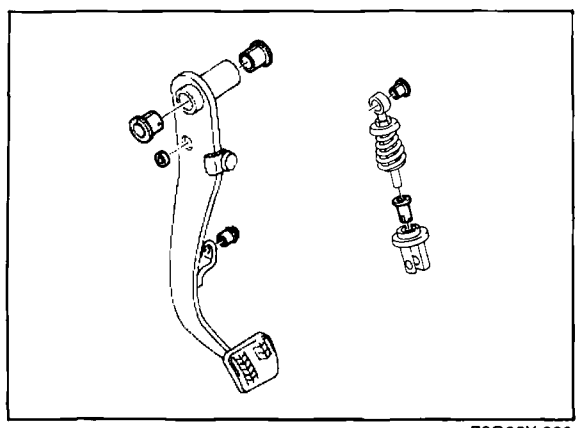
76G06X-007

Removal Note
Before removing the clutch pedal, loosen adjusting nut of the assist spring to relieve the spring tension.

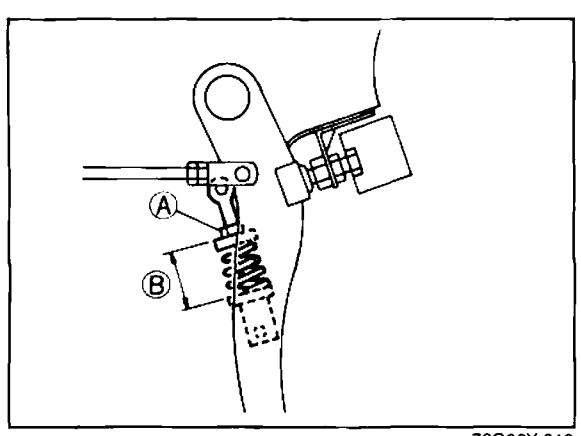
6 CLUTCH PEDAL



76G06X-008



76G06X-009



76G06X-010

INSPECTION
Check the following, and repair or replace any faulty parts.
1. Worn or damaged pedal bushing
2. Twisted or bent pedal
3. Worn or damaged pedal pad

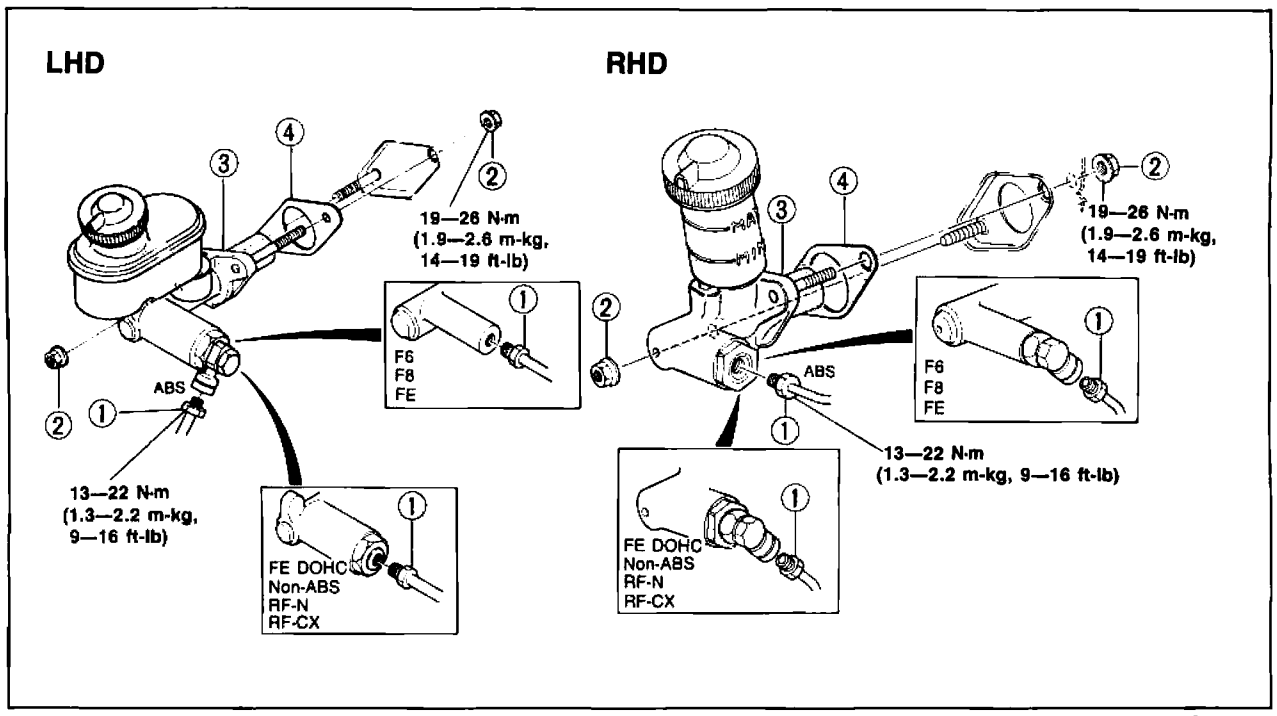
INSTALLATION
Install in the reverse order of removal referring to the installation note.

Installation Note
Apply grease (lithium base, NLGI No.2) to the bushings.

ADJUSTMENT
1. Adjust the pedal height. (Refer to page 6—4.)
2. Check the pedal free play, and adjust if necessary. (Refer to page 6—4.)
3. Adjust the installation length of the assist spring. The installation length is adjusted by turning nut A show in the figure and adjusting dimension B.

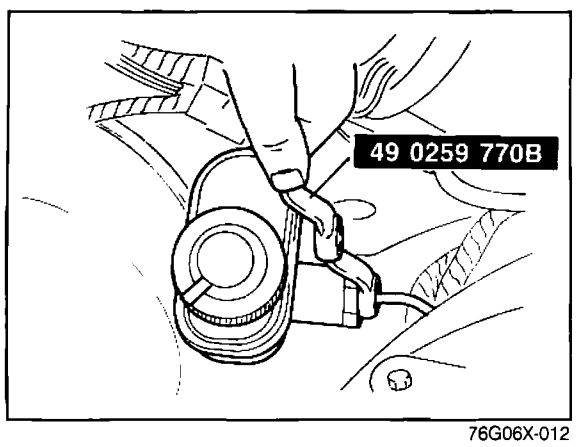
Standard dimension:
38.6—39.6 (1.520—1.559 in)

CLUTCH MASTER CYLINDER



76G06X-011

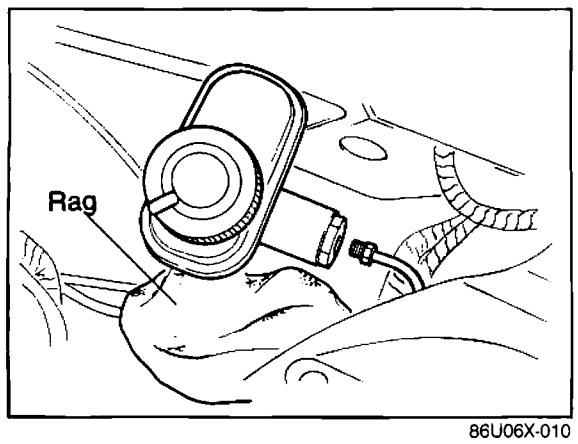
1. Clutch pipe
2. Nuts
3. Clutch master cylinder
4. Gasket



76G06X-012

REMOVAL

1. Remove the ABS relay box. (LHD)
2. Disconnect the clutch pipe with the **SST**.
3. Remove the mounting nuts.
4. Remove the clutch master cylinder.

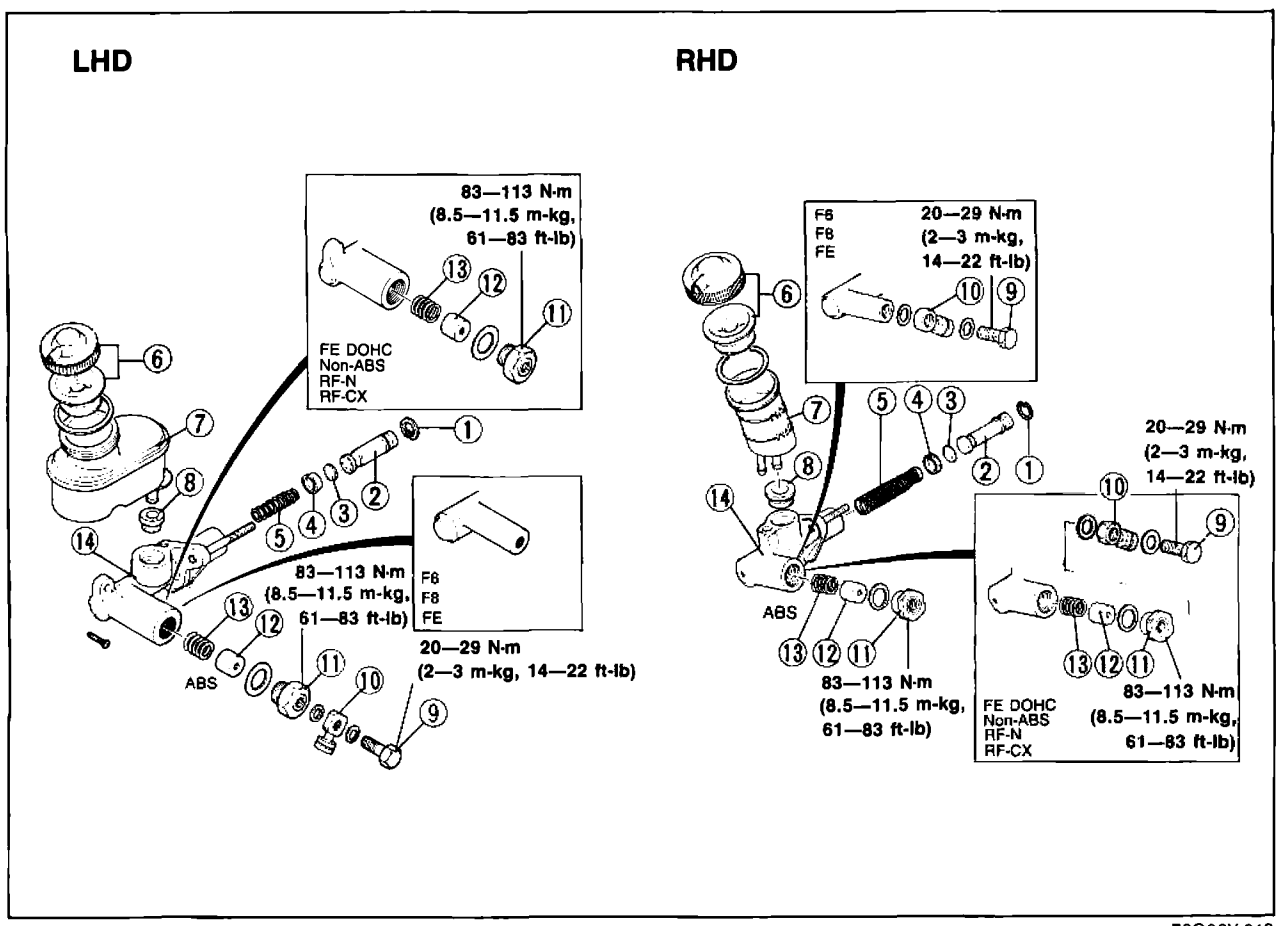


86U06X-010

Caution
Clutch fluid will damage painted surfaces. Be sure to use a container or rags to collect it. If fluid does get on a painted surface, wipe it off immediately with a rag.

6 CLUTCH MASTER CYLINDER

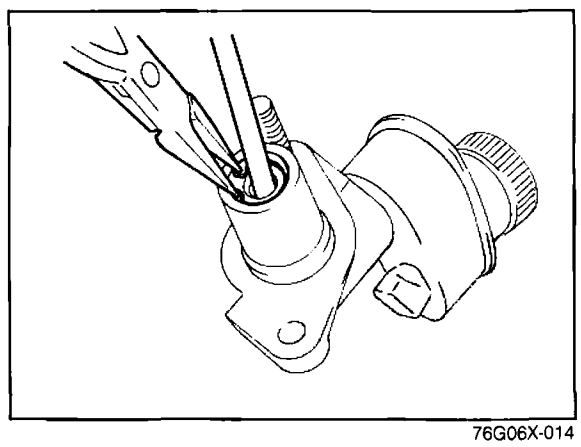
DISASSEMBLY
Components



76G06X-013

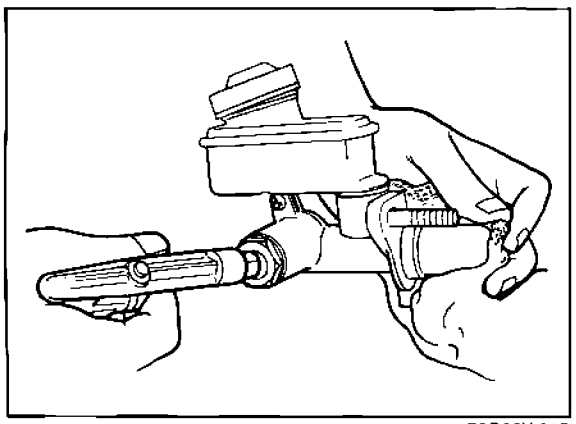
1. Snap ring
2. Piston and secondary cup assembly
3. Spacer
4. Primary cup
5. Return spring
6. Tank cap and baffle
7. Reserve tank
8. Bushing
9. Connector bolt
10. Connector
11. Joint bolt
12. One-way valve piston
13. Spring
14. Cylinder body

Caution
When disassembling or assembling the clutch master cylinder, do so in a clean space free from dirt and dust.



76G06X-014

1. Press down on the piston with a phillips screwdriver and remove the snap ring with snap ring pliers.

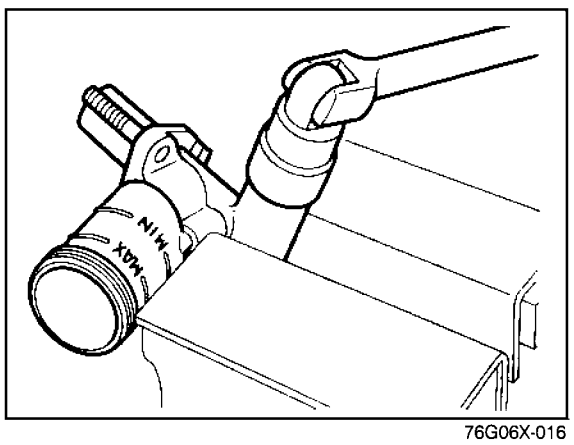


76G06X-015

2. Remove the piston and secondary cup assembly by blowing compressed air through the clutch pipe installation hole.

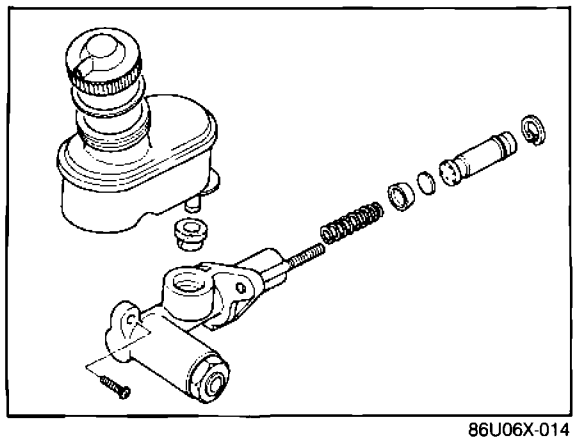
Caution
When doing so, use a rag to prevent the piston and secondary cup assembly from projecting out.

3. Remove the spacer, primary cup, and return spring.
4. Remove the tank cap and baffle.



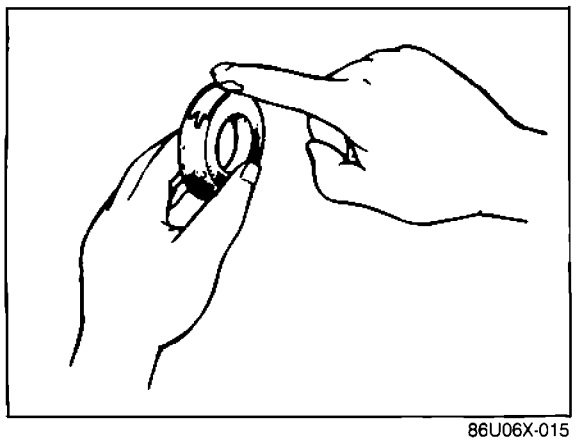
76G06X-016

5. Remove the tank set screw. (LHD)
6. Remove the reserve tank.
7. Remove the bushing, if necessary.
8. Remove the connector. (LHD ABS, RHD without ABS)
9. Remove the joint bolt, then remove the one-way valve piston and spring.(FE DOHC, RF-N, RF-CX)



86U06X-014

INSPECTION
After cleaning all parts, check the following points. Replace any parts with new parts, if necessary. Note that rubber parts should be cleaned with clutch fluid.
1. Wear or damage of cylinder wall and/or piston.
2. Weakness of return spring.
3. Wear or damage of piston cup.
4. Damaged or bent reserve tank and/or reserve tank installation part.

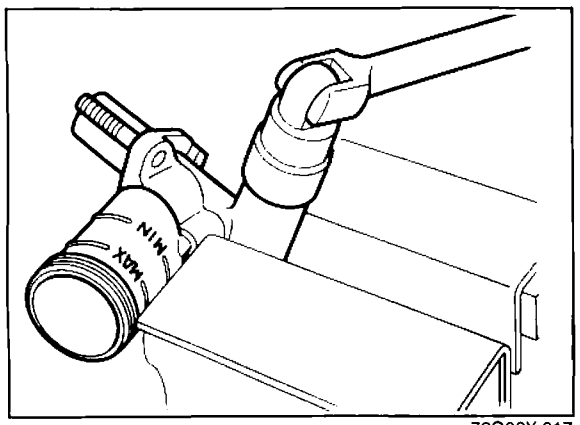


86U06X-015

ASSEMBLY
Apply clean clutch fluid to the piston cup and the cylinder bore before assembly.

Caution
After applying clutch fluid, check that no foreign material is on the cup.

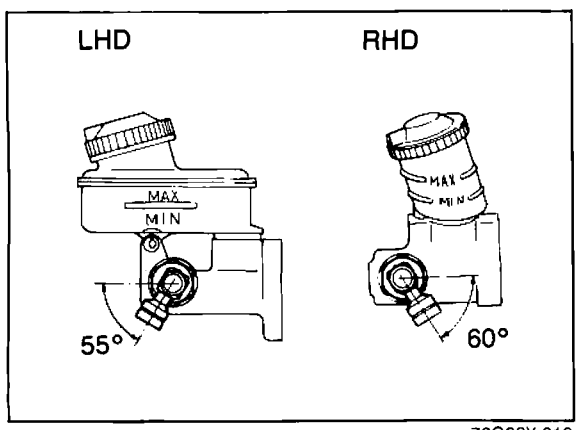
6 CLUTCH MASTER CYLINDER



76G06X-017

1. Install the one-way valve spring and piston. (FE DOHC, RF-N, RF-CX)
2. Tighten the joint bolt with new gasket. (FE DOHC, RF-N, RF- CX)

Tightening torque:
83—113 N·m (8.5—11.5 m-kg, 61—83 ft-lb)

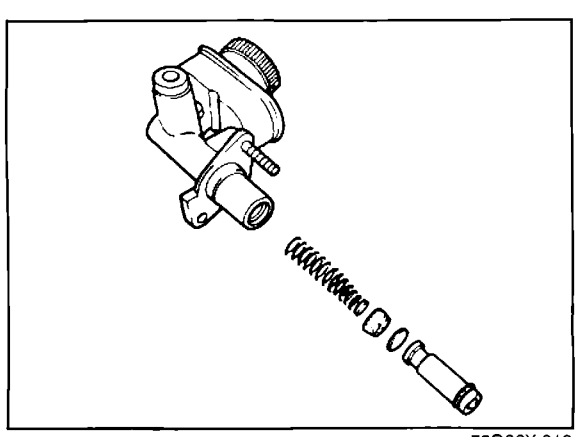


76G06X-018

3. Install the connector and new gaskets. (LHD ABS, RHD without ABS)

Caution
Install the connector at the angle shown in the figure.

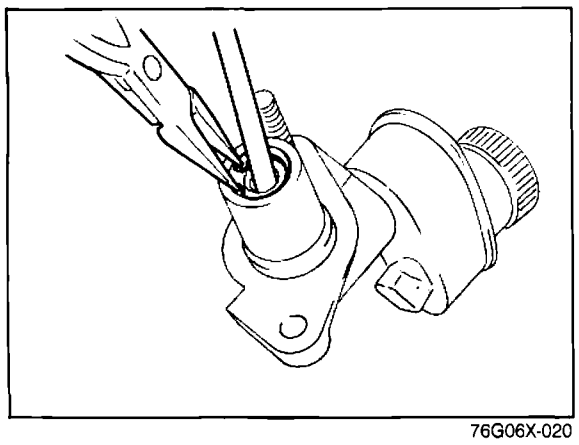
Tightening torque:
20—29 N·m (2—3 m-kg, 14—22 ft-lb)



76G06X-019

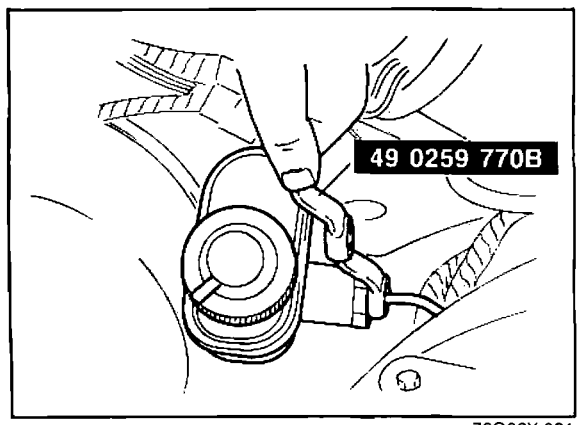
4. Install the new bushing.
5. Install the reserve tank, baffle and tank cap.
6. Install the following parts:
   (1) Return spring
   (2) Primary cup
   (3) Spacer
   (4) New piston and secondary cup assembly

Caution
A new primary cup, piston, and secondary cup assembly must be used.



76G06X-020

7. While pressing the piston with a screwdriver, install the snap ring.



76G06X-021

INSTALLATION

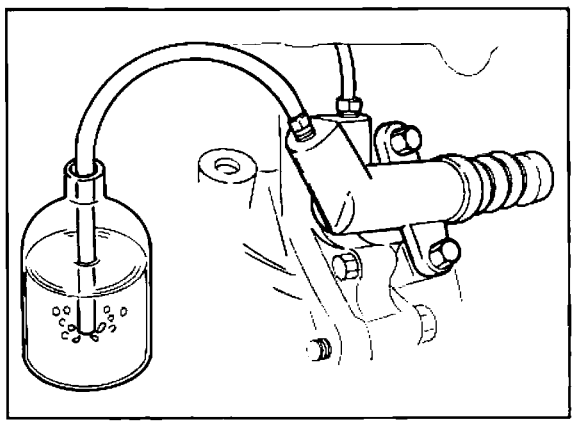
1. Install the clutch master cylinder.
2. Tighten the mounting nuts.

   Tightening torque:
   19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

3. Tighten the clutch pipe flare nut securely with the **SST**.

   Tightening torque:
   13—22 N·m (1.3—2.2 m-kg, 9—16 ft-lb)

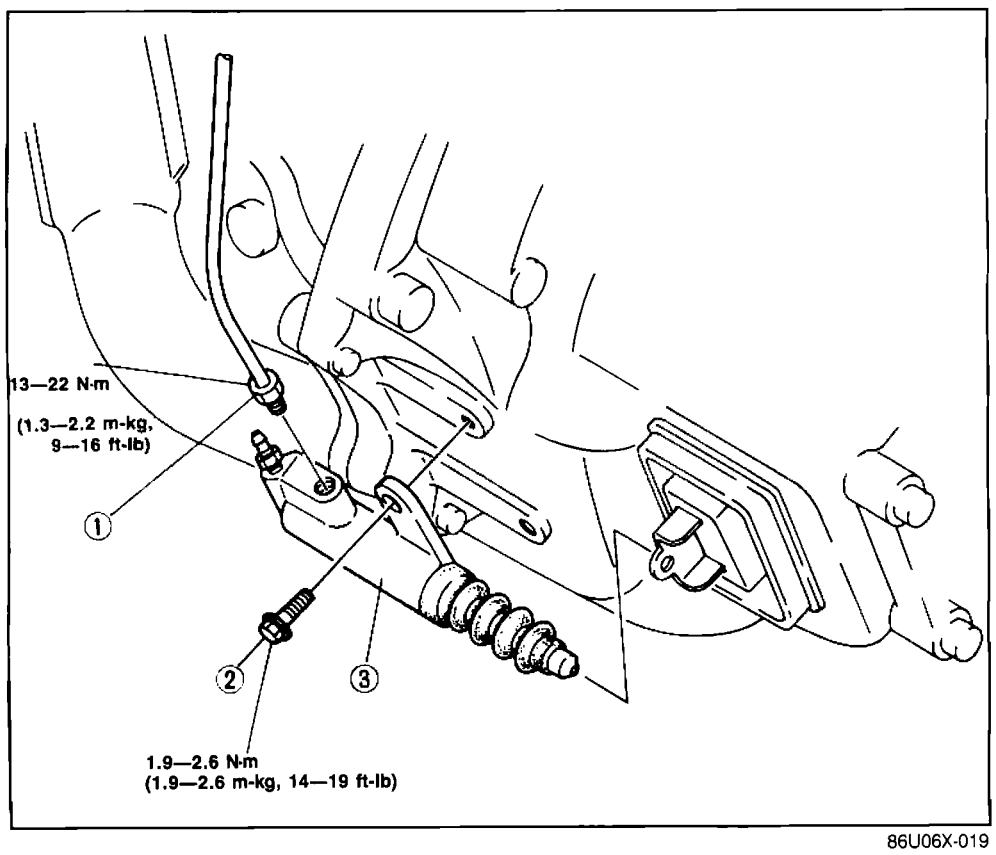
4. Install the ABS relay box. (LHD)



After installation

1. Perform air bleeding. (Refer to page 6—14.)
2. Verify that there is no leakage.
3. Perform a road test.

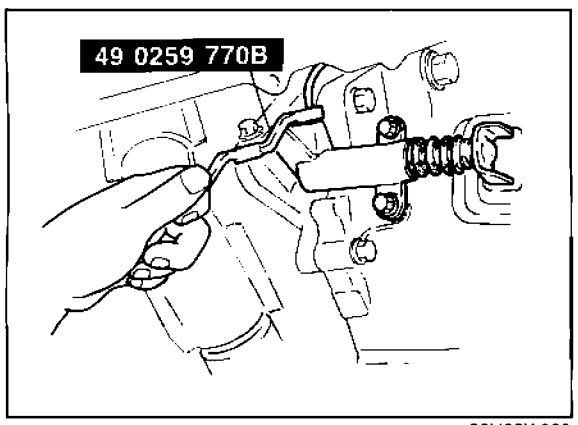
CLUTCH RELEASE CYLINDER



86U06X-019

1. Clutch pipe flare nut
2. Installation bolts
3. Release cylinder

6 CLUTCH RELEASE CYLINDER

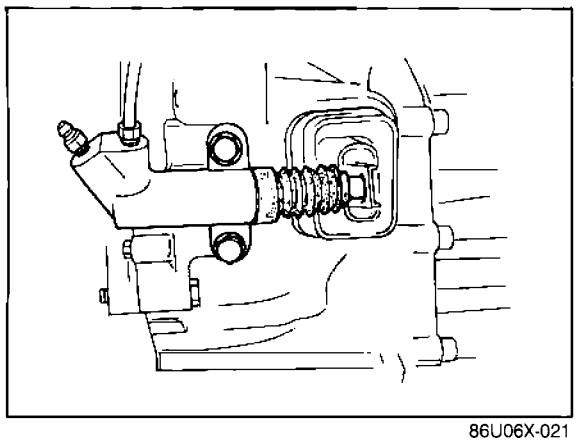


86U06X-020

REMOVAL

1. Disconnect the clutch pipe, with the **SST**.

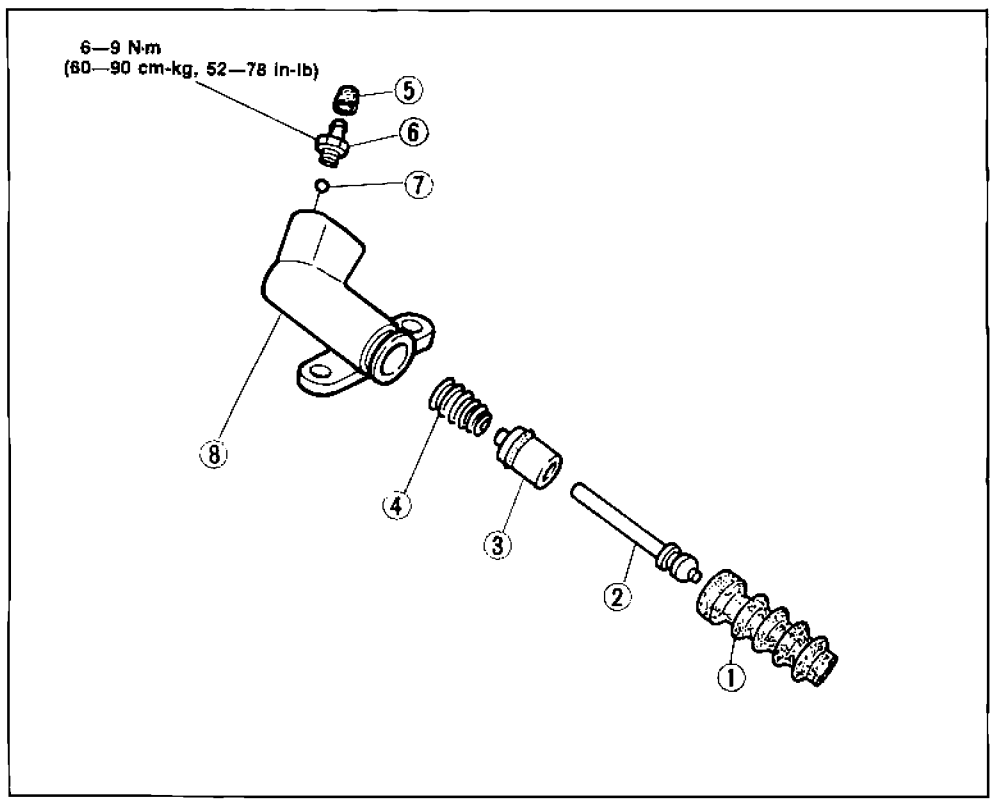
Note
Plug the pipe in order to prevent fluid from leaking.



86U06X-021

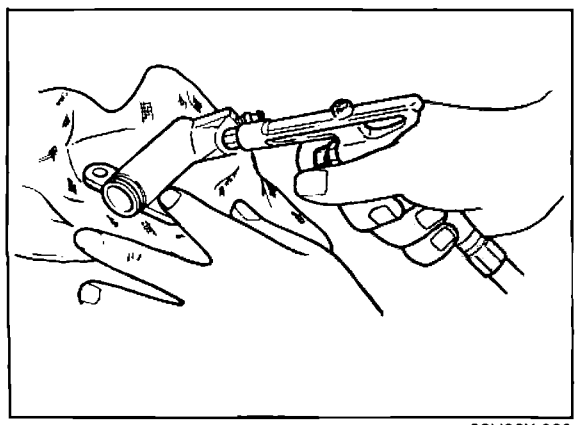
2. Remove the installation bolts.
3. Remove the release cylinder.

DISASSEMBLY
Components



76G06X-022

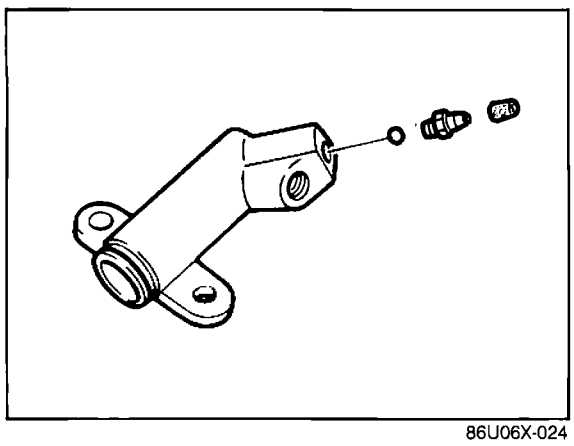
1. Boot
2. Push rod
3. Piston and piston cup
4. Return spring
5. Bleeder cap
6. Bleeder screw
7. Steel ball
8. Cylinder body



86U06X-023

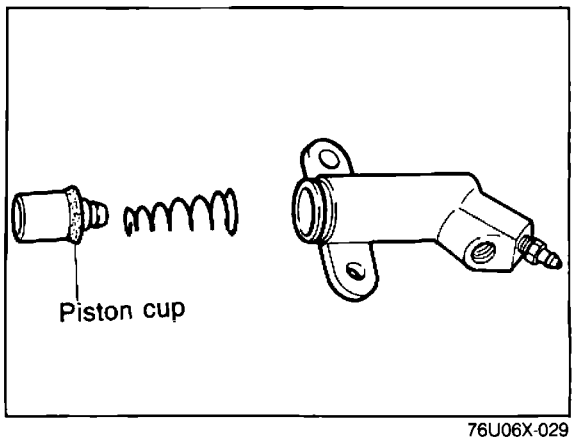
1. Pull out the push rod and boot.
2. Remove the piston and piston cup by blowing compressed air through the clutch pipe installation hole.

Caution
When doing so, use a rag to prevent the piston and piston cup assembly from projecting out.



86U06X-024

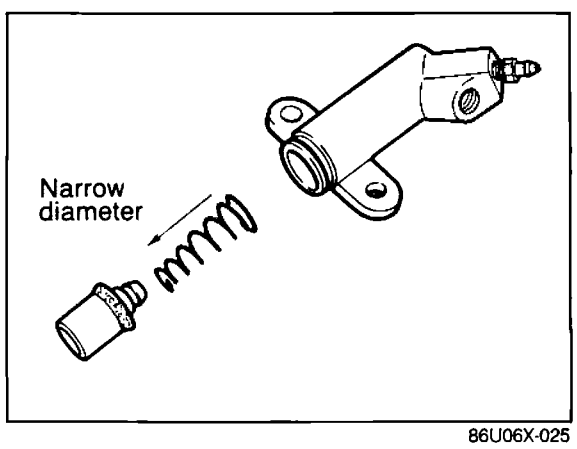
3. Remove the return spring.
4. Remove the following parts if necessary:
   (1) Bleeder cap
   (2) Bleeder screw
   (3) Steel ball



76U06X-029

INSPECTION

After cleaning all parts, check the following points. Replace any parts with new parts if necessary. Note that rubber parts should be cleaned with clutch fluid.
1. Wear or damage of cylinder wall and piston.
2. Weakness of return spring.
3. Wear or damage of piston cup.



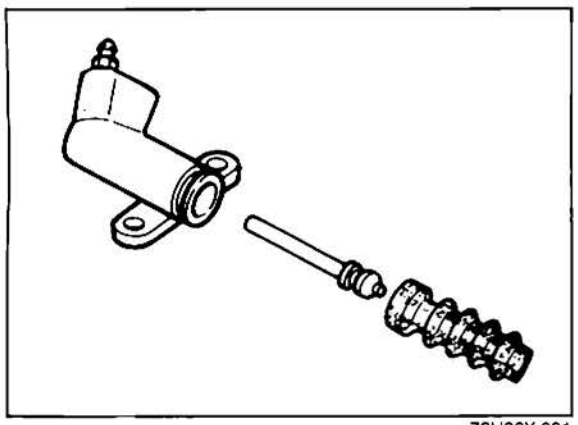
86U06X-025

ASSEMBLY

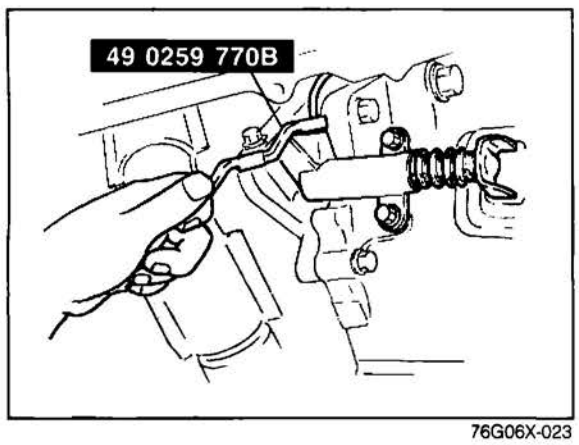
1. Install the following parts:
   (1) Steel ball
   (2) Bleeder screw
   (3) Bleeder cap
2. Install the return spring.
3. Install the new piston and piston cup assembly.

Caution
a) A new piston and piston cup assembly must be used.
b) Make sure the return spring and piston cup assembly are as illustrated.

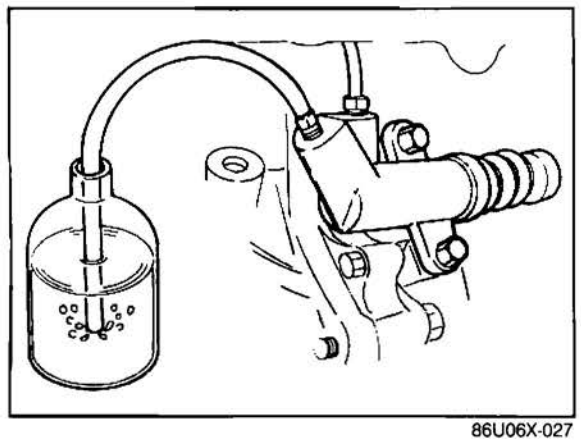
6 AIR BLEEDING



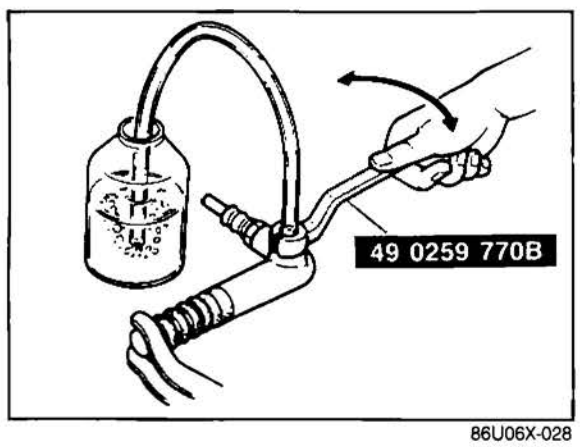
76U06X-031



76G06X-023



86U06X-027



86U06X-028

4. Install the following parts:
   (1) Push rod
   (2) Boot

INSTALLATION
1. Install the release cylinder.
2. Tighten the installation bolts.

   Tightening torque:
   19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

3. Tighten the clutch pipe flare nut securely with the **SST**.

   Tightening torque:
   13—22 N·m (1.3—2.2 m-kg, 9—16 ft-lb)

After installation
1. Perform air bleeding.
2. Verify that there is no leakage from the hydraulic circuit.
3. Perform a road test.

AIR BLEEDING

The clutch hydraulic system must be bled to remove air that entered when the pipes were disconnected. This bleeding is done as described below.

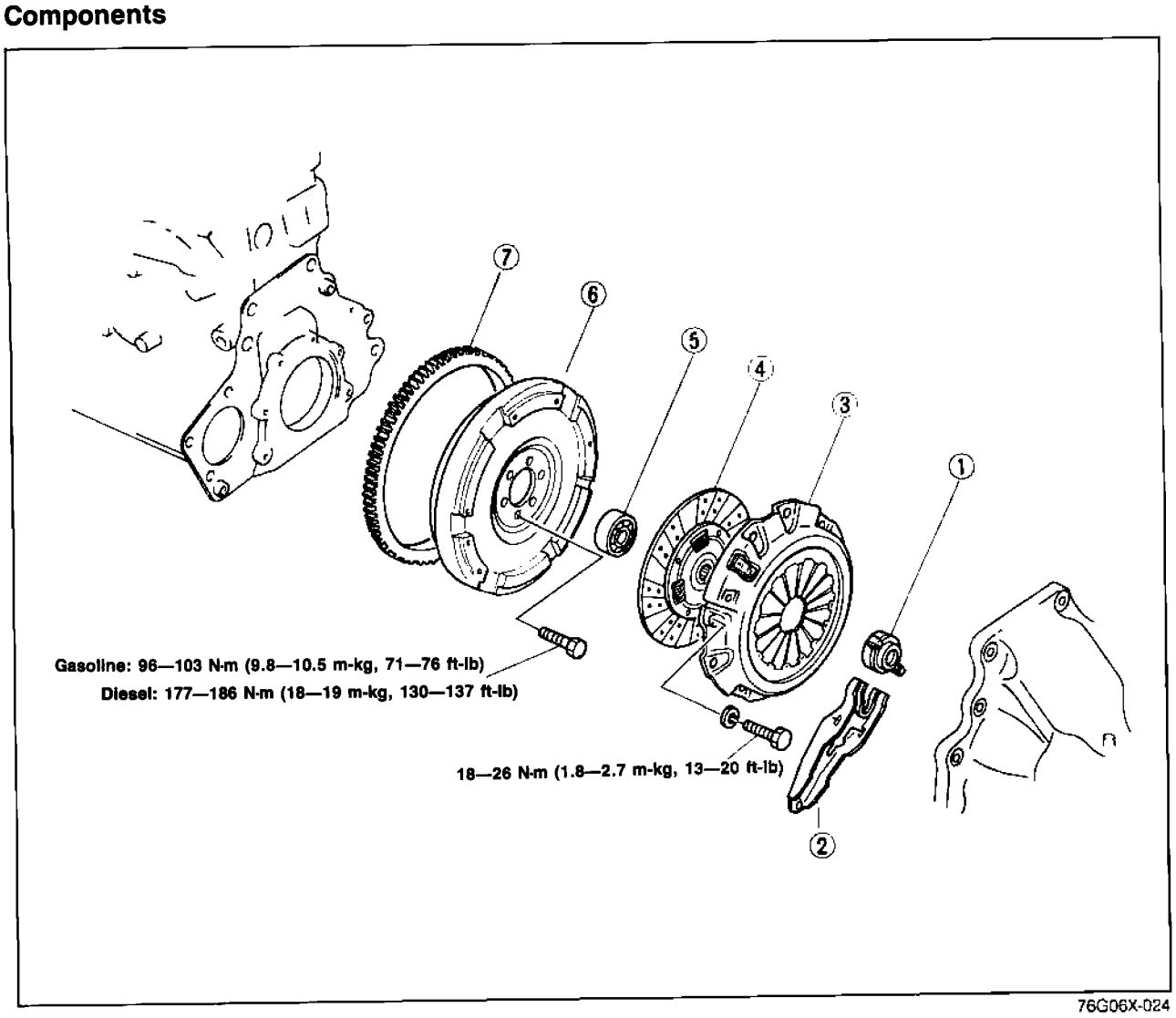
Note
a) The fluid in the reserve tank must be maintained at the 3/4 level or higher during air bleeding.
b) Use only the specified fluid type. (Refer to page 6—3)
c) Be careful not to spill clutch fluid onto a painted surface.

1. Remove the bleeder cap, and attach a vinyl hose to the bleeder screw.
2. Place the other end of the vinyl tube in a glass container of the appropriate capacity.
3. Slowly pump the clutch pedal several times by hand.
4. While the clutch pedal is depressed, loosen the bleeder screw to let fluid and air escape. Then close the bleeder screw.
5. Repeat step 3 and 4 until no more air bubbles are in the fluid.
6. Check for correct clutch operation.

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CLUTCH AND FLYWHEEL

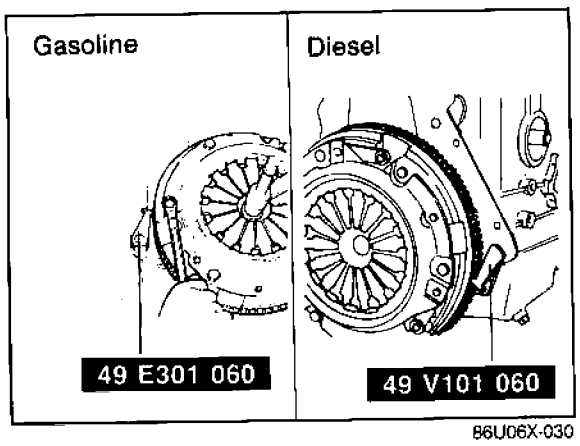
REMOVAL
Components



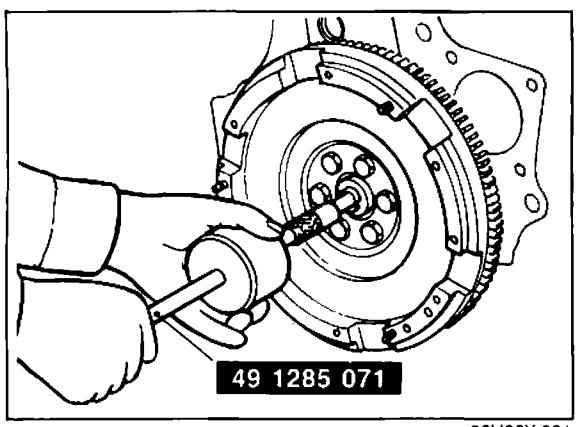
76G06X-024

1. Clutch release bearing
2. Clutch release fork
3. Clutch cover
4. Clutch disc
5. Pilot bearing
6. Flywheel
7. Ring gear

1. Remove the transaxle. (Refer to Section 7).
2. Attach the **SST** to the engine, and remove the clutch cover and clutch disc.



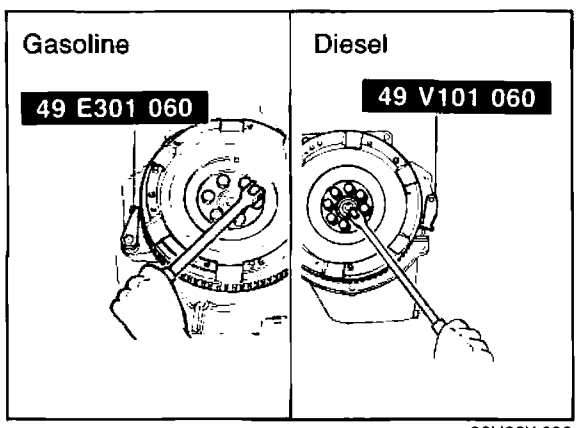
86U06X-030



86U06X-031

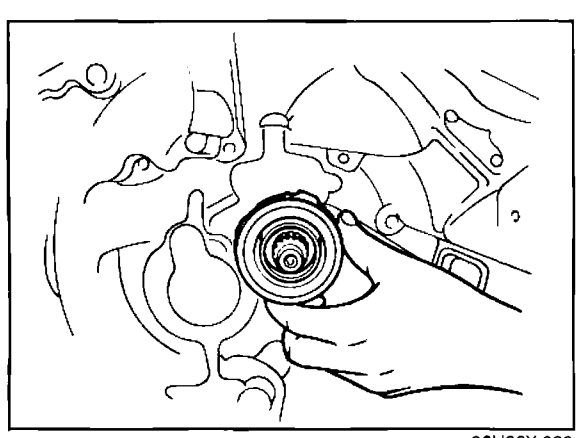
3. Remove the pilot bearing from the crankshaft with the **SST**.

Note
Do not remove the bearing if it is not necessary.



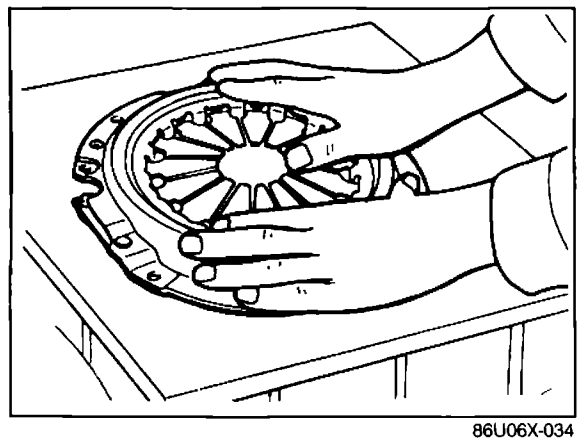
86U06X-032

4. Remove the flywheel.



86U06X-033

5. Remove the release bearing.
6. Remove the release fork.



86U06X-034

INSPECTION

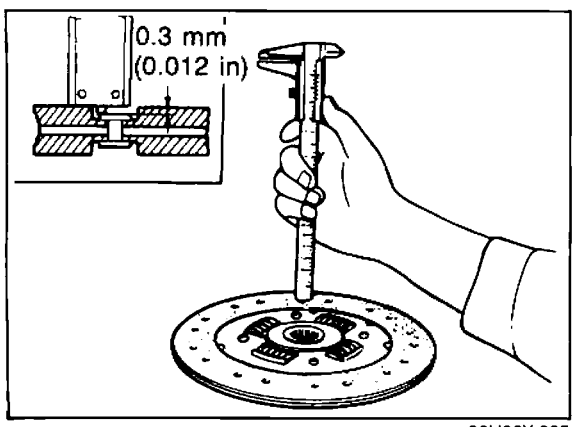
Check the following and repair or replace any faulty parts.

Clutch Cover

1. Clutch disc for scoring, cracks, or discoloration.

Note
Minor scratches or discoloration should be removed with sandpaper.

2. Diaphragm spring and cover for damage.



86U06X-035

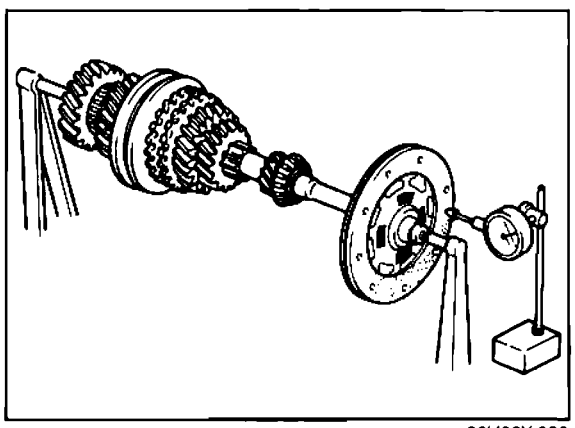
Clutch Disc

1. Facing surface for hardening or presence of oil.

   Note
   Use sandpaper if the trouble is minor.

2. Loose facing rivets.
3. Worn clutch disc.
   Measure the depth to the rivet heads with a slide caliper.

   Depth: 0.3 mm (0.012 in) min.

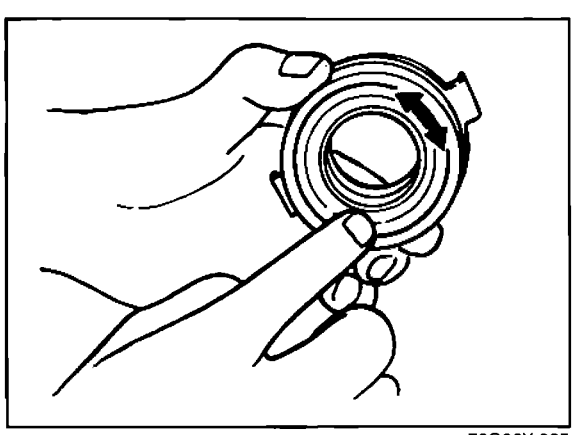


86U06X-036

4. Runout of clutch disc.

   Runout: 1.0 mm (0.039 in) max.

5. Wear or rust on the splines.
   Remove any minor rust.

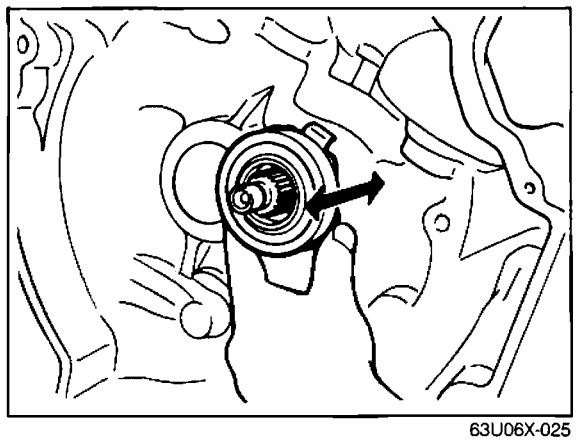


76G06X-025

Clutch Release Bearing

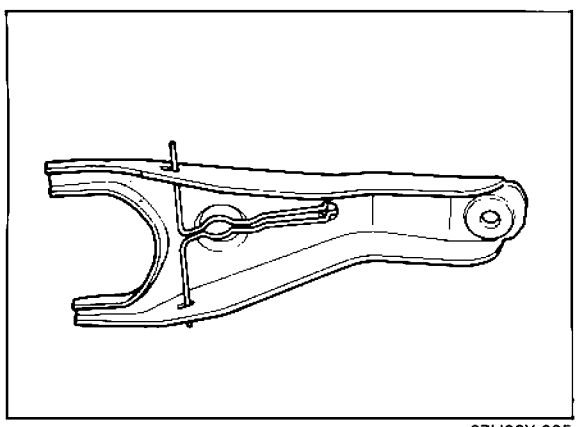
1. Turn the bearing both directions and check for any binding or abnormal noise.
2. Worn or damaged diaphragm spring or release fork contact surface.

   Caution
   The clutch release bearing is a sealed bearing and must not be washed.



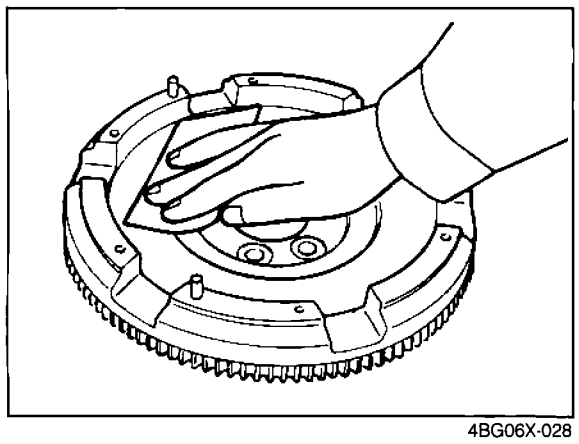
63U06X-025

3. Sliding condition of bearing.
   Install the bearing on the clutch housing extension and check for smooth movement.



67U06X-035

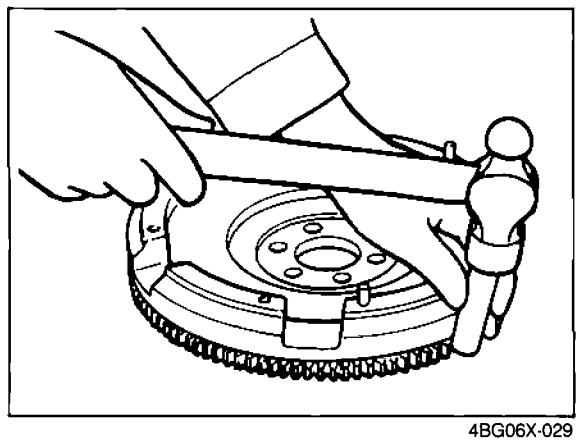
Clutch Release Fork
Cracked or bent clutch release fork.



4BG06X-028

Flywheel
1. Surface marks, scoring or discoloration of clutch contact surface.

Note
If the problem is minor, repairs can be made by cleaning with sandpaper.

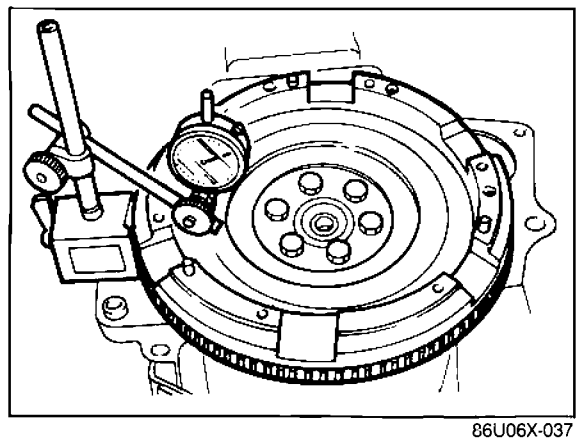


4BG06X-029

2. Damaged or worn ring gear teeth.
   If necessary, replace the ring gear as follows:

   (1) Heat the ring gear with a blowtorch, then tap around the gear to remove it from the flywheel.
   (2) Heat the new ring gear to 250—300°C (480—570°F), then fit it onto the flywheel.

Caution
The bevelled side of the ring gear must face toward the engine side.



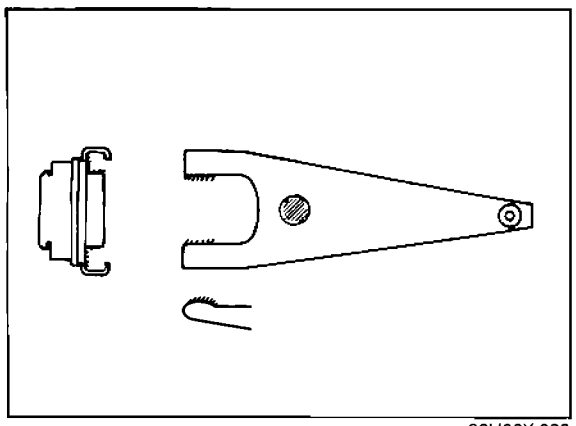
86U06X-037

3. Runout of flywheel
   (1) To measure, set a dial indicator on the clutch disc contact surface, and turn the flywheel.

Runout: 0.2 mm (0.008 in) max.

   (2) If the runout exceeds specification repair by grinding.

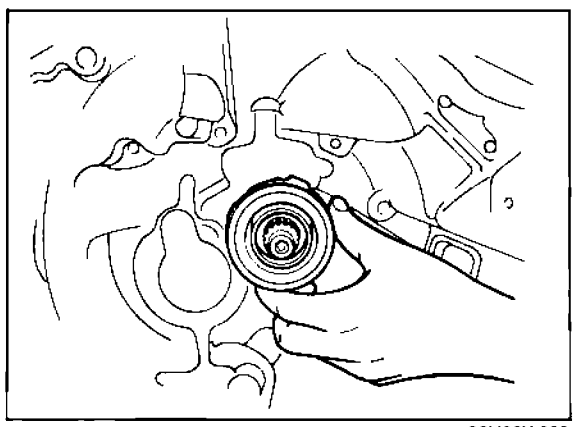
Grinding limit: 0.5 mm (0.020 in) max.



86U06X-038

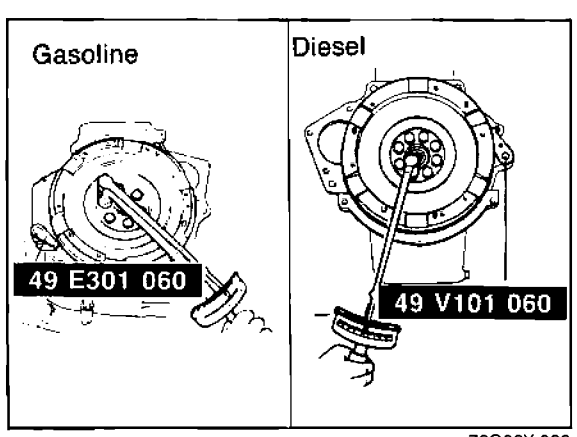
INSTALLATION

1. Apply clutch grease (**Mori While TA No.2** or equivalent organic molybdenum grease) to the clutch release bearing and fork, indicated by the shaded lines in the figure.



86U06X-039

2. Install the clutch release fork and release bearing.

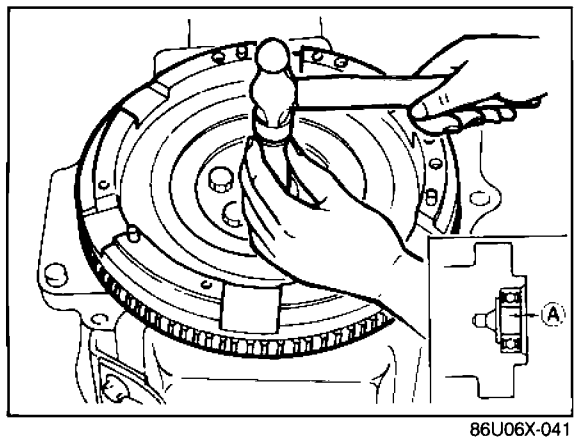


76G06X-026

3. Install the flywheel, then attach the **SST** and tighten the flywheel installation bolts.

Tightening torque:
Gasoline 96—103 N·m
(9.8—10.5 m-kg, 71—76 ft-lb)
Diesel 177—186 N·m
(18—19 m-kg, 130—137 ft-lb)

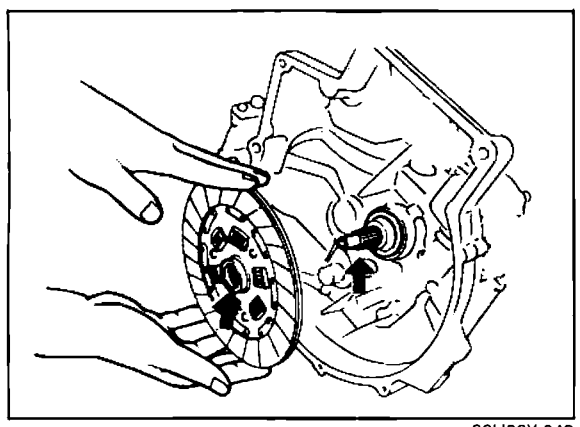
Caution
If reusing the flywheel bolts, clean the threads to remove old sealant, and apply new sealant. If old sealant cannot be removed, replace the bolts.



86U06X-041

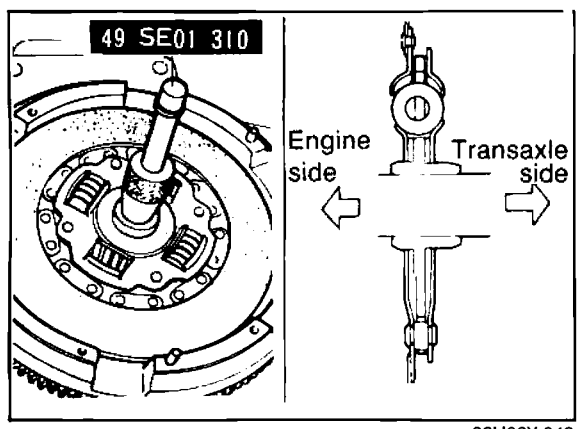
4. Install the pilot bearing in the flywheel using a suitable bar and a hammer.

Caution
a) Tap it in until distance A in the figure is 3.8—4.2 mm (0.150—0.165 in).
b) Put a small amount of clutch grease (Mori White TA No.2 or equivalent organic molybdenum grease).



86U06X-042

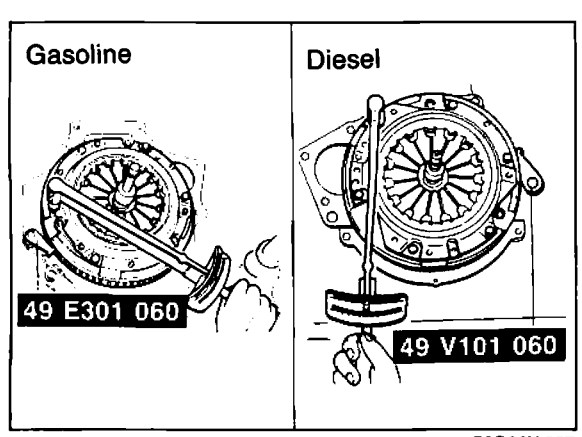
5. Clean the clutch disc splines and primary shaft splines, then apply clutch grease (**Mori White TA No. 2 or equivalent organic molybdenum grease**).



86U06X-043

6. Install the clutch disc with the **SST**.

Note
Install the clutch so that it faces in the direction shown in the figure.



76G06X-027

7. Install the **SST**, and tighten the clutch cover diagonally and evenly.

Tightening torque: 18—26 N·m (1.8—2.7 m-kg, 13—20 ft-lb)

8. Install the transaxle. (Refer to Section 7A.)

7A

MANUAL TRANSAXLE

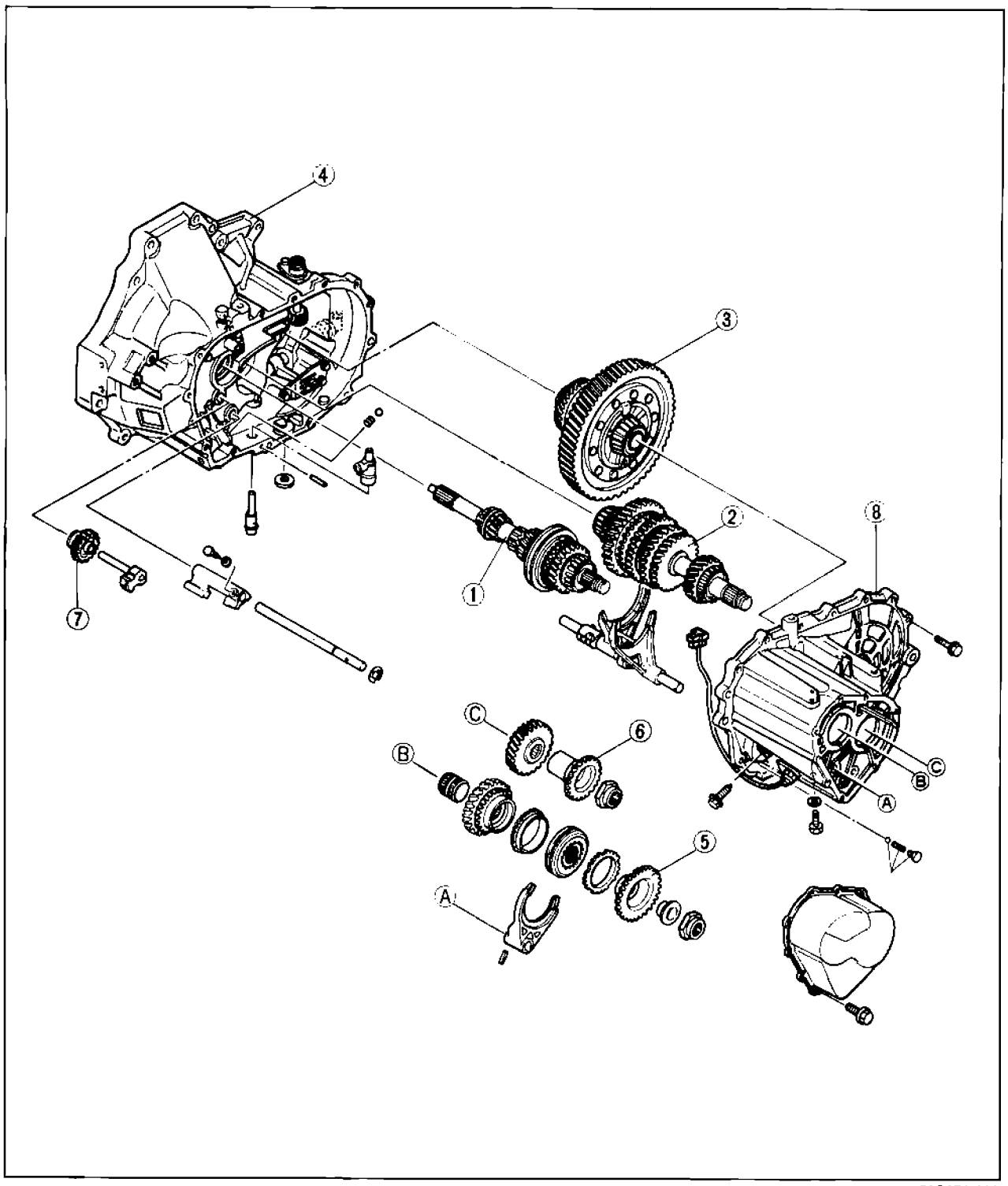
OUTLINE ..... **7A— 2**
STRUCTURAL VIEW ..... **7A— 2**
CROSS-SECTIONAL VIEW ..... **7A— 3**
SPECIFICATIONS ..... **7A— 4**
TROUBLESHOOTING GUIDE ..... **7A— 5**
ON-VEHICLE MAINTENANCE ..... **7A— 6**
TRANSAXLE OIL ..... **7A— 6**
DRIVESHAFT OIL SEALS ..... **7A— 7**
REMOVAL ..... **7A—10**
DISASSEMBLY ..... **7A—18**
STEP 1 ..... **7A—18**
STEP 2 ..... **7A—20**
STEP 3 ..... **7A—22**
STEP 4 ..... **7A—25**
INSPECTION ..... **7A—26**
ASSEMBLY ..... **7A—29**
STEP 1 ..... **7A—29**
STEP 2 ..... **7A—31**
STEP 3 ..... **7A—36**
STEP 4 ..... **7A—44**
INSTALLATION ..... **7A—49**
TRANSAXLE CONTROL ..... **7A—58**

76G07A-001

7A OUTLINE

OUTLINE

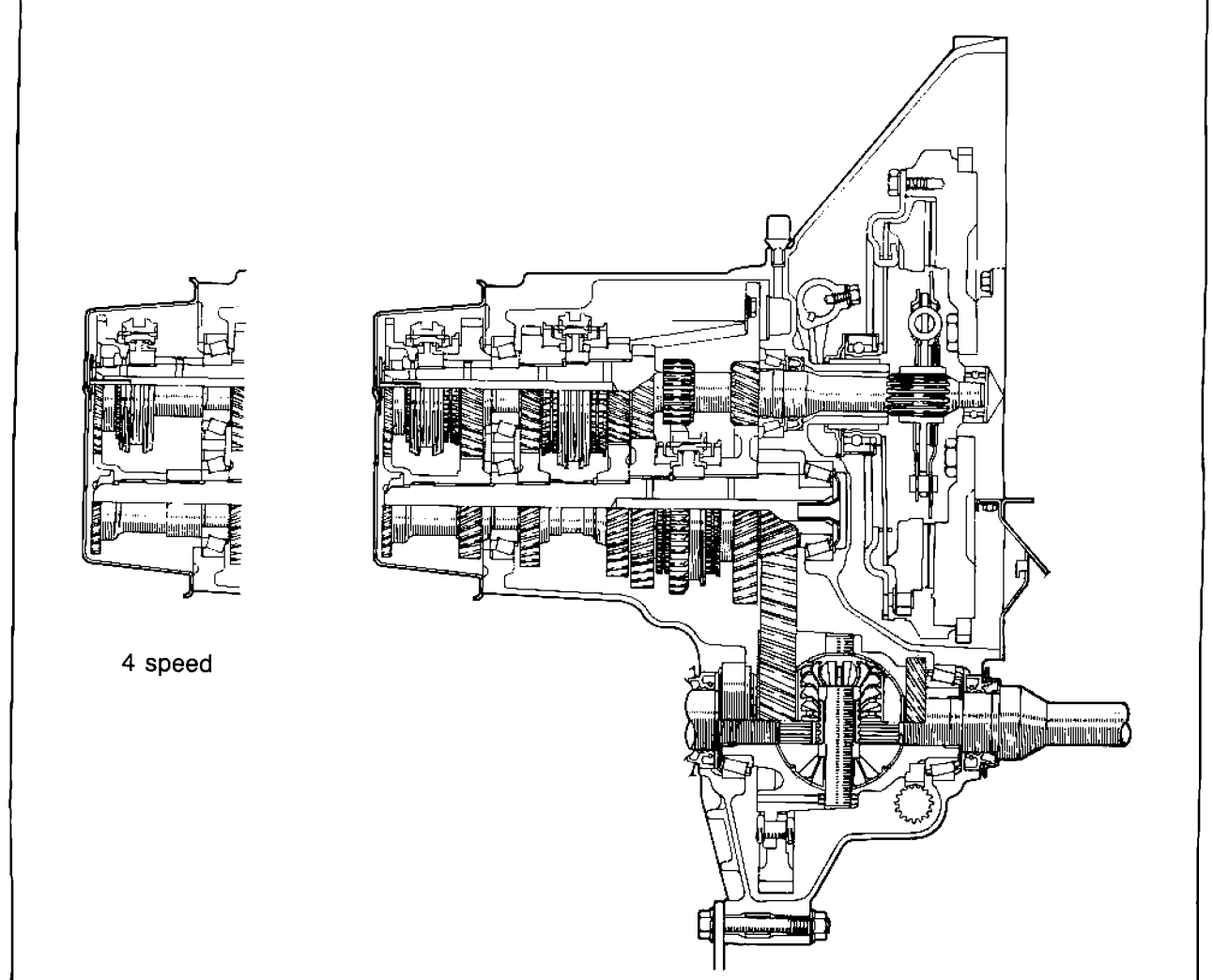
STRUCTURAL VIEW



76G07A-002

1. Primary shaft gear assembly
2. Secondary shaft gear assembly
3. Differential assembly
4. Clutch housing
5. Primary reverse synchronizer gear
6. Secondary reverse synchronizer gear
7. Reverse idle gear
8. Transaxle case

CROSS-SECTIONAL VIEW



76G07A-003

7A OUTLINE

SPECIFICATIONS

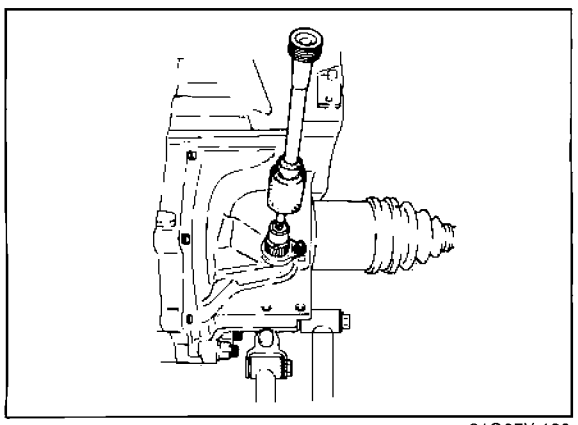
Item \ Engine model		FE DOHC		F6	FE 12-valve	FE 8-valve		F8	RF-N	RF-CX
		Leaded	Unleaded			Carb.	FI			
Transaxle control		Floor shift								
Synchromesh system		Forward.....synchromesh, Reverse.....selective sliding and synchromesh								
Gear ratio	1st	3.307								
	2nd	1.833								
	3rd	1.310				1.233				1.161
	4th	1.030				0.970			0.914	0.861
	5th	0.837				0.795			0.755	0.680
	Reverse	3.166								
Final gear ratio		4.105	3.850			4.105	3.850			4.105
Oil	Type	ATF: DEXRON-II Above −18°C (0°F): API: GL-4 or GL-5 SAE 80W-90 or SAE 90								
	Capacity	3.35 liters (3.6 US qt, 3.9 Imp qt)								

76G07A-004

TROUBLESHOOTING GUIDE

Problem	Possible cause	Remedy	Page
Change lever won't shift smoothly, or is hard to shift	Seized change lever ball	Replace	7A—58
	Seized change control rod joint	Replace	7A—58
	Bent change control rod	Replace	7A—58
Too much play in change lever	Worn change control rod bushing	Replace	7A—58
	Weak spring of ball or change lever	Replace	7A—58
	Worn bushing of ball or change lever	Replace	7A—58
Difficult to shift	Bent change rod	Replace	7A—58
	No grease in transmission control	Lubricate with grease	7A—58
	Insufficient oil	Add oil	7A—6
	Deterioration of oil quality	Replace with oil of specified quality	7A—6
	Wear or play of shift fork or shift rod	Replace	7A—18
	Wear of synchronizer ring	Replace	7A—27
	Wear of synchronizer cone of gear	Replace	7A—27
	Bed contact of synchronizer ring and cone of gear	Replace	7A—27
	Excessive longitudinal play of gears	Replace	7A—22
	Wear of bearing	Adjust or replace	7A—22
	Wear of synchronizer key spring	Replace	7A—27
	Excessive shaft gear bearing preload	Adjust	7A—37
	Improperly adjusted change guide plate	Adjust	7A—20
Won't stay in gear	Bent change control rod	Replace	7A—58
	Worn change control rod bushing	Replace	7A—58
	Weak change lever ball spring	Replace	7A—58
	Improperly installed extension bar	Tighten	7A—58
	Wear of shift fork	Replace	7A—22
	Wear of clutch hub	Replace	7A—27
	Worn clutch hub sleeve	Replace	7A—27
	Worn gear sliding part of both shaft gears	Replace	7A—26
	Worn gear sliding part of each gear	Replace	7A—26
	Worn steel sliding groove of control end	Replace	7A—18
	Weak spring pressing against steel ball	Replace	7A—18
	Excessive thrust clearance	Replace	7A—33,35
	Worn bearing	Replace	7A—22
	Improperly installed engine mount	Tighten	7A—49
Abnormal noise	Insufficient oil	Add oil	7A—6
	Deterioration of oil quality	Replace	7A—6
	Worn bearing	Adjust or replace	7A—22
	Worn gear sliding surface of both shaft gears	Replace	7A—26
	Wear of sliding surfaces of gears	Replace	7A—26
	Excessive thrust clearance	Replace	7A—33,35
	Damaged gear teeth	Replace with oil of specified quality	7A—26
	Foreign material in gears	Replace	7A—22
	Damaged differential gear, or excessive backlash	Adjust or replace	7A—30

76G07A-005



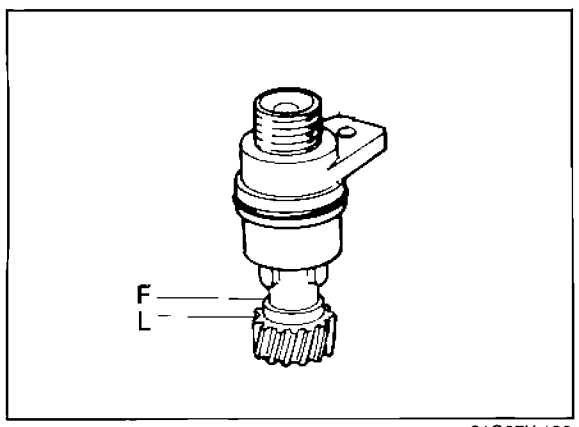
61G07X-189

ON-VEHICLE MAINTENANCE

TRANSAXLE OIL

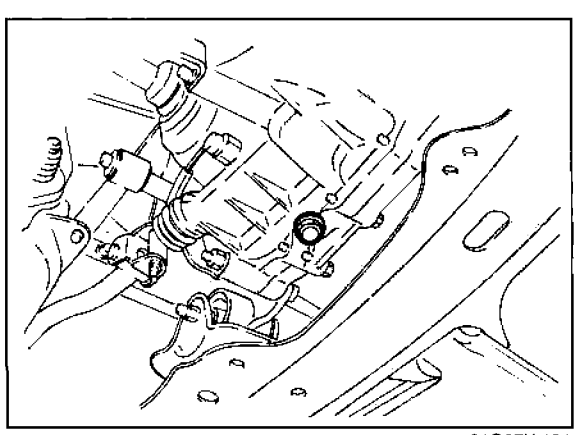
Inspection

1. Park the vehicle on level ground.
2. Remove the speedometer cable dust cover, and disconnect the cable from the speedometer driven gear.
3. After removing the bolt, pull the gear case to remove it from the housing. (Insert a flat-tipped screwdriver between the speedometer gear case and the clutch housing, and use it to pry the gear case loose if necessary.)



61G07X-190

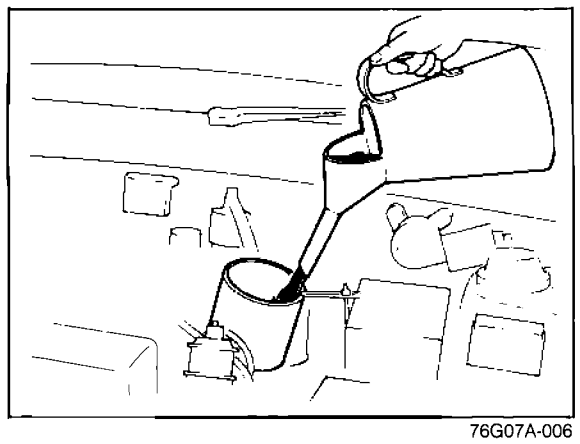
4. Check that the oil level is between the "F" and "L".
5. If not, add the necessary amount of the specified oil through the gear case hole.



61G07X-191

Replacement

1. Park the vehicle on level ground.
2. Remove the speedometer driven gear. (See "**Inspection**" section above.)
3. Remove the drain plug, and drain the oil.

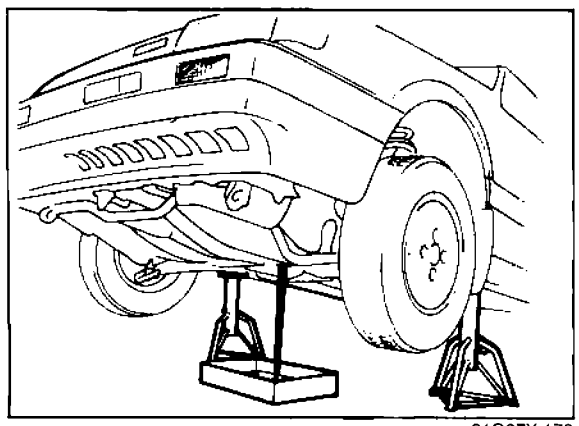


76G07A-006

4. Replace the drain plug, and add the necessary amount of the specified oil through the speedometer gear case hole.

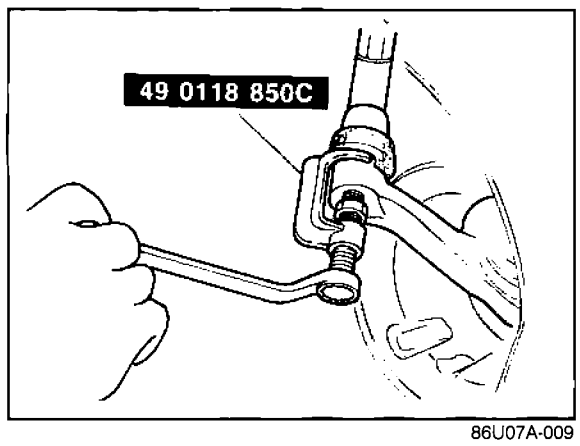
Specified oil
Type
ATF: DEXRON II
Above −18°C (0°F):
API: GL-4 or GL-5
SAE 80W-90 or SAE 90

Capacity:
3.35 liters (3.6 US qt, 3.0 Imp qt)



61G07X-170

DRIVESHAFT OIL SEALS
Replacement
Jack up the vehicle, support it on safety stands, and then drain the transaxle oil. Next, use the following procedure to replace the driveshaft oil seals:
1. Remove the front wheel(s).
2. Remove the splash shield(s).
3. Separate the front stabilizer from the lower arm.

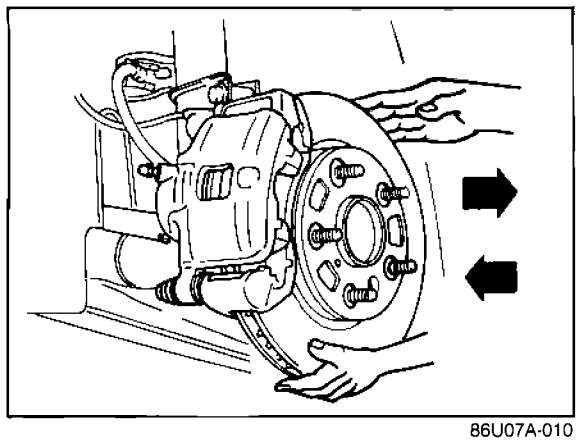


86U07A-009

4. Remove the bolt and pull the lower arm downward. Separate the knuckle from the lower arm ball-joint.

Note
Be careful not to damage the ball-joint dust boot.

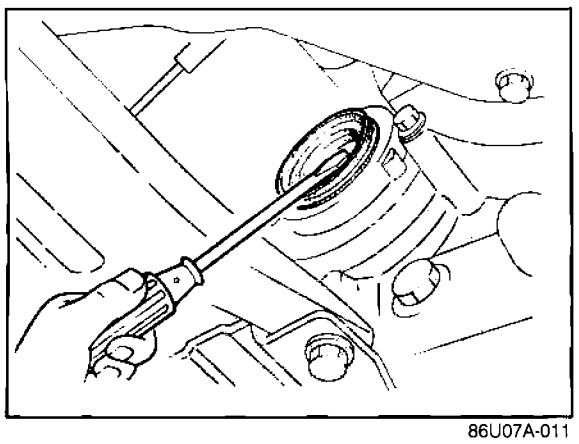
5. Remove the cotter pin then disconnect the tie-rod end with the **SST**.



86U07A-010

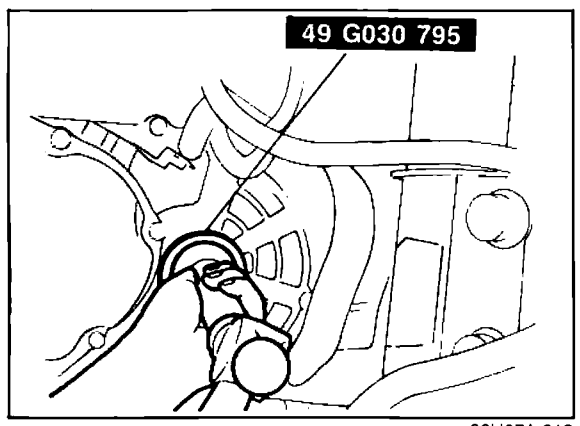
6. Separate the driveshaft by pulling the front hub outward. Do not use too much force at once, increase the force gradually.

Note
a) Do not to allow the driveshaft ball-joint to be bent to its maximum extent.
b) Support the driveshaft using string, wire, etc.



86U07A-011

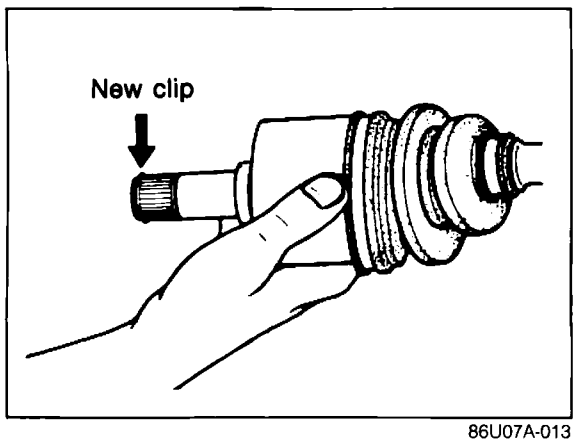
7. Remove the oil seal with a flat-tipped screwdriver.



86U07A-012

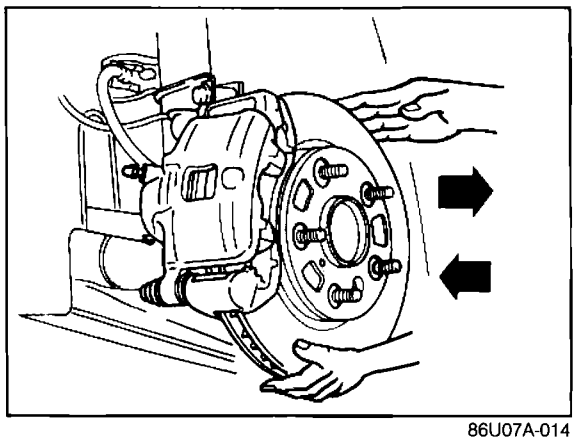
8. Tap the new oil seal into the transaxle case with the **SST**.

Note
a) Tap in until the oil seal installer contacts the case.
b) Coat the oil seal lip with transaxle oil.



86U07A-013

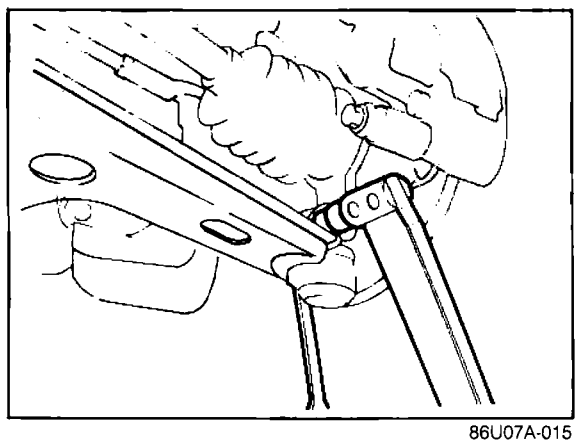
9. Replace the driveshaft end clip with a new one. Insert the clip with the gap at the top of the groove.



86U07A-014

10. Install the driveshaft as follows:
(1) Pull the front hub outward, then fit the driveshaft into the transaxle.
(2) Insert the driveshaft into the transaxle by pushing on the wheel hub assembly.

Note
a) Be careful not to damage the oil seal.
b) After installation is finished, pull the front hub slowly outward to check that the driveshaft is held securely by the clip.



86U07A-015

11. Install the lower arm ball-joint to the knuckle, and tighten the clinch bolt.

Tightening torque:
43—54 N·m (4.4—5.5 m-kg, 32—40 ft-lb)

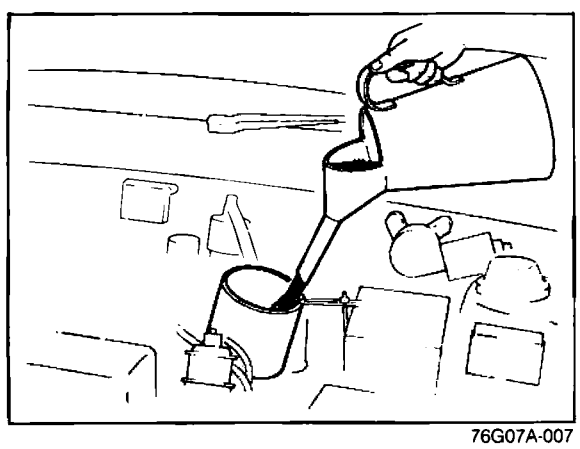
12. Install the tie-rod end and new cotter pin.

Tightening torque:
29—44 N·m (3.0—4.5 m-kg, 22—33 ft-lb)

86U07A-016

13. Adjust and tighten the stabilizer.

Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)
Dimension: 20.1 mm (0.79 in)



76G07A-007

14. Install the drain plug.

Tightening torque:
39—59 N·m (4.0—6.0 m-kg, 29—43 ft-lb)

15. Install the wheel.

Tightening torque:
88—118 N·m (9.0—12.0 m-kg, 65—87 ft-lb)

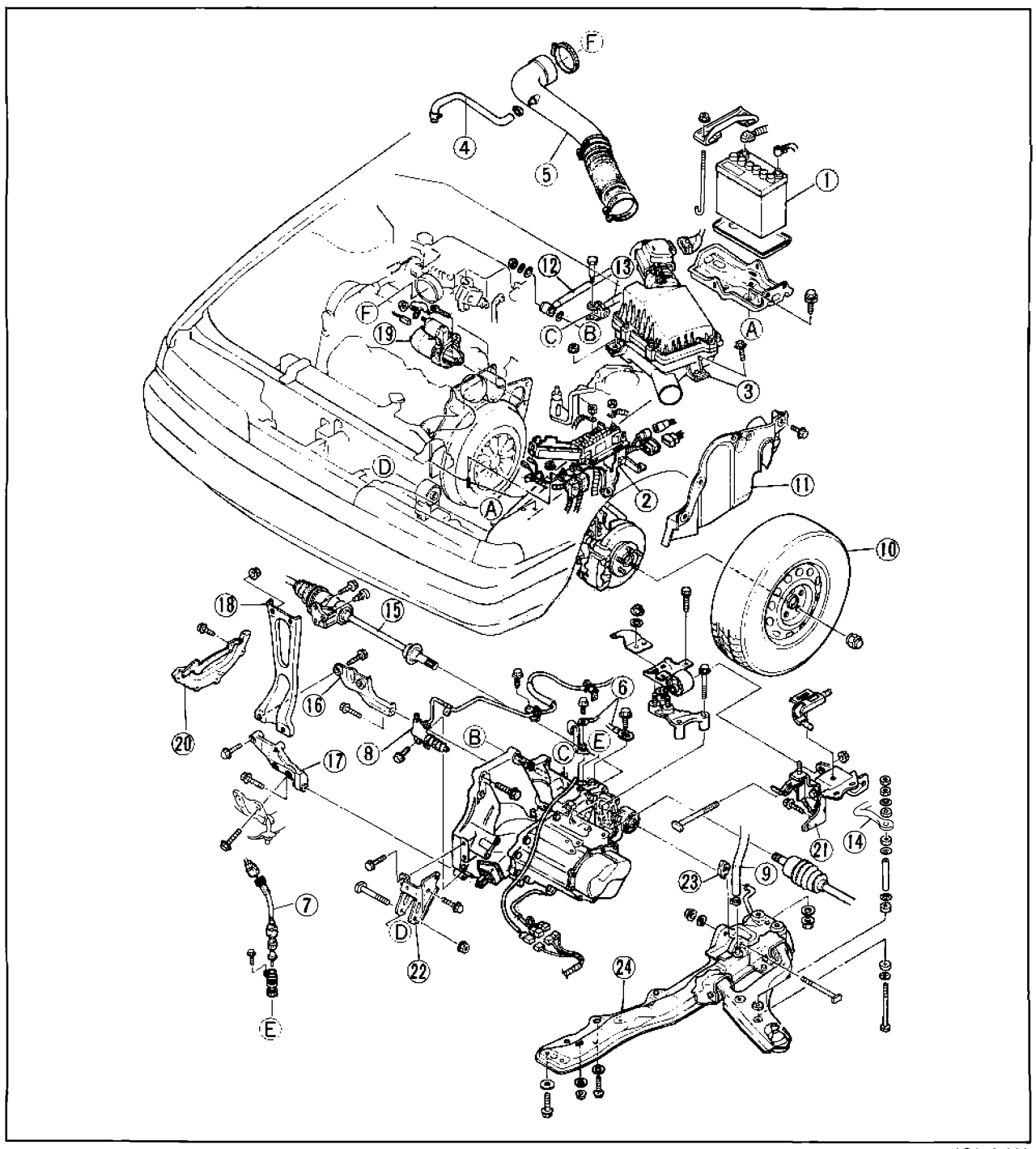
16. Add the correct quantity of the specified oil.

Type: A.T.F.: DEXRON II
Above –18°C (0°F):
API: GL-4 or GL-5
SAE 80W-90 or SAE 90

Capacity: 3.35 liters (3.6 US qt, 3.0 Imp qt)

REMOVAL

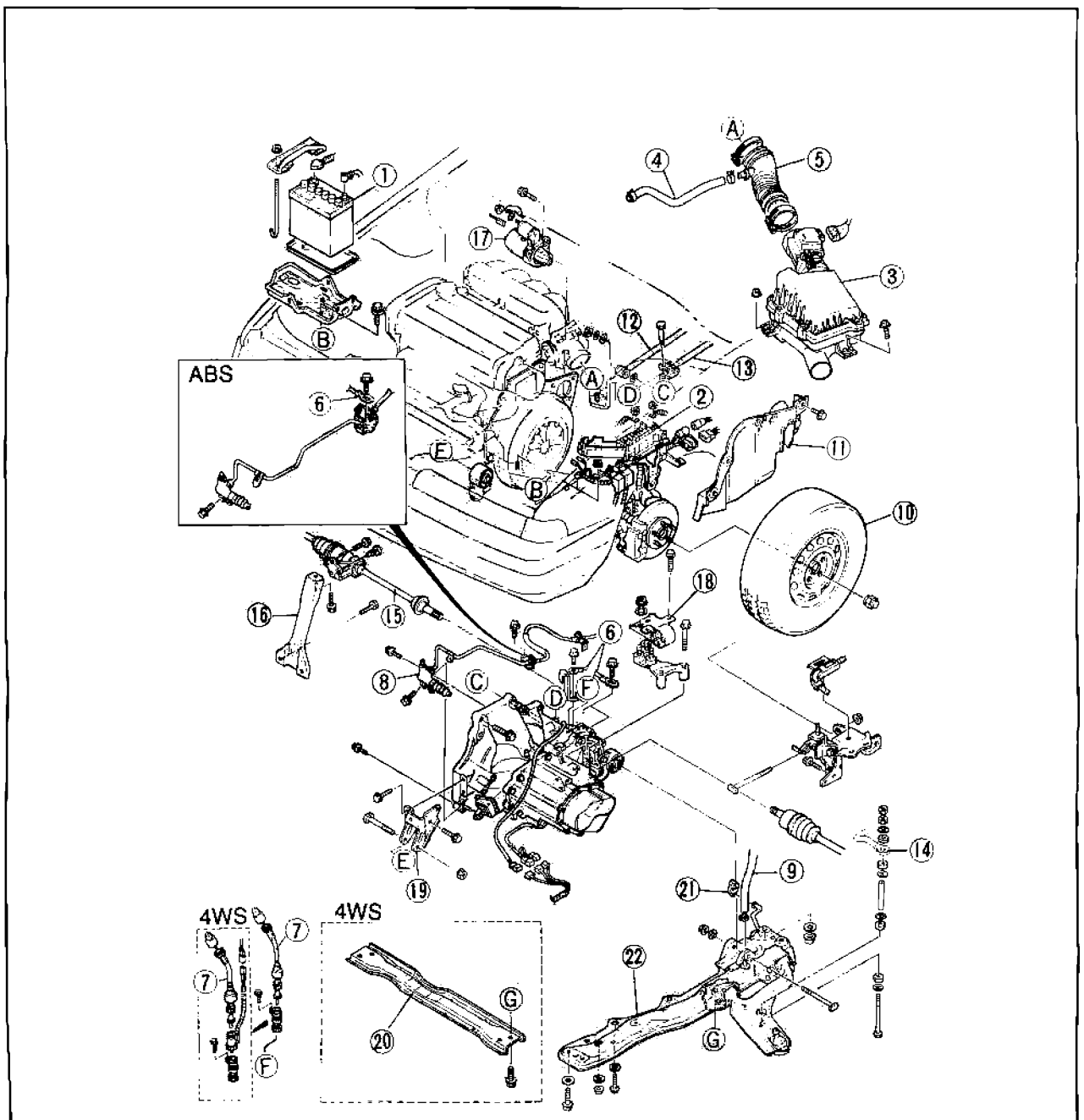
FI except DOHC



76G07A-008

1. Battery
2. Main fuse block
3. Air cleaner assembly
4. Ventilation hose
5. Air hose
6. Ground(s)
7. Speedometer cable
8. Clutch release cylinder
9. Canister hose
10. Wheel
11. Splash sheild
12. Extension bar
13. Control rod
14. Stabilizer
15. Joint shaft
16. Gusset plate (rear)
17. Gusset plate (front)
18. Surge tank bracket
19. Starter
20. Under cover
21. Engine mount No.4
22. Engine mount No.2
23. Hunger rubber
24. Crossmember

DOHC

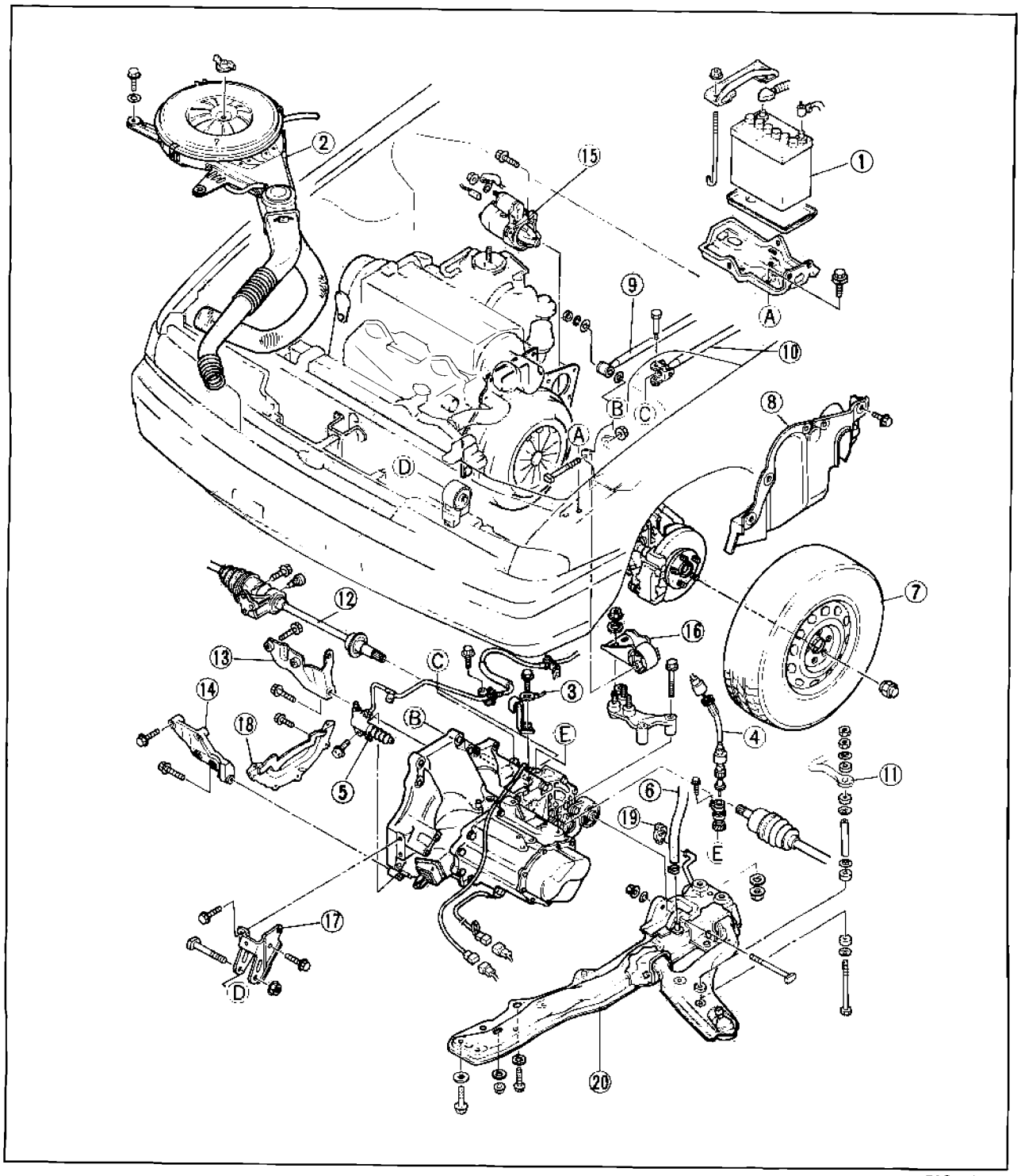


76G07A-009

1. Battery
2. Main fuse block
3. Air cleaner assembly
4. Ventilation hose
5. Air hose
6. Ground(s)
7. Speedometer cable
8. Clutch release cylinder
9. Canister hose
10. Wheel
11. Splash sheild
12. Extension bar
13. Control rod
14. Stabilizer
15. Joint shaft
16. Surge tank bracket
17. Starter
18. Engine mount No.4
19. Engine mount No.2
20. Rear member (4WS)
21. Hunger rubber
22. Crossmember

7A REMOVAL

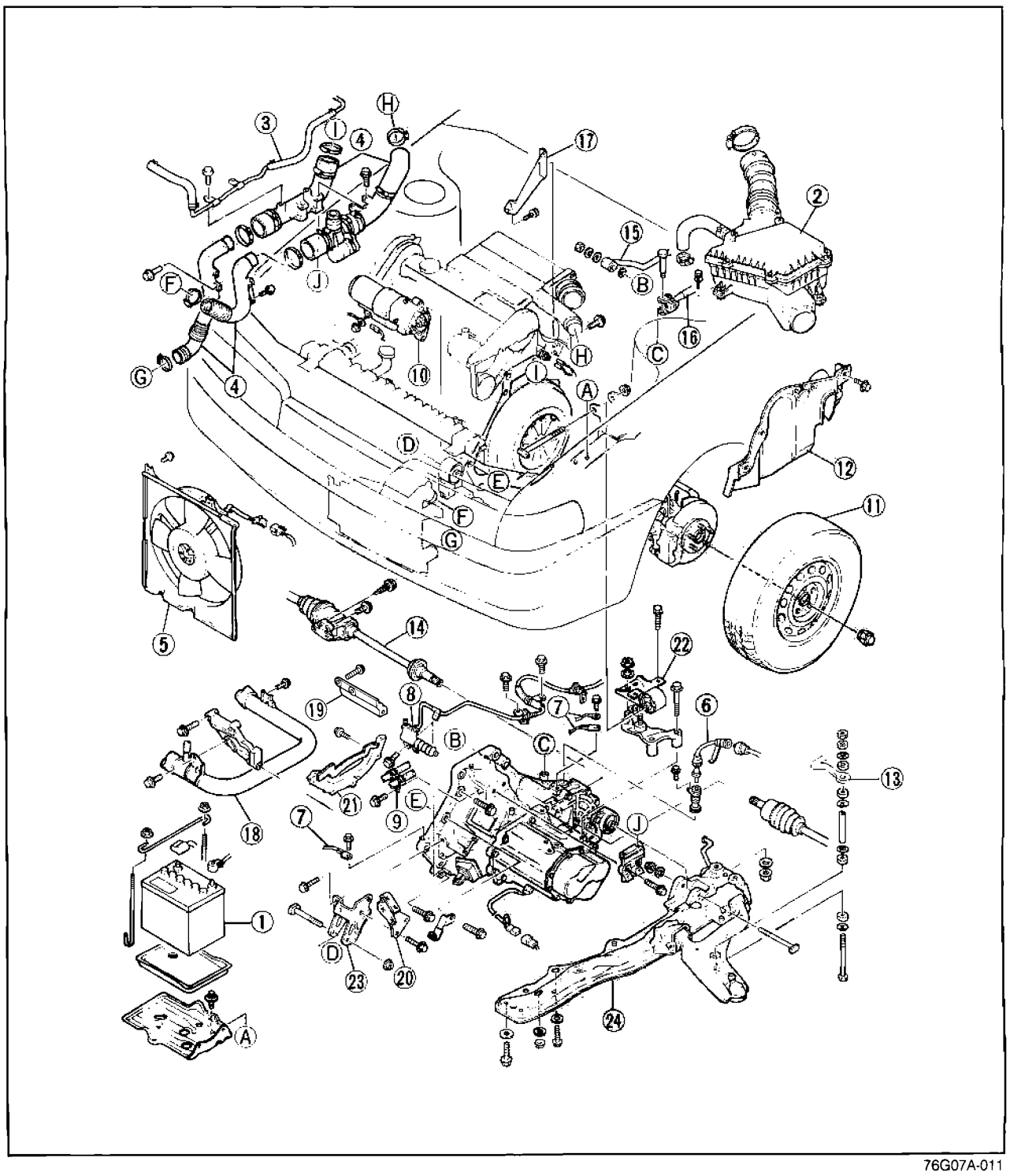
Carburator



76G07A-010

1. Battery
2. Air cleaner assembly
3. Ground
4. Speedometer cable
5. Clutch release cylinder
6. Canister hose
7. Wheel
8. Splash sheild
9. Extension bar
10. Control rod
11. Stabilizer
12. Joint shaft
13. Gusset plate (rear)
14. Gusset plate (front)
15. Starter
16. Engine mount No.4
17. Engine mount No.2
18. Under cover
19. Hunger rubber
20. Crossmember

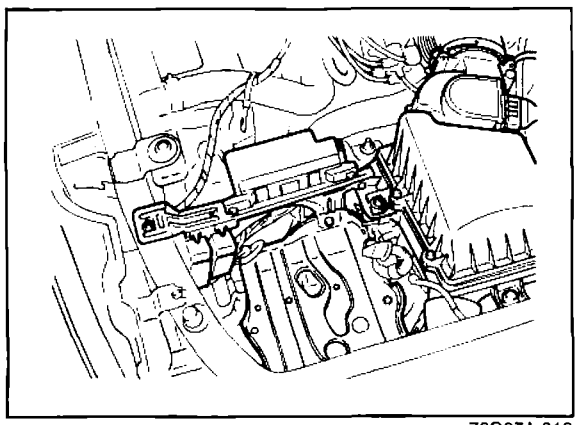
RF-N and RF-CX



76G07A-011

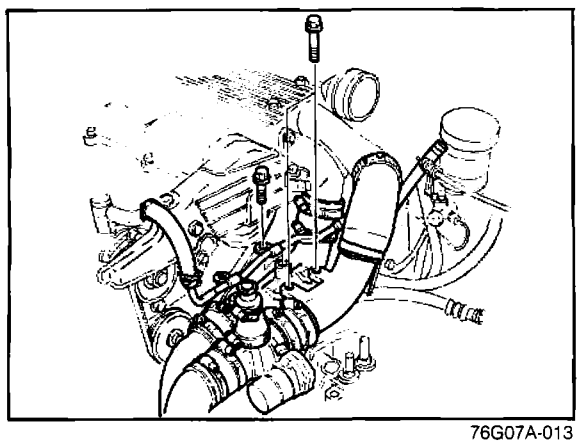
1. Battery
2. Air cleaner assembly
3. Vacuum hose
4. Intercooler pipe and hose (RF-CX)
5. Electric fan
6. Speedometer cable
7. Ground(s)
8. Clutch release cylinder
9. Pressure and return hoses (power steering)
10. Starter
11. Wheel
12. Splash shield
13. Stabilizer
14. Joint shaft
15. Extension bar
16. Control rod
17. Exhaust pipe bracket
18. Water pipe
19. Gusset plate (rear)
20. Gusset plate (front)
21. Under cover
22. Engine mount No.4
23. Engine mount No.2
24. Crossmember

7A REMOVAL



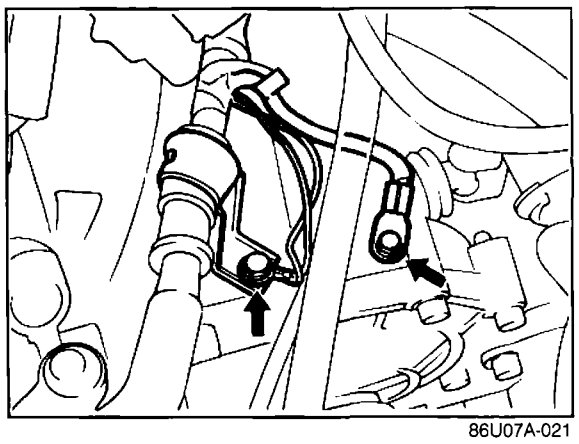
76G07A-012

1. Remove the battery and battery carrier.
2. Disconnect the main fuse block. (FI)
3. Disconnect the distributor lead.
4. Remove the air cleaner assembly.



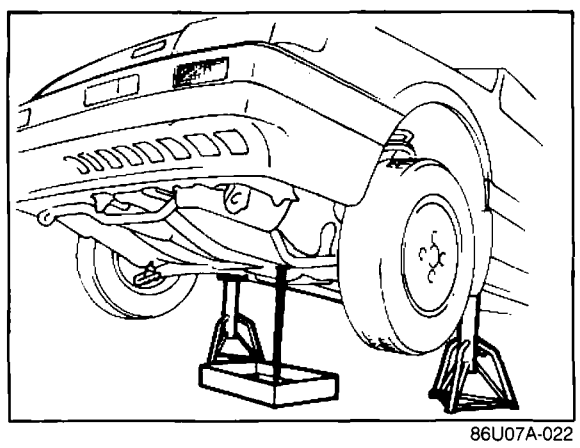
76G07A-013

5. Remove the vacuum hose, the intercooler hose (RF-CX) and the electric fan. (RF-N and RF-CX)



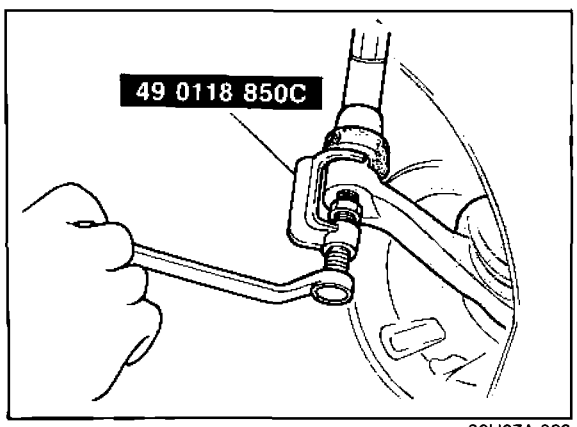
86U07A-021

6. Disconnect the speedometer cable.
7. Disconnect the grounds from the transaxle case.



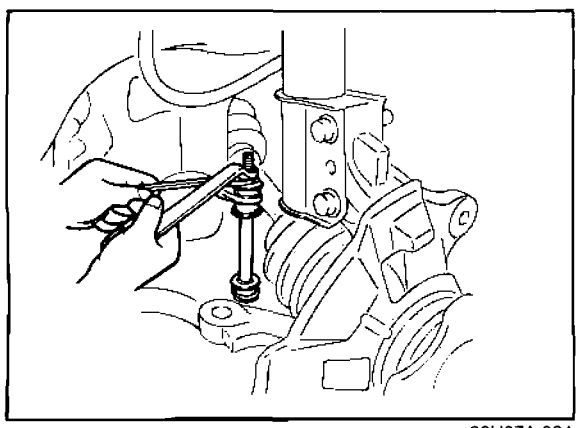
86U07A-022

8. Remove the front wheels.
9. Remove the splash shields.
10. Drain the transaxle oil.



86U07A-023

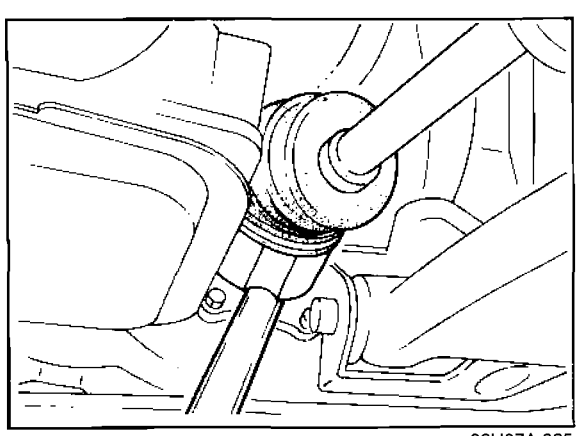
11. Disconnect the clutch release cylinder.
12. Disconnect the tie-rod ends using **SST**.



86U07A-024

13. Remove the stabilizer bar control links.
14. Remove the bolts and nuts at the left and right lower arm bolt joints.
15. Pull the lower arms downward to separate them from the knuckles.

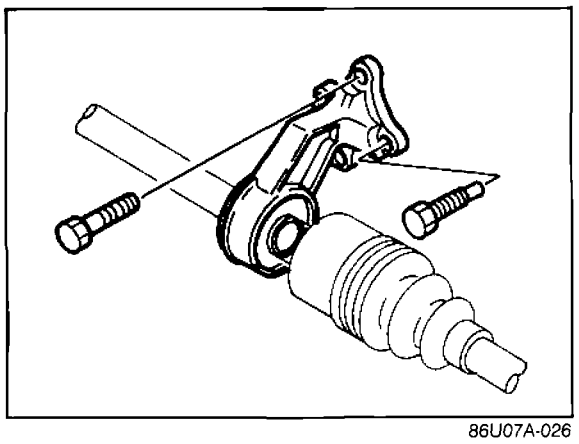
Note
Do not damage the ball-joint dust boots.



86U07A-025

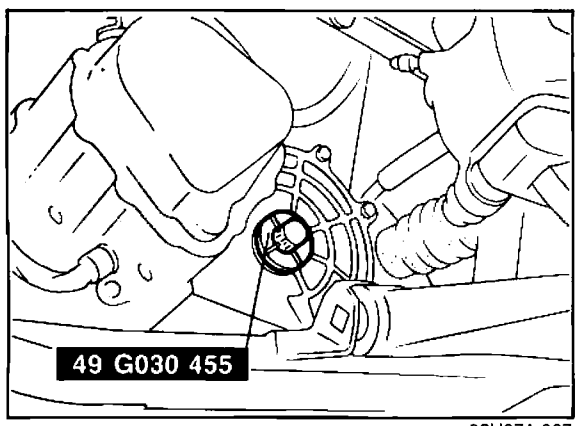
16. Separate the left driveshaft from the transaxle by prying with a bar inserted between the shaft and the case.

Note
Do not damage the oil seal.



86U07A-026

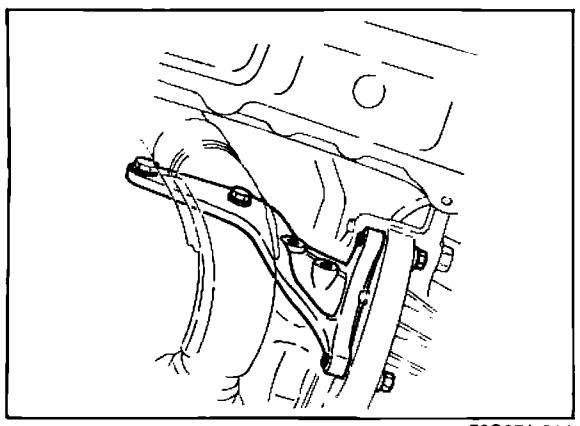
17. Remove the joint shaft bracket.
18. Separate the right driveshaft together with the joint shaft in the same manner.



86U07A-027

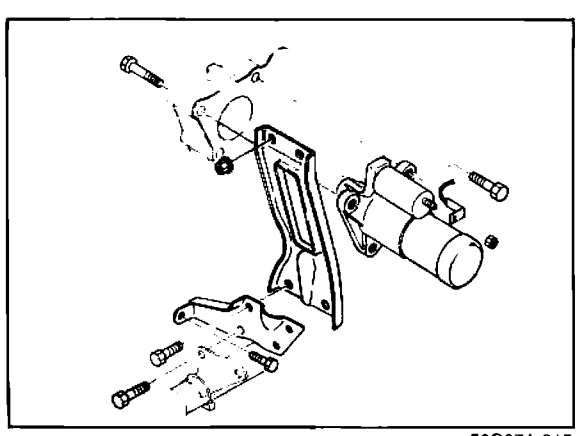
19. Install the **SST** to the differential side gear.

Note
Failure to install the SST may cause the differential side gears to become misposi-tioned.



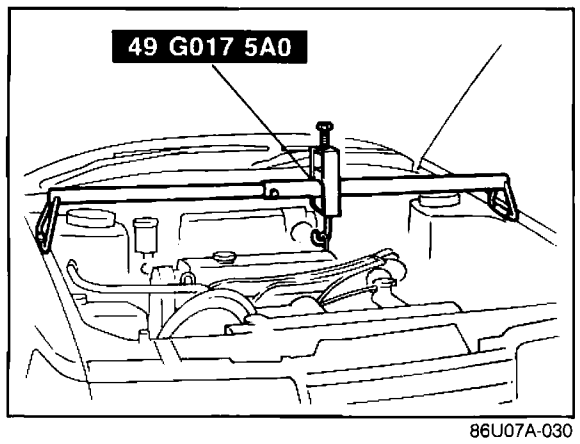
76G07A-014

20. Remove the gusset plates. (except DOHC)
21. Remove the under cover. (except DOHC)
22. Remove the extension bar and the control rod.



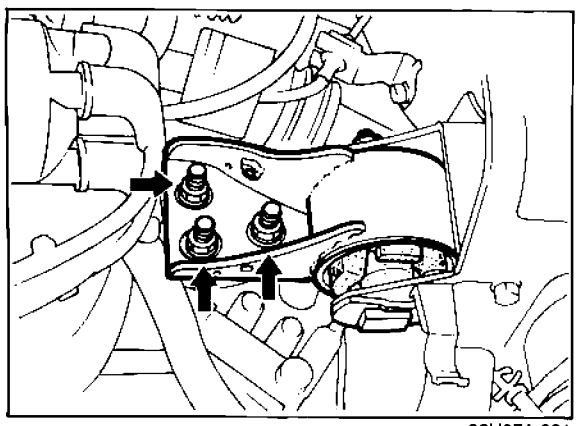
76G07A-015

23. Remove the surge tank bracket. (FI)
24. Remove the starter.



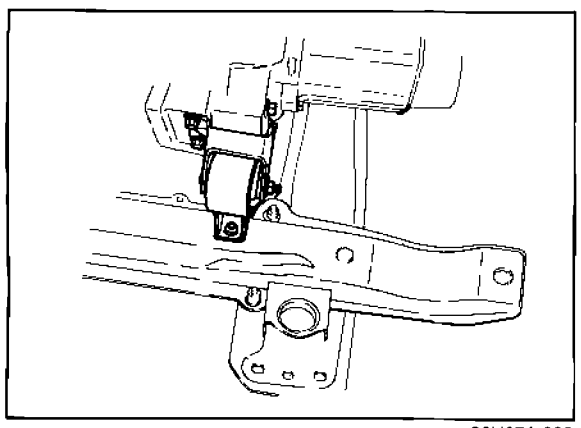
86U07A-030

25. Suspend the engine with the **SST**.



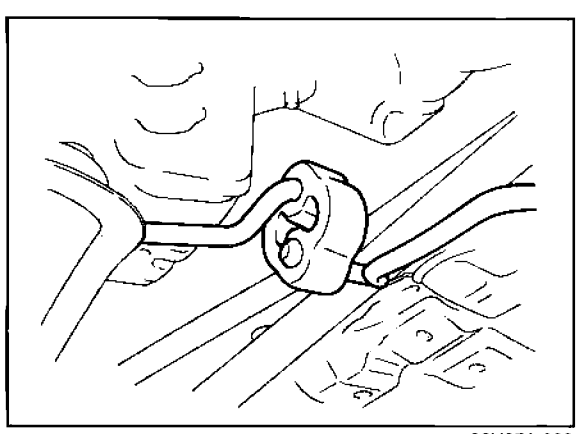
86U07A-031

26. Remove the engine mount No. 4 and bracket.



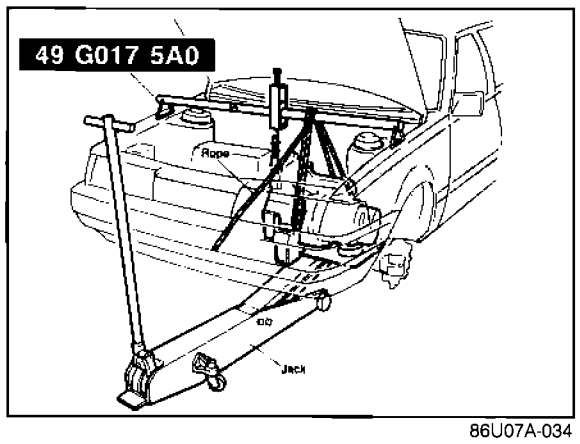
86U07A-032

27. Remove the engine mount No. 2.



86U07A-033

28. Disconnect the hanger rubber then remove the crossmember and the left side lower arm as an assembly.



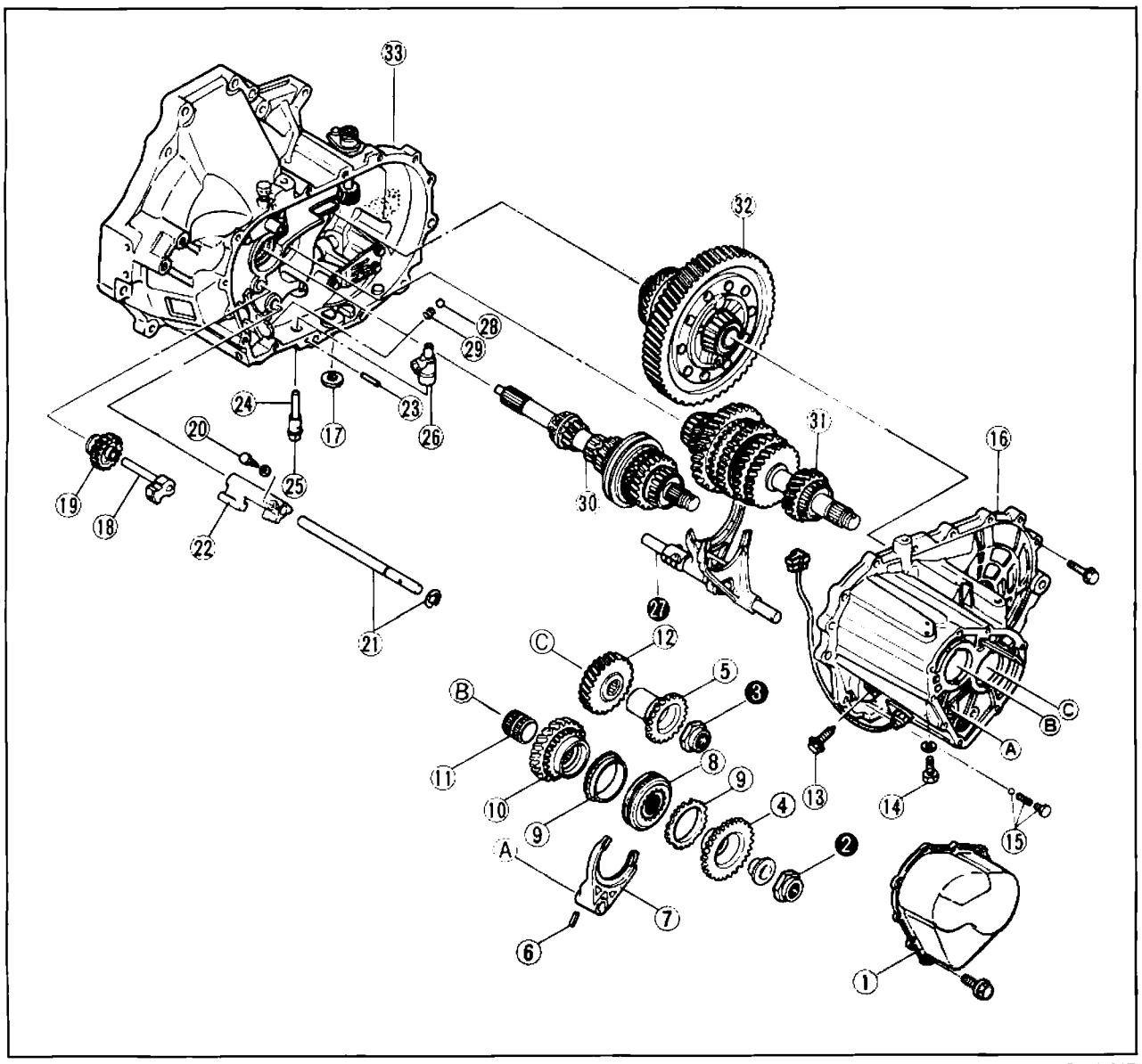
86U07A-034

29. Lean the engine toward the transaxle.
30. Support the transaxle with a jack.
31. Remove the remaining transaxle mounting bolts.
32. Remove the transaxle.

DISASSEMBLY

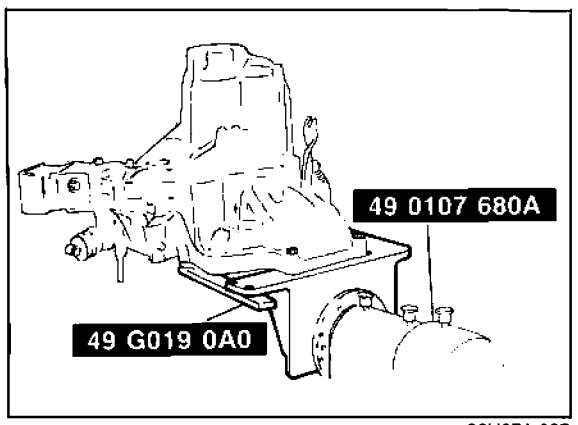
STEP 1
Disassemble in the sequence shown in the figure referring to disassembly note for the specially marked parts.

76G07A-016



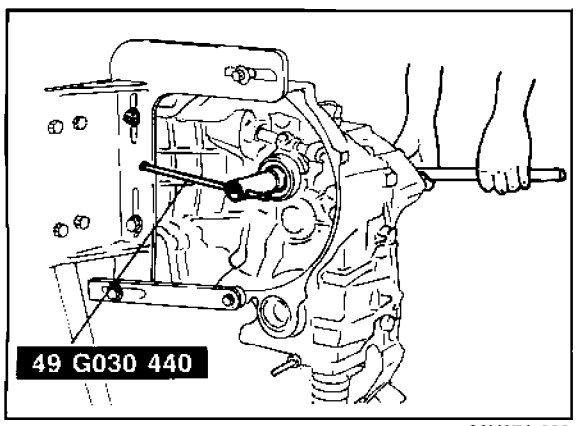
76G07A-017

1. Rear cover
2. Lock nut
3. Lock nut
4. Primary reverse synchronizer gear
5. Secondary reverse synchronizer gear
6. Roll pin
7. Shift fork
8. Clutch hub assembly
9. Synchronizer ring
10. 5th gear
11. Gear sleeve
12. Secondary 5th gear
13. Lock bolt
14. Guide bolt
15. Lock bolt, ball and spring
16. Transaxle case
17. Magnet
18. Reverse idle shaft
19. Reverse idle gear
20. Lock bolt
21. Shift rod (5th and reverse) and clip
22. Gate
23. Pin
24. Crank lever shaft
25. O-ring
26. Crank lever assembly
27. Shift fork and shift rod assembly
28. Steel ball
29. Spring
30. Primary shaft gear assembly
31. Secondary shaft gear assembly
32. Differential assembly
33. Clutch housing



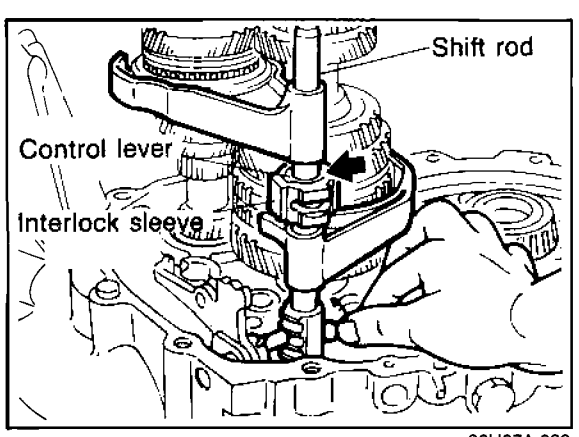
86U07A-037

Disassembly Note
Transaxle
Mount the transaxle on the **SST**.



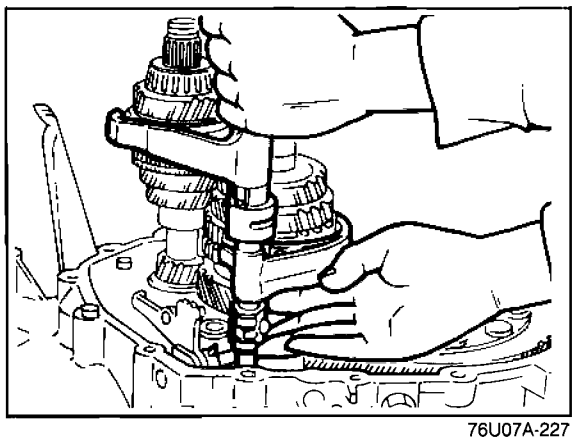
86U07A-038

Lock nut
1. Lock the primary shaft with the **SST**.
2. Shift to 1st or 2nd gear.
3. Remove the lock nut.



86U07A-039

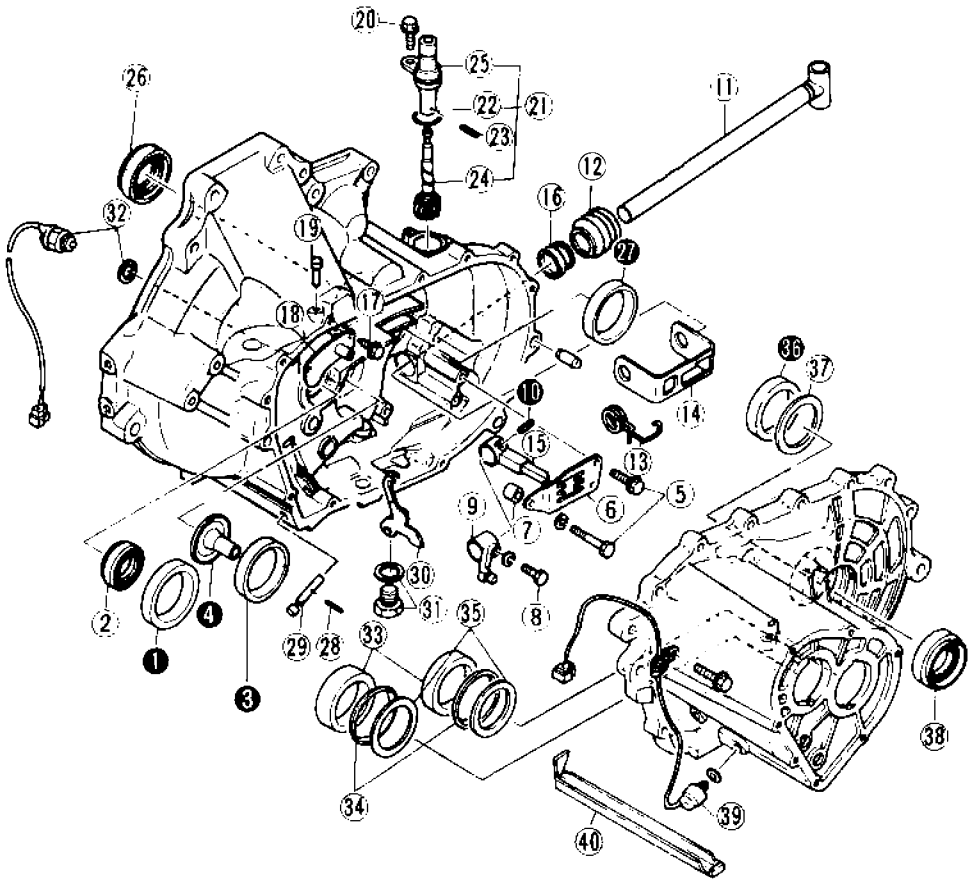
Shift fork and shift rod assembly
1. Align the ends of the interlock sleeve and of the control lever, then turn the shift rod counter-clockwise.
2. While holding the 1st-2nd shift fork with one hand and the 3rd-4th shift fork with the other, raise them both at the same time and shift each of the clutch hub sleeves.
3. Lift the control end and remove the steel ball, and, at the same time, remove the shift rod from the clutch housing.
4. Separate the shift rod and shift fork assembly from each of the clutch hub sleeves.



76U07A-227

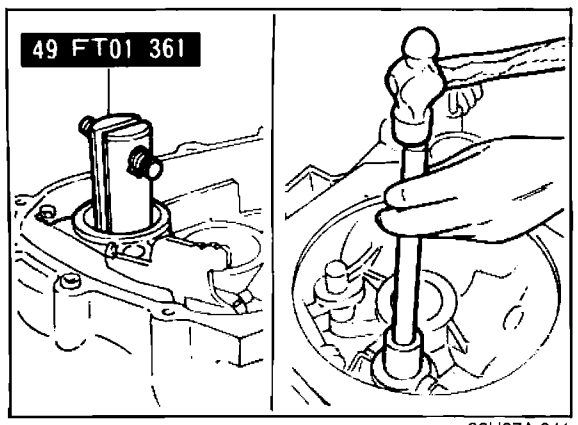
STEP 2
Disassemble in the sequence shown in the figure referring to disassembly note for the specially marked parts.

76G07A-018



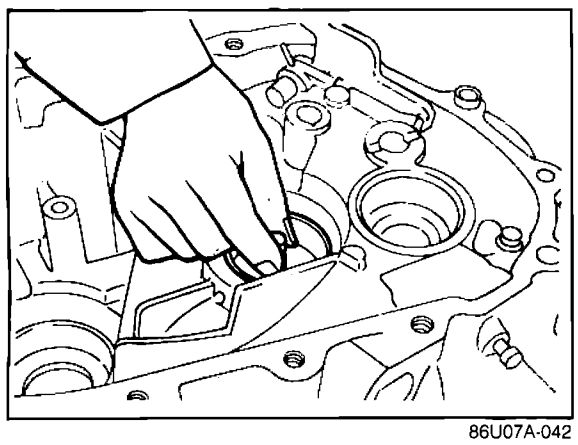
76G07A-019

1. Bearing outer race
2. Oil seal
3. Bearing outer race
4. Funnel
5. Bolts
6. Guide plate
7. Pipe
8. Bolt
9. Change arm
10. Roll pin
11. Change rod
12. Boot
13. Spring
14. Reverse gate
15. Selector
16. Oil seal
17. Bolt
18. Bleeder cover
19. Bleeder
20. Bolt
21. Speedometer driven gear assembly
22. O-ring
23. Roll pin
24. Driven gear
25. Gear case
26. Oil seal
27. Bearing outer race
28. Roll pin
29. Reverse lever shaft
30. Reverse lever
31. Drain plug and washer
32. Neutral switch and gasket
33. Bearing outer race
34. Diaphragm spring
35. Adjust shim
36. Bearing outer race
37. Adjust shim
38. Oil seal
39. Back-up light switch
40. Oil passage



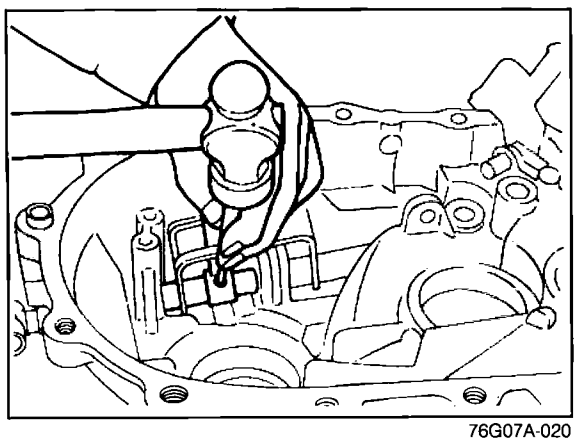
86U07A-041

Disassembly Note
Bearing outer race (primary shaft)
Remove the bearing outer race with the **SST**.



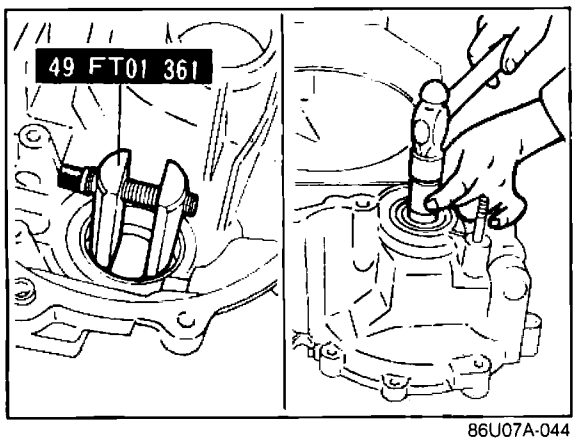
86U07A-042

Bearing outer race (secondary shaft)
Remove the bearing outer race by lifting out the funnel and race together.



76G07A-020

Roll pin
Align the groove for removal of the clutch housing pin with the position of the roll pin, then tap the pin out using a pin punch.

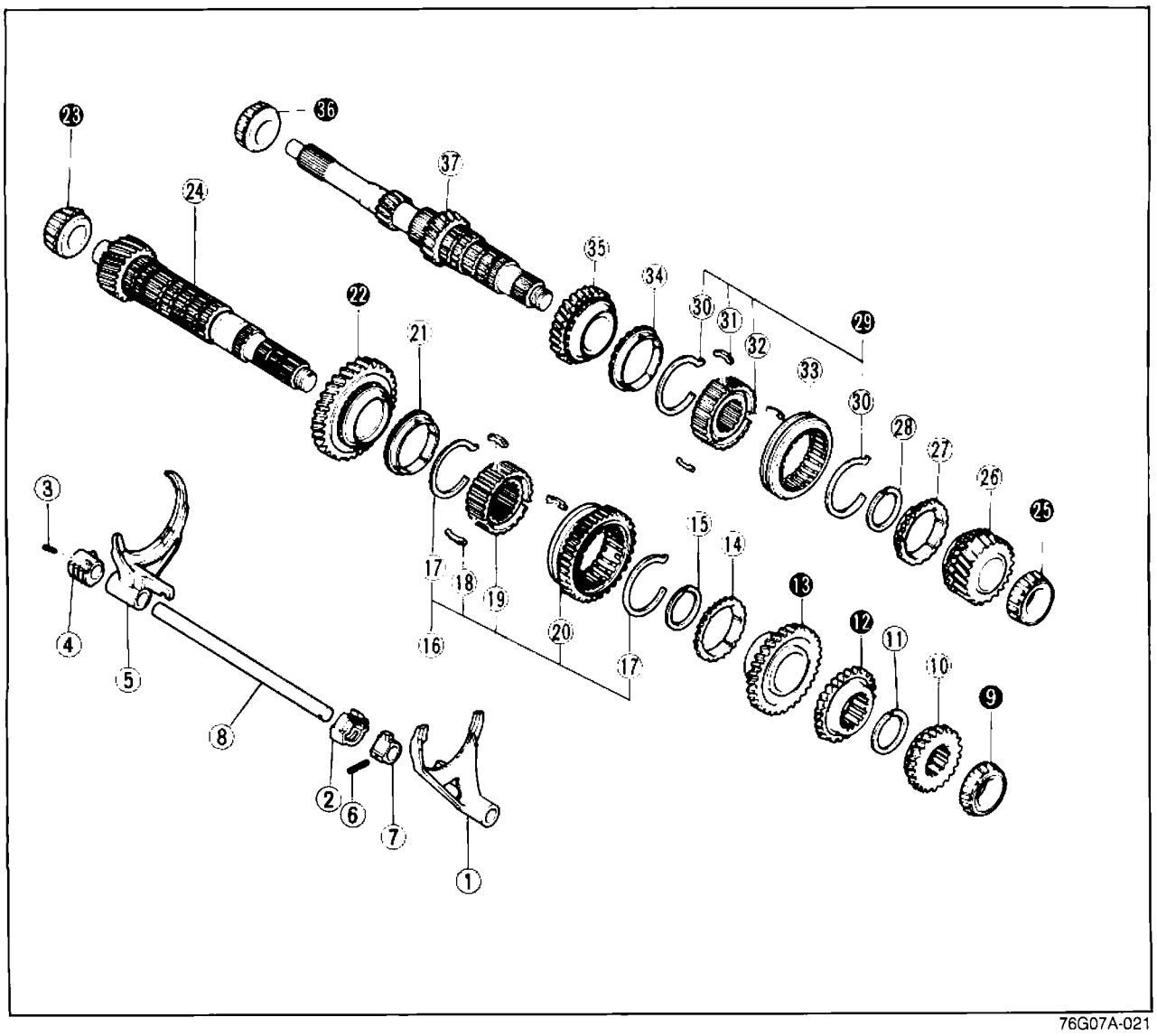


86U07A-044

Bearing outer race (differential)
Remove the bearing outer race with the **SST**.

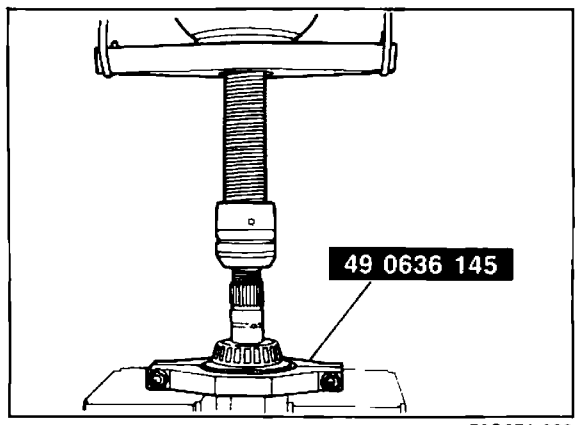
STEP 3
Disassemble in the sequence shown in the figure referring to disassembly note for the specially marked parts.

Note
a) Replace the bearings with new ones whenever they are disassembled.
b) Before disassembly, check the thrust clearance of all gears. (Refer to page 7A—33, 35.)



76G07A-021

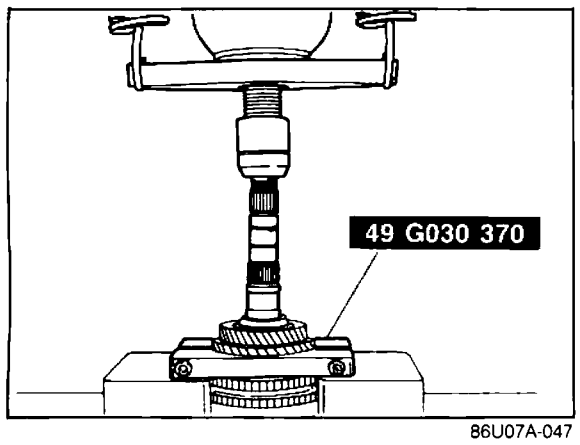
1. Shift fork (3rd and 4th gears)
2. Interlock sleeve
3. Roll pin
4. Control end
5. Shift fork (1st and 2nd gears)
6. Roll pin
7. Control lever
8. Control rod
9. Bearing outer race
10. Secondary 4th gear
11. Retaining ring
12. Secondary 3rd gear
13. 2nd gear
14. Synchronizer ring
15. Retaining ring
16. Clutch hub assembly
17. Synchronizer spring
18. Synchronizer key
19. Clutch hub
20. Clutch hub sleeve (reverse gear)
21. Synchronizer ring
22. 1st gear
23. Bearing inner race
24. Secondary shaft
25. Bearing inner race
26. 4th gear
27. Synchronizer ring
28. Retaining ring
29. Clutch hub assembly (3rd and 4th gears)
30. Synchronizer spring
31. Synchronizer key
32. Clutch hub
33. Clutch hub sleeve
34. Synchronizer ring
35. 3rd gear
36. Bearing inner race
37. Primary shaft



76G07A-022

Disassembly Note
Secondary Shaft
Bearing inner race (secondary 4th gear end)
Remove the bearing inner race and secondary 2nd gear with the **SST**.

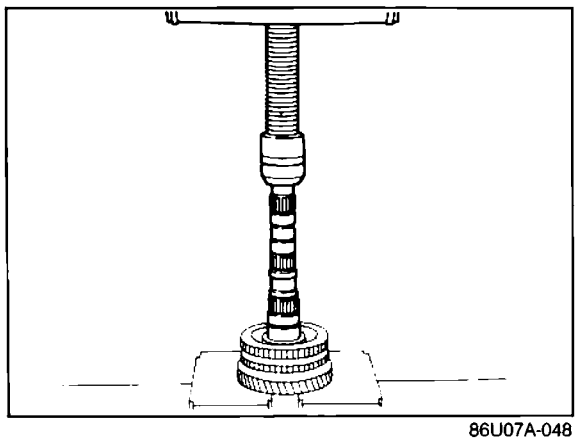
Caution
Hold the shaft with one hand so that it does not fall.



86U07A-047

Secondary 3rd gear and 2nd gear
1. Remove the retaining ring.
2. Shift the gears to 1st gear.
3. Remove the secondary 3rd gear and 2nd gear with the **SST**.

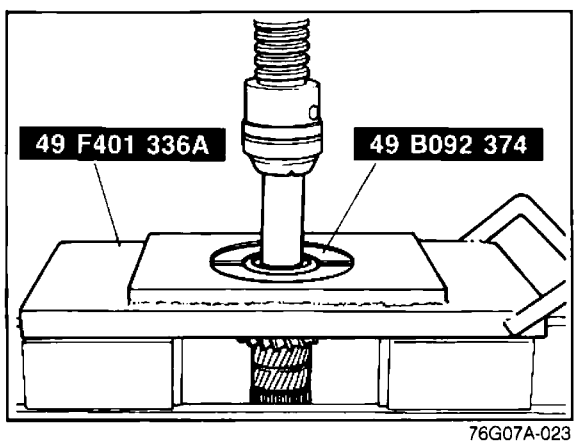
Caution
Hold the shaft with one hand so that it does not fall.



86U07A-048

1st gear
1. Remove the retaining ring.
2. Remove the clutch hub assembly (reverse gear) and 1st gear as shown in the figure.

Caution
Hold the shaft with one hand so that it does not fall.

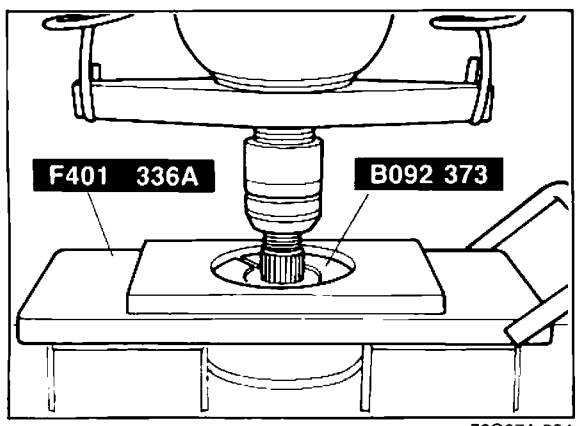


76G07A-023

Bearing inner race
Remove the bearing inner race with the **SST**.

Caution
Hold the shaft with one hand so that it does not fall.

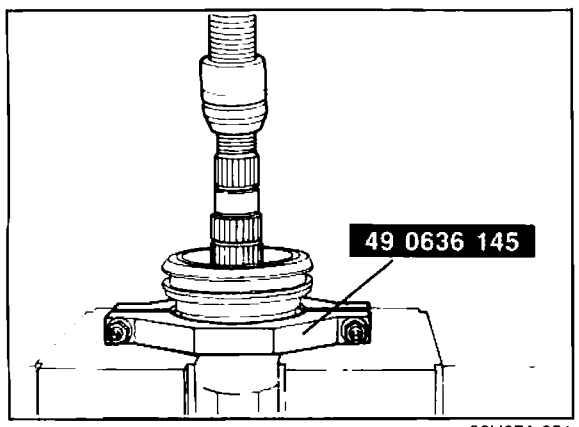
7A DISASSEMBLY



76G07A-024

Primary Shaft
Bearing inner race (4th gear end)
1. Remove the retaining ring.
2. Remove the bearing inner race with the **SST**.

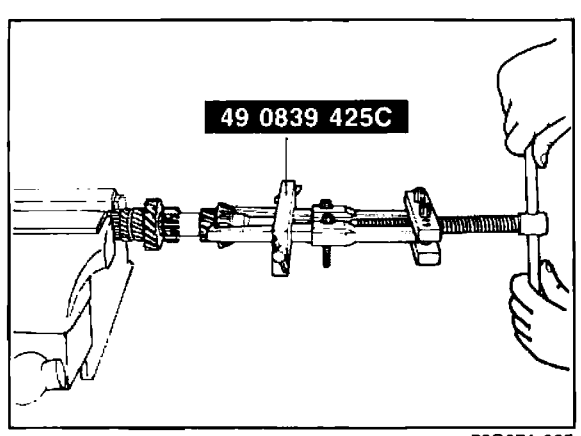
Caution
Hold the shaft with one hand so that it does not fall.



86U07A-051

Clutch hub assembly (3rd/4th)
1. Remove the retaining ring.
2. Remove the clutch hub assembly with the **SST**.

Caution
Hold the shaft with one hand so that it does not fall.



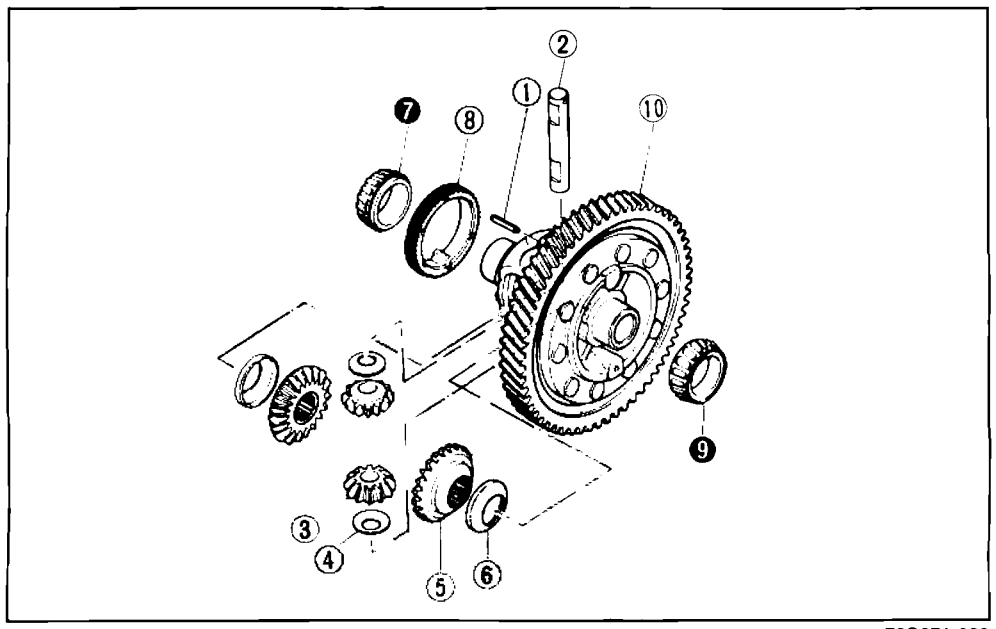
76G07A-025

Bearing inner race
Remove the bearing inner race with the **SST**.

Caution
Hold the shaft with one hand so that it does not fall.

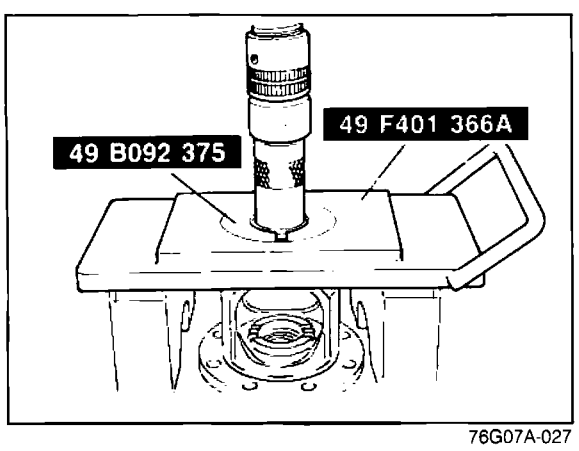
STEP 4 (DIFFERENTIAL)
Disassemble in the sequence shown in the figure referring to disassembly note for the specially marked parts.

Note
a) If the bearing inner races are removed replace them with new ones.
b) Before disassembly, check the backlash of the side gears and pinion gears. (Refer to page 7A—30)



76G07A-026

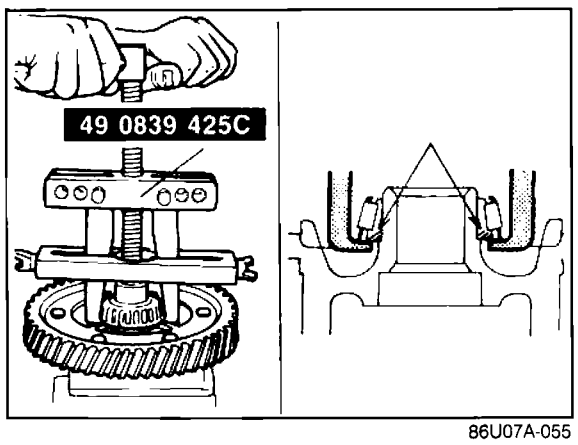
1. Knock pin
2. Pinion shaft
3. Pinion gear
4. Thrust washer
5. Side gear
6. Thrust washer
7. Side bearing inner race
8. Speedometer drive gear
9. Side bearing inner race
10. Gear case



76G07A-027

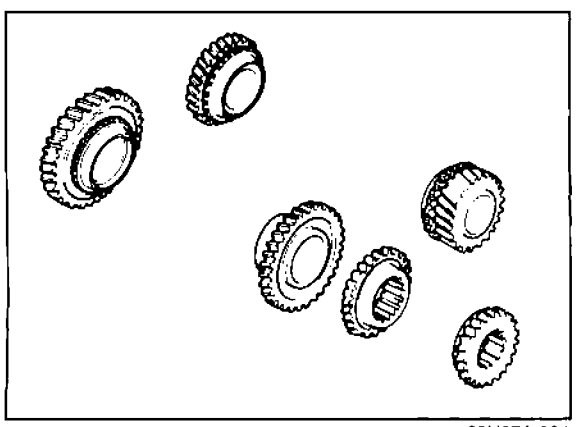
Disassemble Note
Side bearing inner race (side opposite ring gear)
Remove the race from the gear case with the **SST**.

Caution
Hold the gear case with one hand so that it does not fall.



86U07A-055

Side bearing inner race (ring gear side)
Remove the race with a combination of parts from the **SST**.

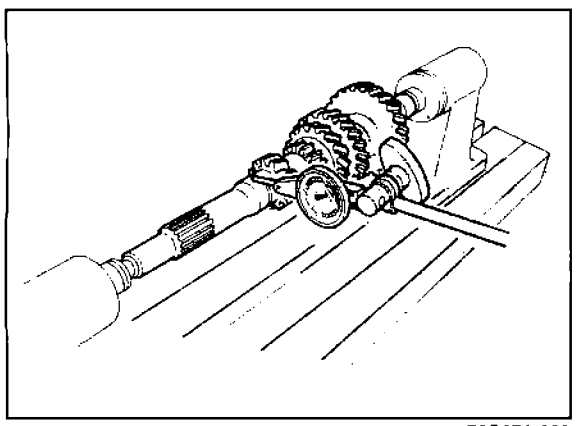


63U07A-064

INSPECTION

Check the following parts, and replace if necessary.

1st, 2nd, 3rd, 4th, and 5th gears
1. Worn or damaged synchronizer cone.
2. Worn or damaged hub sleeve coupling.
3. Worn or damaged teeth.
4. Worn or damaged inner surface or end surface of gears.

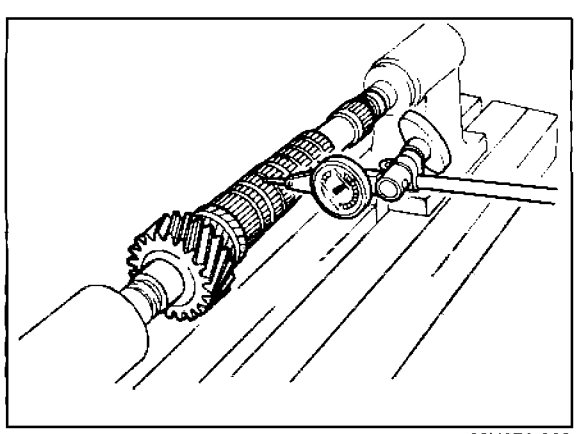


76G07A-028

Primary Shaft Gear and Primary Gear
1. Worn teeth
2. Primary shaft gear run-out

Run-out: 0.05 mm (0.002 in) max.

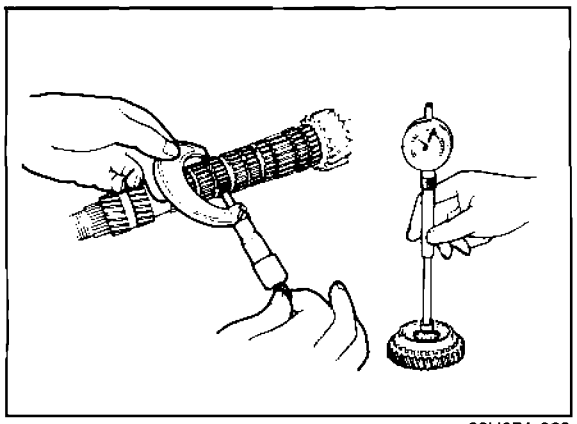
Note
If the shaft gear is replaced, adjust the bearing preload. (Refer to page 7A—37)



63U07A-068

Secondary Shaft Gear
1. Worn or damaged gear contact surface.
2. Worn or damaged splines.
3. Worn teeth.
4. Clogged oil passage.
5. Secondary shaft gear run-out.

Standard run-out: 0.015 mm (0.0006 in)

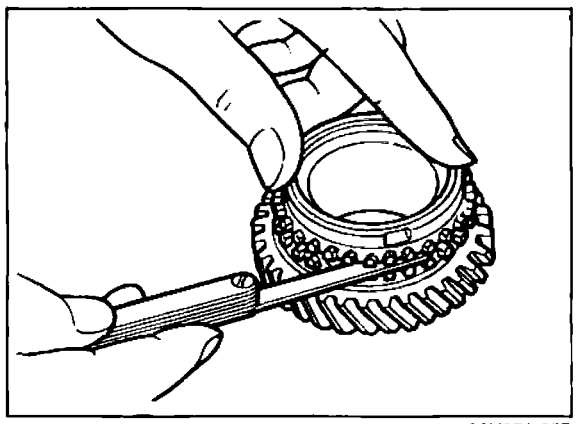


63U07A-069

6. Oil clearance between secondary gear shaft and gears.

Standard: 0.03—0.08 mm (0.001—0.003 in)

Caution
If the shaft gear is replaced, adjust the bearing preload.

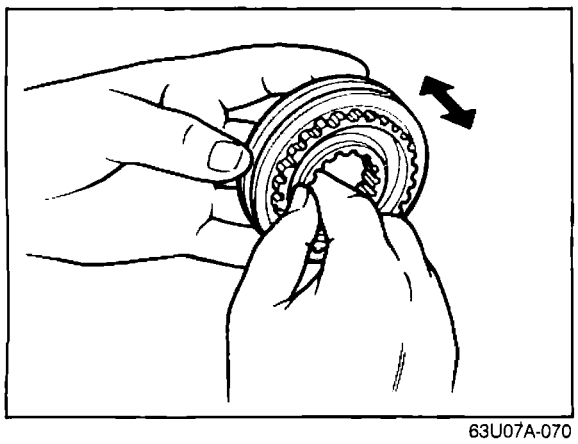


86U07A-057

Synchronizer Ring
1. Engagement with gear
2. Worn or damaged teeth
3. Worn or damaged tapered surface
4. Clearance from side of gear

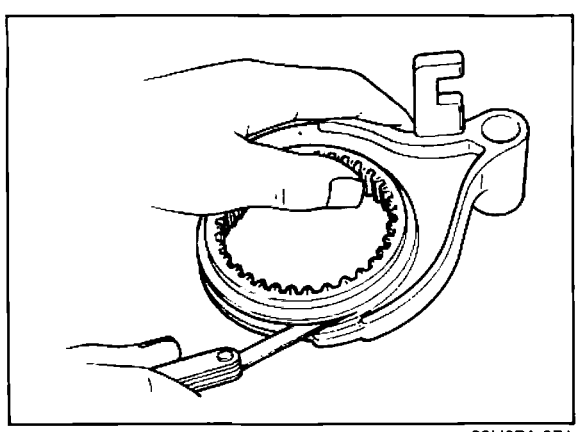
Clearance: 1.5 mm (0.059 in)
Minimum: 0.8 mm (0.031 in)

Note
a) Press the synchronizer ring uniformly against the gear and measure around the circumference.
b) If the clearance is less than specified, replace the synchronizer ring or gear.



63U07A-070

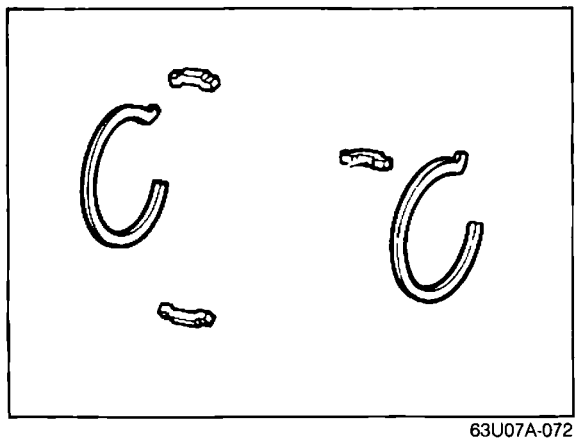
Clutch Hub
1. Worn or damaged splines.
2. Worn or damaged synchronizer key groove.
3. Worn end surface.
4. Operation of the hub sleeve when it is installed.



63U07A-071

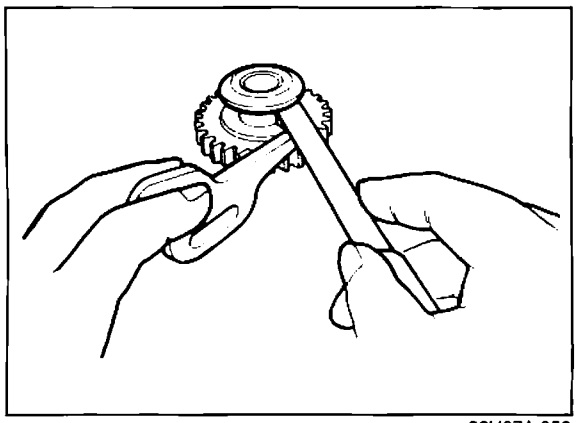
Clutch Hub Sleeve
1. Worn or damaged hub splines.
2. Worn or damaged sleeve fork groove.
3. Clearance between sleeve and shift fork.

Standard: 0.2—0.458 mm (0.008—0.018 in)
Limit: 0.5 mm (0.020 in)



63U07A-072

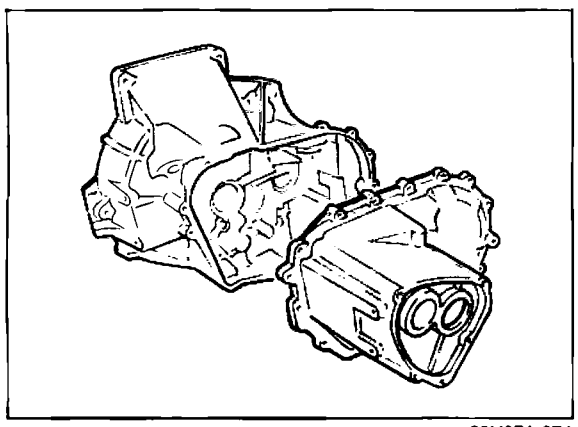
Synchronizer Key and Spring
1. Worn key.
2. Bent spring.



86U07A-058

Reverse Idle Gear
1. Worn or damaged bushing.
2. Worn or damaged teeth.
3. Worn or damaged release lever coupling groove.
4. Clearance between sleeve and reverse lever.

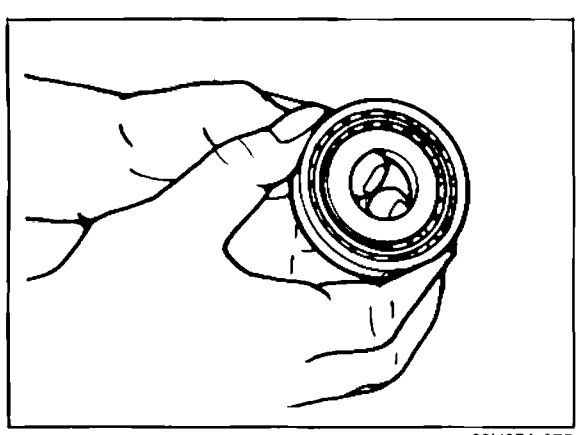
Standard: 0.095—0.318 mm (0.004—0.013 in)
Maximum: 0.5 mm (0.020 in)



63U07A-074

Clutch Housing, Transaxle Case, Rear Cover, and Differential Gear Case
Cracks or damage.

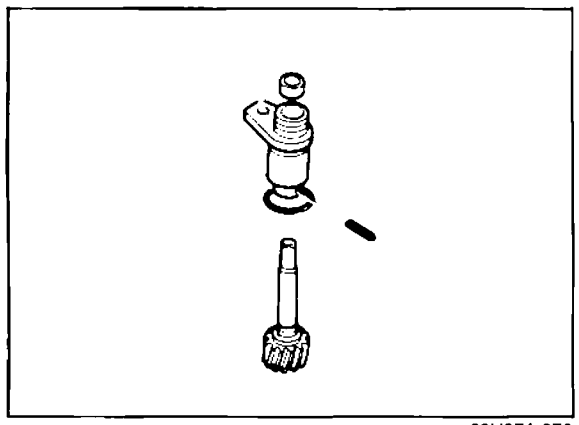
Caution
If the clutch housing, transaxle case, or differential gear case is replaced, adjust the bearing preload of the shaft gears and the preload of the differential side bearings.



63U07A-075

Bearing
1. Roughness or noise while turning
2. Worn or damaged outer race or rollers

Caution
a) Replace the bearing, the outer race, and the inner race as a unit.
b) If the bearing is replaced, adjust the preload.



63U07A-076

Speedometer Driven Gear Assembly
1. Worn or damaged teeth.
2. Worn or damaged O-ring.

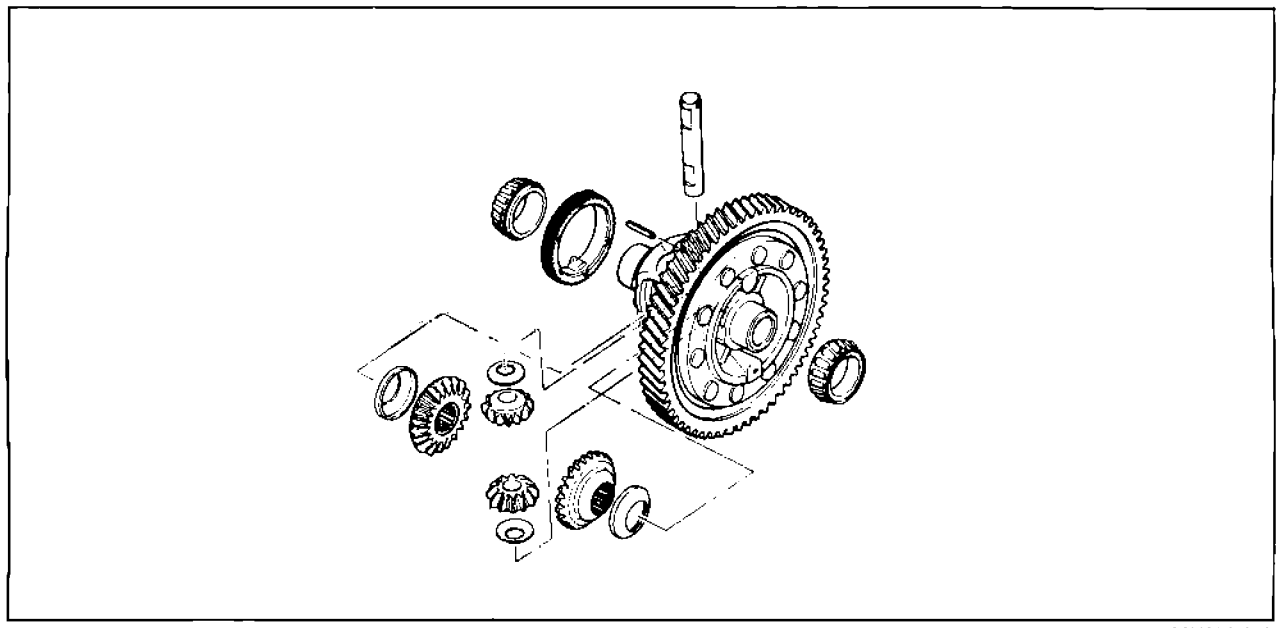
Ring Gear Speedometer Drive Gear
Worn or damaged teeth.

Oil Seal
Damaged or worn lip.

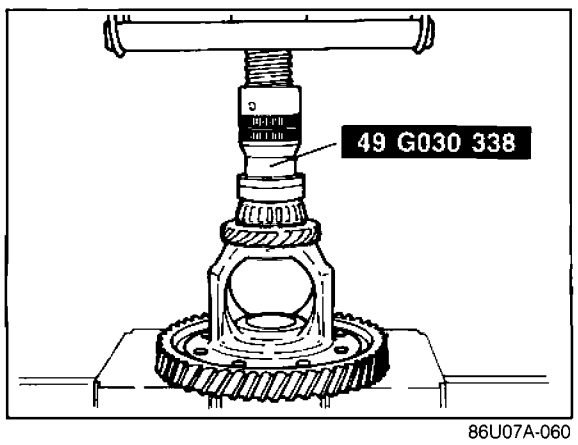
ASSEMBLY

Note
a) Wash all parts.
b) Apply oil to all friction surfaces.
c) Use new roll pins and retaining rings.

STEP 1 (DIFFERENTIAL)



86U07A-059

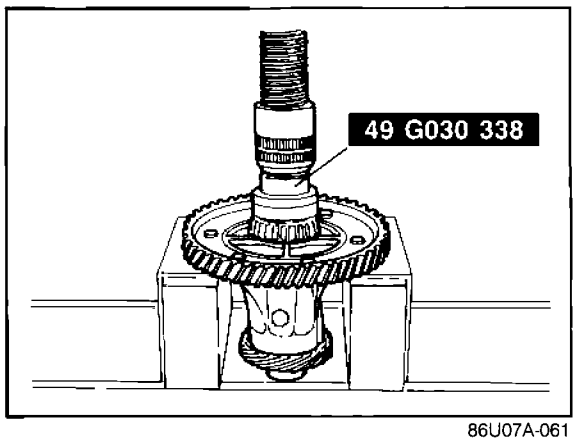


86U07A-060

Assembly

1. Install the speedometer drive gear and the new bearing inner race with the **SST**.

Note
Press to 19,620 N (2,000 kg, 4,400 lb).

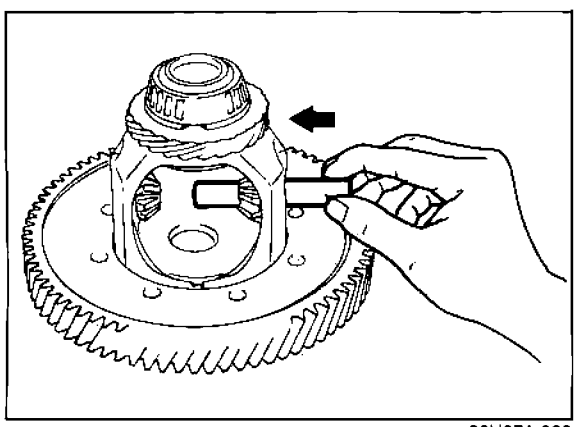


86U07A-061

2. Install the new bearing inner race with the **SST**.

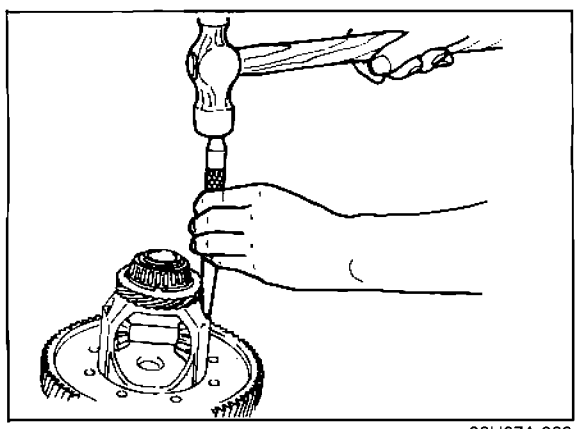
Note
Press to 19,620 N (2,000 kg, 4,400 lb).

7A ASSEMBLY



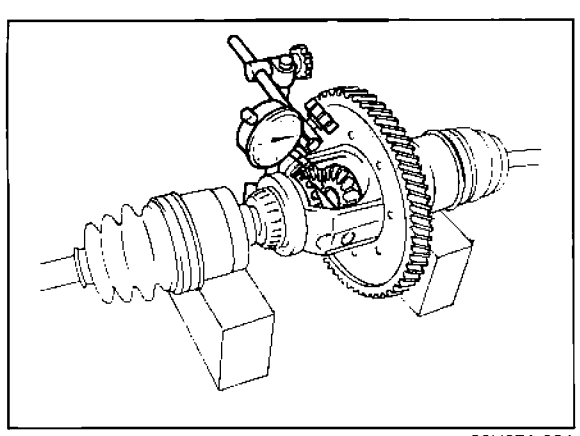
86U07A-062

3. Install the thrust washers and pinion gears.
4. Install the pinion shaft.



86U07A-063

5. Install the knock pin, then crimp it so that it cannot come out of the gear case.
6. Install the thrust washers and the side gears.



86U07A-064

Check and adjust using the following procedure.
7. Install the left and right driveshafts in the differential assembly.
8. Support the driveshafts on V-blocks as shown in the figure.
9. Measure the backlash of both pinion gears.

Backlash: 0—0.1 mm (0—0.004 in)

Identification mark	Thickness
0	2.0 mm (0.079 in)
1	2.1 mm (0.083 in)
2	2.2 mm (0.087 in)

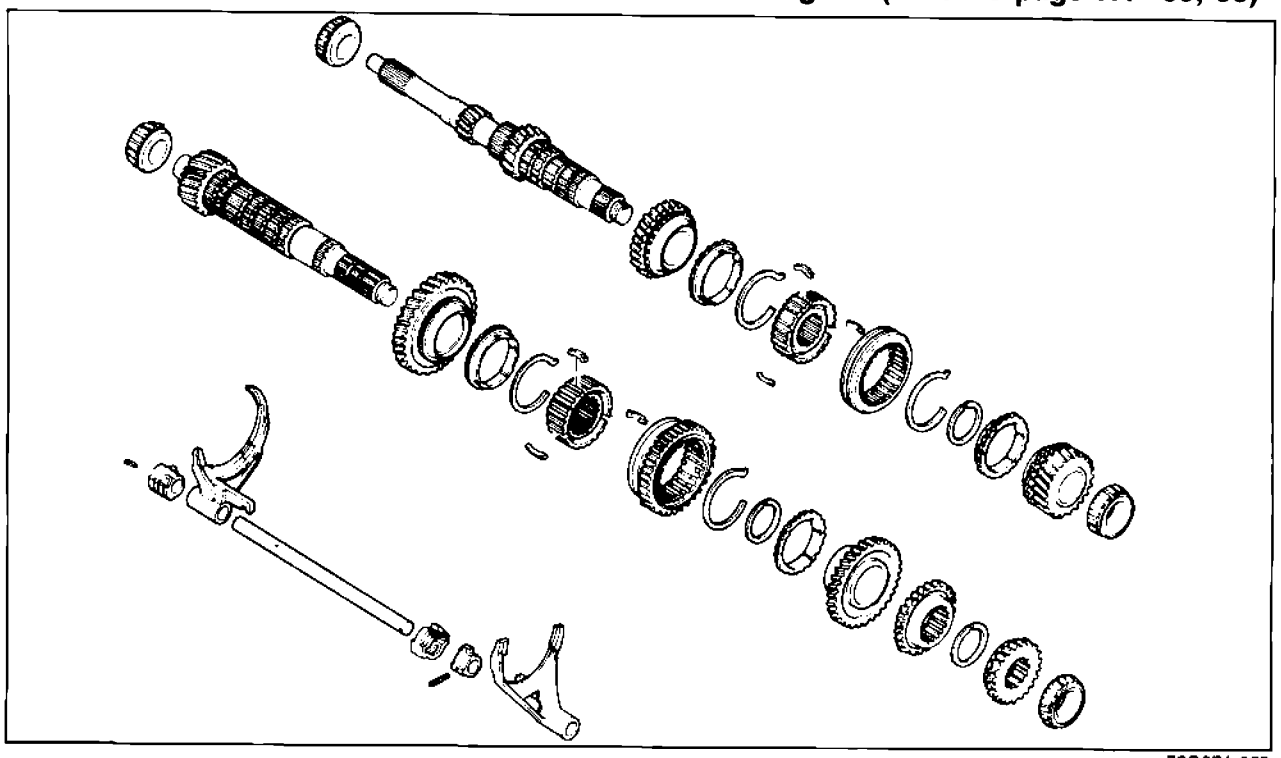
86U07A-065

10. If the backlash is more than specified, adjust by selecting thrust washers from the table and install them between the case and side gears.

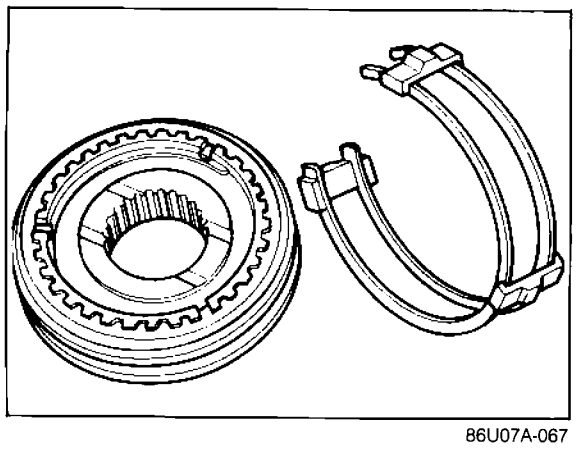
Note
Use the same thickness thrust washer on each side.

STEP 2

Note
During assembly, check the thrust clearance of each gear. (Refer to page 7A—33, 35)



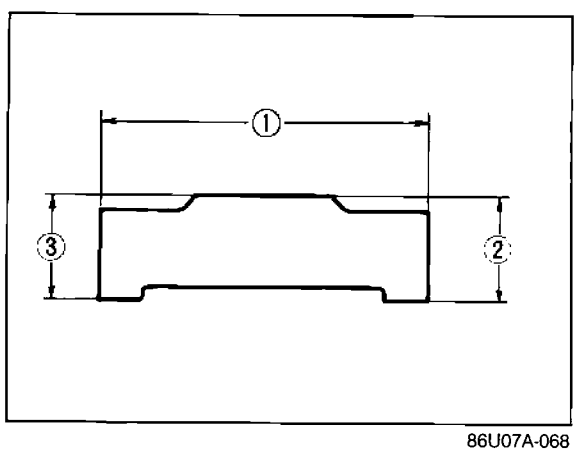
76G07A-029



86U07A-067

Assembly
Install the synchronizer key spring in the clutch hub with the hook in the groove. This holds the three synchronizer keys in place.

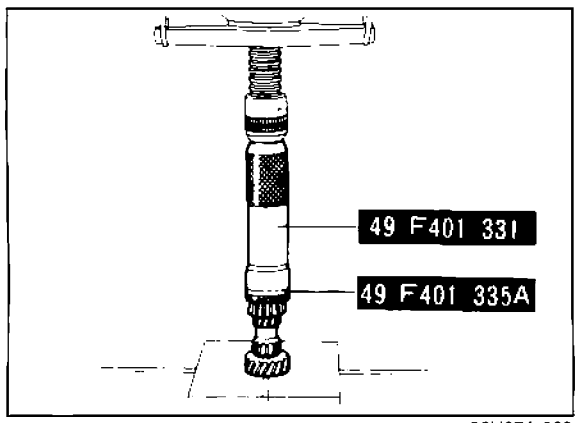
Note
a) The sizes of the synchronizer keys are different.



86U07A-068

Specification: mm (in)

	①	②	③
1st/2nd	19 (0.7480)	4.25 (0.1673)	4.25 (0.1673)
3rd/4th 5th/Rev.	17 (0.6693)	4.25 (0.1673)	4.25 (0.1673)

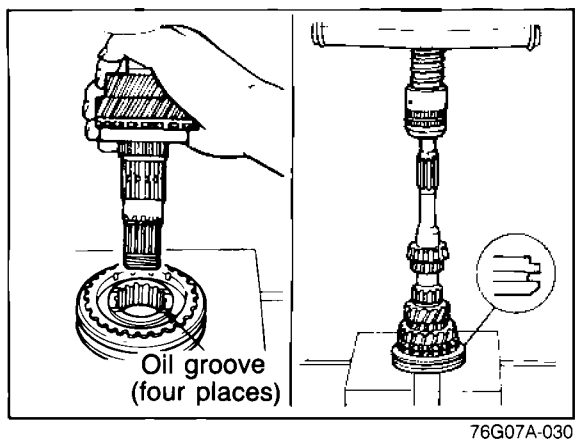


86U07A-069

Primary Shaft

1. Install the new bearing inner race with the **SST**.

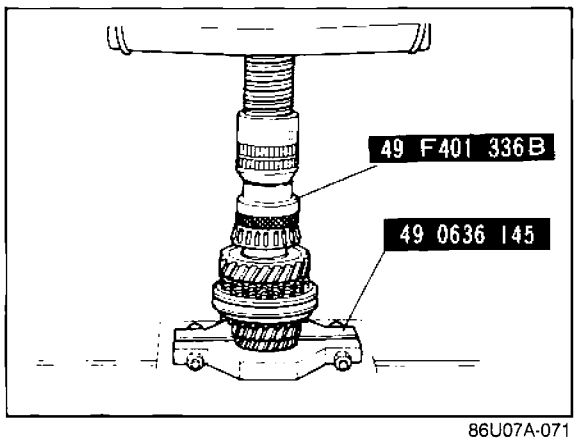
Note
Press to 19,620 N (2,000 kg, 4,400 lb).



76G07A-030

2. Install the 3rd gear, synchronizer ring, and clutch hub assembly with the **SST**. (Refer to page 7A—33)

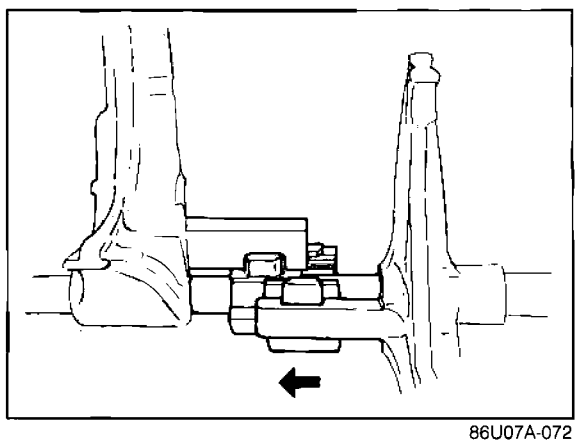
Note
a) Press to 19,620 N (2,000 kg, 4,400 lb).
b) Align the synchronizer ring groove and clutch housing hub key when installing.



86U07A-071

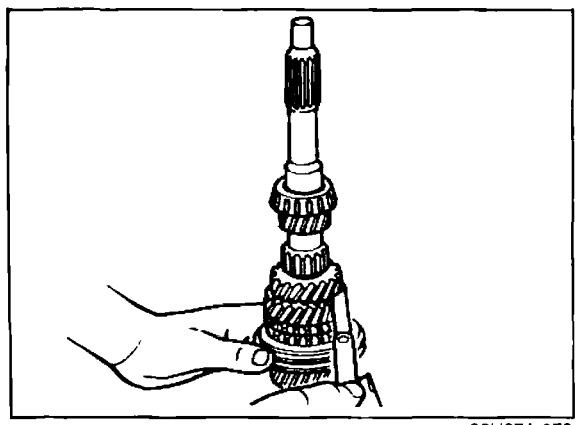
3. Install the retaining ring.
4. Install the synchronizer ring, 4nd gear, and bearing inner race with the **SST**.

Note
Press to 19,620 N (2,000 kg, 4,400 lb).



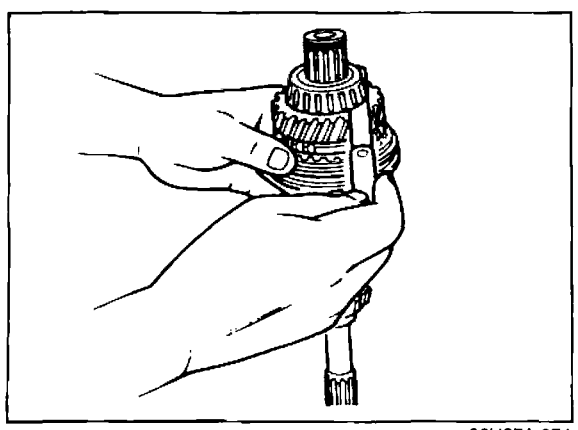
86U07A-072

5. Install both shift forks and the interlock sleeve, as in the figure.


86U07A-073

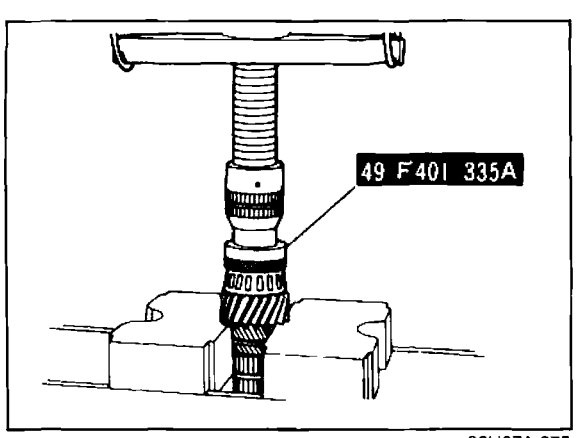
6. Measure the clearance between the 3rd gear and 2nd gear.

Clearance: 0.05—0.20 mm (0.0020—0.0079 in)
Maximum: 0.25 mm (0.0098 in)


86U07A-074

7. Measure the clearance between the 4th gear and bearing inner race.

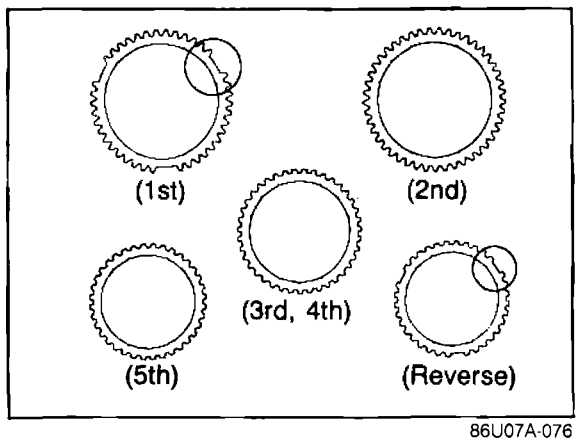
Clearance: 0.165—0.365 mm (0.0064—0.0144 in)
Maximum: 0.415 mm (0.0163 in)



86U07A-075

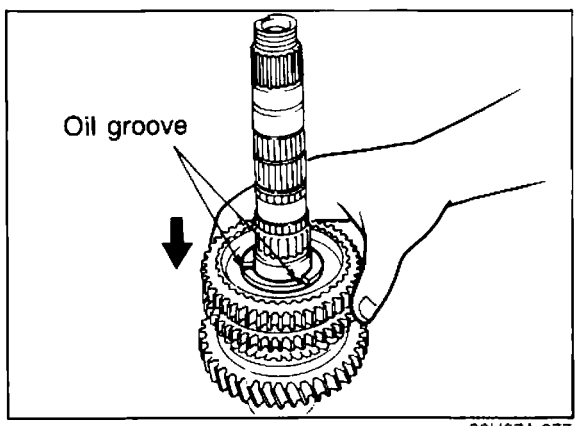
8. Install the new bearing, inner race with the **SST**.

Note
Press to 19,620 N (2,000 kg, 4,400 lb).



86U07A-076

Note
The styles and sizes of synchronizer rings are different as shown in the illustration.

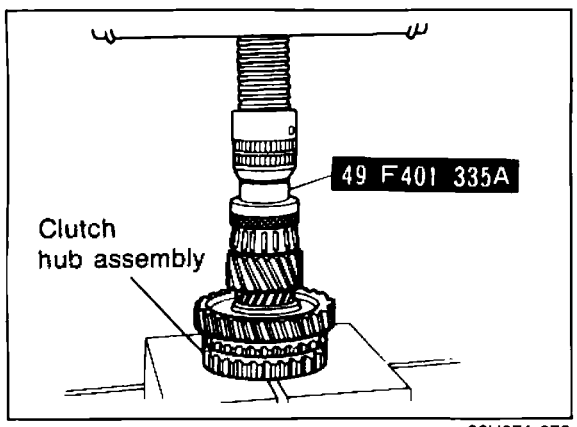


86U07A-077

Secondary Shaft

1. Assemble the 1st gear, synchronizer ring, and clutch hub assembly (reverse gear), as shown in the figure.

Note
Align the synchronizer ring, groove and clutch housing hub key when installing.

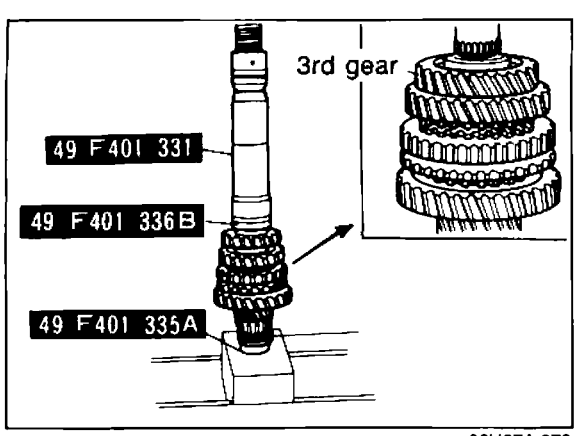


86U07A-078

2. Press on the clutch hub assembly (reverse gear) with the **SST**.

Note
Press to 19,620 N (2,000 kg, 4,400 lb).

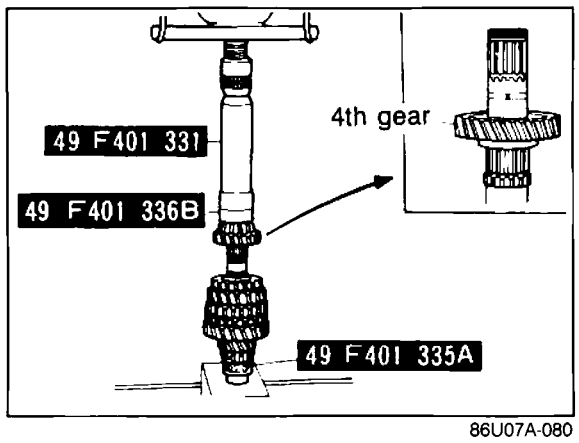
3. Install the retaining ring.



86U07A-079

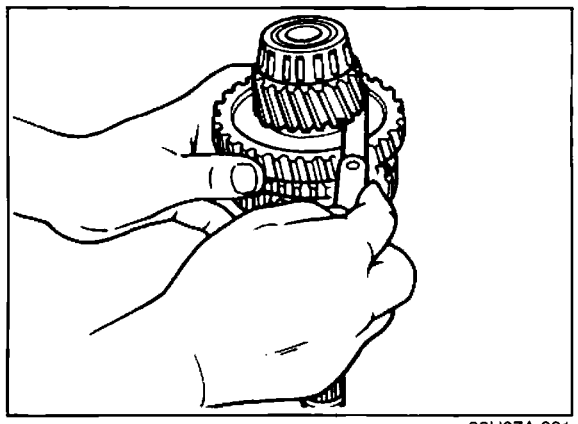
4. Install the synchronizer ring and 2nd gear.
5. Install the secondary 3rd gear with the **SST**.

Note
Press to 19,620 N (2,000 kg, 4,400 lb).



86U07A-080

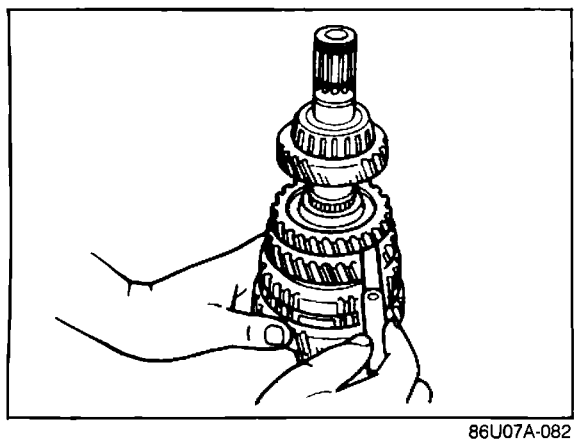
6. Install the retaining ring.
7. Install the secondary 4th gear and new bearing inner race.



86U07A-081

8. Measure the clearance between the 1st gear and differential drive gear.

Clearance: 0.05—0.28 mm (0.0020—0.0110 in)
Maximum: 0.33 mm (0.0199 in)

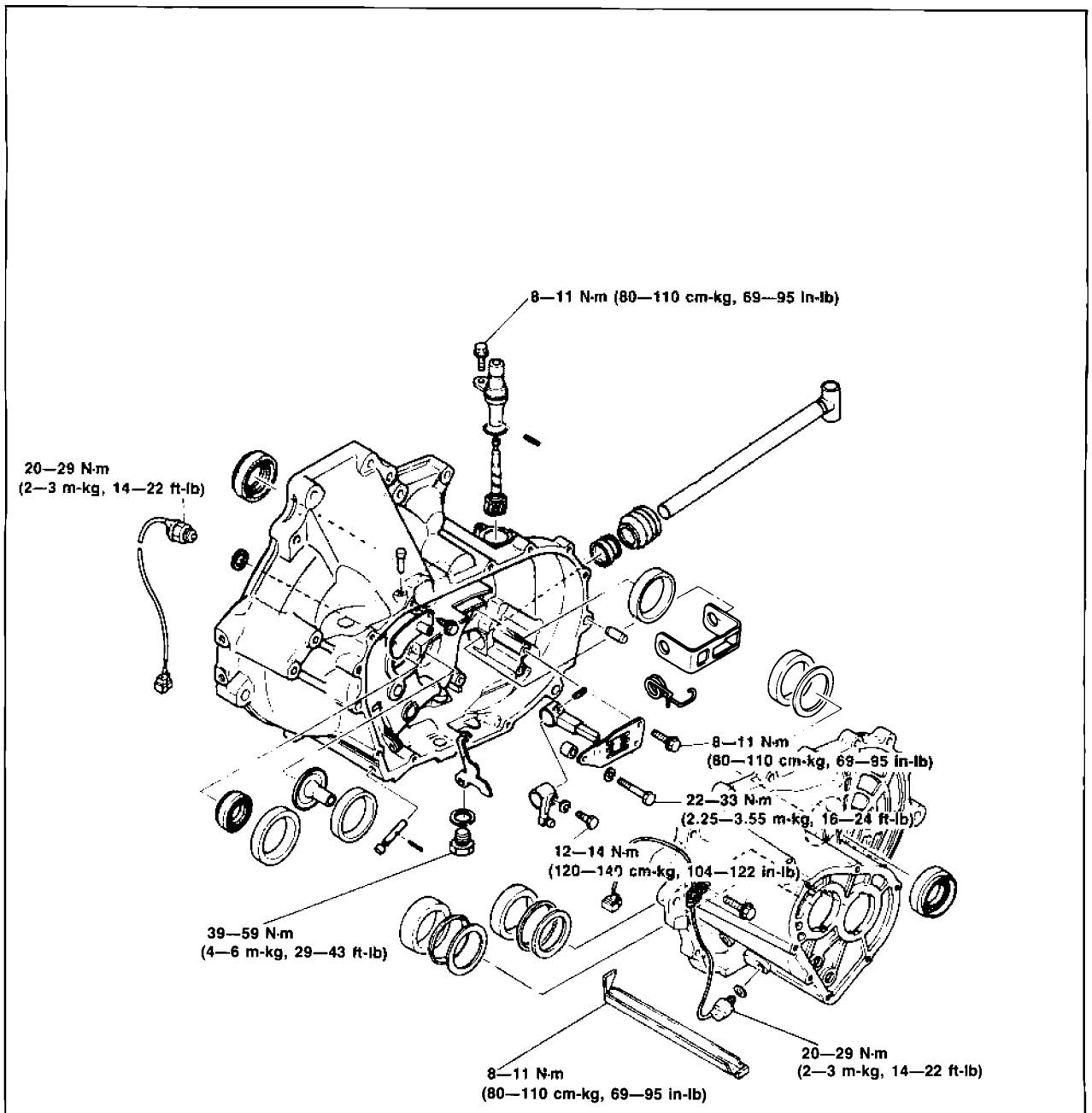


86U07A-082

9. Measure the clearance between the 2nd gear and secondary 3rd gear.

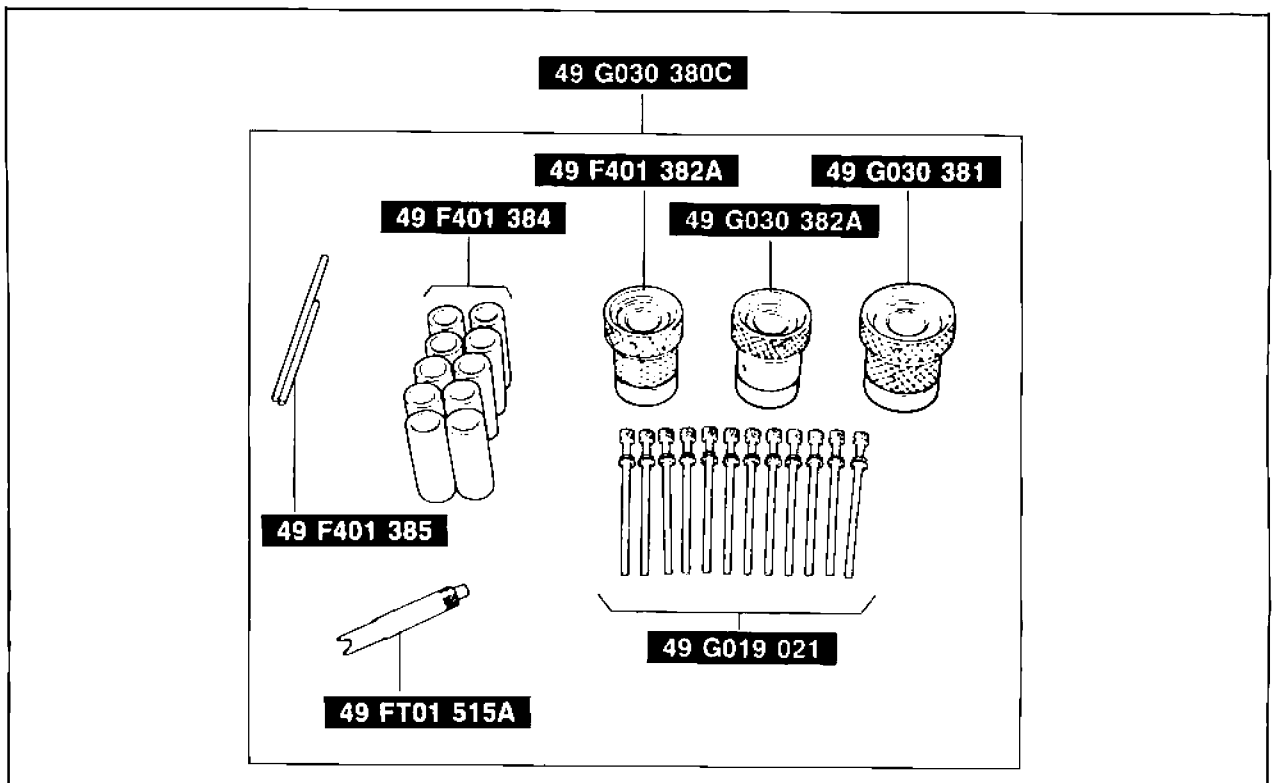
Clearance:
0.175—0.455 mm (0.0069—0.0179 in)
Maximum: 0.505 mm (0.0199 in)

STEP 3
Torque specifications

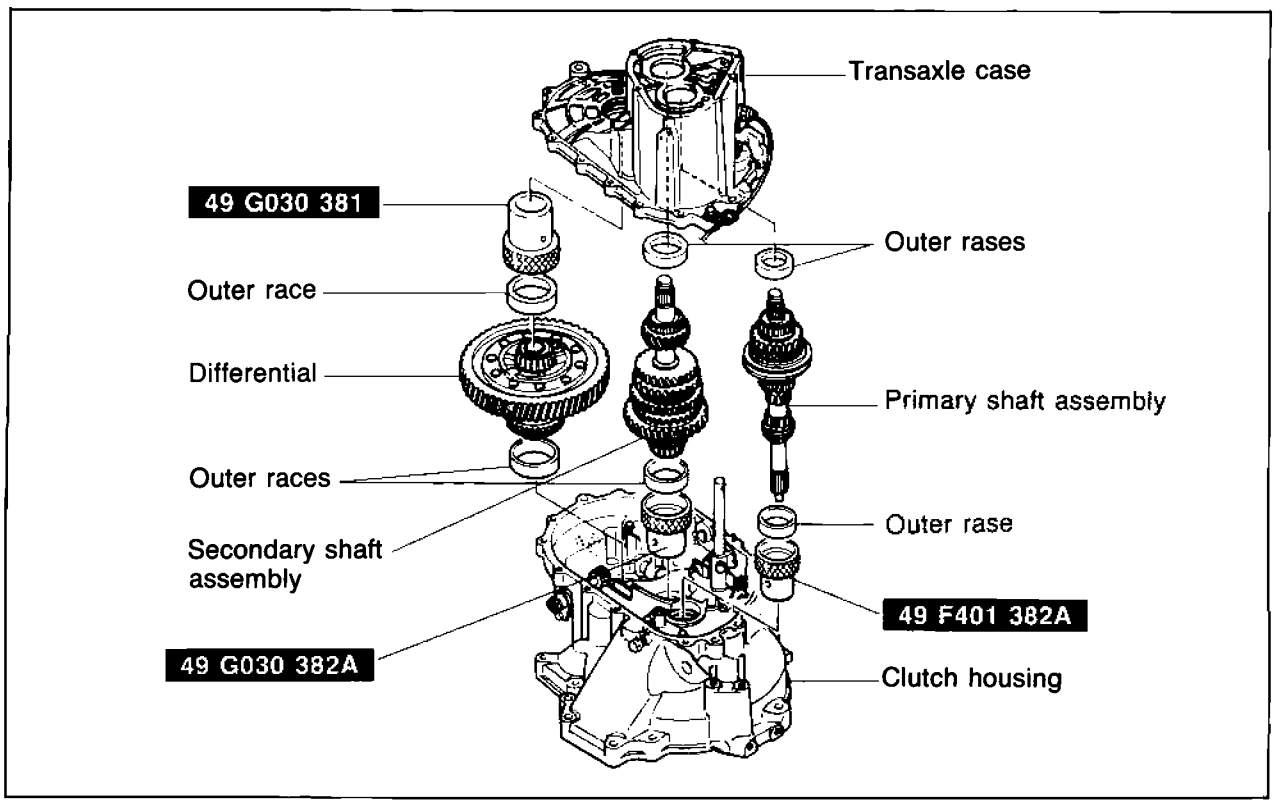


76G07A-031

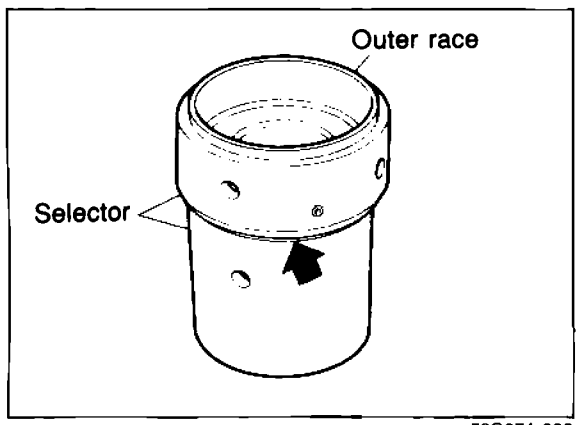
Bearing Preload
Adjust the bearing preload through the use of adjust shim(s).



83U07A-099



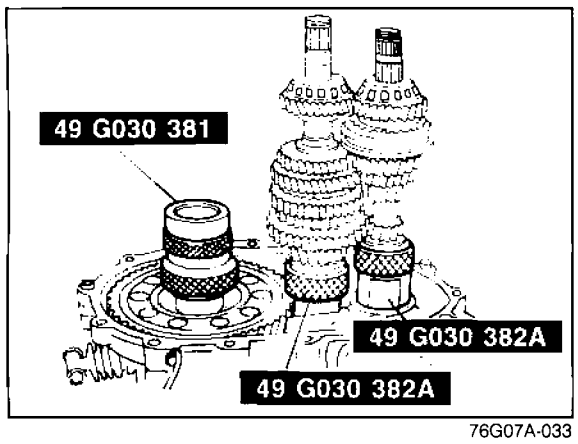
83U07A-033



76G07A-032

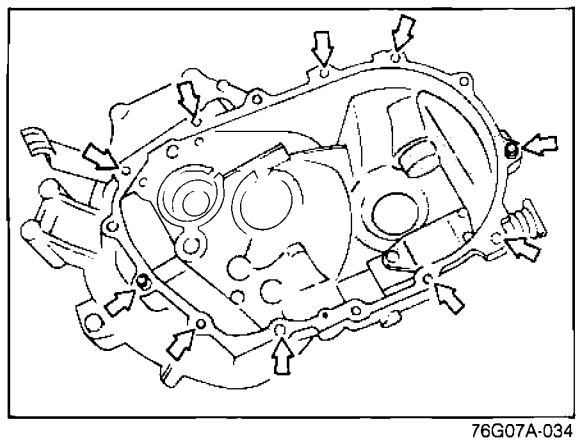
1. Install the primary and secondary shaft bearing outer races into the transaxle case (diaphragm springs and shims removed).
2. After mounting the clutch housing onto the transaxle hanger, and set the differential bearing outer race into the clutch housing, and tap in with a hammer until it contacts the clutch housing, and tap in with a hammer until it contacts the clutch housing.
3. Assemble the outer races into the **SST** (selector) as shown in the figure.

Note
Turn the selector to eliminate the gap indicated by the arrow in the figure.



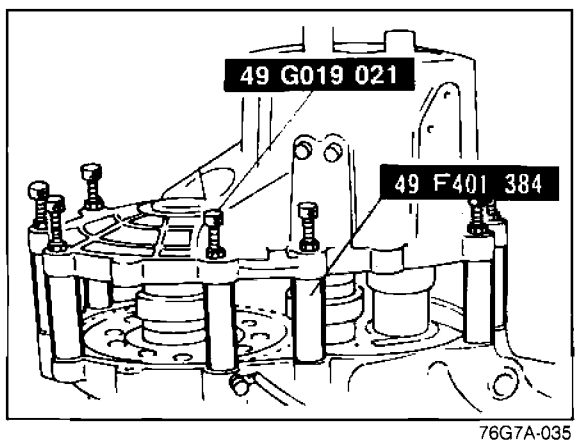
76G07A-033

4. Set the differential assembly onto the clutch housing, then mount the bearing outer race and the selector on the differential.
   Set the assembled selectors for the primary and secondary shaft in the clutch housing.
   Mount the shaft gear assemblies as shown in the figure.



76G07A-034

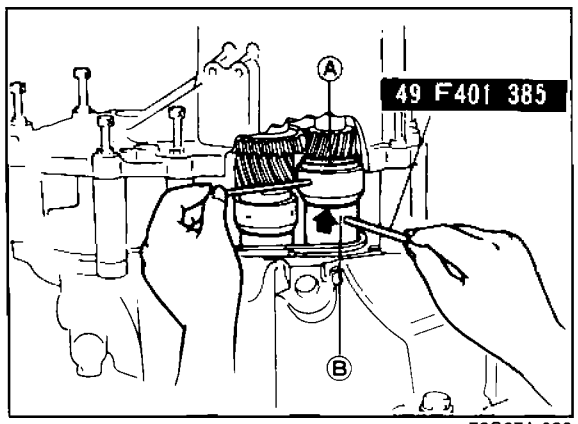
5. Set the **SST** (collars) in the positions shown in the figure.



76G7A-035

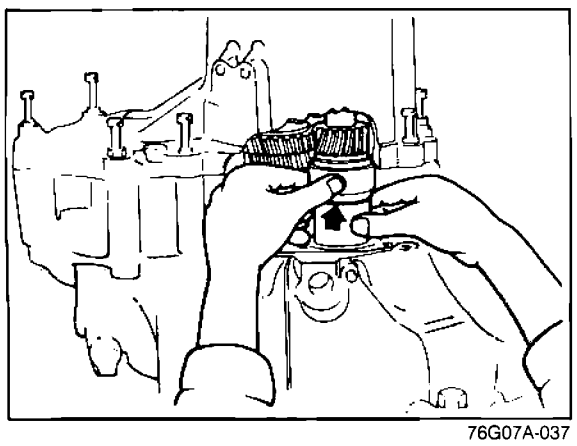
6. Install the transaxle case then tighten the **SST**(bolts) to the specified torque.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft—lb)



76G07A-036

7. To seat the bearings, mount the **SST** (bars) on parts Ⓐ and Ⓑ of the selector, and then turn the selector so the gap is widened.
   Then turn it in the reverse direction until the gap is eliminated.



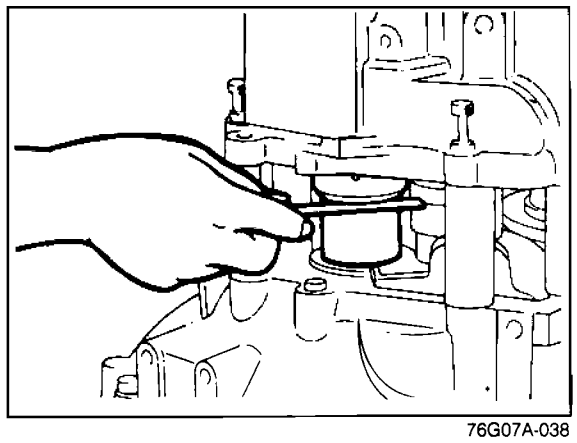
76G07A-037

8. Manually expand the selector until the selector no longer turns by hand.

   Note
   Check that each shaft turns smoothly.

9. Use a feeler gauge and measure the gap in the selector.

   Note
   Measure the gap around the entire circumference of the selector.



76G07A-038

10. Take the maximum reading and determine the shim to be used as follows:

    <Primary shaft adjust shim>
    - Subtract the diaphragm spring thickness (0.70 mm, 0.0276 in) from the gap determined in the step 9.
    - Select the closest thinner shim from the table.

    Example
    1.22 mm (0.0480 in)—0.70 mm (0.0276 in) = 0.52 mm (0.0204 in)
    Shim: 0.50 mm (0.020 in)

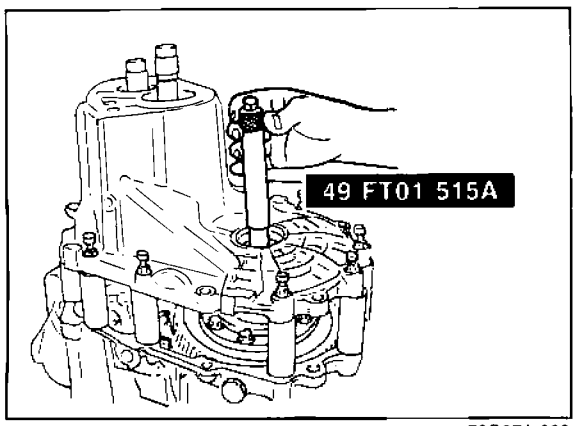
Thickness (Shaft gears)	mm (in)
0.20 (0.008)	0.50 (0.020)
0.25 (0.010)	0.55 (0.022)
0.30 (0.012)	0.60 (0.024)
0.35 (0.014)	0.65 (0.026)
0.40 (0.016)	0.70 (0.028)
0.45 (0.018)	

76G07A-072

    <Secondary shaft adjust shim>
    - Subtract the diaphragm spring thickness (0.70 mm, 0.0276 in) from the gap determined in the step 9.
    - Select the closest thicker shim from the table.

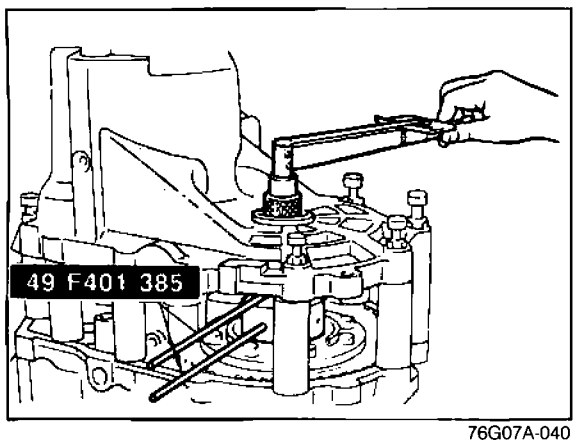
    Example
    1.22 mm (0.0480 in)—0.70 mm (0.0276 in) = 0.52 mm (0.0204 in)
    Shim: 0.55 mm (0.022 in)

    Note
    Use a maximum of two shims.



76G07A-039

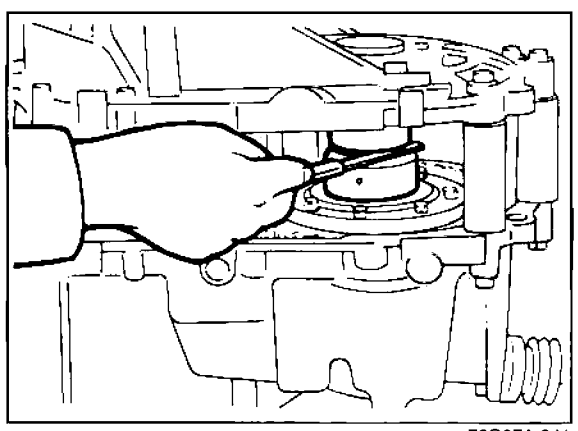
11. Install the **SST**.



76G07A-040

12. Adjust the selector with the **SST** until the specified preload is obtained.

Preload:
0.5 N·m (5 cm-kg, 4.3 in-lb)



76G07A-041

13. Use a feeler gauge to measure the gap in the selector for the differential.

Note
Measure the gap around the entire circumference of the selector

Thickness (Differential)	mm (in)
0.10 (0.004)	0.70 (0.026)
0.15 (0.006)	0.75 (0.028)
0.20 (0.008)	0.80 (0.030)
0.25 (0.010)	0.85 (0.032)
0.30 (0.012)	0.90 (0.034)
0.35 (0.014)	0.95 (0.036)
0.40 (0.016)	1.00 (0.038)
0.45 (0.018)	1.05 (0.040)
0.50 (0.020)	1.10 (0.042)
0.60 (0.022)	1.15 (0.044)
0.65 (0.024)	1.20 (0.046)

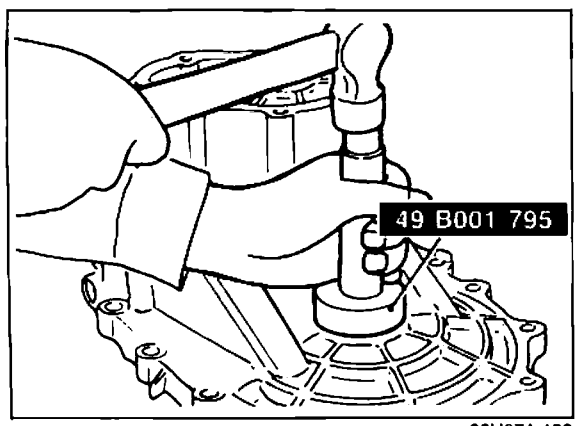
76G07A-042

14. Add **0.15 mm (0.0059 in)** to the measured clearance and select the combination of shims whose thickness added is nearest higher than that valve. See the table for available shim sizes.

Example: 0.32 mm (0.013 in)
0.32 mm (0.013 in) + 0.15 mm (0.006 in) = 0.47 mm (0.019 in).
So the nearest shim (on the thick side) to 0.47 mm (0.019 in) is 0.50 mm (0.020 in).

Note
Use a maximum of two shims.

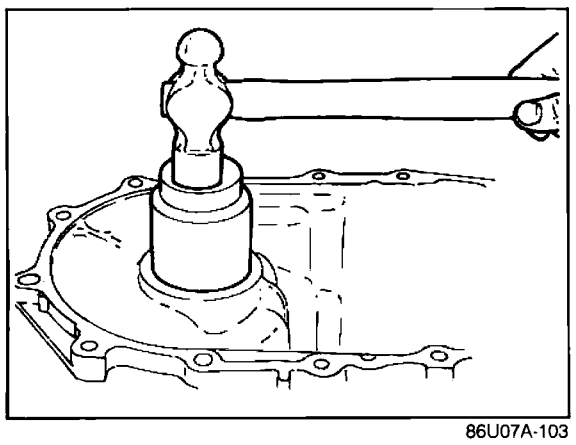
15. Remove the **SST** and transaxle case.
16. Remove the primary shaft assembly and the differential.
17. Remove the bearing outer races.



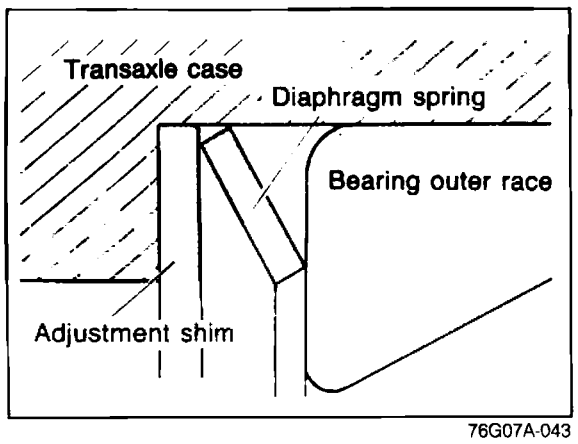
86U07A-102

Assembly

1. Install the neutral switch.
2. Install the drain plug.
3. Install the back-up lamp switch.
4. Install the new oil seals with the **SST**.


86U07A-103

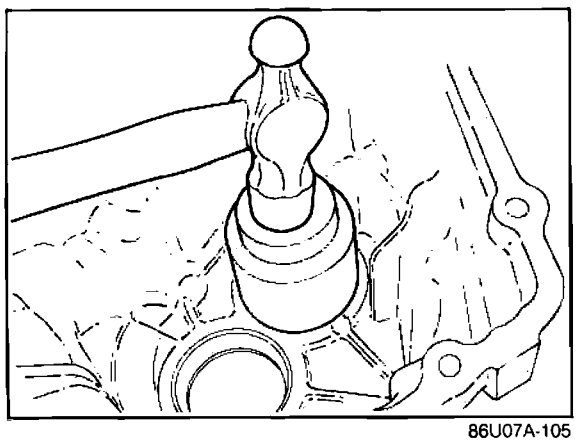
5. Install the differential adjust shim(s) and the bearing outer race with a suitable pipe.



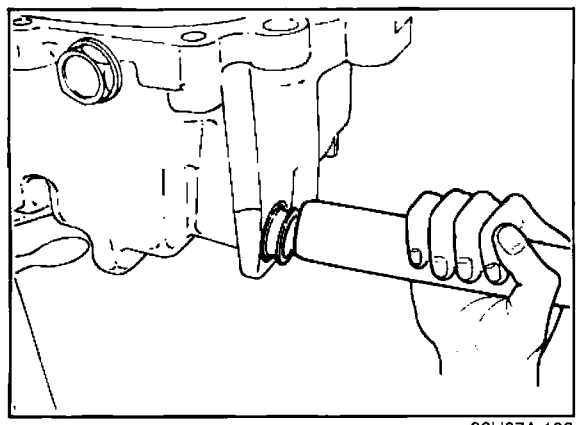
76G07A-043

6. Install the adjust shims, diaphragm springs, funnel, and bearing outer races.

Note
Install the diaphragm spring as shown in the figure.

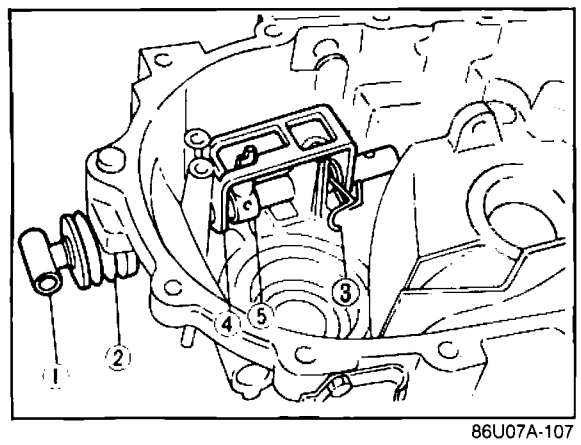

86U07A-105

7. Install the bearing outer races with a suitable pipe.



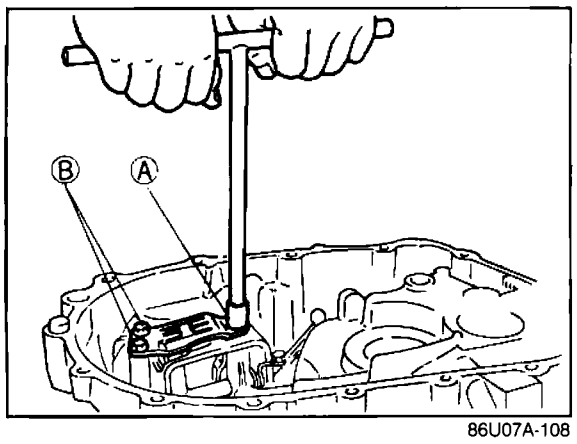
86U07A-106

8. Install the new breather.
9. Install the new change rod oil seal.



86U07A-107

10. Install the change rod ①, the boot ②, the spring ③, the reverse gate ④, and selector ⑤, as shown.
11. Install the new roll pin.



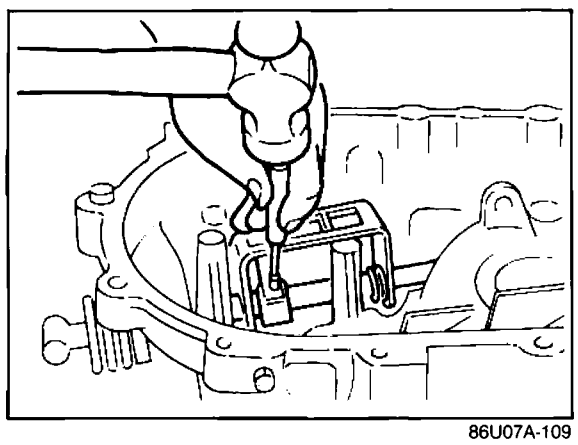
86U07A-108

12. Install the change arm.

Tightening torque: 12—14 N·m (120—140 cm-kg, 104—122 in-lb)

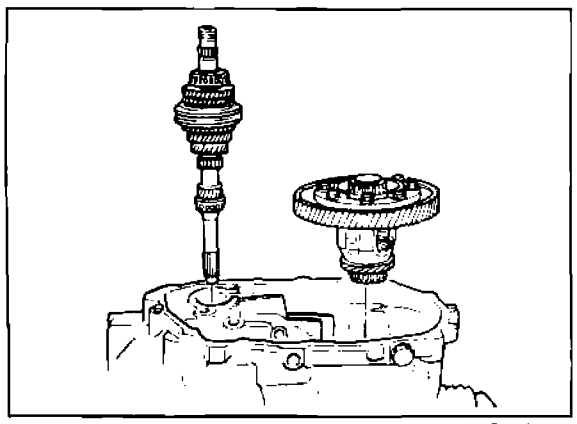
13. Install the guide plate.

Tightening torque:
Ⓐ 8—11 N·m (80—115 cm-kg, 69—100 in-lb)
Ⓑ 22—33 N·m (2.25—3.35 m-kg, 16—25 ft-lb)



86U07A-109

14. Install reverse lever, and reverse lever shaft.
15. Install the new roll pin.
16. Install the speedometer driven gear assembly.



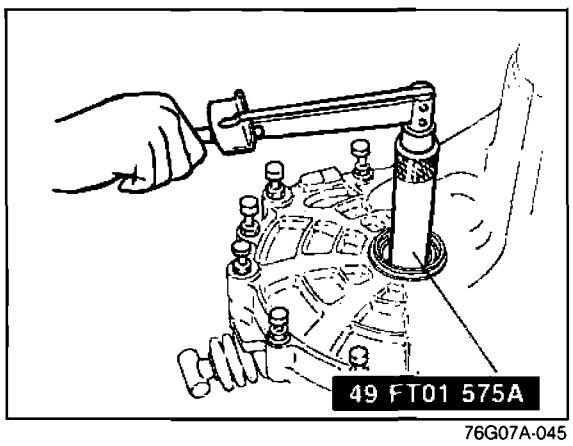
76G07A-044

Bearing Preload
Check the shaft gears and the differential bearing preload.

Note
a) Check that the correct adjust shims were selected.
b) If the bearing preload is not within specification, adjust again.

1. Set the primary shaft gear and the differential into the clutch housing.
2. Install the transaxle case, and tighten to the specified torque.

Tightening torque: 37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

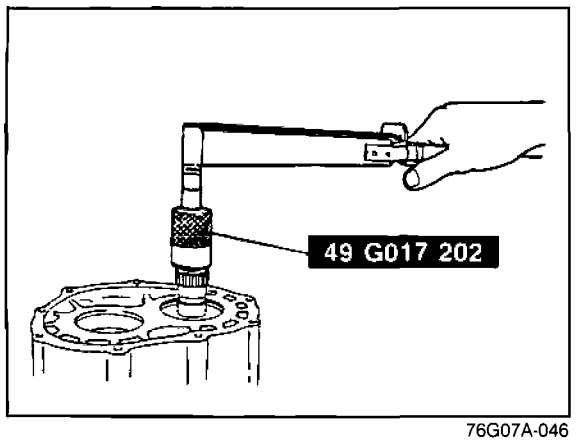


76G07A-045

3. Connect the **SST** and install it through the driveshaft hole.
4. Measure the preload.

Preload: 1.4—2.0 N·m (14—20 cm-kg, 12.1—17.3 in-lb)

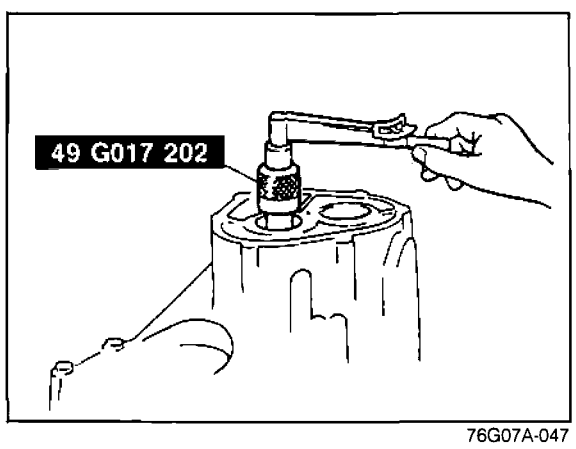
5. Remove the **SST**.



76G07A-046

6. Install the **SST** to the primary shaft gear.
7. Measure the preload.

Preload: 0.1—0.25 N·m (1.0—2.5 cm-kg, 0.87—2.18 in-lb)



76G07A-047

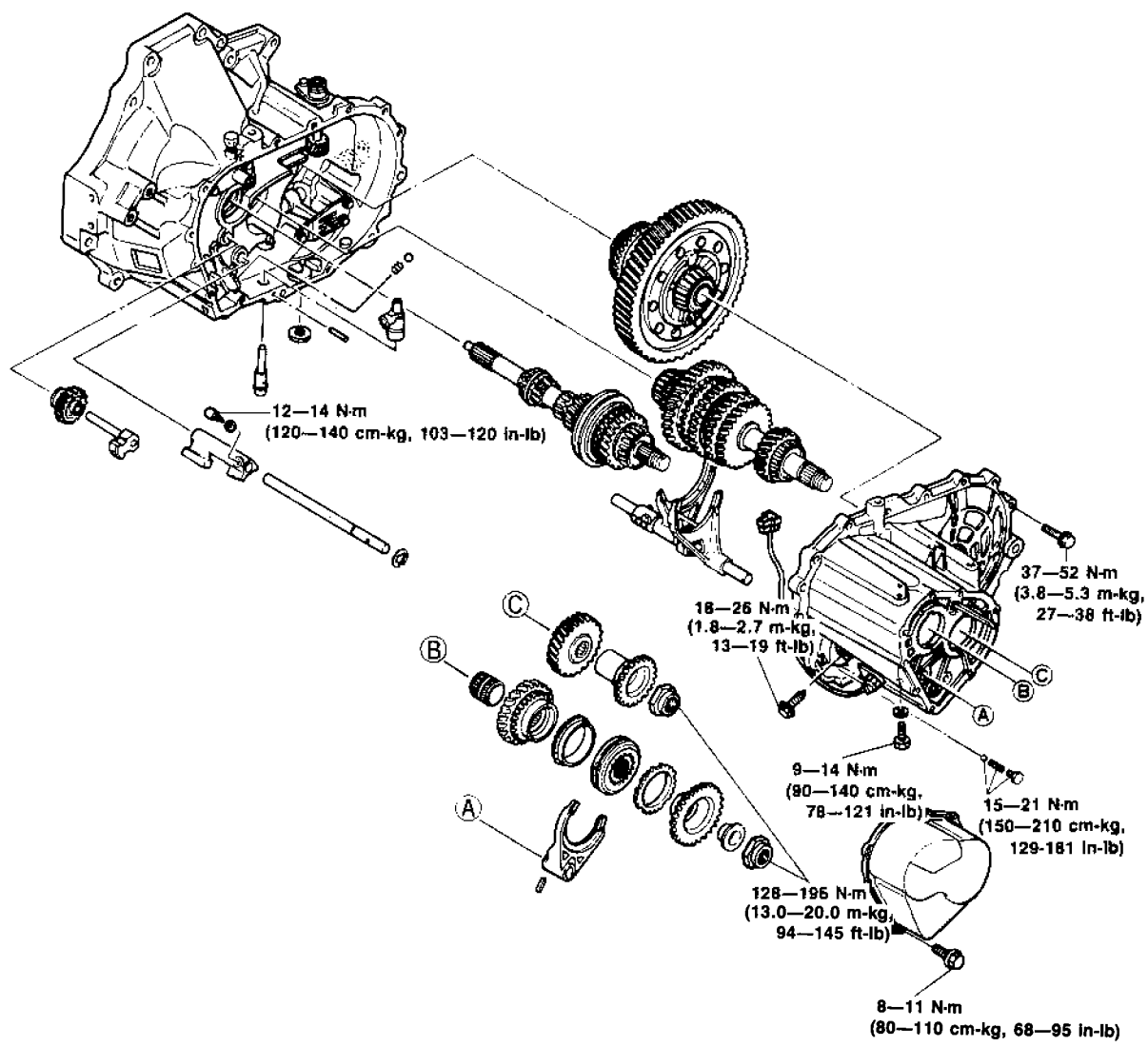
8. Remove the **SST**, transaxle case, primary shaft gear and differential.
9. Install the secondary shaft gear and transaxle case then tighten to the specified torque.

Tightening torque: 37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

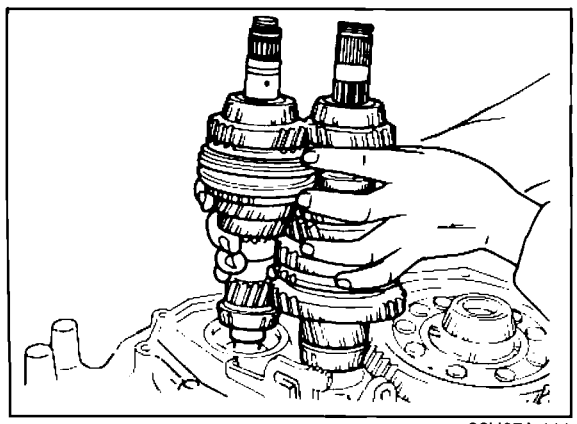
10. Check the secondary shaft preload with the **SST**.

Preload: 0.2—0.4 N·m (2.0—4.0 m-kg, 1.7—3.4 in-lb)

STEP 4
Torque Specifications

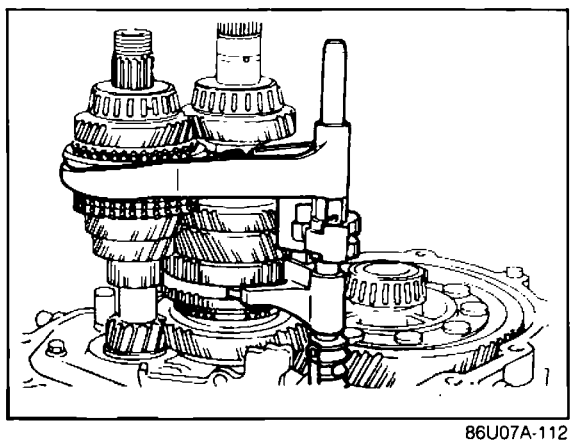


86U07A-110



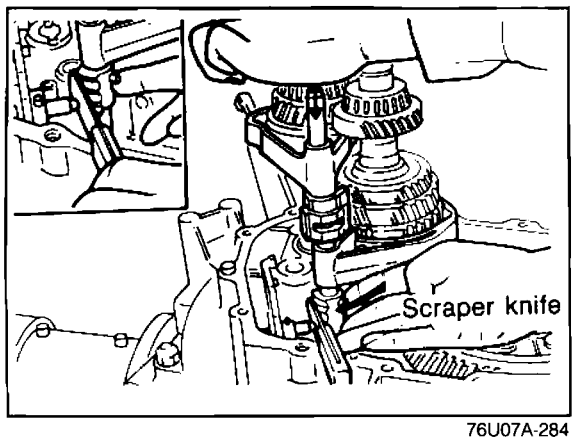
86U07A-111

1. Install the magnet and the differential assembly.
2. Install the primary shaft gear assembly and the secondary shaft gear assembly together.



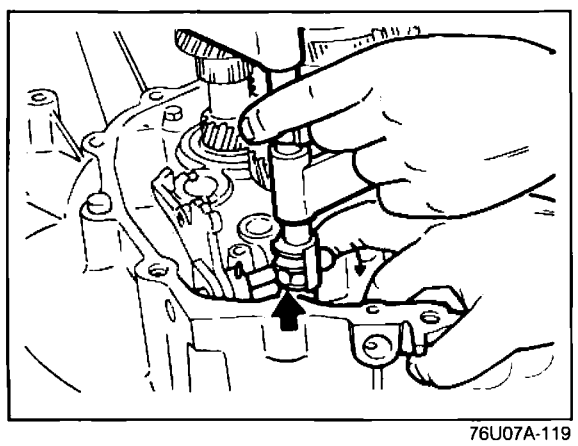
86U07A-112

3. Shift to 2nd gear and position the shift fork and shift rod assembly as shown.



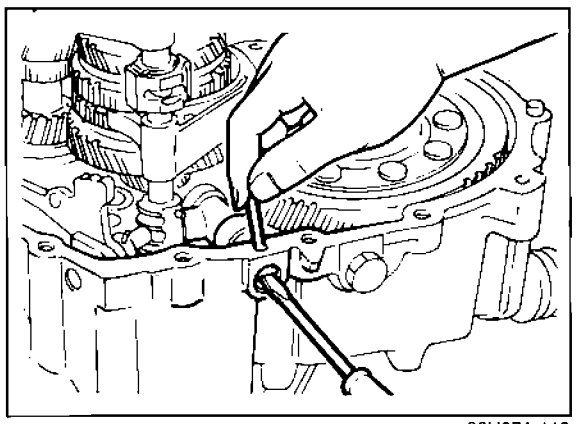
76U07A-284

4. Insert the spring seat and spring into the reverse lever shaft, install the steel ball, and place a scraper knife so that it contacts the steel ball.
5. With the edge of the control end against the knife, when the control end is pushed in the direction of the arrow in the figure so that the ball goes into the shaft, the rod will at the same time line up with the shift rod coupling hole in the clutch housing.



76U07A-119

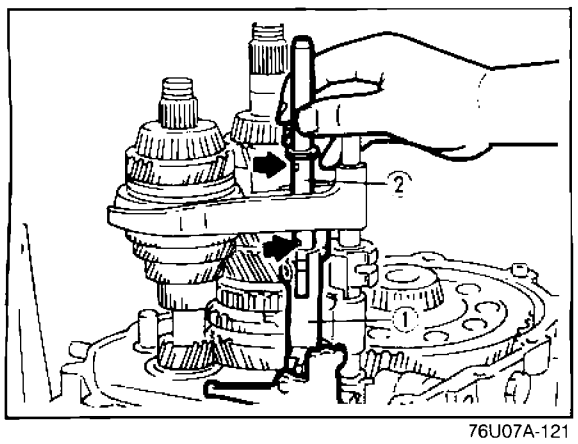
6. Set each clutch hub sleeve to the neutral position, and tap the shift rod from above so that the steel ball goes into the center groove (of the 3 grooves in the control end).
7. Pull the ball part of the control end forward so that the steel ball goes into the detent in the groove.



86U07A-113

8. Fit the crank lever in between the change arm and the control end, and connect the crank lever shaft to the crank lever.
9. Align the pin holes of the crank lever shaft and the clutch housing, and insert the pin.

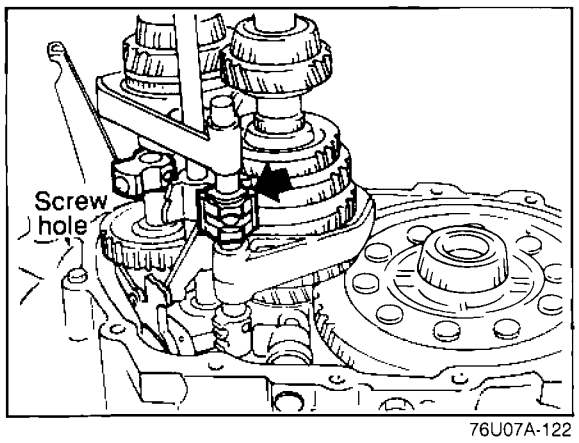
Note
Use a new O-ring for the crank lever shaft.



76U07A-121

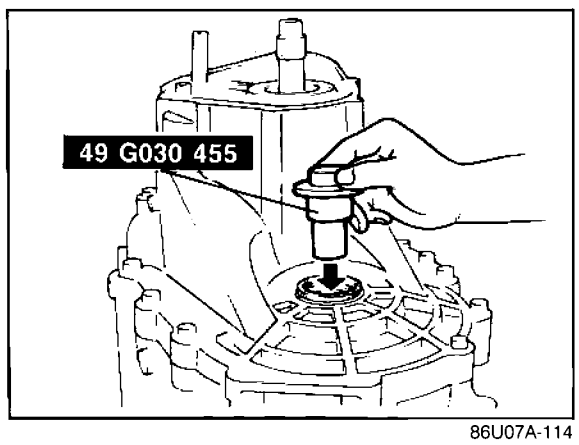
10. Install the gate ① and the shift rod ②, and tighten the gate mounting bolt.

Note
The mark (indicated by the arrow in the figure) and the gate mounting bolt hole must be in the same direction.



76U07A-122

11. Install the reverse idle gear and the reverse idle shaft.
12. Connect the magnet to the clutch housing.
13. Align the end of the interlock sleeve with the control lever indicated by the arrow, and, at the same time, face the reverse idle shaft screw hole in the direction shown in the figure.

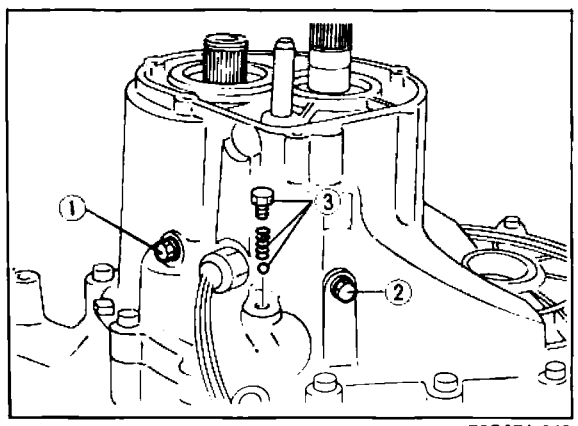


86U07A-114

14. Apply a thin coat of sealant to the contact surfaces of the clutch housing and transmission case, tighten the transaxle case installation bolts to the specified torque.

Tightening torque:
18—26 N·m (1.8—2.7 m-kg, 13—18.8 ft-lb)

15. Insert the **SST** to driveshaft coupling hole.

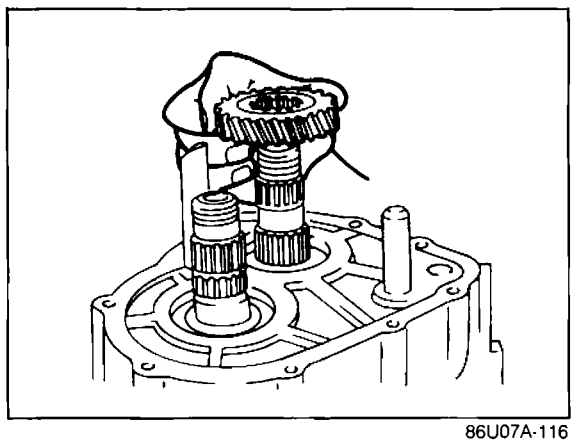


76G07A-048

16. Install the lock bolt ①, the guide bolt ②.
17. Install the ball, spring and lock bolt ③.

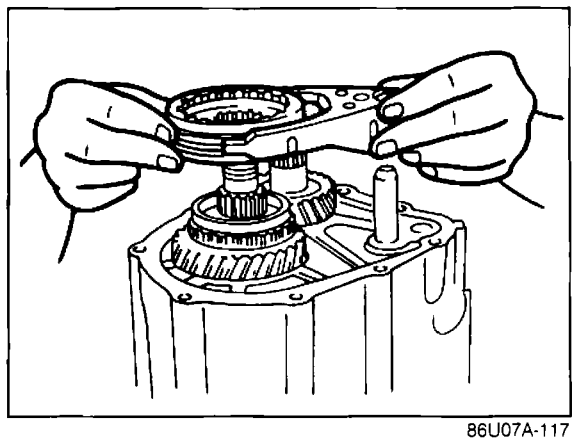
Tightening torque:
(1) 18—26 N·m
(1.8—2.7 m-kg, 13—19 ft-lb)
(2) 9—14 N·m
(90—140 cm-kg, 78—121 in-lb)
(3) 15—21 N·m
(150—210 cm-kg, 129—181 in-lb)

Note
Check that gear change operation is smooth.



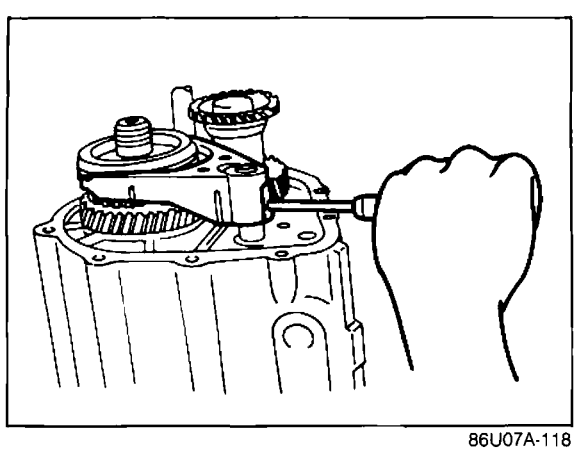
86U07A-116

18. Install the secondary 5th gear as shown.



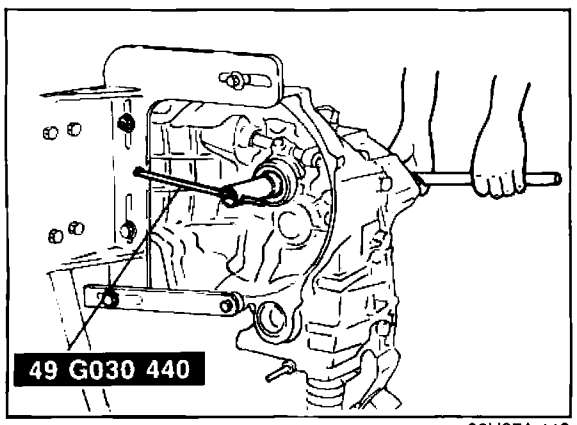
86U07A-117

19. Install the gear sleeve, the 5th gear and synchronizer ring to primary shaft.



86U07A-118

20. Tap in the roll pin.
21. Install the synchronizer ring and the reverse synchronizer gears.

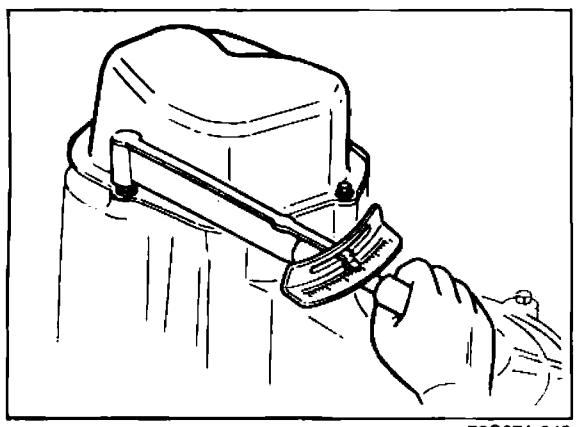


86U07A-119

22. Shift to 1st gear.
23. Lock the primary shaft with the **SST**.
24. Tighten new lock nuts.

Tightening torque: 128—196 N·m (13.0—20.0 m-kg, 94—145 ft-lb)

25. Stake the lock nuts.



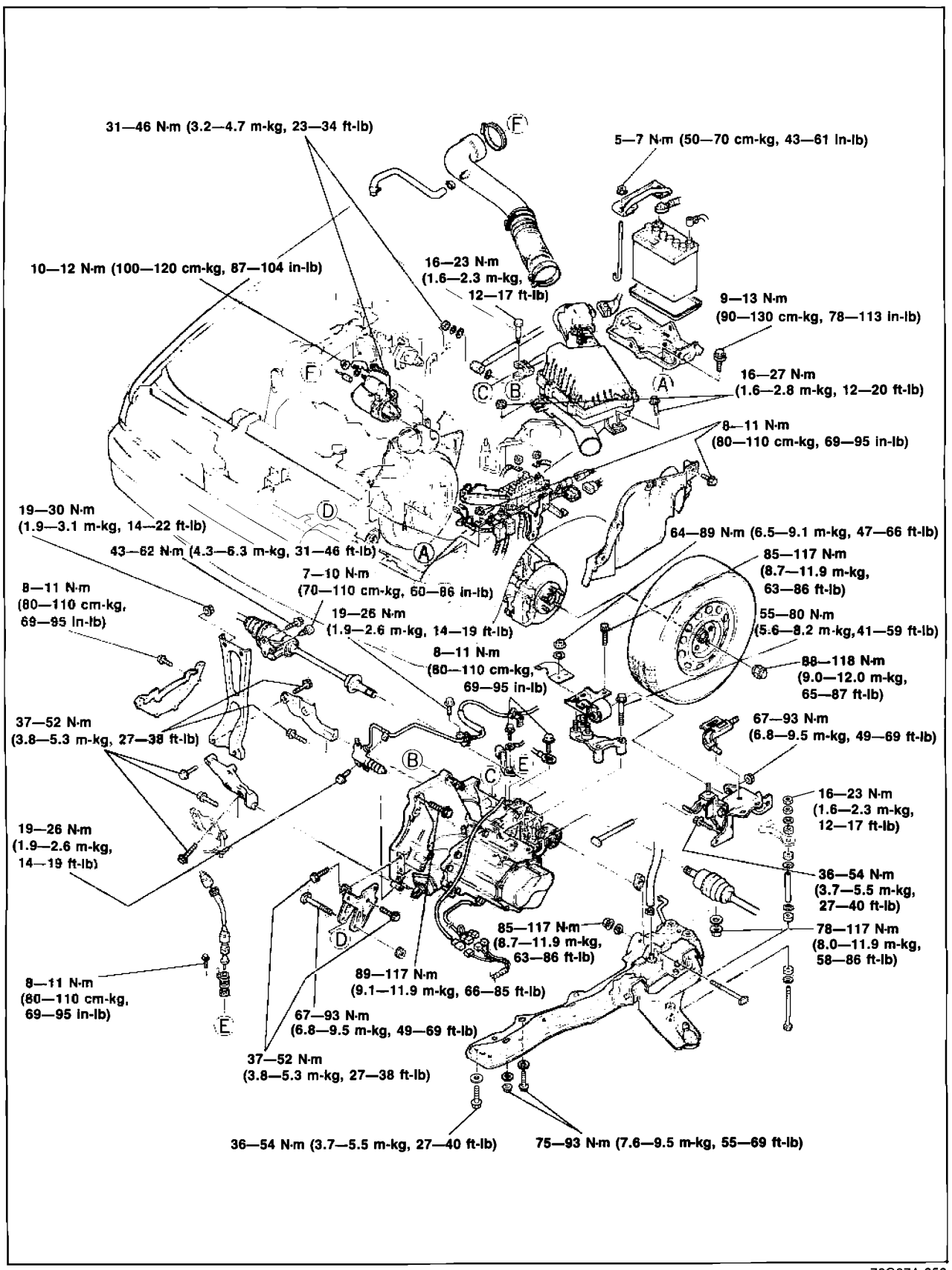
76G07A-049

26. Clean and coat the both surfaces and install the rear cover.

Tightening torque: 8—11 N·m (80—110 cm-kg, 69—95 in-lb)

INSTALLATION (FI except DOHC)

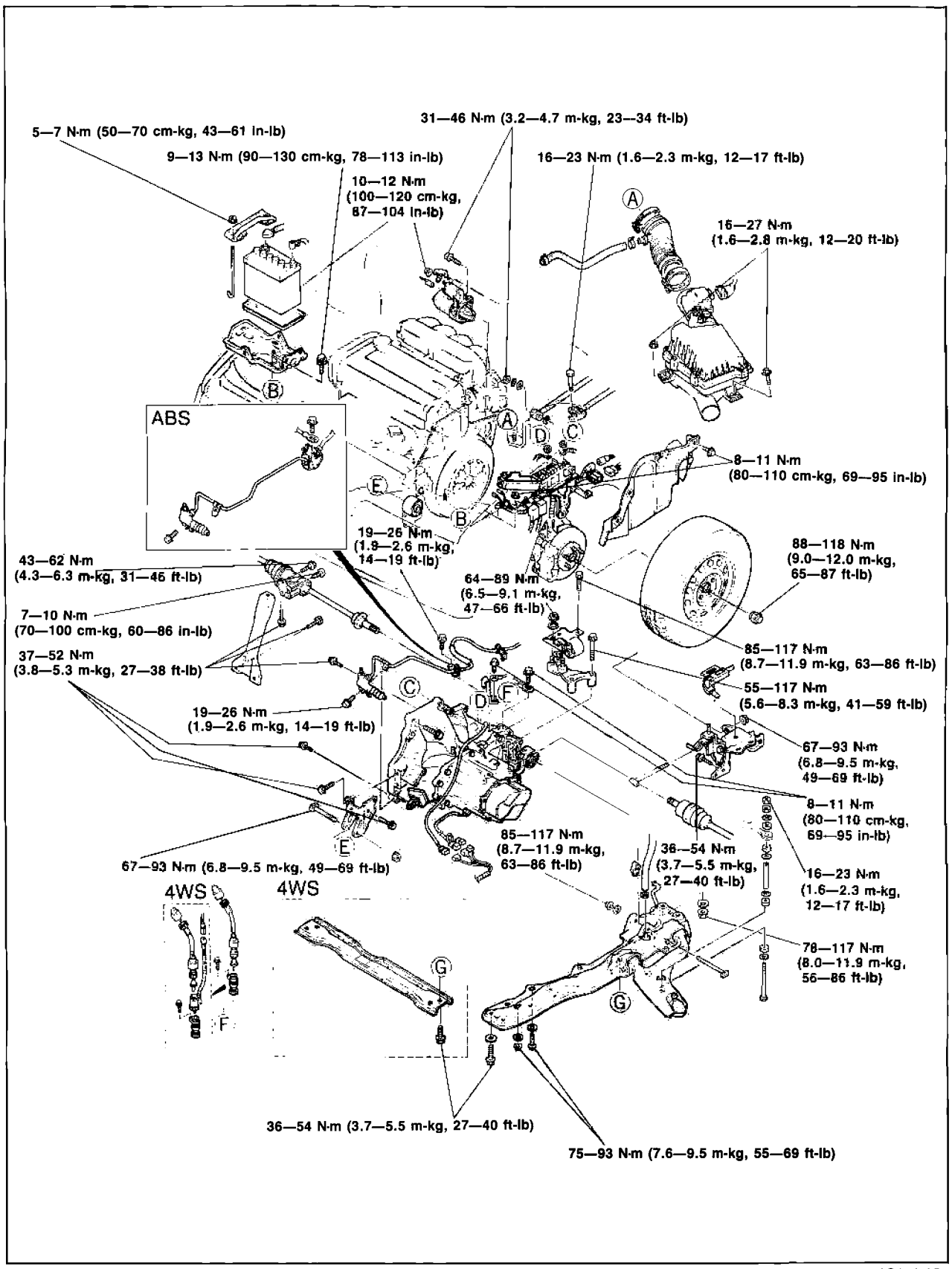
Torque Specifications



76G07A-050

INSTALLATION (DOHC)

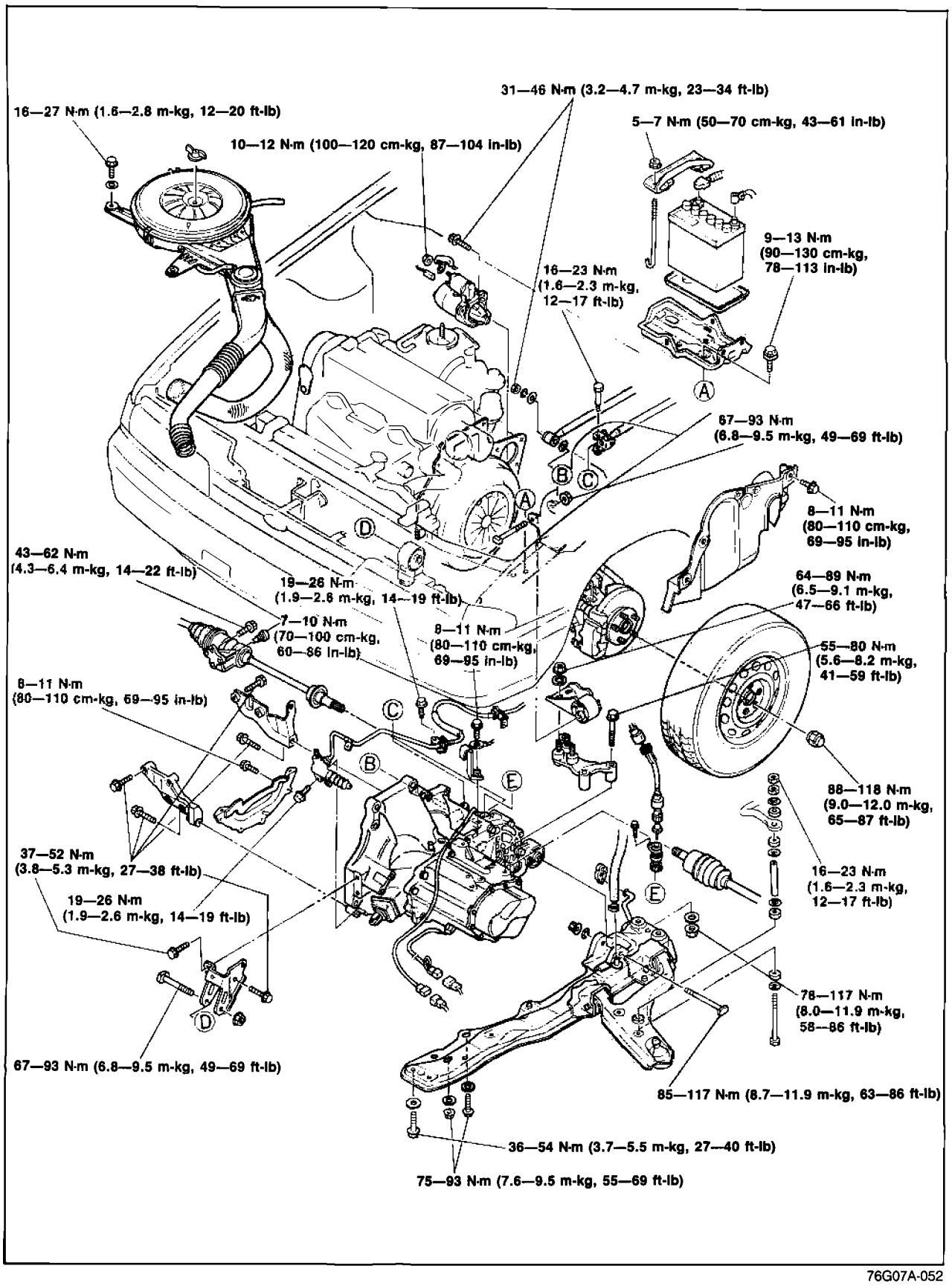
Torque Specifications



76G07A-051

INSTALLATION (Carburator)

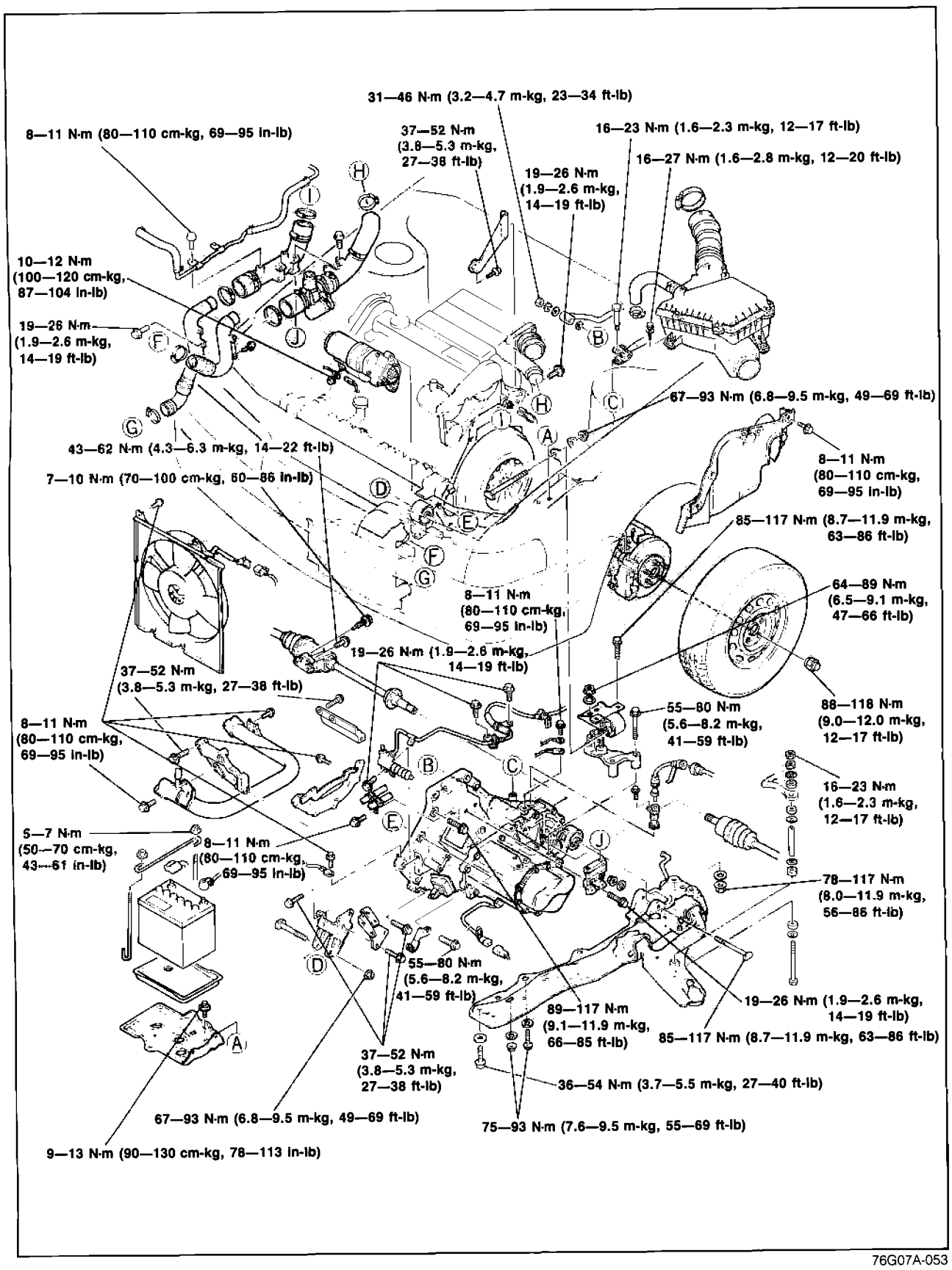
Torque Specifications



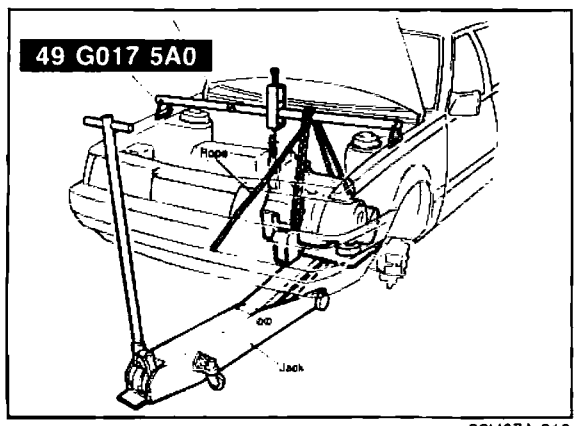
76G07A-052

INSTALLATION (RF-N and RF-CX)

Torque Specifications



76G07A-053

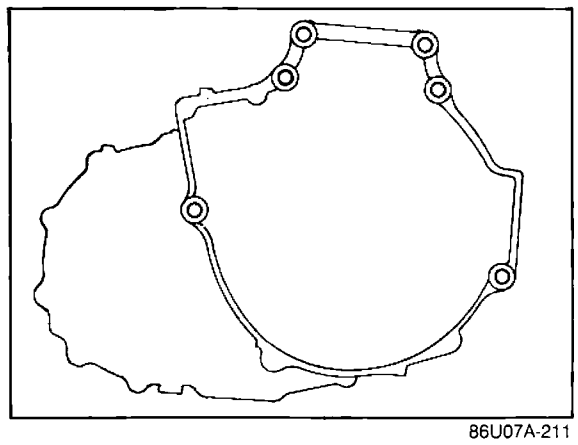


86U07A-210

1. Attach rope at 2 places on the transaxle and place a board on the jack and position the transaxle on it.

   Caution
   The transaxle is not well balanced; be careful when positioning on the jack.

2. Move the transaxle into the place and attach the rope (attached to the transaxle in step 1) to the **SST**.

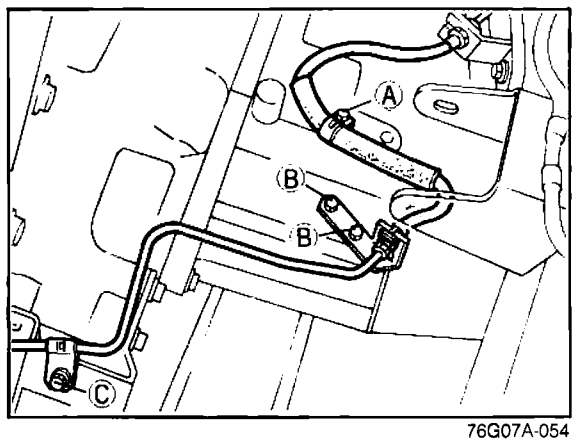


86U07A-211

3. Install the transaxle onto the engine.

   Note
   Lift the transaxle using the jack pulling the rope.

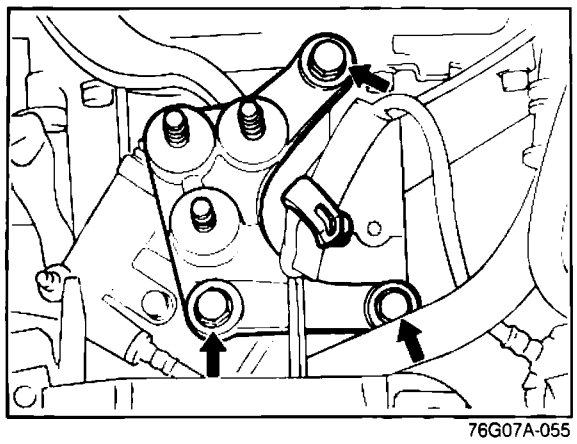
   Tightening torque: 89—117 N·m (9.1—11.9 m-kg, 66—85 ft-lb)



76G07A-054

4. Install the clutch pipe.

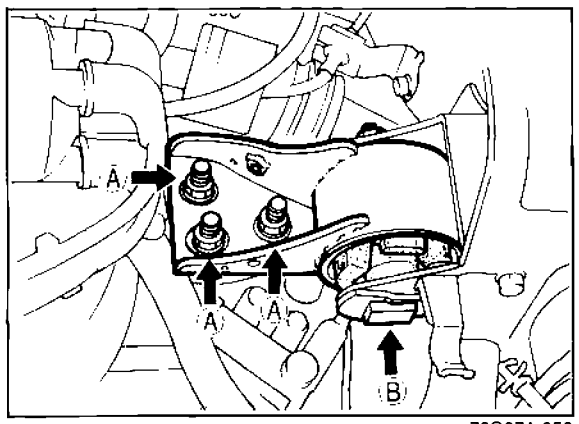
   Tightening torque:
   Ⓐ, Ⓑ: 19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)
   Ⓒ: 8—11 N·m (80—110 cm-kg, 69—95 in-lb)



76G07A-055

5. Install the engine mount bracket.

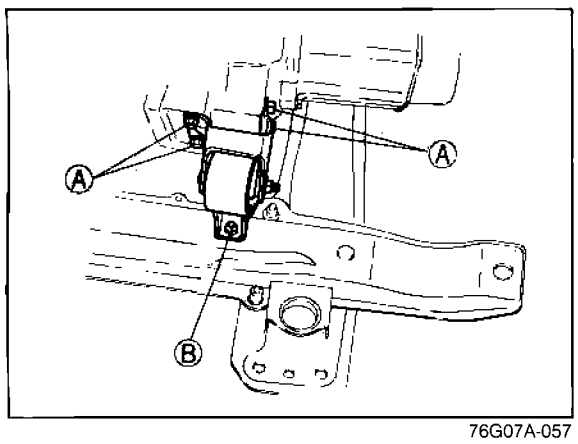
   Tightening torque:
   55—80 N·m (5.6—8.2 m-kg, 41—59 ft-lb)



76G07A-056

6. Install the engine mount rubber No.4.

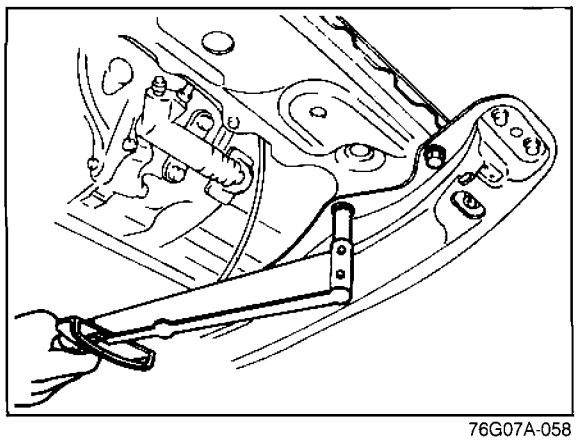
Tightening torque:
Ⓐ: 64—89 N·m
(6.5—9.1 m-kg, 47—66 ft-lb)
Ⓑ: 67—93 N·m
(6.8—9.5 m-kg, 49—69 ft-lb)



76G07A-057

7. Install the engine mount No. 2.

Tightening torque:
Ⓐ 37—52 N·m
(3.8—5.3 m-kg, 27—38 ft-lb)
Ⓑ 67—93 N·m
(6.8—9.5 m-kg, 49—69 ft-lb)



76G07A-058

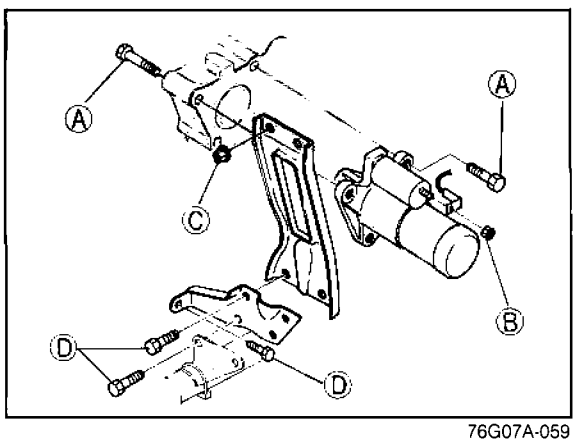
8. Install the crossmember and the left side lower arm as an assembly.

Tightening torque: Bolts, 36—54 N·m
(3.7—5.5 m-kg, 27—40 ft-lb)
Nut, 75—93 N·m
(7.6—9.5 kg, 55—69 ft-lb)

9. Remove the jack and take off the rope.
10. Remove the **SST**.
11. Install the end plate.

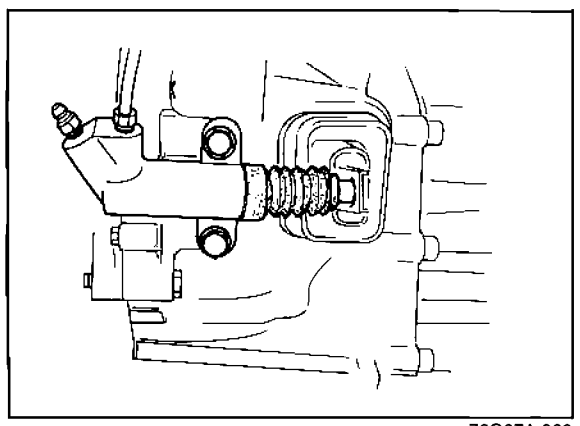
Tightening torque: 8—11 N·m
(80—110 cm-kg, 69—95 in-lb)

12. Install the starter and harnesses.
13. Install the surge tank bracket and the gusset plate.



76G07A-059

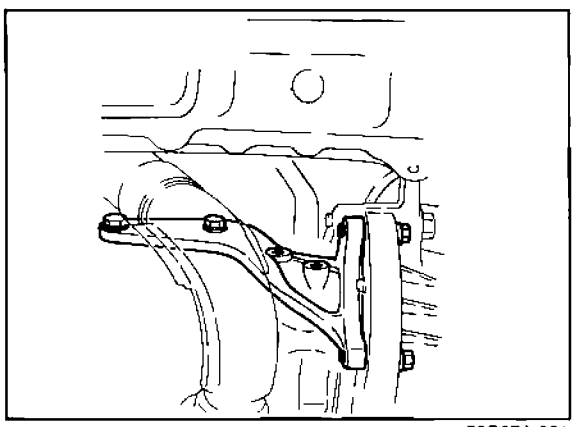
Tightening torque:
Ⓐ. 31—46 N·m
(3.2—4.7 m-kg, 23—34 ft-lb)
Ⓑ. 10—12 N·m
(100—120 cm-kg, 87—104 in-lb)
Ⓒ. 19—30 N·m
(1.9—3.1 m-kg, 14—22 ft-lb)
Ⓓ. 43—61 N·m
(4.4—6.2 m-kg, 32—45 ft-lb)



76G07A-060

14. Install the clutch release cylinder.

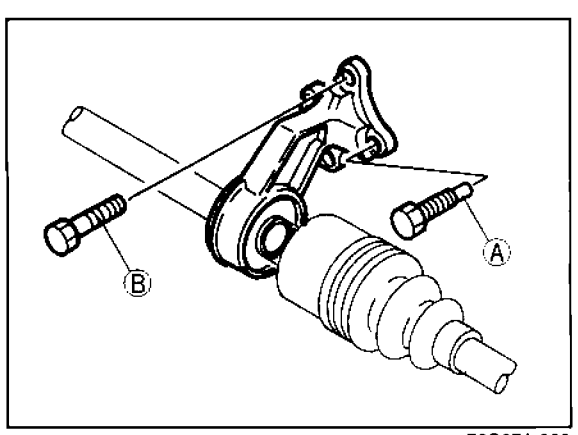
Tightening torque: 19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



76G07A-061

15. Install the gusset plates.

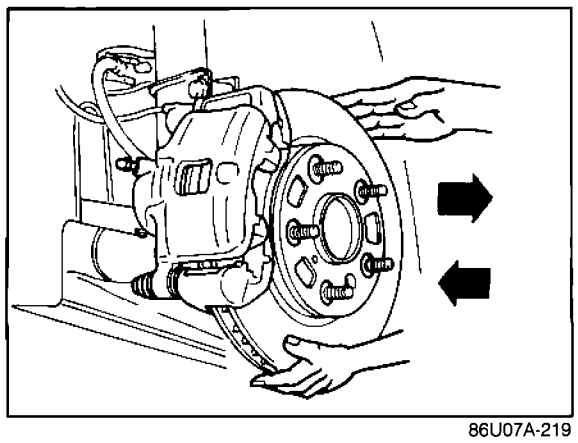
Tightening torque: 37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)



76G07A-062

16. Replace the clips at the end of the driveshafts and joint shaft with new ones.
17. Install the joint shaft and right driveshaft as follows:
    (1) Install and tighten the reamer bolts Ⓐ; then install and tighten the standard bolts Ⓑ.

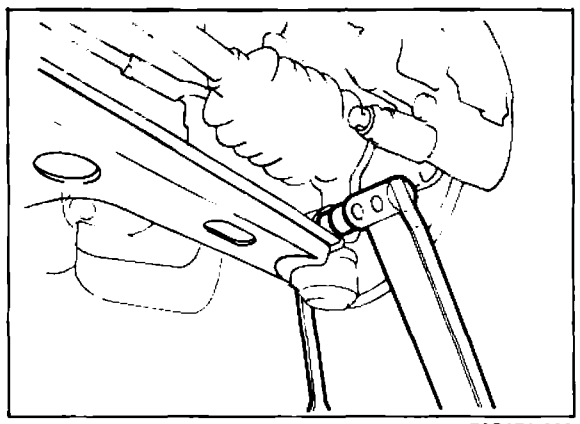
Tightening torque:
Ⓐ :7—10 N·m (70—100 cm-kg, 43—61 in-lb)
Ⓑ :42—62 N·m (4.3—6.3 m-kg, 31—46 ft-lb)



86U07A-219

(2) Remove the **SST** and insert the shaft into the transaxle.
(3) Pull the front hub outward and connect the driveshaft to the joint shaft.
(4) Push the joint at the differential side to securely connect the driveshaft to the joint shaft.

Note
a) After installation, pull the front hub outward to confirm that the driveshaft doesn't come out.
b) Do not damage the oil seal.



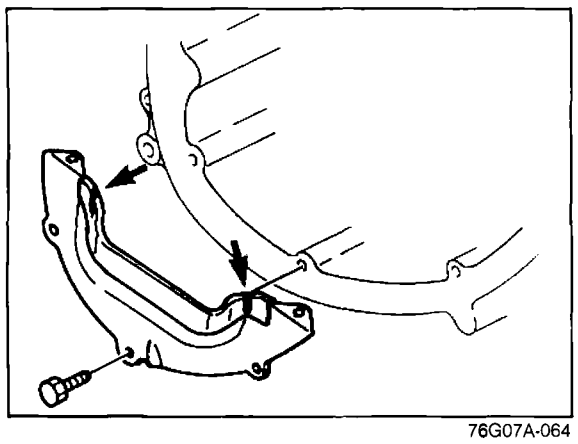
76G07A-063

18. Install the left driveshaft as follows:
    (1) Pull the front hub outward and insert the driveshaft into the transaxle.
    (2) Push the joint at the differential side to connect the driveshaft to the differential side gear.

    Note
    a) Do not damage the oil seal.
    b) After installation, pull the front hub outward to confirm that the driveshaft doesn't come out.

19. Install the lower arm ball joints to the knuckles and tighten the bolts and nuts.

    Tightening torque: 43—54 N·m (4.4—5.5 m-kg, 32—40 ft-lb)

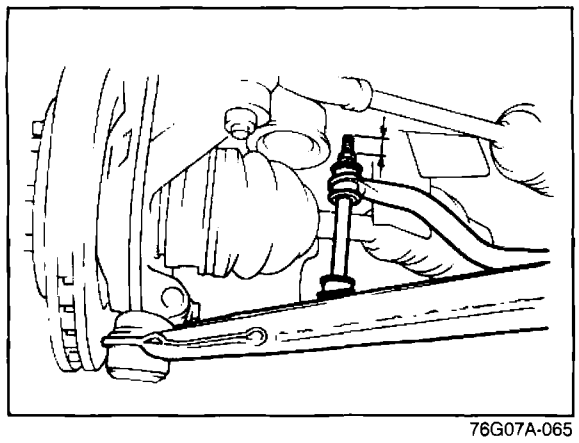


76G07A-064

20. Install the under cover. (except DOHC)

    Note
    Before installation, fill the notches with silicon as shown in the figure.

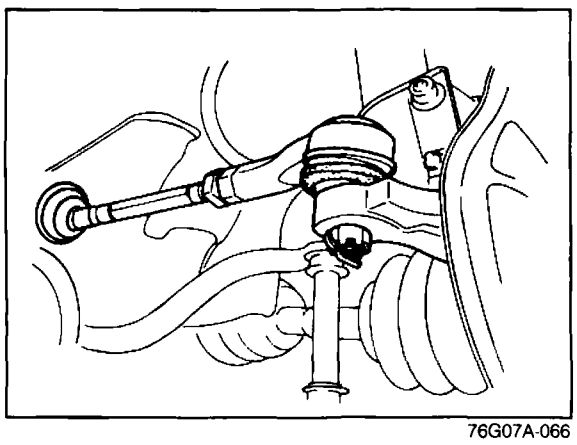
    Tightening torque: 8—11 N·m (80—110 cm-kg, 69—95 in-lb)



76G07A-065

21. Install the stabilizer bar control links as follows.
    (1) Install the stabilizer bar control link.
    (2) Adjust protrusion to 20.1 mm (0.79 in)
    (3) Tighten bolt to specified torque.

    Tightening torque: 16—23 N·m (1.6—2.3 m-kg , 12—17 ft-lb)



76G07A-066

22. Install the tie-rod ends and new cotter pine.

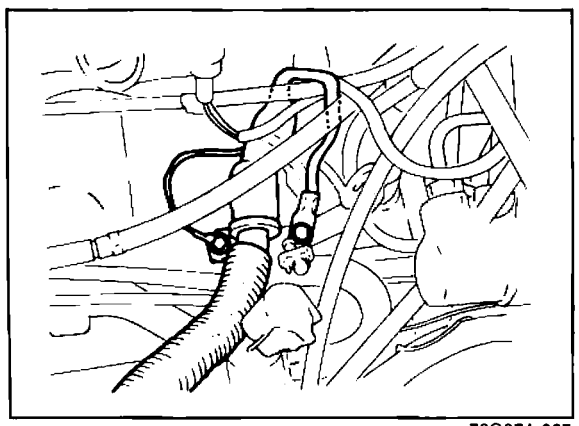
    Tightening torque: 29—44 N·m (3.0—4.5 m-kg, 22—33 ft-lb)

23. Install the splash shields.

    Tightening torque: 8—11 N·m (80—110 cm-kg, 69—95 in-lb)

24. Install the front wheels.

    Tightening torque: 88—118 N·m (9.0—12.0 m-kg, 65—87 ft-lb)

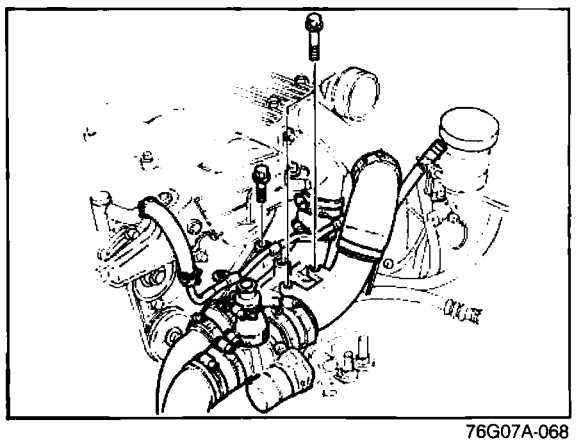


76G07A-067

25. Install the grounds to the transaxle case.

Tightening torque:
8—11 N·m (80—115 cm-kg, 69—100 in-lb)

26. Connect the speedometer cable.



76G07A-068

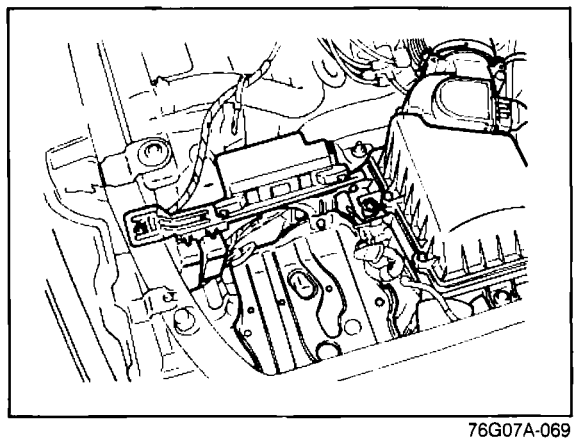
27. Install the intercooler pipe and hose. (RF-CX)

Tightening torque:
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

28. Install the brake vacuum pipe. (RF-CX)

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

29. Connect the brake vacuum hose. (RF-CX)



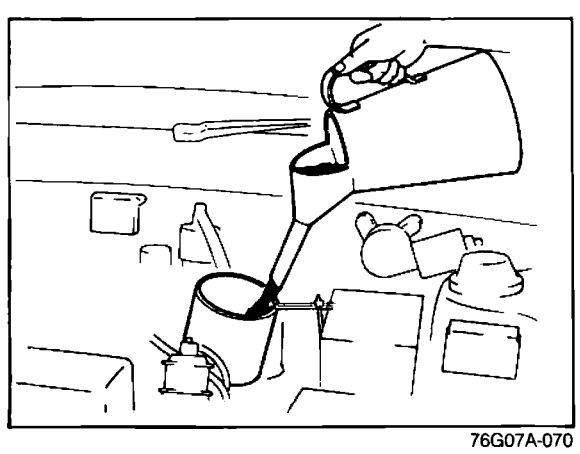
76G07A-069

30. Install the air cleaner assembly and connect the air flow meter connector.

Tightening torque:
16—27 N·m (1.6—2.8 m-kg, 12—20 ft-lb)

31. Connect the distributor lead.
32. Connect the main fuse block.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



76G07A-070

33. Install the battery carrier and battery.
34. Add the correct quantity of the specified transaxle oil.

Specified
Type
A.T.F.: DEXRON II
Above 0°F:
API: GL-4 or GL-5
SAE 80W-90 or SAE 90

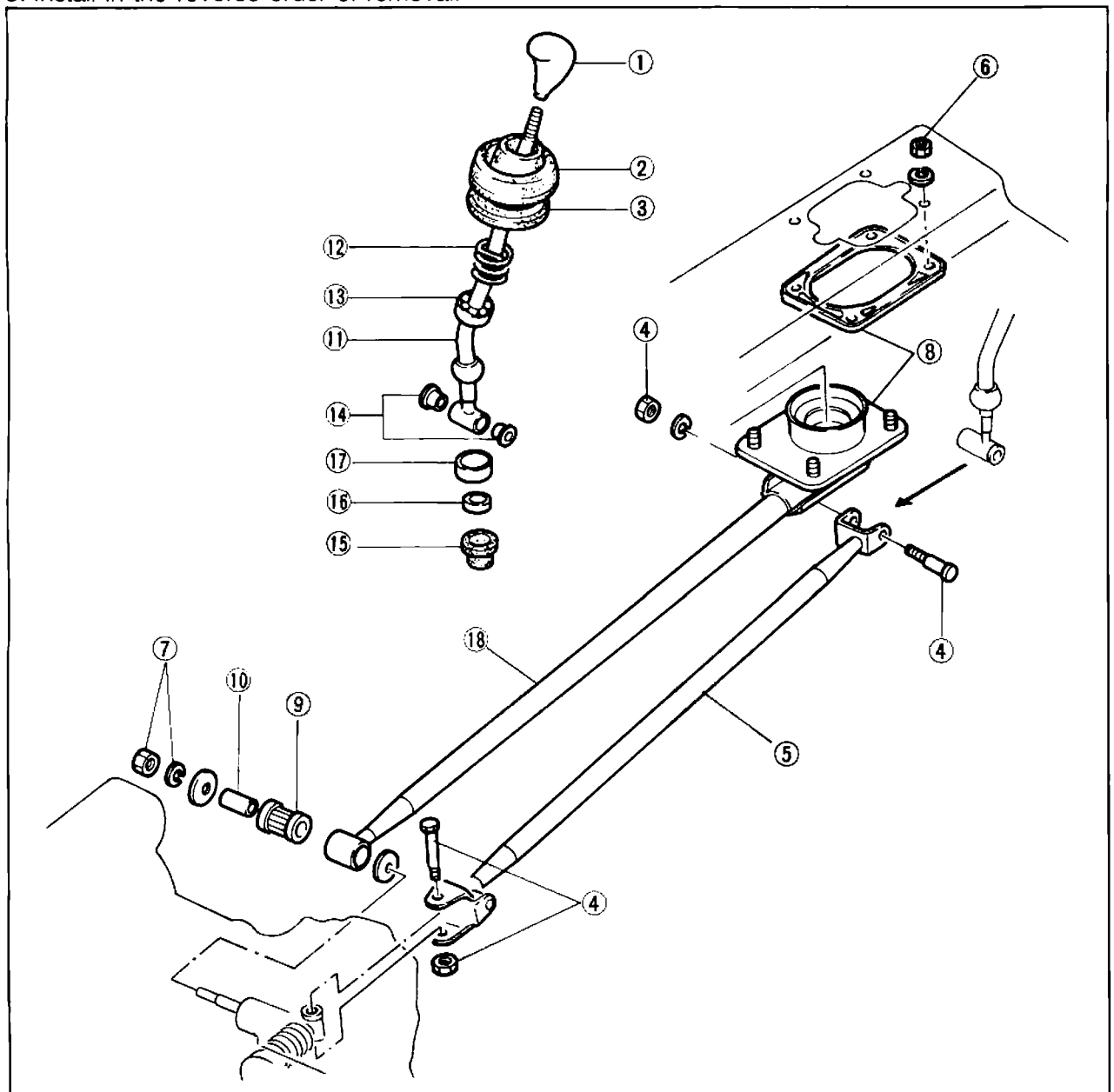
Capacity:
3.35 liters (3.6 US qt, 3.0 Imp qt)

TRANSAXLE CONTROL

REMOVAL AND INSTALLATION

1. Jack up the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure.
3. Install in the reverse order of removal.

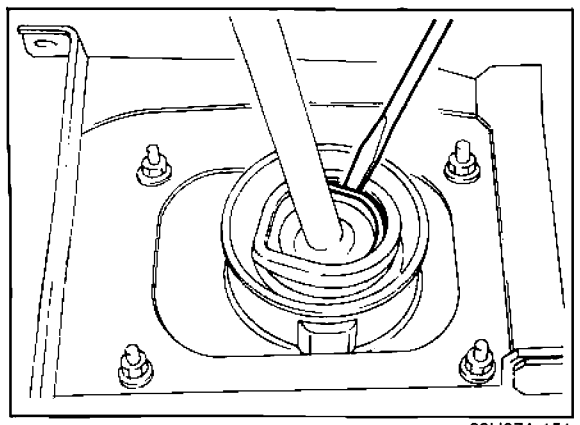
61G07X-165



86U07A-230

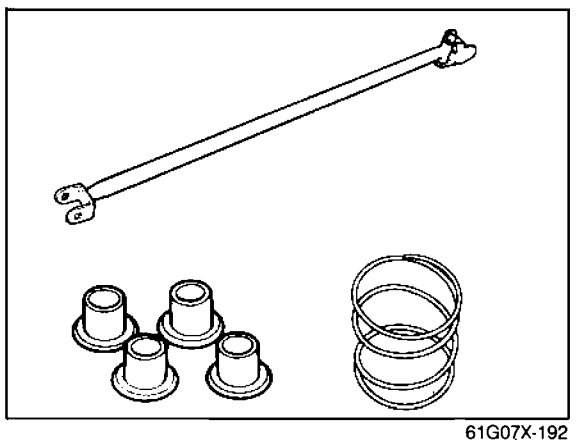
1. Change lever knob
2. Assist boot
3. Mounting rubber boot
4. Bolts and nuts
5. Change control rod
6. Bracket installation nuts
7. Nut and washer
8. Extension bar bracket assembly and gasket
9. Bushing
10. Pipe
11. Change lever
12. Spring
13. Ball seat (upper)
14. Bushings
15. Boot
16. Holder
17. Ball seat (lower)
18. Extention bar

Note
Apply a coat of grease (lithium base, NLGI No. 2) to the change lever ball, the ball seats, and each joint.



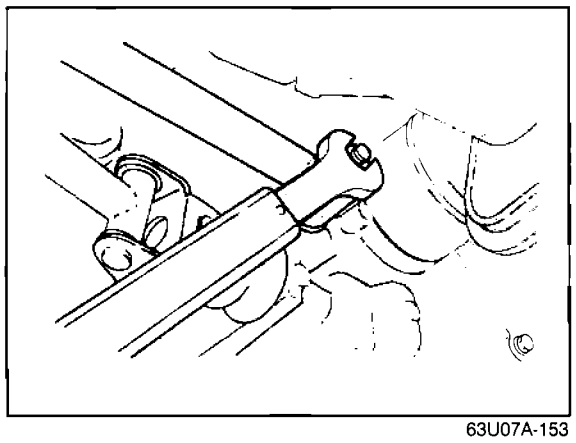
63U07A-151

Spring
Remove the spring by prying on the hooked part of the spring with a screwdriver.



61G07X-192

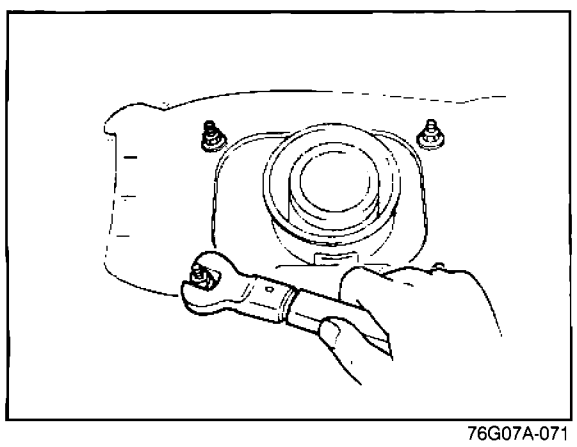
INSPECTION
Check the following, and replace if necessary:
1. Bent control rod.
2. Wear, damage, or malfunction of any joint.
3. Damaged gear shift lever ball.
4. Weak spring.
5. Wear or damage of bushing.



63U07A-153

INSTALLATION
Install in the reverse order of removal and note the following:
Extension Bar
First, install the extension bar to the floor, and then install it onto the transaxle.

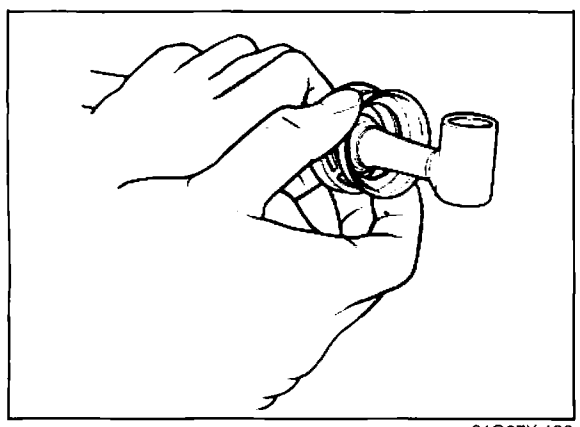
Tightening torque:
31—46 N·m (3.2—4.7 m-kg, 23—34 ft-lb)



76G07A-071

Bracket Installation
Tighten the bracket installation nuts to the specified torque.

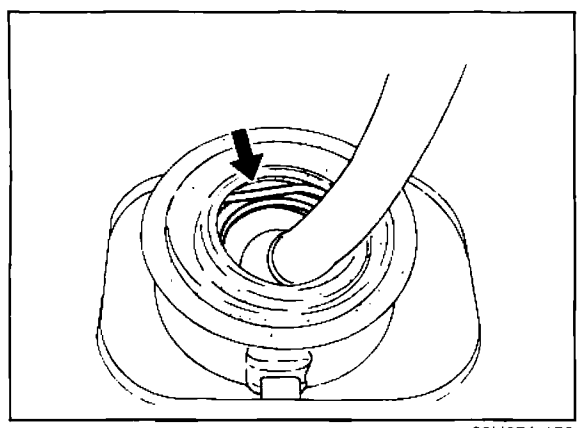
Tightening torque: 7—10 N·m
(70—100 cm-kg, 61—87 in-lb)



61G07X-193

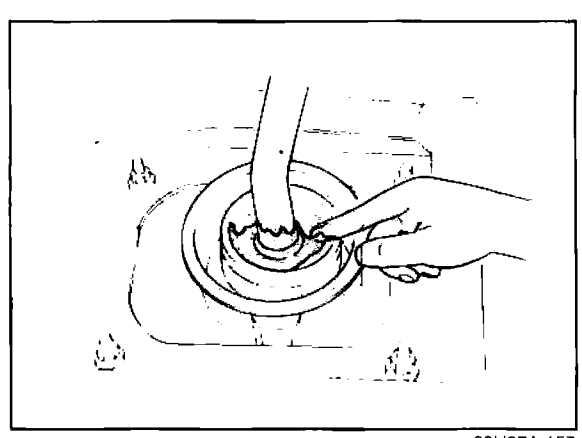
Gear Shift Lever Ball
Apply grease to the ball seat surface, and install the upper and lower ball seat, holder, and boot.

Note
Apply grease to all joints.



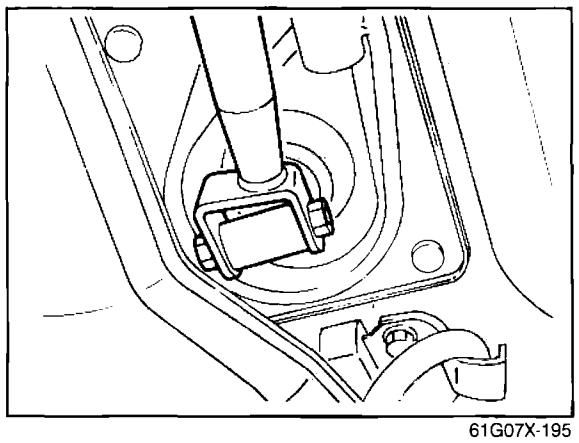
63U07A-156

Spring
Make sure that the hooked part of the spring is properly seated in the bracket groove, as shown in the figure.



63U07A-157

Bracket Cavity
Put grease in the bracket cavity.



61G07X-195

Change Control Rod
Install the change control rod so that its relationship with the shift lever is as shown in the figure.

Tightening torque:
16—22 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

AUTOMATIC TRANSAXLE (Electronically Controlled and 4-Speed)

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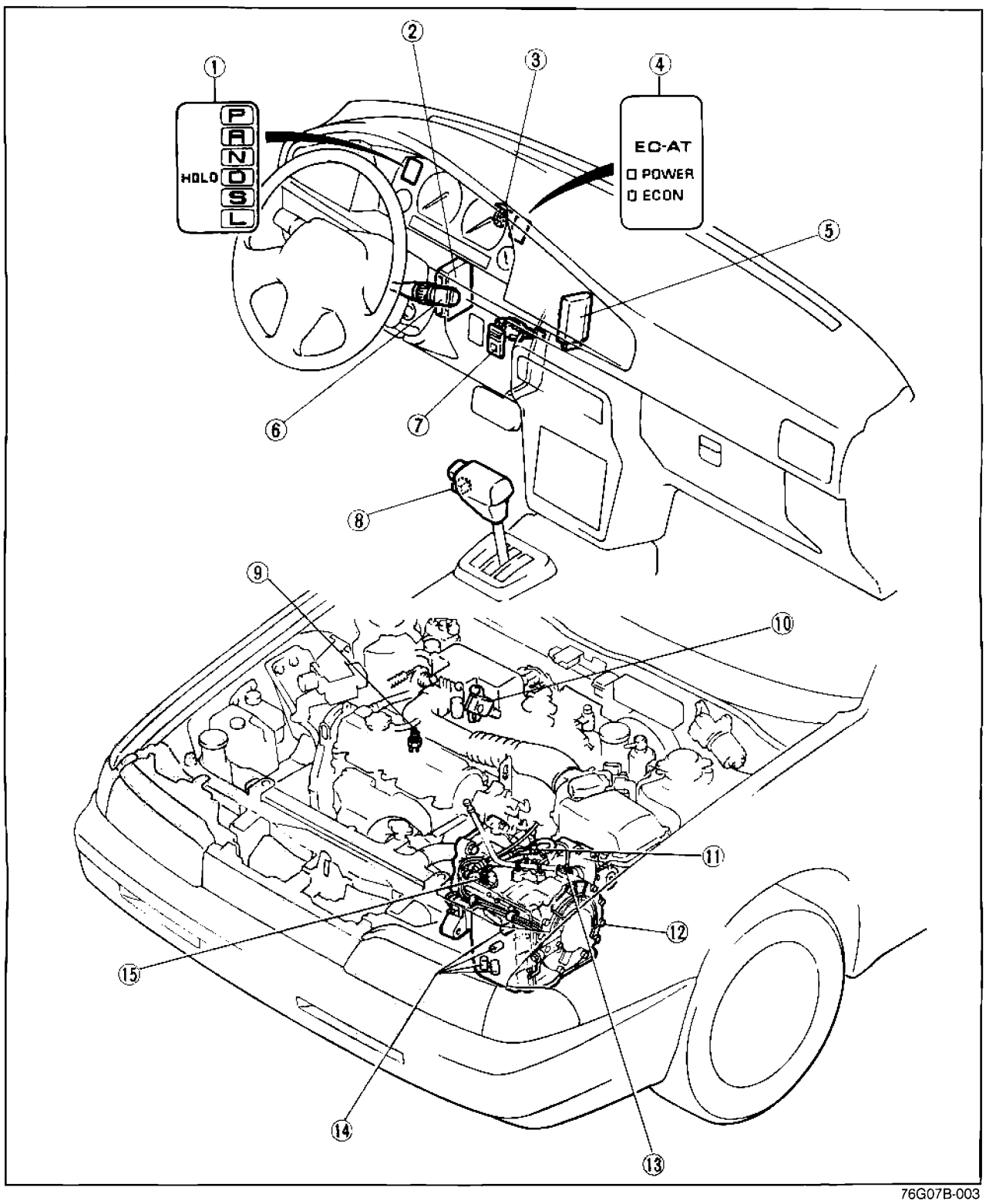
OUTLINE

SPECIFICATIONS

Model		G4A-EL (EC-AT)	G4A-HL (4-speed)	
			FE engine	F8 engine
Torque converter stall torque ratio		1.710—1.900 : 1	1.900—2.100 : 1	
Gear ratio	First	2.800		
	Second	1.540		
	Third	1.000		
	Fourth (OD)	0.700		
	Reverse	2.333		
Final gear ratio		3.700		
Number of drive plates/ driven plates	Forward clutch	3/3		
	Coasting clutch	2/2		
	3-4 clutch	5/5	4/4	
	Reverse clutch	2/2		
	Low and reverse brake	3/3	4/4	
Servo diameter (Piston outer dia./retainer inner dia.) mm (in)		78/53 (3.07/2.09)	78/49 (3.07/1.93)	78/56 (3.07/2.20)
Speedometer gear ratio (Driven/Drive gear)		20 : 25 or 21 : 25		
Automatic transmission luid	Type	Dexron II or MIII		
	Capacity liters (US qt, Imp qt)	6.8 (7.2, 6.0)		

76G07B-002

COMPONENT LOCATION
G4A-EL

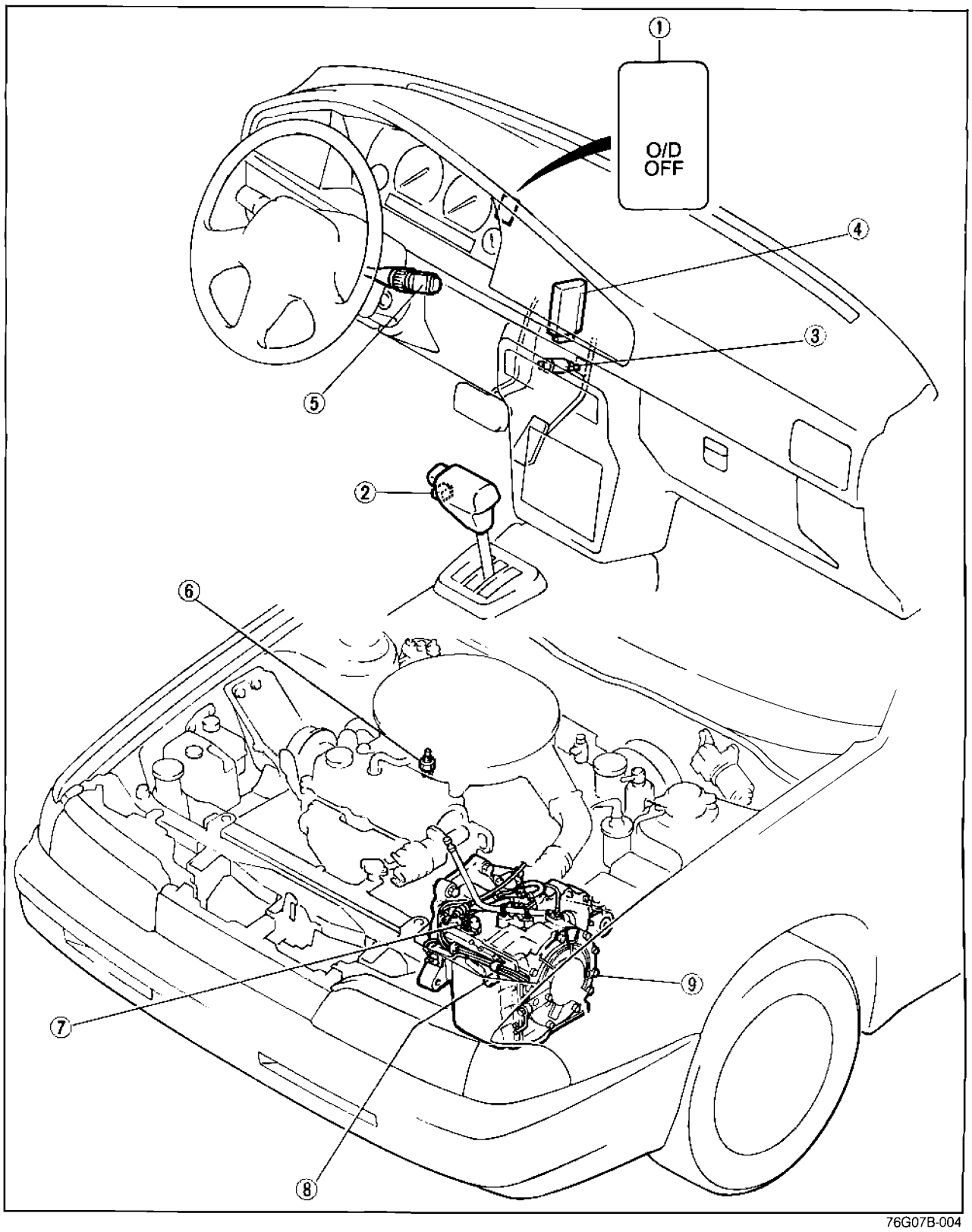


76G07B-003

1. Hold indicator light
2. EC-AT control unit
3. Vehicle speed sensor
4. Mode indicator light
5. Cruise control unit
6. Cruise control switch
7. Mode switch
8. Hold switch
9. Water temperature switch
10. Throttle sensor and idle switch
11. Fluid temperature switch
12. EC-AT
13. Pulse genelator
14. Solenoid valves
15. Inhibitor switch

7B OUTLINE

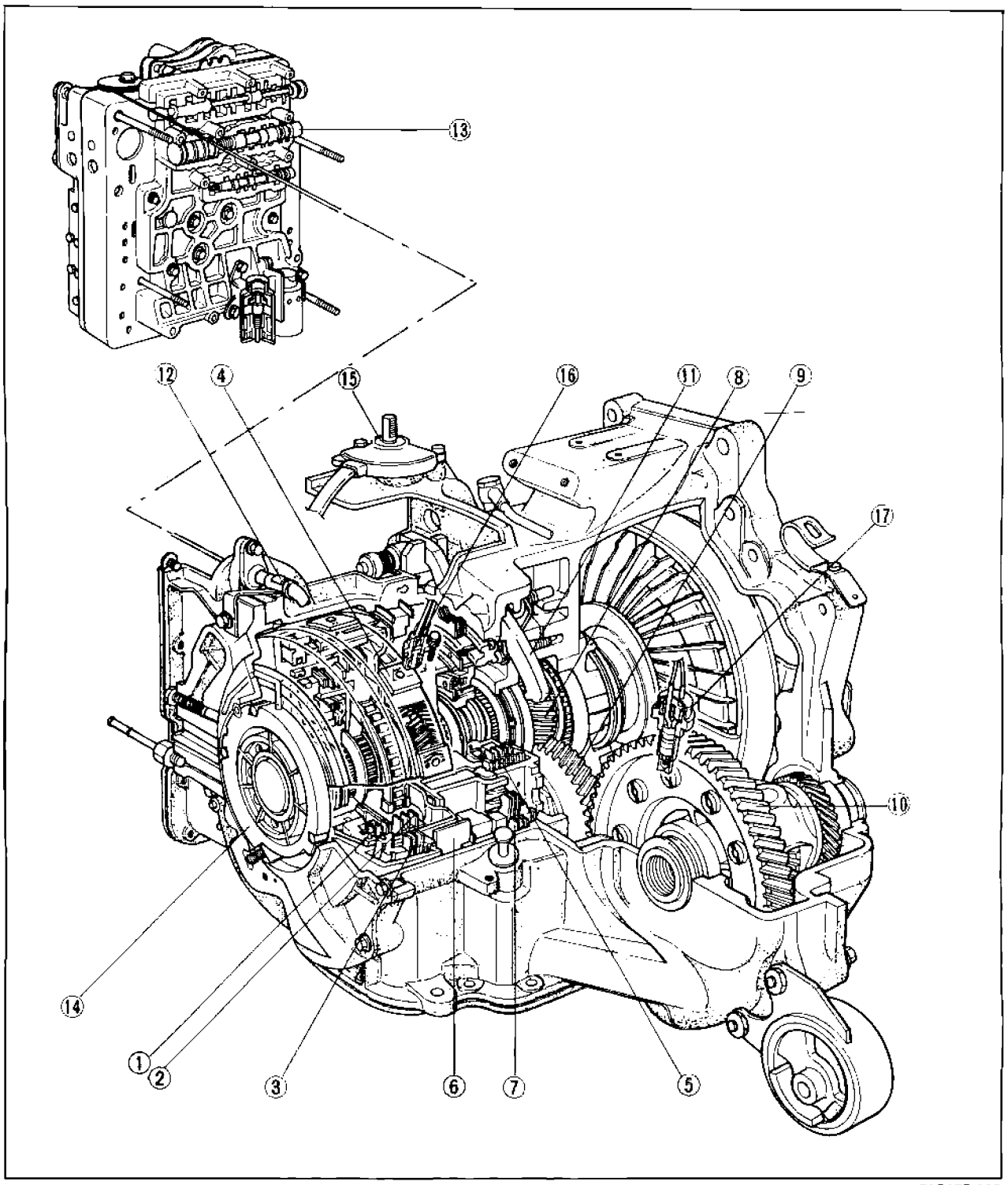
G4A-HL



76G07B-004

1. OD OFF indicator light
2. OD OFF switch
3. Kick-down switch
4. Cruise control unit
5. Cruise control switch
6. Water temperature switch
7. Inhibitor switch
8. OD release solenoid valve
9. Automatic transaxle

STRUCTUAL VIEW

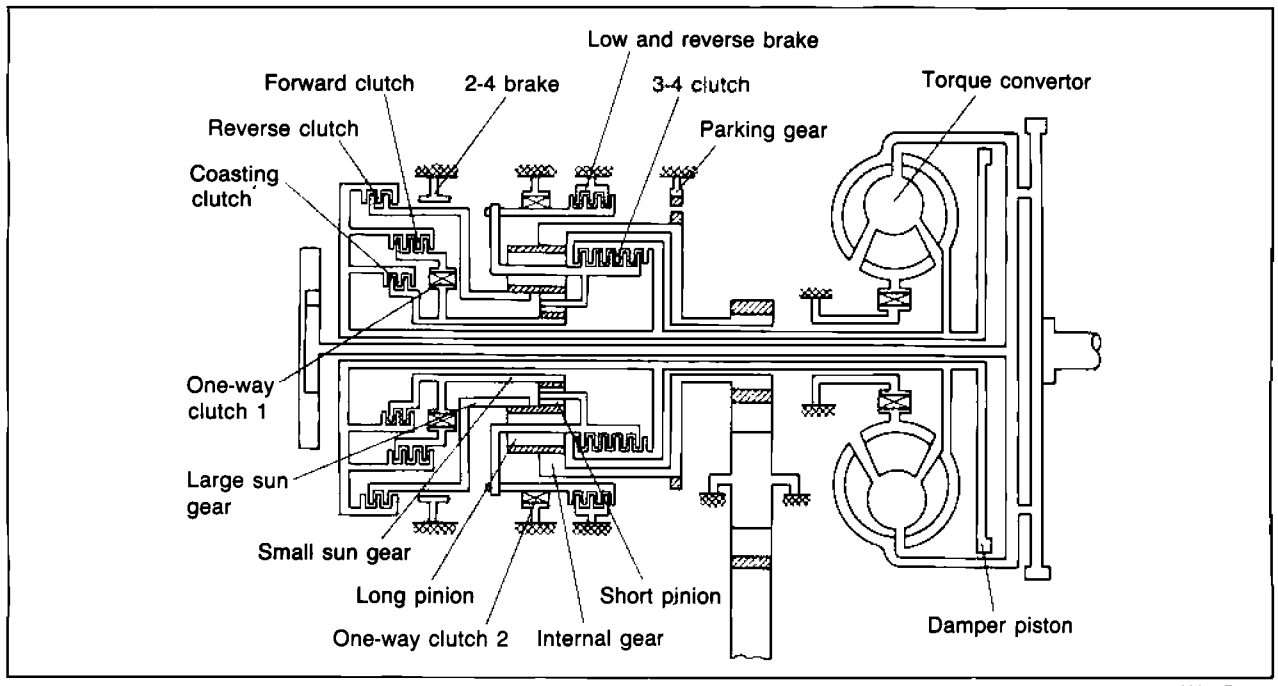


76G07B-005

1. Coasting clutch
2. Forward clutch
3. Reverse clutch
4. Reverse and forward drum
5. 3-4 clutch
6. 2-4 brake band
7. Low and reverse brake
8. Output gear
9. Idle gear
10. Differential
11. Parking pawl
12. Throttle cable
13. Control body
14. Oil pump
15. Inhibitor switch
16. Pulse generator
17. Fluid temperature switch

7B OUTLINE

OPERATION OF COMPONENTS



76U07B-508

Operation Table (G4A-EL)

Range	Gear		Engine braking effect	Operation elements								
				Forward clutch	Coasting clutch	3-4 clutch	Reverse clutch	2-4 brake		Low & reverse brake	One-way clutch 1	One-way clutch 2
								Applied	Released			
P	—		—									
R	Reverse		Yes				○			○		
N	—		—									
D	1st		No	○							○	○
	2nd		No	○				○			○	
	3rd	Below approx. 40 km/h (25 mph)	Yes	○	○	○			○		○	
		Above approx. 40 km/h (25 mph)	Yes	○	○	○		⊗	○		○	
	OD		Yes	◎		○		○				
S	1st		No	○							○	○
	2nd		No	○				○			○	
	3rd	Below approx. 40 km/h (25 mph)	Yes	○	○	○			○		○	
		Above approx. 40 km/h (25 mph)	Yes	○	○	○		⊗	○		○	
L	1st		No	○						○	○	○
	2nd		Yes	○	○			○			○	
HOLD D	2nd		No	○				○			○	
	3rd	Below approx. 40 km/h (25 mph)	Yes	○	○	○			○		○	
		Above approx. 40 km/h (25 mph)	Yes	○	○	○		⊗	○		○	
HOLD S	2nd		Yes	○	○			○			○	
	3rd	Below approx. 40 km/h (25 mph)	Yes	○	○	○			○		○	
		Above approx. 40 km/h (25 mph)	Yes	○	○	○		⊗	○		○	
HOLD L	1st		Yes	○	○					○	○	○
	2nd		Yes	○	○			○			○	

⊗ : Indicates fluid pressure to servo but band not applied due to pressure difference in servo.
◎ : Indicates that it does not function to transmition power.

76G07B-006

Operation Table (G4A-HL)

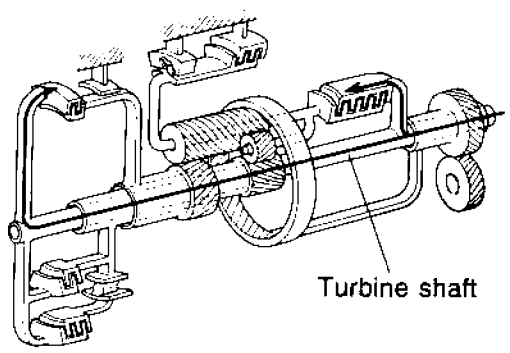
Range	Gear	Operation elements									
		Engine braking effect	Forward clutch	Coasting clutch	3-4 clutch	Reverse clutch	2-4 brake		Low & reverse brake	One-way clutch 1	One-way clutch 2
							Applied	Released			
P	—	—									
R	—	Yes				○			○		
N	—	—									
D	1st	No	○							○	○
	2nd	No	○				○			○	
	3rd	Yes	○	○	○		⊗	○		○	
	OD	Yes	◎		○		○				
2	2nd	Yes	○	○			○			○	
1	1st	Yes	○	○				○	○	○	
	2nd	Yes	○	○			○			○	

76G07B-007

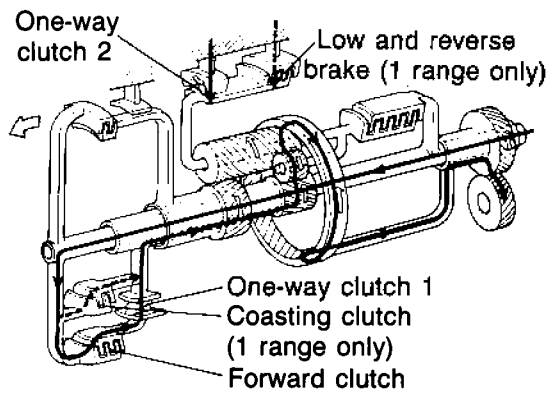
⊗ : Indicates fluid pressure to servo but band not applied due to pressure difference in servo.
◎ : Indicates that it does not function to transmit power.

POWER FLOW DIAGRAM

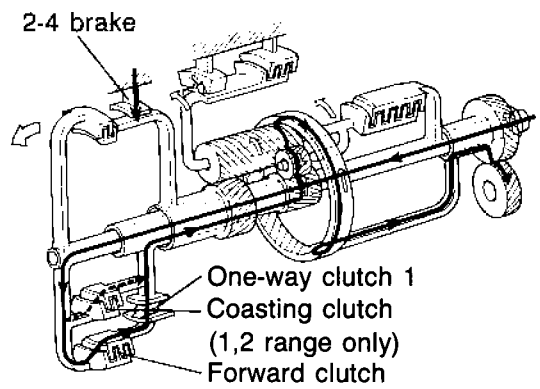
Neutral



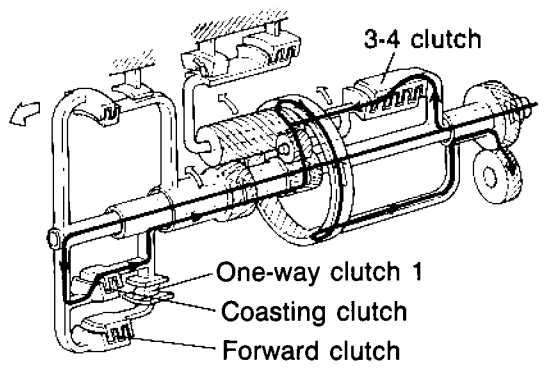
1st gear



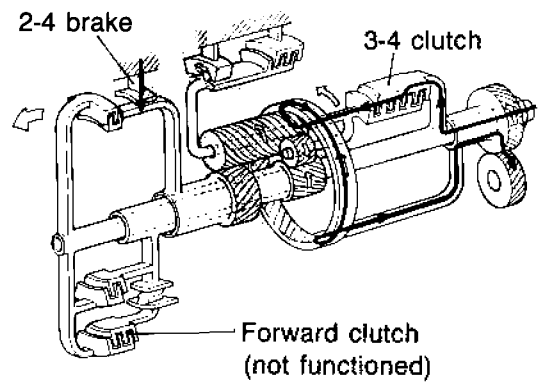
2nd gear



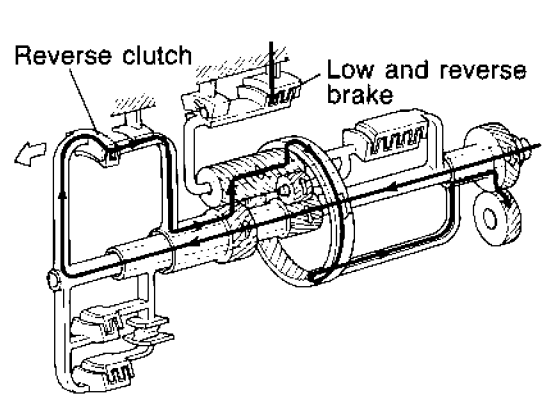
3rd gear



Overdrive gear

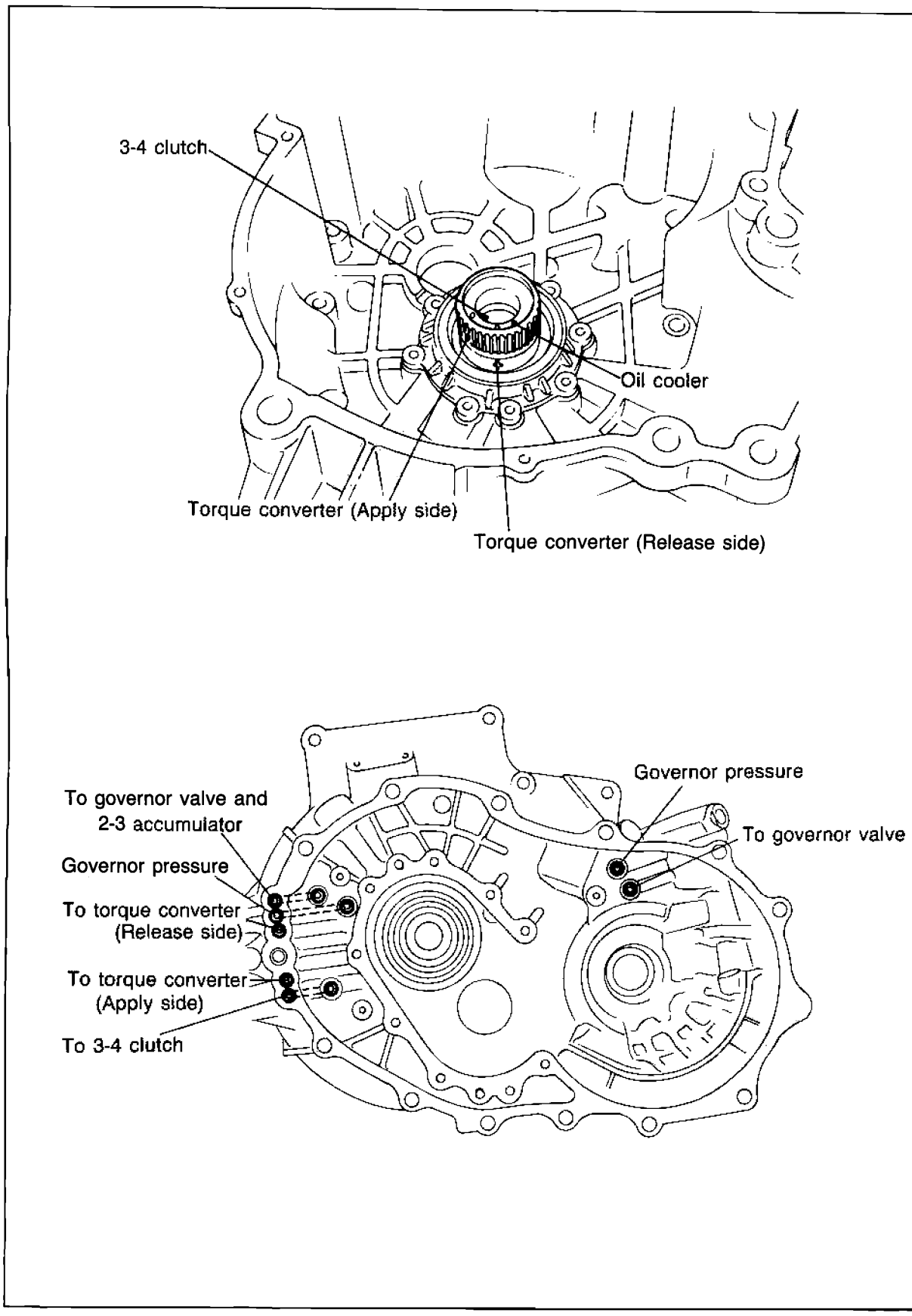


Reverse gear



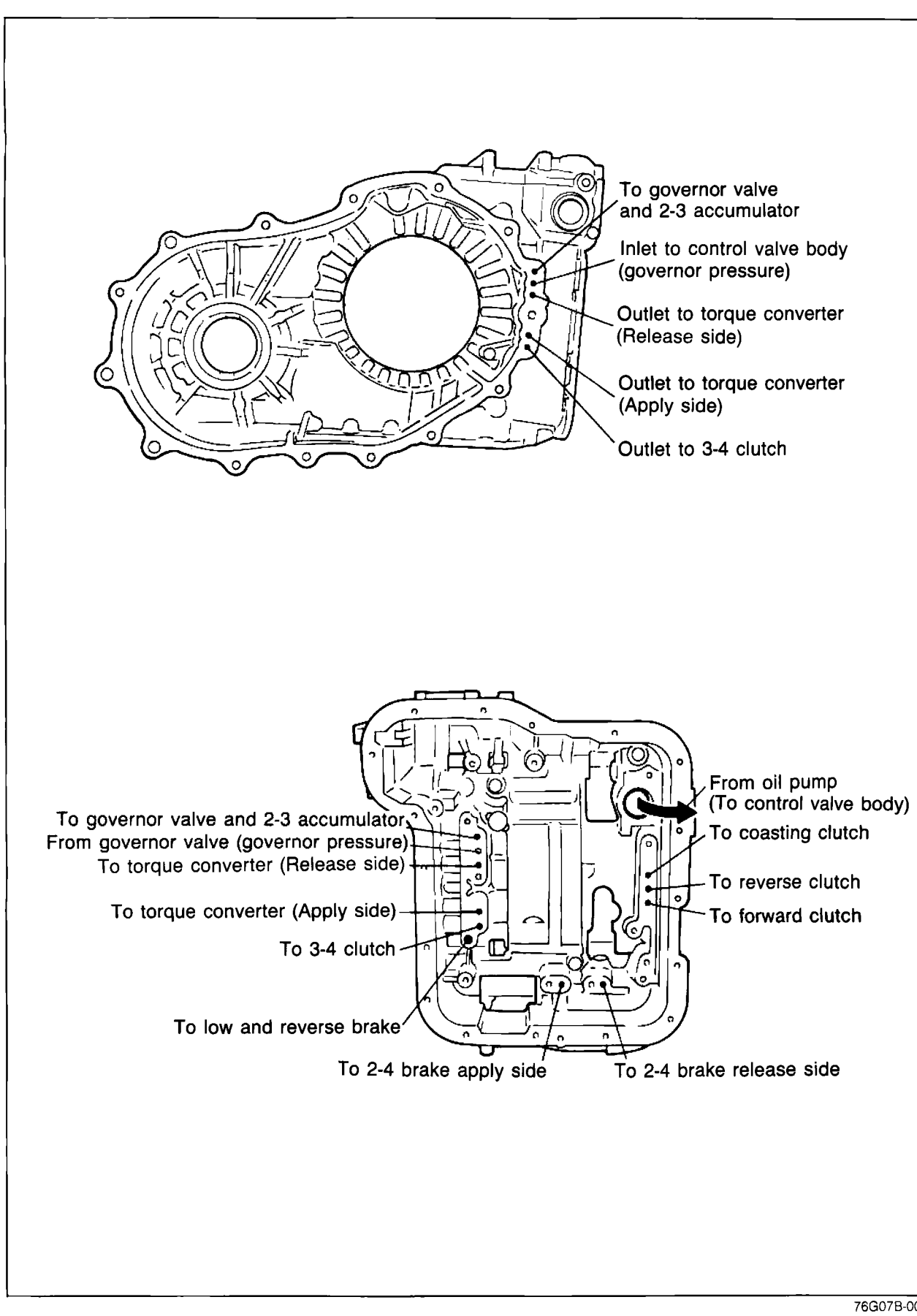
83U07B-015

FLUID PASSAGE LOCATION
Converter Housing



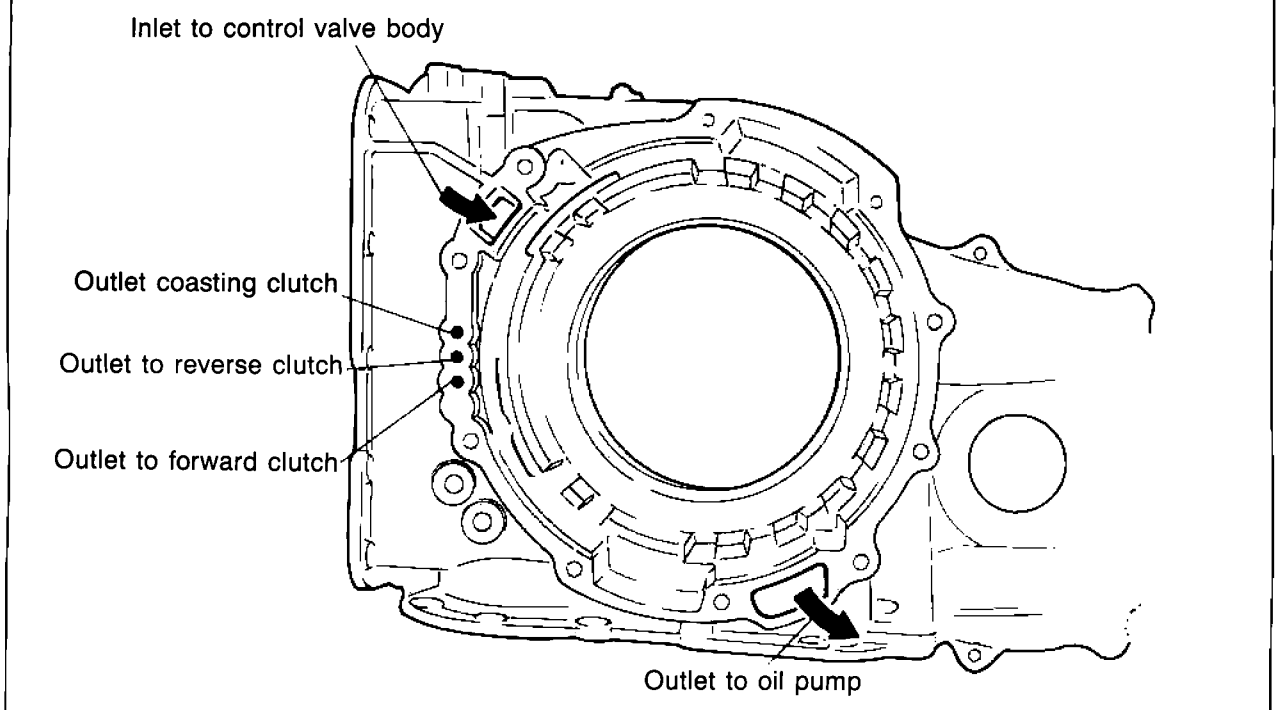
76G07B-008

Transaxle Case



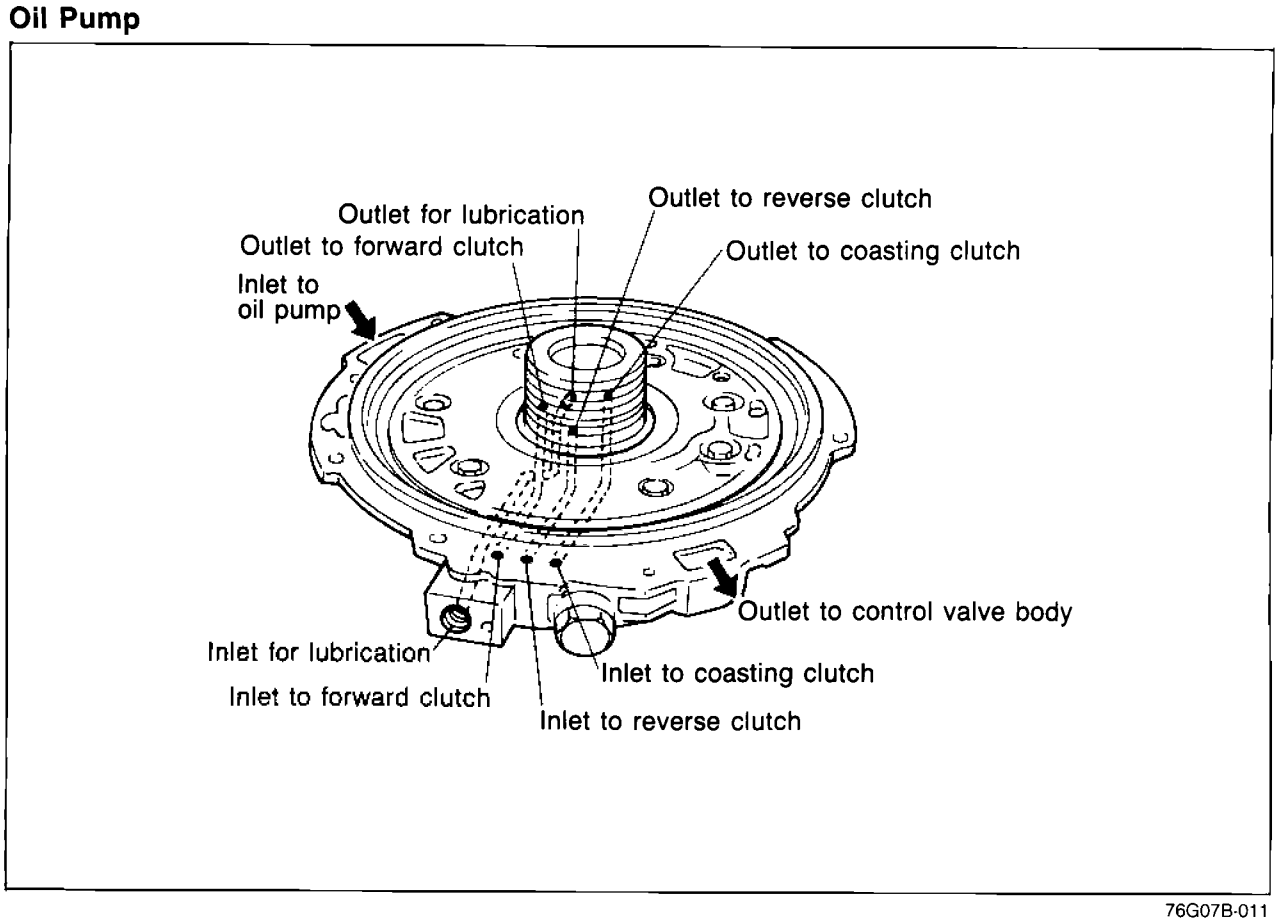
76G07B-009

Transaxle Case



76G07B-010

Oil Pump



76G07B-011

TROUBLESHOOTING (G4A-EL)

GENERAL NOTE

In the event of a problem with the EC-AT, the cause may be in the engine, EC-AT power train, hydraulic control system, or electronic control system.
When troubleshooting, therefore, it is recommended to begin from those points that can be judged quickly and easily. The recommended troubleshooting sequence is described below.

STEP 1: WARNING CODE RETRIEVAL Check self-diagnosed warning code memorized in the EC-AT control unit with the **EC-AT TESTER**	..... This step checks the major electronic components. • Throttle sensor and circuit • Pulse genelator and circuit • Vehicle speed sensor and circuit • All solenoid valves and circuits • EC-AT control unit
STEP 2: PRELIMINARY INSPECTION Check preliminary check items • ATF level and condition • Oil leakage • Selector lever position • Idle speed • Tire inflation pressure • Inhibitor switch • Throttle cable	..... This step checks conditions surrounding the automatic transaxle.
STEP 3: SIGNAL INSPECTION Check signals to the EC-AT control unit with the **EC-AT TESTER**	..... This step checks the electronic control system. • All input signals to EC-AT control unit • All output signals
STEP 4: STALL TEST Check engine stall speed	..... This step checks the power train. • Friction element slipping • Torque converter capacity
STEP 5: TIME LAG TEST Check time lag of oil pressure supply	..... This step checks operation of the hydraulic control system. • Accumulators • Friction elements slipping • Regulating valves
STEP 6: OIL PRESSURE TEST Check line and throttle pressures	..... This step checks major points of the hydraulic control system. • Oil pump • Line pressure control • Throttle pressure control
STEP 7: ROAD TEST Check items on road test • Shift point • Shift schedule • Kick-down • Shift shock • Lock-up and OD inhibition	..... This step checks functions of the EC-AT control unit and hydraulic control system.

76G07B-012

By following the above seven steps, the cause of the problem should be located.
As another guide to faster location of the causes of problems, the Quick Diagnosis Chart is included at pages 7B—13, 14.
In this chart, a circle is used to indicate the components that might be the cause of trouble for 23 types of problems. It is only necessary to check those components indicated by circles, at each step cf the troubleshooting process, in order to quickly locate the cause of the problem.

Quick Diagnosis Chart
The Quick Diagnosis Chart shows various problems and the relationship of various components that might be the cause of the problem.
1. Components indicated in the "Self-Diag." column are diagnosed by the EC-AT control unit self-diagnosis function.
   The **EC-AT Tester** can be used for easy retrieval of these signals.
2. Components indicated in the "Adjustment" column indicate that there is a possibility that the problem may be the result of an incorrect adjustment.
   Check the adjustment of each component, and readjust if necessary.
3. Input and outout signals of the EC-AT control unit for the components indicated in the "EC-AT TESTER" column can be easily checked by using of the **EC-AT Tester**.
4. Components indicated in the "Stall Test" column can be checked for malfunction by the results of the stall test.
5. Components indicated in the "Time Lag Test" column can be checked for malfunction by the results of the time lag test.
6. Components indicated in the "Oil Pressure Test" column can be checked for malfunction by the results of the oil pressure test.
7. Components indicated in the "Road Test" column can be checked for malfunction by the results of the road test.
8. The checking, adjusting, repair or replacement procedures for each component is described in the page(s) noted in the "Reference Page" column.

Inspection point / Item	Electronic control system																Prelimi-nary	Hydraulic control system						Power train											
	Brake light switch	Inhibitor switch	Mode switch	Hold switch	Idle switch	Throttle sensor	Water temp. switch	Vehicle speed sensor	Pulse generator	1-2 solenoid	2-3 solenoid	3-4 solenoid	Lock-up solenoid	ATF level and condition	Selector lever	Throttle cable	Idle speed and ignition timing	Control valves	Accumulators	Oil pump	Hydraulic circuit	Torque converter	Forward clutch	Coasting clutch	Reverse clutch	3-4 clutch	2-4 brake band and servo	Low and reverse brake	One-way clutch 1	One-way clutch 2	Parking gear	Planetary gear	Differential assembly
Self-diag	○					○		○	○	○	○	○	○																					
Adjustment		○			○	○								○	○	○	○										○						
EC-AT TESTER	○	○	○	○	○	○	○	○	○	○	○	○	○																				
Stall Test																		○		○		○	○		○		○		○	○			
Time Lag Test																			○				○					○						
Oil Pressure Test																○		○		○	○													
Road Test																							○	○		○		○	○					

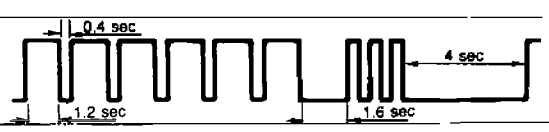
76G07B-013

	Inspection point and reference page	Electronic control system													Preliminary			Hydraulic control system					Power train											
		ON VEHICLE																			OFF VEHICLE													
		7B—66	7B—65	7B—63	7B—63	Section 4B	Section 4B	7B—66	7B—68	7B—68	7B—69	7B—69	7B—69	7B—69	7B—71	7B—72	7B—73	Section 4B	7B—77, 137	7B—132, 141	7B—108	7B—231	7B—107	7B—113	7B—113	7B—113	7B—128	7B—135	7B—134	7B—122	7B—126	7B—135	7B—126	7B—177
	Condition	Brake light switch	Inhibitor switch	Mode switch	Hold switch	Idle switch	Throttle sensor	Water temp. switch	Vehicle speed sensor	Pulse generator	1-2 solenoid	2-3 solenoid	3-4 solenoid	Lock-up solenoid	ATF level and condition	Selector lever	Throttle cable	Idle speed and ignition timing	Control valves	Accumulators	Oil pump	Hydraulic circuit	Torque converter	Forward clutch	Coasting clutch	Reverse clutch	3-4 clutch	2-4 brake band and servo	Low and reverse brake	One-way clutch 1	One-way clutch 2	Parking gear	Planetary gear	Differential assembly
Accelerating	Vehicle does not move in D, S, L, or R range														O	O			O		O	O	O	O		O				O	O	O		
Accelerating	Vehicle moves in N range															O			O															
Accelerating	Excessive creep																O	O					O											
Accelerating	No creep at all														O	O	O		O		O	O		O		O								
Shifting	No shift		O		O						O	O	O		O	O			O		O													
Shifting	Abnormal shift sequence		O		O		O	O		O	O	O	O		O	O			O									O						
Shifting	Frequent shifting		O	O			O			O	O	O	O	O					O															
Shifting	Excessively high or low shift point		O	O	O	O	O			O	O	O	O			O			O															
Shifting	No lock-up	O					O	O		O	O	O	O	O		O							O											
Shifting	No kick-down		O		O		O									O																		
Slipping	Engine run away or slip when starting vehicle		O												O				O		O			O						O				
Slipping	Engine run away or slip when up- or down-shifting		O												O				O		O			O		O	O	O		O				
Shift shock	Excessive N to D or N to R shift shock														O			O	O	O				O		O								
Shift shock	Excessive shift shock when up-shifting or downshifting														O		O		O	O					O		O	O						
Shift shock	Excessive shift shock when changing range		O													O			O						O				O					
Noise	Transaxle noisy in N or P range														O						O		O											O
Noise	Transaxle noisy in D, S, L, or R range														O									O						O			O	
Others	No engine braking											O	O						O			O			O				O					
Others	No mode change		O	O	O		O	O	O	O	O	O	O	O																				
Others	Transaxle overheats													O	O				O		O		O											
Others	Vehicle moves in "P", or parking gear not disengaged when "P" is disengaged															O																O		
Others	Hold indicator flashes						O		O	O	O	O	O	O																				
Others	Engine will not start		O													O																		

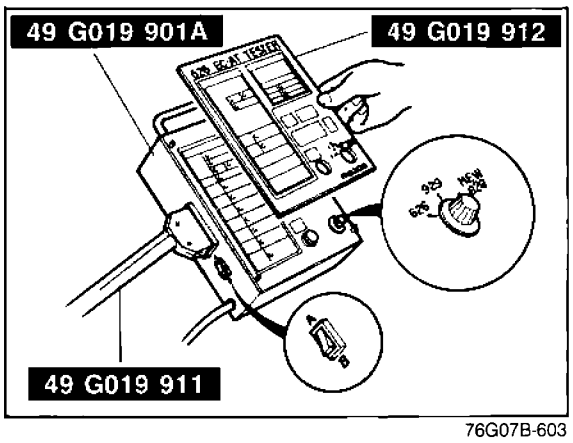
76G07B-014

STEP 1 (WARNING CODE RETRIEVAL)
Self-diagnosis Function
The self-diagnosis system, which is integrated in the EC-AT control unit, diagnoses malfunction of the main sensors (input) and solenoid valves (output), and the EC-AT control unit.
Malfunctions which have happened or are continuing are memorized in the EC-AT control unit as specific codes.
The **EC-AT Tester** is used to retrieve these warning codes. Each malfunction is indicated by a code number and buzzer as shown the table below.

Code Number

Code number	Location of malfunction	Buzzer
06	Vehicle speed sensor or circuit	
12	Throttle sensor or circuit	
55	Pulse genelator or circuit	
60	1-2 shift solenoid valve or circuit	
61	2-3 shift solenoid valve or circuit	
62	3-4 shift solenoid valve or circuit	
63	Lock-up solenoid valve or circuit	

76G07B-213

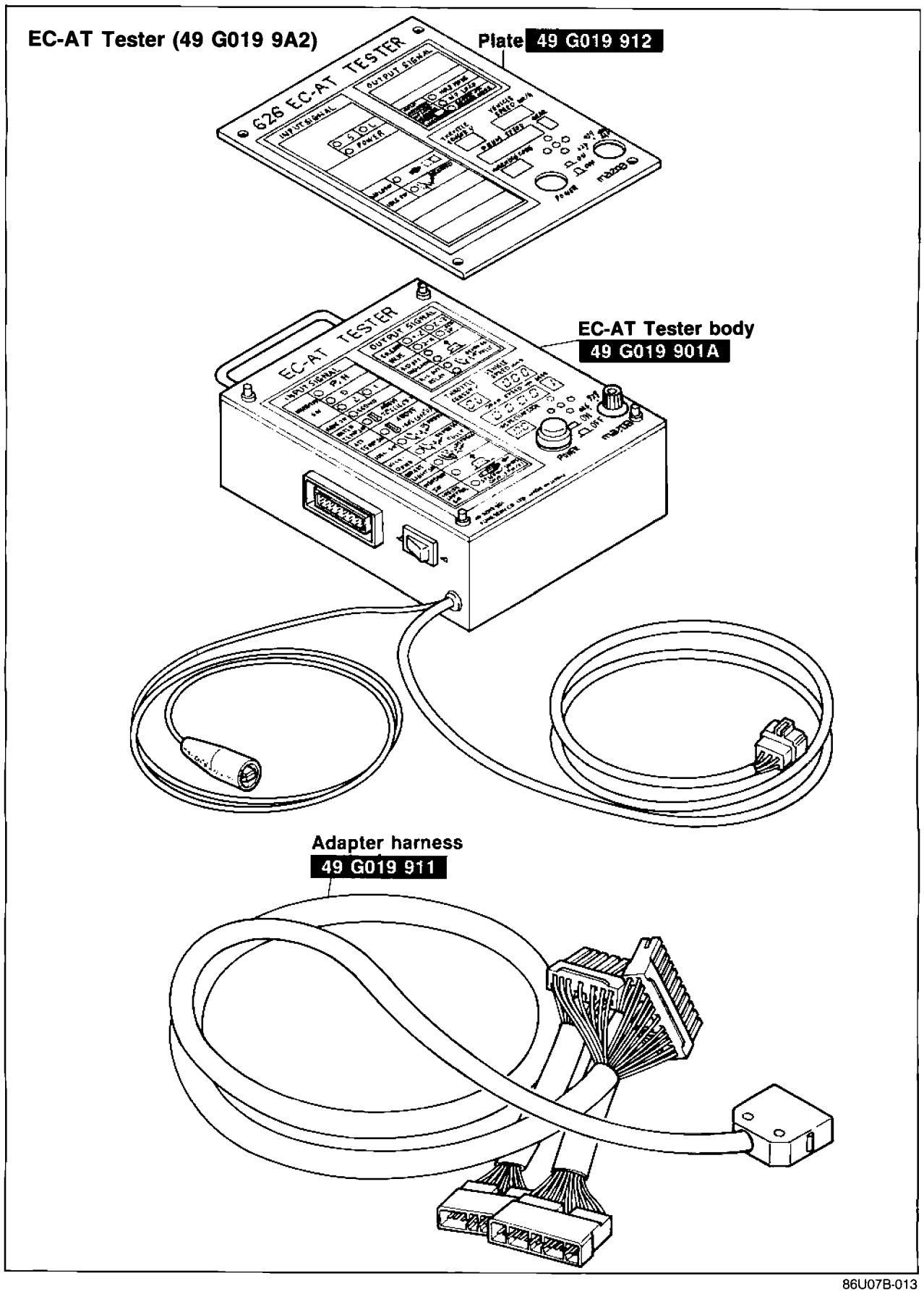


76G07B-603

EC-AT Tester
Assembly of EC-AT tester
1. Set the **plate** (49 G019 912) onto the **EC-AT tester body** (49 G019 901A).
2. Connect the **adapter harness** (49 G019 911) to the **EC-AT tester body**.
3. Select the code select switch to A position.
4. Select the select switch to NEW 626 position.

7B TROUBLESHOOTING (G4A-EL)

Components



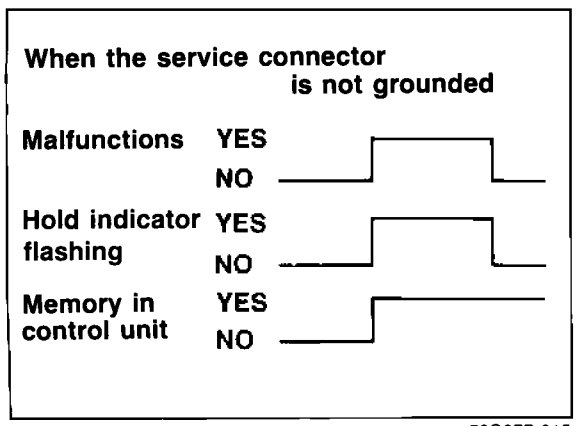
86U07B-013

06 → 4 second period →
55 → 4 second period →
63 → 4 second period →
Repeats above

86U07B-018

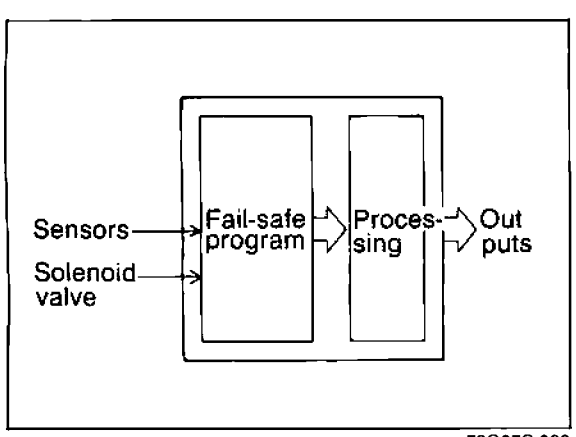
General Note

1. If there is more than one malfunction, the code numbers will be displayed on the tester one by one in a numerical order. In the case of malfunctions, 55, 06, and 63, the code numbers are displayed in an order of 06, 55, then 63. The display is as shown.



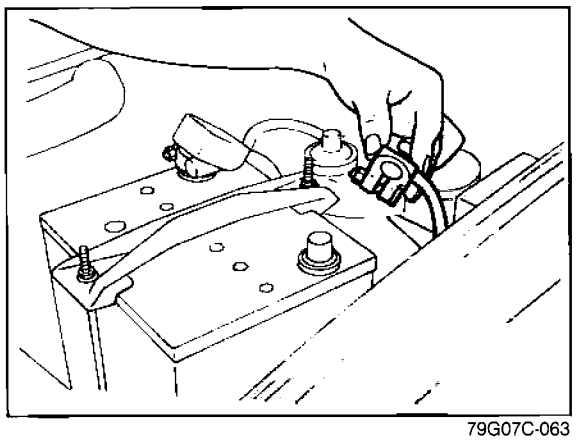
76G07B-015

2. The hold indicator flashes to indicate the same pattern as the buzzer of the EC-AT Tester when the EC-AT service connector is grounded.
   When the EC-AT service connector is not grounded, the indicator flashes in a constant frequency while a malfunction is occurring and goes out if the malfunction recovers. However, the warning code is memorized in the EC-AT control unit.



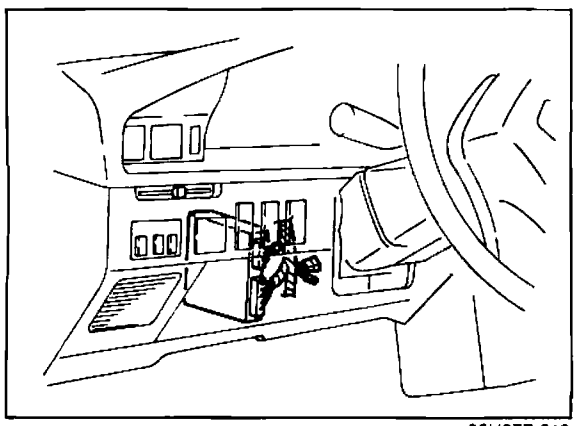
79G07C-062

3. The EC-AT control unit has a built-in fail-safe function for the throttle sensor, the pulse generator, and the 1-2, 2-3, and 3-4 shift solenoid valves.
   If a malfunction occurs, the EC-AT control unit will control operation of the remaining components according to a preset fail-safe program.
   The vehicle may still be driven, although the driving performance will be slightly affected.



79G07C-063

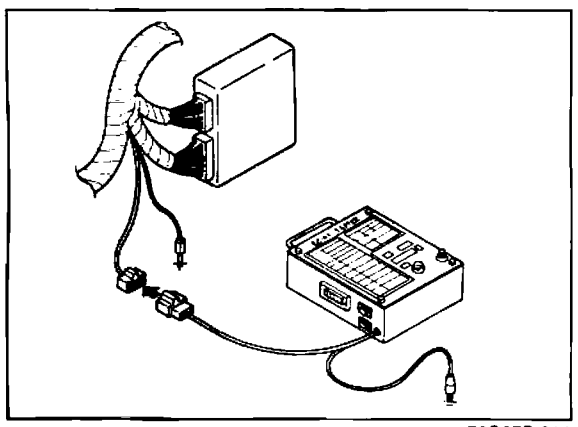
4. The memory of warning codes is canceled by disconnecting the negative battery terminal for approx. five seconds.



86U07B-019

Retrieval Procedure

1. Locate the service connector.



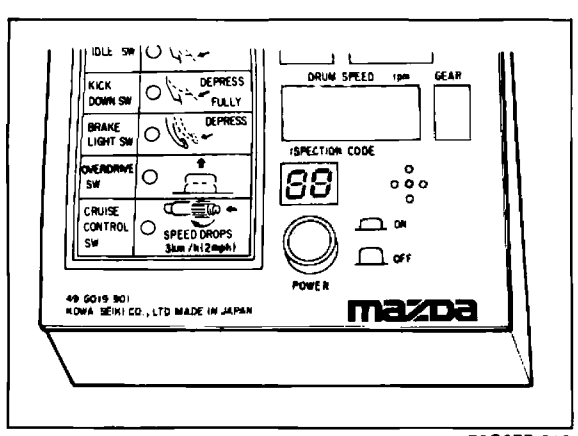
76G07B-214

2. Ground the ground connector of the **EC-AT Tester**.
3. Connect the 6-pin connector of the **EC-AT Tester** to the service connector.

Note
The service connector is blue-colored connector.

4. Ground the 1 pin service connector.

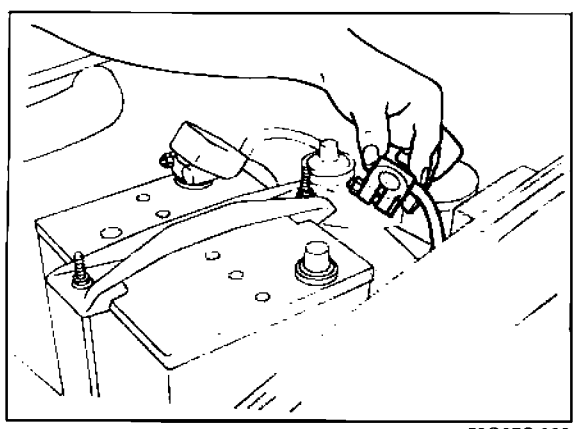
Note
The service connector is blue-colored connector.



76G07B-016

5. Turn the ignition switch ON.
6. Check that "**88**" flashes on the digital display and the buzzer sounds for three seconds after turning the ignition switch ON.
7. If "**88**" does not flash, check the service connector wiring.
8. If "**88**" flashes and the buzzer sounds continuously for more than **20 seconds,** check wiring to 2M terminal of the EC-AT control unit for short-circuit then replace the EC-AT control unit and repeat steps 3 and 4.
9. Note the code numbers and check for the causes by referring to the Inspection Procedure shown on pages 7B—19 to 7B—21, repair as necessary.

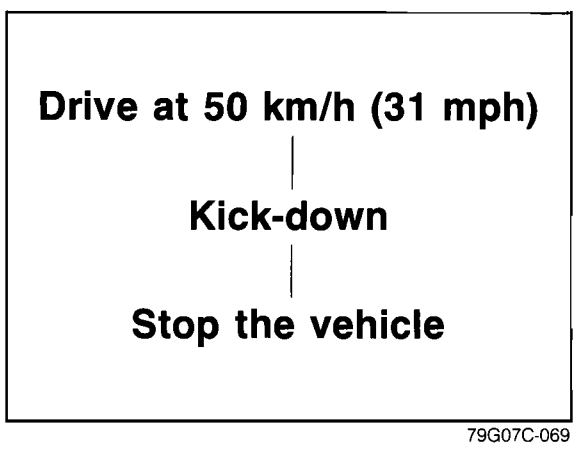
Note
After repairs are made, recheck for code numbers by performing the "After-repair procedure."



79G07C-068

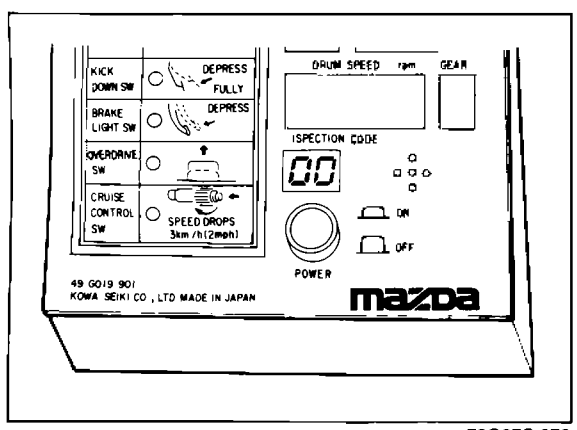
After-repair Procedure

1. Cancel the memory of malfunctions by disconnecting the negative battery terminal for at least five seconds, then reconnect it.
2. Remove the EC-AT tester if it is connected.



79G07C-069

3. Drive the vehicle at 50 km/h (31 mph), then depress the accelerator pedal fully to activate kick-down. Stop the vehicle gradually.

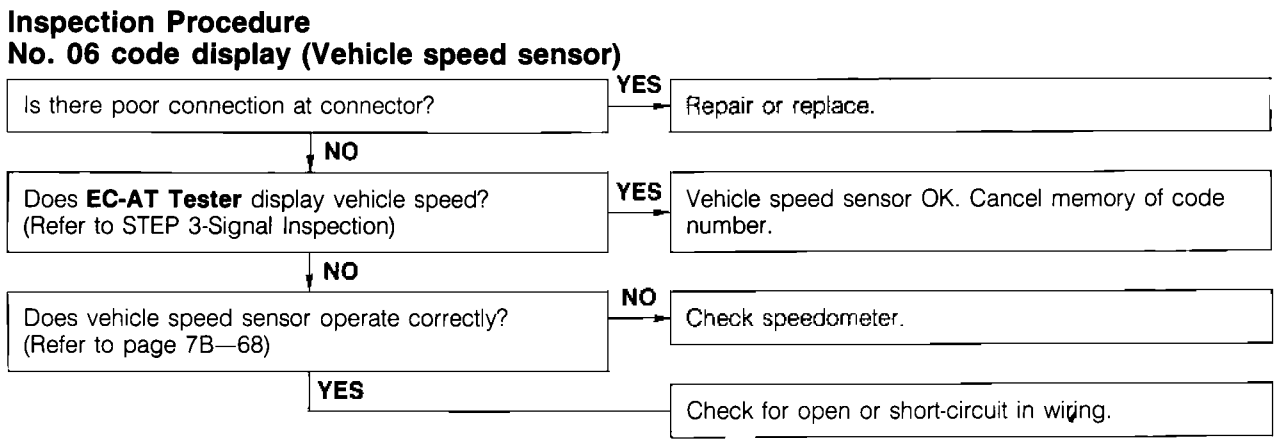


79G07C-070

4. Reconnect the **EC-AT tester** to the 6-pin service connector.
5. Ground the 1-pin service connector with a jumper wire.
6. Turn the ignition switch ON.
7. Check that no code numbers are displayed.

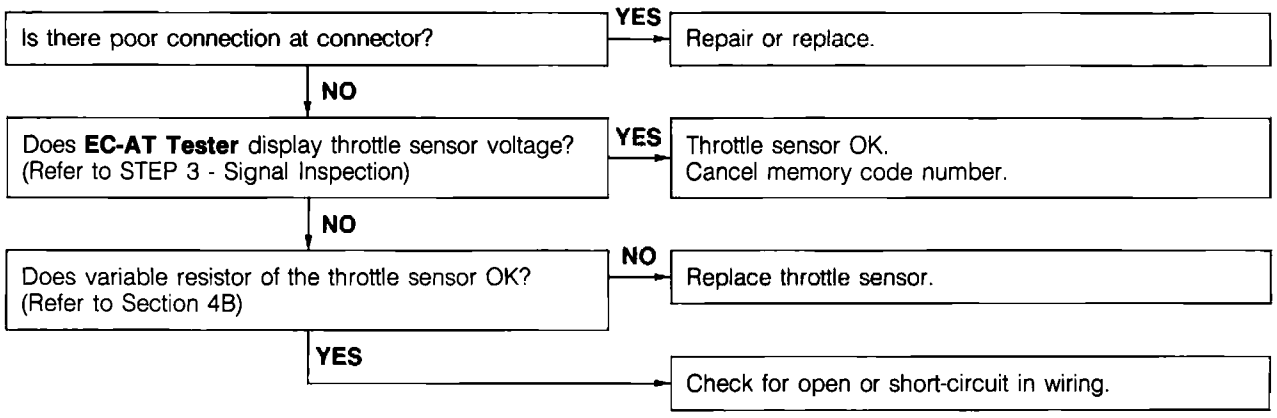
Inspection Procedure

No. 06 code display (Vehicle speed sensor)



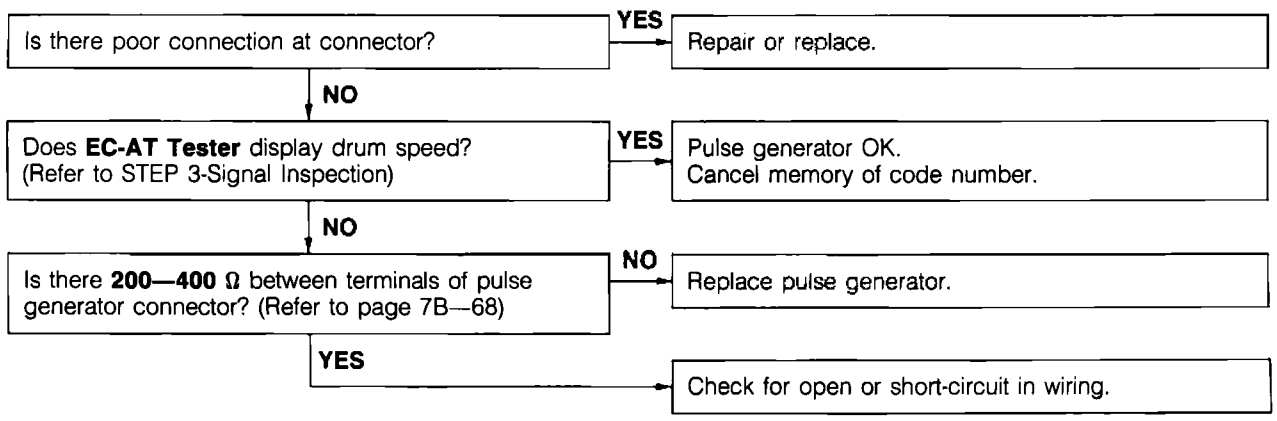
76G07B-017

No. 12 code display (Throttle sensor)



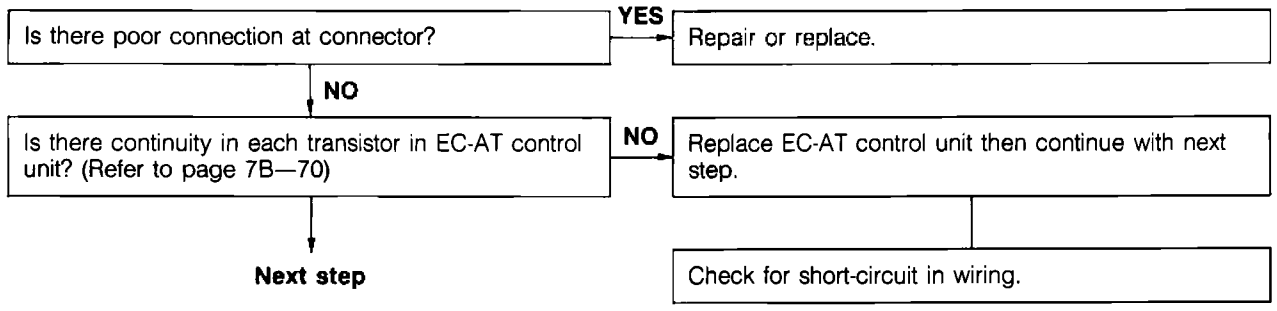
76G07B-018

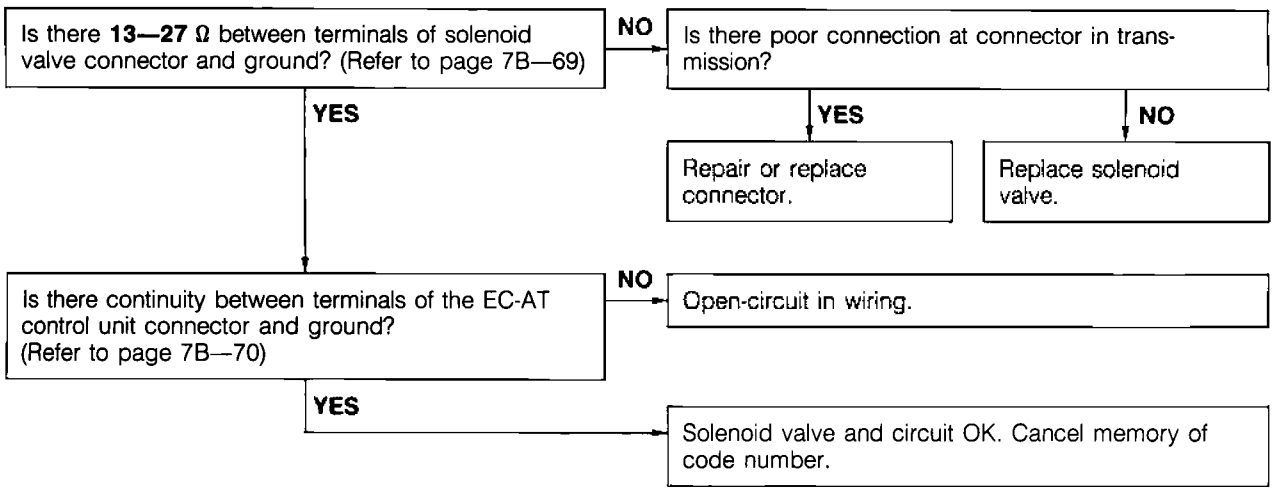
No. 55 code display (Pulse generator)



76G07B-019

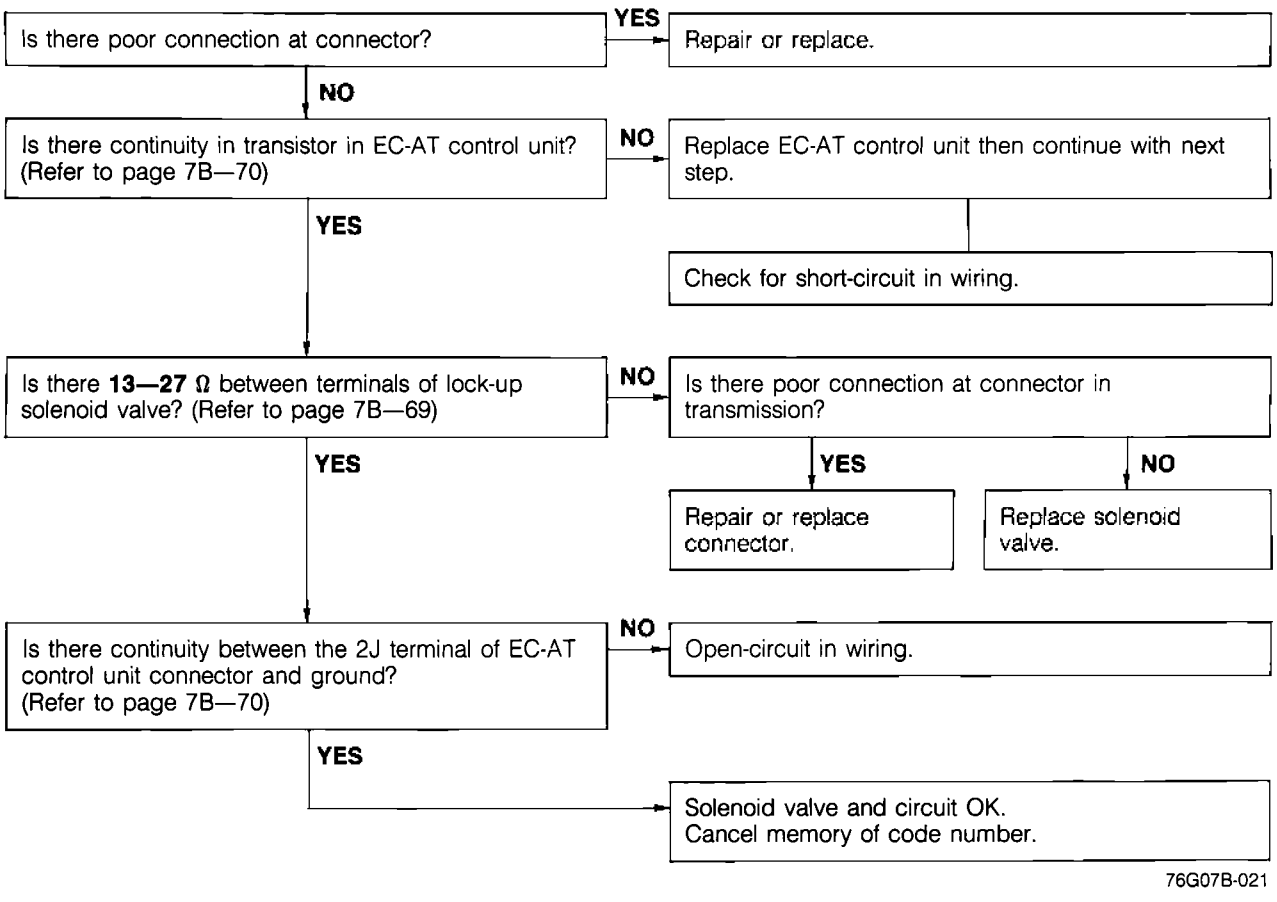
No. 60, 61, 62, or 64 code display (1-2 shift, 2-3 shift, or 3-4 shift solenoid valve)





76G07B-020

No. 63 code display (Lock-up solenoid valve)



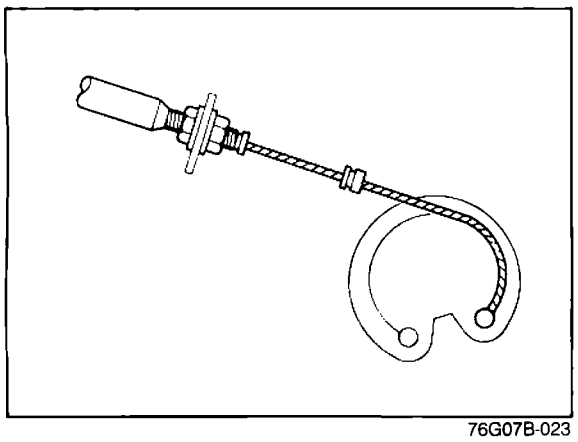
76G07B-021

STEP 2 (PRELIMINARY INSPECTION)
In this step, the fundamental points related to the automatic transaxle are checked. These points must be kept in the correct condition at all times in order to assure proper operation of the automatic transaxle.

1. Automatic Transmission Fluid (ATF)
Check ATF level and condition. (Refer to page 7B—71)

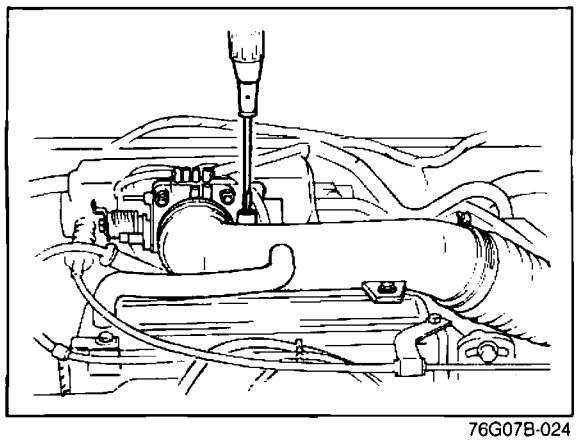
2. Selector Lever
Check selector lever position and adjust if necessary. (Refer to page 7B—72)

76G07B-022



76G07B-023

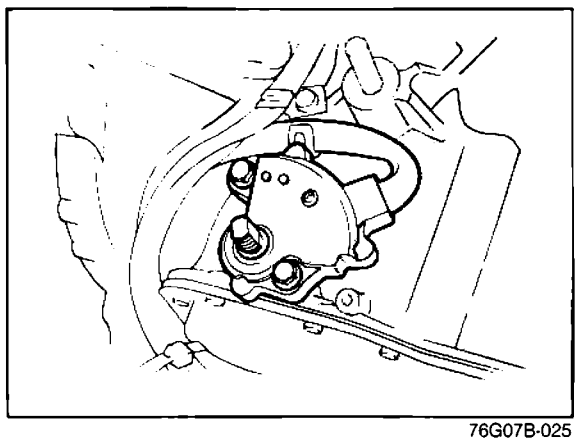
3. Throttle cable
(1) Check the inner and outer cable for damage.
(2) Make sure that the accelerator operates smoothly.



76G07B-024

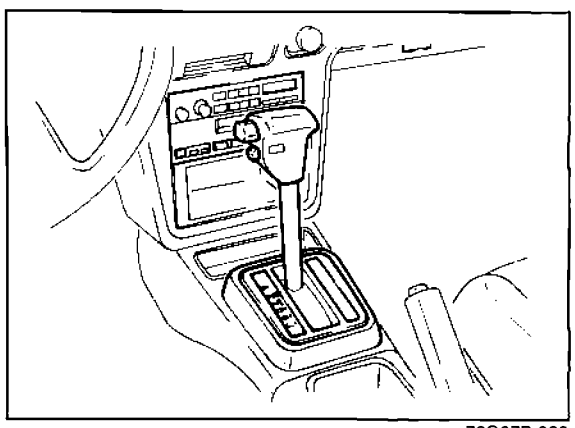
4. Idle Speed
Check idle speed. (Refer to Section 4B)

5. Tire Inflation Pressure
Check tire inflation pressure. (Refer to Section 12)



76G07B-025

6. Inhibitor Switch
Check the inhibitor switch for operation. (Refer to page 7B—65)



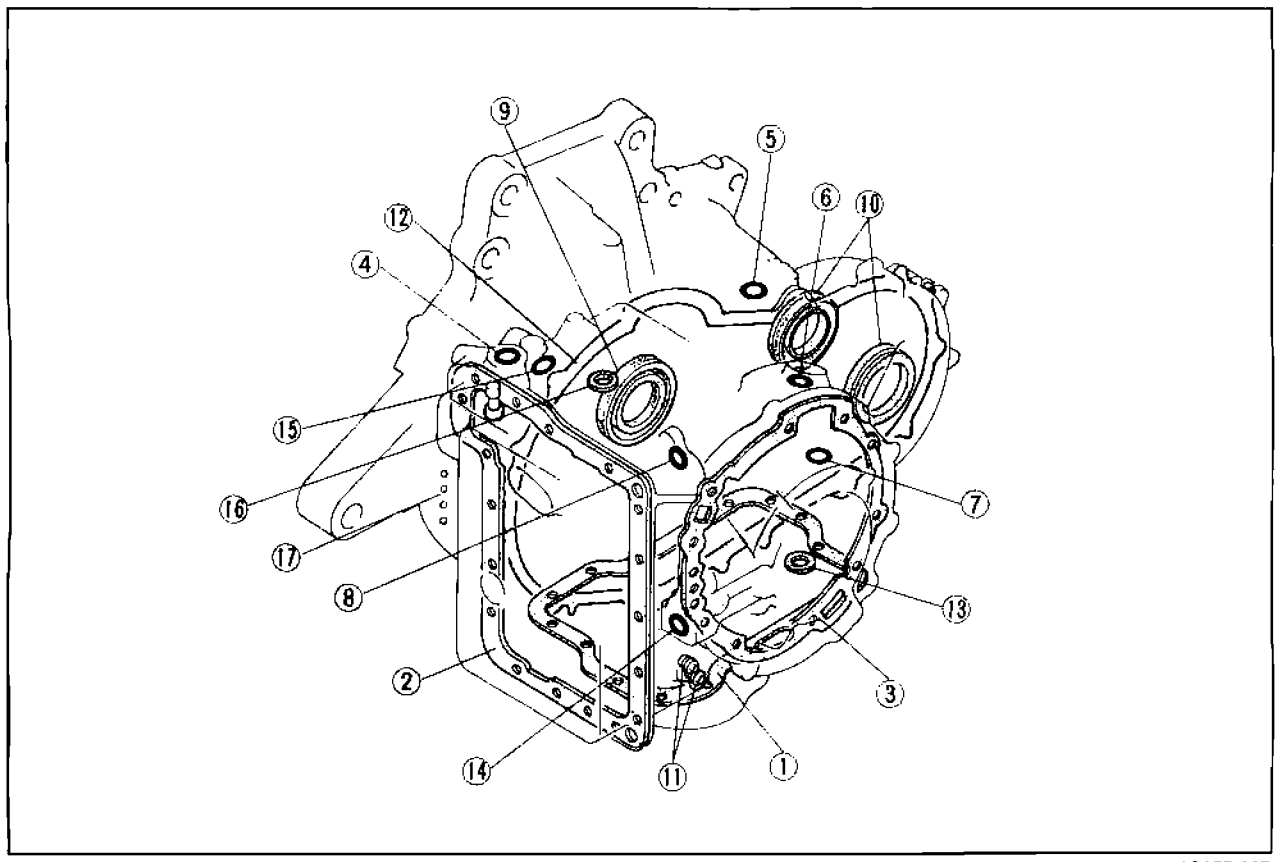
76G07B-026

7. Oil Leakage

Check for oil leakage.

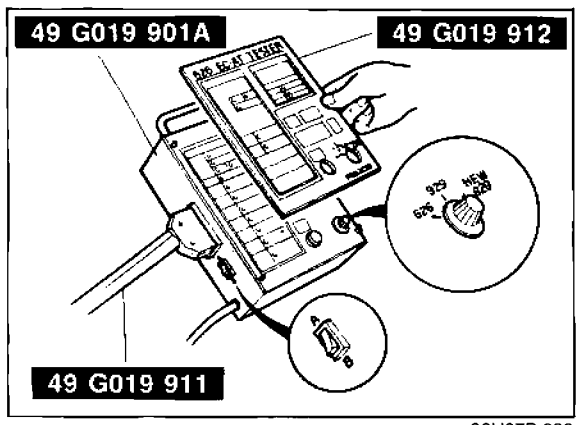
(1) Warm up the ATF.
(2) Apply the parking brake and block the wheels to prevent the vehicle from rolling.
(3) Shift the selector lever to R range.
(4) Check if oil leaks from the following oil seals or gaskets.
(5) If oil leaks, replace the oil seal or gasket.

Check for fluid leaks; the following figure shows the locations where fluid leakage may possibly occur.



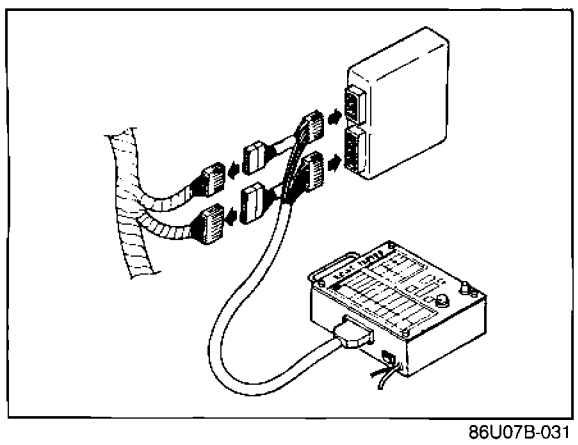
76G07B-027

1. Oil pan
2. Control valve body cover
3. Oil pump
4. Inhibitor switch
5. Speedometer driven gear
6. Pulse generator
7. Oil filler tube
8. Throttle cable
9. Bearing cover
10. Driveshaft
11. Square head plug
12. Transaxle case
13. Drain plug
14. Oil cooler return pipe
15. Oil cooler outlet pipe
16. Fluid temperature switch
17. Blind plugs



86U07B-030

STEP 3 (SIGNAL INSPECTION)
In this step, the input and output signals are checked with the **EC-AT Tester**.
The Tester checks for proper operation of the various switches and sensors in the EC-AT system. It also checks the control unit for output of the various control signals. Powertrain slippage is also checked.



86U07B-031

Inspection Procedure
1. Disconnect the connectors from the EC-AT control unit.
2. Connect the adaptor harness between the control unit and the connectors.
3. Turn the ignition switch and main switch ON.
4. Check indication of the respective light or digital display in each condition, referring to the indication table below.

Indication table of light and digital display

Item		Indication	Condition	Possible cause
Input (Light)				
INHIBITOR SW	L	ON	L range	Inhibitor switch or wiring
		OFF	Other ranges	
	S	ON	S range	
		OFF	Other ranges	
	D	ON	D range	
		OFF	Other ranges	
	P,N	ON	P or N range	
		OFF	Other ranges	
HOLD SW		ON	Hold switch pushed	Hold switch or wiring
		OFF	Hold switch released	
MODE SW		ON	Power mode	Mode switch or wiring
		OFF	Economy mode	
IDLE SW		ON	Throttle valve fully closed	Idle switch or wiring
		OFF	Throttle valve open	

Item	Indication	Condition	Possible cause
BRAKE LIGHT SW	ON	Brake pedal depressed	Brake light switch or wiring
	OFF	Brake pedal released	
WATER TEMP SW	ON	Coolant temperature 72°C (162°F) or above	Water temp switch or wiring
	OFF	Coolant temperature lower than 65°C (149°F)	
ATF TEMP SW	ON	ATF temperature 150°C (302°F) or above	Fluid temperature switch or wiring
	OFF	ATF temperature lower than 143°C (289°F)	
CRUISE CONTROL SW	Not used	—	—
Input (Digital display)			
THROTTLE SENSOR	EC-AT control unit terminal voltage	All the time	Throttle sensor, idle switch or wirings
VEHICLE SPEED*	Vehicle speed calculated from speed sensor signal	All the time	Vehicle speed sensor, speedometer cable, or wiring
DRUM SPEED*	Drum speed	All the time	Pulse generator or wirings
Output (Light)			
1-2 SOLENOID VALVE*	ON	Refer to page 7B—26 solenoid valve operation table	Control unit, 1-2 shift sol., or wiring
	OFF		
2-3 SOLENOID VALVE*	ON		Control unit, 2-3 shift sol., or wiring
	OFF		
3-4 SOLENOID VALVE*	ON		Control unit, 3-4 shift sol., or wiring
	OFF		
LOCK-UP SOLENOID VALVE*	ON	Lock-up condition	Control unit, lock-up sol., or wiring
	OFF	Non-lock-up condition	
HOLD INDICATOR	ON	Hold mode	Control unit, Hold switch, or wiring
	OFF	Other modes	
MODE INDICATOR	ON	Power or economy mode	Control unit, hold switch, mode switch, or wiring
	OFF	Hold mode	
NO LOAD SIGNAL	Not used	—	—

76G07B-028

Item	Indication	Condition
OUTPUT (Digital display)		
GEAR*	1	1st gear position
	2	2nd gear position
	3	3rd gear position
	4	Overdrive (OD) gear position

86U07B-033

Note
a) The back-up condition is as following condition
S range, hold mode, and the accelerator pedal depressed fully.
b) The * marked items should be checked during the engine running or driving.

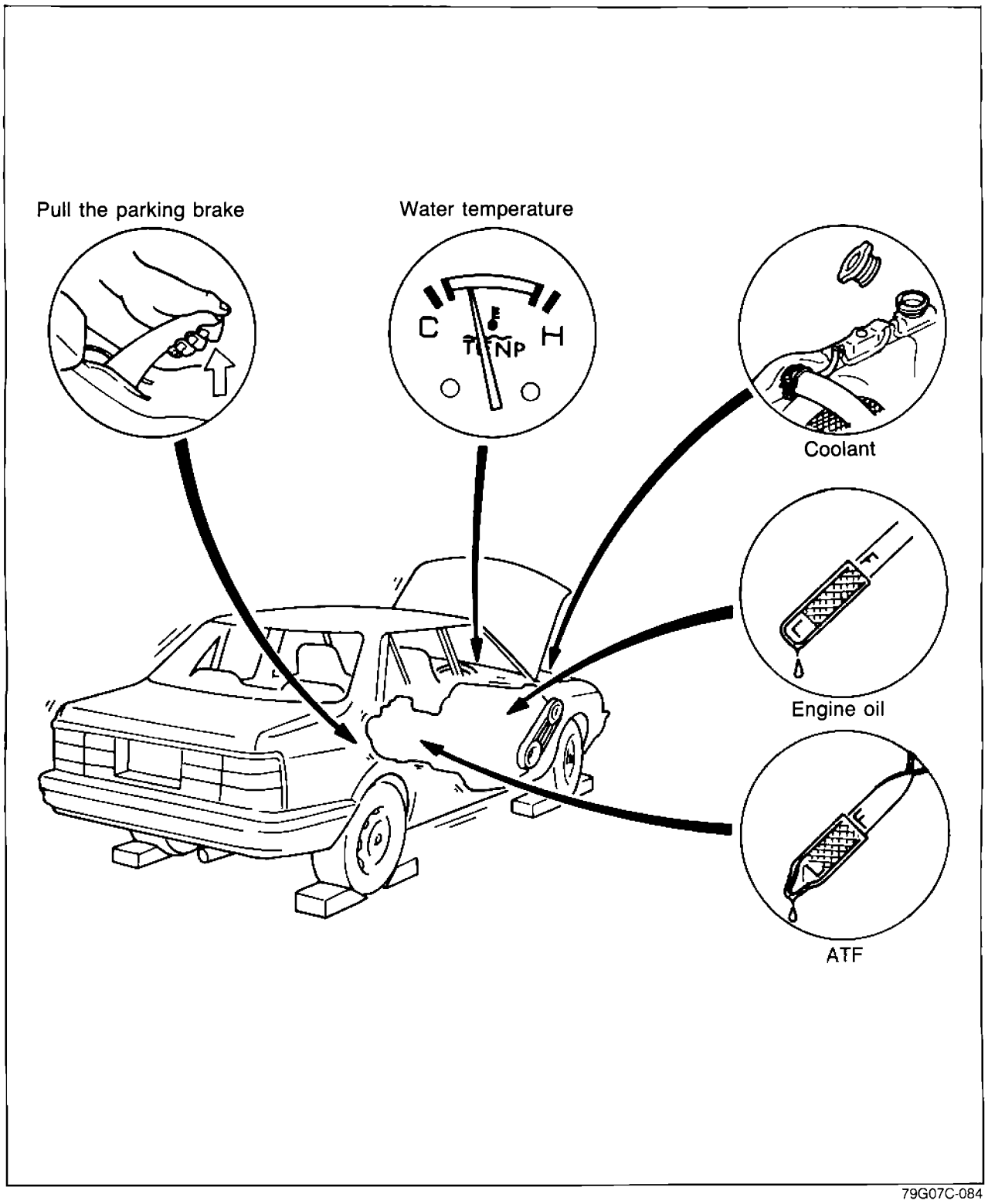
Comprehensive Usage
The **EC-AT Tester** can be used to inspect slippage of friction elements, shift points, and shift sequence during the road test.
The inspection procedure is shown in STEP 7 (ROAD TEST).

Solenoid valve operation table

RANGE	GEAR			SOLENOID VALVES			
				1-2	2-3	3-4	Lock-up
P	Non					ON	
R	Reverse			ON			
N	—	Below approx. 18 km/h (11 mph)				ON	
		Above approx. 18 km/h (11 mph)		ON			
D	1st				ON	ON	
	2nd			ON	ON	ON	
	3rd	Below approx. 40 km/h (25 mph)					
		Above approx. 40 km/h (25 mph)	Lock-up OFF	ON			
			Lock-up ON	ON			ON
	OD	Lock-up OFF		ON		ON	
		Lock-up ON		ON		ON	ON
S	1st				ON	ON	
	2nd			ON	ON	ON	
	3rd	Below approx. 40 km/h (25 mph)					
		Above approx. 40 km/h (25 mph)		ON			
L	1st				ON	ON	
	2nd	Below approx. 110 km/h (68 mph)		ON	ON		
		Above approx. 110 km/h (68 mph)		ON			
HOLD	D	2nd		ON	ON	ON	
		3rd	Below approx. 40 km/h (25 mph)				
			Above approx. 40 km/h (25 mph)	ON			
	S	2nd		ON	ON		
		3rd	Below approx. 40 km/h (25 mph)				
			Above approx. 40 km/h (25 mph)	ON			
	L	1st			ON		
		2nd	Below approx. 110 km/h (68 mph)	ON	ON		
			Above approx. 110 km/h (68 mph)	ON			

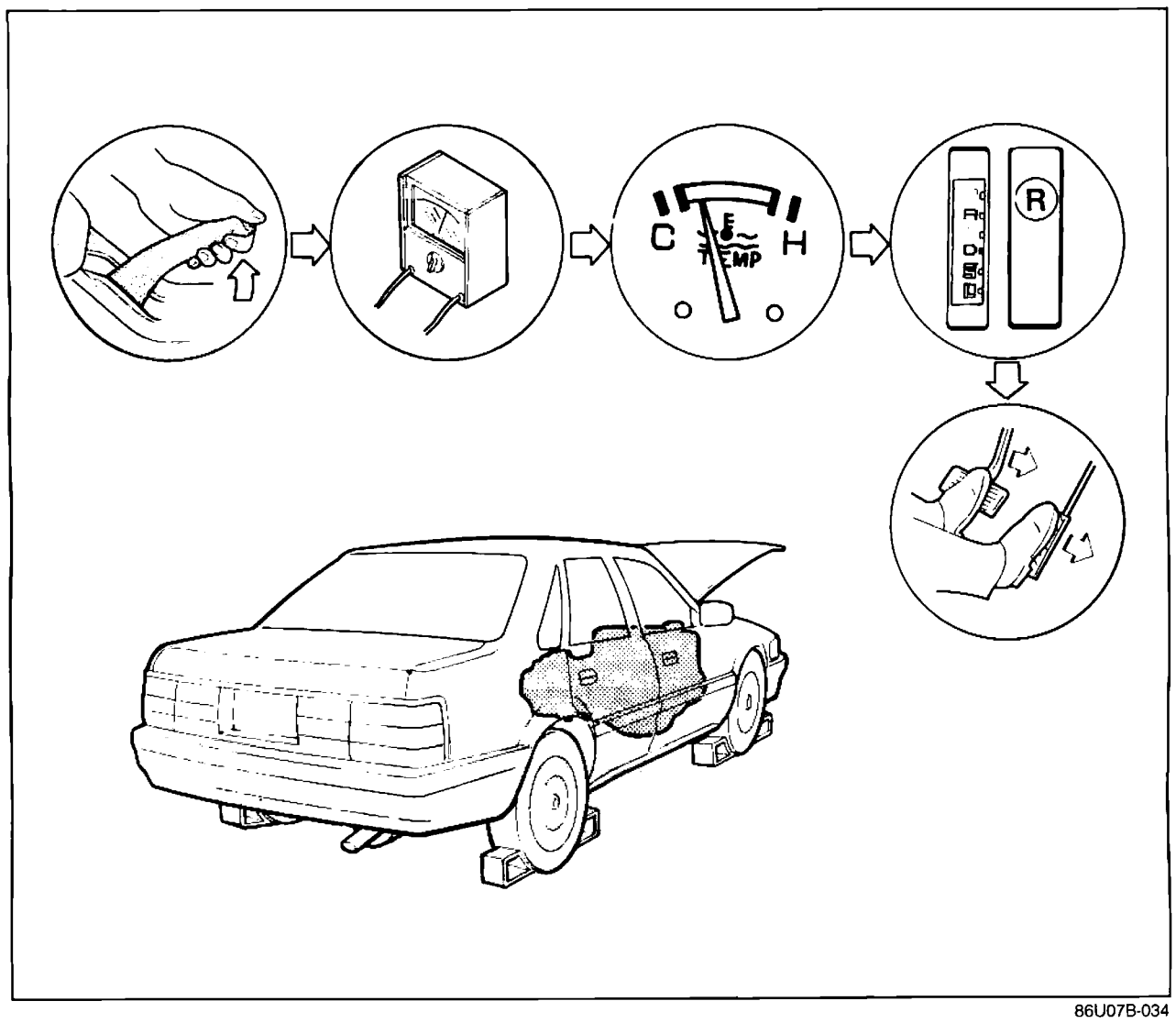
STEP 4 (STALL TEST)
This step is performed to determine if there is slippage of the friction elements or malfunction of the hydraulic components.

Preparation
Check the following items prior to testing:
1. Engine coolant, engine oil and ATF levels.
2. Warm the engine thoroughly to raise the ATF temperature to operating level (50—80°C, 122—176°F).
3. Engage the parking brake and use wheel chocks at the front and rear wheels.



79G07C-084

Procedure



86U07B-034

1. Block the wheels and apply the parking brake.
2. Connect a tachometer to the engine.
3. Shift the selector lever to R.
4. Firmly depress the foot brake with the left foot, and gently depress the accelerator pedal with the right.
5. When the engine speed no longer increases, quickly read the engine speed and release the accelerator.

Caution
Steps 4 → 5 must be done within 5 seconds.

6. Move the selector lever to N and let the engine idle for at least one minute.

Caution
The reason for idling for at least one minute is to cool the ATF and to prevent deterioration of the fluid.

7. Perform the stall test for the following ranges in the same manner.
   (1) D range
   (2) D range (Hold)
   (3) S range (Hold)
   (4) L range
   (5) L range (Hold)

Caution
Be sure to allow sufficient cooling time between each stall test.
Engine stall speed: D.S.L range 2170—2270 rpm
R range 2130—2230 rpm

Note
The stall test can be performed with the EC-AT Tester in place of a tachometer.
Drum stall speed indication: 0 rpm

76G07B-029

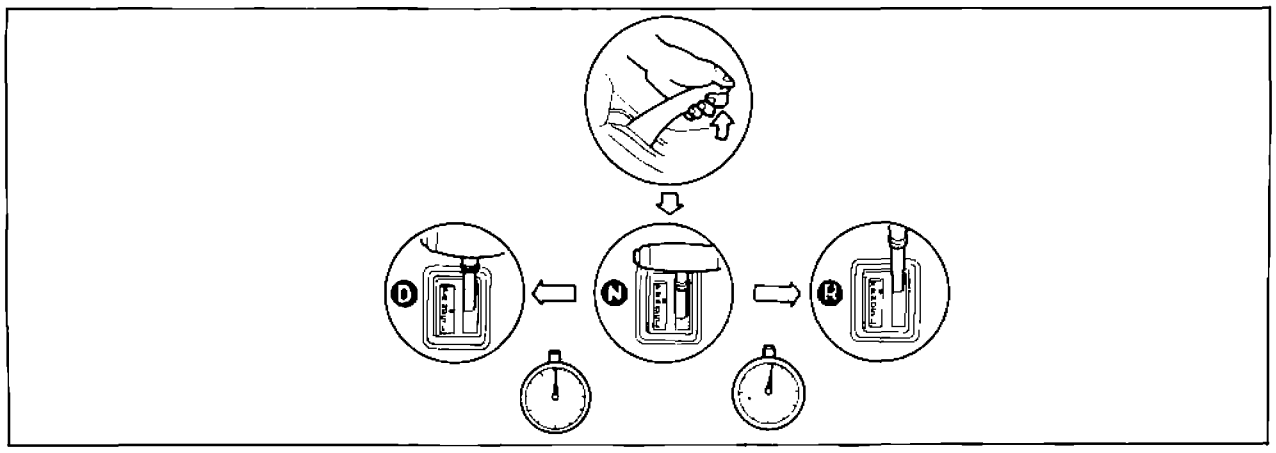
Evaluation

Condition		Possible cause	
Above specification	In all ranges	Insufficient line pressure	Worn oil pump
			Oil leakage from oil pump, control valve, and/or transmission case
			Stuck pressure regulator valve
	In forward ranges	Forward clutch slipping One-way clutch 1 slipping	
	In D range	One-way clutch 2 slipping	
	In S (Hold) and L (Hold) ranges	Coasting clutch slipping	
	In D (Hold) and S (Hold) ranges	*2-4 brake band slipping*	
	In R, L and L (Hold) ranges	Low and reverse brake slipping	
	In R range	Low and reverse brake slipping Reverse cluch slipping Perform road test to determine whether problem is low and reverse brake or reverse clutch a) Engine brake applied in 1st ...Reverse clutch b) Engine brake not applied in 1st ...Low and reverse brake	
Within specification		All shift control elements within transmission are functioning normally.	
Below specification		Engine out of tune	
		One-way clutch slipping within torque converter	

86U07B-036

STEP 5 (TIME LAG TEST)
If the selector lever is shifted while the engine is idling, there will be a certain time lapse, or time lag, before shock is felt. This step checks this time lag for checking condition of the 1-2, N-R, and N-D accumulators, forward, and one-way clutches, 2-4 brake band, and low and reverse brake.

Preparation
Perform the preparation procedure shown in the STEP 4 (STALL TEST).



76G07B-030

Procedure
1. Start the engine and check the idle speed in P range.

   Idle speed: 900 $\pm^{50}_{0}$ rpm

2. Shift from N range to D range
3. Measure the time it takes from shifting until shock is felt, with a stop watch.
4. Shift the selector to N range and run the engine at idle speed for at least one minute.
5. Perform the test for the following shifts in the same manner.
   (1) N → D range (Hold mode)
   (2) N → R range

   Note
   Make three measurements for each test and take the average value.

   Specified time lag: N → D range ..... 0.5—1.0 second
   N → R range ..... 0.5—1.0 second

Evaluation

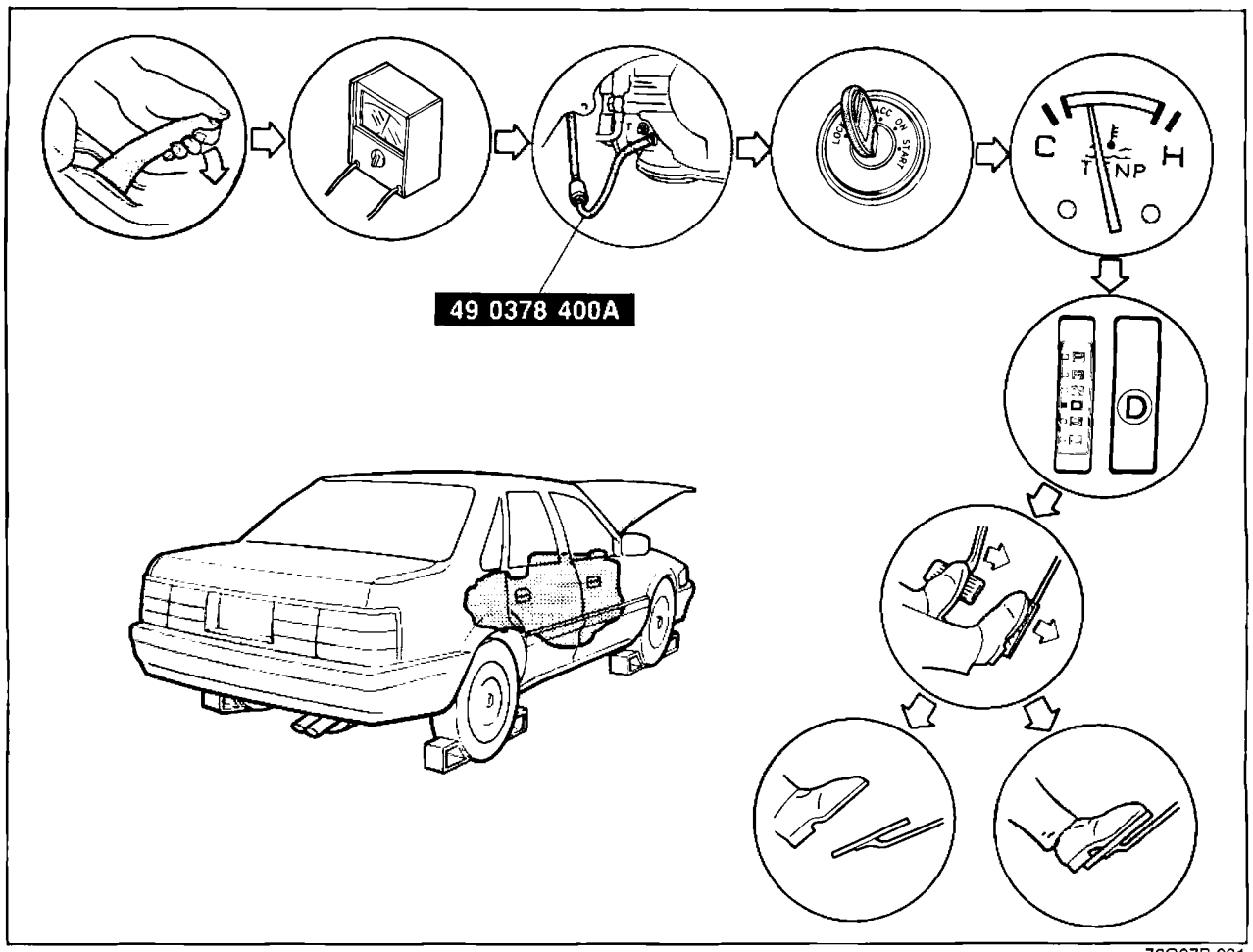
Condition		Possible Cause
N → D (Economy) shifting	More than specification	Insufficient line pressure Forward clutch slipping One-way clutch 1 slipping One-way clutch 2 slipping
	Less than specification	N-D accumulator not operating properly Excessive line pressure
N → D (Hold) shifting	More than specification	Insufficient line pressure Forward clutch slipping 2-4 brake band slipping One-way clutch 1 slipping
	Less than specification	1-2 accumulator not operating properly Excessive line pressure
N → R shifting	More than specification	Insufficient line pressure Low and reverse brake slipping Revese clutch slipping
	Less than specification	N-R accumulator not operating properly Excessive line pressure

86U07B-038

STEP 6 (OIL PRESSURE TEST)
This step checks line pressures for checking the hydraulic components and for oil leakage.

Line Pressure Test
Preparation
1. Perform the preparation procedure shown in STEP 4 (STALL TEST).
2. Connect a tachometer to the engine.
3. Connect the **SST** to the line pressure inspection hole (square head plug L)

Procedure



76G07B-031

1. Start the engine and check the idle speed in P range

   Idle speed: 900 $\pm^{50}_{0}$ rpm

2. Shift the selector lever to D range and read the line pressure at idle.
3. Depress the brake pedal firmly with the left foot and gradually depress the accelerator pedal with the right foot.
4. Read the line pressure as soon as the engine speed becomes constant, then release the accelerator pedal.

   Caution
   Steps 3 to 4 must be performed within 5 seconds.

5. Shift the selector lever to N range and run the engine at idle for at least one minute.
6. Read the line pressure at idle and engine stall speeds for each range in the same manner.

Specified line pressure:

	Line pressure kPa, (kg/cm^2, psi)	
Range	D S L	R
When idling	353—432 (3.6—4.4, 51—63)	598—942 (6.1—9.6, 87—137)
At stall speed	873—1040 (8.9—10.6, 127—151)	1668—2011 (17.0—20.5, 242—292)

76G07B-032

Evaluation

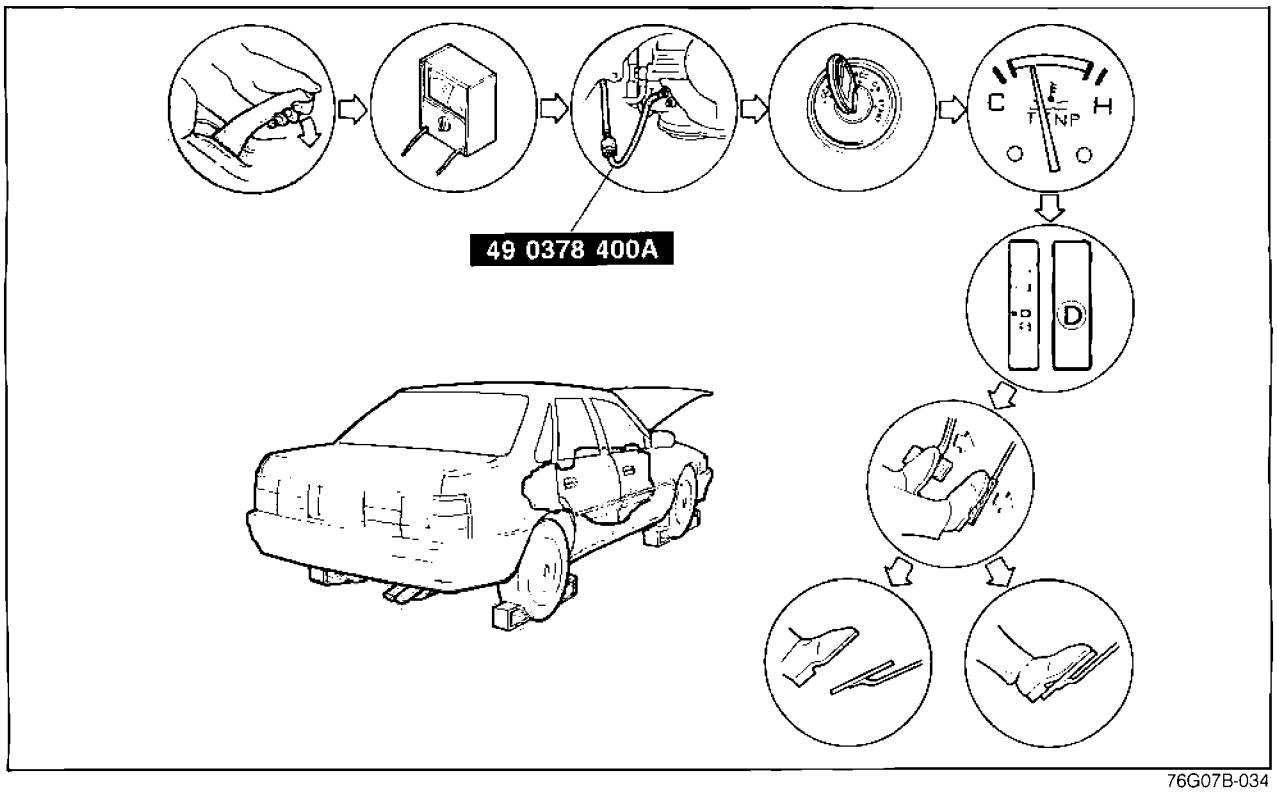
Line pressure	Possible location of problem
Low pressure in every position	Worn oil pump Fluid leaking from oil pump, control valve body, or transaxle case Pressure regulator valve sticking
Low pressure in D and S only	Fluid leaking from hydraulic circuit of forward clutch
Low pressure in R only	Fluid leaking from hydraulic circuit of low and reverse brake
Higher than specification	Throttle valve sticking Throttle modulator valve sticking Pressure regulator valve sticking

76G07B-033

Throttle Pressure Test
This step checks line pressure for checking the hydraulic components and for improper adjustment of throttle cable.

Preparation
1. Perform the preparation procedure shown in STEP 4 (STALL TEST).
2. Connect a tachometer to the engine.
3. Connect the **SST** to the throttle pressure inspection hole (square head plug T).

Procedure



76G07B-034

1. Start the engine and check the idle speed in P range.

   Idle speed: 900 $^{+50}_{-0}$ rpm

2. Shift the selector lever to D range and read the throttle pressure at idle.
3. Depress the brake pedal firmly with the left foot and gradually depress the accelerator pedal with the right foot.
4. Read the throttle pressure as soon as the engine speed becomes constant, then release the accelerator pedal.

   Caution

   Steps 3 to 4 must be performed within 5 seconds.

Specified throttle pressure:

	Throttle pressure kPa (kg/cm^2, psi)
When idling	39—88 (0.4—0.9, 6—13)
At stall speed	471—589 (4.8—6.0, 68—85)

Evaluation

Throttle pressure	Possible location of problem
Not within specification	Throttle valve sticking Pressure regulator valve sticking Improper adjustment of throttle cable

STEP 7 (ROAD TEST)
This step is performed to inspect for problems at the various ranges. If these tests show any problems, adjust or replace by referring to the electronic system component or mechanical sections.

Caution
Perform the test at normal ATF operating temperature (50—80°C, 122—176°F).

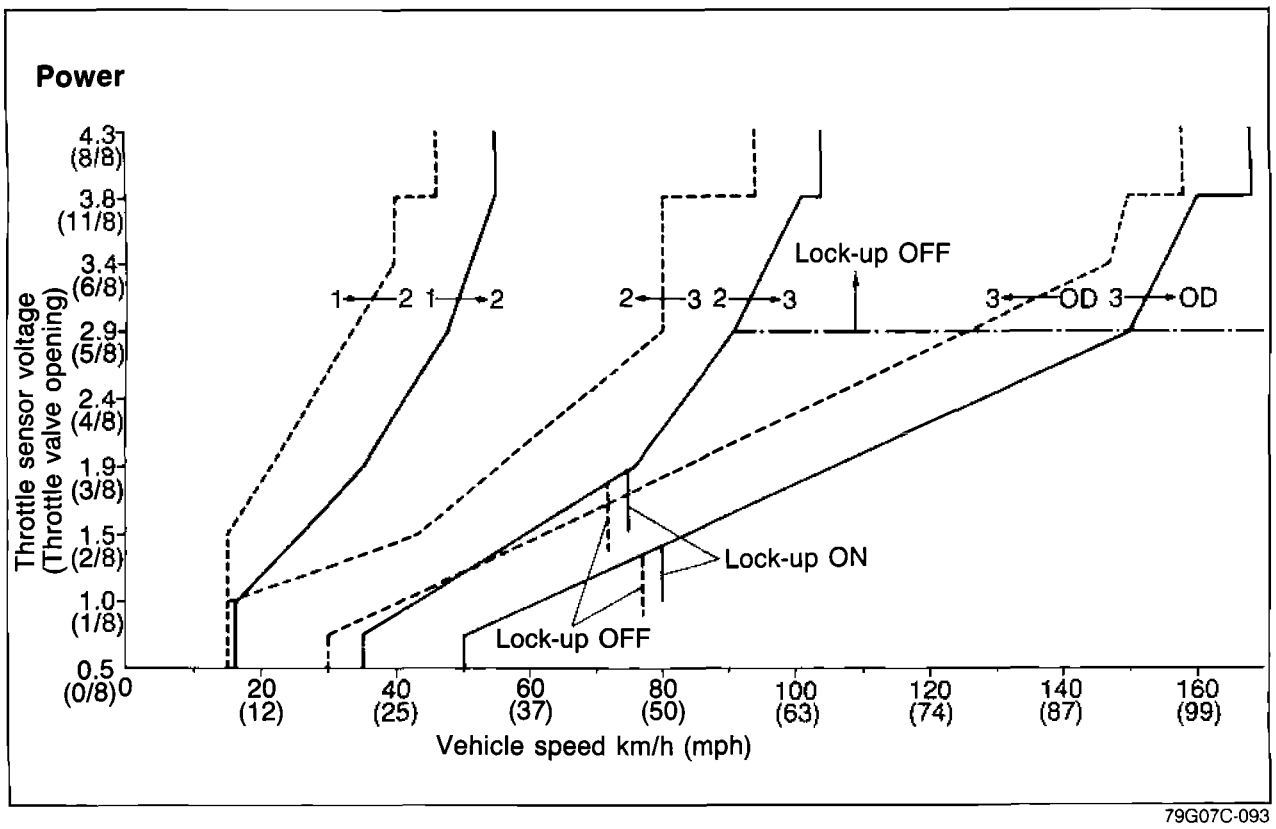
D Range Test
Shift point, shift pattern, and shift shock
1. Shift the selector lever to D range and select the Power mode.
2. Accelerate the vehicle with half and full throttle valve opening.

Note
Throttle sensor voltage of the EC-AT Tester represents the throttle valve opening.

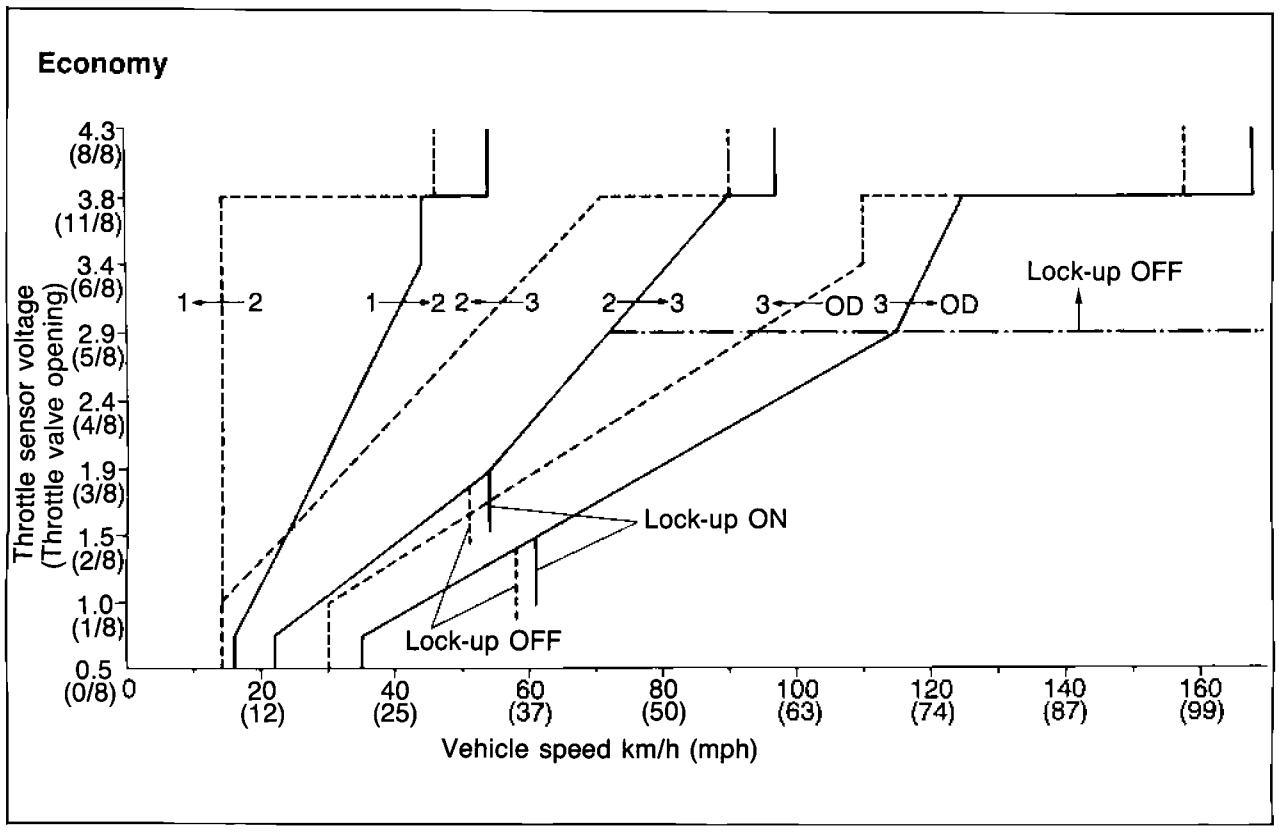
3. Check that 1-2, 2-3 and 3-OD up-shifts and downshifts and lock-up are obtained. The shift points must be as shown in the D range (Power) shift diagram.

Note
a) Drum speed (rpm) of the EC-AT Tester represents the shift point.
b) Vehicle speed of the EC-AT Tester and speedometer and vehicle speed on a chassis roller may not meet the specified shift pattern because of tire size. Therefore, check the shift points with the Drum speed.
c) There is no lock-up when the coolant temperature is below 72°C (162°F).
d) There is no overdrive when the cruise control is operating and there is a 3 km/h (1.9 mph) difference between the pre-set cruise speed and vehicle speed, or set or resume switch is ON.
e) There is no lock-up when the brake pedal is depressed.

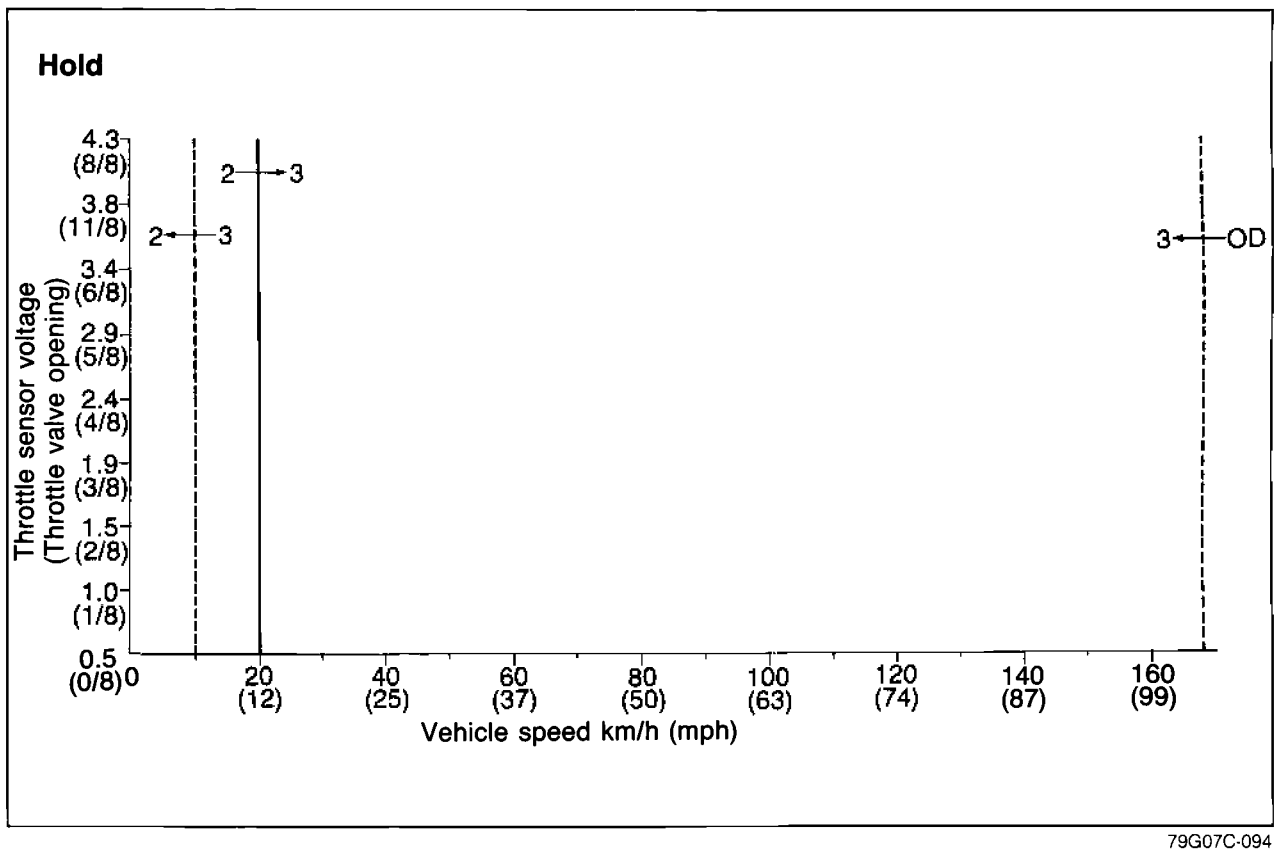
4. Check the up-shifts for shift shock or slippage in the same manner.
5. While driving in OD, shift the selector lever to S range and check that 4-3 downshift immediately occurs, then decelerate and check that engine braking effect is felt in only 3rd gear.



79G07C-093



6. Select D range (Hold mode).
7. Accelerate the vehicle and check 2-3 up- and down-shifts, no 1st, and no OD is obtained and that the 2-3 shift points are as shown in the D range (Hold) shift diagram.



79G07C-094

Evaluation

Condition	Possible Cause
No 1-2 up- or down-shift	Stuck 1-2 shift solenoid valve Stuck 1-2 shift valve
No 2-3 up- or down-shift	Stuck 2-3 shift solenoid valve Stuck 2-3 shift valve
No 3-OD up- or down-shift	Stuck 3-4 shift solenoid valve Stuck 3-4 shift valve
No lock-up shift	Stuck lock-up control solenoid valve Stuck lock-up control valve
Incorrect shift point	Mis-adjusted throttle sensor Sticking shift valves
Excessive shift shock or slippage	Excessive shift shock Stuck accumulators Stuck or no one-way check orifice Worn clutches, brakes, or one-way clutch
No engine braking effect	Worn clutches or brakes

76G07B-035

Noise and vibration
Drive the vehicle in OD (lock-up), OD (no lock-up), 3rd (Hold) and check for abnormal noise or vibration.

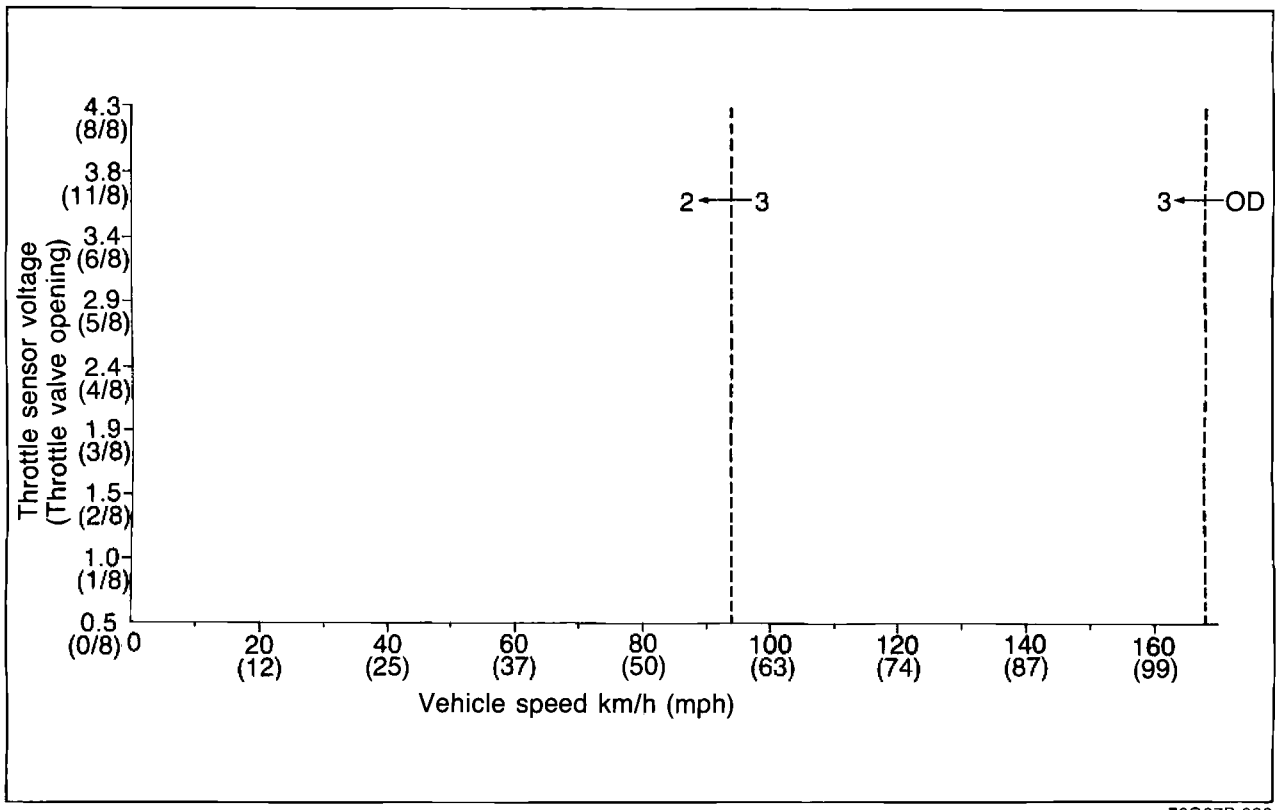
Note
Abnormal noise and vibration can also be caused by the torque converter, drive shaft, or differential. Therefore, checking of cause must be made with extreme care.

Kick-down
Drive the vehicle in OD, 3rd and 2nd gears and check that kick-down occurs for OD→3, OD→2, OD→1, 3→2, 3→1, 2→ 1, and the shift points are as shown in the shift diagram.

S Range Test
Shift pattern
1. Shift the selector lever to S range and select the Economy mode.
2. Accelerate the vehicle and check that 1-2 and 2-3 up-shifts and down-shifts are obtained, and that no overdrive and no lock-up are obtained.

Note
a) Inspections of shift shock and shift point are not necessary because these are the same as those of the D Range Test.
b) In S range, the shift patterns for Economy and Power modes are the same.
c) Shift points are the same as those of the D range (Power) shift diagram.

3. While driving in S range (Economy mode) and 3rd gear, select the Hold mode and check that 3rd gear is held until the 3-2 down-shift point as shown in the S range (Hold) shift diagram is achieved.
4. Accelerate the vehicle with S range (Hold mode) and check that 2nd gear is held.



76G07B-036

Noise and vibration

Drive the vehicle in 2nd gear (Hold mode) and check for abnormal noise or vibration.

Note
Abnormal noise and vibration can also be caused by the torque converter, drive shaft or differential. Therefore, checking of cause must be made with extreme care.

L Range Test

Shift pattern

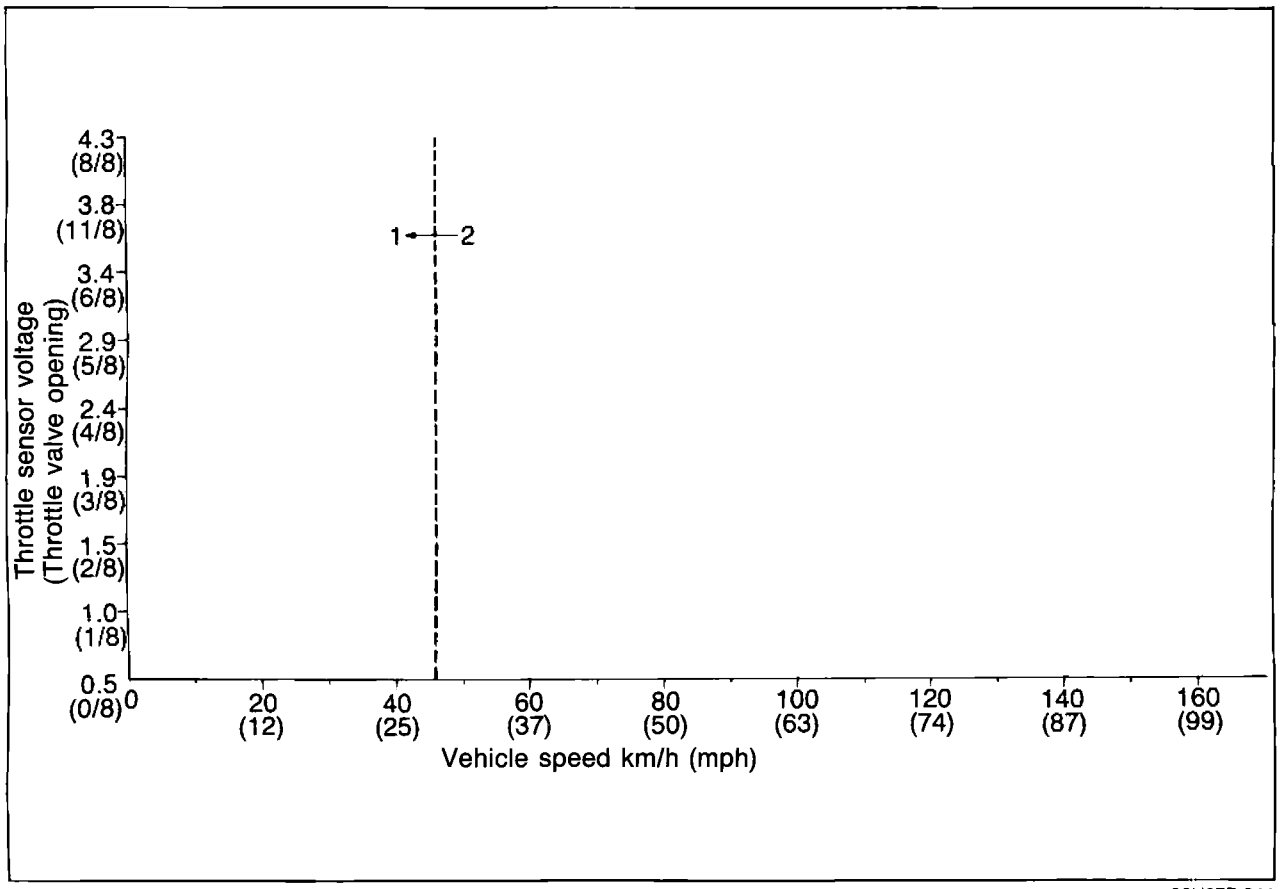
1. Shift the selector lever to L range and select the mode.
2. Accelerate the vehicle and check that the 1-2 up- and down-shiftings are obtained and that no 3rd gear, no OD, and no lock-up are obtained.

Note
Inspection of shift shock and shift point are not necessary because these are the same as those of the D Range Test.

3. Drive in 1st gear then decelerate and check that engine braking effect is felt.

Note
a) In L range, the shift patterns for Economy and Power modes are the same.
b) Shift points are the same as those of the D range (Power) shift diagram.

4. While driving in S range (Hold mode) and 2nd gear, shift the selector lever to L range and check that 2nd gear is held until the 2-1 down-shift point as shown in the L range (Hold) shift diagram is achieved.
5. Accelerate the vehicle in L range (Hold mode) and check that 1st gear is held.



86U07B-044

Noise and vibration

Drive the vehicle in 1st gear (Hold mode) and check for abnormal noise or vibration.

Note

Abnormal noise and vibration can also be caused by the torque converter, drive shaft or differential. Therefore, checking of cause must be made with extreme care.

P Range Test

1. Shift into P range on a gentle slope, release the brake and check that the vehicle does not roll.
2. Shift into P range while driving the vehicle at maximum of 4 km/h (2.5 mph) on a level surface, and check that the vehicle stops.

Vehicle Speed at Gearshift Table

Mode	Range	Throttle condition (Throttle sensor voltage)	Shifting	Drum speed rpm	Vehicle speed km/h (mph)
Power	D	Fully opened (4.3 volt)	D1 → D2	4930—5480	54—60 (33—37)
			D2 → D3	5120—5520	102—110 (63—68)
			D3 → OD	5380—5710	165—175 (102—109)
		Half throttle (1.6—2.2 volt)	D1 → D2	3470—4180	38—45 (24—28)
			D2 → D3	4020—4420	80—88 (50—55)
			D3 → OD	3820—4530	117—139 (73—86)
			Lock-up ON (OD)	2670—3170	117—139 (73—86)
			Lock-up OFF (OD)	2510—2970	110—130 (68—81)
			OD → D3	2150—2630	94—115 (58—71)
			D3 → D2	2020—2410	62—74 (38—46)
		Kick-down	OD → D3	3490—3720	153—163 (95—101)
			OD → D2	2050—2240	90—98 (56—61)
			OD → D1	980—1120	43—49 (27—30)
			D3 → D2	2940—3200	90—98 (56—61)
			D3 → D1	1400—1500	43—46 (27—29)
			D2 → D1	2160—2300	43—46 (27—29)
Economy		Fully opened (4.3 volt)	D1 → D2	4470—5020	49—55 (30—34)
			D2 → D3	4770—5170	95—103 (59—64)
			D3 → OD	5380—5710	165—175 (102—109)
		Half throttle (1.6—2.2 volt)	D1 → D2	2830—3380	31—37 (19—23)
			D2 → D3	2960—3120	59—68 (37—42)
			D3 → OD	2870—3460	88—106 (55—66)
			Lock-up ON (OD)	2010—2420	88—106 (55—66)
			Lock-up OFF (OD)	1940—2310	85—101 (53—63)
			OD → D3	1600—1960	70—86 (43—53)
			D3 → D2	1240—1570	38—48 (24—30)
		Kick-down	OD → D3	3490—3720	153—163 (95—101)
			OD → D2	1960—2150	86—94 (53—58)
			OD → D1	980—1120	43—49 (27—30)
			D3 → D2	2800—3070	86—94 (53—58)
			D3 → D1	1400—1600	43—49 (27—30)
			D2 → D1	2160—2460	43—46 (27—30)
S		Fully opened (4.3 volt)	S1 → S2	4930—5480	54—60 (33—37)
			S2 → S3	5120—5520	102—110 (63—68)
			S4 → S3	3720—3950	163—173 (101—107)
			S3 → S2	2940—3200	90—98 (56—61)
			S2 → S1	2160—2310	43—46 (27—29)
		Half throttle (1.6—2.2 volt)	S1 → S2	3470—4180	38—45 (24—28)
			S2 → S3	4020—4420	80—88 (50—55)
			S4 → S3	3720—3950	163—173 (101—107)
			S3 → S2	2020—2410	62—74 (38—46)
L		Fully opened (4.3 volt)	L1 → L2	4930—5480	54—60 (33—37)
			L2 → L1	2160—2310	43—46 (27—29)
		Half throttle (1.6—2.2 volt)	L1 → L2	3470—4180	38—45 (24—28)
HOLD	D	—	D2 → D3	850—1160	17—23 (11—14)
			D3 → D2	230—420	7—13 (4—8)
		Fully closed (0.5 volt)	OD → D3	3720—3950	163—173 (101—107)
	S		S3 → S2	2940—3200	90—98 (56—61)
	L		L2 → L1	2160—2310	43—49 (27—30)

76G07B-037

Slippage Test
This step is performed to inspect slippage of the friction elements.

Preparation
1. Perform the preparation procedure shown in STEP 4 (STALL TEST).
2. Connect a tachometer to the engine and set it in the cabin.
3. Connect the **EC-AT Tester** and the **adaptor harness** between the EC-AT control unit and wiring harness.

Procedure
Drive the vehicle in each of the gears indicated below and check whether the vehicle speed or engine speed is above or below specification excessively as shown by the drum speed.

Driving condition			Speed	Drum speed (rpm)			
No.	Gears	Other condition		1,000	2,000	3,000	4,000
1	1st	L range, Hold mode	Vehicle speed km/h (mph)	11 (7)	22 (14)	33 (20)	44 (27)
2	1st	D range, Economy mode		11 (7)	22 (14)	33 (20)	44 (27)
3	2nd	S range, Hold mode		20 (12)	40 (25)	60 (37)	80 (50)
4	3rd	D range, Hold mode		31 (19)	61 (38)	92 (57)	123 (76)
5	OD	D range, Economy mode		44 (27)	88 (55)	131 (81)	173 (107)
6	OD	D range, Economy mode, Lock-up	Engine speed (rpm)	1,000	2,000	3,000	4,000

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Evaluation
When there is no malfunction in the electrical system or hydraulic system, but vehicle speed or engine speed is below specification, the problem can be attributed to slippage of the friction elements.

Driving conditions below specification	Possible Cause
No.1 condition only	Low and reverse brake
No.2 condition only	One-way clutch
No.3 condition only	2-4 brake band
No.4 condition only	Coasting clutch
No.5 condition only	3-4 clutch
No.1-No.5 conditions	Forward clutch
No.6 condition only	Lock-up piston (in torque converter)

76G07B-039

TROUBLESHOOTING (G4A-HL)

GENERAL NOTE

In the event of a problem with the automatic transaxle, the cause may be in the engine, power train, hydraulic control system, or electrical control system.
When troubleshooting, therefore, it is recommended to begin from those points that can be judged quickly and easily. The recommended troubleshooting sequence is described below.

STEP 1: PRELIMINARY INSPECTION
Check preliminary check items
- ATF level and condition
- Oil leakage
- Selector lever position
- Idle speed and ignition timing
- Tire inflation pressure
- Inhibitor switch
- Throttle cable

..... This step checks conditions surrounding the automatic transaxle.

↓

STEP 2: ELECTRICAL SYSTEM INSPECTION
Check electrical control system

..... This step checks the electrical control system.
- Function of the electrical control system
- Components

↓

STEP 3: STALL TEST
Check engine stall speed

..... This step checks the power train.
- Friction element slipping
- Torque converter capacity

↓

STEP 4: TIME LAG TEST
Check time lag of oil pressure supply

..... This step checks operation of the hydraulic control system.
- Accumulators
- Friction elements slipping
- Regulating valves

↓

STEP 5: ROAD TEST
Check items on road test
- Shift point
- Shift schedule
- Kick-down
- Shift shock
- Lock-up and overdrive inhibition

..... This step checks functions of the electric control system and hydraulic control system.

↓

STEP 6: OIL PRESSURE TEST
Check line, throttle, and governor pressures

..... This step checks major points of the hydraulic control system.
- Oil pump
- Line pressure control
- Throttle pressure control
- Governer pressure control

↓

By following the above 6 steps, the cause of the problem should be located.
As another guide to faster location of the causes of problems, the Quick Diagnosis Chart is included at pages 7B—42, 43.
In this chart, a circle is used to indicate the components that might be the cause of trouble for 20 types of problems. It is only necessary to check those components indicated by circles, at each step of the troubleshooting process, in order to quickly locate the cause of the problem.

76G07B-040

Quick Diagnosis Chart

The Quick Diagnosis Chart shows various problems and the relationship of various components that might be the cause of the problem.

The following is an explanation of the symbols used in this chart.

1. Components indicated in the "Adjustment" column indicate that there is a possibility that the problem may be the result of an incorrect adjustment.
   Check the adjustment of each component, and readjust if necessary.
2. The components indicated in the "Electrical System Inspection" column can be checked for malfunction by the results of the checking procedure.
3. Components indicated in the "Stall Test" column can be checked for malfunction by the results of the stall test.
4. Components indicated in the "Time Lag Test" column can be checked for malfunction by the results of the time lag test.
5. Components indicated in the "Road Test" column can be checked for malfunction by the results of the road test.
6. Components indicated in the "Oil Pressure Test" column can be checked for malfunction by the results of the oil pressure test.
7. The checking, adjusting, repair or replacement procedures for each component is described in the page(s) noted in the "Reference Page" column.

76G07B-041

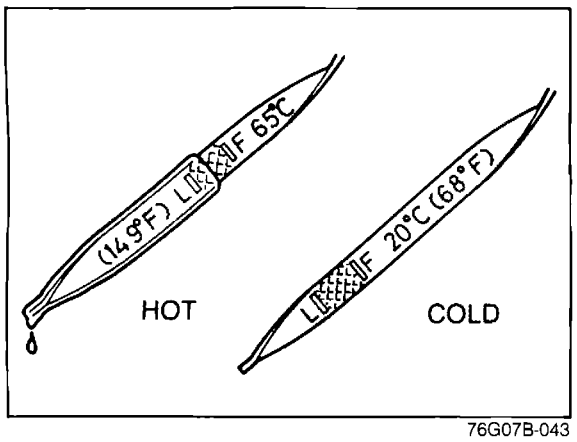
Item / Inspection point	Electrical control system					Preliminary				Hydraulic control system					Power train											
	Inhibitor switch	OD OFF switch	Water temperature switch	Kick-down switch	OD release solenoid valve	ATF level and condition	Selector lever	Throttle cable	Idle speed and ignition timing	Control valves	Accumulators	Oil pump	Governor valve	Hydraulic circuit	Torque converter	Forward clutch	Coasting clutch	Reverse clutch	3-4 clutch	2-4 brake and servo	Low and reverse brake	One-way clutch 1	One-way clutch 2	Parking gear	Planetary gear	Differential assembly
Adjustment	○					○	○	○	○																	
Electrical System Inspection		○		○	○																					
Stall Test										○		○		○	○	○		○		○	○	○	○			
Time Lag Test										○	○			○		○		○			○	○	○			
Oil Pressure Test								○		○	○	○	○	○		○	○	○		○	○					
Road Test					○					○			○	○												

Condition	Inspection point and reference page	Inhibitor switch (7B—65)	OD OFF switch (7B—64)	Water temperature switch (7B—66)	Kick-down switch (7B—67)	OD release solenoid valve (7B—68)	ATF level and condition (7B—71)	Selector lever (7B—72)	Throttle cable (7B—73)	Idle speed and ignition timing (SECTION 4A)	Control valves (7B—77, 155)	Accumulators (7B—132, 155)	Oil pump (7B—108)	Governor valve (7B—82, 133)	Hydraulic circuit (7B—249)	Torque converter (7B—107)	Forward clutch (7B—108)	Coasting clutch (7B—108)	Reverse clutch (7B—108)	3-4 clutch (7B—128)	2-4 brake and servo (7B—134)	Low and reverse brake (7B—134)	One-way clutch 1 (7B—122)	One-way clutch 2 (7B—126)	Parking gear (7B—135)	Planetary gear (7B—126)	Differential assembly (7B—177)
		ON VEHICLE											OFF VEHICLE														
		Electrical control system					Preliminary				Hydraulic control system					Power train											
Accelerating	Vehicle does not move in D, 2, 1, or R range						O	O			O		O		O	O	O		O			O	O	O	O		
Accelerating	Vehicle moves in N range							O			O				O												
Accelerating	Excessive creep								O	O	O					O											
Accelerating	No creep at all						O	O	O	O	O		O		O	O	O		O			O	O	O			
Shifting	No shift						O				O		O	O	O												
Shifting	Abnormal shift sequence		O	O		O	O	O	O		O			O	O		O	O		O	O		O	O			
Shifting	Frequent shifting		O	O	O	O					O			O													
Shifting	Excessive high or low shift point				O	O	O	O	O		O		O	O	O	O											
Shifting	No lock-up		O	O	O	O		O			O			O	O	O											
Shifting	No kick-down				O			O			O			O	O												
Slipping	Engine run away or slip when starting vehicle						O		O		O		O		O		O		O			O	O	O			
Slipping	Engine run away or slip when up- or down-shifting						O		O		O		O		O		O	O		O	O		O	O			
Shift shock	Excessive N to D or N to R shift shock						O			O	O	O															
Shift shock	Excessive shift shock when upshifting or downshifting						O		O		O	O					O	O		O	O		O				
Shift shock	Excessive shift shock when changing range						O	O	O		O	O					O	O		O	O	O	O				
Noise	Transaxle noisy in N or P range						O				O		O	O		O											
Noise	Transaxle noisy in D, 2, 1, or R range						O				O		O	O		O										O	O
Others	No engine braking						O			O	O				O	O		O			O	O					
Others	Transaxle overheats						O				O		O		O	O											
Others	Engine will not start	O						O																			

76G07B-042

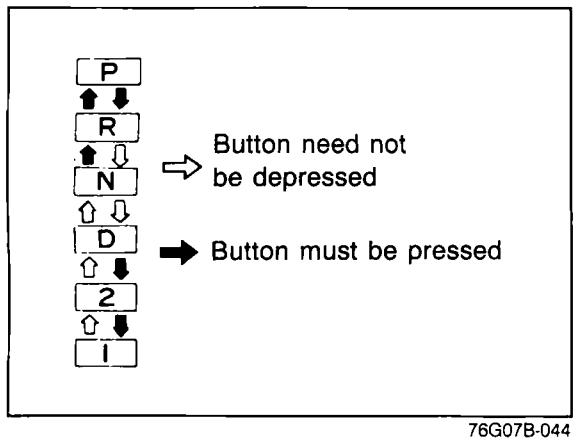
STEP 1 (PRELIMINARY INSPECTION)
In this step, the fundamental points related to the automatic transaxle are checked. These points must be kept in the correct condition at all times in order to assure proper operation of the automatic transaxle.

83U07B-025



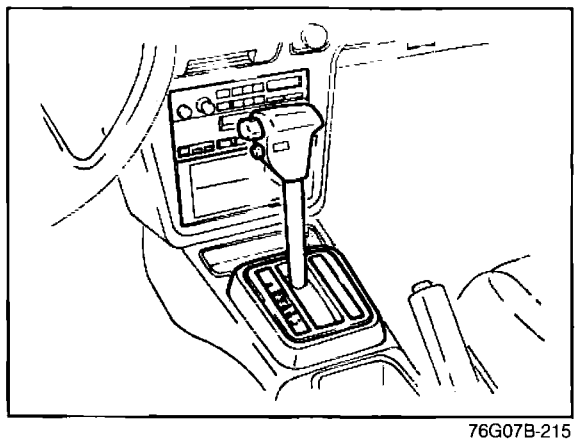
76G07B-043

1. Automatic Transaxle Fluid (ATF)
Check ATF level and condition. (Refer to page 7B—71)



76G07B-044

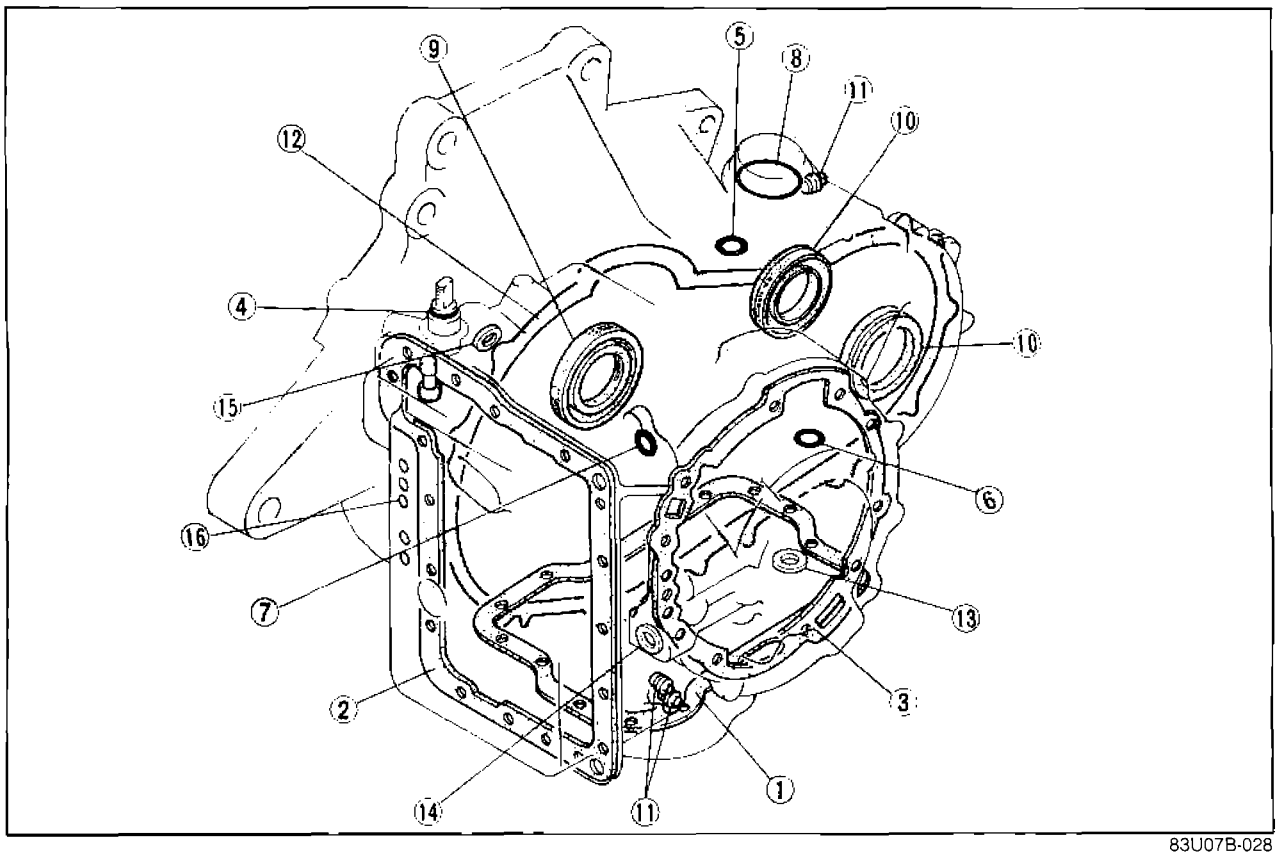
2. Selector Lever
Check selector lever position and adjust if necessary. (Refer to page 7B—72)



76G07B-215

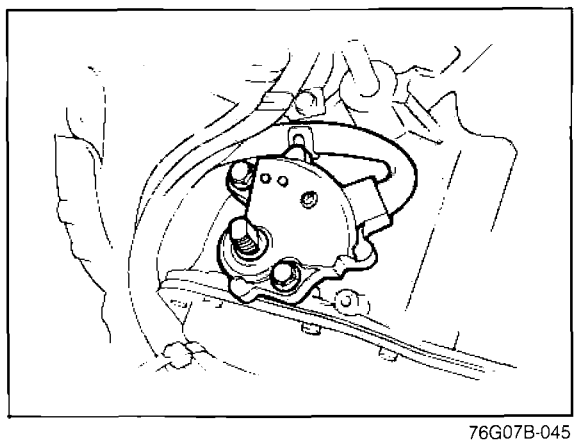
3. Oil Leakage
Check for oil leakage.
(1) Warm up the ATF.
(2) Apply the parking brake and block the wheels to prevent the vehicle from rolling.
(3) Shift the selector lever to R range.
(4) Check if oil leaks from the following oil seals or gaskets.
(5) If oil leaks, replace the oil seal or gasket.

The following figure shows the locations where fluid leakage may possibly occur.



83U07B-028

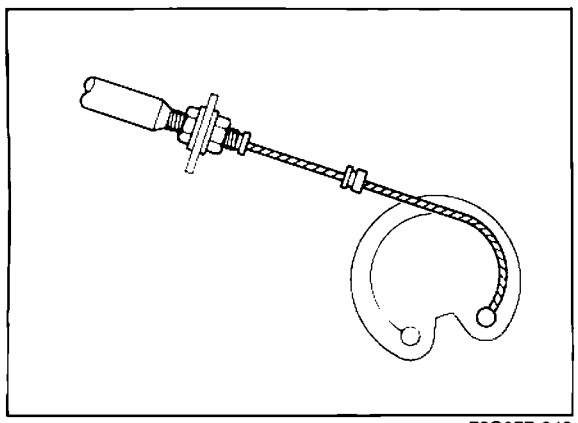
1. Oil pan
2. Control valve body cover
3. Oil pump
4. Inhibitor switch
5. Speedometer driven gear
6. Oil filler tube
7. Throttle cable
8. Governor cover
9. Bearing cover
10. Driveshaft
11. Square head plug
12. Transaxle case
13. Drain plug
14. Oil cooler return pipe
15. Oil cooler outlet pipe
16. Blind plugs



76G07B-045

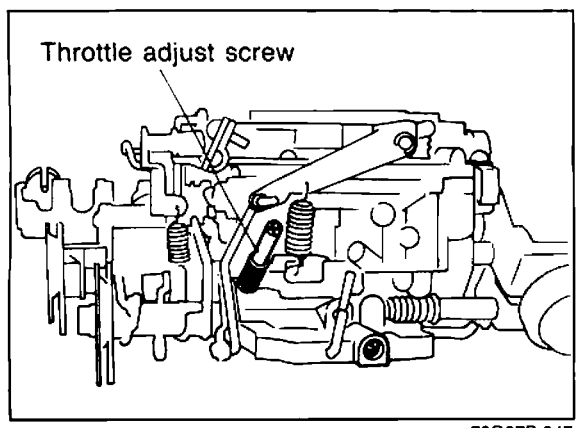
4. Inhibitor Switch

Check the inhibitor switch for operation. (Refer to page 7B—65)



76G07B-046

5. Throttle Cable
(1) Check the inner and outer cable for damage.
(2) Make sure that the accelerator operates smoothly.



76G07B-047

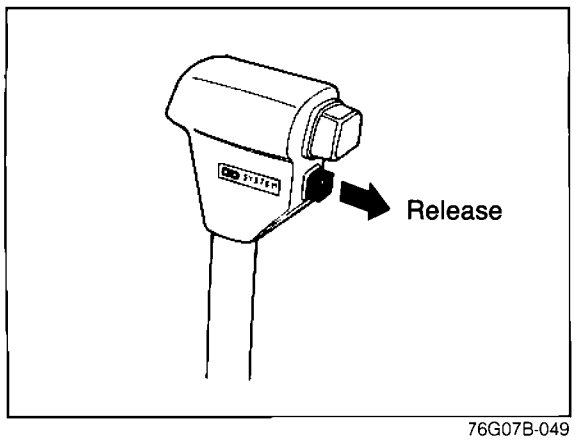
6. Idle Speed
Check idle speed. (Refer to Section 4A)

7. Tire Inflation Pressure
Check tire inflation pressure. (Refer to Section 12)

8. Ignition Timing
Check ignition timing. (Refer to Section 5)

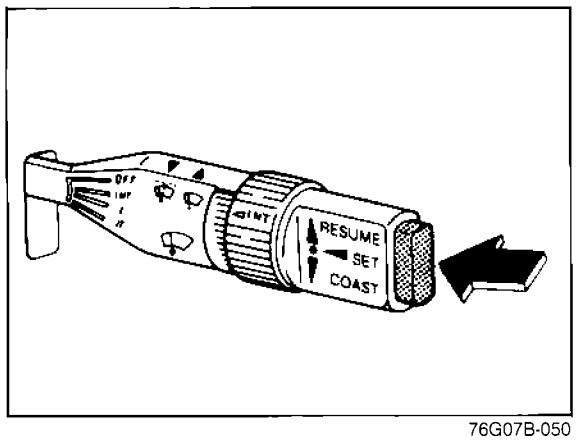
STEP 2 (ELECTRICAL SYSTEM INSPECTION)
In this step, the function of the electrical control system (Inhibition of OD and lock-up) is checked. The electrical control system components should be checked to determine if it functions correctly.

76G07B-048



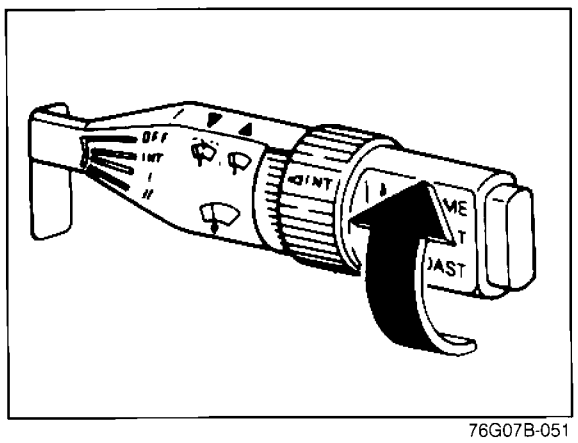
76G07B-049

O/D OFF Switch Inhibition Function
1. Warm up the engine and ATF.
2. Check that the D range, OD, and lock-up is provided.
3. When driving the vehicle with D range, OD, and lock-up selected, depress the O/D OFF switch and check that OD and lock-up is cancelled.
4. If not cancelled, check the O/D OFF switch.
5. Release the O/D OFF switch after completion.



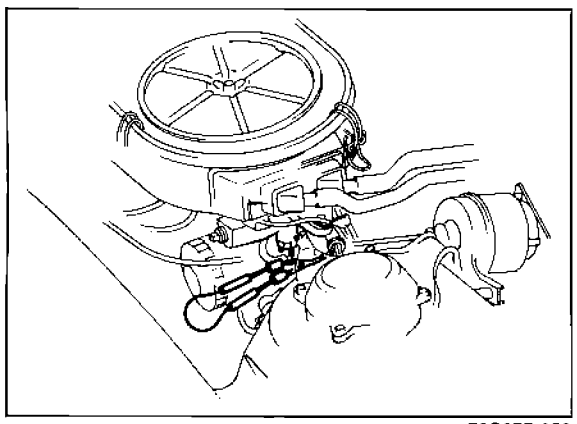
76G07B-050

Cruise Control Switch Inhibition Function
1. Drive the vehicle in D range, OD, and lock-up selected again.
2. Depress the Set switch of the cruise control and check that OD and lock-up is cancelled.
3. If not cancelled, check the cruise control system.



76G07B-051

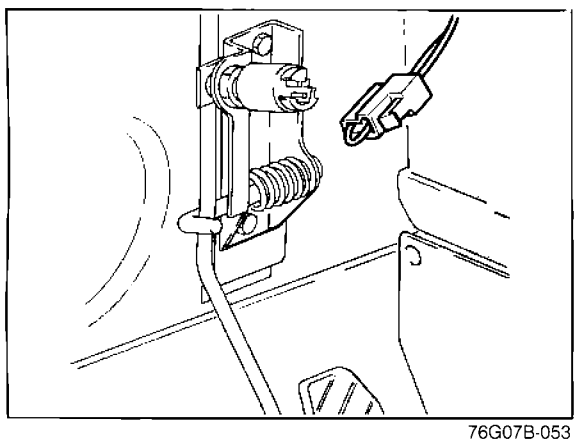
4. Again drive the vehicle in D range, OD, and lock-up.
5. Turn the Resume switch of the cruise control and check that OD and lock-up is cancelled.
6. If not cancelled, check the cruise control system.



76G07B-052

Water Temperature Switch Inhibition Function

1. Stop the vehicle.
2. Disconnect the water temperature switch connector.
3. Drive the vehicle in D range selected.
4. Check that OD and lock-up does not operate.
5. If not cancelled, check the wiring harness of the water temperature switch.
6. Stop the vehicle and reconnect the water temperature switch connector.



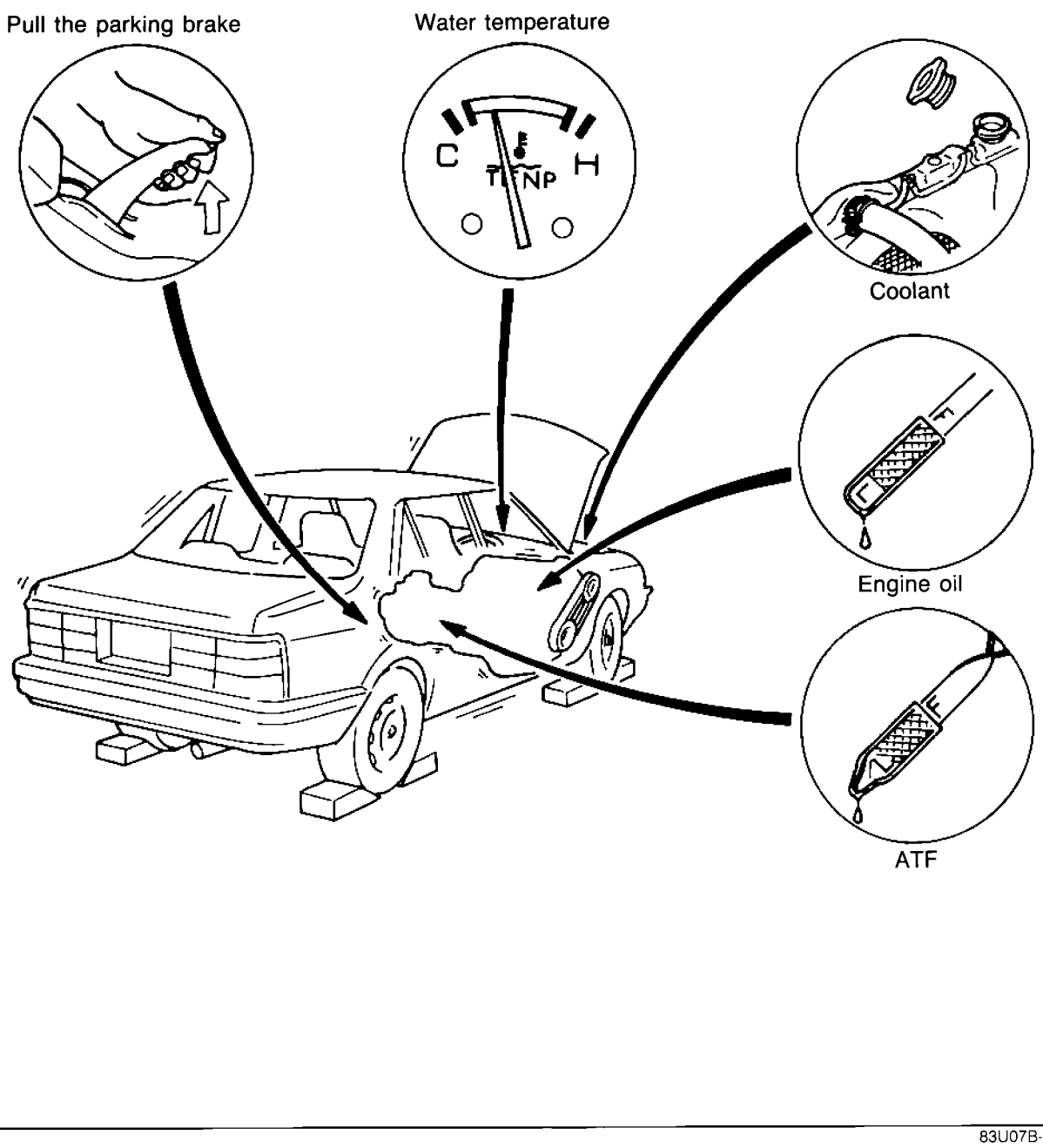
76G07B-053

Kick-down Switch Inhibition Function

1. Connect the terminals of the kick-down switch connector with a jumper wire.
2. Drive the vehicle in D range selected.
3. Check that the OD and lock-up do not achieve.
4. If not correct, check wiring harness of kick-down switch.
5. Stop the vehicle and reconnect the connector to the switch.

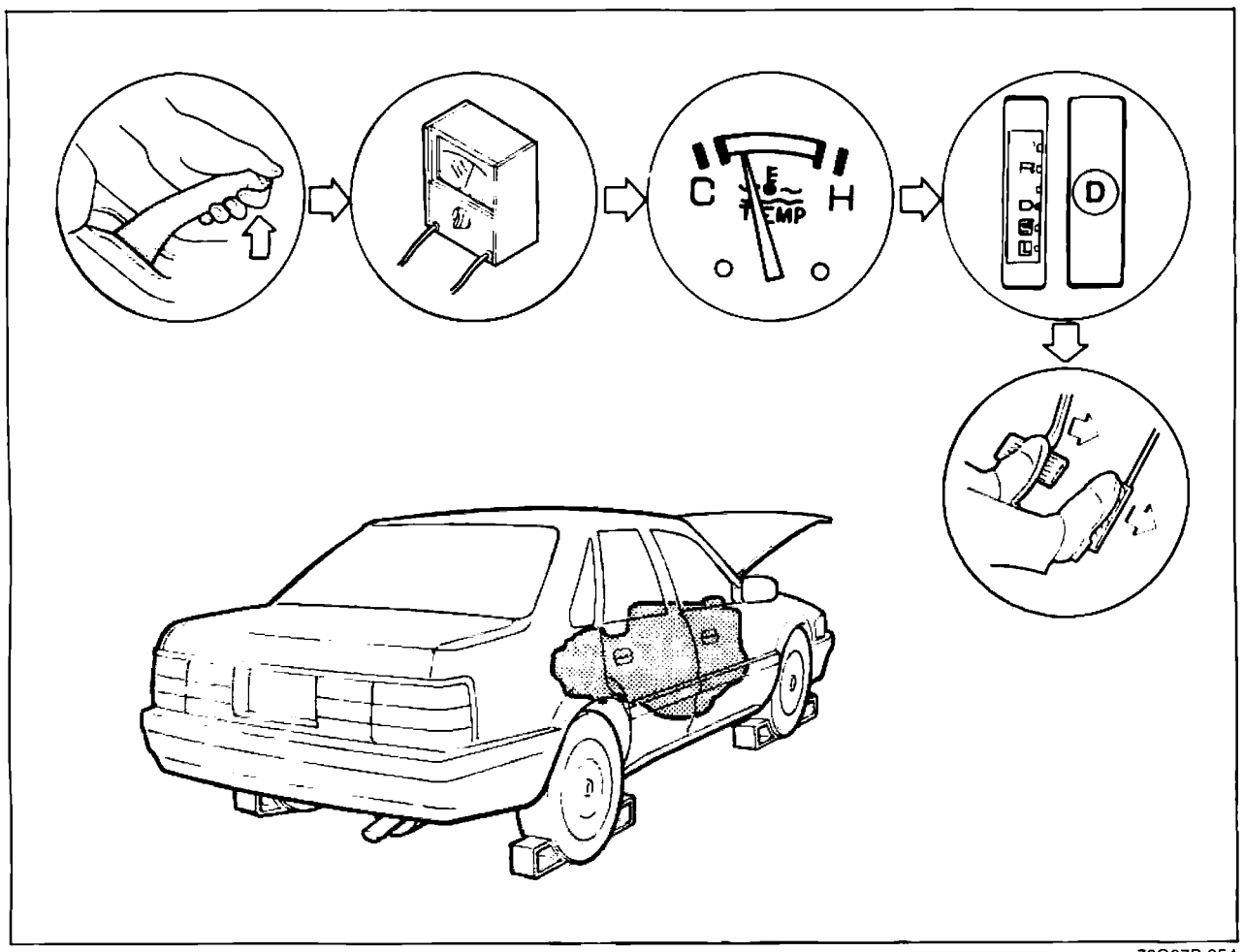
STEP 3 (STALL TEST)
This step is performed to determine if there is slippage of the friction elements or malfunction of the hydraulic components.

Preparation
Check the following items prior to testing:
1. Engine coolant, engine oil and ATF levels.
2. Warm the engine thoroughly to raise the ATF temperature to operating level (50—80°C, 122—176°F).
3. Engage the parking brake and use wheel chocks at the front and rear wheels.



83U07B-038

Procedure



76G07B-054

1. Connect a tachometer to the engine.
2. Shift the selector lever to D range.
3. Depress the brake pedal firmly with the left foot and gradually depress the accelerator pedal with the right foot.
4. Read and note the engine speed as soon as it becomes constant, then release the accelerator pedal.

   Caution
   Steps 3 to 4 must be performed within 5 seconds.

5. Shift the selector to N range and run the engine at idle speed for at least one minutes.

   Note
   This one minute idle period is performed to cool the ATF and prevent oil degradation.

6. Perform stall tests for the following ranges in the same manner.
   (1) 2 range
   (2) 1 range
   (3) R range

Standard stall speed:

FE engine	F8 engine
D.S.L range 2430—2530 rpm	D.S.L range 2180—2280 rpm
R range 2390—2490 rpm	R range 2140—2240 rpm

Caution
Always provide adequate cooling time between individual range stall tests.

Evaluation

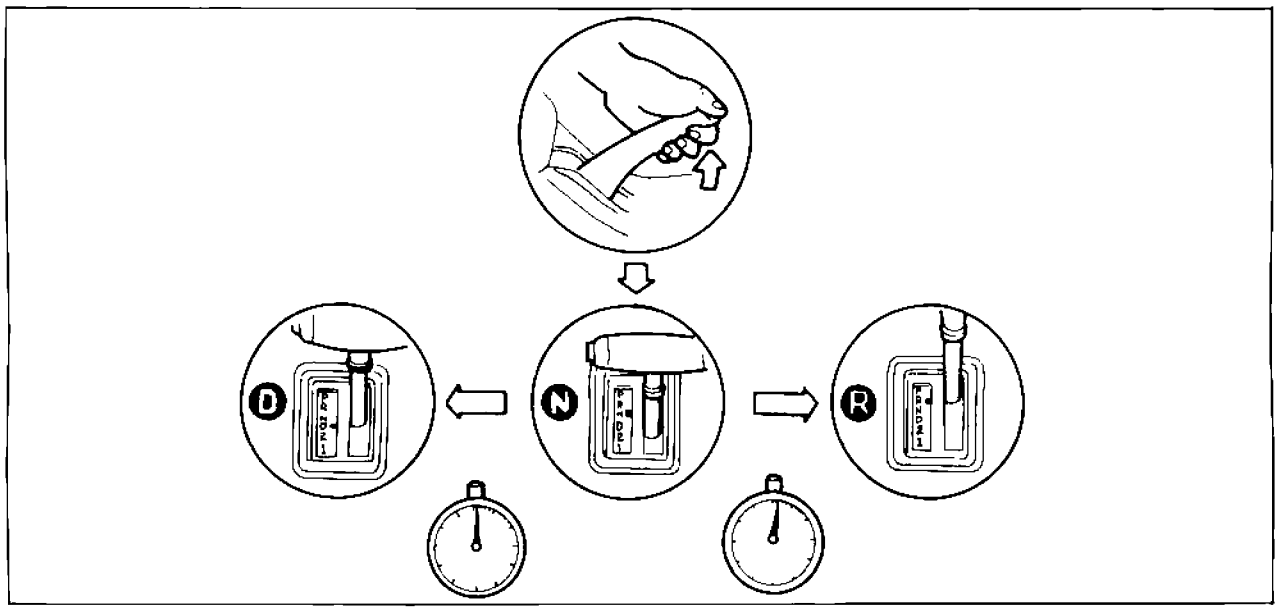
Condition		Possible cause	
Above specification	In all ranges	Insufficient line pressure	Worn oil pump
			Oil leakage from oil pump, control valve, and/or transaxle case
			Stuck pressure regulator valve
	In D 2, and 1	One-way clutch 1 slipping	
	In D range only	One-way clutch 2 slipping	
	In 2 range only	2-4 brake slipping	
	In R range only	Low and reverse brake slipping	
		Reverse clutch slipping	
		Perform a road test, to determine if this is caused by the low and reverse brake or the reverse clutch, as follows: a) Effective engine braking in 1 range.....Front clutch b) No engine braking in 1 range.....Low and reverse brake	
Within specification		All shift control elements within transaxle are functioning normally.	
Below specification		Engine out of tune	
		One-way clutch slipping within torque converter	

76G07B-055

STEP 4 (TIME LAG TEST)
If the selector lever is shifted while the engine is idling, there will be a certain time lapse, or time lag, before shock is felt. This step checks this time lag for checking the condition of the N-D and N-R accumulators, forward, reverse and one-way clutches, and low and reverse brake.

Preparation
Perform the preparation procedure shown in the STEP 3 (STALL TEST).

Procedure



1. Start the engine and check that the idle speed is **900** $^{+50}_{0}$ rpm.
2. Shift from N range to D range
3. Measure the time it takes from shifting until shock is felt using a stop watch.
4. Shift the selector to N range and run the engine at idle speed for at least one minute.
5. Perform the test for the shift from N range to R range in the same manner.

Note
Make three measurements for each test and take the average value.

Specified time lag: N → D range ..... 0.4—1.2 second
N → R range ..... 0.4—1.5 second

Evaluation

Condition		Possible Cause
N → D shift	More than specification	Insufficient line pressure
		Forward clutch slipping
		One-way clutch 1 slipping
		One-way clutch 2 slipping
	Less than specification	N-D accumulator not operating properly
		Excessive line pressure
N → R shift	More than specification	Insufficient line pressure
		Low & reverse brake slipping
		Reverse clutch slipping
	Less than specification	N-R accumulator not operating properly
		Excessive line pressure

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STEP 5 (ROAD TEST)
This step is performed to inspect for problems at the various ranges. If these tests show any problems, adjust or replace by referring to the mechanical sections.

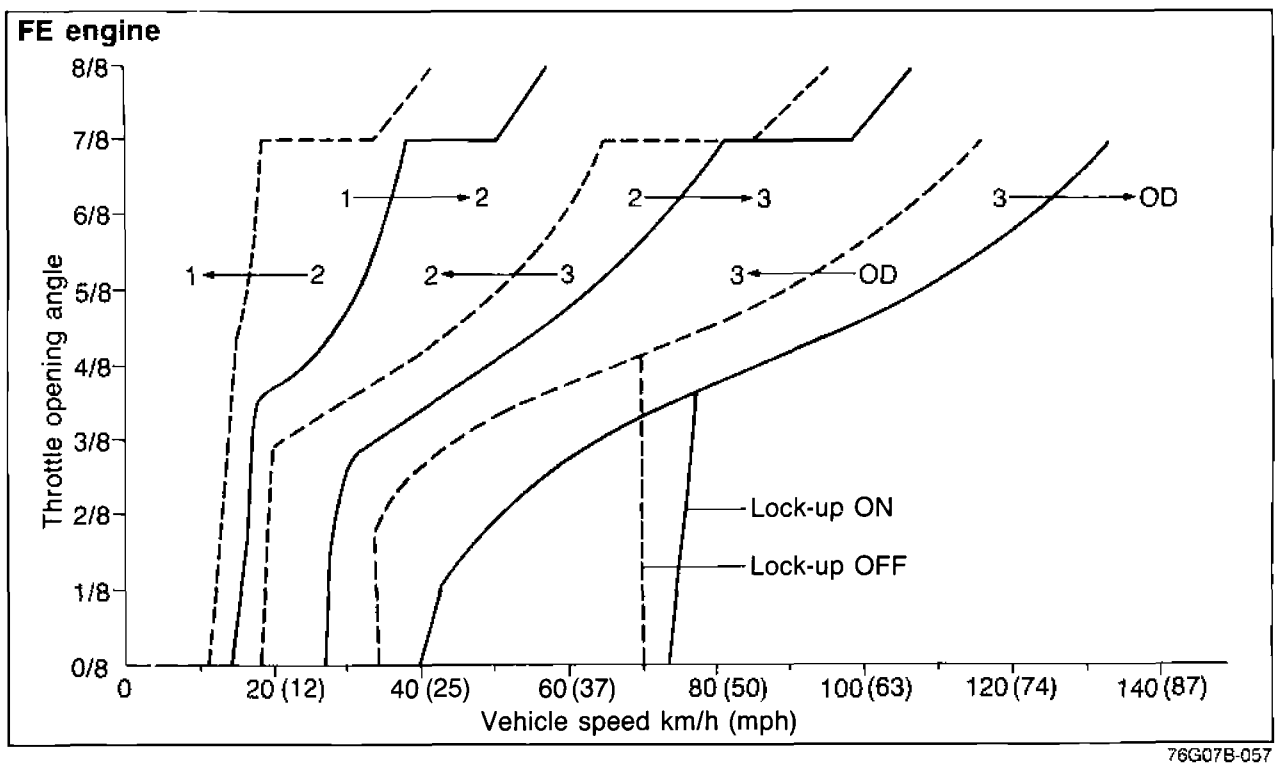
Caution
Perform the test at normal ATF operating temperature (50—80°C, 122—176°F).

D Range Test
Shift point, shift pattern, and shift shock
1. Shift the selector lever to D range and depress the OD OFF switch.
2. Accelerate the vehicle with half (4/8) and full (8/8) throttle valve opening.
3. Check that 1-2, 2-3 and 3-OD up-shifts and downshifts and lock-up are obtained. The shift points must be as shown in the D range shift diagram.

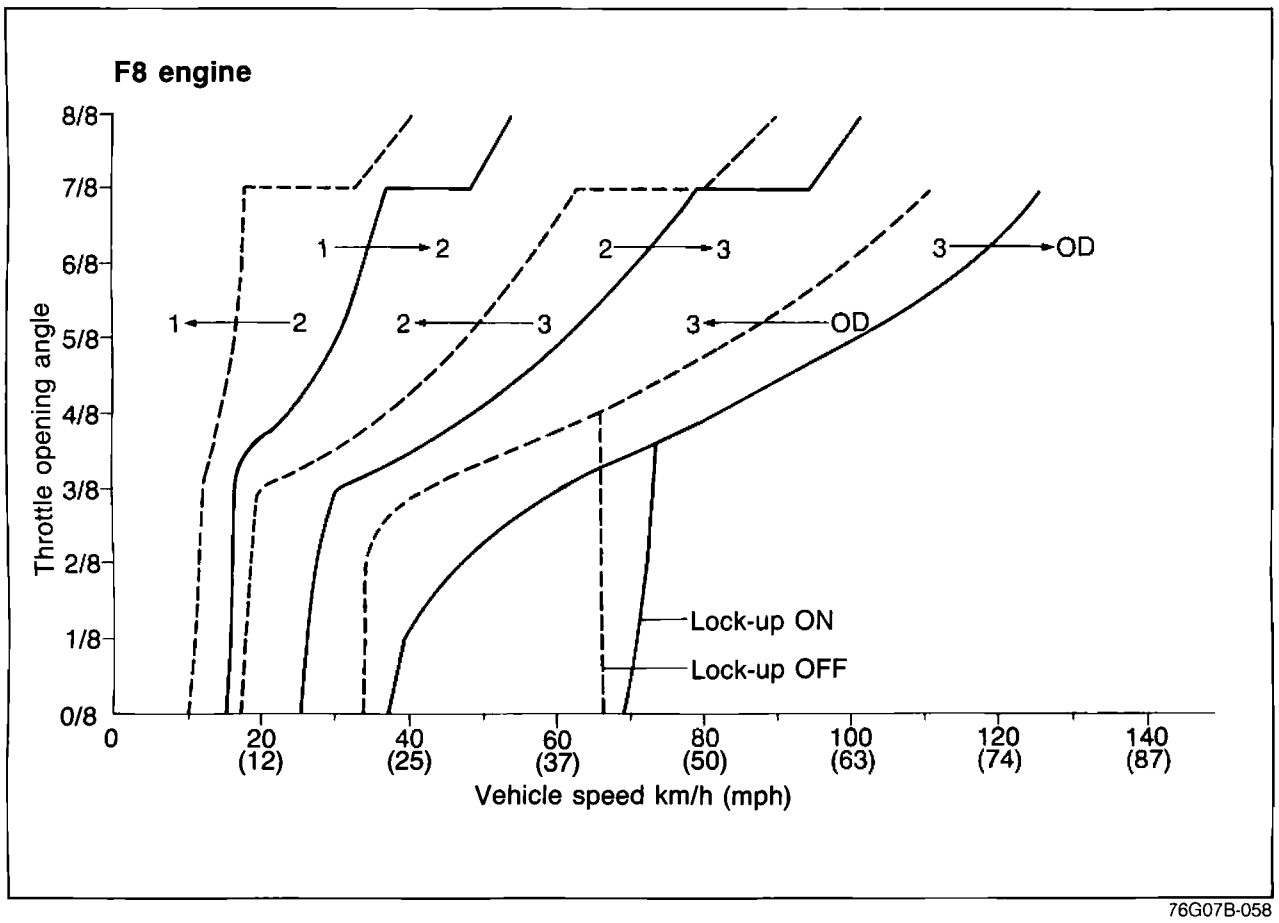
Note
a) Vehicle speed on a chassis roller may not meet the specified shift diagram because of tire size.
b) There is no lock-up or OD when the coolant temperature is below 72°C (162°F), and when the OD OFF switch is depressed.

4. Check the up and down shifts for shift shock or slippage.
5. While driving in 3rd **(50—60 km/h, 31—37 mph)** shift the selector lever to 2 range and check that 3-2 downshift immediately occurs, then decelerate and check that engine braking effect is felt in 2nd gear.

D range shift diagram



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Noise and vibration
Drive the vehicle in OD (lock-up), OD (no lock-up), 3rd and check for abnormal noise or vibration.

Note
Abnormal noise and vibration can also be caused by the torque converter, drive shaft, or differential. Therefore, checking of cause must be made with extreme care.

Kick-down
Drive the vehicle in OD, 3rd and 2nd gears and check that kick-down occurs for OD→3, OD→2, 3→2, 3→1, 2→ 1, and the shift points are as shown in the shift diagram.

2 Range Test
Shift pattern
1. Shift the selector lever to 2 range.
2. Accelerate the vehicle in 2 range and check that 2nd gear is held.

Noise and vibration
Drive the vehicle in 2nd gear and check for abnormal noise or vibration.

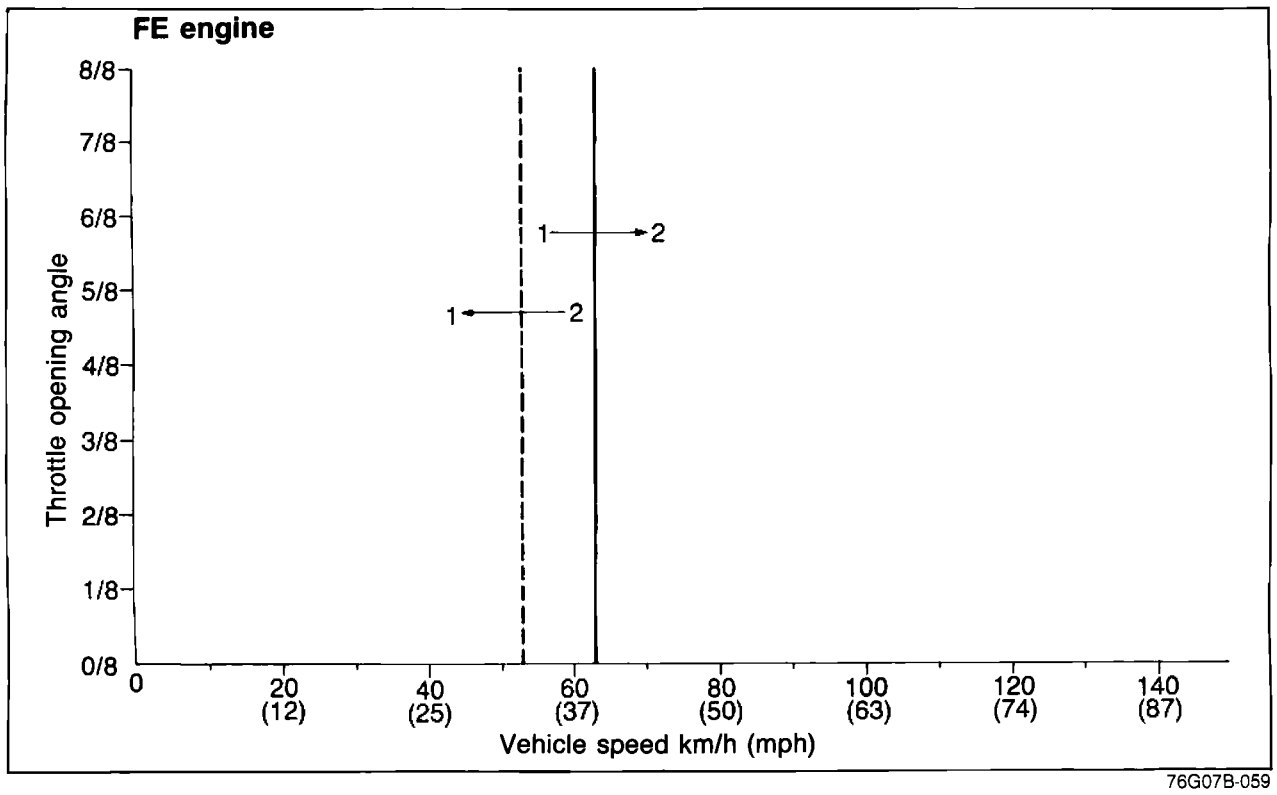
Note
Abnormal noise and vibration can also be caused by the torque converter, drive shaft or differential. Therefore, checking of cause must be made with extreme care.

1 Range Test
Shift pattern
1. Shift the selector lever to 1 range.
2. Accelerate the vehicle with half (4/8) and full (8/8) throttle valve opening.
3. Check that the 1-2 up- and down-shifts are obtained and that no 3rd gear, no OD, and no lock-up are obtained. The shift points must be as shown in the 1 range shift diagram.

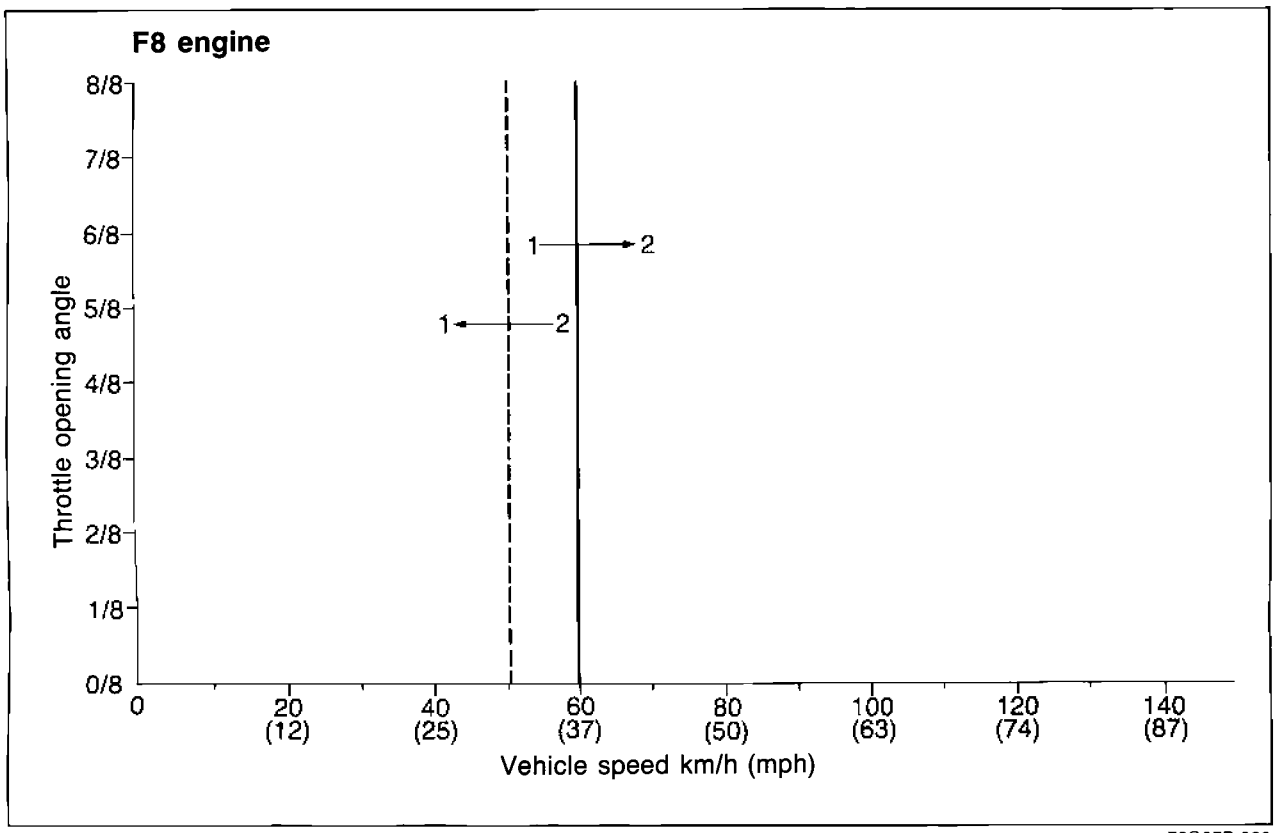
Note
Vehicle speed on a chassis roller may not meet the specified shift diagram because of tire size.

4. Check the up and down-shifts for shift shock or slippage.
5. Drive in 1st gear then decelerate and check that engine braking effect is felt.

1 range shift diagram



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76G07B-060

Noise and vibration

Drive the vehicle in 1st gear and check for abnormal noise or vibration.

Note

Abnormal noise and vibration can also be caused by the torque converter, drive shaft or differential. Therefore, checking of cause must be made with extreme care.

P Range Test

1. Shift into P range on a gentle slope, release the brake and check that the vehicle does not roll.
2. Shift into P range while driving the vehicle at maximum of **4 km/h (2.5 mph)** on a level surface, and check that the vehicle stops.

Vehicle Speed at Gearshift Table

Range	Throttle condition	Shifting	Vehicle speed km/h (mph)	
			FE engine	F8 engine
D	Fully opened	1st → 2nd	50—65 (31—40)	47—62 (29—38)
		2nd → 3rd	100—115 (62—71)	94—109 (58—68)
	Half throttle (1/2)	1st → 2nd	17—32 (11—20)	16—31 (10—19)
		2nd → 3rd	42—57 (26—35)	
		3rd → OD	79—94 (49—58)	74—89 (46—55)
		Lock-up	74—89 (46—55)	
	Kick-down	OD → 3rd	More than 88 (55)	More than 82 (51)
		OD → 2nd	34—103 (21—64)	33—97 (20—60)
		OD → 1st	27—49 (17—30)	26—48 (16—30)
		3rd → 2nd	34—103 (21—64)	33—97 (20—60)
		3rd → 1st	11—49 (7—30)	10—48 (6—30)
		2nd → 1st	4—49 (2—30)	3—48 (2—30)
1	Fully opened	1st → 2nd	56—71 (35—44)	52—67 (32—42)
	Half throttle (1/2)	1st → 2nd	56—71 (35—44)	52—67 (32—42)
	Kick-down	2nd → 1st	46—61 (29—38)	43—58 (27—36)
D	Fully opened	3rd lock-up	106—121 (66—75)	100—115 (62—71)

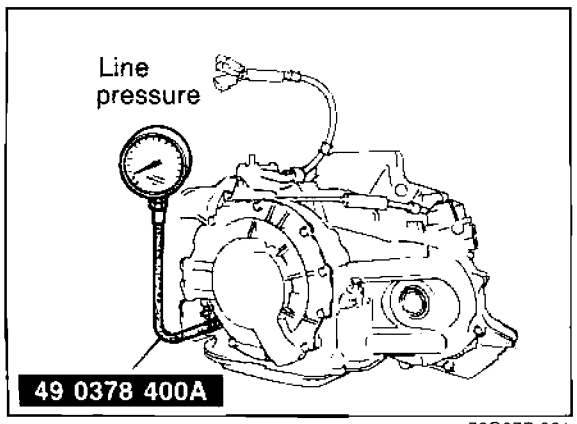
Evaluation

Condition		Possible Cause
No 1-2 shift		Insufficient governor pressure
		Stuck 1 range control valve
		Stuck 1-2 shift control valve
		Stuck 1-2 shift valve
		No check ball (rubber ball)
No 2-3 shift		Insufficient governor pressure
		Stuck 2 range control valve
		Stuck servo control valve
		Stuck 2-3 shift valve
		No check ball (rubber ball)
No 3-OD shift		Insufficient governor pressure
		Excessive throttle pressure
		Stuck OD release valve
		Stuck needle valve of the OD release solenoid valve
		Stuck 3-4 shift valve
		No check ball (rubber ball)
No. Lock-up (Electric circuit is OK)		Insufficient governor pressure
		Stuck OD release valve
		Stuck needle valve of the OD release solenoid valve
		Stuck OD lock-up valve
		Stuck lock-up control valve
Shift occurred in 2 range		Stuck 1-2 control valve
		Stuck 2 range control valve
No kick-down		Stuck throttle valve
		Stuck kick-down valve
Incorrect shift point	In D and 1 range	Excessive or insufficient governor pressure
		Excessive or insufficient throttle pressure
		Excessive or insufficient line pressure
	In 1 range	Stuck 1 range control valve
No engine braking effect		Stuck coasting bypass valve
		Fluid leakage from 2-3 accumulator seal rings
		No check ball (rubber ball)
Shift shock or slippage	In 1-2 and/or 3-OD shift	Fluid leakage from 1-2 accumulator seal rings
		No check ball (rubber ball) or leakage
		No one-way check orifice or leakage
	In 2-3 shift	Fluid leakage from 2-3 accumulator seal ring
		Stuck bypass valve
		Stuck 2-3 timing valve
		Stuck coast bypass valve
		Stuck servo control valve
		No one-way check orifice or leakage
		No check ball (rubber ball) or leakage
	In 3-2 shift	Fluid leakage from 1-2 accumulator seal ring
		No check ball (rubber ball) or leakage
		Stuck 3-2 timing valve
		Stuck 3-2 capacity valve

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STEP 6 (OIL PRESSURE TEST)
This step checks line, throttle, and governor pressures to check the operation of hydraulic components and for oil leakage.

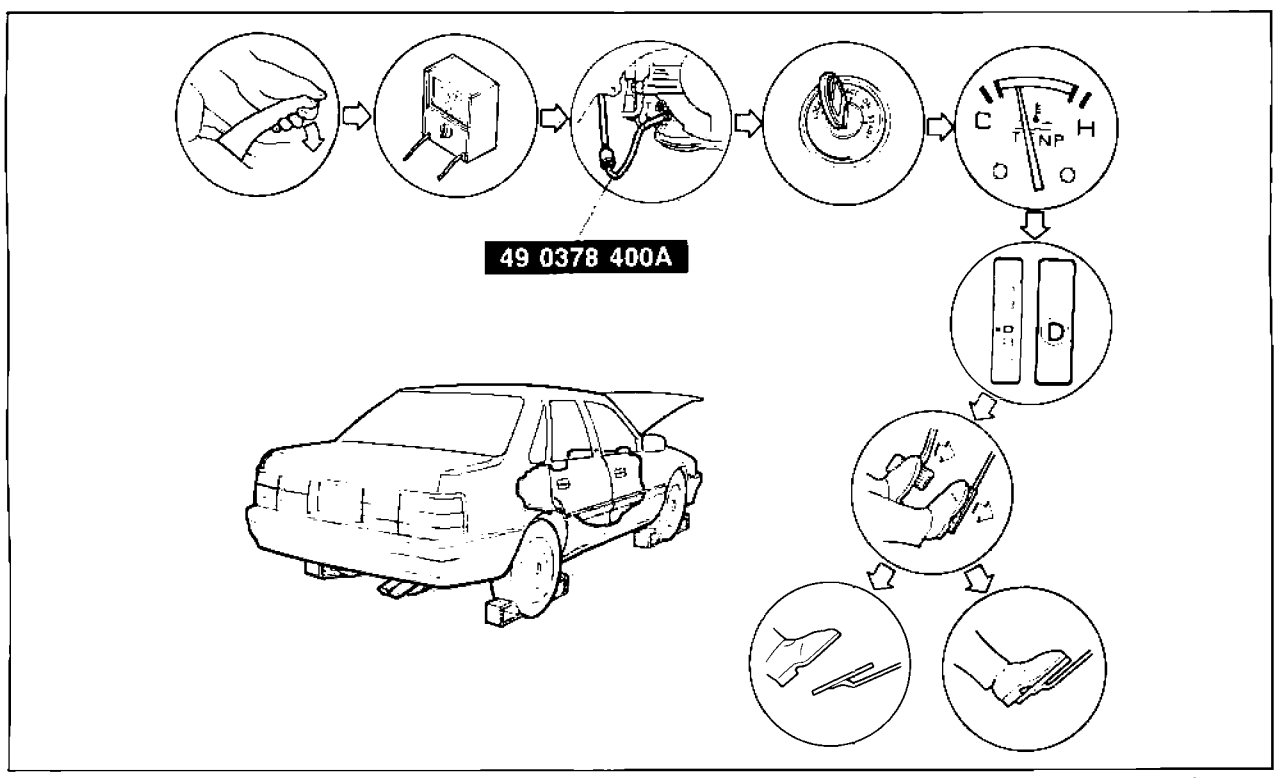
83U07B-047



76G07B-061

Line Pressure Test
Preparation
1. Connect the **SST** to the line pressure output point (square head plug L).
2. Connect a tachometer to the engine.
3. Perform the preparation procedure shown in STEP 3 (STALL TEST).

Procedure



76G07B-062

1. Start the engine and check that the idle speed is **900** $\pm^{50}_{0}$ rpm.
2. Shift the selector lever to D range.
3. Read the line pressure at idle.
4. Depress the brake pedal firmly with the left foot and gradually depress the accelerator pedal with the right foot.
5. Read the line pressure as soon as the engine speed becomes constant, then release the accelerator pedal.

Caution
Steps 4 to 5 must be performed within 5 seconds.

5. Shift the selector lever to N range and run the engine at idle for at least one minute.
6. Read the line pressure at idle and engine stall speeds for each range in the same manner.

Specified Line pressure:

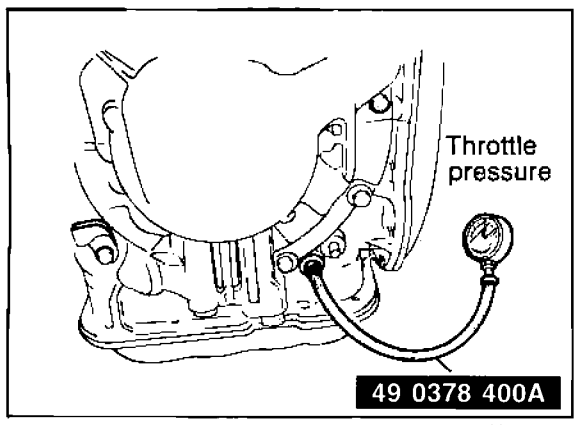
Condition	Line pressure kPa (kg/cm², psi)	
Range	D S L	R
When idling	350—490 (3.6—5.0, 51—71)	600—830 (6.1—8.5, 87—121)
At stall speed	980—1230 (10.0—12.5, 142—178)	1470—1960 (15.0—20.0, 213—284)

76G07B-063

Evaluation

Condition		Possible Cause
Below specification	In all ranges	Worn oil pump
		Fluid leakage from the oil pump, control valve body and/or transaxle case
		Stuck pressure regulator valve
		Stuck throttle valve
		Stuck pressure modulator valve
	In D, 2 and 1 range	Fluid leakage from the forward clutch hydraulic circuit
		Fluid leakage from the governor valve hydraulic circuit
		Fluid leakage from the N-R accumulator seal rings
	In D and 1 range	Fluid leakage from the 2-3 accumulator seal rings
		Fluid leakage from the 1-2 accumulator seal rings
	In D and R range	Fluid leakage from the N-D accumulator seal rings
	In 2 and 1 range	Fluid leakage from the coasting clutch hydraulic circuit
		Stuck throttle backup valve
	In R and 1 range	Fluid leakage from the low and reverse brake hydraulic circuit
	In 2 range only	Fluid leakage from 2-4 brake servo hydraulic circuit
	In 1 range only	Stuck low reducing valve
	In R range only	Fluid leakage from reverse clutch hydraulic circuit
Excessive line pressure		Stuck throttle valve
		Stuck throttle modulator valve
		Stuck pressure regulator valve
		Stuck throttle backup valve

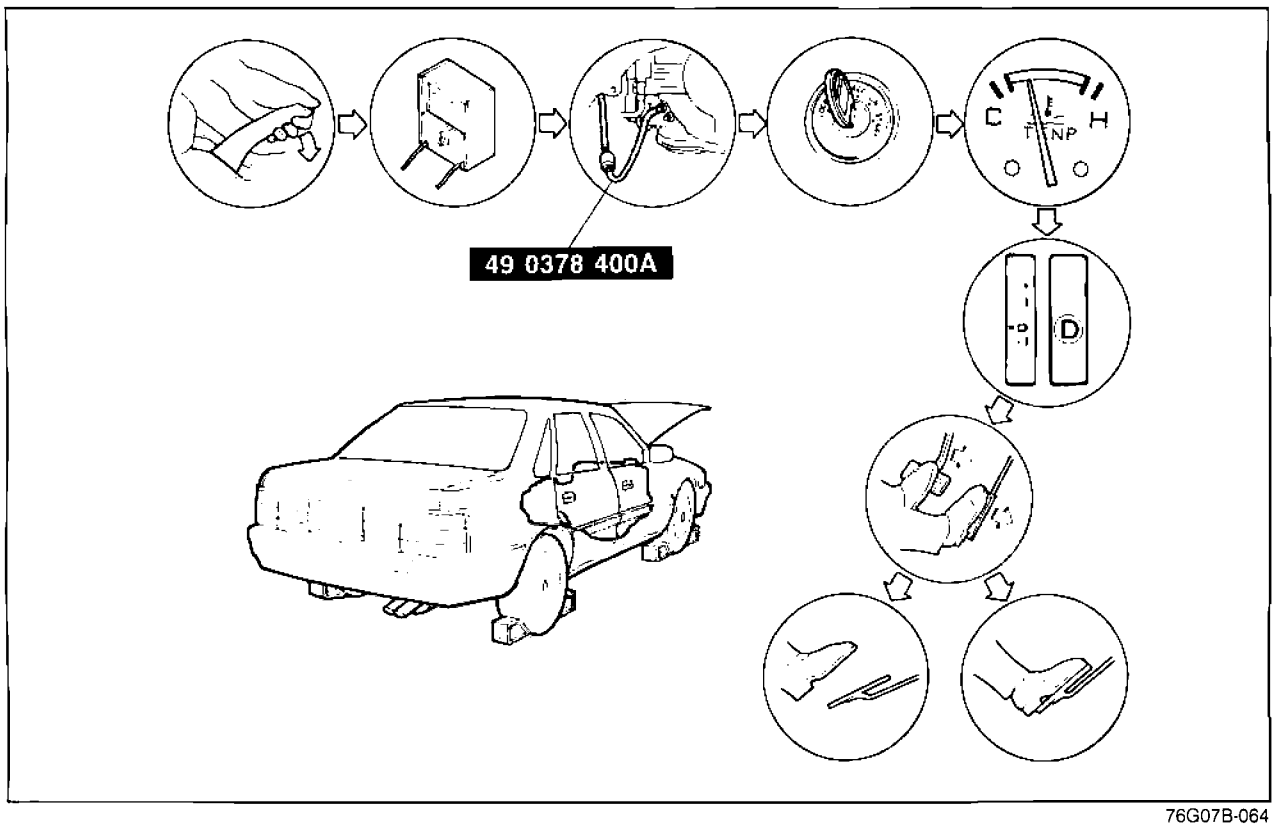
76G07B-216



83U07B-052

Throttle Pressure Test
Preparation
1. Connect the **SST** to the throttle pressure output point (Square head plug T).
2. Connect a tachometer to the engine.
3. Perform the preparation procedure shown in STEP 3 (STALL TEST).

Procedure



76G07B-064

1. Start the engine and check that the idle speed is **900** $\pm^{50}_{0}$ rpm.
2. Shift the selector to D range.
3. Read the throttle pressure at idle.
4. Depress the brake pedal firmly with the left foot and gradually depress the accelerator pedal with the right foot.
5. Read the throttle pressure as soon as the engine speed becomes constant, then release the accelerator pedal.

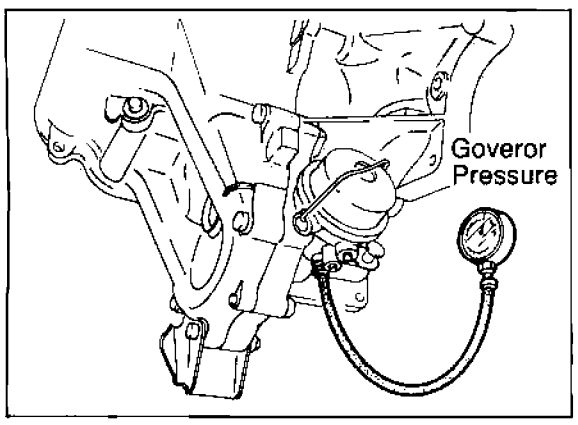
Caution
Steps 4 to 5 must be performed within 5 seconds.

Specified throttle pressure:

Condition	Throttle pressure kPa (kg/cm^2, psi)
When idling	83—113 (0.85—1.15, 12—16)
At stall speed	540—610 (5.5—6.2, 78—88)

Evaluation

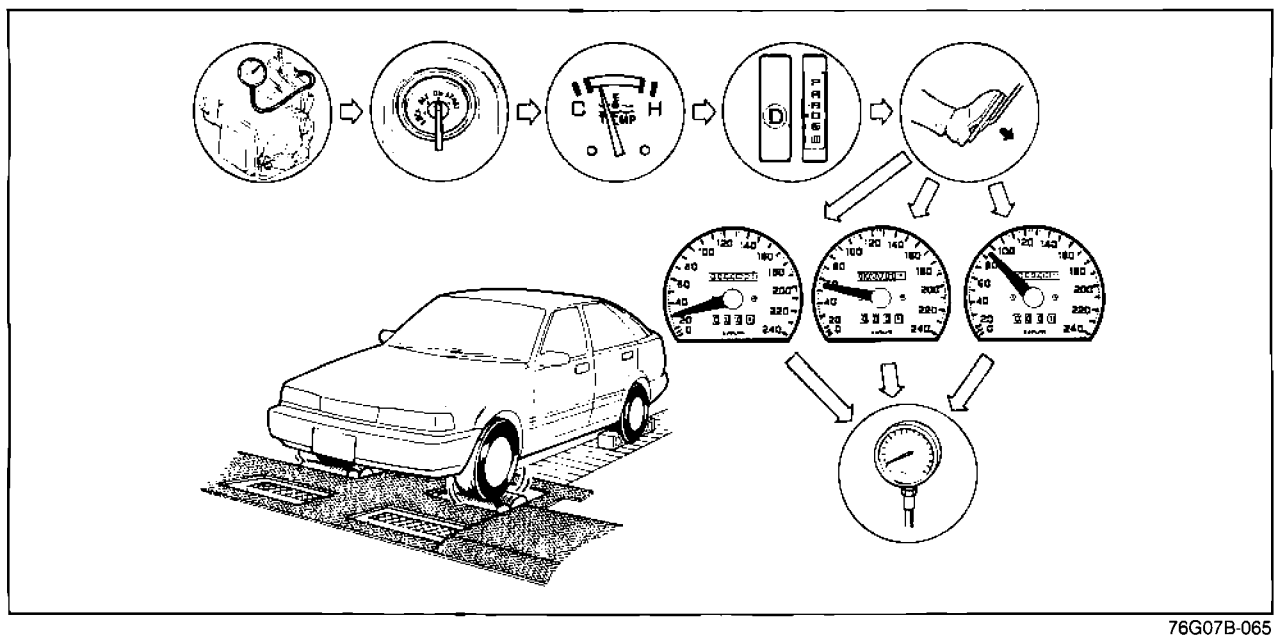
Condition	Possible Cause
Not within specification	Stuck throttle valve
	Stuck pressure regulator valve
	Improper adjustment of throttle cable



83U07B-054

Governor Pressure Test
Preparation
1. Connect the **SST** to the governor pressure output point.
2. Place the pressure gauge inside the vehicle.
3. Warm up ATF and check ATF level.

Procedure



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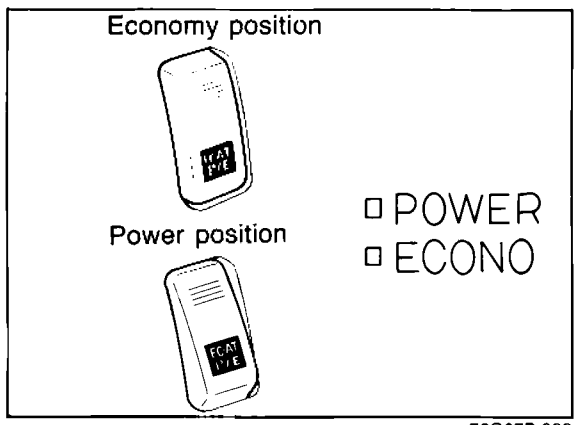
1. Drive the vehicle in D range.
2. Read the governor pressure at the speeds listed in the table below.

Specified governor pressure:

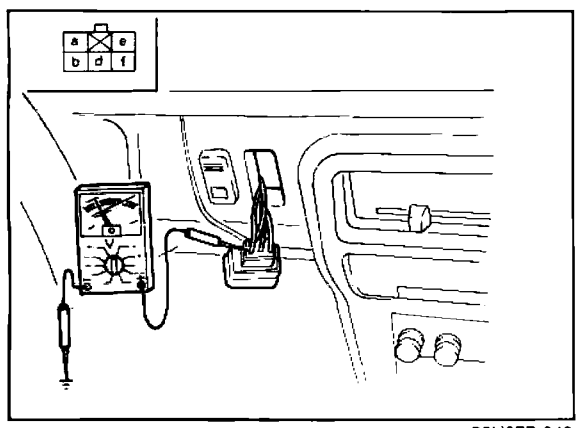
Vehicle Speed km/h (mph)	Governor Pressure kPa (kg/cm^2, psi)	
	FE engine	F8 engine
30 (19)	79—114 (0.81—1.16, 12—16)	82—117 (0.84—1.19, 12—17)
55 (34)	146—190 (1.49—1.94, 21—28)	157—201 (1.60—2.05, 23—29)
85 (53)	276—339 (2.81—3.46, 40—49)	302—366 (3.08—3.73, 44—53)

Evaluation

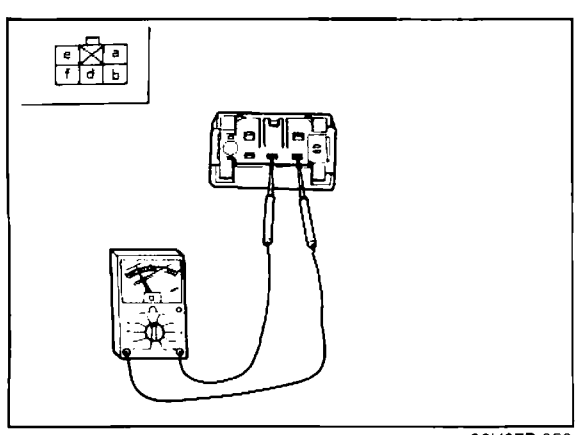
Condition	Possible Cause
Not within specification	Fluid leakage from the line pressure hydraulic circuit
	Fluid leakage from the governor pressure hydraulic circuit
	Defective or stuck governor valve



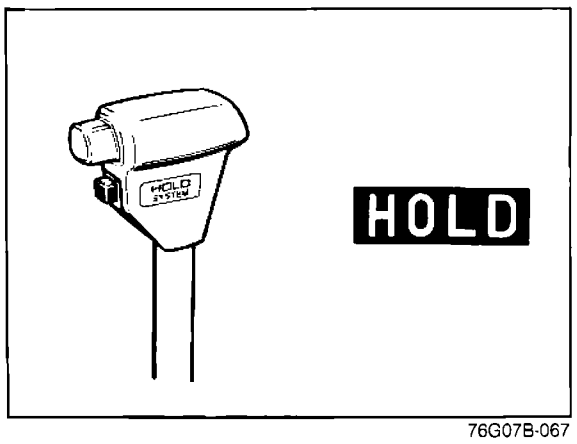
76G07B-066



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86U07B-050



76G07B-067

ELECTRICAL SYSTEM COMPONENTS

MODE SWITCH (G4A-EL)

Inspection of Operation

1. Turn the ignition switch ON.
2. Check that the mode indicator illuminates at each model.
3. If it is not working properly, check terminal voltage of mode switch.

Inspection of Continuity

1. Disconnect the mode switch.
2. Turn the ignition switch ON and light switch OFF.
3. Check the voltage between each terminal and ground.

Mode	Voltage				
	a	b	d	e	f
Power	Approx. 12V	Below 1.5 V	Below 1.5 V	Below 1.5 V	Below 1.5 V
Economy	Below 1.5 V	Below 1.5 V	Below 1.5 V	Below 1.5 V	Approx. 12V

4. If correct, check for continuty between the terminal.

Inspection of Terminal Voltage

1. Disconnect the mode switch connector.
2. Check continuity of the terminals.

Mode	Connector terminal				
	a	f	d	e	b
Economy	○—○		○—○		
Power	○—○		○		○

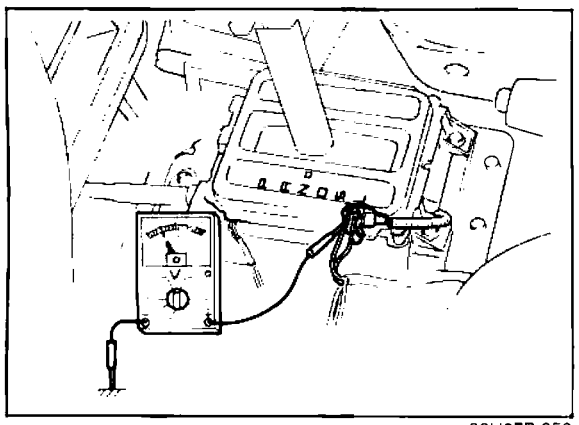
○—○: Indicates continuity

3. If not correct, replace the mode switch.

HOLD SWITCH (G4A-EL)

Inspection of Operation

1. Turn the ignition switch ON.
2. Check that the hold indicator illuminates while switch depressed. Release the switch and mode indicator lights are out.
3. If it is not working properly, check terminal voltage of hold switch.

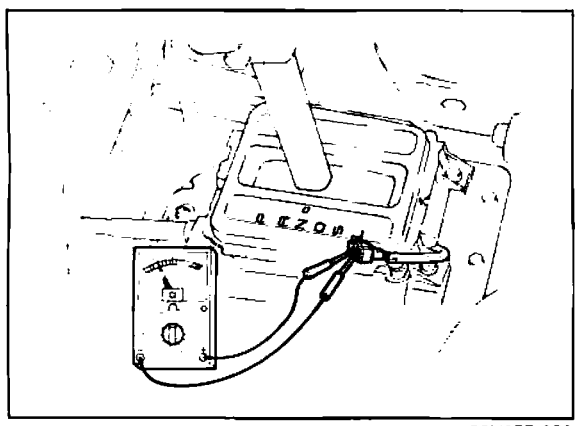


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Inspection of Terminal Voltage
1. Remove the consol box.
2. Turn the ignition switch ON.
3. Check the voltage between the terminal (B) and ground while depressing the switch.

Terminal voltage	Switch
Approx. 12V	Depressed
Below 1.5V	Released

4. If correct, check continuty between the terminal.

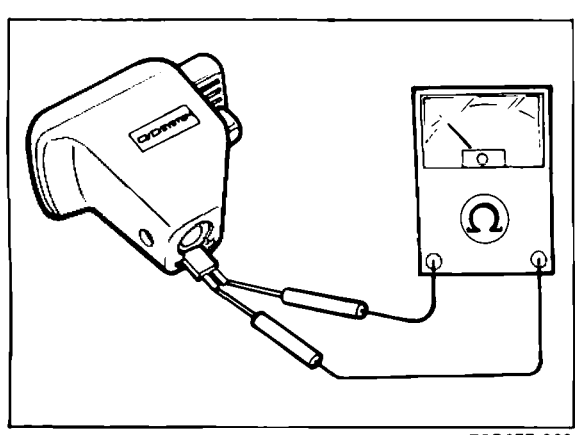


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Inspection of Continuity
1. Disconnect the hold switch connector.
2. Check for continuity between the terminals while depressing the switch.

Continuity	Switch
YES	Released
NO	Depressed

3. If not correct, replace the hold switch.

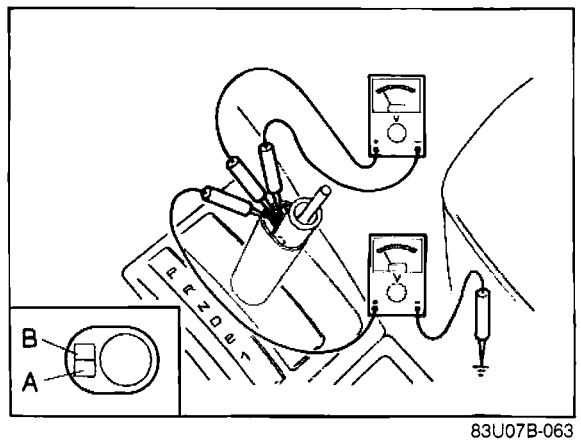


76G07B-068

OD OFF SWITCH (G4A-HL)
Inspection of Continuity
1. Remove the selector lever knob.
2. Check the continuity of the terminals.

Switch	Continuity
Depressed	No
Released	Yes

3. If not correct, replace the selector lever knob.

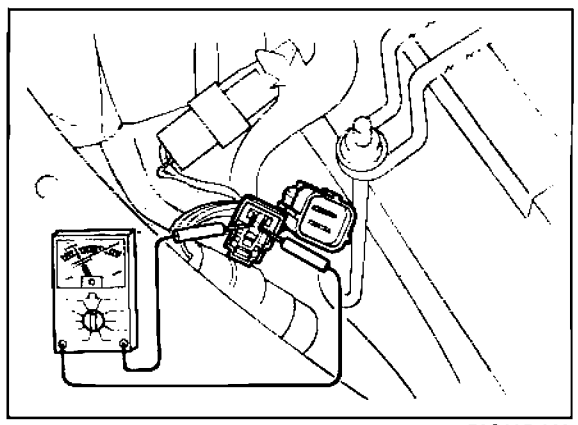


83U07B-063

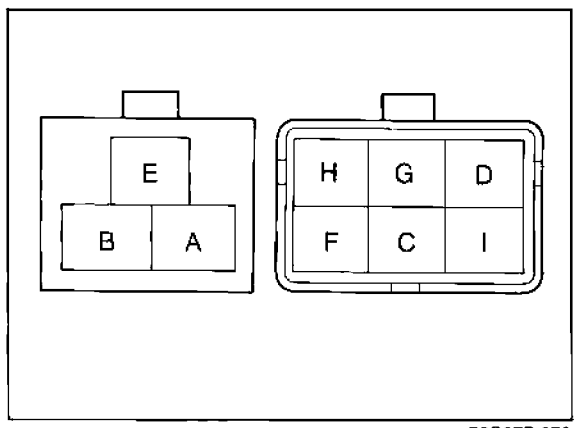
Inspection of Terminal Voltage
1. Check that continuity of the switch is OK.
2. Turn the ignition switch ON.
3. Check the voltage between terminal A and B, and between terminal A and ground.

Terminal	Voltage
A and B	Approx. 12V
A and ground	Approx. 12V

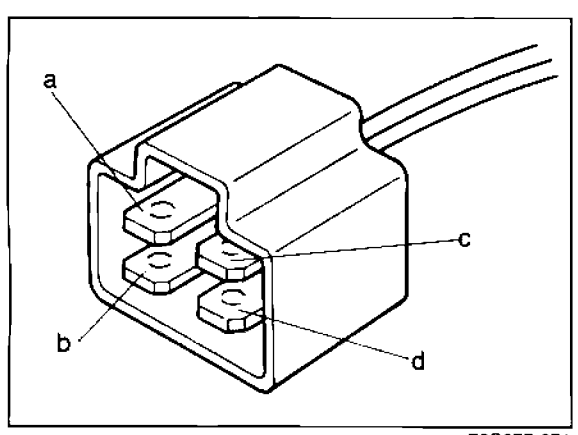
4. If not correct, check the wiring harness.



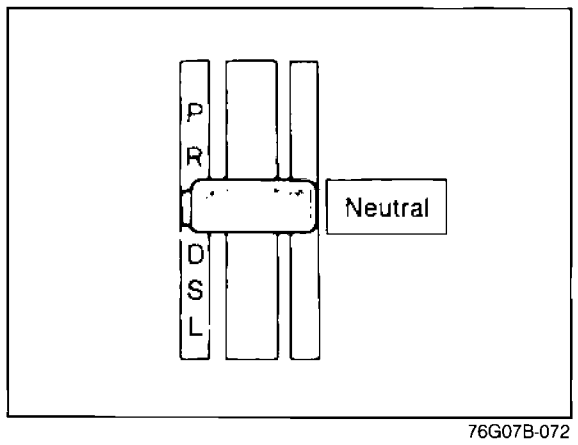
76G07B-069



76G07B-070



76G07B-071



76G07B-072

INHIBITOR SWITCH

Inspection

1. Check that the starter turns with the ignition switch at START position and the selector in the P and N ranges, and dose not operate in other positions.
2. Check that the back-up (reverse) light illuminates when shifted to the R range with the ignition switch in the ON position.
3. Check the inhibitor switch if it is not working properly.

Inspection of continuity

1. Disconnect the inhibitor switch connector.
2. Check continuity of the terminals.

G4A-EL

Position	Connector terminal								
	A	B	C	D	E	F	G	H	I
P	○—○		○—○						
R			○		○				
N	○—○		○			○			
D			○				○		
S			○					○	
L			○						○

○—○: Indicates continuity

G4A-HL

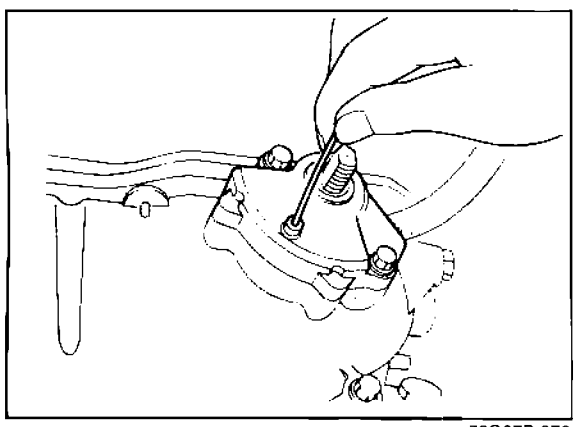
Position	Connector terminal			
	a	b	c	d
P			○—○	
R	○—○			
N			○—○	
D, 1, 2				

○—○: indicates continuity

3. If not correct, replace switch and perform adjustment of inhibitor switch.

Adjustment

1. Shift the selector lever to N range.
2. Loosen the inhibitor switch mounting bolts.

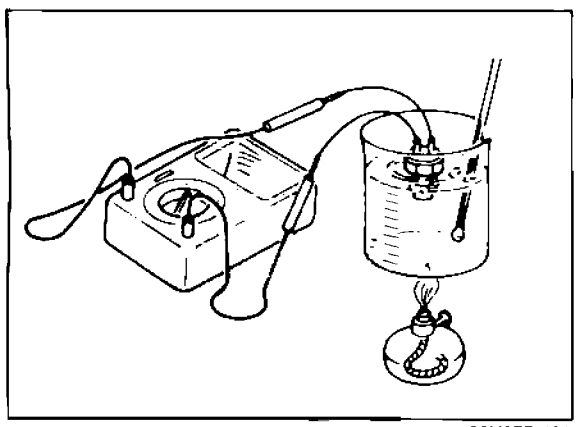


76G07B-073

3. Remove the screw and move the inhibitor switch so that the small hole is aligned with the screw hole.
4. Set the alignment by inserting a **2.0 mm (0.079 in)** diameter pin through the holes.
5. Loosely tighten the switch mounting bolts, remove the pin, and reinstall the screw.
6. Tighten the switch mounting bolts to specification.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

7. Recheck the continuity of the individual terminals.



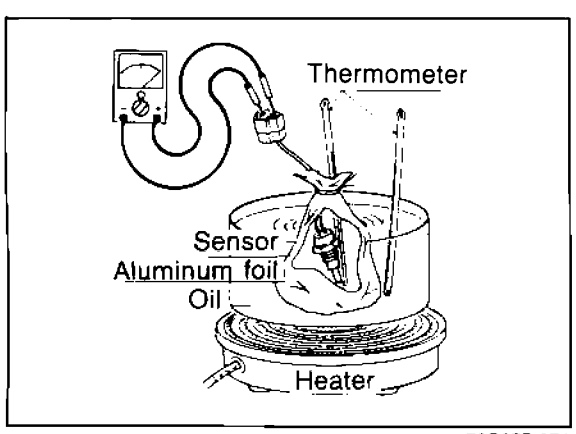
86U07B-481

WATER TEMPERATURE SWITCH
Inspection

1. Remove the water temperature switch.
2. Place the switch in water with a thermometer and heat up the water gradually.
3. Check the continuity of the terminals. If necessary replace the switch.

Connection guide

Water temperature	Continuity
Below 65°C (149°F)	Yes
Above 72°C (162°F)	No



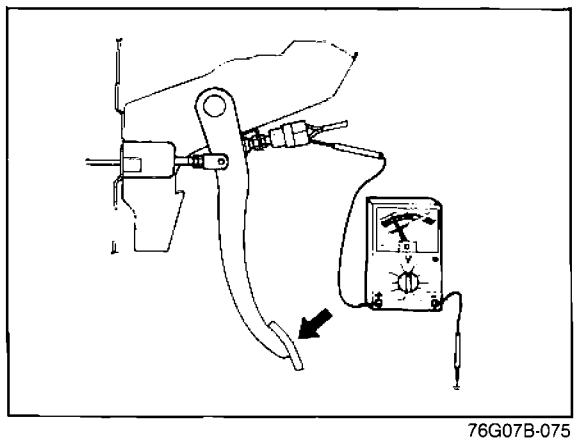
76G07B-074

FLUID TEMPERATURE SWITCH (G4A-EL)
Inspection

1. Remove the fluid temperature switch.
2. Place the switch in oil with a thermometer as shown and heat it up gradually.
3. Check the continuity of the terminals. If necessary replace the switch.

Connection guide

Fluid temperature	Continuity
Above 150°C (302°F)	Yes
Below 143°C (289°F)	No



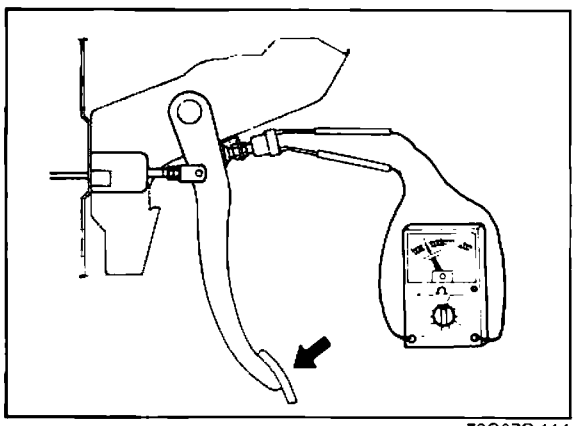
76G07B-075

BRAKE LIGHT SWITCH (G4A-EL)
Inspection of Terminal Voltage

1. Turn the ignition switch ON.
2. Check the voltage between terminal (WG) and ground while depressing the brake pedal.

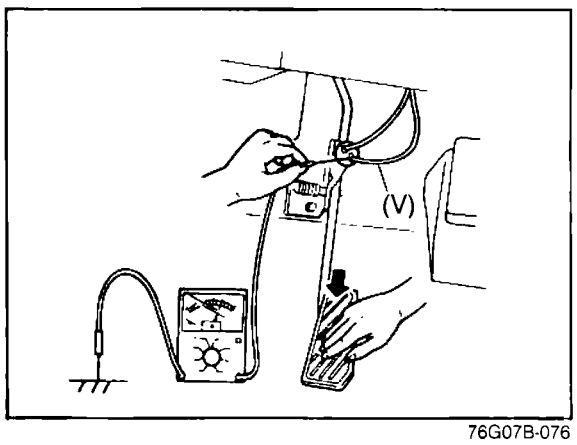
Terminal voltage	Brake pedal
Approx. 12V	Depressed
Below 1.5V	Released

3. If not correct, check continuity of the switch.



79G07C-114

Inspection of Continuity
1. Disconnect the brake light switch connector.
2. Check for continuity between the terminals while depressing the brake pedal.



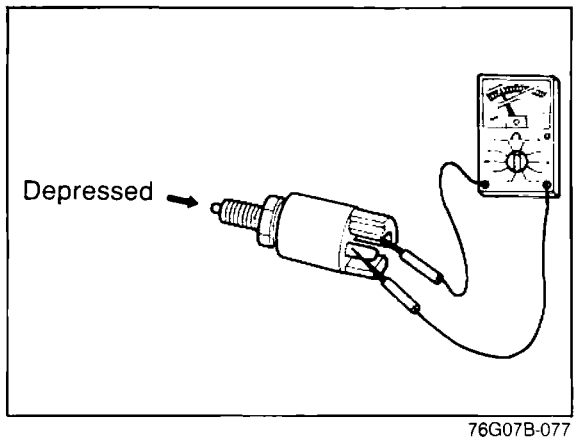
76G07B-076

KICK-DOWN SWITCH (G4A-HL)

Inspection of Terminal Voltage
1. Turn the ignition switch ON.
2. Check the voltage at terminal (V) with a voltmeter.

Depressing stroke	Terminal voltage
7/8—8/8 (Full)	Approx. 12V
0—7/8	Below 1.5V

3. If not correct, check the wiring harness, switch, or adjust the switch position.

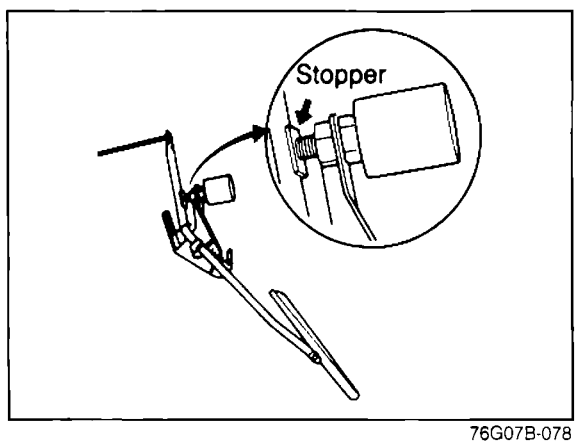


76G07B-077

Inspection of Continuty
1. Disconnect the kick-down switch connector.
2. Check for continuity of the switch with an ohmmeter.

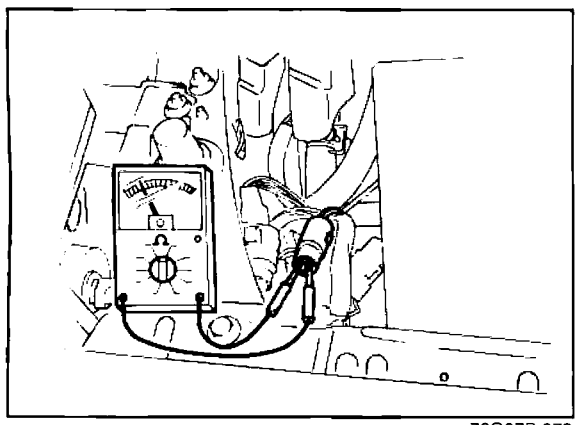
Switch	Continuity
Pushed	Yes
Released	No

3. If not correct, replace the kick-down switch.



76G07B-078

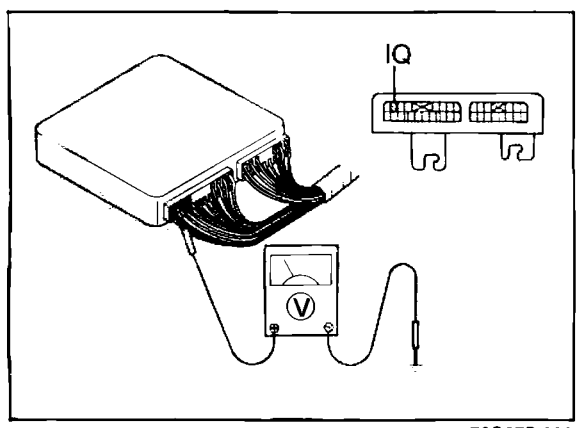
Adjustment
1. Loosen the kick-down switch locknuts.
2. Depress the accelerator pedal fully.
3. Turn the switch until the threaded case touches the stopper.
4. Turn the switch counterclockwise by one half revolution.
5. Secure the switch with the locknut.



76G07B-079

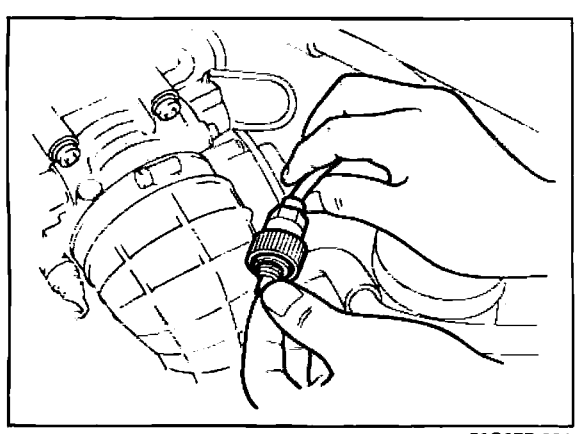
PULSE GENERATOR (G4A-EL)
Inspection
1. Disconnect the pulse generator connector.
2. Check for continuity between the terminals, if necessary replace the pulse generator.

Resistance: 200—400Ω



76G07B-080

VEHICLE SPEED SENSOR (G4A-EL)
Inspection of voltage
1. Connect a voltmeter between the 1Q terminal of the EC-AT control unit and ground as shown.
2. Turn the ignition switch ON.

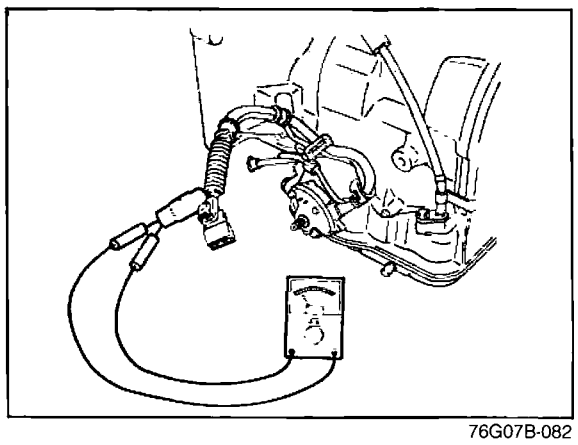


76G07B-081

3. Remove the speedometer cable from the transaxle.
4. Slowly turn the speedometer cable one turn.
5. Check that approx. 4.5V is shown 4 times.
6. If not correct, check the combination meter.

CRUISE CONTROL SWITCH (CRUISE CONTROL UNIT)
Refer to Section 15.

IDLE SWITCH AND THROTTLE SENSOR (G4A-EL)
Refer to Section 4A.

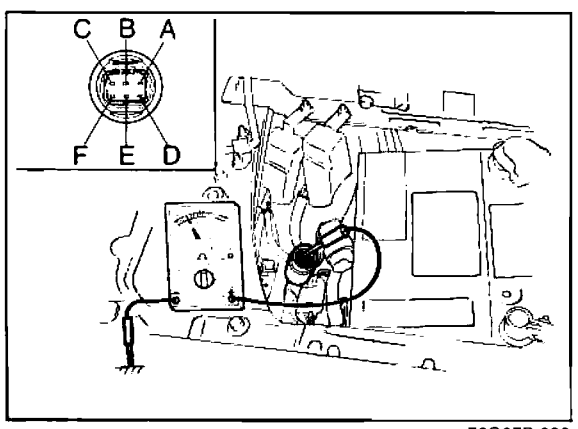


76G07B-082

OD RELEASE SOLENOID VALVE (G4A-HL)
Inspection of Resistance
1. Disconnect the solenoid valve connector.
2. Check resistance between the terminals.

Resistance: 13—27 Ω

3. If not correct, replace the solenoid valve.



76G07B-083

SOLENOID VALVES (G4A-EL)
Inspection of Resistance
1. Disconnect the negative battery cable.
2. Disconnect the solenoid valve connector.
3. Measure the resistance of the terminals except (A) terminal, if necessary replace the solenoid valve.

Resistance: 13—27Ω

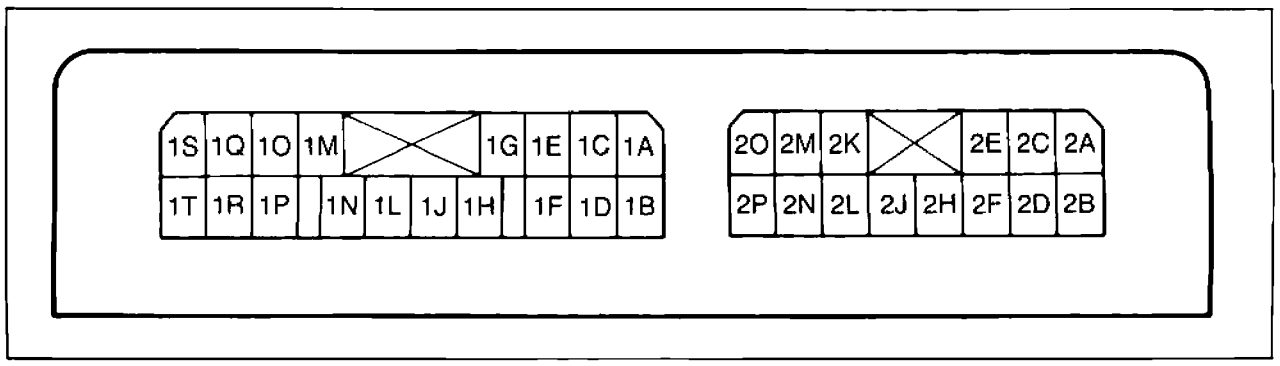
Note
1-2 solenoid valve : F
2-3 solenoid valve : C,E
3-4 solenoid valve : B
Lock-up solenoid valve : D

NO LOAD SIGNAL (G4A-EL)
Refer to STEP 3 in Troubleshooting.

MODE, AND HOLD INDICATOR LIGHT (G4A-EL)
Refer to Section 15.

OD OFF INDICATOR LIGHT (G4A-HL)
Refer to Section 15.

EC-AT CONTROL UNIT (G4A-EL)



Terminal Voltage Chart

Terminal	Connected to		Voltage	Condition
1A (Input)	Hold switch		Approx. 12V	Switch depressed
			Below 1.5V	Switch released
1B (Input)	Mode switch (Power side)		Below 1.5V	POWER mode
			Approx. 12V	ECONOMY mode
1C (Input)	Inhibitor switch	L range	Approx. 12V	L range
			Below 1.5V	Other ranges
1D (Input)		S range	Approx. 12V	S range
			Below 1.5V	Other ranges
1E (Input)		D range	Approx. 12V	D range
			Below 1.5V	Other ranges
1F (Input)		N and P range	Below 1.5V	N or P range
			Approx. 12V	Other ranges
1G (Input)	Water temperature switch		Approx. 12V	Above 72°C (162°F)
			Below 1.5V	Below 65°C (149°F)
1H	—		—	—
1I	—		—	—

Terminal	Connected to	Voltage	Condition
1J	—	—	—
1K	—	—	—
1L (Input)	Idle switch	Below 1.5V	At idle
		Approx. 12V	Other speeds
1M	—	—	—
1N (Input)	Brake light switch	Approx. 12V	Brake pedal depressed
		Below 1.5V	Brake pedal released
1O (Input)	Throttle sensor	Approx. 5V	Ignition switch ON
		Below 1.5V	Ignition switch OFF
1P (Input)		Approx. 0.5—4.3V	Throttle valve fully closed to fully open
1Q (Input)	Vehicle speed sensor	Approx. 4.5V	During driving
		Approx. 4.5V or below 1.5V	Vehicle stopped
1R (Ground)	Throttle sensor	Below 1.5V	—
1S (Input)	Pulse generator	Approx. 12V	Engine running
		Below 1.5V	Engine stopped
1S (Ground)	Pluse generator	Below 1.5V	—
2A (Battery power)	Battery	Approx. 12V	Ignition switch ON
		Below 1.5V	Ignition switch OFF
2B (Ground)	Body ground	Below 1.5V	—
2C (Memory power)	Battery	Approx. 12V	—
2D (Ground)	Body ground	Below 1.5V	—
2E (Output)	1-2 shift solenoid valve	Approx. 12V	Refer to page 7B—26 of solenoid valve operation table
		Below 1.5V	
2F (Output)	2-3 shift solenoid valve	Approx. 12V	
		Below 1.5V	
2G	—	—	—
2H (Output)	3-4 shift solenoid valve	Approx. 12V	Refer to page 7B—26 of solenoid valve operation table
		Below 1.5V	
2I	—	—	—
2J (Output)	Lock-up solenoid valve	Approx. 12V	Lock-up
		Below 1.5V	Other
2K (Output)	Hold indicator	Below 1.5V	Hold mode
		Approx. 12V	Other modes
2L (Output)	Mode indicator	Approx. 12V	Hold mode
		Below 1.5V	Power or economy mode
2M (Output)	EC-AT Tester (malfunction code)	Approx. 12V	Normal
		Below 1.5V	If malfunction present
		Code signal	Self-diagnosis check connector grounded
2N	—	—	—
2O (Input)	Fluid temperature switch	Below 1.5V	Above 150°C (302°F)
		Approx. 10—12V	Below 143°C (289°F)
2P (Input)	EC-AT check connect	Approx. 12V	—

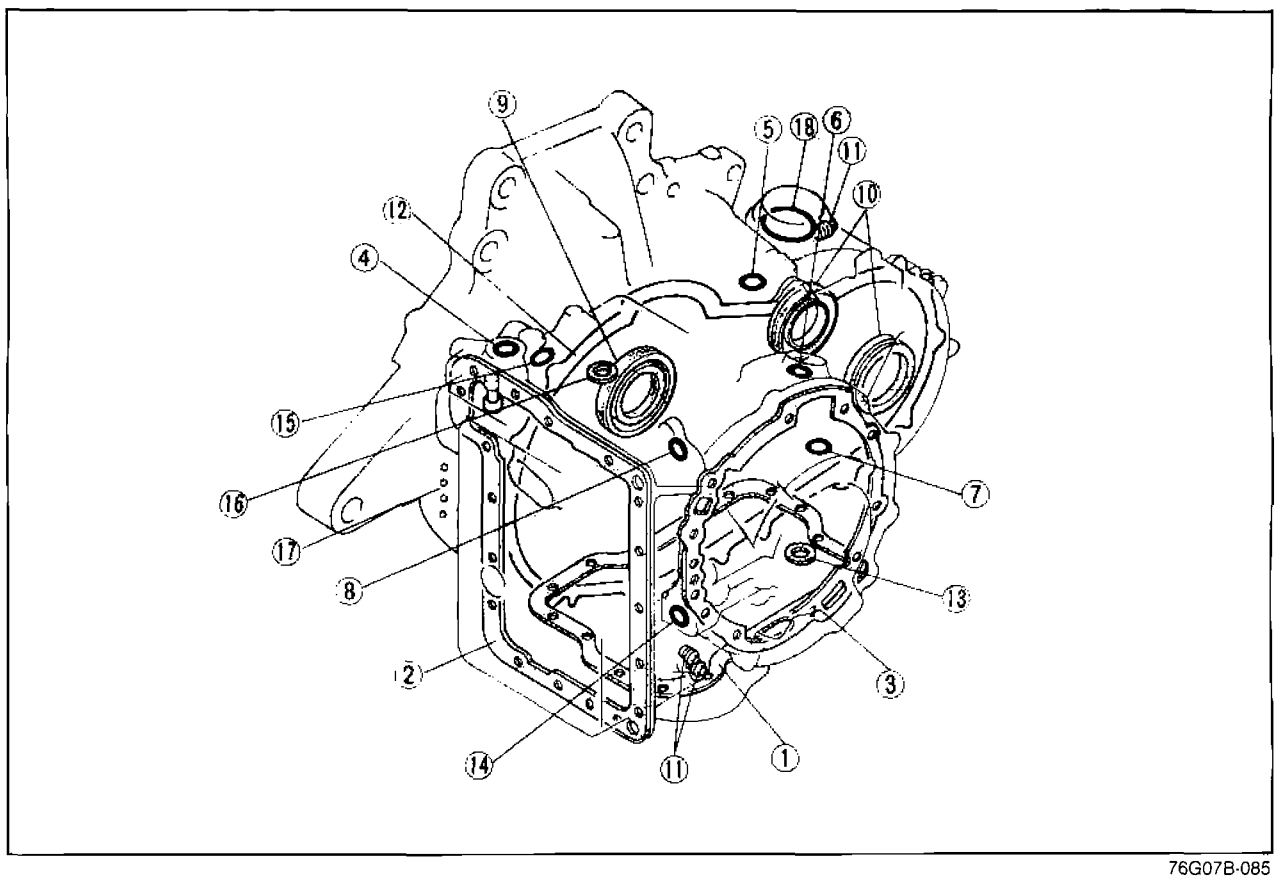
76G07B-084

ON-VEHICLE MAINTENANCE

AUTOMATIC TRANSAXLE FLUID (ATF)

Inspection for Fluid Leaks

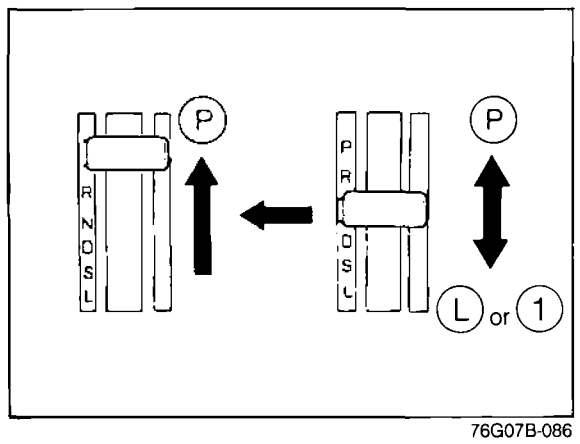
Check for fluid leaks; the following figure shows the locations where fluid leakage may possibly occur.



76G07B-085

1. Oil pan
2. Control valve body cover
3. Oil pump
4. Inhibitor switch
5. Speedometer driven gear
6. Pulse generator (G4A-EL)
7. Oil filler tube
8. Throttle cable
9. Bearing cover
10. Driveshaft
11. Square head plug
12. Transaxle case
13. Drain plug
14. Oil cooler return pipe
15. Oil cooler outlet pipe
16. Fluid temperature switch (G4A-EL)
17. Blind plugs
18. Governor cover (G4A-HL)

Inspection of Level

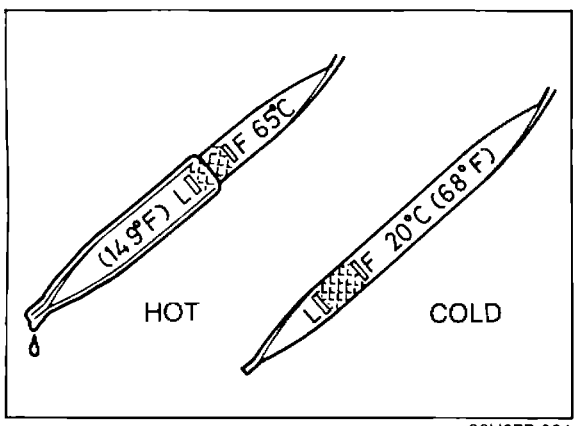


76G07B-086

1. Apply the parking brake and position wheel chocks to prevent the car from rolling forward.

Note
Place the car on a flat, level surface.

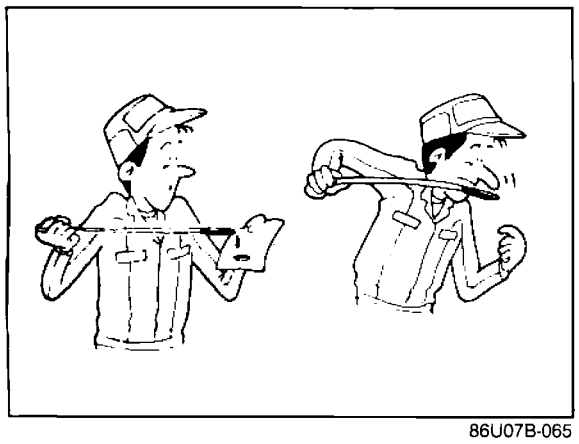
2. Run the engine so that the automatic transaxle fluid reaches specified temperature.
3. While the engine is idling, shift the select lever from P to L or P to 1 and back again.
4. Let the engine idle.
5. Shift the select lever to P.



86U07B-064

6. Ensure that the ATF level is between the F and L marks. Add ATF to specification, if necessary.

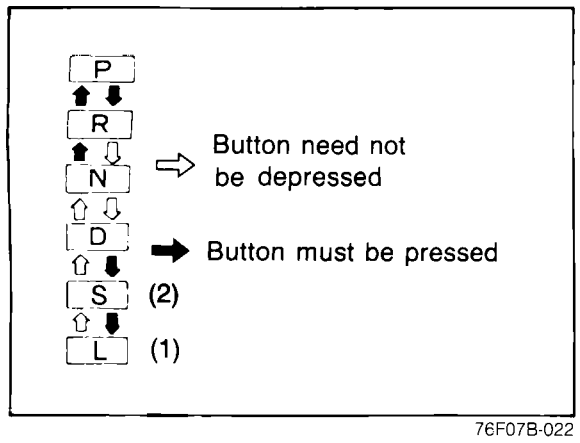
Low temperature scale:
20°C (68°F)
High temperature scale:
65°C (149°F)
ATF type:
Dexron II or M III



86U07B-065

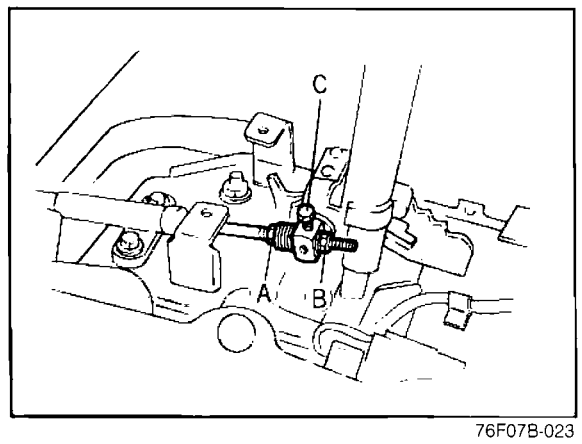
Inspection of Condition
1. Check the ATF for discoloration.
2. Check the ATF for any unusual smell.

Note
Determine whether or not the automatic transmission should be disassembled by observing the condition of fluid carefully.
If the fluid is muddy and varnished, it indicates burned drive plates.



76F07B-022

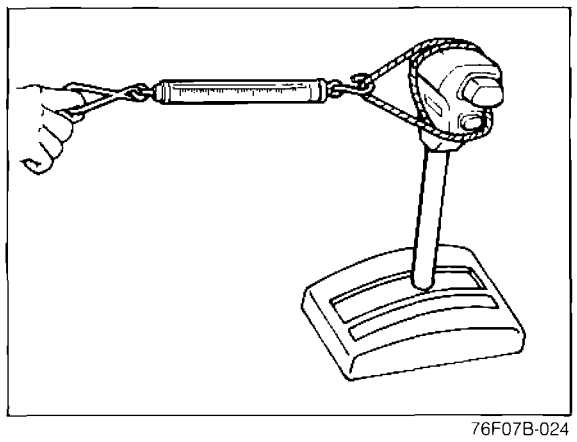
SELECTOR LEVER
Inspection
1. Check that the selector lever can only be shifted as shown in the figure.
2. Make sure there is a click at each range when shifted from P ↔ L or P ↔ 1 range.
3. Check that the position of the selector lever and the indicator are exact.
4. Check that the button returns smoothly when used to shift the selector.



76F07B-023

Adjustment
1. Loosen locknuts A, B, and lockbolt C.
2. Shift the selector lever to P range.
3. Shift the transaxle to P range by moving the manual shaft of the transaxle.
4. While holding the selector lever forward in P range, tighten lockbolt C to the specified torque.

Tightening torque:
8—11 N·m (80—110 cm-kg, 67—95 in-lb)



76F07B-024

5. Turn locknut A by hand until it just touches the spacer.
6. Tighten locknut B to the specified torque.

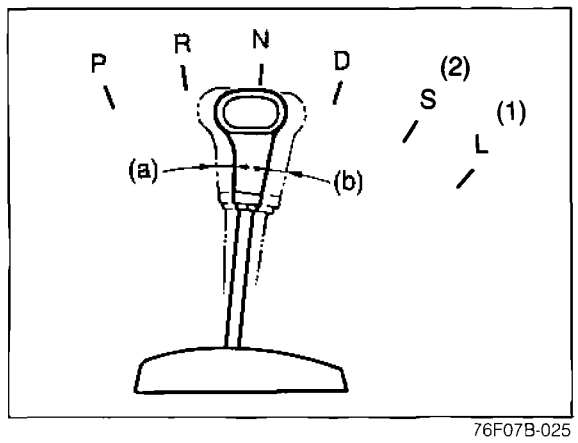
Tightening torque:
8—11 N·m (80—110 cm-kg, 67—96 in-lb)

7. Shift the selector lever to N range.
8. With the button on the selector lever knob pressed, push the selector toward R range with a force of **20 N (2 kg, 4.4 lb)** and check the amount of movement (a) at the selector lever knob.
9. Pull the selector lever toward D range in the same manner and check the amount of movement (b).
10. Verify the stroke difference of (a) and (b) is as specified.

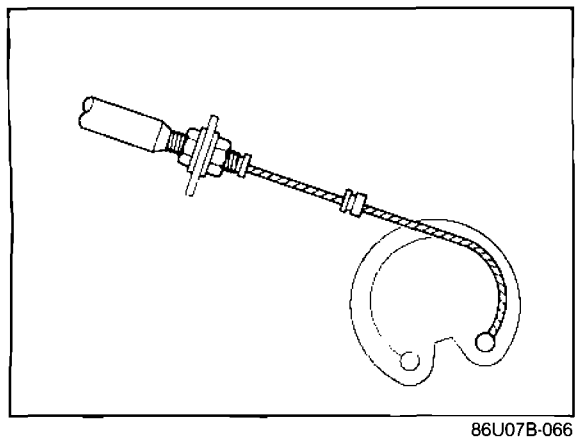
Stroke difference: 8 mm (0.315 in) max.

Note
If not with in specification, readjust locknuts A and B.

11. Check the selector lever operation. (Refer to Inspection section.)

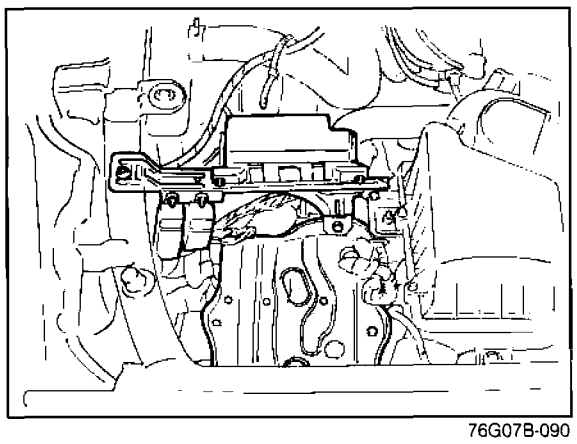


76F07B-025



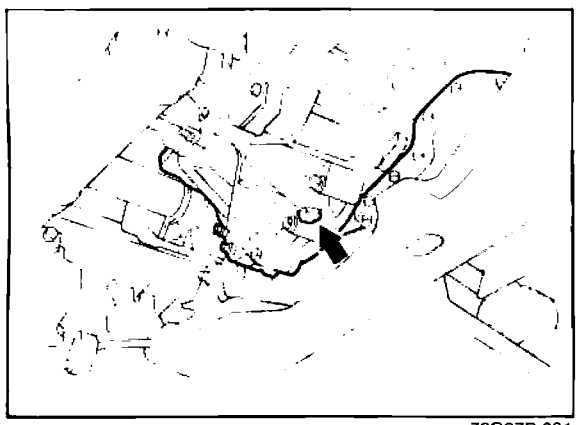
86U07B-066

THROTTLE CABLE
Inspection
1. Check the inner and outer cable for damage.
2. Make sure that the accelerator operates smoothly.



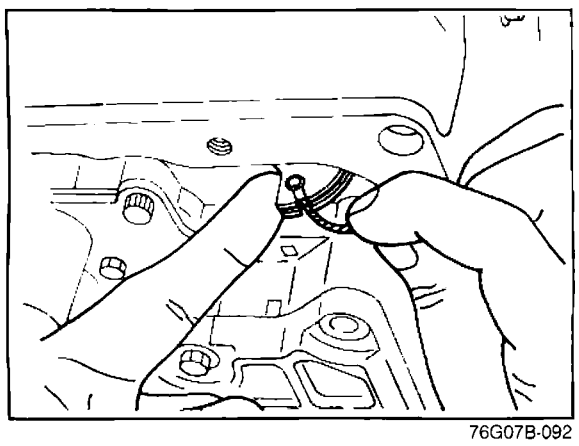
76G07B-090

Removal
1. Remove the battery and battery carrier.
2. Disconnect the main fuse block. (G4A-EL)



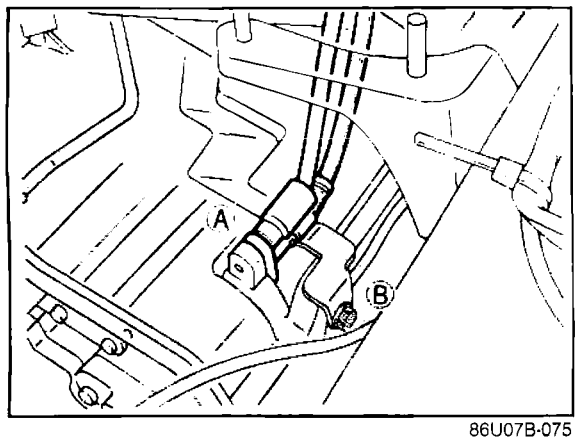
76G07B-091

3. Separate the harness from the clip.
4. Jack up the vehicle and support it with safety stands, then drain the ATF.



76G07B-092

5. Remove the throttle cable from the throttle cam (throttle chamber).
6. Remove the control valve body cover and gasket.
7. Remove the throttle cable from the throttle cam (control valve body).
8. Remove the mounting bolt and throttle cable from the transaxle.
9. Remove the O-ring.

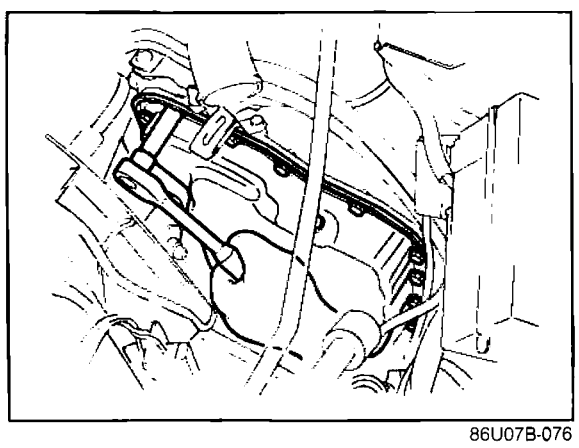


86U07B-075

Installation
Install in the reverse order of removal referring to installation note.

Installation note
Throttle cable
Install the throttle cable and a new O-ring into the transaxle case.

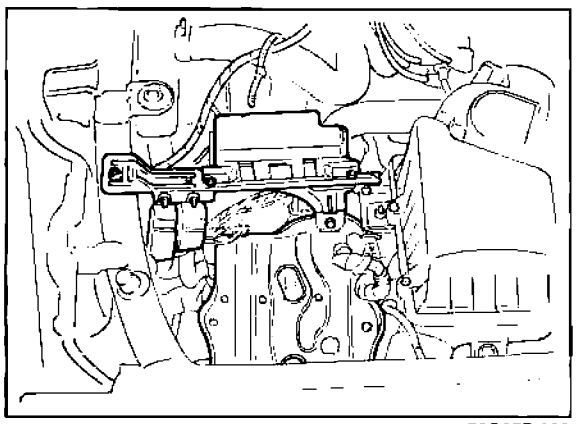
Tightening torque:
Ⓐ 8—11 N·m
(80—110 cm-kg, 69—95 in-lb)
Ⓑ 19—26 N·m
(1.9—2.6 m-kg, 14—19 ft-lb)



86U07B-076

Control valve body cover
Install the control valve body cover and a new gasket.

Tightening torque:
8—11 N·m (85—110 cm-kg, 74—95 in-lb)



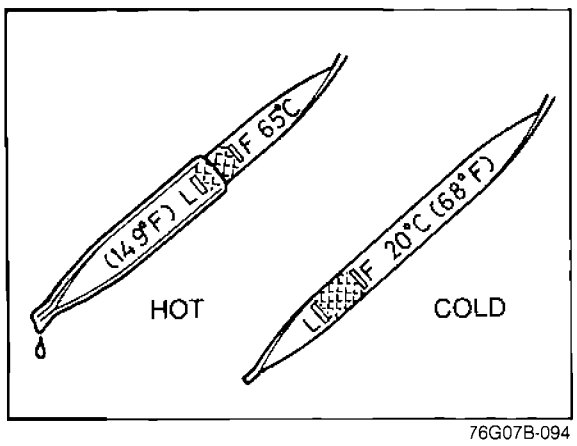
76G07B-093

Main fuse block (G4A-EL)
Install the main fuse block.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

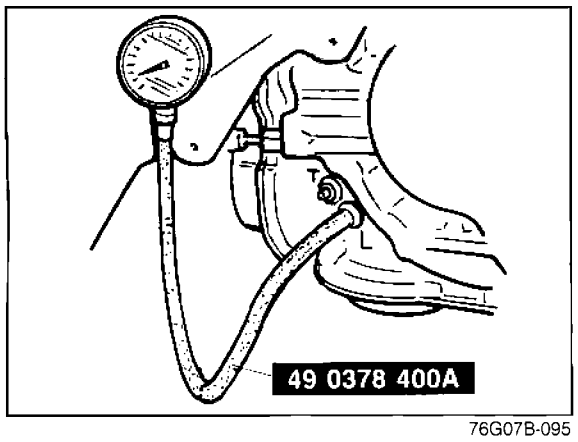
Battery carrier
Install the battery carrier.

Tightening torque:
31—40 N·m (3.2—4.1 m-kg, 23—30 ft-lb)



76G07B-094

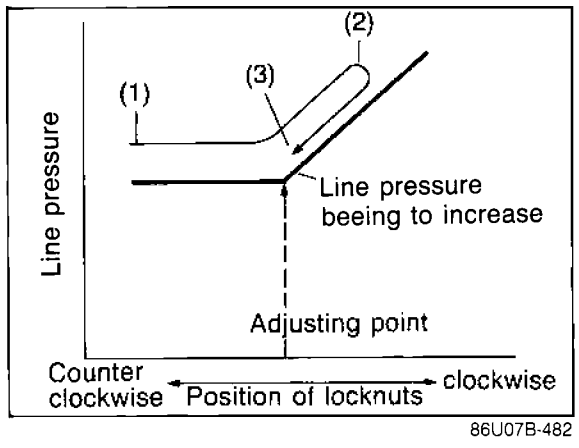
ATF level
After installation, add ATF, and with the engine idling, check the fluid level and for leaks. (Refer to page 7B—71)



76G07B-095

Adjustment (G4A-EL)
1. Remove the splash shield next to the left front tire.
2. Remove the square head plug L and install the **SST**.
3. Shift into P range and start the engine. Warm up the engine to normal operating temperature, and adjust the idle speed.

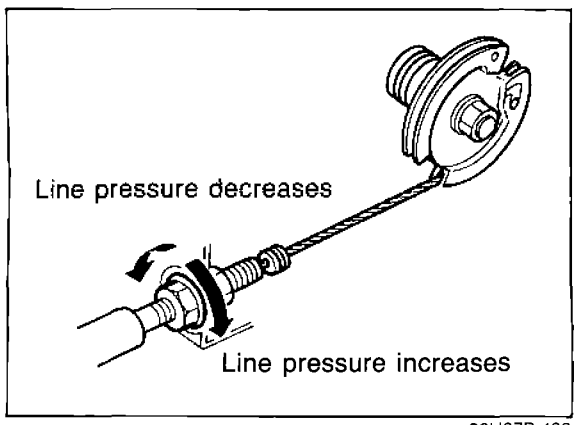
   Idle speed: 950 $^{+50}_{0}$ rpm



86U07B-482

4. Adjust locknuts as follows:
   When the locknuts are moved, line pressure is increased or decreased as shown. Adjust the locknuts to the correct position using the following procedure.

   (1) Initially install the locknuts fully away from the throttle cam. (Loosen the cable all the way)
   (2) Adjust the locknuts in a clockwise direction as viewed from the front of the vehicle until the line pressure begins to increase above the specification shown below.



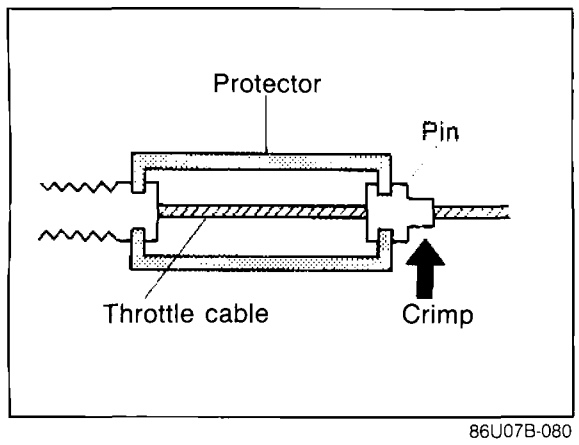
86U07B-483

(3) Adjust the locknuts in a counterclockwise direction until the line pressure decreases to the specification. Tighten the locknuts.

Specified pressure: 432—450 kPa (4.4—4.6 kg/cm^2, 63—66 psi)

Note
Transmission in P range

5. Turn off the engine.

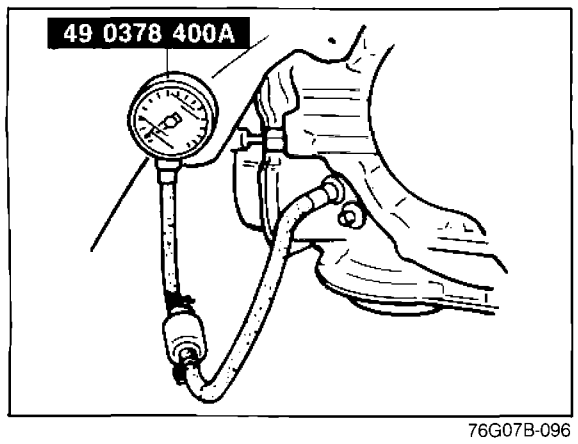


86U07B-080

6. Reinstall the square head plug.

Tightening torque:
5—10 N·m (50—100 cm-kg, 43—87 in-lb)

7. Fully open the throttle valve; then crimp the pin with the protector installed as shown.
8. Remove the protector.

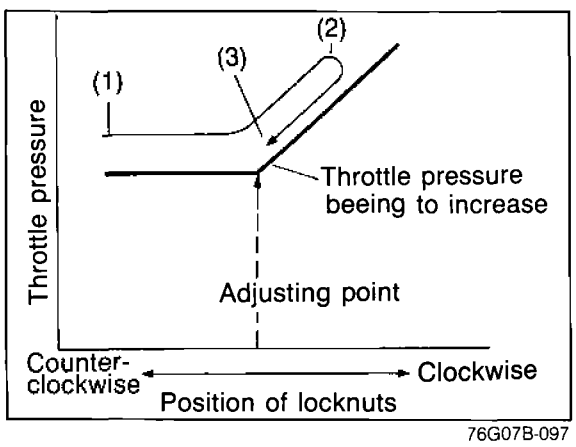


76G07B-096

Adjustment (G4A-HL)

1. Remove the splash shield next to the left front tire.
2. Remove the square head plug T and install the **SST**.
3. Shift into P range and start the engine. Warm up the engine to normal operating temperature, and adjust the idle speed.

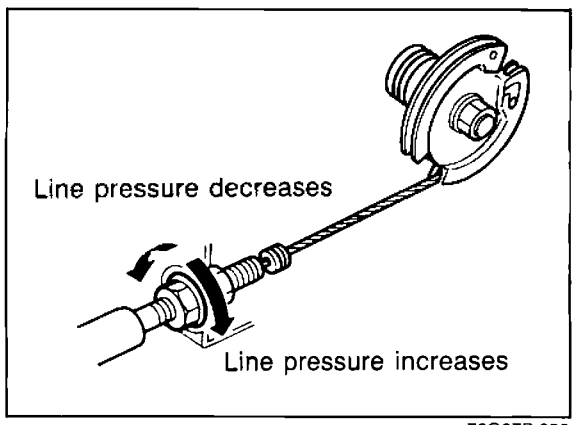
Idle speed: 900 $^{+50}_{0}$ rpm



76G07B-097

4. Adjust locknuts as follows:
When the locknuts are moved, throttle pressure is increased or decreased as shown. Adjust the locknuts to the correct position using the following procedure.

(1) Initially install the locknuts fully away from the throttle cam. (Loosen the cable all the way)
(2) Adjust the locknuts in a clockwise direction as viewed from the front of the vehicle until the throttle pressure begins to increase above the specification shown below.



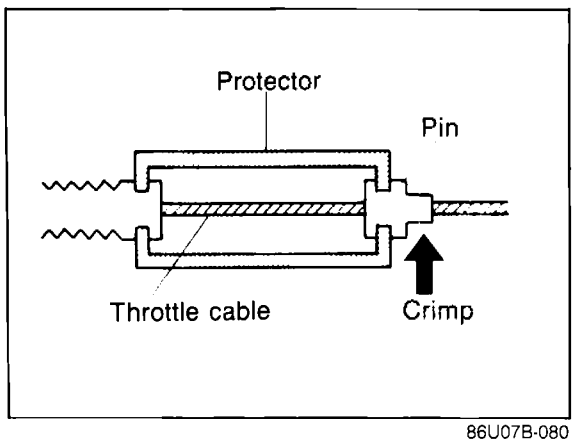
76G07B-098

(3) Adjust the locknuts in a counterclockwise direction until the throttle pressure decreases to the specification. Tighten the locknuts.

Specified pressure: 88—108 kPa (0.9—1.1 kg/cm^2, 13—16 psi)

Note
Transmission in P range

5. Turn off the engine.

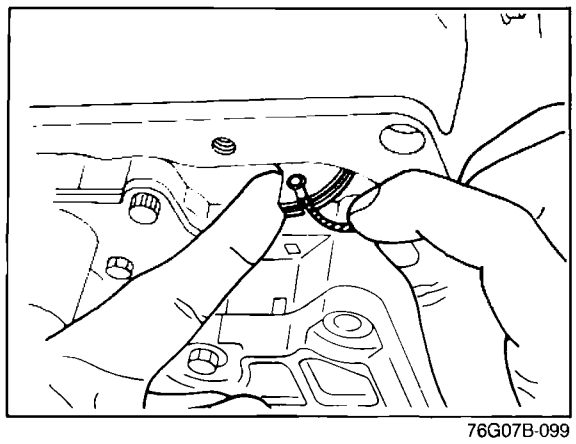


86U07B-080

6. Reinstall the square head plug.

Tightening torque:
5—10 N·m (50—100 cm-kg, 43—87 in-lb)

7. Fully open the throttle valve; then crimp the pin with the protector installed as shown.
8. Remove the protector.



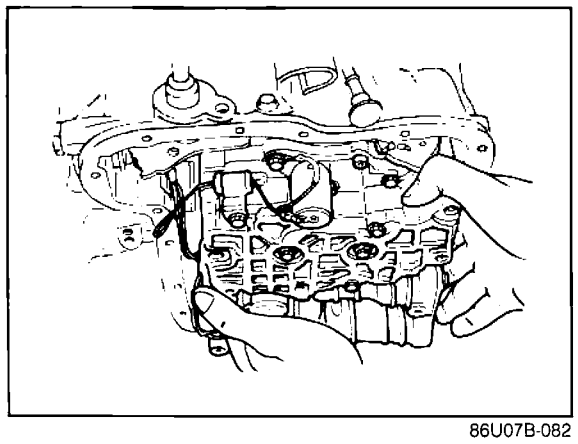
76G07B-099

CONTROL VALVE BODY

Note
Remove the control valve body only if troubleshooting indicates a probable failure.

Removal

1. Remove the throttle cable. (Refer to 7B—73)
2. Disconnect the solenoid connector.

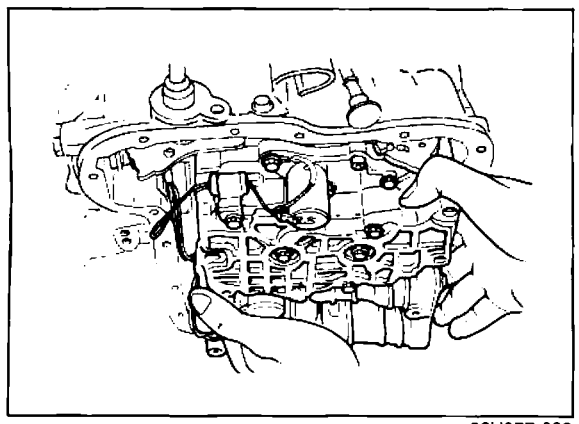


86U07B-082

3. Remove the control valve body.

Disassembly, Inspection and Assembly

Refer to control valve body section of INSPECTION AND REPAIR.

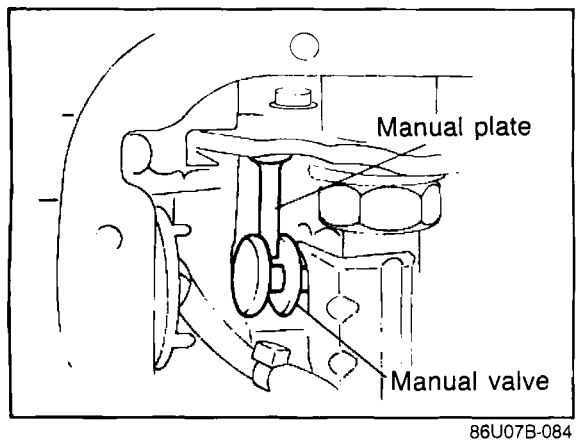


86U07B-083

Installation
Install in the reverse order of removal referring to installation note.

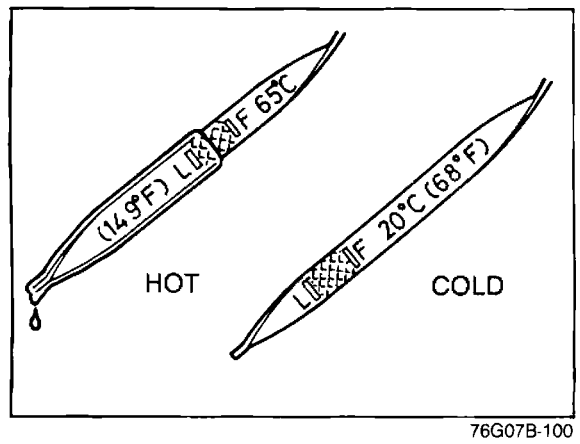
Installation note
Control valve body
Install the control valve body.

Tightening torque: 11—15 N·m (110—150 cm-kg, 95—130 in-lb)



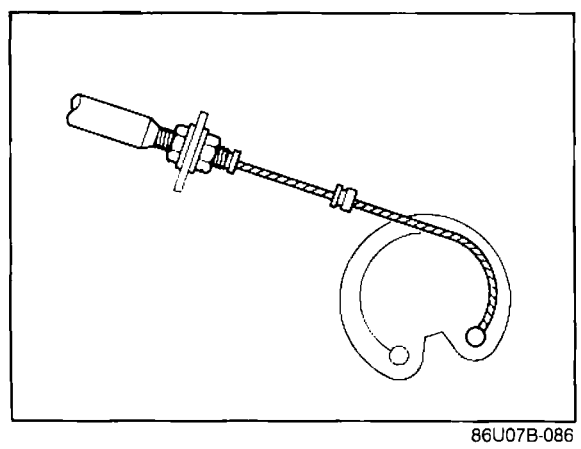
86U07B-084

Note
a) To place the manual plate in the correct position of the manual valve, shift into "R" before installation.
b) Verify that the manual plate and manual valve are assembled correctly by using a mirror, then tighten the mounting bolts.



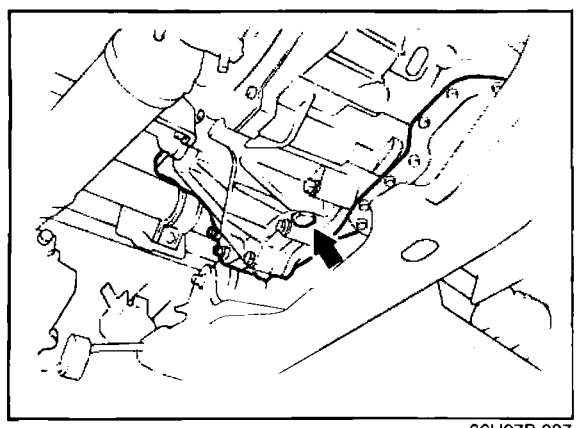
76G07B-100

ATF level
After installation, add ATF, and with the engine idling, check the fluid level and for leaks.
(Refer to page 7B—71)



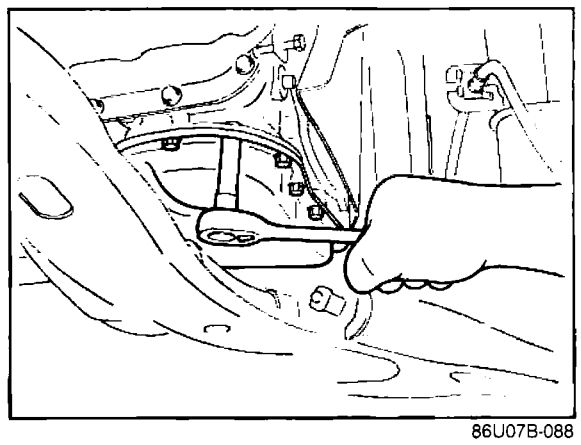
86U07B-086

Throttle cable
Adjust the throttle cable with the oil pressure test.



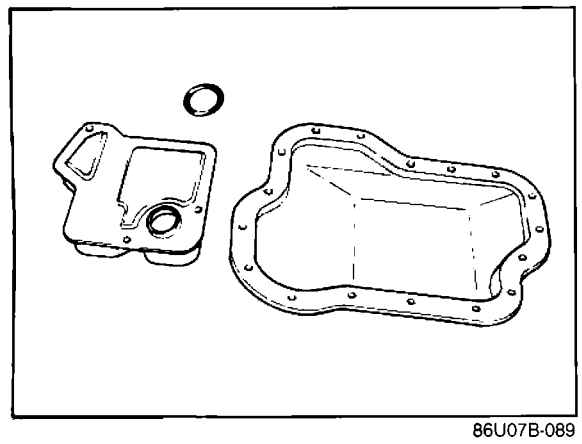
86U07B-087

OIL STRAINER
Removal
1. Jack up the vehicle and support it with safety stands.
2. Drain the ATF.
3. Remove the left side splash shield.



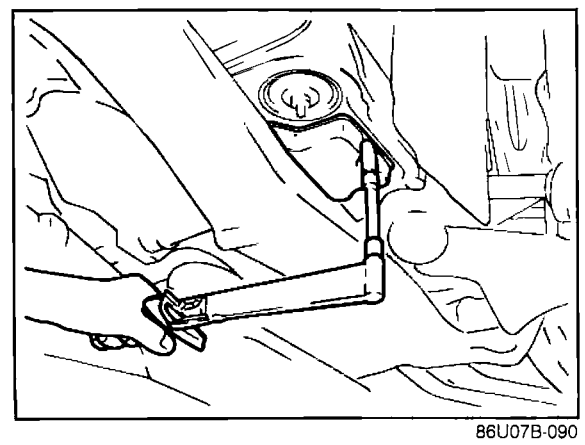
86U07B-088

4. Remove the oil pan and gasket.
5. Remove the oil strainer.
6. Remove the O-ring from the oil strainer.



86U07B-089

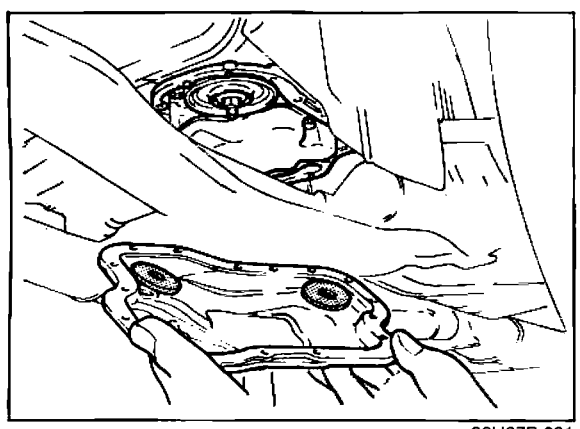
Inspection
Check the following and repair or replace any faulty parts.
1. Deformed or cracked oil pan
2. Deformed or clogged oil strainer



86U07B-090

Installation
1. Apply ATF to the O-ring and install it onto the oil strainer.
2. Install the oil strainer.

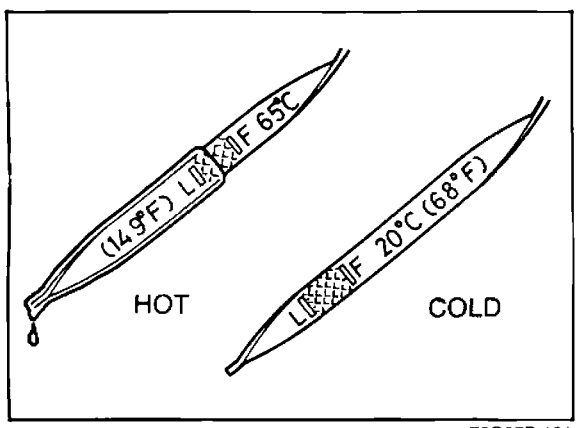
Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



86U07B-091

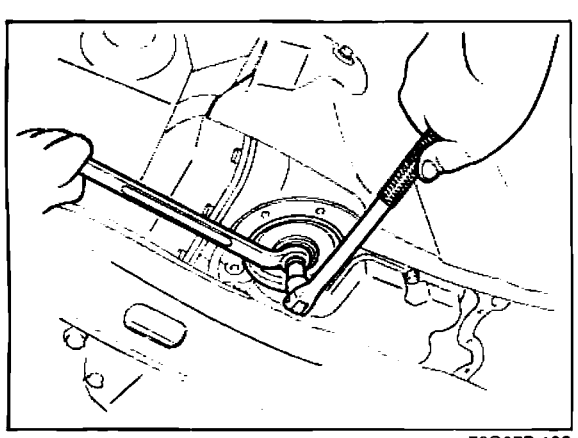
3. Install the magnets on the oil pan as shown and install the oil pan along with a new gasket.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



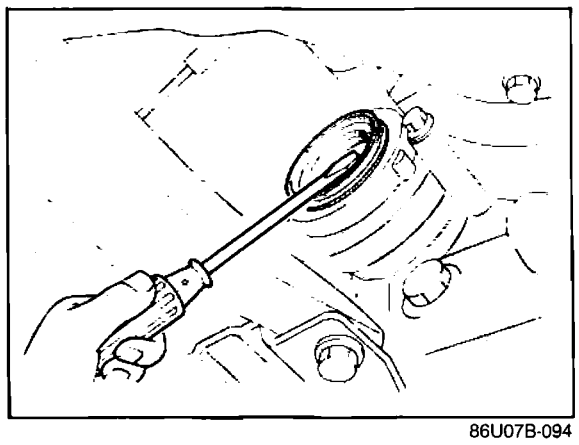
76G07B-101

4. Add ATF, and with the engine idling, check the fluid level and for leaks. (Refer to page 7B—71)



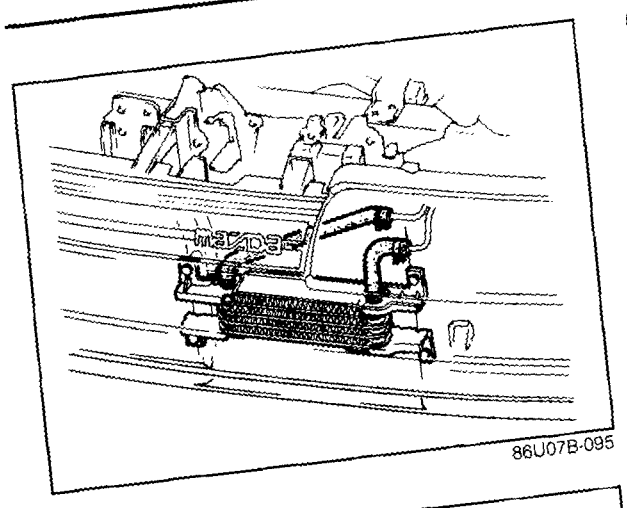
76G07B-102

ADJUSTMENT OF 2-4 BRAKE BAND
1. Remove the oil pan. (Refer to page 7B—79)
2. Adjust the 2-4 brake band. (Refer to page 7B—211)



86U07B-094

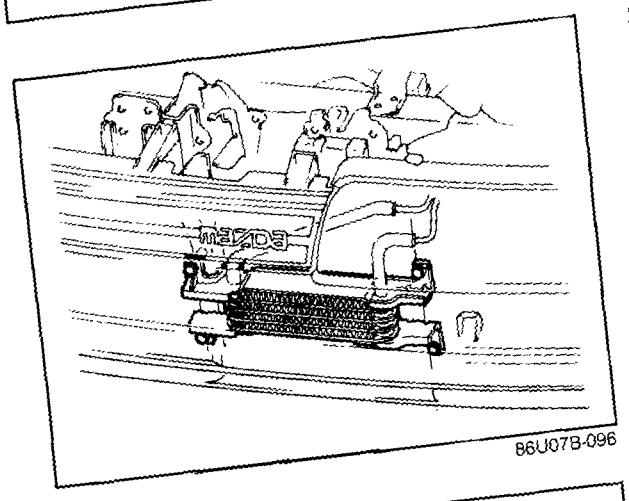
REPLACEMENT OF DRIVESHAFT OIL SEAL
Replace the oil seal in the same manner as for the manual transaxle. (Refer to page 7A—9)


86U07B-095

OIL COOLER

Removal

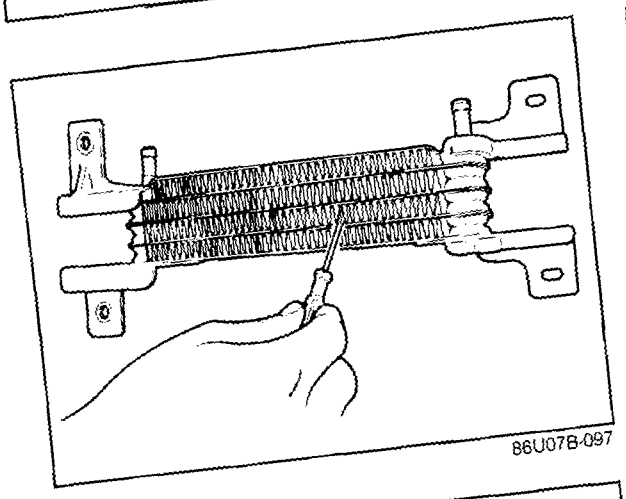
1. Remove the front grille.
2. Disconnect the oil cooler hoses.
3. Remove the oil cooler.


86U07B-096

Inspection

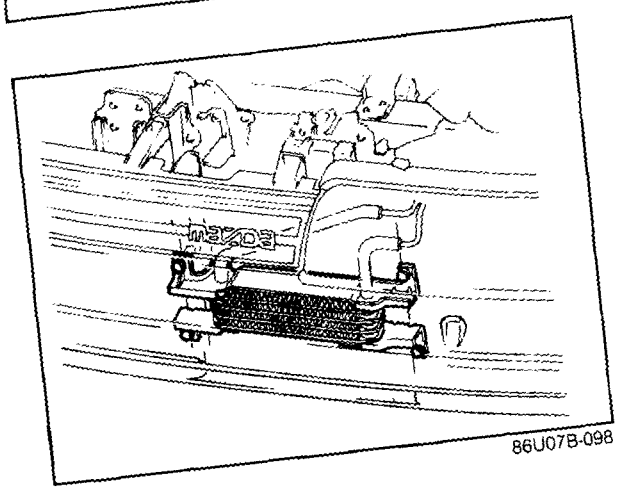
Check the following and repair or replace any faulty parts.

1. Cracks, damage, or oil leakage
2. Bent fins (repair with a screwdriver)


86U07B-097

Installation

Install the oil cooler referring to installation note.

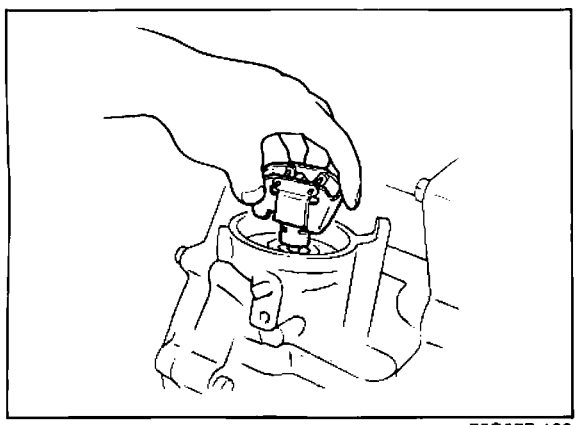

86U07B-098

Installation note

Oil cooler

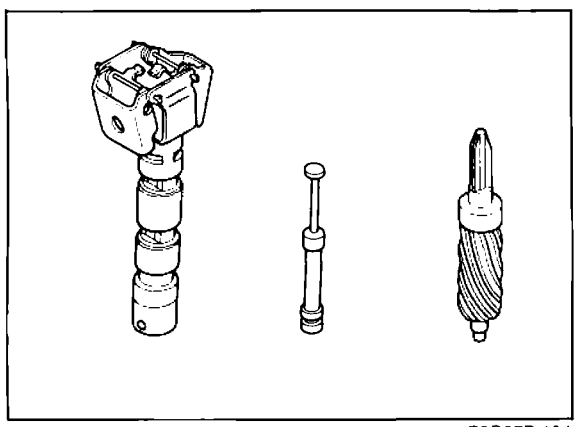
Install the oil cooler.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



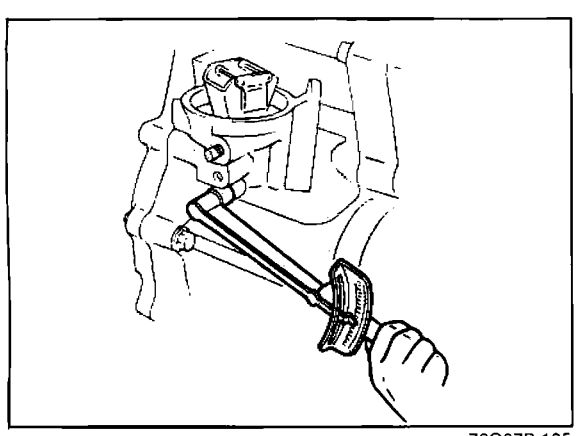
76G07B-103

GOVERNOR (G4A-HL)
Removal
1. Remove the clip from the governor cover.
2. Remove the stopper bolt; then remove the governor assembly.



76G07B-104

Disassembly, Inspection and Assembly
Refer to Governor section of INSPECTION AND REPAIR.



76G07B-105

Installation
Install in the reverse order of removal referring to installation note.

Installation note
Stopper bolt
Tighten the stopper bolt.

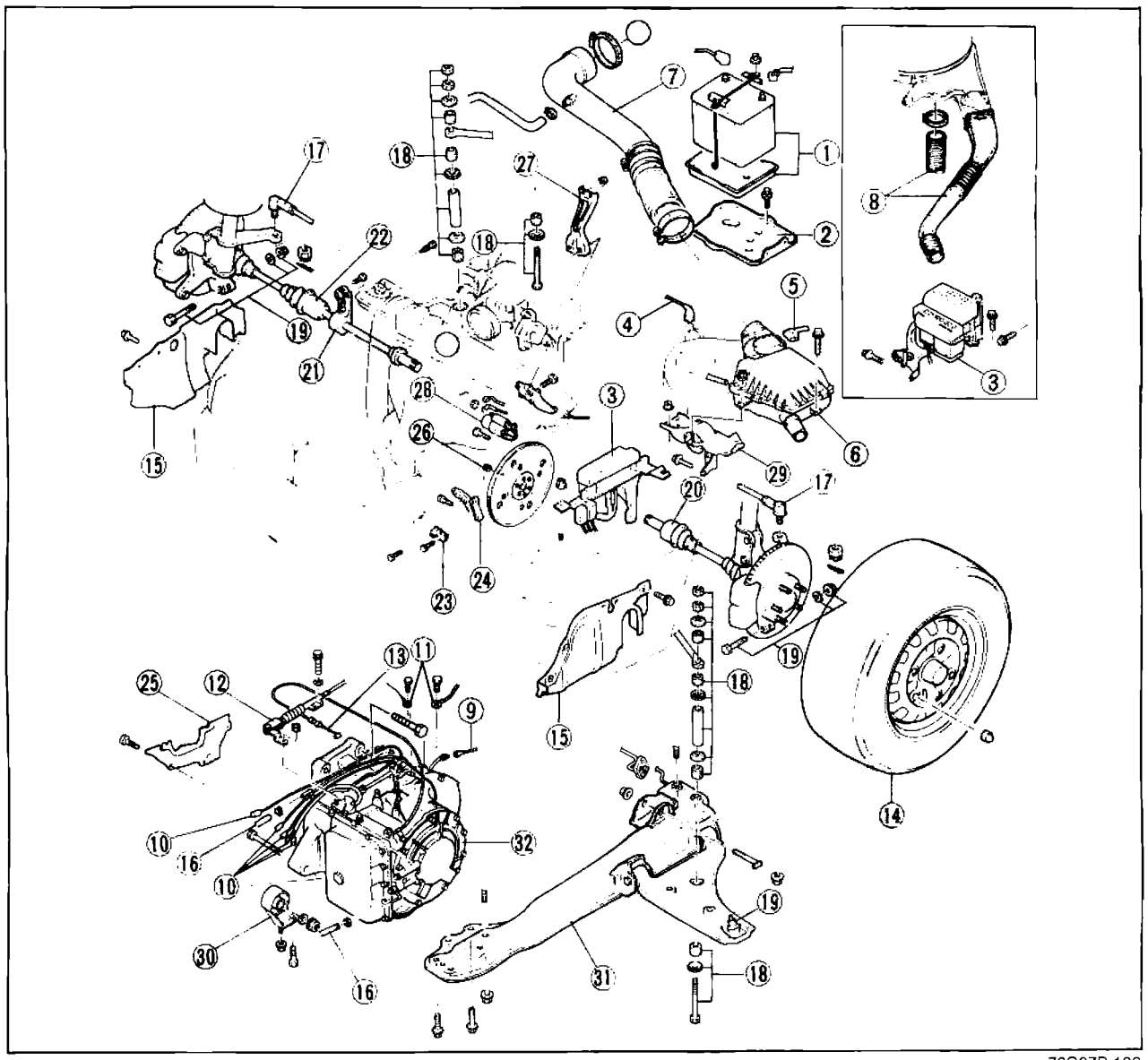
Tightening torque:
6—9 N·m (60—90 cm-kg, 52—78 in-lb)

REMOVAL

PRECAUTION

(1) Drain the ATF before removal.
(2) Jack up the vehicle and support it with safety stands after attaching the engine support.

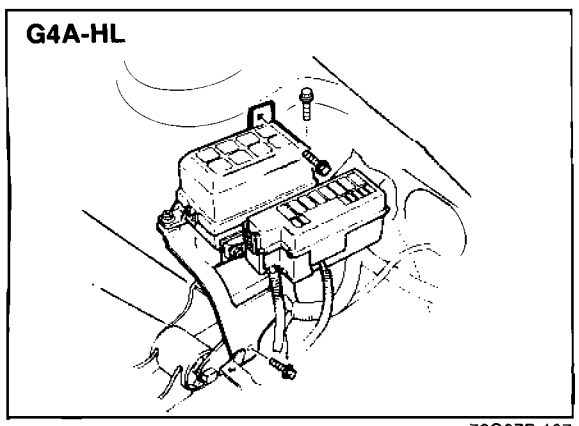
Components



76G07B-106

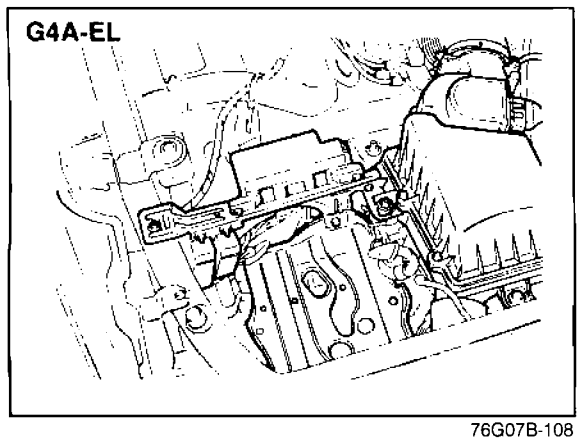
1. Battery
2. Battery carrier
3. Main fuse block
4. Distributor lead
5. Air flow meter connector (G4A-EL)
6. Air cleaner assembly (G4A-EL)
7. Air cleaner hose (G4A-EL)
8. Fresh air duct (G4A-HL)
9. Speedometer cable
10. Connectors
11. Grounds
12. Selector cable
13. Throttle cable
14. Front wheels
15. Splash shields
16. Oil cooler outlet and inlet hoses
17. Tie-rod ends
18. Stabilizer bar control links
19. Lower arm ball joints
20. Driveshaft
21. Joint shaft bracket
22. Joint shaft and driveshaft
23. Exhaust pipe bracket
24. Gusset plates
25. Under cover
26. Torque converter nuts
27. Manifold bracket (G4A-EL)
28. Starter
29. Engine mount No.4
30. Engine mount No.2
31. Crossmember and left side lower arm
32. Transaxle

7B REMOVAL



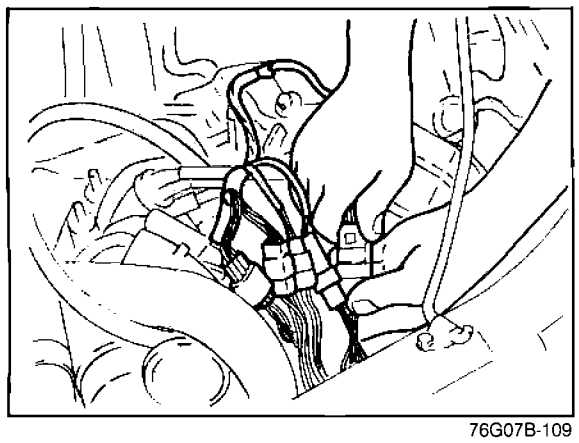
76G07B-107

1. Remove the battery and battery carrier.
2. Disconnect the main fuse block.



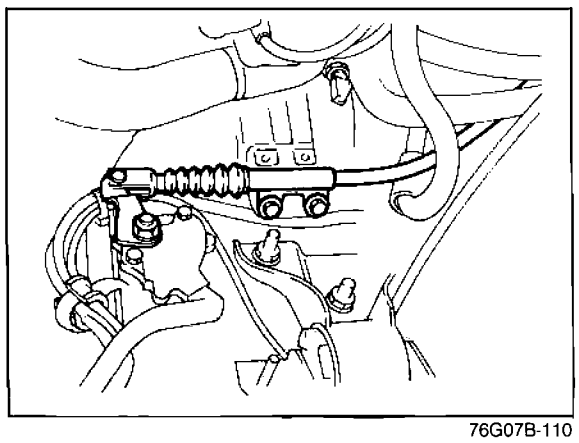
76G07B-108

3. Disconnect the distributor lead.
4. Disconnect the air flow meter connector and remove the air cleaner assembly. (G4A-EL)
5. Remove the air cleaner hose. (G4A-EL)
6. Remove the fresh air duct. (G4A-HL)



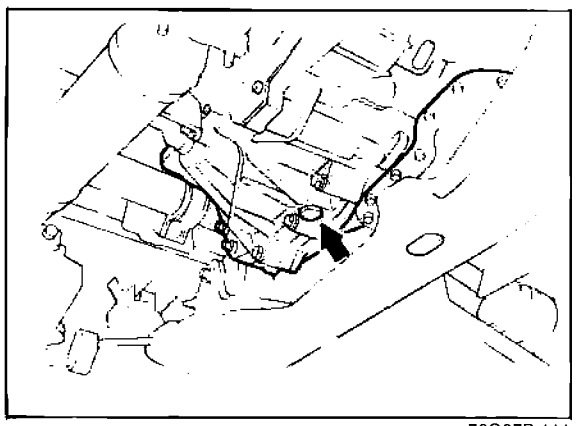
76G07B-109

7. Disconnect the speedometer cable.
8. Disconnect the connectors.
   (1) Inhibitor switch
   (2) Solenoid valve
   (3) Pulse generator (G4A-EL)
   (4) Fluid temperature switch (G4A-EL)
9. Disconnect the grounds from the transaxle case.



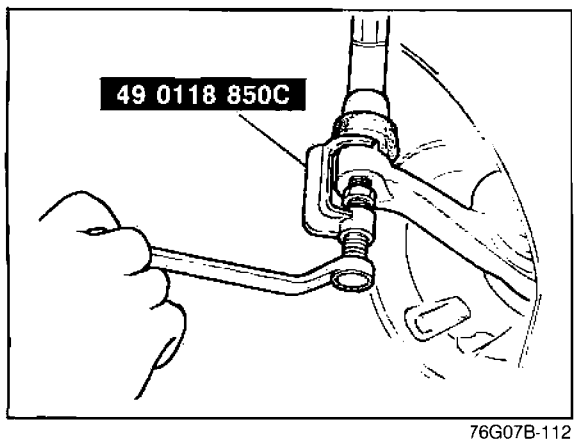
76G07B-110

10. Disconnect the selector cable.
11. Disconnect the throttle cable.



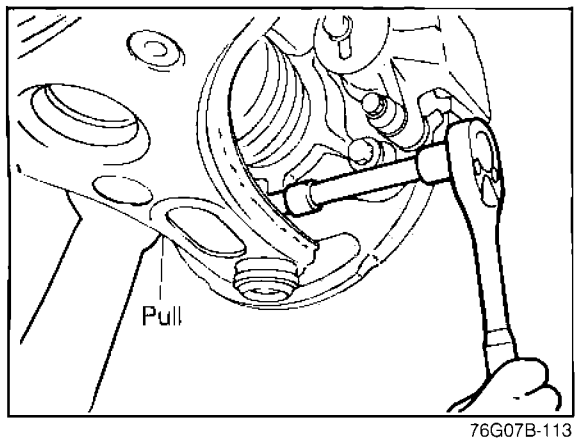
76G07B-111

12. Remove the front wheels.
13. Remove the splash shields.
14. Drain the ATF.
15. Disconnect the oil cooler outlet and inlet hoses.



76G07B-112

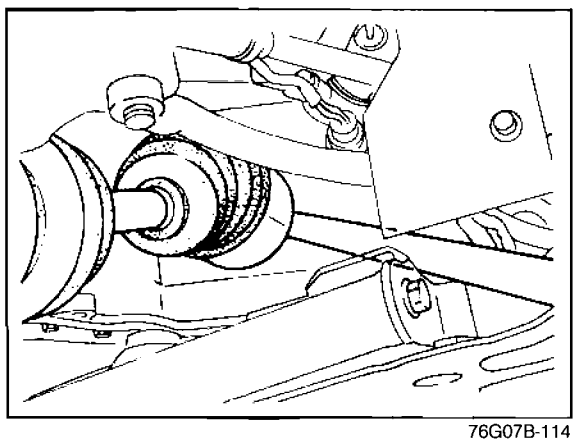
16. Disconnect the tie-rod ends with the **SST**.



76G07B-113

17. Remove the stabilizer bar control links.
18. Remove the bolts and nuts at the left and right lower arm ball joints.
19. Pull the lower arms downward to separate them from the knuckles.

Caution
Do not damage the ball joint dust boots.

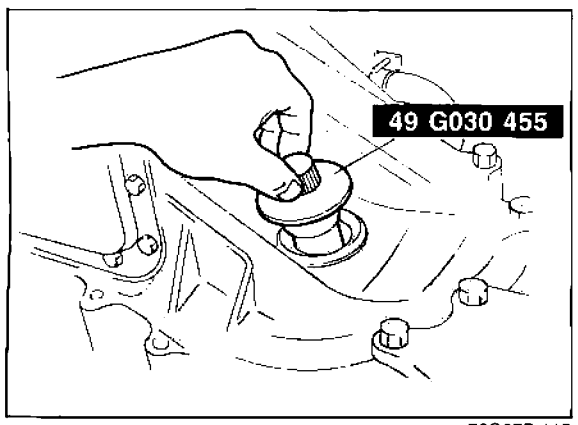


76G07B-114

20. Separate the left driveshaft from the transaxle by prying with a bar inserted between the shaft and the case.

Caution
Do not damage the oil seal.

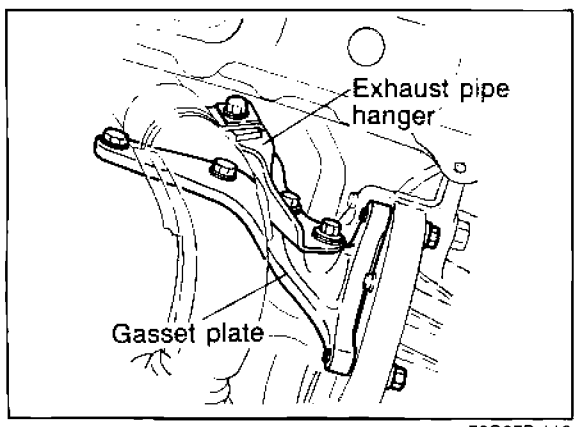
21. Remove the joint shaft bracket.
22. Separate the right driveshaft together with the joint shaft in the same manner.



76G07B-115

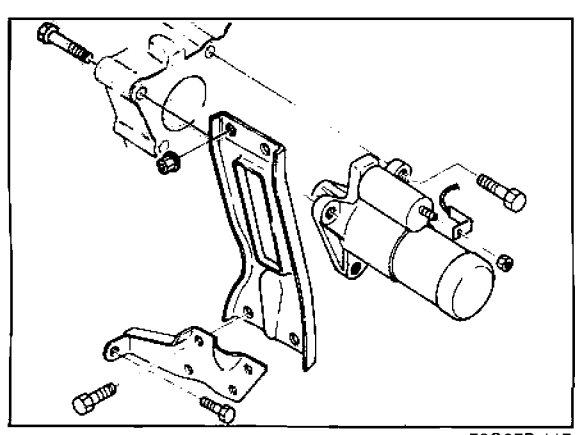
23. Install the **SST** into the differential side gears.

Caution
Failure to install the SST may allow the differential side gears to become misaligned.



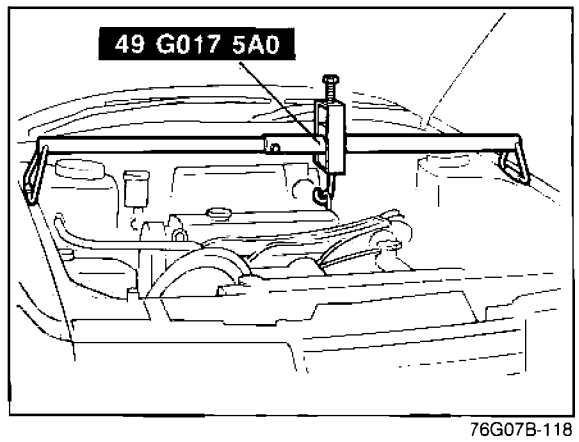
76G07B-116

24. Remove the exhaust pipe hanger and gusset plates.
25. Remove the under cover.
26. Remove the torque converter nuts.



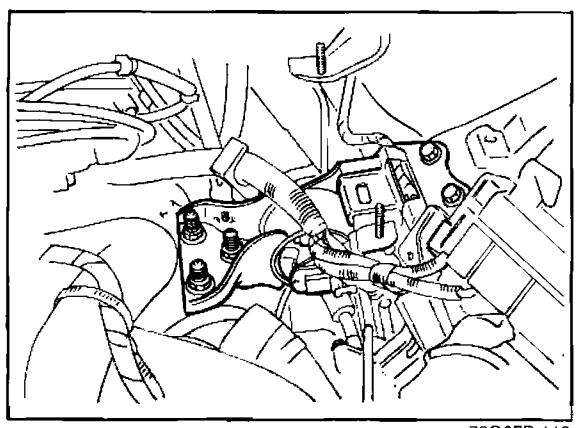
76G07B-117

27. Remove the manifold bracket. (G4A-EL)
28. Remove the starter.



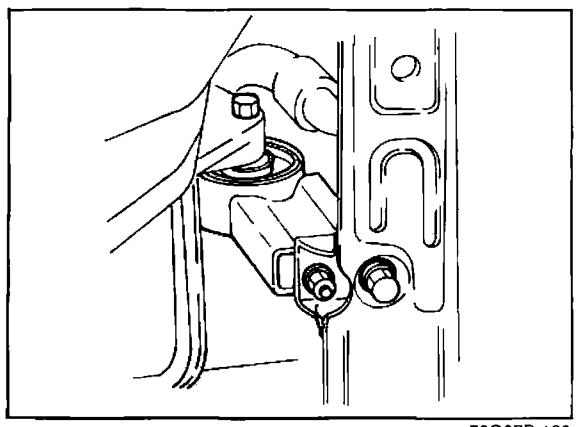
76G07B-118

29. Suspend the engine with the **SST**.



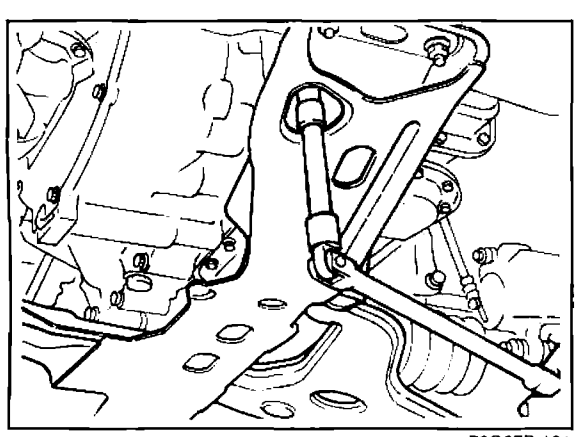
76G07B-119

30. Remove engine mount No. 4 and bracket.



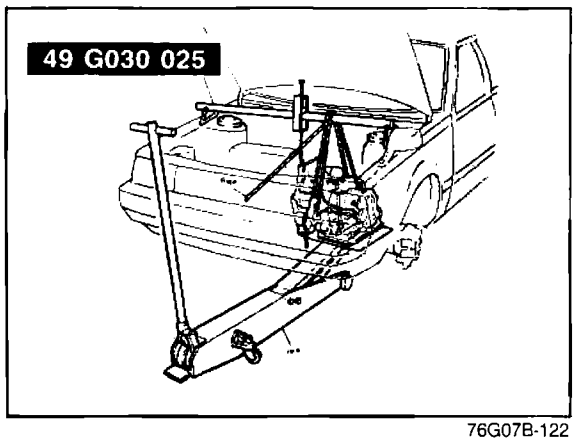
76G07B-120

31. Remove engine mount No. 2.



76G07B-121

32. Remove the crossmember and the left side lower arm as an assembly.

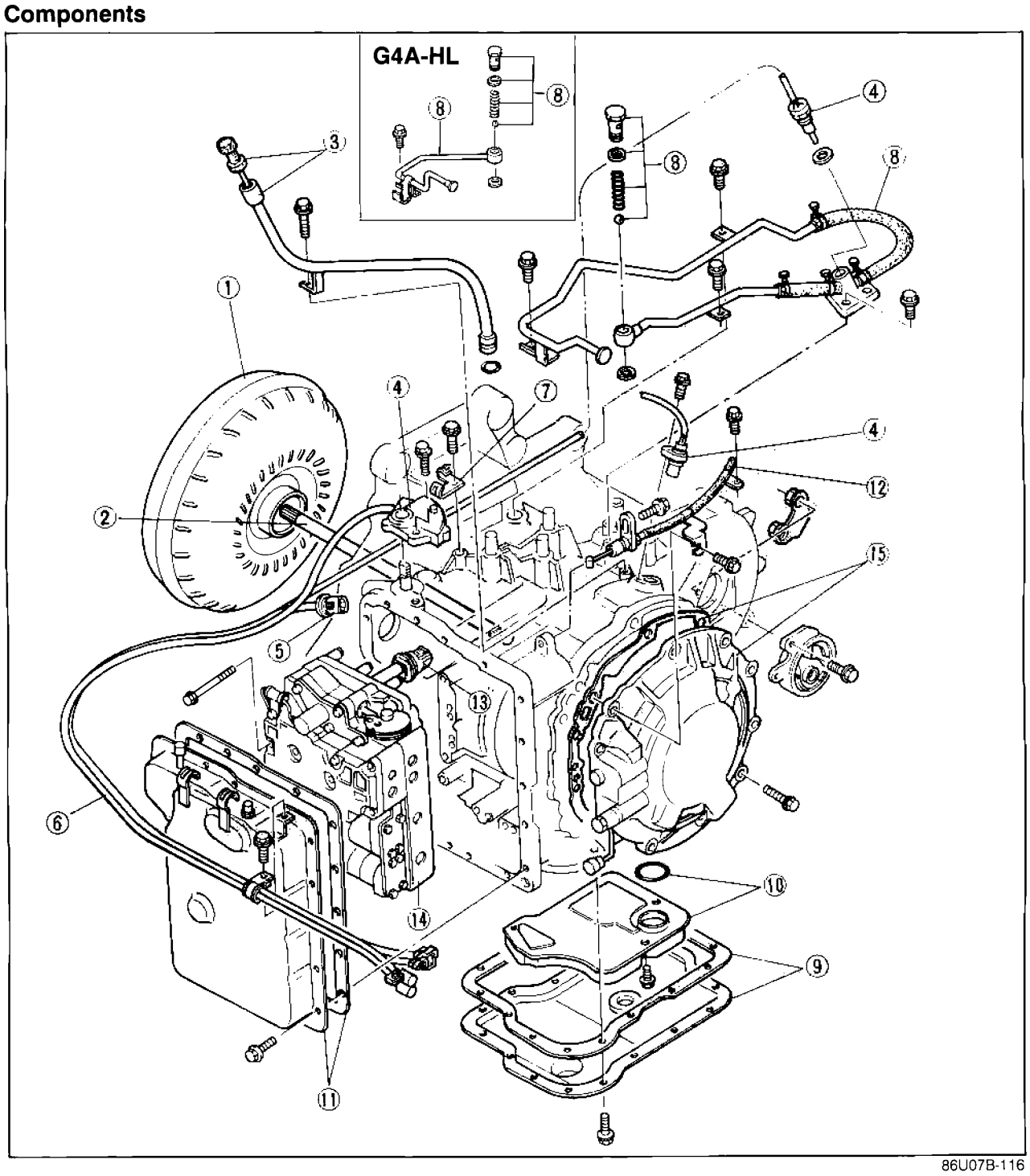


76G07B-122

33. Lean the engine toward the transaxle by loosening the engine support hook bolt.
34. Support the transaxle with a jack.
35. Remove the transaxle mounting bolts.
36. Remove the transaxle.

DISASSEMBLY

DISASSEMBLY-STEP 1
Components

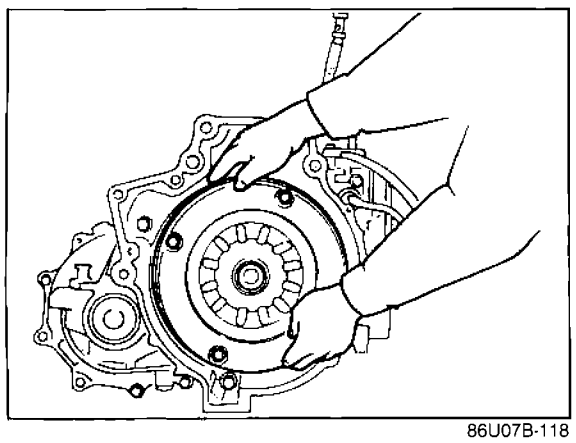


86U07B-116

1. Torque converter
2. Oil pump shaft
3. Oil level gauge and oil filler tube
4. Pulse generator, fluid temperature switch, and inhibitor switch
5. Solenoid connector
6. Wire harnesses
7. Harness clip
8. Oil pipes, oil hoses, and switch box
9. Oil pan and gasket
10. Oil strainer and O-ring
11. Control valve body cover and gasket
12. Throttle cable
13. Solenoid connector (Valve body side)
14. Control valve body
15. Oil pump and gasket

Procedure
Precaution
(1) Drain the ATF before removing the transaxle from the vehicle.
(2) Disassemble the transaxle in a clean area (dustproof workspace) to prevent dust entry into the mechanisms.
(3) Clean the transaxle exterior thoroughly with steam and/or cleaning solvents prior to disassembly.
(4) Inspect the individual transaxle components in accordance with the Troubleshooting during disassembly.
(5) Use plastic hammers when applying force to separate the light alloy case joints.
(6) Do not use rags during disassembly.
(7) Neatly arrange the removed parts in order during disassembly.

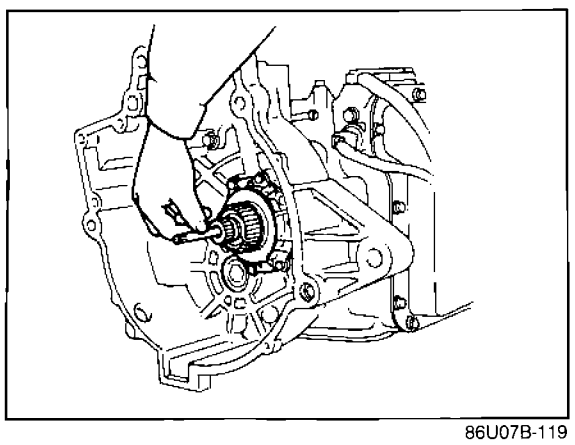
86U07B-117



86U07B-118

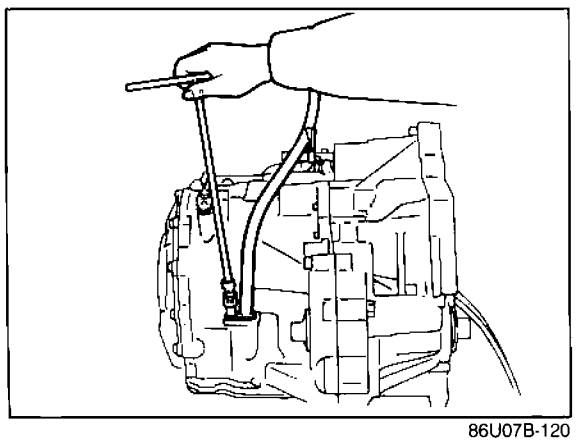
1. Remove the torque converter from the converter housing.

Note
Do not allow the ATF to spill when removing the torque converter.



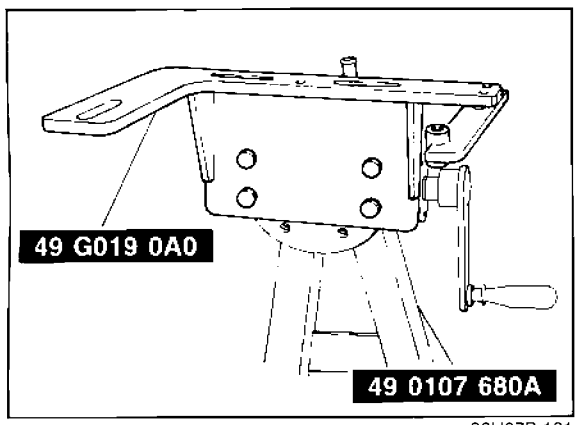
86U07B-119

2. Pull out the oil pump shaft by hand.



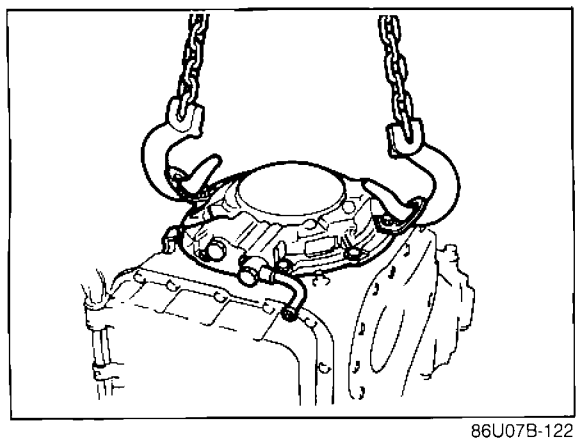
86U07B-120

3. Remove the oil level gauge and oil filler tube.



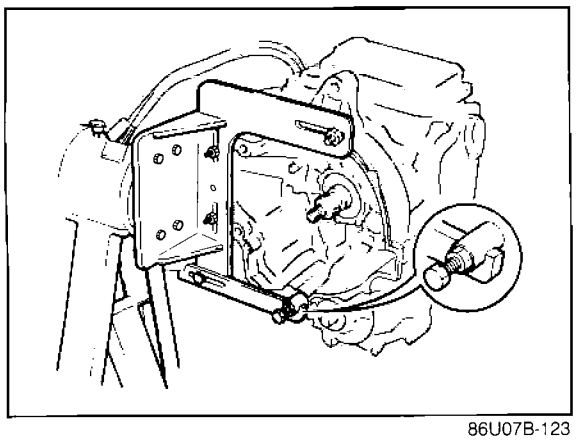
86U07B-121

4. Assemble the **SST**.



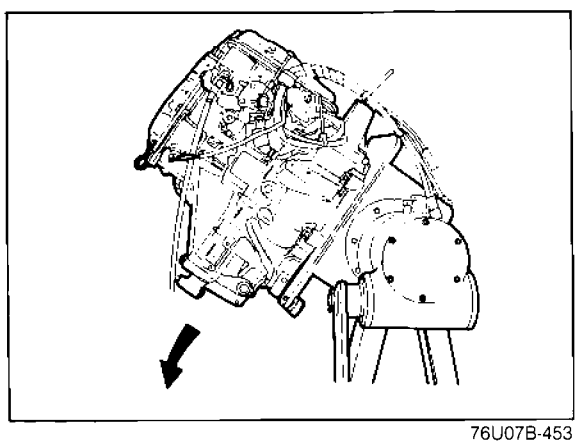
86U07B-122

5. Lift the transaxle and mount it on the **SST**.



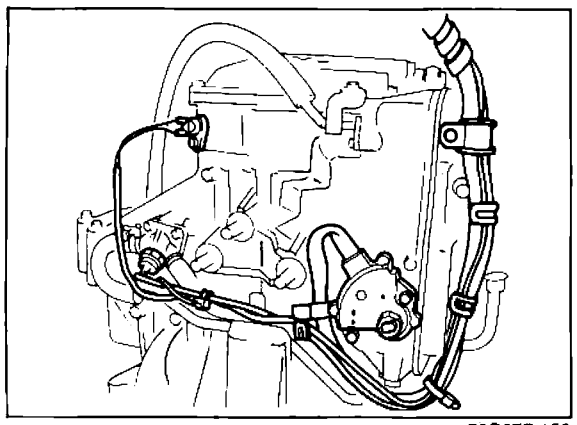
86U07B-123

Note
Attach the suitable hanger to the oil pump as shown.



76U07B-453

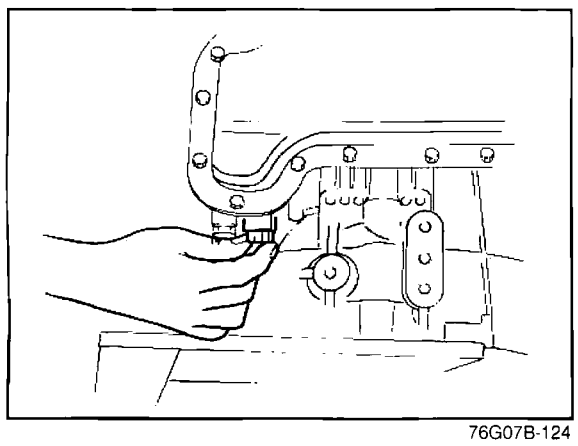
Warning
Avoid leaning the transaxle to one side during disassembly, it may turn quickly and cause injury.



76G07B-123

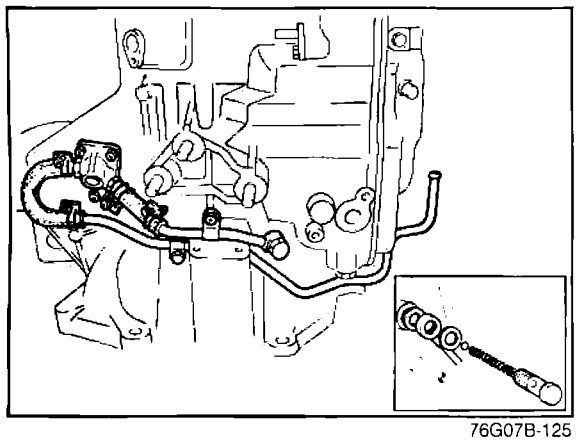
6. **G4A-EL**
Remove the pulse generator, fluid temperature switch, and inhibitor switch.

G4A-HL
Remove the inhibitor switch.



76G07B-124

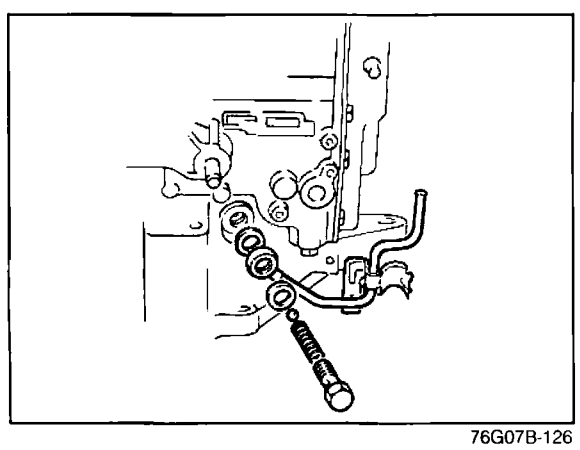
7. Disconnect the solenoid connector.
8. Remove the harnesses.



76G07B-125

9. **G4A-EL**
Remove the harness clip, then remove the oil pipes, oil hoses and switch box as an assembly.

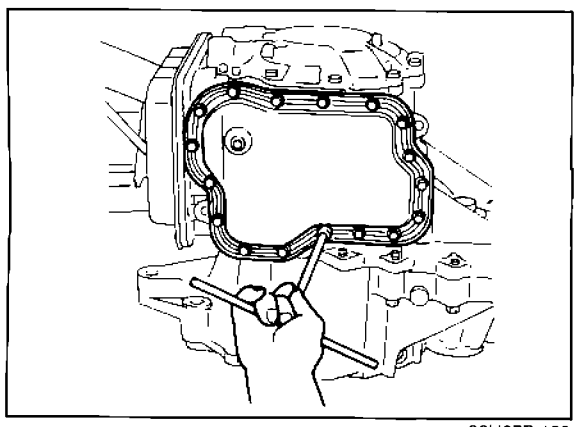
Note
Remove the ball from the case.



76G07B-126

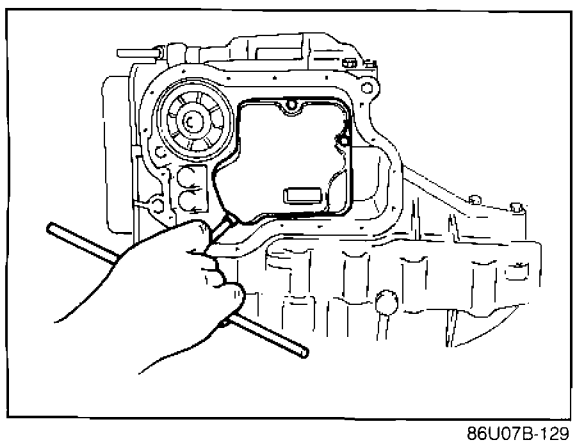
G4A-HL
Remove the oil pipe.

Note
Remove the ball from the case.



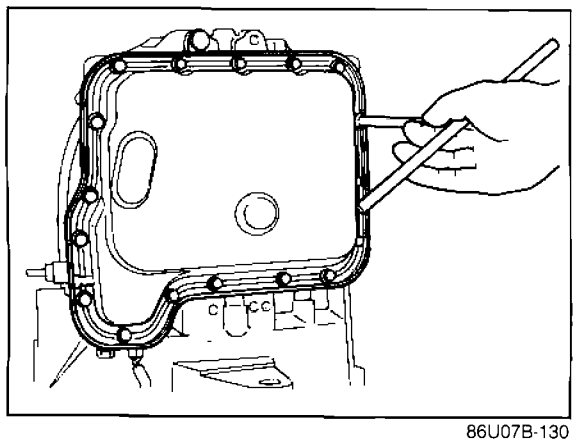
86U07B-128

10. Remove the oil pan and gasket.



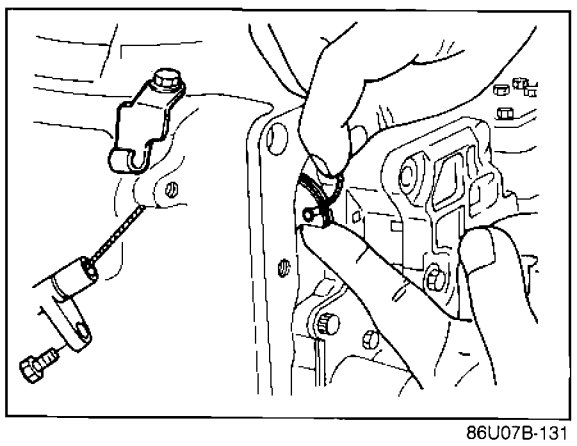
86U07B-129

11. Remove the oil strainer and O-ring.



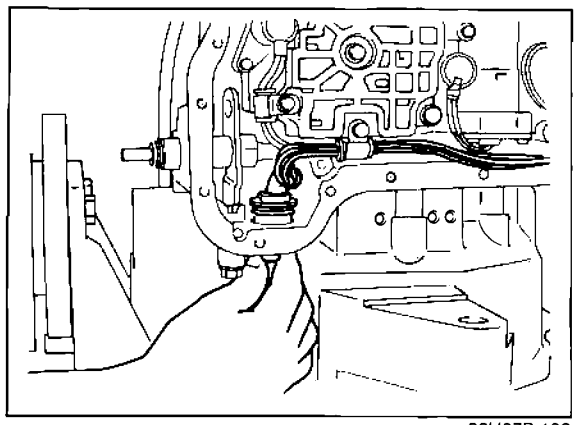
86U07B-130

12. Remove the control valve body cover and gasket.



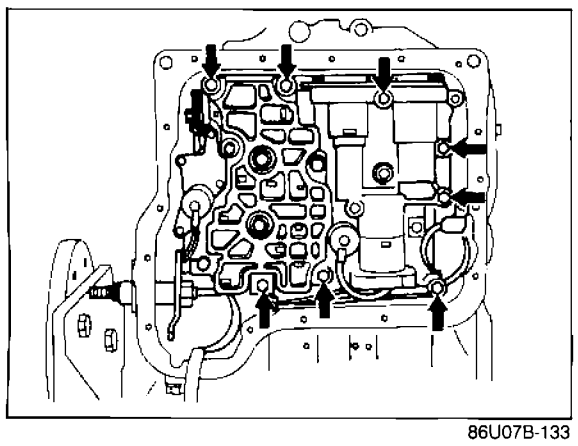
86U07B-131

13. Remove the throttle cable.
    (1) Remove the throttle cable attaching bolt and bracket.
    (2) Remove the cable from the throttle cam of the valve body.



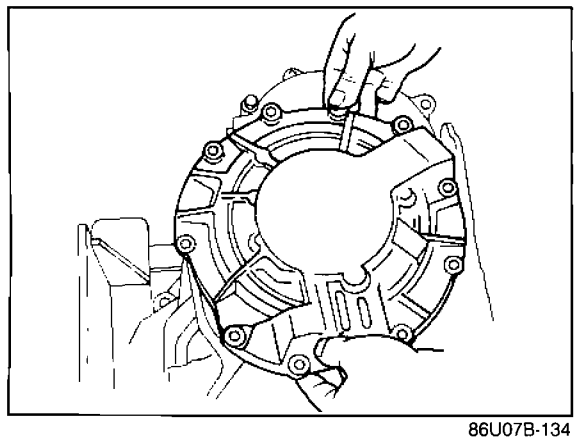
86U07B-132

14. Pinch the teeth of the solenoid connector and remove it by pushing inward.



86U07B-133

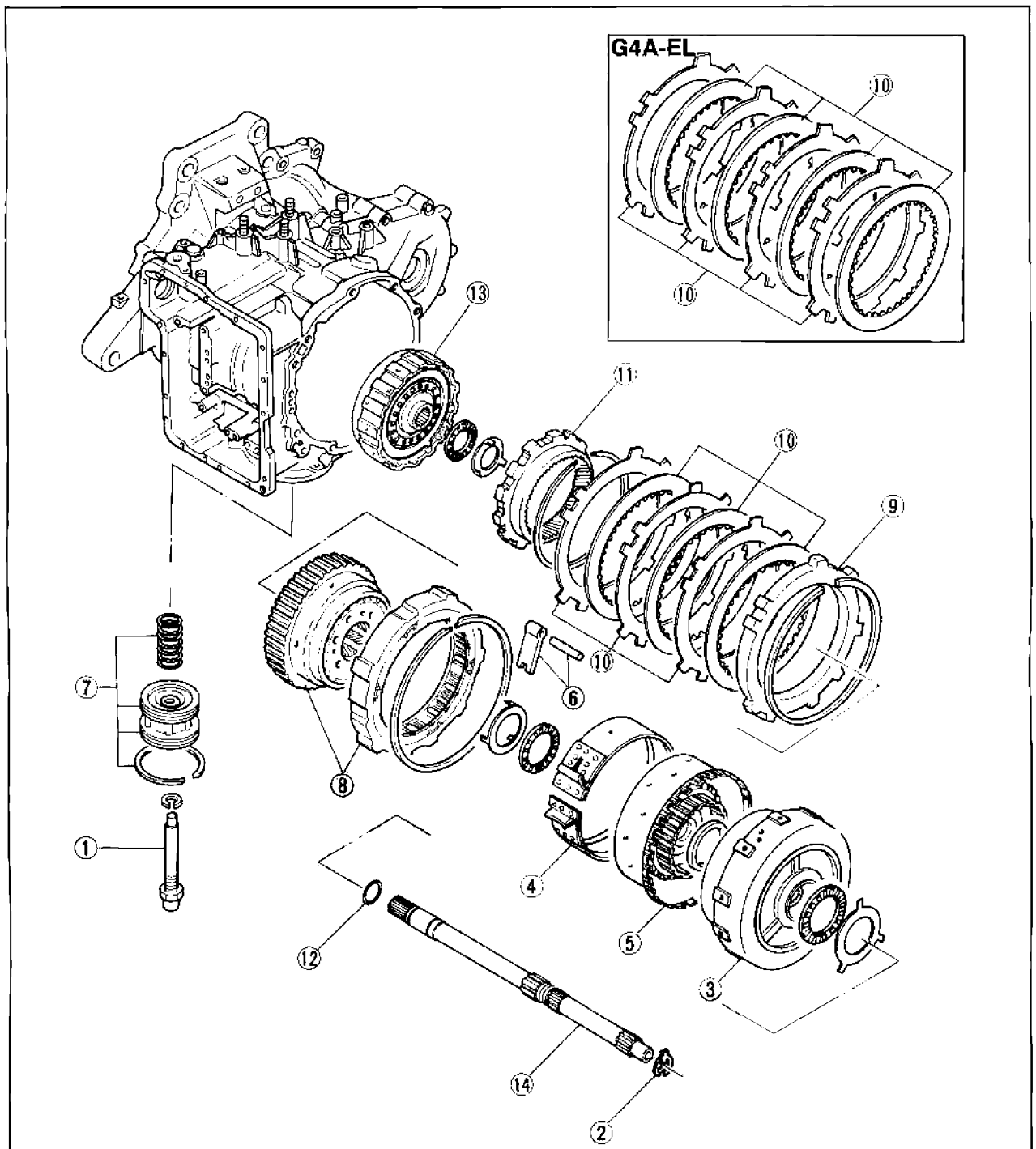
15. Remove the control valve body as an assembly.



86U07B-134

16. Remove the oil pump as an assembly.

DISASSEMBLY-STEP 2
Components

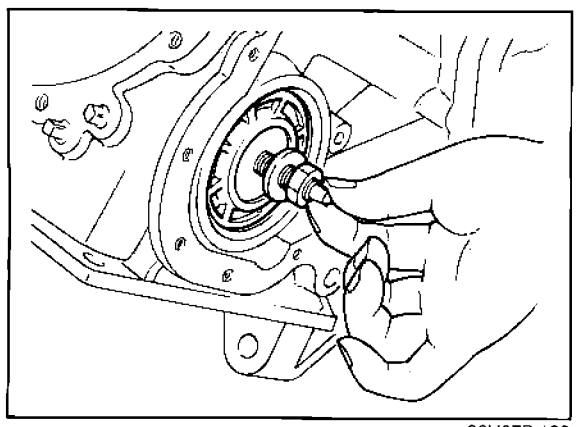


86U07B-135

1. Piston stem
2. Snap ring
3. Clutch assembly
4. 2-4 brake band
5. Small sun gear and one-way clutch
6. Anchor strut and shaft
7. Servo
8. One-way clutch and carrier hub assembly

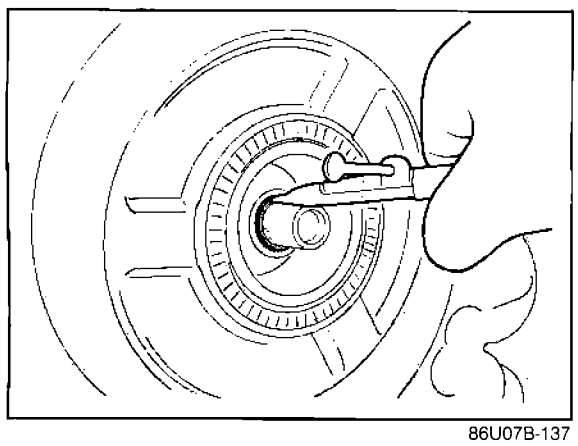
—Low and reverse brake—

9. Retaining plate
10. Drive and driven plates
11. Internal gear
12. O-ring
13. 3-4 clutch assembly
14. Turbine shaft



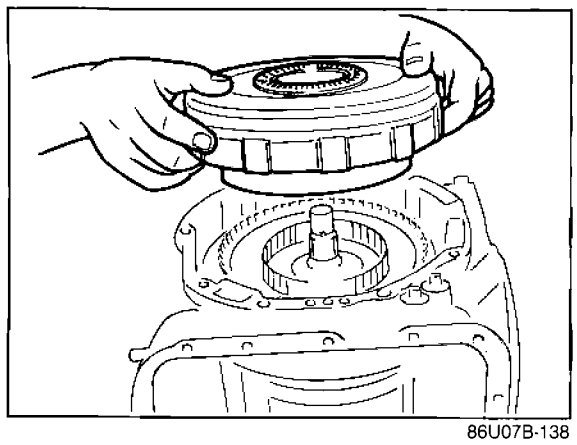
86U07B-136

Procedure
1. Remove the piston stem from the servo.



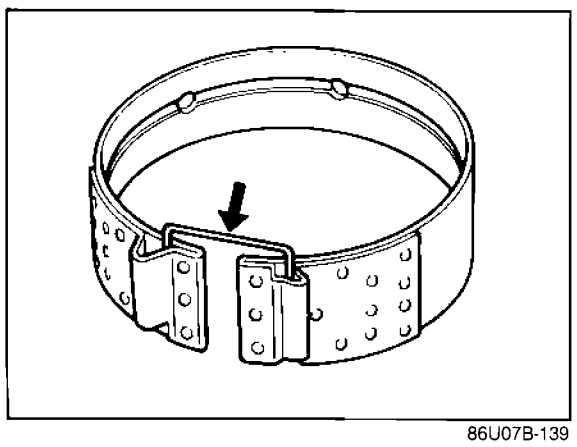
86U07B-137

2. Remove the clutch assembly.
   (1) Remove the turbine shaft snap ring.



86U07B-138

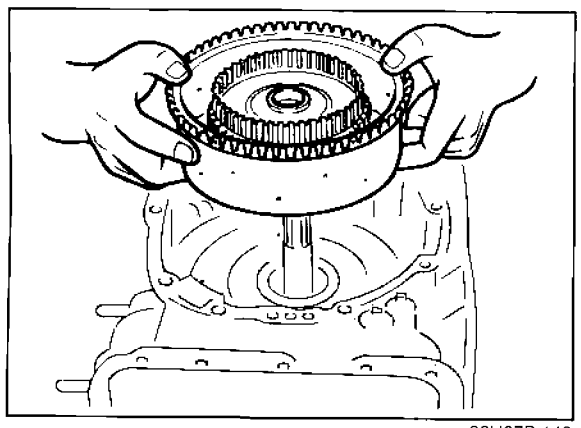
   (2) Pull the reverse and forward drum and remove the clutch assembly.



86U07B-139

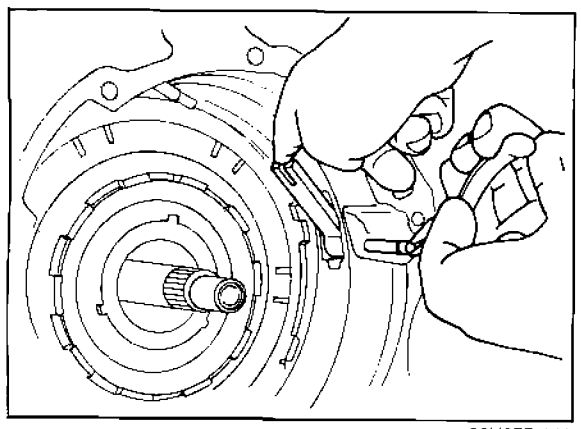
3. Remove the 2-4 brake band.

Note
Use a piece of wire to secure the brake band so that it is not damaged by being stretched.



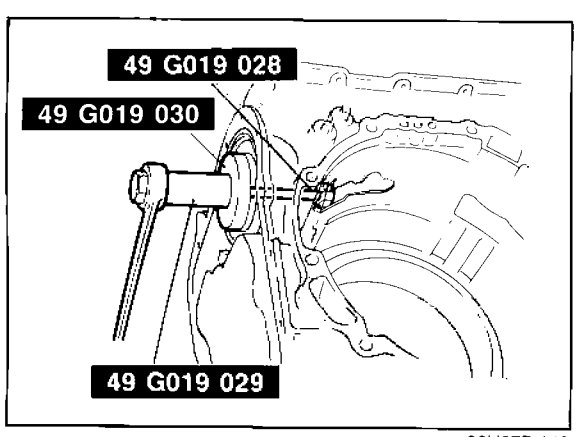
86U07B-140

4. Remove the small sun gear and one-way clutch.



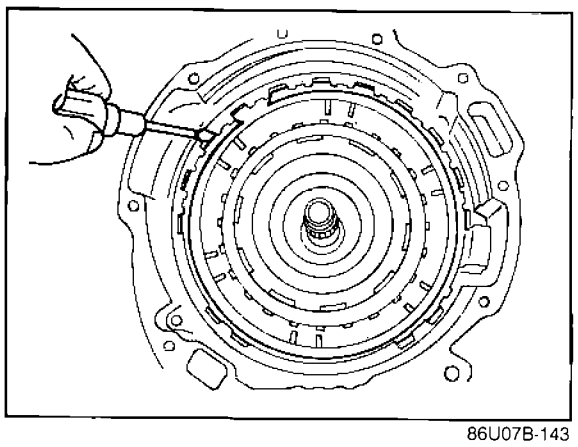
86U07B-141

5. Pull the anchor shaft while holding the strut, then remove the strut.



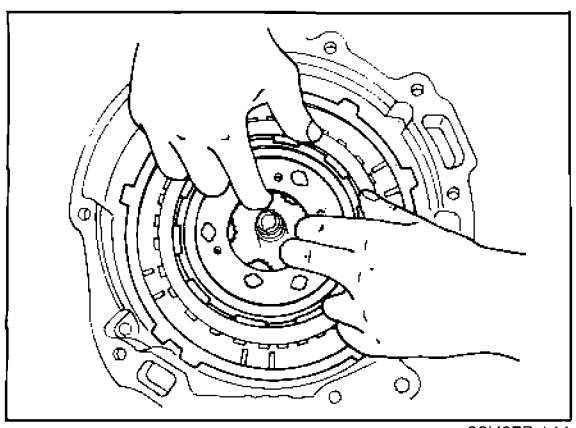
86U07B-142

6. Remove the servo.
   (1) Remove the snap ring with the **SST**.
   (2) Remove the servo and spring.



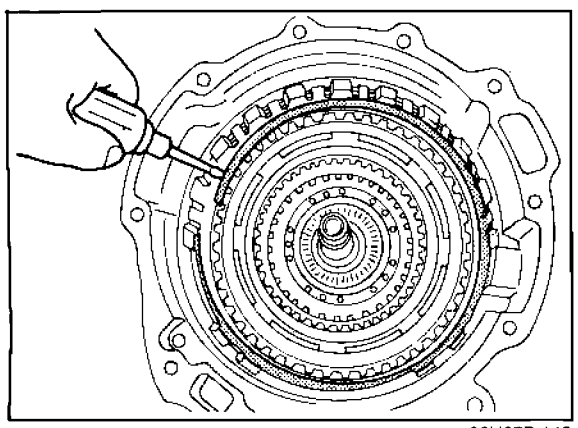
86U07B-143

7. Remove the one-way clutch and carrier hub assembly.
   (1) Remove the snap ring.



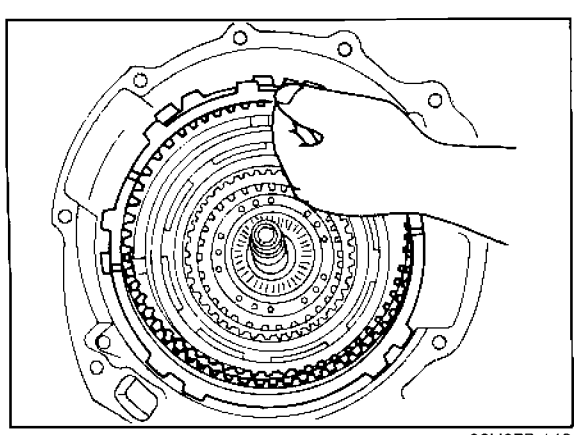
86U07B-144

(2) Remove the one-way clutch together with the carrier hub assembly.



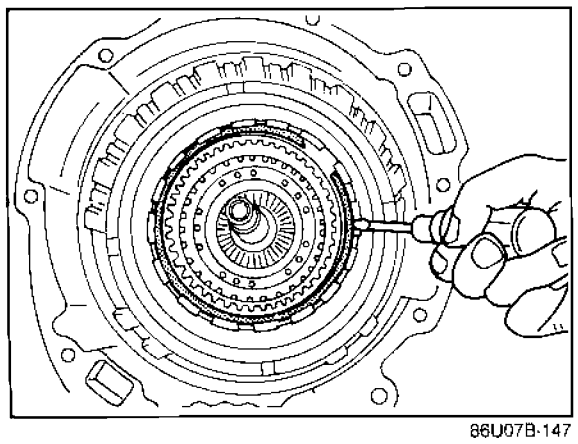
86U07B-145

8. Remove the low and reverse brake assembly.
   (1) Remove the snap ring.



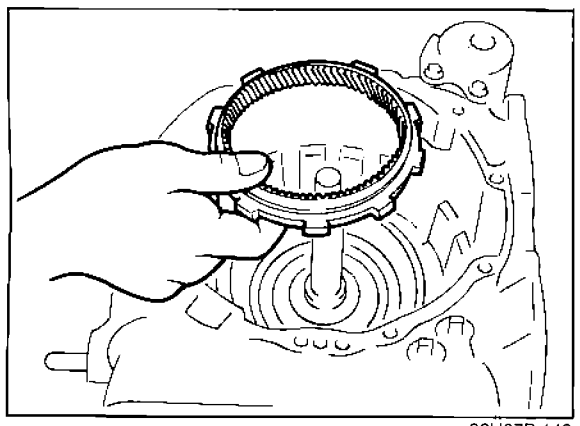
86U07B-146

(2) Remove the retaining plate and the drive and driven plates.



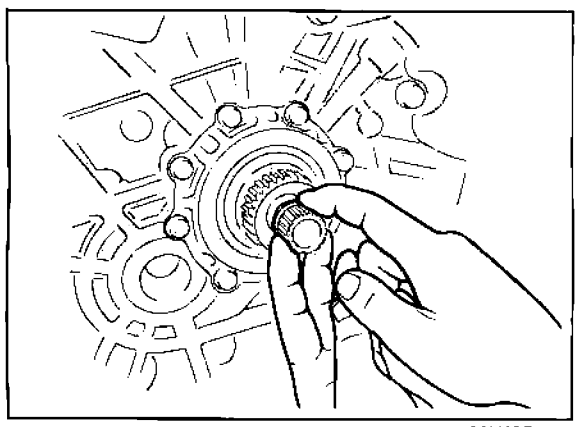
86U07B-147

9. Remove the internal gear.
   (1) Remove the snap ring.



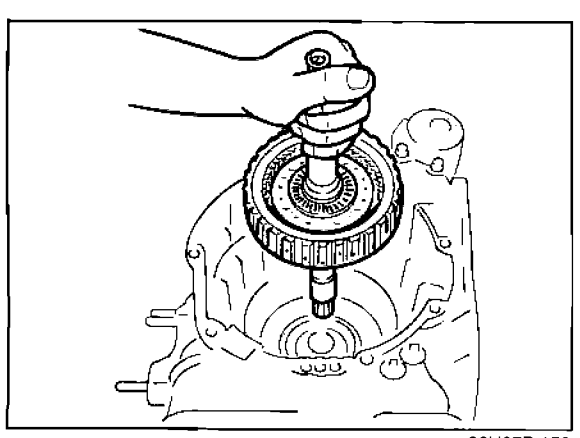
86U07B-148

(2) Remove the internal gear from the 3-4 clutch drum.



86U07B-149

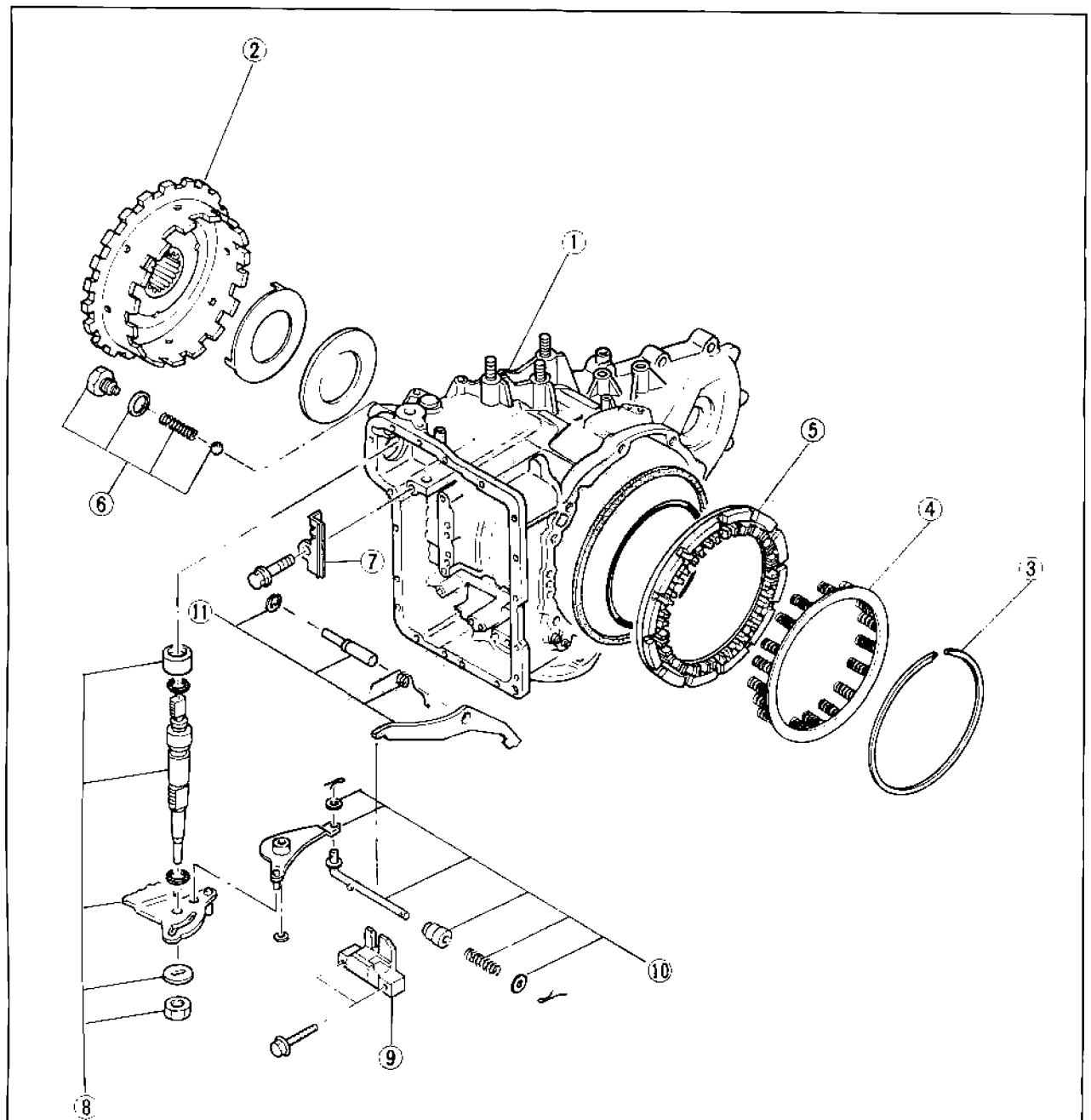
10. Remove the 3-4 clutch assembly.
    (1) Remove the O-ring from the turbine shaft at the converter housing side.



86U07B-150

(2) Pull out the turbine shaft to remove the 3-4 clutch assembly.
(3) Remove the 3-4 clutch assembly.

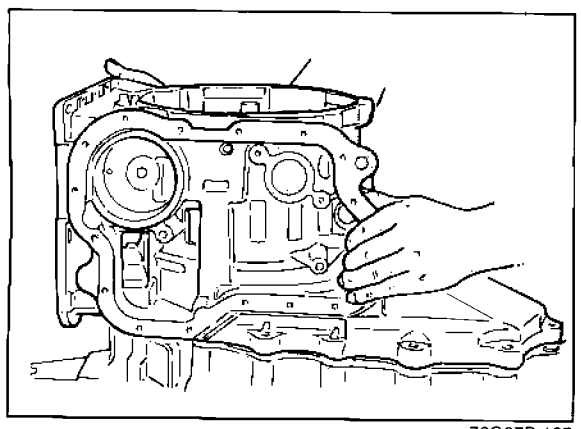
DISASSEMBLY-STEP 3
Component



86U07B-151

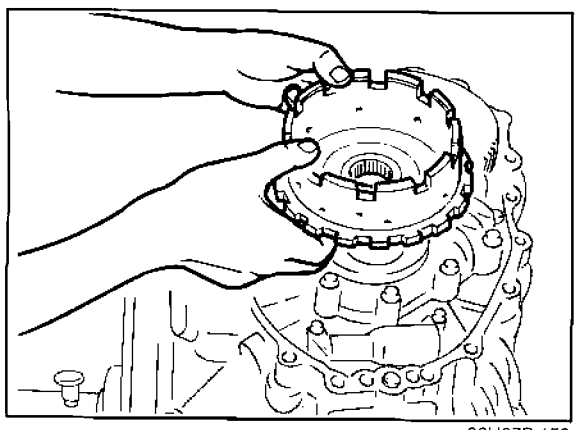
1. Transaxle case
2. Output shell
3. Snap ring
4. Spring and retainer assembly
5. Low and reverse brake piston
6. Plug, washer, spring, and detent ball
7. Bracket
8. Manual shaft and manual plate
9. Actuator support
10. Parking assist lever
11. Parking pawl

7B DISASSEMBLY



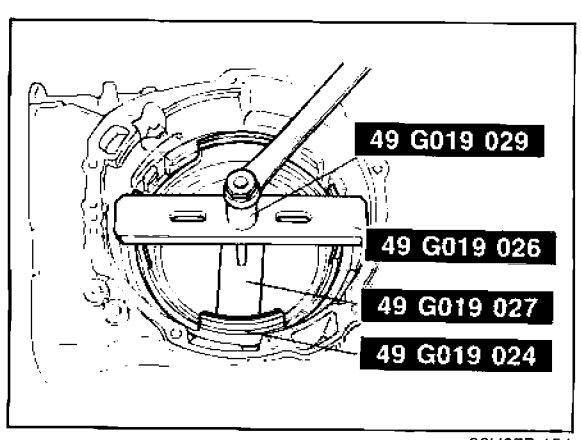
76G07B-127

1. Remove the bolts; then remove the transaxle case by tapping lightly with a plastic hammer.



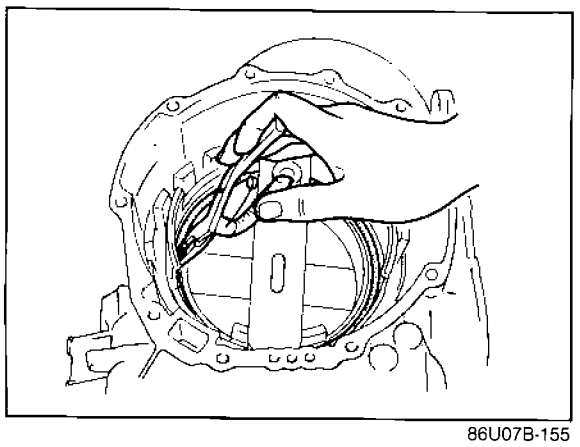
86U07B-153

2. Remove the output shell from the output gear.

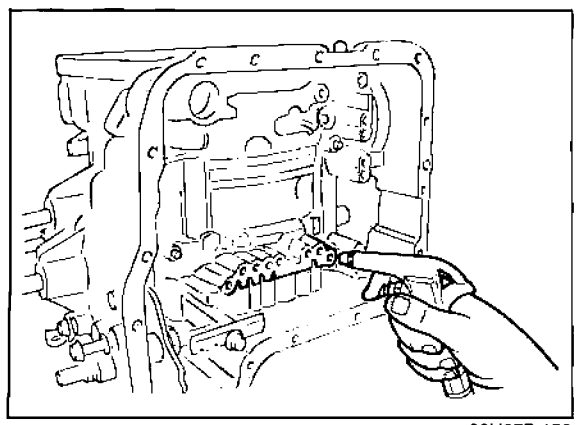


86U07B-154

3. Remove the low and reverse brake piston
   (1) Install the **SST**.
   (2) Compress the spring and retainer assembly.
   (3) Remove the snap ring with snap ring pliers; then remove the spring and retainer assembly.

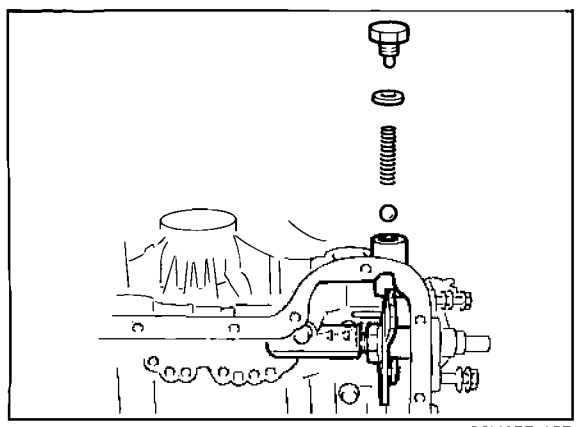


86U07B-155



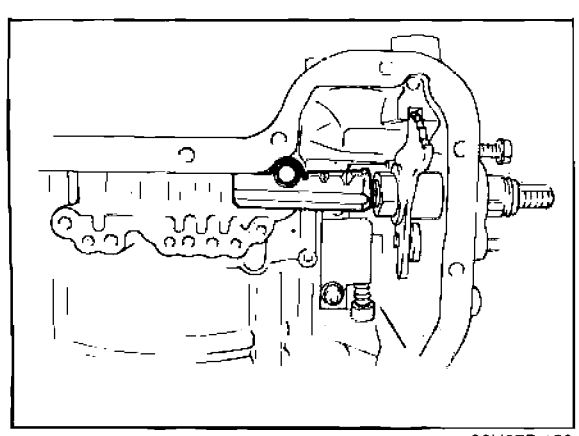
86U07B-156

(4) Remove the low and reverse brake piston by applying compressed air through the fluid passage.



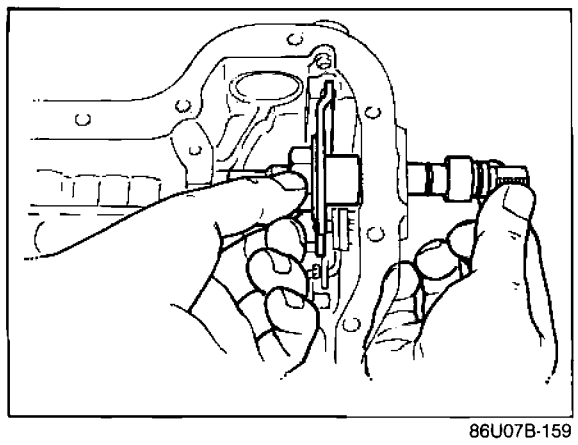
86U07B-157

4. Remove the manual shaft and manual plate.
   (1) Remove the plug, washer, spring, and detent ball.



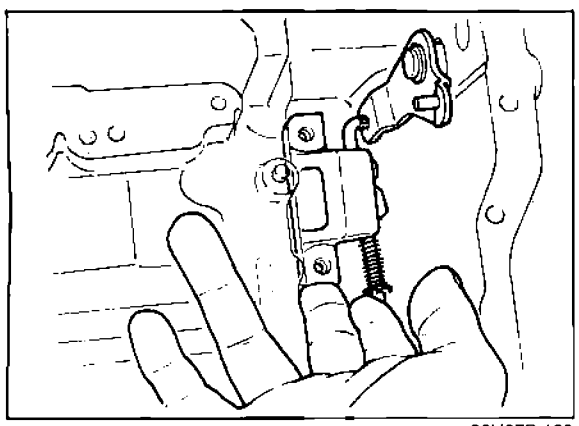
86U07B-158

(2) Remove the bracket.



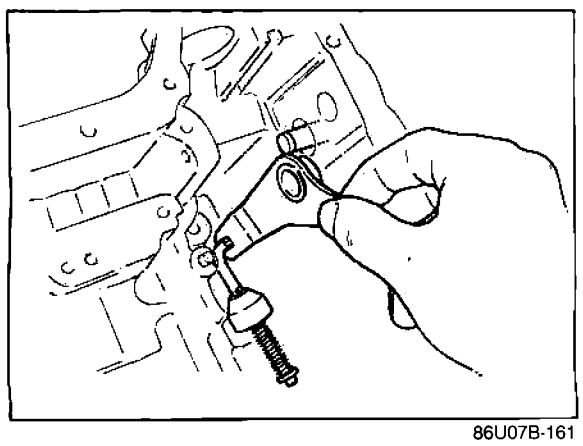
86U07B-159

(3) Loosen the nut and pull the manual shaft out.
(4) Remove the nut, washer, spacer, and manual plate.



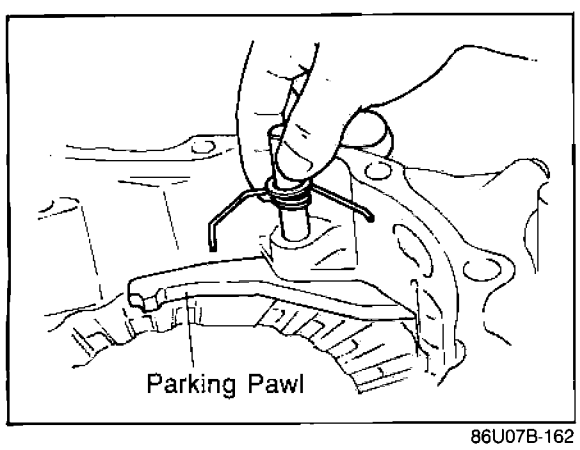
86U07B-160

5. Remove the actuator support.



86U07B-161

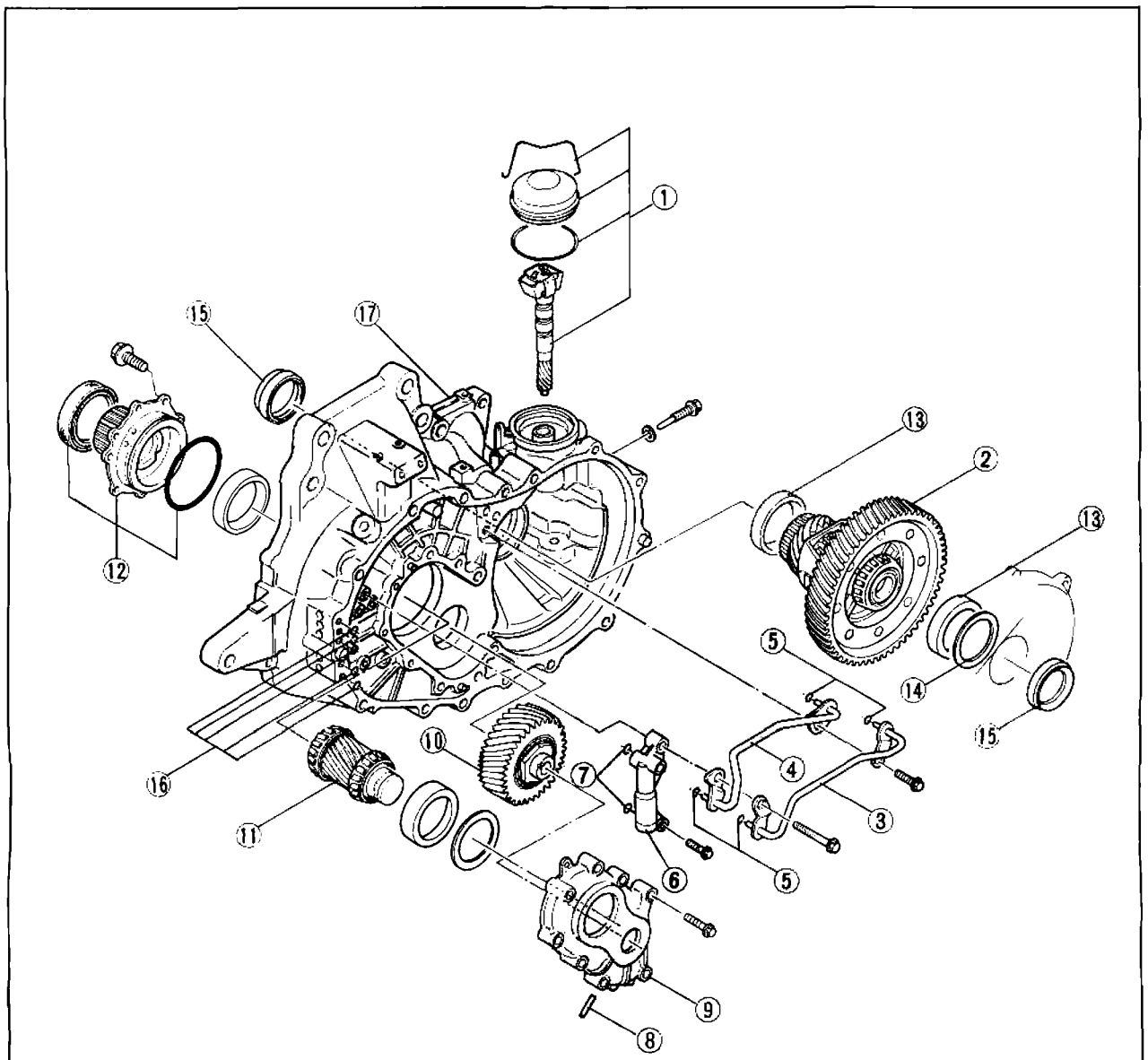
6. Remove the snap ring, then remove the parking assist lever.



86U07B-162

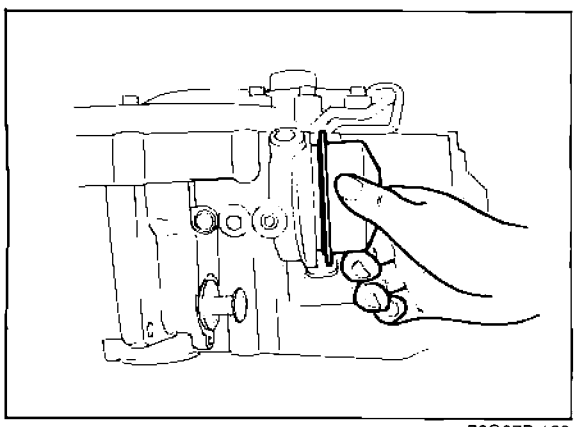
7. Remove the parking pawl.
   (1) Remove the snap ring.
   (2) Pull the parking shaft, then remove the spring and parking pawl.

DISASSEMBLY—STEP 4
Component



76G07B-128

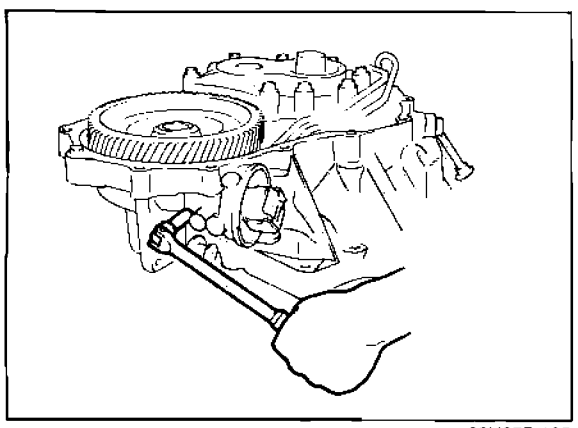
1. Governor assembly (G4A-HL)
2. Differential assembly
3. Governor outlet pipe (G4A-HL)
4. Governor inlet pipe (G4A-HL)
5. O-rings (G4A-HL)
6. 2-3 accumulator piston assembly
7. O-rings
8. Roll pin
9. Bearing housing
10. Idle gear assembly
11. Output gear assembly
12. Bearing cover assembly
13. Bearing outer races
14. Adjust shim
15. Oil seals
16. O-rings
17. Converter housing



76G07B-129

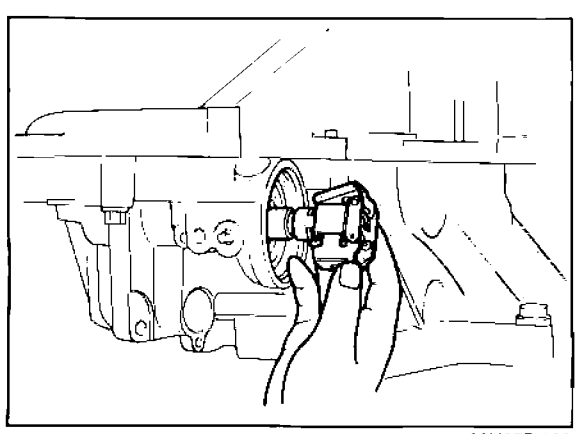
Procedure

1. Remove the governor assembly.
   (1) Remove the clip, governor cover and O-ring.



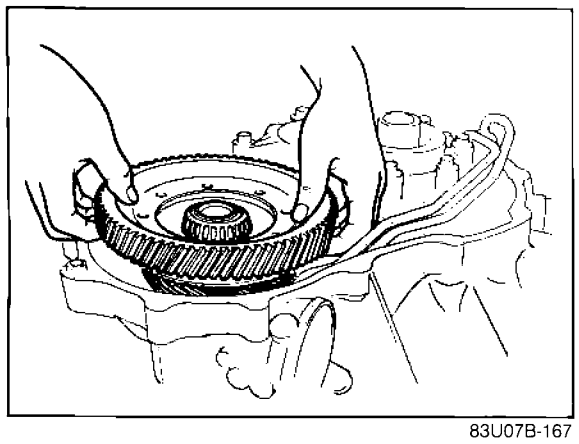
83U07B-165

(2) Remove the stopper bolt.



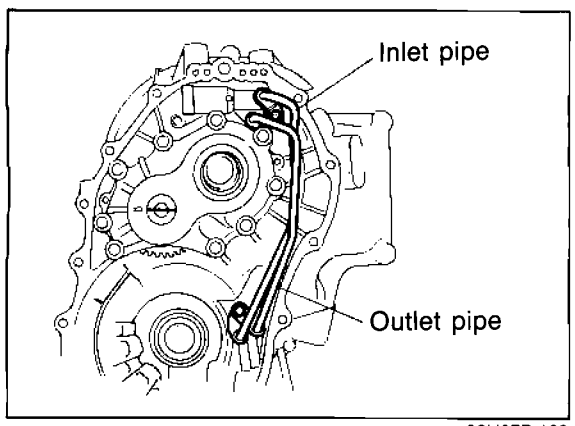
83U07B-166

(3) Remove the governor assembly.



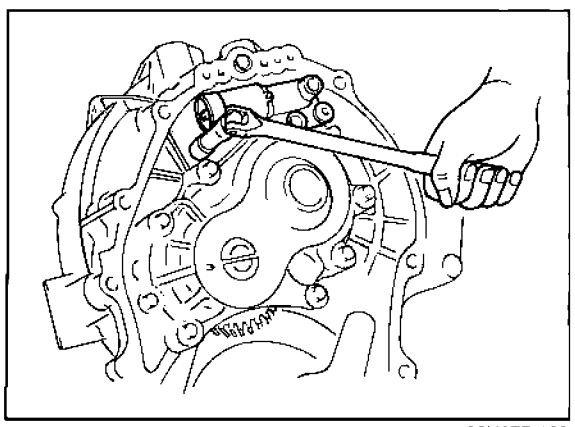
83U07B-167

2. Remove the differential assembly.



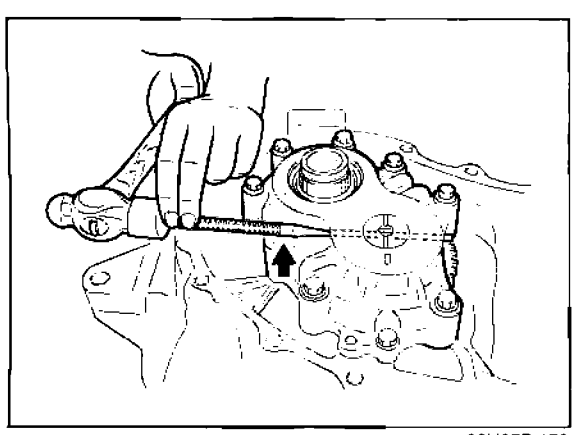
83U07B-168

3. Remove the governor outlet pipe, governor inlet pipe, and O-rings.



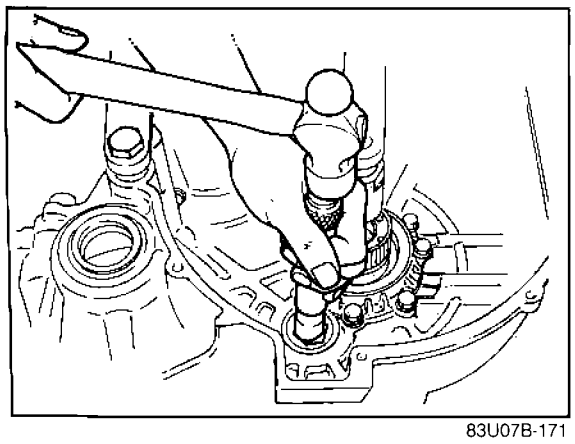
83U07B-169

4. Remove the 2-3 accumulator piston assembly and O-rings.



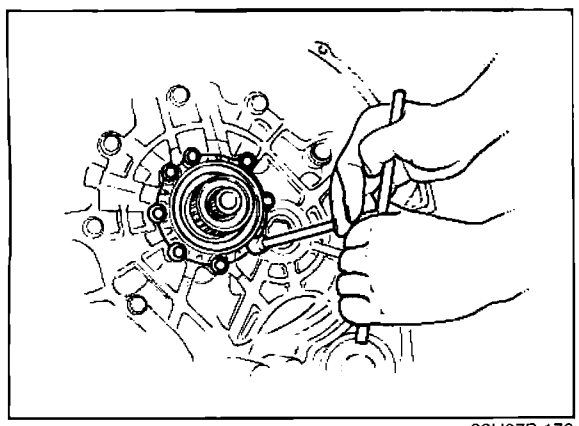
83U07B-170

5. Remove the bearing housing.
   (1) Remove the bolt indicated in the figure.
   (2) Remove the roll pin with a pin punch.
   (3) Remove the bearing housing by tapping lightly with a plastic hammer.



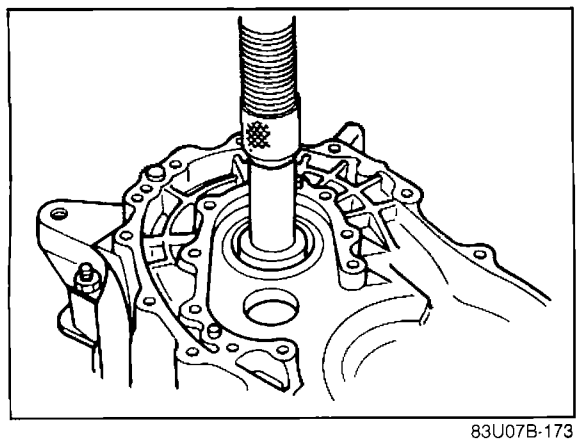
83U07B-171

6. Remove the idle gear assembly and output gear assembly by tapping out from the torque converter side.



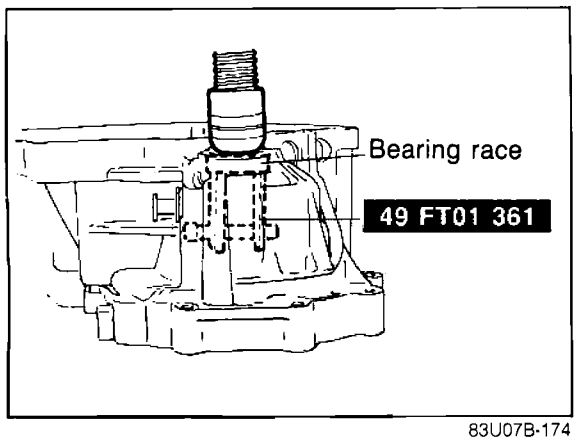
83U07B-172

7. Remove the bearing cover.
   (1) Remove the converter housing from the transaxle hanger.
   (2) Remove the bearing cover bolts.



83U07B-173

   (3) Press the bearing cover assembly out of the converter housing.



83U07B-174

8. Remove the bearing outer races.
   (1) Press out the bearing outer races with the **SST**.

   Note
   Install the bearing outer race during reassembly to adjust the preload.

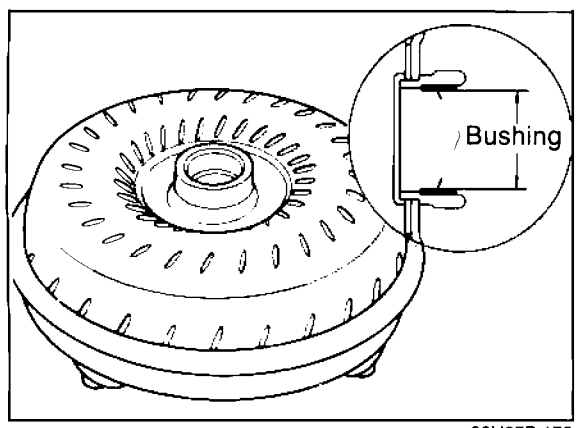
9. Check the oil seals for damage, replace if necessary.
10. Check the O-rings for damage, replace if necessary.

INSPECTION AND REPAIR

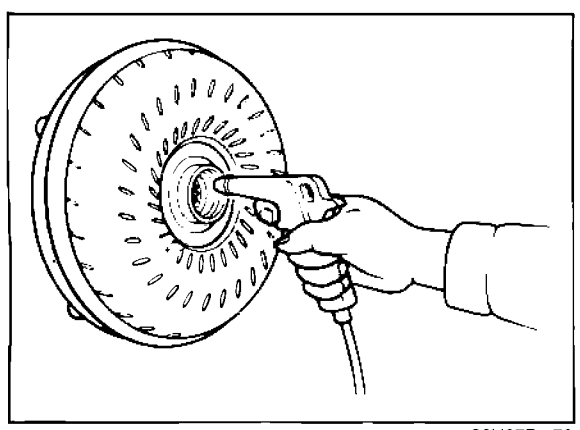
PRECAUTION

(1) Several of the parts resemble each other; organize them so that they do not get mixed up.
(2) Clean each part with cleaning oil, clean out the oil holes and oil passages with compressed air, and check that there are no obstructions.
(3) When using cleaning oil and compressed air, wear protective eyewear.
(4) If a clutch plate or brake band is replaced with a new one, soak it in ATF for 2 hours or more before installing.
(5) Before assembly, apply ATF to all seal rings, rotating parts, and sliding parts.
(6) All seals, gaskets and roll pins must be replaced with new ones during assembly.
(7) Use petroleum jelly, not grease where required.
(8) When it is necessary to replace a bushing, replace the assembly which includes that bushing.

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86U07B-173

TORQUE CONVERTER

The torque converter is welded together and cannot be disassembled.

Inspection

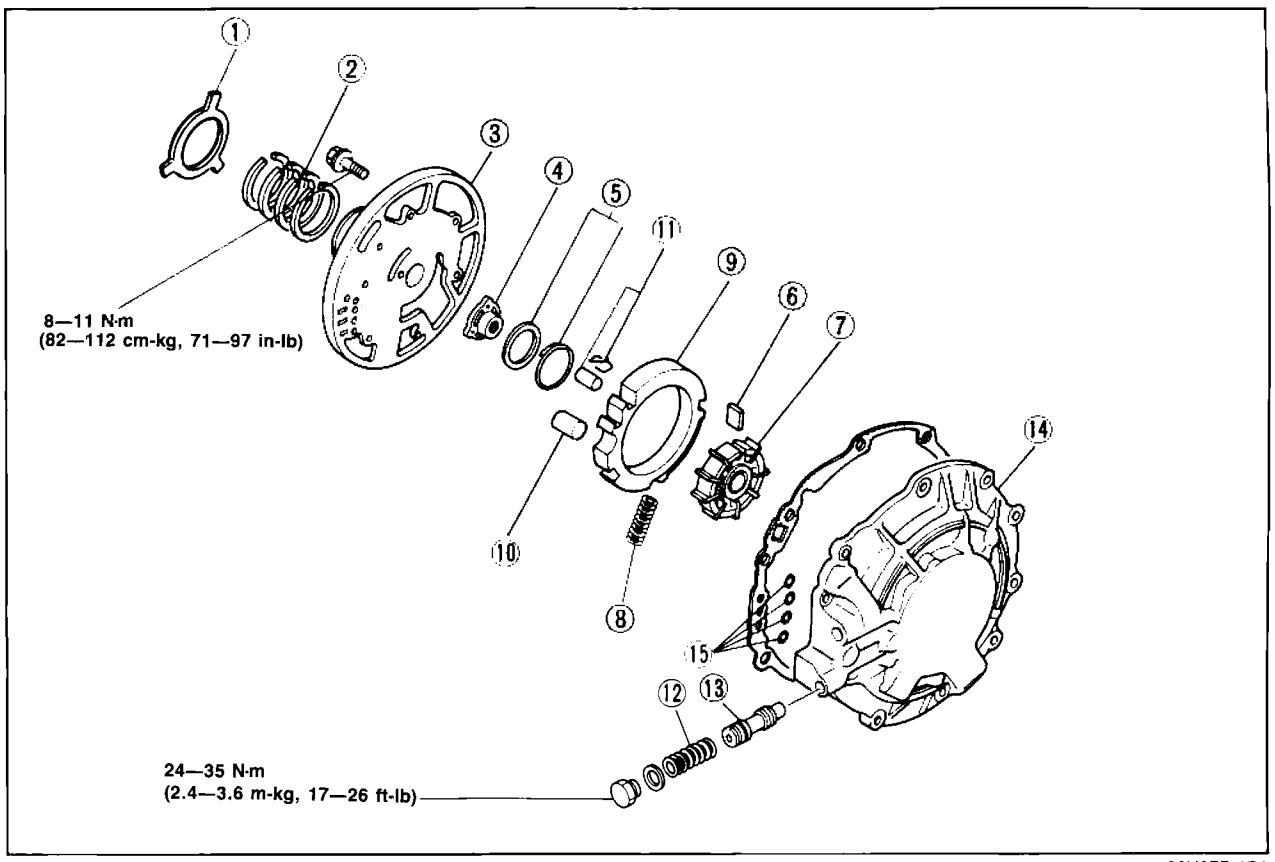
1. Check the outer part of the converter for damage or cracks, and replace it if necessary.
2. Check whether there is any rust on the pilot hub of the converter or on the boss. If there is any, remove it completely.
3. Measure the bushing of the converter boss. Replace the converter assembly if the bushing is worn.

Bushing inner diameter
Standard: 53.030 mm (2.088 in)
Maximum: 53.076 mm (2.090 in)

Washing Inside of Converter

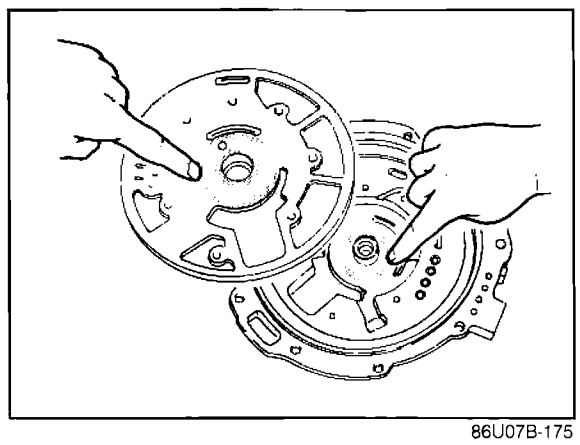
1. Drain any ATF remaining in the converter.
2. Pour in solvent [approximately **0.5 liter (0.53 US qt, 0.44 Imp qt)**].
3. Shake the converter to clean the inside. Pour out the solvent.
4. Clean the inside of the converter with compressed air so that the inside is perfectly empty.
5. Pour in ATF.
6. Shake the converter to clean the inside. Pour out the ATF.

OIL PUMP
Disassembly
Disassemble in the sequence shown in the figure.



86U07B-174

1. Bearing race
2. Seal rings
3. Oil pump cover
4. Pump flange
5. Guide ring and guide spring
6. Vane
7. Rotor
8. Spring
9. Cam ring
10. Pivot roller
11. Seal pin and spring
12. Spring
13. Valve
14. Oil pump body
15. O-ring

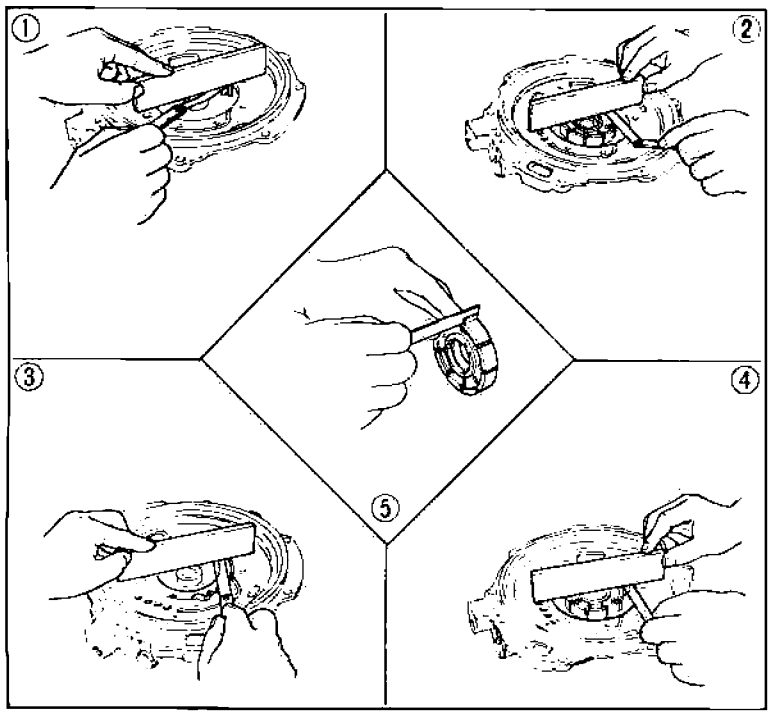


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Inspection
Check the following and replace any faulty parts.
1. Sliding surfaces of the oil pump cover and oil pump body for damage or wear
2. Broken or worn seal ring
3. Weakened spring

Free length of springs:
(1) For the cam ring (No. 8)
41.6 mm (1.64 in)
(2) For the valve (No. 12)
35.0 mm (1.38 in)

4. Clearance
   Measure the clearances below; if not within specification, replace the oil pump.



86U07B-176

1. Seal pin—Oil pump cover
Standard:
0.005—0.020 mm
(0.0002—0.0008 in)
Maximum: 0.060 mm (0.002 in)

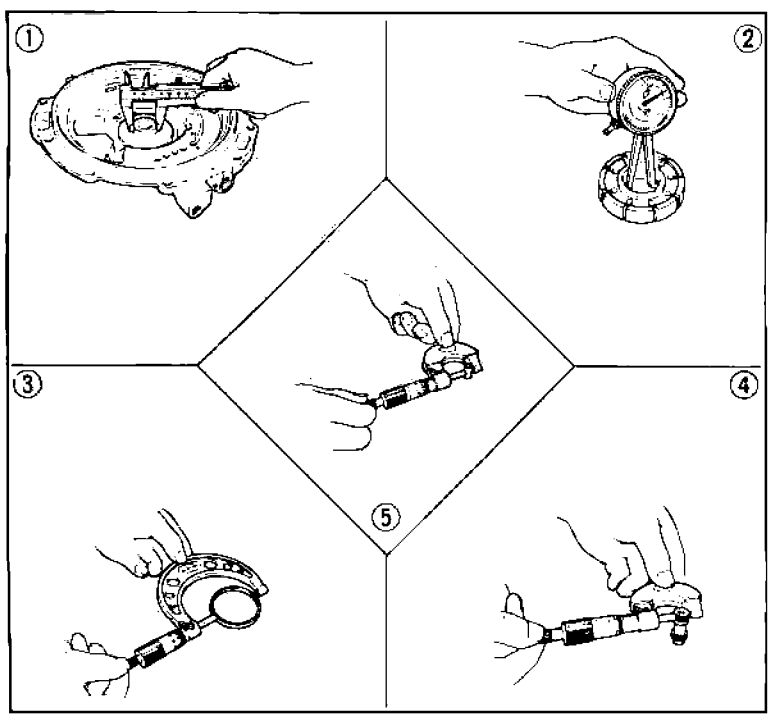
2. Rotor—Oil pump cover
Standard:
0.005—0.020 mm
(0.0002—0.0008 in)
Maximum: 0.030 mm (0.0012 in)

3. Cam ring—Oil pump cover
Standard:
0.005—0.020 mm
(0.0002—0.0008 in)
Maximum: 0.080 mm (0.003 in)

4. Vane—Oil pump cover
Standard:
0.015—0.050 mm
(0.0006—0.0020 in)
Maximum: 0.080 mm (0.003 in)

5. Vane—Rotor groove
Standard:
0.010—0.045 mm
(0.0004—0.0018 in)
Maximum: 0.065 mm (0.0026 in)

5. Wear limit
   Check each part for wear; if not within specification, replace the oil pump.



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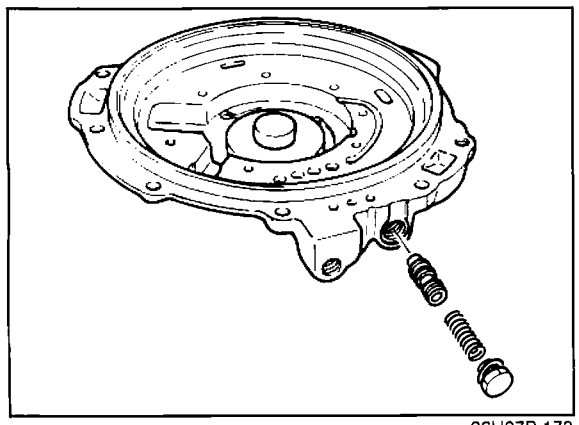
1. Oil pump body sleeve.. outer diameter
Standard: 28.00 mm (1.102 in)

2. Rotor bushing .... inner diameter
Standard: 28.00 mm (1.102 in)
Maximum: 28.05 mm (1.104 in)

3. Guide ring ..... outer diameter
Standard: 57.85 mm (2.278 in)
Minimum: 57.70 mm (2.272 in)

4. Valve..... outer diameter
Standard: 12.00 mm (0.472 in)
Minimum: 11.86 mm (0.467 in)

5. Seal pin..... outer diameter
Standard: 5.00 mm (0.197 in)
Minimum: 4.90 mm (0.193 in)

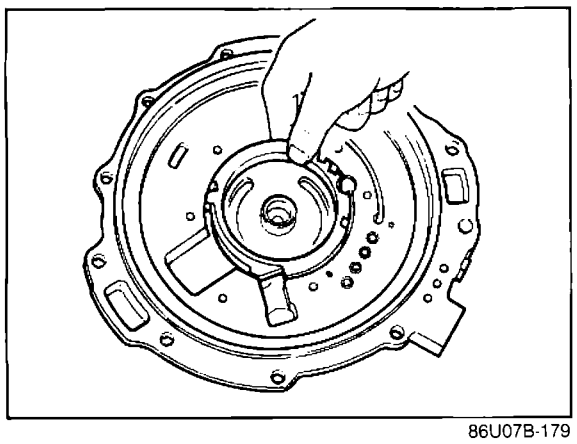


86U07B-178

Assembly

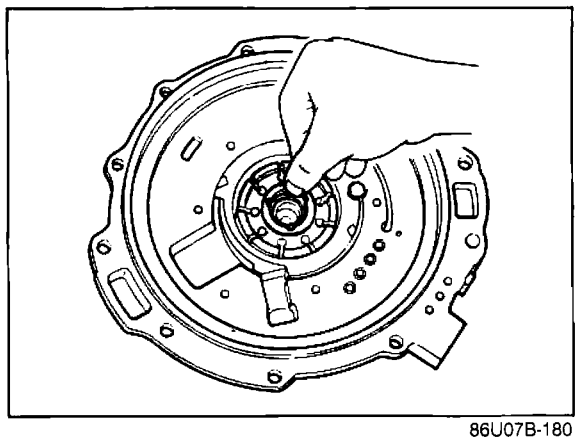
1. Install the valve and spring into the oil pump body, and check that the valve moves smoothly.
2. Install the plug.

Tightening torque:
24—35 N·m (2.4—3.6 m-kg, 17—26 ft-lb)



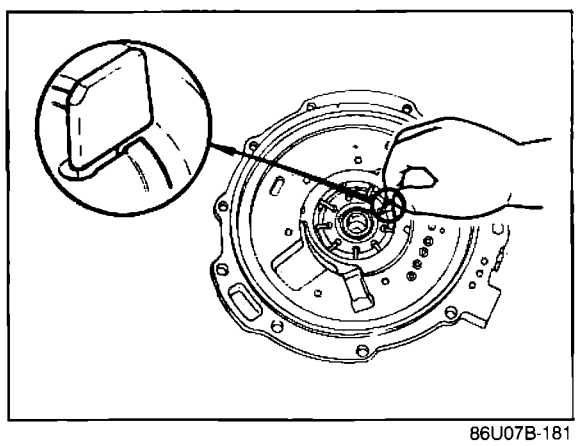
86U07B-179

3. Install the cam ring and pivot roller onto the oil pump body.



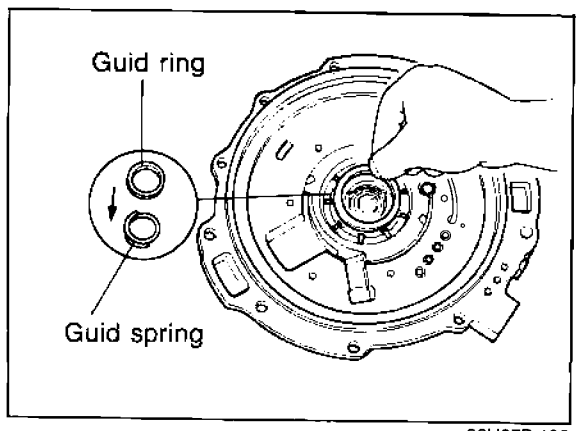
86U07B-180

4. Install the rotor onto the oil pump body.



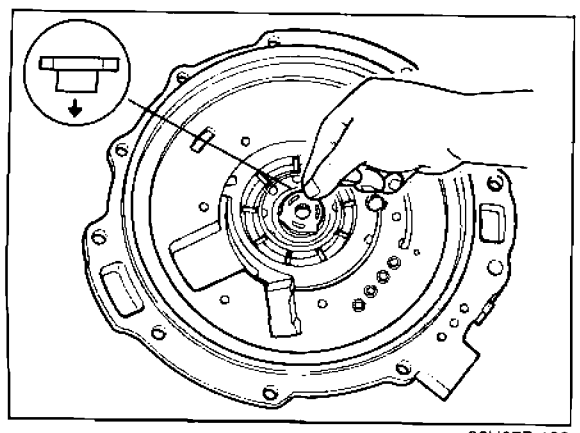
86U07B-181

5. Install the vanes into the rotor as shown.



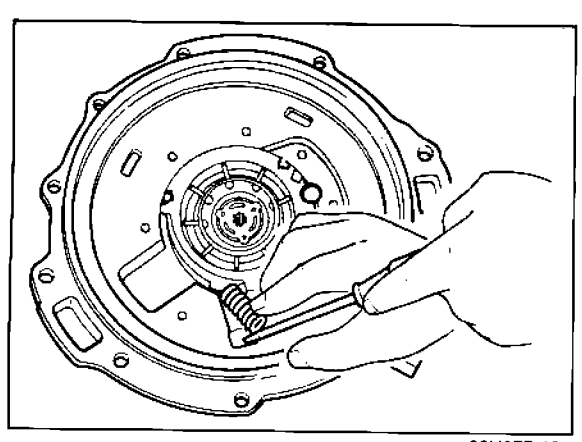
86U07B-182

6. Install the guide spring and guide ring while expanding the vanes toward the cam ring.



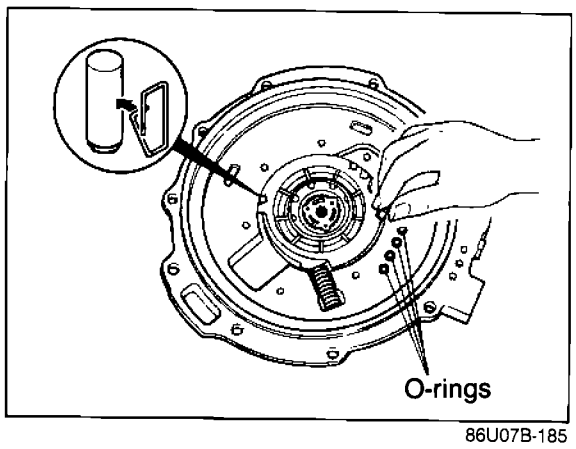
86U07B-183

7. Install the pump flange onto the rotor.



86U07B-184

8. Install the spring between the cam ring and oil pump body.

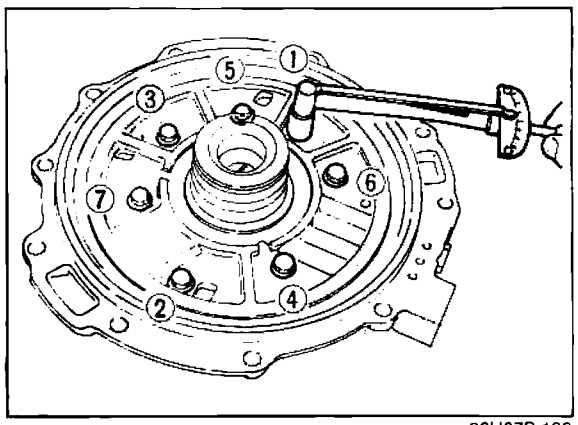


86U07B-185

9. Install the seal pins and springs with the pins facing toward the oil pump body.

Note
Install the seal pins round end first.

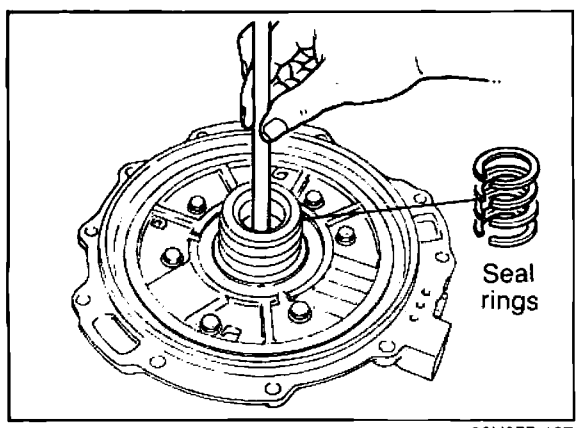
10. Install the O-rings.



86U07B-186

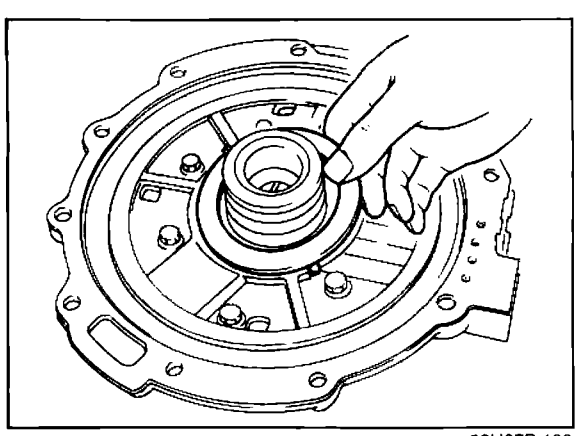
11. Install the oil pump cover to the oil pump body. Tighten the bolts in sequence.

Tightening torque:
8—11 N·m (82—112 cm-kg, 71—97 in-lb)



86U07B-187

12. Install the oil pump shaft and check for smooth oil pump operation.
13. Install the seal rings.



86U07B-188

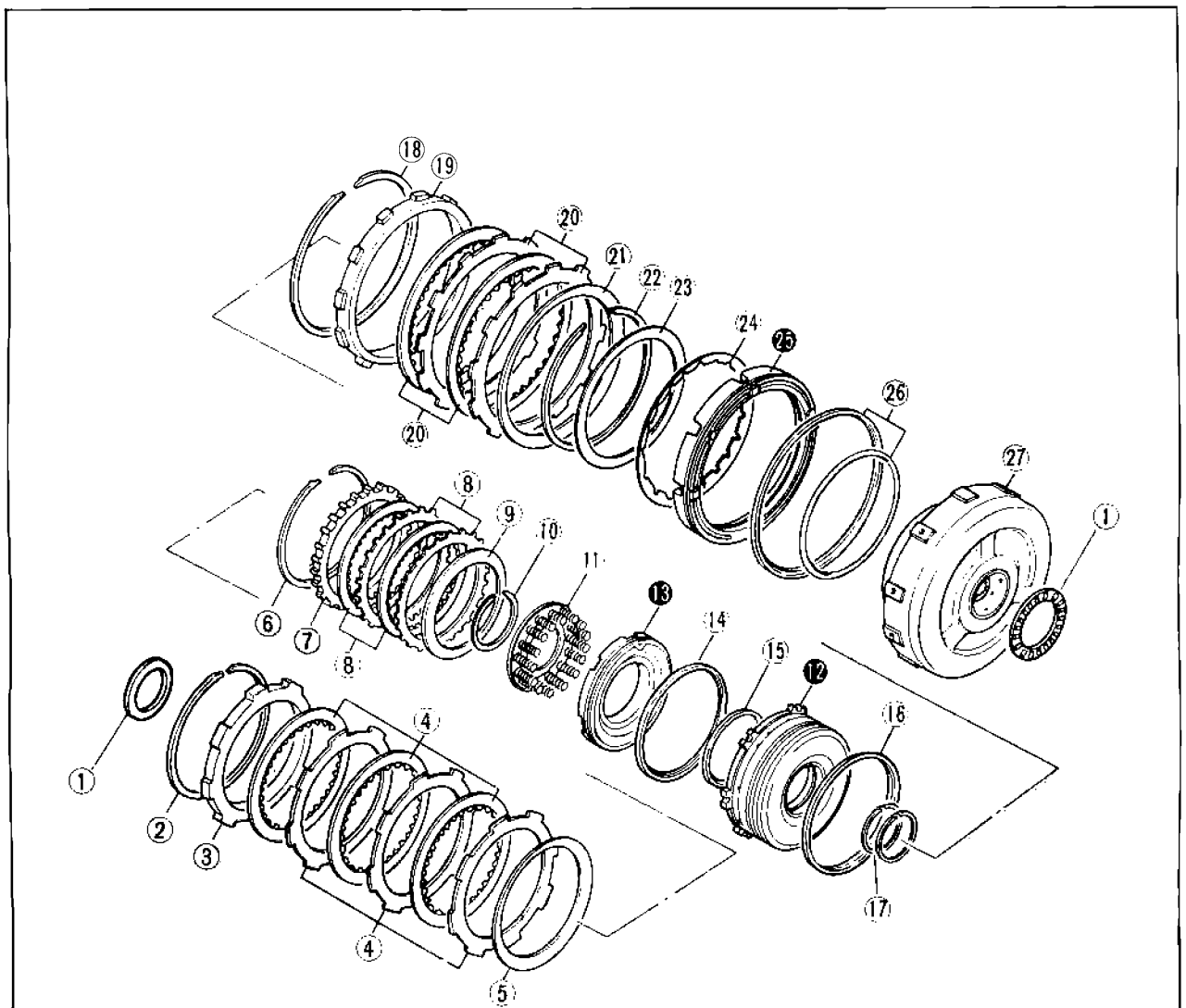
14. Apply petroleum jelly to the bearing race to secure it to the oil pump cover; then install it on the oil pump cover.

Bearing race outer diameter:
88.0 mm (3.46 in)

CLUTCH ASSEMBLY

Disassembly

Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked parts.

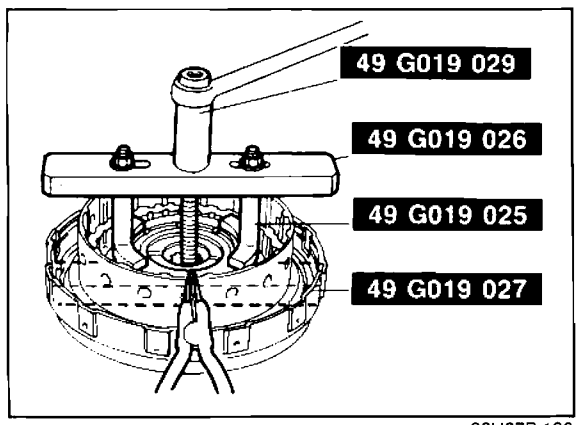


86U07B-189

—Forward clutch—
1. Thrust bearings
2. Snap ring
3. Retaining plate
4. Drive and driven plates
5. Dished plate

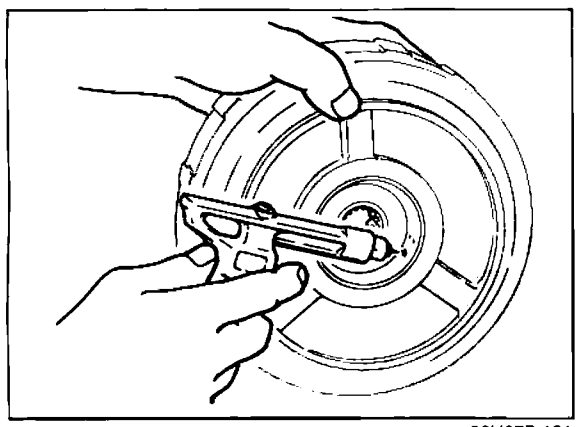
—Coasting clutch—
6. Snap ring
7. Retaining plate
8. Drive and driven plates
9. Dished plate
10. Snap ring
11. Spring and retainer assembly
12. Coasting clutch drum
13. Coasting piston
14. Outer seal
15. Inner seal
16. Outer seal
17. Seal rings

—Reverse clutch—
18. Snap ring
19. Retaining plate
20. Drive and driven plates
21. Dished plate
22. Snap ring
23. Return spring stopper
24. Piston return spring
25. Reverse piston
26. Seal rings (inner and outer)
27. Reverse and forward drum

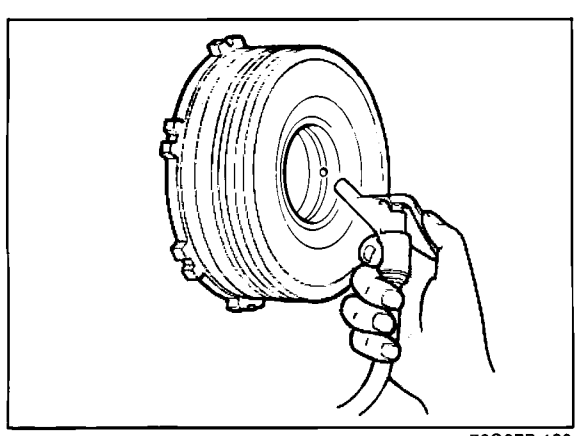


86U07B-190

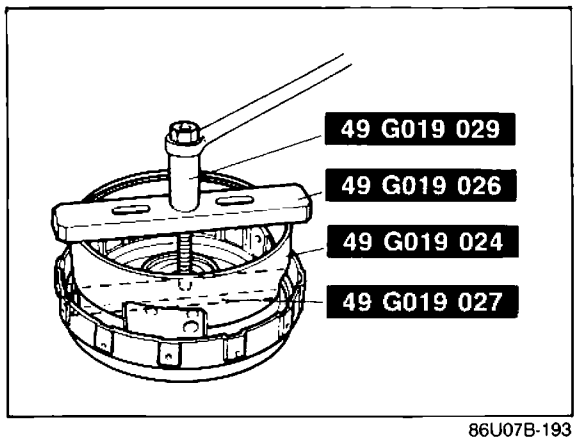
Disassembly note
Coasting clutch drum
1. Install the **SST** in the coasting clutch drum as shown.
2. Compress the spring and retainer assembly.
3. Remove the snap ring.
4. Remove the **SST**, then remove the spring and retainer assembly.


86U07B-191

5. Remove the coasting clutch drum from the reverse and forward drum by applying compressed air through the fluid passage.

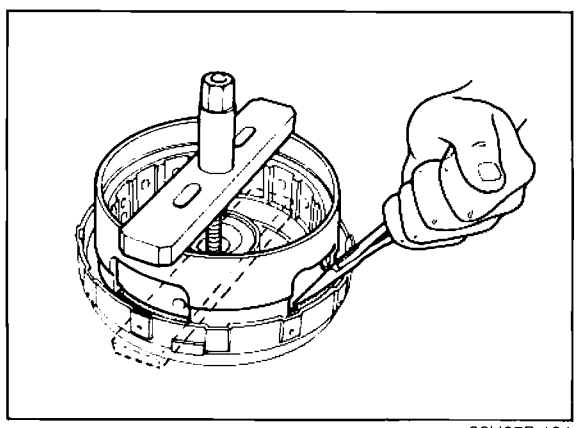

76G07B-130

Coasting piston
1. Remove the coasting clutch piston from the coasting clutch drum by applying compressed air through the fluid passage.



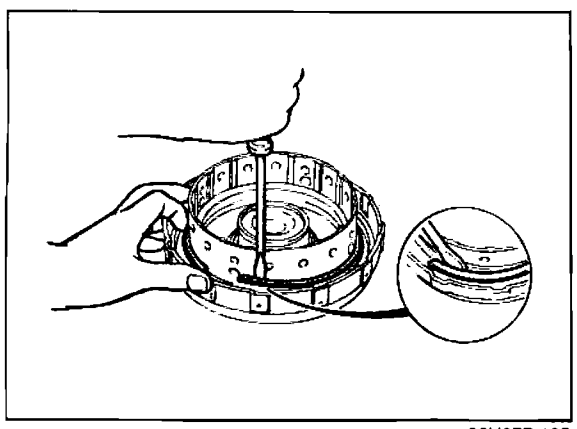
86U07B-193

Reverse piston
1. Install the **SST** in the reverse and forward drum as shown.
2. Compress the piston return spring.



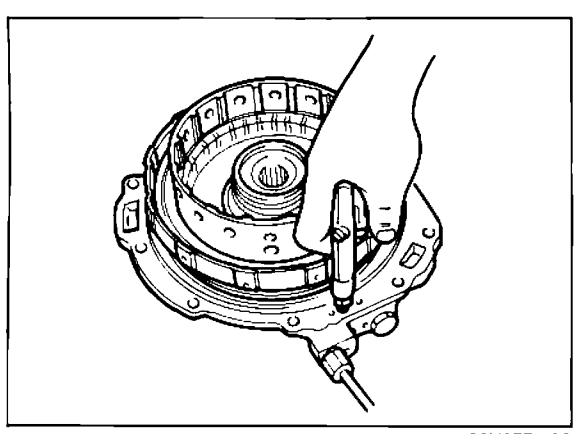
86U07B-194

3. Remove one end of the snap ring from the groove with snap ring pliers.



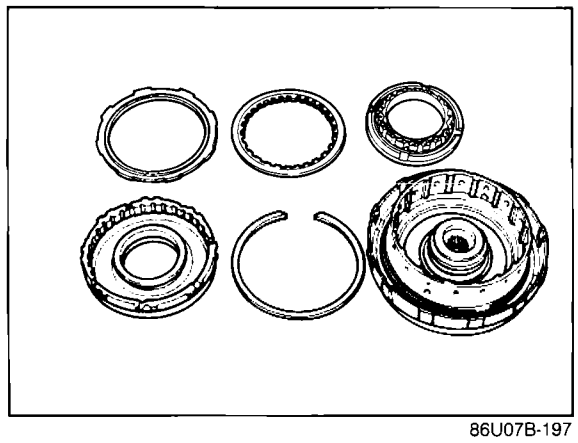
86U07B-195

4. Remove the **SST** from the reverse and forward drum.
5. Remove the snap ring with a screw driver.



86U07B-196

6. Place the reverse and forward drum on the oil pump.
7. Remove the reverse piston by applying compressed air through the fluid passage.



86U07B-197

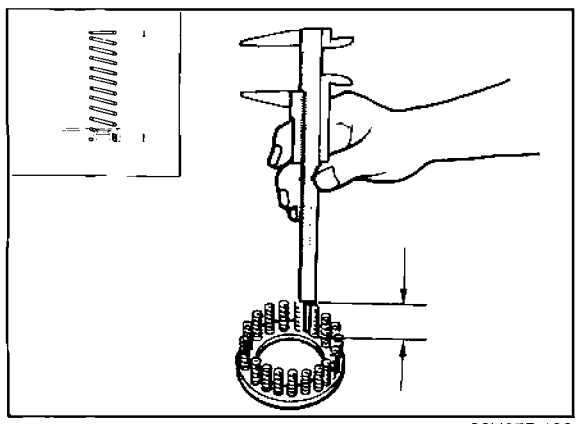
Inspection

Check the following and repair or replace any faulty parts.

1. Drive and driven plates for damage or wear

Drive plate thickness
Standard: 1.6 mm (0.063 in)
Minimum: 1.4 mm (0.055 in)

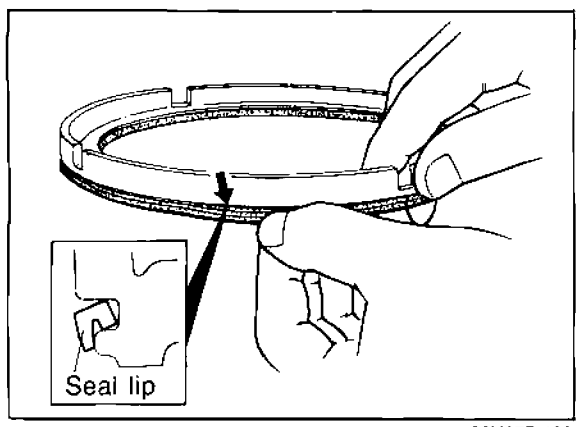
2. Clutch piston for damage or cracks
3. Clutch drum for damage or deformation
4. Seal contact area for damage
5. Check ball for leaking sticking
6. Broken or worn snap ring
7. Broken or weakened spring



86U07B-198

6. Spring and retainer assembly for separation or deformation

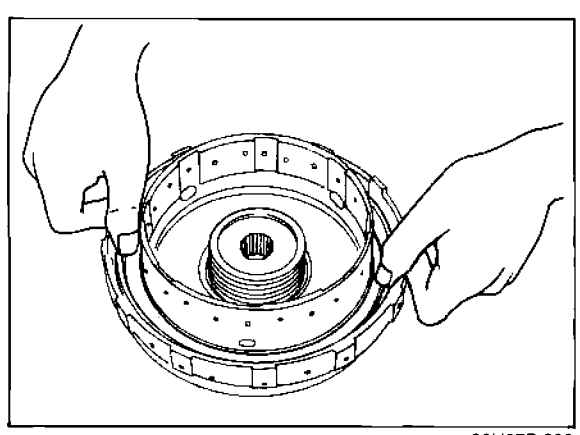
Free length of spring:
29.8 mm (1.173 in)



86U07B-199

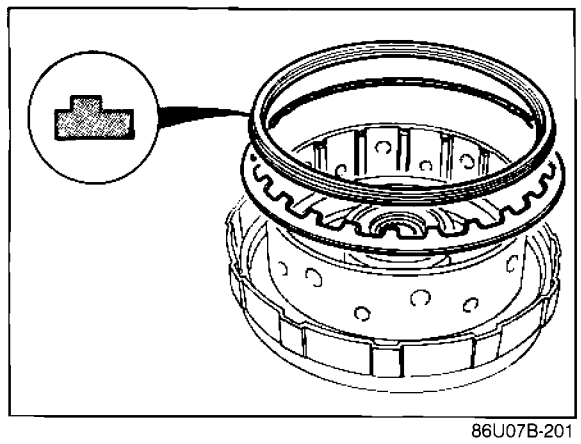
Assembly
Reverse clutch

1. Install the reverse piston.
   (1) Apply ATF to inner and outer faces of the seals, and install them to the reverse piston.
   (2) Face the outer seal lip toward the inside by gently rolling it down around the circumference for easier installation into the reverse clutch drum.



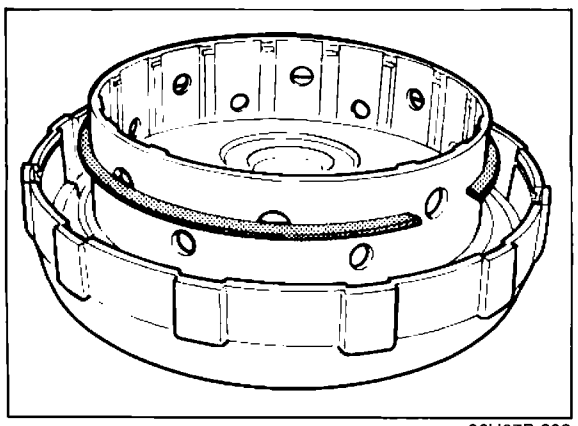
86U07B-200

   (3) Install the reverse piston by pushing evenly around the circumference, being careful not to damage the seal rings.



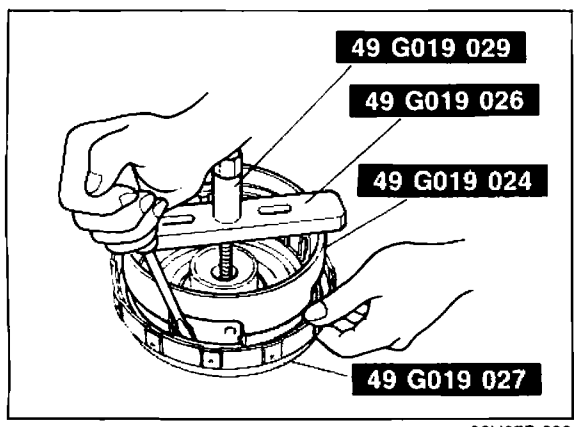
86U07B-201

2. Install the piston return spring with the tabs facing away from the reverse piston.
3. Install the return spring stopper with the step facing upwards.



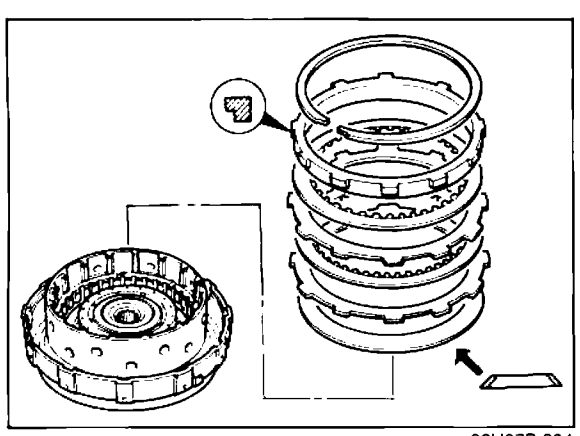
86U07B-202

4. Install the snap ring half-way down the reverse forward drum as shown.



86U07B-203

5. Install the **SST** on the reverse and forward drum.
6. Compress the spring and retainer assembly.
7. Install the snap ring with a screwdriver.
8. Remove the **SST**.

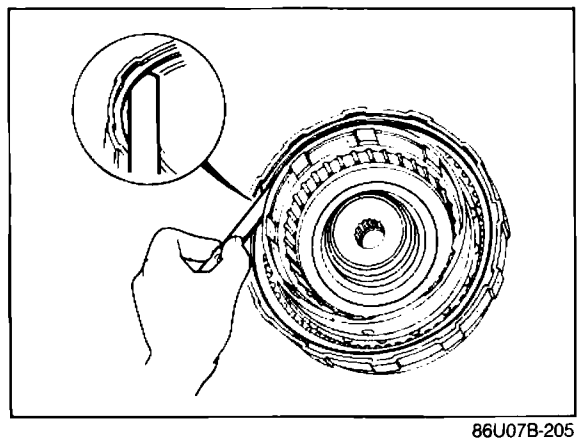


86U07B-204

9. Install the dished plate with the dished side facing the piston as shown.
10. Install the drive and driven plates.

Note
Installation order:
Driven-Drive-Driven-Drive

11. Install the retaining plate with the step facing downward.
12. Install the snap ring.



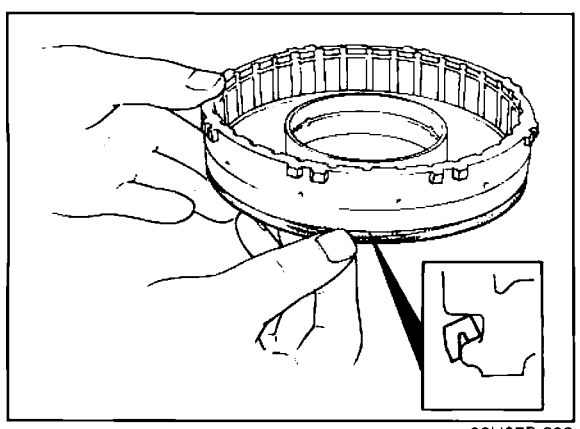
86U07B-205

13. Check the reverse clutch clearance.
    (1) Measure the clearance between the snap ring and the retaining plate of the reverse clutch.
    (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

Reverse clutch clearance:
2.1—2.4 mm (0.083—0.094 in)

Retaining plate sizes mm (in)

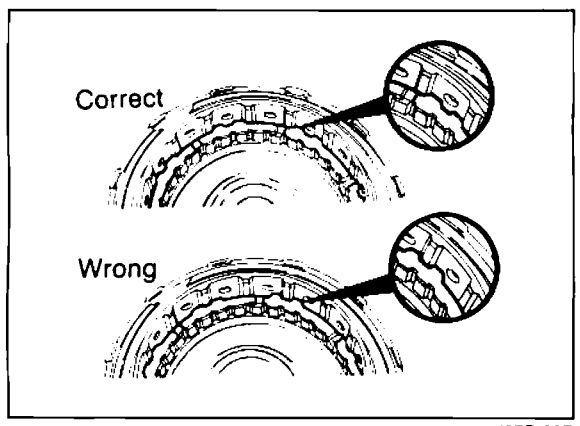
6.6 (0.260)	6.8 (0.268)	7.0 (0.276)
7.2 (0.283)	7.4 (0.291)	7.6 (0.299)



86U07B-206

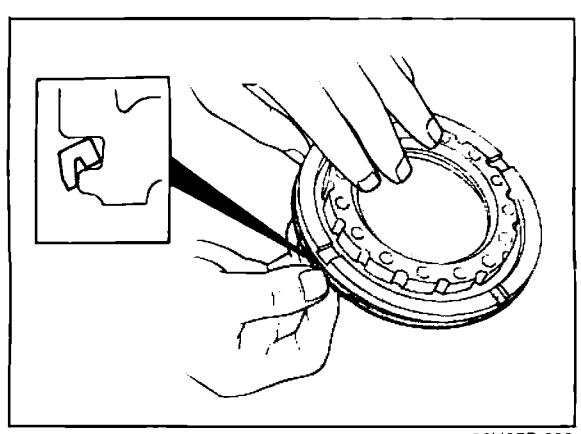
Coasting clutch

1. Install the coasting clutch drum.
   (1) Apply ATF to inner and outer faces of the seal, and install it onto the coasting clutch drum.
   (2) Face the outer seal lip toward the inside by gently rolling it down around the circumference for easier installation into the drum.



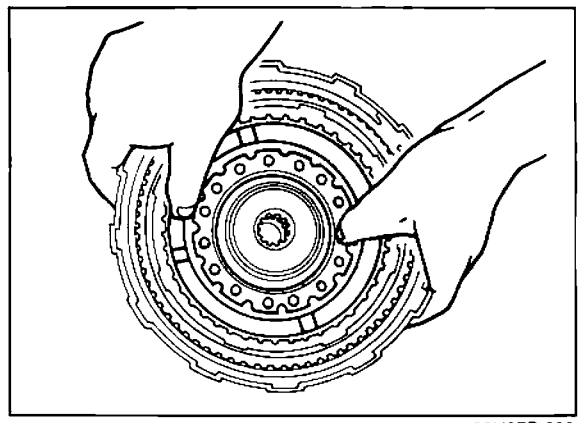
86U07B-207

   (3) Install the coasting clutch drum the correct position in the reverse and forward drum.
   (4) Push evenly around the circumference, being careful not to damage the outer seal.



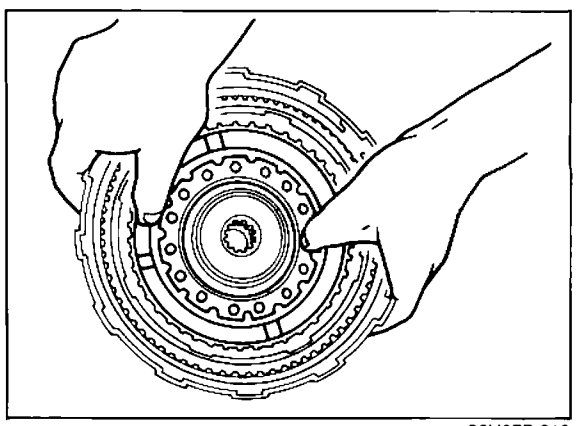
86U07B-208

2. Install the coasting piston
   (1) Apply ATF to inner and outer faces of the seals and install them onto the coasting piston.
   (2) Face the outer seal lip toward the inside by gently rolling it down around the circumference for easier installation into the drum.



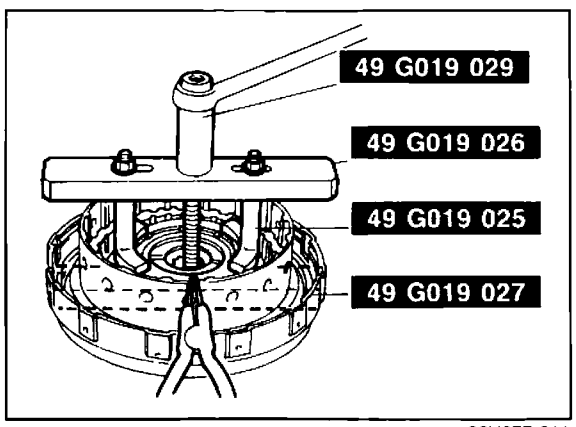
86U07B-209

   (3) Install the coasting piston by pushing evenly around the circumference, being careful not to damage the outer seal.



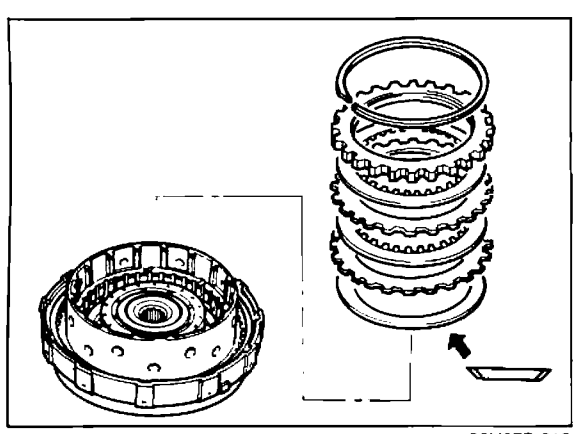
86U07B-210

3. Install the spring and retainer assembly.



86U07B-211

4. Install the **SST** in the coasting clutch as shown.
5. Compress the spring and retainer assembly.
6. Install the snap ring.
7. Remove the **SST**.

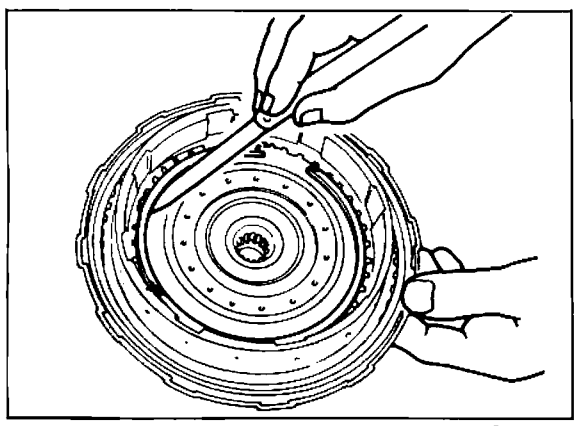


86U07B-212

8. Install the dished plate with the dished side upward.
9. Install the drive and driven plates.

Note
Installation order:
Driven-Drive-Driven-Drive

10. Install the retaining plate.
11. Install the snap ring.



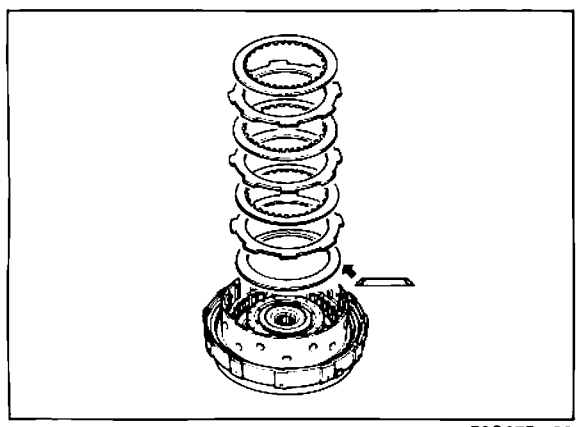
76G07B-131

12. Check the coasting clutch clearance.
    (1) Measure the clearance between the snap ring and the retaining plate of the coasting clutch.
    (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

Coasting clutch clearance:
1.0—1.2 mm (0.040—0.047 in)

Retaining plate sizes mm (in)

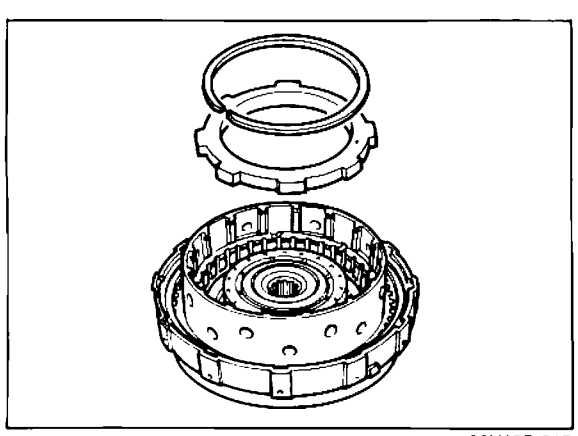
4.6 (0.181)	4.8 (0.189)	5.0 (0.197)
5.2 (0.205)	5.4 (0.213)	5.6 (0.220)



76G07B-132

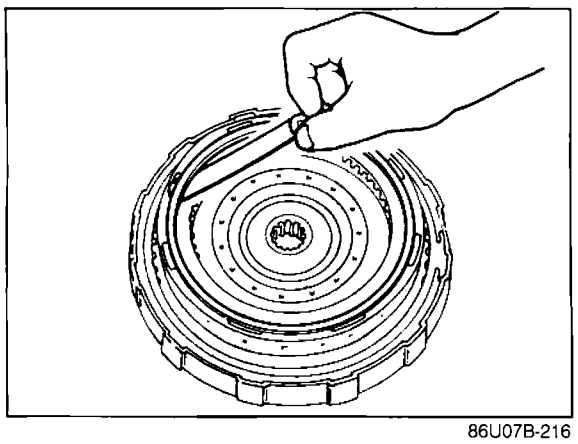
Forward clutch
1. Install the dished plate with the dished side downward.
2. Install the drive and driven plates.

Note
Installation order:
Driven-Drive-Driven-Drive-Driven-Drive



86U07B-215

3. Install the retaining plate.
4. Install the snap ring.



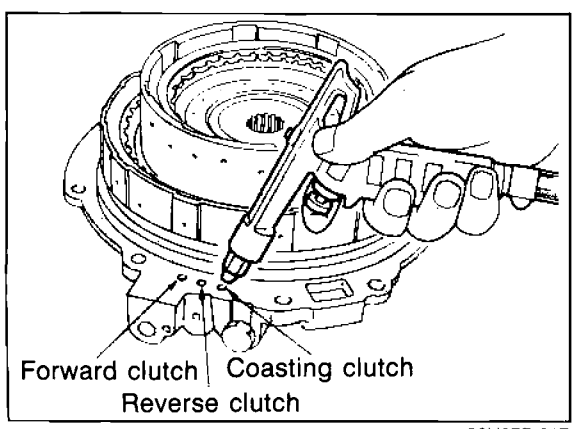
86U07B-216

5. Check the forward clutch clearance.
    (1) Measure the clearance between the snap ring and the retaining plate of the forward clutch.
    (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

Forward clutch clearance:
1.0—1.2 mm (0.040—0.047 in)

Retaining plate sizes mm (in)

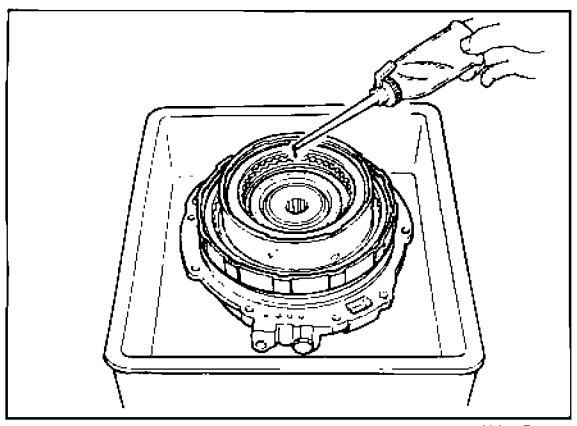
5.9 (0.232)	6.1 (0.240)	6.3 (0.248)
6.5 (0.256)	6.7 (0.264)	8.9 (0.350)



86U07B-217

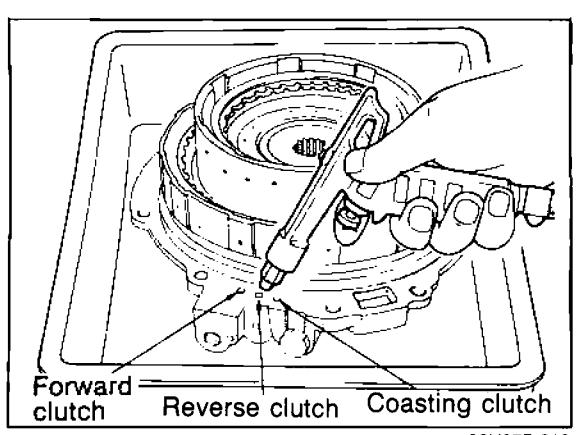
6. Check for the clutch operation as follows.
   (1) Set the clutch assembly onto the oil pump.
   (2) Check the clutch operation by applying compressed air through the fluid passages as shown.

Applied air pressure:
392 kPa (4.0 kg/cm^2, 57 psi)



86U07B-218

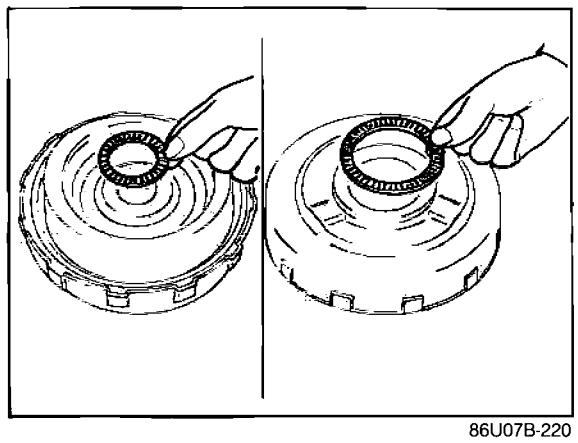
(3) Pour in ATF so that the reverse piston, coasting clutch drum, and coasting clutch piston are fully submerged.



86U07B-219

(4) Check that no bubbles come from between the piston and drum seal when applying compressed air through the fluid passages as shown.

Caution
The compressed air must be under 392 kPa (4.0 kg/cm^2, 57 psi), and should not applied for over 3 seconds.



86U07B-220

7. Apply petroleum jelly to the thrust bearings to secure them; then install them on both sides of the reverse and forward drum.

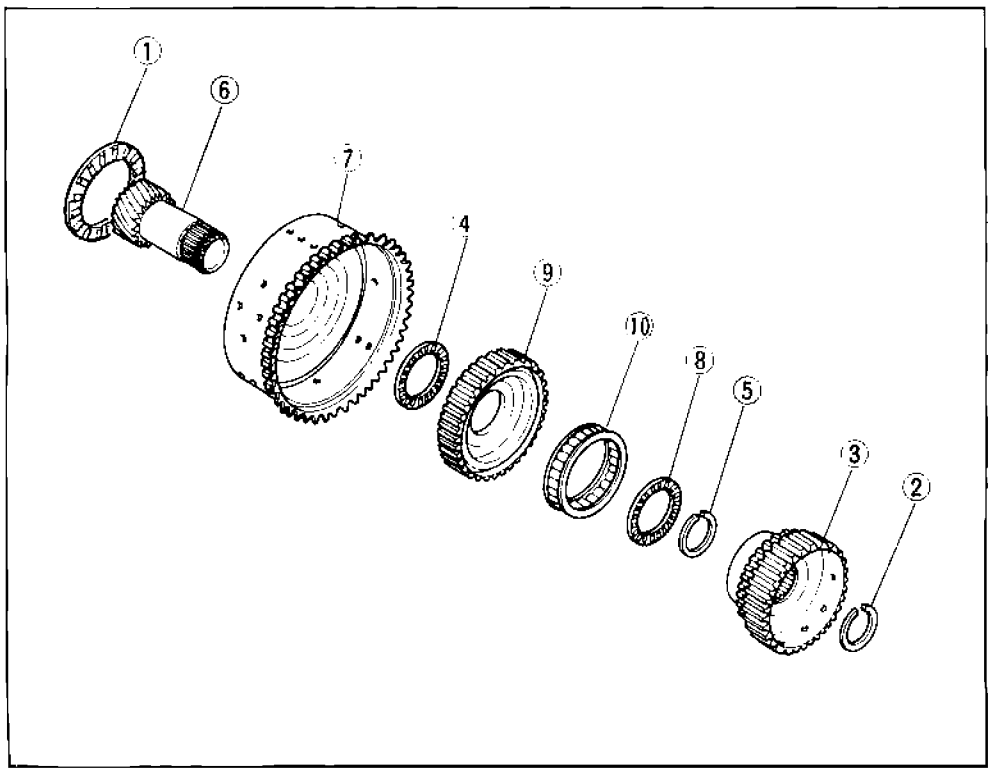
Thrust bearing outer diameter
Oil pump side: 86.0 mm (3.39 in)

Small sun gear and one-way clutch side: 56.1 mm (2.21 in)

SMALL SUN GEAR AND ONE-WAY CLUTCH

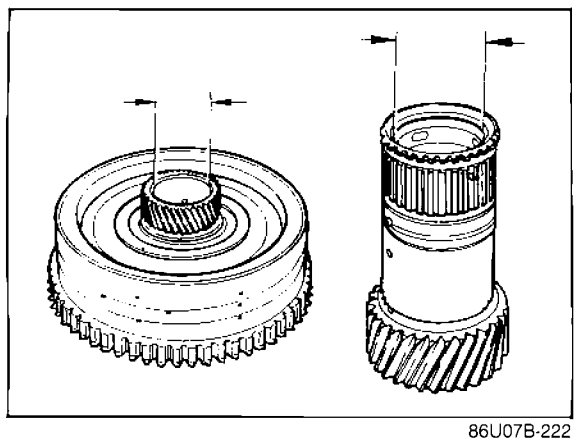
Disassembly

Disassemble in the sequence shown in the figure.



86U07B-221

1. Thrust bearing
2. Snap ring
3. One-way clutch inner race
4. Thrust bearing
5. Snap ring
6. Small sun gear
7. Sun gear drum
8. Thrust bearing
9. One-way clutch outer race
10. One-way clutch



86U07B-222

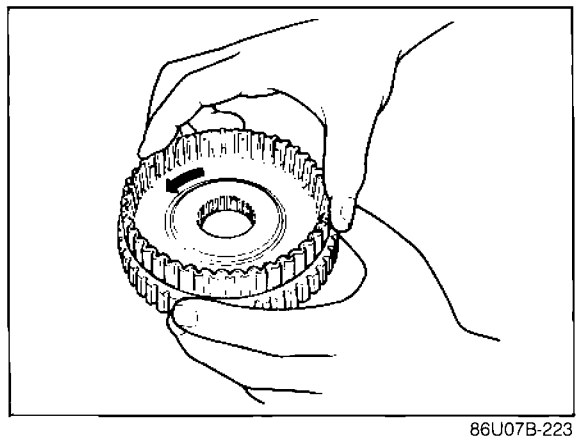
Inspection

Check the following and replace any faulty parts.

1. Sun gear drum and small sun gear for damage or wear
2. Bushing for damage or wear

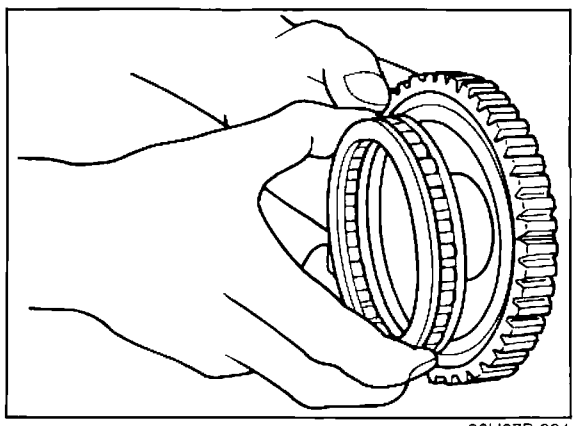
Specification:

Sun gear drum: 33.425 mm (1.316 in) max.
Small sun gear: 24.021 mm (0.946 in) max.



86U07B-223

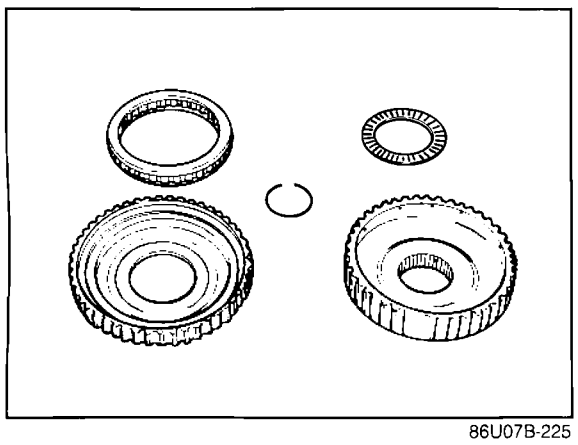
3. Inner and outer race for damage or wear
4. Damaged or worn clutch hub
5. Damaged or worn gear
6. Damaged or worn thrust bearing
7. Broken or worn snap ring
8. One-way clutch operation
   Hold the one-way clutch outer race. Check that the inner race turns only counterclockwise.



86U07B-224

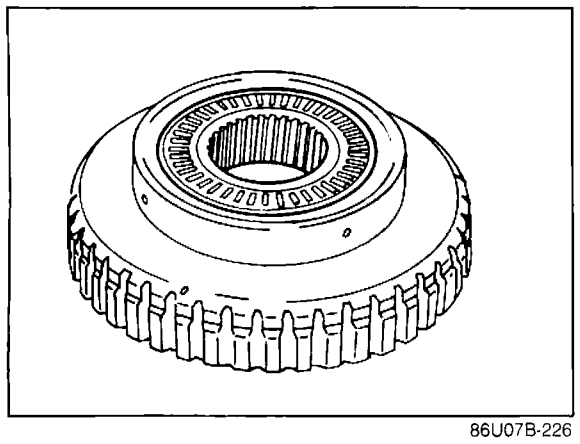
Replacement of one-way clutch

1. Remove the one-way clutch inner race.
2. Remove the one-way clutch.
3. Remove the thrust bearing.



86U07B-225

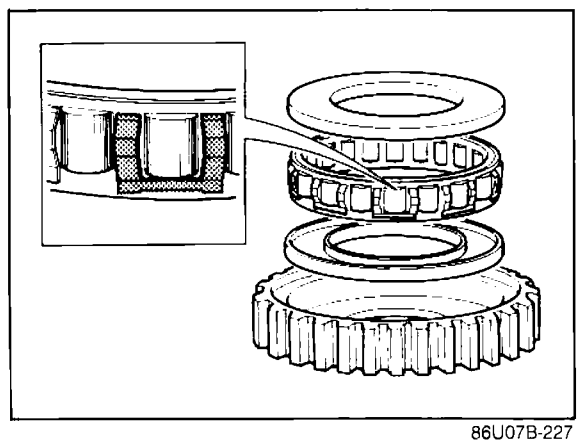
4. Inspect the one-way clutch inner and outer race, and replace if necessary.



86U07B-226

5. Apply petroleum jelly to the thrust bearing to secure it; then install it to the one-way clutch inner race.

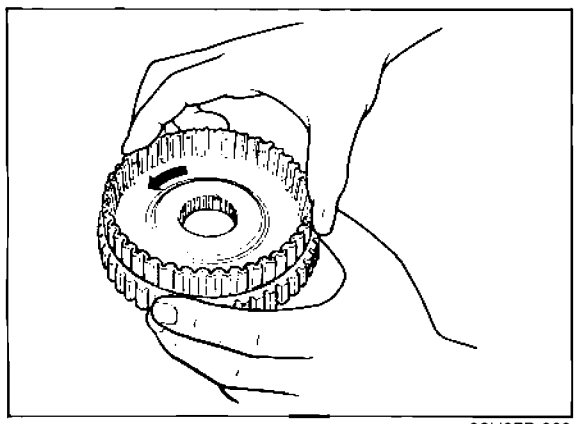
Thrust bearing outer diameter:
62.1 mm (2.44 in)



86U07B-227

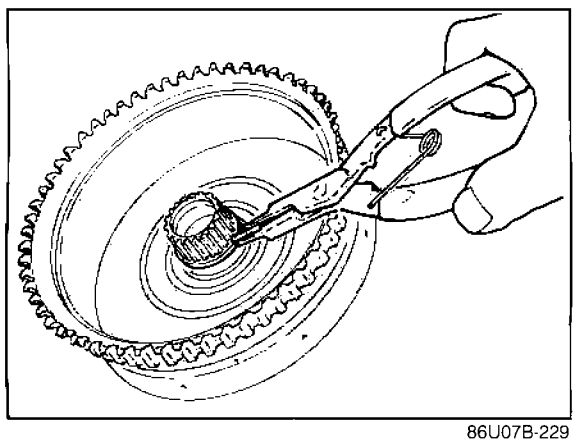
6. Install the one-way clutch into the one-way clutch outer race.

Caution
Check that the spring cage of the one-way clutch faces toward the outer race.



86U07B-228

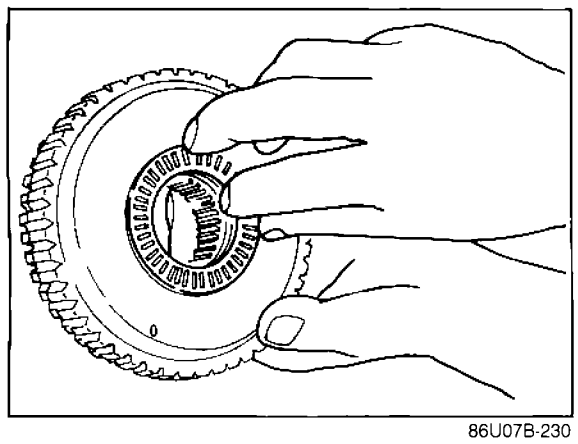
7. Install the one-way clutch inner race into the one-way clutch outer race by turning inner race counterclockwise.
8. Hold the one-way clutch outer race. Check that the inner race turns only counterclockwise.



86U07B-229

Assembly

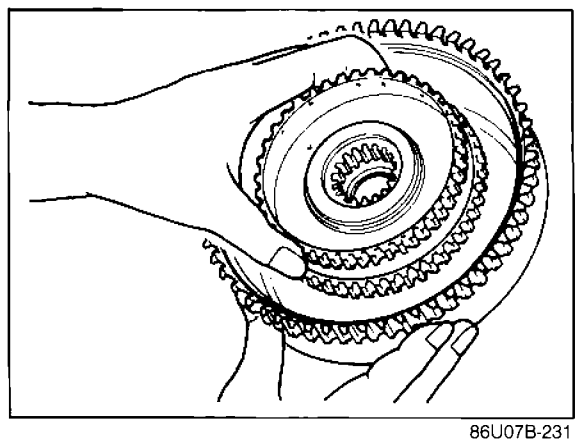
1. Install the small sun gear into the sun gear drum.
2. Install the snap ring.



86U07B-230

3. Apply petroleum jelly to the thrust bearing to secure it; then install it to the one-way clutch inner race.

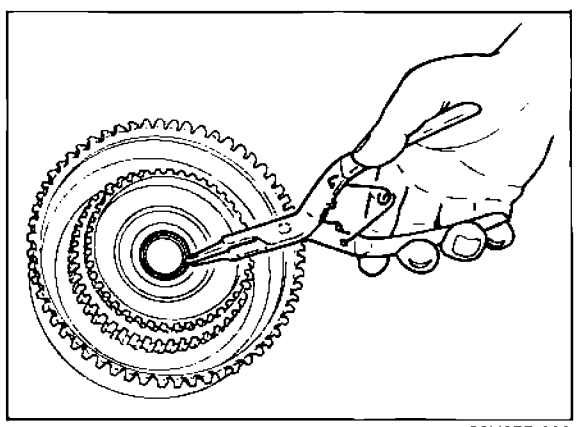
Thrust bearing outer diameter:
62.1 mm (2.44 in)



86U07B-231

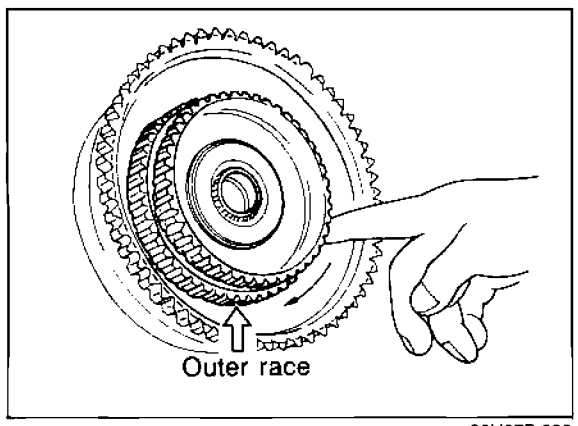
4. Install the one-way clutch inner and outer race to the sun gear drum.

Note
Align the splines of the one-way clutch inner race and small sun gear clutch hub.



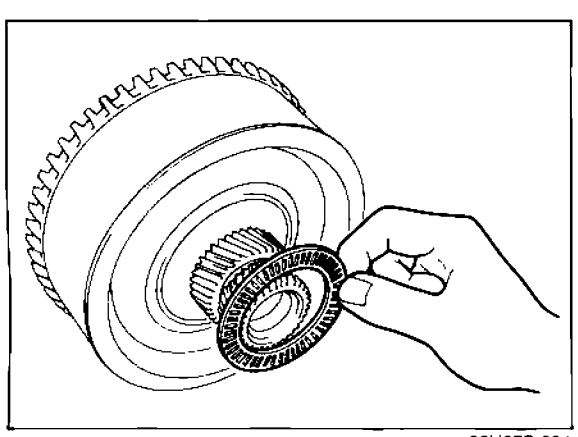
86U07B-232

5. Install the snap ring.



86U07B-233

6. Check that when the small sun gear is held, the one-way clutch outer race turns smoothly and only clockwise.



86U07B-234

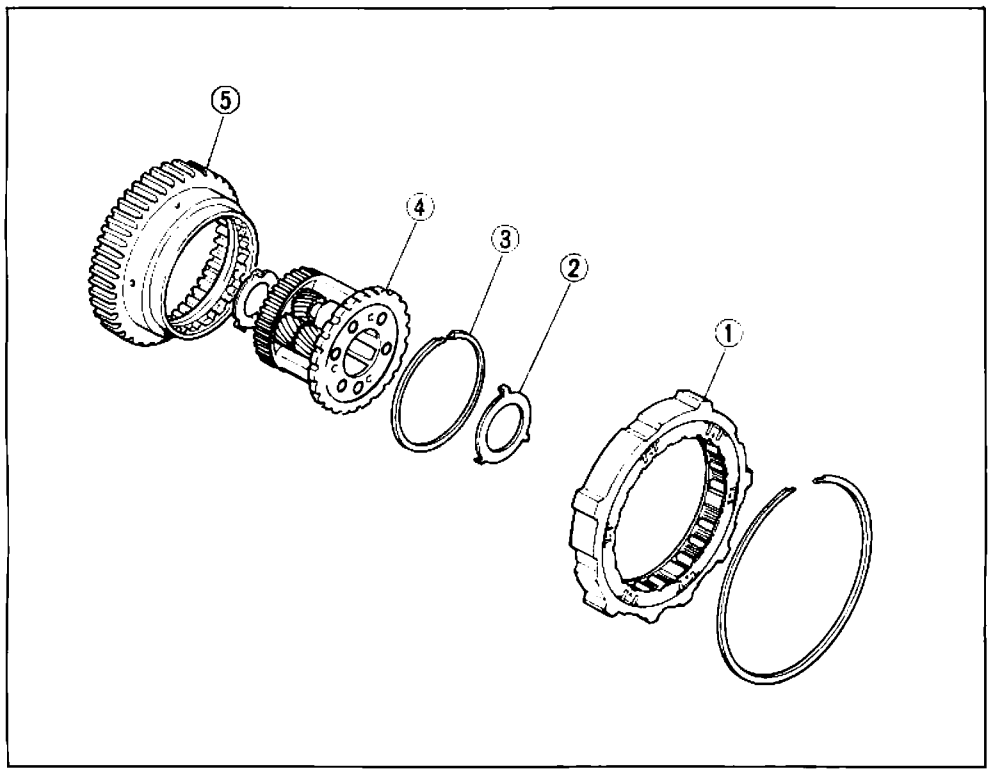
7. Apply petroleum jelly to the thrust bearing to secure it; then install it to the sun gear drum.

Thrust bearing outer diameter:
72.0 mm (2.83 in)

ONE-WAY CLUTCH AND CARRIER HUB ASSEMBLY

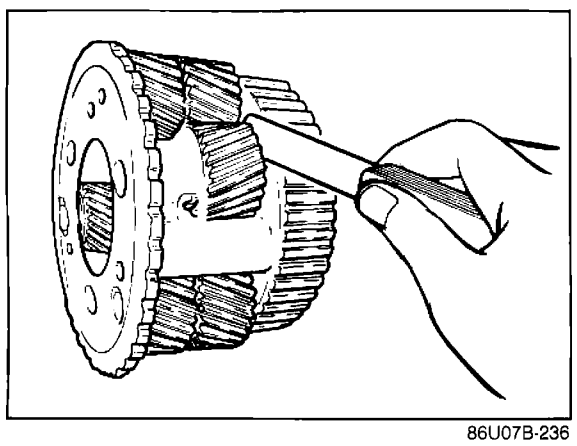
Disassembly

Disassemble in the sequence shown in the figure.



86U07B-235

1. One-way clutch
2. Bearing races
3. Snap ring
4. Carrier hub assembly
5. Inner race (Low and reverse hub)



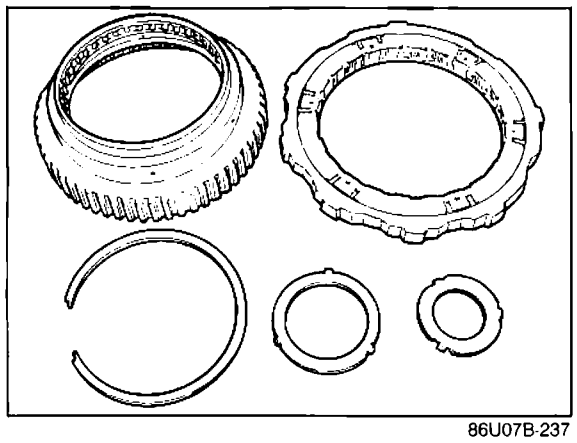
86U07B-236

Inspection

Check the following and replace any faulty parts.

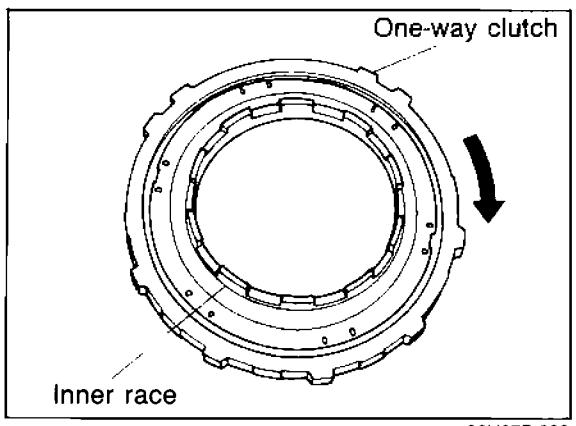
1. Damaged or worn gear and operation
2. Clearance between pinion washer and planetary carrier

Clearance:
0.2—0.7 mm (0.008—0.028 in)



86U07B-237

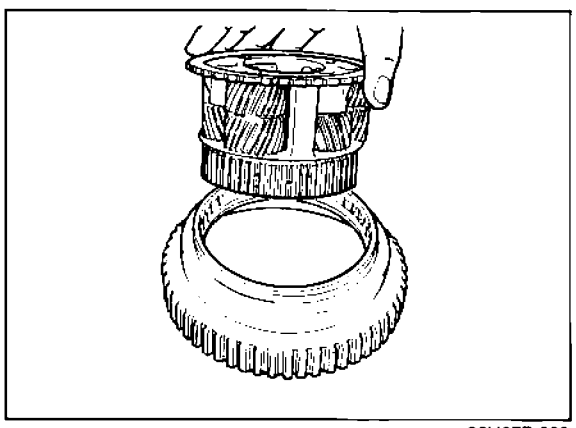
3. Damaged or worn inner race
4. Broken or worn snap ring
5. Damaged or worn bearing race



86U07B-238

6. Damaged or worn one-way clutch and operation
7. Detached roller

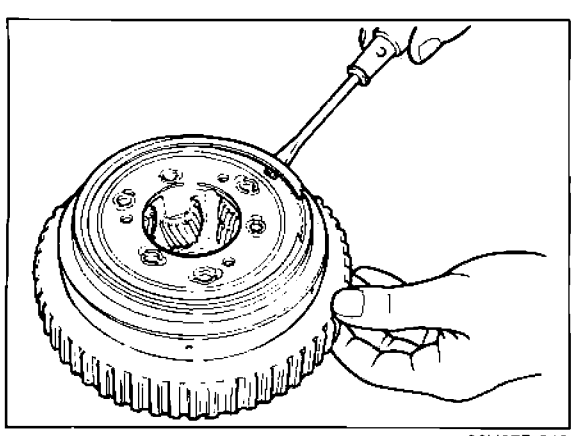
Note
Assemble the one-way clutch and the inner race, then confirm that the one-way clutch rotates only clockwise and smoothly.



86U07B-239

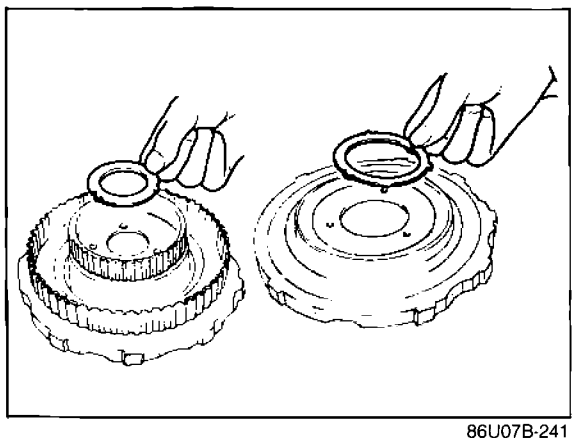
Assembly

1. Assemble the carrier hub assembly to the inner race.



86U07B-240

2. Install th snap ring.



86U07B-241

3. Apply petroleum jelly to the bearing races to secure them; then install them to both sides of the one-way clutch and carrier hub assembly.

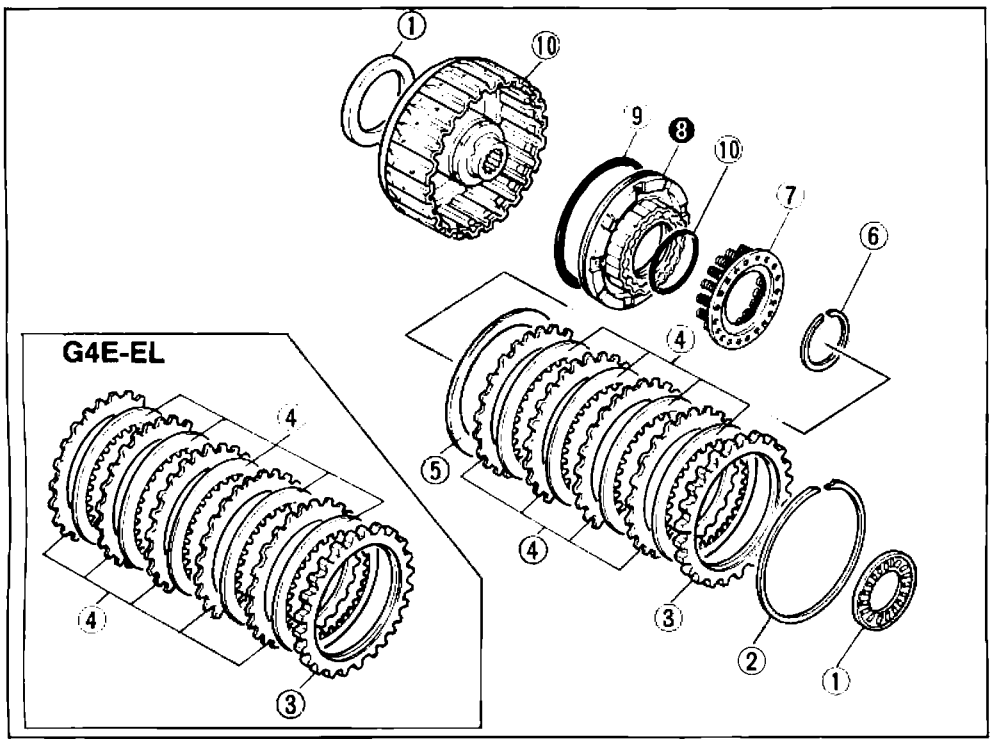
Bearing race outer diameter
Sun gear drum side: 72.0 mm (2.83 in)
3-4 clutch side: 57.0 mm (2.21 in)

Note
Install the tabs of the bearing race into the alignment holes.

3-4 CLUTCH

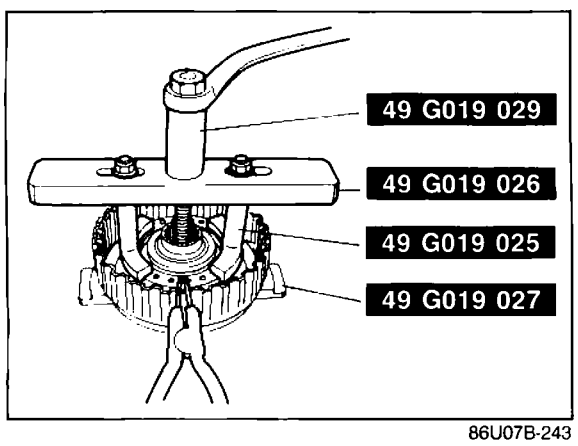
Disassembly

Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked part.



76G07B-133

1. Thrust bearings
2. Snap ring
3. Retaining plate
4. Drive and driven plates
5. Dished plate (G4A-HL)
6. Snap ring
7. Spring and retainer assembly
8. 3-4 clutch piston
9. Outer seal
10. Inner seal
11. 3-4 clutch drum

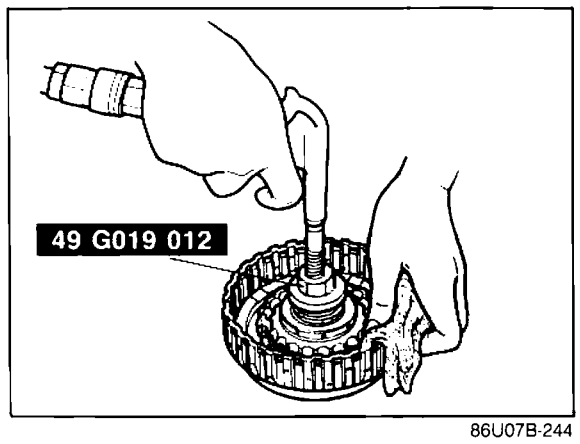


86U07B-243

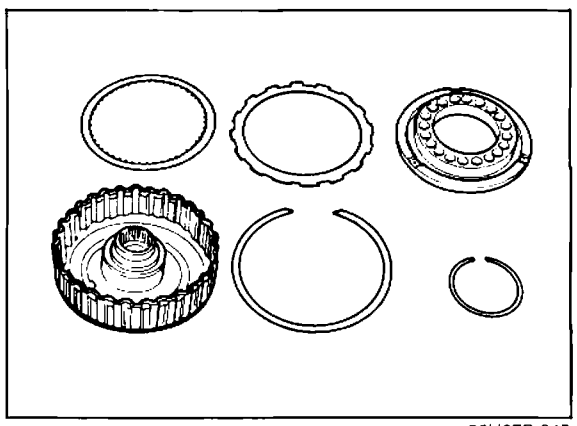
Disassembly note

3-4 clutch piston

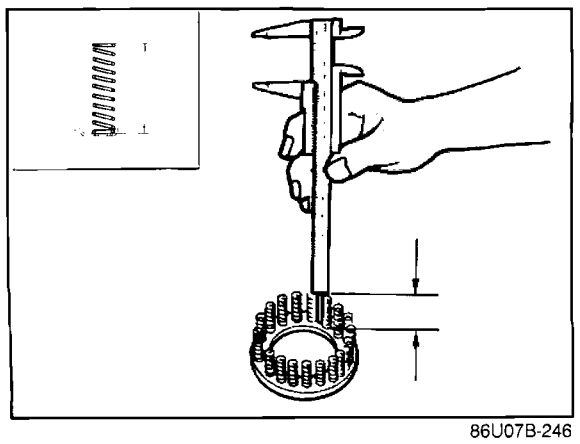
1. Install the **SST** to the 3-4 clutch as shown.
2. Compress the spring and retainer assembly.
3. Remove the snap ring.
4. Remove the **SST** then remove the spring and retainer assembly.
5. Remove the 3-4 clutch piston with the **SST** and compressed air.



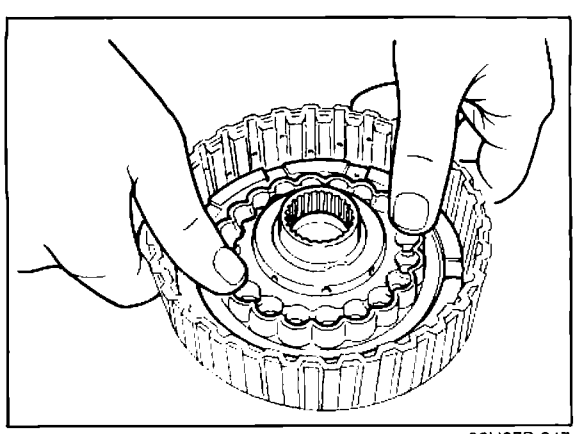
86U07B-244



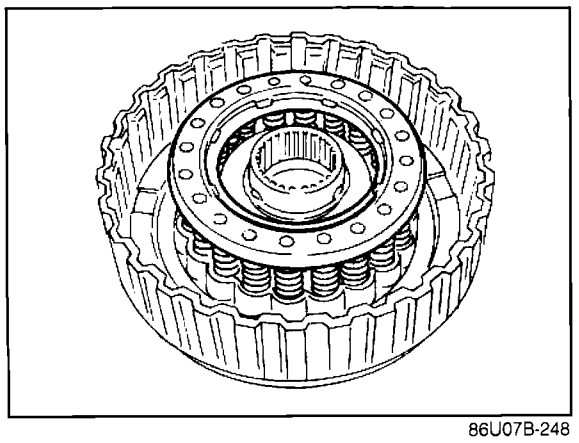
86U07B-245



86U07B-246



86U07B-247



86U07B-248

Inspection

Check the following and repair or replace any faulty parts.

1. Drive and driven plates for damage or wear

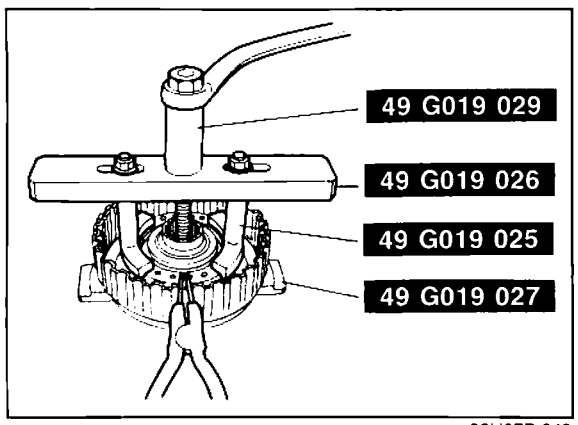
   Drive plate thickness
   Standard: 1.6 mm (0.063 in)
   Minimum: 1.4 mm (0.055 in)

2. Clutch piston for damage or cracks
3. Clutch drum for damage or deformation
4. Seal contact areas for damage
5. Check ball for leaking or sticking
6. Spring and retainer assembly for separation or deformation
7. Broken or worn snap ring
8. Broken or weakened spring

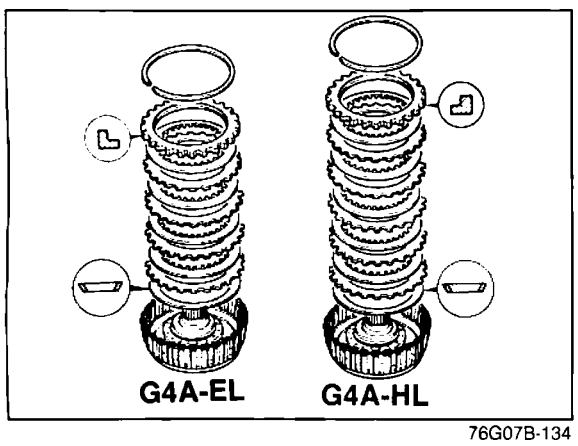
   Free length of spring:
   33.2 mm (1.307 in)

Assembly

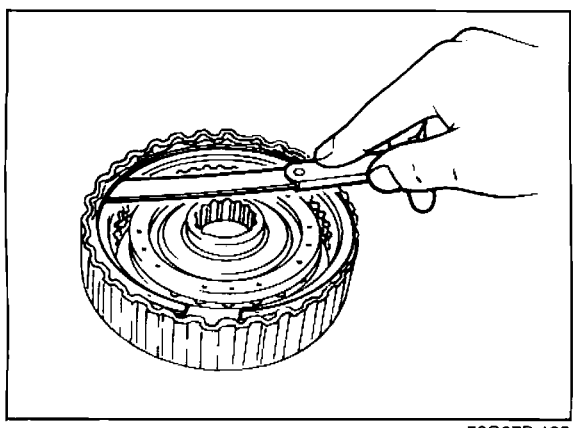
1. Install the 3-4 clutch piston.
   (1) Apply ATF to the inner and outer seals, and install them onto the 3-4 clutch piston.
   (2) Install the piston by pushing evenly around the circumference, being careful not to damage the seal rings.
2. Install the spring and retainer assembly.



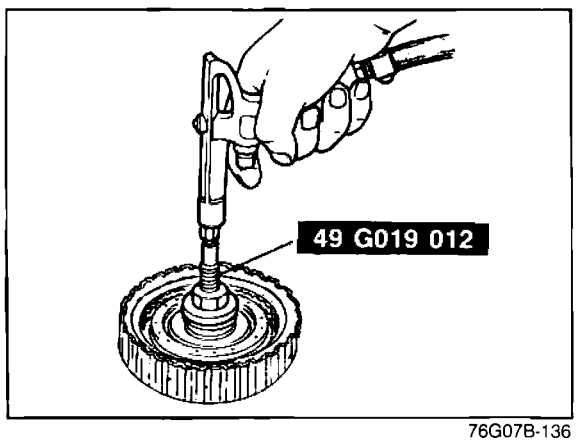
86U07B-249



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76G07B-135



76G07B-136

3. Install the **SST** to the 3-4 clutch as shown.
4. Compress the spring and retainer assembly.
5. Install the snap ring.
6. Remove the **SST**.

7. Install the dished plate the dished side up ward (G4A-HL).
8. Install the drive and driven plates.

Note
Installation order:
G4A-EL
Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive
G4A-HL
Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive

9. Install the retaining plate with the step facing upward.
10. Install the snap ring.
11. Check the 3-4 clutch clearance.
    (1) Measure the clearance between the snap ring and the retaining plate of the 3-4 clutch.
    (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

3-4 clutch clearance:
1.3—1.5 mm (0.051—0.059 in)

Retaining plate sizes mm (in)
G4A-EL

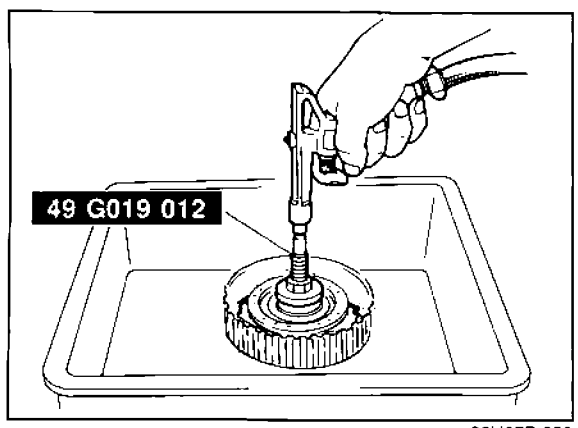
3.8 (0.150)	4.0 (0.157)	4.2 (0.165)
4.4 (0.173)	4.6 (0.181)	4.8 (0.189)

G4A-HL

4.8 (0.189)	5.0 (0.197)	5.2 (0.205)
5.4 (0.213)	5.6 (0.220)	

12. Check clutch operation as follows:
    (1) Install the **SST** as shown, and check clutch operation by applying compressed air.

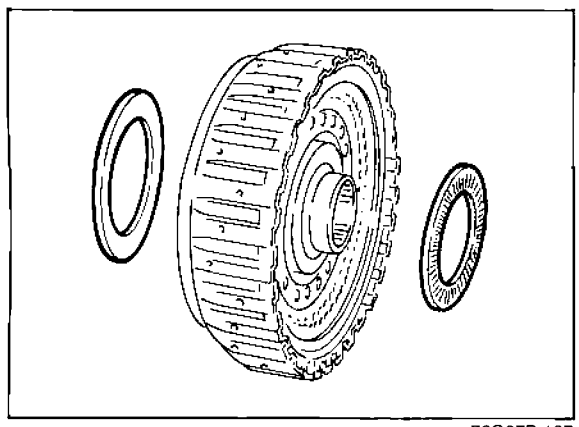
Air pressure:
392 kPa (4.0 kg/cm^2, 57 psi)



86U07B-253

(2) Pour ATF into the clutch drum so that the 3-4 clutch piston is fully submerged.
(3) Check that no bubbles come from the 3-4 clutch piston seal while applying compressed air.

Caution
The compressed air must be under 392 kPa (4.0 kg/cm^2, 57 psi) and not applied for over 3 seconds.



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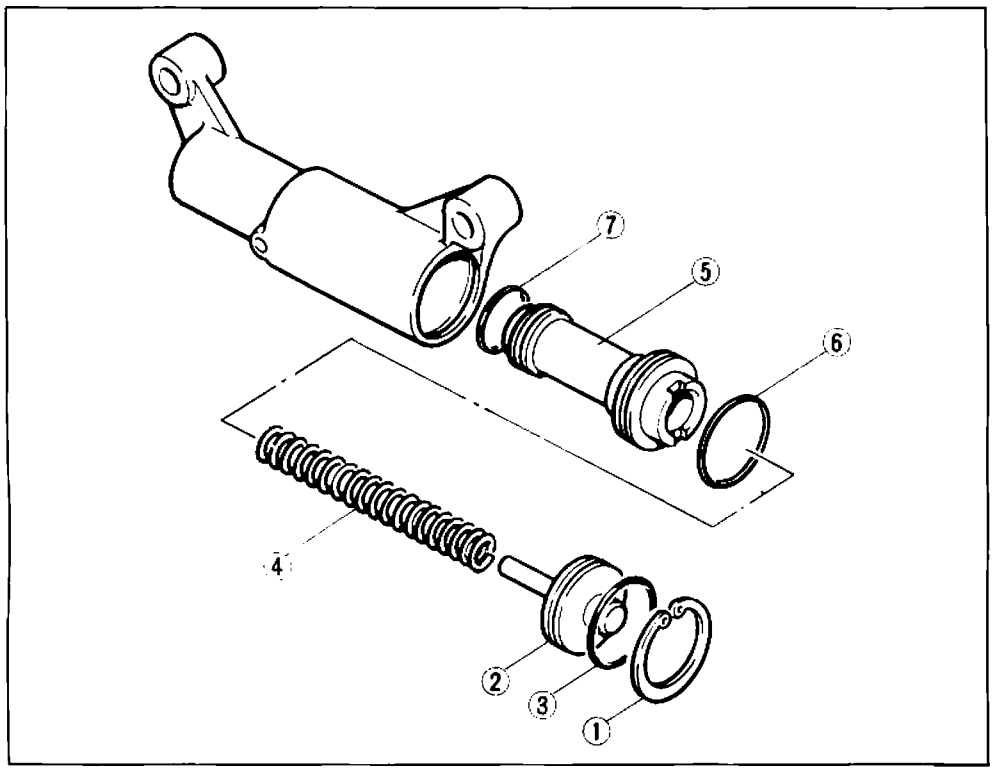
13. Apply petroleum jelly to the thrust bearings and secure them to both sides of the 3-4 clutch drum.

Thrust bearing outer diameter
Carrier hub side: 56.1 mm (2.21 in)
Output shell side: 72.1 mm (2.84 in)

2-3 ACCUMULATOR

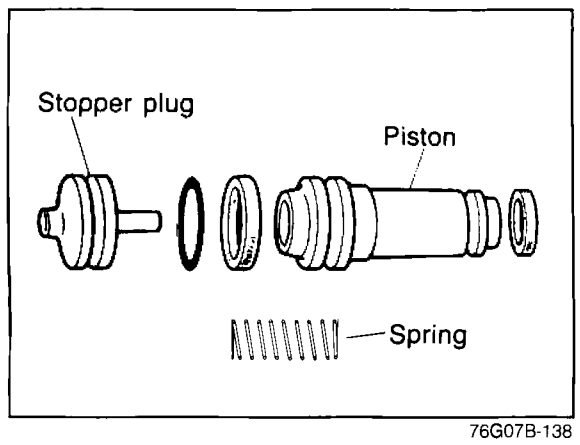
Disassembly

Disassemble in the sequence shown in the figure.



86U07B-255

1. Snap ring
2. Stopper plug
3. O-ring
4. 2-3 accumulator spring
5. 2-3 accumulator piston
6. Large seal ring
7. Small sea ring



76G07B-138

Inspection

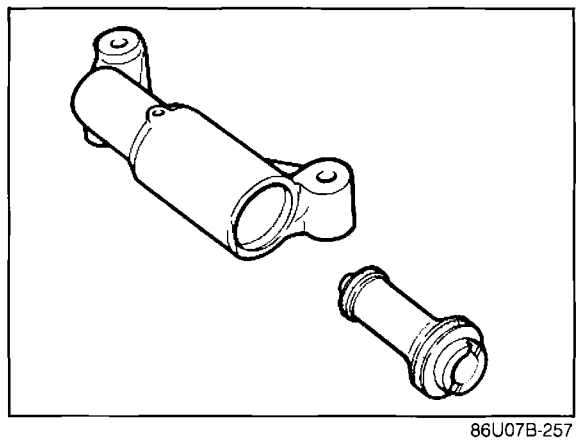
Check the following and replace any faulty parts.

1. Damaged or worn piston
2. Damaged or worn stopper plug
3. Broken or weakened spring

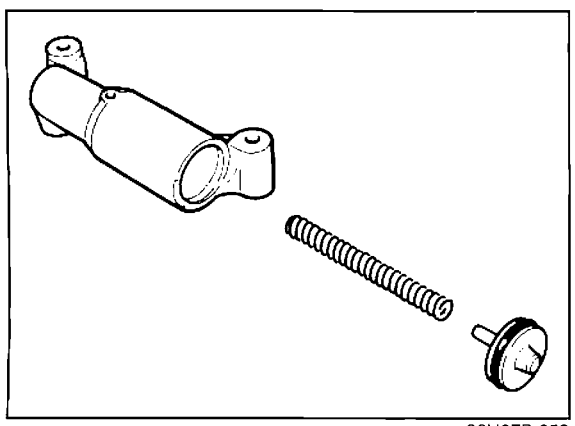
Free length of spring:
G4A-EL 83.3 mm (3.280 in)
G4A-HL 76.0 mm (2.992 in)

Assembly

1. Install the 2-3 accumulator.
   (1) Apply ATF to large and small seal rings; then install them to the accumulator piston.
   (2) Insert the 2-3 accumulator.

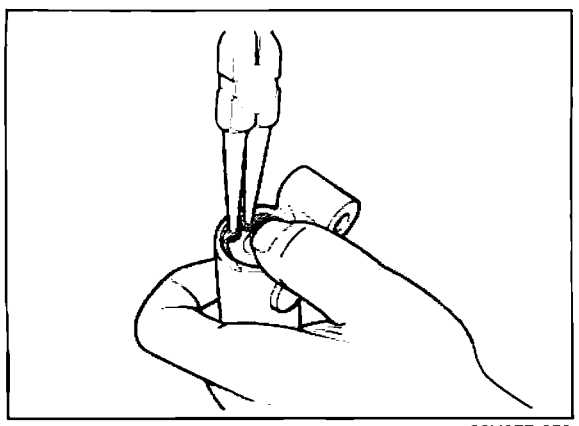


86U07B-257



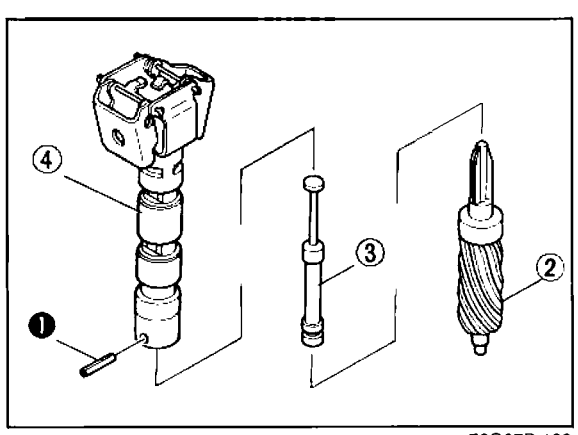
86U07B-258

2. Install the spring to the piston.
3. Install the stopper plug.
   (1) Apply ATF to O-ring, and install it onto the stopper plug.
   (2) Install the stopper plug.



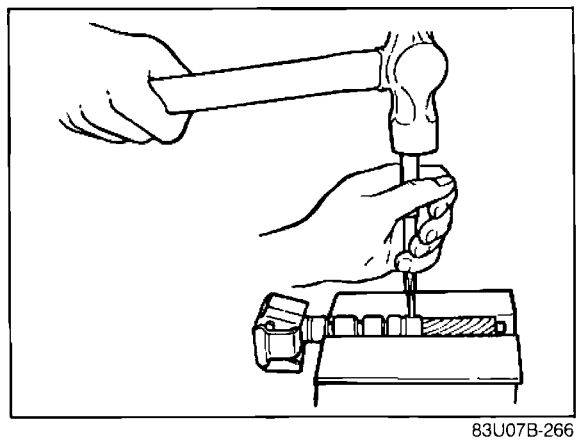
86U07B-259

4. Install the snap ring while holding in the stopper plug.



76G07B-139

GOVERNOR ASSEMBLY (G4A-HL)
Disassembly
Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked part.
1. Roll pin
2. Governor driven gear
3. Governor valve
4. Governor carrier and sleeve

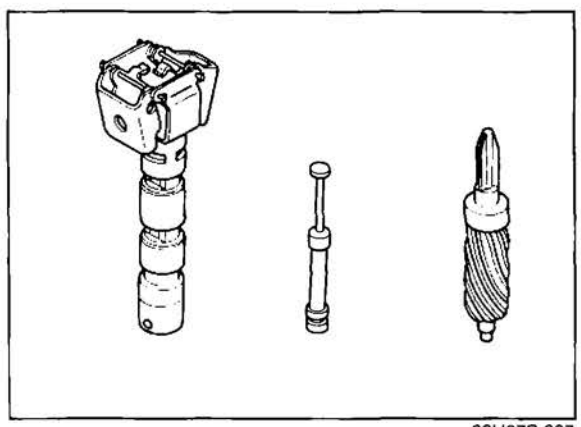


83U07B-266

Disassembly note
Roll pin
1. Secure the governor assembly in a vise.

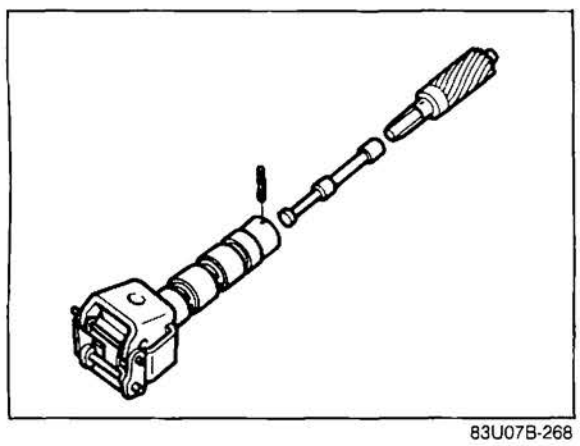
Note
Use the protective plates to prevent damage to the governor assembly.

2. Remove the roll pin from the governor assembly.



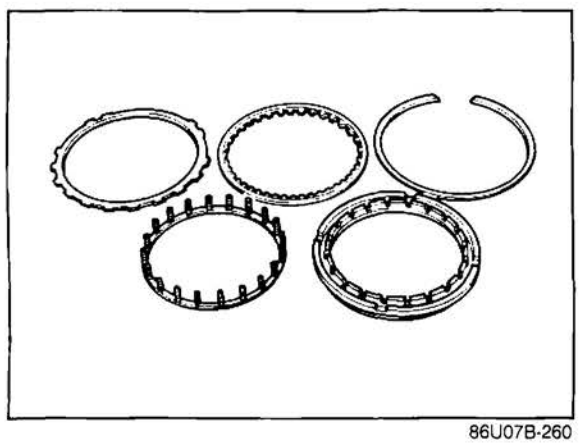
83U07B-267

Inspection
Check the following and replace any faulty parts.
1. Damaged or worn governor gear
2. Damaged or worn governor valve
3. Cracked or damaged governor carrier and sleeve



83U07B-268

Assembly
1. Insert the governor valve to the governor carrier and sleeve.
2. Install the governor driven gear.
3. Install the roll pin.



86U07B-260

LOW AND REVERSE BRAKE
Inspection
Check the following and replace any faulty parts.
1. Damaged or worn drive and driven plates

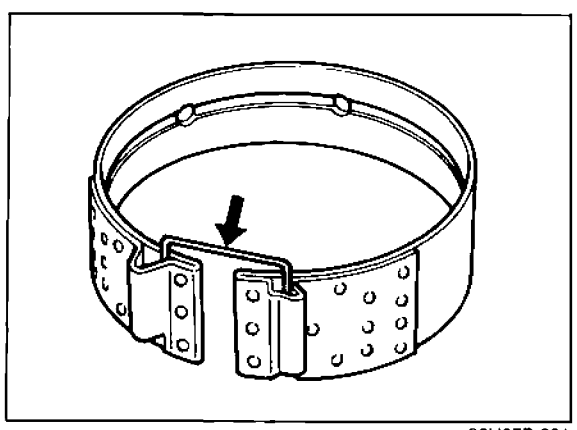
Drive plate thickness
Standard: 1.6 mm (0.063 in)
Minimum: 1.4 mm (0.055 in)

2. Broken or worn snap ring
3. Deformed or detached spring and retainer assembly
4. Broken or weakened spring

Free length of spring:
20.5 mm (0.807 in)

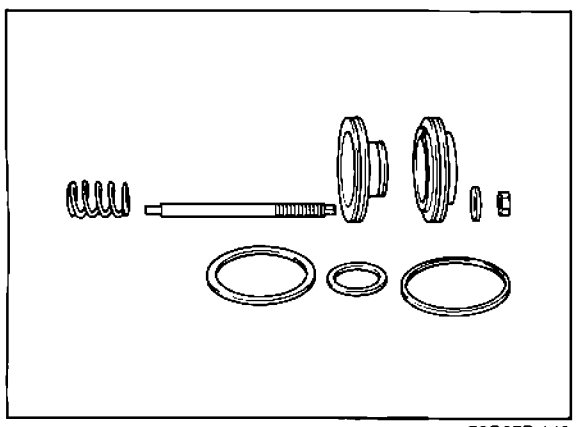
5. Damaged or worn piston
6. Damaged seal contact area of transaxle case

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86U07B-261

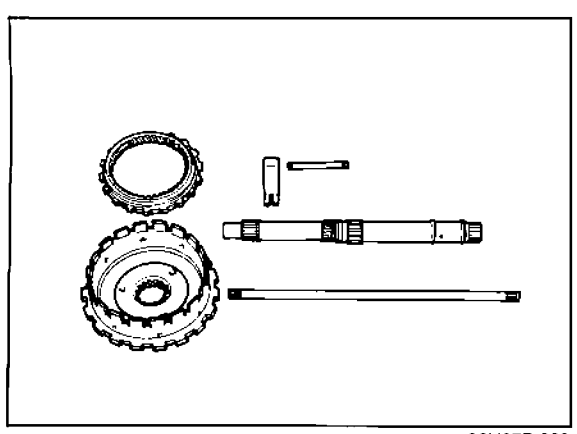
2-4 BRAKE BAND
Inspection
Check the following and replace if necessary.
1. Damaged or worn 2-4 brake band



76G07B-140

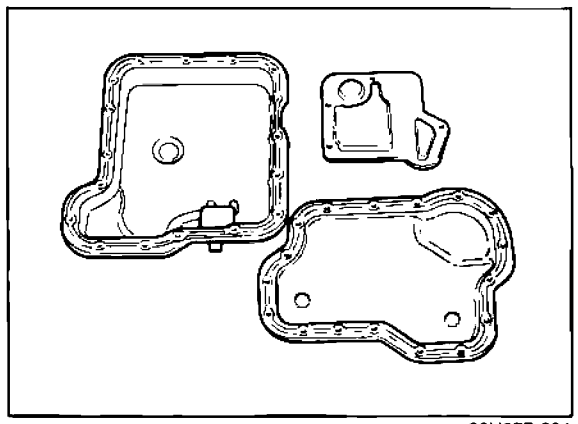
BAND SERVO
Inspection
Check the following and replace any faulty parts.
1. Damaged or worn piston
2. Weakened return spring

Free length of spring:
G4A-EL: 43.25 mm (1.703 in)
G4A-HL: FE engine 42.0 mm (1.654 in)
F8 engine 43.25 mm (1.703 in)



86U07B-263

OTHER INSPECTION
Check the following and replace any faulty parts.
1. Damaged or worn output shell
2. Damaged or worn internal gear
3. Damaged or worn turbine shaft
4. Damaged or worn oil pump shaft
5. Damaged or worn anchor strut and shaft



86U07B-264

6. Damaged or cracked valve body cover
7. Damaged or cracked oil pan
8. Damaged or clogged oil strainer

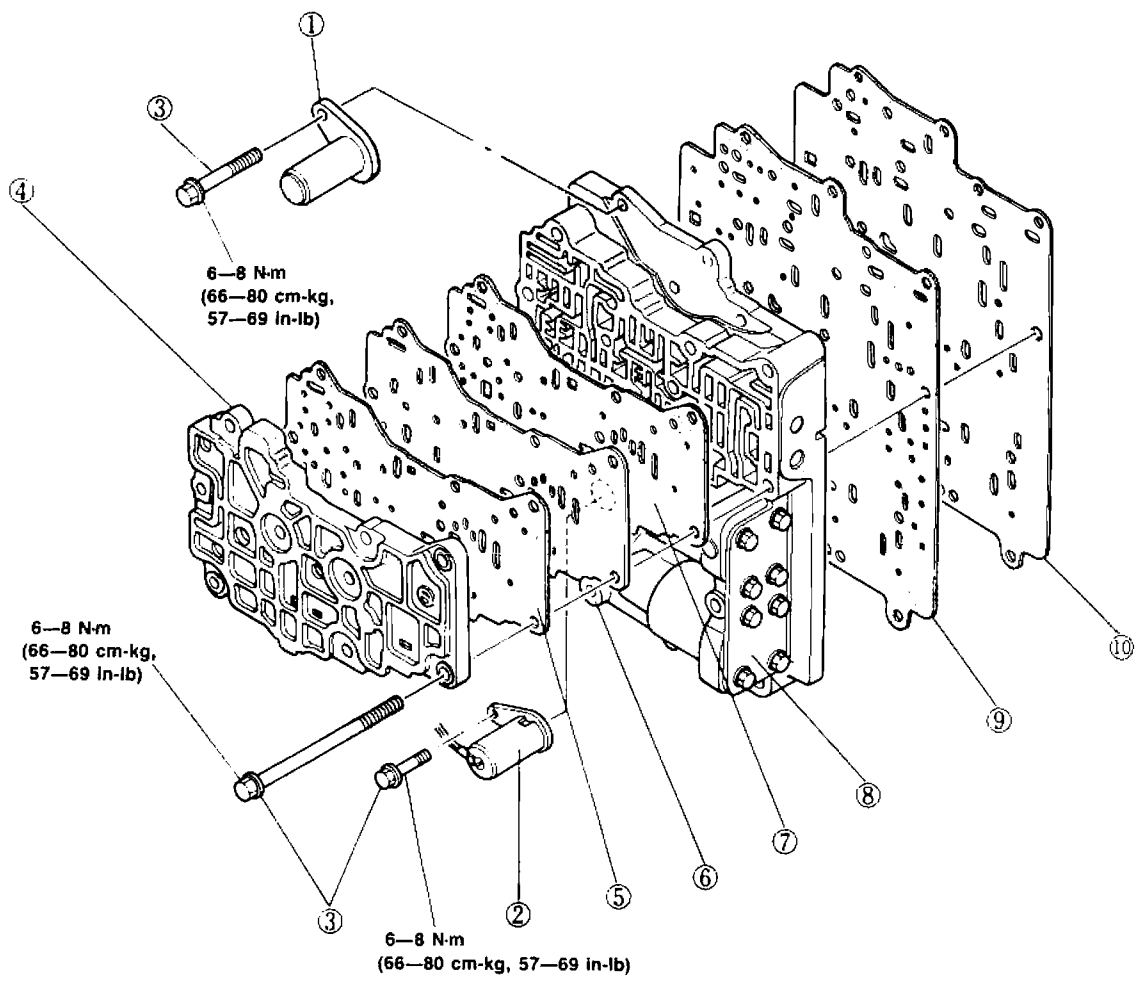
CONTROL VALVE BODY (G4A-EL)

Precaution

(1) Pay close attention when handling the control valve because it consists of the most precise and delicate parts of the transaxle.
(2) Neatly arrange the removed parts in order to avoid mixing up similar parts.
(3) Disassemble the control valve assembly and thoroughly clean it when the clutch and/or brake bands are burned, and/or when the automatic transaxle fluid is degenerated.

Components I

Front and premain control body

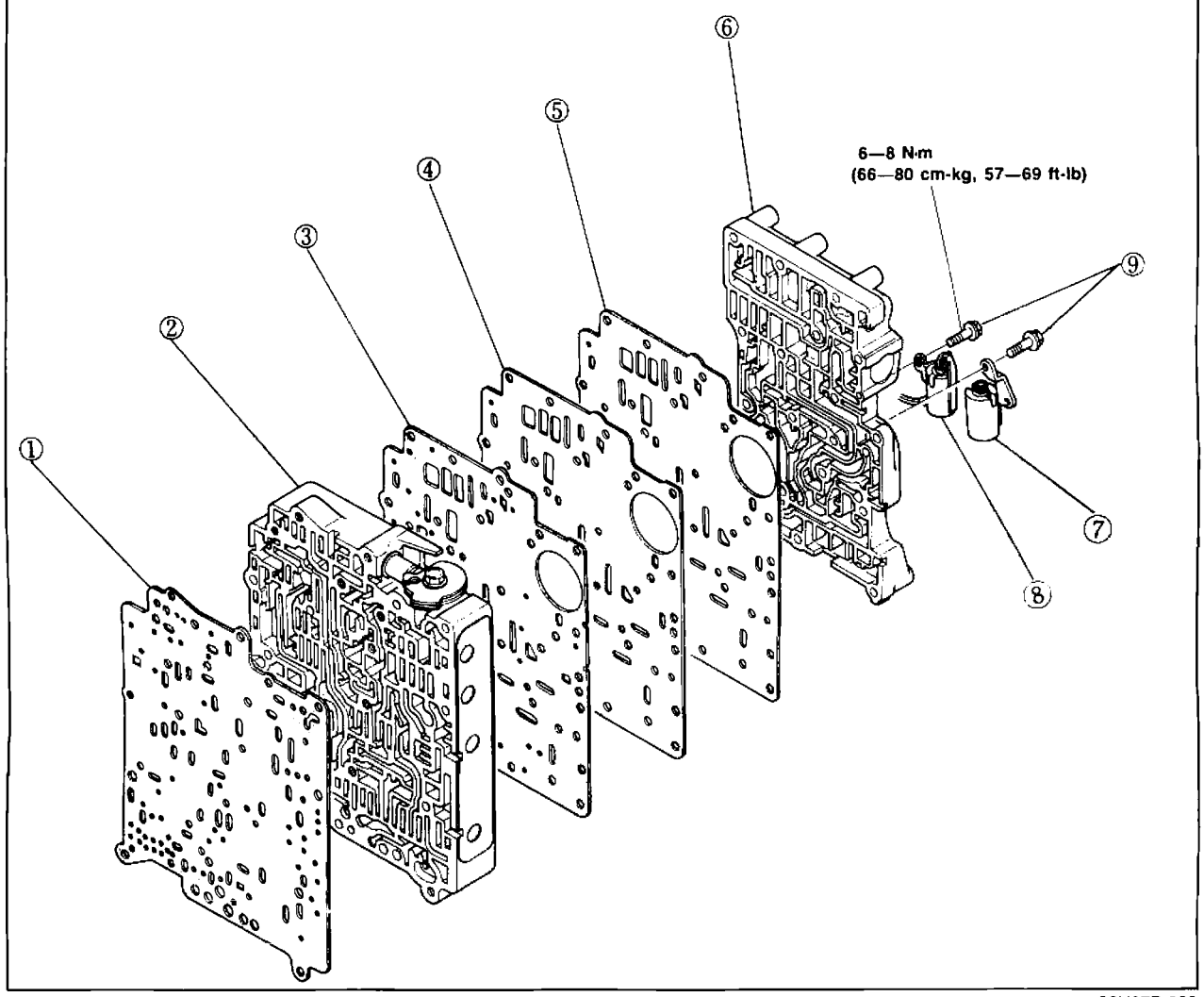


76G07B-141

1. 1-2 Solenoid valve
2. 2-3 Solenoid valve
3. Bolts
4. Front control body
5. Front/premain front gasket
6. Premain separator
7. Front/premain rear gasket
8. Premain control body
9. Premain/main front gasket
10. Main separator

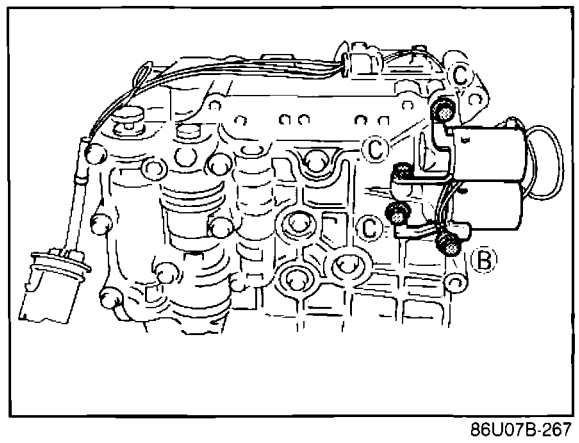
Components II

Main and rear control body



86U07B-266

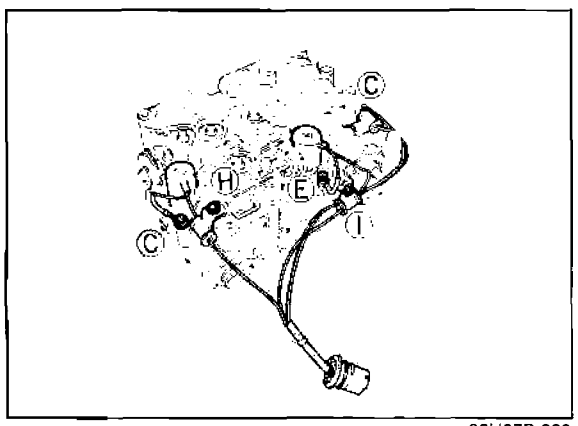
1. Premain/main rear gasket
2. Main control body
3. Main/rear front gasket
4. Rear separator
5. Main/rear rear gasket
6. Rear control body
7. 3-4 solenoid valve
8. Lock-up solenoid valve
9. Bolts



86U07B-267

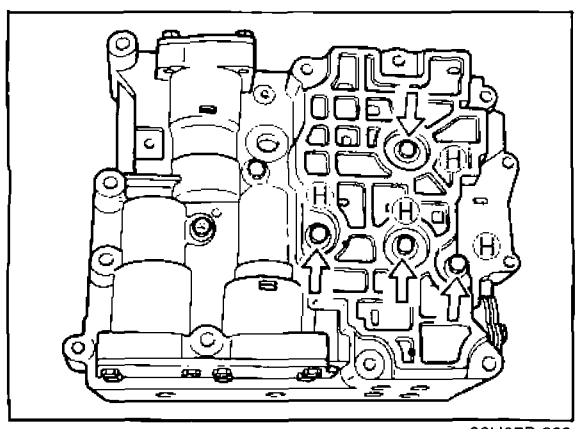
Disassembly of Control Valve Body

1. Remove the 3-4 solenoid valve and lock-up solenoid valve.
2. Remove the O-rings and oil strainers.



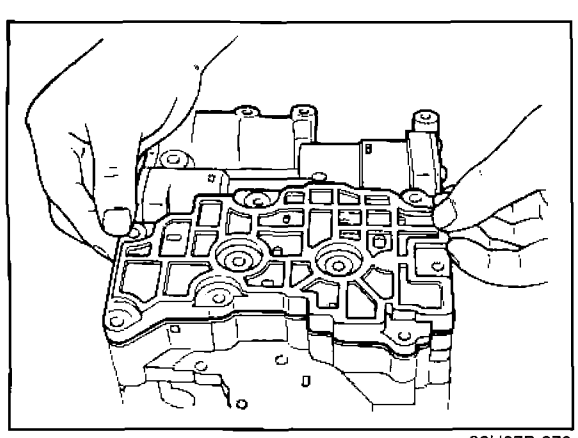
86U07B-268

3. Remove the 1-2 solenoid valve and 2-3 solenoid valve and wire harness.
4. Remove the O-rings and oil strainers.



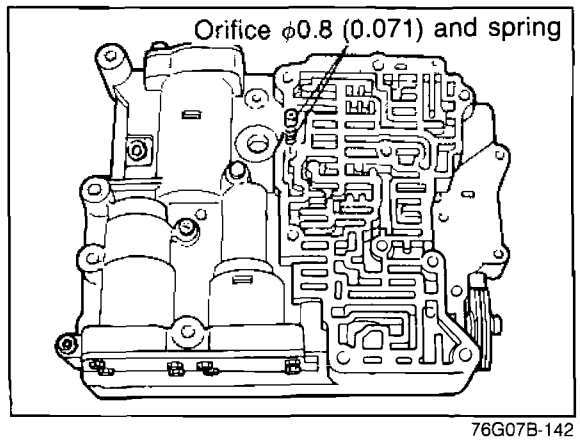
86U07B-269

5. Remove the front indicated bolts and pull out the front control body with premain separator as a unit.



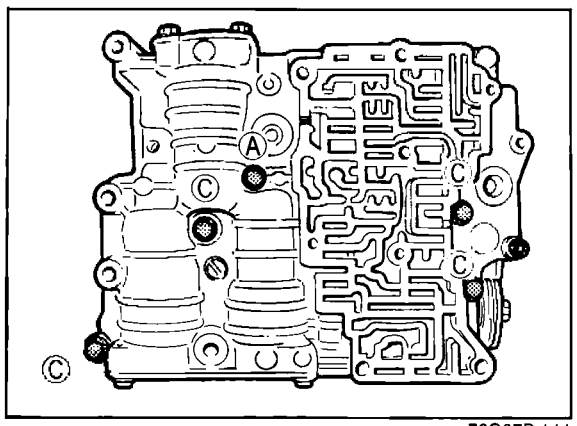
86U07B-270

6. Remove the front/premain gaskets and separator from the front control body.



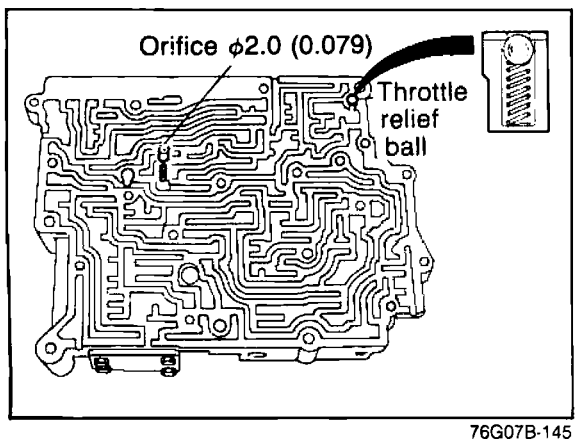
76G07B-142

7. Remove the orifice check valve (ϕ0.8 mm, 0.071 in) and spring from the premain control body.



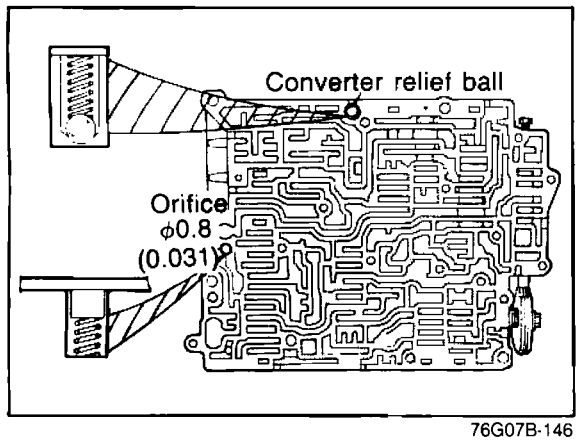
76G07B-144

8. Remove the bolts and hexagonal head bolt and remove the premain control body and the main separator as a unit.



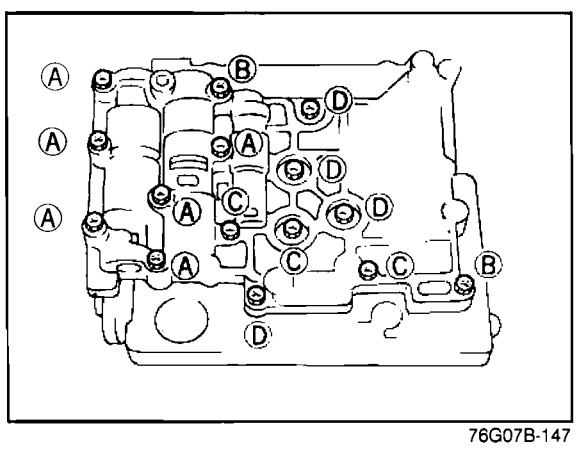
76G07B-145

9. Remove the premain/main gaskets and separator from the premain control body.
10. Remove the orifice check valve (ϕ2.0 mm, 0.079 in) and spring, and the throttle relief ball and spring from the premain control body.



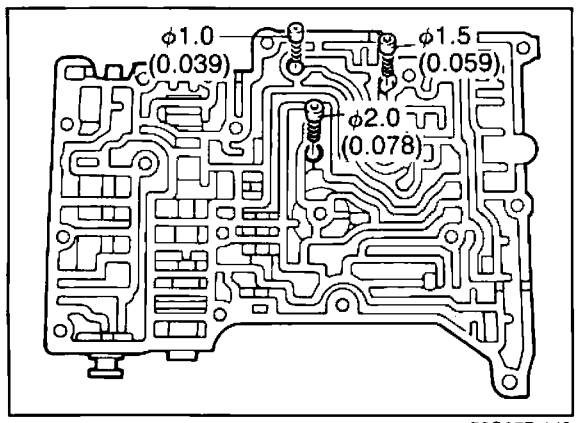
76G07B-146

11. Remove the converter relief ball and spring, and the orifice check valve (ϕ0.8 mm, 0.031 in) and spring from the main control body.



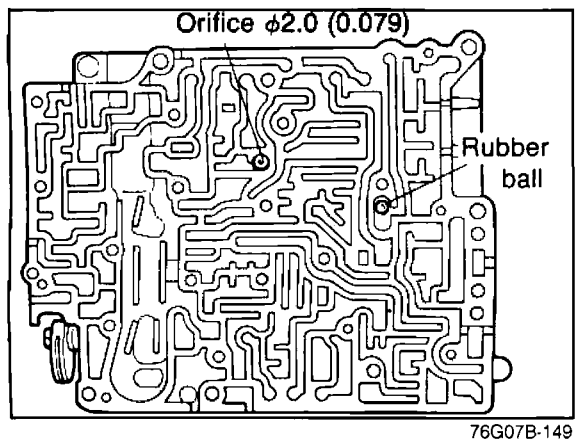
76G07B-147

12. Turn the assembly over and remove the bolts shown in the figure. Remove the rear separator as a unit.



76G07B-148

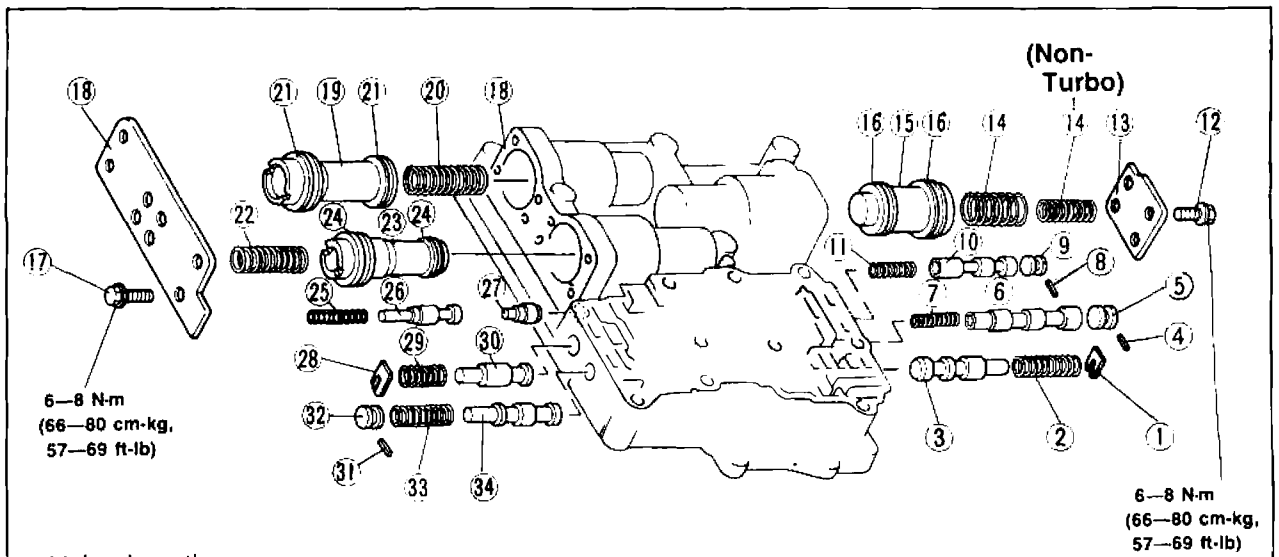
13. Remove the main/rear gaskets and separator from the rear control body.
14. Remove the orifice check valves (φ1.5 mm, 0.059 in; φ1.0 mm, 0.039 in; φ2.0 mm, 0.079 in) and spring from the rear control body.



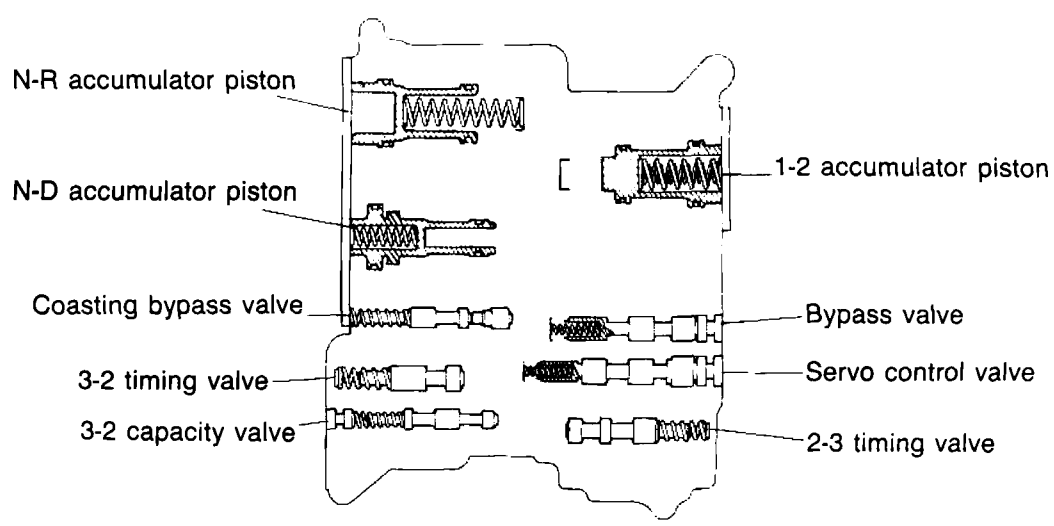
76G07B-149

15. Remove the orifice check valve (φ2.0 mm, 0.079 in) and spring and the rubber ball from the main control body.

Premain Control Body
Disassembly
Disassemble in the sequence shown in the figure.



Valve Location



76G07B-150

1. Retainer
2. 2-3 timing spring
3. 2-3 timing valve
4. Stopper pin
5. Stopper plug
6. Servo control valve
7. Servo control spring
8. Stopper pin
9. Stopper plug
10. Bypass valve
11. Bypass spring
12. Bolt
13. 1-2 accumulator plate and gasket
14. 1-2 accumulator spring
15. 1-2 accumulator piston
16. 1-2 accumulator seal rings
17. Bolt
18. N-R accumulator plate and gasket
19. N-R accumulator piston
20. N-R accumulator rear spring
21. N-R accumulator seal rings
22. N-D accumulator front spring
23. N-D accumulator piston
24. N-D accumulator seal rings
25. Coasting bypass spring
26. Coasting bypass valve
27. Coasting bypass plug
28. Retainer
29. 3-2 timing spring
30. 3-2 timing valve
31. Stopper pin
32. Stopper plug
33. 3-2 capacity spring
34. 3-2 capacity valve

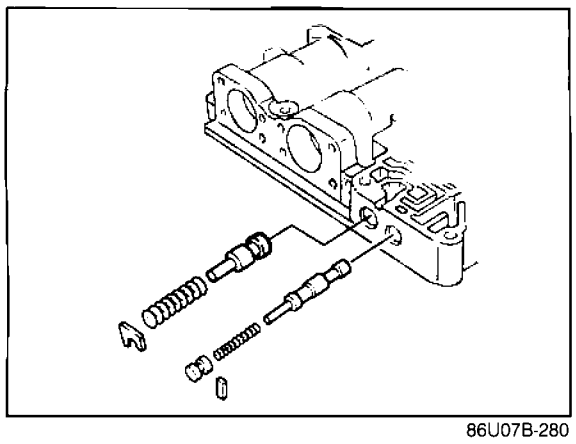
7B INSPECTION AND REPAIR

Inspection
Check the following and replace any faulty parts.
1. Damaged or worn valves
2. Damaged oil passage
3. Cracked or damaged valve body
4. Operation of each valve
5. Weakened spring

Spring

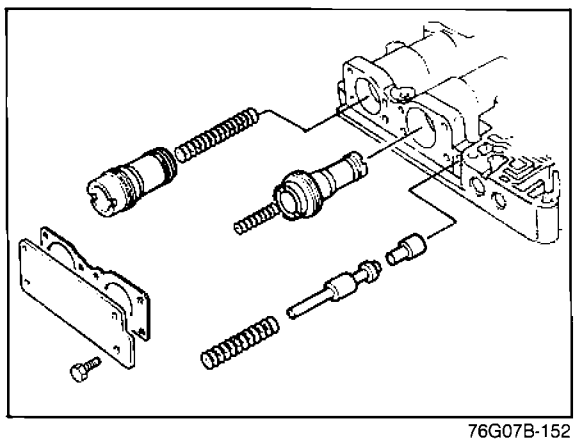
Spring name	Outer dia. mm (in)	Free length mm (in)	Wire dia. mm (in)	Spring color
1-2 accumulator small spring	11.0 (0.433)	88.1 (3.348)	1.4 (0.055)	Gray
1-2 accumulator large spring	16.0 (0.630)	78.0 (3.071)	2.0 (0.079)	Blue
Bypass, Servo control spring	5.0 (0.197)	33.4 (1.315)	0.55 (0.022)	Maroon
2-3 timing spring	8.3 (0.327)	26.5 (1.043)	0.8 (0.031)	—
N-R accumulator rear spring	11.1 (0.437)	62.0 (2.441)	1.2 (0.047)	Light green
N-D accumulator front spring	9.8 (0.386)	52.9 (2.083)	1.0 (0.039)	Brown
Coasting bypass spring	5.8 (0.228)	37.7 (1.484)	0.6 (0.024)	Dark blue
3-2 timing spring	8.2 (0.323)	28.6 (1.126)	0.8 (0.031)	Red
3-2 capacity spring	5.4 (0.213)	30.6 (1.205)	0.5 (0.020)	White
Throttle relief ball spring	6.6 (0.260)	21.6 (0.850)	0.8 (0.031)	—

76G07B-151



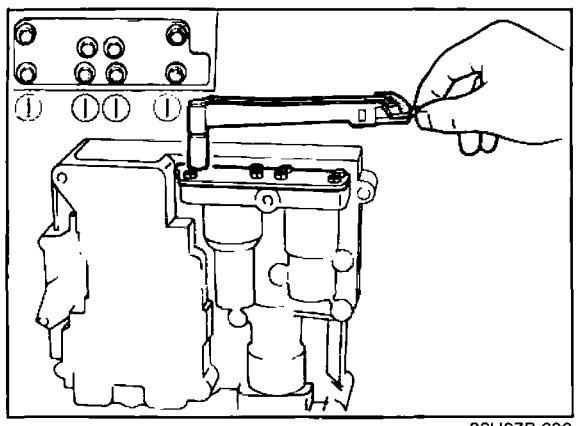
86U07B-280

Assembly
1. Install the 3-2 capacity valve, 3-2 capacity spring, and stopper plug; then install the stopper pin.
2. Install the 3-2 timing valve, the 3-2 timing spring, and retainer.



76G07B-152

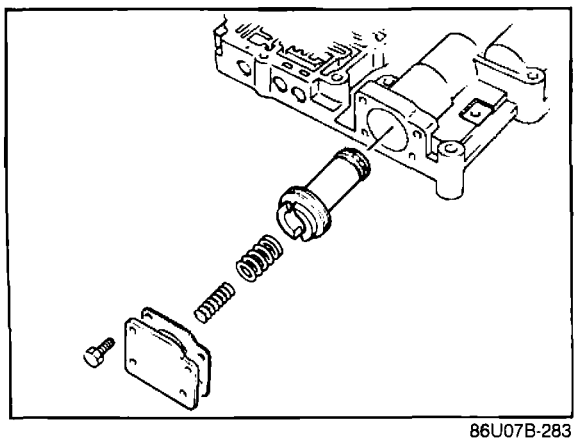
3. Install the coasting bypass plug, coasting bypass valve and coasting bypass spring.
4. Apply ATF to the O-rings, and install them to the piston; then insert the N-R accumulator rear spring and N-R accumulator piston.
5. Apply ATF to the O-rings, and install them to the piston; then insert the N-D accumulator piston and N-D accumulator front spring.



86U07B-282

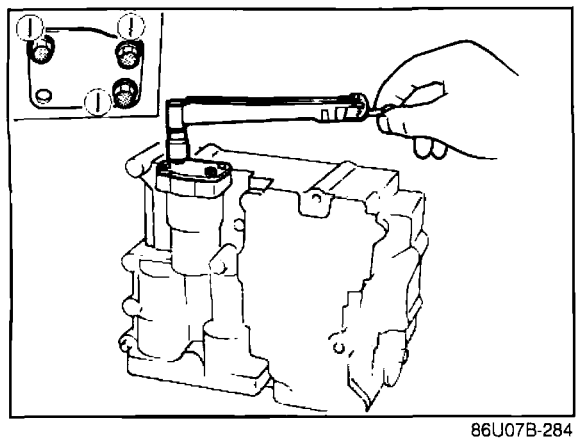
6. Install the N-R accumulator gasket and plate; then tighten the plate.

Tightening torque:
6—8 N·m (66—80 cm-kg, 57—69 in-lb)



86U07B-283

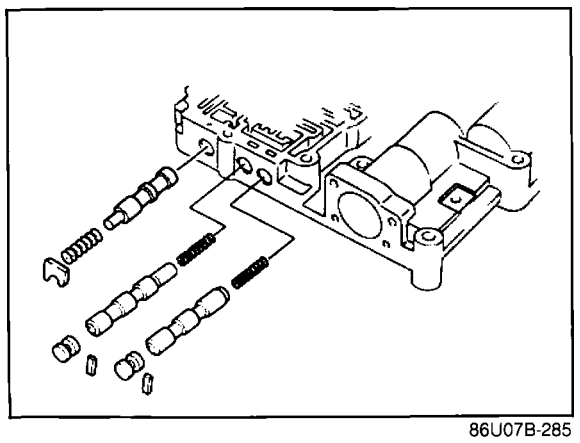
7. Apply ATF to the O-rings, and install them onto the piston; then install the 1-2 accumulator piston and 1-2 accumulator springs.



86U07B-284

8. Install the 1-2 accumulator gasket and plate; then tighten the plate.

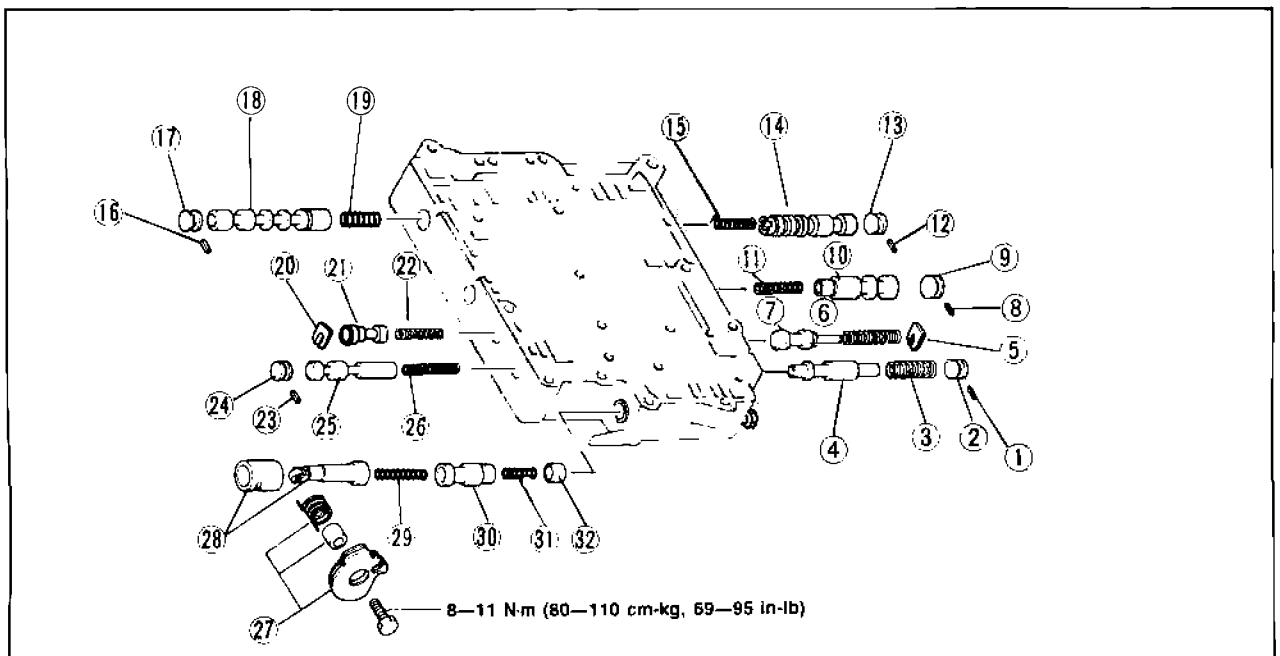
Tightening torque:
6—8 N·m (66—80 cm-kg, 57—69 in-lb)



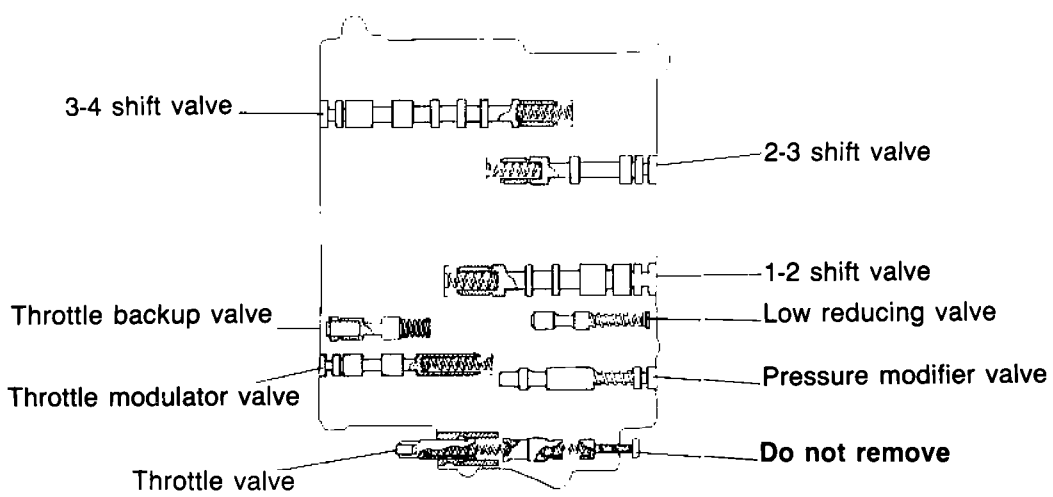
86U07B-285

9. Install the bypass spring, bypass valve, stopper plug, and stopper pin.
10. Install the servo control spring, servo control valve, stopper plug, and stopper pin.
11. Install the 2-3 timing valve, 2-3 timing spring, and retainer.

Main Control Body
Disassembly
Disassemble in the sequence shown in the figure.



Valve Location



86U07B-286

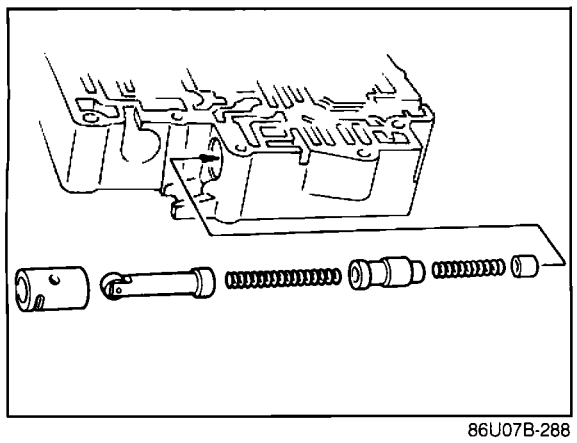
1. Stopper pin
2. Stopper plug
3. Pressure modifier spring
4. Pressure modifier valve
5. Retainer
6. Low reducing spring
7. Low reducing valve
8. Stopper pin
9. Stopper plug
10. 1-2 shift valve
11. 1-2 shift spring
12. Stopper pin
13. Stopper plug
14. 2-3 shift valve
15. 2-3 shift spring
16. Stopper pin
17. Stopper plug
18. 3-4 shift valve
19. 3-4 shift spring
20. Retainer
21. Throttle backup valve
22. Throttle backup spring
23. Stopper pin
24. Stopper plug
25. Throttle modulator valve
26. Throttle modulator spring
27. Throttle cam assembly
28. Throttle plug assembly
29. Throttle spring
30. Throttle valve
31. Throttle assist spring
32. Throttle adjust plug

Inspection
Check the following and replace any faulty parts.
1. Damaged or worn valves
2. Damaged oil passage
3. Cracked or damaged valve body
4. Operation of each valve
5. Weakened spring

Spring

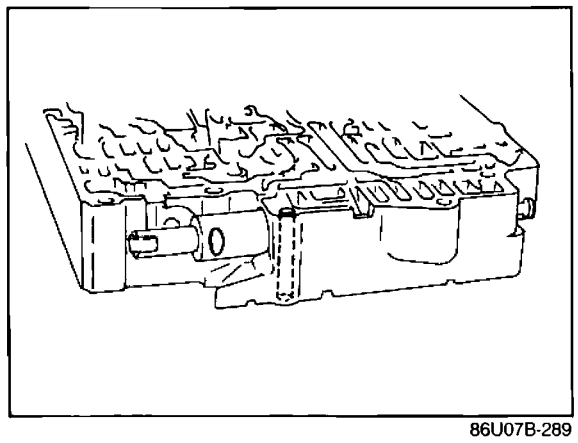
Spring name	Outer dia. mm (in)	Free length mm (in)	Wire dia. mm (in)	Spring color
Pressure modifier spring	8.3 (0.327)	26.5 (1.043)	0.8 (0.031)	—
Low reducing spring	8.7 (0.343)	38.3 (1.508)	0.9 (0.035)	Black
1-2 shift spring	8.7 (0.343)	41.3 (1.626)	1.0 (0.039)	Yellow
2-3, 3-4 shift spring	7.4 (0.291)	36.6 (1.441)	0.8 (0.031)	Gray
Throttle backup spring	9.65 (0.380)	26.9 (1.059)	0.55 (0.022)	Red
Throttle modulator spring	6.3 (0.248)	47.9 (1.886)	0.8 (0.031)	—
Throttle assist spring	5.15 (0.203)	32.3 (1.272)	0.55 (0.022)	Dark green
Throttle spring	5.4 (0.213)	47.2 (1.858)	0.8 (0.031)	Pink
Converter relief ball spring	6.9 (0.272)	24.1 (0.949)	0.9 (0.035)	Maroon
Orifice check valve spring	5.0 (0.197)	12.5 (0.492)	0.23 (0.009)	—

76G07B-219



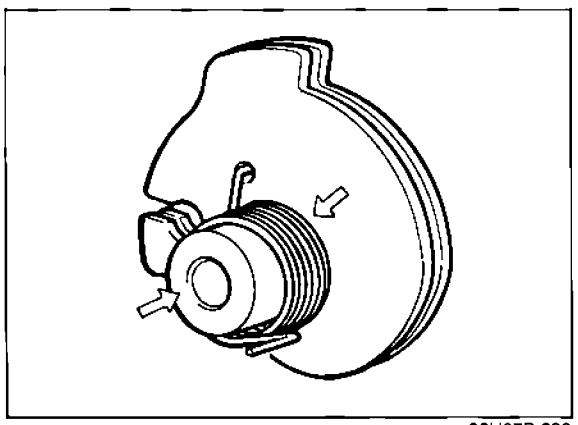
86U07B-288

Assembly
1. Install the throttle adjust plug, throttle assist spring, throttle valve, and throttle plug assembly.



86U07B-289

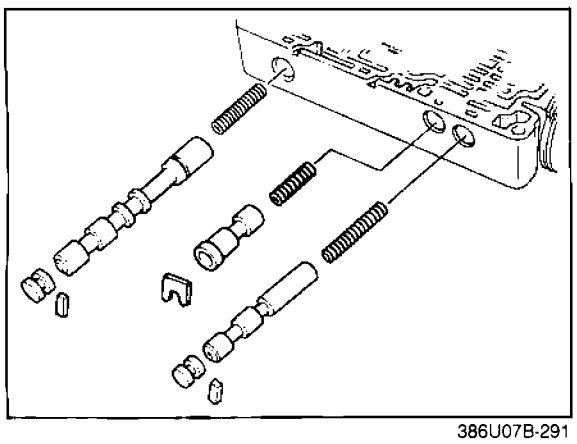
Caution
Install the throttle plug assembly with the groove aligned with the bolt hole.



86U07B-290

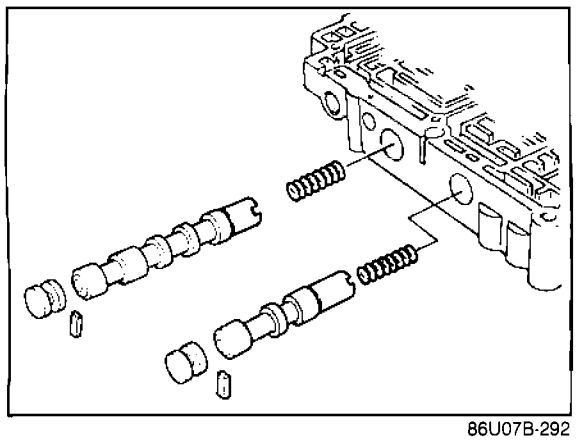
2. Install the throttle return spring as shown.
3. Install the throttle cam assembly to the main control body.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



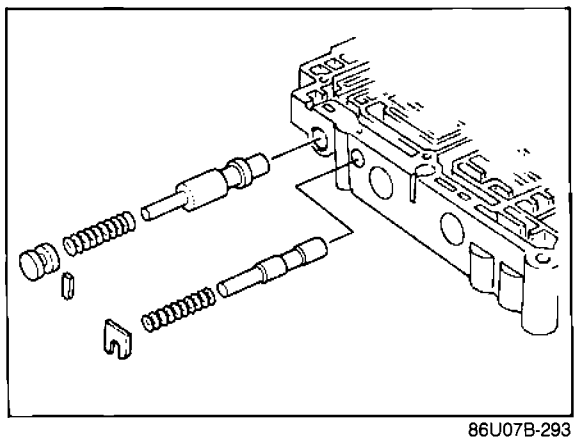
386U07B-291

4. Install the throttle modulator spring, throttle modulator valve, stopper plug, and stopper pin.
5. Install the throttle backup spring, throttle back valve, and retainer.
6. Install the 3-4 shift spring, 3-4 shift valve, stopper plug, and stopper pin.



86U07B-292

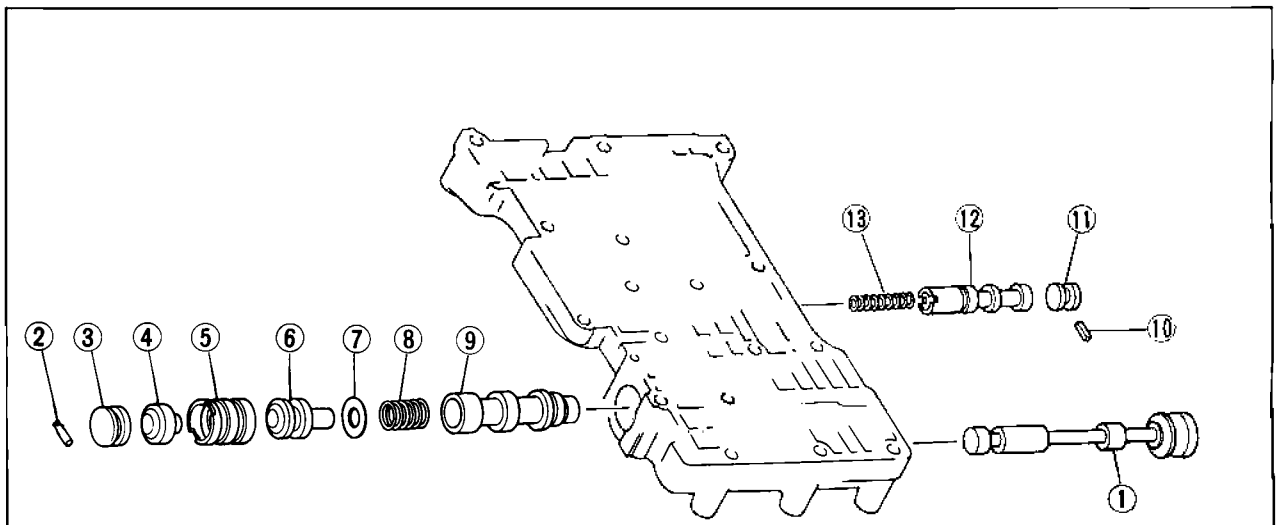
7. Install the 2-3 shift spring, 2-3 shift valve, stopper plug, and stopper pin.
8. Install the 1-2 shift spring, 1-2 shift valve, stopper plug, and stopper pin.



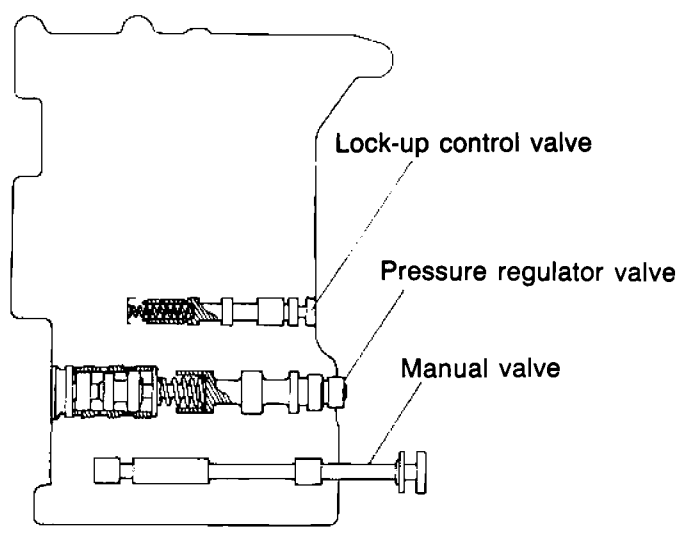
86U07B-293

9. Install the low reducing valve, low reducing spring, and retainer.
10. Install the pressure modifier valve, pressure modifier spring, stopper plug, and stopper pin.

Rear Control Body
Disassembly
Disassemble in the sequence shown in the figure.



Valve Location



86U07B-294

1. Manual valve
2. Stopper pin
3. Stopper plug
4. Pressure regulator backup plug
5. Pressure regulator plug sleeve
6. Pressure regulator plug
7. Pressure regulator spring seat
8. Pressure regulator spring
9. Pressure regulator valve
10. Stopper pin
11. Stopper plug
12. Lock-up control valve
13. Lock-up control spring

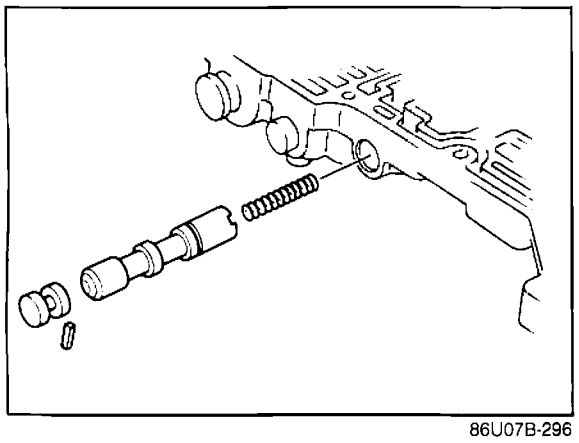
7B INSPECTION AND REPAIR

Inspection
Check the following and replace any faulty parts.
1. Damaged or worn valves
2. Damaged oil passage
3. Cracked or damaged valve body
4. Operation of each valve
5. Weakened spring

Spring

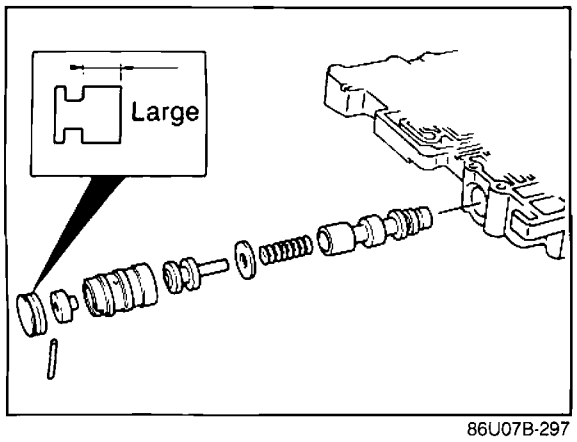
Spring name	Outer dia. mm (in)	Free length mm (in)	Wire dia. mm (in)	Spring color
Pressure regulator spring	11.5 (0.453)	26.5 (1.043)	1.0 (0.039)	Maroon
Lock-up control spring	5.0 (0.197)	35.2 (1.386)	0.6 (0.024)	Purple

86U07B-295



86U07B-296

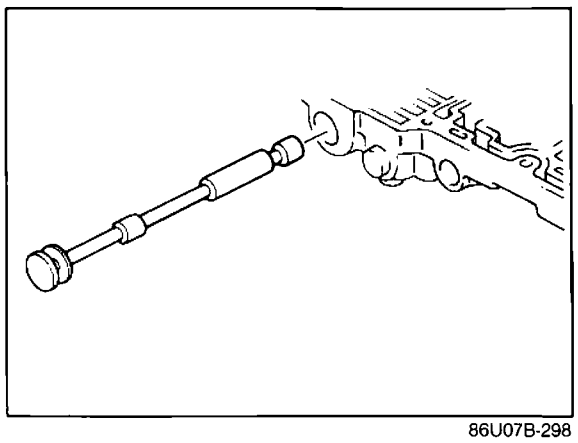
Assembly
1. Install the lock-up control spring, lock-up control valve, stopper plug, and stopper pin.



86U07B-297

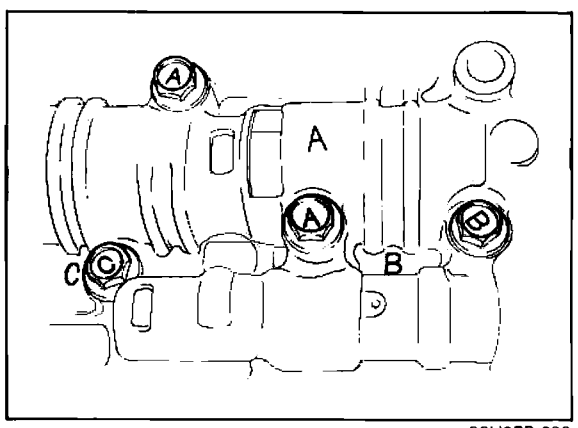
2. Install the pressure regulator valve, pressure regulator spring, pressure regulator spring seat, pressure regulator plug, pressure regulator plug sleeve, pressure regulator backup plug, stopper plug, and stopper pin.

Note
Install the stopper plug larger end first.



86U07B-298

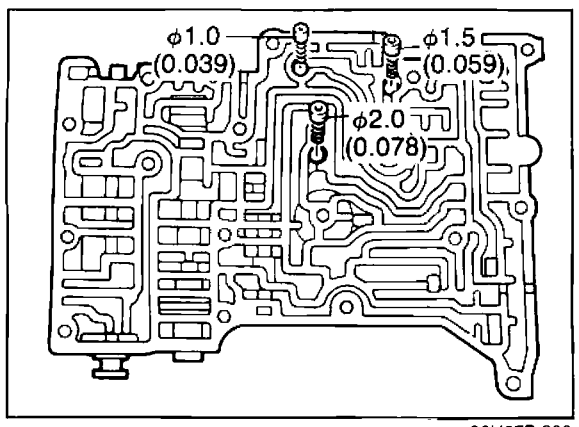
3. Install the manual valve.



86U07B-299

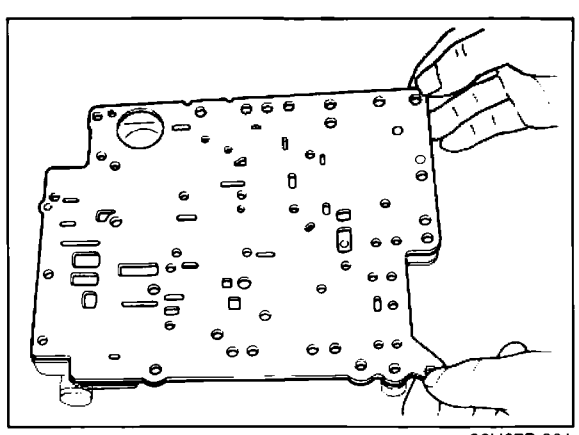
Assembly of Control Valve Body

Note
a) Do not mix-up the front and rear gaskets during assembly.
b) Match the bolt head letter and the control valve body letter.



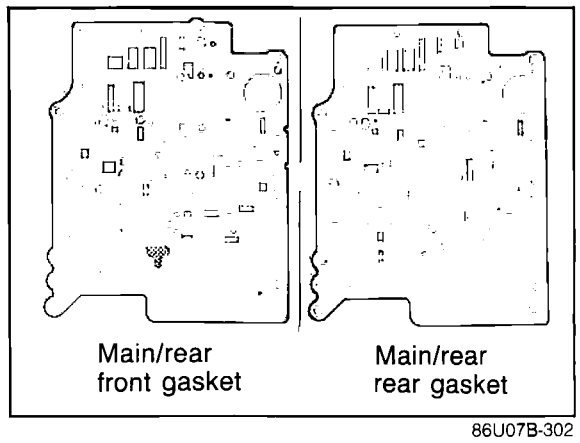
86U07B-300

1. Install the orifice check valves (φ1.5 mm, 0.059 in; φ1.0 mm, 0.039 in; φ2.0 mm, 0.079 in) and springs in the rear control body as shown.



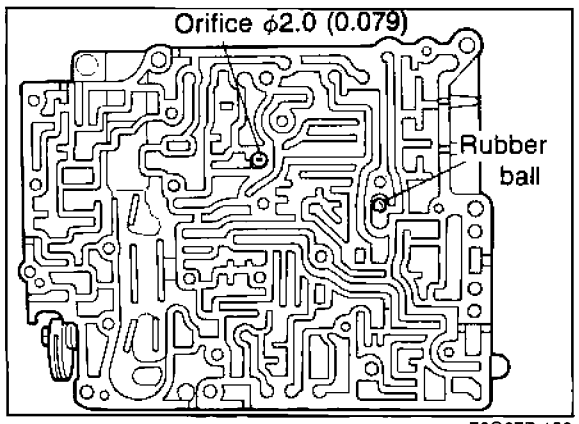
86U07B-301

2. Install the gaskets on both sides of the rear separator; then install it onto the rear control body.



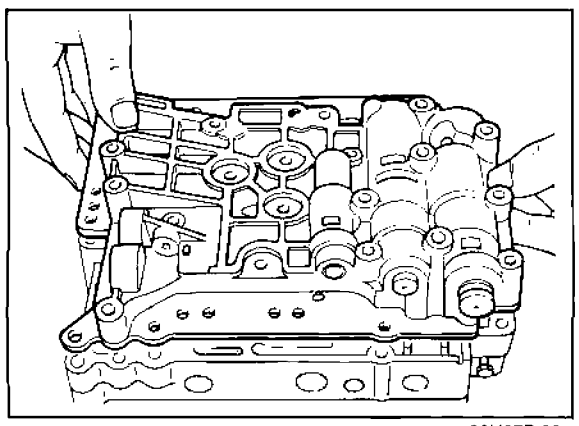
86U07B-302

Note
The main/rear rear gasket and main/rear front gasket are not interchangeable.



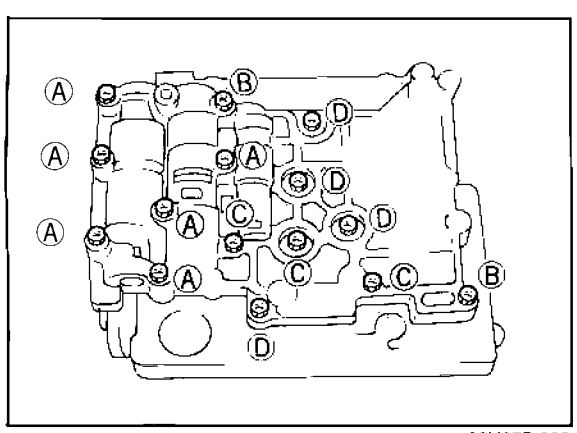
76G07B-153

3. Install the orifice check valve (ϕ2.0 mm, 0.079 in) and spring, and the rubber ball in the main control body as shown.



86U07B-304

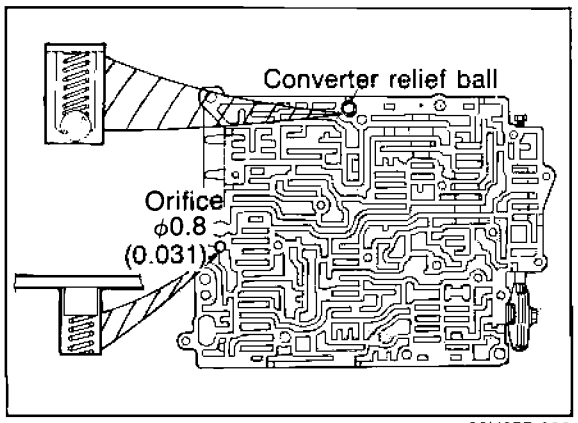
4. Install the rear control body to the main control body.



86U07B-305

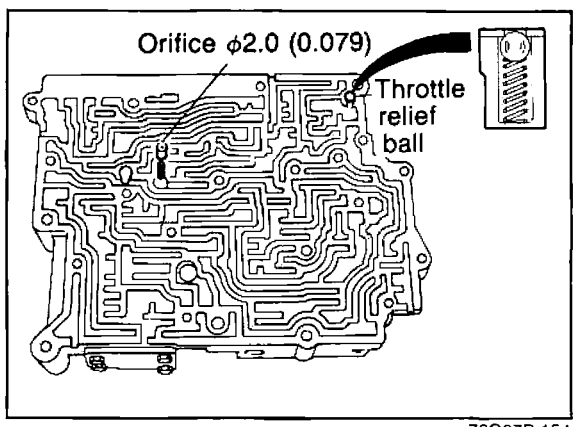
5. Loosely tighten the bolts.

Note
Match the bolt head letter as shown.



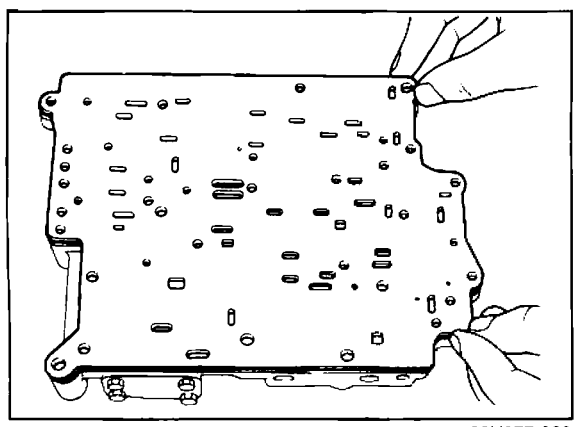
86U07B-306

6. Turn the assembly over and install the orifice check valve (ϕ0.8 mm, 0.031 in) and spring, and the converter relief ball and spring in the main control body as shown.



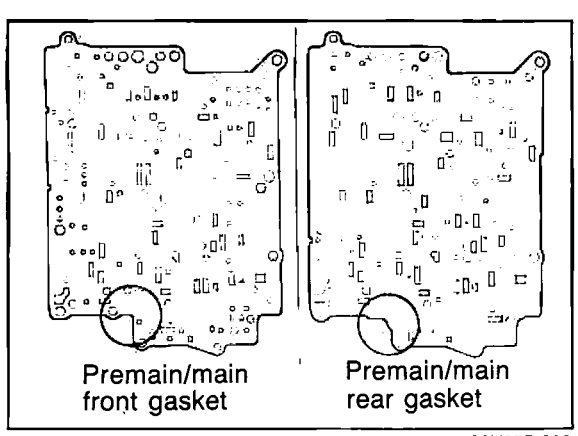
76G07B-154

7. Install the orifice check valve (ϕ2.0 mm, 0.079 in) and spring, and the throttle relief ball and spring in the premain control body as shown.



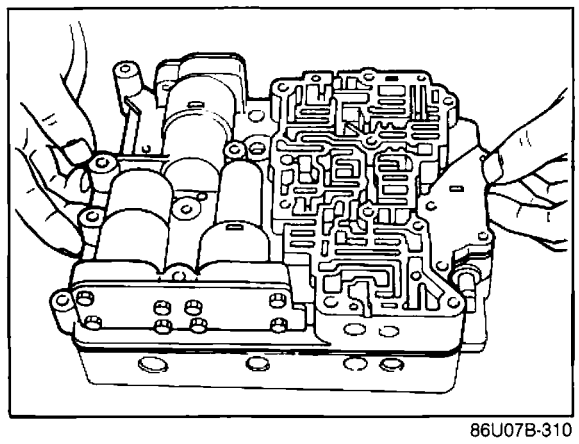
86U07B-308

8. Install the gaskets on both sides of the main separator; then install it onto the premain control body.



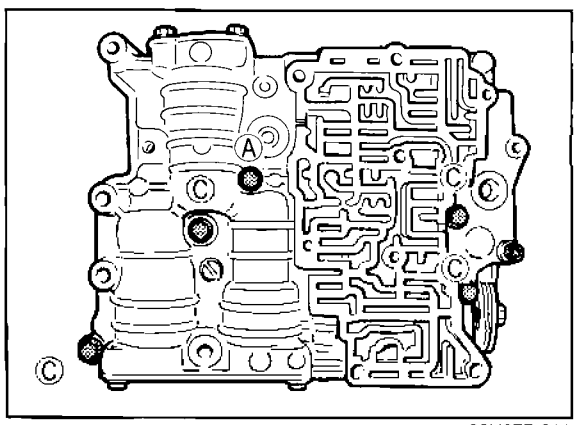
86U07B-309

Note
The premain/main rear gasket and premain/main front gasket are not interchangeable.



86U07B-310

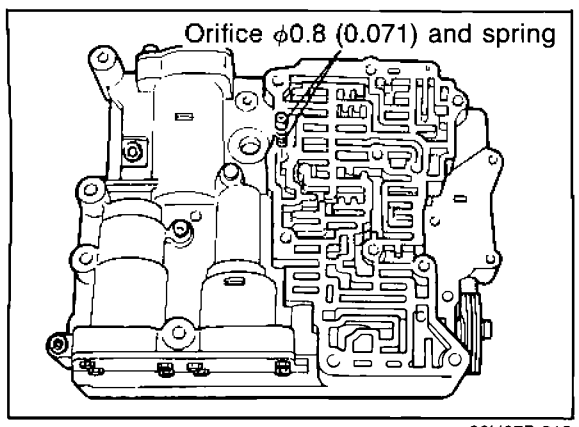
9. Set the premain control body onto the main control body.



86U07B-311

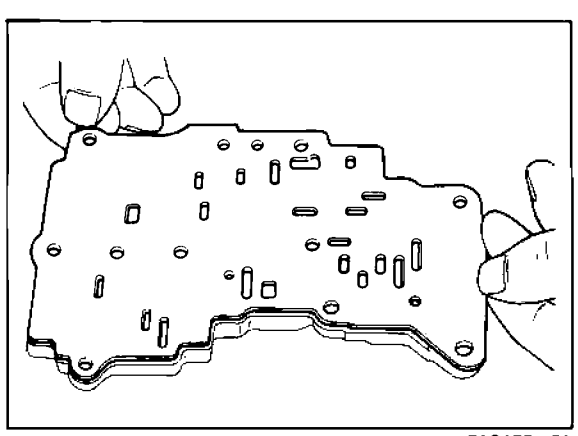
10. Loosely tighten the bolts.

Note
Match the bolt head letter as shown.



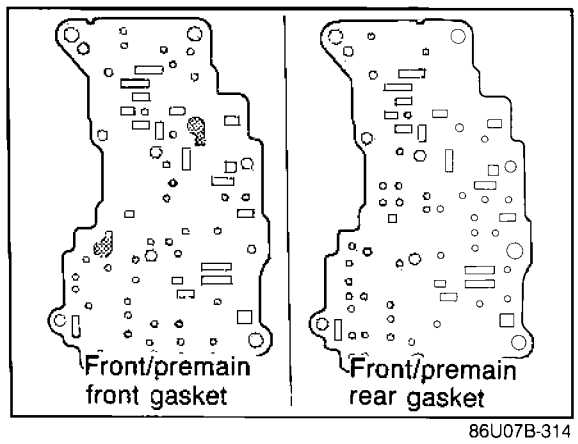
86U07B-312

11. Install the orifice check valve (ϕ0.8 mm, 0.071 in) and spring in the premain control body as shown.



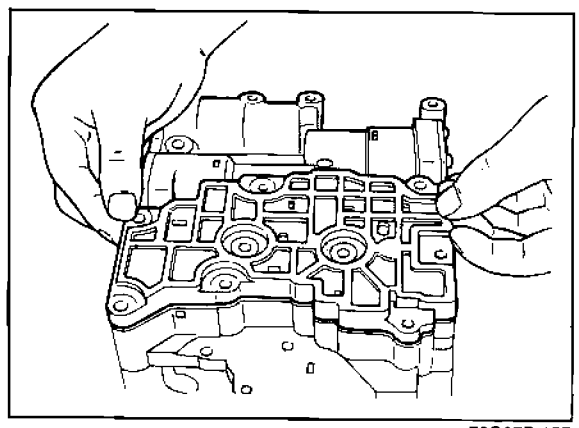
76G07B-156

12. Install the gaskets on both sides of the premain separator; then install it onto the front control body.



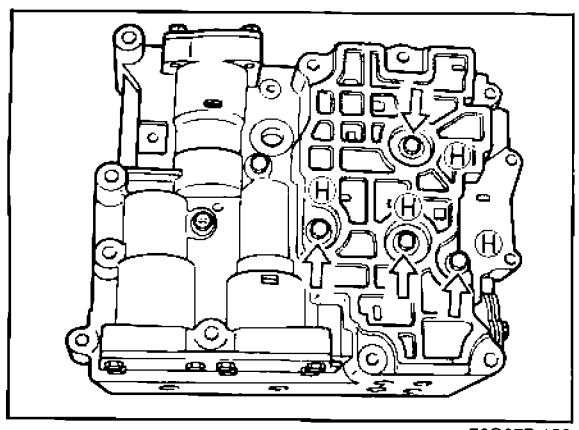
86U07B-314

Note
The front/premain front gasket and front/premain rear gasket are not interchangeable.



76G07B-157

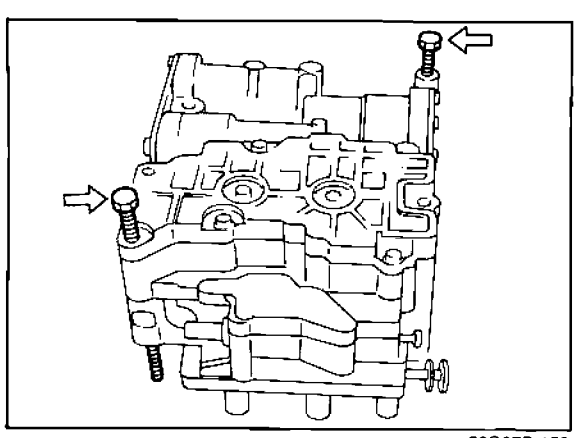
13. Install the front control body on the premain control body.



76G07B-158

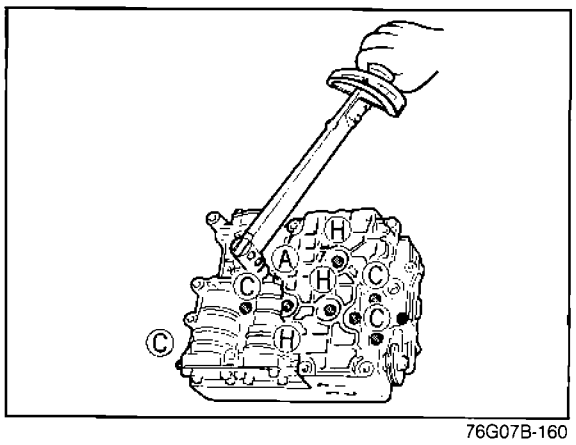
14. Loosely tighten the bolts.

Note
Match the bolt head letter as shown.



76G07B-159

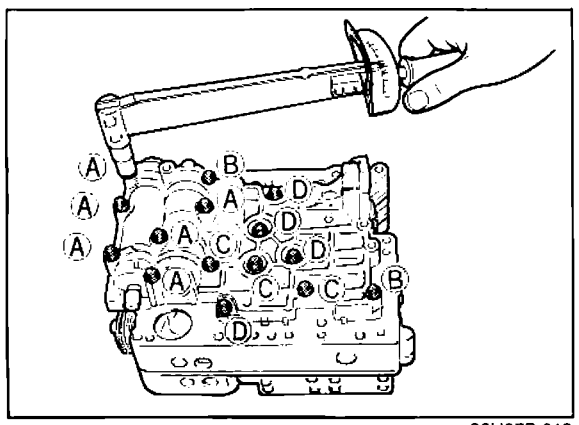
15. Install the control valve body mounting bolts as shown for alignment.



76G07B-160

16. Tighten the mounting bolts.
    (1) Tighten the front control body.

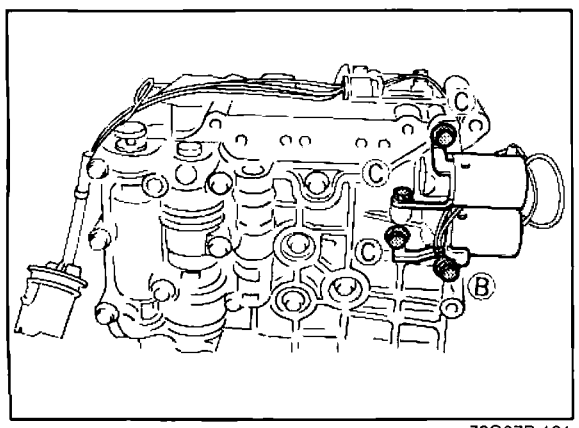
Tightening torque:
6—8 N·m (66—80 cm-kg, 57—69 in-lb)



86U07B-319

(2) Tighten the rear control body.

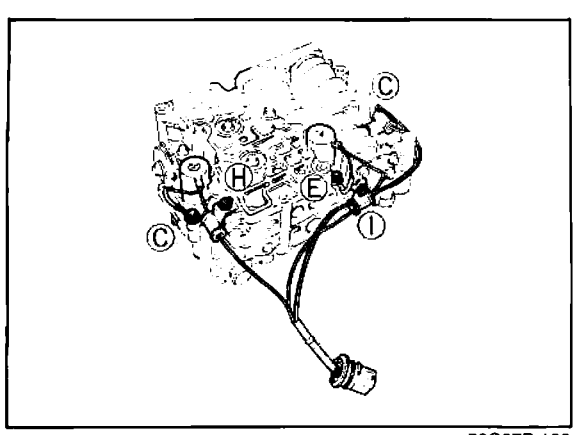
Tightening torque:
6—8 N·m (66—80 cm-kg, 57—69 in-lb)



76G07B-161

17. Install the 3-4 solenoid valve and lock-up solenoid valve along with new O-rings and oil strainers.

Tightening torque:
6—8 N·m (66—80 cm-kg, 57—69 in-lb)



76G07B-162

18. Install the 1-2 solenoid valve and 2-3 solenoid valve along with new O-rings and oil strainers.

Tightening torque:
6—8 N·m (66—80 cm-kg, 57—69 in-lb)

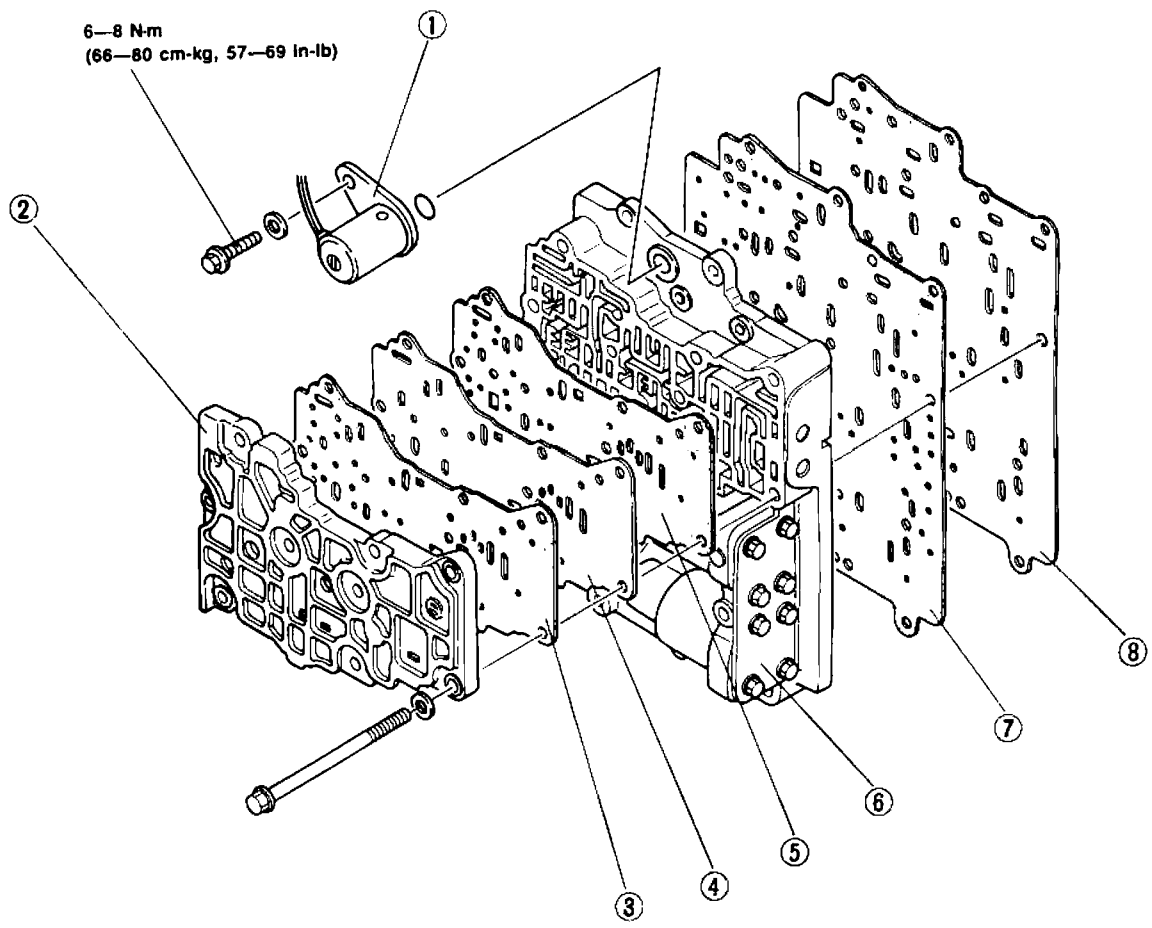
CONTROL VALVE BODY (G4A-HL)

Precaution

(1) Pay close attention when handling the control valve because it consists of the most precise and delicate parts of the transaxle.
(2) Neatly arrange the removed parts in order to avoid mixing up similar parts.
(3) Disassemble the control valve assembly and thoroughly clean it when the clutch and/or brake bands are burned, and/or when the automatic transaxle fluid is degenerated.

Components I

Front and premain control body

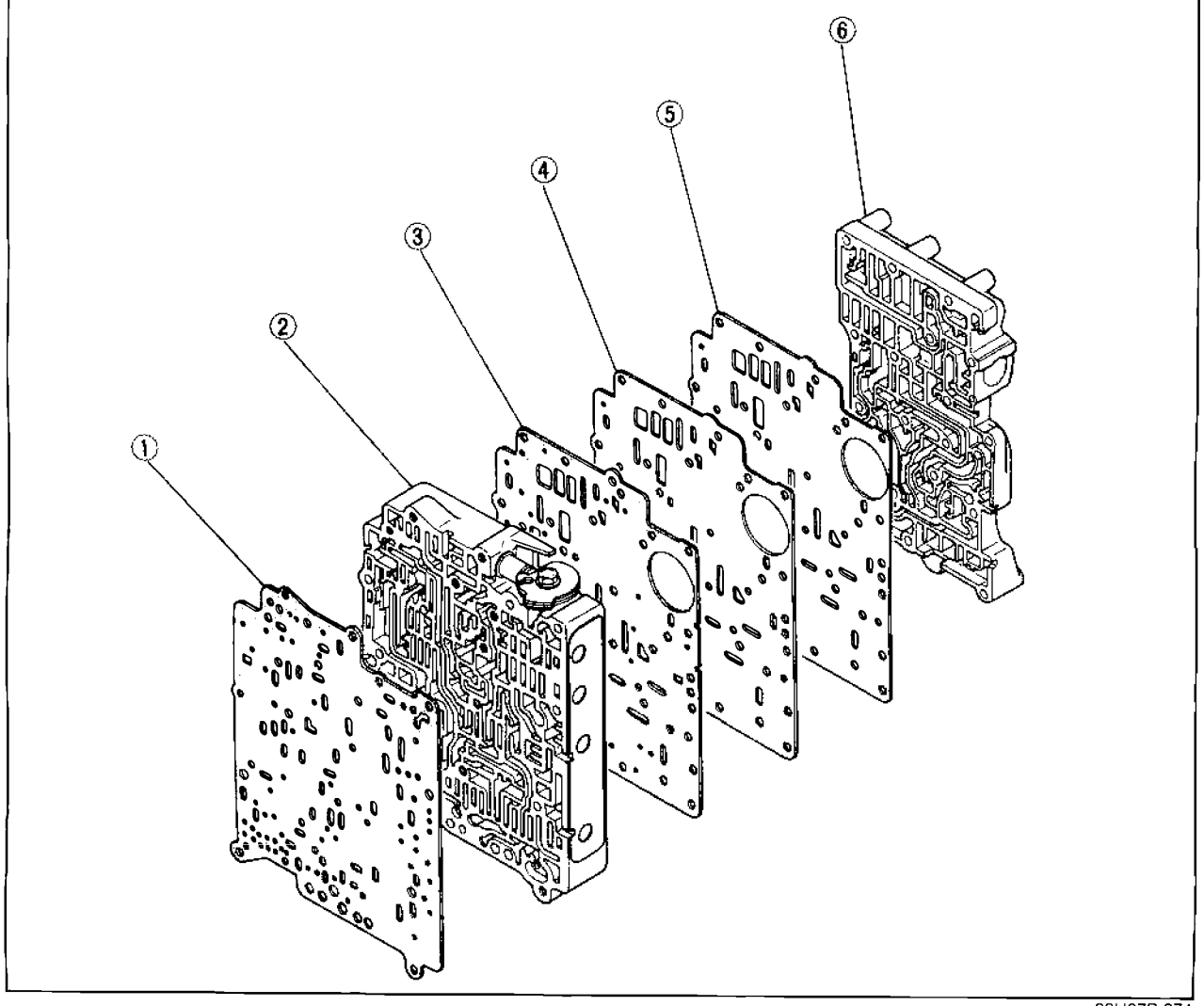


76G07B-163

1. Lock-up solenoid valve
2. Front control body
3. Front/premain front gasket
4. Premain separator
5. Front/premain rear gasket
6. Premain control body
7. Premain/main front gasket
8. Main separator

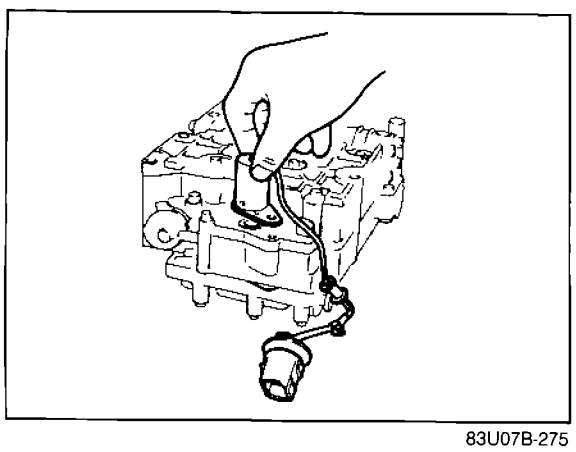
Components II

Main and rear control body



83U07B-274

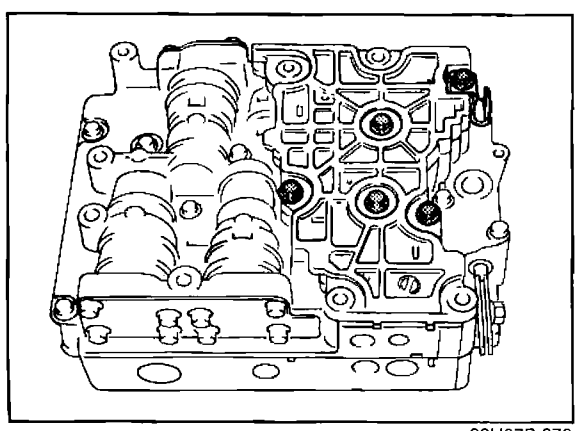
1. Premain/main rear gasket
2. Main control body
3. Main/rear front gasket
4. Rear separator
5. Main/rear rear gasket
6. Rear control body



83U07B-275

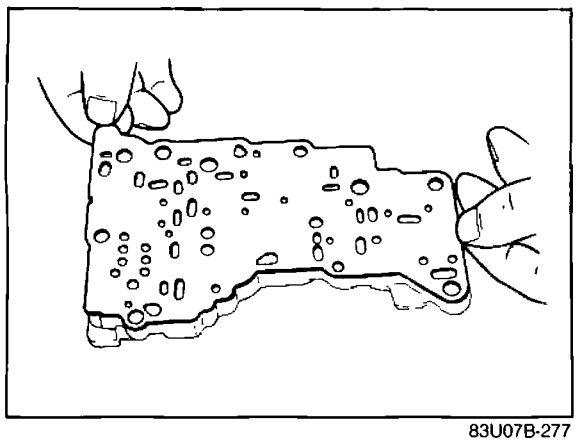
Disassembly of Control Valve Body

1. Remove the lock-up solenoid valve.
2. Remove the O-ring and oil strainer.



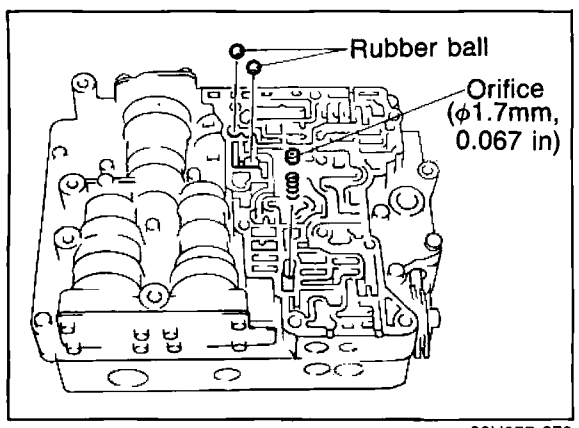
83U07B-276

3. Remove the indicated bolts and bracket, and pull out the front control body with the premain separator as a unit.



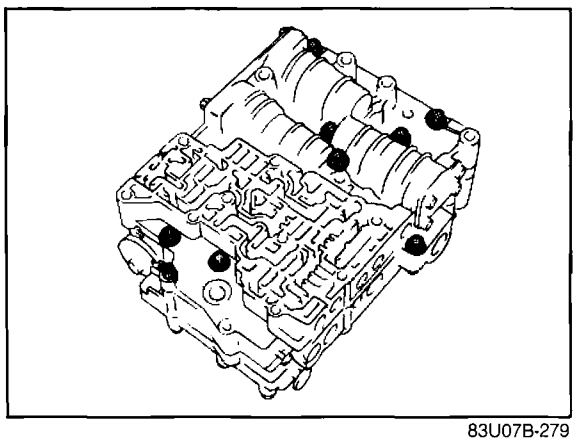
83U07B-277

4. Remove the front/premain gaskets and separator from the front control body.



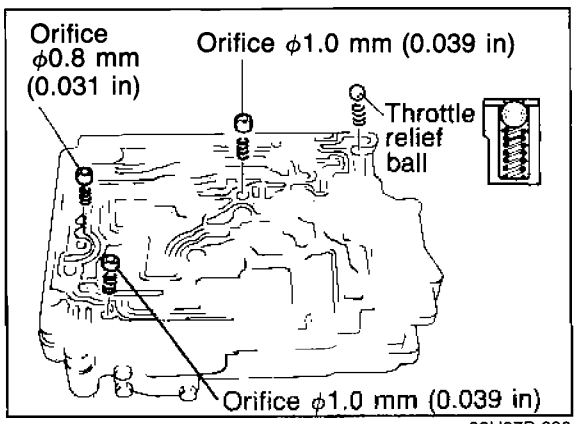
83U07B-278

5. Remove the rubber balls, orifice check valve (ϕ1.7 mm, 0.067 in) and spring from the premain control body.



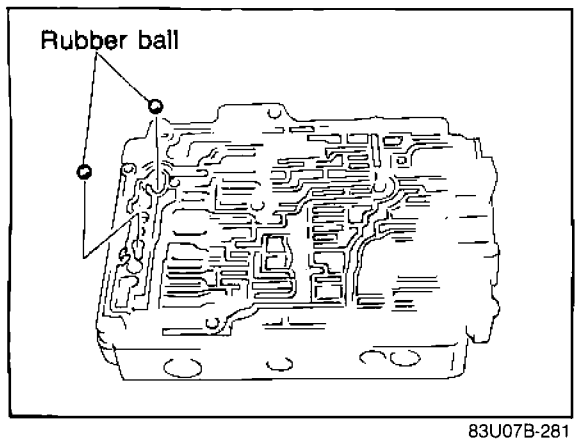
83U07B-279

6. Remove the bolts and hexagonal head bolt and remove the premain control body and the main separator as a unit.



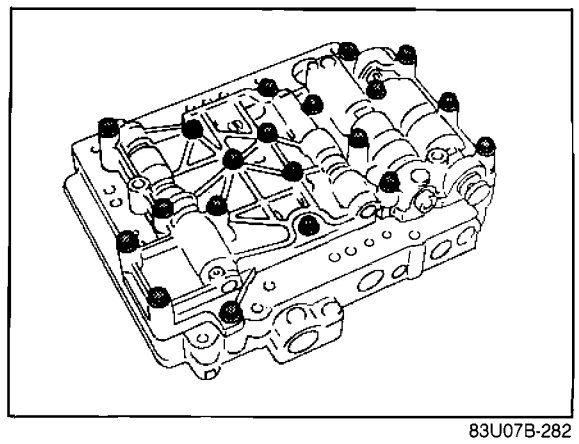
83U07B-280

7. Remove the premain/main gaskets and separator from the premain control body.
8. Remove the orifice check valves (ϕ1.0 mm, 0.039 in; ϕ0.8 mm, 0.031 in) and springs, and the throttle relief ball and spring from the premain control body.



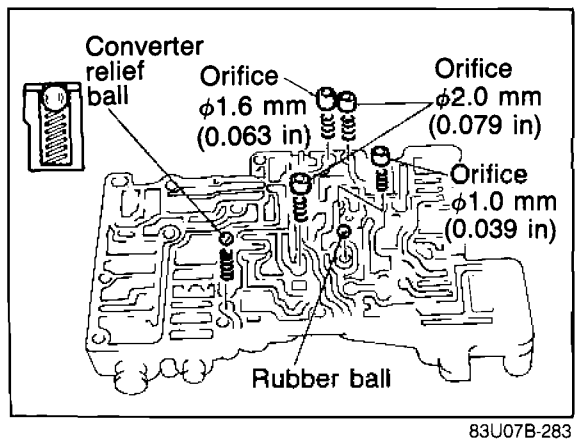
83U07B-281

9. Remove the rubber balls from the main control body.



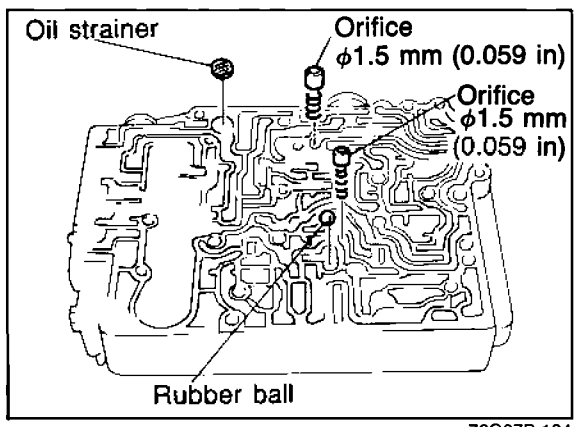
83U07B-282

10. Turn the assembly over and remove the bolts shown in the figure.
    Remove the rear separator as a unit.



83U07B-283

11. Remove the main/rear gaskets and separator from the rear control body.
12. Remove the orifice check valves (ϕ2.0 mm, 0.079 in; ϕ1.6 mm, 0.063 in; ϕ1.0 mm, 0.039 in) and springs, converter relief ball and spring, and the rubber ball from the rear control body.

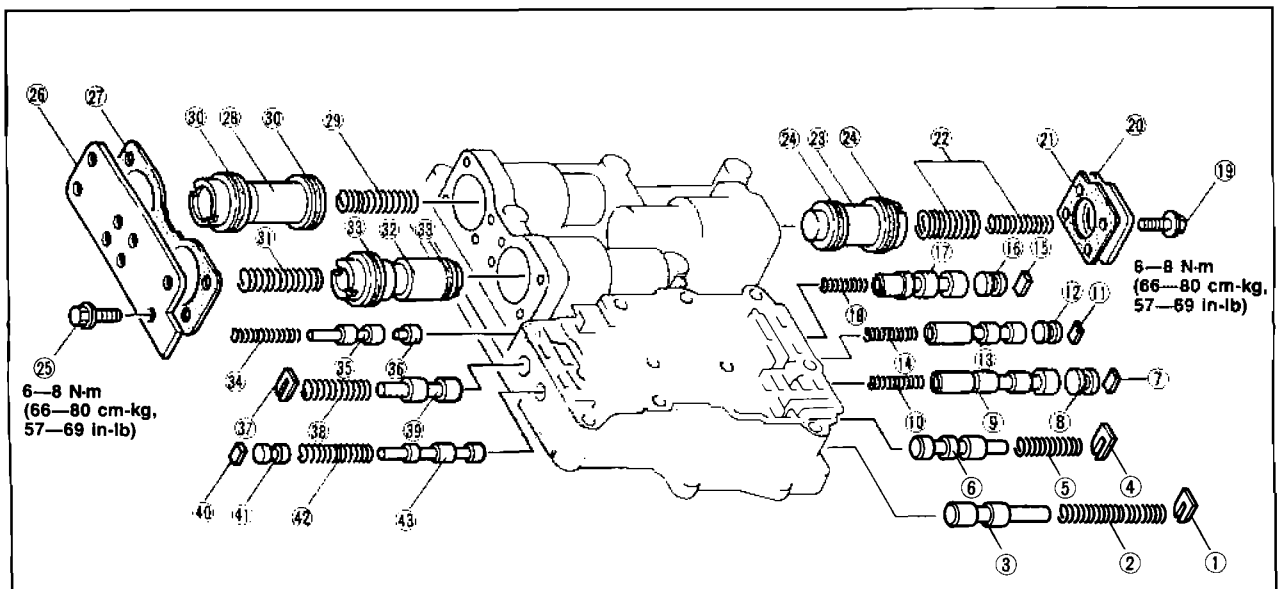


76G07B-164

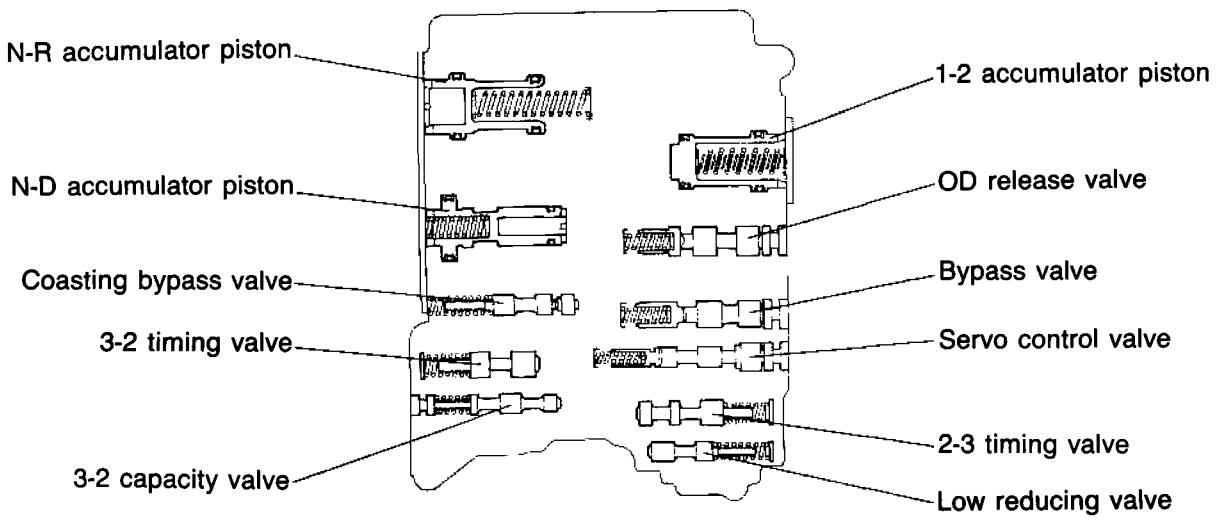
13. Remove the orifice check valves (ϕ1.5 mm, 0.059 in) and springs, oil strainer, and rubber ball from the main control body.

7B INSPECTION AND REPAIR

Premain Control Body
Disassembly
Disassemble in the sequence shown in the figure.



Valve Location



83U07B-285

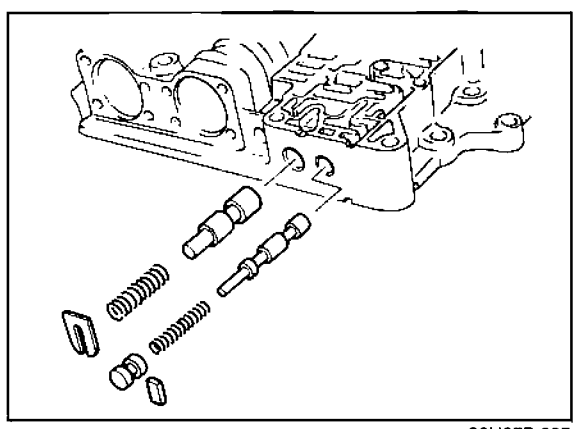
1. Retainer
2. Low reducing spring
3. Low reducing valve
4. Retainer
5. 2-3 timing spring
6. 2-3 timing valve
7. Stopper pin
8. Stopper plug
9. Servo control valve
10. Servo control spring
11. Stopper pin
12. Stopper plug
13. Bypass valve
14. Bypass spring
15. Stopper pin
16. Stopper plug
17. OD release valve
18. OD release spring
19. Bolt
20. 1-2 accumulator plate
21. 1-2 accumulator gasket
22. 1-2 accumulator springs
23. 1-2 accumulator piston
24. 1-2 accumulator seal rings
25. Bolt
26. N-R accumulator plate
27. N-R accumulator gasket
28. N-R accumulator piston
29. N-R accumulator rear spring
30. N-R accumulator seal rings
31. N-D accumulator front spring
32. N-D accumulator piston
33. N-D accumulator seal rings
34. Coasting bypass spring
35. Coasting bypass valve
36. Coasting bypass plug
37. Retainer
38. 3-2 timing spring
39. 3-2 timing valve
40. Stopper pin
41. Stopper plug
42. 3-2 capacity spring
43. 3-2 capacity valve

Inspection
Check the following and replace any faulty parts.
1. Damaged or worn valves
2. Damaged oil passage
3. Cracked or damaged valve body
4. Operation of each valve
5. Weakened spring

Spring

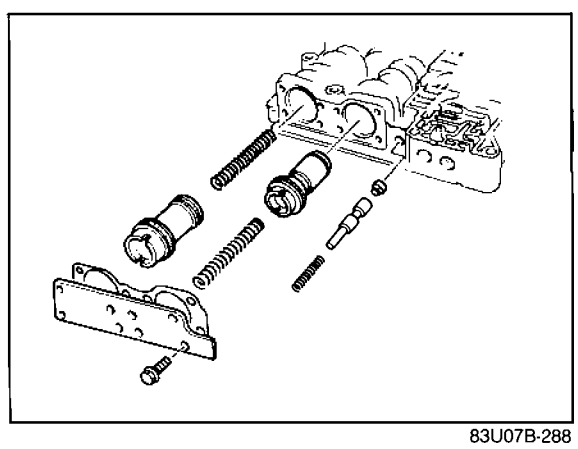
Spring name		Outer dia. mm (in)	Free length mm (in)	Wire dia. mm (in)	Spring color
1-2 accumulator small spring	F8 engine	9.9 (0.400)	84.7 (3.335)	1.2 (0.047)	Red
1-2 accumulator large spring	FE engine	13.0 (0.512)	73.2 (2.881)	1.8 (0.071)	Pink
	F8 engine	16.0 (0.630)	84.7 (3.335)	2.0 (0.079)	White
Bypass spring		5.0 (0.197)	25.1 (0.988)	0.7 (0.028)	Yellow
Servo control spring		4.9 (0.193)	27.1 (1.067)	0.5 (0.020)	Light blue
2-3 timing spring		8.3 (0.327)	26.5 (1.043)	0.8 (0.031)	—
N-R accumulator rear spring		11.1 (0.437)	68.2 (2.685)	1.0 (0.039)	Blue
N-D accumulator front spring		9.8 (0.386)	60.9 (2.398)	1.1 (0.043)	Yellow
Low reducing spring		8.7 (0.343)	38.3 (1.508)	0.9 (0.035)	Black
OD release spring		6.0 (0.236)	32.6 (1.283)	0.6 (0.024)	Orange
Coasting bypass spring		5.8 (0.228)	31.3 (1.232)	0.6 (0.024)	Yellow
3-2 timing spring		8.2 (0.323)	28.55 (1.124)	0.8 (0.031)	Maroon
3-2 capacity spring		5.55 (0.219)	30.5 (1.201)	0.55 (0.022)	Light green
Throttle relief ball spring		6.6 (0.260)	20.3 (0.799)	0.8 (0.031)	Light green

76G07B-165



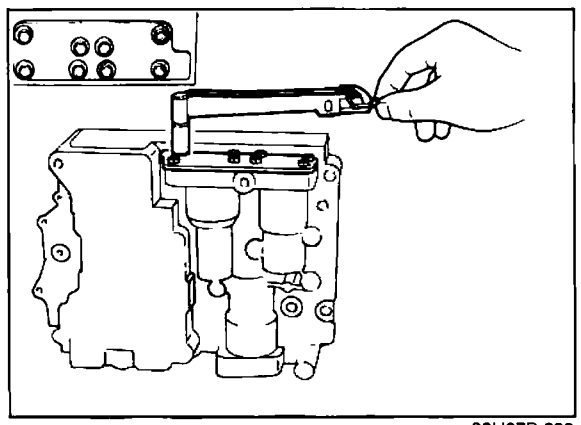
83U07B-287

Assembly
1. Install the 3-2 capacity valve, 3-2 capacity spring, stopper plug, and stopper pin.
2. Install the 3-2 timing valve, 3-2 timing spring, and retainer.



83U07B-288

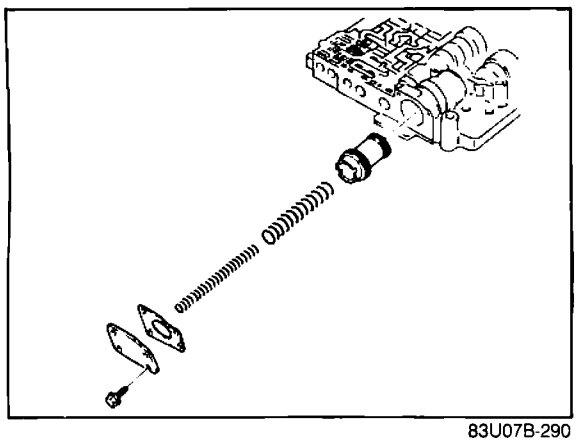
3. Install the coasting bypass plug, coasting bypass valve, and coasting bypass spring.
4. Apply ATF to the O-rings, and install them onto the piston; then insert the N-R accumulator rear spring, and N-R accumulator piston.
5. Apply ATF to the O-rings, and install them onto the piston; then insert the N-D accumulator piston, and N-D accumulator front spring.



83U07B-289

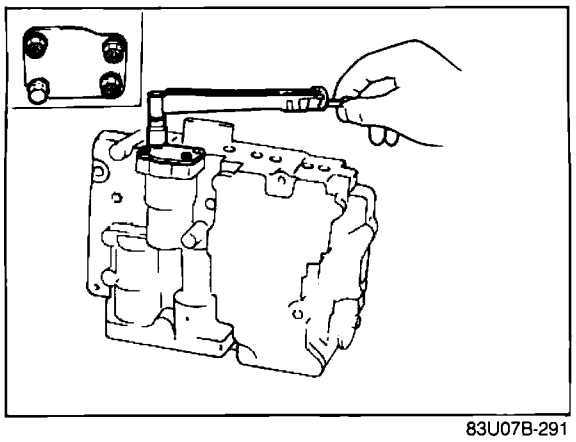
6. Install the N-R accumulator gasket and plate; then tighten the plate.

Tightening torque:
6—8 N·m (66—80 cm-kg, 57—69 in-lb)



83U07B-290

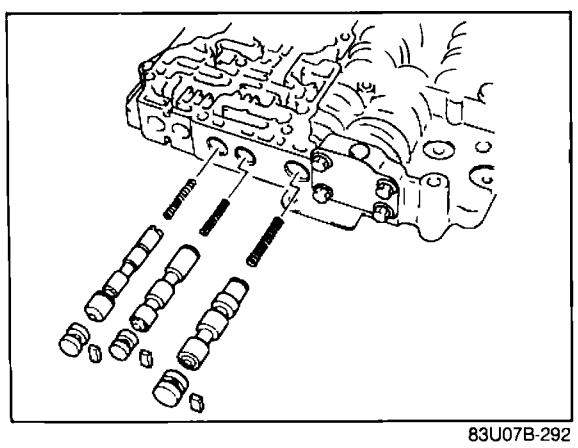
7. Apply ATF to the O-rings, and install them onto the piston; then install the 1-2 accumulator piston and 1-2 accumulator springs.



83U07B-291

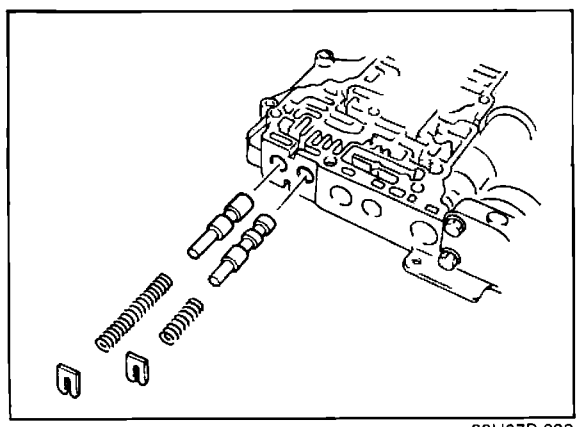
8. Install the 1-2 accumulator gasket and plate; then tighten the plate.

Tightening torque:
6—8 N·m (66—80 cm-kg, 57—69 in-lb)



83U07B-292

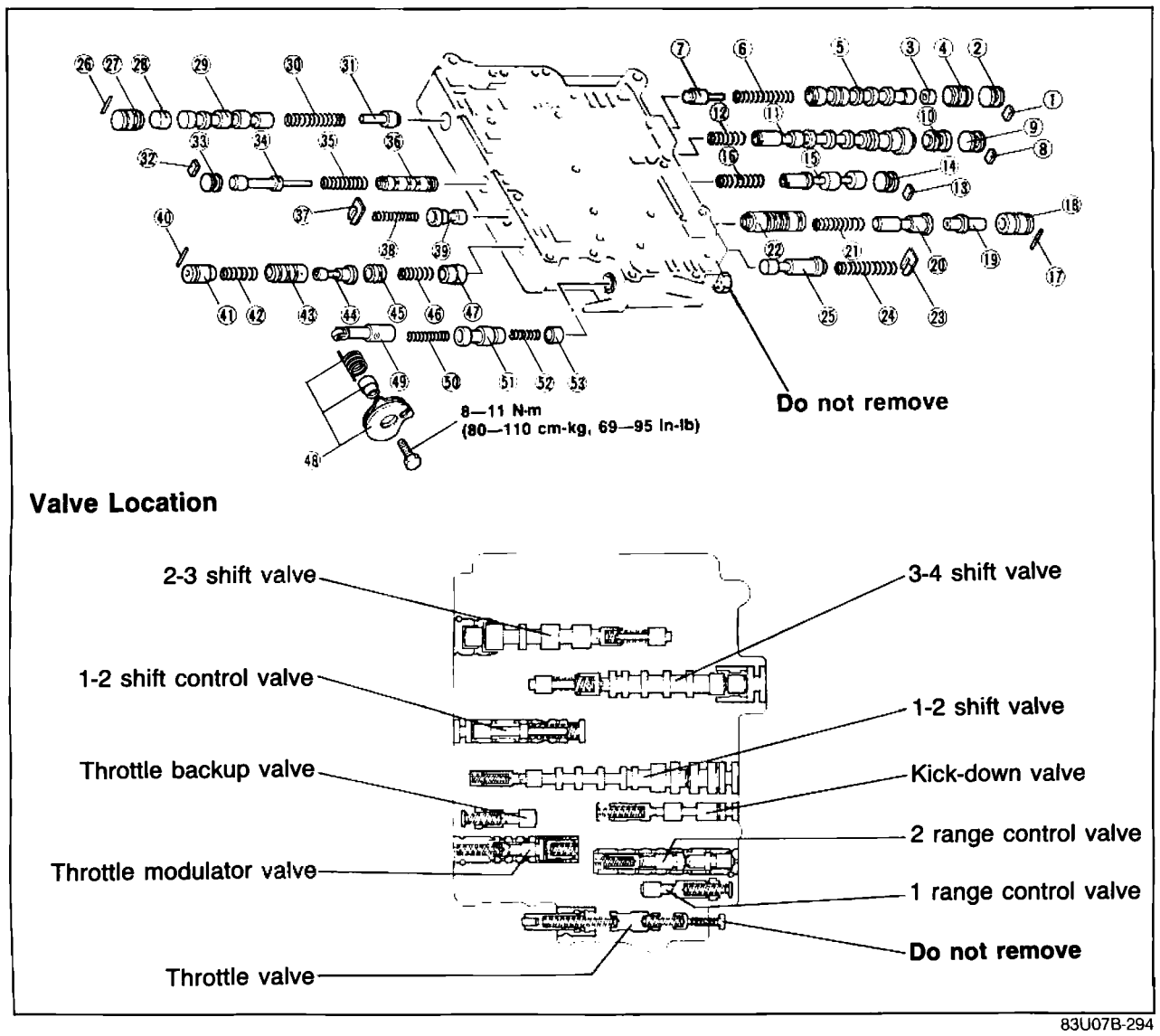
9. Install the OD release spring, OD release valve, stopper plug, and stopper pin.
10. Install the bypass spring, bypass valve, stopper plug, and stopper pin.
11. Install the servo control spring, servo control valve, stopper plug, and stopper pin.



83U07B-293

12. Install the 2-3 timing valve, 2-3 timing spring, and retainer.
13. Install the low reducing valve, low reducing spring, and retainer.

Main Control Body
Disassembly
Disassemble in the sequence shown in the figure.



83U07B-294

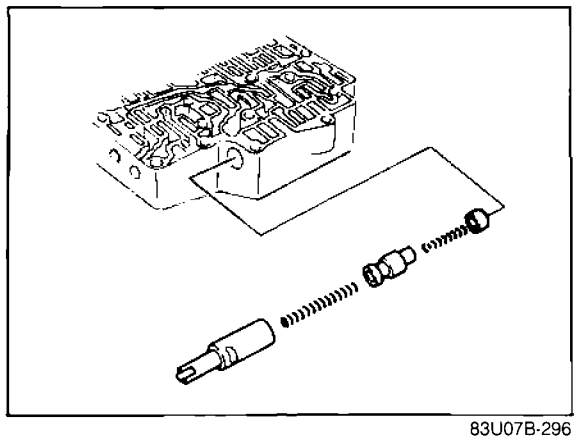
1. Stopper pin
2. Stopper plug
3. 3-4 shift front plug
4. 3-4 shift sleeve
5. 3-4 shift valve
6. 3-4 shift spring
7. 3-4 shift rear plug
8. Stopper pin
9. Stopper plug
10. 1-2 shift plug
11. 1-2 shift valve
12. 1-2 shift spring
13. Stopper pin
14. Stopper plug
15. Kick-down valve
16. Kick-down spring
17. Stopper pin
18. 2 range control front sleeve
19. 2 range control plug
20. 2 range control valve
21. 2 range control spring
22. 2 range control rear sleeve
23. Retainer
24. 1 range control spring
25. 1 range control valve
26. Stopper pin
27. 2-3 shift sleeve
28. 2-3 shift front plug
29. 2-3 shift valve
30. 2-3 shift spring
31. 2-3 shift rear plug
32. Stopper pin
33. Stopper plug
34. 1-2 shift control valve
35. 1-2 shift control spring
36. 1-2 shift control sleeve
37. Retainer
38. Throttle backup spring
39. Throttle backup valve
40. Stopper pin
41. Throttle modulator sleeve A
42. Throttle modulator front spring
43. Throttle modulator sleeve B
44. Throttle modulator valve
45. Throttle modulator sleeve C
46. Throttle modulator rear spring
47. Throttle modulator plug
48. Throttle cam assembly
49. Throttle plug assembly
50. Throttle spring
51. Throttle valve
52. Throttle assist spring
53. Throttle adjust plug

Inspection
Check the following and replace any faulty parts.
1. Damaged or worn valves
2. Damaged oil passage
3. Cracked or damaged valve body
4. Operation of each valve
5. Weakened spring

Spring

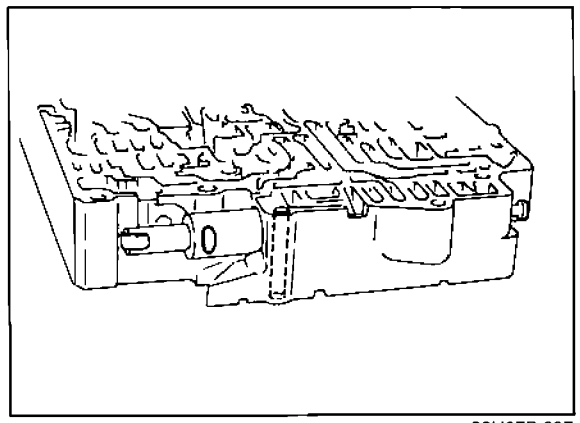
Spring name	Outer dia. mm (in)	Free length mm (in)	Wire dia. mm (in)	Spring color
1-2 shift control spring	5.5 (0.217)	46.0 (1.811)	0.5 (0.020)	Light green
1-2 shift spring	5.0 (0.197)	24.9 (0.980)	0.5 (0.020)	Gray
2-3 shift spring	6.1 (0.240)	39.7 (1.563)	0.65 (0.026)	Pink
3-4 shift spring	6.4 (0.252)	37.0 (1.457)	0.6 (0.024)	—
Throttle backup spring	6.4 (0.252)	33.5 (1.319)	0.6 (0.024)	Pink
Throttle modulator front spring	5.0 (0.197)	27.8 (1.094)	0.6 (0.024)	Red
Throttle modulator rear spring	7.15 (0.281)	30.8 (1.213)	0.85 (0.033)	Red
1 rang control spring	6.15 (0.242)	39.2 (1.543)	0.65 (0.026)	White
2 rang control spring	3.95 (0.156)	32.1 (1.264)	0.45 (0.018)	—
Kick-down spring	5.4 (0.213)	38.1 (1.500)	0.8 (0.031)	—
Throttle assist spring	5.15 (0.203)	32.3 (1.272)	0.55 (0.022)	Dark green
Throttle spring	5.4 (0.213)	48.3 (1.902)	0.8 (0.031)	—
Converter relief ball spring	6.9 (0.272)	24.1 (0.949)	0.9 (0.035)	Maroon
Orifice check valve spring	5.0 (0.197)	12.5 (0.492)	0.23 (0.009)	—

76G07B-220



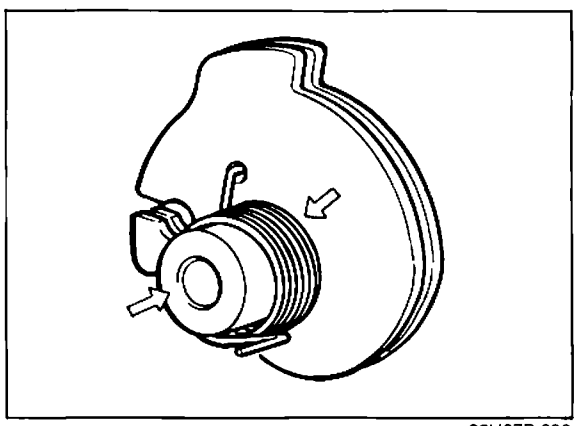
83U07B-296

Assembly
1. Install the throttle adjust plug, throttle assist spring, throttle valve, throttle spring, and throttle plug assembly.



83U07B-297

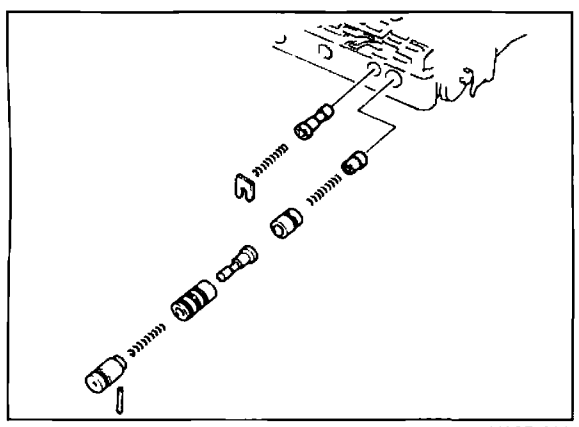
Caution
Install the throttle plug assembly with the groove aligned with the bolt hole.



83U07B-298

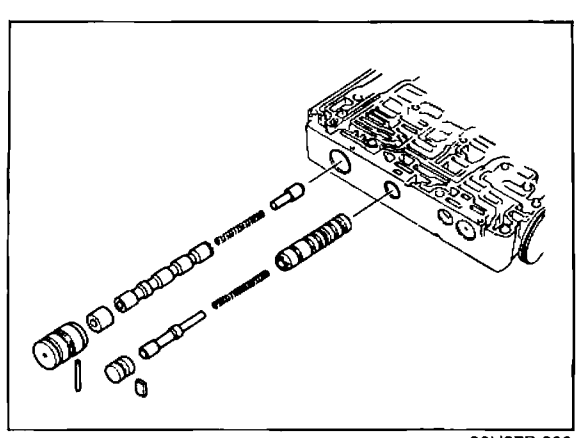
2. Install the throttle return spring as shown.
3. Install the throttle cam assembly to the main control body.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



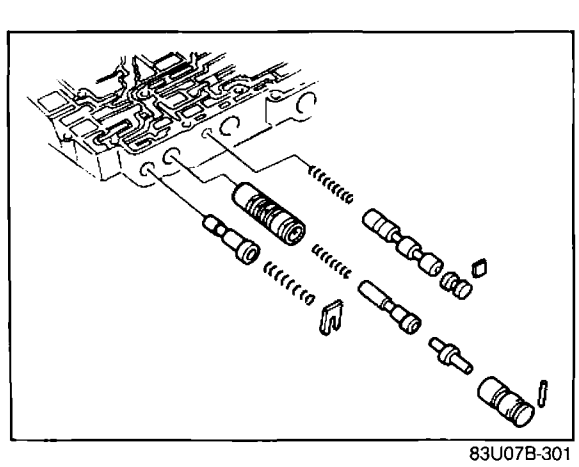
83U07B-299

4. Install the throttle modulator plug, throttle modulator rear spring, throttle modulator sleeve C, throttle modulator valve, throttle modulator sleeve B, throttle modulator front spring, throttle modulator sleeve A, and stopper pin.
5. Install the throttle backup valve, throttle backup spring, and retainer.



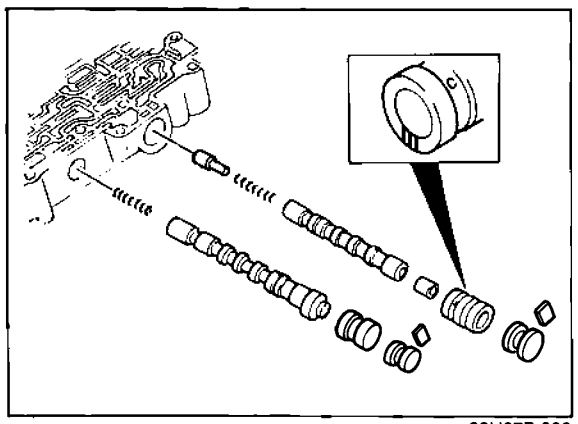
83U07B-300

6. Install the 1-2 shift control sleeve, 1-2 shift control spring, 1-2 shift control valve, stopper plug, and stopper pin.
7. Install the 2-3 shift rear plug, 2-3 shift spring, 2-3 shift valve, 2-3 shift front plug, 2-3 shift sleeve, and stopper pin.



83U07B-301

8. Install the 1 range control valve, 1 range control spring, and retainer.
9. Install the 2 range control rear sleeve, 2 range control spring, 2 range control valve, 2 range control plug, 2 range control front sleeve, and stopper pin.
10. Install the kick-down spring, kick-down valve, stopper plug, and stopper pin.

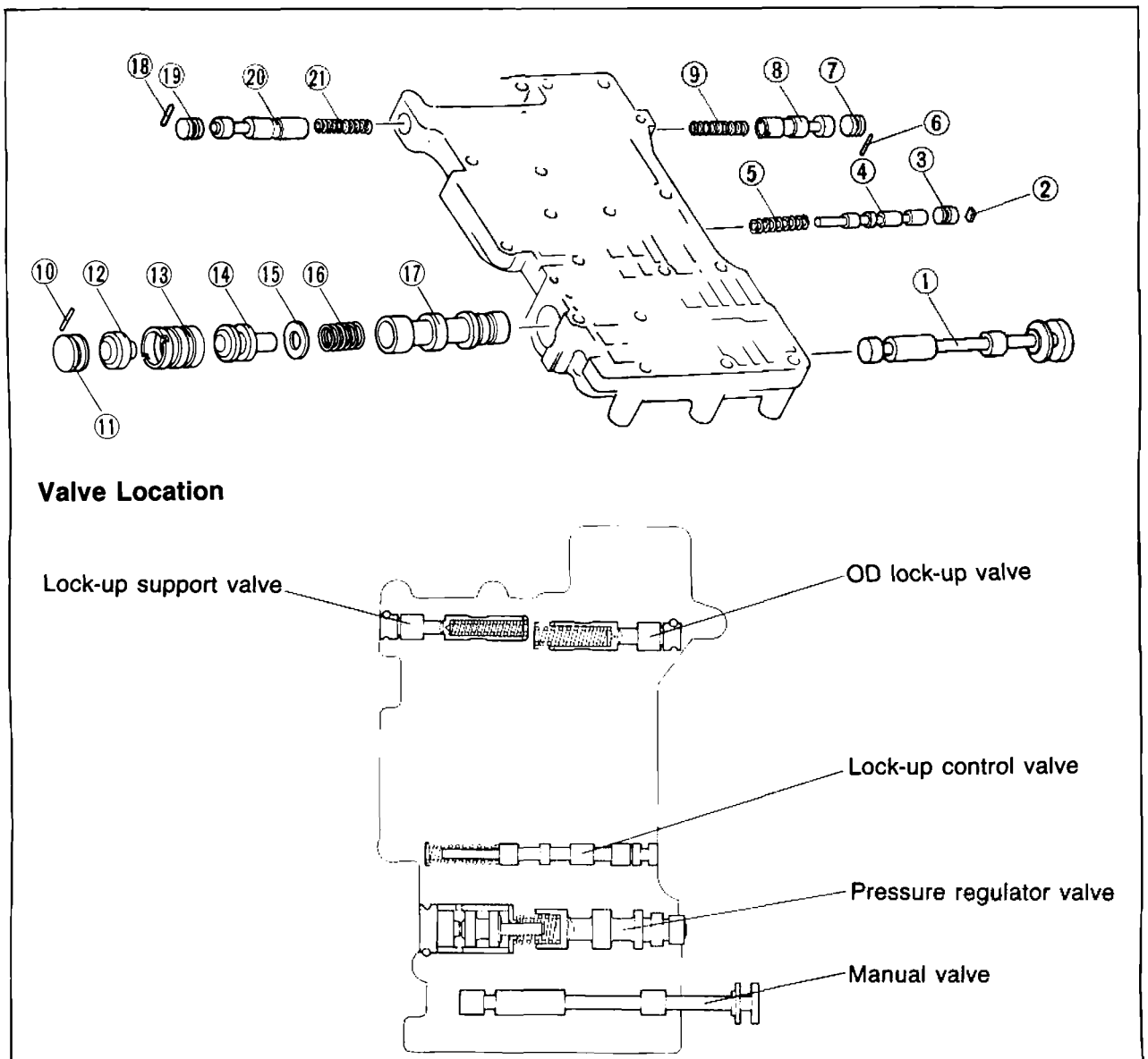


83U07B-302

11. Install the 1-2 shift spring, 1-2 shift valve, 1-2 shift plug, stopper plug, and stopper pin.
12. Install the 3-4 shift rear plug, 3-4 shift spring, 3-4 shift valve, 3-4 shift sleeve, 3-4 shift front plug, stopper plug, and stopper pin.

Note
Install the 3-4 shift sleeve with the identification notches facing inward.

Rear Control Body
Disassembly
Disassemble in the sequence shown in the figure.



83U07B-303

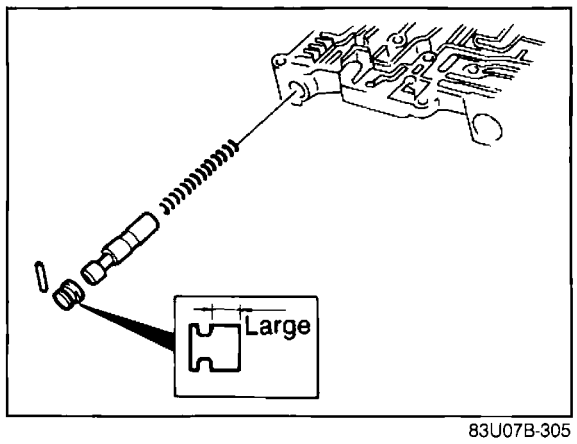
1. Manual valve
2. Stopper pin
3. Stopper plug
4. Lock-up control valve
5. Lock-up control spring
6. Stopper pin
7. Stopper plug
8. OD lock-up valve
9. OD lock-up spring
10. Stopper pin
11. Stopper plug
12. Pressure regulator backup plug
13. Pressure regulator plug sleeve
14. Pressure regulator plug
15. Pressure regulator spring seat
16. Pressure regulator spring
17. Pressure regulator valve
18. Stopper pin
19. Stopper plug
20. Lock-up support valve
21. Lock-up support spring

Inspection
Check the following and replace any faulty parts.
1. Damaged or worn valves
2. Damaged oil passage
3. Cracked or damaged valve body
4. Operation of each valve
5. Weakened spring

Spring

Spring name	Outer dia. mm (in)	Free length mm (in)	Wire dia. mm (in)	Spring color
Pressure regulator spring	9.5 (0.374)	30.7 (1.209)	0.7 (0 028)	—
Lock-up control spring	7.3 (0 287)	46.2 (1.819)	0.8 (0.031)	Blue
Lock-up support spring	7.0 (0.276)	52 3 (2.059)	1.0 (0.039)	Yellow
OD lock-up spring	7.1 (0.280)	66.5 (2.618)	0.8 (0.031)	Red

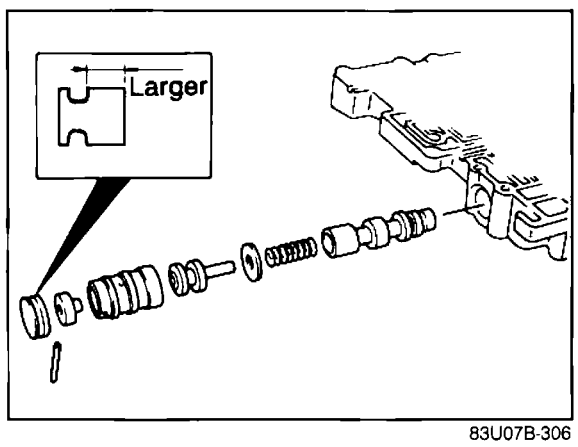
76G07B-166



83U07B-305

Assembly
1. Install the lock-up support spring, lock-up support valve, stopper plug, and stopper pin.

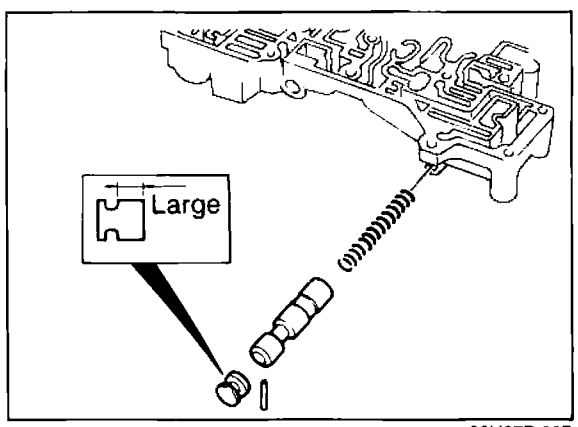
Note
Install the stopper plug large end first.



83U07B-306

2. Install the pressure regulator valve, pressure regulator spring, pressure regulator spring seat, pressure regulator plug, pressure regulator plug sleeve, pressure regulator backup plug, stopper plug, and stopper pin.

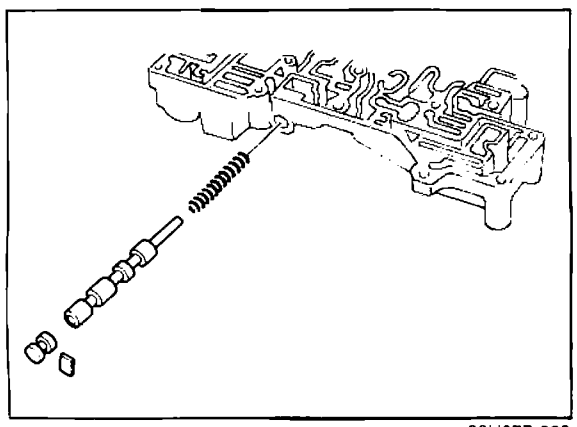
Note
Install the stopper plug large end first.



83U07B-307

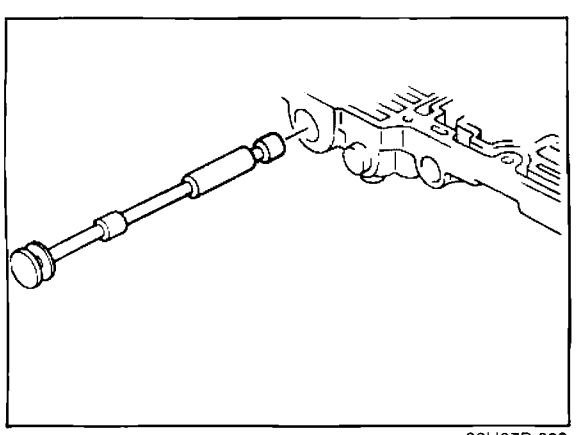
3. Install the OD lock-up spring, OD lock-up valve, stopper plug, and stopper pin.

Note
Install the stopper plug large end first.



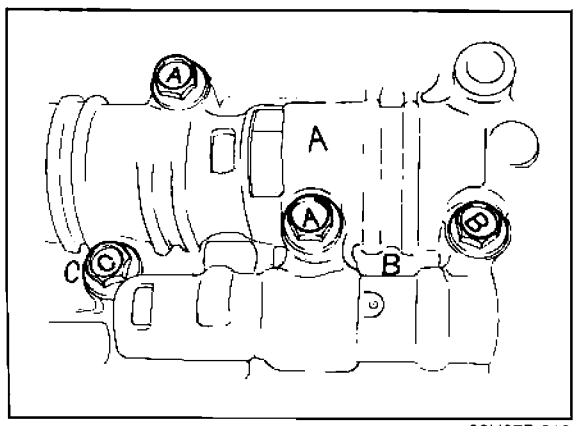
83U07B-308

4. Install the lock-up control spring, lock-up control valve, stopper plug, and stopper pin.



83U07B-309

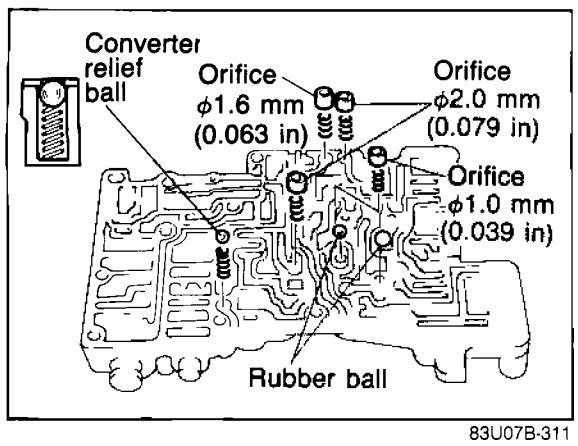
3. Install the manual valve.



83U07B-310

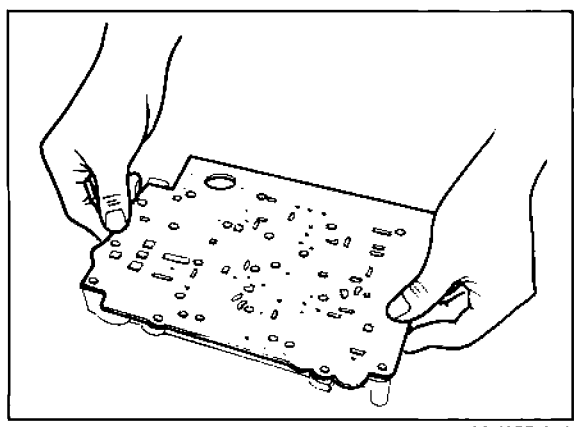
Assembly of Control Valve Body

Note
a) Do not mix-up the front and rear gaskets during assembly.
b) Match the bolt head letter and the control valve body letter.



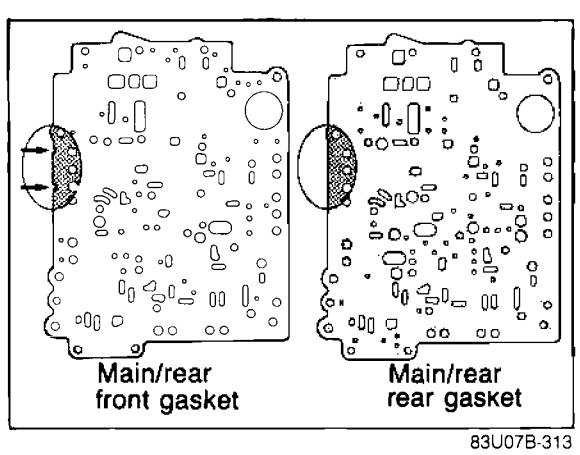
83U07B-311

1. Install the orifice check valves (ϕ2.0 mm, 0.079 in; ϕ1.6 mm, 0.063 in; ϕ1.0 mm, 0.039 in) and springs, converter relief ball and spring, and rubber balls in the rear control body as shown.



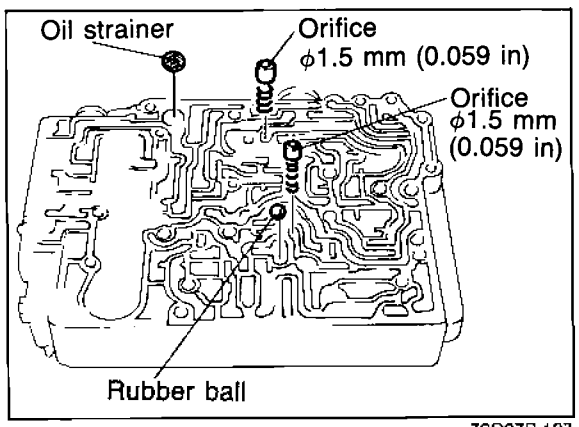
83U07B-312

2. Install the gaskets on both sides of the rear separator; then install it onto the rear control body.



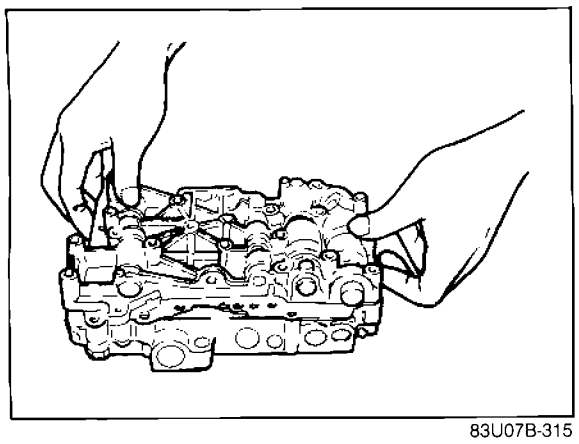
83U07B-313

Note
The main/rear rear gasket and main/rear front gasket are not interchangeable.



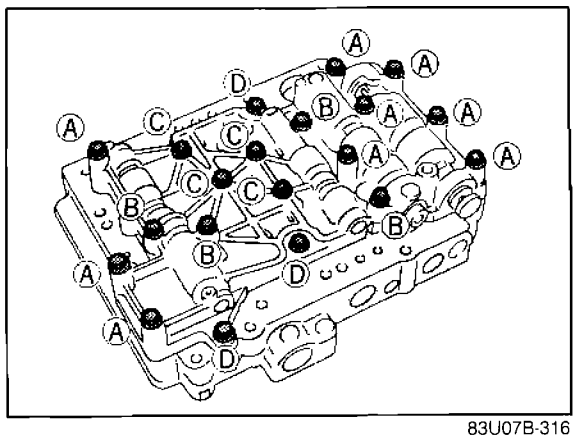
76G07B-167

3. Install the orifice check valves (ϕ1.5 mm, 0.059 in) and springs, oil strainer, and rubber ball in the main control body as shown.



83U07B-315

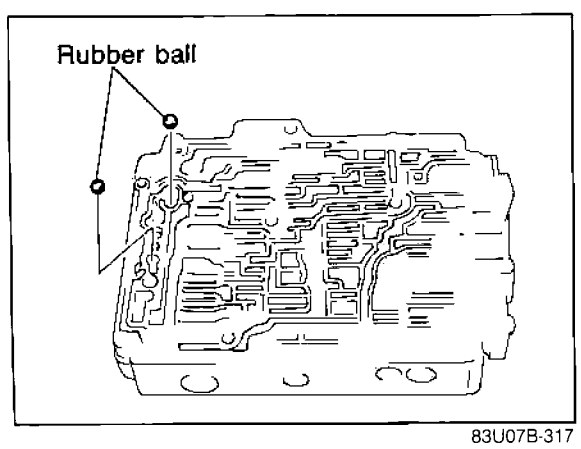
4. Install the rear control body to the main control body.



83U07B-316

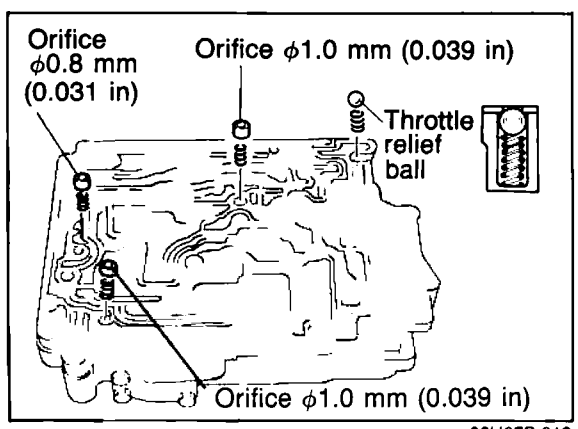
5. Loosely tighten the bolts.

Note
Match the bolt head letter as shown.



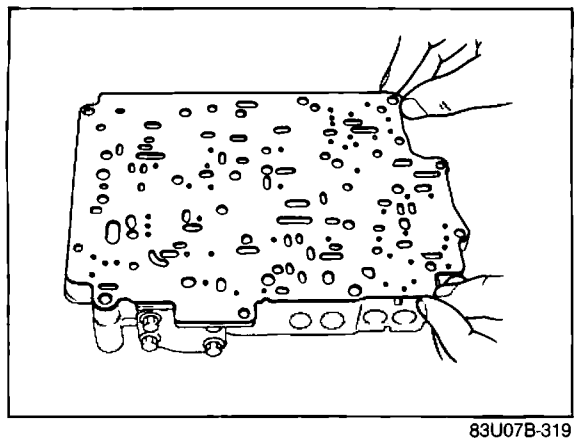
83U07B-317

6. Turn the assembly over and install the rubber balls in the main contrcl body as shown.



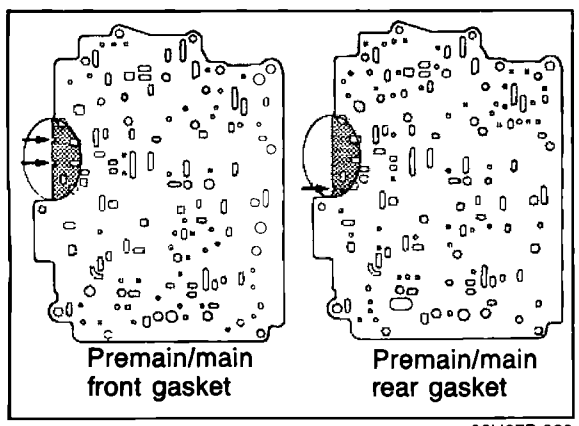
83U07B-318

7. Install the orifice check valves (ϕ1.0 mm, 0.039 in; ϕ0.8 mm; 0.031 in) and springs, and the throttle relief ball and spring in the premain control body as shown.



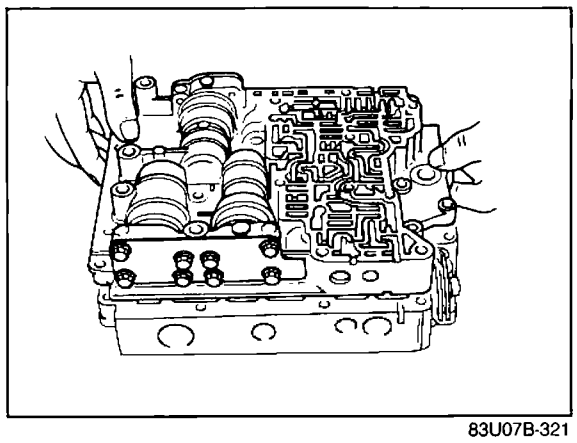
83U07B-319

8. Install the gaskets on both sides of the main separator; then install it onto the premain control body.



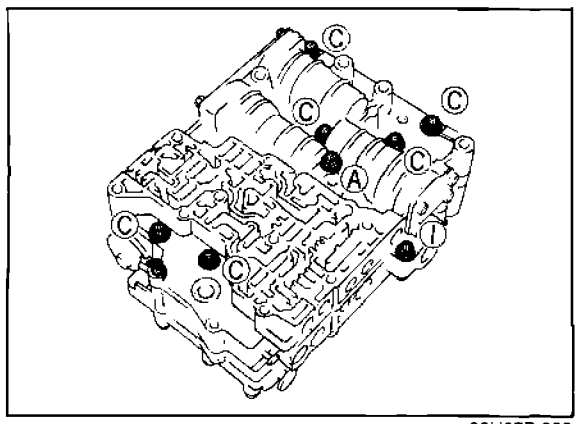
83U07B-320

Note
The premain/main rear gasket and premain/main front gasket are not interchangeable.



83U07B-321

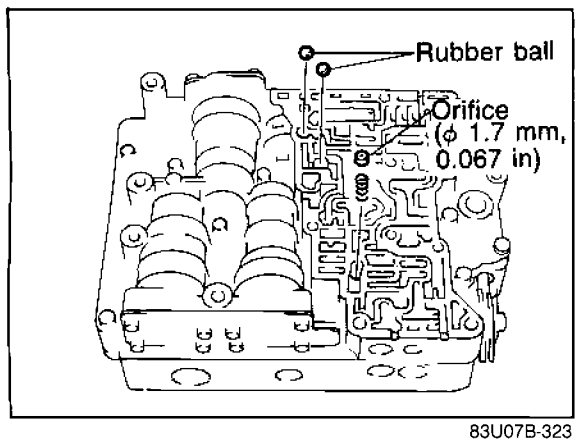
9. Set the premain control body onto the main control body.



83U07B-322

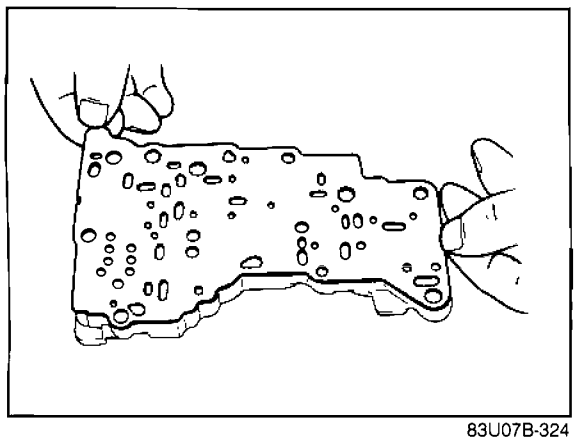
10. Loosely tighten the bolts.

Note
Match the bolt head letter as shown.



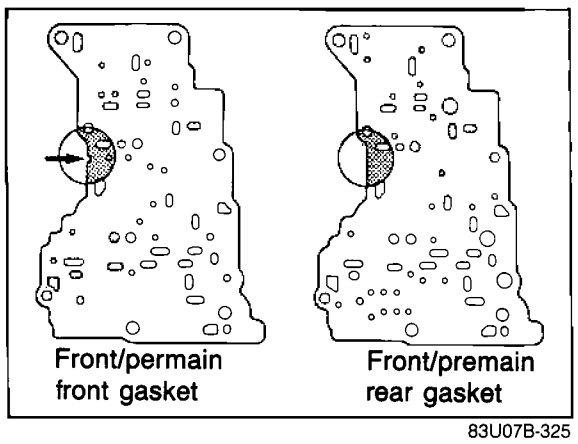
83U07B-323

11. Install the rubber balls, orifice check valve (ϕ1.7 mm, 0.067 in) in and spring in the premain control body as shown.



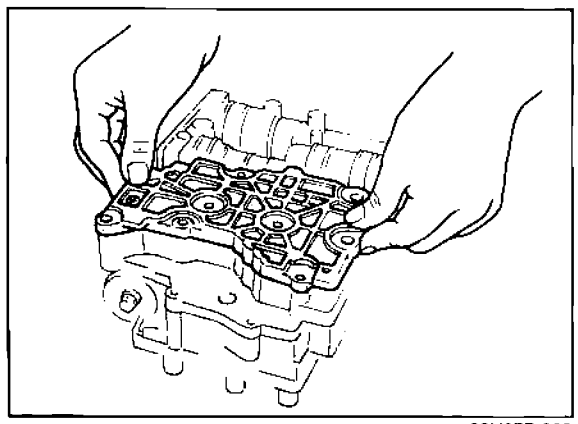
83U07B-324

12. Install the gaskets on both sides of the premain separator; then install it onto the front control body.



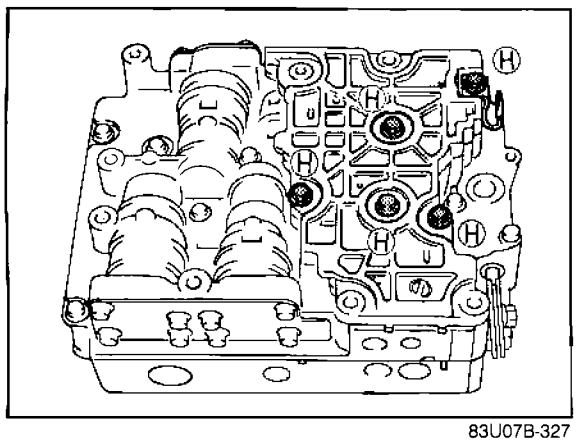
83U07B-325

Note
The front/premain front gasket and front/premain rear gasket are not interchangeable.



83U07B-326

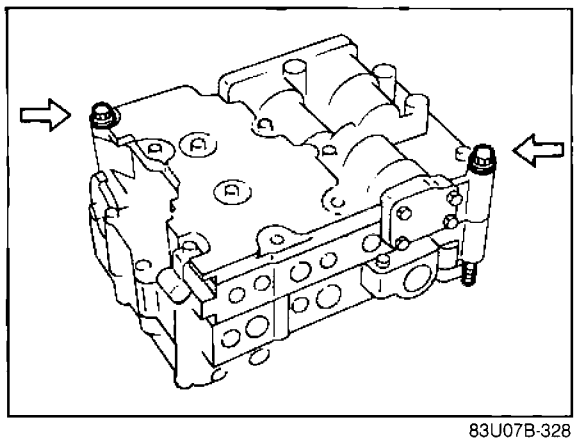
13. Install the front control body on the premain control body.



83U07B-327

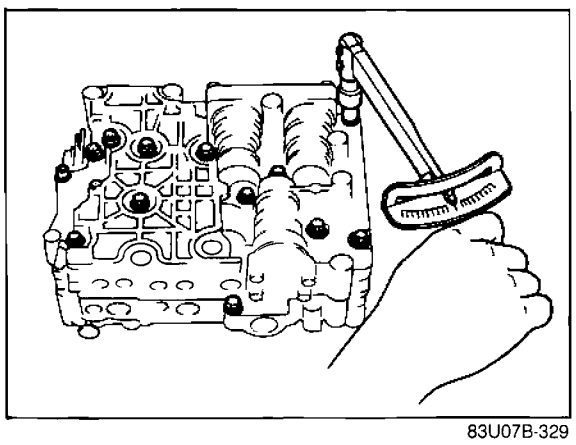
14. Loosely tighten the bolts and bracket.

Note
Match the bolt head letter as shown.



83U07B-328

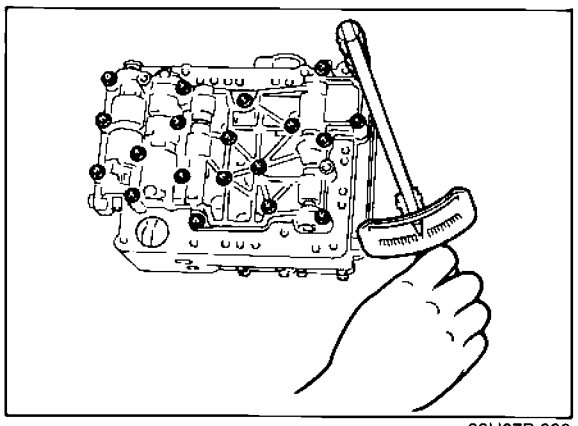
15. Install the control valve body mounting bolts as shown for alignment.



83U07B-329

16. Tighten the mounting bolts.
    (1) Tighten the front control body.

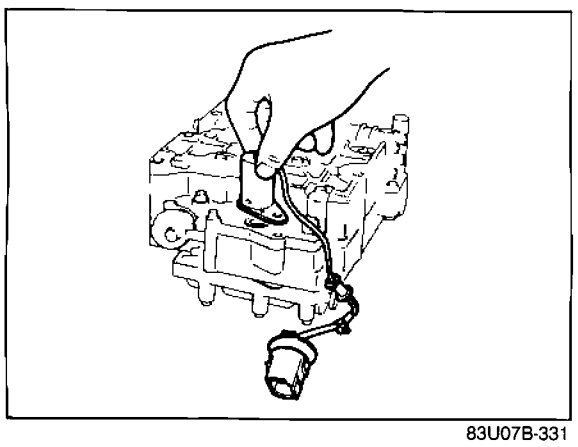
Tightening torque:
6—8 N·m (66—80 cm-kg, 57—69 in-lb)



83U07B-330

(2) Tighten the rear control body.

Tightening torque:
6—8 N·m (66—80 cm-kg, 57—69 in-lb)



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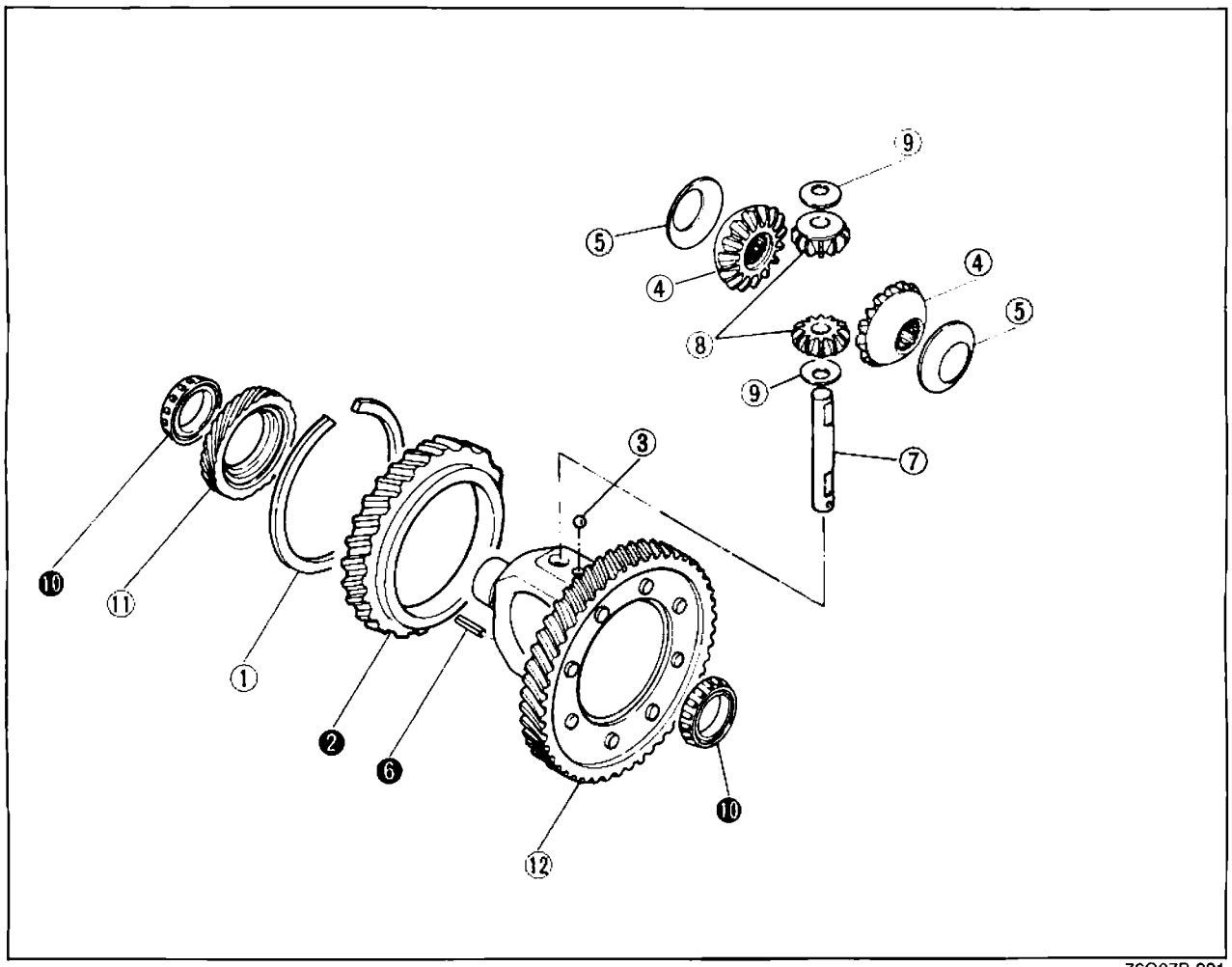
17. Install the lock-up solenoid valve along with new O-ring and oil strainer.

Tightening torque:
6—8 N·m (66—80 cm-kg, 57—69 in-lb)

DIFFERENTIAL

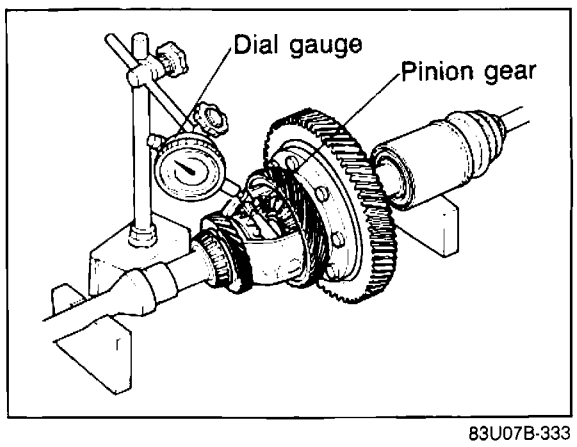
Disassembly

Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked parts.



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1. Snap ring (G4A-HL)
2. Governor drive gear (G4A-HL)
3. Steel ball (G4A-HL)
4. Side gear
5. Side gear thrust washer
6. Roll pin
7. Pinion shaft
8. Pinion gear
9. Pinion gear thrust washer
10. Side bearing inner race
11. Speedometer drive gear
12. Ring gear and gear case assembly



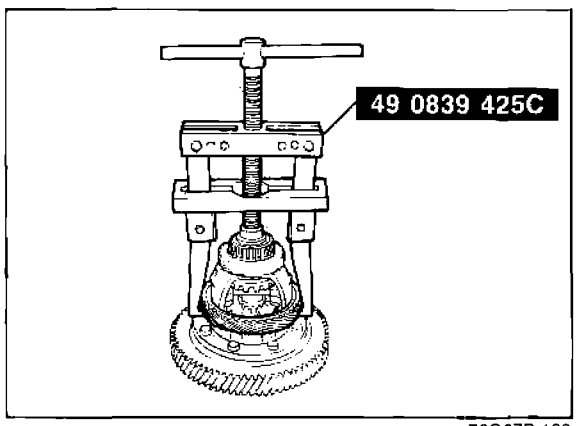
83U07B-333

Disassembly note

Checking backlash

Before disassembly, measure the backlash of the side gears and pinion gears. If it is not within specification, replace the differential assembly.

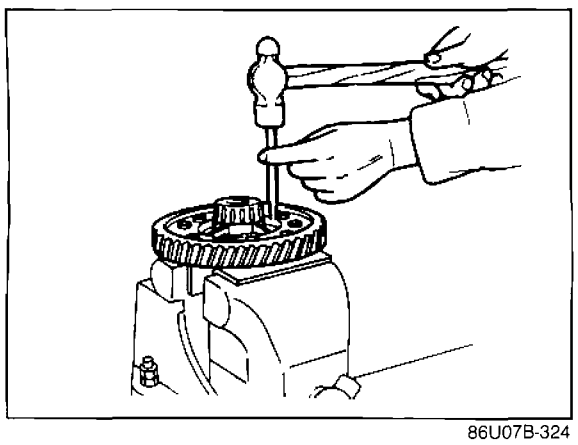
Backlash:
Standard 0.025—0.1 mm (0.001—0.004 in)
Maximum 0.5 mm (0.020 in)



76G07B-168

Governor drive gear (G4A-HL)
Remove the governor drive gear with the **SST**.

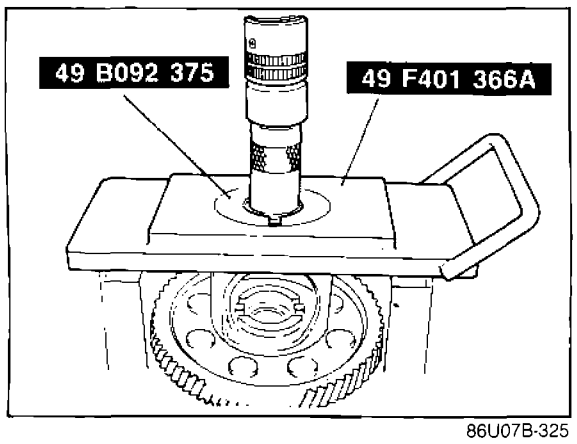
Note
Be careful not to lose the steel ball.



86U07B-324

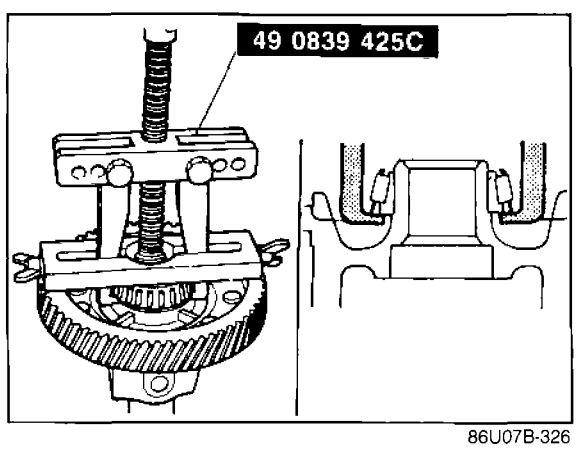
Roll pin
For removing the roll pin from the pinion shaft, place the gear case on a vise and knock the pin out with a suitable pin punch (ϕ2.0 mm (0.079 in)) and hammer.

Note
a) Use the protective plates to prevent damage to the differential.
b) Insert the punch into the spring pin hole from the ring gear side.



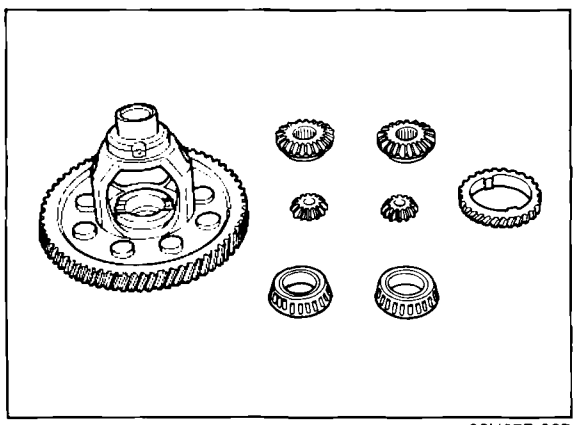
86U07B-325

Side bearing inner race
1. Remove the side bearing inner race (side opposite the ring gear) from the gear case with the **SST**.



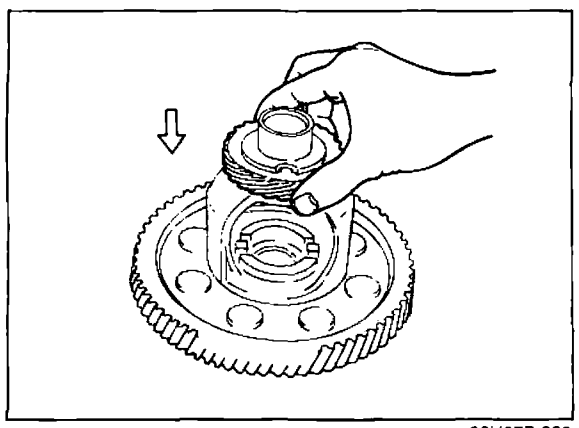
86U07B-326

2. Remove the side bearing inner race (ring gear side) with a combination of parts from the **SST**.



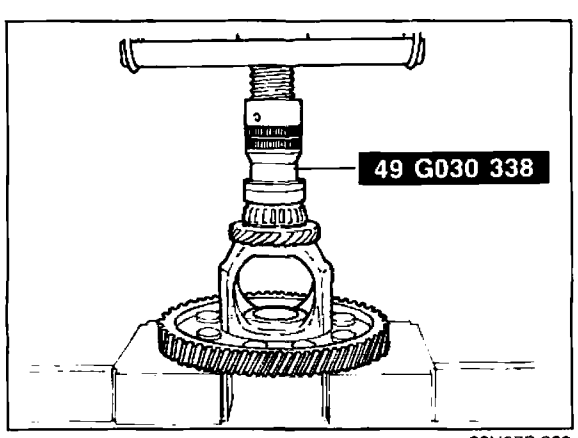
86U07B-327

Inspection
Check the following and replace any faulty parts.
1. Damaged or worn gears
2. Cracked or damaged gear case
3. Damaged bearings



86U07B-328

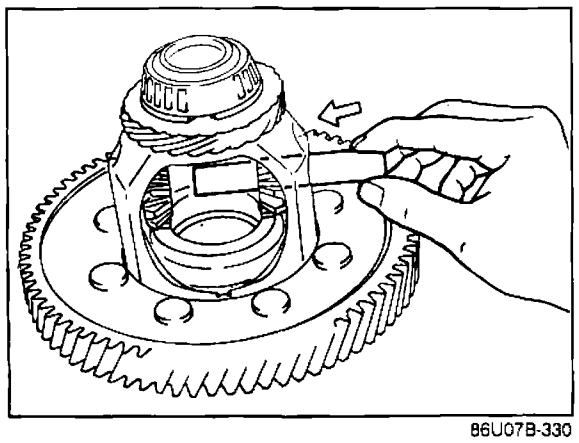
Assembly
1. Set the speedometer drive gear onto the ring gear and case assembly.



86U07B-329

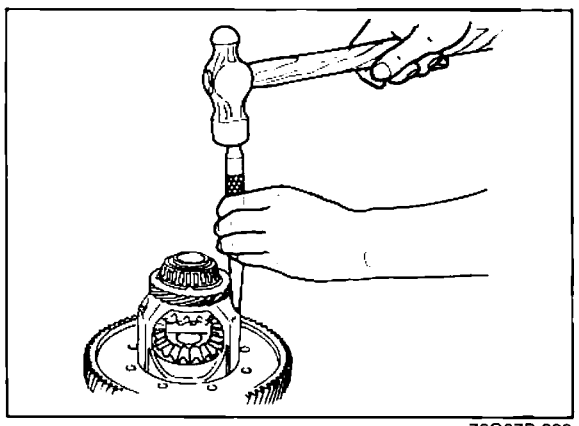
2. Install the side bearing inner races.
   (1) Press the side bearing inner race (side opposite the ring gear) onto the ring gear and case assembly with the **SST**.
   (2) Press on the other side bearing inner race (ring gear side) in the same manner.

Caution
Do not reuse the bearings if they were removed.



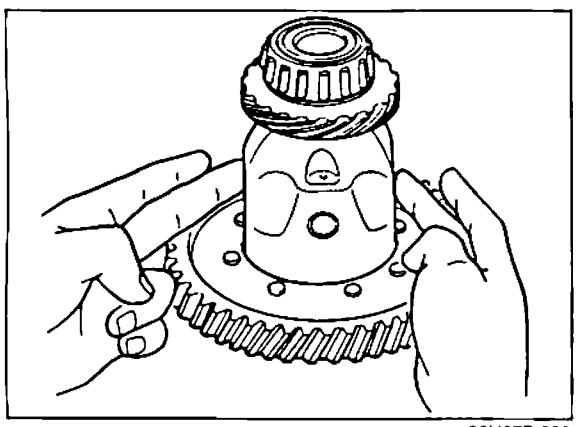
86U07B-330

3. Install the pinion gears and thrust washers into the case.
4. Install the pinion shaft.



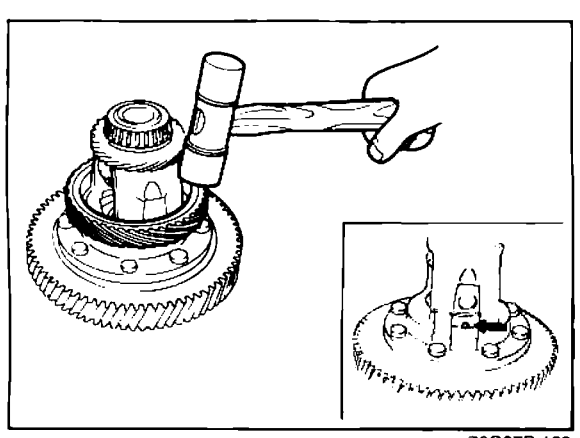
76G07B-222

5. Install the roll pin.



86U07B-332

6. Install the thrust washers and side gears into the gear case at the same time, then turn them back on the pinion gear and align them with the pinion shaft hole.

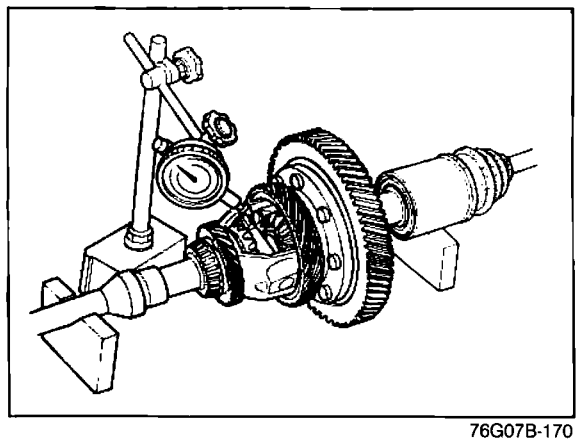


76G07B-169

7. Set the steel ball in the hole in the gear case.

Note
Affix the ball with petroleum jelly.

8. Install the governor drive gear onto the gear case with a plastic hammer.
9. Install the snap ring.



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10. Check and adjust the backlash of the side gears and pinion gears as follows:
    (1) Install the left and right driveshafts in the differential assembly.
    (2) Support the driveshafts on V-blocks.
    (3) Measure the backlash of both pinion gears.

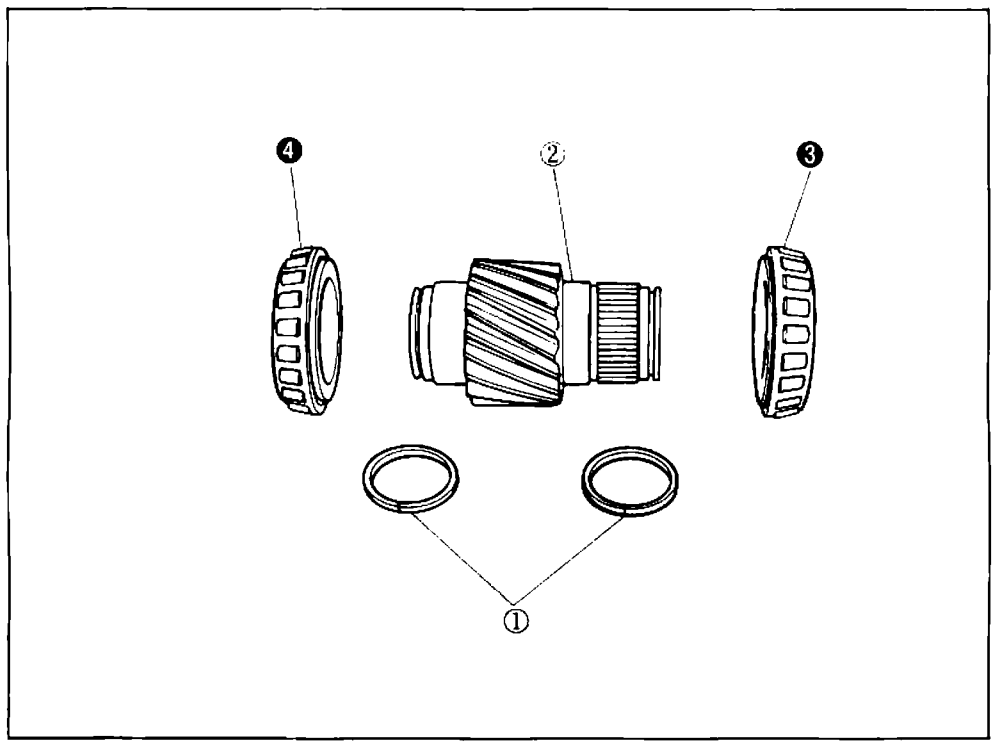
Backlash:
Standard 0.025—0.1 mm (0.001—0.004 in)
Maximum 0.5 mm (0.020 in)

11. If the backlash is not within specification, replace the differential assembly.

OUTPUT GEAR

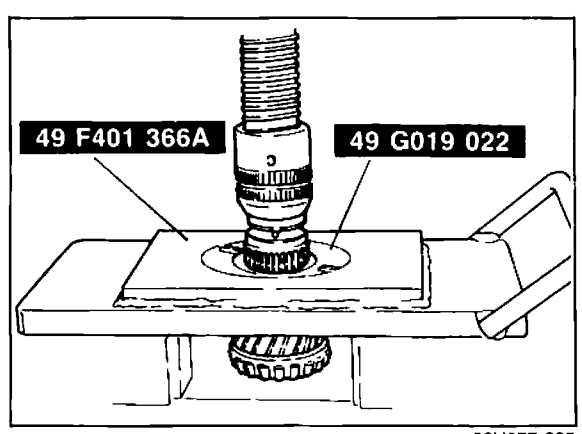
Disassembly

Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked parts.

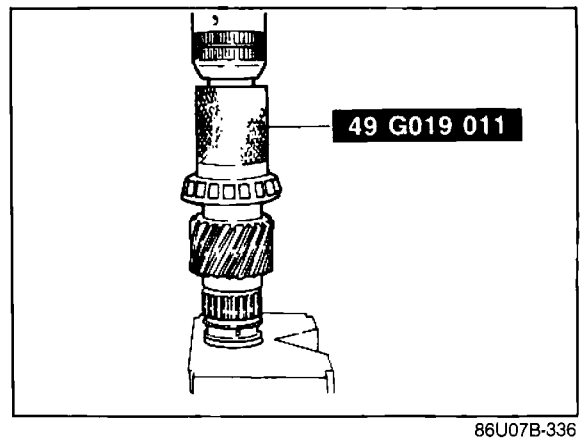


1. Seal ring
2. Output gear
3. Output gear bearing
4. Output gear bearing

86U07B-334



86U07B-335



86U07B-336

Disassembly note

Output gear bearings

Remove the output gear bearings from the output gear with the **SST**.

Inspection

Check the following and replace any faulty parts.

1. Damaged or worn output gear
2. Damaged bearing

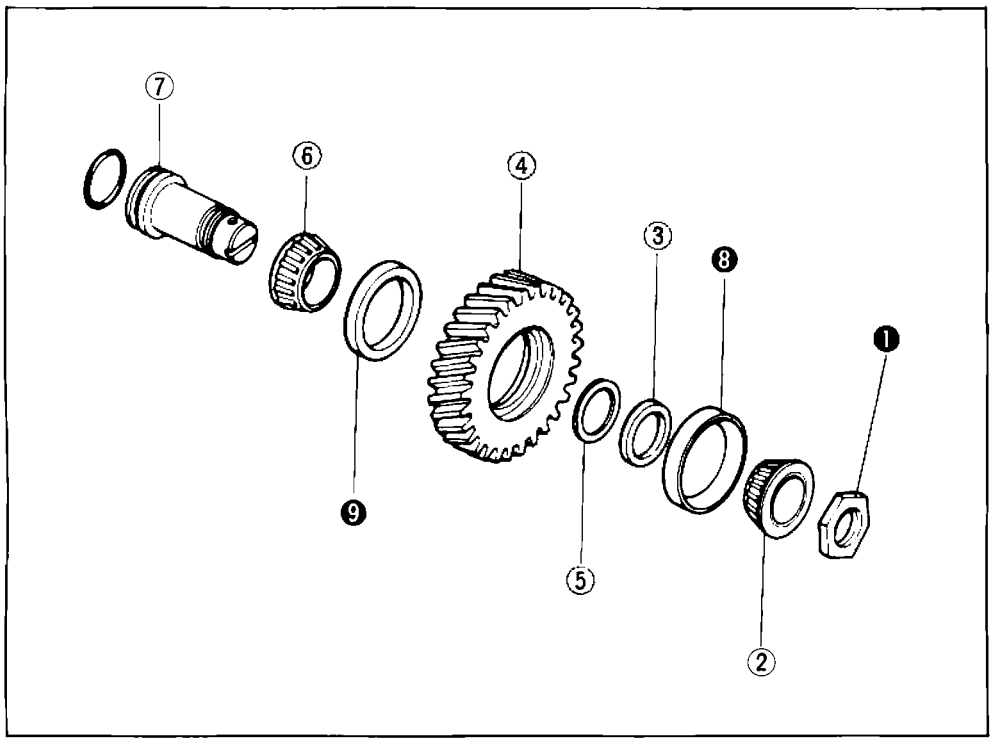
Assembly

1. Press the output gear bearings onto the output gear with the **SST**.

IDLE GEAR

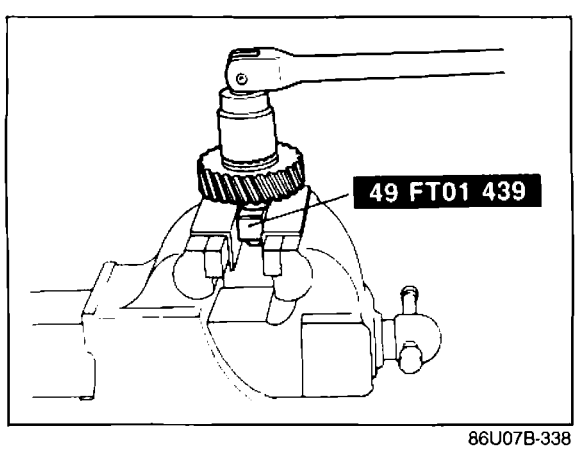
Disassembly

Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked parts.



1. Locknut
2. Idle gear bearing
3. Spacer
4. Idle gear
5. Adjust shim
6. Idle gear bearing
7. Idle shaft
8. Bearing outer race
9. Bearing outer race

86U07B-337

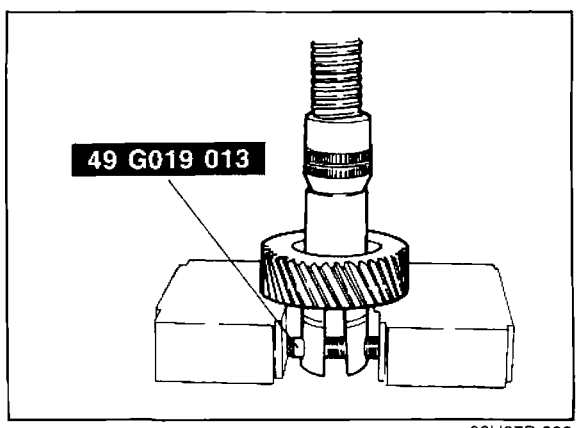


86U07B-338

Disassembly note
Locknut

Secure the idle shaft in a vise with the **SST**; then remove the locknut.

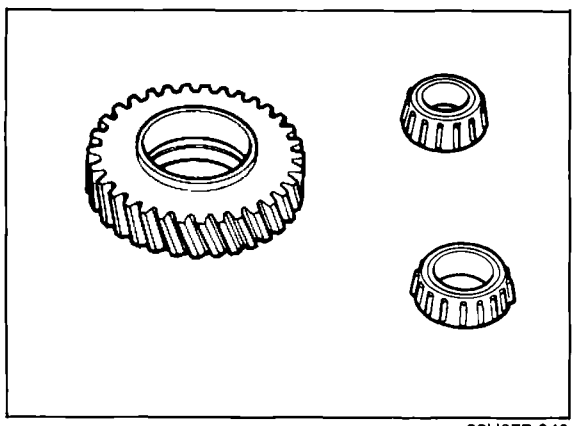
Note
Use the protective plates to prevent damage to the SST.



86U07B-339

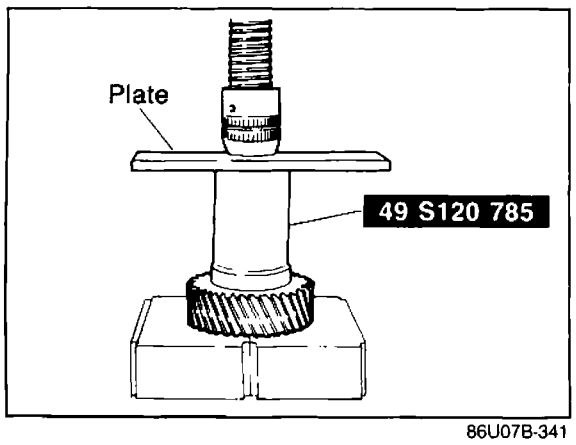
Bearing outer race

Remove the bearing outer race from the idle gear with the **SST**.



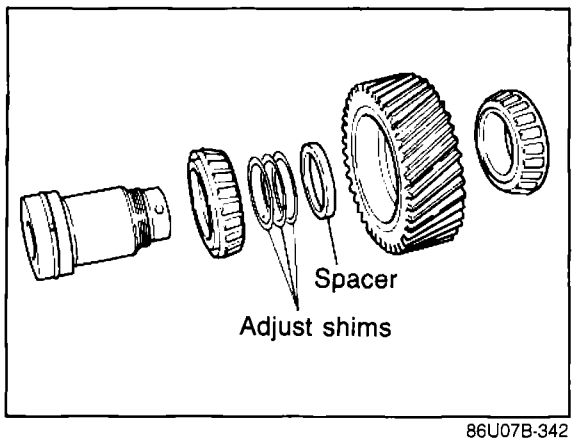
86U07B-340

Inspection
Check the following and replace any faulty parts.
1. Damaged or worn idle gear
2. Damaged or worn bearing



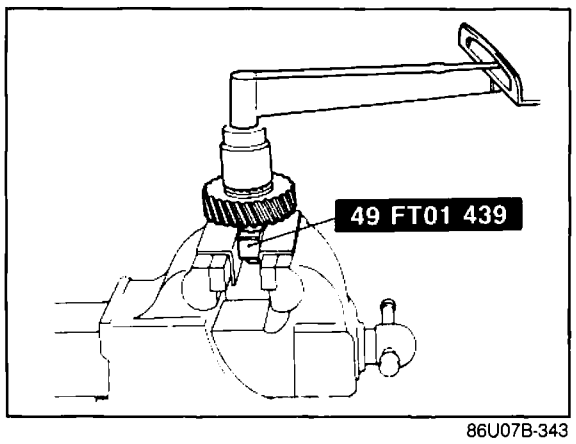
86U07B-341

Assembly
1. Press the bearing outer races in with the **SST**.



86U07B-342

2. Install the idle gear bearing onto the idle shaft, then install the idle gear, adjust shim, spacer, and bearing.

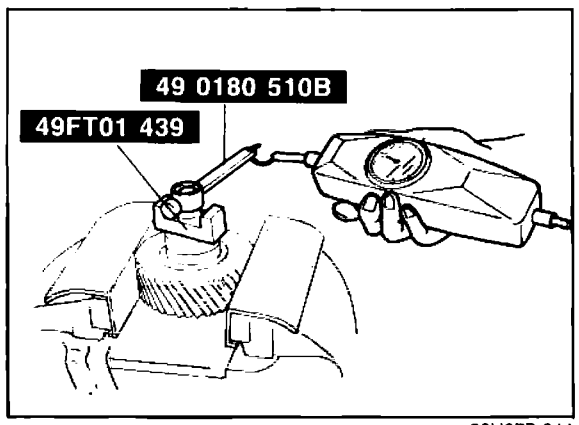


86U07B-343

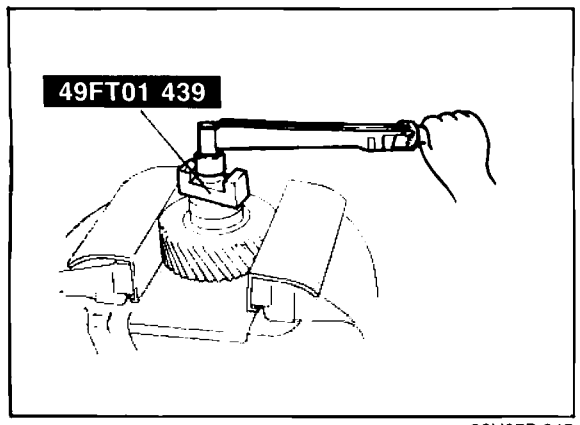
3. Secure the idle shaft in a vise with the **SST**; then tighten the locknut to the lower limit of the tightening torque.

Tightening torque:
128 N·m (13 m-kg, 94 ft-lb)

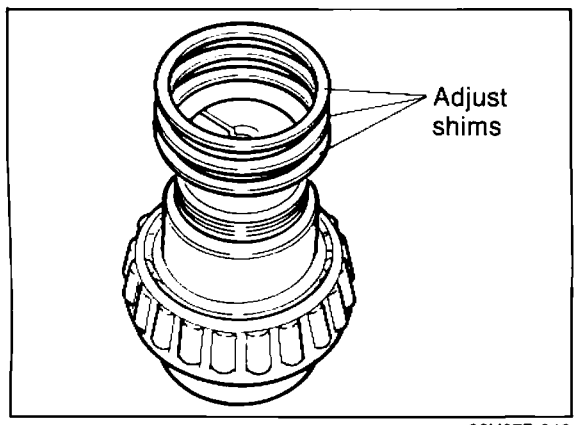
Note
Use the protective plates to prevent damage to the SST.



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86U07B-345



86U07B-346

4. Check and adjust the idle gear bearing preload.
   (1) Turn the idle gear assembly and **SST** over, and secure the gear in the vice.

Note
Use protective plates to prevent damage to the idle gear.

   (2) Attach the **SST** and spring scale or torque wrench, and measure the preload while tightening the locknut.

Tightening torque:
128—177 N·m (13—18 m-kg, 94—130 ft-lb)

Preload:
0.03—0.9 N·m
(0.3—9.0 cm-kg, 0.26—7.8 in-lb)

Value indicated on pull scale:
0.3—9 N (0.03—0.9 kg, 0.066—1.98 lb)

Note
Read the preload when the idle shaft starts to turn.

5. If the specified preload cannot be obtained within the specified tightening torque, adjust by selecting the proper adjust shims.

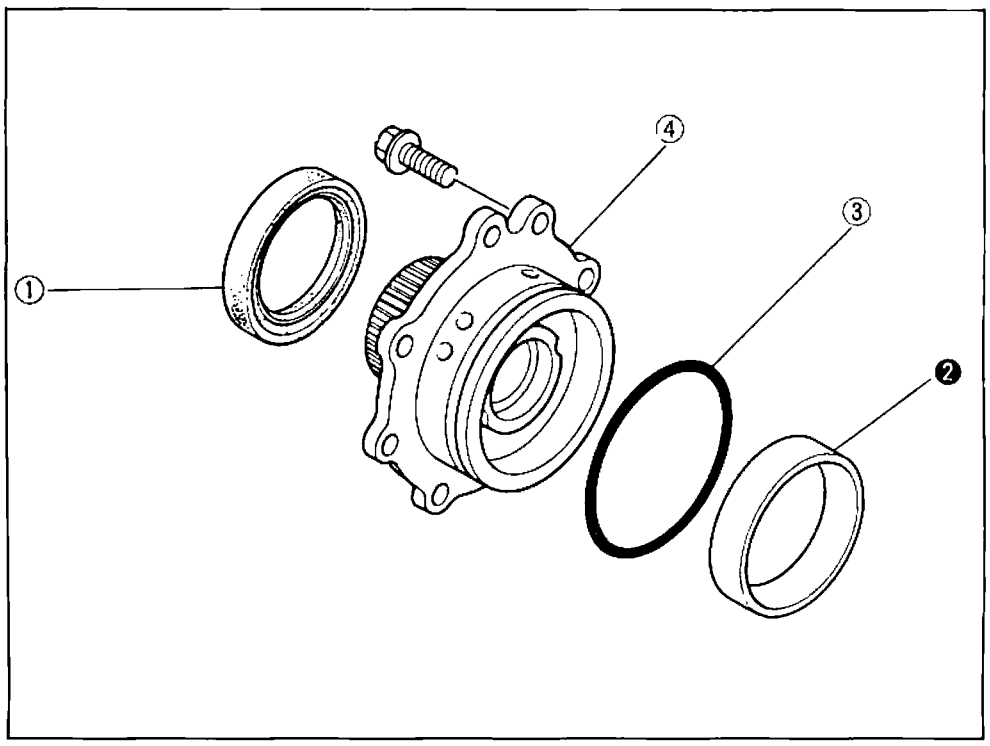
Thickness of shim
0.10 mm (0.004 in)
0.12 mm (0.005 in)
0.14 mm (0.006 in)
0.16 mm (0.0063 in)
0.18 mm (0.007 in)
0.20 mm (0.008 in)

Note
a) The maximum allowable number of shims is 7.
b) Preload is reduced by increasing the thickness of the shims, or increased by reducing the thickness of the shims.

BEARING COVER ASSEMBLY

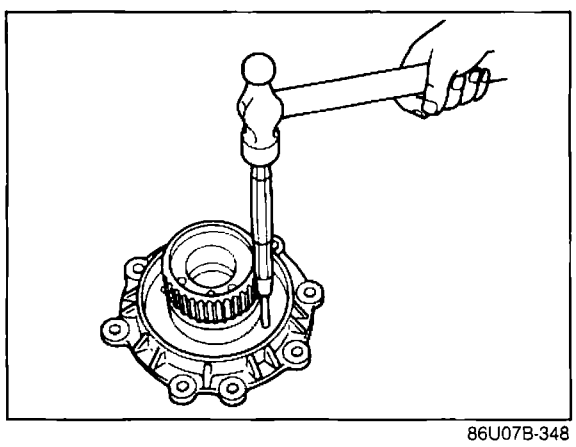
Disassembly

Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked parts.



86U07B-347

1. Oil seal
2. Bearing outer race
3. O-ring
4. Bearing cover



86U07B-348

Disassembly note

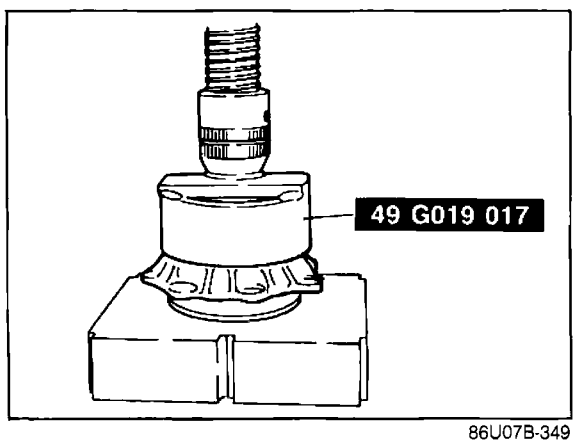
Bearing outer race

Remove the bearing outer race with a pin punch and hammer as shown.

Inspection

Check the following and replace any faulty parts.

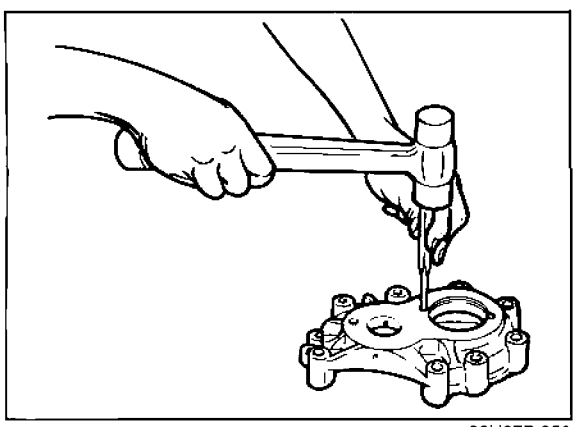
1. Damaged bearing cover
2. Damaged or worn bushing



86U07B-349

Assembly

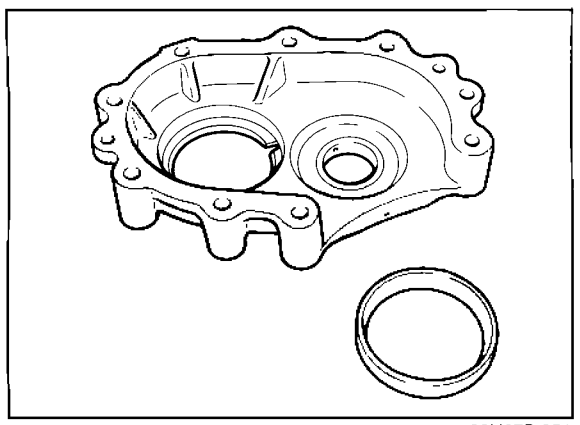
1. Press the bearing outer race into the cover.
2. Press the oil seal into the cover with the **SST**.



86U07B-350

BEARING HOUSING
Disassembly
Remove the bearing outer race with a pin punch and hammer.

Note
Install the bearing outer race during reassembly of transaxle to adjust the preload.



86U07B-351

Inspection
Check the following and replace any faulty parts.
1. Damaged bearing housing
2. Damaged bearing outer race

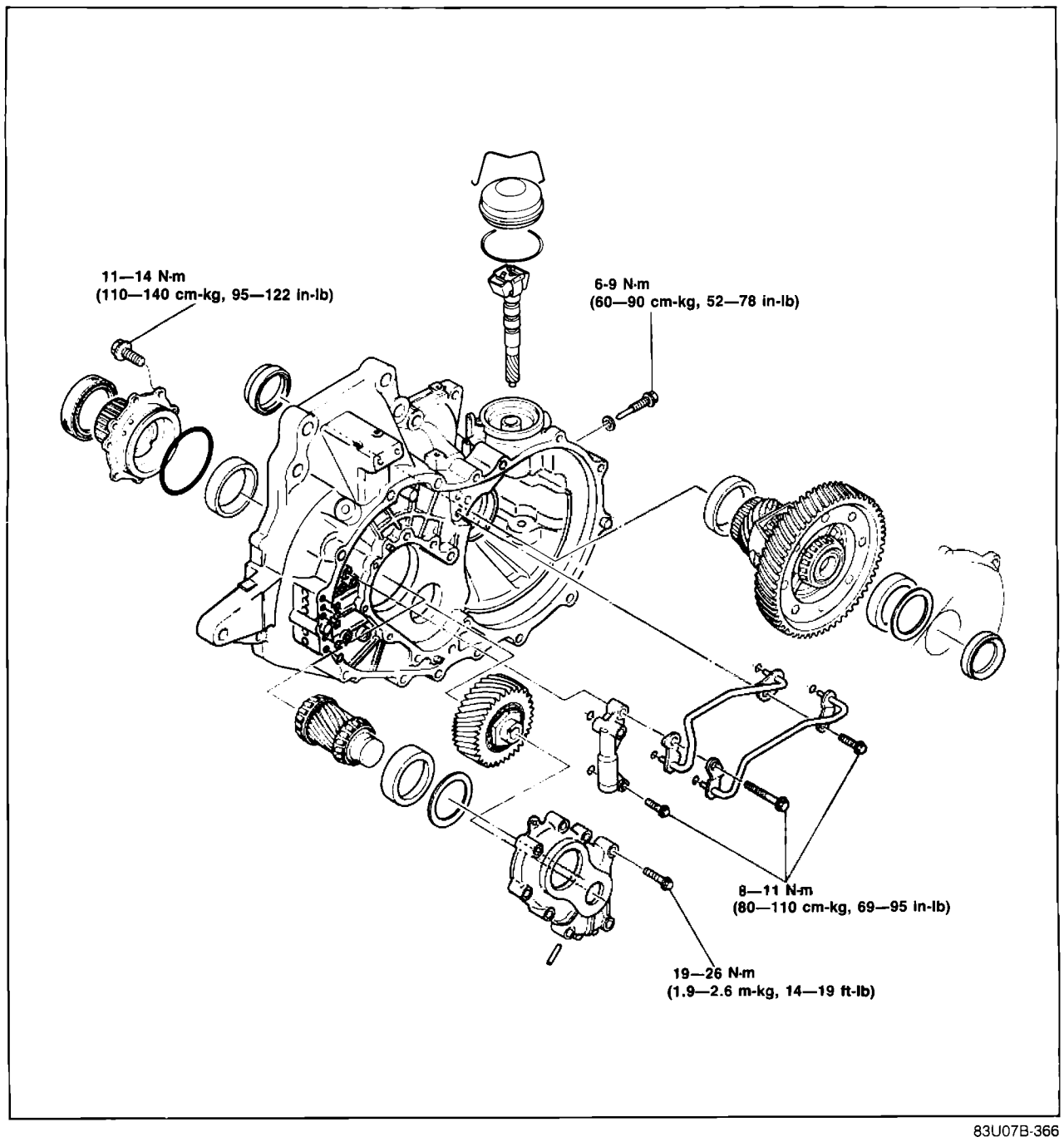
ASSEMBLY

PRECAUTION

(1) The automatic transaxle consists of high-precision-finished parts, necessitating careful inspection before assembly because even a small nick could cause fluid leakage or affect performance.
(2) Clean out oil holes and oil passages with compressed air, and check that there are no obstructions.
(3) Before assembly, apply ATF to each O-ring, seal ring, rotating part, and friction part.
(4) If the brake band or drive plates are replaced with new ones, first soak them in ATF for at least 2 hours before installing.
(5) Each seal gasket and O-ring must be replaced with a new one.
(6) Be sure to install all thrust bearings and races in the correct direction and position.

ASSEMBLY—STEP 1
Torque Specifications

83U07B-365



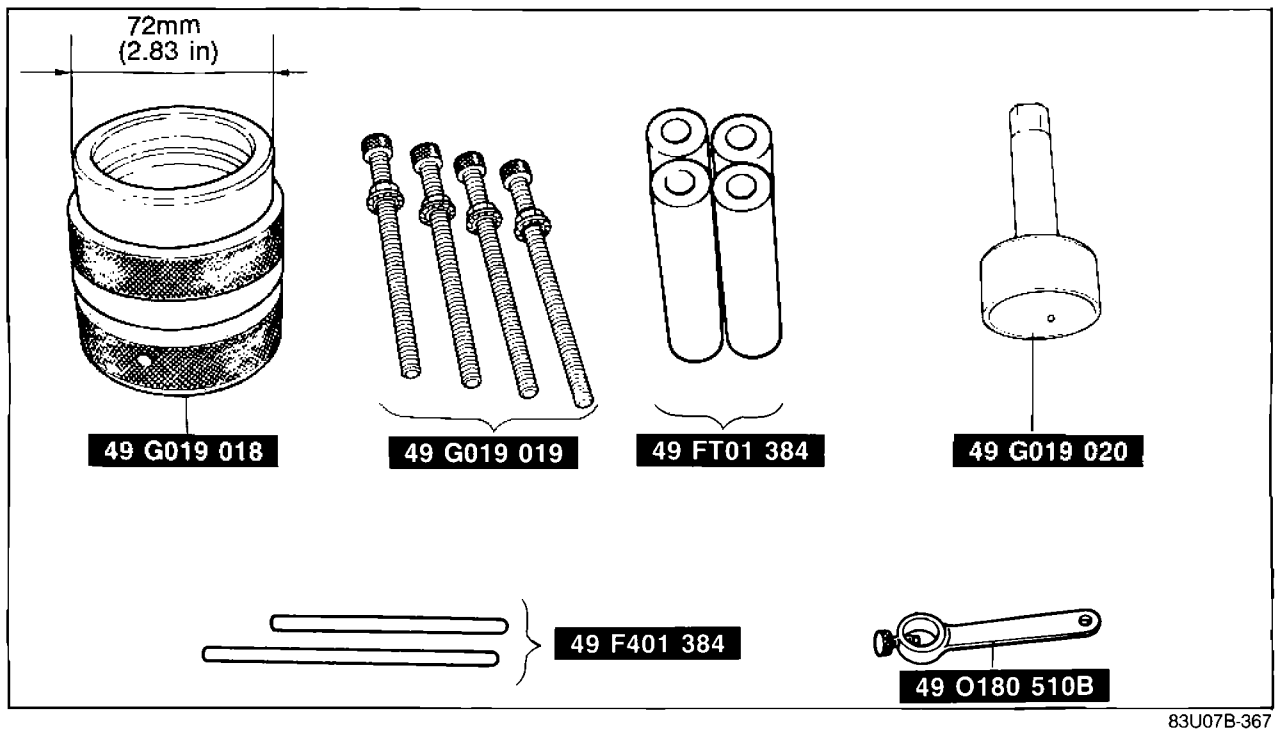
83U07B-366

7B ASSEMBLY

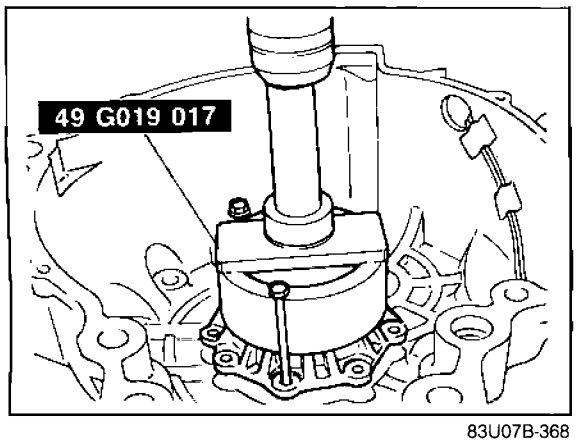
Procedure

1. Adjust the preload of the output gear bearing and select the adjust shim(s) as described below.

Note
To adjust the preload, use the SST shown below.



83U07B-367

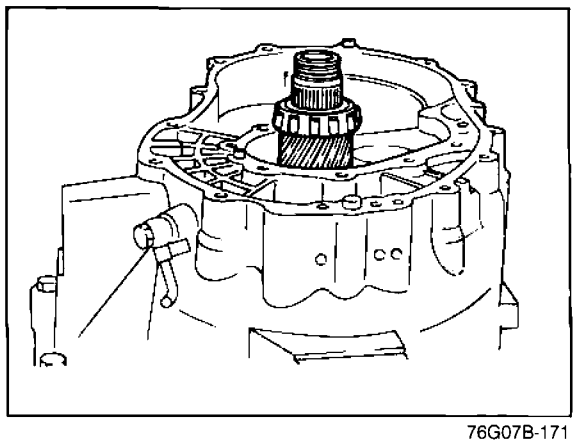


83U07B-368

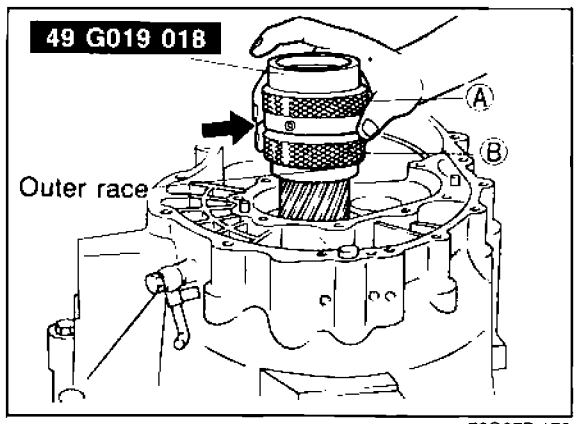
(1) Press the bearing cover in after aligning it with guide bolts as shown.

Tightening torque: 11—14 N·m (110—140 cm-kg, 95—122 in-lb)

(2) Install the converter housing onto the **SST**.
(3) Remove the bearing outer race and adjust shims from the bearing housing. (Refer to page 7B—185)
(4) Mount the output gear assembly onto the converter housing.



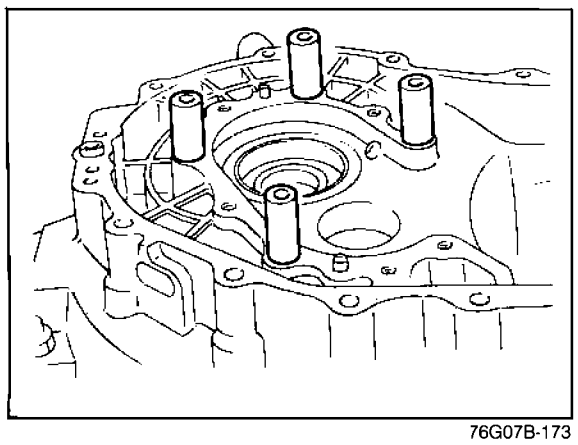
76G07B-171



76G07B-172

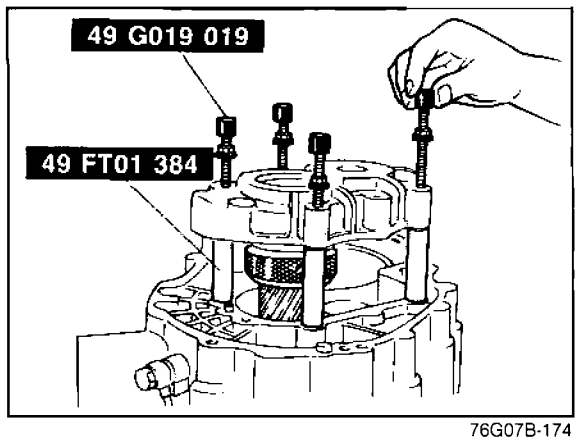
(5) Install the outer race removed in step (2) to the **SST**; then mount them on the output gear assembly.

Caution
Eliminate the gap (arrow) by turning A or B of the selector.



76G07B-173

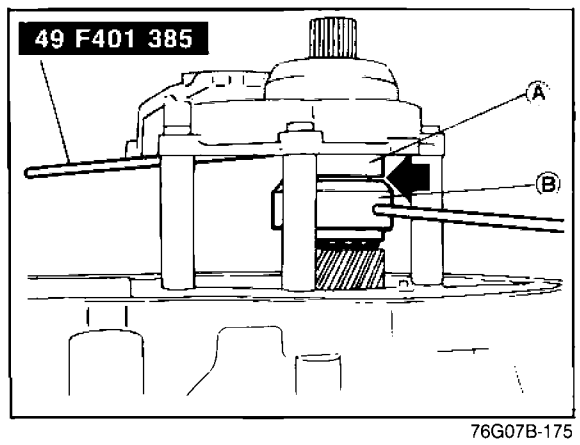
(6) Set the four **SST** on the converter housing in the positions shown.



76G07B-174

(7) Set the bearing housing on the **SST** (selector) and install the four **SST** (bolts); then tighten them to the specified torque.

Tightening torque:
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

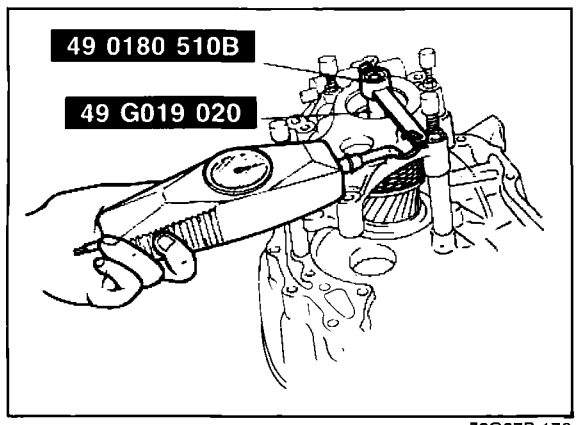


76G07B-175

(8) Turn the **SST** (selector) to increase the clearance indicated by the arrow with the **SST** (bars) until it no longer turns.

Note
This is to seat the bearing.

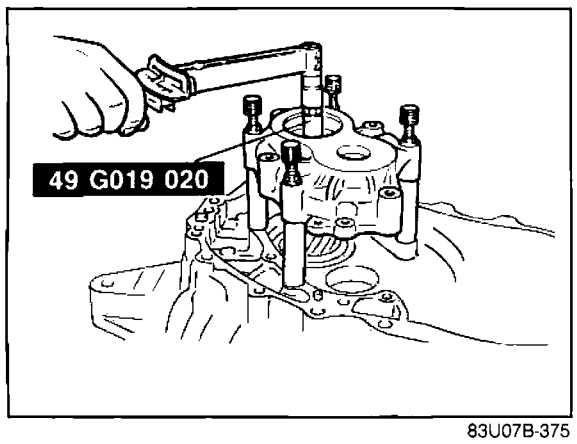
(9) Turn the selector in the opposite direction until the preload is eliminated (gap is reduced).



76G07B-176

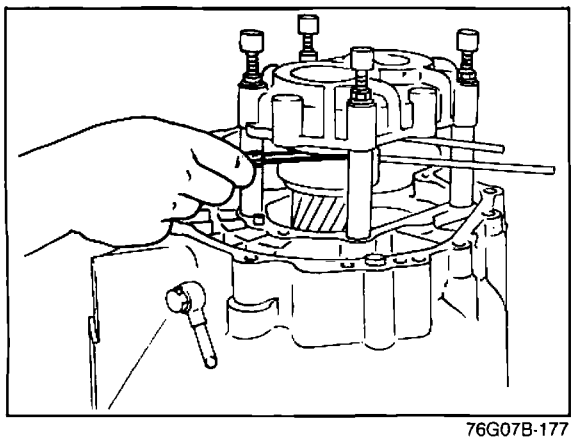
(10) Mount the **SST** and pull scale or torque wrench on the output gear.
(11) Increase the clearance between A and B to obtain the specified preload/pull scale reading.

Preload: 0.5—0.9 N·m
(5.0—9.0 cm-kg, 4.34—7.81 in-lb)
Reading on pull scale: 5—9 N
(0.5—0.9 kg, 1.1—1.98 lb)



83U07B-375

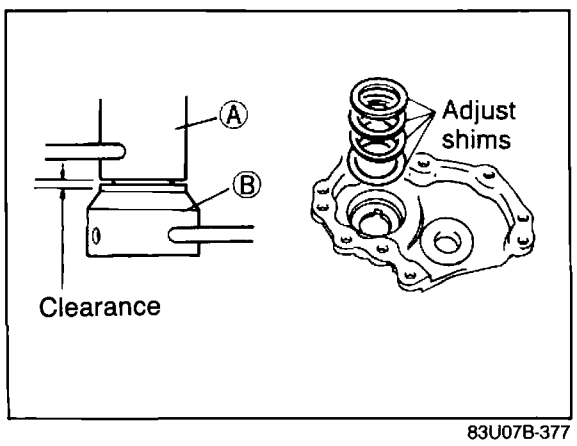
Note
Read the preload when the output gear starts to turn.



76G07B-177

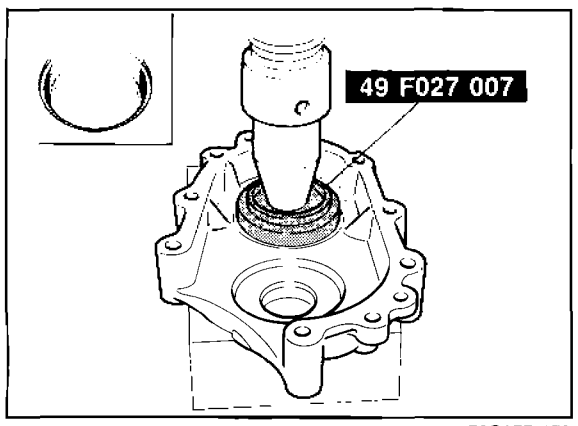
(12) Measure the clearance. Select adjust shim(s) equivalent to the measured clearance.

Thickness of shim	
0.10 mm (0.004 in)	0.18 mm (0.007 in)
0.12 mm (0.005 in)	0.20 mm (0.008 in)
0.14 mm (0.006 in)	0.50 mm (0.020 in)
0.16 mm (0.0063 in)	



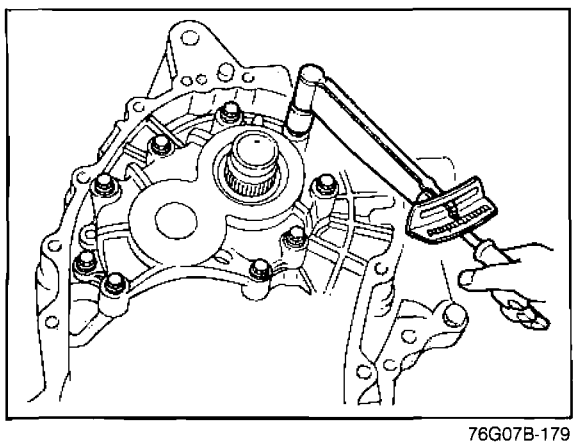
83U07B-377

Caution
a) Measure the clearance around the entire circumference, and select shims equivalent to the maximum clearance.
b) The maximum allowable number of shims is 7.



76G07B-178

(13) Remove the bearing housing and **SST**.
(14) Install the required shim(s) and press the bearing race into the bearing housing with the **SST**.



76G07B-179

(15) Install the bearing housing.

Tightening torque:
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

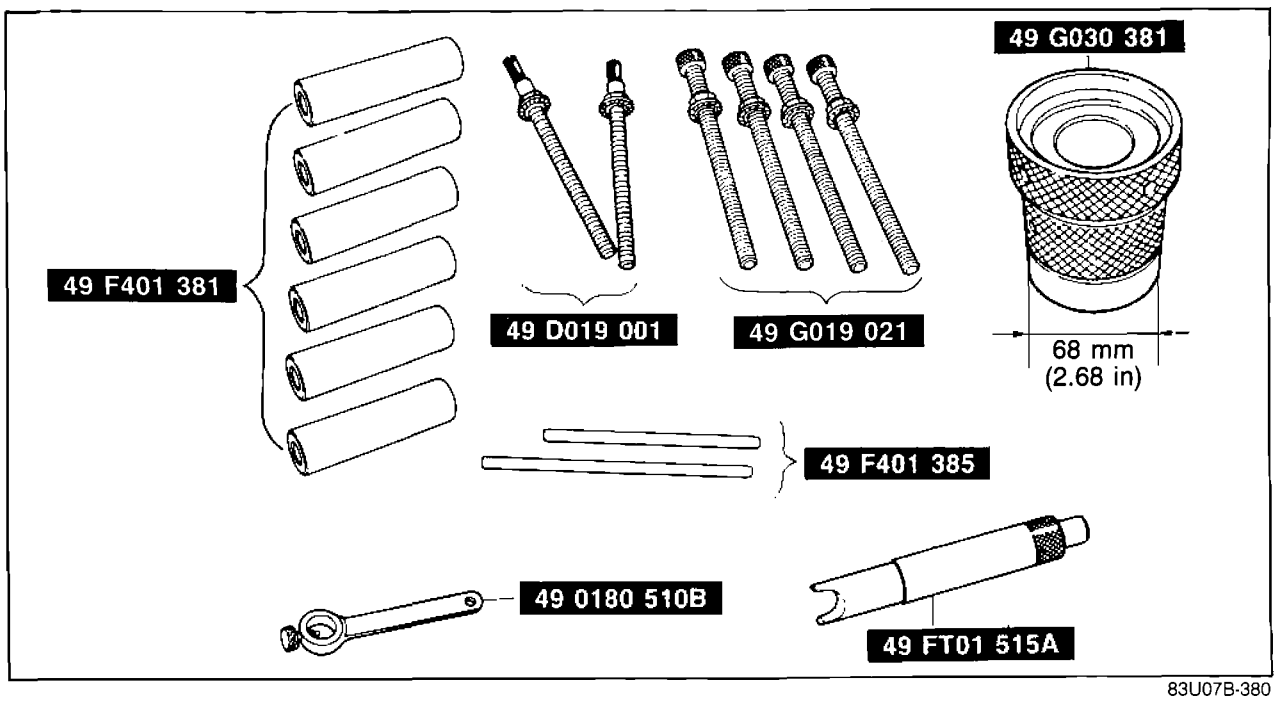
(16) Check that the preload/pull scale reading is within specification. If not within specification return to step (2).

Preload: 0.03—0.9 N·m
(0.3—9.0 cm-kg, 0.26—7.81 in-lb)
Reading on pull scale:
0.3—9 N (0.03—0.9 kg, 0.066—1.98 lb)

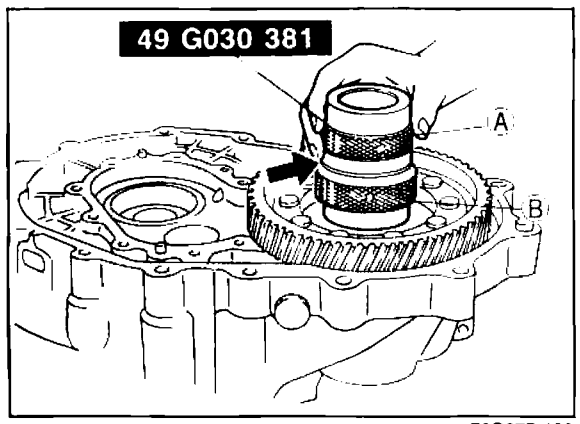
(17) Remove the bearing housing.

2. Adjust the differential side bearing preload and select the adjust shim(s) as described below.

Note
To inspect and adjust the preload, use the SST shown below.



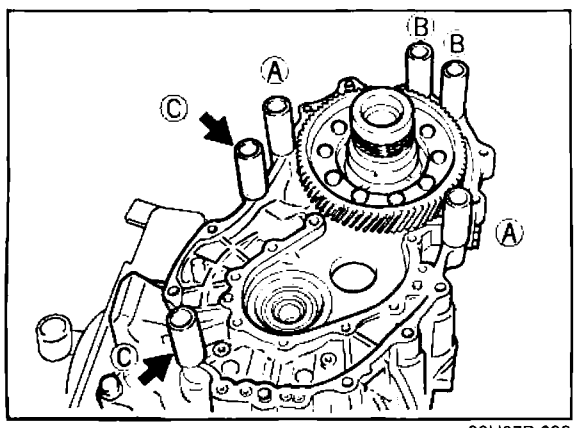
83U07B-380



76G07B-180

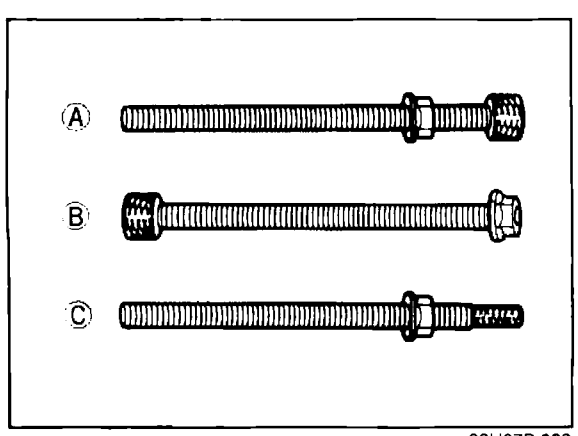
(1) Remove the bearing outer race and adjust shims from the transaxle case. (Refer to page 7B—106)
(2) Set the differential assembly into the converter housing.
(3) Install the outer race removed in step (1) into the **SST**; then set them on the differential assembly.

Caution
Eliminate the gap by turning either A or B of the selector.



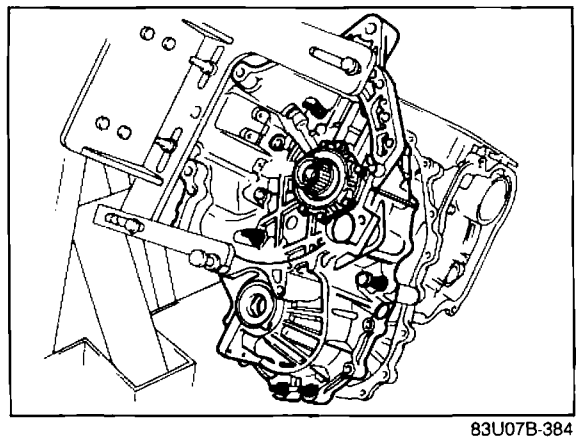
83U07B-382

(4) Set the six **SST** in the positions shown.



83U07B-383

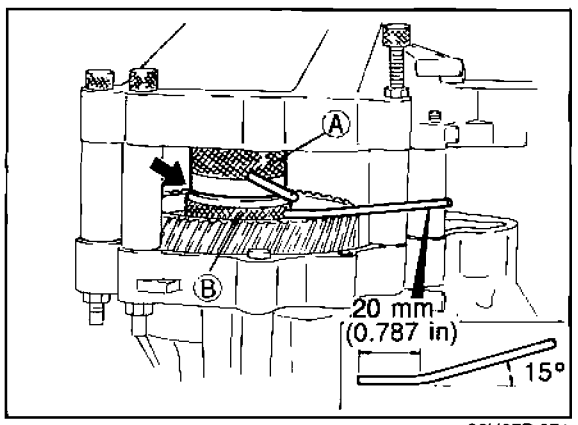
Note
Install the bolts in the positions shown in the illustration above.



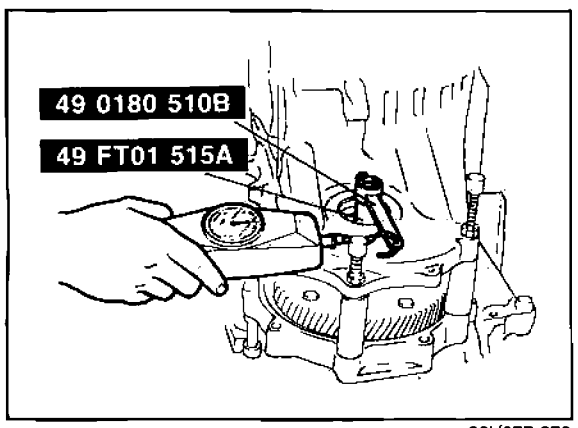
83U07B-384

(5) Set the transaxle case on the selectors.
(6) Tighten the **SST** (bolts) to the specified torque.

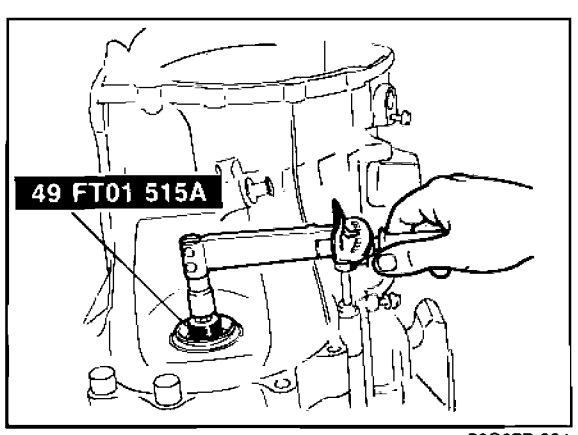
Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)



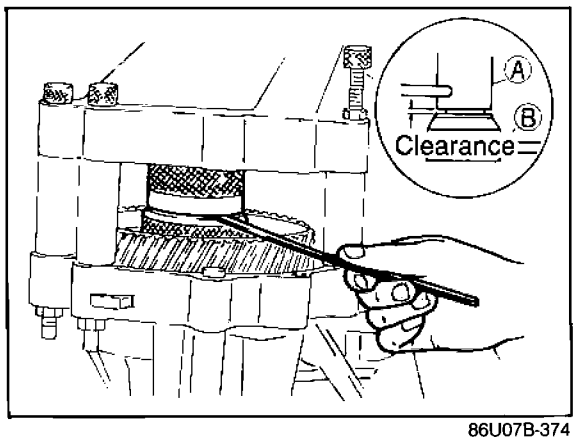
86U07B-371



86U07B-372



76G07B-224



86U07B-374

(7) Turn the **SST** (selector) to increase the clearance indicated by the arrow with the **SST** (bars), until it no longer turns.

Note
a) This is to seat the bearings.
b) To turn the SST (B), bend the bar as shown.

(8) Turn the selector in the opposite direction until the preload is eliminated (gap is reduced).

(9) Insert the **SST** through the oil seal hole of the transaxle case and attach it to the pinion shaft.
(10) Mount the **SST** and pull scale or torque wrench.
(11) Widen the clearance between A and B to obtain the specified preload/pull scale reading.

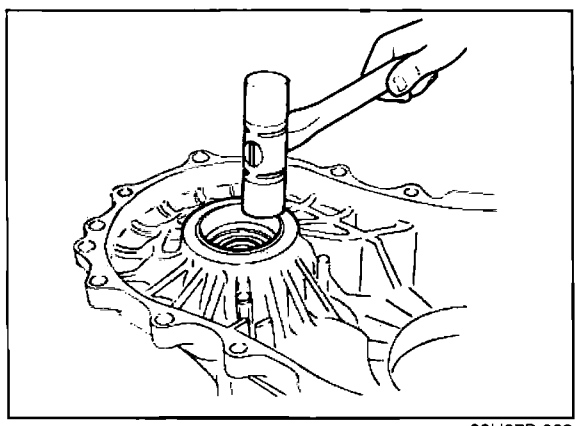
Preload:
0.5 N·m (5 cm-kg, 4.3 in-lb)
Reading on pull scale:
5 N (0.5 kg, 1.1 lb)

Note
Read the preload when the differential starts to turn.

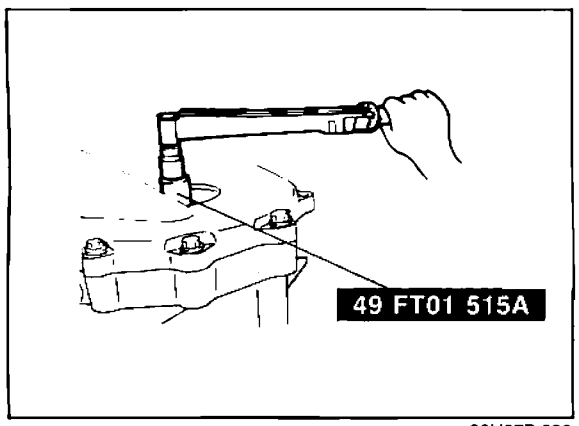
(12) Measure the clearance between A and B.
(13) Add **0.3 mm (0.0118 in)** to the measured clearance, and select the shim(s) closest in valve to that measurement.

Thickness of shim	
0.10 mm (0.004 in)	0.20 mm (0.008 in)
0.12 mm (0.005 in)	0.50 mm (0.020 in)
0.14 mm (0.006 in)	0.70 mm (0.028 in)
0.16 mm (0.0063 in)	1.00 mm (0.039 in)
0.18 mm (0.007 in)	

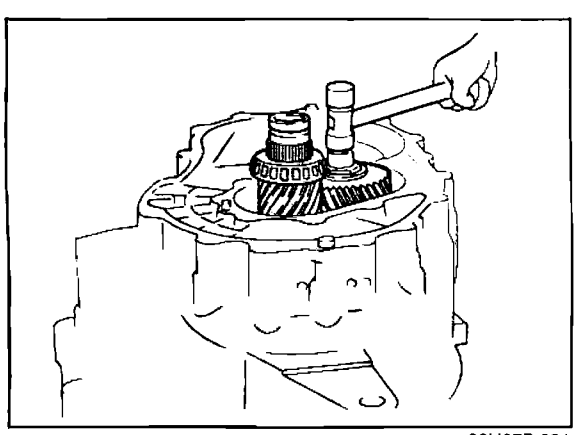
Caution
a) Measure the clearance around the entire circumference, and select shims equivalent to the maximum clearance.
b) The maximum allowable number of shims is 3.



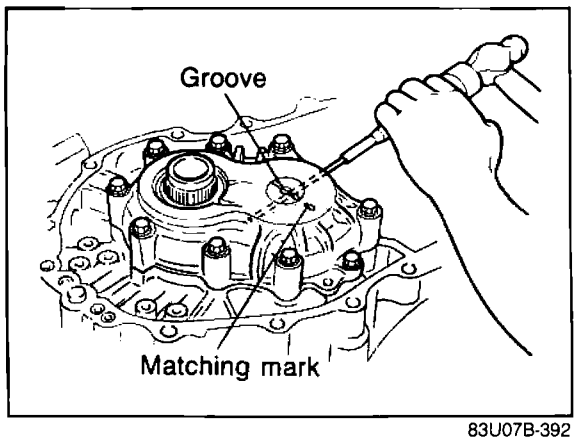
83U07B-389



83U07B-390



83U07B-391



83U07B-392

(14) Remove the transaxle case and selector.
(15) Install the required shim(s) and tap the bearing race into the transaxle case.

(16) Install the transaxle case.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

(17) Check that the preload is within specification. If not within specification, return to step (2).

Preload: 2.9—3.9 N·m
(30—40 cm-kg, 26—35 in-lb)
Reading on pull scale: 29—39 N
(3.0—4.0 kg, 6.6—8.8 lb)

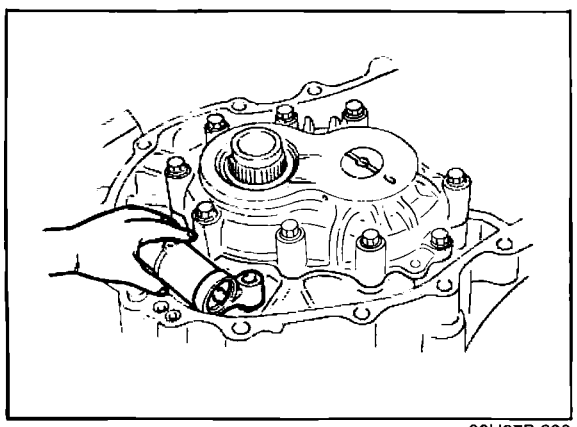
(18) Remove the transaxle case and differential assembly.

3. Install the idle gear and output gear as an assembly by tapping in with a plastic hammer.

4. Install the bearing housing.
(1) Install the bearing housing on the converter housing.

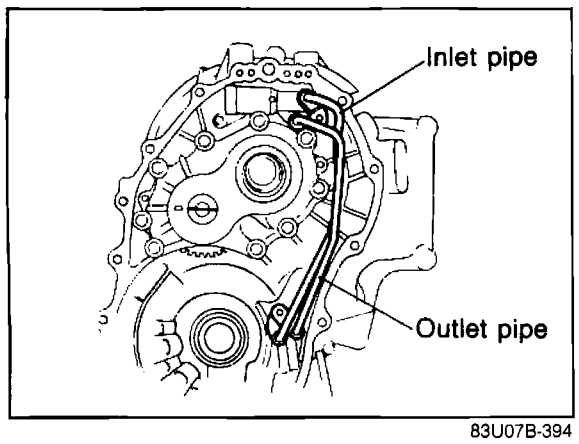
Tightening torque:
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

(2) Align the groove on the idle shaft with the matching mark on the bearing housing.
(3) Tap the roll pin in with a pin punch and hammer.



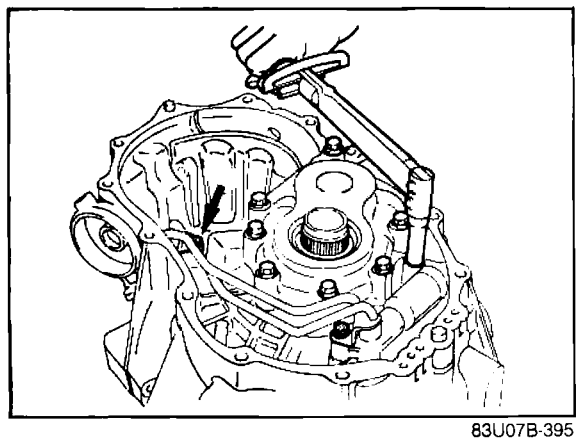
83U07B-393

5. Apply ATF to the O-rings and install them into the 2-3 accumulator; then temporarily install the 2-3 accumulator piston assembly in the converter housing.



83U07B-394

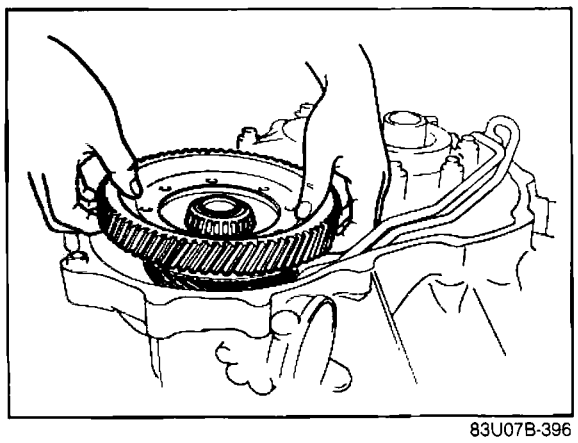
6. Apply ATF to the O-rings and install them onto the governor inlet pipe and governor outlet pipe; then temporarily install the inlet and outlet pipes.



83U07B-395

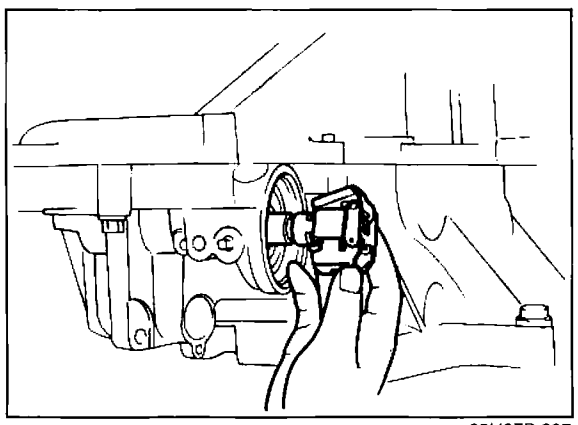
7. Tighten the bolts.

Tightening torque: 8—11 N·m (80—110 cm-kg, 69—95 in-lb)



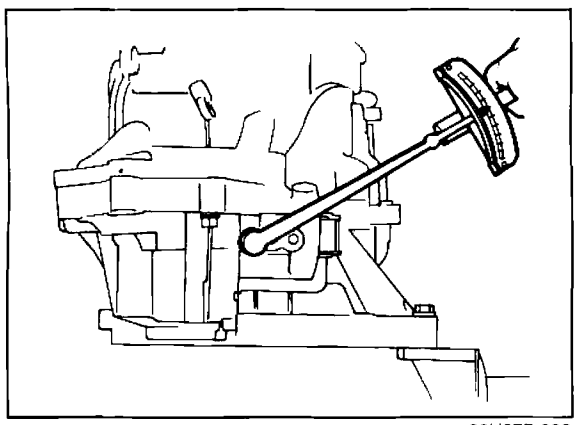
83U07B-396

8. Set the differential assembly into the converter housing.



83U07B-397

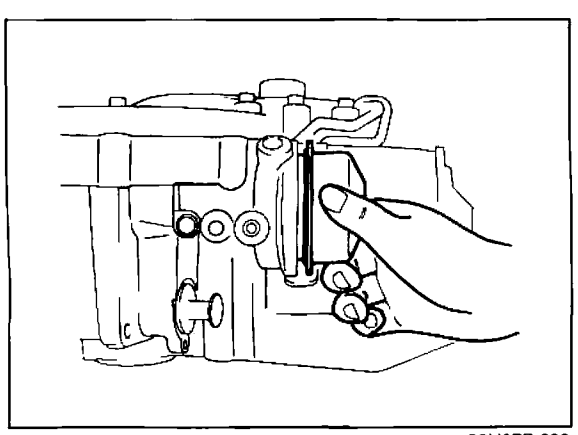
9. Install the governor assembly.
   (1) Install the governor assembly.



83U07B-398

(2) Install the stopper bolt.

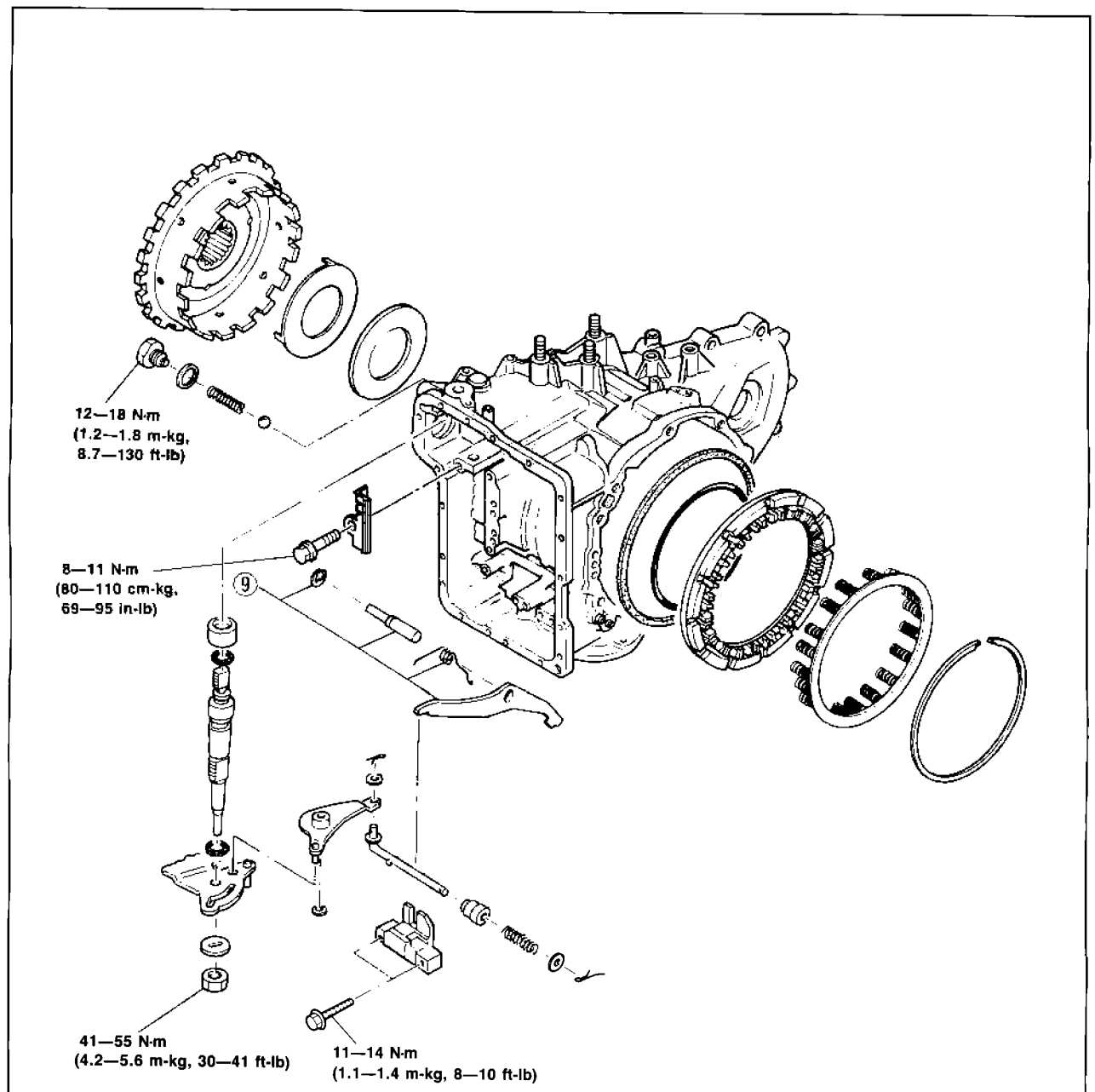
Tightening torque: 6—9 N·m (60—90 cm-kg, 52—78 in-lb)



83U07B-399

(3) Install the O-ring on the governor cover.
(4) Install the governor cover and clip.

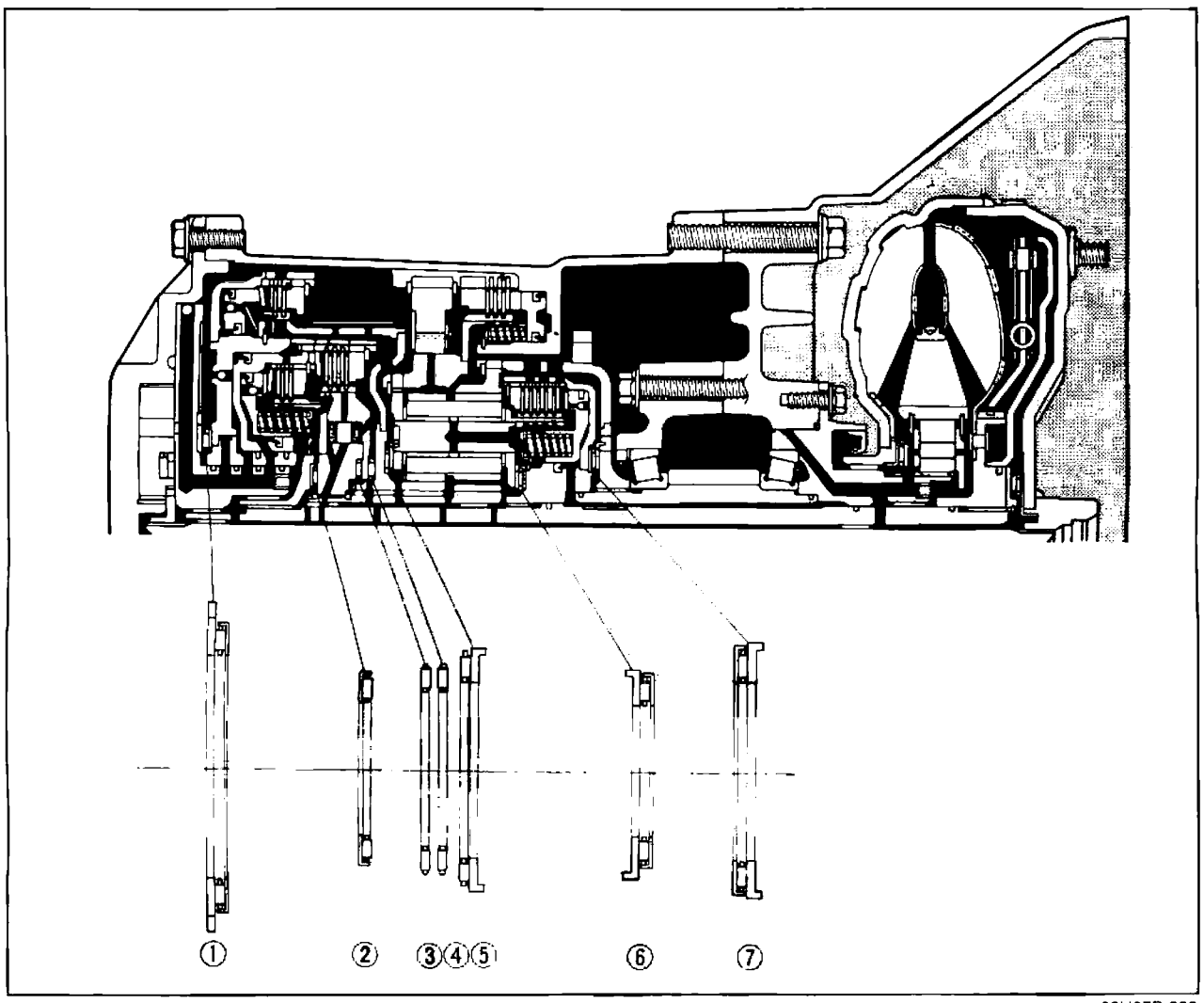
ASSEMBLY-STEP 2
Torque Specifications



86U07B-379

7B ASSEMBLY

Thrust Washer, Bearing, and Race Locations



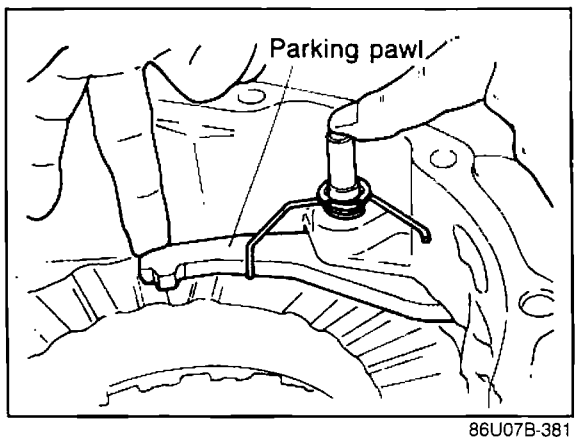
86U07B-380

Outer diameter of bearing and race

mm (in)

	1	2	3	4	5	6	7
Bearing	86.0 (3.39)	56.1 (2.21)	62.1 (2.44)	62.1 (2.44)	72.0 (2.83)	56.1 (2.21)	72.1 (2.84)
Race	88.0 (3.46)	—	—	—	72.0 (2.83)	57.0 (2.21)	72.0 (2.83)

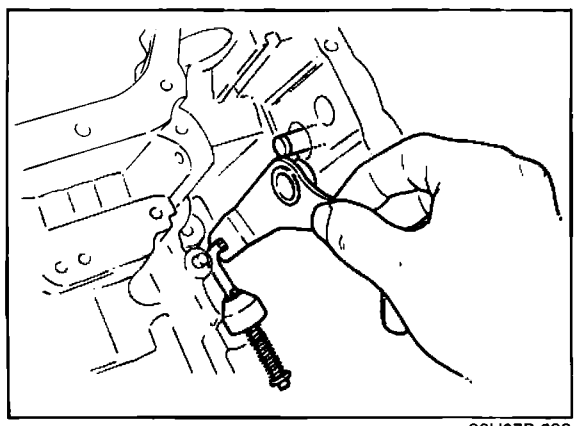
Note: Install with petroleum jelly to prevent the thrust bearing or bearing race from falling out.



86U07B-381

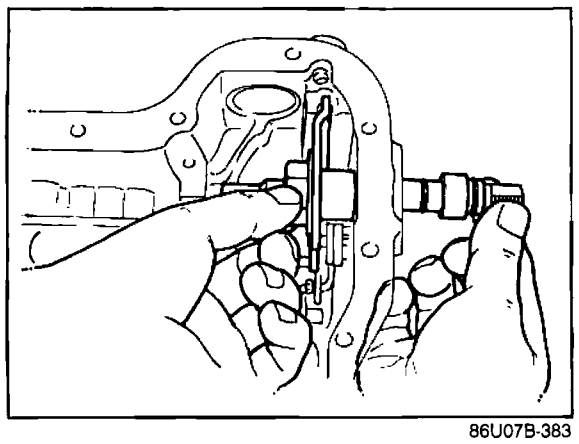
Procedure

1. Install the parking pawl.
   (1) Install the parking pawl and shaft.
   (2) Install the spring and snap ring.
   (3) Move the manual shaft and check that the parking pawl operates.



86U07B-382

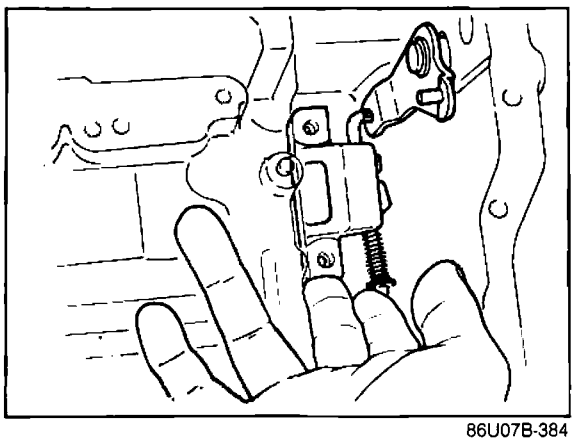
2. Install the parking assist lever and snap ring.



86U07B-383

3. Install the actuator support.

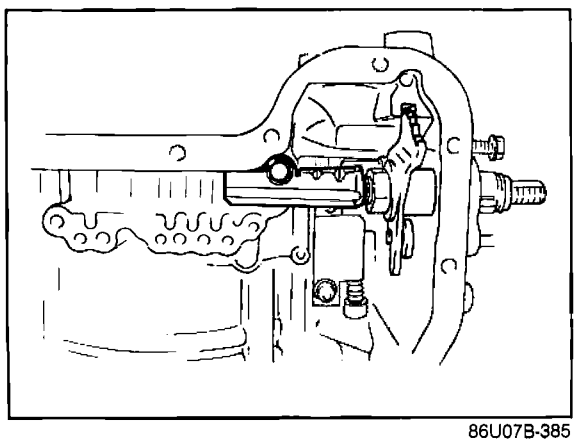
Tightening torque:
11—14 N·m (1.1—1.4 m-kg, 8.0—10 ft-lb)



86U07B-384

4. Install the manual shaft and manual plate.
   (1) Install the manual plate, spacer, washer, and nut.
   (2) Tighten the nut to specified torque.

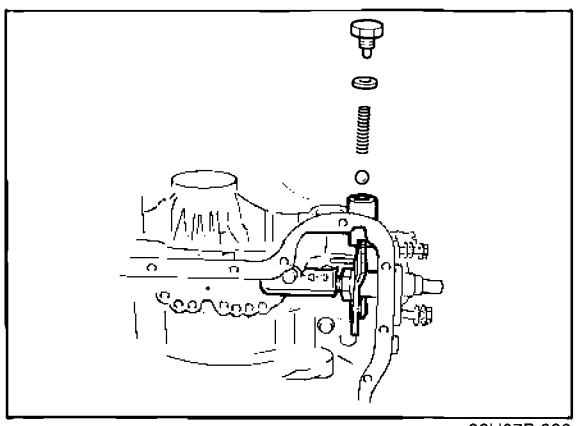
Tightening torque:
41—55 N·m (4.2—5.6 m-kg, 30—41 ft-lb)



86U07B-385

(3) Install the bracket.

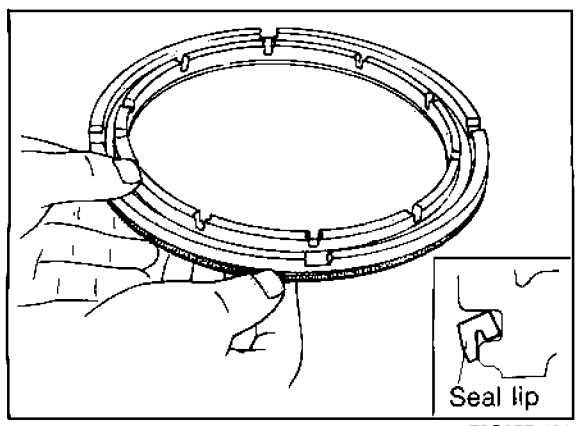
Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



86U07B-386

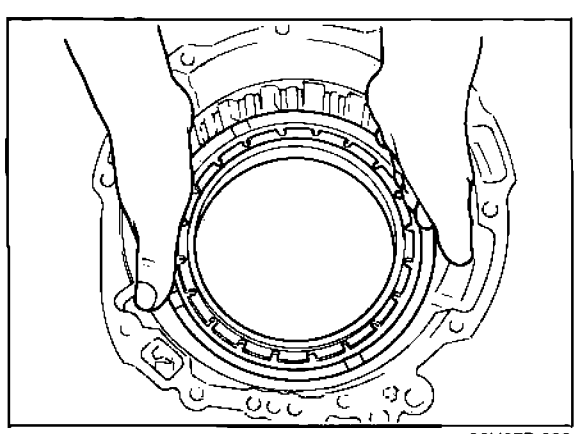
(4) Install the detent ball, spring, washer and plug; then tighten the plug.

Tightening torque:
12—18 N·m (1.2—1.8 m-kg, 8.7—13 ft-lb)



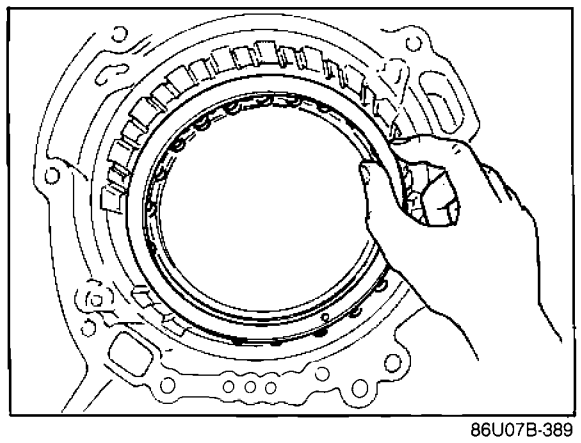
76G07B-181

5. Install the low and reverse brake piston.
   (1) Apply ATF to the inner and outer seals, and install them to the low and reverse brake piston.
   (2) Face the outer seal lip toward the inside by gently rolling it down around the circumference for easier installation into the case.



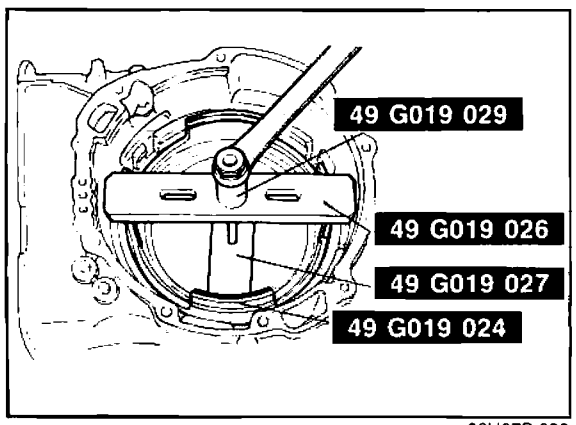
86U07B-388

(3) Install the low and reverse brake piston by pushing evenly around the circumference, being careful not to damage the outer seal.



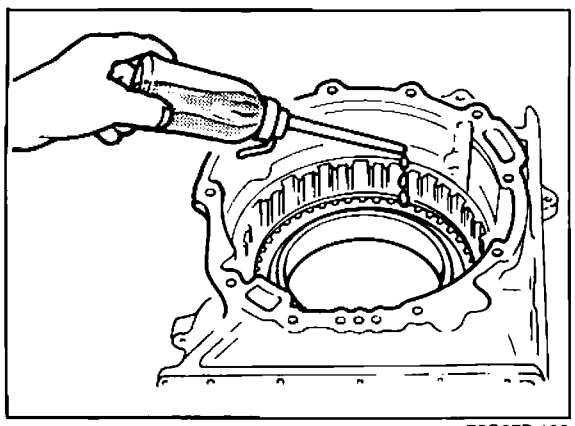
86U07B-389

(4) Install the spring and retainer assembly.



86U07B-390

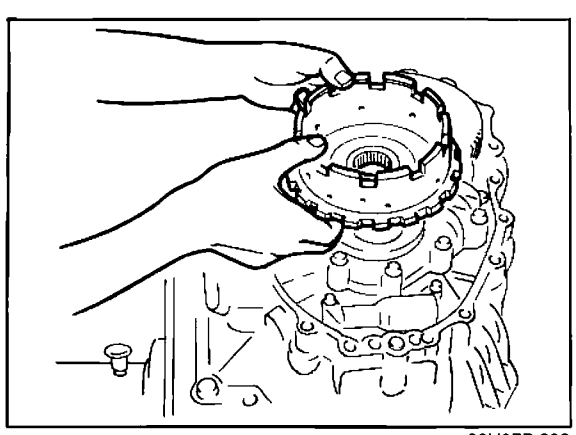
(5) Install the **SST** in the case.
(6) Compress the spring and retainer assembly.
(7) Install the snap ring with snap ring pliers.
(8) Remove the **SST**.



76G07B-182

6. Check the low and reverse brake piston operation.
   (1) Pour in ATF so that the low and reverse brake piston is fully submerged.
   (2) Check that no bubbles come from between the piston and seals when applying compressed air through the fluid passage. (Refer to page 7B—204)

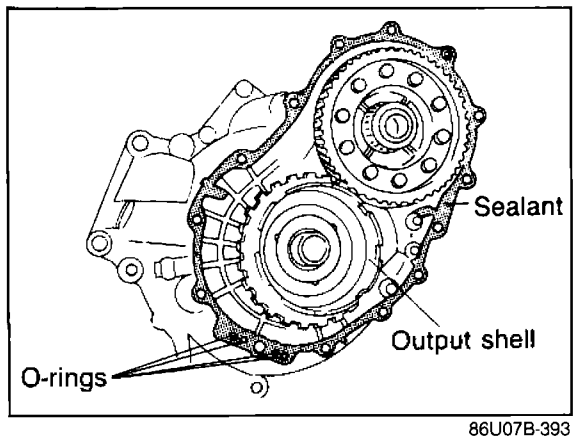
Caution
The compressed air must be under 392 kPa (4.0 kg/cm^2, 57 psi) and not applied for over 3 seconds.



86U07B-392

7. Install the output shell to the output gear, and install the bearing race onto the output shell.

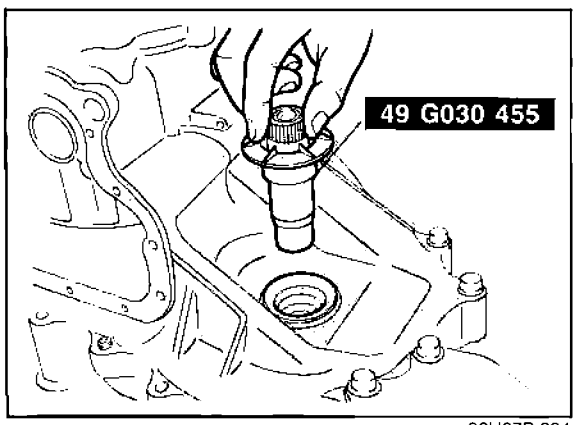
Bearing race outer diameter.
72.0 mm (2.83 in)



86U07B-393

8. Apply a thin coat of silicon sealant to the contact surfaces of the converter housing and transaxle case.
9. Install the O-rings.
10. Install the transaxle case to the converter housing.

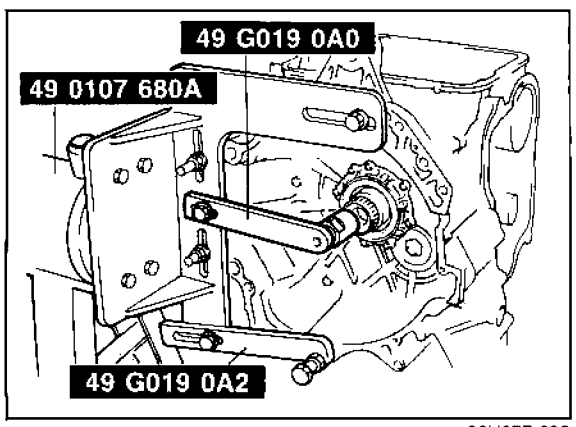
Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)



86U07B-394

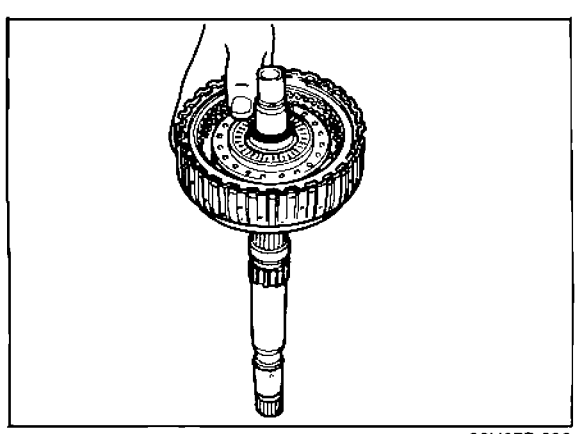
11. Install the **SST** to the differential side gear.

Caution
Failure to install the SST may allow the differential side gears to become mispositioned.



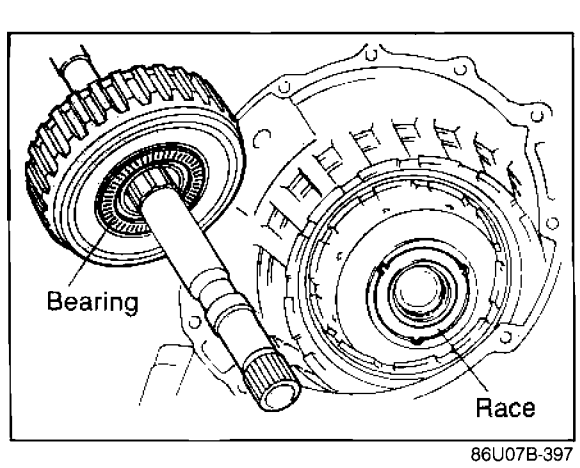
86U07B-395

ASSEMBLY-STEP 3
Procedure
1. Temporarily install the **SST** to hold the turbine shaft.

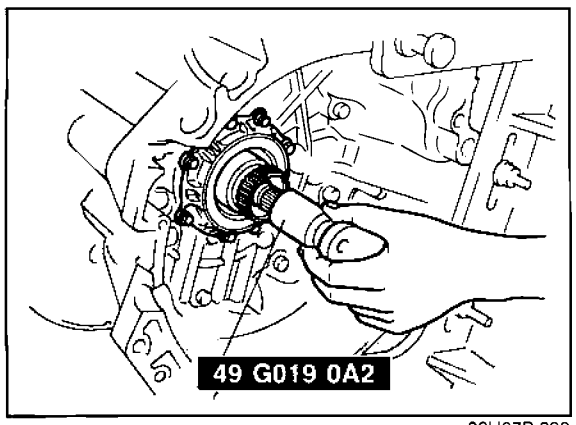


86U07B-396

2. Install the turbine shaft and 3-4 clutch assembly.
   (1) Assemble the turbine shaft and 3-4 clutch assembly.
   (2) Check that the thrust bearing and bearing race are installed in the correct position.
   (3) Install the turbine shaft and 3-4 clutch assembly into the transaxle case.

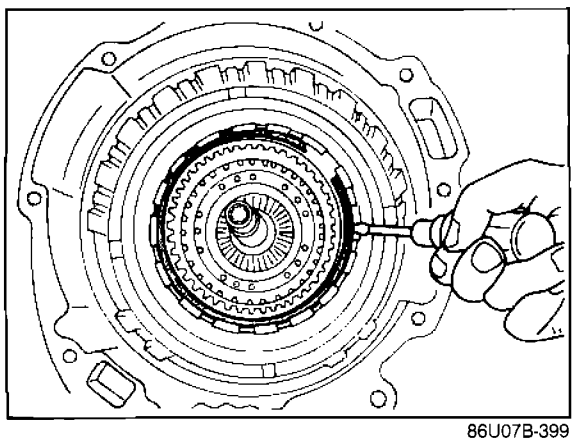


86U07B-397



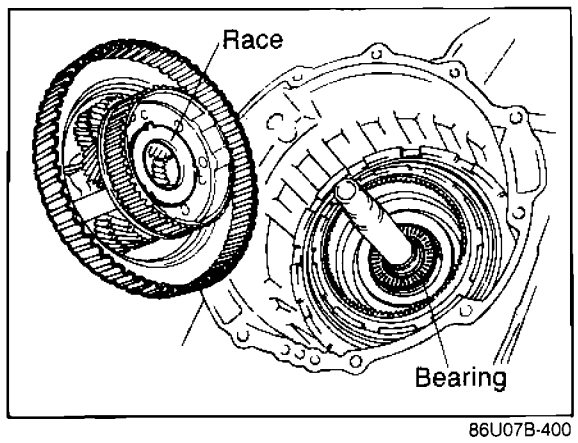
86U07B-398

3. Adjust the **SST** position so that it contacts and holds the turbine shaft.



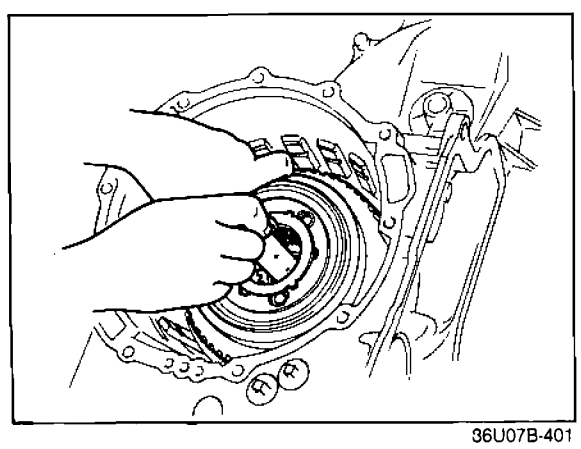
86U07B-399

4. Install the internal gear.
   (1) Install the internal gear to the 3-4 clutch drum.
   (2) Install the snap ring.



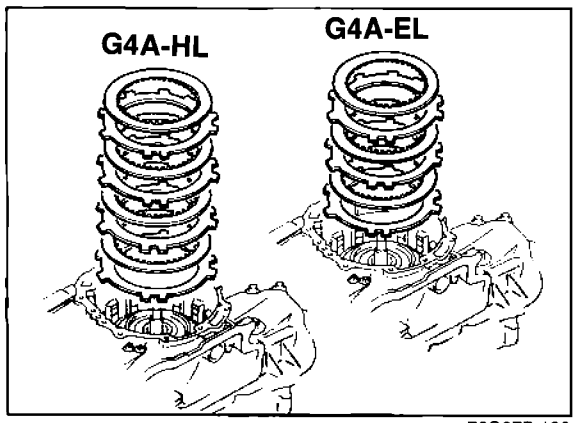
86U07B-400

5. Install the carrier hub assembly.
   (1) Check that the thrust bearing and bearing race are installed in the correct position.



36U07B-401

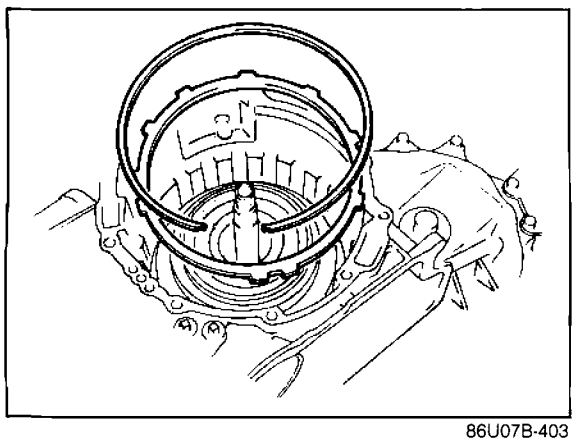
   (2) Hold the turbine shaft with one hand to prevent it from rotating.
   (3) Install the carrier hub assembly into the 3-4 clutch drum by rotating it.



76G07B-183

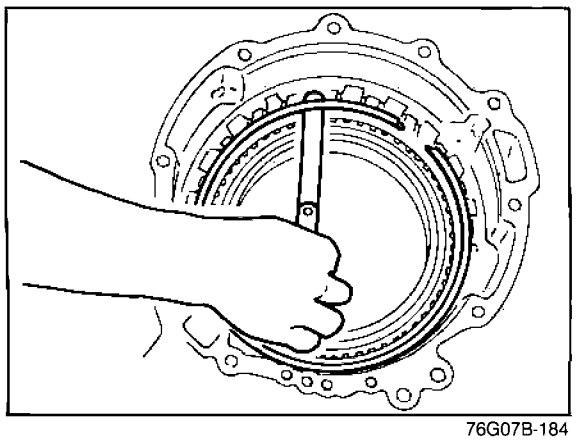
6. Install the drive and driven plates.

Note
Installation order:
G4A-EL
Driven-Drive-Driven-Drive-Driven-Drive
G4A-HL
Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive



86U07B-403

7. Install the retaining plate.
8. Install the snap ring.



76G07B-184

9. Check the low and reverse brake clearance.
   (1) Measure the clearance between the snap ring and the low and reverse brake retaining plate.
   (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

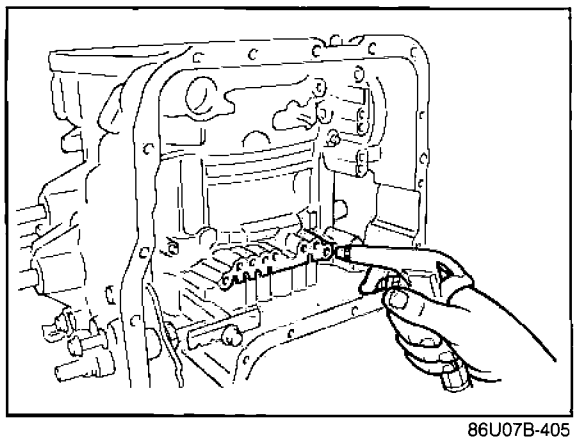
Low and reverse brake clearance:
2.1—2.4 mm (0.083—0.094 in)

Retaining plate sizes mm (in)
G4A-EL

10.0 (0.394)	10.2 (0.402)	10.4 (0.410)
10.6 (0.417)	10.8 (0.425)	

G4A-HL

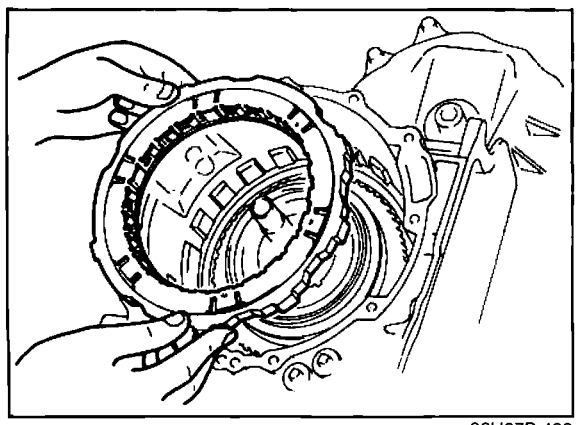
6.8 (0.268)	7.0 (0.276)	7.2 (0.283)
7.4 (0.291)	7.6 (0.299)	7.8 (0.307)



86U07B-405

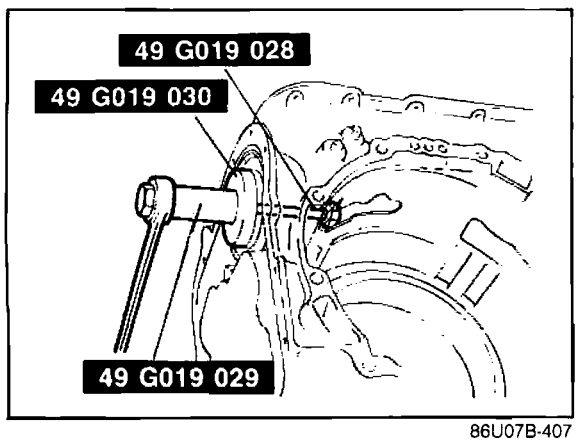
10. Check the low and reverse brake operation by applying compressed air through the fluid passage as shown in the figure.

Air pressure:
392 kPa (4.0 kg/cm^2, 57 psi)



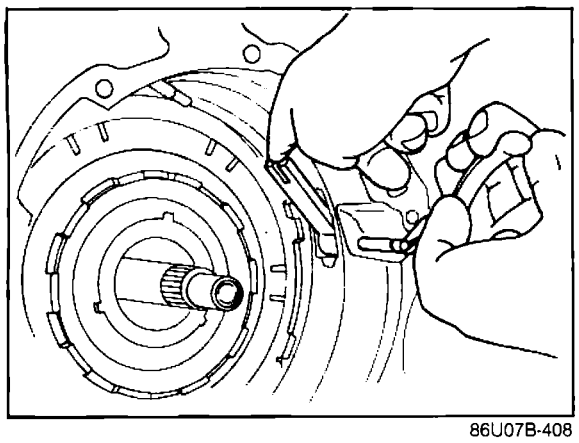
86U07B-406

11. Install the one-way clutch.
    (1) Hold the one-way clutch horizontally.
    (2) Install it by turning the carrier hub assembly counterclockwise.
    (3) Install the snap ring.



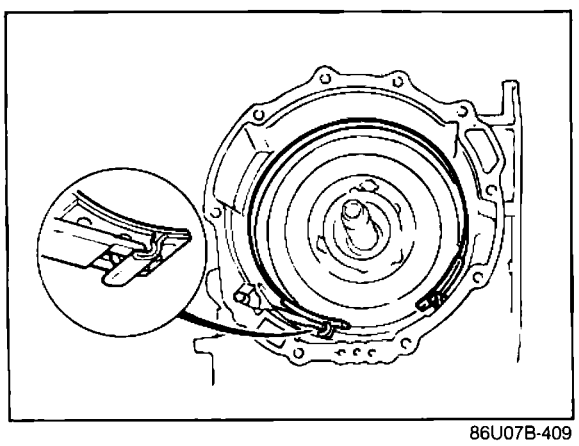
86U07B-407

12. Install the servo to the transaxle case.
    (1) Install the servo spring and servo.
    (2) Compress the servo with the **SST**.
    (3) Install the snap ring.
    (4) Remove the **SST**.
    (5) Install the piston stem.



86U07B-408

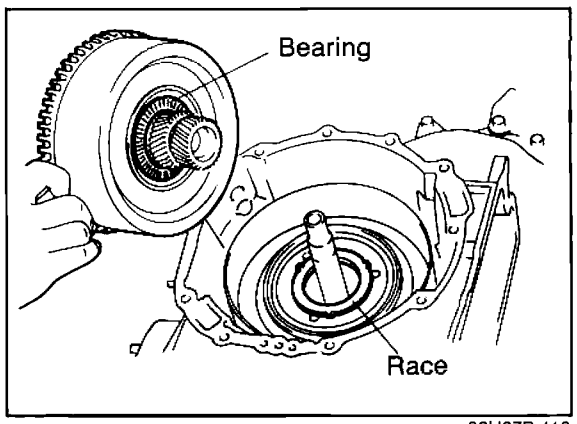
13. Install the anchor strut.



86U07B-409

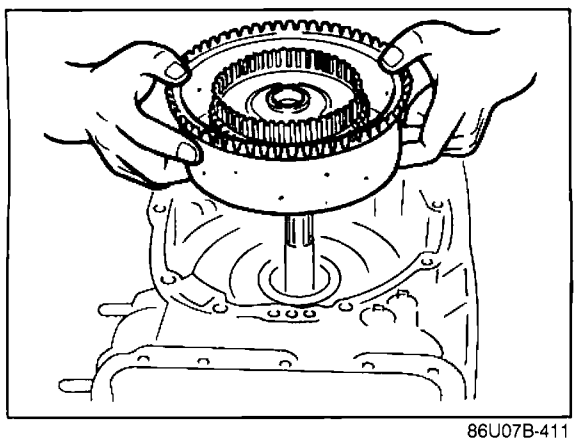
14. Install the 2-4 brake band in the transaxle case so that it is expanded fully.

Note
Interlock the 2-4 brake band and anchor strut as shown.



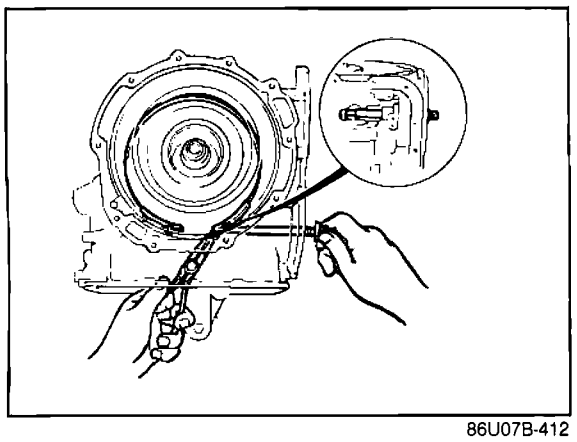
86U07B-410

15. Install the small sun gear and one-way clutch.
    (1) Check that the thrust bearing and bearing race are installed in the correct position.



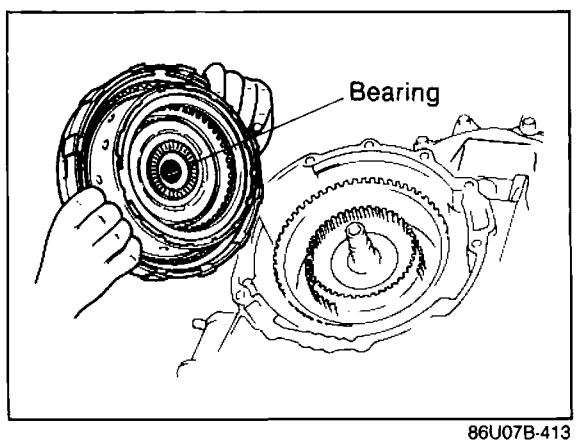
86U07B-411

    (2) Install the small sun gear and one-way clutch by rotating it.



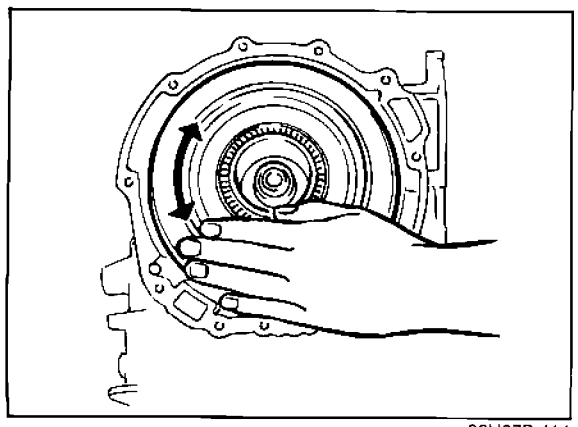
86U07B-412

16. Install the piston stem in the position while pulling out the 2-4 brake band with a pliers; then loosely tighten the piston stem by hand.



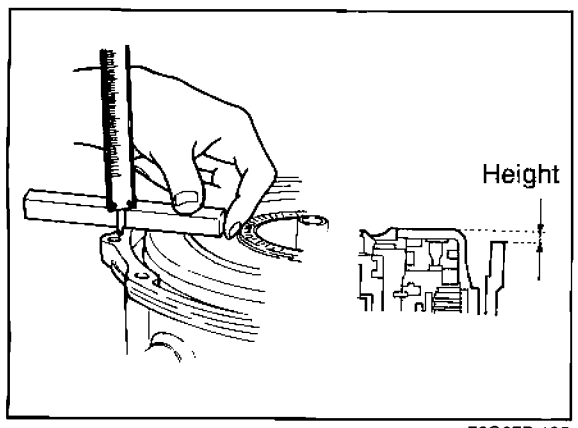
86U07B-413

17. Install the clutch assembly.
    (1) Check that the thrust bearing is installed in the correct position.



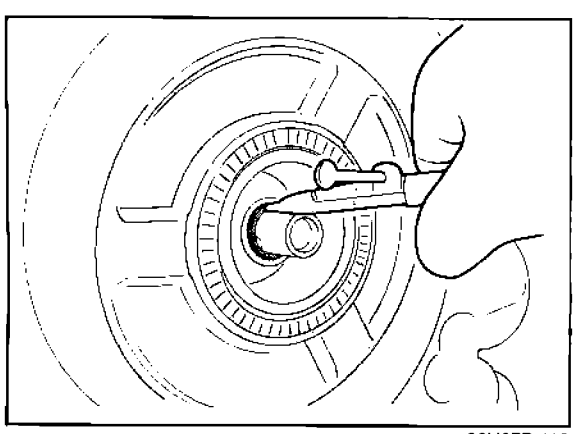
86U07B-414

(2) Install the clutch assembly by rotating it.



76G07B-185

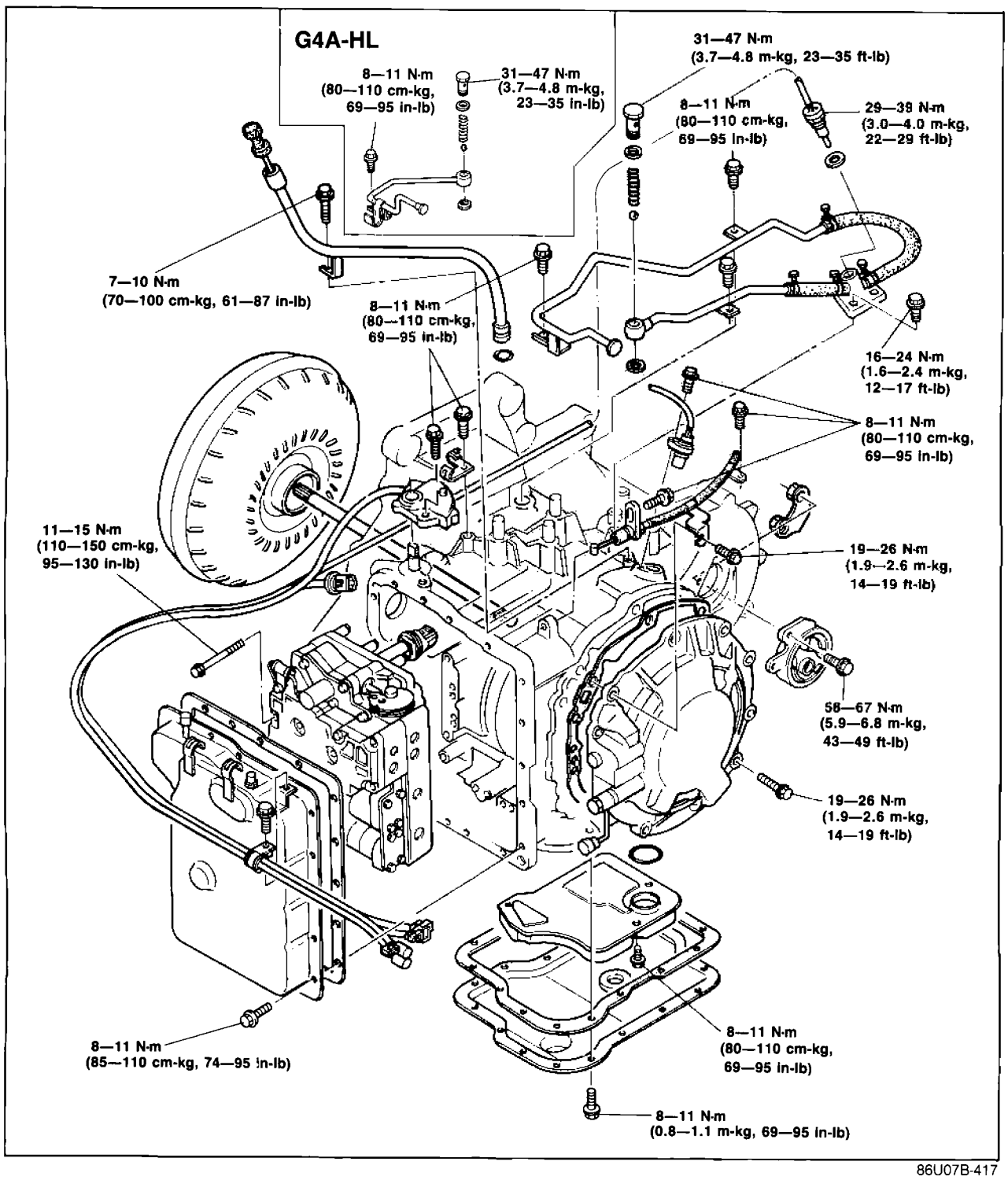
Note
Measure the height difference between the reverse and forward drum and transaxle case.
Standard height: 0.8 mm (0.032 in)



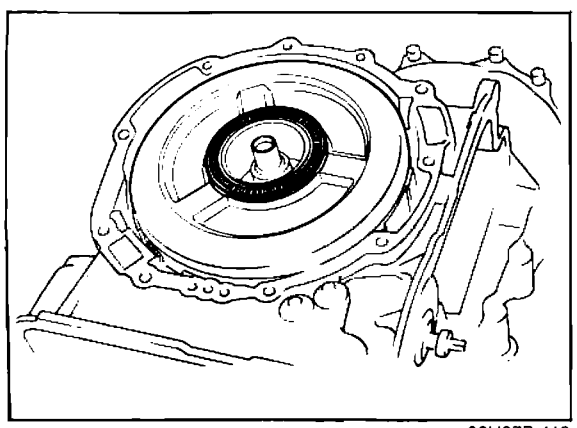
86U07B-416

17. Install the snap ring into the bottom ring groove of the turbine shaft.

ASSEMBLY-STEP 4
Torque Specifications



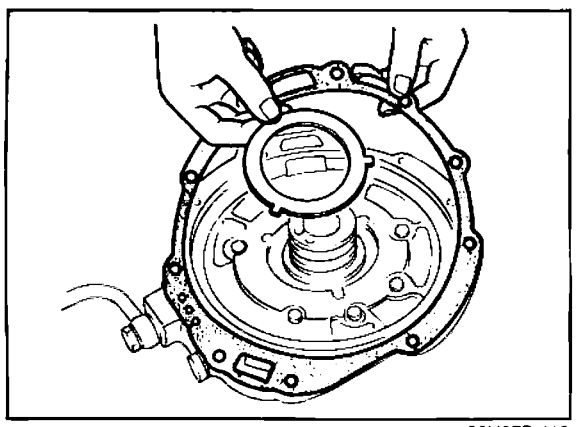
86U07B-417



86U07B-418

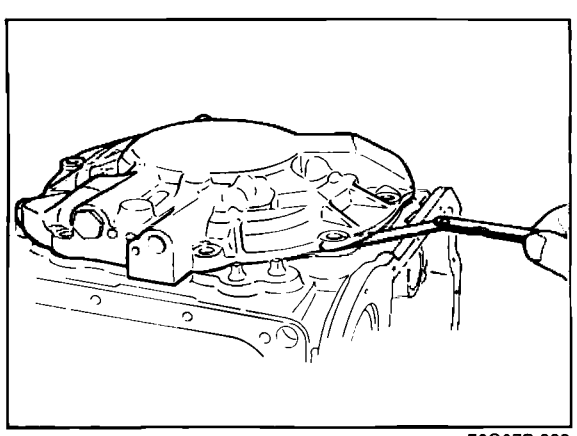
Procedure

1. Use the following procedure to adjust the total end play and select a suitable bearing race.
   (1) Set the thrust bearing onto the clutch assembly.



86U07B-419

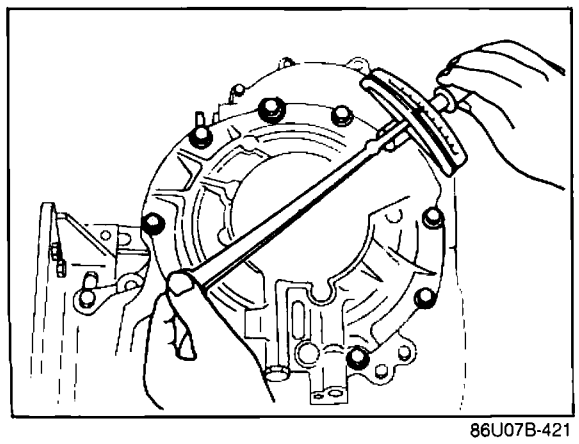
(2) Remove the previous race and gasket.
(3) Set the thickest bearing race **2.2 mm (0.087 in)** onto the oil pump.
(4) Set the oil pump onto the clutch assembly.



76G07B-223

(5) Measure clearance between the transaxle case and oil pump.
(6) Select a suitable bearing race from the chart below.

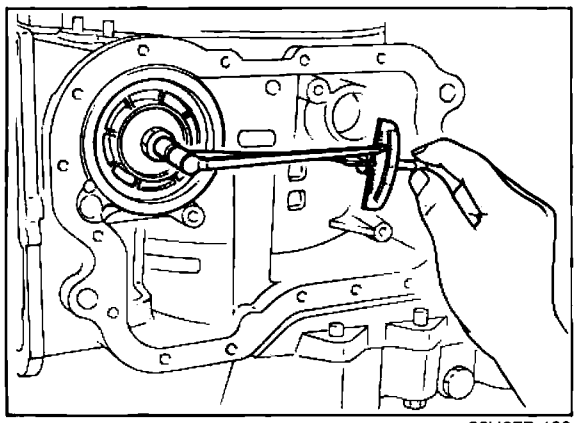
Clearance mm (in)	Select this bearing race mm (in)
0.91—1.10 (0.036—0.043)	1.2 (0.047)
0.71—0.90 (0.028—0.035)	1.4 (0.055)
0.51—0.70 (0.020—0.027)	1.6 (0.063)
0.31—0.50 (0.012—0.019)	1.8 (0.071)
0.11—0.30 (0.004—0.011)	2.0 (0.078)
0—0.10 (0—0.003)	2.2 (0.087)



86U07B-421

(7) Remove the oil pump.
(8) Place the selected bearing race and a new gasket onto the oil pump.
(9) Install the oil pump onto the clutch assembly.

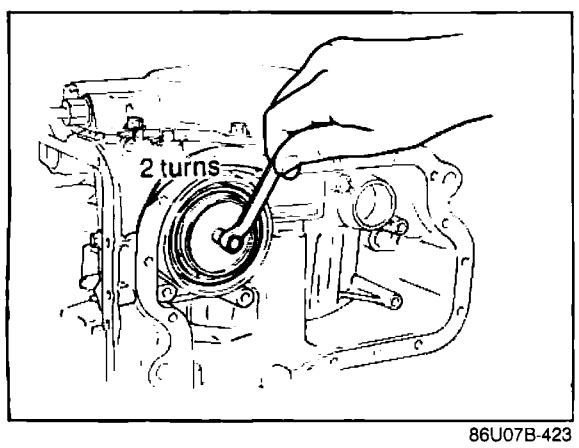
Tightening torque:
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



86U07B-422

2. Adjust the 2-4 brake band.
   (1) Loosen the locknut and tighten the piston stem to the specified torque.

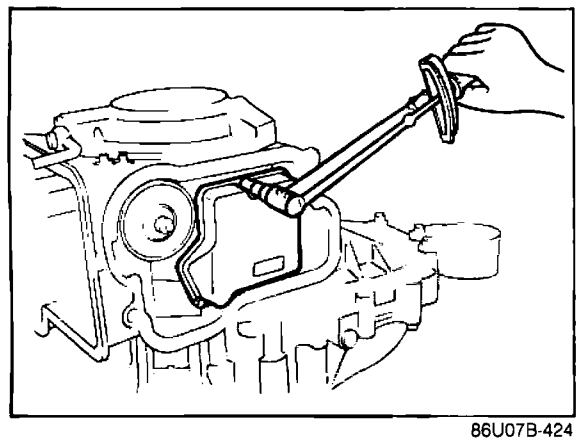
Tightening torque:
9—11 N·m (90—110 cm-kg, 78—95 in-lb)



86U07B-423

   (2) Loosen the piston stem 2 turns.
   (3) Tighten the locknut to the specified torque.

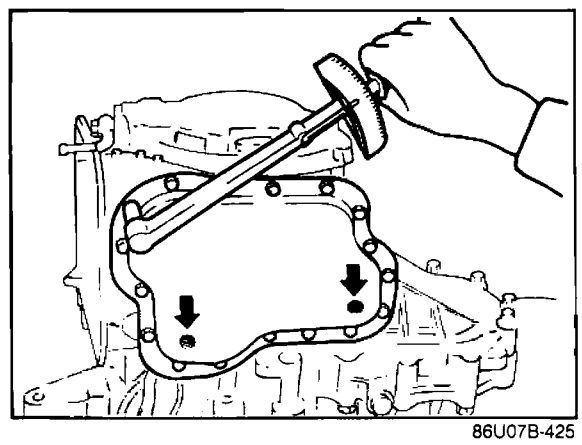
Tightening torque:
25—39 N·m (2.5—4.0 m-kg, 18—29 tt-lb)



86U07B-424

3. Install the oil strainer along with a new O-ring to the transaxle.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

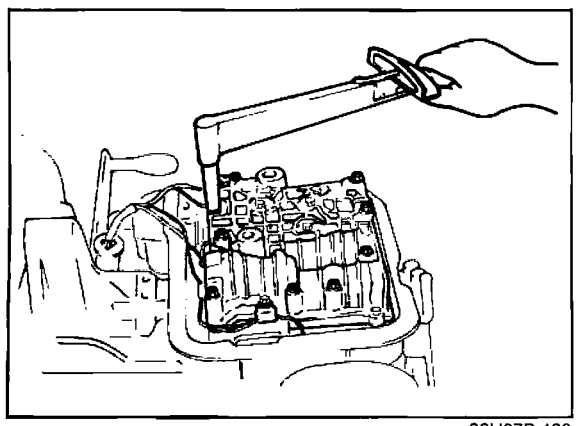


86U07B-425

4. Install the oil pan along with a new gasket.

Tightening torque:
8—11 N·m (85—110 cm-kg, 74—95 in-lb)

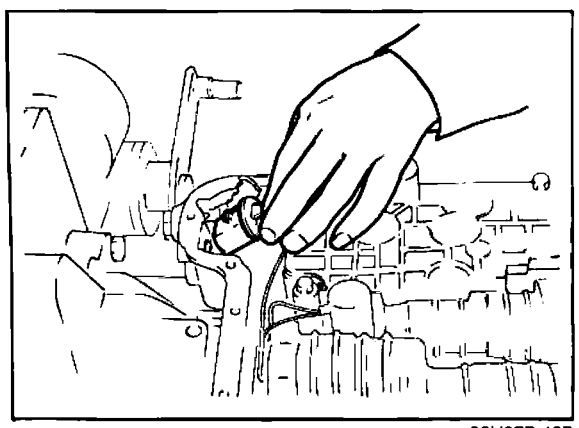
Note
Install the magnets in the positions shown in the illustration.



86U07B-426

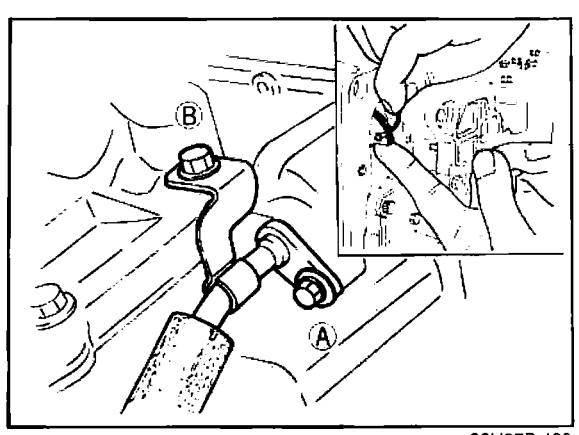
5. Align the manual valve with the pin on the manual plate, and install the control valve body into the transaxle case.

Tightening torque:
11—15 N·m
(110—150 cm-kg, 95—130 in-lb)



86U07B-427

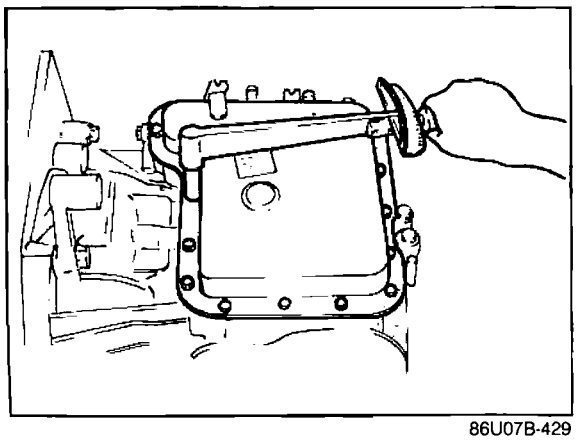
6. Install the solenoid connector and a new O-ring in the transaxle case.



86U07B-428

7. Install a new O-ring on the bracket; then feed the throttle cable through the transaxle case and connect it to the throttle cam.
8. Install the throttle cable attaching bolts and bracket.

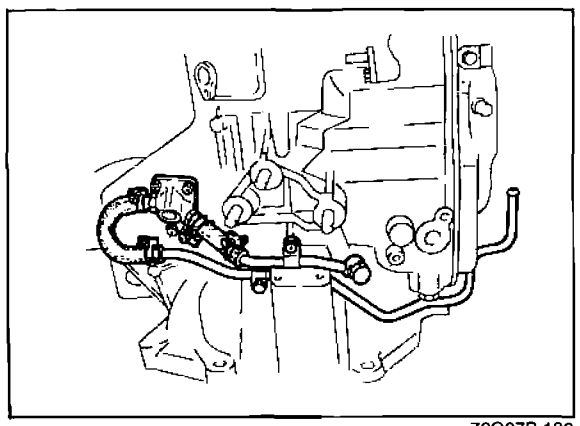
Tightening torque:
Ⓐ 8—11 N·m
(80—110 cm-kg, 69—95 in-lb)
Ⓑ 19—26 N·m
(1.9—2.6 m-kg, 14—19 ft-lb)



86U07B-429

9. Install the control valve body cover along with a new gasket.

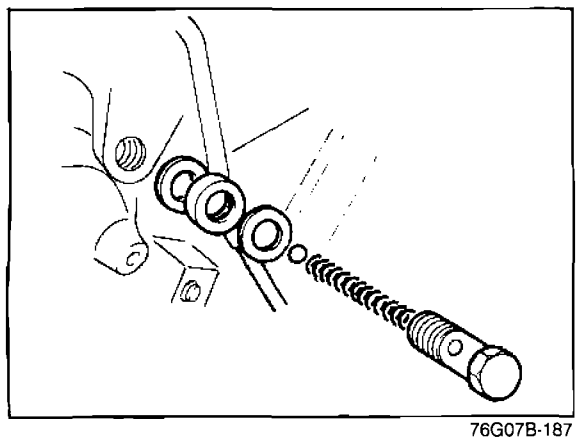
Tightening torque:
8—11 N·m (85—110 cm-kg, 74—95 in-lb)



76G07B-186

10. **G4A-EL**
    (1) Install the oil pipes, oil hoses, and switch box as an assembly; then install the harness clip.

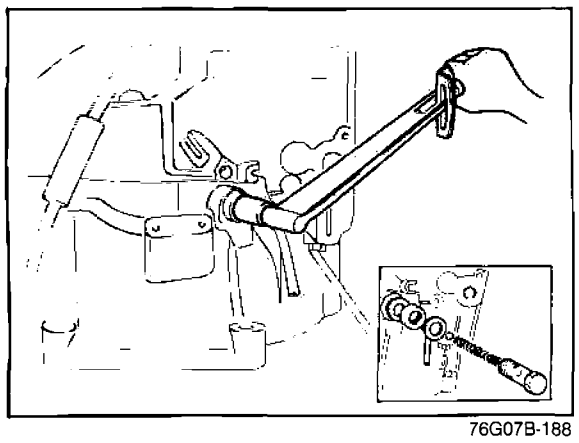
Tightening torque:
Switch box
16—24 N·m (1.6—2.4 m-kg, 12—17 ft-lb)
Harness clip
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



76G07B-187

(2) Install the ball, spring, gasket, and a plug.

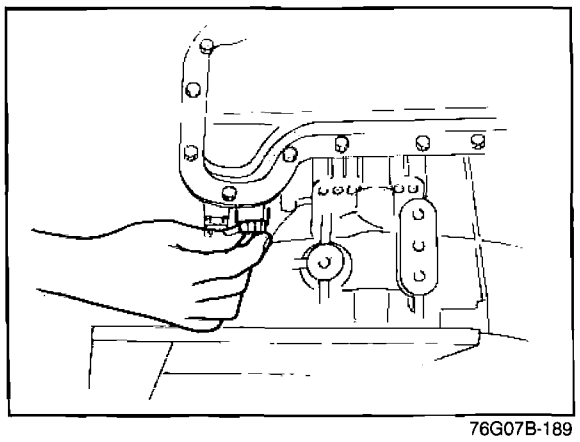
Tightening torque:
31—47 N·m (3.2—4.8 m-kg, 23—35 ft-lb)



76G07B-188

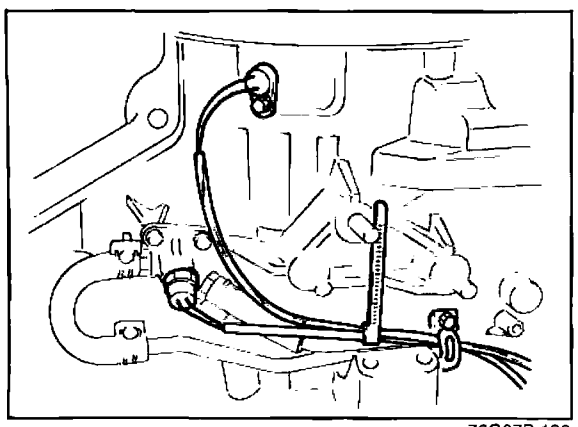
G4A-HL
Install the oil pipe, ball, spring, oil pipe, gasket, and plug.

Tightening torque: 31—47 N·m
(3.2—4.8 m-kg, 23—35 ft-lb)



76G07B-189

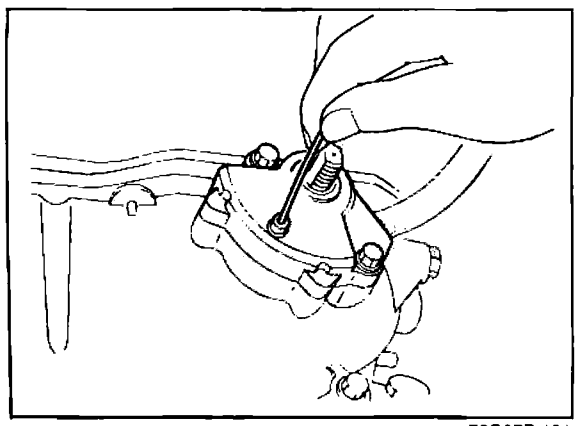
11. Install the solenoid connector.



76G07B-190

12. Install the pulse generator and fluid temperature switch.

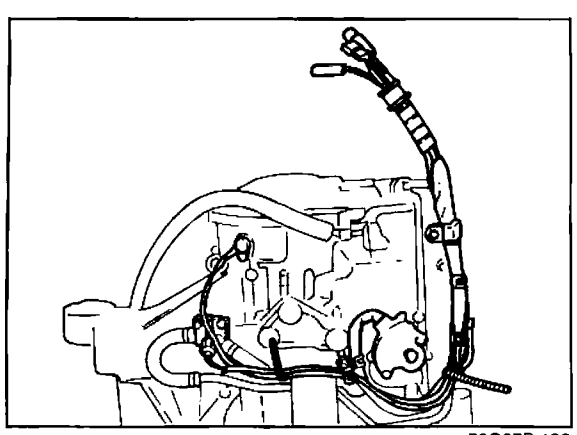
Tightening torque:
Pulse generator
8—11 N·m (80—110 cm-kg, 69—95 in-lb)
Fluid temperature switch
29—39 N·m (3.0—4.0 m-kg, 22—29 in-lb)



76G07B-191

13. Install the inhibitor switch.
    (1) Turn the manual shaft to the "N" position.
    (2) Install the inhibitor switch and loosely tighten the bolts.
    (3) Remove the screw and move the inhibitor switch so that the alignment hole is aligned with the screw hole.
    (4) Insert a **2.0 mm (0.079 in)** diameter pin through the holes.
    (5) Install the screw; then tighten the bolts to the specified torque.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

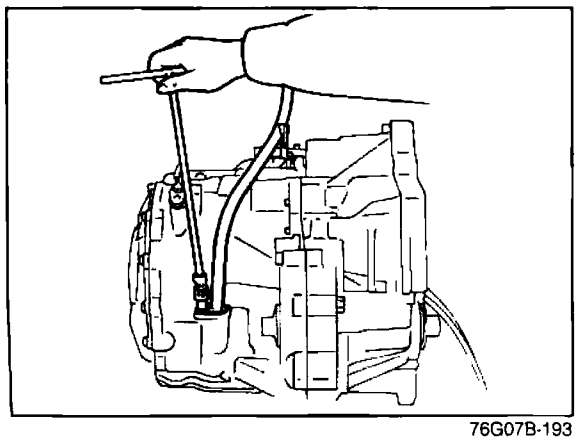


76G07B-192

14. Install the harness with the remaining clip.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

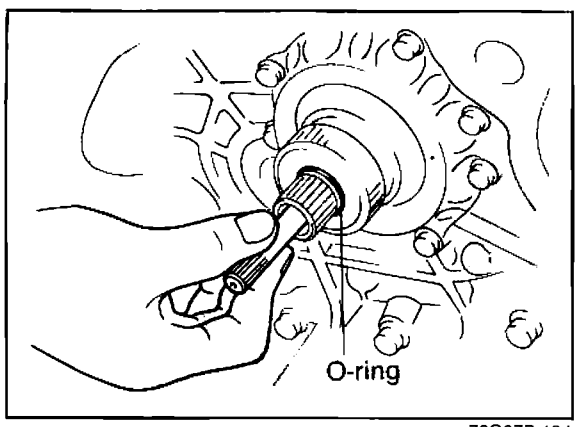
15. Remove the transaxle from the **SST**.



76G07B-193

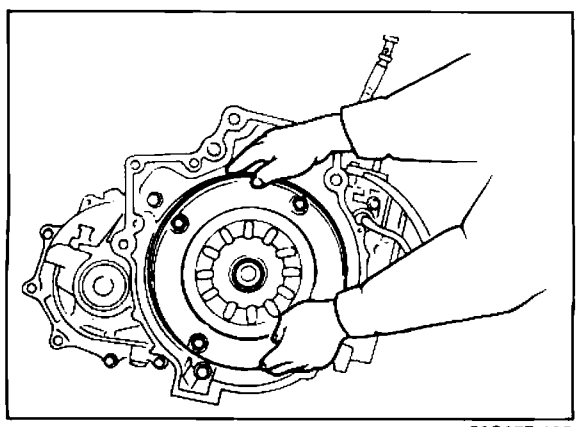
16. Install the oil level gauge and tube along with a new O-ring to the transaxle case.

Tightening torque:
7—10 N·m (70—100 cm-kg, 61—87 in-lb)



76G07B-194

17. Install the oil pump shaft.
18. Install a new O-ring onto the turbine shaft.



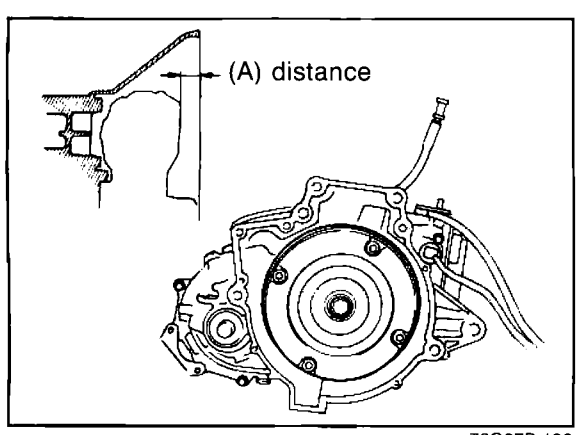
76G07B-195

19. Fill the torque converter with ATF if it has been drained and washed.

ATF type: Dexron II or M III

20. Install the torque converter in the converter housing while rotating it to align the splines.

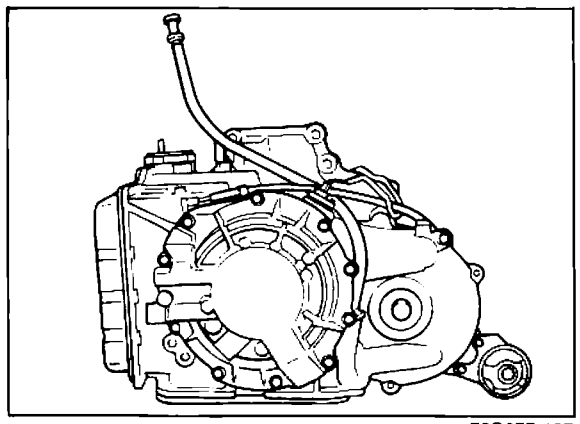
Caution
a) Hold the torque converter in an erect position when filling it with ATF, do not allow the fluid to overflow.
b) If the converter does not fit in easily, do not try to force it; install carefully.



76G07B-196

21. To ensure that the torque converter is installed accurately, measure distance A between the end of the torque converter and the end of the converter housing.

(A): approx. 25 mm (0.98 in)



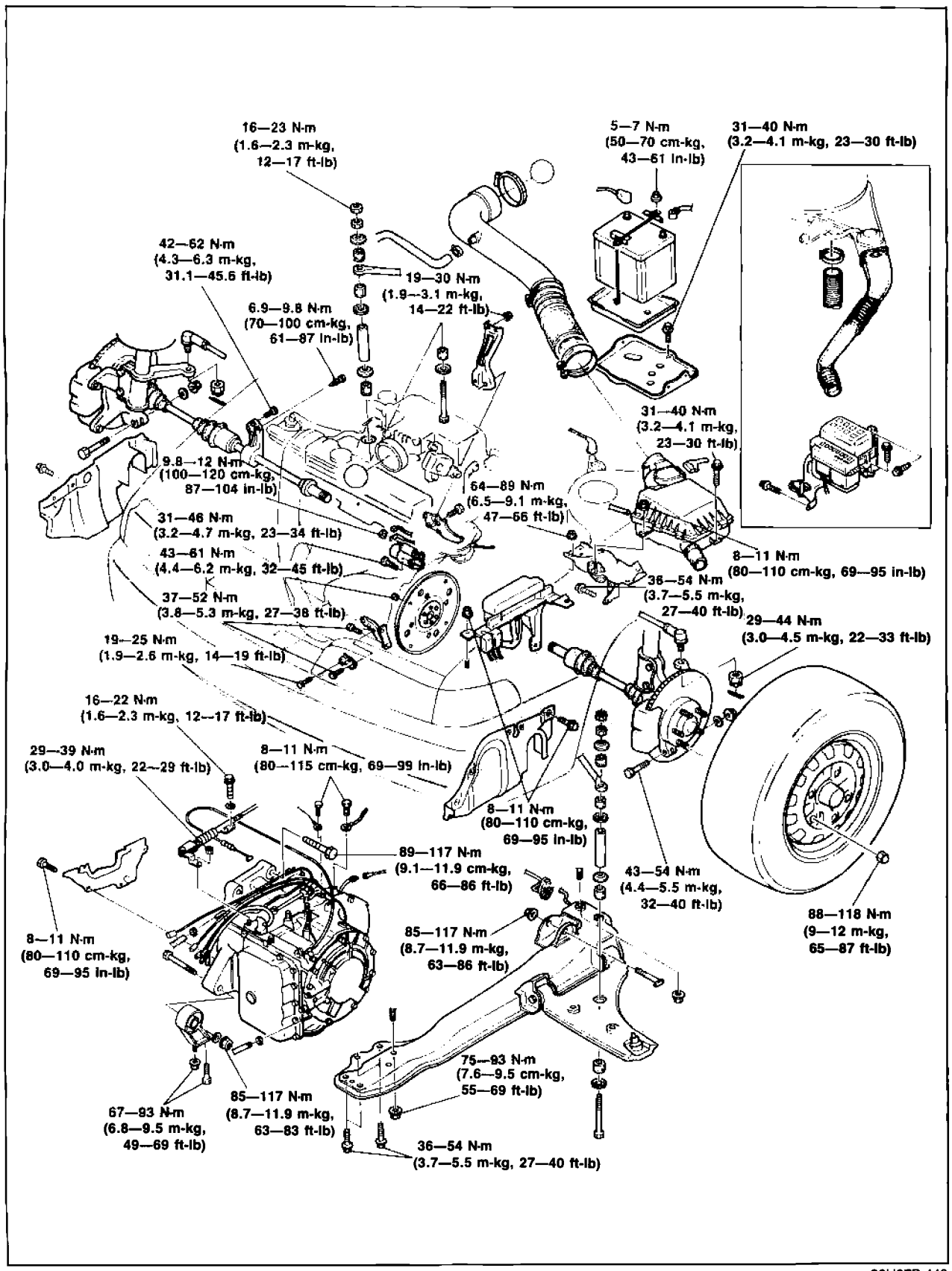
76G07B-197

22. Install the engine mount No.1

Tightening torque:
58—67 N·m (5.9—6.8 m-kg, 43—49 ft-lb)

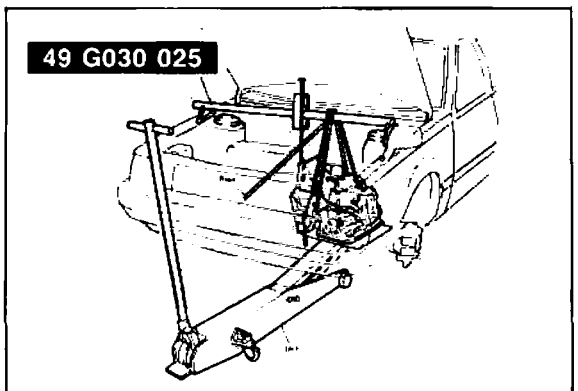
INSTALLATION

TORQUE SPECIFICATIONS



86U07B-440

7B INSTALLATION

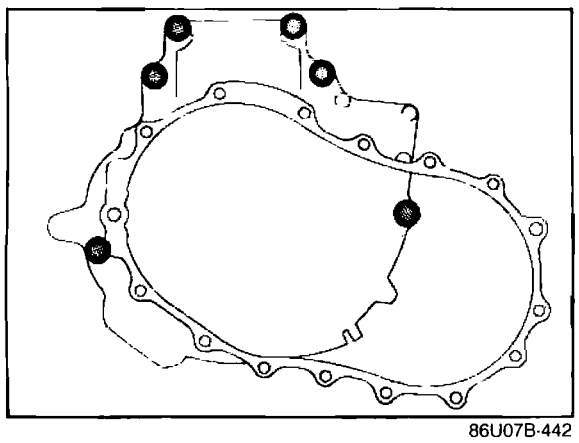


86U07B-441

1. Attach rope at 2 places on the transaxle. Place a flat board on a jack and set the transaxle on it.

   Caution
   The transaxle is not well balanced; be careful when positioning it on the jack.

2. Move the transaxle into place and attach the rope to the **SST**.

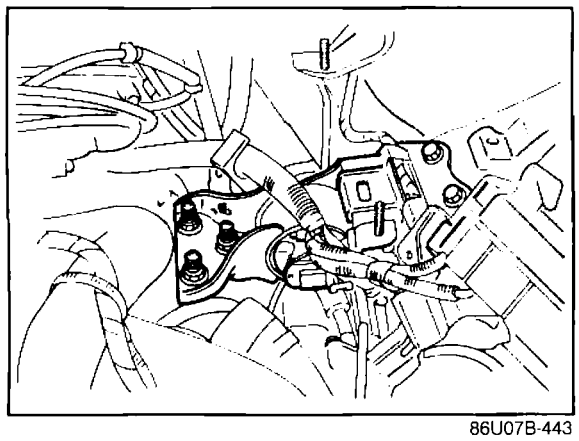


86U07B-442

3. Mount the transaxle to the engine.

   Tightening torque:
   89—117 N·m (9.1—11.9 m-kg, 66—86 ft-lb)

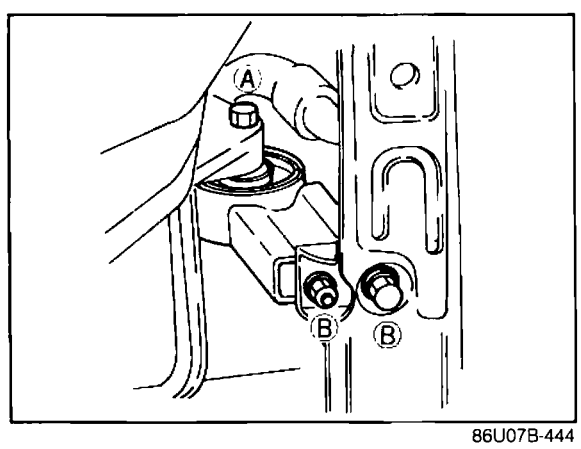
   Note
   a) Lift the transaxle with the jack while pulling the rope.
   b) Align the torque converter bolts and drive plate holes.



86U07B-443

4. Install engine mount No. 4 and bracket.

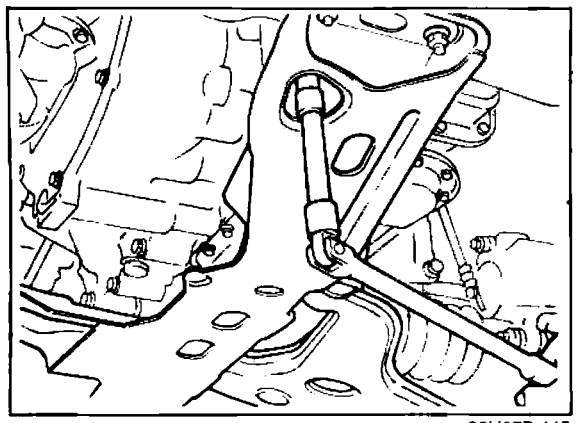
   Tightening torque:
   Bolt
   36—54 N·m (3.7—5.5 m-kg, 27—40 ft-lb)
   Nut
   64—89 N·m (6.5—9.1 m-kg, 47—66 ft-lb)



86U07B-444

5. Install engine mount No. 2.

   Tightening torque:
   Ⓐ 85—117 N·m
   (8.7—11.9 m-kg, 63—86 ft-lb)
   Ⓑ 67—93 N·m
   (6.8—9.5 m-kg, 49—69 ft-lb)

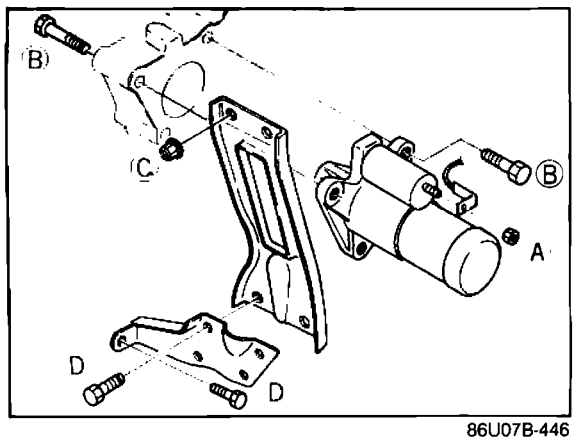


86U07B-445

6. Install the crossmember and the left side lower arm as an assembly.

Tightening torque:
Bolt
36—54 N·m (3.7—5.5 m-kg, 27—40 ft-lb)
Nut
75—93 N·m (7.6—9.5 m-kg, 55—69 ft-lb)

7. Install the jack and the rope.
8. Remove the **SST**.



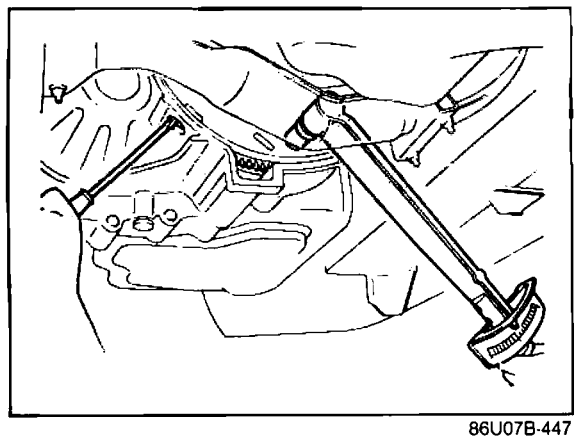
86U07B-446

9. Install the starter and harnesses.

Tightening torque:
Ⓐ 9.8—12 N·m
(100—120 cm-kg, 87—104 in-lb)
Ⓑ 31—46 N·m
(3.2—4.7 m-kg, 23—34 ft-lb)

10. Install the manifold bracket.

Tightening torque:
Ⓒ 19—30 N·m
(1.9—3.1 m-kg, 14—22 ft-lb)
Ⓓ 37—52 N·m
(3.8—5.3 m-kg, 27—38 ft-lb)



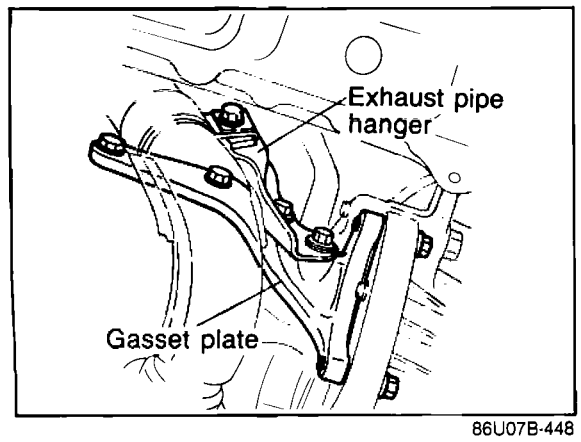
86U07B-447

11. Install the torque converter nuts.

Tightening torque:
43—61 N·m (4.4—6.2 m-kg, 32—45 ft-lb)

12. Install the end plate.

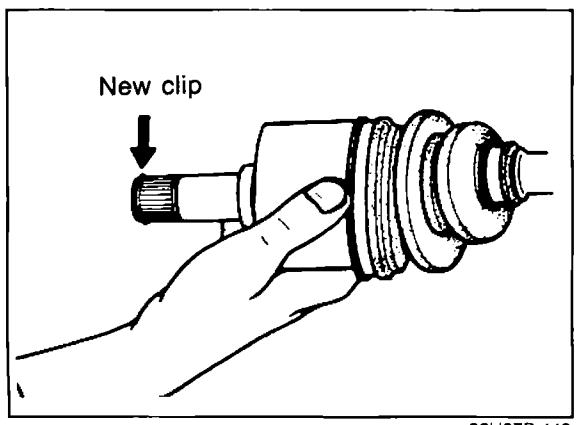
Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



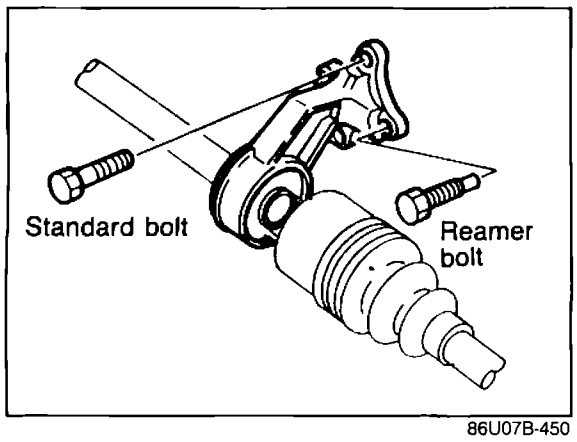
86U07B-448

13. Install the gusset plates and exhaust pipe hanger.

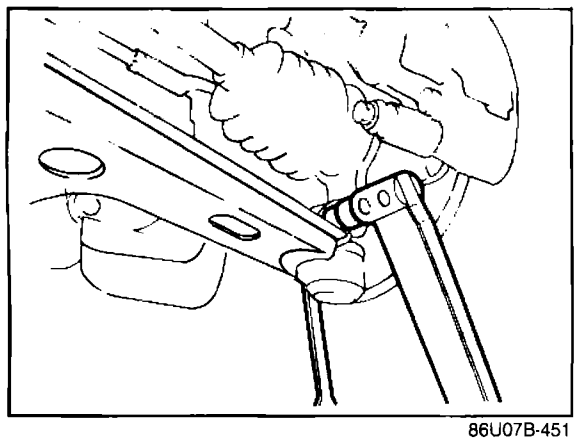
Tightening torque:
Gasset plate
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)
Exhaust pipe hanger
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



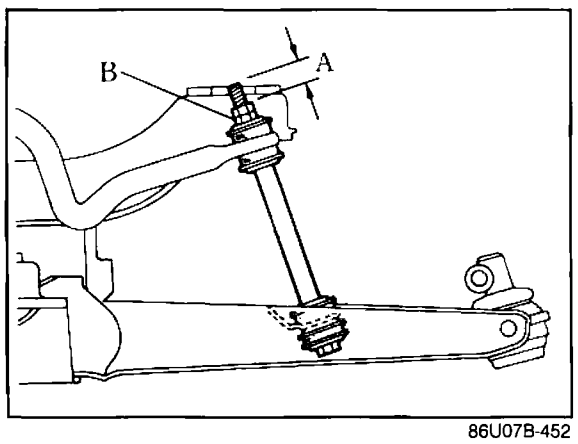
86U07B-449



86U07B-450



86U07B-451



86U07B-452

14. Replace the clips at the end of the driveshaft and joint shaft with new ones.
15. Install the joint shaft and right driveshaft as follows:
    (1) Remove the **SST** and insert the joint shaft into the transaxle.
    (2) Mount the joint shaft bracket onto the engine.
    (3) Install and tighten the reamer bolts; then install and tighten the standard bolts.

Tightening torque:
Reamer bolts 6.9—9.8 N·m (70—100 cm-kg, 61—87 in-lb)
Standard bolts 42—62 N·m (4.3—6.3 m-kg, 31.1—45.6 ft-lb)

    (4) Pull the front hub outward to connect the driveshaft to the joint shaft.
    (5) Push the joint from the differential side to securely connect the driveshaft to the joint shaft.

Caution
a) Do not damage the oil seal.
b) After installation, pull the front hub outward to verify that the driveshaft does not come.

16. Install the left driveshaft as follows:
    (1) Pull the front hub outward to insert the driveshaft into the transaxle.
    (2) Push the joint from the differential side to connect the driveshaft to the differential side gear.

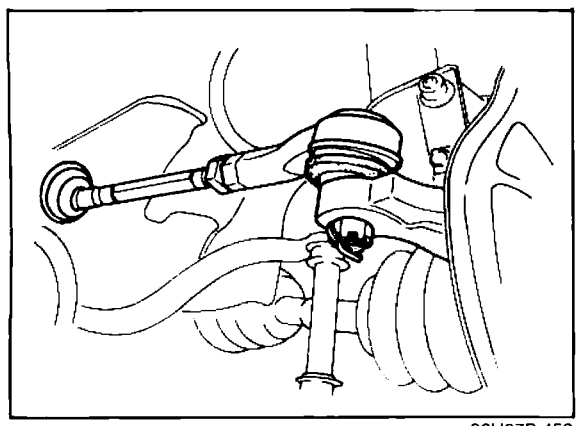
Caution
a) Do not damage the oil seal.
b) After installation, pull the front hub outward to verify that the driveshaft does not come out.

17. Install the lower arm ball joints to the knuckles and tighten the bolts and nuts.

Tightening torque:
43—54 N·m (4.4—5.5 m-kg, 32—40 ft-lb)

18. Install the undercover.
19. Install the stabilizer bar control link as follows:
    (1) Install the stabilizer bar control link.
    (2) Adjust protrusion A to **20.1 mm (0.79 in)**.
    (3) Tighten bolt B to the specified torque.

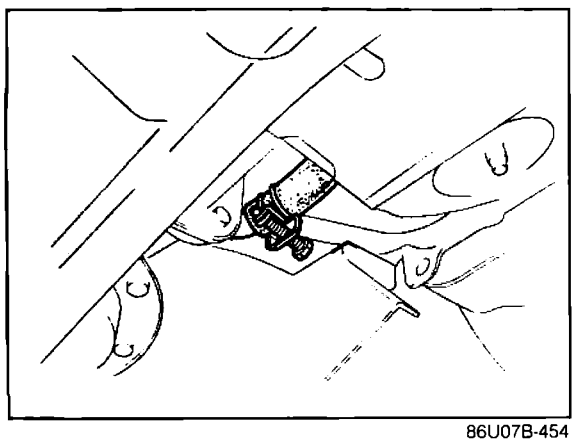
Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)



86U07B-453

20. Install the tie-rod ends and cotter pins.

Tightening torque:
29—44 N·m (3.0—4.5 m-kg, 22—33 ft-lb)



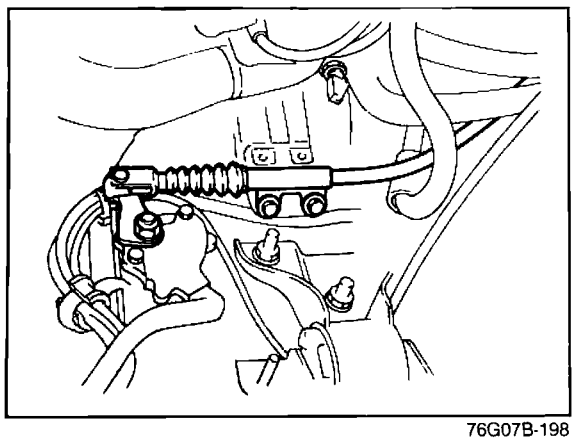
86U07B-454

21. Install the oil cooler outlet and inlet hoses.
22. Install the splash shields.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

23. Install the front wheels.

Tightening torque:
88—118 N·m (9—12 m-kg, 65—87 ft-lb)



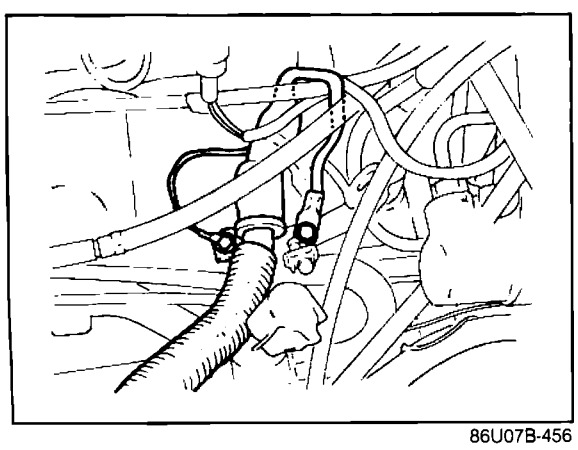
76G07B-198

24. Connect the throttle cable.

Note
Adjust the throttle cable with the oil pressure test. (Refer to page 7B—75, 76)

25. Connect the selector cable.

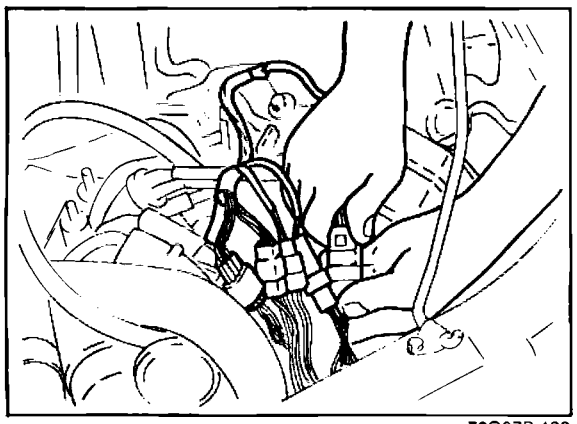
Tightening torque:
Nut
29—39 N·m (3.0—4.0 m-kg, 22—29 ft-lb)
Bolts
16—22 N·m (1.6—2.3 m-kg, 12—17 ft-lb)



86U07B-456

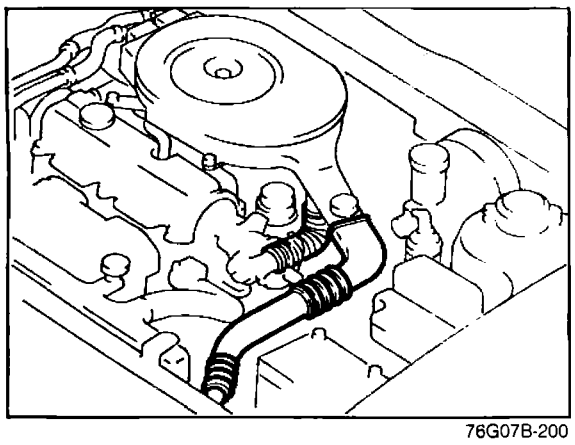
26. Connect the ground wires to the transaxle case.

Tightening torque:
8—11 N·m (80—115 cm-kg, 69—99 in-lb)



76G07B-199

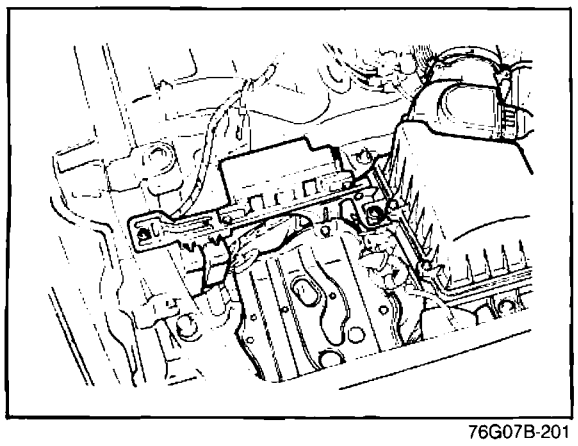
27. Connect the connectors as follows:
    (1) Inhibitor switch
    (2) Solenoid valve
    (3) Pulse generator (G4A-EL)
    (4) Fluid temperature switch (G4A-EL)
28. Connect the speedometer cable.



76G07B-200

29. Install the fresh air duct. (G4A-HL)
30. Install the air cleaner hose. (G4A-EL)
31. Install the air cleaner assembly; then connect the air flow meter connector and inlet hose. (G4A-EL)

Tightening torque:
Bolt
31—40 N·m (3.2—4.1 m-kg, 23—30 in-lb)
Nut
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



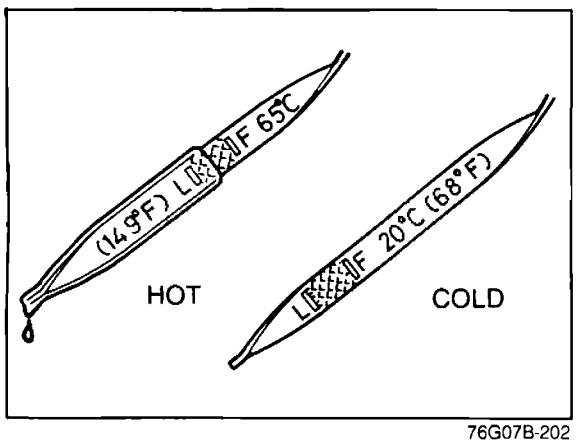
76G07B-201

32. Connect the distributor lead.
33. Install the main fuse block.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

34. Install the battery carrier and battery.

Tightening torque:
31—40 N·m (3.2—4.1 m-kg, 23—30 in-lb)

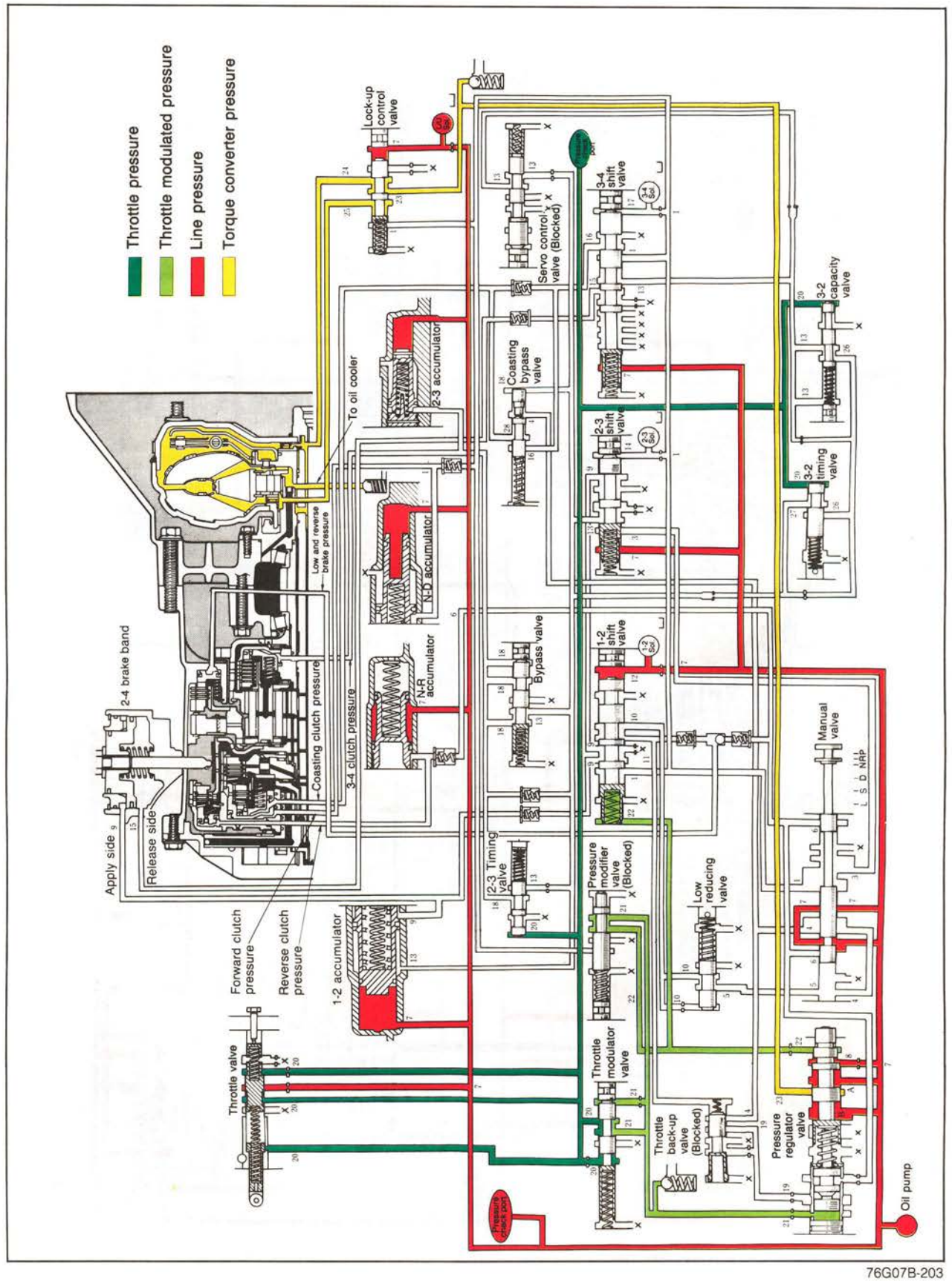


76G07B-202

35. Pour in ATF and check the following:
    (1) With the engine idling, check that the fluid level is between the F and L marks on the dipstick. (Refer to page 7B—71)
    (2) Check the manual linkage, and adjust if necessary. (Refer to page 7B—72)
    (3) Check the inhibitor switch operation. (Refer to page 7B—65)
    (4) Conduct a road test. (Refer to page 7B—34, 35)
    (5) Check that there is no fluid leakage from the transaxle. (Refer to page 7B—71)

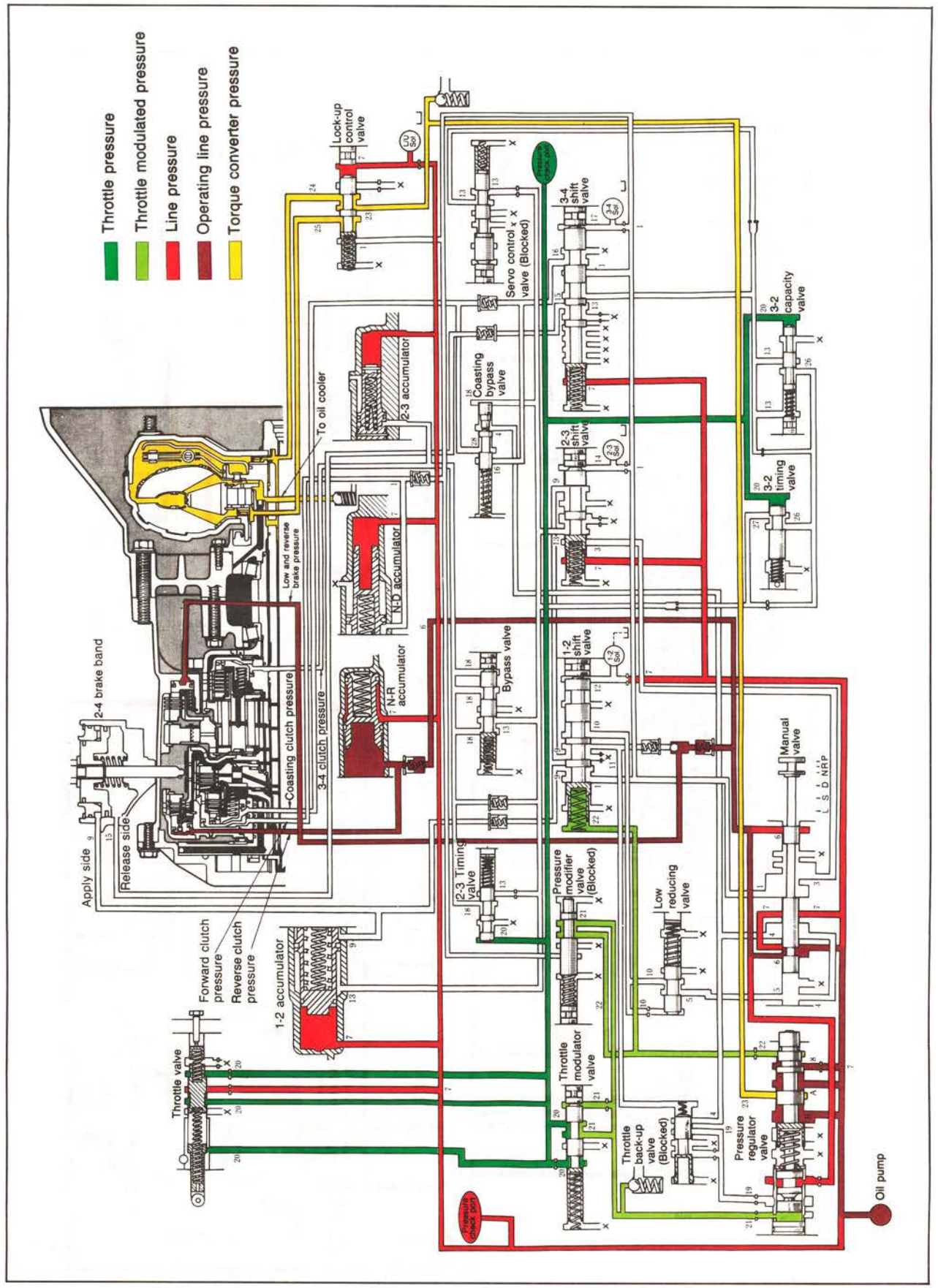
HYDRAULIC CIRCUIT (G4A-EL)

P RANGE



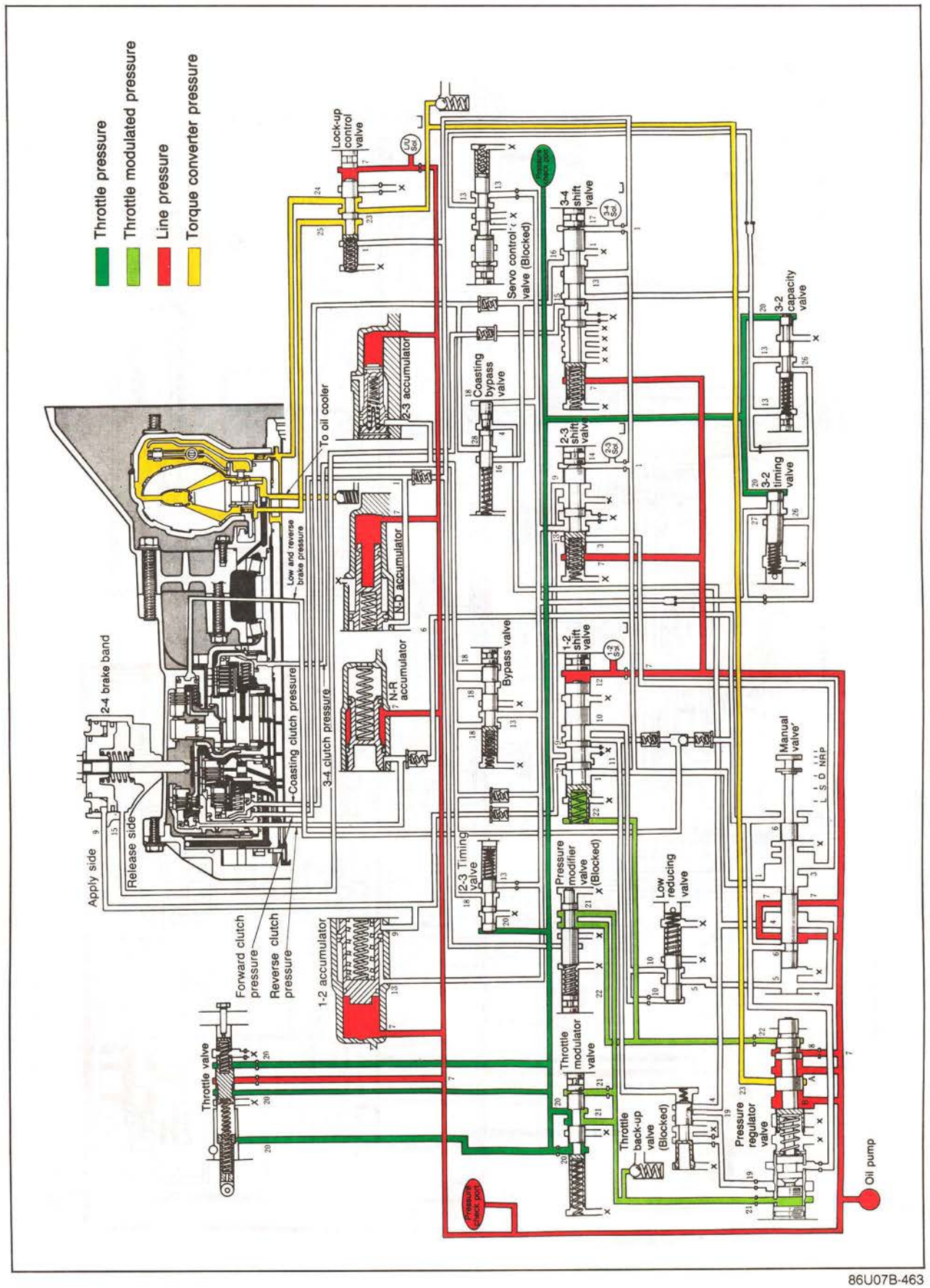
76G07B-203

R RANGE



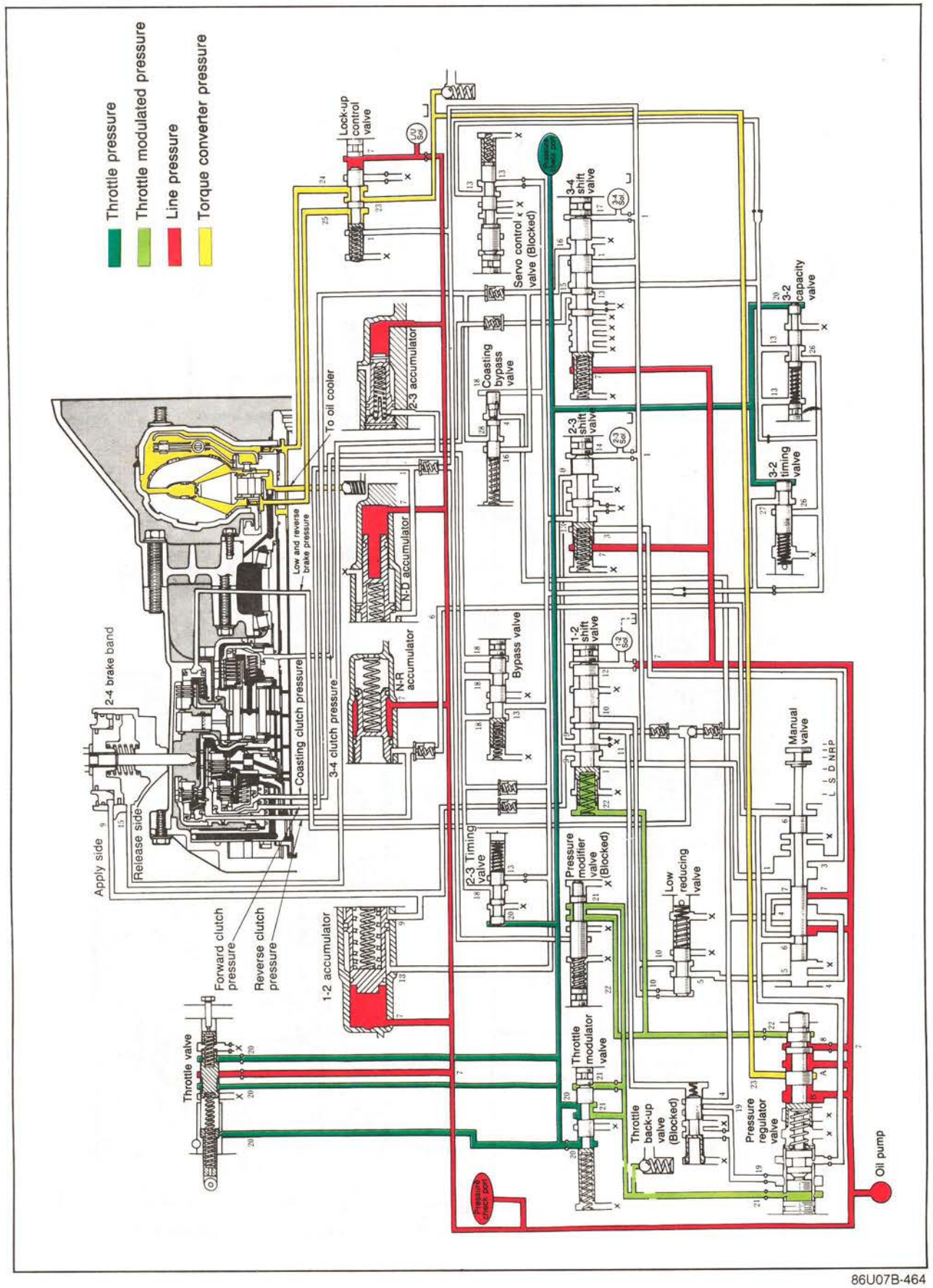
86U07B-462

N RANGE; BELOW APPROX. 18 km/h (11 mph)



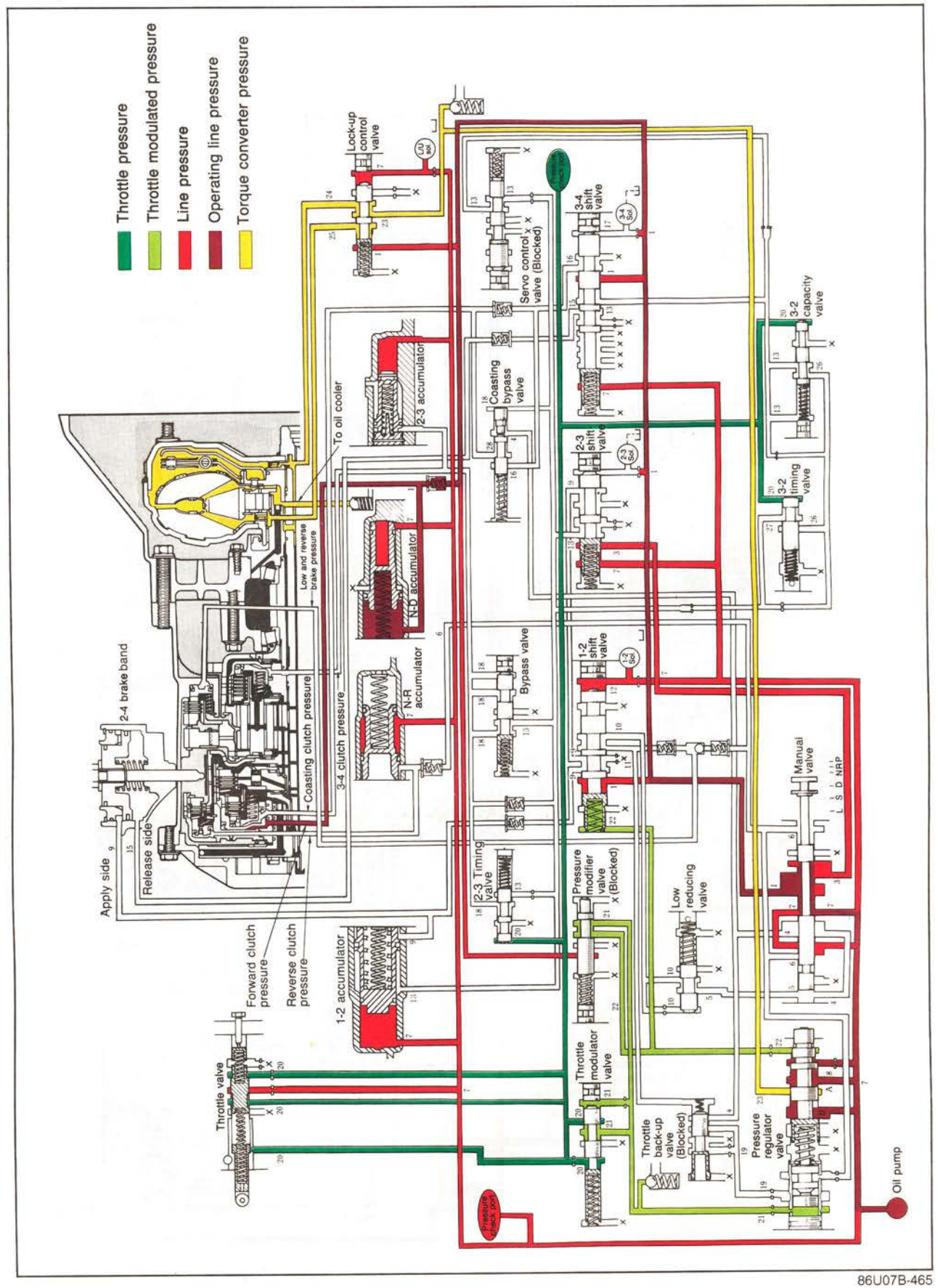
86U07B-463

N RANGE; ABOVE APPROX. 18 km/h (11 mph)



86U07B-464

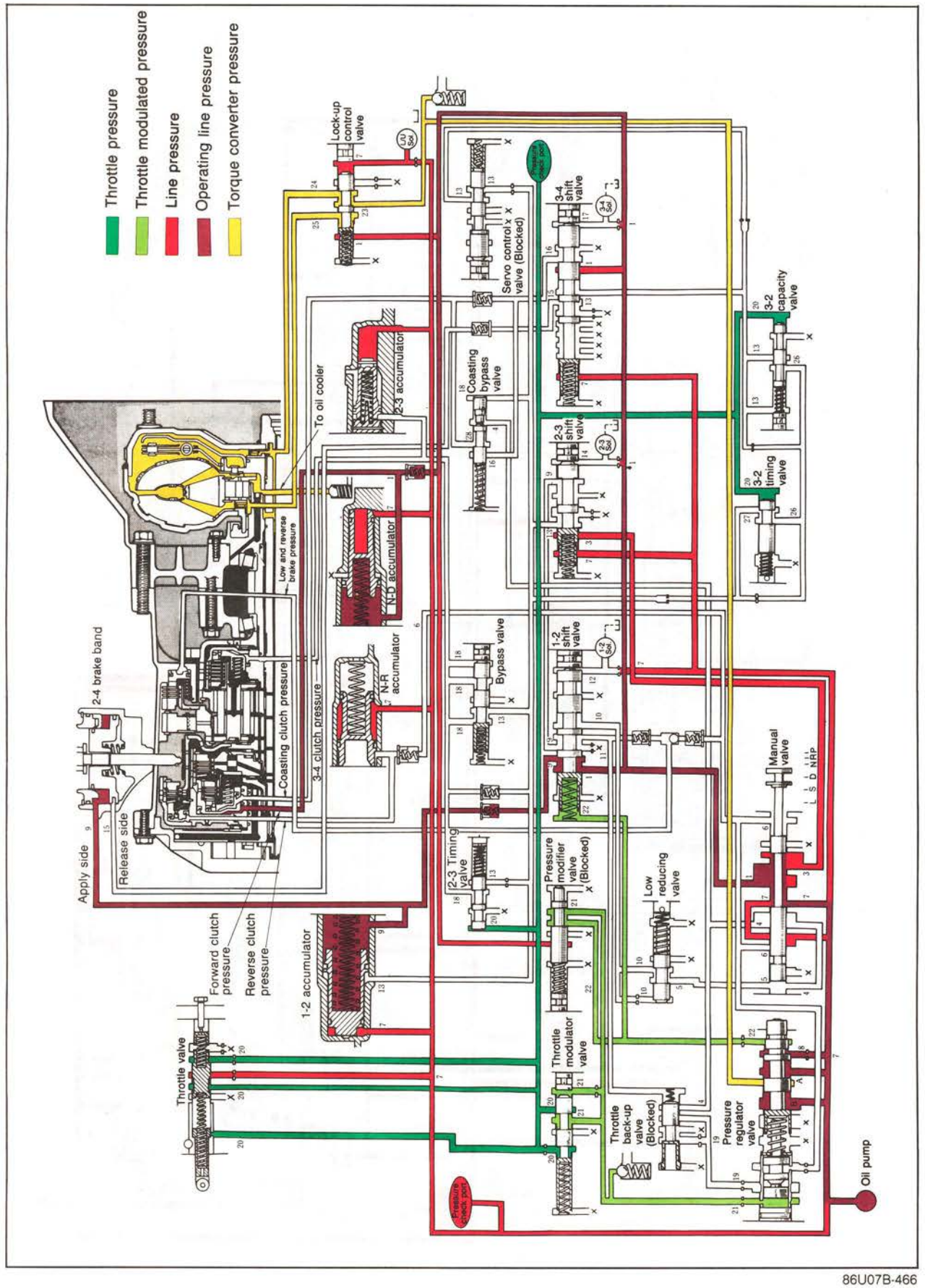
D RANGE; 1ST GEAR



86U07B-465

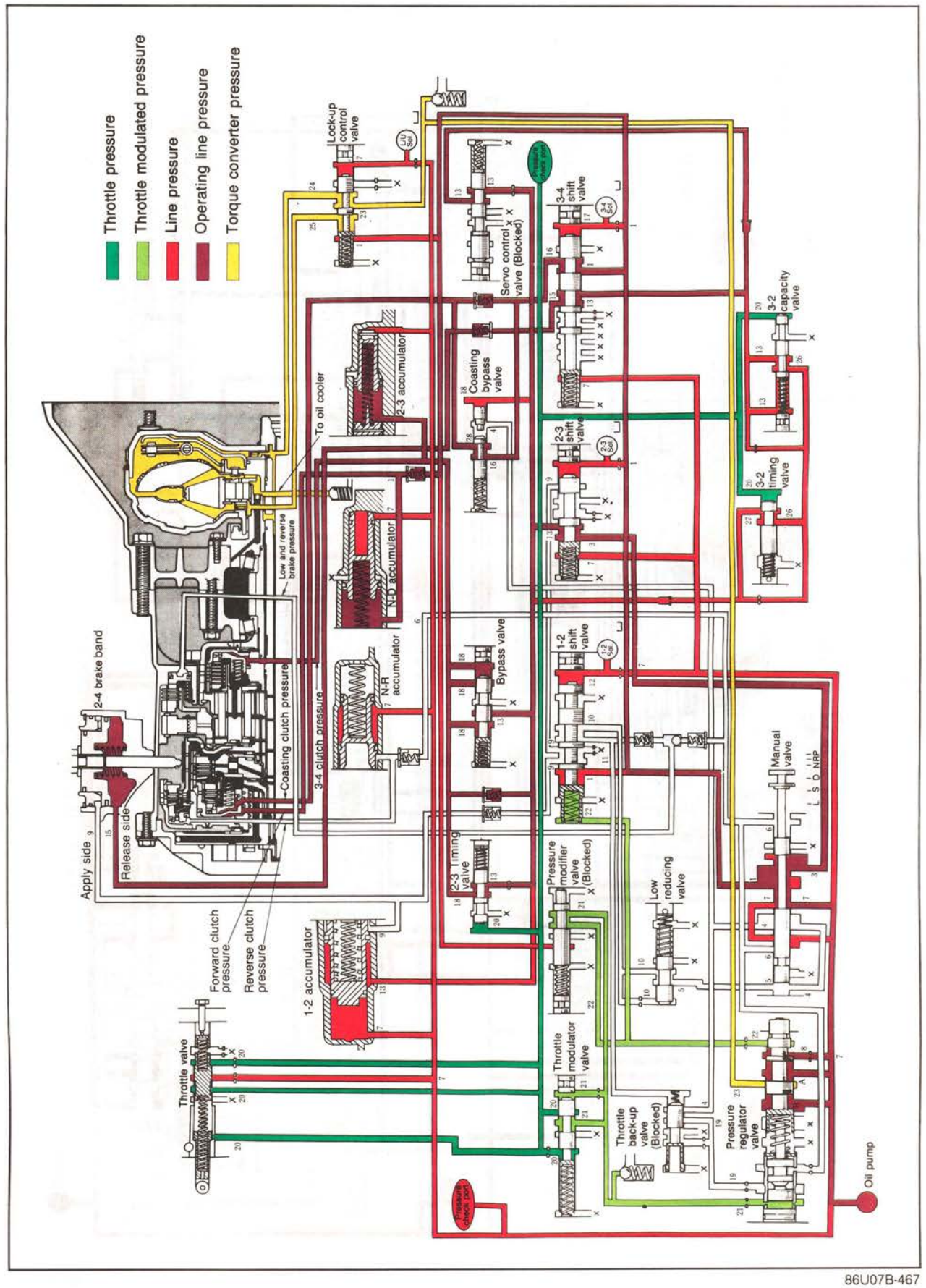
7B HYDRAULIC CIRCUIT (G4A-EL)

D RANGE; 2ND GEAR



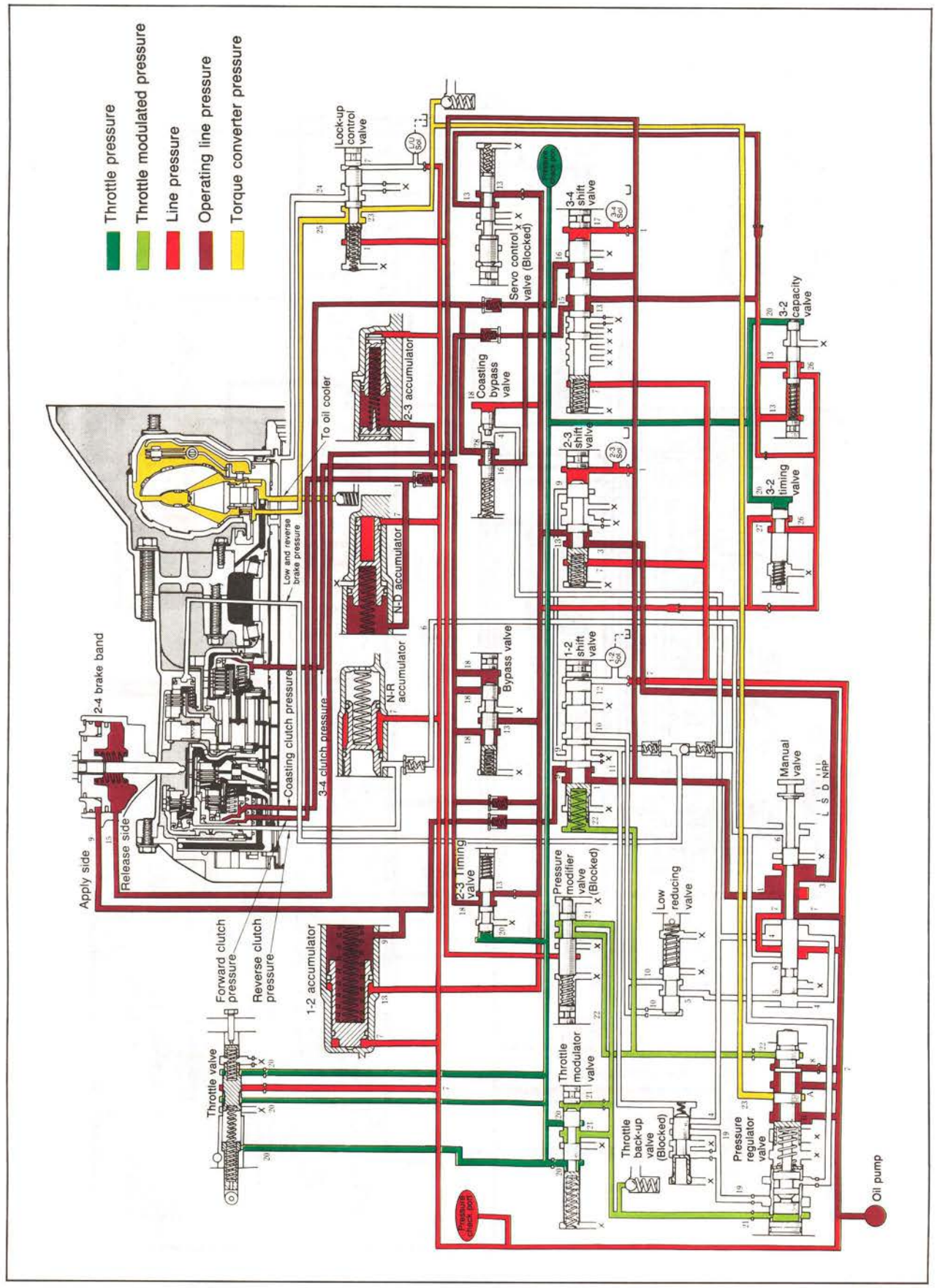
86U07B-466

D RANGE; 3RD GEAR, BELOW APPROX. 40 km/h (25 mph)



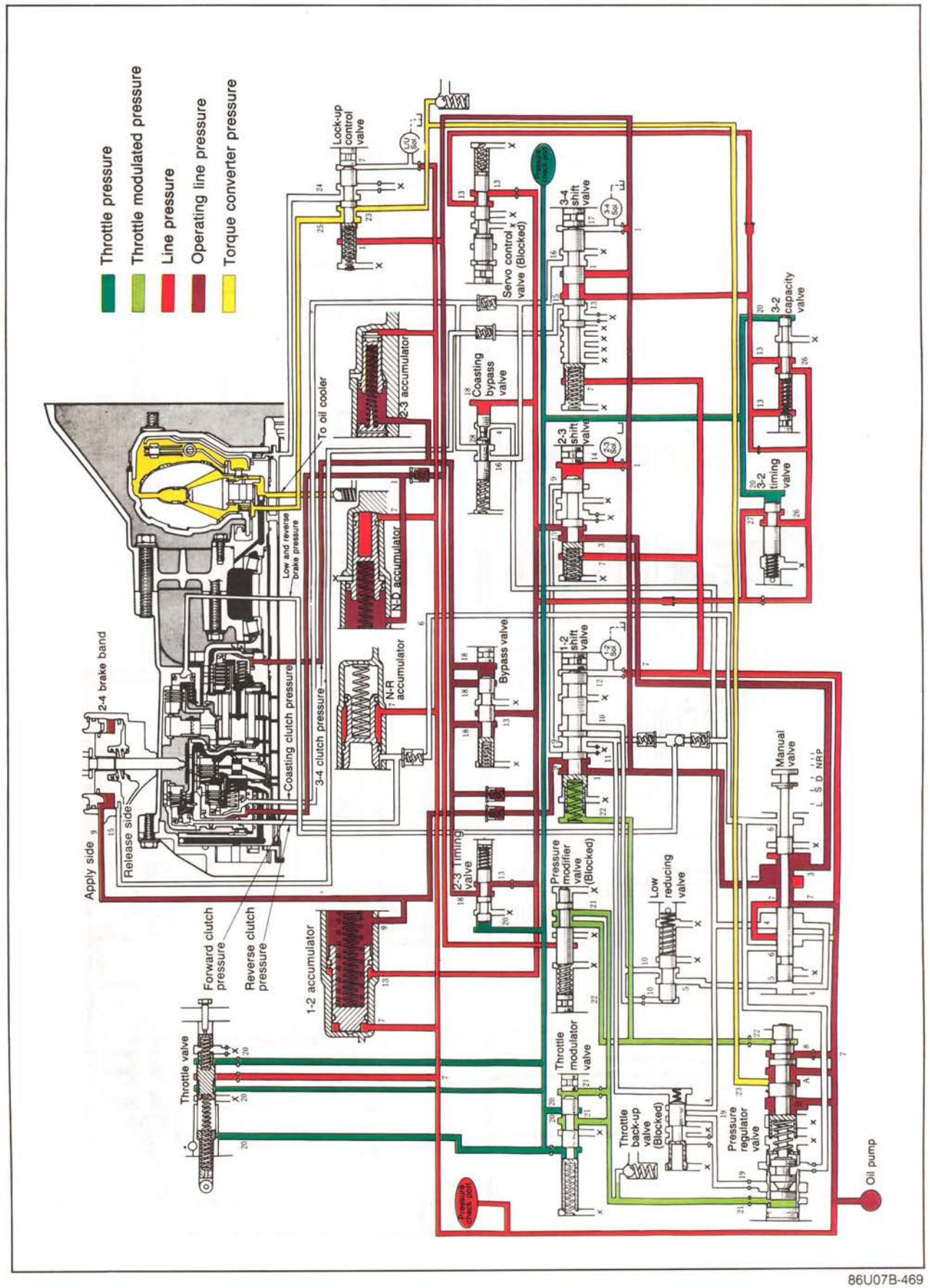
86U07B-467

D RANGE; 3RD GEAR, ABOVE APPROX. 40 km/h (25 mph) LOCK-UP ON



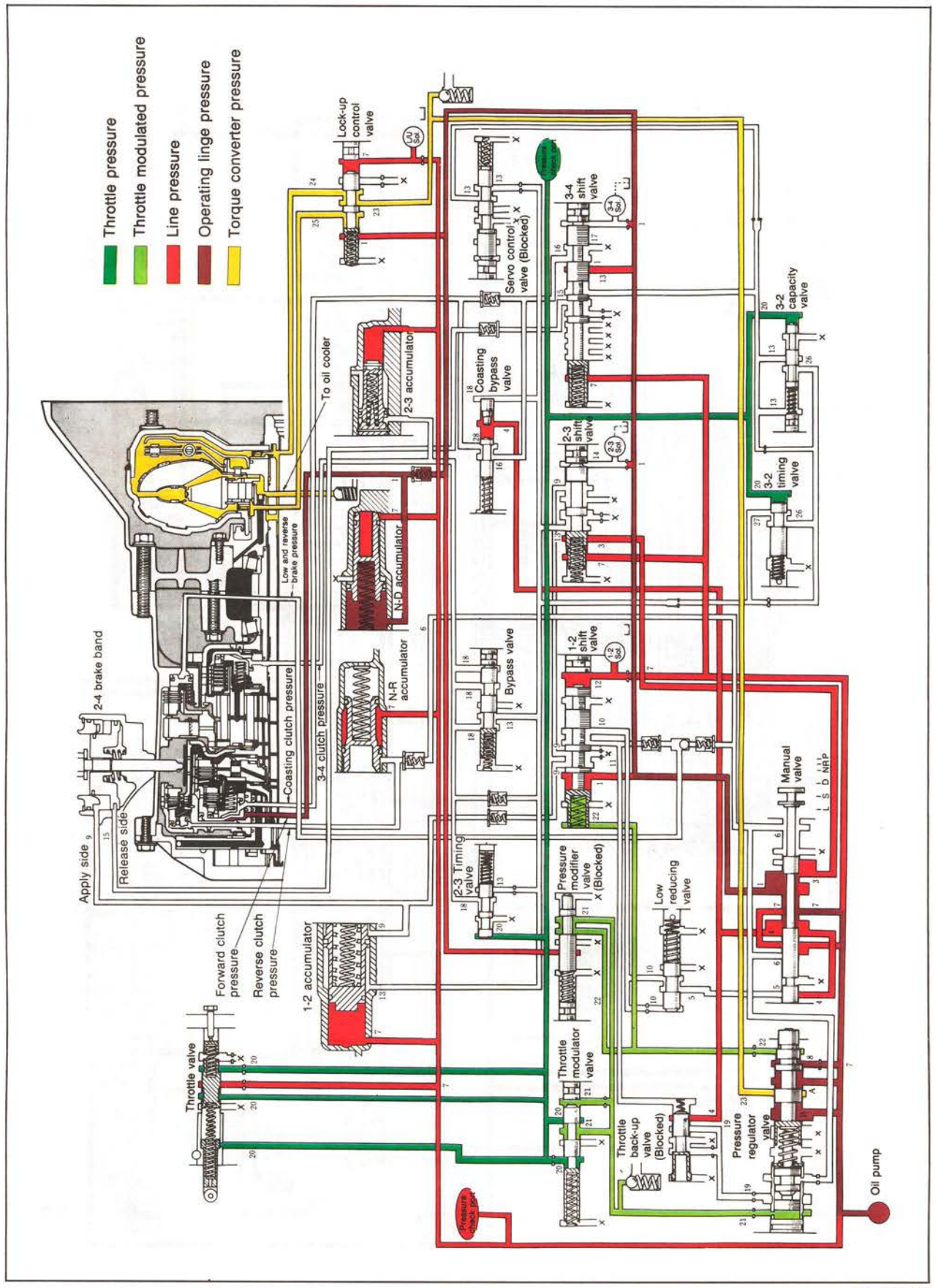
86U07B-468

D RANGE; OD, LOCK-UP ON



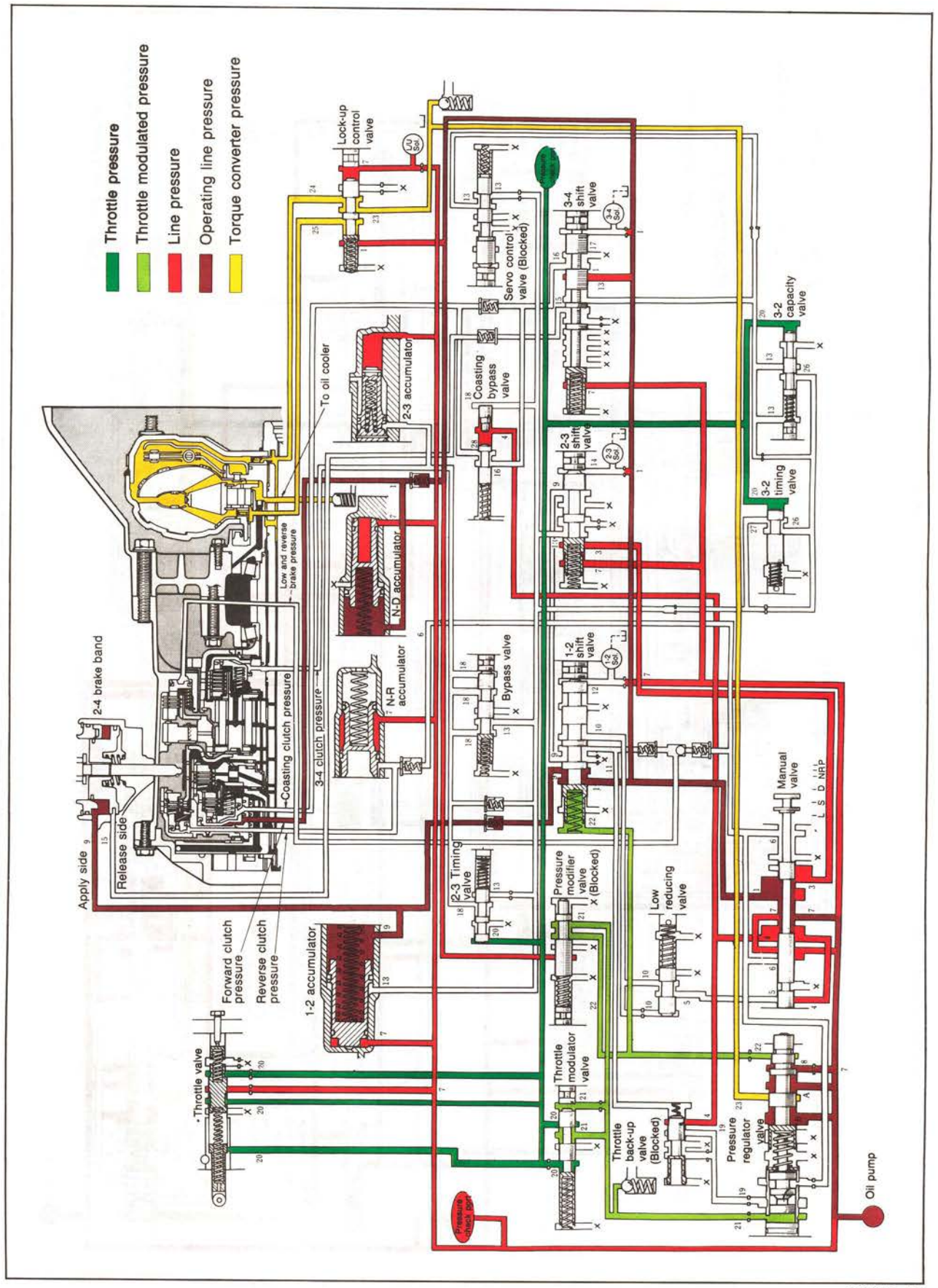
86U07B-469

S RANGE; 1ST GEAR



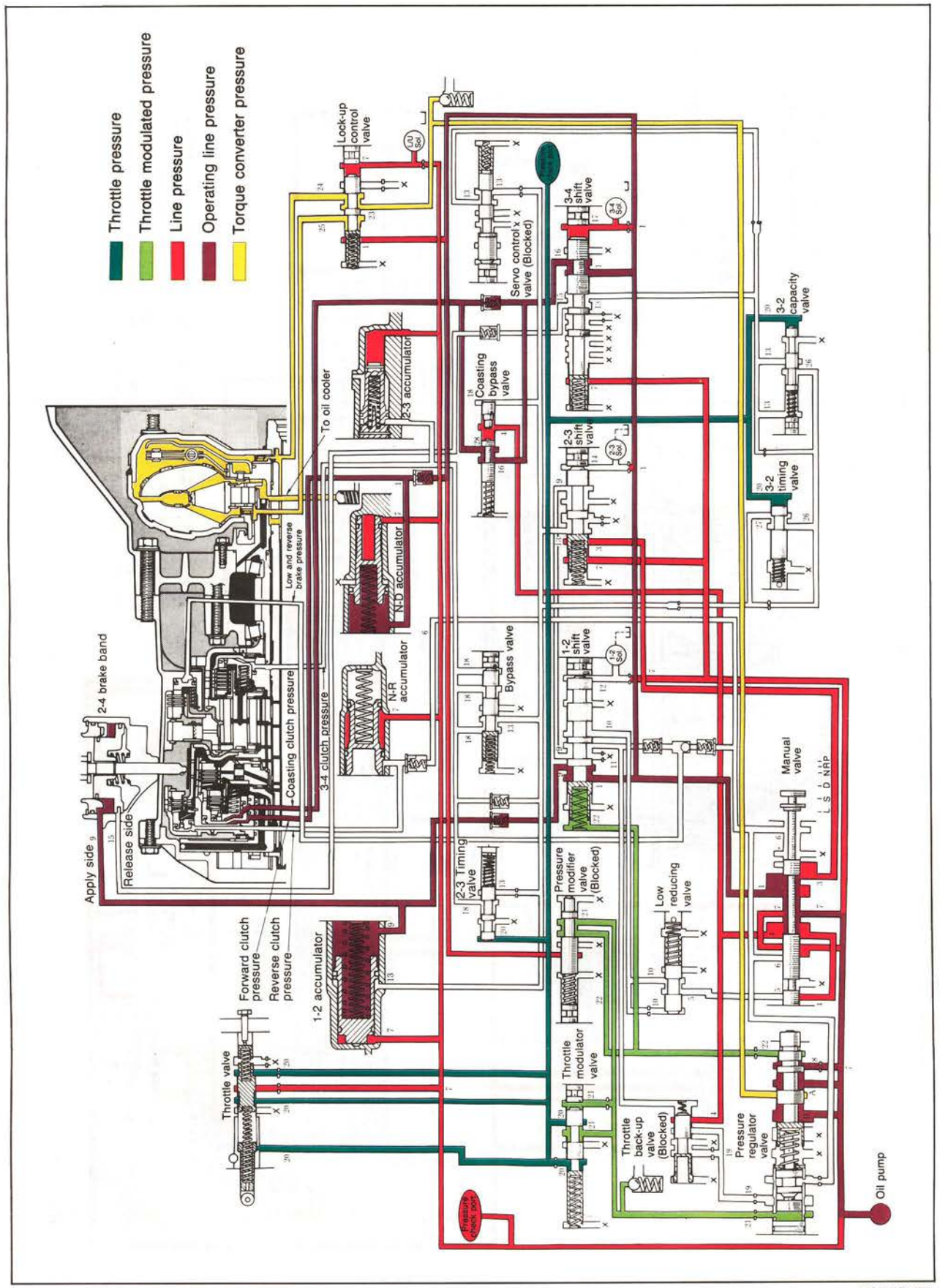
86U07B-470

S RANGE; 2ND GEAR



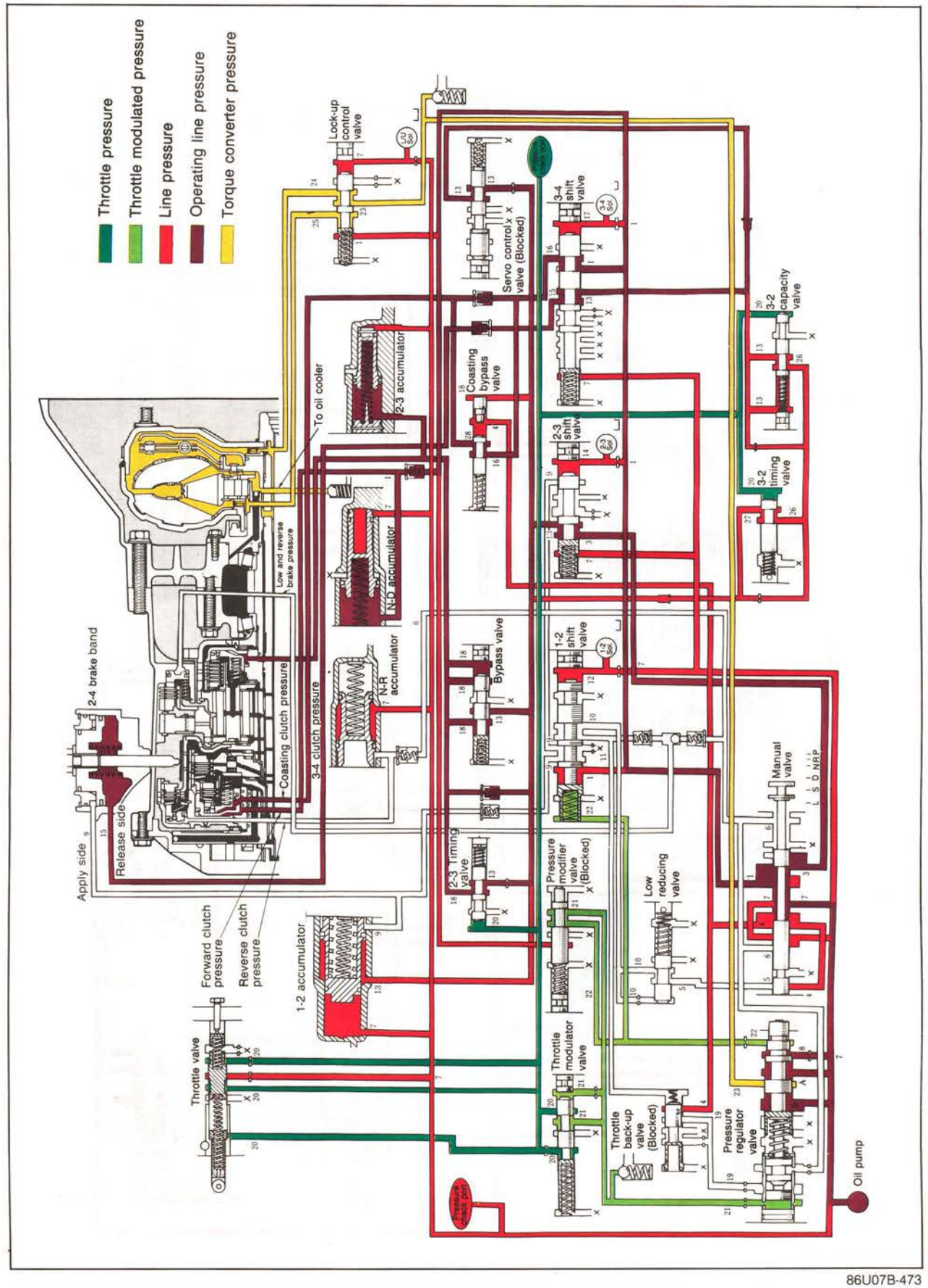
86U07B-471

S RANGE; 2ND GEAR, HOLD



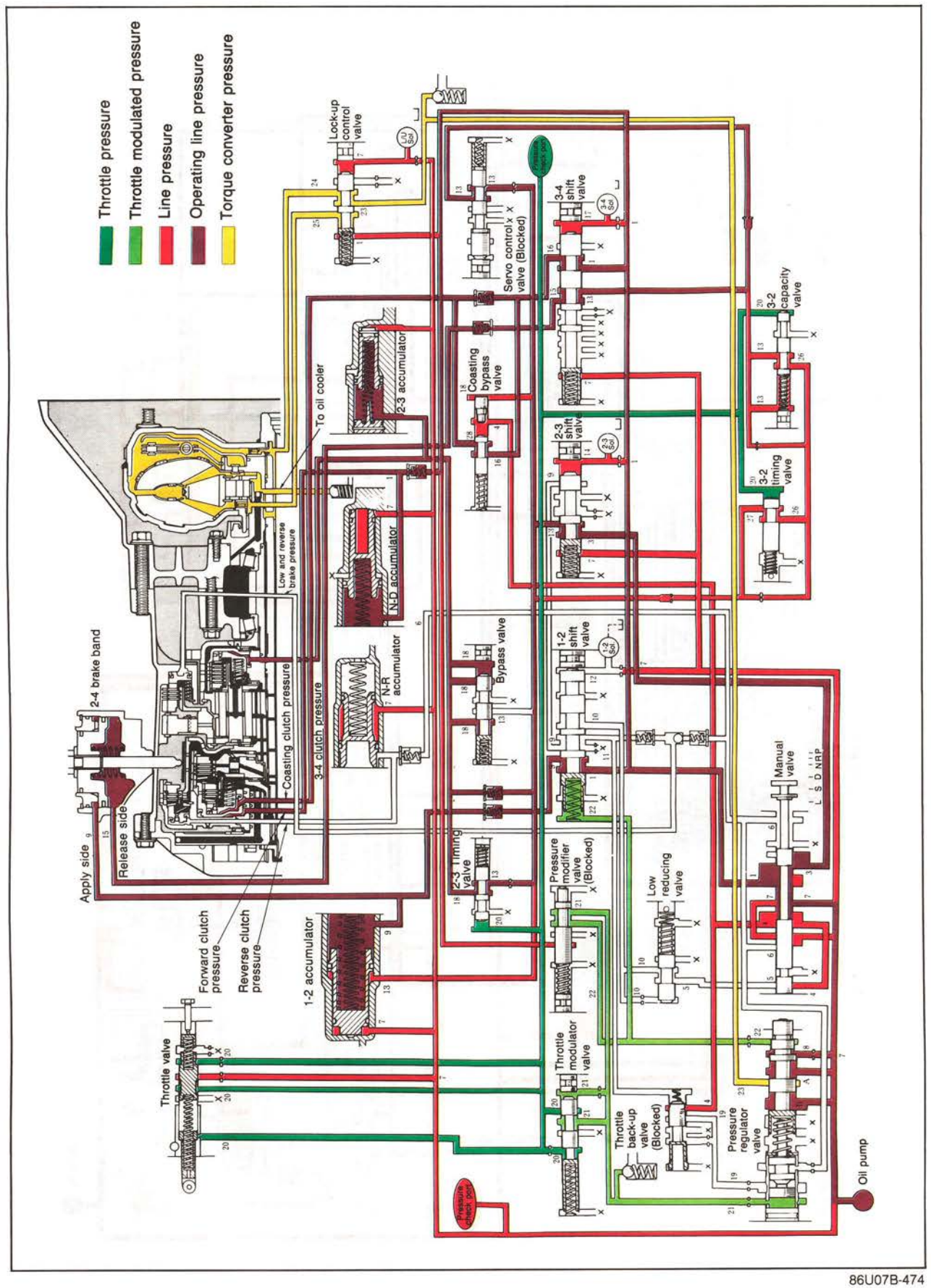
86U07B-472

S RANGE; 3RD GEAR, BELOW APPROX. 40 km/h (25 mph)



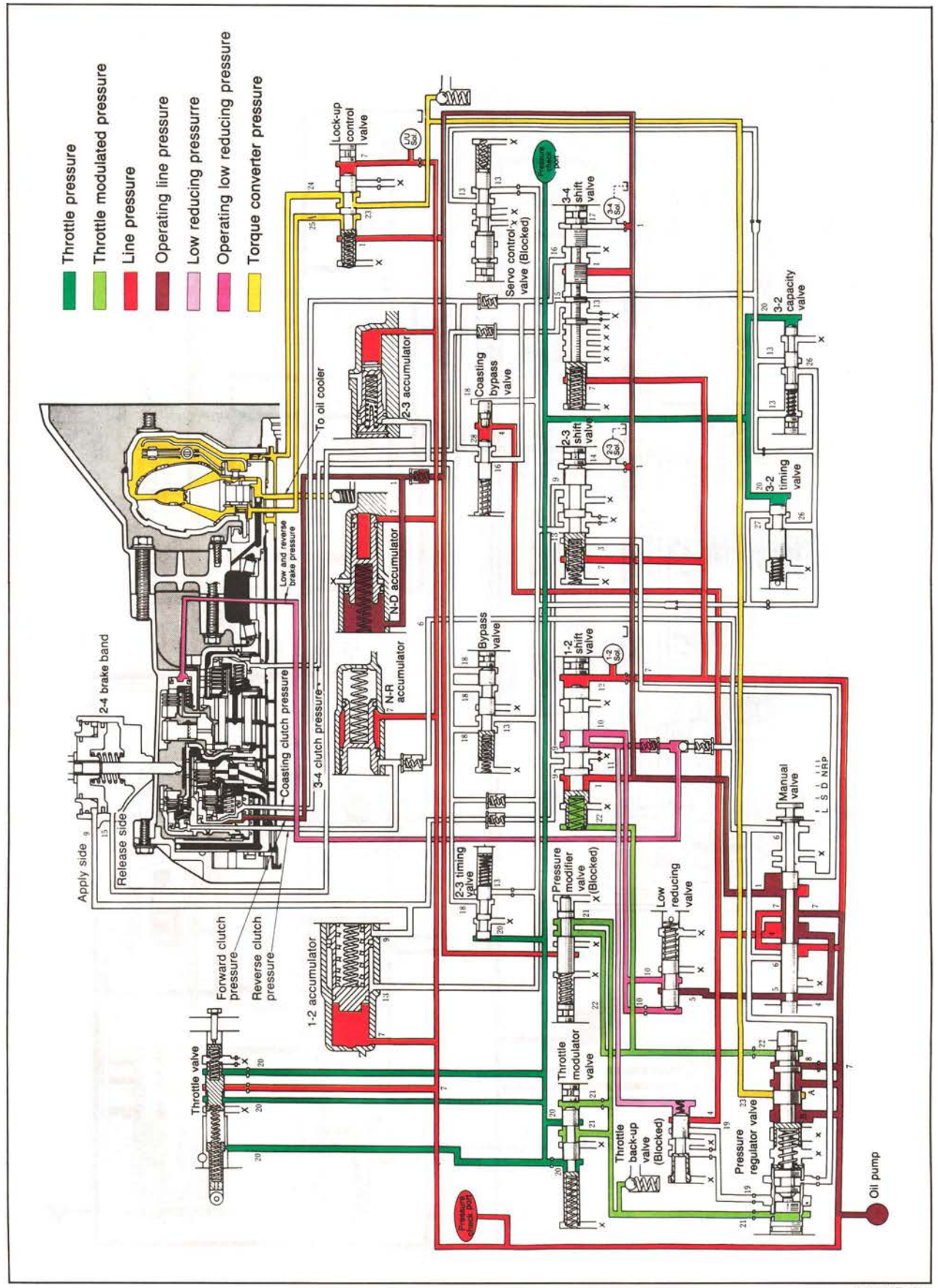
86U07B-473

S RANGE; 3RD GEAR, ABOVE APPROX. 40 km/h (25 mph)



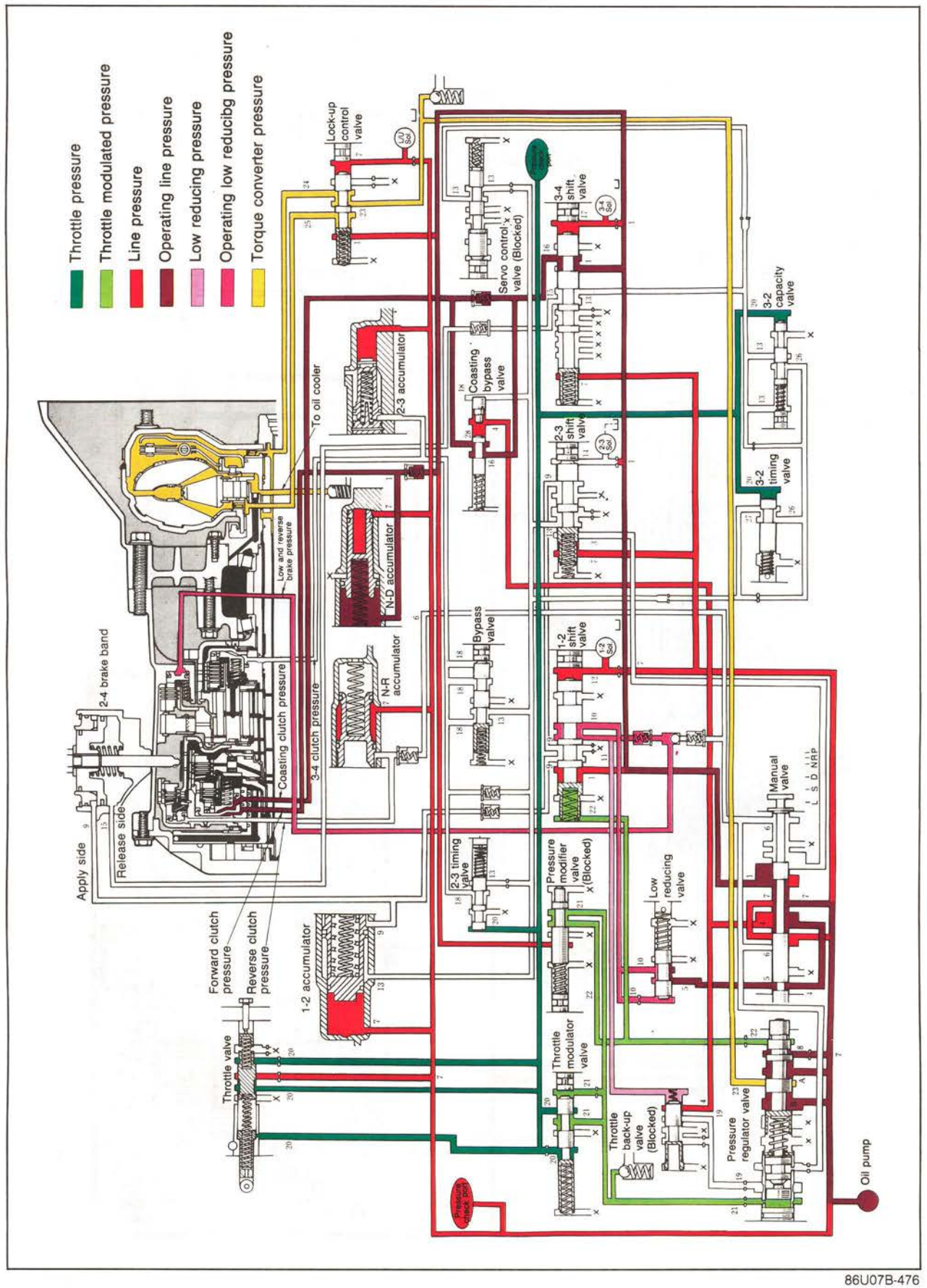
86U07B-474

L RANGE; 1ST GEAR



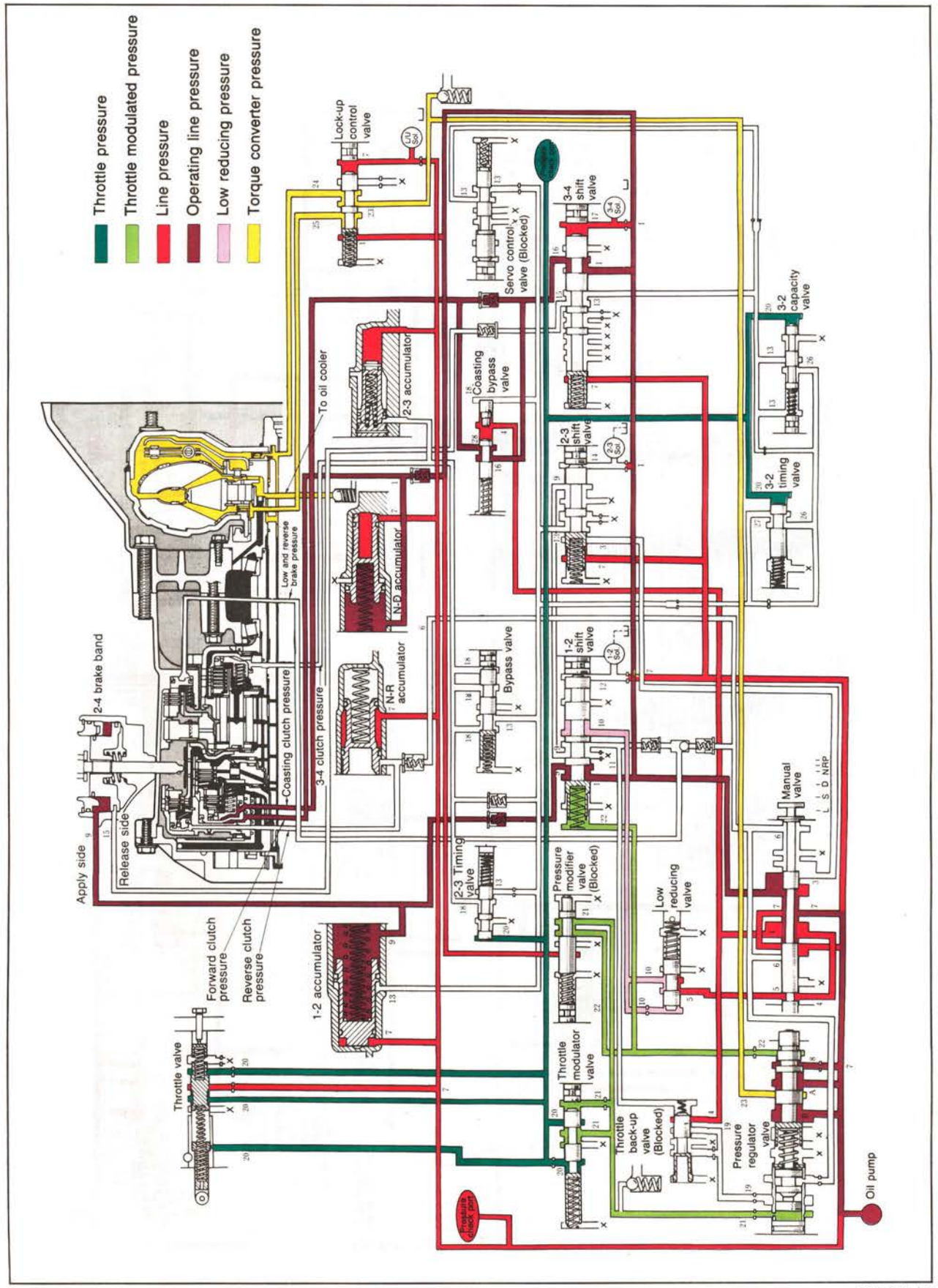
86U07B-475

L RANGE; 1ST GEAR, HOLD



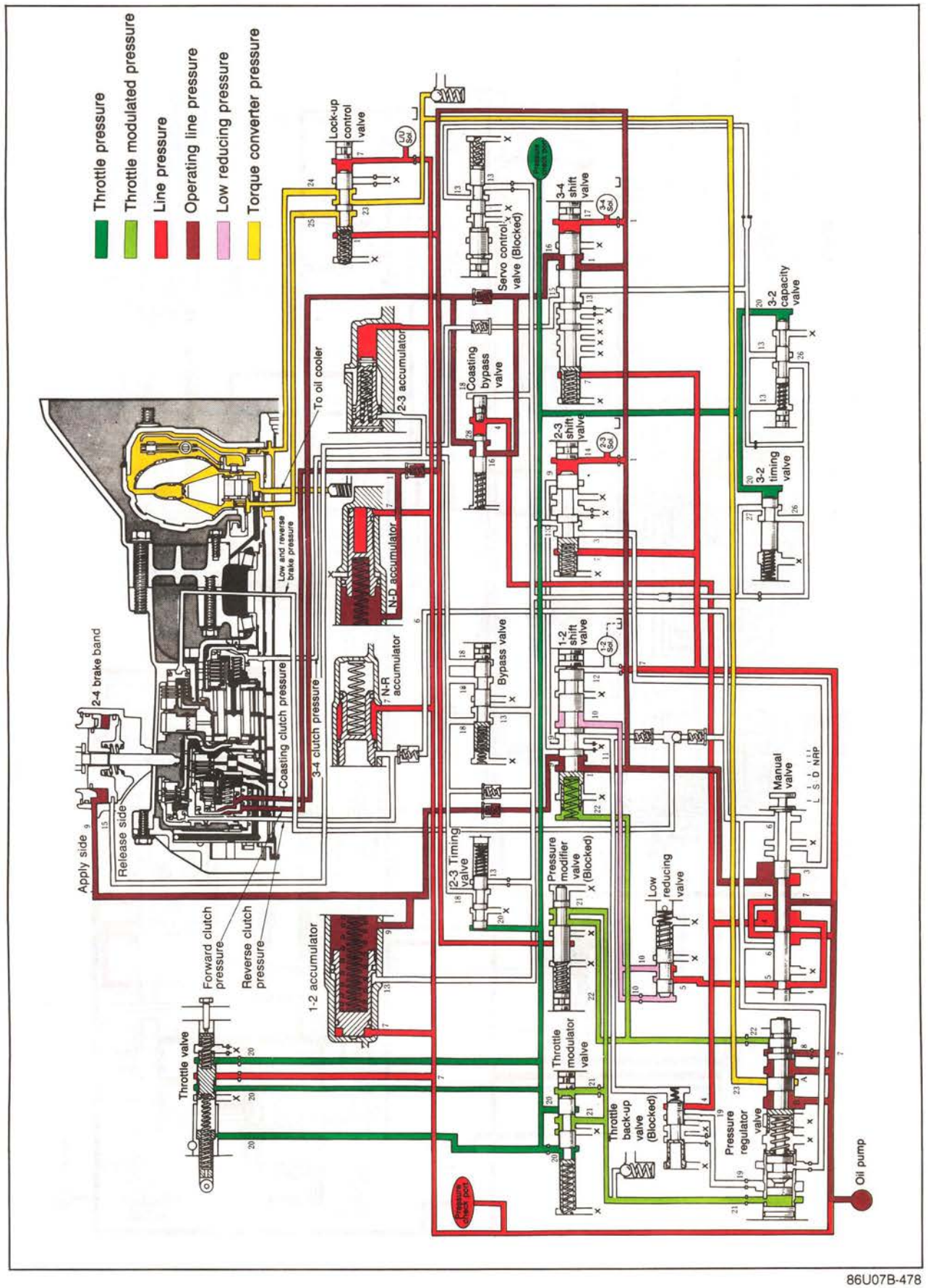
86U07B-476

L RANGE; 2ND GEAR, BELOW APPROX. 110 km/h (68 mph)



86U07B-477

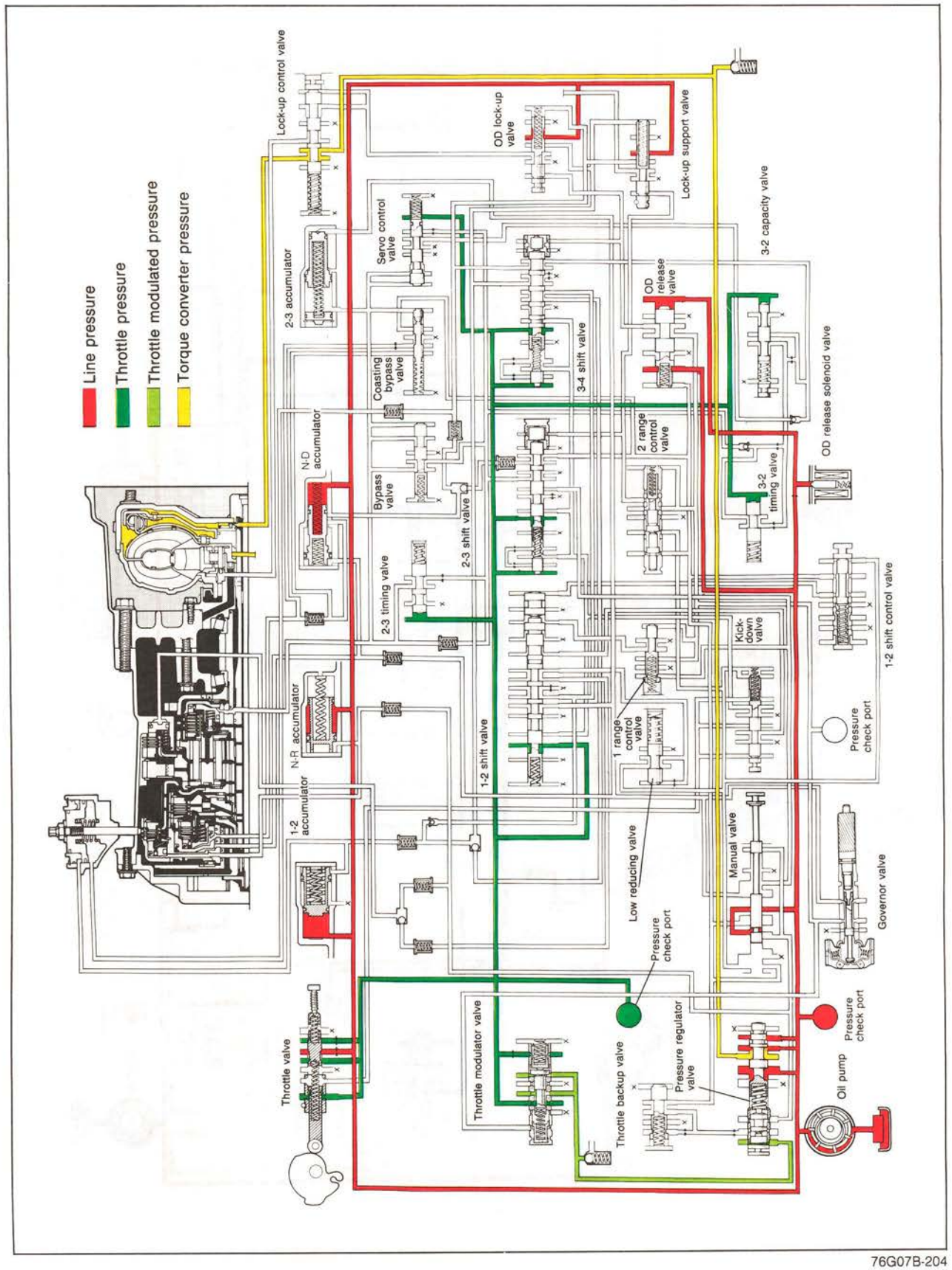
L RANGE; 2ND GEAR, ABOVE APPROX. 110 km/h (68 mph)



86U07B-478

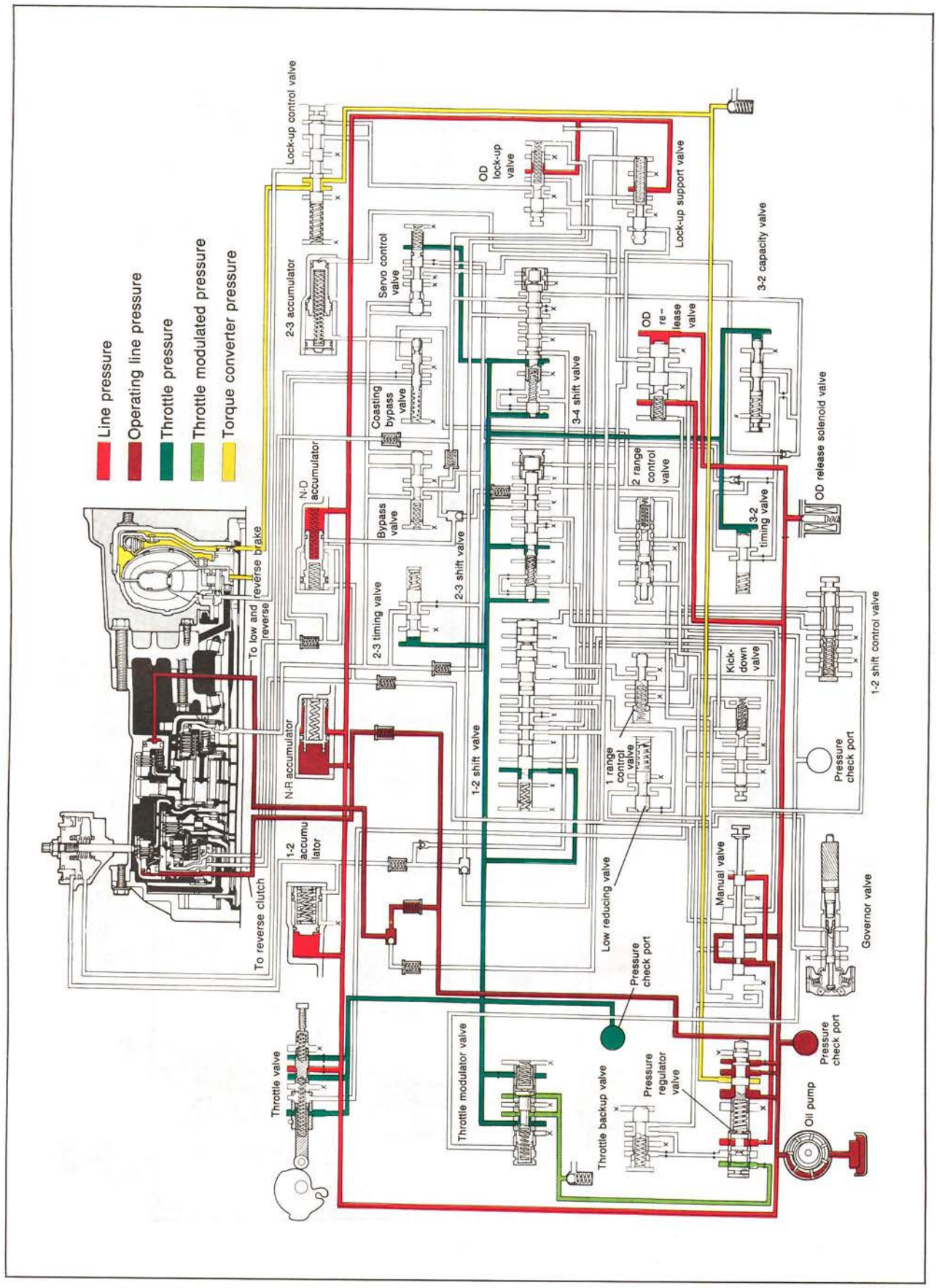
HYDRAULIC CIRCUIT (G4A-HL)

N AND P RANGES



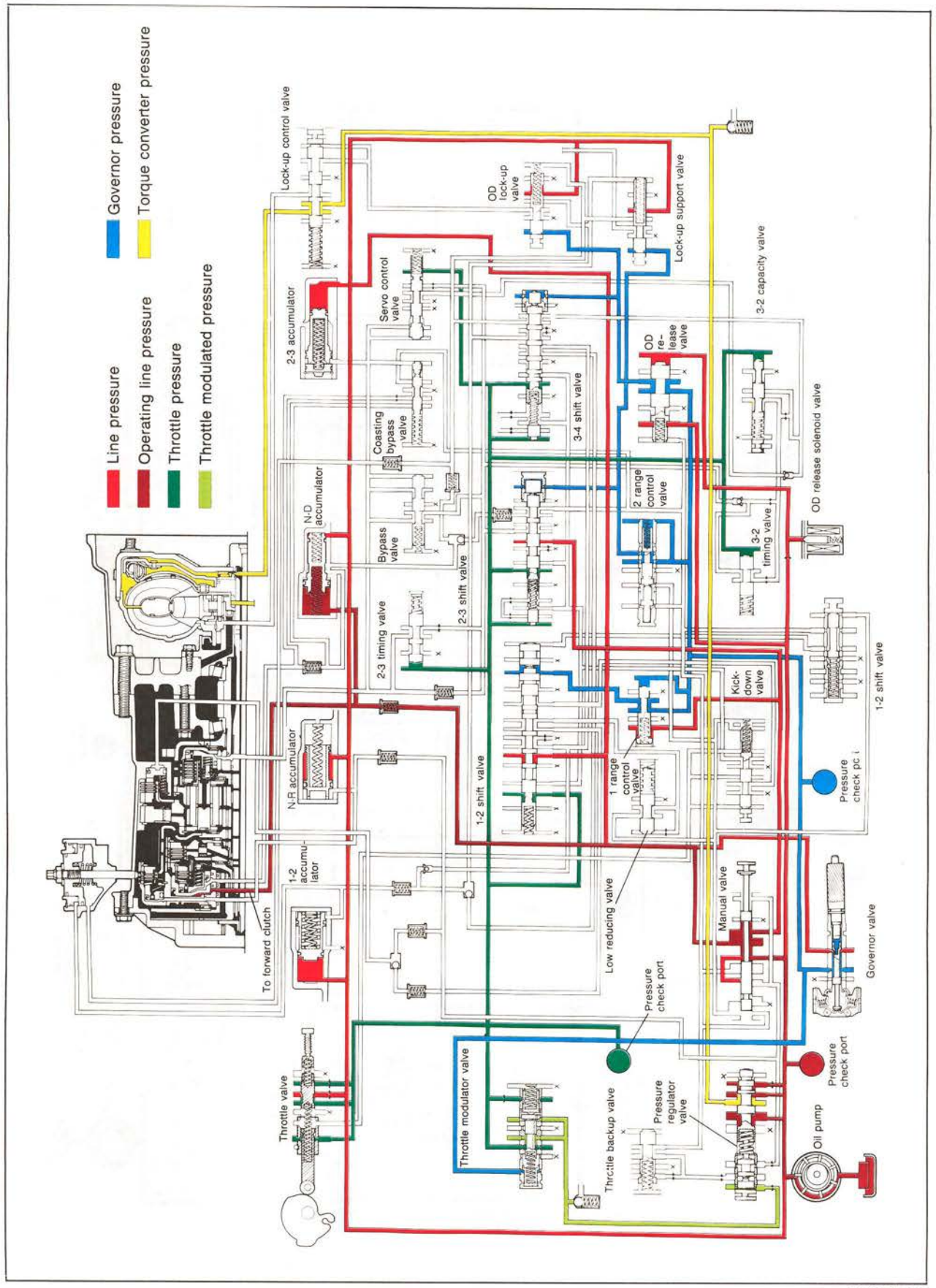
76G07B-204

R RANGE



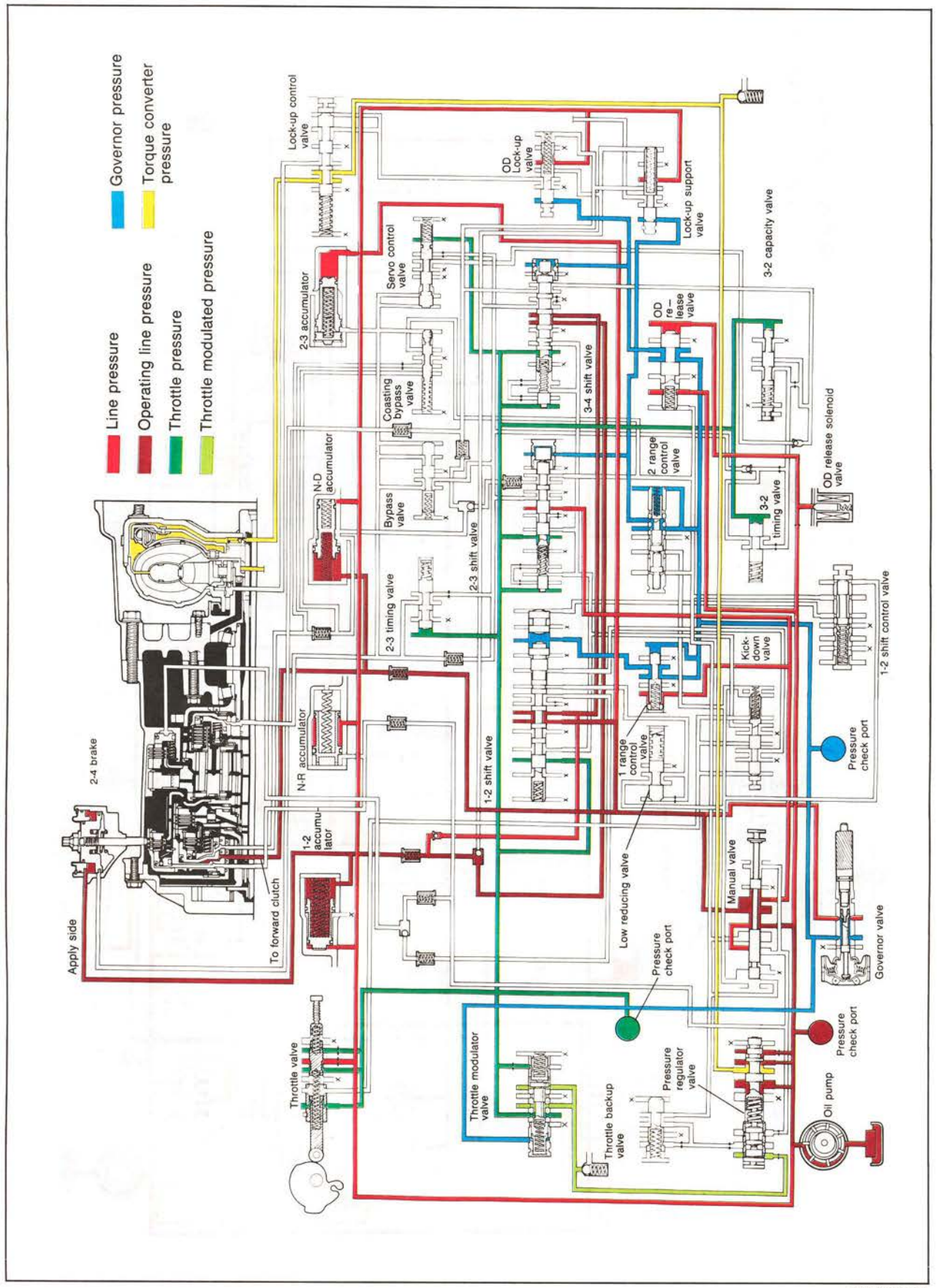
83U07B-476

D RANGE; 1ST GEAR



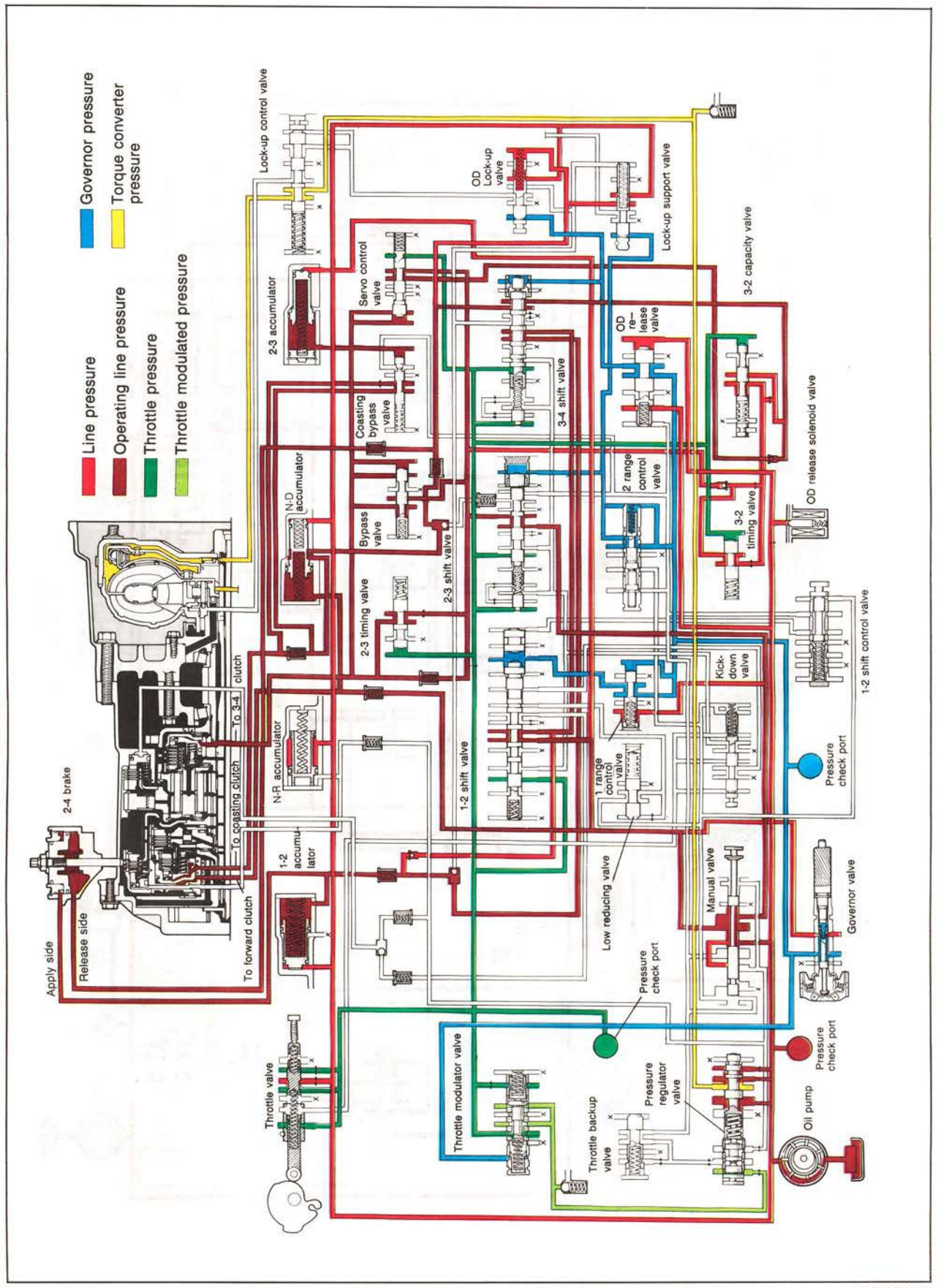
76G07B-205

D RANGE; 2ND GEAR



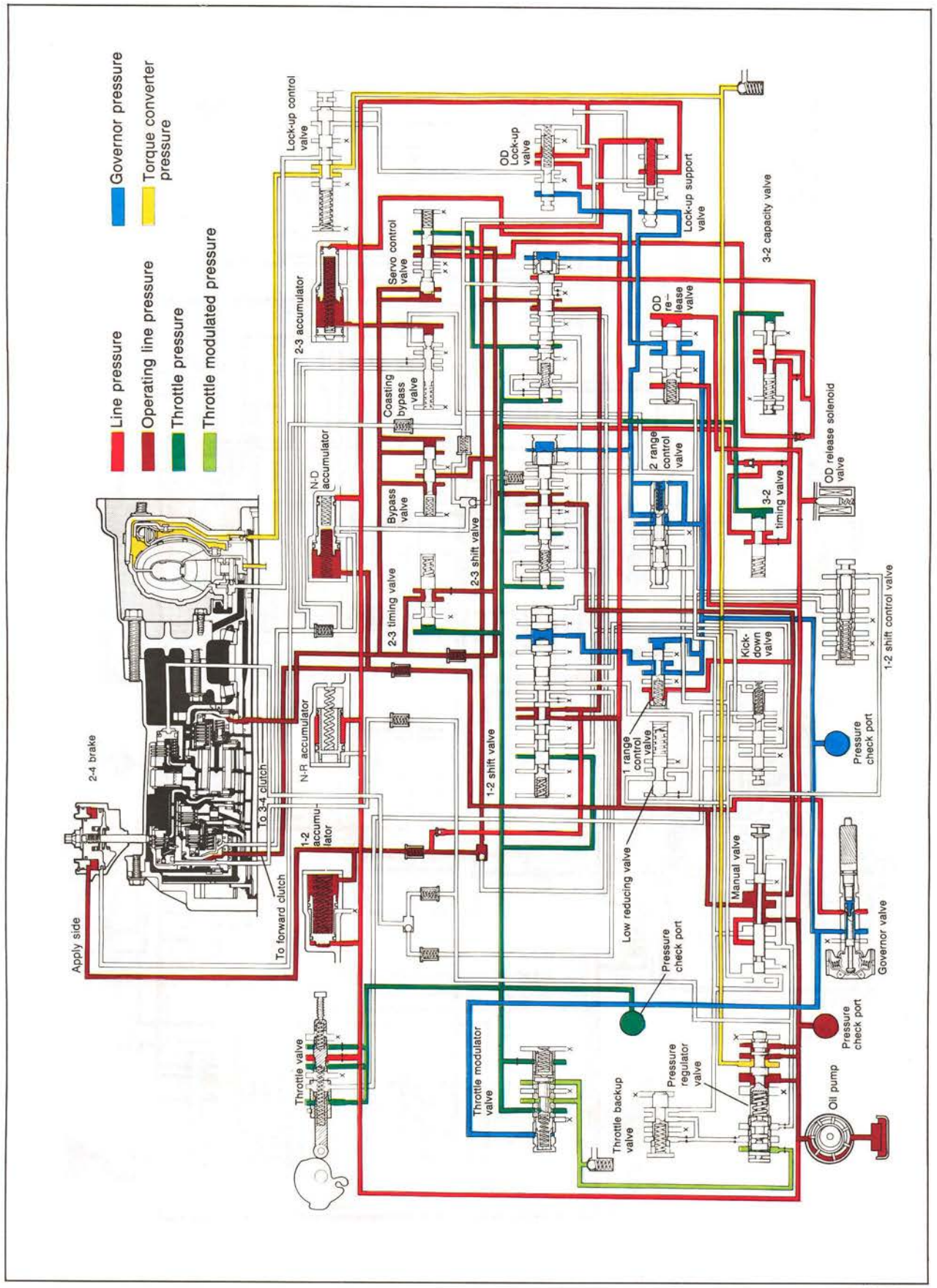
76G07B-206

D RANGE; 3RD GEAR



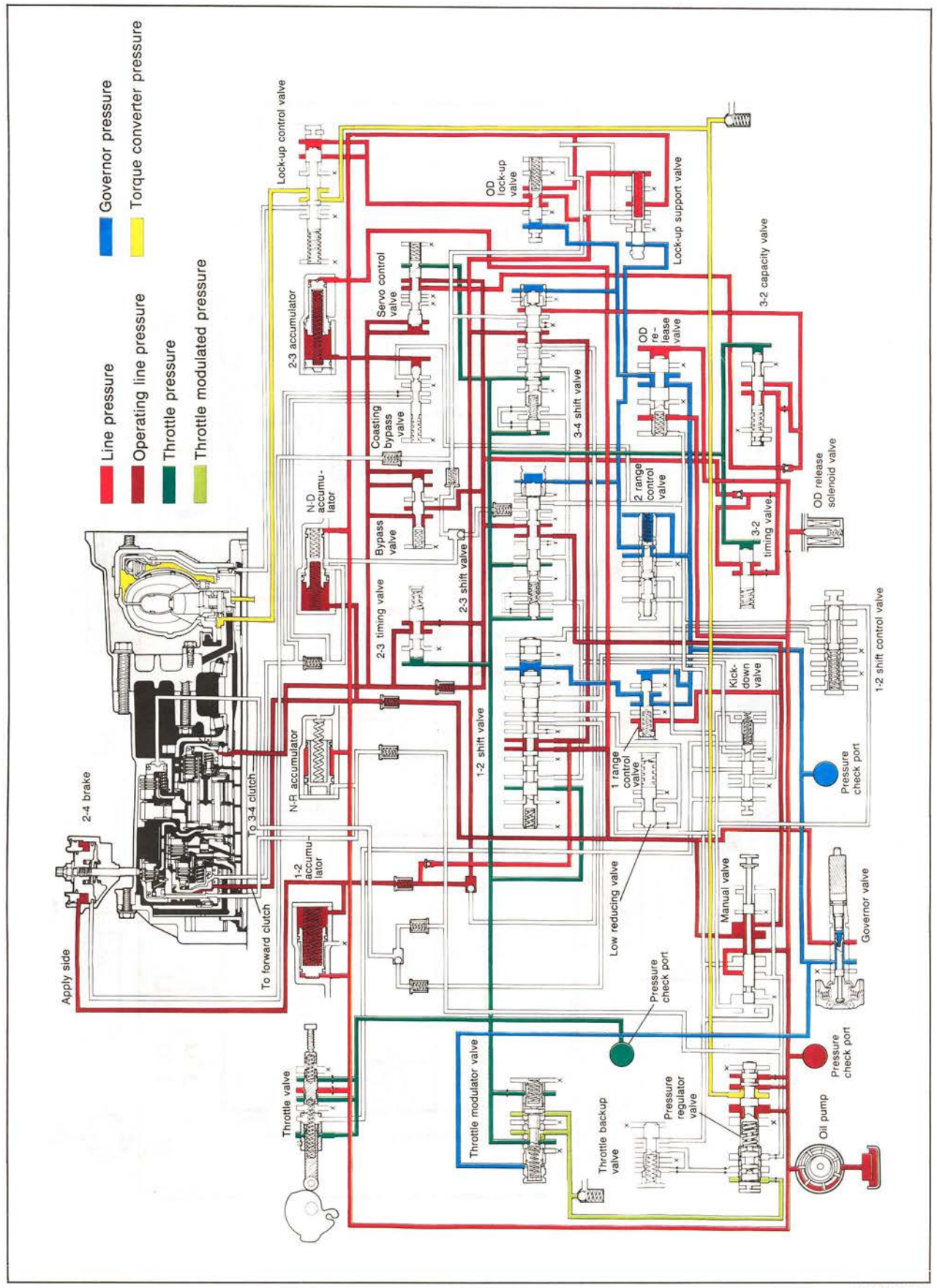
76G07B-207

D RANGE; OD



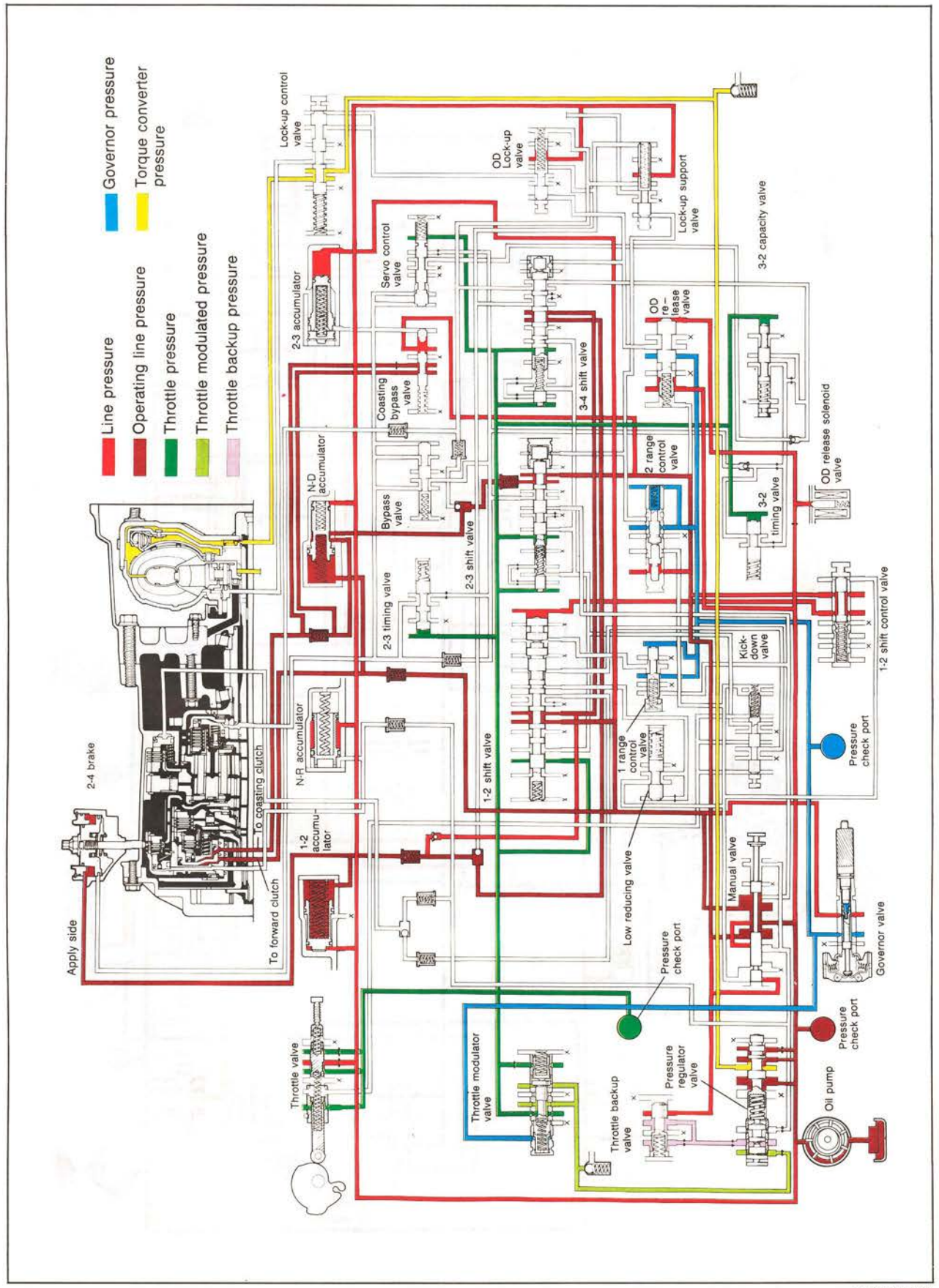
76G07B-208

D RANGE; OD, LOCK-UP ON



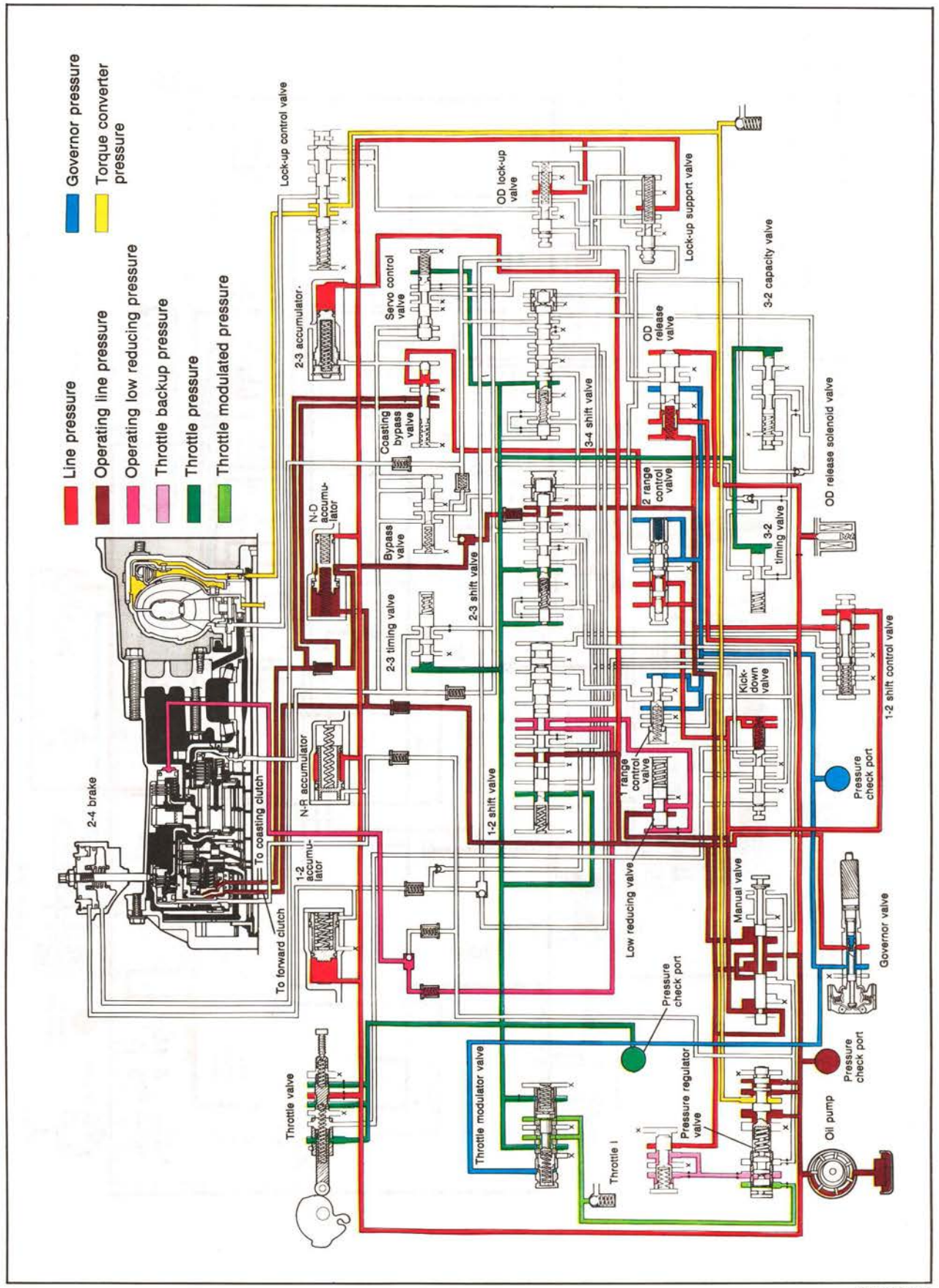
76G07B-209

2 RANGE; 2ND GEAR



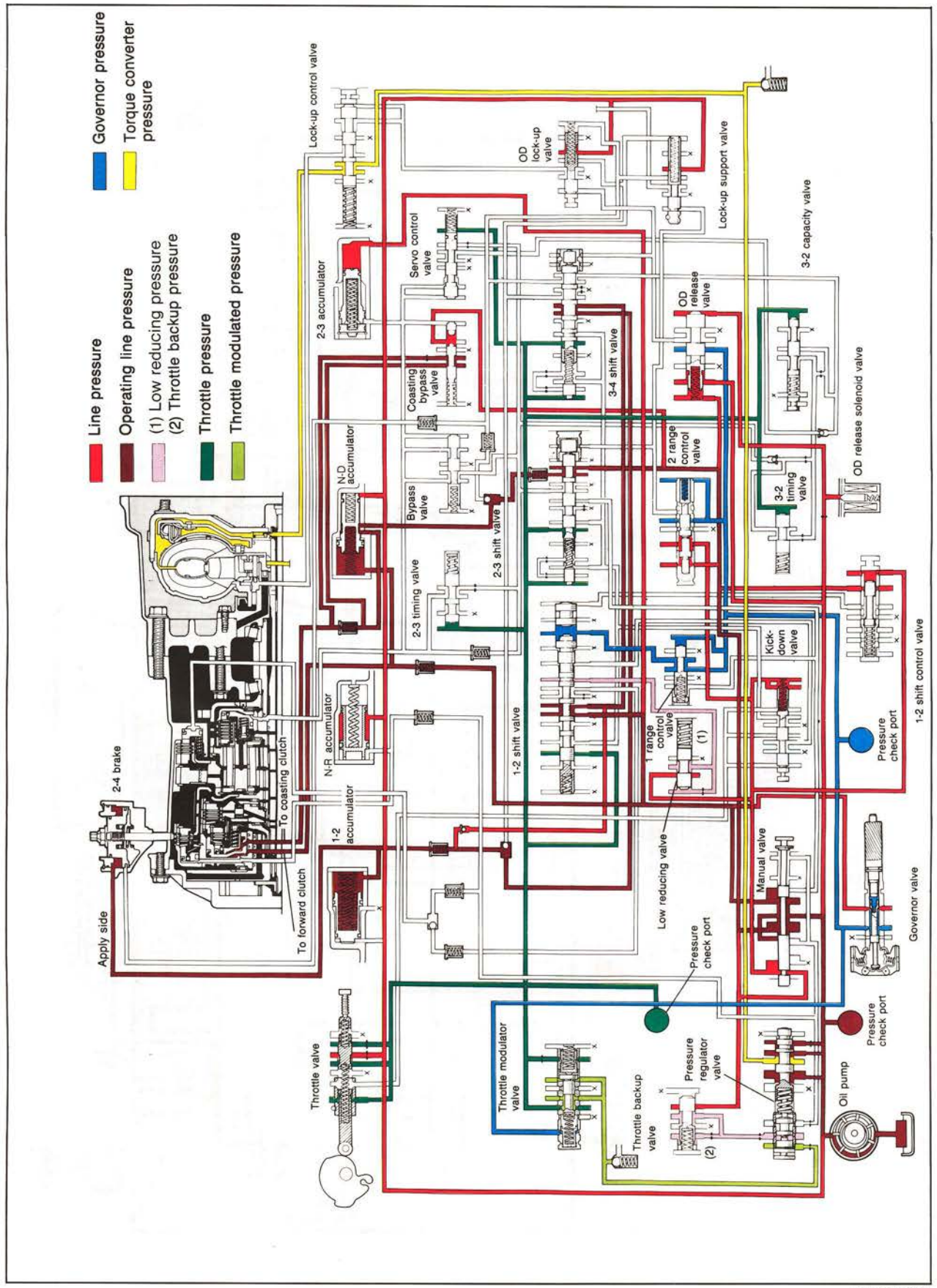
76G07B-210

1 RANGE; 1ST GEAR



76G07B-211

1 RANGE; 2ND GEAR



76G07B-212

AUTOMATIC TRANSAXLE (3-Speed)

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D RANGE (1ST GEAR) ..... **7C—129**
D RANGE (2ND GEAR) ..... **7C—130**
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1 RANGE (1ST GEAR) ..... **7C—134**
1 RANGE (2ND GEAR) ..... **7C—135**

76G07C-001

7C OUTLINE

OUTLINE

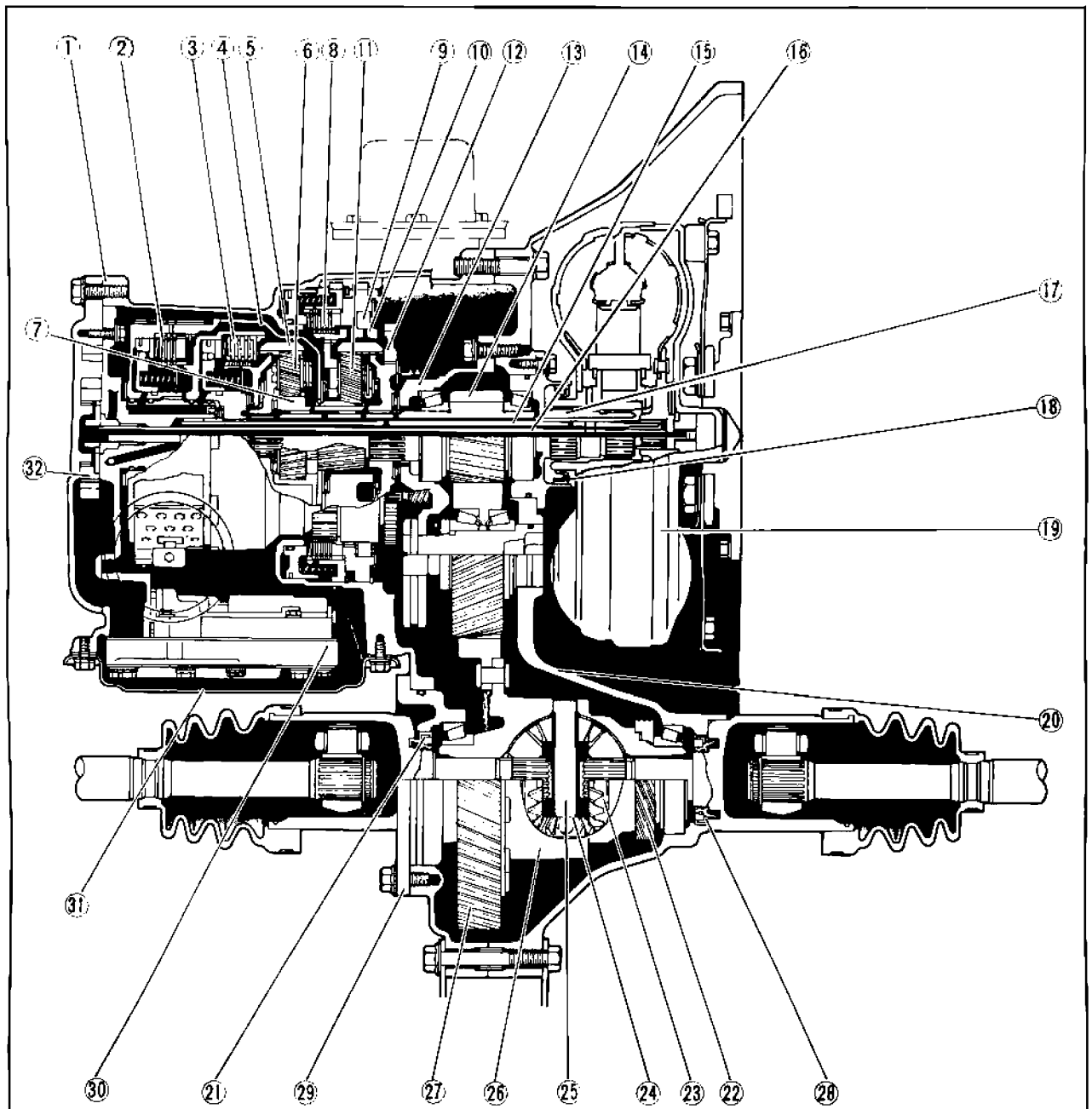
SPECIFICATIONS

Model		F3A	
		FE engine	F6 engine
Torque converter stall torque ratio		1.800—2.100 : 1	
Gear ratio	First	2.841	
	Second	1.541	
	Third	1.000	
	Reverse	2.400	
Final gear ratio		3.450 : 1	3.631 : 1
Number of drive plates/ driven plates	Front clutch	3/3	
	Rear clutch	4/4	
	Low and reverse brake	4/4	
Servo diameter (Piston outer dia./retainer inner dia.) mm (in)		64/36 (2.52/1.42)	64/44 (2.52/1.73)
Speedometer gear ratio (Driven/Drive gear)		0.80 (20/25)	0.84 (21/25)
Automatic transaxle fluid	Type	Dexron-II or M-III	
	Capacity liters (US qt, Imp qt)	6.2 (6.6, 5.5)	

76G07C-002

CROSS-SECTIONAL VIEW

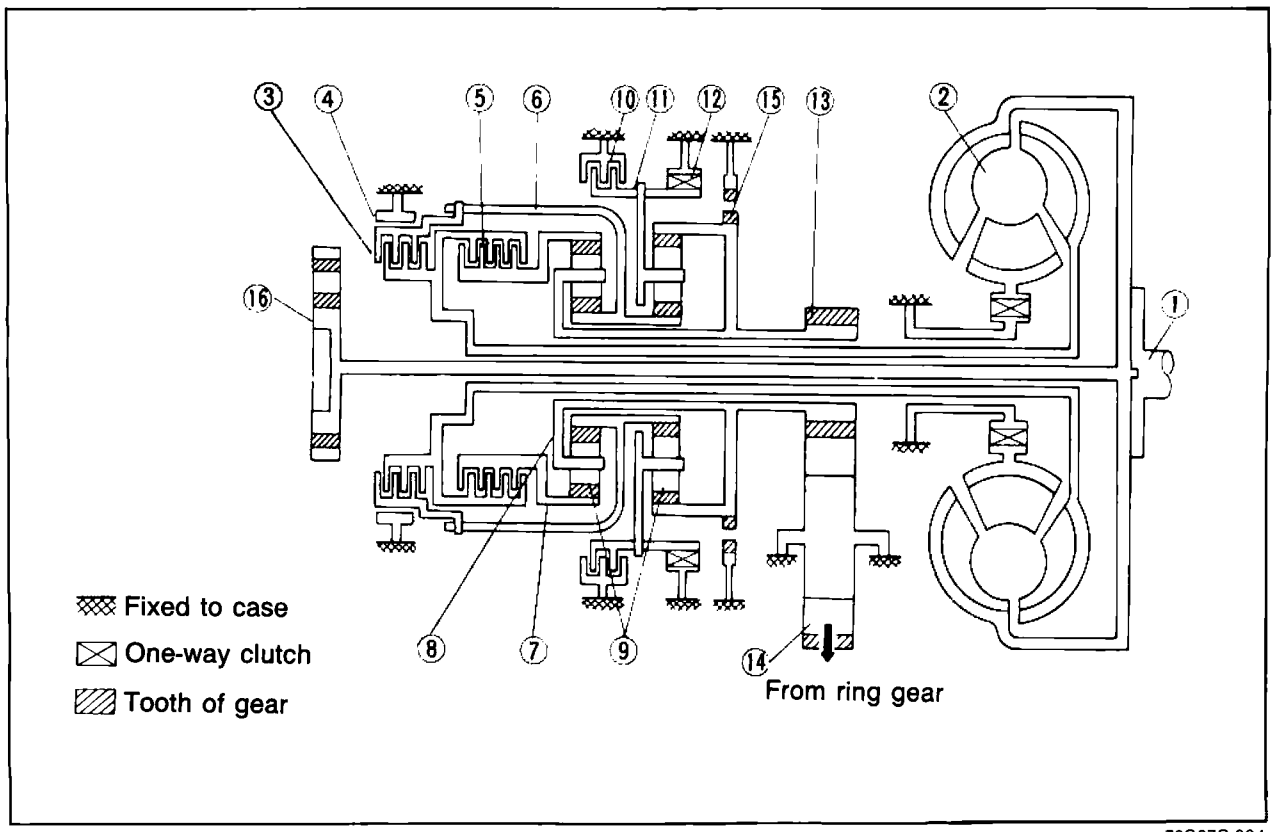
76G07C-003



63U07B-003

1. Transaxle case
2. Front clutch
3. Rear clutch
4. Connecting shell
5. Rear clutch hub
6. Planetary carrier (front)
7. Sun gear
8. Low and reverse brake
9. One-way clutch
10. One-way clutch inner race
11. Planetary carrier (rear)
12. Drum hub assembly
13. Bearing housing
14. Output gear
15. Turbine shaft
16. Oil pump shaft
17. Bearing cover
18. Oil seal
19. Torque converter
20. Converter housing
21. Oil seal
22. Speedometer drive gear
23. Side gear
24. Pinion gear
25. Pinion shaft
26. Differential gear case
27. Ring gear
28. Oil seal
29. Side bearing housing
30. Control valve body
31. Oil pan
32. Oil pump

OPERATION OF COMPONENTS



76G07C-004

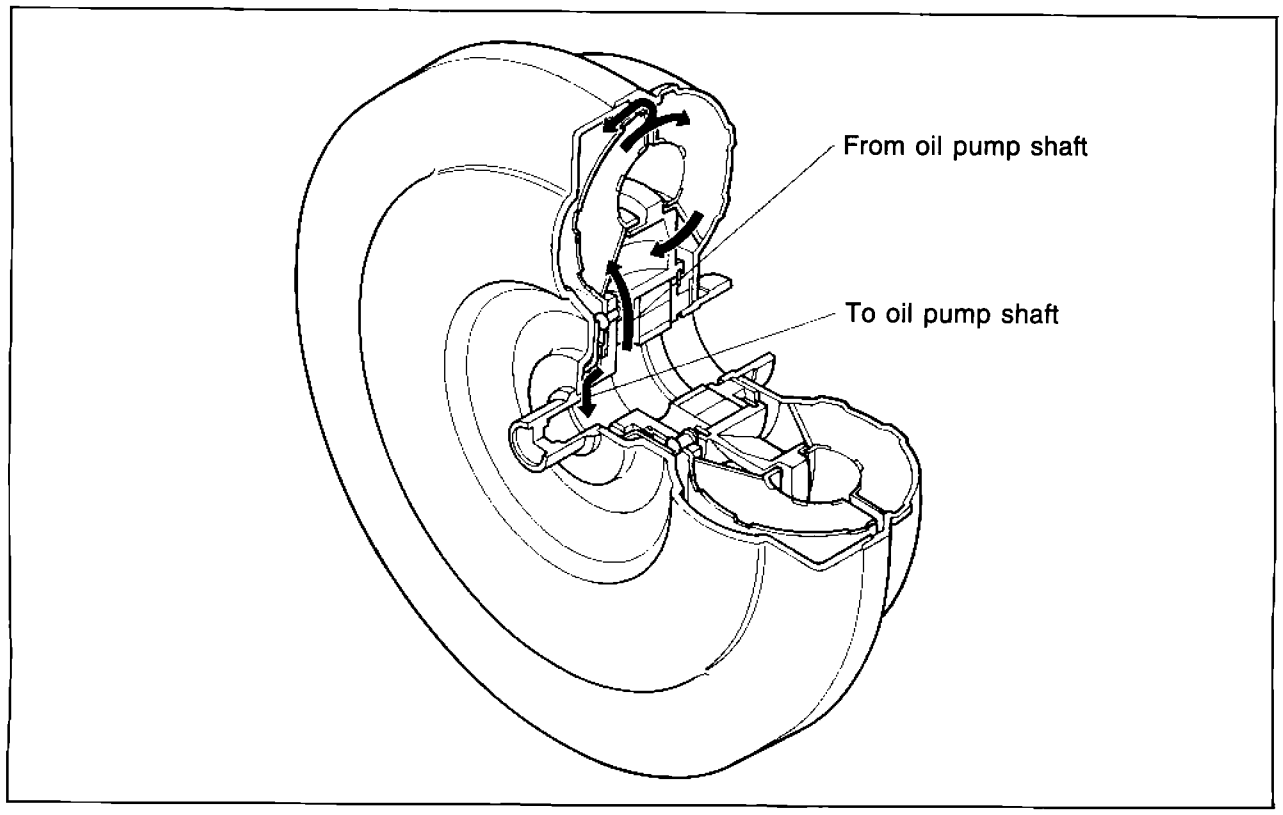
1. Crankshaft
2. Torque converter
3. Front clutch
4. Brake band
5. Rear clutch
6. Connecting shell
7. Internal gear
8. Planetary carrier (front)
9. Pinion gear
10. Low and reverse brake
11. Planetary carrier (rear)
12. One-way clutch
13. Output gear
14. Idle gear
15. Parking gear
16. Oil pump

Shift position		Gear ratio	Clutch		Low and reverse brake	Band servo		One-way clutch
			Front	Rear		Operation	Release	
P		—			○			
R		2.400	○		○		○	
N		—						
D	1	2.841		○				○
	2	1.541		○		○		
	3	1.000	○	○		⊗	○	
2		1.541		○		○		
1	2	1.541		○		○		
	1	2.841		○	○			

⊗ : Indicates fluid pressure to servo but not applied due to pressure difference in servo.

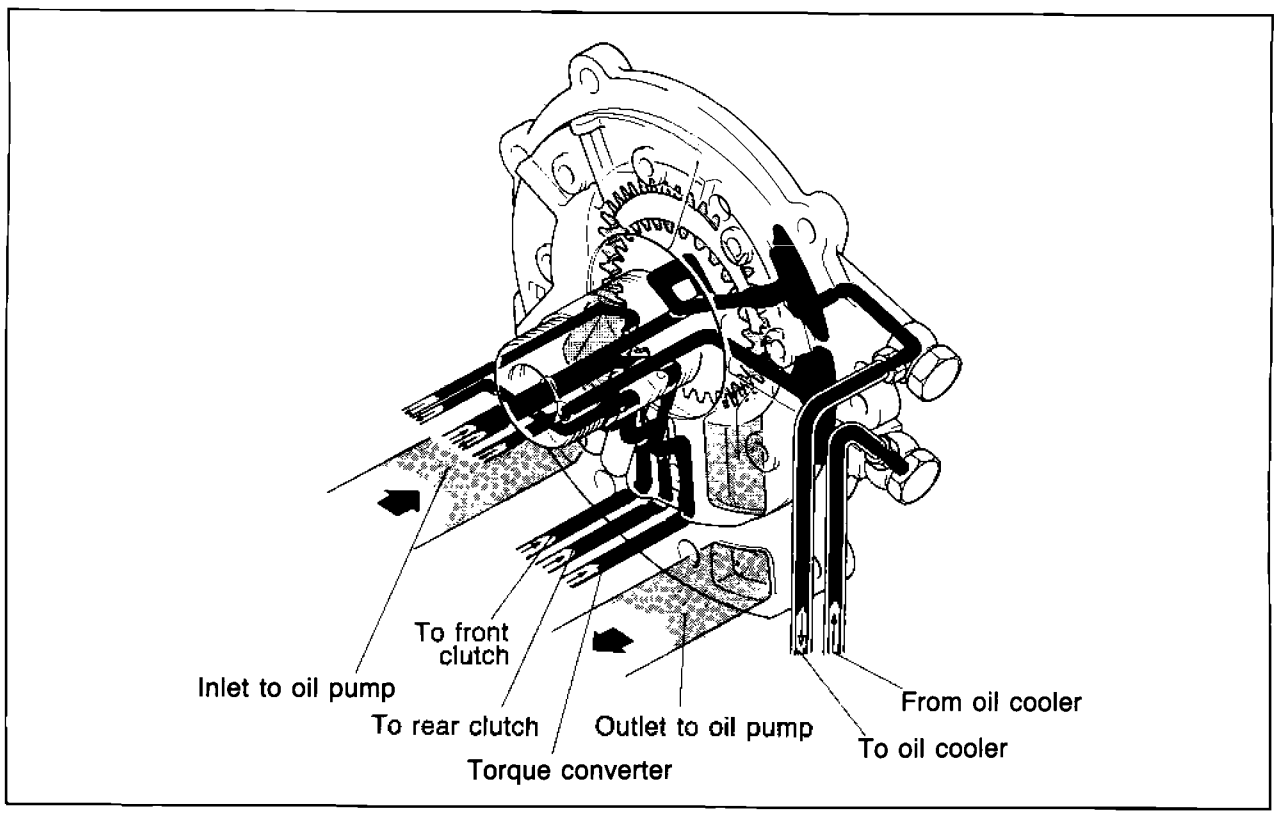
76G07C-005

FLUID PASSAGE LOCATION
Torque Converter



76G07C-006

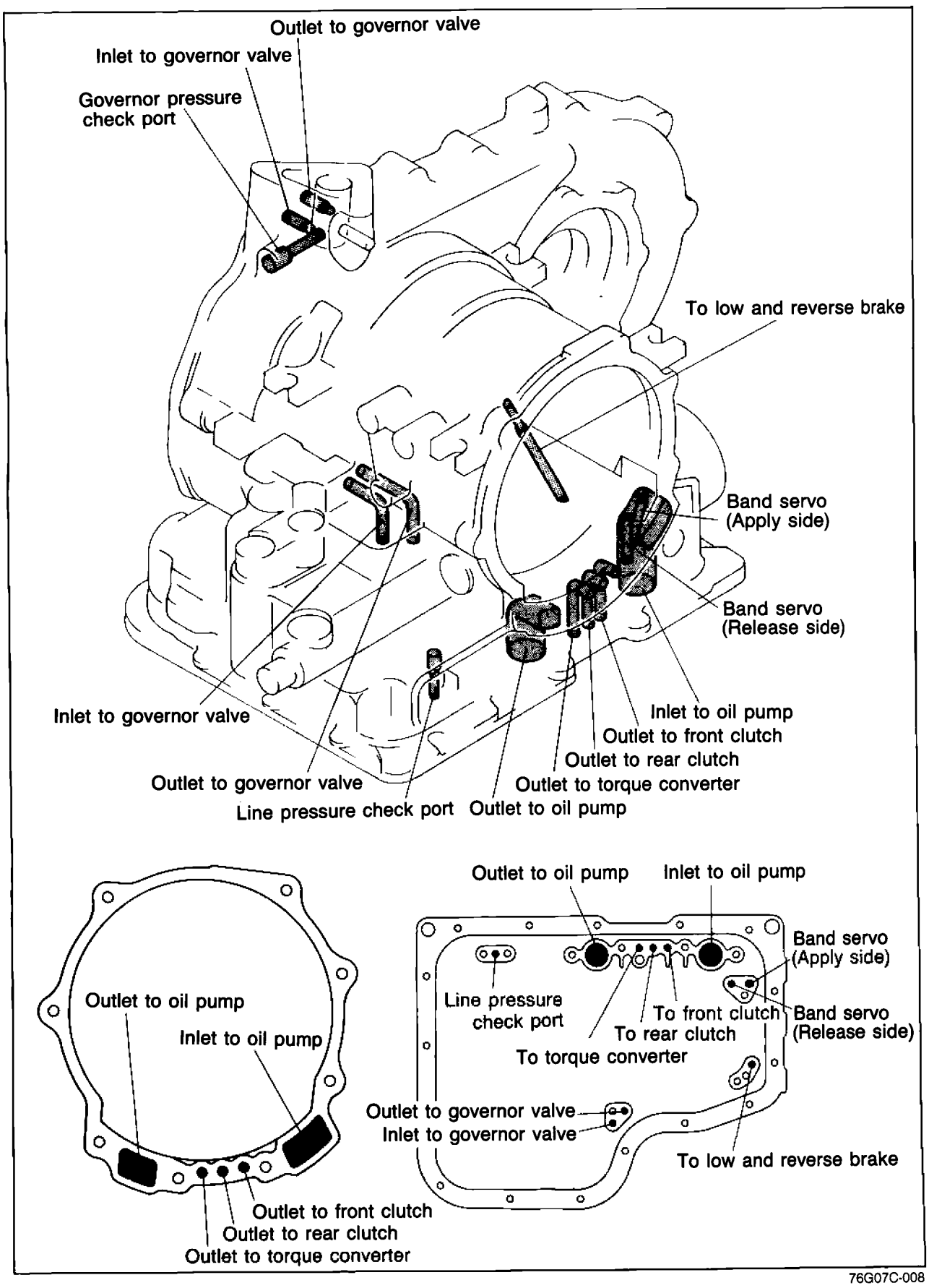
Oil Pump



76G07C-007

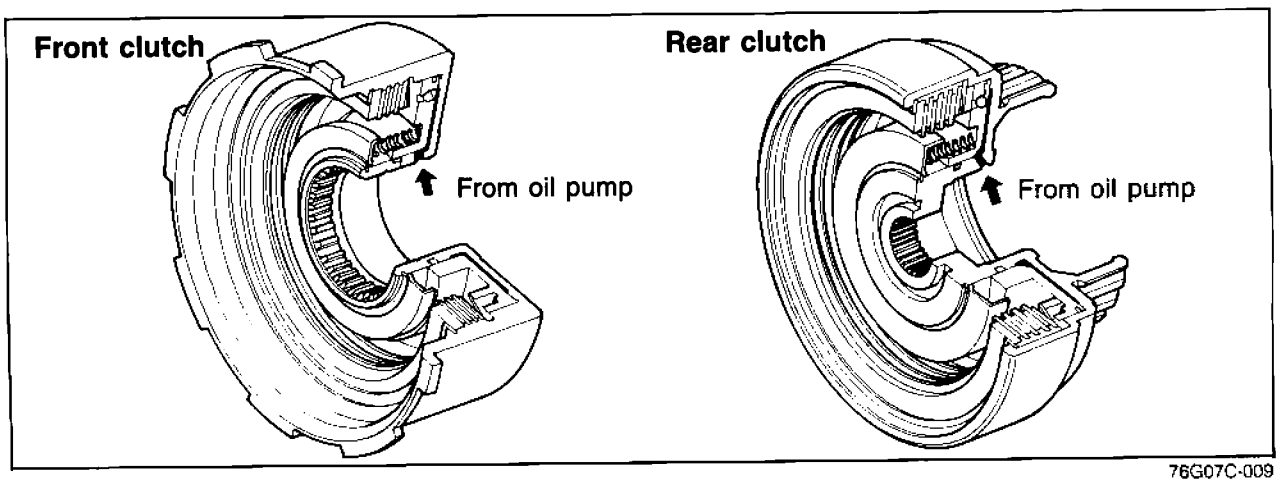
7C OUTLINE

Transaxle Case



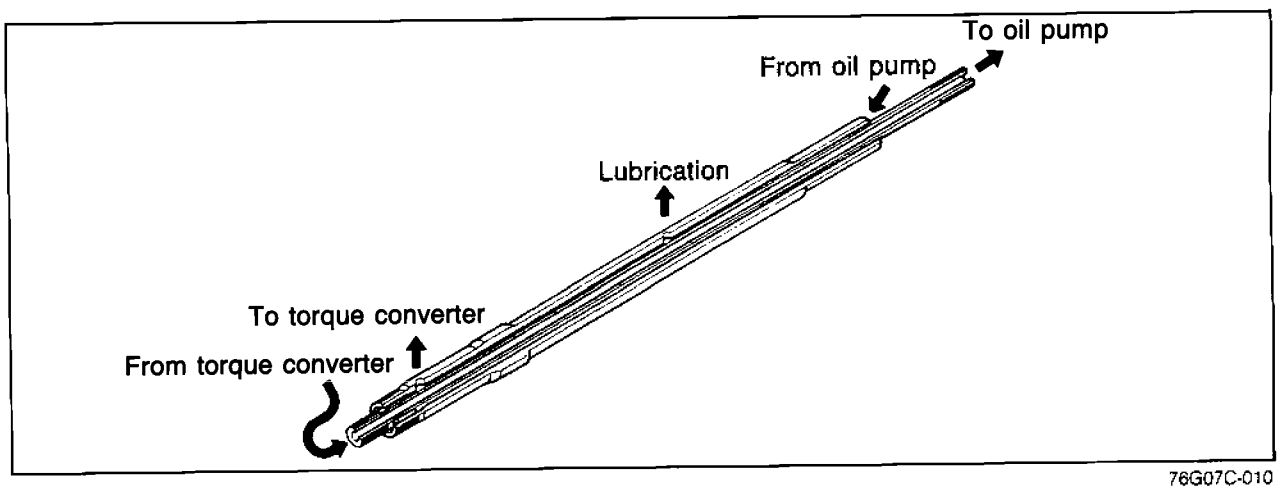
76G07C-008

Clutches



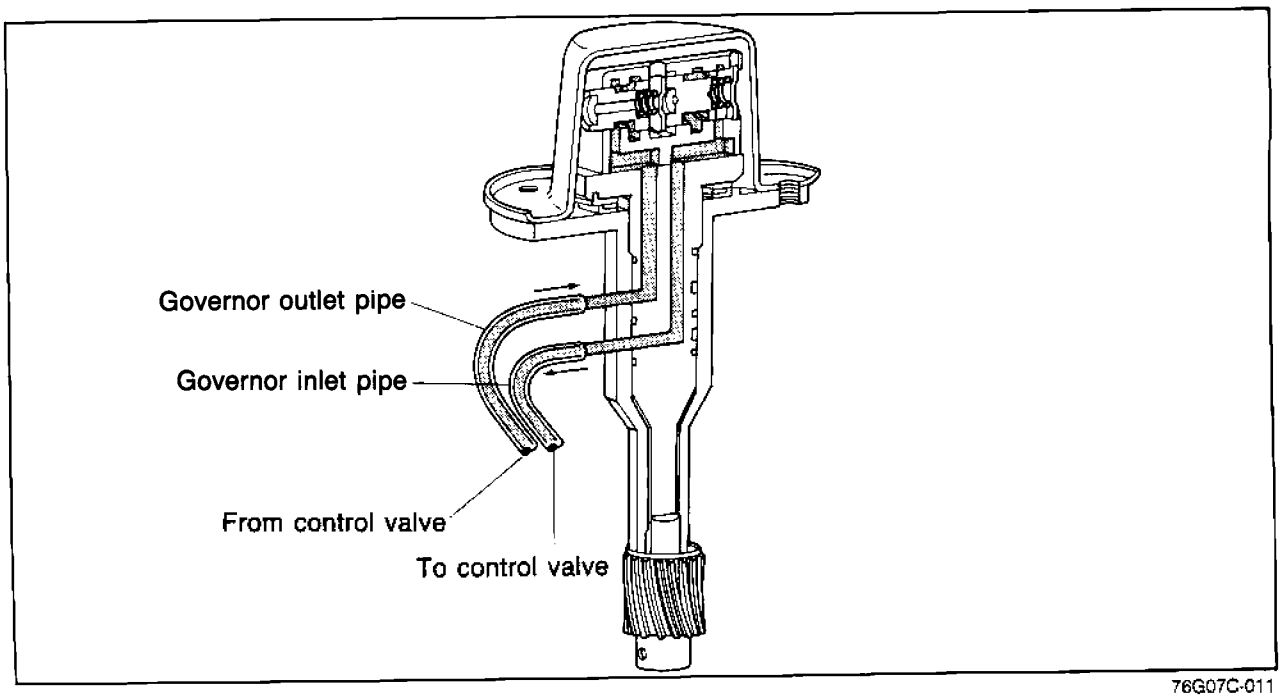
76G07C-009

Oil Pump, and Turbine Shaft



76G07C-010

Governor

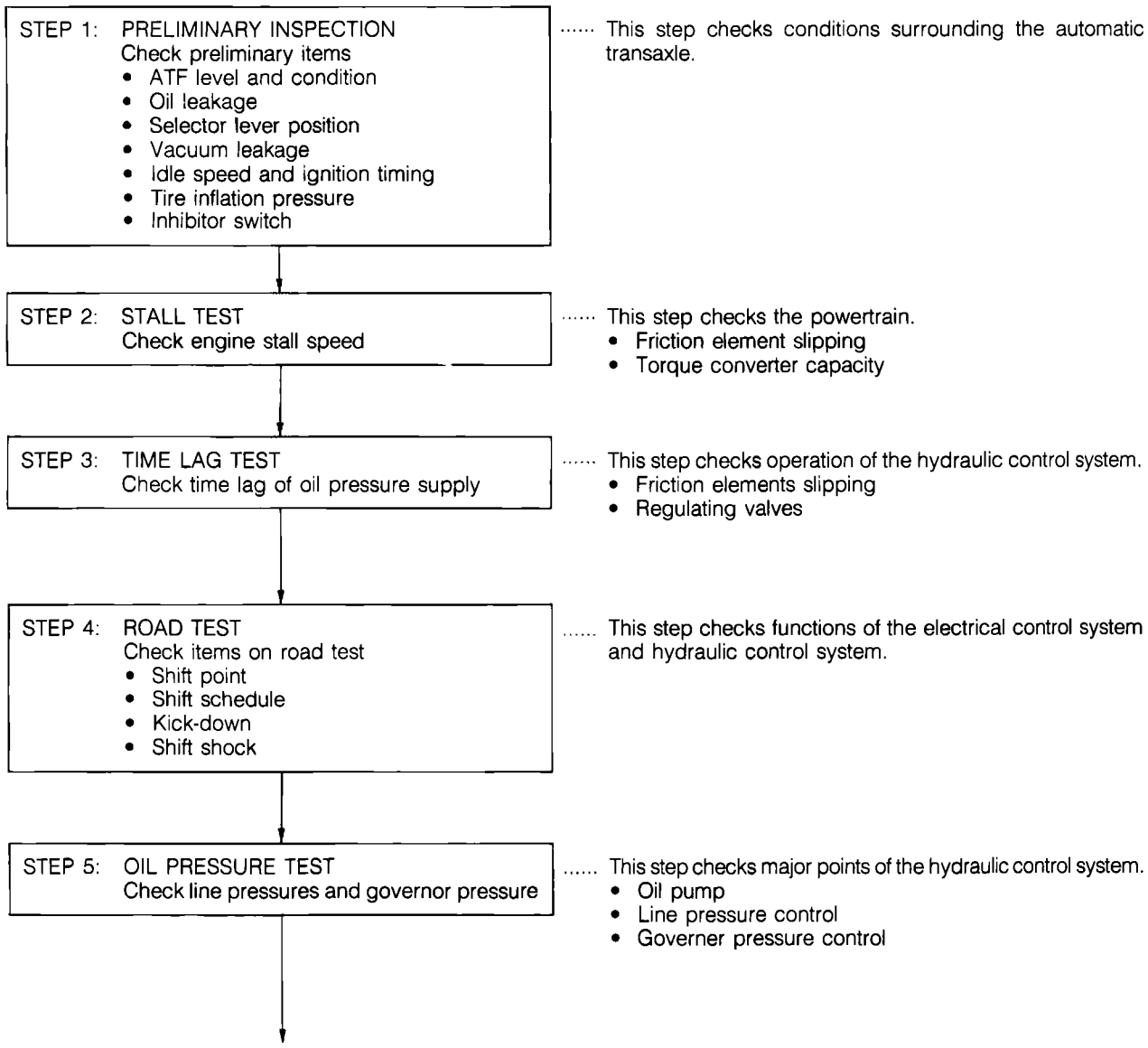


76G07C-011

TROUBLESHOOTING

GENERAL NOTE

In the event of a problem with the automatic transaxle, the cause may be in the engine, powertrain, hydraulic control system, or electrical control system. When troubleshooting, it is recommended to begin from those points that can be judged quickly and easily. The recommended troubleshooting sequence is described below.



By following the above five steps, the cause of the problem should be located.
As another guide to faster location of the causes of problems, the Quick Diagnosis Chart is included at pages 7C—9 to 7C—11.
In this chart, a circle is used to indicate the components that might be the cause of trouble for 54 types of problems. It is only necessary to check those components indicated by circles, at each step of the troubleshooting process, in order to quickly locate the cause of the problem.

76G07C-012

QUICK DIAGNOSIS CHART

How to use Quick Diagnosis Chart

1. The numbers indicate the order of inspection for troubleshooting.
2. Circled numbers indicate that the transaxle must be removed from the vehicle.

76G07C-013

Transaxle

Condition		Inspection point and reference page	ON VEHICLE											OFF VEHICLE											
			7C—25	7C—26	7C—23	7C—27	7C—23,24	Section 4A	7C—14	7C—20,22	7C—75	7C—72	7C—69	7C—5	Section 5	7C—58	7C—62	7C—70	7C—71	7C—55	7C—125	7C—54	7C—71	7C—66, 98	7C—68, 71
			ATF level and condition	Selector lever	Inhibitor switch and wiring	Vacuum diaphragm and piping	Kick-down solenoid, kick-down switch and wiring	Engine idle speed and condition	Engine stall speed	Fluid pressure (Line and governor)	Control valves	Governor valve	Band servo	Transaxle air check	Ignition switch and starter	Front clutch	Rear clutch	Brake band	Low and reverse brake	Oil pump	Hydraulic circuit	Torque converter	One-way clutch	Parking linkage	Planetary gear
Engine starting		Engine does not start in N or P range	•	2	3	•	•	•	•	•	•	•	•	•	1	•	•	•	•	•	•	•	•	•	•
		Engine starts in ranges other than N and P ranges	•	1	2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Accelerating		Vehicle does not move in D range (moves in 1, 2 & R ranges)	•	1	•	•	•	•	•	2	3	•	•	•	•	•	•	•	•	•	•	•	④	•	•
		Vehicle does not move in forward ranges (moves in R range) Extremely poor acceleration	1	2	•	•	•	•	•	3	4	•	•	5	•	•	⑥	•	•	•	⑦	•	•	•	•
		Vehicle does not move in R range (moves in forward range) Extremely poor acceleration	1	2	•	•	•	•	•	3	4	•	•	5	•	⑦	⑧	•	⑥	•	⑨	•	•	•	•
		Vehicle does not move in any range	1	2	•	•	•	•	•	3	4	•	•	5	•	•	•	•	•	⑥	⑦	•	•	⑧	•
		Slippage felt when accelerating	1	2	•	6	•	•	•	3	4	•	•	5	•	•	•	•	•	⑦	⑧	•	•	•	•
		Vehicle moves in N range	2	1	•	•	•	•	•	•	3	•	•	•	•	•	④	•	•	•	•	•	•	•	•
		Excessive creep	•	•	•	•	•	1	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		No creep at all	1	2	•	•	•	3	•	•	4	•	•	•	•	⑧	⑦	•	•	⑤	⑥	•	•	•	•
		Low maximum speed and poor acceleration	1	2	•	•	•	7	3	4	6	•	5	•	•	⑩	⑪	⑧	⑨	⑫	•	•	•	•	•
No shifting		Does not shift from 1st to 2nd	•	1	•	2	3	•	•	•	4	5	6	7	•	•	⑧	⑨	•	•	⑩	•	•	•	•
		Does not shift from 2nd to 3rd	•	1	•	2	3	•	•	•	4	5	6	7	•	⑧	•	•	•	•	⑨	•	•	•	•
		Does not shift from 3rd to 2nd	1	•	•	2	•	•	•	•	3	4	5	6	•	⑦	•	⑧	•	•	⑨	•	•	•	•

76G07C-014

	Inspection point and reference page	ON VEHICLE						OFF VEHICLE				
		7C—25 7C—26 7C—23	7C—27 7C—23,24 Section 4A	7C—14 7C—20,22 7C—75	7C—72 7C—69 7C—5	Section 5		7C—58 7C—62 7C—70	7C—71 7C—55 7C—125	7C—54 7C—71 7C—66, 98	7C—68, 71	
	Condition	ATF level and condition Selector lever Inhibitor switch and wiring	Vacuum diaphragm and piping Kick-down solenoid, kick-down switch and wiring Engine idle speed and condition	Engine stall speed Fluid pressure (Line and governor) Control valves	Governor valve Band servo Transaxle air check	Ignition switch and starter		Front clutch Rear clutch Brake band	Low and reverse brake Oil pump Hydraulic circuit	Torque converter One-way clutch Parking linkage	Planetary gear	
No shifting	Does not shift from 2nd to 1st or from 3rd to 1st	1 • •	2 • •	• • 3	4 5 6	•		• • ⑦	• • •	• ⑧ •	•	
	Does not kick-down when accelerator is depressed in 3rd within the kick-down range	1 • •	3 2 •	• • 4	5 • •	•		• • ⑥	• • ⑦	• • •	•	
	Excessive engine speed when accelerated in 3rd due to delayed kick-down	1 2 •	• • •	• 3 4	5 • 6	•		⑦ • •	• • ⑧	• • •	•	
	Does not shift from 3rd to 2nd on D to 2 range shift	1 2 •	• • •	• 3 4	5 6 •	•		⑦ • ⑧	• • ⑨	• • •	•	
	Does not shift from 3rd to 2nd on D to 1 range shift	1 2 •	• • •	• 3 4	5 7 6	•		⑧ • ⑨	• • ⑩	• • •	•	
Shift shock	Excessive N to D range shift shock	• • •	2 • 1	• 3 4	• • •	•		• ⑤ •	• • •	• • •	•	
	Excessive 1st to 2nd shift shock	1 • •	2 • •	3 • 4	• 5 6	•		• • ⑦	• • •	• • •	•	
	Excissive 2nd to 3rd shift shock	• • •	1 • •	• 2 3	• 4 5	•		⑦ • ⑥	• • •	• • •	•	
	Vehicle braked when shifted from 1st to 2nd	1 • •	• • •	• • 2	• • •	•		④ • •	③ • •	• ⑤ •	•	
	Vehicle braked when shifted from 2nd to 3rd	1 • •	• • •	• • 3	• 2 •	•		• • ④	• • •	• • •	•	
	Vehicle braked when shifted to R range	1 • •	• • •	• • •	• 3 2	•		• ④ ⑤	• • •	• • ⑥	•	
	Shift shock felt when accelerator is released and deceleration occurs	• 1 •	2 3 •	• 4 5	6 • •	•		• • •	• • ⑦	• • •	•	
	Excessively large 2nd to 1st shift shock in 1 range	1 • •	2 • •	3 4 5	• • •	•		• • •	⑥ • •	• • •	•	
Shift point	Excessively high 1st to 2nd and 2nd to 3rd shift	1 • •	2 3 •	• 4 5	6 • •	•		• • •	• • ⑦	• • •	•	
	Excessively high 3rd to 2nd and 2nd to 1st shift point	• 1 •	2 3 •	• 4 5	6 • •	•		• • •	• • ⑦	• • •	•	
	Kick-down operates or engine overruns when depressing pedal in 3rd beyond kick-down speed limit	1 2 •	3 • •	• 4 5	6 • 7	•		⑧ • •	• • ⑨	• • •	•	
Shift sequence	Shifts directly from 1st to 3rd	1 • •	• • •	• • 2	3 • 4	•		• • ⑤	• • ⑥	• • •	•	
	Shifts from 2nd to 1st or 2nd to 3rd in 2 range	• 1 •	• • •	• 2 3	• • •	•		• • •	• • •	• • •	•	

76G07C-015

Condition \ Inspection point and reference page		ON VEHICLE						OFF VEHICLE				
		7C—25 7C—26 7C—23	7C—27 7C—23,24 Section 4A	7C—14 7C—20,22 7C—75	7C—72 7C—69 7C—5	Section 5		7C—58 7C—62 7C—70	7C—71 7C—55 7C—125	7C—54 7C—71 7C—66, 98	7C—68, 71	
		ATF level and condition Selector lever Inhibitor switch and wiring	Vacuum diaphragm and piping Kick-down solenoid, kick-down switch and wiring Engine idle speed and condition	Engine stall speed Fluid pressure (Line and governor) Control valves	Governor valve Band servo Transaxle air check	Ignition switch and starter		Front clutch Rear clutch Brake band	Low and reverse brake Oil pump Hydraulic circuit	Torque converter One-way clutch Parking linkage	Planetary gear	
Shift sequence	Shifts from 1st to 2nd or 2nd to 3rd in 1 range	• 1 •	• • •	• • 2	• • •	•		• • •	• • ③	• • •	•	
Slipping	Practically no shift shock, or slippage while 1st to 2nd shifting	1 2 •	3 • •	• 4 5	• 7 6	•		• • ⑧	• • ⑨	• • •	•	
	Pracatically no shift shock or slippage while 2nd to 3rd shifting	1 2 •	3 • •	• 4 5	• 7 6	•		⑧ • •	• • ⑨	• • •	•	
	No shift shock or engine runaway in 1 to 2 range shift	1 2 •	3 • 4	5 • 6	• • 7	•		• • ⑧	• ⑨ •	• • •	•	
	Engine runaway or slip when shifting 3rd to 2nd	1 • •	2 • •	• 3 4	• 5 6	•		⑦ • ⑧	• • ⑨	• • •	•	
	Slippage evident when vehicle starts moving	1 2 •	5 • •	• 3 4	• • 6	•		• • •	• ⑦ ⑧	• • •	•	
Noise	Transaxle noisy in P and N range	1 • •	• • •	• 2 •	• • •	•		• • •	• ③ •	• • •	•	
	Transaxle noisy in D, 2, 1 and R ranges	1 • •	• • •	• 2 •	• • •	•		• ③ •	• ④ •	• ⑤ •	⑥	
Others	No engine brake in 1 range	• 1 •	• • •	• 2 3	• • 4	•		• • •	⑤ • ⑥	• • •	•	
	Vehicle moves in P range or parking gear not disengaged when P range disengaged	• 1 •	• • •	• • •	• • •	•		• • •	• • •	• • ②	•	
	Transaxle overheats	1 • •	• • •	3 4 5	• 2 6	•		⑦ ⑧ ⑨	⑩ ⑪ ⑫	⑬ • •	⑭	
	White smoke from exhaust while running	1 • •	2 • •	3 4 5	• • 6	•		⑦ ⑧ ⑨	⑩ ⑪ ⑫	⑬ • •	⑭	
	Abnormal odor from oil level gauge pipe	1 • •	• • •	• • •	• • •	•		② ③ ④	⑤ ⑥ ⑦	⑧ • •	⑨	

76G07C-016

Differential

Problem	Probable Cause	Remedy	Page
Noise	Insufficient fluid	Add	7C—25
	Low fluid quality	Replace with specified ATF	7C—25
	Worn bearing	Adjust or replace	7C—79
	Contact surface of gears worn	Replace	7C—79
	Tooth surface of gears damaged	Replace	7C—79
	Contaminated ATF	Repair or replace	7C—25
	Differential gear damaged, excessive backlash	Replace	7C—79
	Excessive bearing preload	Adjust	7C—94

76G07C-017

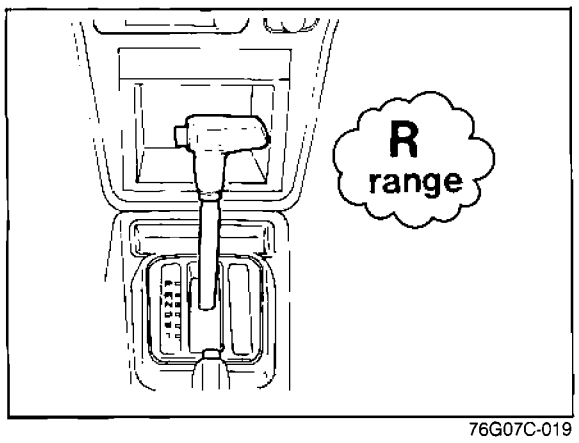
7C TROUBLESHOOTING

STEP 1 (PRELIMINARY INSPECTION)
In this step, the main points related to the automatic transaxle are checked. These items must be kept in the correct condition at all times in order to assure proper operation of the automatic transaxle.

1. Automatic Transaxle Fluid (ATF)
Check ATF level and condition. (Refer to page 7C—25.)

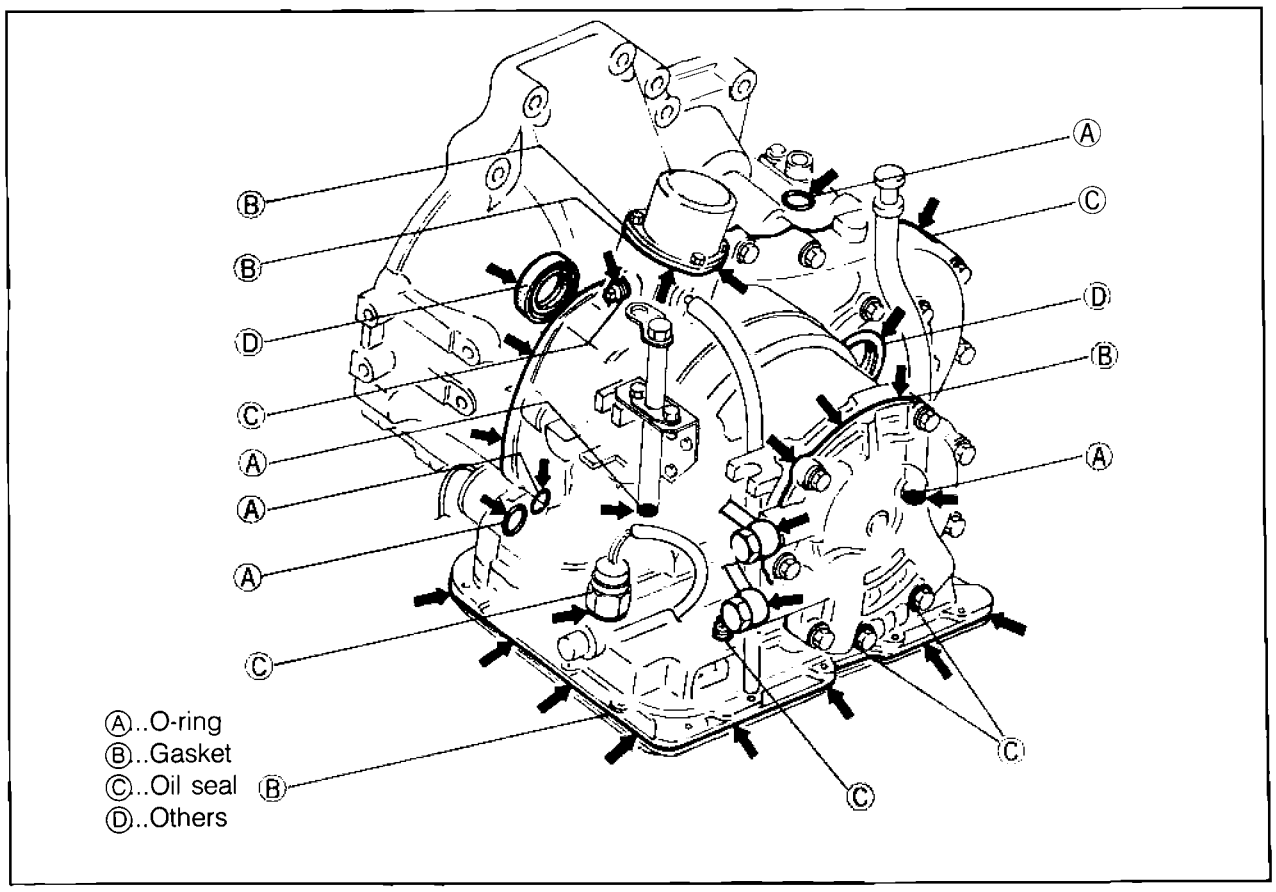
2. Selector Lever
Check selector lever position and adjust it if necessary. (Refer to page 7C—26.)

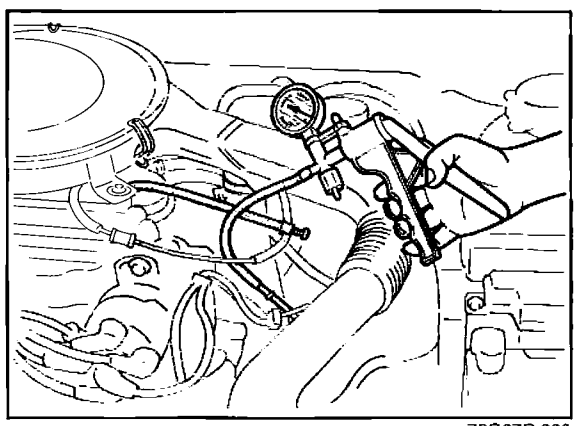
76G07C-018



76G07C-019

3. Oil Leakage
Check for oil leakage.
(1) Warm up the ATF.
(2) Apply the parking brake and block the wheels to prevent the vehicle from rolling.
(3) Shift the selector lever to R range.
(4) Check if oil leaks from the noted oil seals or gaskets.
(5) If oil leaks, replace the seal or gasket.



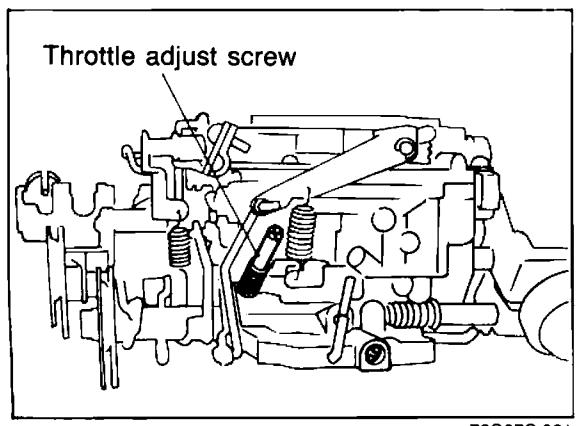


76G07C-020

4. Vacuum Leakage

Check for vacuum leakage.

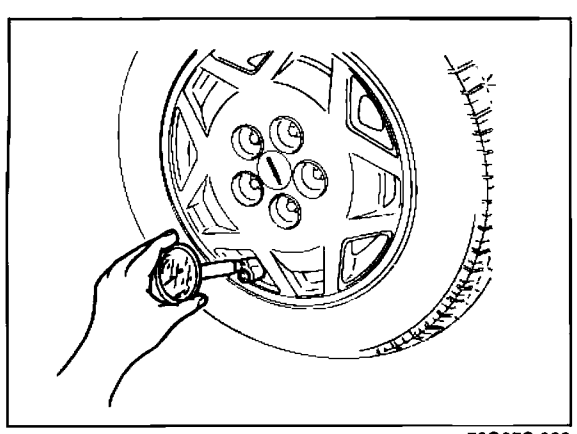
(1) Disconnect the vacuum hose to the vacuum diaphragm.
(2) Connect a vacuum pump to the hose.
(3) Apply vacuum and check if vacuum leaks.
(4) If vacuum leaks, check the vacuum hose and vacuum diaphragm. Replace if necessary.



76G07C-021

5. Idle Speed and Ignition Timing

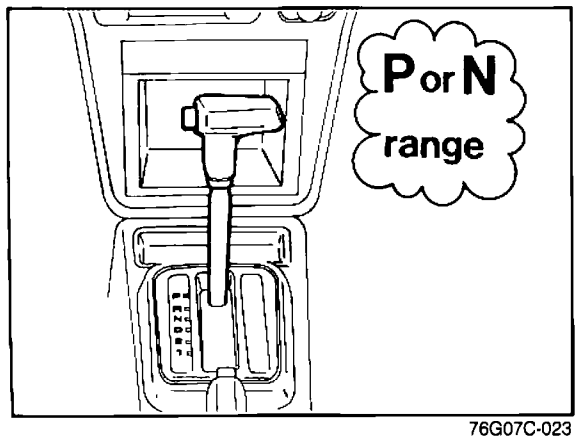
Check idle speed and ignition timing. (Refer to Section 4A.)



76G07C-022

6. Tire Inflation Pressure

Check tire inflation pressure. (Refer to page 12—2.)



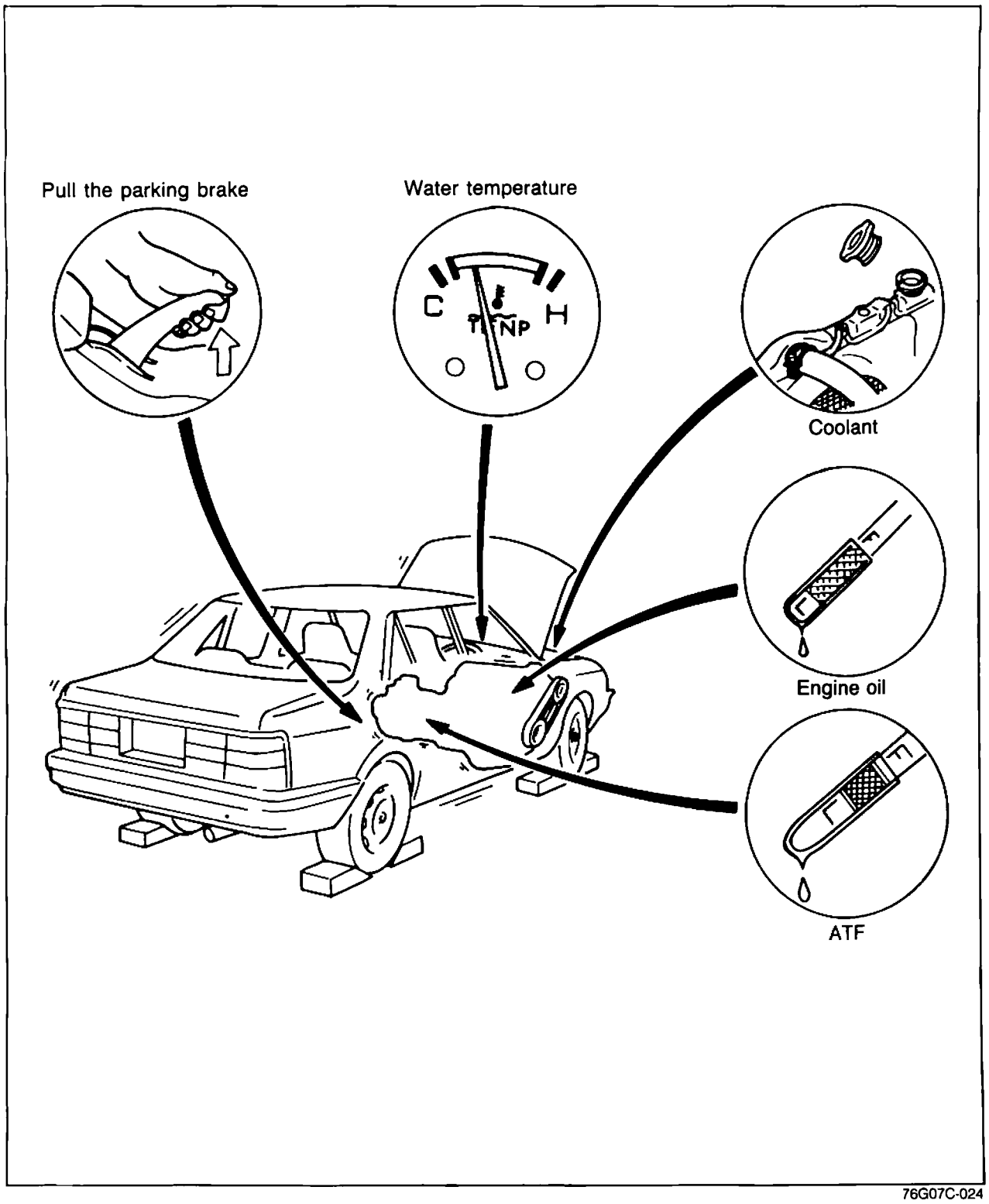
76G07C-023

7. Inhibitor Switch

Check the inhibitor switch for operation. (Refer to page 7C—23.)

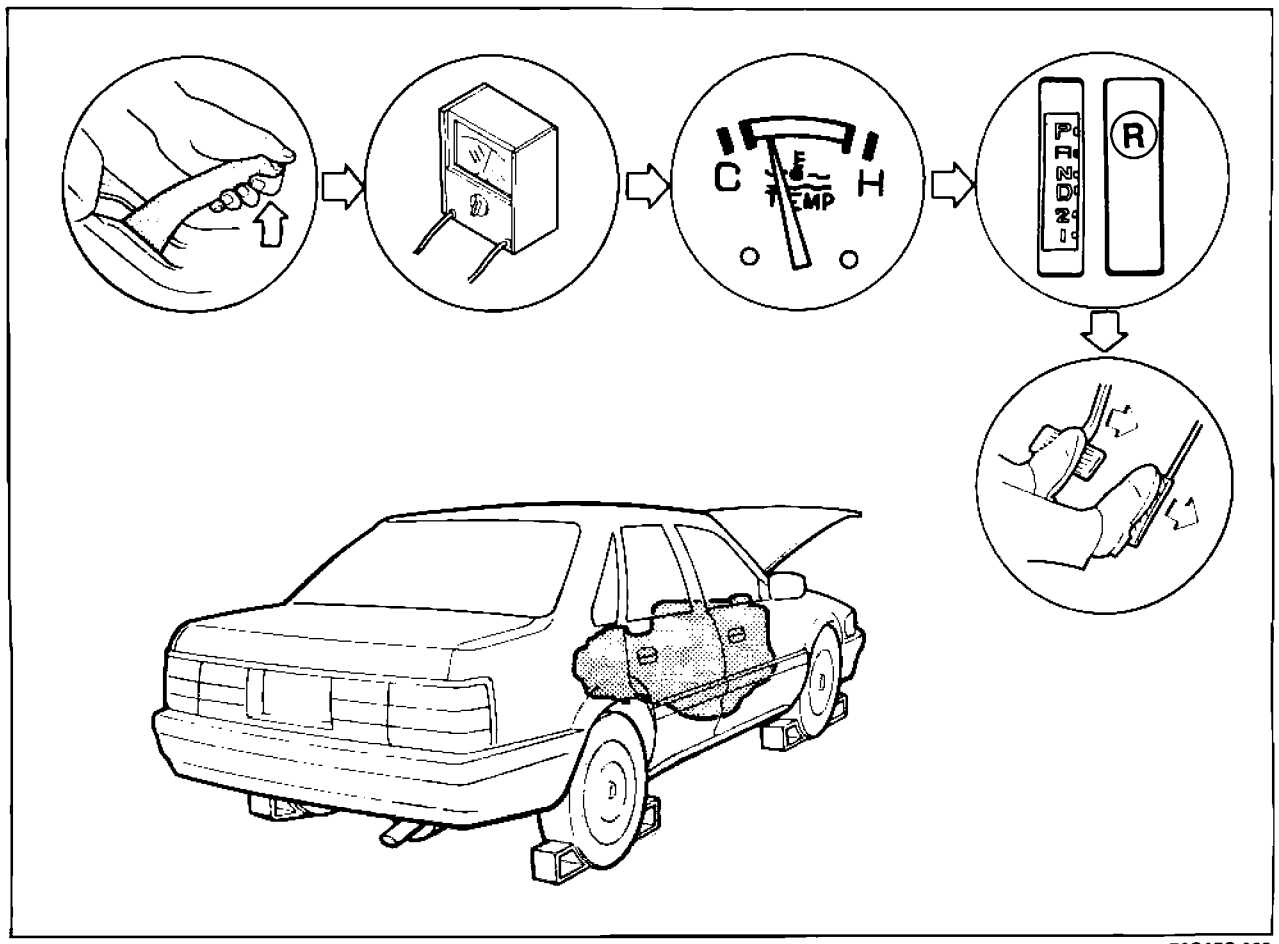
STEP 2 (STALL TEST)
This step is performed to determine if there is slippage of the friction elements or malfunction of the hydraulic components.

Preparation
Check the following items prior to testing:
1. Engine coolant, engine oil and ATF levels.
2. Warm the engine thoroughly to raise the ATF temperature to operating level (50—80°C, 122—176°F).
3. Set the parking brake and block the front and rear of the wheels.



76G07C-024

Procedure



76G07C-025

1. Connect a tachometer to the engine.
2. Shift the selector lever to D range.
3. Depress the brake pedal firmly with the left foot, and gradually depress the accelerator pedal with the right foot.
4. Read and note the engine speed as soon as it becomes constant; then release the accelerator pedal.

   Caution
   Steps 3 to 4 must be done within 5 seconds.

5. Shift the selector to N range and let the engine idle for one minute or more.

   Note
   The idling cools the ATF and prevents oil degeneration.

6. Perform stall tests for the following ranges in the same manner.
   (1) 2 range
   (2) 1 range
   (3) R range

Standard stall speed:
FE engine 2050—2150 rpm
F6 engine 1800—2050 rpm

Caution
Always provide adequate cooling time between individual range stall tests.

Evaluation

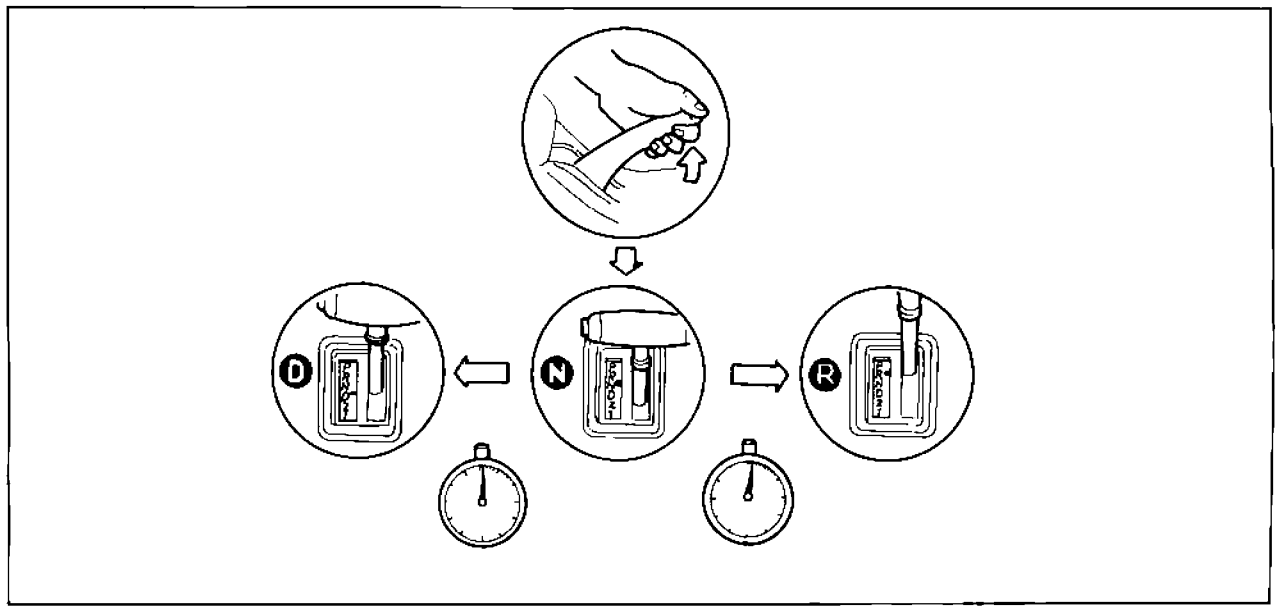
Condition		Possible cause	
Above specification	In all ranges	Insufficient line pressure	Worn oil pump
			Oil leakage from oil pump, control valve, and/or transaxle case
			Stuck pressure regulator valve
	In D, 2, and 1	Rear clutch slipping	
	In D range only	One-way clutch slipping	
	In 2 range only	Brake band slipping	
	In R range only	Low and reverse brake slipping	
		Brake band slipping	
		Road test to determine if cause is low and reverse brake or reverse clutch: a) Engine braking in 1 range..... Front clutch b) No engine braking in 1 range .... Low and reverse brake	
Within specification		All shift control elements within transaxle functioning normally	
Below specification		Engine out of tune	
		One-way clutch slipping within torque converter	

76G07C-026

STEP 3 (TIME LAG TEST)
When the selector lever is shifted while the engine is idling, there is a certain time lapse, or time lag, before shock is felt. This time lag test checks the condition of the front, rear, and one-way clutch, low and reverse brake, and orifice check valve.

Preparation
Follow the test preparation procedure shown in STEP 2 (STALL TEST).

Procedure



1. Start the engine and verify that the idle speed is 950^{+50}_{0} rpm.
2. Shift from N range to D range
3. Measure the time it takes from shifting until shock is felt with a stop watch.
4. Shift the selector to N range and run the engine at idle for one minute or more.
5. Perform the test for N range to R range in the same manner.

Note
Make three measurements for each test and take the average value.

Specified time lag: N → D range ..... 0.5—1.0 second
N → R range ..... 0.5—1.0 second

Evaluation

Condition		Possible Cause
N → D shift	More than specification	Insufficient line pressure
		Rear clutch slipping
		One-way clutch slipping
	Less than specification	N-D accumulator not operating properly
N → R shift	More than specification	Insufficient line pressure
		Low and reverse brake slipping
		Front clutch slipping
	Less than specification	Stuck orifice check valve
		Excessive line pressure

76G07C-027

STEP 4 (ROAD TEST)
This step is performed to check for problems in the various ranges. If these tests show any problems, adjust or replace by referring to the **QUICK DIAGNOSIS CHART** and mechanical sections.

Caution
Perform the test at normal ATF operating temperature (50—80°C, 122—176°F).

Gearshift Function Check Items
1. Shift shock must be minimal, and shifting must be smooth.
2. Engine speed must not run away, and the shifting must not be delayed.
3. Transaxle must shift through $D_1 \rightarrow D_2 \rightarrow D_3$ in D range.
4. Transaxle must shift from 3rd in D range to 2nd gear when 2 range is selected.
5. Transaxle must shift from 2nd to 1st when 1 range is selected from 3rd gear in D range.
6. Transaxle must not upshift in 1 range.
7. Transaxle must remain in 2nd gear in 2 range.
8. Transaxle must positively lock in P range.
   The transaxle must positively lock when P range is selected while moving at a speed below 4 km/h (2.5 mph) on level ground. The transaxle must positively lock when set in P range with the vehicle on a gentle slope and the brakes disengaged.

Shift Speed

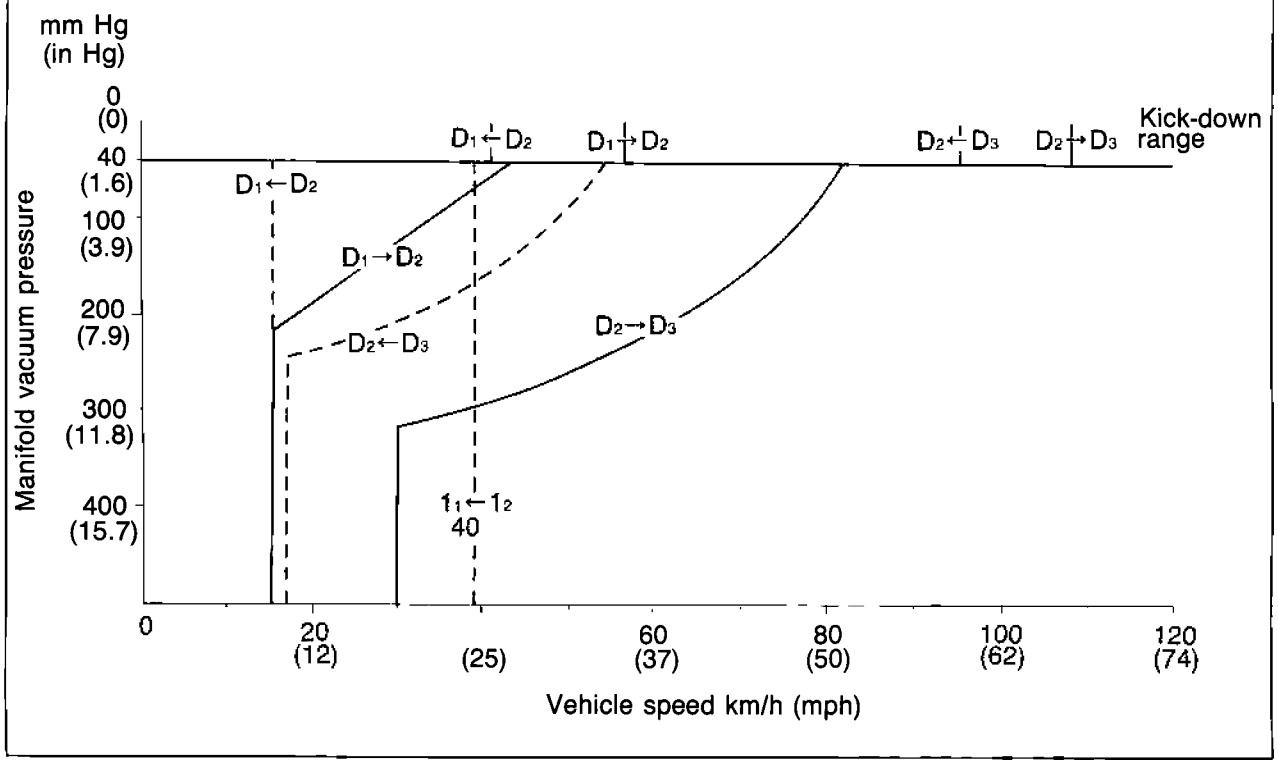
Throttle condition (manifold vacuum)	Range	Shift	Vehicle speed km/h (mph)	
			FE engine	F6 engine
Fully opened 0—100 mmHg (0—3.94 inHg)	D	1st → 2nd	47—57 (29—35)	44—54 (27—33)
		2nd → 3rd	106—119 (66—74)	95—108 (59—67)
		3rd → 2nd	95—103 (59—64)	86—94 (53—58)
		2nd → 1st	35—39 (22—24)	34—38 (21—24)
Half-throttle 130 mmHg (5.12 inHg)	D	1st → 2nd	18—31 (11—19)	18—31 (11—19)
		2nd → 3rd	39—68 (24—42)	44—73 (27—45)
Fully closed	D	2nd → 1st	10—15 (6—9)	10—15 (6—9)
	1	2nd → 1st	32—39 (20—24)	33—40 (20—25)

1. Full-throttle: The throttle opening during kick-down when the manifold vacuum is between **0—100 mmHg (0—3.94 inHg)**
2. Half-throttle: The throttle opening at manifold vacuum of **130 mmHg (5.12 inHg)**

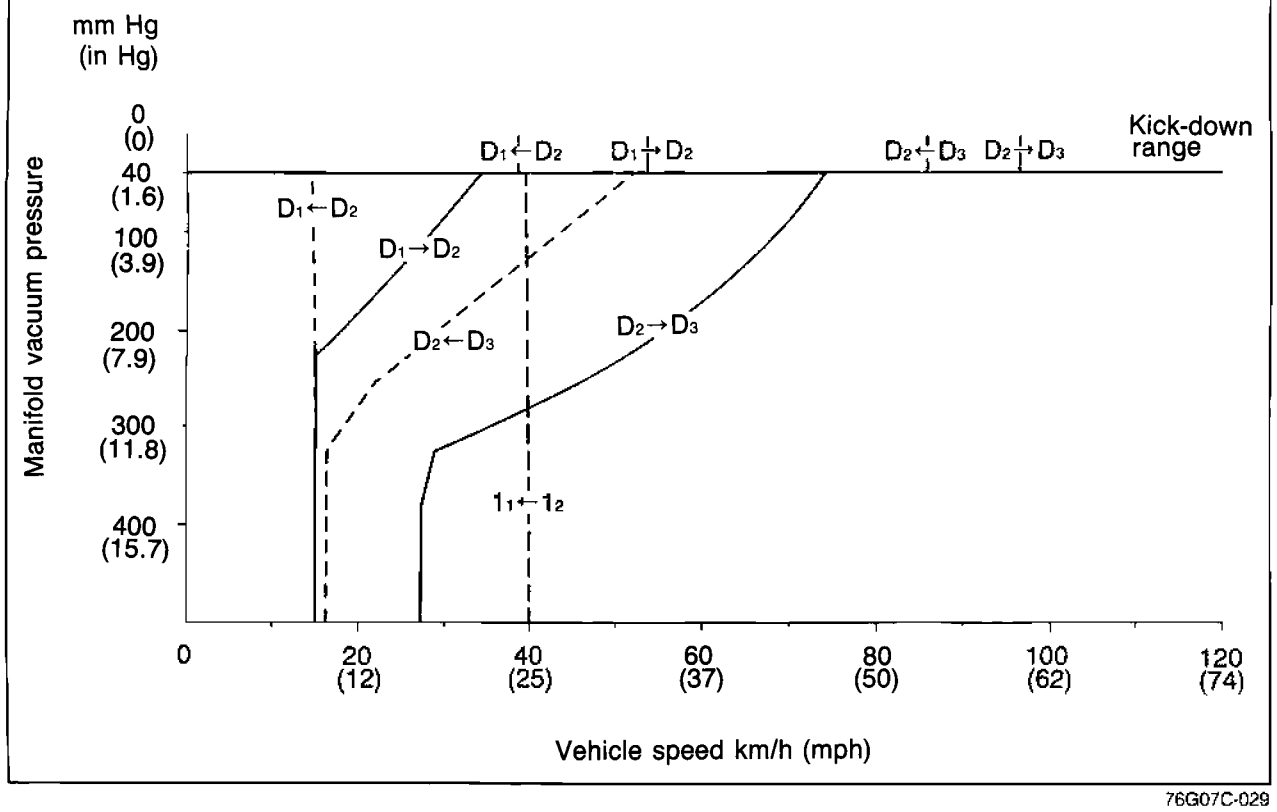
76G07C-028

Basic Gearshift Pattern

FE engine



F6 engine

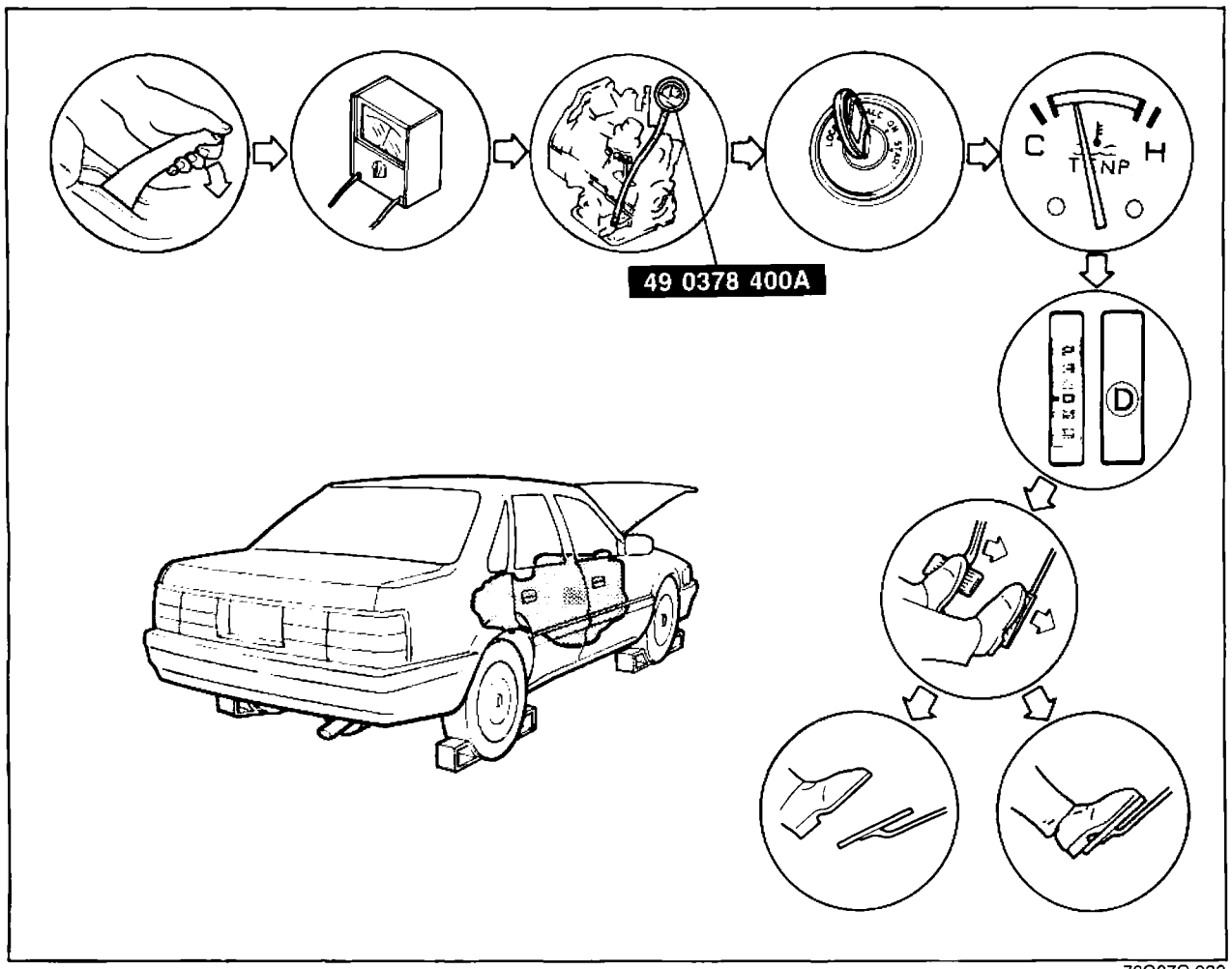


76G07C-029

STEP 5 (OIL PRESSURE TEST)
This step determines line pressure, and governor pressure to check the hydraulic components and for oil leakage.

Line Pressure Test
Preparation
1. Connect the **SST** to the line pressure output point.
2. Connect a tachometer to the engine.
3. Follow the test preparation procedure show in STEP 2 (STALL TEST).

Procedure



76G07C-030

1. Start the engine and verify that the idle speed is 950^{+50}_{0} rpm.
2. Shift the selector lever to D range.
3. Read the line pressure at idle.
4. Depress the brake pedal firmly with the left foot, and gradually depress the accelerator pedal with the right foot.
5. Read the line pressure as soon as the engine speed becomes constant; then release the accelerator pedal.

   Caution
   Steps 4 to 5 must be done within 5 seconds.

5. Shift the selector lever to N range and let the engine idle for one minute or more.
6. Read the line pressure at idle and engine stall speeds for each range in the same manner.

Specified line pressure:

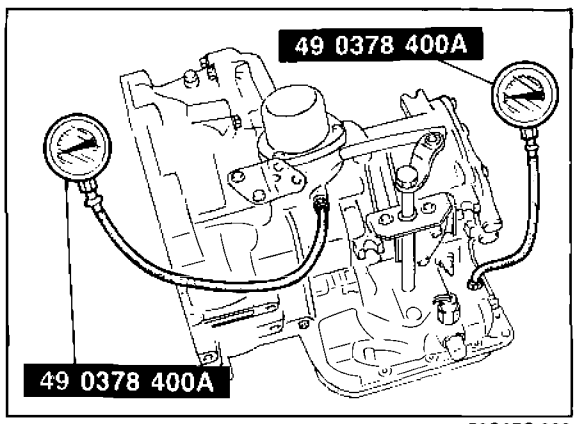
Range	Pressure kPa (kg/cm², psi)	
	Idle	Stall
D	294—392 (3—4, 43—57)	883—1079 (9—11, 128—156)
2	785—1177 (8—12, 114—171)	785—1177 (8—12, 114—171)
1	294—392 (3—4, 43—57)	883—1079 (9—11, 128—156)
R	392—687 (4—7, 57—100)	1570—1864 (16—19, 228—270)

76G07C-031

Evaluation

Condition		Possible cause
Below standard	In all ranges	Worn oil pump
		Fluid leakage from the oil pump, control valve, or transaxle case
		Stuck pressure regulator valve
	In D, 1, 2 ranges	Fluid leakage from the rear clutch or governor hydraulic circuit, or both
	In R range only	Fluid leakage from the low and reverse brake hydraulic circuit
Excessive line pressure at idle		Leaking or disconnected vacuum hose
		Leaking vacuum diaphragm

76G07C-032

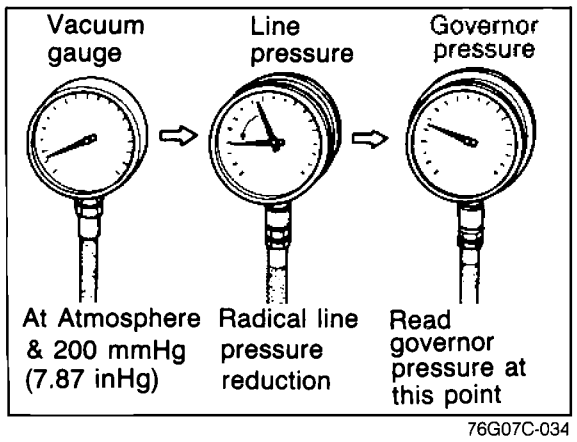


76G07C-033

Line Pressure Cutback Point

1. Connect the **SST** to the line pressure output point and the governor pressure output point in the transaxle case, and place the gauges inside the vehicle.
2. Disconnect the hose to the vacuum diaphragm, and plug it.
3. Connect a vacuum pump to the vacuum diaphragm, and place the pump inside the vehicle.
4. Gradually accelerate the vehicle in D range.
5. Read the governor pressure at the point where the line pressure suddenly drops.
6. Apply **200 mmHg (7.87 inHg)** vacuum, and repeat steps 4 and 5.

Standard



76G07C-034

Vacuum mmHg (inHg)	Governor pressure kPa (kg/cm², psi)
Atmospheric pressure	98—157 (1.0—1.6, 14—23)
200 (7.87)	39—98 (0.4—1.0, 6—14)

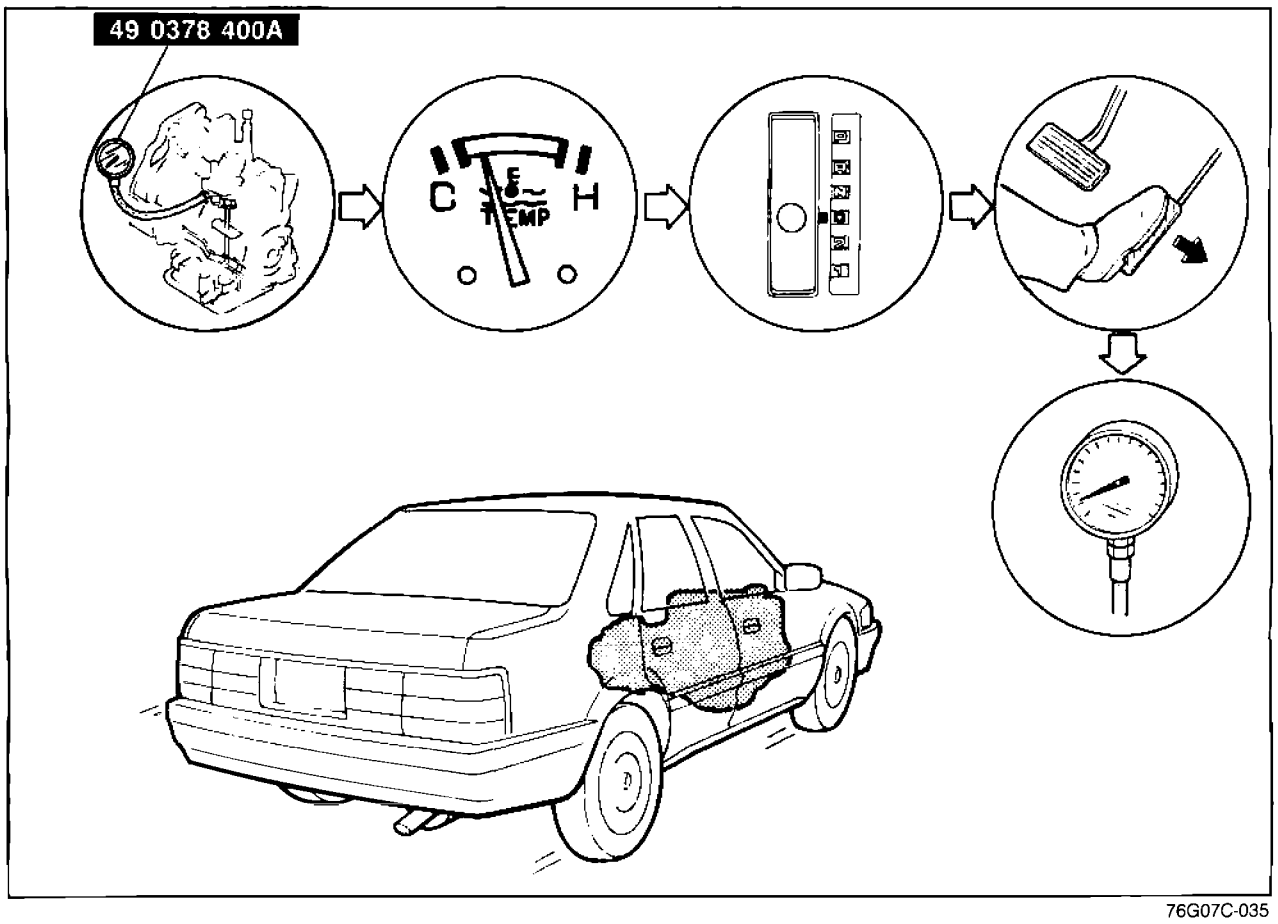
Evaluation

Incorrect pressures

1. Missing diaphragm rod or rod length incorrect, or both.
2. Stuck valve in control valve.

Governor Pressure Test
Preparation
1. Connect the **SST** to the governor pressure output point.
2. Place the **SST** inside the vehicle.
3. Warm up the ATF and check the ATF level.

Procedure



76G07C-035

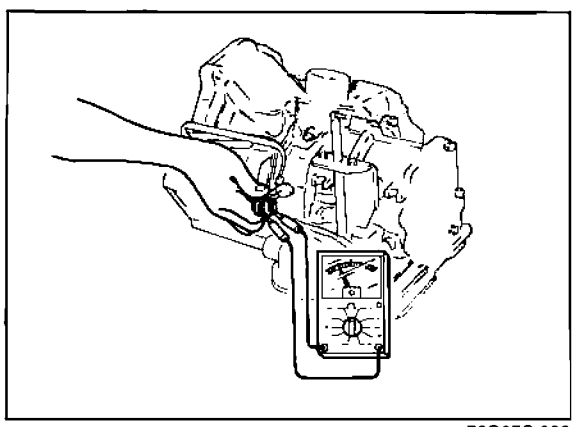
1. Drive the vehicle in D range.
2. Read the governor pressure at the speeds listed in the table below.

Specified governor pressure:

Vehicle Speed km/h (mph)	Governor Pressure kPa (kg/cm^2, psi)
30 (19)	78—137 (0.8—1.4, 11—20)
55 (34)	157—226 (1.6—2.3, 23—33)
85 (53)	314—402 (3.2—4.1, 46—58)

Evaluation

Condition	Possible Cause
Not within specification	Fluid leakage from the line pressure hydraulic circuit
	Fluid leakage from the governor pressure hydraulic circuit
	Defective or stuck governor valve



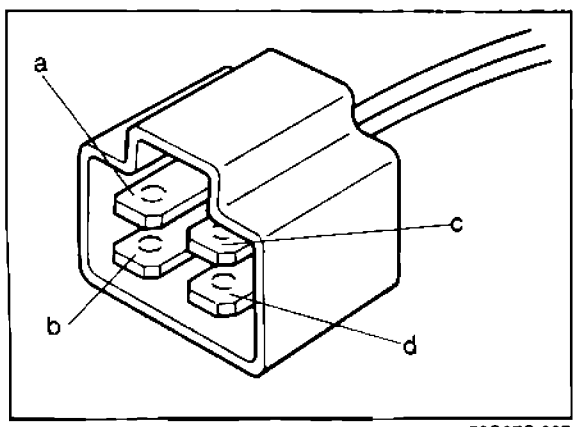
76G07C-036

ELECTRIC COMPONENTS

INHIBITOR SWITCH

Inspection

1. Check that engine starts only at P and N range.
2. Check that the backup lights illuminate in R range with the ignition switch ON.
3. If the inhibitor switch is not operating properly, disconnect it and check the continuity between the terminals.



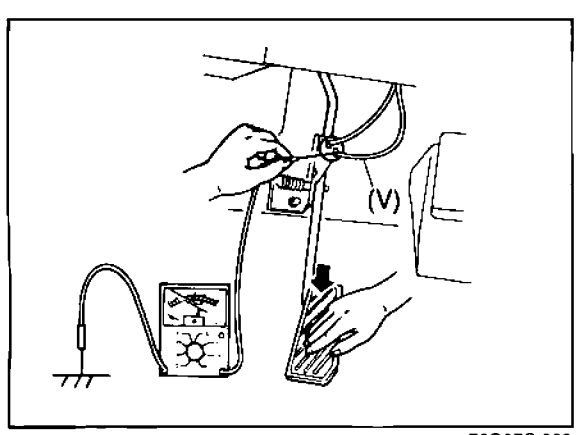
76G07C-037

Connection guide

Position	Connector terminal			
	a	b	c	d
P			○	○
R	○	○		
N			○	○
D, 1, 2				

○—○: Indicates continuity

4. If not correct, replace the inhibitor switch.



76G07C-038

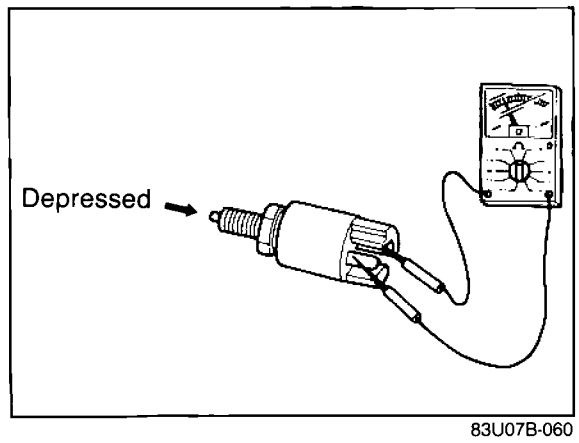
KICK-DOWN SWITCH

Inspection of Terminal Voltage

1. Turn the ignition switch ON.
2. Check the voltage at terminal (V) with a voltmeter.

Depressing stroke	Terminal voltage
7/8—8/8 (Full)	Approx. 12V
0—7/8	Below 1.5V

3. If not correct, check the wiring harness or switch, or adjust the switch position.



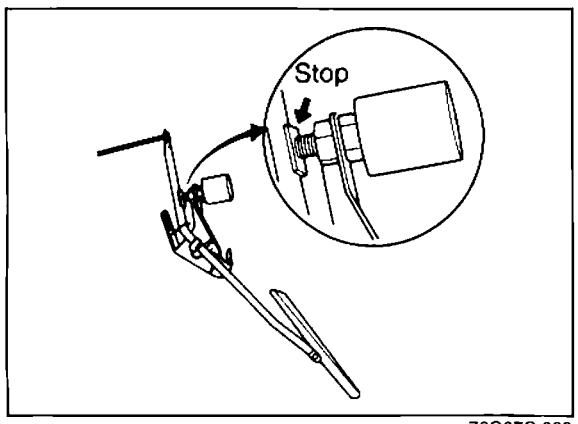
83U07B-060

Inspection of Switch

1. Disconnect the kick-down switch connector.
2. Check for continuity of the switch with an ohmmeter.

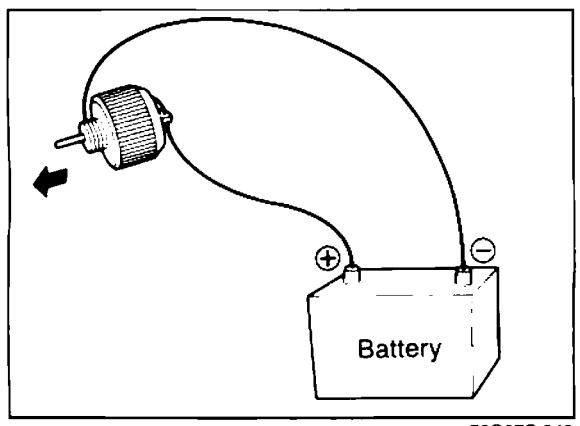
Switch	Continuity
Pushed	Yes
Released	No

3. If not correct, replace the kick-down switch.



76G07C-039

Adjustment
1. Loosen the kick-down switch locknuts.
2. Depress the accelerator pedal fully.
3. Turn the switch until the threaded case touches the stop.
4. Turn the switch counterclockwise one-half turn.
5. Secure the switch with the locknut.



76G07C-040

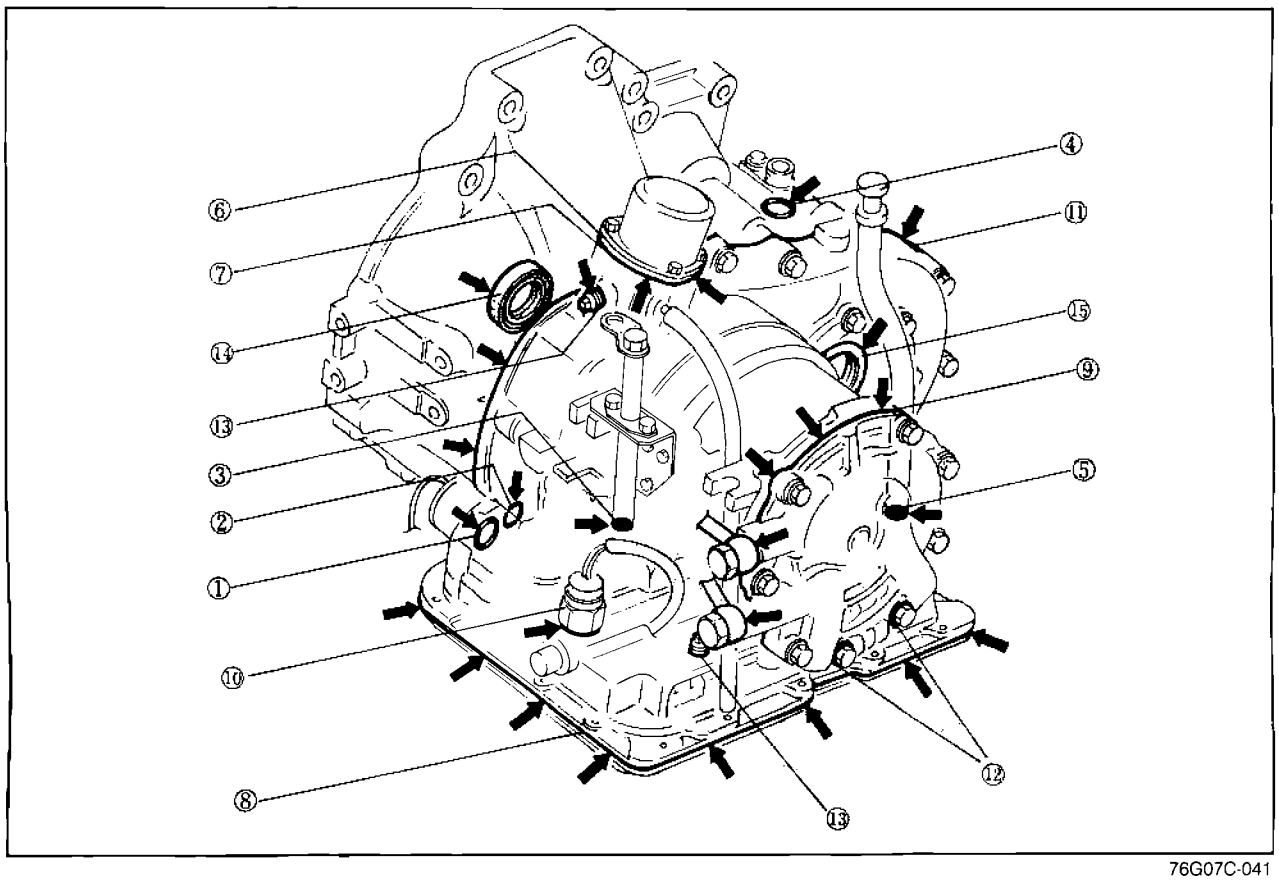
KICK-DOWN SOLENOID
Check that the rod extends when 12 V is applied.

ON-VEHICLE MAINTENANCE

AUTOMATIC TRANSAXLE FLUID (ATF)

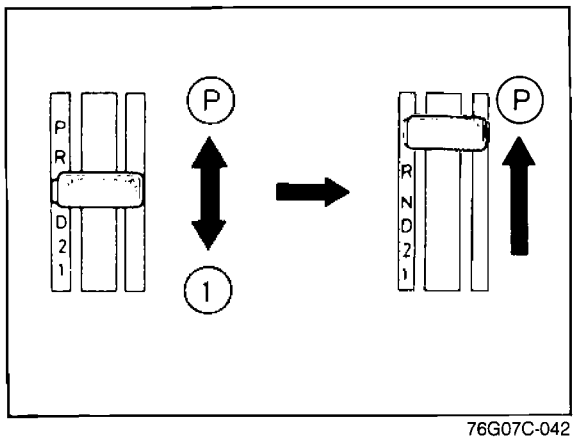
Inspection for Fluid Leaks

Check for fluid leaks; the following figure shows the locations where fluid leakage may possibly occur.



76G07C-041

1. Kick-down solenoid
2. Vacuum diaphragm
3. Manual shaft
4. Speedometer driven gear
5. Oil level tube
6. Governor cover
7. Governor
8. Oil pan
9. Oil pump
10. Inhibitor switch
11. Transaxle case
12. Oil pump
13. Square head plugs
14. Bearing cover
15. Drive shaft



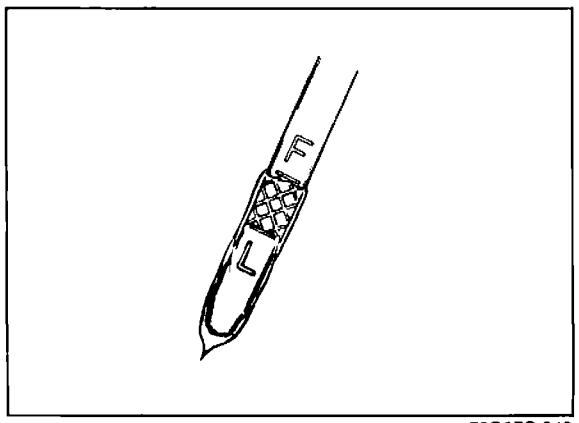
76G07C-042

Inspection of Level

1. Apply the parking brake and block the wheels to prevent the vehicle from rolling.

   Note
   Place the car on a flat, level surface.

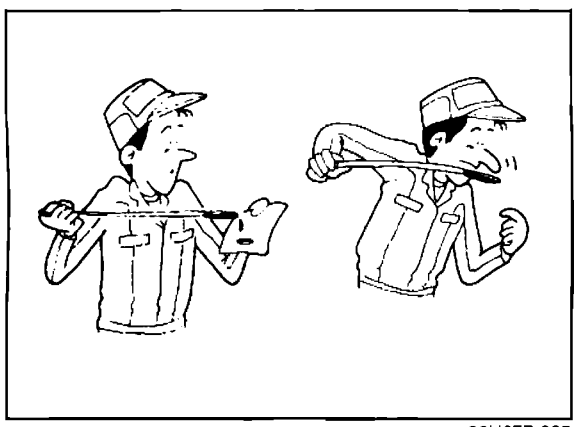
2. Run the engine so that the automatic transaxle fluid reaches operating temperature.
3. While the engine is idling, shift the select lever from P to 1 and back again.
4. Let the engine idle.
5. Shift the select lever to P.



76G07C-349

6. Ensure that the ATF level is between the F and L marks. Add ATF to specification, if necessary.

ATF type: Dexron II or M III

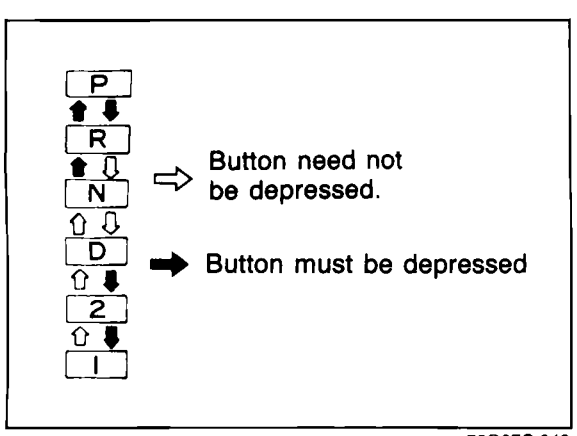


86U07B-065

Inspection of Condition

1. Check the ATF for discoloration.
2. Check the ATF for any unusual smell.

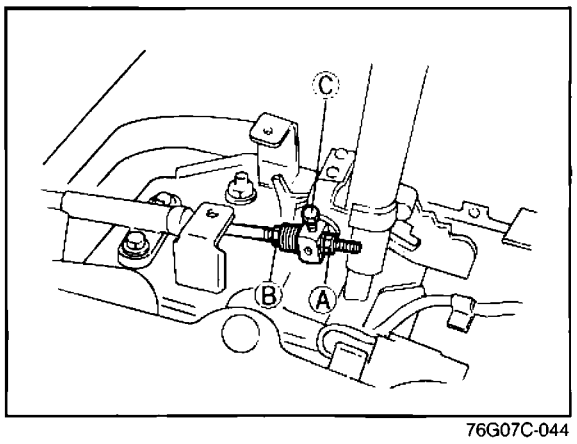
Note
Determine whether or not the automatic transmission should be disassembled by observing the condition of fluid carefully.
If the fluid is muddy and varnished, it indicates burned drive plates.



76G07C-043

SELECTOR LEVER
Inspection

1. Check that the selector lever can be shifted as shown in the figure.
2. Make sure there is a click at each range when shifted from P ↔ 1 range.
3. Check that the positions of the selector lever and the indicator are exact.
4. Check that the button returns smoothly when used to shift the selector.

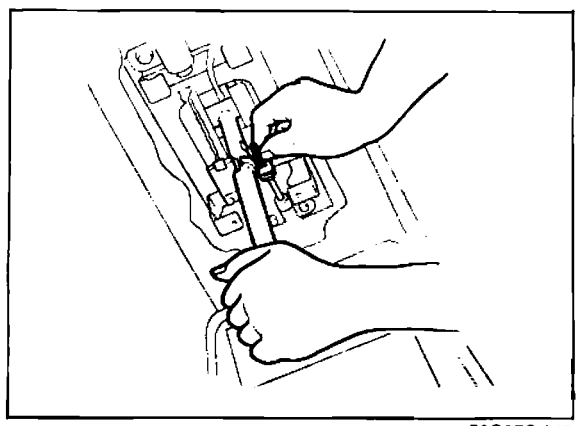


76G07C-044

Adjustment

1. Shift the selector lever to the P range.
2. Loosen locknuts A, B, and C.
3. Shift the transaxle to P range by moving the manual shaft of the transaxle.
4. Tighten locknut C to the specified torque.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

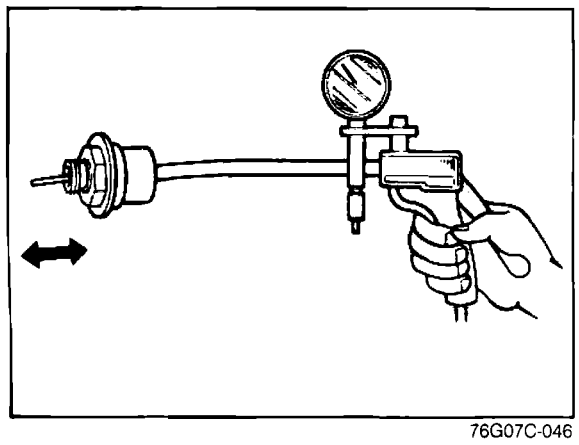


76G07C-045

5. Turn locknut A by hand until it just touches the spacer.
6. Tighten locknut B to the specified torque.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

7. Verify that there is a click at each range when shifted from P ↔ 1 range.
8. Check that the positions of the selector lever and the indicator are exact.
9. Check that the button returns smoothly when used to shift the selector.
10. If necessary, check the spring.



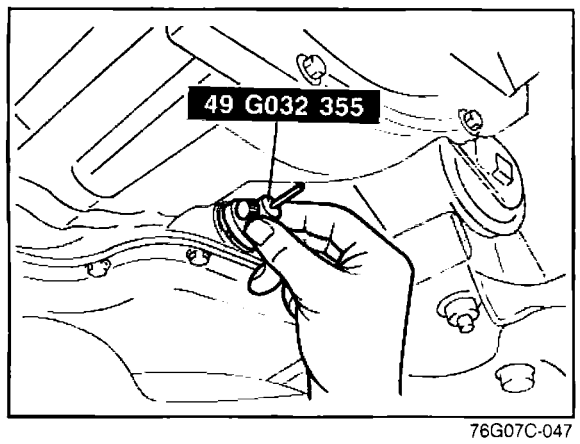
76G07C-046

VACUUM DIAPHRAGM

Inspection

1. Remove the vacuum hose from the vacuum diaphragm. Check for ATF leakage. Replace if any is found.
2. Remove the vacuum diaphragm.
3. Verify that the diaphragm rod moves when vacuum is applied.

Caution
When removing the diaphragm, do not drop the rod into the oil pan.

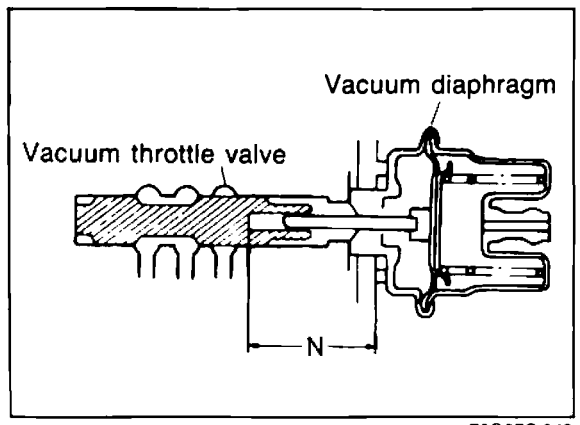


76G07C-047

Adjustment

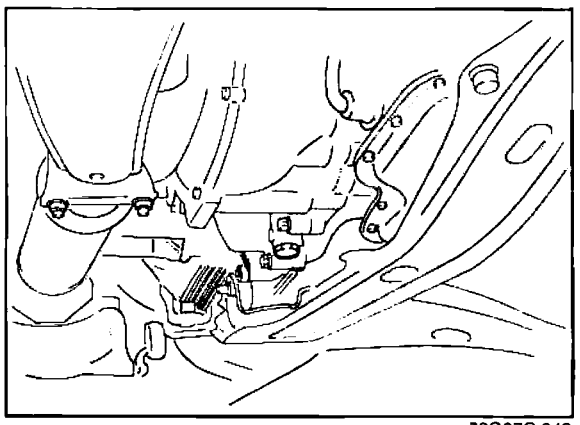
Note
a) Excessive shift shocks and improper shifting often indicate a vacuum diaphragm malfunction.
b) Remove approximately 1.0 liter (1.1 US qt, 0.9 Imp qt) of ATF before removing the vacuum diaphragm.

1. Remove the vacuum diaphragm, rod, and O-ring from the transaxle case.
2. Measure the N dimension indicated in the figure with the **SST** and a scale.
3. Select the diaphragm rod in accordance with the table.



76G07C-048

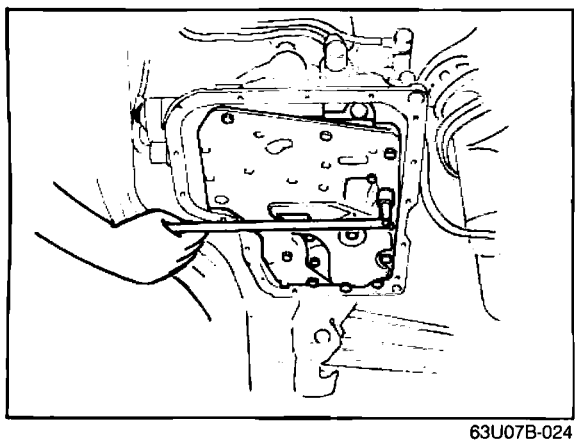
N dimension	Applicable diaphragm rod length
Below 25.4 mm (1.000 in)	29.5 mm (1.161 in)
25.4—25.9 mm (1.000—1.020 in)	30.0 mm (1.181 in)
25.9—26.4 mm (1.020—1.039 in)	30.5 mm (1.200 in)
26.4—26.9 mm (1.039—1.059 in)	31.0 mm (1.220 in)
26.9 mm (1.059 in) or over	31.5 mm (1.240 in)



76G07C-049

REPLACEMENT OF CONTROL VALVE

1. Disconnect the negative battery cable.
2. Jack up the vehicle and support it with safety stands.
3. Drain the ATF.
4. Remove the under cover and side cover.



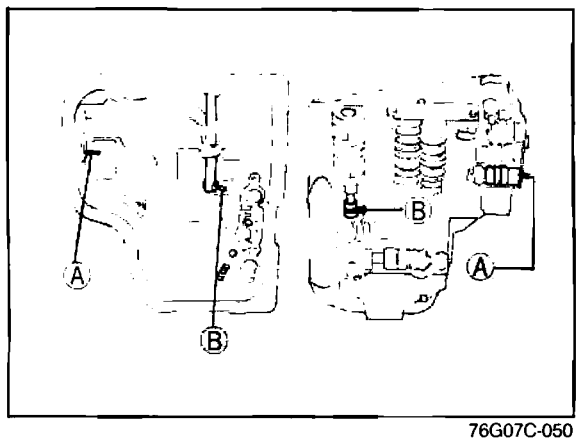
63U07B-024

5. Remove the oil pan from the transaxle case.

Caution
Be careful because some ATF will be in the oil pan.

6. Remove the control valve body.

Caution
Be careful not to lose the ball and spring for the torque converter relief valve or the vacuum diaphragm rod.

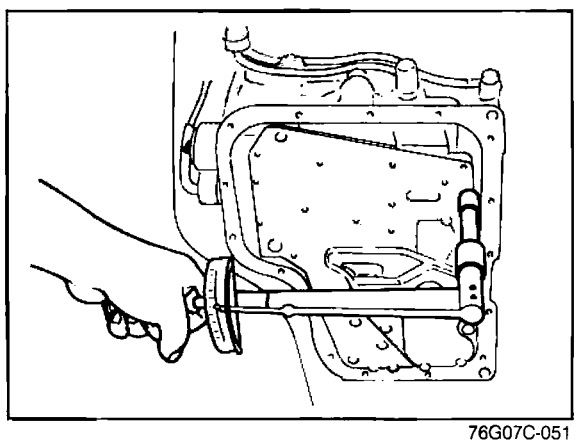


76G07C-050

7. Install the control valve body as follows:
   (1) Install the vacuum diaphragm rod.
   (2) Insert the ball and spring into the hole in the transaxle case.

Note
a) The ball is inserted first, then the spring.
b) Use petroleum jelly to prevent them from falling out.

   (3) Install the control valve, mating the groove of the manual valve with the driving pin of the control rod.



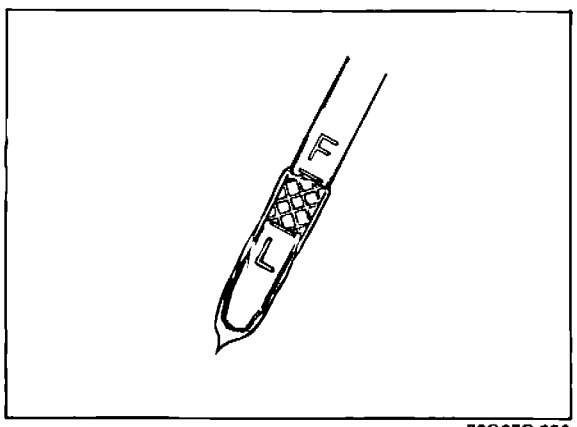
76G07C-051

   (4) Tighten the control valve mounting bolts to the specified torque.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

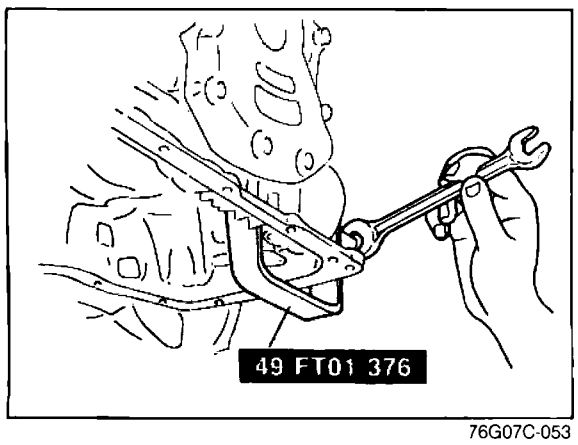
8. Install the oil pan and tighten the bolts to the specified torque.

Tightening torque:
5—8 N·m (50—80 cm-kg, 43—69 in-lb)



76G07C-052

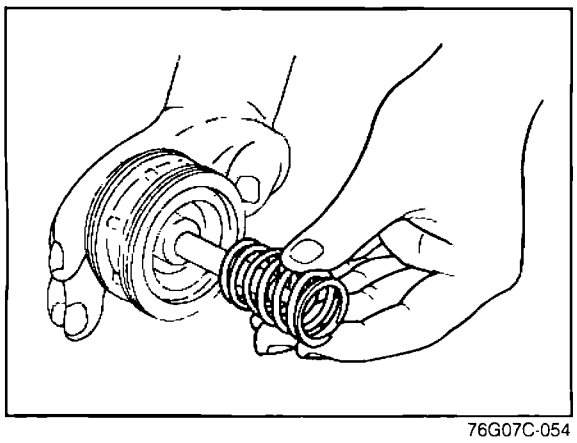
9. Install the under cover and side cover.
10. Lower the vehicle.
11. Add ATF, and with the engine idling, check the fluid level.
12. Verify that there is no fluid leakage from the transaxle. (Refer to page 7C—25.)



76G07C-053

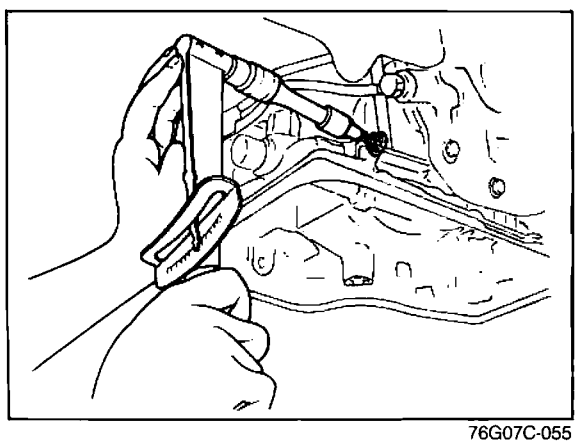
REPLACEMENT OF SERVO PISTON RETURN SPRING

1. Remove the control valve body. (Refer to replacement of control valve.)
2. Loosen the anchor end-bolt and locknut.
3. Remove the band strut.
4. Compress the servo piston retainer with the **SST**.
5. Remove the snap ring with a screwdriver.



76G07C-054

6. Remove the servo retainer, piston and spring by gradually loosening the **SST**.
7. Replace the return spring. If the O-ring or the piston seal is damaged, replace them.
8. Assemble the servo retainer, piston, and spring, insert them into the case with the **SST**. Fit the snap ring into the ring groove.
9. Install the band strut.
10. Tighten the anchor-end bolt to **12—15 N·m (120—150 cm-kg, 104—130 in-lb)**, then back it off two full turns. Tighten the locknut to **55—80 N·m (5.6—8.2 m-kg, 41—59 ft-lb)**.



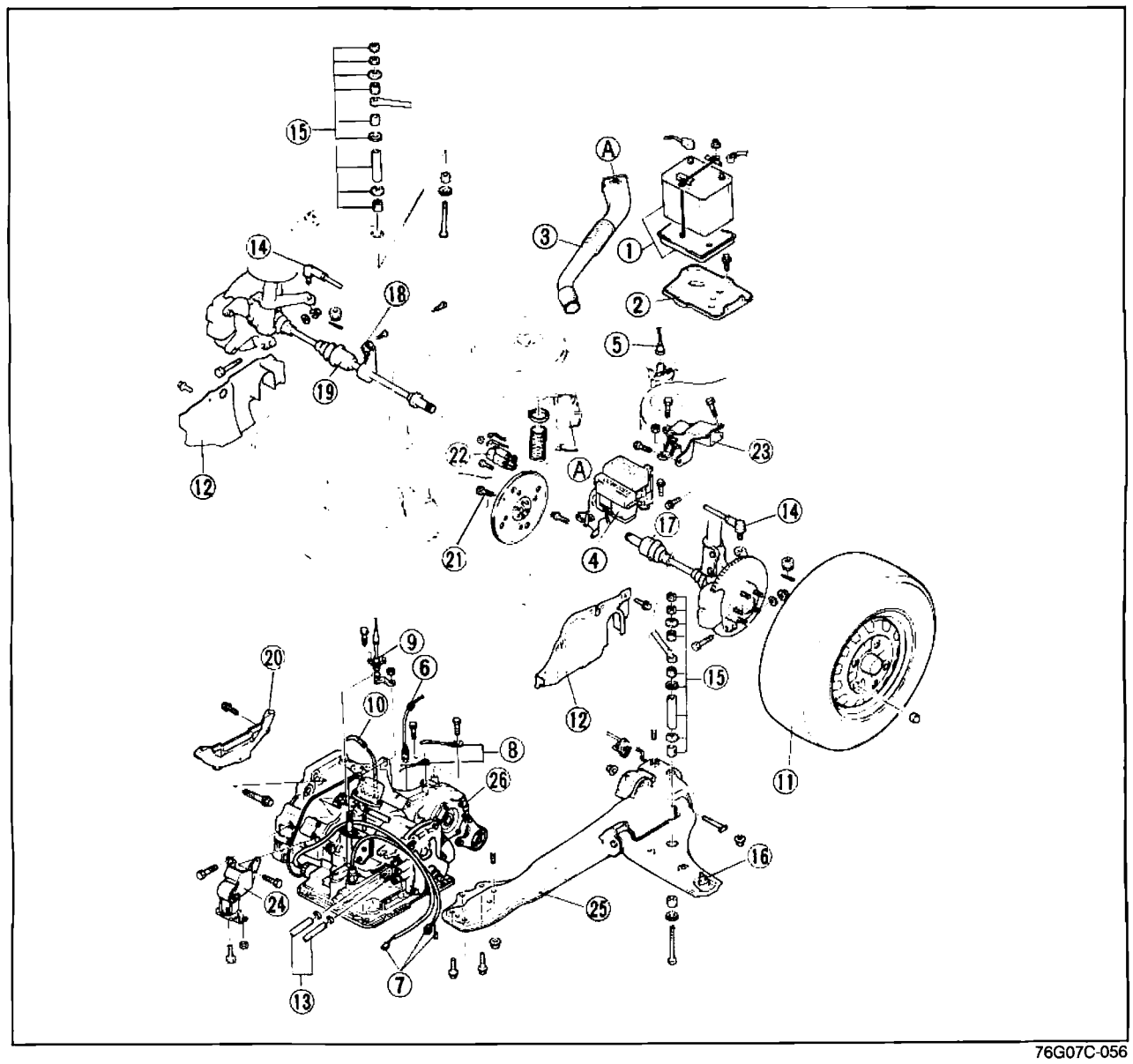
76G07C-055

11. Install the control valve body, oil pan, etc. in the reverse order of removal.
12. Adjust the fluid level, and check for fluid leaks. (Refer to page 7C—25.)

REMOVAL

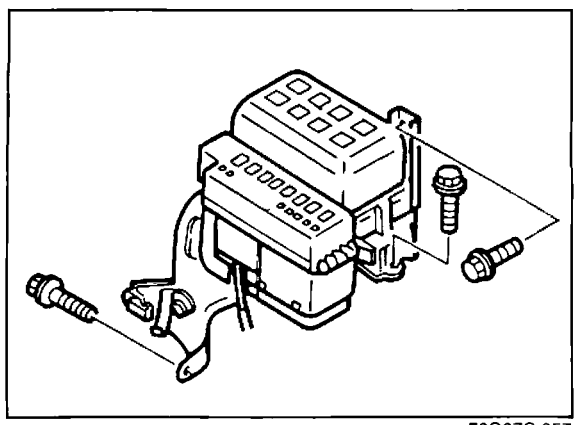
PREPARATION
(1) Drain the ATF before removal.
(2) Attach the engine support.
(3) Jack up the vehicle and support it with safety stands.

Components



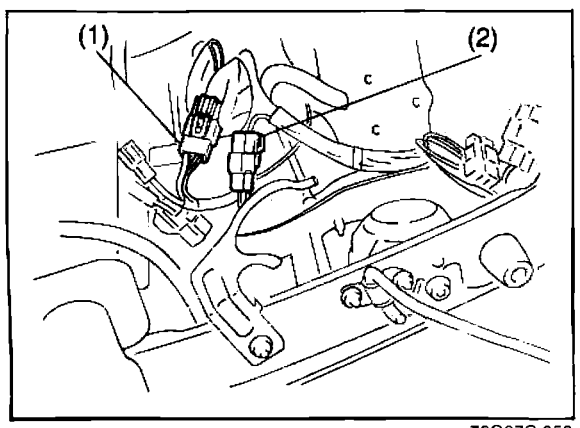
76G07C-056

1. Battery
2. Battery carrier
3. Fresh air duct
4. Main fuse block
5. Distributor leads
6. Speedometer cable
7. Cnnectors
8. Ground wires
9. Selector cable
10. Vacuum hose
11. Front wheels
12. Splash shields
13. Oil cooler outlet and inlet hoses
14. Tie-rod ends
15. Stabilizer bar control links
16. Lower arm ball joints
17. Driveshaft
18. Joint shaft bracket
19. Joint shaft and driveshaft
20. Under cover
21. Torque converter bolts
22. Starter
23. Engine mount No.4
24. Engine mount No.2
25. Crossmember and left side lower arm
26. Transaxle



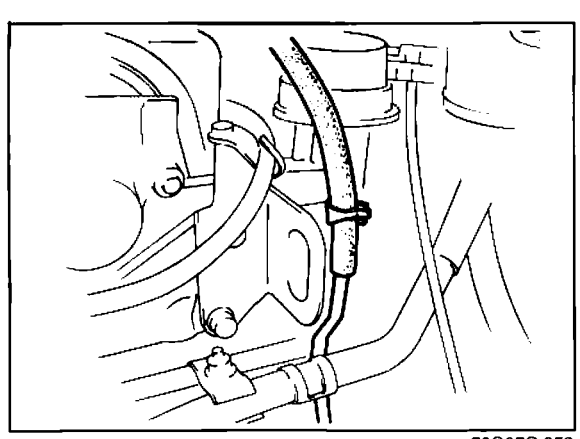
76G07C-057

1. Remove the battery and battery carrier.
2. Remove the fresh air duct.
3. Disconnect the main fuse block.
4. Disconnect the distributor leads.



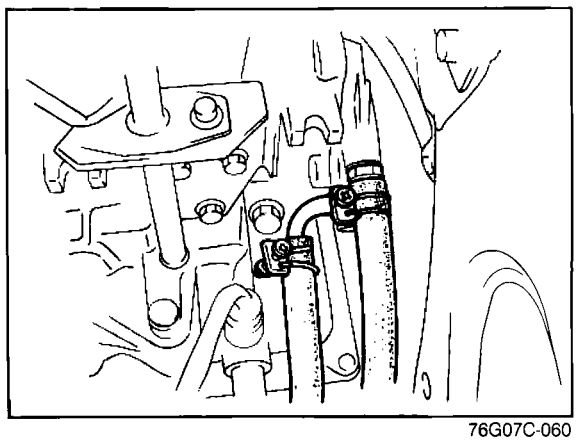
76G07C-058

5. Disconnect the speedometer cable.
6. Disconnect the connectors.
   (1) Inhibitor switch
   (2) Kick-down solenoid
7. Disconnect the grounds from the transaxle case and oil pump.



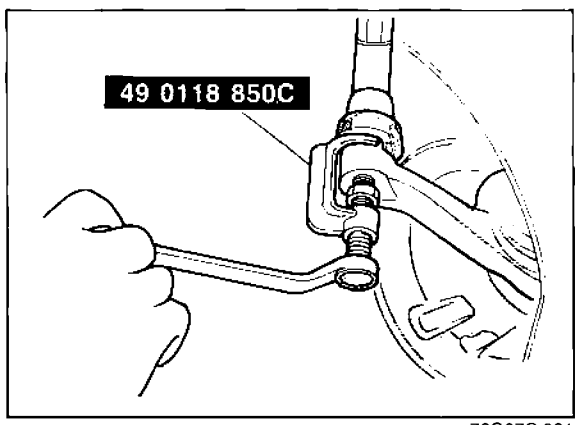
76G07C-059

8. Disconnect the selector cable.
9. Disconnect the vacuum hose.



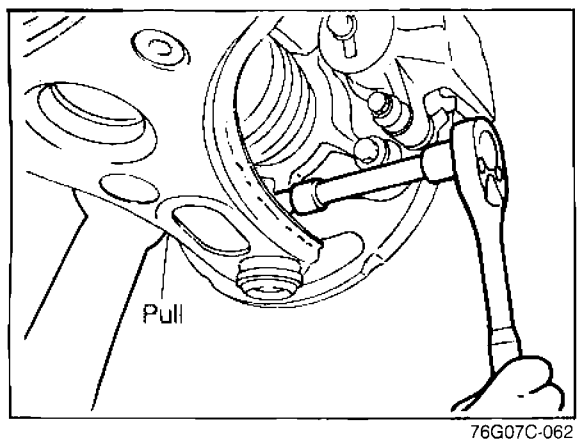
76G07C-060

10. Remove the front wheels.
11. Remove the splash shields.
12. Drain the ATF.
13. Disconnect the oil cooler outlet and inlet hoses.



76G07C-061

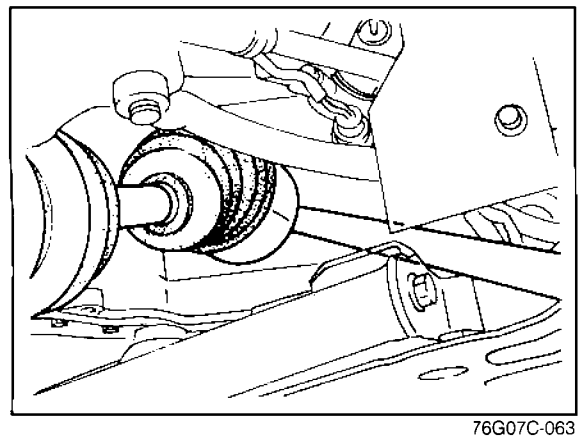
14. Disconnect the tie-rod ends with the **SST**.



76G07C-062

15. Remove the stabilizer bar control links.
16. Remove the bolts and nuts at the left and right lower arm ball joints.
17. Pull the lower arms downward to separate them from the knuckles.

Caution
Do not damage the ball joint dust boots.

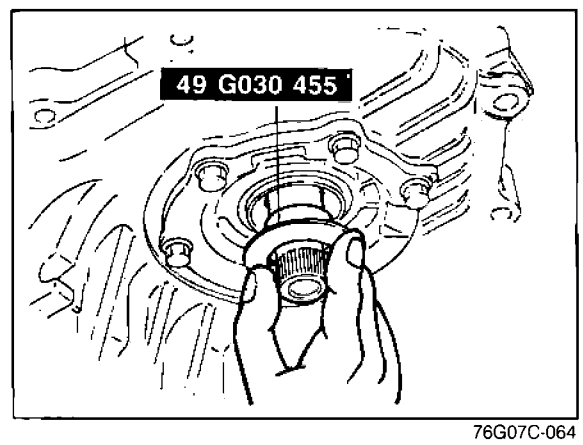


76G07C-063

18. Separate the left driveshaft from the transaxle by prying with a bar inserted between the shaft and the case.

Caution
Do not damage the oil seal.

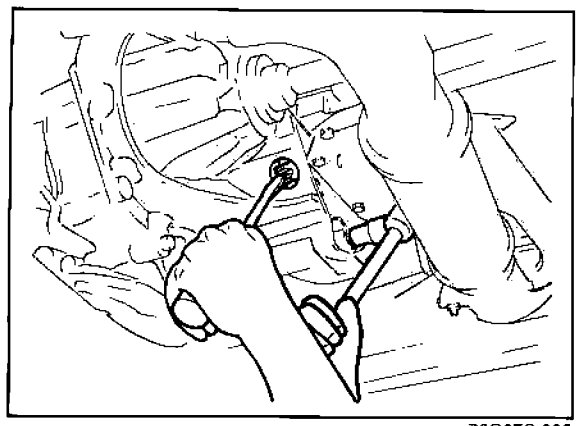
19. Remove the joint shaft bracket.
20. Separate the right driveshaft together with the joint shaft in the same manner.



76G07C-064

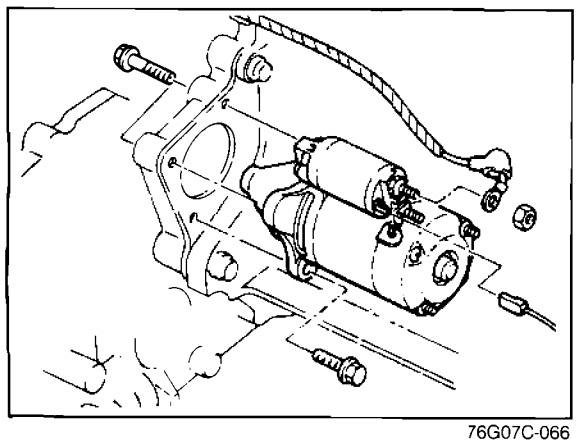
21. Install the **SST** into the differential side gears.

Caution
Failure to install the SST may allow the differential side gears to become misaligned.



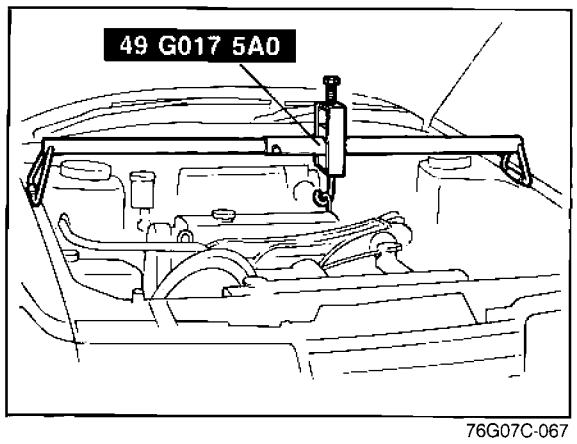
76G07C-065

22. Remove the under cover.
23. Remove the torque converter bolts.



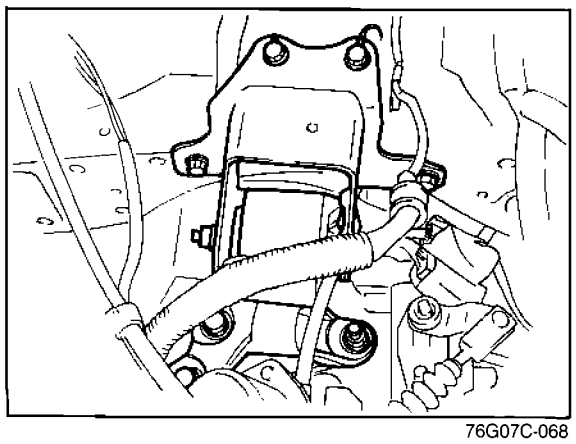
76G07C-066

24. Remove the starter.



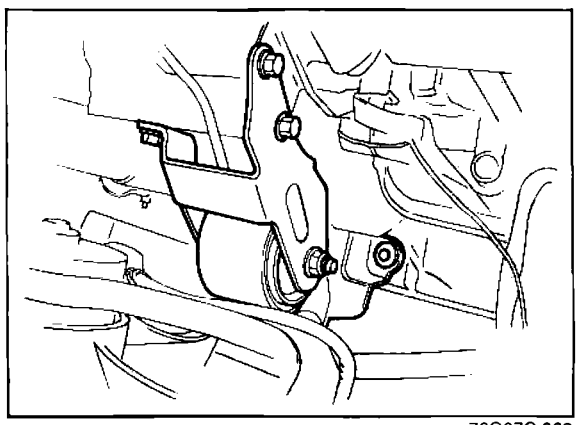
76G07C-067

25. Suspend the engine with the **SST**.



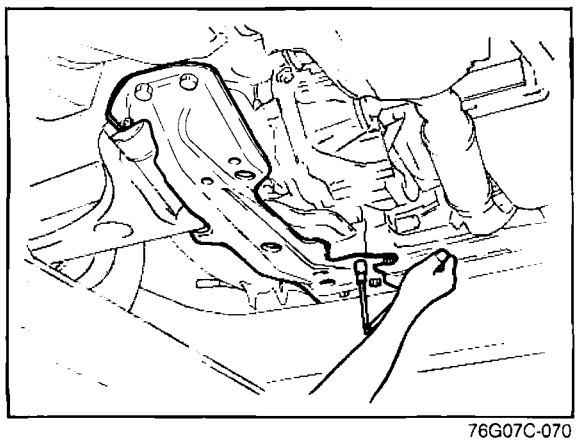
76G07C-068

26. Remove engine mount No.4 and bracket.



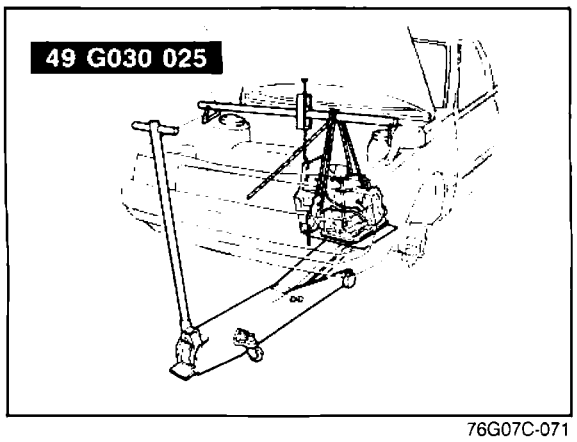
76G07C-069

27. Remove engine mount No. 2.



76G07C-070

28. Remove the crossmember and the left side lower arm as an assembly.

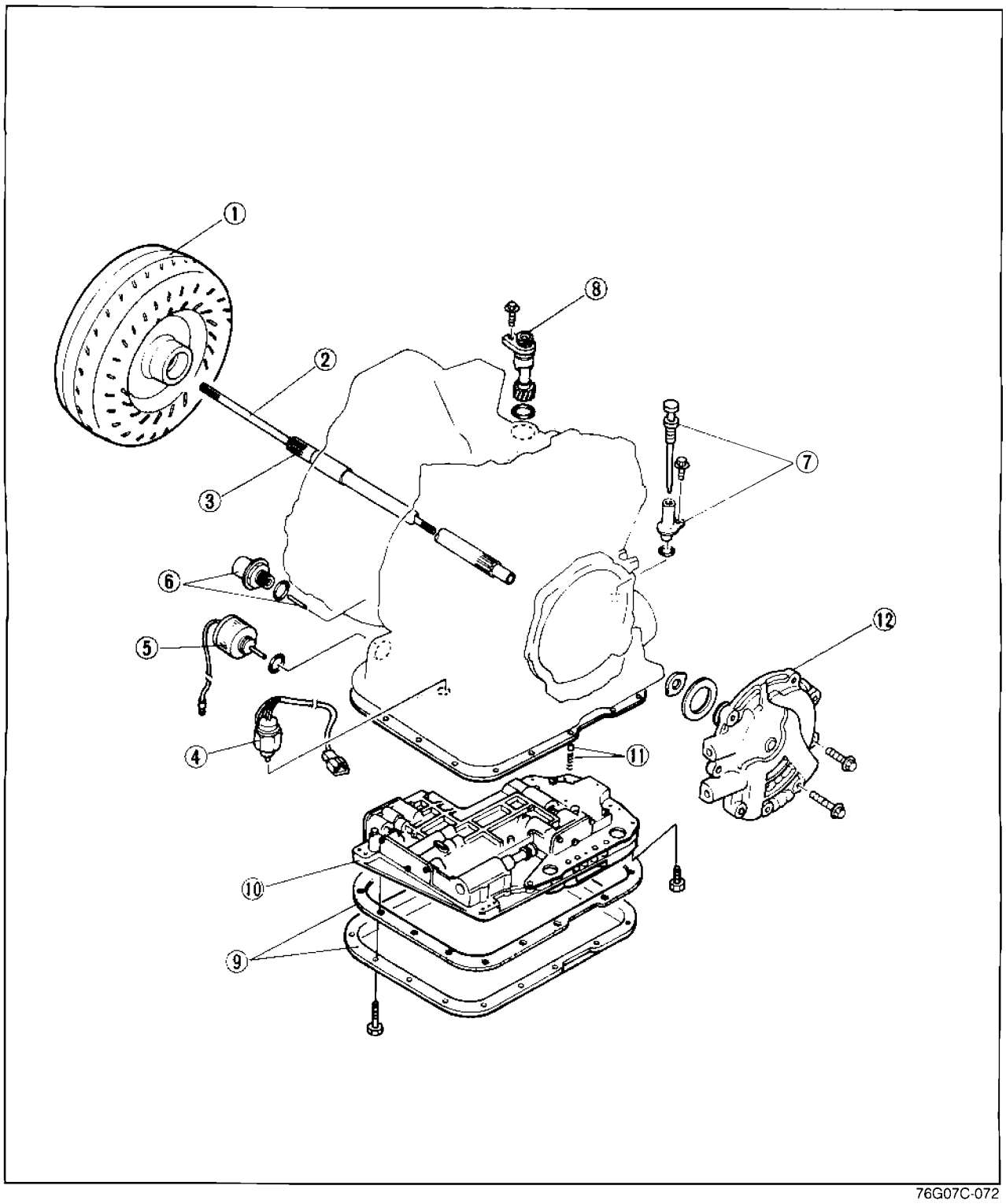


76G07C-071

29. Lean the engine toward the transaxle by loosening the engine support hook bolt.
30. Support the transaxle with a jack.
31. Remove the transaxle mounting bolts.
32. Remove the transaxle.

DISASSEMBLY

DISASSEMBLY - STEP 1



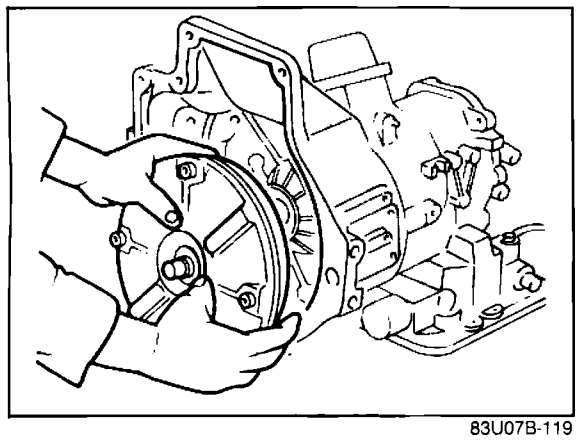
76G07C-072

1. Torque converter
2. Oil pump shaft
3. Turbine shaft
4. Inhibitor switch
5. Kick-down solenoid
6. Vacuum diaphragm and rod
7. Oil level gauge and tube
8. Speedometer driven gear
9. Oil pan and gasket
10. Control valve body
11. Steel ball and spring
12. Oil pump

7C DISASSEMBLY

Procedure
Precaution
(1) Clean the transaxle exterior thoroughly with steam and/or cleaning solvents prior to disassembly.
(2) Disassemble the transaxle in a clean area (dustproof workspace) to prevent dust entry into the mechanisms.
(3) Inspect the individual transaxle components in accordance with the QUICK DIAGNOSIS CHART during disassembly.
(4) Use plastic hammers when applying force to separate the light alloy case joints.
(5) Do not use rags during disassembly to prevent contamination.
(6) Neatly arrange the removed parts in order during disassembly.

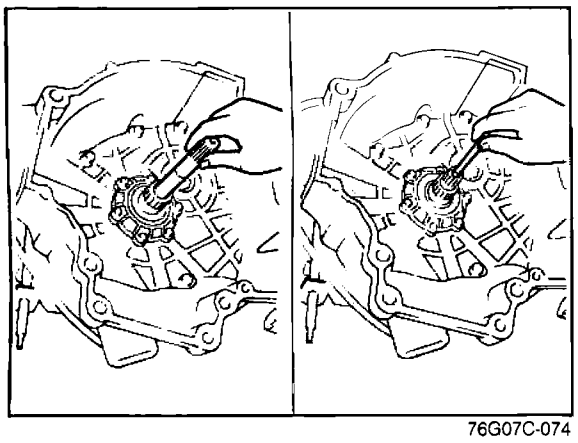
76G07C-073



83U07B-119

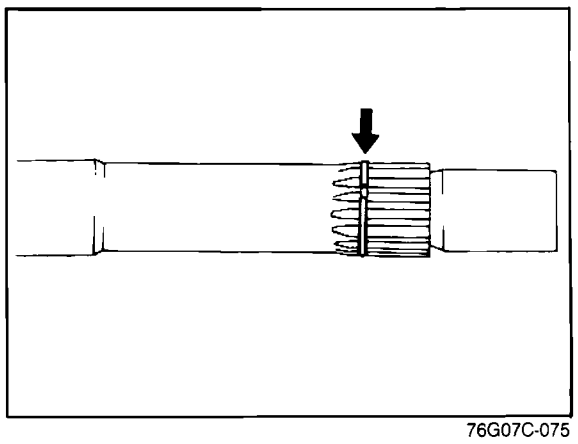
1. Remove the torque converter from the converter housing.

Note
Do not allow the ATF to spill when removing the torque converter.



76G07C-074

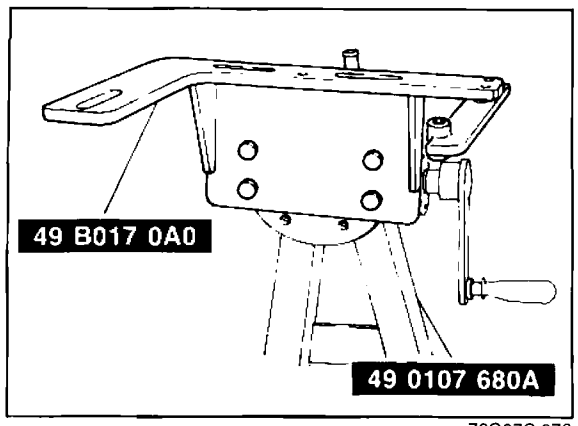
2. Pull out the oil pump shaft by hand.
3. Remove the turbine shaft.



76G07C-075

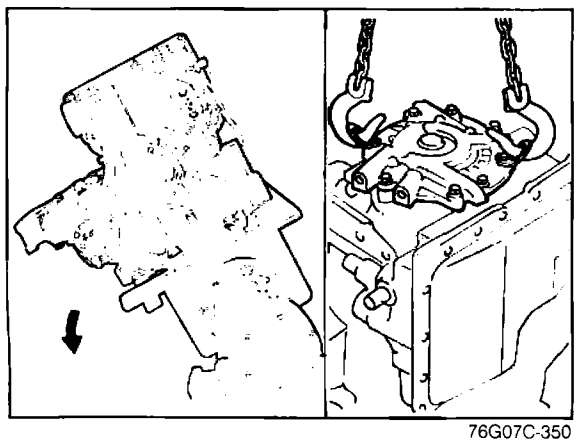
4. Remove the clip from the turbine shaft.

Note
Do not reuse the clip.



76G07C-076

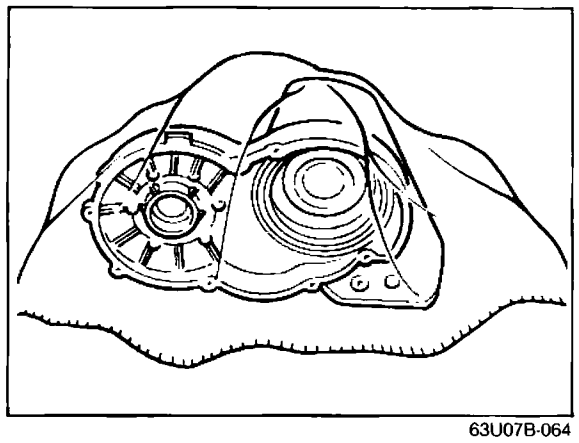
5. Assembly the **SST**.



76G07C-350

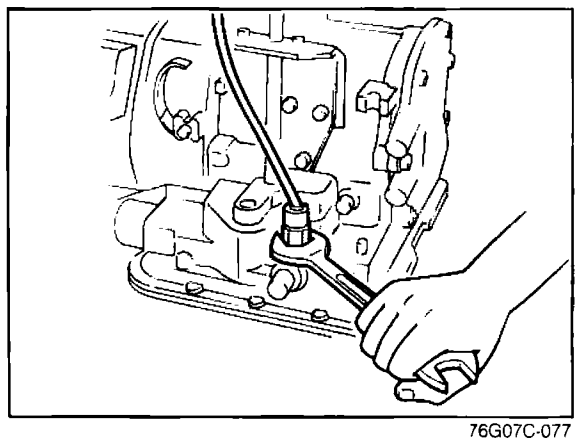
6. Attach the hanger to the oil pump as shown.
7. Lift the transaxle and mount it on the **SST**.

Warning
Avoid leaning the transaxle to one side during disassembly, it may turn quickly and cause injury.



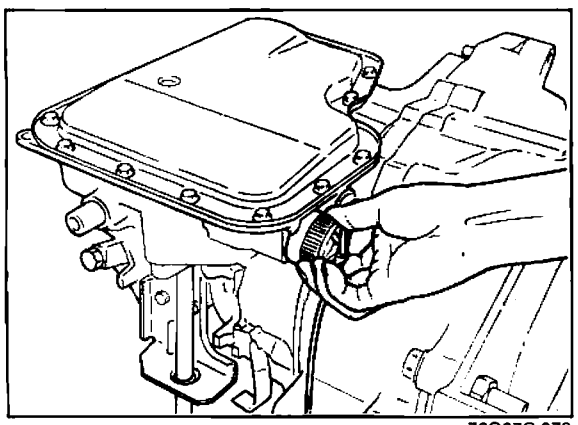
63U07B-064

Note
If troubleshooting indicates that there is a problem on the differential side, separate the transaxle case assembly from the converter housing and cover it.



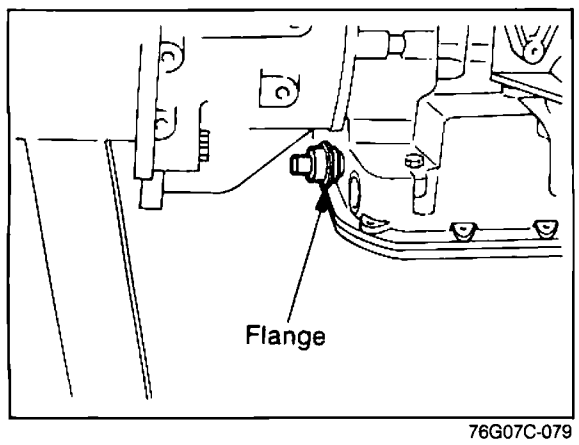
76G07C-077

8. Remove the inhibitor switch.



76G07C-078

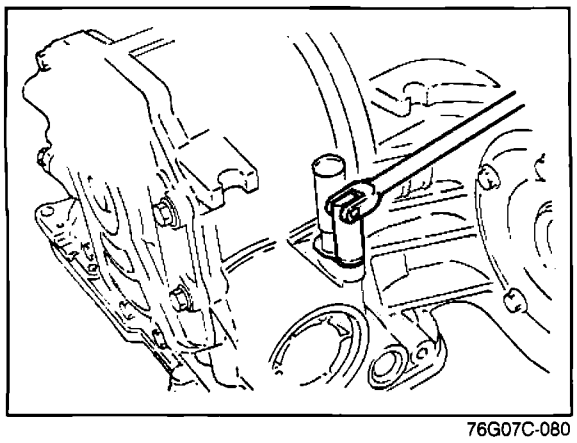
9. Remove the kick-down solenoid and O-ring.



76G07C-079

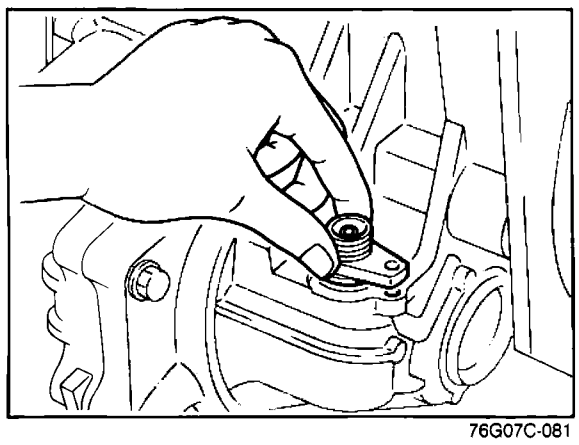
10. Remove the vacuum diaphragm. If the vacuum diaphragm is difficult to remove, use pliers to grasp the flange.

Note
When the vacuum diaphragm is removed, take care not to lose the diaphragm rod.



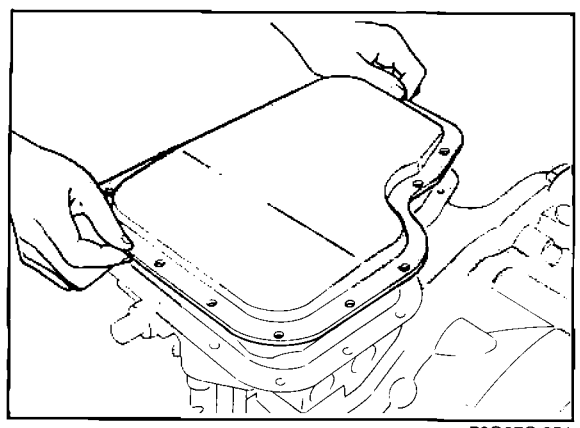
76G07C-080

11. Remove the oil level gauge and filter tube.



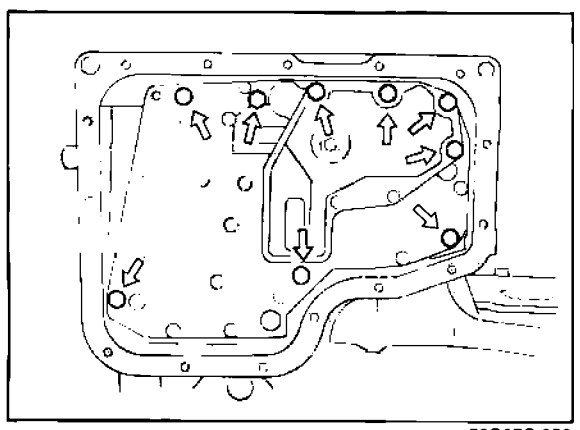
76G07C-081

12. Remove the speedometer driven gear.



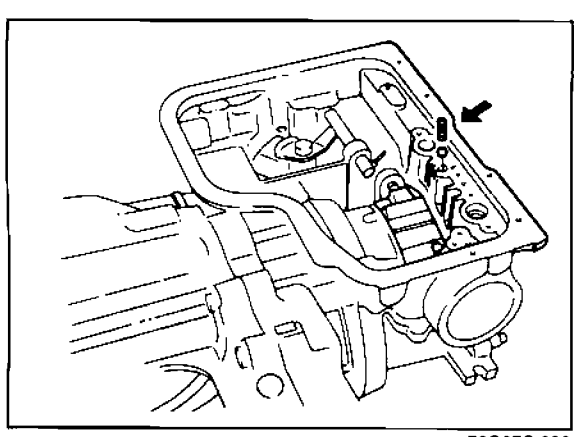
76G07C-351

13. Remove the oil pan and gasket.



76G07C-352

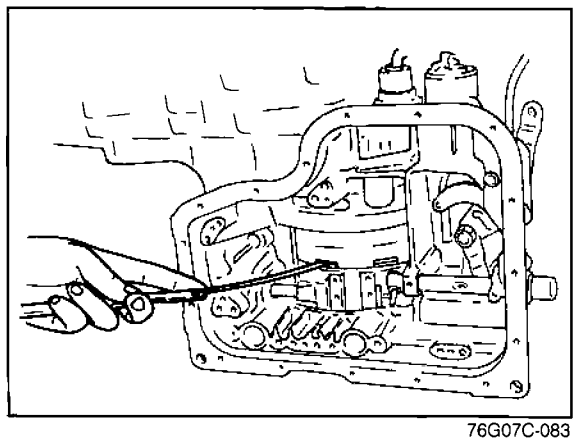
14. Remove the control valve body as an assembly.



76G07C-082

15. Remove the steel ball and spring.

Note
Be careful not to lose the steel ball and spring.

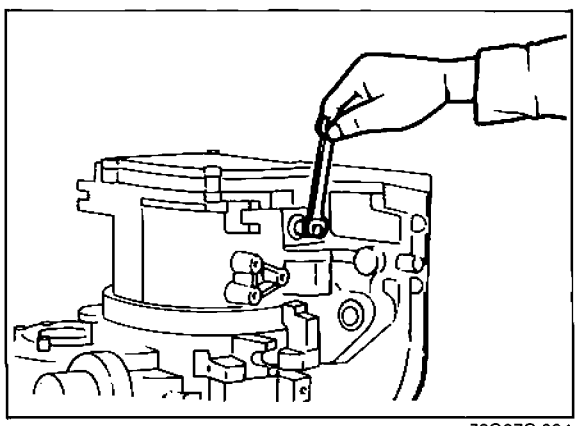


76G07C-083

16. Measure the front clutch drum end play.

End play: 0.5—0.8 mm (0.020—0.031 in)

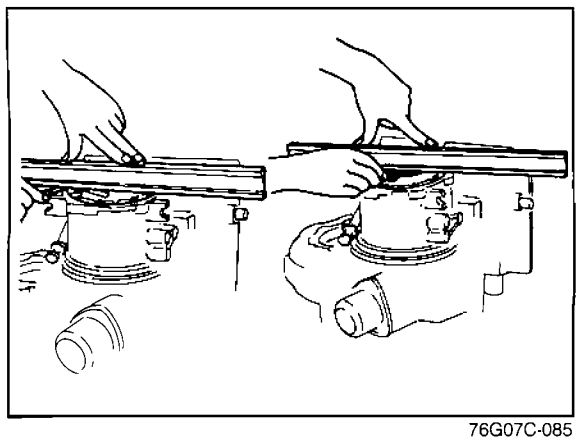
Note
If it is not within specification, make the necessary adjustment by using an adjustment shim during assembly. (Refer to page 7C—113.)



76G07C-084

17. Remove the oil pump.

Note
If the oil pump is difficult to remove, remove it after tightening the anchor-end bolt to secure the front clutch with the brake band.



76G07C-085

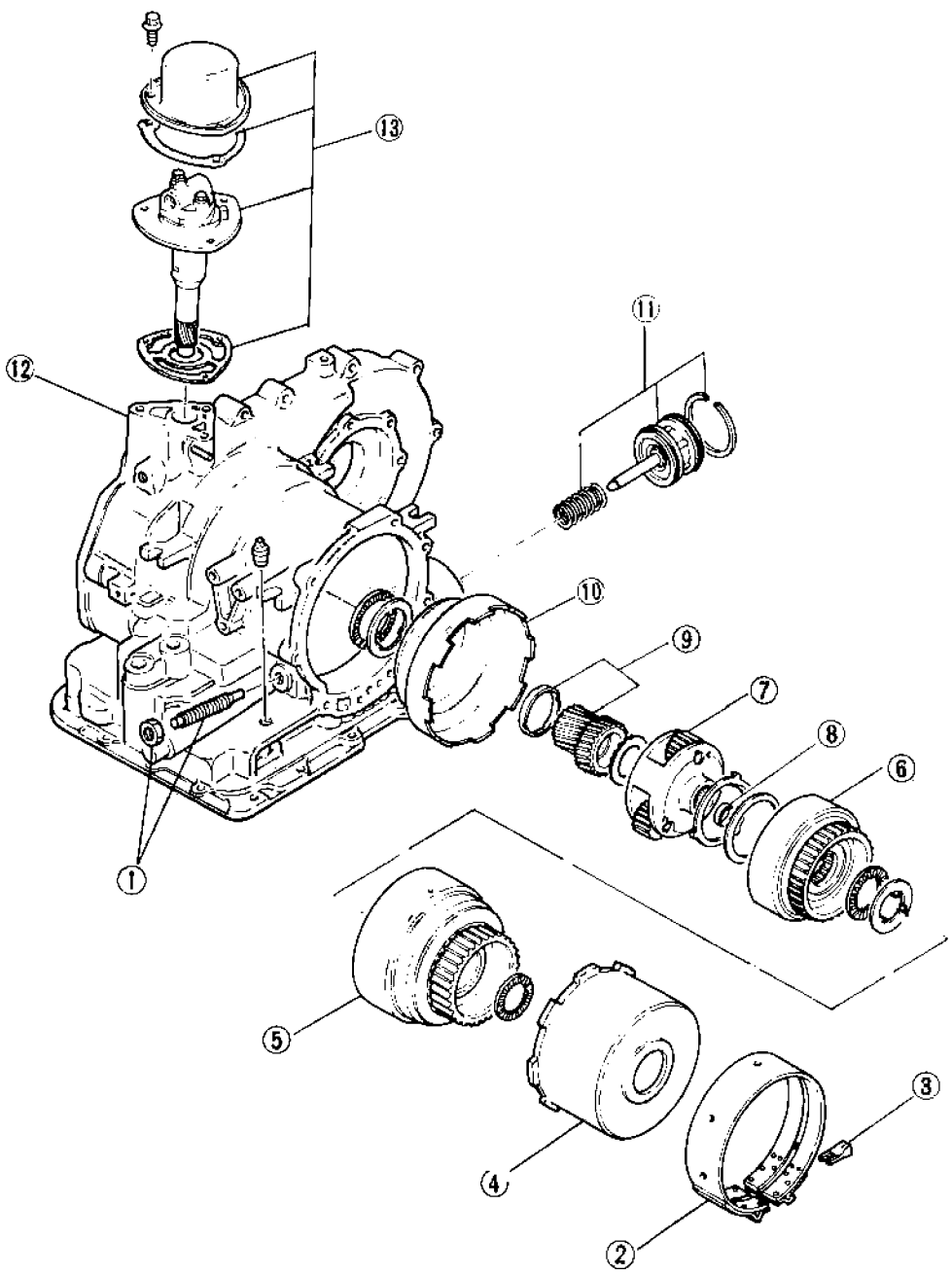
18. Measure the total end play.

Standard clearance:
a) Straight edge—Pump cover
Maximum 0.10 mm (0.004 in)
b) Straight edge—Transaxle case
Maximum 0.15 mm (0.006 in)

Note
If it is not within specification, use the bearing outer race to make the adjustment at the time of installation. (Refer to page 7C—112.)

DISASSEMBLY - STEP 2

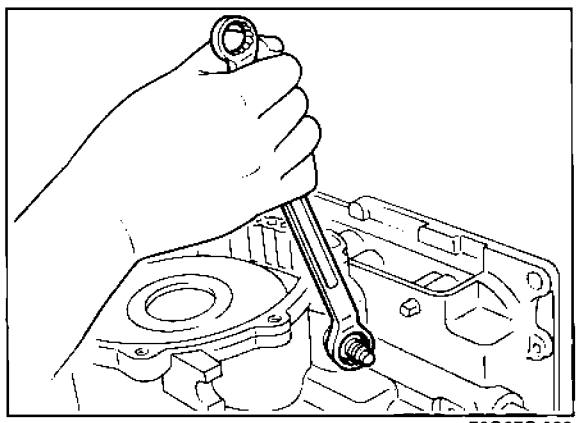
76G07C-086



76G07C-087

1. Anchor-end bolt and locknut
2. Brake band
3. Strut
4. Front clutch
5. Rear clutch
6. Rear clutch hub assembly
7. Planetary carrier (front)
8. Seal sleeve
9. Sun gear and spacer
10. Connecting shell
11. Servo
12. Transaxle case
13. Governor

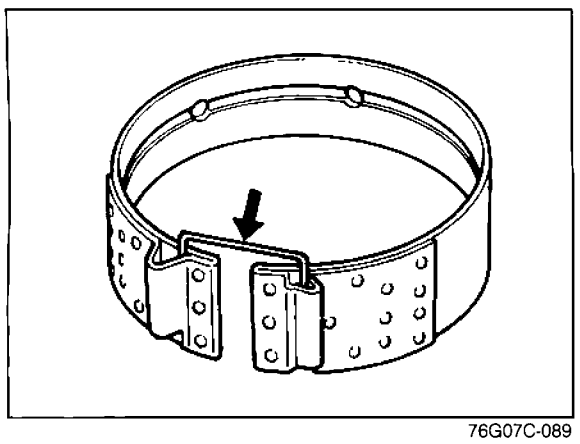
7C DISASSEMBLY



76G07C-088

Procedure

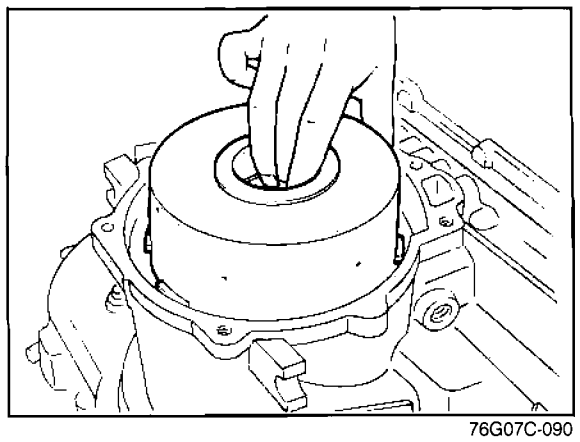
1. Remove the anchor-end bolt and locknut.



76G07C-089

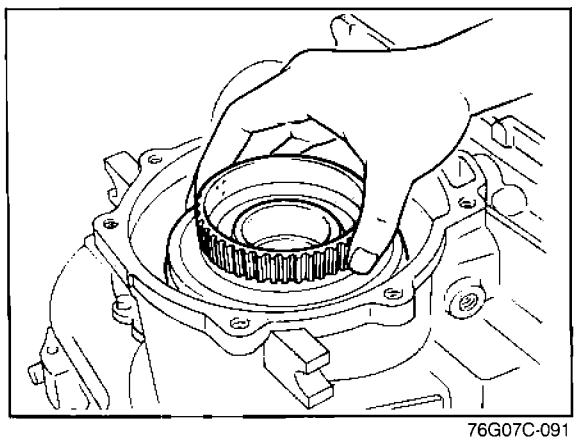
2. Remove the brake band and strut.

Note
Use a piece of wire to secure the brake band so that it is not damaged by being stretched.



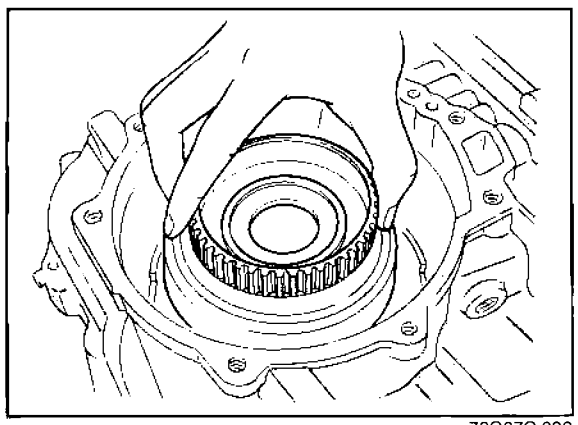
76G07C-090

3. Remove the front clutch.



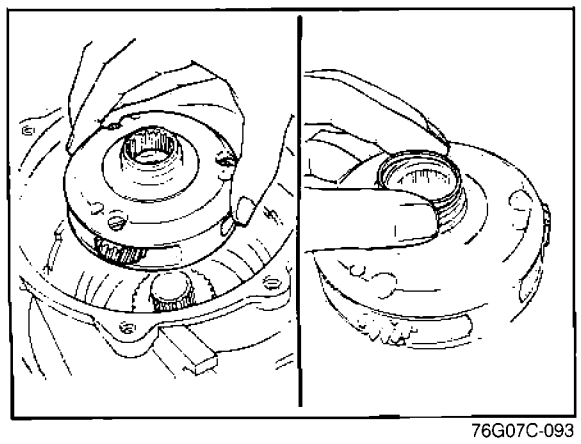
76G07C-091

4. Remove the rear clutch.



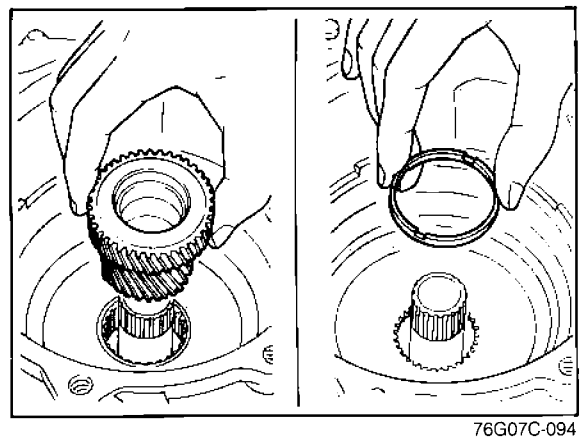
76G07C-092

5. Remove the rear clutch hub assembly.



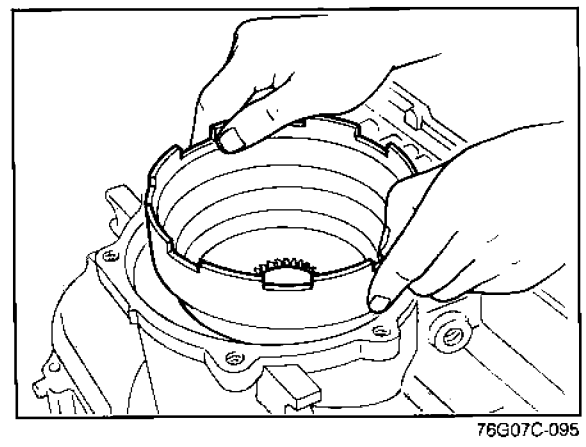
76G07C-093

6. Remove the front planetary carrier.
7. Remove the seal sleeve.



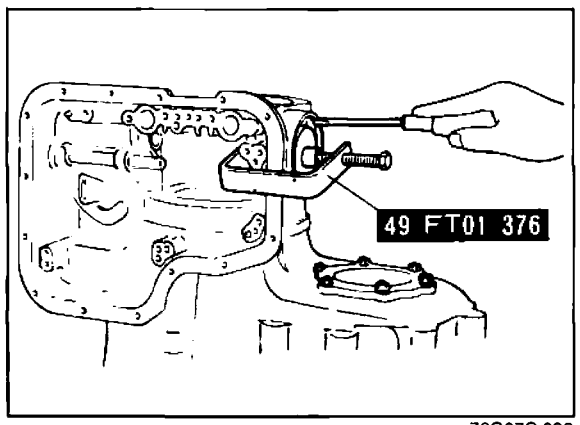
76G07C-094

8. Remove the sun gear and spacer.



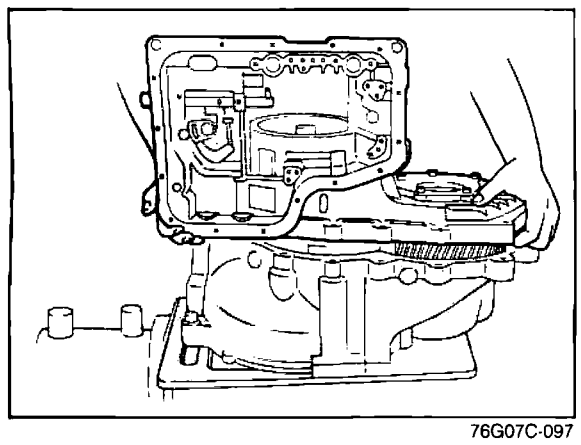
76G07C-095

9. Remove the connecting shell.



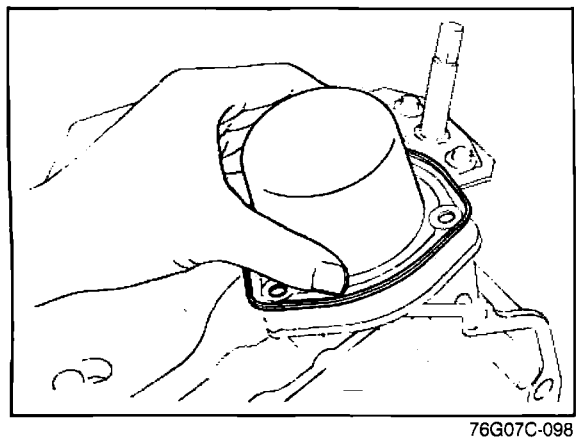
76G07C-096

10. Remove the servo.
    (1) Compress the servo retainer with the **SST**.
    (2) Remove the snap ring.
    (3) Remove the servo retainer and return spring from the transaxle case while loosing the **SST**.



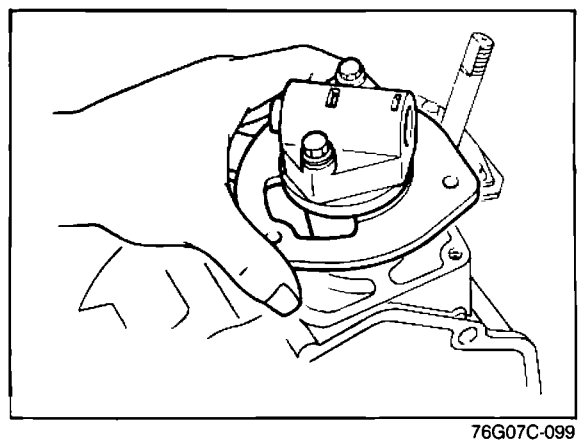
76G07C-097

11. Remove the bolts, and remove the transaxle case by tapping lightly with a plastic hammer.



76G07C-098

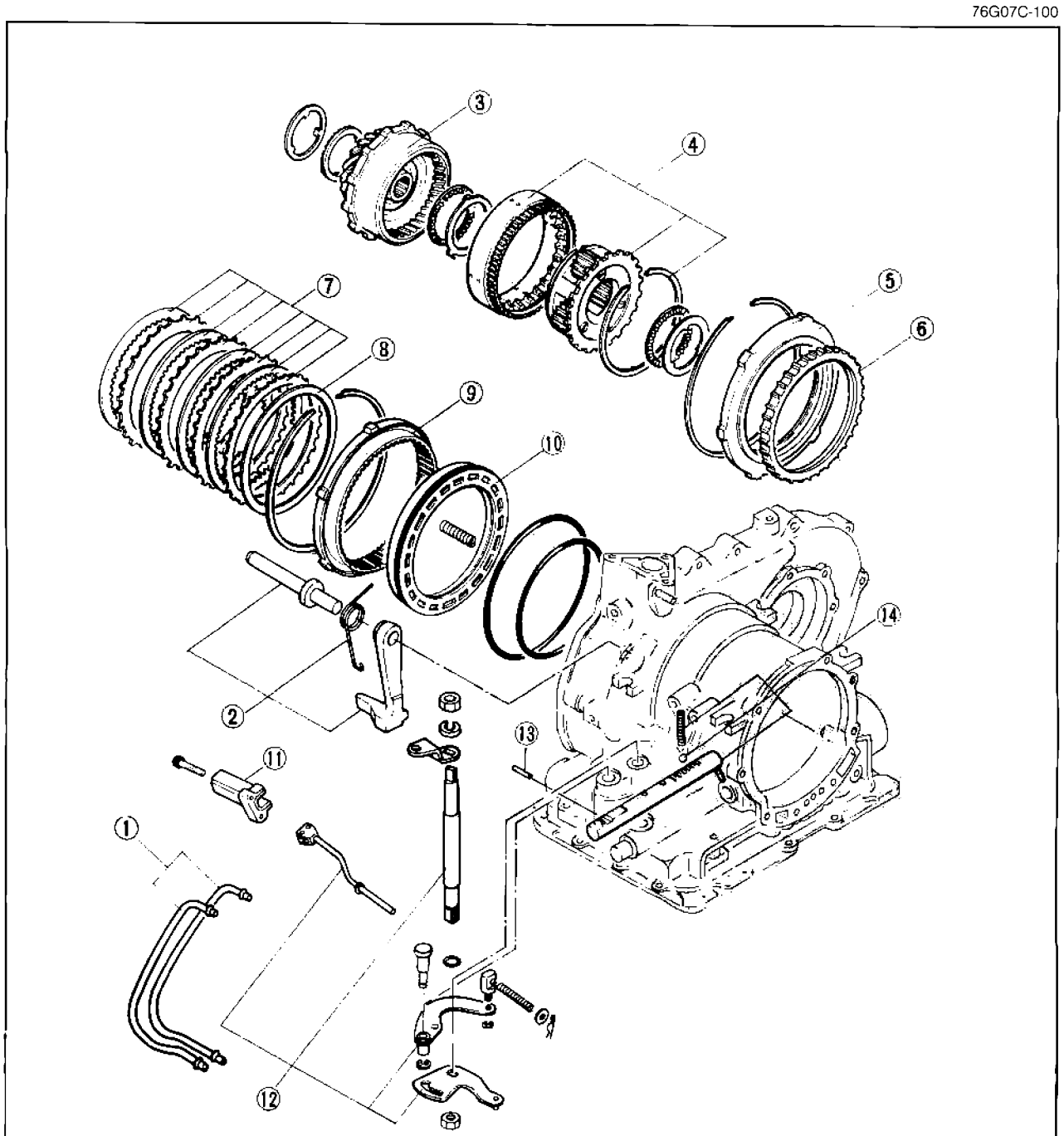
12. Remove the governor assembly.
    (1) Remove the governor cover and gasket.
    (2) Remove the governor assembly and gasket.



76G07C-099

DISASSEMBLY - STEP 3

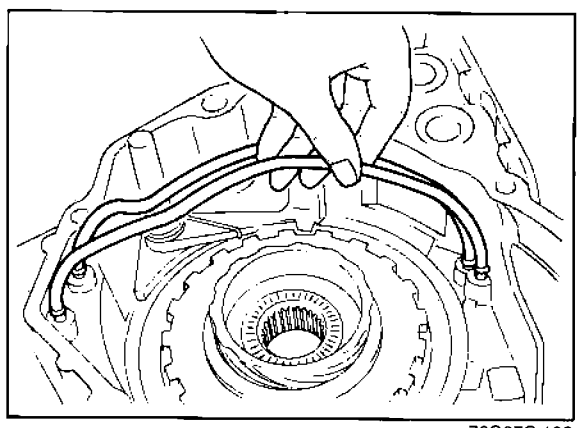
76G07C-100



76G07C-101

1. Oil pipe
2. Parking pawl assembly
3. Drum hub assembly
4. One-way clutch inner race assembly
5. One-way clutch
6. Retaining plate
7. Drive and driven plate
8. Dished plate
9. Low and reverse brake hub
10. Low and reverse brake piston
11. Actuator support
12. Manual shaft assembly
13. Knock pin
14. Control rod, detent ball, and spring

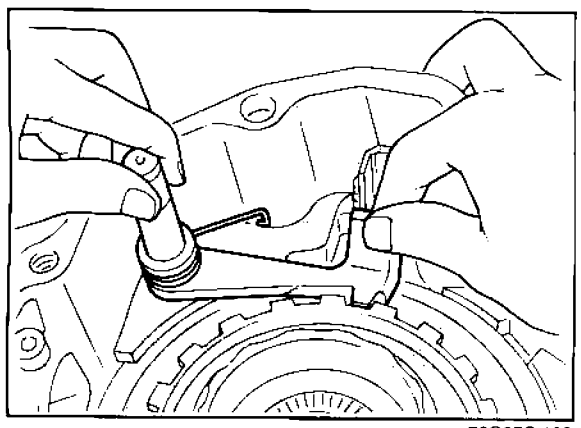
7C DISASSEMBLY



76G07C-102

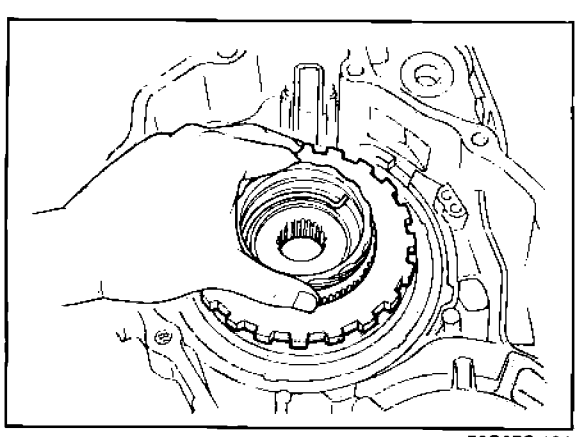
Procedure

1. Remove the governor outlet and inlet pipes.



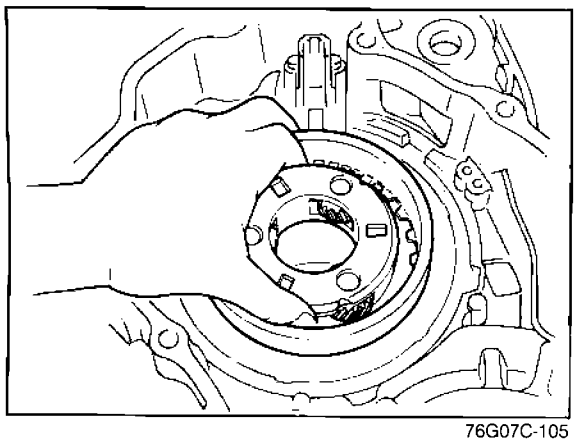
76G07C-103

2. Remove the parking pawl assembly.



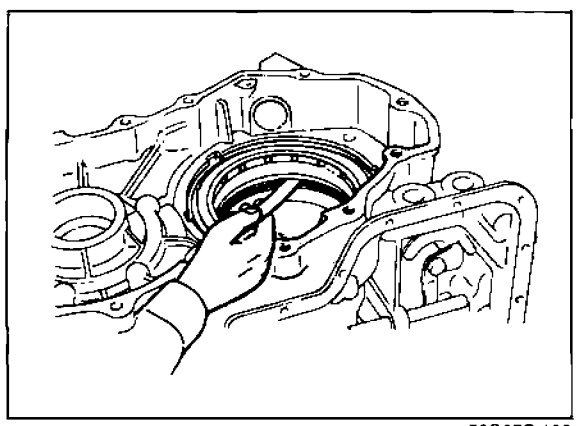
76G07C-104

3. Remove the drum hub assembly.



76G07C-105

4. Remove the one-way clutch inner race assembly.

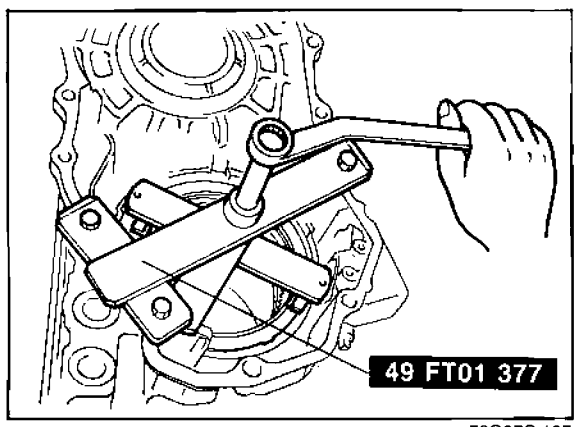


76G07C-106

5. Check the low and reverse brake clearance.

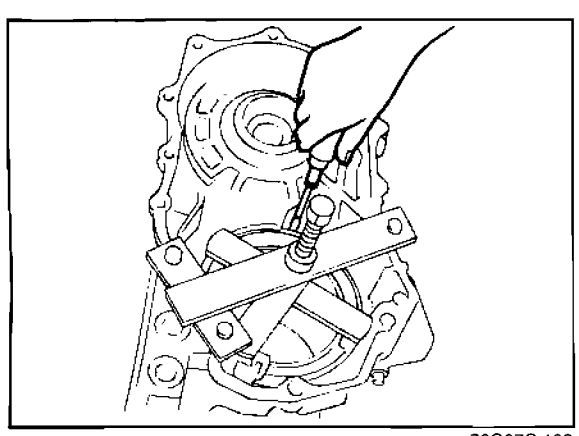
Standard clearance:
0.8—1.05 mm (0.032—0.041 in)

Note
If it is not within specification, use the retaining plate to make the adjustment at the time of installation. (Refer to page 7C—104.)



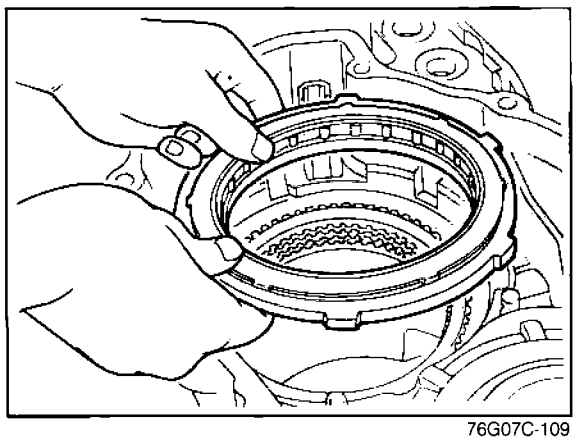
76G07C-107

6. Remove the one-way clutch.
   (1) Install the **SST** to the one-way clutch as shown.
   (2) Compress the one-way clutch.



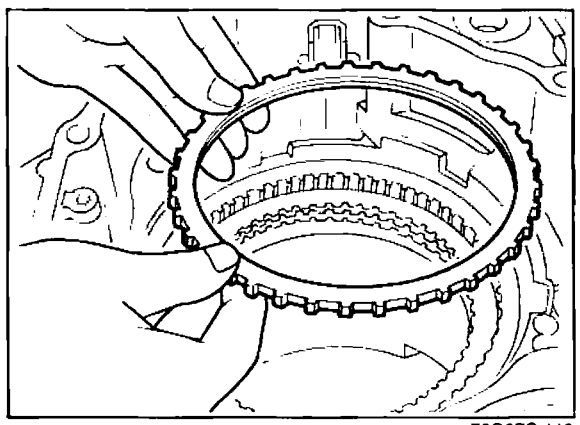
76G07C-108

   (3) Remove the snap ring.
   (4) Remove the **SST**.



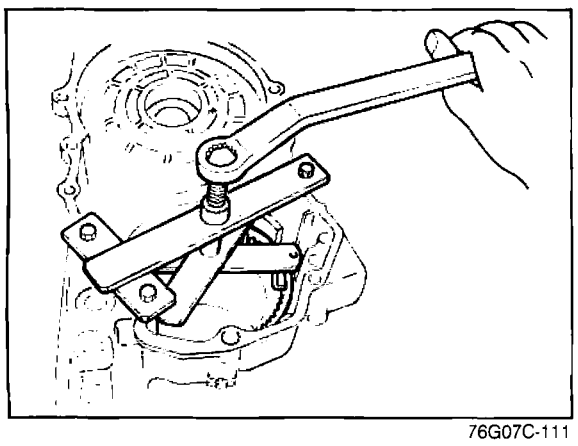
76G07C-109

   (5) Remove the one-way clutch.



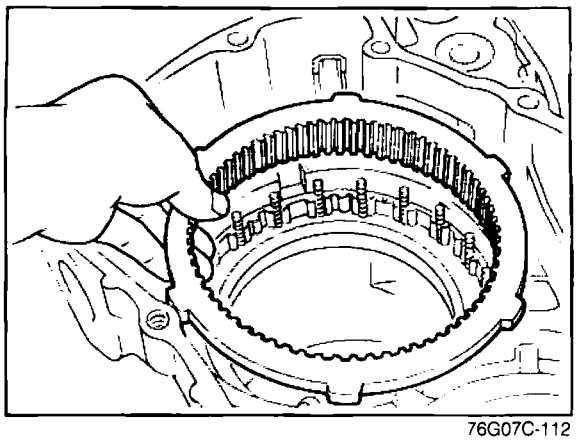
76G07C-110

7. Remove the retaining plate, drive plate, driven plate, and dished plate.



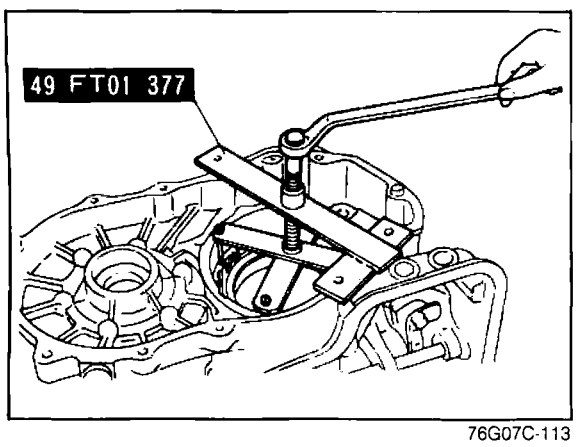
76G07C-111

8. Remove the low and reverse brake hub.
   (1) Install the **SST** to the low and reverse brake hub as shown.
   (2) Compress the brake hub.
   (3) Remove the snap ring.
   (4) Remove the **SST**.



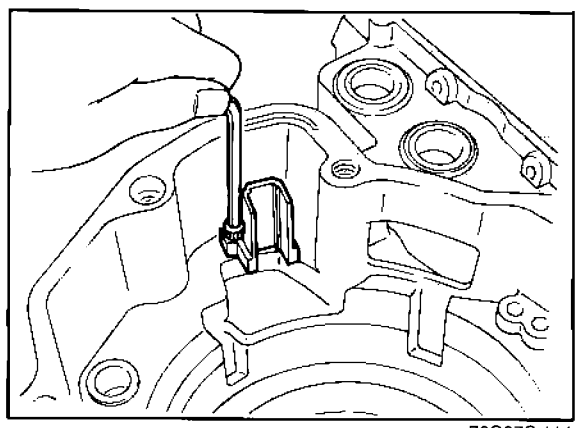
76G07C-112

   (5) Remove the low and reverse brake hub and springs.



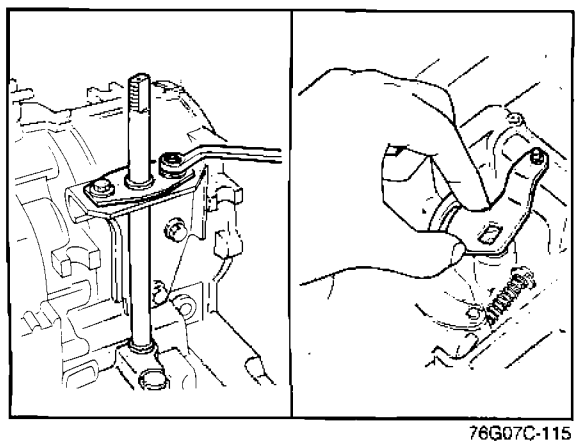
76G07C-113

9. Remove the low and reverse brake piston.
   (1) Install the **SST** to the low and reverse brake piston as shown.
   (2) Remove the brake piston by turning the **SST** counterclockwise.



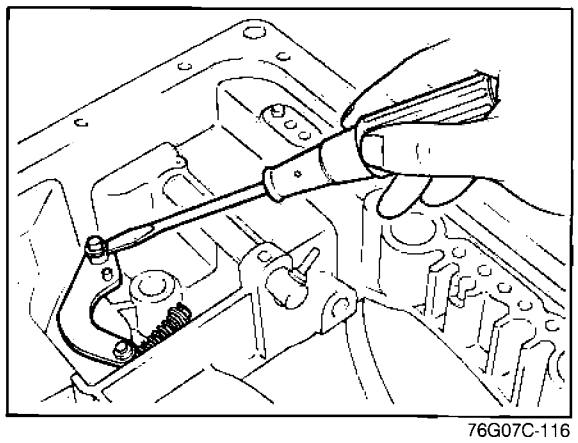
76G07C-114

10. Remove the actuator support.



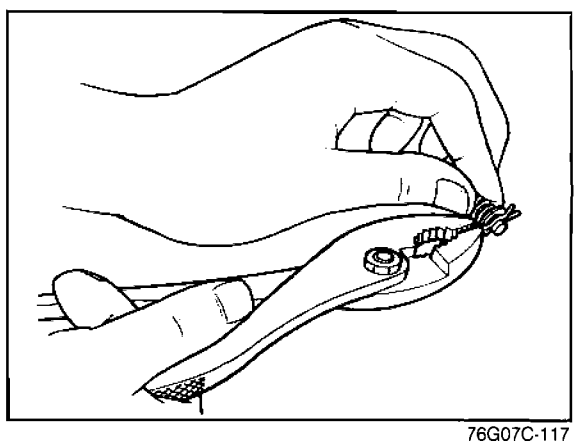
76G07C-115

11. Remove the manual shaft assembly.
    (1) Remove the plate and bushing.
    (2) Remove the nut, and remove the manual shaft and O-ring.
    (3) Remove the manual plate.



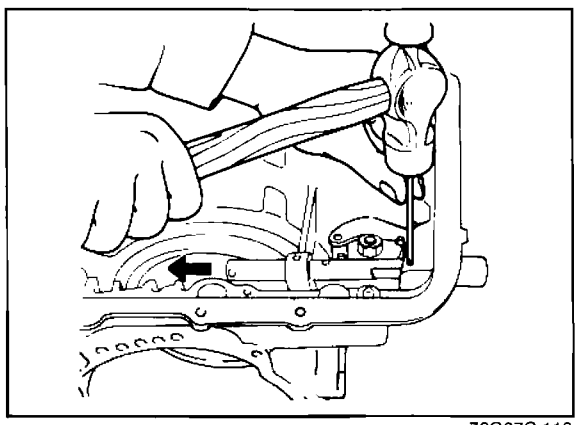
76G07C-116

(4) Remove the snap ring and parking lever.



76G07C-117

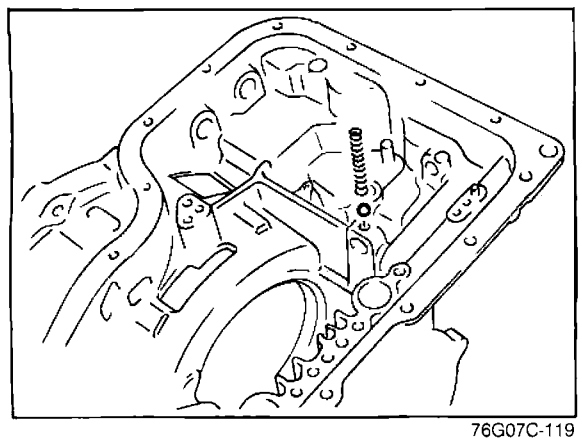
(5) Remove the snap pin, washer, spring, and parking joint.



76G07C-118

12. Remove the control rod.
    (1) Remove the pin, and remove the control rod from the transaxle.

Warning
Be careful when removing the control rod, the detent ball will be pushed out by spring force.

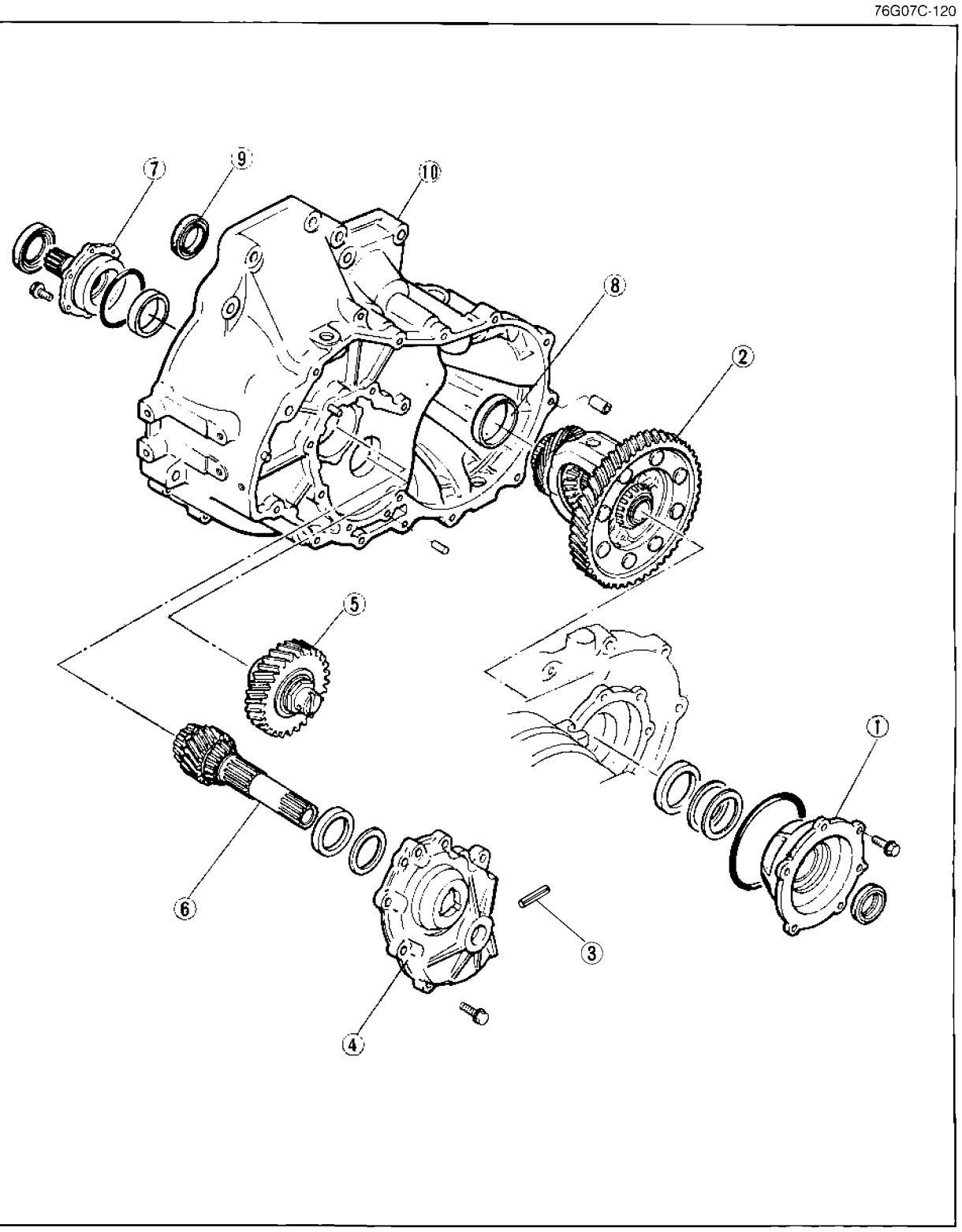


76G07C-119

(2) Remove the detent ball and spring.

DISASSEMBLY-STEP 4
Component

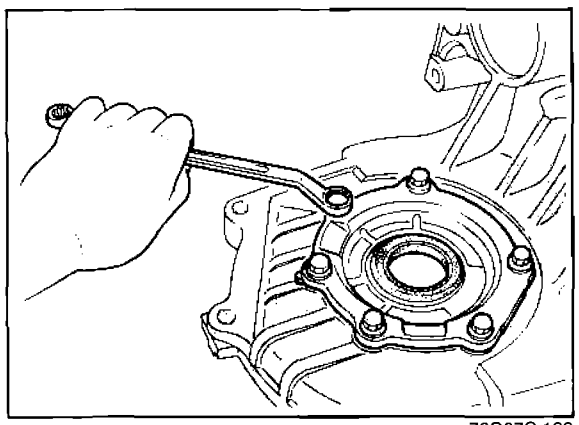
76G07C-120



76G07C-121

1. Side bearing housing
2. Differential assembly
3. Roll pin
4. Bearing housing
5. Idle gear assembly
6. Output gear assembly
7. Bearing cover
8. Bearing outer race
9. Oil seal
10. Converter housing

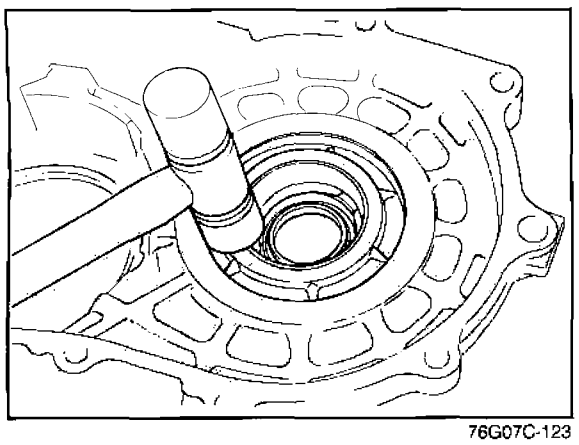
7C DISASSEMBLY



76G07C-122

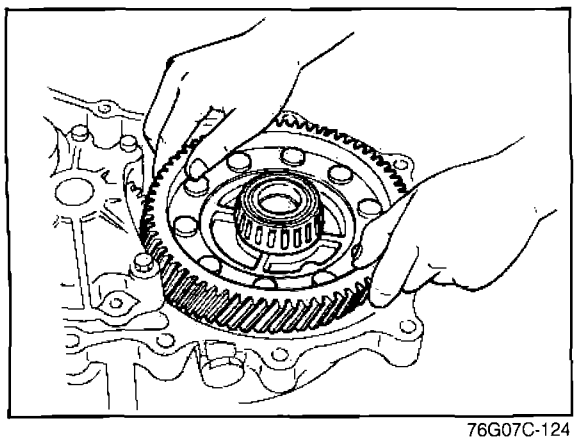
Procedure

1. Remove the side bearing housing installation bolts from the transaxle case.



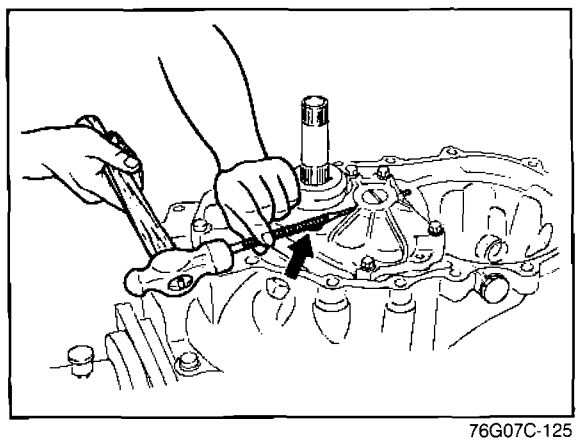
76G07C-123

2. Remove the side bearing housing from the transaxle case by tapping lightly with a plastic hammer.



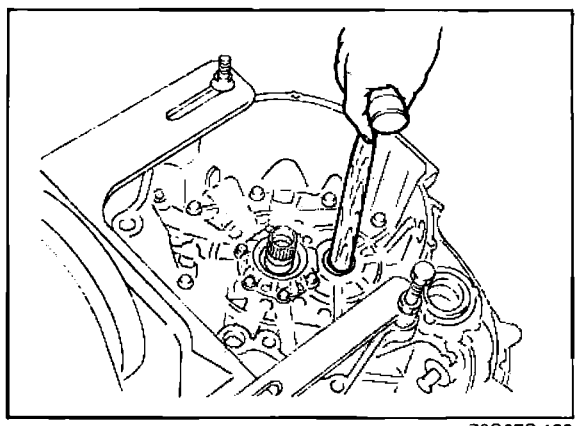
76G07C-124

3. Remove the differential assembly.



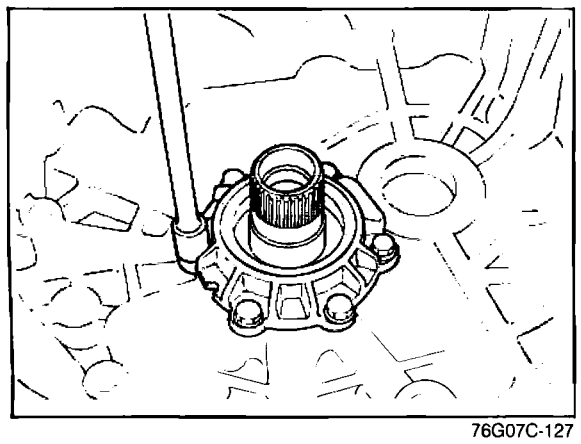
76G07C-125

4. Remove the bearing housing.
   (1) Remove the bolt indicated in the figure (arrow).
   (2) Remove the roll pin with a pin punch.
   (3) Remove the bearing housing by tapping lightly with a plastic hammer.



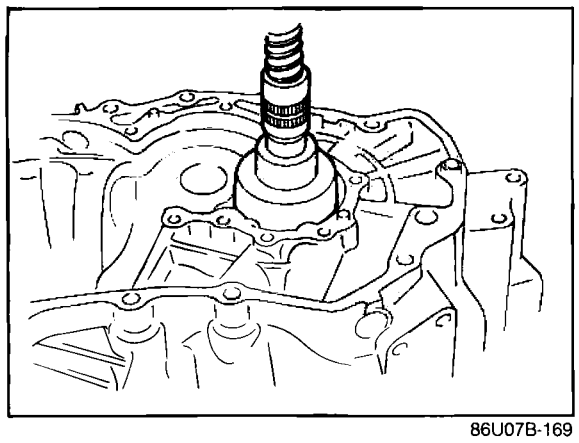
76G07C-126

5. Remove the idle gear assembly and output gear assembly by tapping out from the torque converter side.



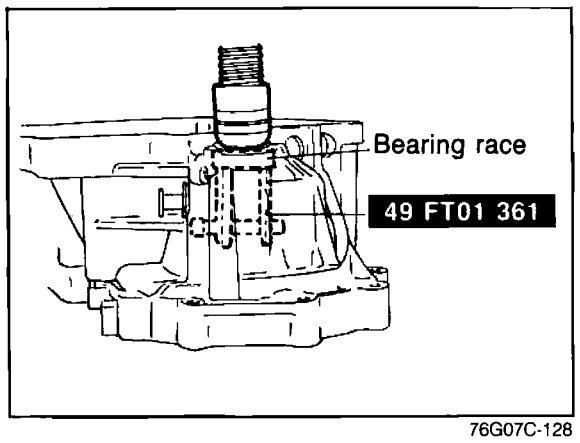
76G07C-127

6. Remove the bearing cover.
   (1) Remove the converter housing from the transaxle hanger.
   (2) Remove the bearing cover bolts.



86U07B-169

   (3) Press the bearing cover assembly out of the converter housing.



76G07C-128

7. Press the bearing outer race out of the converter housing with the **SST**.

   Note
   Install the bearing outer race during reassembly to adjust the preload.

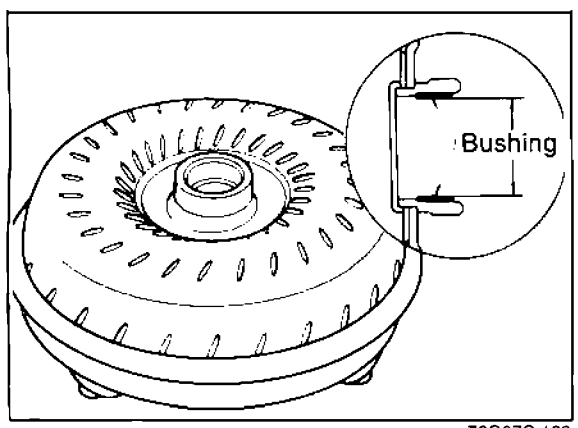
8. Check the oil seals for damage. Replace if necessary.

INSPECTION AND REPAIR

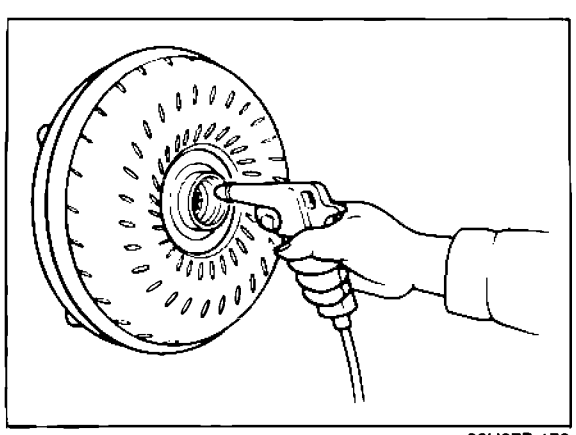
PRECAUTION

(1) Several of the parts resemble each other; organize them so that they do not get mixed up.
(2) Clean each part with cleaning oil, clean out the oil holes and oil passages with compressed air, and check that there are no obstructions.
(3) When using cleaning oil and compressed air, wear protective eyewear.
(4) If a clutch plate or brake band is replaced with a new one, soak it in ATF for 2 hours or more before installing.
(5) Before assembly, apply ATF to all seal rings, rotating parts, and sliding parts.
(6) All seals, gaskets and roll pins must be replaced with new ones during assembly.
(7) Use petroleum jelly, not grease where required.
(8) When it is necessary to replace a bushing, replace the assembly which includes that bushing.

76G07C-353



76G07C-129



86U07B-173

TORQUE CONVERTER

The torque converter is welded together and cannot be disassembled.

Inspection

1. Check the outer part of the converter for damage or cracks, and replace it if necessary.
2. Check for rust on the pilot hub of the converter or on the boss. If there is any, remove it completely.
3. Measure the bushing of the converter boss. Replace the converter assembly if the bushing is worn.

Bushing inner diameter
Standard: 33.000—33.025 mm (1.299—1.300 in)
Maximum: 33.075 mm (1.302 in)

Washing Inside of Converter

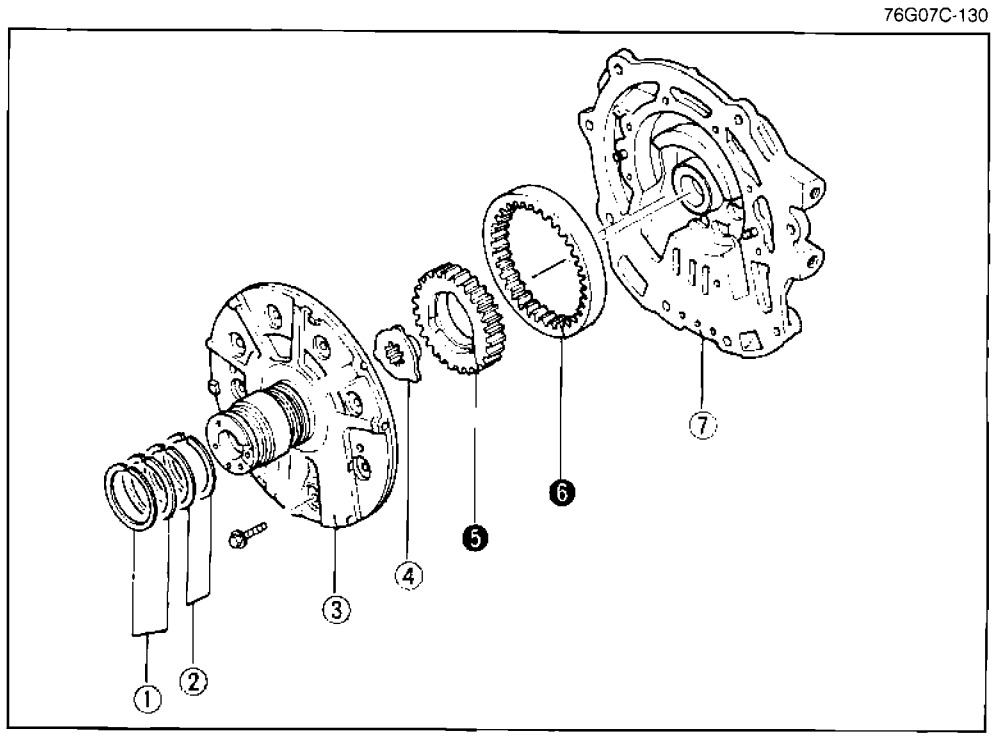
1. Drain any ATF remaining in the converter.
2. Pour in solvent [approximately **0.5 liter (0.53 US qt, 0.44 Imp qt)**].
3. Shake the converter to clean the inside. Pour out the solvent.
4. Clean the inside of the converter with compressed air so that the inside is perfectly empty.
5. Pour in ATF.
6. Shake the converter to clean the inside. Pour out the ATF.

OIL PUMP

Disassembly

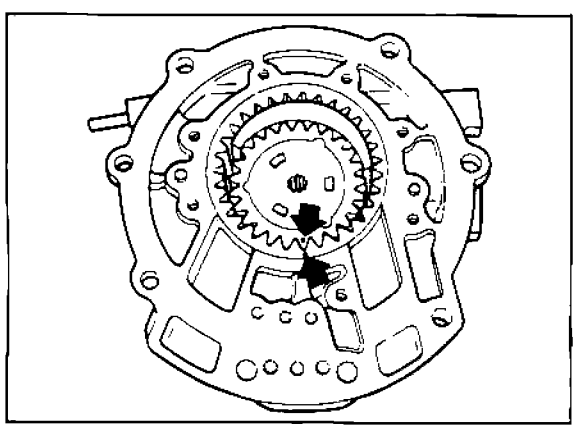
Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked parts.

76G07C-130



63U07B-089

1. Seal ring
2. Seal ring
3. Pump cover
4. Pump flange
5. Inner gear
6. Outer gear
7. Pump housing

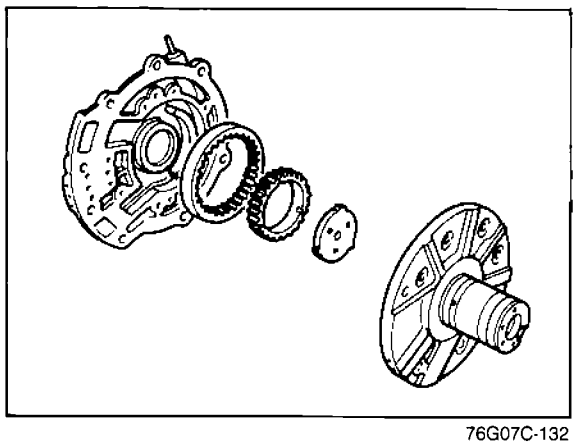


76G07C-131

Disassembly note

Inner gear and outer gear

Mark the inner and outer gears with paint before removing them.



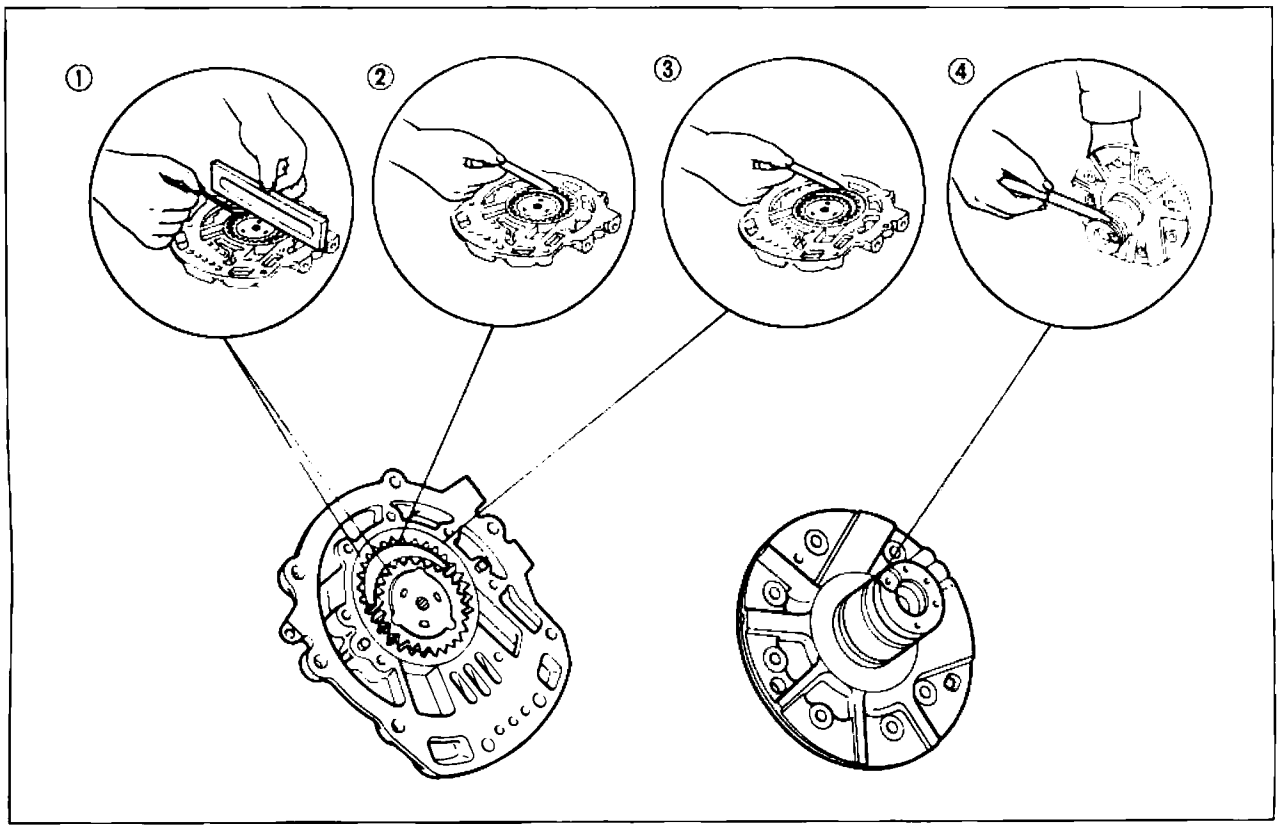
76G07C-132

Inspection

Check for the following and replace any faulty parts:

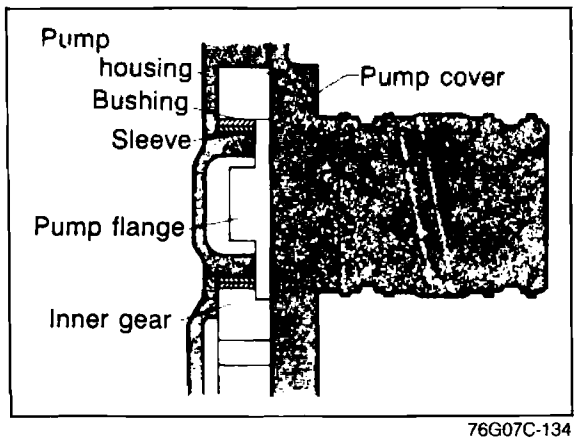
1. Damaged or worn inner or outer gear tooth surfaces.
2. Broken or worn seal ring.

3. Clearance



	Measured location	Standard	Maximum
1	Gear to pump cover	0.02—0.04 mm (0.001—0.002 in)	0.08 mm (0.003 in)
2	Outer gear to crescent	0.14—0.21 mm (0.006—0.008 in)	0.25 mm (0.010 in)
3	Outer gear to housing	0.05—0.20 mm (0.002—0.008 in)	0.25 mm (0.010 in)
4	Oil seal ring to ring groove	0.04—0.16 mm (0.002—0.006 in)	0.40 mm (0.016 in)

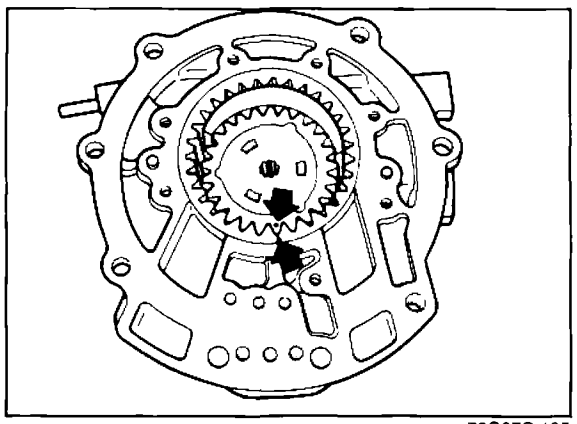
76G07C-133



76G07C-134

4. Damaged or worn inner gear bushing of pump housing sleeve.

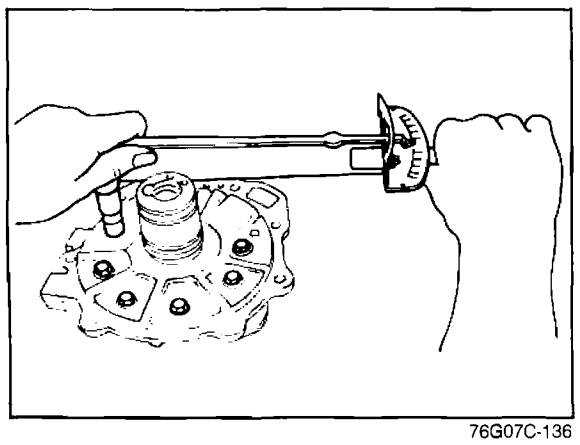
Sleeve outer diameter:
37.900 mm (1.492 in) max.
Bushing inner diameter:
38.075 mm (1.499 in) max.



76G07C-135

Assembly

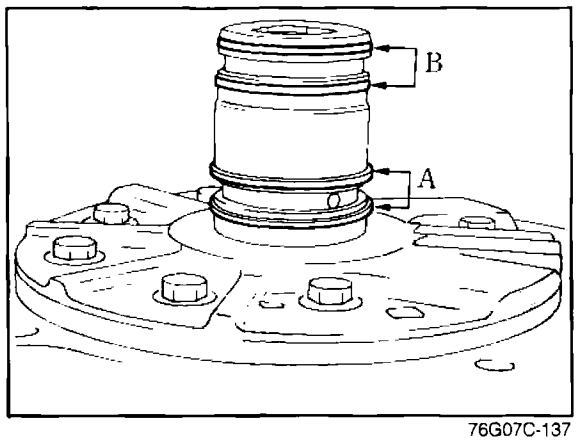
1. Assemble so that the marks on the inner and outer gears are at the pump cover side.
2. Install the pump flange.



76G07C-136

3. Install the oil pump cover.

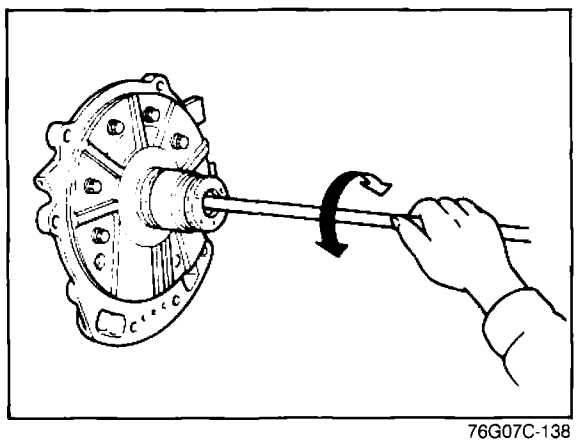
Tightening torque: 11—14 N·m (110—140 cm-kg, 95—122 in-lb)



76G07C-137

4. Install the seal rings.

Seal ring outer diameter
A: 44 mm (1.732 in)
B: 43 mm (1.693 in)



76G07C-138

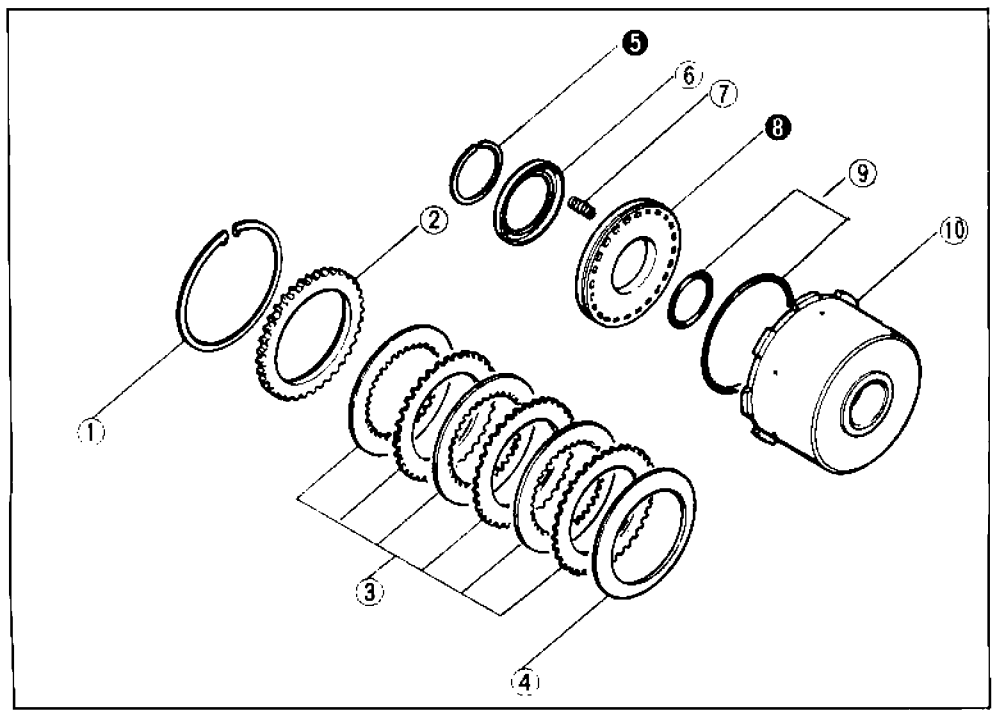
5. When the assembly is completed, install the oil pump shaft and make sure the gears turn easily.

FRONT CLUTCH

Disassembly

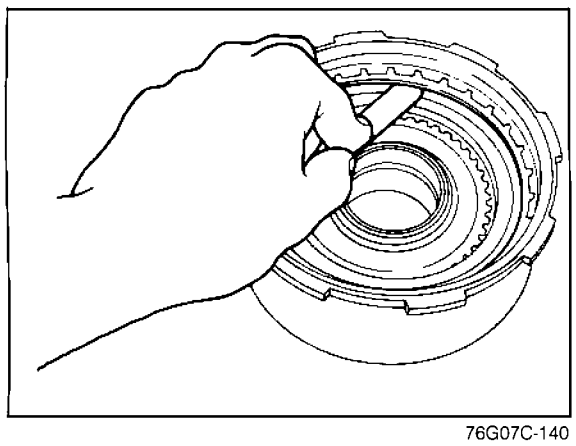
Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked parts.

76G07C-139



63U07B-097

1. Snap ring
2. Retaining plate
3. Drive and driven plates
4. Dished plate
5. Snap ring
6. Spring retainer
7. Return spring
8. Piston
9. Seal rings
10. Rear clutch drum



76G07C-140

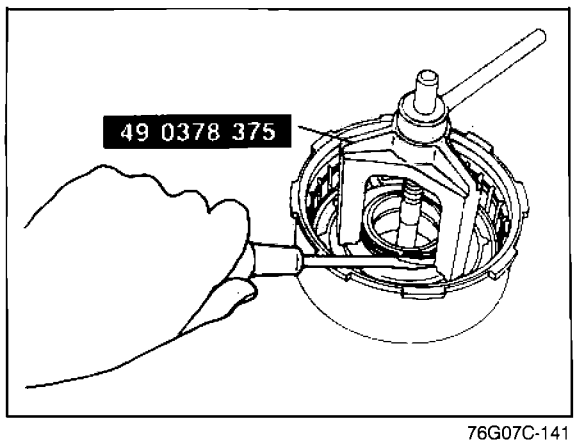
Disassembly note

Front clutch clearance

Before disassembling the front clutch, measure the front clutch clearance.

Front clutch clearance:
1.6—1.8 mm (0.063—0.071 in)

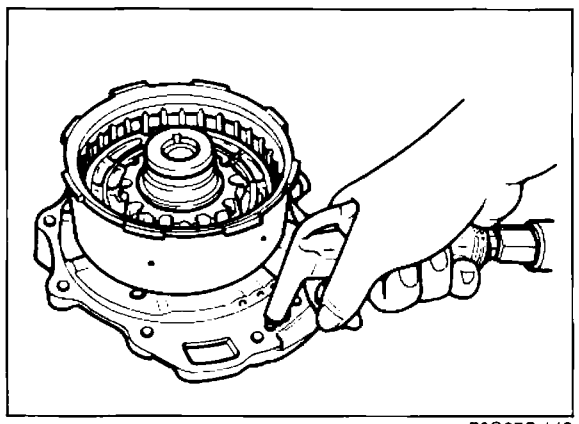
Note
If the clearance is not within specification, adjust by using the retaining plate at the time of assembly. (Refer to page 7C—60.)



76G07C-141

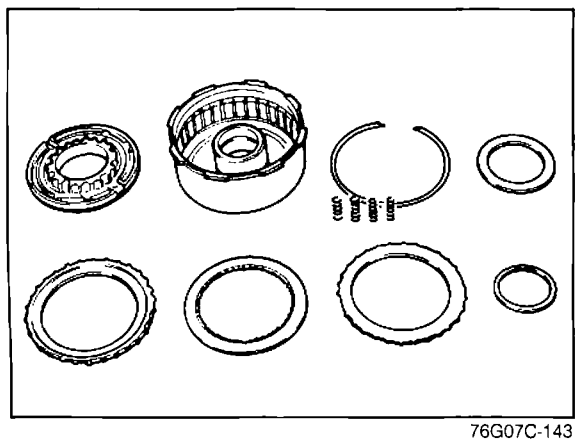
Snap ring

Compress the clutch spring with the **SST**, and remove the snap ring with a screwdriver.

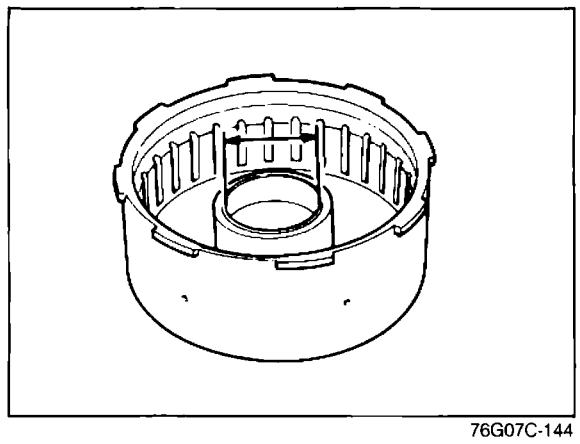


76G07C-142

Piston
Remove the piston by blowing compressed air into the hole indicated.



76G07C-143



76G07C-144

Inspection
Check the following and repair or replace any faulty parts.
1. Drive and driven plates for damage or wear

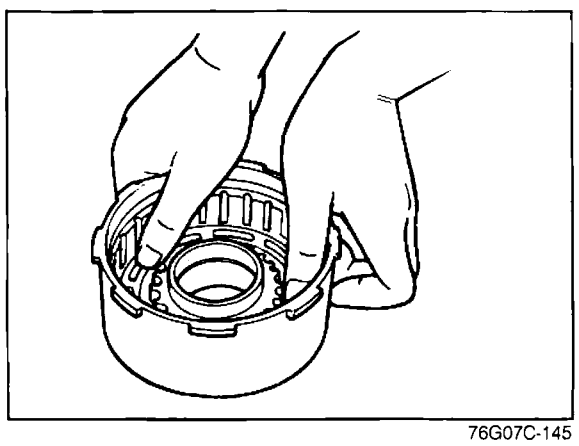
   Drive plate thickness
   Standard: 1.6 mm (0.063 in)
   Minimum: 1.4 mm (0.055 in)

2. Clutch piston for damage or cracks
3. Clutch drum for damage or deformation
4. Seal contact areas for damage
5. Check ball for leaking or sticking
6. Spring retainer for deformation
7. Broken or worn snap ring
8. Broken or weakened spring

   Free length of spring:
   26.2 mm (1.031 in)

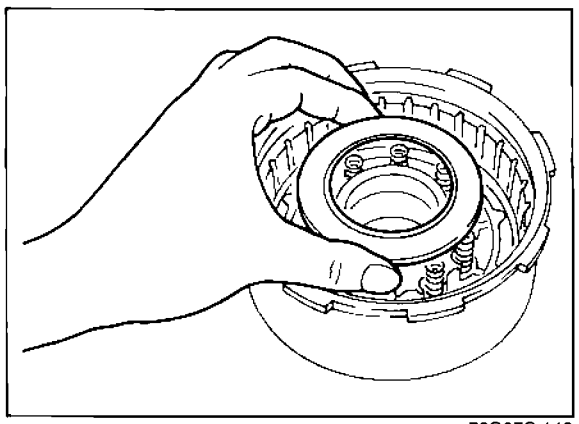
9. Worn drum bushing

   Drum bushing inner diameter:
   44.075 mm (1.735 in) max.



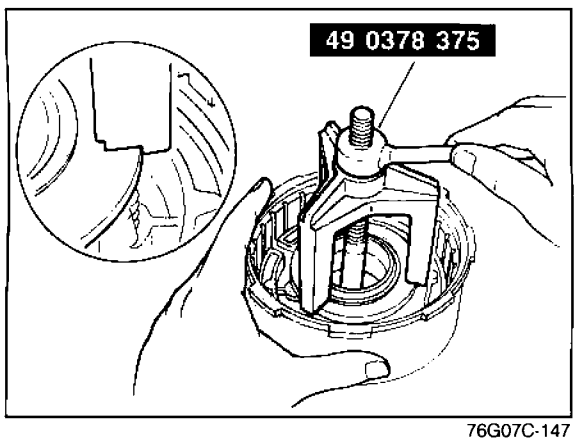
76G07C-145

Assembly
1. Apply ATF to the inner seal ring, and install it into the rear clutch drum.
2. Apply ATF to the outer seal ring, and install it onto the piston.
3. Install the piston by pushing evenly around the circumference, being careful not to damage the seal rings.



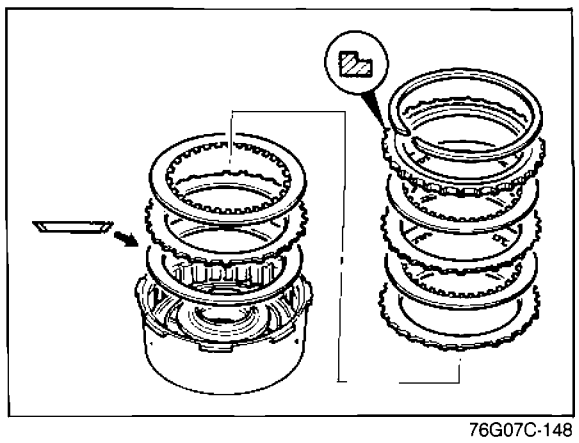
76G07C-146

4. Install the return springs and the spring retainer.



76G07C-147

5. Install the snap ring.
   (1) Place the **SST** onto the spring retainer and compress only enough to install the snap ring.
   (2) Install the snap ring into the groove.
   (3) Remove the **SST**.

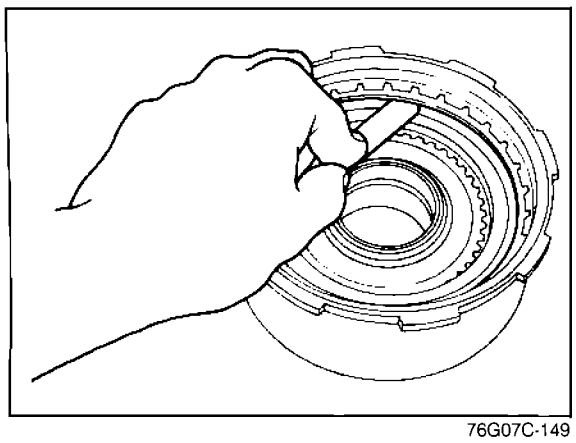


76G07C-148

6. Install the dished plate with the beveled side facing the piston as shown. Then install the drive and driven plates.

   Note
   Installation order:
   Driven-Drive-Driven-Drive-Driven-Drive

7. Install the retaining plate with the step facing upward; then install the snap ring.



76G07C-149

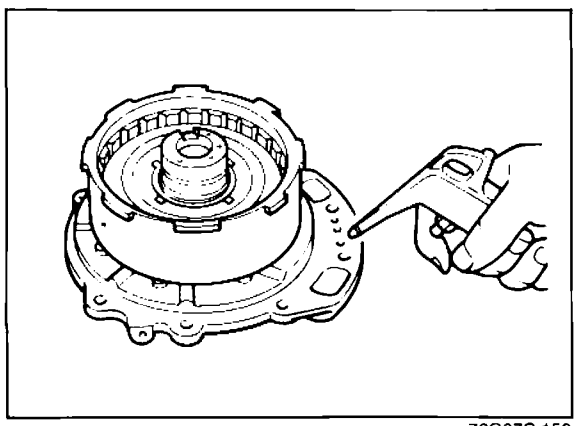
8. Check the front clutch clearance.
   (1) Measure the clearance between the snap ring and retaining plate of the front clutch with a feeler gauge.

   Front clutch clearance:
   1.6—1.8 mm (0.063—0.071 in)

   (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

Retaining plate sizes **mm (in)**

5.2 (0.205)	5.4 (0.213)	5.6 (0.220)
5.8 (0.228)	6.0 (0.236)	6.2 (0.244)

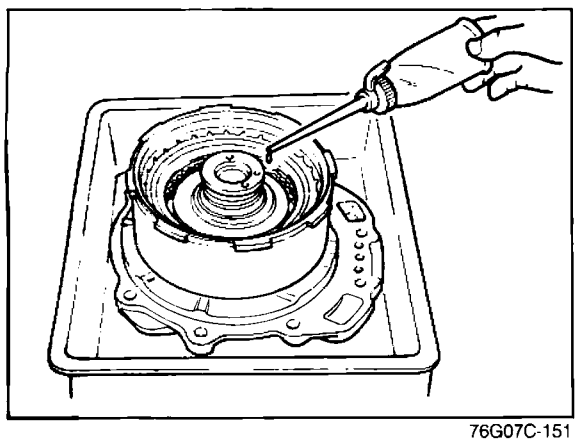


76G07C-150

9. Check the front clutch operation.
   (1) Set the clutch assembly onto the oil pump.
   (2) Check the front clutch operation by applying compressed air through the fluid passage shown.

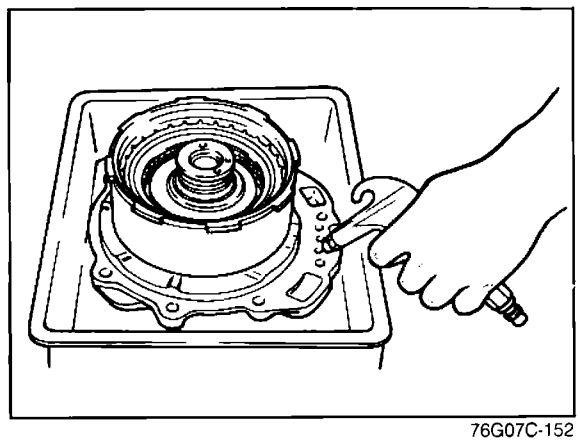
Air pressure:
392 kPa (4.0 kg/cm^2, 57 psi) max.

Caution
Apply air for no more than 3 seconds.



76G07C-151

(3) Pour ATF into the front clutch until the clutch piston is fully submerged.



76G07C-152

(4) Check that no bubbles come from between the piston and drum seal while applying compressed air through the fluid passage shown.

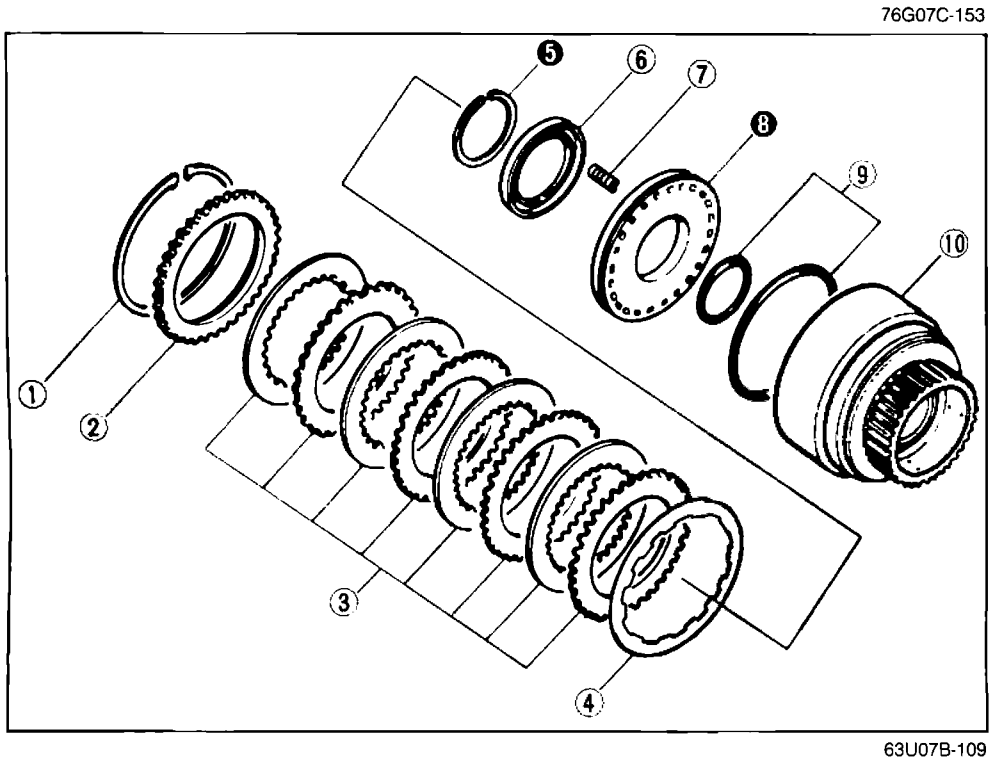
Air pressure:
392 kPa (4.0 kg/cm^2, 57 psi) max.

Caution
Apply air for no more than 3 seconds.

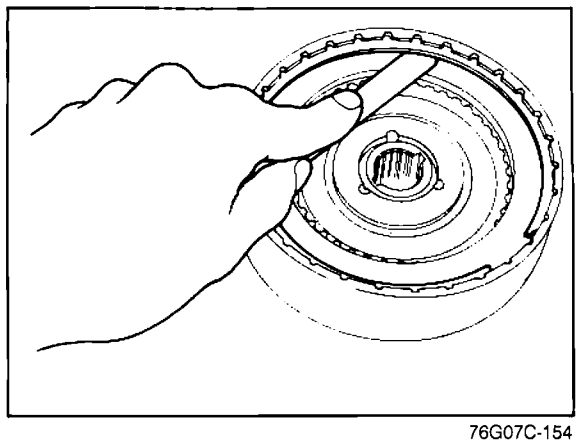
REAR CLUTCH

Disassembly

Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked parts.



1. Snap ring
2. Retaining plate
3. Drive and driven plates
4. Dished plate
5. Snap ring
6. Spring retainer
7. Return spring
8. Piston
9. Seal rings
10. Rear clutch drum

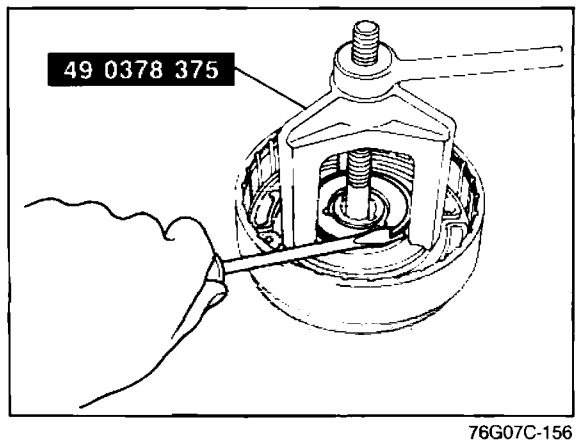


Disassembly note
Rear clutch clearance

Before disassembling the rear clutch, measure the rear clutch clearance.

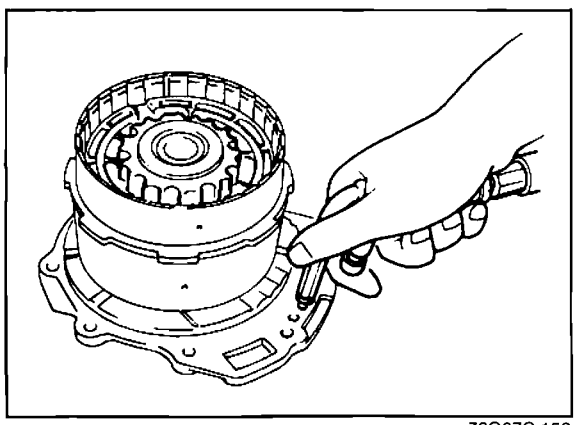
Rear clutch clearance:
0.8—1.0 mm (0.031—0.039 in)

Note
If the clearance is not within specification, adjust it by selecting a proper retaining plate. (Refer to page 7C—64.)



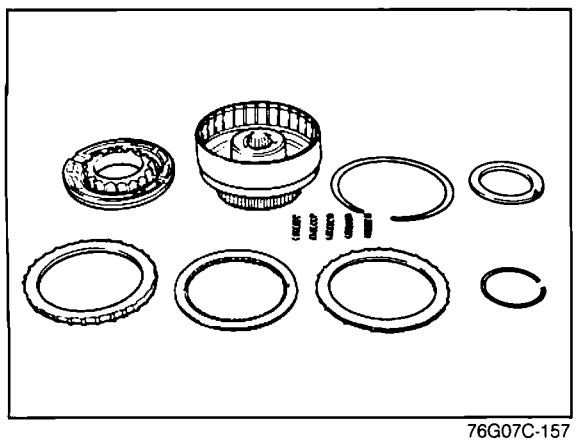
Snap ring

Compress the clutch spring, with the **SST** ; then remove the snap ring with a screwdriver.

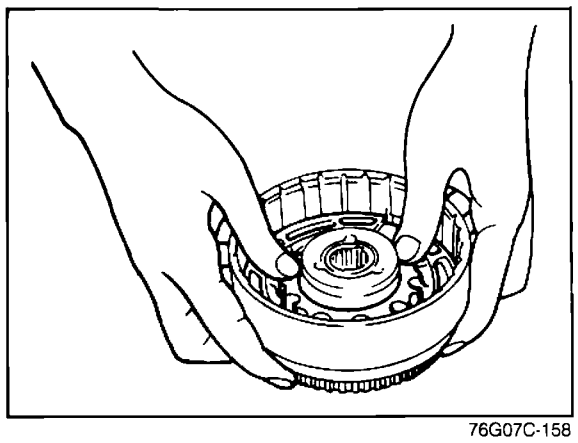


76G07C-156

Piston
Remove the piston by blowing compressed air into the fluid hole as shown.



76G07C-157



76G07C-158

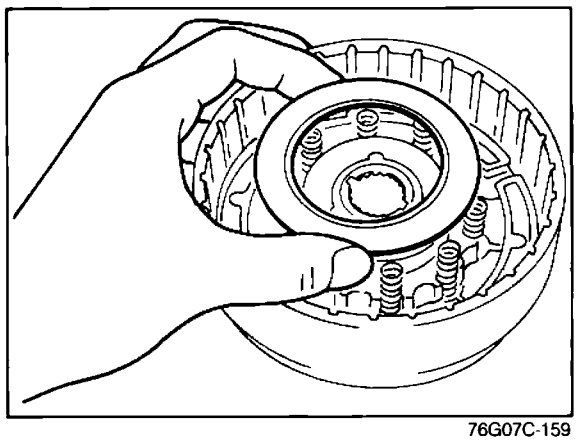
Inspection
Check the following and repair or replace any faulty parts.
1. Drive and driven plates for damage or wear

Drive plate thickness
Standard: 1.6 mm (0.063 in)
Minimum: 1.4 mm (0.055 in)

2. Clutch piston for damage or cracks
3. Clutch drum for damage or deformation
4. Seal contact areas for damage
5. Check ball for leaking or sticking
6. Spring retainer for deformation
7. Broken or worn snap ring
8. Broken or weakened spring

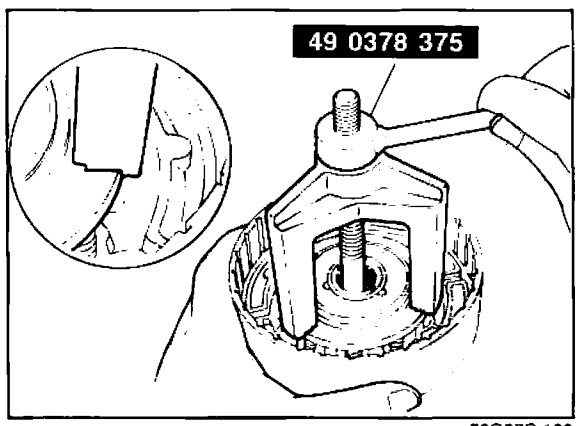
Free length of spring:
26.2 mm (1.031 in)

Assembly
1. Apply ATF to the inner seal ring and install it into the rear clutch drum.
2. Apply ATF to the outer seal ring, and install it onto the piston.
3. Install the piston by pushing evenly around the circumference, being careful not to damage the seal rings.



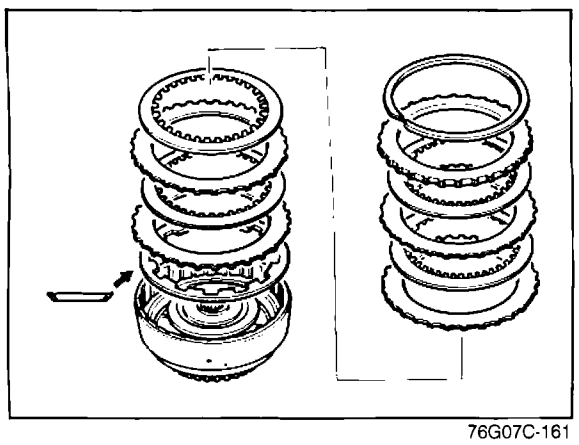
76G07C-159

4. Install the return springs and spring retainer into the piston.



76G07C-160

5. Install the snap ring.
   (1) Place the **SST** on the spring retainer and compress only enough to install the snap ring.
   (2) Install the snap ring in the groove.
   (3) Remove the **SST**.

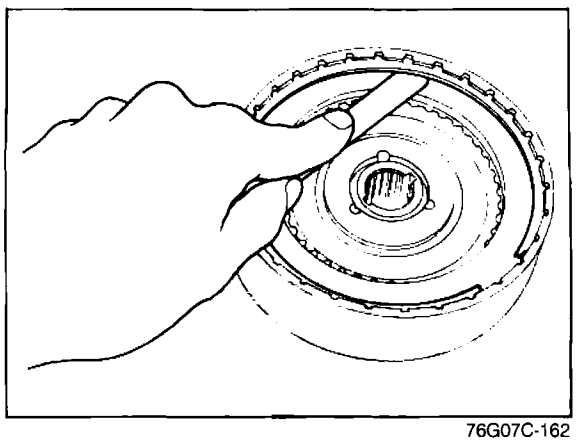


76G07C-161

6. Install the dished plate with the beveled side facing the piston as shown; then install the drive and driven plates.

Note
Installation order:
Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive

7. Install the retaining plate with the step facing upward; then install the snap ring.



76G07C-162

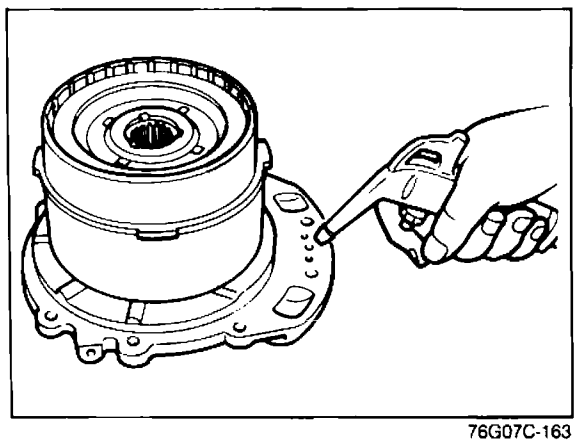
8. Check the rear clutch clearance.
   (1) Measure the clearance between the snap ring and retaining plate of the rear clutch with a feeler gauge.

Rear clutch clearance:
0.8—1.0 mm (0.031—0.039 in)

   (2) If the clearance is not with in specification, adjust it by selecting a proper retaining plate.

Retaining plate sizes **mm (in)**

4.8 (0.189)	5.0 (0.197)	5.2 (0.205)	5.4 (0.213)
5.6 (0.220)	5.8 (0.228)	6.0 (0.236)	6.2 (0.244)

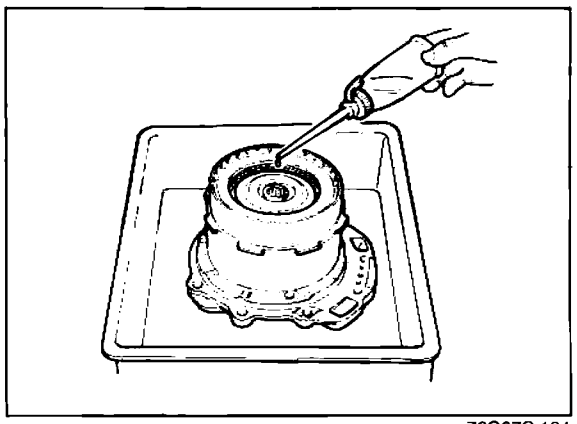


76G07C-163

9. Check the rear clutch operation.
   (1) Assemble the front clutch, and rear clutch; then set the clutch assembly onto the oil pump.
   (2) Check the rear clutch operation by applying compressed air through the fluid passage as shown.

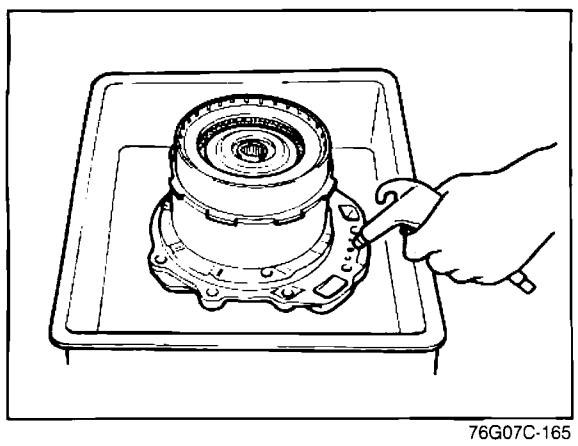
Air pressure:
392 kPa (4.0 kg/cm^2, 57 psi) max.

Caution
Apply air for no more than 3 seconds.



76G07C-164

(3) Pour ATF into the rear clutch until the clutch piston is fully submerged.



76G07C-165

(4) Check that no bubbles come from between the piston and drum seal while applying compressed air through the fluid passage shown.

Air pressure:
392 kPa (4.0 kg/cm^2, 57 psi) max.

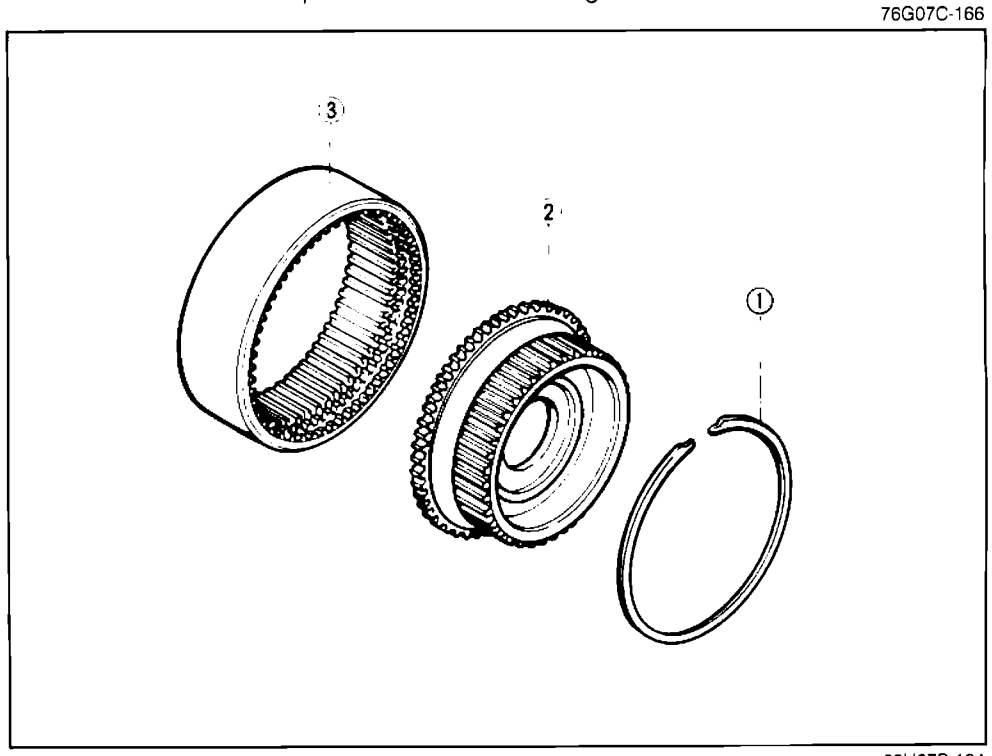
Caution
Apply air for no more than 3 Seconds

REAR CLUTCH HUB

Disassembly

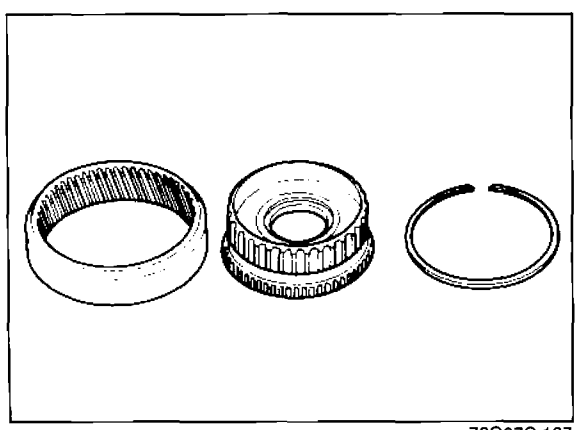
Disassemble in the sequence shown in the figure.

76G07C-166



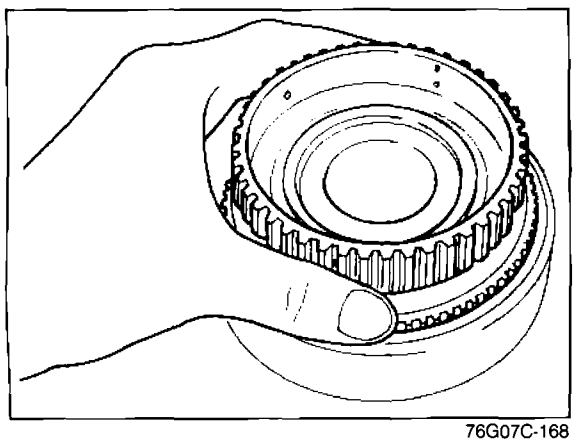
1. Snap ring
2. Rear clutch hub
3. Internal gear

63U07B-124



76G07C-167

Inspection
Check the following and replace any faulty parts.
1. Broken or worn snap ring
2. Damaged or worn internal gear



76G07C-168

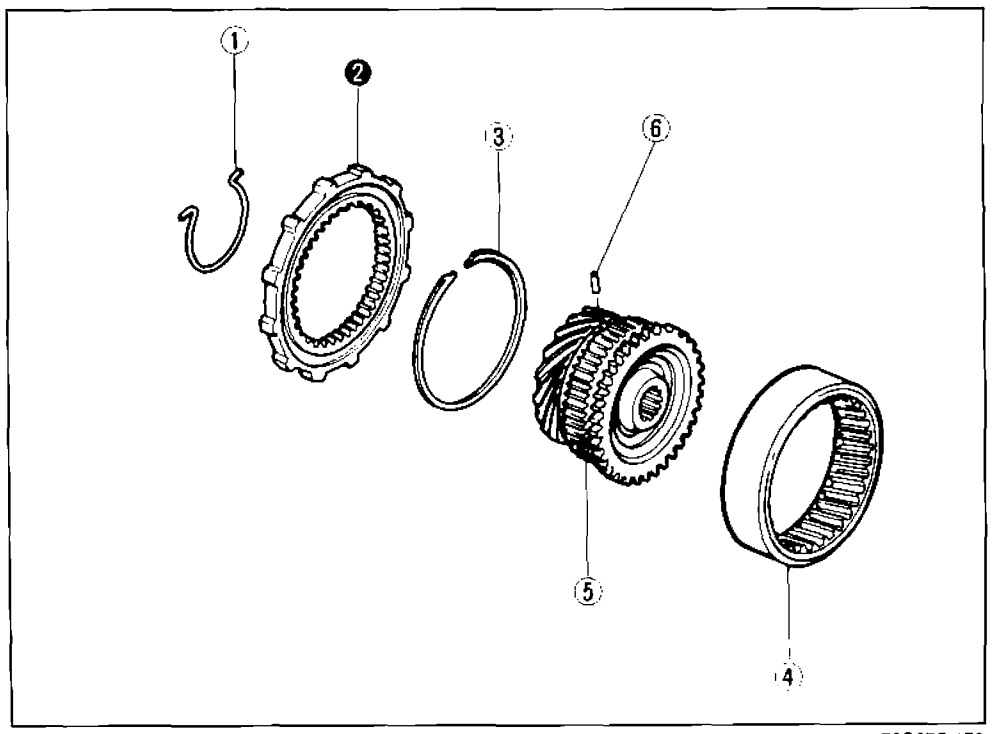
Assembly
1. Set the rear clutch hub into the internal gear.

Note
Align the splines of the rear clutch hub and internal gear

2. Install the snap ring.

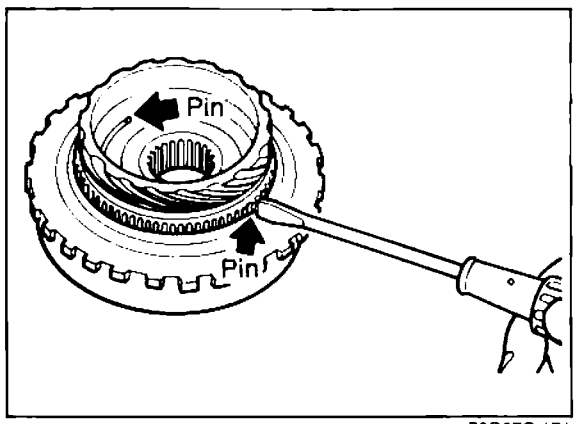
DRUM HUB
Disassembly
Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked part.

76G07C-169



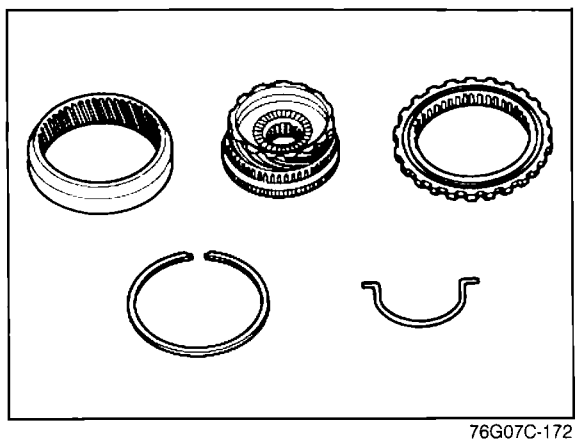
76G07C-170

1. Parking gear spring
2. Parking gear
3. Snap ring
4. Internal gear
5. Drive hub
6. Pin



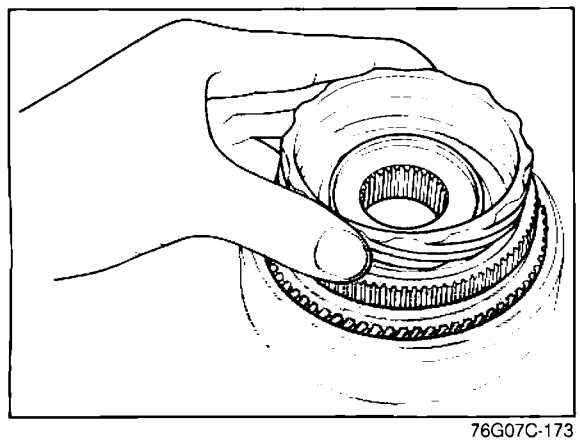
76G07C-171

Disassembly note
Parking gear
Remove the parking gear from the drive hub by first removing the parking gear spring by pushing in the two pins which project from the internal gear.



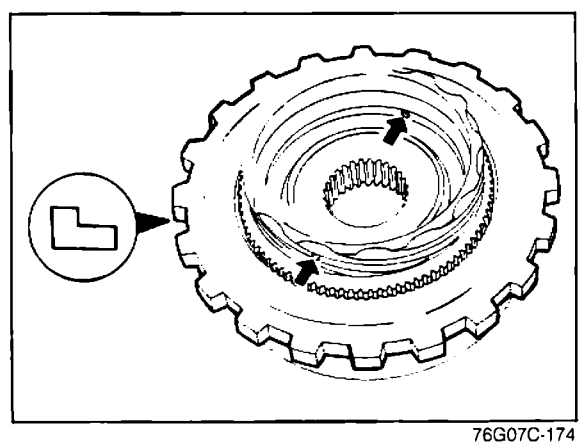
76G07C-172

Inspection
Check the following and replace any faulty parts.
1. Broken or worn snap ring
2. Damaged or worn gear

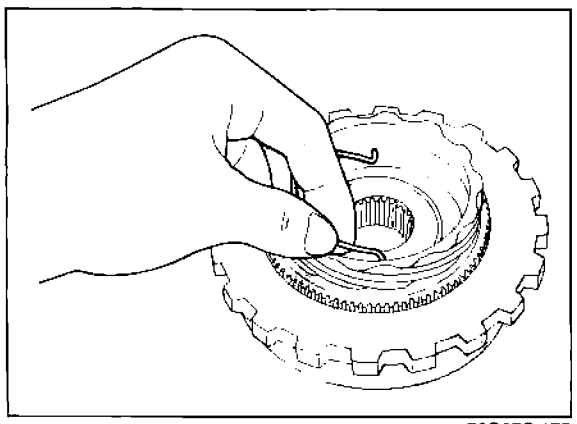


76G07C-173

Assembly
1. Install the drive hub to the internal gear; then install the snap ring.
2. Install the parking gear onto the drive hub with the step facing upward.
3. Apply petroleum jelly to the pins to secure them; then install them into the drive hub.



76G07C-174



76G07C-175

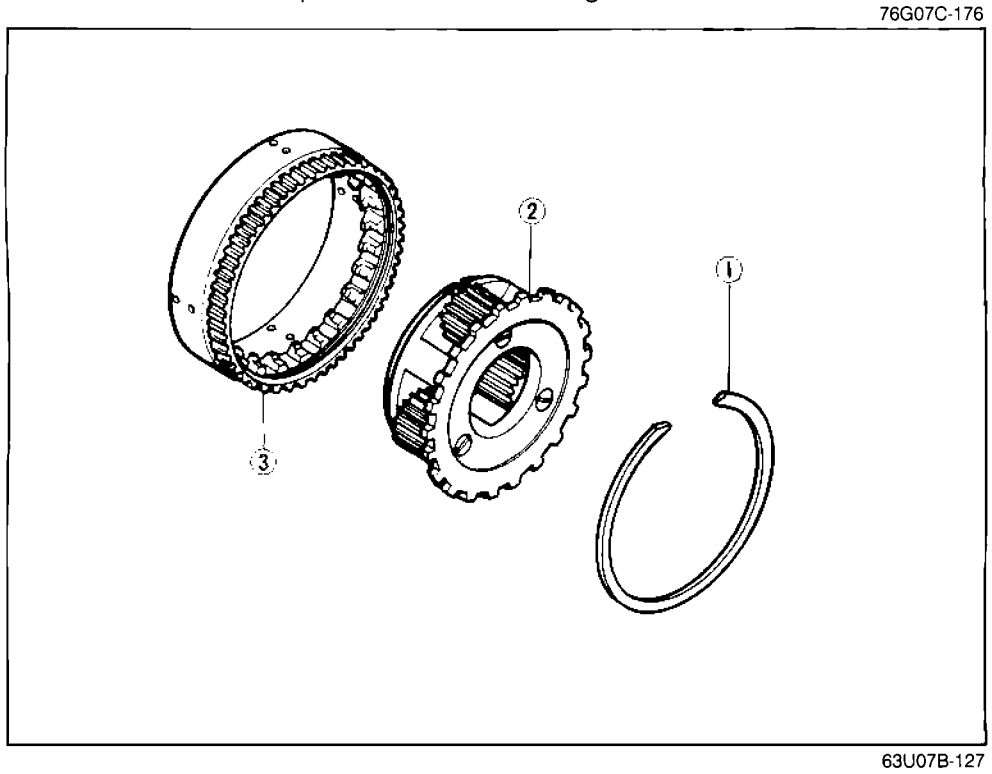
4. Install the parking gear spring.

ONE-WAY CLUTCH INNER RACE

Disassembly

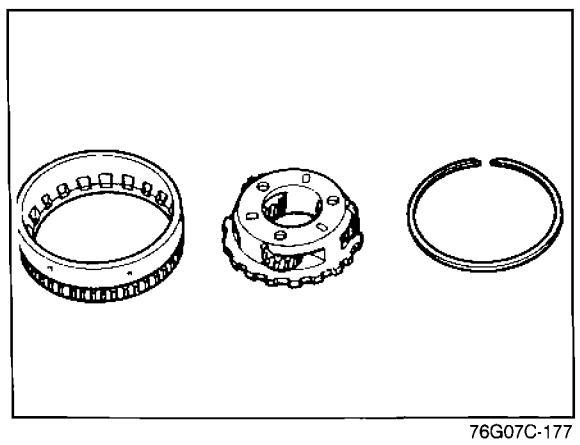
Disassemble in the sequence shown in the figure.

76G07C-176



63U07B-127

1. Snap ring
2. Planetary carrier (Rear)
3. One-way clutch inner race

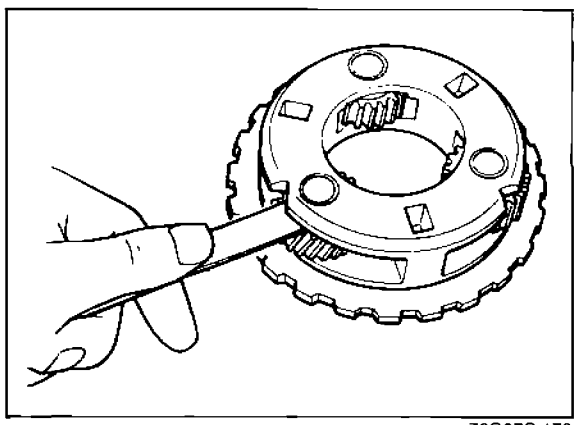


76G07C-177

Inspection

Check the following and replace any faulty parts.

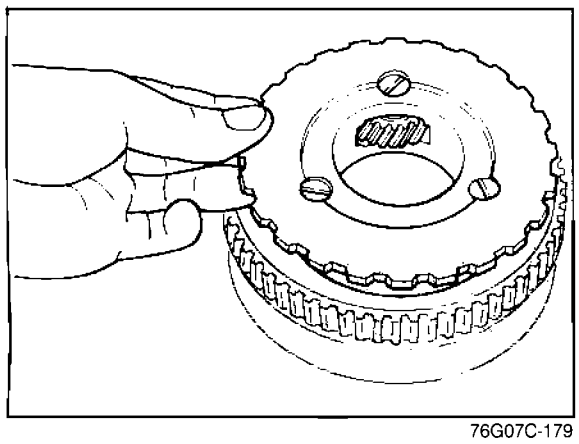
1. Broken or worn snap ring
2. Damaged or worn gear
3. Worn one-way clutch inner race
4. Rotation of pinion gear



76G07C-178

5. Clearance between the pinion washer and planetary carrier

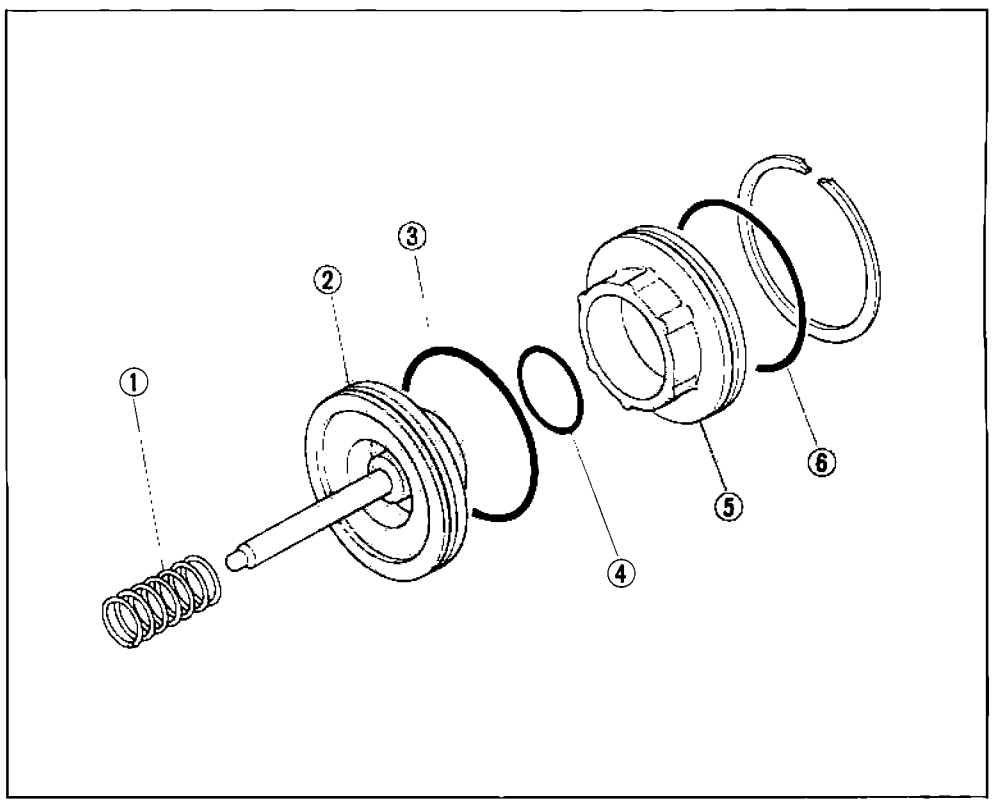
Clearance: 0.8 mm (0.031 in) max.



76G07C-179

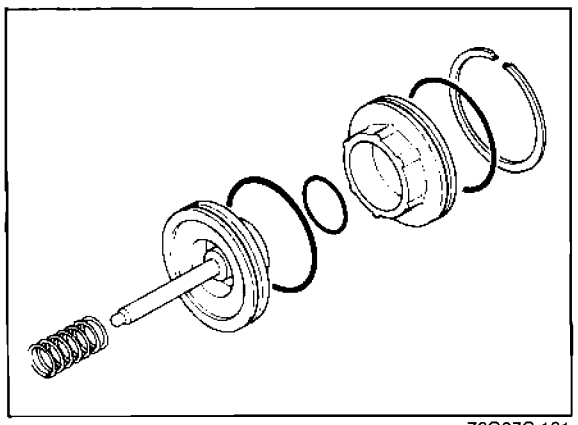
Assembly
Install the rear planetary carrier into the one-way clutch inner race; then install the snap ring.

BAND SERVO
Disassemble in the sequence shown in the figure.



76G07C-180

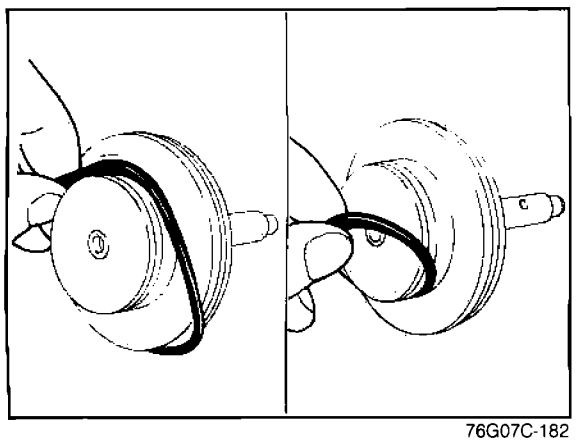
1. Return spring
2. Servo piston
3. Outer seal ring
4. Inner seal ring
5. Servo retainer
6. Seal ring



76G07C-181

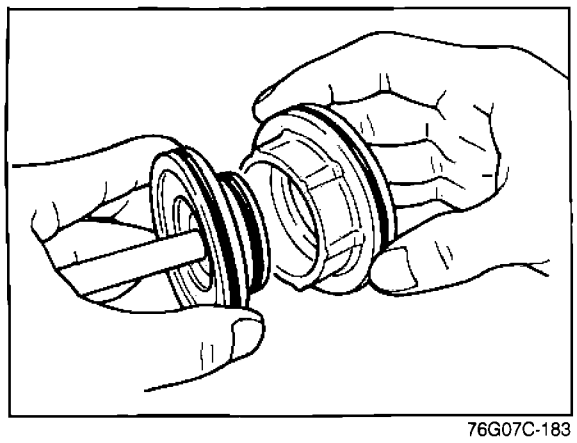
Inspection
Check the following and replace any faulty parts.
1. Damaged or worn piston
2. Weakened return spring

Free length of spring:
FE engine: 48.0 mm (1.89 in)
F6 engine: 45.5 mm (1.79 in)



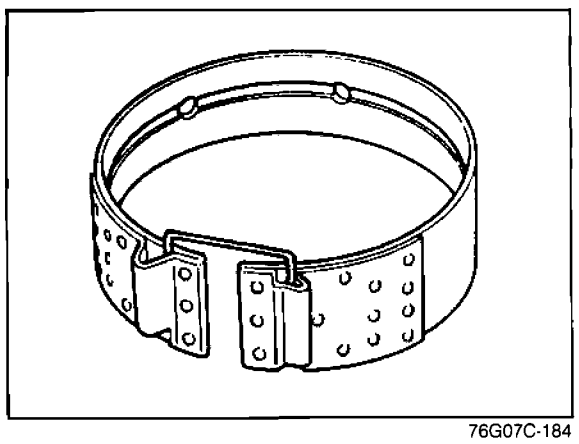
76G07C-182

Assembly
1. Apply ATF to the inner and outer seal rings, and install them onto the servo piston.



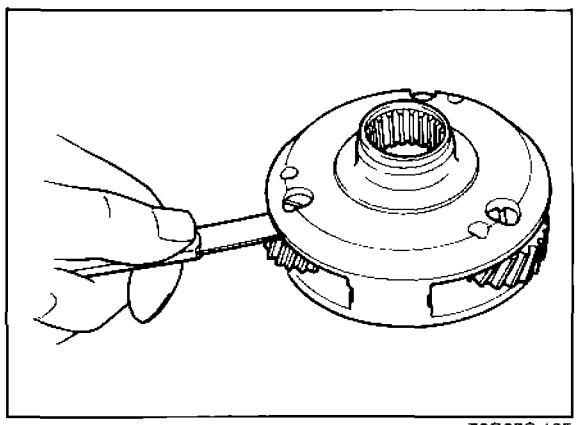
76G07C-183

2. Apply ATF to the seal ring, and install it onto the servo retainer.
3. Assemble the servo retainer and servo piston.



76G07C-184

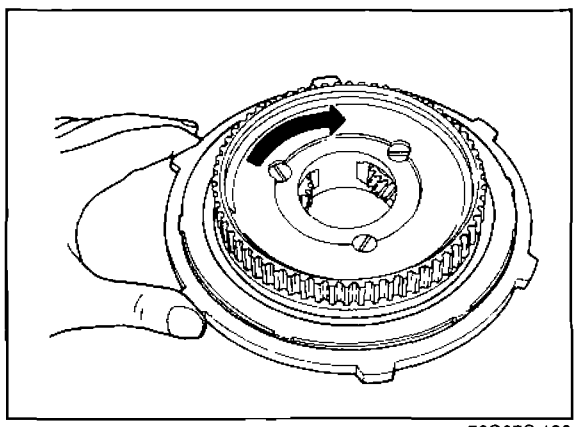
BRAKE BAND
Inspection
Check the following and replace any faulty part.
1. Damaged or worn brake band



76G07C-185

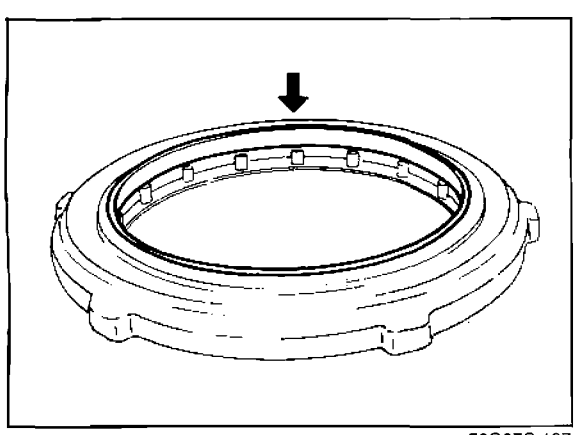
PLANETARY CARRIER (FRONT)
Inspection
Check the following and replace any faulty parts.
1. Rotation of pinion gear
2. Clearance between pinion washer and planetary carrier

Clearance: 0.8 mm (0.031 in) max.



76G07C-186

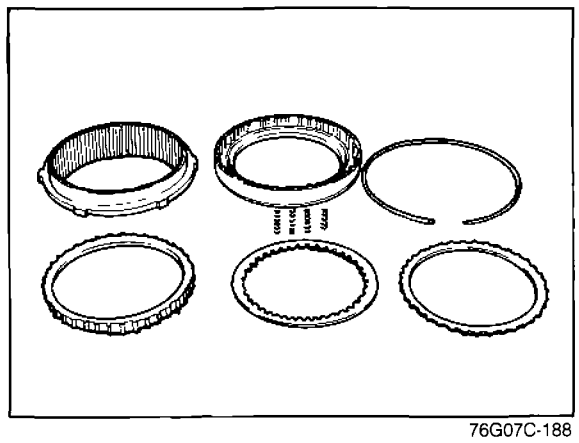
ONE-WAY CLUTCH
Inspection
Check the following and replace any faulty parts.
1. One-way clutch operation
   (1) Install the one-way clutch into the one-way clutch inner race.
   (2) Make sure that when the one-way clutch is held and the inner race is turned, the clutch turns smoothly in one direction only.



76G07C-187

2. Worn bushing

Bushing inner diameter:
130.063 mm (5.121 in) max.



76G07C-188

LOW AND REVERSE BRAKE
Inspection
Check the following and replace any faulty parts.
1. Damaged or worn drive and driven plates

Drive plate thickness
Standard: 1.6 mm (0.063 in)
Minimum: 1.4 mm (0.055 in)

2. Broken or worn snap ring
3. Deformed low and reverse brake hub
4. Broken or weakened spring

Free length of spring:
27.7 mm (1.091 in)

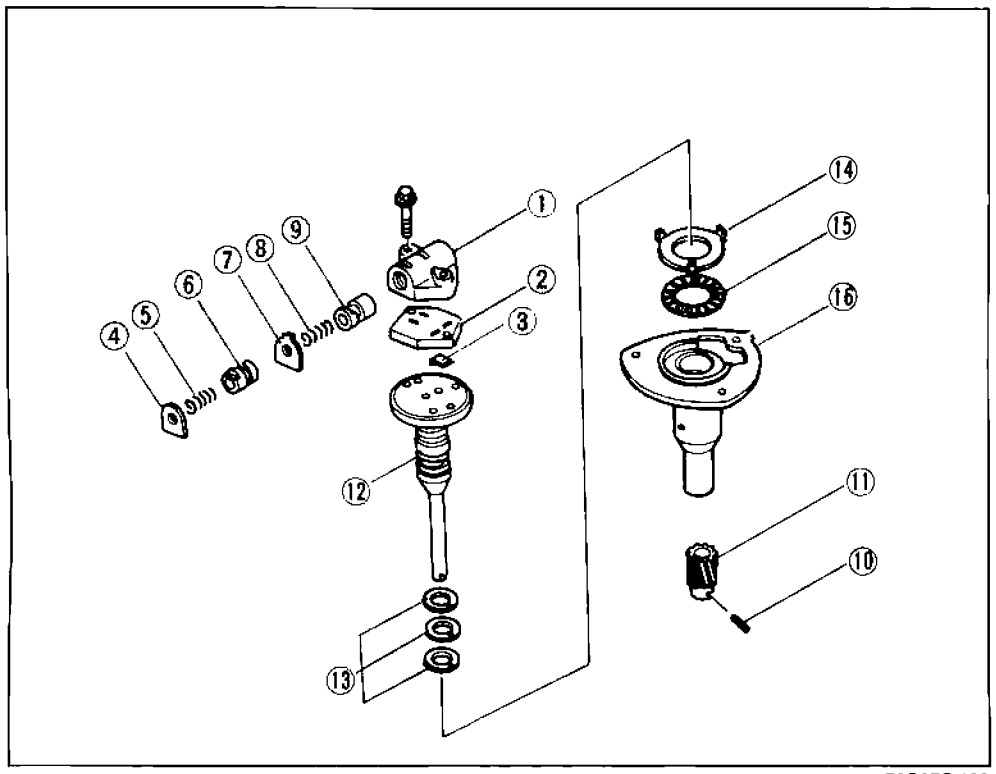
5. Damaged or worn piston
6. Damaged seal contact area of transaxle case

GOVERNOR

Disassembly

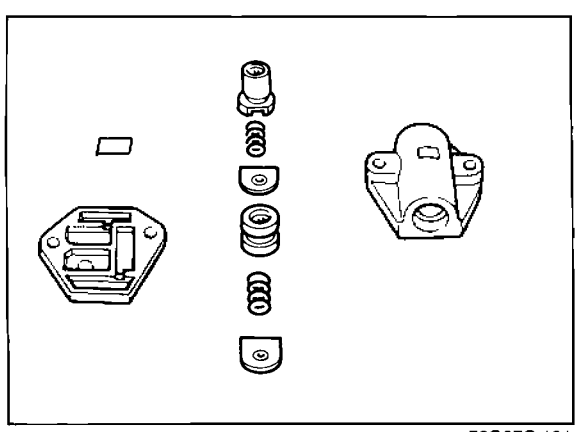
Disassemble in the sequence shown in the figure.

76G07C-189



76G07C-190

1. Governor body
2. Separate plate
3. Filter
4. Retainer plate
5. Return spring
6. Primary governor
7. Retainer plate
8. Return spring
9. Secondary governor
10. Roll pin
11. Governor driven gear
12. Governor shaft
13. Seal ring
14. Bearing race
15. Thrust bearing
16. Sleeve



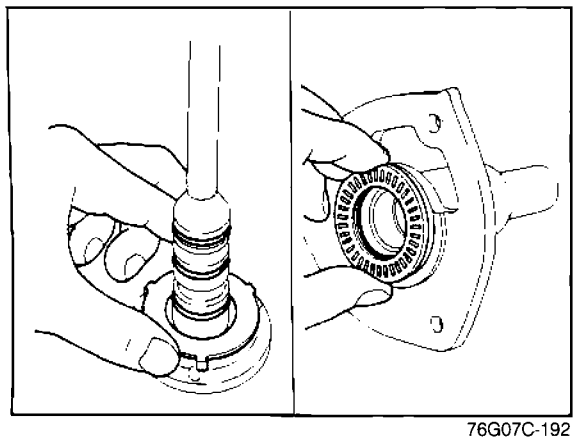
76G07C-191

Inspection

Check the following and replace any faulty parts.

1. Damaged or worn valve
2. Clogged filter
3. Weakened return spring

	Outer diameter	Free length
Primary spring	9.0 mm (0.354 in)	17.2 mm (0.667 in)
Secondary spring	9.25 mm (0.364 in)	13.2 mm (0.520 in)



76G07C-192

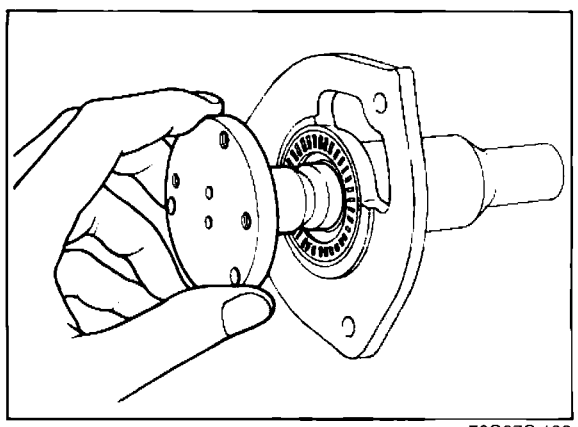
Assembly

1. Install the seal rings onto the governor shaft.
2. Apply petroleum jelly to the bearing race to secure it; then install it onto the governor shaft.

   Bearing race outer diameter:
   47.0 mm (1.850 in)

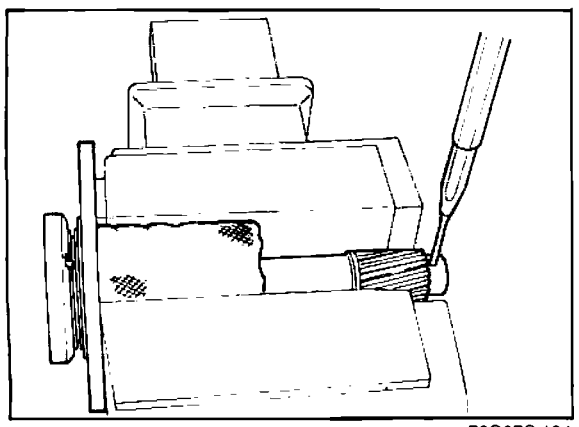
3. Apply petroleum jelly to the thrust bearing to secure it; then install it onto the sleeve.

   Thrust bearing outer diameter:
   46.9 mm (1.846 in)



76G07C-193

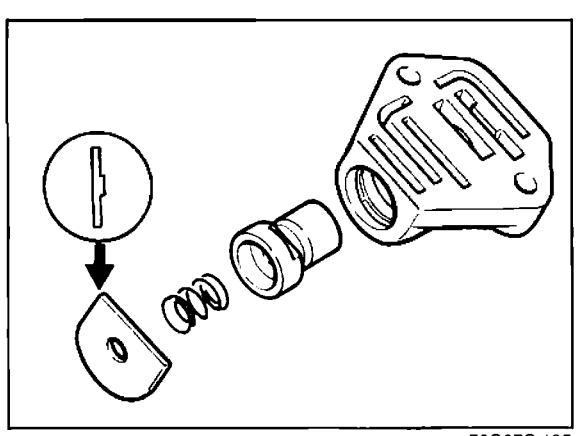
4. Install the governor shaft into the sleeve.



76G07C-194

5. Secure the governor in a vise; then install the governor driven gear with the roll pin.

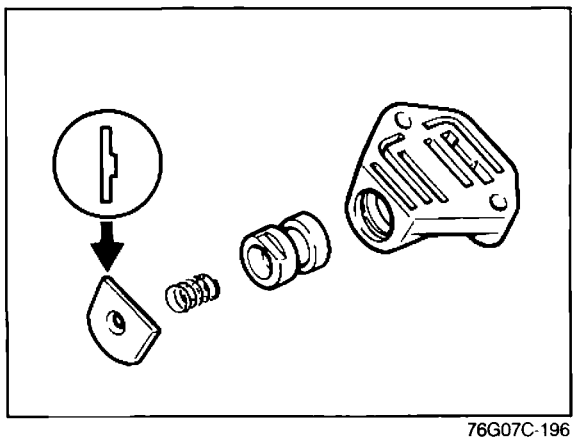
Note
Use protective plates in the vice to prevent damage to the governor.



76G07C-195

6. Install the secondary governor valve and return spring; then install the retainer plate.

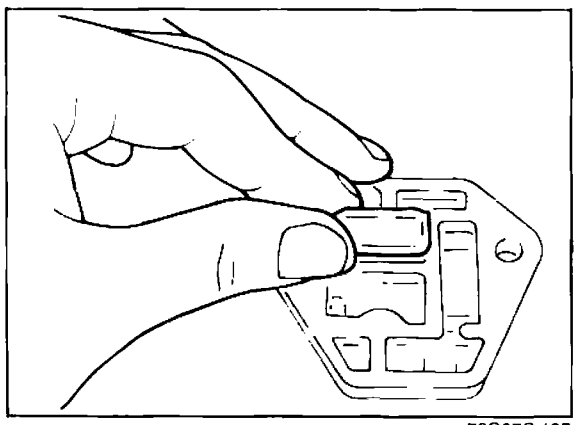
Note
Install the retainer plate with the spring fit over the pin.



76G07C-196

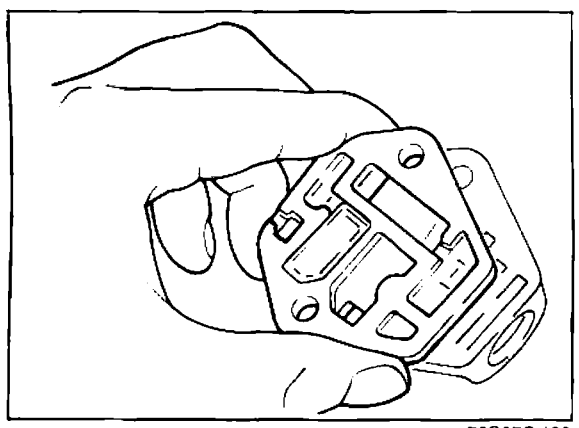
7. Install the primary governor and return spring; then install the retainer plate.

Note
Install the retainer plate with the spring fit over the pin.



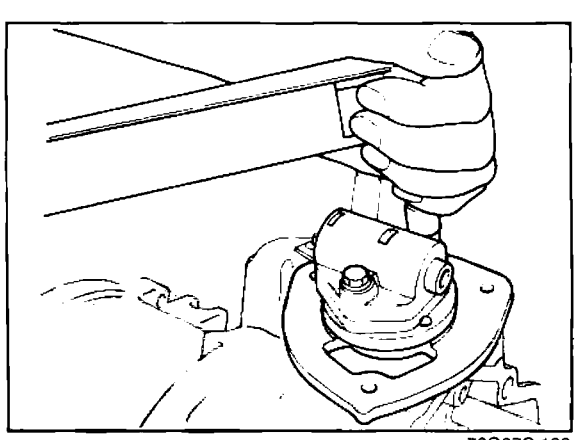
76G07C-197

8. Install the filter into the separate plate.



76G07C-198

9. Set the separate plate onto the governor body.

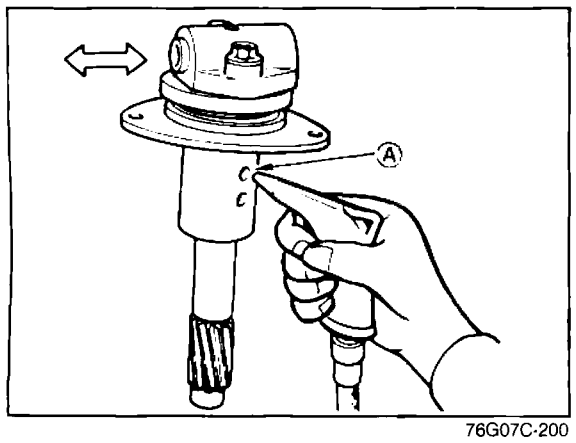


76G07C-199

10. Secure the governor in the vise; tighten the governor body mounting bolts to the specified torque.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

Note
Use protective plates in the vice to prevent damage to the governor.



76G07C-200

11. Check that when compressed air is blown through port A, the valve functions (rattles).

Air Pressure:
491 kPa (5.0 kg/cm^2, 71 psi) max.

Caution
Apply air for no more than 5 seconds.

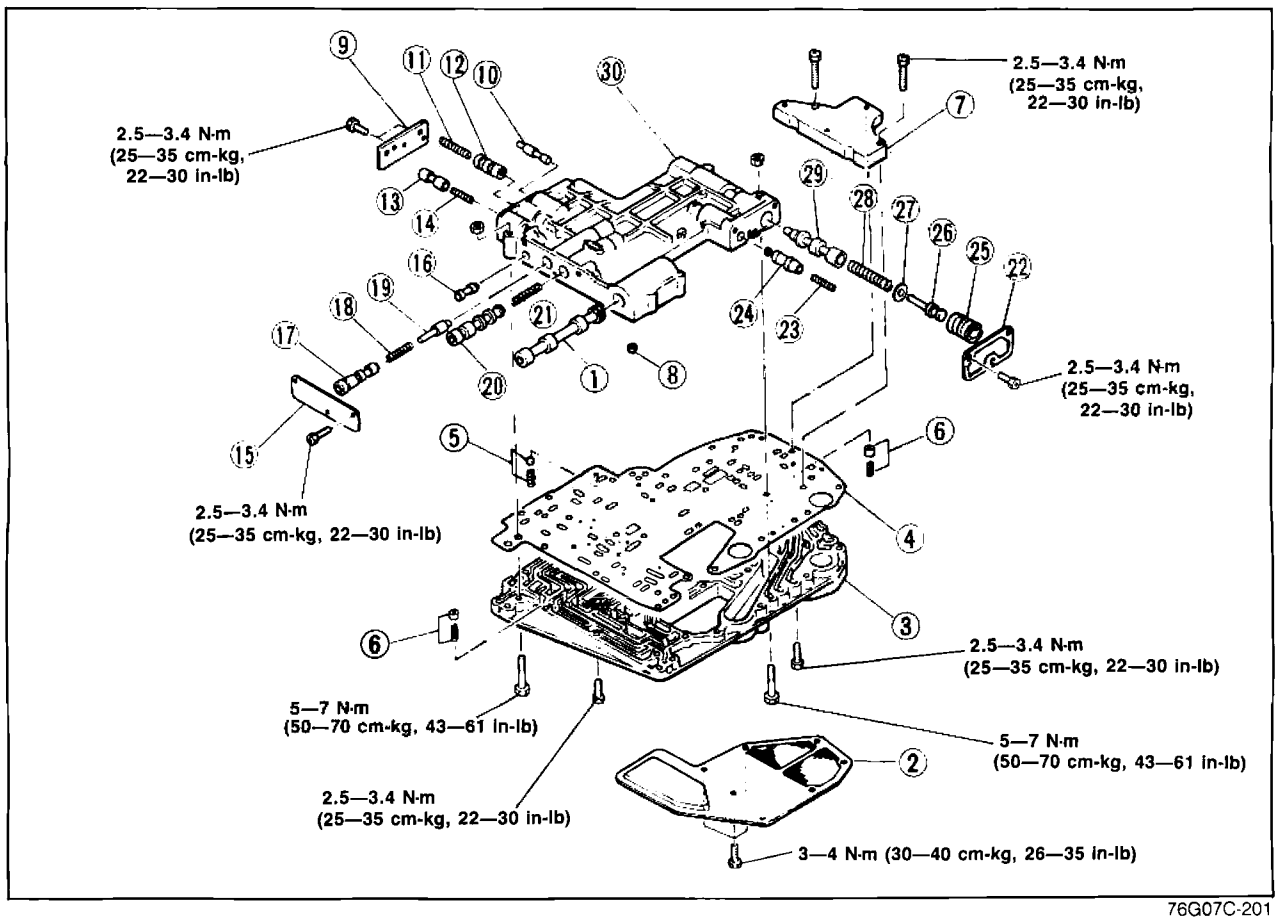
CONTROL VALVE BODY

Precaution

(1) Pay close attention when handling the control valve because it consists of the most precise and delicate parts of the transaxle.
(2) Neatly arrange the removed parts in order to avoid mixing up similar parts.
(3) Disassemble the control valve assembly and thoroughly clean it when the clutch and/or brake bands are burned, and/or when the automatic transaxle fluid is degenerated.

Disassembly

Disassemble in the sequence shown in the figure.



76G07C-201

1. Manual valve
2. Oil strainer
3. Lower body
4. Separator plate
5. Throttle relief ball and spring
6. Orifice check valve and spring
7. Sub-body
8. Orifice check valve
9. Side plate
10. Vacuum throttle valve
11. Spring
12. Throttle backup valve
13. Downshift valve
14. Spring
15. Side plate
16. Modifier valve
17. 2-3 shift valve
18. Spring
19. 2-3 shift plug
20. 1-2 shift valve
21. Spring
22. Side plate
23. Spring
24. Second lock valve
25. Pressure regulator sleeve
26. Pressure regulator plug
27. Spring seat
28. Spring
29. Pressure regulator valve
30. Upper body

Inspection
Check the following and replace any faulty parts.
1. Damaged or worn valves
2. Damaged oil passage
3. Cracked or damaged valve body
4. Operation of each valve
5. Weakened spring

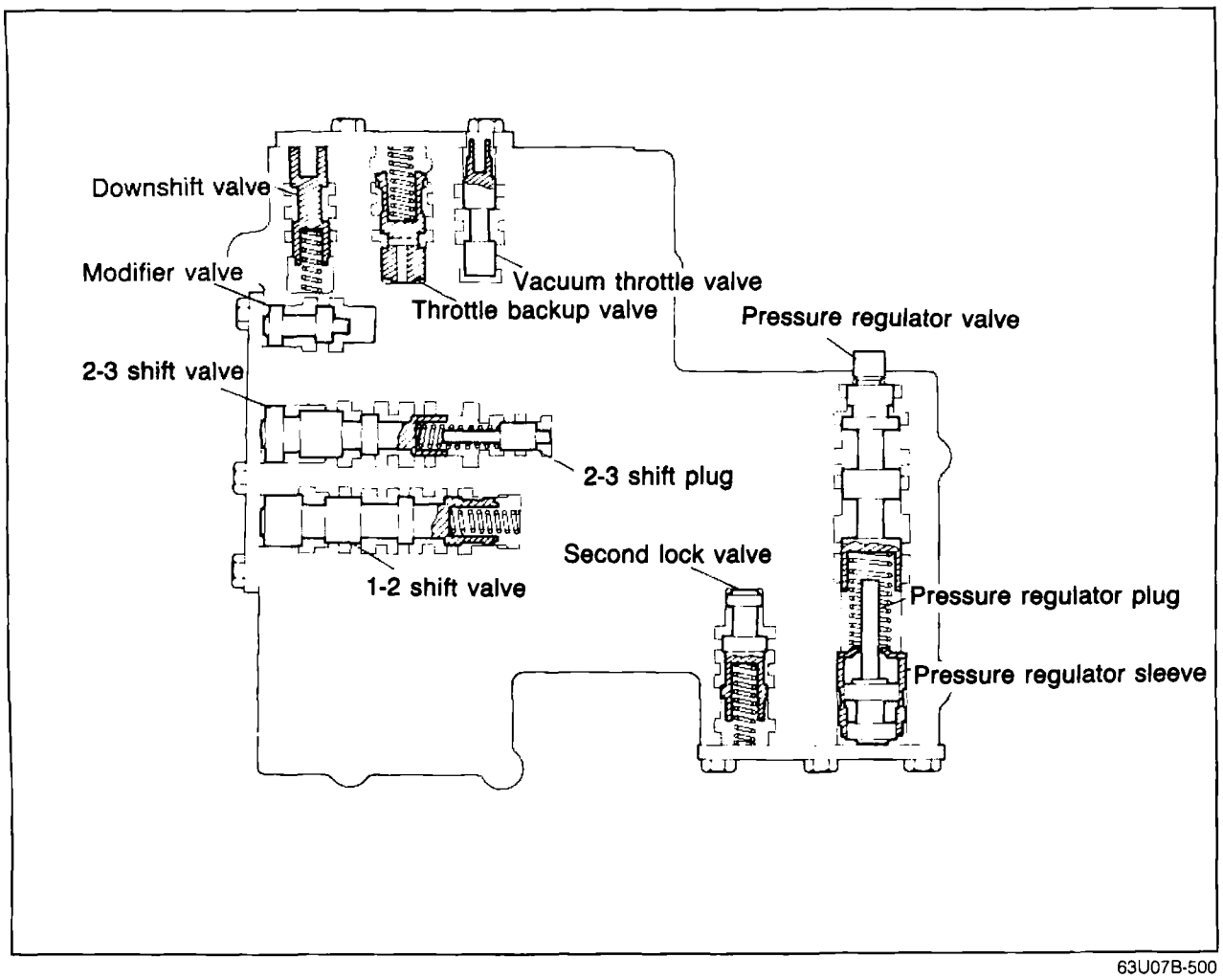
76G07C-202

Spring

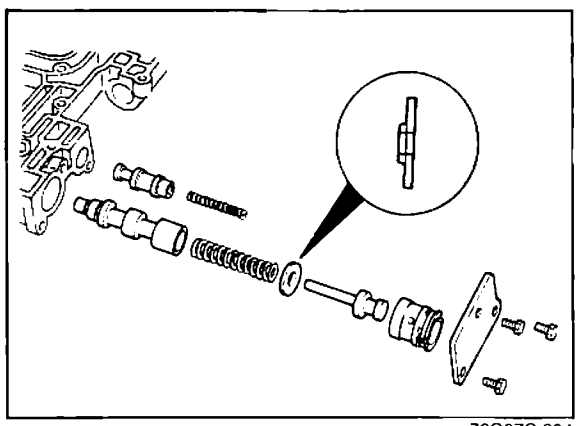
Name	Outer dia. mm (in)	Free length mm (in)	Wire dia. mm (in)
Throttle backup	7.3 (0.287)	36.0 (1.417)	0.8 (0.031)
Downshift	5.55 (0.219)	21.9 (0.862)	0.55 (0.022)
2-3 shift	6.9 (0.272)	41.0 (1.614)	0.7 (0.028)
1-2 shift	6.4 (0.252)	31.63 (1.245)	0.4 (0.016)
Second lock	5.55 (0.219)	33.5 (1.319)	0.55 (0.022)
Pressure regulator	11.7 (0.461)	43.0 (1.693)	1.2 (0.047)
Throttle relief	7.0 (0.276)	11.2 (0.441)	0.9 (0.035)
Orifice check	5.0 (0.197)	15.5 (0.610)	0.23 (0.009)

76G07C-203

Valve Location



63U07B-500

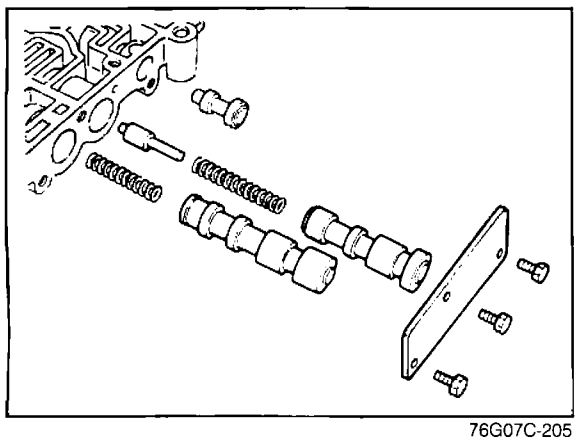


76G07C-204

Assembly

1. Install the pressure regulator valve, spring, spring seat, pressure regulator plug, and pressure regulator sleeve.
2. Install the second lock valve and spring.
3. Install the side plate.

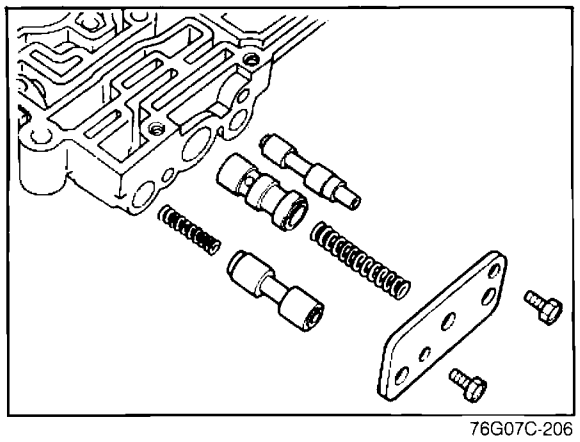
Tightening torque:
2.5—3.4 N·m (25—35 cm-kg, 22—30 in-lb)



76G07C-205

4. Install the 1-2 shift spring, and valve.
5. Install the 2-3 shift plug, spring, and 2-3 shift valve.
6. Install the modifier valve.
7. Install the side plate.

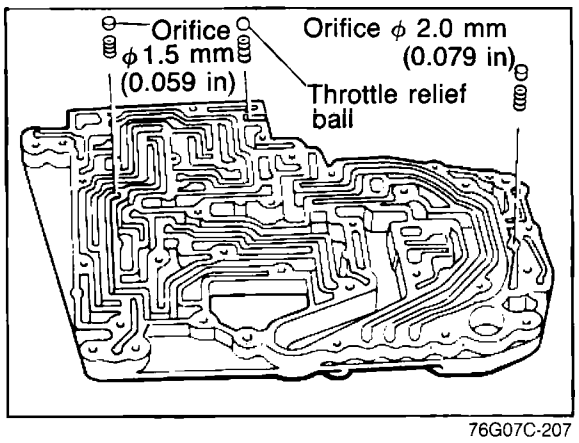
Tightening torque:
2.5—3.4 N·m (25—35 cm-kg, 22—30 in-lb)



76G07C-206

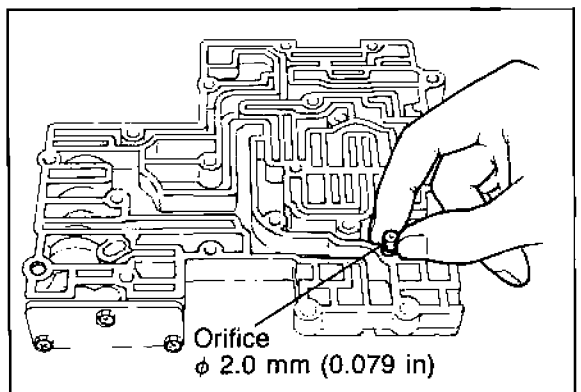
8. Install the downshift spring, and valve.
9. Install the throttle backup valve and spring.
10. Install the vacuum throttle valve.
11. Install the side plate.

Tightening torque:
2.5—3.4 N·m (25—35 cm-kg, 22—30 in-lb)



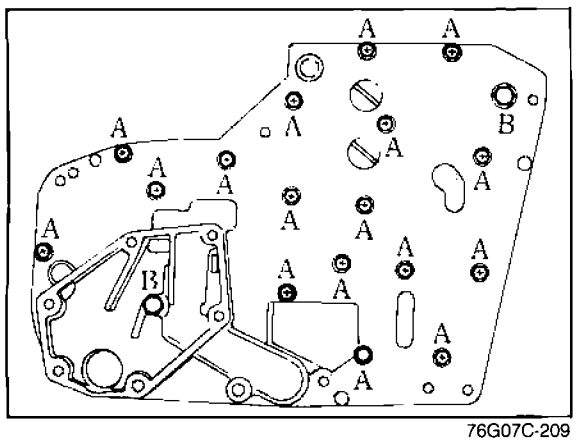
76G07C-207

12. Install the orifice check valves (ϕ2.0 mm, (0.079 in), 1.5 mm (0.059 in)) and springs, and throttle relief ball and spring in the lower body as shown.



76G07C-208

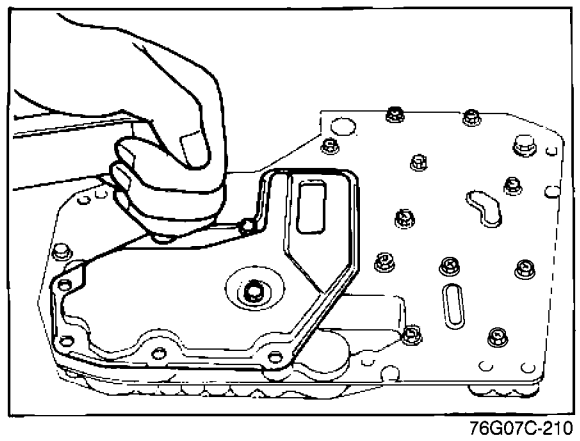
13. Install the orifice check valve (ϕ2.0 mm (0.079 in)) in the upper body as shown.



76G07C-209

14. Install the separator plate on the lower body, and hold it with clips; then install them onto the upper body.
15. Tighten the mounting bolts to the specified torque.

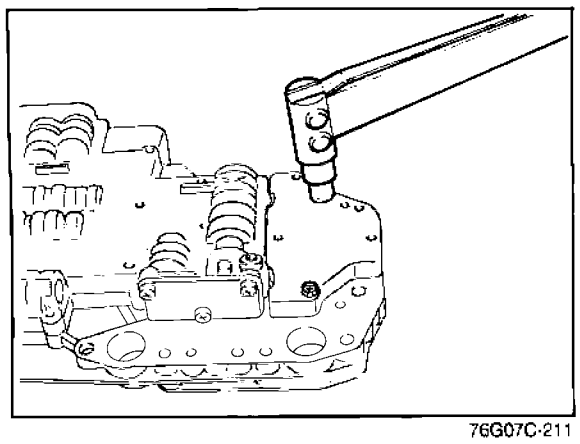
Tightening torque:
A: 2.5—3.4 N·m (25—35 cm-kg, 22—30 in-lb)
B: 5—7 N·m (50—70 cm-kg, 43—61 in-lb)



76G07C-210

16. Install the oil strainer.

Tightening torque:
3—4 N·m (30—40 cm-kg, 26—35 in-lb)



76G07C-211

17. Turn the valve body assembly over, and install the sub-body.

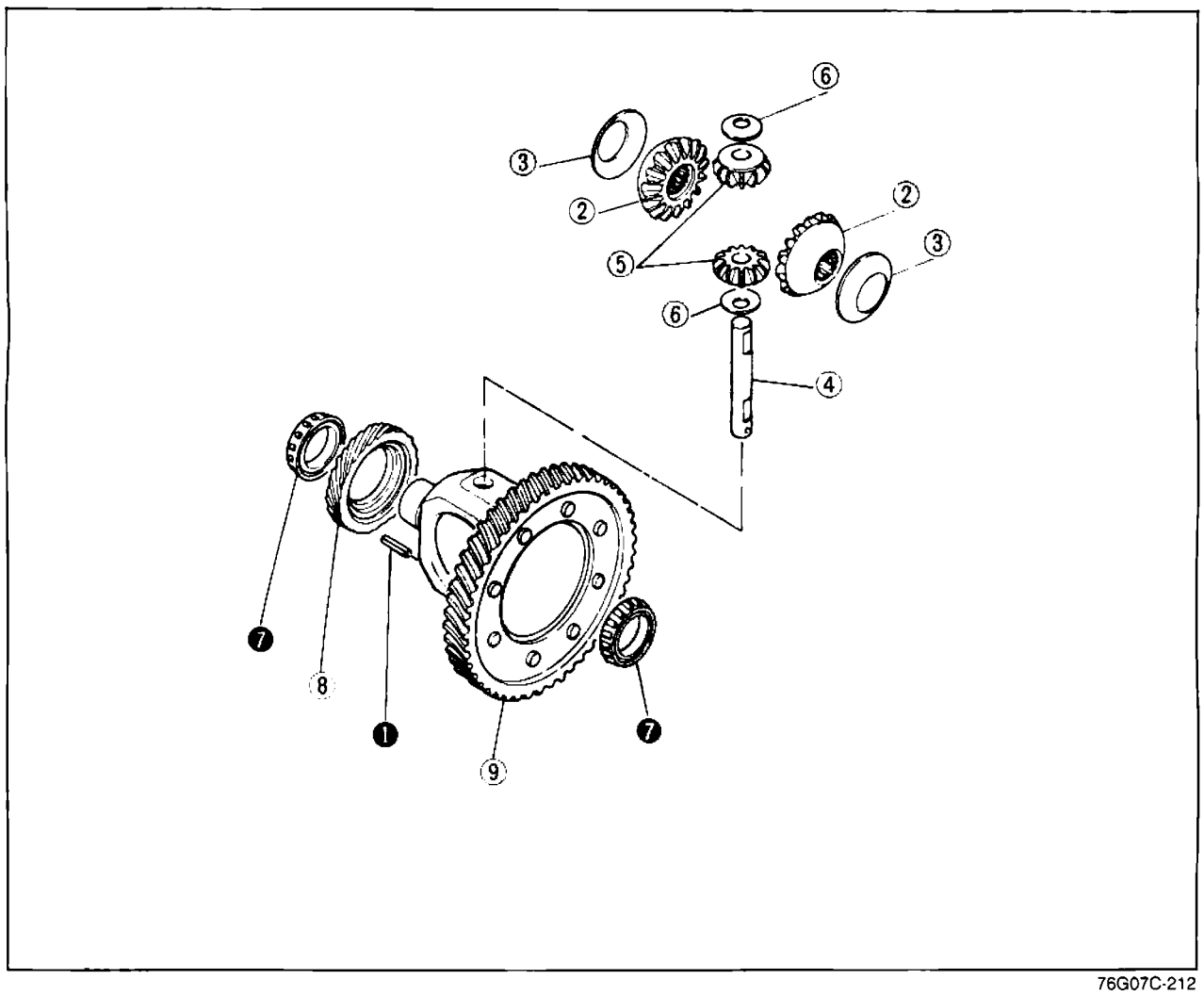
Tightening torque:
2.5—3.4 N·m (25—35 cm-kg, 22—30 in-lb)

18. Install the manual valve.

DIFFERENTIAL

Disassembly

Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked parts.



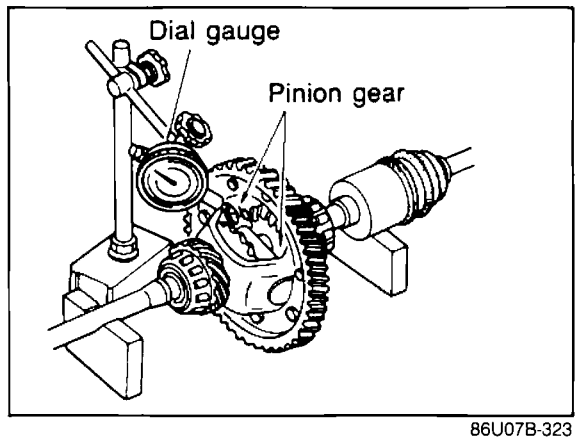
76G07C-212

1. Roll pin
2. Side gear
3. Side gear thrust washer
4. Pinion shaft
5. Pinion gear
6. Pinion gear thrust washer
7. Side bearing inner race
8. Speedometer drive gear
9. Ring gear and gear case assembly

Disassembly note

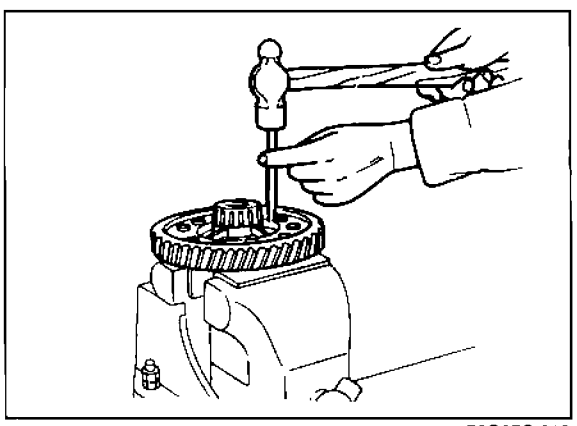
Checking backlash

Before disassembly, measure the backlash of the side gears and pinion gears. If not within specification, replace the differential assembly.



86U07B-323

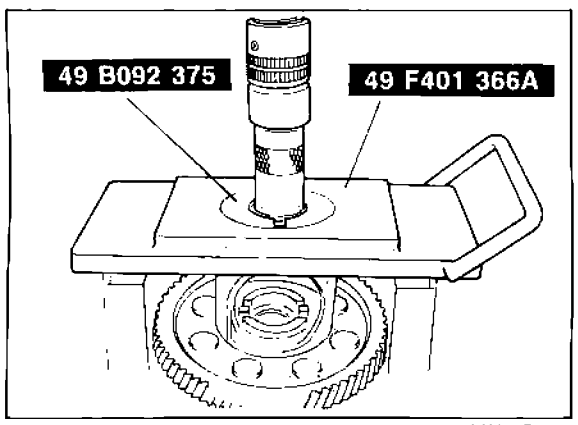
Backlash:
Standard 0.025—0.1 mm (0.001—0.004 in)
Maximum 0.5 mm (0.020 in)



76G07C-213

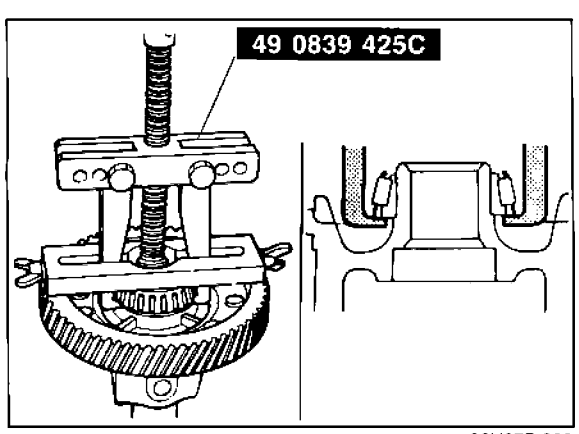
Roll pin
To remove the roll pin from the pinion shaft, place the gear case on a vise and knock the pin out with a suitable pin punch (ϕ4.0 mm (0.157 in)) and hammer.

Note
a) Use the protective plates in the vice to prevent damage to the differential.
b) Insert the punch into the roll pin hole from the ring gear side.



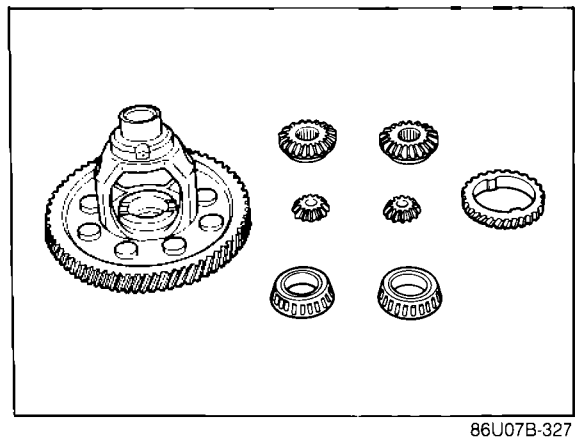
86U07B-325

Side bearing inner race
1. Remove the side bearing inner race (side opposite the ring gear) from the gear case with the **SST**.



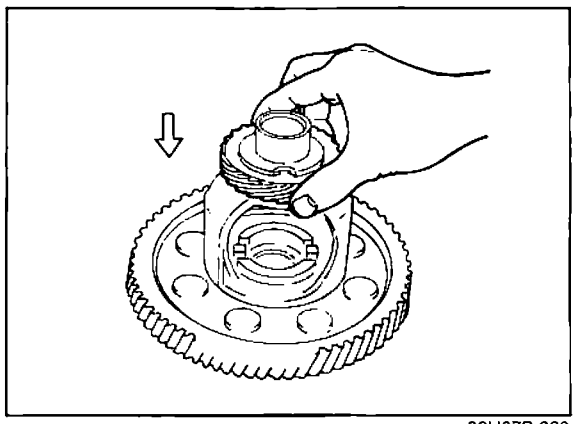
86U07B-326

2. Remove the side bearing inner race (ring gear side) with a combination of parts from the **SST**.



86U07B-327

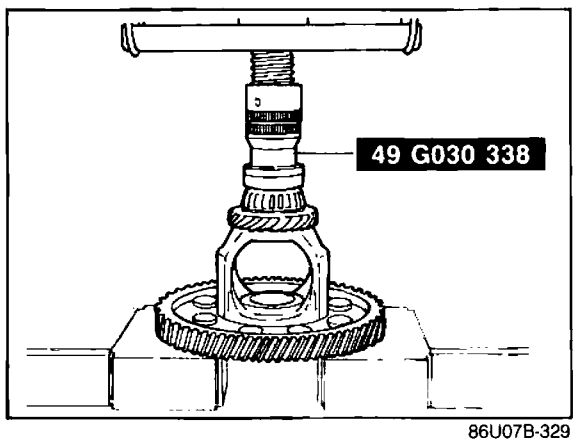
Inspection
Check the following and replace any faulty parts.
1. Damaged or worn gears
2. Cracked or damaged gear case
3. Damaged bearings



86U07B-328

Assembly

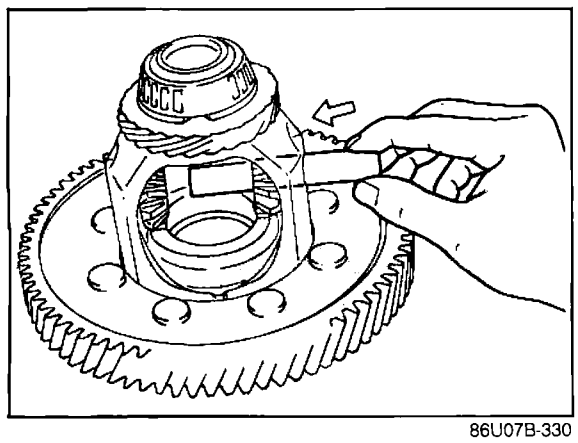
1. Set the speedometer drive gear onto the ring gear and case assembly.



86U07B-329

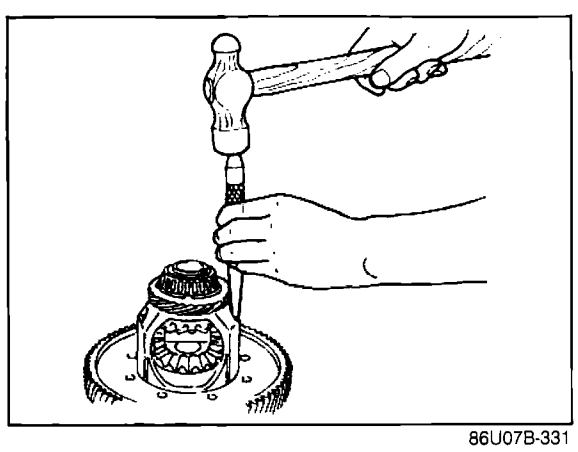
2. Install the side bearing inner races.
   (1) Press the side bearing inner race (side opposite the ring gear) onto the ring gear and case assembly with the **SST**.
   (2) Press on the other side bearing inner race (ring gear side) in the same manner.

Caution
Do not reuse the bearings if they were removed.



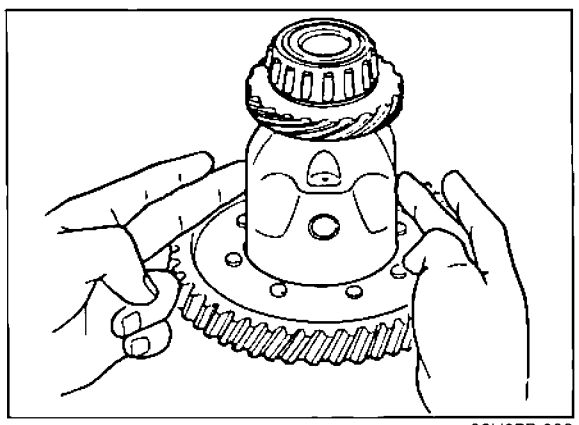
86U07B-330

3. Install the pinion gears and thrust washers into the case.
4. Install the pinion shaft.



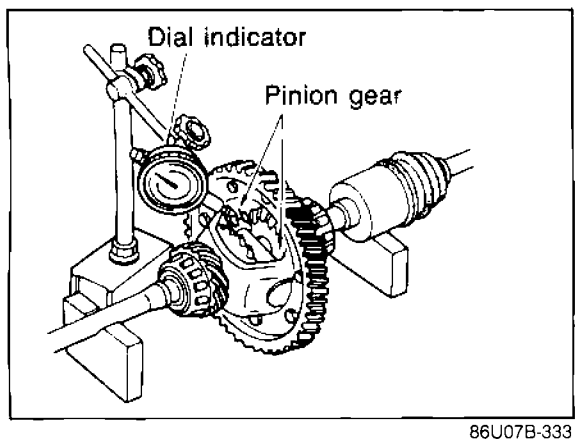
86U07B-331

5. Install the roll pin, and make a crimp so that it will not come out of the gear case.



86U07B-332

6. Install the thrust washers and side gears into the gear case at the same time, then turn them back on the pinion gear and align them with the pinion shaft hole.



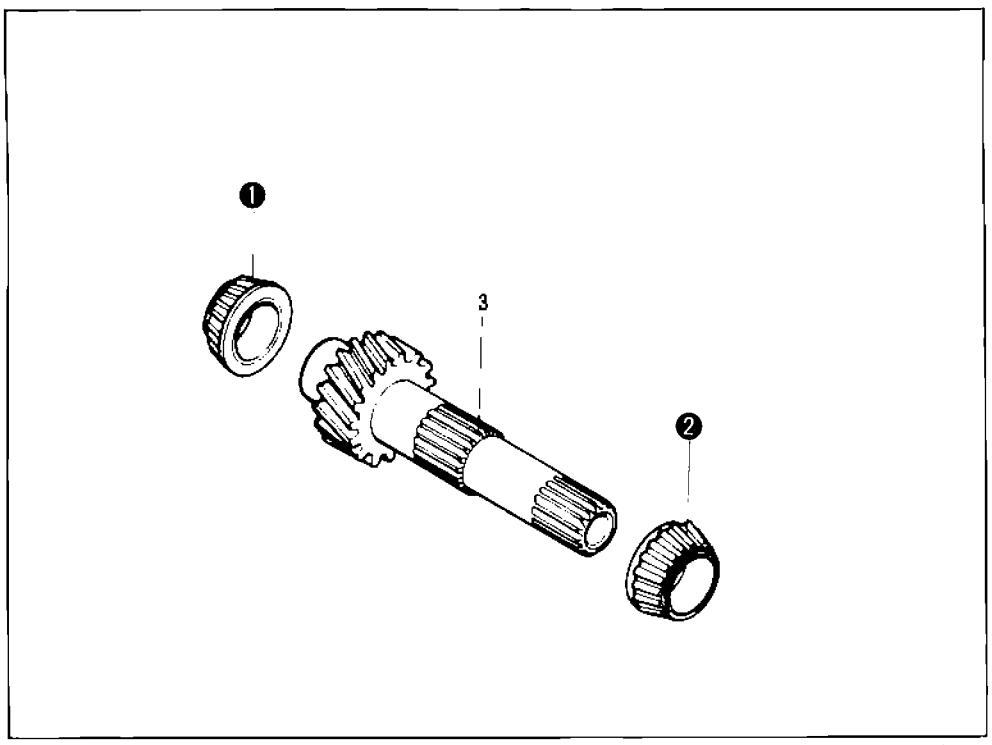
86U07B-333

7. Check and adjust the backlash of the side gears and pinion gears as follows:
   (1) Install the left and right driveshafts in the differential assembly.
   (2) Support the driveshafts on V-blocks.
   (3) Measure the backlash of both pinion gears.

   Backlash:
   Standard 0.025—0.1 mm (0.001—0.004 in)
   Maximum 0.5 mm (0.020 in)

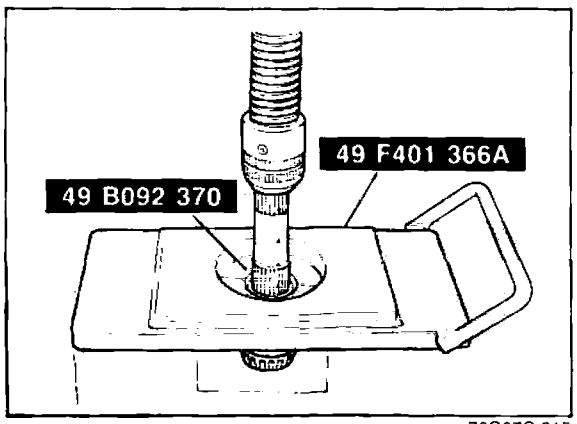
8. If the backlash is not within specification, place the differential assembly.

OUTPUT GEAR
Disassembly
Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked parts.



1. Output gear bearing
2. Output gear bearing
3. Output gear

76G07C-214

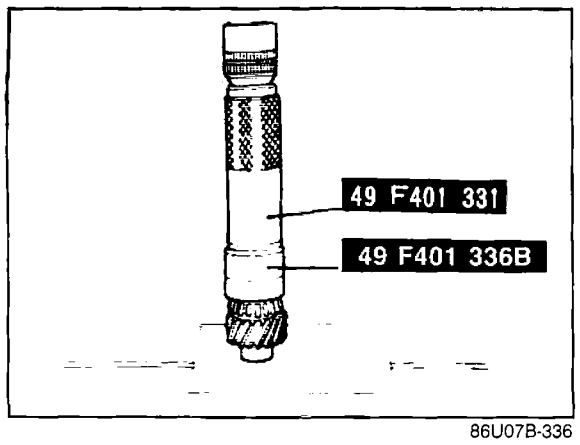


76G07C-215

Disassembly note
Output gear bearings
Remove the output gear bearings from the output gear with the **SST**.

Caution
Hold the output gear with one hand so that it does not fall.

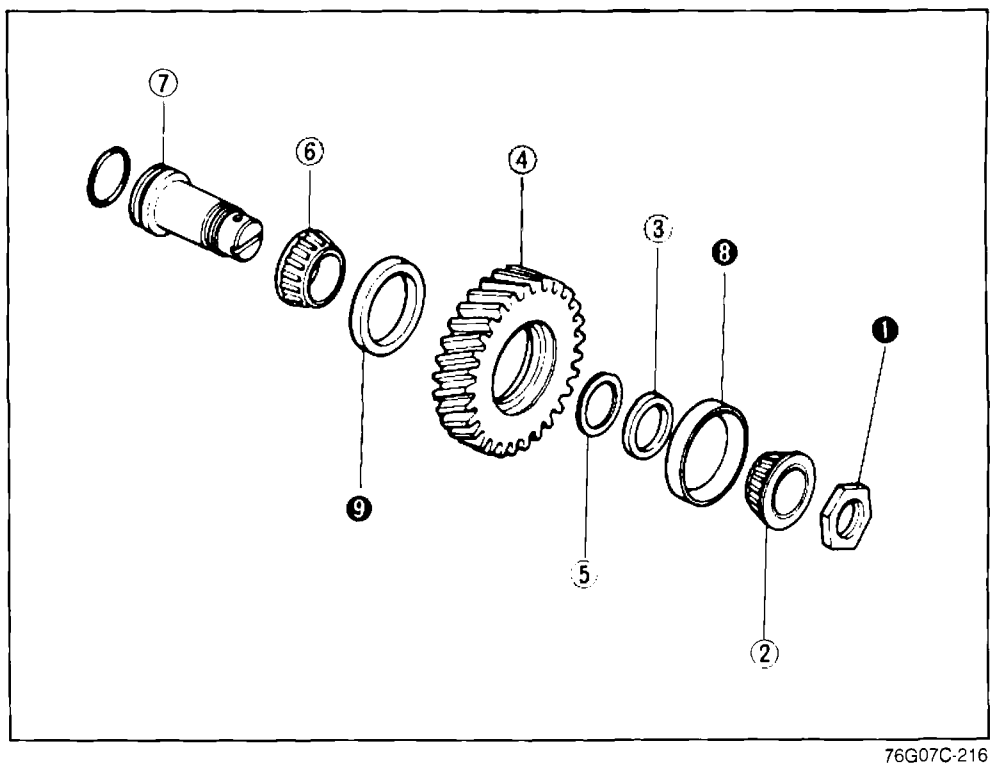
Inspection
Check the following and replace any faulty parts.
1. Damaged or worn output gear
2. Damaged bearing



86U07B-336

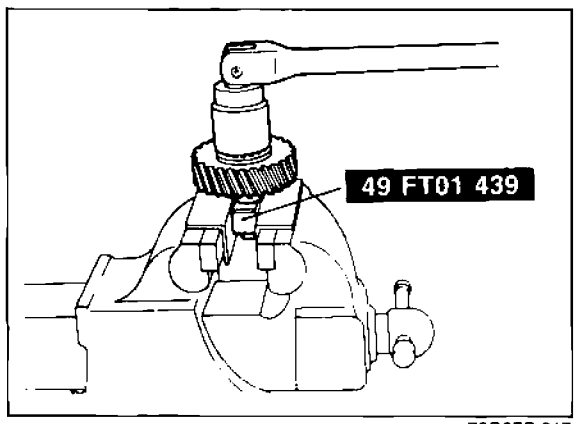
Assembly
1. Press the output gear bearings onto the output gear with the **SST**.

IDLE GEAR
Disassembly
Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked parts.



76G07C-216

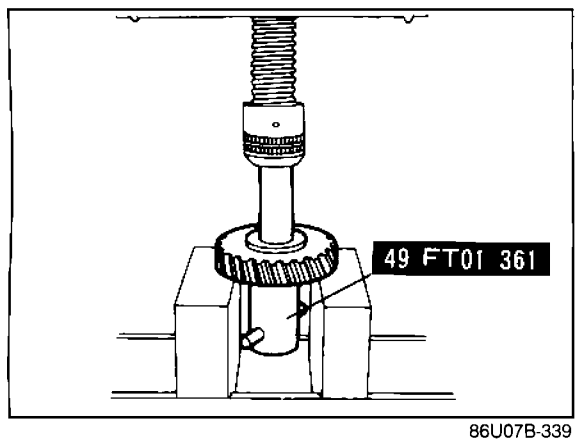
1. Locknut
2. Idle gear bearing
3. Spacer
4. Idle gear
5. Adjust shim
6. Idle gear bearing
7. Idle shaft
8. Bearing outer race
9. Bearing outer race



76G07C-217

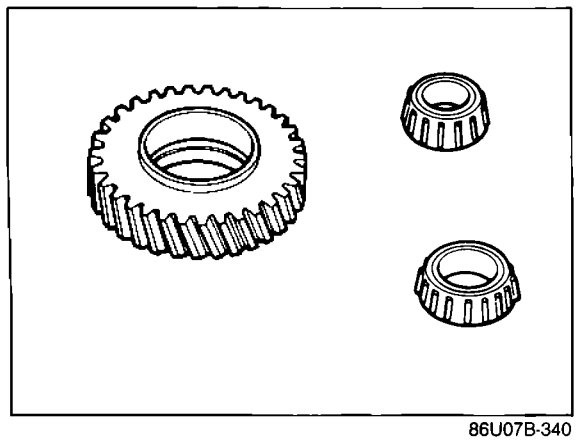
Disassembly note
Locknut
Secure the idle shaft in a vise with the **SST**; then remove the locknut.

Note
Use the protective plates in the vice to prevent damage to the SST.



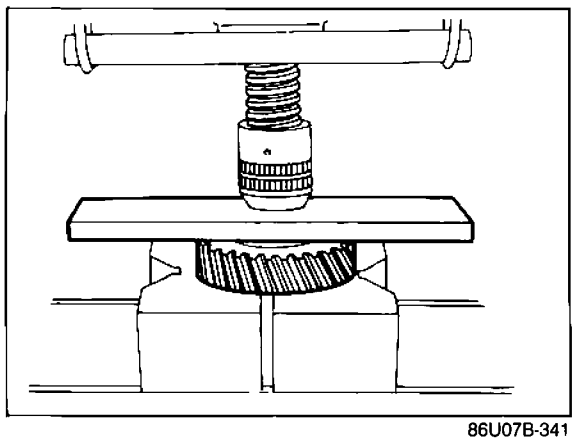
86U07B-339

Bearing outer race
Remove the bearing outer race from the idle gear with the **SST**.



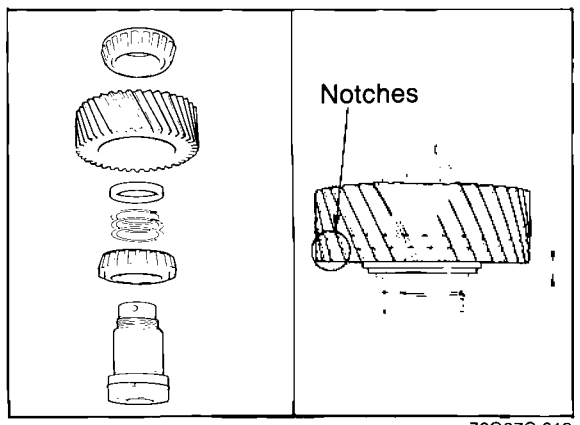
86U07B-340

Inspection
Check the following and replace any faulty parts.
1. Damaged or worn idle gear
2. Damaged or worn bearing



86U07B-341

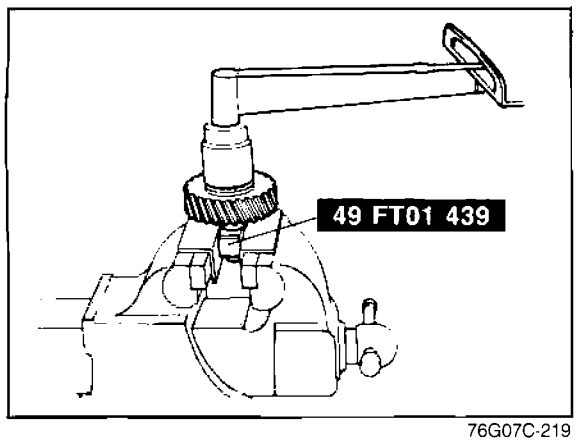
Assembly
1. Press the bearing outer races in with the **SST**.



76G07C-218

2. Install the idle gear bearing onto the idle shaft, then install the idle gear, adjust shim, spacer, and bearing.

Note
Install the idle gear with the notches in the teeth facing as shown.
FE engine: 2 notches
F6 engine: 3 notches

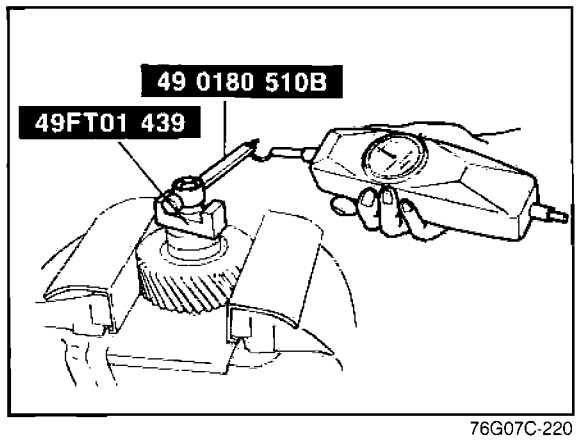


76G07C-219

3. Secure the idle shaft in a vise with the **SST**; then tighten the locknut to the lower limit of the tightening torque.

Tightening torque:
128 N·m (13 m-kg, 94 ft-lb)

Note
Use the protective plates in the vice to prevent damage to the SST.



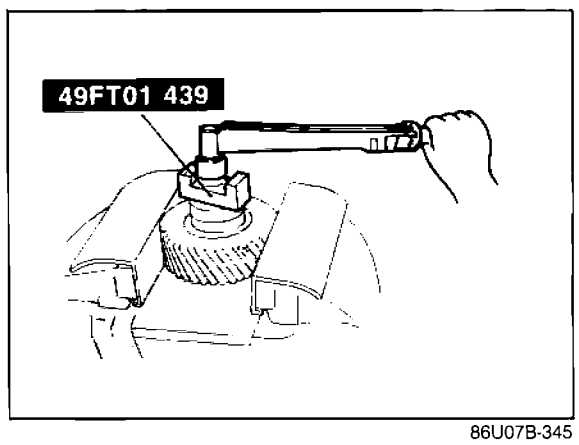
76G07C-220

4. Check and adjust the idle gear bearing preload.
   (1) Turn the idle gear assembly and **SST** over, and secure the gear in the vice.

Note
Use protective plates in the vice to prevent damage to the idle gear.

   (2) Attach the **SST** and spring scale or a torque wrench, and measure the preload while tightening the locknut.

Tightening torque:
128—177 N·m (13—18 m-kg, 94—130 ft-lb)

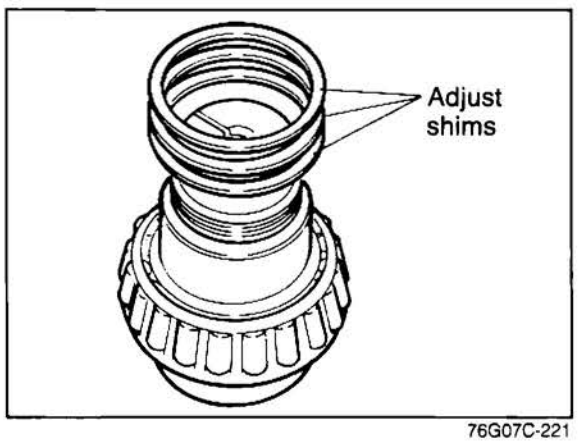


86U07B-345

Preload:
0.03—0.9 N·m
(0.3—9.0 cm-kg, 0.26—7.8 in-lb)

Value indicated on pull scale:
0.3—9 N (0.03—0.9 kg, 0.066—1.98 lb)

Note
Read the preload when the idle shaft starts to turn.



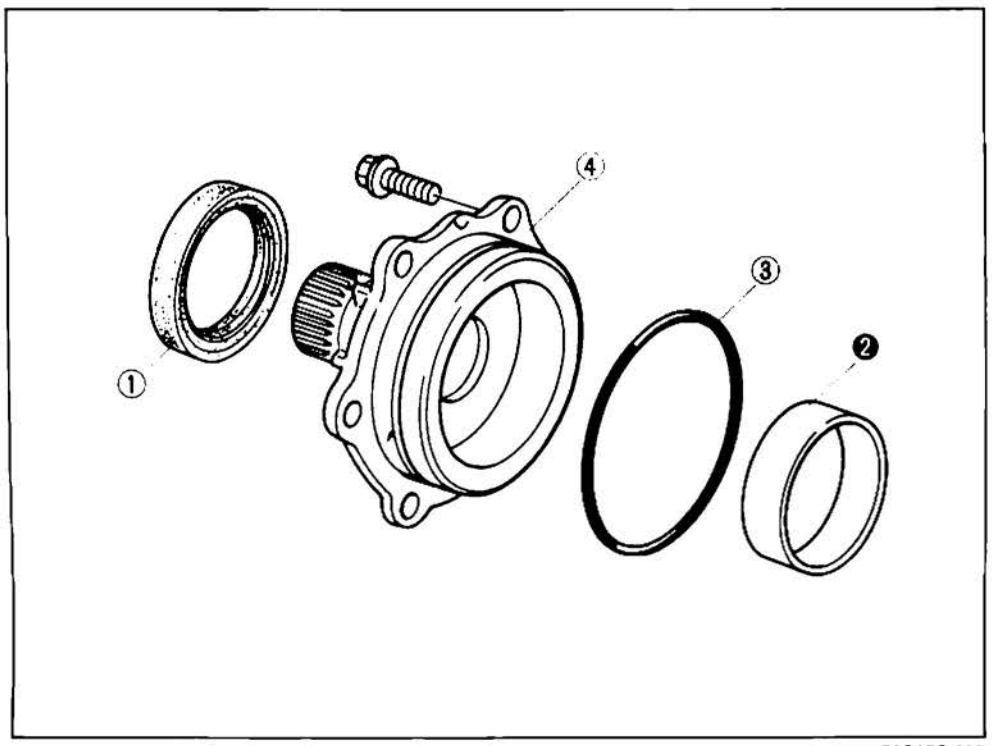
76G07C-221

5. If the specified preload can not be obtained within the specified tightening torque, adjust it by selecting the proper adjust shims.

Thickness of shim
0.10 mm (0.004 in)
0.12 mm (0.005 in)
0.14 mm (0.006 in)
0.16 mm (0.0063 in)
0.20 mm (0.008 in)
0.50 mm (0.020 in)

Note
a) The maximum allowable number of shims is 7.
b) Preload is reduced by increasing the thickness of the shims, or increased by reducing the thickness of the shims.

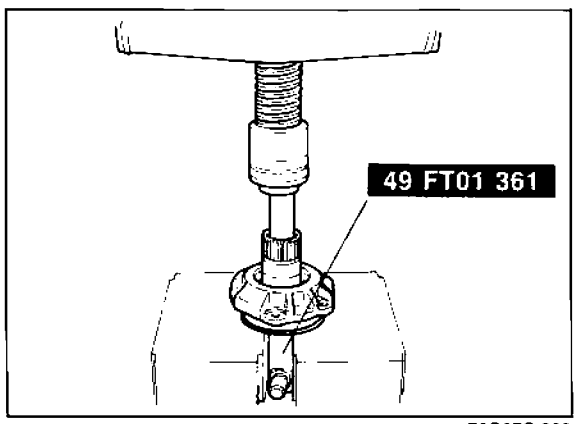
BEARING COVER ASSEMBLY
Disassembly
Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked part.



76G07C-222

1. Oil seal
2. Bearing outer race
3. O-ring
4. Bearing cover

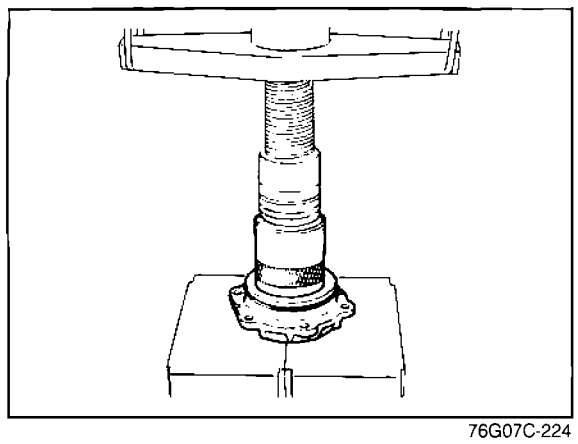
expert22 для http://rutracker.org



76G07C-223

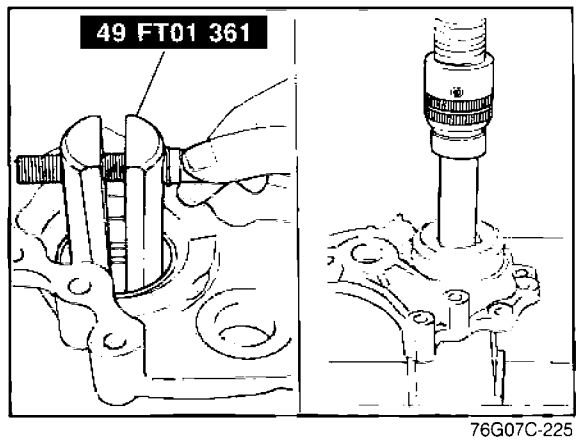
Disassembly note
Bearing outer race
Remove the bearing outer race with the **SST**.

Inspection
Check the following and replace any faulty parts.
1. Damaged bearing cover
2. Damaged or worn bushing



76G07C-224

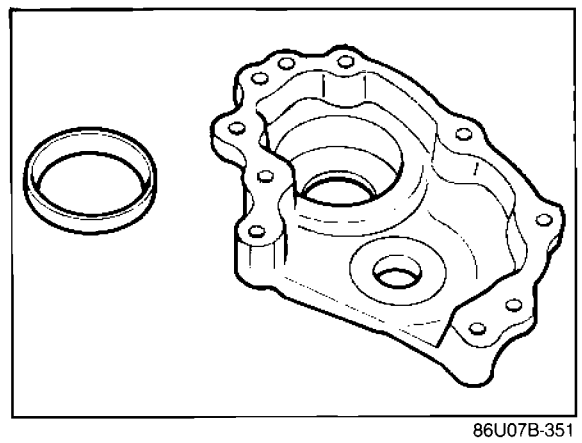
Assembly
1. Press the bearing outer race into the cover.
2. Press the oil seal into the cover.



76G07C-225

BEARING HOUSING
Disassembly
Remove the bearing outer race with the **SST**.

Note
Install the bearing outer race during reassembly of the transaxle to adjust the preload.



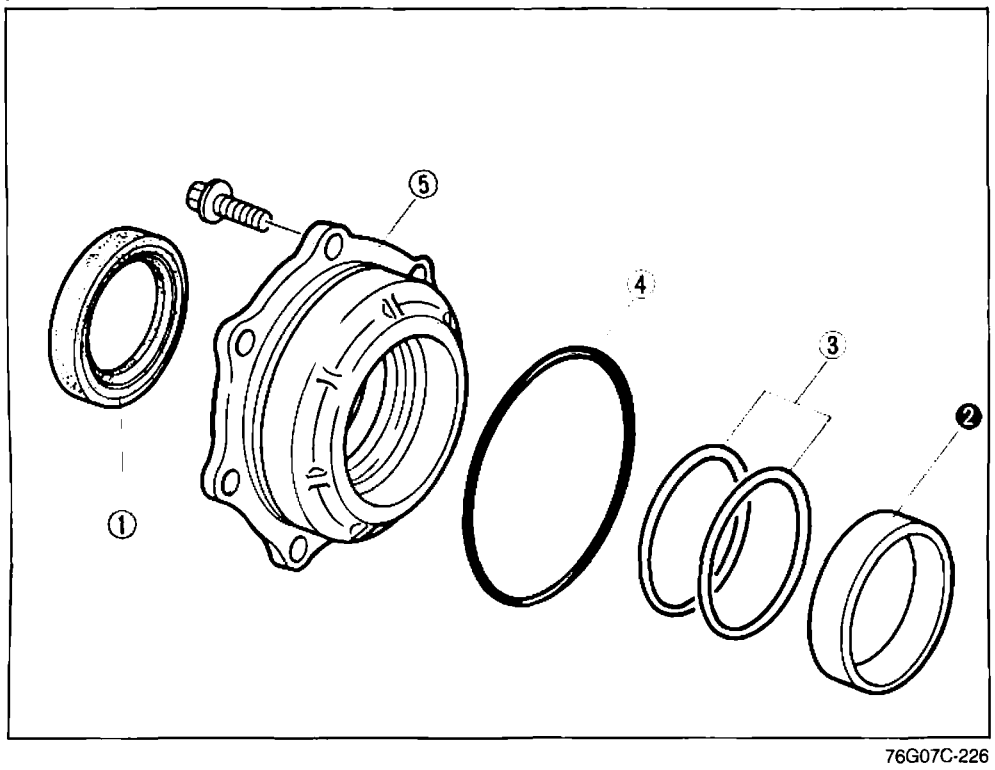
86U07B-351

Inspection
Check the following and replace any faulty parts.
1. Damaged bearing housing
2. Damaged bearing outer race

SIDE BEARING HOUSING

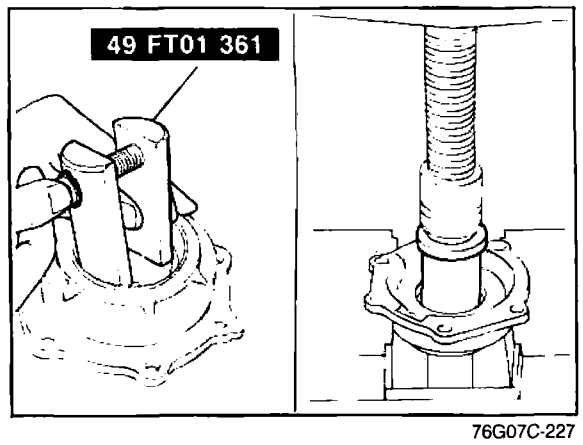
Disassembly

Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked part.



76G07C-226

1. Oil seal
2. Bearing outer race
3. Adjust shim
4. O-ring
5. Side bearing housing cover



76G07C-227

Disassembly note

Bearing outer race

Remove the bearing outer race with the **SST**.

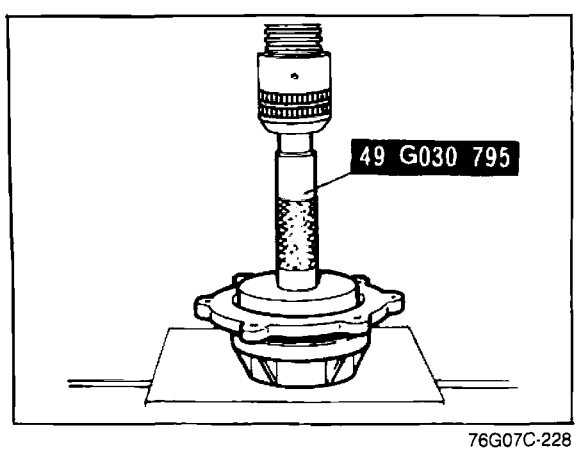
Note

Install the bearing outer race during reassembly of the transaxle to adjust the preload.

Inspection

Check the following and replace any faulty parts.

1. Damaged side bearing housing cover
2. Damaged or worn bushing



76G07C-228

Assembly

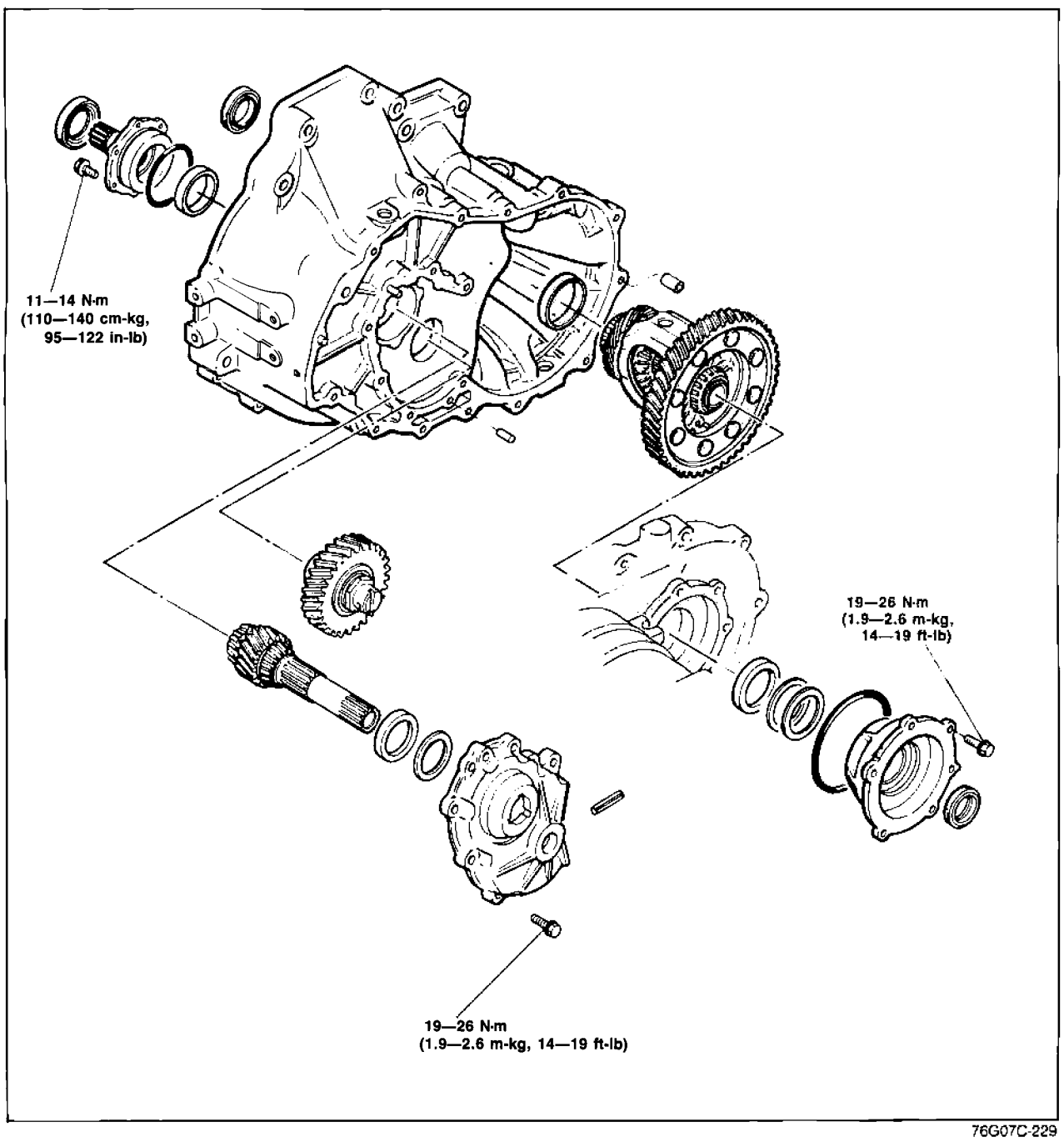
1. Press the oil seal into the cover with the **SST**.

ASSEMBLY

PRECAUTION

(1) The automatic transaxle consists of high-precision-finished parts, necessitating careful inspection before assembly because even a small nick could cause fluid leakage or affect performance.
(2) Clean out oil holes and oil passages with compressed air, and check that there are no obstructions.
(3) Before assembly, apply ATF to each O-ring, seal ring, rotating part, and friction part.
(4) If the brake band or drive plates are replaced with new ones, soak them in ATF for at least 2 hours before installing.
(5) Each seal gasket and O-ring must be replaced with a new one.
(6) Be sure to install all thrust bearings and races in the correct direction and position.

ASSEMBLY—STEP 1
Torque Specifications

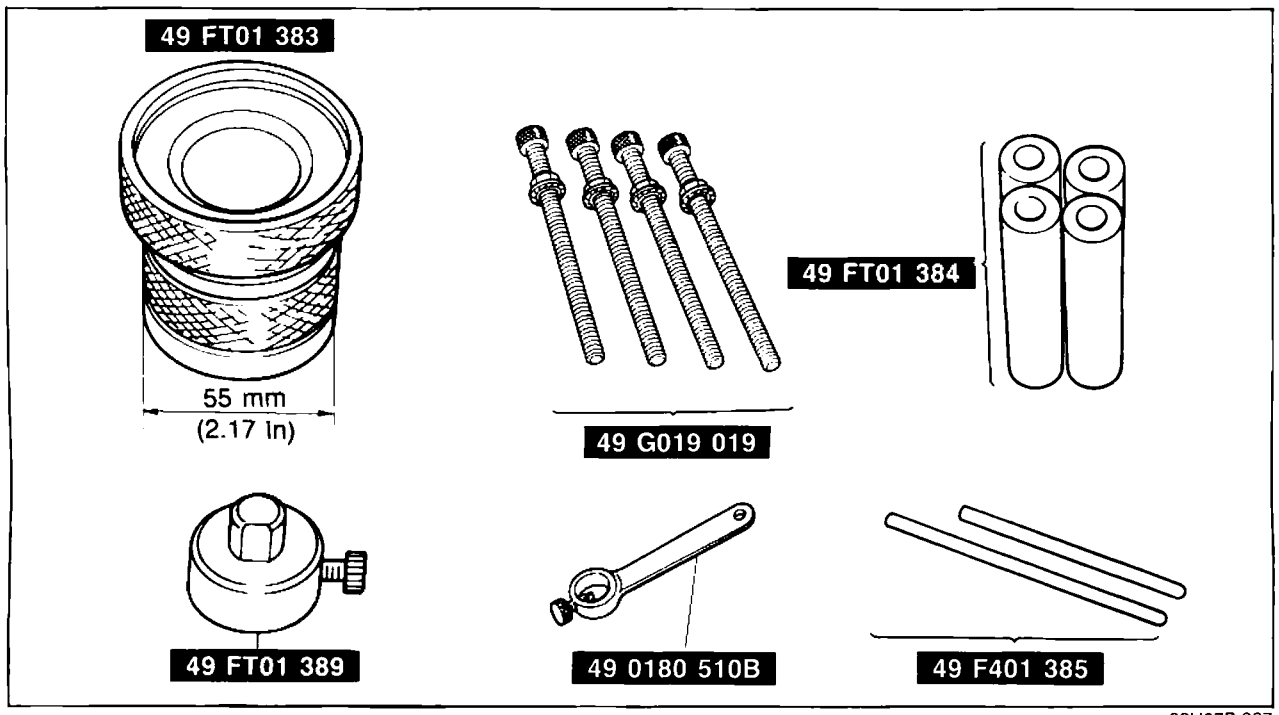


76G07C-229

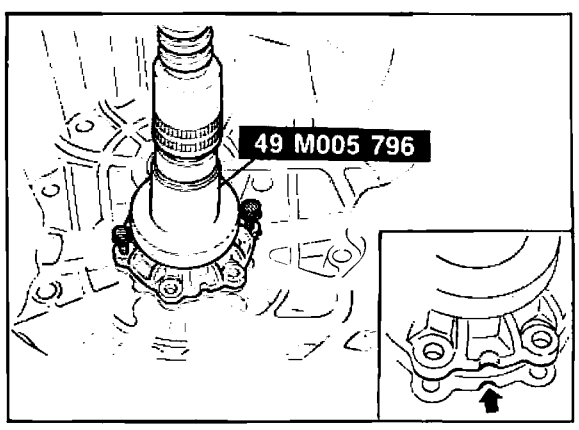
Procedure

1. Adjust the preload of the output gear bearing and select the adjust shim(s) as described below.

Note
To adjust the preload, use the SST shown below.



83U07B-367

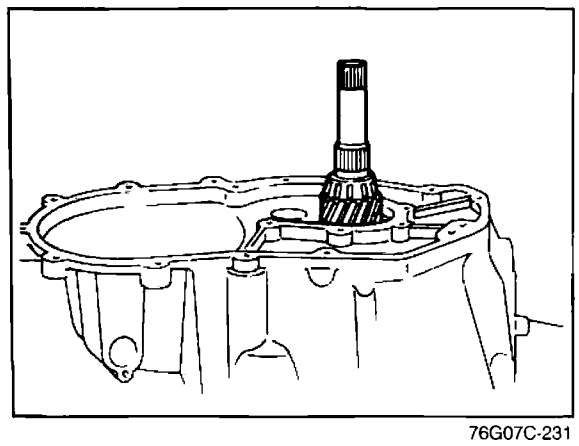


76G07C-230

(1) Align the matching mark as shown; then press the bearing cover in with the **SST** after aligning it with guide bolts as shown.

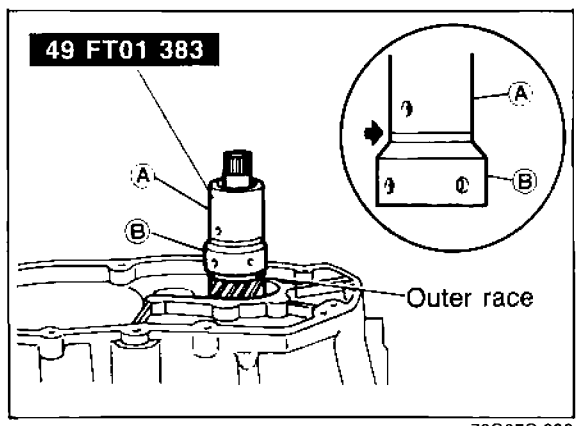
Tightening torque: 11—14 N·m (110—140 cm-kg, 95—122 in-lb)

(2) Mount the converter housing onto the transaxle hunger.



76G07C-231

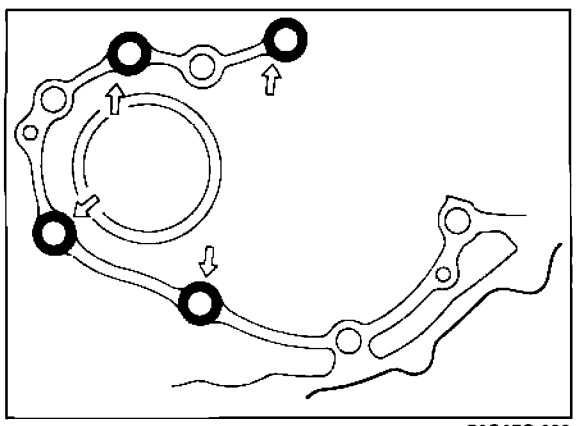
(3) Remove the bearing outer race and adjust shims from the bearing housing. (Refer to page 7C—87.)
(4) Set the output gear assembly into the converter housing.



76G07C-232

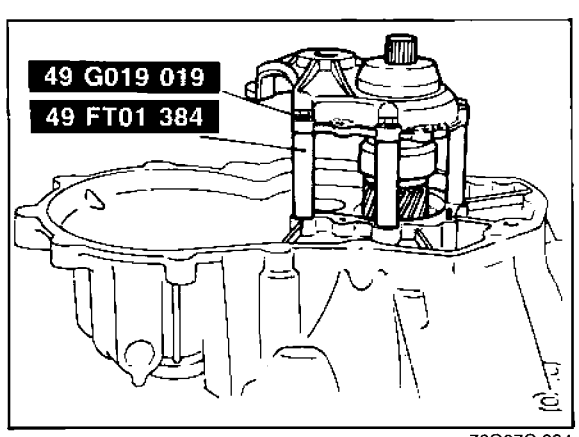
(5) Install the outer race removed in step (3) to the **SST**; then mount them on the output gear assembly.

Caution
Eliminate the gap (arrow) by turning A or B of the selector.



76G07C-233

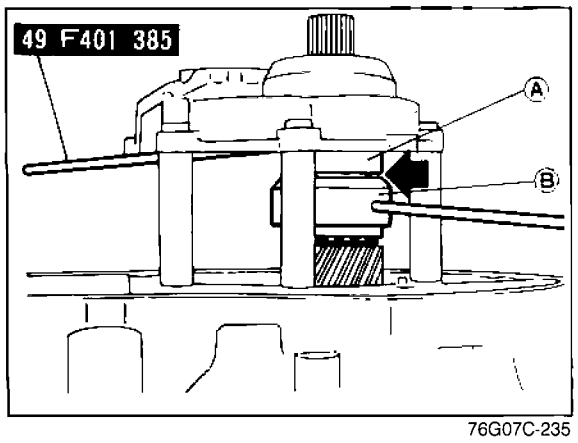
(6) Set the four **SST** on the converter housing in the positions shown.



76G07C-234

(7) Set the bearing housing on the **SST** (selector) and install the four **SST** (bolts); then tighten them to the specified torque.

Tightening torque:
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

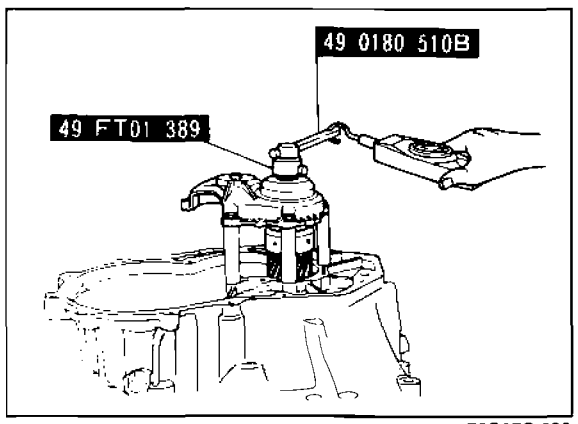


76G07C-235

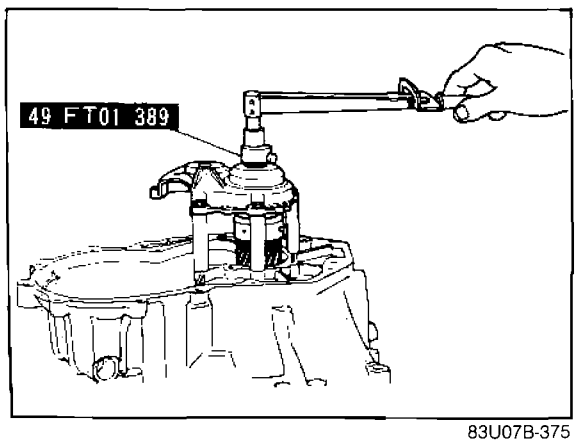
(8) Turn the **SST** (selector) to increase the clearance (indicated by the arrow) with the **SST** (bars) until it no longer turns.

Note
This is to seat the bearing.

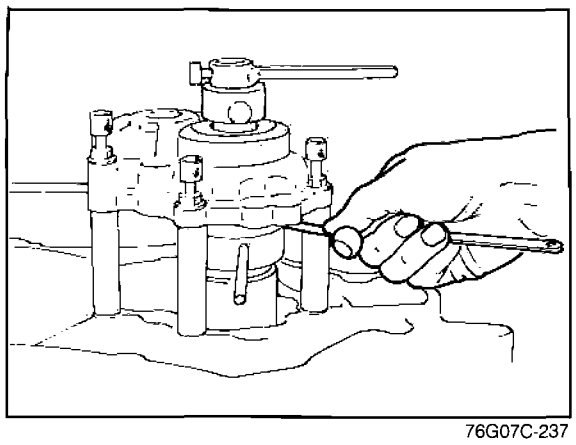
(9) Turn the selector in the opposite direction until the preload is eliminated (gap is reduced).



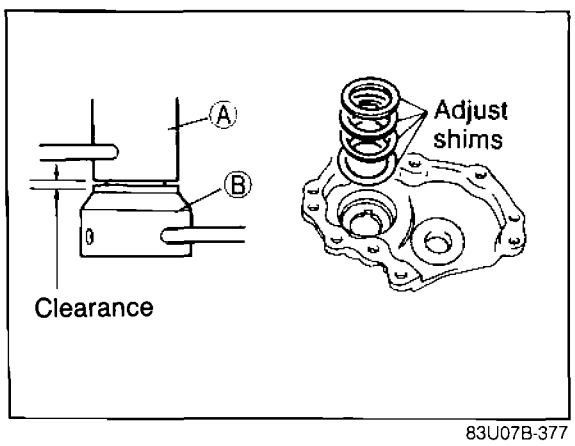
76G07C-236



83U07B-375



76G07C-237



83U07B-377

(10) Mount the **SST** and pull scale or torque wrench on the output gear.
(11) Increase the clearance between A and B to obtain the specified preload/pull scale reading.

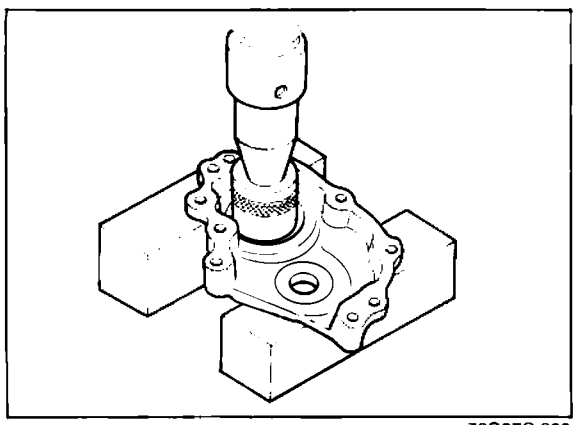
Preload: 0.5—0.9 N·m
(5.0—9.0 cm-kg, 4.34—7.81 in-lb)
Reading on pull scale: 5—9 N
(0.5—0.9 kg, 1.1—1.98 lb)

Note
Read the preload when the output gear starts to turn.

(12) Measure the clearance. Select adjust shim(s) equivalent to the measured clearance.

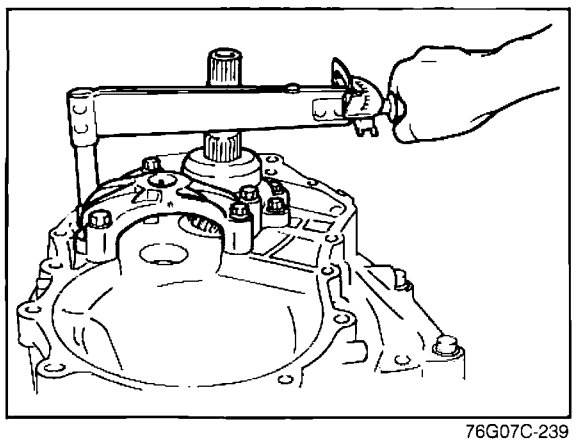
Thickness of shim	
0.10 mm (0.004 in)	0.16 mm (0.0063 in)
0.12 mm (0.005 in)	0.20 mm (0.008 in)
0.14 mm (0.006 in)	0.50 mm (0.020 in)

Caution
a) Measure the clearance around the entire circumference, and select shims equivalent to the maximum clearance.
b) The maximum allowable number of shims is 7.



76G07C-238

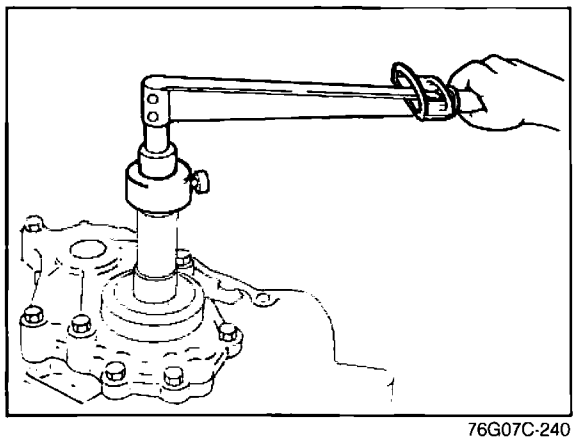
(13) Remove the bearing housing and **SST**.
(14) Install the required shim(s) and press the bearing race into the bearing housing with a suitable pipe.



76G07C-239

(15) Install the bearing housing.

Tightening torque:
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

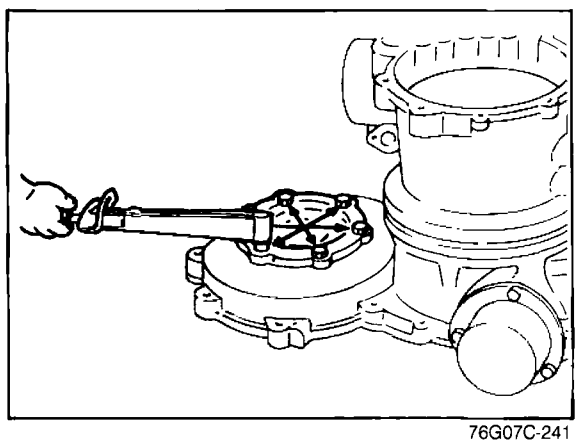


76G07C-240

(16) Check that the preload/pull scale reading is within specification. If not within specification return to step (3).

Preload: 0.03—0.9 N·m
(0.3—9.0 cm-kg, 0.26—7.81 in-lb)
Reading on pull scale:
0.3—9 N (0.03—0.9 kg, 0.066—1.98 lb)

(17) Remove the bearing housing and output gear assembly.



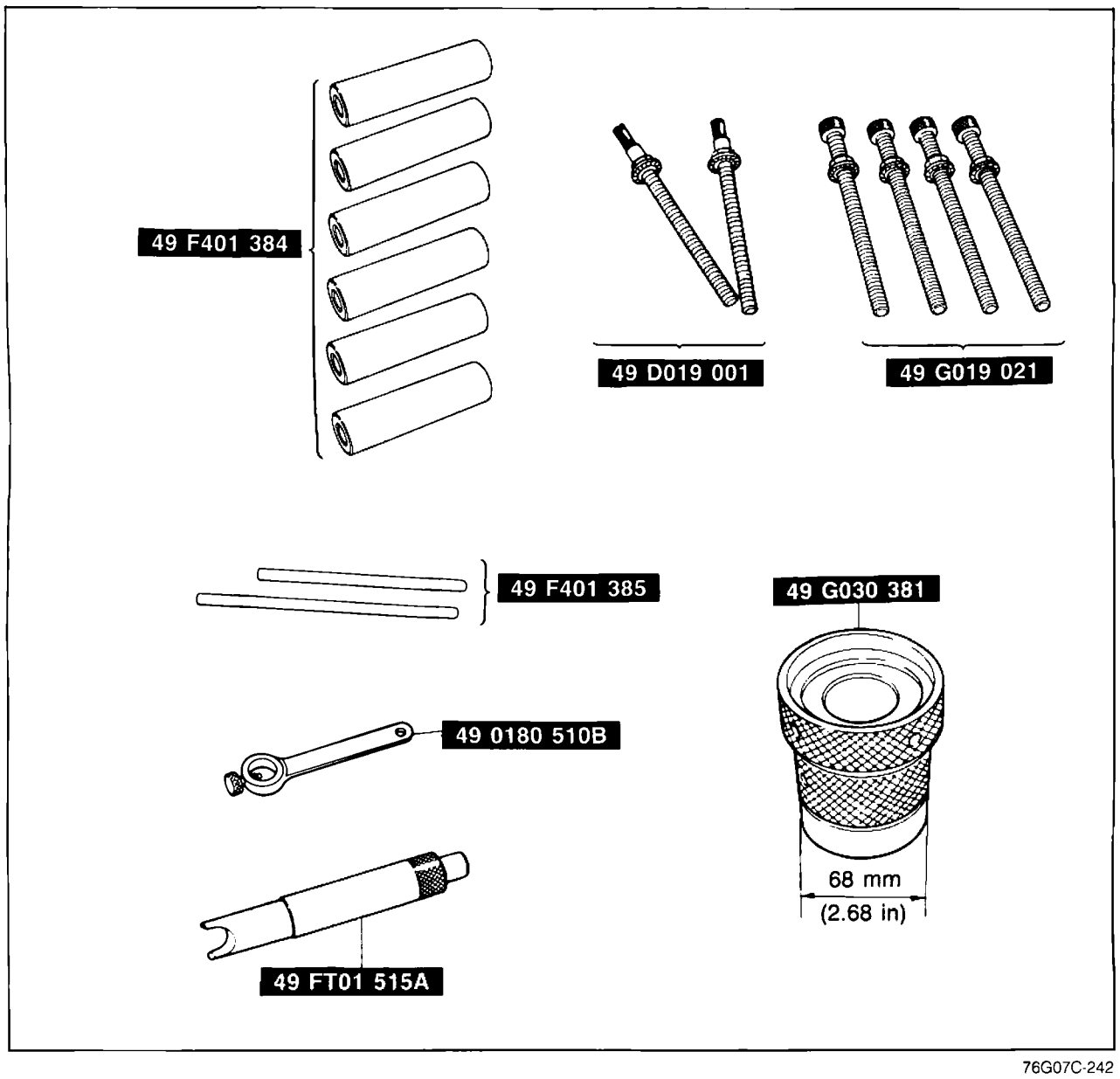
76G07C-241

2. Mount the side bearing housing to transaxle case by gradually tightening the mounting bolts in a diagonal pattern.

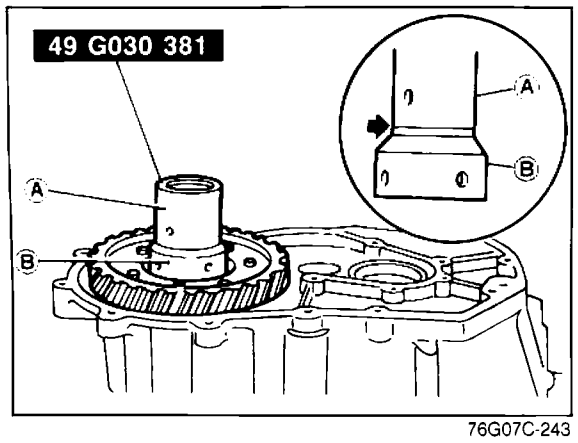
Tightening torque:
19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

3. Adjust the differential side bearing preload and select the adjust shim(s) as described below.

Note
To inspect and adjust the preload, use the SST shown below.



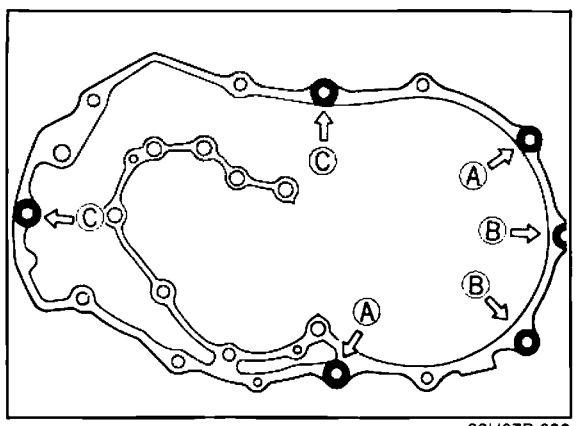
76G07C-242



76G07C-243

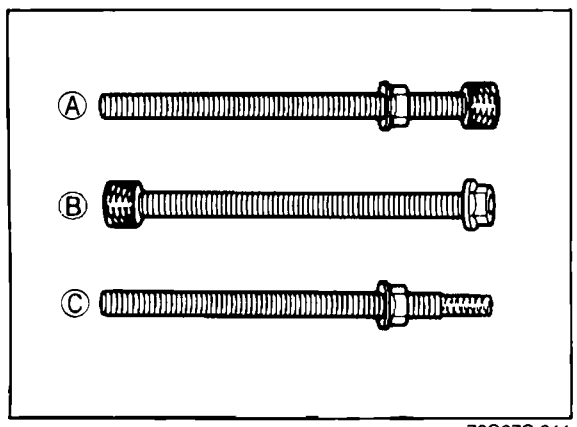
(1) Remove the side bearing housing race and adjust shims from the transaxle case. (Refer to page 7C—88.)
(2) Set the differential assembly into the converter housing.
(3) Install the outer race removed in step (1) into the **SST**; then set them on the differential assembly.

Caution
Eliminate the gap by turning either A or B of the selector.



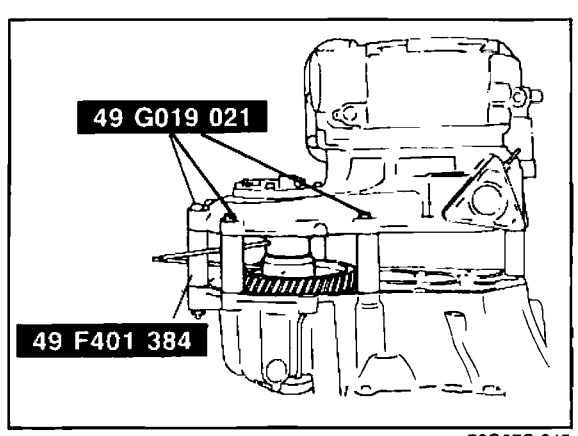
83U07B-382

(4) Set the six **SST** in the positions shown.



76G07C-244

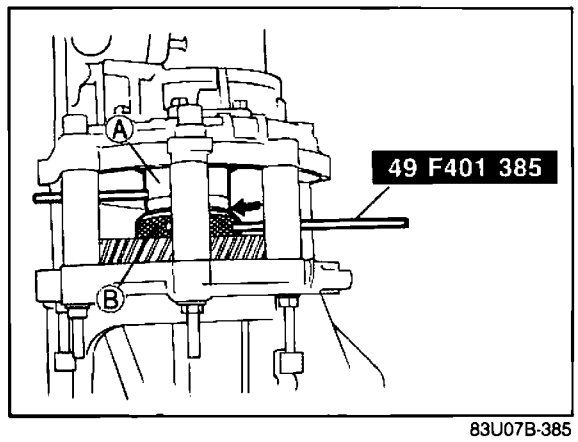
Note
Install the bolts in the positions shown in the illustration above.



76G07C-245

(5) Set the transaxle case on the selectors.
(6) Tighten the **SST** (bolts) to the specified torque.

Tightening torque:
29—46 N·m (3.0—4.7 m-kg, 22—34 ft-lb)

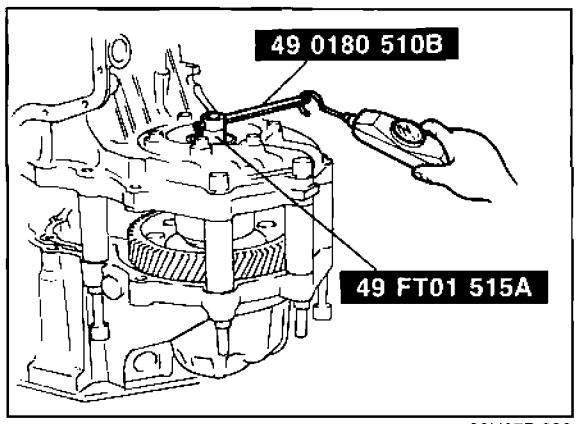


83U07B-385

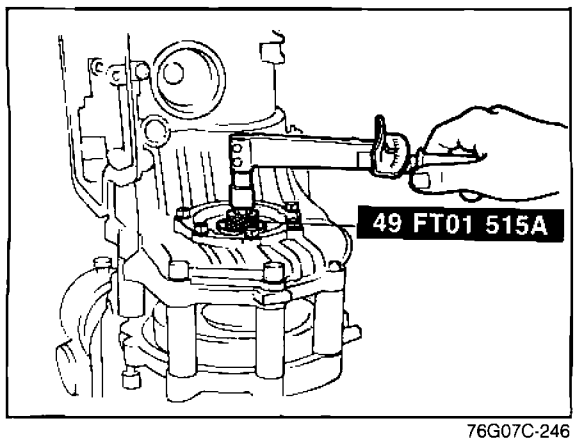
(7) Turn the **SST** (selector) to increase the clearance (indicated by the arrow) with the **SST** (bars), until it no longer turns.

Note
a)This is to seat the bearings.
b)To turn the SST (B), bend the bar as shown.

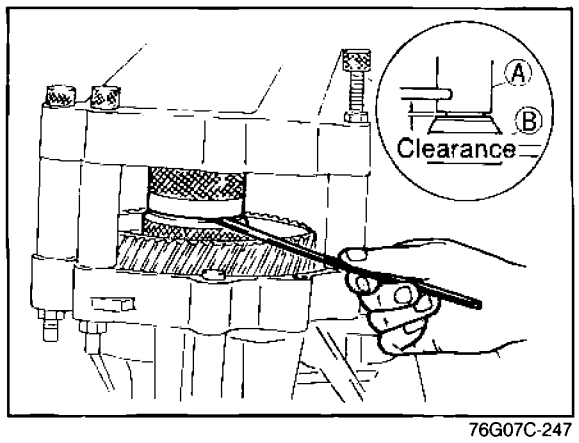
(8) Turn the selector in the opposite direction until the preload is eliminated (gap is reduced).



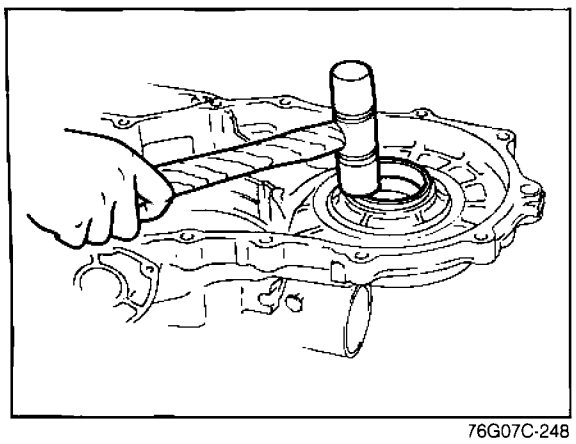
83U07B-386



76G07C-246



76G07C-247



76G07C-248

(9) Insert the **SST** through the oil seal hole of the transaxle case and attach it to the pinion shaft.
(10) Mount the **SST** and pull scale or torque wrench.
(11) Widen the clearance between A and B to obtain the specified preload/pull scale reading.

Preload:
0.5 N·m (5 cm-kg, 4.3 in-lb)
Reading on pull scale: 5 N (0.5 kg, 1.1 lb)

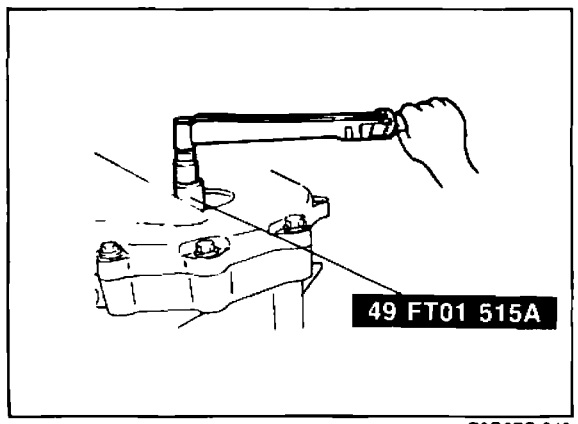
Note
Read the preload when the differential starts to turn.

(12) Measure the clearance between A and B.
(13) Add **0.15 mm (0.0059 in)** to the measured clearance, and select the shim(s) closest in valve to that measurement.

Thickness of shim	
0.10 mm (0.004 in)	0.20 mm (0.008 in)
0.12 mm (0.005 in)	0.50 mm (0.020 in)
0.14 mm (0.006 in)	0.70 mm (0.028 in)
0.16 mm (0.0063 in)	1.00 mm (0.039 in)
0.18 mm (0.007 in)	

Caution
a) Measure the clearance around the entire circumference, and select shims equivalent to the maximum clearance.
b) The maximum allowable number of shims is 3.

(14) Remove the transaxle case and selector.
(15) Install the required shim(s) and tap the bearing race into the side bearing housing.



76G07C-249

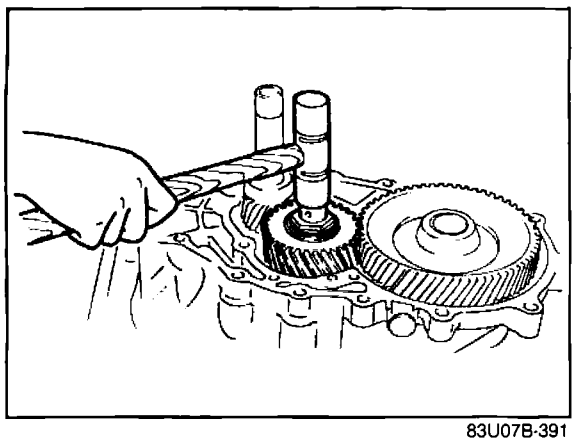
(16) Install the transaxle case.

Tightening torque:
29—46 N·m (3.0—4.7 m-kg, 22—34 ft-lb)

(17) Check that the preload is within specification. If not within specification, return to step (2).

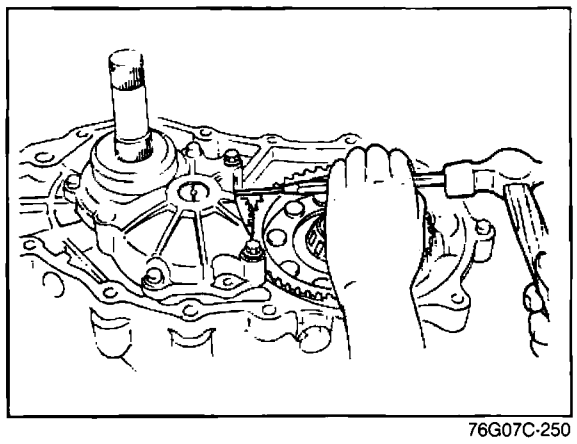
Preload: 2.1—3.0 N·m
(21—31 cm-kg, 18—27 in-lb)
Reading on pull scale: 20—30 N
(2.1—3.1 kg, 4.6—6.8 lb)

(18) Remove the transaxle case.



83U07B-391

3. Install the idle gear and output gear as an assembly by tapping in with a plastic hammer.



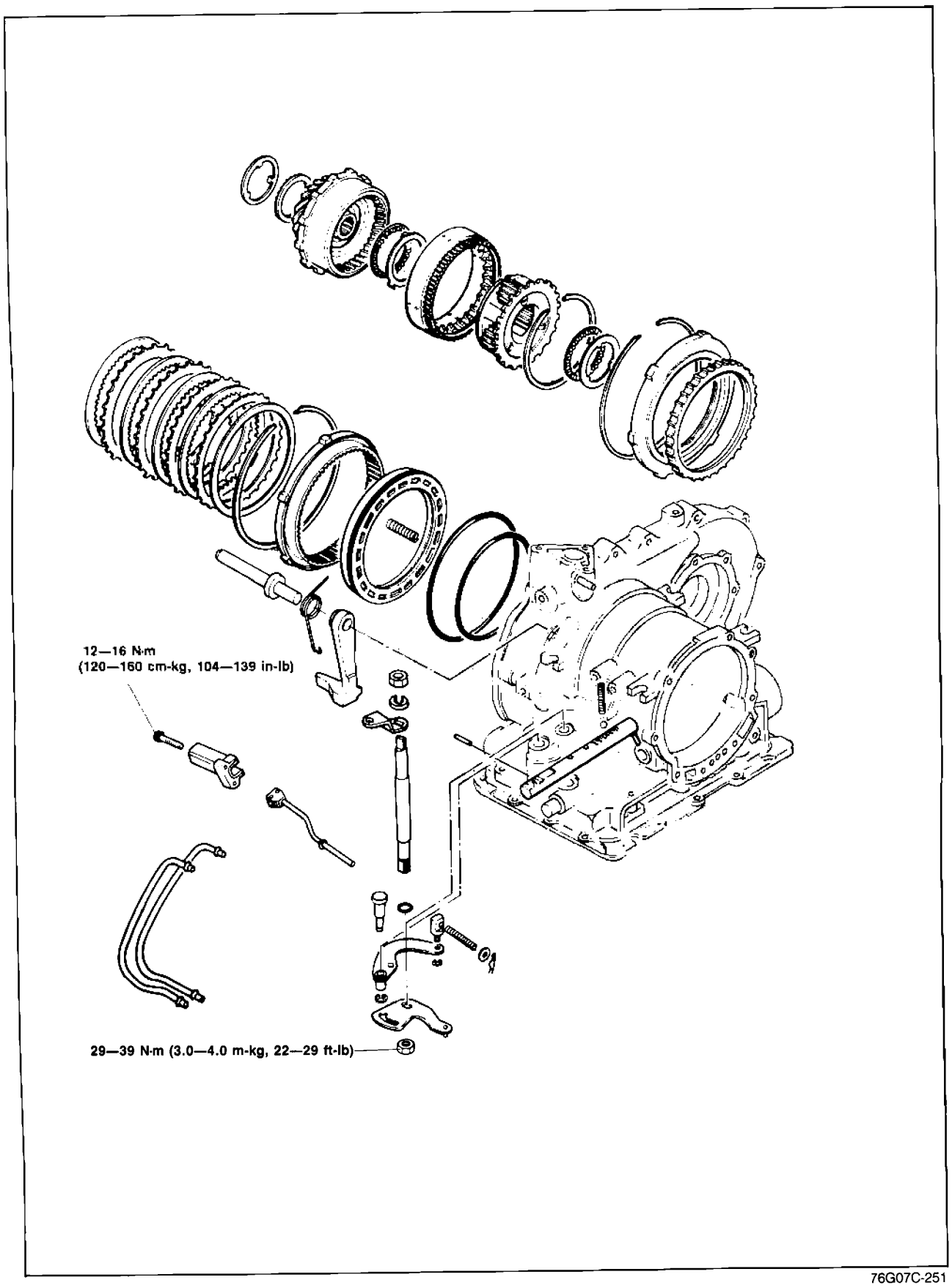
76G07C-250

4. Install the bearing housing.
   (1) Mount the bearing housing onto the converter housing.

   Tightening torque:
   19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

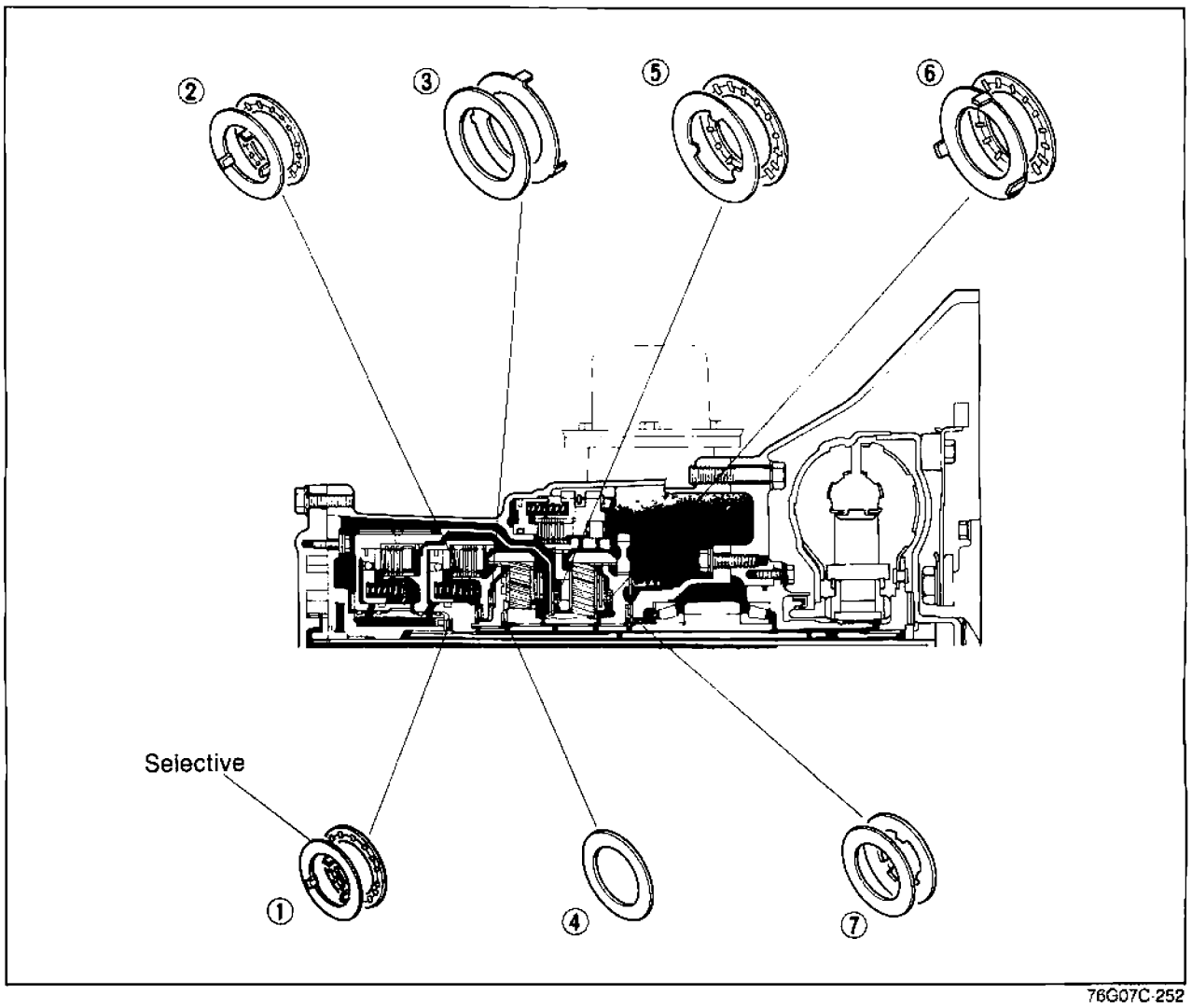
   (2) Align the groove on the idle shaft as shown.
   (3) Tap the roll pin in with a pin punch and hammer.

ASSEMBLY-STEP 2
Torque Specifications



76G07C-251

Thrust Washer, Bearing, and Race Locations



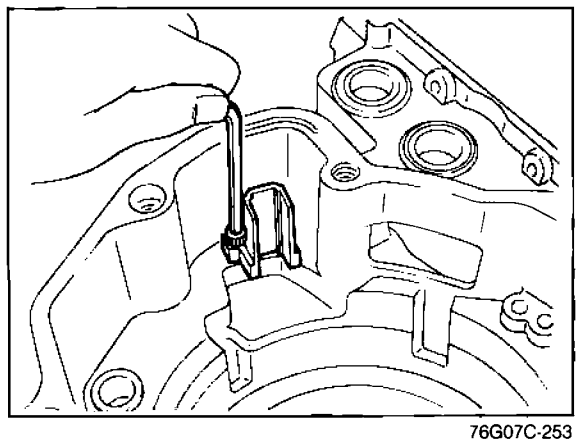
76G07C-252

Outer diameter of bearing and race

mm (in)

	1	2	3	4	5	6	7
Bearing	41.9 (1.65)	52.9 (2.08)	69.9 (2.75)	46.9 (1.85)	69.9 (2.75)	69.9 (2.75)	52.9 (2.08)
Race	41.0 (1.61)	51.5 (2.03)	70.0 (2.76)	—	70.0 (2.76)	70.0 (2.76)	51.5 (2.03)

Note: Install with petroleum jelly to prevent the thrust bearing or bearing race from falling out.

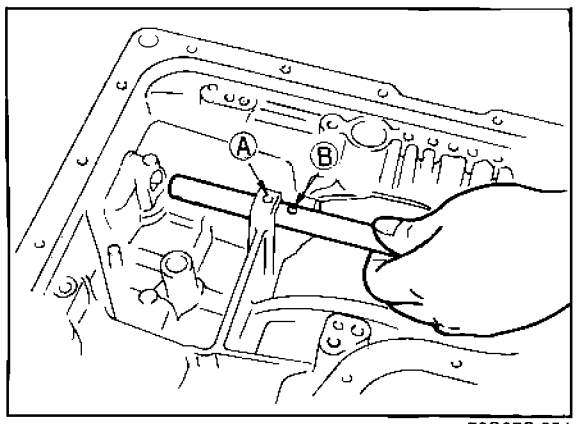


76G07C-253

Procedure

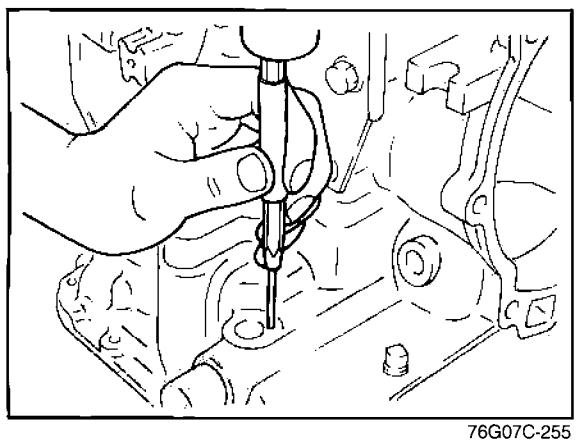
1. Install the actuator support.

Tightening torque: 12—16 N·m (120—160 cm-kg, 104—139 in-lb)



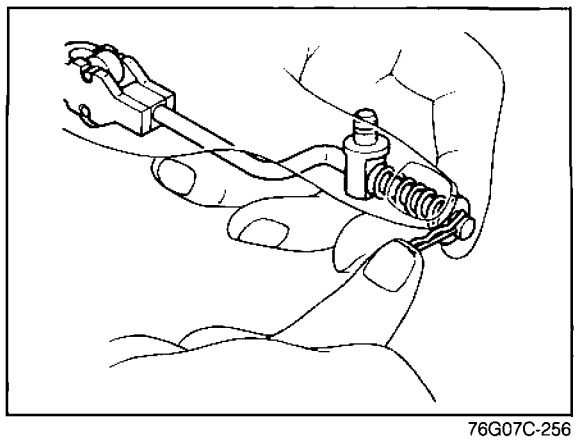
76G07C-254

2. Install the control rod.
   (1) Insert the control rod and align holes A and B.
   (2) Install the spring and ball.



76G07C-255

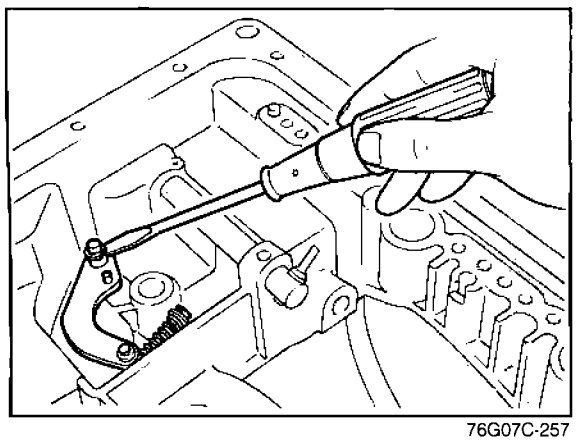
(3) Install the knock pin.



76G07C-256

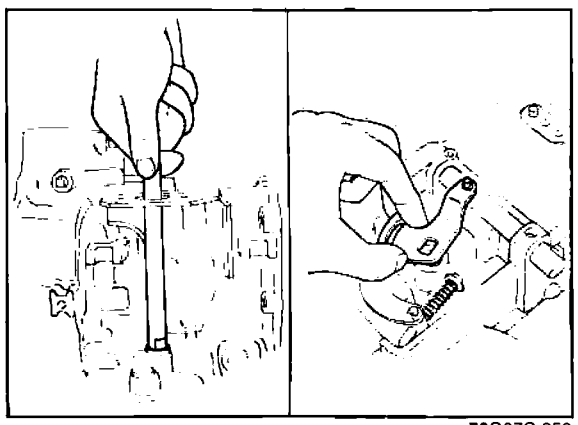
3. Install the manual shaft assembly.
   (1) Install the parking joint, spring, and washer to the parking rod.
   (2) Install the snap pin.

Note
Face the snap pin in the direction shown.



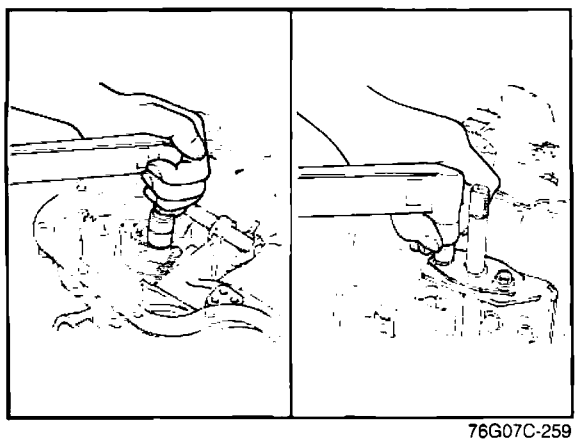
76G07C-257

(3) Install the parking lever; then install the snap ring.



76G07C-258

(4) Apply ATF to the O-ring, and install it onto the manual shaft.
(5) Insert the manual shaft and manual plate.



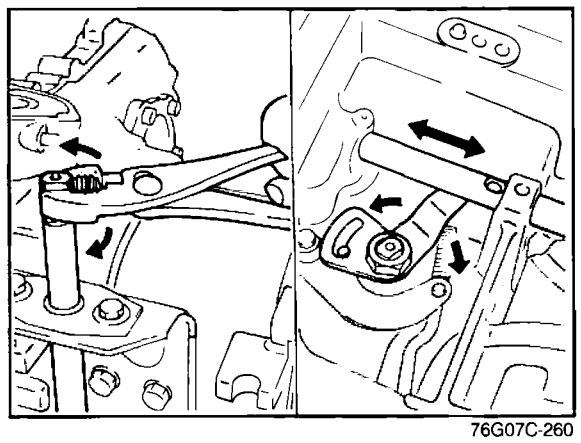
76G07C-259

(6) Install the locknut.

Tightening torque:
29—39 N·m (3.0—4.0 m-kg, 22—29 ft-lb)

(7) Install the bushing into the plate; then install the plate.

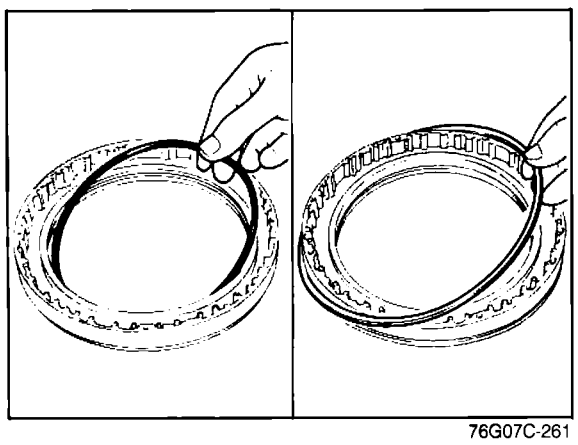
Tightening torque:
5—8 N·m (50—80 cm-kg, 43—69 in-lb)



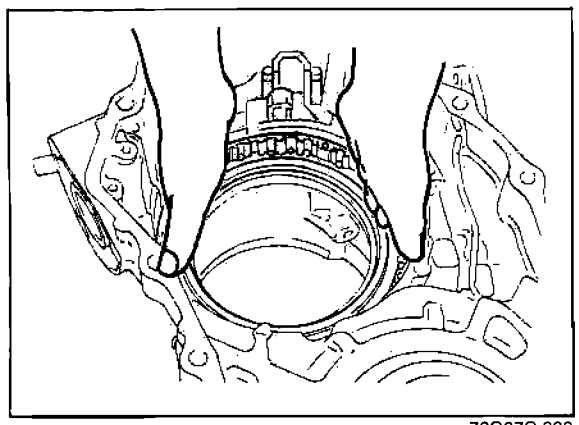
76G07C-260

(8) Move the manual shaft and check the manual shaft mechanism operation.

4. Install the low and reverse brake piston.
   (1) Apply ATF to the inner and outer seals and install them onto the low and reverse brake piston.

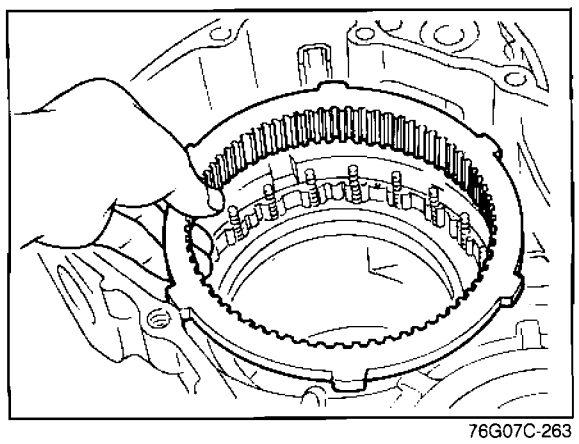


76G07C-261



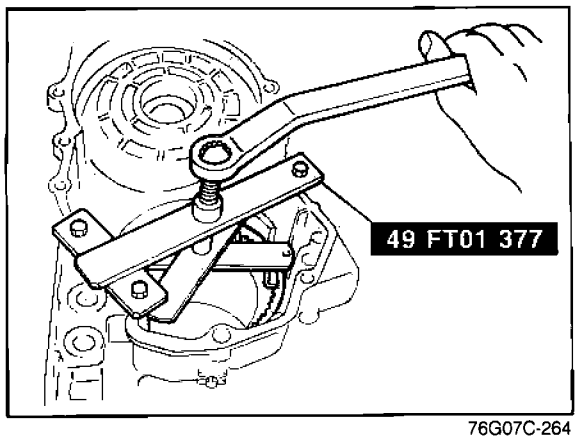
76G07C-262

(2) Install the low and reverse brake piston by pushing evenly around the circumference.



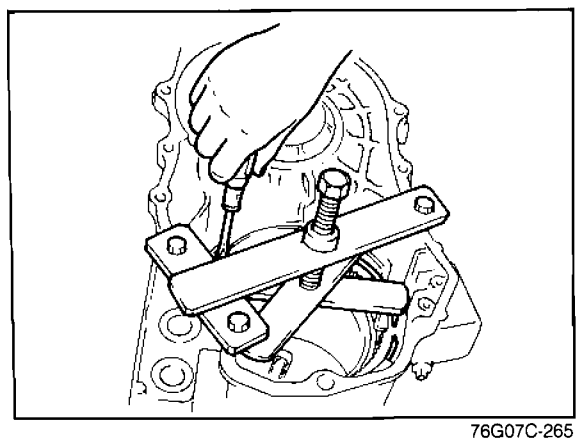
76G07C-263

5. Install the low and reverse brake hub.
   (1) Install the springs and low and reverse brake hub.
   (2) Set the snap ring onto the low and reverse brake hub.



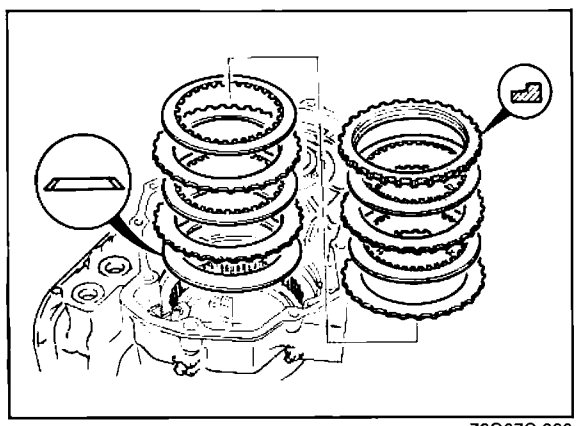
76G07C-264

(3) Install the **SST**.
(4) Compress the low and reverse brake hub.



76G07C-265

(5) Install the snap ring.
(6) Remove the **SST**.

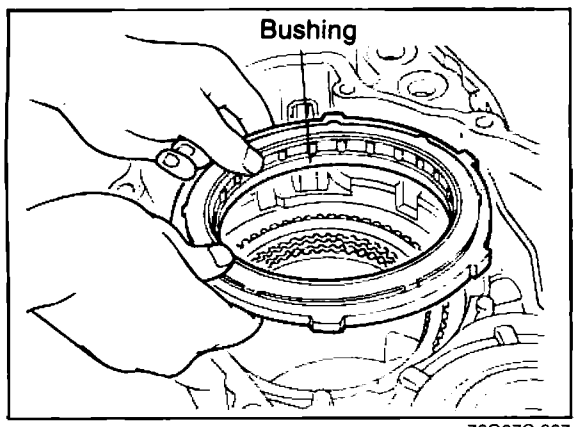


76G07C-266

6. Install the dished plate with the dished side downward as shown.
7. Install the drive and driven plates.

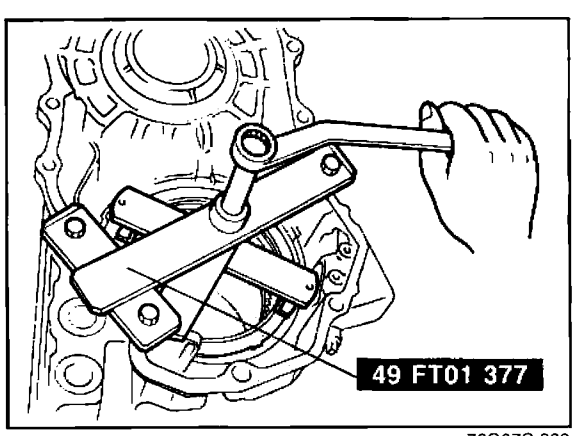
Note
Installation order:
Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive

8. Install the retaining plate with the step facing upward.



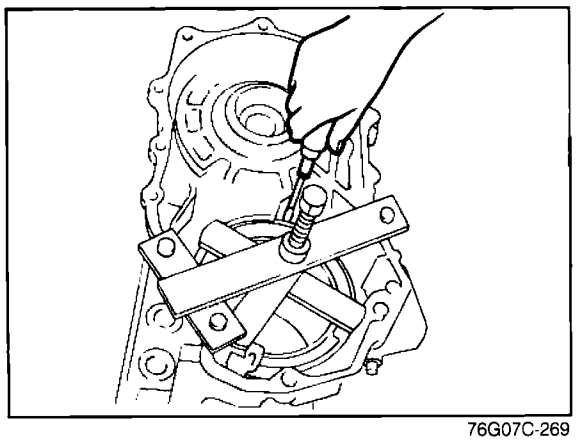
76G07C-267

9. Install the one-way clutch.
   (1) Install the one-way clutch so that the side with the bushing faces the retaining plate.



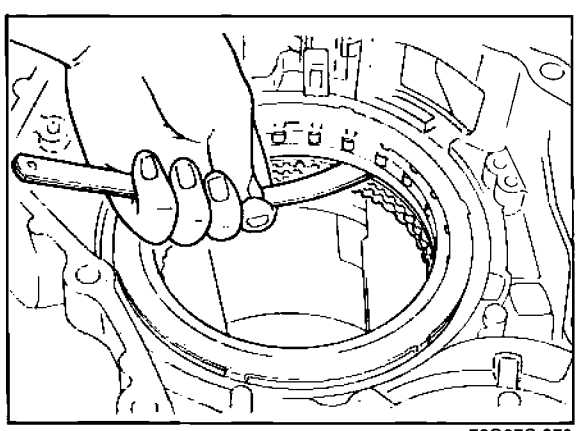
76G07C-268

   (2) Set the snap ring on the one-way clutch.
   (3) Install the **SST**.
   (4) Compress the one-way clutch.



76G07C-269

   (5) Install the snap ring.
   (6) Remove the **SST**.



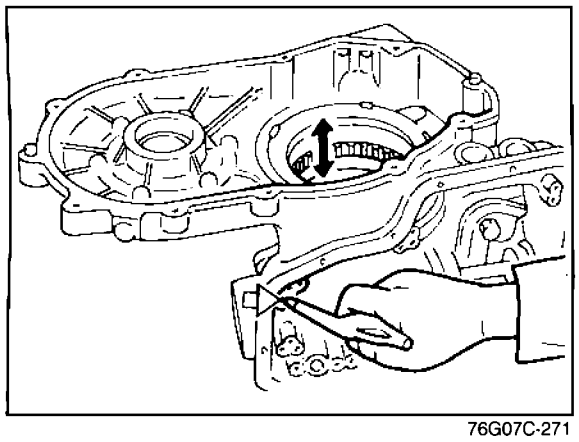
76G07C-270

10. Check the low and reverse brake clearance.
    (1) Measure the clearance between the one-way clutch and the low and reverse brake retaining plate.
    (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

Low and reverse brake clearance:
0.8—1.05 mm (0.032—0.041 in)

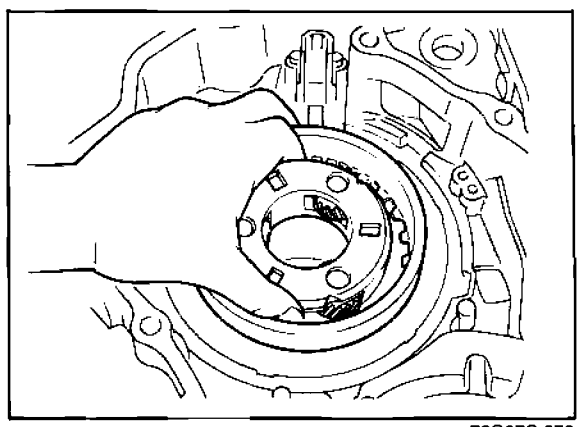
Retaining plate sizes **mm (in)**

4.6 (0.181)	4.8 (0.189)	5.0 (0.197)
5.2 (0.205)	5.4 (0.213)	5.6 (0.220)



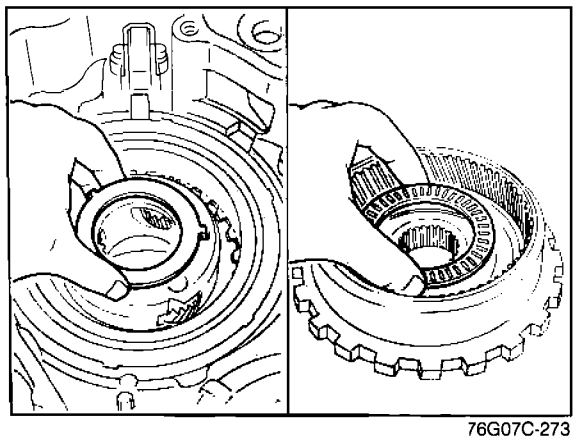
76G07C-271

11. Blow compressed air into the fluid hole of the transaxle case to check the operation of the low and reverse brake.



76G07C-272

12. Install the one-way clutch inner race assembly.



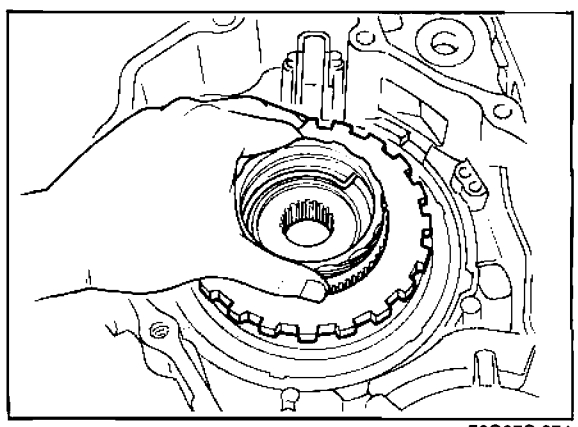
76G07C-273

13. Apply petroleum jelly to the bearing race to secure it; then install it onto the one-way clutch inner race assembly.

Bearing race outer diameter:
70.0 mm (2.76 in)

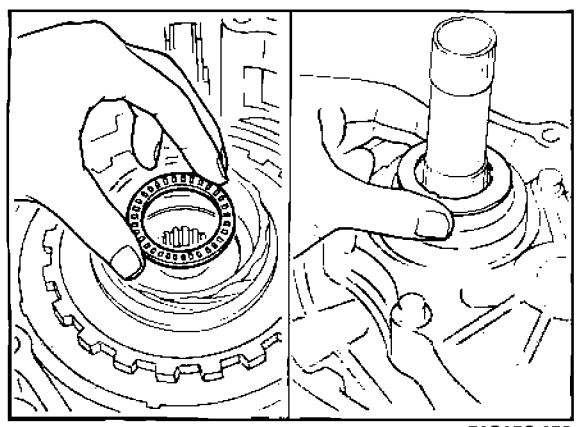
14. Apply petroleum jelly to the thrust bearing to secure it; then install it into the drum hub assembly.

Thrust bearing outer diameter:
69.9 mm (2.75 in)



76G07C-274

15. Install the drum hub assembly.



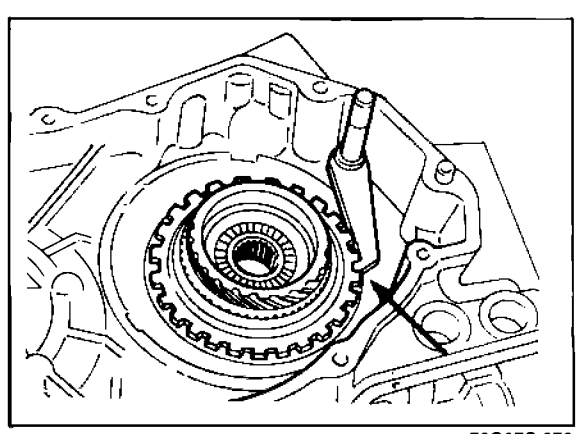
76G07C-275

16. Apply petroleum jelly to the thrust bearing to secure it; then install it into the drum hub assembly.

Thrust bearing outer diameter:
52.9 mm (2.08 in)

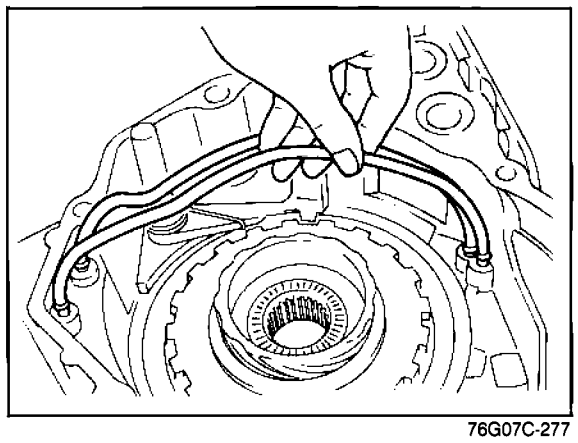
17. Apply petroleum jelly to the bearing race to secure it; then install it into the transaxle case.

Bearing race outer diameter:
51.5 mm (2.03 in)



76G07C-276

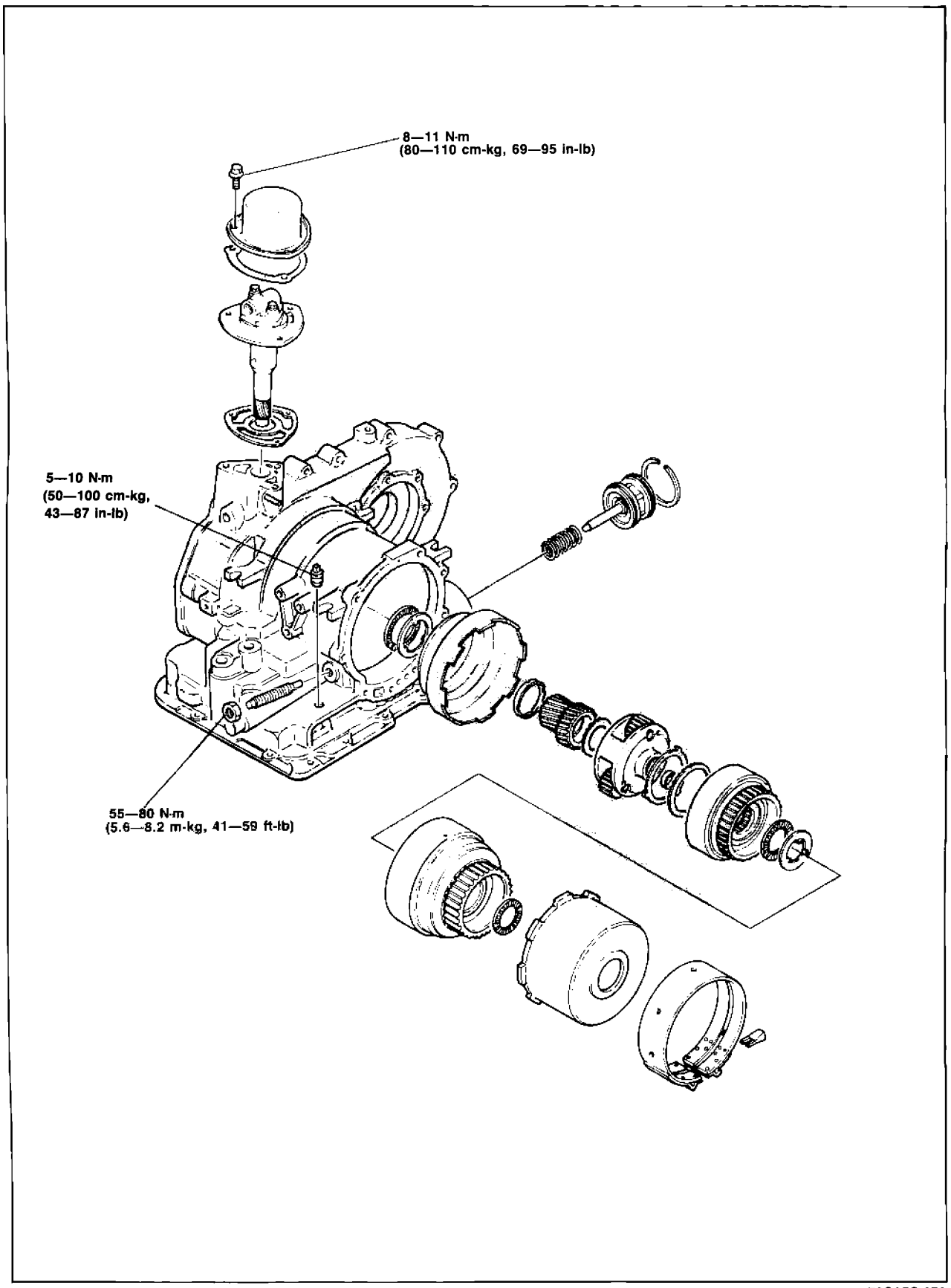
18. Install the parking pawl assembly.
19. Move the manual shaft and check that the parking pawl meshes properly with the parking gear when the manual shaft is at P.



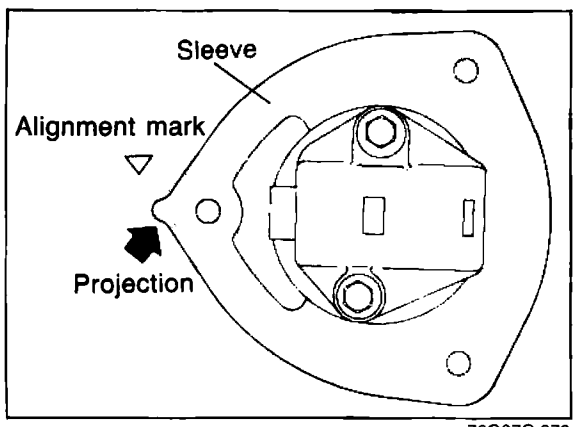
76G07C-277

20. Install the governor inlet and outlet pipe.

ASSEMBLY-STEP 3
Torque Specifications



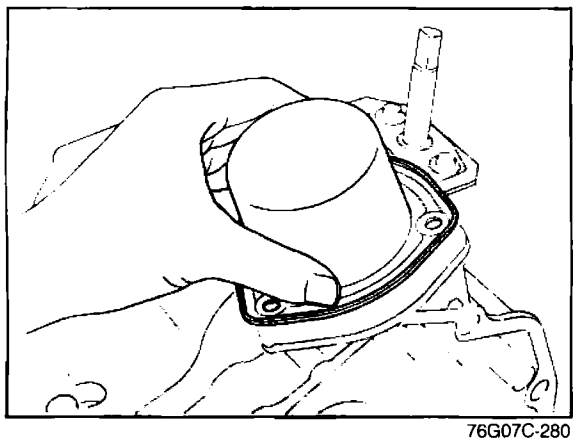
76G07C-278



76G07C-279

Procedure

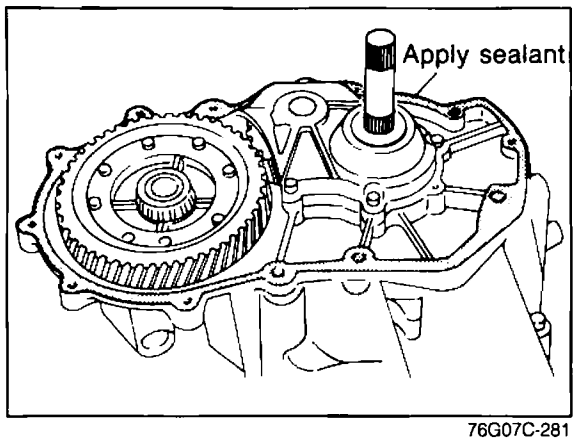
1. Install the governor assembly.
   (1) Mount the governor along with a new gasket onto the transaxle case so that the sleeve projection is aligned with the alignment mark on the transaxle case.



76G07C-280

   (2) Install the governor cover along with a new gasket.

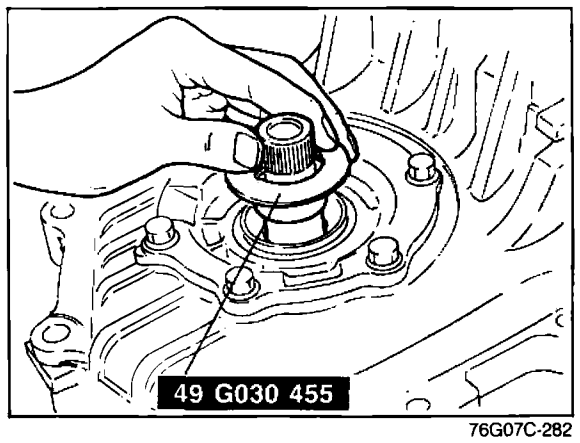
Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



76G07C-281

2. Apply a thin coat of silicone sealant to the contact surfaces of the converter housing and transaxle case.
3. Install the transaxle case onto the converter housing.

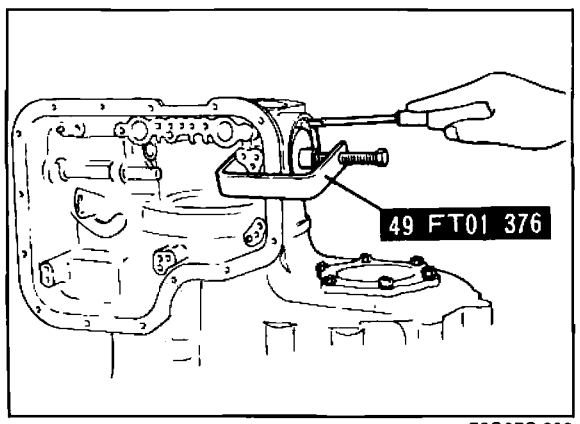
Tightening torque:
29—46 N·m (3.0—4.7 m-kg, 22—34 ft-lb)



76G07C-282

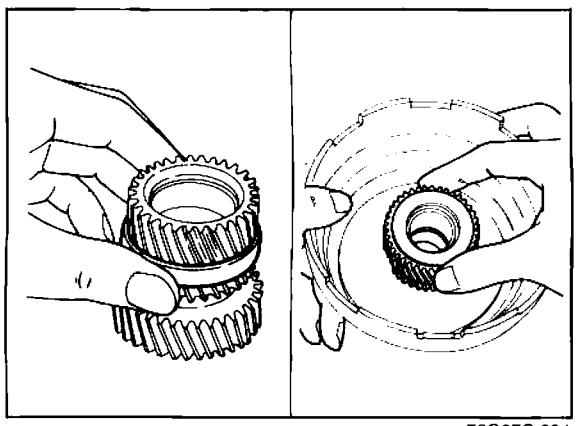
4. Install the **SST** into the differential side gear.

Caution
Failure to install the SST may allow the differential side gears to become misaligned.

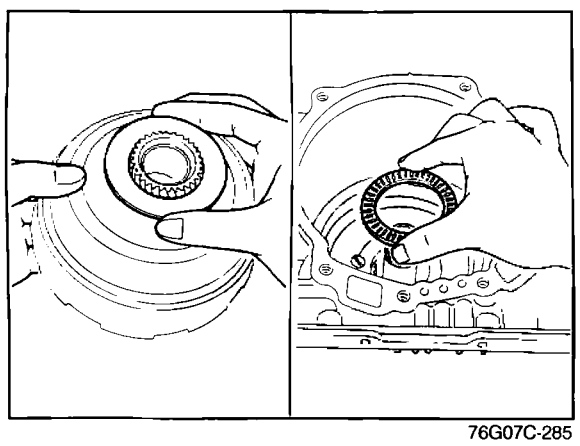


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5. Install the servo into the transaxle case.
   (1) Install the return spring and servo retainer.
   (2) Compress the servo retainer with the **SST**.
   (3) Install the snap ring.
   (4) Remove the **SST**.


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6. Install the spacer onto the sun gear.
7. Install the sun gear into the connecting shell.


76G07C-285

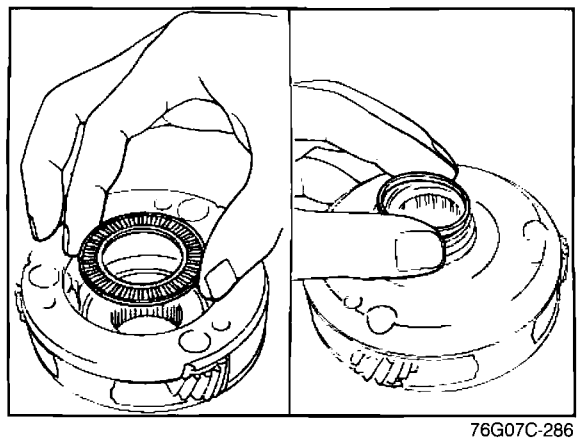
8. Apply petroleum jelly to the bearing race to secure it; then install it onto the connecting shell.

   Bearing race outer diameter:
   70.0 mm (2.76 in)

9. Apply petroleum jelly to the thrust bearing to secure it; then install it onto the one-way clutch inner race.

   Thrust bearing outer diameter:
   69.9 mm (2.75 in)

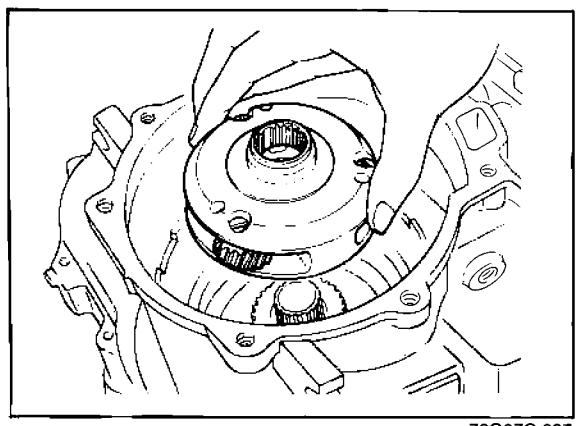
10. Install the sun gear and connecting shell into the drum hub assembly.


76G07C-286

11. Apply petroleum jelly to the thrust bearing to secure it; then install it into the front planetary carrier.

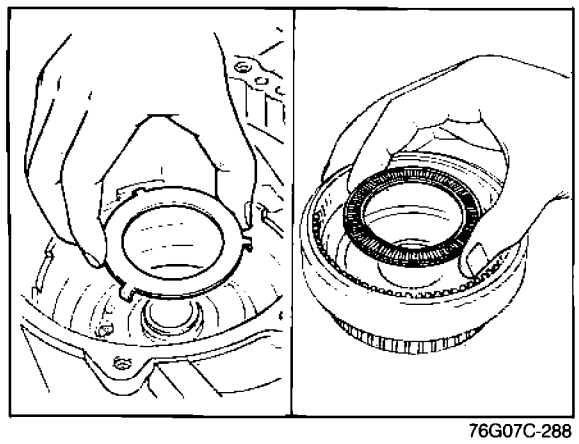
    Thrust bearing outer diameter:
    46.9 mm (1.85 in)

12. Install the seal sleeve.



76G07C-287

13. Install the front planetary carrier.



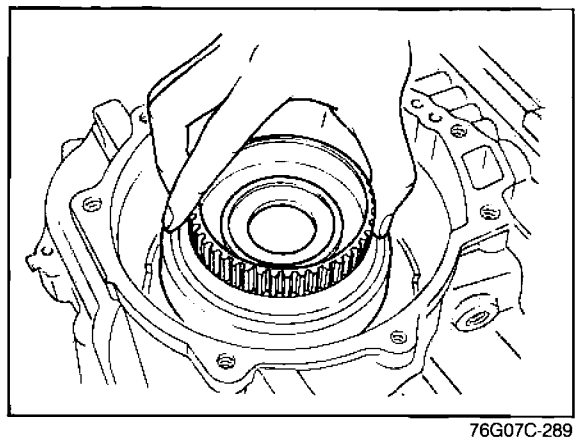
76G07C-288

14. Apply petroleum jelly to the bearing race to secure it; then install it into the front planetary carrier.

Bearing race outer diameter:
70.0 mm (2.76 in)

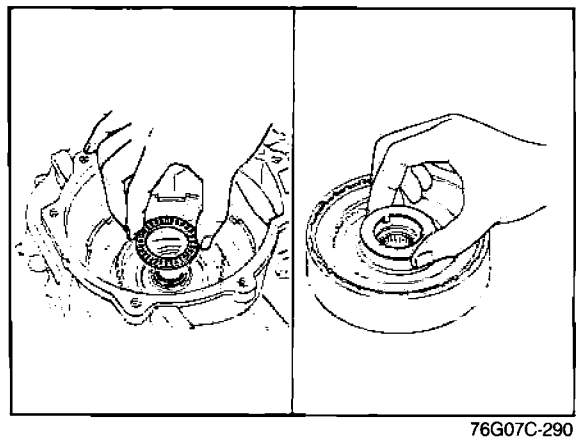
15. Apply petroleum jelly to the thrust bearing to secure it; then install it into the rear clutch hub assembly.

Thrust bearing outer diameter:
69.9 mm (2.75 in)



76G07C-289

16. Install the rear clutch hub assembly.



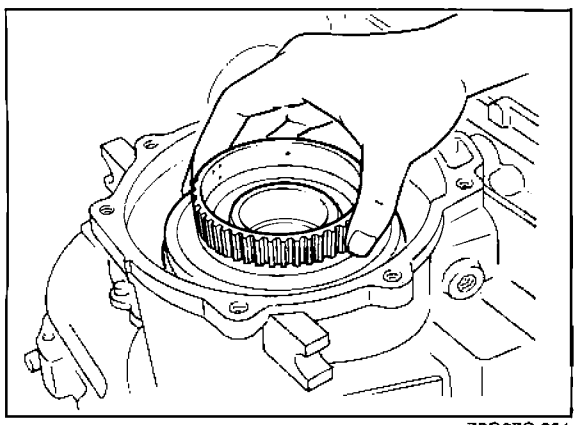
76G07C-290

17. Apply petroleum jelly to the thrust bearing to secure it; then install it into the rear clutch hub assembly.

Thrust bearing outer diameter:
52.9 mm (2.08 in)

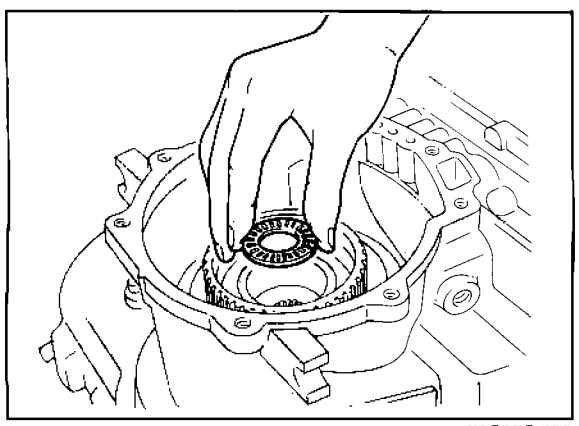
18. Apply petroleum jelly to the bearing race to secure it; then install it into the rear clutch.

Bearing race outer diameter:
51.5 mm (2.03 in)



76G07C-291

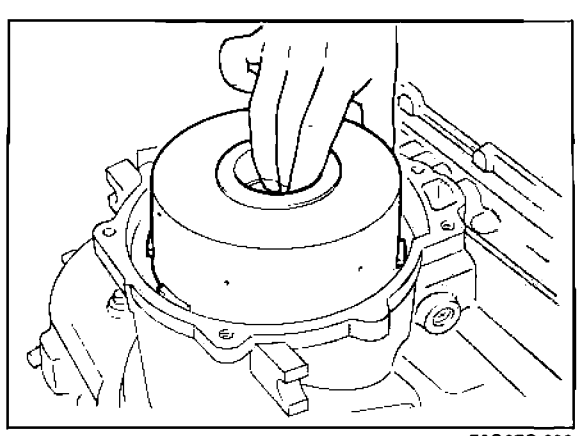
19. Install the rear clutch.



76G07C-292

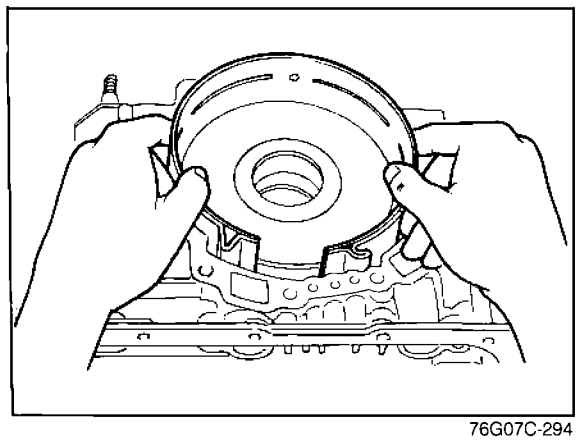
20. Apply petroleum jelly to the thrust bearing to secure it; then install it into the rear clutch.

Thrust bearing outer diameter:
41.9 mm (1.65 in)



76G07C-293

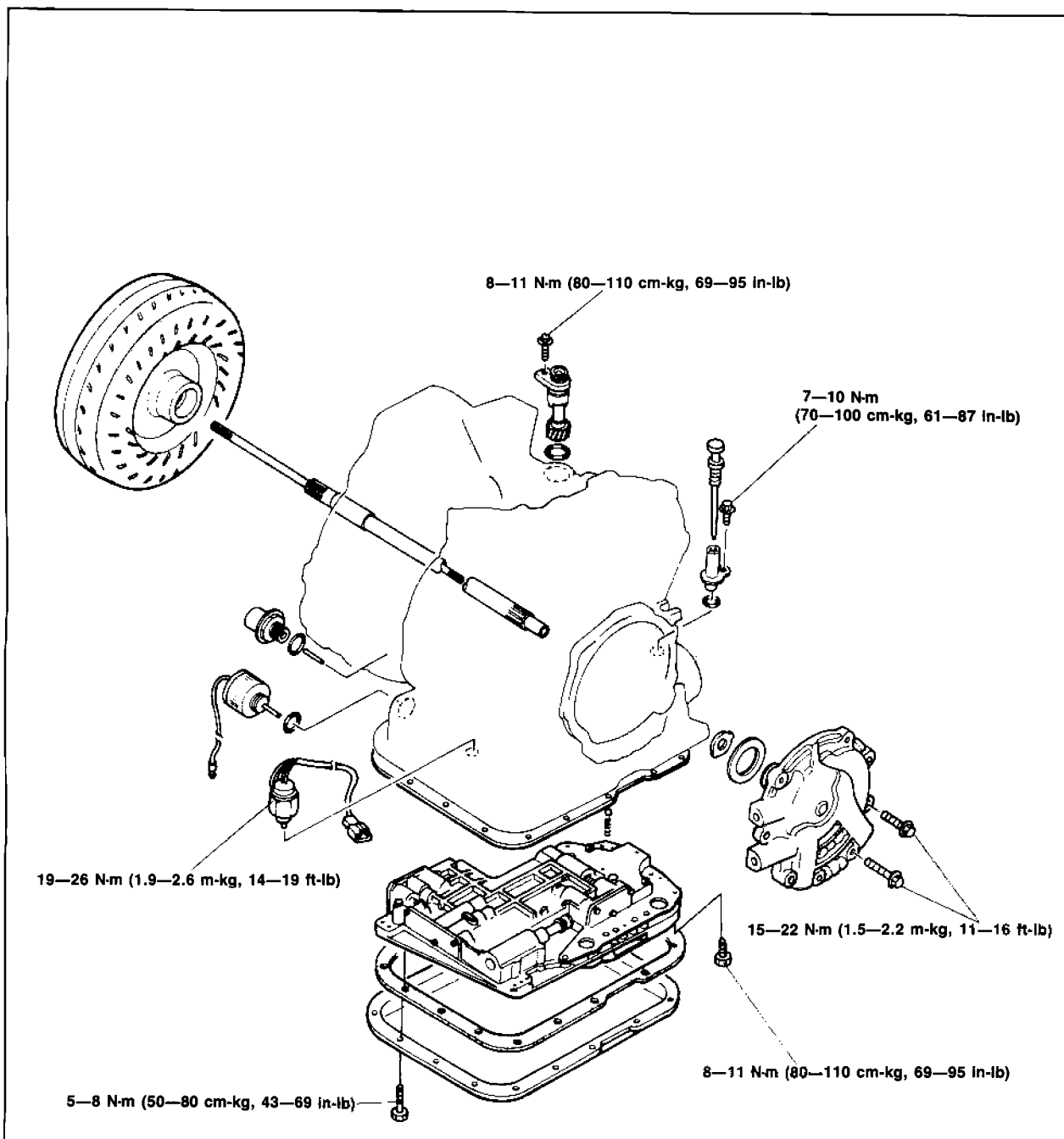
21. Install the front clutch.



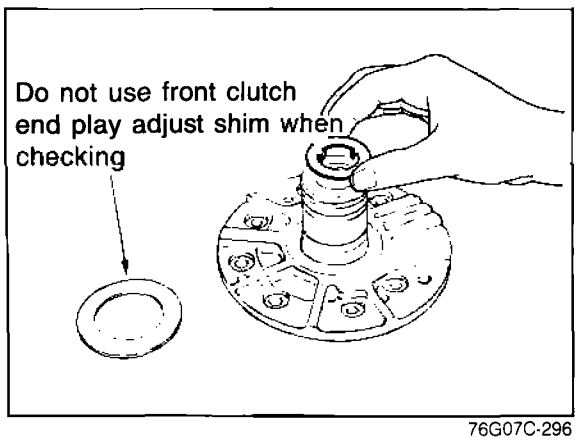
76G07C-294

22. Install the brake band and strut.
23. Install the anchor-end bolt and locknut; then loosely tighten the anchor-end bolt.

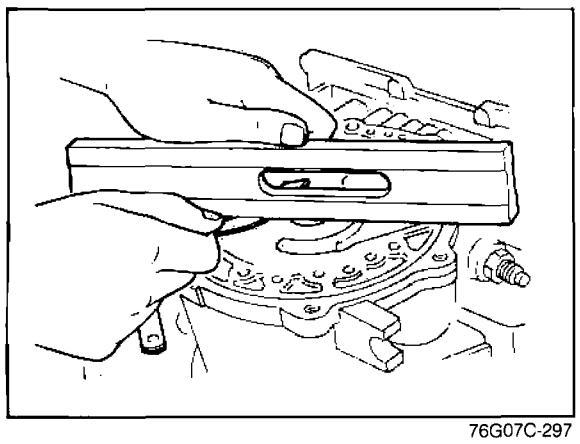
ASSEMBLY-STEP 4
Torque Specifications



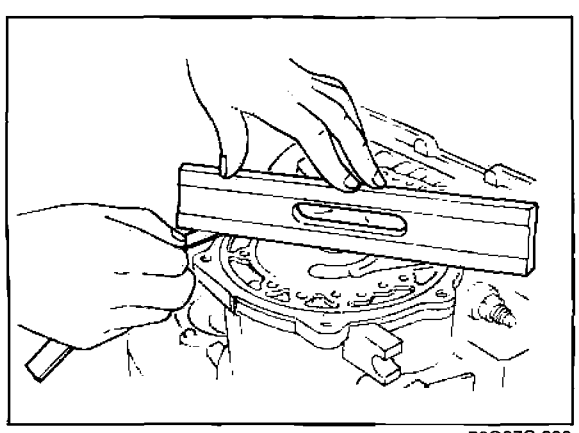
76G07C-295



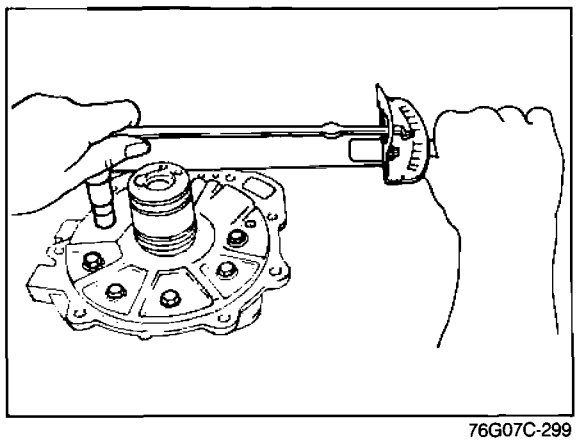
76G07C-296



76G07C-297



76G07C-298



76G07C-299

Procedure

1. Use the following procedure to adjust the total end play and select a suitable bearing race.
   (1) Remove the pump cover from the oil pump.
   (2) Install the bearing into the rear clutch drum.
   (3) Mount the bearing race to the pump cover; and then install it into the front clutch drum.

Note
A front clutch drum end play adjust shim must not be used between the pump cover and the front clutch drum when checking total end play.

   (4) Position a straight edge on the transaxle case, and measure the clearance between the straight edge and either the pump cover or the transaxle case.
      a) If the pump cover surface is lower than the transaxle case, measure the clearance between the straight edge and the pump cover.

Specification:
0.10 mm (0.004 in) max.

Note
a) Make the measurement without the oil pump gasket installed.
b) Measured clearance plus thickness of oil pump gasket equals total end play.

      b) If the pump cover surface is higher than the transaxle case, measure the clearance between the straight edge and the transaxle case.

Specification:
0.15 mm (0.006 in) max.

Caution
Do not position the straight edge on the bolt holes for mounting the oil pump to the transaxle case.

Note
Thickness of oil pump gasket minus measured clearance equals total end play.

2. If the end play is not within specification, adjust it by selecting the proper bearing race.

Caution
Use only one bearing race.

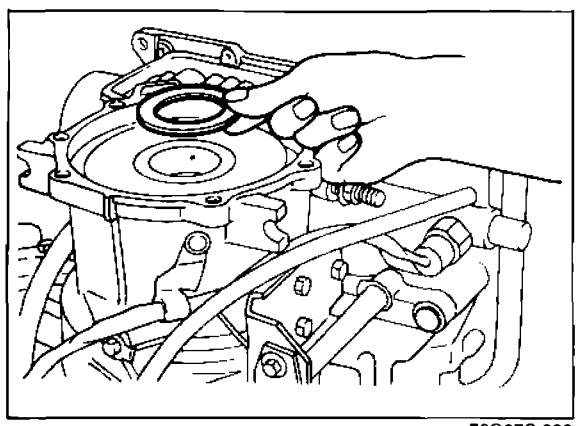
Bearing race outer diameter: 41.0 mm (1.61 in)

Bearing race sizes **mm (in)**

1.2 (0.047)	1.4 (0.055)	1.6 (0.063)
1.8 (0.071)	2.0 (0.079)	2.2 (0.087)

3. Reinstall the oil pump cover.

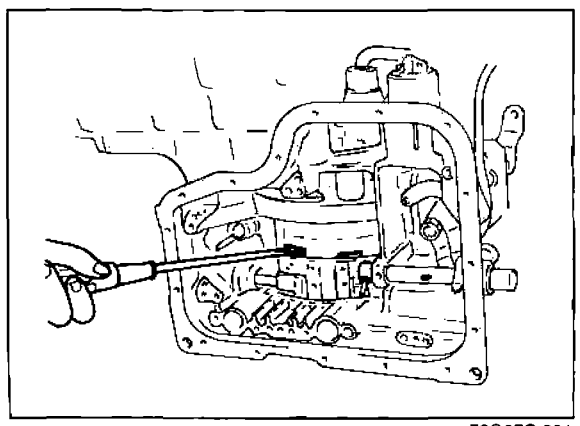
Tightening torque: 11—14 N·m (110—140 cm-kg, 95—122 in-lb)



76G07C-300

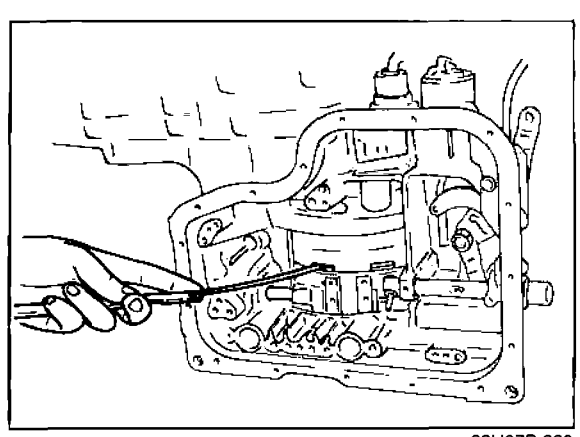
4. Use the following procedure to adjust the front clutch drum end play and select the adjust shim.
   (1) Set the oil pump gasket onto the transaxle case.
   (2) Place the adjust shim onto the front clutch drum.
   (3) Install the oil pump and bearing race into the transaxle; then tighten the oil pump mounting bolts to the specified torque.

Tightening torque:
15—22 N·m (1.5—2.2 m-kg, 11—16 ft-lb)



76G07C-301

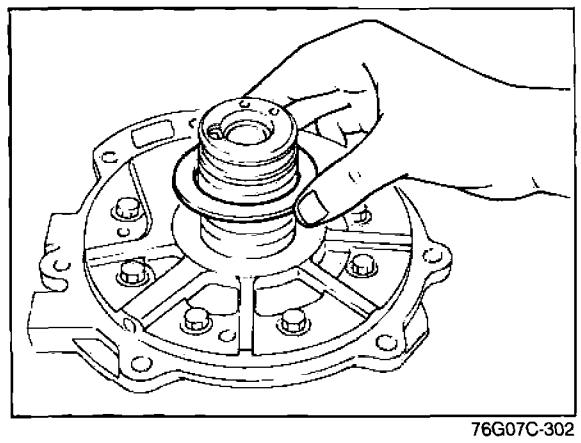
   (4) Position the transaxle with the oil pump facing down ward position.
   (5) While turning the connecting shell 2 complete turns, push the front clutch drum toward the oil pump with a screwdriver to seat the front clutch drum.



63U07B-220

   (6) Measure the clearance between the front clutch drum and the connecting shell. This clearance is the front clutch drum end play.

End play: 0.5—0.8 mm (0.020—0.031 in)

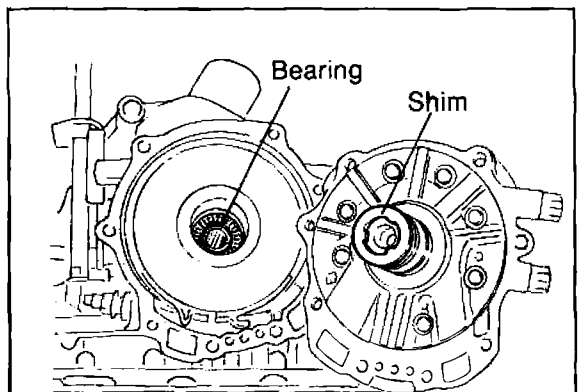


76G07C-302

   (7) If the end play is not within specification, adjust it by selecting the proper adjust shim.

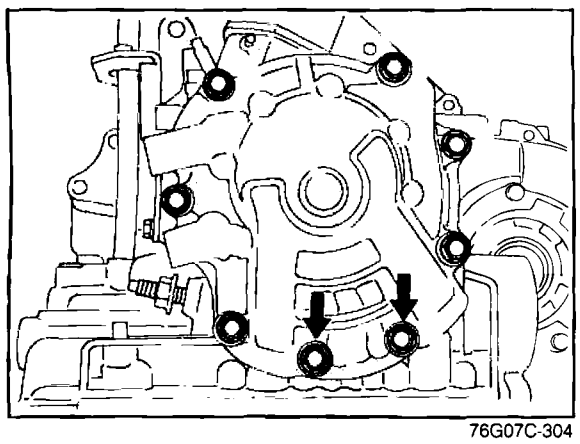
Shim sizes **mm (in)**

1.3 (0.051)	1.5 (0.059)	1.7 (0.067)
1.9 (0.075)	2.1 (0.083)	2.3 (0.091)
2.5 (0.098)	2.7 (0.106)	



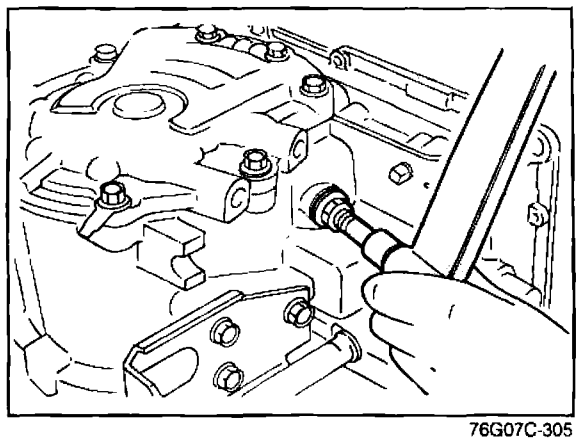
76G07C-303

5. Check that bearing race and shim are installed correctly.


76G07C-304

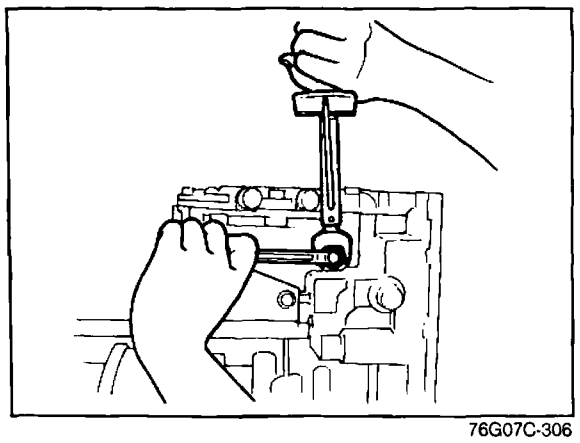
6. Apply sealant to the seat face of the arrow marked bolts install the oil pump.

Tightening torque:
15—22 N·m (1.5—2.2 m-kg, 11—16 ft-lb)


76G07C-305

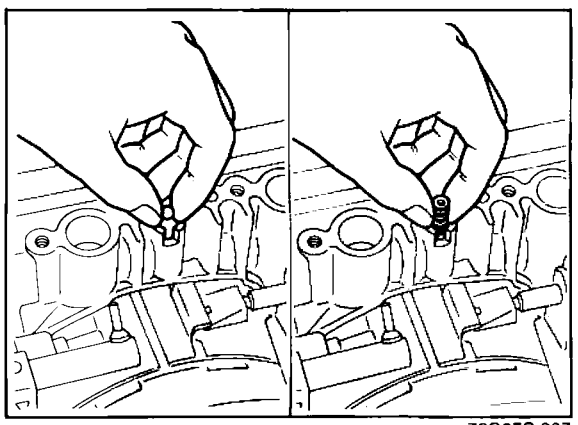
7. Adjust the band brake.
   (1) Apply sealant to threads; and tighten the anchor-end bolt.

Tightening torque: 12—15 N·m
(120—150 cm-kg, 104—130 in-lb)


76G07C-306

   (2) Loosen the anchor-end bolt 2 turns.
   (3) Tighten the locknut to the specified torque.

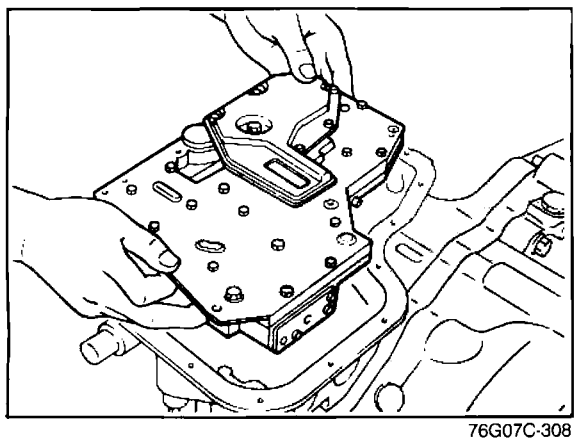
Tightening torque:
55—80 N·m (5.6—8.2 m-kg, 41—59 ft-lb)



76G07C-307

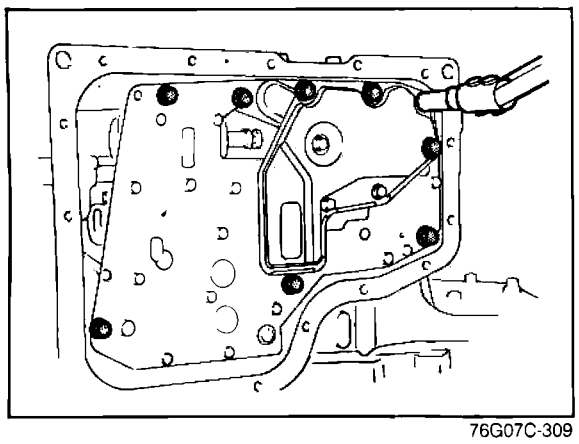
8. Install the steel ball and spring.

Note
Install the ball first, then the spring.



76G07C-308

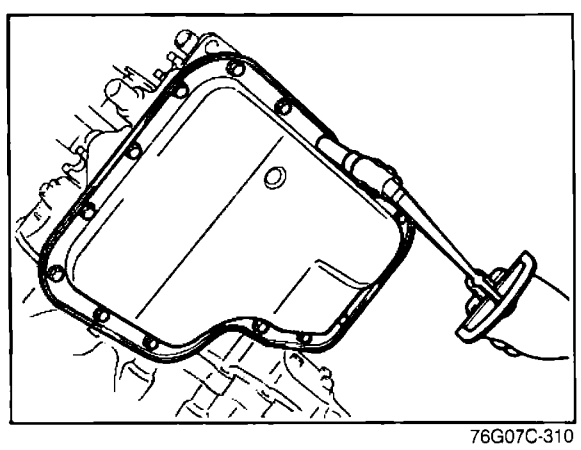
9. Install the control valve, mating the groove of the manual valve with the driving pin of the control rod.



76G07C-309

10. Tighten the control valve mounting bolts to the specified torque.

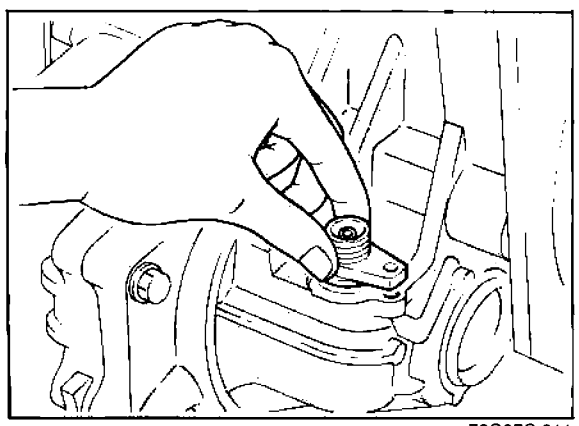
Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



76G07C-310

11. Install the gasket and oil pan.

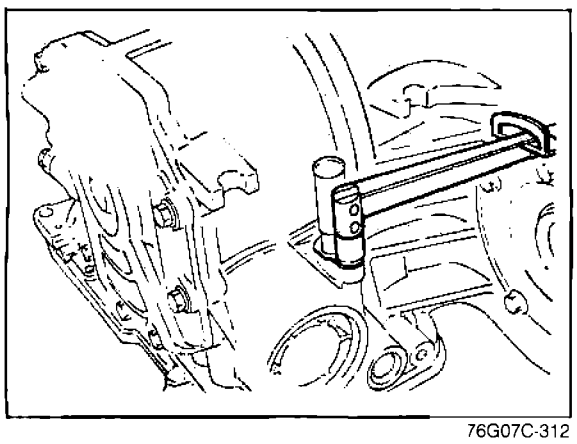
Tightening torque:
5—8 N·m (50—80 cm-kg, 43—69 in-lb)



76G07C-311

12. Install the speedometer driven gear.

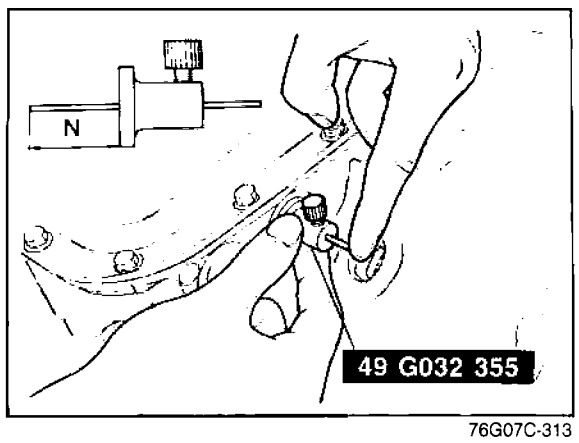
Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



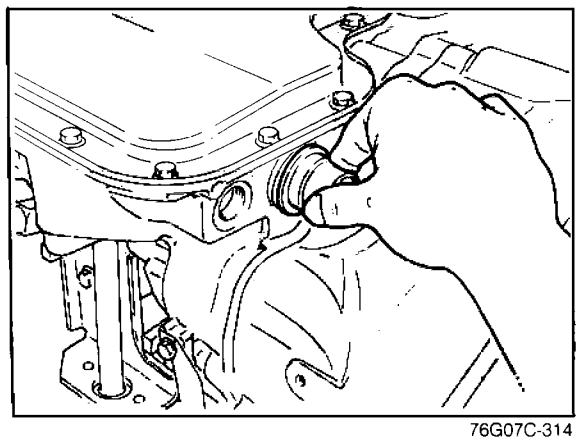
76G07C-312

13. Install the oil level gauge and tube along with a new O-ring to the transaxle case.

TIghtening torque:
7—10 N·m (70—100 cm-kg, 61-87 in-lb)



76G07C-313

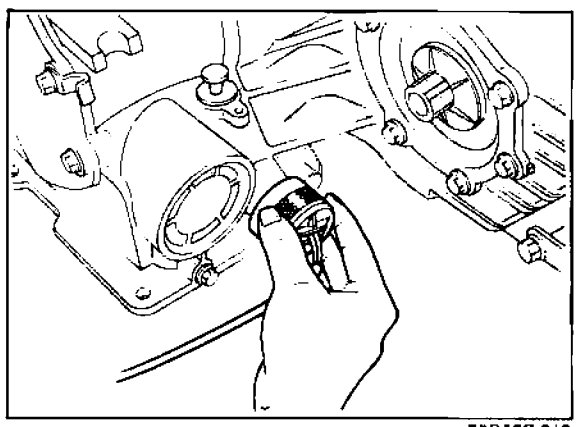


76G07C-314

14. Install a new O-ring on the vacuum diaphragm.
15. Select the proper diaphragm rod.
    (1) Measure the N dimension with the **SST** and a scale.
    (2) Select the diaphragm rod in accordance with the table below.

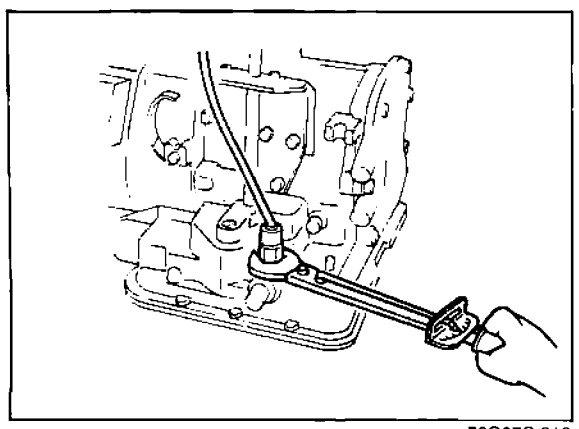
N dimension	Applicable diaphragm rod length
Below 25.4 mm (1.000 in)	29.5 mm (1.161 in)
25.4—25.9 mm (1.000—1.020 in)	30.0 mm (1.181 in)
25.9—26.4 mm (1.020—1.039 in)	30.5 mm (1.200 in)
26.4—26.9 mm (1.039—1.059 in)	31.0 mm (1.220 in)
26.9 mm (1.059 in) or over	31.5 mm (1.240 in)

16. Install the vacuum diaphragm.



76G07C-315

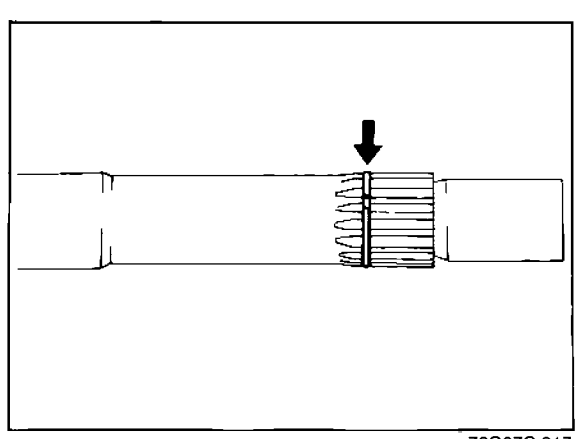
17. Install a new O-ring on the kick-down solenoid.
18. Install the kick-down solenoid.



76G07C-316

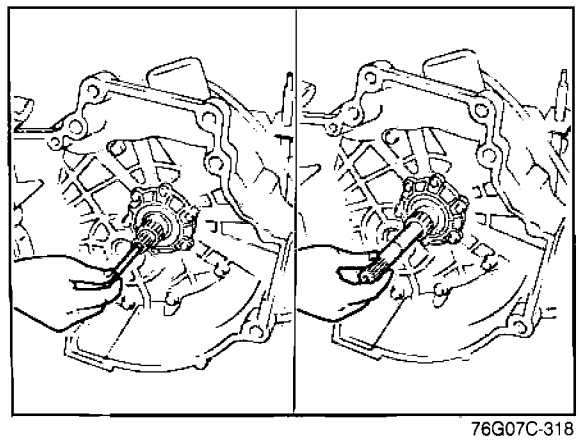
19. Apply sealant to the threads and seat face of the switch; and install the inhibitor switch.

    Tightening torque:
    19—26 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



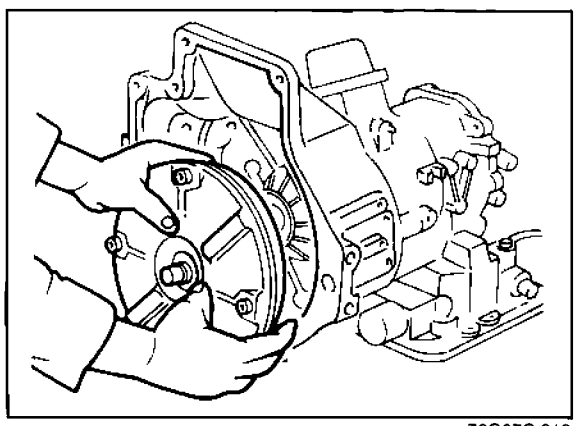
76G07C-317

20. Remove the transaxle from the transaxle hanger.
21. Install a new clip on the turbine shaft.



76G07C-318

22. Install the turbine shaft.
23. Install the oil pump shaft.



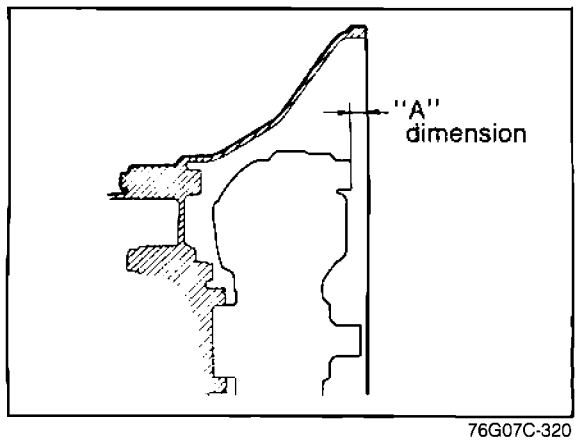
76G07C-319

24. Fill the torque converter with ATF if it has been drained and washed.

    ATF type: Dexron II or M III

25. Install the torque converter in the converter housing while rotating it to align the splines.

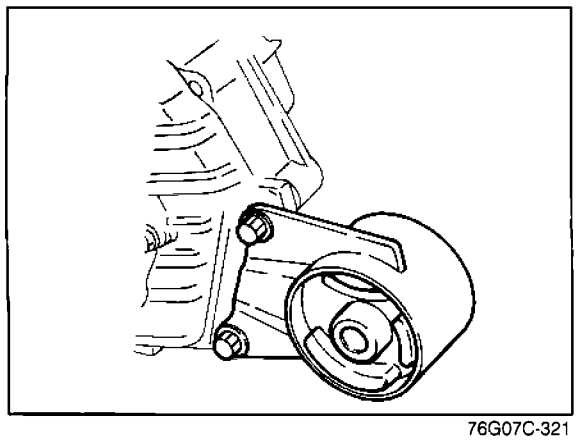
    Caution
    a) Hold the torque converter in an erect position when filling it with ATF, do not allow the fluid to overflow.
    b) If the converter does not fit in easily, do not try to force it; install carefully.



76G07C-320

26. To ensure that the torque converter is installed accurately, measure distance A between the end of the torque converter and the end of the converter housing.

    (A): approx. 20 mm (0.79 in)



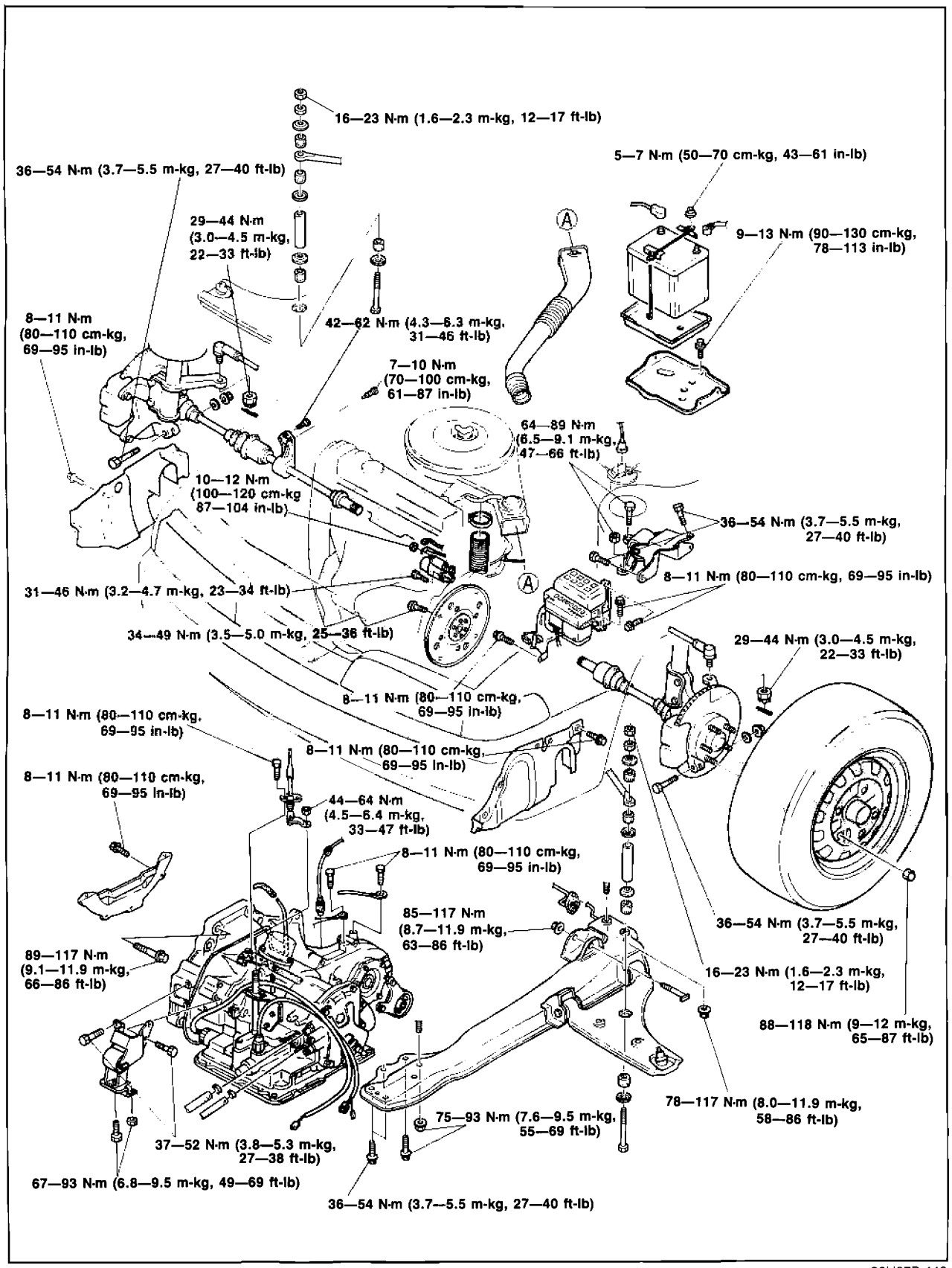
76G07C-321

27. Install engine mount No.1.

    Tightening torque:
    29—46 N·m (3.0—4.7 m-kg, 22—34 ft-lb)

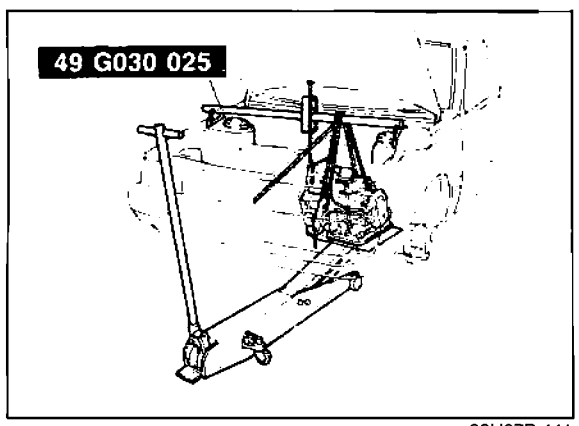
INSTALLATION

TORQUE SPECIFICATIONS



86U07B-440

7C INSTALLATION

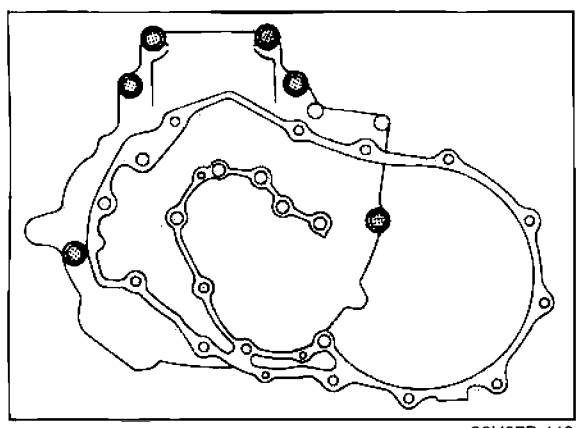


86U07B-441

1. Attach rope at 2 places on the transaxle. Place a flat board on a jack and set the transaxle on it.

   Caution
   The transaxle is not well balanced; be careful when positioning it on the jack.

2. Move the transaxle into place and attach the rope to the **SST**.

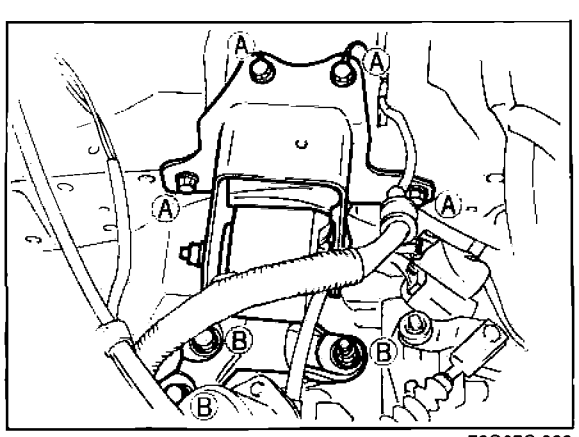


86U07B-442

3. Mount the transaxle to the engine.

   Tightening torque:
   89—117 N·m (9.1—11.9 m-kg, 66—86 ft-lb)

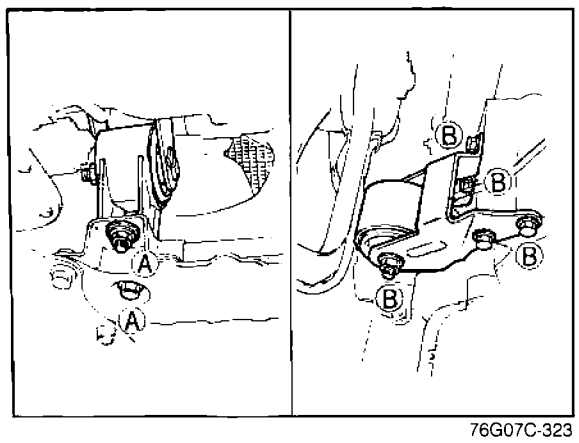
   Note
   a) Lift the transaxle with the jack while pulling the rope.
   b) Align the torque converter bolts and drive plate holes.



76G07C-322

4. Install engine mount No. 4 and bracket.

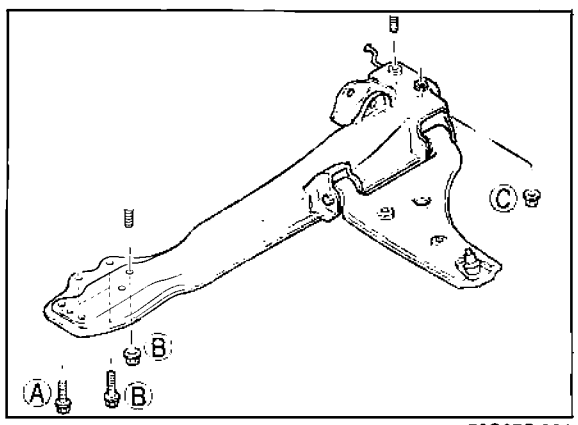
   Tightening torque:
   Ⓐ 36—54 N·m
   (3.7—5.5 m-kg, 27—40 ft-lb)
   Ⓑ 64—89 N·m
   (6.5—9.1 m-kg, 47—66 ft-lb)



76G07C-323

5. Install engine mount No. 2.

   Tightening torque:
   Ⓐ 67—93 N·m
   (6.8—9.5 m-kg, 49—69 ft-lb)
   Ⓑ 37—52 N·m
   (3.8—5.3 m-kg, 27—38 ft-lb)

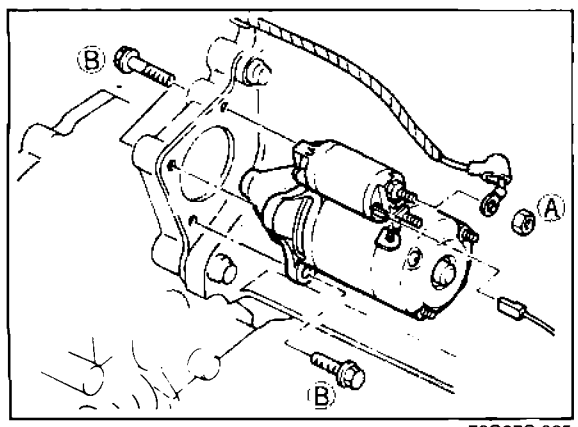


76G07C-324

6. Install the crossmember and the left side lower arm as an assembly.

Tightening torque:
Ⓐ 36—54 N·m (3.7—5.5 m-kg, 27—40 ft-lb)
Ⓑ 75—93 N·m (7.6—9.5 m-kg, 55—69 ft-lb)
Ⓒ 78—117 N·m (18.0—11.9 m-kg, 58—86 ft-lb)

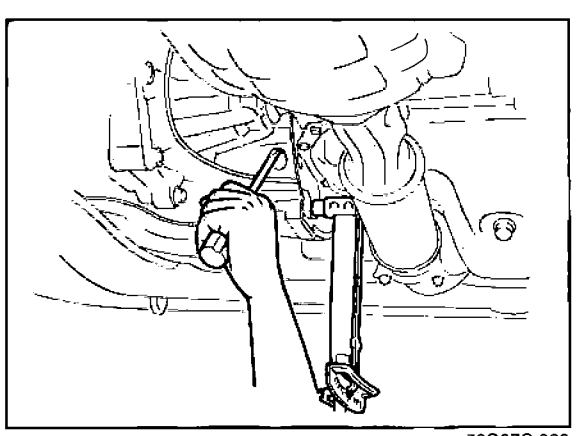
7. Remove the jack and the rope.
8. Remove the **SST**.



76G07C-325

9. Install the starter and harnesses.

Tightening torque:
Ⓐ 10—12 N·m (100—120 cm-kg, 87—104 in-lb)
Ⓑ 31—46 N·m (3.2—4.7 m-kg, 23—34 ft-lb)



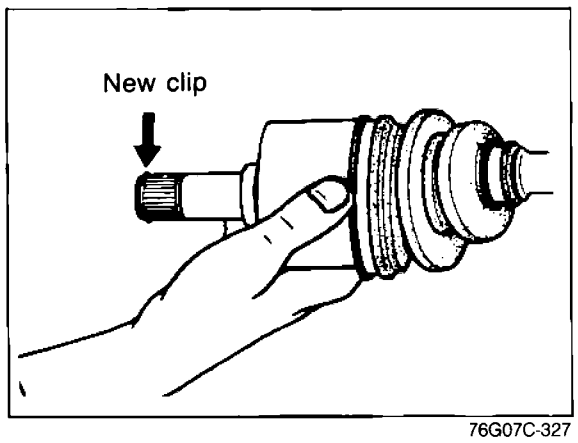
76G07C-326

10. Install the torque converter bolts.

Tightening torque:
34—49 N·m (3.5—5.0 m-kg, 25—36 ft-lb)

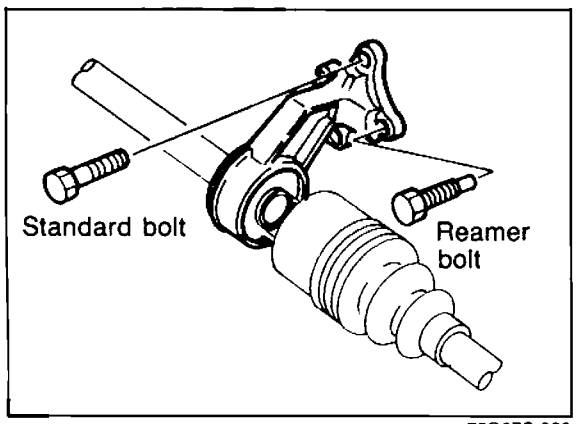
11. Install the end plate.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

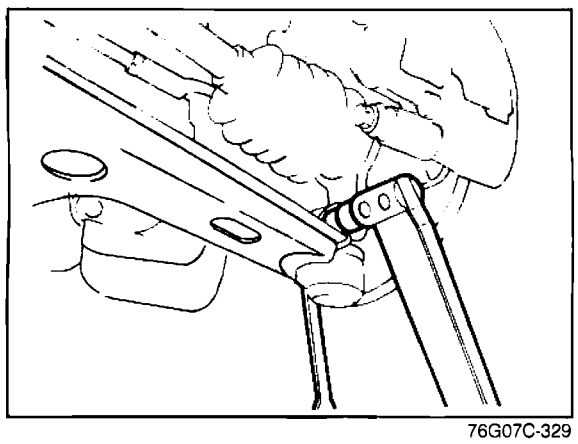


76G07C-327

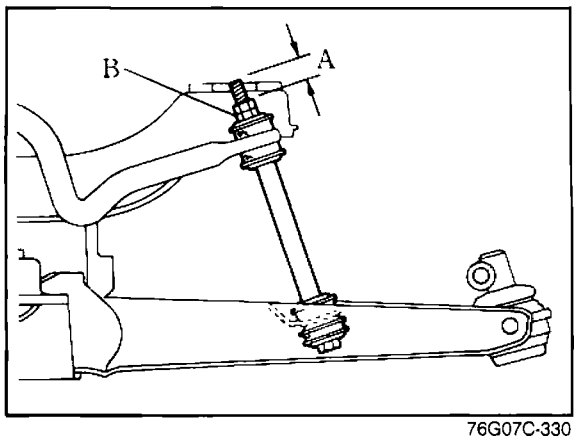
12. Replace the clip at the ends of the driveshafts and joint shaft with new ones.
13. Install the joint shaft and right driveshaft as follows:
    (1) Remove the **SST** and insert the joint shaft into the transaxle.
    (2) Mount the joint shaft bracket onto the engine.



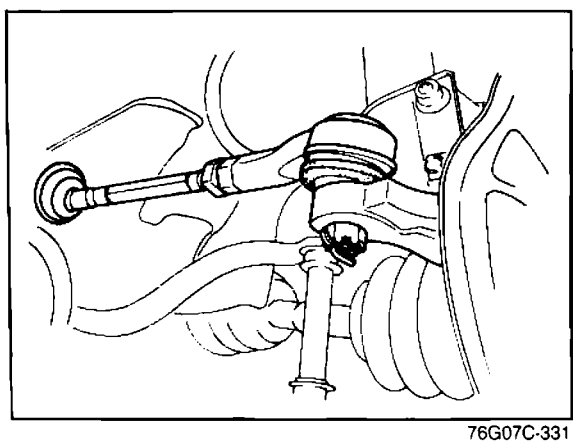
76G07C-328



76G07C-329



76G07C-330



76G07C-331

(3) Install and tighten the reamer bolts, then install and tighten the standard bolts.

Tightening torque:
Reamer bolts 7—10 N·m (70—100 cm-kg, 61—87 in-lb)
Standard bolts 42—62 N·m (4.3—6.3 m-kg, 31—46 ft-lb)

(4) Pull the front hub outward to connect the driveshaft to the joint shaft.
(5) Push the joint from the differential side to securely connect the driveshaft to the joint shaft.

Caution
a) Do not damage the oil seal.
b) After installation, pull the front hub outward to verify that the driveshaft is secured.

14. Install the left driveshaft as follows:
(1) Pull the front hub outward to insert the driveshaft into the transaxle.
(2) Push the joint from the differential side to connect the driveshaft to the differential side gear.

Caution
a) Do not damage the oil seal.
b) After installation, pull the front hub outward to verify that the driveshaft is secured.

15. Install the lower arm ball joints to the knuckles and tighten the bolts and nuts.

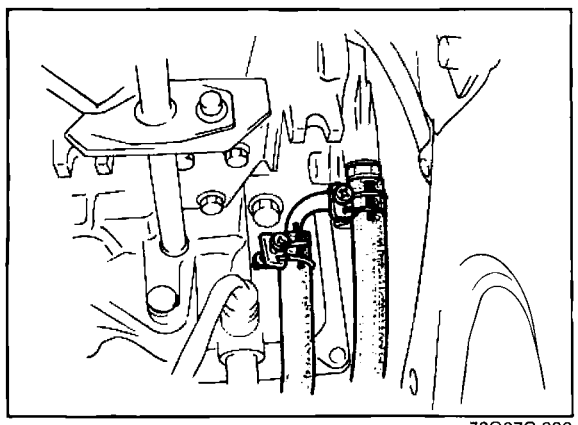
Tightening torque:
36—54 N·m (3.7—5.5 m-kg, 27—40 ft-lb)

16. Install the under cover.
17. Install the stabilizer bar control link as follows:
(1) Install the stabilizer bar control link.
(2) Adjust length A to **20.1 mm (0.79 in)**.
(3) Tighten bolt B to the specified torque.

Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

18. Install the tie-rod ends and cotter pins.

Tightening torque:
29—44 N·m (3.0—4.5 m-kg, 22—33 ft-lb)



76G07C-332

19. Install the oil cooler outlet and inlet hoses.

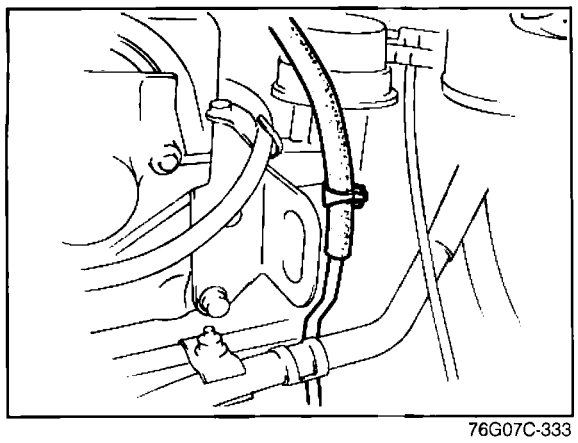
Note
Align the mating mark as shown.

20. Install the splash shields.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

21. Install the front wheels.

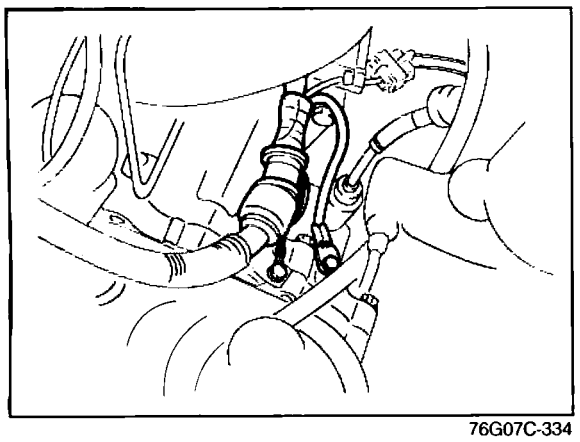
Tightening torque:
88—118 N·m (9—12 m-kg, 65—87 ft-lb)



76G07C-333

22. Connect the vacuum hose.
23. Connect the selector cable.

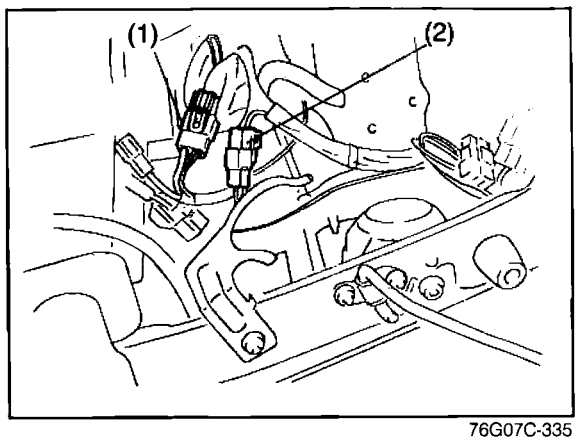
Tightening torque:
Nut
44—64 N·m (4.5—6.5 m-kg, 33—47 ft-lb)
Bolts
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



76G07C-334

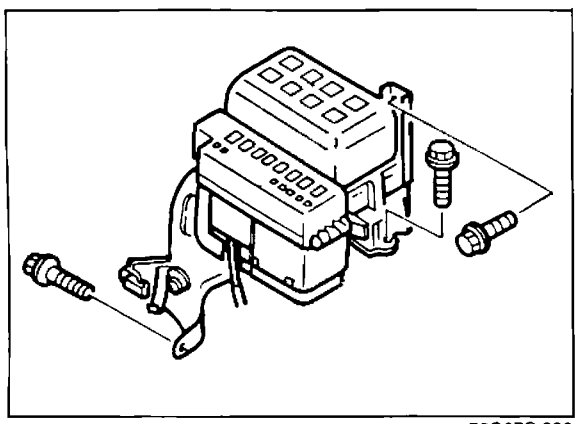
24. Connect the ground wires to the transaxle case and oil pump.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)



76G07C-335

25. Connect the connectors.
    (1) Inhibitor switch
    (2) Kick-down switch
26. Connect the speedometer cable.



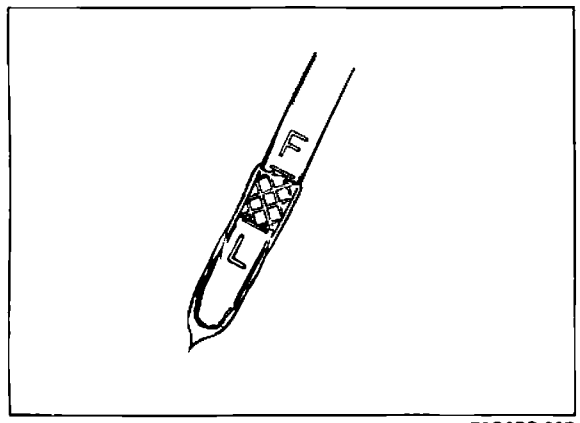
76G07C-336

27. Connect the distributor lead.
28. Connect the main fuse block.

Tightening torque:
8—11 N·m (80—110 cm-kg, 69—95 in-lb)

29. Install the fresh air duct.
30. Install the battery carrier and battery.

Tghtening torque:
Bolts
9—13 N·m (90—130 cm-kg, 78—113 in-lb)
Nut
5—7 N·m (50—70 cm-kg, 43—61 in-lb)



76G07C-337

31. Pour in ATF and check the following:
    (1) With the engine idling, check that the fluid level is between the F and L marks on the dipstick. (Refer to page 7C—25.)
    (2) Check the manual linkage, and adjust if necessary. (Refer to page 7C—26.)
    (3) Check the inhibitor switch operation. (Refer to page 7C—23.)
    (4) Conduct a road test. (Refer to page 7C—18.)
    (5) Check that there is no fluid leakage from the transaxle. (Refer to page 7C—25.)

HYDRAULIC CIRCUIT

OUTLINE

The flow of the individual hydraulic circuits are identified as listed below.

	(Numbers indicate individual circuits)
Line pressure source	7
Control element operation system line pressure	1,2,3,4,5,6,7,8,9,10,11,12
Auxiliary line pressure	13
Throttle system pressure	16,17,18,19
Governor system pressure	15
Torque converter system pressure	14

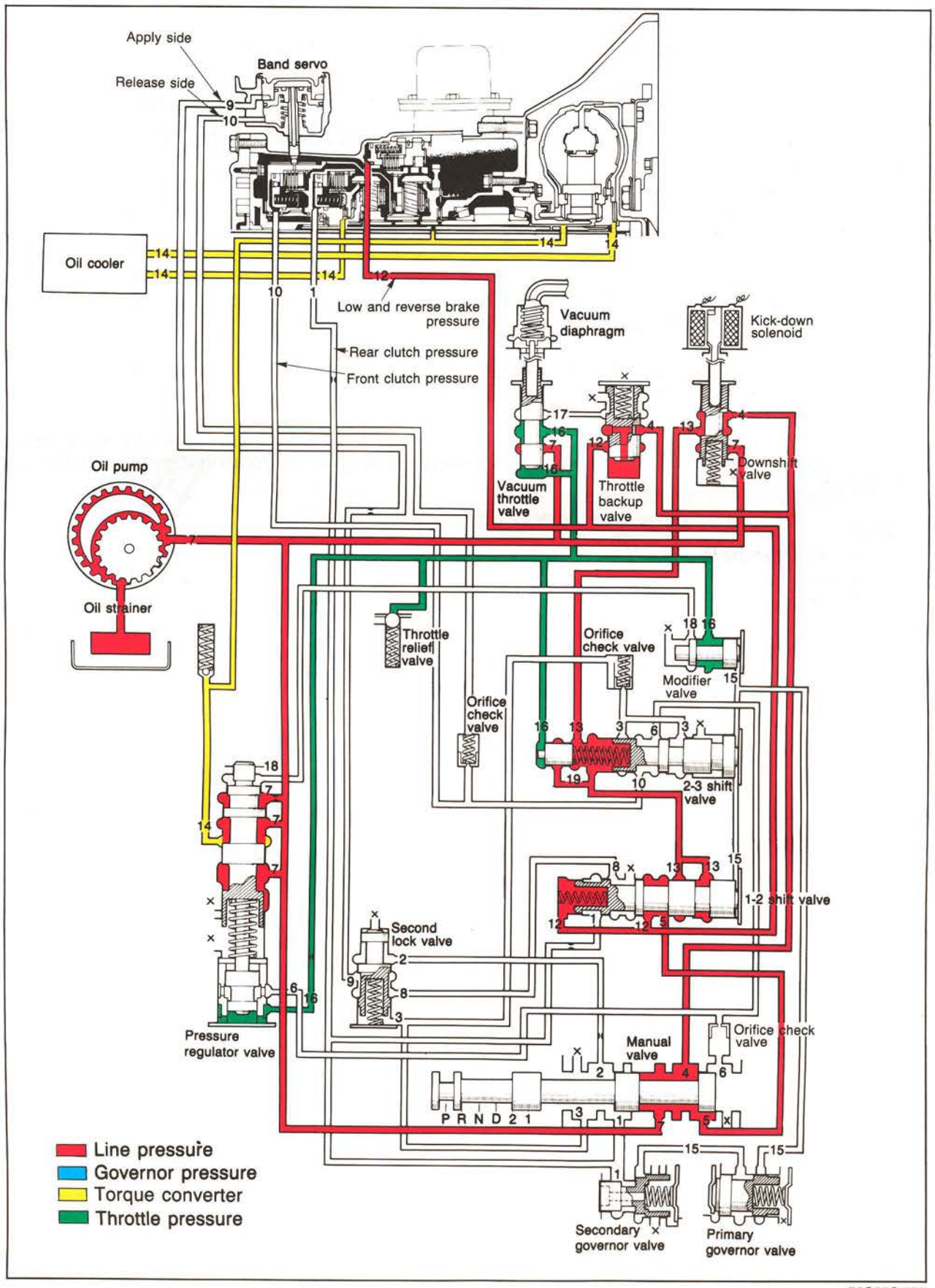
1. Line pressure
   The line pressure is the hydraulic pressure of the oil emitted from the oil pump after adjustment by the pressure regulator valve.
2. Throttle pressure
   Derived from the line pressure, the throttle pressure is the hydraulic pressure generated by the throttle valve which operates in conjunction with the intake manifold vacuum.
3. Governor pressure
   Also derived from the line pressure, the governor pressure is the hydraulic pressure which varies in conjuction with the vehicle's speed. It is controlled by the governor rotating together with the output shaft.

Note
Schematic symbols
X : Drain
: Orifice

76G07C-338

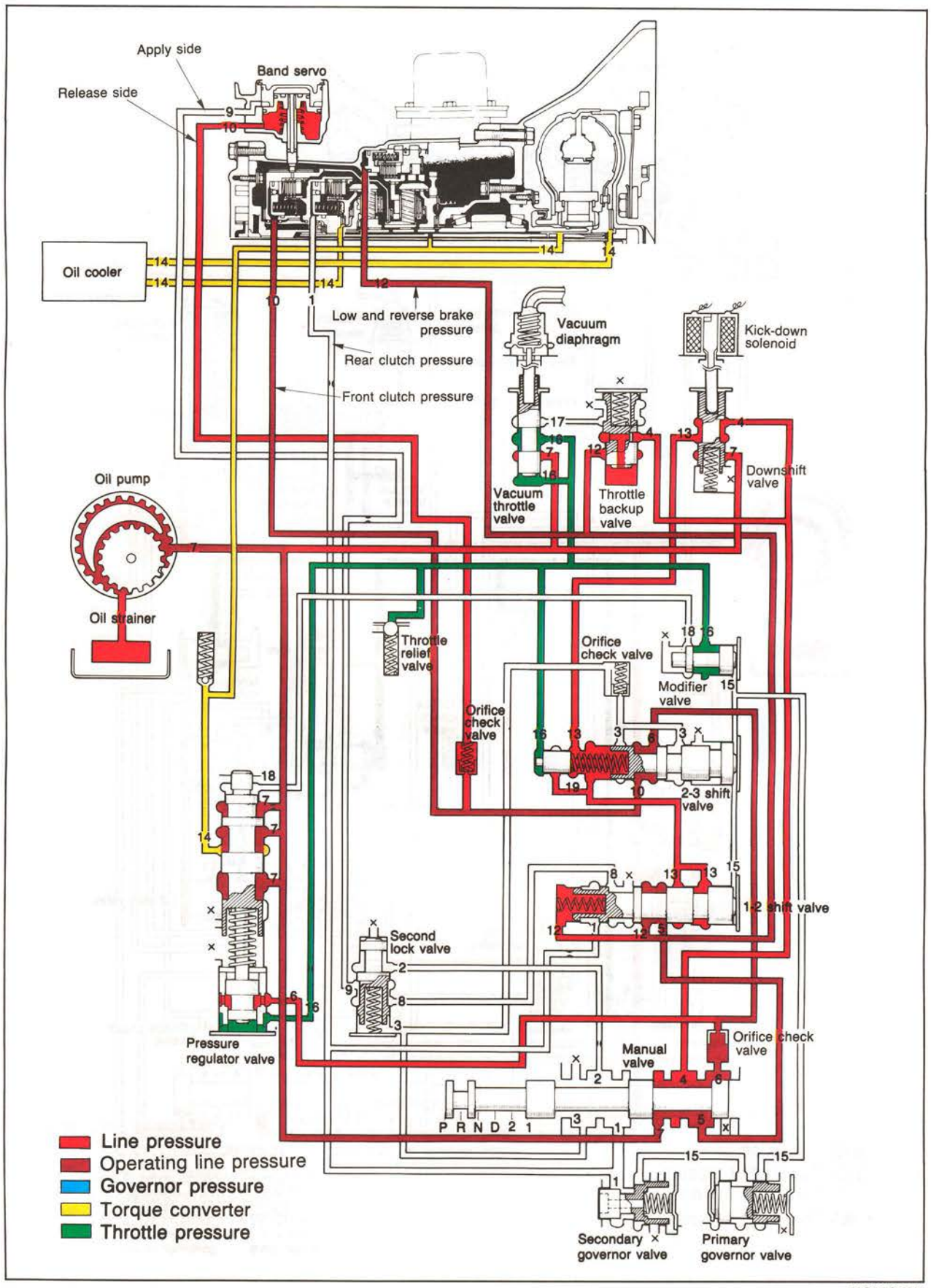
7C HYDRAULIC CIRCUIT

P RANGE



76G07C-339

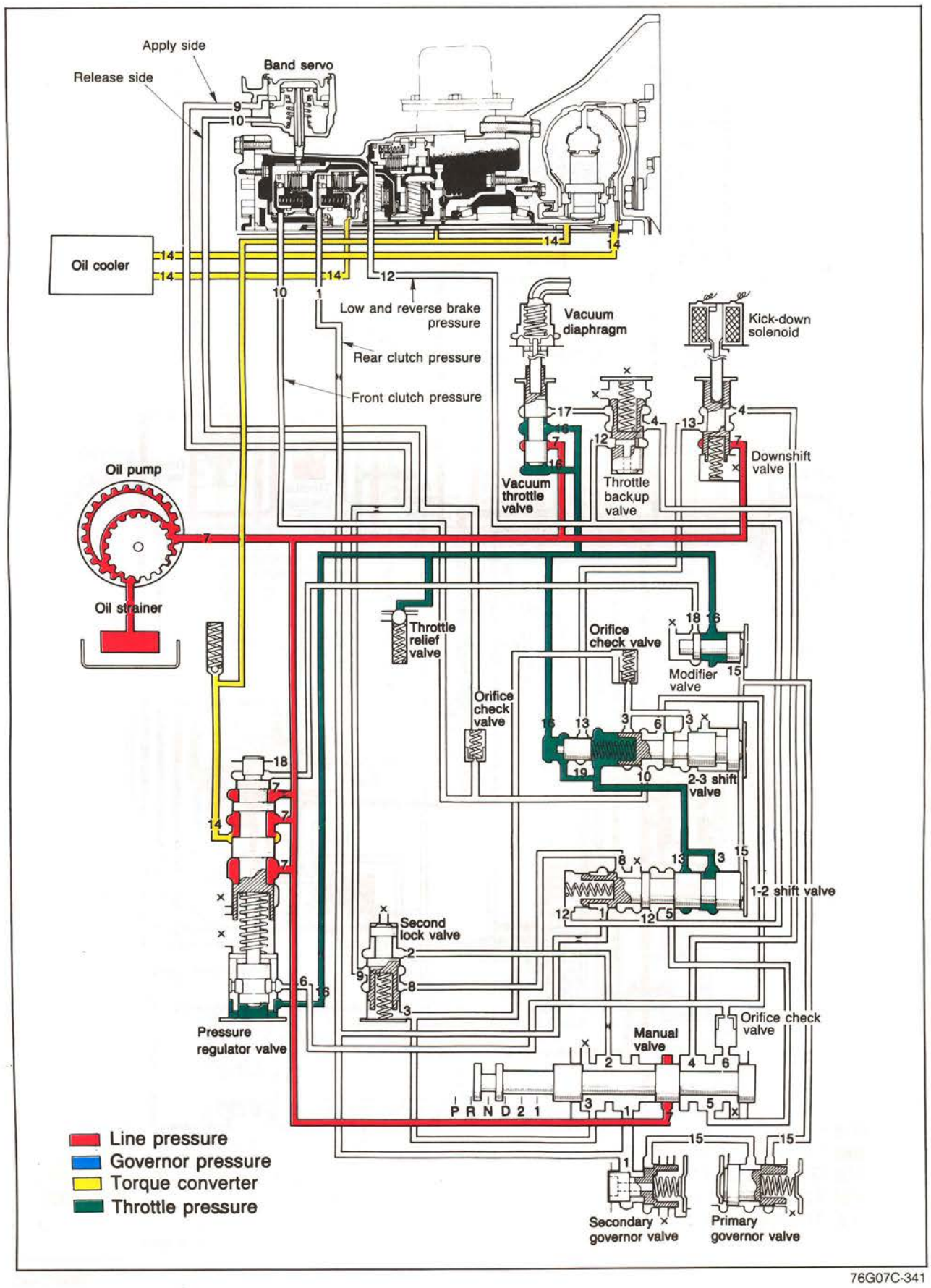
R RANGE



76G07C-340

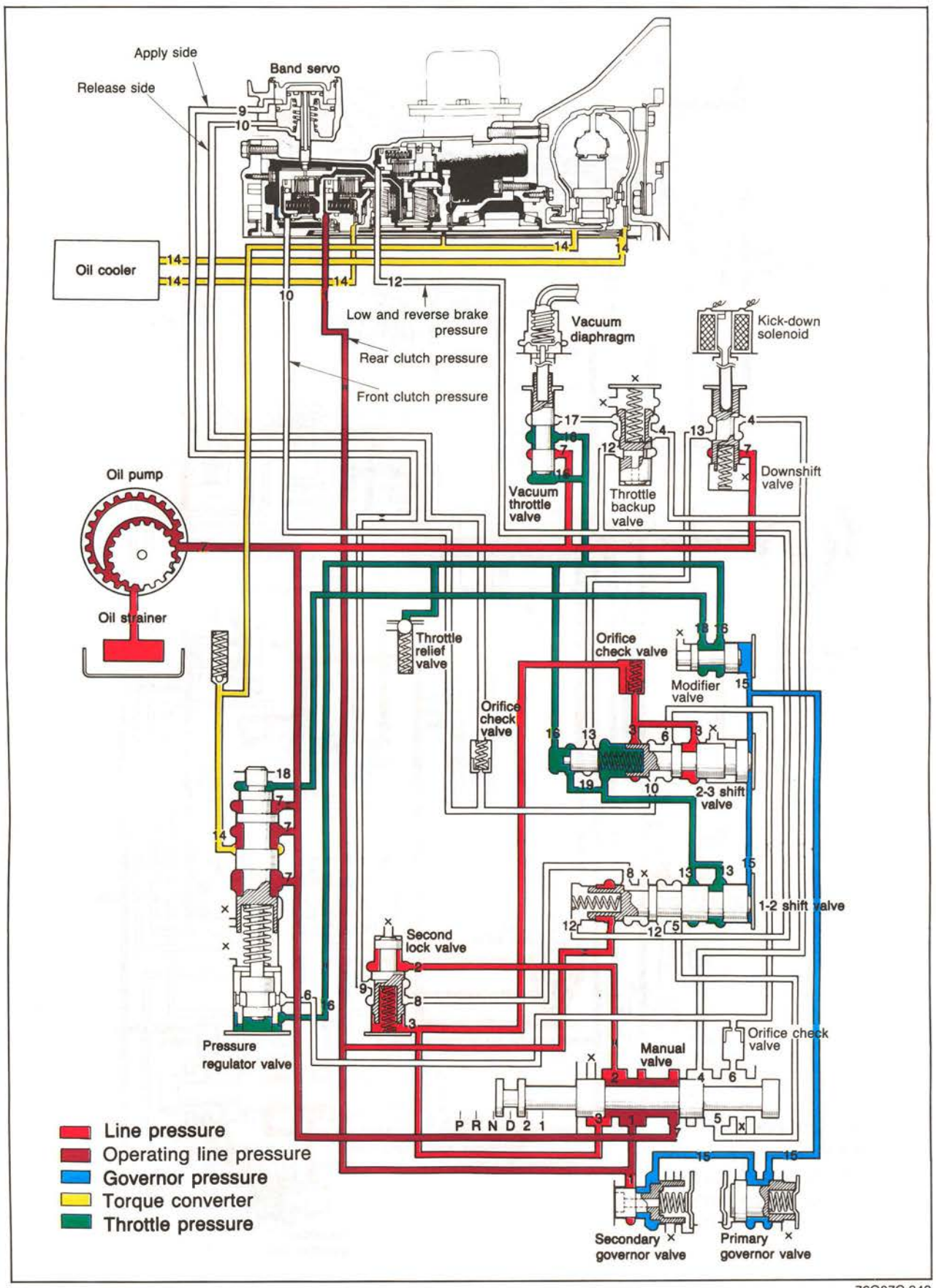
7C HYDRAULIC CIRCUIT

N RANGE



76G07C-341

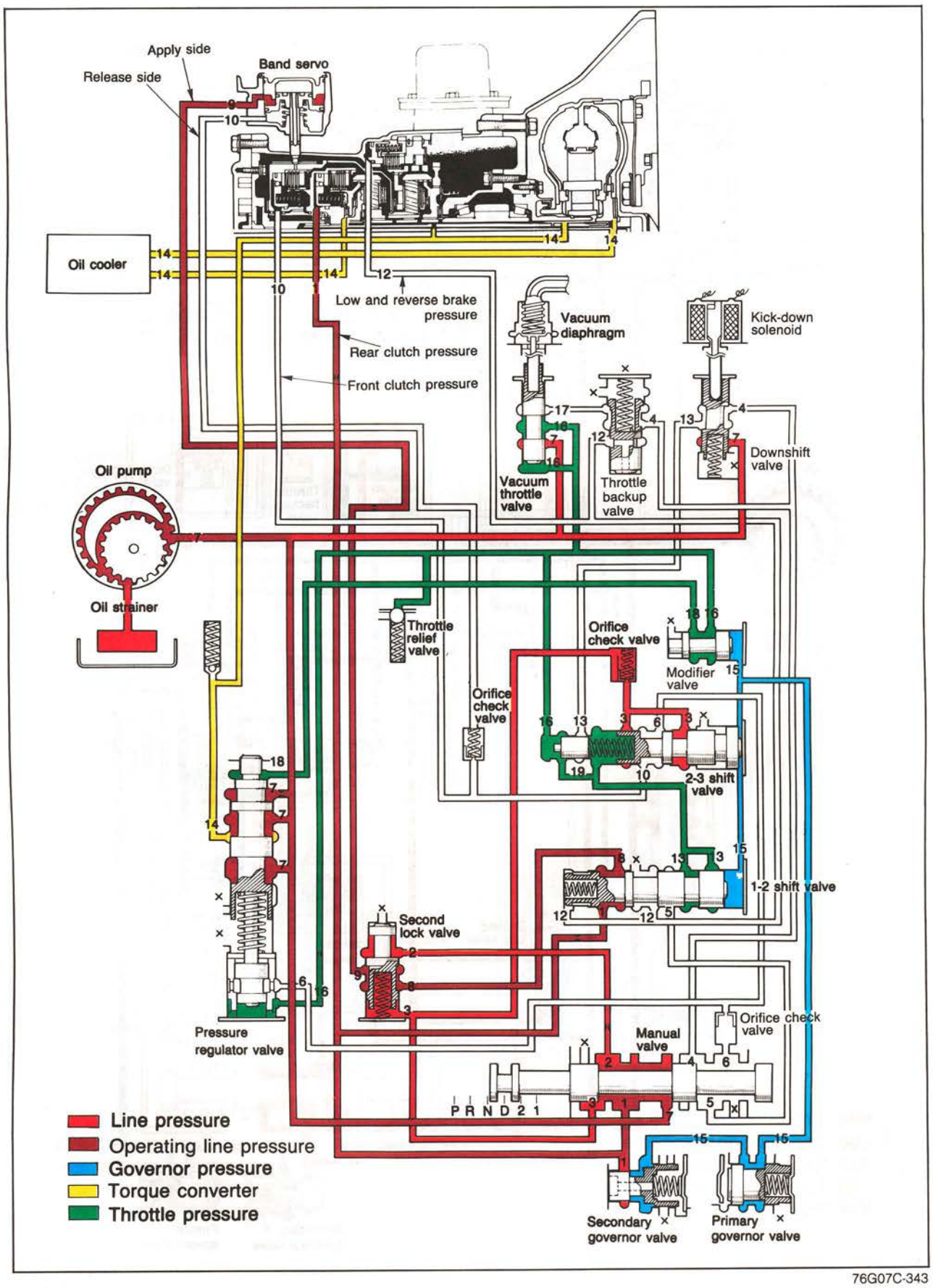
D RANGE (1ST GEAR)



76G07C-342

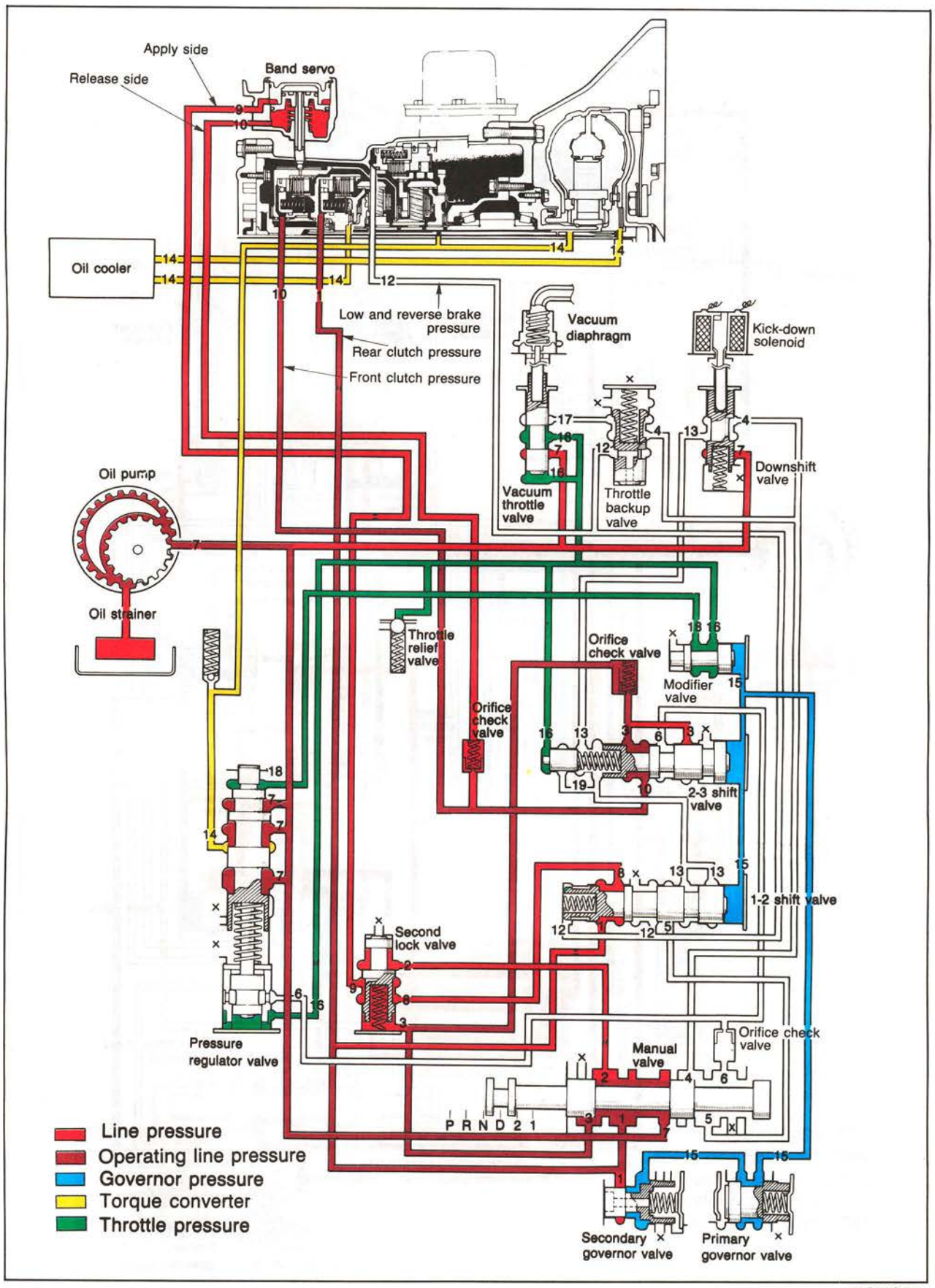
7C HYDRAULIC CIRCUIT

D RANGE (2ND GEAR)



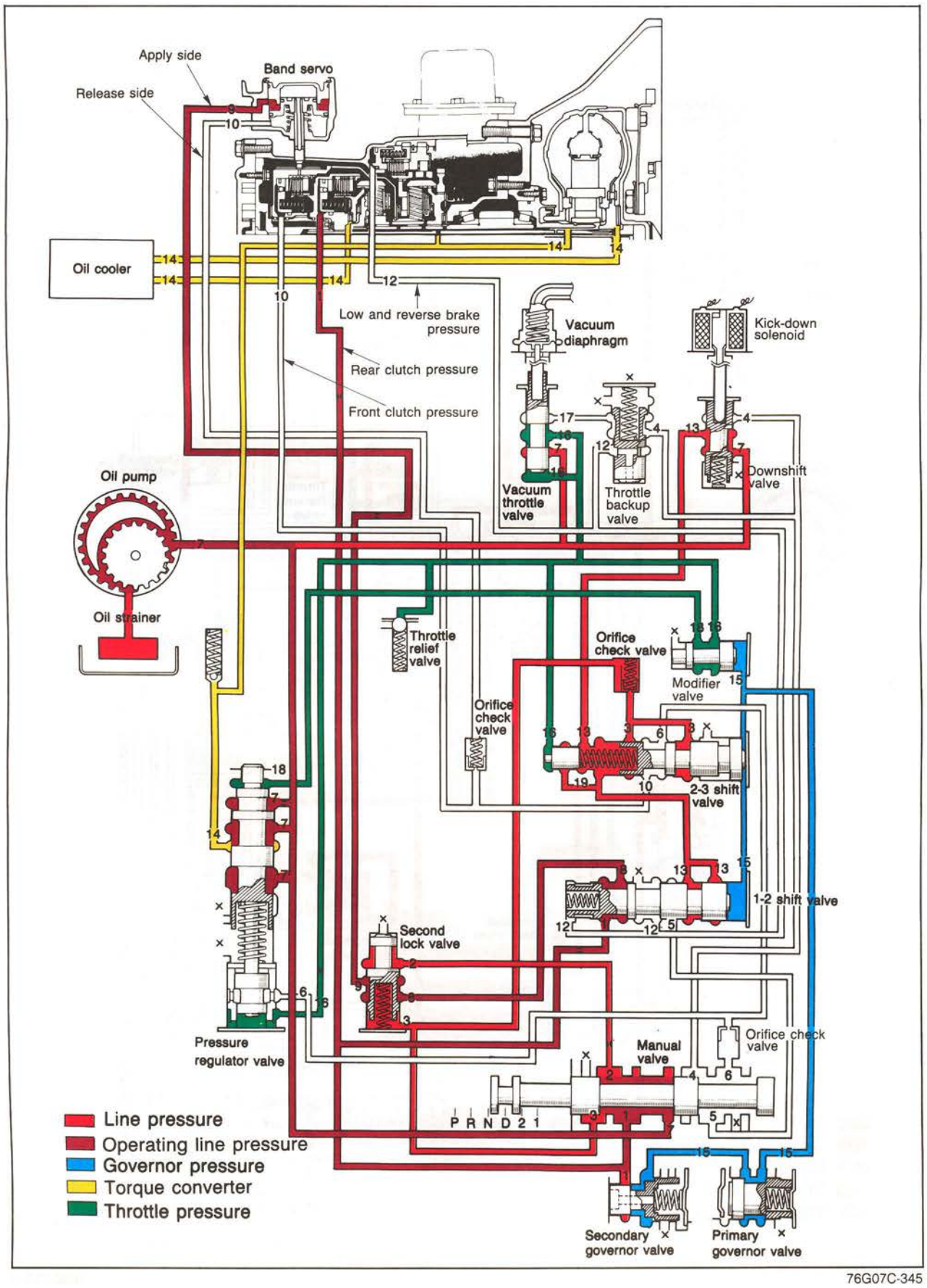
76G07C-343

D RANGE (3RD GEAR)



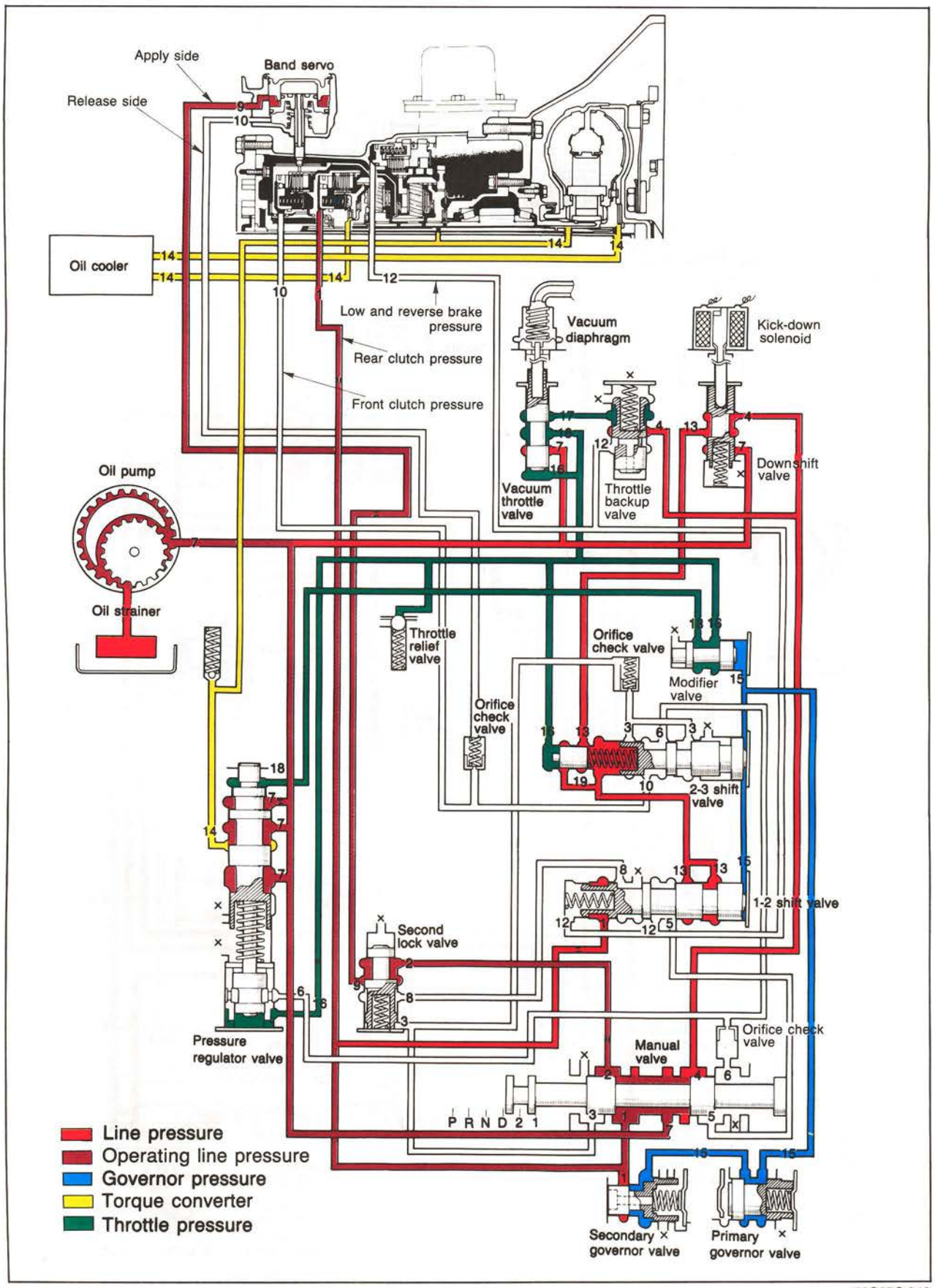
76G07C-344

D RANGE (KICK-DOWN; SHIFT VALVES IN 2ND POSITION)



76G07C-345

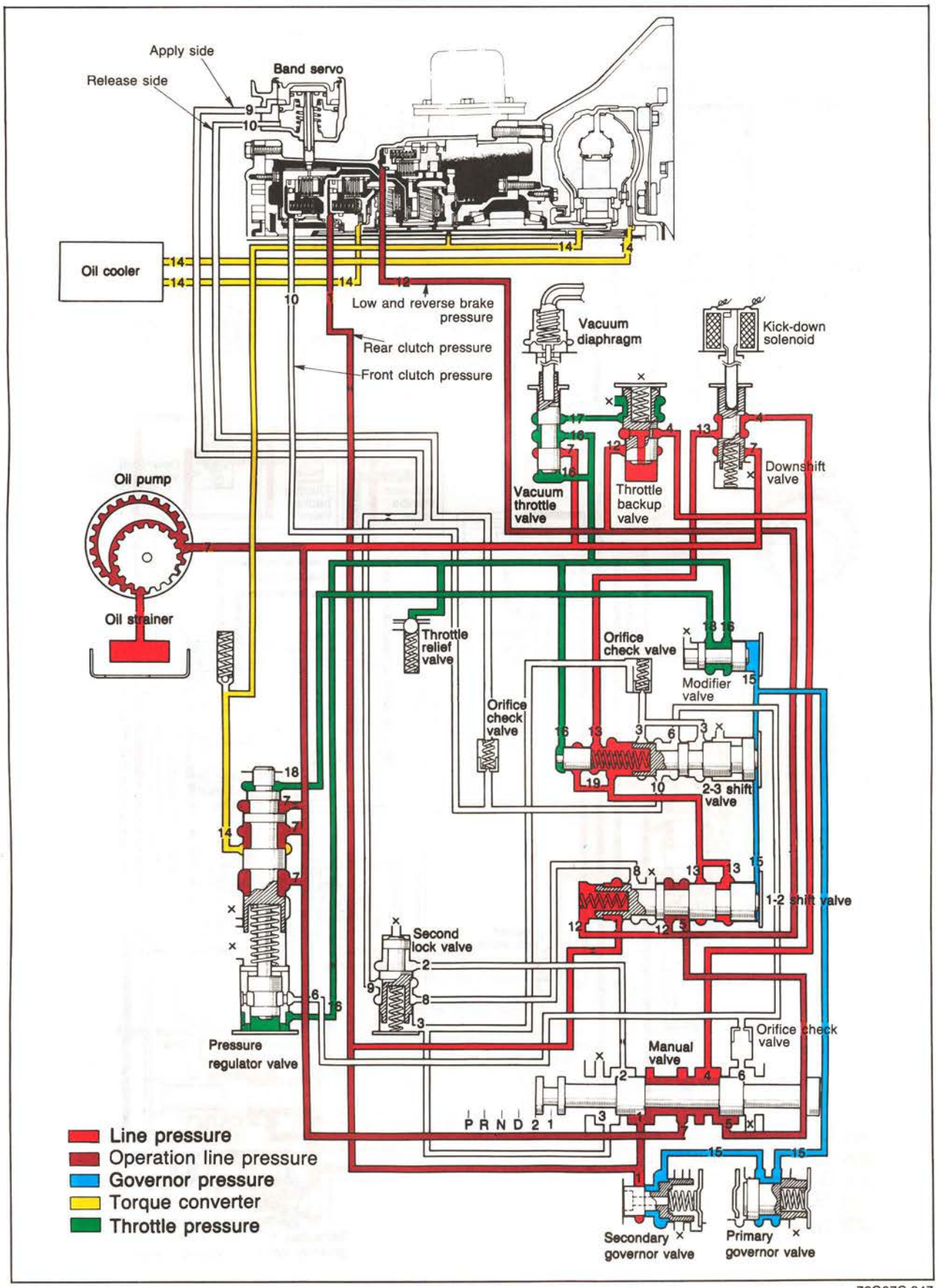
2 RANGE (2ND GEAR)



76G07C-346

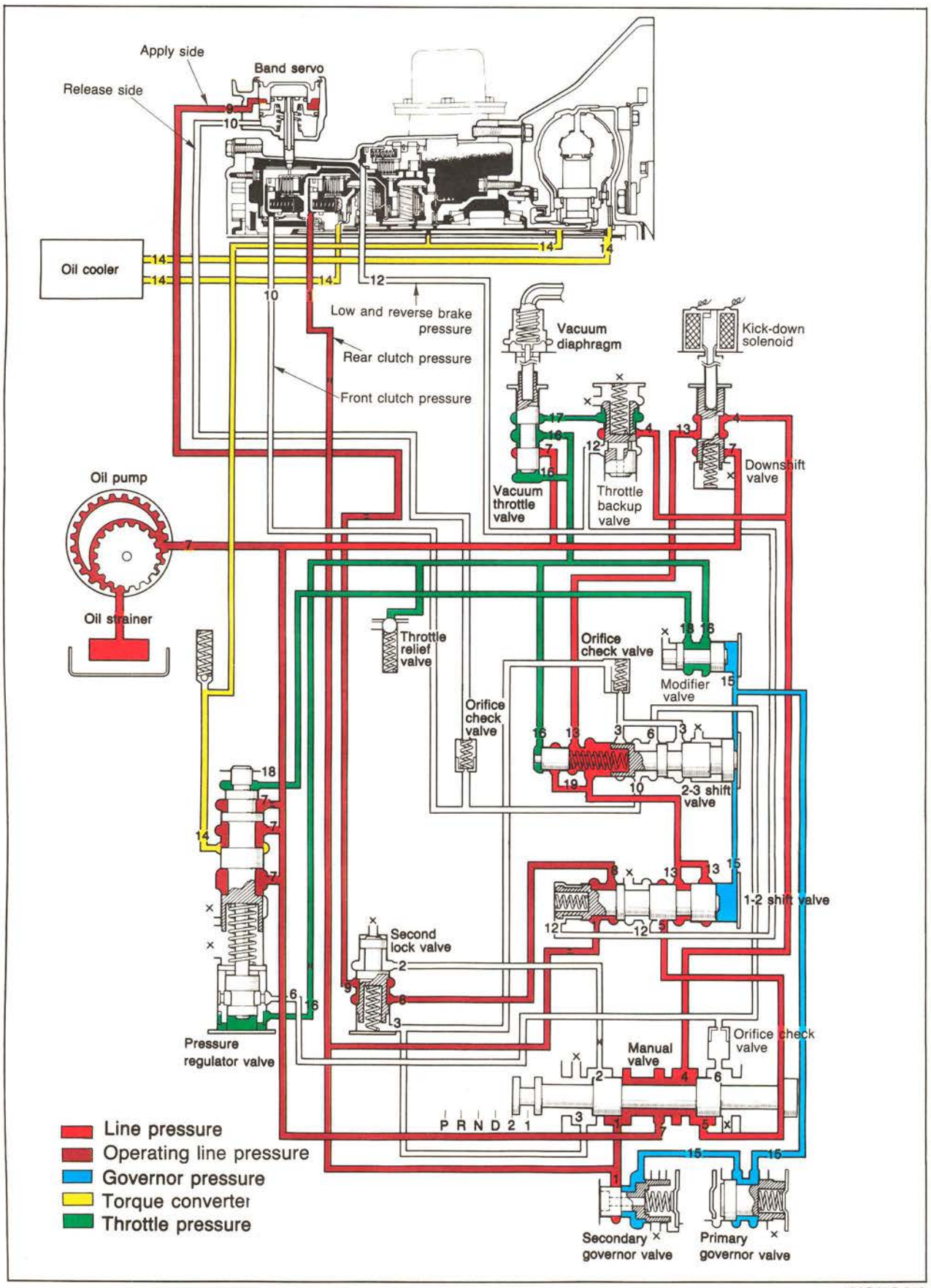
7C HYDRAULIC CIRCUIT

1 RANGE (1ST GEAR)



76G07C-347

1 RANGE (2ND GEAR)



76G07C-348

9

FRONT AND REAR AXLES

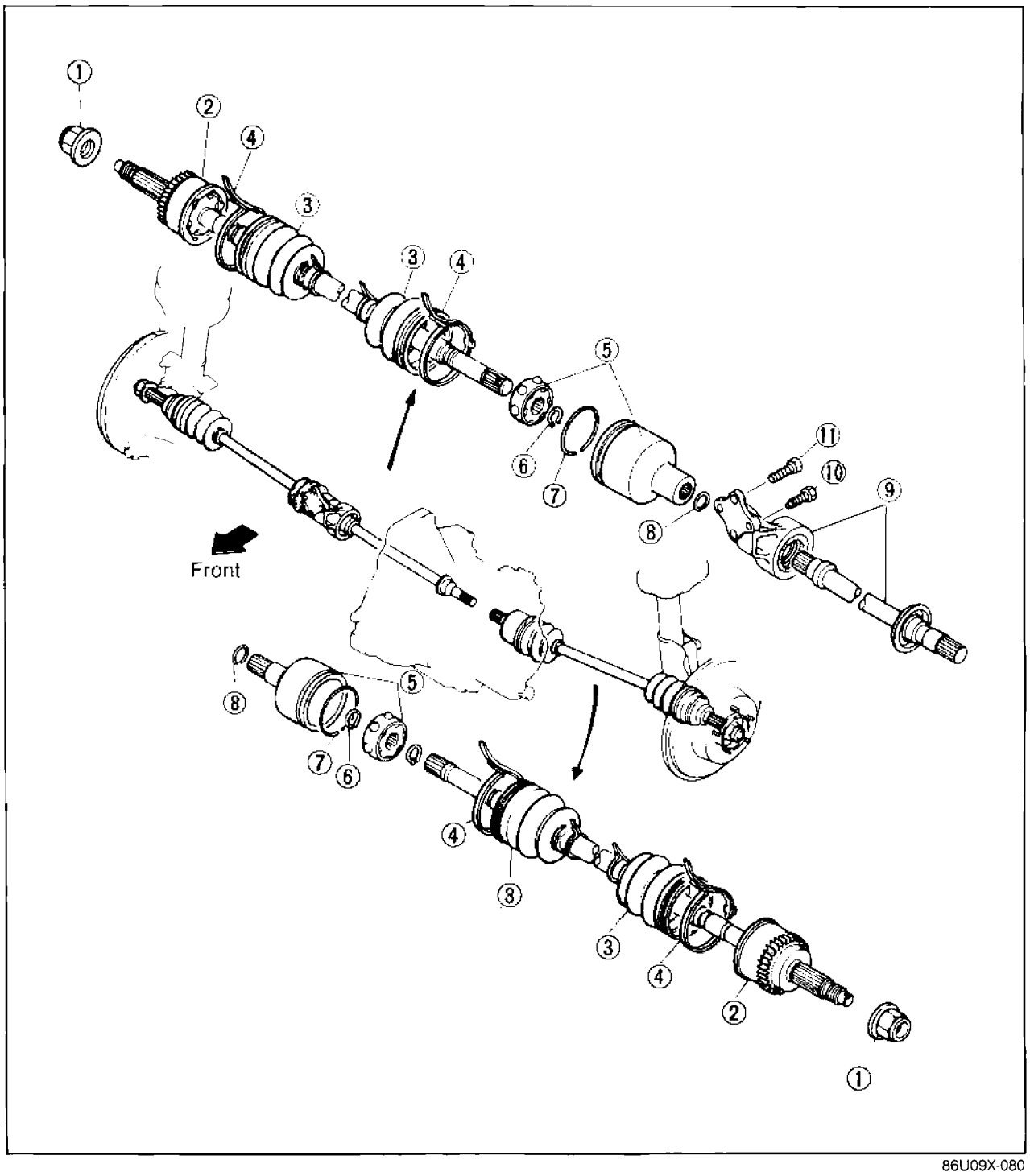
OUTLINE ..... **9— 2**
STRUCTURAL VIEW ..... **9— 2**
SPECIFICATIONS ..... **9— 6**
TROUBLESHOOTING GUIDE ..... **9— 7**
FRONT AXLE ..... **9— 8**
ON-VEHICLE MAINTENANCE ..... **9— 8**
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DISASSEMBLY ..... **9—11**
INSPECTION ..... **9—12**
ASSEMBLY ..... **9—13**
INSTALLATION ..... **9—14**
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[Drum Brake] ..... **9—17**
REMOVAL ..... **9—17**
DISASSEMBLY ..... **9—18**
INSPECTION ..... **9—19**
ASSEMBLY ..... **9—19**
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[Disc Brake] ..... **9—21**
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REMOVAL (4WS) ..... **9—22**
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REMOVAL ..... **9—29**
DISASSEMBLY (MTX) ..... **9—31**
INSPECTION (MTX) ..... **9—32**
ASSEMBLY (MTX) ..... **9—33**
DISASSEMBLY (ATX) ..... **9—35**
INSPECTION (ATX) ..... **9—36**
ASSEMBLY (ATX) ..... **9—36**
INSTALLATION ..... **9—37**
JOINT SHAFT ..... **9—39**

86U09X-001

9 OUTLINE

OUTLINE

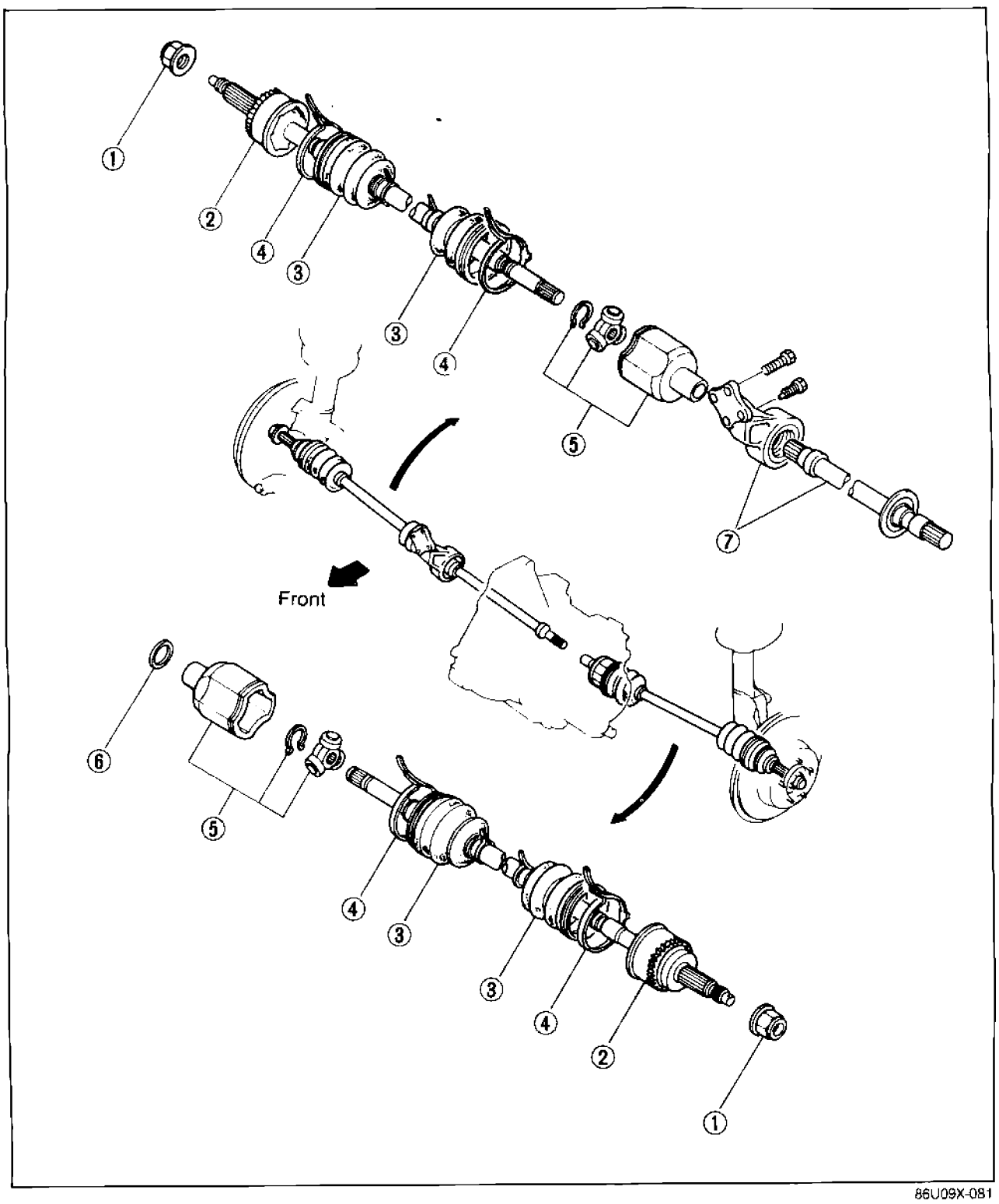
STRUCTURAL VIEW
Driveshaft (MTX)



86U09X-080

1. Lock nut
2. Shaft and ball joint assembly
3. Boot
4. Boot band
5. Ball joint assembly (differential side)
6. Snap ring
7. Clip
8. Clip
9. Joint shaft assembly
10. Reamer bolt
11. Bracket mounting bolt

Driveshaft (ATX)

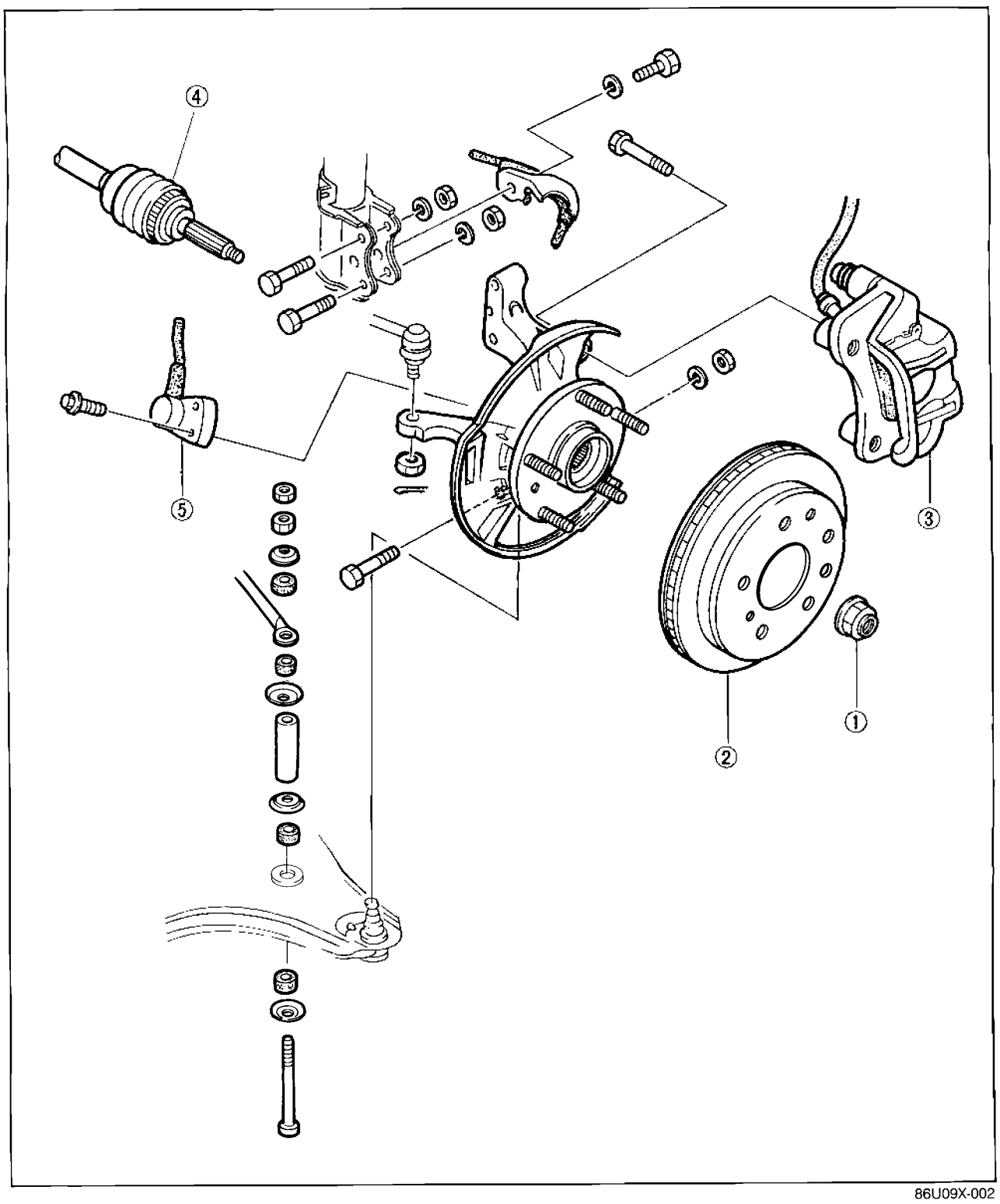


86U09X-081

1. Lock nut
2. Shaft and ball joint assembly
3. Boot
4. Boot band
5. Tripod joint assembly
6. Clip
7. Joint shaft assembly

9 OUTLINE

Front Axle

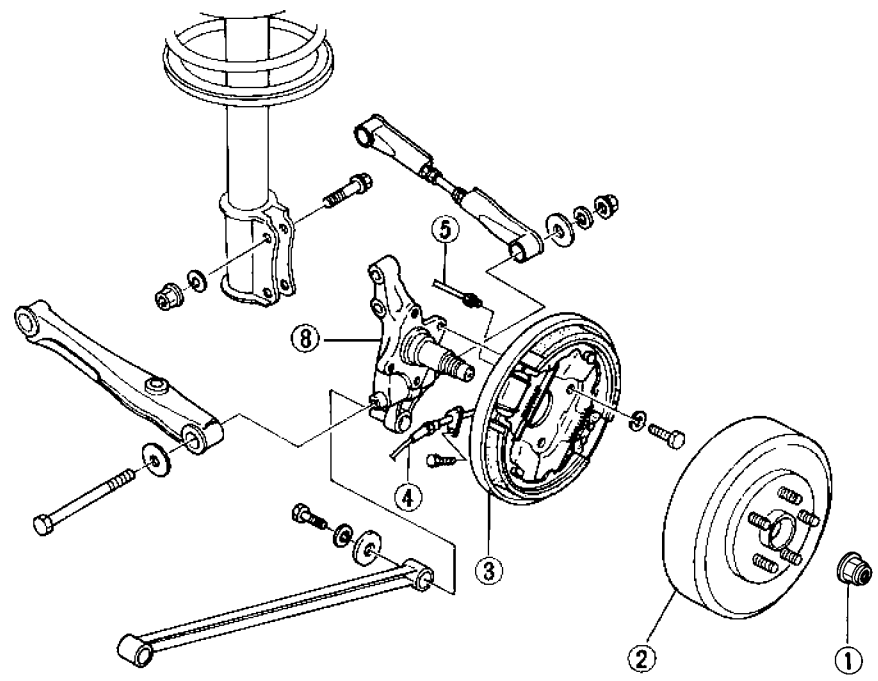


86U09X-002

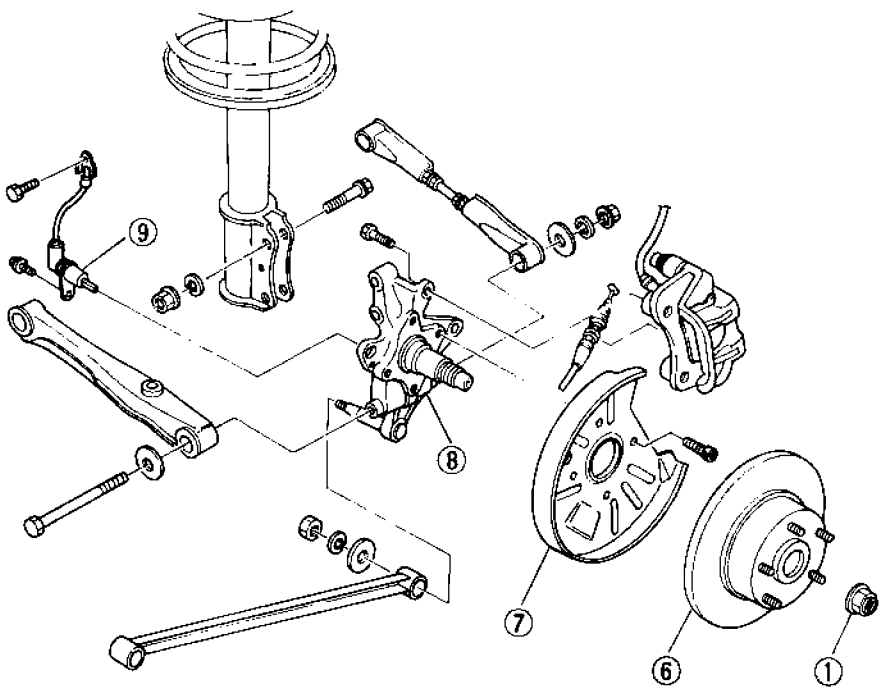
1. Lock nut
2. Disc plate
3. Caliper assembly
4. Driveshaft
5. Wheel speed sensor (ABS)

Rear Axle

Drum brake



Disc brake

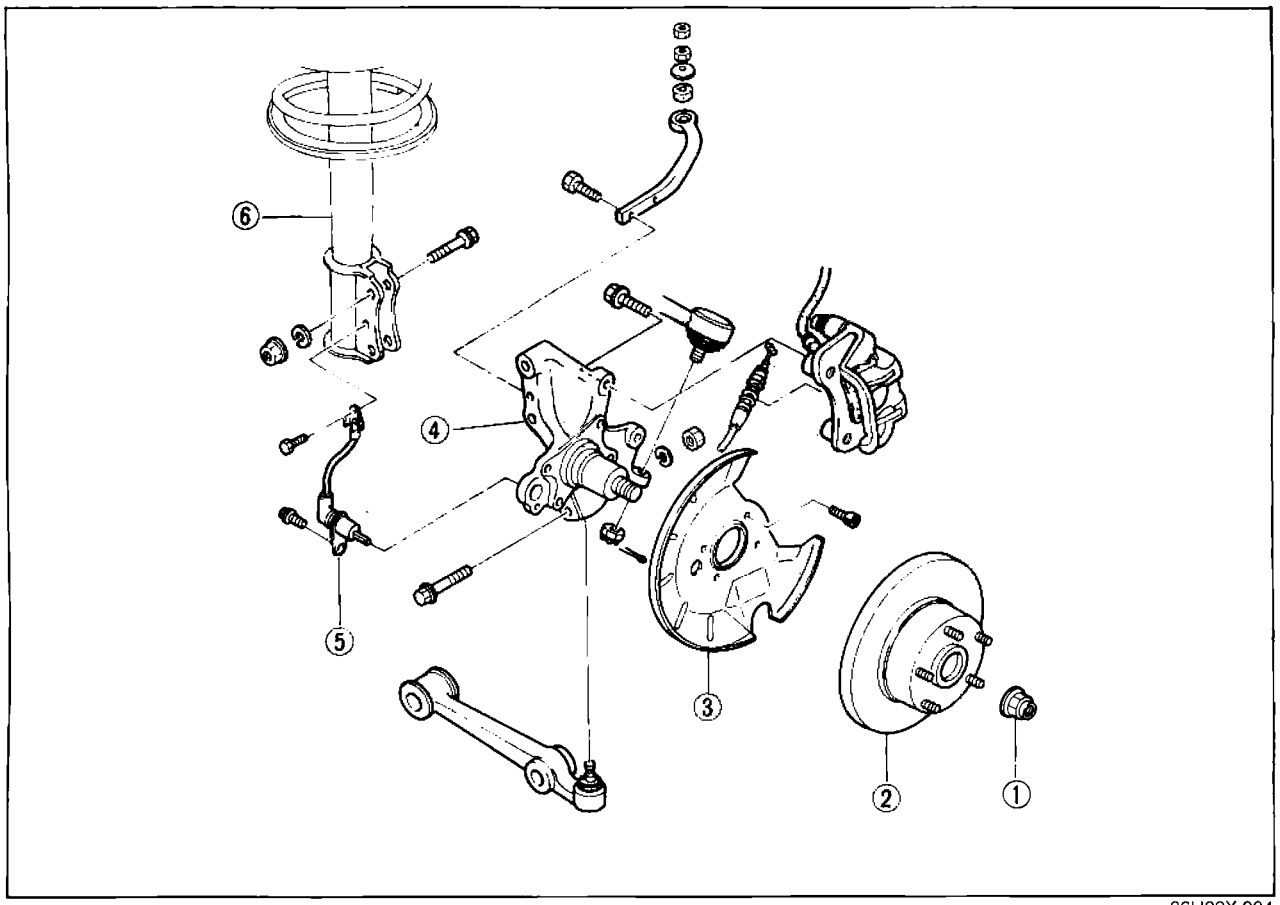


86U09X-003

1. Lock nut
2. Brake drum
3. Back plate
4. Parking cable
5. Brake pipe
6. Disc plate
7. Dust cover
8. Knuckle spindle
9. Wheel speed sensor (ABS)

9 OUTLINE

Rear Axle (4WS)



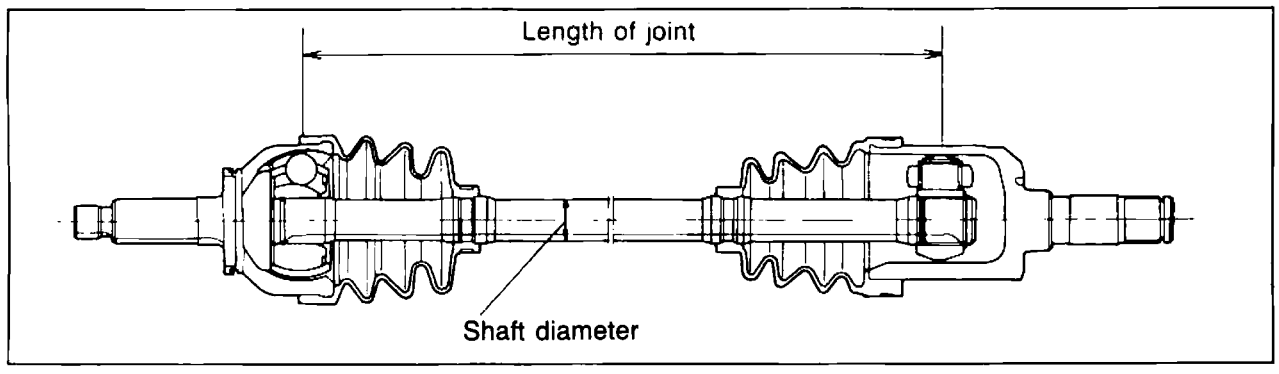
86U09X-004

1. Lock nut
2. Disc plate
3. Dust cover
4. Knuckle spindle
5. Wheel speed sensor (ABS)
6. Shock absorber

SPECIFICATIONS

Item		Engine model	F6, F8, RF-N		FE, RF-CX	
			Right	Left	Right	Left
Length of joint (between centers of joints)	mm (in)	MTX	368.5 (14.51)	368.5 (14.51)	360.0 (14.17)	360.0 (14.17)
		ATX	359.5 (14.15)	359.5 (14.15)	355.5 (14.00)	355.5 (14.00)
Shaft diameter	mm (in)	MTX	23.0 (0.91)		24.0 (0.94)	
		ATX	23.0 (0.91)		24.0 (0.94)	

76G09X-001

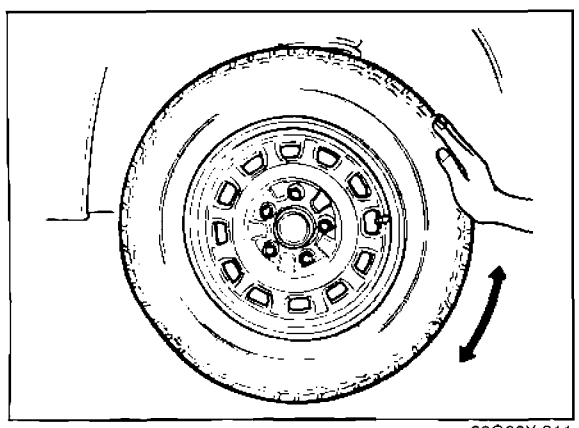


86U09X-082

TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Faulty operation of driveshaft	Broken ball joint	Replace	9—31
	Broken tri-pod joint	Replace	9—35
	Worn or seized joint	Replace	9—31, 35
Abnormal noise from driveshaft	Insufficient grease in joint or spline	Add or replace	9—33, 36
	Excessive backlash on spline	Replace	9—31, 35
	Worn joint	Replace	9—31, 35
Steering wheel pulls. (Steering wheel pulls toward either right or left side)	Bent steering linkage	Refer to Section 10	—
	Fatigued coil spring	Refer to Section 13	—
	Lower arm bushing worn or damaged	Refer to Section 13	—
	Bent knuckle	Replace	9—11
	Bent lower arm or loose mounting	Refer to Section 13	—
	Incorrect toe-in adjustment	Refer to Section 13	—
	Improper tire air pressure	Refer to Section 12	—
	Unevenly worn tires (left and right tires)	Refer to Section 12	—
	Brake dragging	Refer to Section 11	—
Unstable handling	Bent steering linkage	Refer to Section 10	—
	Joint in steering system worn or damaged	Refer to Section 10	—
	Incorrect steering pinion preload adjustment	Refer to Section 10	—
	Fatigued coil spring	Refer to Section 13	—
	Faulty shock absorber(s)	Refer to Section 13	—
	Lower arm bushing worn or damaged	Refer to Section 13	—
	Incorrect toe-in adjustment (front or rear)	Refer to Section 13	—
	Improper tire air pressure	Refer to Section 12	—
	Wheel(s) bent or unbalanced	Refer to Section 12	—
Excessive steering wheel play	Faulty front wheel bearing	Adjust	9—11
	Incorrect steering pinion preload adjustment	Refer to Section 10	—
	Rack and pinion worn	Refer to Section 10	—
	Joint in steering system worn or damaged	Refer to Section 10	—
	Lower arm bushing worn or damaged	Refer to Section 13	—
Tires excessively worn or worn unevenly	Incorrect toe-in adjustment	Refer to Section 13	—
	Improper tire air pressure	Refer to Section 12	—
	Unbalanced wheel(s)	Refer to Section 12	—
Abnormal noise from axle	Faulty wheel bearing	Replace	9—11,18,23

86U09X-006



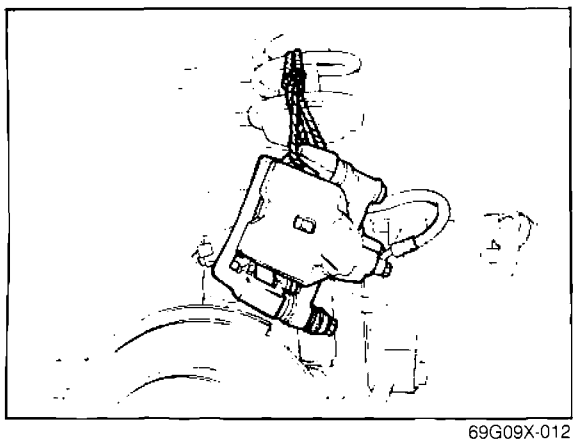
69G09X-011

FRONT AXLE

ON-VEHICLE MAINTENANCE

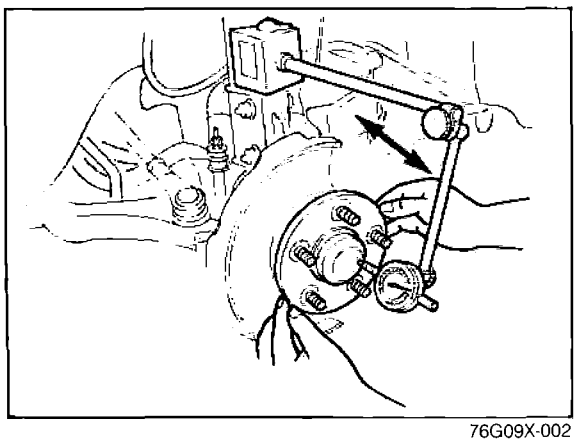
Wheel Bearing Play

1. Jack up the vehicle and support it with safety stands.
2. Check that there is no abnormal noise and that the tire rotates smoothly when rotated by hand.



69G09X-012

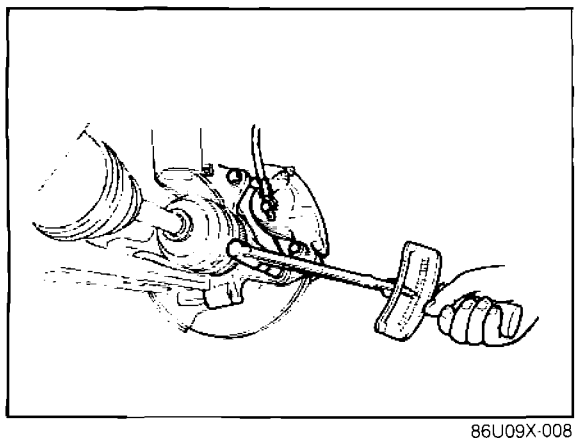
3. Remove the wheel.
4. Remove the caliper assembly and suspend it using a rope.



76G09X-002

5. Position a dial indicator against the hub cap, then push and pull the front wheel hub by hand in the axial direction and measure the end play of the wheel bearing.
   If the end play exceeds specification, replace the wheel bearing.

   End play: 0.2 mm (0.0079 in) max



86U09X-008

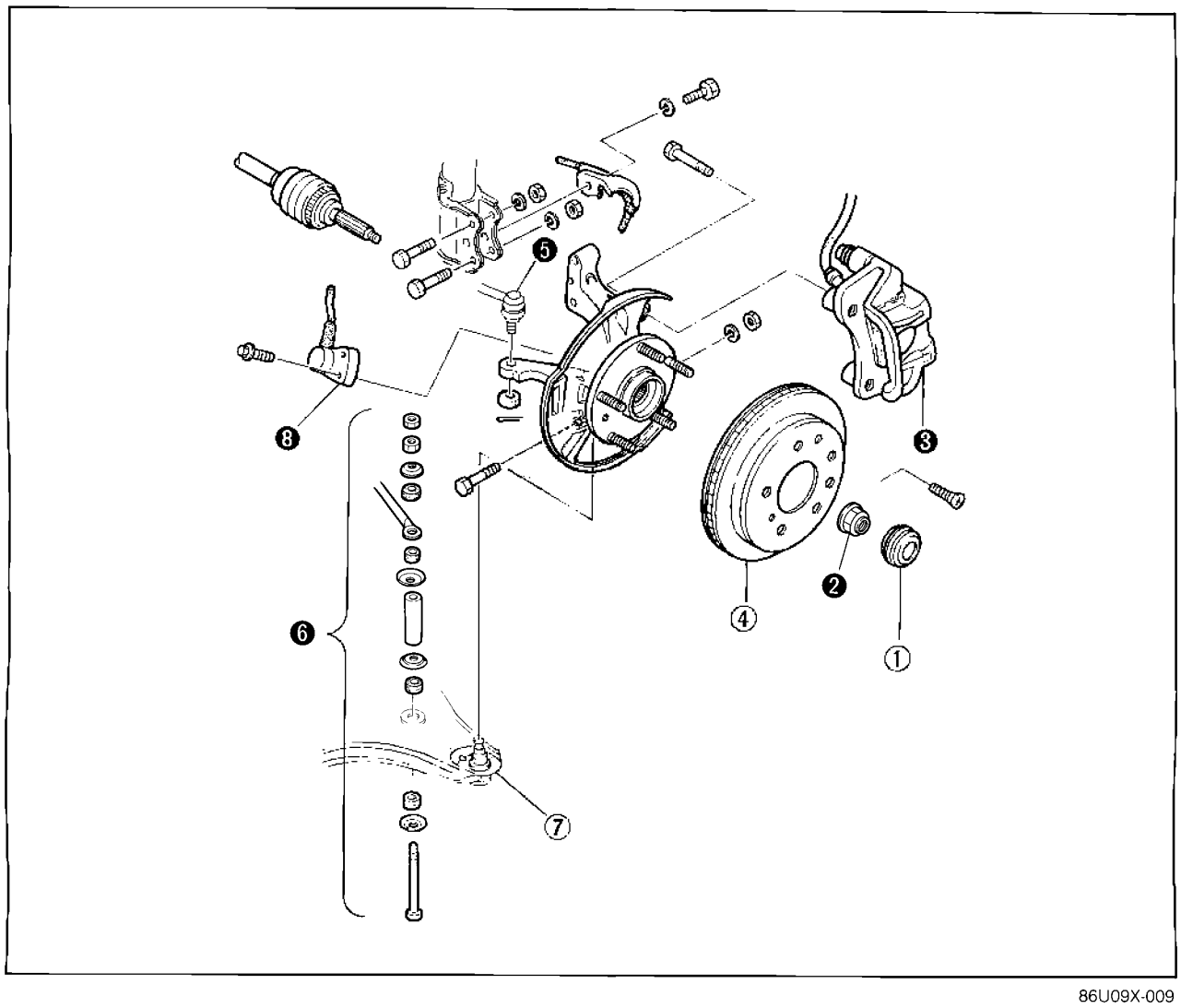
6. Install the caliper assembly.

   Tightening torque: 78—98 N·m (8.0—10.0 m-kg, 58—72 ft-lb)

7. Install the wheel.

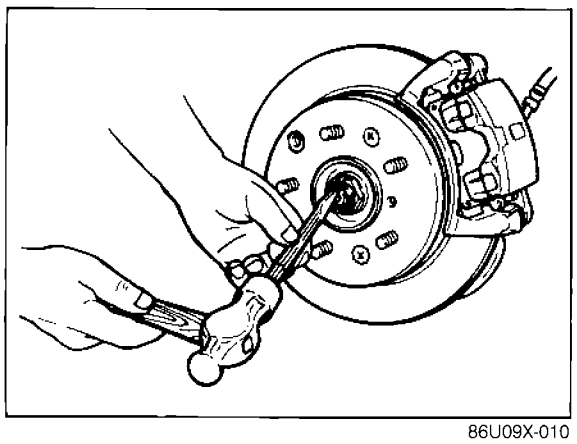
   Tightening torque: 88—118 N·m (9.0—12.0 m-kg, 65—87 ft-lb)

REMOVAL
Removal in the sequence shown in the figure referring to the removal note for the specially marked parts.



86U09X-009

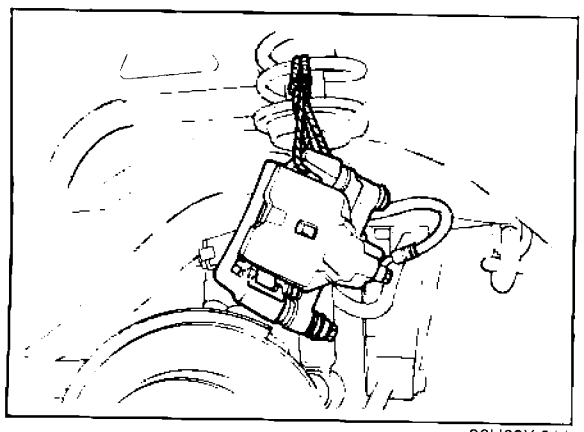
1. Hub cap
2. Lock nut
3. Caliper assembly
4. Disc plate
5. Tie-rod end
6. Stabilizer
7. Lower arm
8. Wheel speed sensor (ABS)
9. Knuckle



86U09X-010

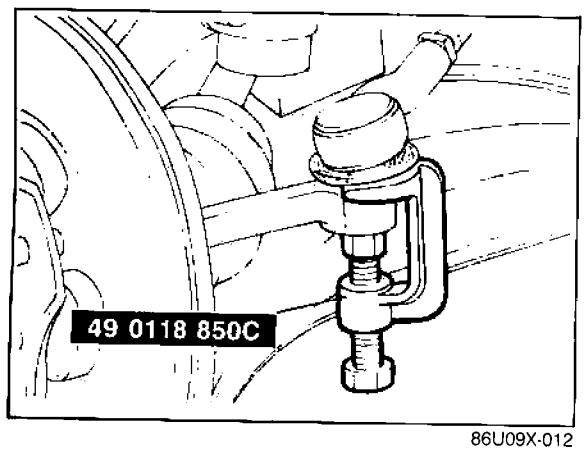
Removal Note
Lock nut
1. Uncrimp the tab of the lock nut.

9 FRONT AXLE



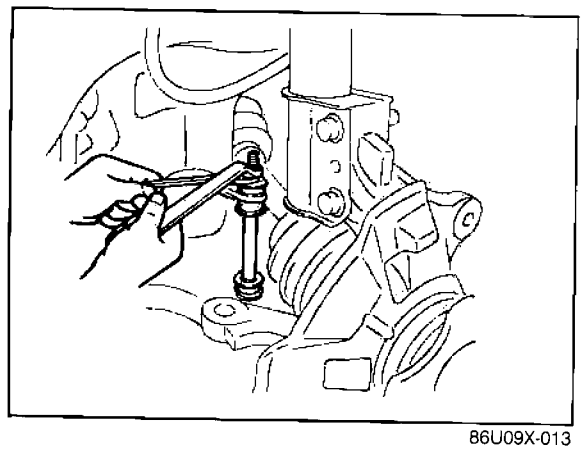
86U09X-011

Caliper assembly
Remove the caliper assembly and suspend it.



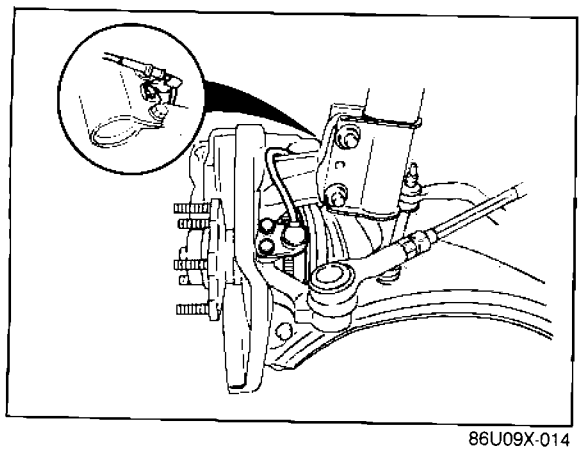
86U09X-012

Tie-rod end
Disconnect the tie-rod end with the **SST**.



86U09X-013

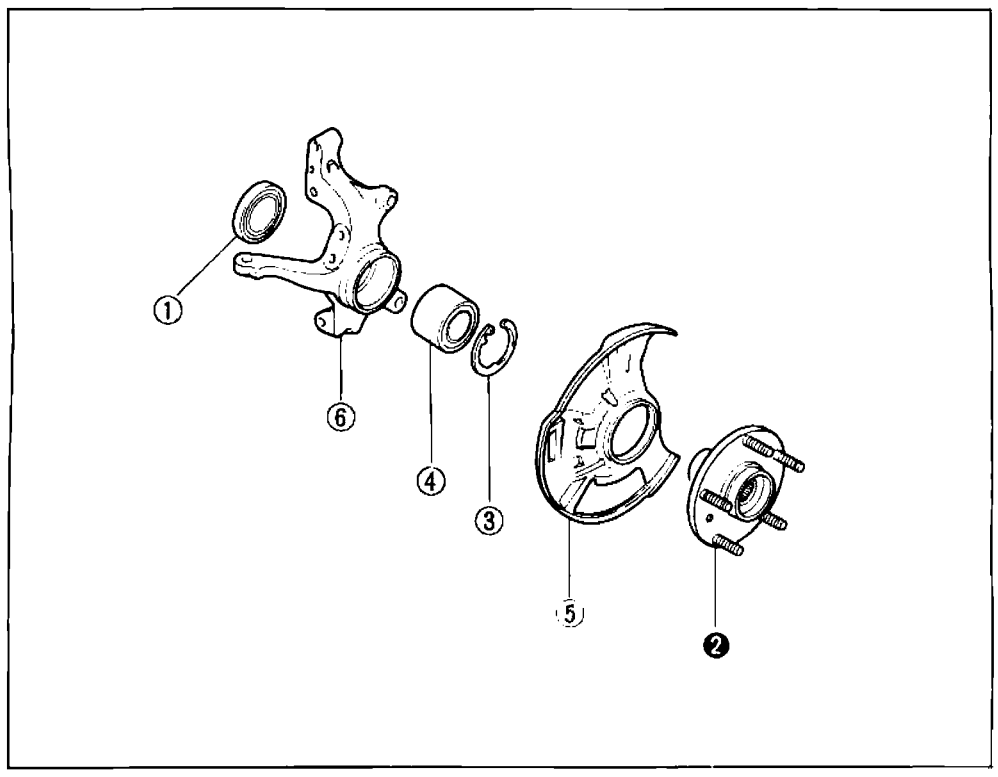
Stabilizer
Remove the stabilizer bolt.



86U09X-014

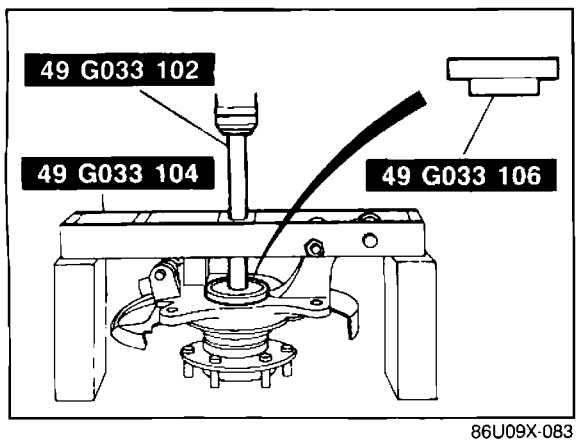
Wheel speed sensor (ABS)
Remove the speed sensor.

DISASSEMBLY
Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked parts.



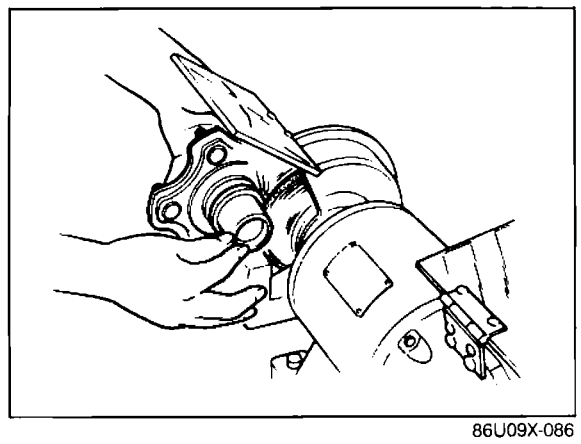
86U09X-015

1. Oil seal
2. Front wheel hub
3. Retaining ring
4. Front wheel bearing
5. Dust cover
6. Knuckle



86U09X-083

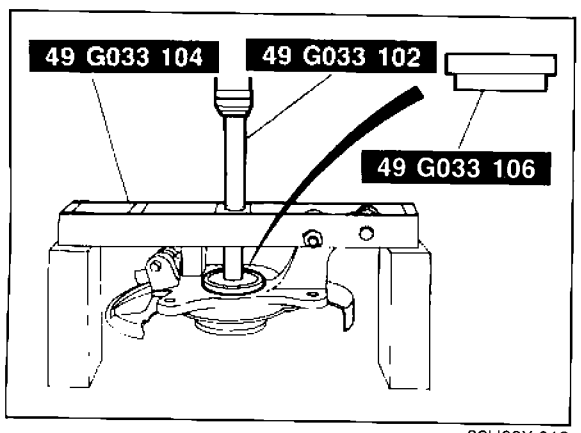
Disassembly Note
Front wheel hub
Remove the front wheel hub with the **SST**.



86U09X-086

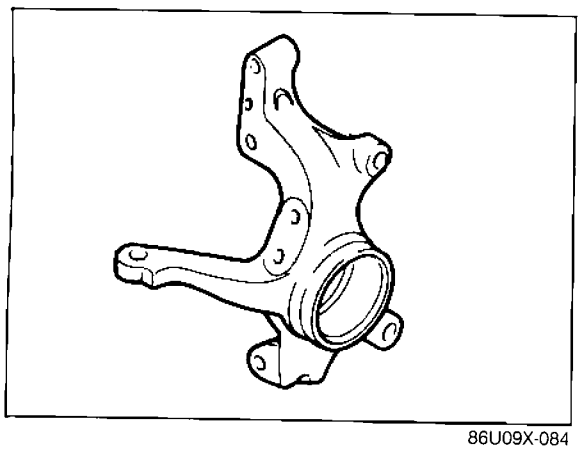
Note
If the bearing inner race remains on the front wheel hub, grind a section of the bearing inner race to approx. 0.5 mm (0.0197 in). Then remove it with a chisel.

9 FRONT AXLE



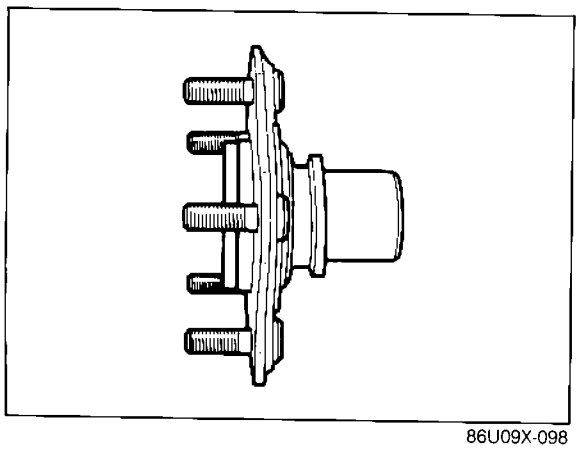
86U09X-016

Front wheel bearing
Remove the front wheel bearing with the **STT**.



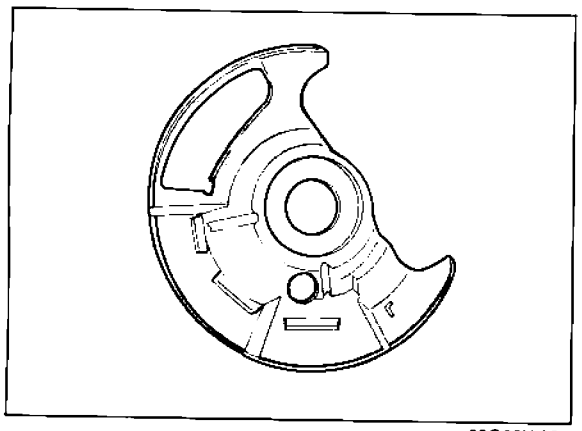
86U09X-084

INSPECTION
Check as described below, replace parts if necessary.
1. Check the knuckle for cracks or damage.



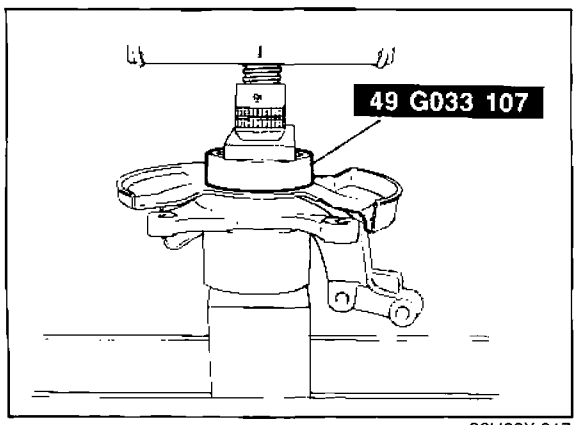
86U09X-098

2. Check the front wheel hub for seizure, cracks or damage.



69G09X-084

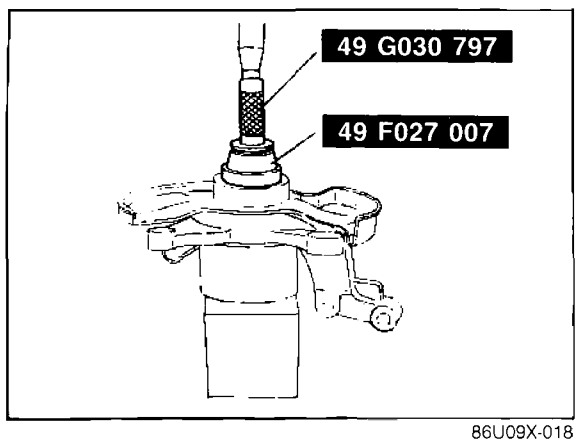
3. Check the dust cover for cracks or damage.



86U09X-017

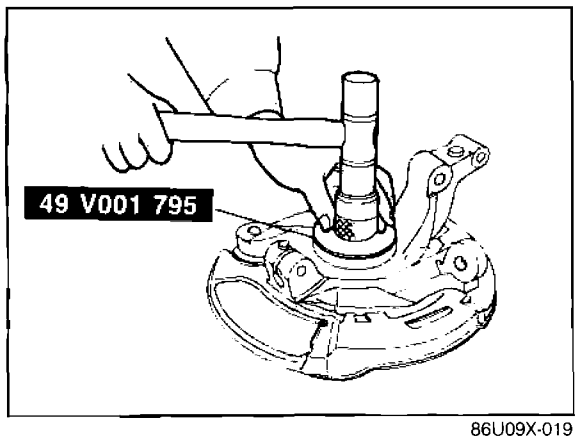
ASSEMBLY

1. Install new hub bolts. (If applicable)
2. Install a new dust cover with the **SST**.



86U09X-018

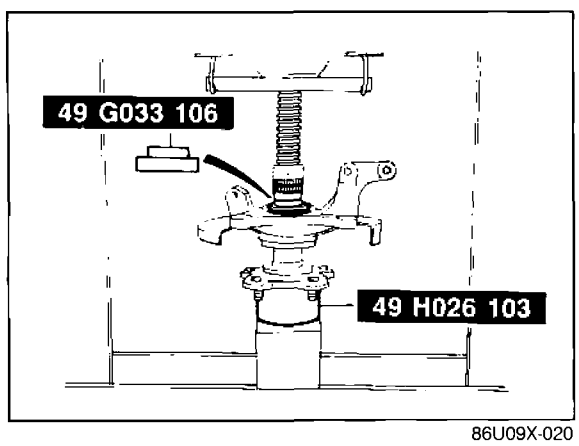
3. Install a new front wheel bearing with the **SST**.



86U09X-019

4. Install the retaining ring.
5. Install a new oil seal with the **SST**.

Note
Apply grease to the oil seal lip.

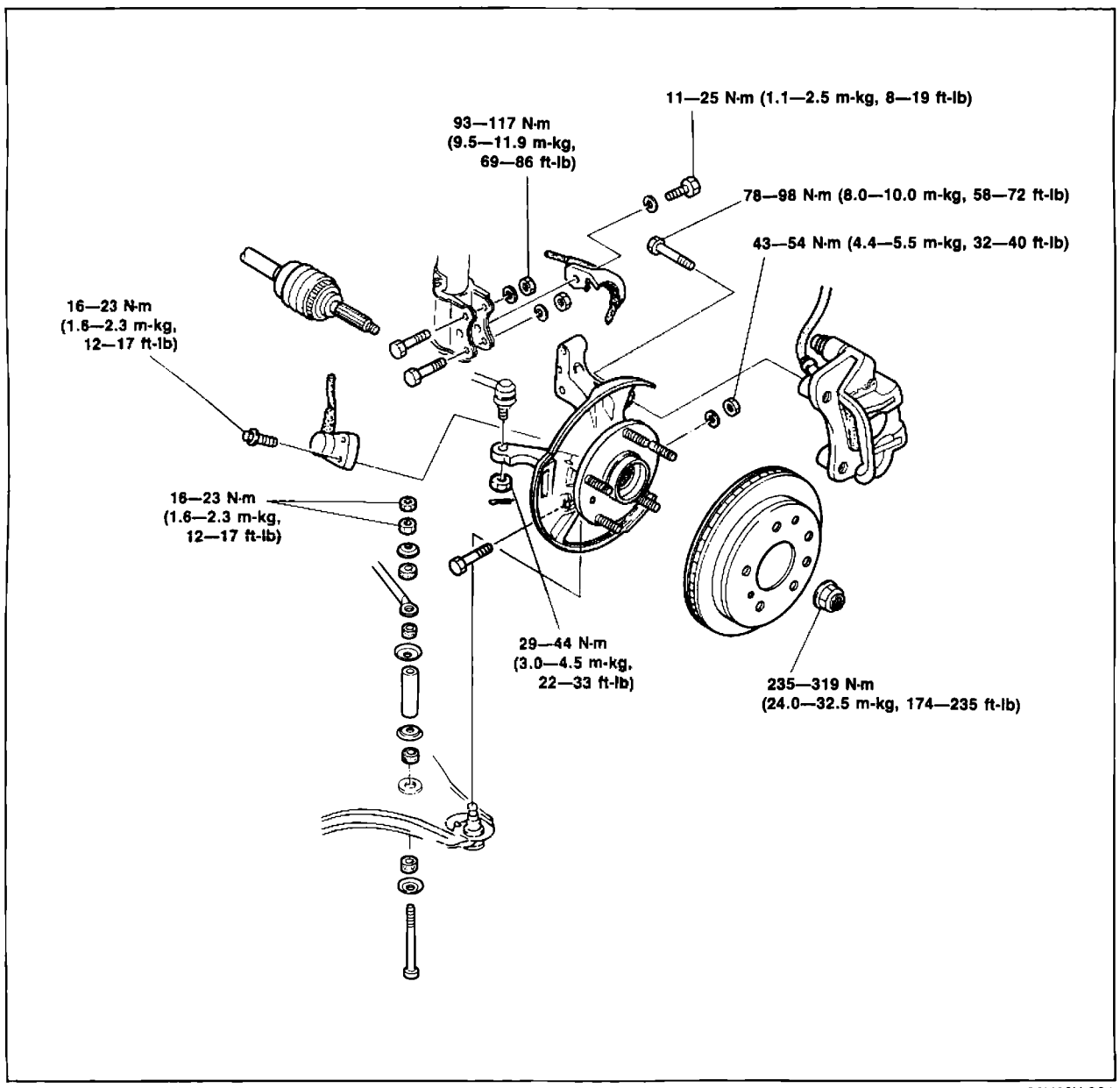


86U09X-020

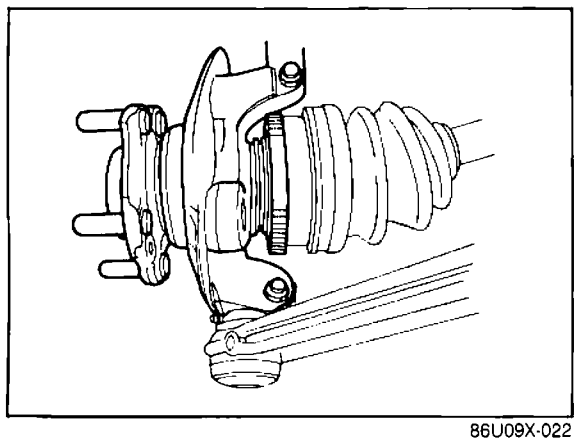
6. Install the front wheel hub with the **SST**.

9 FRONT AXLE

INSTALLATION
Torque Specifications



86U09X-021



86U09X-022

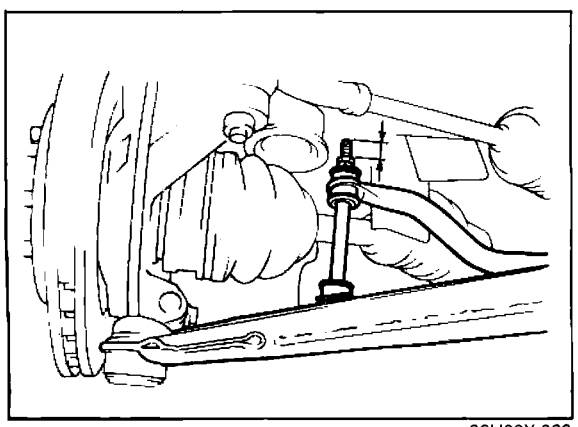
1. Install the knuckle to the shock absorber.

   Tightening torque: 93—117 N·m (9.5—11.9 m-kg, 69—86 ft-lb)

2. Install the lower arm ball-joint.

   Tightening torque: 43—54 N·m (4.4—5.5 m-kg, 32—40 ft-lb)

3. Install the driveshaft.

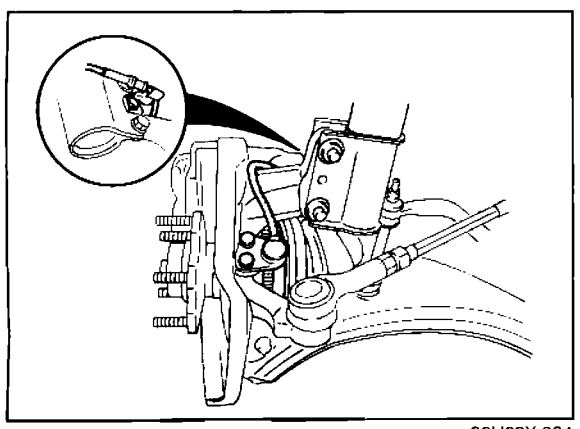


86U09X-023

4. Install the stabilizer.

Dimension: 20.1 mm (0.79 in)

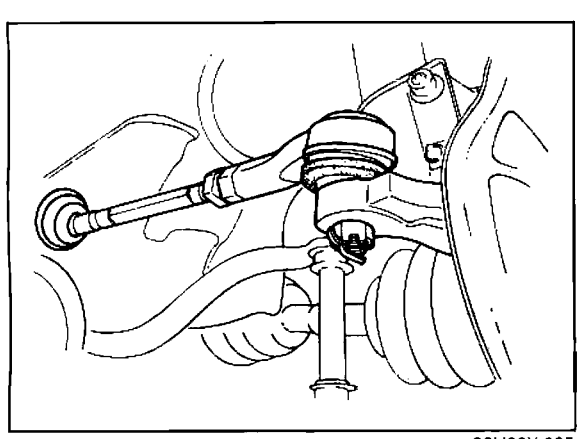
Tightening torque: 16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)



86U09X-024

5. Install the wheel speed sensor. (ABS)

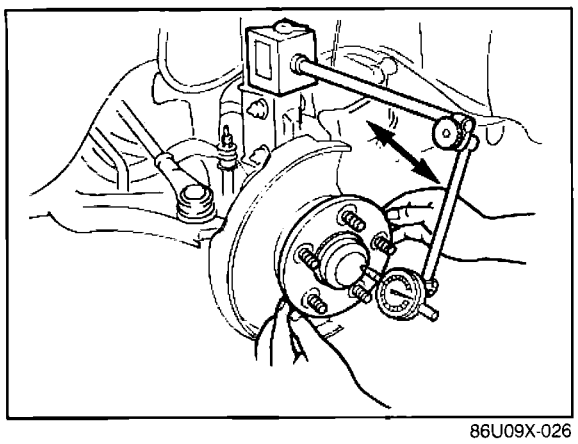
Tightening torque: 16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)



86U09X-025

6. Install the tie-rod end.

Tightening torque: 29—44 N·m (3.0—4.5 m-kg, 22—33 ft-lb)



86U09X-026

7. Check the end play. (Refer to page 9—8)

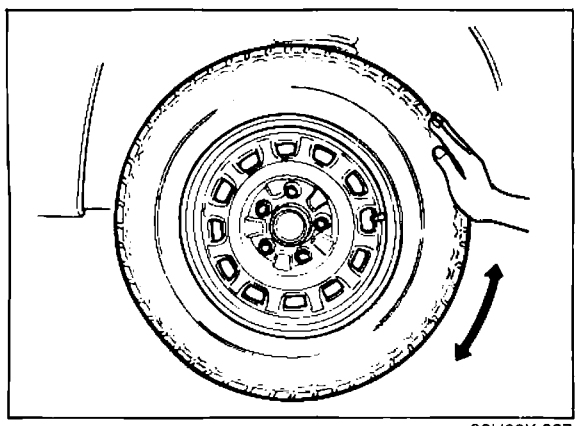
End play: 0.2 mm (0.0079 in) max.

8. Stake the lock nut to groove.
9. Install the caliper assembly.

Tightening torque: 78—98 N·m (8.0—10.0 m-kg, 58—72 ft-lb)

10. Install the wheel.

Tightening torque: 88—118 N·m (9.0—12.0 m-kg, 65—87 ft-lb)



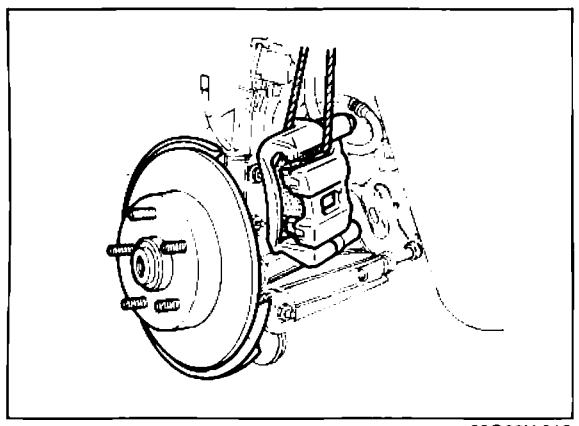
86U09X-027

REAR AXLE

ON-VEHICLE MAINTENANCE

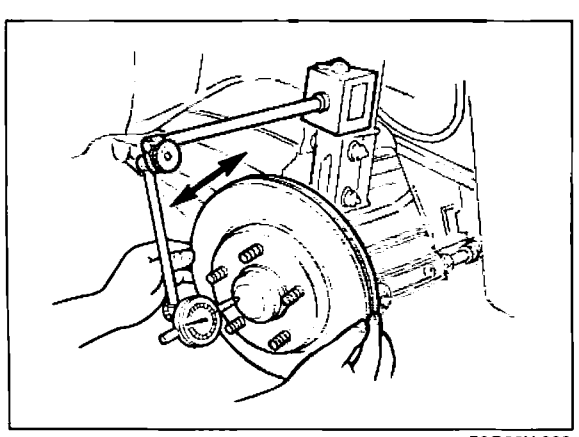
Wheel Bearing Play

1. Jack up the vehicle and support it with safety stands.
2. Check that there is no abnormal noise and that the tire rotates smoothly when rotated by hand.



69G09X-012

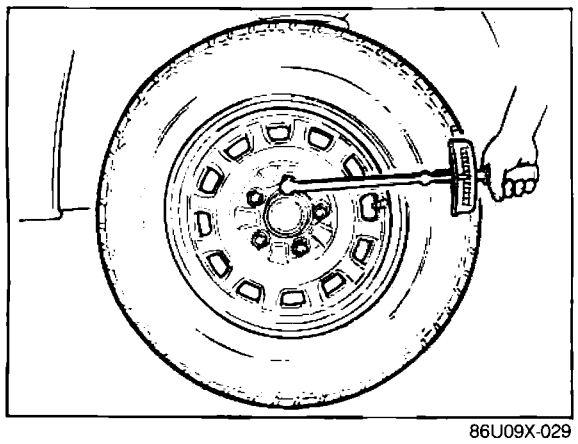
3. Remove the wheel.
4. Remove the caliper assembly and suspend it using a rope.



76G09X-003

5. Position a dial indicator against the hub cap, then push and pull the front wheel hub or brake drum by hand in the axial direction and measure the end play of the wheel bearing.
   If the end play exceeds specification, replace the wheel bearing.

   End play: 0.2 mm (0.0079 in) max.



86U09X-029

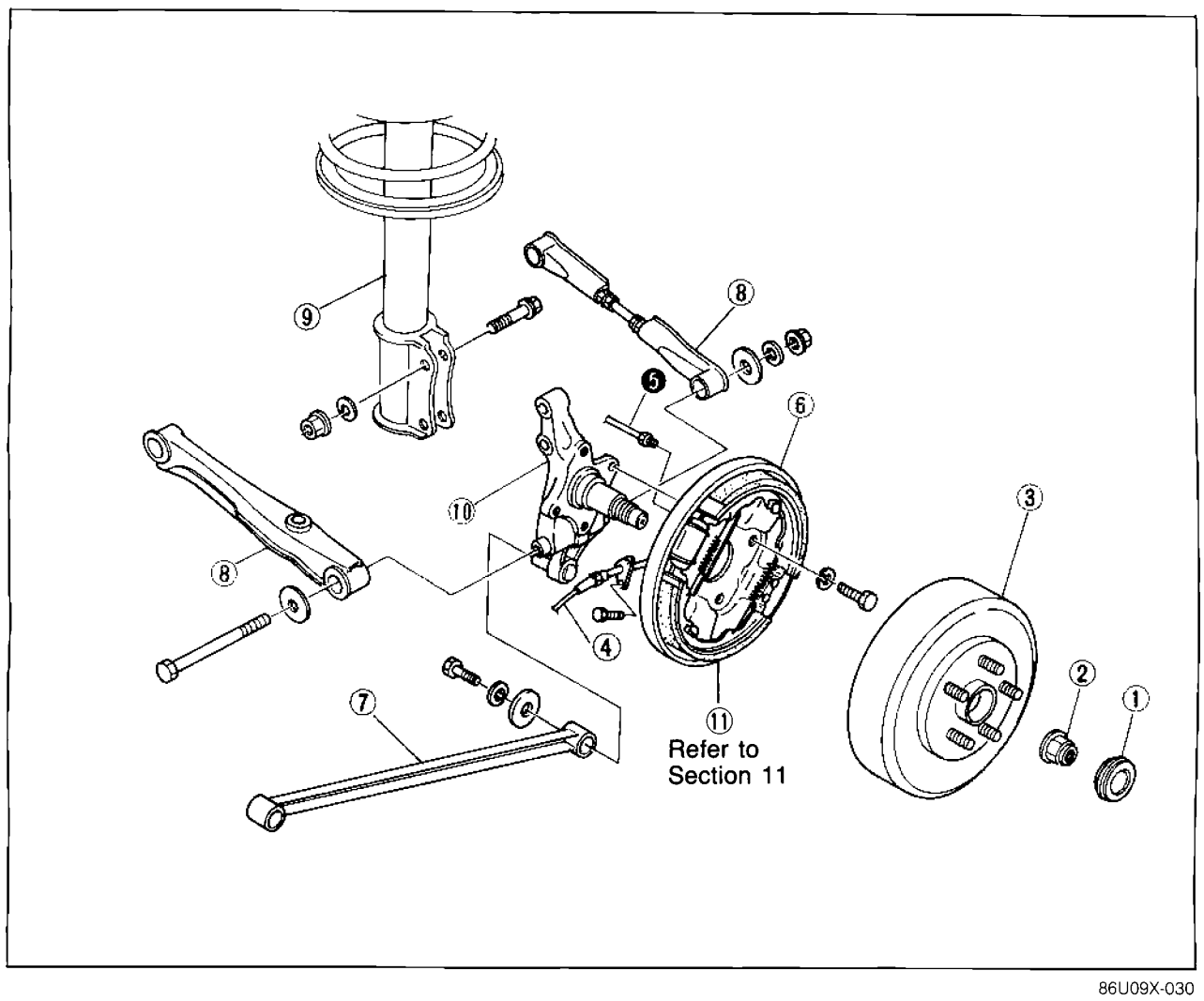
6. Install the caliper assembly. (Disc)

   Tightening torque: 45—67 N·m (4.6—6.8 m-kg, 33—49 ft-lb)

7. Install the wheel.

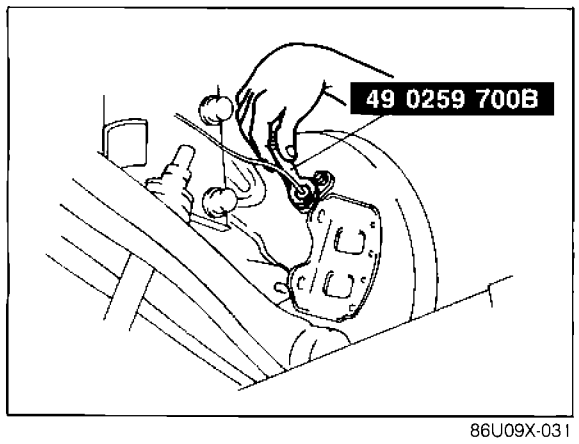
   Tightening torque: 88—118 N·m (9.0—12.0 m-kg, 65—87 ft-lb)

[Drum Brake]
REMOVAL
Remove in the sequence shown in the figure referring to the removal note for the specially marked parts.



86U09X-030

1. Hub cap
2. Lock nut
3. Brake drum
4. Parking brake cable
5. Brake pipe
6. Back plate
7. Trailing link
8. Lateral link
9. Shock absorber
10. Knuckle spindle
11. Brake shoe assembly

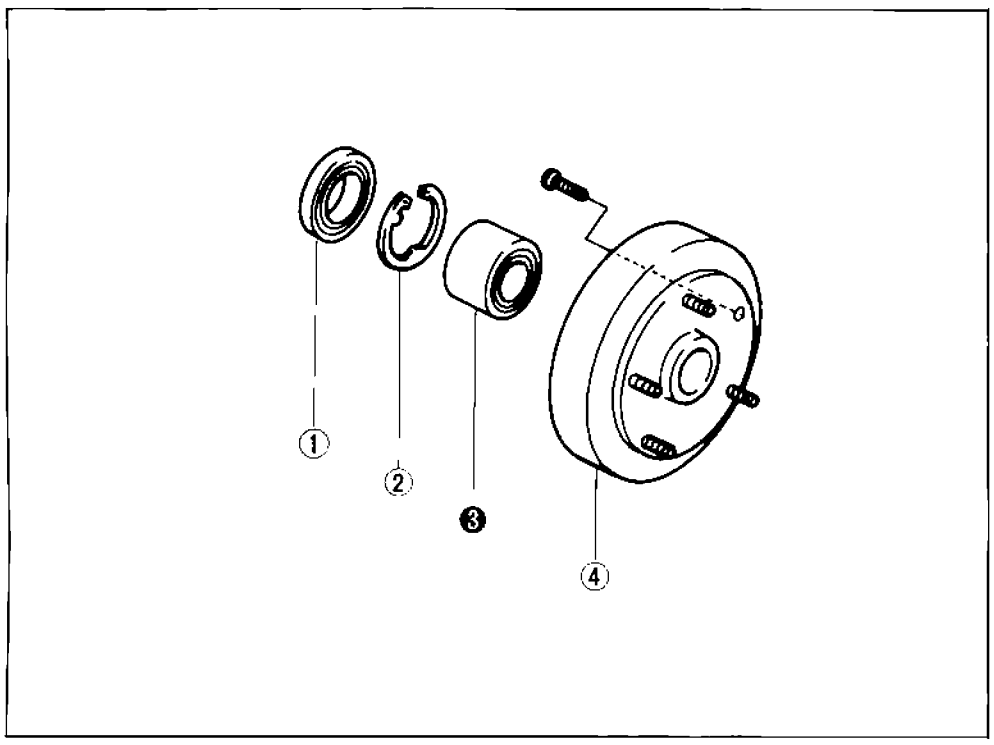


86U09X-031

Removal Note
Disconnect the brake pipe with the **SST**.

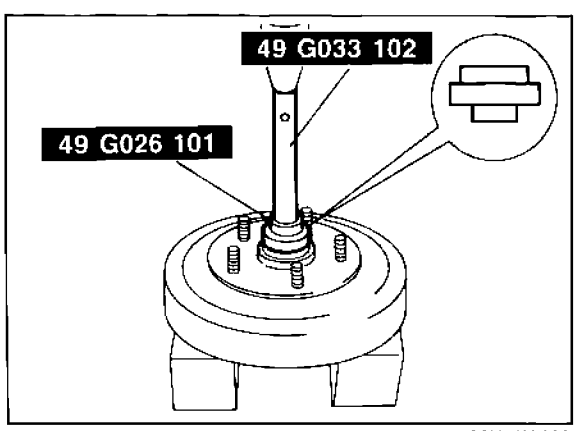
9 REAR AXLE

DISASSEMBLY
Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked parts.



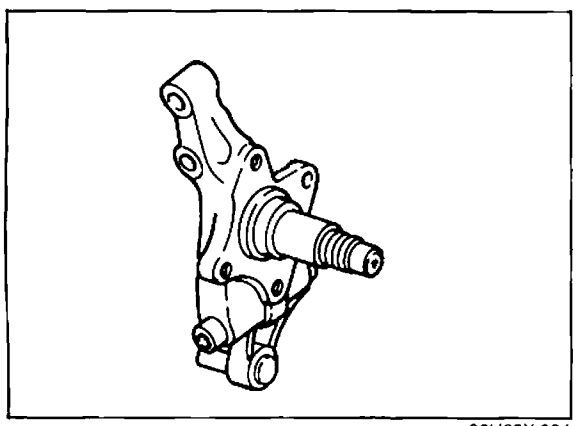
1. Oil seal
2. Retaining ring
3. Rear wheel bearing
4. Brake drum

86U09X-032



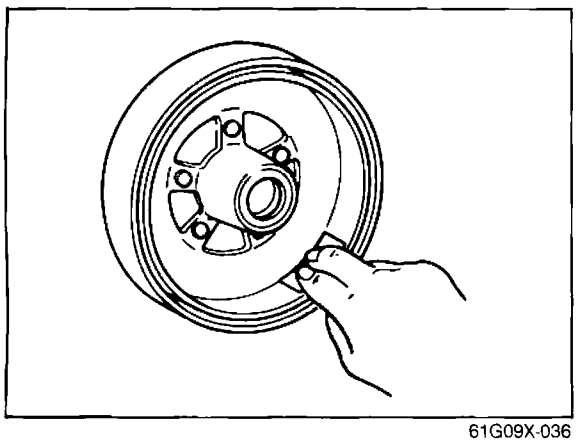
86U09X-033

Disassembly Note
Bearing
Remove the rear wheel bearing with the **SST**.



86U09X-034

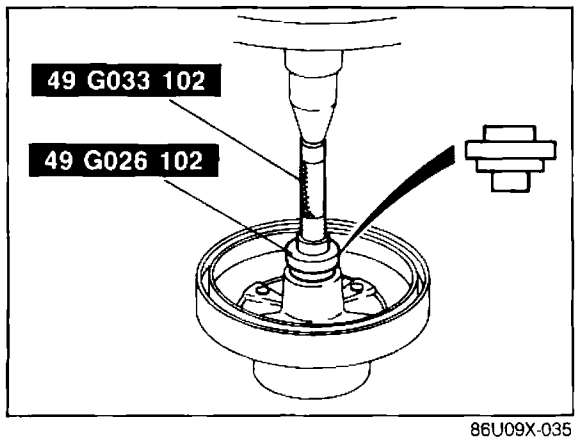
INSPECTION
Knuckle Spindle
1. Cracks or damage.
2. Wear or rust on the oil seal contact surface.



61G09X-036

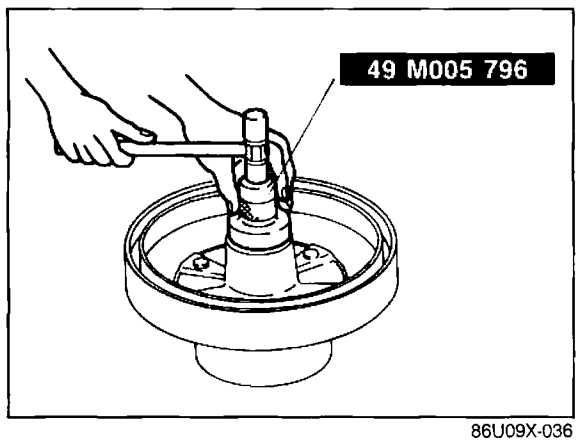
Brake Drum
Wear or damage to brake drum.

Note
Remove minor rust with sandpaper



86U09X-035

ASSEMBLY
1. Install a new rear wheel bearing with the **SST**.



86U09X-036

2. Install the retaining ring.
3. Install a new oil seal with the **SST**.

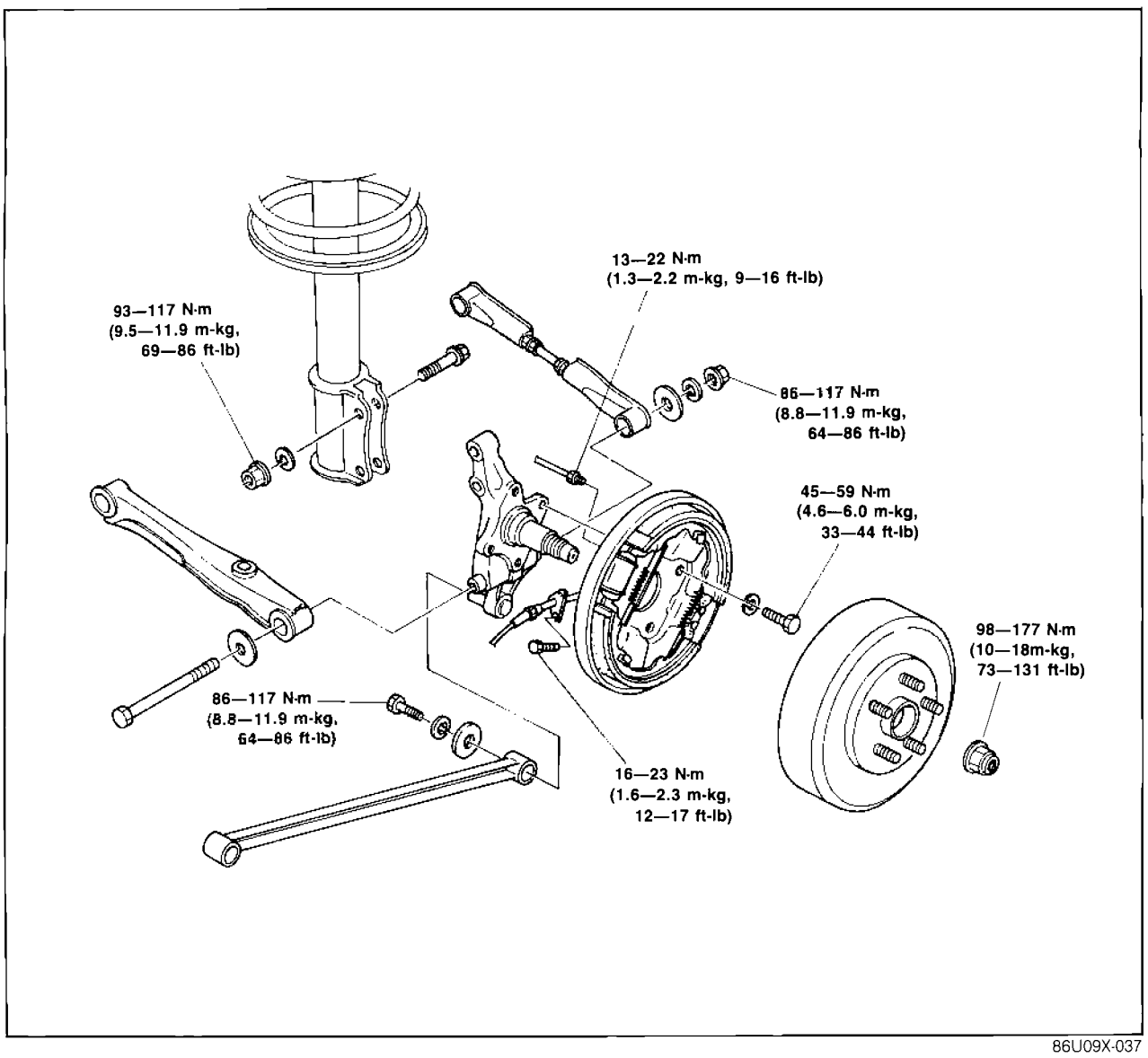
Note
Apply grease to the oil seal lip.

9 REAR AXLE

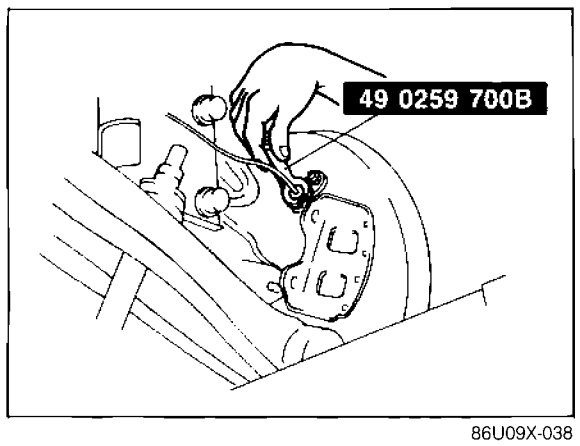
INSTALLATION

Install in the reverse order of removal referring to the installation note.

Torque specifications



86U09X-037



86U09X-038

Installation Note

Brake pipe

1. Connect the brake pipe with the **SST**.

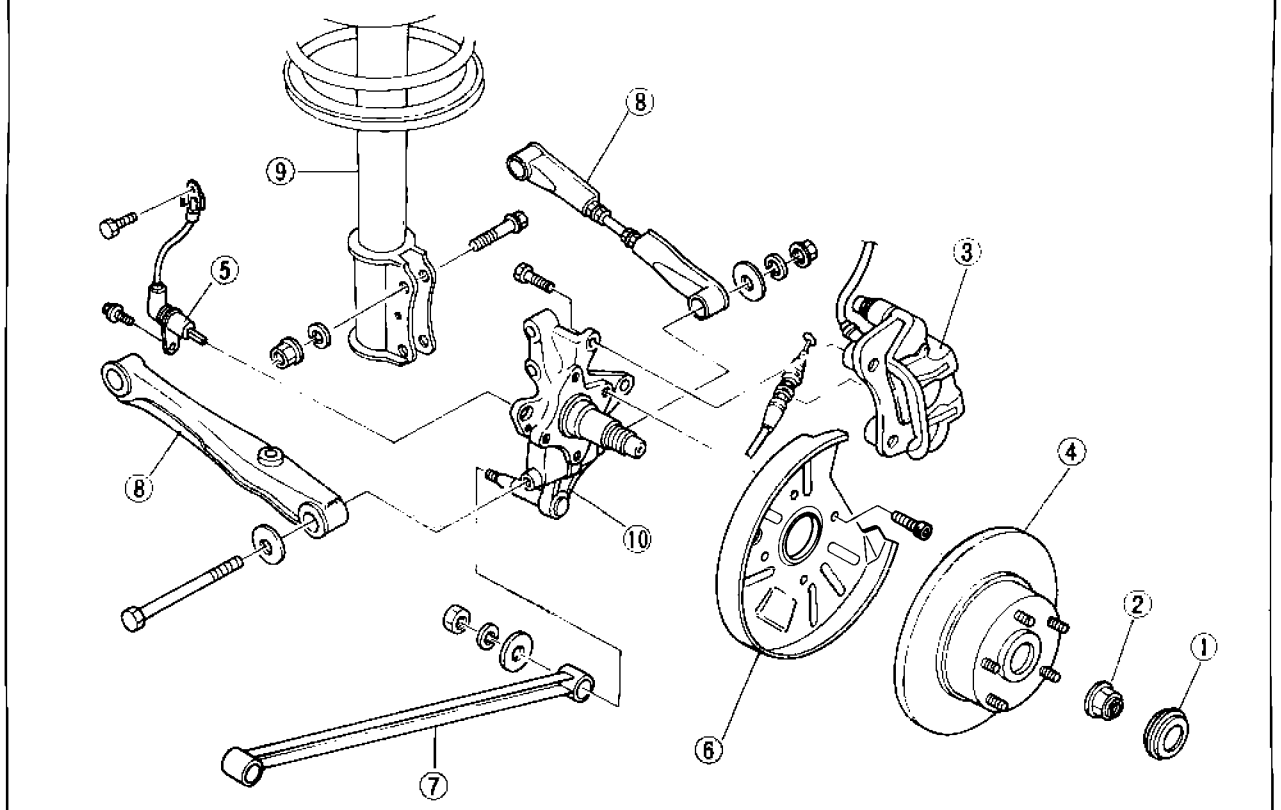
Tightening torque: 13—22 N·m (1.3—2.2 m-kg, 9—16 ft-lb)

2. Bleed the air. (Refer to Section 11)

End play

Measure the end play. (Refer to page 9—16)

[Disc Brake]
REMOVAL (2WS)
Remove in the sequence shown in the figure.

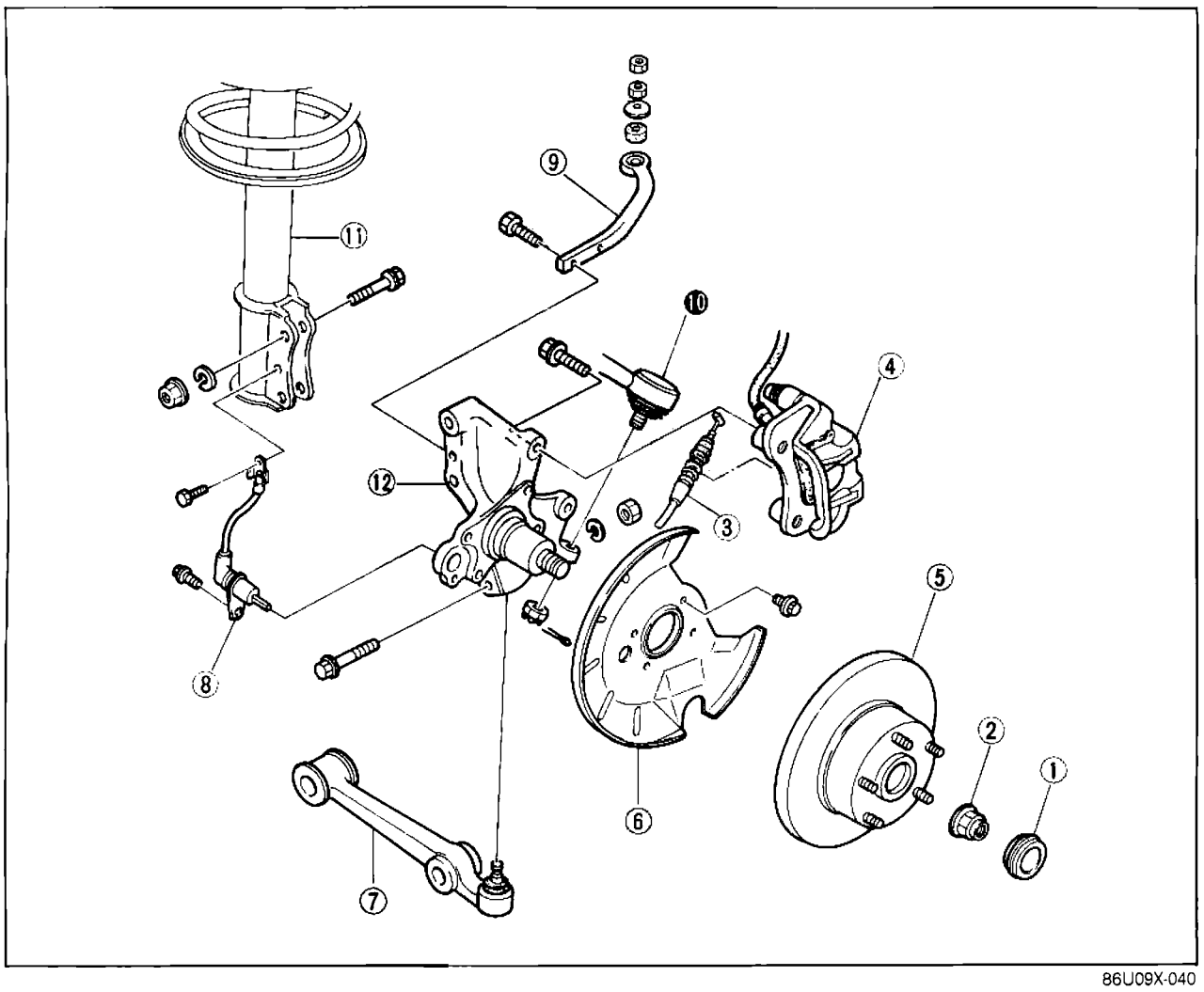


86U09X-039

1. Hub cap
2. Lock nut
3. Caliper assembly
4. Disc plate
5. Wheel speed sensor (ABS)
6. Dust cover
7. Trailing link
8. Lateral link
9. Shock absorber
10. Knuckle spindle

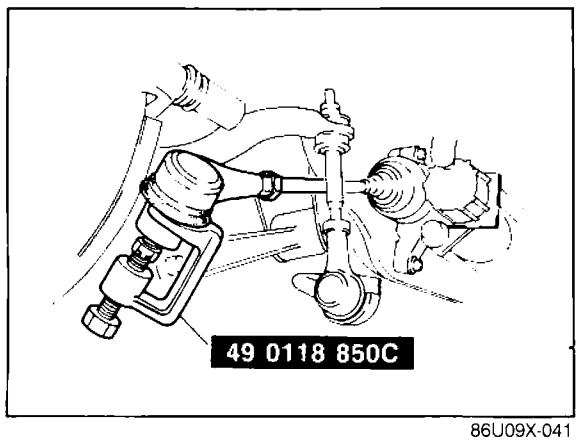
9 REAR AXLE

REMOVAL (4WS)
Remove in the sequence shown in the figure referring to the removal note for the specially marked parts.



86U09X-040

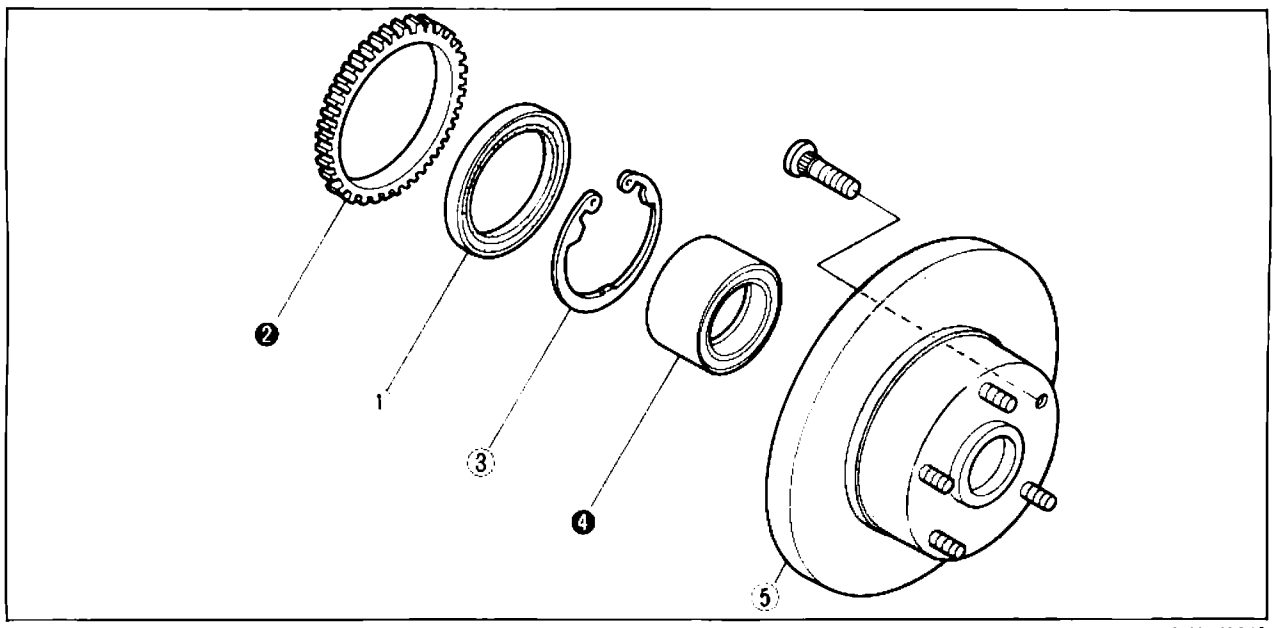
1. Hub cap
2. Lock nut
3. Parking brake cable
4. Caliper assembly
5. Disc plate
6. Dust cover
7. Control link
8. Wheel speed sensor (ABS)
9. Stabilizer bracket
10. Tie-rod end
11. Shock absorber
12. Knuckle spindle



86U09X-041

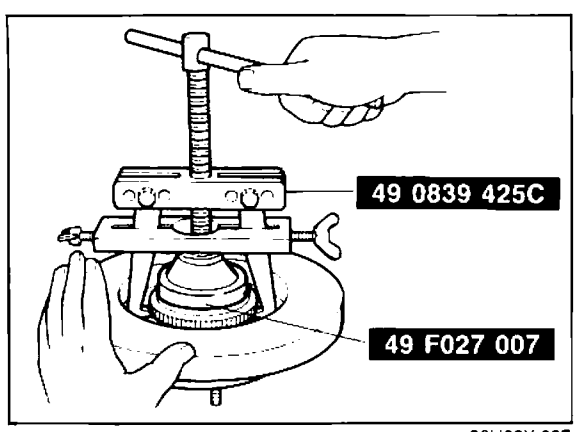
Removal Note
Tie-rod end
Remove the tie-rod end from the knuckle spindle with the **SST**.

DISASSEMBLY
Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked parts.



86U09X-042

1. Oil seal
2. Sensor rotor (ABS)
3. Retaining ring
4. Rear wheel bearing
5. Disc plate



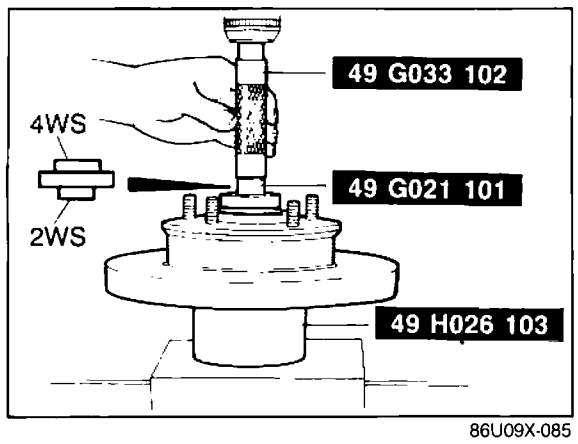
86U09X-087

Disassembly Note

Note
a) Do not remove the hub bolts unless necessary.
b) Do not reuse the hub bolts if removed.

Sensor rotor (ABS)
Remove the sensor rotor with the **SST**.

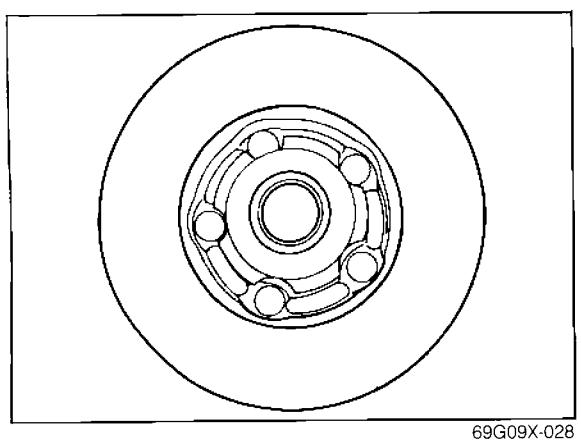
Note
a) Do not remove the sensor rotor unless necessary.
b) Do not reuse the sensor rotor if removed.



86U09X-085

Rear wheel bearing
Remove the rear wheel bearing with the **SST**.

Note
Do not reuse the rear wheel bearing if removed.

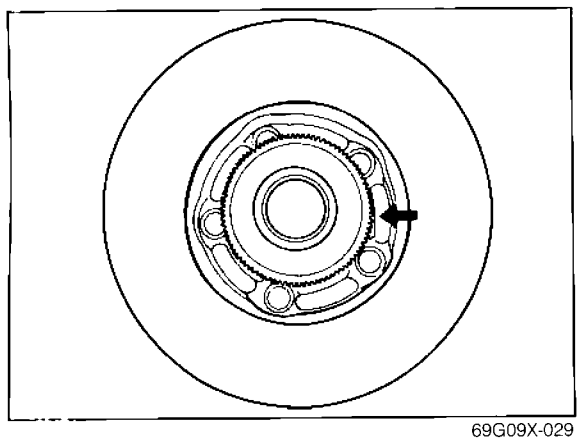


69G09X-028

INSPECTION

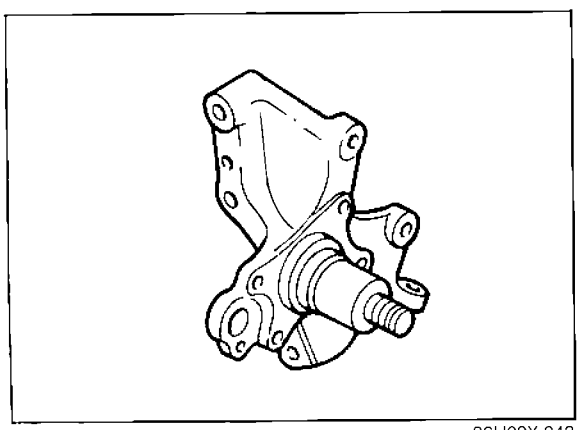
Check as described below, replace parts if necessary.

1. Check the hub for cracks or damage.



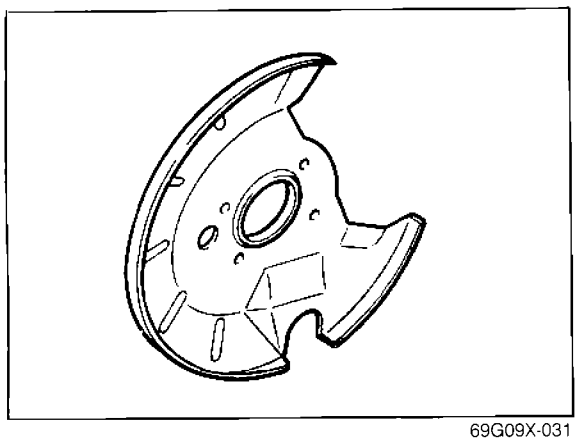
69G09X-029

2. Check the sensor rotor for cracks or damage.



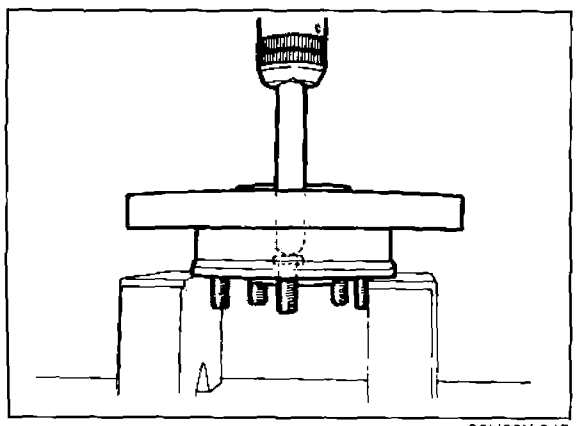
86U09X-043

3. Check the knuckle spindle for cracks or damage, and the oil seal friction surface for wear or rust.



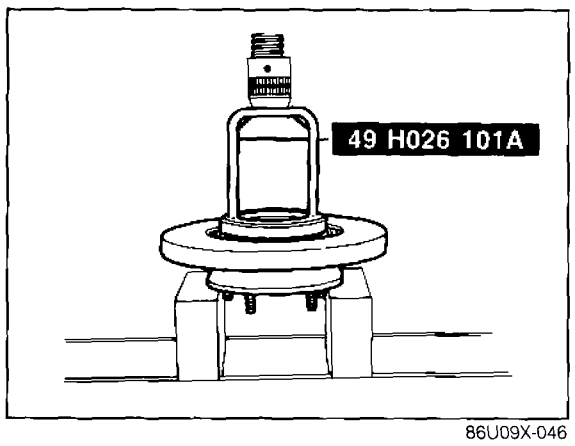
69G09X-031

4. Check the dust cover for damage.
5. Check the hub cap for damage.



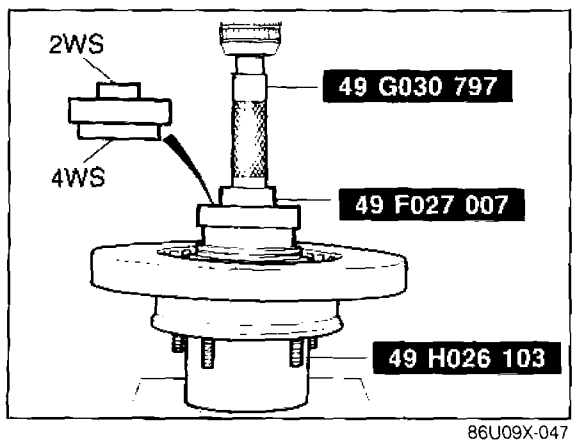
86U09X-045

ASSEMBLY
1. Install new hub bolts.



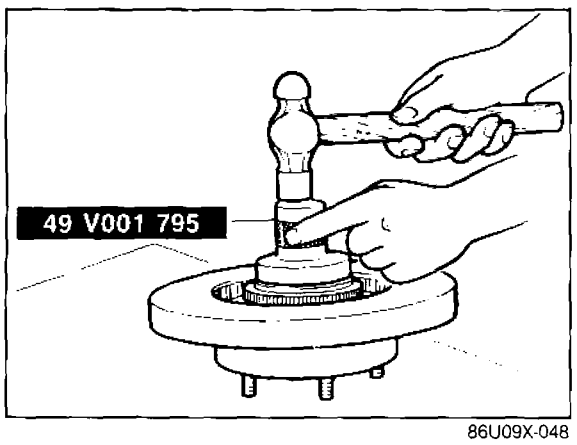
86U09X-046

2. Install a new sensor rotor with the **SST**. (ABS)



86U09X-047

3. Install a new rear wheel bearing with the **SST**.
4. Install the retaining ring.



86U09X-048

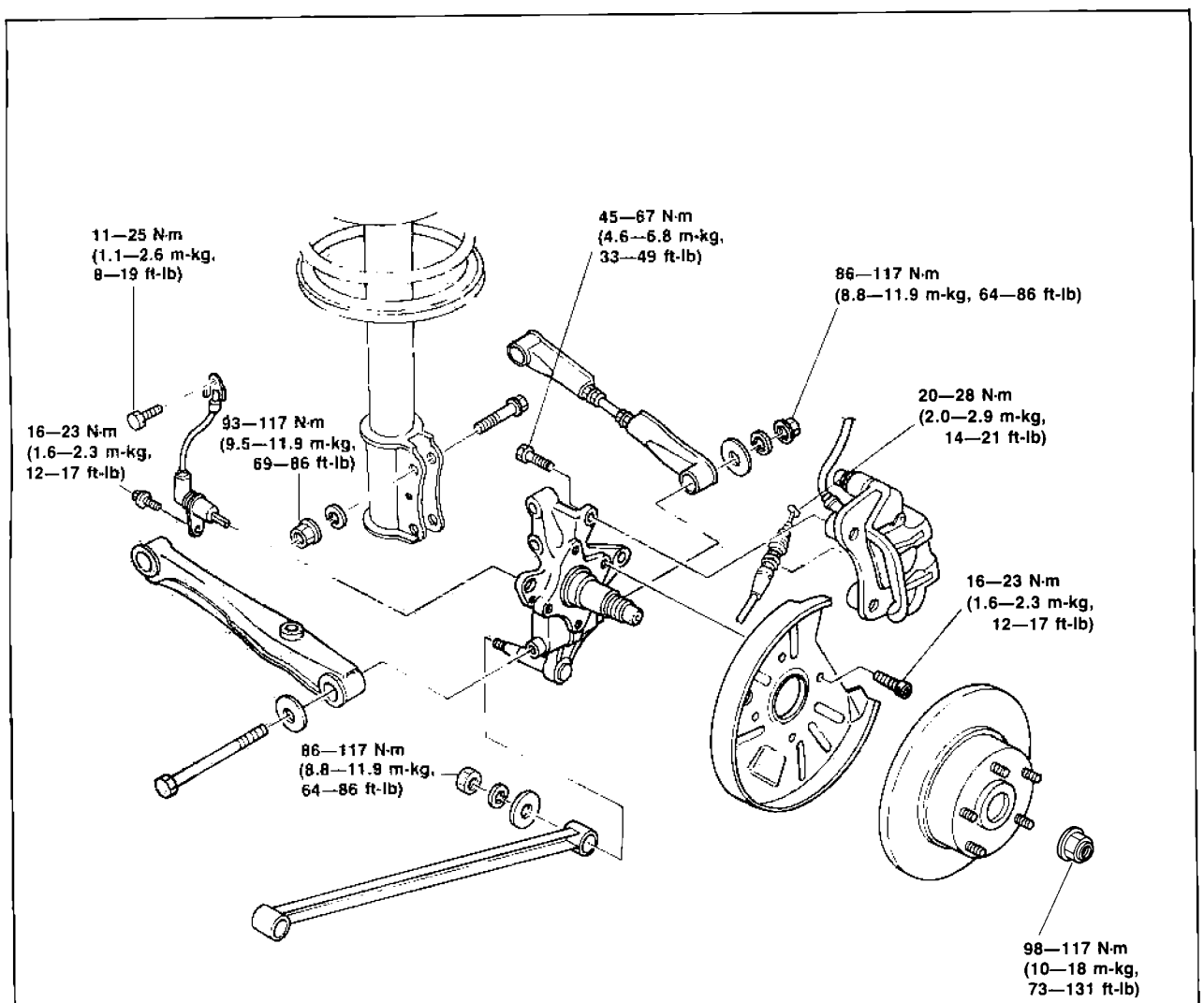
5. Install a new oil seal with the **SST**.

Note
Apply grease to the oil seal lip.

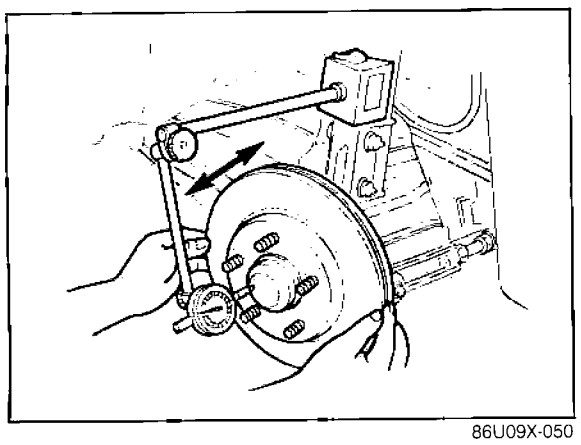
INSTALLATION (2WS)

Install in the reverse order of removal.

Torque Specifications



86U09X-049



86U09X-050

Installation Note

End play

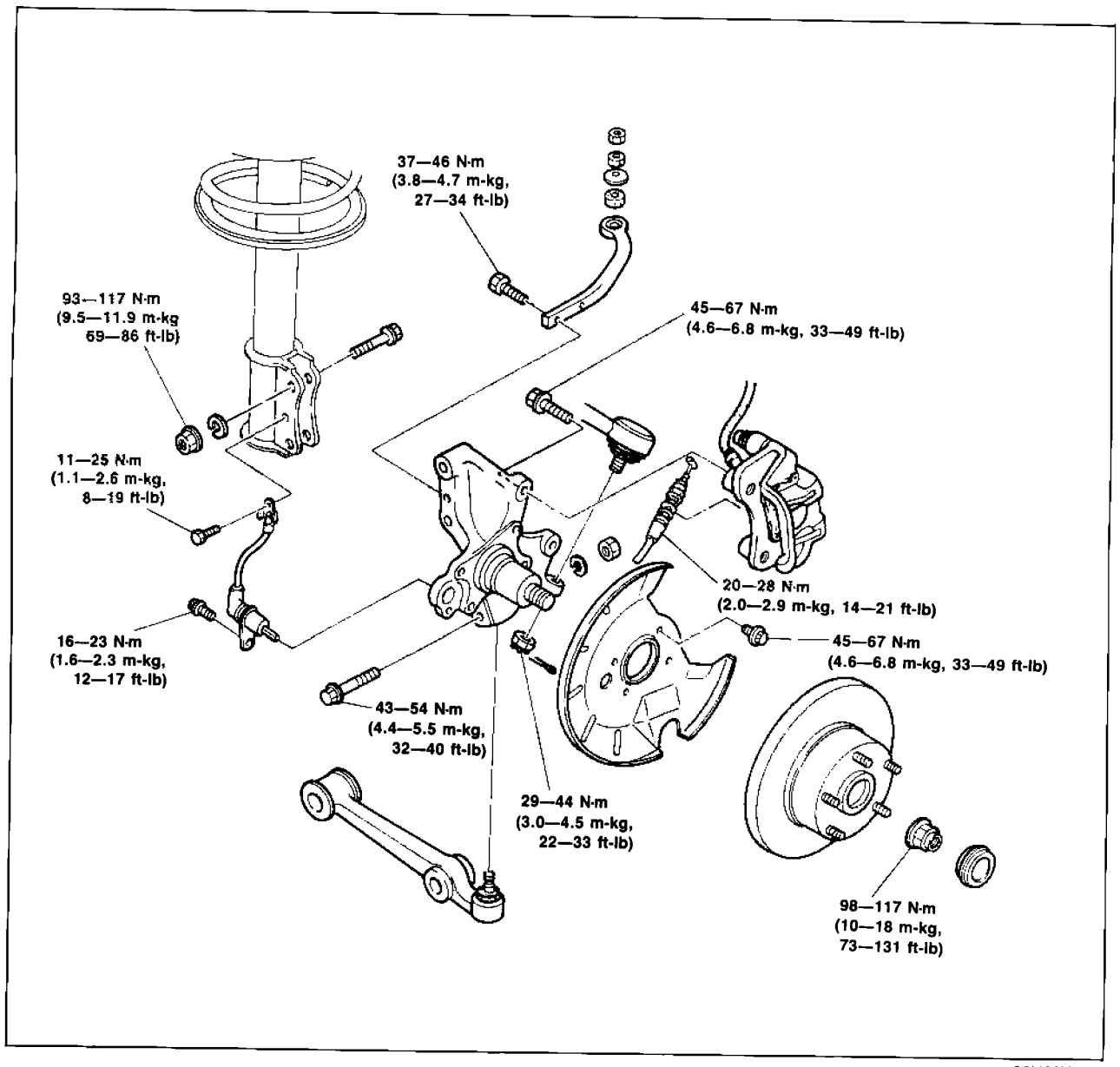
Measure the end play. (Refer to page 9—16)

End play: 0.2 mm (0.0079 in) max.

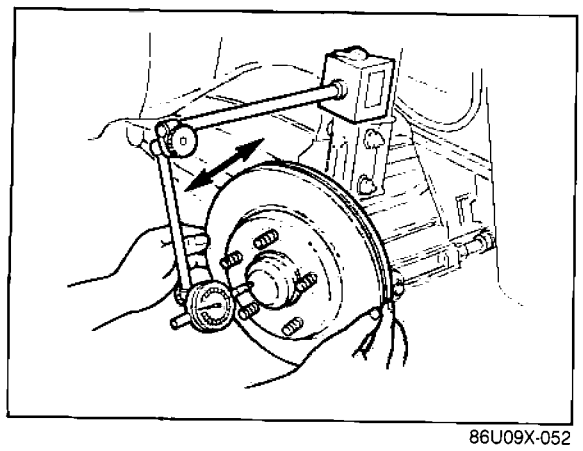
INSTALLATION (4WS)

Install in the reverse order of removal.

Torque Specifications



86U09X-051



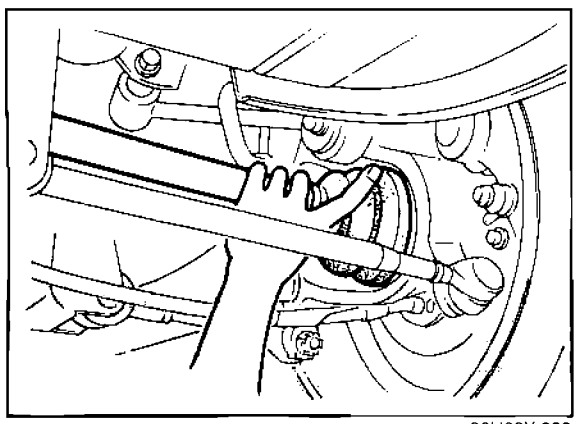
86U09X-052

Installation Note

End play

Measure the end play. (Refer to page 9—16)

End play: 0.2 mm (0.0079 in) max.



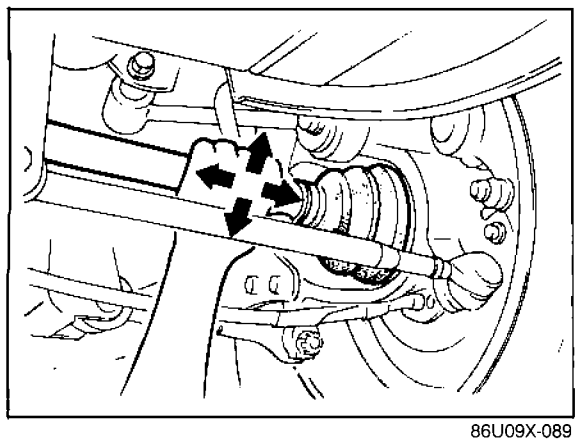
86U09X-088

DRIVESHAFT

ON-VEHICLE MAINTENANCE

Boot

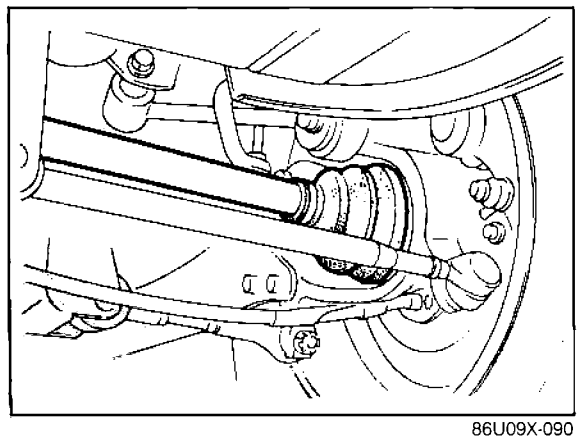
Check the boots on the driveshaft for cracks, damage, grease leakage or loose boot bands. Replace if necessary.



86U09X-089

Spline Looseness

Turn the driveshaft by hand and check that the spline and joint are not excessively loose.
Replace if necessary.

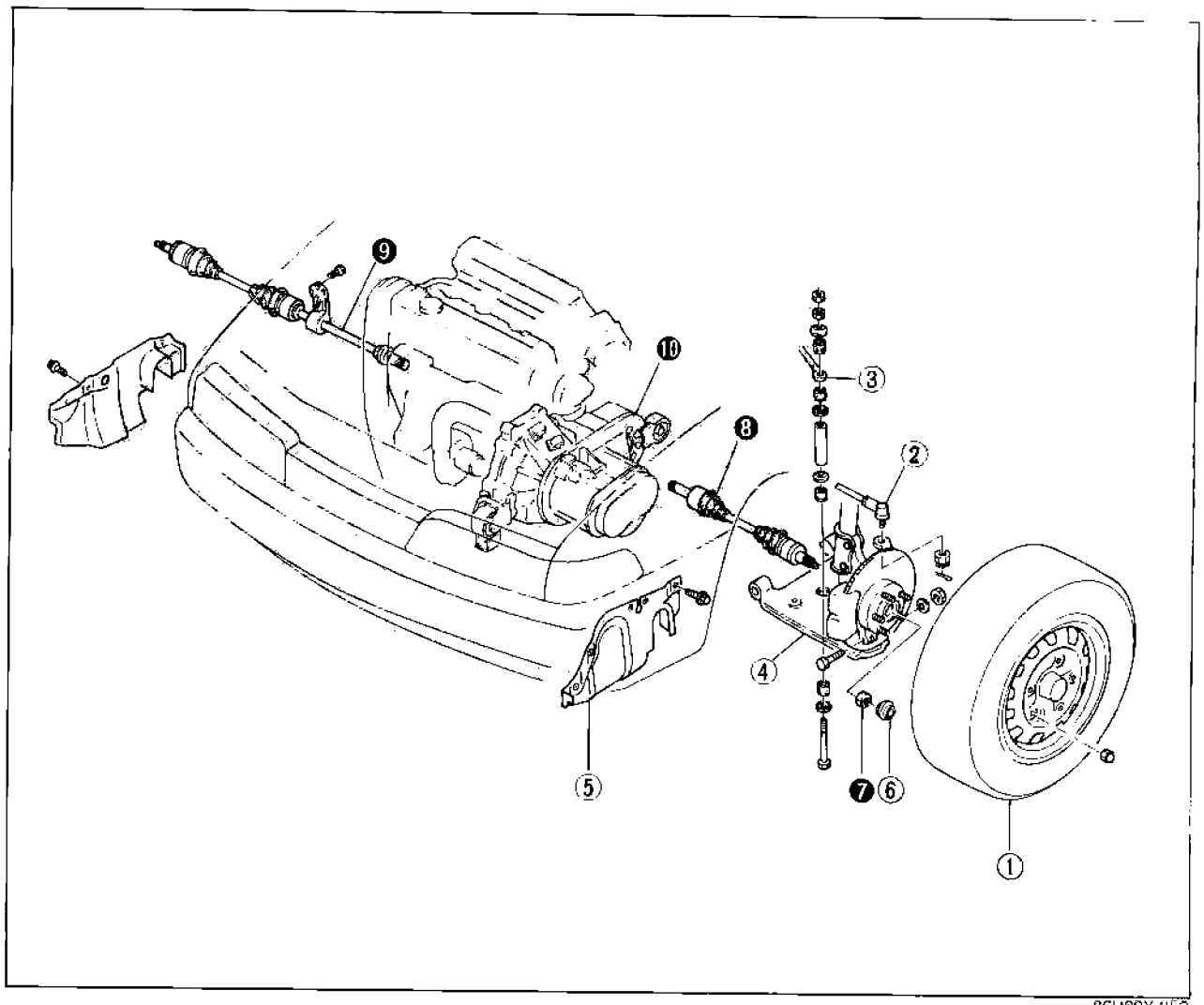


86U09X-090

Twisted or Cracked

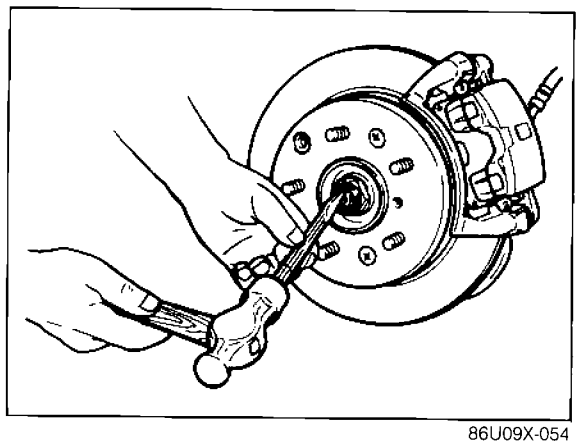
Check that the driveshaft is not twisted or cracked.
Replace if necessary.

REMOVAL
Remove in the sequence shown in the figure referring to the removal note for the specially marked parts.



86U09X-053

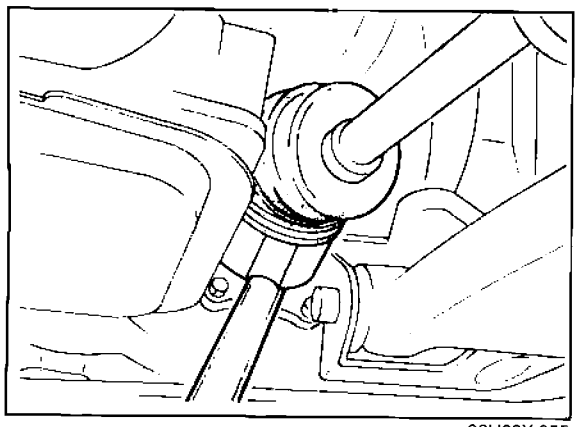
1. Wheel
2. Tie-rod end
3. Stabilizer
4. Lower arm
5. Splash shield
6. Hub cap
7. Lock nut
8. Driveshaft
9. Joint shaft
10. Transaxle



86U09X-054

Removal Note
Lock nut
Applying the brakes. Raise the lock nut tab and loosen it. Do not remove it.

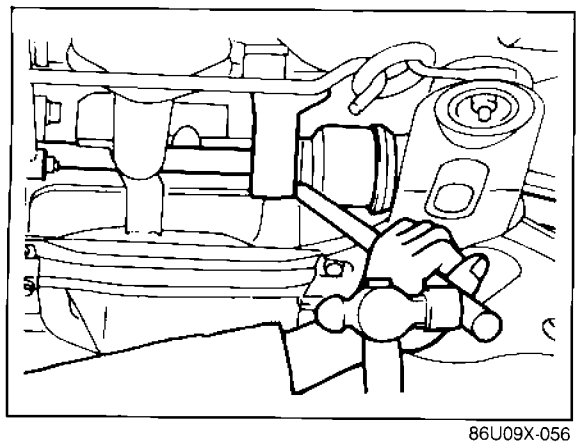
9 DRIVESHAFT



86U09X-055

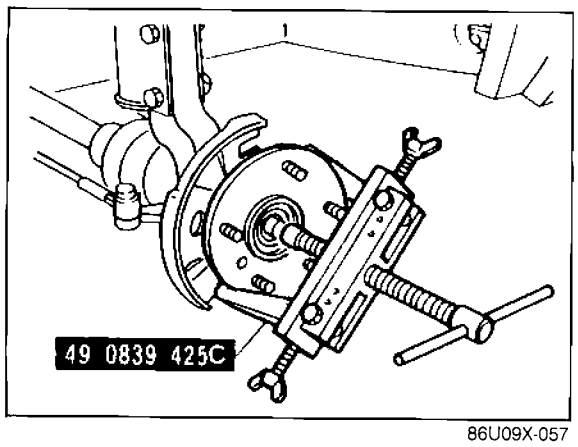
Driveshaft
Disconnect the driveshaft from the transaxle with a prybar.

Note
Do not damage the boot or the oil seal.



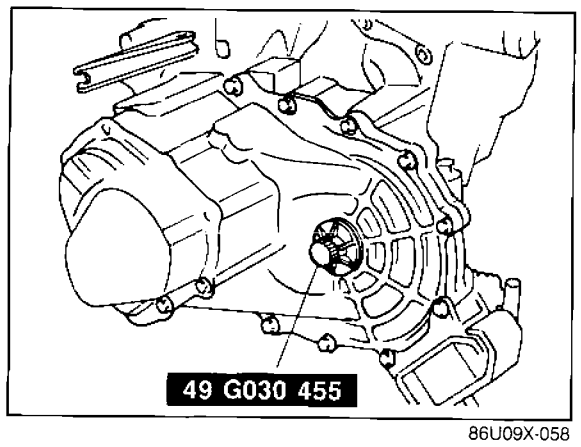
86U09X-056

Joint shaft
As shown in the figure, insert a pry bar between the driveshaft and the joint shaft and tap on the bar to uncouple them.



86U09X-057

Front wheel hub
Use the **SST** to push the shaft out if it is stuck in the front wheel hub.

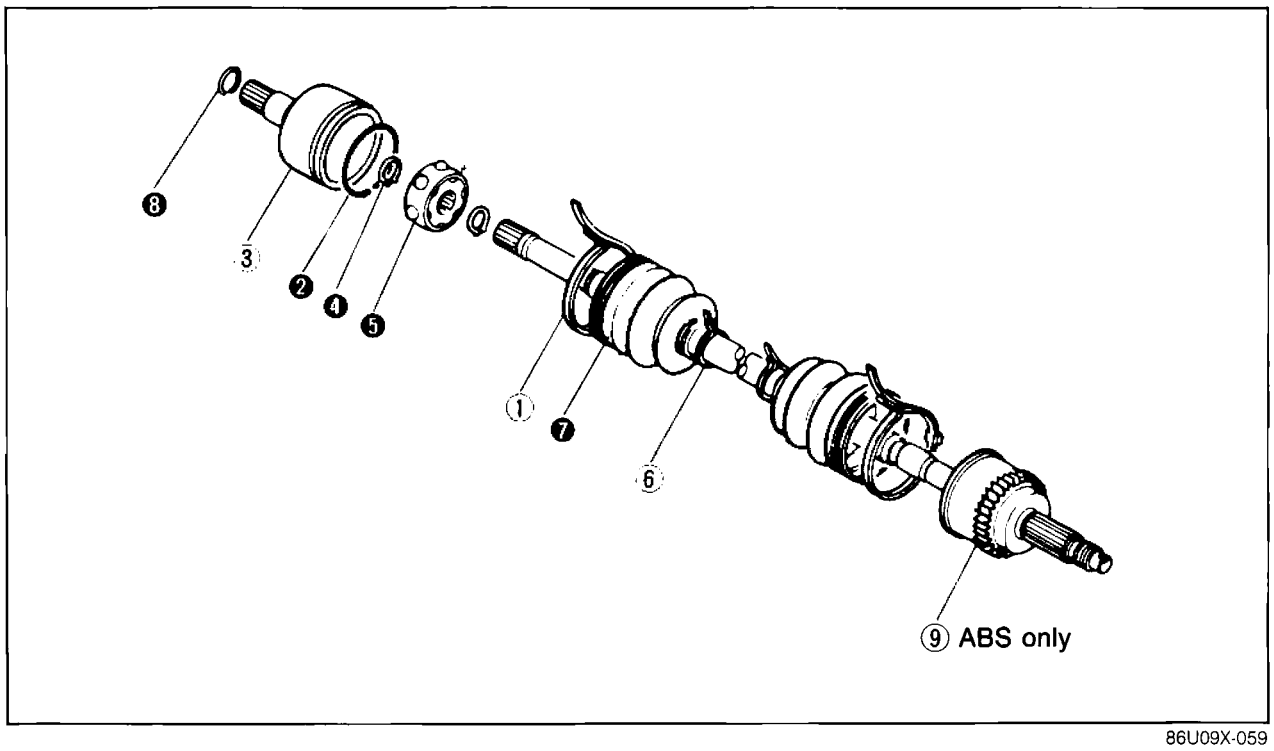


86U09X-058

Differential
Install the **SST** to hold the side gear after removing the driveshaft.

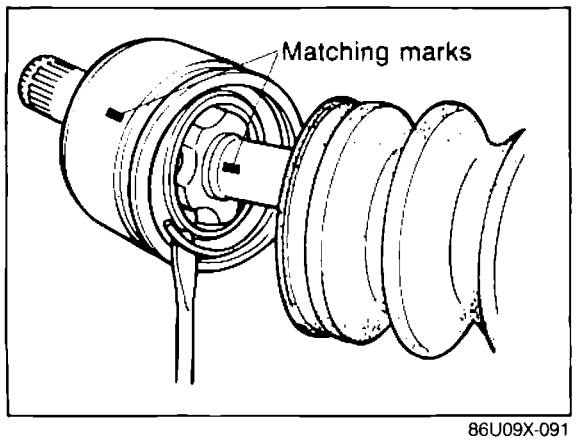
[MTX]
DISASSEMBLY
Disassemble in the sequence shown in the figure referring to the disassembly note for specially marked parts.

Note
a) Clamp the shaft in a vice. Use protectors in the vice to avoid damage.
b) Do not allow dirt or foreign matter in the joint during disassembly or assembly.
c) Do not disassemble the ball-joint at the wheel side. Do not wipe the grease off if there is no problem.
d) Do not remove the clip used to secure the outer ring to the ball-joint at the differential side if there is no problem.
If the clip is removed, replace it with a new one.



86U09X-059

1. Boot band
2. Clip
3. Outer ring
4. Snap ring
5. Ball joint
6. Boot band
7. Boot
8. Clip
9. Sensor rotor (Refer to Section 11)

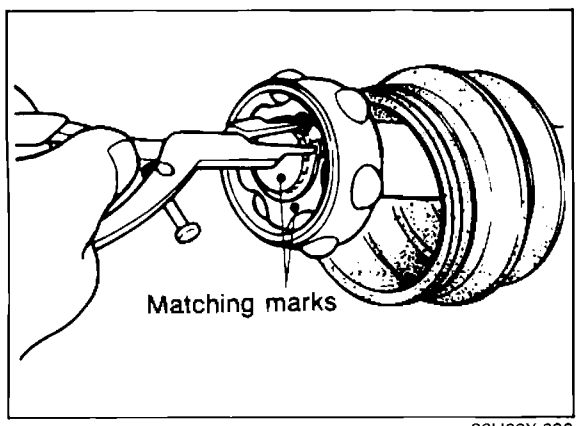


86U09X-091

Clip
1. Make matching marks on the driveshaft and outer ring for proper reassembly.

Note
Mark with paint, do not use a punch.

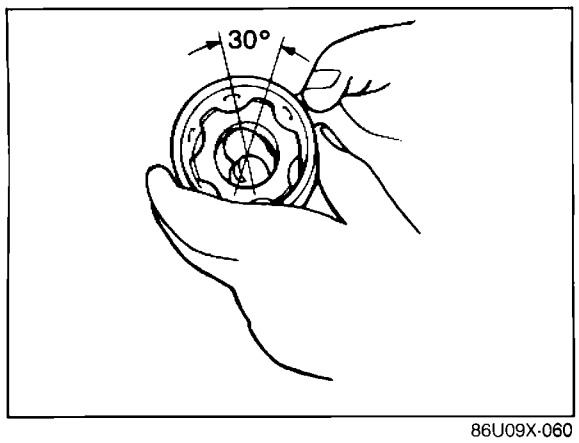
2. Remove the clip.



86U09X-092

Snap ring

1. Make matching marks on the driveshaft end and inner ring.
2. Remove the snap ring using snap ring pliers.



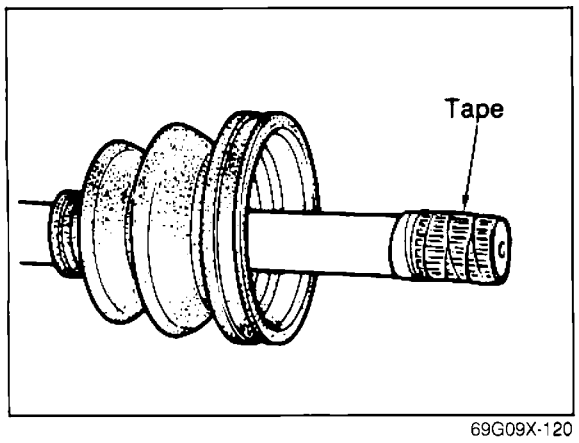
86U09X-060

Balls, inner ring and cage

1. Make matching marks on the inner ring and cage.

Note
Mark with paint, do not use a punch.

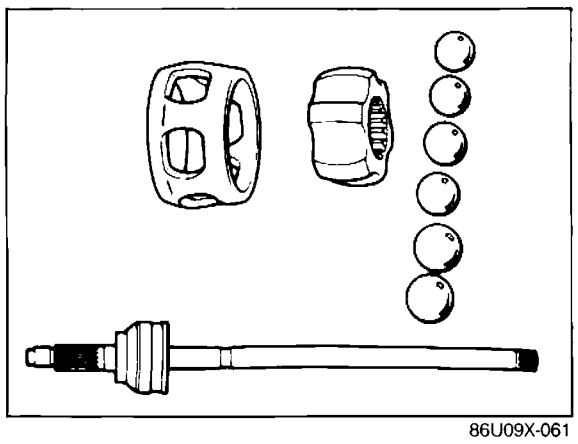
2. Turn the cage approximately 30°, then pull it away from the inner ring.



69G09X-120

Boot

1. Wrap the shaft splines with tape.
2. Remove the boot.

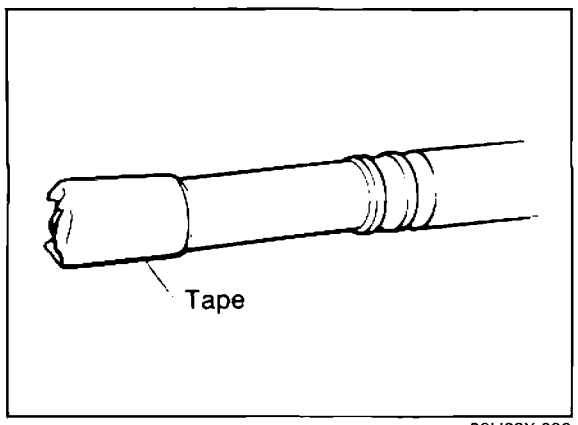


86U09X-061

INSPECTION

Wash the parts. Check and replace all damaged parts.

1. Twisted, bent, or damaged shaft.
2. Worn or scored splines.
3. Worn, rusted, or damaged outer ring.

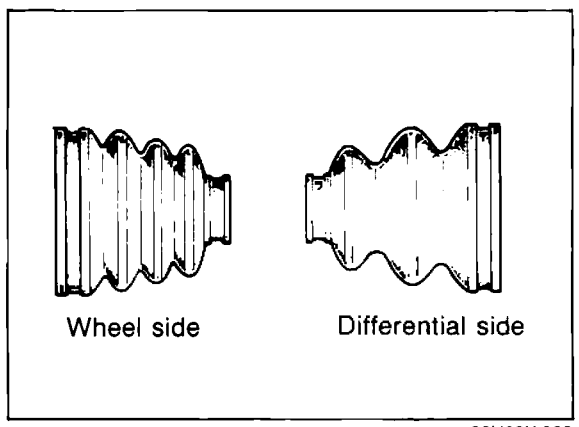


86U09X-093

ASSEMBLY

Boot

Wrap the shaft splines with tape before installing the boot.



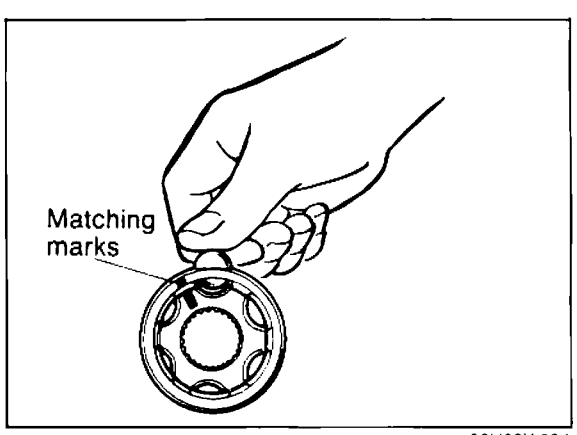
86U09X-062

Note

a) The wheel side and differential side boots are different as shown in the figure.

b) Fill the inside of the ball joint with the specified grease included in the kit.

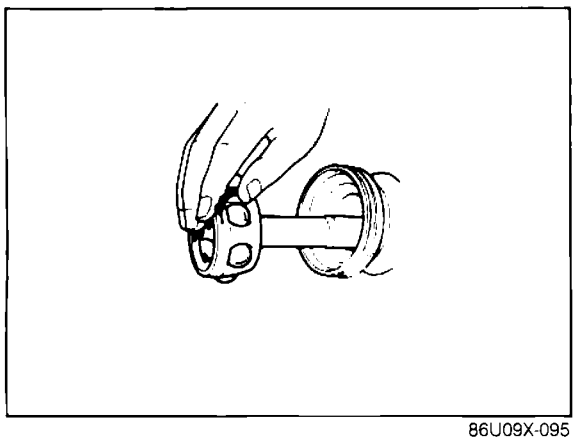
c) Securely fit the boot to the shaft and the outer race boot grooves.



86U09X-094

Balls, inner ring and cage

1. Align the matching marks and install the balls.

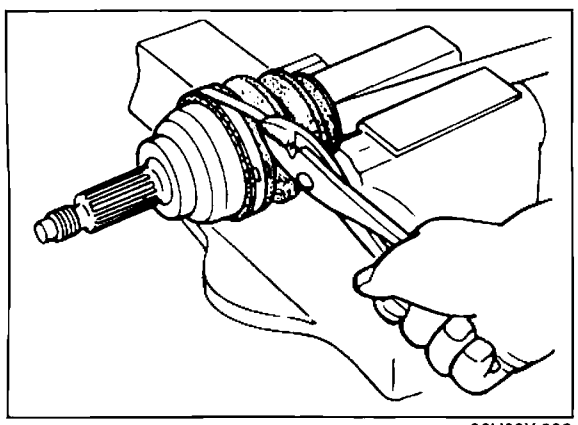


86U09X-095

2. Apply molybdenum disulfide grease to the joint.

Note

Do not use other than specified grease.

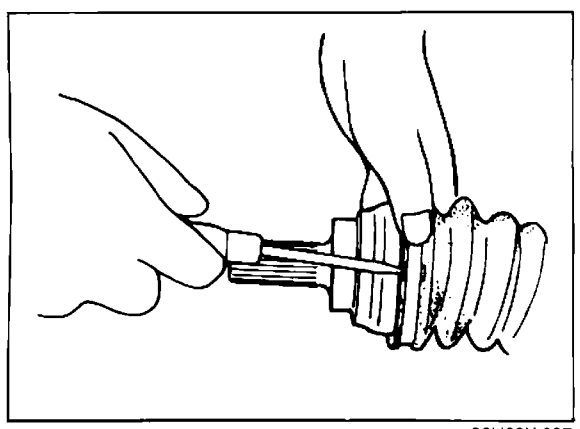


86U09X-096

Boot Band
Tighten the boot band.

Note
a) Use a new band.
b) Fold the band in the direction opposite the forward rotation of the driveshaft.

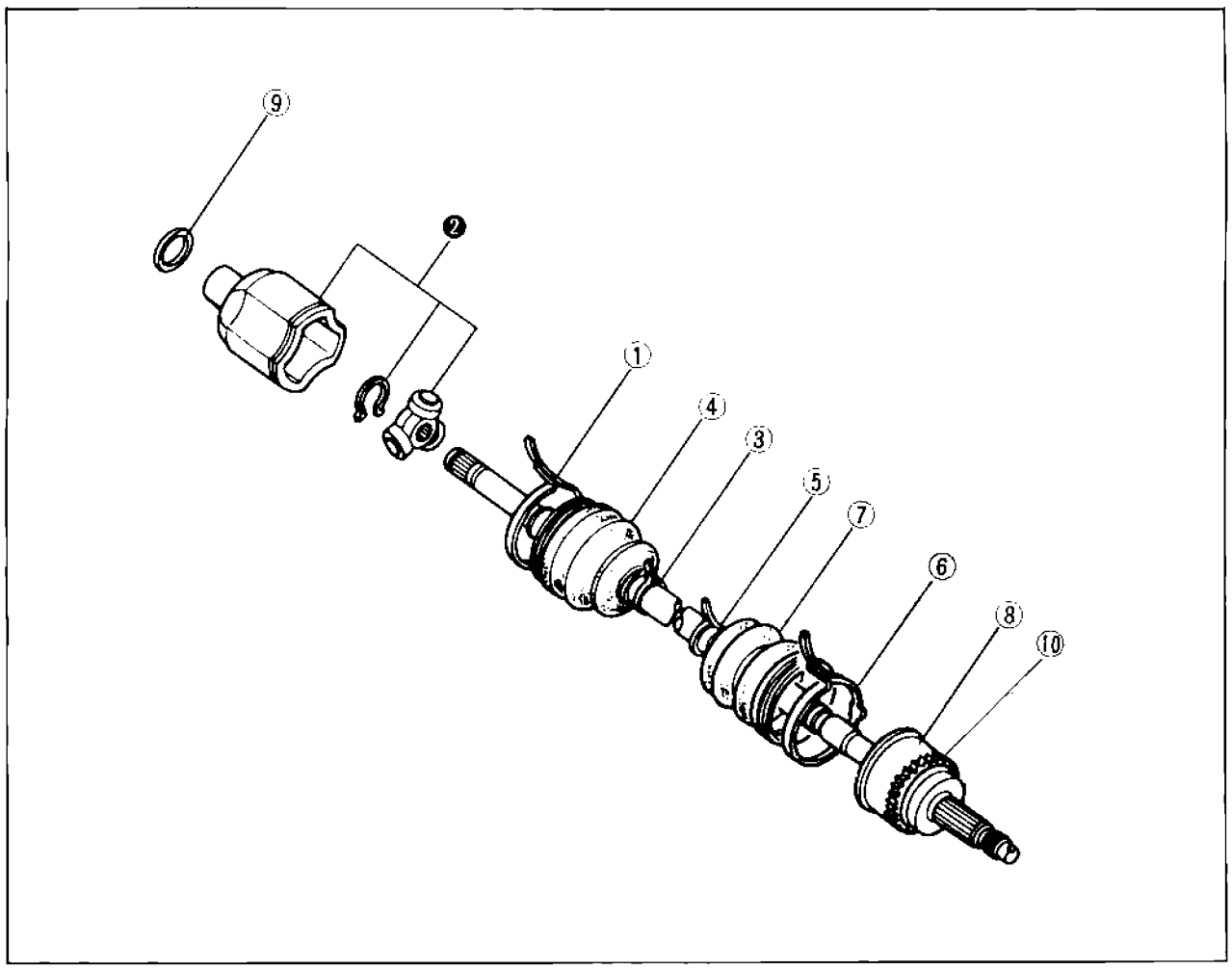
1. Fold the band back by pulling on the end of the band.



86U09X-097

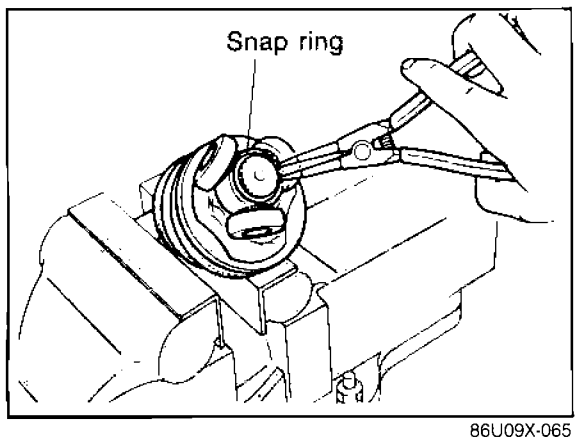
2. Bend the locking clip to lock the end of the band.

[ATX]
DISASSEMBLY
Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked parts.



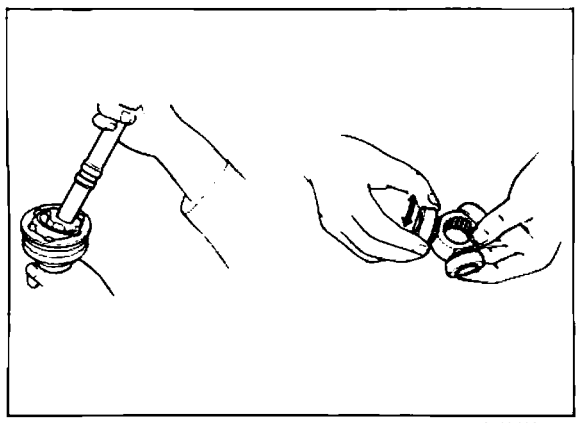
86U09X-064

1. Boot band
2. Tripod joint assembly
3. Boot band
4. Boot
5. Boot band
6. Boot band
7. Boot
8. Shaft and ball-joint assembly
9. Clip
10. Sensor rotor (Refer to Section 11)



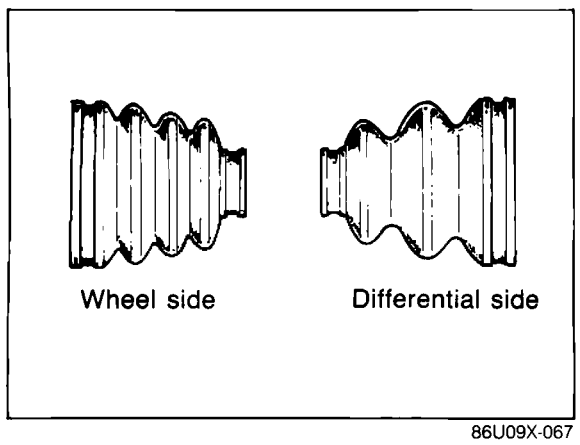
86U09X-065

Disassembly Note
Tripod joint assembly
1. Remove the snap ring using snap ring pliers, then remove the tripod joint bearing.
2. Disassemble the joint shaft assembly.



86U09X-066

INSPECTION
Check and replace any faulty parts.
1. Twisted, bent, or damaged shaft.
2. Wear or scoring of splines.
3. Wear, excessive looseness, seizure, rust, or damage of bearing.
4. Checking, damage, or deterioration of boots.
5. Excessive play or heat damage of joint shaft bearing.

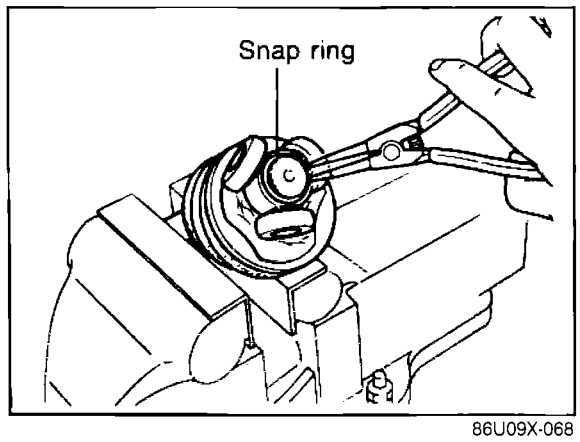


86U09X-067

ASSEMBLY
Assemble in the reverse order of disassembly, referring to assembly note.

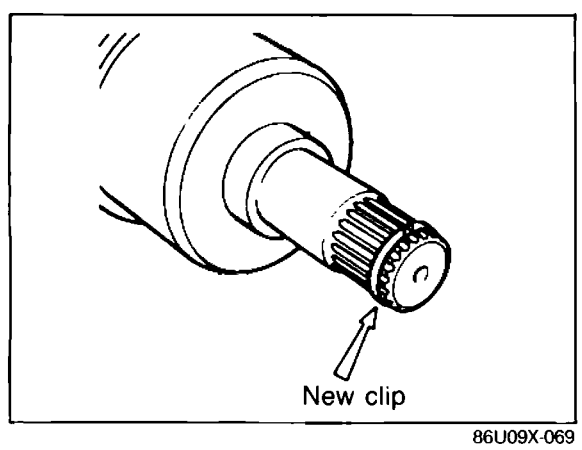
Assembly Note

Note
a) The wheel side and differential side boots are different as shown in the figure.
b) Fill the inside of the ball joint with the specified grease included in the kit.
c) Securely fit the boot to the shaft and the outer race boot grooves.



86U09X-068

Tripod joint
Install the snap ring to the joint.

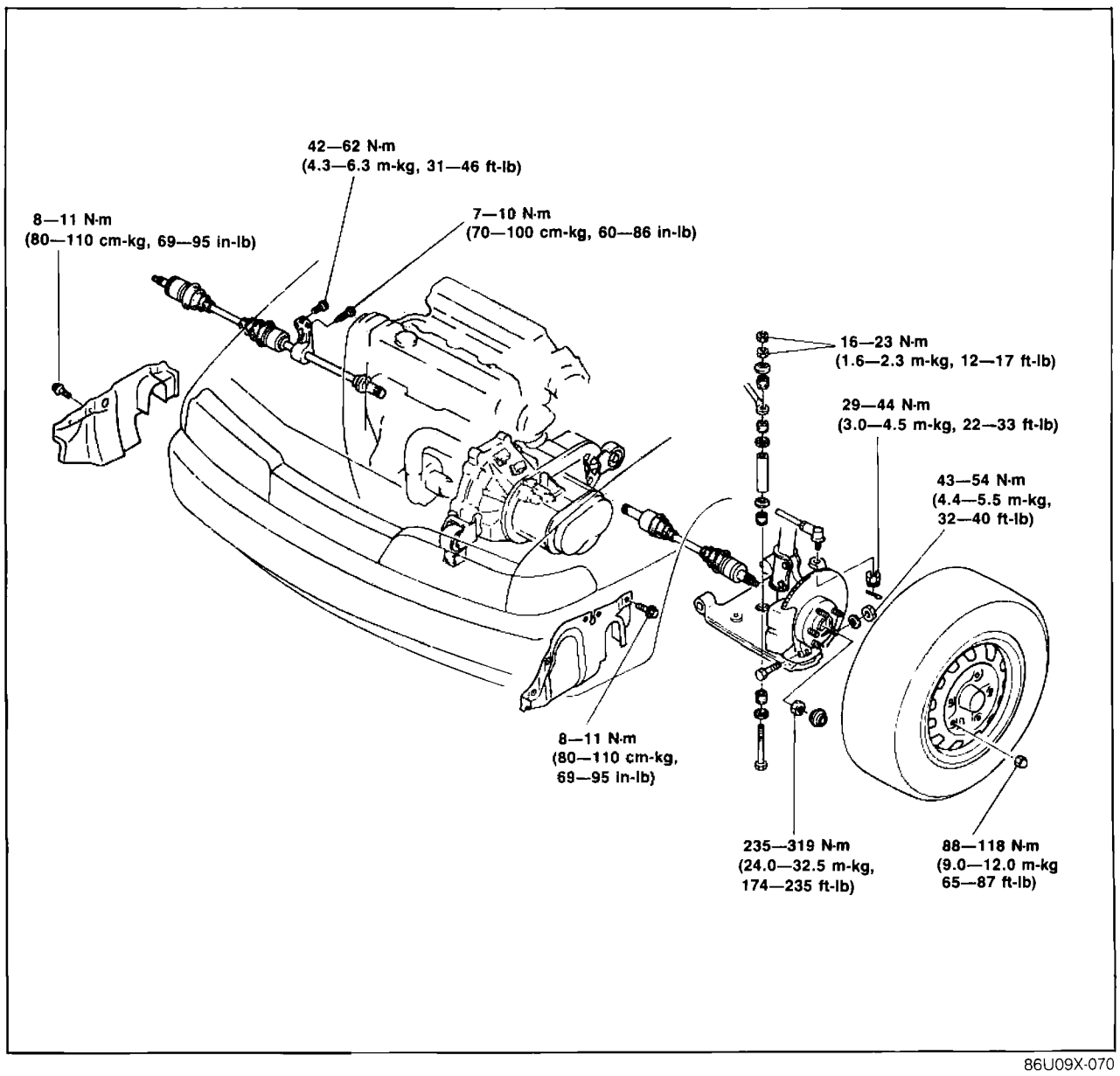


86U09X-069

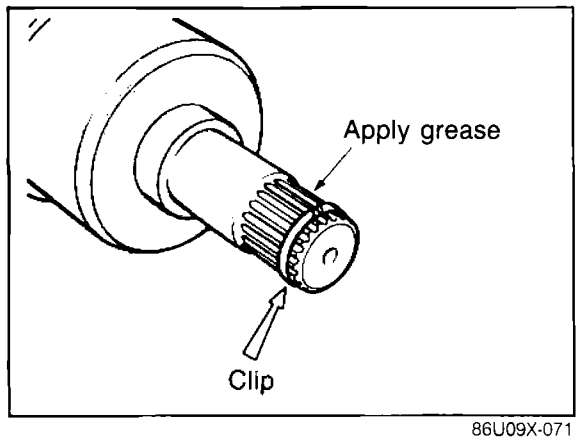
Clip
Install a new clip.

INSTALLATION
Install in the reverse order of removal referring to the installation note.

Torque specifications



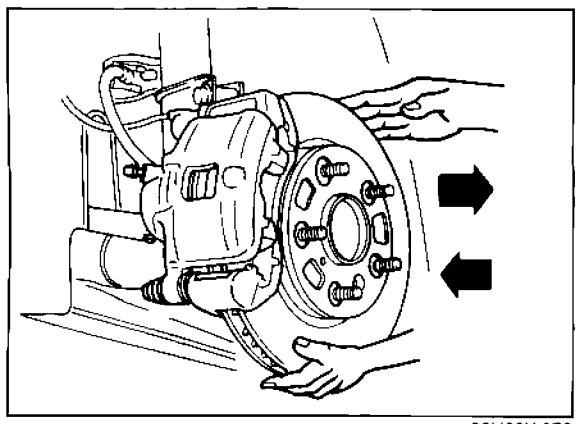
86U09X-070



86U09X-071

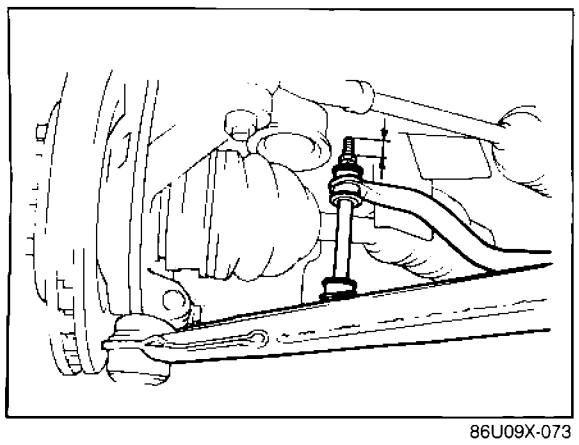
Installation Note
Clip
Install a new clip.

Note
a) Before installing the shaft, check the transaxle oil seal for damage.
b) Apply transaxle oil to the oil seal lip.



86U09X-072

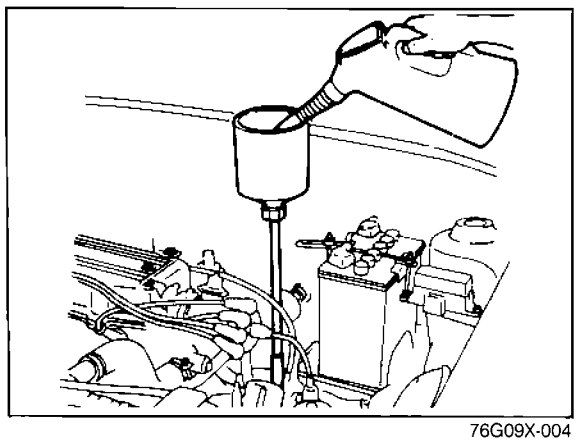
Front wheel hub
After installation, pull the front wheel hub outward and check that the driveshaft does not come out.



86U09X-073

Stabilizer
Lock the nut with **20.1 mm (0.79 in)** of the threads exposed.

Tightening torque: 16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)



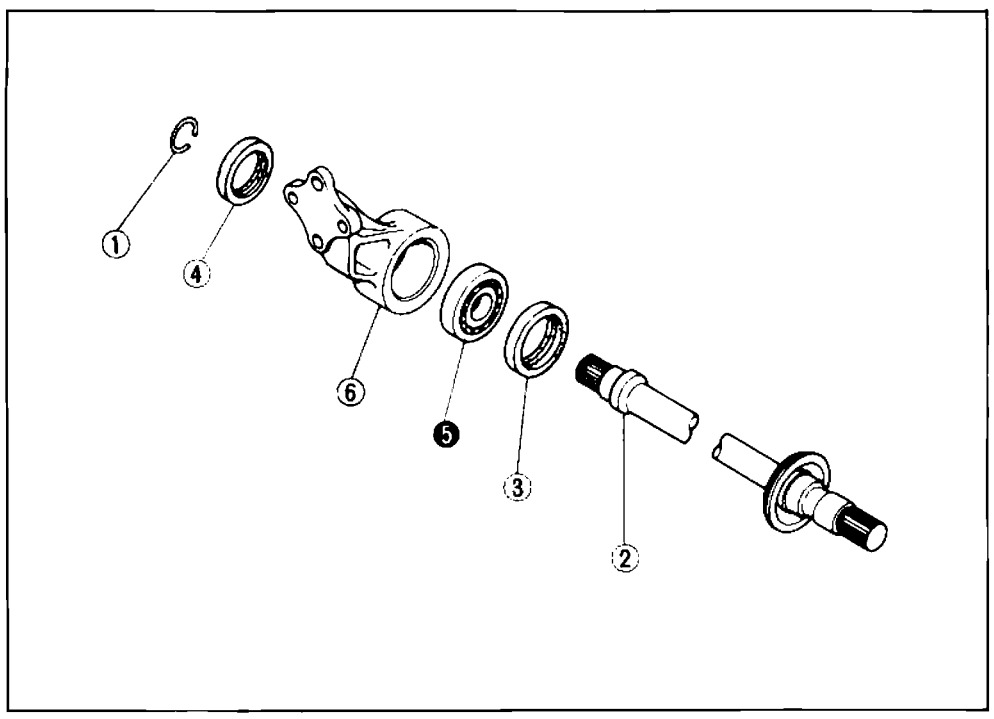
76G09X-004

Oil
Add the specified grade and quantity of transaxle oil. (Refer to Section 7A, 7B, 7C)

JOINT SHAFT

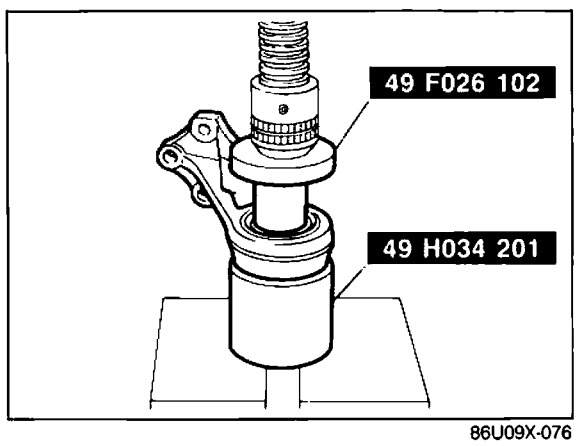
Disassembly and Assembly

Disassemble in the sequence shown in the figure.
Assembly in the reverse order of disassembly.
Referring to the notes for the specially marked parts.



76G09X-005

1. Clip
2. Joint shaft
3. Oil seal
4. Oil seal
5. Bearing
6. Bracket



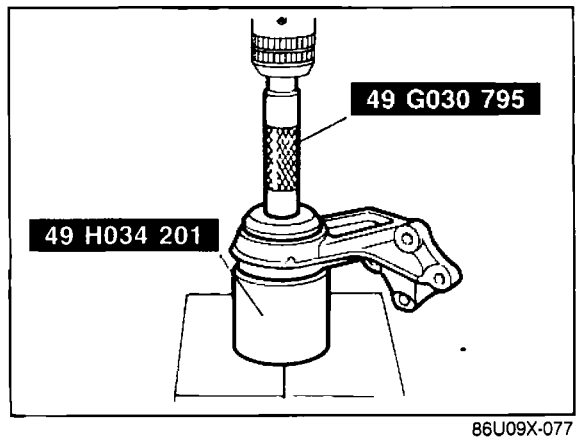
86U09X-076

Disassembly Note

Bearing

Remove the shaft and bearing with the **SST** and press.

Caution
Hold the shaft and the bearing by hand does not drop.



86U09X-077

Assembly Note

Bearing

1. Install the shaft and a new bearing with the **SST** and press.
2. Install new oil seals.
3. Install a new clip.

10

STEERING SYSTEM

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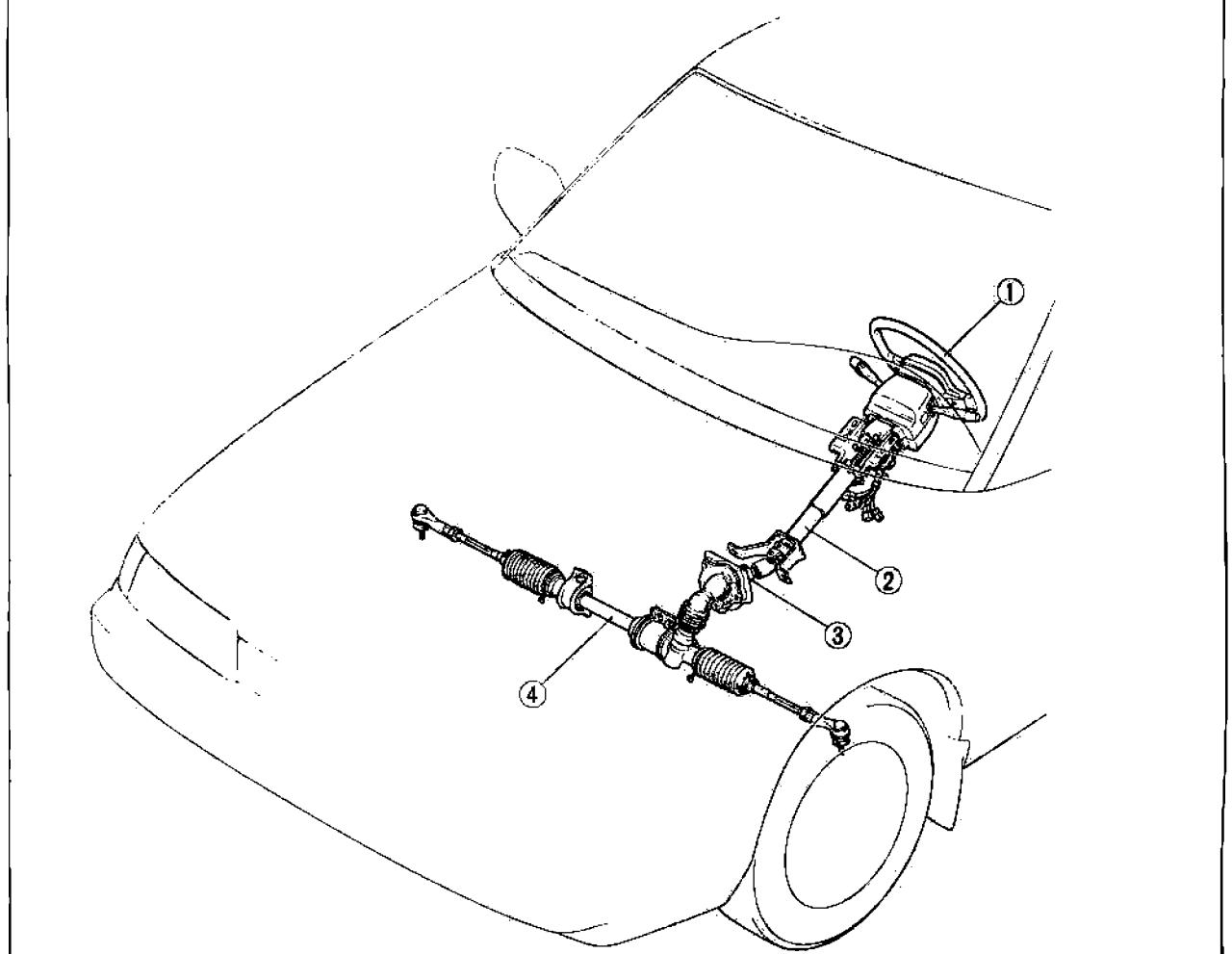
76G10X-001

10 OUTLINE

OUTLINE

STRUCTURAL VIEW

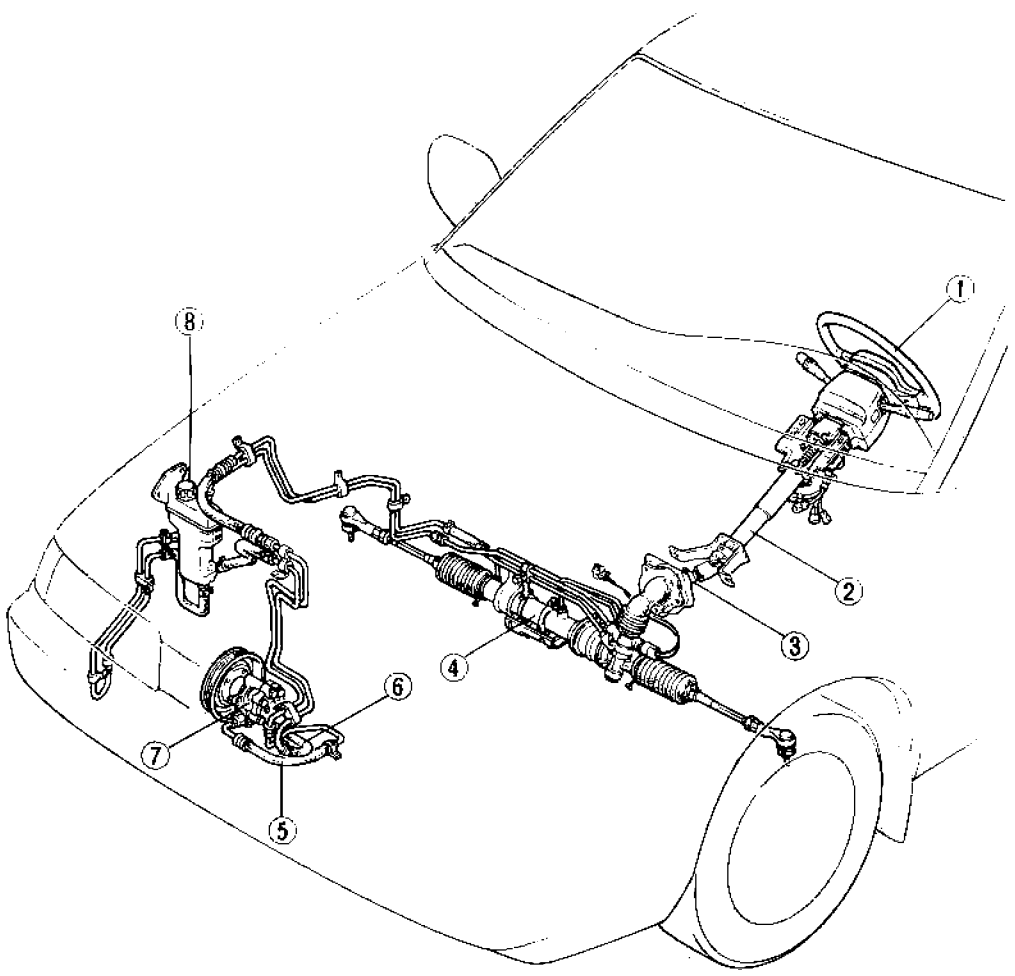
Manual Steering



86U10X-002

1. Steering wheel
2. Steering shaft
3. Intermediate shaft
4. Steering gear assembly

Power Steering (ESPS)

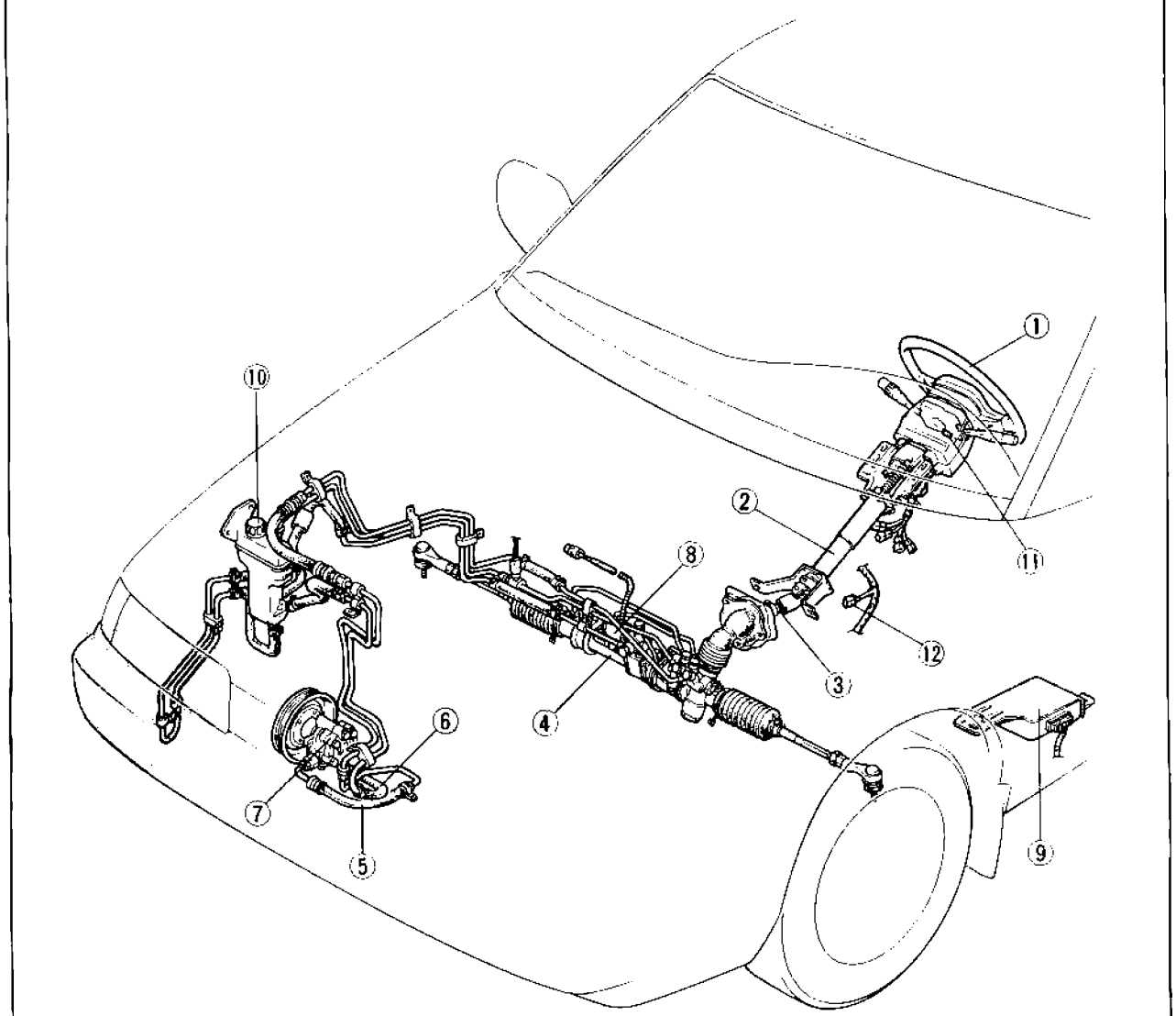


86U10X-003

1. Steering wheel
2. Steering shaft
3. Intermediate shaft
4. Steering gear assembly
5. Pressure hose
6. Return hose
7. Oil pump
8. Reserve tank

Note
Engine speed sensing power steering is abbreviated ESPS.

Power Steering (ECPS)

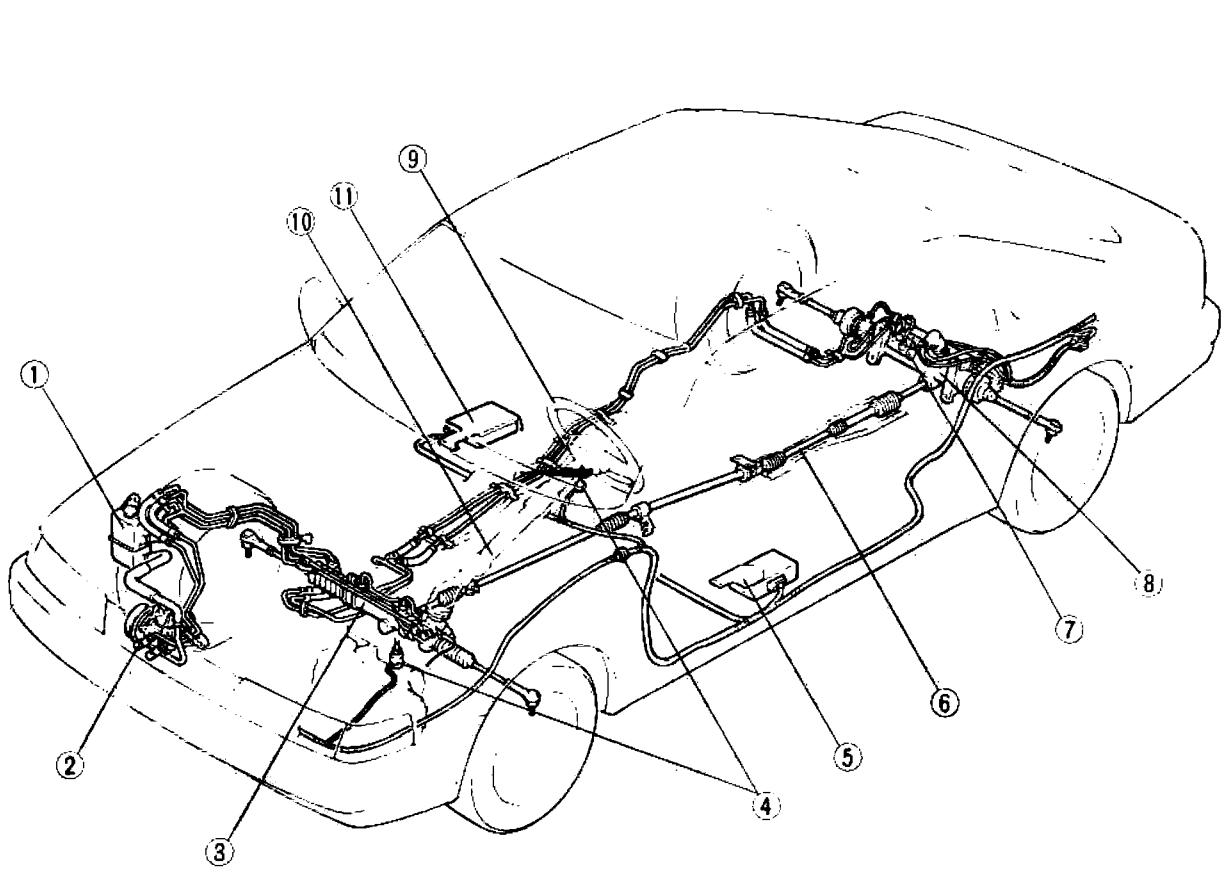


86U10X-004

1. Steering wheel
2. Steering shaft
3. Intermediate shaft
4. Steering gear assembly
5. Pressure hose
6. Return hose
7. Oil pump
8. Solenoid valve
9. Control unit
10. Reserve tank
11. Steering angle sensor
12. Check connector

Note
Electronically - controlled power steering is abbreviated ECPS.

Power Steering (4WS)



86U10X-005

1. Reserve tank
2. Oil pump
3. Front steering gear assembly
4. Speed sensor
5. Control unit
6. Steering angle transfer shaft
7. Solenoid valves
8. Rear steering gear assembly
9. Steering wheel
10. Steering shaft
11. Relay and timer

Note
4-wheel steering is abbreviated 4WS.

10 OUTLINE

SPECIFICATIONS

Item \ Type			Manual steering	Power steering
Steering wheel	Outer diameter mm (in)		380 (15.0)	
	Turns lock to lock		4.32	2.93
Steering shaft and joints	Shaft type		Collapsible	
	Joint type		Cross joints (2)	
	Tilt stroke mm (in)		40 (1.6)	
Front steering gear	Type		Rack and pinion	
	Gear ratio		∞ (infinite)	
Power steering fluid	Capacity liter (US qt, Imp)	2WS	—	0.9 (0.95, 0.79)
		4WS	—	1.0 (1.06, 0.88)
	Type	2WS 4WS	—	Dexron II or M III

86U10X-006

Note
2-Wheel steering is abbreviated 2WS.

TROUBLESHOOTING GUIDE

MANUAL STEERING

Problem	Probable Cause	Remedy	Page
Steering "heavy" (vehicle jacked up, both wheels off ground)	Poor lubrication, foreign material, or abnormal wear of steering ball-joints	Refer to Section 13	—
	Stuck or damaged ball-joints	Replace	10—18
	Improperly adjusted steering pinion preload	Adjust	10—56
	Damaged steering gear	Replace	10—28
	Worn or damaged steering bushing	Replace	10—53
	Stuck lower-arm ball-joint	Refer to Section 13	—
	Malfunction of steering-shaft joint	Replace	10—21
Steering wheel pulls to one side	Incorrect tire pressure	Refer to Section 12	—
	Unevenly worn tires	Refer to Section 12	—
	Weakened front spring	Refer to Section 13	—
	Worn or damaged stabilizer and/or lower arm bushing	Refer to Section 13	—
	Dragging brake	Refer to Section 11	—
	Loose lower arm	Refer to Section 13	—
	Improperly adjusted wheel alignment	Refer to Section 13	—
General instability while driving	Incorrect tire pressure	Refer to Section 12	—
	Damaged or unbalanced wheel	Refer to Section 13	—
	Worn or damaged steering joints	Replace	10—21
	Improperly adjusted steering pinion preload	Adjust	10—56
	Weakened front spring	Refer to Section 13	—
	Worn or damaged stabilizer and/or lower arm bushing	Refer to Section 13	—
	Malfunctioning shock absorber	Refer to Section 13	—
	Improperly adjusted wheel alignment	Refer to Secton 13	—
Steering wheel vibrates	Incorrect tire pressure	Refer to Section 12	—
	Unevenly worn tires	Refer to Section 12	—
	Worn wheel bearing, or incorrect adjustment	Refer to Section 13	—
	Worn or damaged steering joints	Replace	10—21
	Improperly adjusted steering pinion preload	Adjust	10—56
	Loose gear housing mounting bolts	Tighten	10—30
	Worn steering gear bearing	Replace	—
	Worn or damaged stabilizer and/or lower arm bushing	Refer to Section 13	—
	Improperly adjusted wheel alignment	Refer to Section 13	—
	Worn lower-arm ball-joint	Refer to Section 13	—
	Damaged unbalanced wheel	Refer to Section 13	—
	Malfunctioning or loose shock absorber	Refer to Section 13	—
Excessive steering wheel play	Improperly adjusted steering gear backlash	Adjust	10—56
	Worn rack and pinion gear	Replace	10—51
	Worn or damaged steering joints	Replace	10—21
	Worn or damaged lower-arm bushing	Refer to Section 13	—
Poor steering wheel return	Incorrect tire pressure	Refer to Section 12	—
	Stuck or damaged steering joints	Replace	10—21
	Improperly adjusted front wheel alignment	Refer to Section 13	—
	Improperly adjusted steering pinion preload	Adjust	10—56
Abnormal noise from steering system	Loose steering linkage	Tighten	10—28
	Worn steering joints	Replace	10—21
	Improperly adjusted steering gear backlash	Adjust	10—56

86U10X-007

10 TROUBLESHOOTING GUIDE

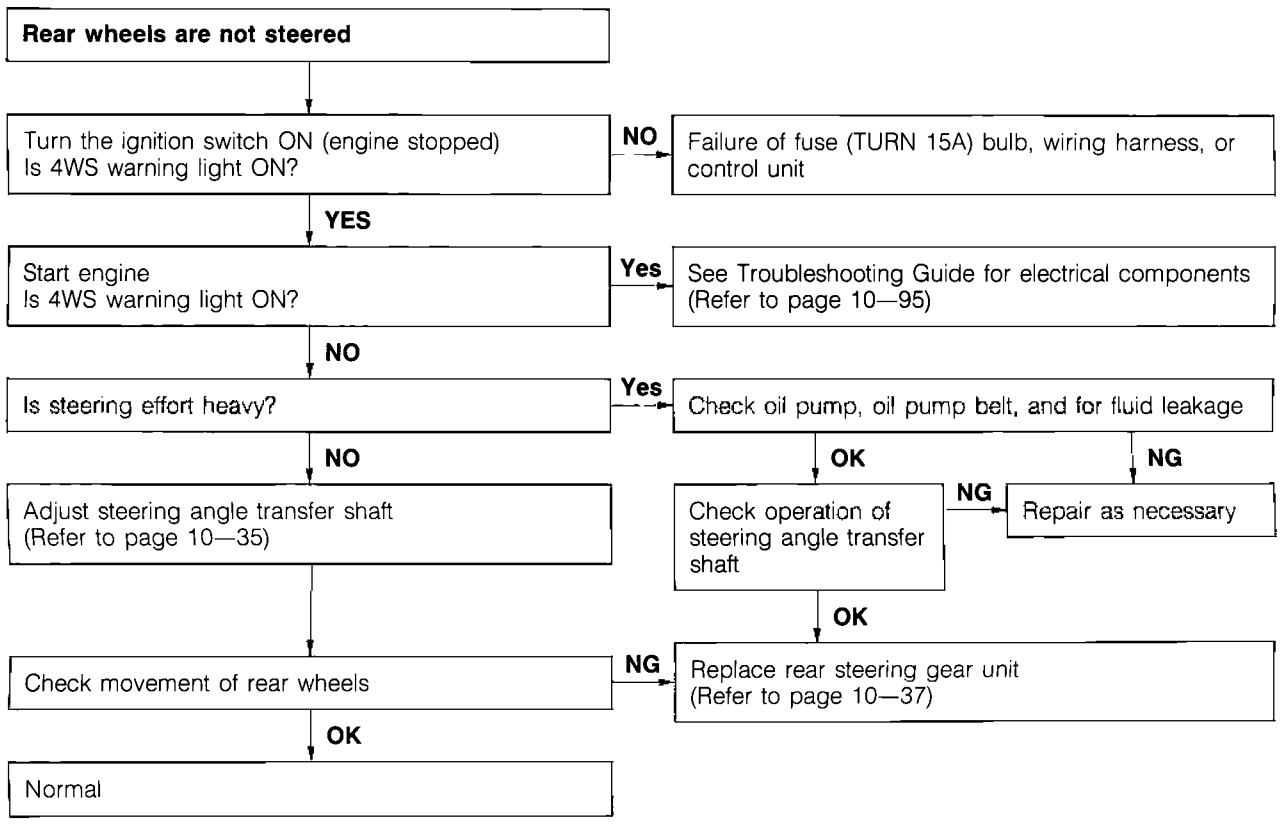
POWER STEERING

Problem	Possible cause	Remedy	Page
Hard steering	Loose or damaged belt	Adjust or replace	10—12
	Low fluid level, or air in fluid	Add fluid or bleed air	10—11
	Leakage of fluid	Repair or replace	10—13
	Malfunctioning electrical system*	Repair or replace	10—87
	Insufficient oil pump pressure	Repair or replace	10—16
	Improperly adjusted wheel alignment	Refer to Section 13	—
	Malfunctioning steering gear	Repair or replace	10—28, 37
	Linkage ball joint not operating smoothly	Replace	10—18
Poor return	Insufficient tire pressure	Refer to Section 12	—
	Improperly adjusted wheel alignment	Refer to Section 13	—
	Ball-joint not operating smoothly	Replace	10—20
	Steering shaft contacting something	Repair	10—21
Excessive play	Loose gear box housing mounting bolts	Tighten	10—30
	Worn linkage or tie-rod ball joint	Replace	10—18
	Worn lower ball joint	Refer to Section 13	—
	Worn or damaged steering joint	Replace	10—21
	Worn rack and pinion gear	Replace	10—58, 75
Steering wheel vibrates	Insufficient tire pressure	Refer to Section 12	—
	Damaged or unbalanced wheel	Refer to Section 13	—
	Improperly adjusted wheel alignment	Refer to Section 13	—
	Loose gear box housing mounting bolts	Tighten	10—30
	Incorrect pinion preload adjustment	Adjust	10—72, 81
	Worn ball joints	Replace	10—18
	Loose shock absorber mounting	Refer to Section 13	—
	Malfunctioning shock absorber	Refer to Section 13	—
Steering wheel pulls	Unevenly worn tires	Refer to Section 12	—
	Incorrect tire pressure	Refer to Section 12	—
	Dragging brake	Refer to Section 11	—
	Improperly adjusted wheel alignment	Refer to Section 13	—
Excessively light steering at high speed*	Malfunctioning electrical system	Repair or replace	10—87

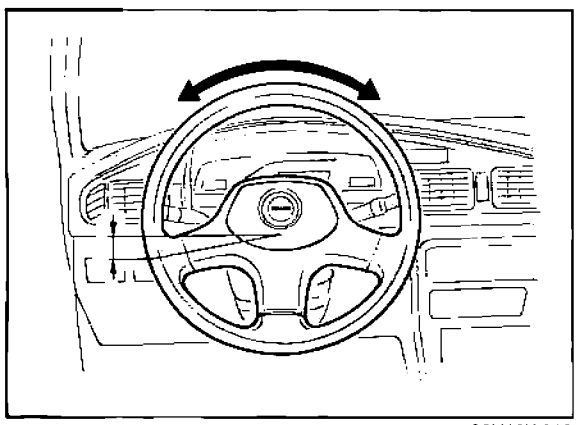
*... Only for electronically - controlled type

76G10X-002

4WS
Rear Steering Gear



76G10X-003



86U10X-010

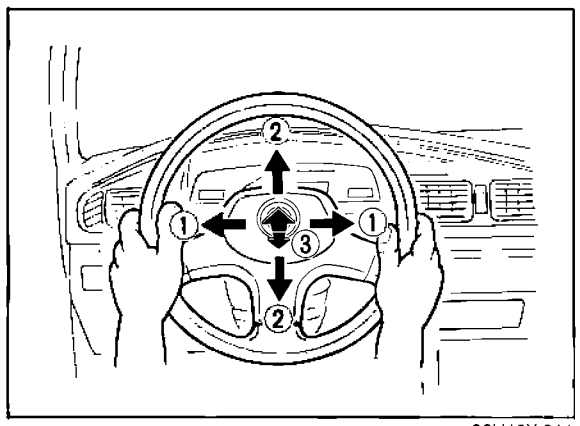
ON-VEHICLE MAINTENANCE

STEERING WHEEL PLAY

With the wheels in the straight-ahead position, gently turn the steering wheel to the left and right and check that the play is within specification.

Play: 0—30 mm (0—1.18 in)

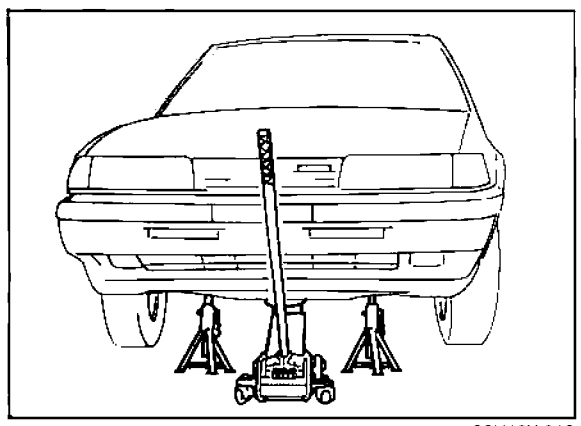
Note
If play exceeds specification, either the steering joints are worn or backlash of the steering gear is excessive.



86U10X-011

LOOSENESS OR PLAY OF STEERING WHEEL

Move the steering wheel in the directions ①, ②, and ③ to check for column bearing wear, steering-shaft joint play, steering wheel looseness, and column looseness.



86U10X-012

STEERING WHEEL EFFORT

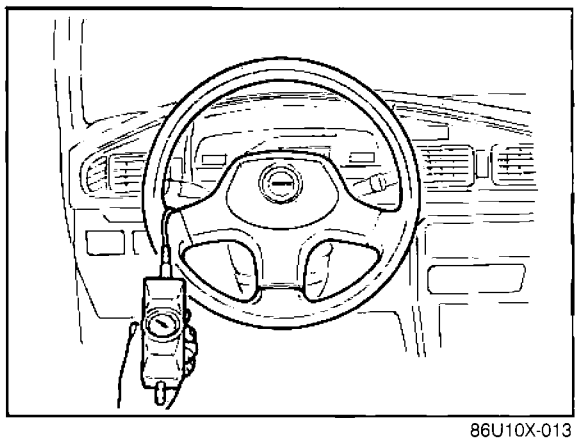
Manual Steering

1. Jack up the vehicle. Move the steering wheel to put the wheels in the straight-ahead position.
2. Measure the steering wheel effort by connecting a pull scale to the outer circumference of the steering wheel.

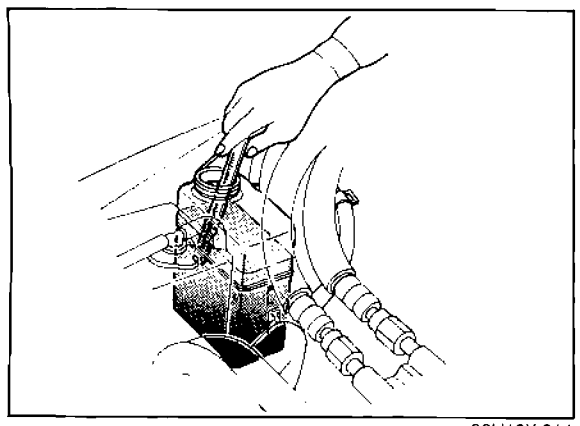
Steering wheel effort:
5—25 N (0.5—2.5 kg, 1—5.5 lb)
[during one turn of the steering wheel]

Note
Measure after turning the steering wheel to the left and right at least 5 times.

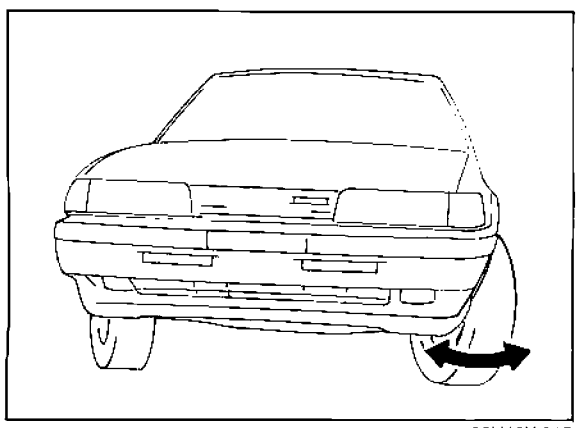
3. If the measured value exceeds specification, check the following: rotation-starting torque of pinion, rotation torque of each ball-joint, and joints.



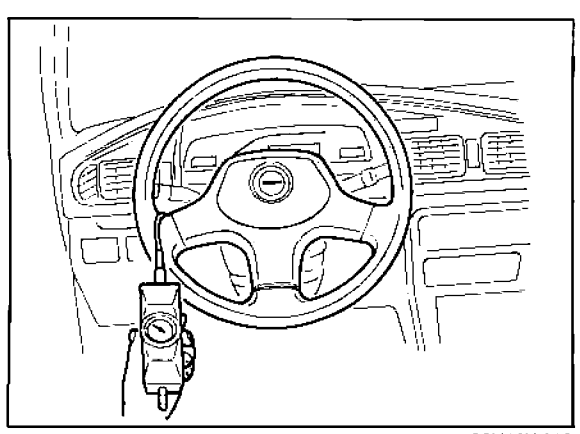
86U10X-013



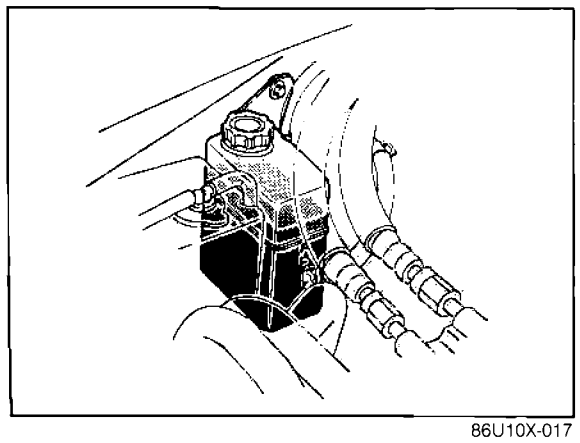
86U10X-014



86U10X-015



86U10X-016



86U10X-017

Power Steering

1. With the vehicle on a hard level surface, move the steering wheel to put the wheels in the straight ahead position.
2. Start the engine and warm the power steering fluid to **50—60°C (122—140°F)**, pull scale.
3. Attach a pull scale to the outer circumference of the steering wheel. Then, starting with the wheels in the straight-ahead position, check the steering effort required to turn the steering wheel to the left and to the right.
4. If the measured value exceeds specification, check the following: fluid level, air in system, fluid leakage at hose or connections, function of oil pump and gear box, and tire pressure.

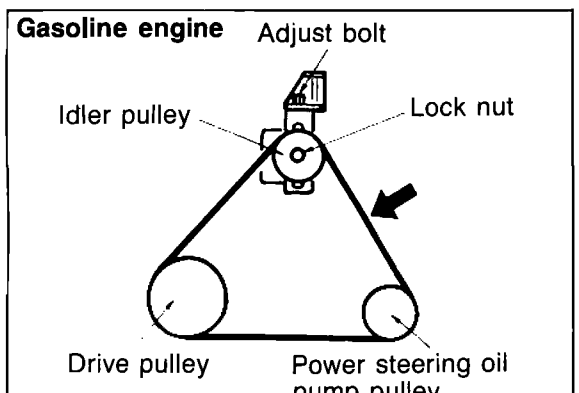
Steering wheel effort:
ESPS Type
25—31N (2.6—3.2 kg, 6—7 lb)
ECPS Type
15—23 N (1.7—2.3 kg, 3—5 lb)
4WS Type
25—35N (2.5—3.5 kg, 6—8 lb)
[during one turn of the steering wheel]

Note (4WS)
1) If not within specification, separate the transfer shaft from the front steering gear and check again.
2) If still not within specification, there is a malfunction of the front steering gear.
3) If the measured value is now within specification, check the transfer shaft and rear steering gear. (Refer to Page 10—45.)

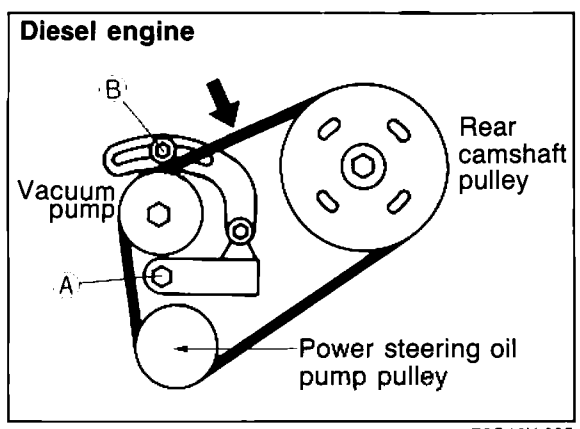
POWER STEERING FLUID LEVEL

Check the power steering fluid level, and add fluid to the specified level if necessary.

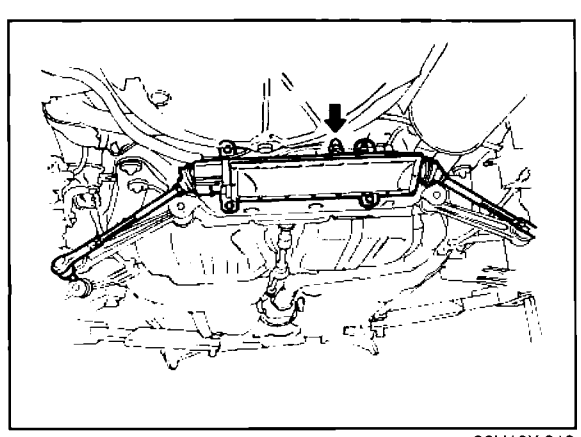
Caution
Use only the specified power steering fluid.



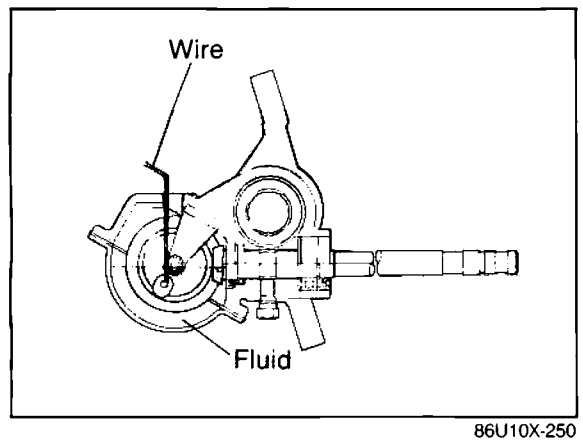
76G10X-004



76G10X-005



86U10X-019



86U10X-250

LOOSE OR DAMAGED OIL PUMP BELT

Inspection

Inspect the oil pump belt for looseness or damage.

Power steering oil pump drive belt	Deflection	
	New	Used
Gasoline engine	8—10 mm (0.31—0.39 in)	9—11 mm (0.35—0.43 in)
Diesel engine	6.5—7.5 mm (0.26—0.30 in)	7—8 mm (0.28—0.31 in)

[When depressed with a force of 98 N (10 kg, 22 lb)]

Adjustment

Gasoline engine

1. Loosen the lock nut on the idler pulley.
2. Turn the adjust bolt on the idler pulley until the correct tension is obtained.
3. Tighten the lock nut and recheck the tension.

Tightening torque:
49—59 N·m (5—6 m-kg, 36—43 ft-lb)

Diesel engine

1. Loosen the vacuum pump bolt Ⓐ and Ⓑ.
2. Lever the vacuum pump outward and apply tension to the belt.
3. Tighten the adjust bolt Ⓑ.

Tightening torque:
49—59 N·m (5—6 m-kg, 36—43 ft-lb)

4. Tighten the mounting bolt Ⓐ.

Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

REAR STEERING GEAR OIL

Fluid Level (4WS)

Remove the bleeder valve, and check the fluid level with a wire.

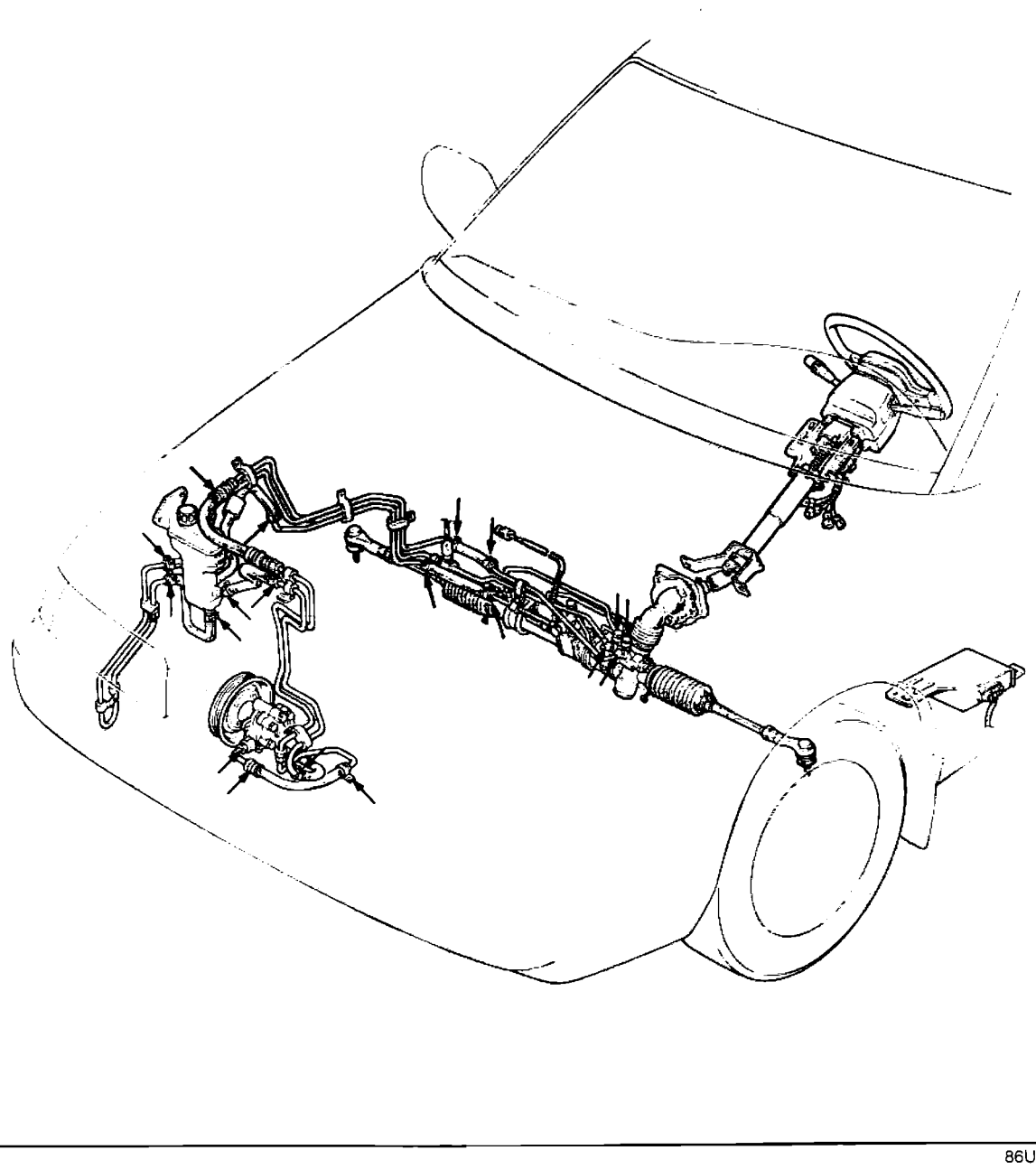
Caution
Be careful not to let dirt in.

Fluid level
44 ± 3 mm (1.7 ± 0.1 in)
0.9 ± 0.1 liters (1.0 ± 0.1 US qt, 0.8 ± 0.1 Imp qt)

LEAKAGE OF POWER STEERING FLUID
Check the following points for fluid leakage:
1. Gear
2. Oil pump
3. All fluid pipes and connections
4. Solenoid valve (ECPS Type, 4WS Type)

Note
a) Start the engine, and check for fluid leakage after turning the steering wheel completely to the left and right to apply fluid pressure. Do not, however, keep the steering wheel in the fully turned position for more than 15 seconds.
b) The points where fluid leakage may occur are indicated by the arrows in the figure.

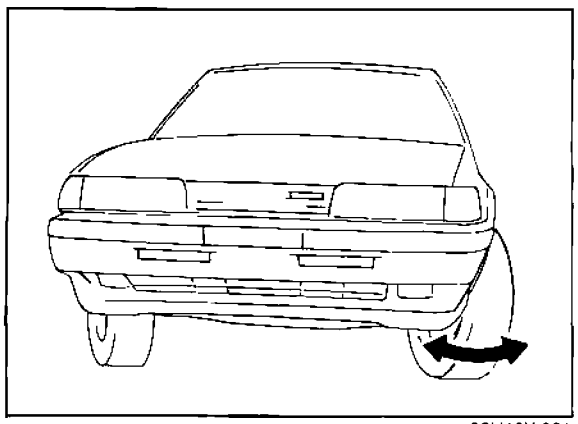
Power Steering (2WS)



86U10X-020

Power Steering (4WS)

86U10X-235

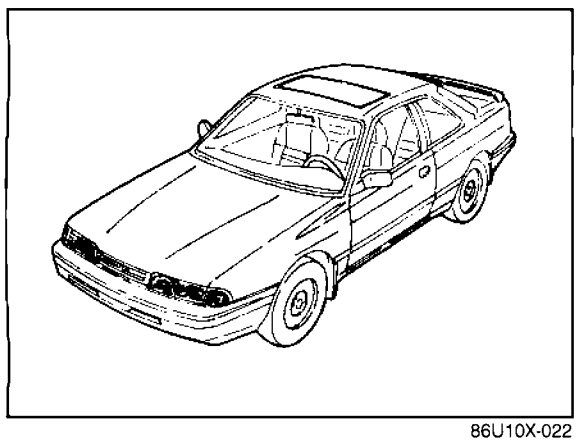


86U10X-021

INSPECTION AND ADJUSTMENT

BLEEDING OF POWER STEERING SYSTEM

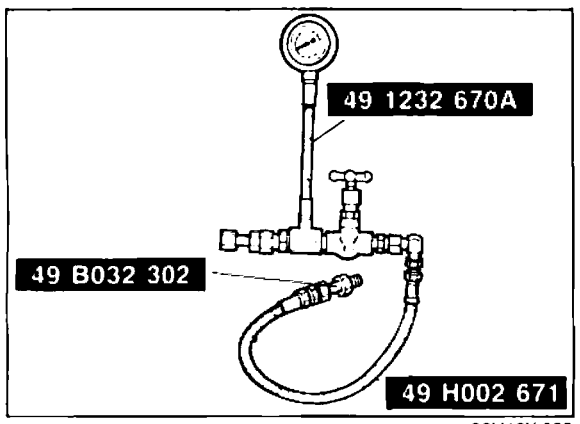
1. Check the fluid level, and add fluid if necessary.
2. Turn the steering wheel fully in both directions 5 times (engine not running).
3. Recheck the fluid level. If the level has lowered, add fluid, and repeat from step 1.



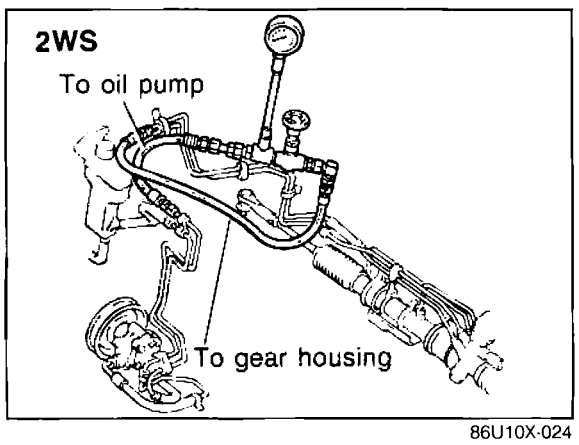
86U10X-022

4. Start the engine, and run it at idle.
5. Turn the steering wheel fully in both directions 5 times to bleed air from the system.
6. Check that the fluid is not foamy and the fluid level has not lowered.
   If a problem is found, add fluid as necessary and repeat from step 5.

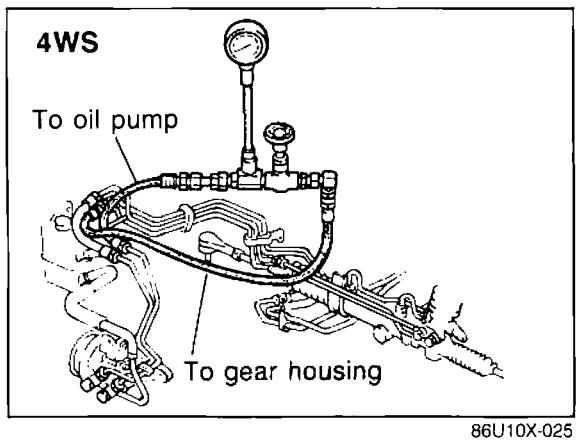
Note
If bleeding is not done completely, the following problems may appear:
- **Foamy fluid on level gauge.**
- **Noise from power steering oil pump.**



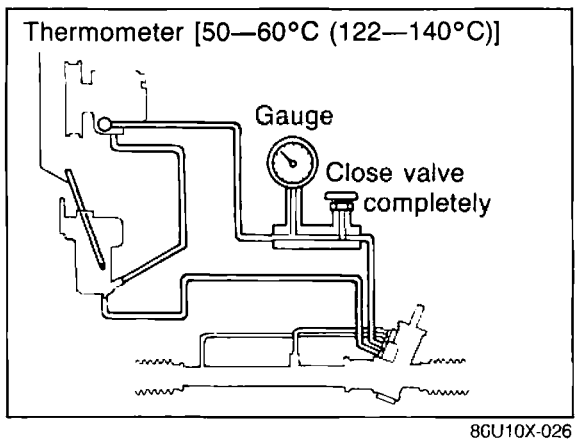
86U10X-023



86U10X-024



86U10X-025



86U10X-026

POWER STEERING PRESSURE

1. Disconnect the high-pressure hose of the gear housing side, and attach the **SST**.

   Tightening torque:
   39—49 N·m (4.0—5.0 m-kg, 29—36 ft-lb)

2. Bleed air from the system.
3. Open the gauge valve fully, then start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50—60°C (122—140°F)**.
4. To measure the fluid pressure generated by the oil pump, close the gauge valve completely and increase the engine speed to **1,000—1,500 rpm**. If the fluid pressure is low, replace the oil pump assembly.

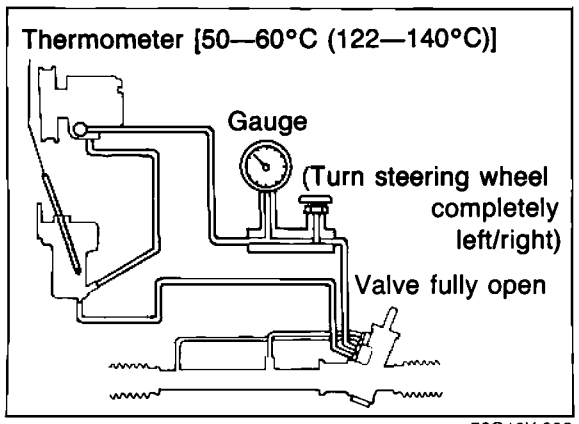
   Warning
   If the valve is left closed for more than 15 seconds, the fluid temperature will increase excessively and adversely affect the oil pump.

   Oil pump fluid pressure
   2WS
   7,355—7,846 kPa
   (75—80 kg/cm^2, 1,066—1,138 psi)

   4WS
   Front 8,093—8,829 kPa
   (82.5—90.0 kg/cm^2, 1,173—1,280 psi)
   Rear 7,112—7,848 kPa
   (72.5—80.0 kg/cm^2, 1,031—1,138 psi)

5. To measure the fluid pressure generated at the gear housing, first open the gauge valve completely, increase the engine speed to **1,000—1,500 rpm**, and then turn the steering wheel fully to the left and right.

   Warning
   If the steering wheel is kept in the fully turned position for more than 15 seconds, the fluid temperature will rise excessively.



76G10X-032

Gear housing fluid pressure
2WS
7,355—7,846 kPa
(75—80 kg/cm^2, 1,066—1,138 psi)
4WS
Front 8,093—8,829 kPa
(82.5—90.0 kg/cm^2, 1,173—1,280 psi)
Rear More than 2,943 kPa
(More than 30 kg/cm^2, more than 427 psi)

If the fluid pressure is low, repair or replace the gear box.

6. Remove the gauge set, then tighten the high-pressure hose to the specified torque.

Tightening torque:
31—36 N·m (3.2—3.7 m-kg, 23—27 ft-lb)

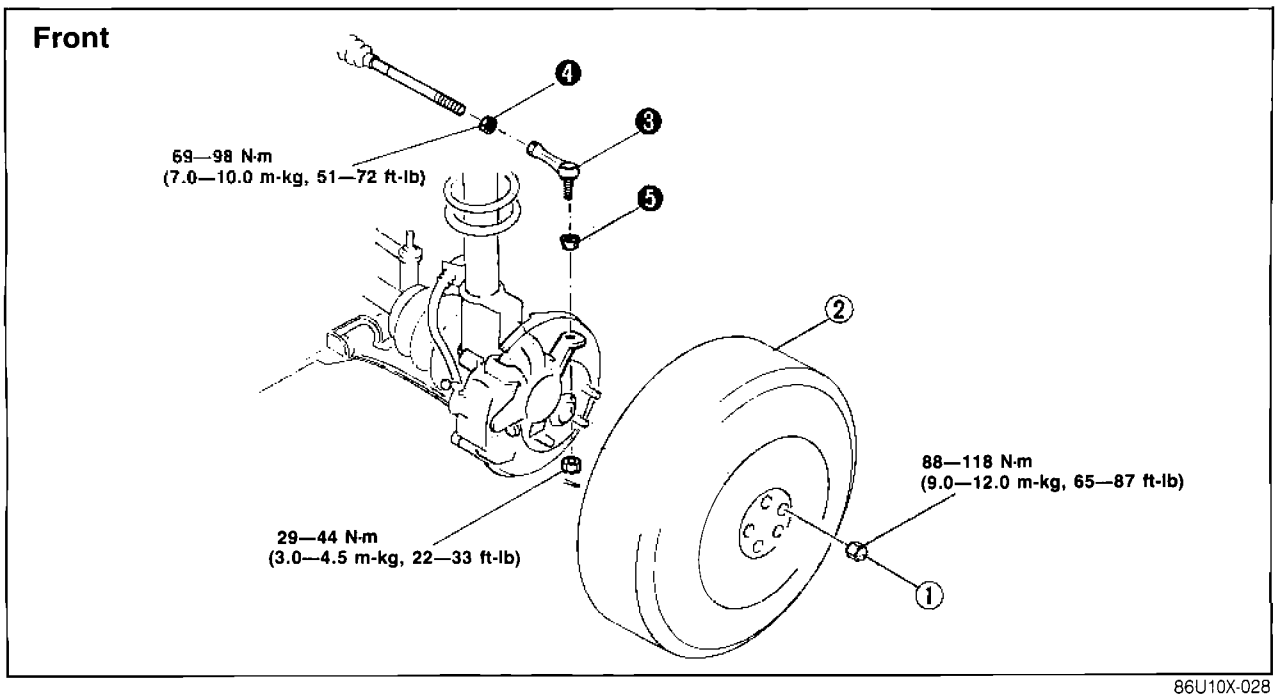
7. Bleed the air from the system. (Refer to page 10—15.)

TIE-ROD END BOOT

REMOVAL AND INSTALLATION

1. Jack up the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure, referring to the removal note for specially marked parts.
3. Install in the reverse order of removal, referring to the installation note for specially marked parts.
4. Tighten all nuts and bolts to the specified torque, referring to the figure.

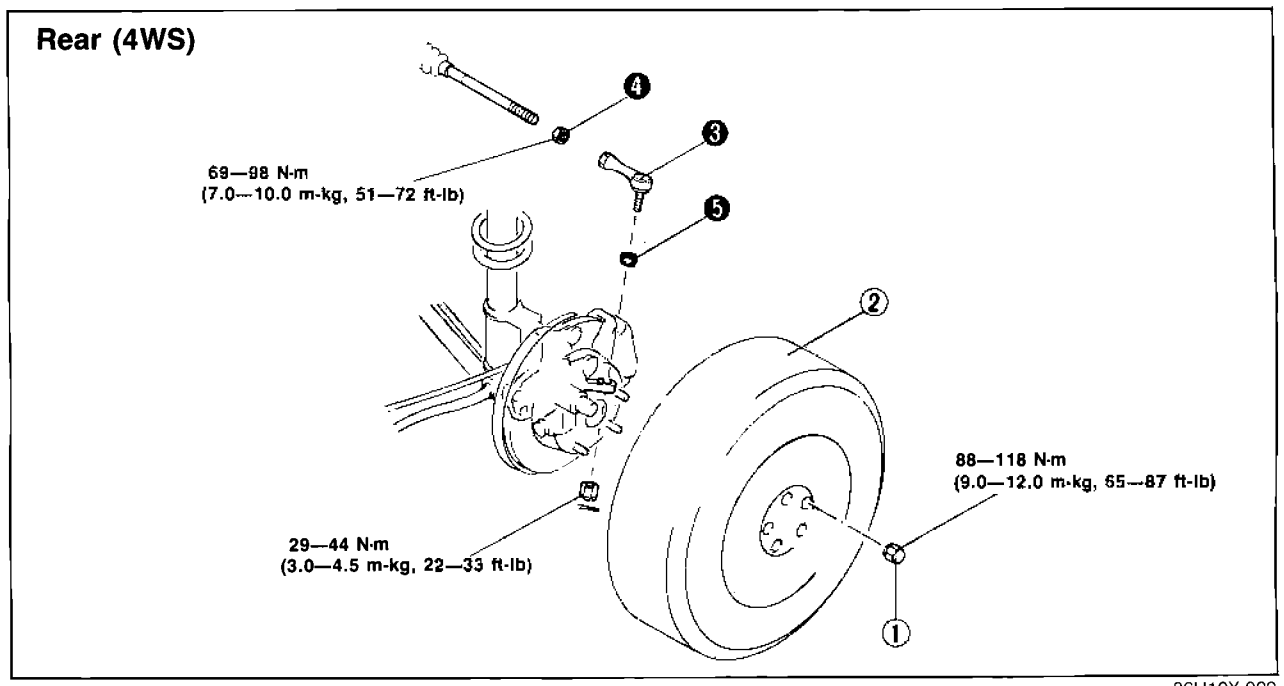
Front



86U10X-028

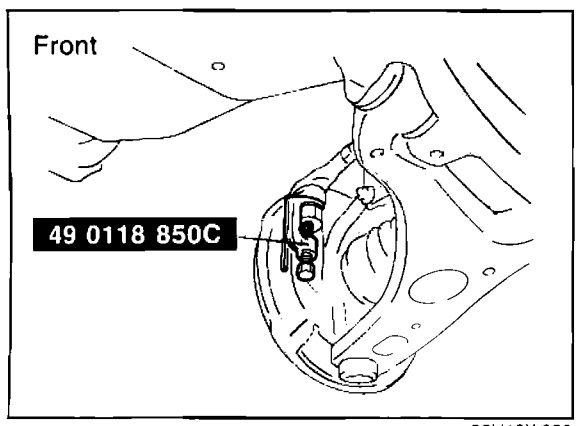
1. Lug nuts
2. Wheel
3. Tie-rod end
4. Nut
5. Boot

Rear (4WS)

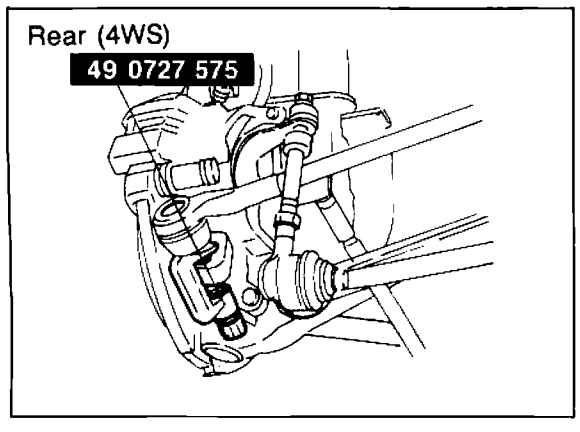


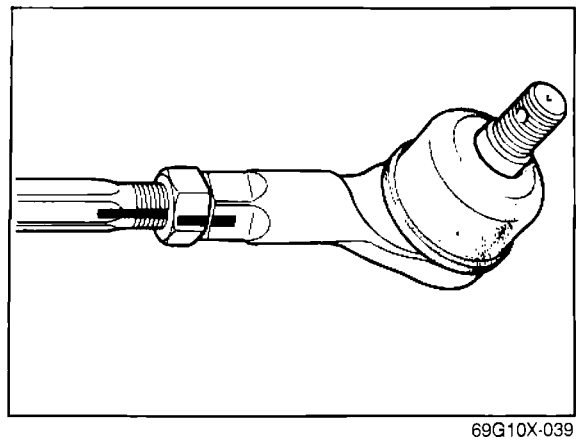
86U10X-029

1. Lug nuts
2. Wheel
3. Tie-rod end
4. Nut
5. Boot

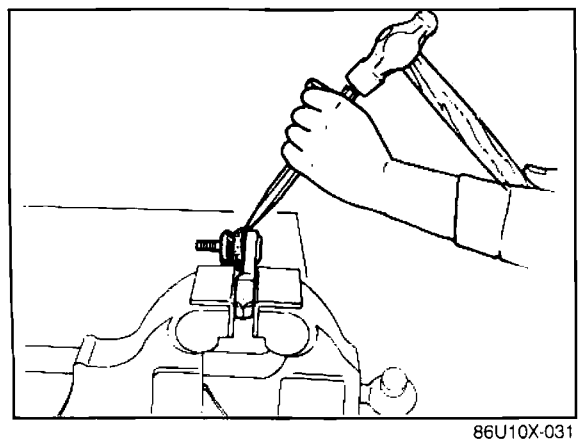


86U10X-030





69G10X-039



86U10X-031

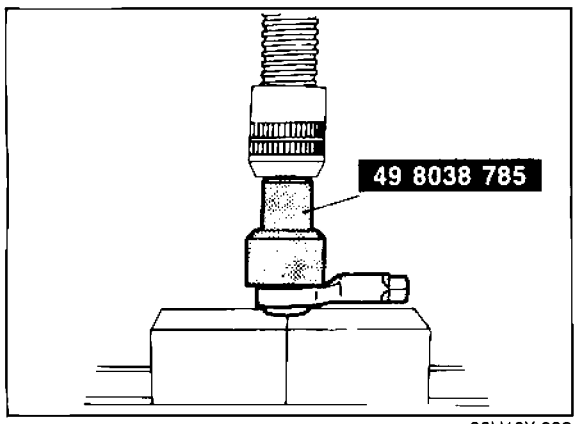
Removal Note
Tie-rod end
Separate the tie-rod end from the knuckle using the **SST**.

Nut
Before removing the nut from the tie-rod end, make a mark for reference during installation.

Boot
Secure the tie-rod end in a vise. Place a chisel against the boot and hold it at the angle shown. Remove the boot by tapping with a hammer.

Caution
Be careful not to scar the part where the boot is attached to the tie-rod end.

10 TIE-ROD END BOOT

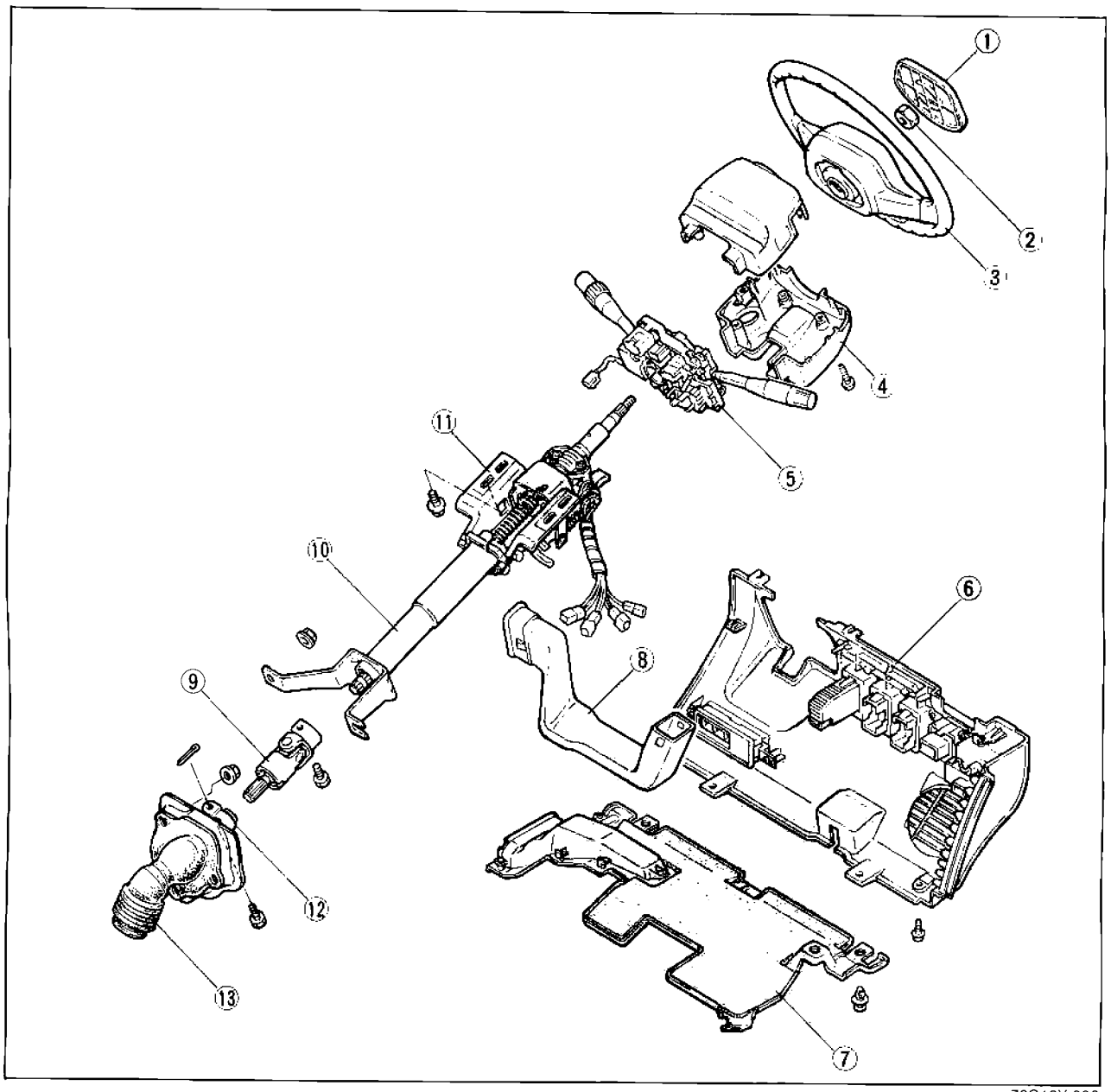


86U10X-032

Installation Note
Boot
Put a small amount of grease (lithium base, NLGI No. 2) into the new boot and set it onto the **SST**. Install the boot to the tie-rod end with a press.

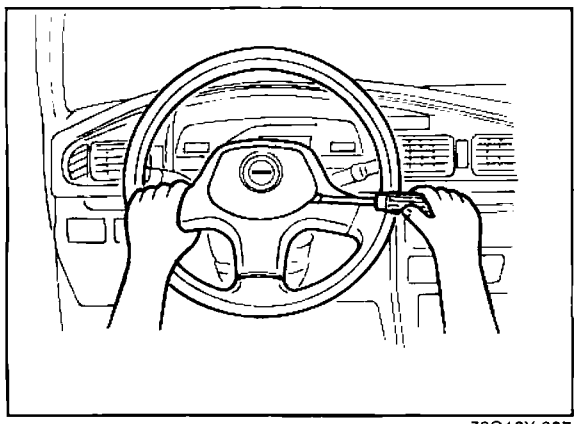
STEERING WHEEL AND COLUMN

STRUCTURAL VIEW



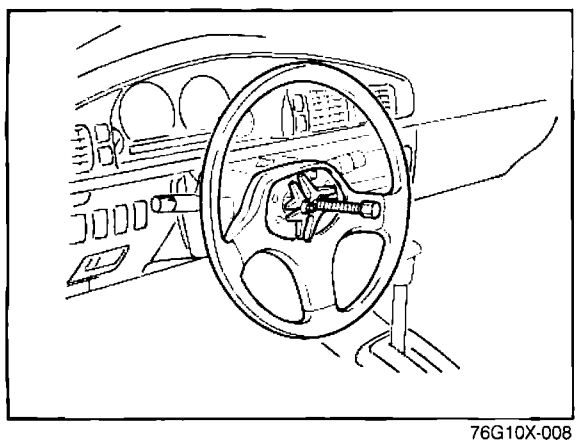
76G10X-006

1. Horn cap
2. Lock nut
3. Steering wheel
4. Column cover
5. Combination switch
6. Switch panel
7. Lower panel
8. Duct
9. Universal joint
10. Steering shaft
11. Steering shaft assembly
12. Intermediate shaft
13. Dust boot



76G10X-007

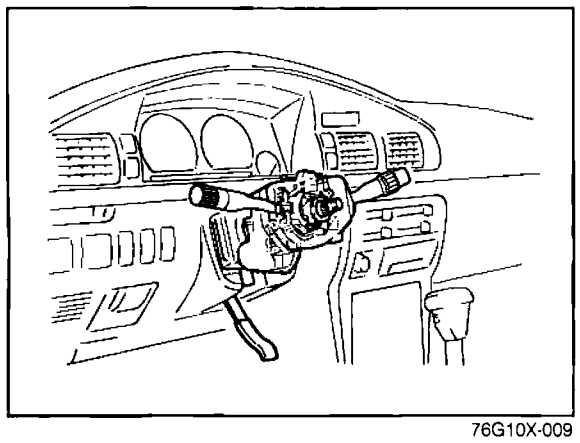
REMOVAL
1. Remove the horn cap.
2. Remove the locknut.



76G10X-008

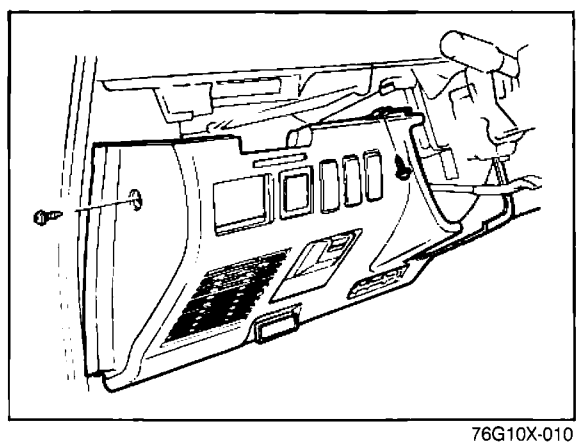
3. The steering wheel must be removed with a suitable puller.

Caution
Be careful not to subject the steering shaft to severe impact in the axial direction when removing or installing the steering wheel.



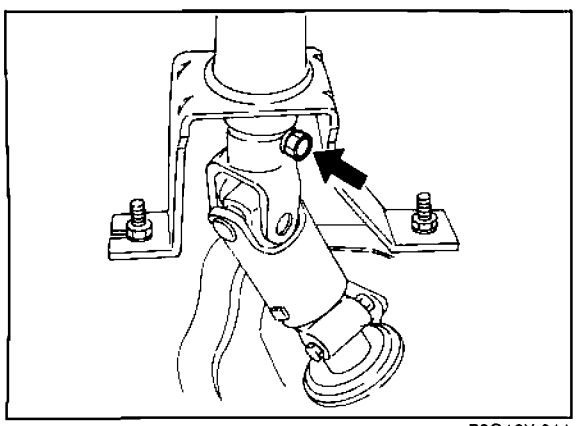
76G10X-009

4. Remove the column cover.
5. Disconnect the ignition switch connector.
6. Remove the combination switch.



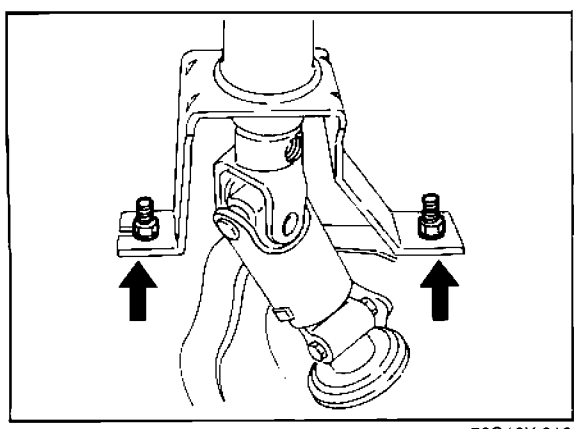
76G10X-010

7. Remove the lower panel and switch panel.
8. Remove the duct.



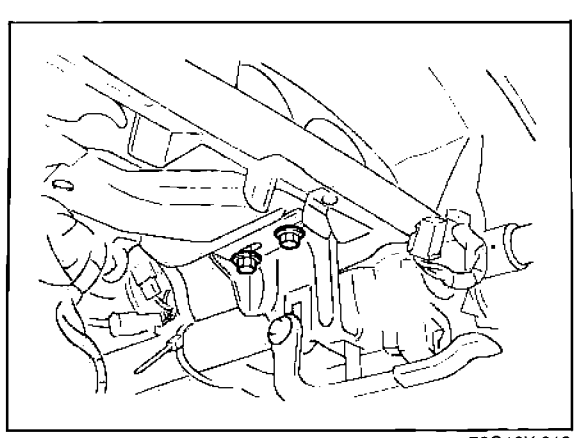
76G10X-011

9. Remove the bolt connecting the universal joint and steering shaft.



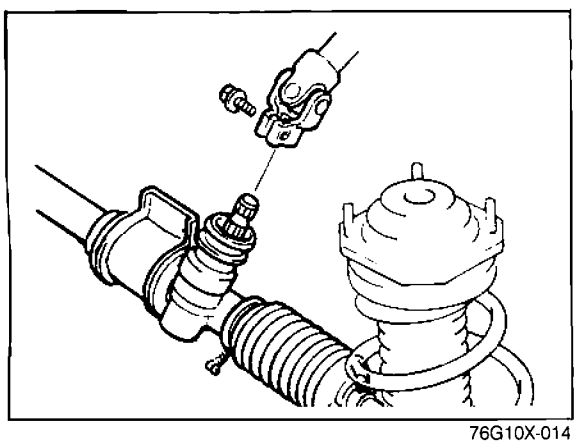
76G10X-012

10. Remove the nuts from the lower bracket of the steering shaft.



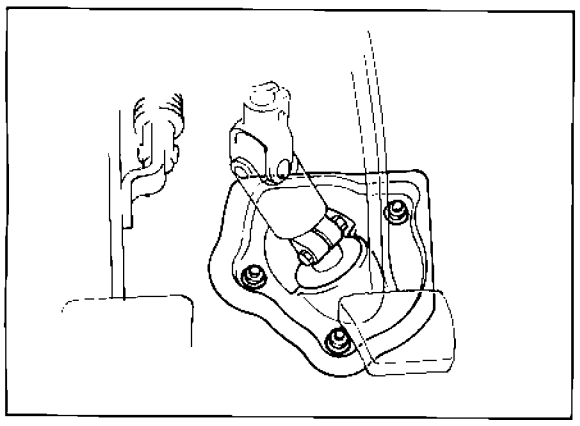
76G10X-013

11. Remove the bolts from the upper bracket of the steering shaft.
12. Remove the steering shaft assembly.



76G10X-014

13. Remove the bolts from the intermediate shaft.

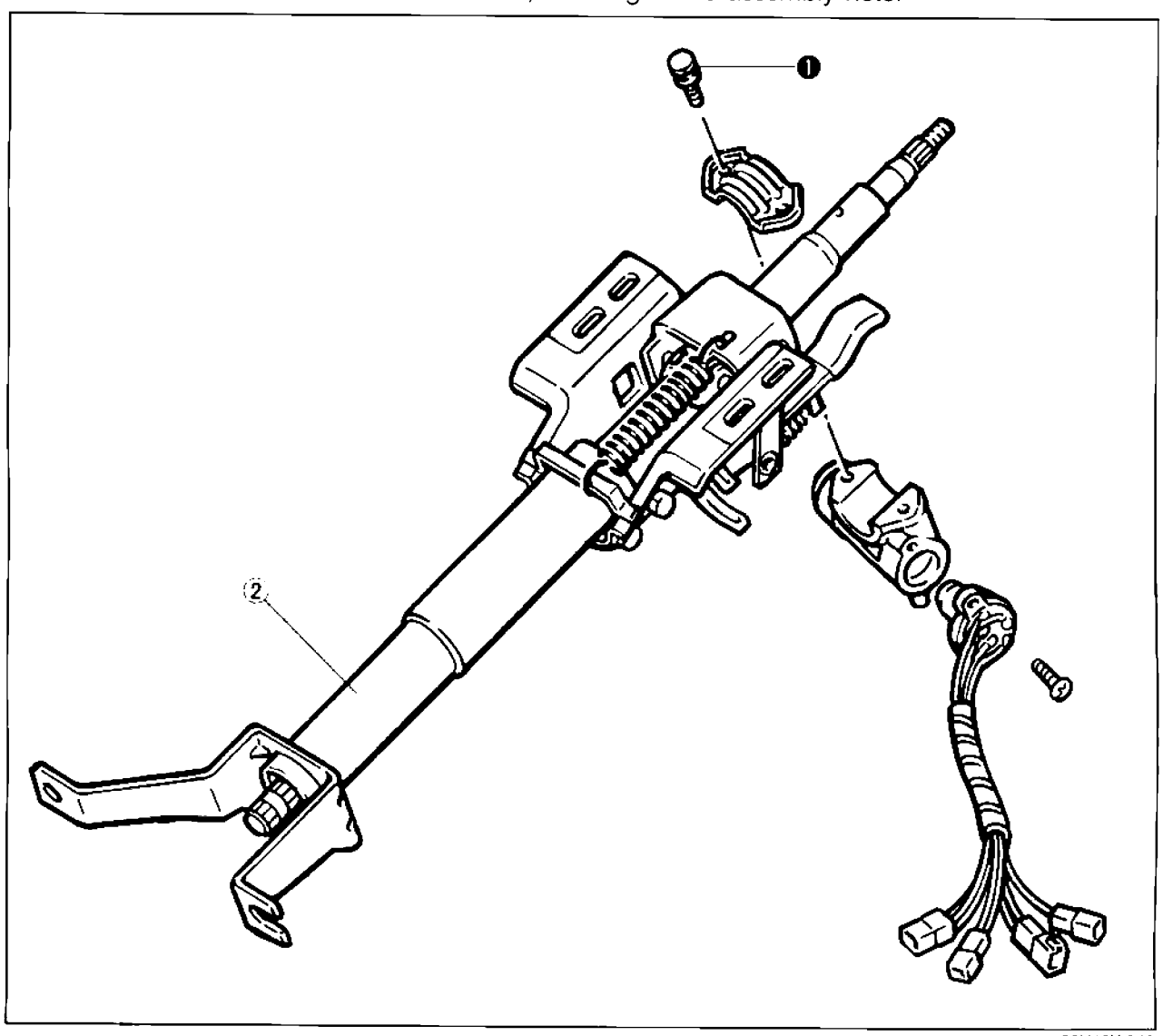


76G10X-015

14. Remove the dust cover assembly.
15. Remove the intermediate shaft.

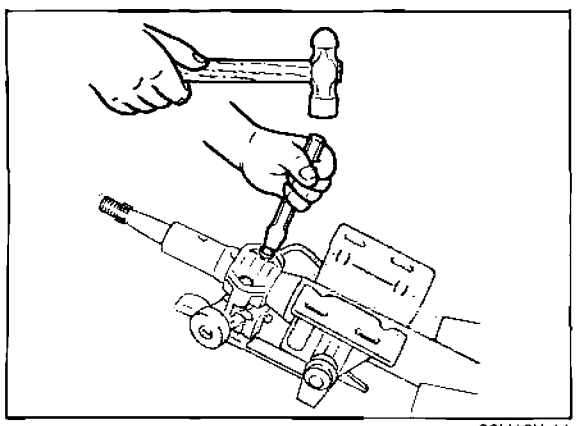
DISASSEMBLY AND ASSEMBLY

1. Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked parts.
2. Assemble in the reverse order of removal, referring to the assembly note.



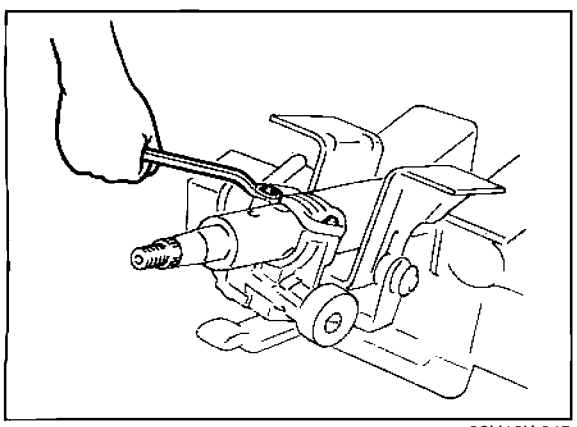
86U10X-043

1. Steering lock bolt
2. Steering shaft



86U10X-44

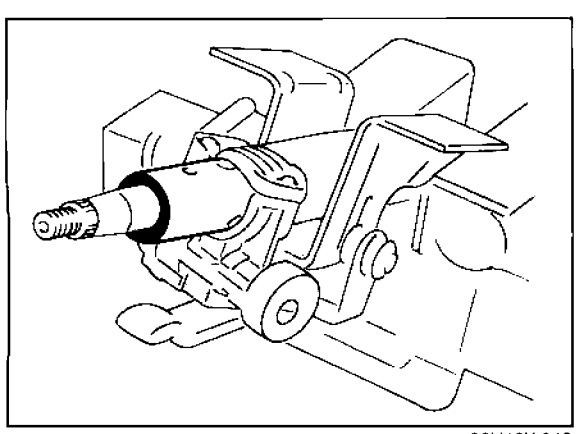
Disassembly Note
Steering lock
Use a chisel to make a groove in the head of the steering lock installation screws. Remove the screws with a screwdriver; then remove the steering lock.



86U10X-045

Assembly Note
Steering lock
Install the steering lock on the jacket; then use new steering lock mounting screws, and tighten them until the heads break off.

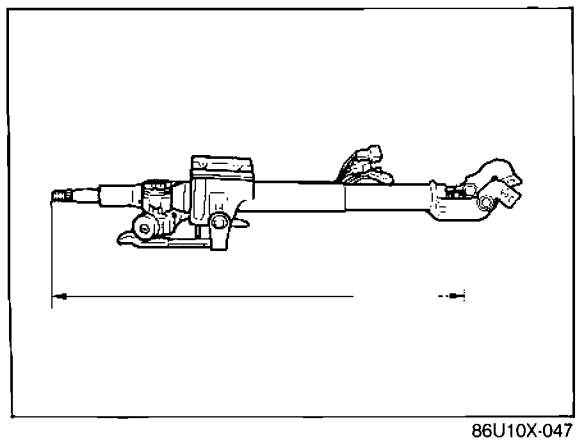
Caution
Check the operation of the lock while tightening the steering lock mounting screws.



86U10X-046

INSPECTION
Check the following and replace any faulty parts.

Shaft
1. Wear of column bushing

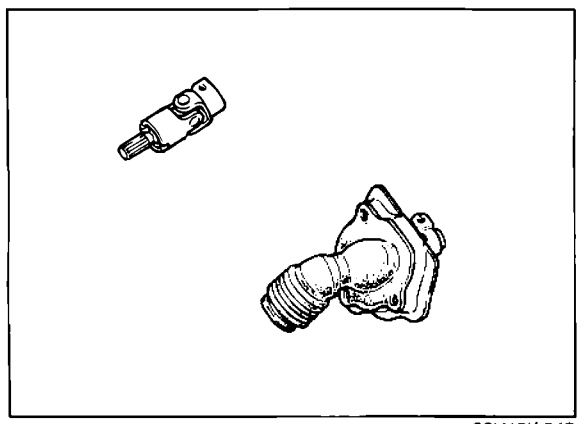


86U10X-047

2. Length of steering column

Length:
614—616 mm (24.2—24.3 in)

3. Damage of column



86U10X-048

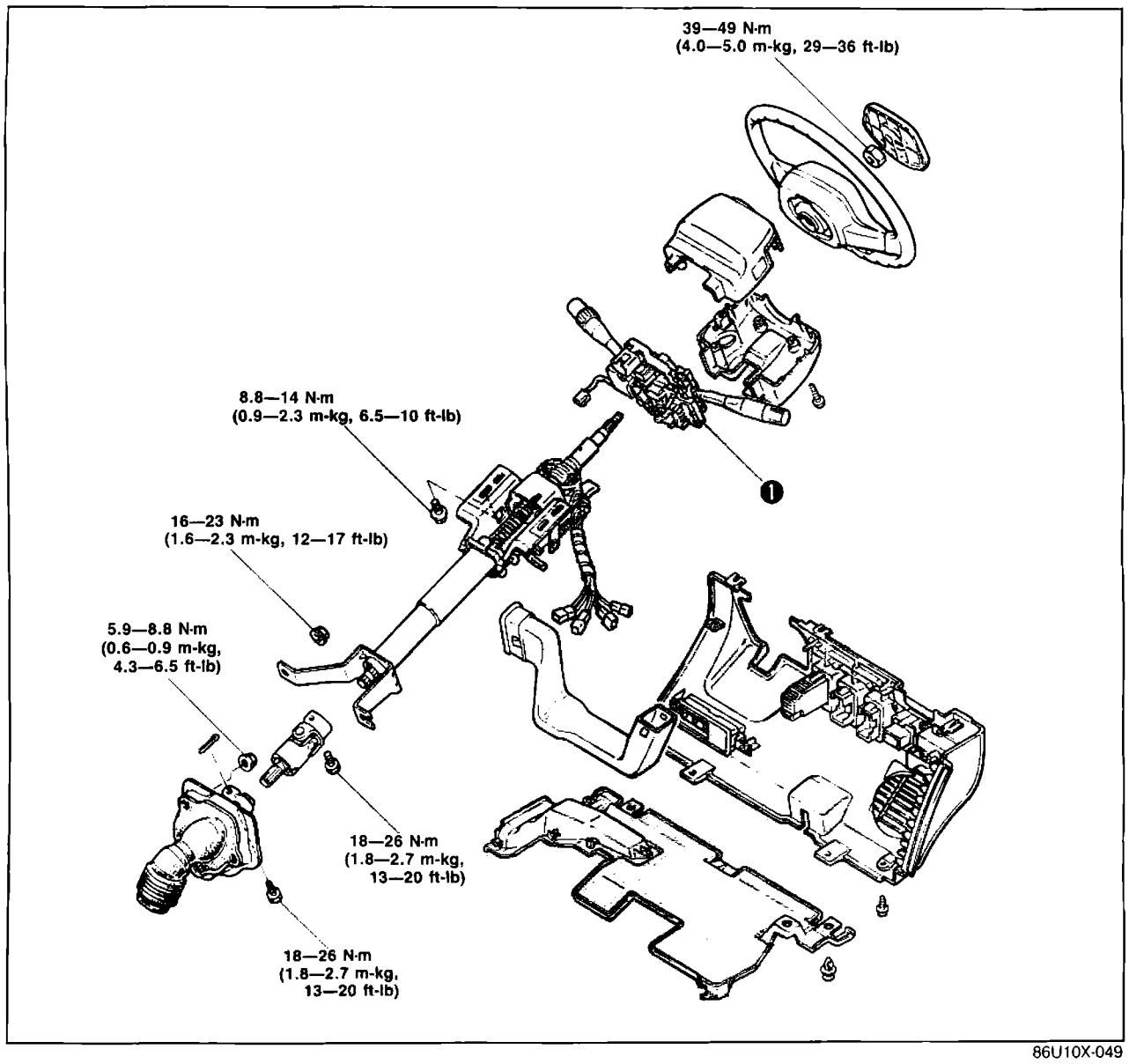
Intermediate Shaft and Universal Joint
Looseness, abnormal noise, or sticking while rotating

Dust Boot
Damage or deterioration

INSTALLATION

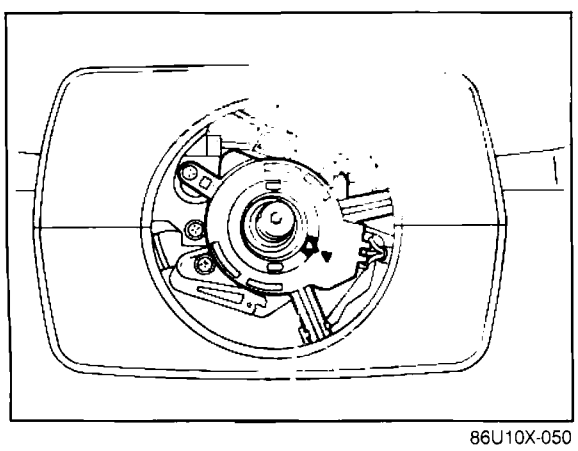
Install in the reverse order of removal, referring to the installation note for specially marked parts.

Torque specifications



86U10X-049

1. Combination switch



86U10X-050

Installation Note

Combination switch (angle sensor)

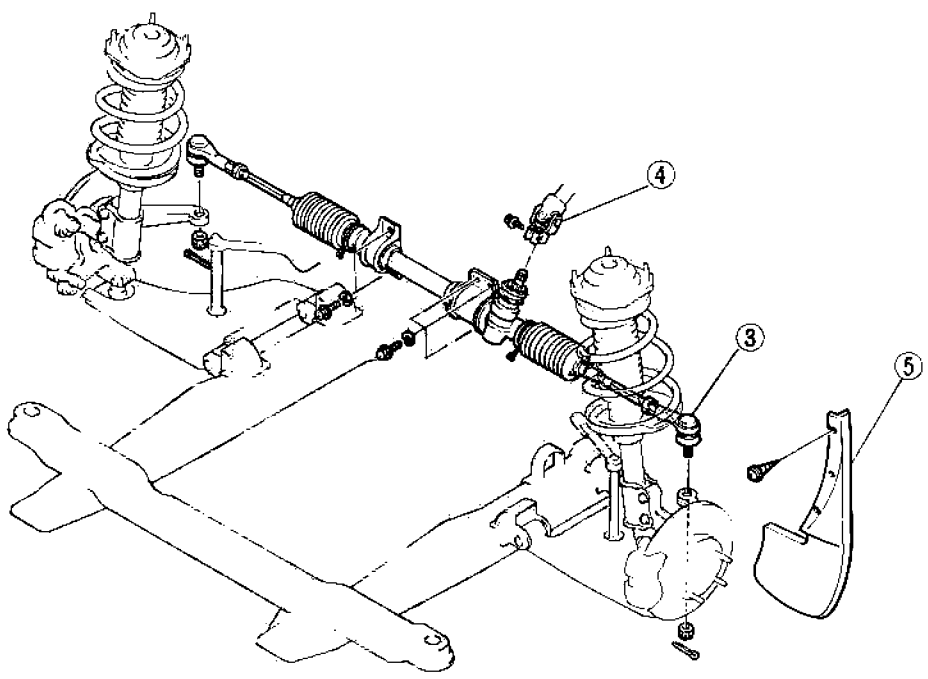
Position the angle sensor in the following order:
1. Set the wheels in the straight-ahead position.
2. Align the alignment marks (arrows).

10 STEERING GEAR AND LINKAGE

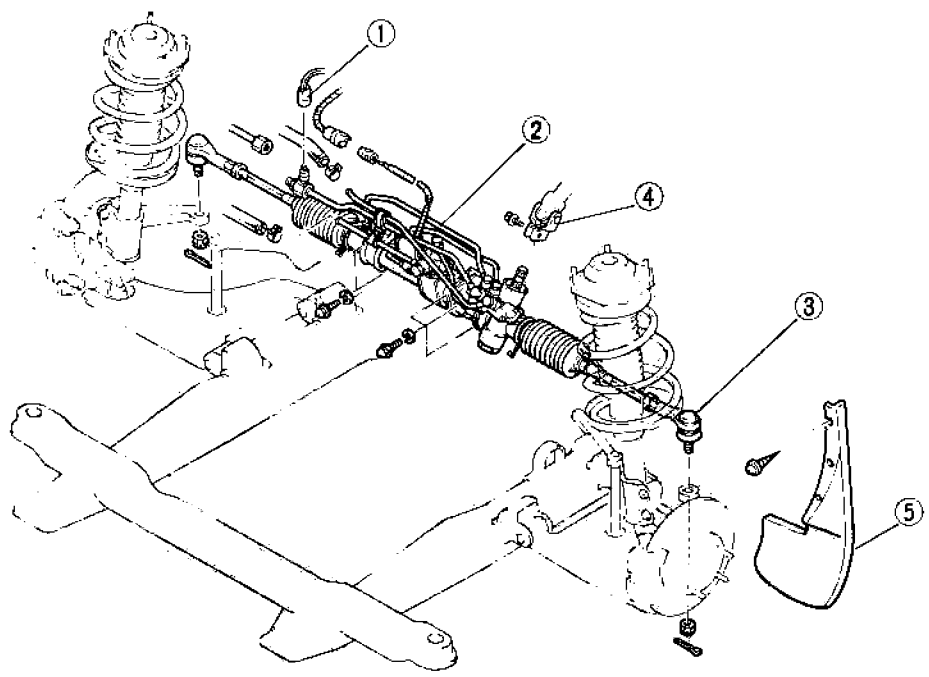
STEERING GEAR AND LINKAGE

STRUCTURAL VIEW

Manual steering

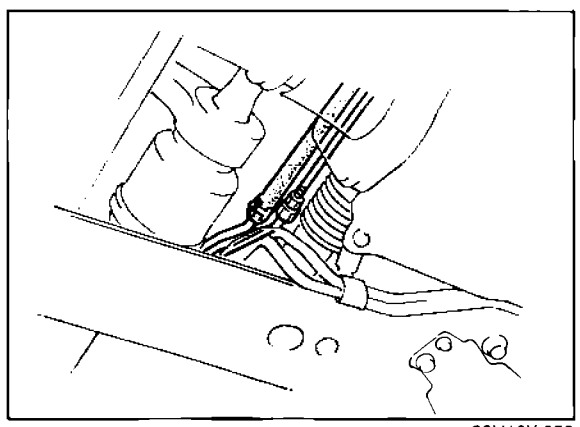


Power steering



86U10X-051

1. Oil pressure switch connector
2. Pipes
3. Tie-rod end
4. Steering shaft universal joint
5. Mud flap

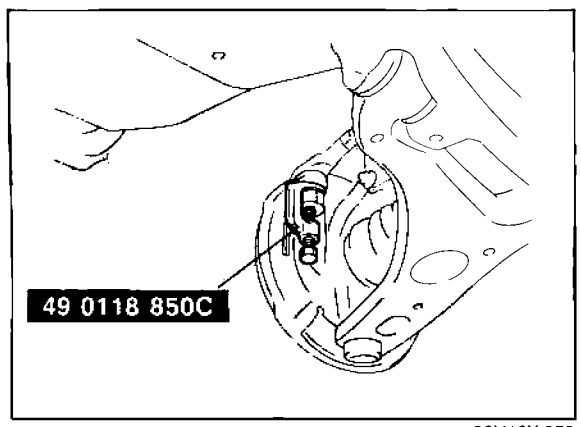


86U10X-052

REMOVAL

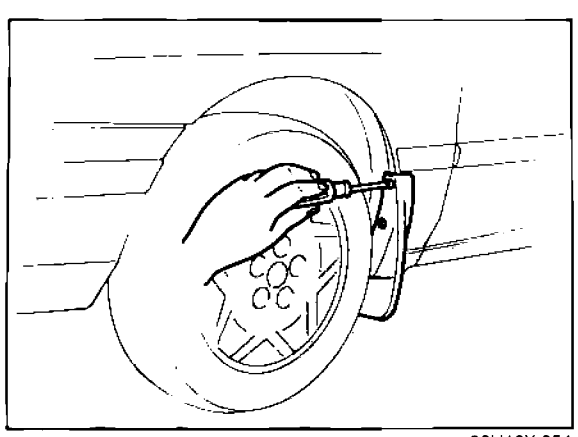
Note
The power steering fluid will leak out when the return hose or the pressure hose is disconnected. Prepare a suitable container for it to drain into.

1. Disconnect the negative battery cable.
2. Disconnect the pressure switch connector.
3. Raise the vehicle on a lift or safety stands, and remove the front wheels.
4. Disconnect the power steering hose and pipe.



86U10X-053

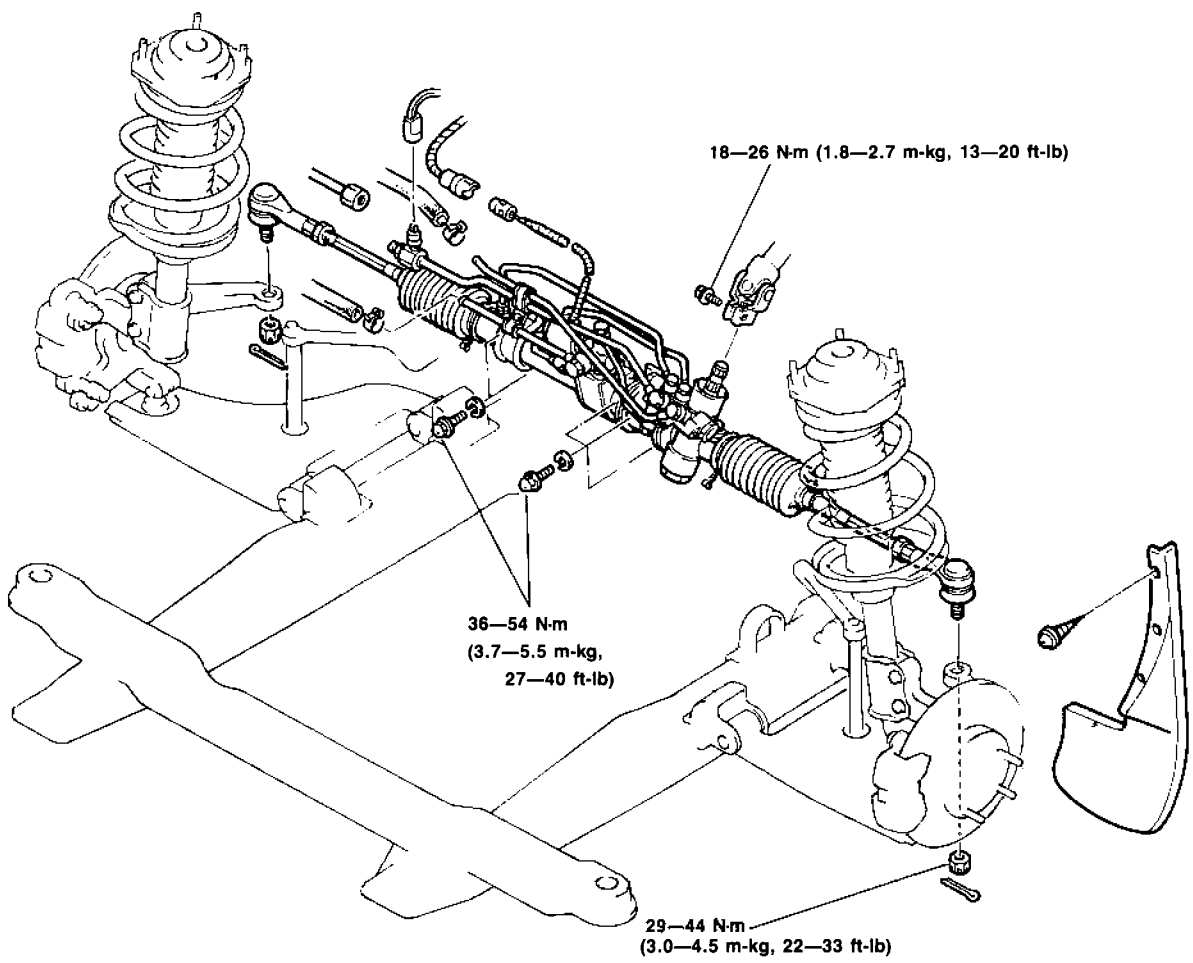
5. Disconnect the tie-rod ends from the knuckles with the **SST**.
6. Remove the steering shaft universal joint.



86U10X-054

7. Remove the mud flap.
8. Remove the mounting bolts and the steering gear.

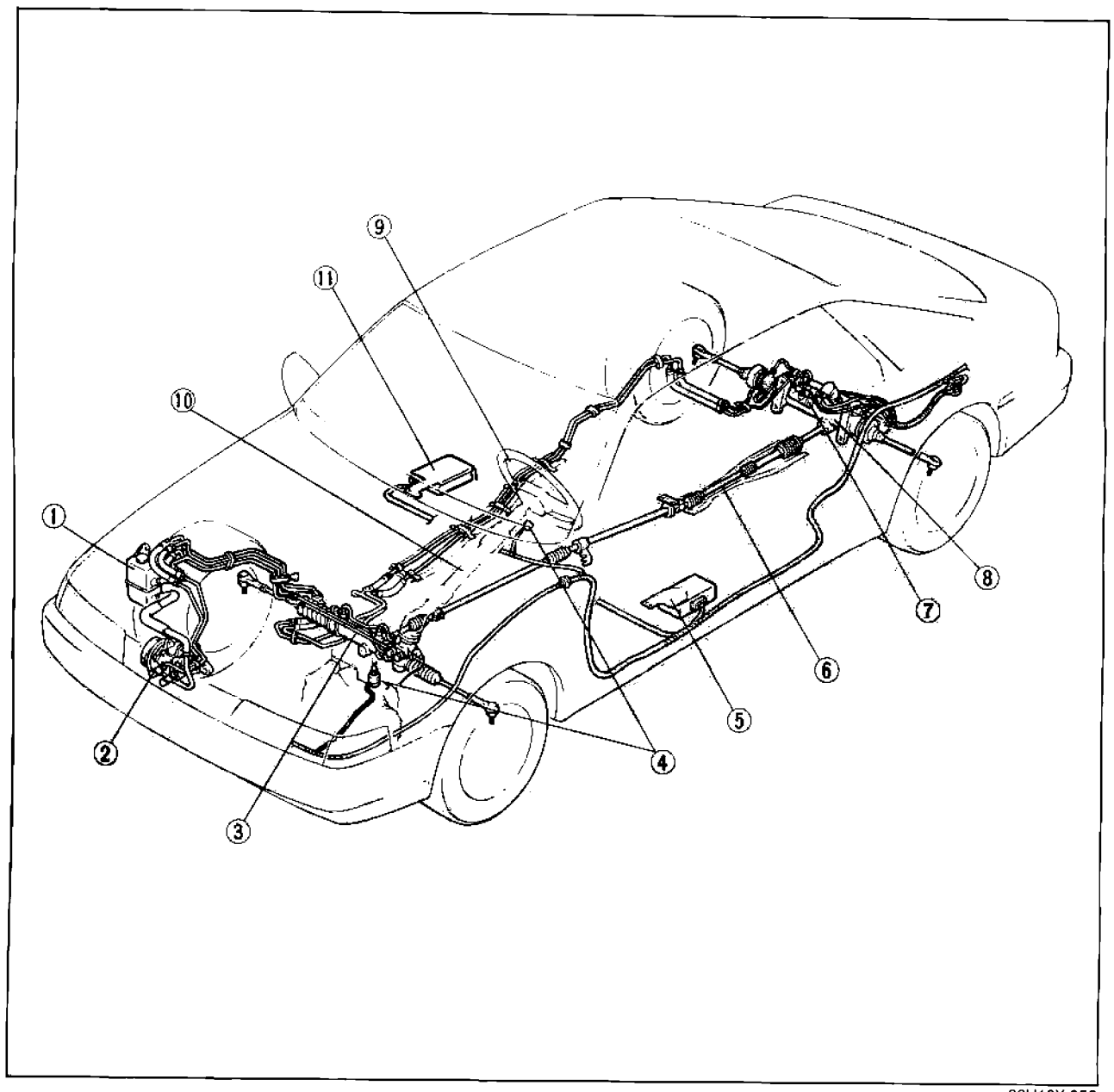
INSTALLATION
Install in the reverse order of removal.
Torque Specifications



86U10X-055

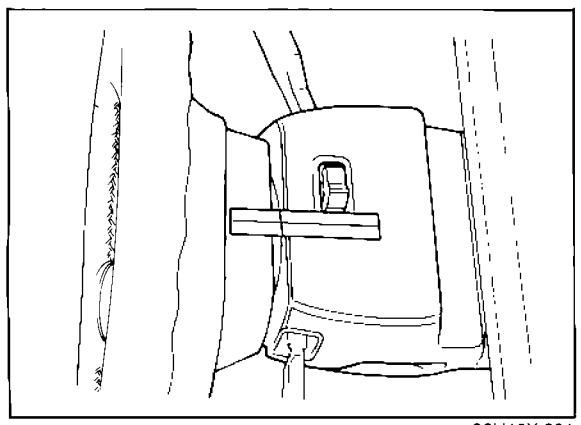
4-WHEEL STEERING GEAR AND LINKAGE

STRUCTURAL VIEW



86U10X-056

1. Reserve tank
2. Oil pump
3. Front steering gear assembly
4. Speed sensor
5. Control unit
6. Steering angle transfer shaft
7. Solenoid valve
8. Rear steering gear assembly
9. Steering wheel
10. Steering shaft
11. Relay and timer

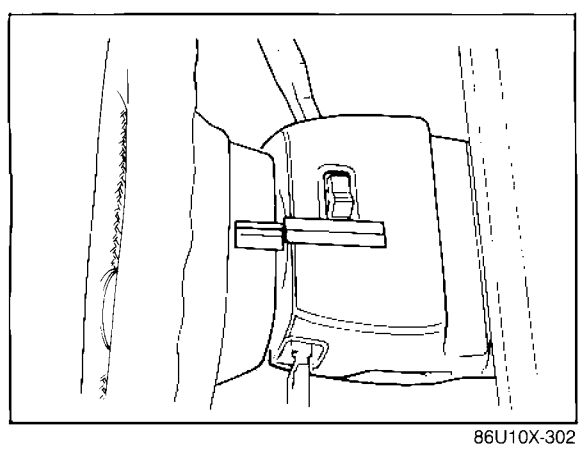


86U10X-301

4WS PERFORMANCE INSPECTION

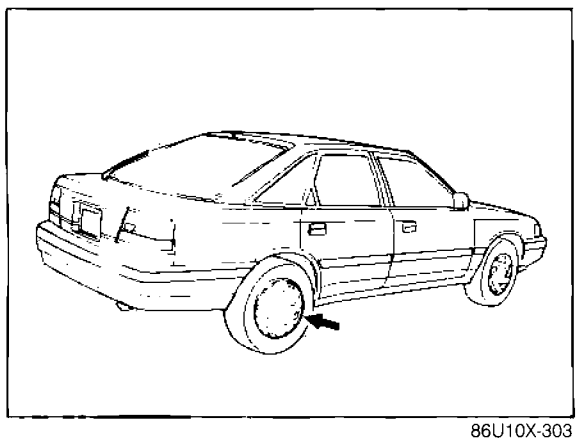
1. Steering Angle Transfer Shaft Alignement (Simple inspection)

(1) Put masking tape on the steering wheel and column cover.



86U10X-302

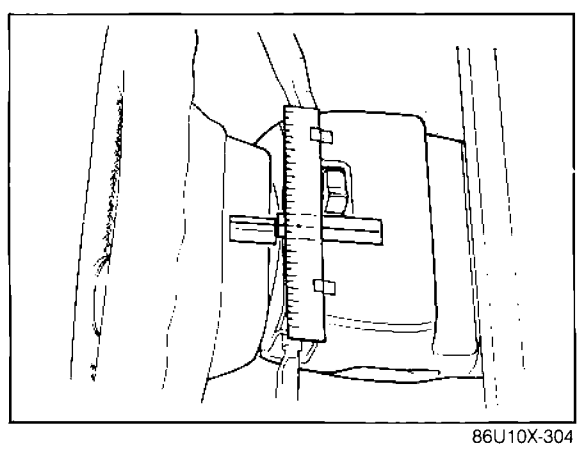
(2) Drive the vehicle on a straight, flat road for at least 30 m (18.6 ft) and note the steering wheel position. Stop and mark the straight-ahead position on the steering wheel and column cover tape. Drive the vehicle again and check the marks.



86U10X-303

(3) With the marks between the steering wheel and column cover aligned, check that the rear wheels do not turn off center when the engine is started.

(4) If the rear wheels move, adjust the steering angle transfer shaft.

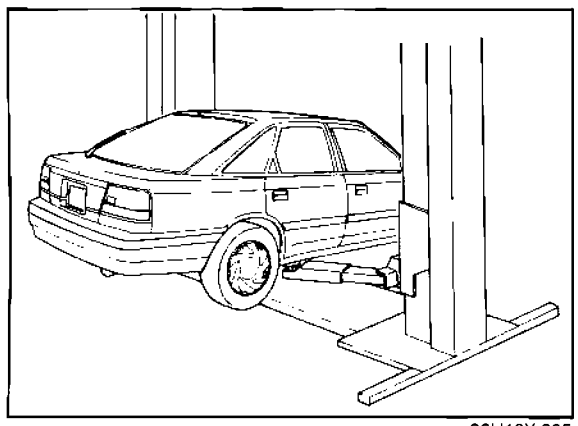


86U10X-304

(Inspection by dial indicator)

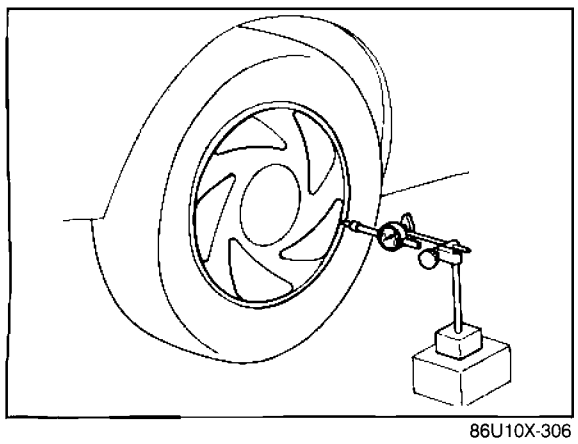
(1) Mark between the steering wheel and column cover as shown above.

(2) Attach a scale on the column cover as shown in the illustration.



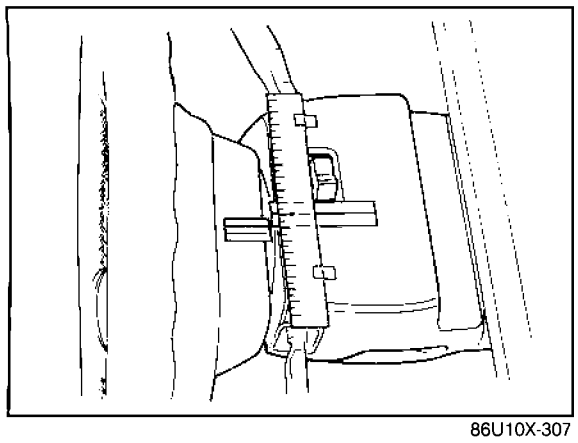
86U10X-305

(3) Raise the vehicle on a lift or safety stands.
(4) Set a dial indicator against one rear tire. Set the pointer to 0.



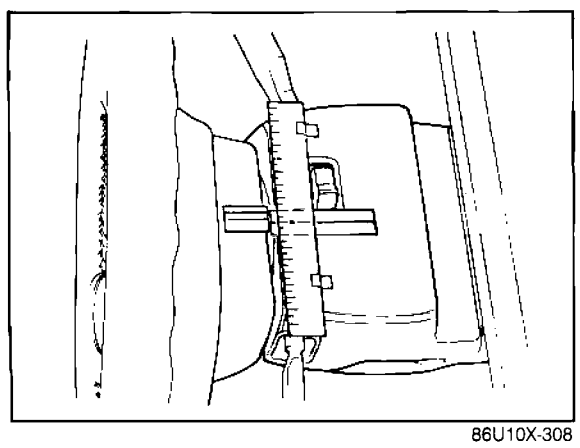
86U10X-306

(5) With the marks on the steering wheel and column cover aligned, start the engine and turn the steering wheel slowly to the right. Using the scale on the column cover, note the rotation of the steering wheel at the point where the rear wheels begin to turn (dial indicator begins to move).



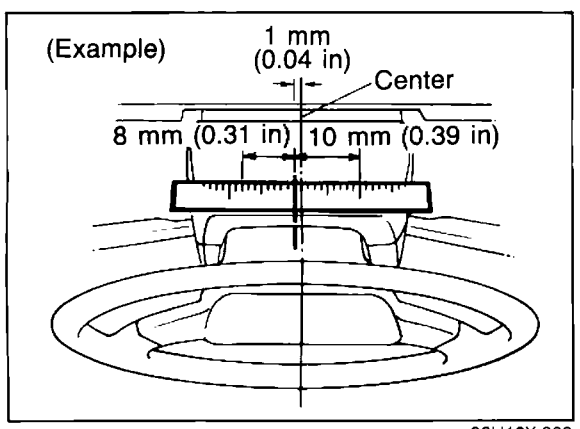
86U10X-307

(6) Turn the steering wheel left and right a few times to equalize the hydraulic pressure. Re-align the marks between the steering wheel and column cover.



86U10X-308

(7) Reset the dial indicator to 0 and turn the steering wheel slowly to the left. Using the scale on column cover, again note the rotation of the steering wheel at the point where the rear wheels begin to turn (dial indicator begins to move).



86U10X-309

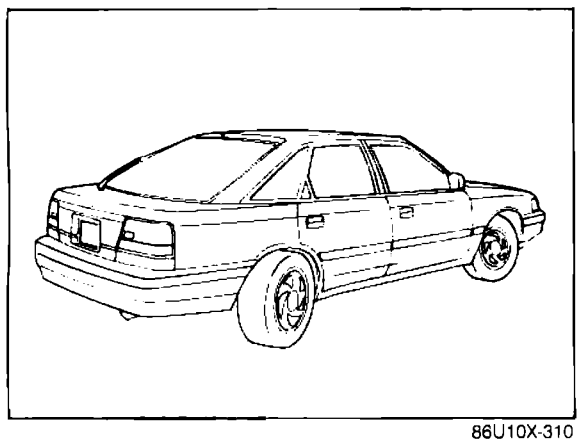
(8) The center position can be determined from the left/right measurements in (5) and (7) above.

Example:
Right rotation....10 mm (0.39 in)
Left rotation....8 mm (0.31 in)
Center = Right 1 mm (0.04 in)

(9) Check that the center is within specification.

Specification
= R 5 mm (0.4 in) to L 5 mm (0.4 in)

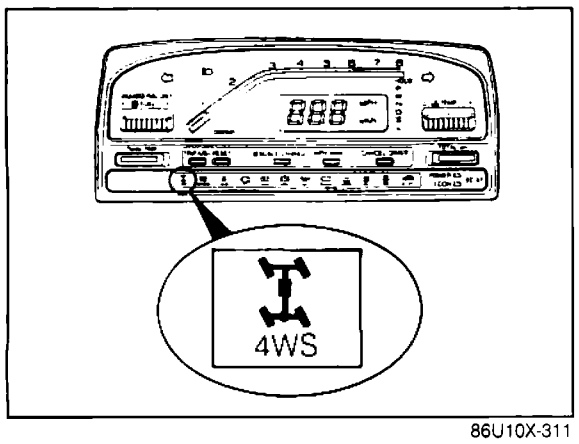
(10) If not correct, adjust the steering angle transfer shaft.



86U10X-310

2. Steering Inspection

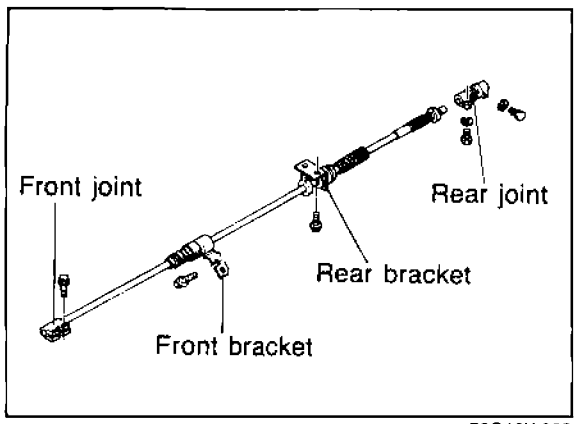
With the vehicle stopped and the engine running, check that the rear wheels turn in the opposite direction when the steering wheel is turned and that there is no abnormal noise.



86U10X-311

3. 4WS Electric System Inspection

Drive the vehicle and check that the 4WS warning light does not come on at over 40 km/h (25mph).

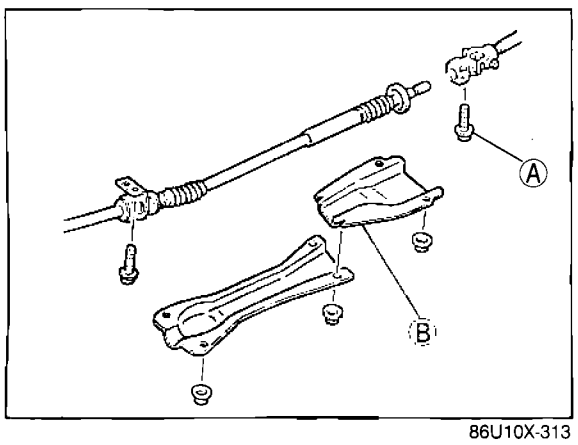


76G10X-033

ADJUSTMENT OF STEERING ANGLE TRANSFER SHAFT

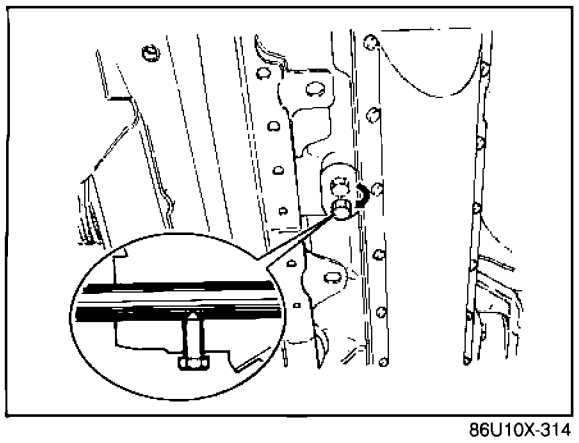
If the steering angle transfter shaft is disconnected from the front or rear steering gear or after adjusting the wheel alignement, or if the rear steering angle is not correct, adjust the rear turning angle as described below.

Warning
Improper installation of the 4WS steering transfer shaft may affect control of the vehicle and result in the risk of an accident or personal injury.



86U10X-313

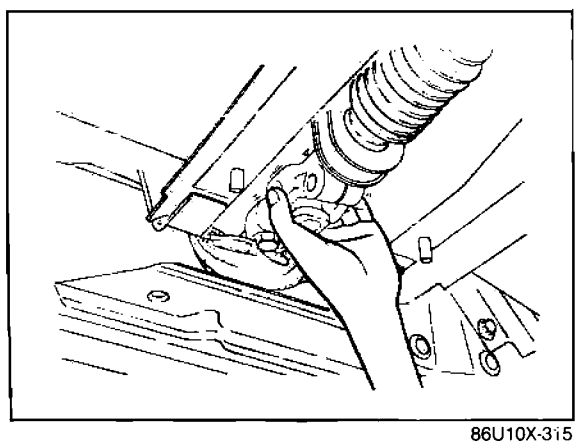
1. Raise the vehicle on a lift or safety stands.
2. Remove cover B and joint bolt A.
3. Slide the shaft out of the joint.



86U10X-314

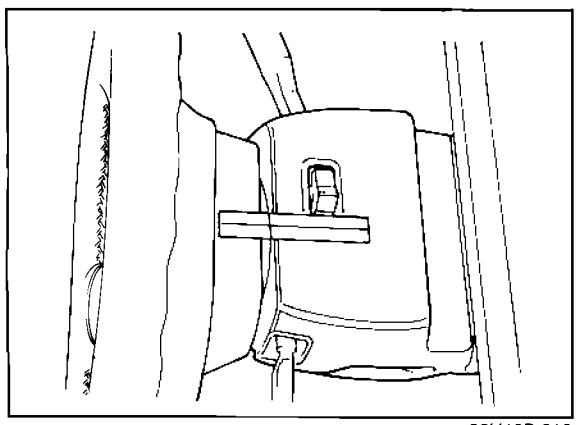
4. Remove the plug from the rear steering gear. Sight through the hole and turn the steering angle input shaft to align the notch in the input shaft with the center of hole.
5. Remove the set bolt attached to the rear steering gear, and install it in the steering gear to set the input shaft.

Tightening torque:
4.9—7.8 N·m (50—80 cm-kg, 43—69 in-lb)



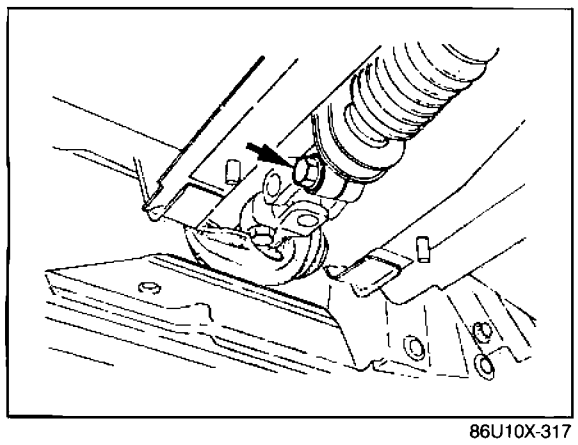
86U10X-315

Note
After the input shaft is set, manually turn the rear joint and chack that the shaft does not move.



86U10B-316

6. Lower the vehicle.
7. Check and adjust the front and rear wheel alignment if necessary. (Refer to Section 13.)
8. Drive the vehicle and mark the steering straight-ahead position.(Refer to page 10—32.)

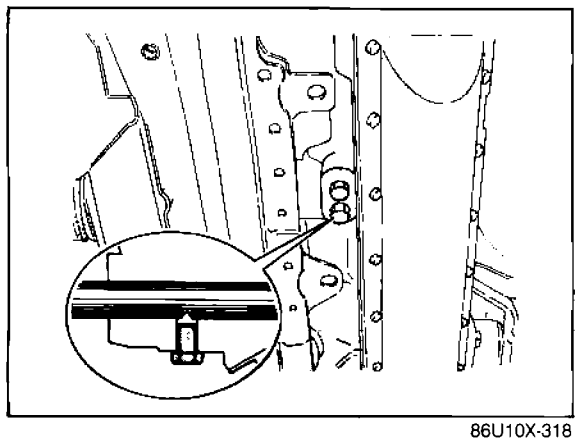


86U10X-317

9. Install the shaft and rear joint removed at step 2, and tighten the bolt to the specified torque.

   Tightening torque: 22—30 N·m (2.2—3.1 m-kg, 191—269 in-lb)

10. Install and tighten a new wire on the joint boot.



86U10X-318

11. Install the set bolt in the rear steering gear.

    Tightening torque: 20—28 N·m (2.0—2.9 m-kg, 14—21 ft-lb)

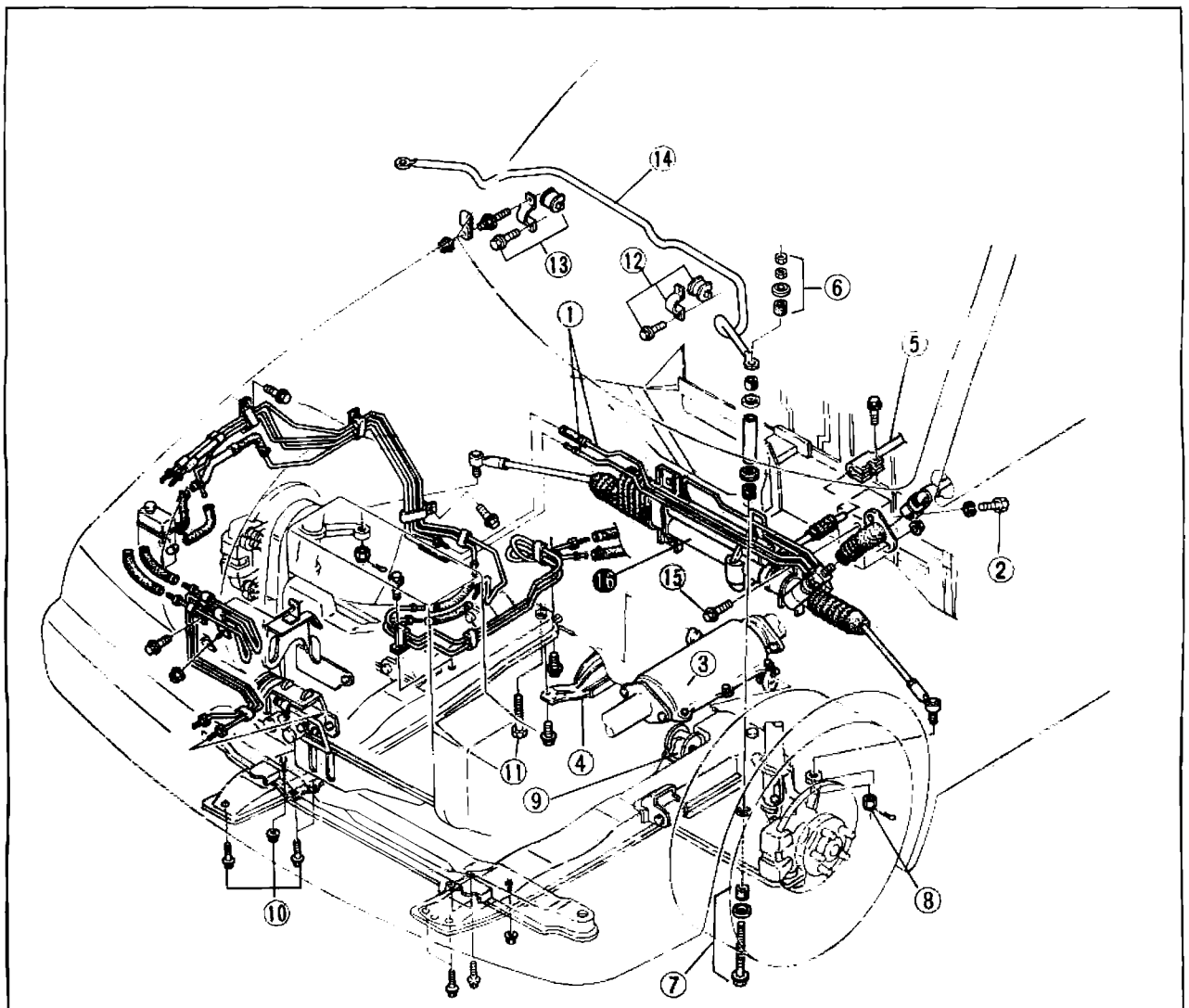
    After installing the steering angle transfer shaft, check the steering angle transfer shaft alignment. [Refer to page 10—32 (Simple inspection).]

REMOVAL AND INSTALLATION

1. Jack up the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure, referring to the removal note for specially marked parts.
3. Install in the reverse order of removal, referring to installation note for specially marked parts.
4. Tighten all nuts and bolts to the specified torque, referring to page 10—39.

Note
The power steering fluid will leak out when the return hose or the pressure hose is disconnected. Prepare a suitable container for it to drain into.

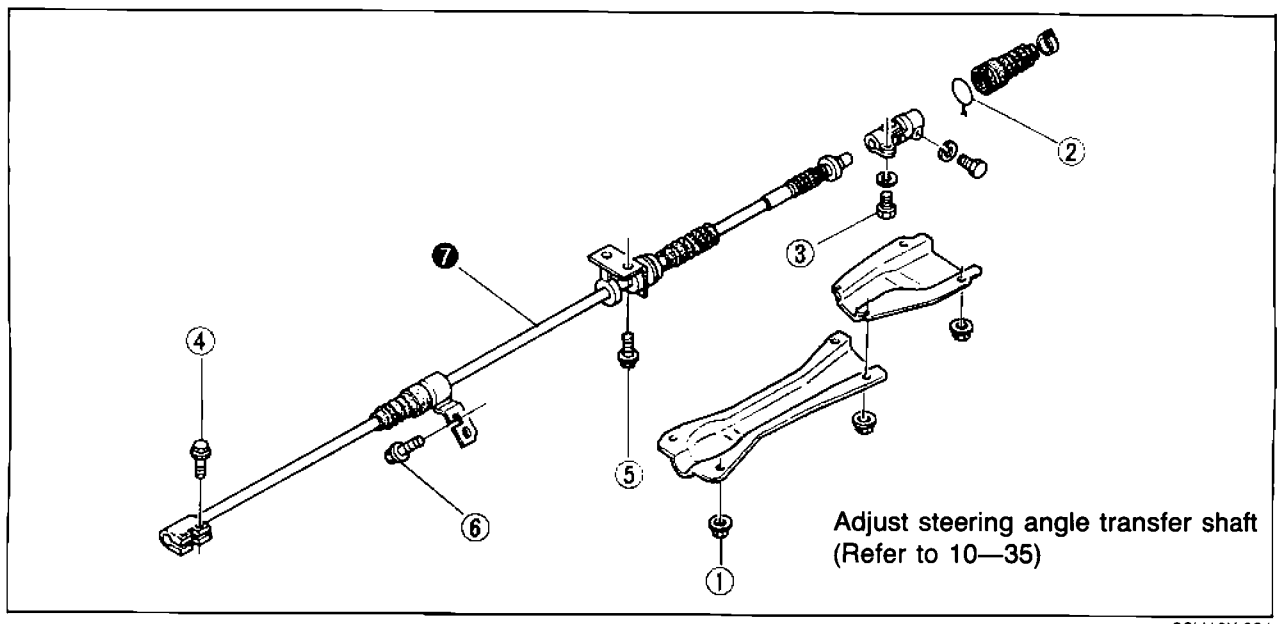
Front Steering Gear



76G10X-034

1. Pipes
2. Bolt
3. Exhaust pipe
4. Under cover
5. Shaft (Refer to next page)
6. Nuts retainer and bushing
7. Bolt, retainer and bushing
8. Nuts
9. Engine mount
10. Bolts and nut
11. Bolt
12. Bolt and mounting
13. Bolts and mounting
14. Stabilizer
15. Bolt
16. Front steering gear assembly

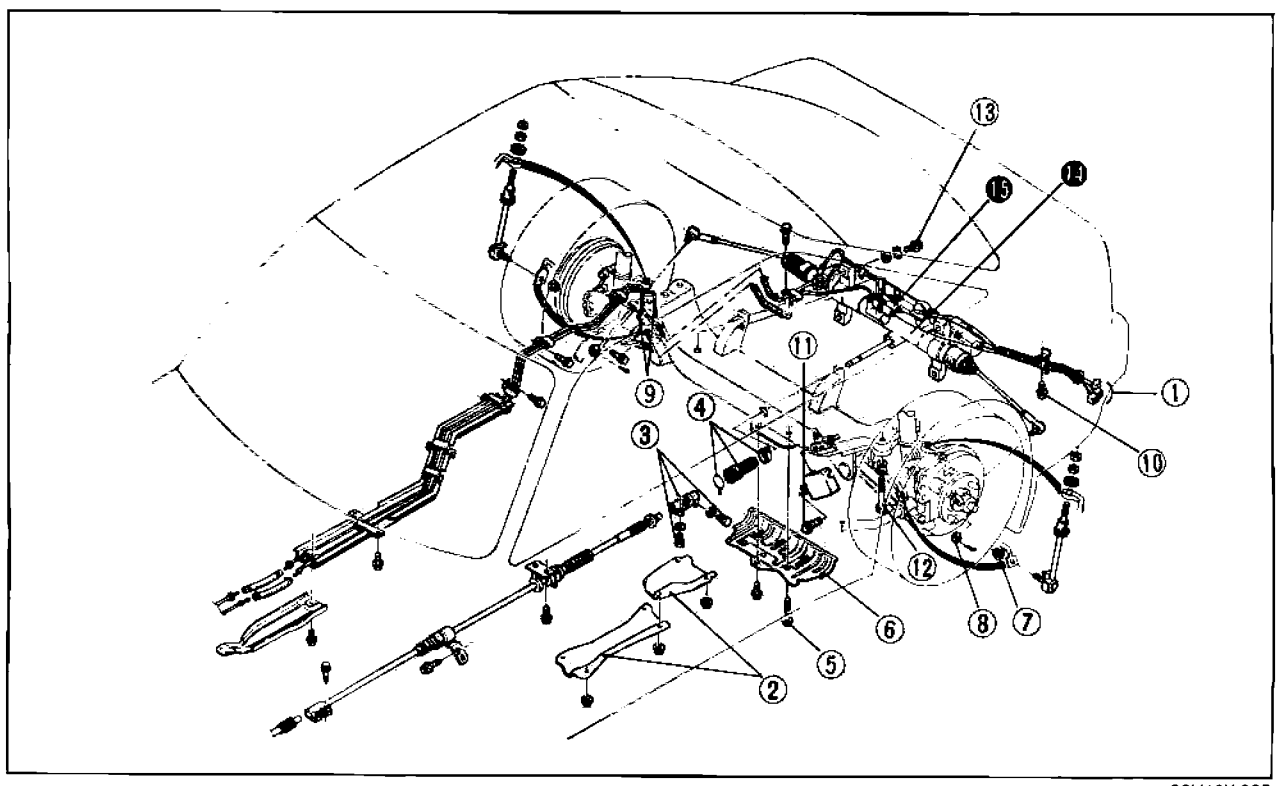
Steering Angle Transfer Shaft



86U10X-064

1. Nut
2. Boot band
3. Bolt
4. Bolt
5. Bolt
6. Bolt
7. Steering angle transfer shaft

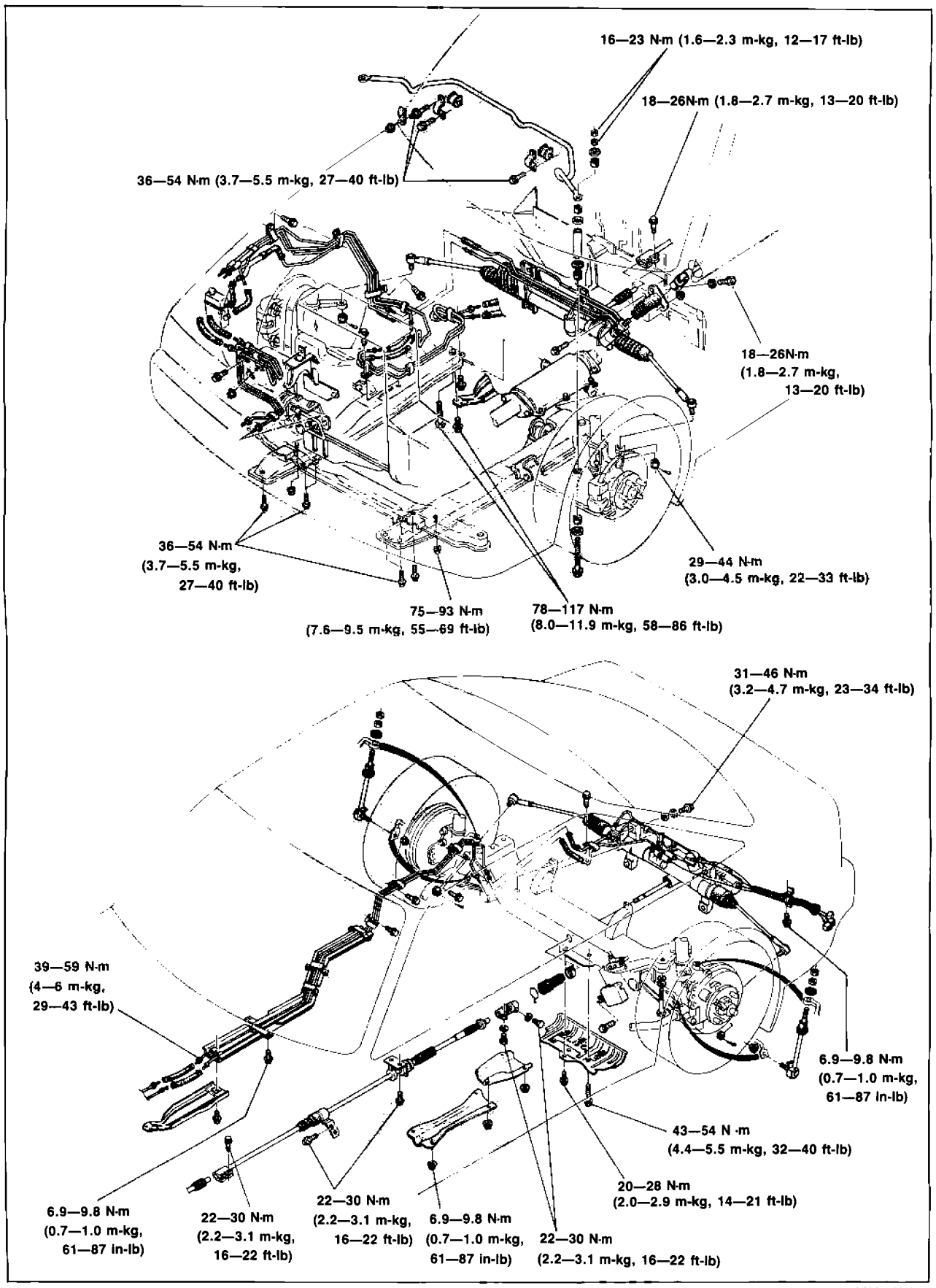
Rear Steering Gear



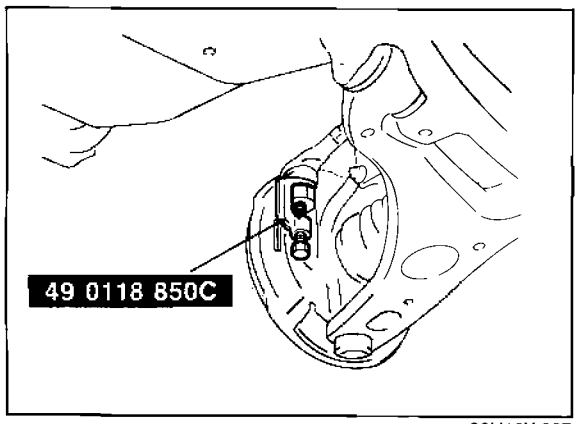
86U10X-065

1. Connector
2. Cover
3. Universal joint and bolts
4. Boot and boot band
5. Bolts
6. Cover
7. Nuts
8. Nuts
9. Pipes
10. Bolt
11. Bolt
12. Bolt
13. Bolt
14. Rear steering gear assembly
15. Solenoid valve

Torque Specifications

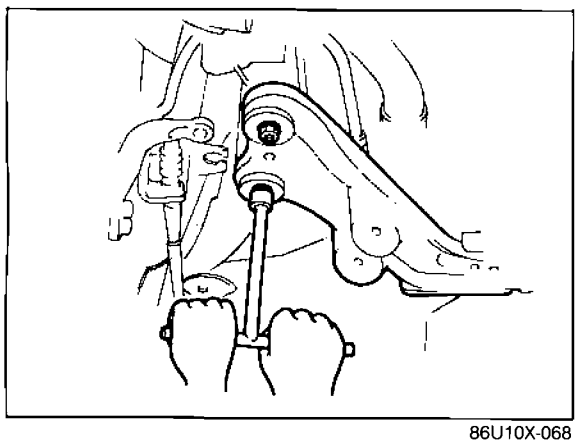


86U10X-066



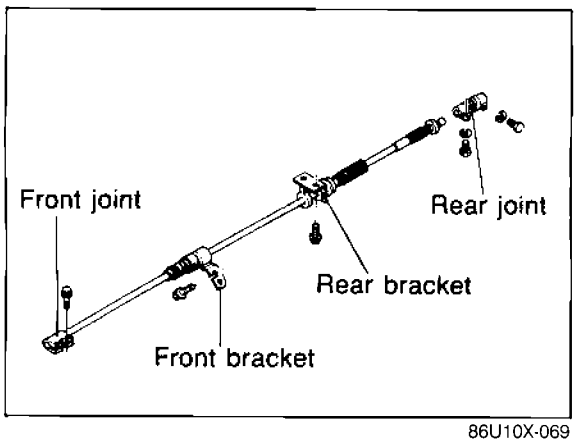
86U10X-067

Removal Note
Front steering gear
1. Disconnect the tie-rod ends from the knuckles with the **SST**.



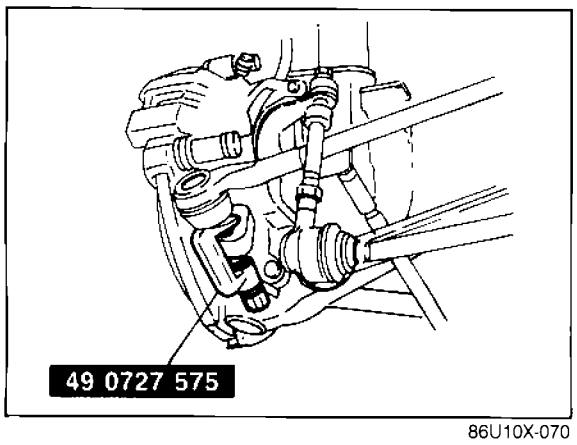
86U10X-068

2. Remove the mounting bolts and nuts from the body and crossmember. Let the lower members hang down.



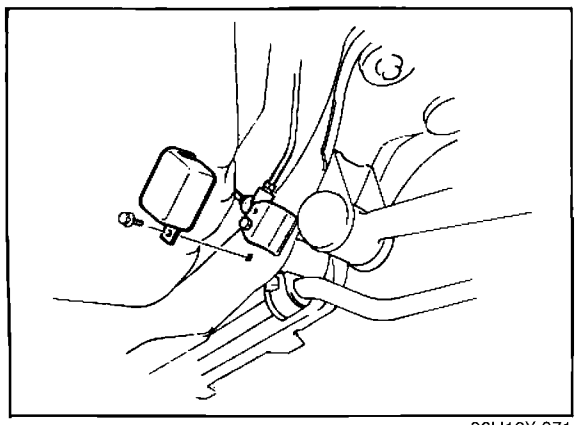
86U10X-069

Steering angle transfer shaft
Be careful not to bend the joints to extreme angles.



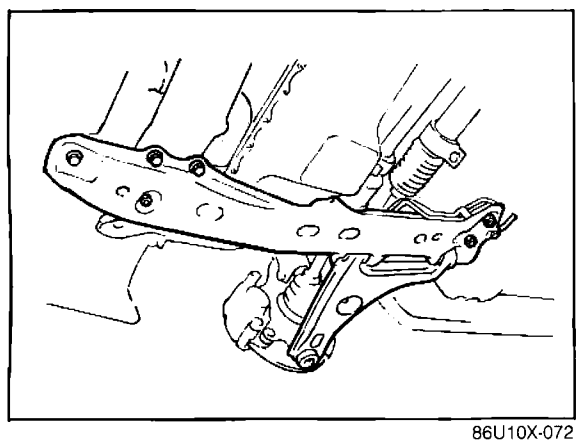
86U10X-070

Rear steering gear
1. Disconnect the tie-rod ends from the knuckles with the **SST**.



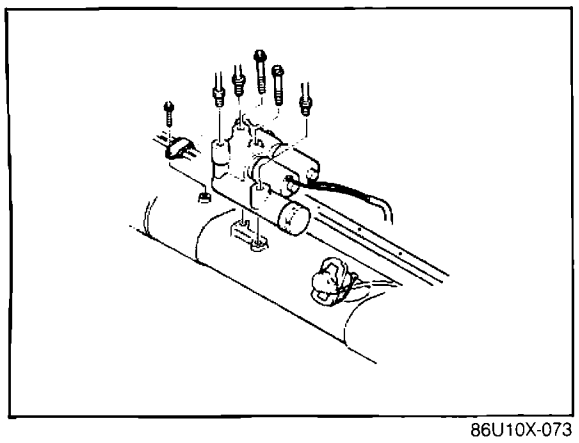
86U10X-071

2. Remove the cover and the brake pipe joint block.



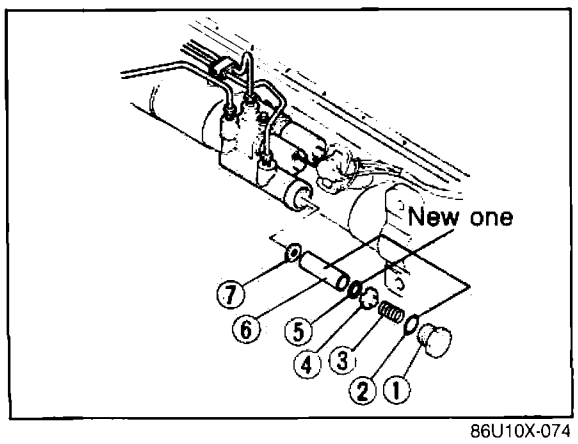
86U10X-072

3. Remove the mounting bolts and nuts from the left and right subframes.
4. Let the subframes hang down.



86U10X-073

Solenoid valves
1. Remove the oil pipes.
2. Remove the bolts.
3. Disconnect the solenoid valve connectors.
4. Remove the solenoid valve assembly.

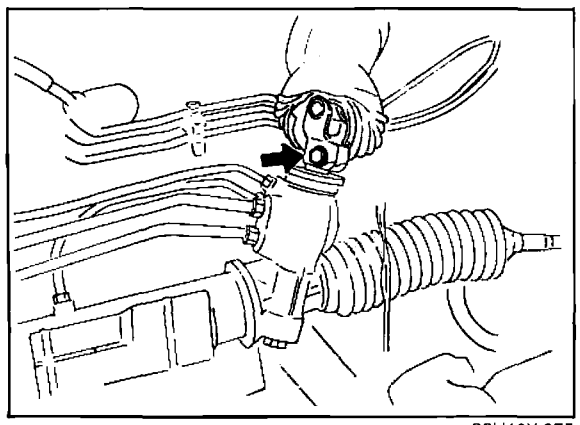


86U10X-074

Oil filter
Replace the oil filter in the sequence shown in the figure.

1. Filter cap
2. O-ring
3. Spring
4. Set plate
5. Rubber
6. Oil filter
7. Magnet

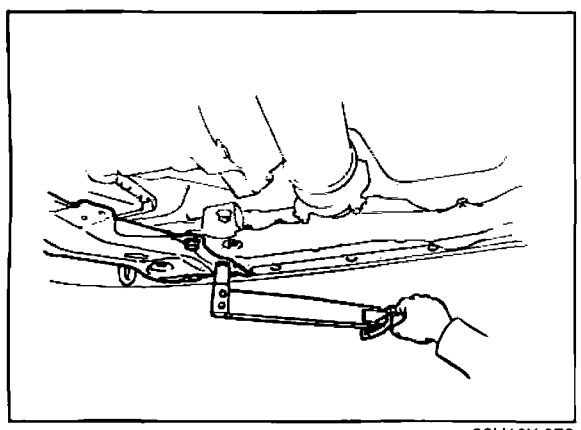
Note
Clean up and install the magnet and set plate.



86U10X-075

Installation Note
Front steering gear
Tighten the universal joint to the pinion shaft.

Tightening torque:
18—26 N (1.8—2.7 m-kg, 13—20 ft-lb)

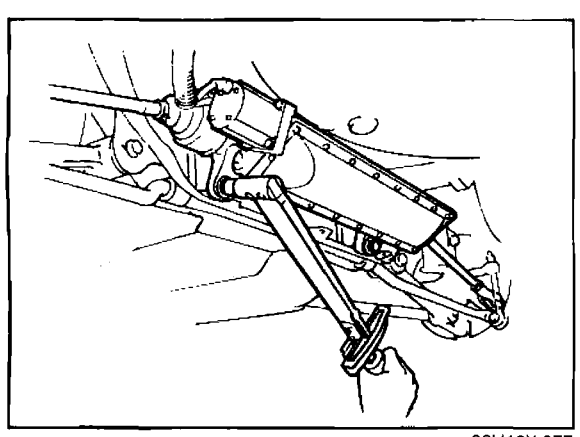


86U10X-076

Install the subframe.

Tightening torque:
36—54 N·m (3.7—5.5 m-kg, 27—40 ft-lb)

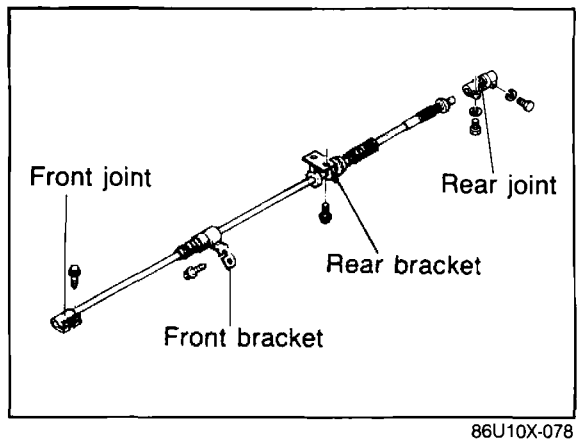
Adjust the rear turning angle. (Refer to page 10—35.)



86U10X-077

Rear steering gear
Adjust the rear steering angle after installation of the rear steering gear. (Refer to page 10—35.)

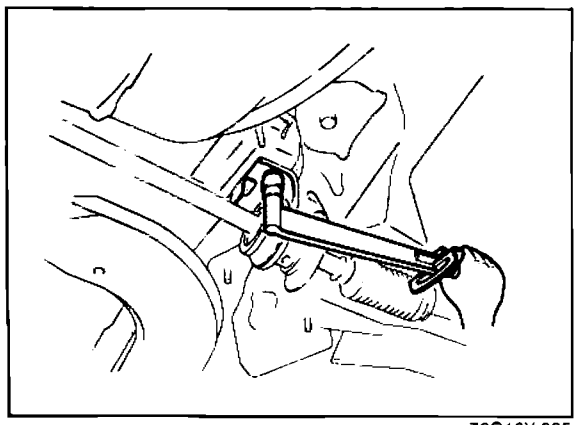
Note
When the replacement of rear steering gear or the oil pan gasket owing to the oil leakage, add fluid to the specified level. (Refer to page 10—12)



86U10X-078

Steering angle transfer shaft

Caution
Installation of the steering angle transfer shaft must be done correctly.
Work carefully, referring to the adjustment of steering angle transfer shaft (page 10—35).
If not installed correctly, the rear steering angle may be incorrect, causing steering problems or damage to the rear steering gear assembly.



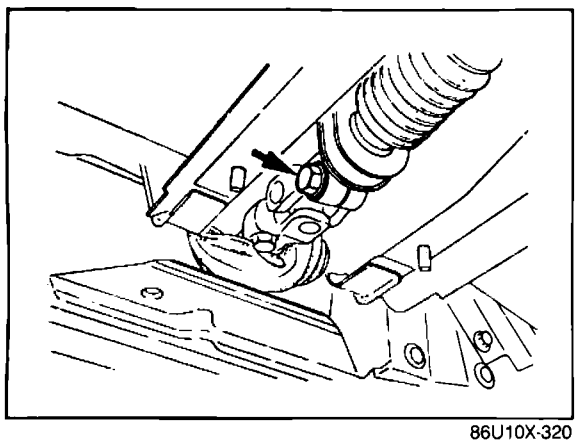
76G10X-035

1. Temporarily install the front bracket.
2. Install the rear bracket, and then tighten at the specified torque.

Tightening torque:
22—30 N·m (2.2—3.1 m-kg, 5.1—7.2 ft-lb)

3. Tighten the front bracket bolt.

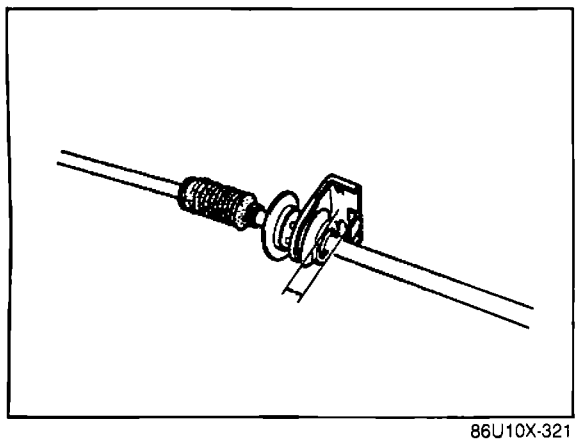
Tightening torque:
22—30 N·m (2.2—3.1 m-kg, 5.1—7.2 ft-lb)



86U10X-320

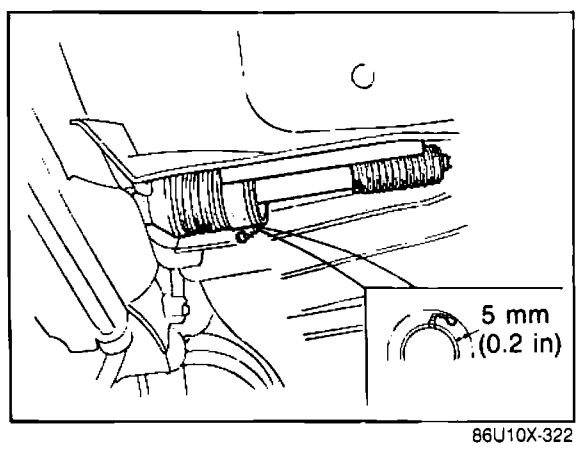
Caution
The shaft should be installed by two or more persons, taking care not to bend the joint part.

4. Connect the joint of the front steering gear side, and then tighten the bolt.
5. Connect the joint of the rear steering gear side, and then tighten the bolt.



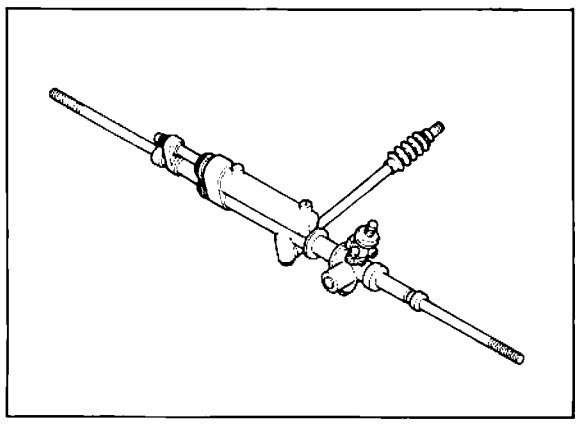
86U10X-321

Caution
Check to be sure that the front and rear brackets do not contact the oil seal.

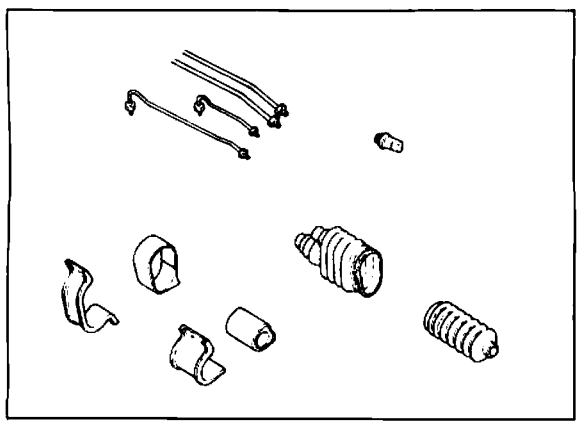


86U10X-322

6. Attach a new wire and clamp, and as shown in the illustration be sure that protrusion is within 5mm (0.2 in).
7. Install the cover.



86U10X-079



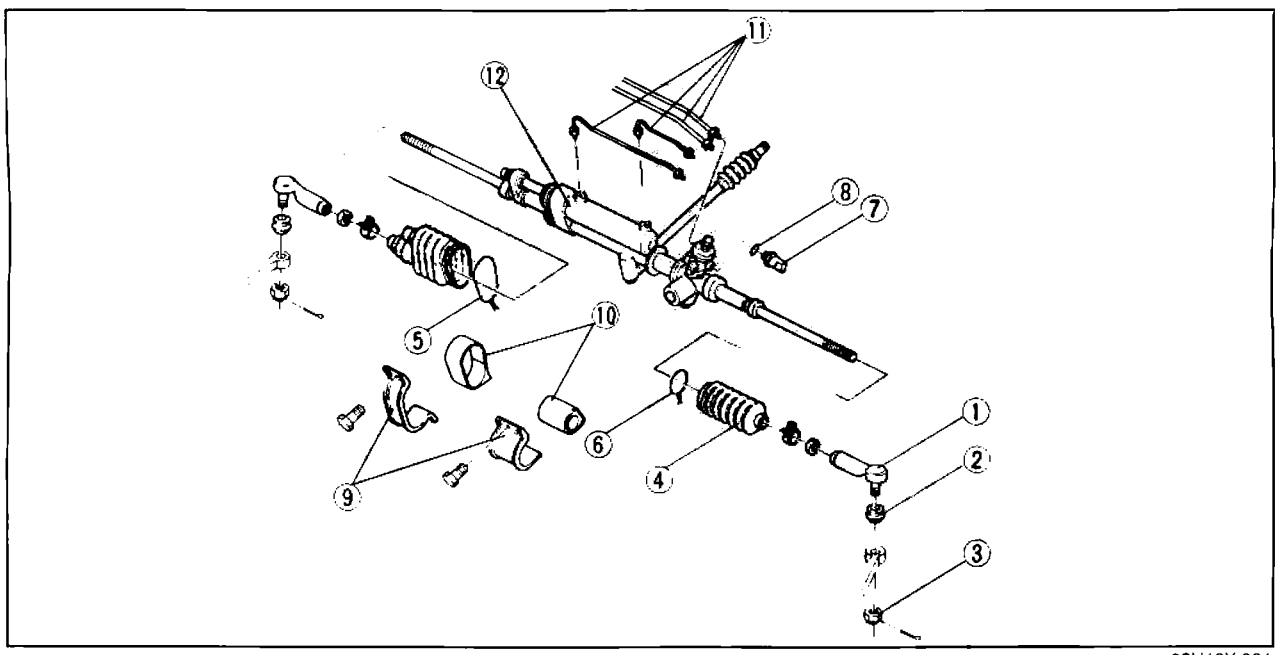
86U10X-080

INSPECTION

Front Steering Gear and Linkage

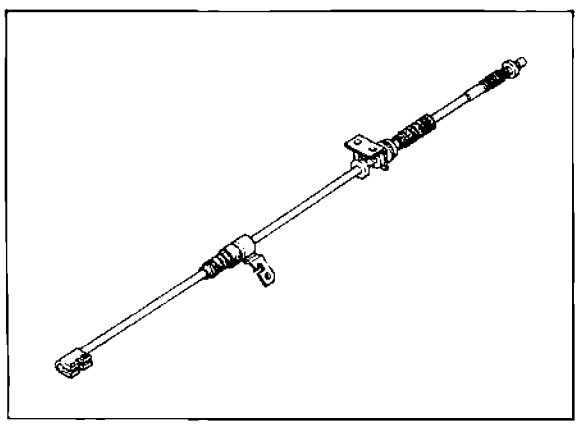
1. Check the following and replace the front steering gear assembly if necessary.
   (a) Damaged or cracked case
   (b) Bent linkage
2. Check the following and replace any faulty parts.
   (a) Clogged, bent, or pinched pipes
   (b) Faulty oil pressure switch
   (c) Damaged mounting bracket and mounting rubber
   (d) Cracked, damaged, or deteriorated boots

Available spare parts



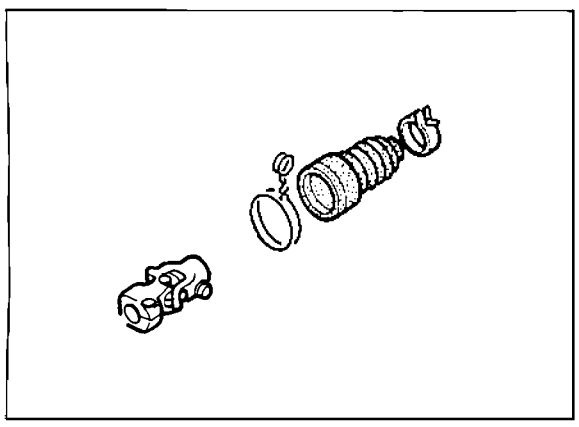
86U10X-081

1. Tie-rod end
2. Tie-rod end boot
3. Nut
4. Boot
5. Boot band (large)
6. Boot band (small)
7. Oil pressure switch
8. O-ring
9. Mounting bracket
10. Mounting rubber
11. Oil pipe
12. Steering gear assembly



86U10X-082

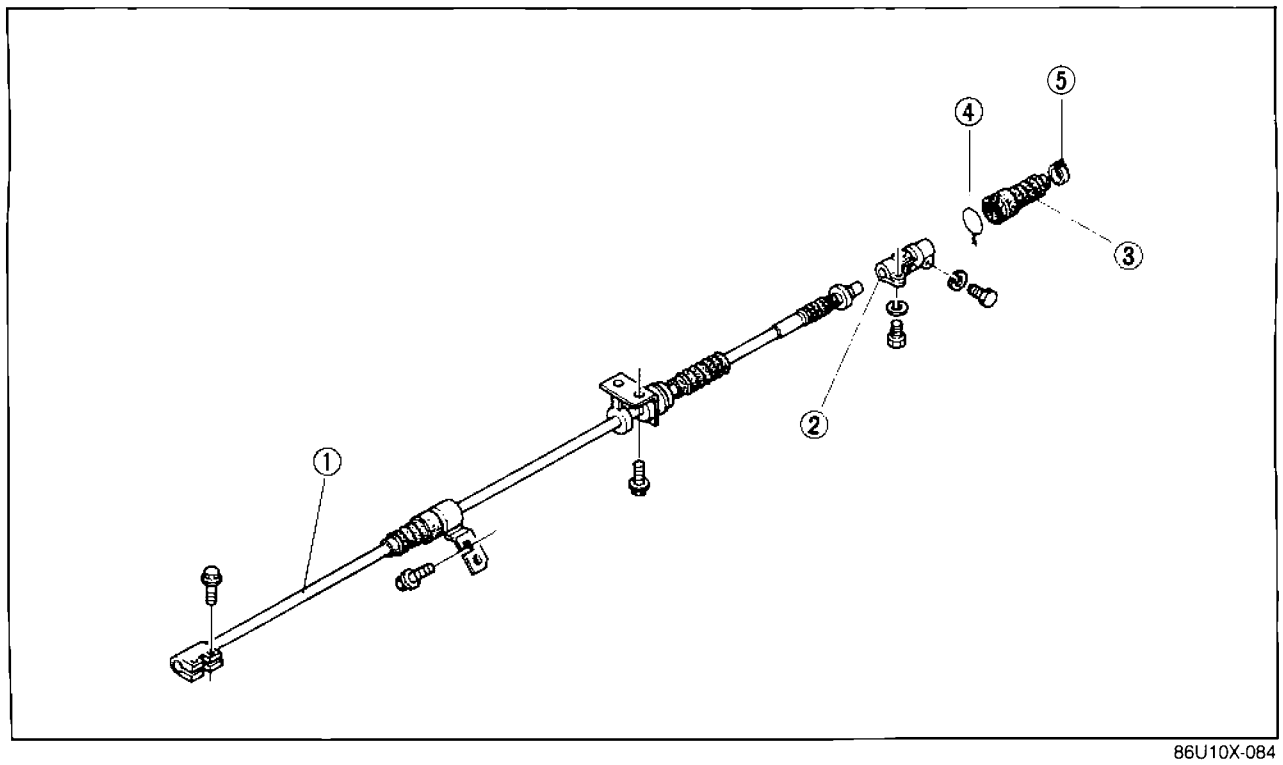
Steering Angle Transfer Shaft
Check the following and replace the shaft assembly if necessary
1. Shaft
   (a) Cracked, damaged, or deteriorated boots
   (b) Stuck carrier bearing
   (c) Bending
   (d) Damaged mounting brackets



86U10X-083

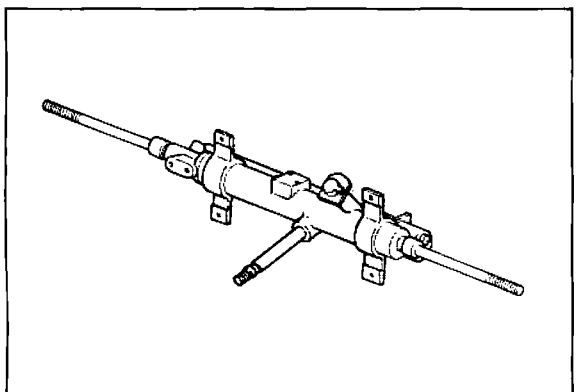
2. Universal joint
   Looseness or damage
3. Rear boot
   Crackes, damage, or deterioration

Available spare parts

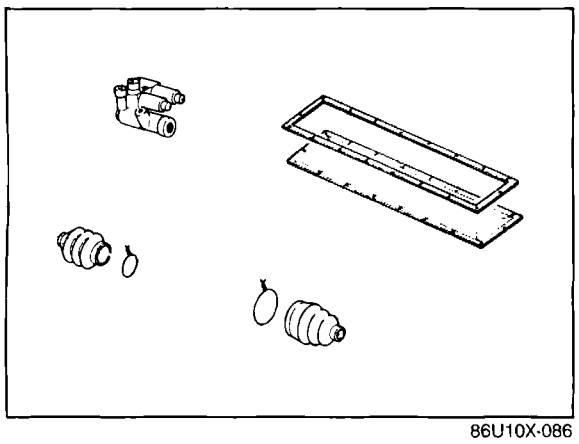


86U10X-084

1. Shaft
2. Universal joint
3. Rear boot
4. Wire
5. Clip



86U10X-085



86U10X-086

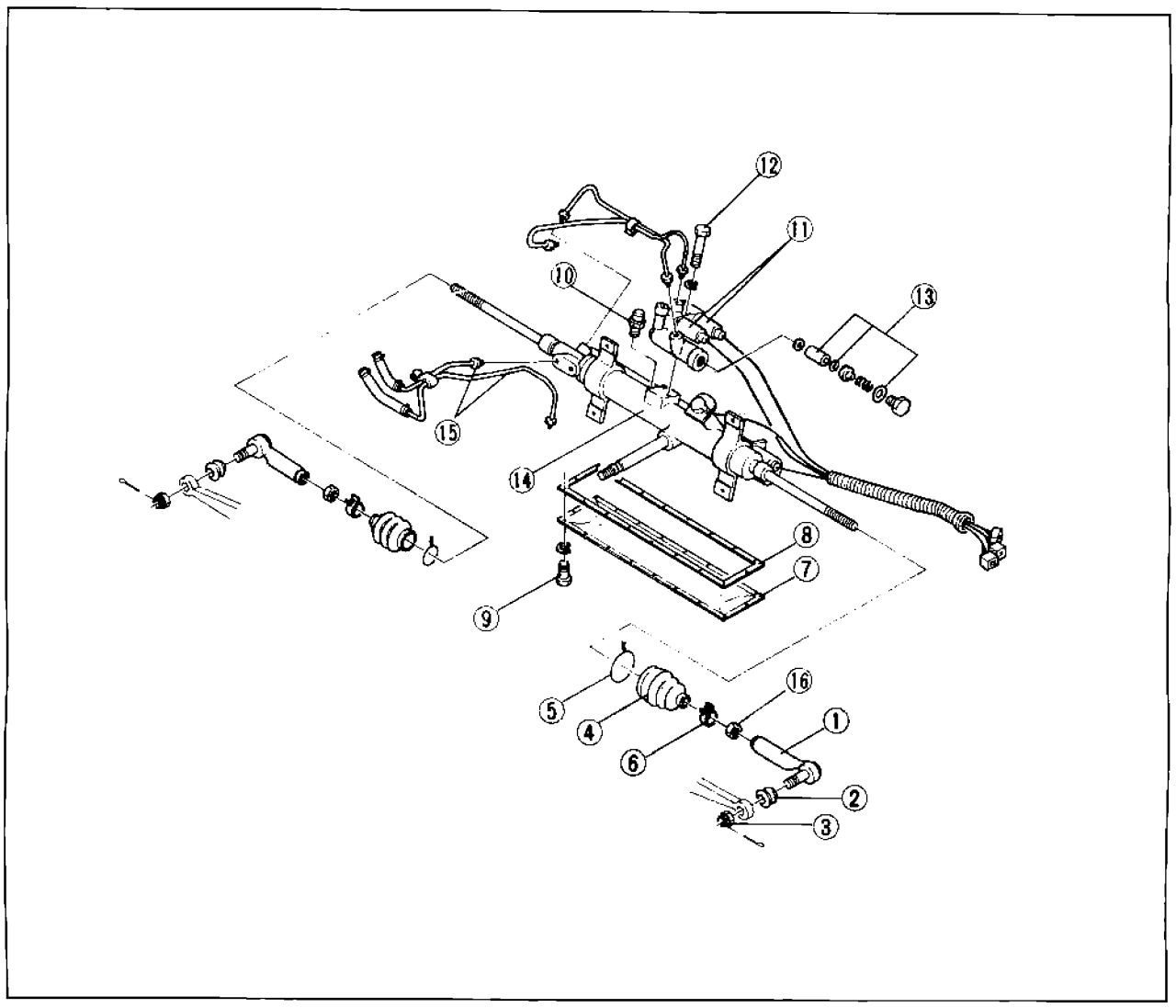
Rear Steering Gear and Linkage

1. Check the following and replace the rear steering gear assembly if necessary.
   (a) Damaged or cracked case
   (b) Faulty stepper motor or rear-to-front steering ratio sensor
   (c) Sticking bearings
   (d) Oil leakage

Note
There is no fluid in a new replacement rear steering gear assembly, add fluid to the specified level. (Refer to 10—12.)

2. Check and tighten bolts and nuts, if necessary.
3. Check the following and replace any faulty parts.
   (a) Cracked, damaged, or deteriorated rear steering gear boots and bands
   (b) Cracked or damaged oil pan
   (c) Malfunctioning solenoid valve

Available spare parts



86U10X-087

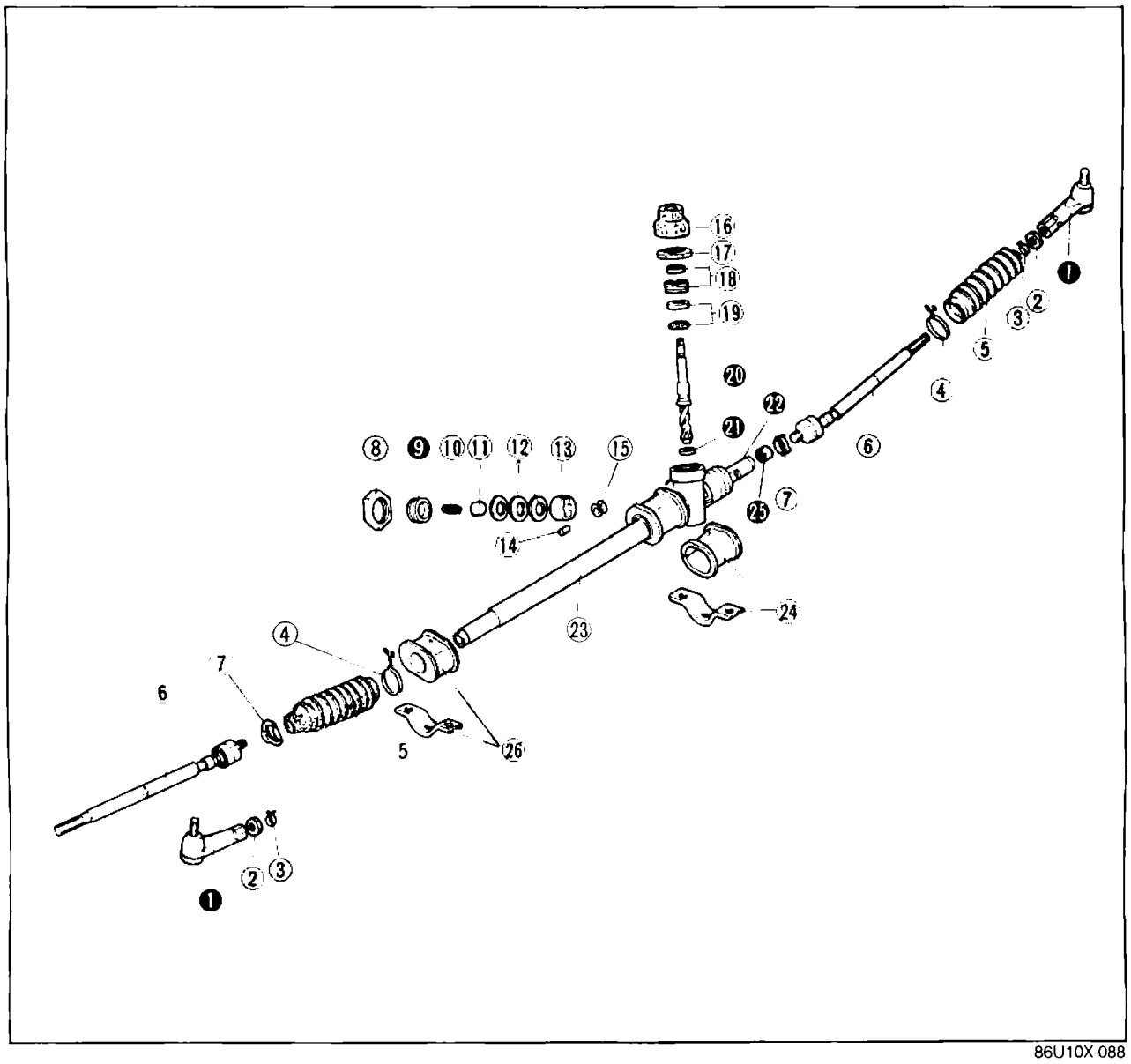
1. Tie-rod end
2. Tie-rod end boot
3. Nut
4. Boot
5. Boot band (wire)
6. Boot band (clip)
7. Oil pan
8. Oil pan gasket
9. Bolt
10. Oil filler bolt
11. Solenoid valve (Refer to 10—41)
12. Bolt
13. Oil filter set (Refer to 10—41)
14. Steering gear assembly
15. Pipe
16. Nut

MANUAL STEERING

DISASSEMBLY

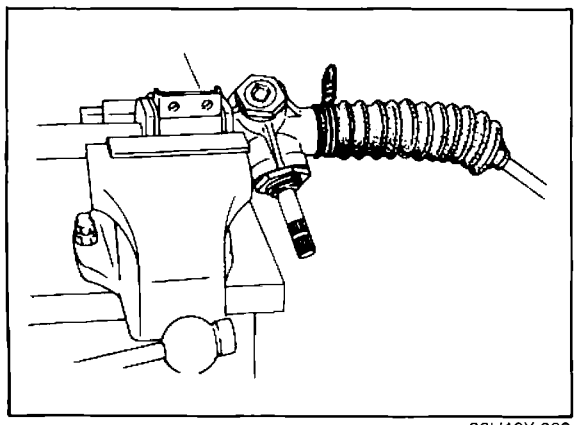
Disassemble in the sequence shown in the figure, referring to the disassembly note for specialy marked parts.

Note
Before disassembling, drain the gear oil and remove all external grease and dirt.



86U10X-088

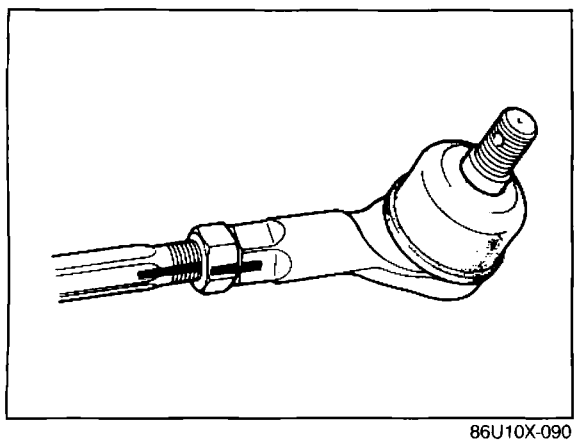
1. Tie-rod end
2. Nut
3. Clip
4. Boot wire
5. Boot
6. Tie-rod
7. Washer
8. Adjust cover locknut
9. Adjust cover
10. Spring
11. Friction block
12. Dish spring
13. Holder
14. Needle roller
15. Roller assembly
16. Boot support
17. Rear cover locknut
18. Rear cover and oil seal
19. Bearing
20. Pinion
21. Bearing
22. Rack
23. Gear housing
24. Mounting rubber and bracket
25. Bushing



86U10X-089

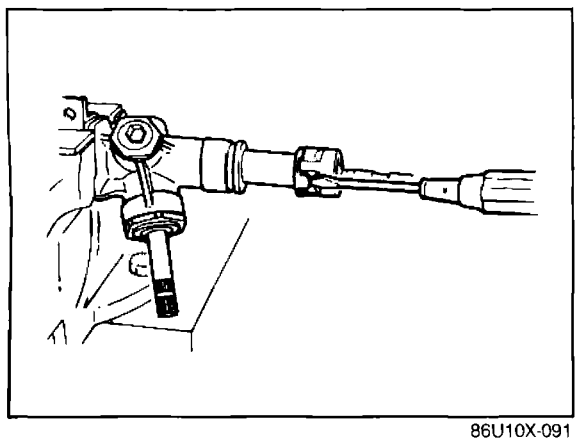
Disassembly Note
Steering gear and linkage
Secure the gear and linkage in a vise.

Caution
Insert protective material (such as copper plates) in the jaws of the vise.



86U10X-090

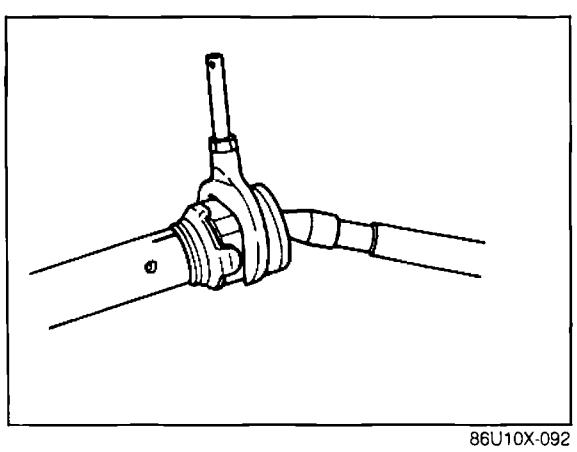
Tie-rod ends
Before removing the tie-rod ends, make a mark for proper installation.



86U10X-091

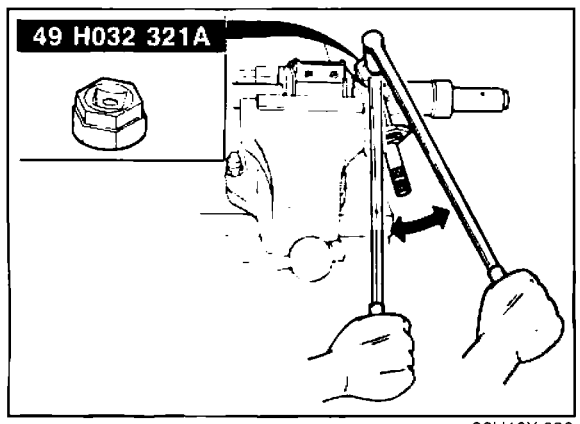
Tie-rods
Remove the tie-rods.

1. Uncrimp the washer as shown in the figure.



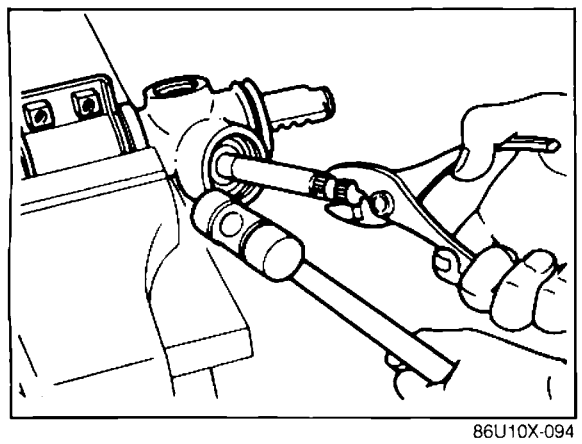
86U10X-092

2. Secure the rack in a vise and remove the tie-rod.



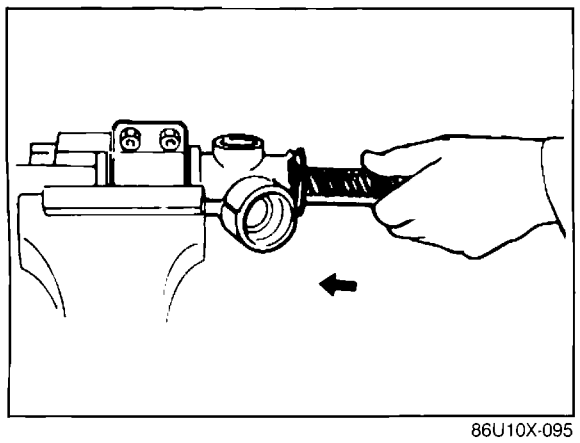
86U10X-093

Adjust cover
1. Loosen the locknut, and remove the adjust cover with the **SST**.
2. Remove the spring, friction block, dish springs holder, and needle roller assembly.


86U10X-094

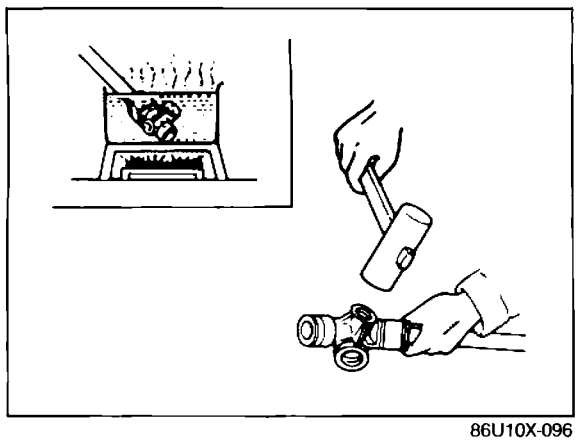
Pinion
Gently grasp the serrated part of the pinion and pull it out of the gear housing.

Caution
If the pinion is difficult to remove, gently tap the gear housing with a plastic hammer while pulling.

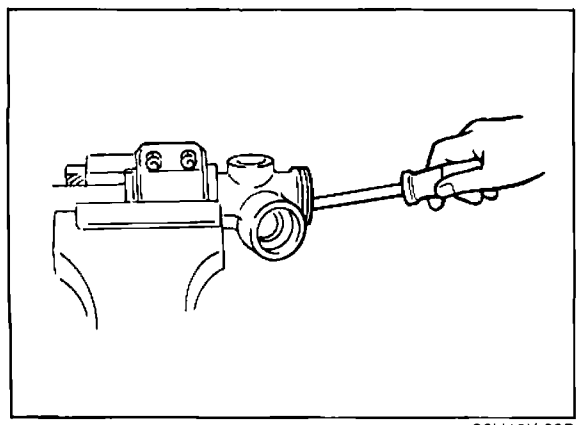

86U10X-095

Rack
Remove the rack by taking it out in the direction indicated by the arrow.

Caution
Do not damage the rack bushing with the edge of the rack gear.


86U10X-096

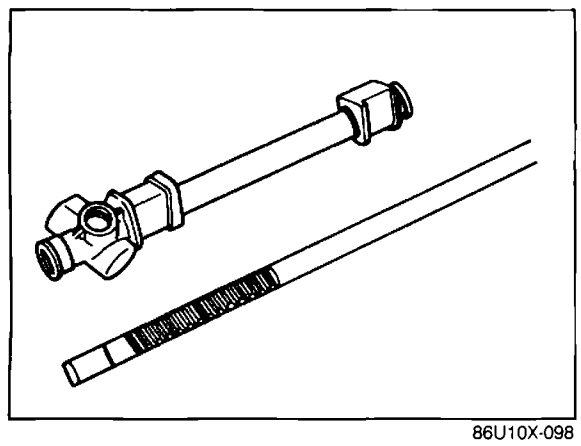
Bearing (lower)
Heat the housing in water to about 80°C (176°F); then tap the end of the housing with a wooden hammer to remove the bearing.



86U10X-097

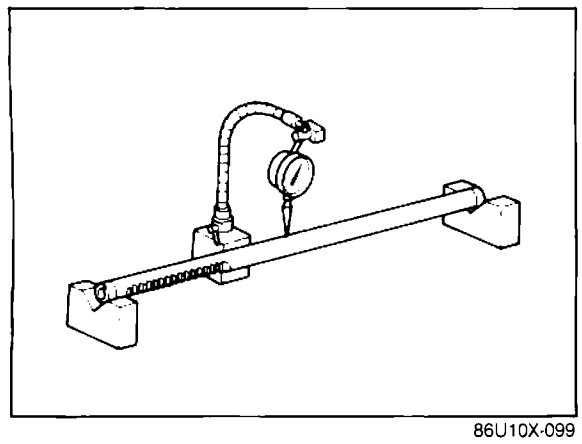
Bushing
Break the bushing and remove it.

Caution
Be careful not to damage the gear housing.



86U10X-098

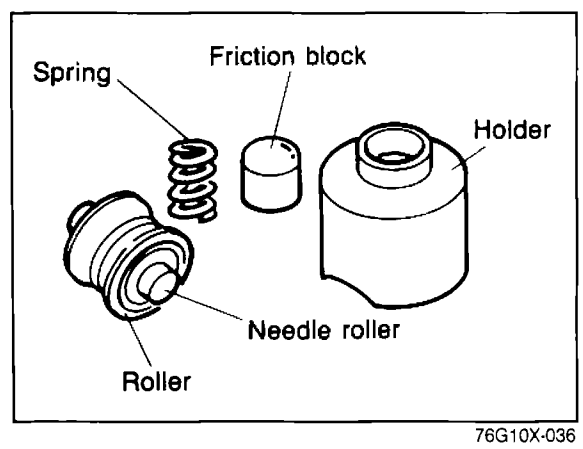
INSPECTION
Check the following and replace any faulty parts.
1. Damaged mounting rubber or bracket
2. Cracked, worn teeth, or damaged pinion
3. Loose, noisy, or sticking bearing in gear housing
4. Cracked or damaged gear housing
5. Worn rack and housing bushing
6. Tie-rod ball-joint operation and looseness
7. Bent tie-rods or tie-rod ends



86U10X-099

8. Cracked, worn teeth, or damaged rack
9. Runout of rack

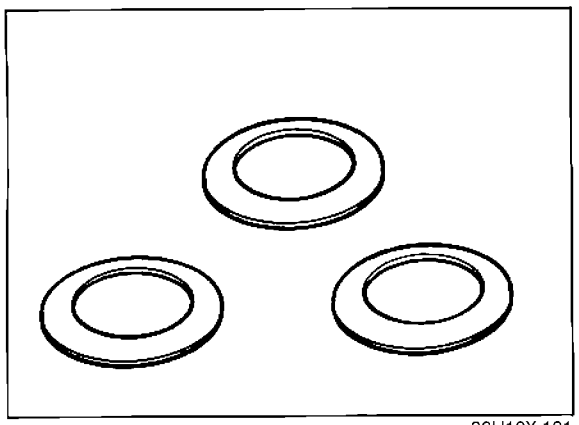
Runout: 0.30 mm (0.012 in) max.



76G10X-036

10. Worn or damaged roller and friction block
11. Bearing operation
12. Cracked or damaged holder
13. Weak or damaged spring

Note
If the needle bearing must be replaced, replace the roller assembly.

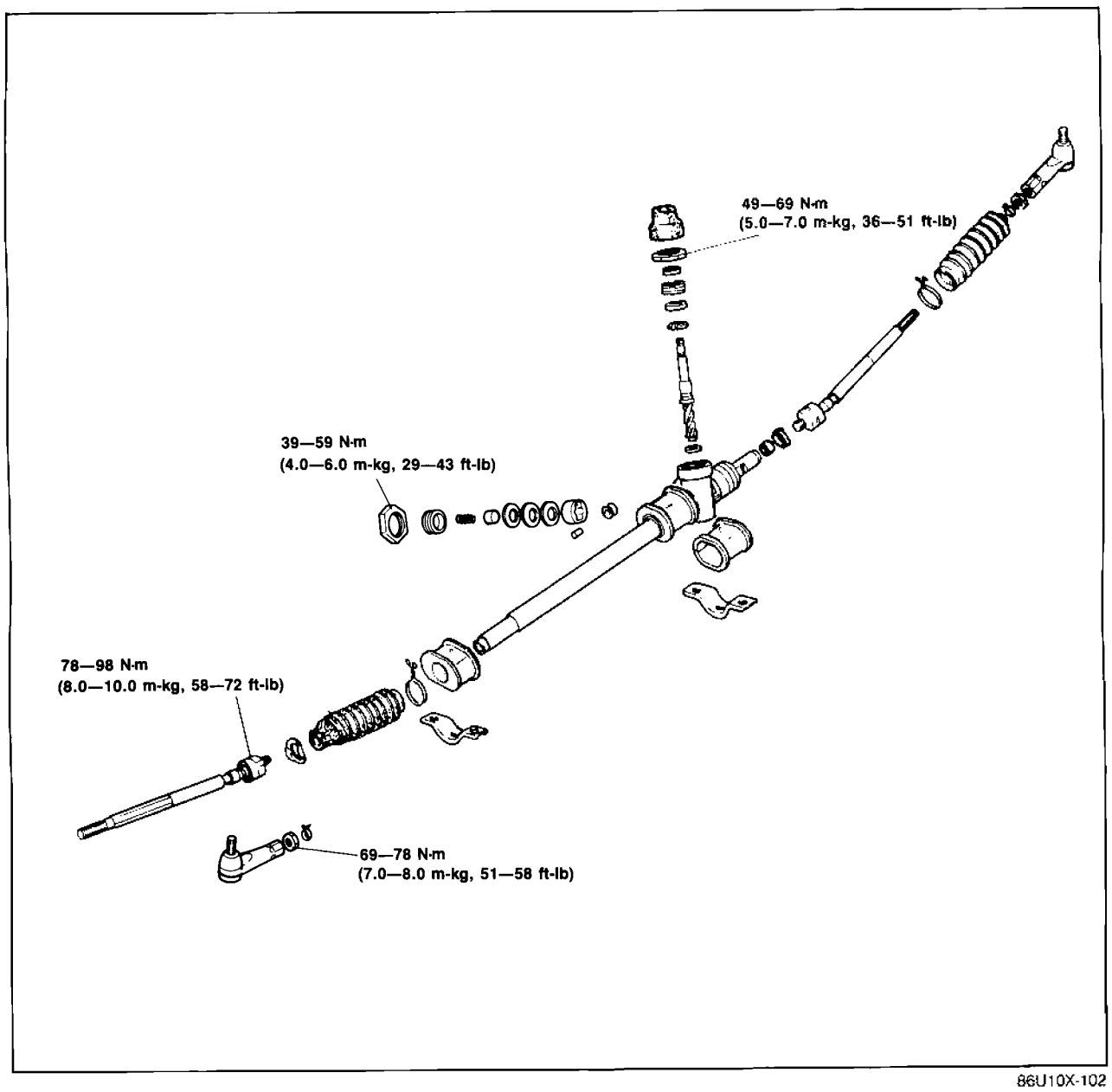


14. Damaged dish springs

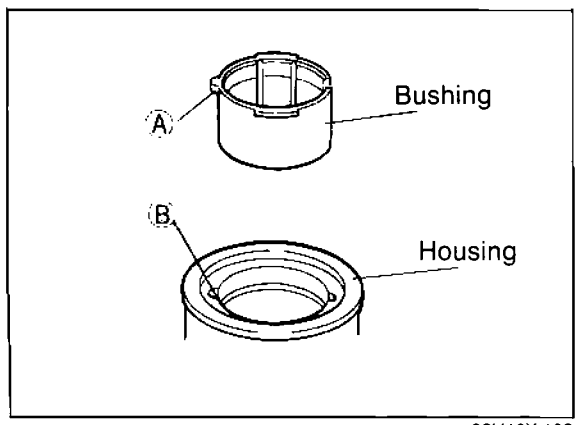
86U10X-101

ASSEMBLY

Torque Specifications

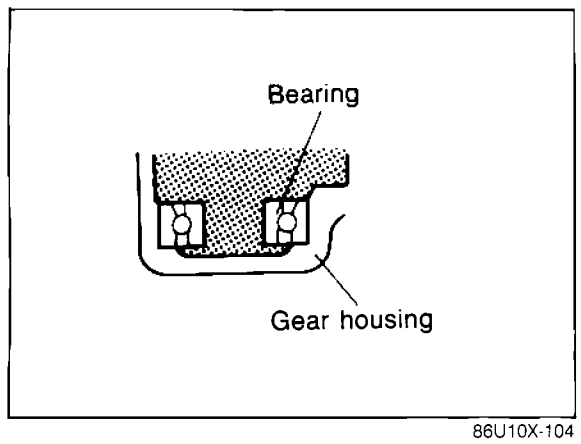


86U10X-102



86U10X-103

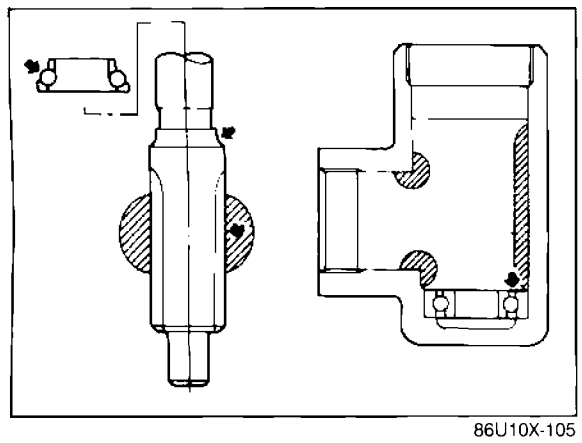
1. Install the mounting rubber and bracket.
2. Install the bushing.
   Align A with B and press the bushing into the gear housing until it is fully seated.



86U10X-104

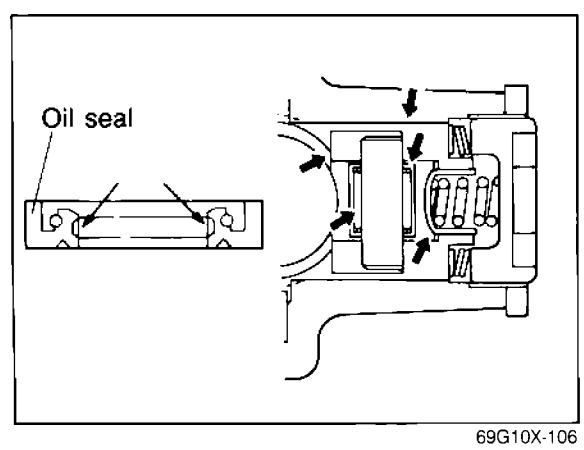
3. Press in the lower bearing.

Caution
a) Before pressing in, put grease (lithium base, NLGI No. 2) in the bearing and bearing bore.
b) Install the bearing in the proper direction.
c) Use the pinion to press the bearing in.



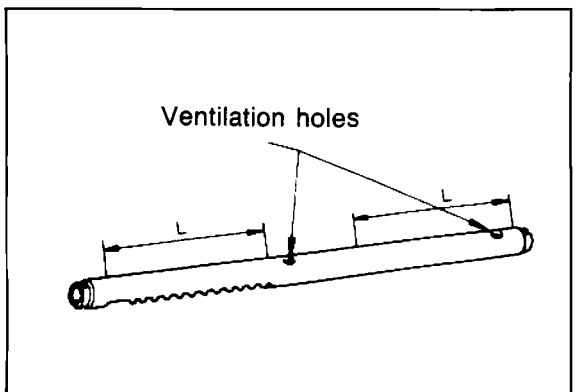
86U10X-105

4. Fill or coat the following points with grease (lithium base, NLGI No. 2) before assembly.
   a) Pinion bearing and teeth
   b) Inside gear housing



69G10X-106

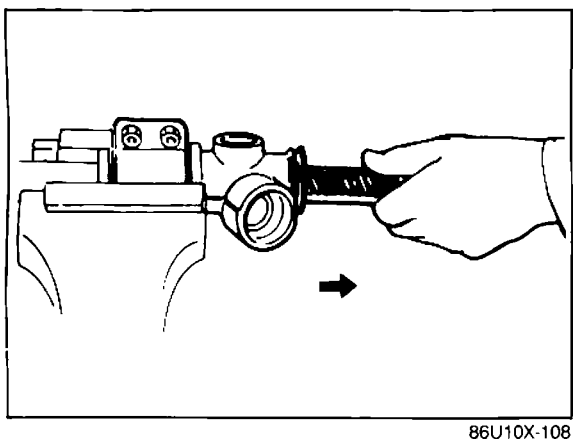
c) Oil seal lip
d) Roller surface
e) Holder
f) Friction block surface



86U10X-107

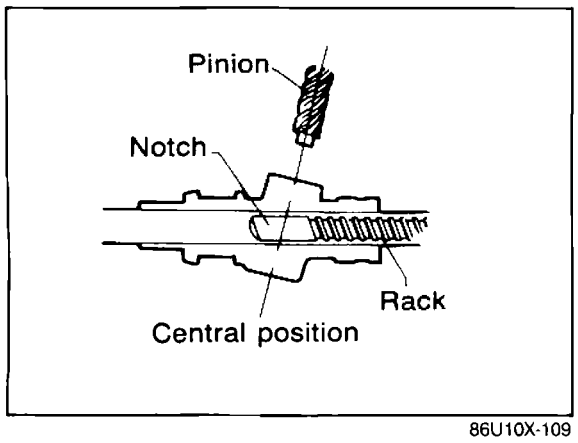
g) Inner surface of housing rack bushing
h) Rack gear and outer circumference of rack shaft
L = 180 mm (7.09 in)
i) Tie-rod ball-joint
j) Inside left and right boots

Caution
Be careful not to fill the ventilation holes in the rack shaft with grease.



86U10X-108

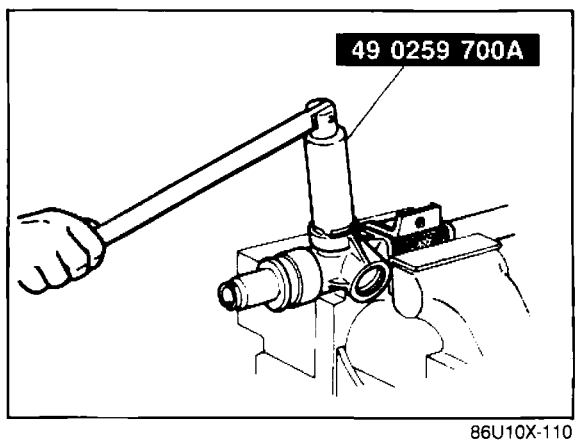
5. Carefully install the rack in the direction of the arrow.



86U10X-109

6. Set the notch of the teeth of the rack at the pinion position, then insert the pinion.

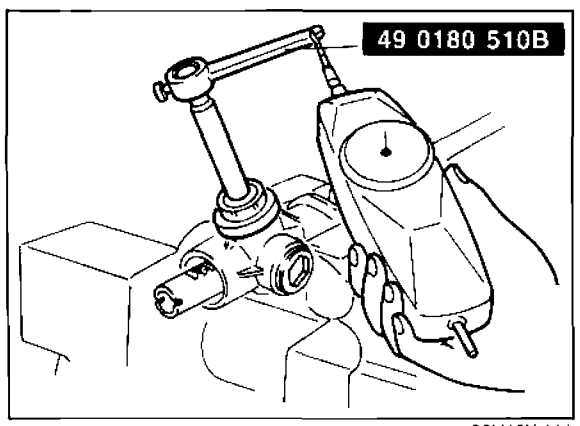
Caution
This notch is used for adjustment of the pinion bearing preload without the pinion engaged with the rack.



86U10X-110

7. Install the upper bearing, and then screw on the rear cover.

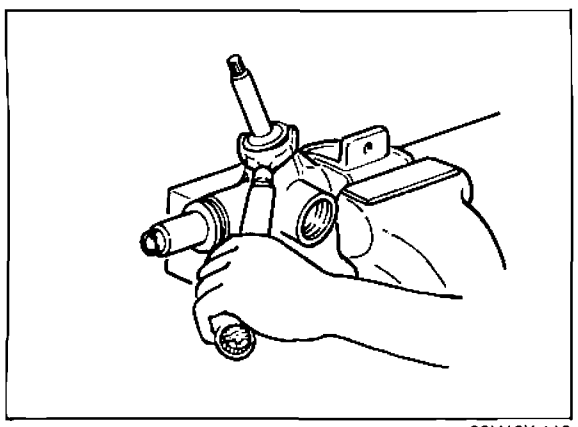
Caution
a) Apply sealant to the threads of the rear cover.
b) Do not install the oil seal.
c) Screw on the rear cover with the SST.



86U10X-111

8. Tighten the rear cover so that the torque of the pinion is approx **400 g (14.1 oz)**. Check with the **SST** and a pull gauge.

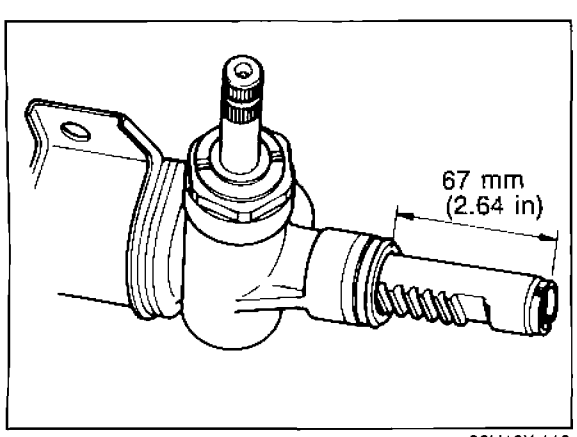
Caution
Before measuring the torque, rotate the pinion to the left and right a few times to seat the bearing.


86U10X-112

9. Loosen the rear cover and readjust the pinion torque to **300 g (10.6 oz)**. Tighten the locknut.

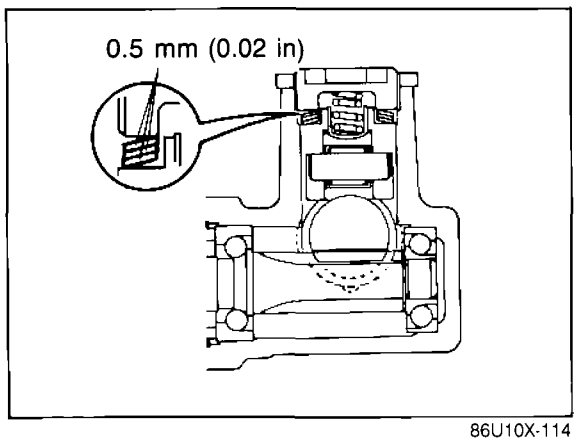
Tightening torque:
49—69 N·m (5,0—7,0 m-kg, 36—51 ft-lb)

Caution
Recheck the pinion torque after tightening the locknut. If it is not within 200—350 g (7—12.3 oz), loosen the locknut and adjust once again.



86U10X-113

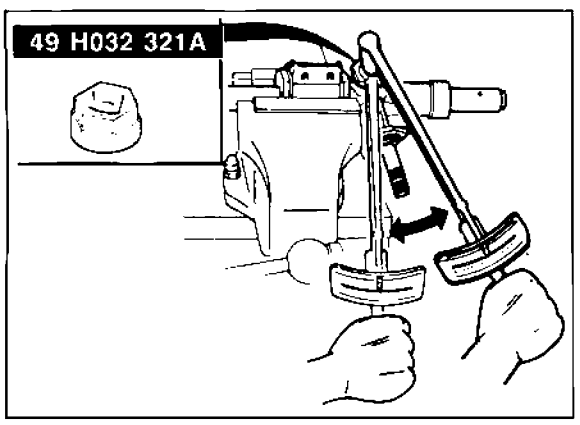
10. Carefully move the rack so that the pinion is set to the center (neutral position) of the rack gear.



86U10X-114

11. Install the roller assembly, needle roller, holder, dish springs, friction block, and spring.

Caution
Install the roller bearing so that it correctly contacts the rack.

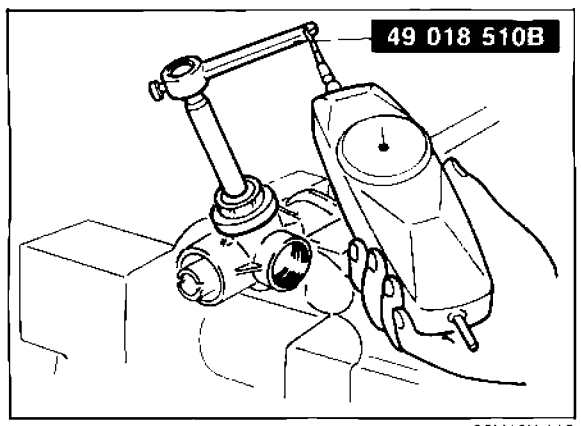


86U10X-115

12. Torque the adjust cover to **9.8 N·m (1 m-kg, 7.2 ft-lb)**, then loosen it 25°—45°. Secure the adjust cover with the locknut and the **SST**.

Locknut tightening torque:
39—59 N·m (4.0—6.0 m-kg, 29—43 ft-lb)

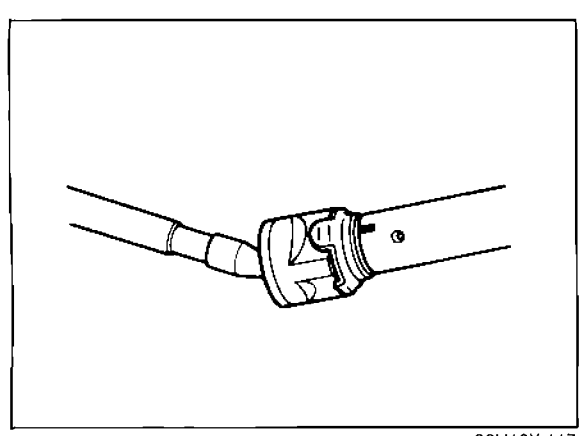
Note
Apply sealant to the threads of the adjust cover before installing.



86U10X-116

13. Measure the pinion torque with the **SST**.

Center position ± 90°
Pull gauge reading:
1,000—1,400 g (35—50 oz)
Any other position
Pull gauge reading:
less than 1,700 g (60 oz)

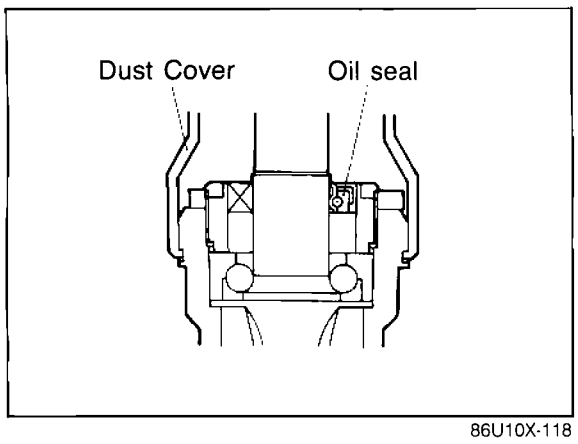


86U10X-117

14. Mark the positions of the rack grooves of the left tie-rod for staking.
15. Install the new washer on the left tie-rod, and install the tie-rod.

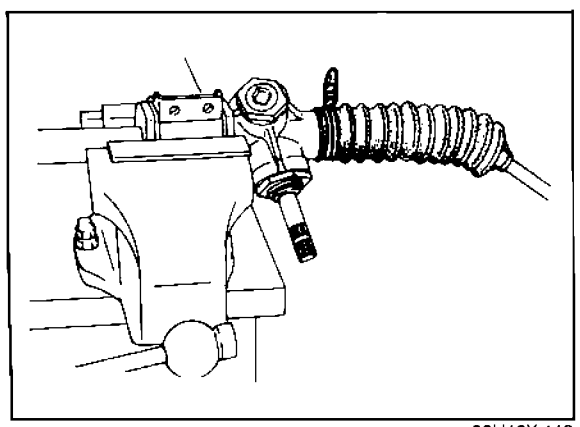
Tightening torque:
78—98 N·m (8.0—10.0 m-kg, 58—72 ft-lb)

16. Stake the washer in two places.



86U10X-118

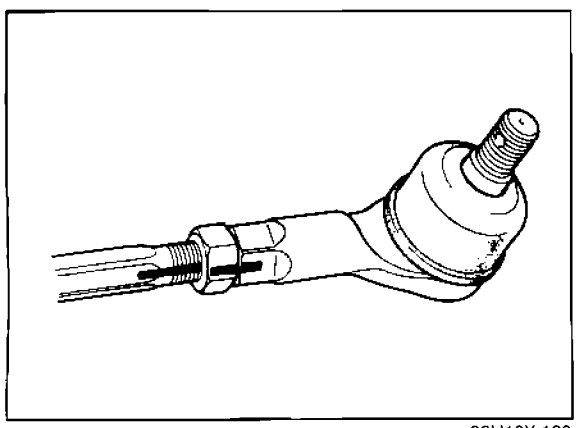
17. Use a pipe to press in the oil seal until it is flush with the end of the rear cover.
18. Slide on the dust cover so that it fits into the pinion groove.
19. Press in the boot support. Be sure that it fits tightly.



86U10X-119

20. Install the boot, then wrap a new wire around it two times and twist 4 to 4.5 times.
Install the clip.

Caution
Check that the boot is not twisted or dented.



86U10X-120

21. Install the tie-rod ends, aligning them with the marks made before disassembly.

ENGINE SPEED SENSING POWER STEERING

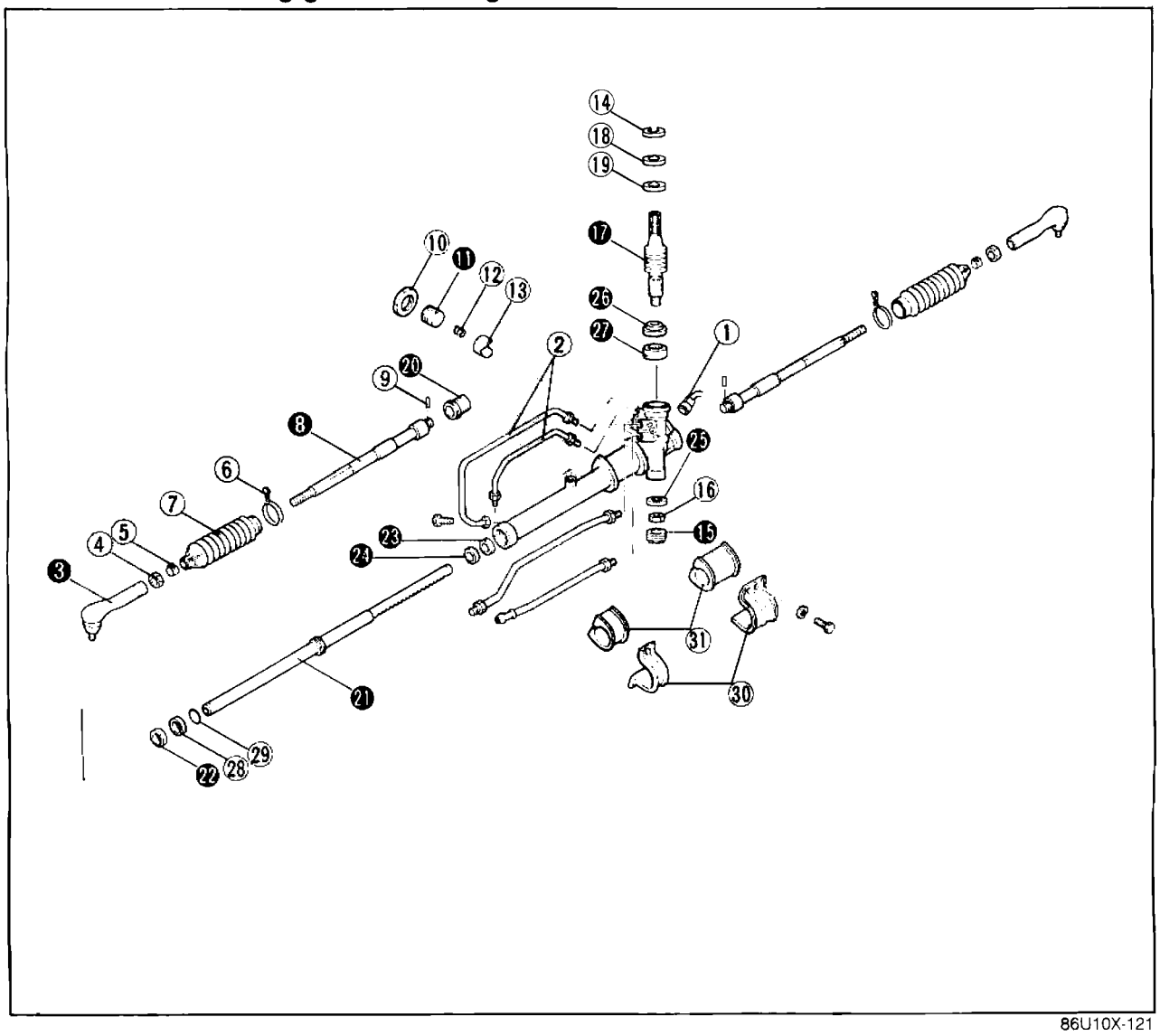
DISASSEMBLY

Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked parts.

Caution

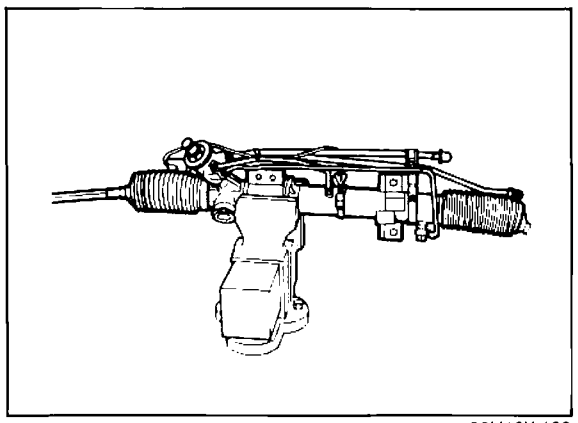
a) In order to prevent the entrance of dirt, all disassembly and assembly should be done in a clean area.

b) Before disassembly, plug the openings of all pipe installation fittings, then thoroughly clean the steering gear and linkage.



86U10X-121

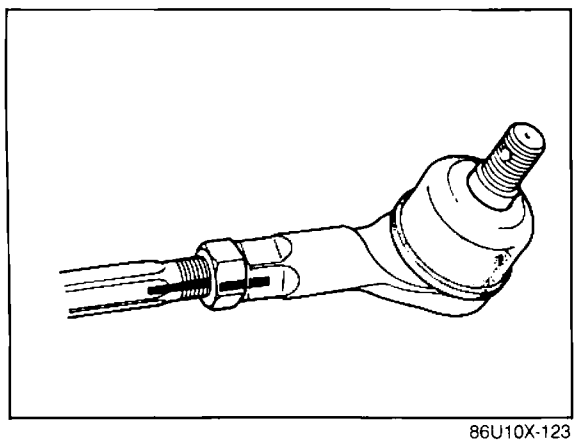
1. Oil pressure switch
2. Oil pipe
3. Tie-rod end
4. Tie-rod end locknut
5. Spring clip
6. Boot wire
7. Boot
8. Tie-rod
9. Lock pin
10. Adjust cover locknut
11. Adjust cover
12. Spring
13. Pressure pad
14. Snap ring
15. Housing cover
16. Lower bearing locknut
17. Pinion shaft and control valve assembly
18. Oil seal
19. Upper bearing
20. Rack bushing assembly
21. Rack
22. Oil seal
23. Spacer
24. Oil seal
25. Lower bearing
26. Oil seal
27. Needle bearing
28. Seal ring
29. O-ring
30. Mounting bracket
31. Mounting rubber mount



86U10X-122

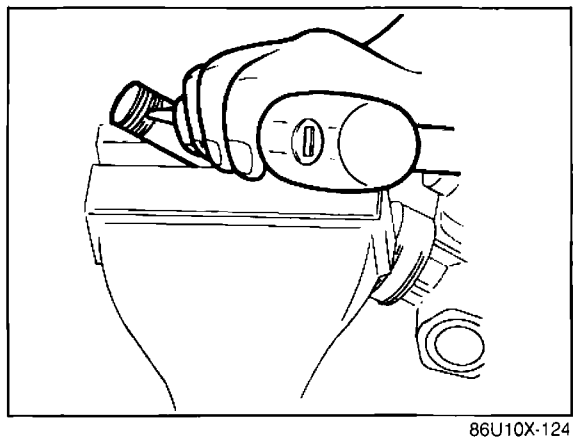
Disassembly Note
Steering gear and linkage
Secure the gear and linkage in a vise.

Caution
Insert protective material (such as copper plates) in the jaws of the vise.



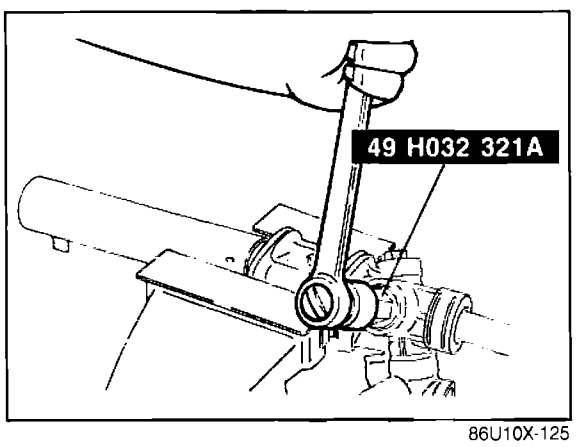
86U10X-123

Tie-rod ends
Before removing the tie-rod ends, make a mark for proper installation.



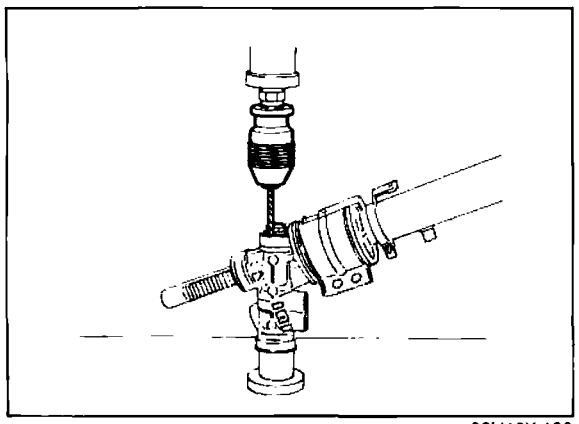
86U10X-124

Tie-rod
1. Remove the tie-rod from rack.
2. Remove the roll pin with a pin-punch and hammer.



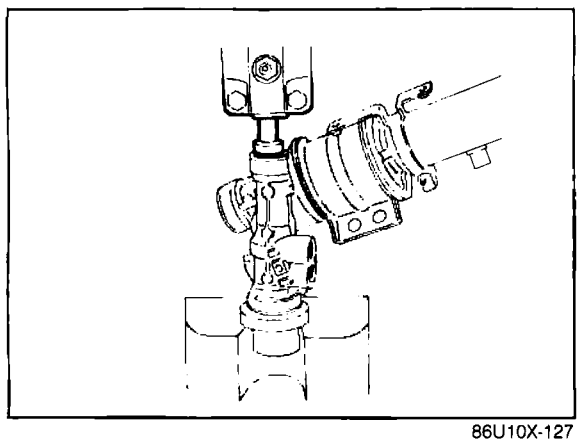
86U10X-125

Adjust cover
1. Remove the locknut from the adjust cover.
2. Remove the adjust cover with the **SST**.
3. Remove the spring and pressure pad.



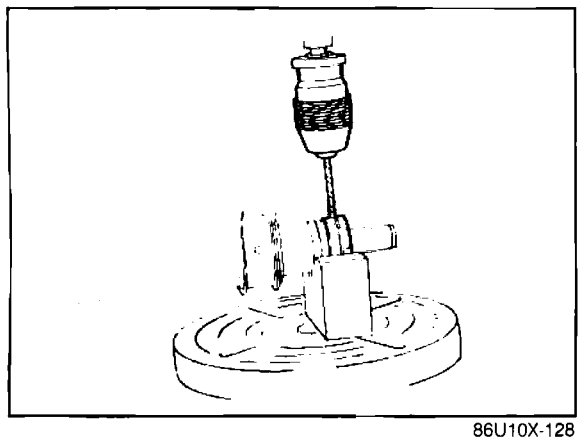
86U10X-126

Housing cover
1. Cut away the staked areas with a drill.
2. Remove the housing cover.



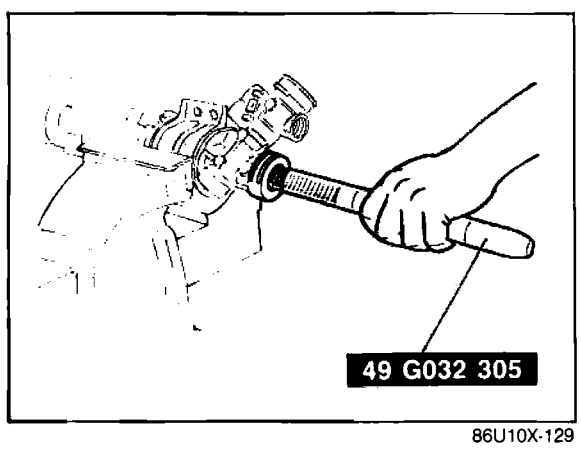
86U10X-127

Pinion shaft
1. Remove the locknut.
2. Set the gear housing assembly on a press and remove the pinion shaft assembly as shown in the figure.



86U10X-128

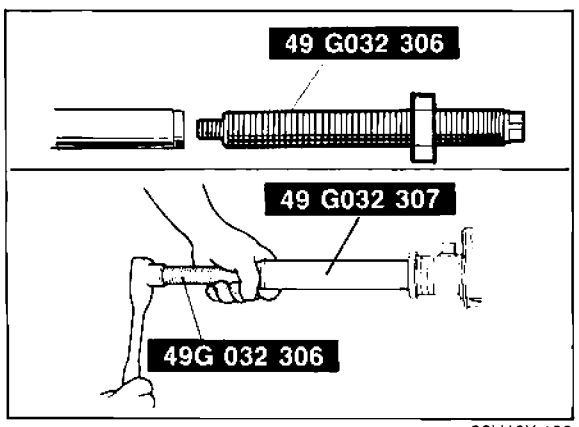
Rack bushing
1. Cut away the staked areas with a drill.
2. Remove the rack bushing.



86U10X-129

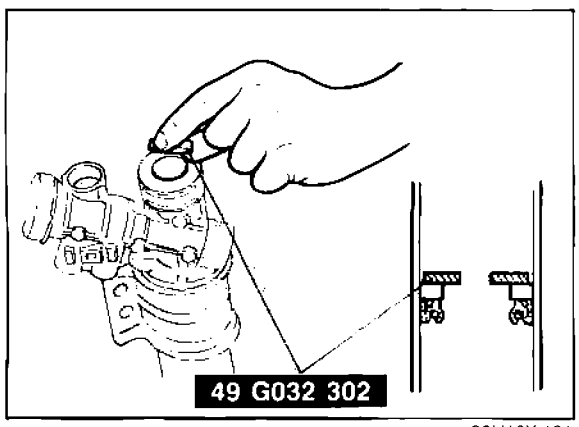
Rack and oil seal at tube side
1. Slide the **SST** over the rack from the gear housing side.

Note
If the rack is removed without using the SST, there is the possibility that the rack housing may be damaged by the rack teeth.



86U10X-130

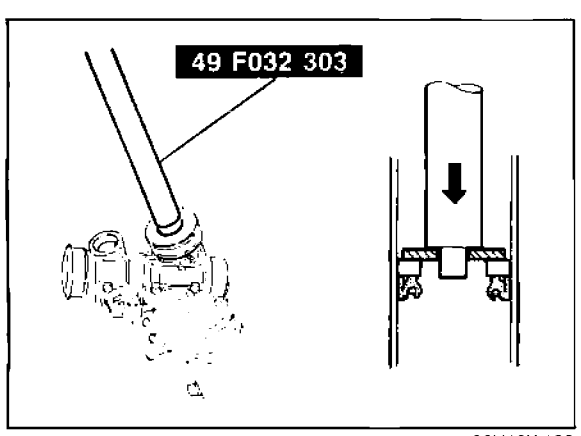
2. Install the **SST** to the threaded part of the rack at the tube side.
3. Remove the oil seal at the tube side which pulling out the rack.



86U10X-131

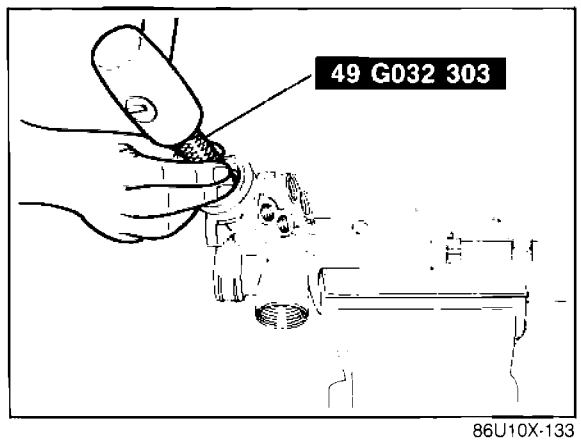
Spacer and oil seal at housing side

1. Insert the **SST** from the pinion housing side so that it contacts the spacer.



86U10X-132

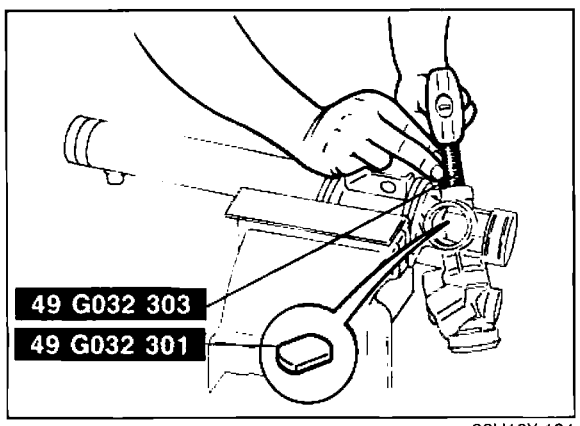
2. Set the **SST** against the **SST** inserted in step 1.
3. Secure the gear housing in a vise.
4. Drive the spacer and oil seal out of the housing.



86U10X-133

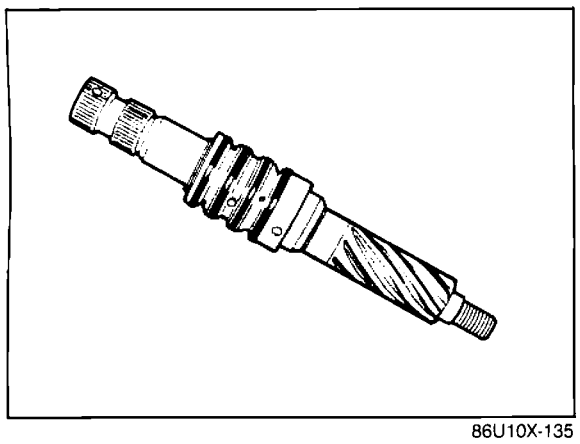
Lower bearing

Drive the lower bearing out of the housing with the **SST**.



86U10X-134

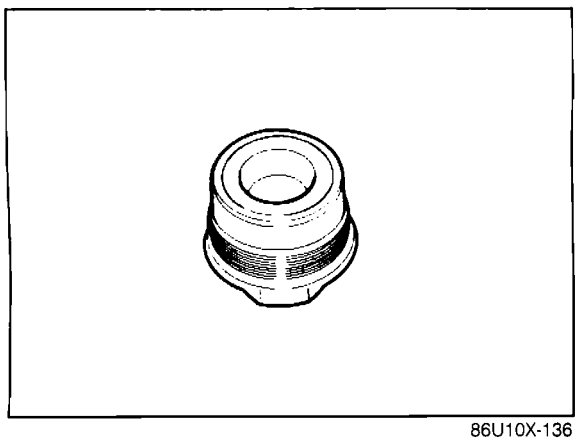
Oil seal and needle bearing
1. Insert the **SST** so that it contacts the needle bearing.
2. Drive the oil seal and needle bearing out with the **SST** bar.



86U10X-135

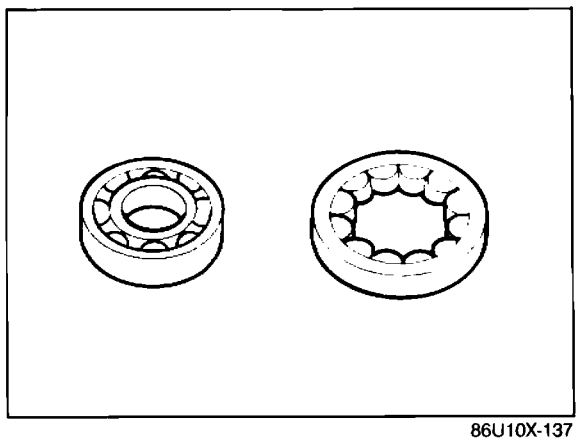
INSPECTION
Check the following and replace any faulty parts.

Pinion shaft assembly
1. Pinion shaft teeth wear or damage
2. Control valve damage, clogging, and wear



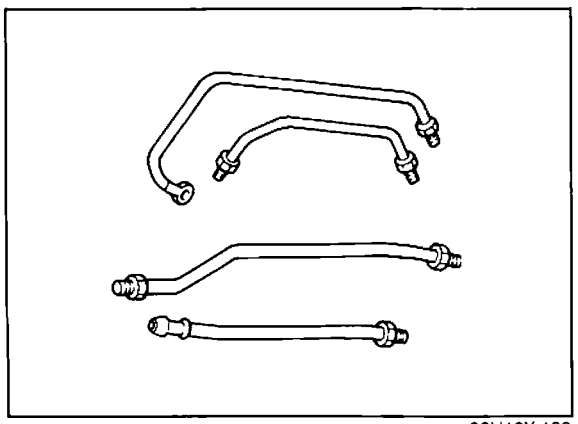
86U10X-136

Rack bushing
Wear or damage



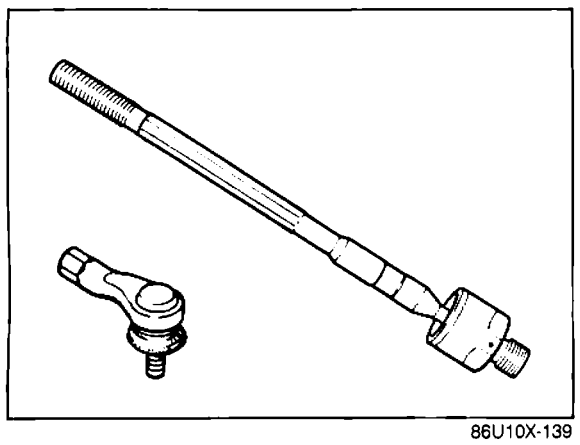
86U10X-137

Bearing
Wear, damage, and operation



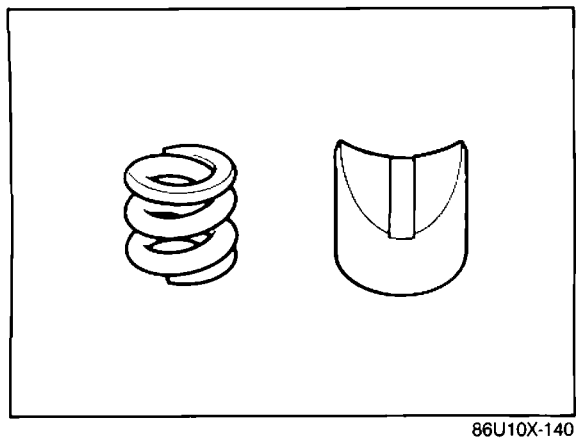
86U10X-138

Oil pipe
Clogging or damage



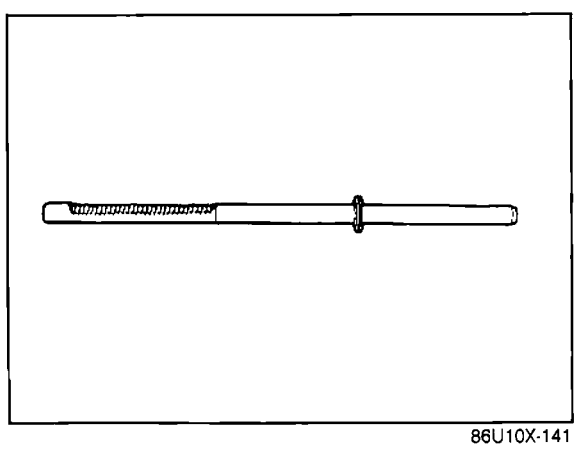
86U10X-139

Tie-rod and tie-rod end
1. Tie-rod damage
2. Tie-rod ball joint damage and operation
3. Tie-rod end damage and operation



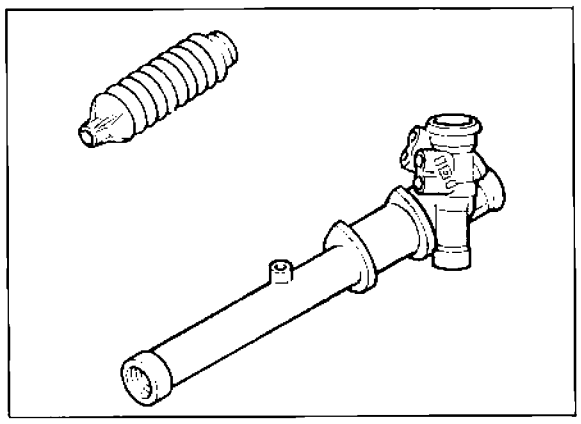
86U10X-140

Pressure pad and spring
1. Pressure pad damage
2. Spring damage



86U10X-141

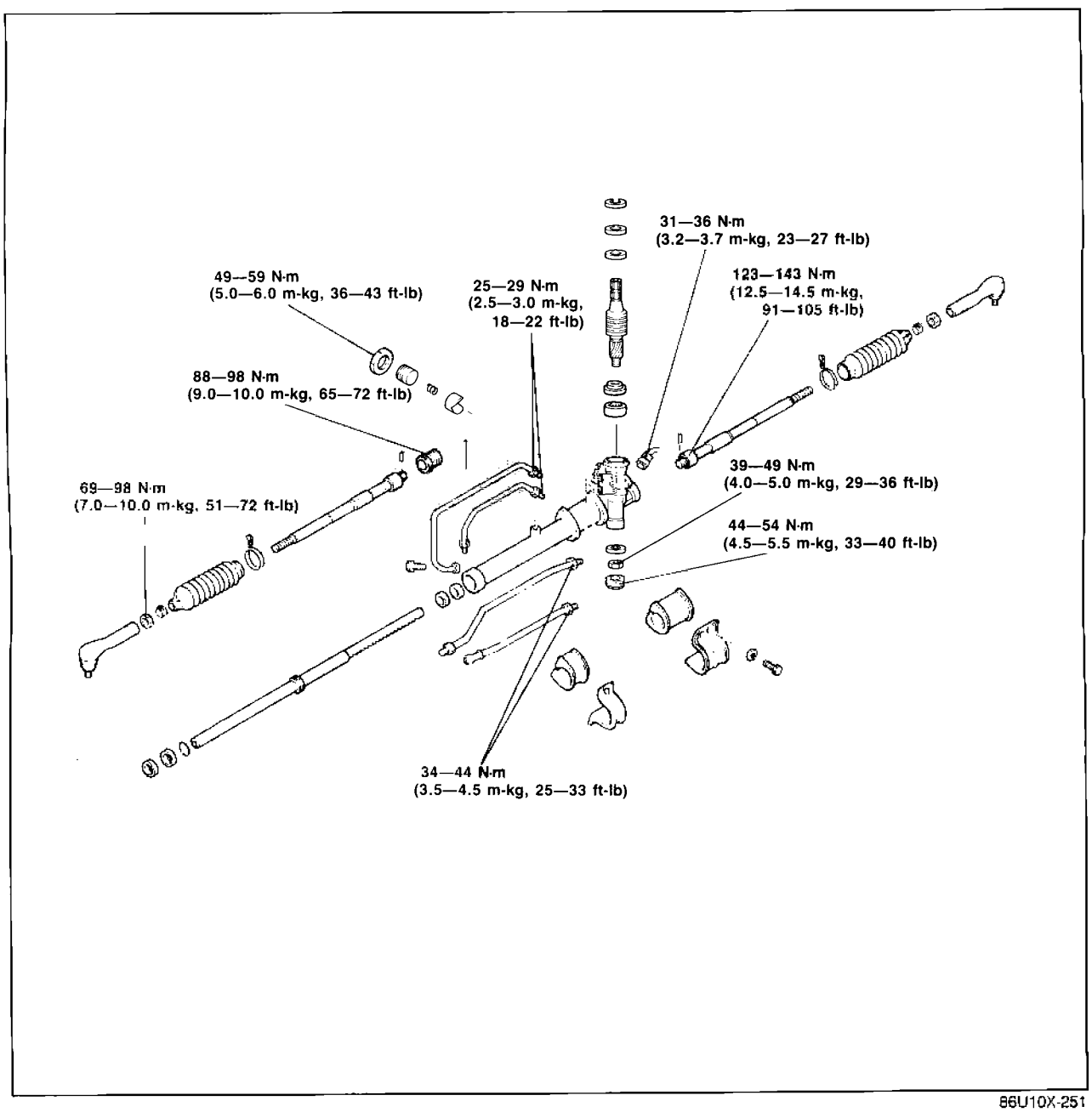
Rack
1. Rack cracking, damage, or wear of teeth
2. Seal ring holder wear or damage
3. Rack piston side corrosion



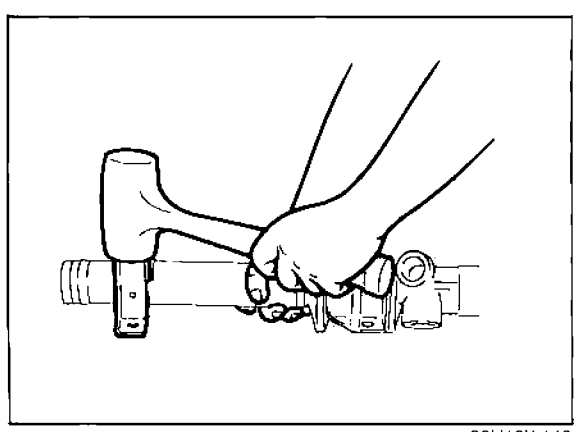
86U10X-142

Gear housing and boots
1. Gear housing cracking or damage
2. Boot cracking or tearing

ASSEMBLY
Torque Specifications

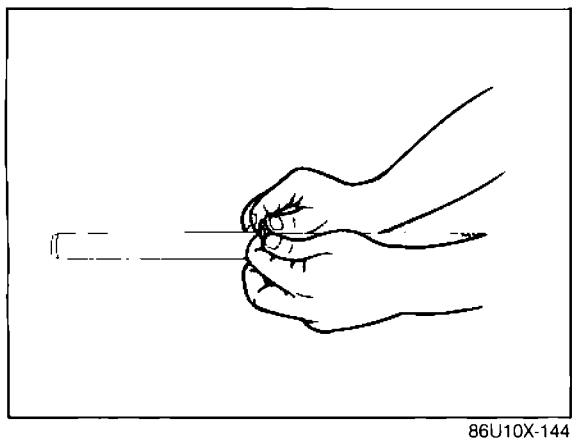


86U10X-251



86U10X-143

Mounting bracket and rubber
1. Install the mounting rubber.
2. Tap the mounting bracket on with a plastic hammer.

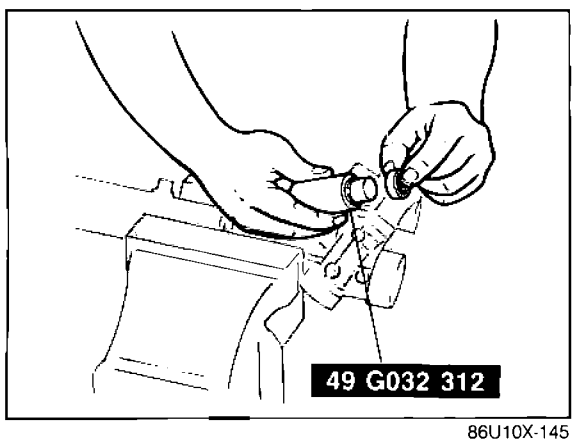


86U10X-144

O-ring and seal ring
1. Apply AFT to the O-ring and seal ring.
2. Install the O-ring in the ring groove of the rack.
3. Install the seal ring in the groove of the rack.

Note
Be careful not to cut or otherwise damage the edge of the seal ring.

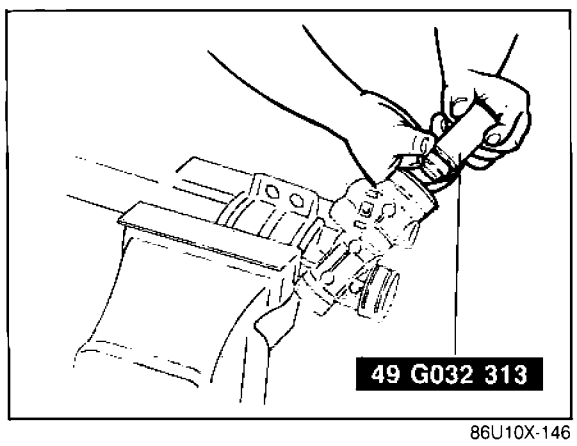
4. Compress the seal ring by hand to fit it to the groove.



86U10X-145

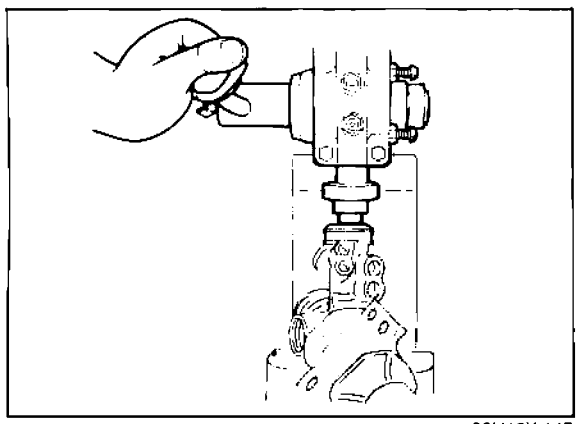
Needle bearing
1. Apply grease to the end of the **SST**.
2. Apply ATF to the needle bearing.
3. Set the needle bearing on the **SST**.

Note
When installing the needle bearing to the SST, install the embossed side first.



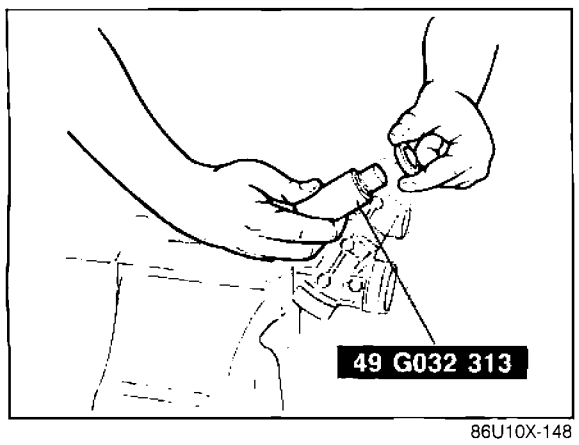
86U10X-146

4. Insert the needle bearing and the **SST** into the housing.



86U10X-147

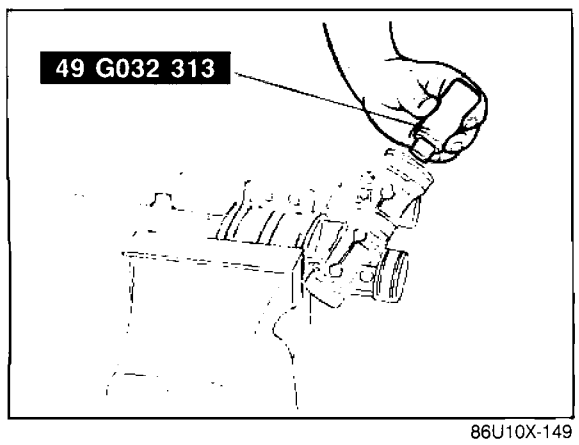
5. Set the housing on a press and press in the bearing.



86U10X-148

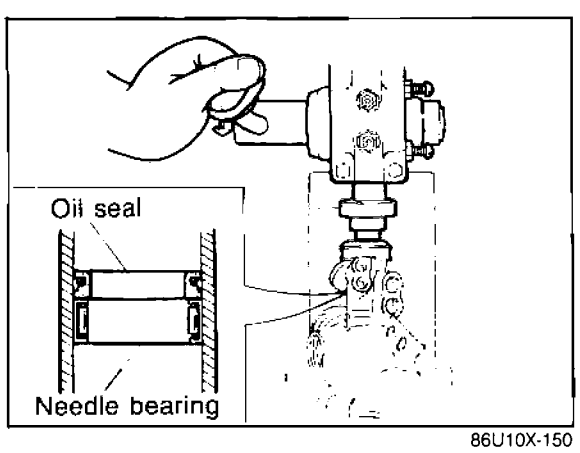
Oil seal

1. Apply grease to the end of the **SST**.
2. Apply ATF to the oil seal.
3. Set the oil seal on the **SST**.



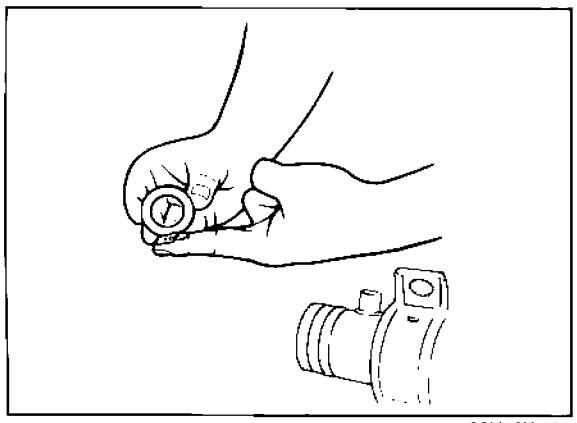
86U10X-149

4. Insert the oil seal and the **SST** into the housing.



86U10X-150

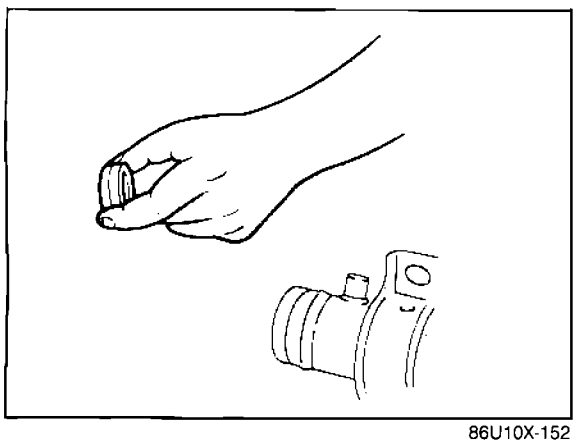
5. Set the housing on a press and press in the seal.



86U10X-151

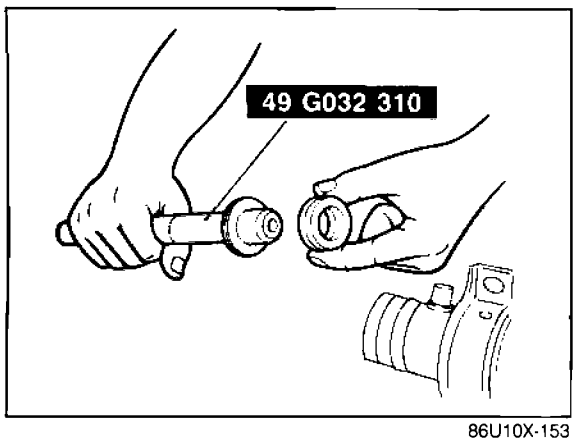
Spacer and pinion housing side oil seal

1. Apply grease to flat surface of the spacer.



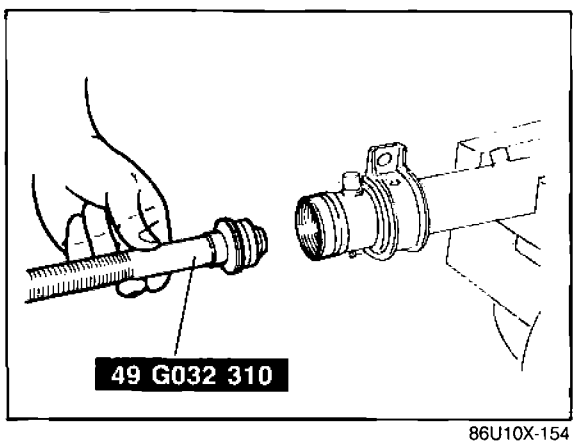
86U10X-152

2. Connect the oil seal to the grease coated surface of the spacer.
3. Apply ATF to the inside and outside of the spacer and oil seal.



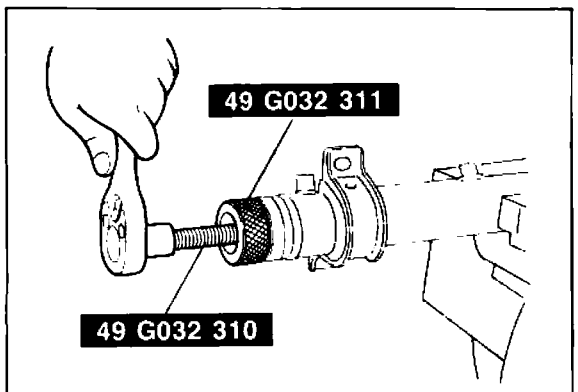
86U10X-153

4. Set the spacer and oil seal on the **SST**.



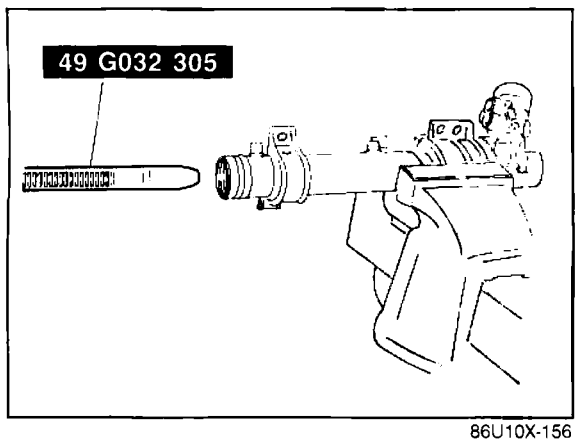
86U10X-154

5. Insert the **SST** from the tube side.



86U10X-155

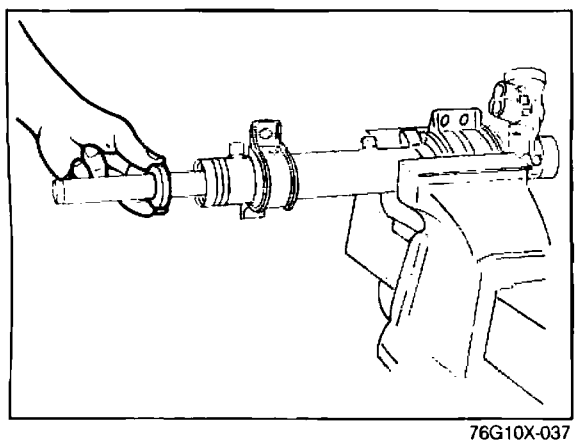
6. Install and tighten the **SST** nut against the tube.
7. Turn the **SST** shaft in as far as it will go to push in the seal and spacer.
8. Remove the **SST**.



86U10X-156

Rack

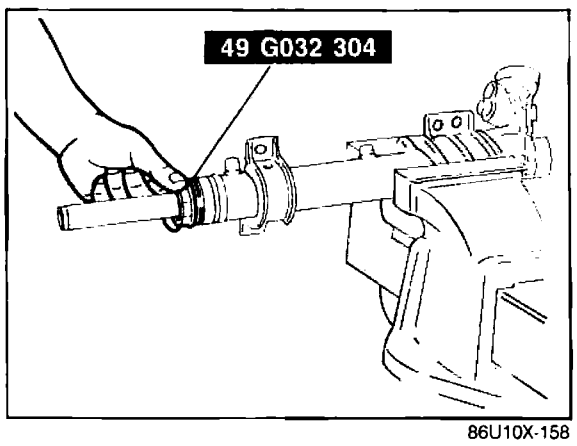
1. Apply grease (lithium base, NLGI No.2) to the friction surface and teeth of the rack.
2. Slide the **SST** over the rack and slide it in from the tube side.
3. Remove the **SST**.



76G10X-037

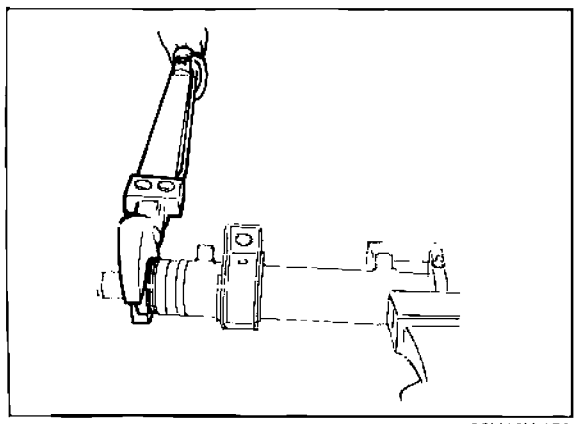
Oil seal (Rack)

1. Apply ATF to the oil seal and slide it onto the rack.



86U10X-158

2. Set the **SST** on the rack.
3. Turn the **SST** as far as it will go, and push the oil seal into the tube.
4. Remove the **SST**.



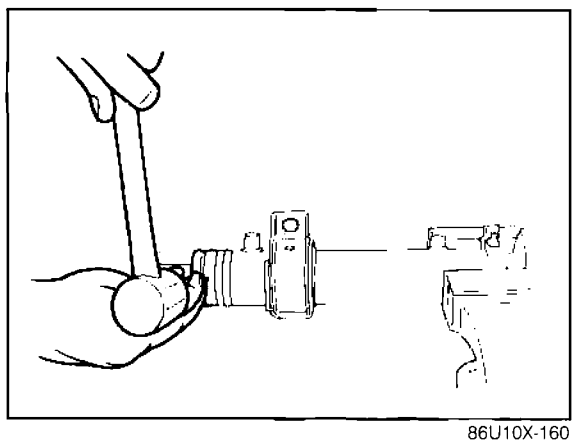
86U10X-159

Rack bushing

1. Install the rack bushing assembly in the rack housing.

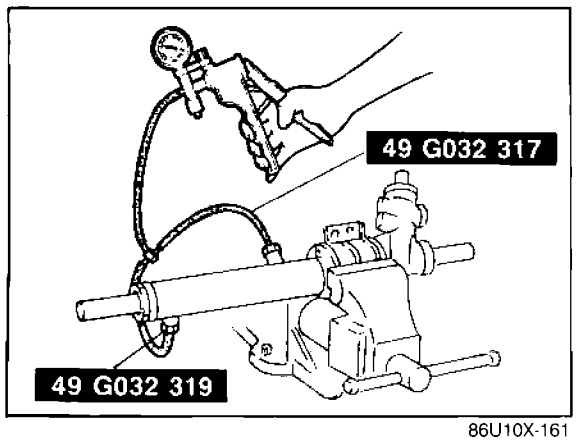
Tightening torque:
88—98 N·m (9—10 m-kg, 65—72 ft-lb)

Note
The oil seal is pushed to the correct position in the rack housing by the tightening of the rack bushing.



86U10X-160

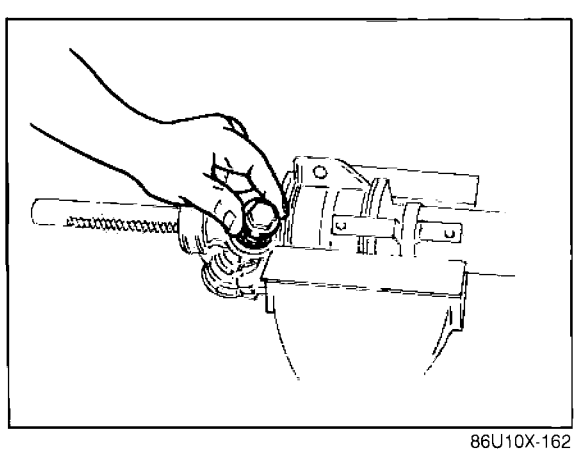
2. Stake the rack housing at two points **approx 1.5 mm (0.06 in)** from the end with a hammer and center punch.



86U10X-161

Hermetic inspection

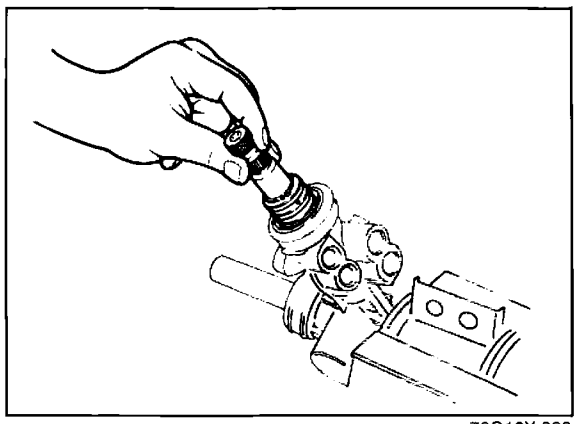
1. Connect the **SST** to the cylinder housing.
2. Connect a vacuum pump to the **SST**.
3. Apply **400 mmHg (15.7 inHg)** vacuum.
4. Verify that vacuum is held for at least **30 sec.** If not, check the seal and assembly.



86U10X-162

Lower bearing

1. Secure the gear housing in a vise so that the lower bearing bore faces upward.
2. Apply ATF to the lower bearing, then install it in the housing.
3. Press the bearing into the gear housing with the housing cover. Tighten the cover until the tightening force suddenly increases.



76G10X-038

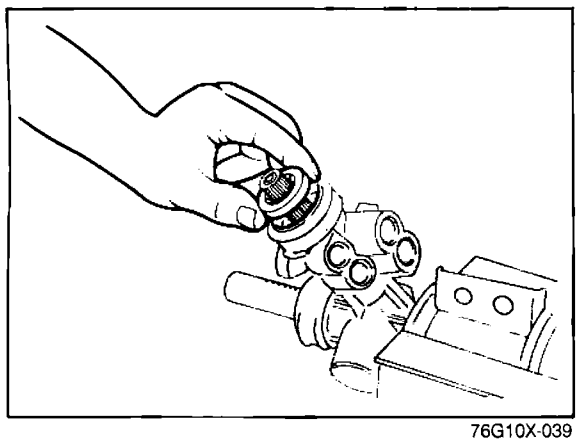
Pinion shaft assembly

1. Apply grease (lithium base, NLGI No. 2) to the teeth of the pinion shaft.
2. Apply ATF to the seal ring and the friction surface of the control valve.
3. Install the pinion shaft in the housing.

Note

a) Be careful not to damage the oil seal by the teeth of the pinion.

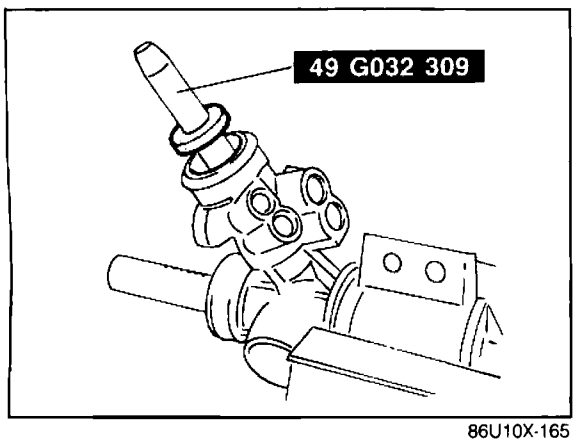
b) Be careful not to damage the edge of the seal ring and control valve.



76G10X-039

Upper bearing

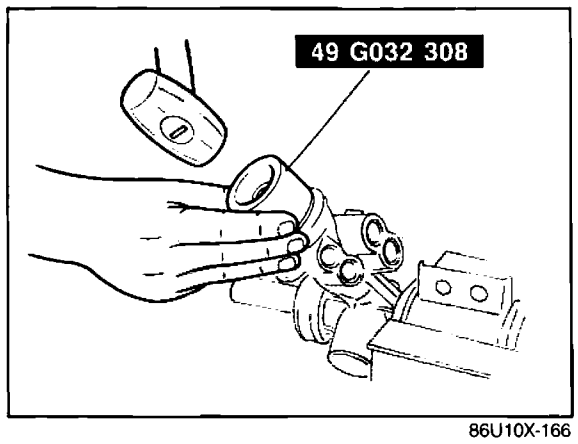
Apply ATF to the upper bearing, and then install it.



86U10X-165

Oil seal

1. Apply ATF to the oil seal, and fill inside the lip with grease (lithium base, NLGI No. 2).
2. Slide the **SST** over the serrations of the pinion shaft assembly.
3. Slide the oil seal over the **SST** and position it in the housing.

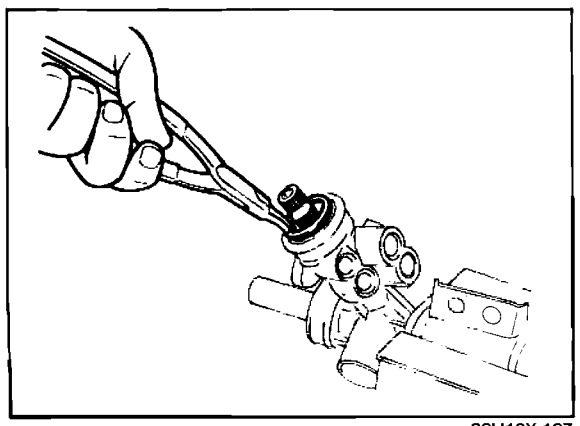


86U10X-166

4. Tap the oil seal in with the **SST** until the snap ring installation groove in the housing is just visible.

Note

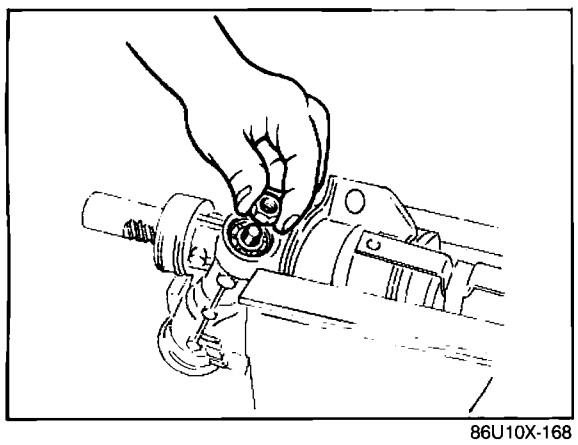
Apply uniform force to the oil seal when installing.



86U10X-167

Snap ring
Install the snap ring.

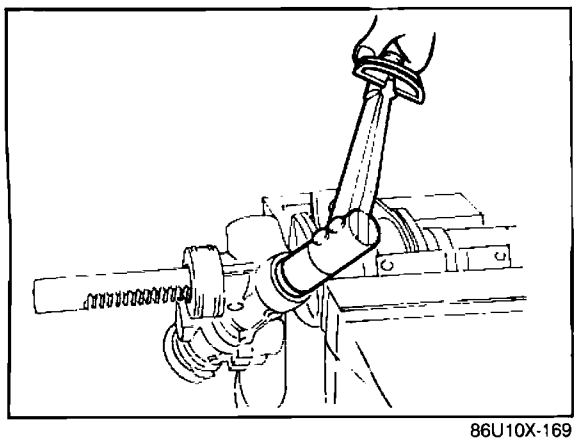
Note
Verify that the snap ring is correctly seated in the ring groove of the housing.



86U10X-168

Locknut
1. Temporarily install the tie-rod on the tube side of the rack.
2. Install the locknut and turn it until the tie-rod contacts the tube.
3. Tighten the locknut.

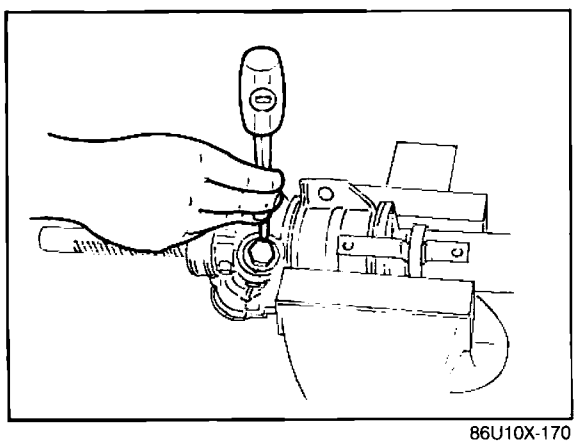
Tightening torque:
39—49 N·m (4.0—5.0 m-kg, 29—36 ft-lb)



86U10X-169

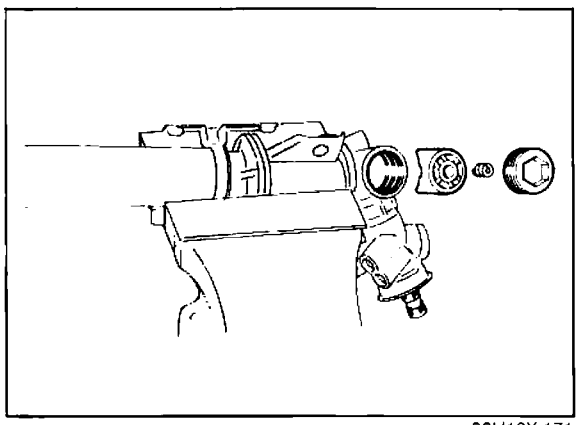
Housing cover
1. Apply thread sealant to the housing cover threads.
2. Install the housing cover.

Tightening torque:
44—54 N·m (4.5—5.5 m-kg, 33—40 ft-lb)



86U10X-170

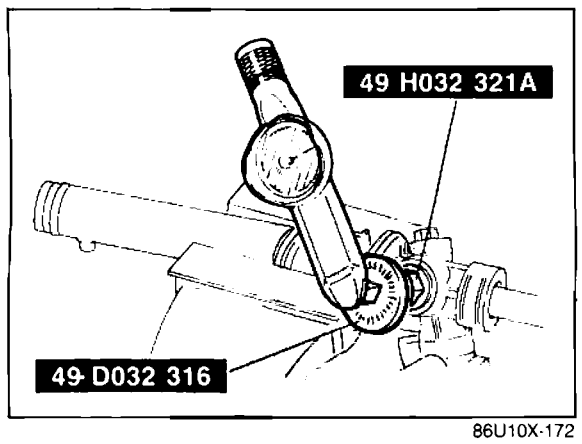
3. Stake between the rack housing and housing cover at two points with a center punch.



86U10X-171

Pressure pad

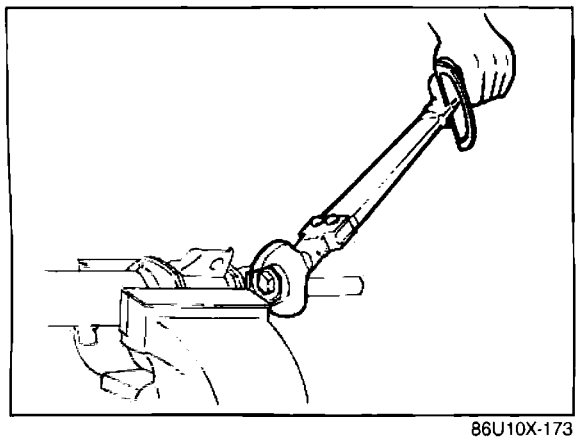
1. Secure the gear housing in a vise so that the pressure pad position faces upward.
2. Apply grease (lithium base NLGI No. 2) to the rack sliding surface of the pressure pad; then install it in the housing.
3. Install the pressure pad.



86U10X-172

Adjust cover

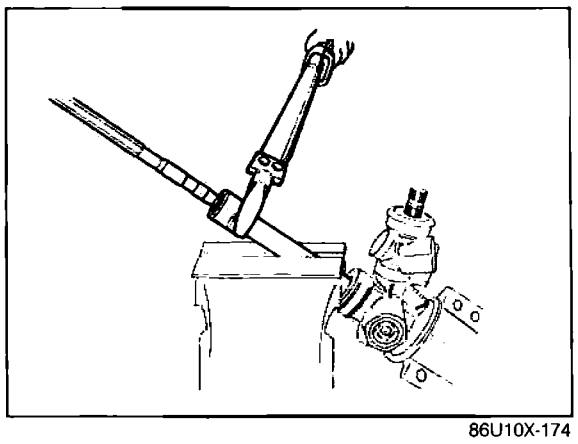
1. Set the rack in the center position.
2. Tighten the adjust cover to **9.8 N·m (100 cm-kg, 7.2 ft-lb)** then loosen it.
3. Tighten again to **4.9 ± 0.5 N·m (50 ± 5 cm-kg, 3.6 ± 0.4 ft-lb)**, and then return it 45°.
4. Apply thread sealant to the exposed threads of adjust cover.



86U10X-173

5. Install and tighten the locknut.

Tightening torque:
49—59 N·m (5.0—6.0 m-kg, 36—43 ft-lb)

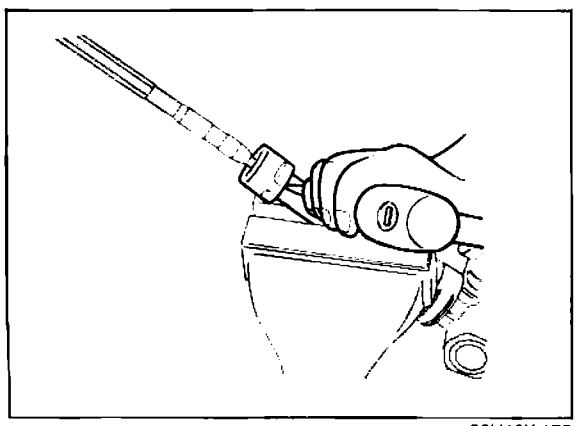


86U10X-174

Tie-rod

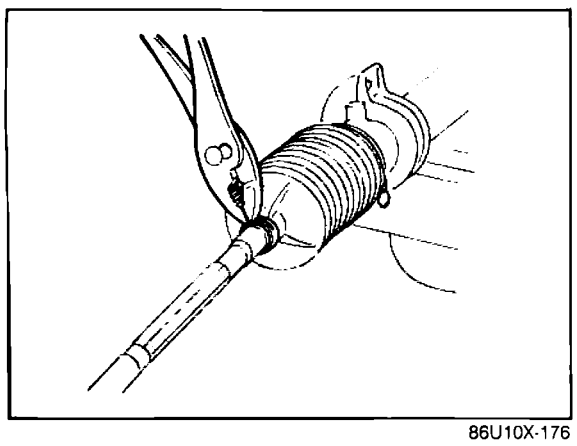
1. Secure the rack in a vise.
2. Install the tie rod on the rack.

Tightening torque:
123—143 N·m
(12.5—14.5 m-kg, 90.6—105 ft-lb)



86U10X-175

3. Tap in a new roll pin.



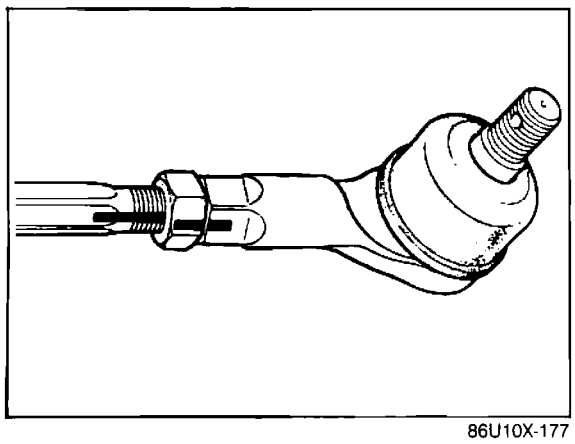
86U10X-176

Boot

1. Apply grease to the inner surface of the small end of the boot.
2. Install the boot. Wrap a new wire around the large end of the boot two times and then twist it 4 to 4.5 times. Bend the twisted part toward the mounting bracket.

Note
Be careful not to break the boot wire.

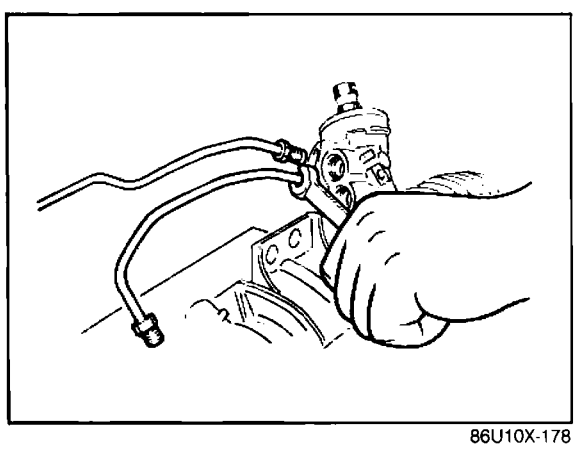
3. Install the spring clip on the small end of the boot.



86U10X-177

Tie-rod end

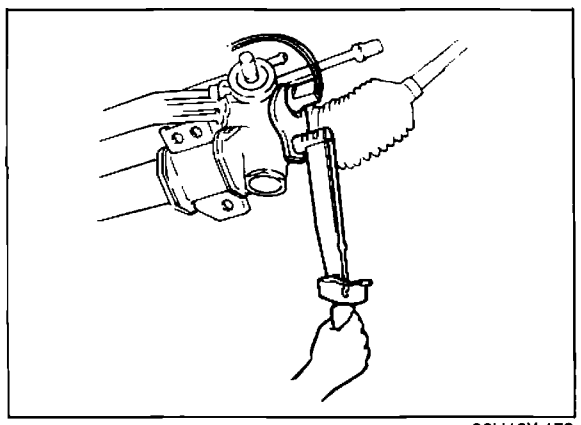
Align with the mark made before disassembly, and then tighten the nut.



86U10X-178

Oil pipe

Secure the mounting bracket in a vise so that the oil pipe connections face upward.



86U10X-179

Oil pressure switch

1. Install the pressure switch O-ring in the gear housing.
2. Install the oil pressure switch.

Tightening torque:
31—36 N·m (3.2—3.7 m-kg, 23—27 ft-lb)

ELECTRONICALLY-CONTROLLED POWER STEERING

DISASSEMBLY

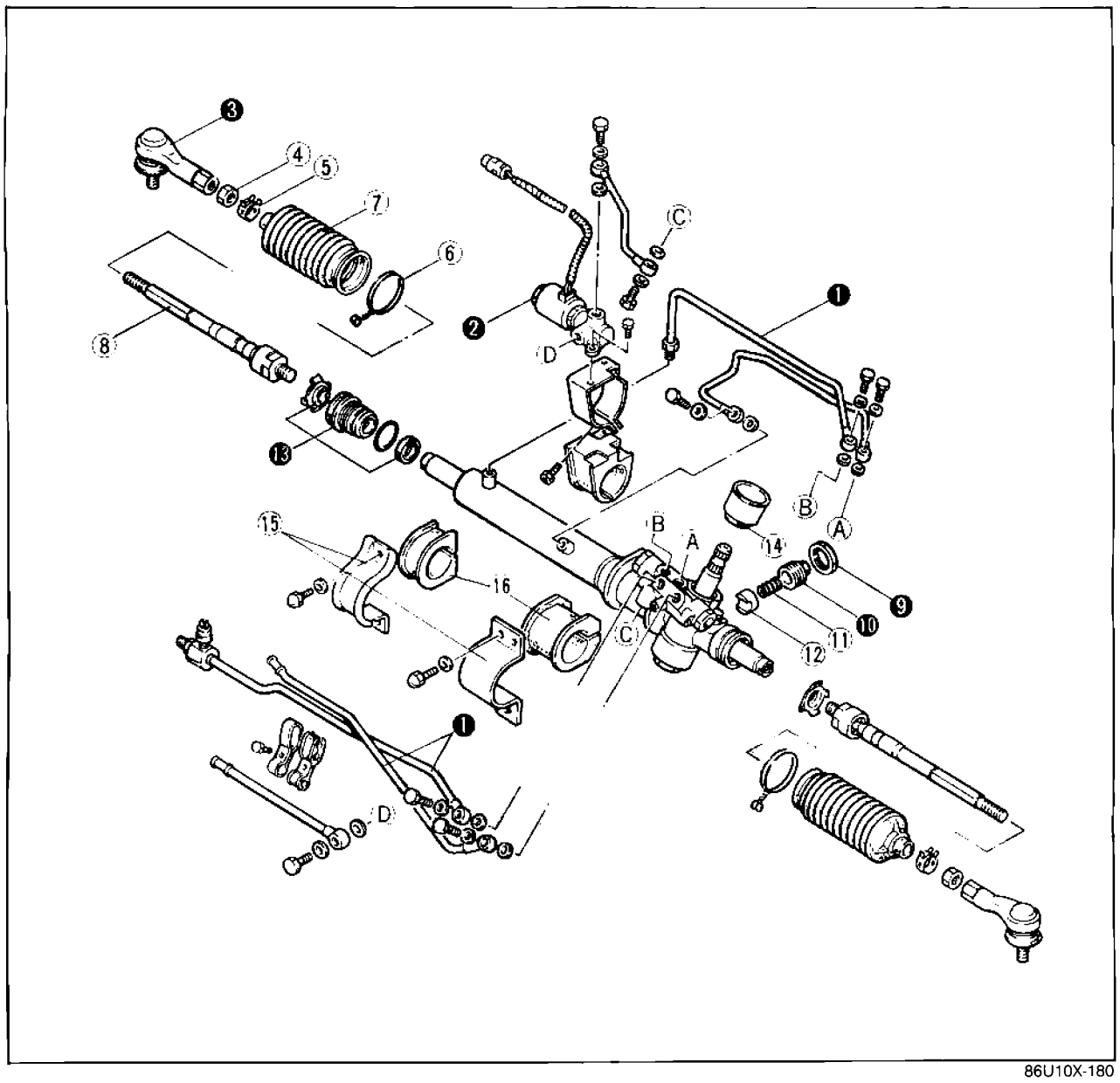
Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked parts.

Caution

a) Because adjustment of the spool valve is not possible, do not disassemble the gear box for spool valve repairs. If repairs are necessary, replace the gear box assembly.

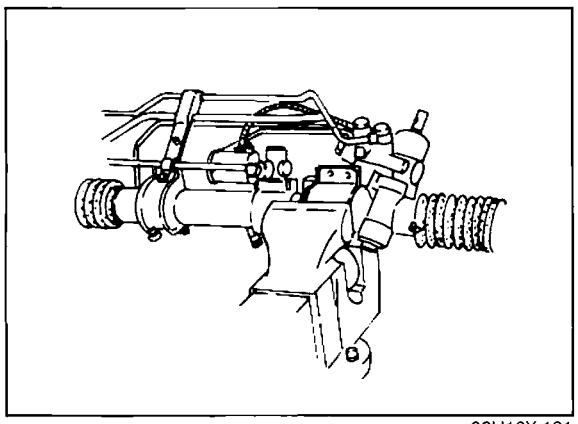
b) In order to prevent the entrance of dirt, all disassembly and assembly should be done in a clean area.

c) Before disassembly, plug the openings of all pipe installation fittings; then thoroughly clean the steering gear and linkage.



86U10X-180

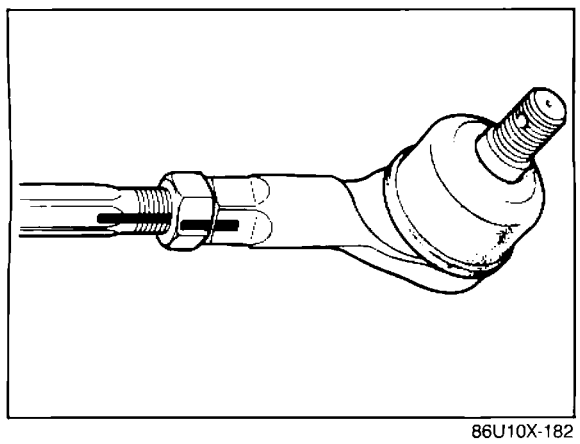
1. Pipe
2. Solenoid valve
3. Tie-rod end
4. Tie-rod end locknut
5. Spring clip
6. Boot wire
7. Boot
8. Tie-rod
9. Adjust cover locknut
10. Adjust cover
11. Spring
12. Pressure pad
13. Outer box assembly
14. Oil seal
15. Mounting bracket
16. Mounting rubber



86U10X-181

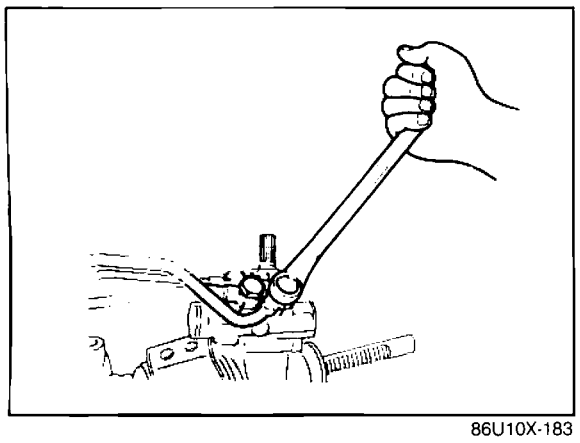
Disassembly Note
Steering gear and linkage
Secure the mount part of the removed gear and linkage in a vise.

Caution
Insert protective material (such as copper plates) in the jaws of the vise.



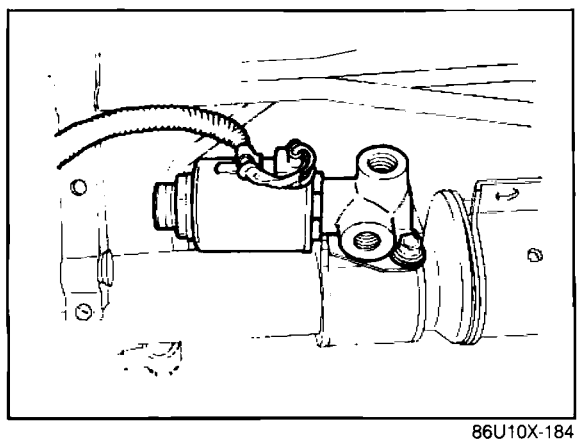
86U10X-182

Tie-rod ends
Before removing the tie-rod ends, make a mark for proper installation.



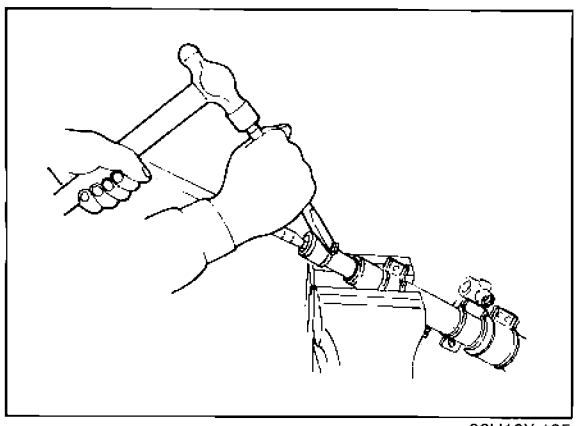
86U10X-183

Oil pipe
Mark the pressure and return pipes and the valve case for proper installation. Remove the pipes.



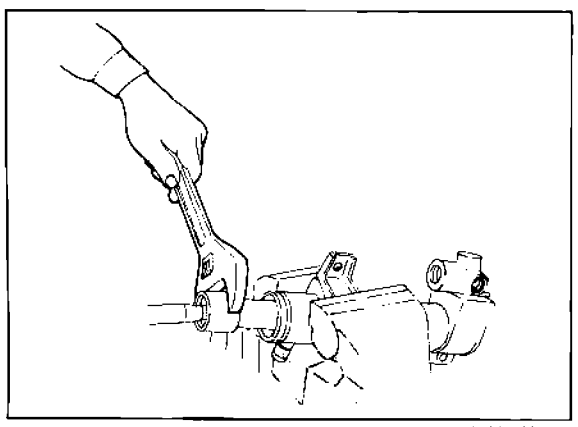
86U10X-184

Solenoid valve
Remove the solenoid valve.



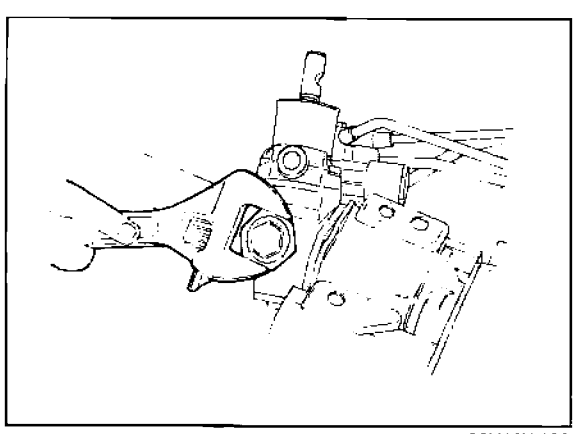
86U10X-185

Tie-rods
1. Uncrimp the washer as shown in the figure.



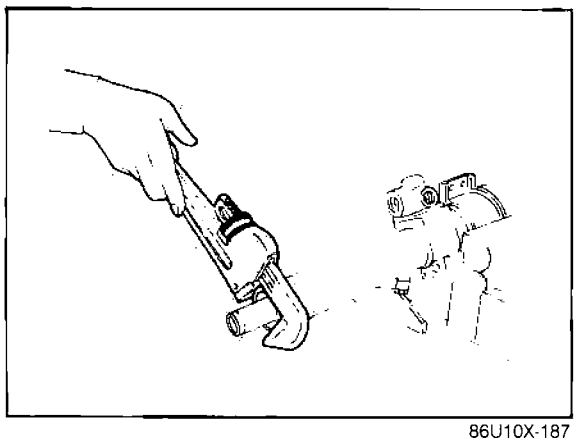
63U10X-127

2. Remove the tie-rod from the rack.



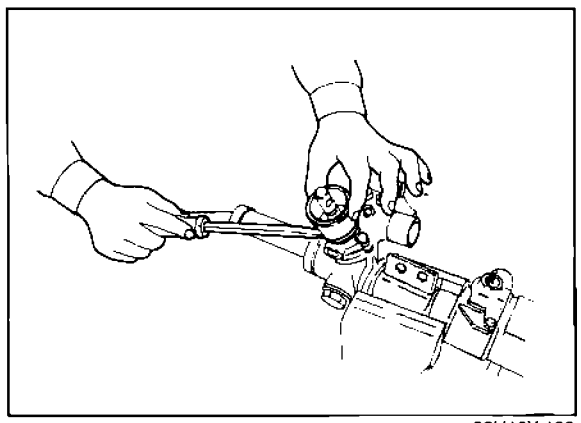
86U10X-186

Locknut and adjust cover
Loosen the locknut and remove the adjust cover, spring, and pressure pad.



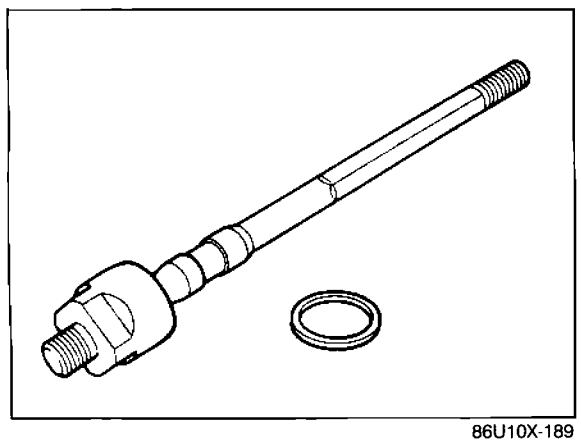
86U10X-187

Outer box
Protect the outer box with cloth and remove it with a pipe wrench.



86U10X-188

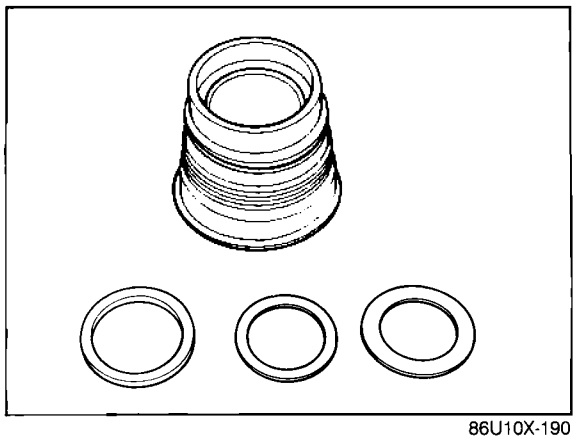
Oil seal
Remove the oil seal with a screwdriver.



86U10X-189

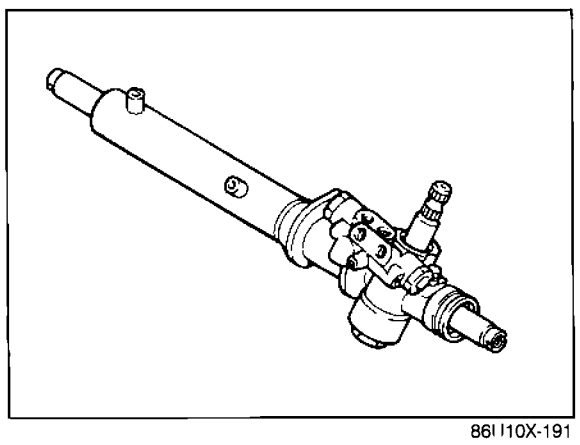
INSPECTION

Check the following and replace any faulty parts.
1. Cracked, damaged, or deteriorated boots
2. Worn pressure pad friction surface
3. Loose or sticking tie-rod ball joint
4. Bent or damaged tie-rod or tie-rod end



86U10X-190

5. Worn outer box bushing

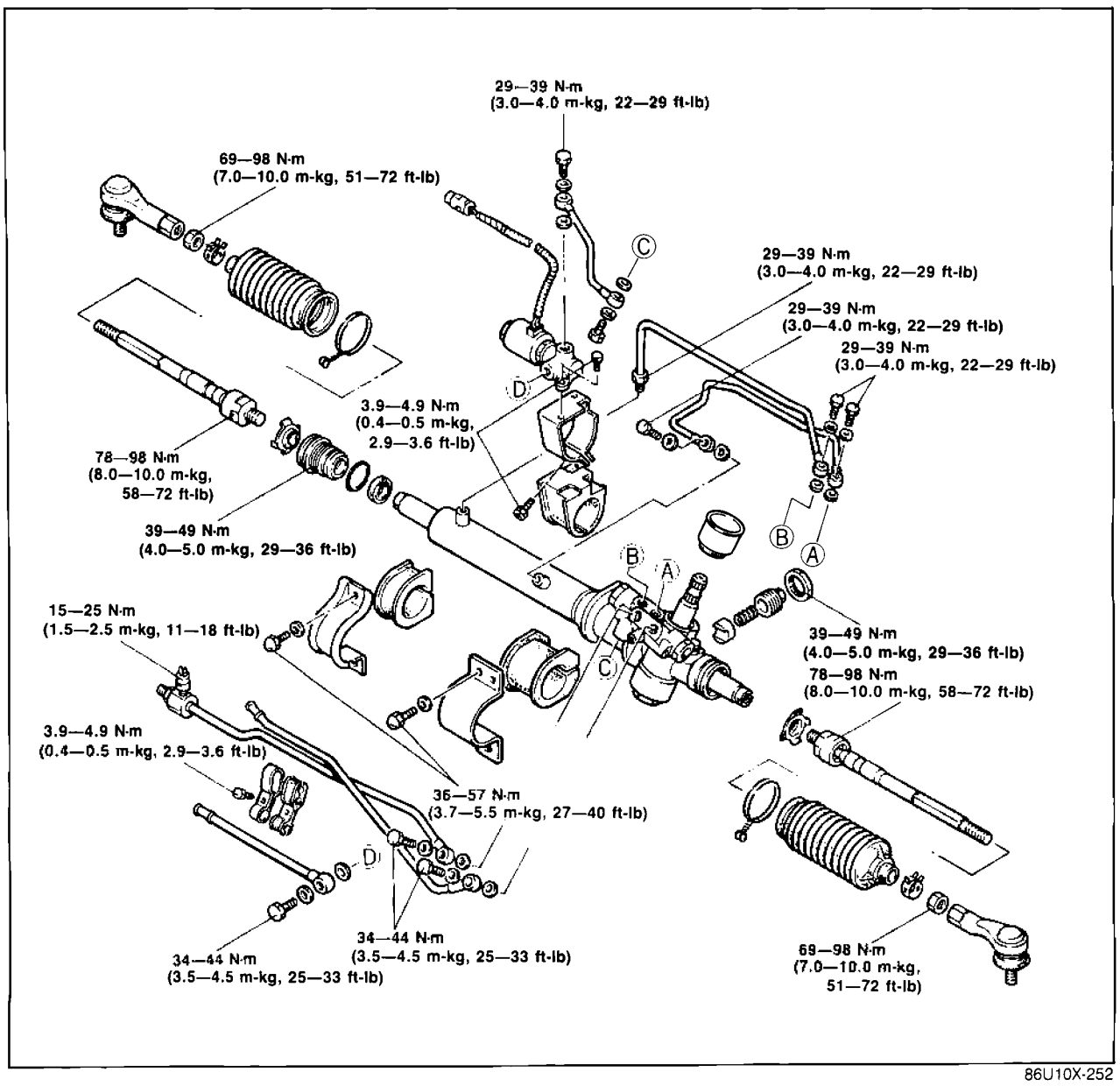


86U10X-191

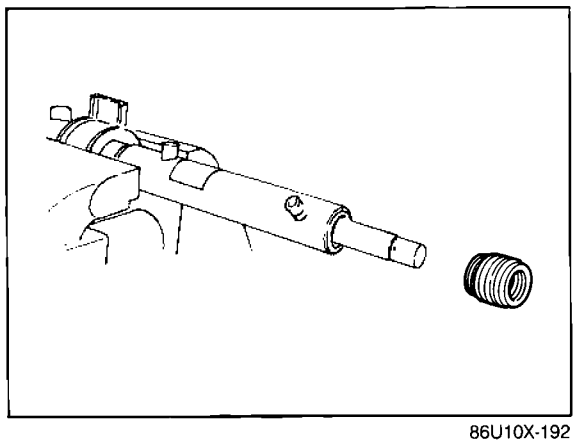
6. Cracked or damaged gear housing
7. Steering gear oil leakage

ASSEMBLY

Torque Specifications



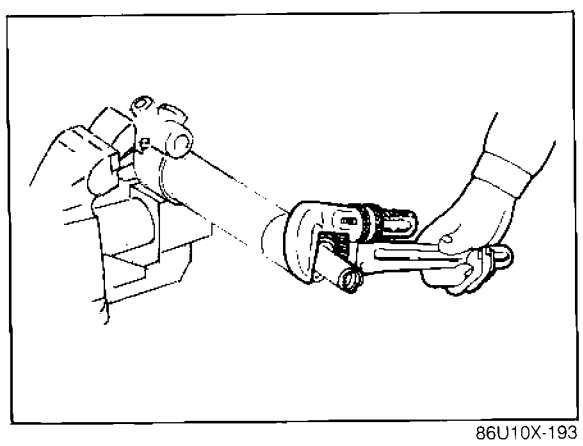
86U10X-252



86U10X-192

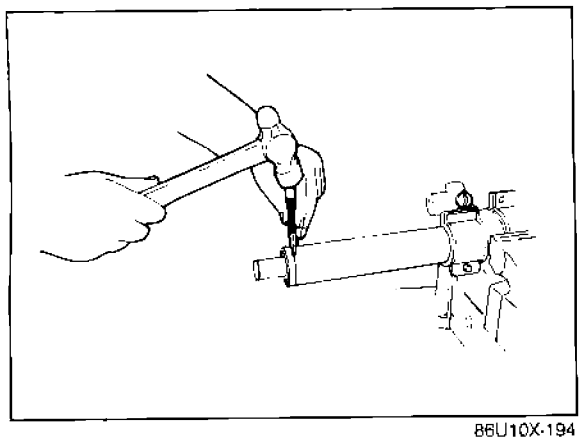
1. Install the outer box in the rack housing.

Note
Coat the seals and O-rings with ATF.



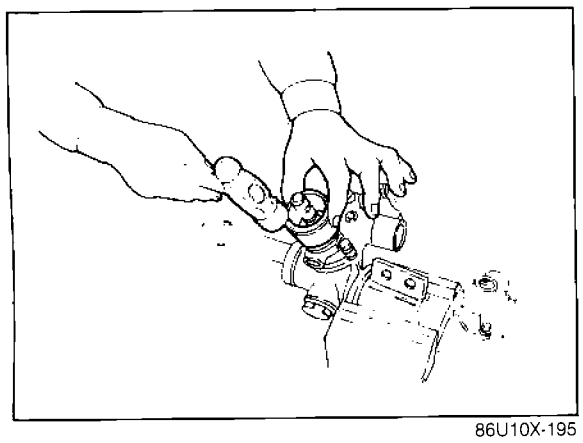
86U10X-193

2. Protect the outer box with cloth and tighten it with a pipe wrench.



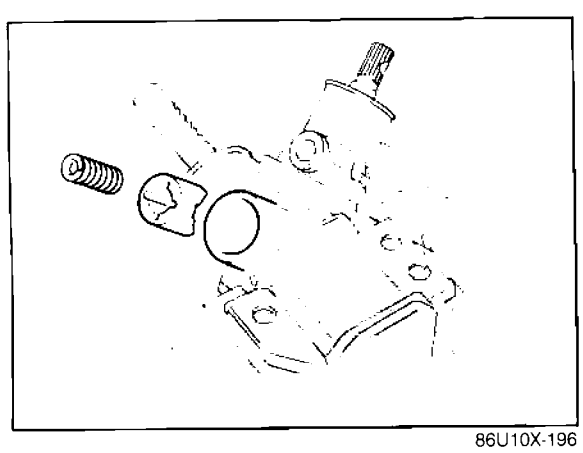
86U10X-194

3. Stake between the outer box and the rack housing with a center punch.



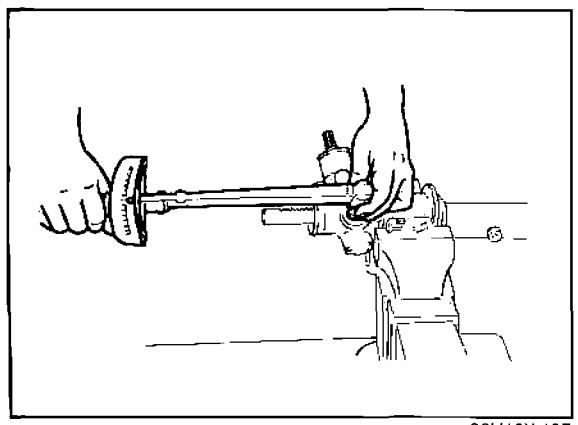
86U10X-195

4. Install the oil seal with a suitable pipe.



86U10X-196

5. Install the pressure pad and spring in the gear housing.

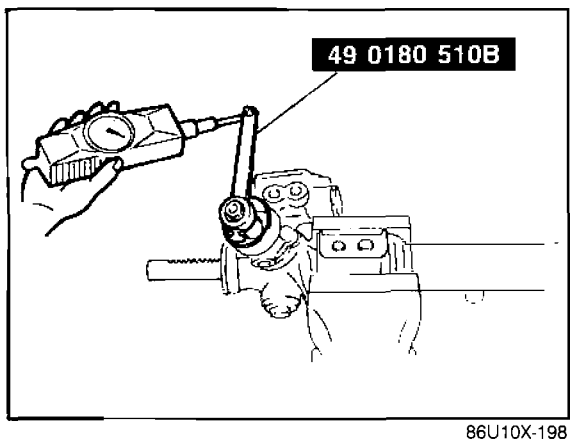


86U10X-197

6. Apply thread sealant to the threads of the adjust cover.

7. Install the adjust cover to the gear housing and tighten it as specified; then loosen it 35°.

Tightening torque:
4.5—5.5 N·m
(45—55 cm-kg, 39—48 in-lb)

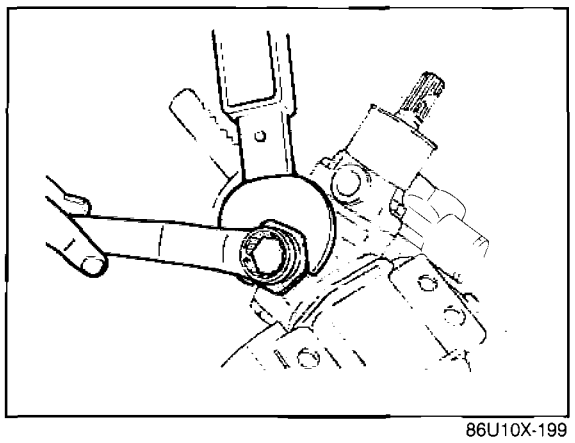


86U10X-198

8. Measure the pinion torque with the **SST**.

Pull scale: 1,000—1,400 g (35.3—49.4 oz)

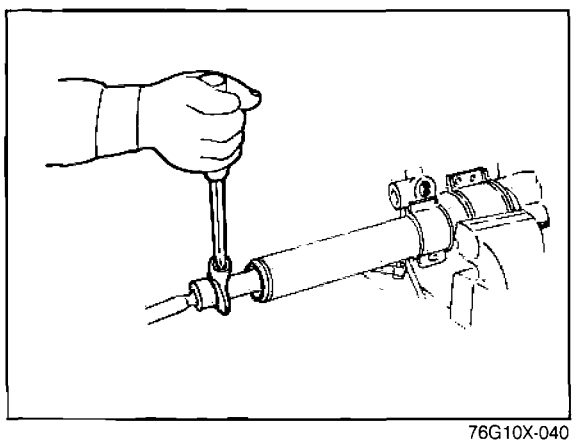
9. If the pinion torque is not within specification, readjust the adjust cover.



86U10X-199

10. Lock the adjust cover with the locknut.

Tightening torque:
40—50 N·m
(4—5 m-kg, 29—36 ft-lb)

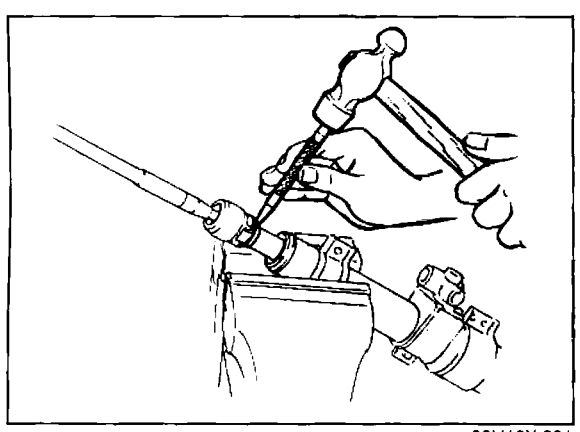


76G10X-040

11. Set the rack in a vise and install the washer. Tighten the tie-rod.

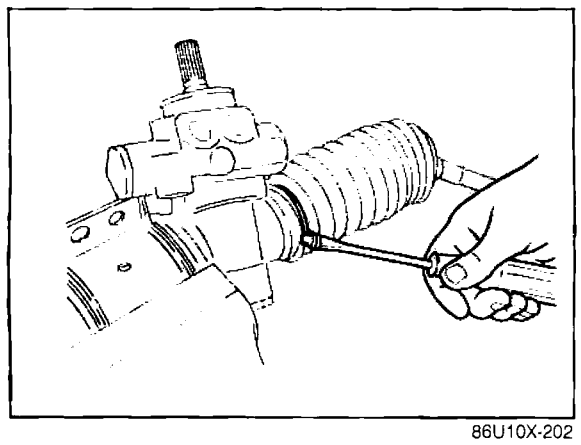
Tightening torque:
60—80 N·m
(6—8 m-kg, 43—58 ft-lb)

Caution
Insert protective material (such as copper plates) in the jaws of the vise.



86U10X-201

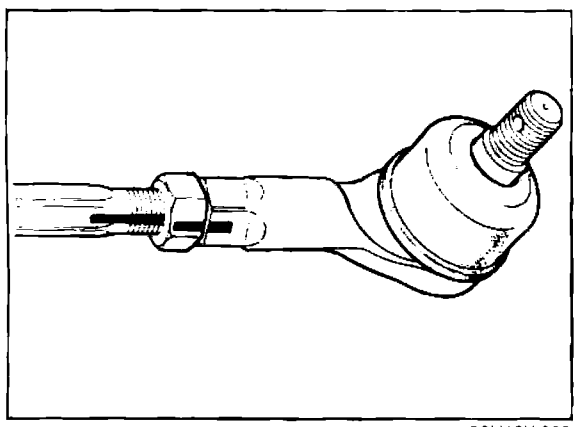
12. Stake the washer in two places with a punch.



86U10X-202

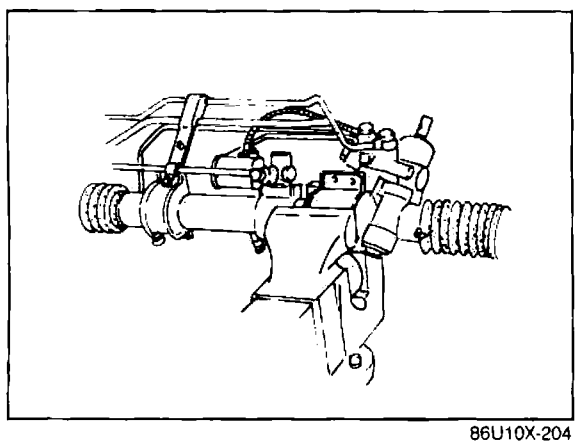
13. Install the boot. Wrap a new wire around it two times and twist it 4 to 4.5 times.

Caution
Be sure that the boot is not twisted or dented.



86U10X-203

14. Install the tie-rod ends, aligning them with the marks made before disassembly.



86U10X-204

15. Install the solenoid valve and pressure switch.
16. Align the oil pipes with the marks made before disassembly, then tighten them.

OIL PUMP

REMOVAL AND INSTALLATION

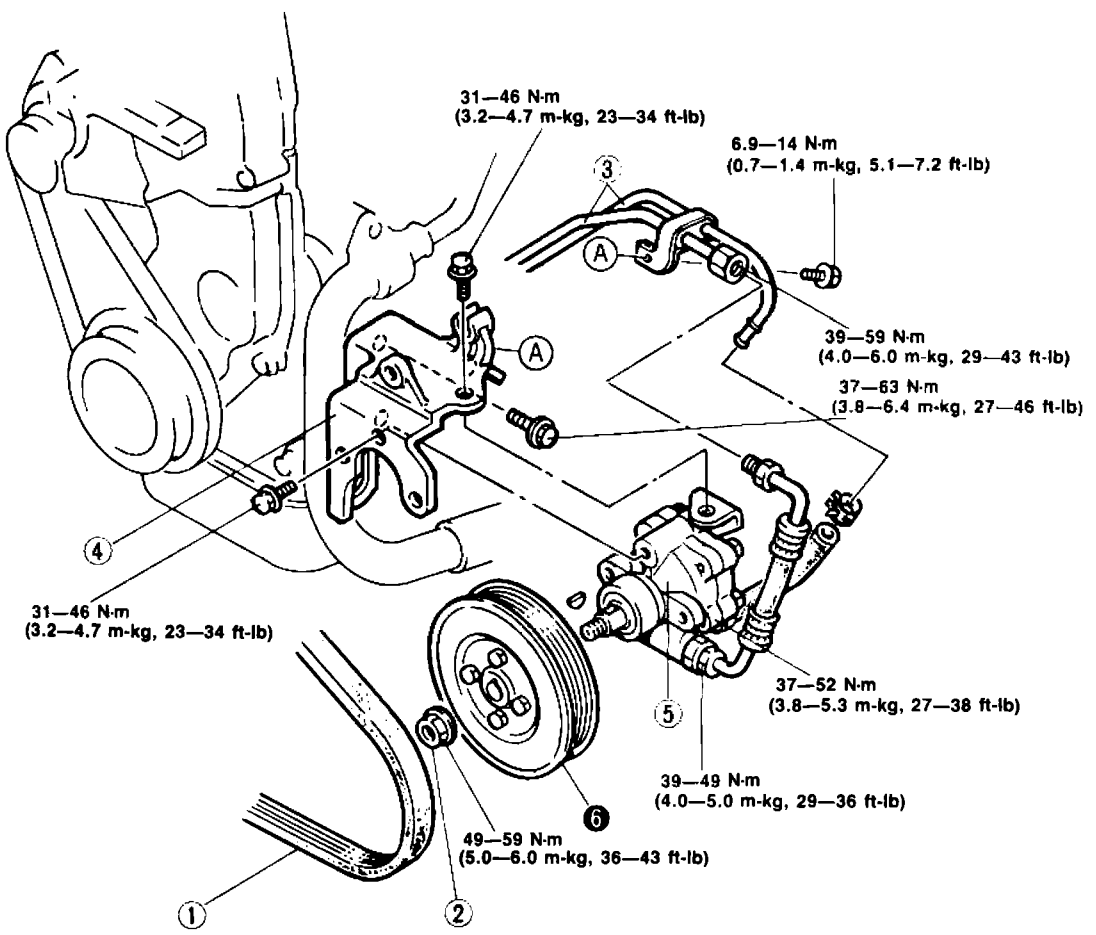
1. Jack up the front of the vehicle, and support it with safety stands.
2. Remove in the order shown in the figure, referring to the removal note for specially marked parts.
3. Install in the reverse order of removal.
4. Tighten all nuts and bolts to the specified torque, referring to the figure.

Note

a) The power steering fluid will leak out when the return hose or the pressure hose is disconnected. Prepare a suitable container for it to drain into.

b) After installation, inspect the deflection of the oil pump belt and bleed the air from the system, then check for fluid leakage.

2WS (Gasoline engine)

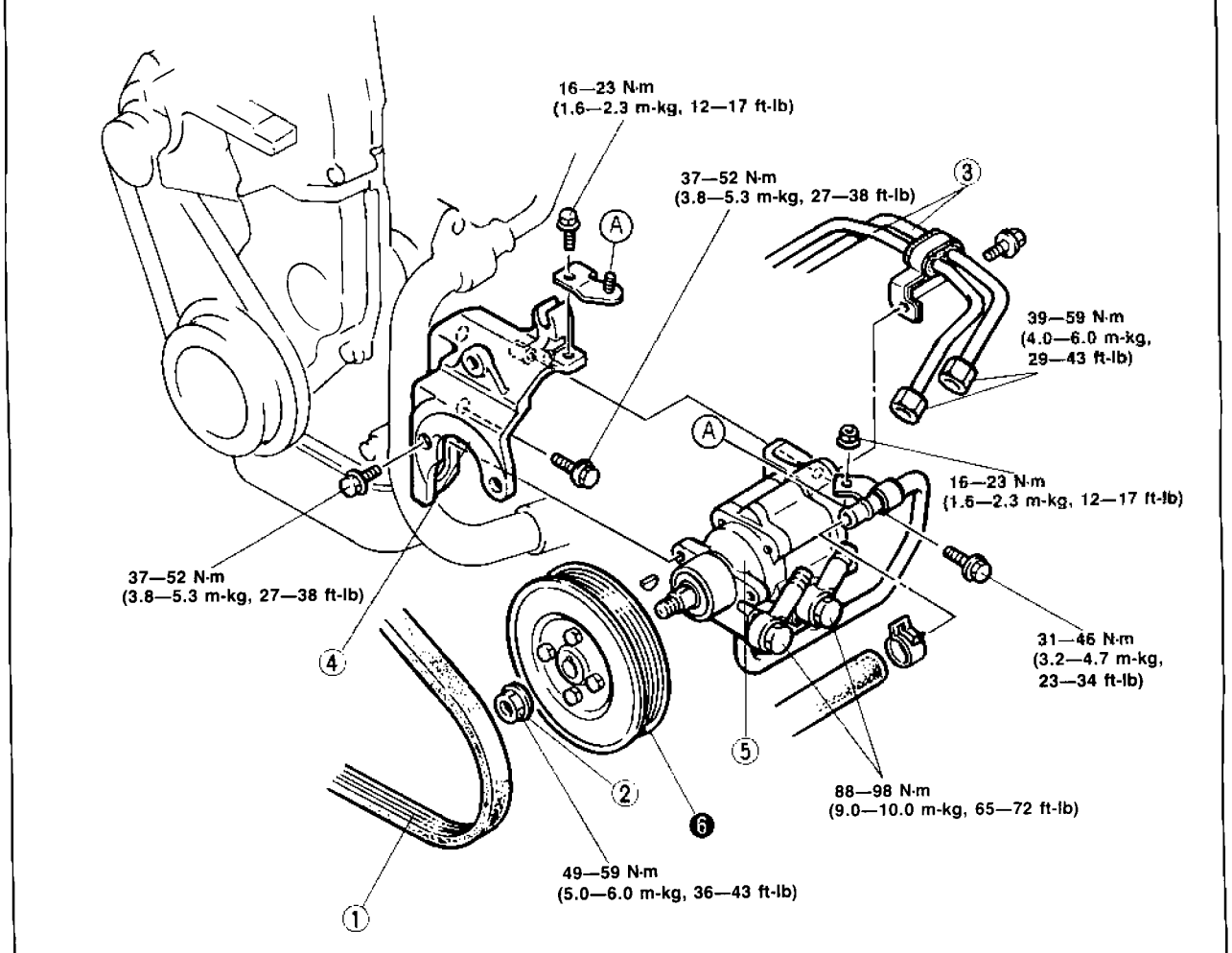


76G10X-041

1. Belt
2. Nut
3. Pipes
4. Bracket
5. Oil pump
6. Oil pump pulley

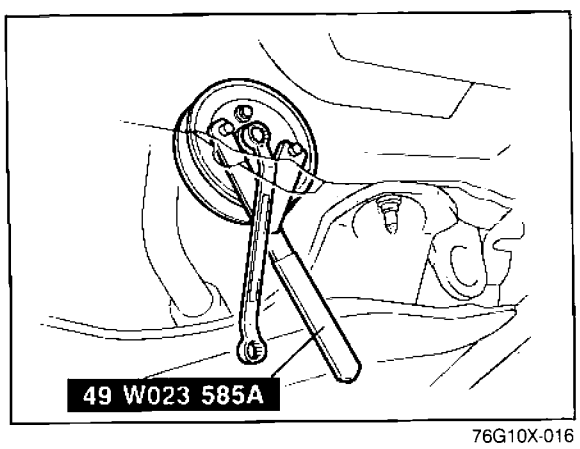
10 OIL PUMP

4WS



86U10X-206

1. Belt
2. Nut
3. Pipes
4. Bracket
5. Oil pump
6. Oil pump pulley



76G10X-016

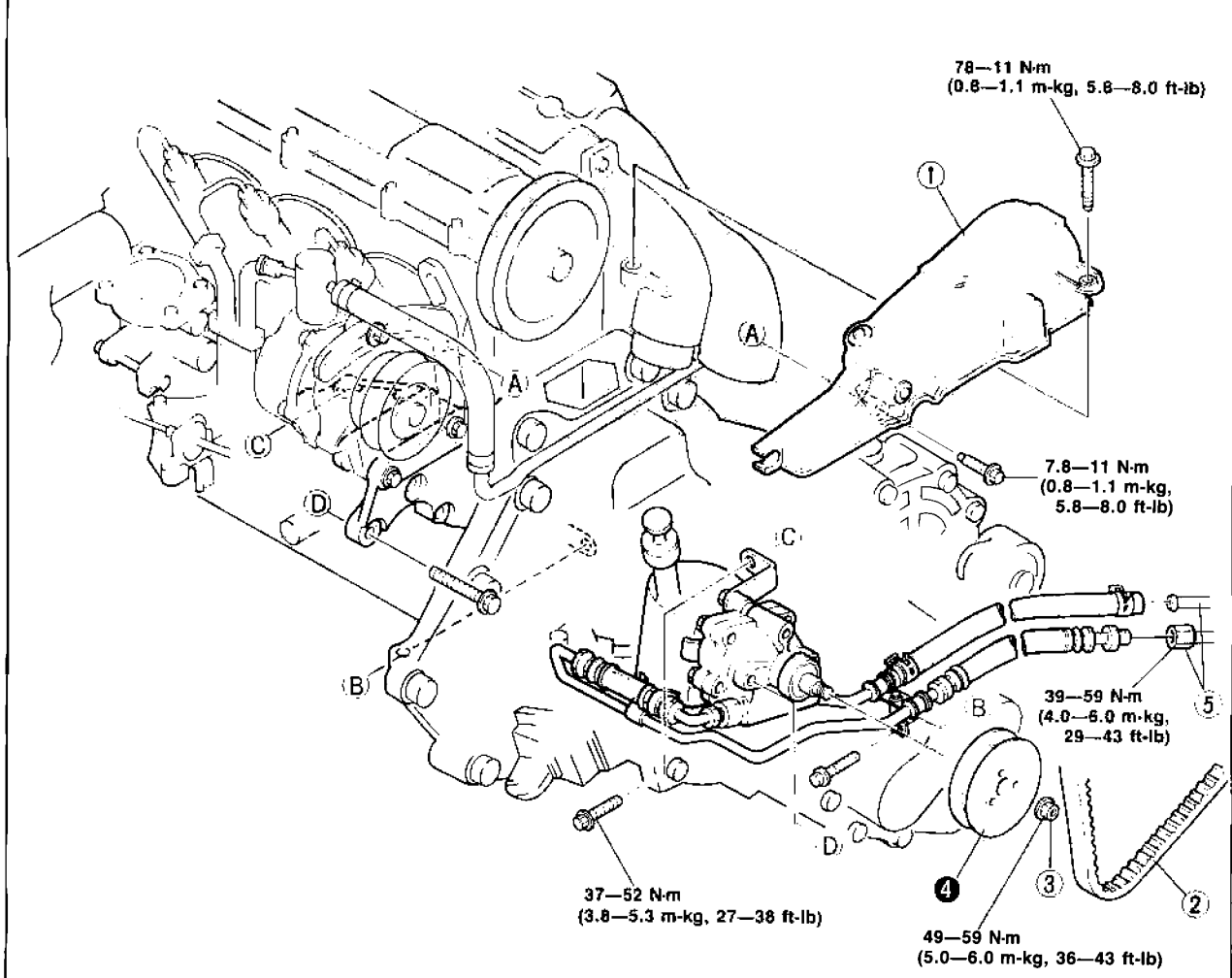
Removal Note

Oil pump (2WS Gasoline engine, 4WS)

1. Hold the oil pump pulley with the **SST**, and remove the pulley nut.
2. Slide the pulley forward. Remove the hose, pipes, and the pump.
3. Remove the pulley.

10 OIL PUMP

2WS (Diesel engine, without CX)

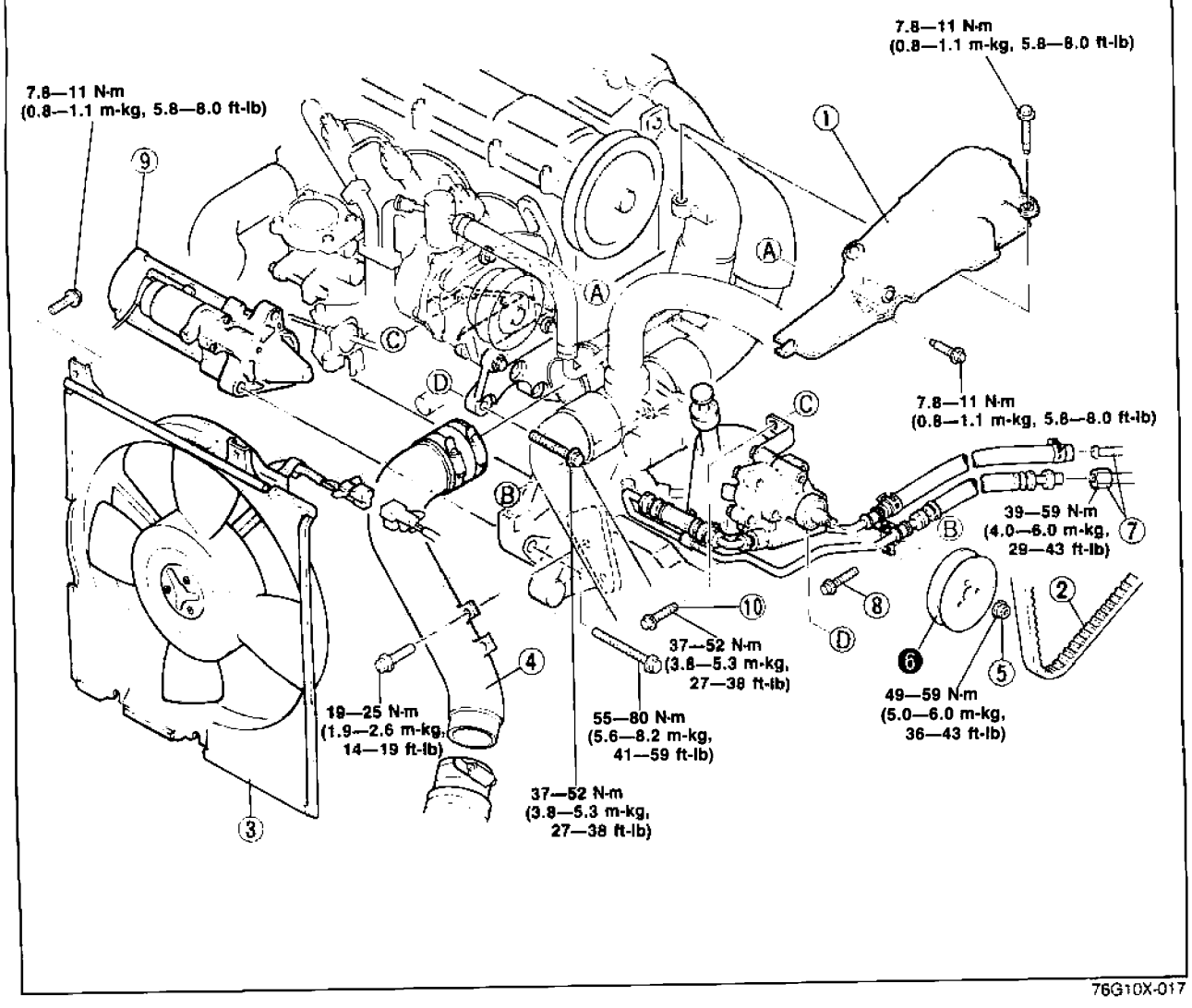


76G10X-042

1. Drive belt cover
2. Belt
3. Nut
4. Oil pump pulley
5. Pipes
6. Bolt
7. Bolt

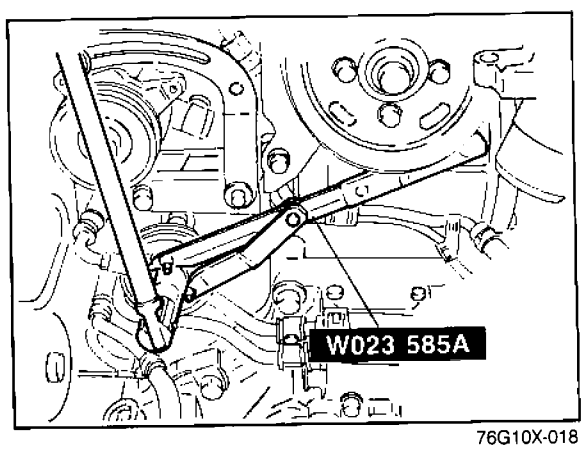
10 OIL PUMP

2WS (Diesel engine, with CX)



76G10X-017

1. Drive belt cover
2. Belt
3. Cooling fan
4. Intake air pipe
5. Nut
6. Oil pump pulley
7. Pipes
8. Bolt
9. Starter
10. Bolt



76G10X-018

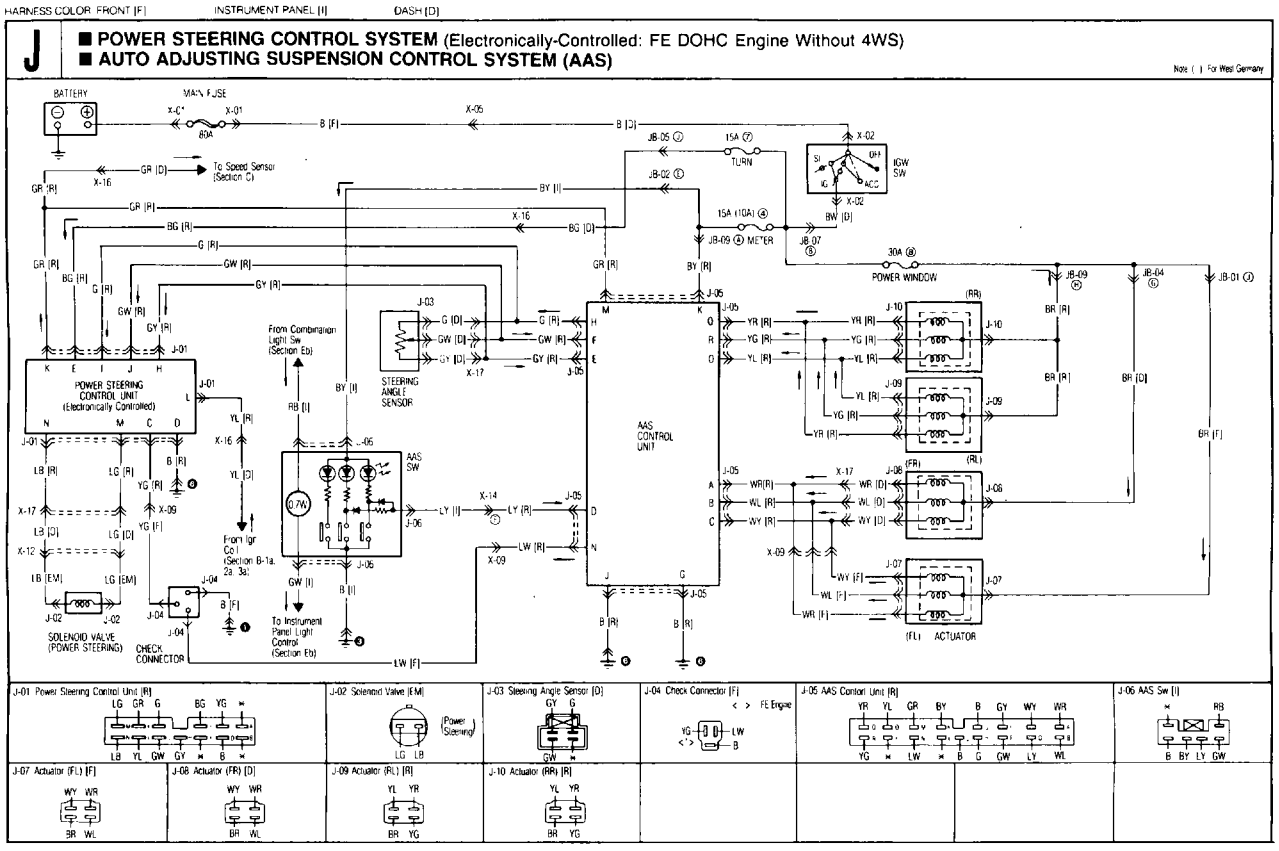
Removal Note

Oil pump (2WS Diesel engine)

1. Hold the oil pump pulley with the **SST**, and remove the pulley nut.
2. Slide the pulley forward. Remove the hose, pipes, and the pump.
3. Remove the pulley.

ELECTRICAL COMPONENTS OF ELECTRONICALLY-CONTROLLED POWER STEERING (ECPS)

CIRCUIT DIAGRAM

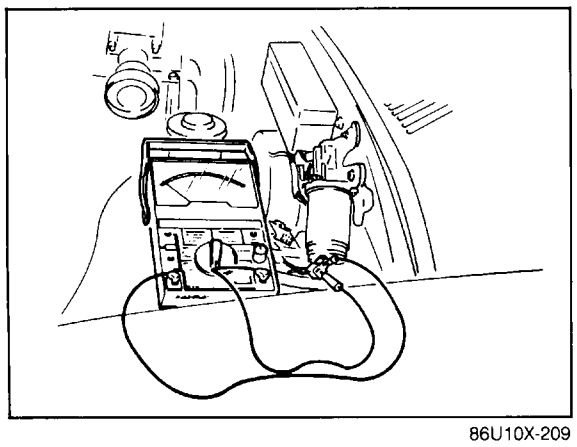


86U10X-208

Note
Refer to page 10—4 for the component location.

TROUBLESHOOTING GUIDE

The power steering control unit contains a self-diagnosis function to detect malfunctions within itself, the ECPS electrical components and circuits.
If a malfunction is detected, the control unit indicates where the problem is located by outputting specific voltage pulsations at terminal wire (YB) of the check connector.
Troubleshooting of the ECPS system, then, is easily performed by comparing the output pattern with those of the Diagnosis Table on pages 10—89 and 90. 76G10X-019

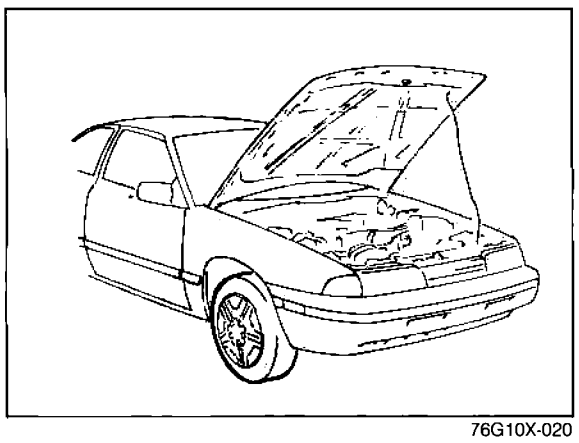


86U10X-209

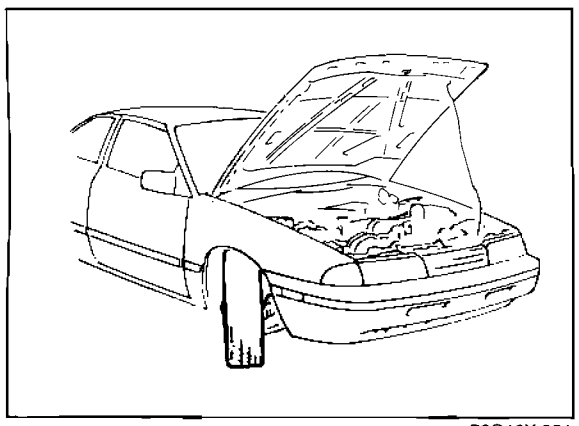
TROUBLESHOOTING
How To Use Self-Diagnosis System

By using the control unit's self-diagnosis function and a voltmeter, malfunctions of the system are easily determined. When diagnosing malfunctions, follow the steps below.

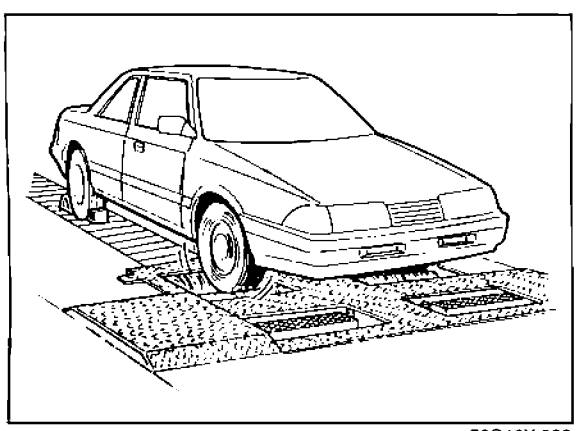
1. Connect a voltmeter to terminal wire (YB) of the check connector in the engine compartment.
2. Check the output patterns as described on the following page.



76G10X-020

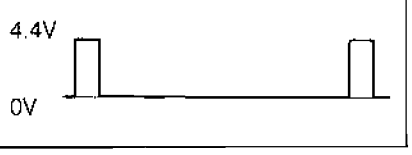


76G10X-021



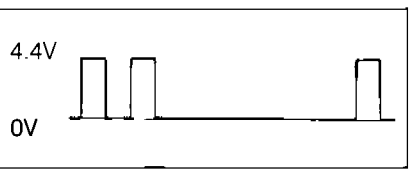
76G10X-022

Checking Condition
Condition A
1. Turn the ignition switch OFF.
2. Start the engine and let it idle.
3. Turn the steering wheel to the straight-ahead position, and check the output pattern.

Normal pattern	

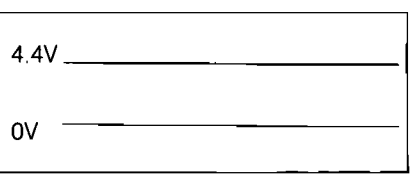
Refer to page 10—89 for other patterns and indicated failure points.

Condition B
1. Turn the ignition switch OFF.
2. Start the engine and let it idle.
3. Turn the steering wheel 45° left and right from the center, and check the output pattern.

Normal pattern	

Refer to page 10—89 for other patterns and indicated failure points.

Condition C
1. Turn the ignition switch OFF.
2. Place the vehicle on a chassis roller tester. Block the rear wheels, and secure it with chains.
3. Start the engine. Put the transmission in gear and operate the vehicle at more than 10 km/h (6.2 mph).
4. Check the output pattern.

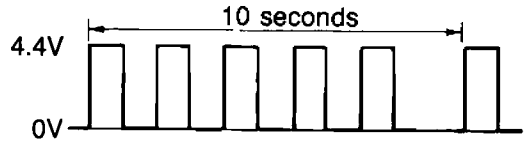
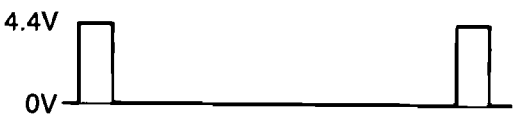
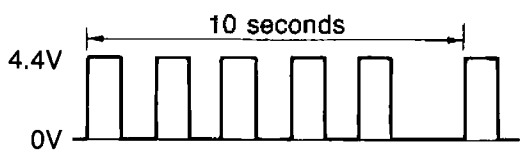
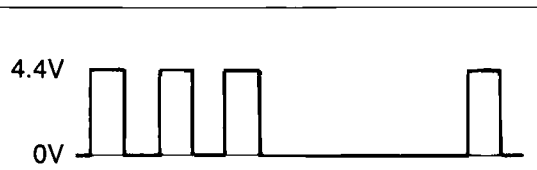
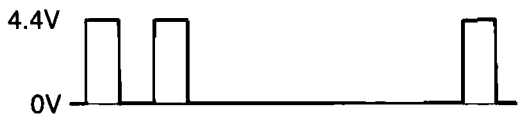
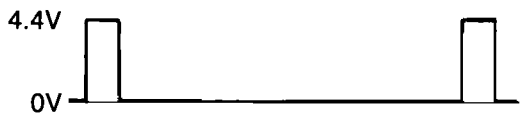
Normal pattern	

Refer to page 10—90 for other patterns and indicated failure points.

Note
For vehicles equipped with ABS, the ABS warning light may come on. This is not a failure. The light will go off when turning the ignition switch OFF and back ON.

86U10X-213

Diagnosis Table

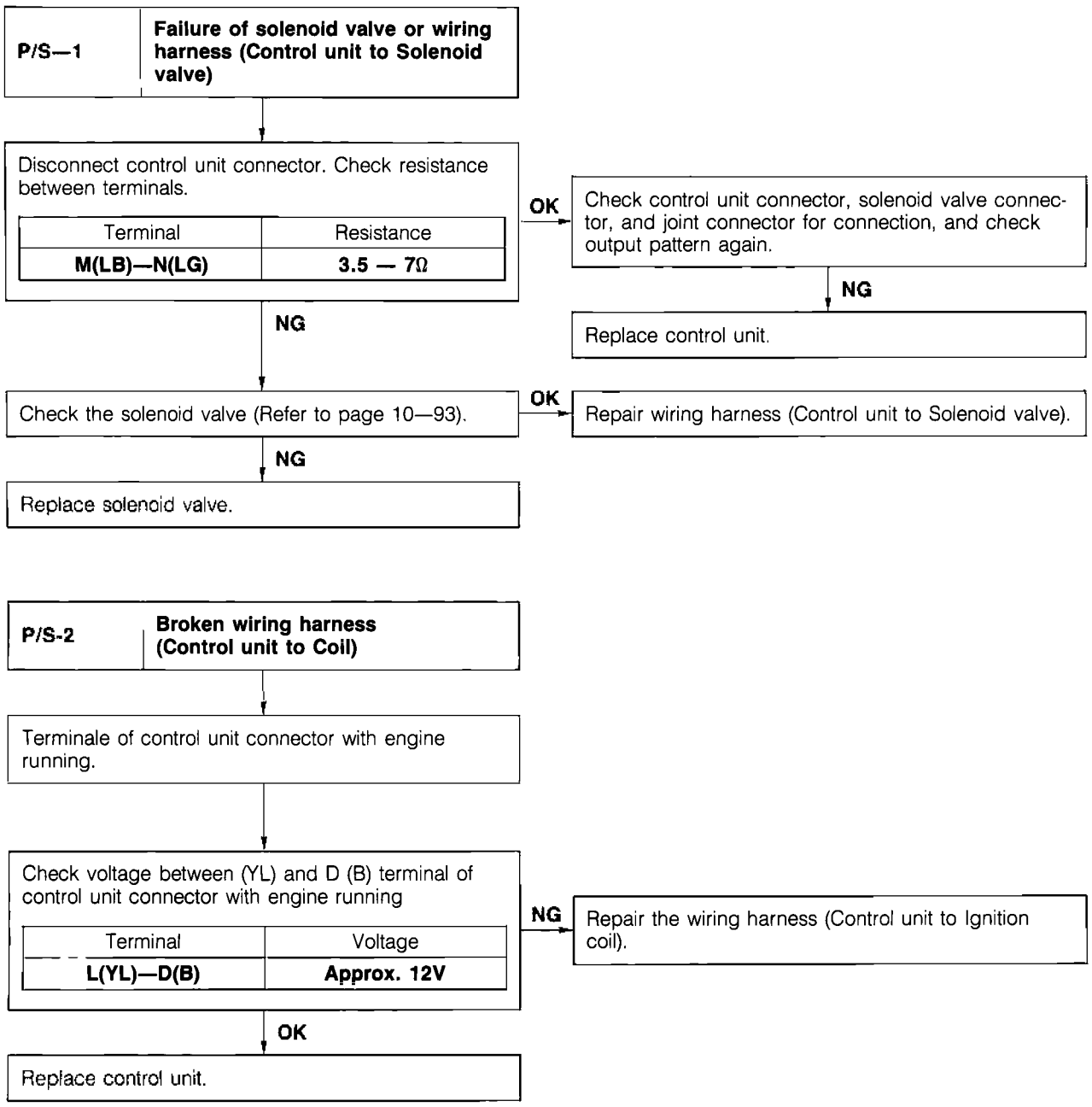
Condition	Output pattern	Malfunction	Flow chart No.
A **Steering wheel in straight-ahead position with engine idling.**		**Power steering solenoid valve** or **wiring harness** (Control unit to Solenoid valve)	**P/S—1** Refer to page 10—91
		**Wiring harness** (Control unit to Ignition coil)	**P/S—2** Refer to page 10—91
		**Steering wheel angle sensor** or **wiring harness** (Control unit to Angle sensor)	**P/S—3** Refer to page 10—92
		**Normal operation**	—
		**Wiring harness** (Fuse box to Control unit or Control unit to Body ground)	**P/S—5** Refer to page 10—93
B **Steering wheel turned 45° left and right from center with engine idling**		**Power steering solenoid valve** or **wiring harness** (Control unit to Solenoid valve)	**P/S—1** Refer to page 10—91
		**Wiring harness** (Control unit to Ignition coil)	**P/S—2** Refer to page 10—91
		**Normal operation**	—
		**Steering wheel angle sensor** or **wiring harness** (Control unit to Angle sensor)	**P/S—3** Refer to page 10—92

76G10X-023

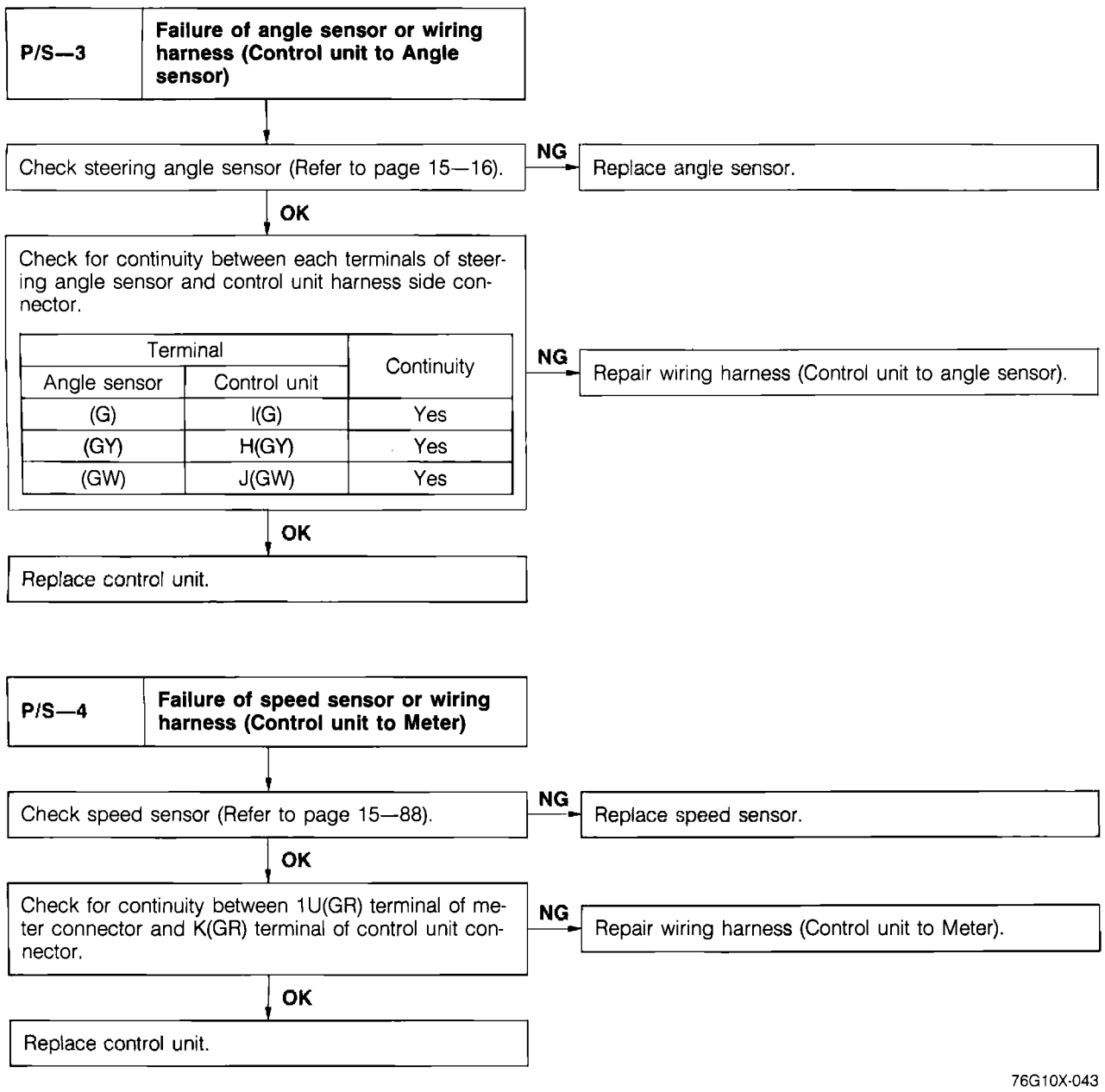
Condition	Output pattern	Malfunction	Flow chart No.
B Cont'd	0V	**Wiring harness** (Fuse box to Control unit or Control unit to Body ground)	**P/S—5** Refer to page 10—93
C Front wheels driven at more than 10 km/h (6.2 mph)	10 seconds; 4.4V; 0V	**Power steering solenoid valve** or **wiring harness** (Control unit to Solenoid valve)	**P/S—1** Refer to page 10—91
	4.4V; 0V	**Wiring harness** (Control unit to Ignition coil)	**P/S—2** Refer to page 10—91
	4.4V; 0V	**Steering wheel angle sensor** or **wiring harness** (Control unit to Angle sensor)	**P/S—3** Refer to page 10—92
	4.4V; 0V	**Vehicle speed sensor** or **wiring harness** (Control unit to Meter)	**P/S—4** Refer to page 10—92
	4.4V; 0V	**Normal operation**	—
	0V	**Wiring harness** (Fuse box to Control unit or Control unit to Body ground)	**P/S—5** Refer to page 10—93

76G10X-024

Flow Chart



76G10X-025


P/S—3
Failure of angle sensor or wiring harness (Control unit to Angle sensor)
Check steering angle sensor (Refer to page 15—16).
NG
Replace angle sensor.
OK
Check for continuity between each terminals of steering angle sensor and control unit harness side connector.
Terminal
Angle sensor
Control unit
Continuity
(G)
I(G)
Yes
(GY)
H(GY)
Yes
(GW)
J(GW)
Yes
NG
Repair wiring harness (Control unit to angle sensor).
OK
Replace control unit.
P/S—4
Failure of speed sensor or wiring harness (Control unit to Meter)
Check speed sensor (Refer to page 15—88).
NG
Replace speed sensor.
OK
Check for continuity between 1U(GR) terminal of meter connector and K(GR) terminal of control unit connector.
NG
Repair wiring harness (Control unit to Meter).
OK
Replace control unit.

76G10X-043

P/S—5	**Broken wiring harness (Fuse box to Control unit, Control unit or to Body ground)**

↓

Measure voltage between terminal of control unit connector and body ground with ignition ON.

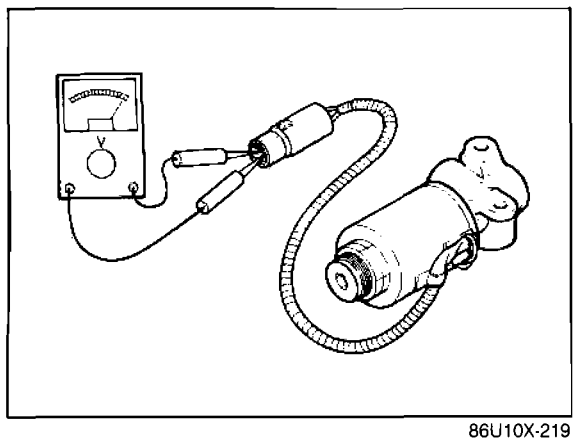
Terminal	Voltage
E(BG)	**Approx. 12V**
D(B)	**Approx. 0V**

OK → Replace the control unit.

NG ↓

Replace METER 10A fuse or repair wiring harnesses (Fuse box to Control unit or Control unit to Body ground).

86U10X-218



86U10X-219

Power Steering Solenoid Valve Inspection

1. Listen for actuation sound of the solenoid valve when applying 12V between A and B terminals.
2. If no sound is heard, check the resistance of the solenoid valve with an ohmmeter.

Terminals	Resistance
A — B	**3.4—6.9 Ω**

3. If there is no continuity, replace the solenoid valve.

Steering Angle Sensor Inspection

Refer to page 15—16.

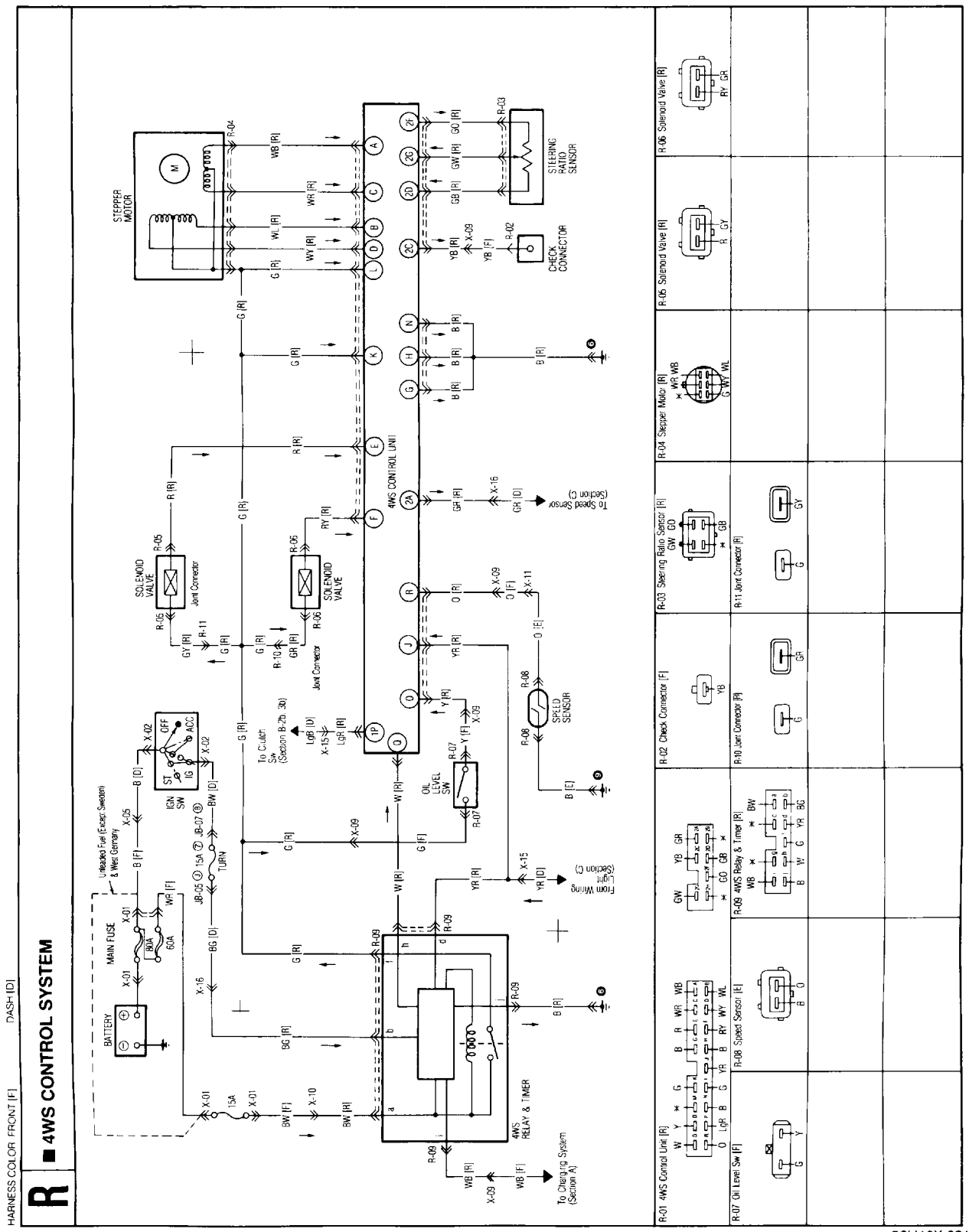
Vehicle Speed Sensor Inspection

Refer to page 15—88.

76G10X-044

ELECTRICAL COMPONENTS OF 4-WHEEL STEERING (4WS)

CIRCUIT DIAGRAM



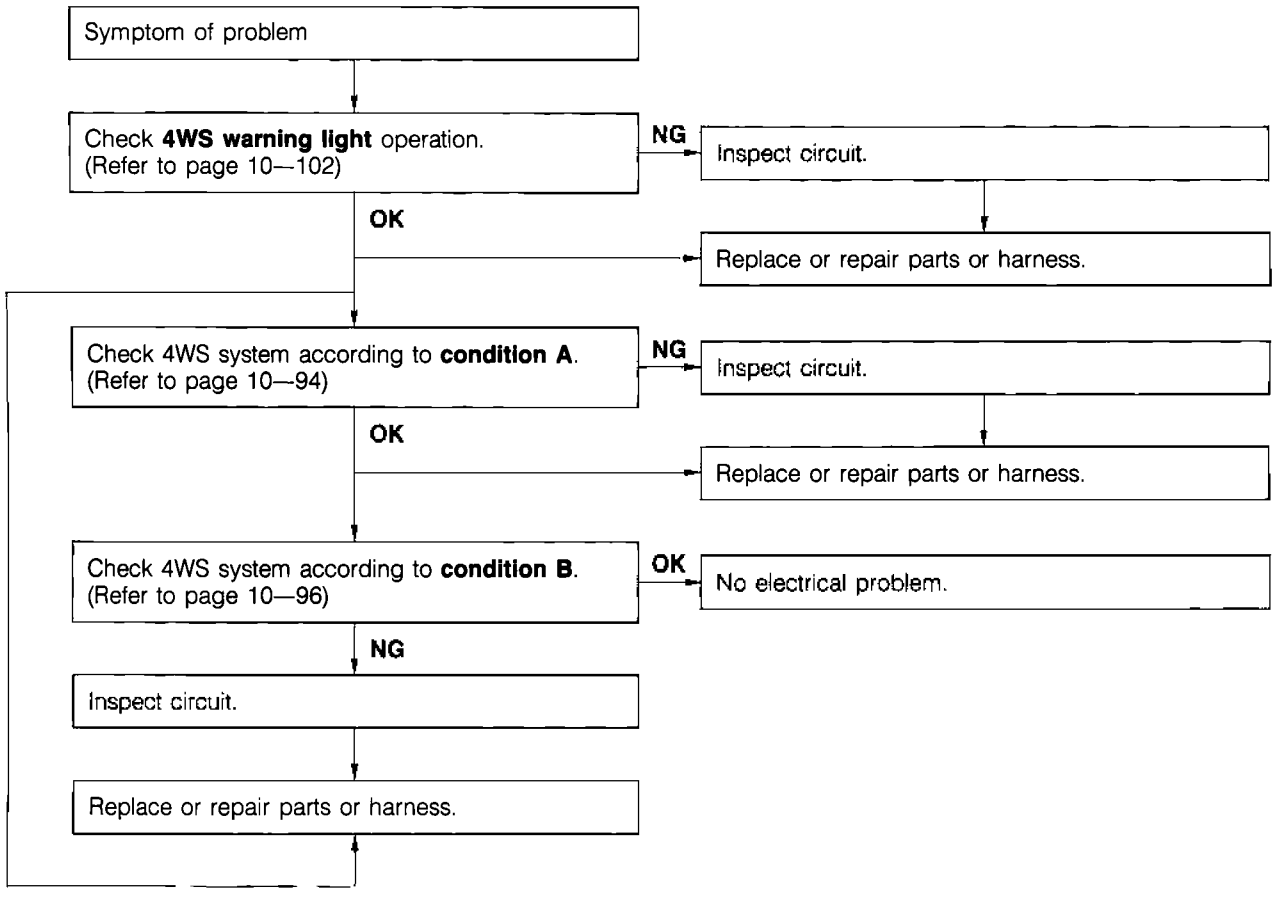
86U10X-221

Note
Refer to page 10—31 for component location.

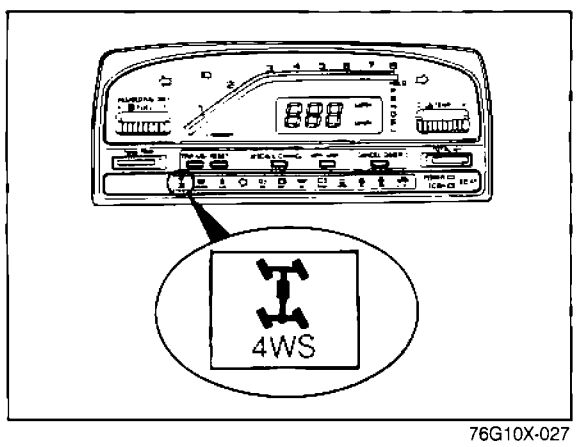
TROUBLESHOOTING GUIDE

Self-Diagnosis Function

The four-wheel steering (4WS) control unit contains a self-diagnosis function to detect malfunctions within itself, the 4WS electrical components and circuits.
If a malfunction is detected, the control unit indicates where the problem is located and the 4WS warning light in the instrument cluster will flash for one minute with a specific pattern.
Troubleshoot the 4WS system according to the following flow chart.



76G10X-026



76G10X-027

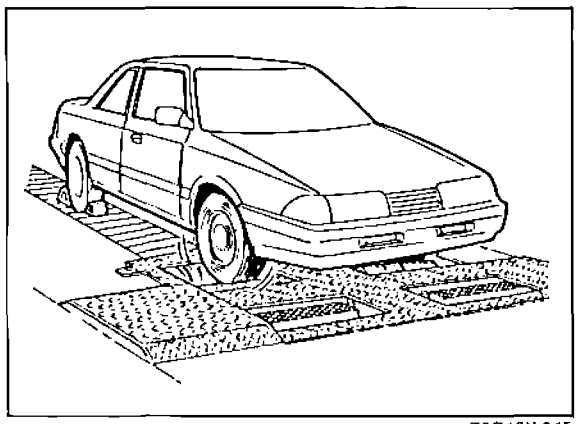
TROUBLESHOOTING

Checking Condition

Condition A

1. Turn the ignition switch OFF.
2. Start the engine after the ignition switch has been OFF for at least 10 seconds, and check if the 4WS warning light flashes or illuminates within 60 seconds.
3. If flashing or illumination occurs, inspect the circuit. (Refer to page 10—95.)

10 ELECTRICAL COMPONENTS OF 4-WHEEL STEERING



76G10X-045

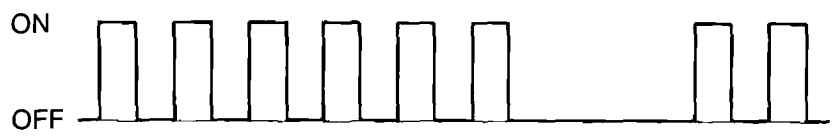
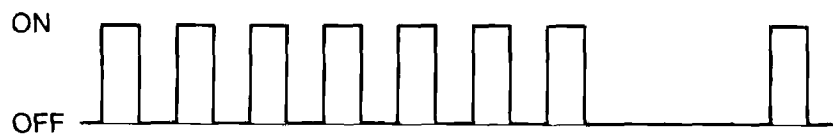
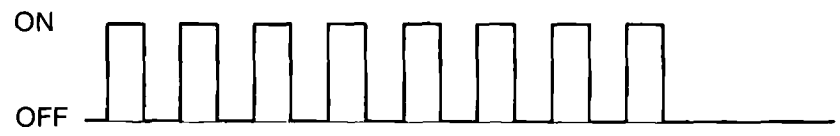
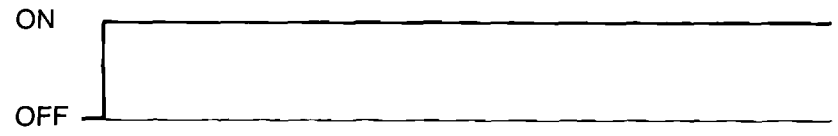
Condition B

1. Place the vehicle on a chassis roller tester. Block the rear wheels, and secure it with chains.
2. Turn the ignition switch OFF.
3. Start the engine after the ignition switch has been OFF for at least 10 seconds. Put the transmission in gear and operate the vehicle at more than 40 km/h (25 mph).
4. Check if the 4WS warning light flashes or illuminates within 60 seconds.
5. If flashing or illumination occurs, inspect the circuit by referring to the table below.

Diagnosis Output Pattern

Warning light output pattern	Malfunction	Flow chart No.
	Normal operation, control unit or wiring harness	4WS—0
0.5 sec 2.5 sec	Speed sensors or wiring harness	4WS—1
	Rear steering gear assembly	4WS—2
	Solenoid valve or wiring harness	4WS—3
	Stepper motor or wiring harness	4WS—4
	Rear-to-front steering ratio sensor or wiring harness	4WS—5

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Warning light output pattern	Malfunction	Flow chart No.
	Stepper motor or wiring harness	4WS—6
	Oil leakage or oil level switch	4WS—7
	Control unit	4WS—8
	Control unit, alternator, or wiring harness	4WS—9

86U10X-226

4WS-0 — **Normal operation or failure of control unit or harness**

Start engine.

Disconnect R-01 (7-pin) connector.
Check that **4WS warning light** flashes or illuminates.

YES → No electrical problem.

NO

Reconnect connector.

Check voltage between terminals and body ground.

Terminal	Voltage
G (B)	**0V**
H (B)	**0V**
K (G)	**Approx. 12V**
L (G)	**Approx.12V**
N (B)	**0V**

OK → Replace control unit.

NG

Repair harness. (Fuse box to Control unit or Control unit to Body ground).

4WS-1 — **Failure of speed sensors or wiring harness**

Check speed sensor at transaxle.
(Referring to page 10—103)

NG → Replace speed sensor.

OK

Check for continuity between **terminal of transaxle speed sensor** and **R (O) terminal of the control unit connector**.

NG → Repair wiring harness (Control unit to Transaxle speed sensor).

Cont'd

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Cont'd

OK

Check **speed sensor in meter** (Refer to page 10—103).

NG → Replace speed sensor.

OK

Check for continuity between **1U (GR) terminal of meter connector** and **2A (GR) terminal of control unit connector**.

NG → Repair harness (Control unit to Meter).

OK

Replace control unit.

4WS-2	**Failure of rear steeing gear assembly**

Turn ignition switch OFF.

Check for 4WS warning light operation in conditions A and B again (Refer to page 10—102)

No flash or illumination → Momentary trouble (If 4WS warning light often flashes or illuminates, replace rear steering gear assembly.)

Flashes or illuminates

Replace rear steering gear assembly.

4WS-3	**Failure of solenoid valve or harness**

Disconnect R-01 (17-pin) connector. Check voltage between terminals and body ground with ignition switch ON.

Terminal	Voltage
E (R)	**Approx.12V**
F (RY)	**Approx. 12V**

OK → Replace control unit.

NG

Disconnect solenoid valve connector. Check for continuity between terminals on valve side.

Terminals	continuity
GR — RY	**Yes**
GY — R	**Yes**

OK → Repair harness (Fuse box to Solenoid valve or Solenoid valve to Control unit).

NG

Replace solenoid valve unit.

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4WS-4	Failure of stepper motor or harness

Disconnect R-01 (17-pin) connector. Check for no continuity between each terminal of harness side connector and body ground.

Terminal	Continuity
A (WB)	No
B (WL)	No
C (WR)	No
D (WY)	No
L (G)	No

NG →

Disconnect stepper motor connector. Check for no continuity between each terminal and body ground.

Terminal	Continuity
WB	No
WL	No
WR	No
WY	No
G	No

OK → Repair harness (Stepper motor to Control unit).

NG → Replace rear steering gear assembly.

OK ↓

Check for continuity between terminals of R-01 (17-pin) harness side connector.

Terminal	Continuity
A (WB) — L (G)	Yes
B (WL) — L (G)	Yes
C (WR) — L (G)	Yes
D (WY) — L (G)	Yes

NG →

Disconnect stepper motor connector. Check for continuity between terminals of motor side connector.

Terminals	Continuity
WB — G	Yes
WL — G	Yes
WR — G	Yes
WY — G	Yes

OK ↓

Replace control unit.

OK → Repair wiring harness (Stepper motor to Control unit).

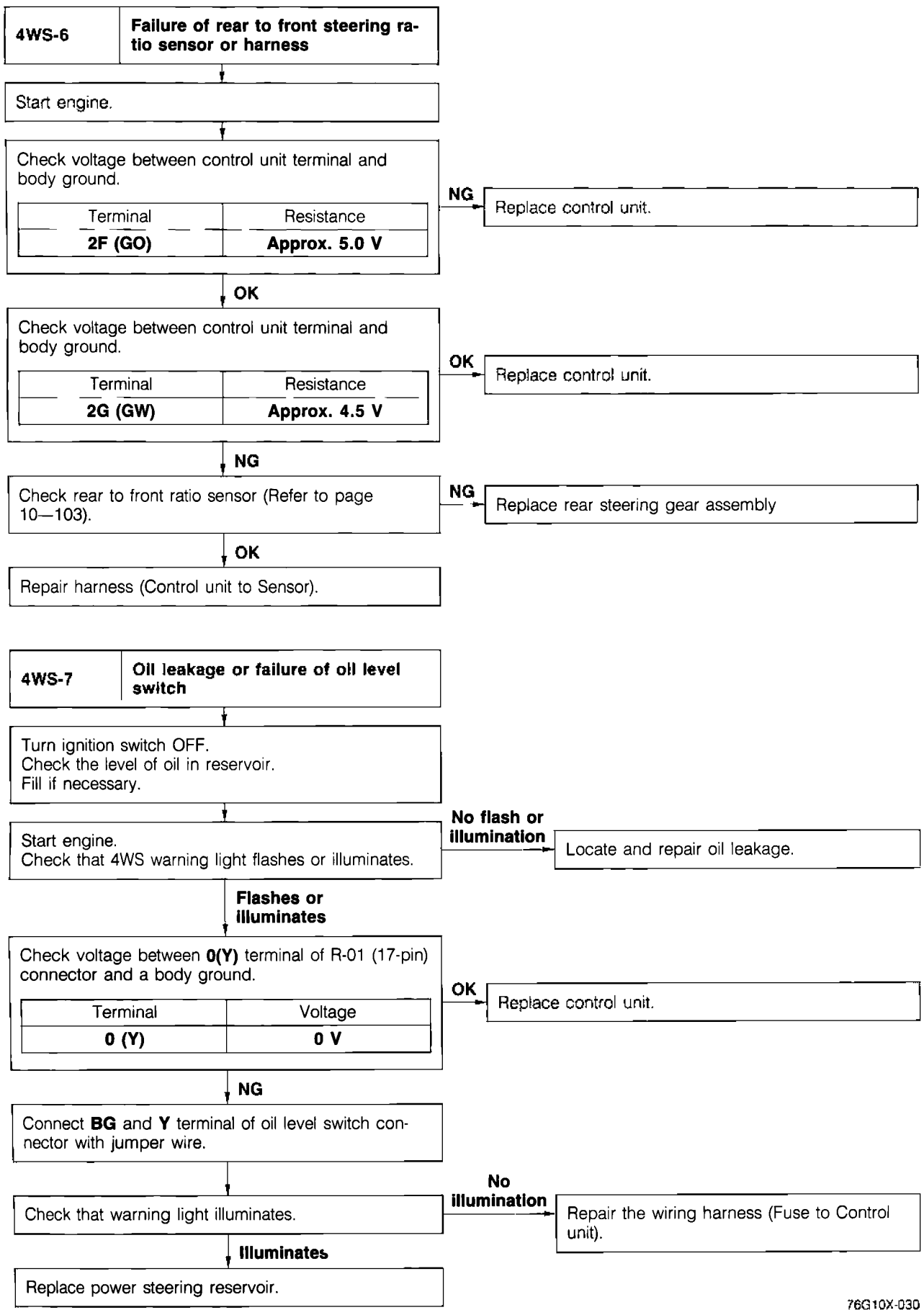
NG → Replace rear steering gear assembly.

4WS-5	Failure of rear to front steering ratio sensor

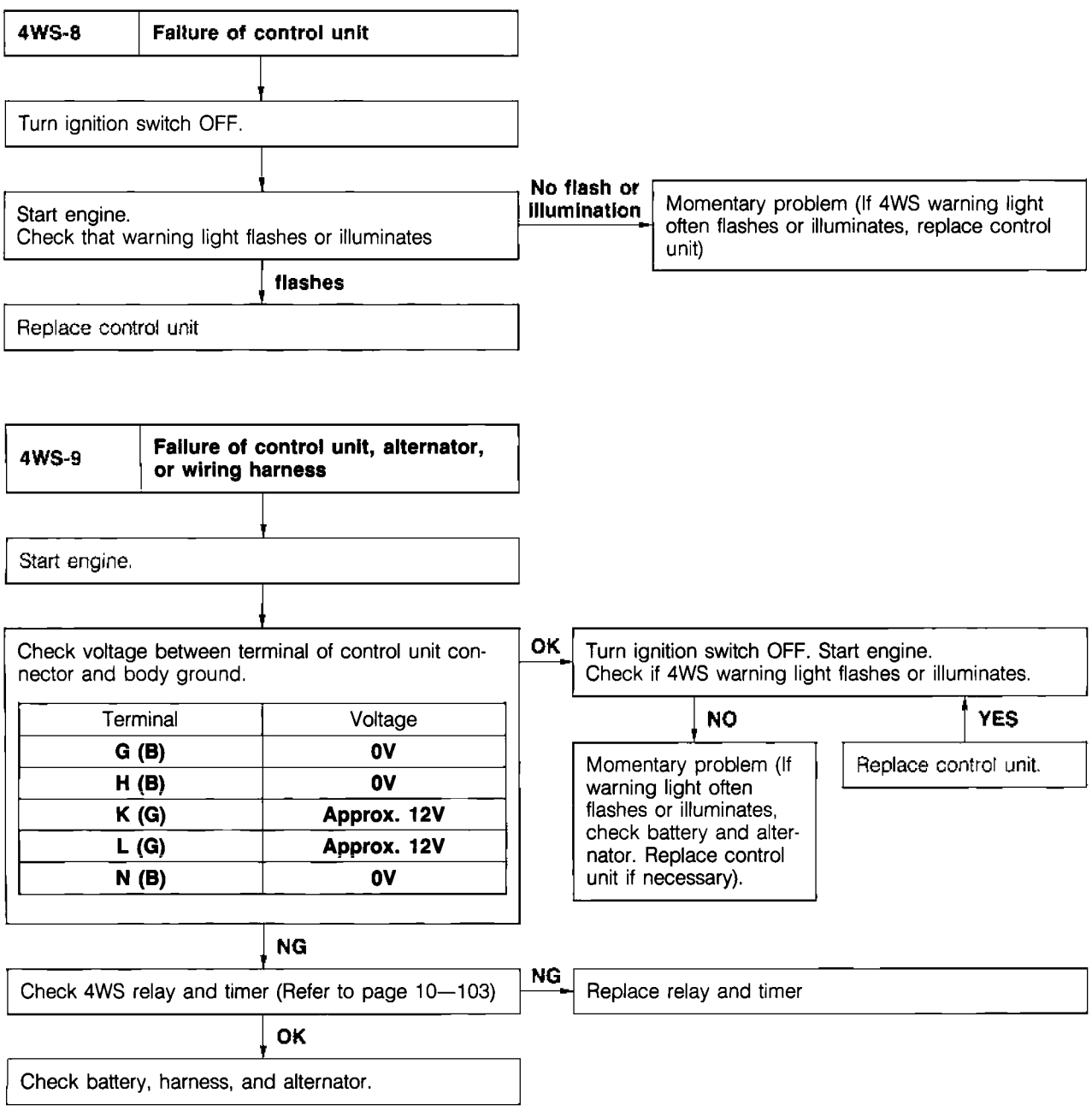
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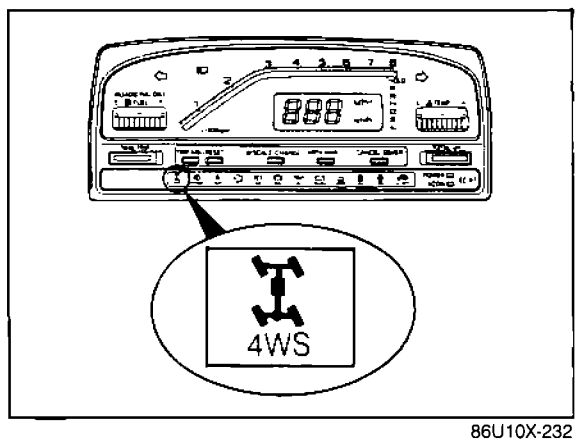
Go to 4WS-2

76G10X-046


4WS-6
Failure of rear to front steering ratio sensor or harness
Start engine.
Check voltage between control unit terminal and body ground.
Terminal
Resistance
2F (GO)
Approx. 5.0 V
NG
Replace control unit.
OK
Check voltage between control unit terminal and body ground.
Terminal
Resistance
2G (GW)
Approx. 4.5 V
OK
Replace control unit.
NG
Check rear to front ratio sensor (Refer to page 10—103).
NG
Replace rear steering gear assembly
OK
Repair harness (Control unit to Sensor).
4WS-7
Oil leakage or failure of oil level switch
Turn ignition switch OFF.
Check the level of oil in reservoir.
Fill if necessary.
Start engine.
Check that 4WS warning light flashes or illuminates.
No flash or illumination
Locate and repair oil leakage.
Flashes or illuminates
Check voltage between 0(Y) terminal of R-01 (17-pin) connector and a body ground.
Terminal
Voltage
0 (Y)
0 V
OK
Replace control unit.
NG
Connect BG and Y terminal of oil level switch connector with jumper wire.
Check that warning light illuminates.
No illumination
Repair the wiring harness (Fuse to Control unit).
Illuminates
Replace power steering reservoir.

76G10X-030

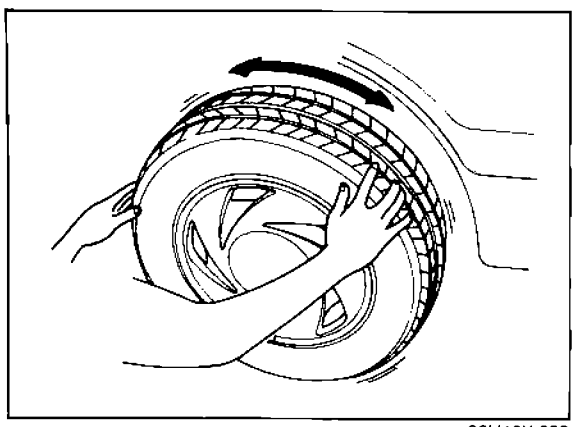




86U10X-232

4WS WARNING LIGHT

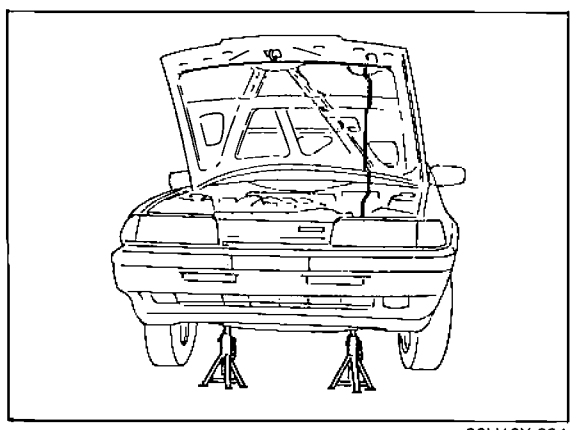
1. Turn the ignition switch OFF.
2. Turn the ignition switch ON, and check that the 4WS warning light illuminates.
3. If there is no illumination, check the warning light bulb and wiring harness.
   Replace the control unit if necessary.



86U10X-233

SPEED SENSOR (IN METER)

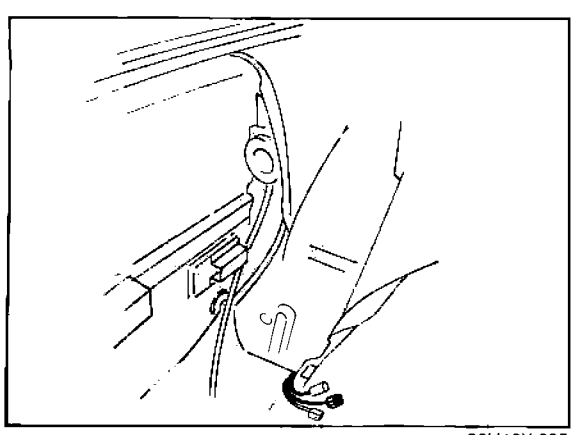
1. Jack up the front of the vehicle.
2. Connect a voltmeter between **2A (GR)** terminal of the control unit connector and a body ground.
3. Start the engine. Check that periodic voltage is detected when turning the front wheels slowly.
4. If periodic voltage is not detected, check the wiring harness. Replace the speed sensor if necessary.



86U10X-234

SPEED SENSOR (AT TRANSAXLE)

1. Jack up the front of the vehicle.
2. Connect a voltmeter between **R (O)** terminal of the control unit connector and a body ground.
3. Start the engine. Check that periodic voltage is detected when turning the front wheels slowly.
4. If periodic voltage is not detected, check the wiring harness. Replace the speed sensor if necessary.



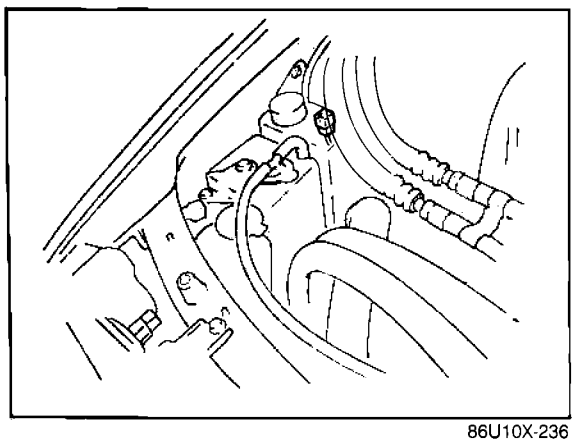
86U10X-235

REAR-TO-FRONT STEERING RATIO SENSOR

Check the resistance between the terminals with an ohmmeter.

Terminal	Resistance
GB—GO	**3.5—6.5 kΩ**
GB—GW	**3.2—5.9 kΩ**

If the resistance is not within specification, replace the rear steering gear assembly.



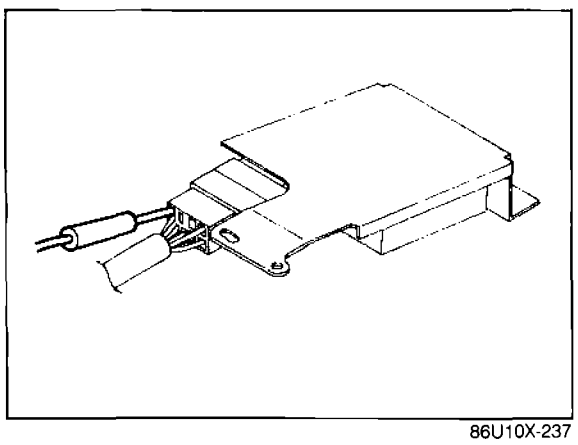
86U10X-236

OIL LEVEL SWITCH (IN P/S RESERVOIR)

Check for continuity of the switch with an ohmmeter.

Fluid level	Continuity
More than L	**No**
Less than L	**Yes**

If the continuity is not within specification, replace the P/S reservoir.



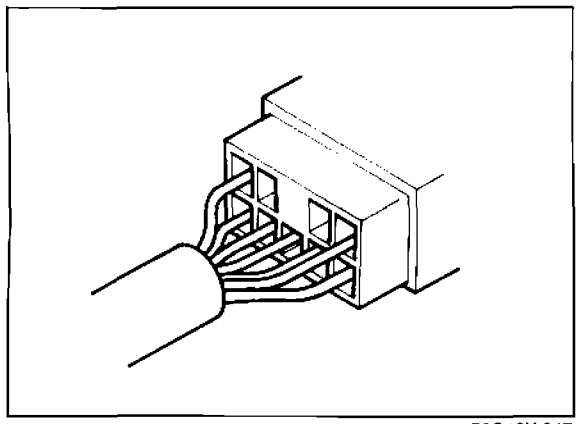
86U10X-237

RELAY AND TIMER

1. Start the engine.
2. Check voltage between each terminal of the relay and timer connector and a body ground.

Terminal	Voltage
a	**12V**
b	**12V**
d	**12V**
i	**12V**
j	**0V**

If the voltage is not as specified, replace the fuse or repair the harness.



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3. Check voltage between each terminal and a body ground with the engine running.

Terminal	Voltage
f	**12V**
h	**12V**

4. Check that the voltage of f and h terminal is 12V for approximately 7 to 10 seconds after the ignition switch is turned OFF.
   If not, replace the relay and timer.

11

BRAKING SYSTEM

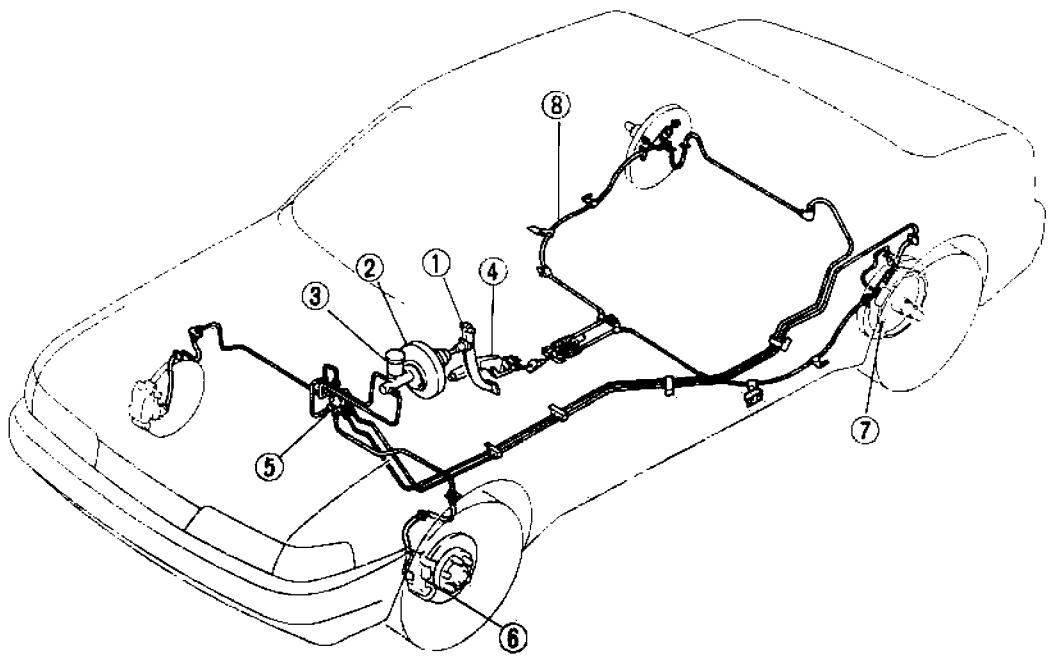
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11 OUTLINE

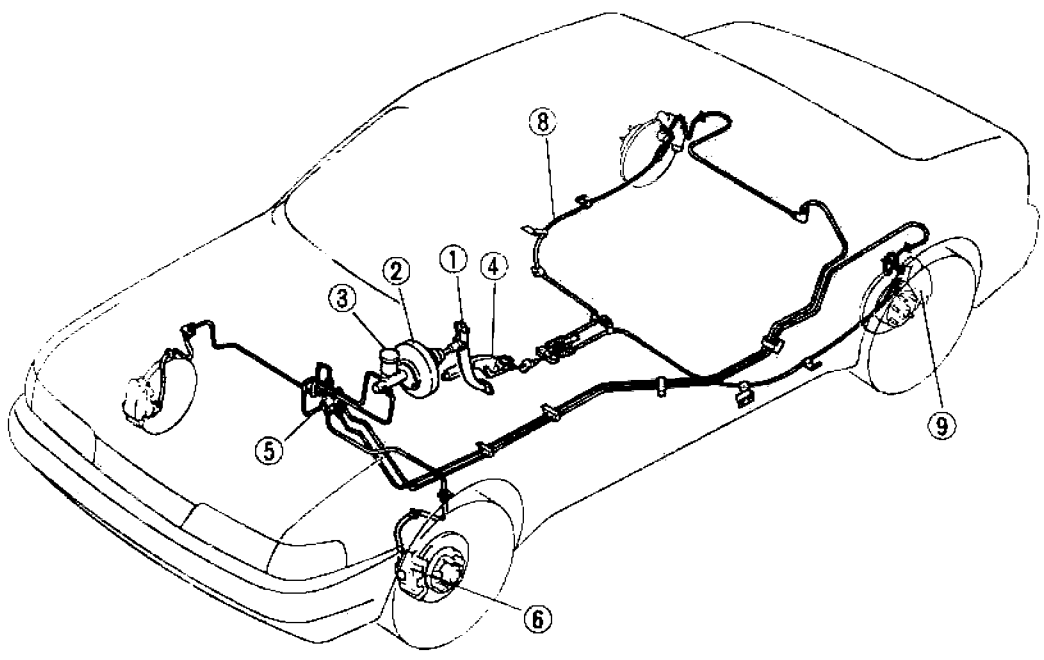
OUTLINE

STRUCTURAL VIEW

Front disc/rear drum brake



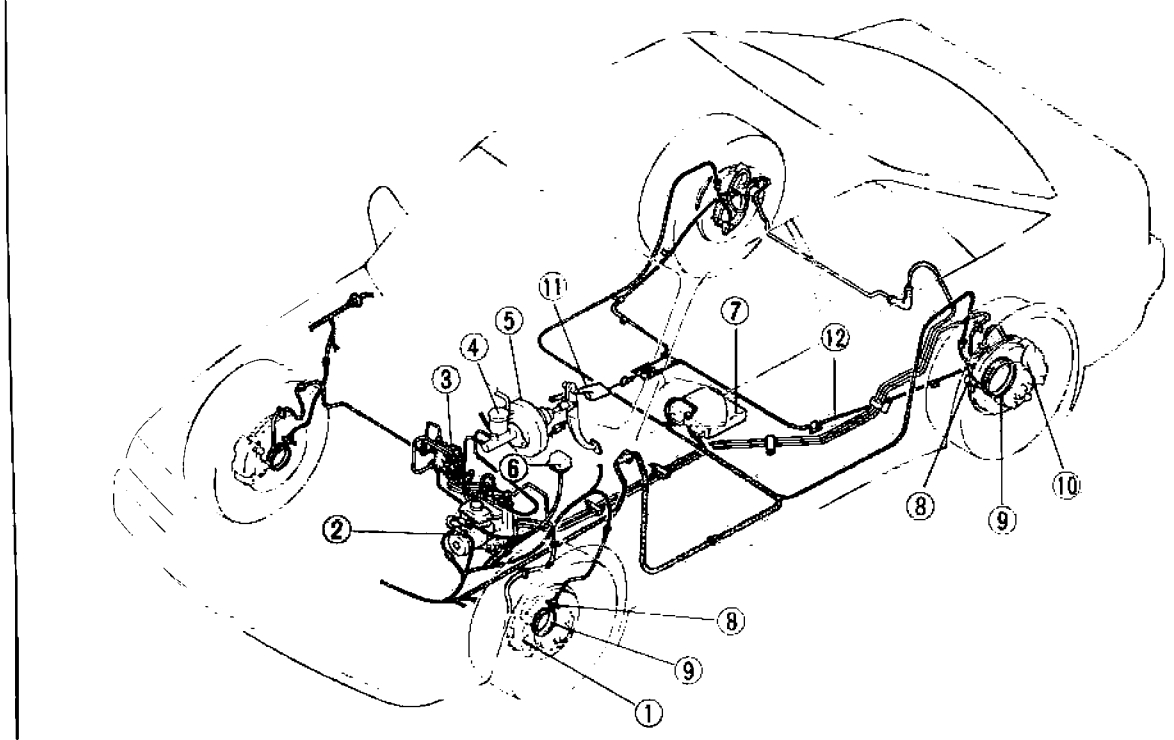
4-wheel disc brake



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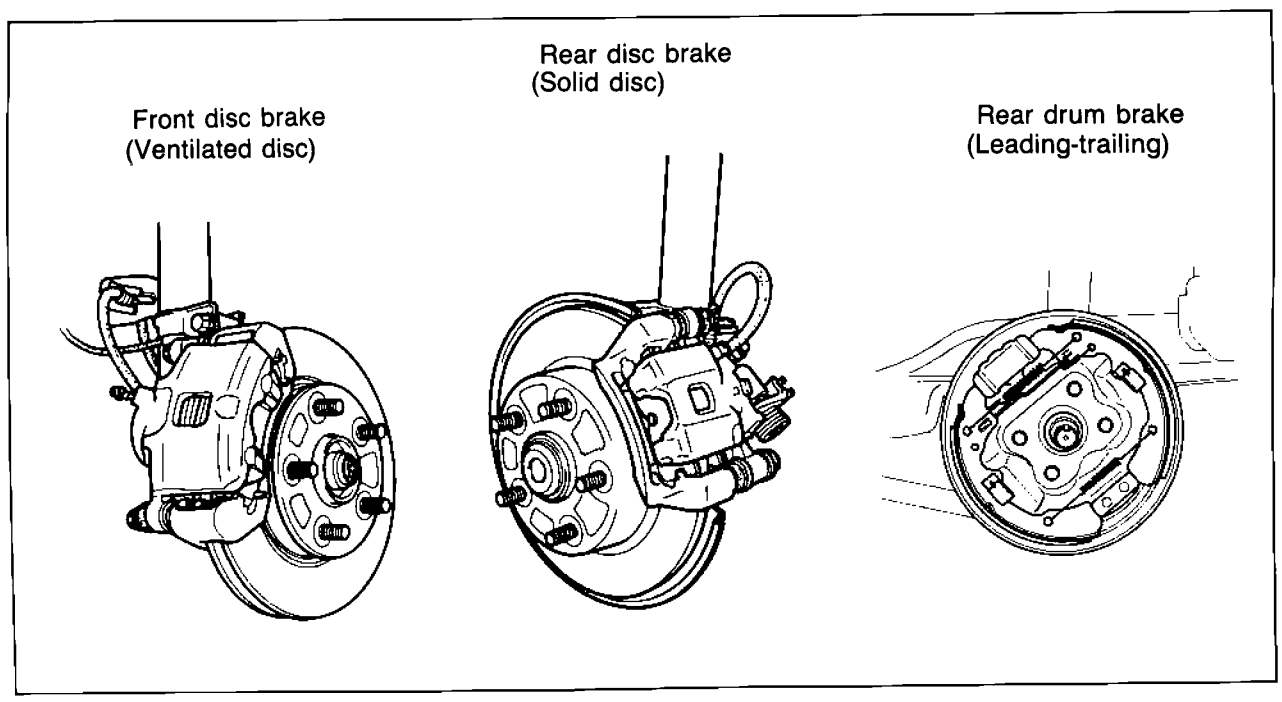
1. Brake pedal
2. Power brake unit
3. Brake master cylinder
4. Parking brake lever
5. Dual proportioning valve
6. Front disc brake
7. Rear drum brake
8. Parking brake cable
9. Rear disc brake

Anti-lock brake system (ABS)



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1. Front disc brake
2. Hydraulic unit
3. Pipe joint
4. Master cylinder
5. Power brake unit
6. Relay box
7. Control unit
8. Wheel speed sensor
9. Sensor rotor
10. Rear disc brake
11. Parking brake lever
12. Parking brake cable



11 OUTLINE

SPECIFICATIONS

Item		Specification
Brake pedal	Type	Suspended
	Pedal lever ratio	4.2
	Max. stroke mm (in)	LHD: 136.5 (5.37) RHD: 135 (5.31)
Master cylinder	Type	Tandem (with level sensor)
	Cylinder inner diameter mm (in)	22.22 (0.87)
Front disc brake	Type	Mounting support, Ventilated disc
	Cylinder bore mm (in)	53.97 (2.12)
	Pad dimensions (area x thickness) mm^2 x mm (in^2 x in)	4,800 x 10 (7.44 x 0.39)
	Disc plate dimensions mm (in) (outer diameter x thickness)	13 inch-wheel: 242 x 20 (9.53 x 0.79) 14 or 15 inch-wheel: 264 x 24 (10.39 x 0.94)
Rear disc brake (Turbo model)	Type	Mounting support, Solid disc
	Cylinder bore mm (in)	30.2 (1.19)
	Pad dimensions (area x thickness) mm^2 x mm (in^2 x in)	2,900 x 8 (4.5 x 0.31)
	Disc plate dimensions mm (in) (outer diameter x thickness)	259 x 10 (10.2 x 0.39)
Rear drum brake (Non-Turbo model)	Type	Leading-trailing
	Wheel cylinder inner diameter mm (in)	17.46 (0.69)
	Lining dimensions mm (in) (width x length x thickness)	(a): 25 x 191.9 x 5 (0.98 x 7.56 x 0.20) (b): 30 x 219.3 x 5 (1.18 x 8.63 x 0.20)
	Drum inner diameter mm (in)	(a): 200.0 (7.87) (b): 228.6 (9.0)
	Shoe clearance adjustment	Automatic adjuster
Power brake unit	Type	Vacuum multiplier
	Diameter mm (in)	238 (9.37)
Braking force control device	Type	Dual proportioning valve or ABS (if equipped)
Brake fluid		DOT-3 or DOT-4, or SAE J1703
Parking brake	Type	Center lever (Mechanical two rear brakes)

(a)...13-inch wheel in General LHD and RHD models
(b)...Except 13-inch wheel in General LHD and RHD models

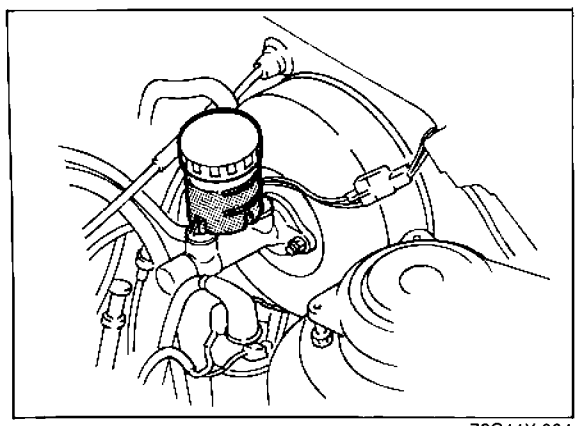
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TROUBLESHOOTING GUIDE

The table below covers the normal braking system. Refer to page 11—73 for ABS system.

Problem	Possible cause	Remedy	Page
Poor braking	Leakage of brake fluid	Repair	—
	Air in system	Air bleed	11—9
	Worn pad or lining	Replace	11—40,47,56
	Brake fluid, grease, oil, or water on pad or lining	Clean or replace	11—40,47,56
	Hardening of pad or lining surface or poor contact	Grind or replace	11—40,47,56
	Malfunction of disc brake piston	Replace	11—43,50
	Malfunction of master cylinder or wheel cylinder	Repair or replace	11—14,57
	Malfunction of power brake unit	Repair or replace	11—29
	Malfunction of check valve (vacuum hose)	Repair or replace	11—29
	Damaged vacuum hose	Replace	11—29
	Deterioration of flexible hose	Replace	—
	Malfunction of dual proportioning valve	Replace	11—39
Brakes pull to one side	Worn pad or lining	Replace	11—40,47,56
	Brake fluid, grease, oil, or water on pad or lining	Clean or replace	11—40,47,56
	Hardening of pad or lining surface or poor contact	Grind or replace	11—40,47,56
	Abnormal wear or distortion of disc, drum, pad, or lining	Repair or replace	11—40,47,56
	Malfunction of automatic adjuster	Repair or replace	11—56
	Looseness of backing plate mounting bolts	Tighten	11—61
	Malfunction of wheel cylinder	Repair or replace	11—57
	Improper adjustment of wheel bearing preload, or wear	Refer to Section 9	—
	Improper adjustment of wheel alignment	Refer to Section 10	—
	Unequal tire air pressures	Refer to Section 12	—
Brakes do not release	No brake pedal play	Adjust	11—11
	Improper adjustment of push rod clearance	Adjust	11—23,24
	Clogged master cylinder return port	Clean	—
	Shoe does not return properly	Adjust	—
	Wheel cylinder does not return properly	Clean or replace	11—57
	Improper return due to malfunction of piston seal of disc brake	Replace	11—43,50
	Excessive runout of disc plate	Replace	—
	Improper return of parking brake cable or improper adjustment	Repair or adjust	11—65
	Improper adjustment of wheel bearing preload	Refer to Section 9	—
Pedal goes too far (too much pedal stroke)	Air in system due to insufficient brake fluid	Add fluid and bleed air	11—9
	Improper adjustment of pedal play	Adjust	11—11
	Worn pad or lining	Replace	11—40,47,56
	Air in system	Air bleed	11—9
Abnormal noise or vibration during braking	Worn pad or lining	Replace	11—40,47,56
	Deterioration of pad or lining	Grind or replace	11—40,47,56
	Brakes do not release	Repair	—
	Foreign material or scratches on disc plate or drum contact surface	Clean	—
	Looseness of backing plate or caliper mounting bolts	Tighten	11—61
	Damage or deviation of disc or drum contact surface	Replace	11—56
	Poor contact of pad or lining	Repair or replace	11—40,47,56
	Insufficient grease on sliding parts	Apply grease	—
Parking brake does not hold well	Excessive lever stroke	Adjust	11—65
	Brake cable stuck or damaged	Repair or replace	11—68
	Brake fluid or oil on pad or lining	Clean or replace	11—40,47,56
	Hardening of pad or lining surface or poor contact	Grind or replace	11—40,47,56

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76G11X-004

ON-VEHICLE MAINTENANCE

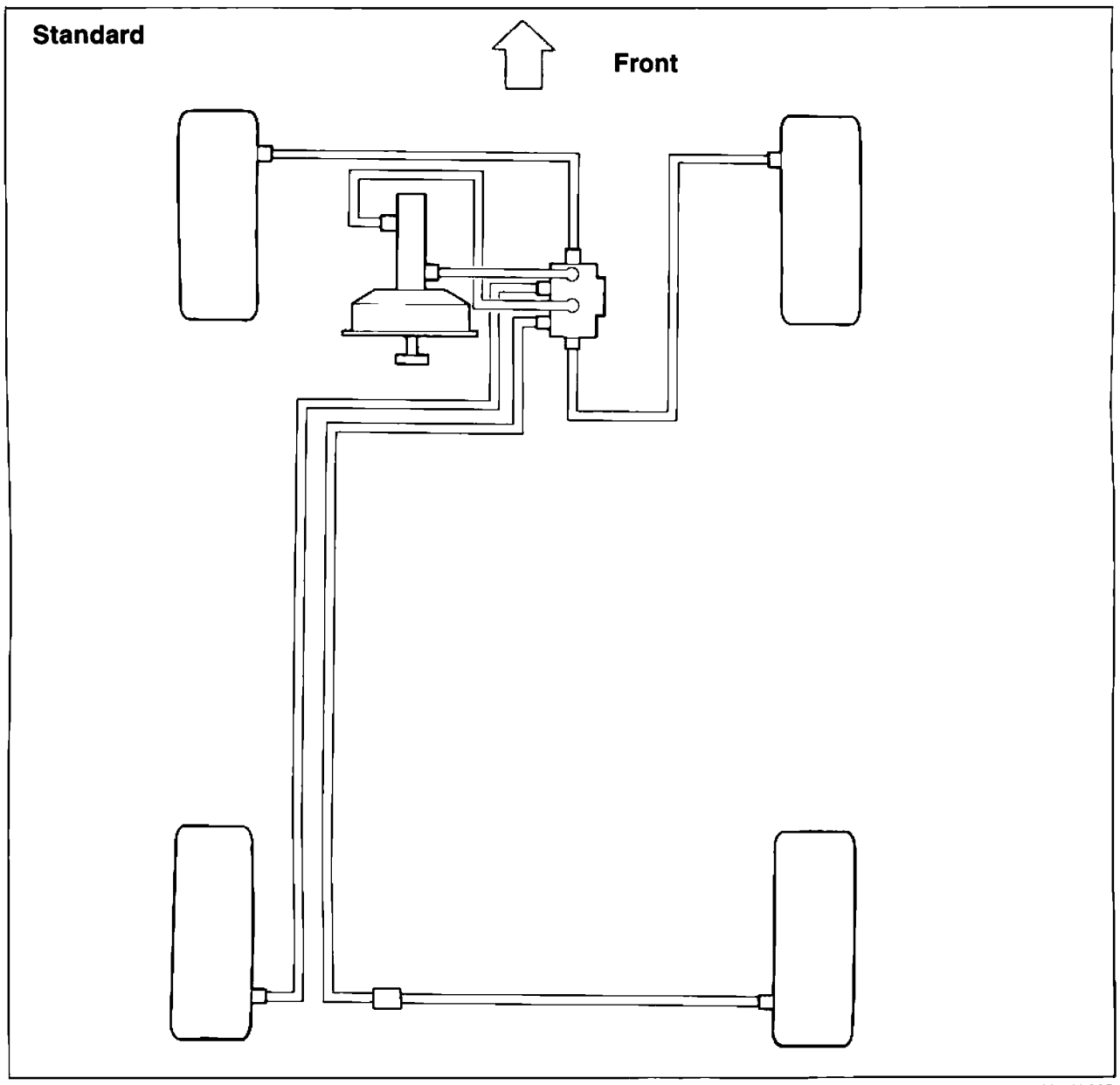
BRAKE FLUID LEVEL IN MASTER CYLINDER RESERVOIR

Check the fluid level in the reservoir. It should be between the Max and Min lines on the reservoir.
If the fluid level is extremely low, check the brake system for leaks.

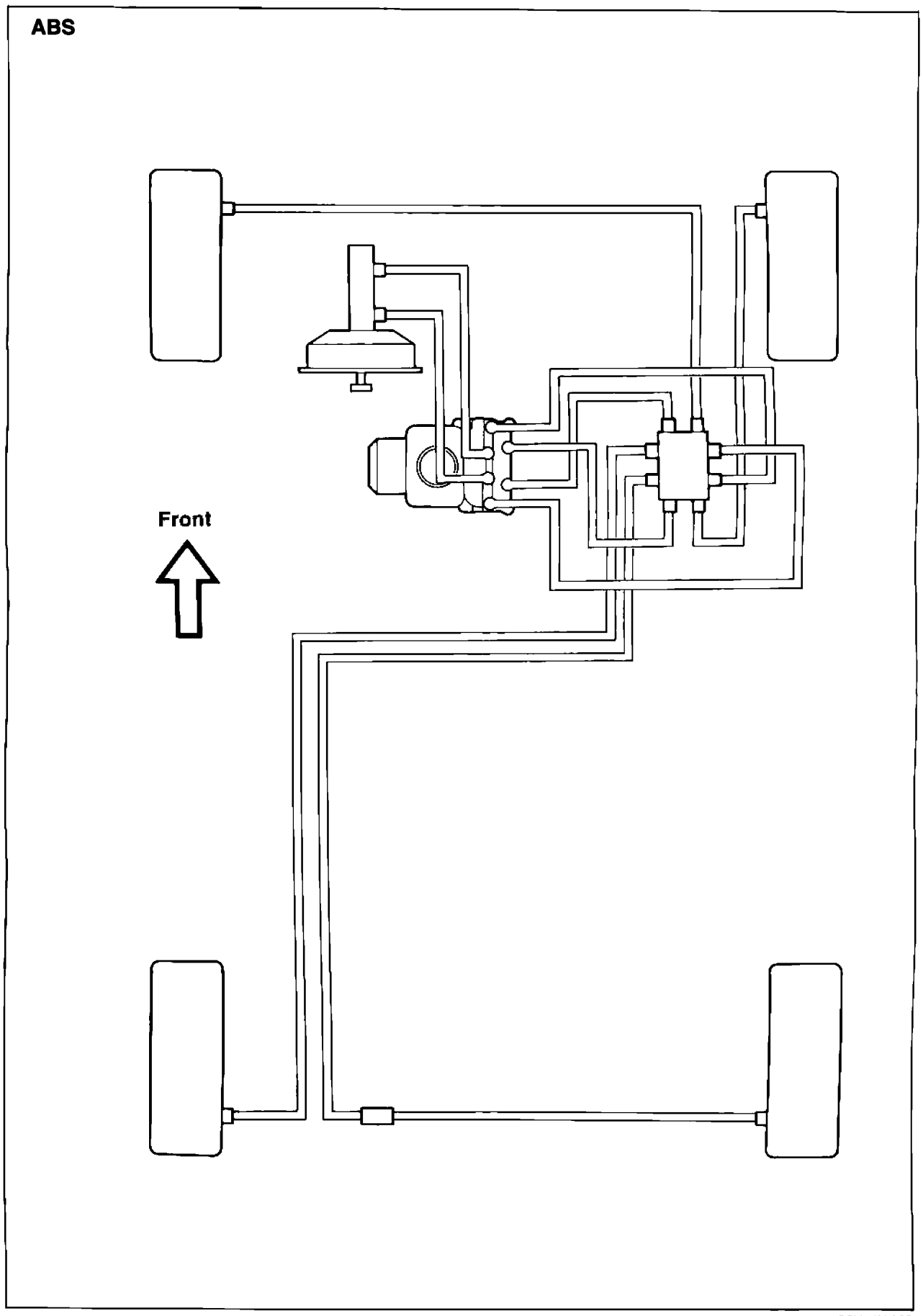
Fluid specification:
DOT-3 or DOT-4 or SAE J1703

BRAKE HYDRAULIC LINE

STRUCTURAL VIEW

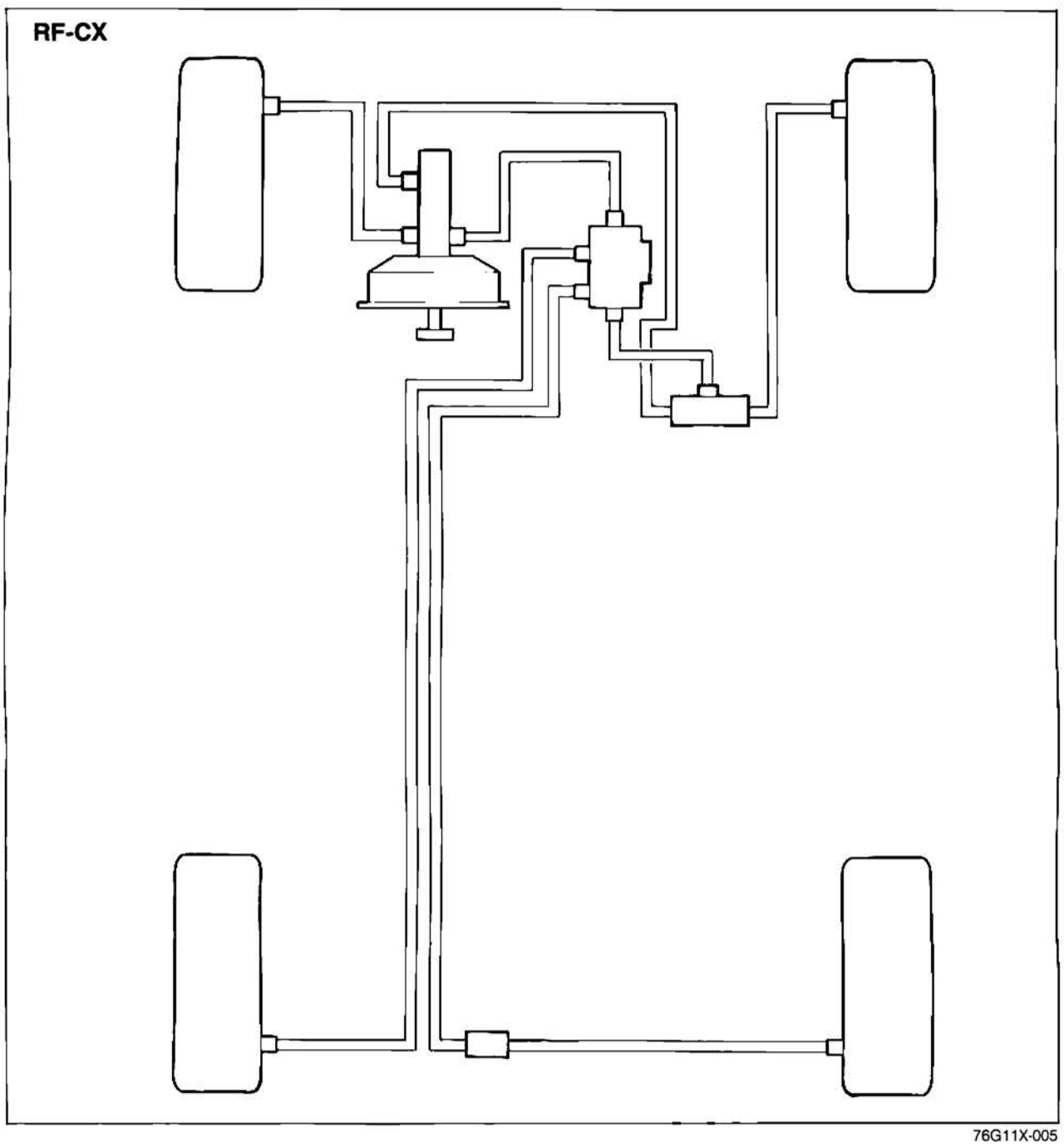


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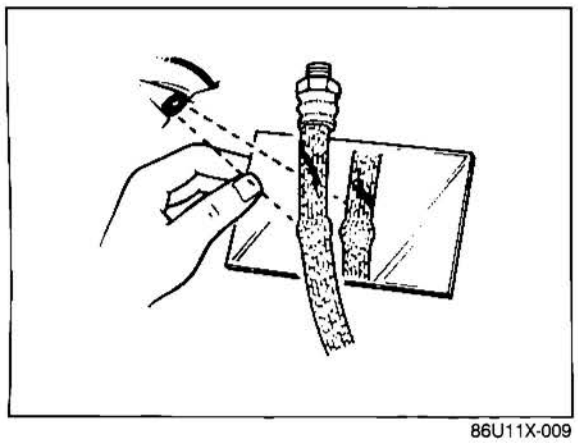


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11 BRAKE HYDRAULIC LINE



76G11X-005



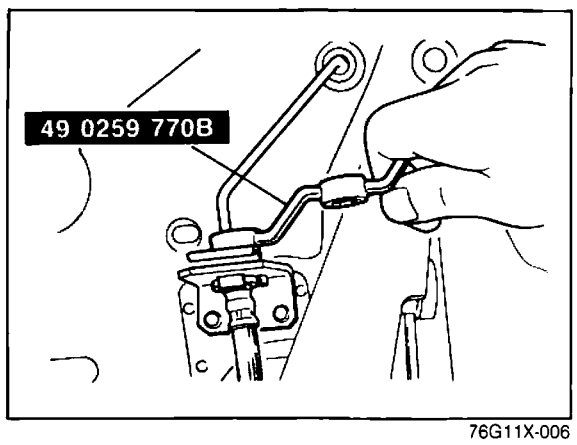
86U11X-009

ON-VEHICLE INSPECTION OF BRAKE LINES

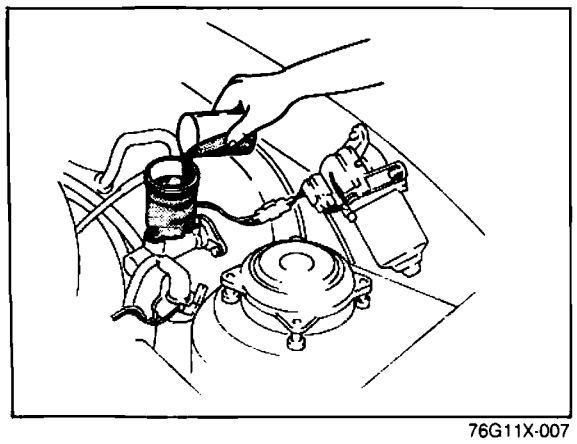
Check the following and replace or repair any faulty parts.

1. Cracks, damage, corrosion of brake hose
2. Damage to brake hose threads
3. Scars, cracks, and swelling of flexible hose
4. Fluid leakage of all lines

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76G11X-006



76G11X-007

REMOVAL AND INSTALLATION OF BRAKE LINES

1. Loosen or tighten the flare nut with the **SST**.

   Flare nut tightening torque: 13—22 N·m (1.3—2.2 m-kg, 9—16 ft-lb)

2. When connecting the flexible hose, do not over-tighten or twist it.
3. After installation:
   (1) Check that the hose does not contact other parts when the vehicle bounces or when the steering wheel is turned all the way to the right or left.
   (2) Bleed the air from the brake system. (Refer to page 11—9.)

REPLACEMENT OF BRAKE FLUID

1. Remove the brake fluid from the reservoir with a suction pump.
2. Fill the reservoir with new, specified brake fluid.
3. Pump out the old brake fluid by loosening the bleeder screws (one by one) and pumping the brake pedal. (Refer to page 11—10 for details.)

AIR BLEEDING

Air Bleeding Locations

After the following parts are removed, air bleeding is necessary after installation.

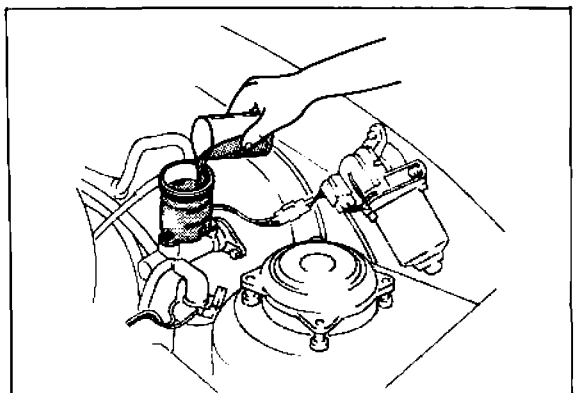
Removed part			Air bleeding location			
			Front		Rear	
			Right side	Left side	Right side	Left side
Master cylinder			*	*	*	*
Wheel cylinder or caliper	Front	Right side	*	—	—	—
		Left side	—	*	—	—
	Rear disc	Right side	—	—	*	—
		Left side	—	—	—	*
	Rear drum	Right side	—	—	*	—
		Left side	—	—	—	*
Dual proportioning valve			*	*	*	*
Hydraulic unit (ABS)			*	*	*	*

ABS: Anti-lock Brake System

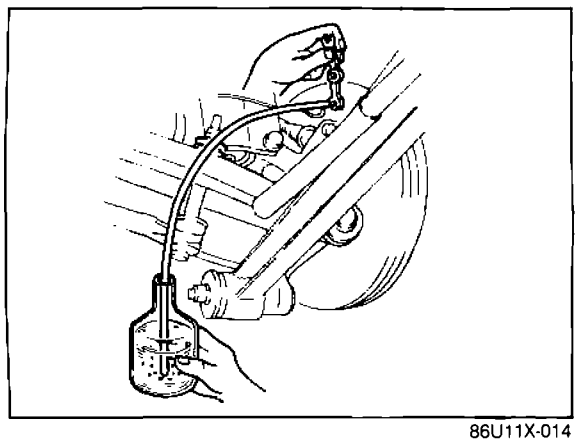
76G11X-064

*: Indicates where air bleeding is necessary

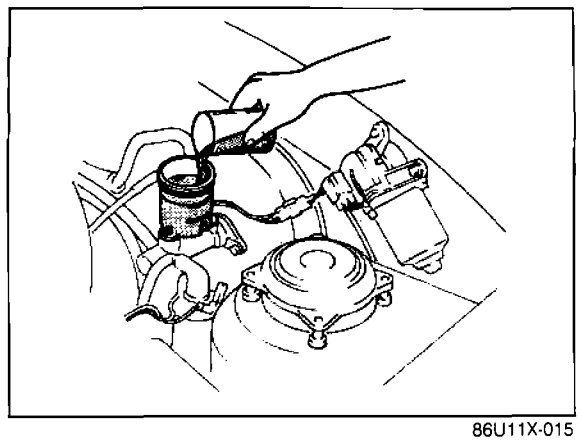
11 BRAKE HYDRAULIC LINE



86U11X-013



86U11X-014



86U11X-015

Procedure

1. Jack up the vehicle and support it with safety stands.
2. Fill the reservoir with brake fluid. Be sure that it is at least half full at all times during the air bleeding process.

Caution

a) Be careful not to spill brake fluid onto a painted surface.
b) Use only the specified brake fluid. Do not mix it with any other type.

3. Remove the bleeder cap; then connect one end of a transparent vinyl tube to the bleeder screw and place the other end in a receptacle.
4. Have an assistant depress the brake pedal a few times, and then hold it in the depressed position.
5. Loosen the bleeder screw, drain out the fluid, and retighten the bleeder.

Note

a) The two people should stay in voice contact with each other.
b) Be sure the pedal remains depressed until the bleeder is tightened.

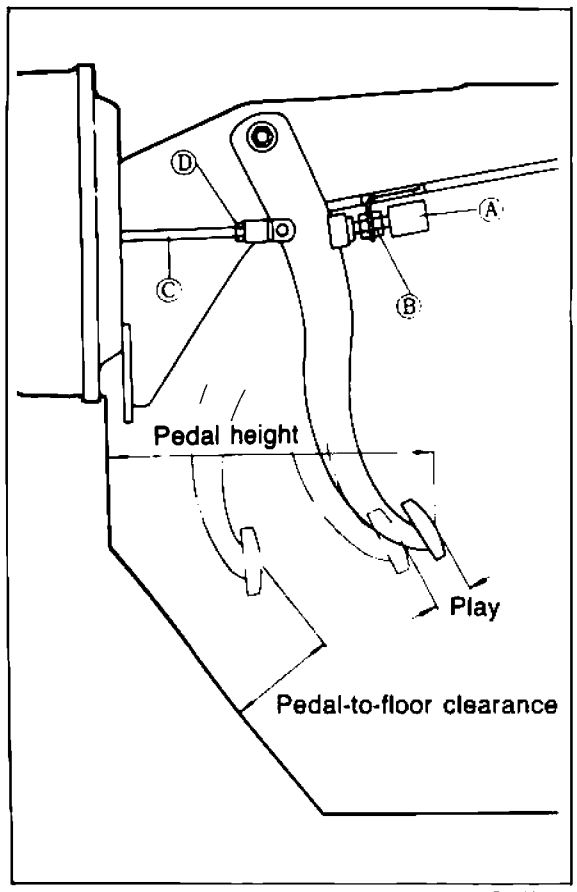
6. Repeat steps 4 and 5 until no more air is discharged.
7. Tighten the bleeder screw, and check that there is no fluid leakage.

Bleeder screw tightening torque:
6—9 N·m (60—90 cm-kg, 52—78 in-lb)

Caution

Be sure to clean away any spilled fluid with rags.

8. Add brake fluid to the reservoir up to the specified level.



76G11X-008

BRAKE PEDAL

ON-VEHICLE INSPECTION

Pedal Height

Inspection

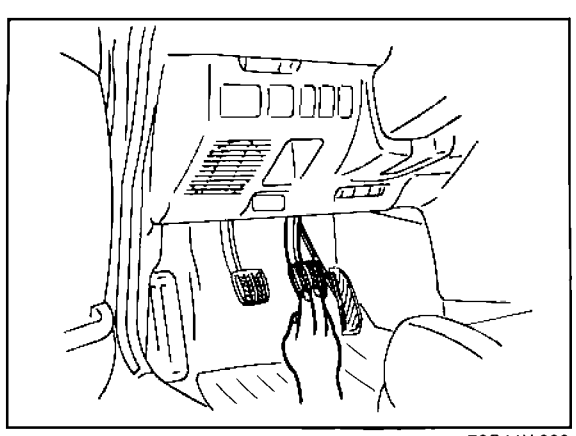
Check that the distance from the center of the upper surface of the pedal pad to the firewall is as specified.

LHD and RHD
Pedal height: 222 $^{+5}_{-0}$ mm (8.74 $^{+0.20}_{-0}$ in)

Adjustment

1. Disconnect the stop light switch connector.
2. Loosen locknut B and turn switch A until it does not contact the pedal.
3. Loosen locknut D and turn rod C to adjust the height.
4. Adjust the pedal free play and tighten locknut D.
5. Turn the stop light switch until it contacts the pedal; then turn an additional 1/2 turn. Tighten locknut B.

Locknut B tightening torque:
14—18 N·m (1.4—1.8 m-kg, 10—13 ft-lb)
Locknut D tightening torque:
24—34 N·m (2.4—3.5 m-kg, 17—25 ft-lb)

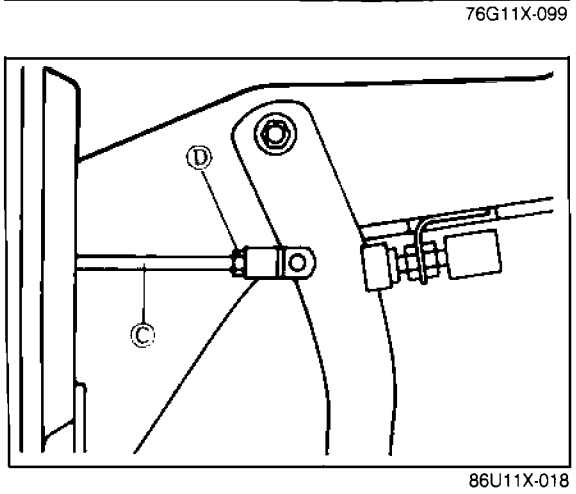

76G11X-099

Pedal Play

Inspection

1. Depress the pedal a few times to eliminate the vacuum in the system.
2. Gently depress the pedal again by hand, and check the free play. (Until the valve plunger contacts the stopper plate = until the power piston begins to move.)

Pedal play: 4—7 mm (0.16—0.28 in)



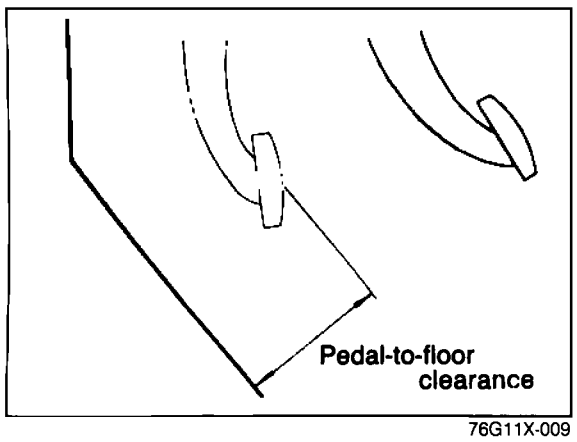
86U11X-018

Adjustment

Loosen the locknut D of the operating rod C; then turn the rod to adjust the free play.

Locknut D tightening torque:
24—34 N·m (2.4—3.5 m-kg, 17—25 ft-lb)

11 BRAKE PEDAL



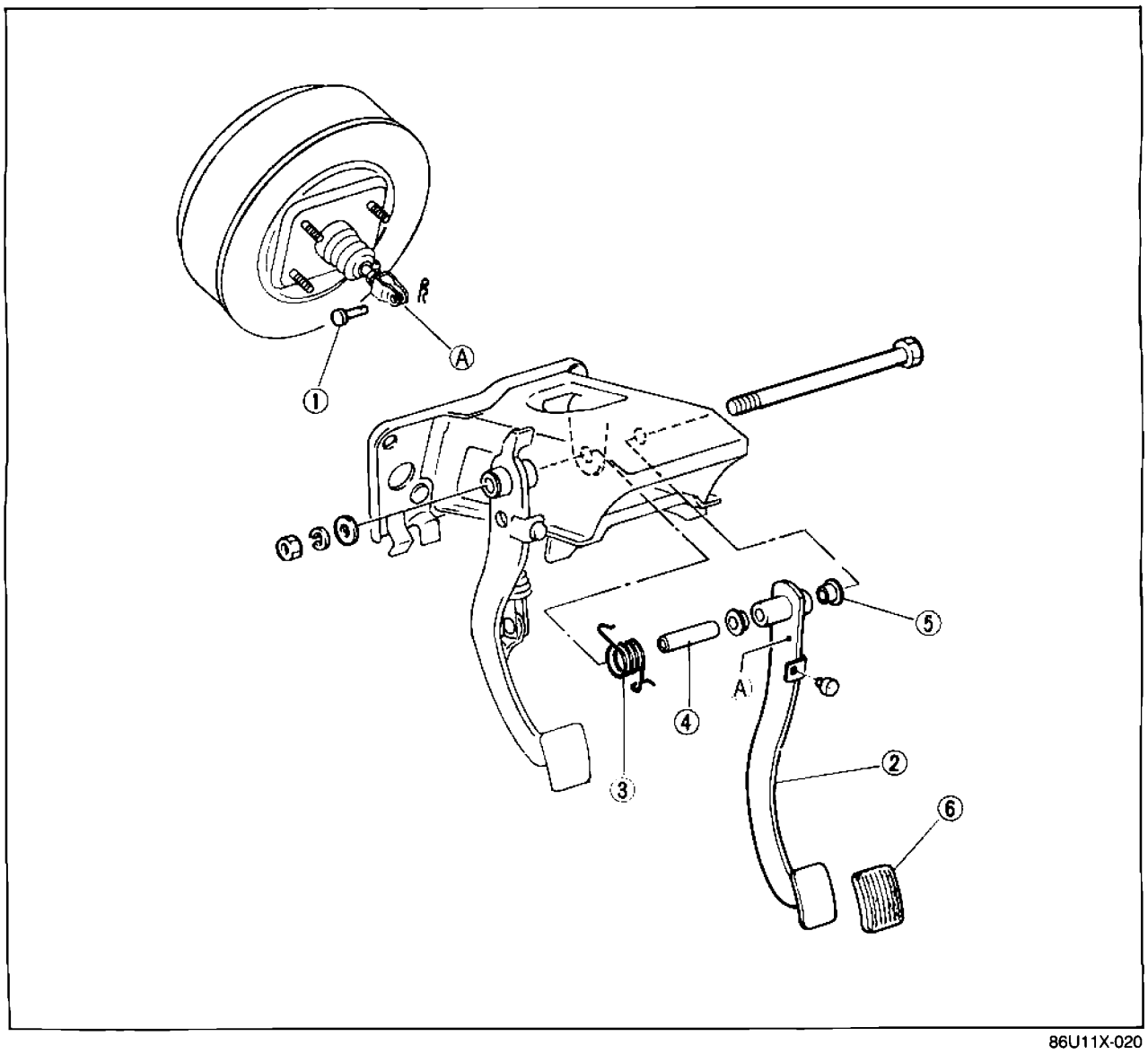
76G11X-009

Pedal-to-Floor Clearance
Inspection
Check that the distance from the floor panel to the center of the upper surface of the pedal pad is as specified when the pedal is depressed with a force of 589 N (60 kg, 132.3 lb).

Pedal-to-floor clearance:
LHD and RHD
95 mm (3.7 in) min.

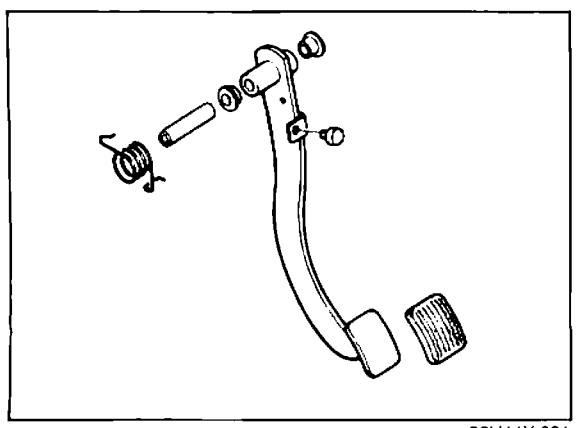
If the distance is less than specified, check for the following problems.
1. Air in brake system
2. Malfunction of automatic adjuster (rear drum brakes)
3. Worn shoes or pads

REMOVAL
Remove in the sequence shown in the figure.



86U11X-020

1. Clevis pin
2. Brake pedal
3. Return spring
4. Guide pipe
5. Bushing
6. Brake pad

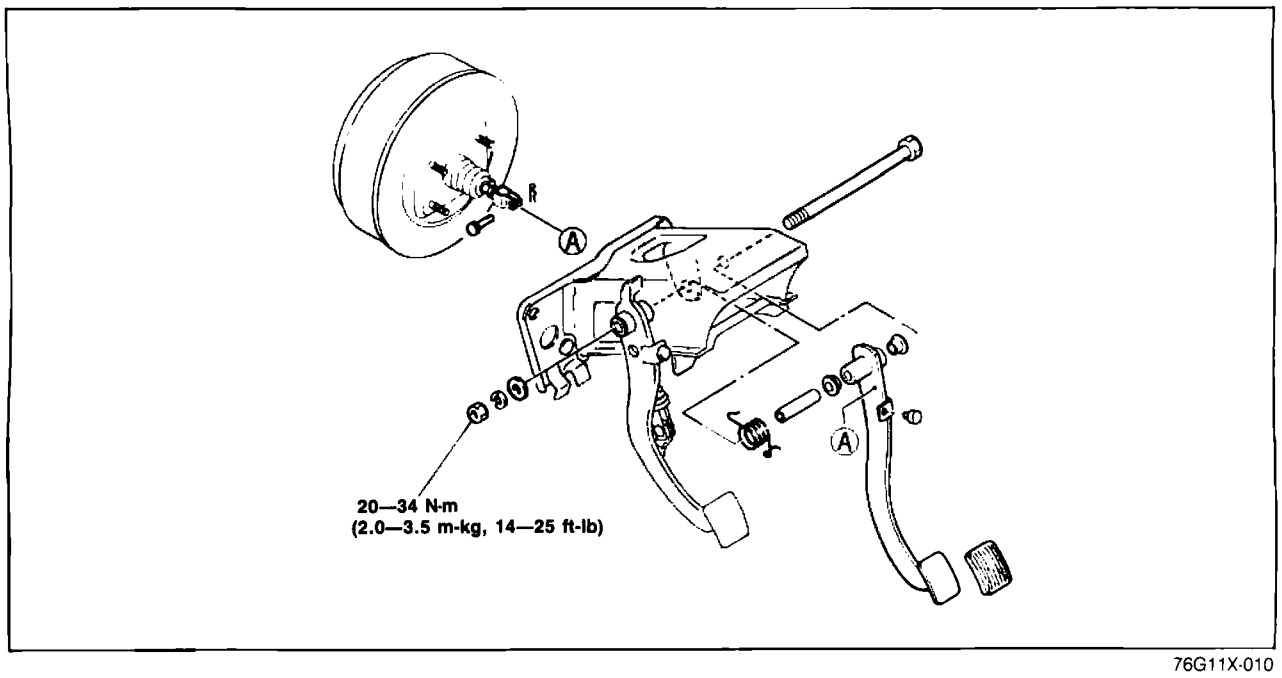


86U11X-021

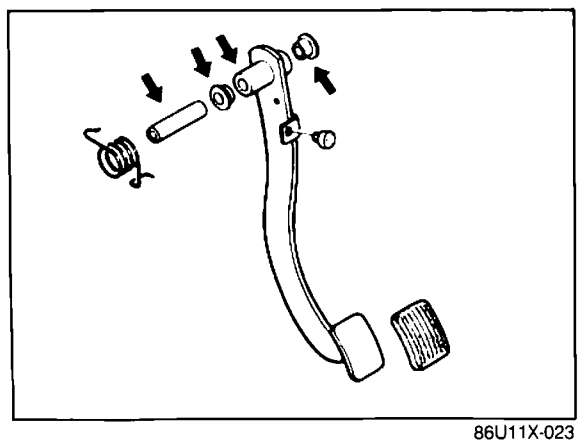
INSPECTION
Check the following and replace or repair any faulty parts.
1. Pedal pad for wear or damage
2. Bushing for wear
3. Bolt for bending
4. Pedal for bending
5. Return spring for weakness or damage

INSTALLATION
1. Install in the reverse order of removal.
2. Tighten all nuts and bolts, referring to torque specifications.
3. After installation:
   Check and adjust the pedal height and play. (Refer to page 11—11.)

Torque specifications



76G11X-010



86U11X-023

Installation Note
Application of grease
Apply grease to the following parts:
(1) Inner and outer surfaces of bushing
(2) Outer surface of guide pipe
(3) Contact surface of clevis pin and spring

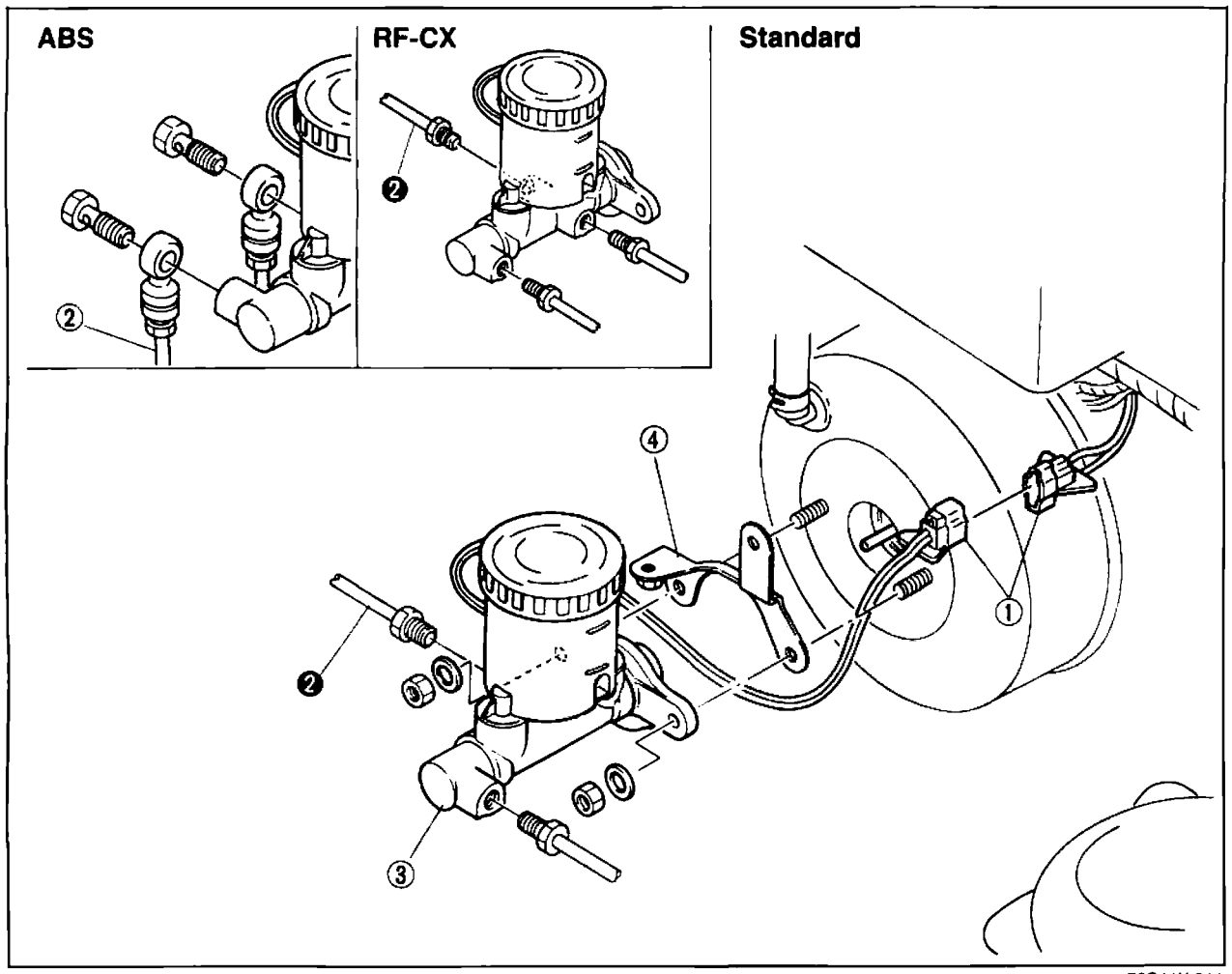
11 MASTER CYLINDER

MASTER CYLINDER

REMOVAL

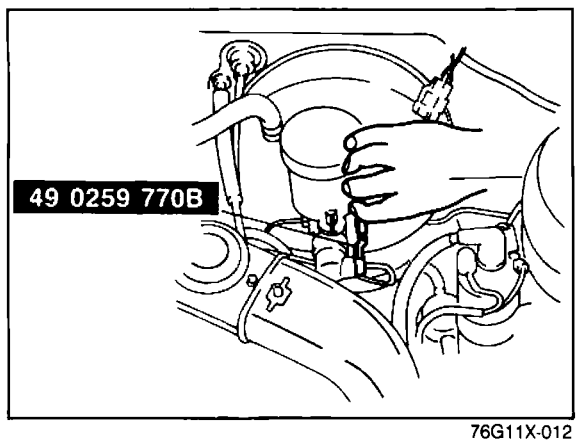
Remove in the sequence shown in the figure, referring to removal note for specially marked parts.

Caution
Brake fluid will damage painted surfaces. If it does get on a painted surface, wipe it off immediately.



76G11X-011

1. Fluid level sensor connector
2. Brake pipe
3. Master cylinder
4. Clutch pipe holder (LHD MTX ABS)



76G11X-012

Removal Note
Brake pipe (Flare nut type)

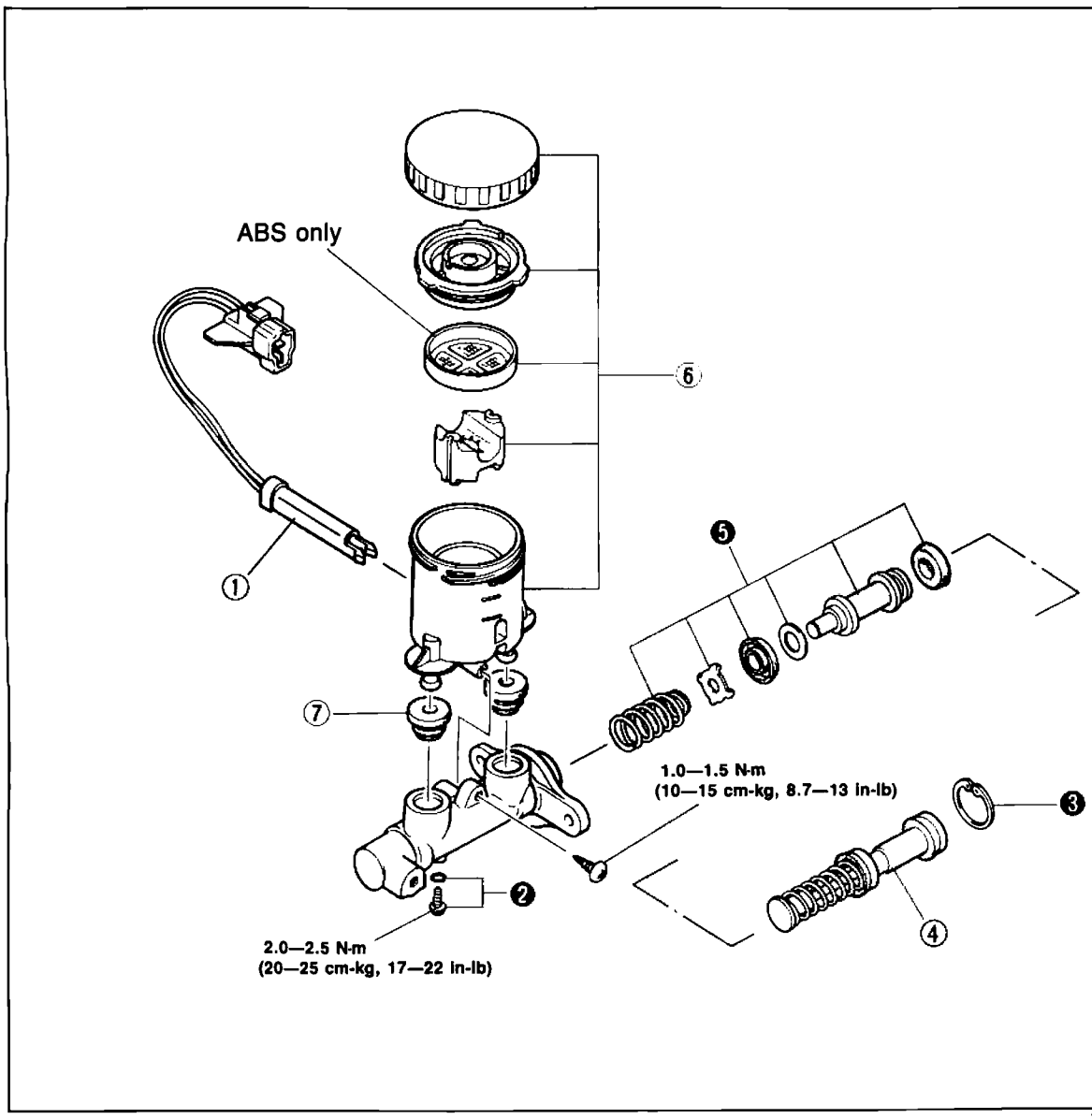
1. Place rags under the master cylinder to prevent brake fluid from dripping on painted surfaces.
2. Disconnect the brake pipe from the master cylinder with the **SST**.

DISASSEMBLY AND ASSEMBLY (EXCEPT RHD DOHC TURBO)

1. Pour out the brake fluid.
2. Disassemble in the sequence shown in the figure, referring to disassembly note for specially marked parts.
3. Assemble in the reverse order of disassembly, referring to assembly note for specially marked parts.

Caution
a) Do not to allow any foreign material into the master cylinder during repairs.
b) Do not scratch the inside of the cylinder or the outer surface of the piston.

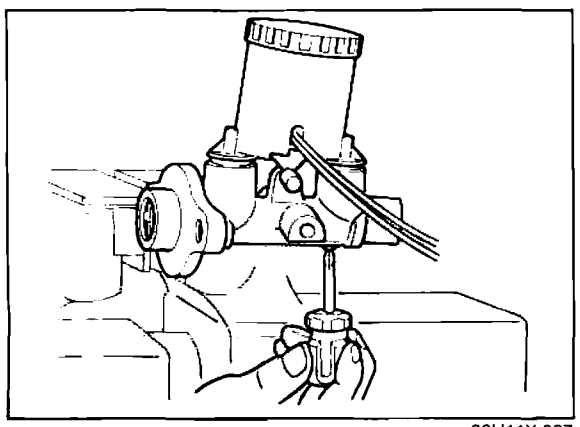
Note
The primary piston assembly is not repairable. Replace it as an assembly.



76G11X-013

1. Fluid level sensor
2. Stopper screw and O-ring
3. Snap ring
4. Primary piston assembly
5. Secondary piston assembly
6. Reservoir assembly
7. Bushing

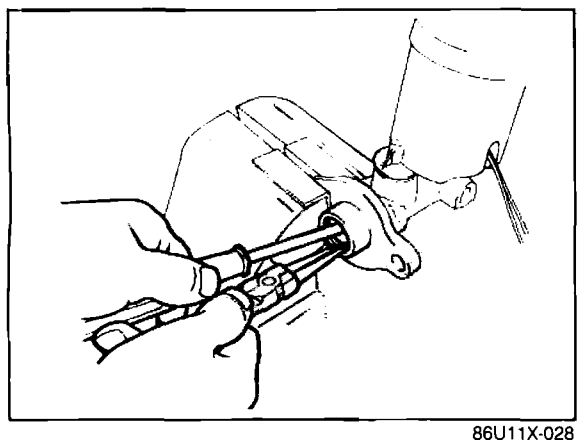
11 MASTER CYLINDER



86U11X-027

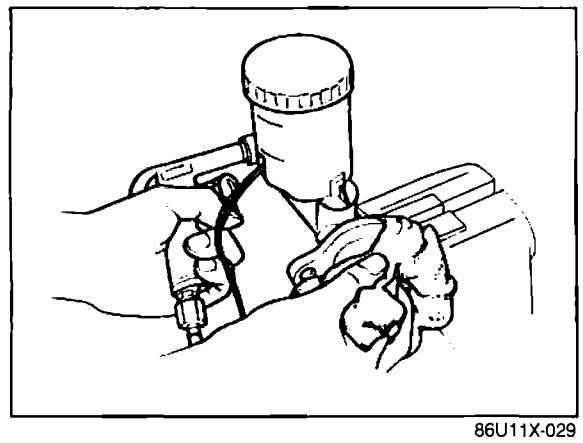
Disassembly Note
Stopper screw
Remove the stopper screw with a Phillips screwdriver.

Note
Prepare a suitable container for the brake fluid to drain into.



86U11X-028

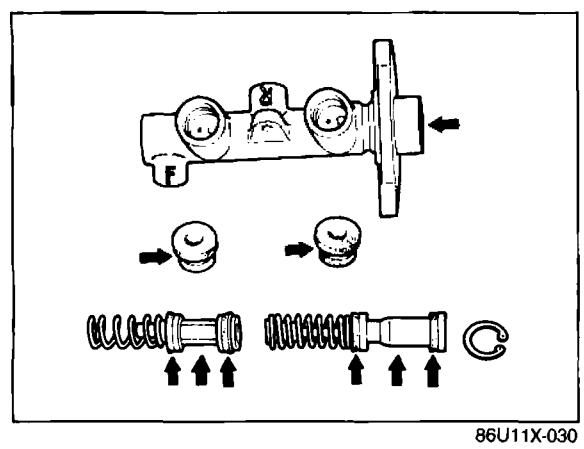
Snap ring
Push the primary piston with a Phillips screwdriver and remove or install the snap ring with snap-ring pliers.



86U11X-029

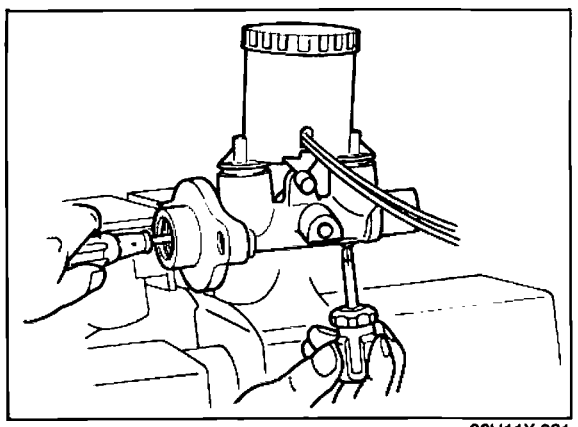
Secondary Piston Assembly
Remove the secondary piston assembly by gradually blowing compressed air into the cylinder.

Caution
Use a rag to catch the secondary piston assembly when applying compressed air.



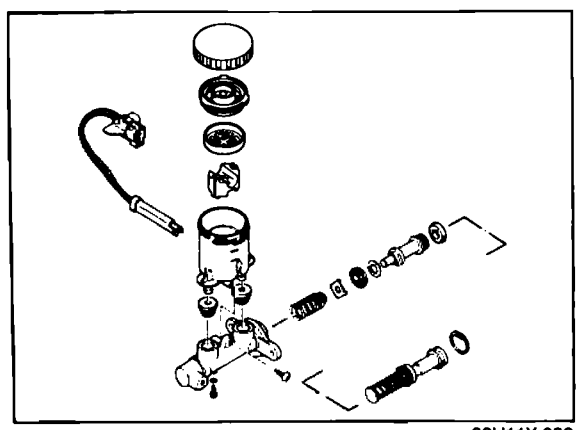
86U11X-030

Assembly Note
Application of brake fluid
Before assembly, apply brake fluid to the following parts:
1. Cylinder inner surface
2. Piston
3. Piston cups
4. Bushings



86U11X-031

Stopper screw
1. Push the primary piston assembly all the way in with a Phillips screwdriver.
2. Tighten the stopper screw.
3. Push and release the screwdriver to verify that the position of the stopper screw is correct.



86U11X-032

INSPECTION
Check the following and replace any faulty parts.
1. Piston and cylinder bore for abnormal wear, rust, and damage
2. Springs for weakness and damage
3. Reservoir for damage and deformation

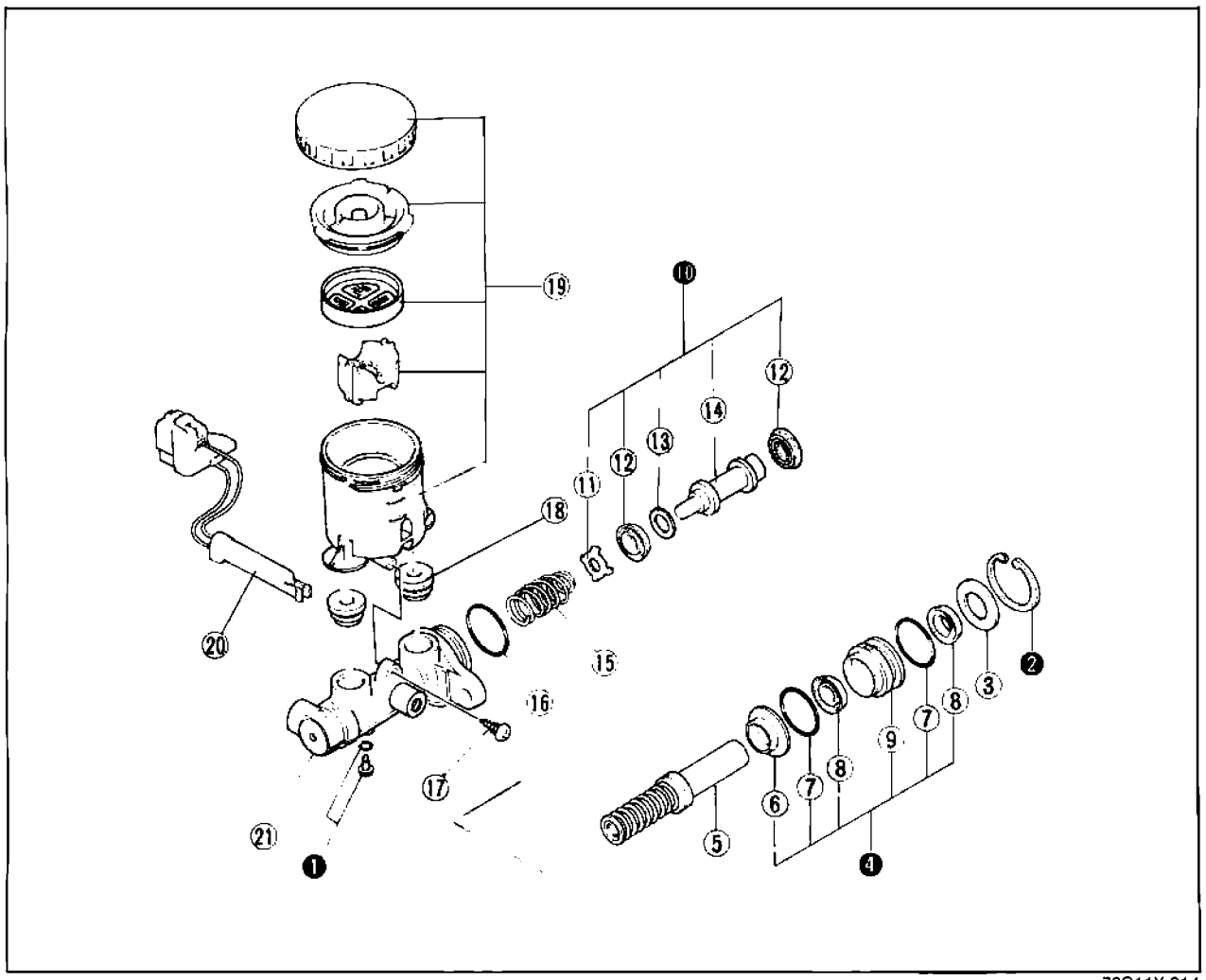
11 MASTER CYLINDER

DISASSEMBLY AND ASSEMBLY (RHD DOHC TURBO)

1. Pour out the brake fluid.
2. Disassemble in the sequence shown in the figure, referring to disassembly note for specially marked parts.
3. Assemble in the reverse order of disassembly, referring to assembly note for specially marked parts.

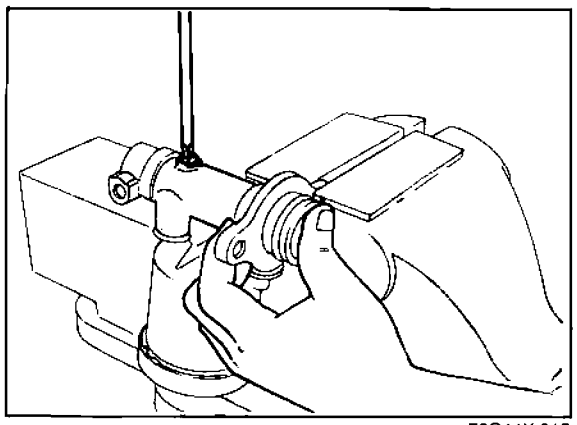
Caution
a) Do not to allow any foreign material into the master cylinder during repairs.
b) Do not scratch the inside of the cylinder or the outer surface of the piston.

Note
The primary piston assembly is not repairable. Replace it as an assembly.



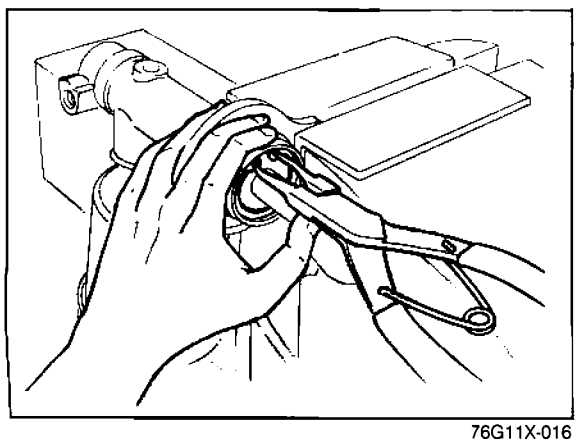
76G11X-014

1. Stopper screw and O-ring
2. Snap ring
3. Spacer
4. Piston guide assembly
5. Primary piston assembly
6. Stopper
7. O-ring
8. Piston guide cup
9. Piston guide
10. Secondary piston assembly
11. Stopper
12. Piston cup
13. Washer
14. Secondary piston
15. Spring
16. O-ring
17. Screw
18. Bushing
19. Reservoir assembly
20. Fluid level sensor
21. Master cylinder body



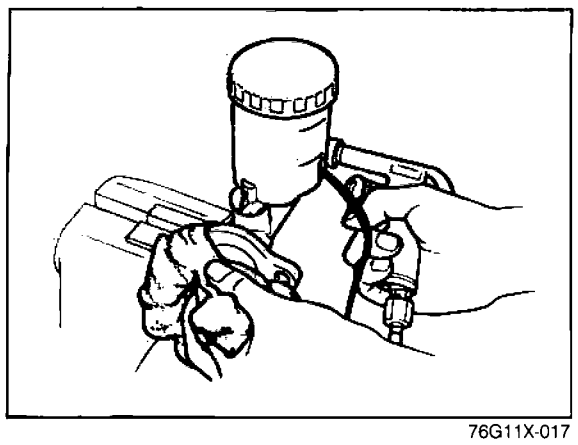
76G11X-015

Disassembly Note
Stopper screw
Push the piston in by hand and remove the stopper screw.



76G11X-016

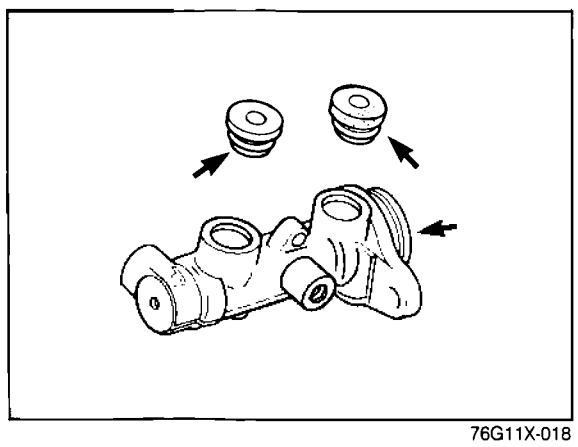
Snap ring
Push the piston in fully with a rod and remove the snap ring using snap ring pliers.



76G11X-017

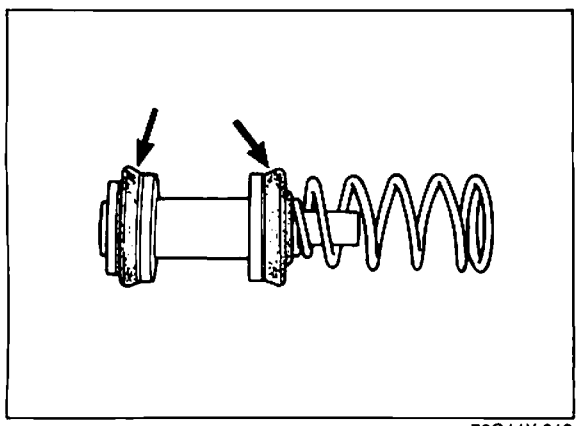
Secondary piston assembly
Remove the secondary piston assembly by gradually blowing compressed air into the cylinder.

Caution
Use a rag to catch the secondary piston assembly when applying compressed air.



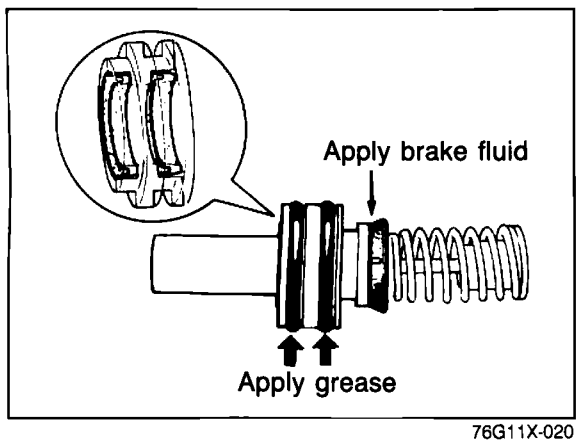
76G11X-018

Assembly Note
Application of brake fluid
Before assembly, apply brake fluid to the following parts:
1. Bushing
2. Cylinder inner wall



76G11X-019

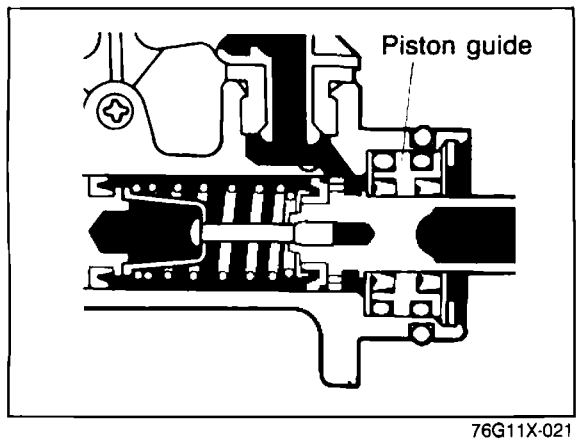
3. Secondary piston cup



76G11X-020

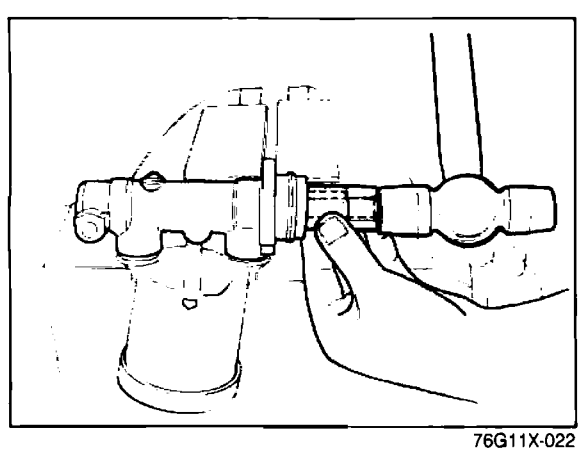
Piston guide assembly

1. Apply brake fluid to the piston guide cups; then install them to the piston guide.
2. Install the O-rings to the piston guide.
3. Install the piston guide to the primary piston assembly.
4. Apply brake fluid to the primary piston cup and apply grease to the piston guide O-rings.



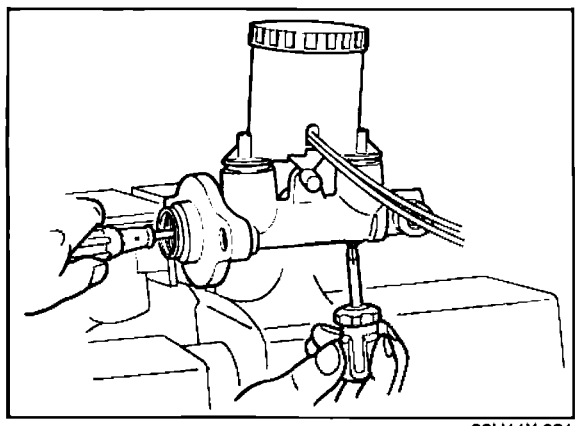
76G11X-021

5. Insert the piston guide and primary piston assembly into the cylinder slowly and straight; then fit them in the position in the cylinder.



76G11X-022

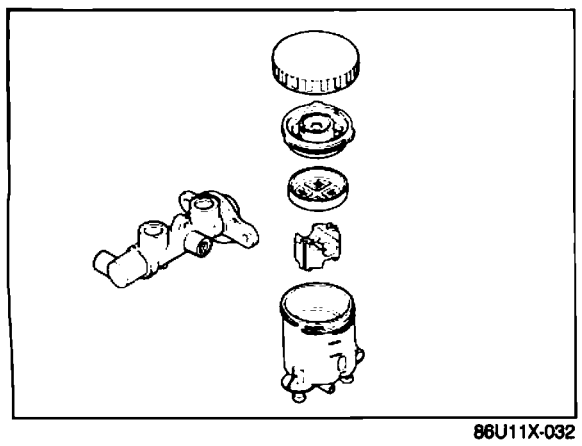
Note
If the piston guide is not easily installed in the cylinder, use a suitable pipe and tap it to install.



86U11X-031

Stopper screw

1. Push the primary piston assembly all the way in with a Phillips screwdriver.
2. Tighten the stopper screw.
3. Push and release the screwdriver to verify that the position of the stopper screw is correct.



86U11X-032

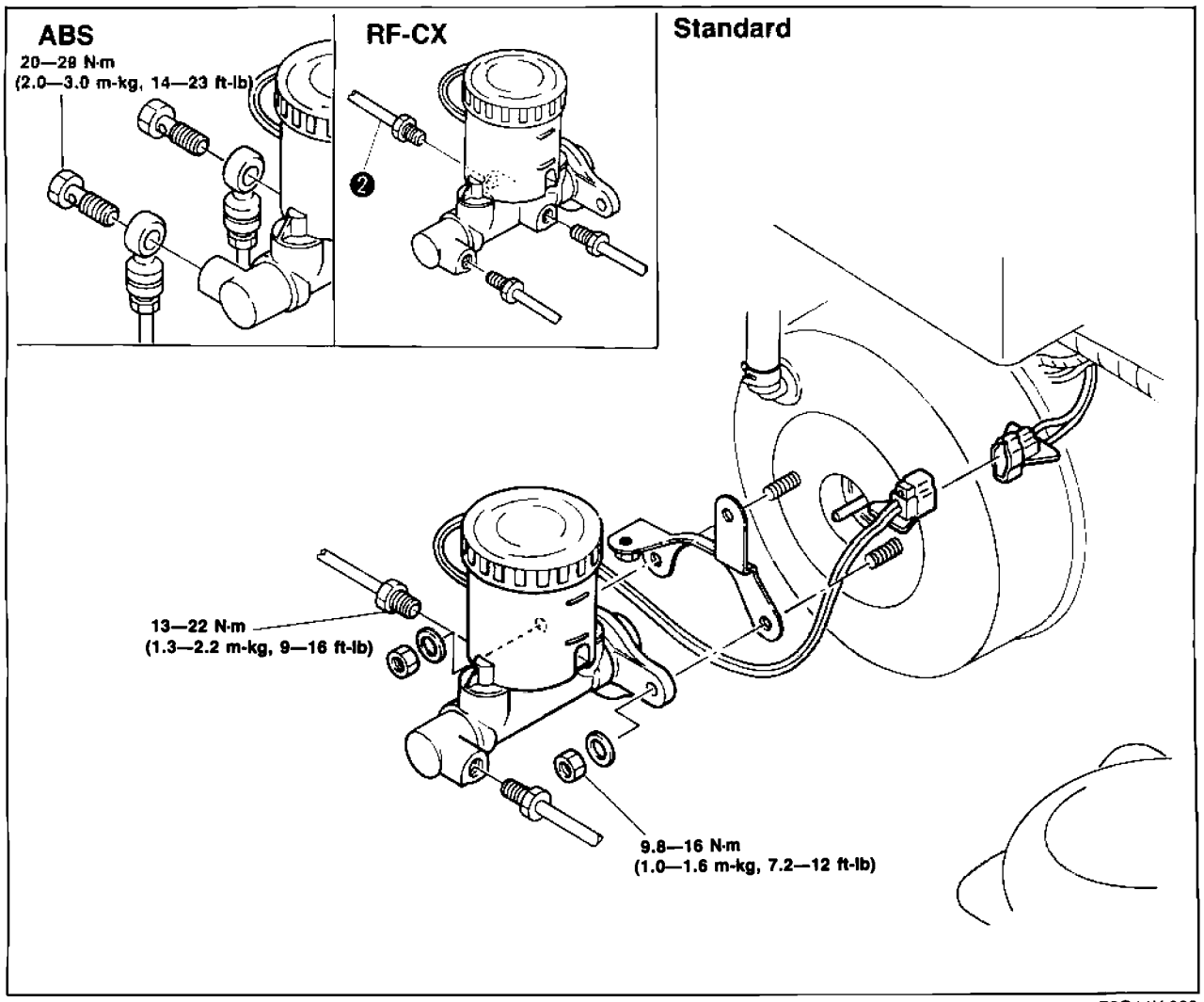
INSPECTION

Check the following and replace any faulty parts.

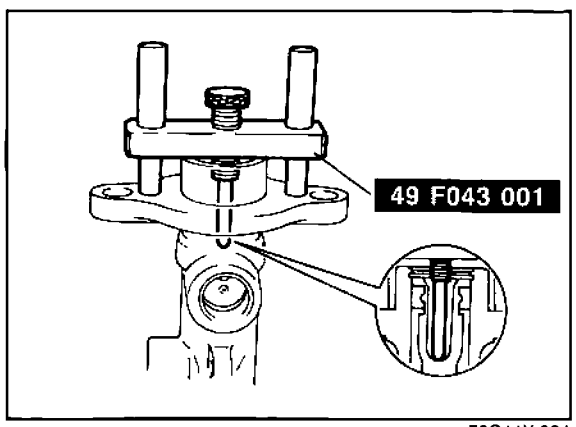
1. Piston and cylinder bore for abnormal wear, rust, and damage
2. Springs for weakness and damage
3. Reservoir for damage and deformation

INSTALLATION
1. Install in the reverse order of removal.
2. Tighten all nuts and bolts to the specified torque, referring to torque specifications.
3. After installation:
   (1) Fill the reservoir with the specified fluid.
   (2) Bleed air from the system. (Refer to page 11—9.)
   (3) Check each part for fluid leakage.

Torque specifications



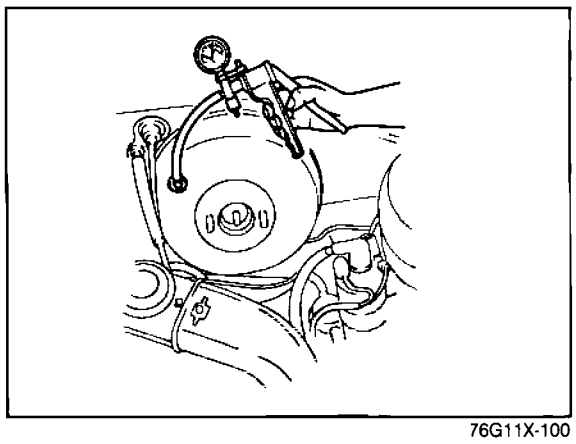
76G11X-023



76G11X-024

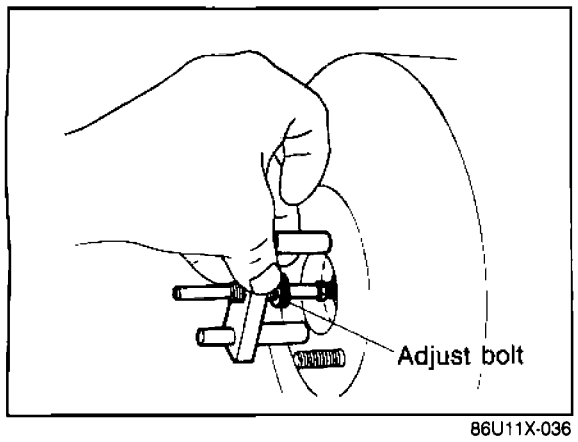
Installation Note
Piston to push rod clearance adjustment (Except RHD DOHC TURBO)
Before installing the master cylinder, check the clearance between the piston of the master cylinder and the push rod of the power brake unit as follows.

1. Place the **SST** on the top of the master cylinder; then turn the adjust bolt until it contacts the bottom of the push rod hole in the piston.



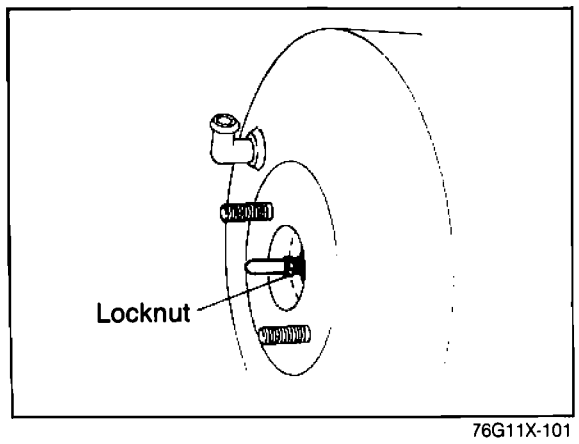
76G11X-100

2. Apply **500 mmHg (19.7 inHg)** vacuum to the power brake unit with a vacuum pump.



86U11X-036

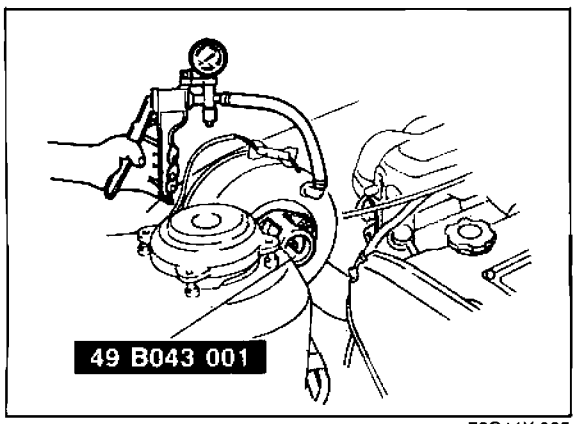
3. Invert the **SST** used in step 1, and place it on the power brake unit.



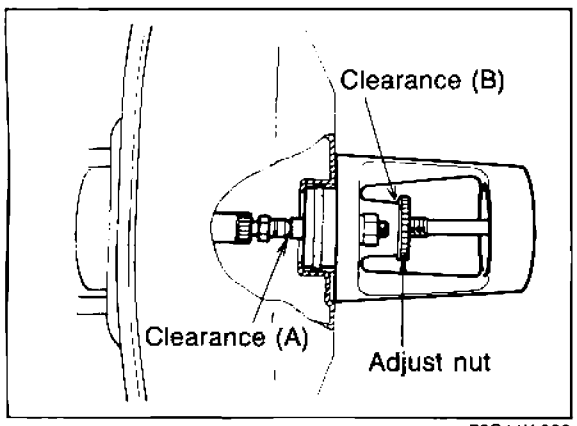
76G11X-101

4. Check the clearance between the adjust bolt and the push rod of the power brake unit. If it is not **0 mm**, loosen the push rod locknut and turn the push rod to adjust.

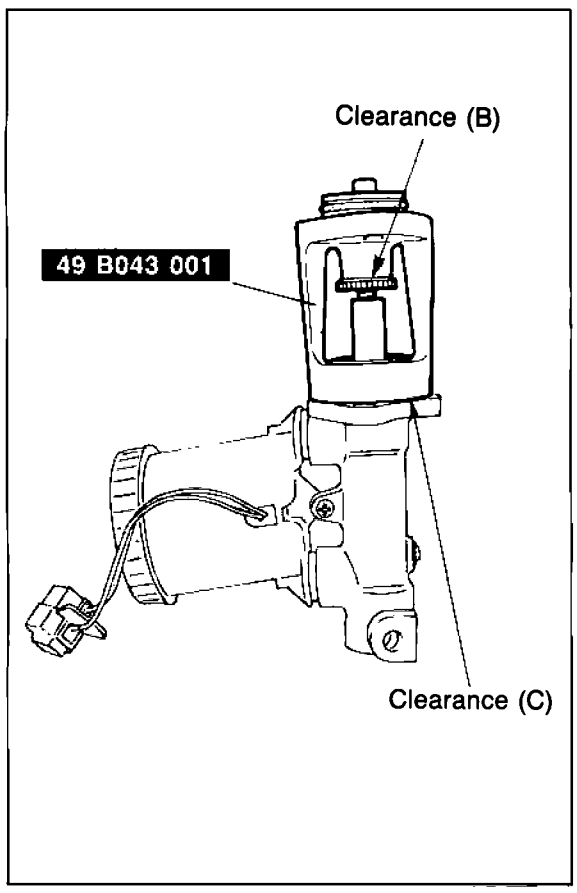
11 MASTER CYLINDER



76G11X-025



76G11X-026



76G11X-027

Piston to push rod clearance adjustment (RHD DOHC TURBO)

Inspection

Inspect the piston to push rod clearance in the following order.

1. Attach the **SST** to the power brake unit.

   Tightening torque:
   10—16 N·m (1.0—1.6 m-kg, 84—144 in-lb)

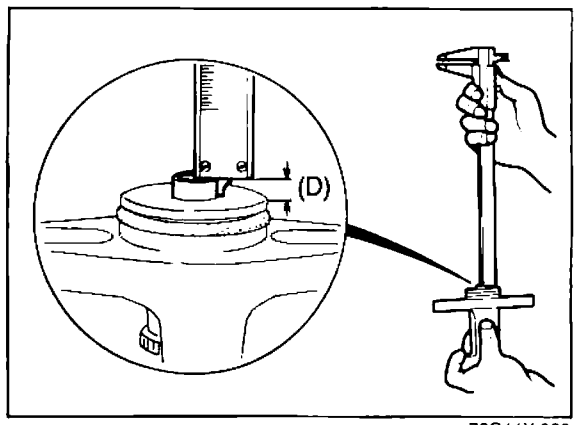
2. Apply a vacuum of **500 mmHg (19.7 inHg)** using a vacuum pump.
3. Set clearance (A) between the push rod of the power brake unit and the push rod of the **SST**, and clearance (B) between the adjust nut and the **SST** body to 0 mm (0in) by turning the adjust nut.
4. Remove the **SST** from the power brake unit keeping the clearance as above. Install the **SST** to the master cylinder body as shown in the figure.
5. Measure clearance (C) between the **SST** and the master cylinder, and then measure clearance (B) between the adjust nut and the **SST** body.

Judgement Table

	Measurement	Necessity of adjustment
(a)	Clearance at (C)	Yes
(b)	Clearance at (B)	Yes
	Both clearances of (C) and (B) are 0 mm (0in)	No

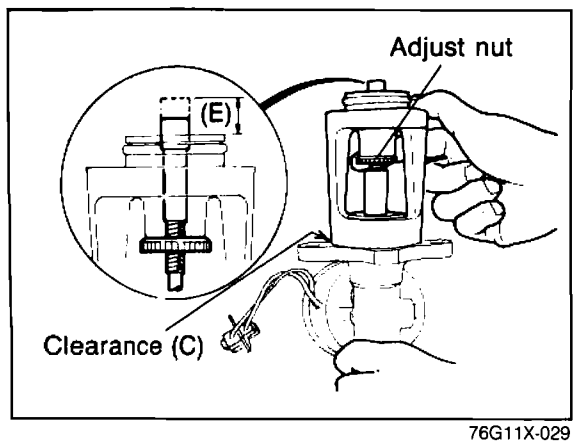
(a) is when the push rod of the power brake unit extends.

(b) is when the push rod of the power brake unit is recessed.



76G11X-028

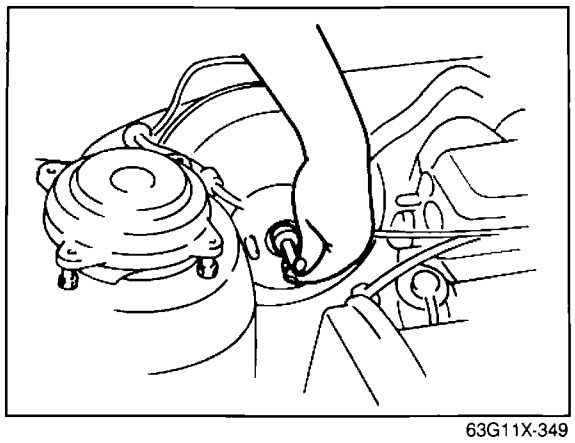
Adjustment
Adjust the piston to push rod clearance in the following order.
1. For **(a)** of judgement table
   (1) Measure the height of (D) and record after removing the **SST** from the master cylinder.



76G11X-029

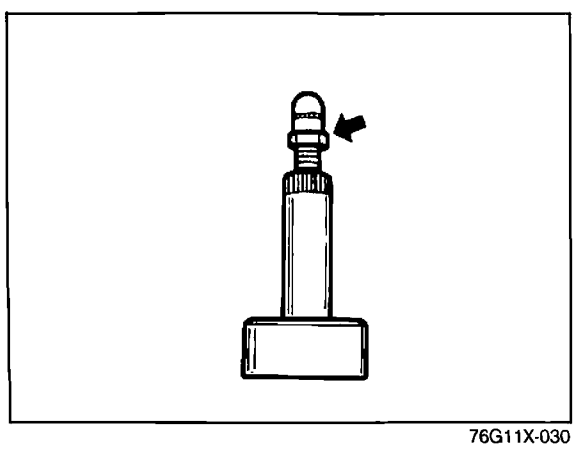
   (2) Install the **SST** again to the master cylinder, and turn the adjust nut so that clearance (C) between the **SST** and the master cylinder is 0 mm (0in).
   (3) Measure the height of (E) when clearance (C) is 0 mm (0in).

   (E) — (D) = Projecting amount of the power brake unit push rod



63G11X-349

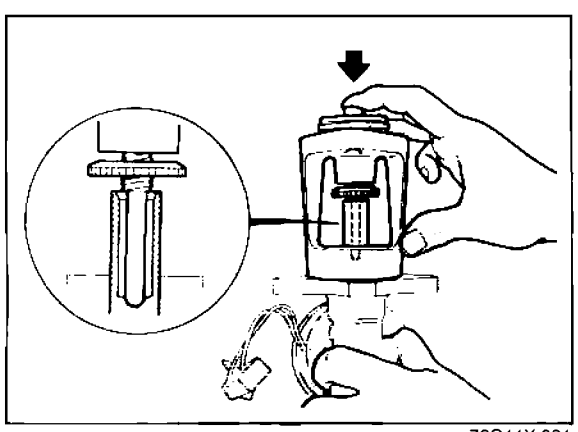
   (4) Remove the push rod from the power brake unit.



76G11X-030

   (5) Make the piston to push rod clearance 0 mm (0in) by turning the push rod and shortening the push rod length by the amount of (E) — (D).

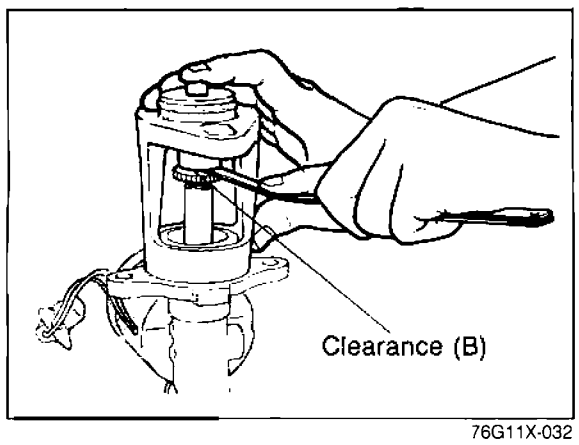
Note
The threads of the push rod are specially designed so that the push rod bolt becomes harder to turn past a certain point to prevent loosening of the bolt. Turn the push rod bolt only within this range when adjusting.



76G11X-031

2. For **(b)** of the judgement table
   (1) Push the push rod of **SST** lightly by hand until the push rod end touches the bottom of the primary piston in the master cylinder.

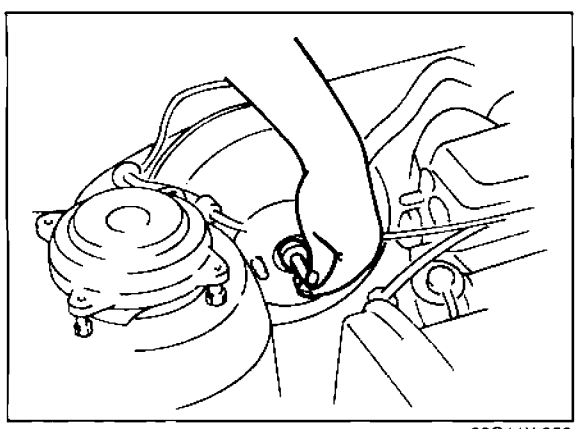
Note
When pushing only use enough pressure to bottom the rod in the piston. If too much pressure is applied a false reading will occur.



76G11X-032

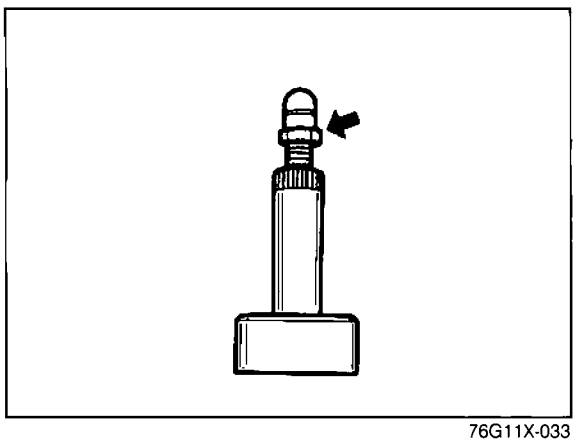
(2) Measure clearance (B) between the adjust nut and the **SST** body with the rod held down.

(B) = Recessed amount of the power brake unit push rod



63G11X-353

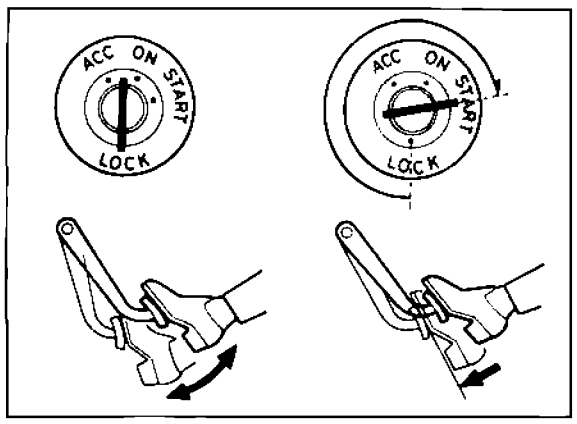
(3) Remove the push rod from the power brake unit.



76G11X-033

(4) Make the push rod clearance 0 mm (0in) by turning the push rod and lengthening the push rod length by the amount of (B).

Note
The threads of the push rod are specially designed so that the push rod bolt becomes harder to turn past a certain point to prevent loosening of the bolt. Turn the push rod bolt only within this range when adjusting.



86U11X-038

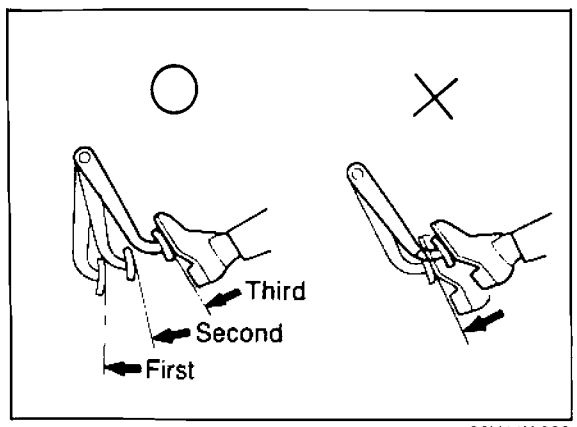
POWER BRAKE UNIT

FUNCTION CHECK

Simple Method

First step

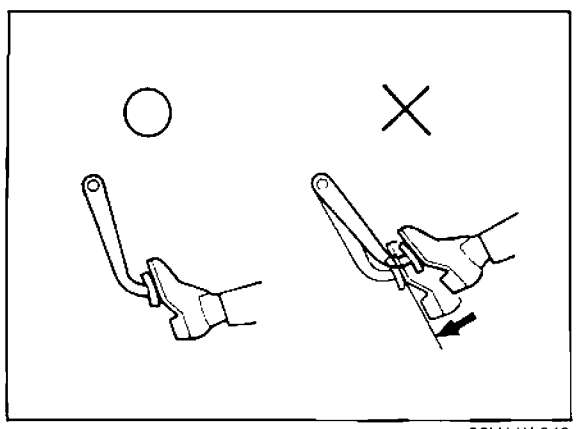
1. With the engine stopped, depress the pedal a few times.
2. With the pedal depressed, start the engine
3. If immediately after the engine starts the pedal moves down slightly, the unit is operating.



86U11X-039

Second step

1. Start the engine.
2. Stop the engine after it has run for **1 or 2 minutes**.
3. Depress the pedal with the usual force.
4. If the first pedal stroke is long and becomes shorter with subsequent strokes, the unit is operating.
5. If a problem is found, inspect for damage of the check valve or vacuum hose, and examine the installation condition. Repair if necessary, and inspect it once again.

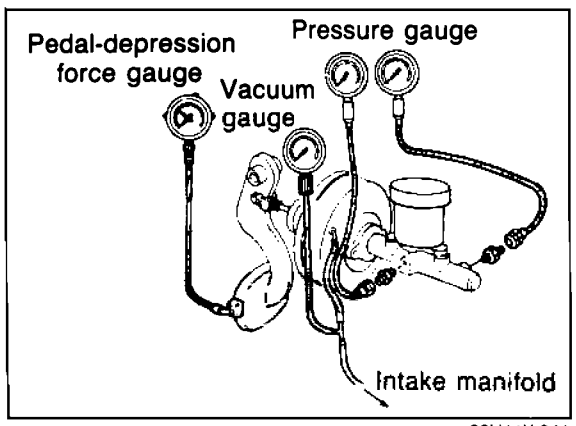


86U11X-040

Third step

1. Start the engine.
2. Depress the pedal with the usual force.
3. Stop the engine with the pedal still depressed.
4. Hold the pedal down for **about 30 seconds**.
5. If the pedal height does not change, the unit is operating.
6. If there is a problem, check for damage to the check valve or vacuum hose, and check the connection. Repair if necessary, and check once again.

If the nature of the problem is still not clear after following the 3 steps above, follow the more detailed check described in "Method using tester".

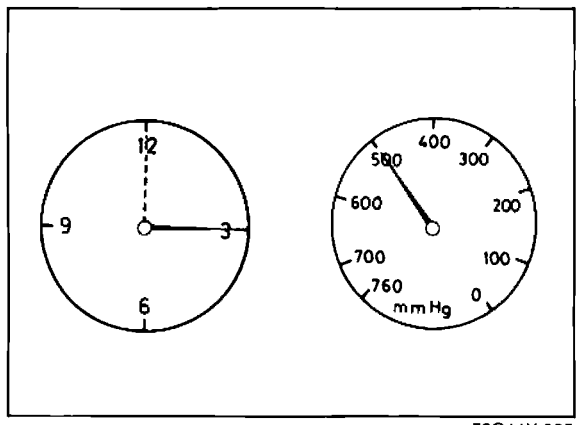


86U11X-041

Method Using Tester

Connect a pressure gauge, vacuum gauge, and pedal depression force gauge as shown in the figure. After bleeding the air from the pressure gauge, conduct the test as described in the 3 steps below.

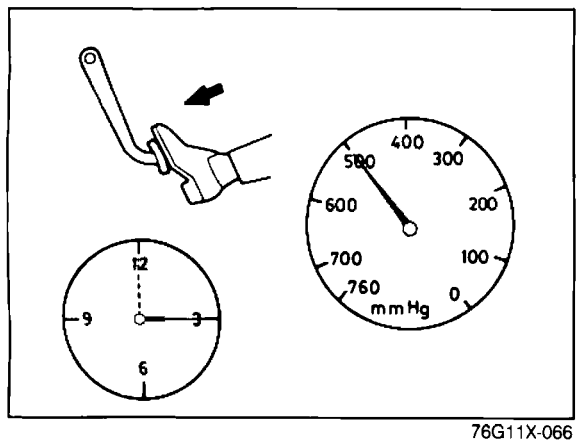
Note
Use commercially available gauges and pedal depression force gauge.



76G11X-065

a) Checking for vacuum loss
Unloaded condition

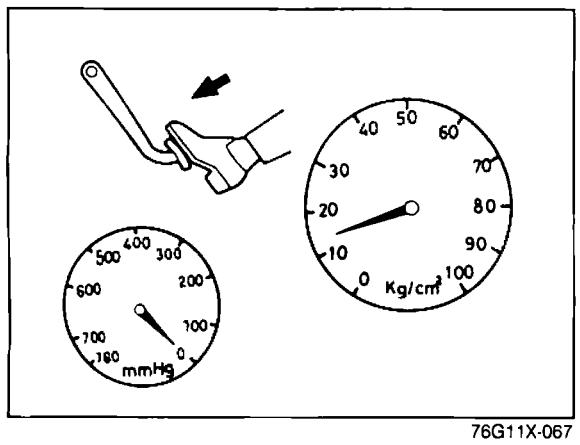
1. Start the engine.
2. Stop the engine when the vacuum gauge reading reaches **500 mmHg (19.7 inHg)**.
3. Observe the vacuum gauge for **15 seconds**. If the gauge shows **475—500 mmHg (18.7—19.7 inHg)**, the unit is operating.



76G11X-066

Loaded condition

1. Start the engine.
2. Depress the brake pedal with a force of **196 N (20 kg, 44 lb)**.
3. With the brake pedal depressed, stop the engine when the vacuum gauge reading reaches **500 mmHg (19.7 inHg)**.
4. Observe the vacuum gauge for **15 seconds**. If the gauge shows **475—500 mmHg (18.7—19.7 inHg)**, the unit is operating.

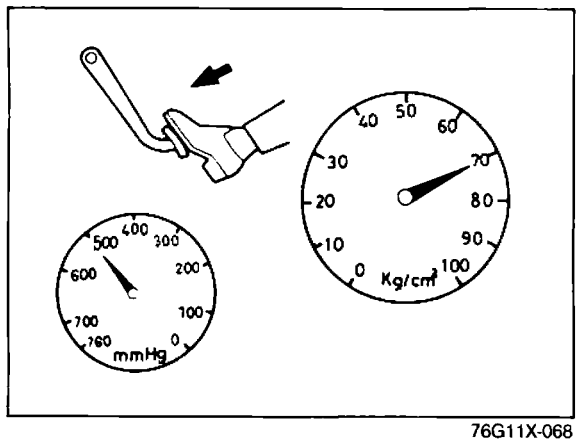


76G11X-067

b) Checking for hydraulic pressure

1. If with the engine stopped (when vacuum is 0 mmHg) the relation between pedal force and fluid pressure is within specification, the unit is operating.

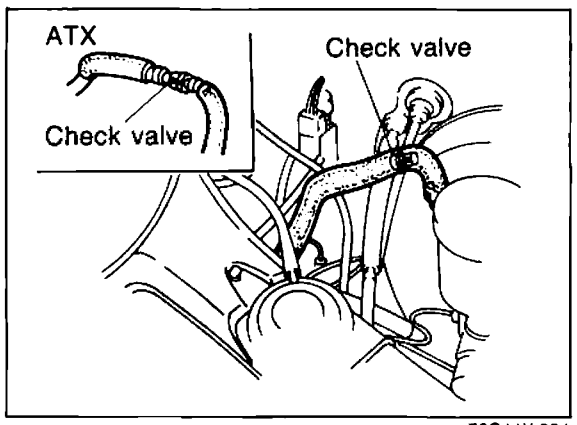
Pedal force	Fluid pressure
196 N (20 kg, 44 lb)	1,177 kPa (12 kg/cm^2, 171 psi) min.



76G11X-068

2. Start the engine. Depress the brake pedal when the vacuum reaches **500 mmHg (19.7 inHg)**. If the relation between pedal force and fluid pressure is within specification, the unit is operating.

Pedal force	Fluid pressure
196 N (20 kg, 44 lb)	7,063 kPa (72 kg/cm^2, 1,024 psi) min.



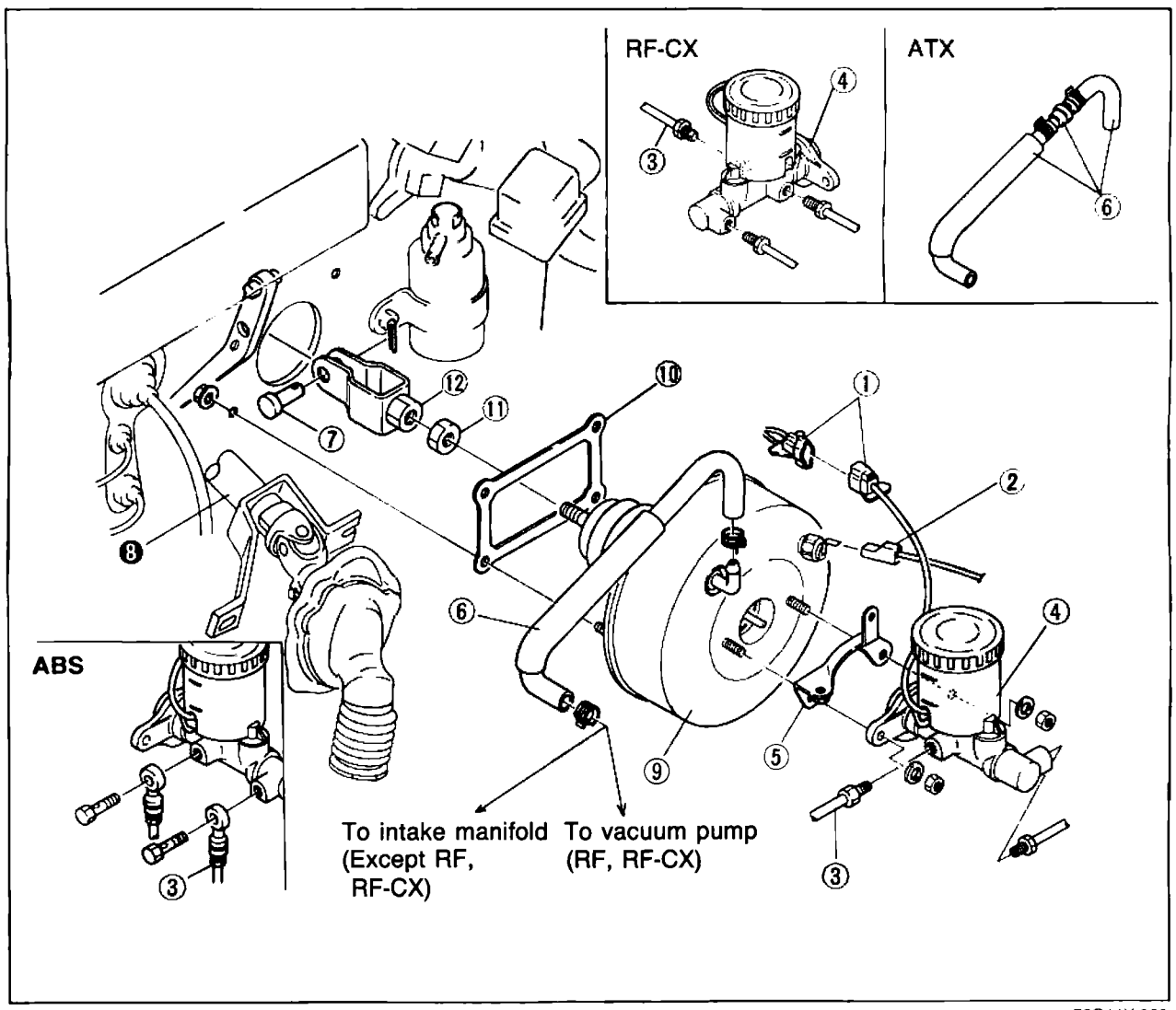
76G11X-034

INSPECTION OF CHECK VALVE

Note (MTX)
The check valve is pressed into the vacuum hose. There is an arrow on the hose surface to indicate direction of installation.

Inspection
1. Disconnect the vacuum hose from the engine.
2. Apply suction and pressure to the hose from the engine side. Check that air flows only toward the engine.
   If the air passes in both directions or not at all, replace the check valve (along with the hose).

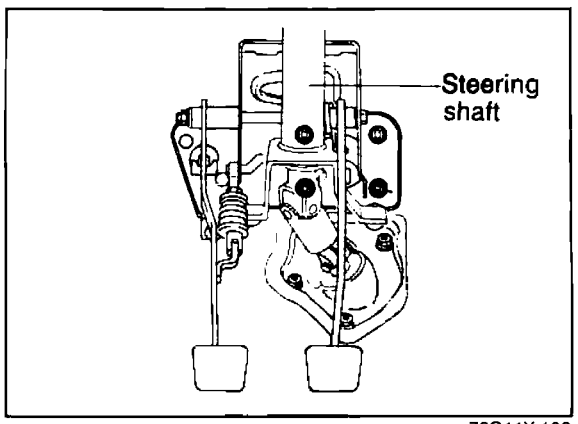
REMOVAL
Remove in the sequence shown in the figure, referring to removal note for specially marked parts.



76G11X-069

1. Fluid level sensor connector
2. Vacuum switch coupler (RF, RF-CX)
3. Brake pipe
4. Master cylinder
5. Clutch pipe holder
6. Vacuum hose and check valve
7. Clevis pin
8. Steering shaft
9. Power brake unit
10. Gasket
11. Locknut
12. Operating lever

11 POWER BRAKE UNIT

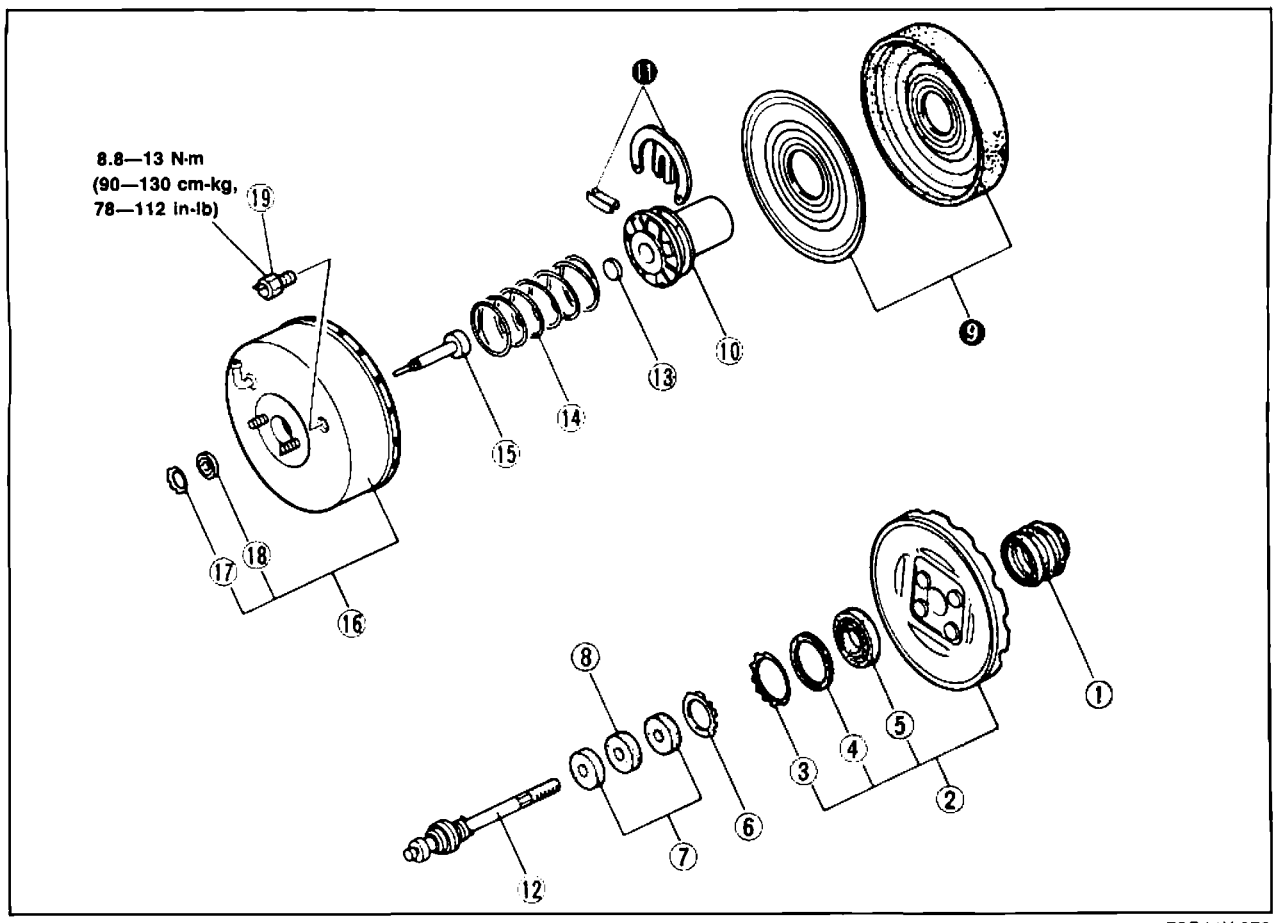


76G11X-102

Removal Note
Steering Shaft
To remove the mounting nuts of the power brake unit, the steering shaft must be removed. (Refer to page 10—22 for removal and installation procedures.)

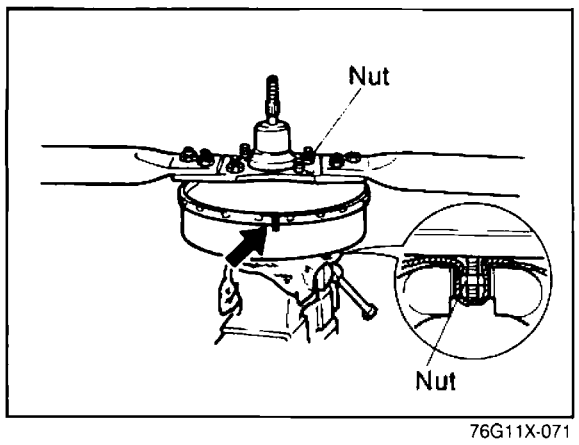
DISASSEMBLY AND ASSEMBLY

1. Disassemble in the sequence shown in the figure, referring to disassembly note for specially marked parts.
2. Inspect each part, referring to inspection note.
3. Assemble in the reverse order of disassembly, referring to assembly note for specially marked parts.



76G11X-070

1. Dust boot
2. Rear shell assembly
3. Retainer
4. Bearing
5. Dust seal
6. Retainer
7. Air filters
8. Air silencer
9. Diaphragm and plate
10. Power piston assembly
11. Retainer key
12. Valve rod and plunger assembly
13. Reaction disc
14. Spring
15. Push rod
16. Front shell assembly
17. Retainer
18. Seal
19. Vacuum switch (RF, RF-CX)

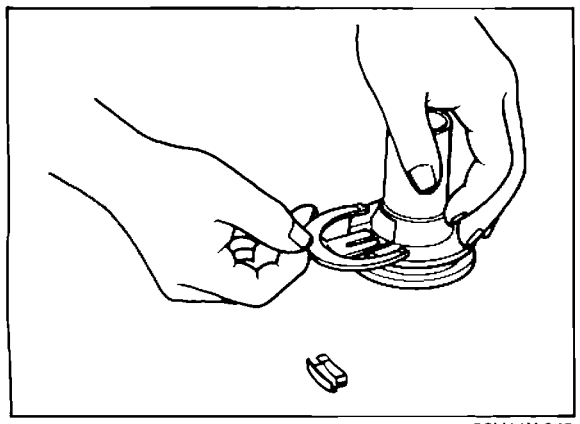


76G11X-071

Disassembly Note
Front and rear shells

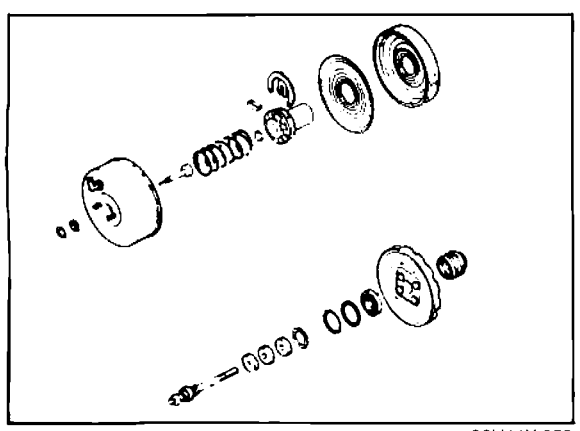
1. Secure the front shell studs in a vise after attaching suitable nuts to them to prevent damage to the studs.
2. Before separating the front and rear shell assemblies, make matching marks to be used in reassembly.
3. Fit a wrench onto the rear shell studs; then fasten two of them with suitable nuts.
4. Rotate the rear shell counterclockwise to unlock.

Caution
The rear shell is spring loaded; loosen it carefully.



86U11X-049

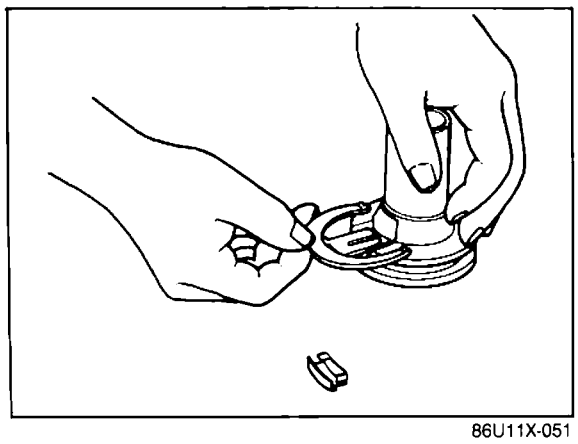
Retainer key
Depress the plunger rod fully; then remove the retainer key.



86U11X-050

Assembly Note
Application of Grease
Before assembly, coat the parts shown in the figure with silicon grease.

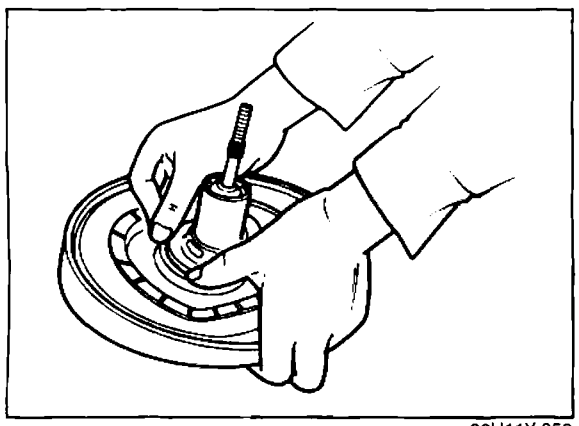
(1) Entire surface of reaction disc
(2) Dust seal lip
(3) Push rod
(4) Diaphragm-to-shell contacting surfaces
(5) Power piston
(6) Valve plunger oil seal



86U11X-051

Retainer key

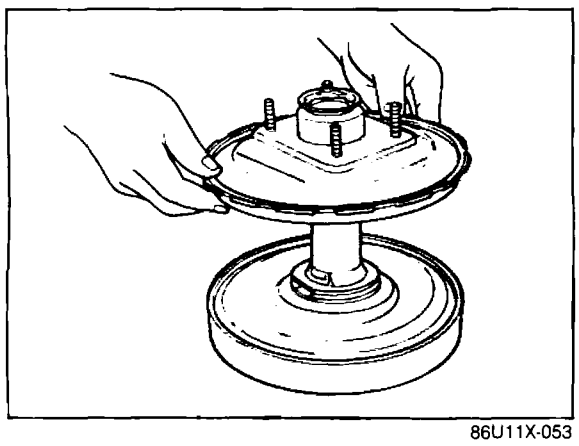
1. Push down the plunger rod.
2. Align the groove of the valve plunger with the slot of the power piston.
3. Insert the retainer key.



86U11X-052

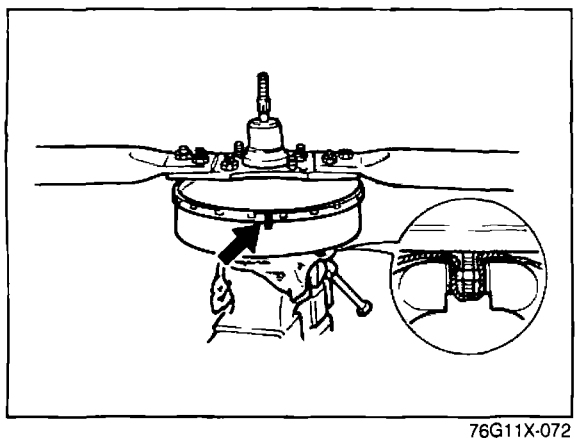
Diaphragm
Install the diaphragm to the power piston and plate.

Caution
Check that the diaphragm is well seated in the groove.



86U11X-053

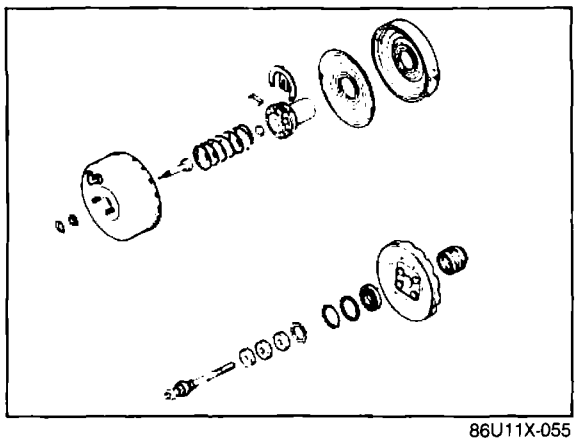
Rear shell assembly
Assemble the rear shell assembly; carefully guiding the tube end of the power piston through the dust seal of the rear shell.



76G11X-072

Front shell and rear shells
Press down the rear shell assembly, and rotate it clockwise until the matching marks are aligned.

Caution
Fit suitable nuts to two studs of the rear shell and tighten them to mount the wrench.



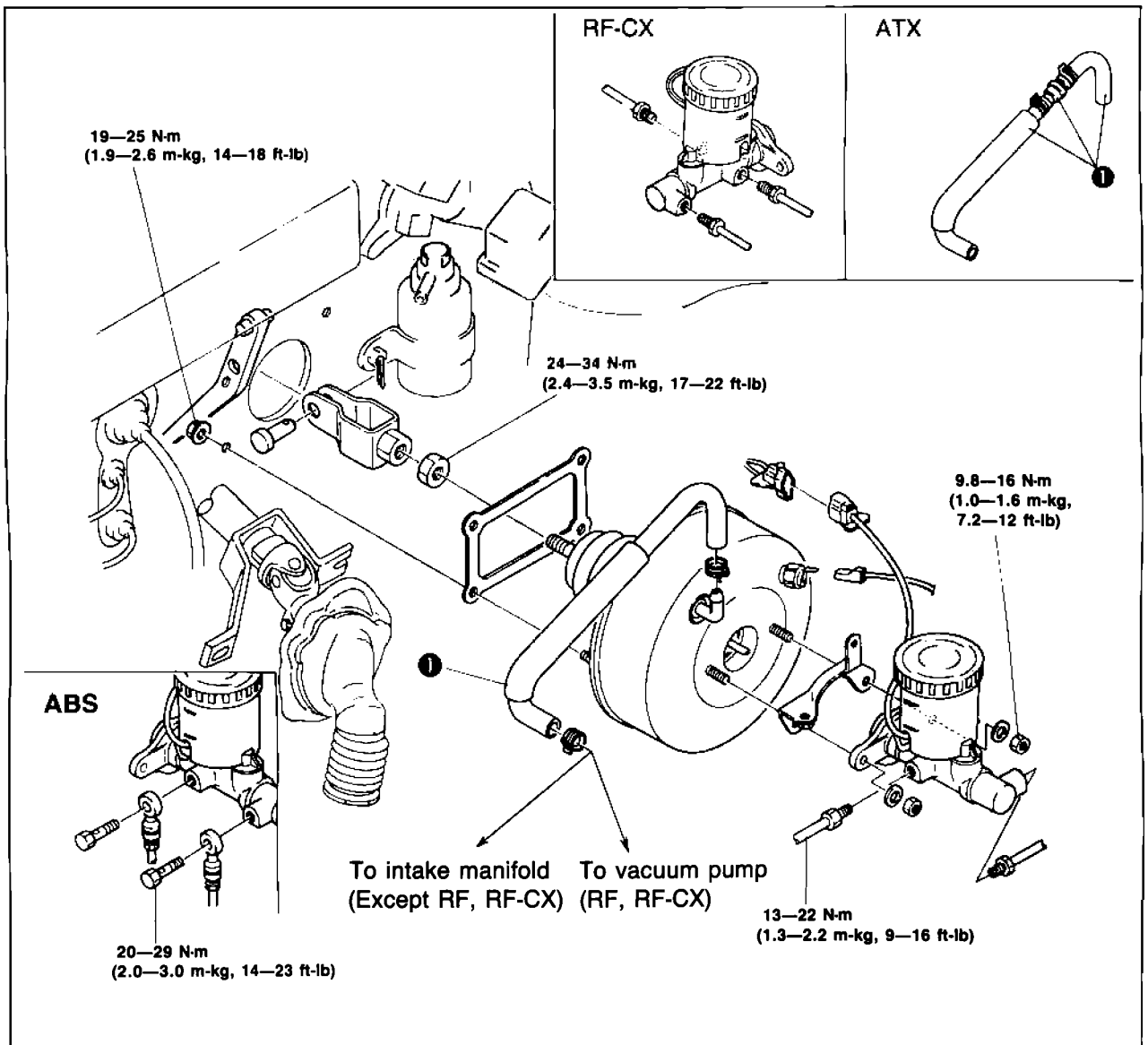
86U11X-055

INSPECTION
1. Inspect all rubber parts. Wipe free of fluid and carefully inspect all rubber parts for cuts, nicks, and other damage.
2. Check the power piston for cracks,distortion, chipping, and damaged seats.
3. Inspect the reaction disc rubber for deterioration.
4. Check that the seats of the valve rod and plunger are smooth and free of nicks and dents.
5. Inspect the front and rear shells for scratches, scores, pits, dents, and other damage.
6. Check the diaphragm for cuts and other damage.

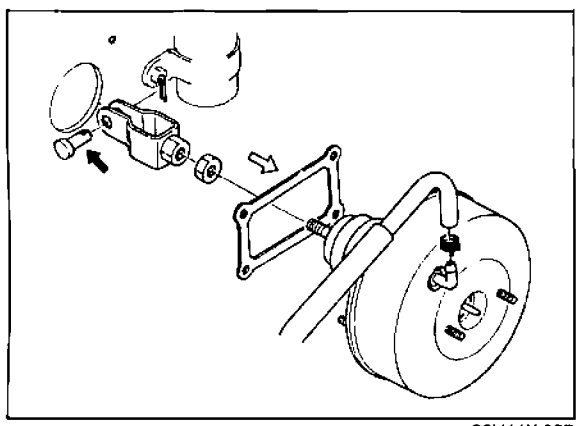
INSTALLATION

1. Install in the reverse order of removal, referring to installation note for specially marked parts.
2. Tighten all nuts and bolts to the specified torque, referring to torque specifications.
3. After installation:
   (1) Add fluid and bleed the air. (Refer to page 11—9.)
   (2) Check all parts for fluid leakage.
   (3) Make an on-vehicle check of the unit (Refer to page 11—27.)
   (4) Verify that the vacuum hose does not contact other parts.

Torque specifications

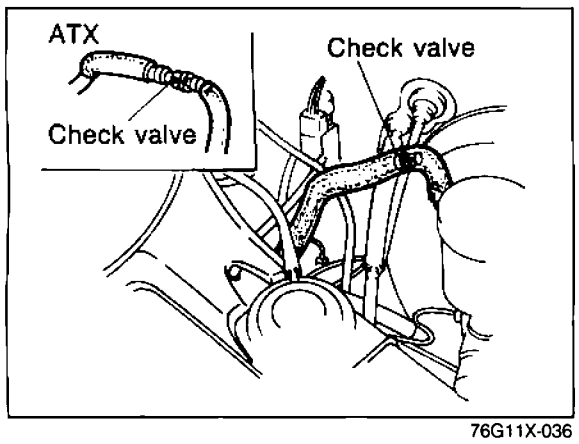


1. Vacuum hose and check valve



86U11X-057

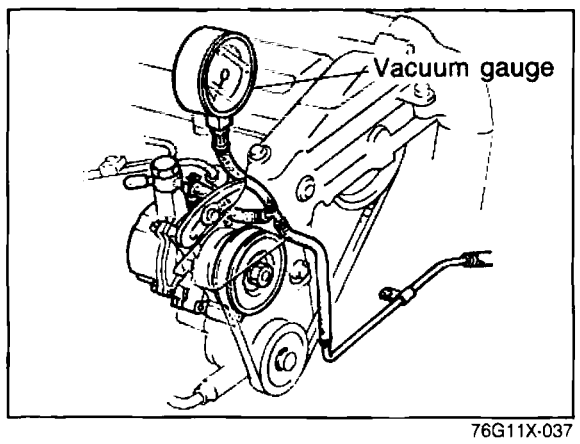
Installation Note
Application of grease and sealant
1. Apply grease to the clevis pin contact surface.
2. Apply sealant to the gasket contact surface.



76G11X-036

Vacuum hose and check valve
Install the vacuum hose and check valve, noting the installation direction.

Note (MTX)
The check valve is pressed into the vacuum hose. There is an arrow on the hose surface to indicate direction of installation.



76G11X-037

VACUUM PUMP

1. Disconnect the vacuum hose and release the remaining vacuum.
2. Connect a vacuum gauge as shown in the figure.
3. Run the engine at idle speed.

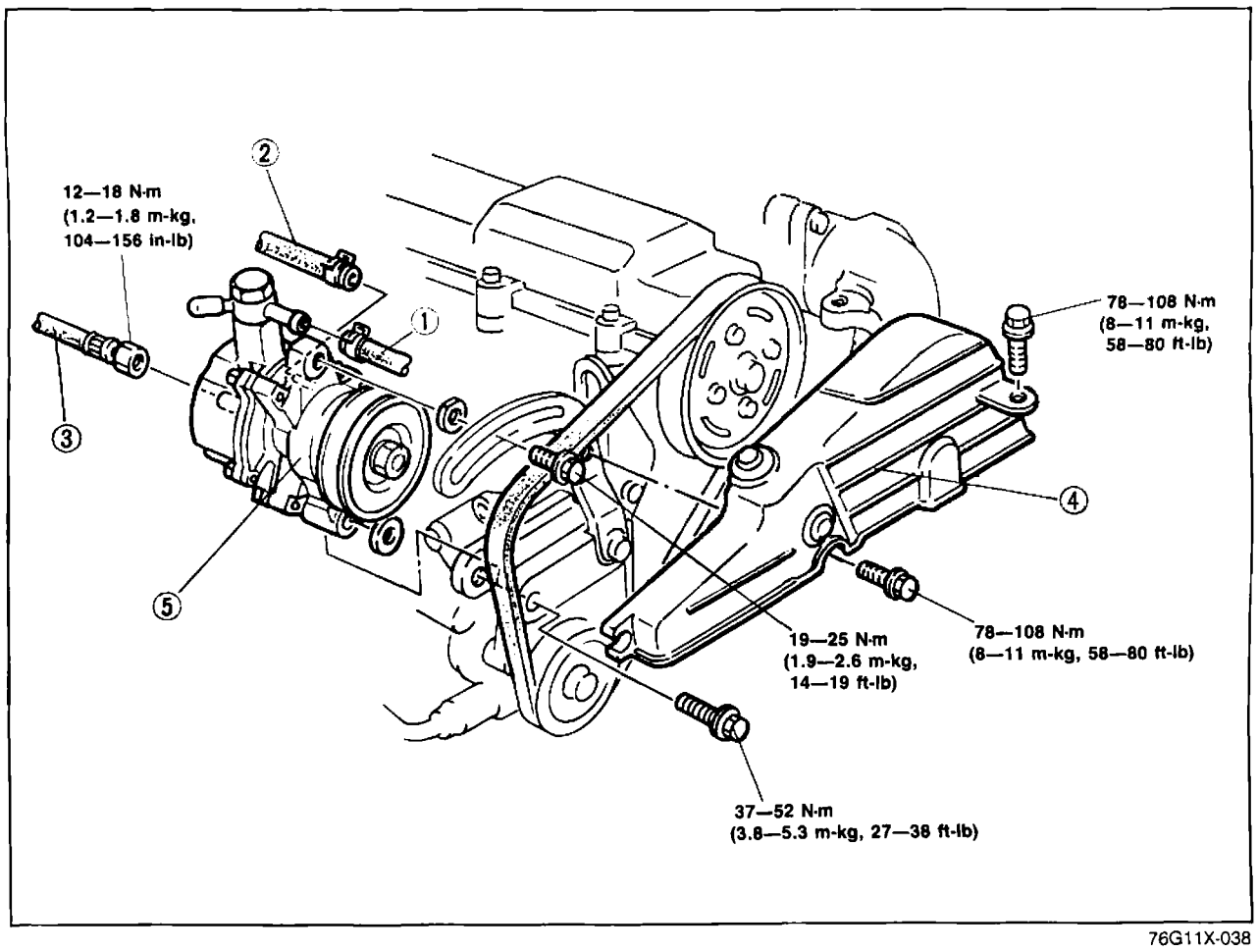
   Idle speed: 720 $^{+30}_{-20}$ rpm

4. Check that the vacuum reaches **500 mmHg (19.7 inHg)** in **8** seconds or less.
5. Check that the maximum vacuum is within approx. **700—720 mmHg (27.6—28.3 inHg)** in **80** seconds or less.

REMOVAL AND INSTALLATION

1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal, referring to installation note for specially marked parts.

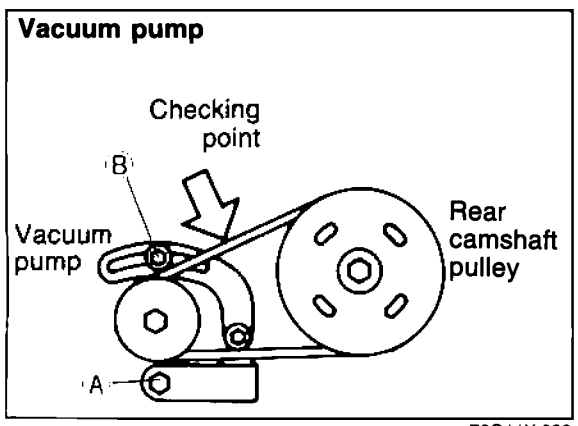
Note
The engine oil will leak out when disconnecting the oil hose. Prepare a suitable container for it to drain into.



76G11X-038

1. Vacuum hose
2. Oil return hose
3. Oil inlet hose
4. Drive velt cover
5. Vacuum pump

11 VACUUM PUMP



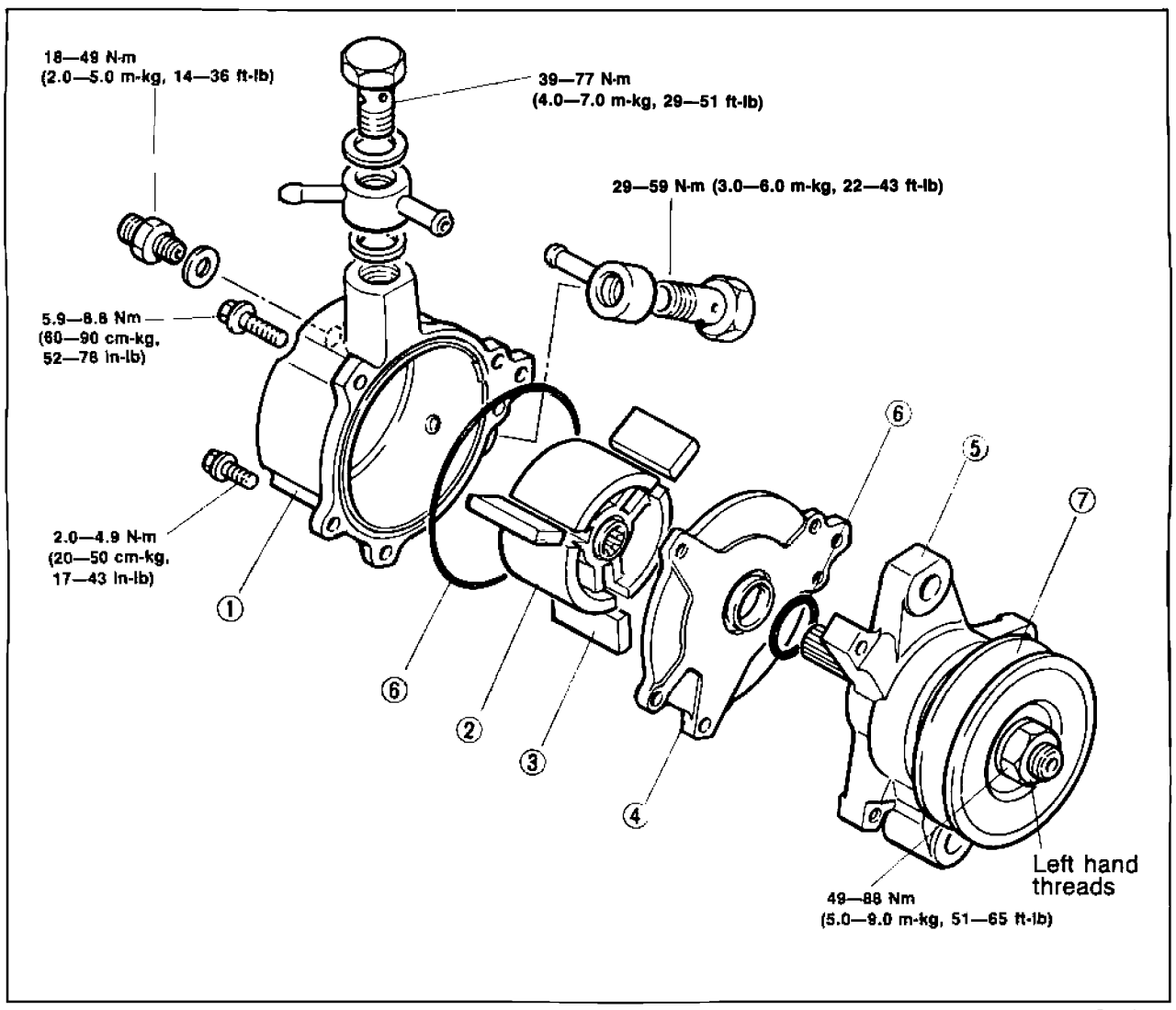
76G11X-039

Installation Note
Belt deflection
Inspection
Check the belt deflection within specification applying moderate pressure.

Specification
New belt: 7.5—8.5mm (0.30—0.33)
Used belt: 8.5—9.5 mm (0.33—0.37)

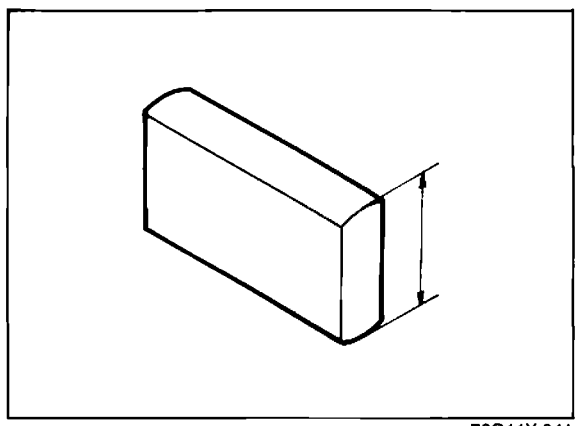
Adjustment
1. Loosen the mounting bolt Ⓐ and adjust bolt Ⓑ.
2. Lever the vacuum pump outward and apply tension to the belt.
3. Tighten the mounting bolt Ⓐ and adjust bolt Ⓑ to the specified torque. (See page 11—35.)

DISASSEMBLY AND ASSEMBLY
1. Disassemble in the sequence shown in the figure.
2. Assemble in the reverse order of disassembly.



76G11X-040

1. Vacuum pump housing
2. Rotor
3. Vane
4. Center plate
5. Vacuum pump bracket assembly
6. O-ring
7. Pulley

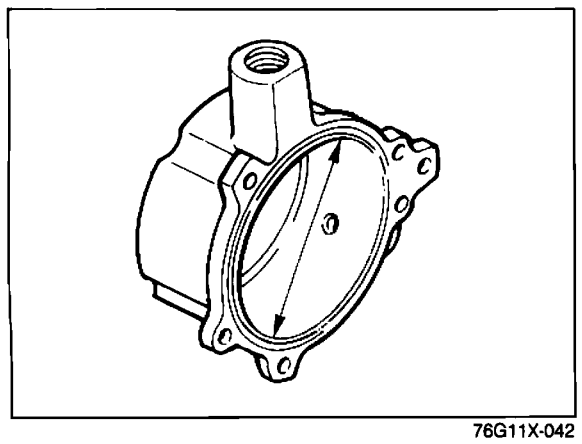


76G11X-041

INSPECTION

1. Check the rotor, housing and cover for wear or damage.
2. Check the O-ring for deterioration or damage.
3. Check the vane for wear or damage. Replace if necessary.

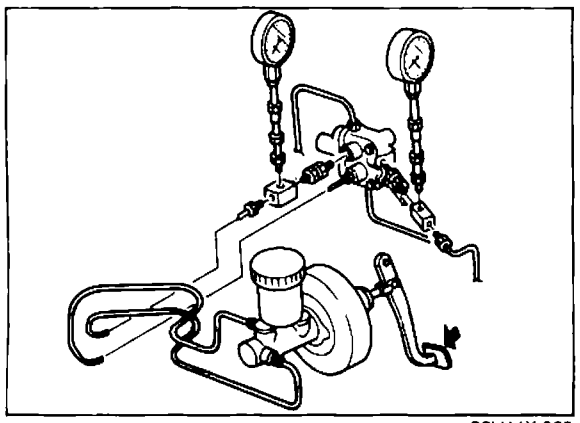
Height:
13.0—13.5 mm (0.512—0.530 in)



76G11X-042

4. Check the housing inner diameter.

Diameter:
57.0—57.1 mm (2.244—2.248 in)



86U11X-060

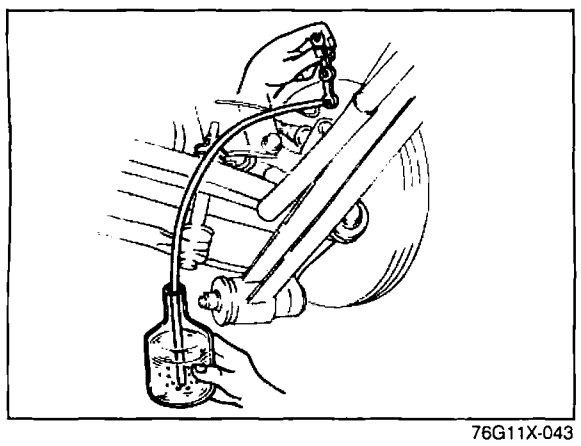
DUAL PROPORTIONING VALVE

FUNCTION CHECK

1. Connect two pressure gauges [9,810 kPa (100 kg/cm^2, 1,422 psi)] to the brake pipes and adaptors as shown in the figure.

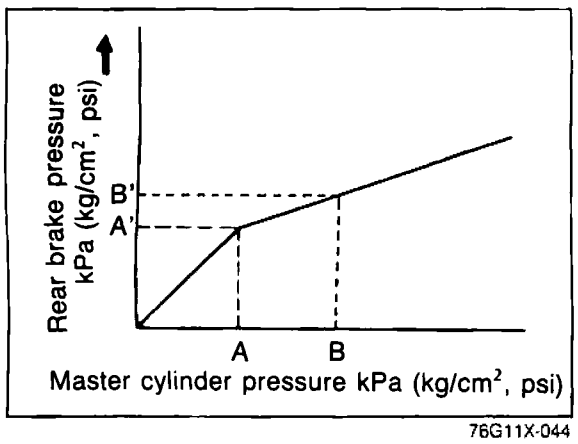
Adaptor and flare nut tightening torque:
13—22 N·m (1.3—2.2 m-kg, 9—16 ft-lb)

Note
Disconnect and connect the brake pipes with the SST (49 0259 770B).



76G11X-043

2. Bleed air from the brake system. (Refer to page 11—9.)



76G11X-044

3. Depress the brake pedal until the master cylinder pressure equals A; then measure rear brake pressure A'.
4. Depress the brake pedal again; apply additional pressure until A equals B; then measure pressure B'.
5. If the measurements are not within specification, replace the valve assembly.
6. Install the brake pipes to the valve, and bleed air from the brake system.

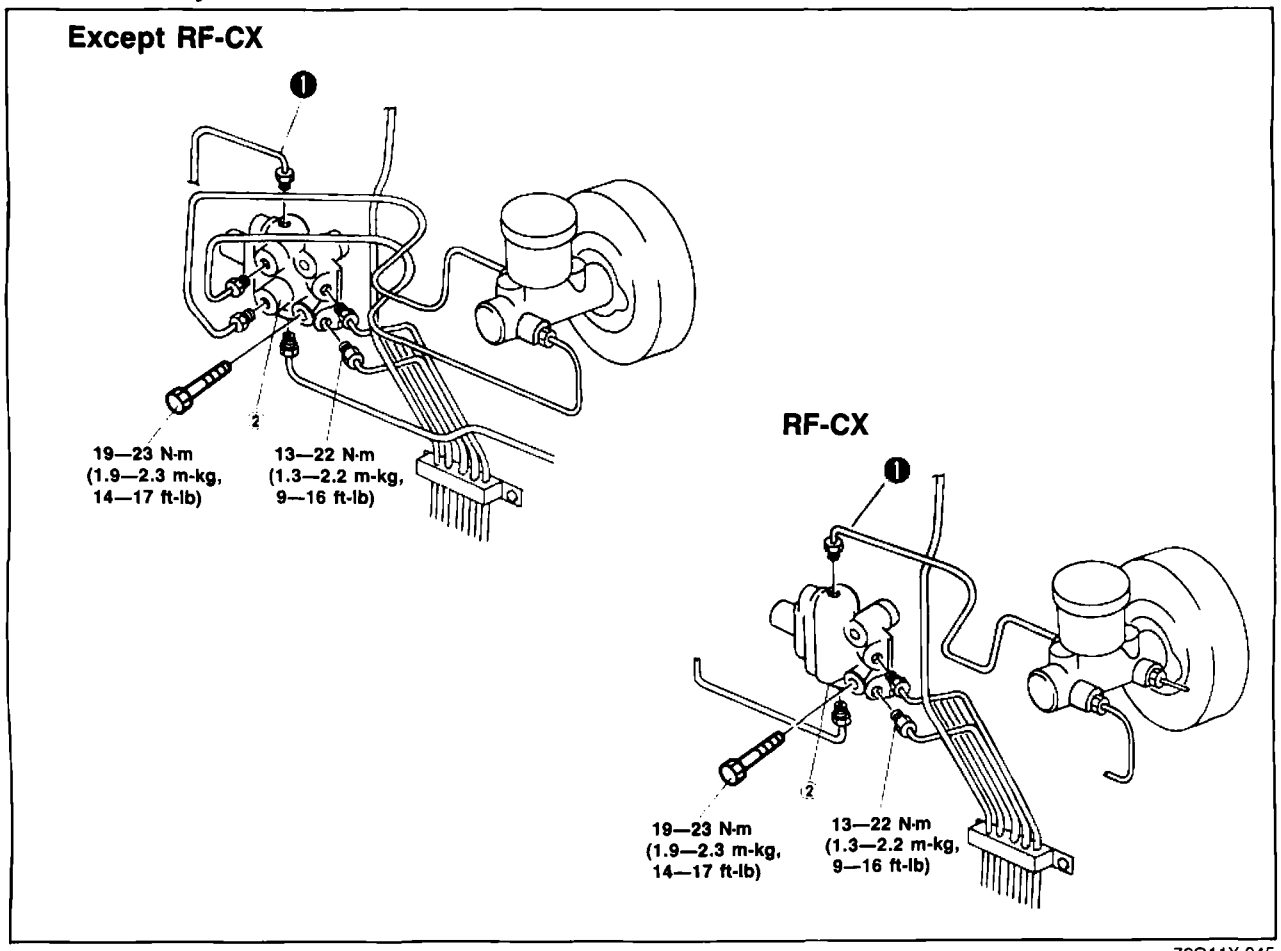
Specification

Fluid pressure	kPa (kg/cm^2, psi)			
	A	A'	B	B'
Except General LHD and RHD	1,962 (20,284)	1,962 ± 196 (20 ± 2, 284 ± 28)	6,867 (70,995)	3,434 ± 196 (35 ± 2, 498 ± 28)
General LHD and RHD	2,943 (30,427)	2,943 ± 196 (30 ± 2, 427 ± 28)		4,120 ± 196 (42 ± 2, 597 ± 28)

REMOVAL AND INSTALLATION

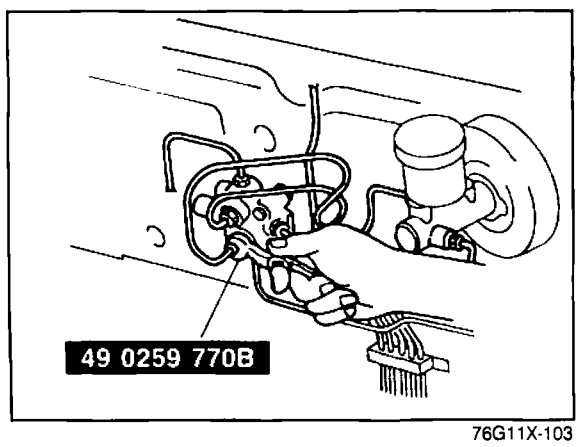
1. Remove in the sequence shown in the figure, referring to removal and installation note for specially marked parts.
2. Install in the reverse order of removal.
3. After installation:
   (1) Add brake fluid and bleed the air. (Refer to page 11—9.)
   (2) Check the brake lines for fluid leakage.

Caution
Brake fluid will damage painted surfaces. If it does get on a painted surface, wipe it off immediately.



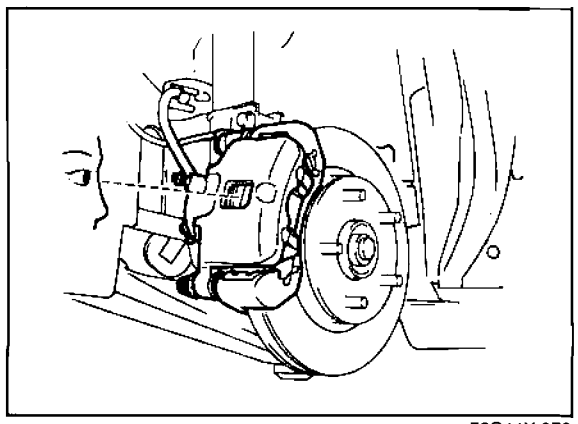
76G11X-045

1. Brake pipe
2. Dual proportioning valve

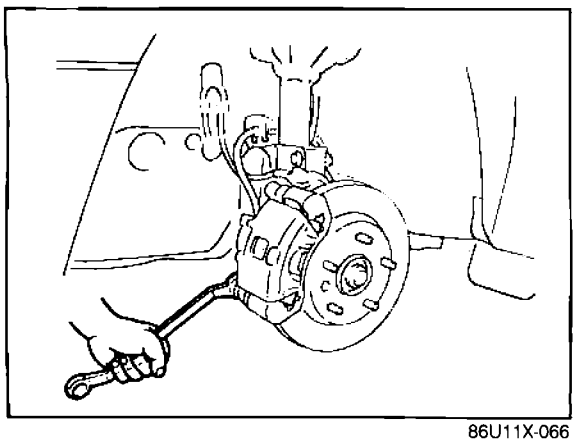


76G11X-103

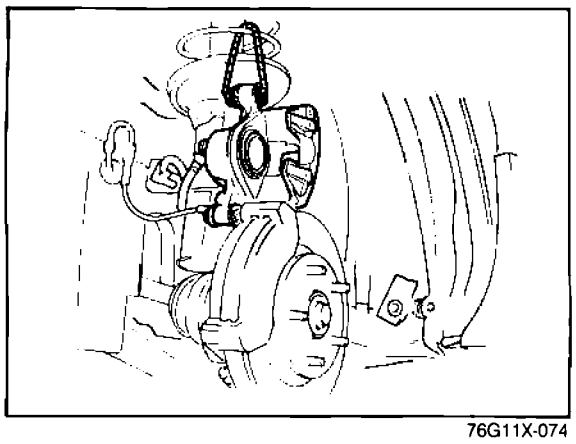
Removal and Installation Note
Brake pipe
Disconnect or connect the brake pipes with the **SST**.



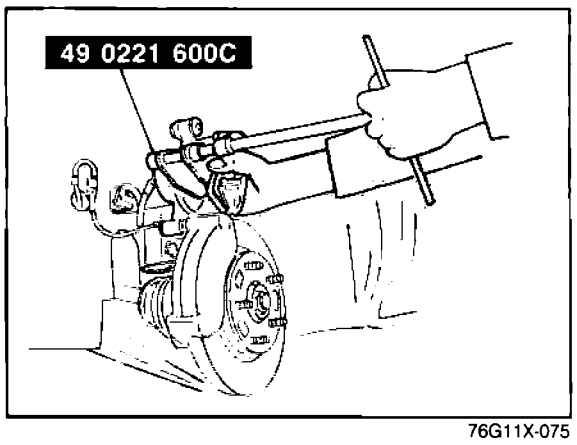
76G11X-073



86U11X-066



76G11X-074



76G11X-075

FRONT DISC BRAKE

SIMPLE INSPECTION OF DISC PAD WEAR

1. Loosen the front wheel lug nuts.
2. Jack up the front of the vehicle and support it with safety stands.
3. Remove the wheels.
4. Look through the caliper inspection hole and check that the remaining thickness of the pad is **2 mm (0.08 in) min**.

Note
When the remaining thickness becomes 2 mm (0.08 in), the wear indicator informs that the pad should be replaced by creating a squealing noise before any disc plate damage occurs.

REPLACEMENT OF DISC PAD

Caution
Replace the left and right pads at the same time.

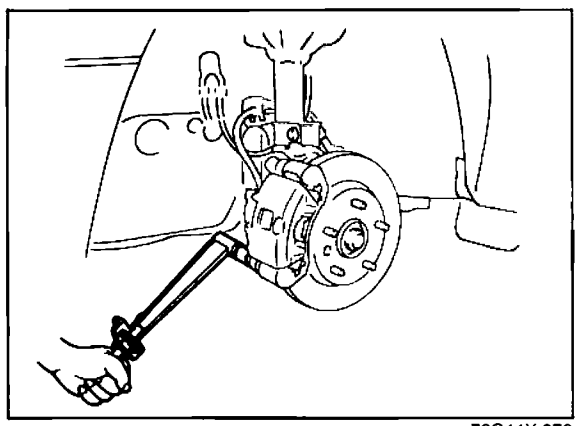
1. Loosen the front wheel lug nuts.
2. Block the rear wheels firmly.
3. Jack up the front of the vehicle and support it with safety stands.
4. Remove the wheels.
5. Remove the lower mounting bolt.
6. Pivot the caliper on the top bolt and support it.
7. Remove the V-springs.

Note
V-springs are equipped for non-asbesto pad type.

8. Remove the pads and shims.

Warning (Asbesto pad type)
Asbestos dust is a health hazard. Do not blow away brake dust with compressed air.

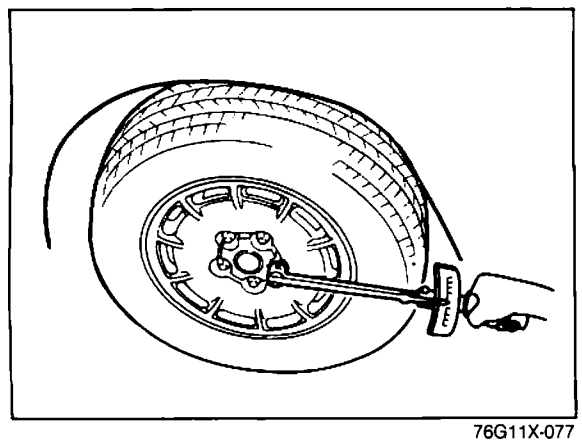
9. Apply the grease supplied in the pad attachment set to the new shims, and attach them to the new pads.
10. Push the piston inward with the **SST** and the old pad.
11. Install the new pads and shims into the mounting support.
12. Install the V-springs (non-asbesto pad type).



76G11X-076

13. Lower the caliper assembly onto the mounting support.
14. Tighten the mounting bolt to the specified torque.

Tightening torque:
31—41 N·m (3.2—4.2 m-kg, 23—30 ft-lb)



76G11X-077

15. Mount the wheels.
16. Apply the brakes a few times; then turn the wheels and check that the brakes do not drag excessively.
17. Lower the vehicle.
18. Tighten the wheel lug nuts.

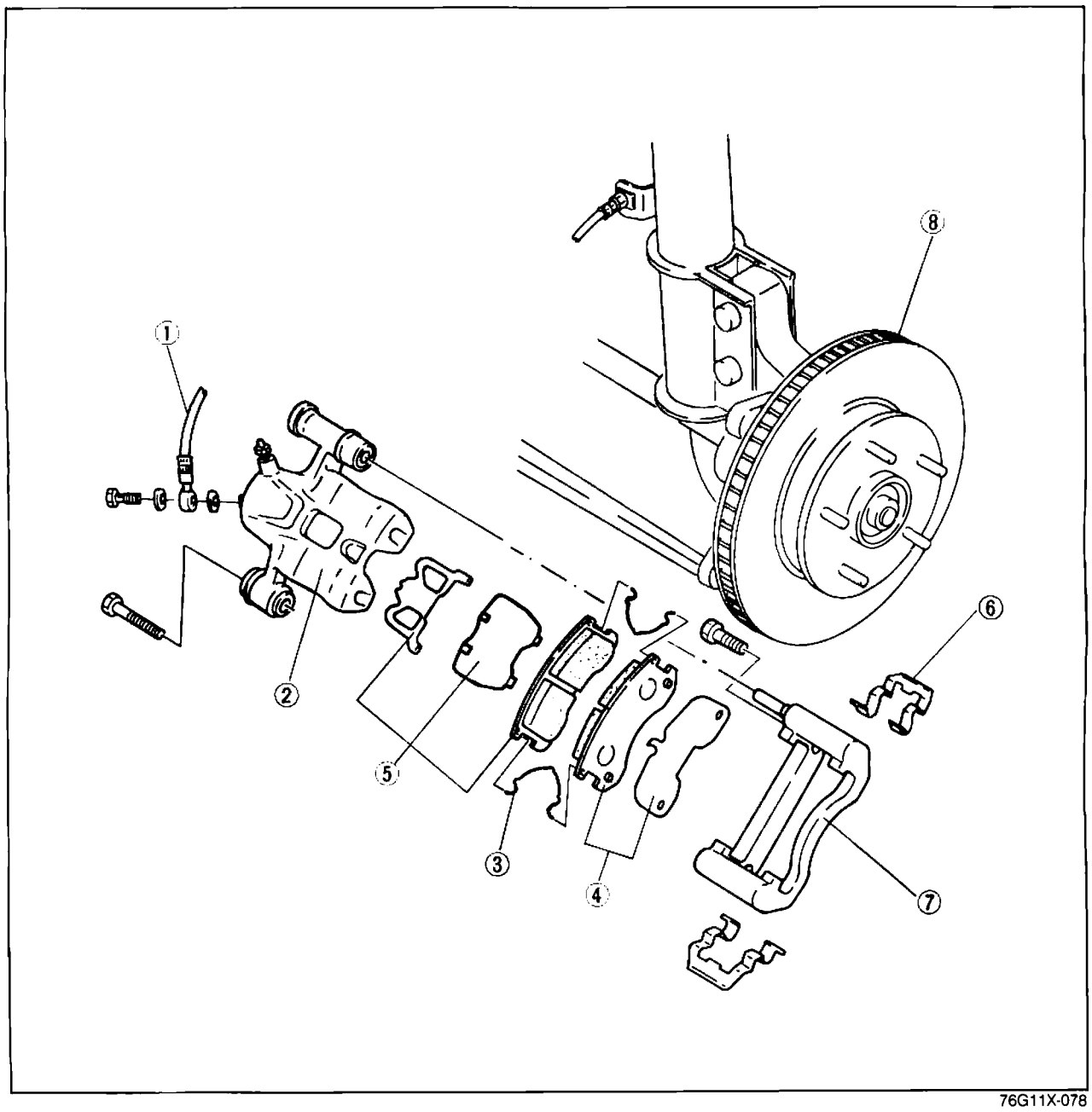
Tightening torque:
88—118 N·m (9.0—12.0 m-kg, 65—87 ft-lb)

11 FRONT DISC BRAKE

REMOVAL
1. Loosen the wheel lug nuts.
2. Jack up the front of the vehicle and support it with safety stands.
3. Remove the wheels.
4. Remove in the sequence shown in the figure.

Warning
Asbestos dust is a health hazard. Do not blow away brake dust with compressed air.

Caution
Brake fluid will damage painted surfaces. If it does get on a painted surface, wipe it off immediately.

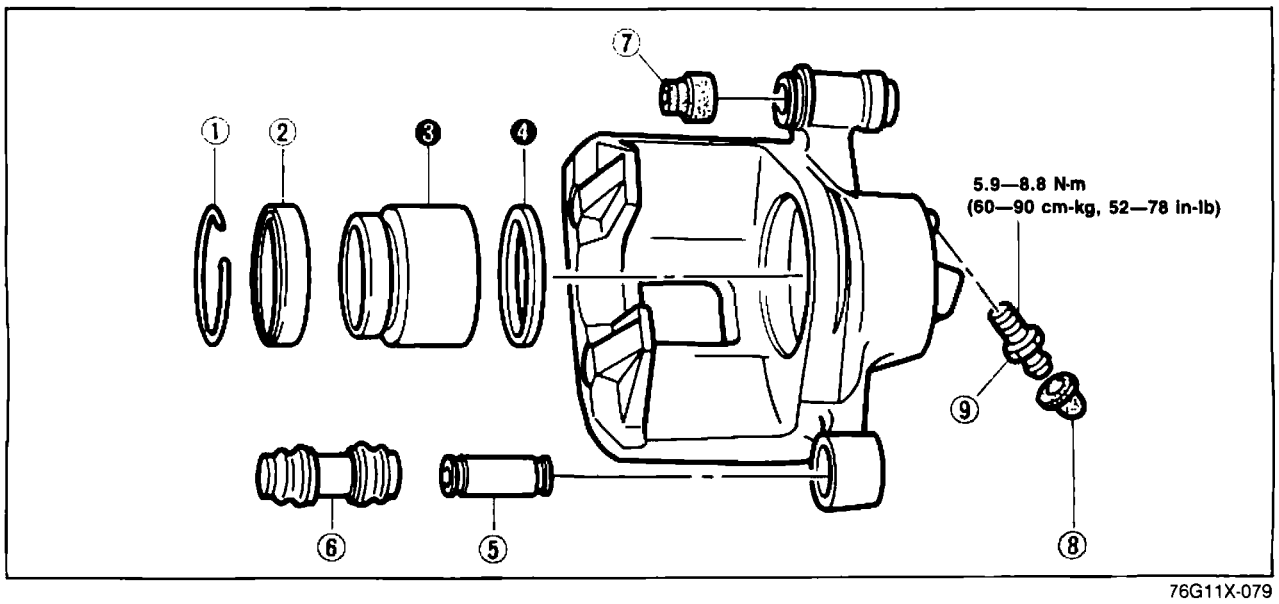


76G11X-078

1. Flexible hose
2. Caliper assembly
3. V-spring
4. Outer pad and shim
5. Inner pad and shim
6. Guide plate
7. Mounting support
8. Disc plate (Refer to section 9)

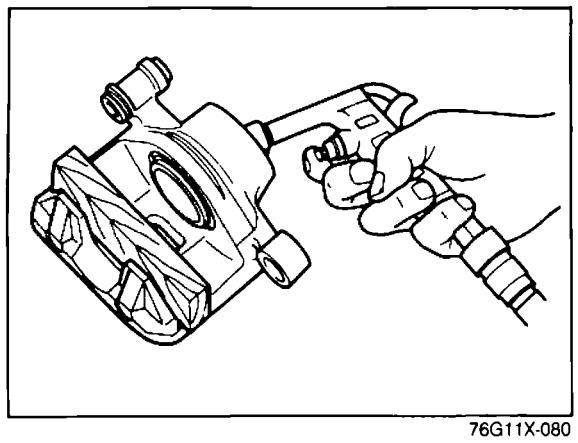
DISASSEMBLY AND ASSEMBLY

1. Disassemble in the sequence shown in the figure, referring to disassembly note for specially marked parts.
2. Inspect all parts, referring to inspection note.
3. Assemble in the reverse order of disassembly, referring to assembly note for specially marked parts.



76G11X-079

1. Snap ring
2. Dust seal
3. Piston
4. Piston seal
5. Guide pin
6. Pin boot
7. Bushing
8. Cap
9. Bleeder screw

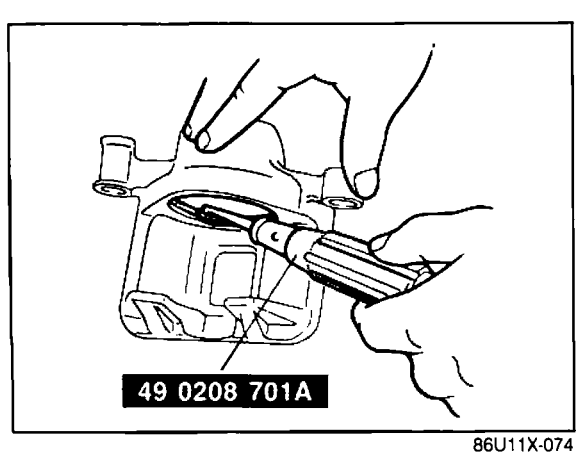


76G11X-080

Disassembly Note
Piston

Place a piece of wood in the caliper; then blow compressed air through the hose connection hole to force out the piston.

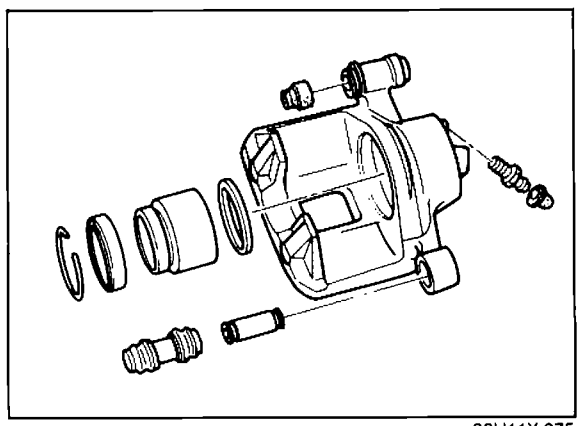
Caution
Blow the compressed air a little at a time to prevent the piston from popping out.



86U11X-074

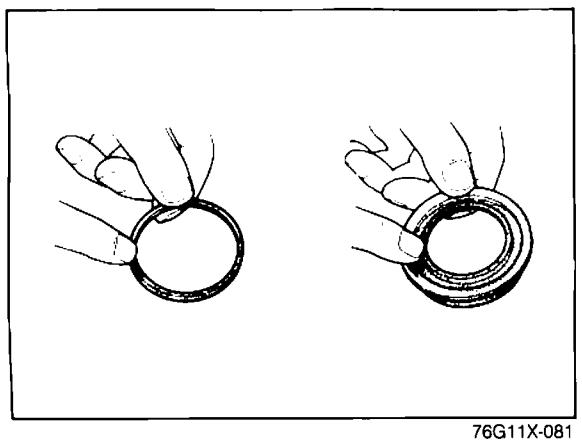
Piston seal

Remove the piston seal from the caliper with the **SST**.



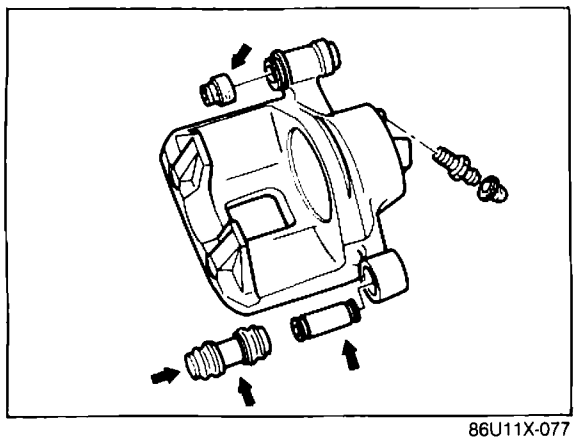
86U11X-075

Inspection Note
Check the following and replace any faulty parts.
1. Cylinder and piston for wear or rust
2. Caliper body for damage or cracks
3. Boot for damage or poor sealing



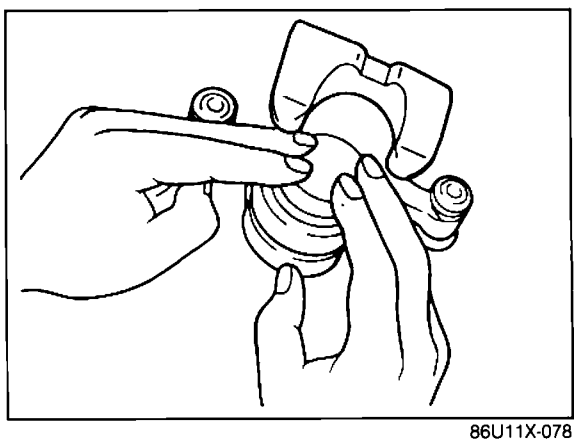
76G11X-081

Assembly Note
Application of grease
Coat the following parts with the grease supplied in the seal kit.
1. Piston seal
2. Dust seal



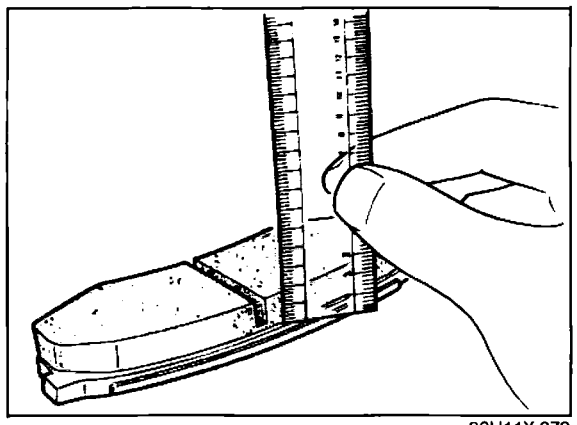
86U11X-077

3. Guide pin
4. Guide pin boot
5. Bushing



86U11X-078

Piston
Coat the piston and the cylinder with brake fluid; then insert the piston straight into the cylinder.

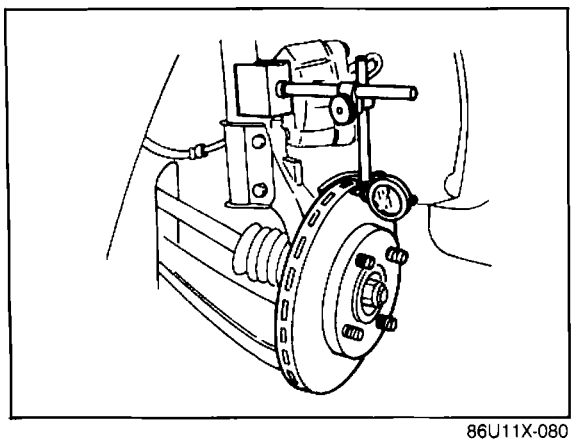


86U11X-079

INSPECTION
Check the following and replace any faulty parts.

Disc Pad
1. Oil or grease on facing
2. Abnormal wear or cracks
3. Deterioration or heat damage
4. Remaining lining thickness

Thickness: 2.0 mm (0.08 in) min.

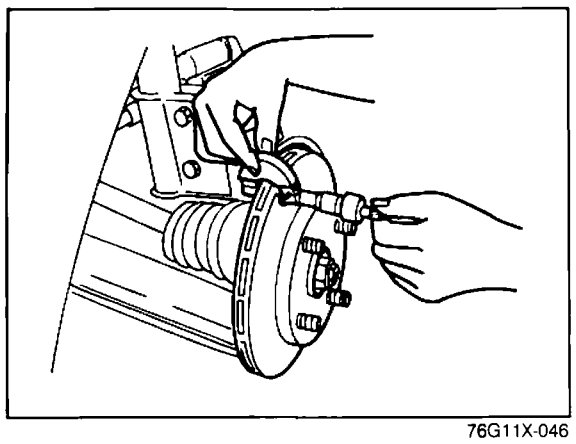


86U11X-080

Disc Plate
1. Runout

Runout: 0.1 mm (0.004 in) max.

Caution
a) There must be no wheel bearing looseness.
b) Measure at the outer edge of the disc plate surface.



76G11X-046

2. Wear or damage

Thickness specifications:

mm (in)

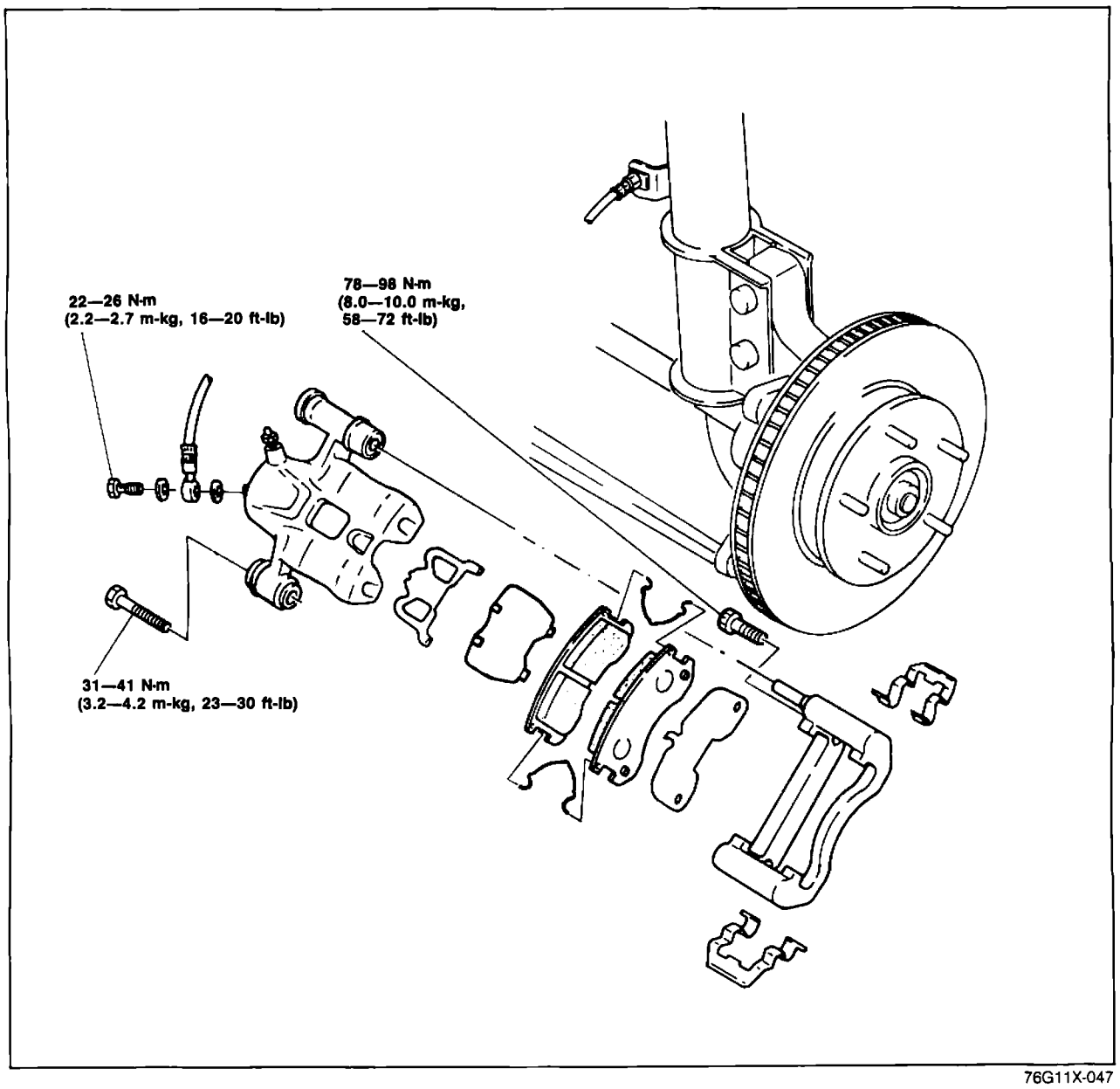
	Standard	Minimum
13 inch-wheel	20 (0.79)	18 (0.71)
14 or 15 inch-wheel	24 (0.94)	22 (0.86)

INSTALLATION

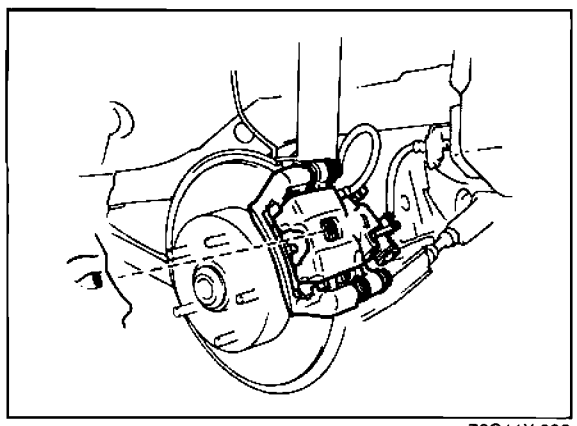
1. Install in the reverse order of removal.
2. Tighten all nuts and bolts to the specified torque, referring to torque specifications.
3. After installation:
   (1) Add brake fluid and bleed air. (Refer to page 11—9.)
   (2) Depress the brake pedal a few times and check that the front brakes do not drag excessively while the wheels are being rotated.

Note
Refer to page 11—40 for pad installation.

Torque specifications



76G11X-047

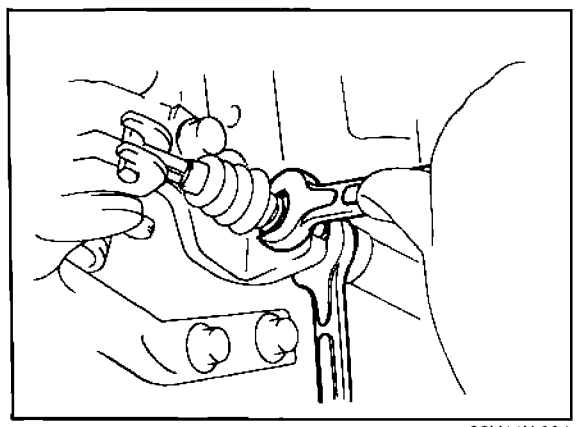


76G11X-082

REAR DISC BRAKE

SIMPLE INSPECTION OF DISC PAD WEAR

1. Loosen the rear wheel lug nuts.
2. Jack up the rear of the vehicle and support it with safety stands.
3. Remove the wheels.
4. Look through the caliper inspection hole and check that the remaining thickness of the pad is **1 mm (0.04 in) min**.

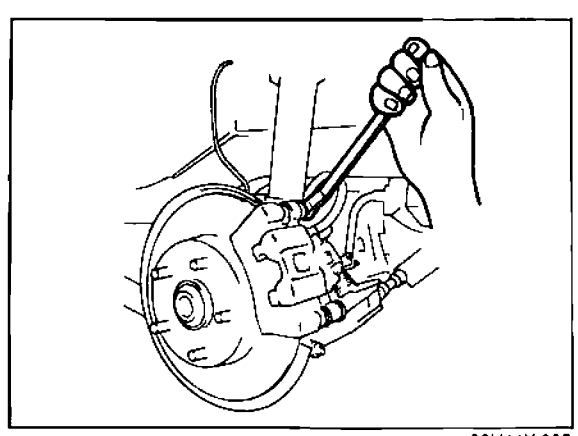


86U11X-084

REPLACEMENT OF DISC PAD

Caution
Replace the left and right pads at the same time.

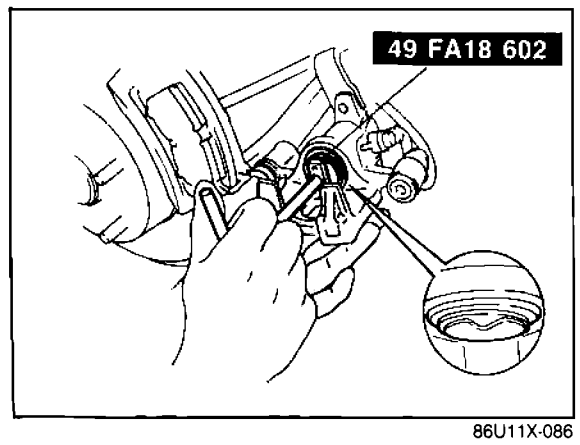
1. Loosen the wheel lug nuts.
2. Release the parking brakes.
3. Jack up the rear of the vehicle and support it with safety stands.
4. Remove the wheels.
5. Remove the parking brake cable from the cable bracket and the operating lever.



86U11X-085

6. Remove the upper mounting bolt; then pivot the caliper.
7. Remove the V-springs.
8. Remove the pads and shims.

Warning
Asbestos dust is a health hazard. Do not blow away brake dust with compressed air.

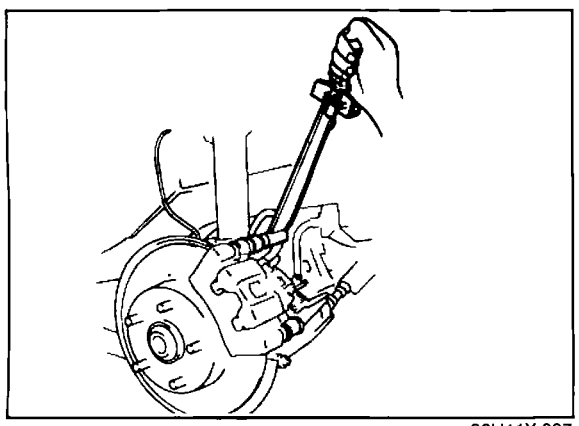


86U11X-086

9. Apply the grease supplied in the pad attachment set to the new shims; then attach them to the new pads.
10. Turn the piston fully inward by rotating the **SST** clockwise. Align the piston groove as shown in the illustration.

Note
The piston groove and inner pad alignment pin must be aligned when the inner pad is installed.

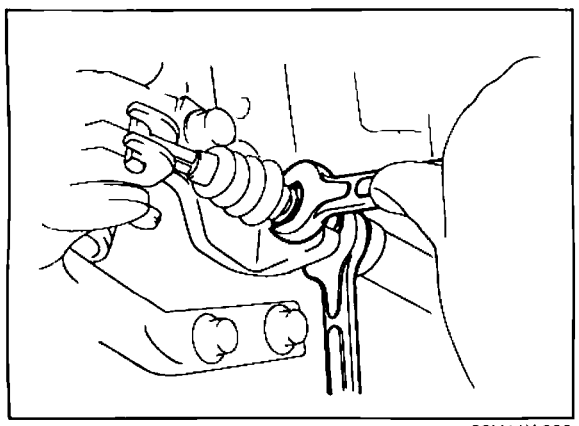
11. Install the pads and shims to the mounting support.
12. Install the pad clip.



86U11X-087

13. Lift the caliper assembly onto the mounting support.
14. Tighten the mounting bolt to the specified torque.

Tightening torque:
16—24 N·m (1.6—2.4 m-kg, 12—17 ft-lb)

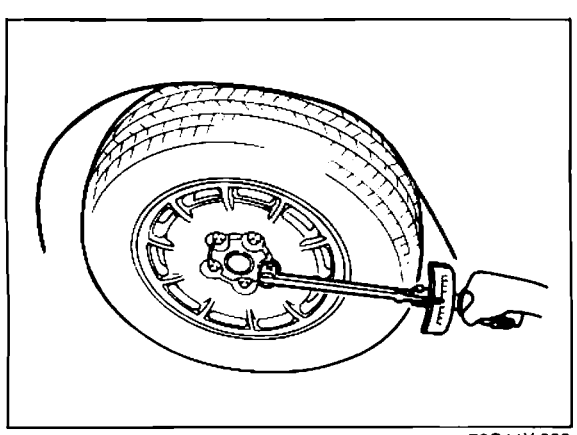


86U11X-088

15. Connect the parking cable end to the operating lever; then tighten the locknut.

Tightening torque:
20—28 N·m (2.0—2.9 m-kg, 14—21 ft-lb)

Caution
There must be no clearance between the cable end and the operating lever.



76G11X-083

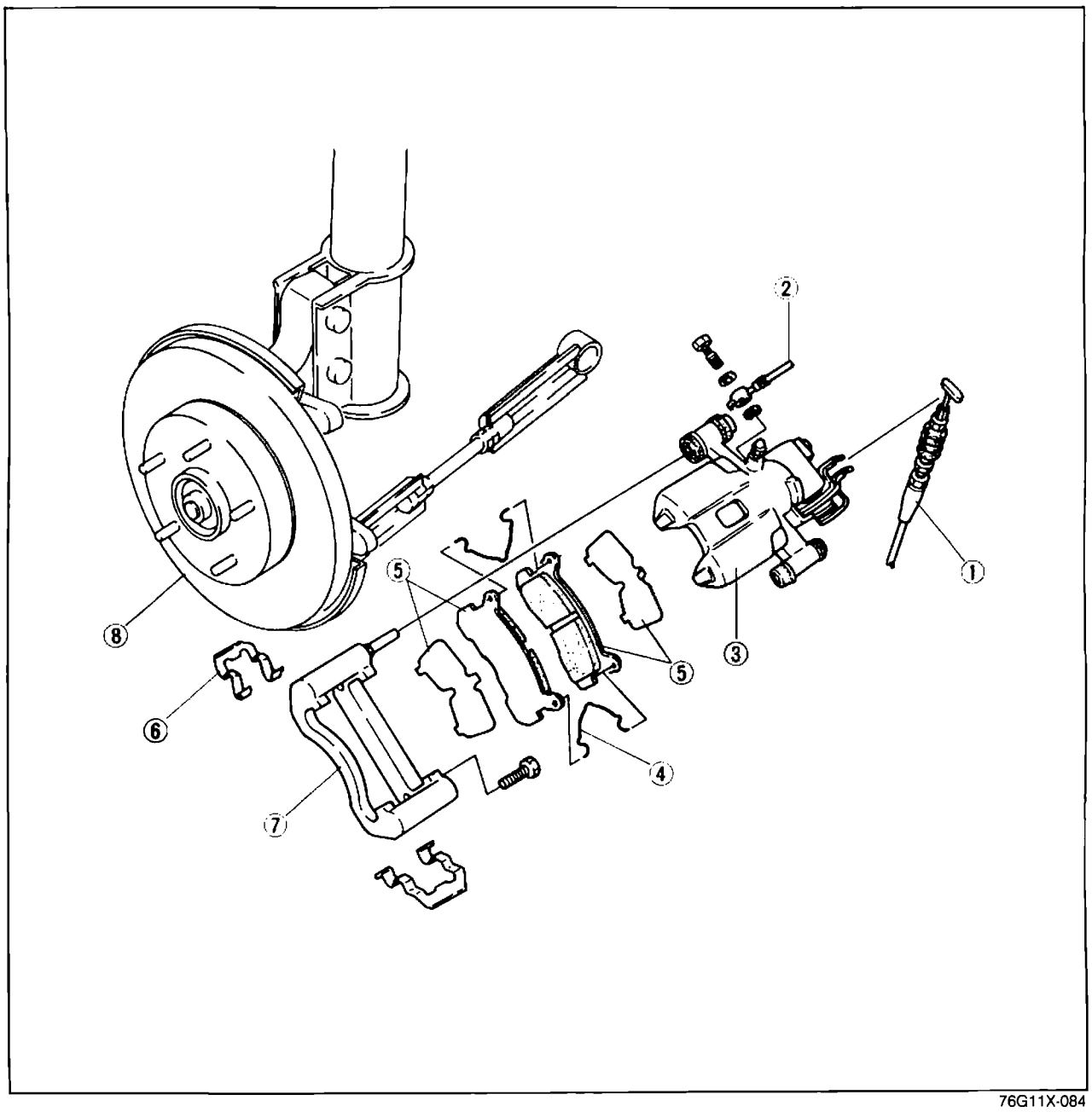
16. Mount the wheels.
17. Apply the brakes a few times; then check that the brakes do not drag excessively while the wheels are being rotated.
18. Lower the vehicles.
19. Tighten the wheel lug nuts.

Tightening torque:
88—118 N·m (9—12 m-kg, 65—87 ft-lb)

REMOVAL
1. Loosen the wheel lug nuts.
2. Release the parking brakes.
3. Jack up the rear of the vehicle and support it with safety stands.
4. Remove the wheels.
5. Remove in the sequence shown in the figure.

Warning
Asbestos dust is a health hazard. Do not blow away brake dust with compressed air.

Caution
Brake fluid will damage painted surfaces. If it does get on a painted surface, wipe it off immediately.



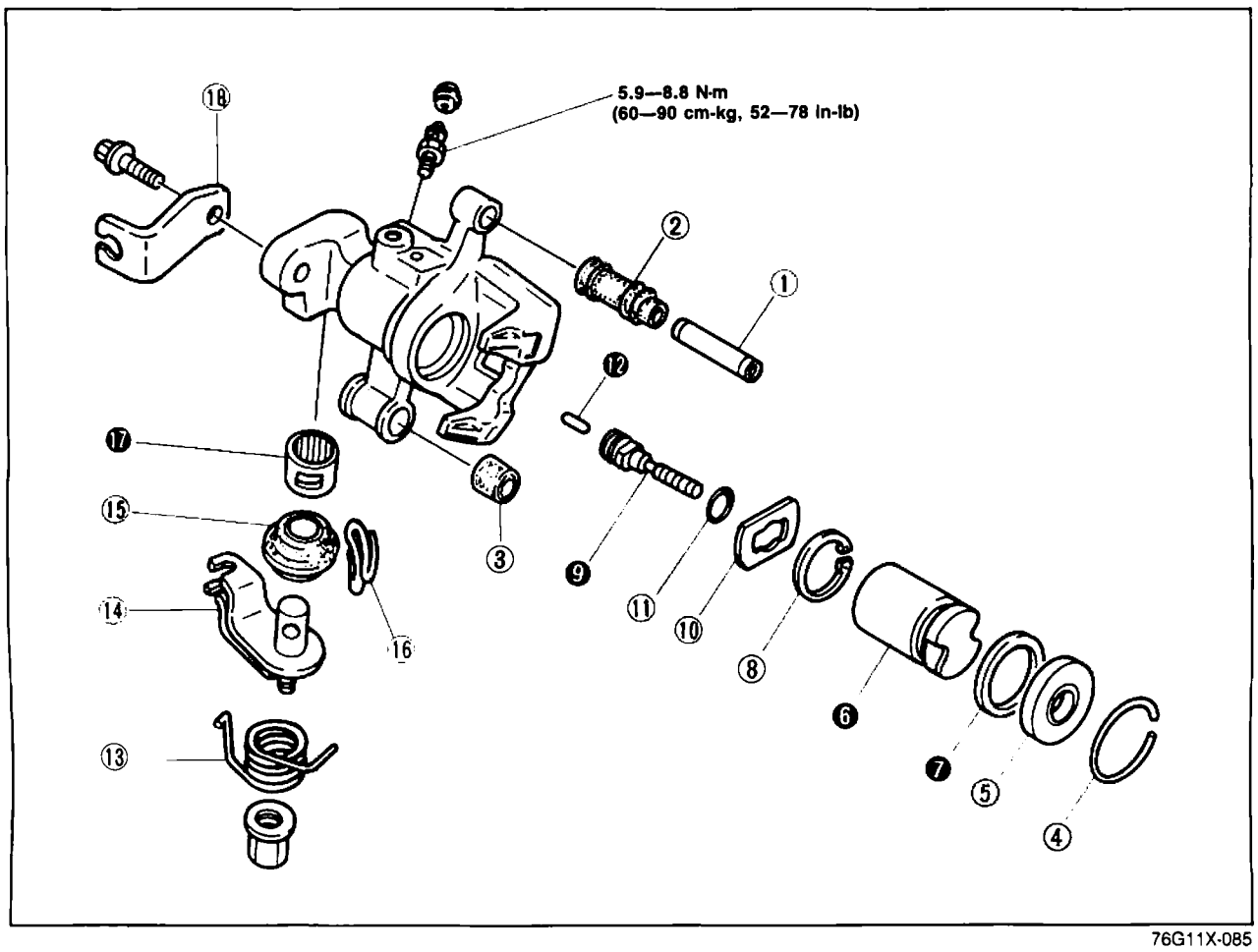
76G11X-084

1. Parking brake cable
2. Flexible hose
3. Caliper assembly
4. V-spring
5. Pad and shim
6. Guide plate
7. Mounting support
8. Disc plate
   (Refer to section 9)

11 REAR DISC BRAKE

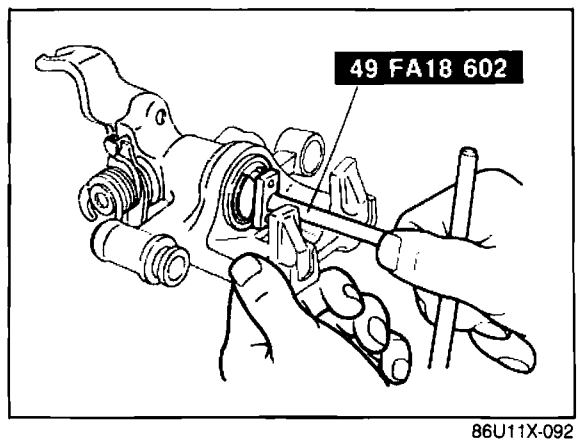
DISASSEMBLY AND ASSEMBLY

1. Disassemble the caliper in the sequence shown in the figure, referring to disassembly note for specially marked parts.
2. Inspect all parts, referring to inspection note.
3. Assemble in the reverse order of disassembly, referring to assembly note for specially marked parts.



76G11X-085

1. Guide pin
2. Pin boot
3. Bushing
4. Retaining ring
5. Dust seal
6. Piston
7. Piston seal
8. Snap ring
9. Adjuster spindle
10. Stopper
11. O-ring
12. Connecting link
13. Return spring
14. Operating lever
15. Boot
16. Boot clip
17. Needle bearing
18. Cable braket



86U11X-092

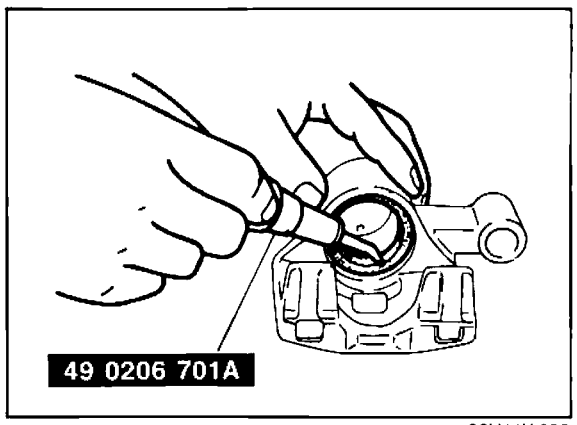
Disassembly Note

Piston

Remove the piston with the **SST**.

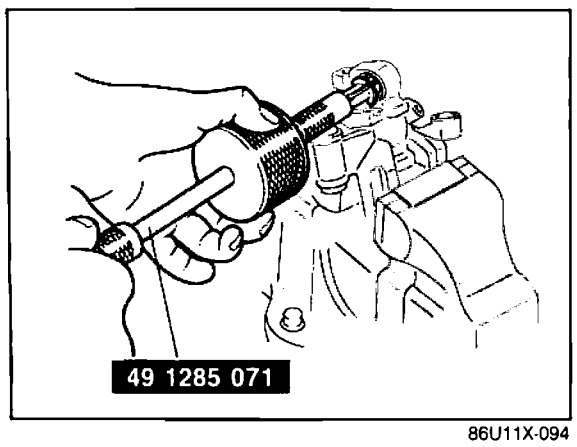
Note

The piston can be removed by turning the SST counterclockwise.



86U11X-093

Piston seal
Remove the piston seal with the **SST**.

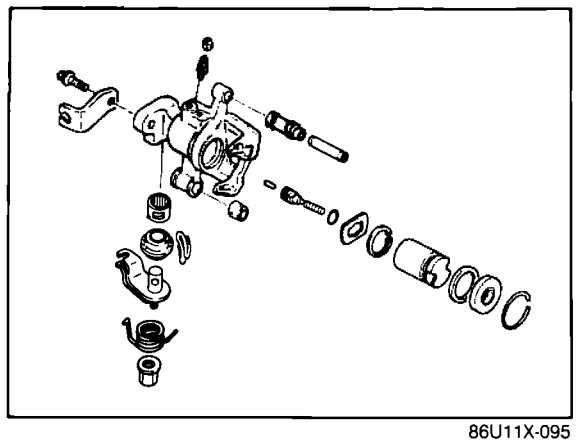


86U11X-094

Needle bearing
1. Secure the caliper in a vise.

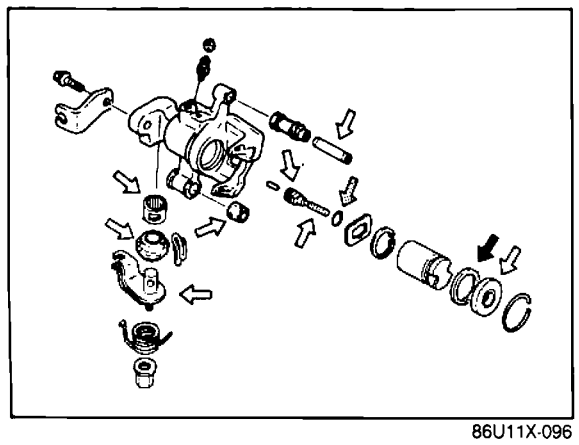
Caution
Insert a soft, protective material (such as copper plates) in the jaws of the vise.

2. Remove the needle bearing from the caliper with the **SST**.



86U11X-095

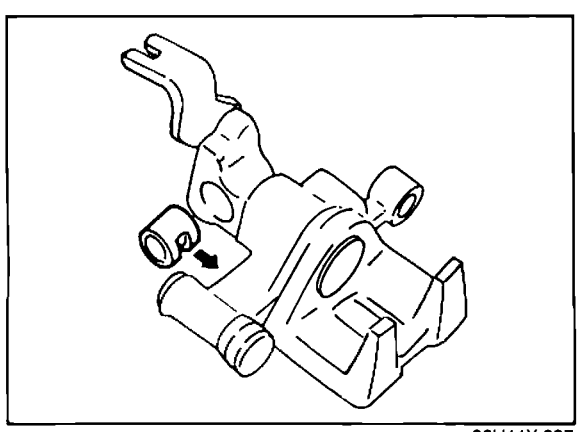
Inspection Note
Check the following and repair or replace any faulty parts.
1. Cylinder and piston for wear and rust
2. Caliper body for damage and cracks
3. Sleeve bolt and sleeve for damage and wear
4. Guide pin for damage and rust
5. Adjuster spindle threads for damage



86U11X-096

Assembly Note
Application of grease
Before assembly, apply the grease supplied in the seal kit to the parts indicated by the arrows.

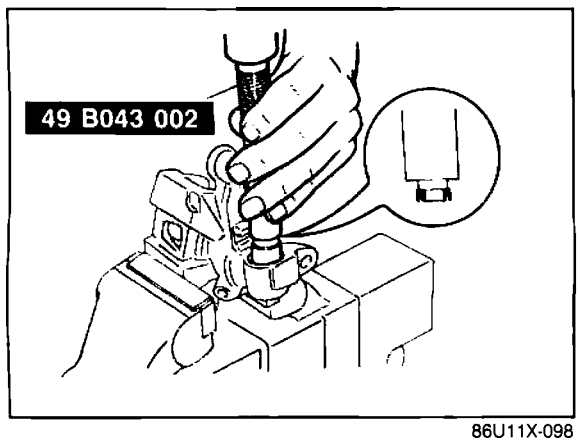
⇨: Orange grease
⇨: White grease
➡: Red grease



86U11X-097

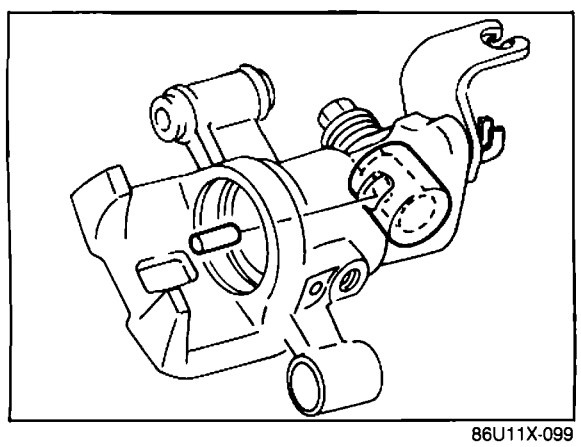
Needle bearing

1. Align the needle bearing hole with the caliper hole, and set the needle bearing in the caliper.



86U11X-098

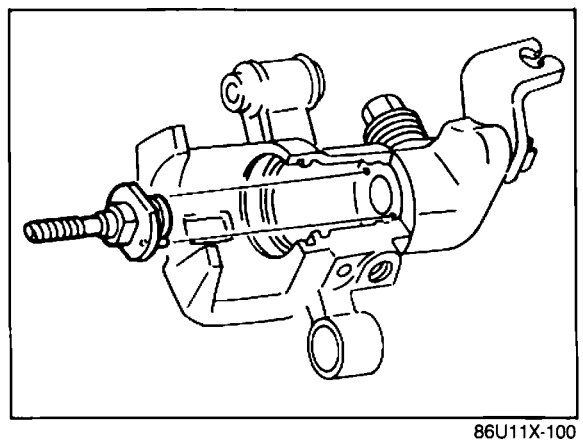
2. Press the needle bearing into the caliper with the **SST** until the **SST** bottoms against the caliper.



86U11X-099

Connecting link

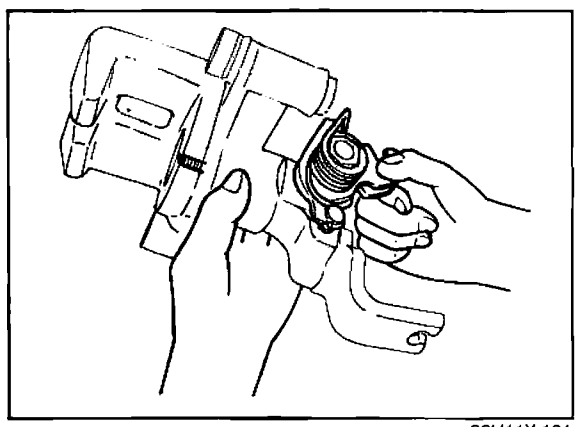
Install the connecting link into the operating lever.



86U11X-100

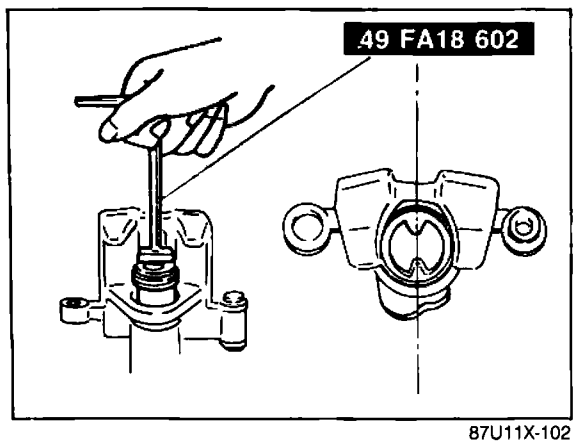
Adjuster spindle

1. Assemble the adjuster spindle and the stopper.
2. Install the adjuster and stopper straight into the caliper cylinder with the two stopper pins fit into the caliper.
3. Install the snap ring.



86U11X-101

4. Move the operating lever and check that the adjuster spindle moves smoothly.



87U11X-102

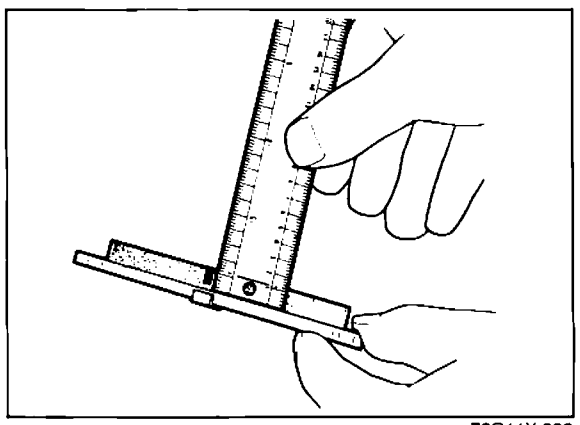
Piston

1. Clean the piston.
2. Install the dust seal in the piston groove.
3. Turn the piston into the caliper cylinder while rotating the **SST** clockwise.

Note
Turn the piston in fully, and align the piston grooves as shown in the illustration.

4. Fit the dust seal into the caliper cylinder.

11 REAR DISC BRAKE

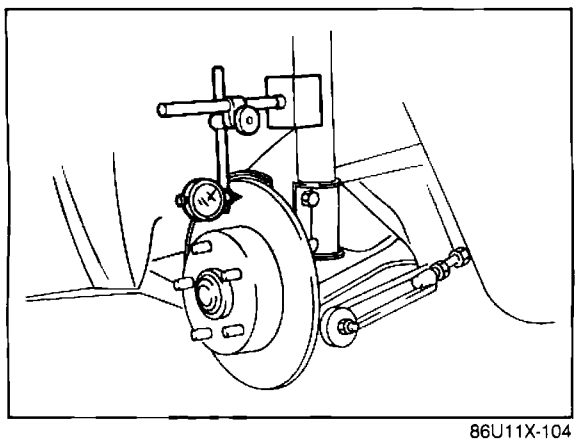


76G11X-086

INSPECTION
Check the following and replace or repair any faulty parts.

Disc Pad
1. Oil or grease on facing
2. Abnormal wear or cracks
3. Deterioration or heat damage
4. Remaining lining thickness

Thickness: 1 mm (0.04 in) min.

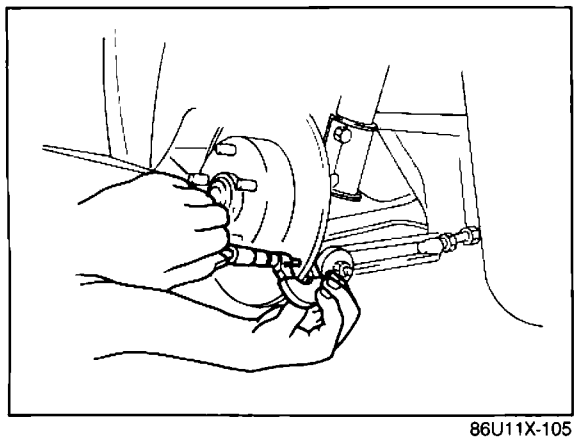


86U11X-104

Disc Plate
1. Runout

Runout: 0.1 mm (0.004 in) max.

Caution
a) There must be no wheel bearing looseness.
b) Measure at the outer edge of the disc plate surface.



86U11X-105

2. Wear or damage

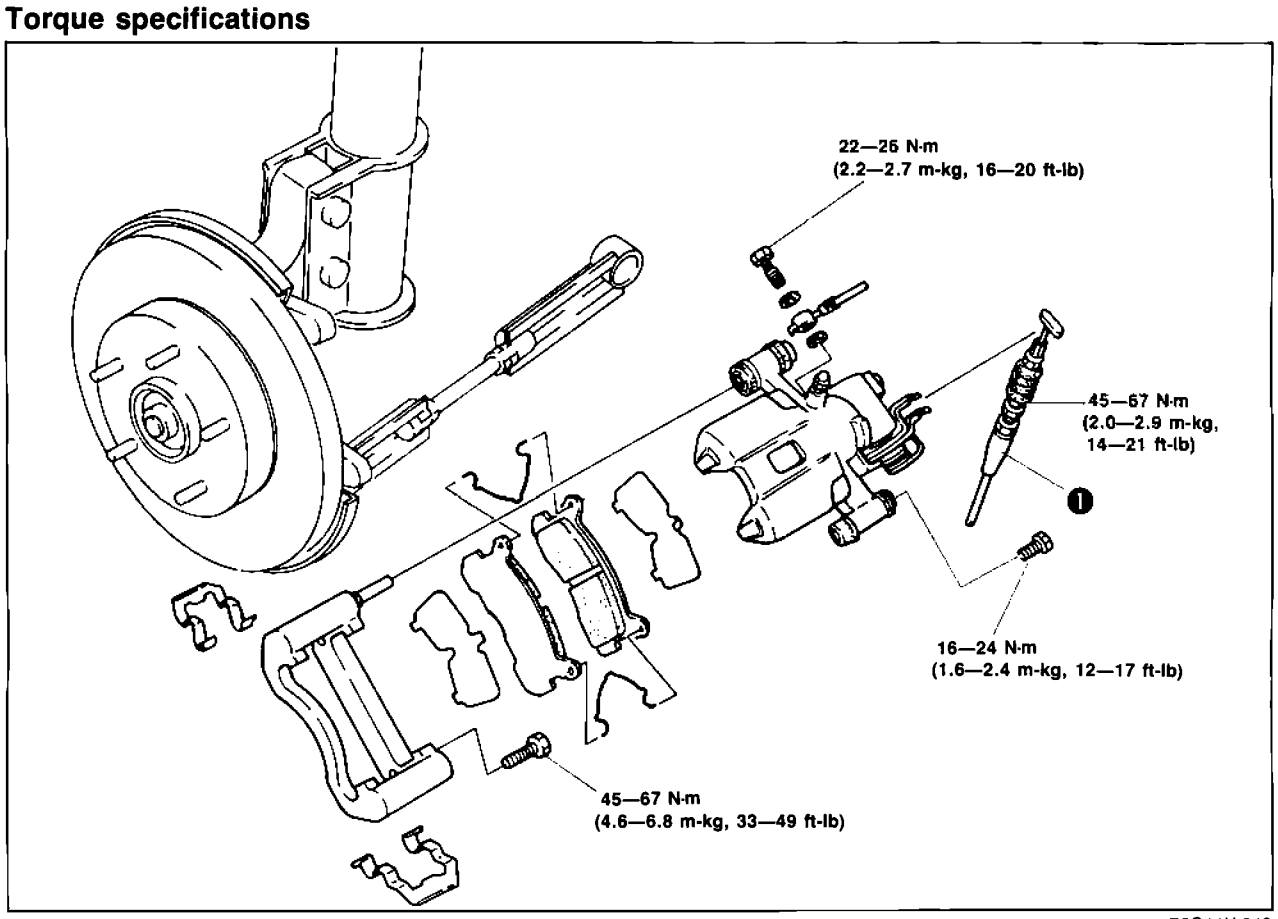
Thickness
Standard: 10 mm (0.39 in)
Minimum: 8 mm (0.31 in)

INSTALLATION

1. Install in the reverse order of removal, referring to installation note for the specially marked parts.
2. Tighten all nuts and bolts to the specified torque, referring to torque specifications.
3. After installation:
   (1) Add brake fluid and bleed air. (Refer to page 11—9.)
   (2) Adjust the parking brake lever stroke. (Refer to page 11—65.)
   (3) Depress the brake pedal a few times and check that the rear brakes do not drag excessively while the wheels are being rotated.

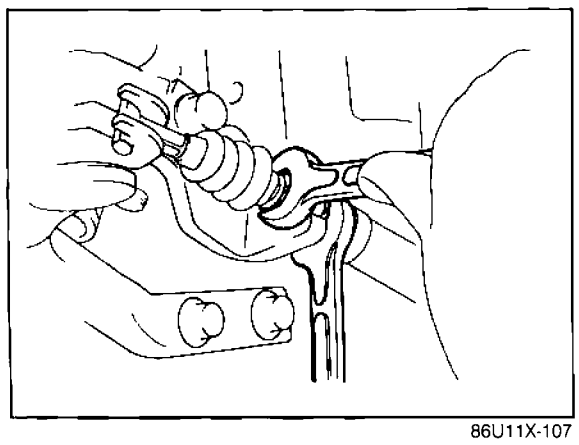
Note
Refer to page 11—47 for pad installation.

Torque specifications



76G11X-048

1. Parking brake cable



86U11X-107

Installation Note
Parking brake cable
Connect the parking brake cable end onto the operating lever; then fix it to the bracket by the locknut.

Caution
There must be no clearance between the cable end and the operating lever.

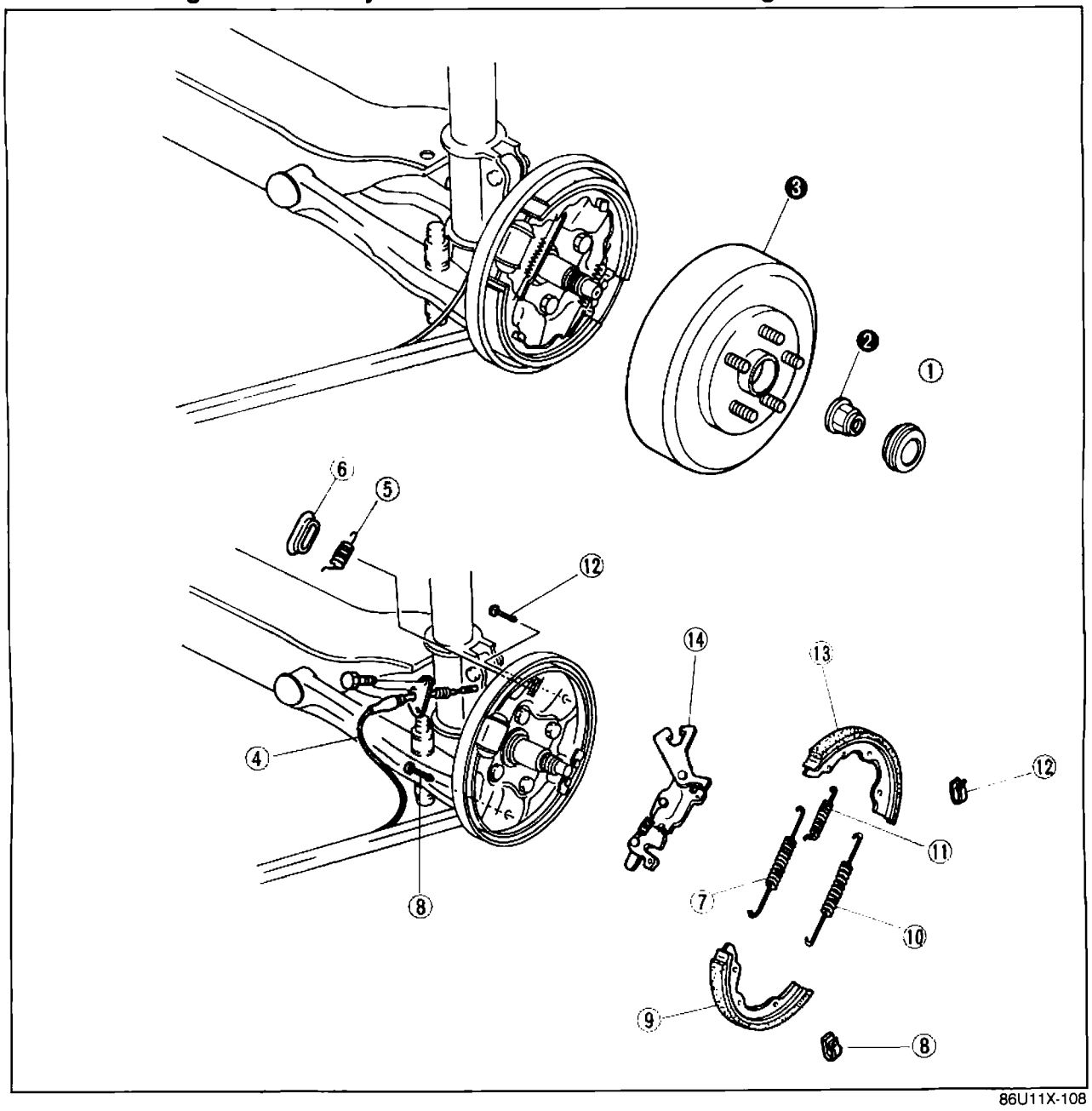
REAR DRUM BRAKE

REMOVAL

1. Loosen the wheel lug nuts.
2. Release the parking brakes.
3. Jack up the rear of the vehicle and support it with safety stands.
4. Remove the wheels.
5. Remove in the sequence shown in the figure, referring to removal note for the specially marked parts.

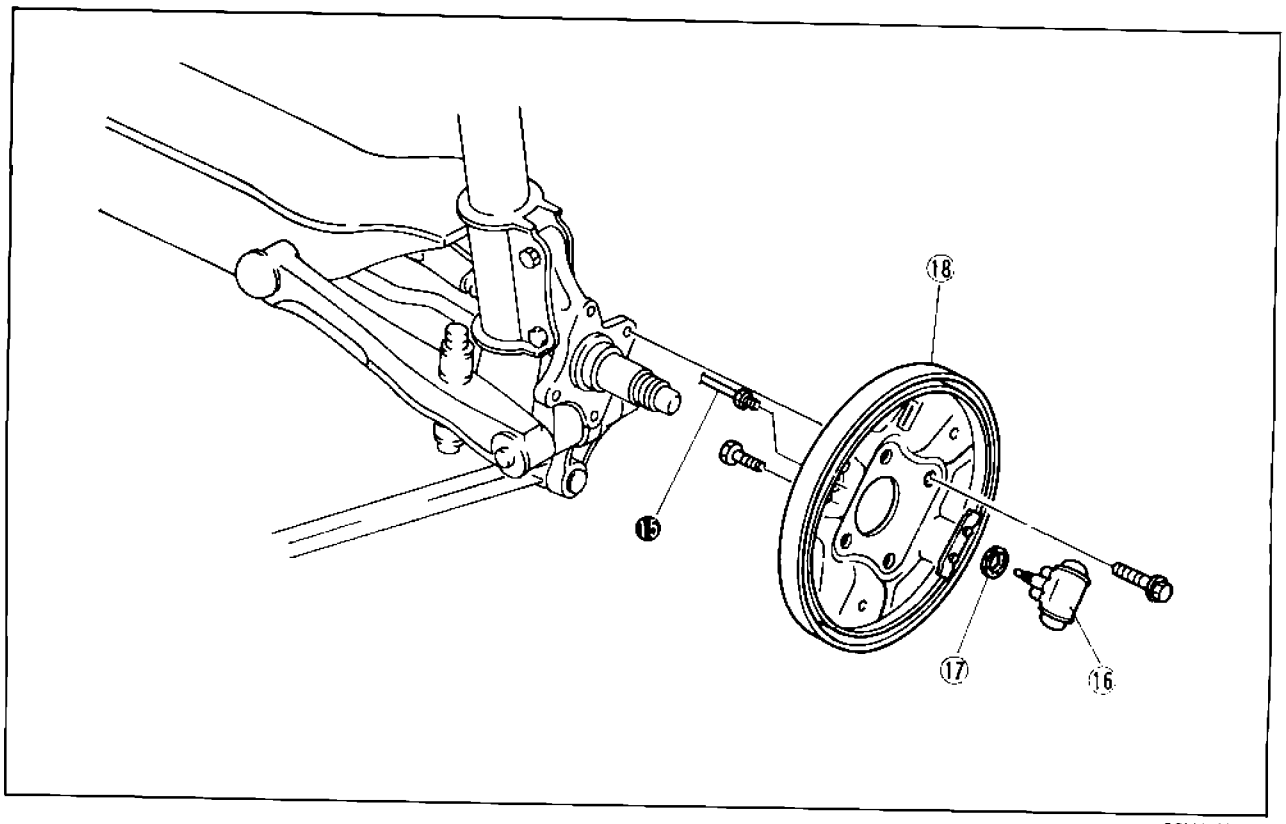
Caution

Do not damage the wheel cylinder dust boots when removing the brake shoes.



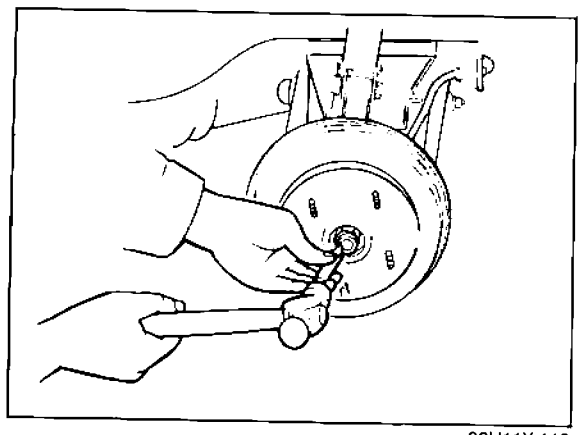
86U11X-108

1. Hub cap
2. Locknut
3. Brake drum
4. Parking brake cable
5. Return spring
6. Dust cover
7. Return spring (upper)
8. Hold pin and spring
9. Brake shoe (leading side)
10. Return spring (lower)
11. Anti-rattle spring
12. Hold pin and spring
13. Brake shoe (trailing side)
14. Operating lever assembly



86U11X-109

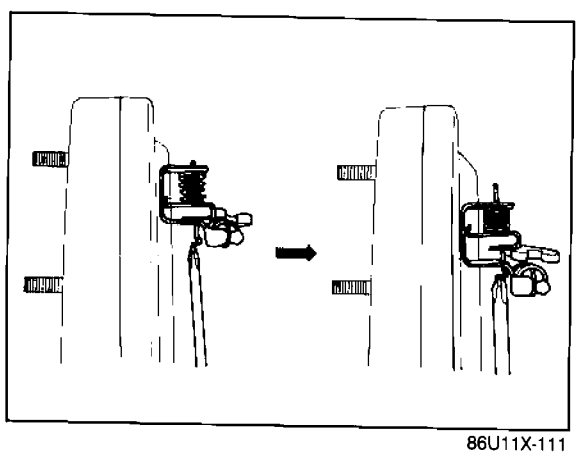
15. Brake pipe
16. Wheel cylinder assembly
17. Gasket
18. Backing plate



86U11X-110

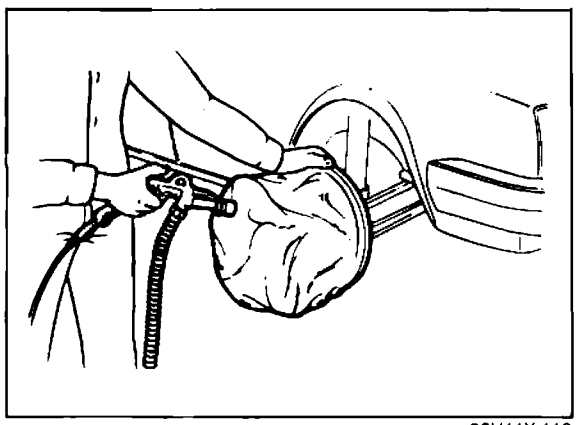
Removal Note
Locknut
Uncrimp the locknut, and remove it.

Caution
Do not reuse the locknut.



86U11X-111

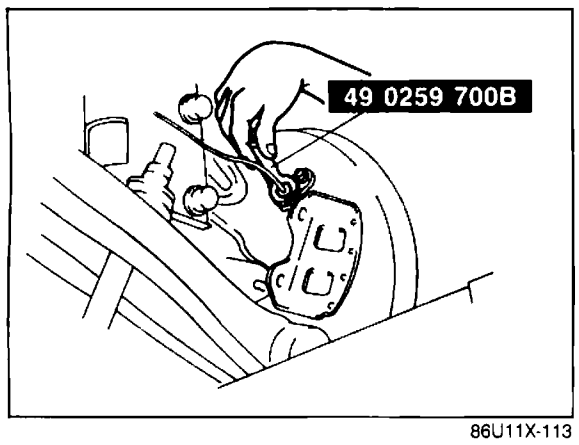
Brake drum
If the drum is difficult to remove, push the operating lever stopper (at backing plate) upward to release the operating lever and increase shoe clearance.



86U11X-112

Cleaning of drum brake assembly
Use a vacuum cleaner or equivalent to clean the brake assembly

Warning
Asbestos dust is a health hazard. When cleaning the brake assembly, do not use compressed air or a brush.



86U11X-113

Brake pipe
Disconnect the brake pipe with the **SST**.

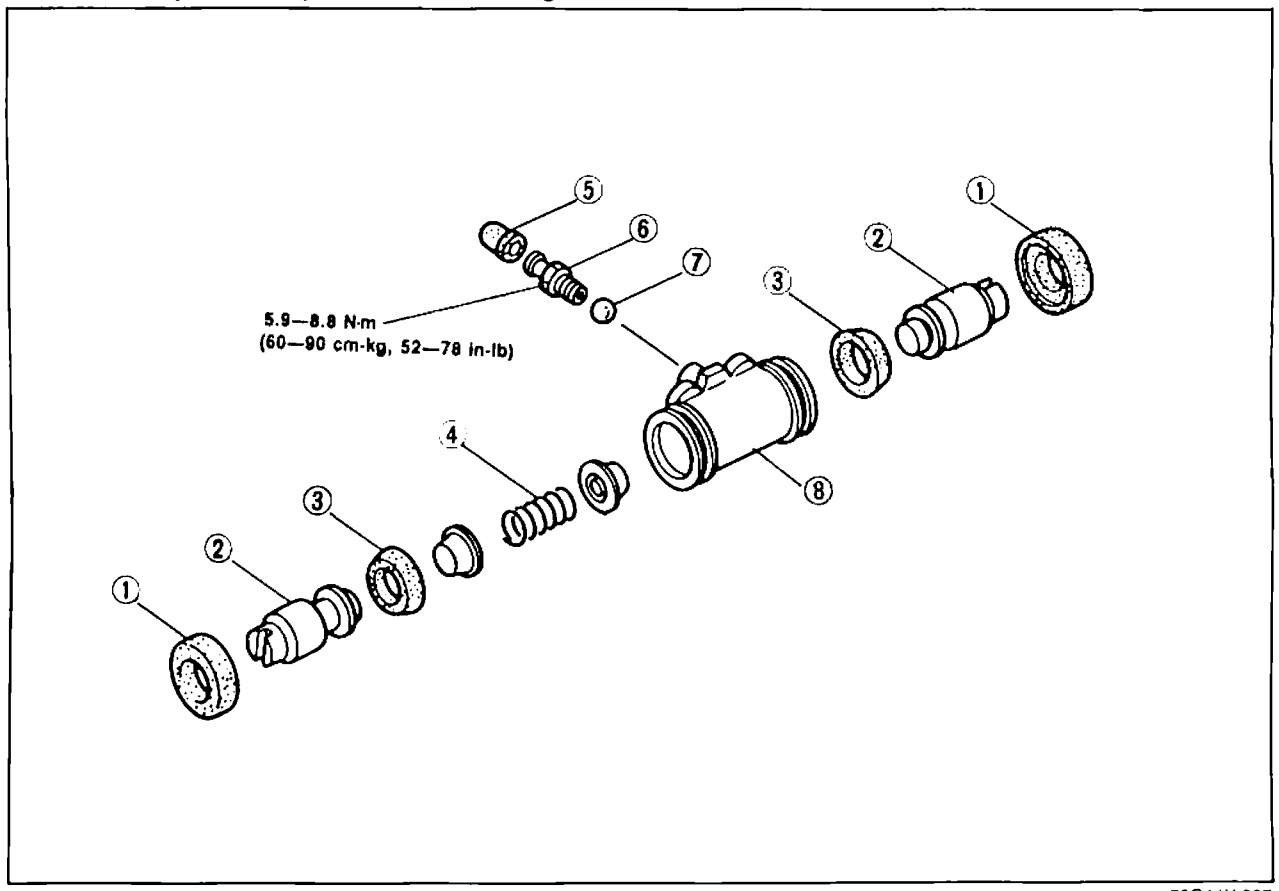
Caution
Brake fluid will damage painted surfaces. If it does get on a painted surface, wipe it off immediately.

DISASSEMBLY AND ASSEMBLY OF WHEEL CYLINDER

1. Disassemble in the sequence shown in the figure.
2. Inspect all parts, referring to inspection note.
3. Assemble in the reverse order of disassembly, referring to assembly note for the specially marked parts.

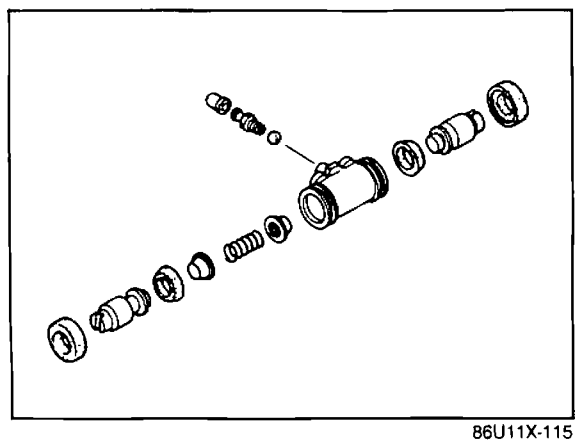
Caution
Do not damage the piston or cylinder. Do not let foreign material into the cylinder.

Note
Use new piston cups when installing.



76G11X-087

1. Dust boot
2. Piston
3. Piston cup
4. Spring
5. Rubber cap
6. Bleeder screw
7. Steel ball
8. Wheel cylinder body

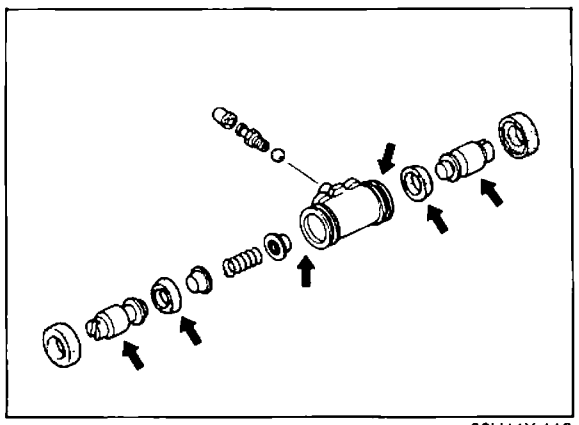


86U11X-115

Inspection Note

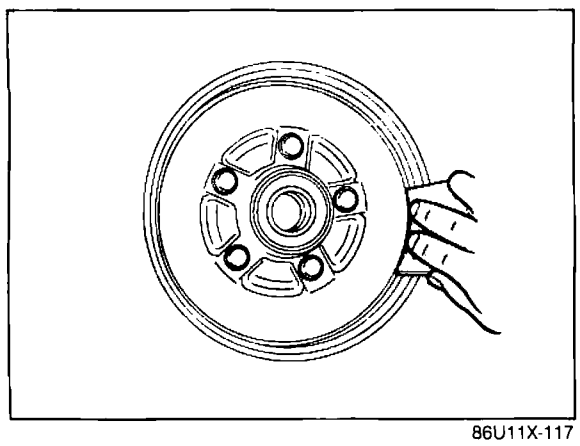
Check the following and repair or replace any faulty parts.

1. Weak or broken spring
2. Worn, rusted, or damaged wheel cylinder



86U11X-116

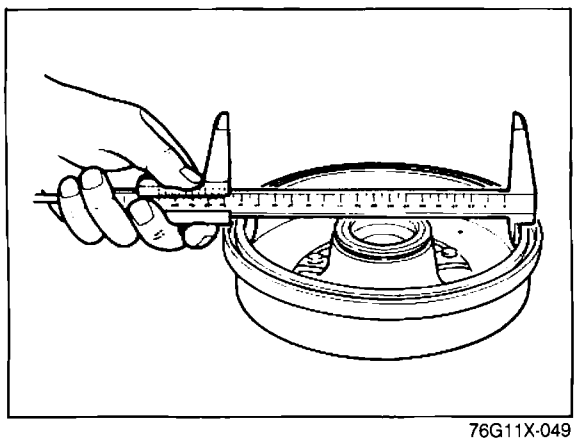
Assembly Note
Before assembly, apply brake fluid to the following parts:
1. Piston cup
2. Cylinder inner wall
3. Piston



86U11X-117

INSPECTION
Check the following and repair or replace any faulty parts.
1. Scratches, uneven or abnormal wear inside drum

Note
Repair by sanding if the problem is minor.



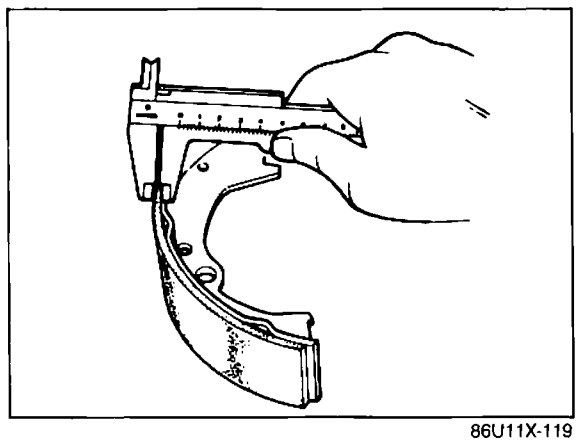
76G11X-049

2. Drum inner diameter

mm (in)

	Standard	Maximum
(a)	200.0 (7.87)	201.5 (7.93)
(b)	228.6 (9.00)	230.1 (9.06)

(a): 13-inch wheel in General LHD and RHD models
(b): Except 13-inch wheel in General LHD and RHD models

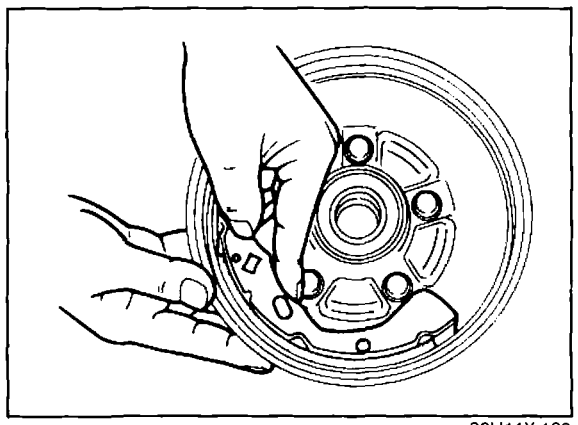


86U11X-119

3. Peeling, cracking, or extremely uneven wear of lining
4. Lining wear

Thickness: 1.0 mm (0.04 in) min.

Caution
When replacing the shoe assembly, replace the left and right shoes at the same time as a set.



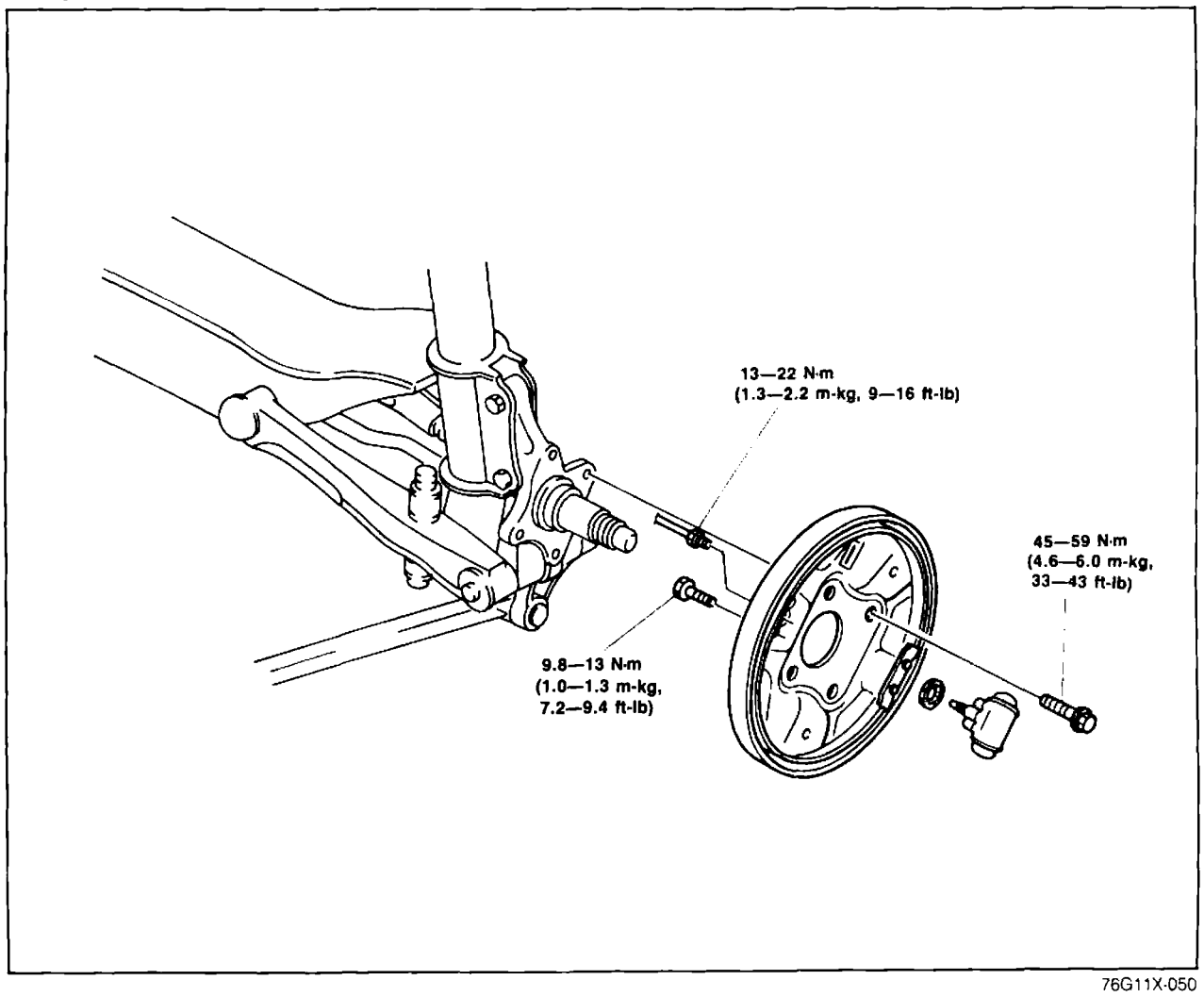
86U11X-120

5. Fit of drum and lining
   (1) Apply chalk to the inside of the drum.
   (2) Rub the shoe against the drum.
   (3) Check lining to drum contact.
   (4) After checking, remove chalk.

INSTALLATION

1. Install in the reverse order of removal.
2. Tighten all nuts and bolts to the specified torque, referring to torque specifications.
3. After installation:
   (1) Add brake fluid and bleed air. (Refer to page 11—9.)
   (2) Adjust the parking brake lever stroke. (Refer page to 11—65.)
   (3) Depress the brake pedal a few times and check that the rear brakes do not drag while the wheels are being rotated.

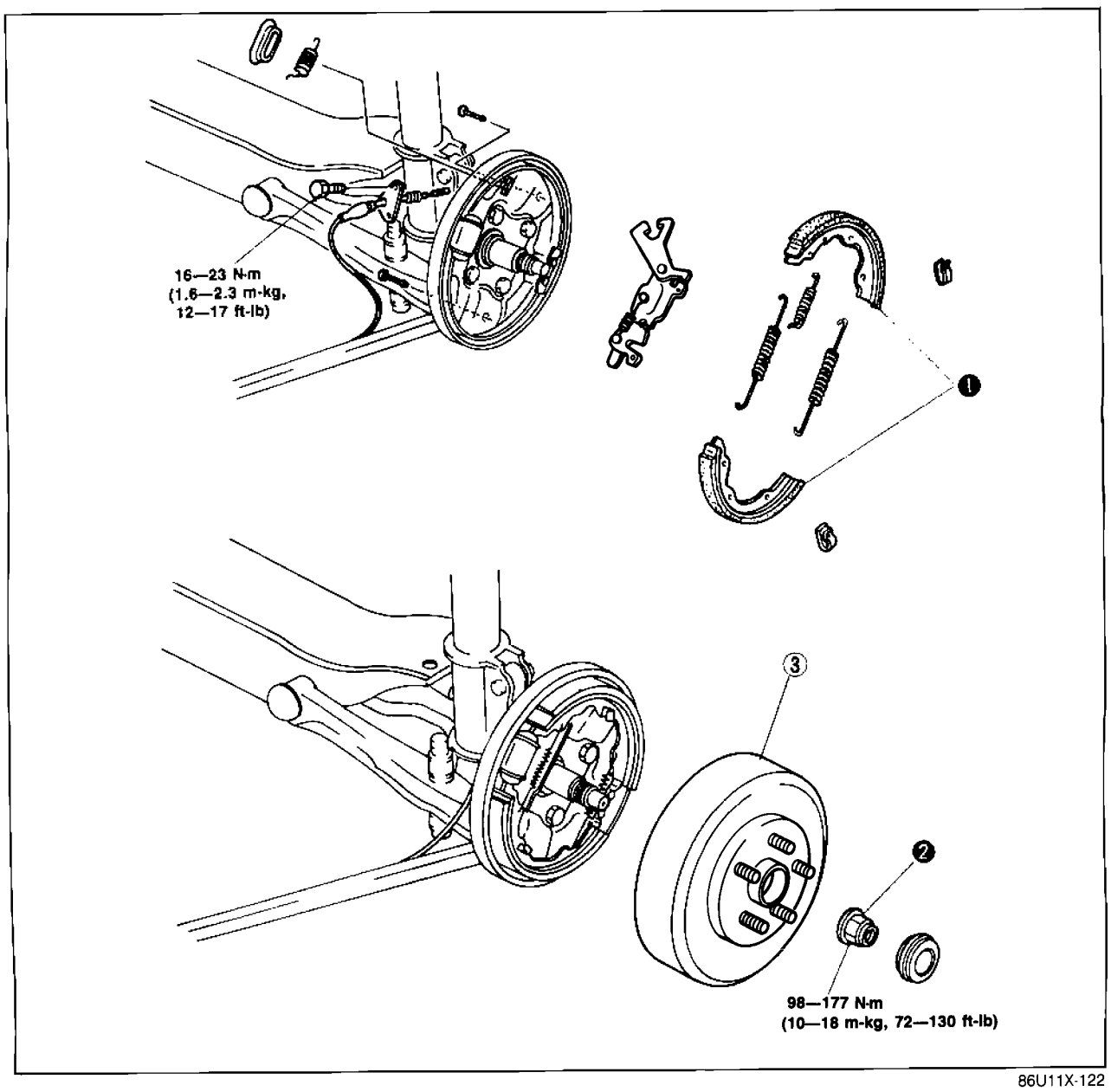
Torque specification



76G11X-050

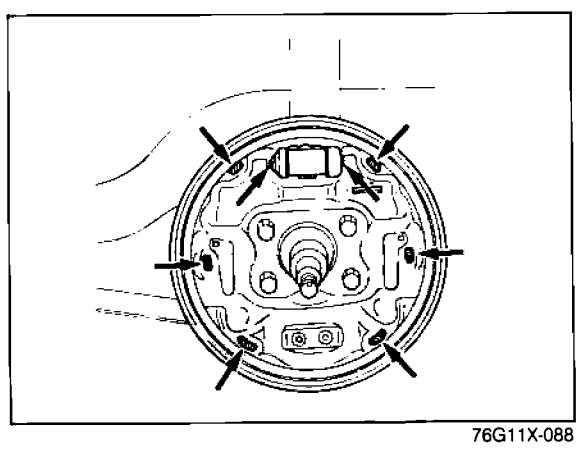
11 REAR DRUM BRAKE

Torque specification



86U11X-122

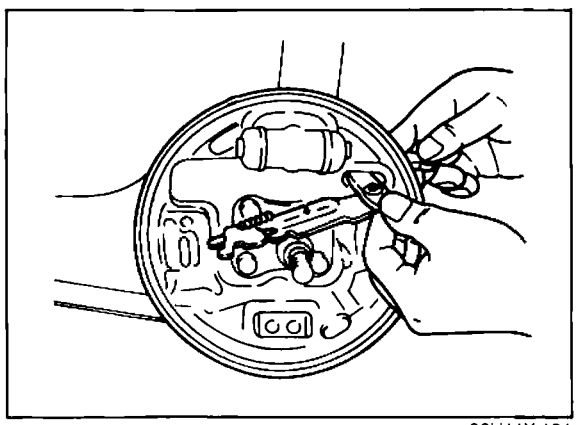
1. Brake shoe
2. Brake drum
3. Locknut



76G11X-088

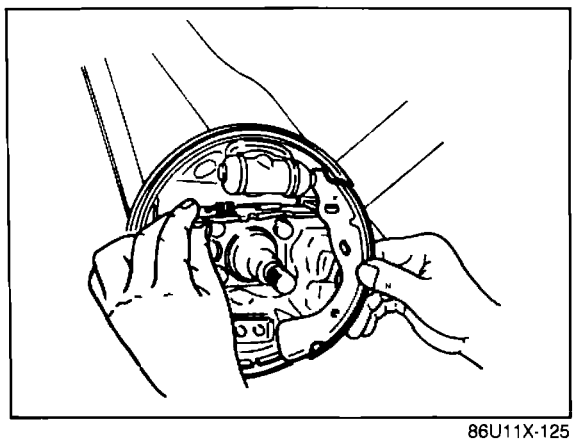
Installation Note
Brake shoes

1. Apply grease to:
   (1) Shoe and cylinder contact points
   (2) Shoe anchor points
   (3) Projections of backing plate



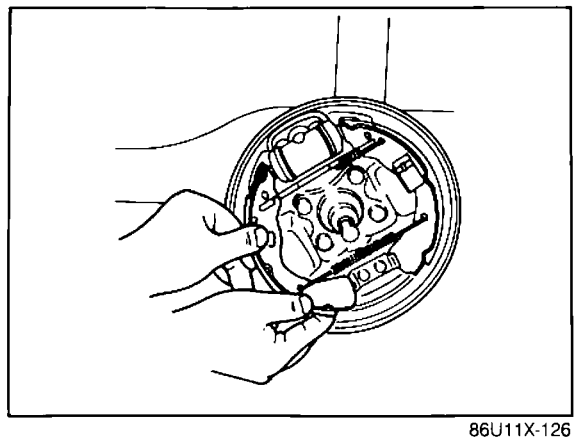
86U11X-124

2. Install the operating lever assembly through the backing plate.
3. Install the return spring to the backing plate (reverse side) and the operating lever.



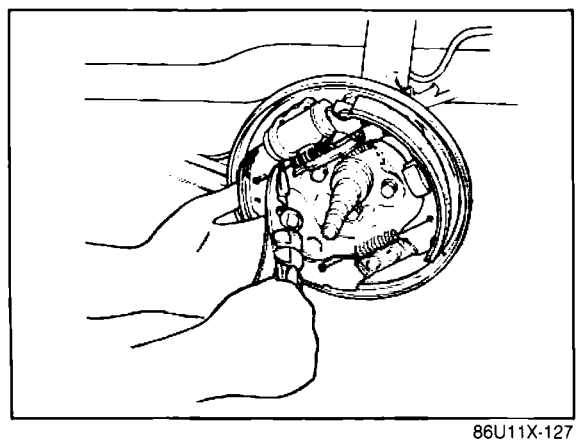
86U11X-125

4. Install the shoe (trailing side) to the operating lever, then to the wheel cylinder and anchor plate.
5. Fix the shoe with the hold spring and hold pin.
6. Install the anti-rattle spring.



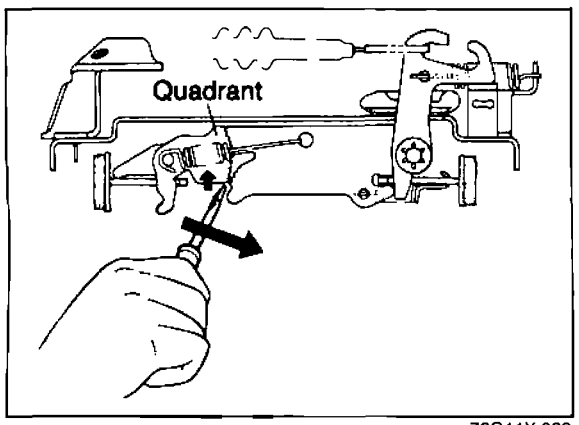
86U11X-126

7. Install the return spring (lower) to the shoes (trailing side and leading side).
8. Install the shoe leading side to the operating lever, then to the wheel cylinder and anchor plate.
9. Fix the shoe with the hold spring and hold pin.



86U11X-127

10. Install the return spring (upper).

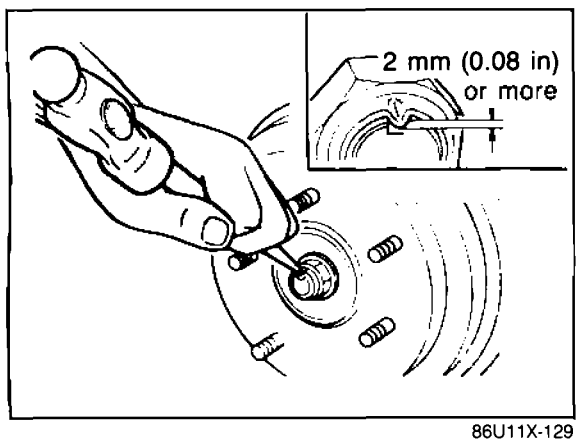


76G11X-089

Brake drum

1. Move the quadrant against the backing plate with a screwdriver and increase the shoe clearance.
2. Install the brake drum.

Note
The shoe clearance will be automatically adjusted by applying the parking brakes.



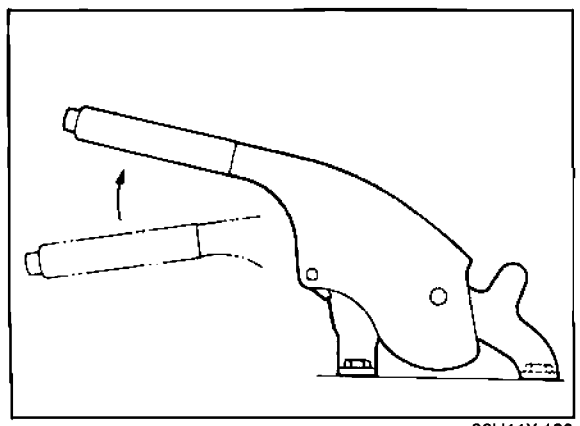
86U11X-129

Locknut

Tighten the new locknut to the specified torque and securely stake it to the spindle groove.

Tightening torque:
98—177 N·m (10—18 m-kg, 72—130 ft-lb)

Caution
Do not use a pointed tool for staking.



86U11X-130

PARKING BRAKE

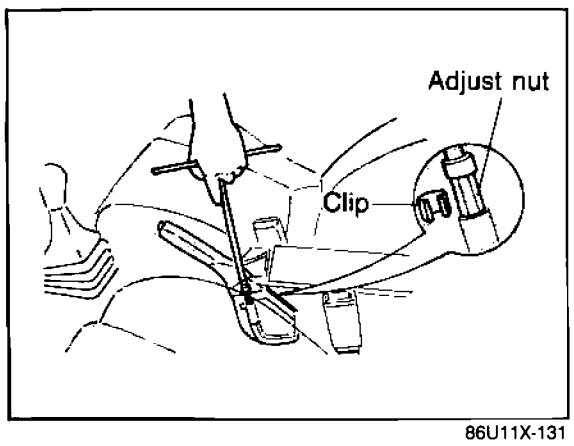
ON-VEHICLE MAINTENANCE

Parking Brake Lever Stroke

Inspection

Check that the stroke is within specification when the parking brake lever is pulled with a force of 98N (10kg, 22lb).

Stroke: 5—7 notches



86U11X-131

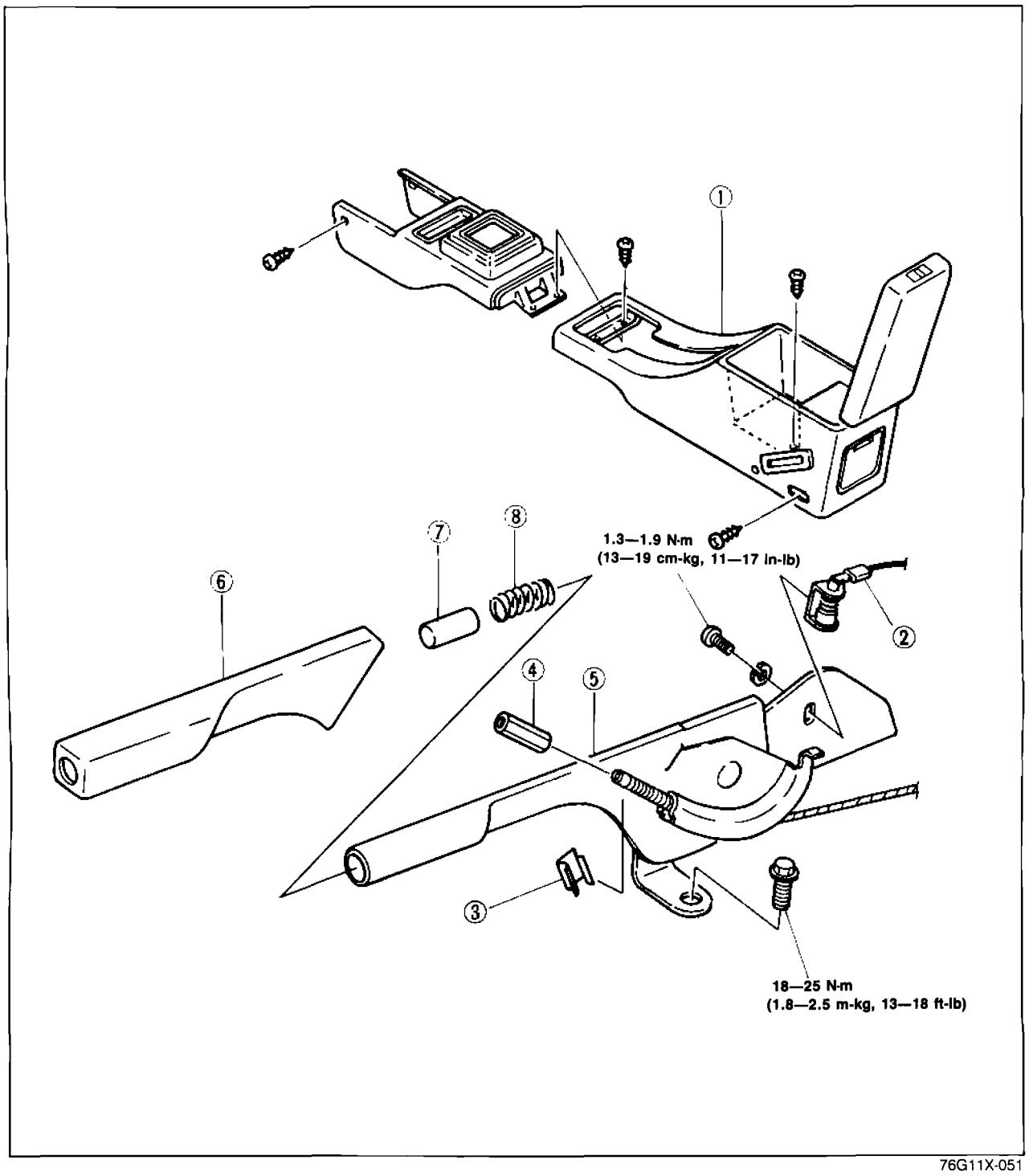
Adjustment

1. Before adjustment, start the engine and depress the brake pedal several times.
2. Stop the engine.
3. Remove the adjust nut clip and turn the adjust nut at the front of the parking cable.
4. After adjustment, check the following points:
   (1) Turn the ignition switch ON, pull the parking brake lever one notch, and check that the parking brake warning lamp illuminates.
   (2) Check that the rear brakes do not drag.

11 PARKING BRAKE

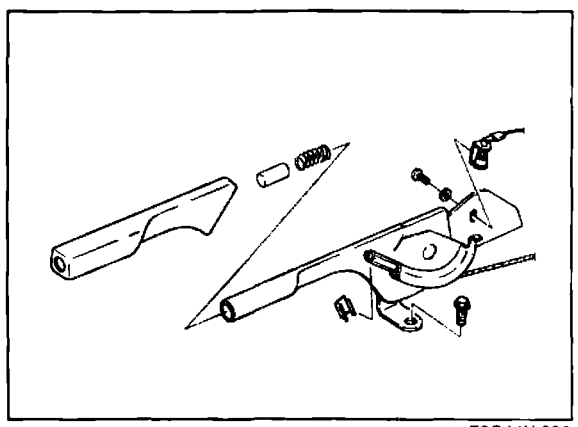
REMOVAL AND INSTALLATION OF PARKING BRAKE LEVER

1. Block the wheels firmly.
2. Release the parking brakes.
3. Remove in the sequence shown in the figure.
4. Inspect all parts, referring to inspection note.
5. Install in the reverse order of removal, referring to installation note for specially marked parts.
6. After installation:
   Adjust the parking lever stroke. (Refer to page 11—65.)



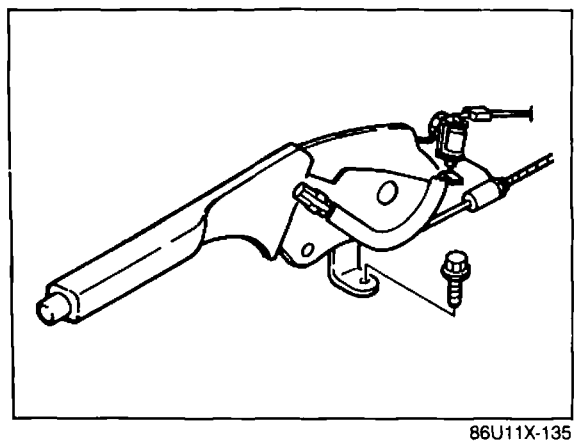
76G11X-051

1. Rear console
2. Parking brake switch
3. Clip
4. Adjust nut
5. Parking brake lever
6. Cover
7. Button
8. Spring



76G11X-090

Inspection Note
Check the following and replace any faulty parts.
1. Sector and ratchet pawl for wear and damage
2. Spring for weakness and breakage



86U11X-135

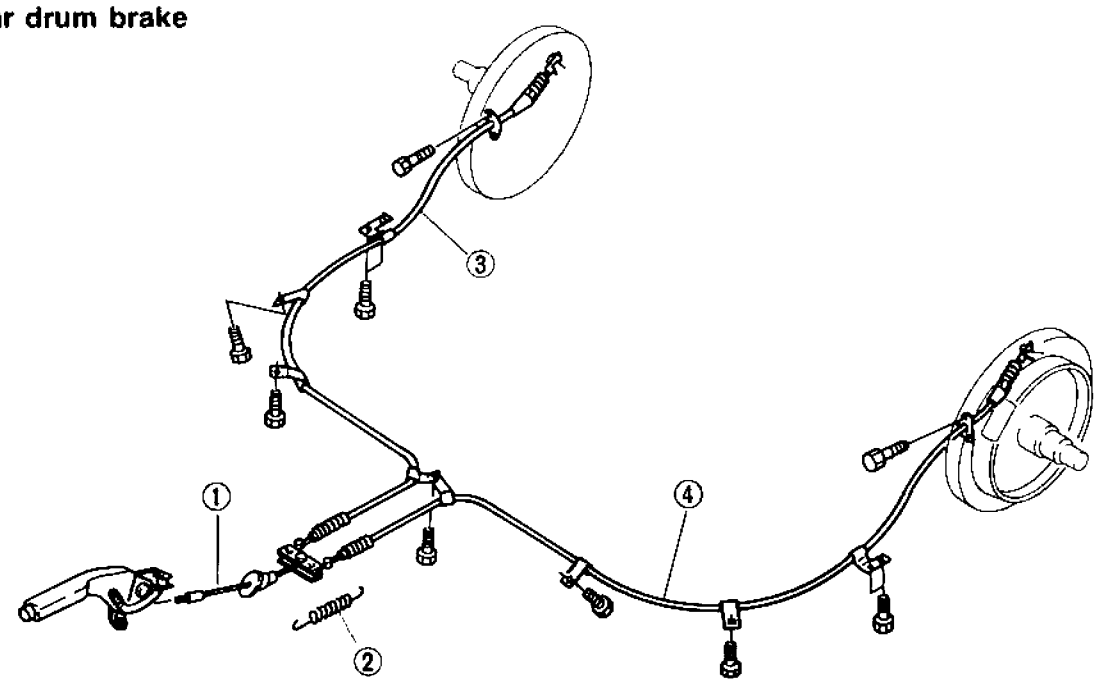
Installation Note
Parking switch
1. Install the parking switch so that it contacts the parking brake lever when the lever is released.
2. Turn the ignition switch ON, and check that the parking brake warning lamp illuminates with the lever pulled one notch.

11 PARKING BRAKE

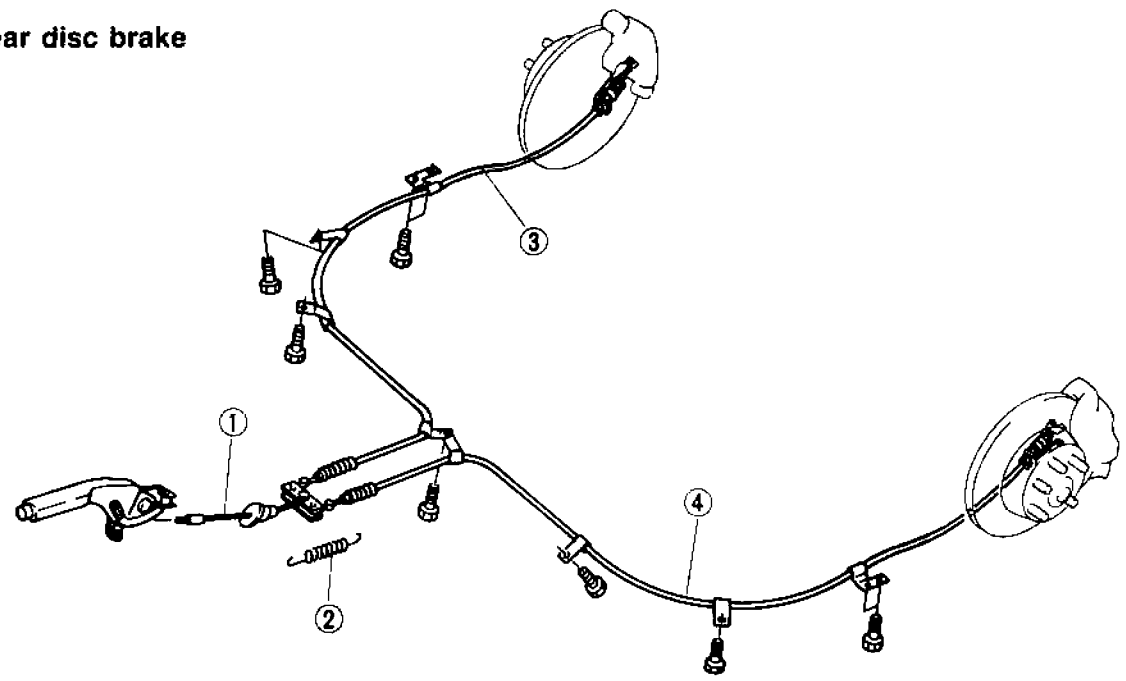
REMOVAL OF PARKING BRAKE CABLE

1. Block the wheels firmly.
2. Remove the rear console. (Refer to page 11—66.)
3. Release the parking brake and remove the adjust nut of the parking brake lever. (Refer to page 11—66.)
4. Jack up the vehicle and support it with safety stands.
5. Remove the parking brake cable in the sequence shown in the figure.

Rear drum brake



Rear disc brake



76G11X-052

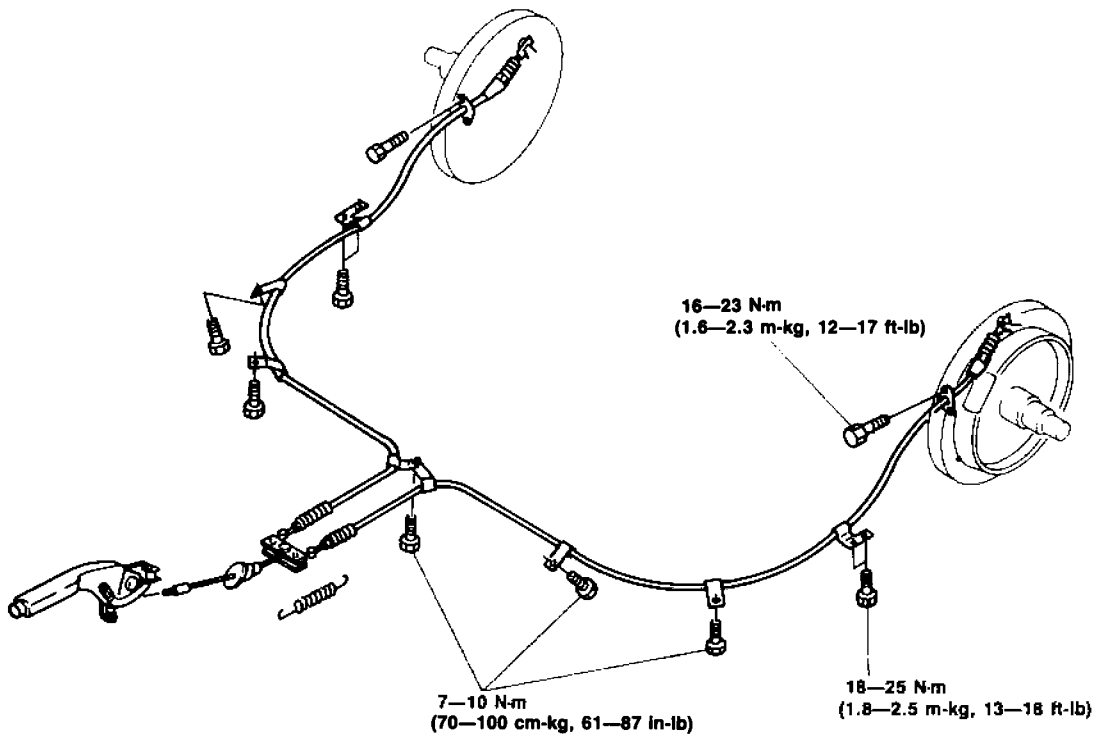
1. Front parking cable
2. Spring
3. Parking brake cable (left)
4. Parking brake cable (right)

INSTALLATION OF PARKING BRAKE CABLE

1. Install in the reverse order of removal, referring to installation note for specially marked parts.
2. Tighten all nuts and bolts to the specified torque, referring to torque specifications.
3. After installation:
   (1) Adjust the parking brake lever stroke. (Refer to page 11—65.)
   (2) Depress the brake pedal a few times and check that the rear brakes do not drag while the wheels are being rotated.

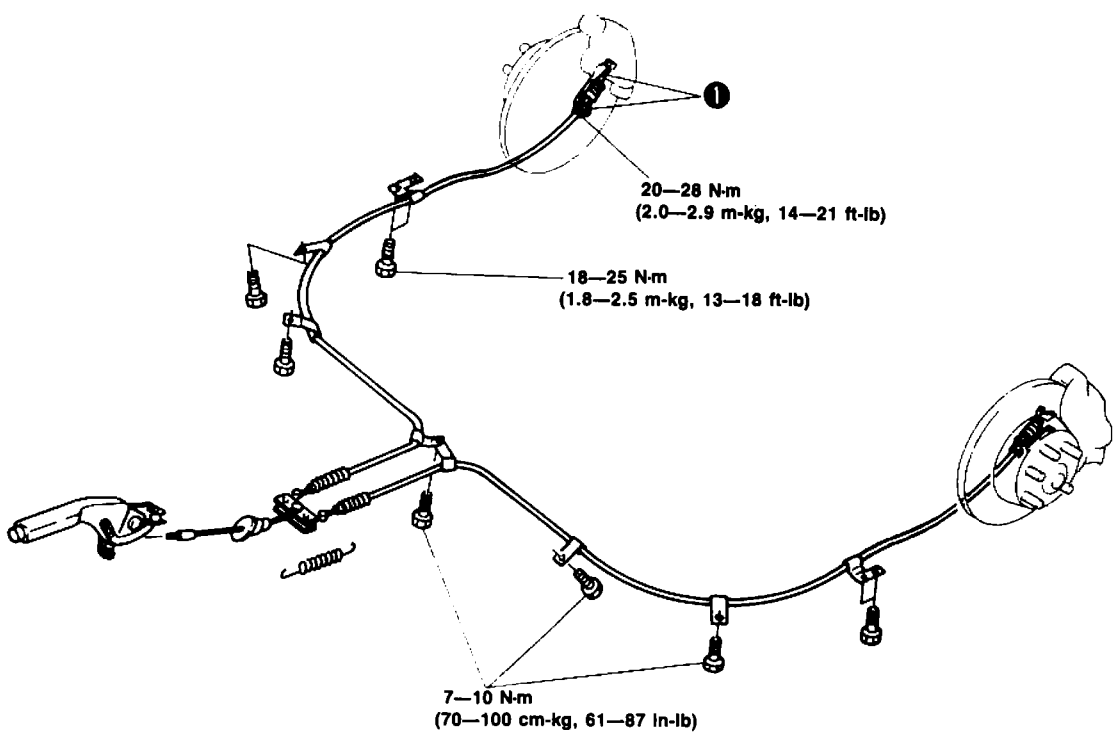
Torque specifications

Rear drum brake



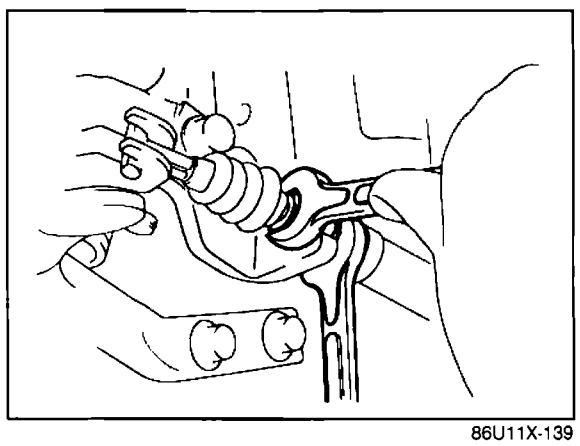
76G11X-053

Rear disc brake



86U11X-138

1. Parking brake cable (rear disc brake)



86U11X-139

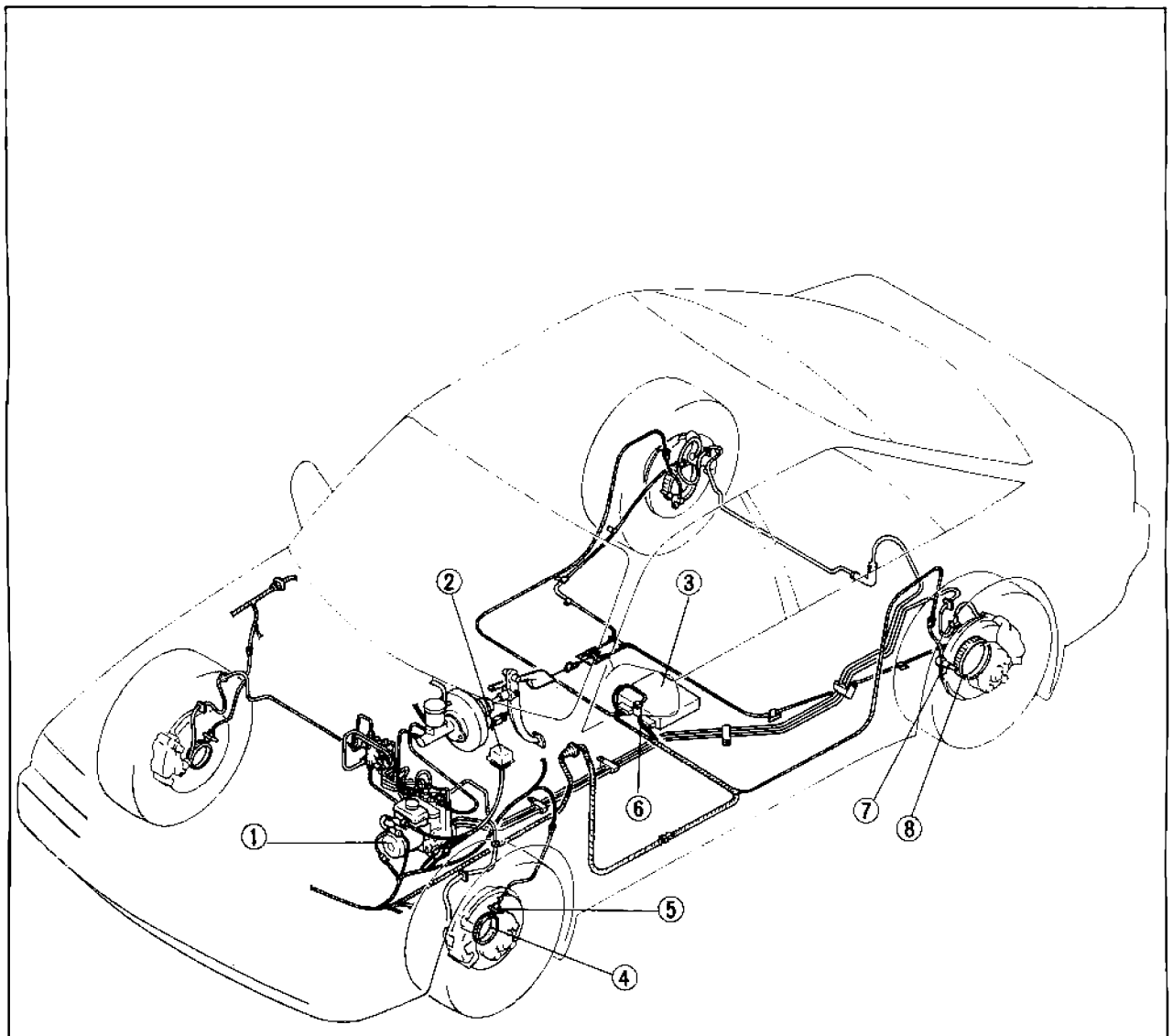
Installation Note
Parking brake cable (Rear disc brake)
Connect the cable end to the operating lever; then tighten the locknut.

Tightening torque:
20—28 N·m (2.0—2.9 m-kg, 14—21 ft-lb)

Caution
There must be no clearance between the cable end and the operating lever.

ANTI-LOCK BRAKE SYSTEM (ABS)

STRUCTURAL VIEW

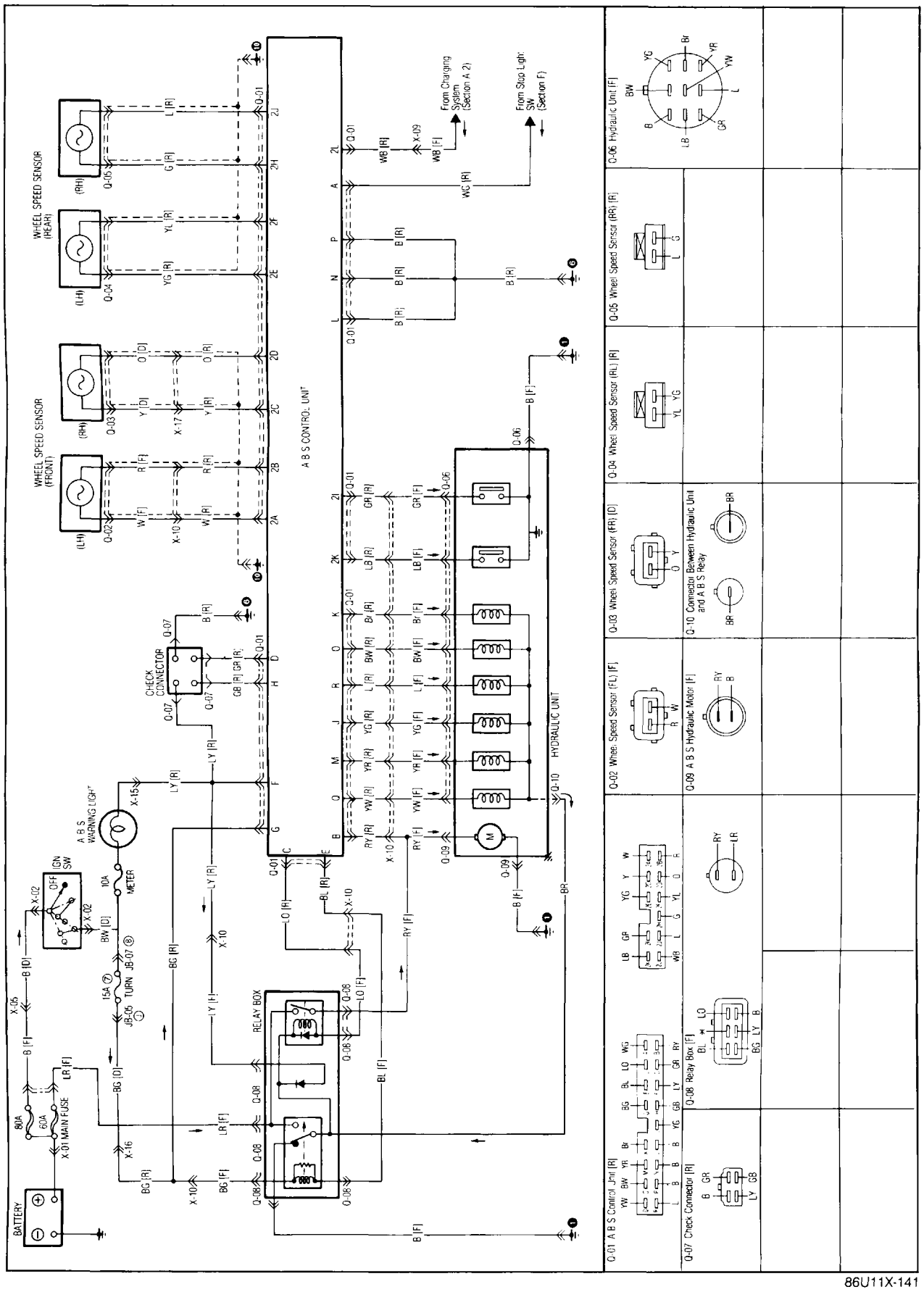


86U11X-140

1. Hydraulic unit
2. Relay box
3. Control unit
4. Sensor rotor (front)
5. Wheel speed sensor (front)
6. Check connector
7. Wheel speed sensor (rear)
8. Sensor rotor (rear)

11 ANTI-LOCK BRAKE SYSTEM (ABS)

WIRING DIAGRAM



86U11X-141

TROUBLESHOOTING

Precaution

Conditions that are not malfunctions

1. It may happen that vibration is felt in the steering wheel, body, and/or brake pedal when the ABS is functioning; such vibration is simply an indication that the system is functioning.
2. Sound of the pump motor operating, accumulator pressure being released, or the relay operating may be heard from the engine compartment when the engine is started as the system is being automatically checked.
3. The ABS pump motor may be automatically activated even though the ABS is not operating.
4. The ABS warning light may illuminate under any of the following conditions:
   - When the vehicle is traveling on snow or ice with the parking brake activated or a brake dragging at one wheel.
   - When different-sized tires are used.
   - When tires of different gripping performance are used.
   - When (while the vehicle is jacked up or stuck) only the front wheels are spun for 20 seconds or more.
   - When there is insufficient battery voltage.

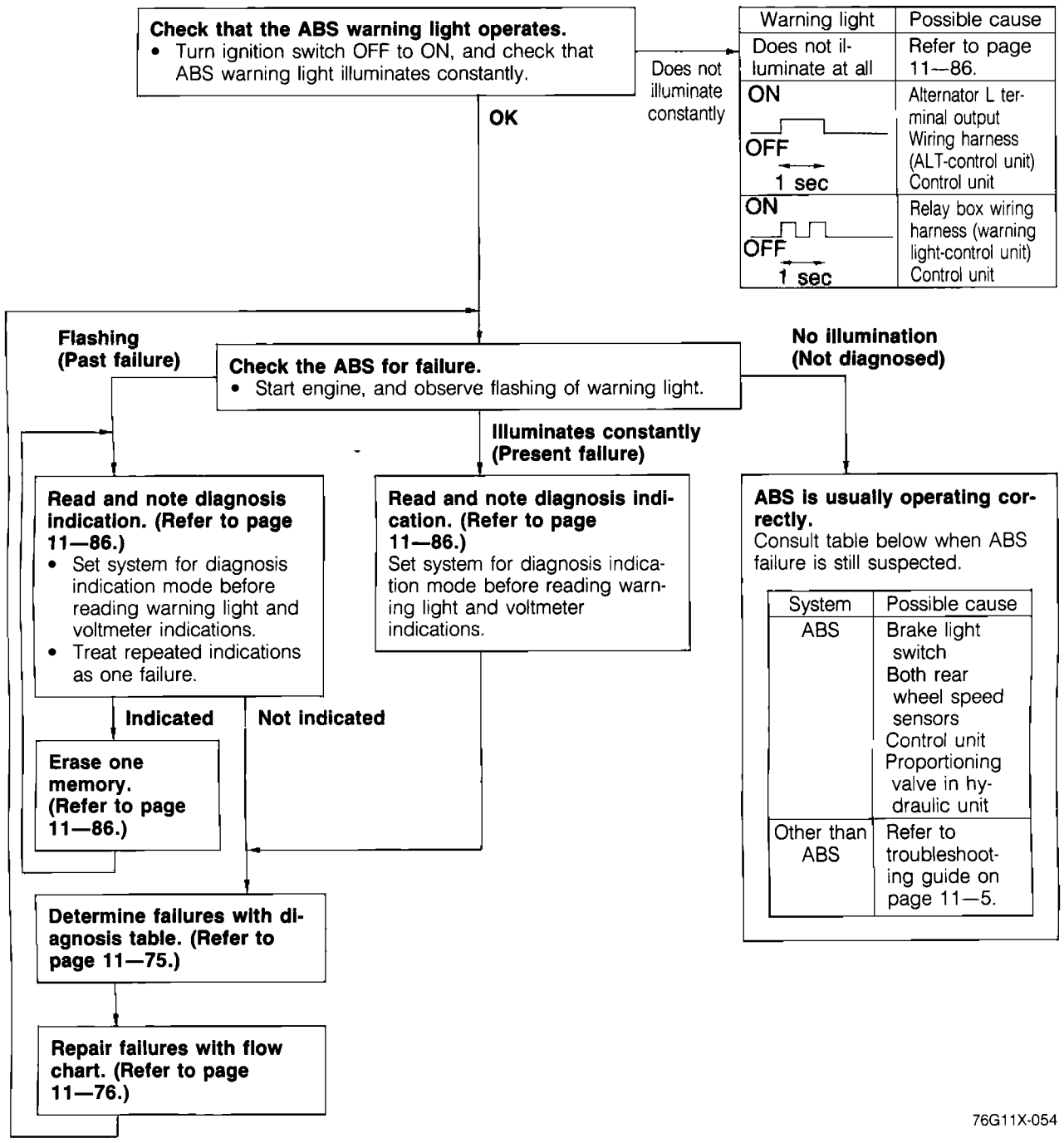
Note
Under the above conditions, the warning light will not illuminate a second time when the ignition is switched OFF then back ON, and there will be no memory entry to the control unit of a problem.

Troubleshooting notes

The ABS is composed of electrical components, mechanical components (hydraulic unit), and the components of the standard brake system.
Fundamentally, malfunction of the ABS electrical or mechanical components is judged by the self-diagnosis function within the ABS control unit. And malfunctions are indicated by the warning light in the instrument panel.
The location of a malfunction is indicated by the technician switching the system to the diagnosis-indication mode.
The self-diagnosis and indication functions must be used when malfunctions of the ABS are being diagnosed.

76G11X-091

Troubleshooting Main Flow Chart



Diagnosis Table

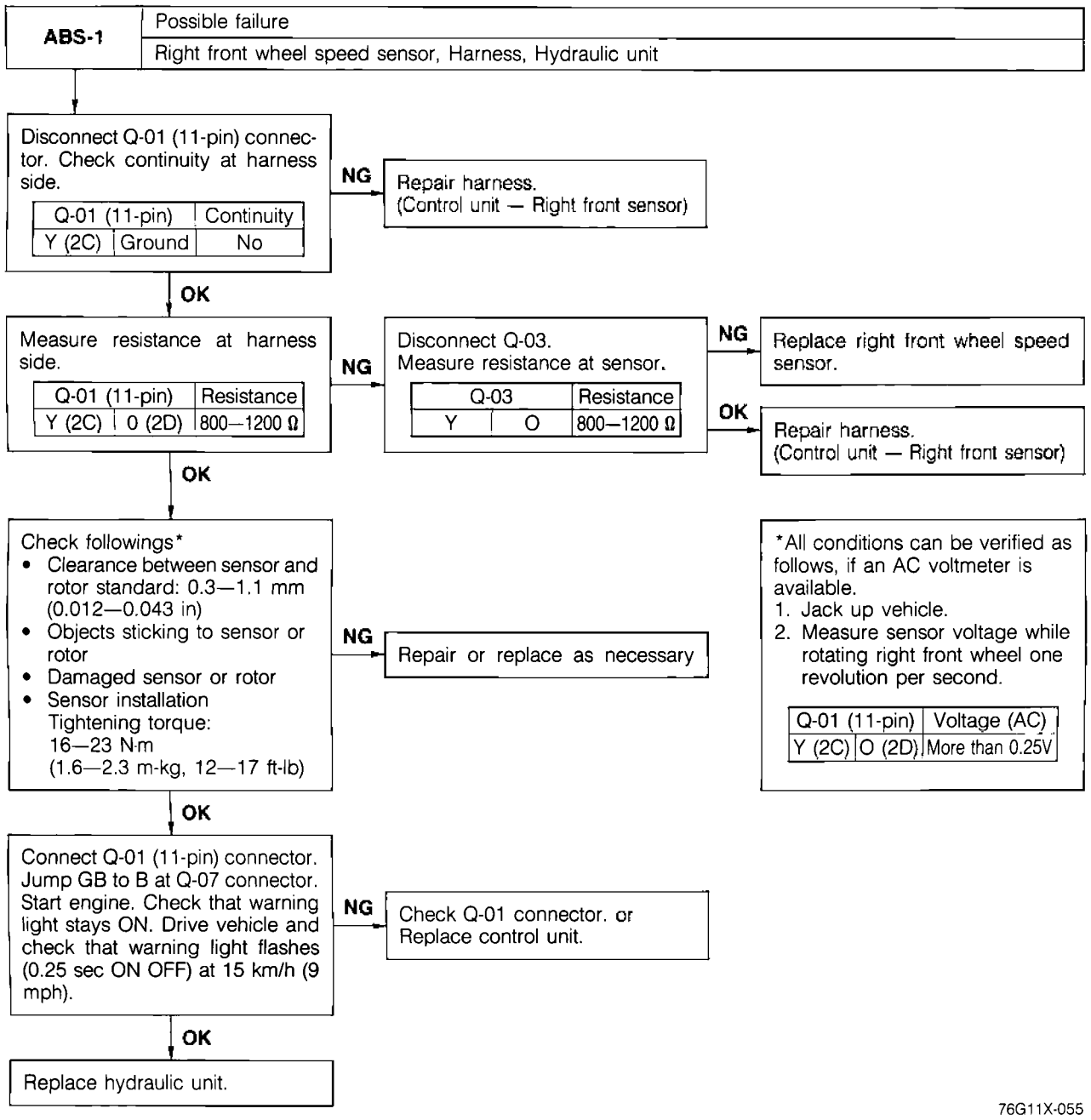
Note
Flashing of the warning light shows past failure, and its illumination shows present failure.

Diagnosis indication		Possible failure		Flow chart No.
Warning light	Voltmeter			
ON / OFF	12V / 0V	Hydraulic unit Harness	Right front wheel speed sensor	ABS-1
			Left front wheel speed sensor	ABS-2
			Rear wheel speed sensor	ABS-3
		Right front sensor rotor		ABS-4
		Left front sensor rotor		ABS-5
		Right rear sensor rotor		ABS-6
		Left rear sensor rotor		ABS-7
		Hydraulic unit Harness Control unit connector (11-pin)		ABS-8
		Relay box Hydraulic unit Harness		ABS-9
				ABS-10
				ABS-11
				ABS-12
				ABS-13
				ABS-14
		Hydraulic unit Harness Control unit		ABS-15
				ABS-16
		Control unit		ABS-17
				ABS-18
	No signal; failure conditions not stored in memory	Control unit Control unit connector (17-pin) Battery capacity Alternator output voltage Wiring harness (warning light-control unit-check connector)		Inspect, and repair or replace as necessary
		No problem	When warning light does not illuminate with engine running and no jumper wire	

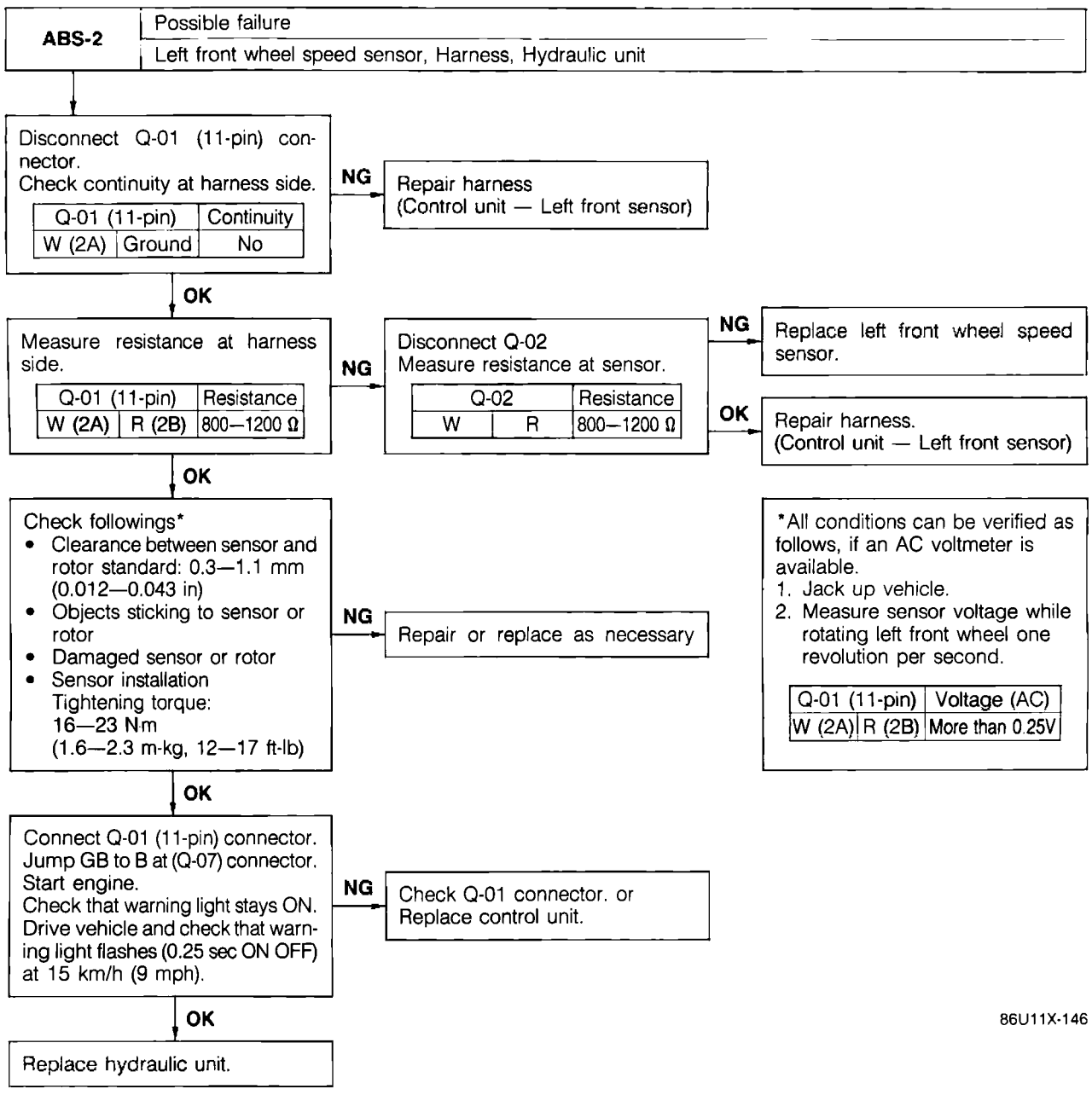
76G11X-092

11 ANTI-LOCK BRAKE SYSTEM (ABS)

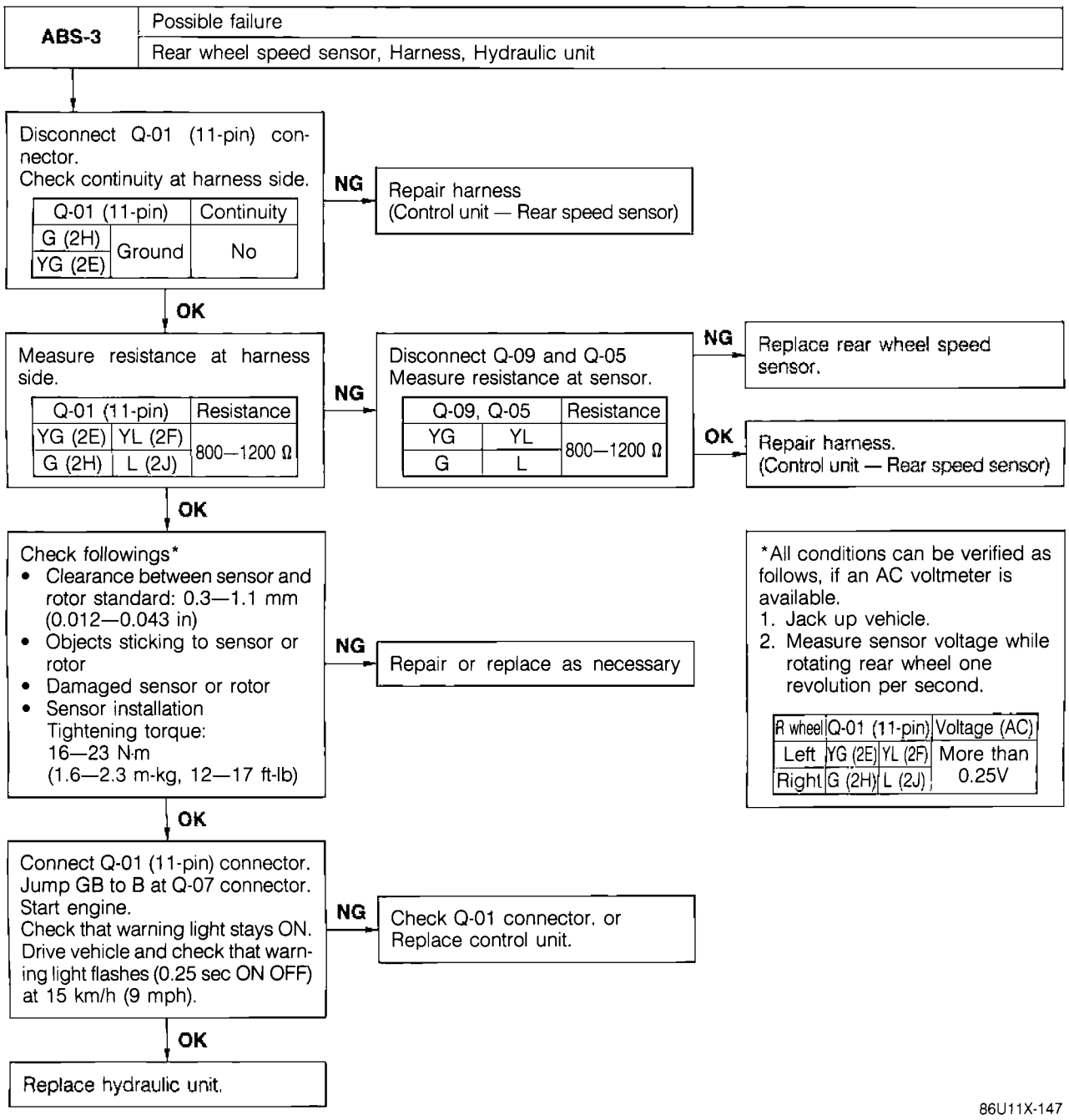
Flow Chart (Refer to Wiring Diagram, Page 11—72.)



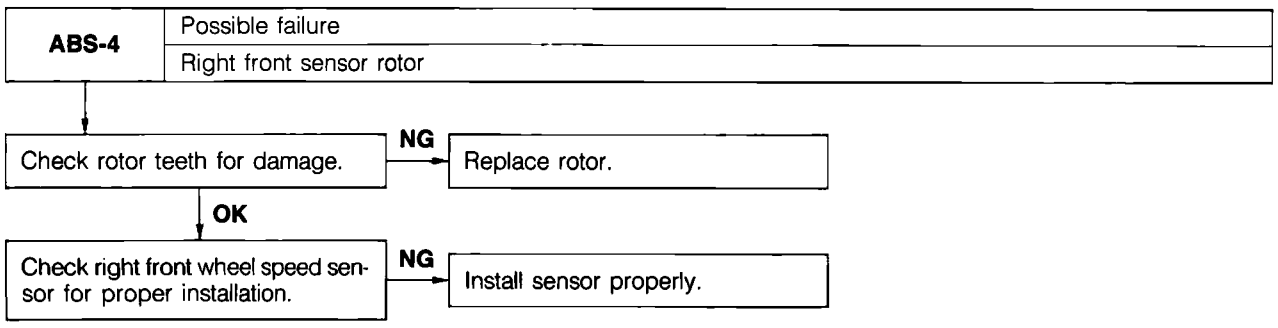
76G11X-055


ABS-2
Possible failure
Left front wheel speed sensor, Harness, Hydraulic unit
Disconnect Q-01 (11-pin) connector.
Check continuity at harness side.
Q-01 (11-pin) | Continuity
W (2A) | Ground | No
NG
Repair harness
(Control unit — Left front sensor)
OK
Measure resistance at harness side.
Q-01 (11-pin) | Resistance
W (2A) | R (2B) | 800—1200 Ω
NG
Disconnect Q-02
Measure resistance at sensor.
Q-02 | Resistance
W | R | 800—1200 Ω
NG
Replace left front wheel speed sensor.
OK
Repair harness.
(Control unit — Left front sensor)
OK
Check followings*
• Clearance between sensor and rotor standard: 0.3—1.1 mm (0.012—0.043 in)
• Objects sticking to sensor or rotor
• Damaged sensor or rotor
• Sensor installation
Tightening torque:
16—23 N·m
(1.6—2.3 m-kg, 12—17 ft-lb)
NG
Repair or replace as necessary
*All conditions can be verified as follows, if an AC voltmeter is available.
1. Jack up vehicle.
2. Measure sensor voltage while rotating left front wheel one revolution per second.
Q-01 (11-pin) | Voltage (AC)
W (2A) | R (2B) | More than 0.25V
OK
Connect Q-01 (11-pin) connector.
Jump GB to B at (Q-07) connector.
Start engine.
Check that warning light stays ON.
Drive vehicle and check that warning light flashes (0.25 sec ON OFF) at 15 km/h (9 mph).
NG
Check Q-01 connector. or
Replace control unit.
OK
Replace hydraulic unit.

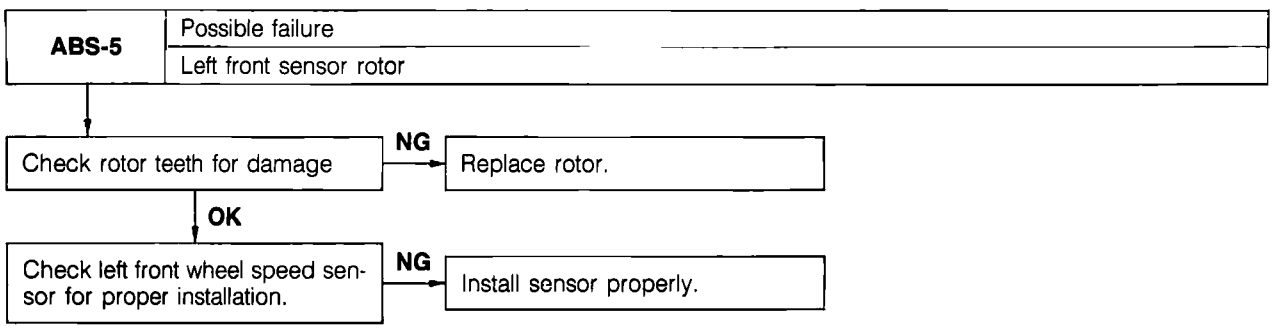
86U11X-146


ABS-3
Possible failure
Rear wheel speed sensor, Harness, Hydraulic unit
Disconnect Q-01 (11-pin) connector.
Check continuity at harness side.
Q-01 (11-pin)
Continuity
G (2H)
YG (2E)
Ground
No
NG
Repair harness
(Control unit — Rear speed sensor)
OK
Measure resistance at harness side.
Q-01 (11-pin)
Resistance
YG (2E)
YL (2F)
G (2H)
L (2J)
800—1200 Ω
NG
Disconnect Q-09 and Q-05
Measure resistance at sensor.
Q-09, Q-05
Resistance
YG
YL
G
L
800—1200 Ω
NG
Replace rear wheel speed sensor.
OK
Repair harness.
(Control unit — Rear speed sensor)
OK
Check followings*
• Clearance between sensor and rotor standard: 0.3—1.1 mm (0.012—0.043 in)
• Objects sticking to sensor or rotor
• Damaged sensor or rotor
• Sensor installation
Tightening torque:
16—23 N·m
(1.6—2.3 m-kg, 12—17 ft-lb)
NG
Repair or replace as necessary
*All conditions can be verified as follows, if an AC voltmeter is available.
1. Jack up vehicle.
2. Measure sensor voltage while rotating rear wheel one revolution per second.
R wheel
Q-01 (11-pin)
Voltage (AC)
Left
YG (2E)
YL (2F)
Right
G (2H)
L (2J)
More than 0.25V
OK
Connect Q-01 (11-pin) connector.
Jump GB to B at Q-07 connector.
Start engine.
Check that warning light stays ON.
Drive vehicle and check that warning light flashes (0.25 sec ON OFF) at 15 km/h (9 mph).
NG
Check Q-01 connector, or Replace control unit.
OK
Replace hydraulic unit.

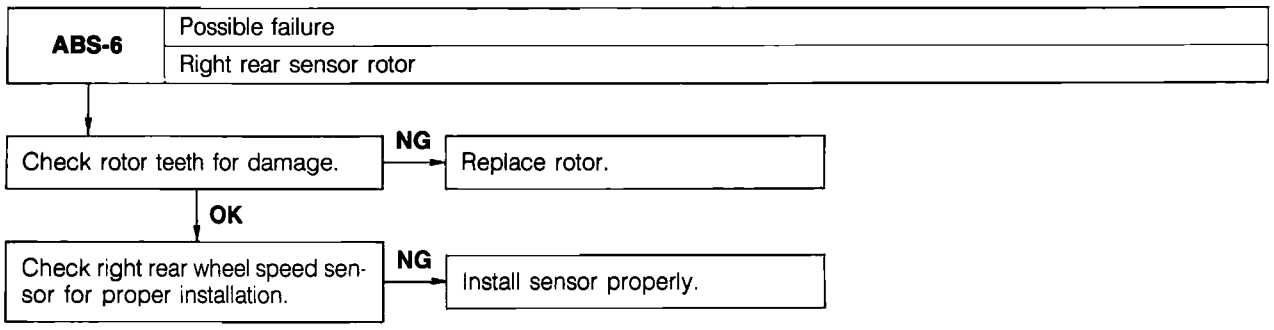
86U11X-147



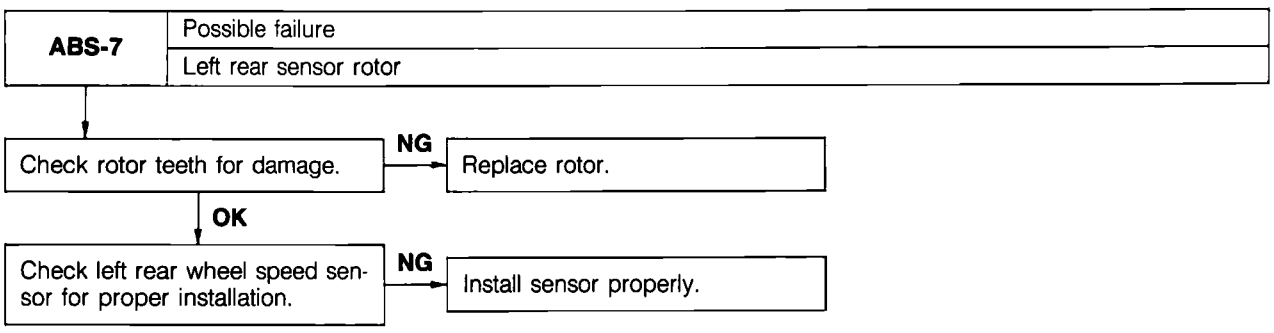
86U11X-148



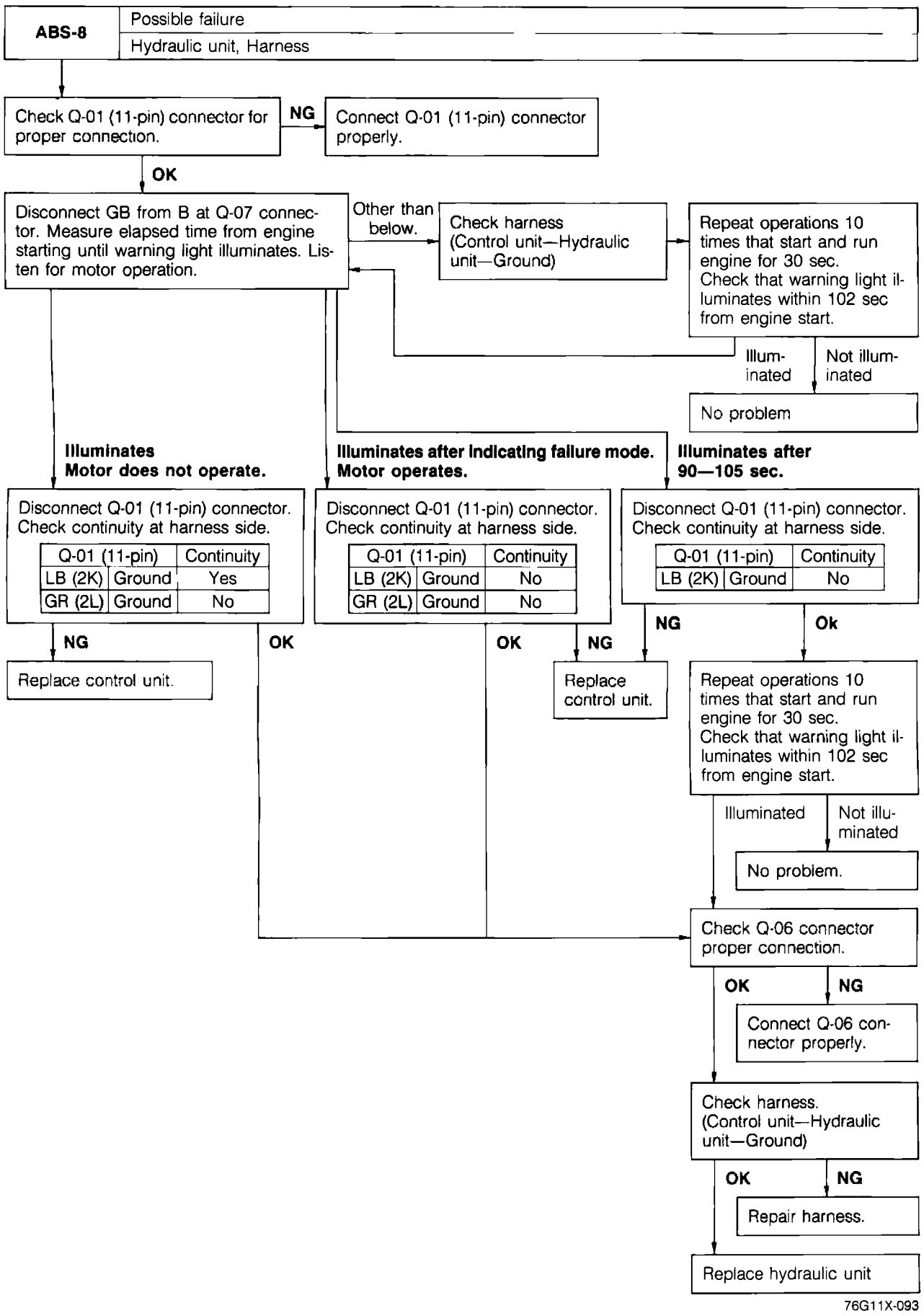
86U11X-149

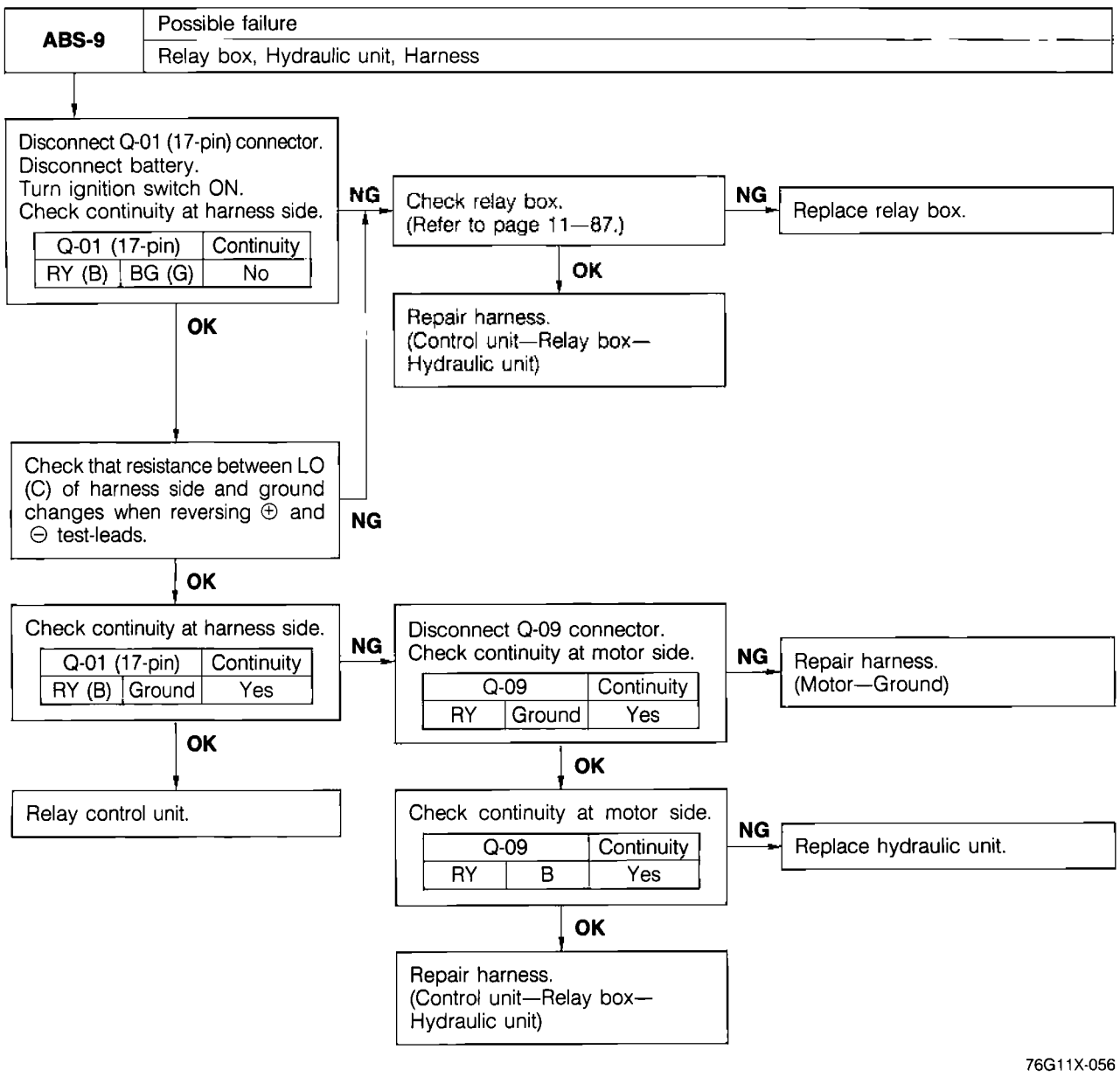


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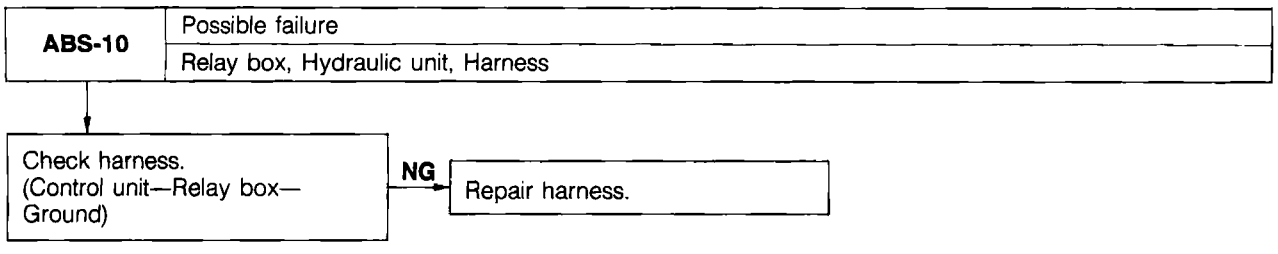


86U11X-151

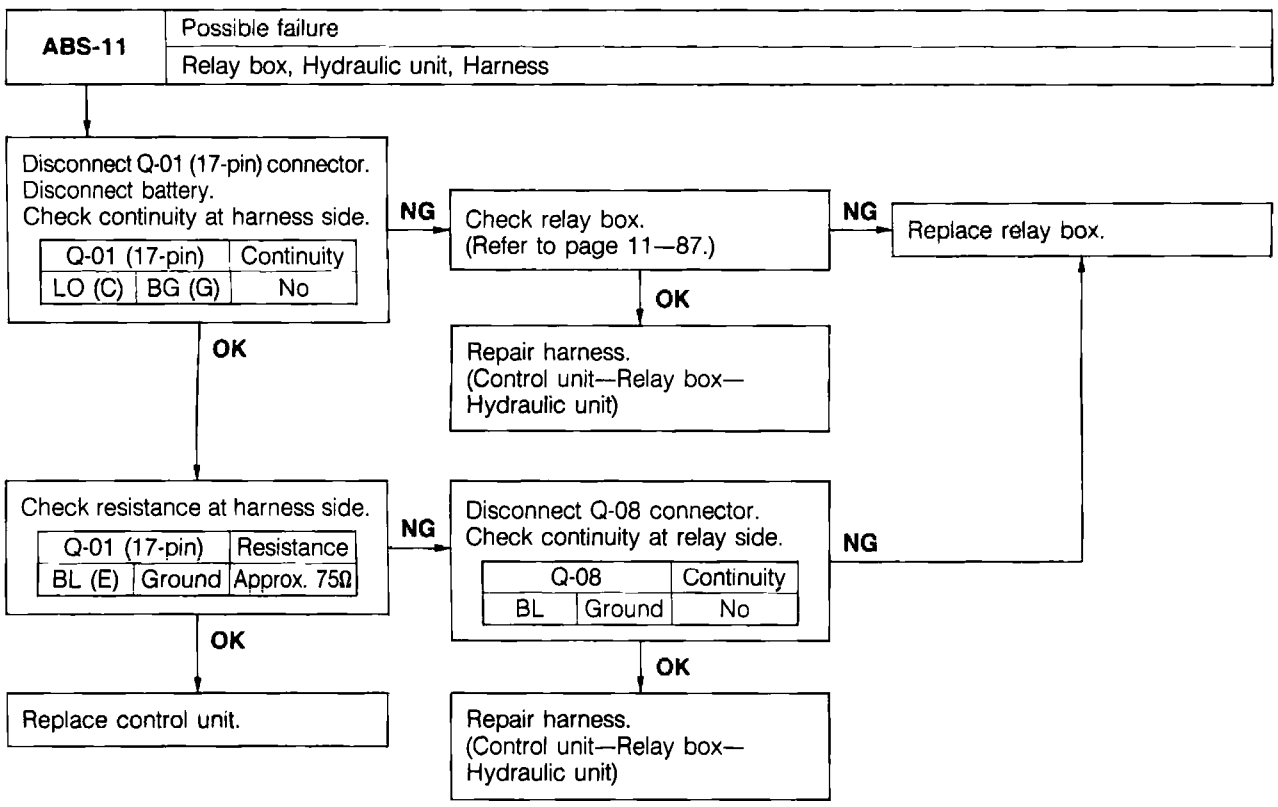

ABS-8
Possible failure
Hydraulic unit, Harness
Check Q-01 (11-pin) connector for proper connection.
NG
Connect Q-01 (11-pin) connector properly.
OK
Disconnect GB from B at Q-07 connector. Measure elapsed time from engine starting until warning light illuminates. Listen for motor operation.
Other than below.
Check harness (Control unit—Hydraulic unit—Ground)
Repeat operations 10 times that start and run engine for 30 sec. Check that warning light illuminates within 102 sec from engine start.
Illuminated
Not illuminated
No problem
Illuminates
Motor does not operate.
Illuminates after indicating failure mode.
Motor operates.
Illuminates after
90—105 sec.
Disconnect Q-01 (11-pin) connector. Check continuity at harness side.
Q-01 (11-pin) | Continuity
LB (2K) | Ground | Yes
GR (2L) | Ground | No
NG
OK
Replace control unit.
Disconnect Q-01 (11-pin) connector. Check continuity at harness side.
Q-01 (11-pin) | Continuity
LB (2K) | Ground | No
GR (2L) | Ground | No
OK
NG
Replace control unit.
Disconnect Q-01 (11-pin) connector. Check continuity at harness side.
Q-01 (11-pin) | Continuity
LB (2K) | Ground | No
NG
Ok
Repeat operations 10 times that start and run engine for 30 sec. Check that warning light illuminates within 102 sec from engine start.
Illuminated
Not illuminated
No problem.
Check Q-06 connector proper connection.
OK
NG
Connect Q-06 connector properly.
Check harness. (Control unit—Hydraulic unit—Ground)
OK
NG
Repair harness.
Replace hydraulic unit
76G11X-093


ABS-9
Possible failure
Relay box, Hydraulic unit, Harness
Disconnect Q-01 (17-pin) connector.
Disconnect battery.
Turn ignition switch ON.
Check continuity at harness side.
Q-01 (17-pin) | Continuity
RY (B) | BG (G) | No
NG
Check relay box.
(Refer to page 11—87.)
NG
Replace relay box.
OK
Repair harness.
(Control unit—Relay box—Hydraulic unit)
OK
Check that resistance between LO (C) of harness side and ground changes when reversing ⊕ and ⊖ test-leads.
NG
OK
Check continuity at harness side.
Q-01 (17-pin) | Continuity
RY (B) | Ground | Yes
NG
Disconnect Q-09 connector.
Check continuity at motor side.
Q-09 | Continuity
RY | Ground | Yes
NG
Repair harness.
(Motor—Ground)
OK
OK
Relay control unit.
Check continuity at motor side.
Q-09 | Continuity
RY | B | Yes
NG
Replace hydraulic unit.
OK
Repair harness.
(Control unit—Relay box—Hydraulic unit)

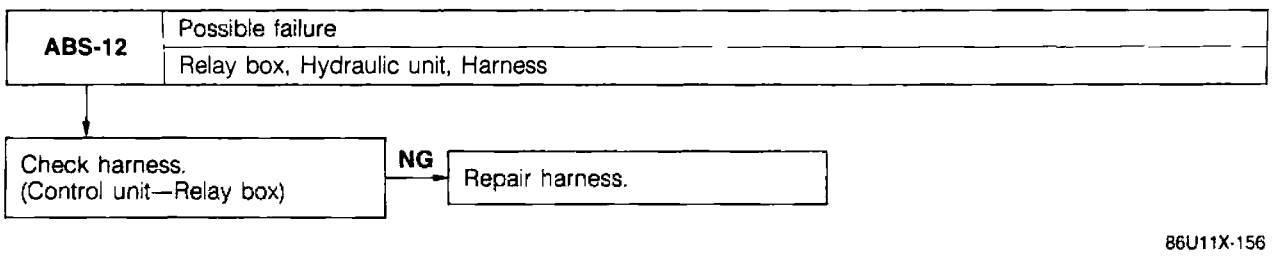
76G11X-056



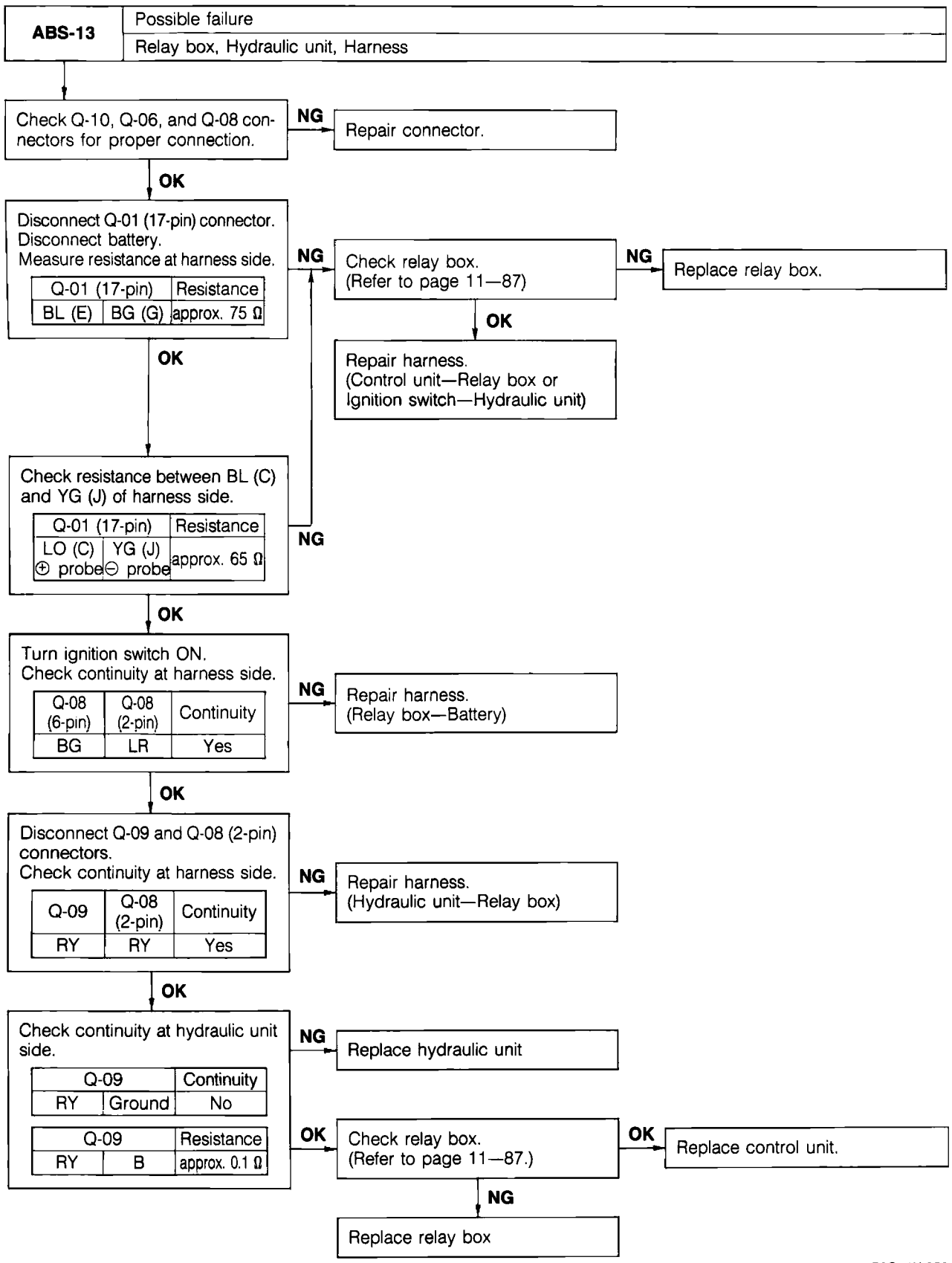
86U11X-154



76G11X-057



86U11X-156


ABS-13
Possible failure
Relay box, Hydraulic unit, Harness
Check Q-10, Q-06, and Q-08 connectors for proper connection.
NG
Repair connector.
OK
Disconnect Q-01 (17-pin) connector.
Disconnect battery.
Measure resistance at harness side.
Q-01 (17-pin) | Resistance
BL (E) | BG (G) | approx. 75 Ω
NG
Check relay box.
(Refer to page 11—87)
NG
Replace relay box.
OK
Repair harness.
(Control unit—Relay box or Ignition switch—Hydraulic unit)
OK
Check resistance between BL (C) and YG (J) of harness side.
Q-01 (17-pin) | Resistance
LO (C) ⊕ probe | YG (J) ⊖ probe | approx. 65 Ω
NG
OK
Turn ignition switch ON.
Check continuity at harness side.
Q-08 (6-pin) | Q-08 (2-pin) | Continuity
BG | LR | Yes
NG
Repair harness.
(Relay box—Battery)
OK
Disconnect Q-09 and Q-08 (2-pin) connectors.
Check continuity at harness side.
Q-09 | Q-08 (2-pin) | Continuity
RY | RY | Yes
NG
Repair harness.
(Hydraulic unit—Relay box)
OK
Check continuity at hydraulic unit side.
Q-09 | Continuity
RY | Ground | No
Q-09 | Resistance
RY | B | approx. 0.1 Ω
NG
Replace hydraulic unit
OK
Check relay box.
(Refer to page 11—87.)
OK
Replace control unit.
NG
Replace relay box

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ABS-14

Possible failure

Relay box, Hydraulic unit, Harness

Start and stop engine 5 times without depressing brake pedal, and check that motor operates occasionally and warning light stays ON.

OK → Go to ABS-13.

NG ↓

Check Q-10, Q-06 and Q-08 connectors for proper connection. Check related harness for open or short circuit.

NG → Repair harness. (Battery—Relay box—Hydraulic unit)

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ABS-15

Possible failure

Control unit, Harness, Hydraulic unit

Disconnect Q-10 and Q-01 (17-pin and 11-pin) connectors. Check continuity at hydraulic unit side.

Q-10		Continuity
BR	Ground	No

NG → Repair harness. (Hydraulic unit—Control unit)

OK ↓

Disconnect Q-06 connector. Check continuity at hydraulic side.

Q-10		Continuity
BR	Ground	No

NG → Replace hydraulic unit.

OK ↓

Check Q-06 connector for proper connection.

NG → Repair Q-06 connector.

OK ↓

Disconnect Q-06 connector. Measure resistance at hydraulic unit side.

Q-06	Q-10	Resistance
Br BW L YG YR YW	BR	approx. 3 Ω

OK → Connect Q-06 and Q-10 connectors. Check continuity at harness side.

Q-01 (17-pin)		Continuity
Br (K) BW (O) L (R) YG (J) YR (M) YW (Q)	LO (C)	Yes (Less than 100 Ω)

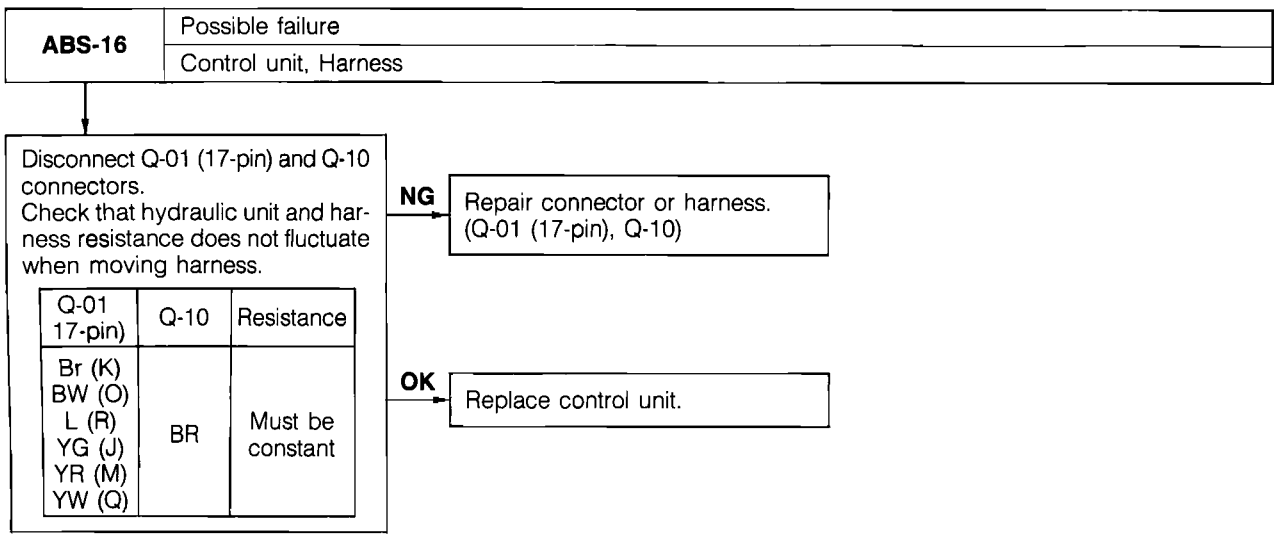
NG → Repair harness. (Control unit—Hydraulic unit)

OK → Replace control unit.

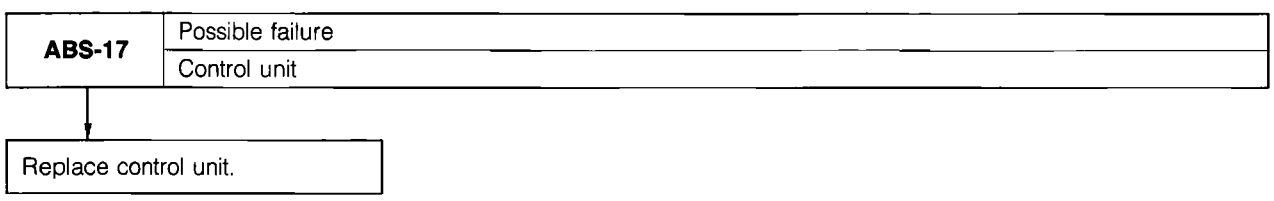
NG ↓

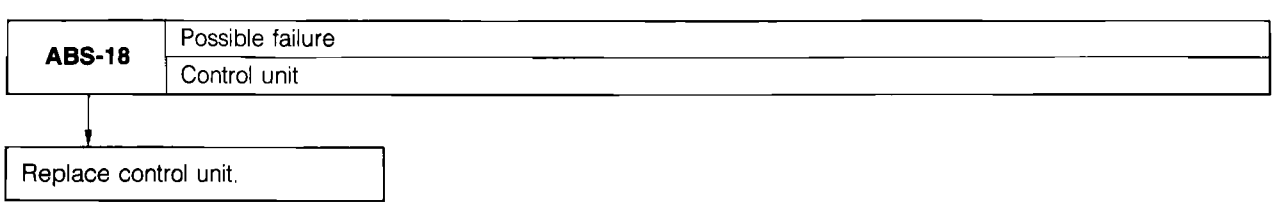
Replace hydraulic unit.

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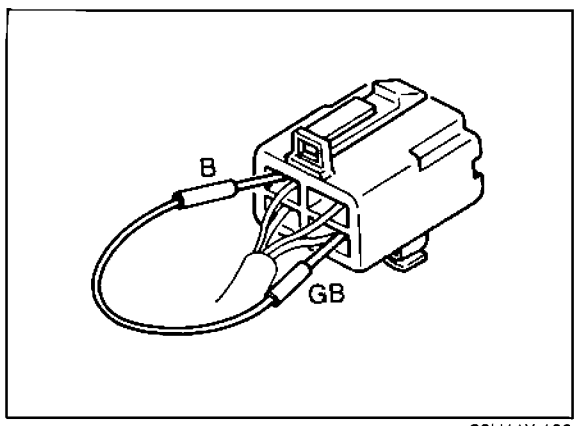


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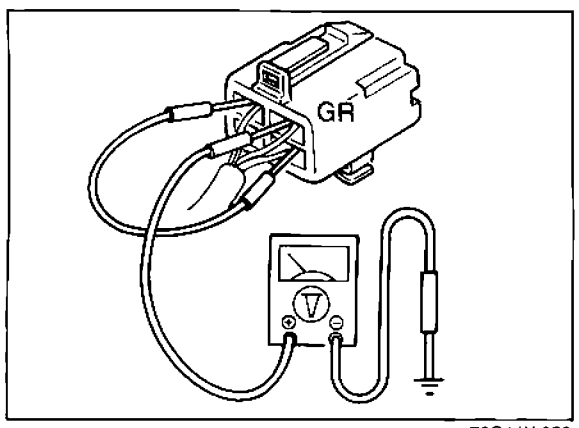




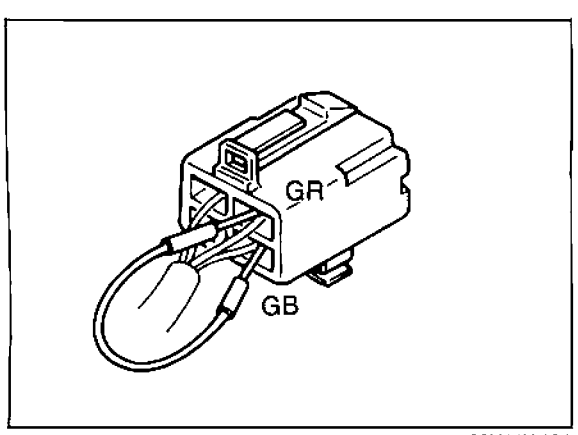
86U11X-161



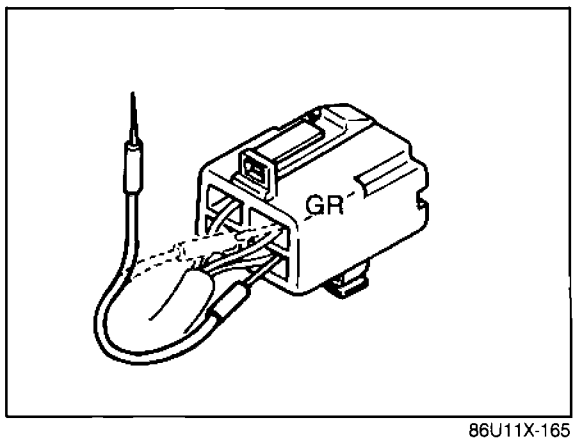
86U11X-162



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86U11X-164



86U11X-165

DIAGNOSIS INDICATION MODE

To obtain the diagnosis indication mode, proceed as follows:

1. Remove the driver's seat.
2. Connect terminal wires (GB) and (B) of the check connector (at control unit) with a jumper wire.
3. Start the engine.

Note
The system is now in the diagnosis indication mode.

4. Observe the warning light for illumination or count flashing.
5. Connect an analog voltmeter to terminal wire (GR), and count the times voltage is output.

Note
a) The voltmeter will fluctuate between 0V and approx. 12V.
b) Determine the failure and flow chart number with the Diagnosis Table. (Refer to page 11—75.)

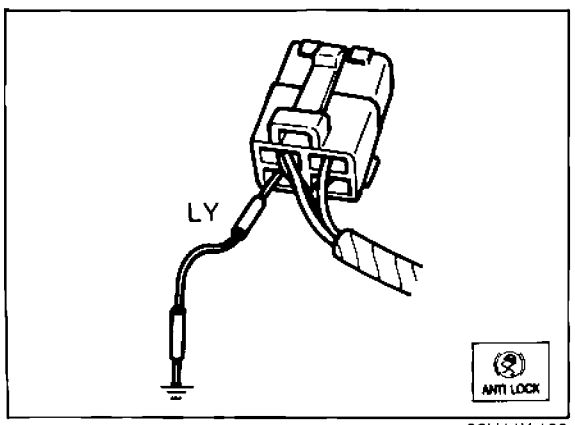
MEMORY CANCEL

Note
Failures are contained in the control unit memory. They are not erased when the battery is disconnected. Follow the procedure below to erase them.

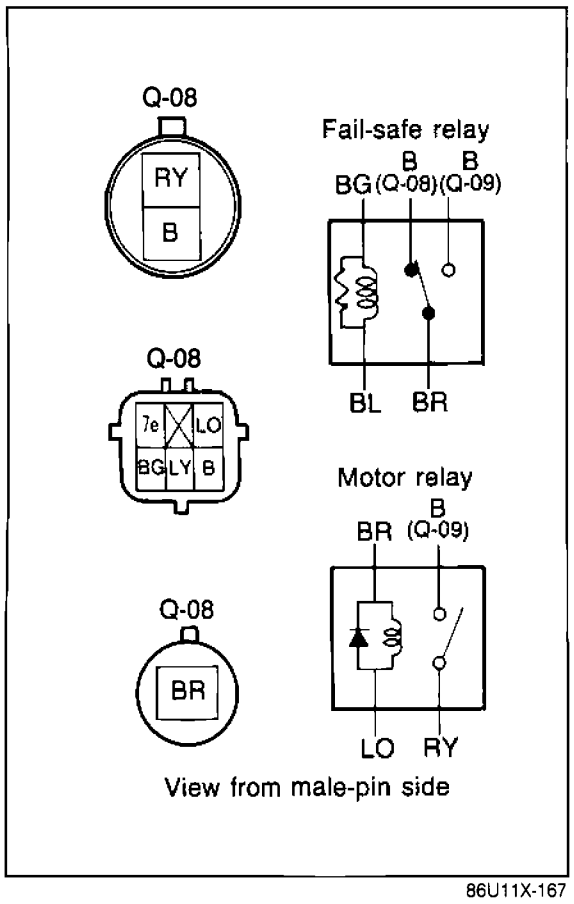
1. Connect the terminal wires (GR) and (GB) of the check connector with a jumper wire.
2. Turn the ignition switch ON.
3. Check that the warning light is illuminated, and wait 1—2 seconds.
4. Turn the ignition switch OFF.
5. Disconnect the jumper wire from terminal wire (GR).
6. Start the engine and wait for the warning light to go OFF.

Note
a) One failure memory is erased each time the above steps are taken.
b) If the warning light illuminates or blinks after step 6, read and note diagnosis indication. The memory has the capacity for storing 32 failures.

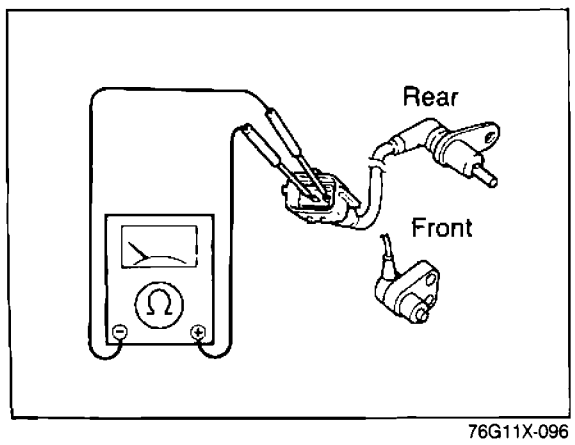
7. Turn the ignition switch OFF.
8. Remove the jumper wire.



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ABS WARNING LIGHT

Inspection for No Illumination

1. Check that other warning lights illuminate. If not, check the METER 10A fuse for burning out.
2. Turn the ignition switch ON.
3. Ground the LY terminal of the check connector with a jumper wire.
4. Check that the ABS warning light illuminates. If not illuminated, check the bulb and harness (battery → check connector).
5. Check for 12V at F (LY) terminal of the control unit connector.

If the voltage is not as specified, check the harness (bulb → control unit).
If the voltage is as specified, replace the relay box and the control unit.

RELAY BOX

Inspection of Fail-safe Relay

1. Check for continuity of the relay with an ohmmeter. Replace the relay box if necessary.

Connecting to		BR	B (Q-08)	B (Q-09)
12V	Ground			
—	—	○	○	
BG	BL	○		○

○—○: Indicates continuity

2. Check that the resistance between terminal wire (BR) and terminal wire (LY) changes when reversing the ⊕ and ⊖ test-leads. Replace the relay box if necessary.

Inspection of Motor Relay

1. Check for continuity of the relay with an ohmmeter. Replace the relay box if necessary.

Connecting to		RY	B (Q-09)
12V	Ground		
—	—		
BR	LO	○	○

○—○: Indicates continuity

2. Check that the resistance between terminal wire (BR) and terminal wire (LO) changes when reversing the ⊕ and ⊖ test-leads. Replace the relay box if necessary.

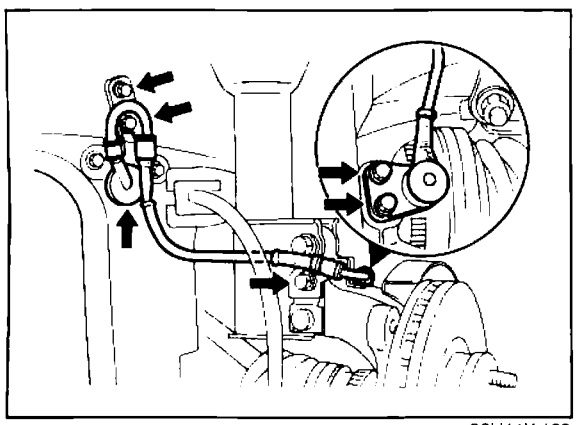
WHEEL SPEED SENSOR

Inspection

1. Measure the resistance of the sensor with an ohmmeter.

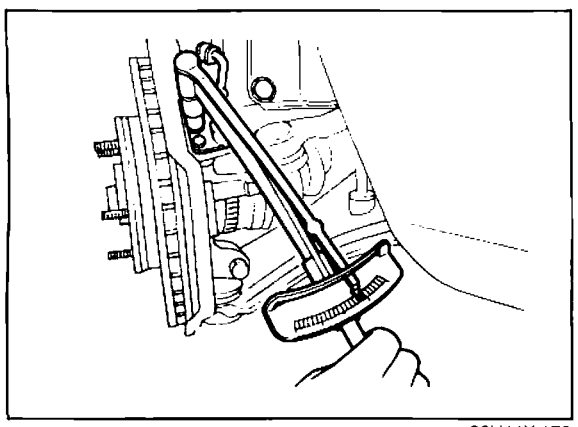
   Resistance: 800—1,200 Ω

2. If the resistance is not within specification, replace the sensor.
3. Check that the harness is not twisted and does not contact other objects when turning the steering wheel is turned fully.



86U11X-169

Removal of Front Wheel Speed Sensor
1. Remove the wheel and tire.
2. Remove the parts shown in the figure, and remove the sensor from the knuckle.

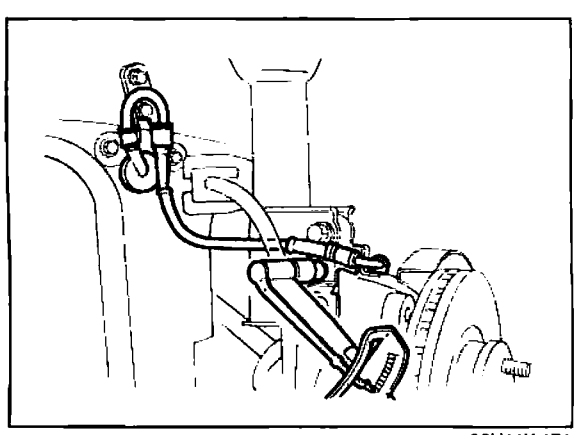


86U11X-170

Installation of Front Wheel Speed Sensor
1. Install the sensor to the knuckle.

Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

Caution
The left and right sensors are not interchangeable. L or R is indicated on the bracket.



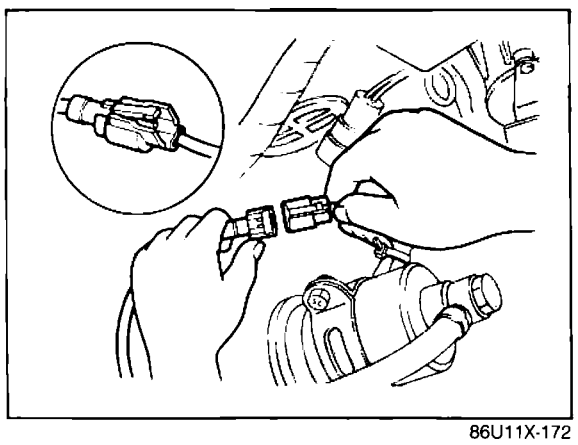
86U11X-171

2. Install the sensor harness bracket onto the knuckle.

Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

3. Push the sensor harness through the splash shield and secure it with the clip.
4. Install the sensor harness bracket to the body.

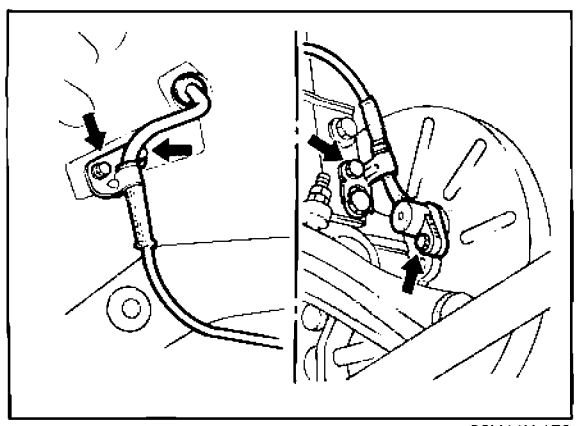
Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)



86U11X-172

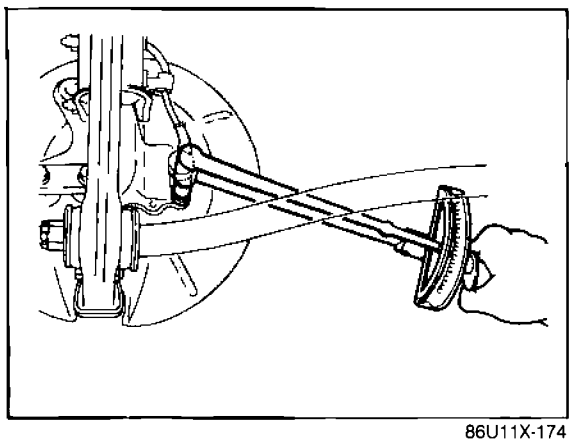
Caution
Verify that the harness is not twisted and does not contact the shock absorber or body when the steering wheel is turned.

5. Connect the sensor connector.
6. Install the wheel and tire.



86U11X-173

Removal of Rear Wheel Speed Sensor
1. Remove the wheel and tire.
2. Remove the parts shown in the figure, and remove the sensor from the hub spindle.

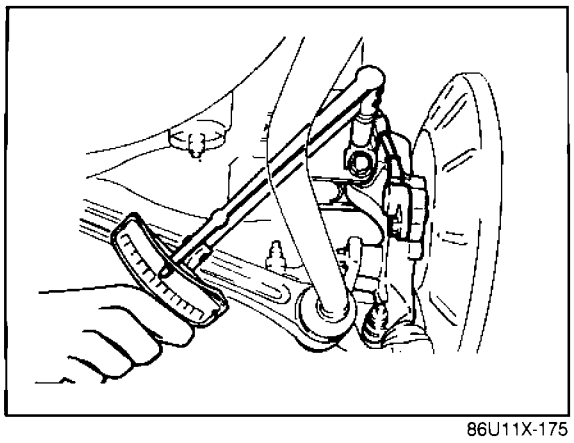


86U11X-174

Installation of Rear Wheel Speed Sensor
1. Install the sensor to the hub spindle.

Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

Caution
The left and right sensors are not interchangeable. L or R is indicated on the bracket.



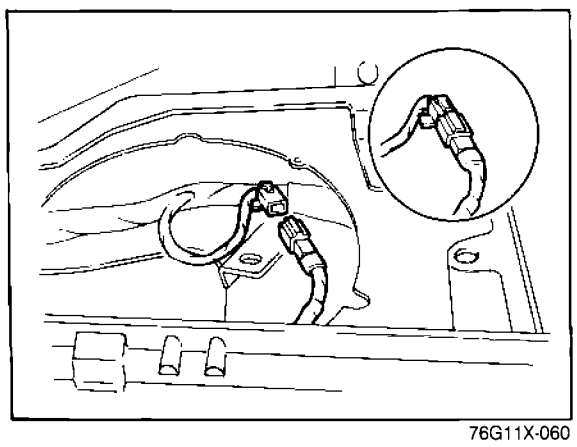
86U11X-175

2. Install the sensor harness bracket onto the knuckle.

Tightening torque:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

3. Feed the sensor harness through the body and install the grommet.
4. Install the sensor harness bracket to the body.

Tightening torque:
11—26 N·m (1.1—2.6 m-kg, 8—19 ft-lb)

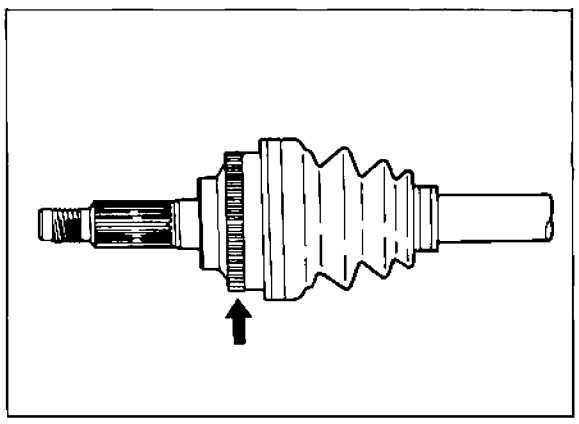


76G11X-060

Caution
Verify that the harness is not twisted and does not contact the shock absorber or body when the steering wheel is turned.

5. Connect the sensor connector.
6. Install the wheel and tire.

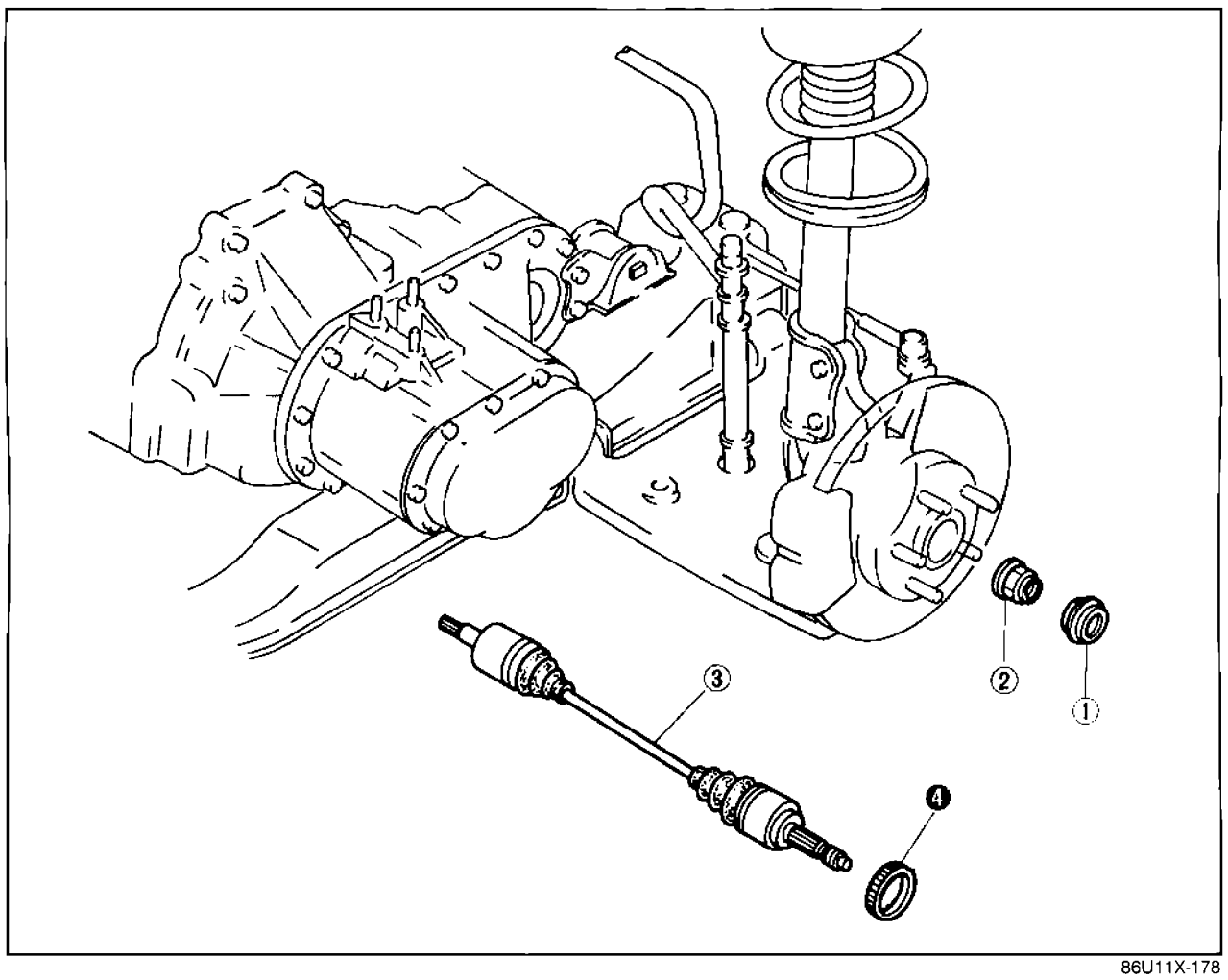
BRAKE LIGHT SWITCH
Refer to page 15—58.



86U11X-177

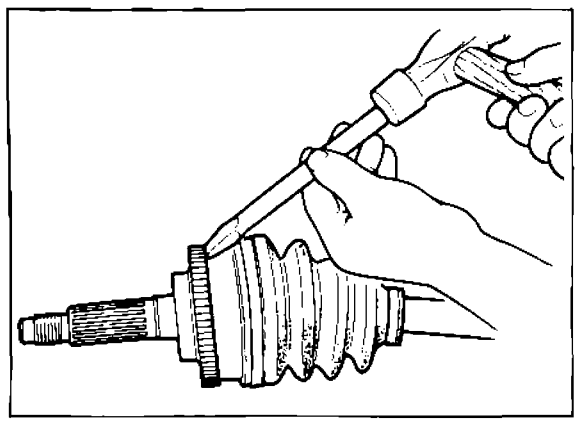
SENSOR ROTOR
Inspection
Check the sensor rotor for missing or damaged teeth.

Removal of Front Sensor Rotor
1. Loosen the front wheel lug nuts.
2. Block the rear wheels.
3. Jack up the front of the vehicle and support it with safety stands.
4. Remove the wheels.
5. Remove in the sequence shown in the figure, referring to removal note for the specially marked parts.



86U11X-178

1. Hub cap
2. Locknut
3. Driveshaft (Refer to section 9)
4. Sensor rotor

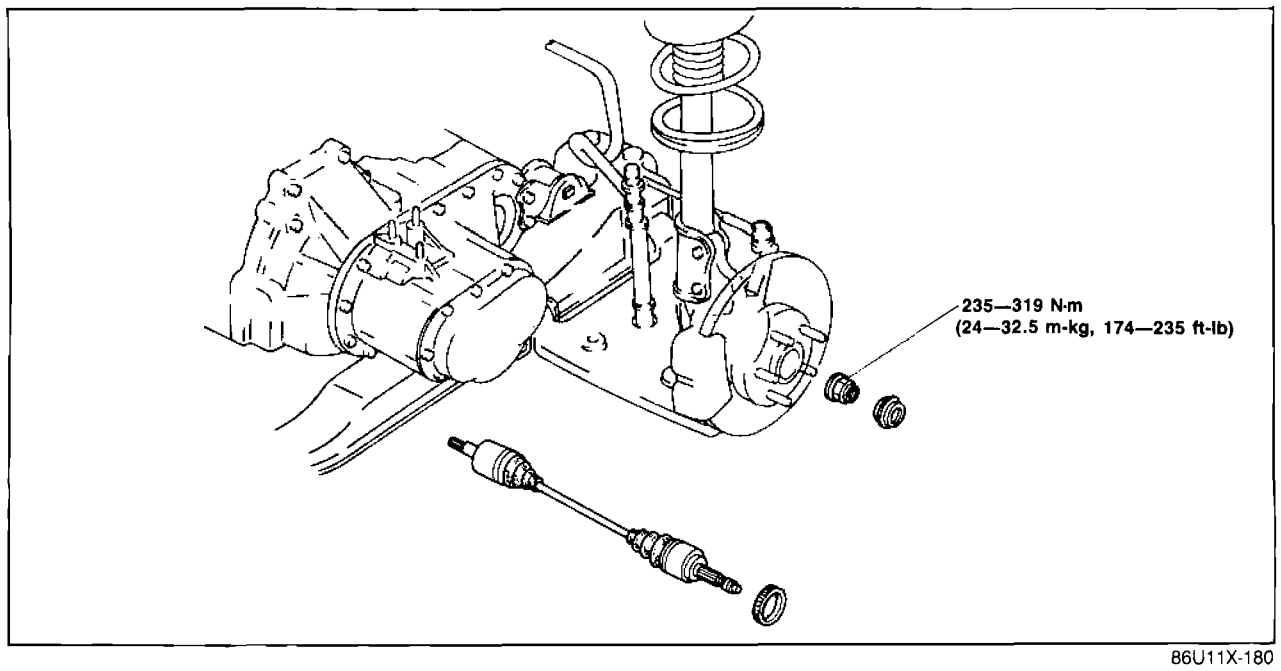


86U11X-179

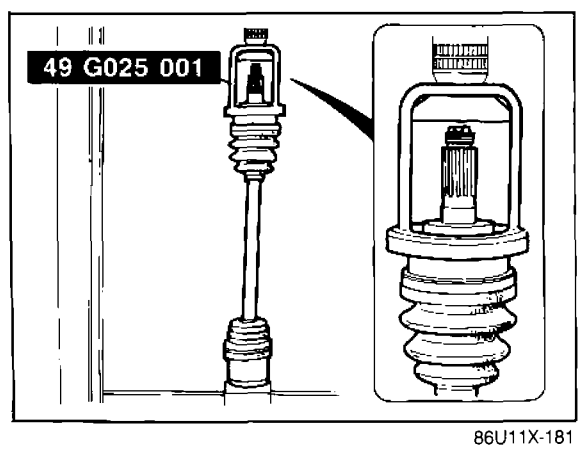
Removal note
Sensor rotor
Tap the sensor rotor off the drive shaft with a chisel.

Installation of Front Sensor Rotor
Install in the reverse order of removal, referring to installation note for the specially marked parts.

Torque specifications



86U11X-180



86U11X-181

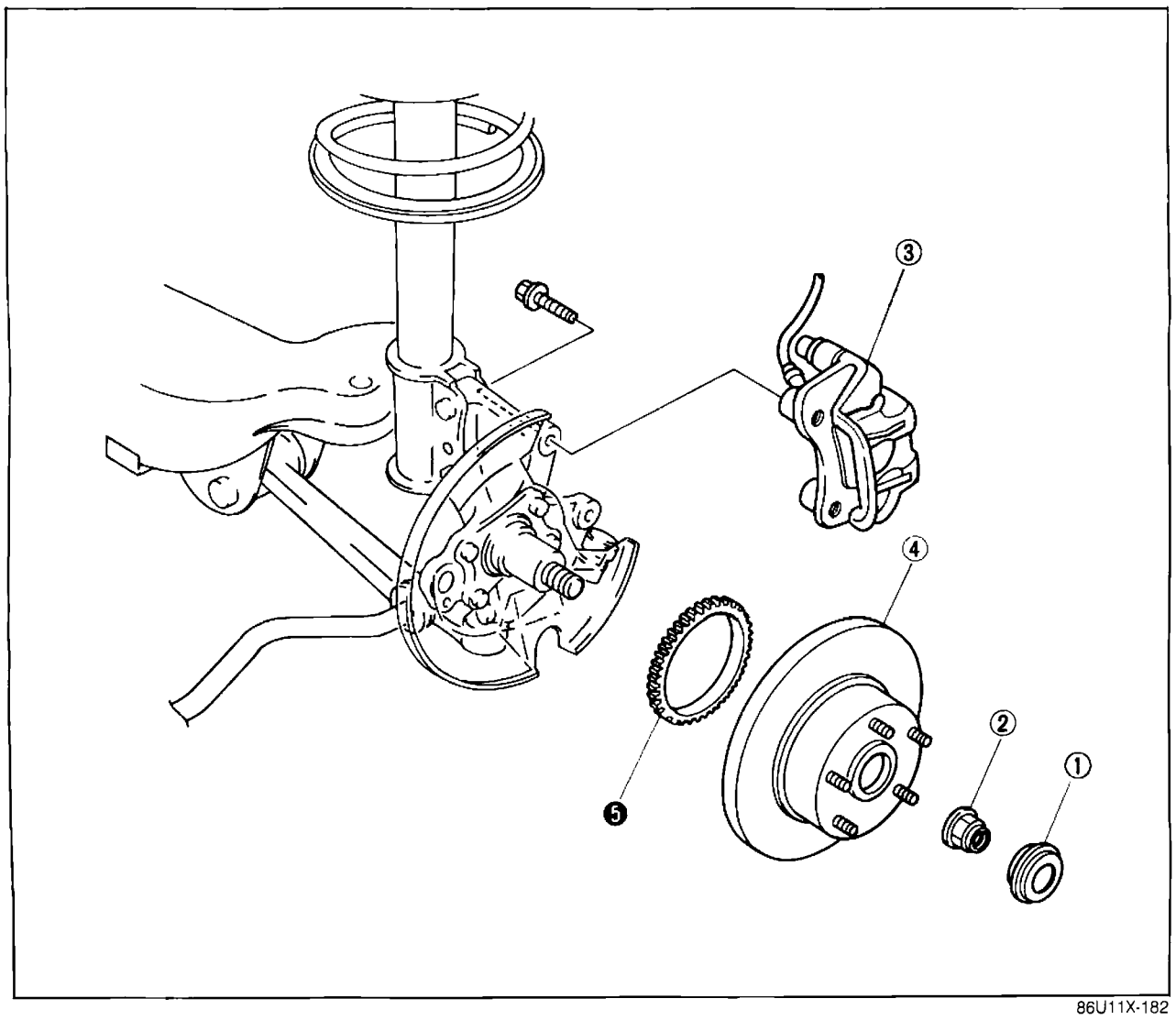
Installation note
Sensor rotor
Press the sensor rotor onto the driveshaft with the **SST**.

Caution
Install the sensor rotor with chamfered edge toward the driveshaft.

11 ANTI-LOCK BRAKE SYSTEM (ABS)

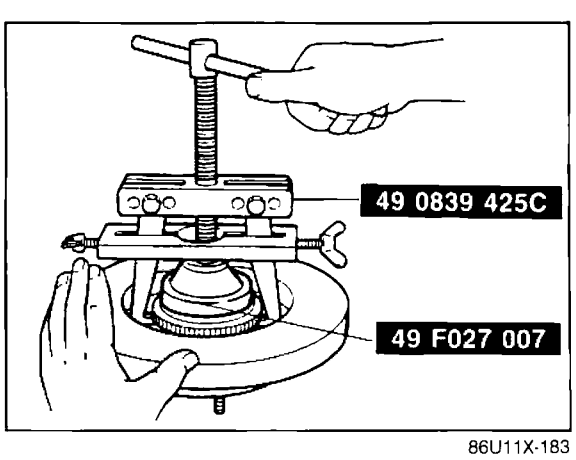
Removal of Rear Sensor Rotor

1. Loosen the rear wheel lug nuts.
2. Block the front wheels.
3. Jack up the rear of the vehicle and support it with safety stands.
4. Remove the wheels.
5. Remove in the sequence shown in the figure, referring to removal note for the specially marked parts.



86U11X-182

1. Hub cap
2. Locknut
3. Caliper assembly and mounting support
4. Disc plate
5. Sensor rotor



86U11X-183

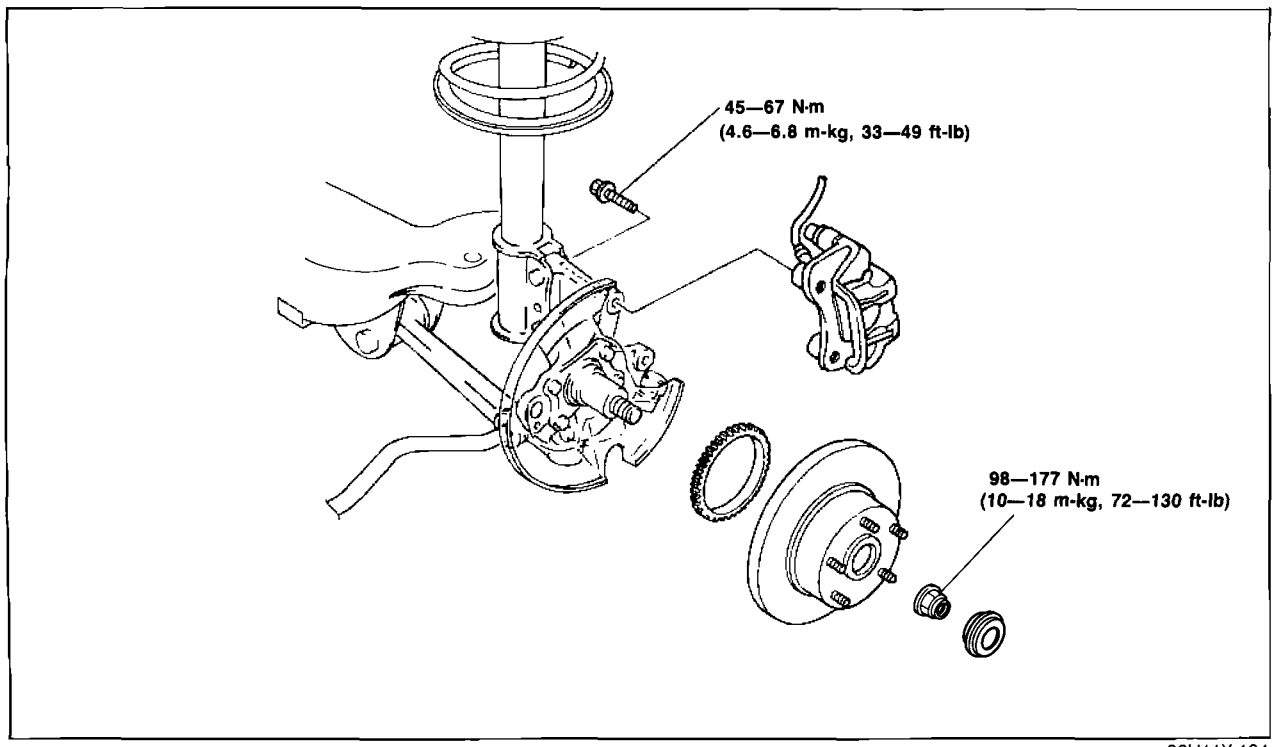
Removal note

Sensor rotor

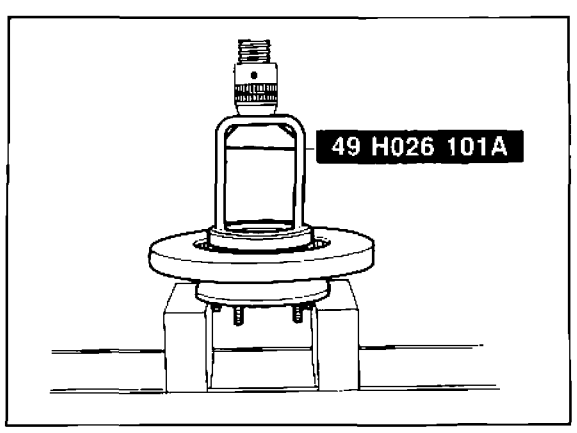
Remove the sensor rotor from the hub assembly with the **SST**.

Installation of Rear Sensor Rotor
Install in the reverse order of removal, referring to installation note for the specially marked parts.

Torque specifications

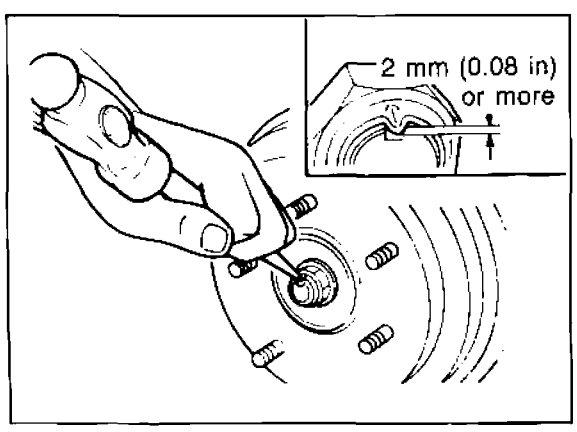


86U11X-184



86U11X-185

Installation
Sensor rotor
Press the sensor rotor onto the hub with the **SST**.

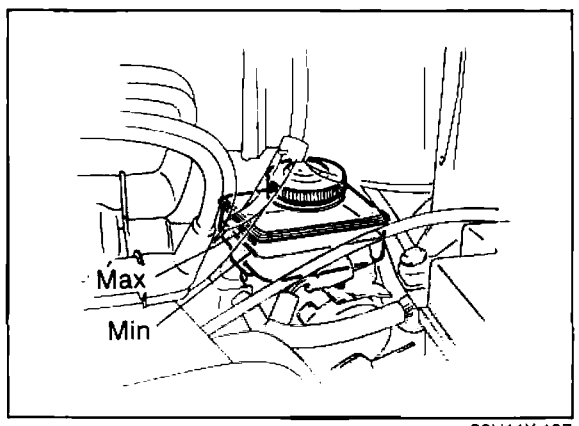


86U11X-186

Locknut
1. Install and tighten the locknut.
2. Stake a new locknut securely in the driveshaft groove.

Caution
Do not use a pointed tool for staking.

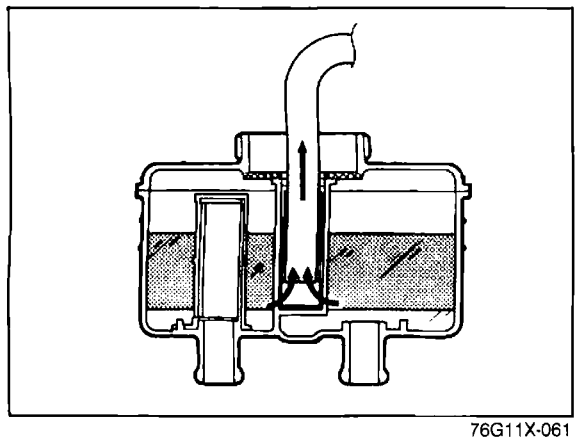
3. Check that the hub rotates freely by hand.



86U11X-187

HYDRAULIC UNIT FLUID
Inspection of Level

1. Run the engine for 10 seconds to let the pump motor build pressure in the accumulator; then stop the engine.
2. Check that the fluid level is between the Max and Min lines of the reservoir.
3. If the level is lower than the Min line and leakage from cap is not found, replace the hydraulic unit assembly.



76G11X-061

Replacement

1. Remove the reservoir cap and retainer.
2. Use a suction pump and a soft vinyl hose to suck fluid from the reservoir.

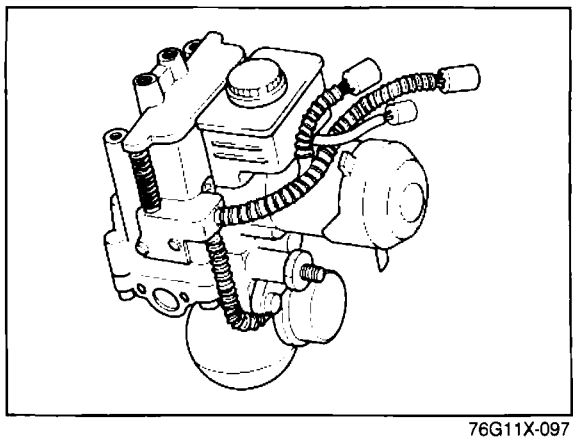
Caution
a) A hard hose may damage the filter in the reservoir.
b) Only the amount of fluid shown can be removed from the reservoir.

3. Fill the reservoir with the specified type and amount of brake fluid.

Caution
a) Do not allow any foreign material to enter the reservoir.
b) Do not soak the upper filter with brake fluid. Otherwise, pouring fluid may be difficult.

Fluid: DOT-3 or DOT-4 or SAE J1703

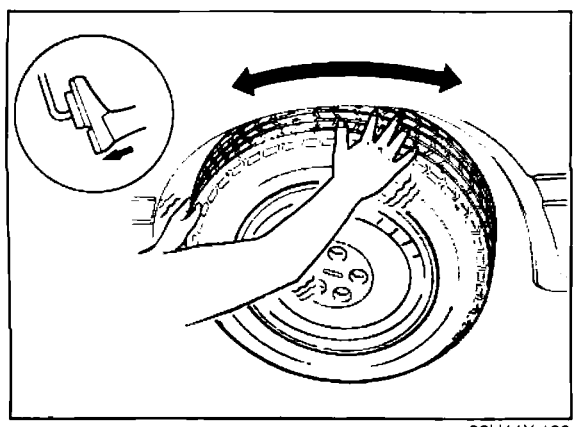
4. Check the fluid level as described above.



76G11X-097

HYDRAULIC UNIT

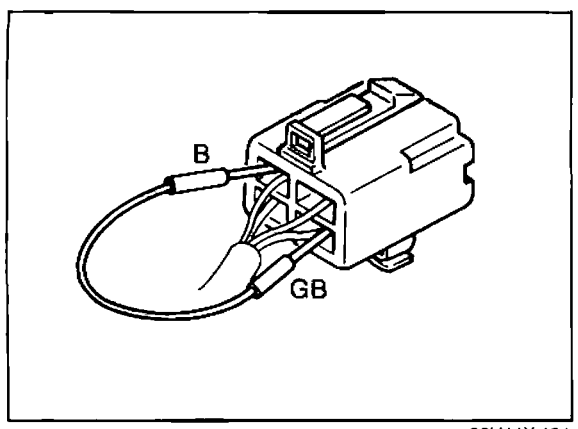
Warning
The accumulator contains high-pressure gas; do not attempt to disassemble it or subject it to hard shocks or high heat.
When the hydraulic unit is scrapped, the high-pressure gas must be released. Turn the screw on the accumulator bottom one full turn only and allow the gas to escape gradually.



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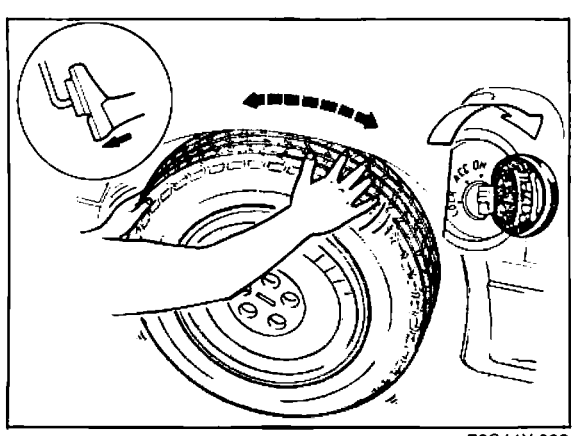
Inspection of Pressure Reduction

1. Check that the battery is fully charged.
2. Jack up the vehicle and support it with safety stands.
3. Release the parking brake.
4. Check the wheel for brake drag while turning it by hand.



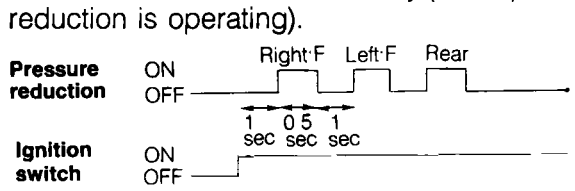
86U11X-191

5. Connect terminal wires (GB) and (B) of the check connector with a jumper wire.
6. Have an assistant depress the brake pedal; then verify that the wheel cannot be turned.
7. Run the engine for 10 sec, and stop it.

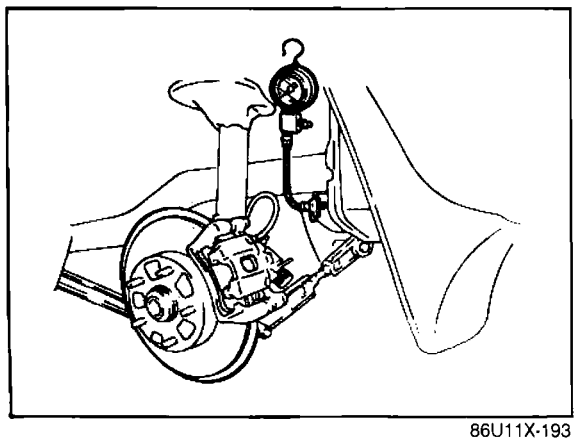


76G11X-098

8. With the brake pedal depressed, turn the ignition switch ON.
9. With the brake pedal still depressed, check that the wheel can be turned intermittently (when pressure-reduction is operating).



10. Check operation at the remaining wheels.
11. If not operated correctly, check the warning light and brake light switch circuit for proper operation.



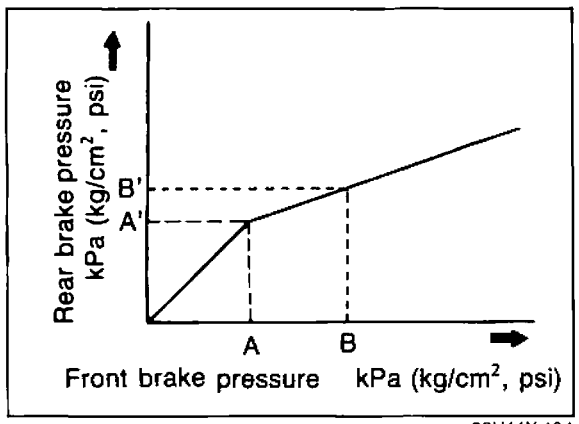
86U11X-193

Inspection of Proportioning Valve

Note
The proportioning valve is built into the hydraulic unit.

1. Disconnect the flexible hose from the brake pipe; then connect one pressure gauge to the front brake pipe, the other to the rear brake pipe.

Note
Use a pressure gauge [9,810 kPa (100 kg/cm^2, 1,422 psi)].



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2. Bleed air from the system.
3. Depress the brake pedal, and compare the fluid pressure of the front brake with that of the rear brake.

Fluid pressure **kPa (kg/cm², psi)**

Front brake side		Rear brake side	
A	2,943 (30,427)	A'	2,747—3,139 (28—32, 398—455)
B	6,867 (70,995)	B'	3,924—4,316 (40—44, 569—626)

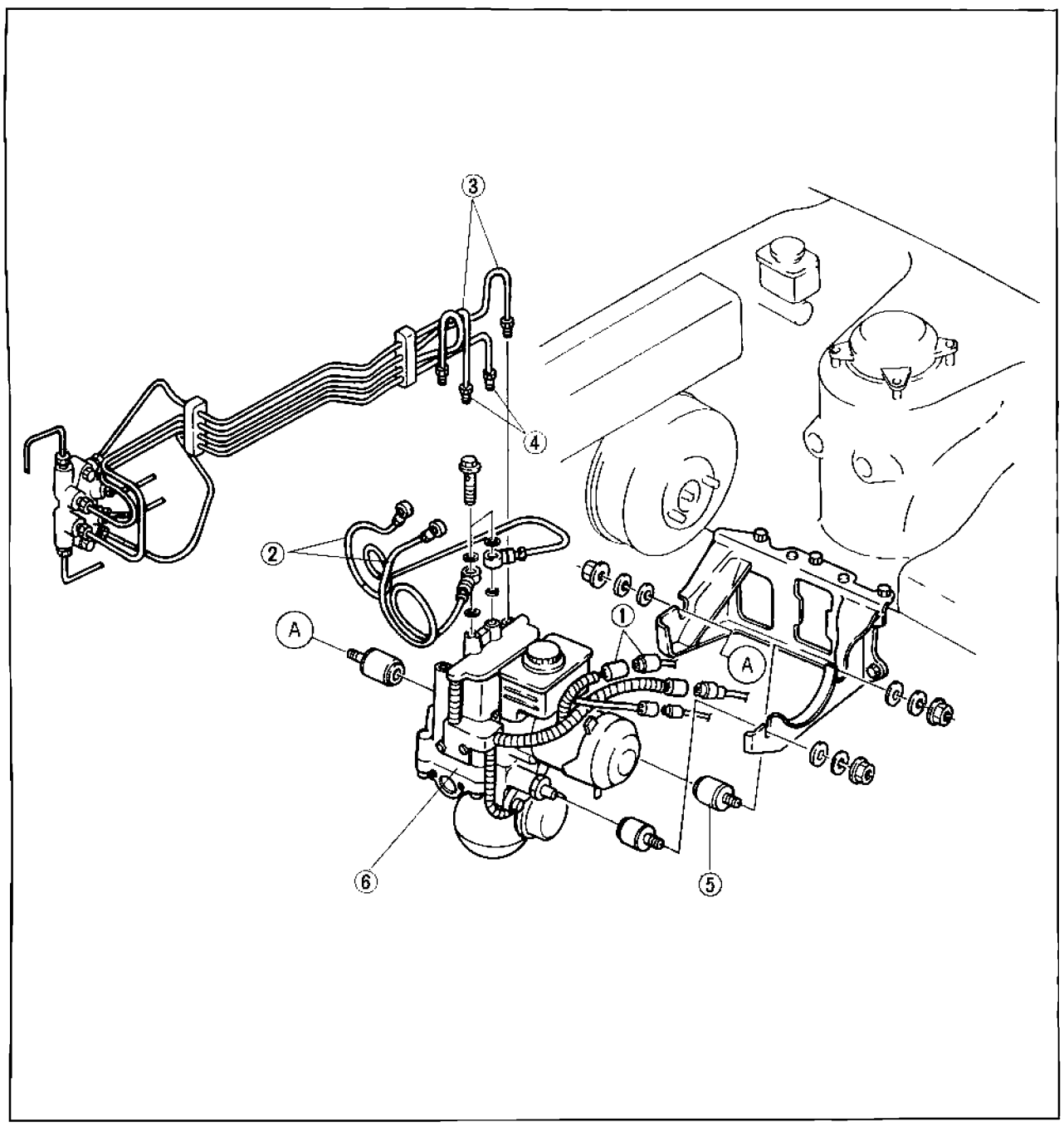
4. If the measurement is not within specification replace the hydraulic unit assembly.

REMOVAL

Caution
a) Brake fluid will damage painted surfaces. If it does get on the painted surfaces, wipe it off immediately.
b) Do not tip the hydraulic unit to prevent the brake fluid in the reservoir from draining.

1. Remove the nuts mounting the fuel filter and ignitor to the bracket and move them toward the engine.
2. Remove the air cleaner assembly.
3. Remove the master cylinder. (Refer to page 11—14.)
4. Remove the hydraulic unit in the sequence shown in the figure.

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86U11X-196

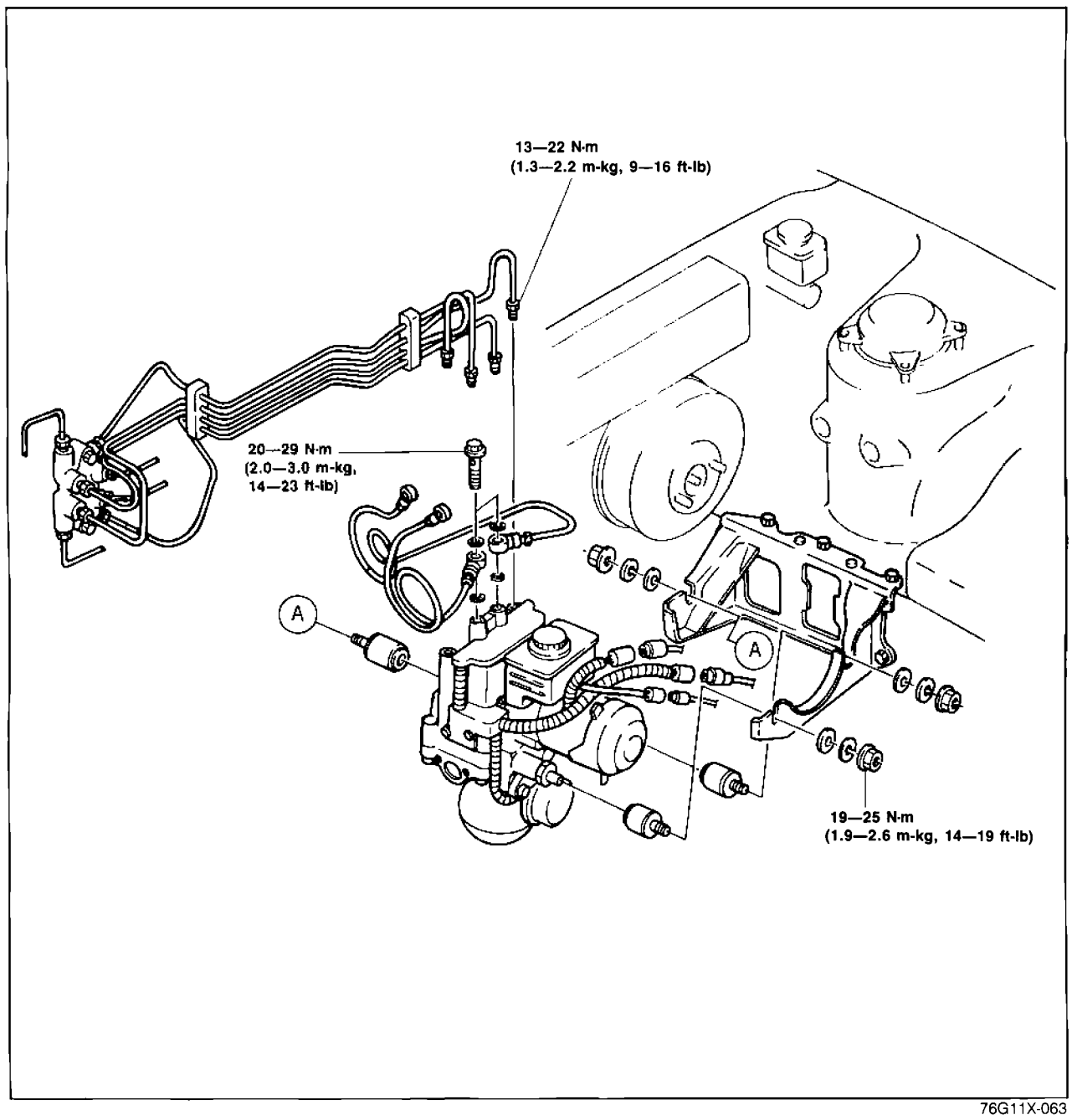
1. Coupler
2. Brake pipe (from master cylinder)
3. Brake pipe (to front brakes)
4. Brake pipe (to rear brakes)
5. Mount bushing
6. Hydraulic unit

INSTALLATION

1. Install in the reverse order of removal.
   Before installing the air cleaner assembly, igniter, and fuel filter:
   (1) Add brake fluid and bleed air. (Refer to page 11—9.)
   (2) Check each part for fluid leakage.
   (3) Check the brake fluid level of both the master cylinder reservoir and hydraulic unit reservoir.

2. Tighten all bolts and nuts to the specified torque, referring to torque specifications.
3. After installation:
   (1) The sealing reservoir cap (red) is installed on the new hydraulic unit to prevent the brake fluid from leaking while shipping. Replace it with an original cap (black) after replacing the hydraulic unit.
   (2) Check that the hydraulic unit operates properly by testing the pressure reduction. (Refer to page 11—95.)

Torque specifications



76G11X-063

CONTROL UNIT CIRCUIT

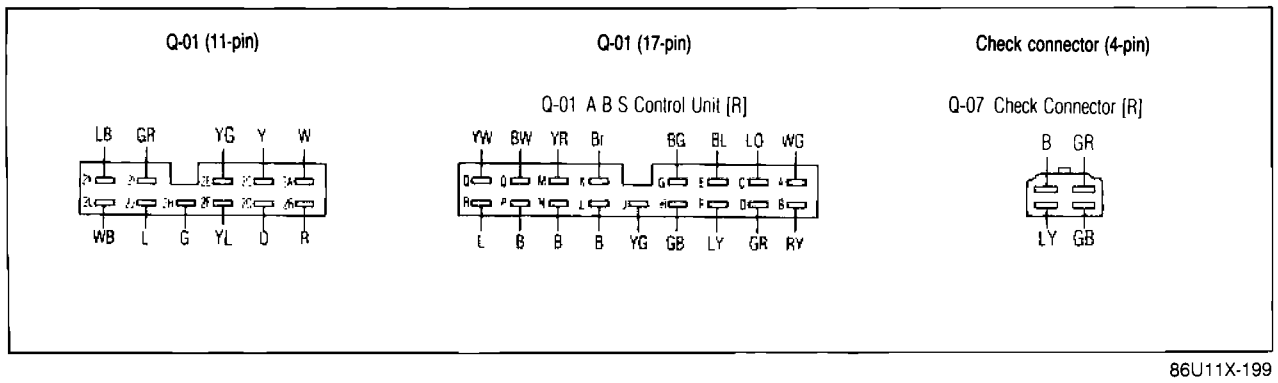
Inspection of Control Unit Circuit

1. Start the engine, and run it for 10 seconds.
2. Disconnect the connectors from the control unit. Check the connector at the harness side as shown in the table below.

Terminal		Connection or measured item		Check item	Tester connection	Condition	Voltage or resistance
Q-01 11-pins	2A (W), 2B (R)	Wheel speed sensor	Left front	Voltage (AC)	2A (W) — 2B (R)	Turn wheel 1 revolution per second	More than 0.25V (AC)
				Resistance		—	800—1,200Ω
	2C (Y), 2D (O)		Right front	Voltage (AC)	2C (Y) — 2D (O)	Turn wheel 1 revolution per second	More than 0.25V (AC)
				Resistance		—	800—1,200Ω
	2E (YG), 2F (YL)		Left rear	Voltage (AC)	2E (YG) — 2F (YL)	Turn wheel 1 revolution per second	More than 0.25V (AC)
				Resistance		—	800—1,200Ω
	2H (G), 2J (L)		Right rear	Voltage (AC)	2H (G) — 2J (GR)	Turn wheel 1 revolution per second	More than 0.25V (AC)
				Resistance		—	800—1,200Ω
	2I (GR)	Low pressure switch		Continuity	2I (GR) — Ground	—	Continuity
	2K (LB)	High pressure switch		Continuity	2K (LB) — Ground	—	Continuity
	2L (WB)	Alternator output		Voltage	2L (WB) — Ground	Run engine	Approx. 14V
Q-01 17-pins	A (WG)	Brake light switch		Voltage	A (WG) — Ground	Depress brake pedal	12V
	B (RY)	Motor		Continuity	B (RY) — Ground	—	Continuity
	C (LO)	Motor relay		Resistance	C (Lo)(⊕ test-lead)-J	—	Approx. 60—70Ω
	D (GR)	Check connector		Continuity	D (GR) — A (GR, Q-07)	—	Continuity
	E (BL)	Fail-safe relay		Resistance	E (BL) — G (BG)	—	Approx. 70—80Ω
	F (LY)	Warning light		Continuity	F (LY) — Ground	—	Continuity
	G (BG)	Battery		Voltage	G (BG) — Ground	Turn ignition SW ON	12V
	H (GB)	Check connector		Continuity	H (GB) — B (GB, Q-07)	—	Continuity
	J (YG)	Solenoid valve		Resistance	J(YG) — K (Br)	—	Approx. 5.5—7.0Ω
	K (Br)						
	M (YR)	Solenoid valve			M (YR) — O (BW)		
	O (BW)						
	Q (YW)	Solenoid valve			Q (YW) — R (L)		
	R (L)						
	L (B)	Ground circuit		Continuity	L (B) — Ground	—	Continuity
	N (B)				N (B) — Ground		
	P (B)				P (B) — Ground		
4-pins	C (B)				C (B,Q-07) — Ground		

Control Unit Connector

View from harness side



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12

WHEELS AND TIRES

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INSPECTION AND ADJUSTMENT ..... **12— 3**
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WHEEL MOUNTING ..... **12— 5**
SPECIAL NOTE ..... **12— 5**

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12 OUTLINE, TROUBLESHOOTING GUIDE

OUTLINE

SPECIFICATIONS

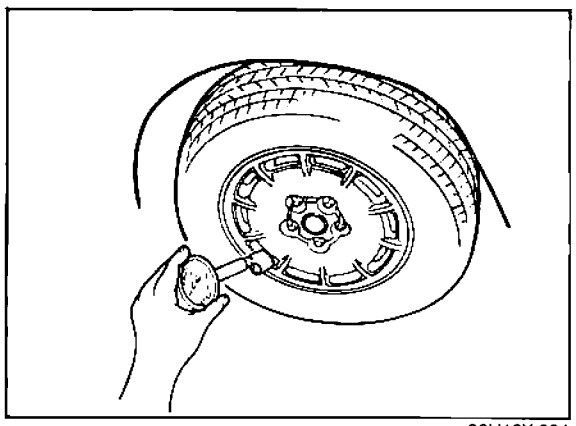
Item \ Type			Standard	Temporary spare (If equipped)
Wheel	Size		5-J x 13	4-T x 15
			5 1/2-JJ x 14	
			6-JJ x 15	
	Off set mm (in)		42 (1.65)	53 (2.09)
	Diameter of pitch circle mm (in)		114.3 (4.5)	
	Material		Steel or aluminum alloy	Steel
	Number of fixing nuts	13 inch-wheel	4	4 or 5
		14 inch-wheel	5	
		15 inch-wheel		
Tire	Size	13 inch-wheel	6.45—13—6PR 165 SR13 165/80R13 82S 185/70HR13 185/70R13 85H	T125/70D15
		14 inch-wheel	185/70HR14 185/70R14 87H 185/70R14 88H 185/70VR14	
		15 inch-wheel	195/60R15 86H 195/60VR15	
	Air pressure kPa (kg/cm², psi)	Front	216 (2.2, 31) or 196 (2.0, 28) *See tire labels for application	412 (4.2, 60)
		Rear	177 (1.8, 26)	

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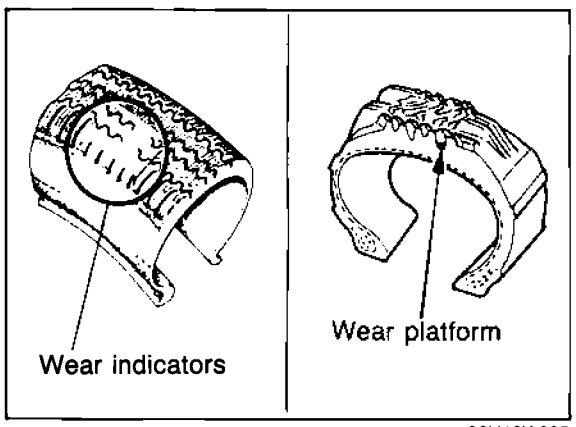
TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Premature tire wear	Incorrect tire pressure	Adjust	12— 2
Tire squeal	Incorrect tire pressure	Adjust	12— 2
	Tire deterioration	Replace	—
Road noise or body vibration	Insufficient tire pressure	Adjust	12— 2
	Unbalanced wheel(s)	Adjust	12— 5
	Deformed wheel(s) or tire(s)	Repair or replace	—
	Irregular tire wear	Replace	—
Steering wheel vibration	Irregular tire wear	Replace	—
	Right and left tread depths different	Replace	—
	Deformed or unbalanced wheel(s)	Replace or adjust	12— 5
	Deformed tire(s)	Replace	—
	Unequal tire pressures	Adjust	12— 2
	Loose lug nuts	Tighten	12— 5
Uneven (one-sided) braking	Unequal tire pressures	Adjust	12— 2
Steering wheel doesn't return properly, or pulls to either left or right while vehicle moving on level road surface	Incorrect tire pressure	Adjust	12— 2
	Irregular tire wear (left and right are different)	Replace	—
	Unequal tire pressures	Adjust	12— 2
	Different types or brands of tires mixed (right/left)	Replace	—
	Improperly tightened lug nuts	Tighten	12— 5
General driving instability	Unequal tire pressures	Adjust	12— 2
	Deformed or unbalanced wheel(s)	Replace or adjust	12— 5
	Loose lug nuts	Tighten	12— 5
Excessive steering wheel play	Loose lug nuts	Tighten	12— 5

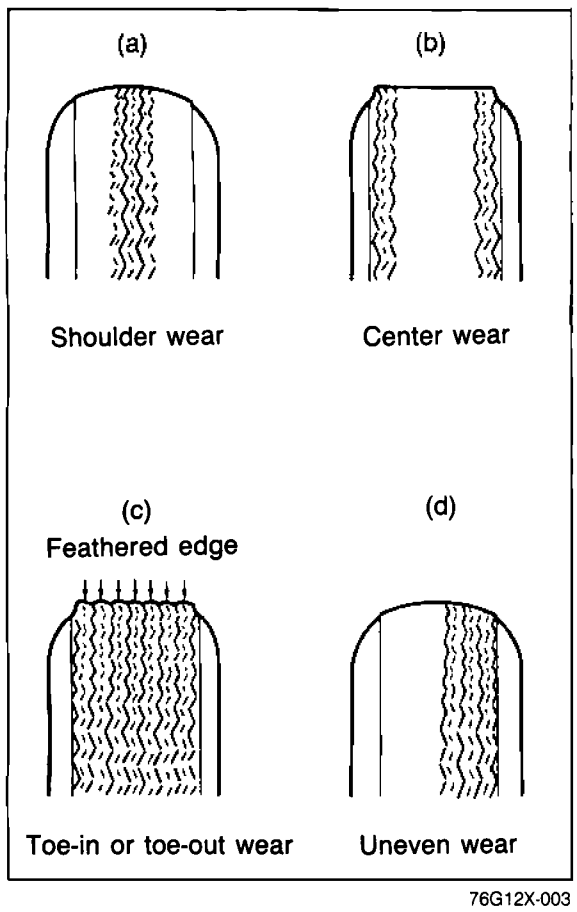
76G12X-002



86U12X-004



86U12X-005



76G12X-003

WHEELS AND TIRES

INSPECTION AND ADJUSTMENTS

Check the following, and adjust or replace as necessary.

1. Air pressure
   Check the air pressure of all tires, including the spare tire, with an air pressure gauge.
   (Refer to page 12—2.)

   Caution
   The air pressure must be measured when the tire is cold.

2. Tire wear

Specifications

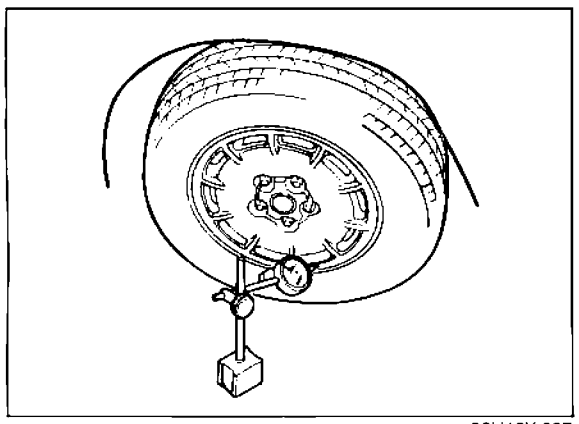
Remaining tread
Ordinary tires: 1.6 mm (0.063 in) min.
(Tire should be replaced if wear indicators are exposed.)

Snow tires: 50% of tread
(Tire should be replaced if wear indicators are exposed.)

Troubleshooting guide

Abnormal tire wear patterns shown in the illustration can occur. Refer to the chart for the probable causes and remedies.

	Probable cause	Remedy
(a)	• Underinflation (both sides worn) • Incorrect camber (one side worn) • Hard cornering • Lack of rotation	• Measure and adjust pressure • Repair or replace axle and suspension parts • Reduce speed • Rotate tires
(b)	• Overinflation • Lack of rotation	• Measure and adjust pressure • Rotate tires
(c)	• Incorrect toe-in	• Adjust toe-in
(d)	• Incorrect camber or caster • Malfunctioning suspension • Unbalanced wheel • Out-of-round brake drum or disc • Other mechanical conditions • Lack of rotation	• Repair or replace axle and suspension parts • Repair or replace • Balance or replace • Correct or replace • Correct or replace • Rotate tires

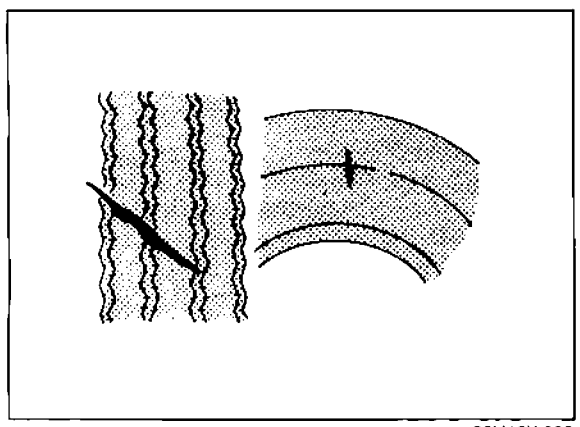


86U12X-007

3. Wheel deflection
   Set the probe of a dial indicator against the wheel, and turn the wheel one full revolution.

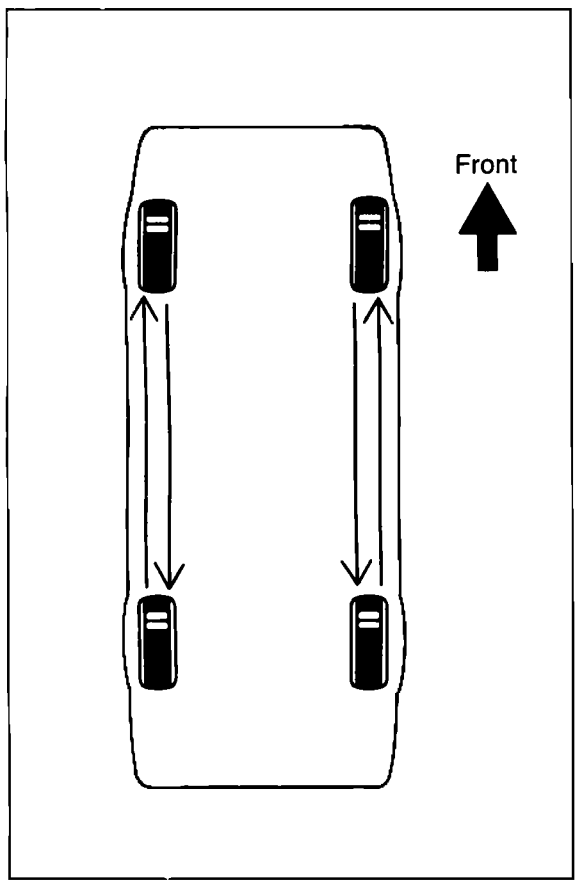
Wheel deflection limit mm (in)

	Horizontal	Vertical
Steel wheel	2.5 (0.098)	2.0 (0.079)
Aluminum wheel	2.0 (0.079)	



86U12X-008

4. Cracks, damage, or foreign matter (such as metal pieces, nails, and stones) in the tire and cracks, deformation, and damage to the wheel
5. Loose wheel lug nut(s)
6. Air leaking from the valve stem



76G12X-004

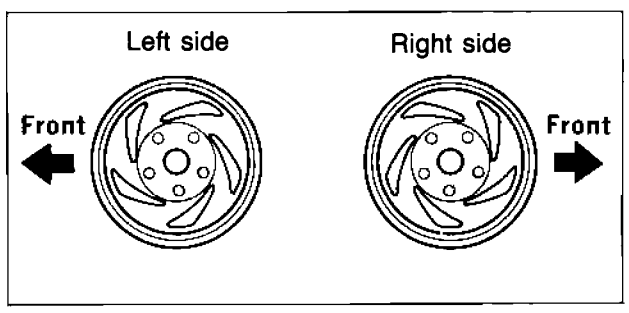
TIRE ROTATION

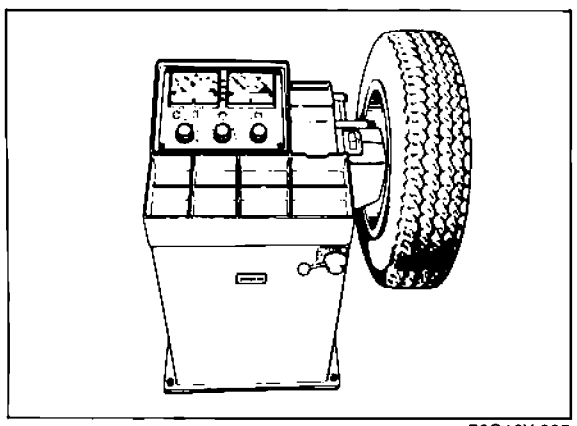
To prolong tire life and assure uniform wear, rotate the tires every 6,000 km (3,750 miles) or sooner if irregular wear develops.

Caution
a) Do not include "TEMPORARY USE ONLY" spare tire in rotation.
b) After rotating the tires, adjust each tire to the specified air pressure. (Refer to page 12—2.)

Note
The optional unidirectional wheels are marked to indicate direction of travel.

Unidirectional wheel





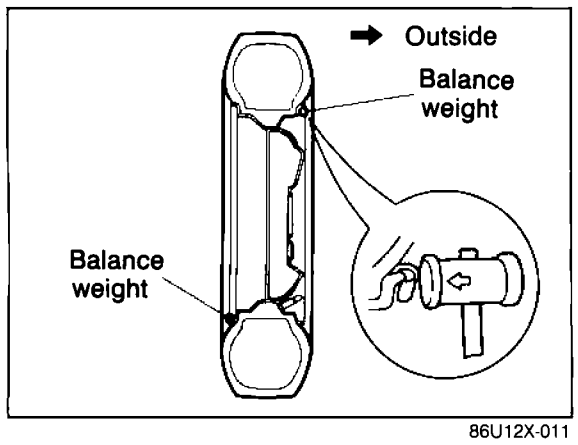
76G12X-005

WHEEL BALANCE

If a wheel becomes unbalanced or if a tire is replaced or repaired, the wheel must once again be balanced to within specification.

Maximum unbalance (at rim edge): g (oz)

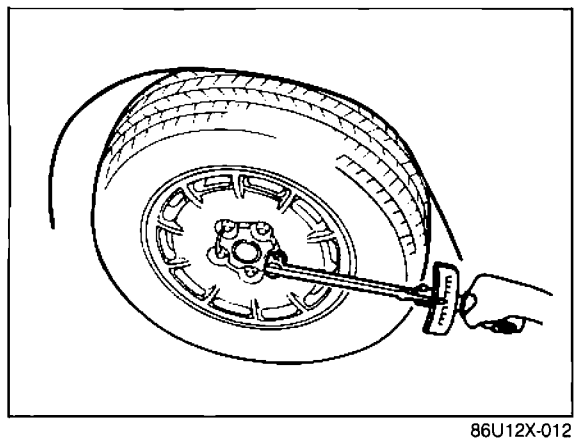
13 inch-wheel	11 (0.39)
14 inch-wheel	10 (0.35)
15 inch-wheel	9 (0.32)



86U12X-011

Caution

a) Do not use more than two balance weights on the inner or outer side of the wheel. if the total weight exceeds 100 g (3.5 oz), re-balance after moving the tire around on the rim.
b) Attach the balance weights tightly so that they do not protrude more than 3 mm (0.12 in) beyond the wheel edge.
c) Select suitable balance weights for steel or aluminum alloy wheels.
d) Do not use an on-car balancer on ATX models. Use of this type of balancer may cause clutch damage.



86U12X-012

WHEEL MOUNTING

Tighten the lug nuts to the specified torque in a criss-cross fashion.

Tightening torque:
88—118 N·m (9—12 m-kg, 65—87 ft-lb)

Caution

a) The wheel-to-hub contact surfaces must be clean.
b) Never apply oil to the nuts, bolts, or wheels; doing so might cause looseness or seizure of the lug nuts.

SPECIAL NOTE

Regarding wheels and tires:

1. Do not use wheels or tires other than the specified types.
2. Aluminum wheels are easily scratched. When washing them, use a soft cloth, never a wire brush. If the vehicle is steam cleaned, do not allow boiling water to contact the wheels.
3. If alkaline compounds (such as salt water or road salts), get on aluminum wheels, wash them as soon as possible to prevent damage. Use only a neutral detergent.

86U12X-013

Regarding tire replacement:
Note the following points when tires are to be removed from or mounted onto the wheels.
1. Be careful not to scratch the tire bead, the rim bead, or the edge of the rim.
2. Apply a soapy solution to the tire bead and the edge of the rim.
3. Use a wire brush, sandpaper, or cloth to clean and remove all rust, dirt, etc., from the rim edge and the rim bead. For aluminum wheels, use only a cloth for this purpose; never use a wire brush or sandpaper.
4. Remove any pebbles, glass, nails, etc., embedded in the tire tread.
5. Be sure the air valve is installed correctly.
6. After mounting a tire onto a wheel, inflate the tire to 250—300 kPa (2.55—3.06 kg/cm^2, 35.55—42.66 psi). Check to be sure that the bead is seated correctly onto the rim and that there are no air leaks. Then reduce the pressure to the specified level.
7. If a tire iron is used to change a tire on an aluminum wheel, be sure to use a piece of rubber between the iron lever and the wheel in order to avoid damage to the wheel. Work should be done on a rubber mat, not on a hard or rough surface.

76G12X-006

13

SUSPENSION

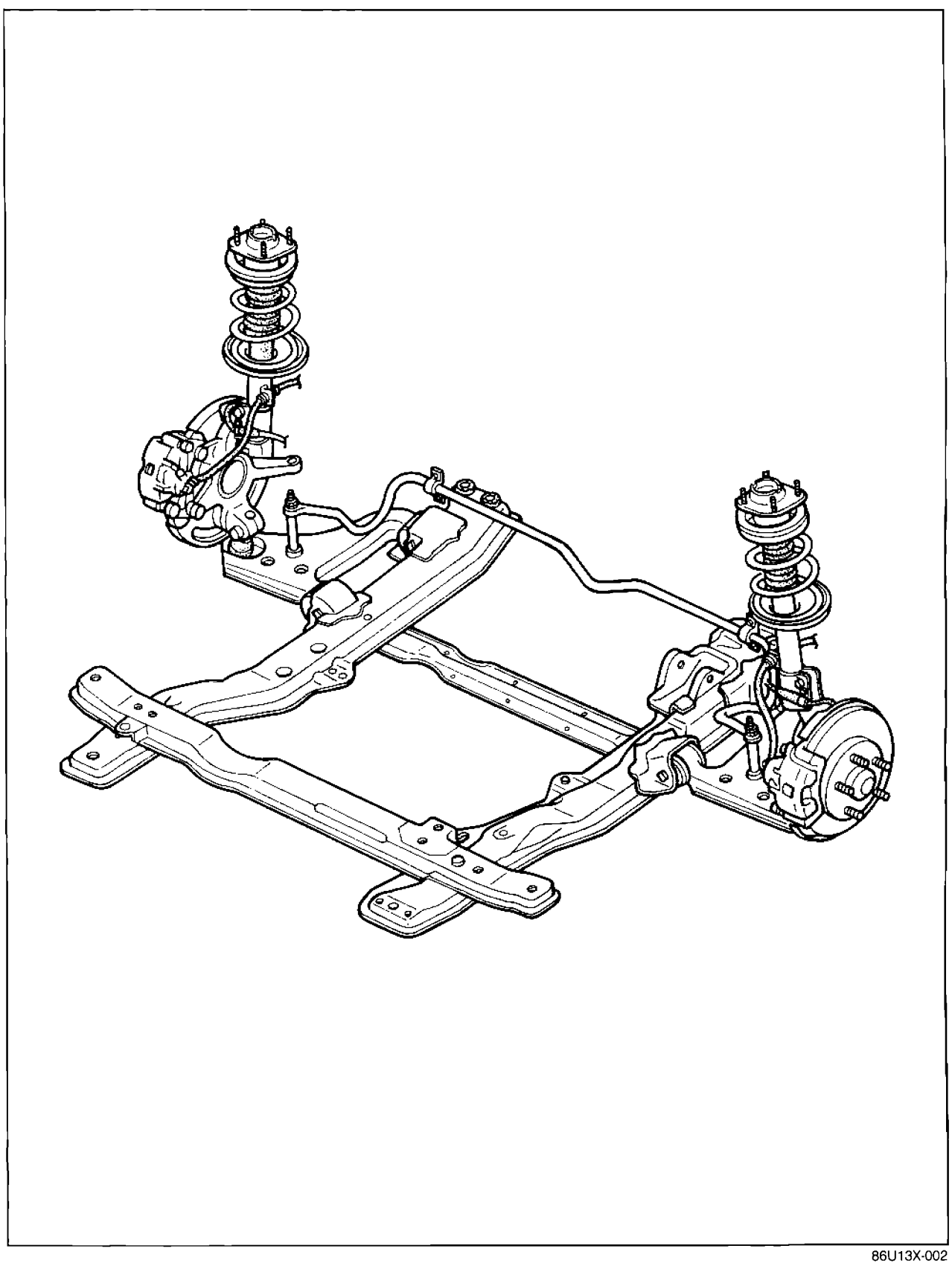
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13 OUTLINE

OUTLINE

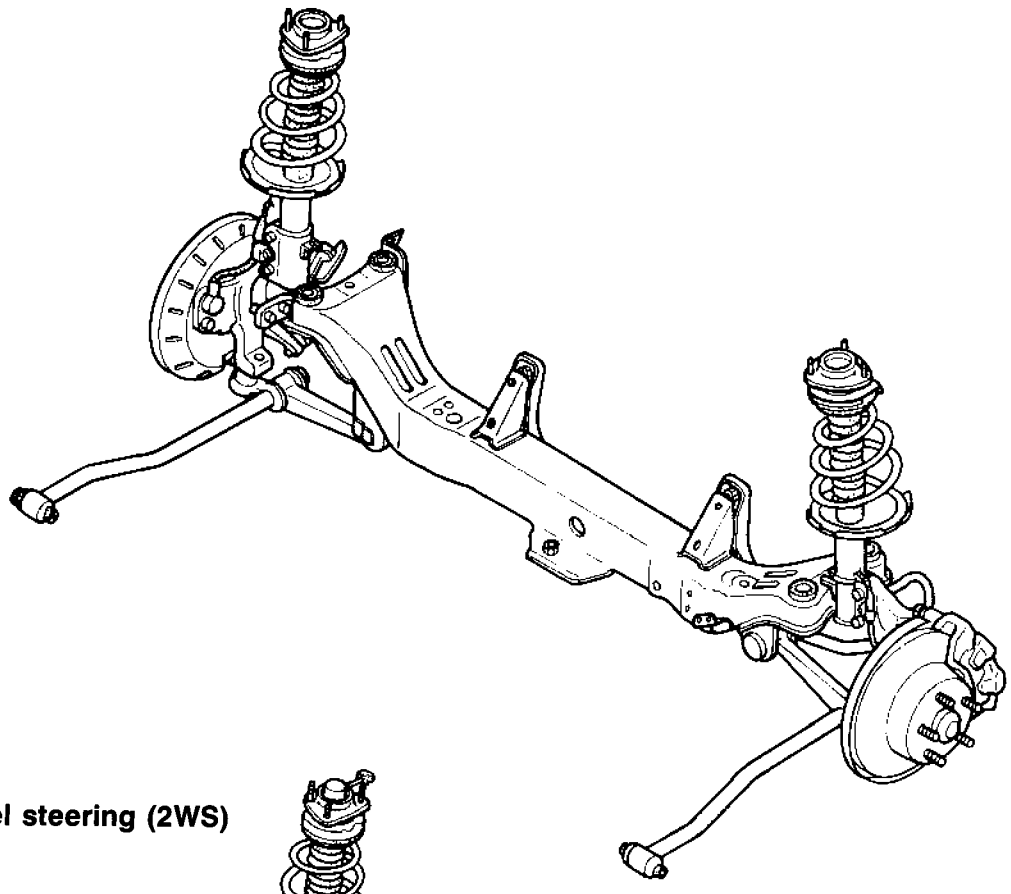
STRUCTURAL VIEW
Front Suspension



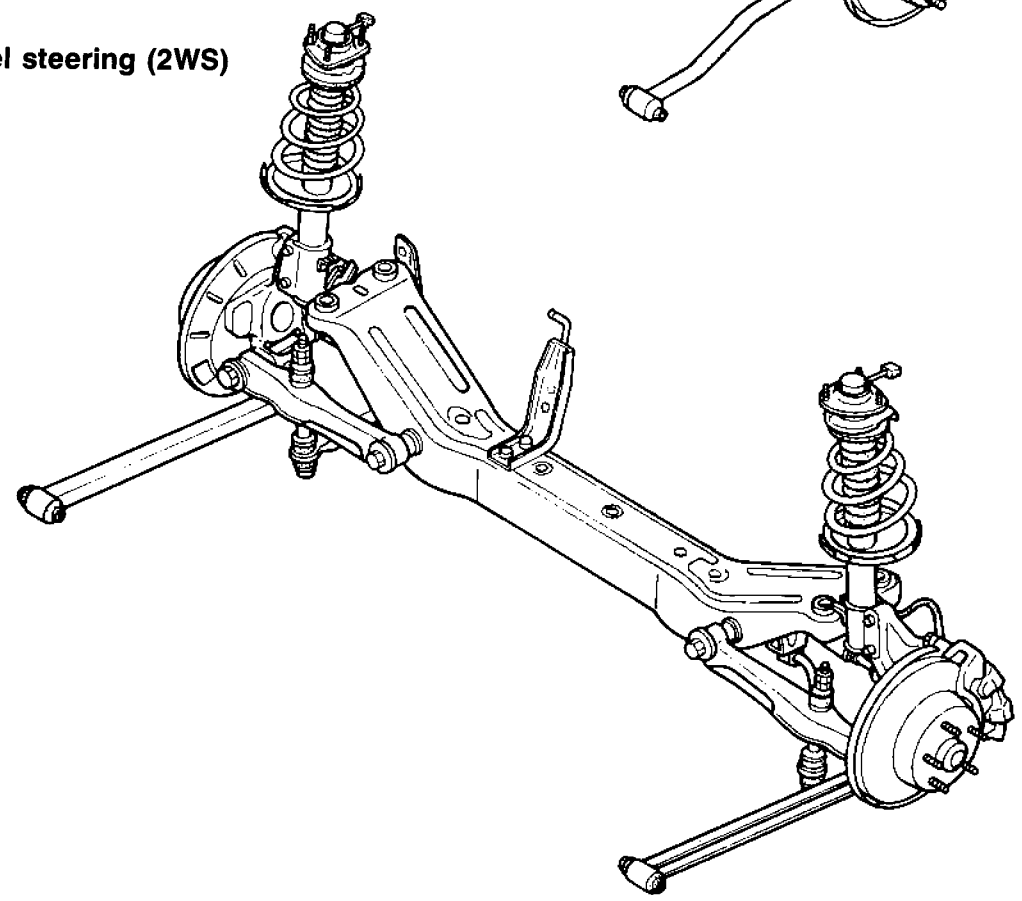
86U13X-002

Rear Suspension

4-wheel steering (4WS)



2-wheel steering (2WS)



86U13X-003

13 OUTLINE

SPECIFICATIONS
Front Suspension

Item			Specifications						
Suspension type			Strut						
Front wheel alignment	Toe-in mm (in)		0 ± 3 (0 ± 0.12)						
	Camber angle		0°17' ± 45'						
	Caster angle		1°13' ± 45'						
	King pin angle		12°47'						
Maximum front steering angle	Inner		36°00' ± 2°						
	Outer		31°00' ± 2°						
Stabilizer	Type		Torsion bar						
	Diameter mm (in)		20.0 (0.79)						
Shock absorbers	Standard suspension		Oil type						
	Auto adjust suspension		Low-pressure gas sealed type						
*Coil springs	Identification color		Green	Light green	Pink	Brown	Purple	Gray	Orange
	Wire diameter mm (in)		12.6 (0.49)	12.8 (0.50)	12.9 (0.51)	13.1 (0.52)	13.3 (0.53)	13.6 (0.54)	12.5 (0.49)
	Coil inner diameter mm (in)		147.5 (5.8)						
	Free length mm (in)		353 (13.9)	362 (14.3)	370 (14.6)	372 (14.6)	365 (14.4)	350 (13.8)	344 (13.5)
	Coil number		5.09	5.31	5.42	5.53	5.46	5.34	4.99

* Refer to pages 13—5, 6, 7 spring applications.

Rear Suspension

Item			Specifications							
Suspension type			Strut							
Rear wheel alignment	Toe-in mm (in)	2WS	0 ± 3 (0 ± 0.12)							
		4WS	3 ± 3 (0.12 ± 0.12)							
	Camber angle	2WS	–0°30' ± 45'							
		4WS	0°00' ± 45'							
Maximum rear steering angle (4WS)	Inner		5°00' ± 45'							
	Outer		5°00' ± 45'							
Stabilizer	Type		Torsion bar							
	Diameter mm (in)		16 (0.63)							
Shock absorbers	Standard suspension		Oil type							
	Auto adjust suspension		Low-pressure gas sealed type							
*Coil springs	Identification color		Orange	White	Yellow	Brown	Blue	Green	Red	Pink
	Wire diameter mm (in)		11.6 (0.45)	11.7 (0.46)	11.8 (0.46)	11.9 (0.47)	12.1 (0.48)	12.2 (0.48)	12.4 (0.49)	12.6 (0.50)
	Coil inner diameter mm (in)		127.5 (5.0)							
	Free length mm (in)		297 (11.7)	306 (12.0)	314 (12.4)	323 (12.7)	327 (12.9)	332 (13.1)	336 (13.2)	340 (13.4)
	Coil number		5.44	5.58	5.72	5.87	6.03	6.04	6.21	6.36

*Refer to pages 13—8, 9, 10 spring applications.

76G13X-002

Front Coil Springs

Model	Market	Engine	Transaxle	Sunroof	AAS	ABS	Identification color						
							Green	Light green	Pink	Brown	Purple	Gray	Orange
Sedan	ECE	F8	M4	—	—	—	○						
			M5	—	—	—	○						
			4HAT	—	—	—				○			
		FE	M5	—	—	—		○					
				○	—	—		○					
				—	○	—	○						
				○	○	—	○						
			4HAT	—	—	—					○		
				—	○	—			○				
				—	—	—				○			
				○	—	—					○		
		FE (DOHC)	M5	—	—	—				○			
				—	○	—		○					
				—	○	○		○					
				—	—	○				○			
				○	—	—				○			
				○	○	—			○				
				○	○	○			○				
				○	—	○				○			
		FE (Fuel Injection)	M5	—	—	—	○						
				—	○	—							○
			EC-AT	○	—	—			○				
				○	○	—		○					
		RF-N	M5	—	—	—				○			
		RF-CX		—	—	—					○		
	Left Hand Drive	F8	M5	—	—	—	○						
				—	○	—	○						
			4HAT	—	—	—				○			
		RF-N	M5	—	—	—				○			
	Middle East	FE	M5	—	—	—	○						
				—	○	—		○					
			4HAT	—	—	—			○				
				—	○	—				○			
	Right Hand Drive	F6	3AT	—	—	—		○					
			M5	—	—	—	○						
		FE	M5	—	—	—	○						
				—	○	—		○					
			4HAT	—	—	—			○				
				—	○	—				○			
		FE (DOHC)	M5	—	—	—		○					
				—	○	○		○					
		RF-N	M5	—	—	—				○			
		F8	M5	—	—	—	○						
			4HAT	—	—	—				○			

76G13X-003

○.....Available
—.....Not available

M4, M5.....Manual transaxle
EC-AT.....Electronically controlled automatic transaxle
4HAT.....Hydrallic controlled automatic transaxle
4WS..... 4-Wheel steering
AAS.....Auto adjusting suspention
ABS.....Anti-lock brake system
3AT..... Automatic transaxle

Model	Market	Engine	Transaxle	Sunroof	AAS	ABS	Identification color						
							Green	Light green	Pink	Brown	Purple	Gray	Orange
Hatchback	ECE	F8	M4	—	—	—	○						
			M5	—	—	—		○					
			4HAT	—	—	—				○			
		FE	M5	—	—	—		○					
				○	—	—		○					
			4HAT	—	—	—				○			
				○	—	—					○		
		FE (DOHC)	M5	—	—	—				○			
				—	○	—			○				
				—	○	○			○				
				—	—	○				○			
				○	—	—				○			
				○	○	—			○				
				○	○	○			○				
				○	—	○				○			
				—	—	○						○ (4WS)	
				○	—	○						○ (4WS)	
	Left Hand Drive	F8	M5	—	—	—		○					
			4HAT	—	—	—				○			
		FE	M5	—	—	—	○						
				—	○	—		○					
	Middle East	FE	M5	—	—	—	○						
				—	○	—		○					
			4HAT	—	—	—			○				
				—	○	—				○			
	Right Hand Drive	F8	M5	—	—	—	○						
			4HAT	—	—		○						
		FE	M5	—	—	—	○						
				—	○	—		○					
			4HAT	—	—	—			○				
				—	○	—				○			
		FE (DOHC)	M5	—	—	—			○				
				—	○	—				○			
				—	○	○			○				

76G13X-004

Model	Market	Engine	Transaxle	Sunroof	AAS	ABS	Identification color						
							Green	Light green	Pink	Brown	Purple	Gray	Orange
Coupe/MX-6	ECE	FE	M5	—	—	—		○					
				○	—	—			○				
			4HAT	—	—	—					○		
				○	—	—					○		
		FE (DOHC)	M5	—	—	—				○			
				—	○	—			○				
				—	○	○			○				
				—	—	○				○			
				○	—	—				○			
				○	○	—			○				
				○	○	○			○				
				○	—	○				○			
	Left Hand Drive	FE	M5	—	—	—	○						
				—	○	—		○					
		F8	M5	—	—	—		○					
	Middle East	FE	M5	○	—	—	○						
				—	○	—			○				
	Right Hard Drive	F8	M5	—	—	—		○					
		FE	M5	—	—	—	○						
				—	○	—		○					
			4HAT	—	—	—			○				
				—	○	—					○		
		FE (DOHC)	M5	—	—	—			○				
				—	○	—				○			
				—	○	○			○				

76G13X-005

Rear Coil Springs

Model	Market	Engine	Transaxle	Sunroof	AAS	ABS	Identification color							
							Orange	White	Yellow	Brown	Blue	Green	Red	Pink
Sedan	ECE	F8	M4	—	—	—				R		L		
			M5	—	—	—					R		L	
			4HAT	—	—	—					R		L	
		FE	M5	—	—	—					R		L	
				○	—	—					R		L	
				—	○	—				R		L		
				○	○	—				R		L		
			4HAT	—	—	—					R		L	
				—	○	—			R		L			
				—	—	—					R		L	
				○	—	—					R		L	
		FE (DOHC)	M5	—	—	—					R		L	
				—	○	—				R		L		
				—	○	○				R		L		
				—	—	○					R		L	
				○	—	—						R		L
				○	○	—				R		L		
				○	○	○				R		L		
				○	—	○						R		L
		FE (Fuel Injection)	M5	—	—	—						R		L
				—	○	—					R		L	
			EC-AT	○	—	—						R		L
				○	○	—				R		L		
		RF-N	M5	—	—	—				R	R	L	L	
		RF-CX		—	—	—					R		L	
Left Hand Drive		F8	M5	—	—	—					R		L	
				—	○	—					R		L	
			4HAT	—	—	—					R		L	
		RF-N	M5	—	—	—				R		L		
Middle East		FE	M5	—	—	—			R		L			
				—	○	—					R		L	
			4HAT	—	—	—			R		L			
				—	○	—					R		L	
Right Hand Drive		F6	3AT	—	—	—					L		R	
			M5	—	—	—					L		R	
		FE	M5	—	—	—			L		R			
				—	○	—					L		R	
			4HAT	—	—	—			L		R			
				—	○	—					L		R	
		FE (DOHC)	M5	—	—	—				L		R		
				—	○	○					L		R	
		RF-N	M5	—	—	—				L		R		
		F8	M5	—	—	—					L		R	
			4HAT	—	—	—					L		R	

76G13X-006

○..... Available
—..... Not available

R..... Right side
L..... Left side

M4, M5 Manual transaxle
3AT..... Automatic transaxle
EC-AT... Electronically controlled automatic transaxle
4HAT.... Hydrallic controlled automatic transaxle
4WS..... 4-wheel steering
AAS..... Auto adjusting suspention
ABS..... Anti-lock brake system

Model	Market	Engine	Transaxle	Sunroof	AAS	ABS	Identification color							
							Orange	White	Yellow	Brown	Blue	Green	Red	Pink
Hatchback	ECE	F8	M4	—	—	—				R		L		
			M5	—	—	—					R		L	
			4HAT	—	—	—					R		L	
		FE	M5	—	—	—					R		L	
				○	—	—						R		L
			4HAT	—	—	—					R		L	
				○	—	—					R		L	
		FE (DOHC)	M5	—	—	—					R		L	
				—	○	—				R		L		
				—	○	○				R		L		
				—	—	○					R		L	
				○	—	—						R		L
				○	○	—				R		L		
				○	○	○				R		L		
				○	—	○						R		L
				—	—	○						R (4WS)		L (4WS)
				○	—	○						R (4WS)		L (4WS)
	Left Hand Drive	F8	M5	—	—	—					R		L	
			4HAT	—	—	—					R		L	
		FE	M5	—	—	—			R		L			
				—	○	—					R		L	
	Middle East	FE	M5	—	—	—			R		L			
				—	○	—					R		L	
			4HAT	—	—	—			R		L			
				—	○	—					R		L	
	Right Hand Drive	F8	M5	—	—	—					L		R	
			4HAT	—	—	—					L		R	
		FE	M5	—	—	—			L		R			
				—	○	—					L		R	
			4HAT	—	—	—			L		R			
				—	○	—					L		R	
		FE (DOHC)	M5	—	—	—				L		R		
				—	○	—					L		R	
				—	○	○				L		R		

76G13X-007

13 OUTLINE

Model	Market	Engine	Transaxle	Sunroof	AAS	ABS	Identification color							
							Orange	White	Yellow	Brown	Blue	Green	Red	Pink
Coupe/MX-6	ECE	FE	M5	—	—	—			R		L			
				○	—	—			R		L			
			4HAT	—	—	—			R		L			
				○	—	—			R		L			
		FE (DOHC)	M5	—	—	—			R		L			
				—	○	—		R		L				
				—	○	○		R		L				
				—	—	○			R		L			
				○	—	—			R		L			
				○	○	—		R		L				
				○	○	○		R		L				
				○	—	○			R		L			
	Left Hand Drive	FE	M5	—	—	—	R		L					
				—	○	—			R		L			
		F8	M5	—	—	—			R		L			
	Middle East	FE	M5	○	—	—		R		L				
				—	○	—			R		L			
	Right Hand Drive	F8	M5	—	—	—			L		R			
		FE	M5	—	—	—	L		R					
				—	○	—			L		R			
			4HAT	—	—	—	L		R					
				—	○	—			L		R			
		FE (DOHC)	M5	—	—	—		L		R				
				—	○	—			L		R			
				—	○	○		L		R				

76G13X-008

TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Body "rolls"	Weak stabilizer	Replace	13—23, 27
	Worn or deteriorated stabilizer or suspension arm bushing	Replace	13—39, 41
	Shock absorber malfunction	Replace	13—13, 29
Poor riding comfort	Weak coil spring	Replace	13—15, 32
	Shock absorber malfunction	Replace	13—13, 29
Body tilt	Worn coil spring	Replace	13—15, 32
	Worn stabilizer of suspension bushing	Replace	13—23, 27, 39, 41
Abnormal noise from suspension system	Poor lubrication or wear of lower arm ball joint	Replace	13—18, 36
	looseness of peripheral connections	Tighten	
	Shock absorber malfunction	Replace	13—13, 29
	Worn or deteriorated stabilizer or suspension arm bushing	Replace	13—23, 27, 39, 41
	Worn or damaged front strut bearing	Replace	13—15
"Heavy" steering wheel operation	Lower arm ball joint stuck	Replace	13—18, 36
	Ball joints stuck or damaged	Replace	13—18, 36
	Ball joints insufficiently lubricated; foreign material; abnormal wear	Lubricate or replace	13—18, 36
	Improperly adjusted wheel alignment (toe-in)	Adjust	13—50, 52
	Worn or damaged steering gear bushing	Refer to section 10	—
	Improperly adjusted pinion pre-load	Refer to section 10	—
	Damaged steering gear	Refer to section 10	—
	Insufficient grease on steering gear	Refer to section 10	—
	Malfunction of steering shaft universal joint	Refer to section 10	—
	Low tire pressure	Refer to section 12	—
	Abnormal tire wear	Refer to section 12	—
Steering wheel pulls to one side	Weak coil spring	Replace	13—15, 32
	Lower arm or stabilizer bushing worn or damaged	Replace	13—20, 38
	Damaged knuckle arm	Refer to section 9	—
	Lower arm damaged or loose	Replace or tighten	13—18
	Improperly adjusted wheel alignment (toe-in)	Adjust	13—50, 52
	Damaged steering linkage	Refer to section 10	—
	Damaged wheel bearing	Refer to section 9	—
	Uneven tire pressure	Refer to section 12	—
	Abnormal tire wear	Refer to section 12	—
	Brakes dragging	Refer to section 11	—
Steering wheel vibrates	Suspension arm or stabilizer bushing worn or deteriorated	Replace	13—23, 27, 39, 41
	Worn lower arm ball joint	Replace	13—18, 36
	Shock absorber malfunction or looseness	Replace or tighten	13—13, 29
	Improperly adjusted wheel alignment (toe-in)	Adjust	13—50, 52
	Damaged linkage	Refer to section 10	—
	Improperly adjusted pinion preload	Refer to section 10	—
	Worn steering gear bushing	Refer to section 10	—
	Loose steering shaft universal joint	Refer to section 10	—
	Damaged wheel bearing	Refer to section 9	—
	Abnormal tire wear	Refer to section 12	—
	Abnormal tire wear	Refer to section 12	—
	Damaged or unbalanced wheel	Refer to section 12	—

76G13X-009

13 TROUBLESHOOTING GUIDE

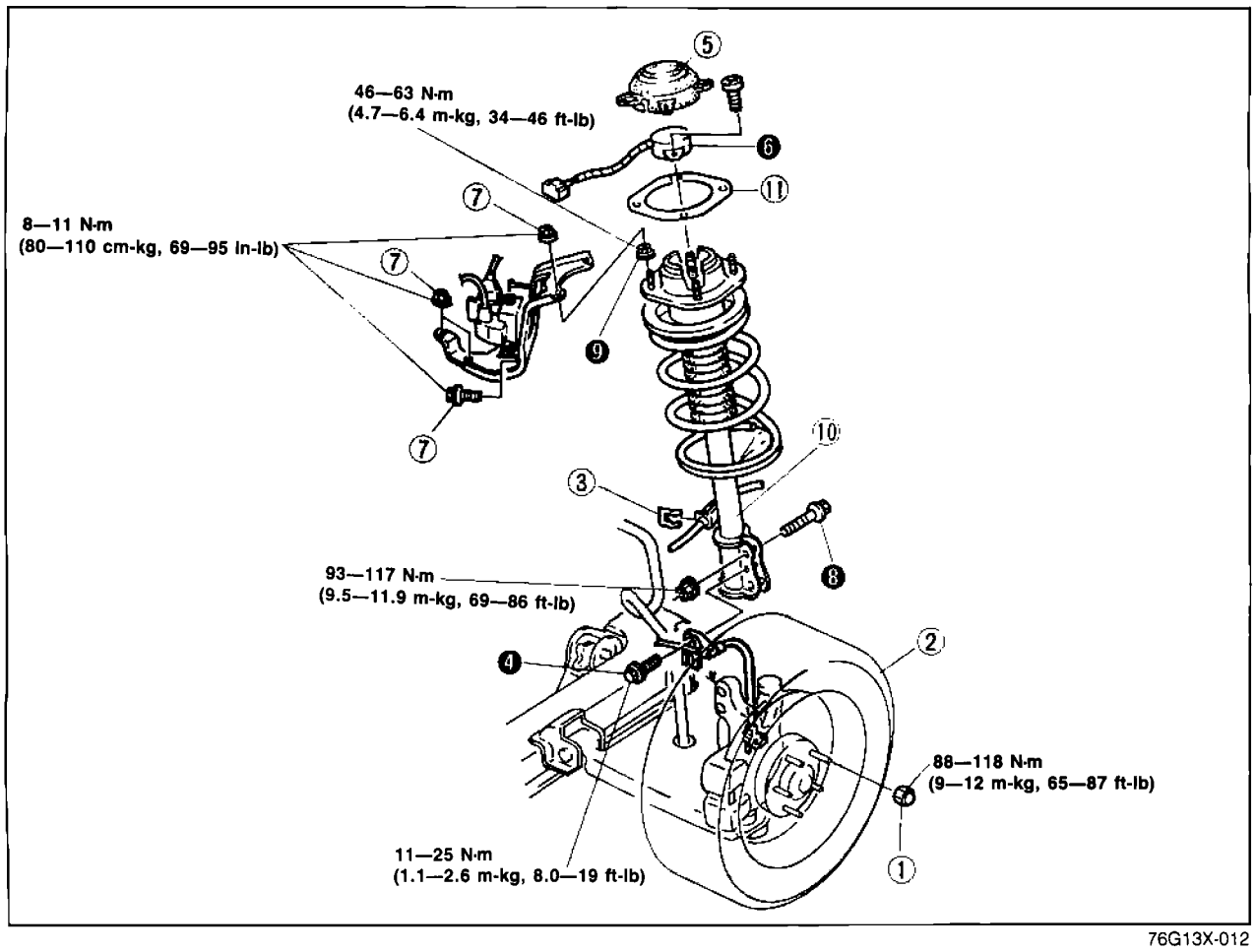
Problem	Possible Cause	Remedy	Page
Excessive steering wheel play	Worn or damaged lower arm bushing	Replace	13—20, 38
	Improperly adjusted pinion preload	Refer to section 10	—
	Worn rack and pinion	Refer to section 10	—
	Loose steering shaft universal joint	Refer to section 10	—
General instability	Weak coil springs	Replace	13—15, 32
	Shock absorber malfunction	Replace	13—13, 29
	Worn or damaged lower arm or stabilizer bushing	Replace	13—20, 38
	Improperly adjusted wheel alignment	Adjust	13—50, 52
	Improperly adjusted pinion preload	Refer to section 10	—
	Loose steering shaft universal joint	Refer to section 10	—
	Incorrect tire pressure	Refer to section 12	—
	Damaged or unbalanced wheel	Refer to section 12	—
	Malfunction of wheel bearing	Refer to section 9	—

76G13X-009

FRONT SHOCK ABSORBER AND SPRING

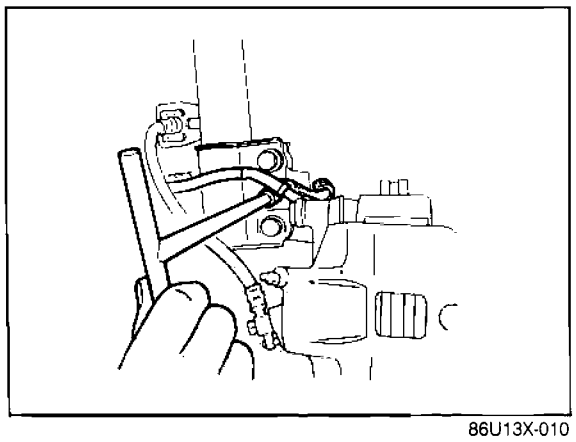
REMOVAL AND INSTALLATION

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure, referring to the removal note for specially marked parts.
3. Install in the reverse order of removal, referring to the installation note for specially marked parts.
4. Tighten all nuts and bolts to the specified torque, referring to the figure.



76G13X-012

1. Lug nut
2. Wheel and tire
3. Clip
4. Harness and bracket bolt (ABS)
5. Rubber cap
6. Actuator (AAS)
7. Nuts and bolts (Ignition coil bracket)
8. Bolt and nut
9. Nut
10. Shock absorber assembly
11. Seat



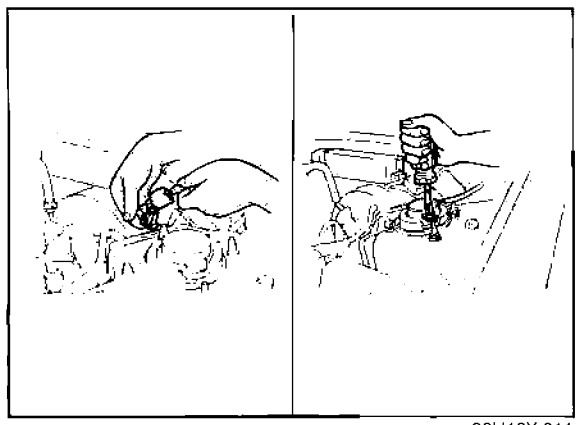
86U13X-010

Removal Note

ABS Harness bracket

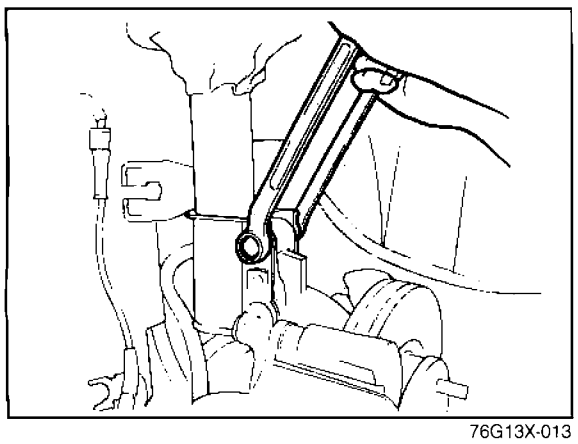
Remove the ABS harness and bracket.

13 FRONT SHOCK ABSORBER AND SPRING



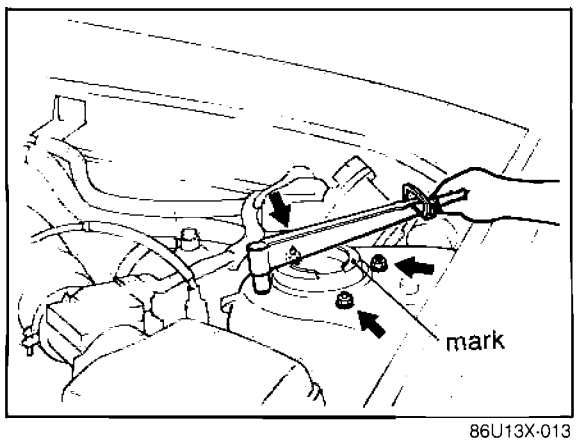
86U13X-011

AAS actuator
1. Disconnect the AAS actuator connector.
2. Remove the AAS actuator.



76G13X-013

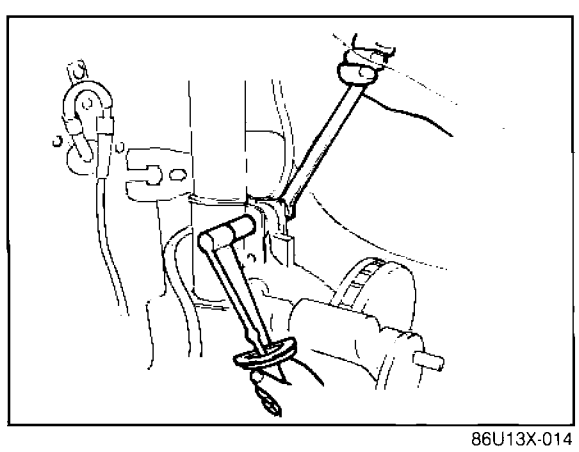
Shock absorber clinch bolts and nuts
1. Remove the shock absorber clinch bolts and nuts.
2. Remove the shock absorber upper mounting nuts.



86U13X-013

Installation Note
Mounting block
Install the mounting block to the suspension tower with the white mark facing the front-inside direction.

Tightening torque: 46—63 N·m (4.7—6.4 m-kg, 34—46 ft-lb)



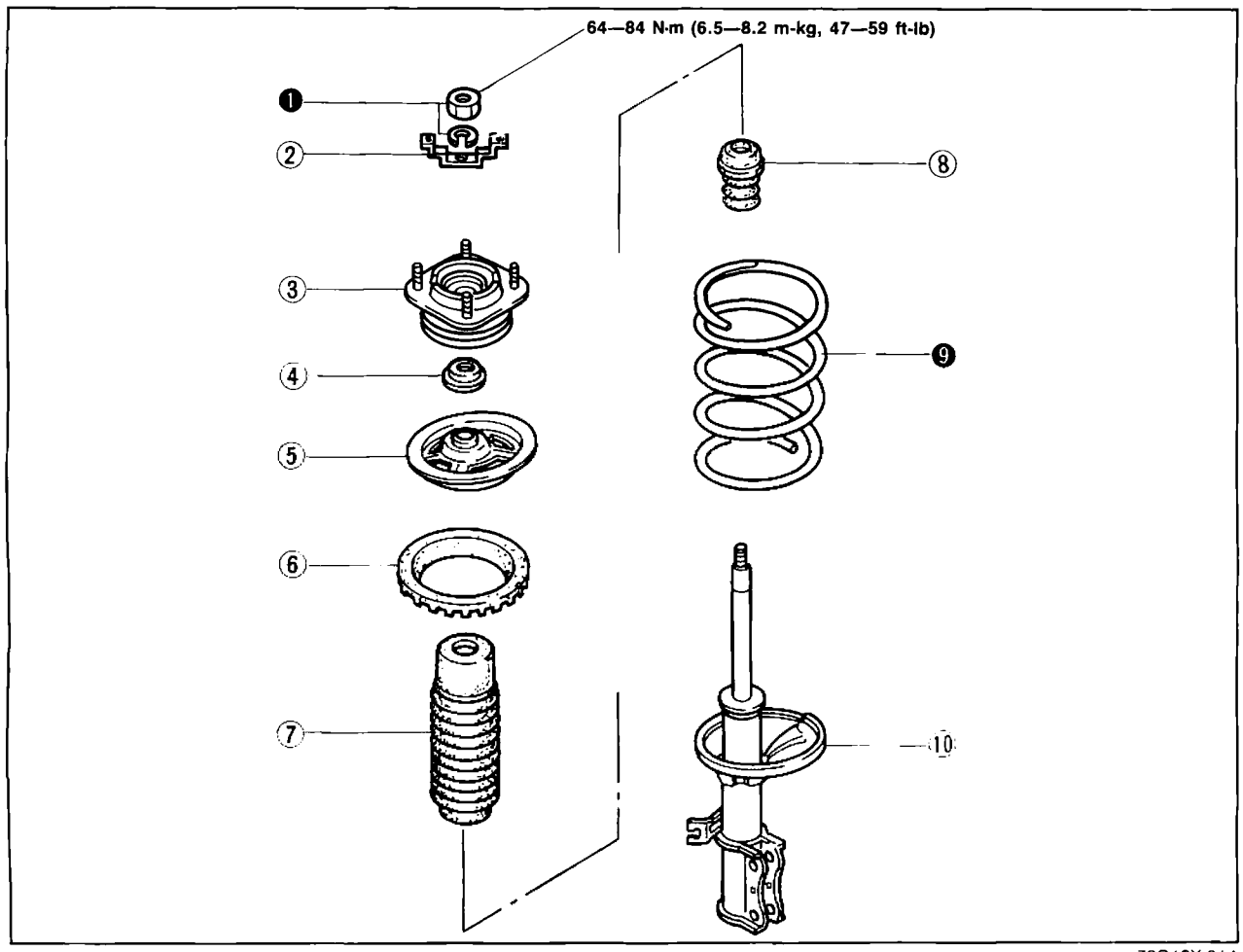
86U13X-014

Shock absorber clinch bolts and nuts
Install the clinch bolts and nuts.

Tightening torque: 93—117 N·m (9.5—11.9 m-kg, 69—86 ft-lb)

DISASSEMBLY AND ASSEMBLY

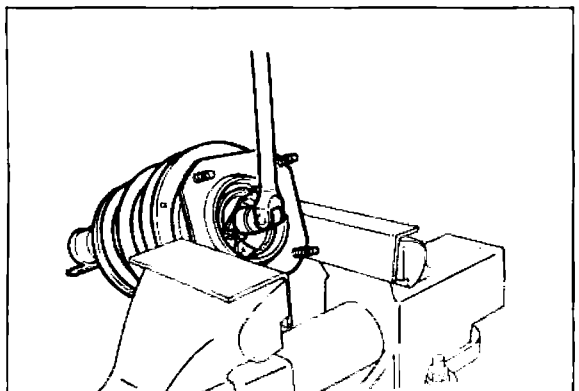
1. Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked parts.
2. Inspect all components and parts, referring to inspection note.
3. Assemble in the reverse order of disassembly, referring to the assembly note for specially marked parts.
4. Tighten all nuts and bolts to the specified torque, referring to the figure.



76G13X-014

1. Nut
2. Actuator bracket
3. Mounting block
4. Bearing
5. Spring upper seat
6. Spring seat
7. Dust boot
8. Bound stopper
9. Coil spring
10. Shock absorber

13 FRONT SHOCK ABSORBER AND SPRING



76G13X-015

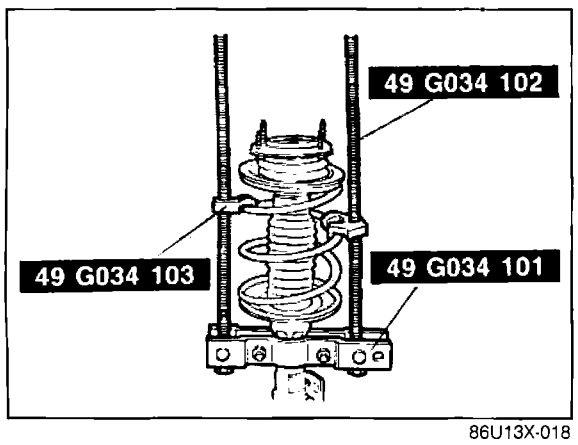
Disassembly Note

1. Loosen the piston rod upper nut several turns, bu
   do not remove.

Caution

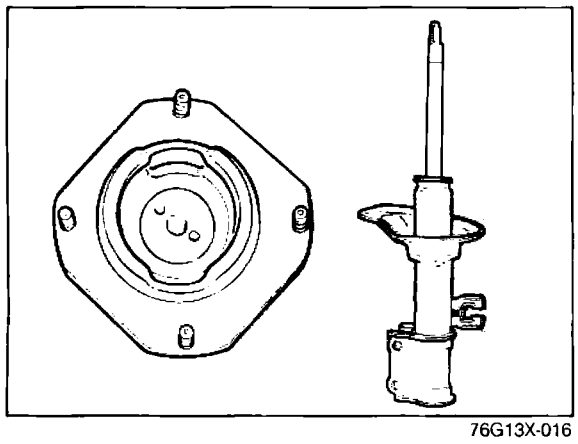
a) Do not remove the nut.

b) Use copper or aluminum plates in the jaw:
of a vice.



86U13X-018

2. Set the **SST** in a vise.
3. Secure the shock absorber in the **SST**.
4. Compress the coil spring with the **SST**, then re
   move the upper nut.
5. Remove the coil spring.

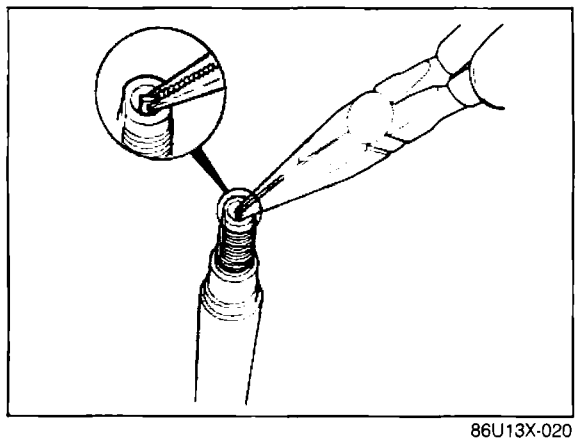


76G13X-016

Inspection Note

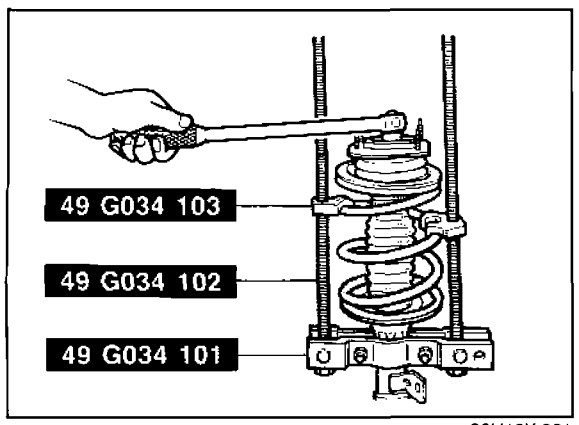
Check the following and repair or replace any fault
parts.

1. Oil leakage or abnormal noise from shock ab
   sorbers
2. Deterioration or damage of mounting block anc
   bearing
3. Wear or damage of bound stopper



86U13X-020

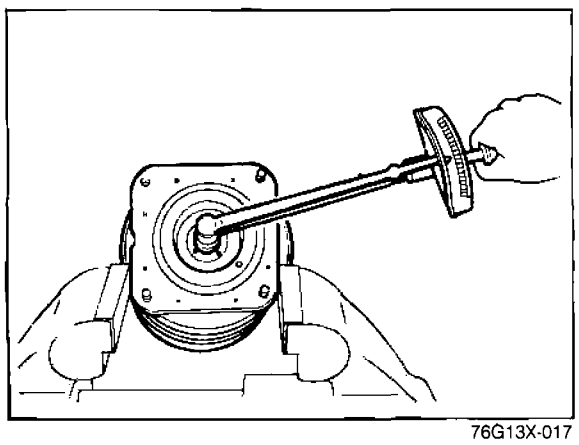
4. Smooth rotation of control rod (AAS)



86U13X-021

Assembly Note

1. Set the **SST** in a vise
2. Secure the shock absorber in the **SST**.
3. Install the bound stopper and dust boot to the shock absorber.
4. Install the compressed coil spring (compressed with **SST**).
5. Install the rubber seat, spring upper seat, bearing and mounting block.



76G13X-017

6. Remove the **SST**.
7. Secure the mounting block in a vise.

Caution
Use copper or aluminum plates in the jaws of a vice.

8. Tighten the piston rod upper nut.

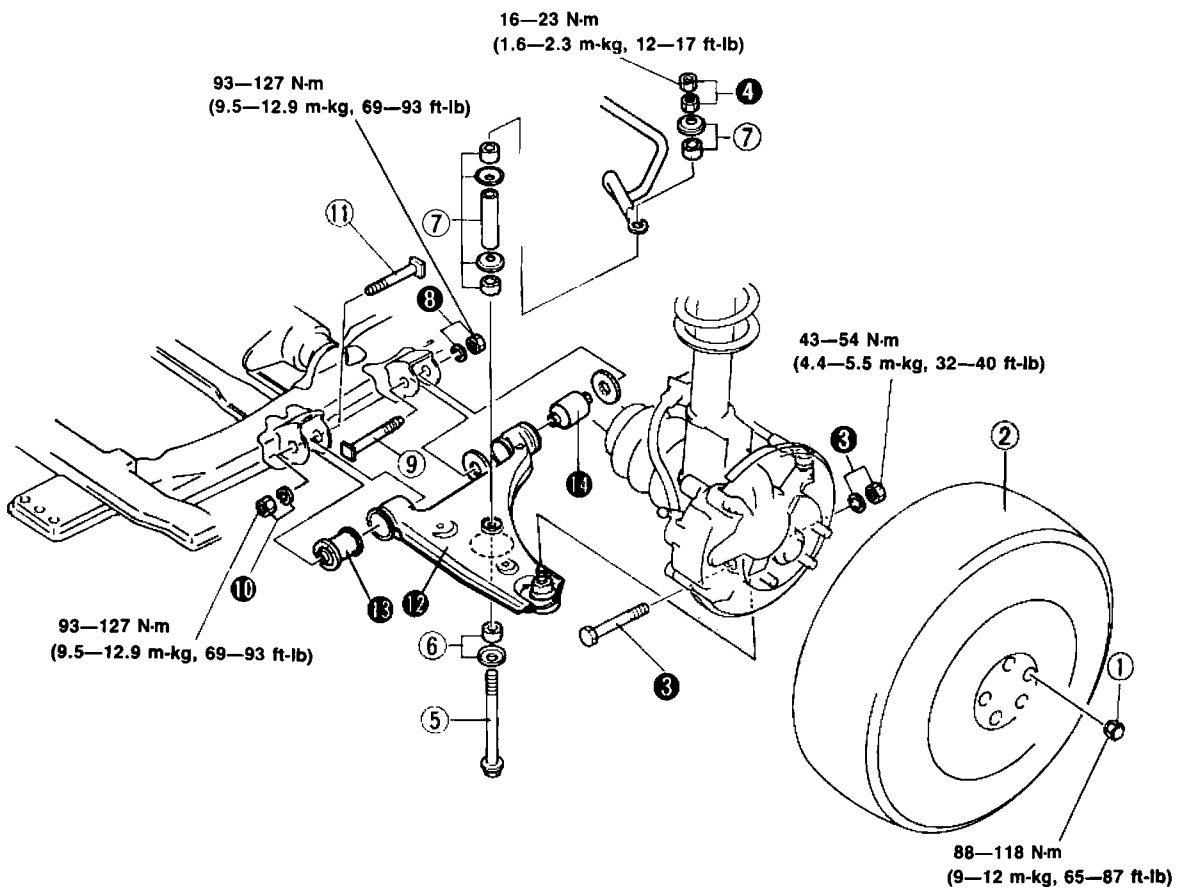
Tightening torque:
64—84 N·m (6.5—8.2 m-kg, 47—59 ft-lb)

Caution
Check that the spring is well seated in the upper seats.

FRONT LOWER ARM

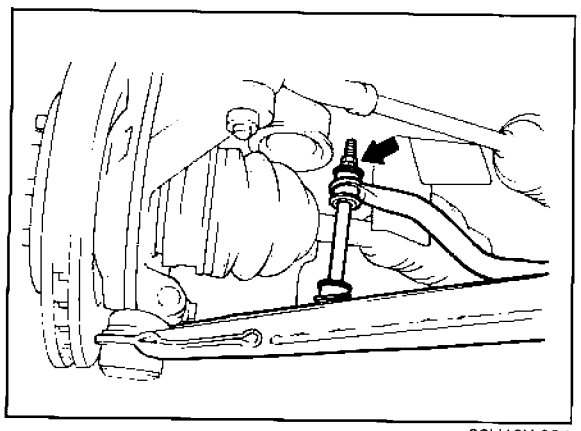
REMOVAL AND INSTALLATION

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure, referring to the removal note for specially marked parts.
3. Inspect all components and parts, referring to inspection note.
4. Install in the reverse order of removal, referring to the installation note for specially marked parts.
5. Tighten all nuts and bolts to the specified torque, referring to the figure.



76G13X-018

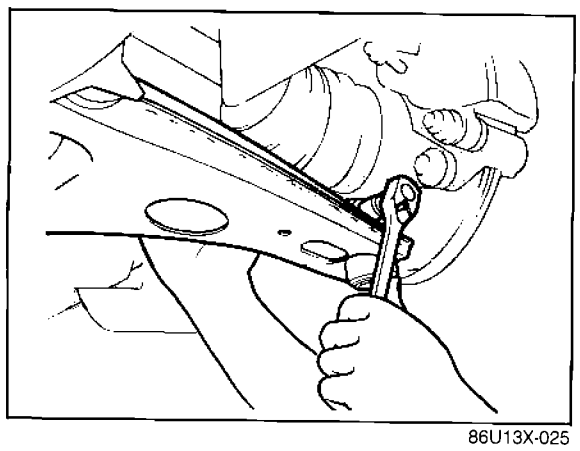
1. Lug nut
2. Wheel and tire
3. Bolt and nut
4. Nuts
5. Bolt
6. Retainer and bushing
7. Retainer, bushing and spacer
8. Nut
9. Bolt
10. Nut
11. Bolt
12. Front lower arm
13. Front bushing
14. Rear bushing



86U13X-024

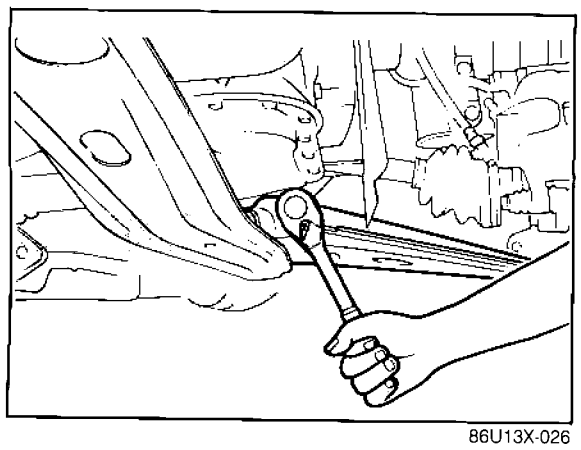
Removal Note

1. Remove the stabilizer bar control link.



86U13X-025

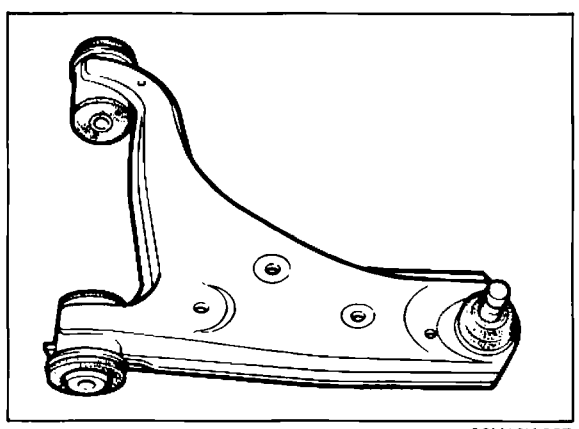
2. Remove the lower arm ball joint.



86U13X-026

3. Remove the lower arm spindle from the lower arm.

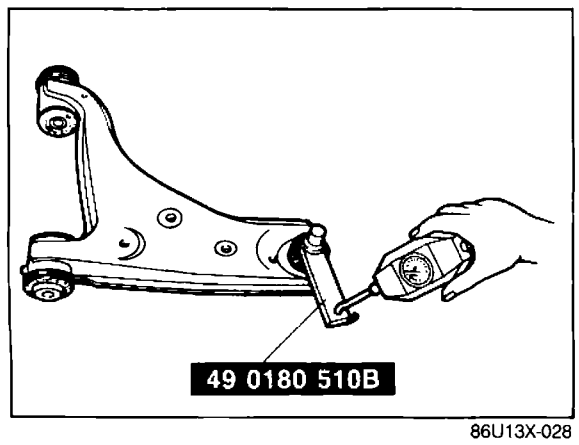
13 FRONT LOWER ARM



86U13X-027

Inspection Note
Check the following and repair or replace any faulty parts.
1. Lower arm for damage or cracks
2. Preload of ball joint
3. Bushings for deterioration or wear
4. Dust boot for damage

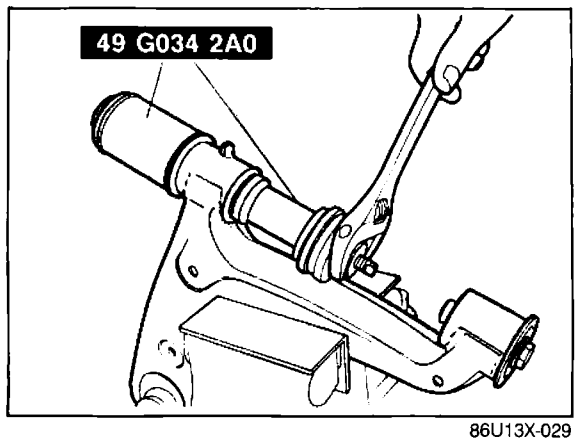
Note
If it is necessary to replace the ball joint, replace the lower arm assembly.



86U13X-028

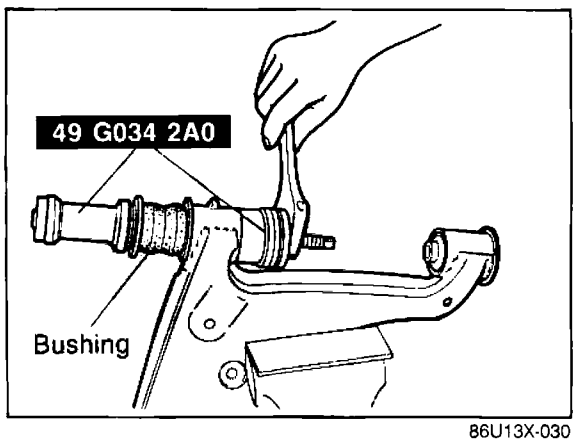
Ball joint preload
Attach the **SST** to the ball stud, and measure the preload with a pull scale.

Caution
Measure the preload after shaking ball joint the stud 3 or 4 times.



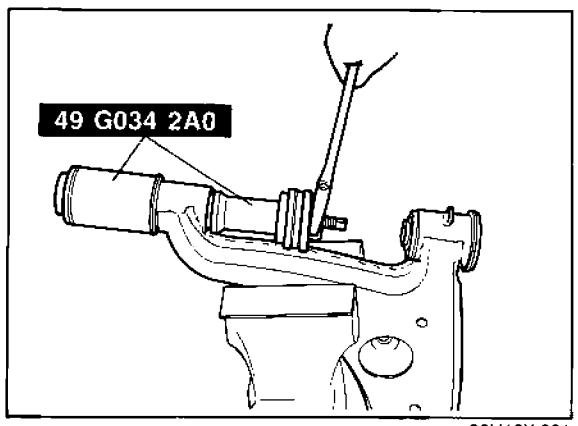
86U13X-029

Lower arm bushing (Front)
Removal
1. Cut away the projecting rubber of the lower arm bushing.
2. Set the **SST** on the lower arm and remove the bushing.



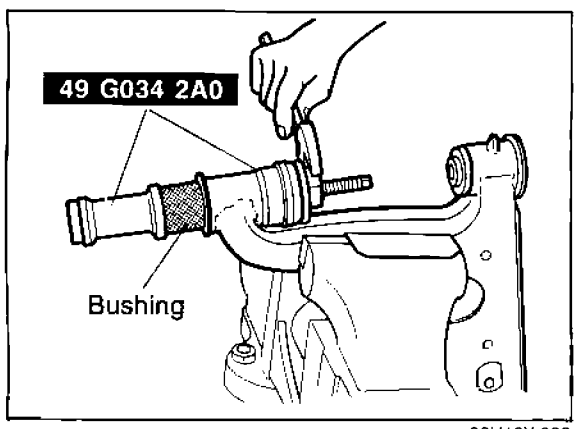
86U13X-030

Installation
Apply soapy water to the new bushing, then pull it into the lower arm with the **SST**.



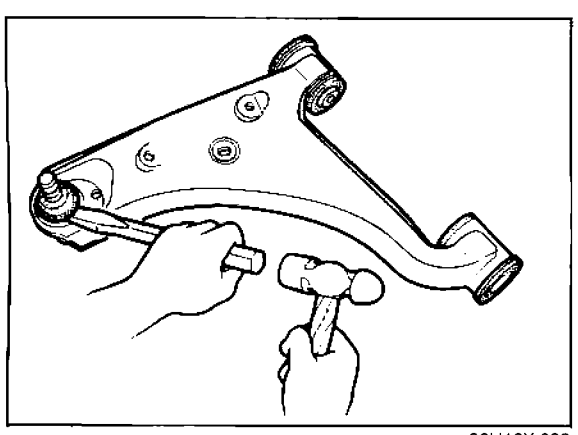
86U13X-031

Lower arm bushing (Rear)
Removal
Set the **SST** on the lower arm and remove the bushing.



86U13X-032

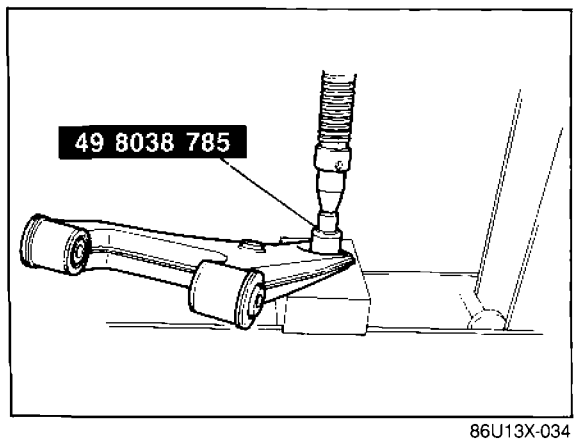
Installation
Install the new bushing, and then pull it into the lower arm with the **SST**.



86U13X-033

Ball joint dust boot
Removal
Remove the dust boot with a chisel.

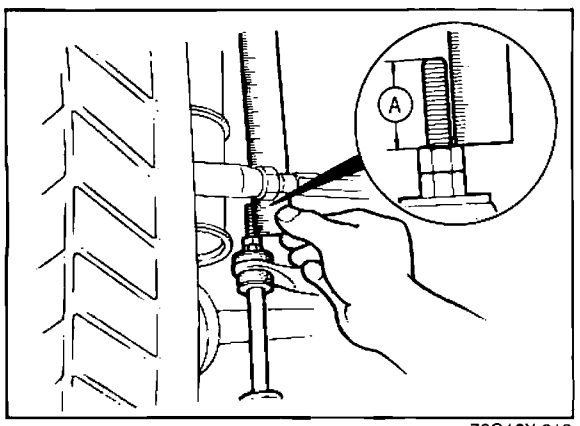
Caution
Do not damage the ball joint.



86U13X-034

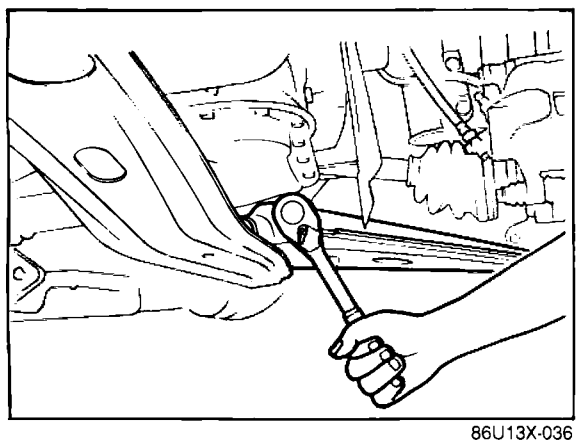
Installation
1. Liberally coat the inside of the new dust boot with grease.
2. Install the dust boot onto the ball joint with the **SST**.

13 FRONT LOWER ARM



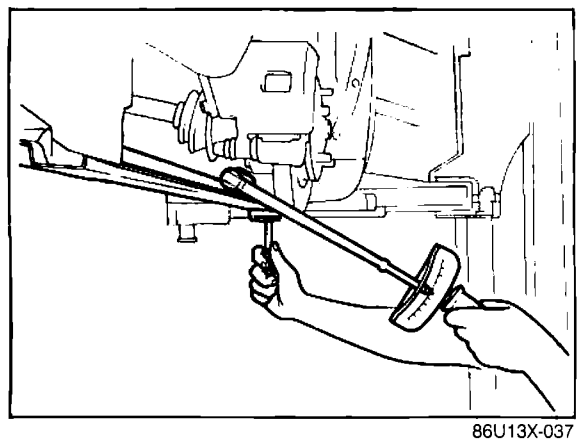
76G13X-019

Installation Note
Stabilizer control link
Tighten the link nut so that there is **20.1 mm (0.79 in)** of thread (A) exposed.



86U13X-036

Lower arm
1. Install the lower arm spindle to the lower arm, and loosely tighten the nut.

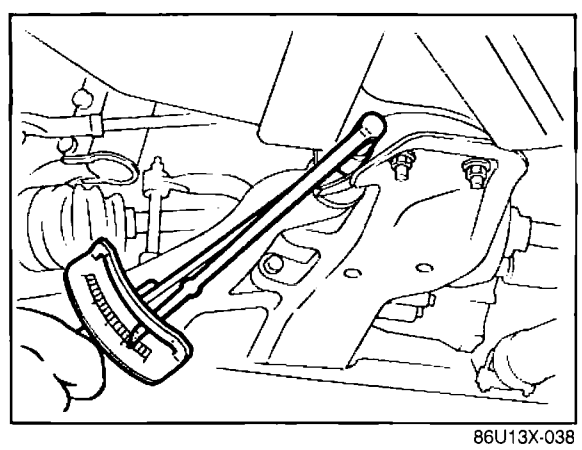


86U13X-037

2. Install the lower arm ball joint to the knuckle arm.

Tightening torque: 43—54 N·m (4.4—5.5 m-kg, 32—40 ft-lb)

Caution
Lower the vehicle and check the torque with the vehicle unloaded.



86U13X-038

3. Lower the vehicle from the jack. Torque the lower arm spindle nut which was loosely tightened in step (1).

Tightening torque:
Front and rear lower arm spindle nut

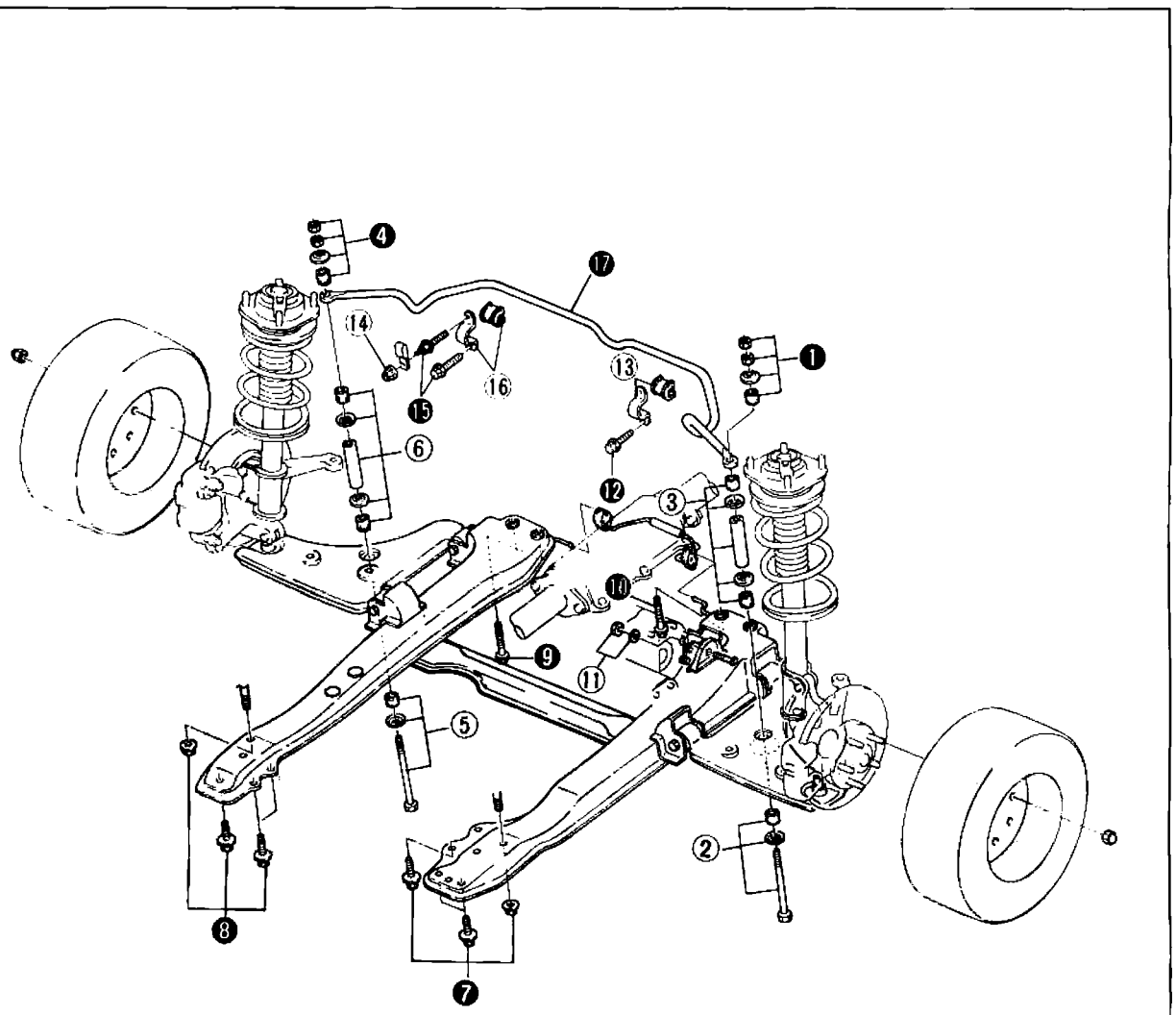
93—127 N·m (9.5—12.9 m-kg, 69—93 ft-lb)

Caution
Lower the vehicle and check the torque with the vehicle unloaded.

FRONT STABILIZER (4WS)

REMOVAL AND INSTALLATION

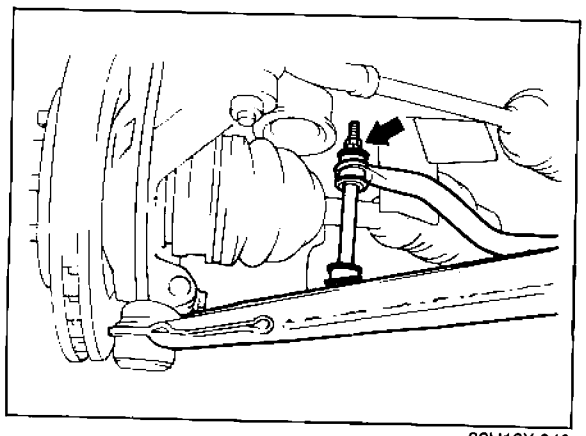
1. Jack up the front of the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure, referring to the removal note for specially marked parts.
3. Inspect all components and parts, referring to the inspection note.
4. Install in the reverse order of removal, referring to the installation note for specially marked parts.
5. Tighten all nuts and bolts to the specified torque, referring to page 13—26.



76G13X-020

1. Nut, retainer, and bushing
2. Bolt, retainer, and bushing
3. Bushing, retainer, and spacer
4. Nut, retainer, and bushing
5. Bolt, retainer, and bushing
6. Bushing, retainer, and spacer
7. Bolt and nut
8. Bolt and nut
9. Bolt
10. Bolt
11. Bolt
12. Bolt
13. Bushing and bracket
14. Nut
15. Bolt
16. Bushing and bracket
17. Stabilizer

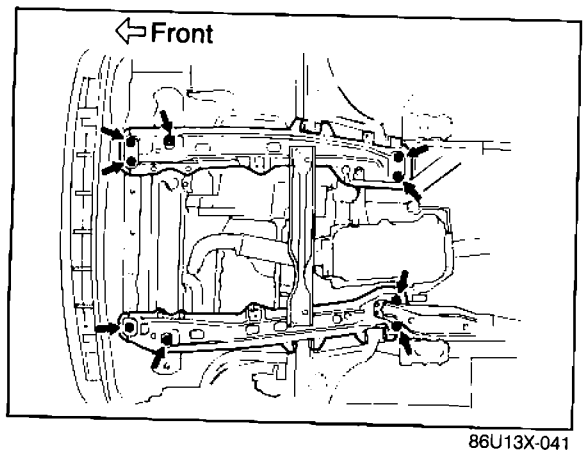
13 FRONT STABILIZER (4WS)



86U13X-040

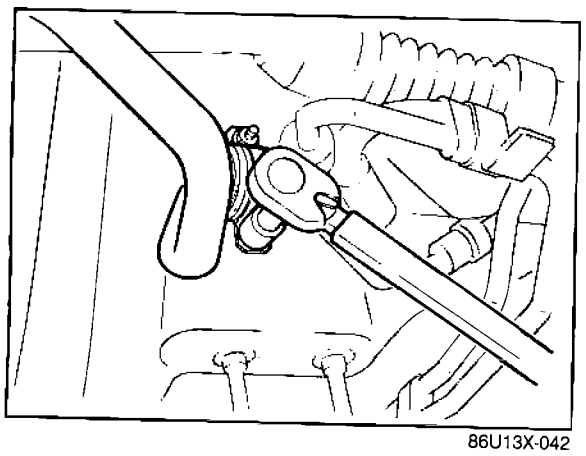
Removal Note

1. Remove the wheel and tire.
2. Remove the stabilizer bar control link.



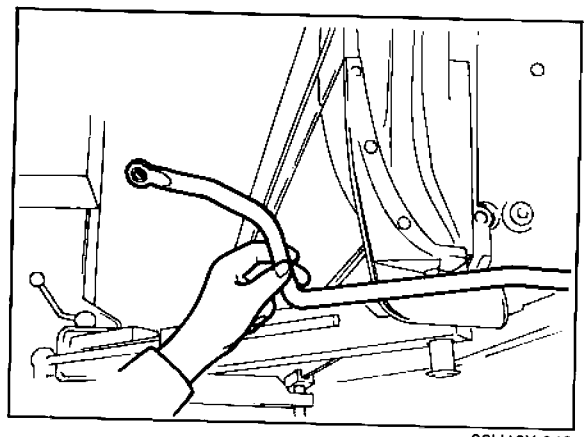
86U13X-041

3. Remove the bolts indicated by the arrows.



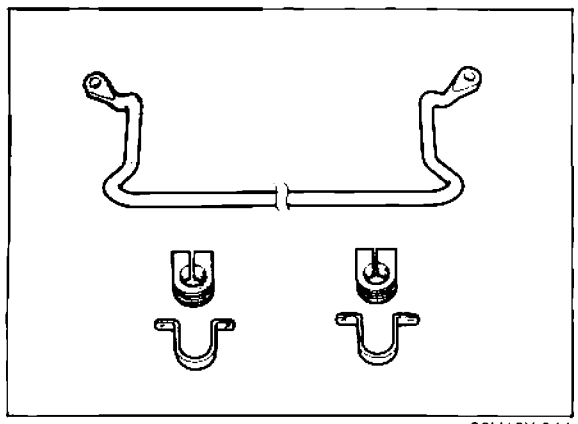
86U13X-042

4. Remove the stabilizer bushing and bracket.



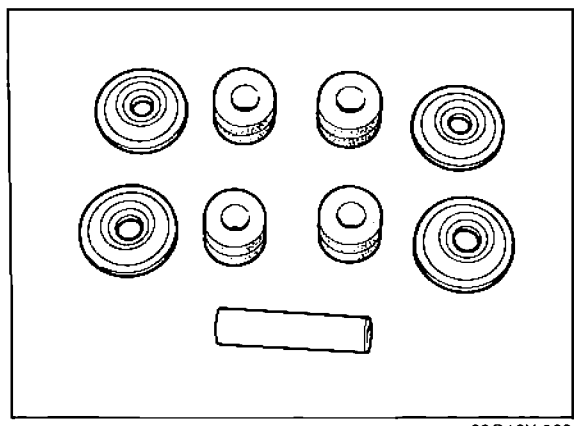
86U13X-043

5. Remove the stabilizer.



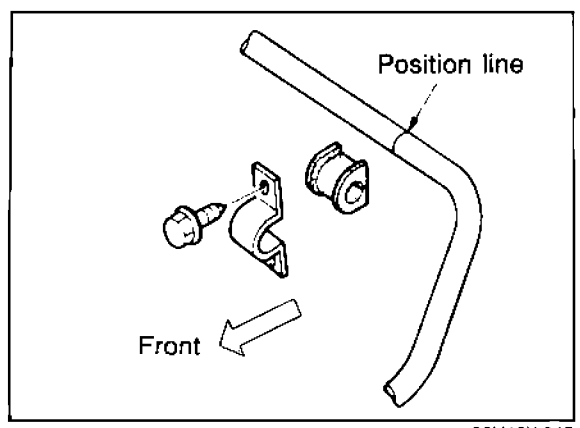
86U13X-044

Inspection Note
Check the following and repair or replace any faulty parts.
1. Stabilizer for bending or damage
2. Stabilizer bushings for deterioration or wear



69G13X-029

3. Retainers and spacers for bending or damage
4. Bushings for deterioration or wear
5. Bolts for bending or damage

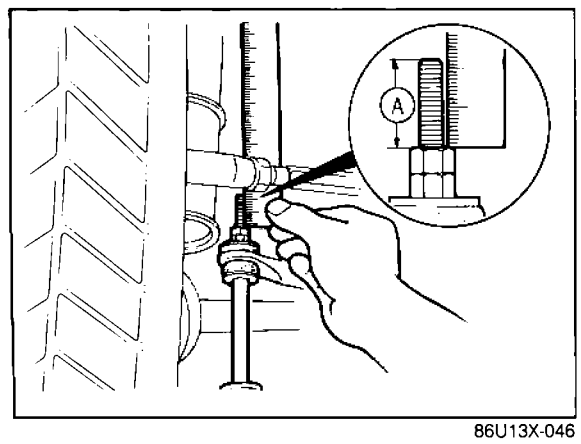


86U13X-045

Installation Note
Stabilizer bushing and control link
Align the bushing with the installation position line on the stabilizer, mount it so that the notch faces the rear of the chassis.

Caution
Mount the brackets of the stabilizer first and loosely tighten them. After mounting the control links, tighten the bracket to the specified torque with the vehicle on the ground and unloaded.

Tightening torque: 36—54 N·m (3.7—5.5 m-kg, 27—40 ft-lb)

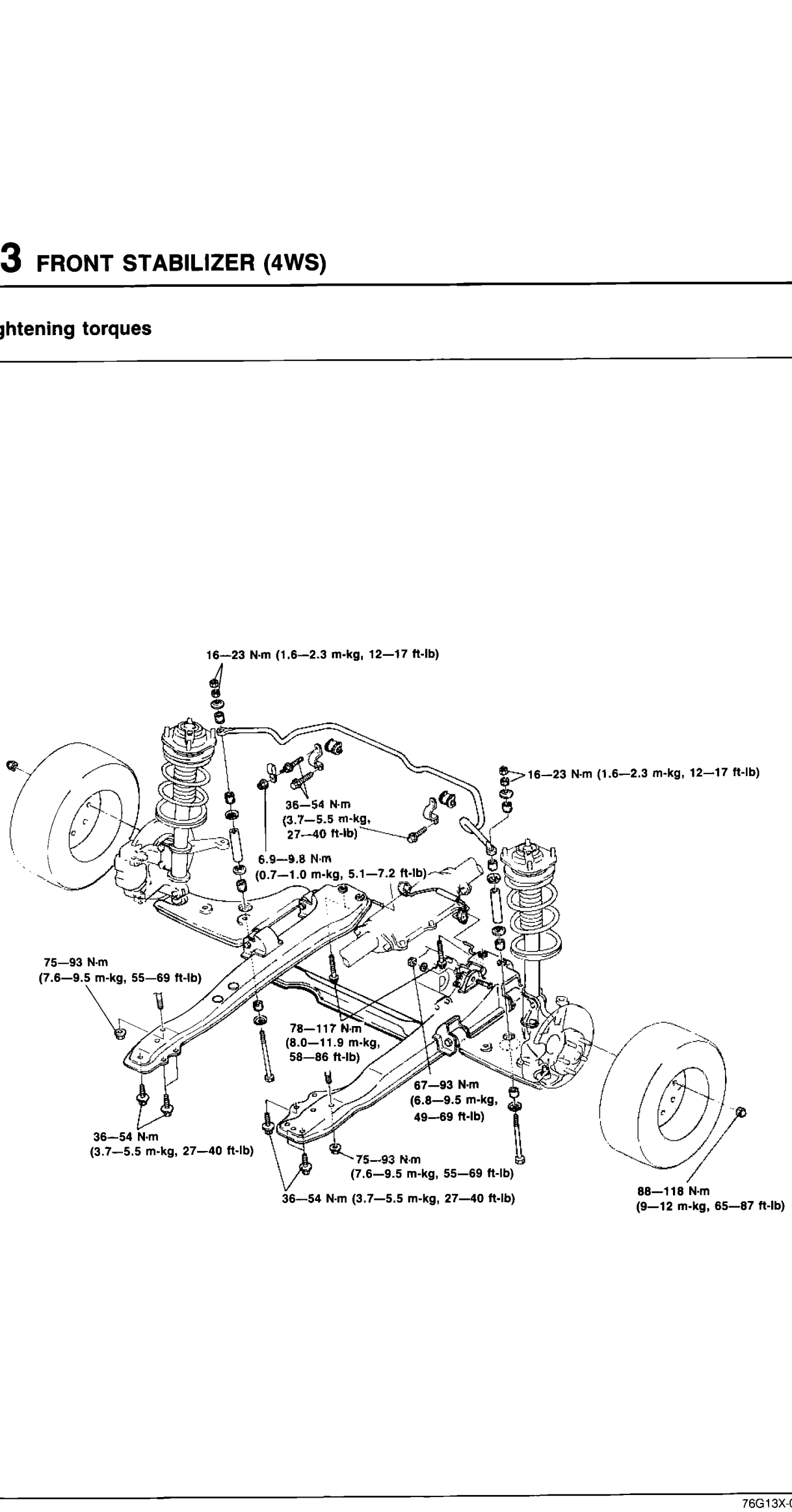


86U13X-046

Tighten the link nut so that there is **20.1mm (0.79 in)** of thread (A) exposed beyond it.

13 FRONT STABILIZER (4WS)

Tightening torques

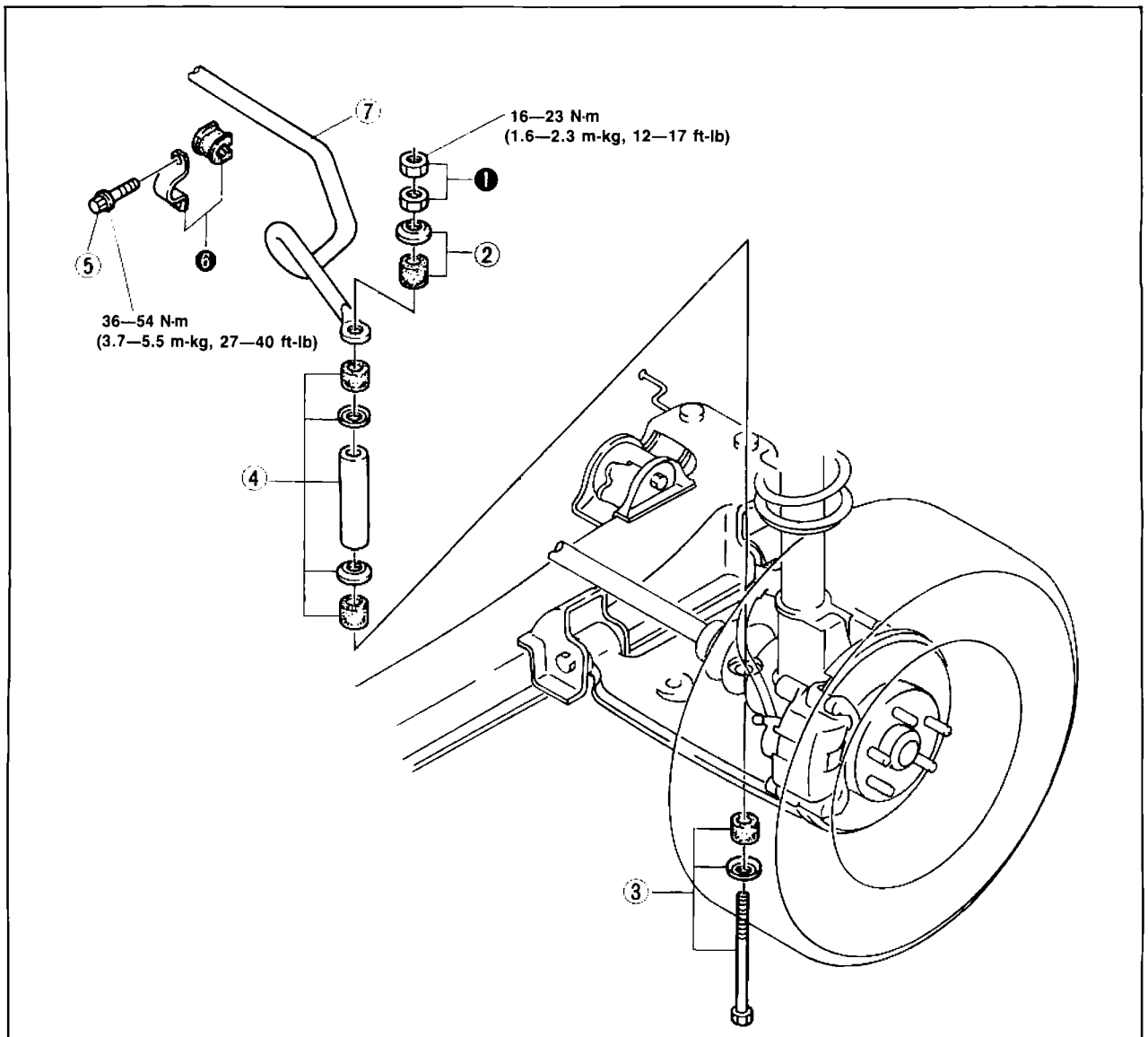


76G13X-034

FRONT STABILIZER

REMOVAL AND INSTALLATION

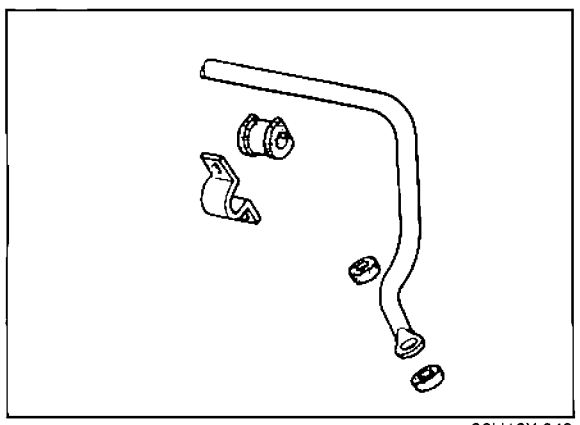
1. Jack up the front of the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure.
3. Inspect all components and parts, referring to the inspection note.
4. Install in the reverse order of removal, referring to the installation note for specially marked parts.
5. Tighten all nuts and bolts to the specified torque, referring to the figure.



76G13X-021

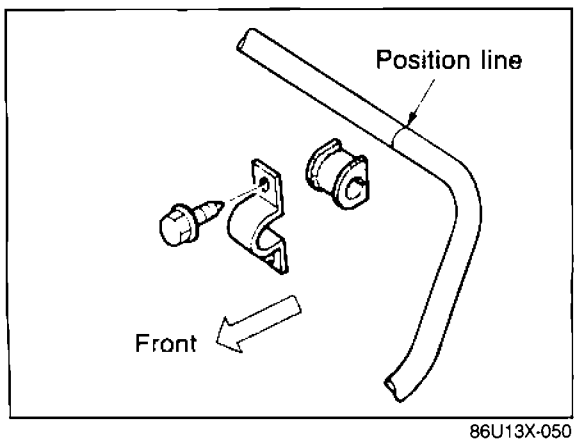
1. Nuts
2. Retainer and bushing
3. Bolt, retainer, and bushing
4. Bushing, retainer, and spacer
5. Bolt
6. Bushing and bracket
7. Stabilizer

13 FRONT STABILIZER



86U13X-049

Inspection Note
Check the following and repair or replace any faulty parts.
1. Stabilizer for bending or damage
2. Stabilizer bushings for deterioration or wear.
3. Retainers and spacers for bending or damage.
4. Mounting bushings for deterioration or wear.
5. Bolts for bending or damage.

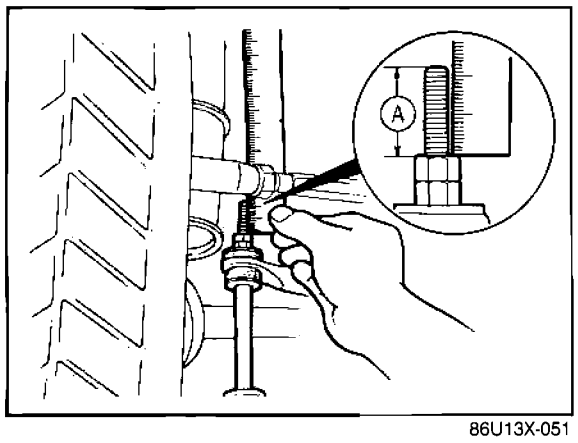


86U13X-050

Installation Note
Stabilizer bushing
Align the bushing with the installation position line on the stabilizer, and mount it so that the notch faces the rear of the chassis.

Caution
Mount the brackets of the stabilizer first and loosely tighten them. After mounting the control links, tighten the brackets to the specified torque with the vehicle on the ground and unloaded.

Tightening torque: 36—54 N·m (3.7—5.5 m-kg, 27—40 ft-lb)



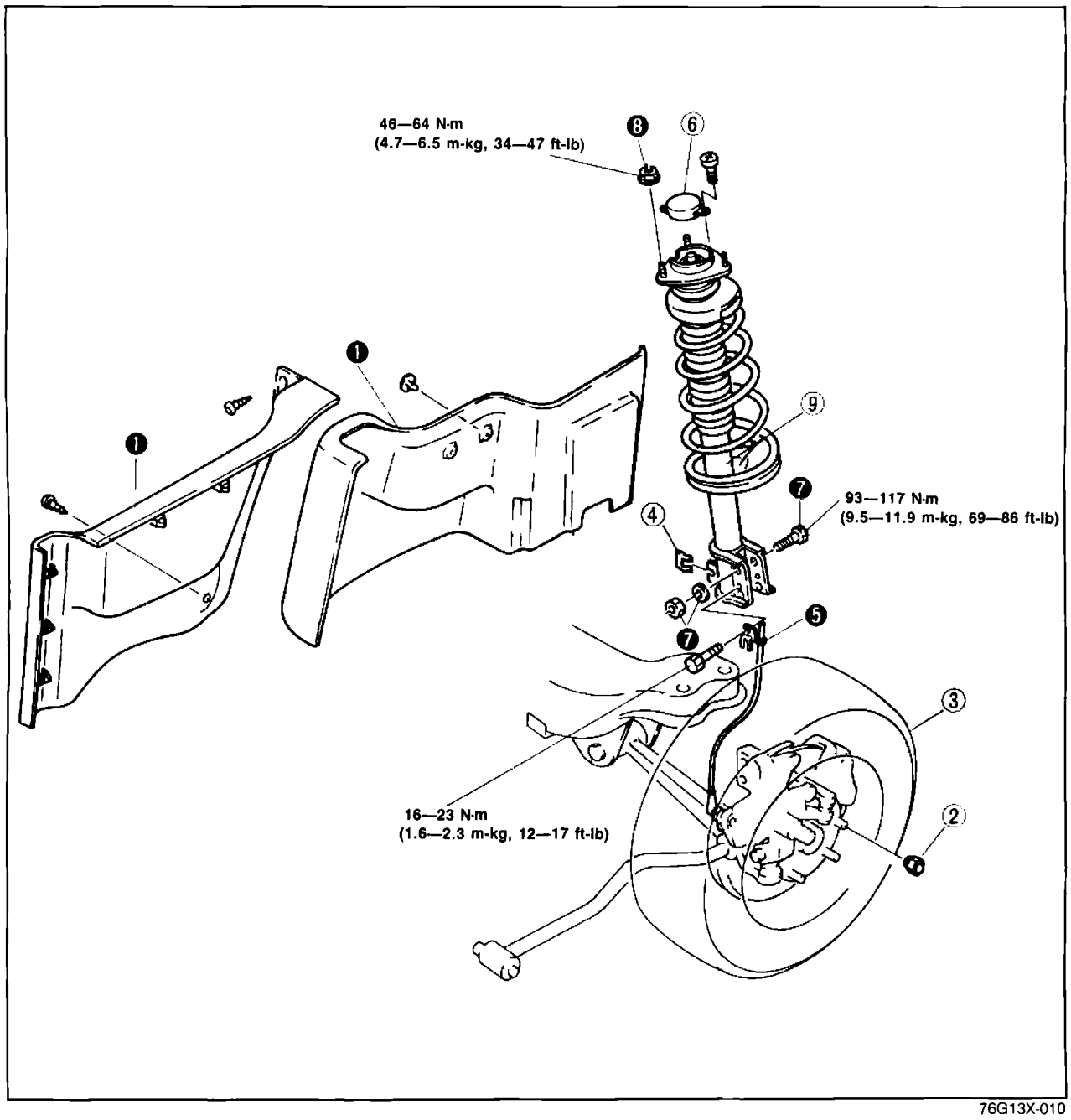
86U13X-051

Tighten the link nut so that there is **20.1 mm (0.79 in)** of thread (A) exposed beyond it.

REAR SHOCK ABSORBER AND SPRING

REMOVAL AND INSTALLATION

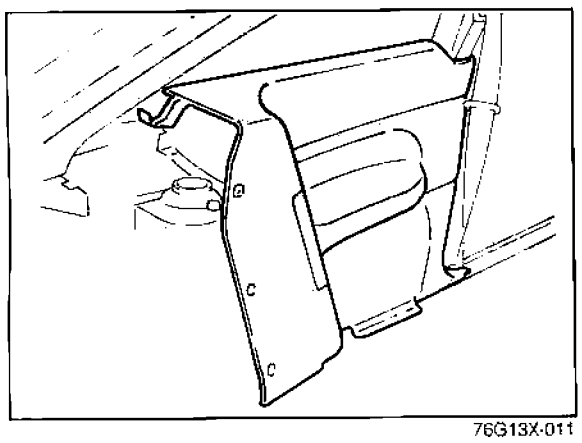
1. Jack up the front of the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure, referring to the removal note for specially marked parts.
3. Install in the reverse order of removal, referring to the installation note for specially marked parts.
4. Tighten all nuts and bolts to the specified torque, referring to the figure.



76G13X-010

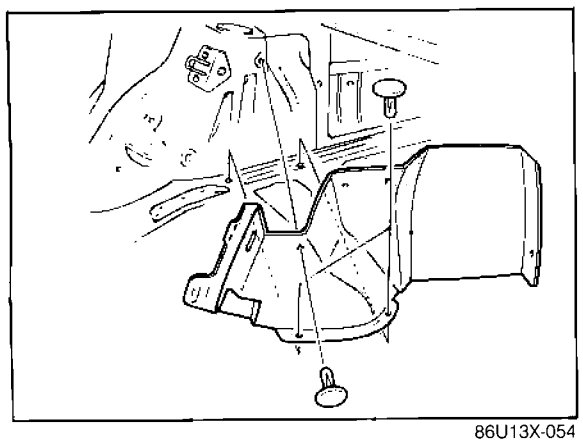
1. Trim
2. Lug nut
3. Wheel and tire
4. Clip
5. Harness and bracket (ABS)
6. Actuator (AAS)
7. Bolt and nut
8. Nut
9. Shock absorber assembly

13 REAR SHOCK ABSORBER AND SPRING

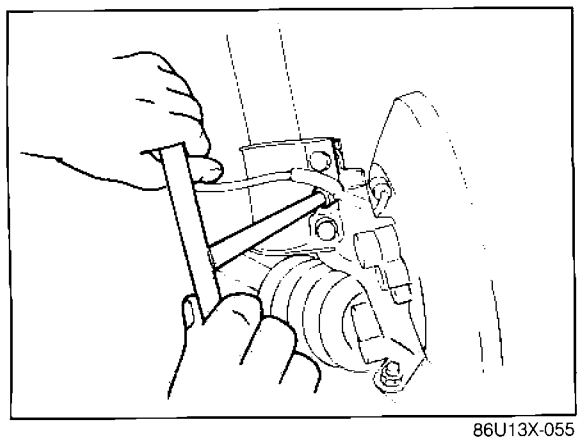


76G13X-011

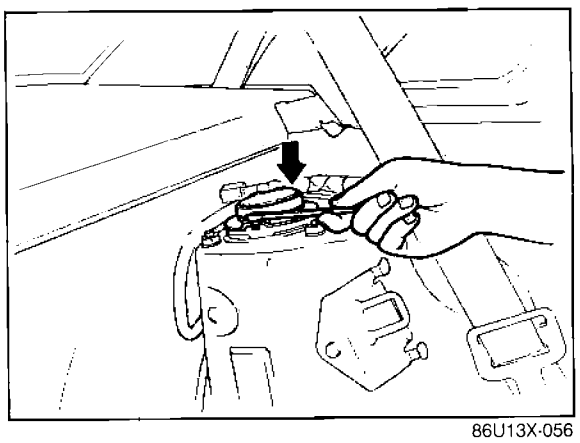
Removal Note
Trim
1. Remove the quarter trim.


86U13X-054

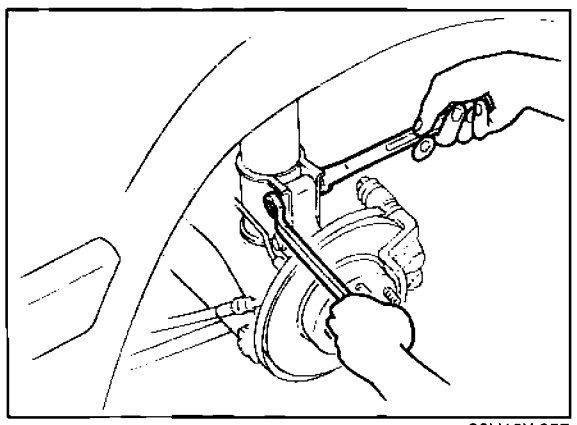
2. Remove the trim.


86U13X-055

ABS harness bracket
Remove the ABS harness and bracket.

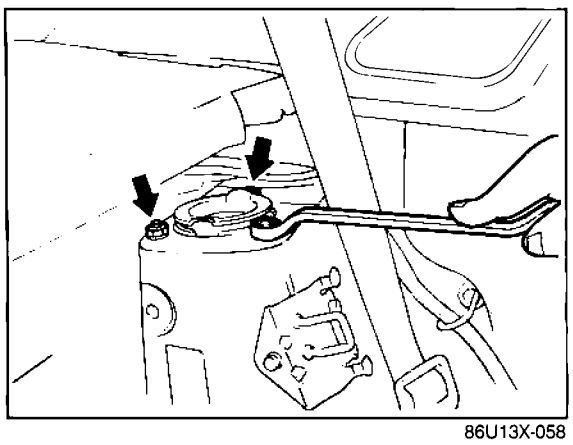

86U13X-056

AAS actuator
1. Disconnect the AAS actuator connector.
2. Remove the AAS actuator.



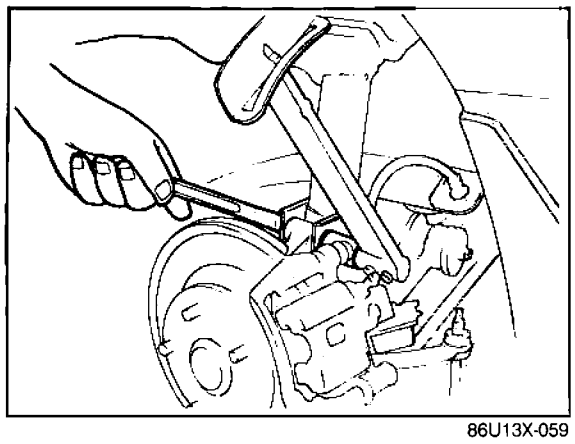
86U13X-057

Shock absorber clinch bolts and nuts
Remove the clinch bolts.



86U13X-058

Shock absorber upper nuts
Remove the upper mounting shock absorber nuts.



86U13X-059

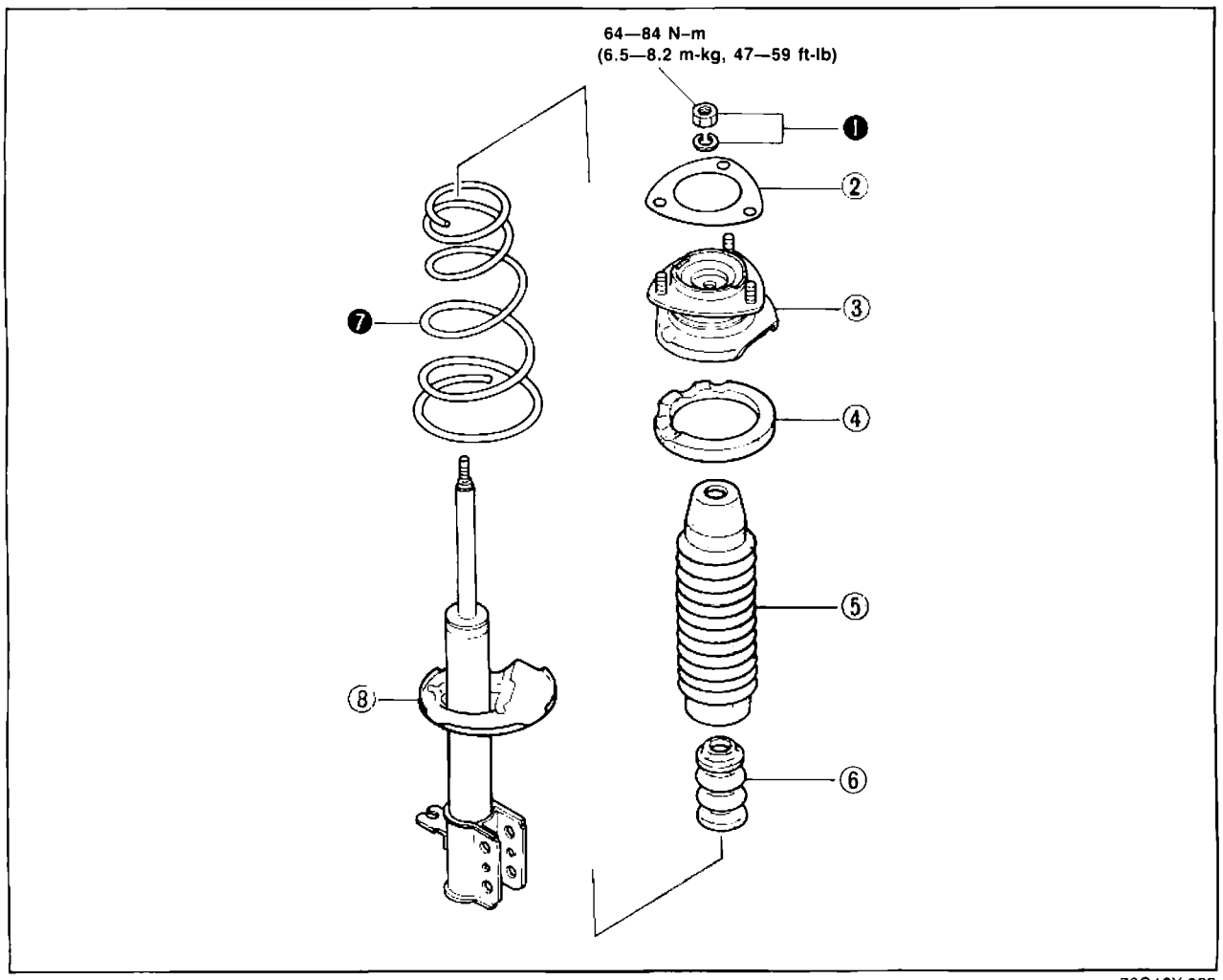
Installation Note
Shock absorber
Tighten the shock absorber mounting bolts and nuts.

Tightening torque:
Upper nuts 46—64 N·m
(4.7—6.5 m-kg, 34—47 ft-lb)
Clinch bolts 93—117 N·m
(9.5—11.9 m-kg, 69—86 ft-lb)

13 REAR SHOCK ABSORBER AND SPRING

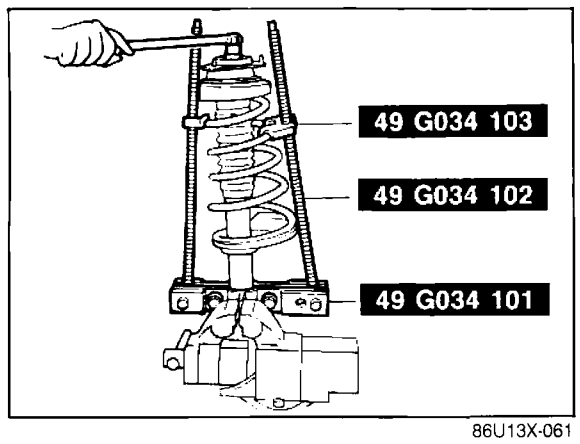
DISASSEMBLY AND ASSEMBLY

1. Disassemble in the sequence shown in the figure the referring to the disassembly note for specially marked parts.
2. Inspect all components and parts, referring to inspection note.
3. Assemble in the reverse order of disassembly, referring to the assembly note for specially marked parts.
4. Tighten all nuts and bolts to the specified torque, referring to the figure.



76G13X-022

1. Nut
2. Seat
3. Mounting block
4. Spring seat
5. Dust boot
6. Bound stopper
7. Coil spring
8. Shock absorber



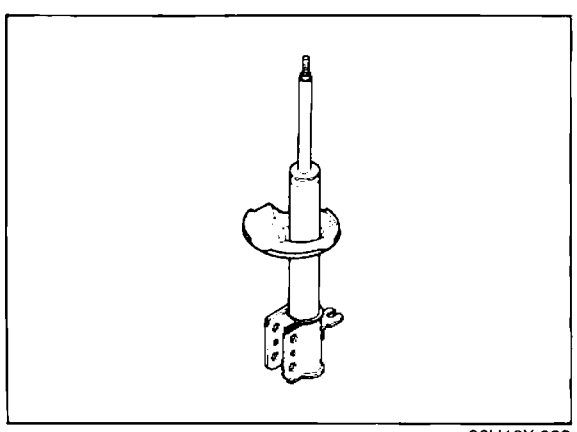
86U13X-061

Disassembly Note

1. Loosen the piston rod upper nut several turns, but do not remove.

Caution
a) Do not remove the nut.
b) Use copper or aluminum plates in the jaws of the vise.

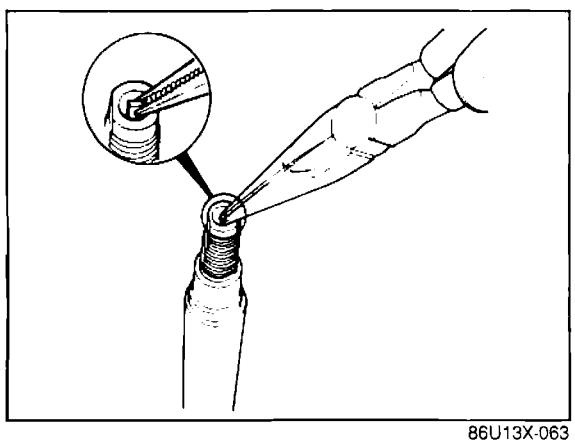
2. Set the **SST** in a vise.
3. Secure the shock absorber in the **SST**.
4. Compress the coil spring with the **SST**, then remove the nut.
5. Remove the coil spring.



86U13X-062

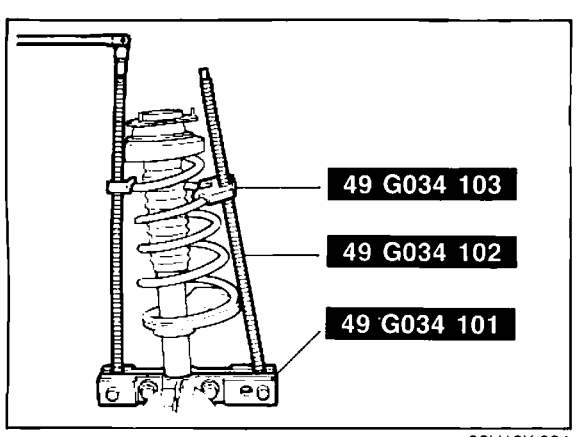
Inspection Note
Check the following and repair or replace any faulty parts.

1. Oil leakage or noise from shock absorbers
2. Deterioration or damage of mounting block
3. Wear or damage of bound stopper



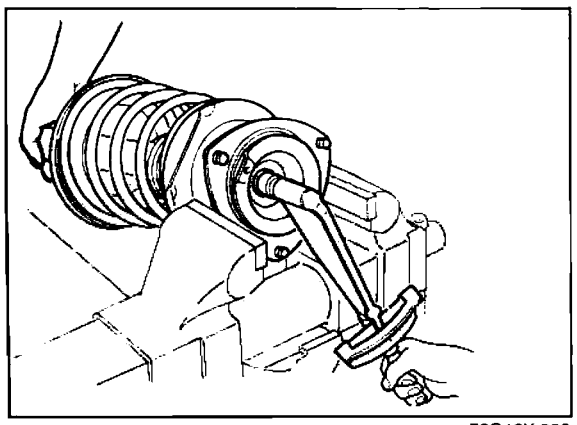
86U13X-063

4. Rotation of the control rod (AAS).



86U13X-064

Assembly Note
1. Set the **SST** in a vise
2. Secure the shock absorber in the **SST**.
3. Install the bound stopper and dust boot onto the shock absorber.
4. Install the compressed coil spring (compressed with **SST**).
5. Install the spring seat and mounting block.
6. Remove the **SST**.
7. Secure the mounting blocks in the vise.



76G13X-023

Caution
Use copper or aluminum plate in the jaws of a vice.

8. Tighten the piston rod upper nut.

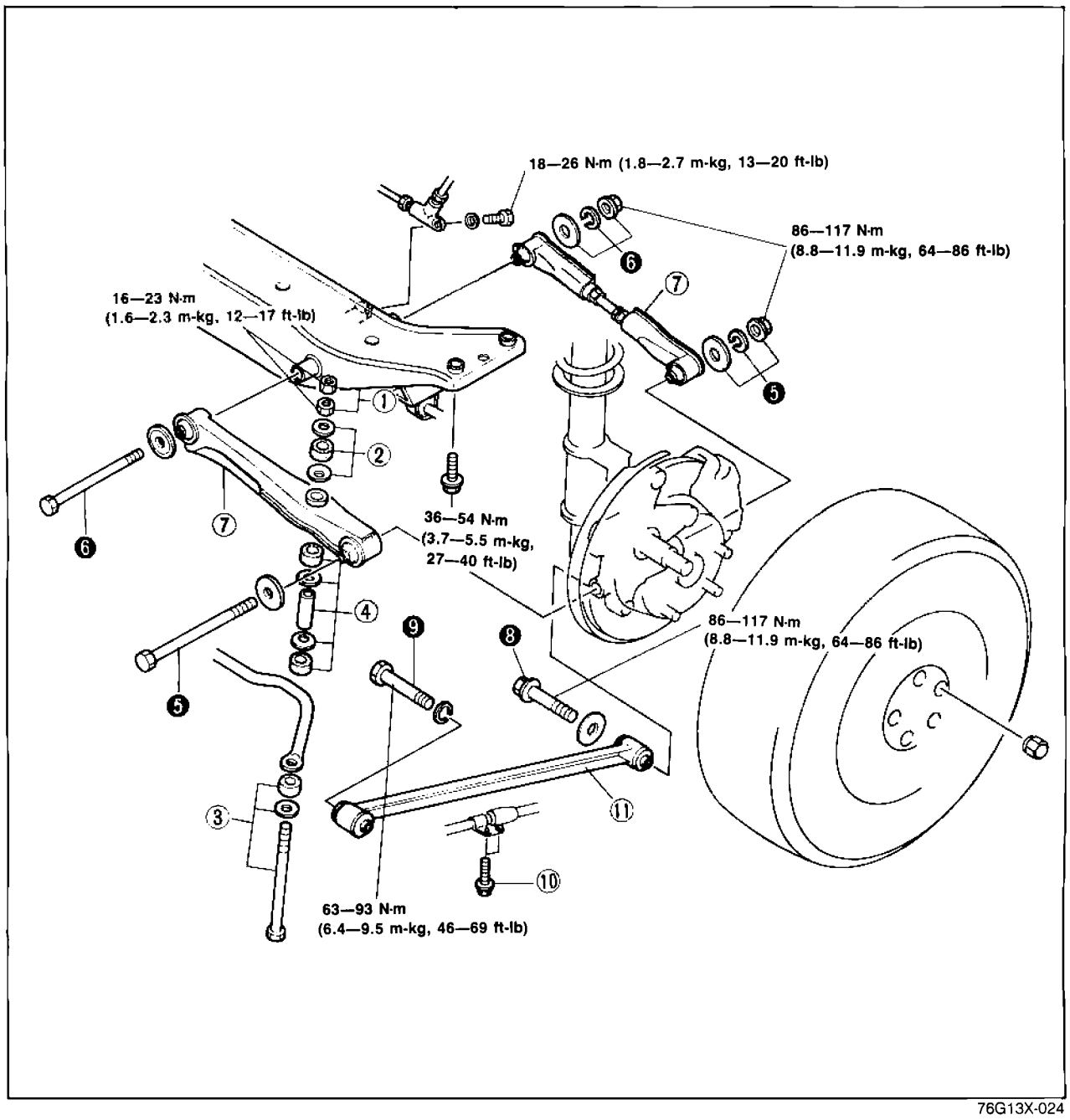
Tightening torque:
64—84 N·m (6.5—8.2 m-kg, 47—59 ft-lb)

Caution
Check that the spring is well seated in the upper seats.

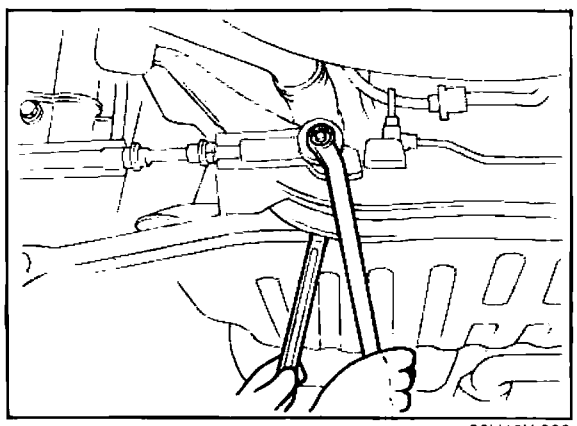
LATERAL LINK AND TRAILING LINK

REMOVAL AND INSTALLATION

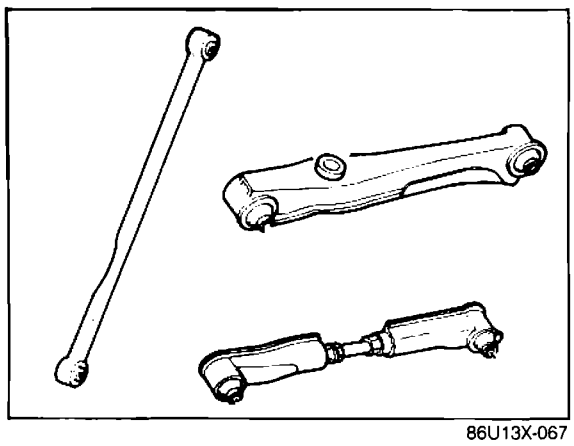
1. Jack up the front of the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure, referring to the removal note for specially marked parts.
3. Inspect all components and parts, referring to inspection the note.
4. Install in the reverse order of removal, referring to the installation note for specially marked parts.
5. Tighten all nuts and bolts to the specified torque, referring to the figure.



1. Nut
2. Bushing and retainer
3. Retainer, bushing, and bolt
4. Retainer, bushing, and spacer
5. Bolt and nut
6. Bolt and nut
7. Lateral link
8. Bolt
9. Bolt
10. Bolts
11. Trailing link


86U13X-066

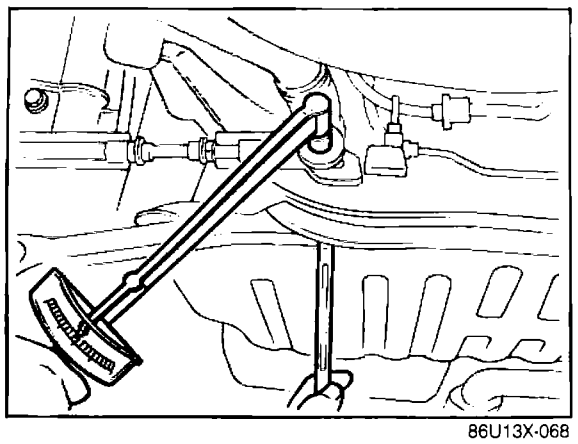
Removal Note
Lateral links
1. Loosen the crossmember mounting bolts and allow it to drop down for clearance.
2. Remove the lateral links.


86U13X-067

Inspection Note
Check the following and repair or replace any faulty parts.

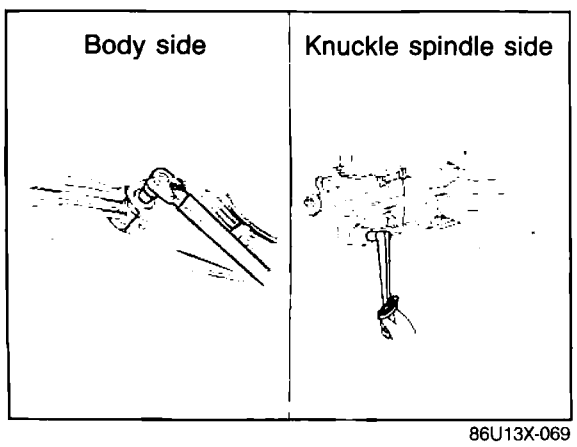
1. Deformed or cracked lateral link and trailing link
2. Damaged or worn bushings

Note
If it is necessary to replace the bushing, replace the lateral link or trailing link assembly.


86U13X-068

Installation Note
Lateral links
Loosely tighten the mounting bolts of each link, and lower the vehicle from the safety stands. Adjust the toe-in, and then tighten the bolts with the vehicle unloaded.

Tightening torque: 86—117 N·m (8.8—11.9 m-kg, 64—86 ft-lb)



86U13X-069

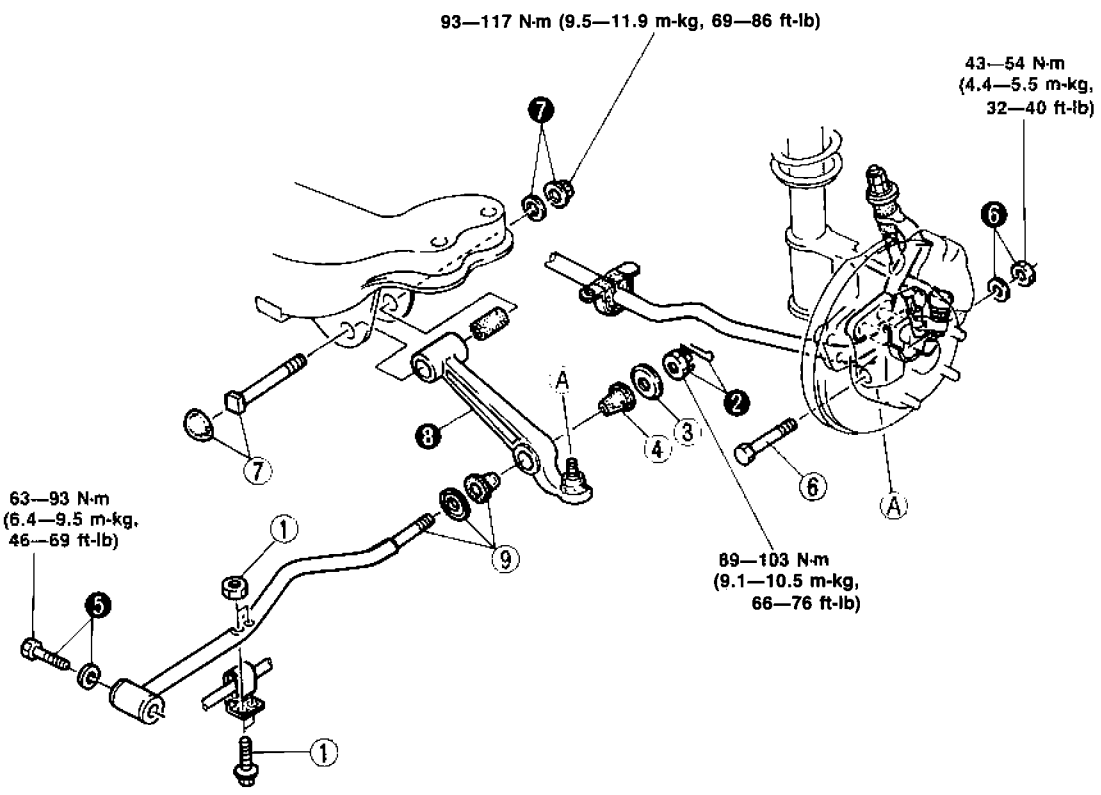
Trailing link
1. Loosely tighten the mounting bolt and nut.
2. Lower the vehicle from the safety stands.
3. Tighten the bolt and nut with the vehicle unloaded.

Tightening torque:
Body side 63—93 N·m (6.4—9.5 m-kg, 46—69 ft-lb)
Knuckle spindle side 86—117 N·m (8.8—11.9 m-kg, 64—86 ft-lb)

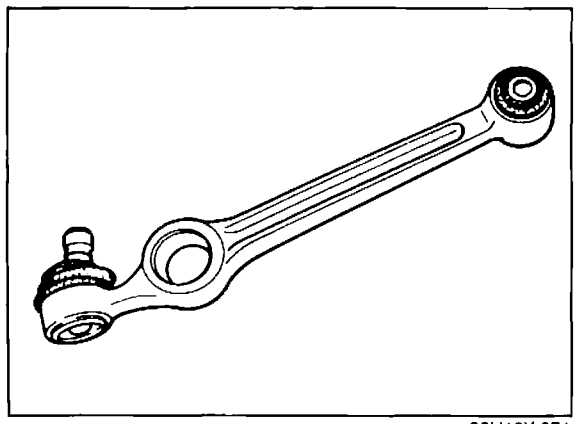
REAR LOWER ARM AND TRAILING LINK (4WS)

REMOVAL AND INSTALLATION

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure.
3. Inspect all components and parts, referring to the inspection note.
4. Install in the reverse order of removal, referring to the installation note for specially marked parts.
5. Tighten all nuts and bolts to the specified torque, referring to the figure.



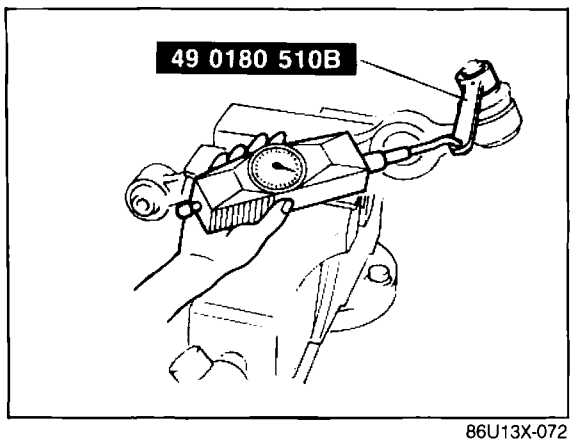
1. Bolt and nut
2. Cotter pin and nut
3. Retainer
4. Bushing
5. Bolt
6. Bolt and nut
7. Bolt and nut
8. Lower arm
9. Trailing link, retainer, and bushing
10. Bushing



86U13X-071

Inspection Note
Check the following and repair or replace any faulty parts.
1. Deformation or cracks in lower arm and trailing link
2. Deformation or wear of bushing
3. Rotation torque of ball joint

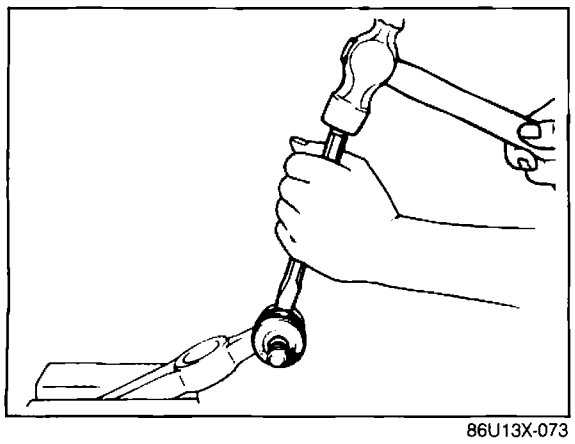
Note
If it is necessary to replace the ball joint, replace the lower arm assembly.



86U13X-072

Measurement of ball joint rotation torque
Connect the **SST** to the ball stud, then measure by using a pull scale.

Rotation torque: 1.8—3.1 N·m
(18—31 cm-kg, 15.6—26.9 in-lb)
pull scale reading: 18—30 N
(1.8—3.1 kg, 3.9—6.8 lb)

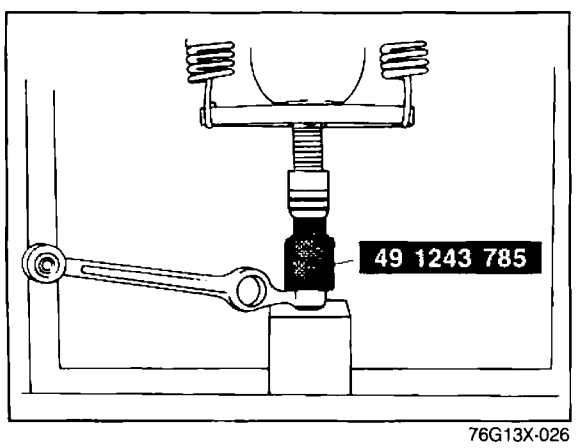


86U13X-073

Dust boot

Removal
Use a chisel to remove the dust boot.

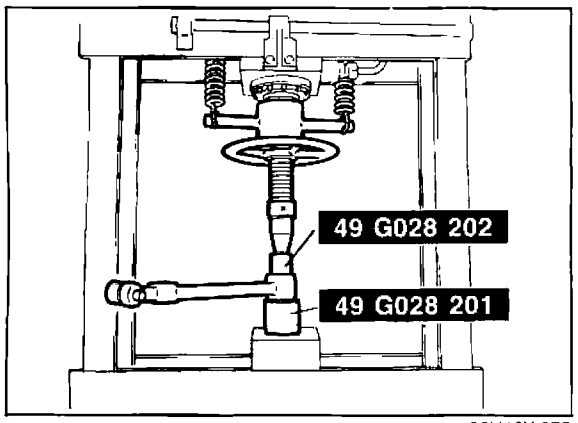
Caution
Do not damage the ball joint.



76G13X-026

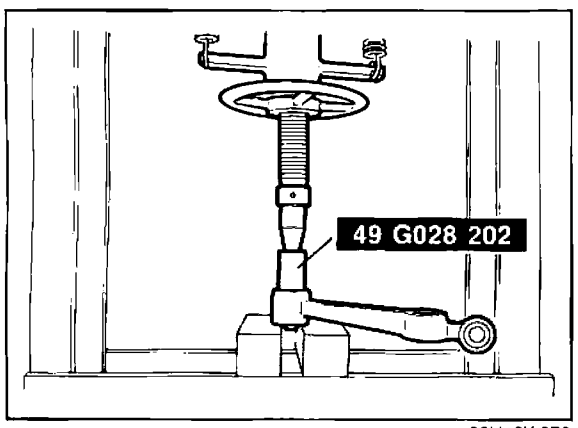
Installation
Apply lithium grease to the inside of the new dust boot, then install it with the **SST**.

13 REAR LOWER ARM AND TRAILING LINK (4WS)



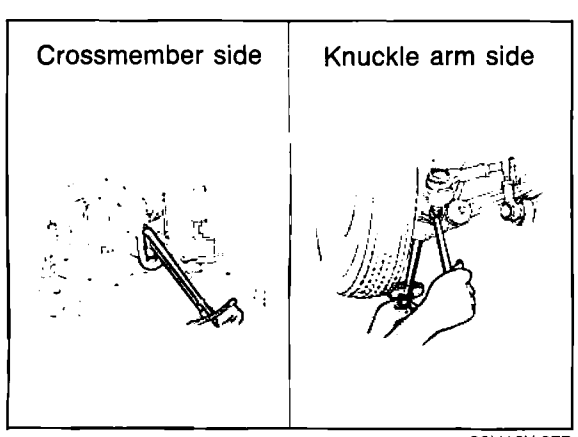
86U13X-075

Lower arm bushing
Removal
Use the **SST** as shown in the figure, and remove the bushing.



86U13X-076

Installation
Apply soapy water to the bushing and press it into the lower arm with the **SST**.

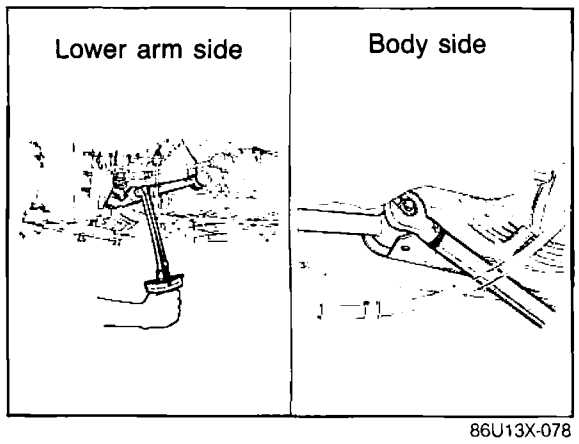


86U13X-077

Installation Note
Lower arm
Tighten the lower arm to the crossmember and knuckle arm.

Tightening torque:
Crossmember side 93—117 N·m
(9.5—11.9 m-kg, 69—86 ft-lb)
Knuckle arm side 43—54 N·m
(4.4—5.5 m-kg, 32—40 ft-lb)

Caution
Lower the vehicle and check the torque with the vehicle unloaded.



86U13X-078

Trailing link
Tighten the trailing link to the body and lower arm.

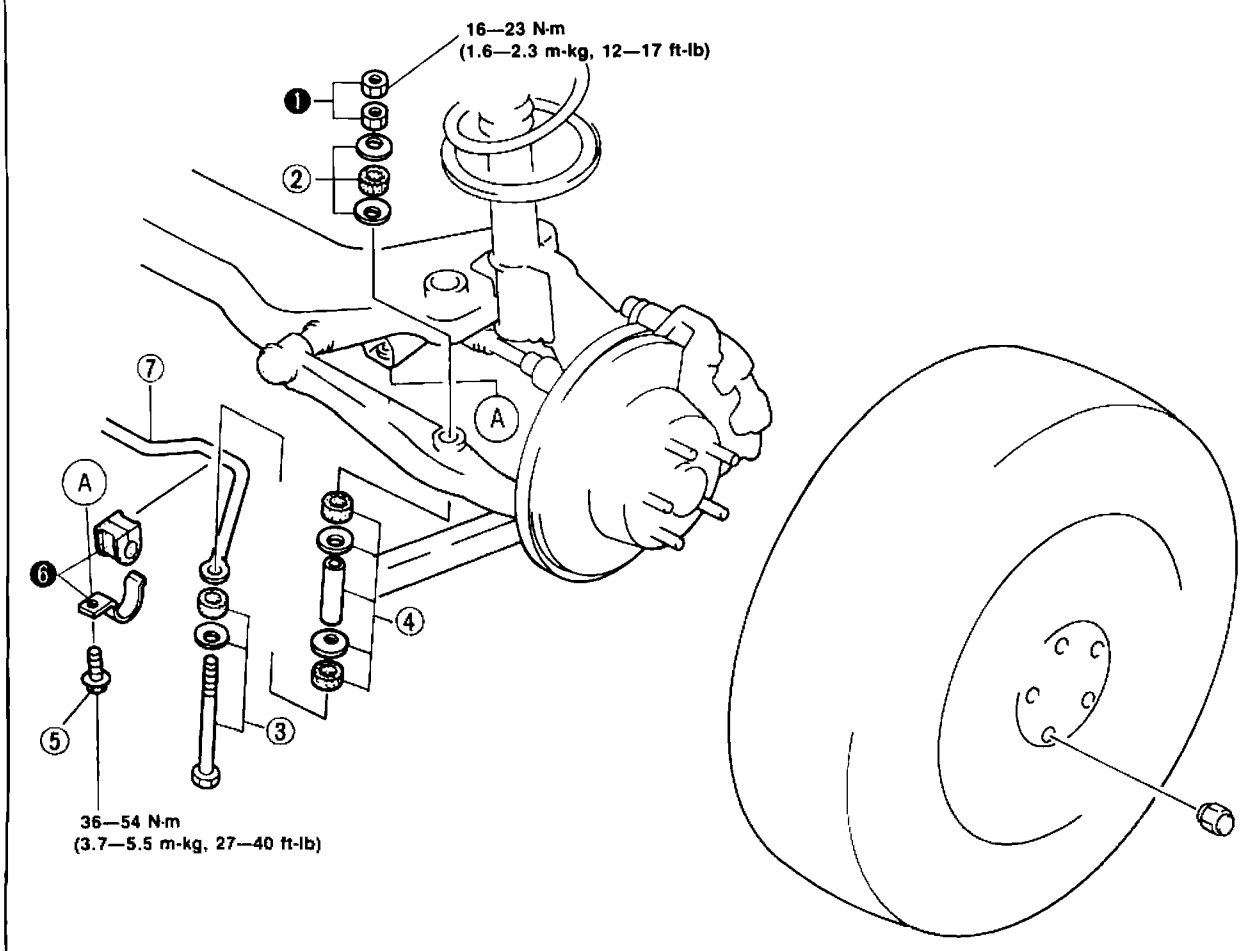
Tightening torque:
Body side 63—93 N·m
(6.4—9.5 m-kg, 46—69 ft-lb)
Lower arm side 89—103 N·m
(9.1—10.5 m-kg, 66—76 ft-lb)

Caution
a) Lower the vehicle and check the torque with the vehicle unloaded.
b) If the cotter pin was removed, replace it with a new one.

REAR STABILIZER

REMOVAL AND INSTALLATION

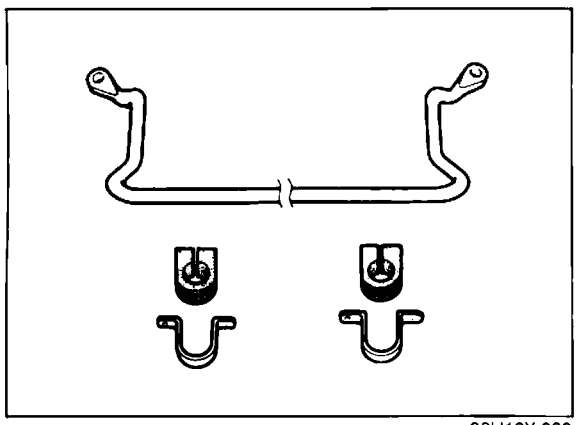
1. Jack up the front of the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure.
3. Inspect all components and parts, referring to the inspection note.
4. Install in the reverse order of removal, referring to the installation note for specially marked parts.
5. Tighten all nuts and bolts to the specified torque, referring to the figure.



76G13X-027

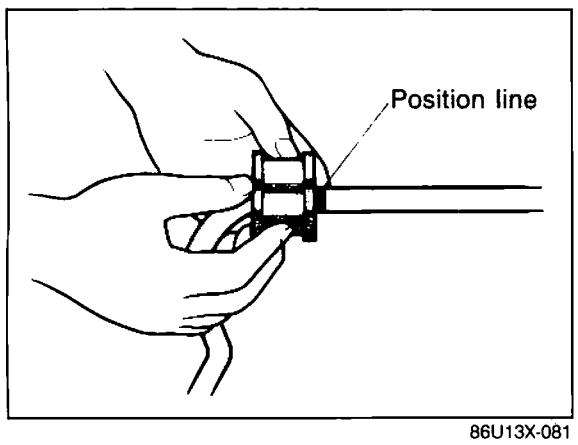
1. Nuts
2. Bushing and retainer
3. Retainer, bushing, and bolt
4. Retainer, bushing, and spacer
5. Bolt
6. Bushing and bracket
7. Stabilizer

13 REAR STABILIZER

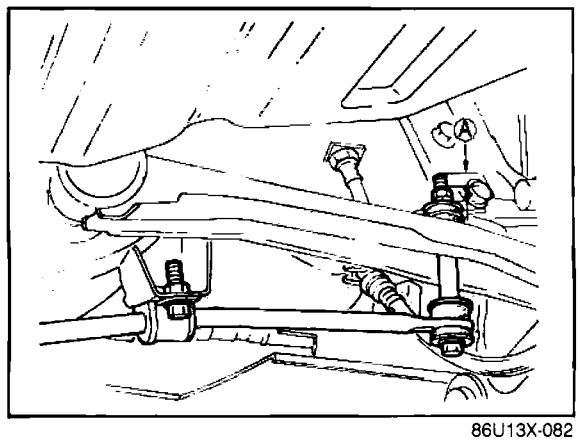


86U13X-080

Inspection Note
Check the following and replace or repair any faulty parts.
1. Stabilizer for bending or damage
2. Stabilizer bushings for deterioration or wear
3. Retainers and spacers for bending or damage
4. Mounting bushings for deterioration or wear
5. Bolts for bending or damage



86U13X-081



86U13X-082

Installation Note
Stabilizer bushing and bracket
1. Install the bushing on the stabilizer.
2. Align the bushing with the stabilizer installation Position line.
3. Install the stabilizer bracket and loosely tighten the bolts.
4. Install the link to the upper link, and tighten the nut and bolt.
5. Install the retainers, rubber bushings and nuts.
6. Lower the vehicle, then tighten the bolts with the vehicle unloaded.

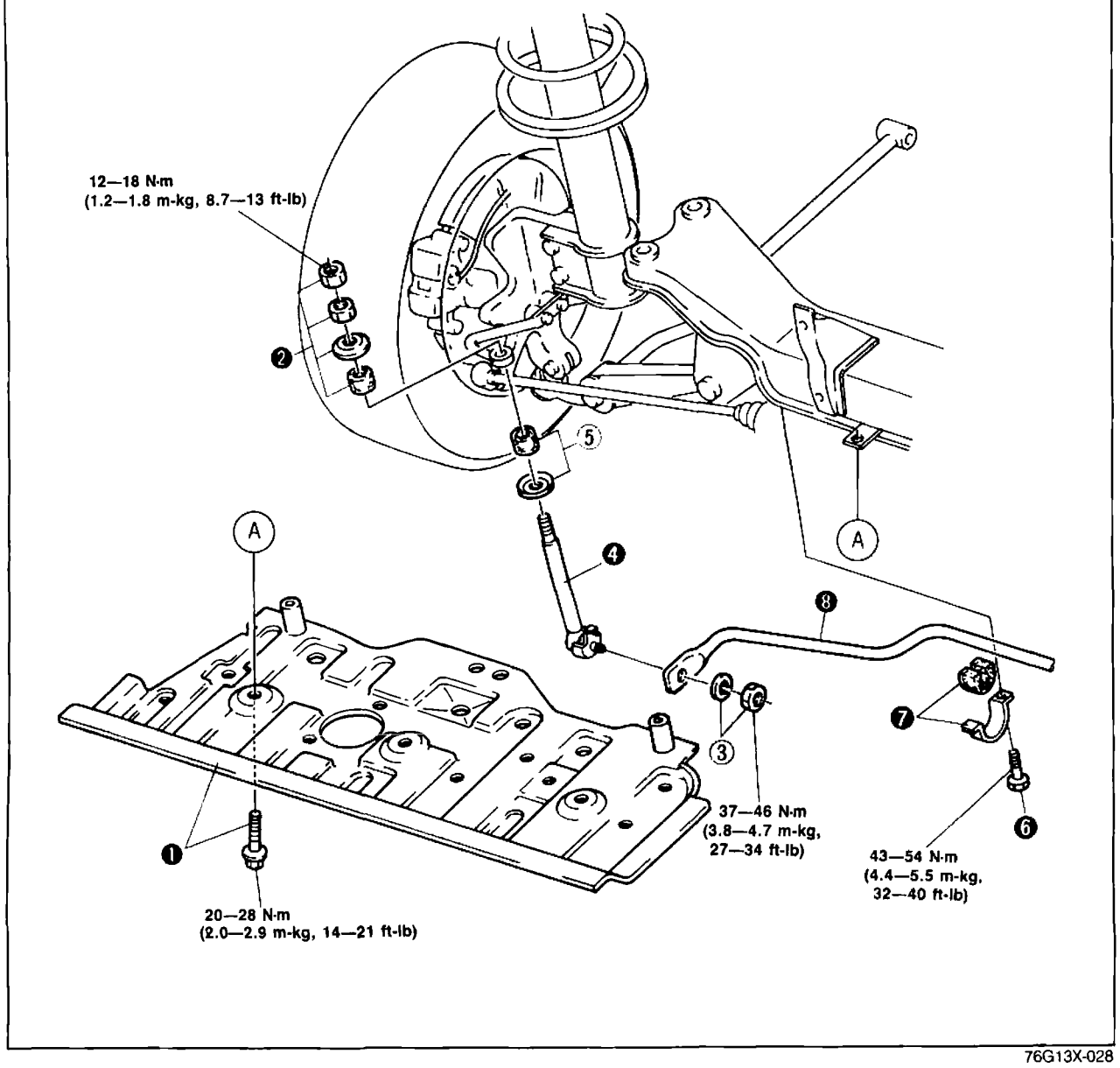
Tightening torque: 36—54 N·m (3.7—5.5 m-kg, 27—40 ft-lb)

7. Tighten the link nut so that there is **10.4 mm (0.41 in)** of thread (A) exposed.

REAR STABILIZER AND CONTROL LINK (4WS)

REMOVAL AND INSTALLATION

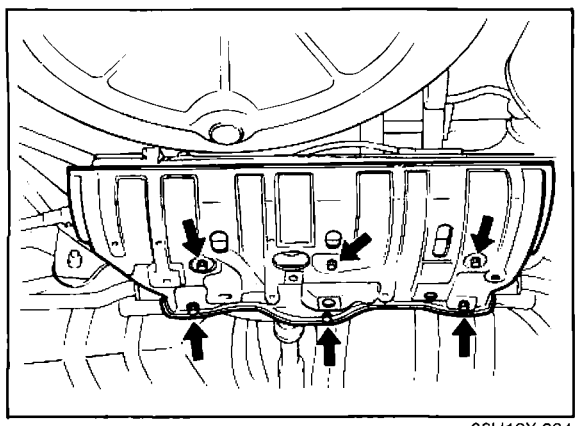
1. Jack up the front of the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure, referring to the removal note for specially marked parts.
3. Inspect all components and parts, referring to inspection note.
4. Install in the reverse order of removal, referring to the installation note for specially marked parts.
5. Tighten all nuts and bolts to the specified torques, referring to the figure.



76G13X-028

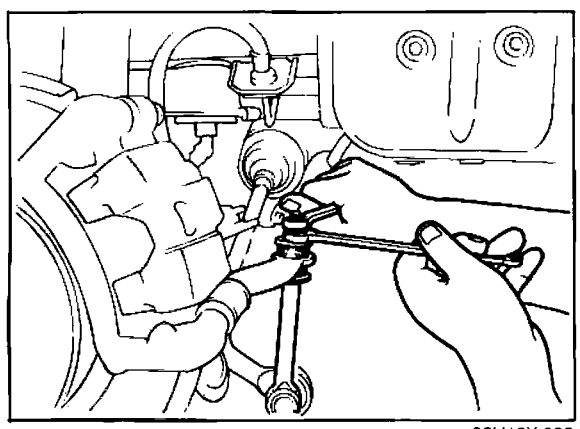
1. Rear steering cover and bolts
2. Nut; bushing, and retainer
3. Nut
4. Control link assembly
5. Bushing and retainer
6. Bolt
7. Bushing and bracket
8. Rear stabilizer

13 REAR STABILIZER AND CONTROL LINK (4WS)



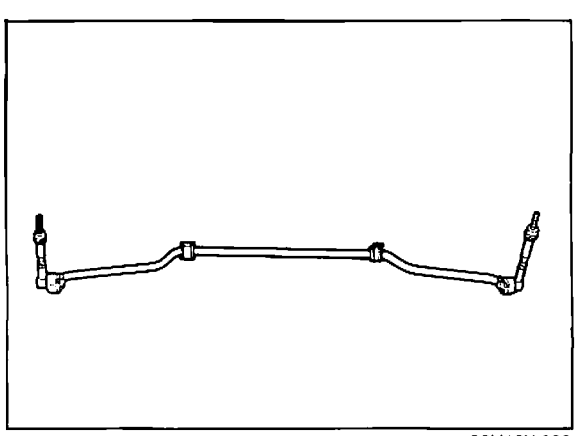
86U13X-084

Removal Note
1. Remove the rear steering cover bolts.



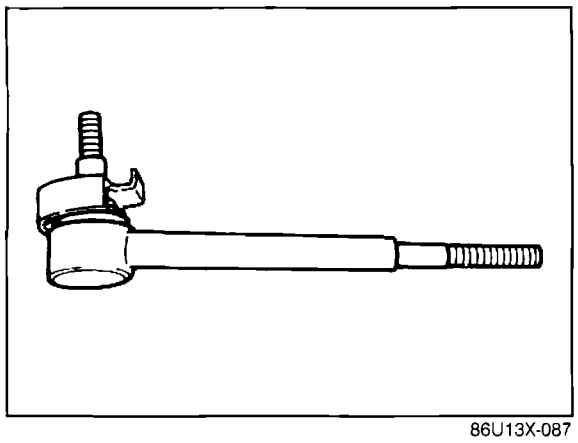
86U13X-085

2. Remove the stabilizer bar control link.



86U13X-086

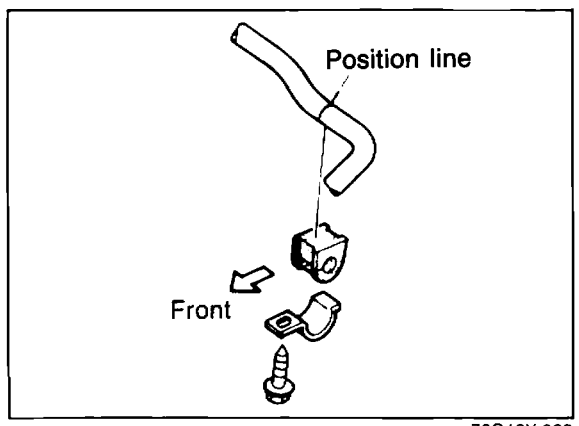
Inspection Note
Check the following and repair or replace any faulty parts.
1. Worn or deteriorated rubber bushing
2. Bent, deteriorated, or damaged stabilizer



86U13X-087

3. Damaged control link
4. Damaged control link dust boot
5. Worn or deteriorated bushing

Note
If it is necessary to replace the ball joint, replace the control link assembly.

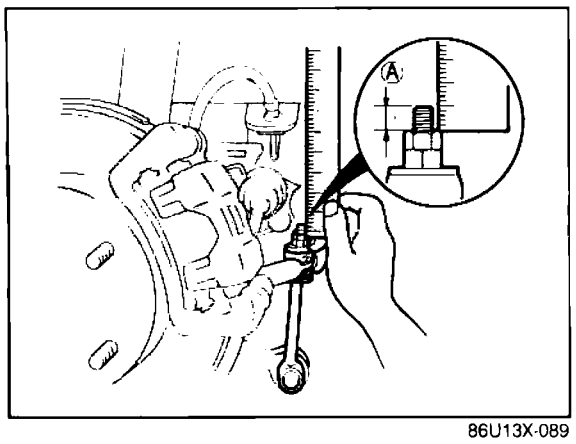


76G13X-029

Stabilizer bushing installation
Align the bushing with the stabilizer installation position line, and attach it so that the seam faces the front of the vehicle.

Caution
Mount the brackets of the stabilizer first and loosely tighten them. After mounting the control links, tighten the brackets to the specified torque with the vehicle on the ground and unloaded.

Tightening torque: 43—54 N·m (4.4—5.5 m-kg, 32—40 ft-lb)



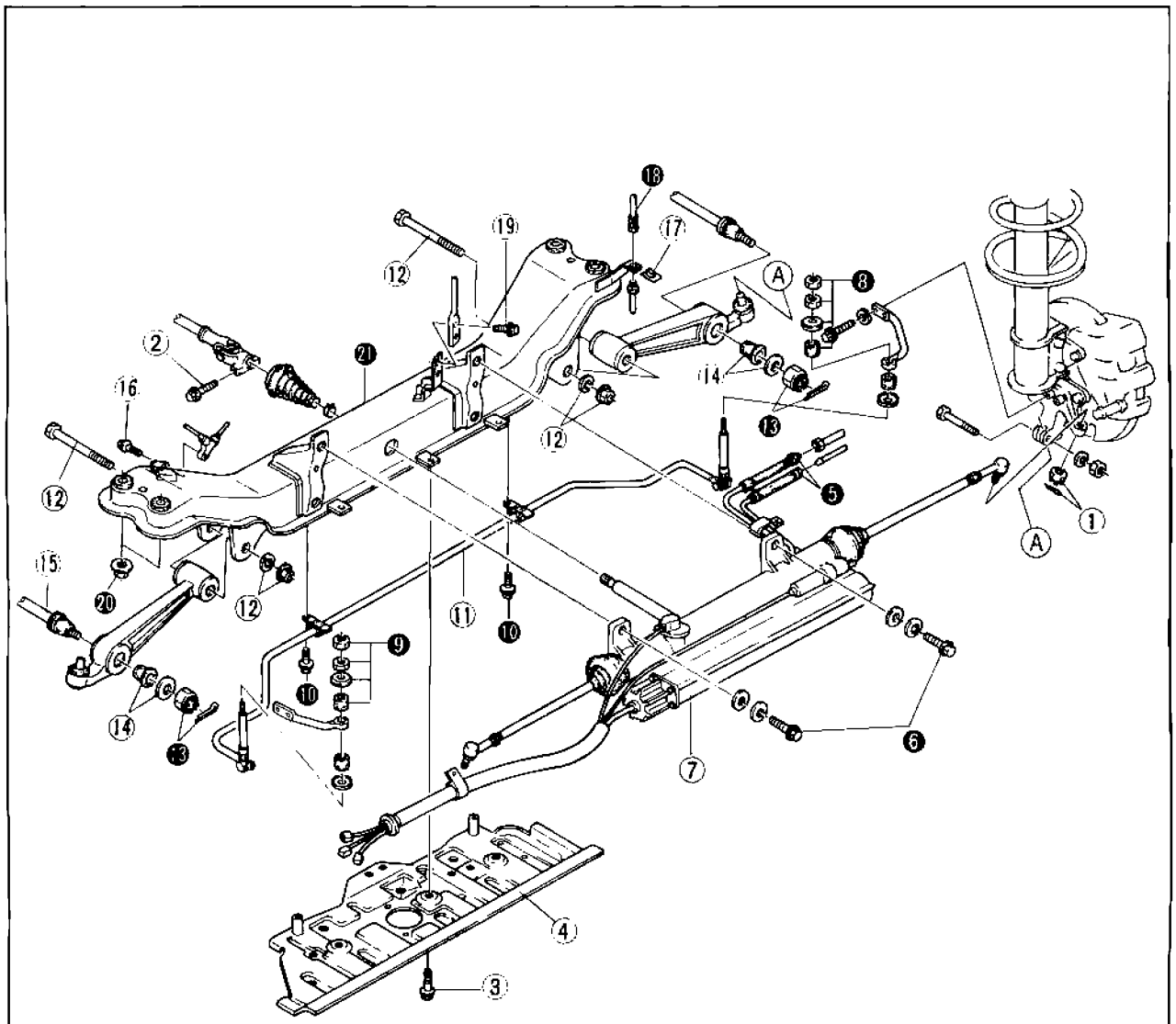
86U13X-089

Tighten the link nut so that there is **13 mm (0.51 in)** of thread (A) exposed.

REAR CROSSMEMBER (4WS)

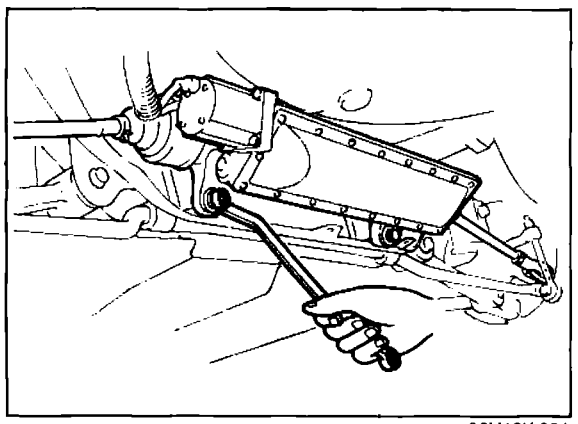
REMOVAL AND INSTALLATION

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure, referring to the removal note for specially marked parts.
3. Inspect all components and parts, referring to inspection note.
4. Install in the reverse order of removal, referring to the installation note for specially marked parts.
5. Tighten all nuts and bolts to the specified torque, referring to page 13—49.



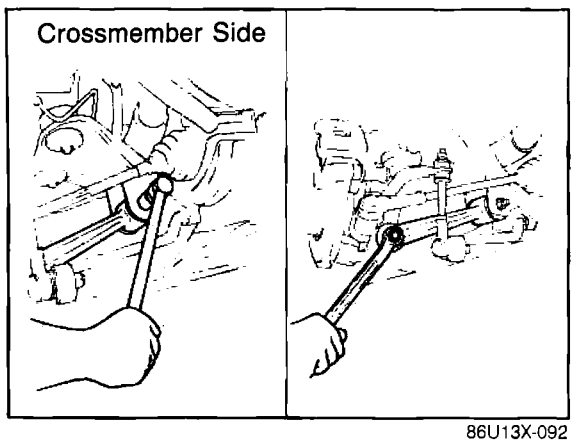
76G13X-030

1. Cotter pin and nut
2. Bolt
3. Bolt
4. Cover
5. Oil hose and pipe
6. Bolts
7. Rear steering assembly
8. Nut, retainer, and bushing
9. Nut, retainer, and bushing
10. Bolts
11. Stabilizer
12. Nuts and bolts
13. Cotter pin and nut
14. Bushing and retainer
15. Trailing link
16. Bolt
17. Clip
18. Brake pipe
19. Bolt
20. Nut
21. Crossmember



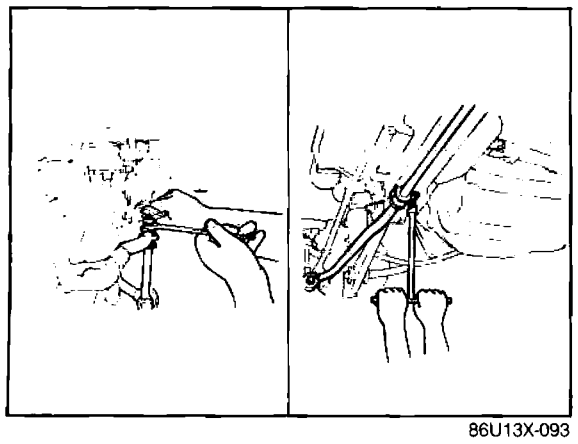
86U13X-091

Removal Note
Rear steering control system
Remove the rear steering. (Refer to Section 10)



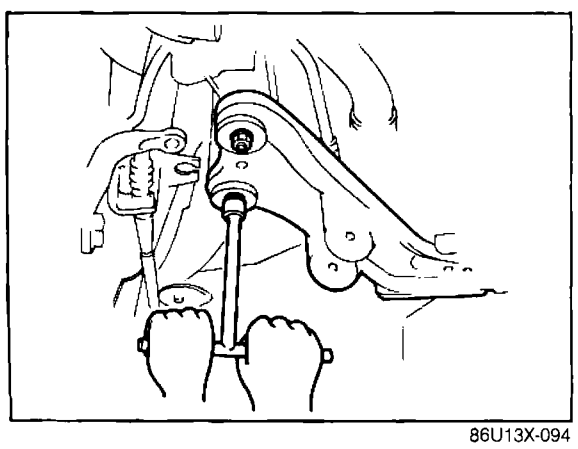
86U13X-092

Lower arm and trailing link
1. Remove the lower arm from the crossmember.
2. Remove the trailing link from the lower arm and body.



86U13X-093

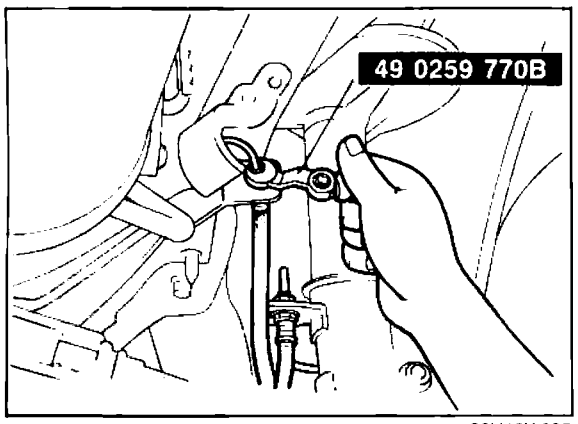
Stabilizer and control link
Remove the stabilizer bar control link.



86U13X-094

Crossmember
Remove the crossmember from the body.

13 REAR CROSSMEMBER (4WS)

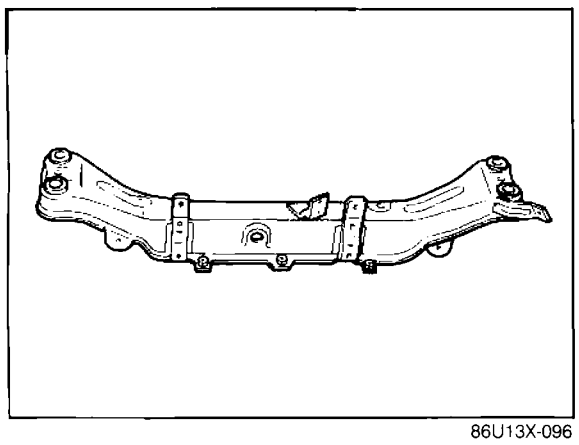


86U13X-095

Brake lines

1. When disconnecting the flexible hose and brake line, remove the clip after first loosening the flare nut.
2. When connecting the flexible hose, do not tighten too tight or twist.
3. Air bleed the brake system. (Refer to Section 11)

Caution
Do not allow brake fluid to get on painted surfaces. If it does, wipe it off immediately.

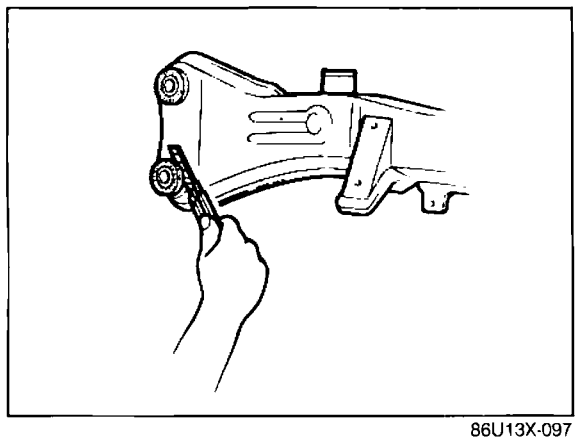


86U13X-096

Inspection Note

Check the following and repair or replace any faulty parts.

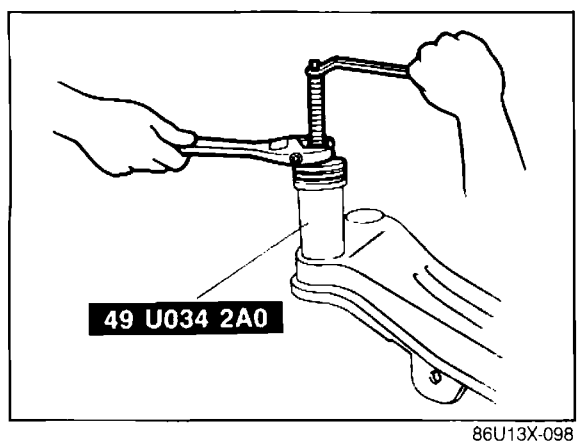
1. Crossmember for bending or damage
2. Crossmember mounts for deterioration or wear



86U13X-097

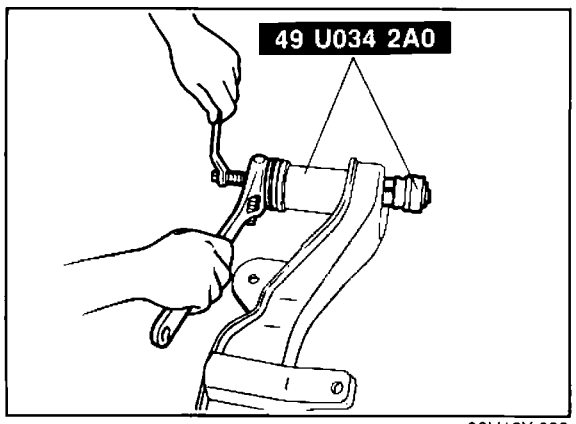
Crossmember bushing
Removal

1. Cut away the projecting rubber of the crossmember bushing.



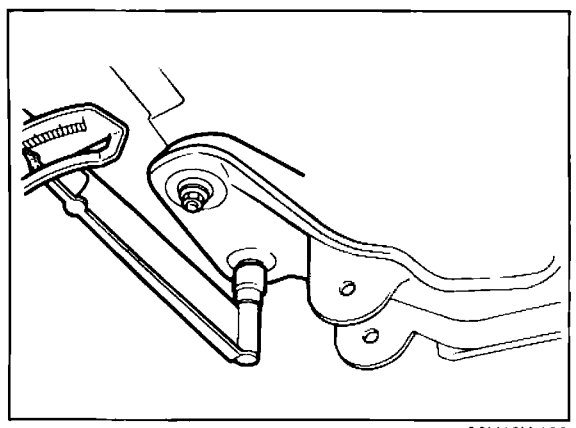
86U13X-098

2. Remove the bushing from the crossmember with the **SST**.



86U13X-099

Installation
Apply soapy water to the bushing, then press it into the crossmember with the **SST**.

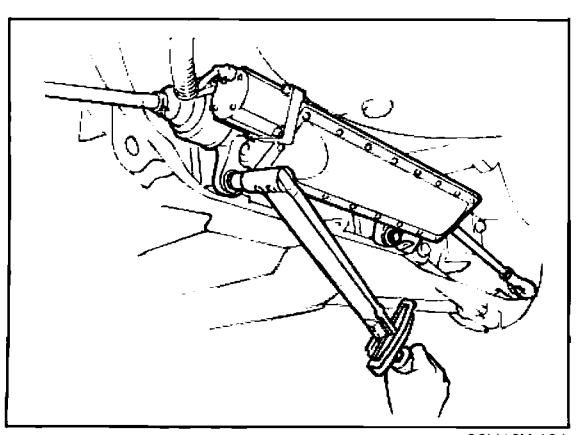


86U13X-100

Installation Note
1. Mount the crossmember to the body, and loosely tighten the nuts.

Caution
Lower the vehicle then tighten the nuts to the specified torque with the vehicle unloaded.

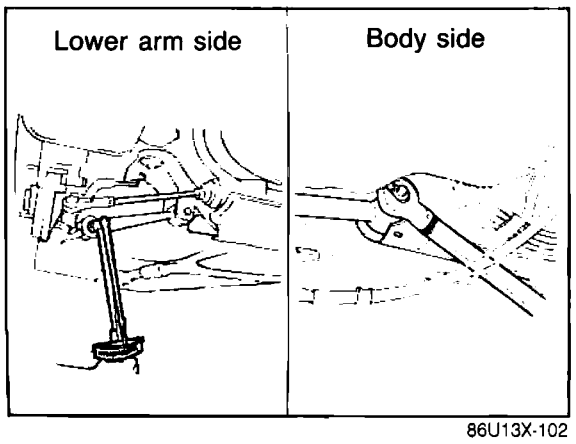
Tightening torque: 93—117 N·m (9.5—11.9 m-kg, 69—86 ft-lb)



86U13X-101

2. Mount the rear steering to the crossmember, and tighten the bolts. (Refer to Section 10)

Tightening torque: 31—46 N·m (3.2—4.7 m-kg, 24—34 ft-lb)

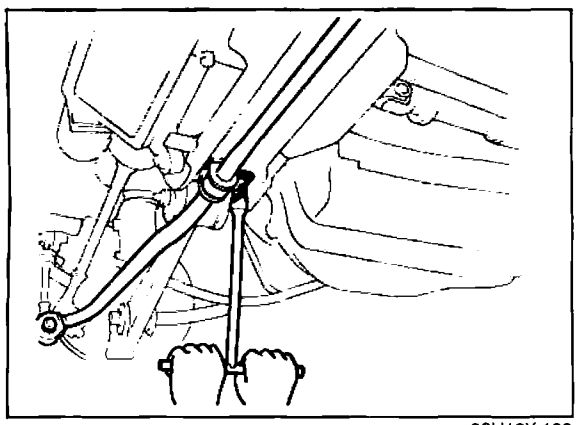


86U13X-102

3. Install the lower arm to the crossmember.
4. Install the trailing link to the lower arm and body.

Caution
Lower the vehicle then tighten the bolts to the specified torque with the vehicle unloaded.

Tightening torque:
Lower arm side 89—103 N·m (9.1—10.5 m-kg, 66—76 ft-lb)
Body side 63—93 N·m (6.4—9.5 m-kg, 46—69 ft-lb)

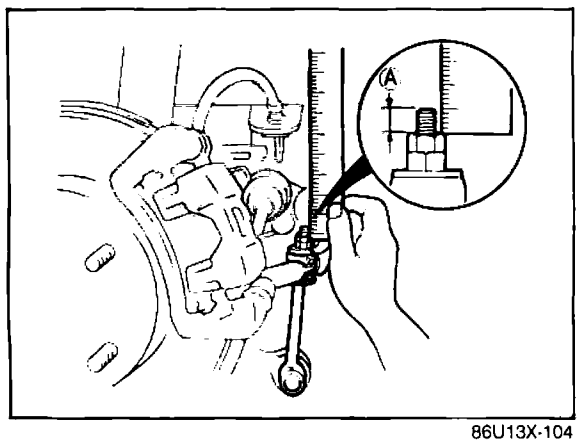


86U13X-103

5. Install the stabilizer bushings and brackets.

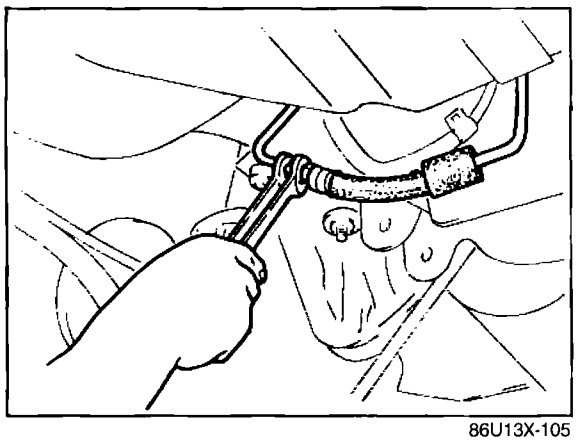
Tightening torque: 43—54 N·m (4.4—5.5 m-kg, 32—40 ft-lb)

Caution
Lower the vehicle and check the torque with the vehicle unloaded.



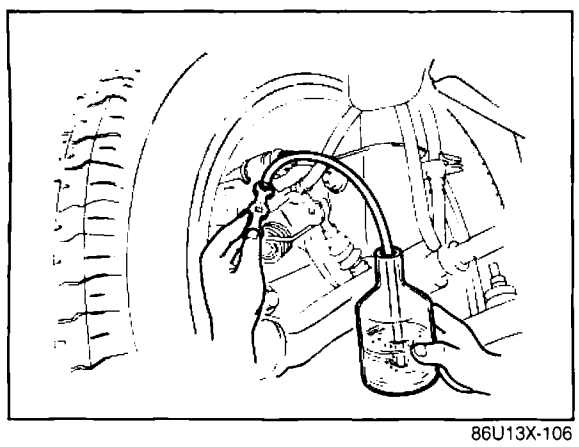
86U13X-104

6. Install the stabilizer control link.
Tighten the link nuts so that there is **13 mm (0.51 in)** of thread (A) exposed.



86U13X-105

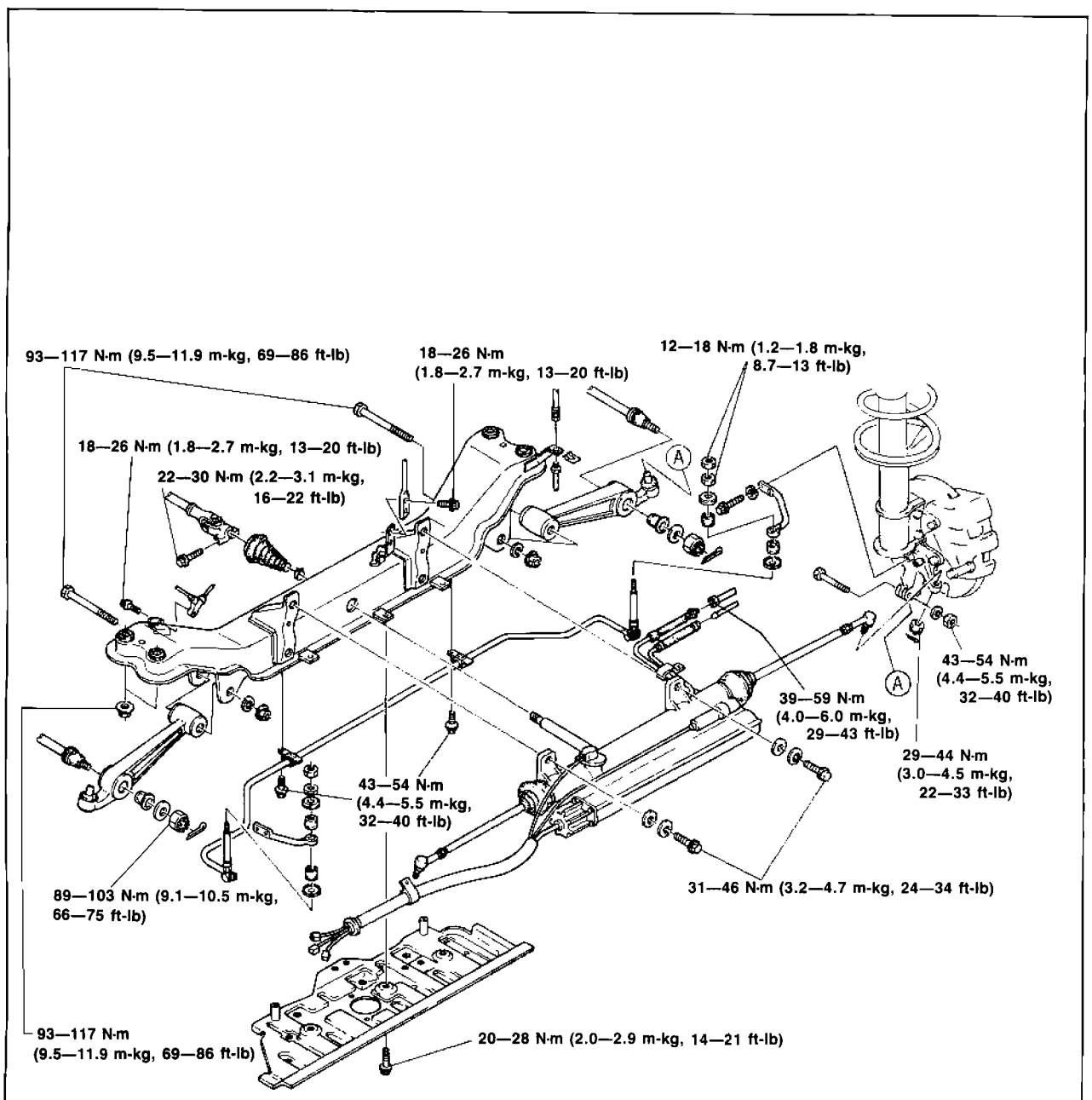
7. Install the rear steering pipe and hose.



86U13X-106

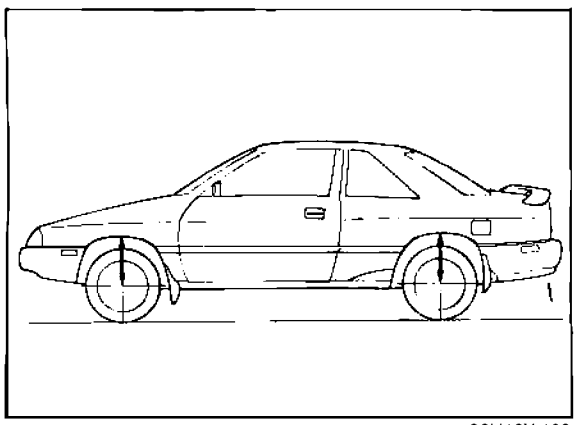
8. Air bleed the brake system. (Refer to Section 11)

Tightening torques

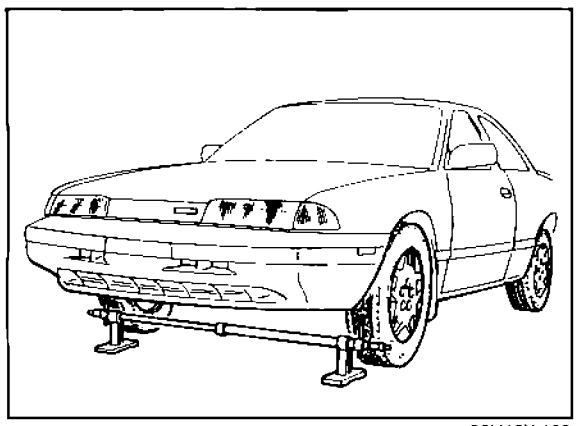


76G13X-031

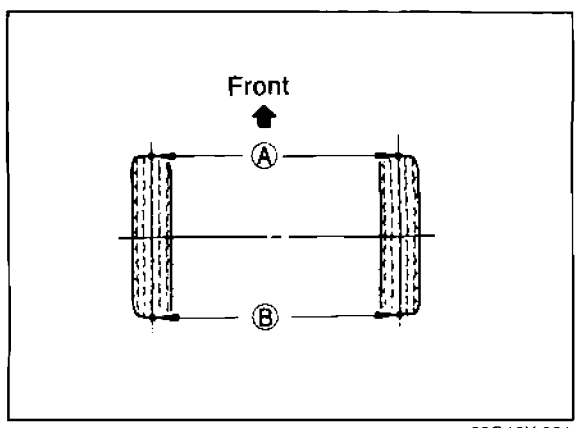
13 FRONT WHEEL ALIGNMENT



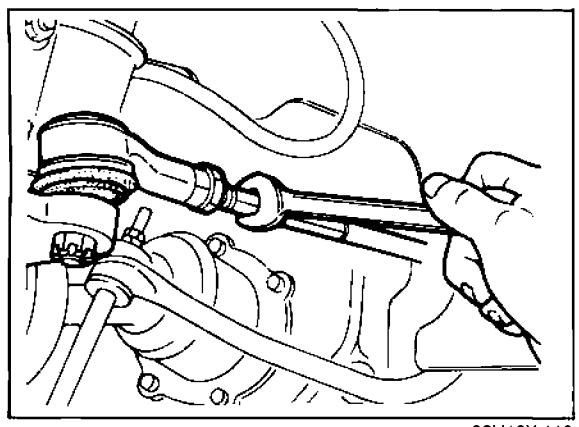
86U13X-108



86U13X-109



69G10X-031



86U13X-110

FRONT WHEEL ALIGNMENT

Pre-inspection

1. Check the tire inflation and bring to the recommended pressure.
2. Inspect the front wheel bearing play and correct, it if necessary.
3. Inspect the wheel and tire runout.
4. Inspect the ball joints and steering linkage for any excessive looseness.
5. The vehicle must be on level ground and have no luggage or passenger load.
6. The difference in height between the left and right sides from the center of the wheel to the fender brim must be within **10 mm (0.39 in)**.

Caution

a) Front and rear wheel alignment should be checked simultaneously. If adjustment is made to either the front or rear wheels, recheck the alignment, particularly toe-in, on all other wheels.

b) Check and adjust the steering angle transfer shaft after adjusting the front wheel alignment. (Refer to Section 10)

TOE-IN

Inspection

1. Raise the front of the vehicle until the wheels clear the ground.
2. Turn the wheels by hand, mark a line in the center of each tire tread using a scribing block.
3. Place the front wheels in the straight-ahead position and lower the vehicle.
4. Measure the distance between the lines at the front and rear of the wheels.
   Both measurements must be taken at equal distances from the ground.

   Toe-in (distance greater at rear than front):
   3 ± 3 mm (0.12 ± 0.12 in)

Adjustment

To adjust the toe-in, loosen the left and right tie-rod lock nuts, then turn the tie-rods by the same amount.

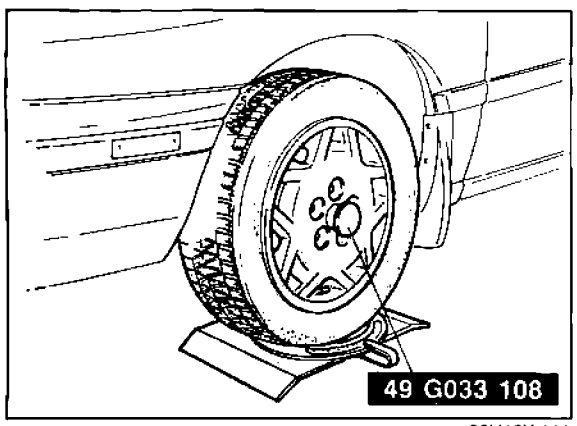
Caution

a) The left and right tie-rods are both right threaded, so, to increase the toe-in, turn the right tie-rod toward the front of the vehicle, and turn the left tie-rod by the same amount toward the rear.

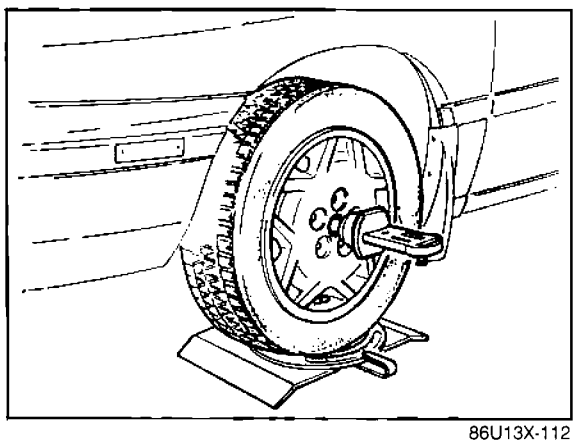
b) One turn of the tie-rod (both sides) changes the toe-in by about 7.2 mm (0.28 in).

c) Tighten the tie-rod locknuts to the specified torque.

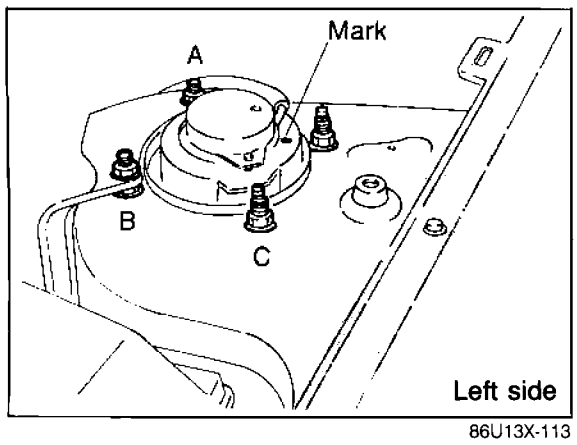
Tightening torque: 69—98 N·m
(7—10 m-kg, 51—72 ft-lb)



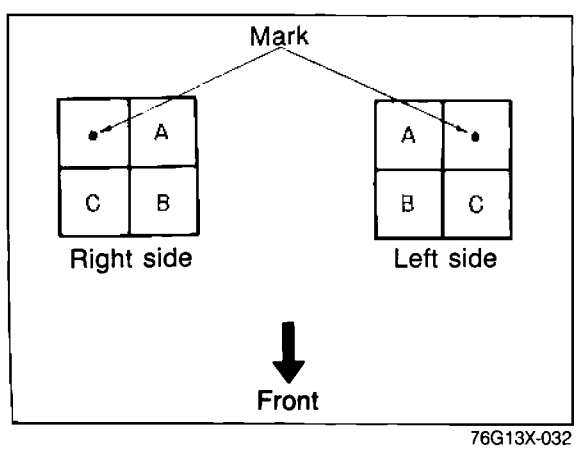
86U13X-111



86U13X-112



86U13X-113



76G13X-032

CAMBER AND CASTER

Inspection

The camber and caster is measured by placing the front wheels on a turning-radius gauge in accordance with the manufacturer's instructions.

Proceed in the following order:

1. Jack up the vehicle and remove the wheel caps and nuts. Then attach the **SST** to the wheel hub as shown in the figure.
2. Attach the caster/camber gauge to the adapter and measure the camber and caster.

Camber angle: 0°17' ± 45'
Caster angle: 1°13' ± 45'

Left/right difference:
Camber: 30' max.
Caster: 40' max.

Adjustment

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the mounting block nuts.
3. Push the mounting block downward, and turn it to the desired position.
4. Retighten the nuts to the specified torque.

Tightening torque: 46—63 N·m (4.7—6.4 m-kg, 34—46 ft-lb)

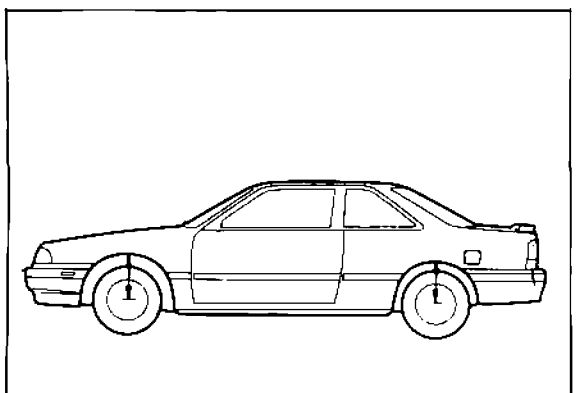
Mark	Difference from standard position	
	Camber angle	Caster angle
A	27'	0°
B	27'	+28'
C	0°	+28'

Steering Angle (turning angle to left and right)

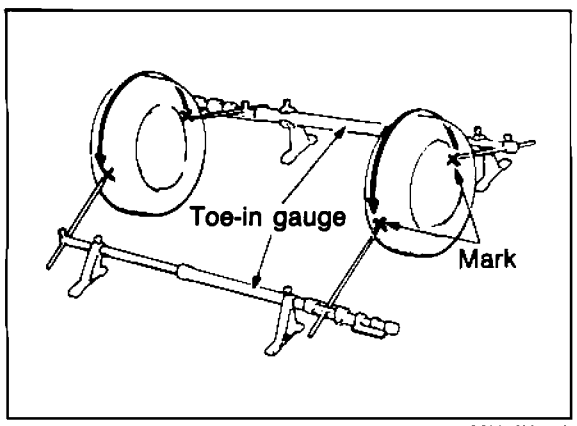
Inspection

The steering angle is measured by placing the front wheels on a turning-radius gauge.

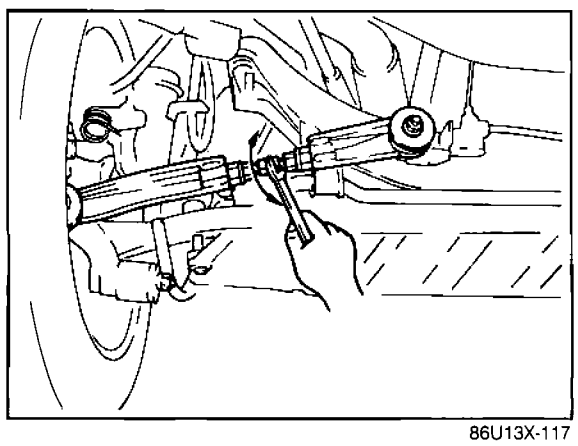
Inward 36°00' ± 2°
Outward 31°00' ± 2°



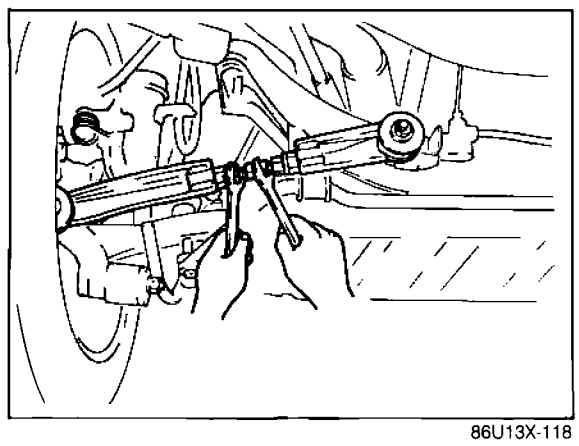
76G13X-033



86U13X-116



86U13X-117



86U13X-118

REAR WHEEL ALIGNMENT

PRE-INSPECTION

1. Check the tire inflation and bring to the recommended pressure.
2. Inspect the wheel and tire runout.
3. The vehicle must be on level ground and have no luggage or passenger load.
4. Check that the suspension is correctly adjusted.
5. The difference in height between the left and right sides from the center of the wheel to the fender rim should be within **10 mm (0.39 in)**.

Caution

a) Front and rear wheel alignments should be checked simultaneously. If adjustment is made to either the front or rear wheels, recheck the alignment, particularly toe-in, on all other wheels.

b) Check and adjust the steering angle transfer shaft after adjusting the rear wheel alignment. (Refer to Section 10.)

TOE-IN

Inspection

1. Raise the rear of the vehicle until the wheels clear the ground.
2. Turn the wheels by hand, mark a line in the center of each tire tread using a scribing block.
3. Lower the vehicle.
4. Measure the distance between the marked lines at the front and rear of the wheels.

Toe-in

0 ± 3 mm (0 ±0.12 in) 2WS
3 ± 3 mm (0.12 ±0.12 in) 4WS

Adjustment (2WS)

1. Loosen the adjusting rod lock nuts, then adjust the toe-in.
2. To increase the toe-in, turn the adjusting rods as follows:
   Right rod — Turn counterclockwise
   Left rod — Turn clockwise
   To decrease the toe-in, turn the adjusting rods as follows:
   Right rod — Turn clockwise
   Left rod — Turn counterclockwise

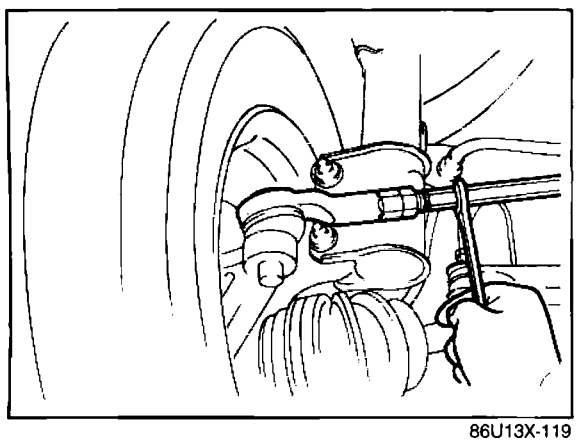
Caution

a) Both the left and right rods must be adjusted by the same amount.

b) One turn of the adjusting rod (both sides) changes the toe-in by about 11.6 mm (0.46 in).

3. Tighten the adjusting rod lock nuts to the specified torque.

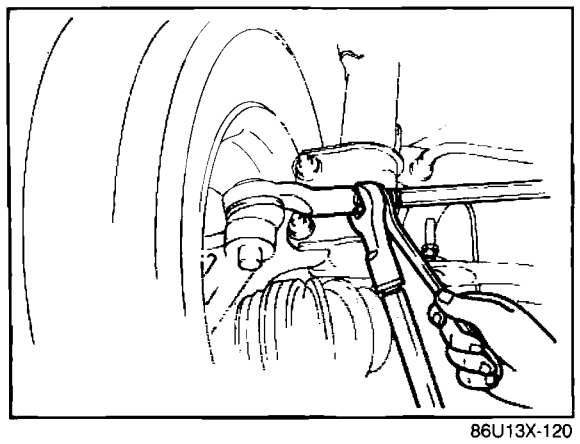
Tightening torque:
55—80 N·m (5.6—8.2 m-kg, 41—59 ft-lb)



86U13X-119

Adjustment (4WS)
To adjust the toe-in, loosen the left and right tie-rod locknuts, and turn the tie-rods by the same amount.

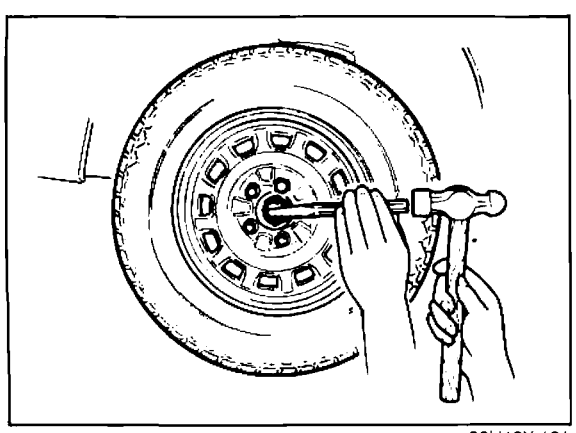
Caution
a) The left and right tie-rods are both right threaded, so, to increase the toe-in, turn the right tie-rod toward the front of the vehicle, and turn the left tie-rod by the same amount toward the rear.
b) One turn of the tie-rod (both sides) changes the toe-in by about 7.8 mm (0.31 in).
c) Adjust the toe-in after adjusting the steering angle.



86U13X-120

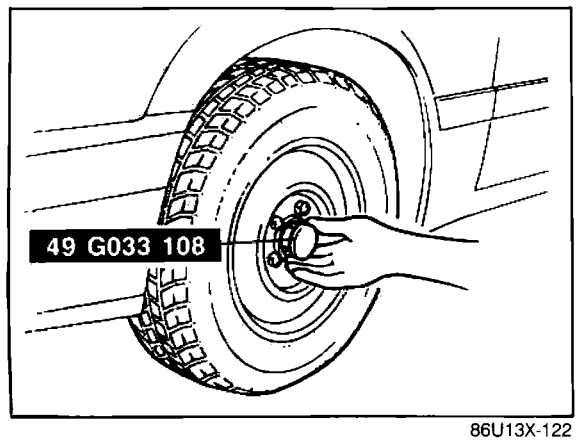
Tighten the tie-rod locknuts to the specified torque.

Tightening torque: 69—98 N·m (7—10 m-kg, 51—72 ft-lb)



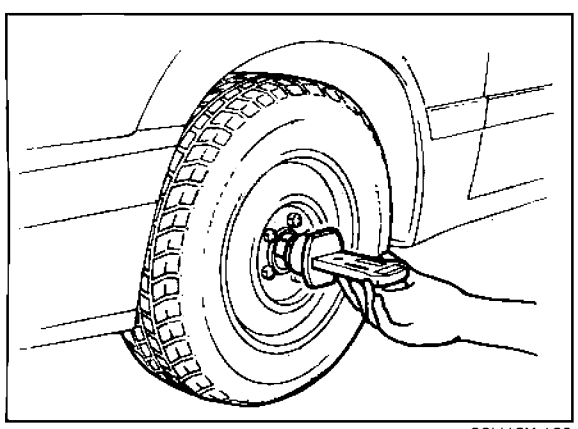
86U13X-121

CAMBER
Preparation
1. Remove the center caps from the wheels.
2. Uncrimp the locknut and remove it.



86U13X-122

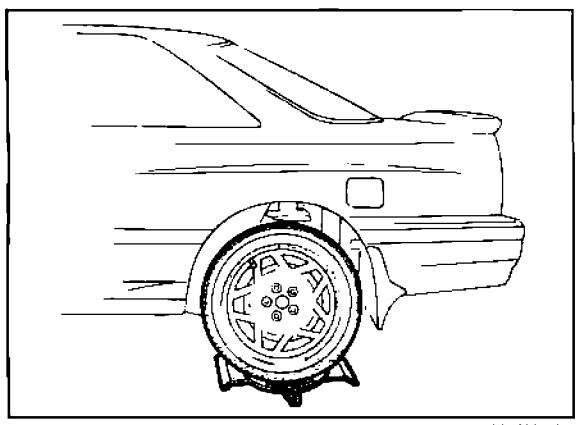
Inspection
1. Install the **SST** to the driveshaft.



86U13X-123

2. Measure the camber angle with the caster/camber gauge.

Camber: –0°30' ± 45' (2WS)
0°00' ± 45' (4WS)



86U13X-124

REAR TURNING ANGLE (4WS)

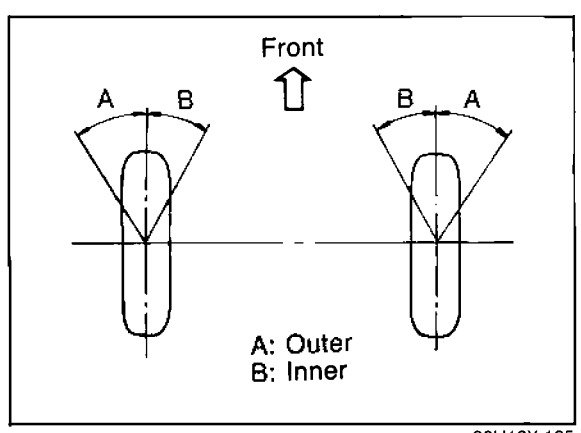
1. Place the rear wheels on a turning radius gauge.
2. Jack up the front of the vehicle.
3. Start the engine and let it idle.

Caution
If the engine is stopped while the steering wheel is left turned to one side or the other, the rear wheels will return to the straight-ahead direction, and, when the engine is later started once again, the direction of the rear wheels will change. Be sure, therefore, to check to be sure that the wheels are not touching, or close to, anyone's hands or feet, or any other object, when the engine is stopped or started.

4. Turn the steering wheel fully left and right, and measure the rear turning angle.

Rear turning angle Inner 5°00' ± 45'
Outer 5°00' ± 45'

5. If not within specification, adjust the rear turning angle. (Refer to Section 10)



86U13X-125

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BODY

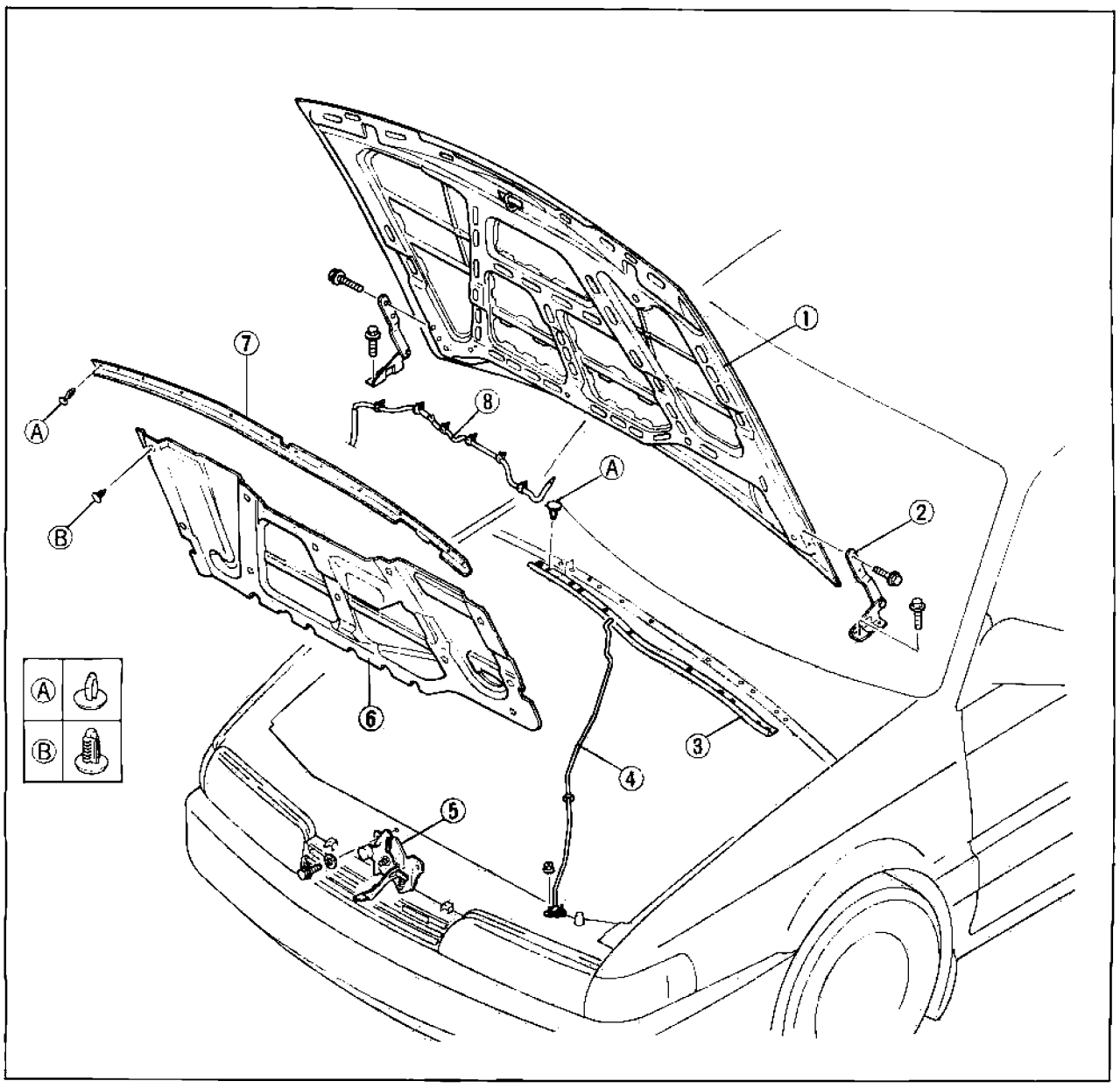
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UNDERBODY STRAIGHT-LINE DIMENSIONS 14—104

76G14X-001

14 BONNET

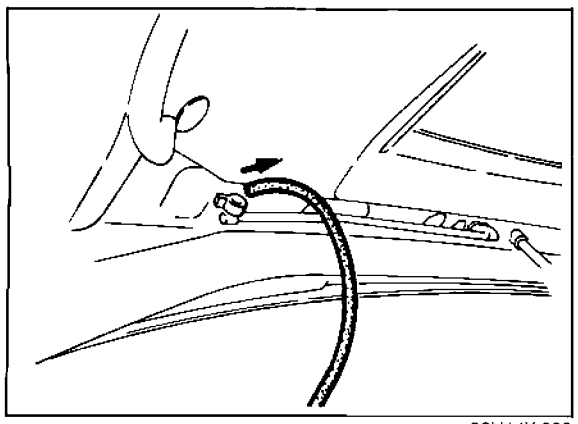
BONNET

STRUCTURAL VIEW



76G14X-602

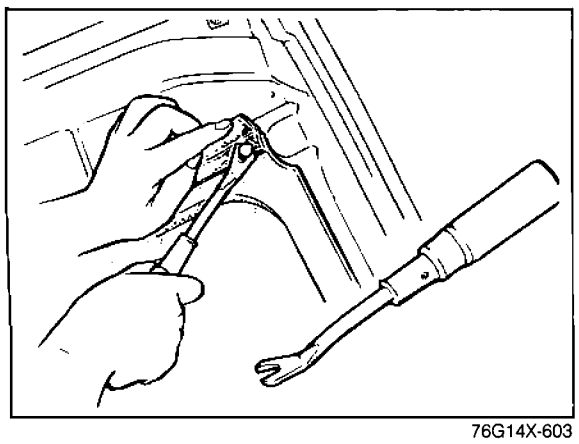
1. Bonnet
2. Hinge
3. Cowl seal rubber
4. Bonnet stay
5. Bonnet lock
6. Bonnet insulator
7. Front seal rubber
8. Windshield washer hose



86U14X-003

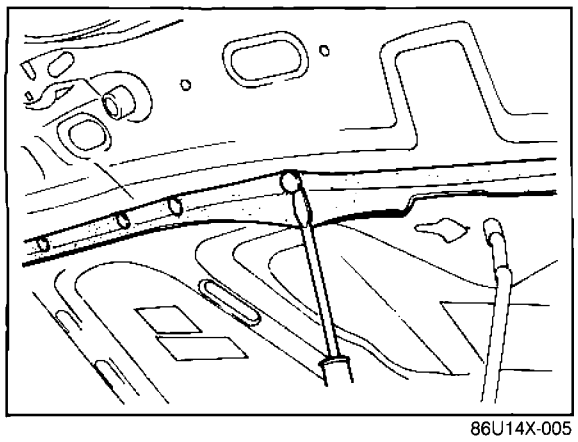
REMOVAL

1. Disconnect the windshield washer hose at the joint shown in the figure.



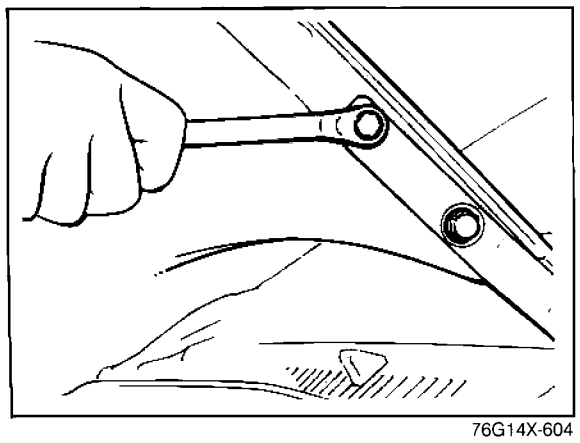
76G14X-603

2. Remove bonnet insulator fasteners, then remove the insulator.



86U14X-005

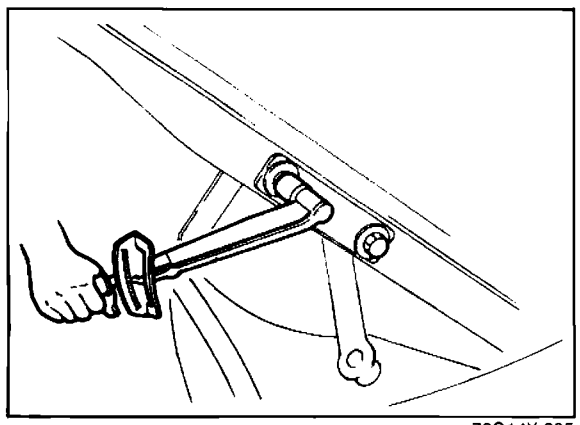
3. Remove the front seal rubber fasteners, then remove the seal rubber.



76G14X-604

4. Remove the bonnet hinge installation bolts, then remove the bonnet.

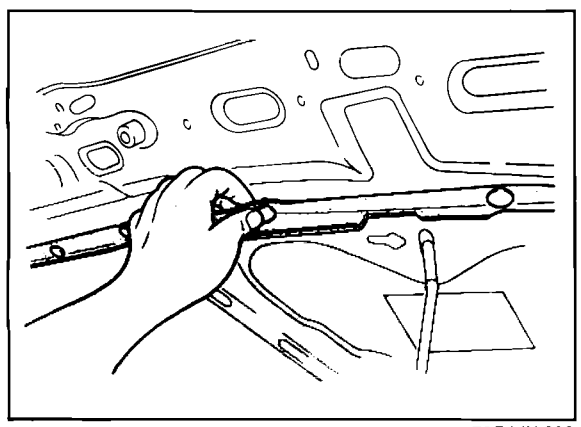
14 BONNET



76G14X-605

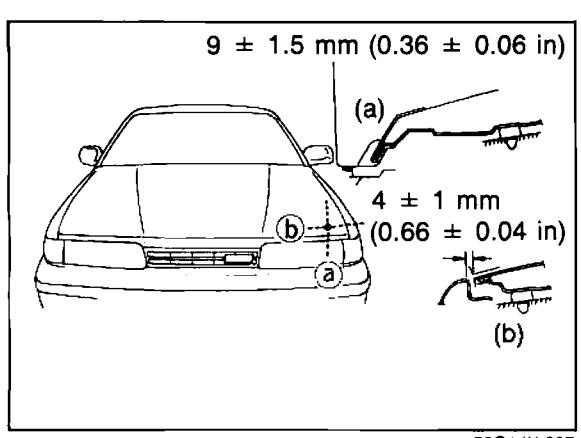
INSTALLATION
Install in the reverse order of removal, noting the following:
1. Bonnet hinge installation bolts

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



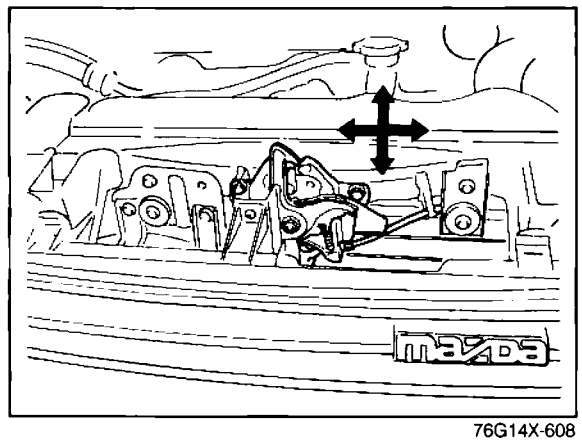
76G14X-606

2. Push the fasteners into the bonnet.



76G14X-607

ADJUSTMENT
Bonnet
Adjust the bonnet laterally and vertically by loosening the bonnet to hinge mounting bolts and repositioning the bonnet.



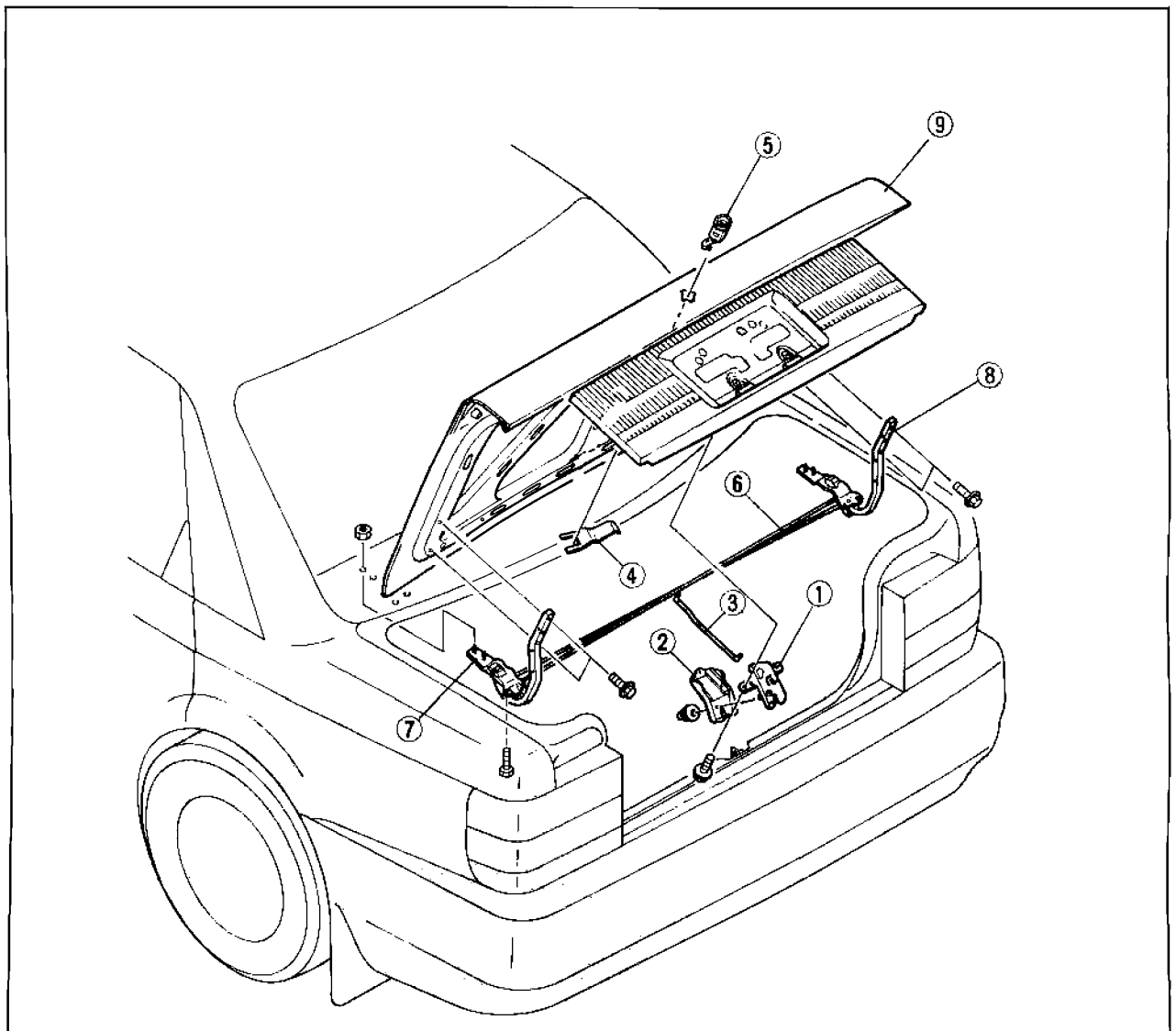
76G14X-608

Bonnet Lock
Adjust the bonnet lock after the bonnet has been aligned. The lock can be moved vertically and horizontally. Align it with the striker on the bonnet after loosening the mounting bolts.

Tightening torque:
7.8—11 N·m (0.8—1.1 m-kg, 5.8—8.0 ft-lb)

TRUNK LID

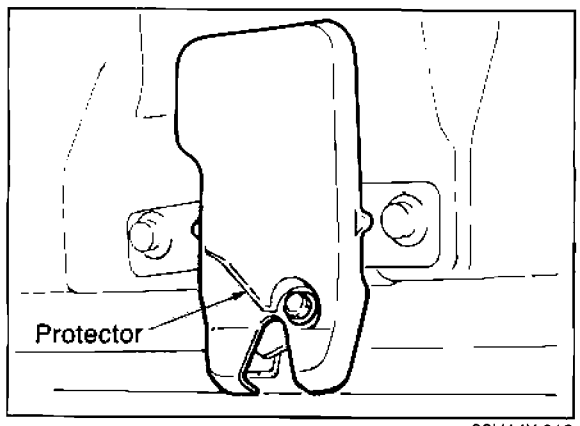
STRUCTURAL VIEW (SEDAN AND COUPE/MX-6)



76G14X-040

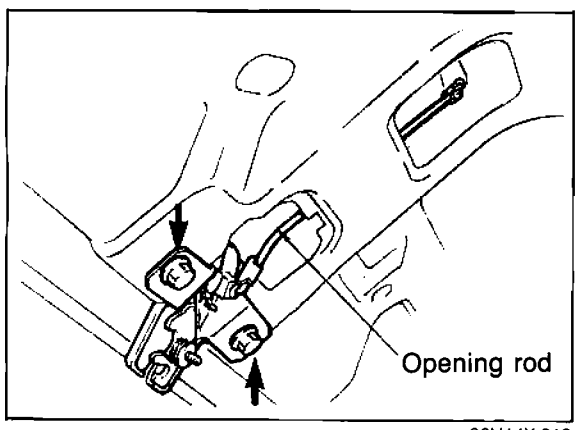
1. Trunk lid lock
2. Trunk lid opener protector
3. Opening rod
4. Retainer
5. Trunk lid key cylinder
6. Balance spring
7. Trunk lid hinge bracket
8. Trunk lid hinge
9. Trunk lid

14 TRUNK LID



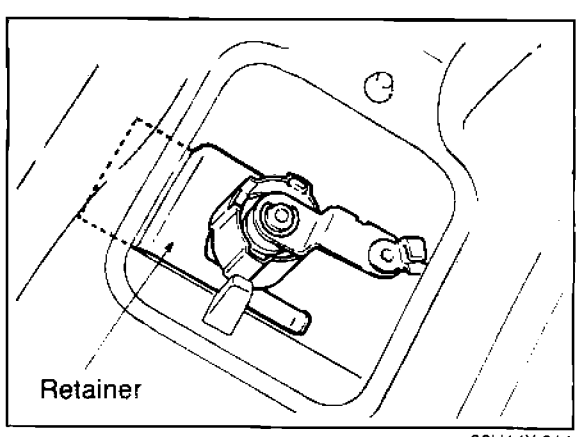
86U14X-012

REMOVAL
Trunk Lid Opener
1. Remove the nut and the protector.



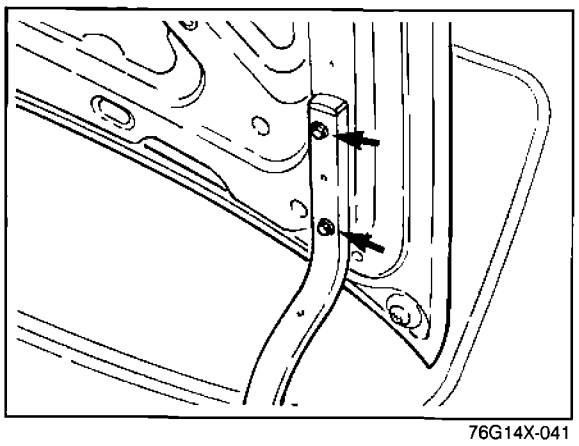
86U14X-013

2. Remove the opening rod.
3. Remove the bolts and the trunk lid opener.



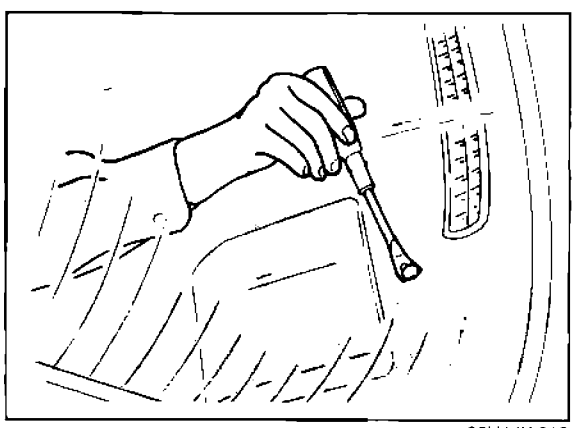
86U14X-014

Trunk Lid Key Cylinder
Remove the retainer and the trunk lid key cylinder.



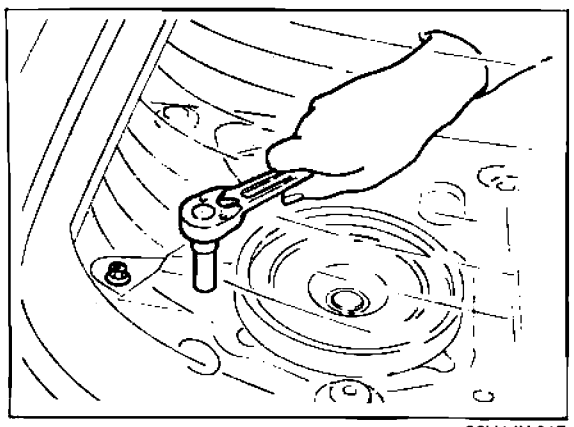
76G14X-041

Trunk Lid
1. Remove the trunk lid installation bolts, then remove the trunk lid.
2. Remove the balance spring.
3. Remove the rear seat. (Refer to page 14—100)



86U14X-016

4. Remove the fasteners and remove the rear package tray.

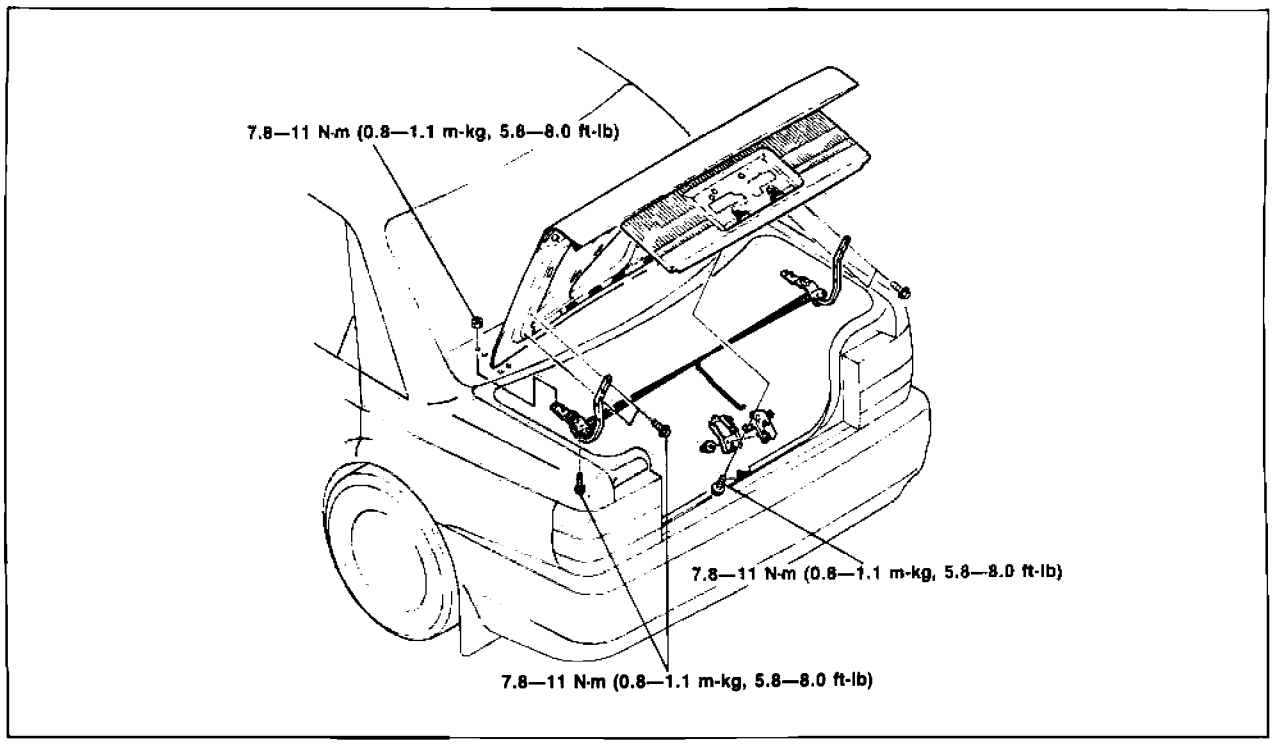


86U14X-017

5. Remove the bolts and remove the trunk lid hinge bracket.

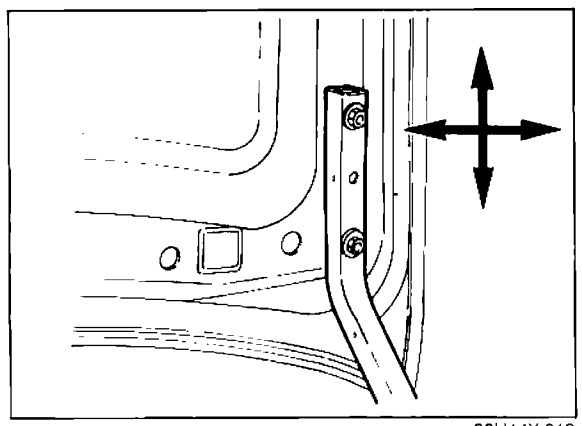
INSTALLATION
Install in the reverse order of removal.

Tightening torque:



86U14X-018

14 TRUNK LID

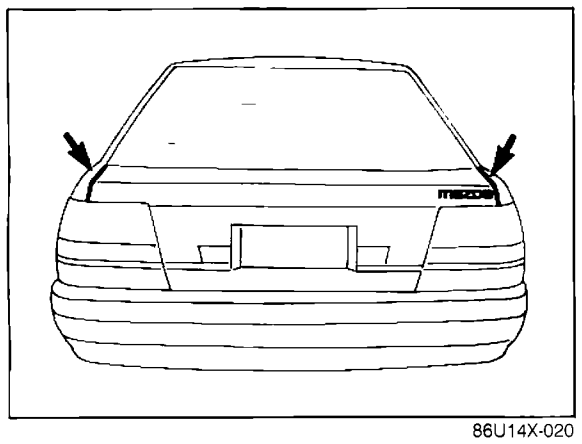


86U14X-019

ADJUSTMENT

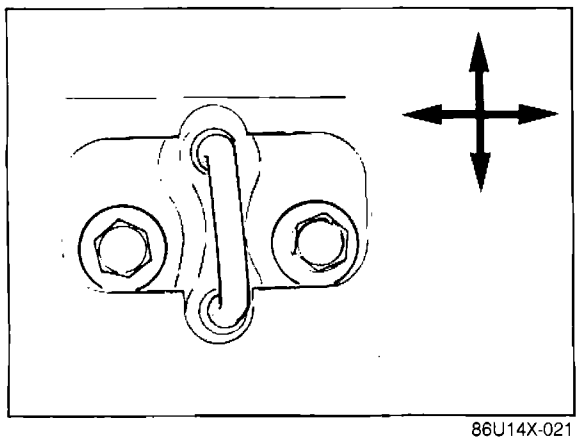
Trunk Lid

1. Adjust the trunk lid by loosening the lid to hinge mounting bolts and repositioning it.



86U14X-020

2. Align the trunk lid evenly as shown in the figure.



86U14X-021

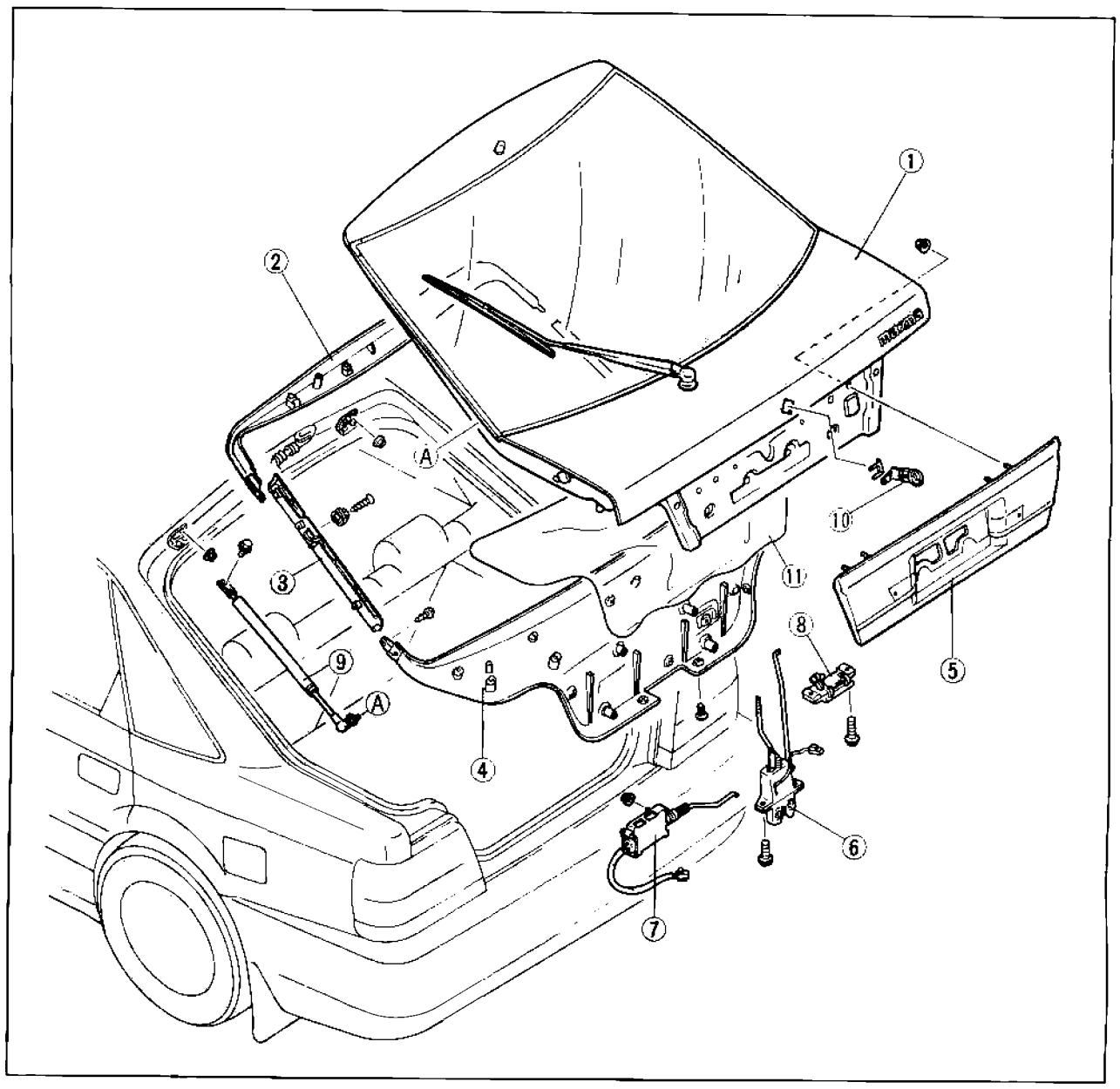
Trunk Lid Striker

1. Loosen the striker mounting bolts.
2. Tighten the bolts after adjusting.

Tightening torque:
7.8—11 N·m (0.8—1.1 m-kg, 5.8—8.0 ft-lb)

REAR HATCH

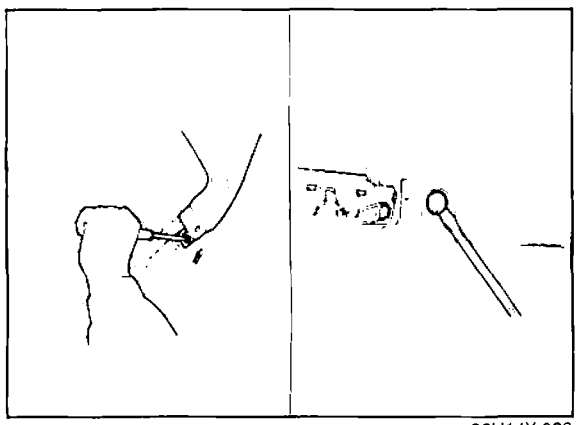
STRUCTURAL VIEW



86U14X-022

1. Rear hatch
2. Upper trim
3. Side trim
4. Lower trim
5. Rear finisher
6. Rear hatch lock
7. Lock controller
8. Rear hatch outer handle
9. Stay damper
10. Key cylinder
11. Rear hatch screen

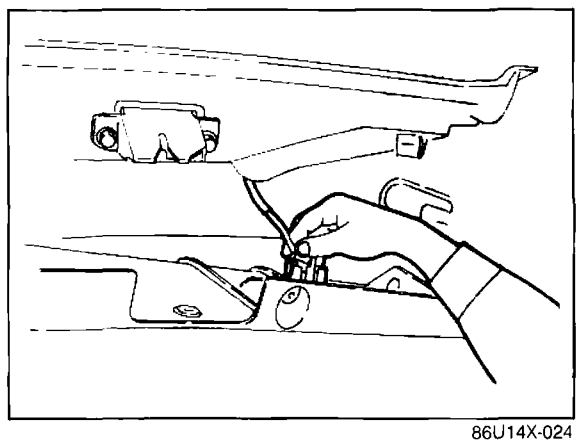
14 REAR HATCH



86U14X-023

REMOVAL

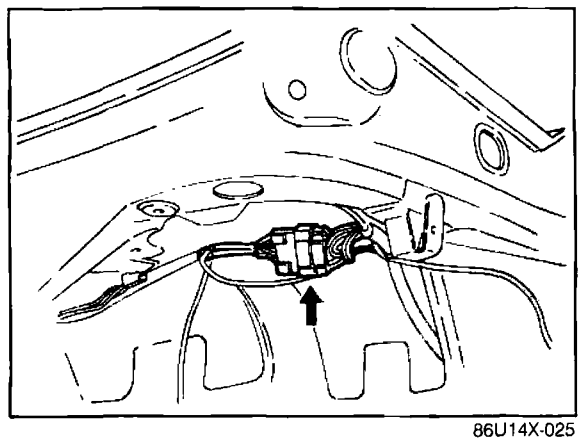
1. Disconnect the negative battery cable.
2. Remove the rear hatch trim.



86U14X-024

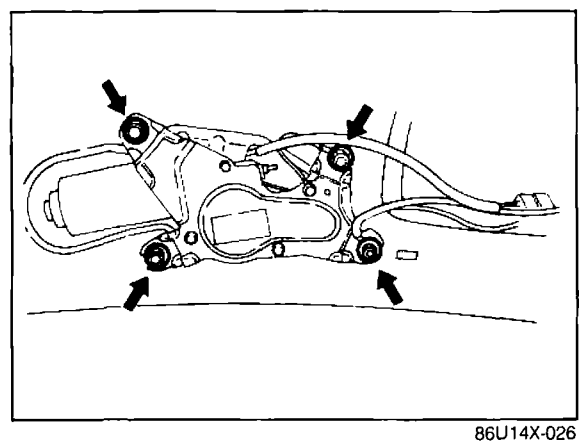
3. Disconnect the connector, then remove the cargo room light.
4. Remove the rear hatch screen.

Caution
Remove the screen carefully so that it may be reused.



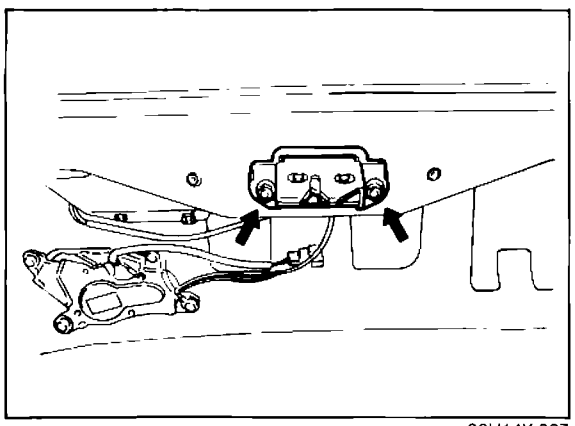
86U14X-025

5. Disconnect the rear defogger and wiper motor connectors, then remove the wire harness through the rear hatch.



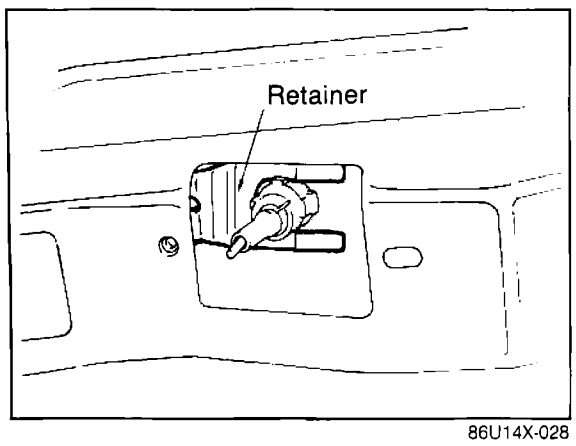
86U14X-026

6. Remove the wiper arm.
7. Remove the wiper motor.



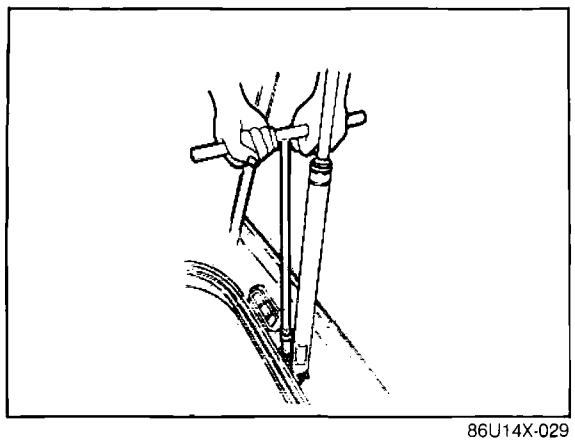
86U14X-027

8. Remove the opening rod.
9. Remove the rear hatch opener.



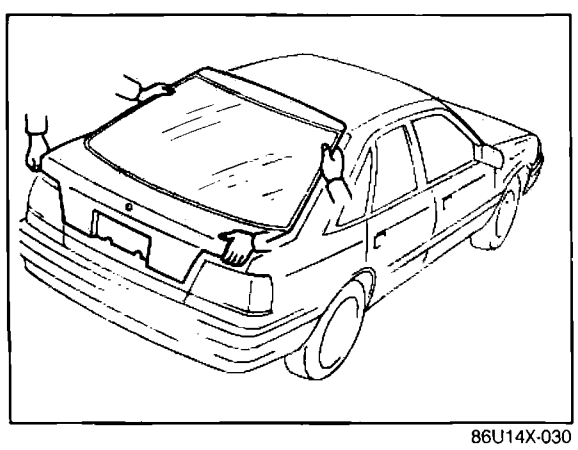
86U14X-028

10. Remove the retainer, and the key cylinder.



86U14X-029

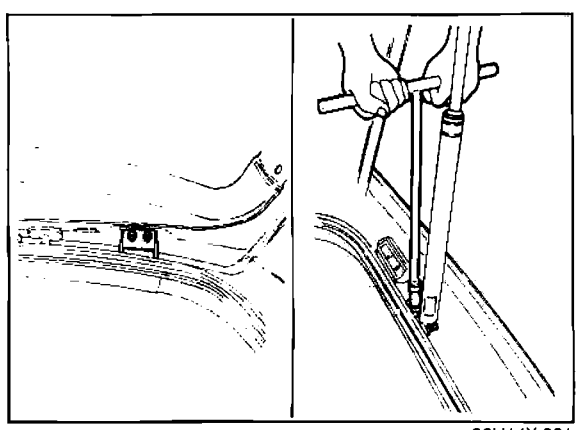
11. Remove the stay damper mounting bolts.
12. Disconnect the rear washer hose.
13. Remove the wiring harness.



86U14X-030

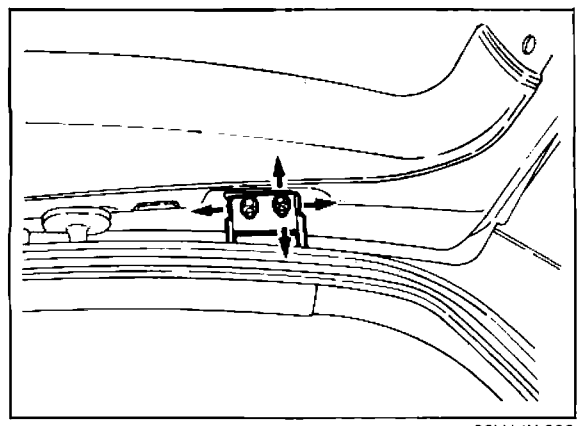
14. Remove the rear hatch hinge to door mounting bolts.
15. Remove the rear hatch.

14 REAR HATCH



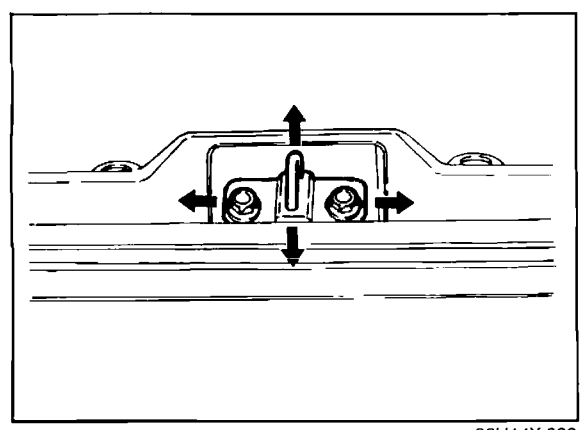
86U14X-031

INSTALLATION
Install in the reverse order of removal.



86U14X-032

ADJUSTMENT
Rear Hatch Hinge
Loosen the door hinge mounting nuts and make the adjustment.



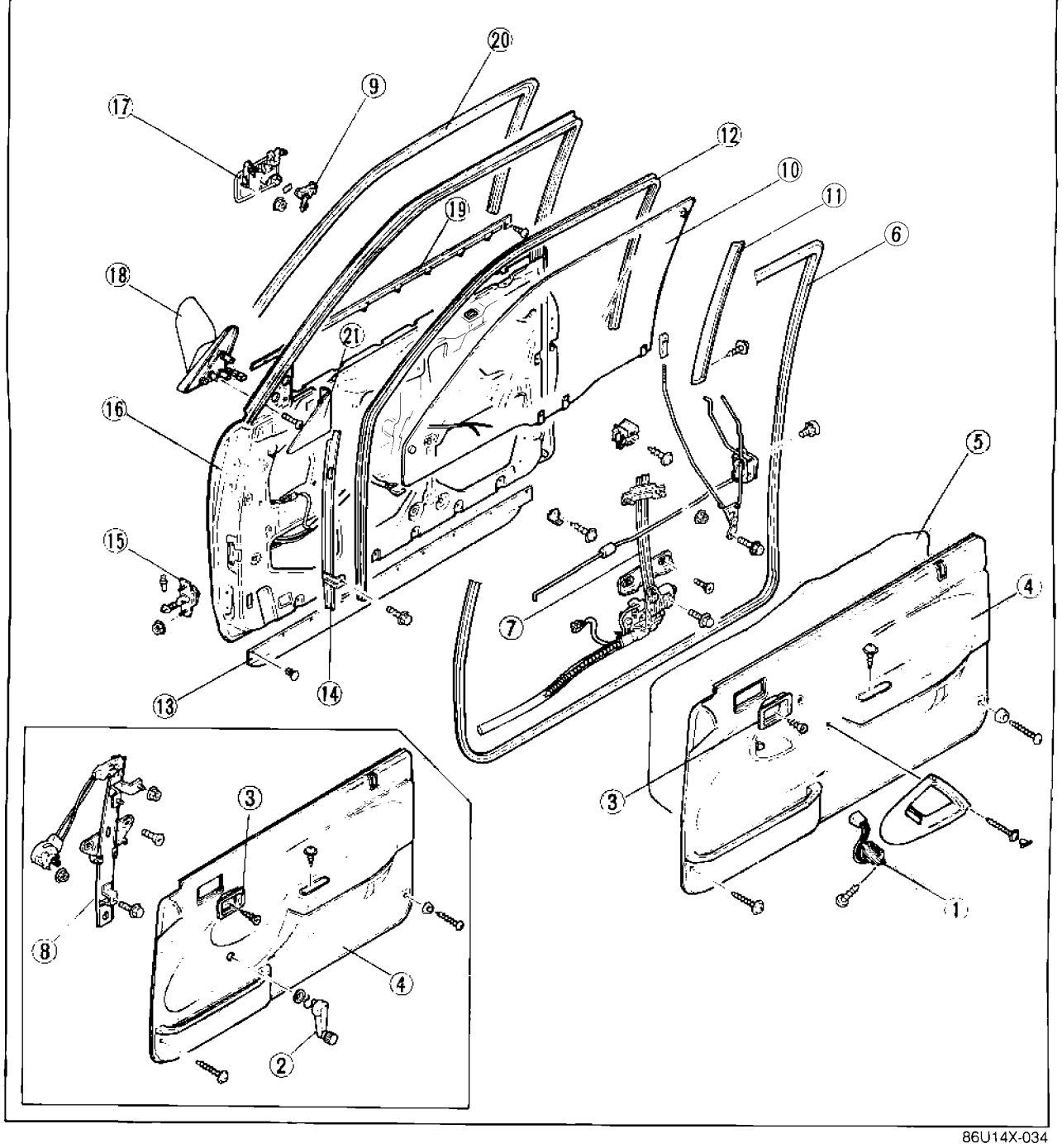
86U14X-033

Striker
Loosen the striker mounting bolts and make the adjustment.

FRONT DOORS

STRUCTURAL VIEW

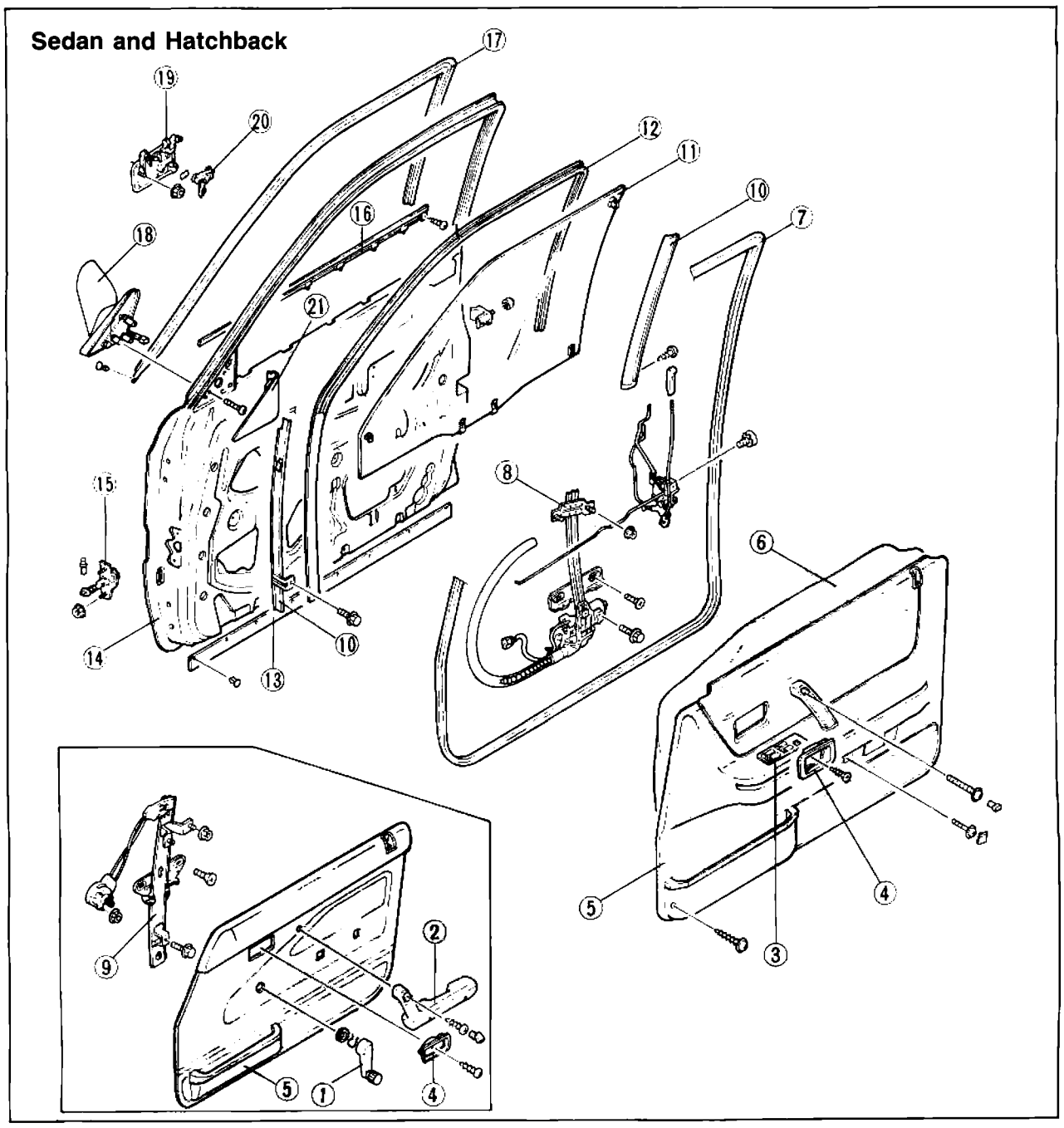
COUPE/MX-6



86U14X-034

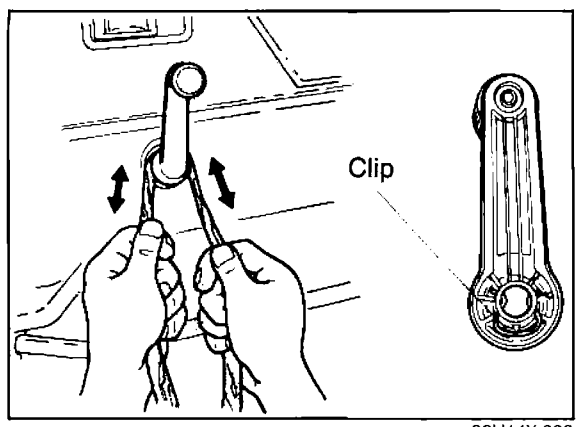
1. Power window switch
2. Regulator handle
3. Inner handle cover
4. Door trim
5. Door screen
6. Weatherstrip
7. Regulator (power type)
8. Regulator (manual type)
9. Key cylinder
10. Glass
11. Glass guide
12. Runchannel
13. Weatherstrip
14. Glass guide
15. Door checker
16. Door
17. Outer handle
18. Door mirror
19. Beltline molding
20. Weatherstrip
21. Sail inner garnish

14 FRONT DOORS



86U14X-035

1. Regulator handle
2. Arm rest
3. Power window switch
4. Inner handle cover
5. Door trim
6. Door screen
7. Weatherstrip
8. Regulator (power type)
9. Regulator (manual type)
10. Glass guide
11. Glass
12. Runchannel
13. Weatherstrip
14. Door
15. Door checker
16. Beltline molding
17. Weatherstrip
18. Door mirror
19. Outer handle
20. Key cylinder
21. Sail inner garnish

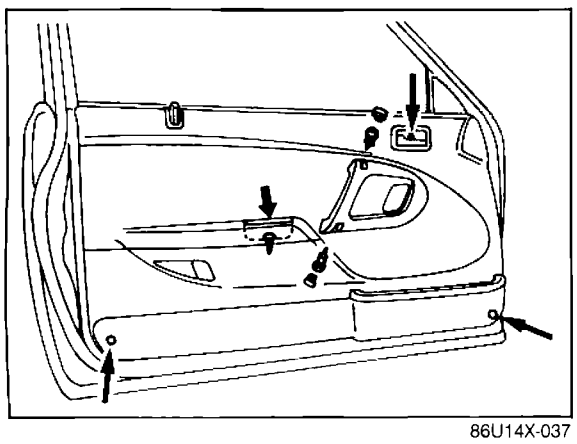


86U14X-036

REMOVAL
Front Door Glass and Regulator

Note
Raise the door glass 100 mm (3.94 in) from the fully open position.

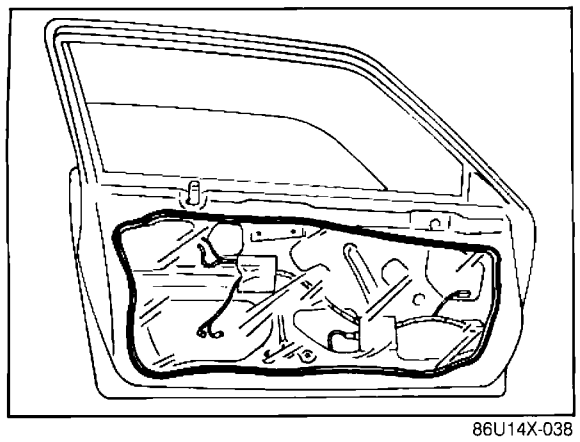
1. Remove the clip and regulator handle. (Manual type)



86U14X-037

2. Remove the inner handle cover, the screws (arrows), and the door trim.

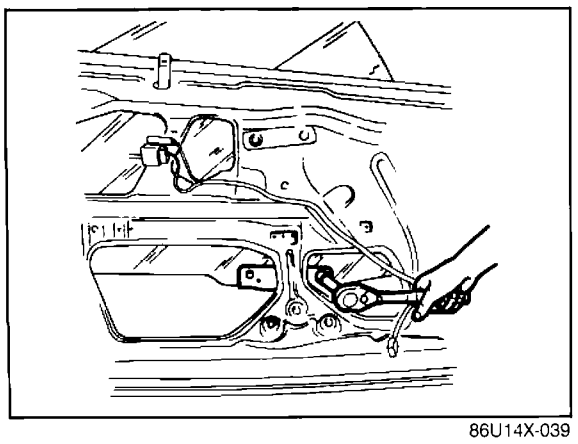
Note
For vehicles with power windows, disconnect the connectors.



86U14X-038

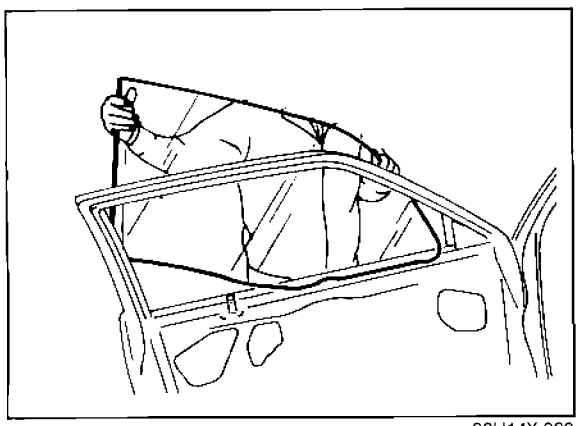
3. Remove the door screen.

Caution
Remove the screen carefully so that it may be reused.



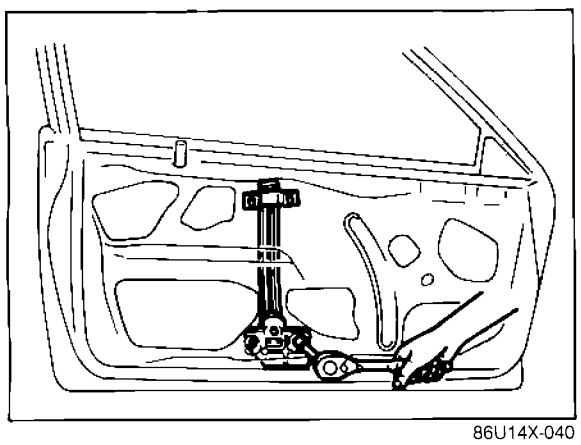
86U14X-039

4. Position the door glass so that the mounting bolts can be removed from the service holes.
5. Remove the mounting bolts.



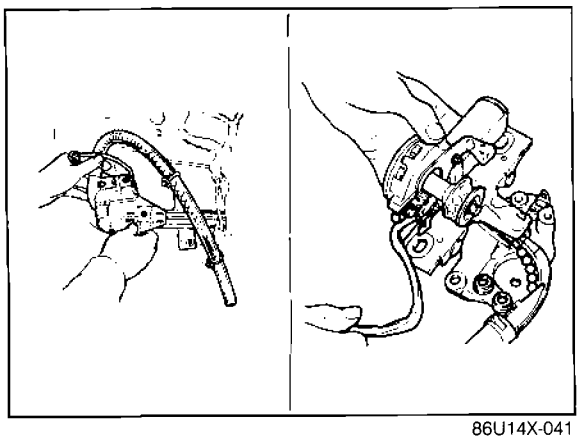
86U14X-060

6. Remove the beltline molding. (Refer to page 14—39)
7. Remove the door glass upward.



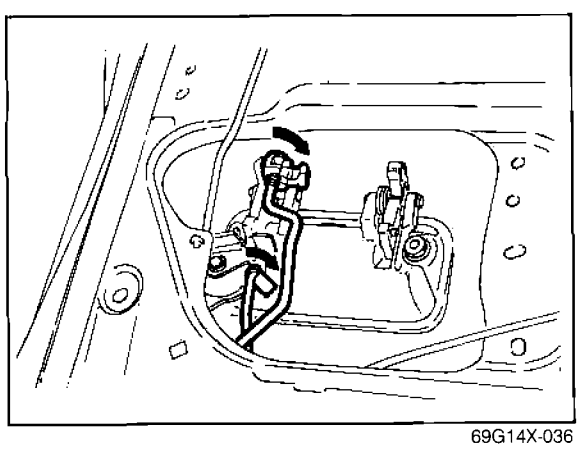
86U14X-040

8. Remove the mounting bolts, and remove the regulator through the service hole.



86U14X-041

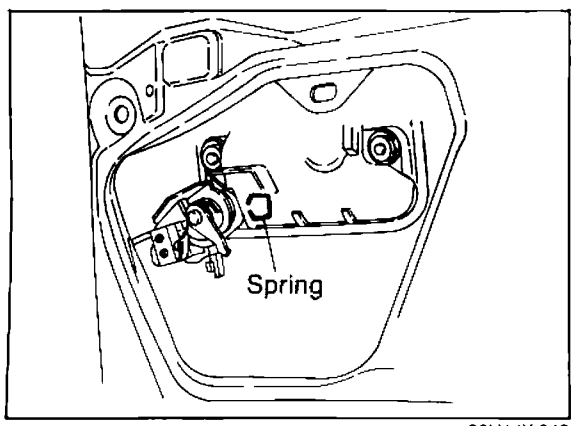
9. Remove the window motor mounting bolt, and remove the motor from the regulator (power window).



69G14X-036

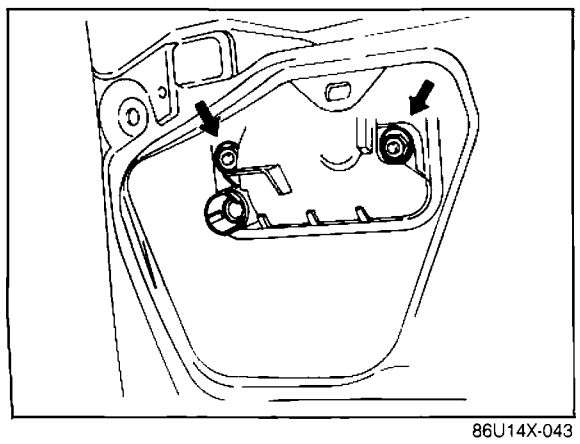
Removal of Outer Handle and Key Cylinder

1. Disconnect the rod from the outer handle.



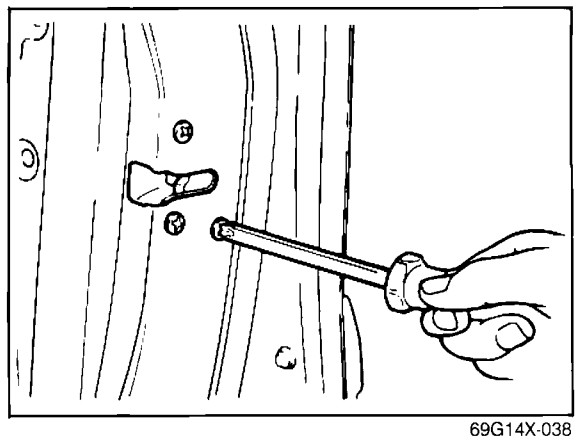
86U14X-042

2. Remove the key cylinder spring.
3. Remove the key cylinder.



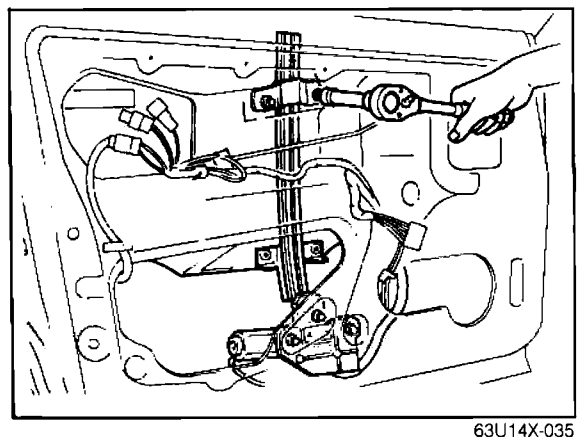
86U14X-043

4. Remove the mounting nuts and remove the outer handle.



69G14X-038

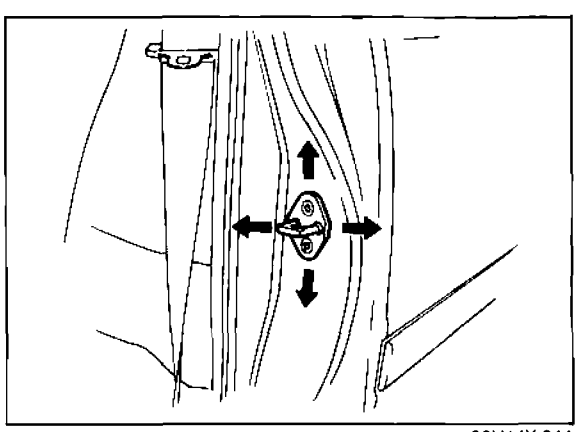
Removal of Door Lock Assembly
1. Remove the mounting screws.
2. Remove the door lock assembly.



63U14X-035

INSTALLATION
Install in the reverse order of removal, noting the following.

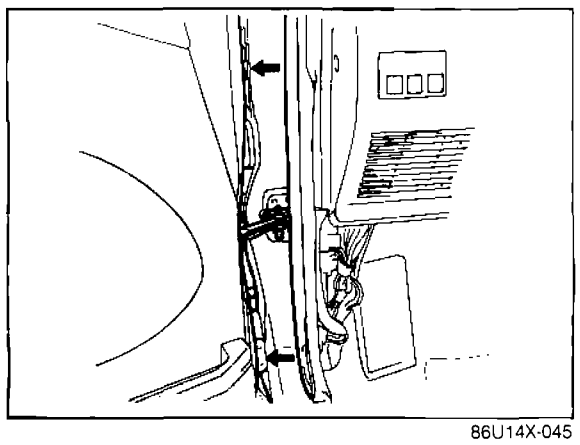
Power Window
Before installing the motor, connect the leads to a battery and run the regulator down to the position shown.



86U14X-044

ADJUSTMENT
Door Lock Striker

1. Check that the door can be closed easily and whether there is any looseness. If there is a problem, loosen the striker mounting screws and adjust by moving the striker down, or laterally.
2. Check the rear offset of the door to the body. If there is a problem, adjust by moving the door lock striker laterally.



86U14X-045

Door Hinge

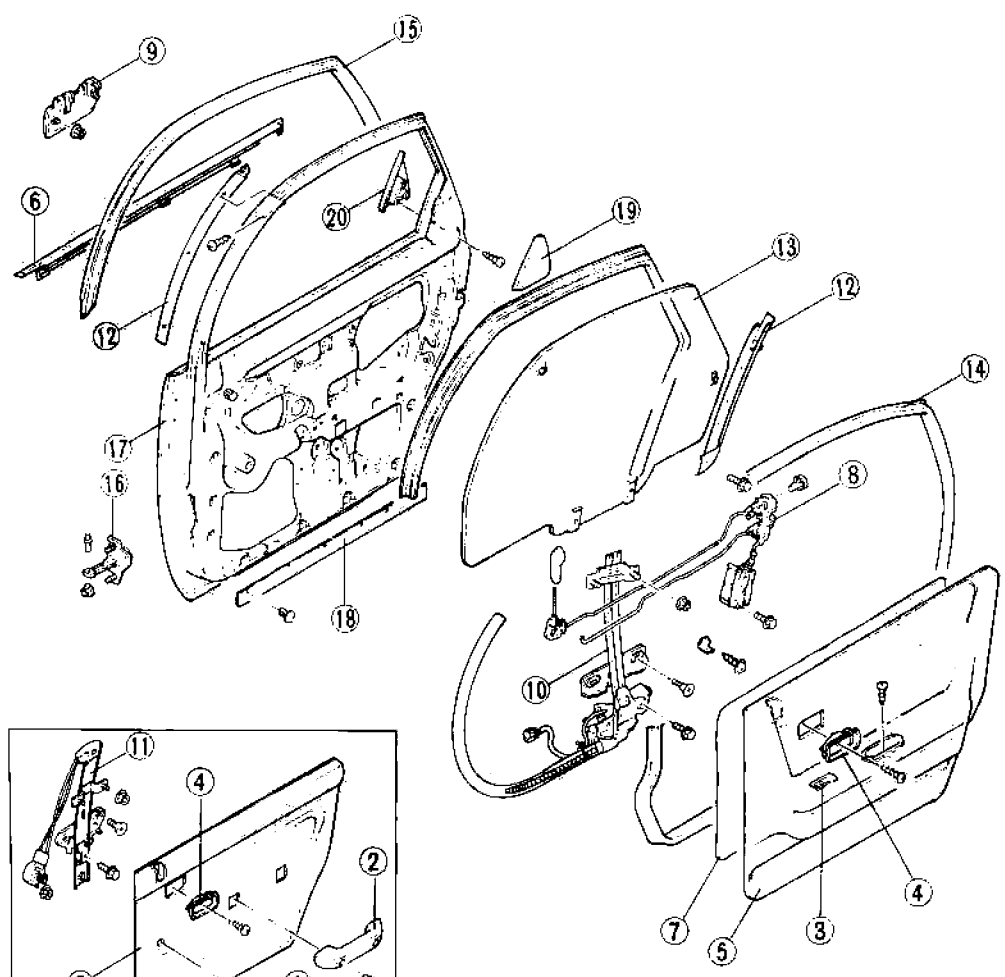
1. If looseness is found when the door is opened, tighten the door hinge mounting bolts (arrows).
2. Align the door and body by loosening and adjusting the door hinge mounting bolts.

Note
If noise is heard from the checker when the door is opened, apply grease to the checker cam.

REAR DOORS

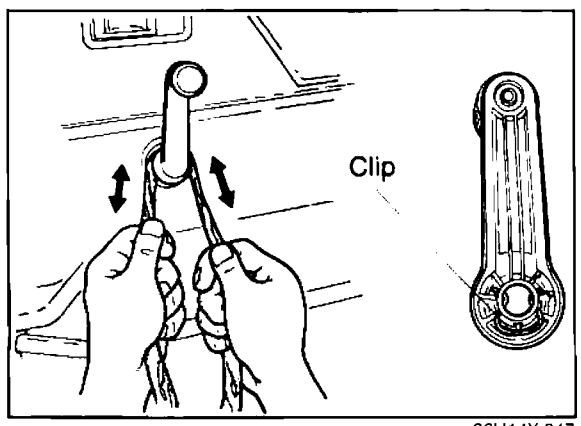
STRUCTURAL VIEW

Sedan and Hatchback



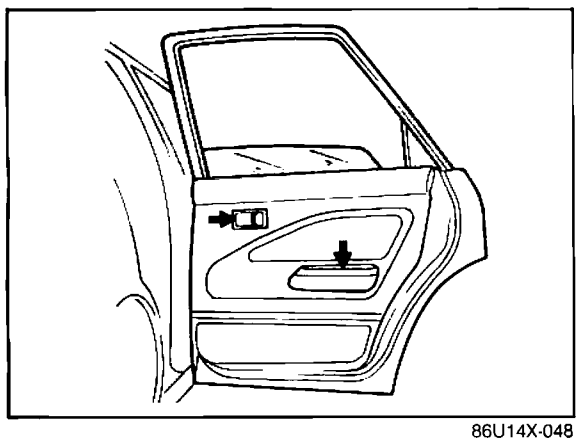
86U14X-046

1. Regulator handle (manual type)
2. Arm rest
3. Power window switch
4. Inner handle cover
5. Door trim
6. Belt line molding
7. Door screen
8. Door lock
9. Outer handle
10. Regulator (power type)
11. Regulator (manual type)
12. Glass guide
13. Glass
14. Weatherstrip
15. Weatherstrip
16. Door checker
17. Door
18. Weatherstrip
19. Sail inner garnish
20. Sail outer garnish



86U14X-047

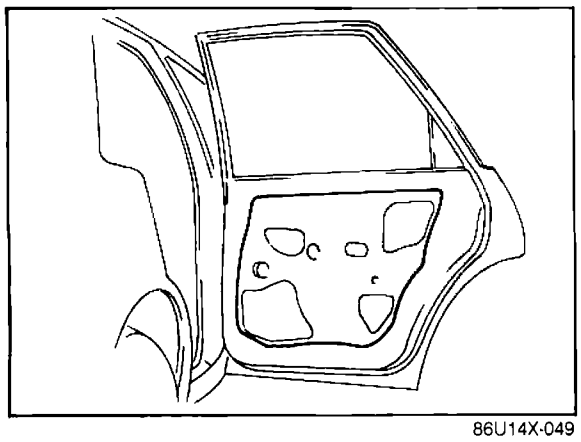
REMOVAL
Rear Door Glass and Regulator
1. Lower the door glass the way.
2. Remove the clip. (Manual type)
3. Remove the regulator handle. (Manual type)



86U14X-048

4. Remove the inner handle cover.
5. Remove the door trim.

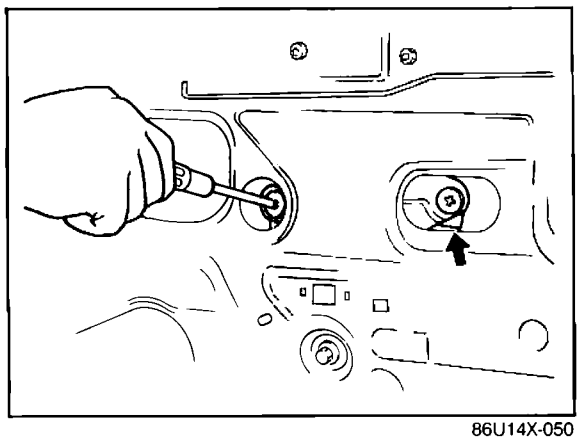
Note
For vehicles with power windows, disconnect the connectors.



86U14X-049

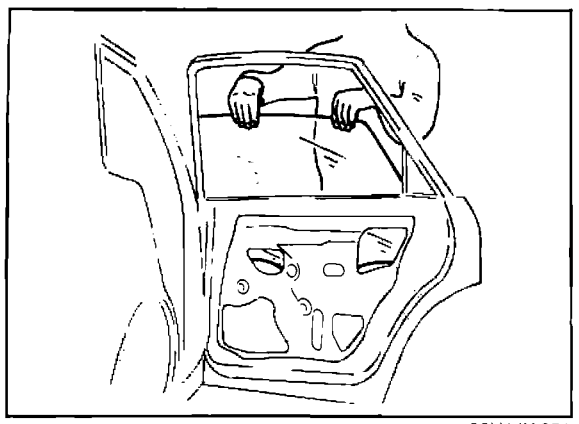
6. Remove the door screen.

Caution
Remove the screen carefully so that it may be reused.



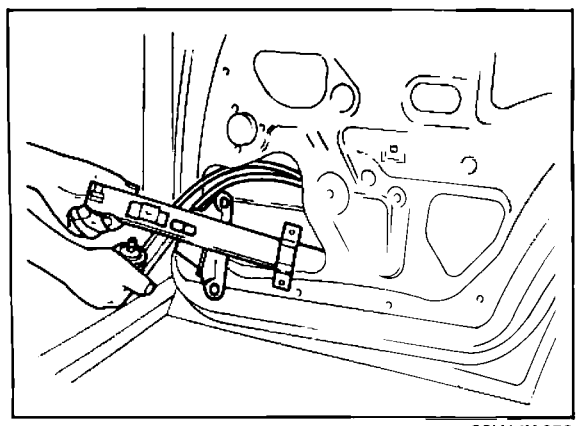
86U14X-050

7. Position the door glass so that the mounting bolts can be removed from the service hole.
8. Remove the mounting bolts.



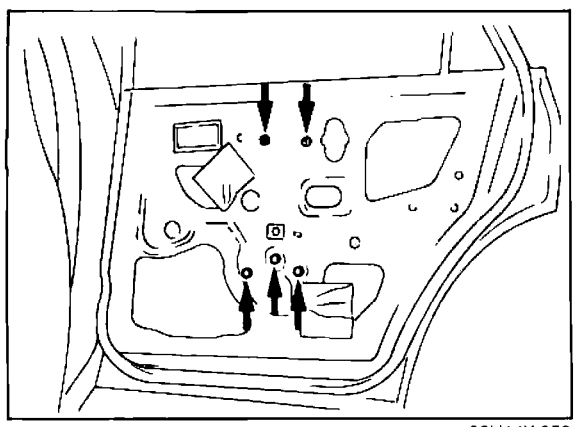
86U14X-051

9. Remove the door glass upward.



86U14X-052

10. Remove the mounting bolts, and remove the window regulator through the service hole.
11. Remove the window motor mounting bolts, then remove the motor from the regulator (power window).



86U14X-053

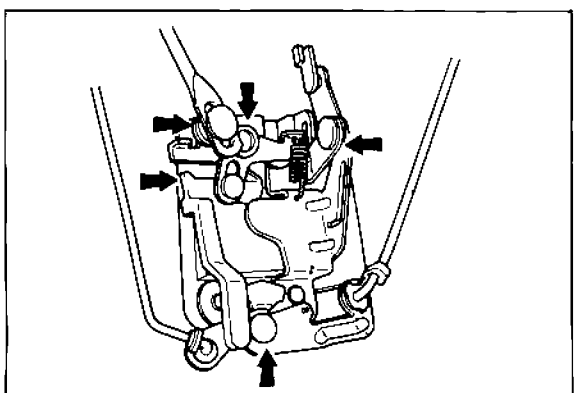
INSTALLATION

Install in the reverse order of removal, noting the following.

Tightening torque:

Torque		N·m (m-kg, ft-lb)
Door lock assembly		4.22—6.18 (0.43—0.63, 3.10—4.54)
Outer handle		8.8—13 (0.9—1.3, 6.5—9.4)
Glass guide		7.8—11 (0.8—1.1, 5.8—8.0)
Regulator	Nut	8.8—13 (0.9—1.3, 6.5—9.4)
	Bolt	7.8—11 (0.8—1.1, 5.8—8.0)
Door lock striker		18—26 (1.8—2.7, 13—20)

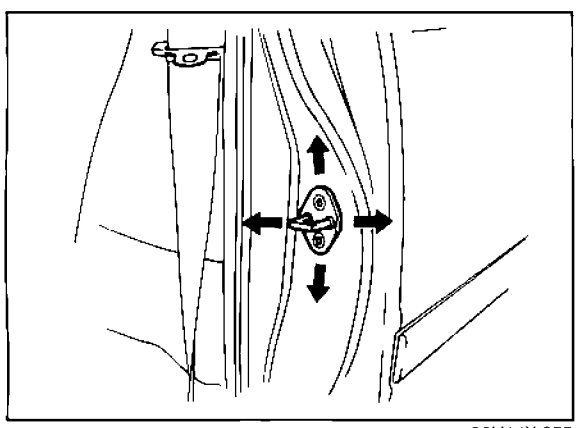
Before installing the motor, connect the leads to a battery and run regulator down to the position shown.



86U14X-054

Installation of door lock and outer handle

1. Before installing the door lock, apply grease to the places shown in the figure.
2. After installation, check that the door opens smoothly, and that the operation of the lock is correct when using the key and the door lock knob.



86U14X-055

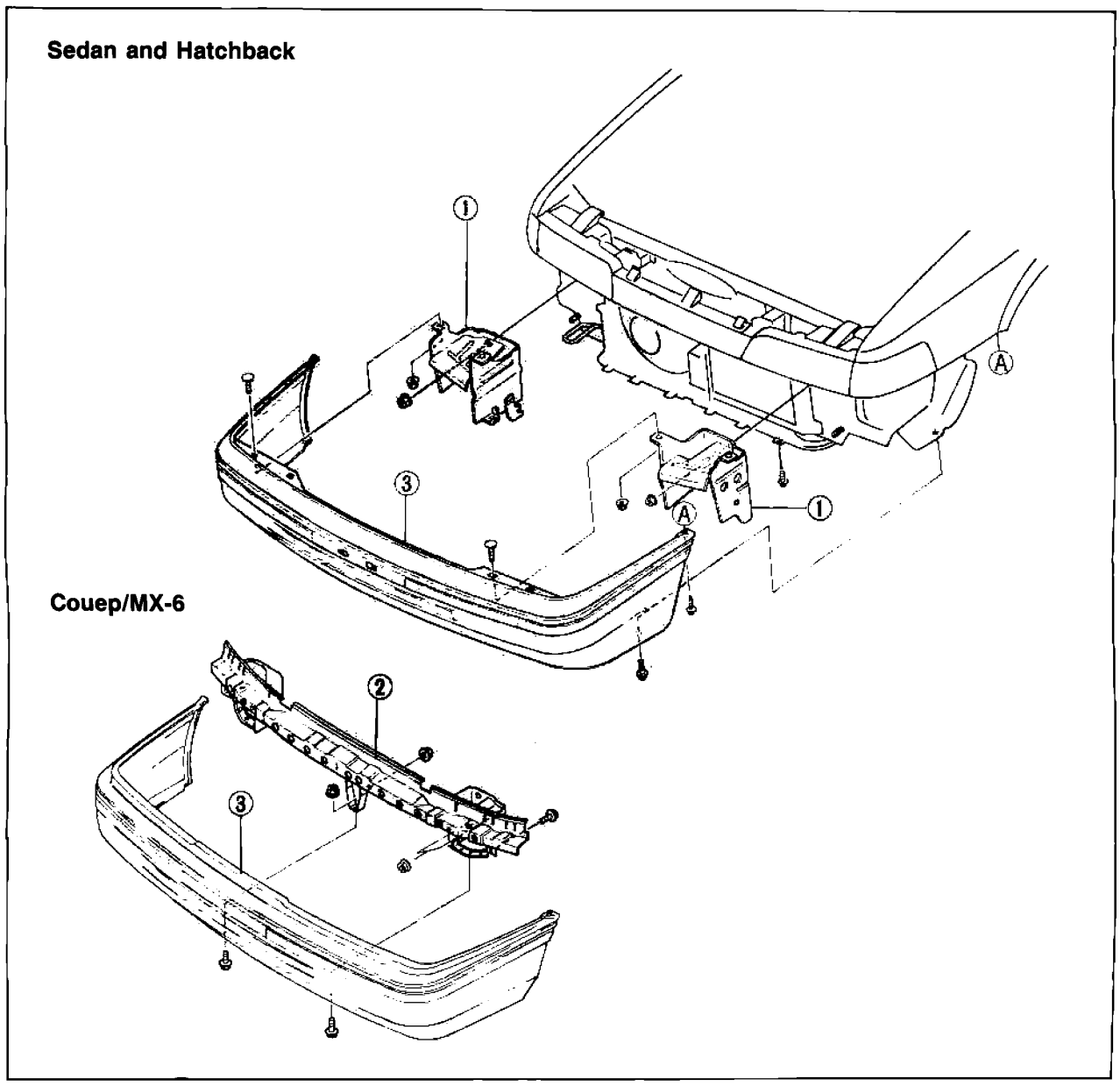
ADJUSTMENT

Door Lock Striker

1. Check that the door can be closed easily and whether there is any looseness. If there is a problem, loosen the striker mounting screws and adjust by moving the striker vertically, or laterally.
2. Check the rear offset of the door to the body. If there is a problem, adjust by moving the door lock striker laterally.

FRONT BUMPER

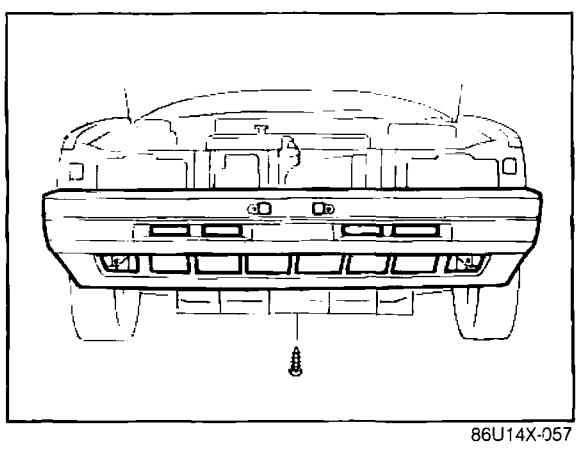
STRUCTURAL VIEW



76G14X-002

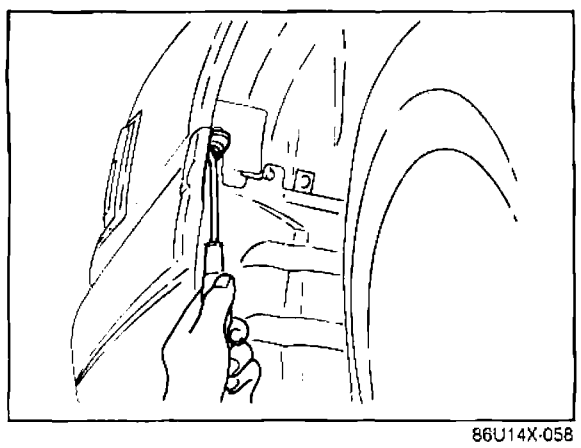
1. Bumper stay 2. Reinforcement 3. Bumper

14 FRONT BUMPER



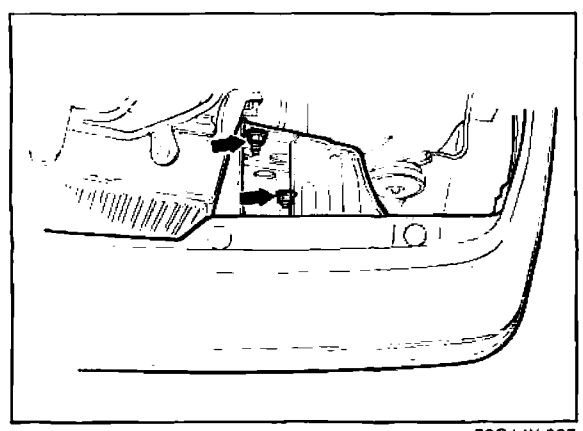
86U14X-057

REMOVAL
1. Remove the under cover mounting screws.



86U14X-058

2. Remove the bumper mounting screws.



76G14X-037

3. Remove the front side bumper stay mounting nuts.

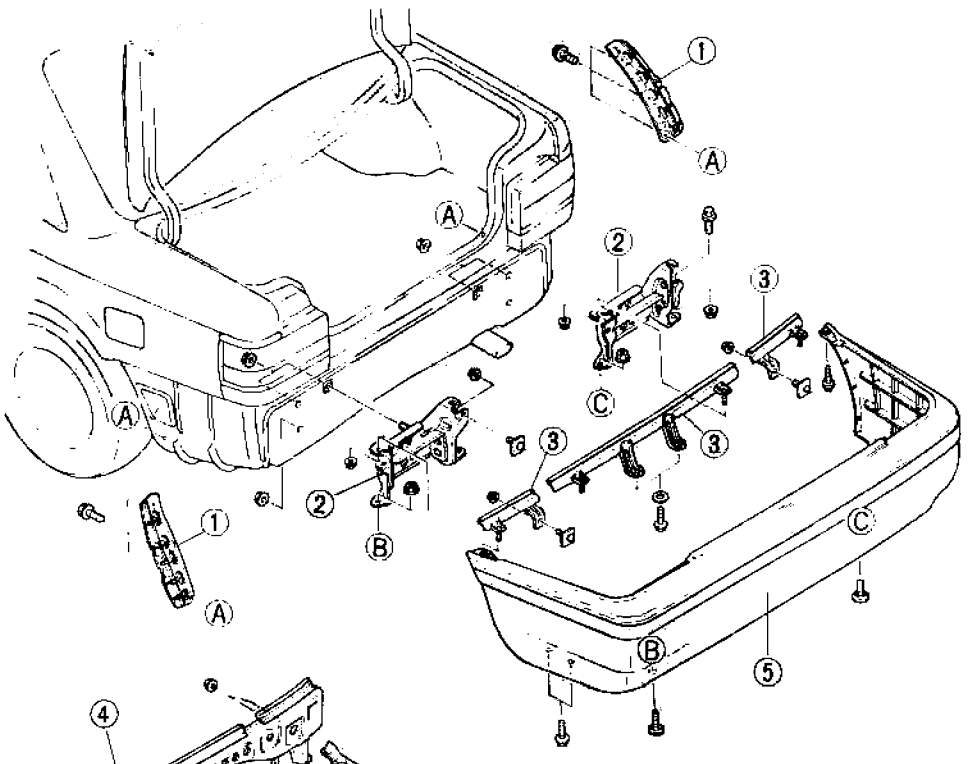
INSTALLATION
Install the front side bumper stay mounting nuts and tighten the stay mounting nuts.

Tightening torque:
31—46 N·m (3.2—4.7 m-kg, 23—34 ft-lb)

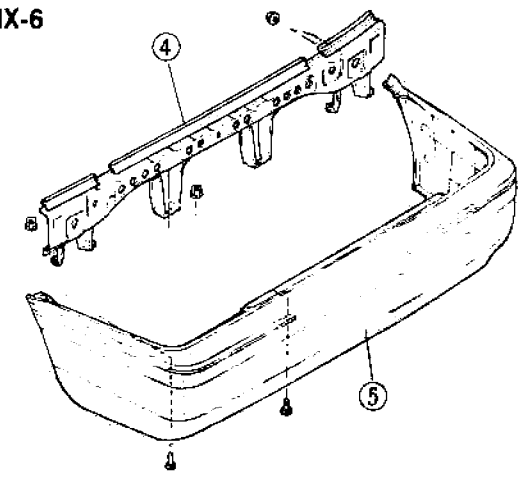
REAR BUMPER

STRUCTURAL VIEW

Sedan and Hatchback



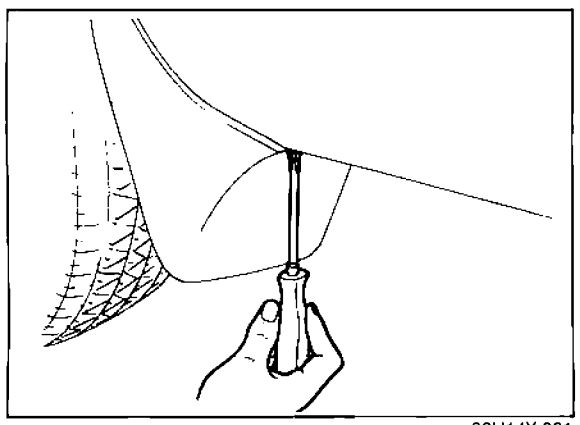
Coupe/MX-6



76G14X-003

1. Splash shield
2. Bumper stay
3. Set plate
4. Reinforcement
5. Bumper

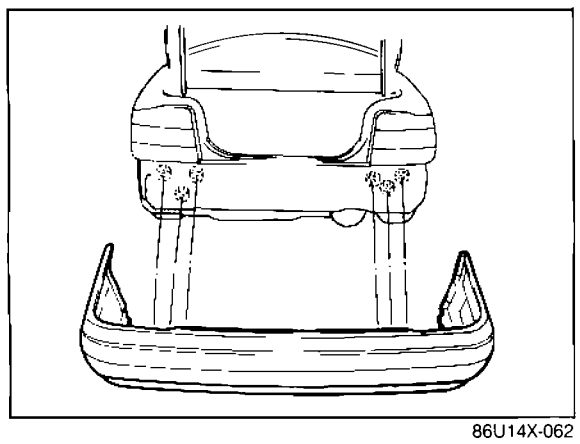
14 REAR BUMPER



86U14X-061

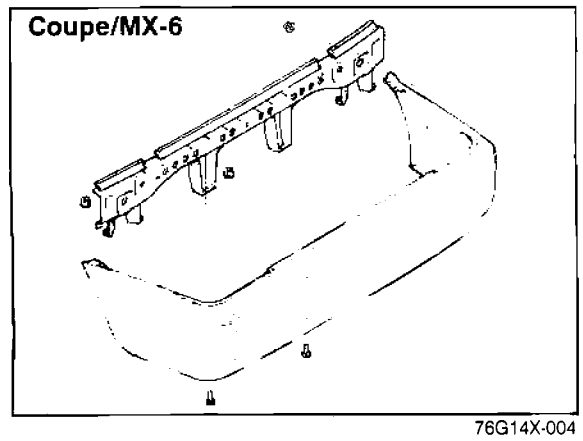
REMOVAL

1. Remove the screws shown in the figure.



86U14X-062

2. Remove the bumper mounting nuts.



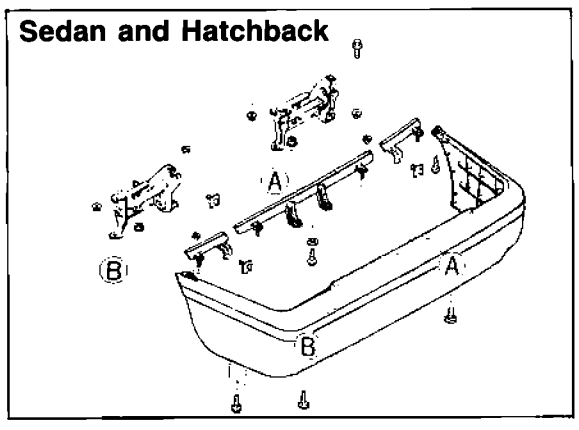
76G14X-004

3. Remove the nuts and fasteners shown in the figure and remove the reinforcement and bumper stay from the bumper.

INSTALLATION

Install in the reverse order of removal.

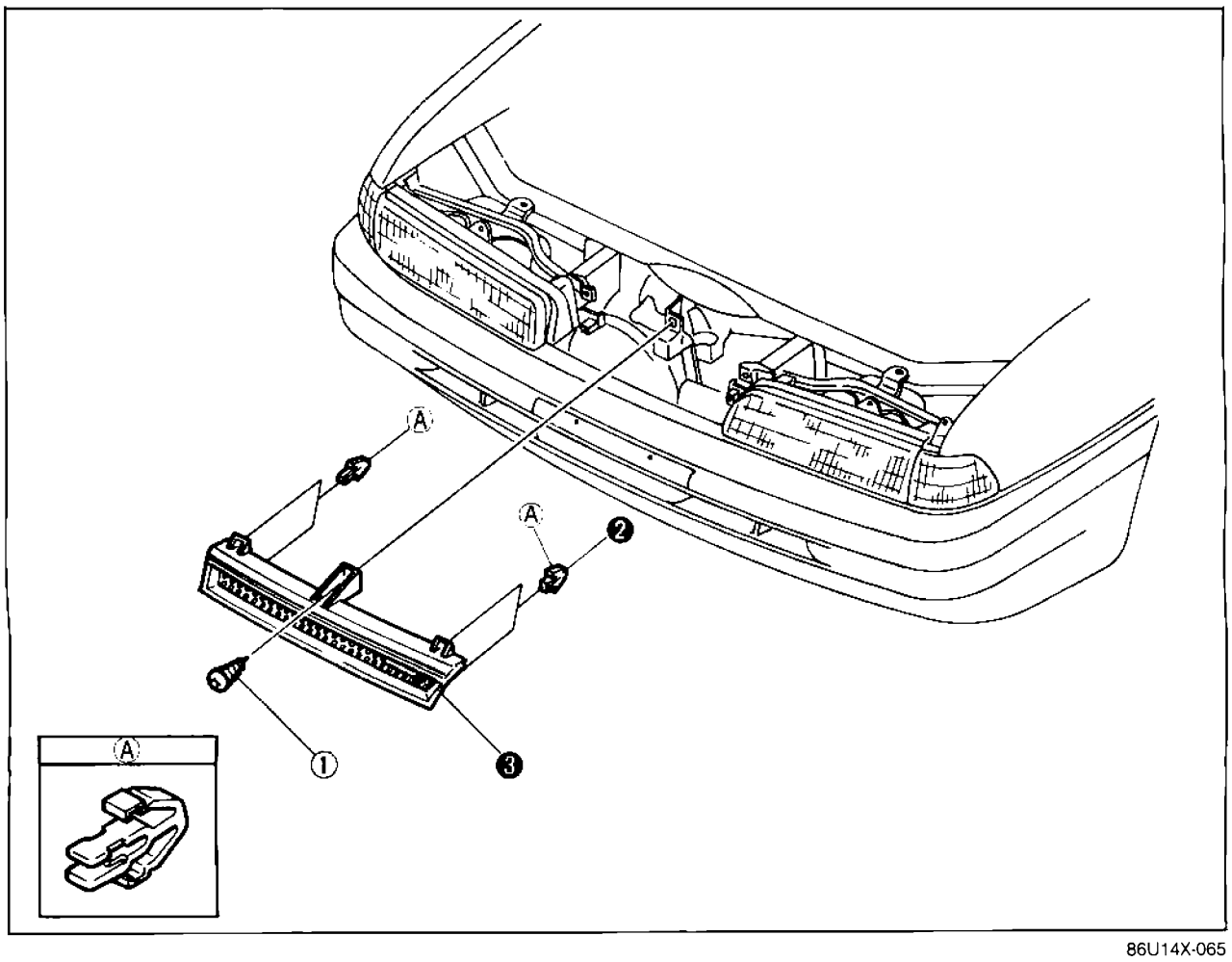
Tightening torque:
Bumper stay installation nuts:
31—46 N·m (3.2—4.7 m-kg, 23—34 ft-lb)



RADIATOR GRILLE

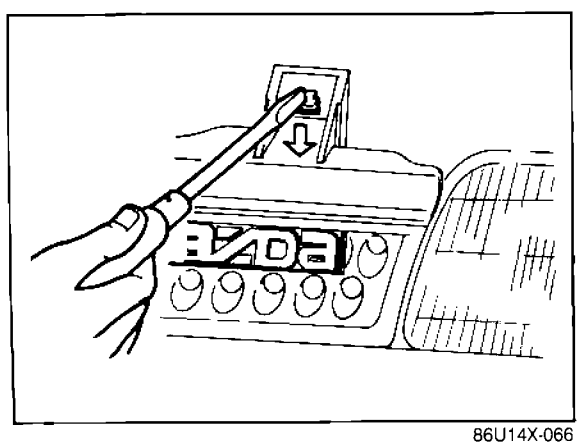
REMOVAL AND INSTALLATION

1. Remove in the sequence shown in the figure, referring to removal note for the specially marked parts.
2. Install in the reverse order of removal, referring to installation note for the specially marked parts.



86U14X-065

1. Screw
2. Fasteners
3. Radiator grille



86U14X-066

Removal Note

Fasteners

Push the tabs of the fasteners (5) with a small screwdriver.

Installation Note

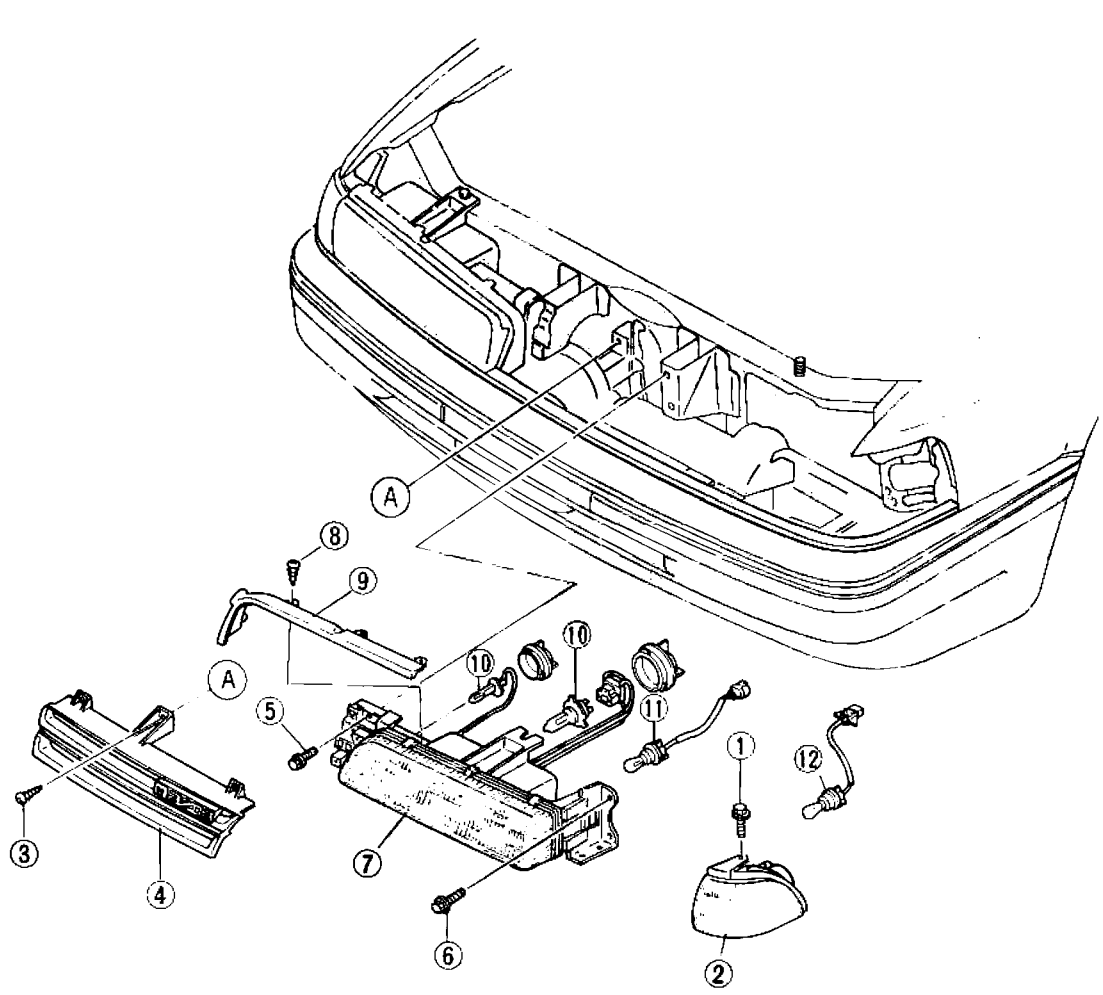
Insert the fasteners into the grille, then align with the installation holes in the body and press in the grille.

HEADLIGHT AND COMBINATION LIGHT

REMOVAL AND INSTALLATION

1. Disconnect the negative battery cable.
2. Remove in the sequence shown in the figure, referring to removal note for the specially marked parts.
3. Install in the reverse order of removal.

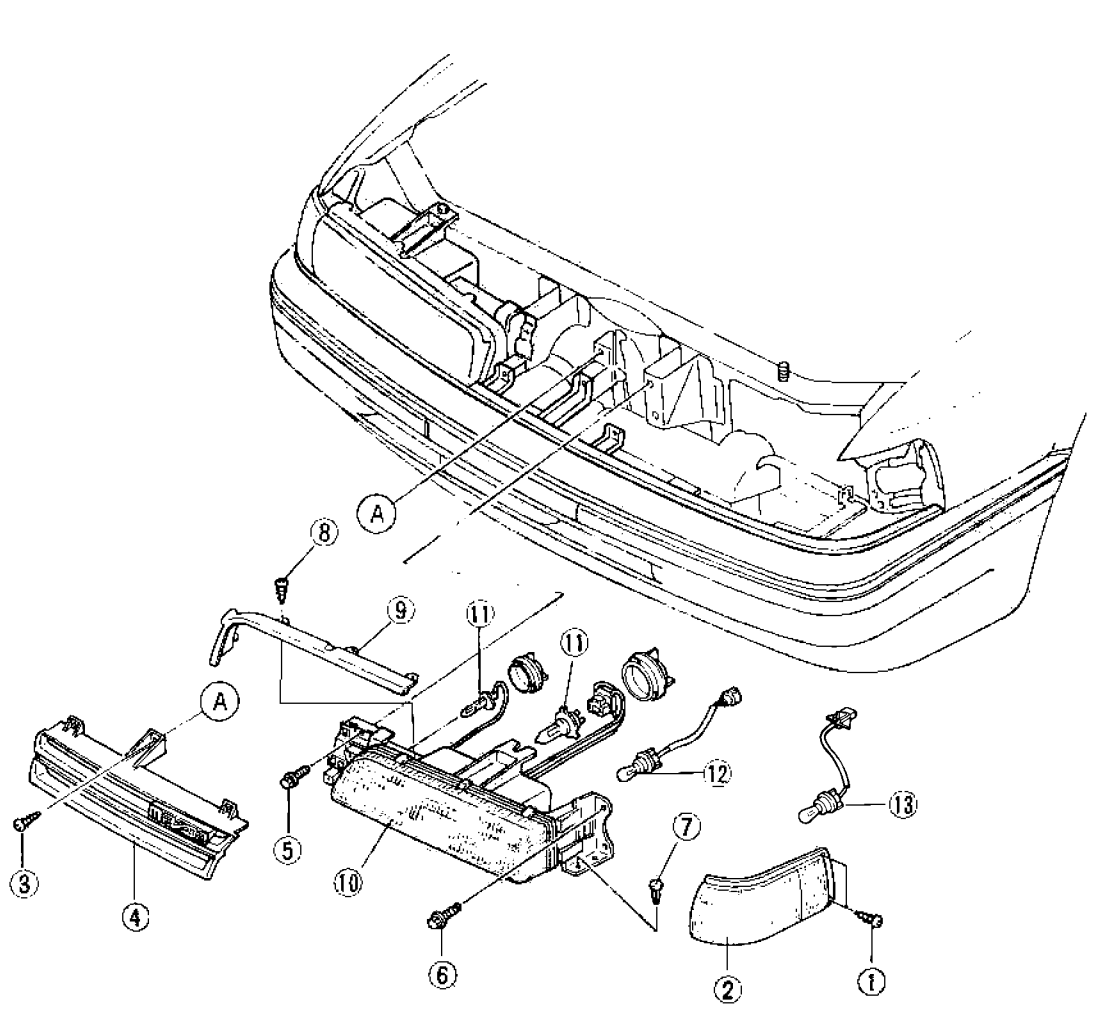
Coupe/MX-6



76G14X-005

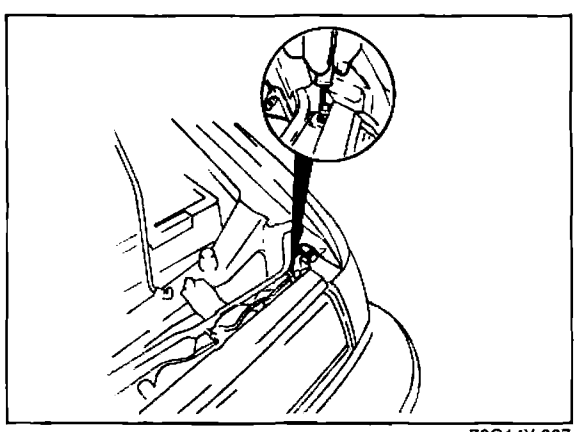
1. Screw
2. Turn signal light assembly
3. Screw
4. Radiator grille
5. Bolts
6. Bolts
7. Headlight assembly
8. Screws
9. Light garnish
10. Headlight bulb 60 + 55W/55W
11. Parking light bulb 5W
12. Turn signal light bulb 21W

Sedan and Hatchback



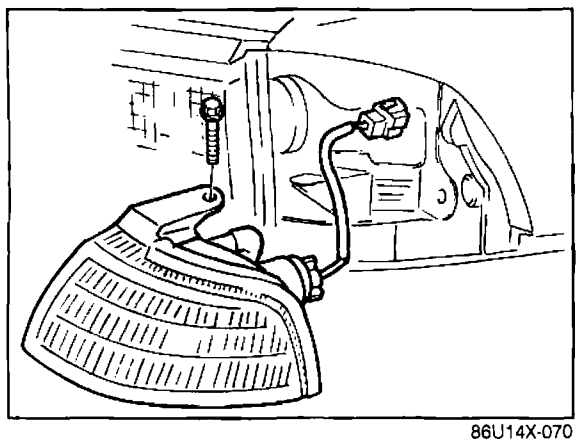
76G14X-006

1. Screw
2. Turn signal light assembly
3. Screw
4. Radiator grille
5. Bolts
6. Bolts
7. Fastener
8. Screw
9. Light garnish
10. Headlight assembly
11. Headlight bulb
    60 + 55/55W
12. Parking light bulb 5W
13. Turn signal light bulb
    21W



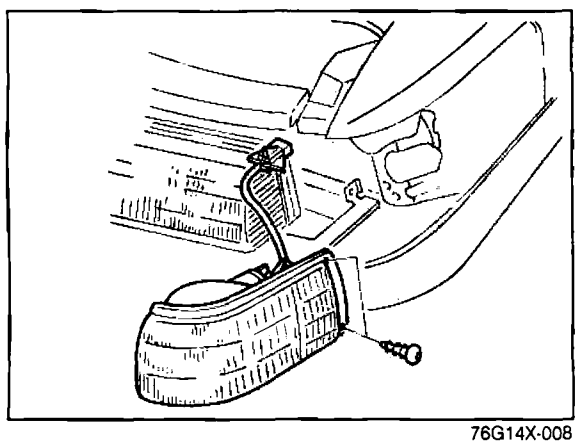
76G14X-007

Removal Note
Turn signal light (Coupe/MX-6)
1. Remove the screws shown in the figure.
2. Disconnect the turn signal light connector.



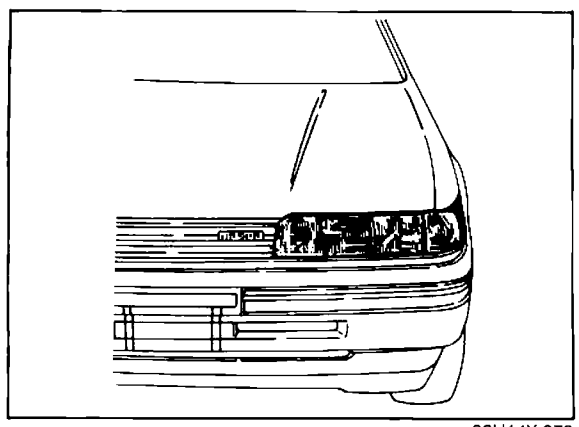
86U14X-070

3. Remove the turn signal light assembly.



76G14X-008

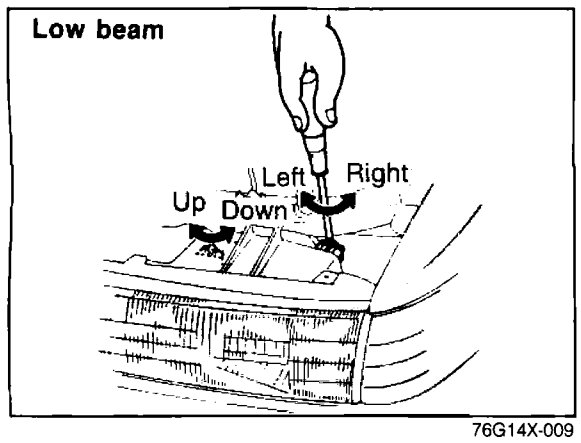
Turn signal light (Sedan and Hatchback)
1. Remove the screws shown in the figure.
2. Disconnect the turn signal and parking light connector.
3. Remove the turn signal and parking light assemble.



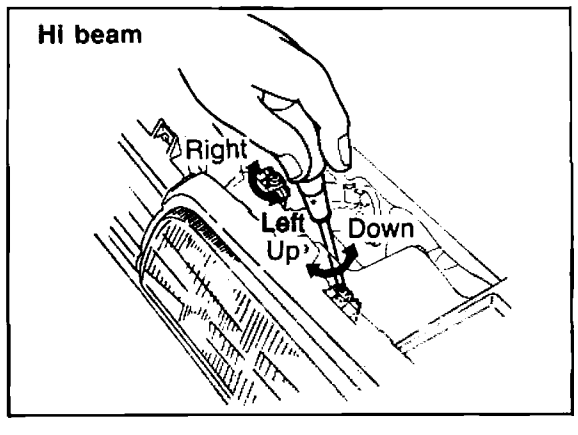
86U14X-073

AIMING
Headlight

1. Adjust the tires to the standard pressure.
2. Position the vehicle on a flat level surface (unloaded condition).



76G14X-009



3. Adjust the headlights to meet local regulations. To adjust, turn the adjusting screws.

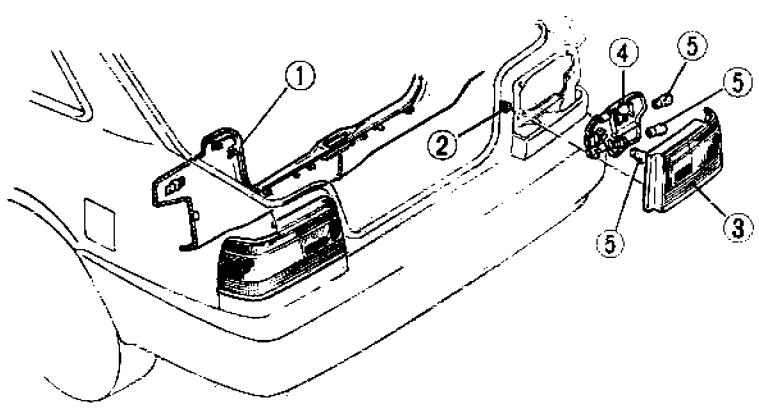
14 REAR COMBINATION LIGHTS

REAR COMBINATION LIGHTS

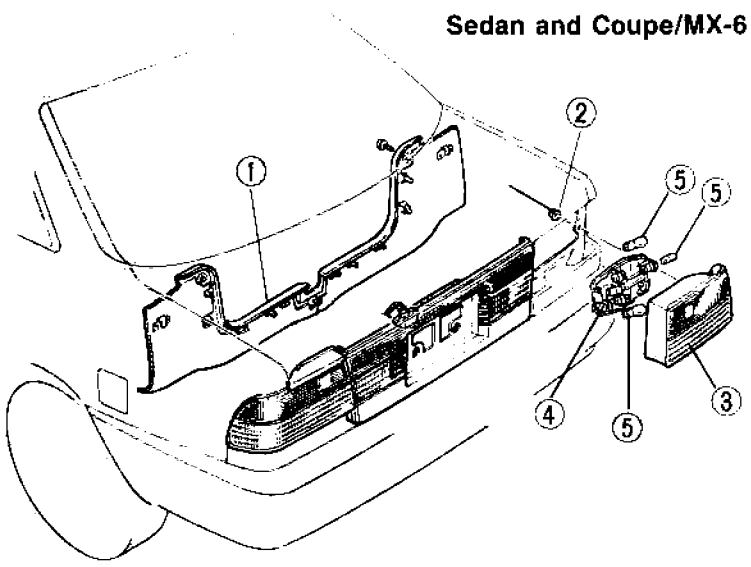
REMOVAL AND INSTALLATION

1. Disconnect the negative battery cable.
2. Remove in the sequence shown in the figure.
3. Install in the reverse order of removal.

Hatchback



Sedan and Coupe/MX-6



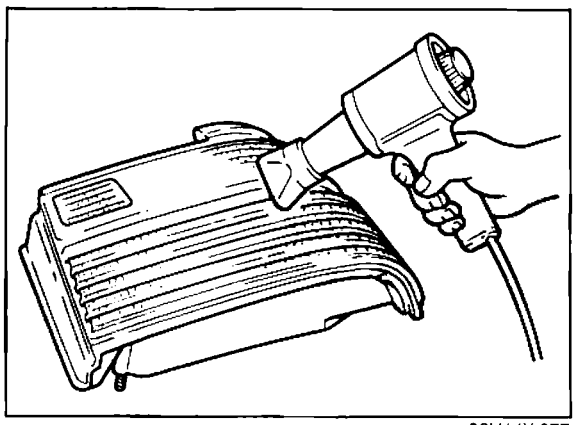
76G14X-010

Hatchback

1. End trim
2. Nuts
3. Lens and body
4. Cover
5. Bulb: Turn signal light 21W
   Brake and tail light 21W
   Side marker light 5W

Sedan and Coupe/MX-6

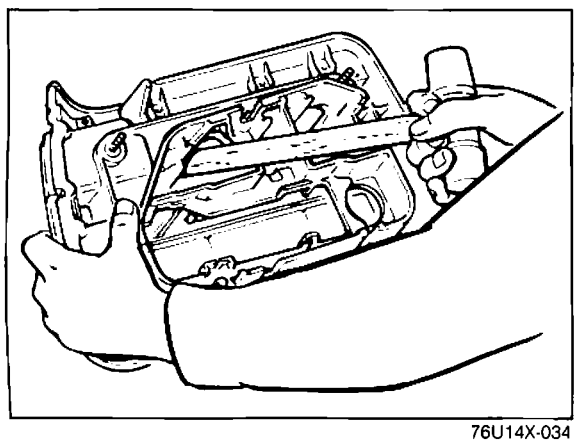
1. End trim
2. Nuts
3. Lens and body
4. Cover
5. Bulb: Turn signal light 21W
   Brake and tail light 21W
   Side marker light 5W



86U14X-077

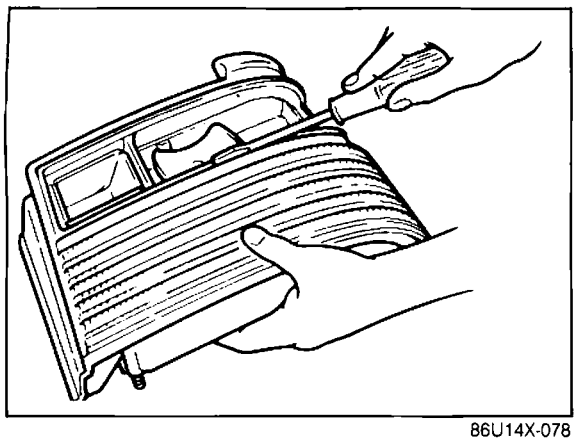
REPLACEMENT OF REAR COMBINATION LIGHT LENS

1. Use a hot air blower to soften the "hot melt" (bonding agent) around the lens.



76U14X-034

2. Remove the lens from the light housing by pushing the rear of the lens with a hammer handle or round bar.



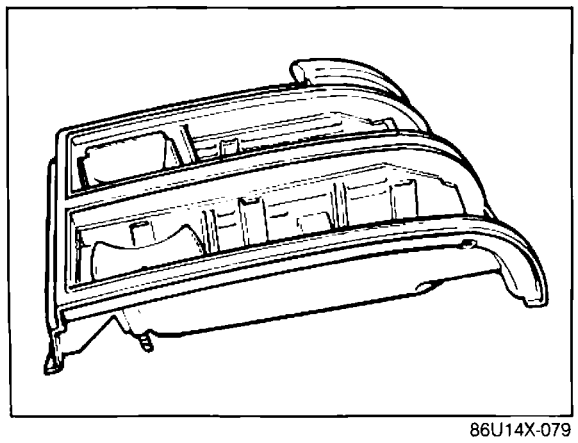
86U14X-078

3. Heat the light housing, and remove the "hot melt" and any fragments of the lens.

Note

a) The "hot melt" should be reused if possible.

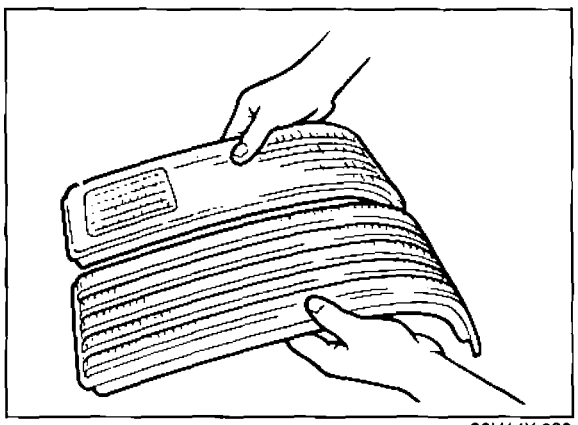
b) If the "hot melt" can be reused, the following step is unnecessary.



86U14X-079

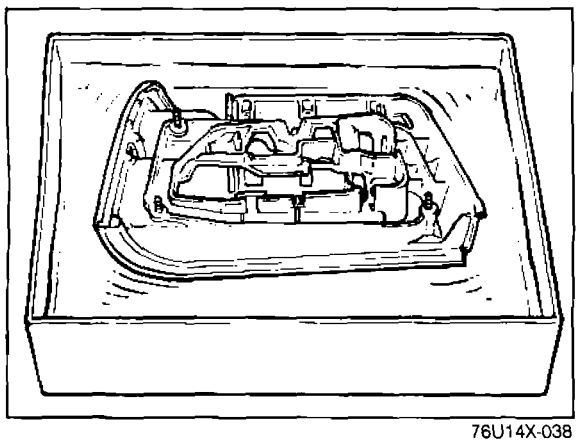
4. Put **Uni-sealer** (8531 77 739) adhesive in the light housing groove.

14 REAR COMBINATION LIGHTS



86U14X-080

5. Fit the new lens onto the light housing. Press the lens firmly so that it will adhere.



76U14X-038

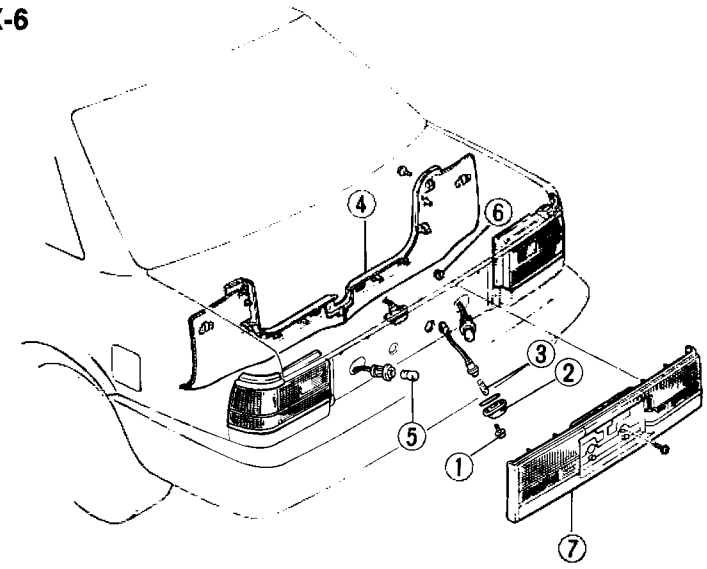
6. Immerse the combination light in water to check for leaks.

LICENSE PLATE LIGHT AND CORGO ROOM LIGHT

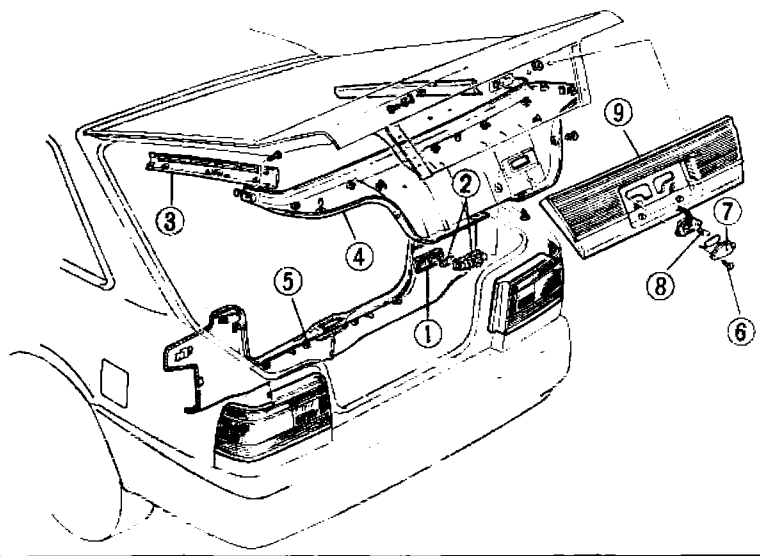
REMOVAL AND INSTALLATION

1. Disconnect the negative battery cable.
2. Remove in the sequence shown in the figure.
3. Install in the reverse order of removal.

Sedan and Coupe/MX-6



Hatchback



76G14X-011

Sedan and Coupe/MX-6
License plate light
1. Screws
2. Lens
3. Bulb 5W x 2

Back up light
4. End trim
5. Bulb 21W
6. Nuts
7. Rear finisher

Hatchback
Corgo room light
1. Lens
2. Switch and bulb assembly 5W

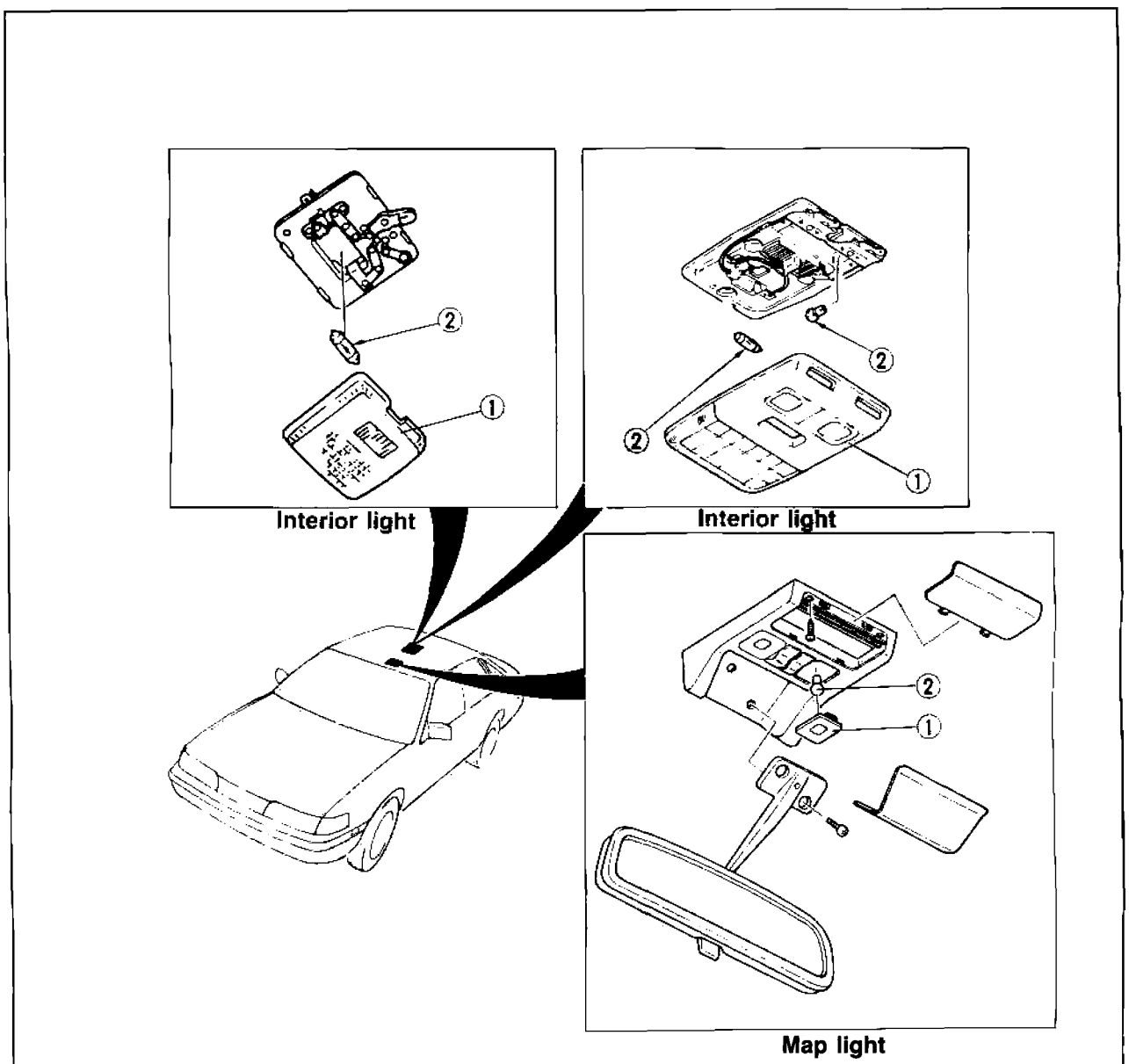
License plate light
3. Side trim
4. Lower trim
5. End trim
6. Screws
7. Lens
8. Bulb 5W x 2
9. Rear finisher

14 INTERIOR LIGHT AND MAP LIGHT

INTERIOR LIGHT AND MAP LIGHT

REMOVAL AND INSTALLATION

1. Disconnect the negative battery cable.
2. Remove in the sequence shown in the figure.
3. Install in the reverse order of removal.



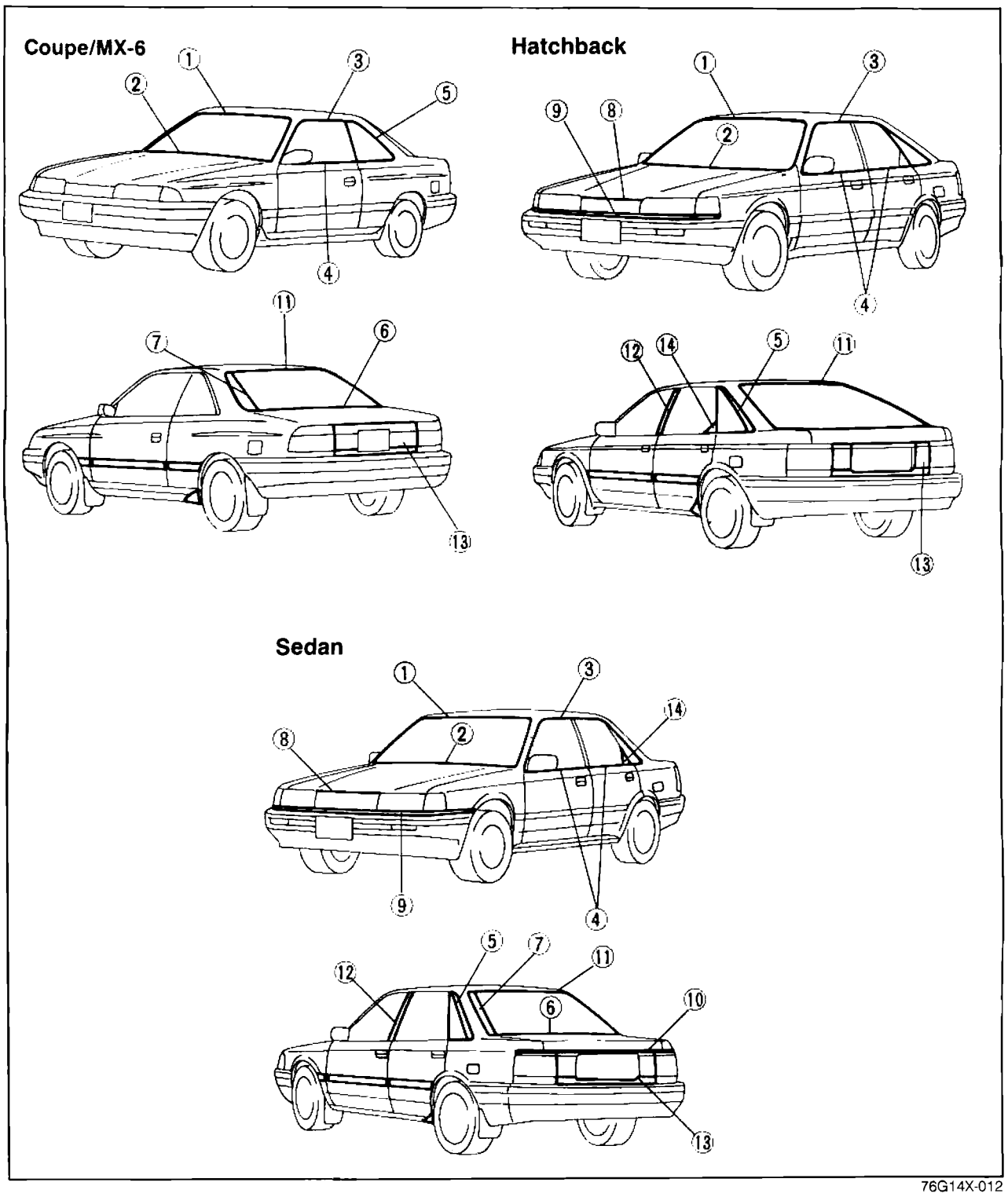
86U14X-082

Interior Light
1. Lens
2. Bulb 10W

Map Light
1. Lens
2. Bulb 8W

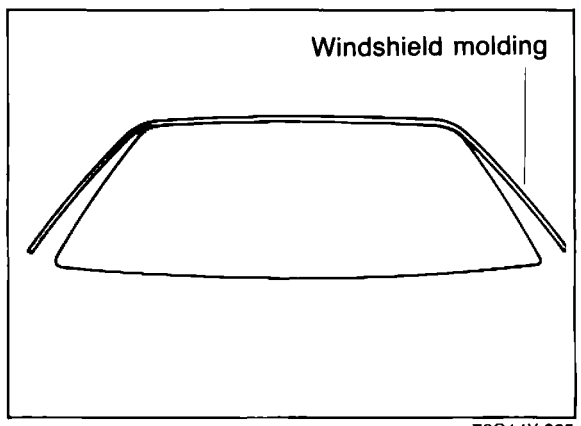
MOLDING AND GARNISH

STRUCTURAL VIEW



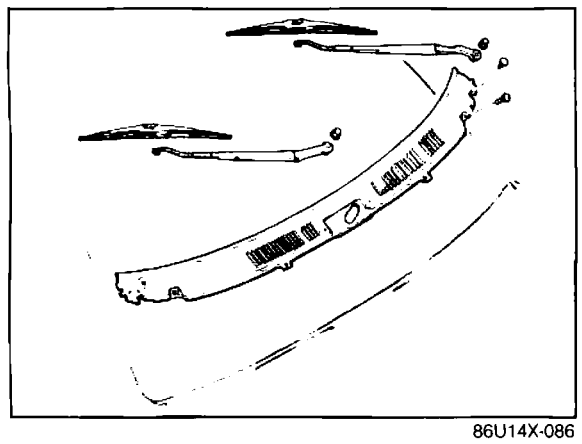
76G14X-012

1. Windshield molding
2. Windshield lower molding
3. Drip molding
4. Beltline molding
5. Quarter window molding
6. Rear window lower molding
7. Rear window side molding
8. Bonnet molding
9. Front lower molding
10. Trunk lid molding
11. Rear window upper molding
12. Center pillar garnish
13. Rear finisher
14. Sail garnish



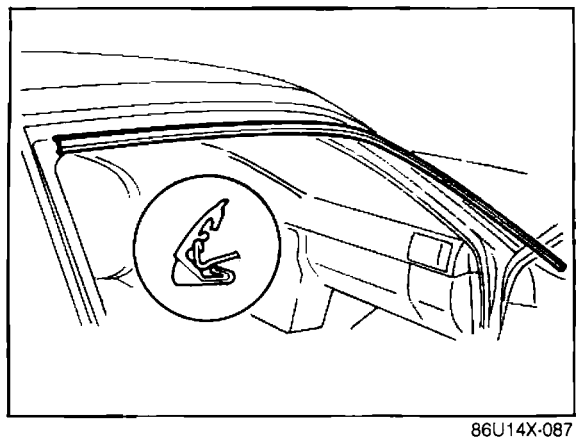
76G14X-035

WINDSHIELD MOLDING
Removal and Installation
1. Remove the windshield molding. (Refer to page 14—48)
2. Install the windshield molding. (Refer to page 14—51)



86U14X-086

WINDSHIELD LOWER MOLDING
Removal and Installation
1. Remove the wiper arms.
2. Remove the lower molding screws and the lower molding.
3. Install in the reverse order of removal.

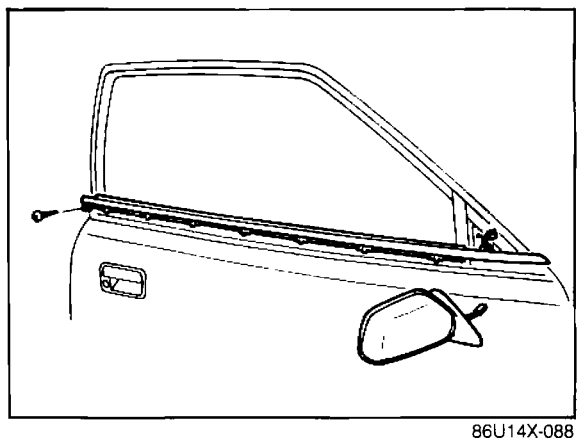


86U14X-087

DRIP MOLDING
Removal and Installation
1. Insert a screwdriver between the roof rail and drip molding and slightly loosen the end of the molding.

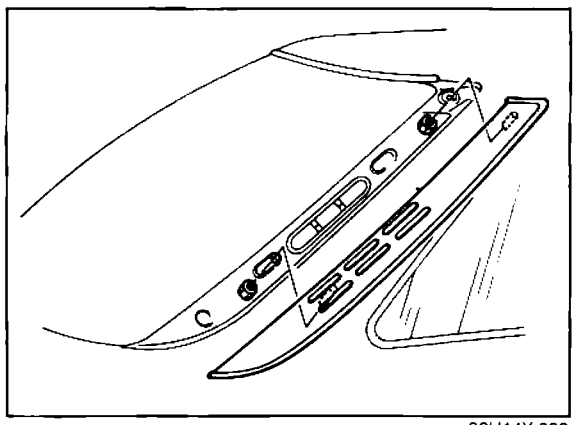
   Note
   Be careful not to scratch the molding.

2. Remove the molding by twisting upward with both hands.
3. Install in the reverse order of removal.



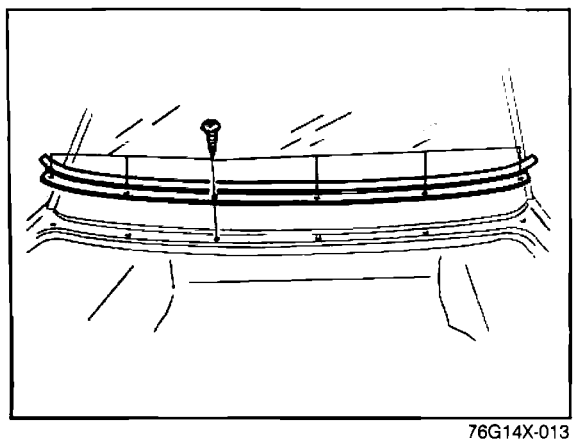
86U14X-088

BELTLINE MOLDING
Removal and Installation
1. Remove the door mirror.
2. Remove the screw from the end of the beltline molding, then pull the molding up to remove it.
3. Install in the reverse order of removal.



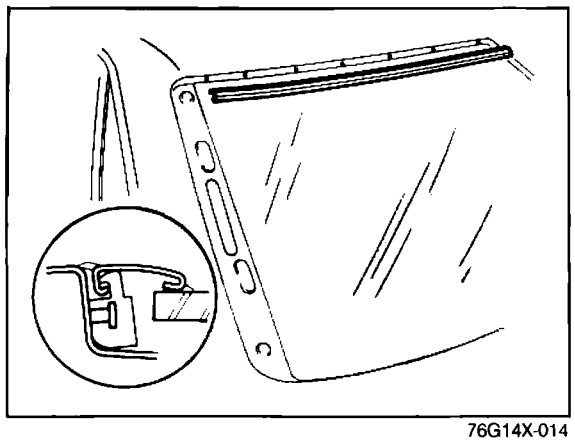
86U14X-089

REAR WINDOW SIDE MOLDING (SEDAN)
Removal and Installation
1. Remove the rear side seatback bolt, then the rear side seatback.
2. Remove the rear pillar trim.
3. Remove the window side molding nuts, then the window side molding.
4. Install in the reverse order of removal.



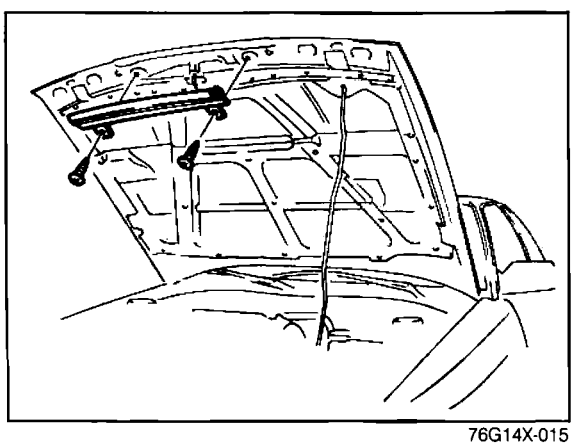
76G14X-013

REAR WINDOW LOWER MOLDING (SEDAN AND COUPE/MX-6)
Removal and Installation
1. Remove the rear window lower molding screws, then the rear window lower molding.
2. Install in the reverse order of removal.



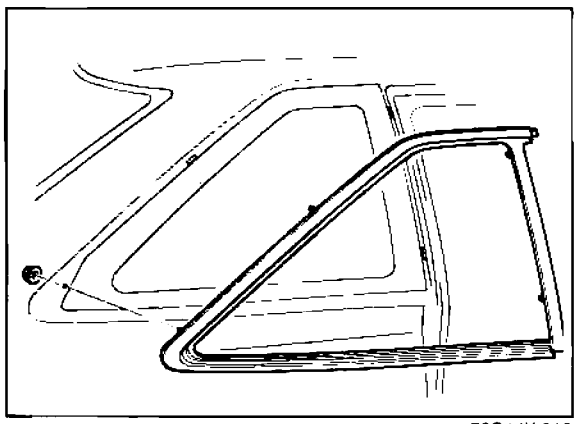
76G14X-014

REAR WINDOW UPPER MOLDING (SEDAN, HATCHBACK AND COUPE/MX-6)
Removal and Installation
1. Remove the rear window side molding. (Refer to page 14—54)
2. Remove the rear window upper molding.
3. Install in the reverse order of removal.



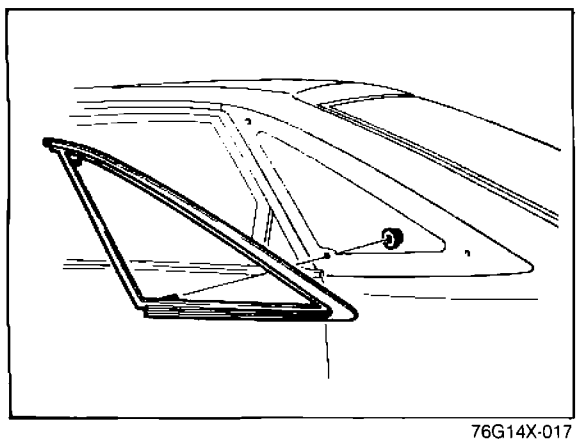
76G14X-015

BONNET MOLDING (SEDAN AND HATCHBACK)
Removal and Installation
1. Remove the bonnet molding screws, then the bonnet molding.
2. Install in the reverse order of removal.



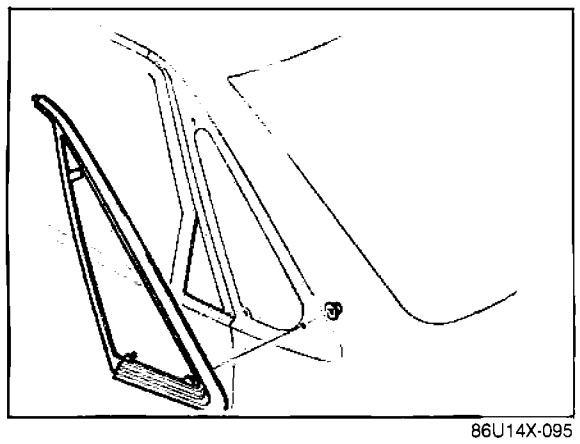
76G14X-016

QUARTER WINDOW MOLDING (COUPE/MX-6)
Removal and Installation
1. Remove the seat belts.
2. Remove the rear header screw.
3. Remove the screws and the quarter trim.
4. Remove the screws and the center pillar trim.
5. Remove the quarter window molding mounting installation nuts.
6. Remove the screws and the quarter window molding.
7. Install in the reverse order of removal.



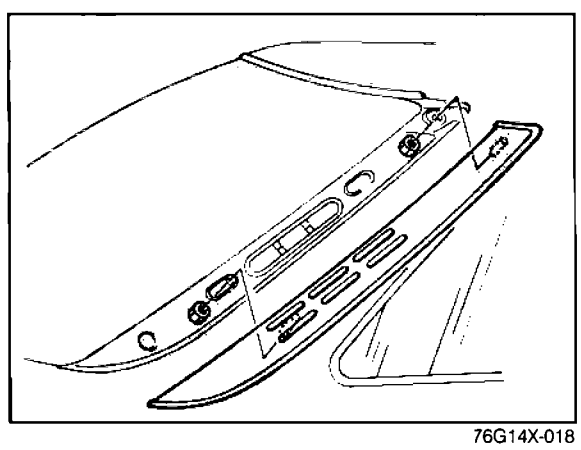
76G14X-017

QUARTER WINDOW MOLDING (HATCHBACK)
Removal and Installation
1. Remove the rear header screw.
2. Remove the bolt and the rear side seatback.
3. Remove the screws and the package side shelf.
4. Remove the screws and the rear pillar trim.
5. Remove the nuts and the quarter window molding.
6. Install in the reverse order of removal.



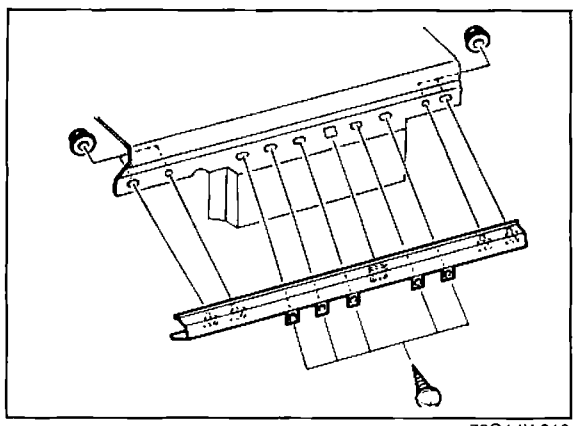
86U14X-095

QUARTER WINDOW MOLDING (SEDAN)
Removal and Installation
1. Remove the rear header screw.
2. Remove the bolt and the rear side seatback.
3. Remove the quarter trim.
4. Remove the nuts and the quarter window molding.
5. Install in the reverse order of removal.



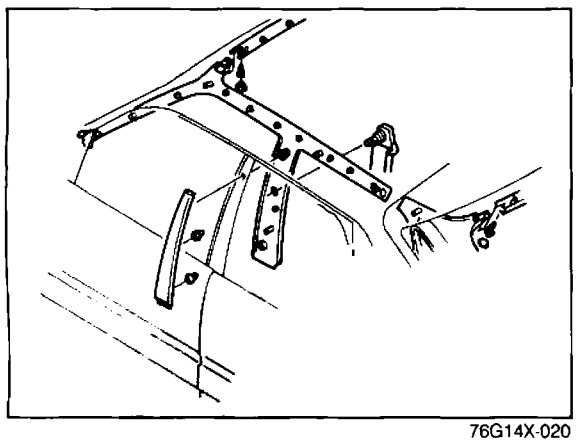
76G14X-018

REAR WINDOW SIDE MOLDING (COUPE/MX-6)
Removal and Installation
1. Remove the seat belts.
2. Remove the rear header screw.
3. Remove the screws and the quarter side trim.
4. Remove the screws and the center pillar trim.
5. Remove the nuts and the rear window side molding.
6. Install in the reverse order of removal.



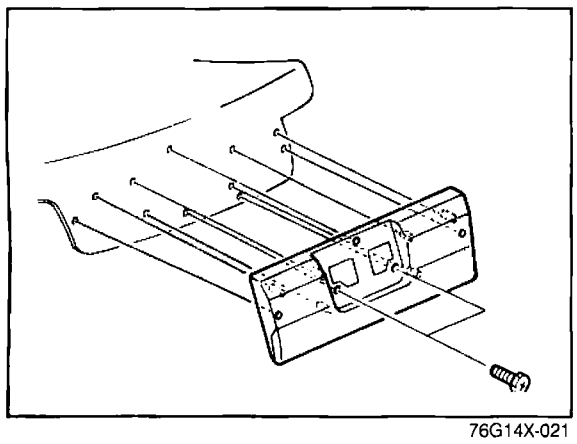
76G14X-019

TRUNK LID MOLDING (SEDAN AND HATCHBACK)
Removal and Installation
1. Remove the rear finisher.
2. Remove the nuts and screws and remove the trunk lid molding.
3. Install in the reverse order of removal.



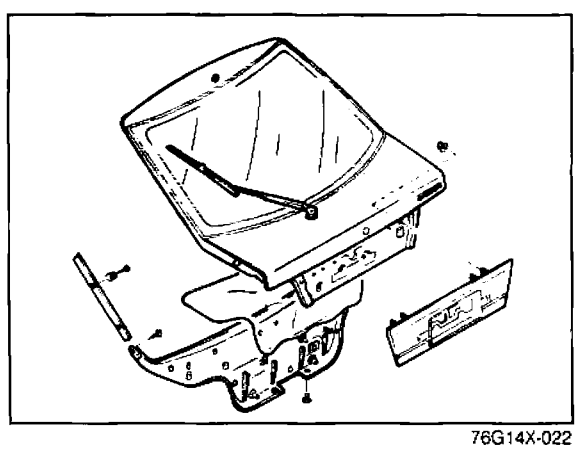
76G14X-020

CENTER PILLAR GARNISH (SEDAN AND HATCHBACK)
Removal and Installation
1. Remove the seat belts.
2. Remove the front header trim.
3. Remove the center pillar trim.
4. Remove the nuts with a deep socket wrench, then remove the garnish.
5. Install in the reverse order of removal.



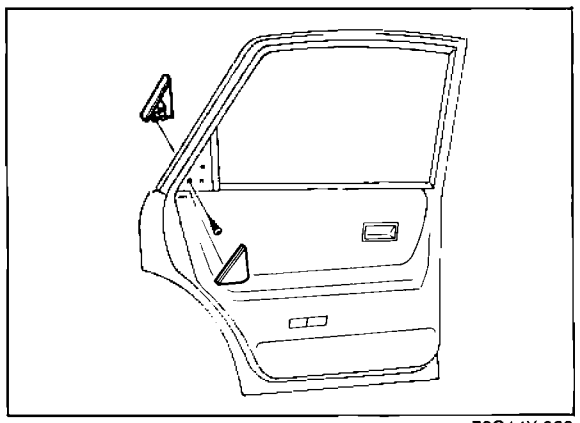
76G14X-021

REAR FINISHER (COUPE/MX-6 AND SEDAN)
Removal and Installation
1. Remove the nuts and the rear finisher.
2. Install in the reverse order of removal.



76G14X-022

REAR FINISHER (HATCHBACK)
Removal and Installation
1. Remove the hatchback door side trims.
2. Remove the hatchback door lower trim.
3. Remove the hatchback door screen.
4. Remove the nuts and the rear finisher.
5. Install in the reverse order of removal.

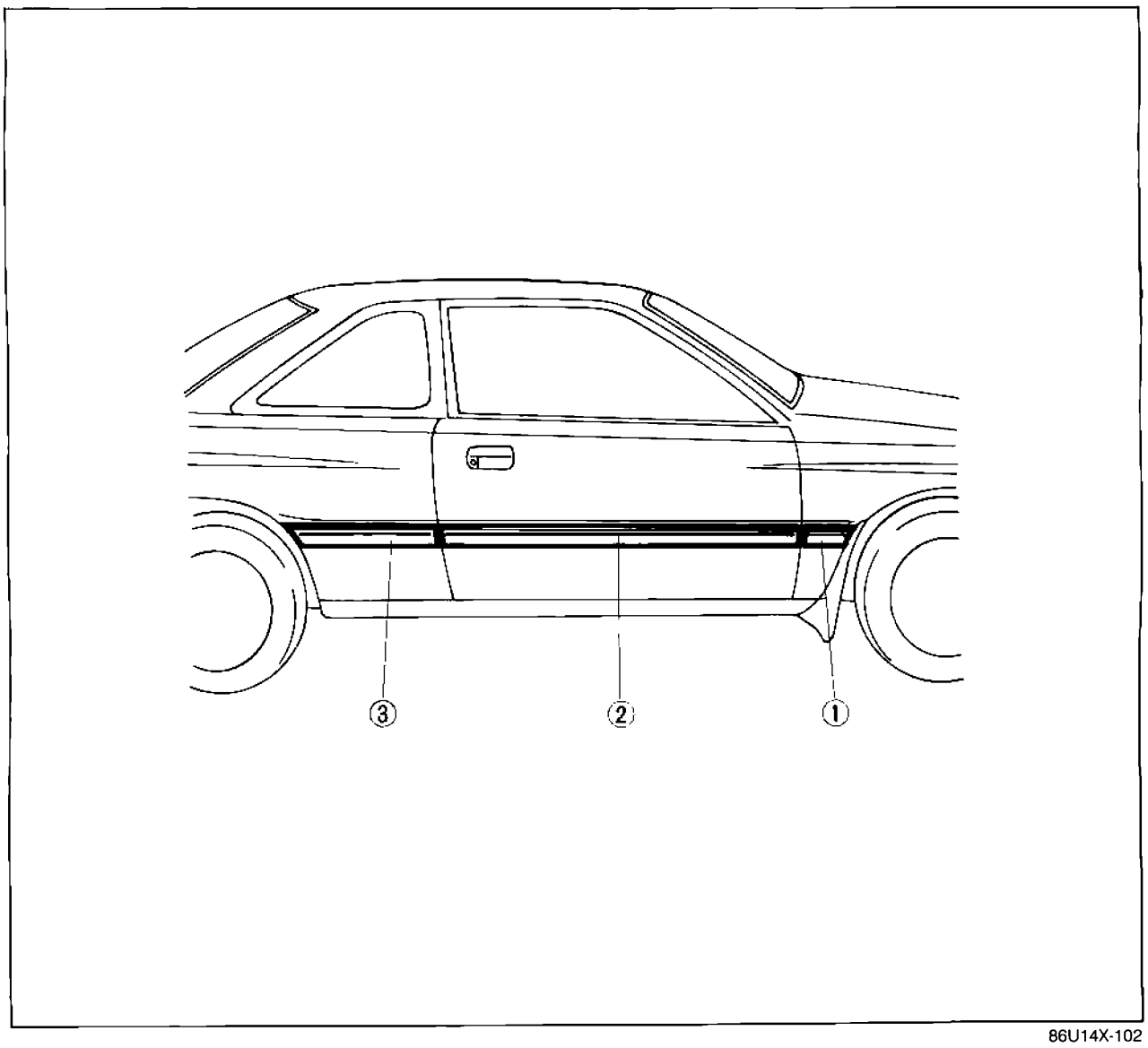


76G14X-023

SAIL GARNISH
(SEDAN AND HATCHBACK)
Removal and Installation

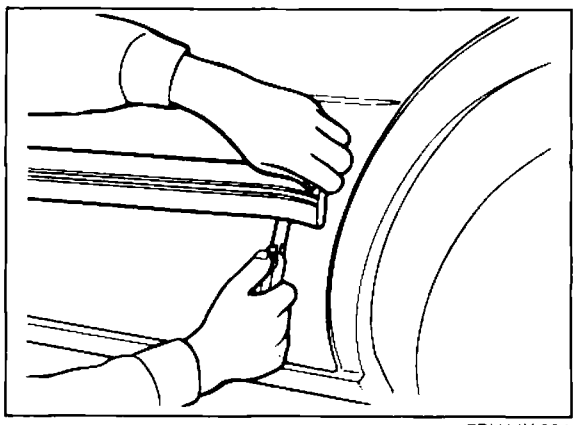
1. Remove the sail inner garnish.
2. Remove the screws and remove the sail garnish.
3. Install in the reverse order of removal.

SIDE PROTECTOR MOLDING
Structural View



86U14X-102

1. Side protector A molding
2. Side protector B molding
3. Side protector C molding

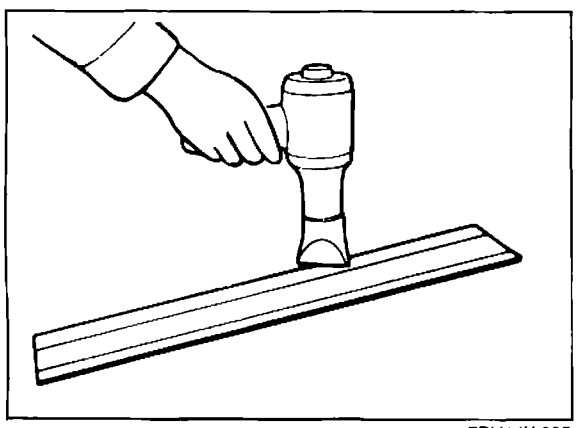


7BU14X-034

Removal

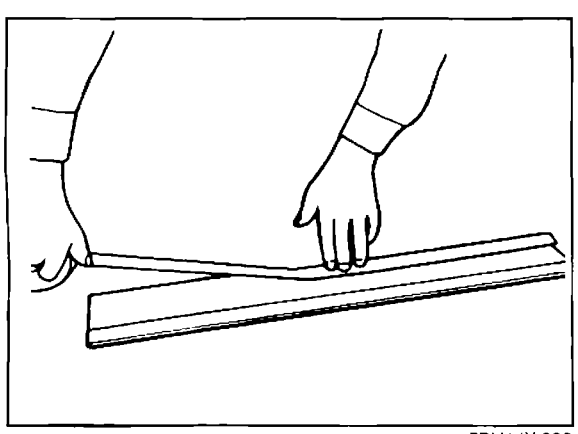
1. Using a screwdriver or knife, twist the molding end, being careful not to damage the painted surface, and separate the adhesive for **20—30 mm (0.79—1.18 in)**.
2. Pull the separated portion to remove it.
3. Use a knife to remove any adhesive remaining on the body or molding.

Note
Remove as much adhesive as possible without damaging the painted surface.



7BU14X-035

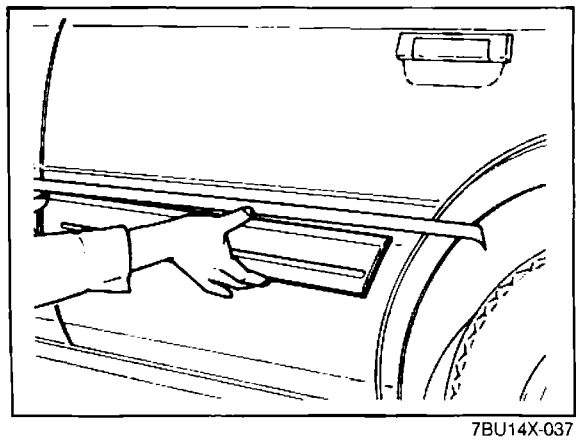
4. If the adhesive is difficult to remove, soften it with a hot air blower.



7BU14X-036

Installation

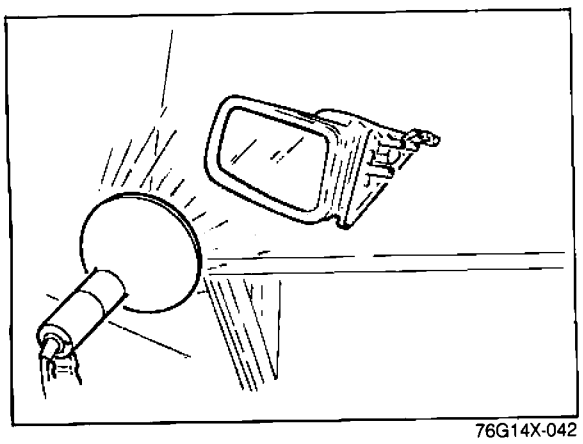
1. Remove any grease or dirt from the molding adhesion surface and the body surface.
2. Mark the installation position on the body with masking tape.
3. Attach double-sided adhesive tape to the molding adhesion surface.



7BU14X-037

4. Align the molding on the body, and attach it securely.

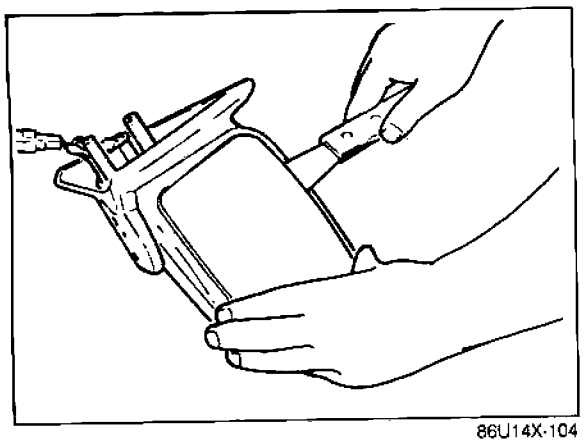
Note
Adhesion conditions deteriorate if air temperature is 20°C (68°F) or less; heating of the body is thus recommended.


76G14X-042

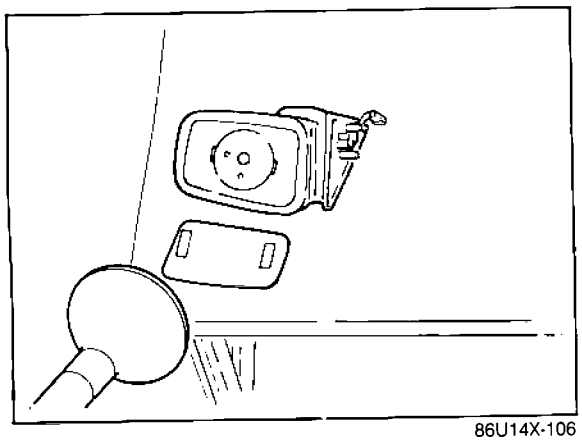
DOOR MIRROR

DISASSEMBLY

1. Warm the frame and the mirror glass with a lamp **(500W)** to approx. **70°C (158°F)** for approx. 3 minutes.

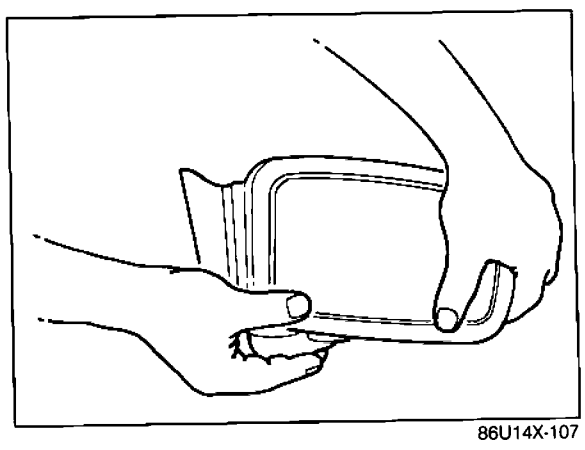

86U14X-104

2. Insert a scraper between the mirror glass and the frame, then pry the mirror loose.
3. Remove any remaining adhesive.


86U14X-106

ASSEMBLY

1. Warm the frame with a lamp.

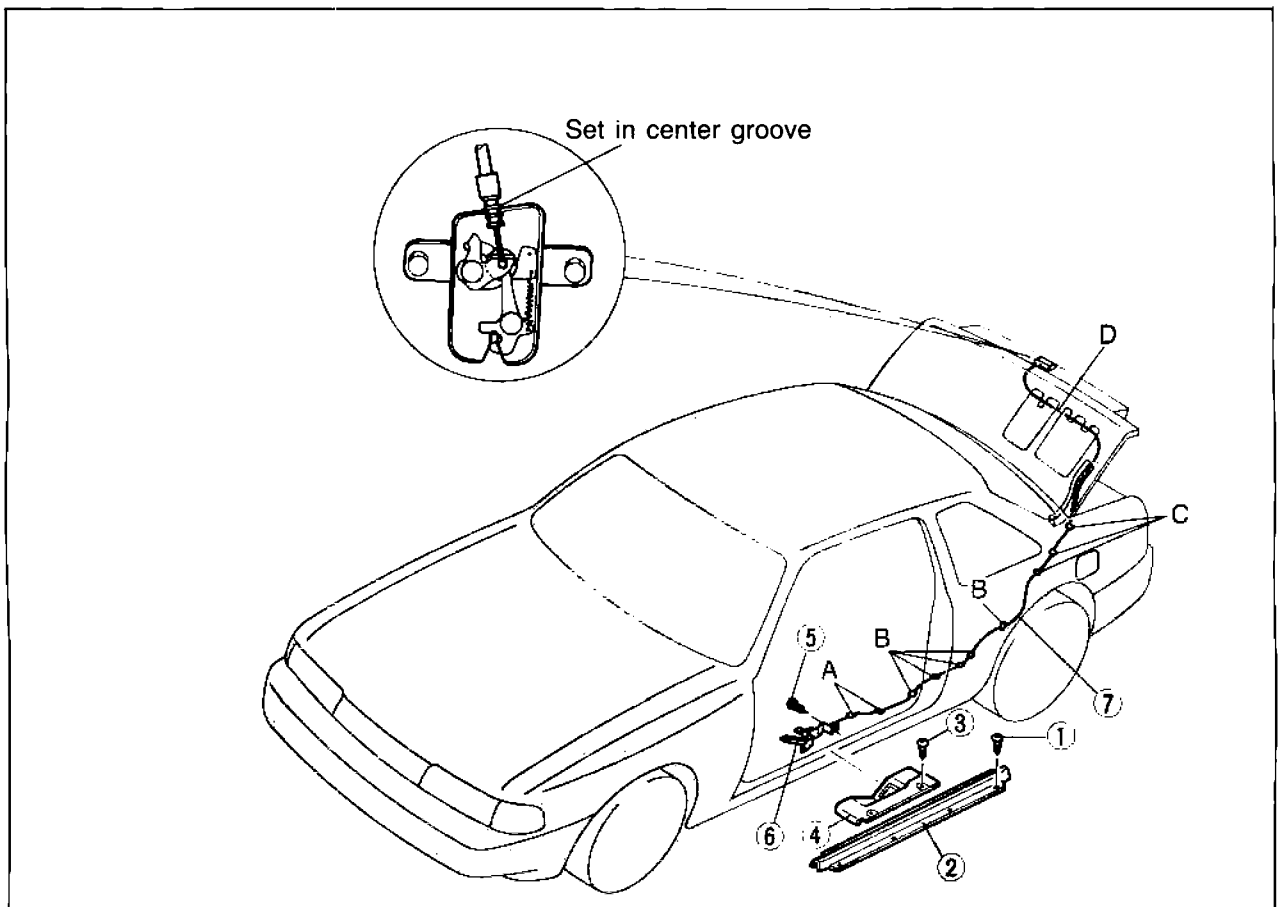

86U14X-107

2. Install the glass in the frame, then gently press it in to secure it.

TRUNK-LID LOCK REMOTE RELEASE

REMOVAL AND INSTALLATION

1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.



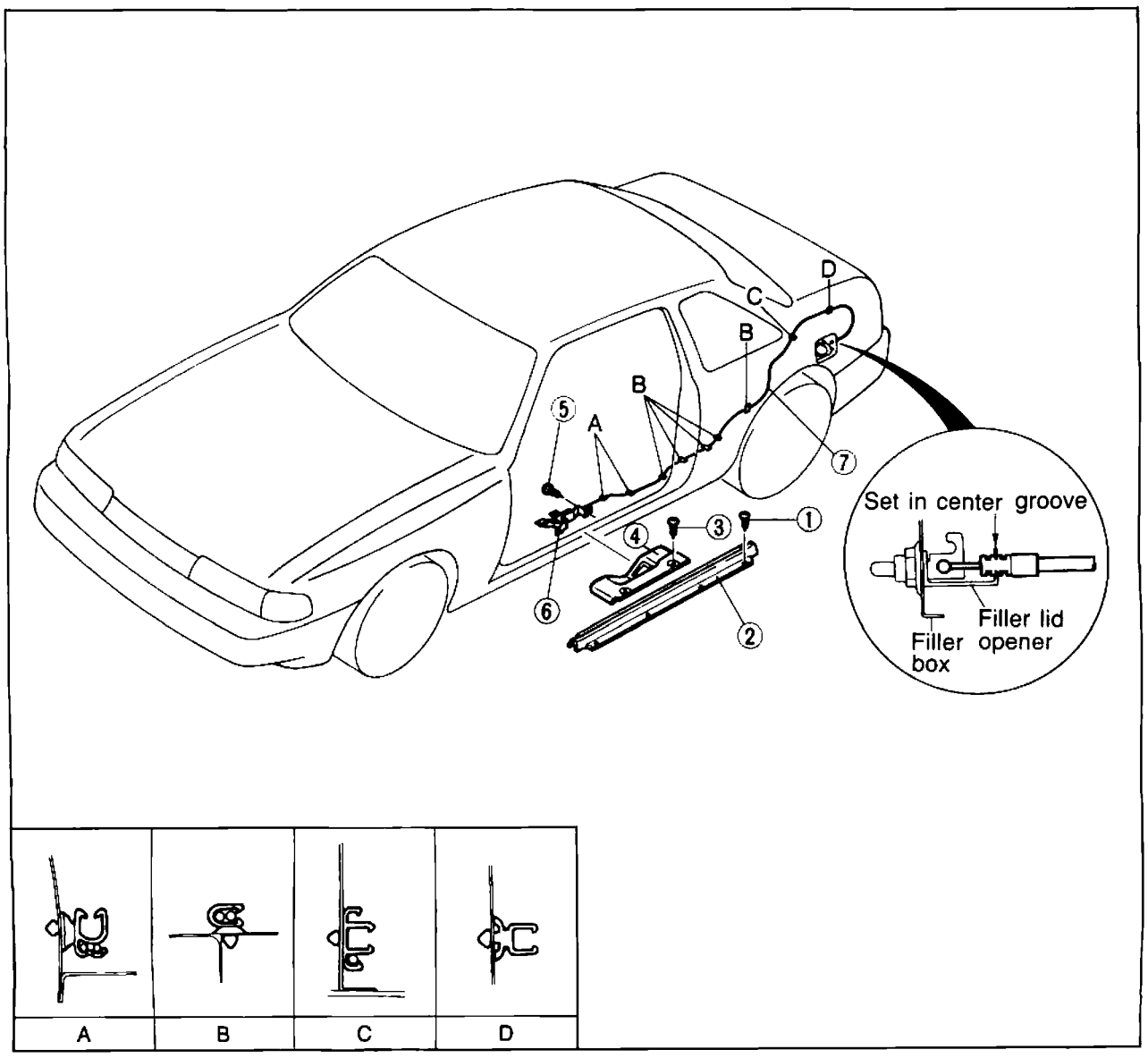
86U14X-108

1. Screws
2. Scuff plate
3. Screws
4. Cover
5. Bolts
6. Release lever
7. Release wire

FUEL FILLER LID REMOTE RELEASE

REMOVAL AND INSTALLATION

1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.

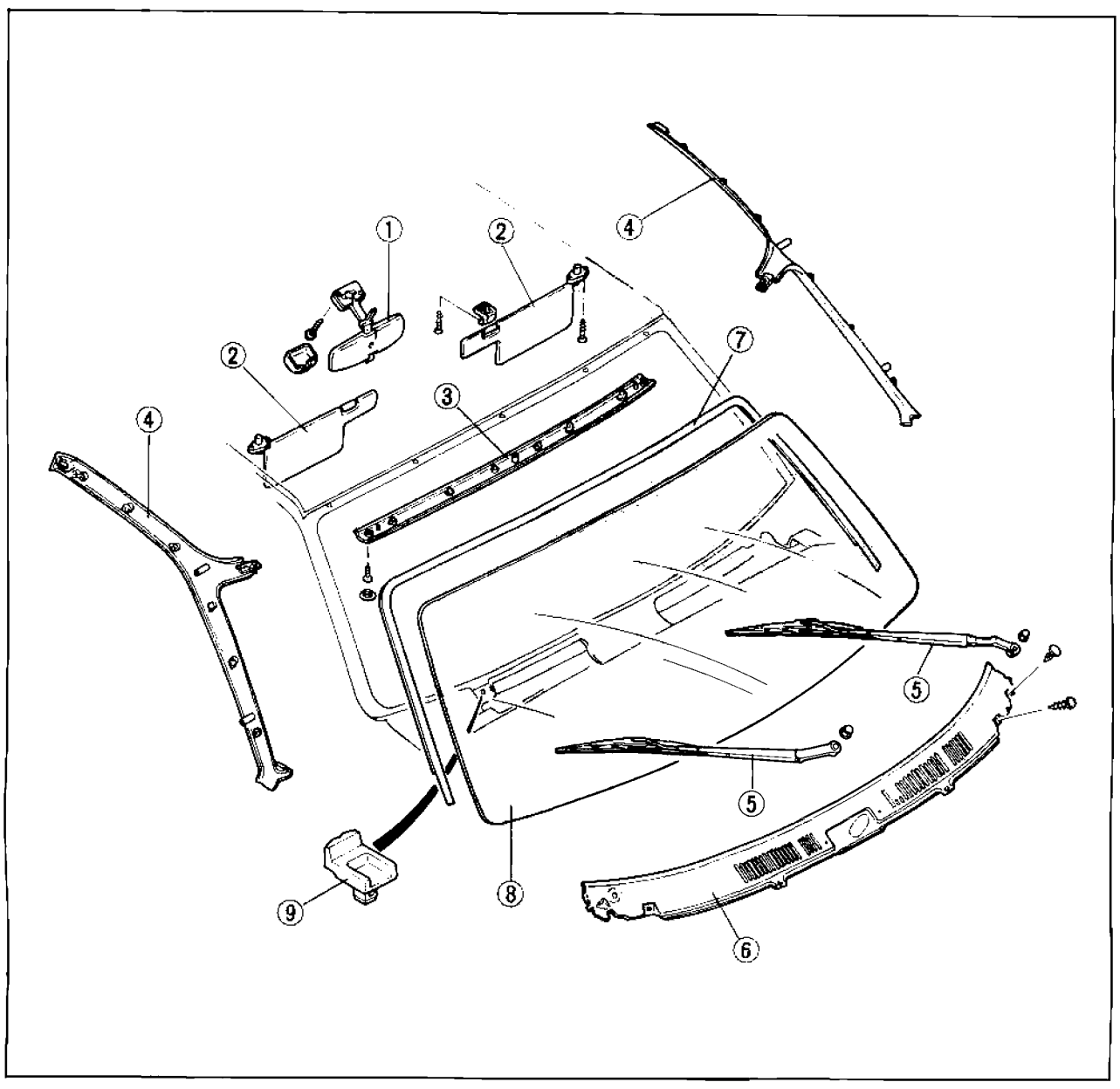


1. Screws
2. Scuff plate
3. Screws
4. Cover
5. Bolts
6. Release lever
7. Release wire

86U14X-109

WINDSHIELD GLASS

STRUCTURAL VIEW

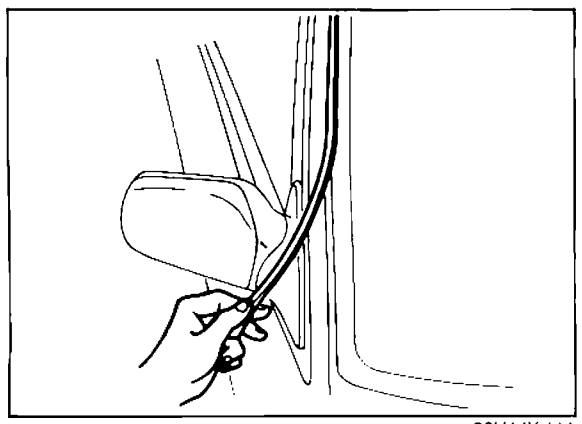


86U14X-110

1. Rear view mirror
2. Sunvisor
3. Front header trim
4. Front pillar trim
5. Wiper arm
6. Lower molding
7. Front windshield molding
8. Windshield glass
9. Spacer

Note
Use window tool set (49 0305 870A) to remove and install the glass.

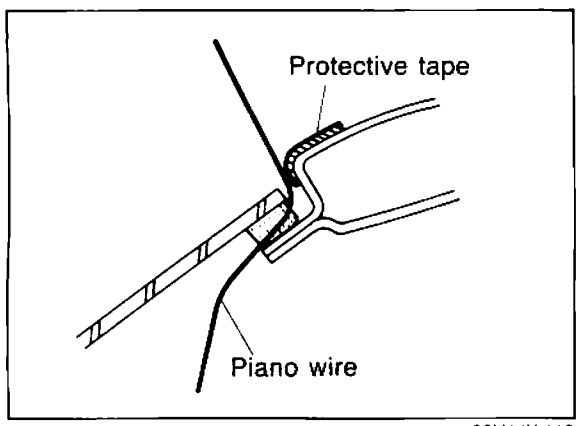
14 WINDSHIELD GLASS



86U14X-111

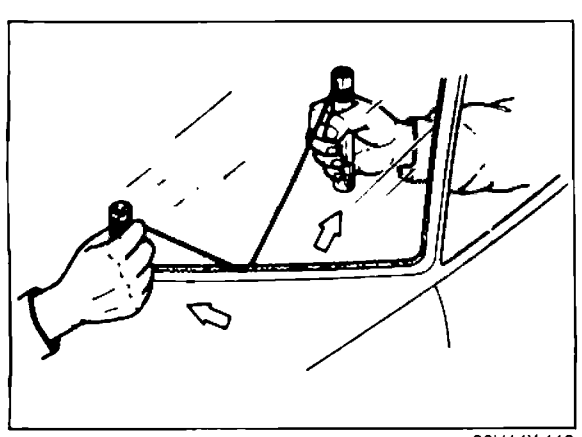
REMOVAL

1. Remove the rearview mirror, sunvisors, front pillar trim, and front header trim.
2. Remove the wiper arms and lower molding.
3. Remove the front window molding.



86U14X-112

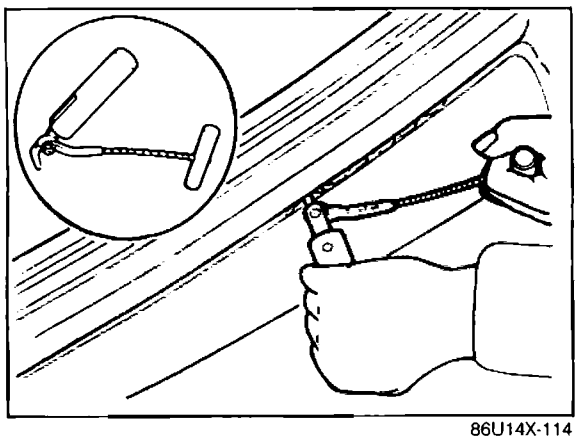
Caution
Before removing the sealant, apply adhesive tape to the body and instrument panel to protect them from damage.



86U14X-113

4. Make a small hole through the sealant.
5. Pass the piano wire through the hole.
6. Wind each end of the wire around a bar.
7. Pull the wire to and fro, and saw through the sealant around the edge of the glass. Then remove the glass.

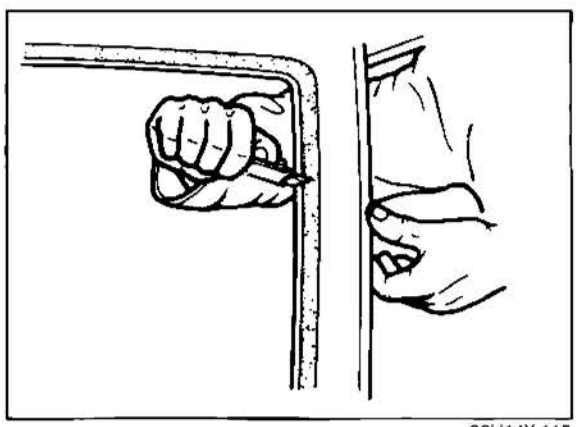
Caution
a) Use a long sawing action to spread the work over the whole length of wire to prevent it from breaking.
b) Be careful that the wire does not rub on the body or instrument panel.



86U14X-114

Note
If the glass is not to be reused, a tool like that shown in the figure may be used.

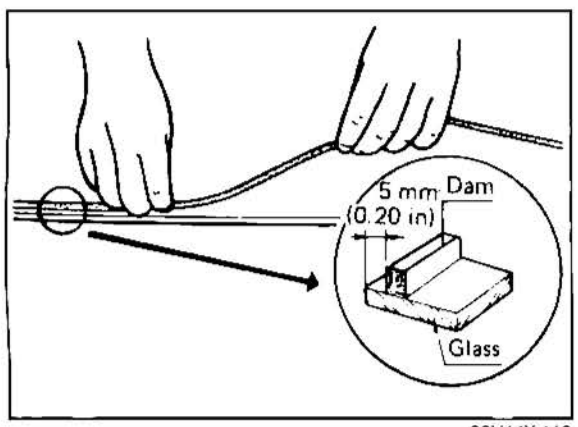
Insert the blade in the sealant, and pull on the bars.



86U14X-115

INSTALLATION

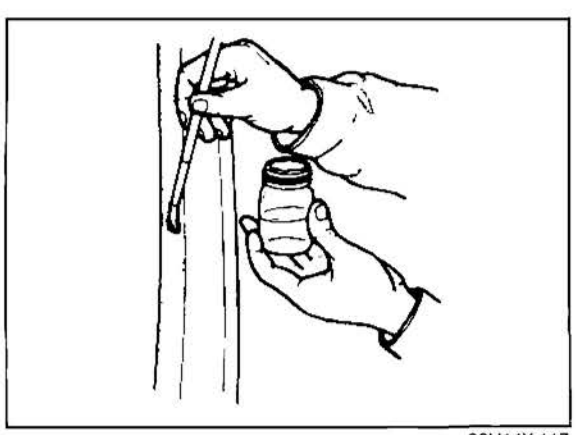
1. Cut away the old sealant with a sharp knife so that **1 to 2 mm (0.04 to 0.08 in)** thickness of sealant remains around the circumference of the frame. If all the sealant has come off in any one place, apply some primer after degreasing, and allow it **30 minutes** to dry. Then put on new sealant to build up to a **2 mm (0.08 in)** layer.



86U14X-116

2. Carefully clean a **5 cm (1.97 in)** wide area around the circumference of the glass and the bond on the body.
3. Bond a new dam along the circumference of the glass **5 mm (0.20 in)** from the edge.

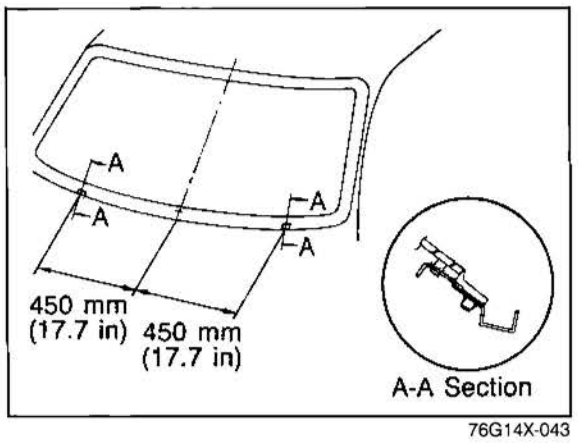
Caution
Securely bond the dam and allow it to dry.



86U14X-117

4. Apply primer with a brush to the bonding area of the glass and the body, and allow it to dry for **approx. 30 minutes**.

Caution
Keep the area free of dirt. Do not touch the surface. If primer gets on the hands, remove it immediately.

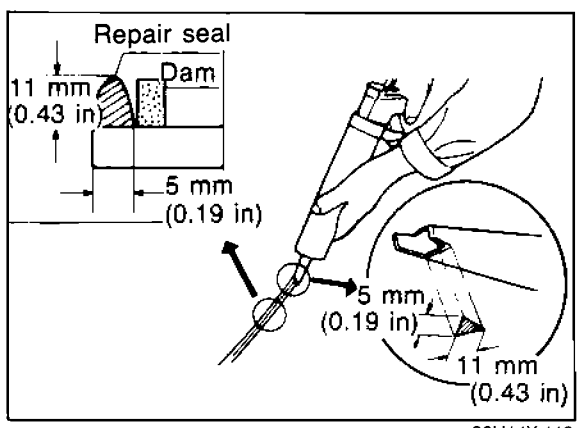


76G14X-043

5. Bond the spacers to the body as shown.

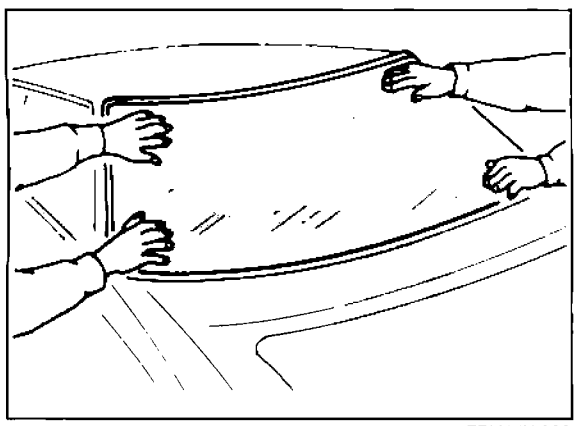
Caution
Damaged spacers must be replaced.

expert22 для http://rutracker.org



86U14X-119

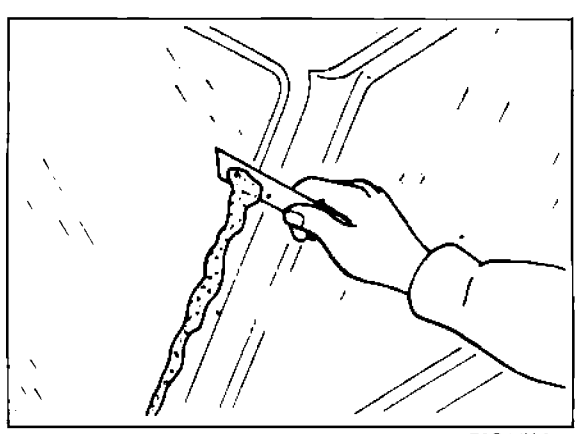
6. Prepare the nozzle of the sealant gun so that it has a flange that can run along the edge of the glass, and a V from which the sealant can flow. Once the primer is dry, apply the sealant around the entire circumference to fill the gap between the dam and the edge of the glass with a ridge of sealant **11 mm (0.43 in)** high.
   Keep the bead of sealant smooth and even, reshaping it where necessary with a spatula.



7BU14X-026

7. Lift the glass into place. Push it in lightly toward the vehicle to compress the sealant.

Caution
Open the windows to prevent the glass from being pushed out by air pressure if a door is closed.

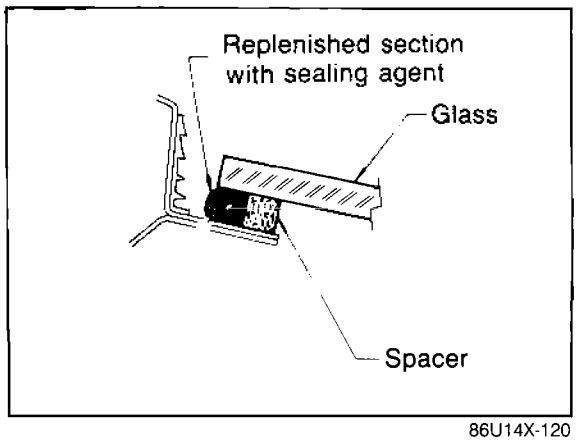


76G14X-044

Hardening time of repair seal

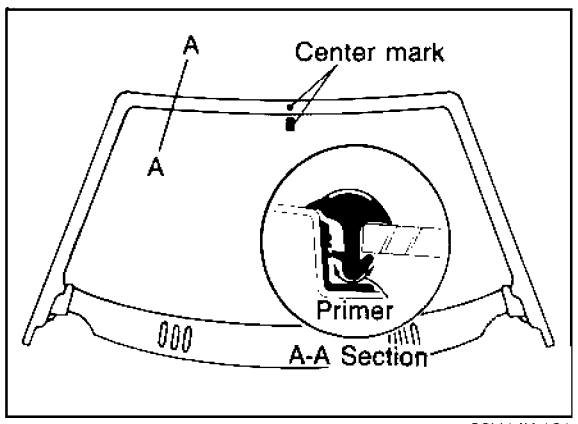
Temperature	Surface hardening time	Time required until car can be put in service
5°C (41°F)	Approx. 1.5 hrs	12 hrs
20°C (68°F)	Approx. 1 hr	4 hrs
35°C (95°F)	Approx. 10 min.	2 hrs

8. Use a scraper to smooth away any sealant that oozes out. Add more sealant to any points of poor contact.



86U14X-120

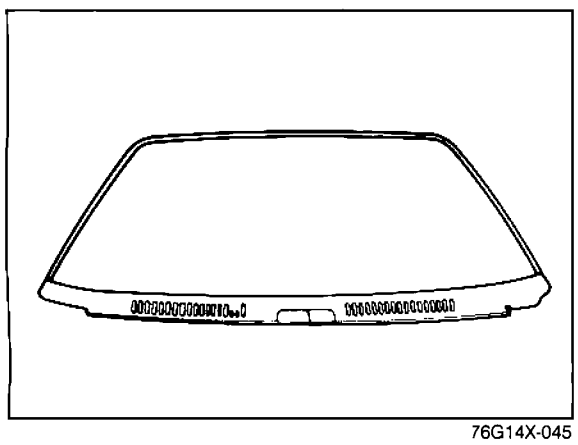
9. Check for water leaks. If a leak is found, wipe the water off well and add **repair seal** (B001 77 739) where needed.



86U14X-121

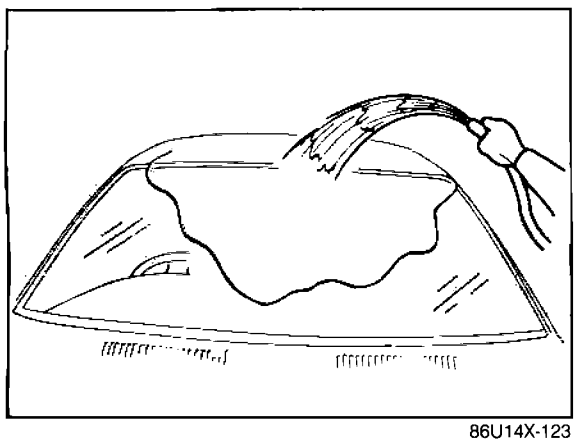
10. Align the alignment mark of the molding with that on the lap of the glass and push the molding into place along the top.

Caution
a) Apply primer with a brush to the bonding area of the molding, and allow it to dry for approx. 30 minutes.
b) Use a new window molding



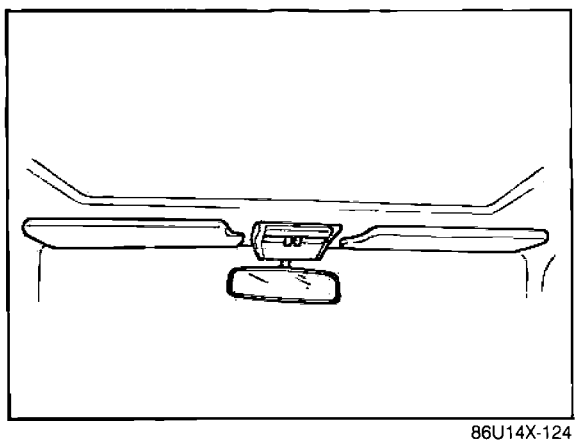
76G14X-045

11. Insert the molding ends into the flanges of the lower molding. Then push it in the along sides.



86U14X-123

12. After checking for water leakage, mount the pillar garnish.



86U14X-124

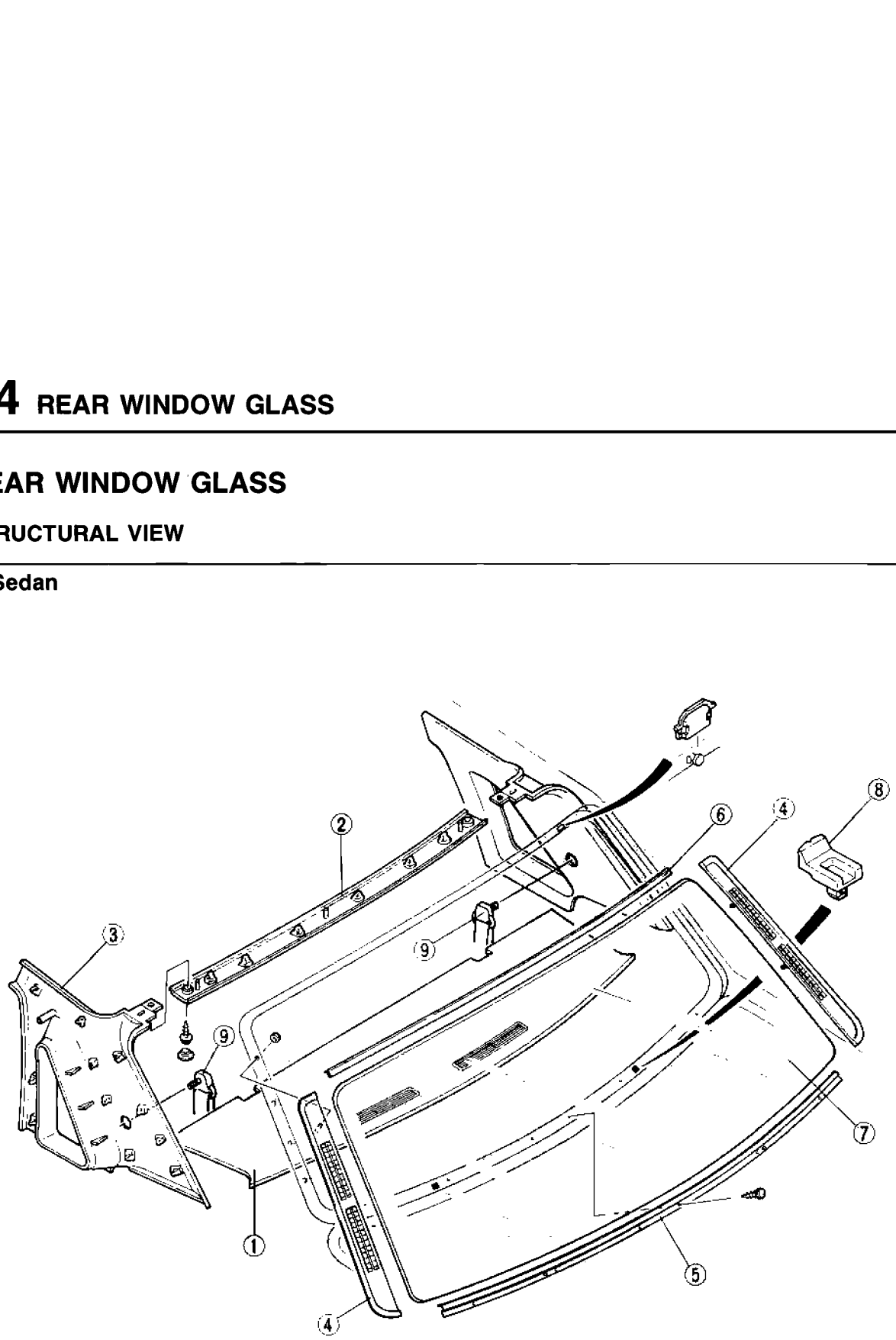
13. Attach the front header trim, pillar trim, sunvisors, and rearview mirror.

14 REAR WINDOW GLASS

REAR WINDOW GLASS

STRUCTURAL VIEW

Sedan

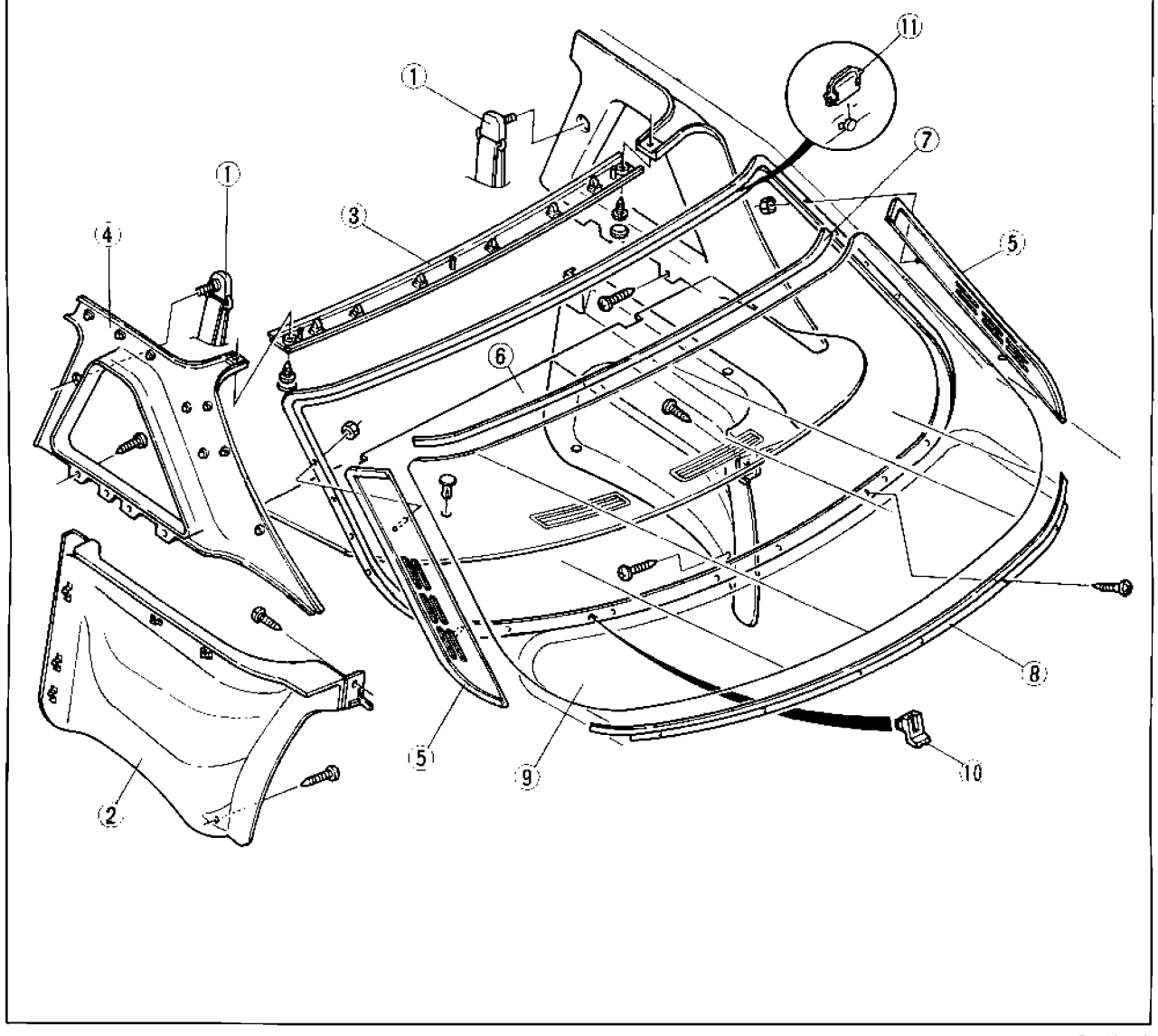


86U14X-125

1. Rear package tray
2. Rear header trim
3. Rear pillar trim
4. Rear window side molding
5. Rear window lower molding
6. Rear window upper molding
7. Rear window glass
8. Spacer
9. Seat belt bolts

Note
Use window tool set (49 0305 870A) to remove and install the glass.

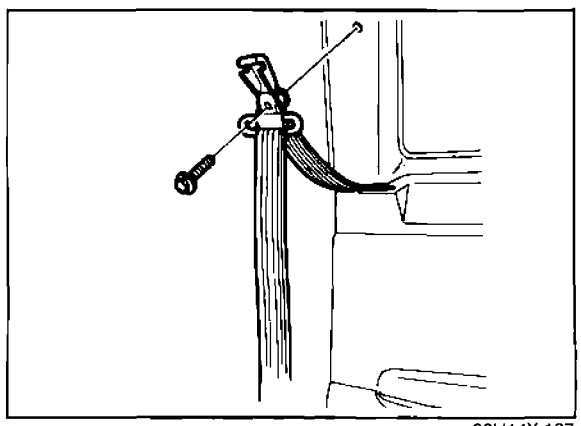
Coupe/MX-6



76G14X-046

1. Seat belt bolts
2. Rear side trim
3. Rear header trim
4. Rear pillar trim
5. Rear window side molding
6. Rear package tray
7. Rear window upper molding
8. Rear window lower molding
9. Rear window glass
10. Spacer
11. Clips

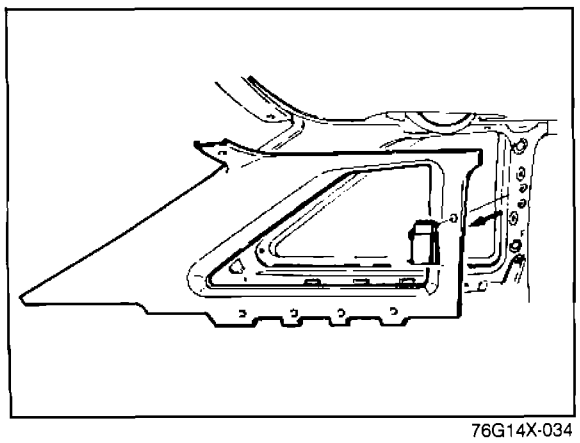
14 REAR WINDOW GLASS



86U14X-127

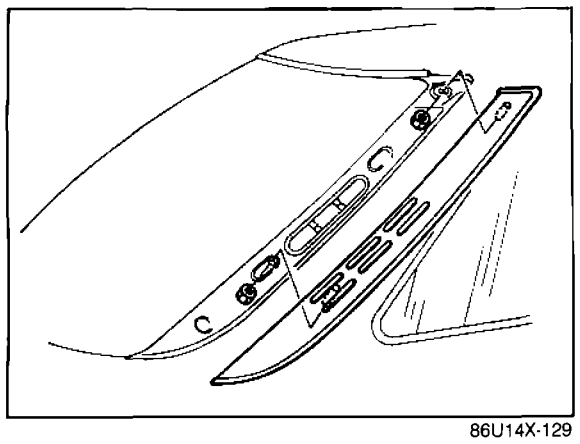
REMOVAL

1. Disconnect the negative battery cable.
2. Disconnect the defogger connector.
3. Remove the seat belts.



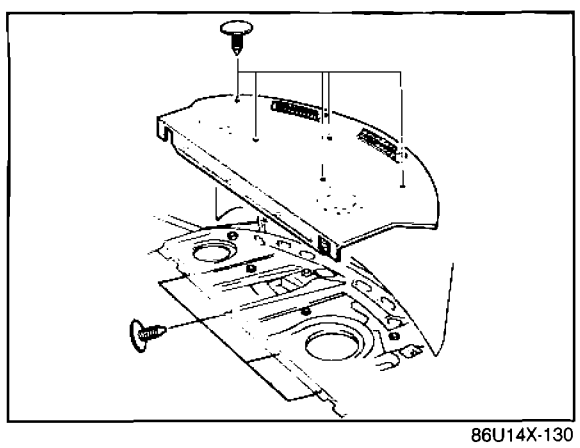
76G14X-034

4. Remove the screws and the quarter trim.
5. Remove the screws and the center pillar trim.
6. Remove the screws and the rear header.



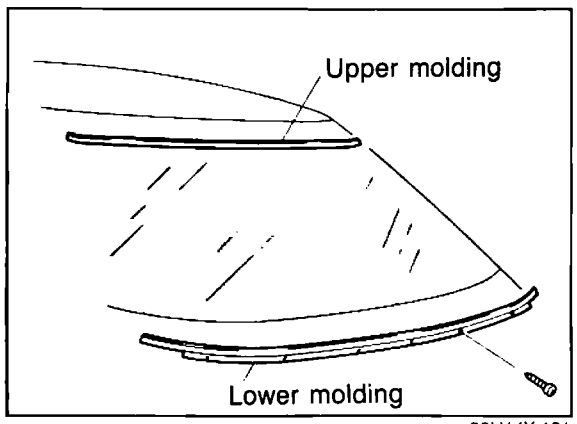
86U14X-129

7. Remove the nuts and the rear window side molding.



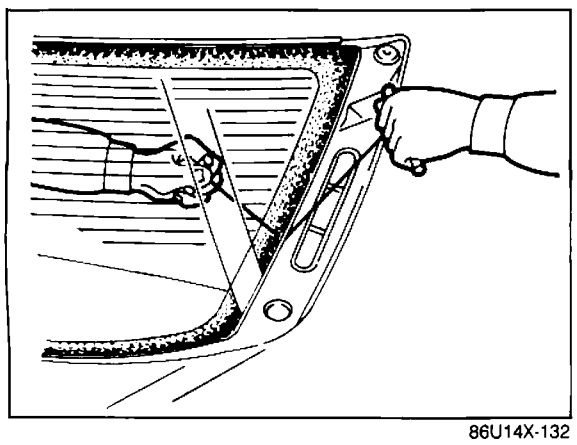
86U14X-130

8. Remove the fasteners and the rear package tray.



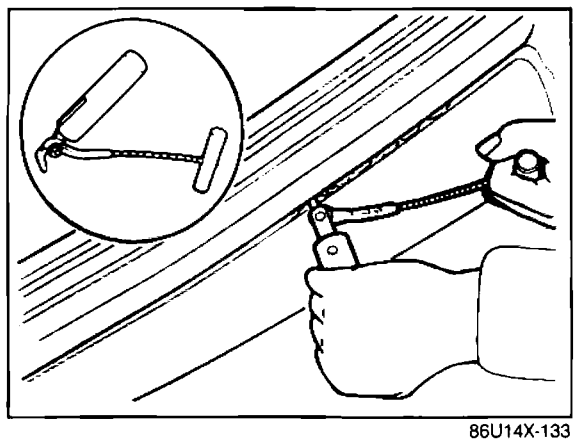
86U14X-131

9. Remove the lower and upper window molding.



86U14X-132

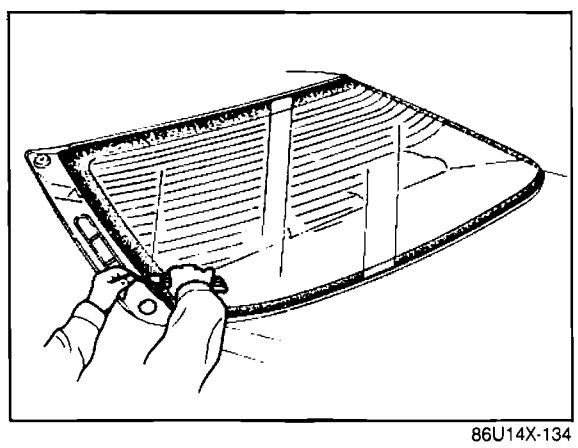
10. Use an awl to make a hole in the sealant. Pass the end of a piece of the piano wire **(about 40 cm 15.7 in)** through the hole, and attach bars to both ends.
11. Apply protective tape along the edge of the body to the glass as shown.
12. Two people should hold the bars, one inside and one outside the vehicle, and then "saw" the sealant from around the glass.
13. Remove the glass from the body.



86U14X-133

Caution
a) Cut along the border between the glass and the sealant.
b) If too much heat develops, the piano wire may break, so cool it occasionally, or don't work on one place too long.
c) If the glass is not to be reused, a tool like that shown in the figure is faster than piano wire.

Insert the blade in the sealant, pull on the bars, and cut the sealant.



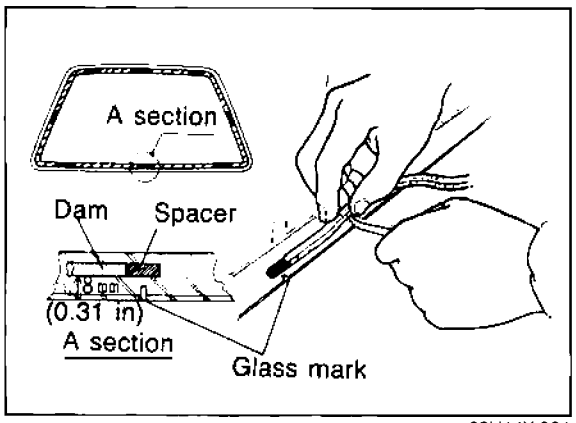
86U14X-134

INSTALLATION

1. Use a knife to smoothly trim the sealant on the body. Leave a layer about **1 or 2 mm (0.04 to 0.08 in)** thick.

Caution
If some sealant flakes off, use new sealant to patch it.

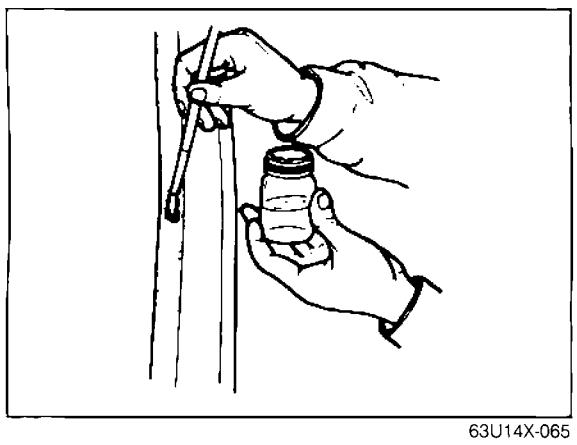
14 REAR WINDOW GLASS



63U14X-064

2. Carefully clean and remove any grease from a **5 cm (1.97 in)** wide area around the circumference of the glass and the remaining bond on the body.
3. Bond a dam along the circumference of the glass **8 mm (0.31 in)** from the edge.

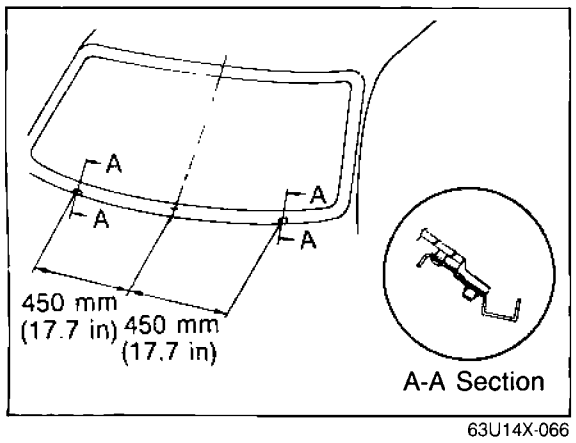
Caution
Securely bond the dam and let it dry.



63U14X-065

4. Apply primer with a brush to the circumference of the glass and the body and it them to naturally dry for 20 to 30 minutes.

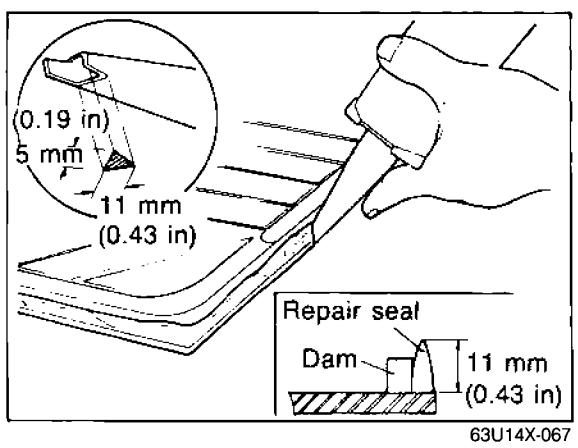
Caution
Be sure not to allow dirt, water, oil, etc. to come in contact with the coated surfaces and do not touch it with your hand.



63U14X-066

5. Install the spacers at the positions shown in the figure.

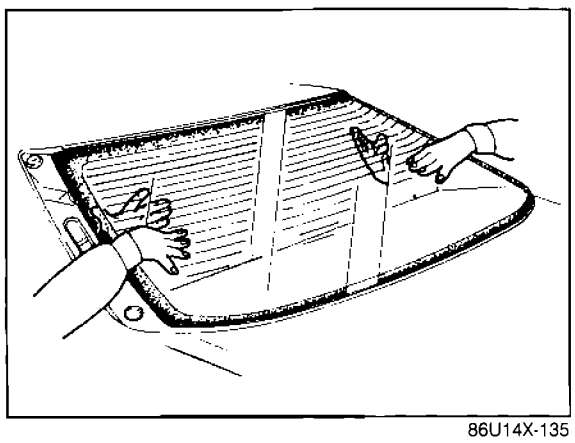
Caution
Spacer, with flaws, must be replaced.



63U14X-067

6. When the primer has dried, apply an **11 mm (0.43 in)** thick bead of **repair seal** (B001 77 739) **11 mm (0.43 in)** from the periphery of the window glass using a sealant gun.

Caution
Cut the nozzle of the repair seal cartridge as illustrated in the figure.
If necessary, smooth the repair seal to correct any irregularities.



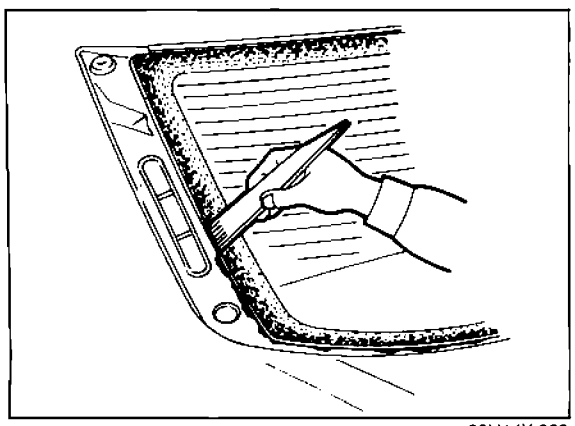
86U14X-135

7. Attach the back door glass to the body.

Caution
Keep the door glass open until the repair seal hardens to some degree to prevent pressure from being exerted on the rear glass, if the door is closed quickly.

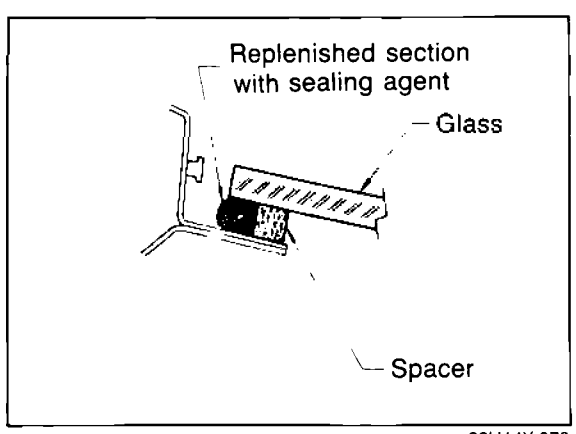
Hardening time of repair seal

Temperature	Surface hardening time	Time required until car can be put in service
5°C (41°F)	Approx. 1.5 hrs	12 hrs
20°C (68°F)	Approx. 1 hr	4 hrs
35°C (95°F)	Approx. 10 min	2 hrs



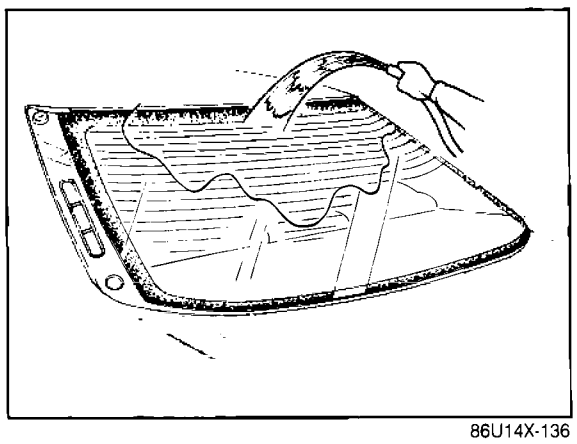
63U14X-069

8. Remove any excess or add repair seal where necessary.



63U14X-070

9. Check for water leaks. If a leak is found, wipe the water off well and add **repair seal** (B001 77 739).

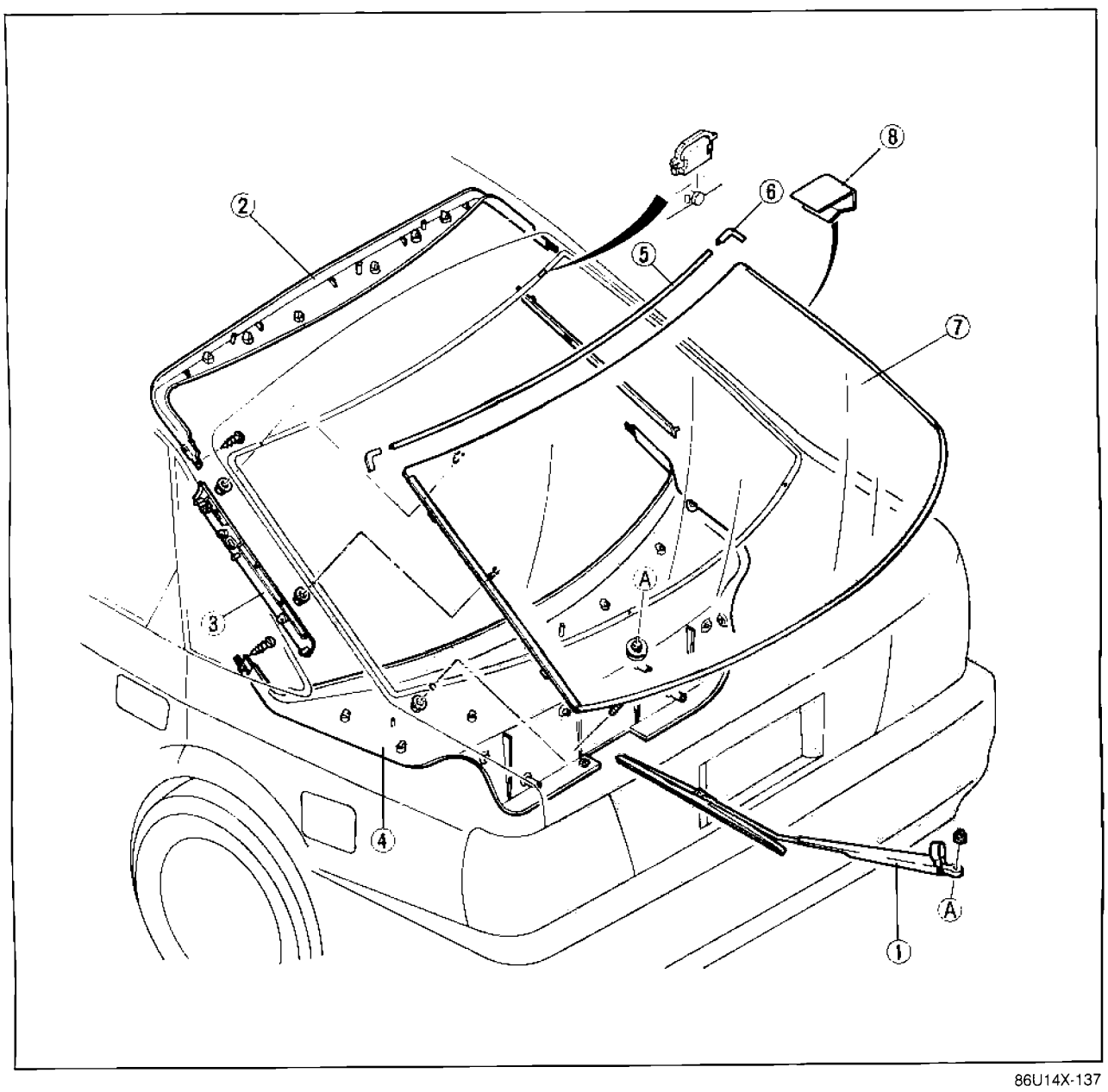


86U14X-136

10. After checking for water leakage, install the molding and trim.
11. Connect the defogger connector.

REAR HATCH GLASS

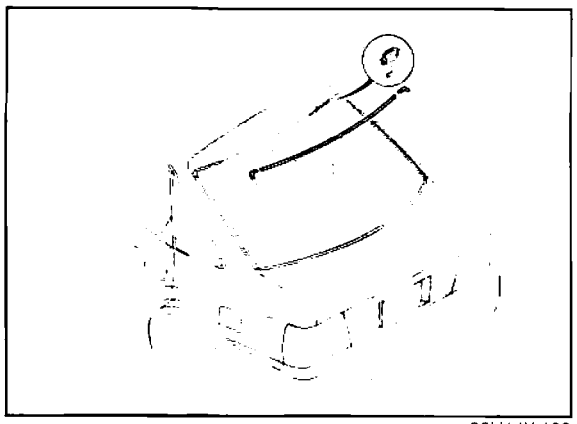
STRUCTURAL VIEW



86U14X-137

1. Rear wiper arm
2. Upper trim
3. Side trim
4. Lower trim
5. Window upper molding
6. Window upper molding joint
7. Rear hatch glass
8. Clips

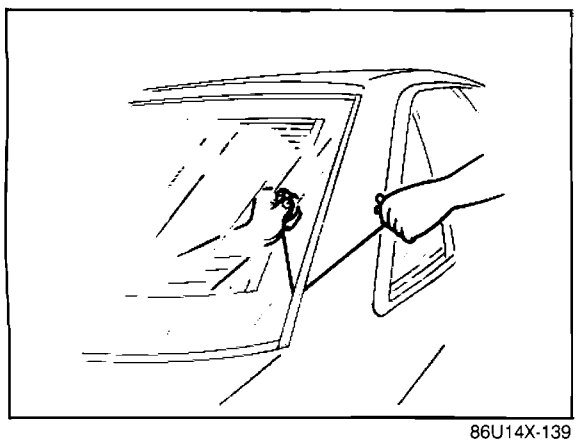
Note
Use window tool set (49 0305 870A) to remove and install the glass.



86U14X-138

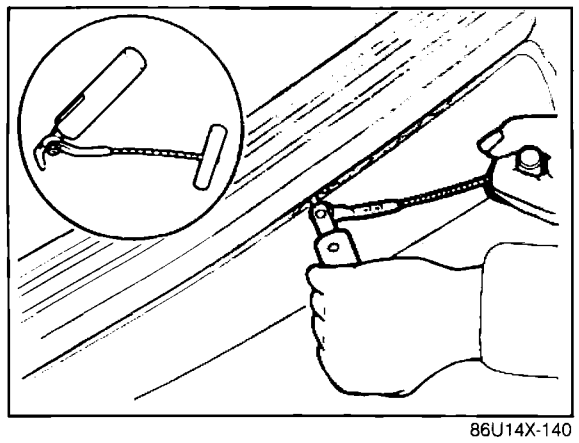
REMOVAL

1. Remove the wiper arm, rear hatch trim and defogger connector.
2. Remove the rear window upper molding.
3. Remove the glass mounting nuts.



86U14X-139

4. Use an awl to make a hole in the sealant. Pass the end of a piece of the piano wire **(about 40 cm 15.7 in)** through the hole, and attach bars to both ends.
5. Apply protective tape along the edge of the rear hatch body to the glass as shown.
6. Two people should hold the bars, one inside and one outside the vehicle, and then "saw" the sealant from around the glass.
7. Remove the glass from the back door body.



86U14X-140

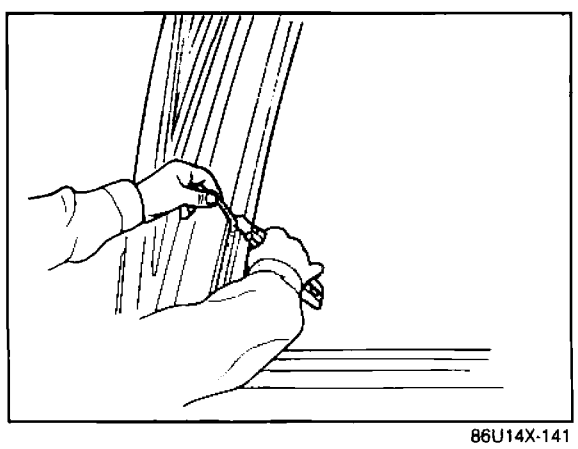
Caution

a) Cut along the border between the glass and the sealant.

b) If too much heat develops, the piano wire may break, so cool it occasionally or don't work on one place too long.

c) If the glass is not to be reused, a tool like that shown in the figure is faster than piano wire.

Insert the blade in the sealant, pull on the bars, and cut the sealant.



86U14X-141

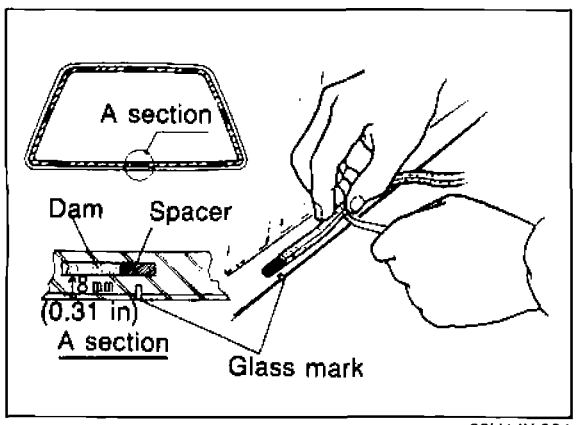
INSTALLATION

1. Use a knife to smoothly trim the sealant on the body. Leave a layer about **1 or 2 mm (0.04 to 0.08 in)** thick.

Caution

If some sealant flakes off, use new sealant to patch it.

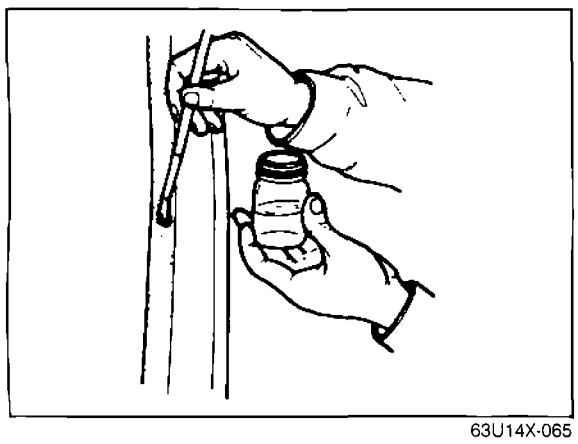
14 REAR HATCH GLASS



63U14X-064

2. Carefully clean and remove any grease from a **5 cm (1.97 in)** wide area around the circumference of the glass and the remaining bond on the body.
3. Bond a dam along the circumference of the glass **8 mm (0.31 in)** from the edge.

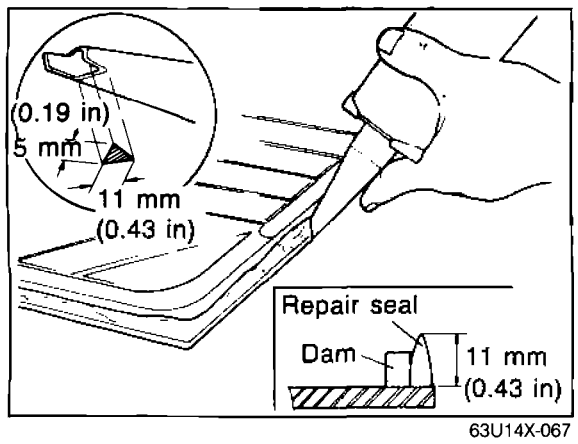
Caution
Securely bond the dam and let it dry.



63U14X-065

4. Apply primer with a brush to the circumference of the glass and the body and it them to naturally dry for **20 to 30 minutes**.

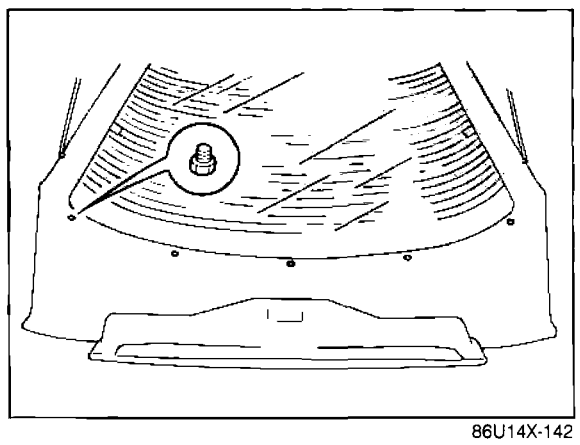
Caution
Be sure not to allow dirt, water, oil, etc. to come in contact with the coated surfaces and do not touch it with your hand.



63U14X-067

5. When the primer has dried, apply an **11 mm (0.43 in)** thick bead of **repair seal** (B001 77 739) **11 mm (0.43 in)** from the periphery of the window glass using a sealant gun.

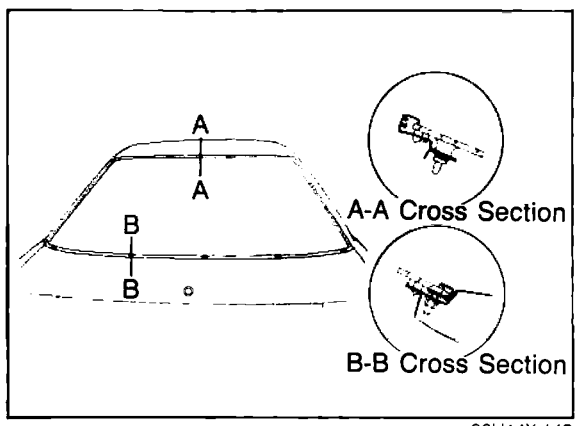
Caution
Cut the nozzle of the repair seal cartridge as illustrated in the figure.
If necessary, smooth the repair seal to correct any irregularities.



86U14X-142

6. Tighten the rear hatch glass mounting nuts.

Tightening torque:
2.9 N·m (30 cm-kg, 26 in-lb)

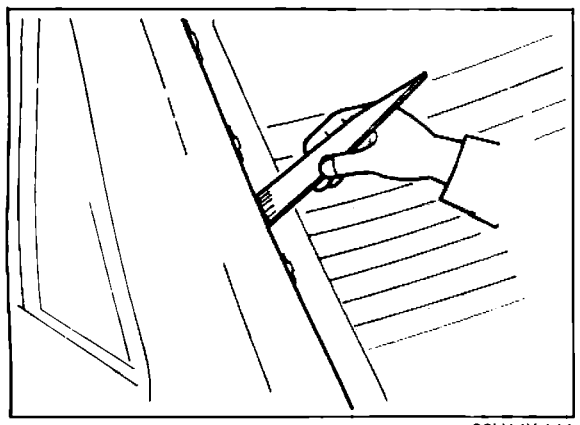


86U14X-143

8. Keep the door glass open until the repair seal hardens to some degree to prevent pressure from being exerted on the rear hatch glass.
If the door is closed quickly etc.

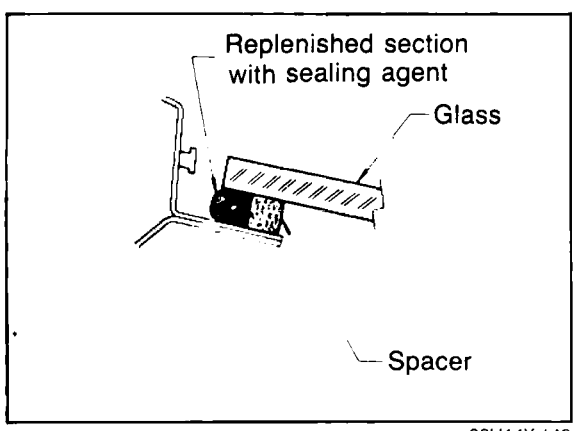
Hardening time of repair seal

Tem-perature	Surface hardening time	Time required until car can be put in service
5°C (41°F)	Approx. 1.5 hrs	12 hrs
20°C (68°F)	Approx. 1 hr	4 hrs
35°C (95°F)	Approx. 10 min	2 hrs



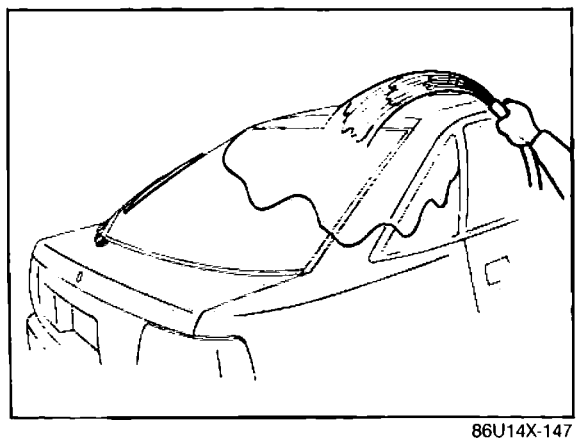
86U14X-144

9. Remove any excess or add repair seal where necessary.



86U14X-146

10. Check for water leaks. If a leak is found, wipe the water off well and add **repair seal** (B001 77 739).



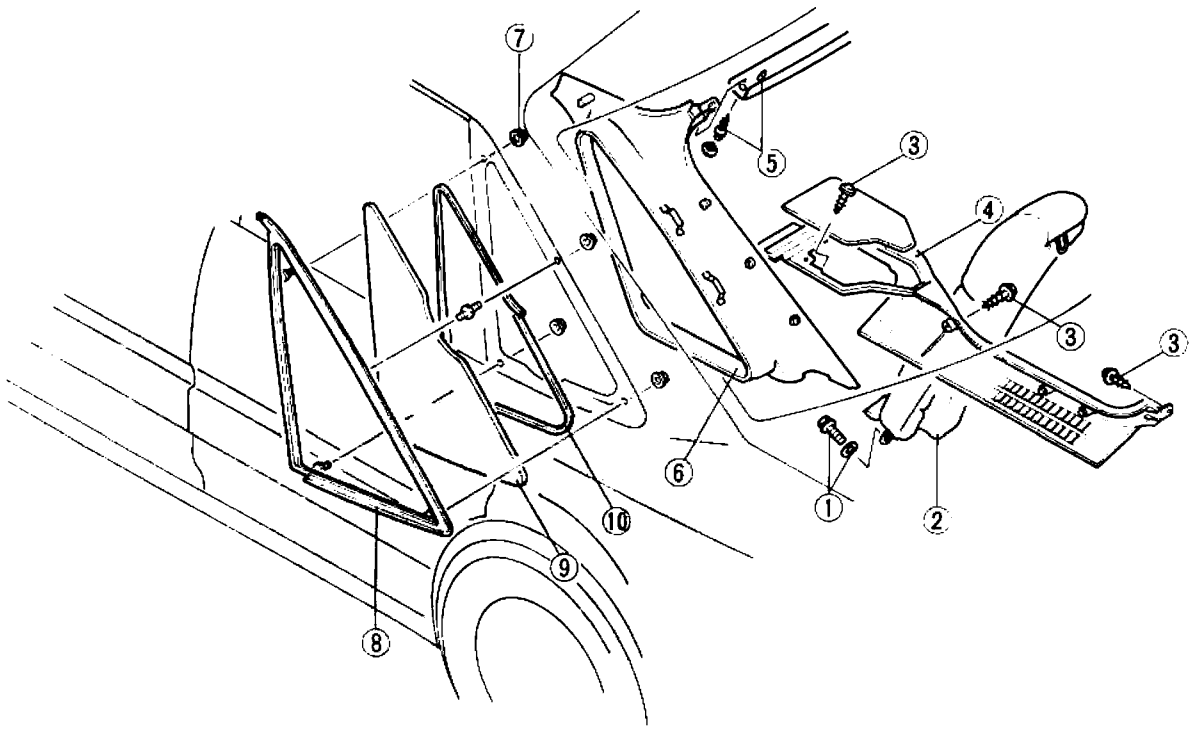
86U14X-147

11. After checking for water leakage, install the mold.
12. Install the wiper arm, door trim, and defogger connector.

QUARTER WINDOW GLASS

STRUCTURAL VIEW

Hatchback and Sedan

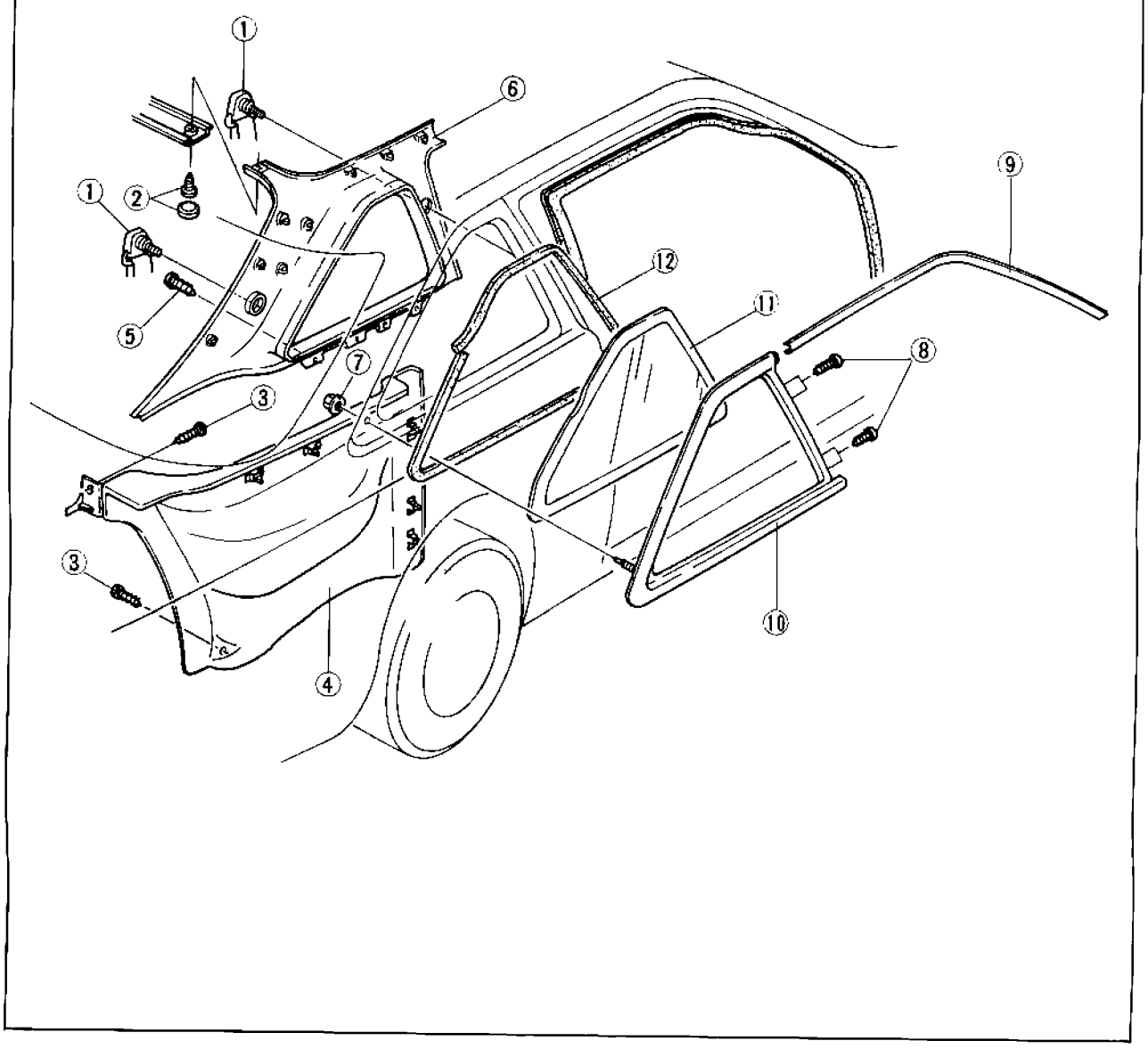


76G14X-024

1. Bolt
2. Rear side seatback
3. Screw (Hatchback)
4. Package side shelf (Hatchback)
5. Rear header trim screw
6. Rear pillar trim
7. Nuts
8. Quarter window molding
9. Quarter window glass
10. Dam

Note
Use window tool set (49 0305 870A) to remove and install the glass.

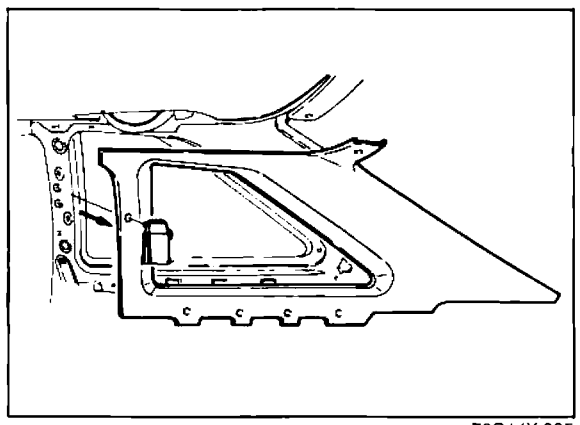
Coupe/MX-6



86U14X-149

1. Seat belt bolts
2. Screw
3. Screw
4. Side trim
5. Screw
6. Rear pillar trim
7. Nut
8. Screw
9. Drip molding
10. Quarter window molding
11. Quarter window glass
12. Dam

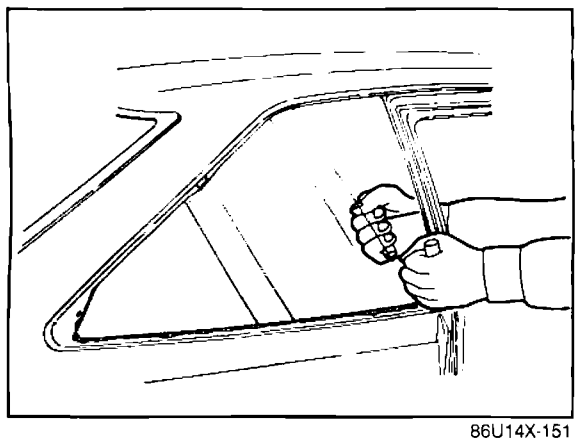
14 QUARTER WINDOW GLASS



76G14X-025

REMOVAL

1. Fold down the rear seatback, and remove the rear side seatback. (Hatchback)
2. Remove the luggage compartment cover and the package side shelf. (Hatchback)
3. Remove the seat bolts.
4. Remove the rear pillar trim.
5. Remove the mounting nut and fastener, and remove the quarter window molding.



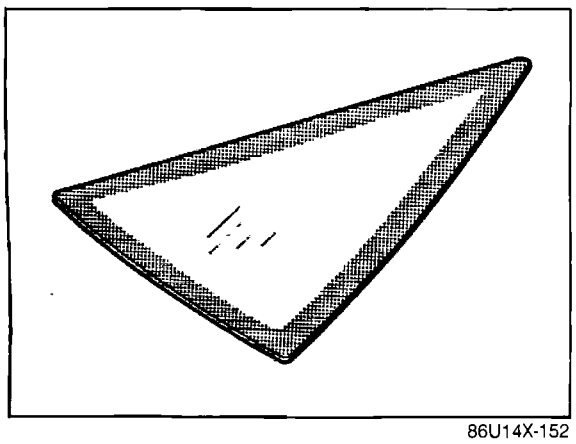
86U14X-151

6. Make a small hole through the sealant.
7. Pass the piano wire through the hole.
8. Wind each end of the wire around a bar.
9. Pull the wire to and fro, and saw through the sealant around the edge of the glass. Then remove the glass.

Caution

a) Use a long sawing action to spread the work over the whole length of wire to prevent it from breaking.

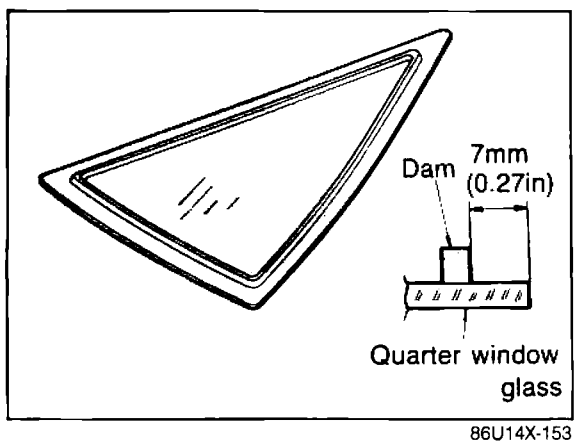
b) Be careful that the wire does not rub on the vehicle paint.



86U14X-152

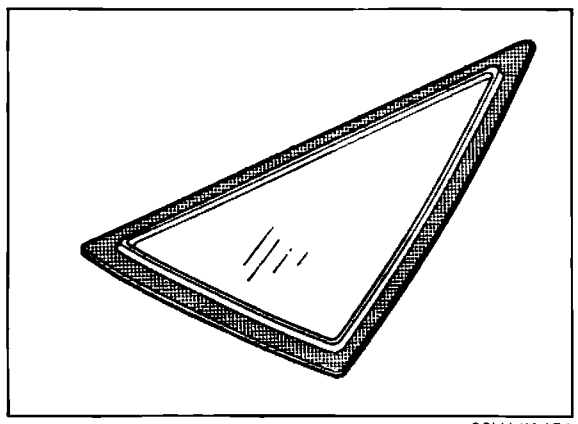
INSTALLATION

1. Use the knife to smoothly cut the sealant on the body side, leaving a layer about **1 or 2 mm (0.04 to 0.08 in)** thick.
2. Carefully clean around the edge of the quarter window glass **(up to approx. 5 cm (0.2 in)** from the edge), and the adhesion surface at the body side.



86U14X-153

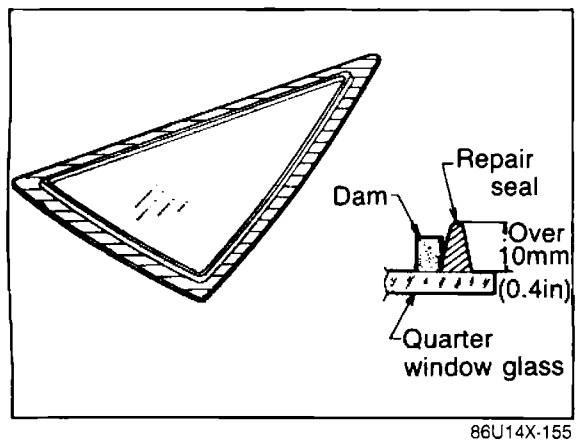
3. Attach a **dam** (G043 50 762) around the glass, **approx. 7 mm (0.28 in)** from the edge.



86U14X-154

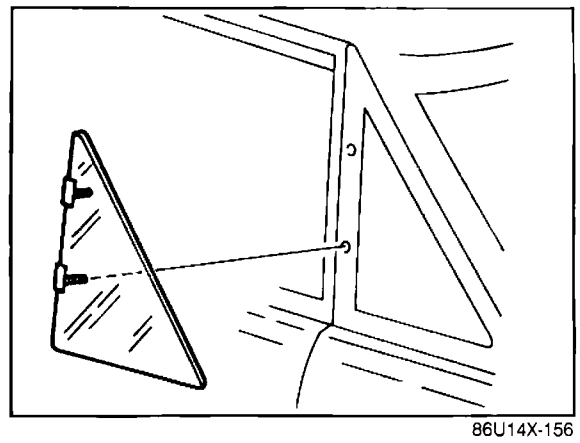
4. Apply a thin coat of primer to the bonding area of the body and glass, and **allow 30 minutes** for it to dry.

Caution
Keep the area free of dirt. Do not touch the surface. If primer gets on the hands, remove it immediately.



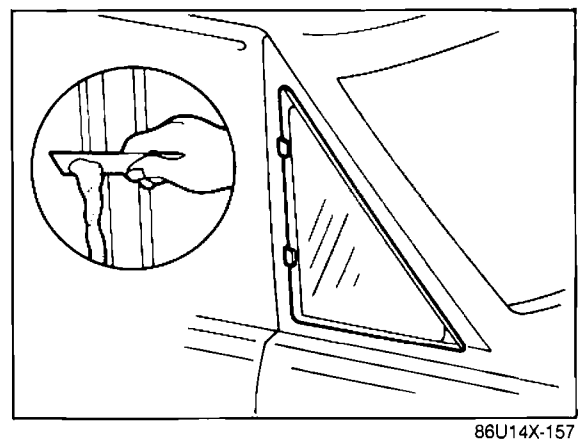
86U14X-155

5. After the primer dries, apply a bead of repair seal to a height of **10 mm (0.4 in) min.** around the edge of the glass.



86U14X-156

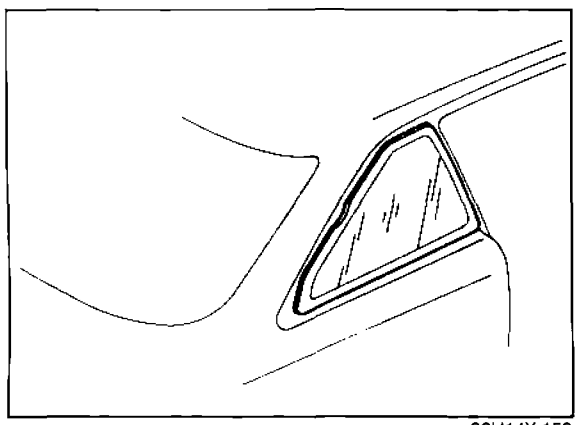
6. Attach the glass to the body.



86U14X-157

7. Remove excess sealant. Add sealant where necessary.

14 QUARTER WINDOW GLASS



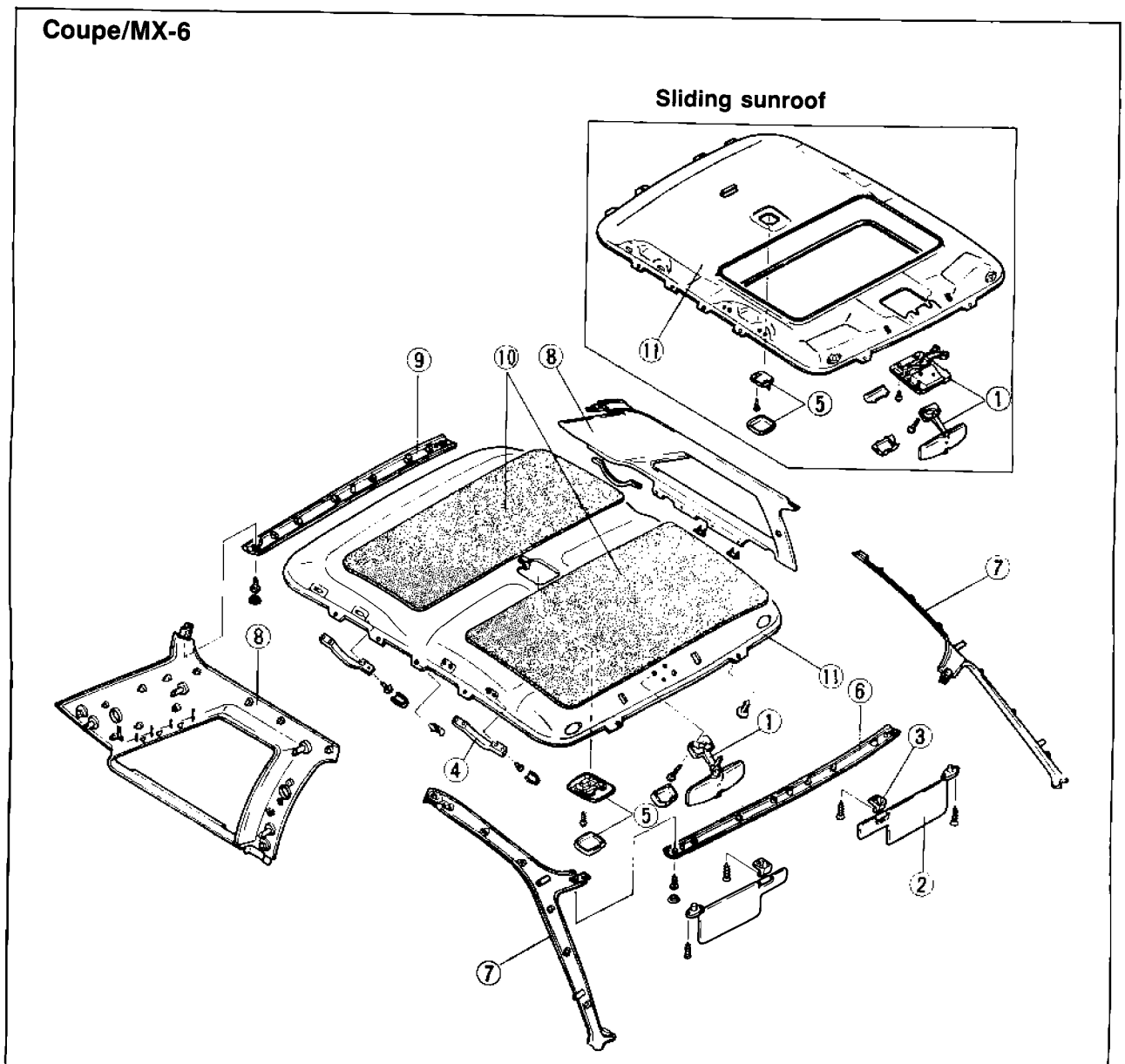
86U14X-158

8. Check for water leaks. If a leak is found, wipe the water off well and add **repair seal** (B001 77 739).
9. Install in the reverse order of removal.

HEADLINER

STRUCTURAL VIEW

Coupe/MX-6

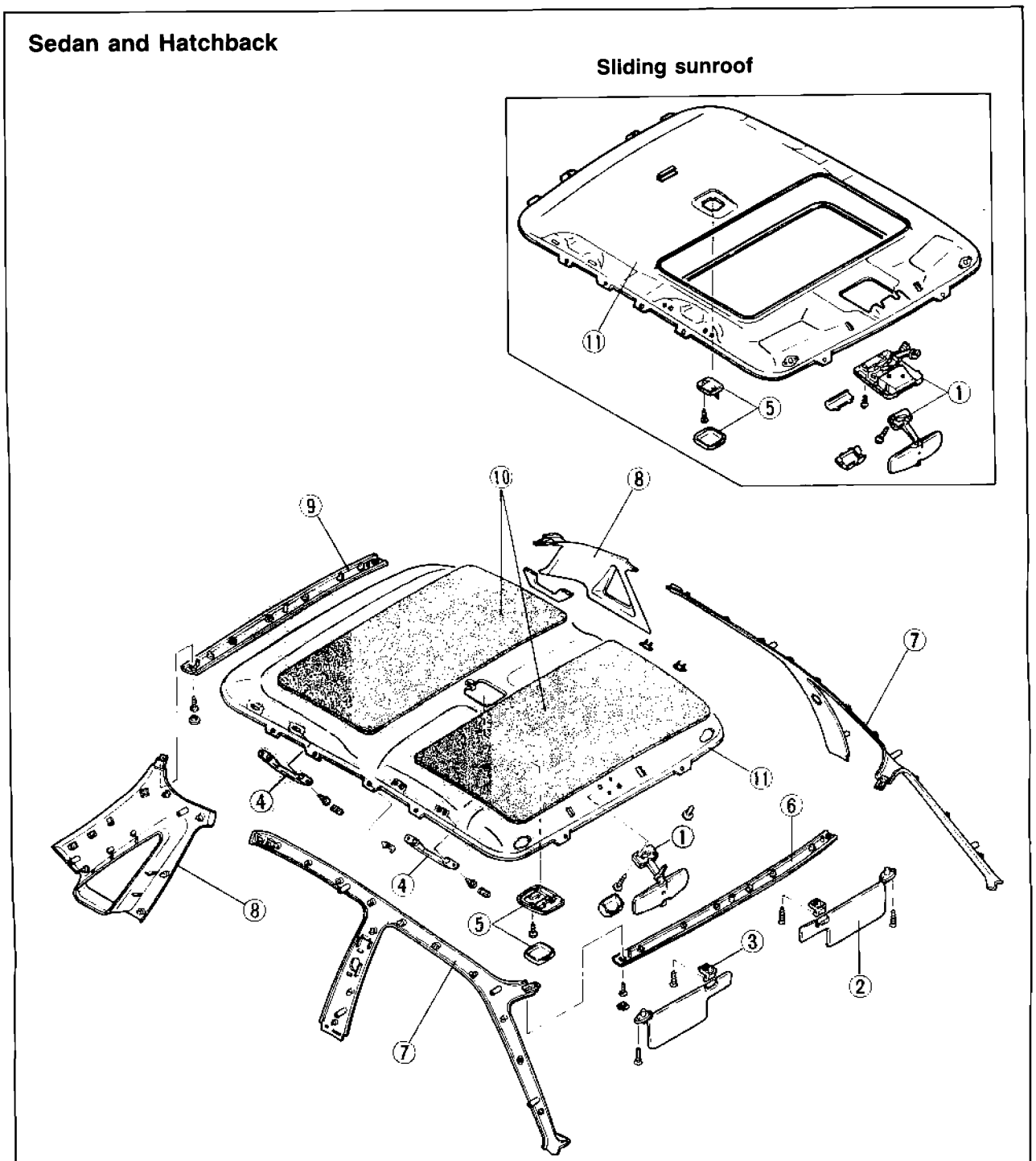


86U14X-159

1. Rearview mirror and overhead console
2. Sunvisor
3. Center adapter
4. Assist handle
5. Interior light
6. Front header trim
7. Front pillar trim
8. Rear pillar trim
9. Rear header trim
10. Insulator
11. Headliner

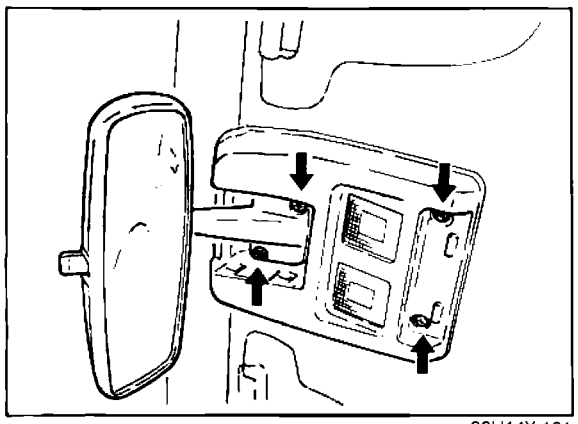
14 HEADLINER

Sedan and Hatchback



86U14X-160

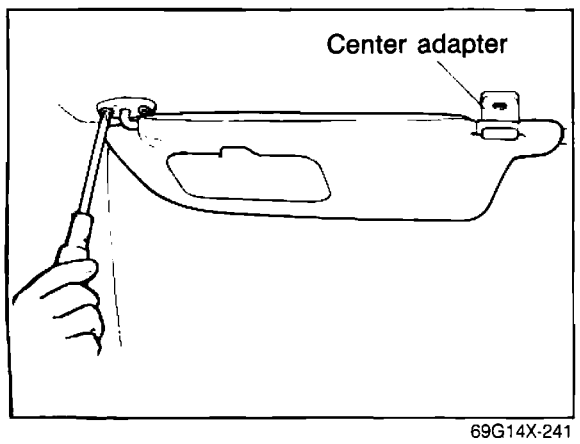
1. Rearview mirror and overhead console
2. Sunvisor
3. Center adapter
4. Assist handle
5. Interior light
6. Front header trim
7. Front pillar trim
8. Rear pillar trim
9. Rear header trim
10. Insulator
11. Headliner



86U14X-161

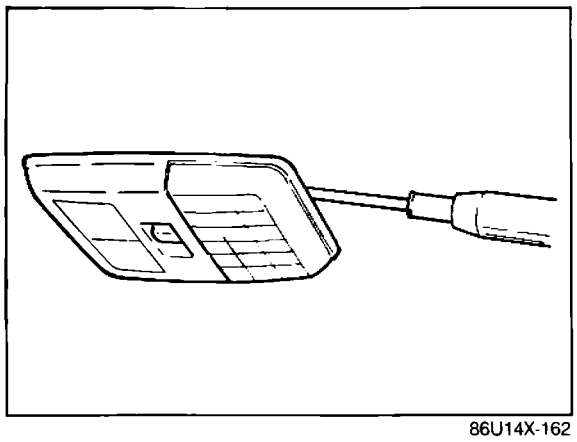
REMOVAL

1. Remove the overhead console cover.
2. Remove the rearview mirror.
3. Remove the overhead console mounting screws.
4. Disconnect the connectors and remove the overhead console.



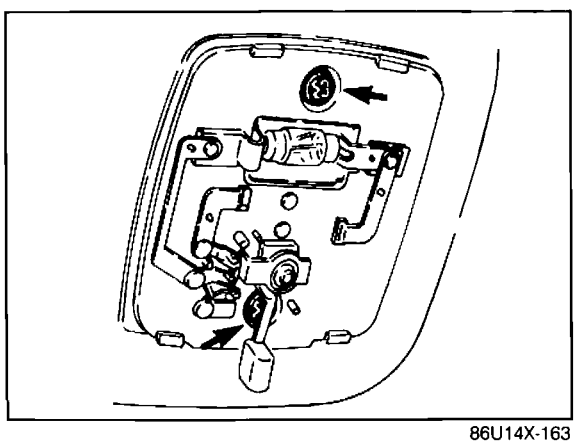
69G14X-241

5. Remove the sunvisors.
6. Remove the center adapters.



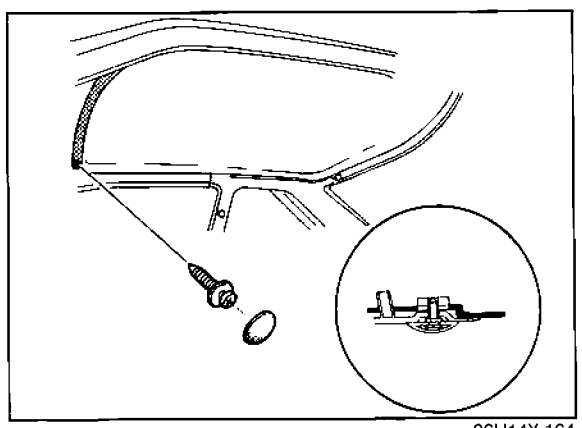
86U14X-162

7. Remove the interior light lens with a protected small screwdriver.



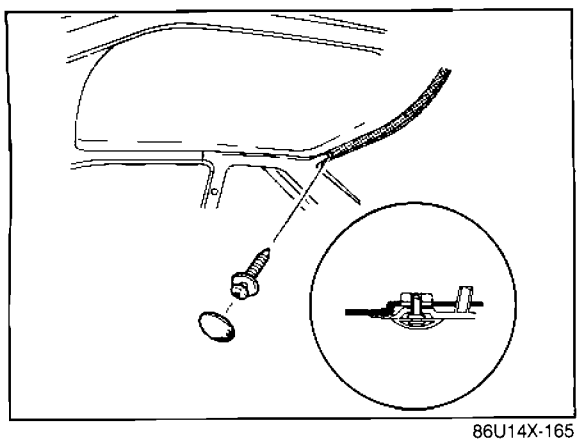
86U14X-163

8. Remove the interior light mounting screws and disconnect the connector.
9. Remove the interior light.



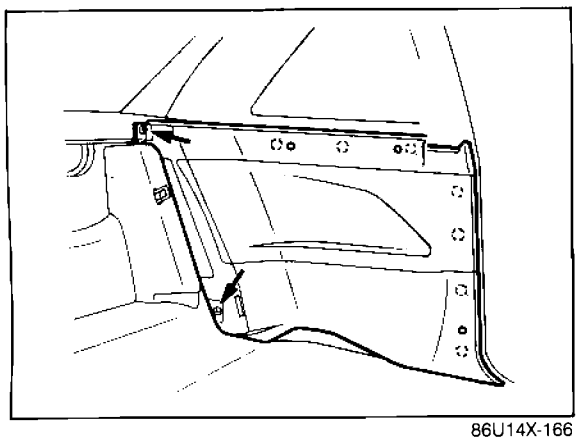
86U14X-164

10. Remove the caps and screws at the ends of the front header trim.



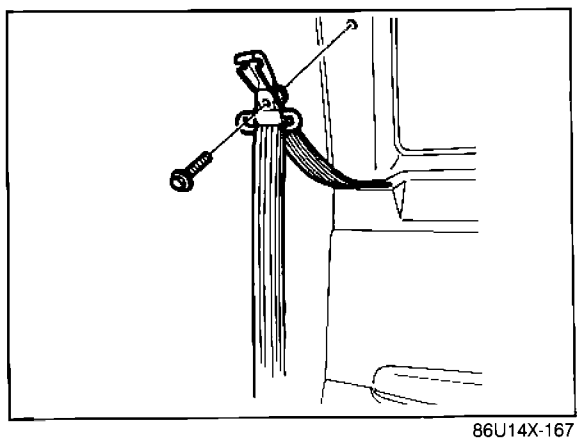
86U14X-165

11. Remove the caps and screws at the ends of the rear header trim.



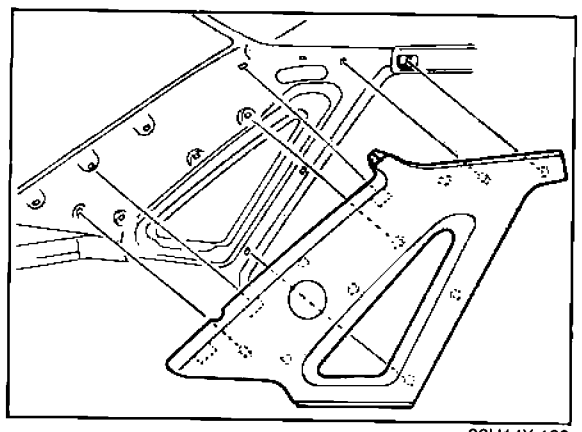
86U14X-166

12. Remove the rear side trim.



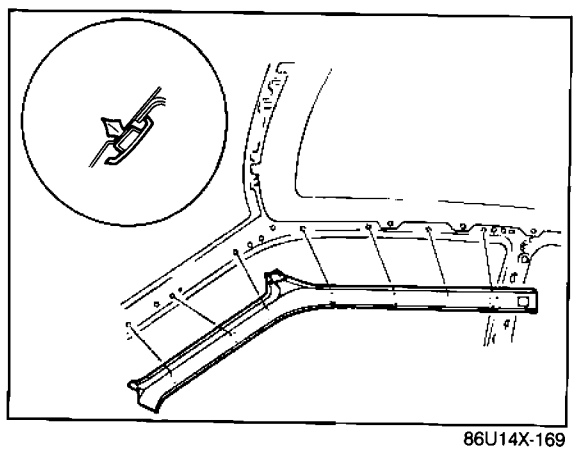
86U14X-167

13. Remove the seat belt mounting bolts.



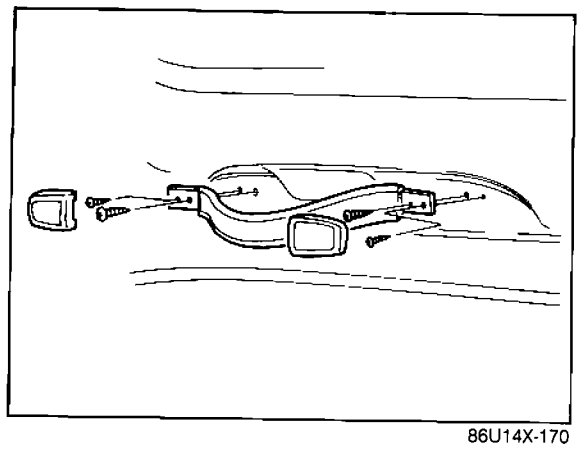
86U14X-168

14. Remove the rear pillar trim with a protected standard screwdriver.



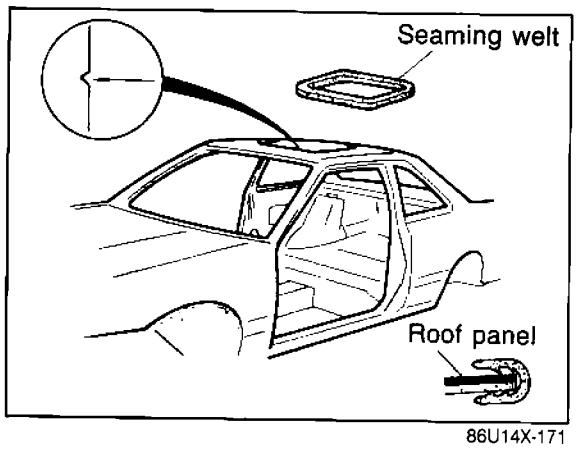
86U14X-169

15. Remove the front pillar trim using a protected standard screwdriver.



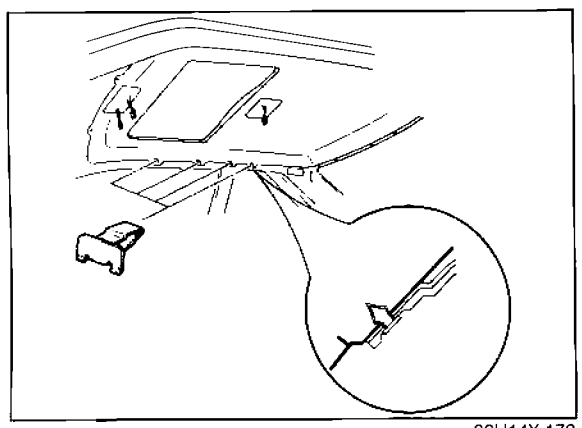
86U14X-170

16. Remove the assist handles.



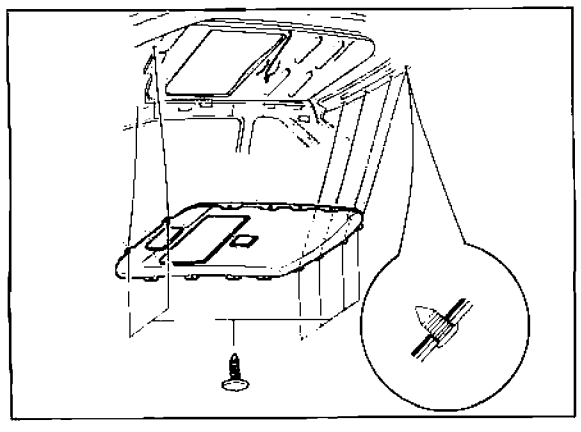
86U14X-171

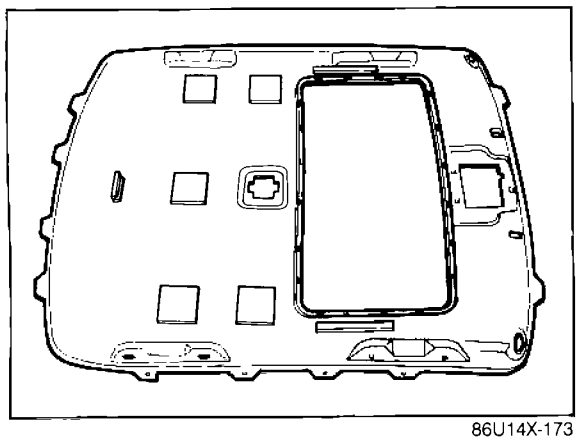
17. Remove the sliding sunroof seaming welt.



86U14X-172

18. Remove the fasteners and remove the headliner.





86U14X-173

INSTALLATION

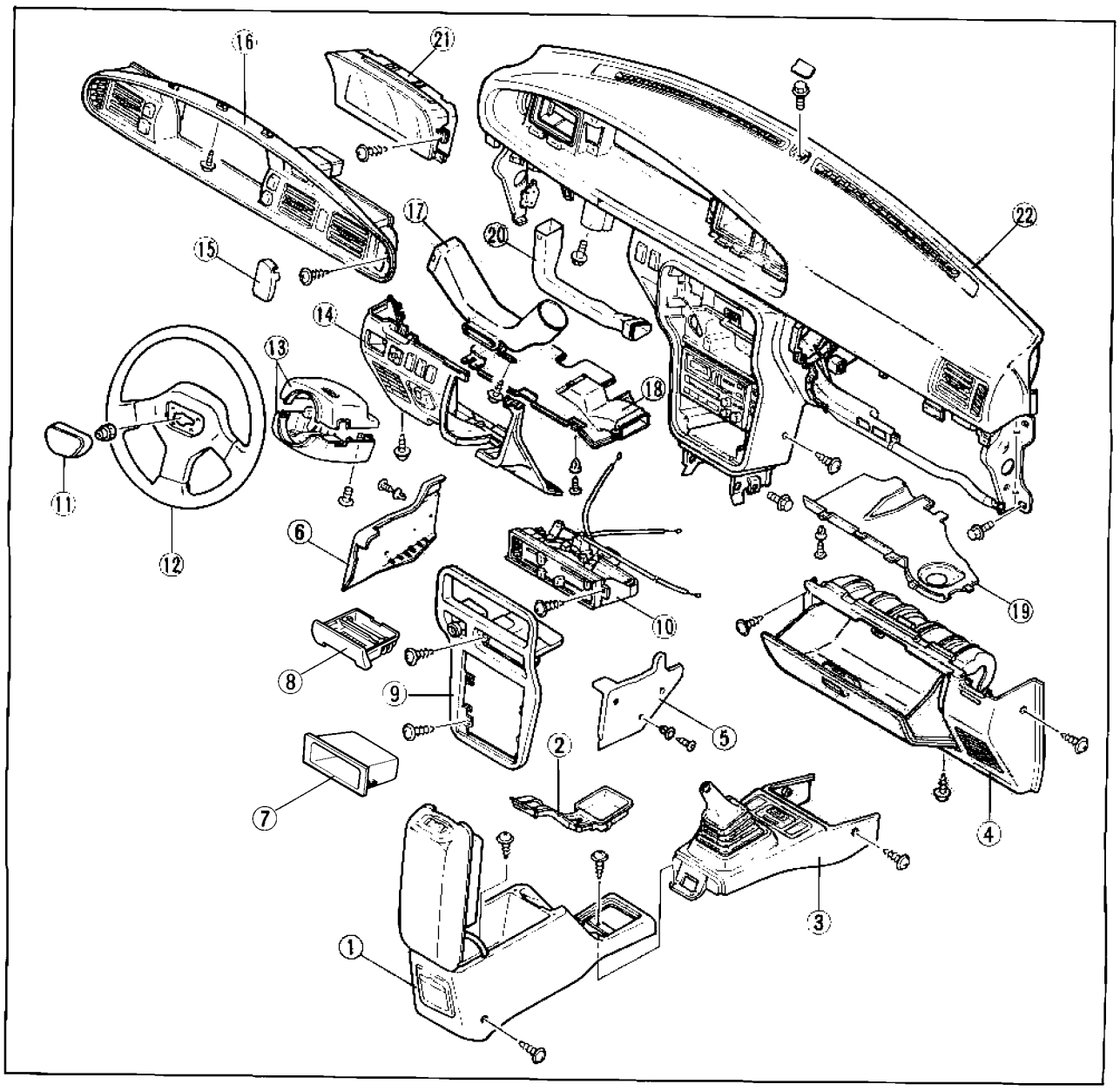
Install in the reverse order of removal, noting the following.

Note

Align the trim and clip positions, then install the clips by striking them lightly.

INSTRUMENT PANEL

STRUCTURAL VIEW

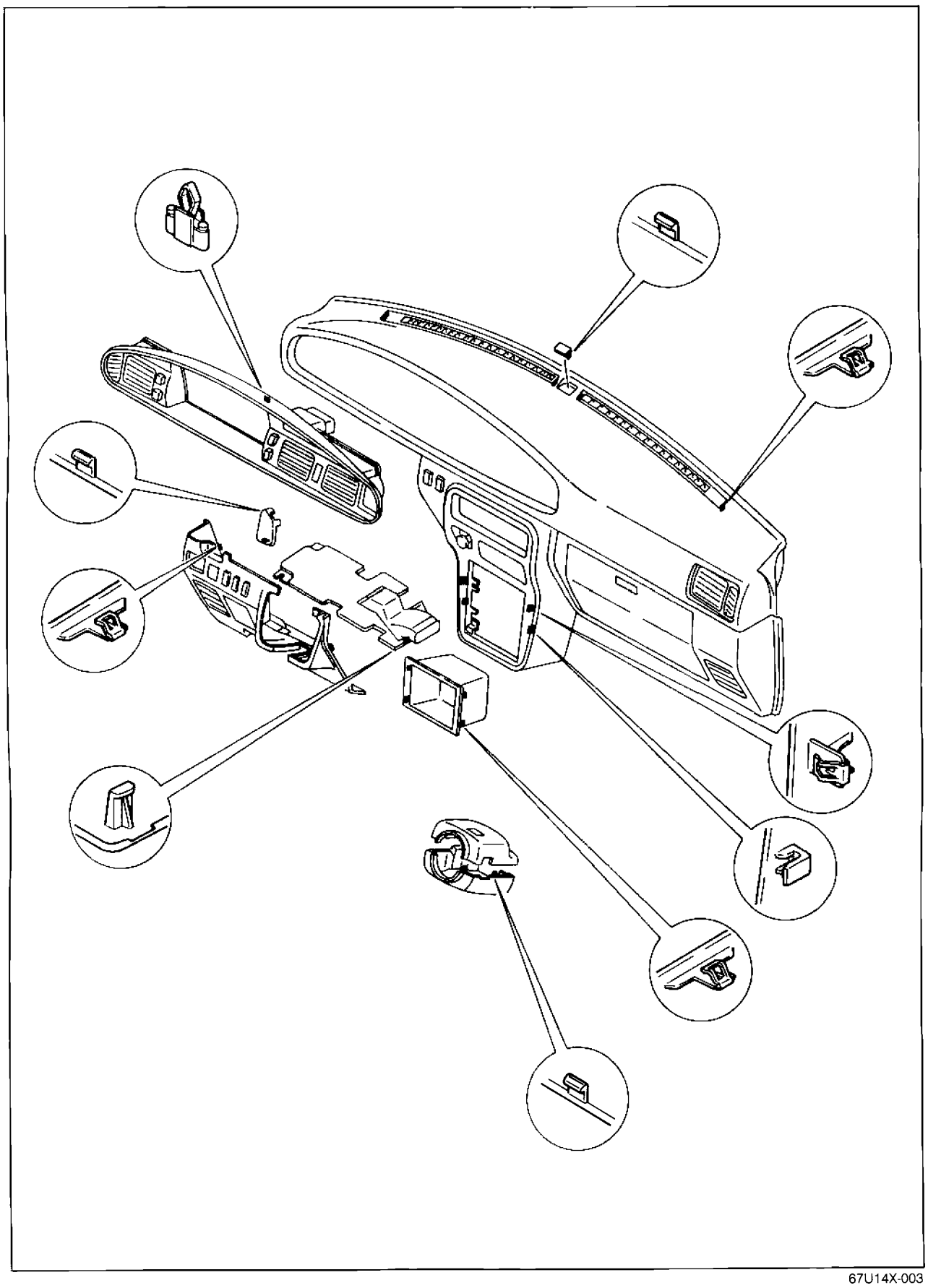


76G14X-036

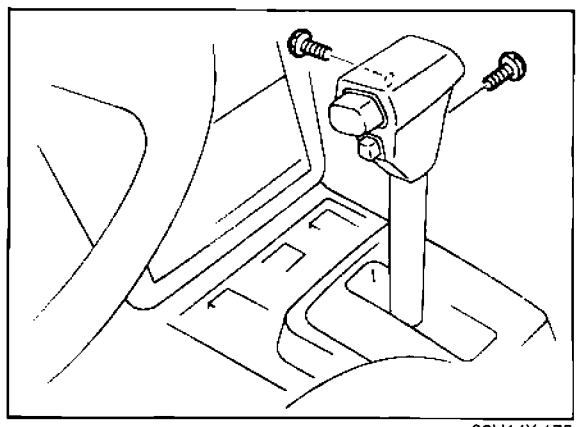
1. Rear console
2. Upper plate.
3. Front console
4. Glove compartment
5. Side cover
6. Side cover
7. Box
8. Ashtray
9. Center panel
10. Heater control assembly
11. Steering wheel cap
12. Steering wheel
13. Column cover
14. Switch panel
15. Cap
16. Meter hood
17. Duct
18. Duct and under cover
19. Under cover
20. Duct
21. Meter assembly
22. Instrument panel

14 INSTRUMENT PANEL

INSTALLATION VIEW



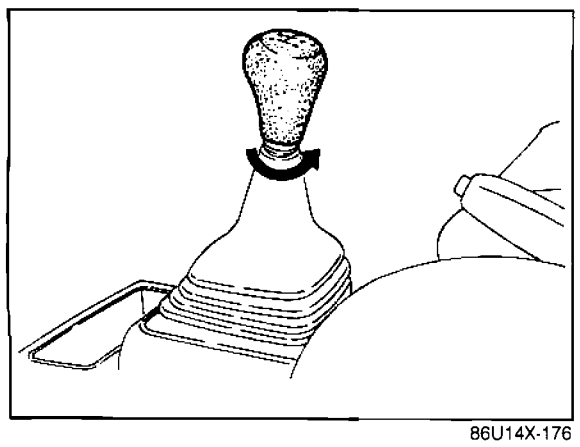
67U14X-003



86U14X-175

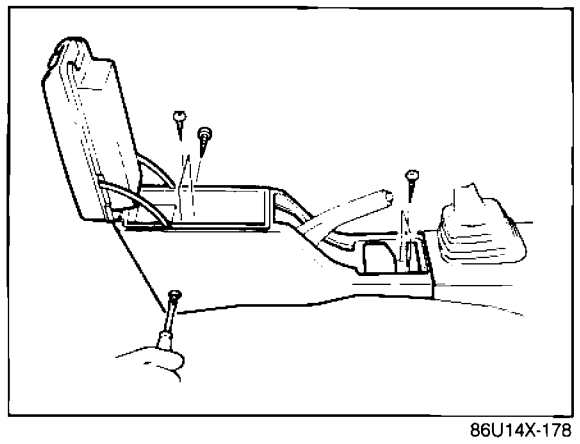
REMOVAL

1. Remove the screws and remove the shift lever knob (ATX).



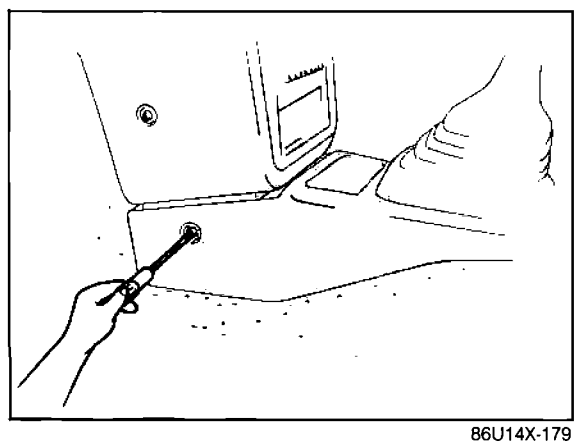
86U14X-176

2. Remove the shift lever knob (MTX).



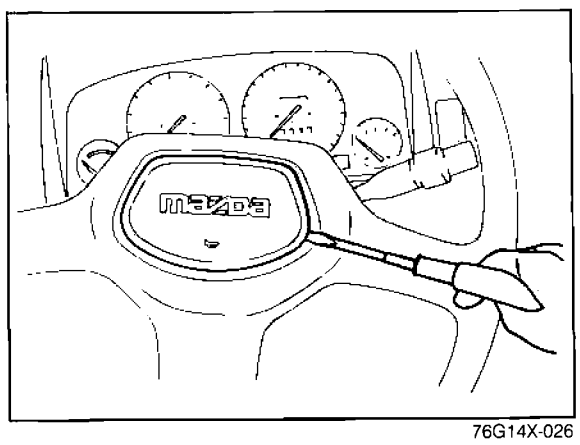
86U14X-178

3. Remove the rear console mounting screws.
4. Pull the console rearward and remove it.



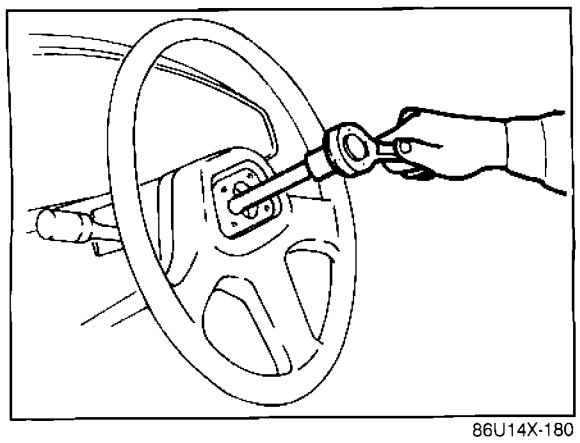
86U14X-179

5. Remove the front console mounting screws.



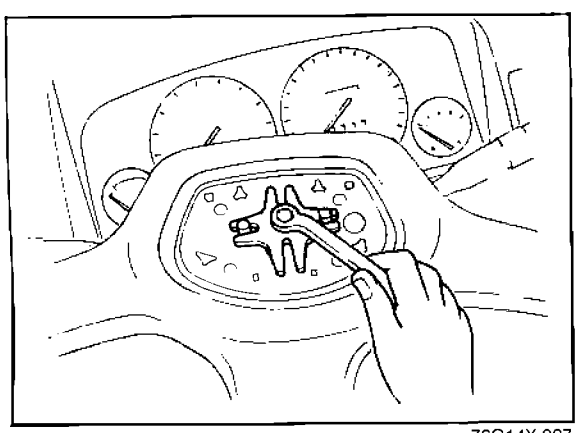
76G14X-026

6. Remove the steering wheel cap.



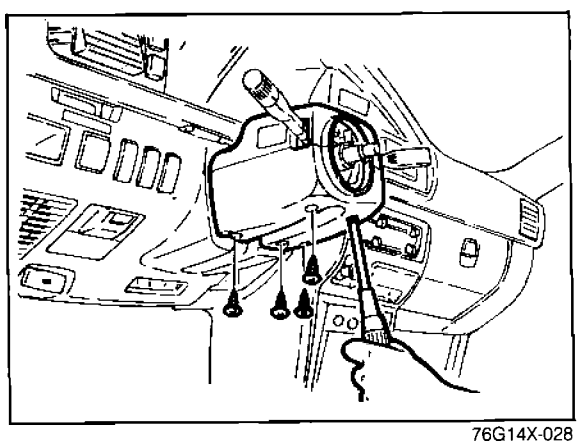
86U14X-180

7. Remove the steering wheel mounting nut.



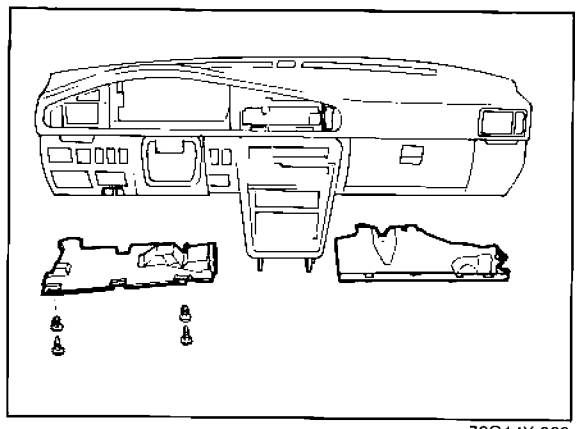
76G14X-027

8. Remove the steering wheel with a steering wheel puller.



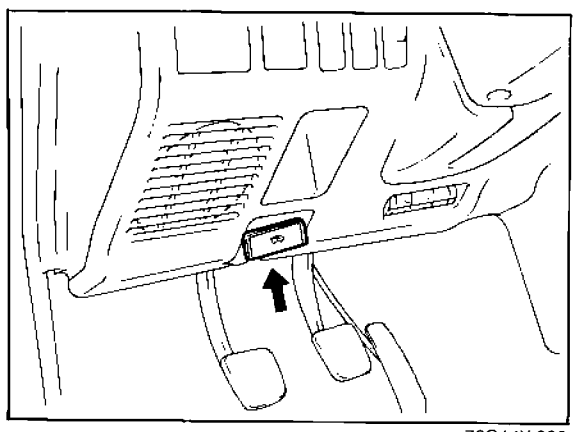
76G14X-028

9. Remove the screws and remove the column covers (upper and lower).



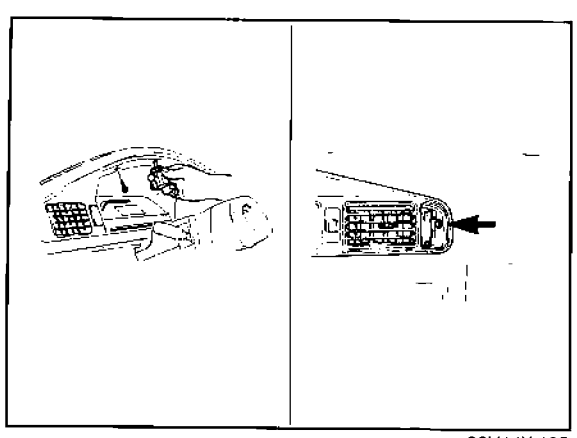
76G14X-029

10. Remove the screws and remove the under covers.



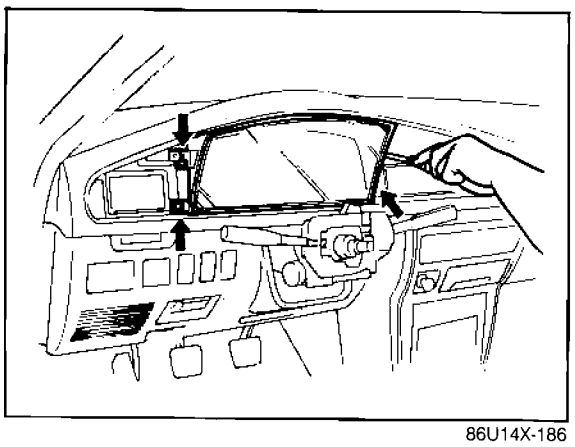
76G14X-030

11. Loosen the nut and remove the hood release knob.



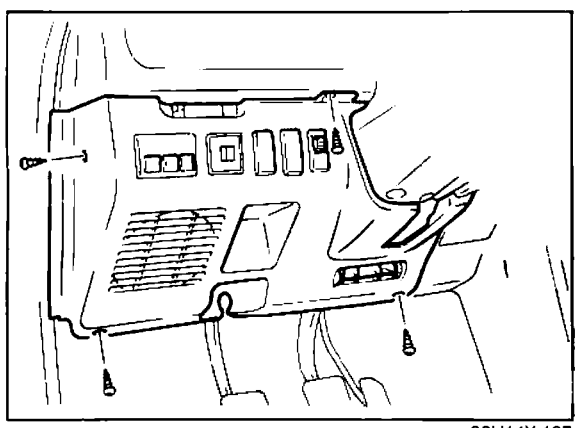
86U14X-185

12. Remove the screws and pull out the meter hood.
13. Disconnect the connectors and remove the meter hood.



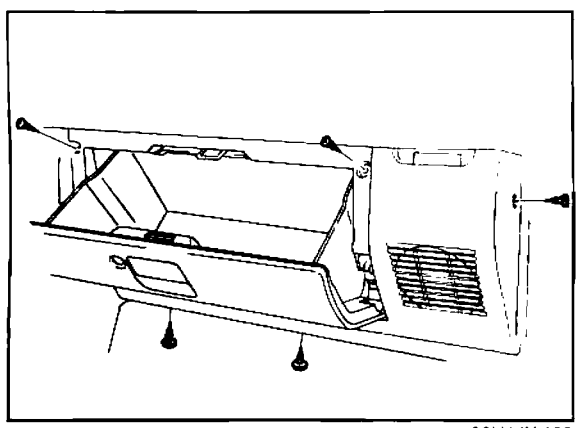
86U14X-186

14. Remove the screws and pull the meter assembly outward.
15. Disconnect the speedometer cable at the speedometer.
16. Disconnect the gauge connectors.
17. Remove the meter assembly.



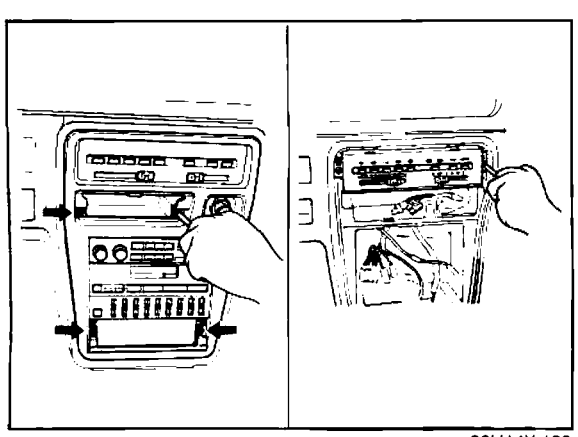
86U14X-187

18. Remove the screws and pull the panel outward.
19. Disconnect the connectors and remove the switch panel.



86U14X-188

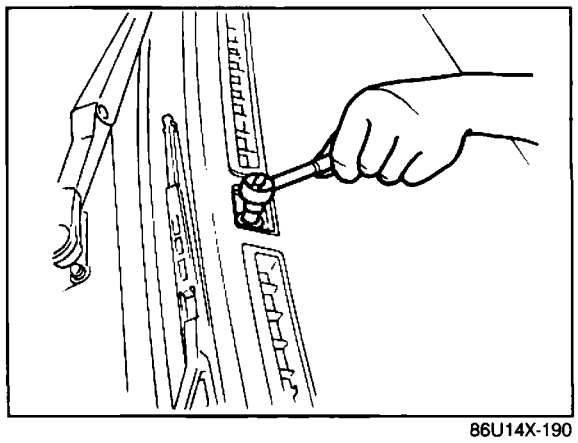
20. Remove the screws and remove the glove box.
21. Disconnect the glove box light connector.



86U14X-189

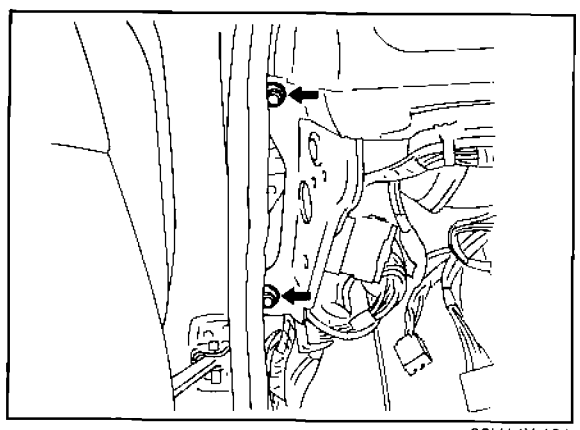
22. Remove the center panel.
23. Remove the screws and slide out the heater control assembly.
24. Disconnect the control wires at the DEF, MAX—COLD and REC positions (lever type control).

Note
Disconnect the connectors at the rear of the control (Logicon type).



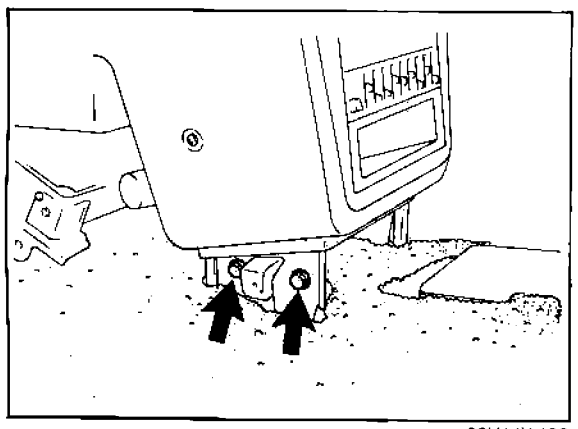
86U14X-190

25. Remove the center cap.
26. Remove the instrument panel mounting bolt.



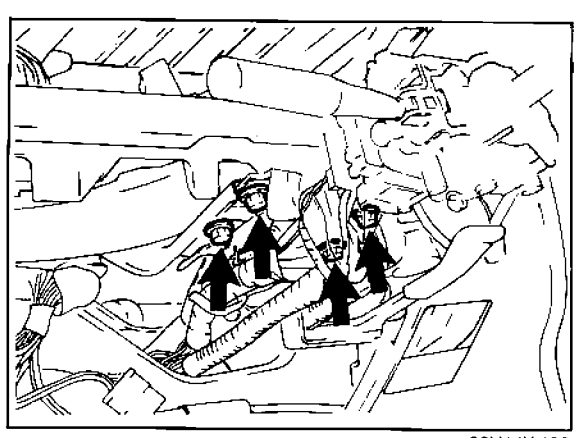
86U14X-191

27. Remove the instrument panel side mounting bolts.



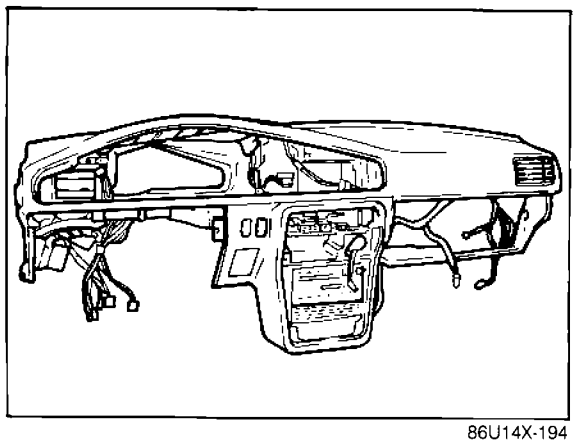
86U14X-192

28. Remove the instrument panel center bracket mounting bolts.



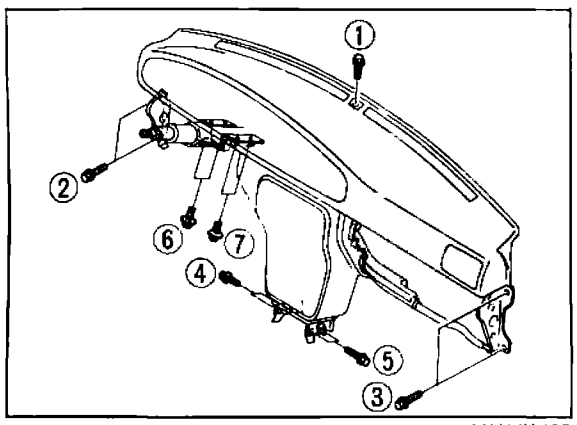
86U14X-193

29. Remove the steering shaft mounting bolts.



86U14X-194

30. Disconnect the dash harness connectors.
31. Remove the instrument panel.



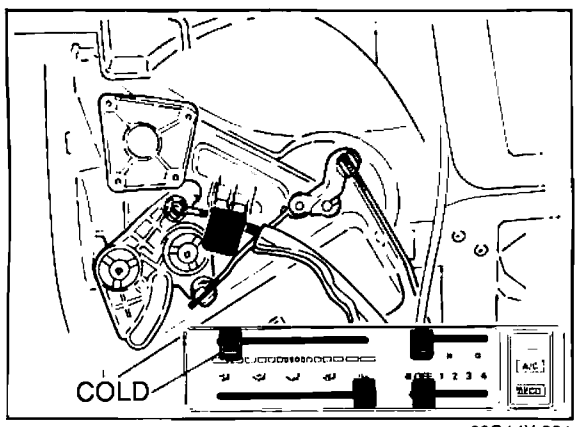
86U14X-195

INSTALLATION

Install in the reverse order of removal, noting the following.

1. Tightening torque:

Bolt \ Torque	N·m (m-kg, ft-lb)
①	4.22—6.18 (0.43—0.63, 3.10—4.54)
② ③	8.8—14 (0.9—1.4, 6.5—10)
④ ⑤	8.8—14 (0.9—1.4, 6.5—10)
⑥ ⑦	8.8—14 (0.9—1.4, 6.5—10)
Steering wheel	39—49 (4.0—5.0, 29—36)

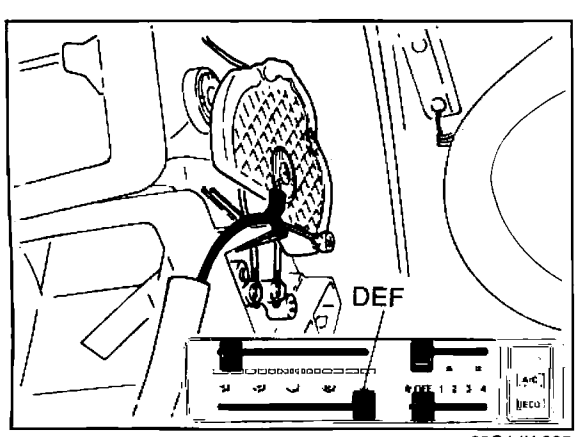


69G14X-224

2. Air-mix door control wire

a. Set TEMP lever at MAX—COLD position.
b. Connect the control wire and clamp it with the shutter lever on the heater unit all the way to the right side.

Caution
Move the temperature control lever to check that the wire is secured. Also, check that it moves the full stroke between HOT and COLD.

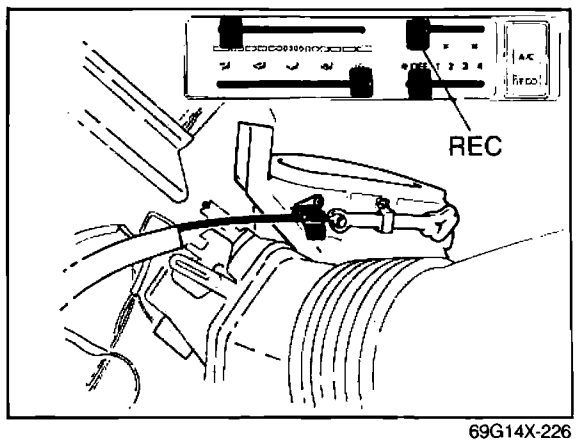


69G14X-225

3. Mode control wire

a. Set MODE control lever to DEF position.
b. Connect the control wire and clamp it with the shutter lever on the heater unit at its closest point.

Caution
Move the mode lever to check that the wire is secured. Also, check that it moves the full stroke between DEF and VENT.



69G14X-226

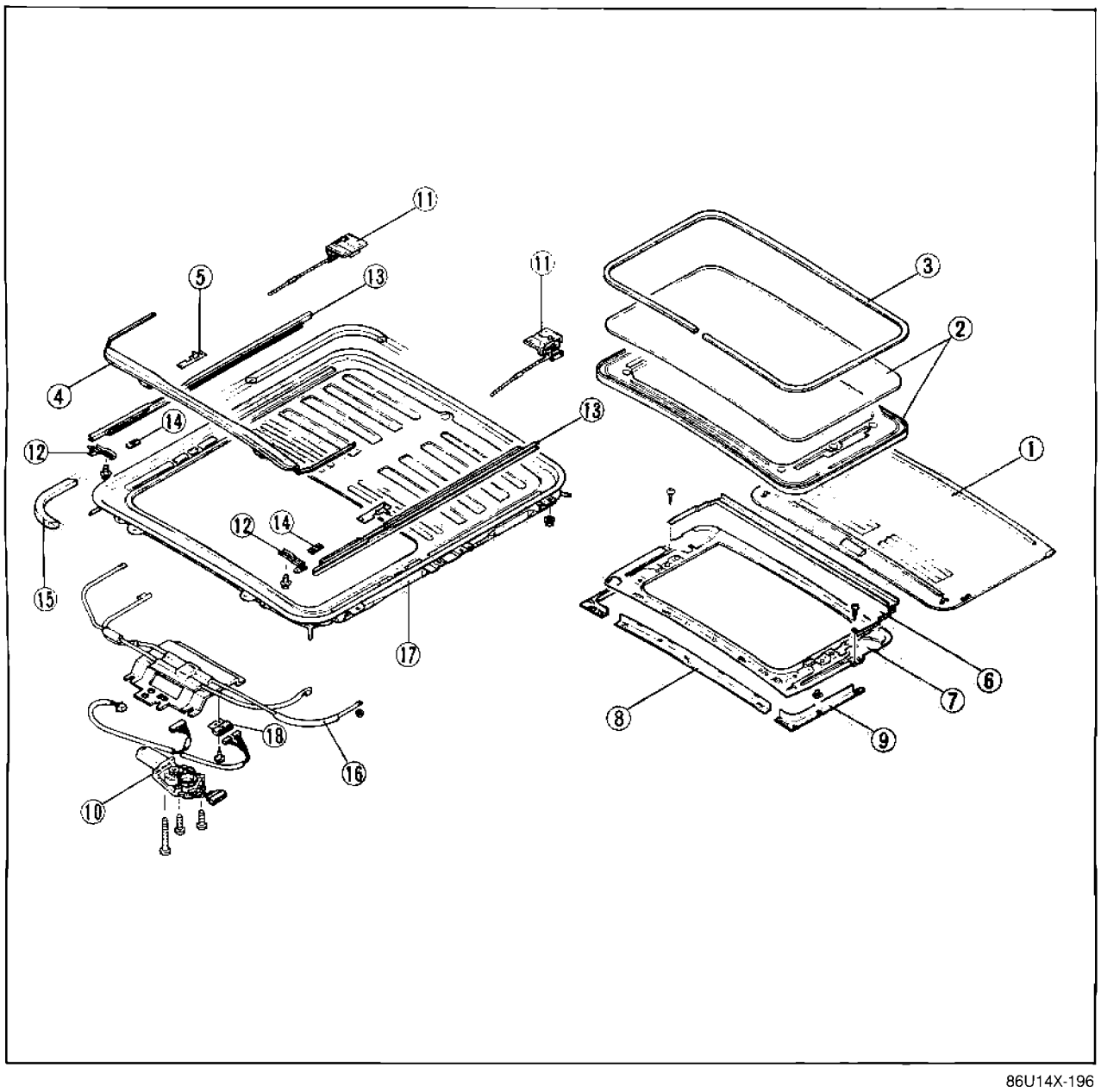
4. REC-FRESH air selector wire

a. Set the selector lever to REC position.
b. Connect the control wire and clamp it with the shutter lever on the blower unit at its closest point.

Caution
Move the recirculate-fresh air switch lever to check that the wire is secured. Also, check that it moves the full stroke between REC and FRESH.

SLIDING SUNROOF

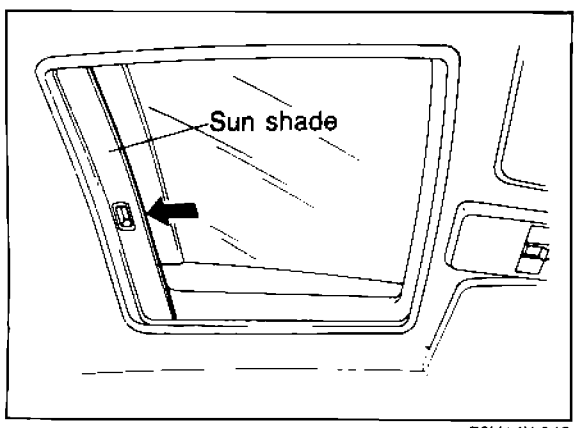
STRUCTURAL VIEW



86U14X-196

1. Sun shade
2. Slide panel
3. Weatherstrip
4. Deflector
5. Set plate
6. Drip rail
7. Lower panel
8. Lower panel cover
9. Decoration cover
10. Motor assembly
11. Guide brackets (rear)
12. Guide bracket (front)
13. Guide rails
14. Guide
15. Packing
16. Tube assembly
17. Frame assembly
18. Sunroof relay

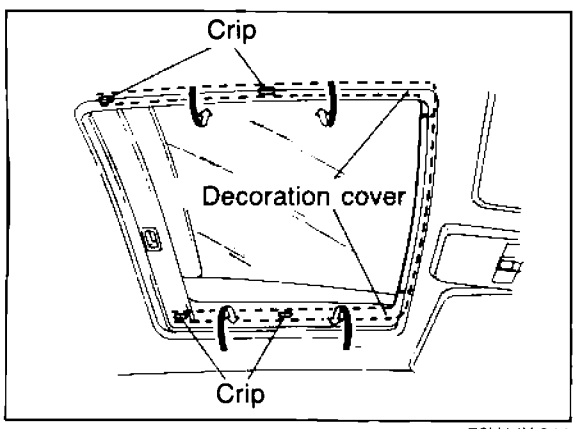
14 SLIDING SUNROOF



76U14X-043

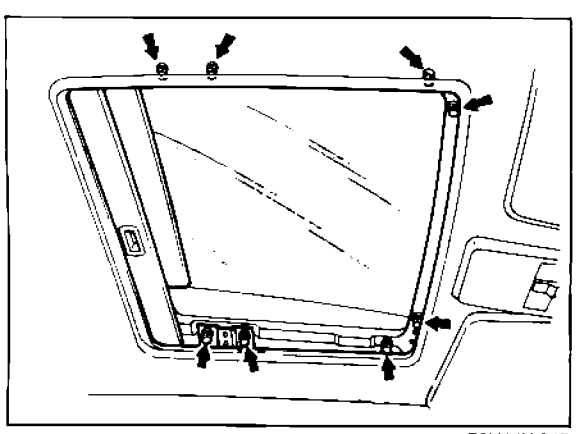
REMOVAL

1. Slide the sun shade all the way to the rear.
2. Fully close the sliding panel.



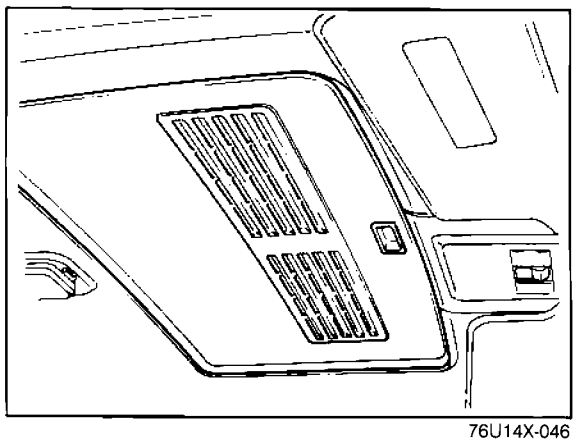
76U14X-044

3. Remove the left and right decoration covers.



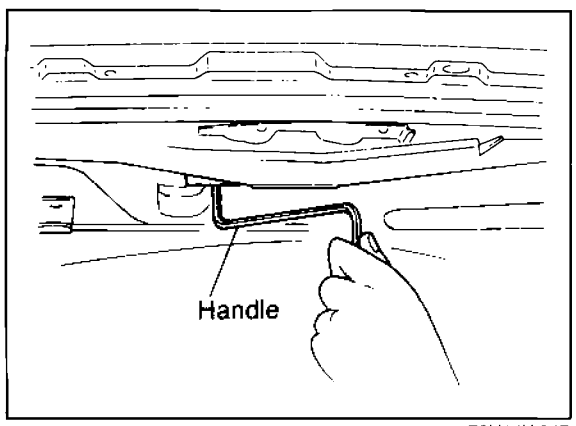
76U14X-045

4. Remove the installation nuts for the sliding panel and lower panel.
5. Remove the sliding panel by pushing it upward from inside the vehicle.



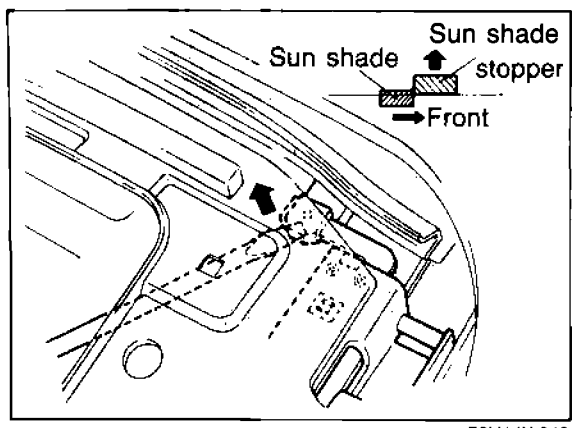
76U14X-046

6. Fully close the sun shade.



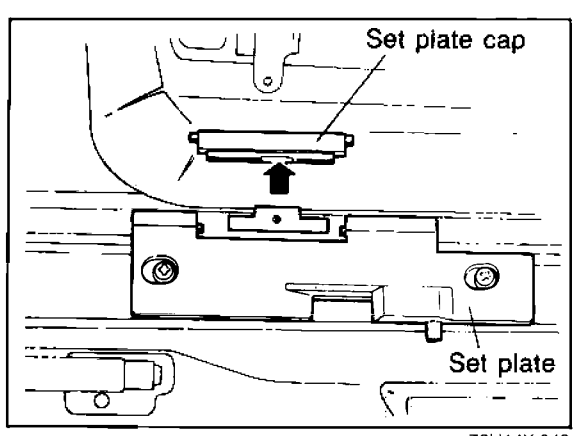
76U14X-047

7. Turn the handle and move the sun shade **5—10 mm (0.19—0.39 in)** to the rear.



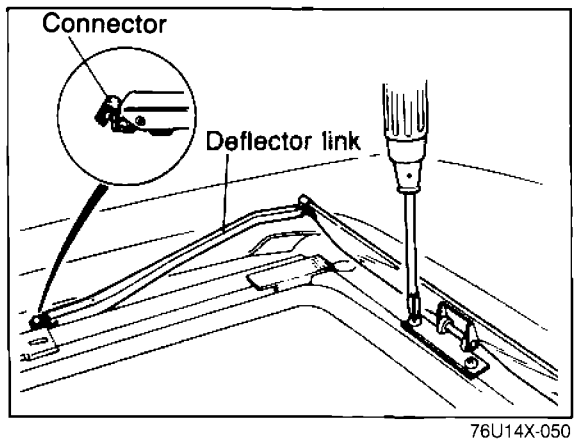
76U14X-048

8. Use a flat-tip screwdriver to lift the sun shade stopper at the rear of the cable holder, then release the stopper and move the sun shade toward the front.
9. Turn the handle to fully open the lower panel. (Leave the sun shade fully closed.)



76U14X-049

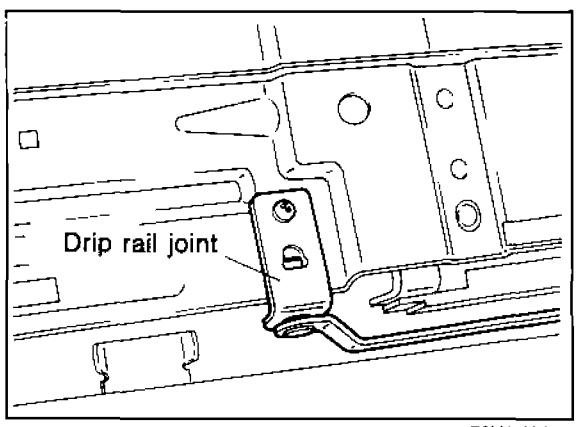
10. Open the sun shade half way and remove the set plate cap. Pull out the sun shade from the notch of the set plate.



76U14X-050

11. Use a flat-tip screwdriver to pry up the connector at the rear of the deflector link, being careful not to scratch it, and remove the deflector link.
12. Remove the screws and remove the deflector.

Note
Because force is applied to the deflector by the spring in the direction of opening, hold so that the deflector doesn't contact the roof panel, then pull out the deflector link.

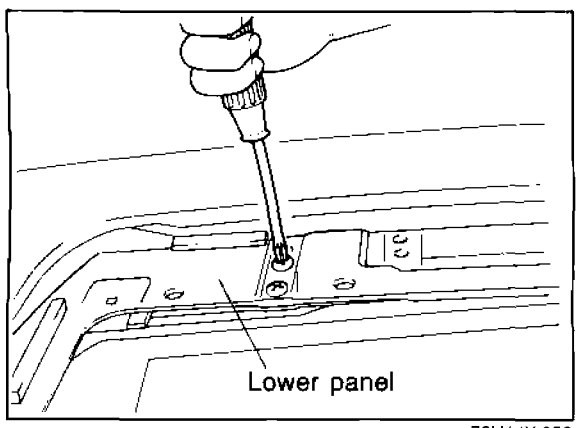


76U14X-051

13. Completely close the lower panel.

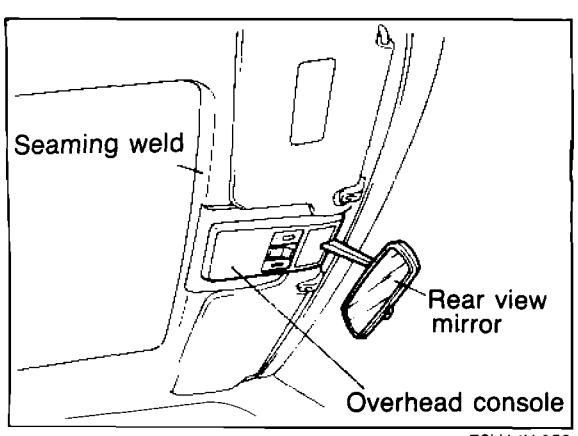
Note
Because the lower panel will move forward out of place, turn the motor using the handle while pushing to the rear to close fully.

14. After removing the screw and the drip rail joint link, push the drip rail backward and inward.



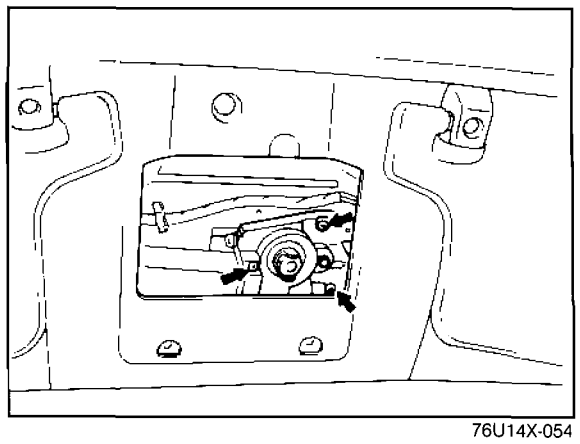
76U14X-052

15. After removing the installation screw of the guide bracket assembly (rear), remove the right side of the guide (front).
16. Remove the lower panel.



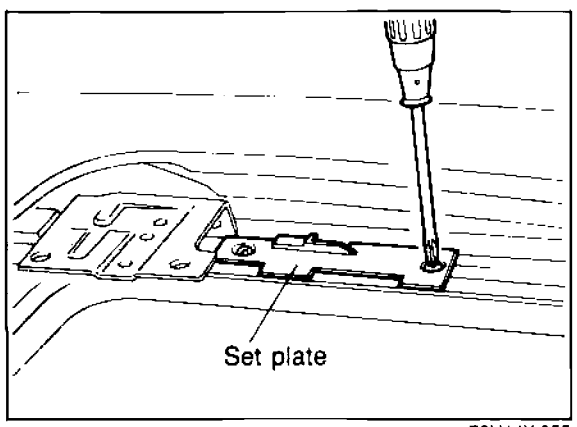
76U14X-053

17. Remove the rear view mirror, overhead console, and seaming welt.



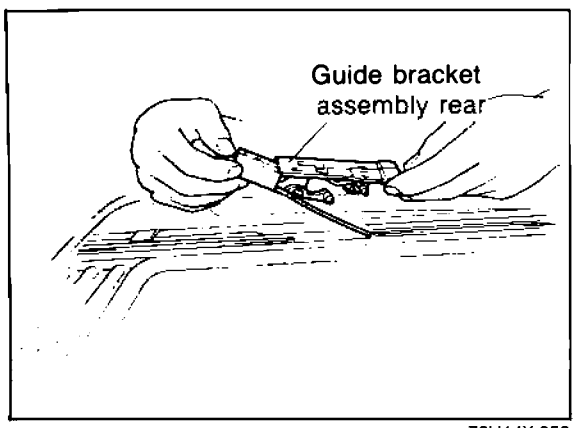
76U14X-054

18. After removing the 3 screws, remove the motor and pull out the harness coupler.



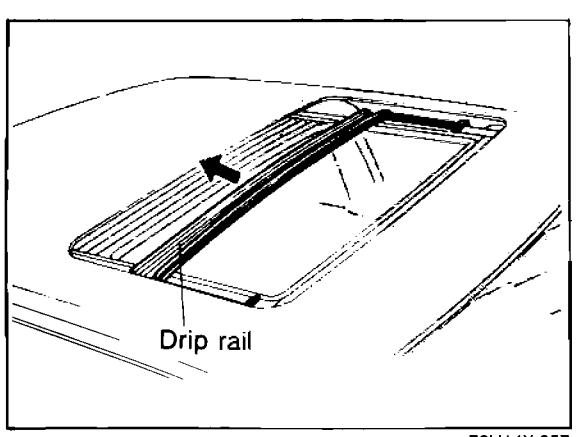
76U14X-055

19. Push the rear guide bracket backward and downward about **10 cm (3.9 in)**.
20. Remove the screw and the set plate.



76U14X-056

21. Move the rear guide bracket all the way forward, and pull out while lifting from the rear.
22. Move the drip rail forward then pull out from the notch of the guide rail.

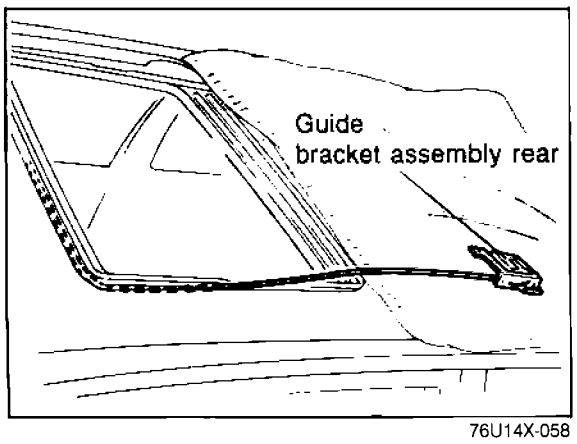


76U14X-057

INSTALLATION

1. Insert the drip rail.

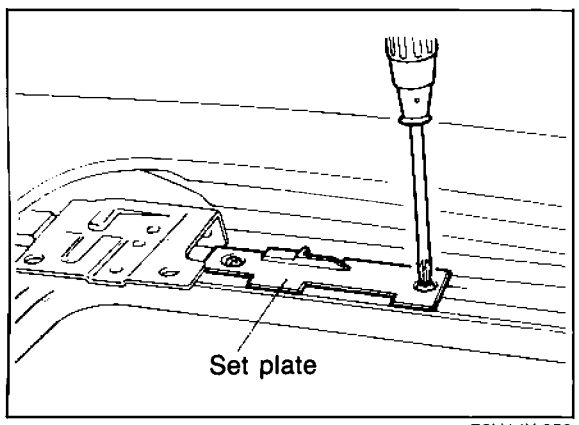
Note
Paying attention to the direction of the rail, push in from the open part to the position where it is not visible.



76U14X-058

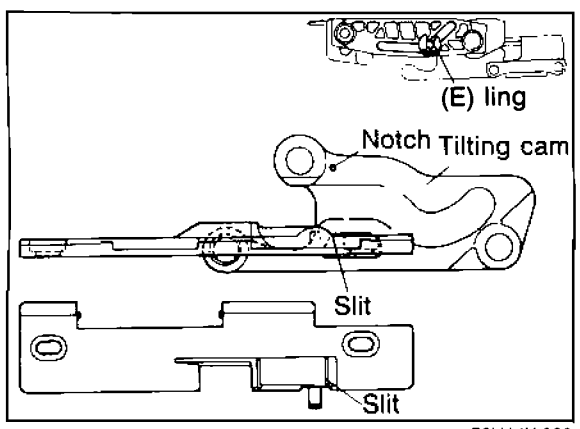
2. Insert the drive cable into the tube.

Note
Apply a liberal coat of grease to the drive cable and the sliding part of the guide bracket assembly (rear), then push the cable all the way forward.



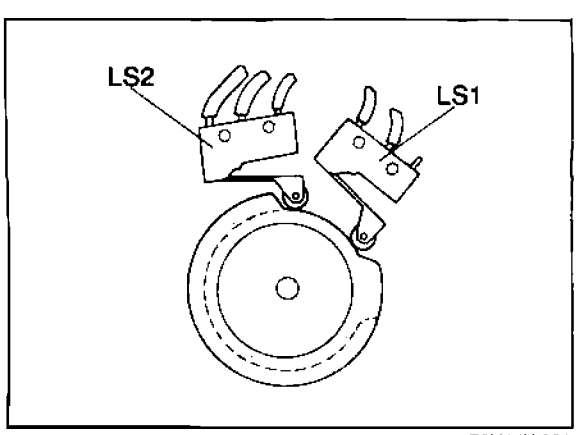
76U14X-059

3. After moving the guide bracket assembly slightly toward the rear, tighten the screw, taking care regarding the direction the set plate faces.



76U14X-060

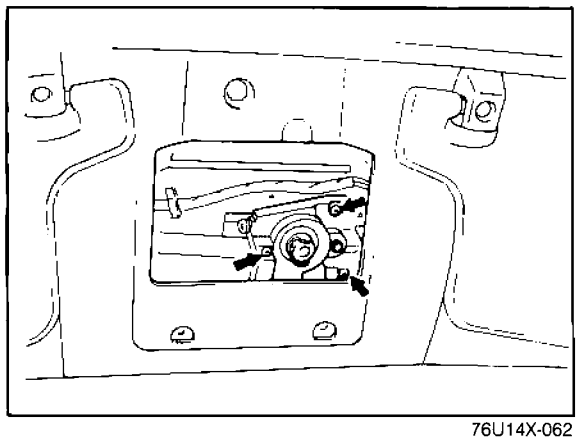
4. Align the projection of the tilting cam and the slit in the set plate.



76U14X-061

5. Check that the limit switches (LS1 and LS2) of the motor are as shown in the figure at the OFF position.

Note
a) Be careful of the cam position.
b) Use the handle to position it correctly.

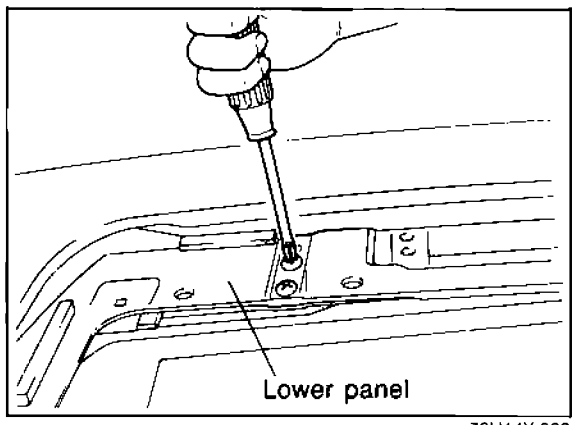


76U14X-062

6. Install the motor assembly.

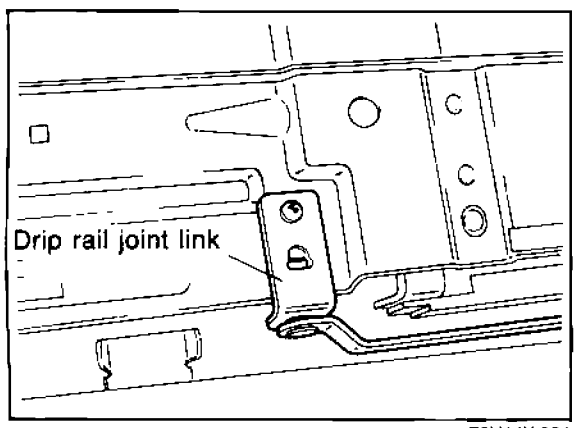
Note
There are 2 types of screws, long and short.
Be sure to use the correct ones.

7. Connect the wiring of the motor assembly and the motor switch.



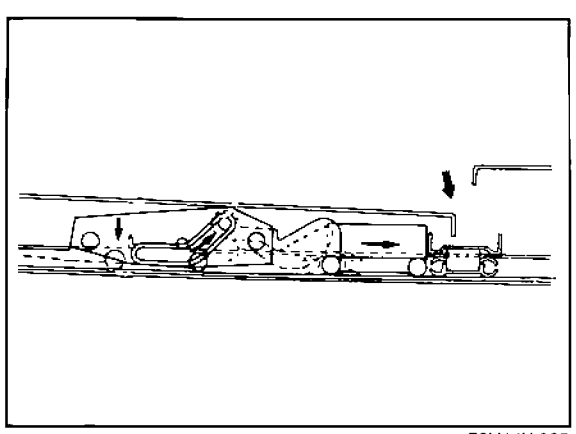
76U14X-063

8. Install the lower panel and tighten the screws.
9. Install the guide front and tighten the screws.



76U14X-064

10. Pull out the drip rail from the rear, and secure the link by the screw.



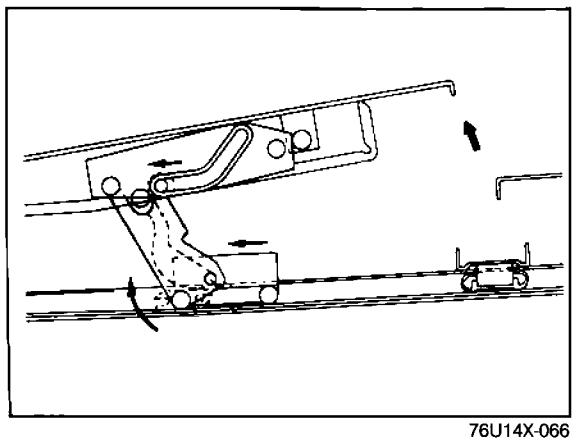
76U14X-065

11. Using the handle turn the motor to fully open the lower panel.

Note

a) Because the roof panel and lower panel might interfere with each other when the lower panel is opened, check as shown in the figure, that the guide roller is completely fitted into the guide rail.

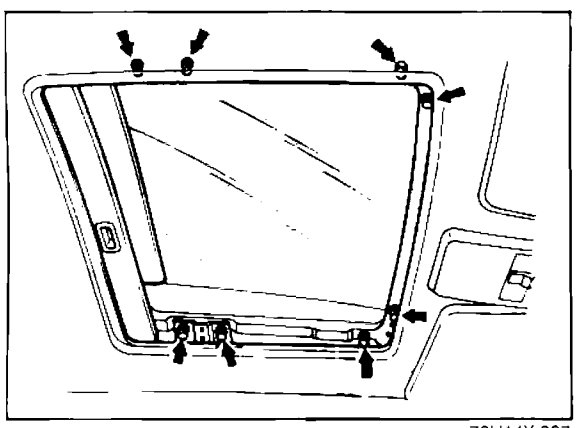
b) Turn the motor while pushing the cable.



76U14X-066

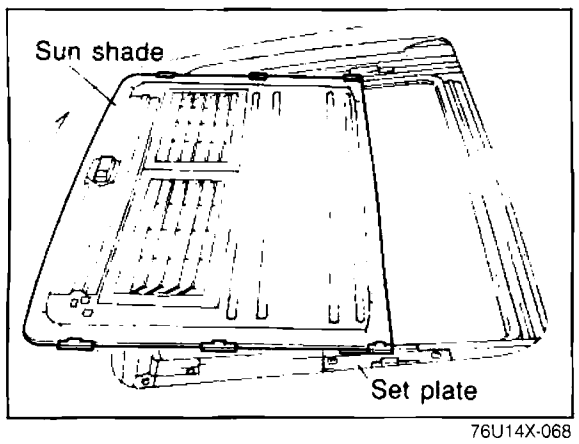
12. Secure the deflector by tightening the screw, and then install the deflector link.
13. Turn the motor using the handle, and visually check the sliding, tilt-down and tilt-up operations.

14 SLIDING SUNROOF



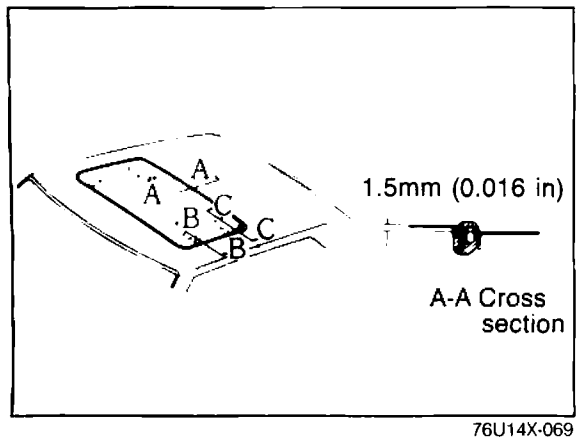
76U14X-067

14. Fully close the lower panel.
15. Install the slide panel to the lower panel, and tighten securely.



76U14X-068

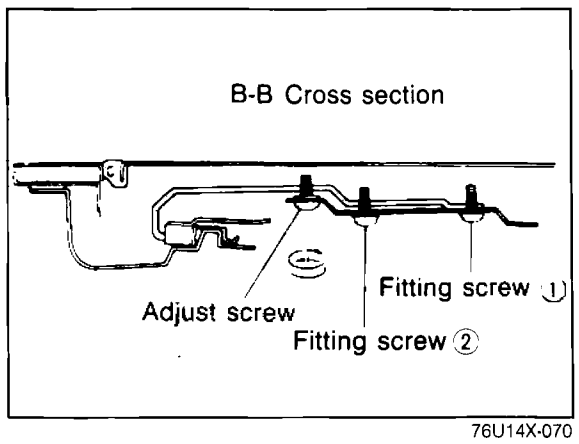
16. Insert the sun shade from the notch in the set plate, and push it all the way back.
17. Insert the set plate cap.



76U14X-069

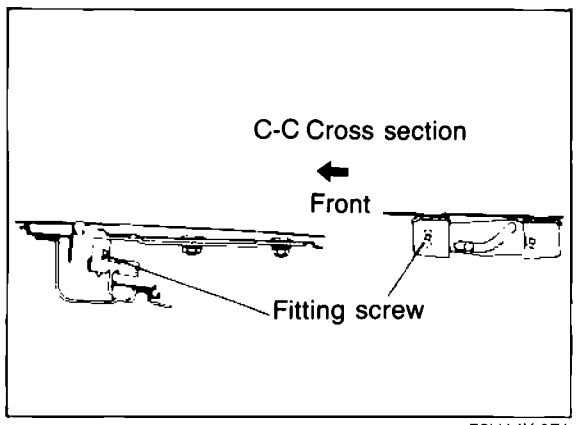
18. Adjust the height of the slide panel.

(Cross-section A-A)
Adjust so that the height difference between the outer panel and roof panel is **1.5 mm (0.06 in) max**.



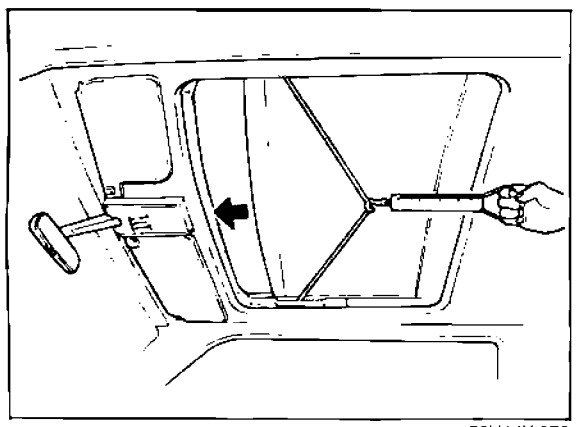
76U14X-070

(Cross-section B-B adjustment)
(1) Loosen installation screws (1) and (2).
If the adjustment is only about **2 mm (0.08 in)** don't loosen screw (1).
(2) Turn the screws to adjust.
Turning to the right raises, and to the left lowers.
(3) Tighten installation screws (1) and (2).



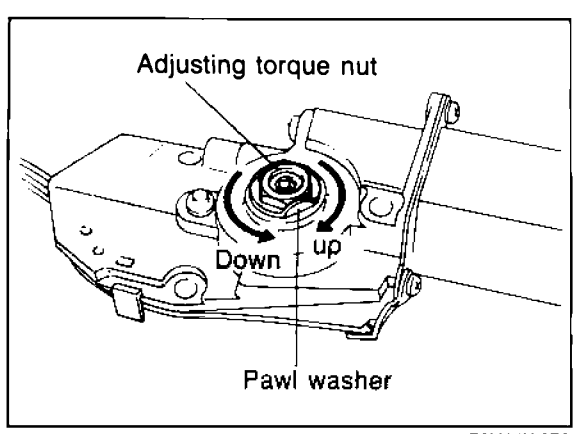
76U14X-071

(Cross-section C-C adjustment)
(1) Loosen the installation screw and the adjust screw.
The adjustment will be easier if the installation screw is not loosened too much.
(2) Adjust by moving the outer panel from the inside or outside.
(3) Tighten the adjust screw first, and then the installation screw.



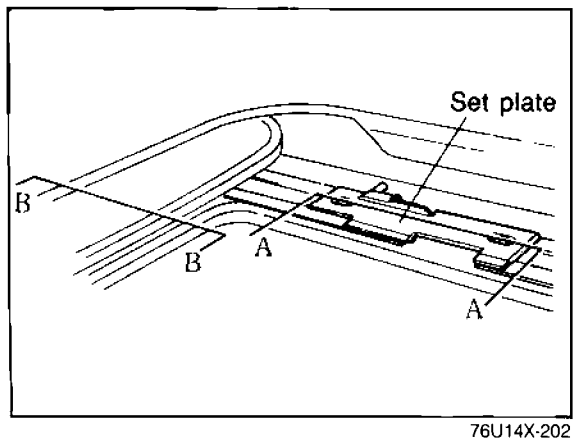
76U14X-072

19. Measure the moving load of the panel, and adjust it to **15—25 kg (33.1—55.7 lb)** using the torque adjustment nut on the motor.
20. To measure, use the deep hole in the center of the lower panel.



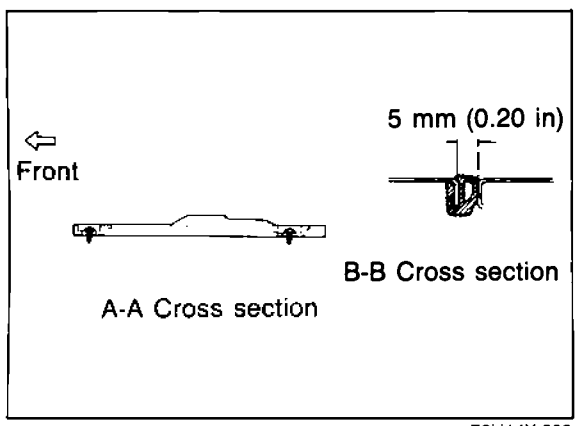
76U14X-073

21. After adjustment, be sure to lock the nut with the pawl washer.
22. Install the ornamental cover.
23. Install the front peripheral parts.



76U14X-202

24. After installation is completed, check the operation.
(1) Is the battery voltage correct?
(2) Is there any foreign material on the sliding parts of the sunroof?
(3) When the slide panel is opened, does the roof panel interfere with the rear part? If so, open the slide panel fully and move the set plate forward.

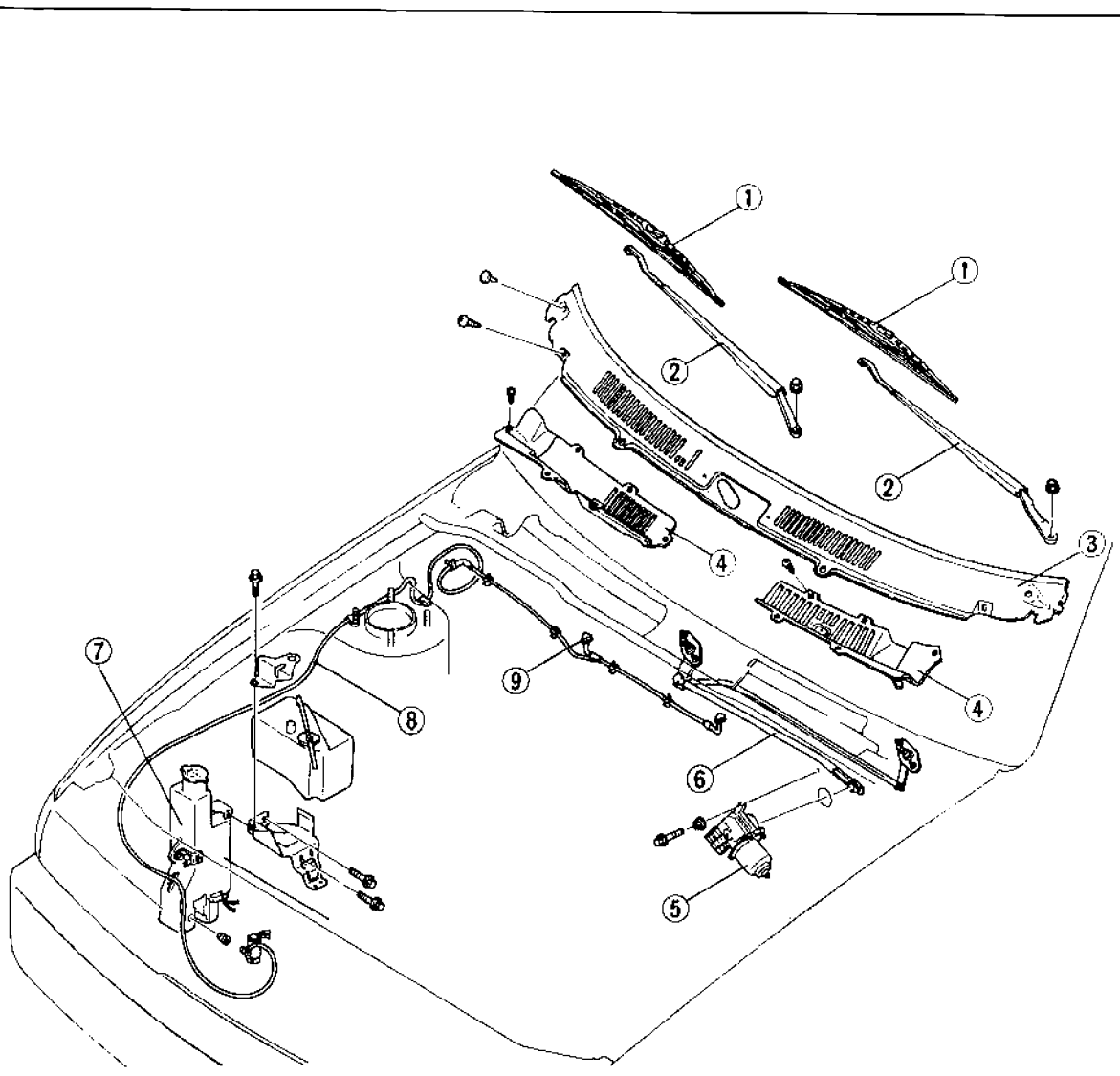


76U14X-203

Caution:
If the stopper is moved too far forward, there might be a malfunction or leaking. Do not leave a gap of more than 5 mm (0.2 in) between the slide panel and roof panel.

WINDSHIELD WIPER

STRUCTURAL VIEW

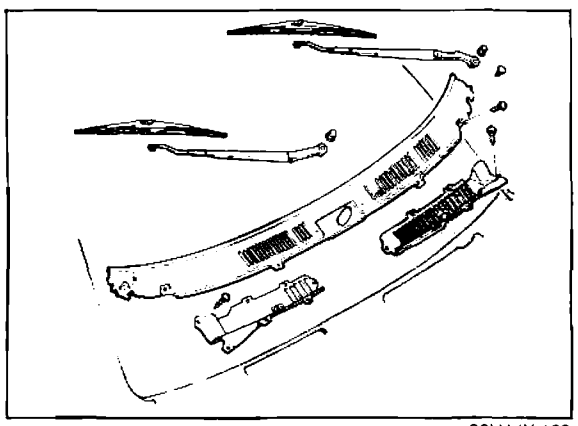


Note
The wiper arms not interchangeable.

63U14X-132

1. Wiper blade
2. Wiper arm
3. Lower molding
4. Cover
5. Wiper motor
6. Link assembly
7. Washer tank
8. Hose
9. Washer nozzle

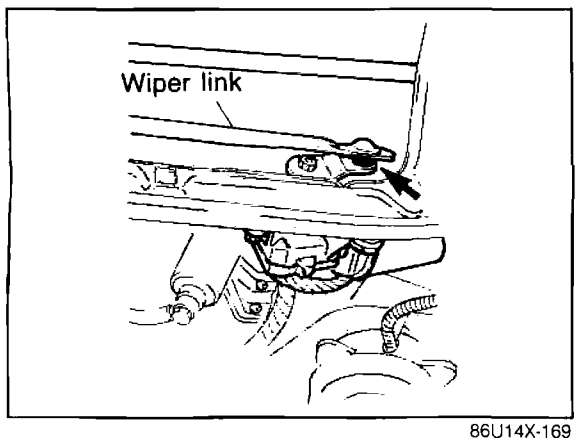
14 WINDSHIELD WIPER



86U14X-168

REMOVAL

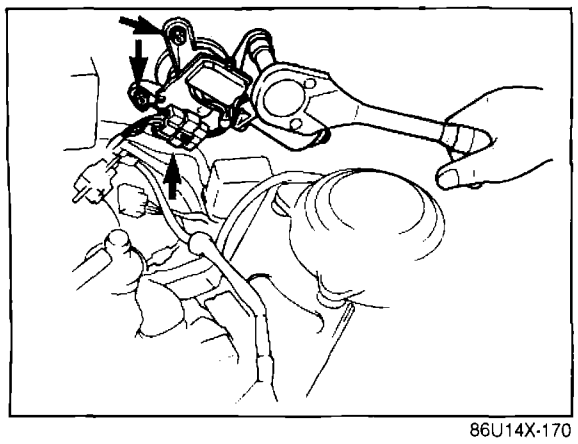
1. Disconnect the negative battery cable.
2. Remove the wiper arms.
3. Remove the lower molding.
4. Remove the cover.



86U14X-169

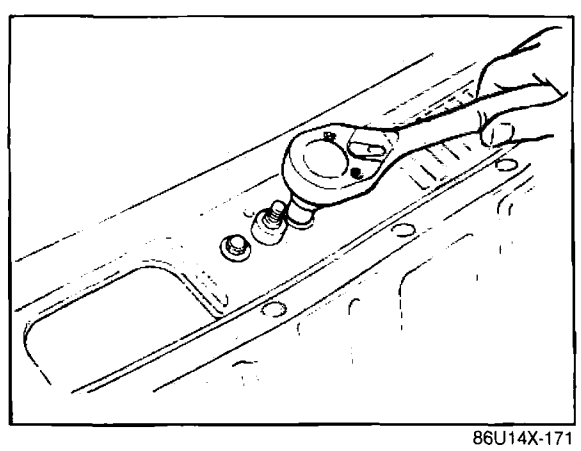
5. Disconnect the wiper link from the motor.

Caution
Do not remove the motor arm unless necessary. The motor arm position on the motor shaft decides the automatic stop position. (lowest position of the wiper arm)



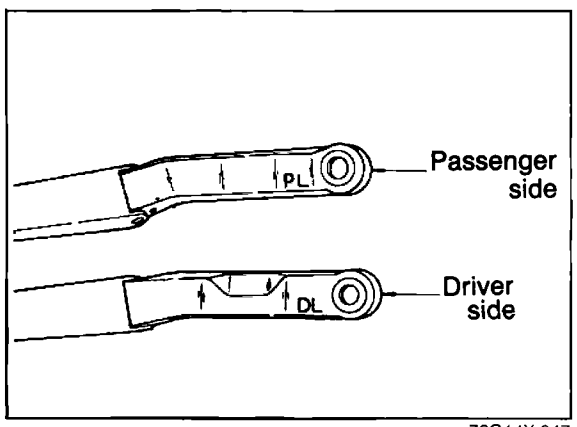
86U14X-170

6. Disconnect the connector.
7. Remove the wiper motor.



86U14X-171

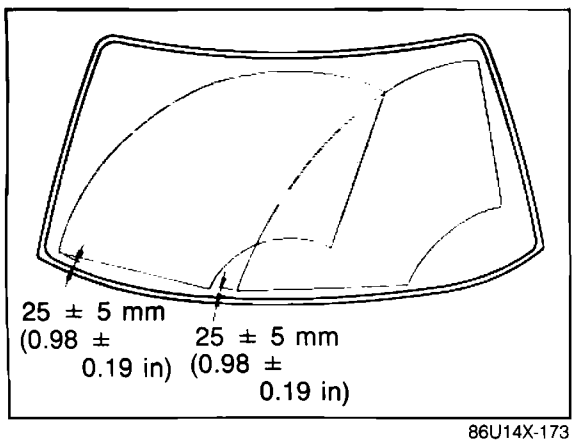
8. Remove the wiper link assembly mounting bolts.
9. Lift the wiper link assembly out from the left side (driver's side) service hole.



76G14X-047

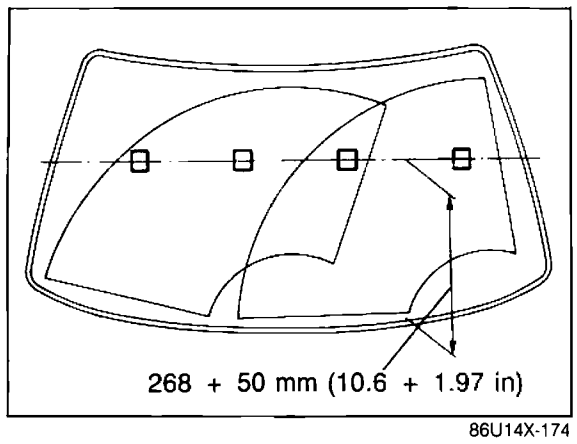
INSTALLATION
Install in the reverse order of removal.

Note
The wiper arms are identified by marks on the arms.
DL: driver side
PL: passenger side



86U14X-173

ADJUSTMENT
Arm Height
Set the arm height as shown in the figure.

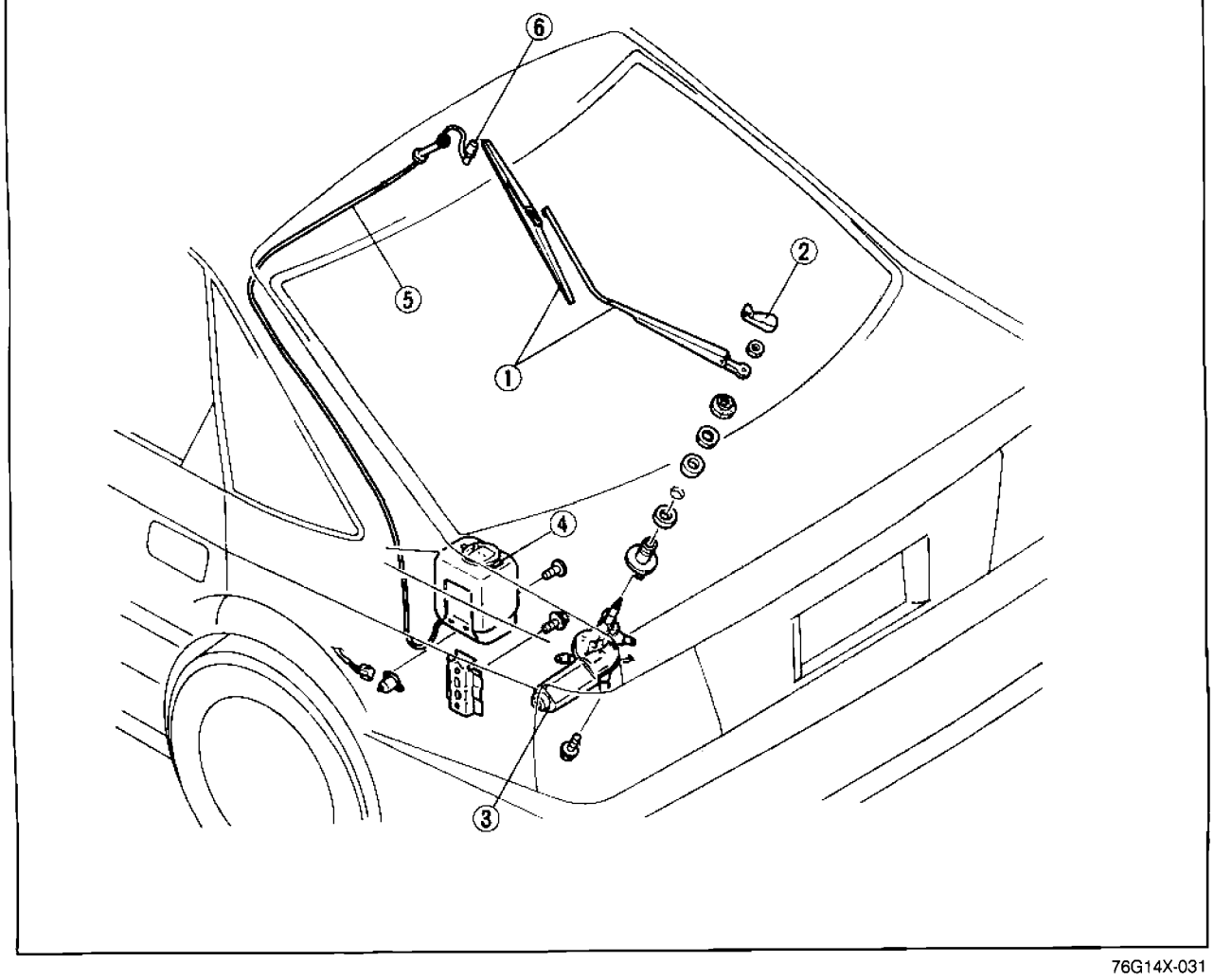


86U14X-174

Adjustment of washer spray
Inserting a needle or similar object into the nozzle hole and bend to change the spray direction.

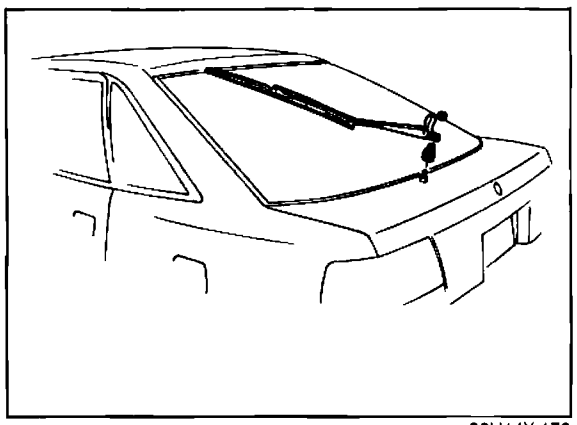
REAR WINDOW WIPER

STRUCTURAL VIEW (HATCHBACK)



76G14X-031

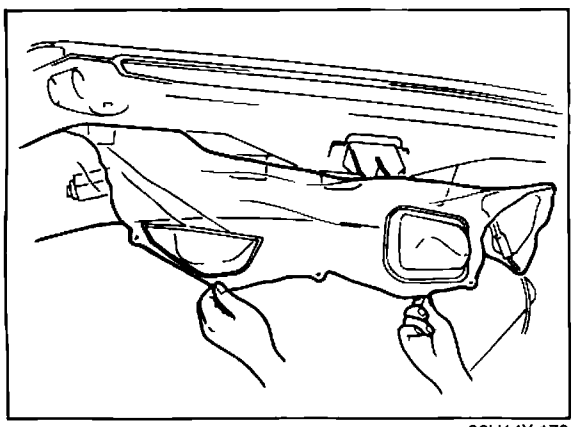
1. Wiper arm and blade
2. Seal cap
3. Wiper motor
4. Washer tank
5. Hose
6. Washer nozzle



86U14X-176

REMOVAL

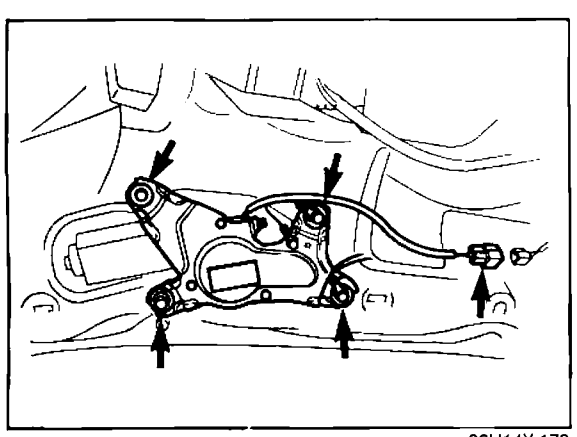
1. Disconnect the negative battery cable.
2. Remove the wiper arm.
3. Open the rear hatch.



86U14X-178

4. Remove the rear hatch trim (upper, side and lower).
5. Remove the rear hatch screen.

Note
Remove the screen carefully so that it may be reused.



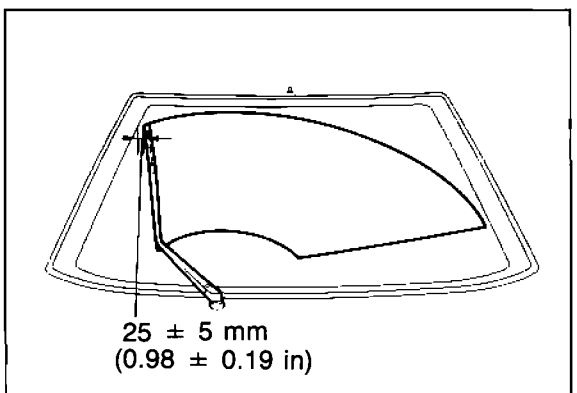
86U14X-179

6. Disconnect the rear wiper motor connector.
7. Remove the rear wiper motor.

INSTALLATION

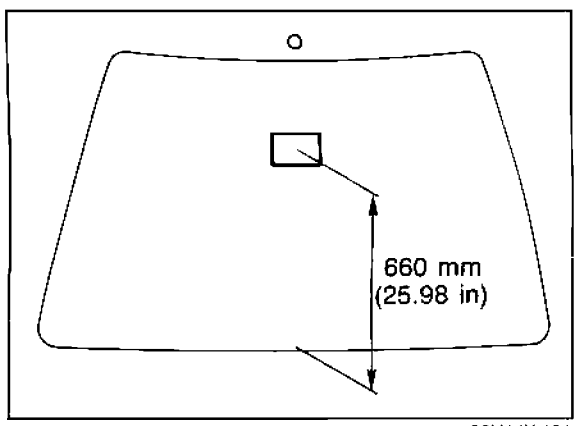
Install in the reverse order of removal.

14 REAR WINDOW WIPER



86U14X-180

ADJUSTMENT
Arm Height
Set the height as shown in the figure.



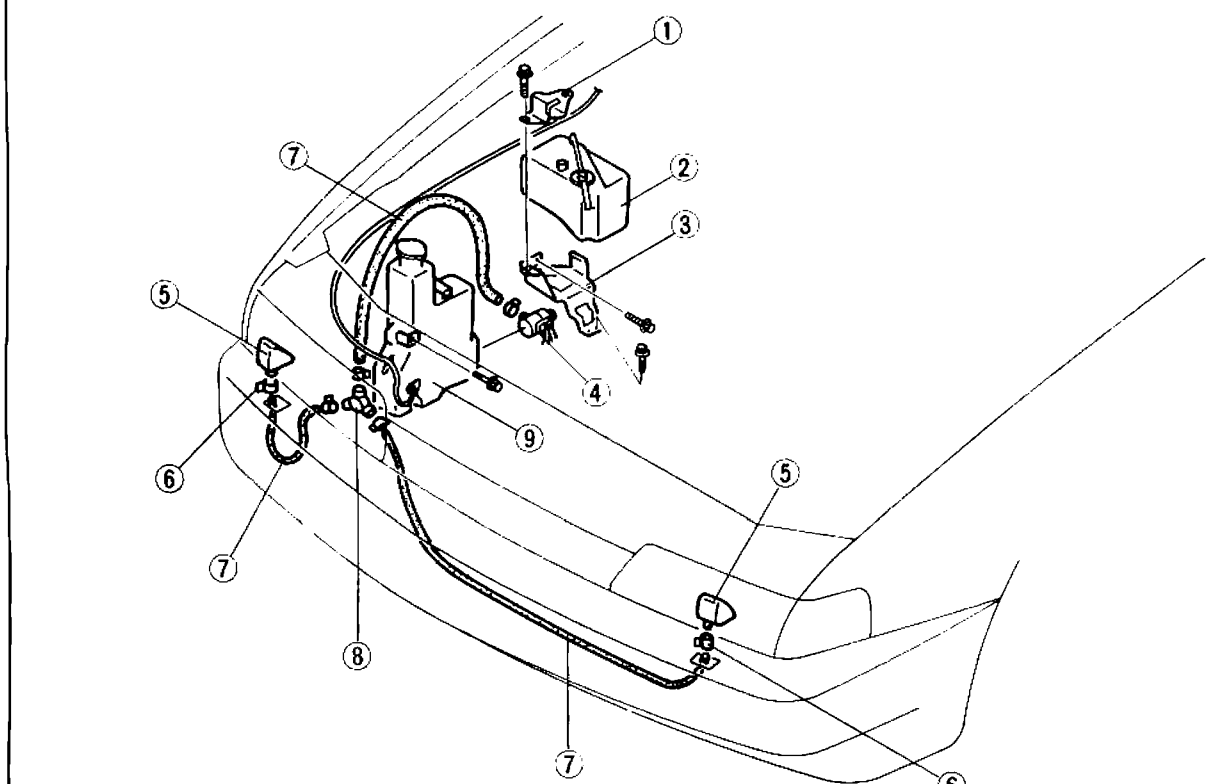
86U14X-181

Adjustment of washer spray
Insert a needle or similar object into the nozzle hole and bend to change the spray direction.

HEADLIGHT WASHER

REMOVAL AND INSTALLATION

1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.

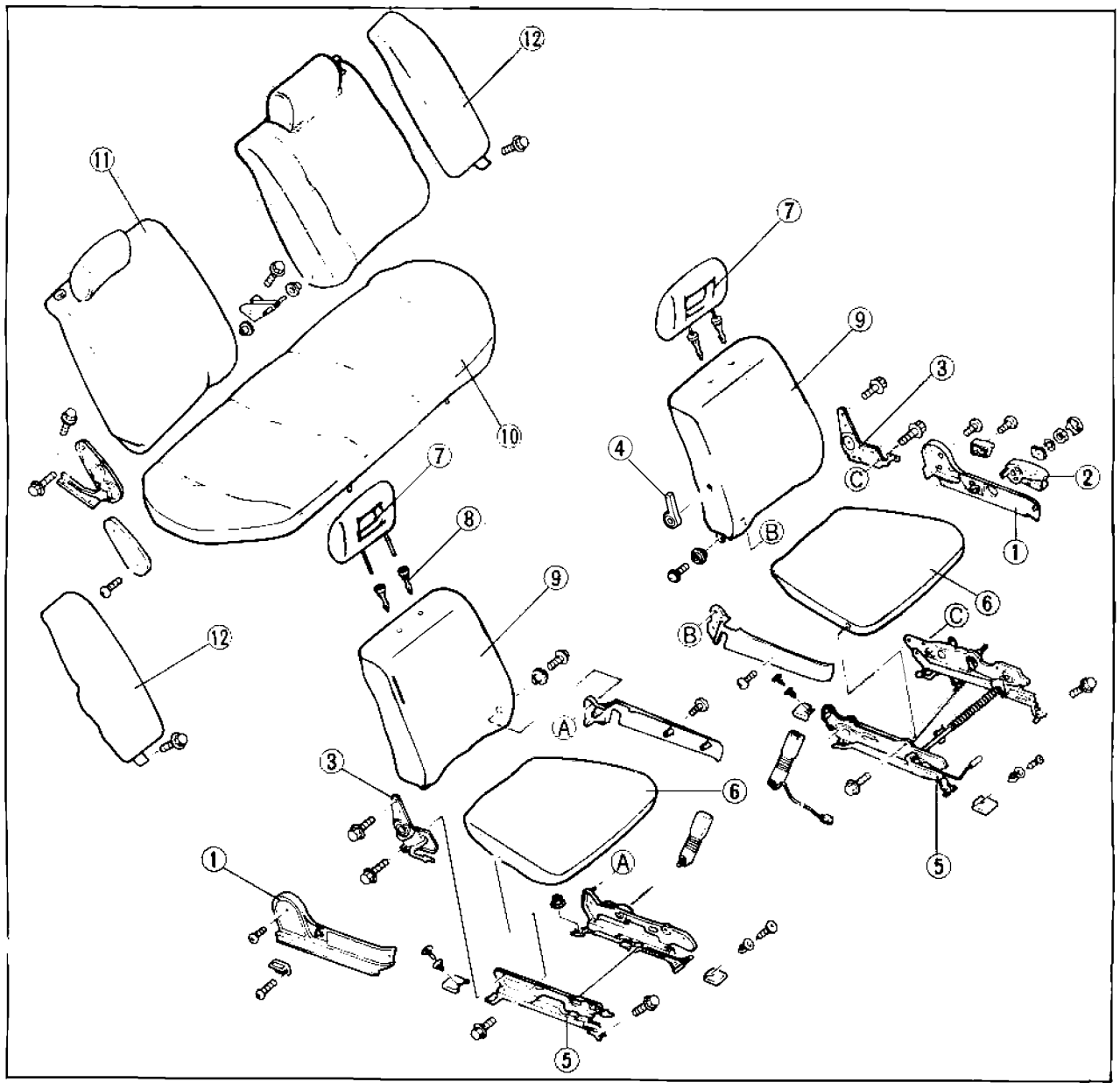


76G14X-039

1. Bracket
2. Coolant reservoir
3. Bracket
4. Washer pump
5. Washer nozzles
6. Clips
7. Hose
8. Joint
9. Washer tank

SEAT

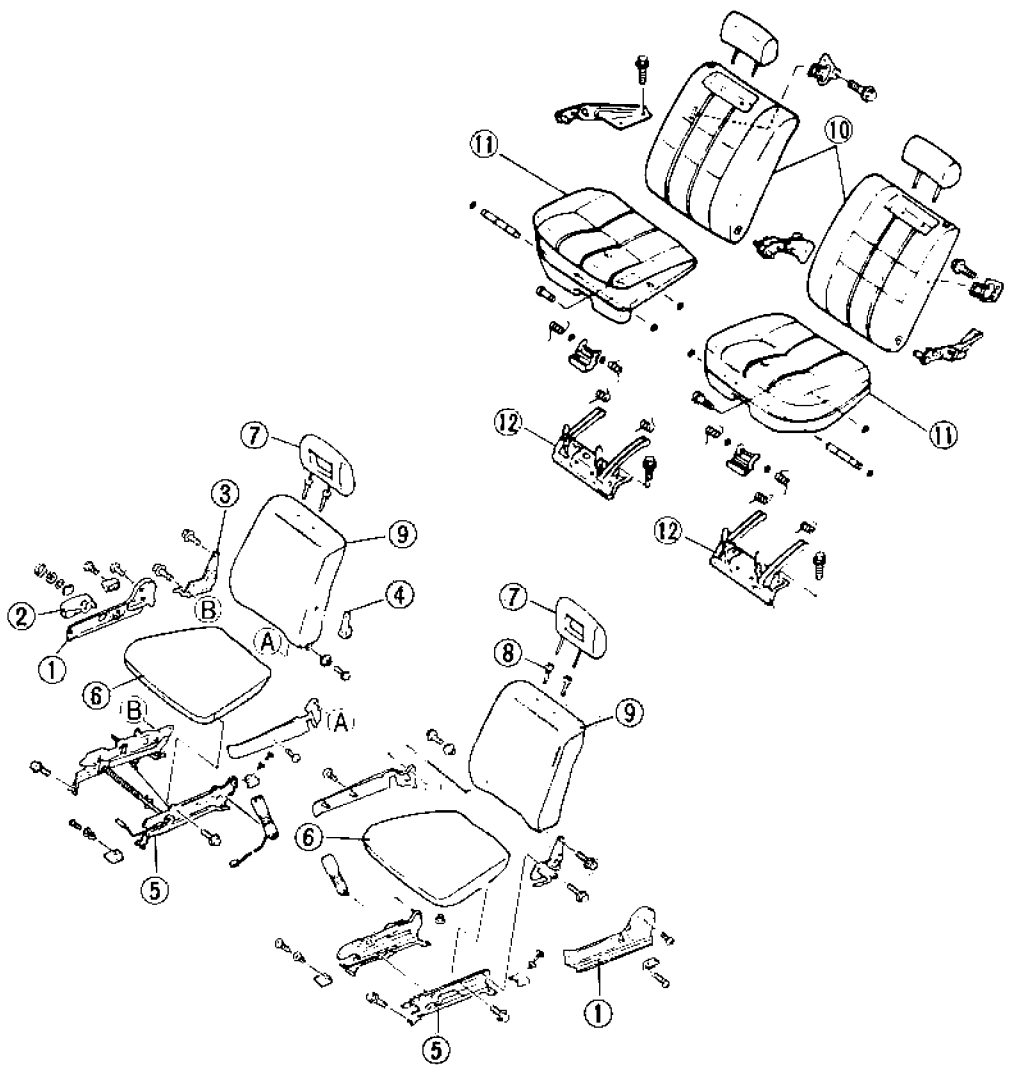
STRUCTURAL VIEW



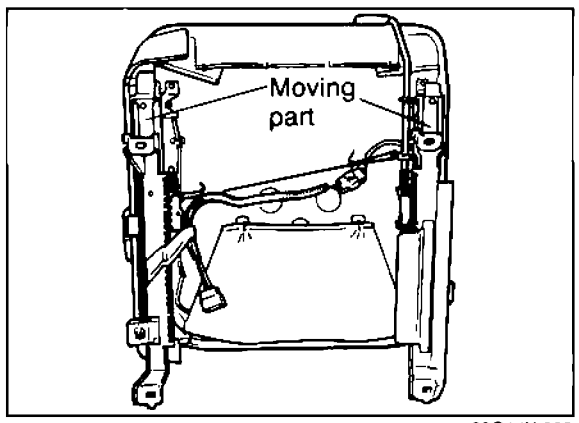
76G14X-033

1. Seat side cover
2. Lifter lever
3. Reclining knuckle
4. Lumbar support lever
5. Seat adjuster
6. Front seat cushion
7. Headrest
8. Headrest pole
9. Front seat back
10. Rear seat cushion
11. Rear seat back
12. Seat side

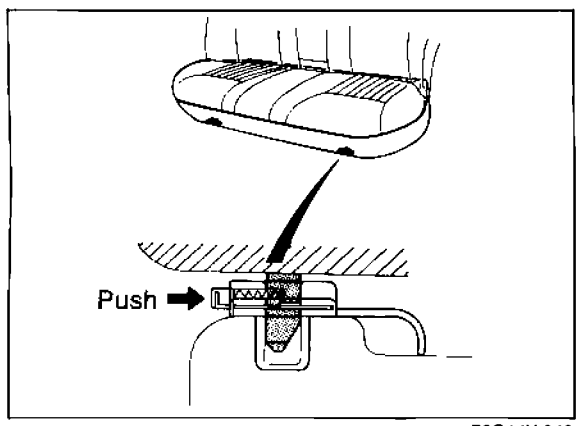
Hatchback



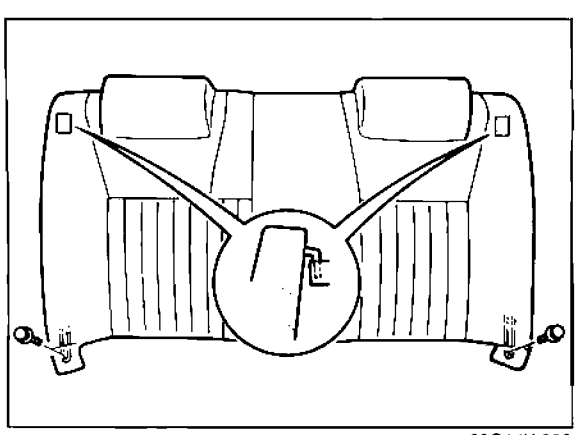
1. Seat side cover
2. Lifter lever
3. Reclining knuckle
4. Lumber support lever
5. Seat adjuster
6. Front seat cushion
7. Headrest
8. Headrest pole
9. Front seat back
10. Rear seatbacks (split-folding rear seat)
11. Rear seat cushion (flat-folding rear seat)
12. Stay



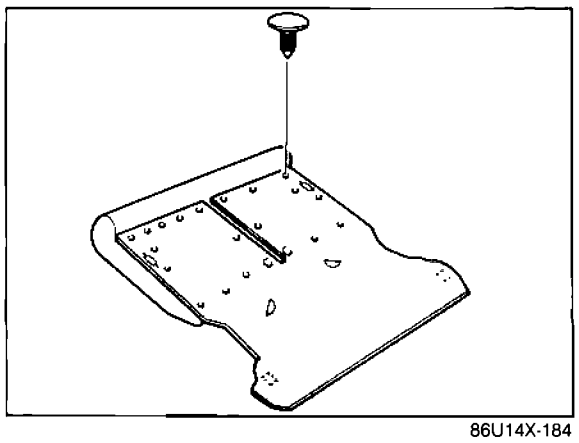
69G14X-228



76G14X-048



69G14X-236



86U14X-184

INSPECTION

Inspection of Front Seat

1. Check that the seat adjuster lever and recliner knuckle lever move smoothly.
2. Check the seat mounting bolts for looseness. If necessary, tighten the bolts to the specified torque.

Tightening torque:
Seat mounting bolt: 38—51 N·m (3.9—5.2 m-kg, 28—38 ft-lb)

3. Apply grease to the moving parts.
4. Check the seat adjuster lever for wear.

REAR SEAT (Sedan and Coupe/MX-6)

Removal

1. Push the locks as shown in the figure to release the cushion, then lift the seat cushion out.
2. Remove the end bolts, and lift the seat back off the hooks.
3. Remove the fastener.
4. Remove the seat back.

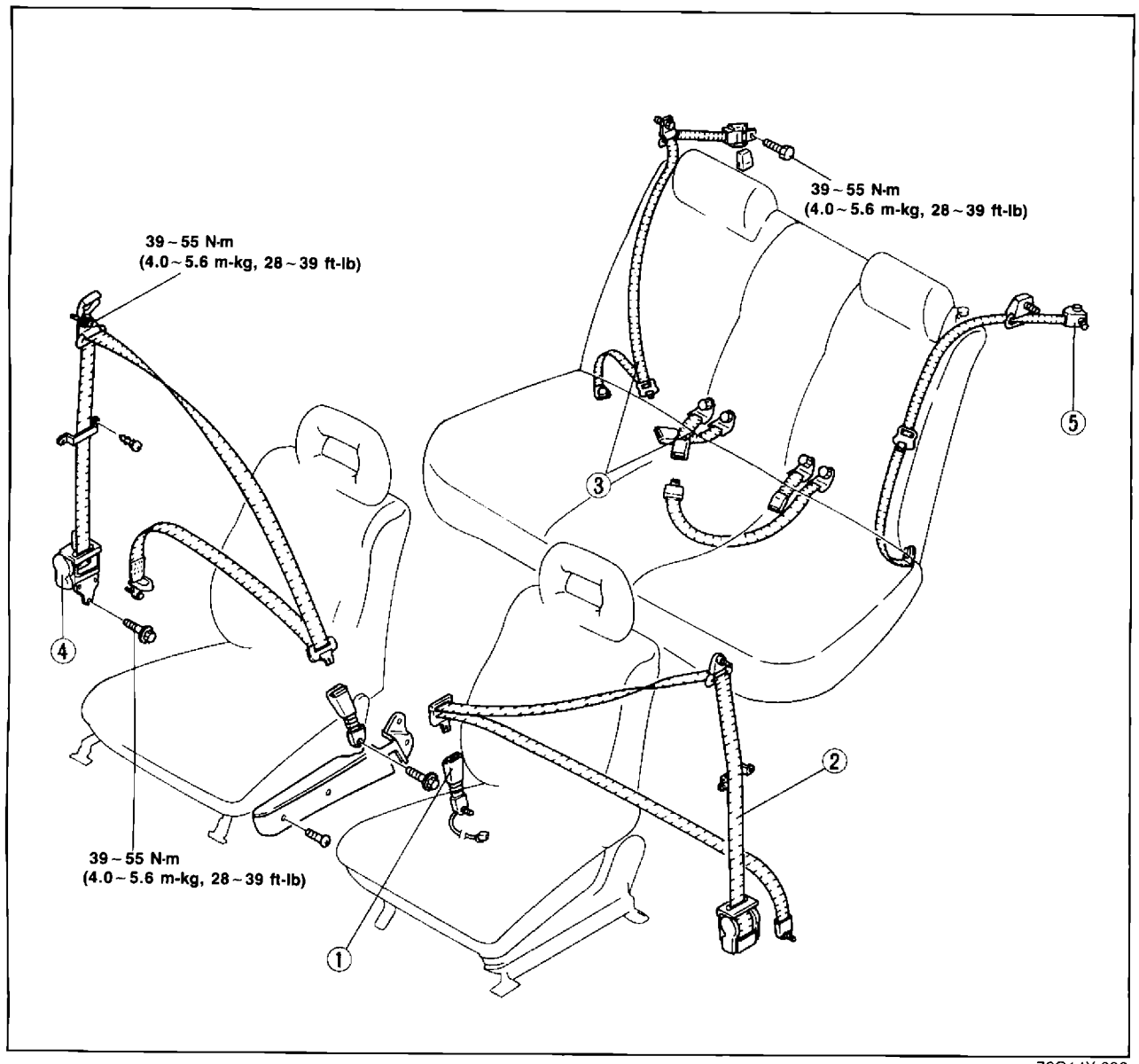
Installation

Install in the reverse order of removal.

Note
Tightening torque:
Seat back:
16—23 N·m (1.6—2.3 m-kg, 12—17 ft-lb)

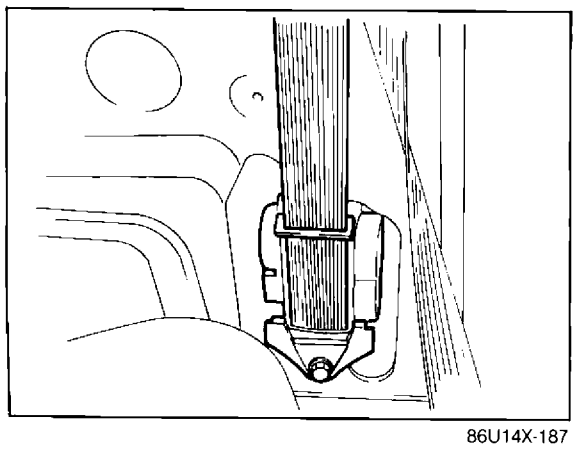
SEAT BELTS

STRUCTURAL VIEW



76G14X-032

1. Buckles
2. Front seat belts
3. Rear seat belts
4. Retractors
5. Retractors



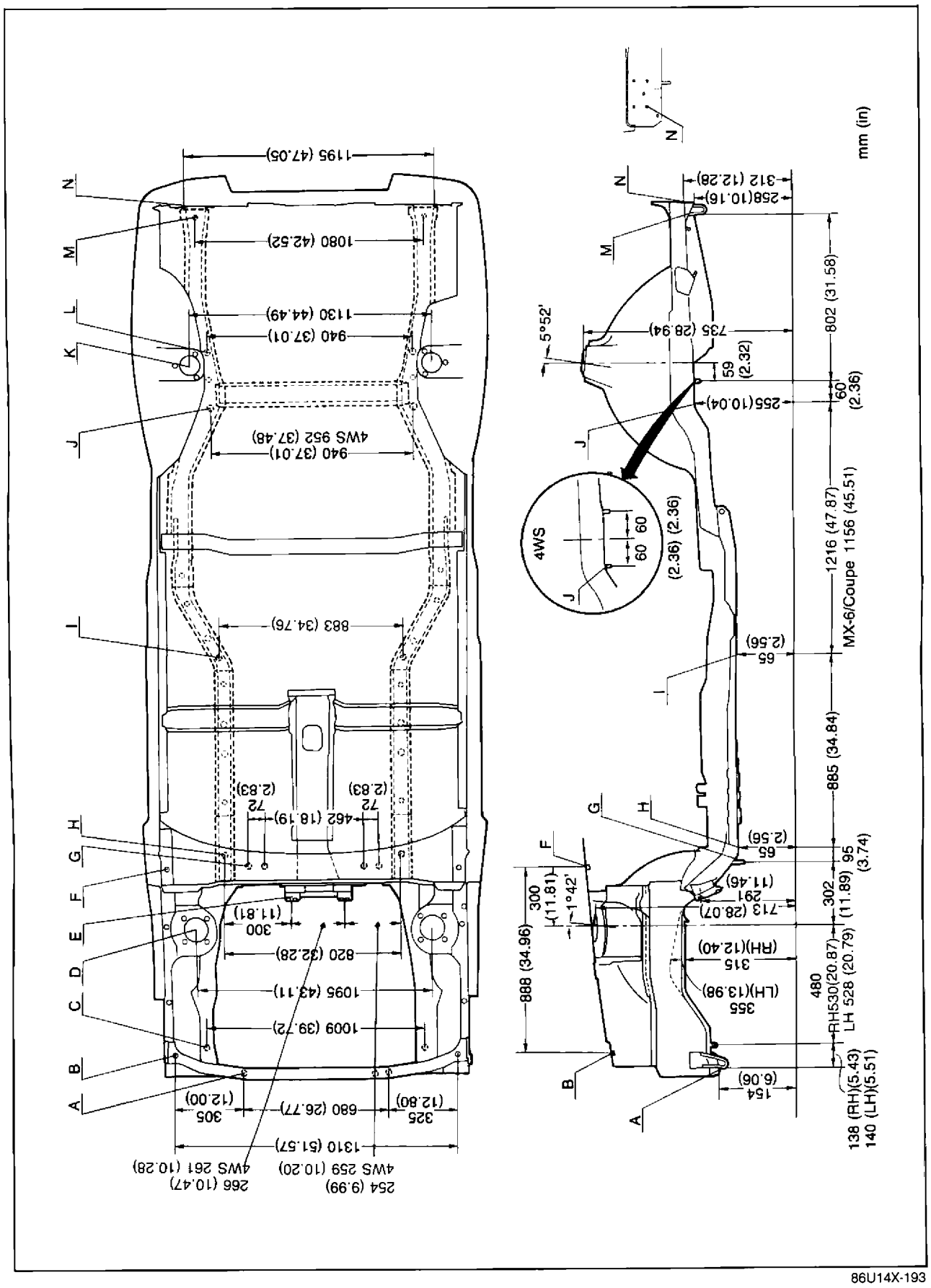
86U14X-187

INSPECTION

1. Check that the belt can be pulled out smoothly and that it retractors lock when belt pulled quickly.
2. Inspect the webbing for scars, tears, and wear and for deformation of the fittings.

Caution
Do not disassemble the buckle or ELR assembly.

UNDERBODY PROJECTED DIMENSIONS

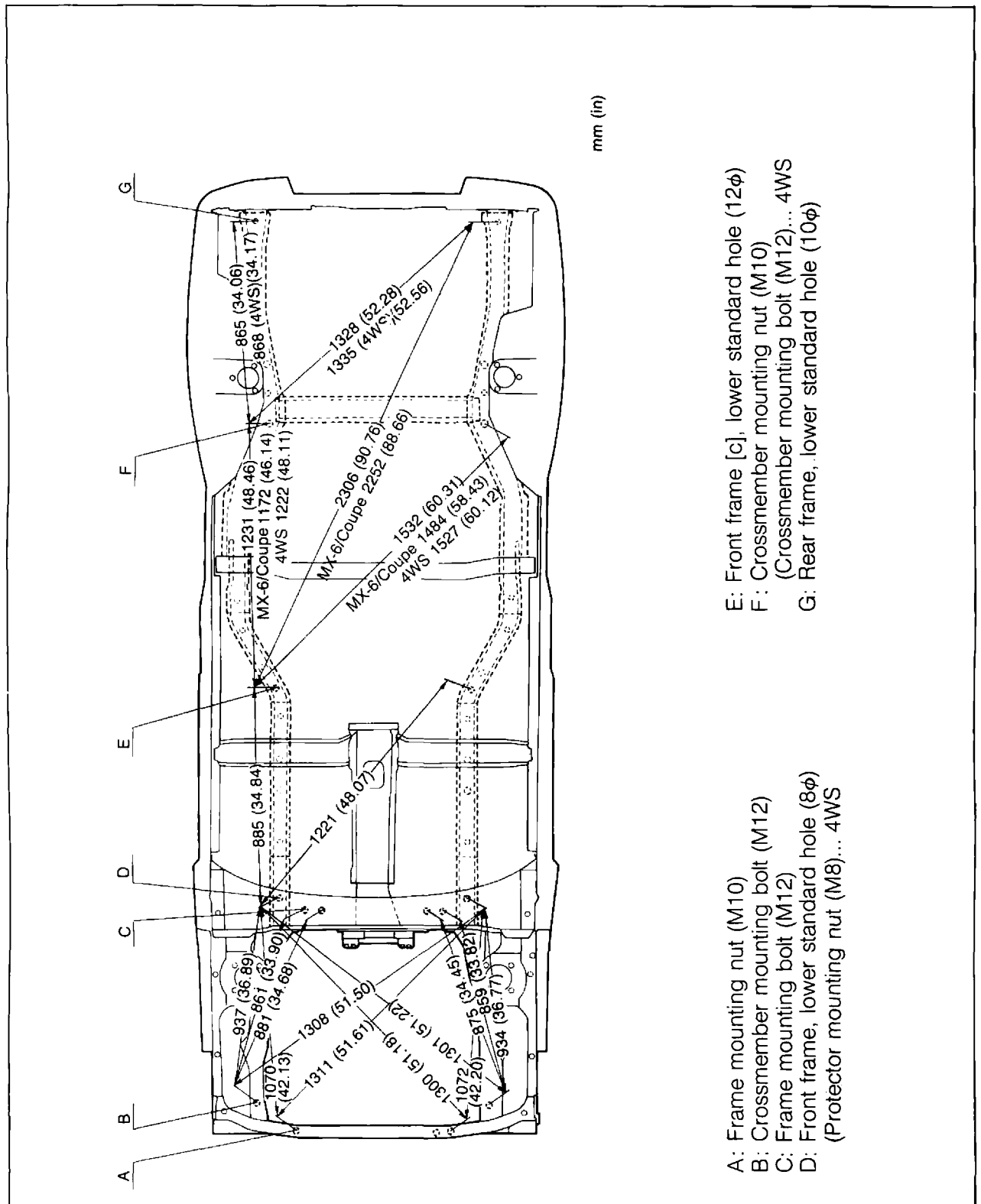


86U14X-193

A: Frame mounting nut (M10)
B: Front fender panel mounting nut (M6)
C: Crossmember mounting bolt (M12)
D: Front mounting block
E: Steering bracket mounting nut (M12)
F: Front fender panel mounting nut (M6)
G: Frame mounting bolt (M12)
H: Front frame, lower standard hole (8ϕ)
I : Front frame [c], lower standard hole (12ϕ)
J : Crossmember mounting nut (M10)
(Crossmember mounting bolt (M10)...4WS)
K : Rear mounting block
L : Crossmember mounting nut (M10)
(Crossmember mounting bolt (M12)...4WS)
M: Rear frame, lower standard hole(10ϕ)
N: Rear bumper mounting hole (14ϕ)
(outside,lower)

86U14X-193

UNDERBODY STRAIGHT-LINE DIMENSIONS



86U14X-194

15

BODY ELECTRICAL SYSTEM

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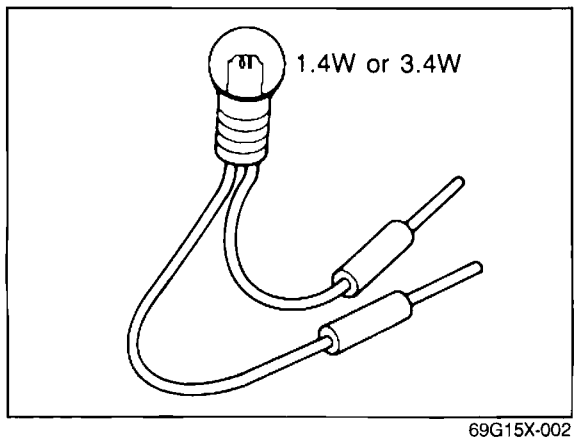
15 INTRODUCTION

INTRODUCTION

HOW TO USE THIS SECTION

Information regarding removal and installation of electrical equipment is given in **SECTION 14.** Understanding will be easier if this section is used in conjunction with the **WIRING DIAGRAMS.**

63U15X-002



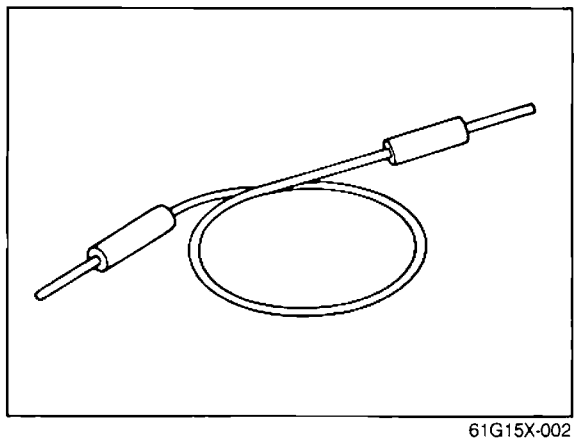
69G15X-002

ELECTRICAL TROUBLESHOOTING TOOLS

Test Light

The test light, as shown in the figure, uses a 12V bulb. The two leads should be connected to probes. The test light is used for simple voltage checks and to check for short circuits.

Caution
When checking the control unit, never use a bulb over 3.4W.

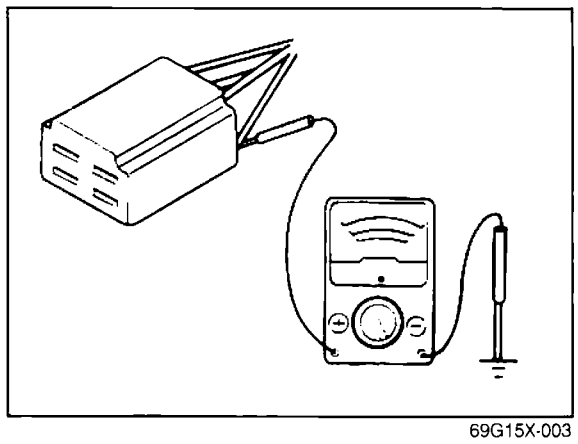


61G15X-002

Jumper Wire

The jumper wire is used for testing by short-circuiting switch terminals and to verify the condition of ground connections.

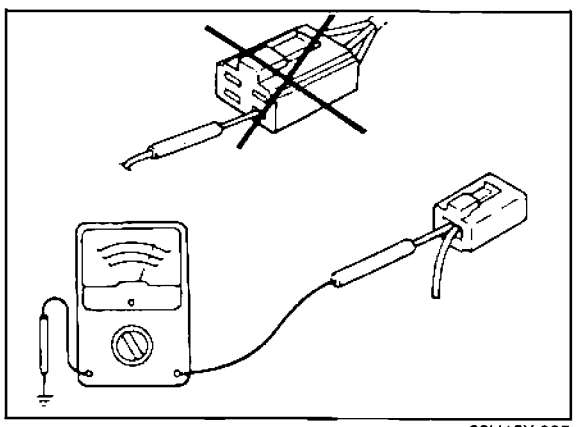
Caution
Do not connect the jumper wire between a power source line and body ground, because doing so may cause burning or other damage to harnesses or electronic components, etc.



69G15X-003

Voltmeter

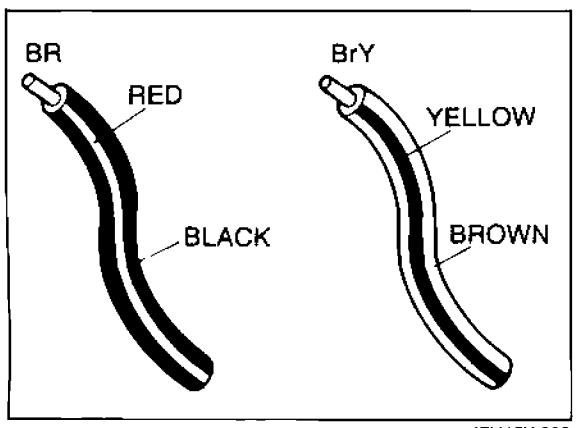
The DC voltmeter is used for measurement of circuit voltage. A voltmeter with a range of 15V or more is used. It is used by connecting the positive (+) probe (red lead) to the point where voltage is to be measured and connecting the negative (–) probe (black lead) to the body ground.



63U15X-005

Ohmmeter
The ohmmeter is used to measure the resistance between two points in a circuit, and is also used to check for continuity and diagnosis of short circuits.

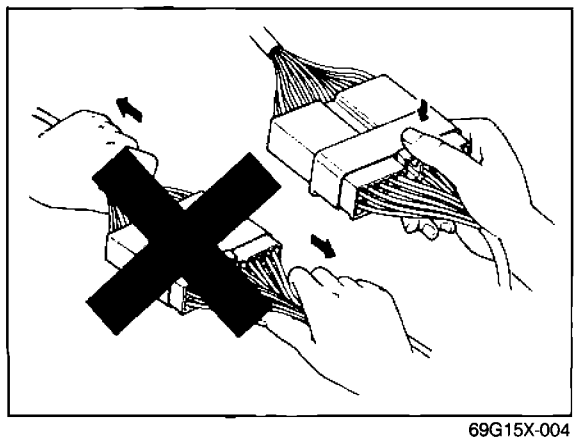
Caution
Do not attempt to connect the ohmmeter to any circuit to which voltage is applied, because doing so may burn or otherwise damage the ohmmeter.



47U15X-008

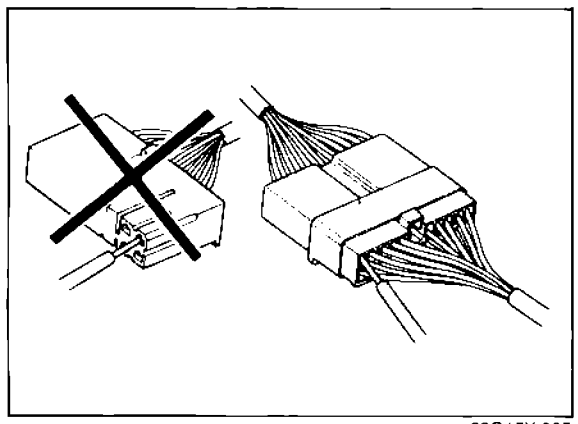
PRECAUTION
Wiring Color Code
Two-color wires are indicated by a 2-letter symbol. The first letter indicates the base color of the wire and the second indicates the color of the stripe.

CODE	COLOR
B	BLACK
Br	BROWN
G	GREEN
L	BLUE
Lb	LIGHT BLUE
Lg	LIGHT GREEN
O	ORANGE
R	RED
Y	YELLOW
W	WHITE



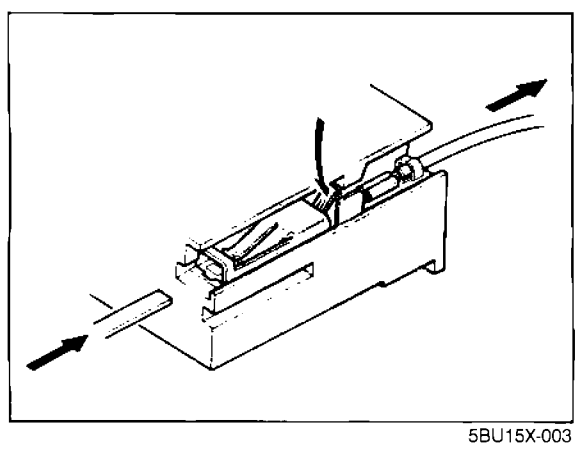
69G15X-004

Bulkhead-Type Connector
This connector can be separated by pressing the lock lever.
Do not pull the wire when removing the connector; be careful to hold the connector itself when disconnecting.



69G15X-005

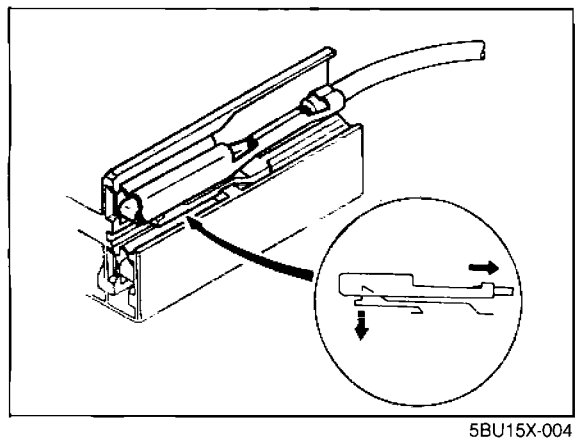
Inspection note
When checking the continuity or voltage with a circuit tester, insertion of the test probe into the receptacle connector may open the fitting of the connector and result in poor contact.
Therefore, insert the test probe only from the wire harness side.



5BU15X-003

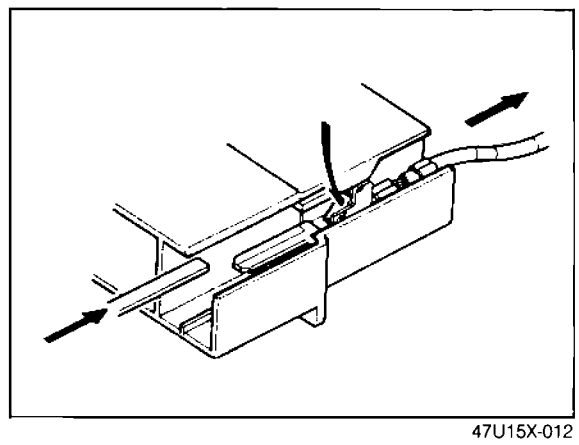
Replacement of Terminal
Use the appropriate tools to remove the terminal, as shown in the figure.
When installing a terminal, be sure to press it in until it locks securely.

<Female Type No.1>
Insert a push-tool or thin piece of metal from the terminal side of the connector, and then, with the locking tabs of the terminal pressed down, pull the terminal out from the rear side.



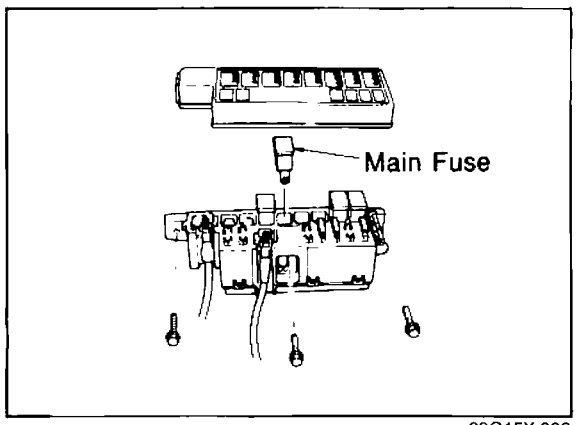
5BU15X-004

<Female Type No.2>



47U15X-012

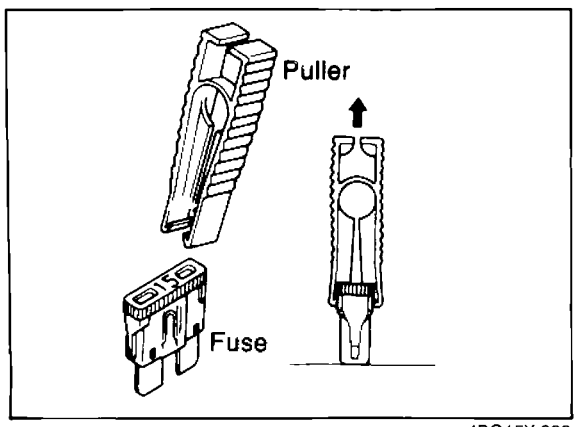
<Male Type>
Same as the female type.



69G15X-006

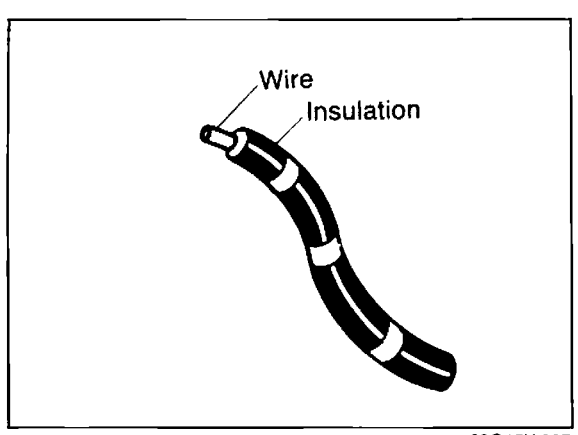
Replacement of Fuse

1. When replacing a fuse, be sure to replace it with one of the specified capacity.
   If, after a fuse has been replaced, it fails again, there is probably a short in the circuit, and the wiring should be checked.
2. Be sure the negative battery terminal is disconnected before replacing a main fuse.



4BG15X-003

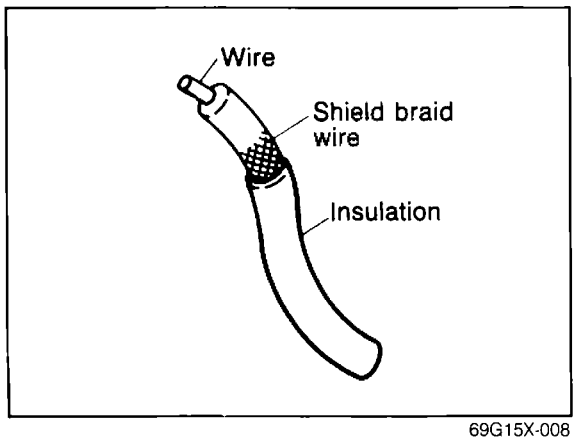
3. When replacing a fuse, use the supplied fuse puller in the fuse box cover.



69G15X-007

Thin Insulation Wire

To reduce the weight of the wiring harness, a thin coating of high resistance insulation material is used.



69G15X-008

Shielded braid wire

This wire is used to prevent a malfunction in important circuits that are susceptible to outside signals or interference.

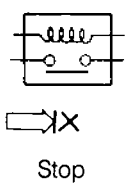
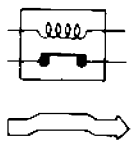
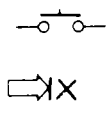
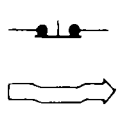
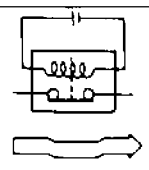
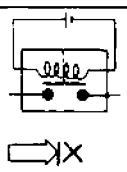
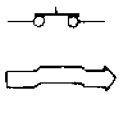
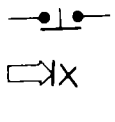
Eg.

Ignition coil
O_2 sensor

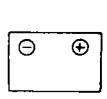
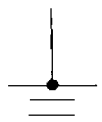
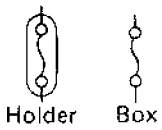
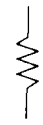
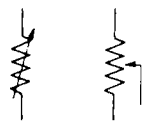
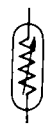
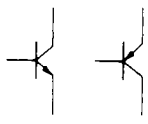
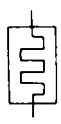
ELECTRICAL SYMBOLS

Switches and Relays

There is an NC (normally closed) and NO (normally open) indication for switches and relays; this indicates the condition when there has been no change of operating conditions.

	Relay		Switch	
	NO type relay	NC type relay	NO switch	NC switch
Not in operation (No power supply)	 Stop	 Flow	 Stop	 Flow
In operation (Power supply)	 Flow	 Stop	 Flow	 Stop

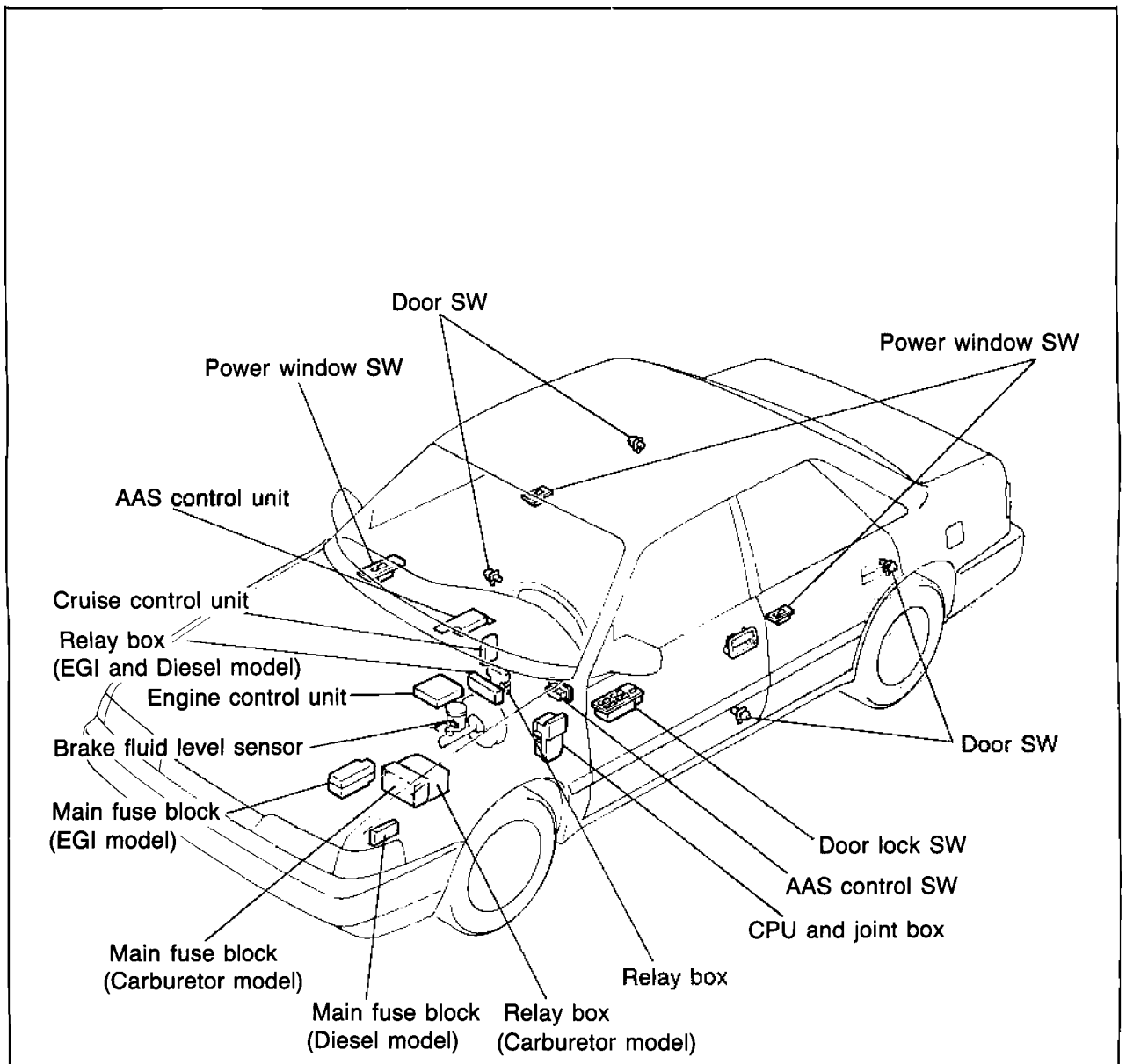
Other Electrical Symbols

		 Holder Box	
BATTERY	BODY GROUND	FUSE	FUSIBLE LINK
			
MOTOR	COIL, SOLENOID	RESISTOR	VARIABLE RESISTOR
			 3.4
THERMISTER	DIODE	CONDENSER	LIGHT
			
TRANSISTOR	SPEAKER	CIGARETTE LIGHTER	HEATER

69G15X-009

LOCATION OF UNIT, RELAY AND SWITCH

STRUCTURAL VIEW

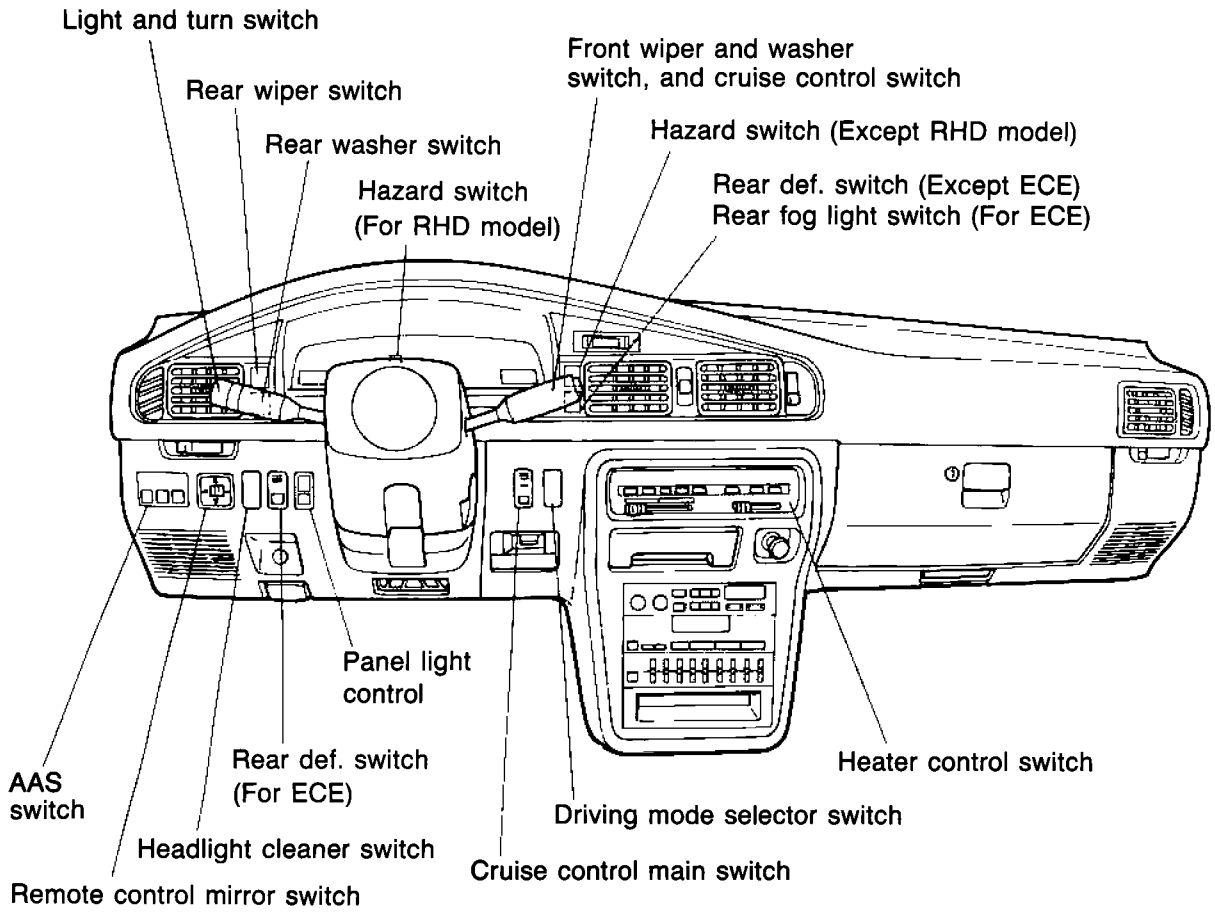


86U15X-002

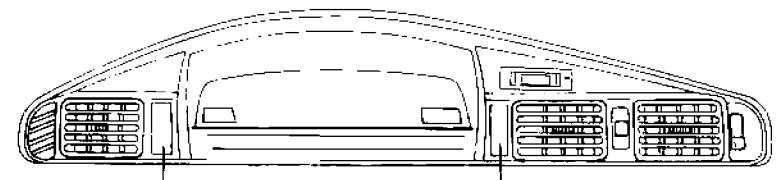
15 LOCATION OF UNIT, RELAY AND SWITCH

STRUCTURAL VIEW

Hatchback



Coupe/MX-6 and Sedan

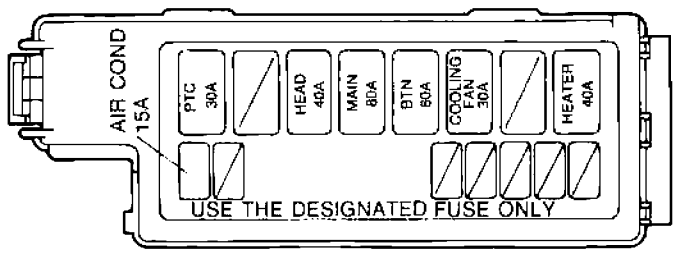


86U15X-003

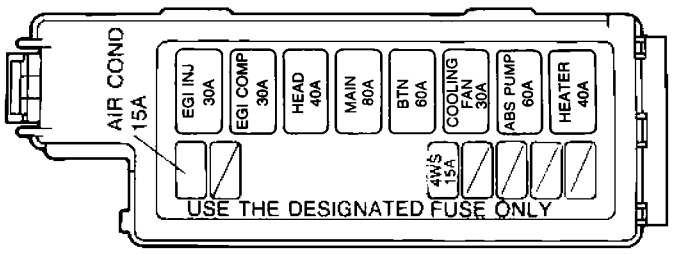
MAIN FUSE BLOCK

STRUCTURAL VIEW

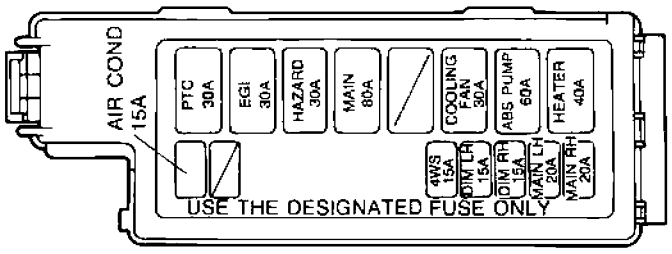
LHD and RHD General, Middle East, ECE (Carburetor model)



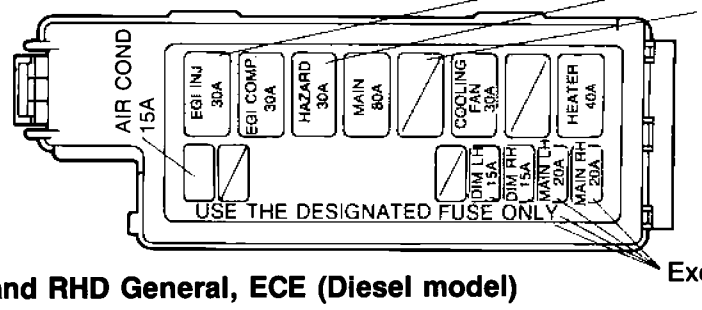
ECE (EGI model)



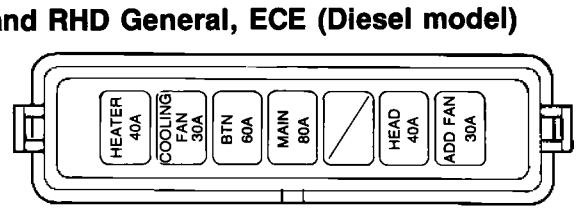
West Germany (Carburetor and EGI model)



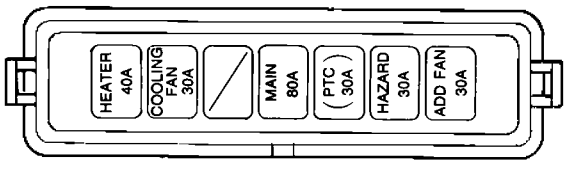
Unleaded fuel model (EGI)



LHD and RHD General, ECE (Diesel model)

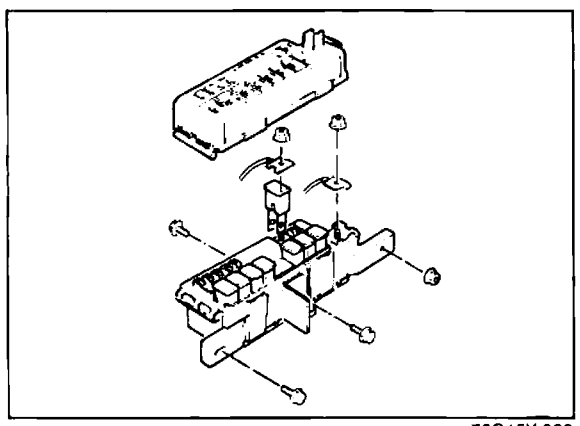


West Germany (Diesel model)



86U15X-004

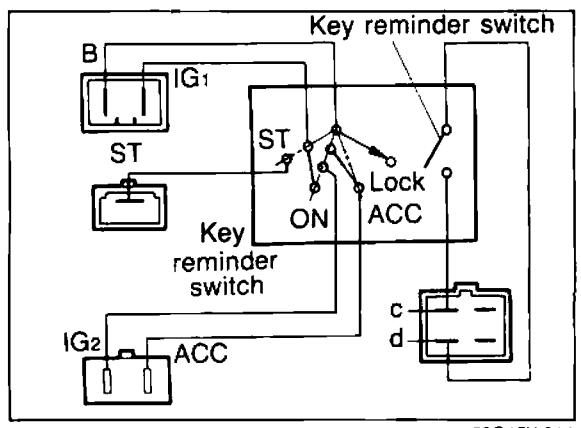
5 IGNITION SWITCH



76G15X-026

REPLACEMENT

Disconnect the negative battery terminal. 30, 40 and 60A fuses: pull out and push in a new fuse.
80A fuse:
1. Remove the main fuse box.
2. Open the cover.
3. Remove the terminal.
4. Pull out and push in a new fuse.



69G15X-014

IGNITION SWITCH

INSPECTION

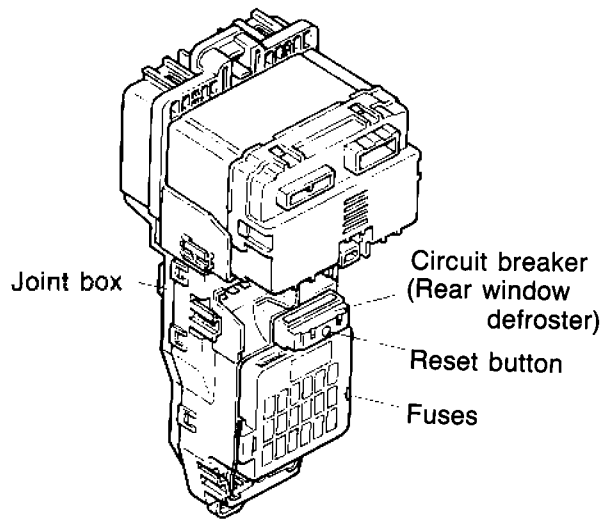
1. Use an ohmmeter to check continuity of the terminals of the switch.
2. If continuity is not as specified, replace the switch.

Position \ Terminal		B	ACC	IG2	IG1	ST	c	d
LOCK	Remove							
	Insert						○—○	
ACC		○—○					○—○	
ON		○—○		○—○			○—○	
ST		○			○—○		○—○	

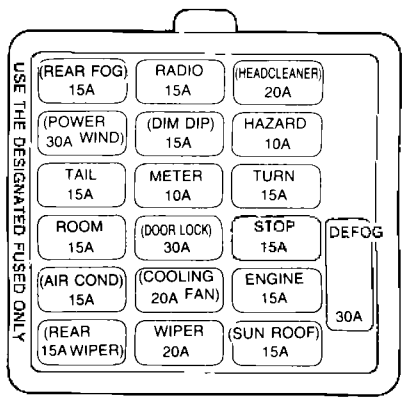
○—○: Indicates continuity

JOINT BOX AND FUSE

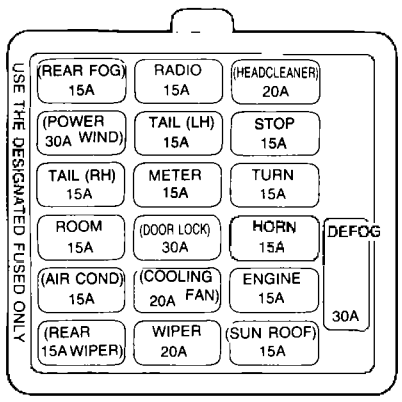
STRUCTURAL VIEW



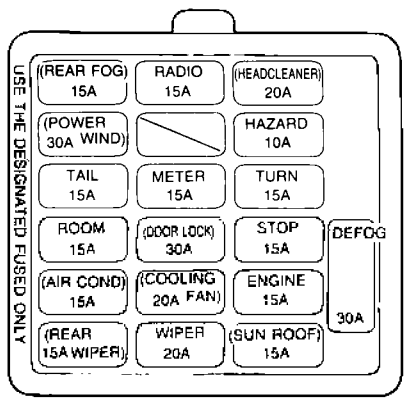
UK, RHD General



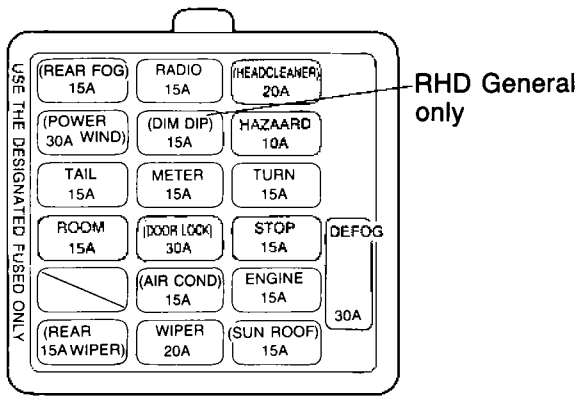
West Germany



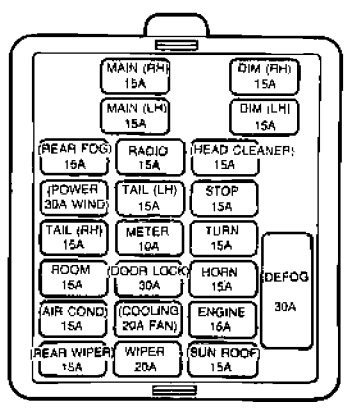
ECE, Middle East, LHD General



ECE, LHD and RHD General (Diesel model)



West Germany (Diesel model)

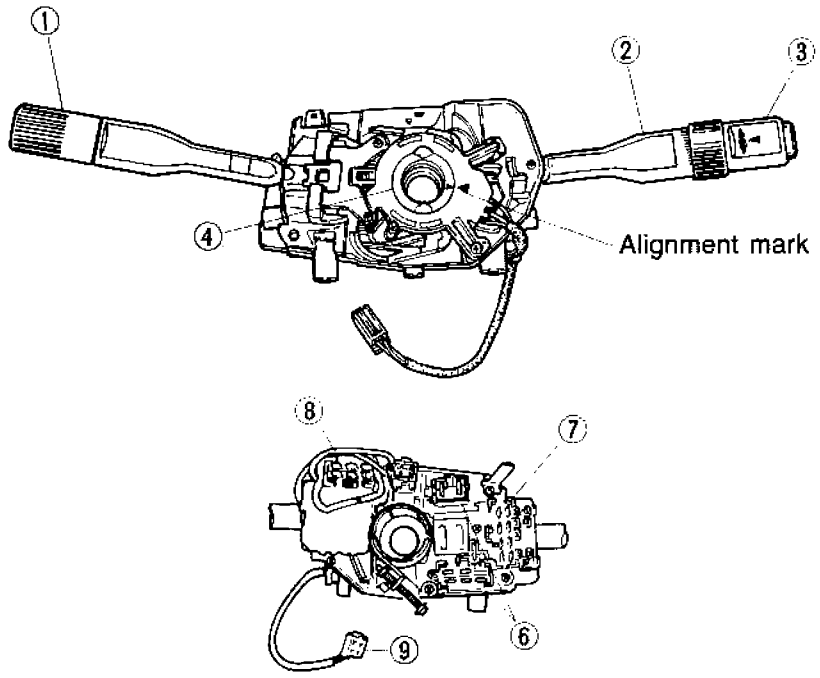


86U15X-006

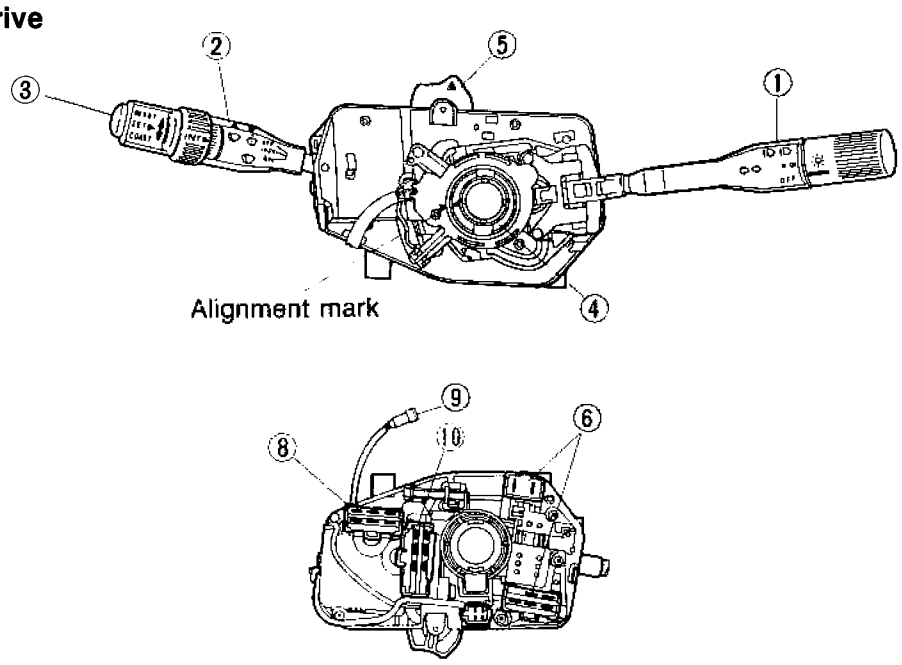
CONBINATION SWITCH

STRUCTURAL VIEW

Left hand drive

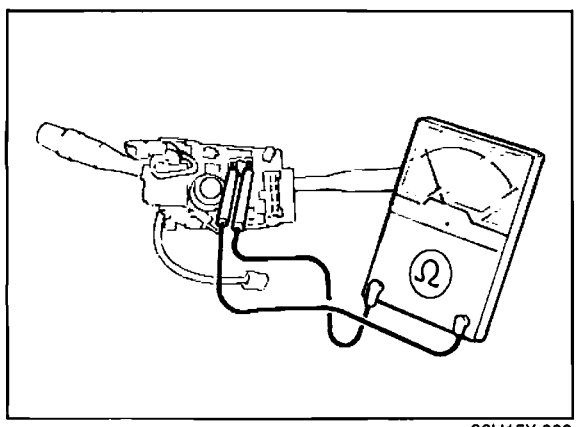


Right hand drive



76G15X-002

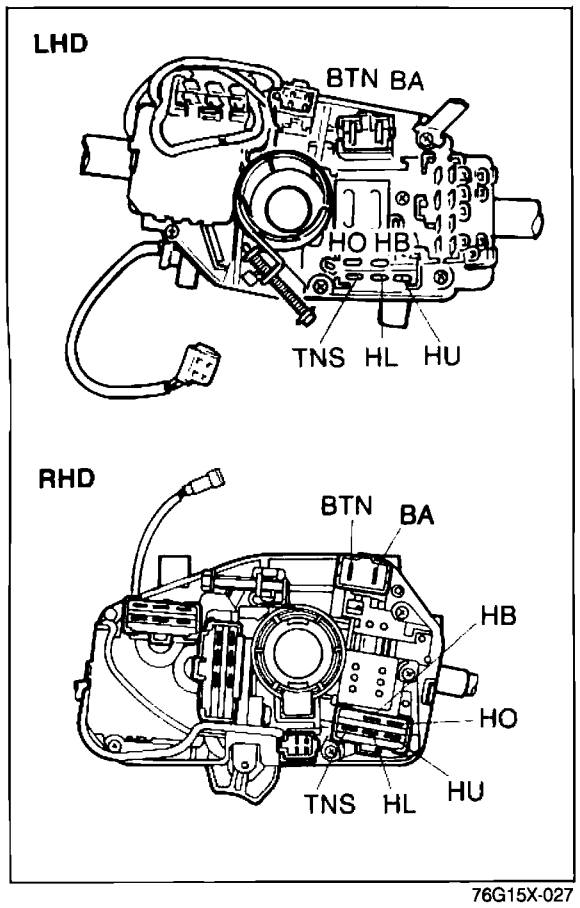
1. Light and turn signal switch lever
2. Windshield wiper and washer switch lever
3. Cruise control switch
4. Steering angle sensor
5. Hazard switch
6. Light switch connectors
7. Turn signal switch connector
8. Windshield wiper and washer switch connector
9. Steering angle sensor connector
10. Turn signal and hazard switch connector



86U15X-008

INSPECTION

1. Check for continuity or the resistance between the terminals in each position with an ohmmeter.
2. If the continuity or resistance is not as specified, replace the switch.



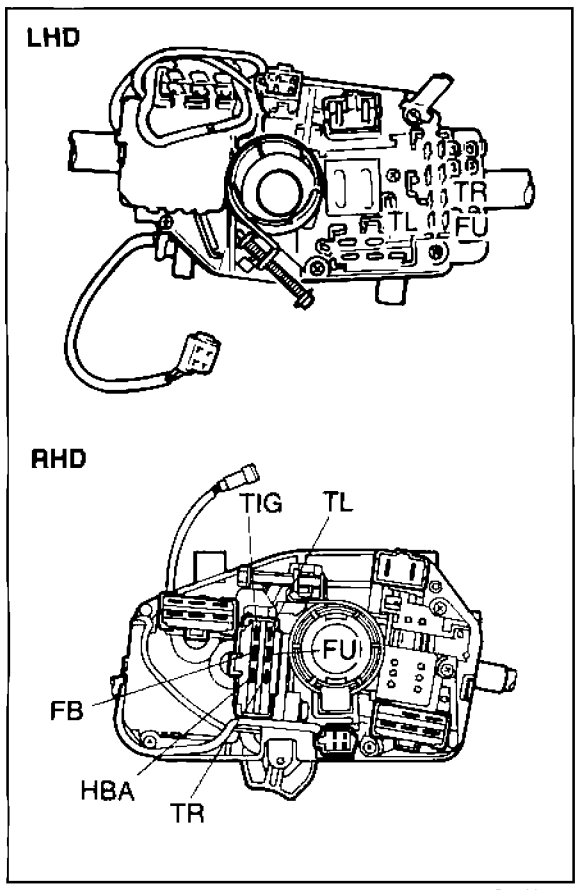
76G15X-027

Light, dimmer, and passing switch

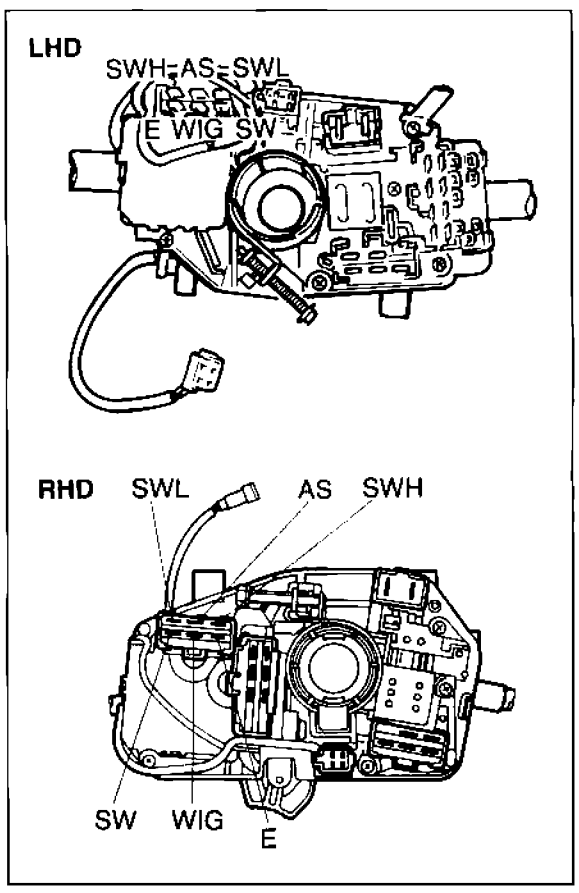
Position \ Terminal		HB	HL	HU	BA	BTN	TNS
Headlight	Low beam	○—○			○	○—○	
	High beam	○		○	○	○—○	
Passing				○—○			
Tail, parking						○—○	

○—○: indicates continuity

15 COMBINATION SWITCH



76G15X-028



76G15X-029

Turn signal switch
For LHD

Position \ Terminal	FU	TL	TR
Left	○——○		
Right	○——		——○

○——○: indicates continuity

For RHD (with hazard switch)

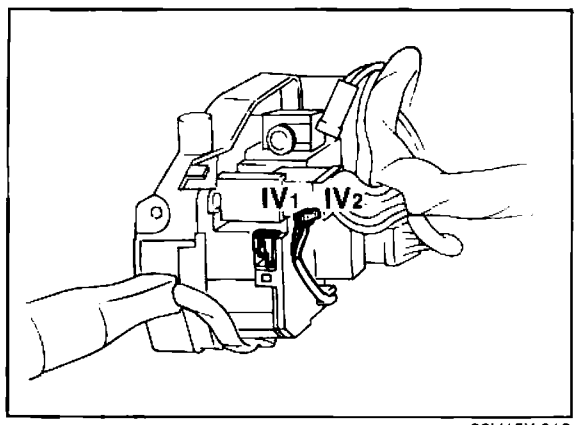
Hazard switch	Turn switch	FU	TL	TR	TIG	HBA	FB
OFF	Left	○——	——○		○—	——	——○
	OFF				○—	——	——○
	Right	○——	——	——○	○—	——	——○
ON	OFF	○——	——○	——○		○——	——○

○——○: indicates continuity

Windshield wiper and washer switch

Position		Terminal (one touch)	AS	WIG	SWL	SWH	E	SW
Wiper switch	OFF	OFF	○——		——○			
		ON			○——		——○	
	INT				○——		——○	
	I (Low)				○——		——○	
	II (High)					○—	——○	
Washer switch ON							○——	——○

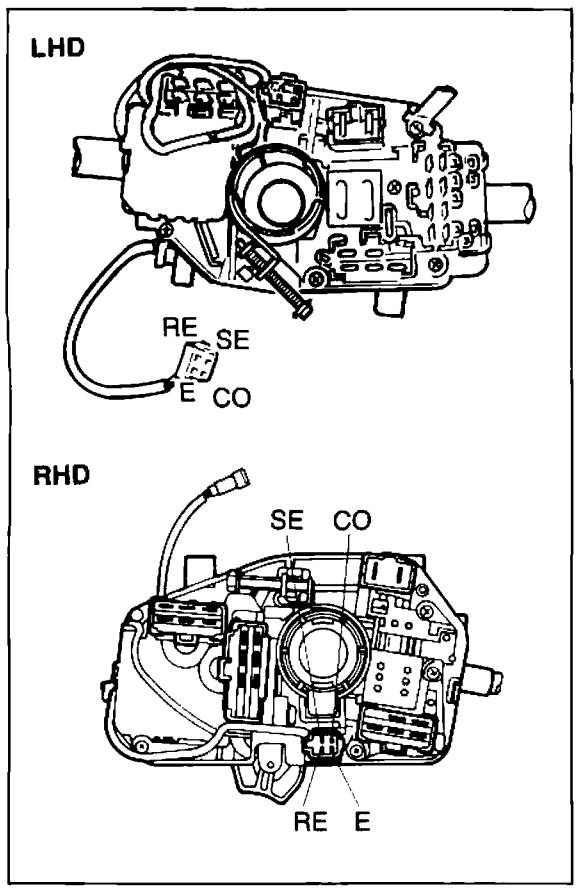
○——○: indicates continuity



86U15X-012

Variable speed intermittent wiper timer control resistance

Position \ Terminal	IV1 — IV2
Slow	0 — 1 kΩ
Fast	40 — 60 kΩ



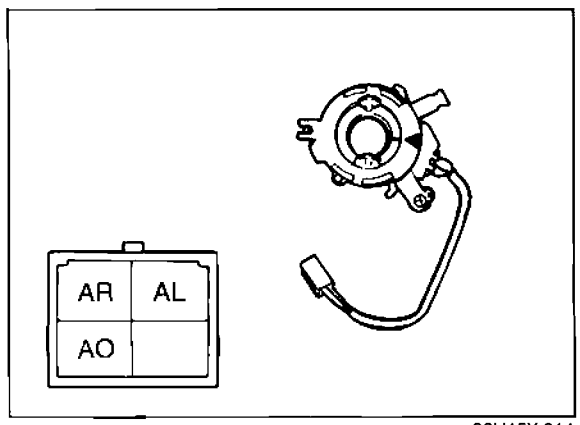
76G15X-030

Cruise control switch

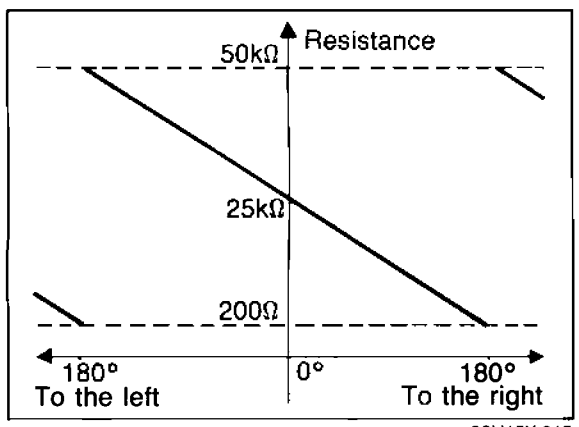
Position \ Terminal	CO	RE	SE	E
OFF				
SET			○—○	
Resume		○—		—○
Coast	○—			—○

○—○: indicates continuity

15 COMBINATION SWITCH



86U15X-014



86U15X-015

Steering angle sensor

Terminal	Steering wheel position	Resistance value
AO to AR	Turn the wheel a little at a time from the straight-ahead position 180° to the right.	Decreases from about 25 kΩ to about 200 Ω.
AO to AR	Straight-ahead position	About 25 kΩ
AO to AR	Turn the wheel a little at a time from the straight-ahead position 180° to the left.	Increases from about 25 kΩ to about 50 kΩ.
AL to AR	Straight-ahead position	About 50 kΩ

Note
When the steering wheel is turned more than the specified angle in the above test, the resistance value will become as shown in the table below.

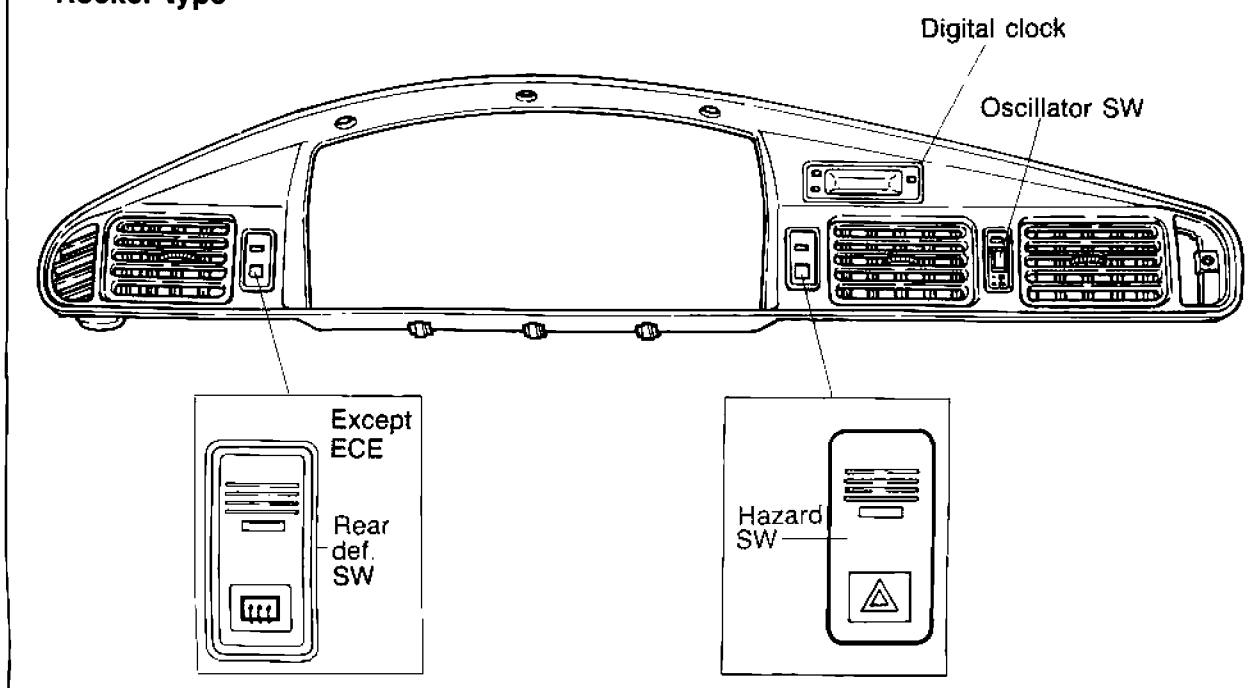
Terminal	Steering wheel position	Resistance value
AO to AR	When turned 180° or more to the right from the straight-ahead position.	Resistance slowly and gradually decreases after there is once an indication of about 50 kΩ.
AO to AR	When turned 180° or more to the left from the straight-ahead position.	Resistance slowly and gradually increases after there is once an indication of about 200 Ω.

CLUSTER SWITCH

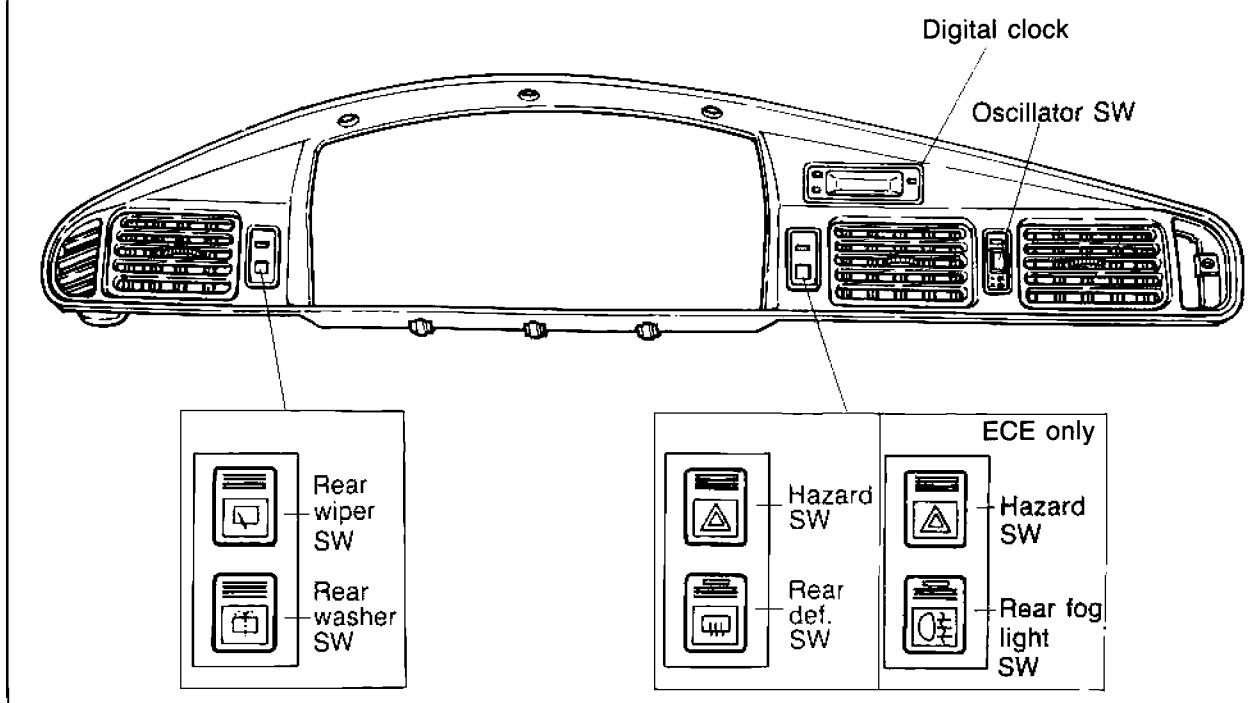
STRUCTURAL VIEW

For Left Hand Drive

Rocker type



Push type



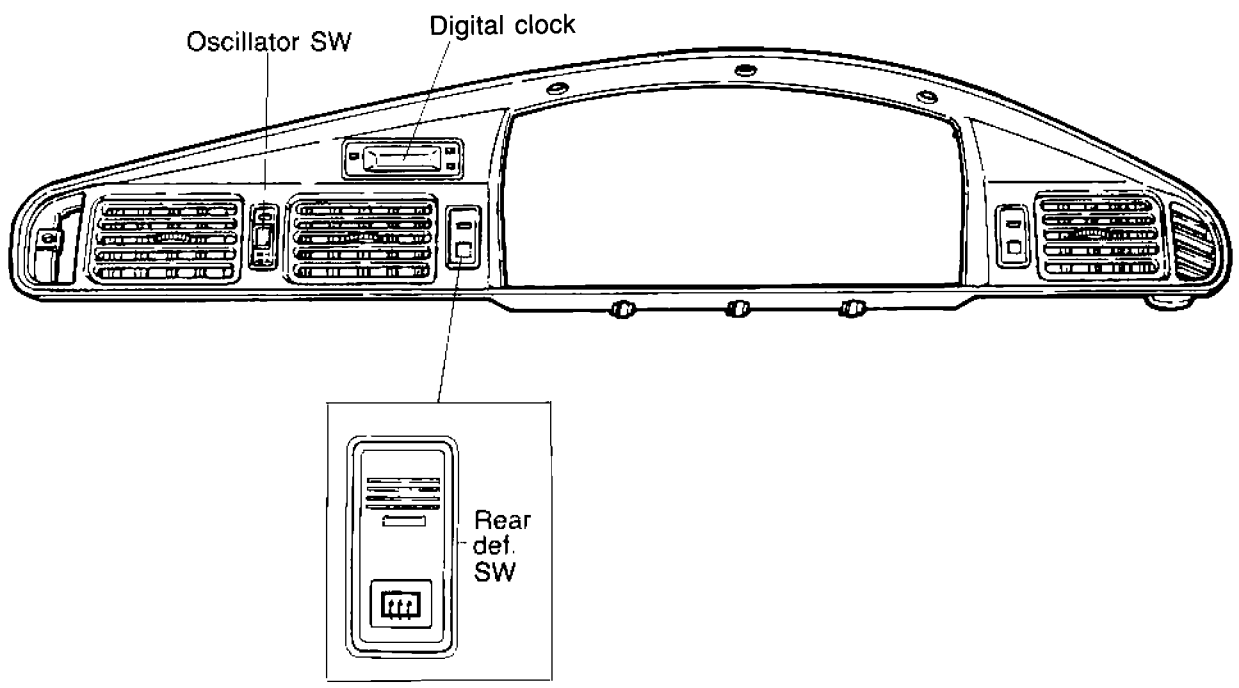
76G15X-003

15 CLUSTER SWITCH

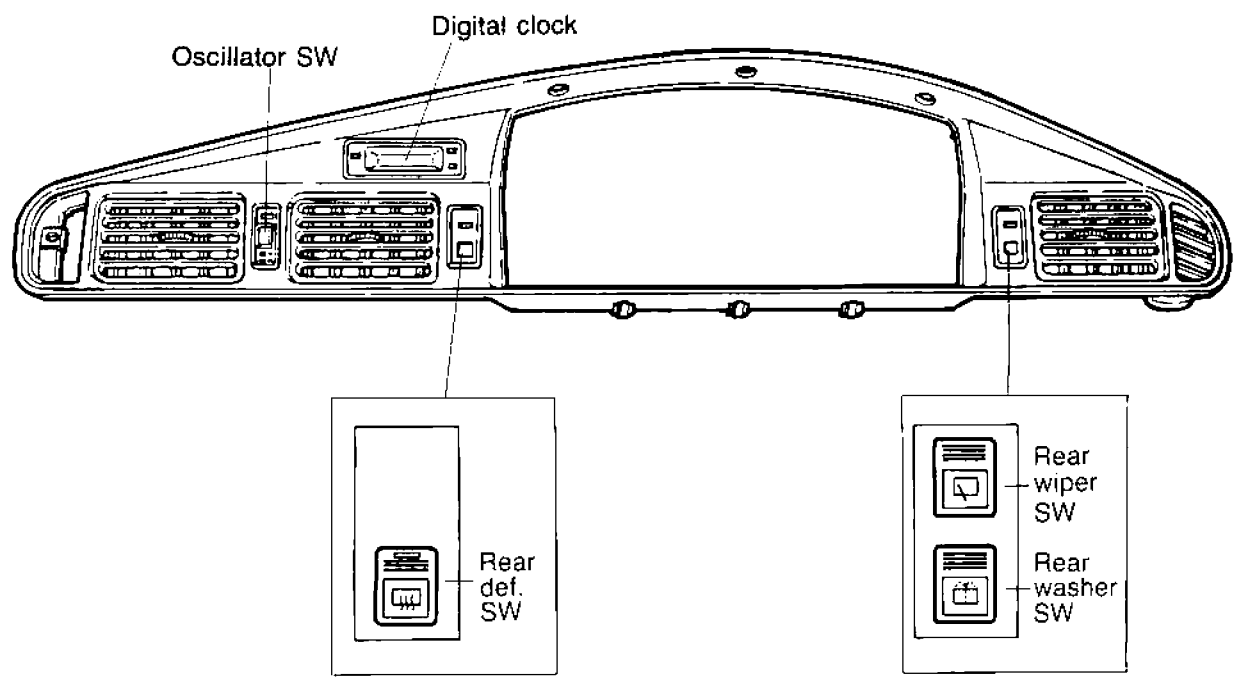
STRUCTURAL VIEW

For Right Hand Drive

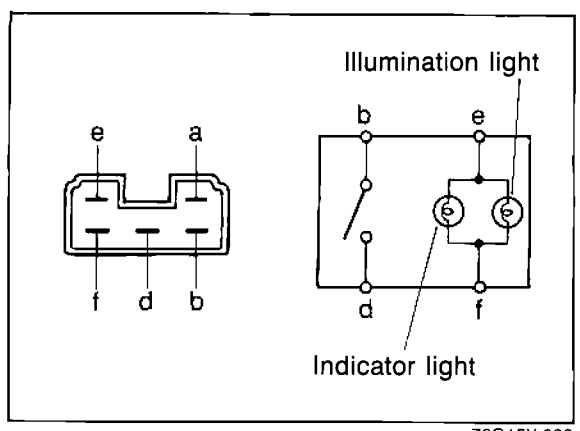
Rocker type



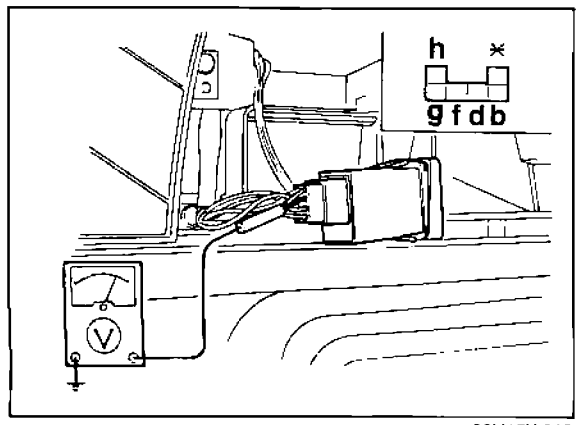
Push type



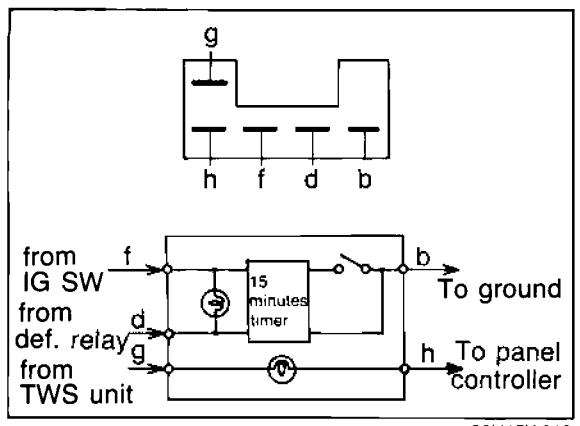
76G15X-004



76G15X-088



86U15X-018



86U15X-019

INSPECTION OF ROCKER TYPE

Hazard switch

1. Check for continuity between the terminals in each position with an ohmmeter.

Position \ Terminal	a	b	d	e	f
OFF				○—○	
ON		○—○		○—○	

○—○: Indicates continuity

2. If continuity is not as specified, replace the switch or replace the light(s).

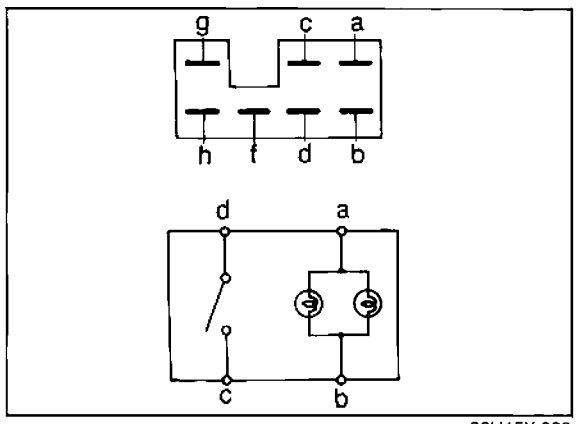
Defroster switch

1. Turn the ignition switch ON.
2. Push the defroster switch to ON, and check the lights for lighting.
3. If the lights do not light, replace the lights.
4. Check that the switch goes off after 15 min from switch ON.
5. Check the voltage between each terminal and a body ground.

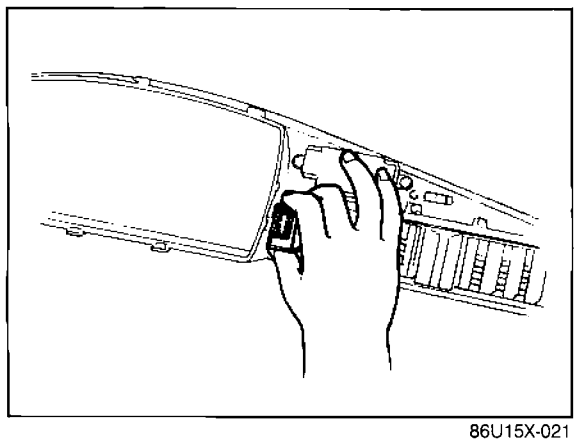
Position	Terminal voltage (V)				
	b	d	f	g	h
OFF	0	12	12	0	12
ON	0	0	12	0	12
ON (head light switch ON)	0	0	12	2-12	12
OFF (head light switch ON)	0	12	12	2-12	12

6. If the voltage of "d" terminal is 12V with switch off but not 0V with switch on, replace the defroster switch.
   If the voltage of "d" terminal is not 12V with switch off, trouble is in defroster relay or harness.
   If the voltages of the other terminals are not correct, trouble is in the other parts or harness.

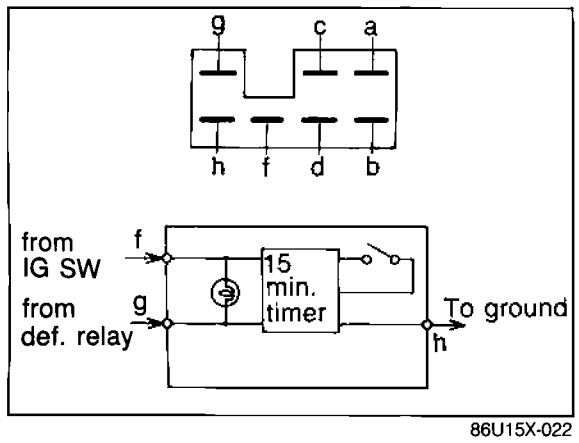
15 CLUSTER SWITCH



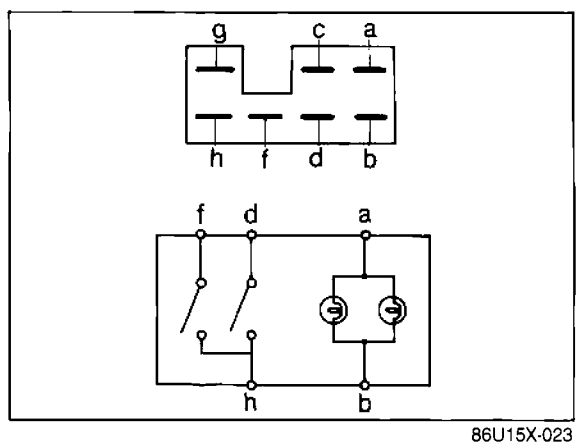
86U15X-020



86U15X-021



86U15X-022



86U15X-023

INSPECTION OF FOUR SWITCH TYPE

Hazard switch

1. Check for continuity between terminals of the switch.

Position \ Terminal	a	b	c	d
OFF	○—○			
ON	○—○		○—○	

○—○: Indicates continuity

2. If continuity is not as specified, replace the switch.

Defroster switch

1. Turn the ignition switch ON.
2. Check the light for lighting.
3. If the light doesn't light, replace the light.
4. Check that the switch goes off after 15 min from switch on.
5. Check the voltage between each terminal and a body ground.

Position	Terminal voltage (V)		
	f	g	h
OFF	12	12	0
ON	12	0	0

6. If the voltage of terminal "g" is 12V with switch off but not 0V with switch on, replace the defroster switch
   If the voltage of terminal "g" is not 12V with switch off, trouble is in defroster relay or harness.
   If the voltage of terminal "f" and "h" is not correct, the trouble is in the other parts or harness.

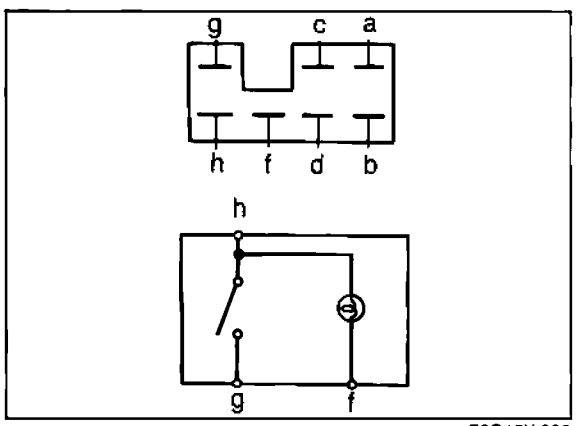
Rear wiper and washer switch

1. Check for continuity between the terminals in each position with an ohmmeter.

Position		Terminal a	b	d	f	h
Rear wiper switch	OFF	○—○				
	ON	○—○		○		○
Rear washer switch	OFF	○—○				
	ON	○—○			○—○	

○—○: Indicates continuity

2. If continuity is not as specified, replace the switch.



76G15X-006

Rear fog light switch

1. Check for continuity between the terminals in each position with an ohmmeter.

Position \ Terminal	f	g	h
OFF	○		○
ON	○	○	○

○——○: Indicates continuity

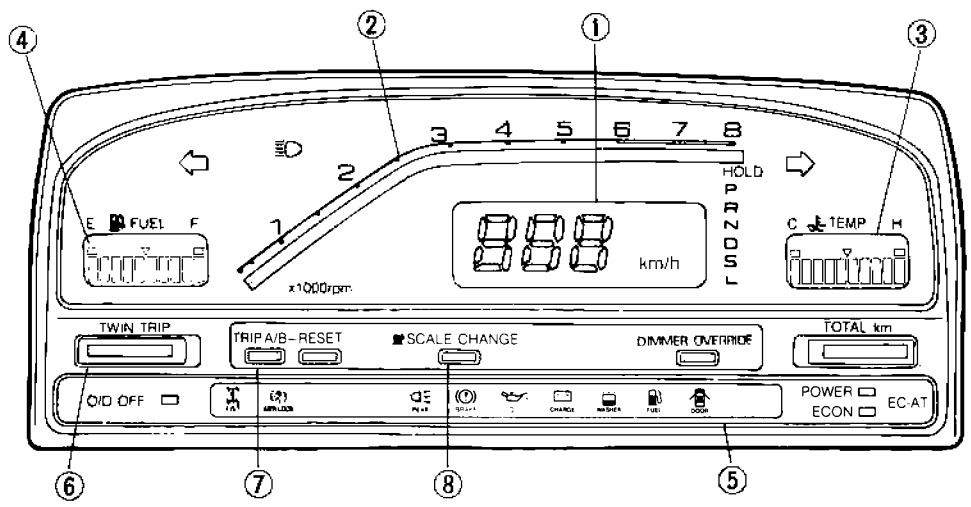
2. If continuity is not as specified, replace the switch or replace the light(s).

15 METER

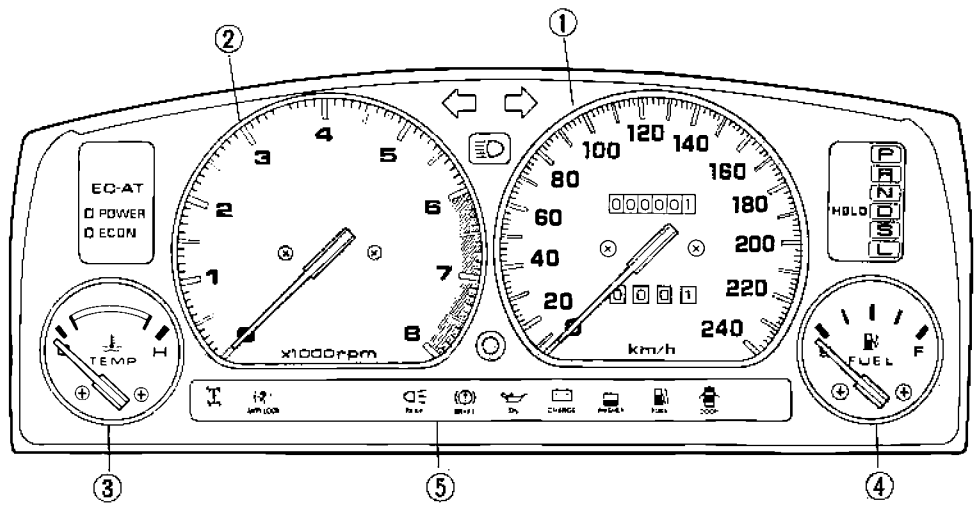
METER

STRUCTURAL VIEW

DIGITAL ELECTRONIC DISPLAY METER



ANALOG DISPLAY METER

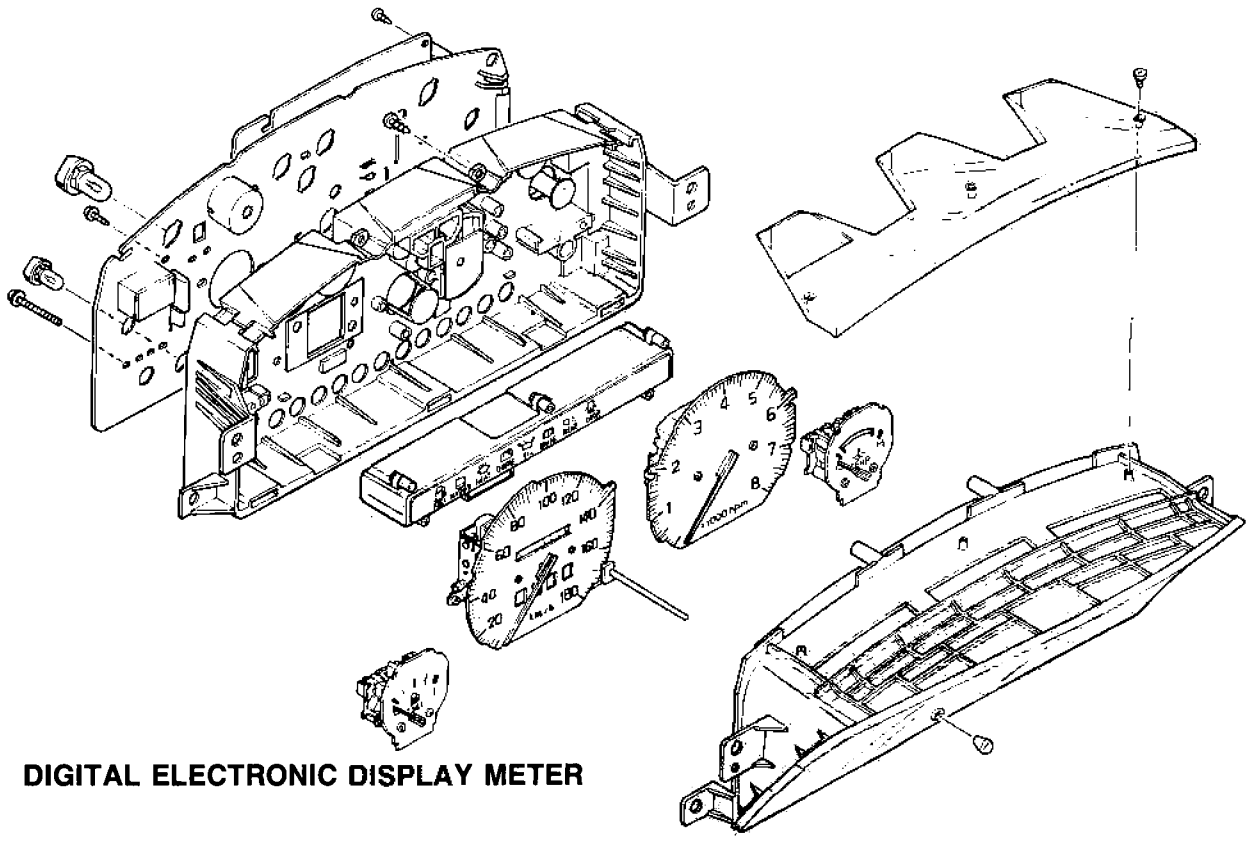


76G15X-007

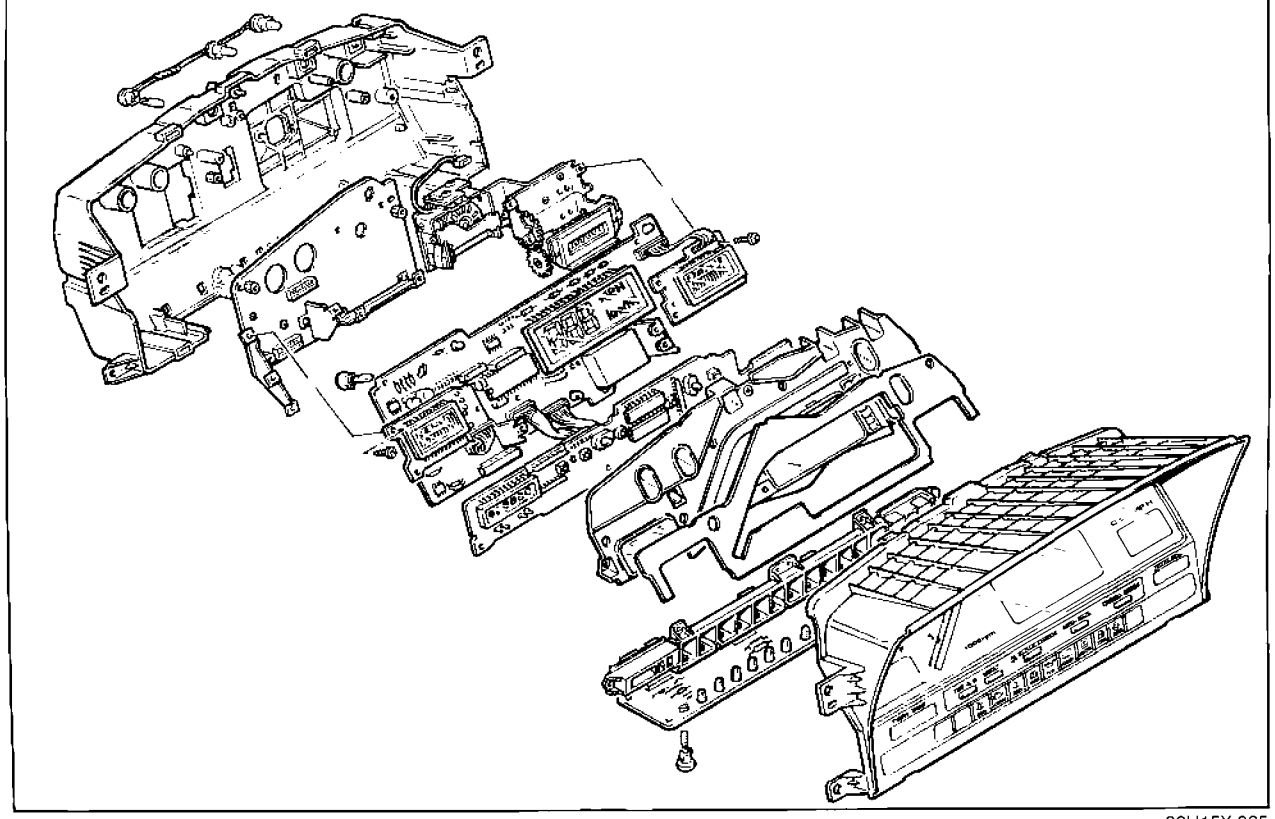
1. Speedometer
2. Tachometer
3. Water temperature gauge
4. Fuel gauge
5. Warning and indicator lights
6. Tripmeter
7. Twin tripmeter change switch
8. Fuel garge scale change switch

DISASSEMBLY AND ASSEMBLY

ANALOG DISPLAY METER



DIGITAL ELECTRONIC DISPLAY METER



86U15X-025

15 METER

TROUBLESHOOTING

Note
Check the METER 10 or 15A fuse in the fuse box for fusing before troubleshooting.

Fuel gauge does not operate when ignition switch ON.

Turn the ignition switch on, and check that some warning lights illuminate.
- NG → Repair harness. (Fuse box to meter)
- OK ↓

Check the fuel gauge.
analog meter: refer to page 15—26
digital meter: refer to page 15—28
- OK → Check the fuel tank unit.
except 4WS model: refer to page 15—29
only 4WS model: refer to page 15—30
- NG ↓

Remove the meter assembly.
Connect 1R terminal of 22 pin connector to a battery (+) terminal, 1N and 1P terminal of 22 pin connector to a battery (–) terminal, and check the voltage at 2B (Y) terminals of 14 pin connector.

Terminal	Voltage
2B (Y)	12V

- NG → Replace the fuel gauge.
- OK ↓

Repair harness. (Meter to fuel tank unit)

76G15X-031

Water temperature gauge does not operate when ignition switch on. (after warming engine)

Turn the ignition switch on, and check that some warning lights illuminate.
- NG → Repair harness (Fuse box to Meter)
- OK ↓

Check the water temperature gauge.
analog meter: refer to page 15—27
digital meter: refer to page 15—29
- OK → Check the water thermo sensor. refer to page 15—30
- NG ↓

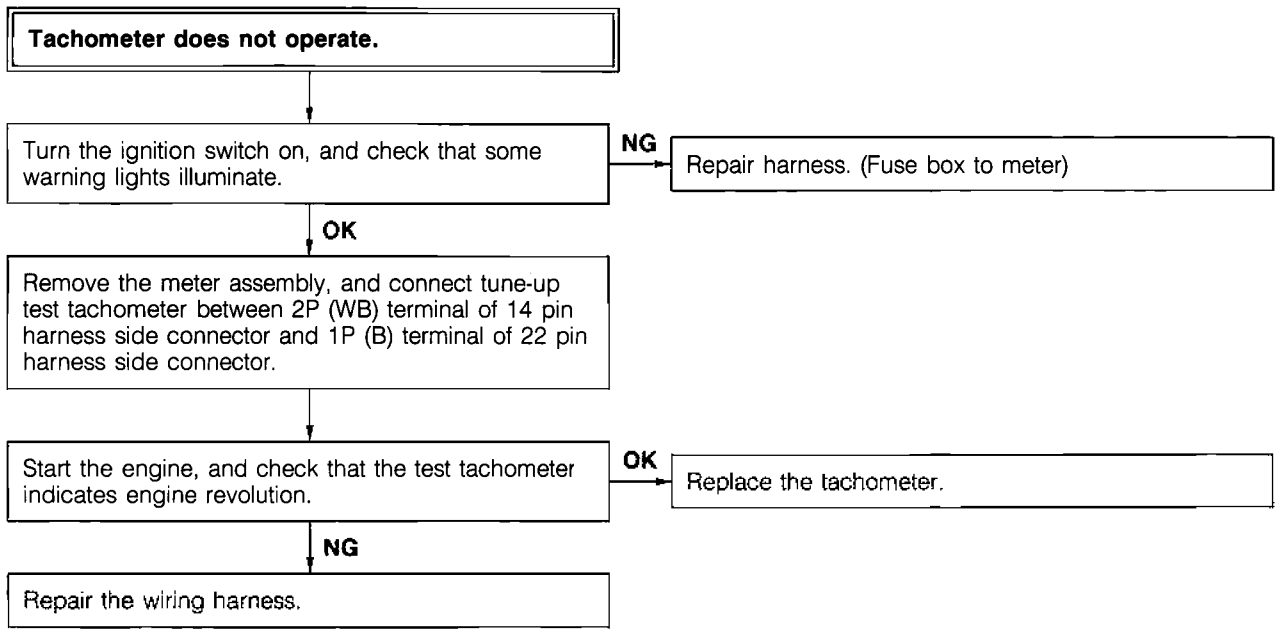
Remove the meter assembly.
Connect 1R terminal of 22 pin connector to a battery (+) terminal, 1N and 1P terminal of 22 pin connector to a battery (–) terminal, and check the voltage at 2D (BL) terminals of 14 pin connector.

Terminal	Voltage
2D (BL)	12V

- NG → Replace the water temperature gauge.
- OK ↓

Repair the wiring harness. (Meter to water thermo sensor)

76G15X-032


Tachometer does not operate.
Turn the ignition switch on, and check that some warning lights illuminate.
NG
Repair harness. (Fuse box to meter)
OK
Remove the meter assembly, and connect tune-up test tachometer between 2P (WB) terminal of 14 pin harness side connector and 1P (B) terminal of 22 pin harness side connector.
Start the engine, and check that the test tachometer indicates engine revolution.
OK
Replace the tachometer.
NG
Repair the wiring harness.

86U15X-028

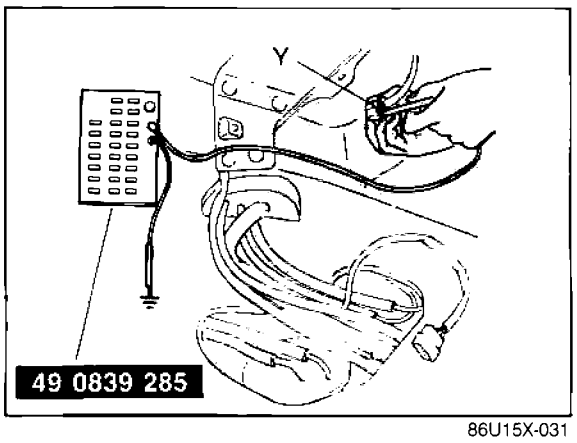
Standard indication (km/h)	Allowable range (km/h)
40	40— 43
80	80— 84
120	120—126

Standard indication (mph)	Allowable range (mph)
30	30—32
50	50—53
80	80—84

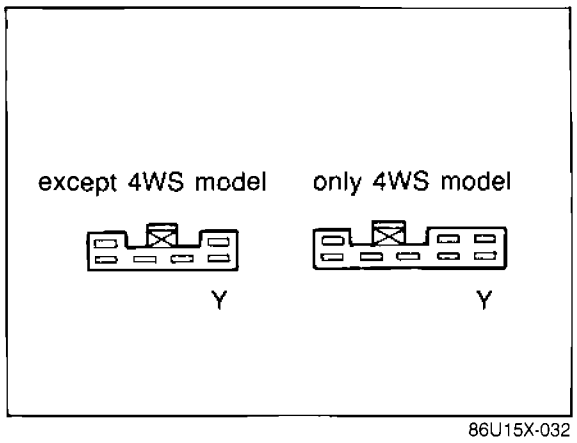
86U15X-029

Standard Indication (rpm)	Allowable range (rpm)
1000	850—1090
2000	1910—2210
3000	2850—3330
4000	3820—4420
5000	4790—5510
6000	5760—6600

86U15X-030



86U15X-031



86U15X-032

INSPECTION OF ANALOG METER

Speedometer

1. Using a speedometer tester, check the speedometer for allowable indication error, and check the operation of the odometer. Replace if necessary.
2. Check the speedometer for fluctuation and/or abnormal noise.

Caution
a) If significant fluctuation occurs or the speedometer does not move at all, remove the speedometer cable. If normal, replace the speedometer assembly.
b) Tire wear and improper inflation will increase speedometer error.

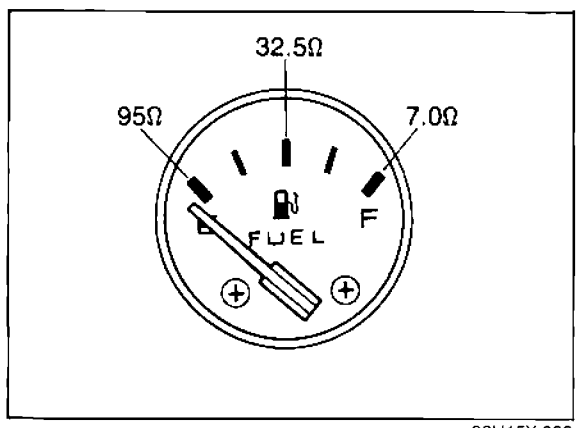
Tachometer

1. Connect a test tachometer to the engine, and start the engine.
2. Check the tachometer for allowable indicator error. Replace if necessary.

Caution
When removing or installing the tachometer, be careful not to drop it.

Fuel Gauge

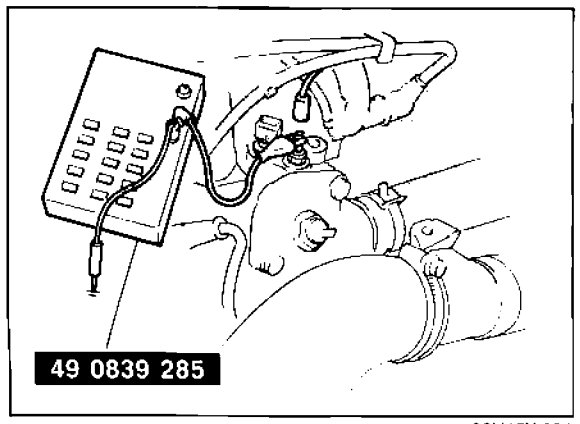
1. Disconnect the connector from the fuel tank unit.
2. Connect the red lead of the **SST** to the terminal **"Y"**, and the black lead to a body ground.



86U15X-033

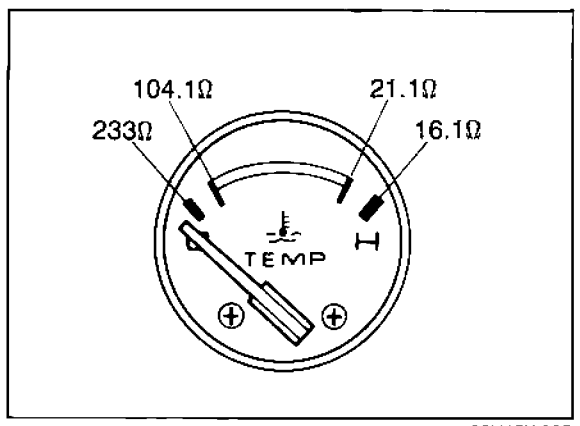
3. Set the **SST** to the resistance values shown in the figure.
4. Turn the ignition switch ON, and check that the needle indicator displays the correct values.
   If the needle displays correctly, check the gauge unit. If not, replace the fuel gauge in the meter or repair the wiring harness.

Caution
a) Continue the above checks for at least two minutes each to correctly judge the condition.
b) The allowable indication error is twice the width of the needle.



86U15X-034

Water Temperature Gauge
1. Disconnect the connector from the water thermo sensor.
2. Connect the red lead of the **SST** to the connector, and the black lead to a body ground.



86U15X-035

3. Set the **SST** to the resistance values shown in the figure.
4. Turn the ignition switch ON, and check that the needle indicator displays the correct values.
   If the needle displays the correct values, the trouble is in the gauge unit; if not, the trouble is in the meter or the wiring harness.

Caution
a) Continue the above checks for at least two minutes each to correctly judge the condition.
b) The allowable indication error is twice the width of the needle.

INSPECTION OF DIGITAL METER
Speedometer
1. Using a speedometer tester, check the speedometer for allowable indication error, and check the operation of the odometer. Replace the meter assembly if necessary.
2. Check the speedometer for fluctuation and/or abnormal noise.

Standard indication (km/h)	Allowable range (km/h)
60	60—63

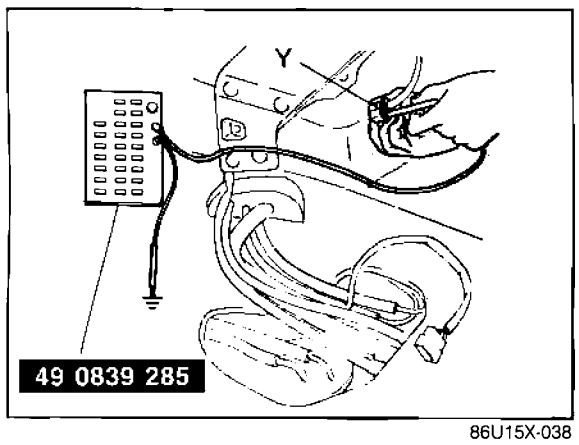
Standard indication (mph)	Allowable range (mph)
60	60—63

86U15X-036

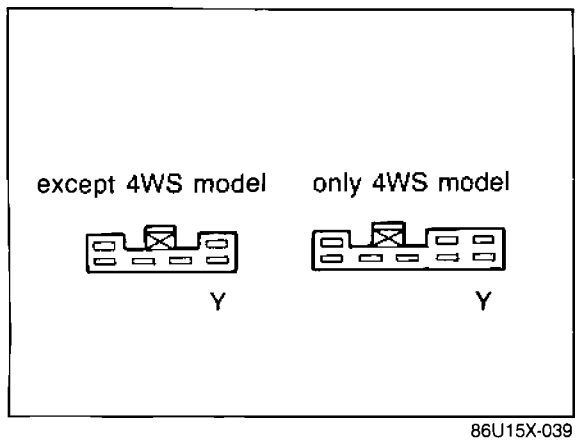
Caution
a) If significant fluctuation occurs or the speedometer does not move at all, remove the speedometer cable. If normal, replace the digital meter assembly.
b) Tire wear and improper inflation will increase speedometer error.

Standard Indication (rpm)	Allowable range (rpm)
1000	900— 950
2000	1900—1950
3000	2900—2950
4000	3900—3950
5000	4900—4950
6000	5900—5950

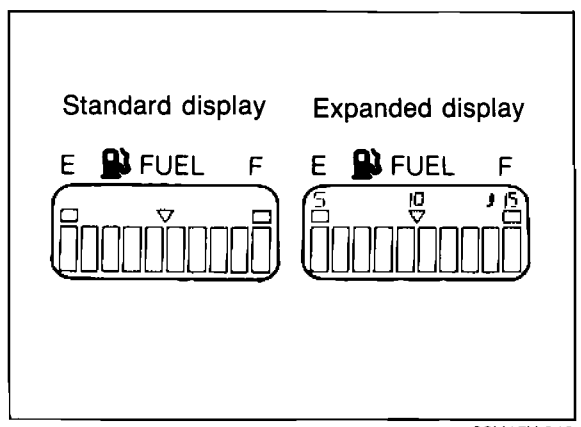
86U15X-037



86U15X-038



86U15X-039



86U15X-040

Tachometer

1. Connect a test tachometer to the engine, and start the engine.
2. Check the tachometer for the allowable indicator error. Replace digital meter assembly.

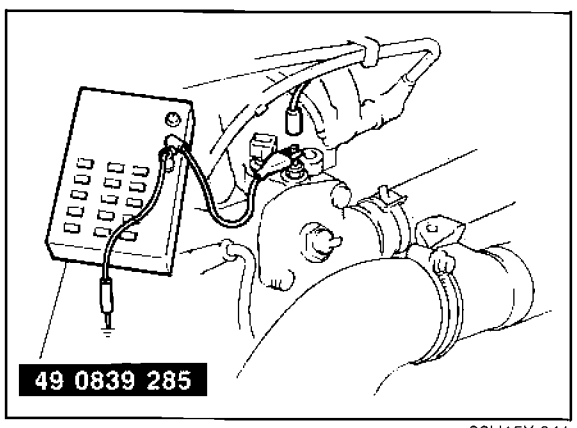
Caution
When removing or installing the tachometer, be careful not to drop it or subject it to sharp impact.

Fuel Gauge

1. Disconnect the connector from the fuel tank unit.
2. Connect the red lead of the **SST** to terminal **"Y"** and the black lead to body ground.
3. Set the **SST** to the resistance values shown the following table.
4. Turn the ignition switch ON and check that the segment displays the correct values in each range. If the segment displays the correct values, check the gauge unit. If not, replace the digital meter assembly.

Caution
Continue the above inspections for at least two minutes each to correctly judge the condition.

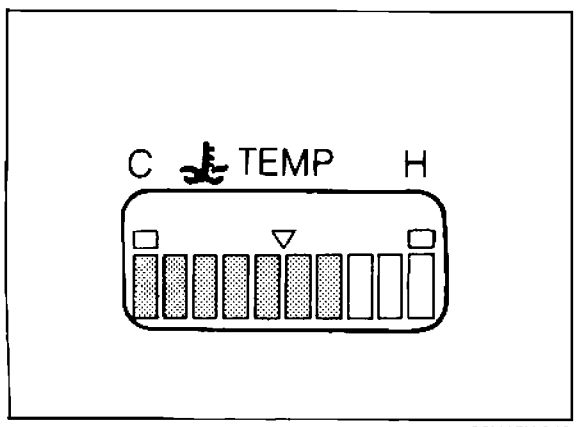
Segment	Standard display	Expanded display
	Resistance (Ω)	
1—10	less than 8	less than 63
1— 9	8—14	63—66
1— 8	14—20	66—70
1— 7	20—25	70—74
1— 6	25—30	74—78
1— 5	30—37	78—82
1— 4	37—46	82—86
1— 3	46—63	86—90
1— 2	63—86	90—93
1	86—98	93—98
1 (flashing)	more than 98	less than 98



86U15X-041

Water Temperature Gauge

1. Remove the connector from the water thermo sensor.
2. Connect the red lead of the **SST** to the connector, and the black lead to a body ground.

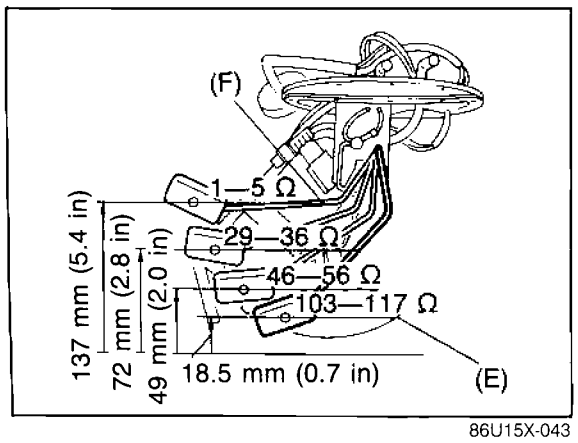


86U15X-042

3. Set the **SST** to the resistance values shown in the following table.
4. Turn the ignition switch ON and check that the segment displays the correct values. If the segment displays the correct values, check the gauge unit. If not, replace the digital meter assembly or repair wiring harness.

Caution
Continue the above checks for at least two minutes each to correctly judge the condition.

Segment	Resistance (Ω)	Segment	Resistance (Ω)
1—10	less than 17	1—5	33—89
1— 9	17—20	1—4	89—120
1— 8	20—26	1—3	120—145
1— 7	26—28	1—2	145—177
1— 6	28—33	1	more than 177

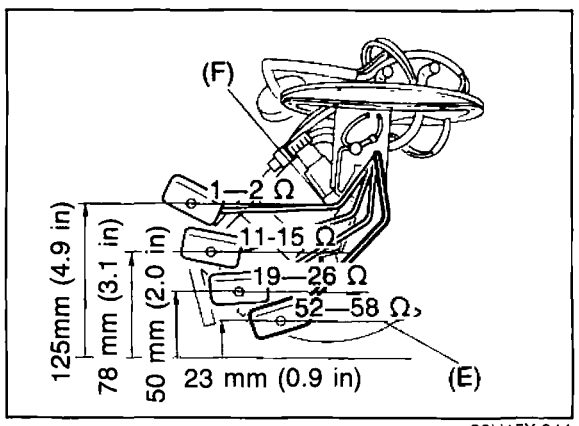


86U15X-043

INSPECTION OF METER SENDER

Fuel tank unit (except 4WS model)

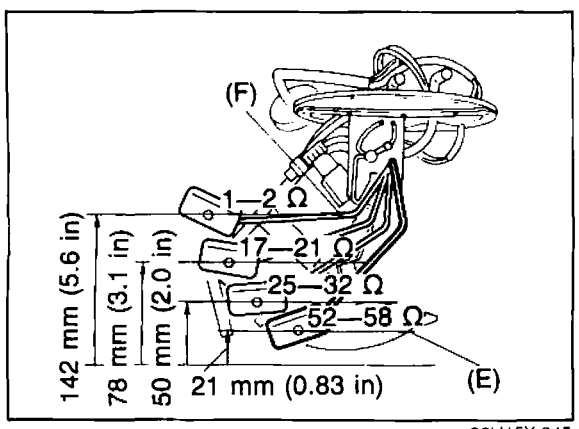
1. Disconnect the connector from the fuel tank unit.
2. Remove the fuel tank unit from the tank.
3. Connect an ohmmeter to terminal "b" of connector.
4. Move the unit arm slowly from point (F) to point (E), and read the resistance values. If not as specified, replace the unit.



86U15X-044

Fuel transfer unit (only 4WS model)

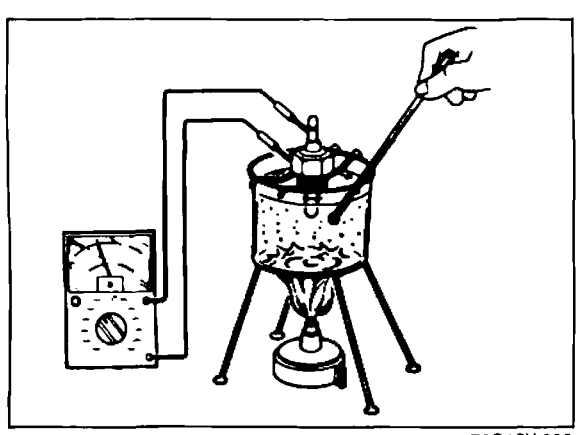
1. Remove the fuel transfer unit referring to section 4.
2. Remove the connector from the fuel transfer unit.
3. Connect an ohmmeter between "b" and "d" terminal of the connector.
4. Move the unit arm slowly from point (F) to point (E), and read the resistance values.
5. If not as specified, replace the unit.



86U15X-045

Fuel tank unit (only 4WS model)

1. Remove the fuel tank unit.
2. Remove the connector from the fuel tank unit.
3. Connect an ohmmeter between "d" terminal of the connector and fuel tank unit cover.
4. Move the unit arm slowly from point (F) to point (E) and read the resistance values.
5. If not as specified, replace the unit.



76G15X-089

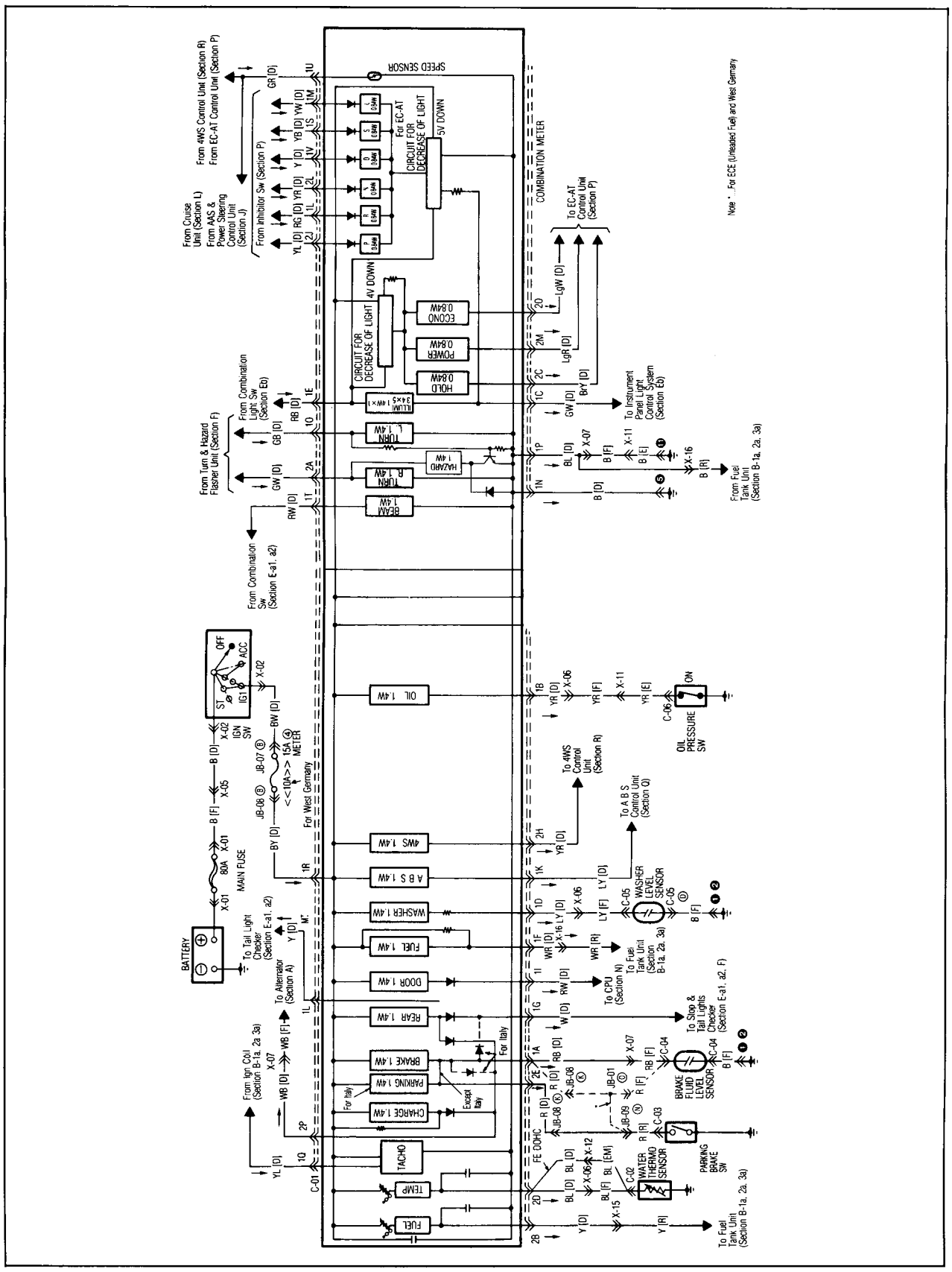
Water Thermo Sensor

1. Remove the sensor.
2. Place the sensor in water along with a thermometer.
3. Heat the water gradually, and check the resistance of the sensor with an ohmmeter.
4. If the resistance is not as specified, replace the sensor.

Resistance: 49.3—57.7 Ω at 80°C (176°F)

WARNING LIGHT AND SENDER

CIRCUIT DIAGRAM



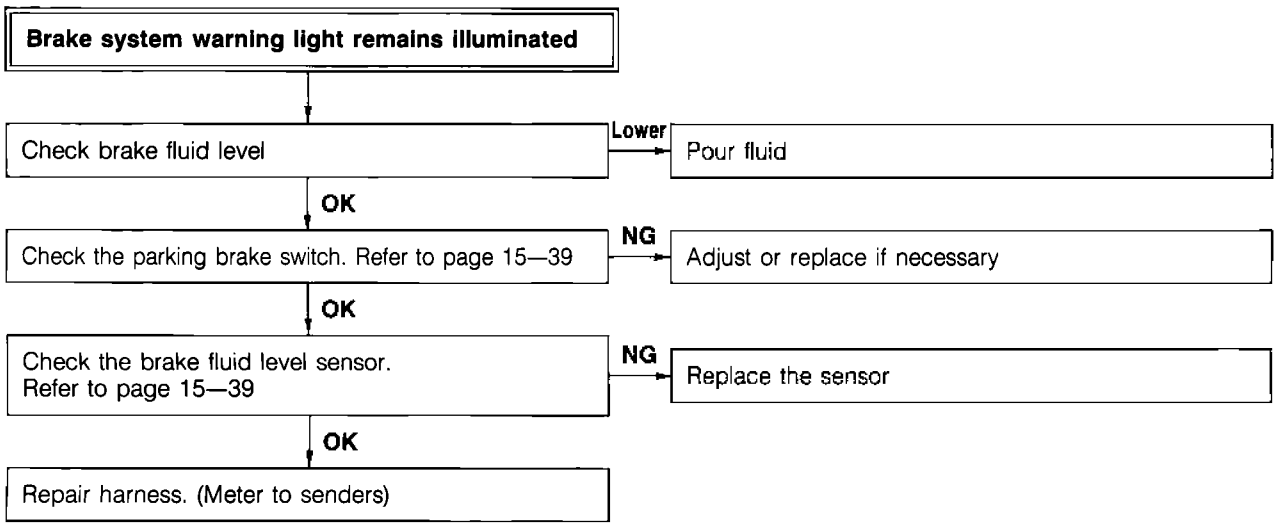
86U15X-047

15 WARNING LIGHT AND SENDER

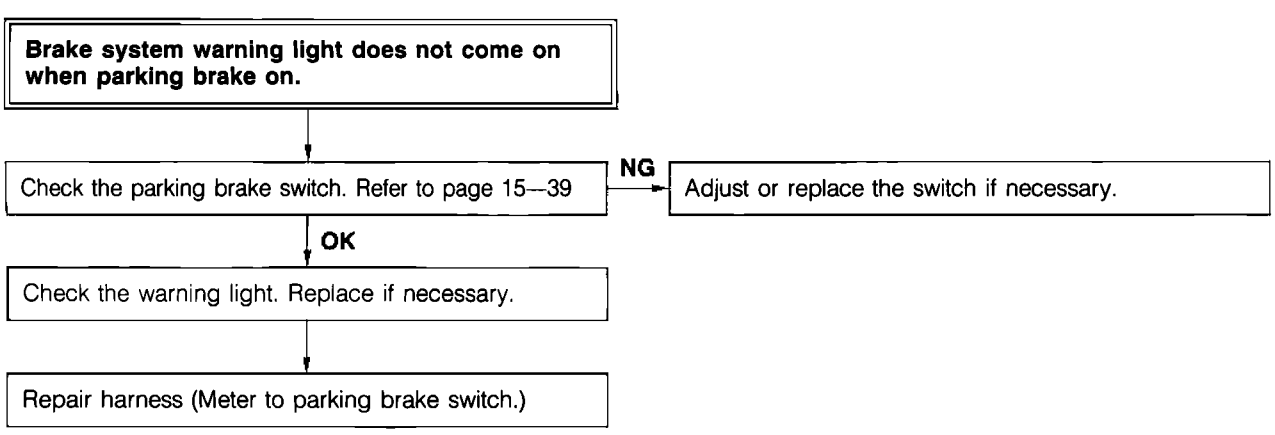
TROUBLESHOOTING

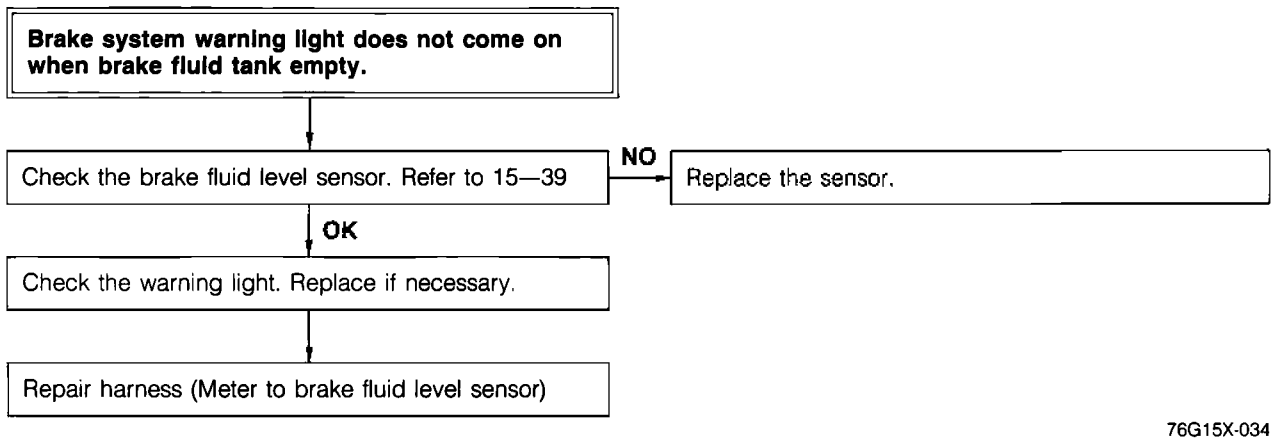
Note
Check the "Meter 10 or 15A" fuse in the fuse box before troubleshooting. If normal, refer to the following troubleshooting chart.

Brake System Warning Light



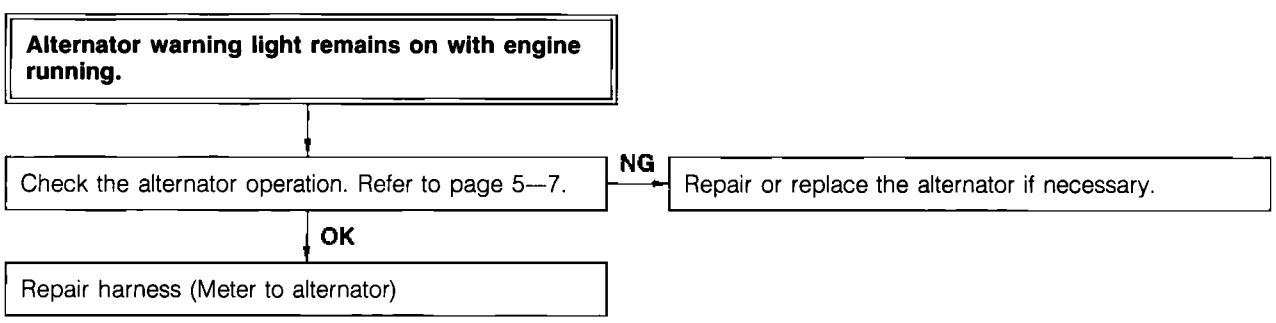
76G15X-033



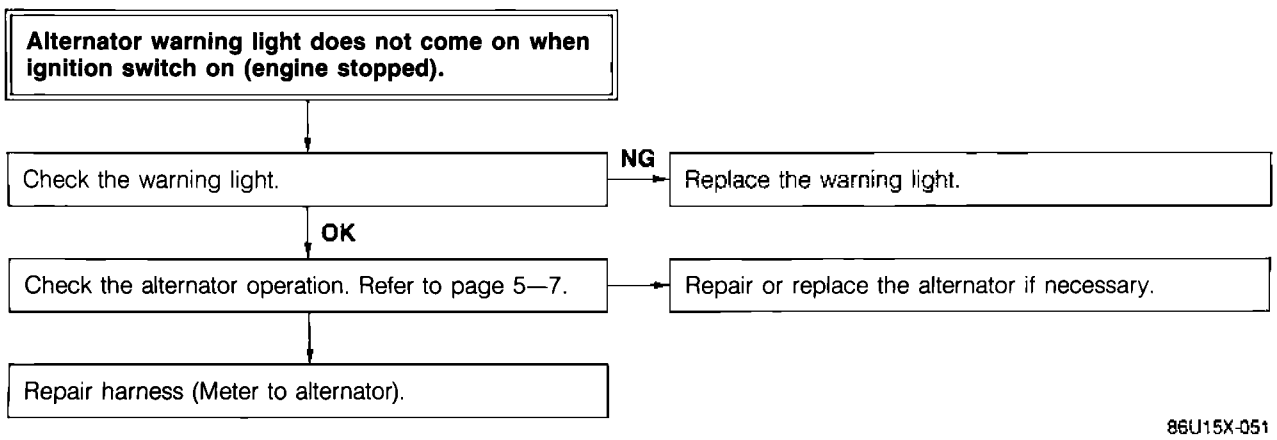


76G15X-034

Alternator Warning Light

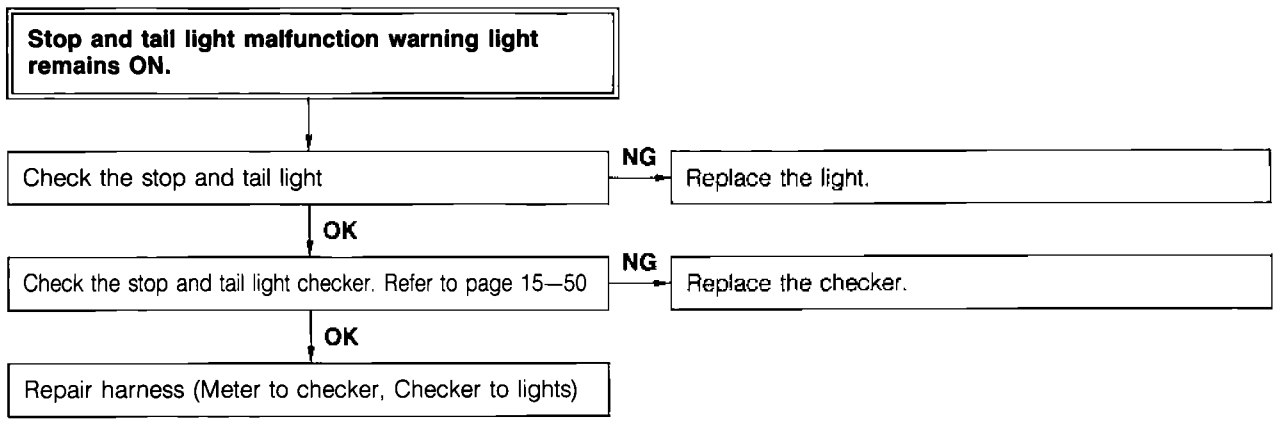


86U15X-050



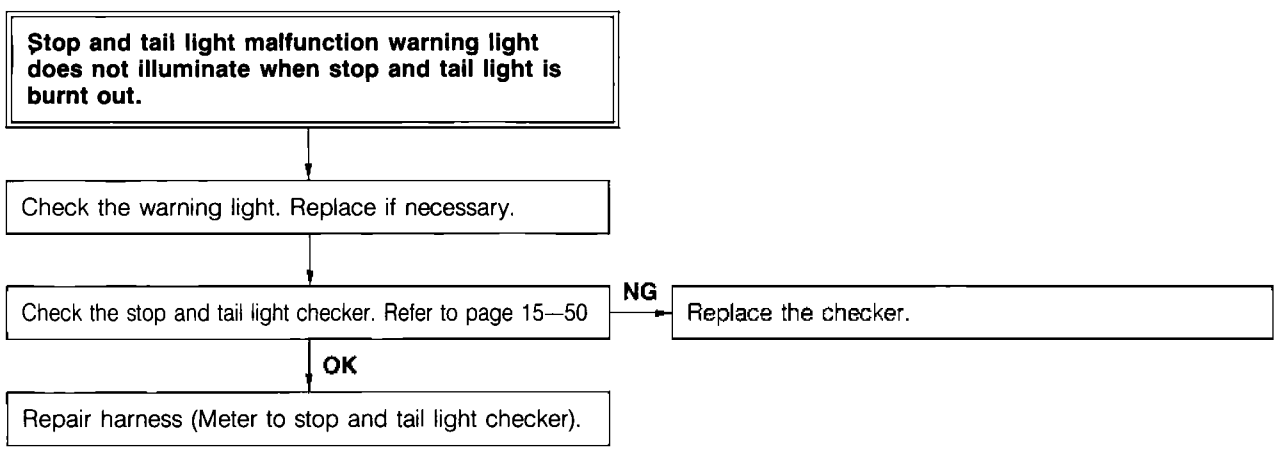
86U15X-051

Stop And Tail Light Malfunction Warning Light



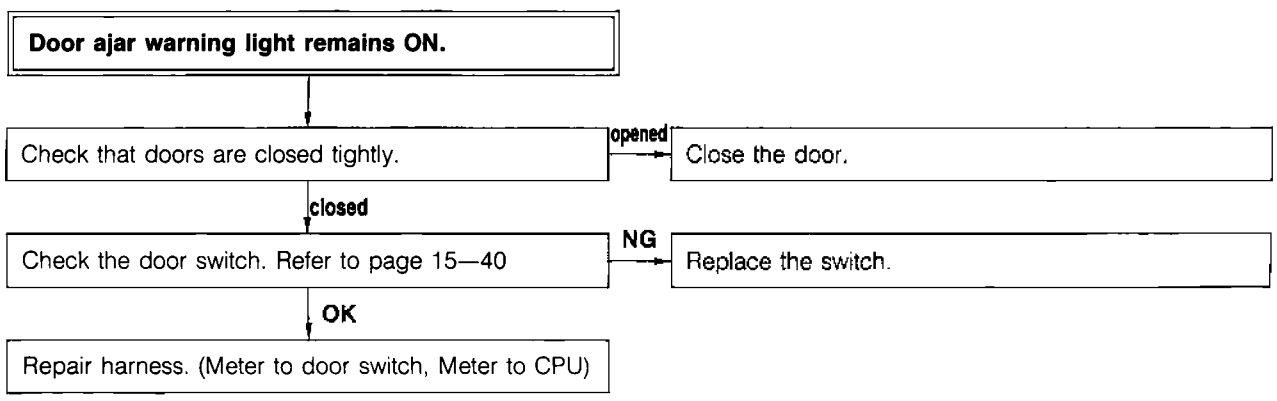
76G15X-035

15 WARNING LIGHT AND SENDER

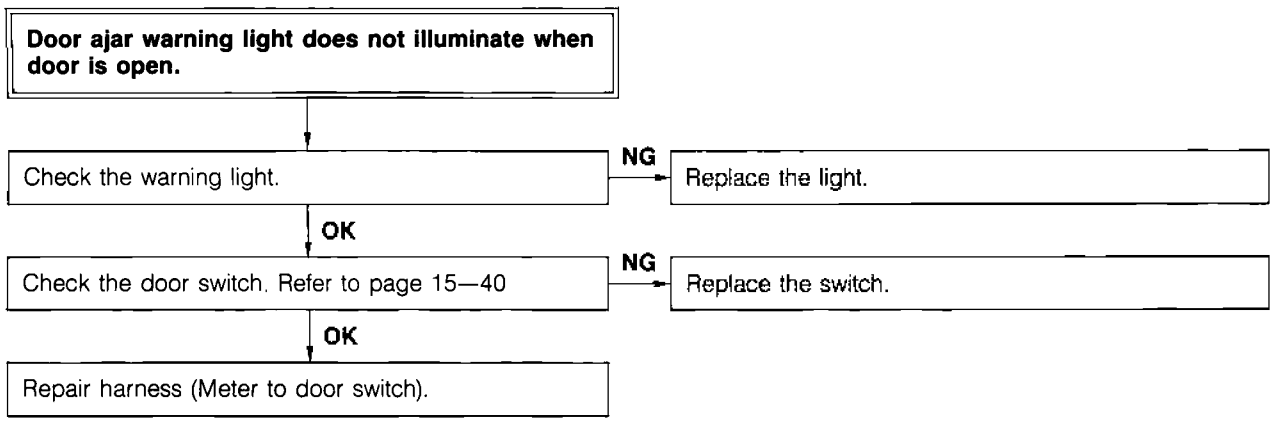


76G15X-036

Door Ajar Warning Light

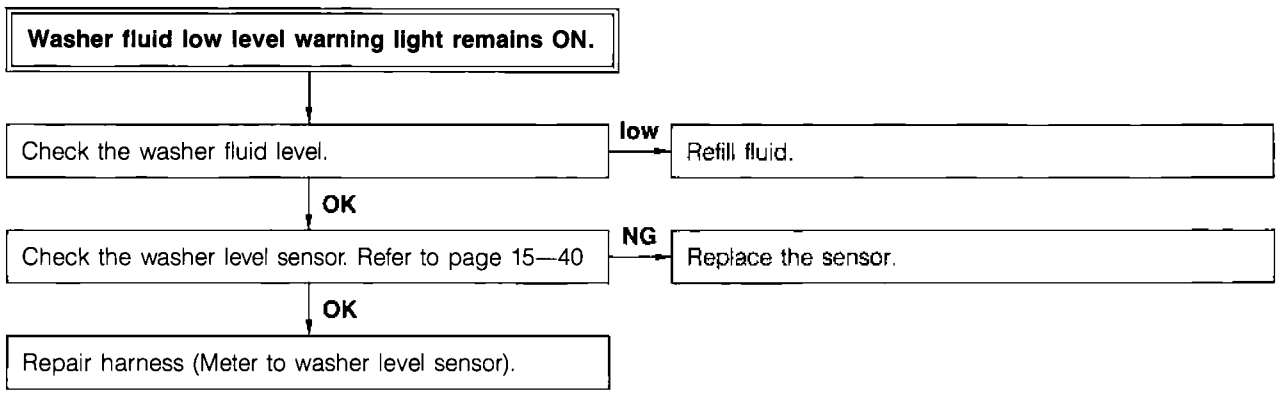


76G15X-037

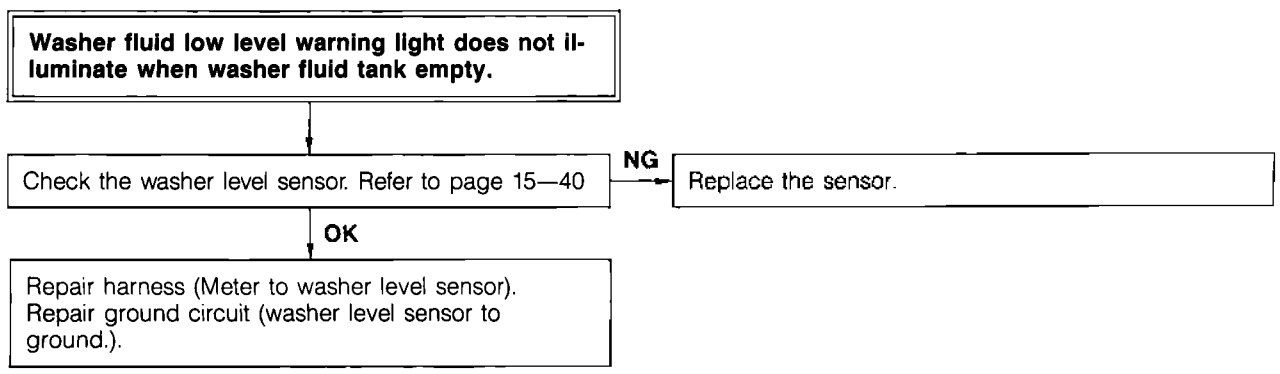


76G15X-038

Washer Fluid Low Level Warning Light

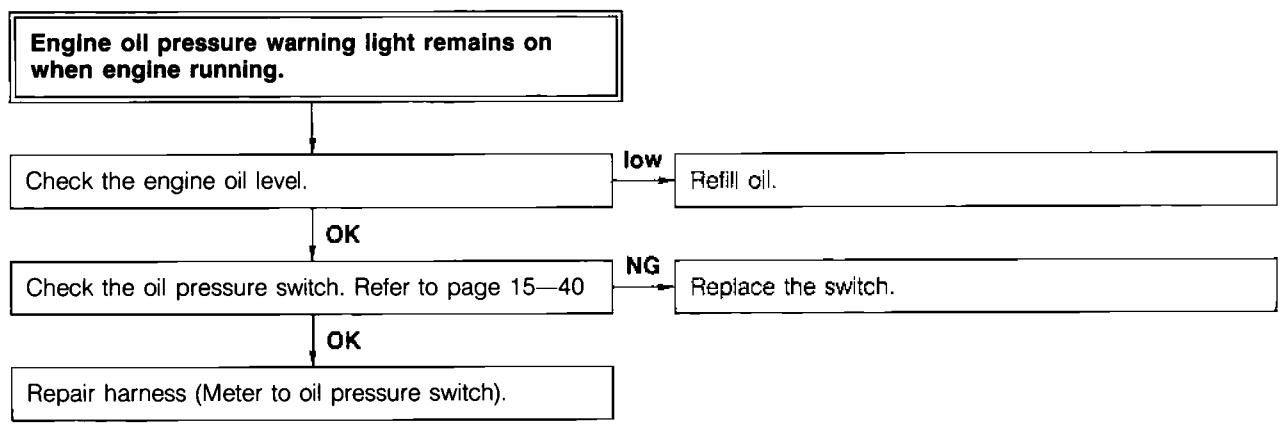


76G15X-039



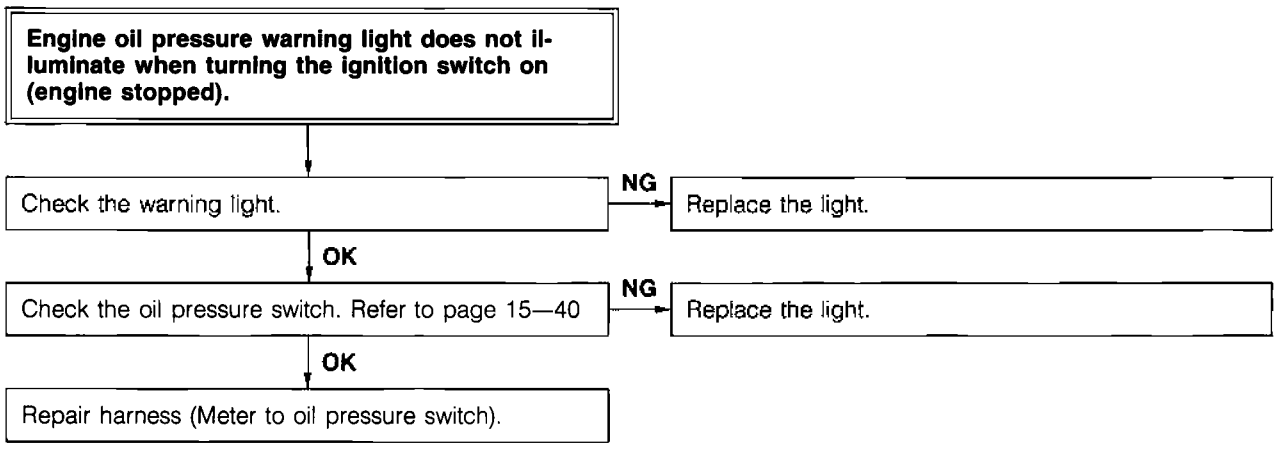
76G15X-040

Engine Oil Pressure Warning Light



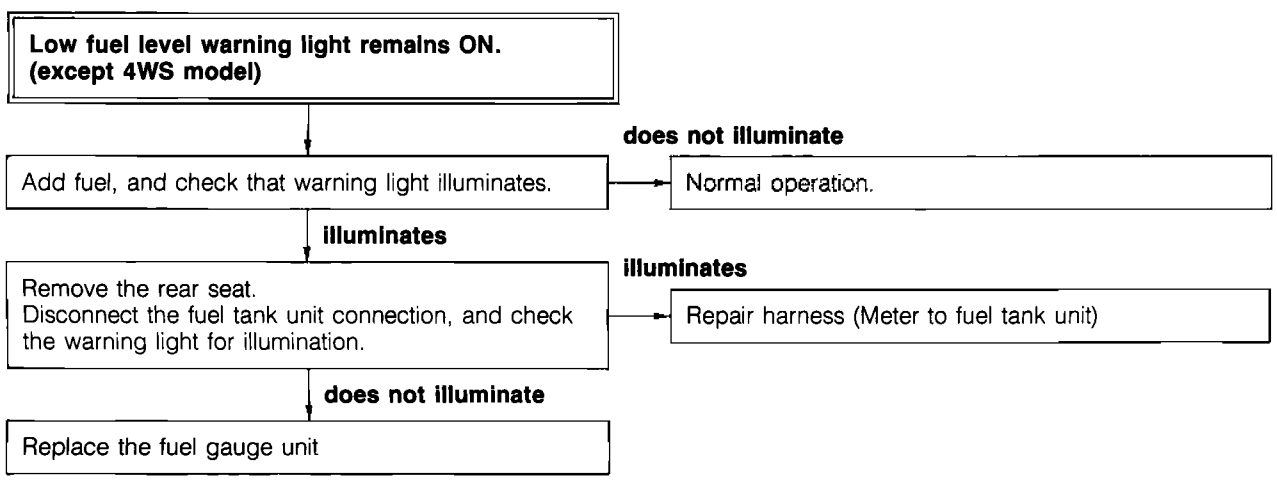
76G15X-041

15 WARNING LIGHT AND SENDER

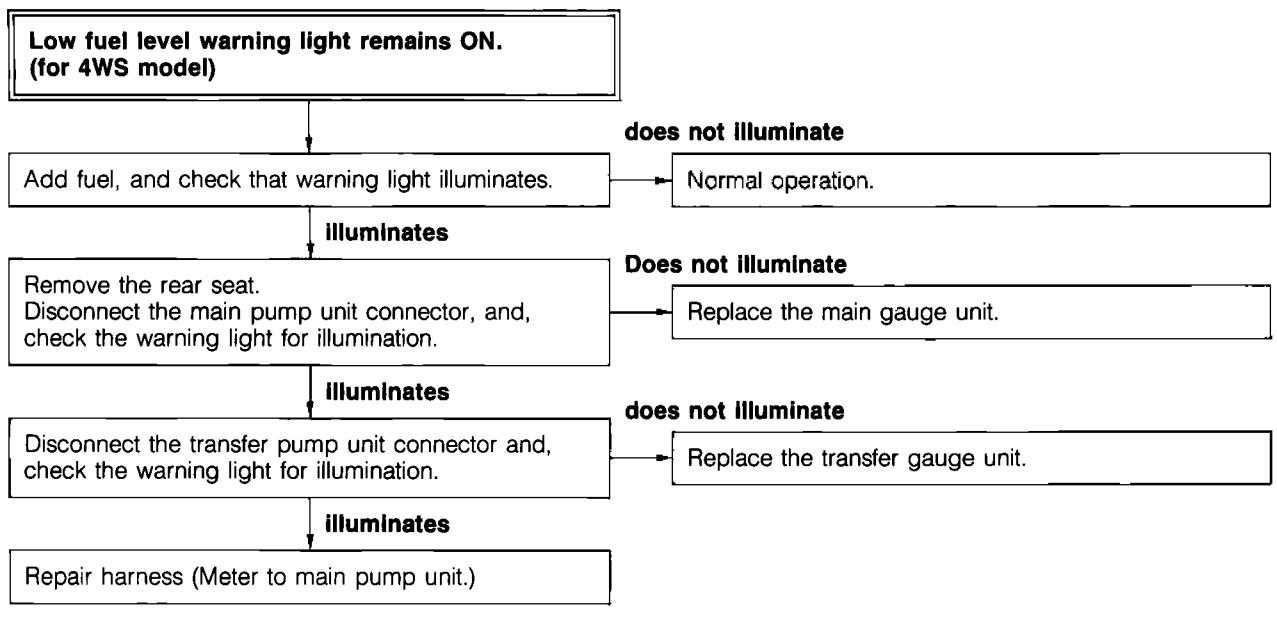


76G15X-042

Low Fuel Level Warning Light



86U15X-060



86U15X-061

Low fuel level warning light illuminates earlier than fuel gauge indicates low fuel.

↓

Refer to page 4C—59

76G15X-090

Seat Belt Warning Light

Seat belt warning light remains ON even if 6 seconds pass after ignition switch ON.

↓

Check that the seat belt warning light comes on when turning the ignition switch ON with unfastened seat belt.

→ **OK** → Normal operation.

↓ **NG**

Repair harness (Meter to CPU) or replace CPU

76G15X-043

EC-AT Mode Indicator Light

POWER and ECONO indicator lights do not illuminate.

↓

Check the hold switch. Refer to page 7B—63

→ **NG** → Replace the switch.

↓ **OK**

Check the mode switch. Refer to page 7B—63

→ **NG** → Replace the switch.

↓ **OK**

Replace the bulb or repair the harness (Meter to mode switch, EC-AT switch to control unit).

76G15X-091

HOLD indicator lights do not illuminate when ignition switch and hold switch ON.

↓

Check the hold switch. Refer to page 7B—63

→ **NG** → Replace the switch.

↓ **OK**

Disconnect the EC-AT control unit connector and check the voltage at **BrY (2K)** terminal of the harness side connector with ignition switch on.

Terminal	Voltage
BrY (2K)	12V

→ **NG** → Replace the bulb or repair the harness (Meter to control unit).

76G15X-044

Shift Indicator Light

All shift indicator lights do not illuminate when ignition switch on. (other warning light are all right.)

↓

Check the voltage at **BY** terminal of the inhibitor switch connector with ignition switch on.

Terminal	Voltage
BY	12V

NG → Repair the harness (Fuse box to inhibitor switch).

↓ **OK**

Check the inhibitor switch. Refer to page 7B—65 → **NG** → Replace the inhibitor switch.

↓ **OK**

Check the bulbs of the shift indicator lights. → **NG** → Replace the bulb.

↓ **OK**

Turn the ignition switch on, and check the voltage at each terminal of the meter connector with each condition.

Terminal	Selector lever	Voltage
YL (2J)	P	12V
RG (1L)	R	12V
YR (2L)	N	12V
Y (1V)	D	12V
YB (1S)	2	12V
YW (1M)	1	12V

NG → Repair the harness (Inhibitor switch to meter).

76G15X-087

O/D OFF Indicator Light

O/D OFF indicator light does not illuminate when ignition switch ON and O/D OFF switch released.

↓

Check the O/D OFF switch. Refer to page 7B—64 → **NG** → Replace the switch.

↓ **OK**

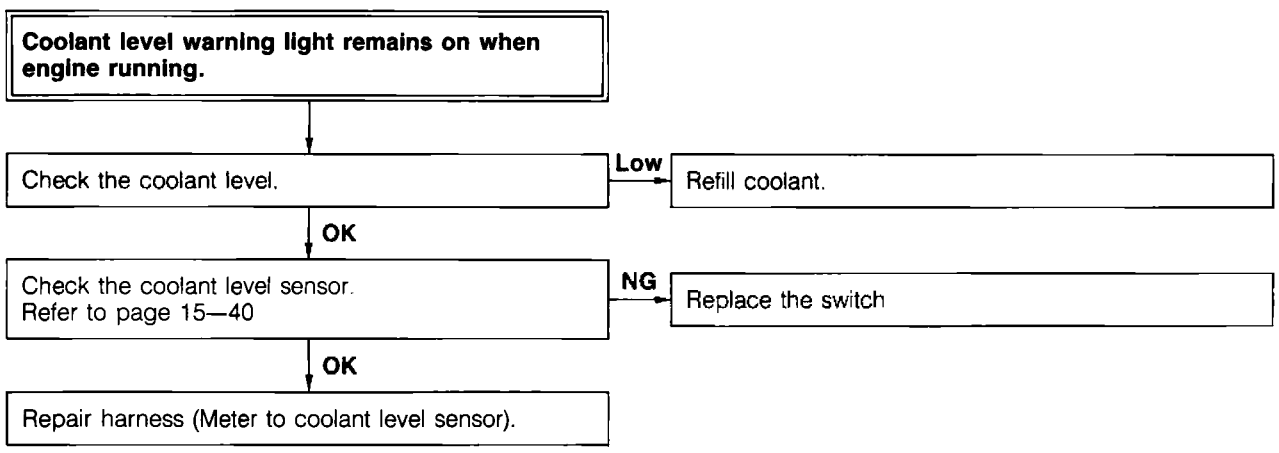
Check for 12V at **BrB** terminal of the O/D OFF switch connector. → **NG** → Replace the bulb or repair the harness (Meter to O/D OFF switch).

↓ **OK**

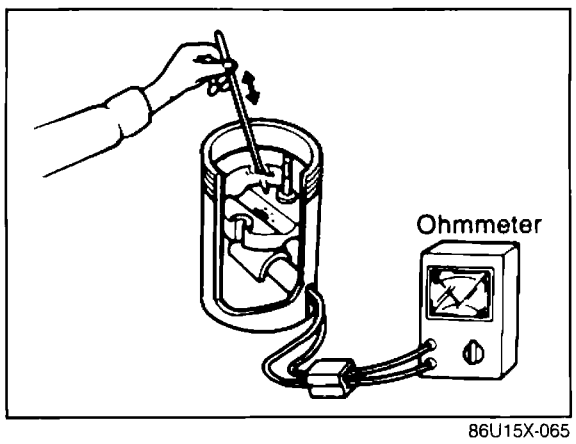
Repair the harness (O/D OFF switch to ground).

76G15X-092

Coolant Level Warning Light



76G15X-093



86U15X-065

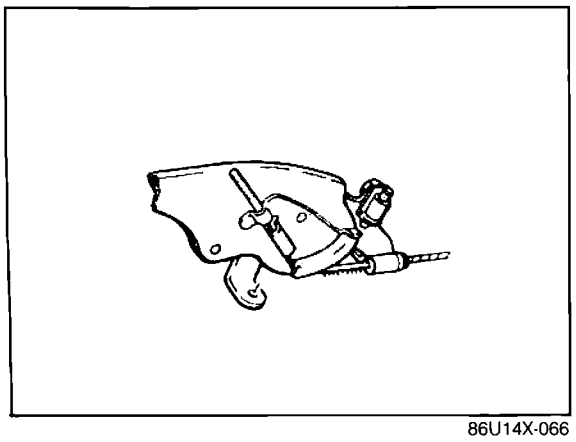
INSPECTION

Brake Fluid Level Sensor

1. Check for continuity of the sensor with an ohmmeter.

Float level	Continuity
Below min	Yes
Above min	No

2. If continuity is not as specified, replace the sensor.



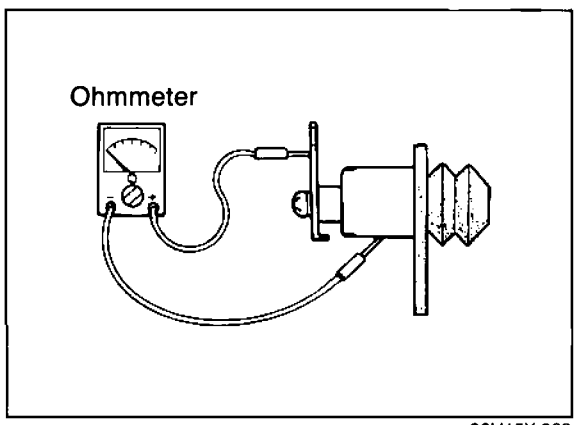
86U14X-066

Parking Brake Switch

1. Check for continuity between (R) terminal and a body ground with an ohmmeter.

Lever	Continuity
Pulled one notch	Yes
Released	No

2. If continuity is not as specified, adjust the switch or replace the switch.



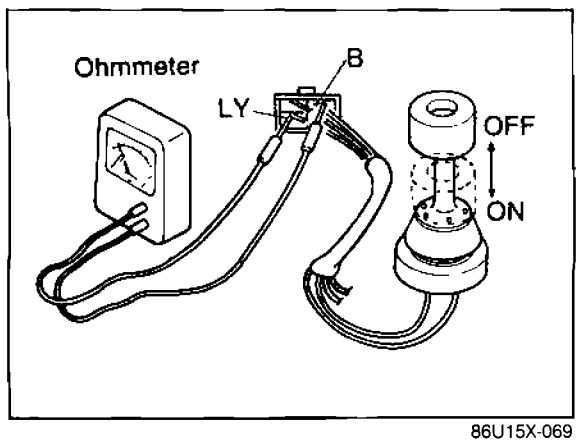
86U15X-068

Door Switch

1. Check for continuity of the switch with an ohmmeter.

Switch	Continuity
Pushed	No
Released	Yes

2. If continuity is not as specified, replace the switch.



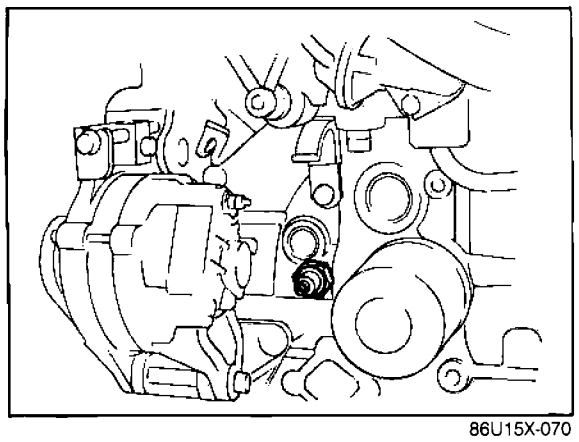
86U15X-069

Washer Level Sensor

1. Check for continuity between **C (LY)** terminal and **D (B)** terminal of the washer level sensor connector.

Terminals	Float level	Continuity
C (LY)—D (B)	Bottom	Yes
	Above bottom	No

2. If continuity is not as specified, replace the sensor.

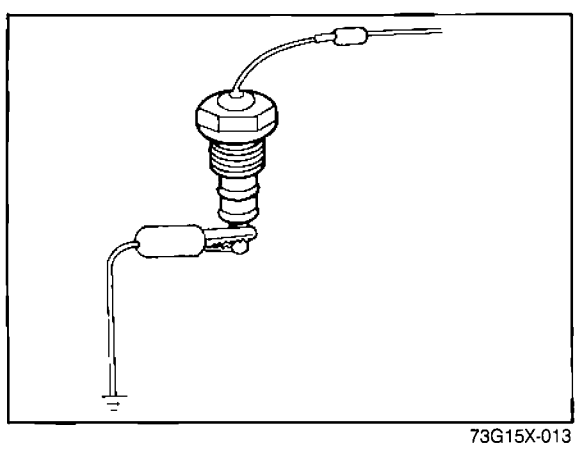


86U15X-070

Oil Pressure Switch

1. Disconnect the connector from the oil pressure switch.
2. Check for continuity between the switch and a body ground with each condition.

Engine	Continuity
Running	Yes
Stop	No



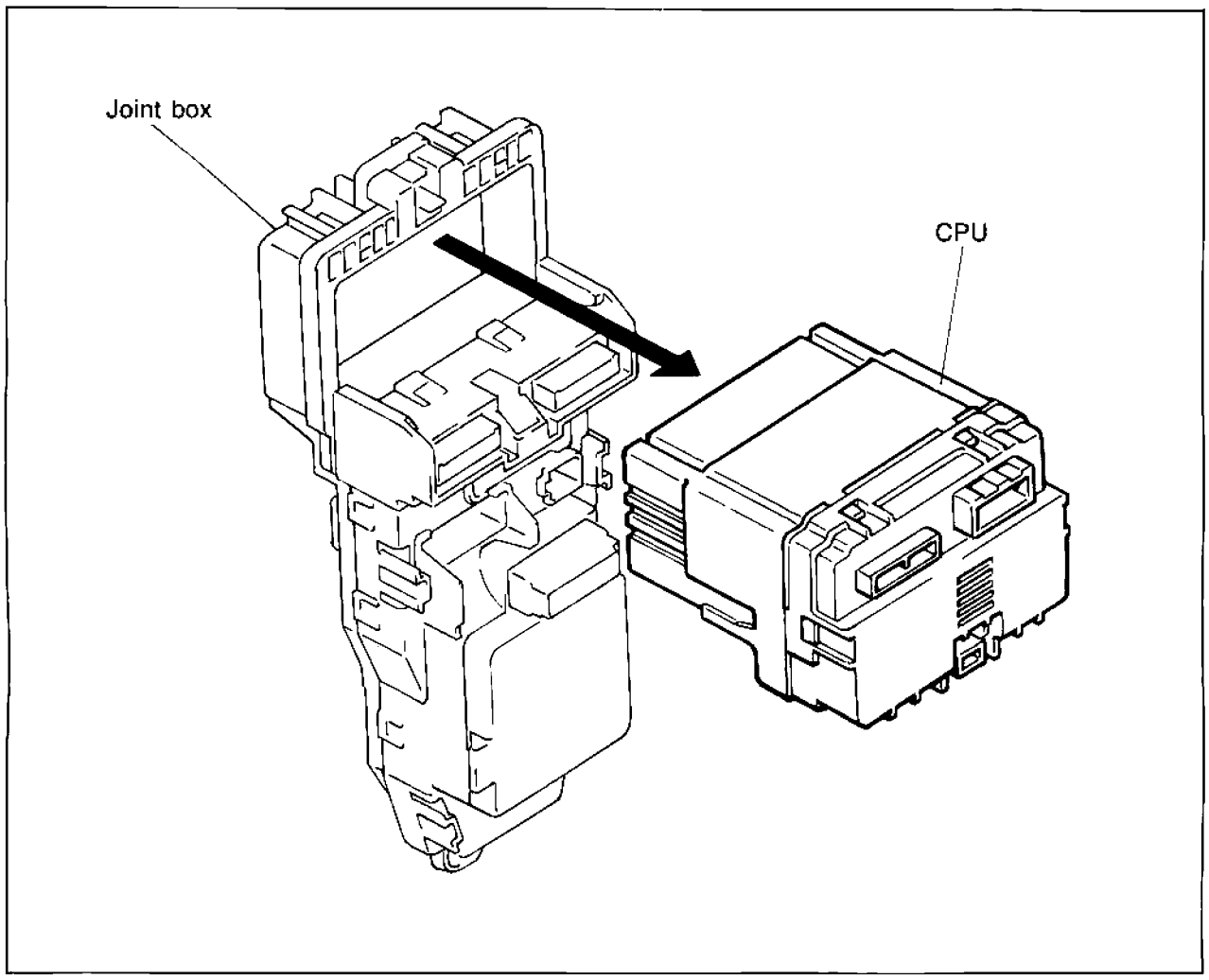
73G15X-013

Coolant Level Sensor

1. Remove the level sensor and connect the connector.
2. With the sensor not grounded to the body, start the engine.
3. After checking that the warning light illuminates, ground the threaded part of the sensor.
4. If the warning light remains illuminated, the sensor is faulty and replace it.

CENTRAL PROCESSING UNIT (CPU)

STRUCTURAL VIEW



86U15X-071

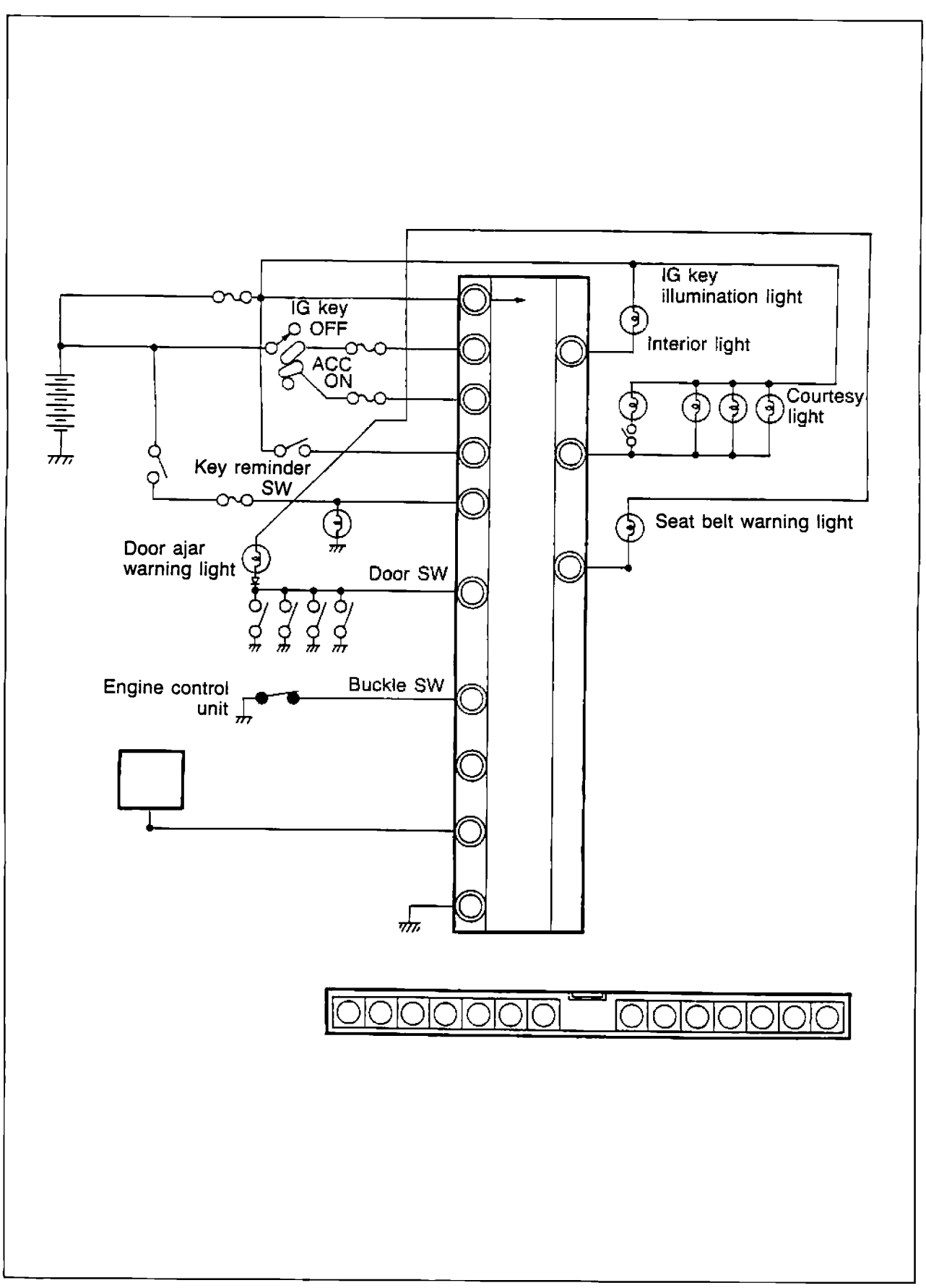
FUNCTIONS

System	Function
Sound Alarm System	Key reminder alarm
	Light-off reminder alarm
	Seat belt alarm
Timer System	Seat belt timer
	Key illumination light timer
	Interior light timer

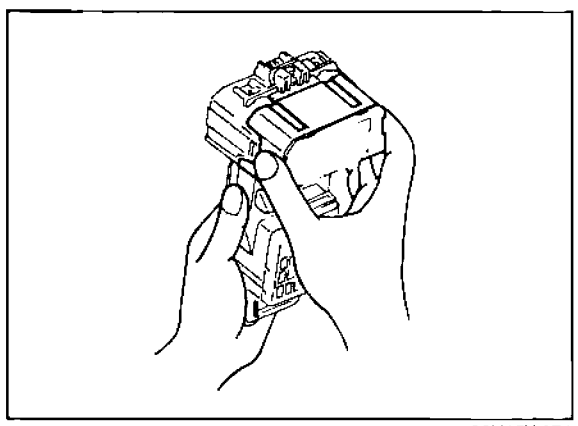
76G15X-008

15 CENTRAL PROCESSING UNIT (CPU)

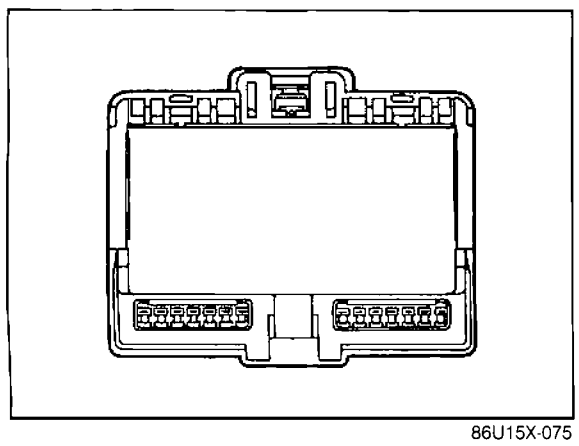
CIRCUIT DIAGRAM



86U15X-073



86U15X-074



86U15X-075

REMOVAL AND INSTALLATION

1. Disconnect the negative battery cable.
2. Disconnect the CPU connectors.
3. Release the lock and remove the CPU from the joint box.
4. Install in the reverse order of removal.

ON-VEHICLE INSPECTION

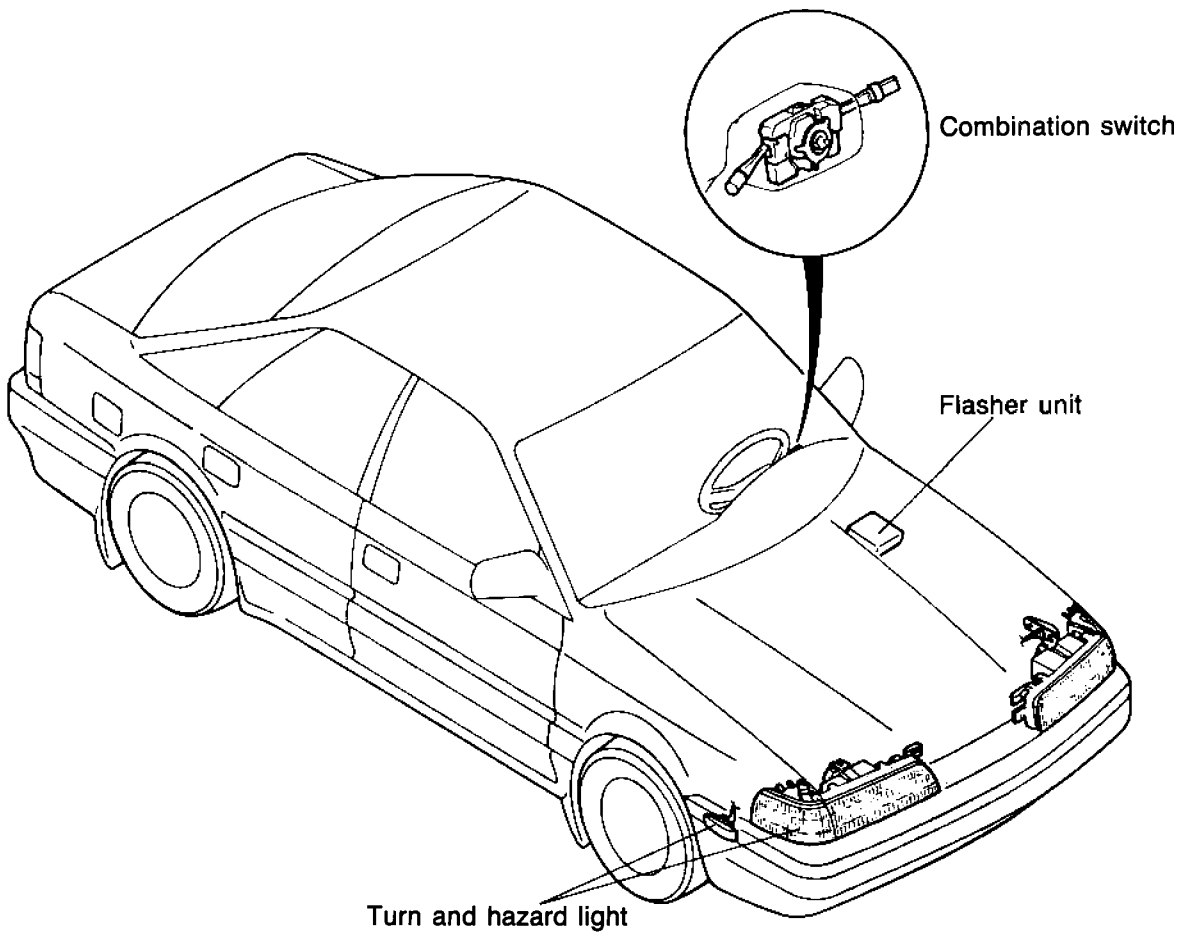
Note: Check the voltage between "a through l" terminal and ground.
Check the continuity between "m, n" terminal and ground.

Terminal	Connecting to	Measurement condition	Measurement value
a	Interior light and courtesy lights	Any time	Approx. 12V
b	Battery	Any time	Approx. 12V
c	No used	—	—
d	Ground	Any time	0V
e	Seat belt warning light	Ignition switch ON	Approx. 12V
f	Engine control unit	Engine running	Approx. 12V
g	Key cylinder illumination light	Any time	Approx. 12V
i	Key reminder switch	Insert the key into the cylinder	Approx. 12V
		Pull out the key from the cylinder	0V
j	Ignition switch (ON)	Ignition switch ON	Approx. 12V
		Ignition switch OFF or ACC	0V
k	Ignition switch (ACC)	Ignition switch ON or ACC	Approx. 12V
		Ignition switch OFF	0V
l	Light switch (In the combination switch)	Turn the light switch ACC and ON	Approx. 12V
		Light switch OFF	0V
m	Seat belt switch	Seat belt fastened	0Ω
		Seat belt unfastered	∞
n	Door switch	Door closed	∞
		Door open	0Ω

76G15X-009

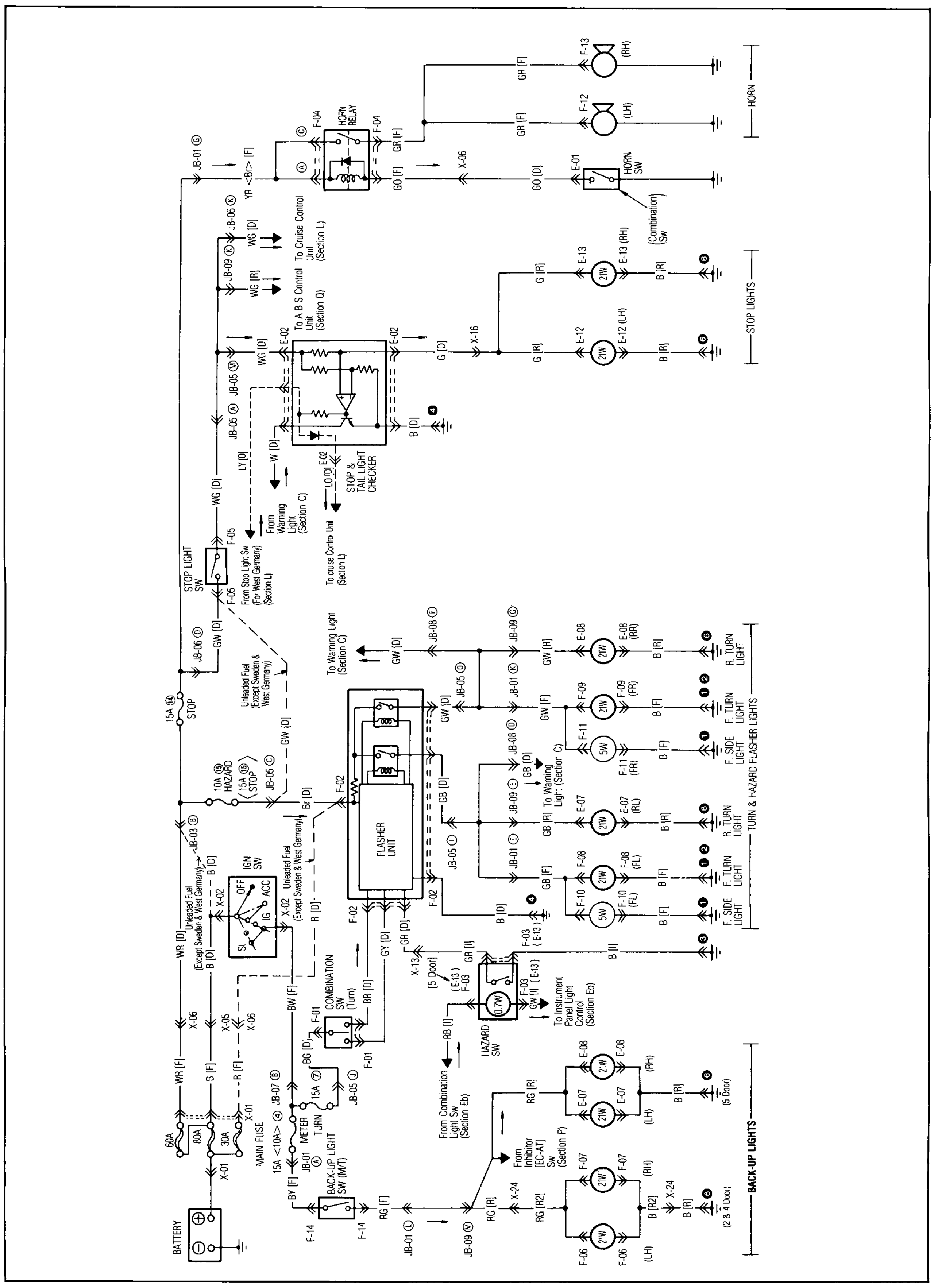
TURN AND HAZARD LIGHT

STRUCTURAL VIEW



86U15X-077

CIRCUIT DIAGRAM



86U15X-078

15 TURN AND HAZARD LIGHT

TROUBLESHOOTING

Note
Check the TURN 15A fuse in the fuse box before troubleshooting.

Turn function does not operate.

Check the flasher unit. Refer to page 15—47 — **NG** → Replace the unit.

OK

Check the turn signal switch. Refer to page 15—14 — **NG** → Replace the switch.

OK

Check the voltage at H (BG) terminal of the combination switch (Turn). — **NG** → Repair harness. (Fuse box to combination switch)

Terminal	Voltage
H (BG)	12V

OK

Check the voltage between each terminal of flasher unit connector and a body ground with each condition. — **NG** → Repair harness.

Terminal	Condition	Voltage
A (B)	Any time	0V
E (BR)	Turn switch is Right	12V
F (GY)	Turn switch is left	12V
H (Br)	Any time	12V

Terminal	Wiring harness
A (B)	Flasher unit to ground
E (BR)	Flasher unit to combination switch
F (GY)	Flasher unit to combination switch
H (Br)	Fuse box to Flasher unit

OK

Check the lights and wiring harness (Each bulb to a body ground) — **NG** → Replace the lights or repair the wiring harness.

OK

Repair harness. (Flasher unit to each bulb)

76G15X-045

Hazard function does not operate. (Turn function is normal)

Check the hazard switch. Refer to page 15—19, 20 — **NG** → Replace the switch.

OK

Check the voltage at each terminal of the hazard switch connector. — **NG** → Repair the wiring harness. (Flasher unit to hazard switch, hazard switch to ground)

Terminal	Voltage
B (GR)	12V
D (B)	0V

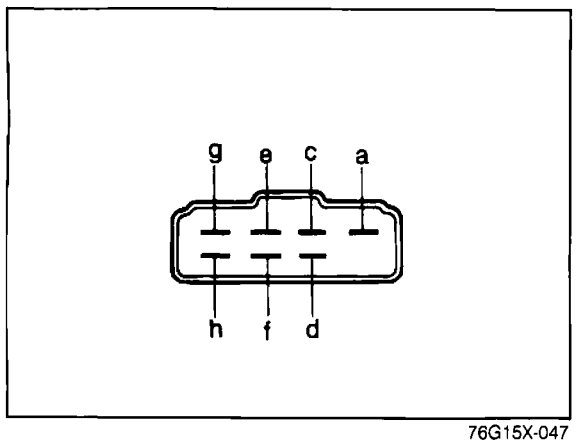
OK

Check the flasher unit. Refer to page 15—47 — **NG** → Replace the unit.

76G15X-046

Rapid flashing
↓
Check the lights and wiring harness between each bulb and a body ground (rapid flashing side).

86U15X-081



76G15X-047

INSPECTION

Hazard and Flasher Unit

For LHD

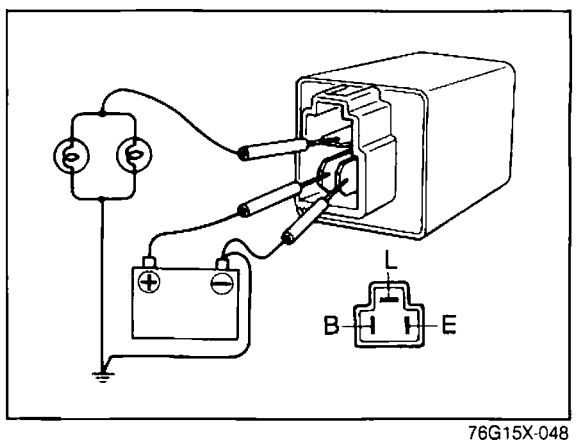
1. Check for continuity between terminals of the hazard and flasher unit.

Terminal	Continuity	Terminal	Continuity	Terminal	Continuity
a-c	X	d-e	X	f-g	X
a-d	X	d-f	X	f-h	X
a-e	○	d-g	X	g-a	X
a-f	○	d-h	X	g-c	X
a-g	X	e-a	X	g-d	X
a-h	X	e-c	X	g-e	X
c-a	○	e-d	X	g-f	X
c-d	○	e-f	X	g-h	X
c-e	○	e-g	X	h-a	○
c-f	○	e-h	X	h-c	○
c-g	○	f-a	X	h-d	○
c-h	○	f-c	X	h-e	○
d-a	X	f-d	X	h-f	○
d-c	X	f-e	X	h-g	○

○: Indicates continuity X: No continuity

Note
Set the tester to x1000Ω range.

2. If continuity is not as specified, replace the switch.



76G15X-048

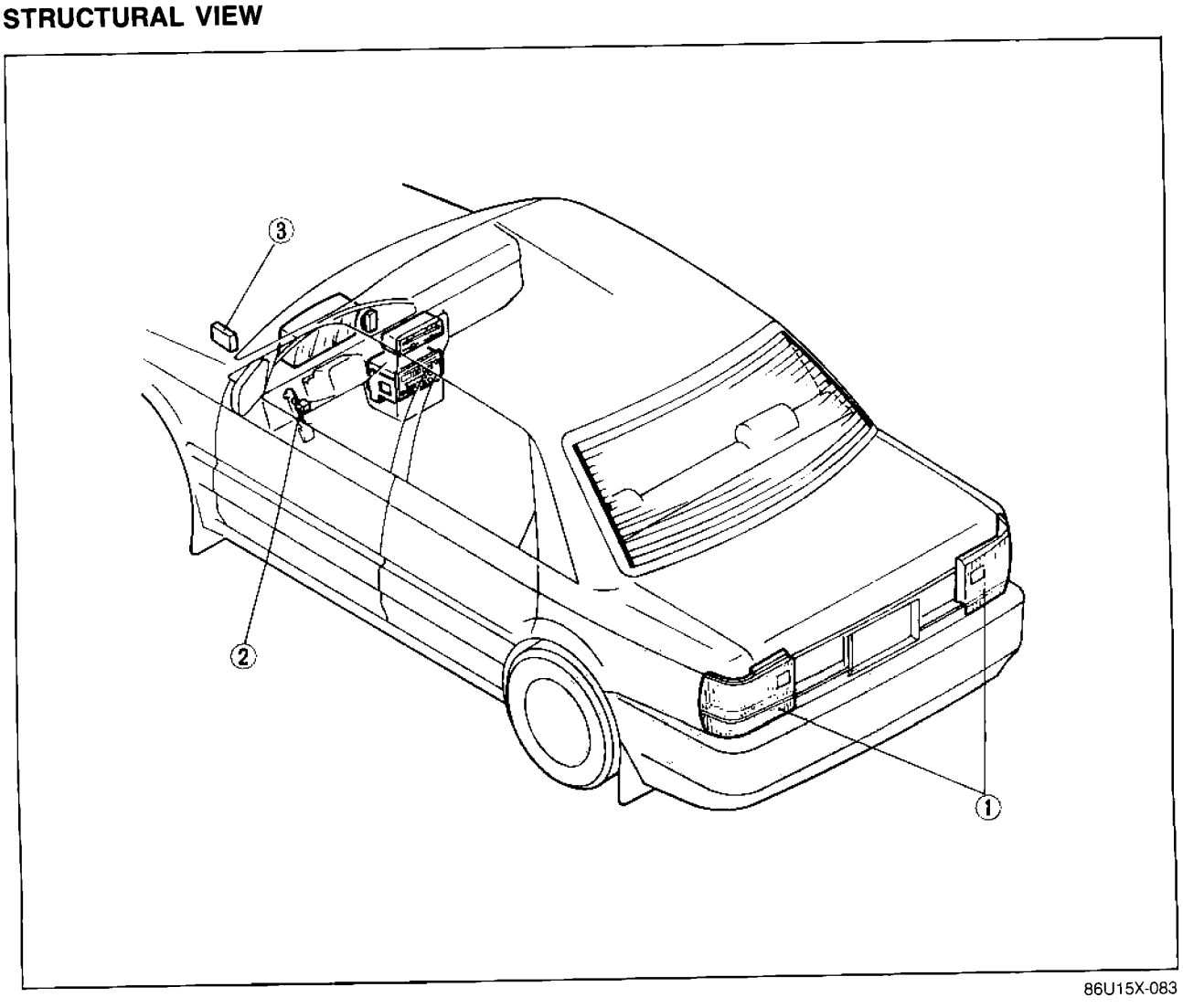
For RHD

1. Apply 12V to the "B" terminal of the unit and connect "E" terminal to the ground.
2. Confirm that the two paralleled lamps come on when connected between the "L" terminal and the ground.

Caution
Do no reverse the polarity of the electrical source to the terminals.

STOP LIGHT

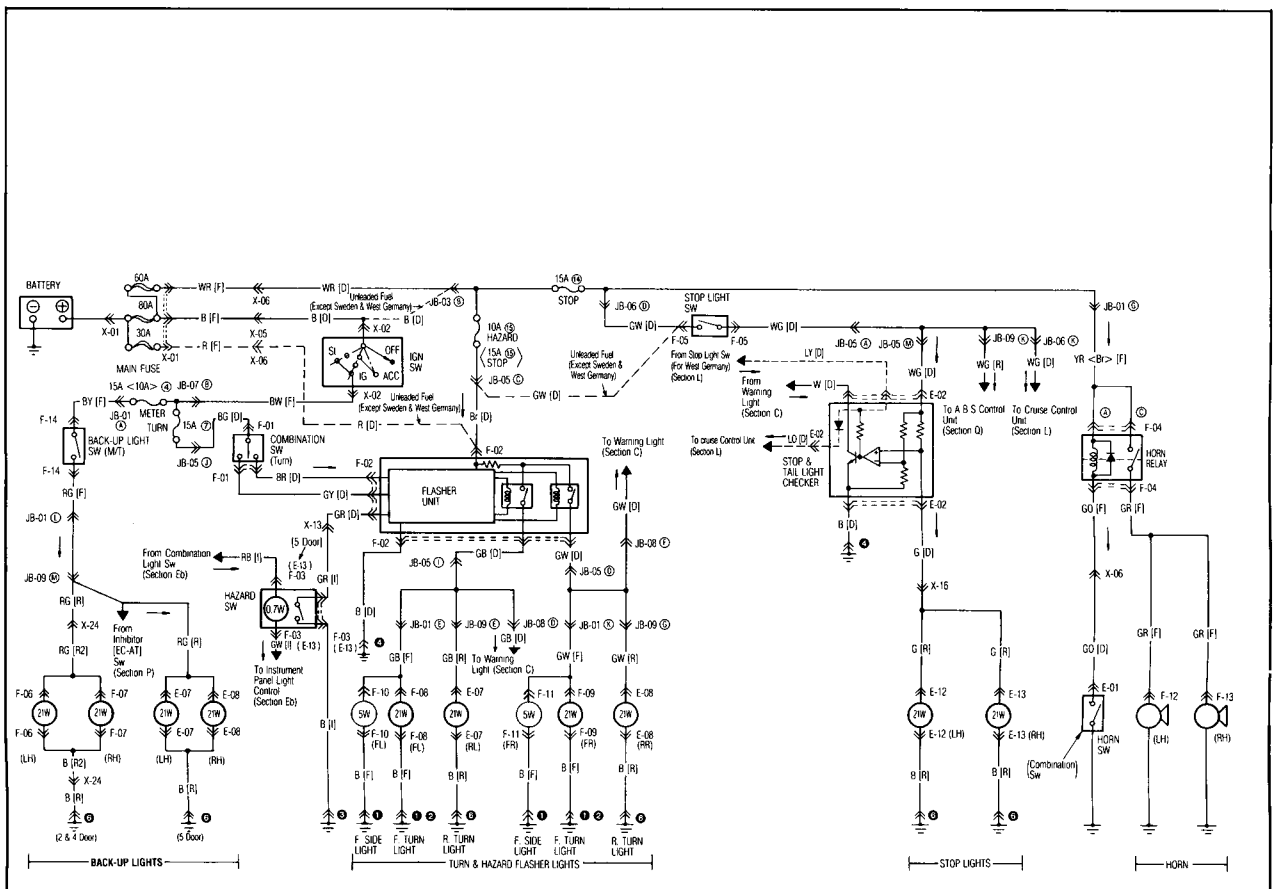
STRUCTURAL VIEW



86U15X-083

1. Stop light
2. Stop light switch
3. Stop and tail light checker

CIRCUIT DIAGRAM



86U15X-084

TROUBLESHOOTING

Note
Check the STOP 15A fuse in the fuse box before troubleshooting.

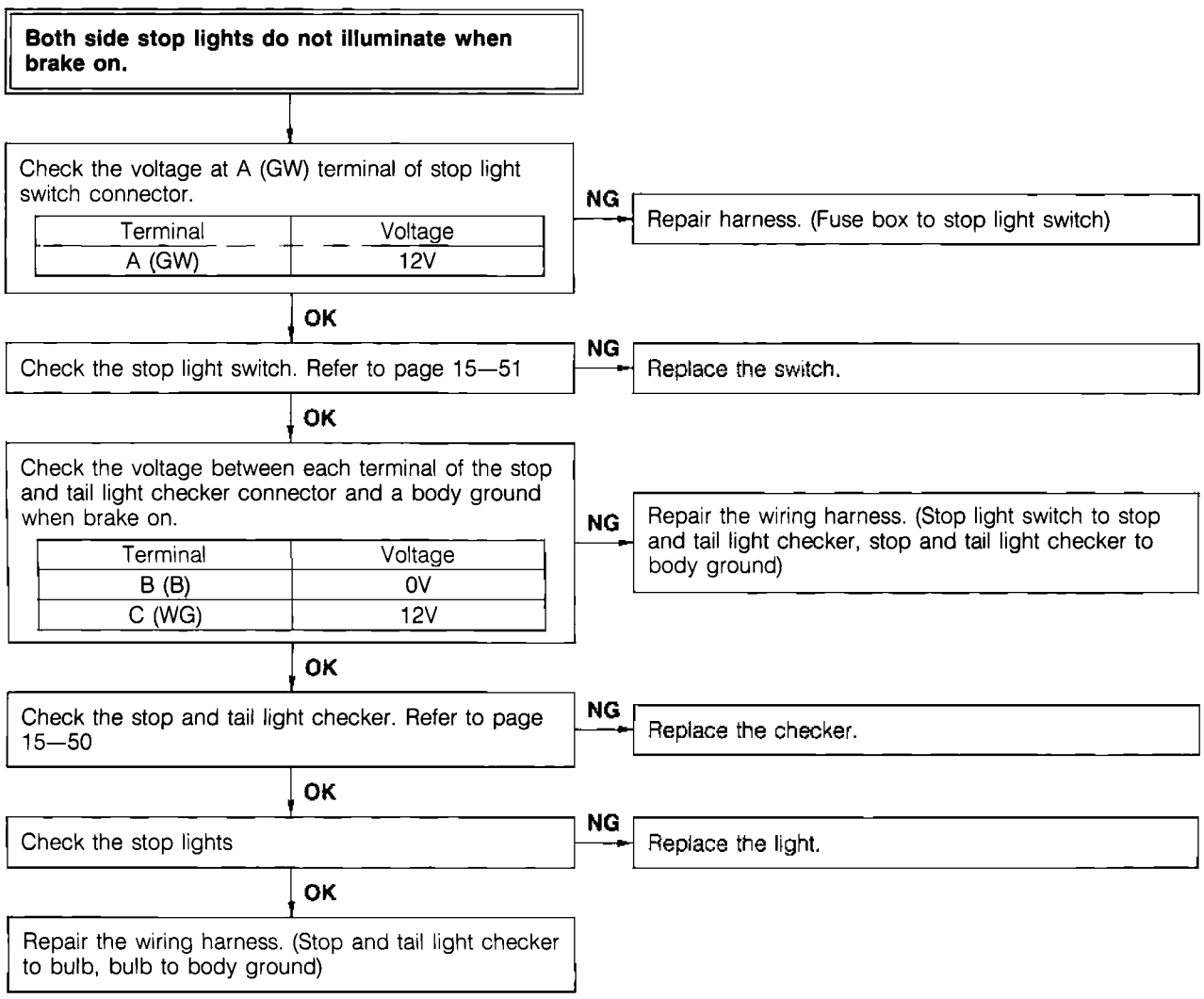
One side stop light does not illuminate.

↓

Replace the light or repair the wiring harness (Stop and tail light checker to light, light to ground).

86U15X-085

15 STOP LIGHT

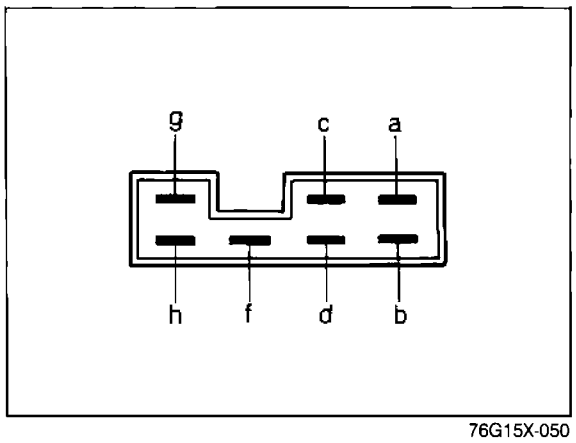


76G15X-049

Light Checker

1. Check for continuity between terminals of the stop and tail light checker.

Stop and tail light checker (except West Germany)

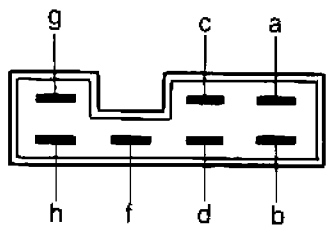


76G15X-050

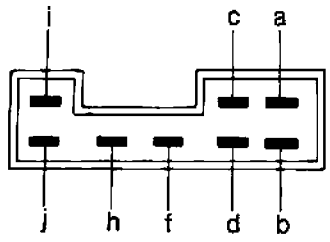
Terminal +	Terminal −	Continuity	Terminal +	Terminal −	Continuity	Terminal +	Terminal −	Continuity
a	b	○	c	d	X	f	g	X
a	c	○	c	f	○	f	h	○
a	d	X	c	g	X	g	a	○
a	f	○	c	h	○	g	b	○
a	g	X	d	a	○	g	c	○
a	h	○	d	b	○	g	d	X
b	a	○	d	c	○	g	f	○
b	c	○	d	f	○	g	h	○
b	d	X	d	g	X	h	a	○
b	f	○	d	h	○	h	b	○
b	g	X	f	a	○	h	c	○
b	h	○	f	b	○	h	d	X
c	a	○	f	c	○	h	f	○
c	b	○	f	d	X	h	g	X

○: Indicates continuity X: No continuity

Stop light checker



Tail light checker



76G15X-051

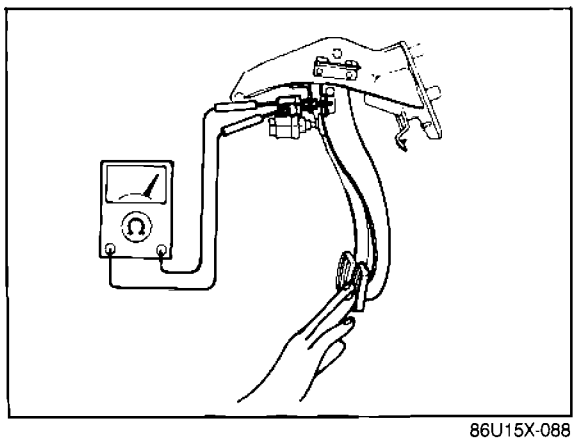
Stop light checker (for West Germany)

Terminal +	Terminal −	Continuity	Terminal +	Terminal −	Continuity	Terminal +	Terminal −	Continuity
a	b	○	c	d	X	f	g	X
a	c	○	c	f	X	f	h	X
a	d	X	c	g	X	g	a	X
a	f	X	c	h	X	g	b	X
a	g	X	d	a	○	g	c	X
a	h	X	d	b	○	g	d	X
b	a	○	d	c	○	g	f	X
b	c	○	d	f	X	g	h	X
b	d	X	d	g	X	h	a	X
b	f	X	d	h	X	h	b	X
b	g	X	f	a	X	h	c	X
b	h	X	f	b	X	h	d	X
c	a	○	f	c	X	h	f	X
c	b	○	f	d	X	h	g	X

Tail light checker (for West Germany)

Terminal +	Terminal −	Continuity	Terminal +	Terminal −	Continuity	Terminal +	Terminal −	Continuity
a	b	○	c	i	X	h	d	X
a	c	○	c	j	○	h	f	○
a	d	○	d	a	○	h	i	X
a	f	X	d	b	○	h	j	X
a	h	X	d	c	○	i	a	○
a	i	X	d	f	X	i	b	○
a	j	○	d	h	X	i	c	○
b	a	○	d	i	X	i	d	○
b	c	○	d	j	○	i	f	X
b	d	○	f	a	X	i	h	X
b	f	X	f	b	X	i	j	○
b	h	X	f	c	X	j	a	○
b	i	X	f	d	X	j	b	○
b	j	○	f	h	○	j	c	○
c	a	○	f	i	X	j	d	○
c	b	○	f	j	X	j	f	X
c	d	○	h	a	X	j	h	X
c	f	X	h	b	X	j	i	X
c	h	X	h	c	X	—	—	—

○: Indicates continuity X: No continuity



86U15X-088

Note

Set the tester to x1000Ω range.

2. If continuity is not as specified, replace the light checker.

Stop Light Switch

1. Disconnect the stop light switch connector.
2. Check for continuity between terminals of the switch.

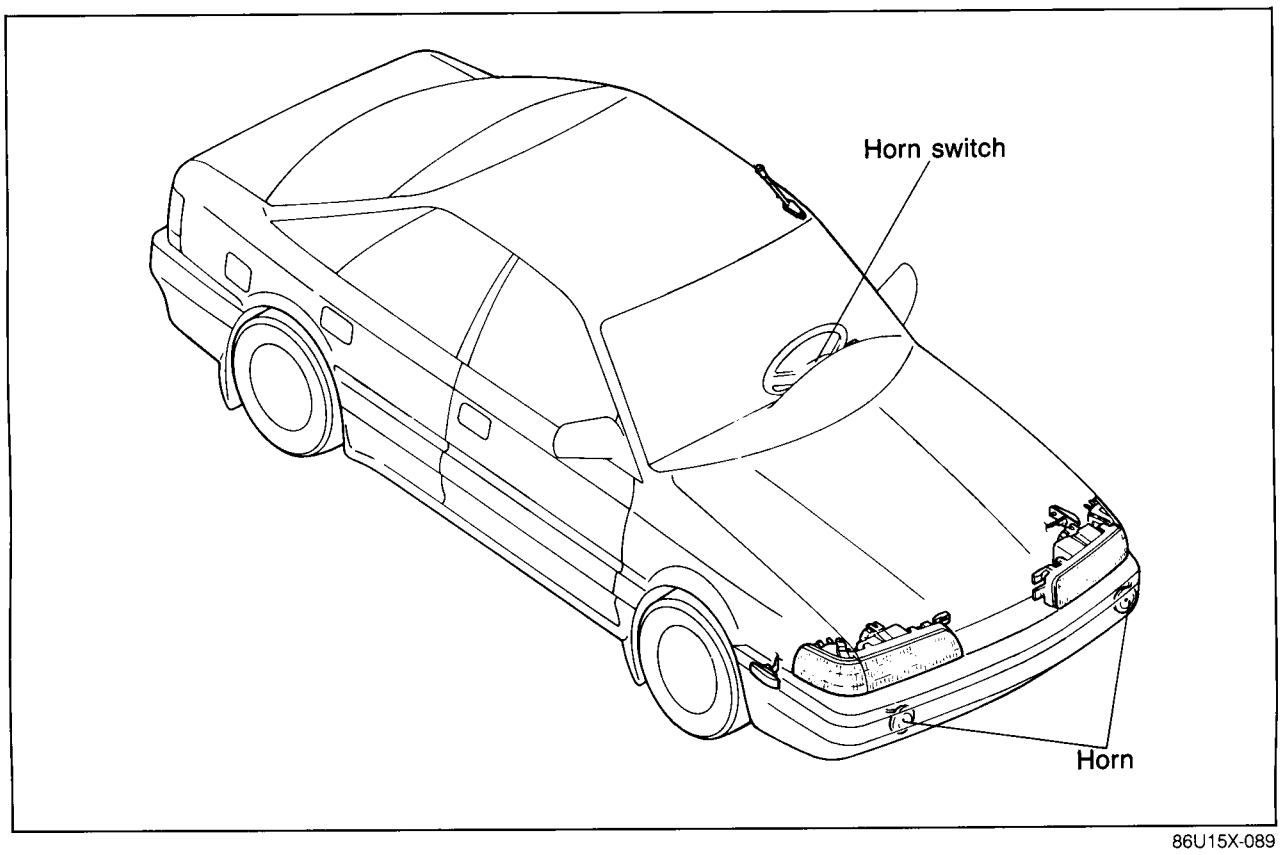
Position \ Terminal	a	b
Pedal depressed	○—○	
Pedal released		

○—○ : Indicates continuity

15 HORN

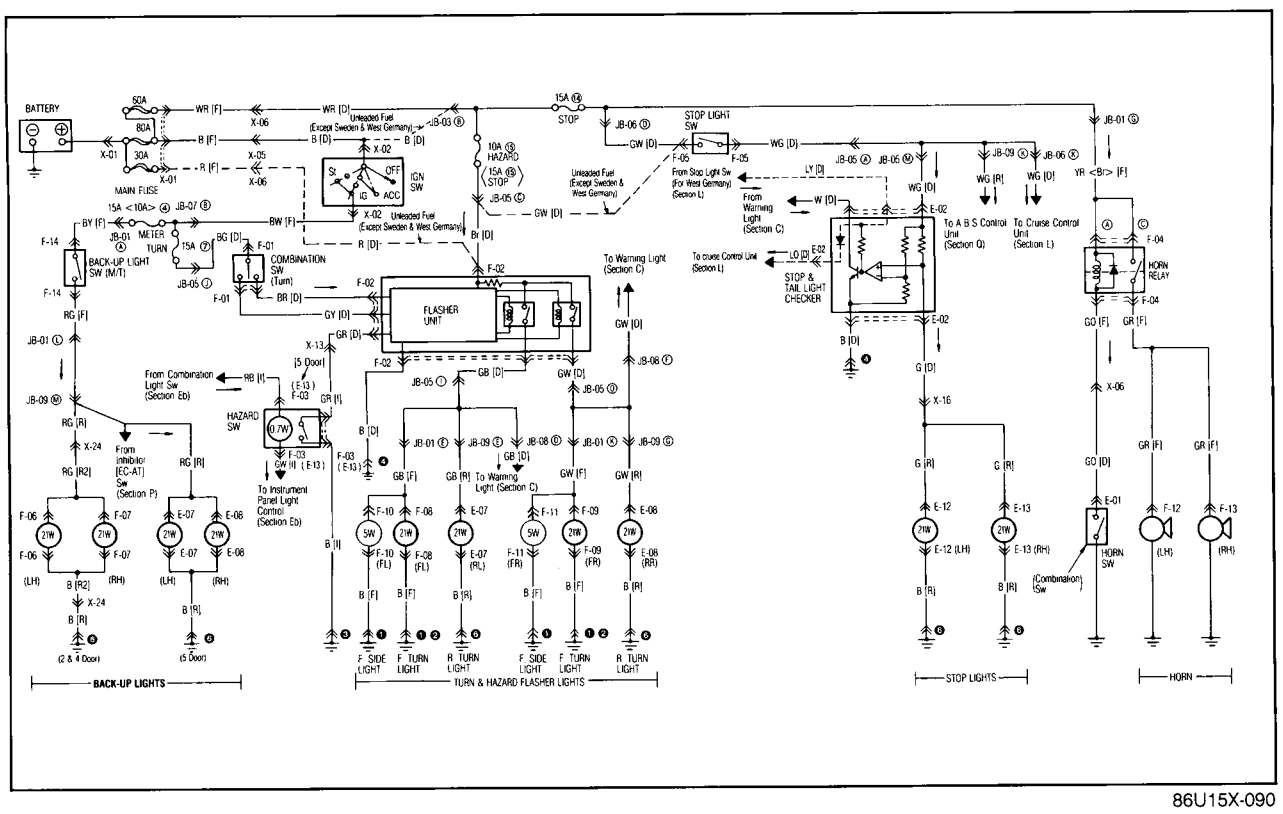
HORN

STRUCTURAL VIEW



86U15X-089

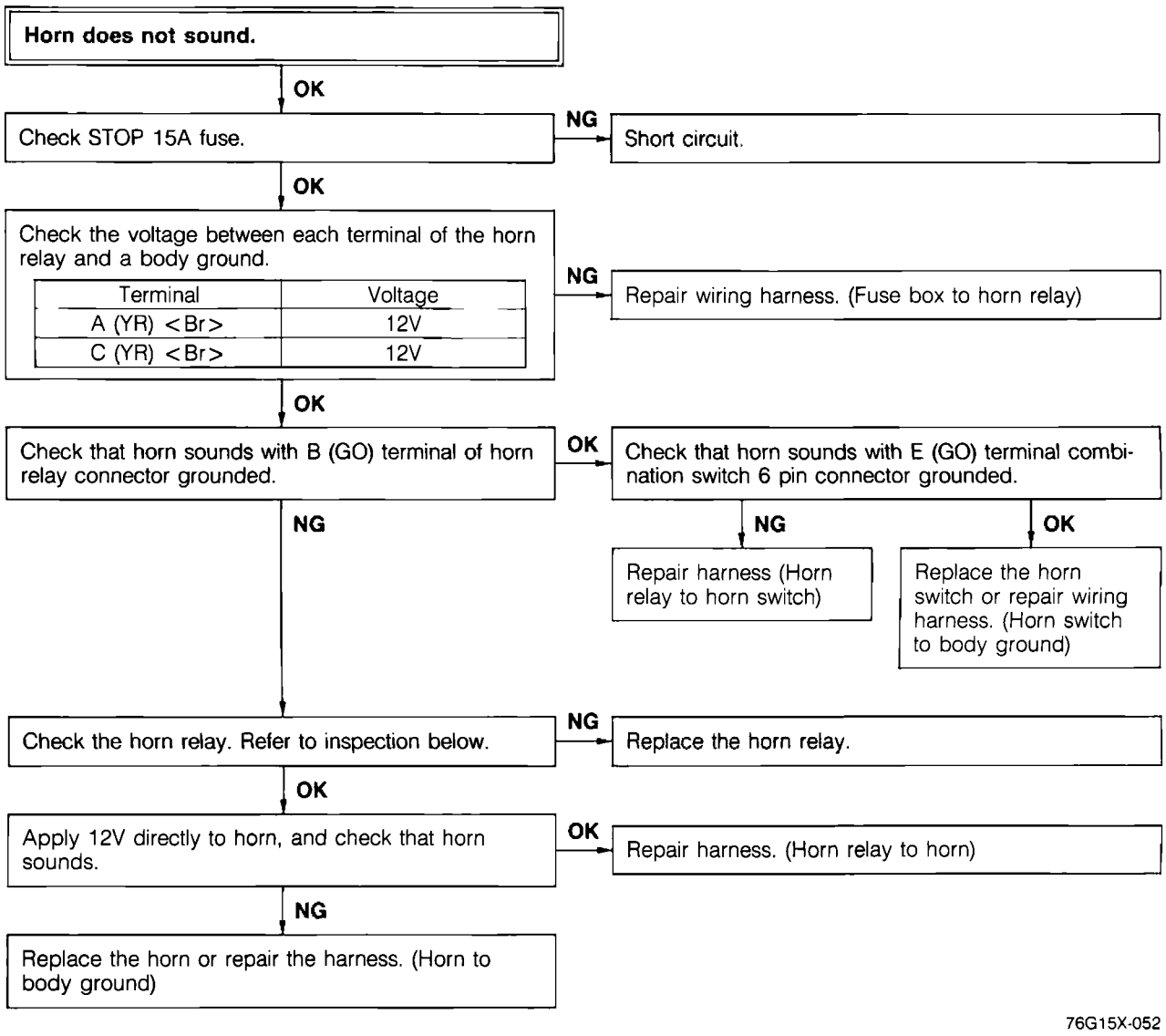
CIRCUIT DIAGRAM



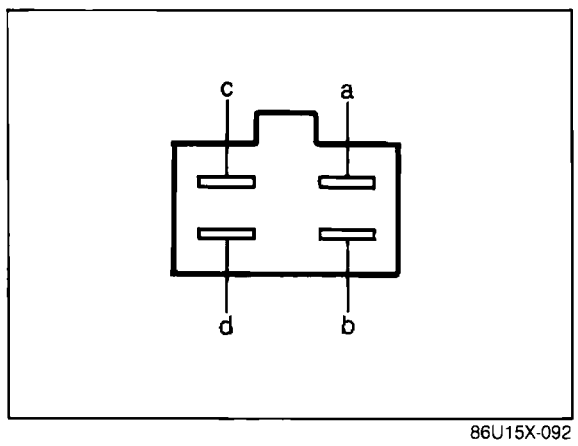
86U15X-090

TROUBLESHOOTING

< >...For West Germany



76G15X-052



86U15X-092

INSPECTION

Horn Relay

Check for continuity between terminals of the relay.

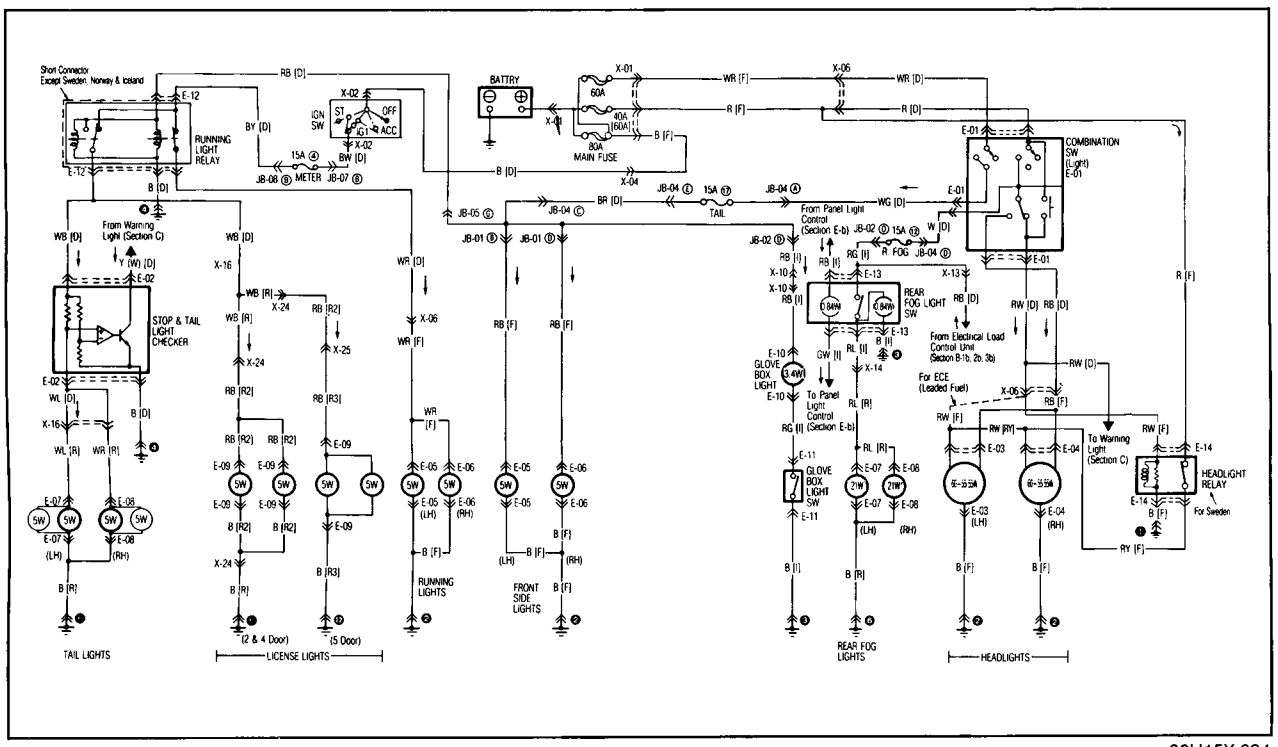
Connecting to		Terminal			
12V	Ground	a	b	c	d
—	—	○—○			
a	b			○—○	

○—○: indicates continuity

15 HEADLIGHT

HEADLIGHT

CIRCUIT DIAGRAM



86U15X-094

TROUBLESHOOTING
Leaded Fuel Model

Headlights do not operate (Low and/or High)

Check HEAD (40A) fuse
- NG → Short circuit.
- OK ↓

Check for 12V at "R" wire of combination switch 2 pin connector
- NG → Repair harness (Main fuse to combination switch)
- OK ↓

Check for 12V at "RB" wire (when low and/or "RW" wire (when high) of combination switch 6 pin connector
- NG → Replace combination switch
- OK ↓

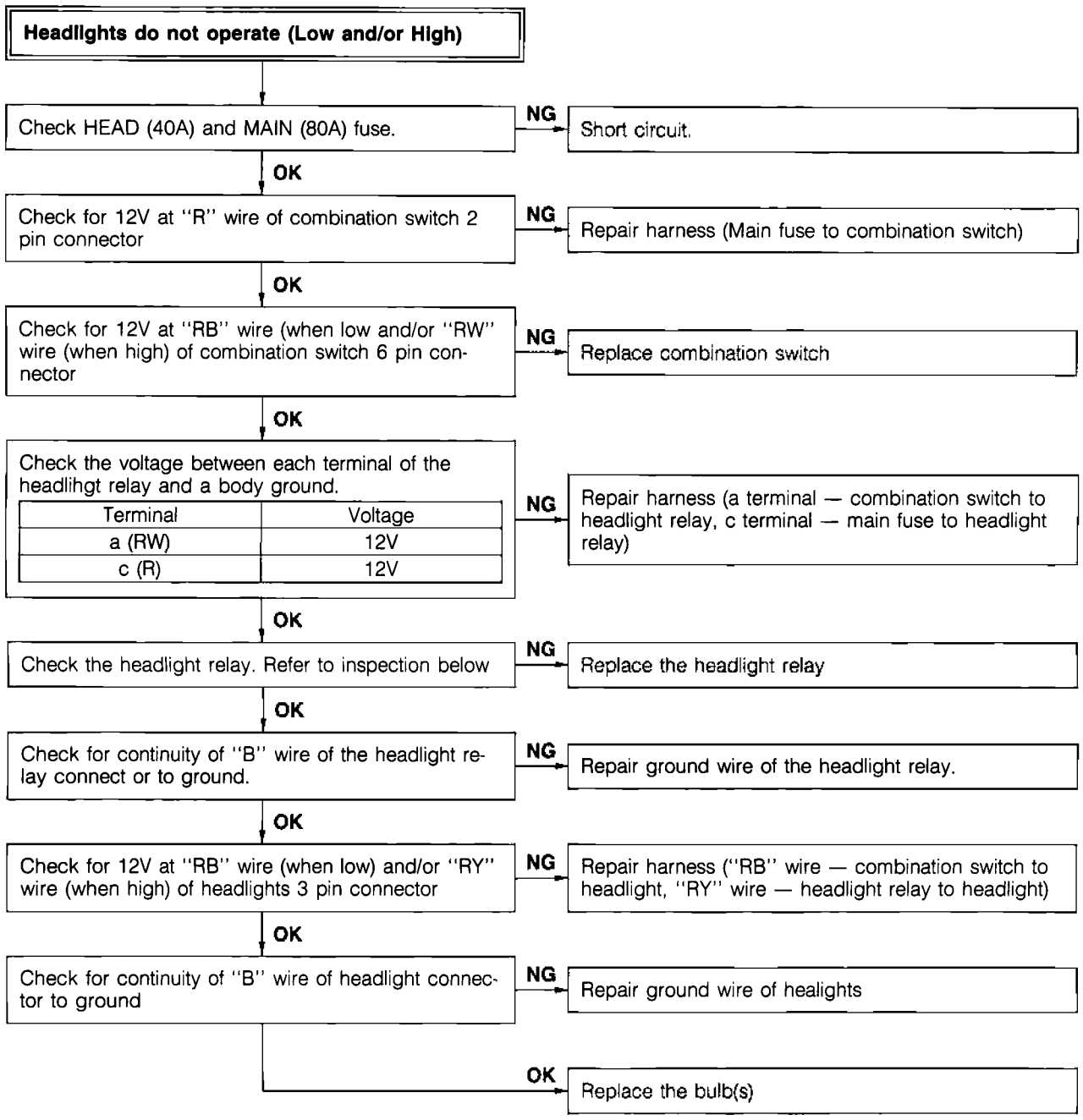
Check for 12V at "RB" wire (when low) and/or "RW" wire (when high) of headlights 3 pin connector
- NG → Repair harness (Combination switch to headlight)
- OK ↓

Check for continuity of "B" wire of headlight connector to ground
- NG → Repair ground wire of headlights
- OK ↓

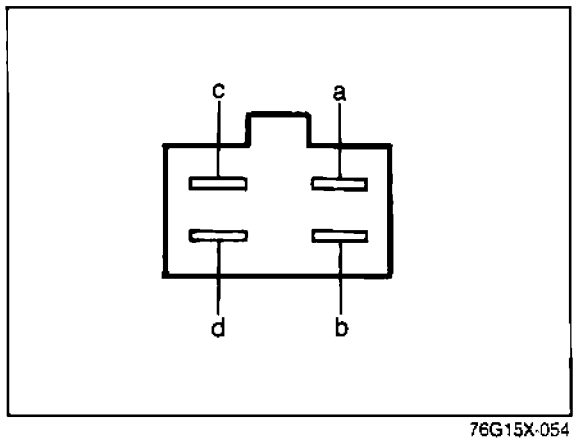
Replace the bulb(s)

76G15X-055

Unleaded fuel model



76G15X-053



76G15X-054

INSPECTION

Headlight Relay

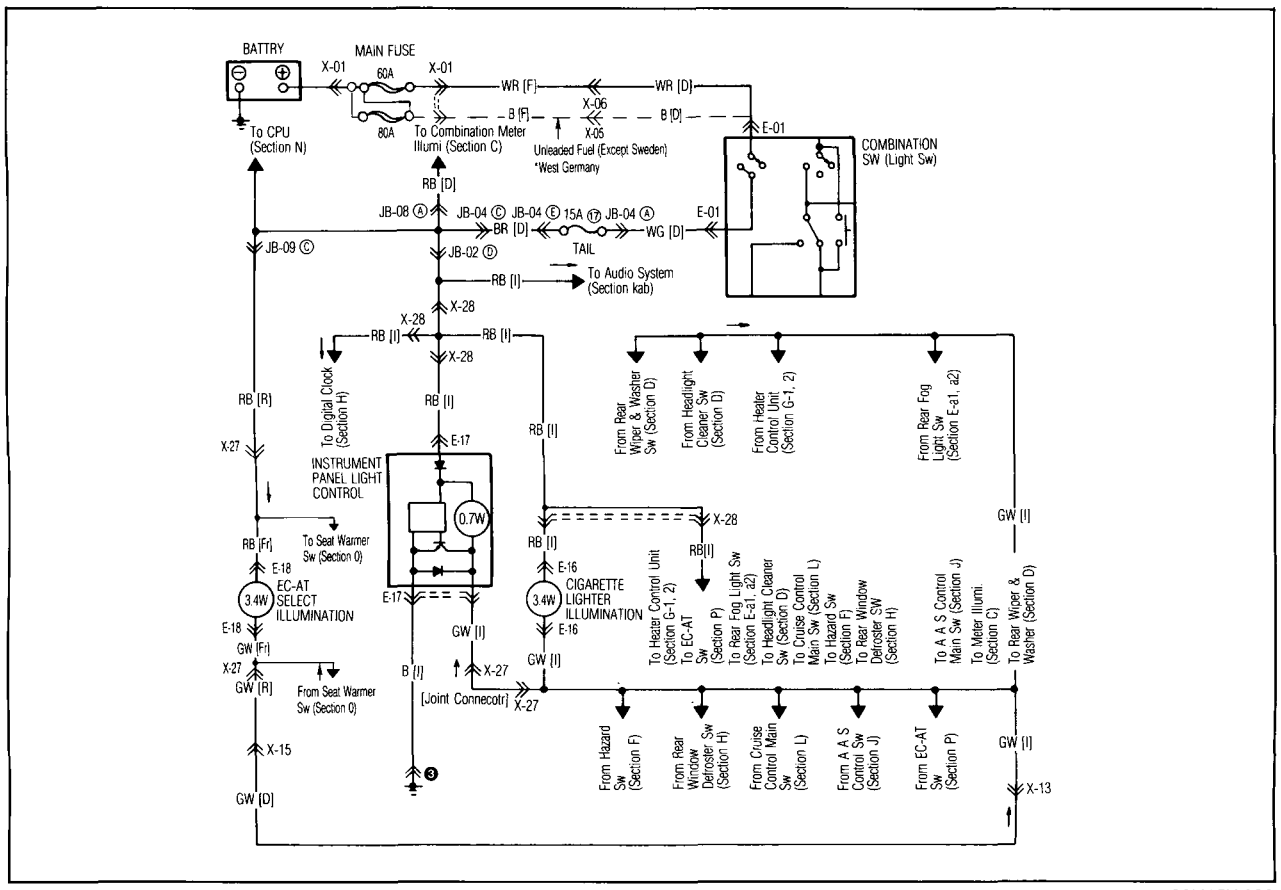
Check for continuity between terminals of the relay.

Connecting to		Terminal			
12V	Ground	a	b	c	d
—	—	○—○			
a	b			○—○	

○—○: indicates continuity

PANEL LIGHT CONTROL

CIRCUIT DIAGRAM



86U15X-098

TROUBLESHOOTING

Brightness of the illumination lights cannot be controlled.

Check the panel light controller. Refer to page 15—57 → **NG** → Replace the controller.

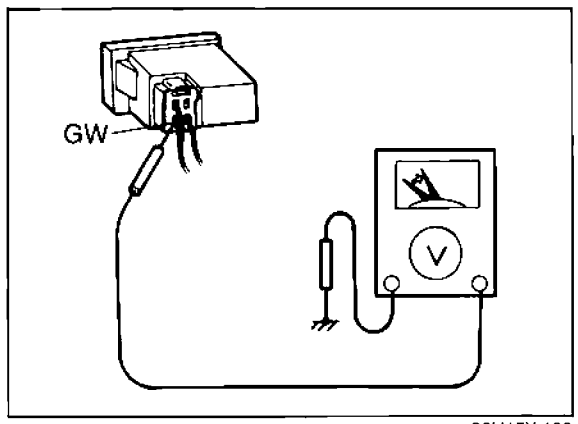
OK

Check the voltage between each terminal of the panel light controller connector and a body ground.

Terminal	Voltage
B (RB)	12V
C (B)	0V

NG → Repair the wiring harness. (Fuse box to panel light controller, Panel light controller to body ground)

76G15X-056



86U15X-100

INSPECTION

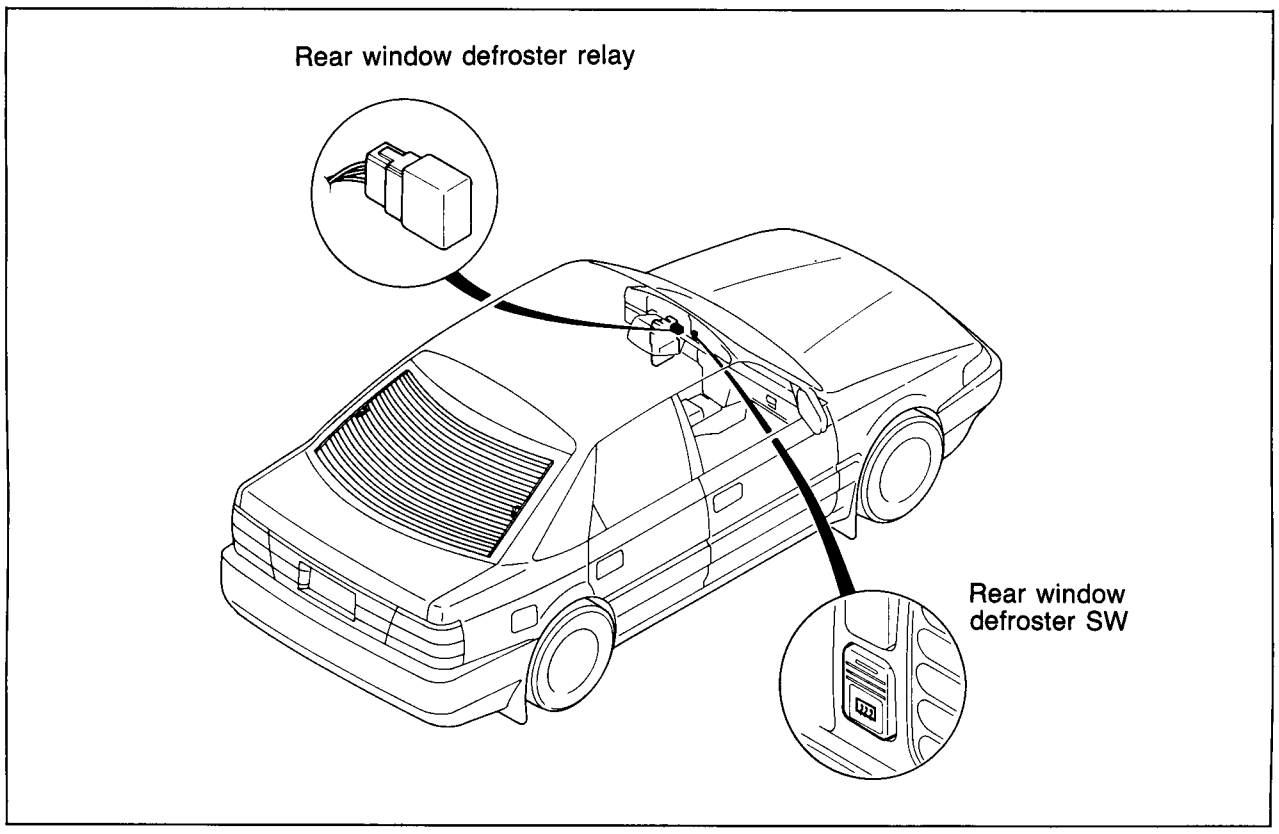
Panel Light Controller

1. Remove the panel light controller.
2. Check the voltage at **D (GW)** terminal of the panel light controller.

Panel light controller	Voltage
Mın	10V
Max.	0V

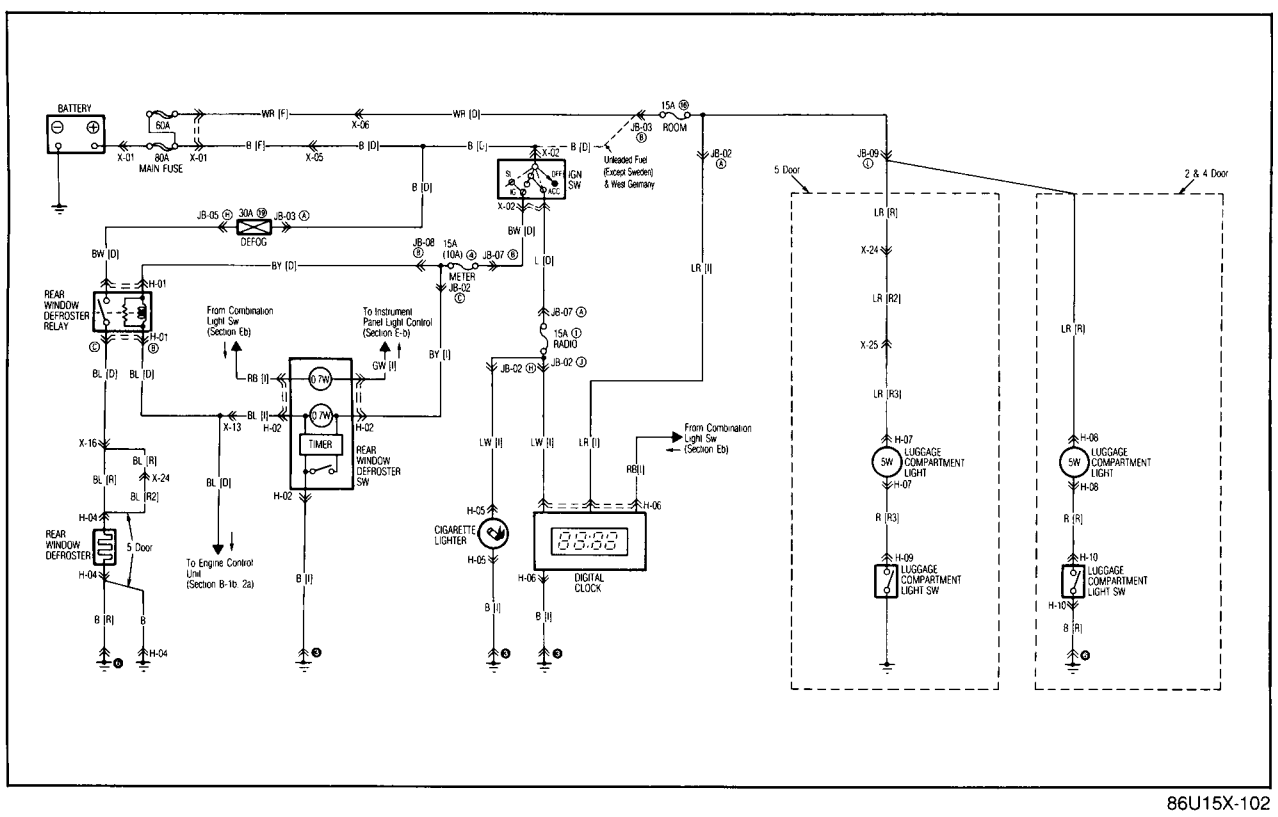
REAR WINDOW DEFROSTER

STRUCTURAL VIEW



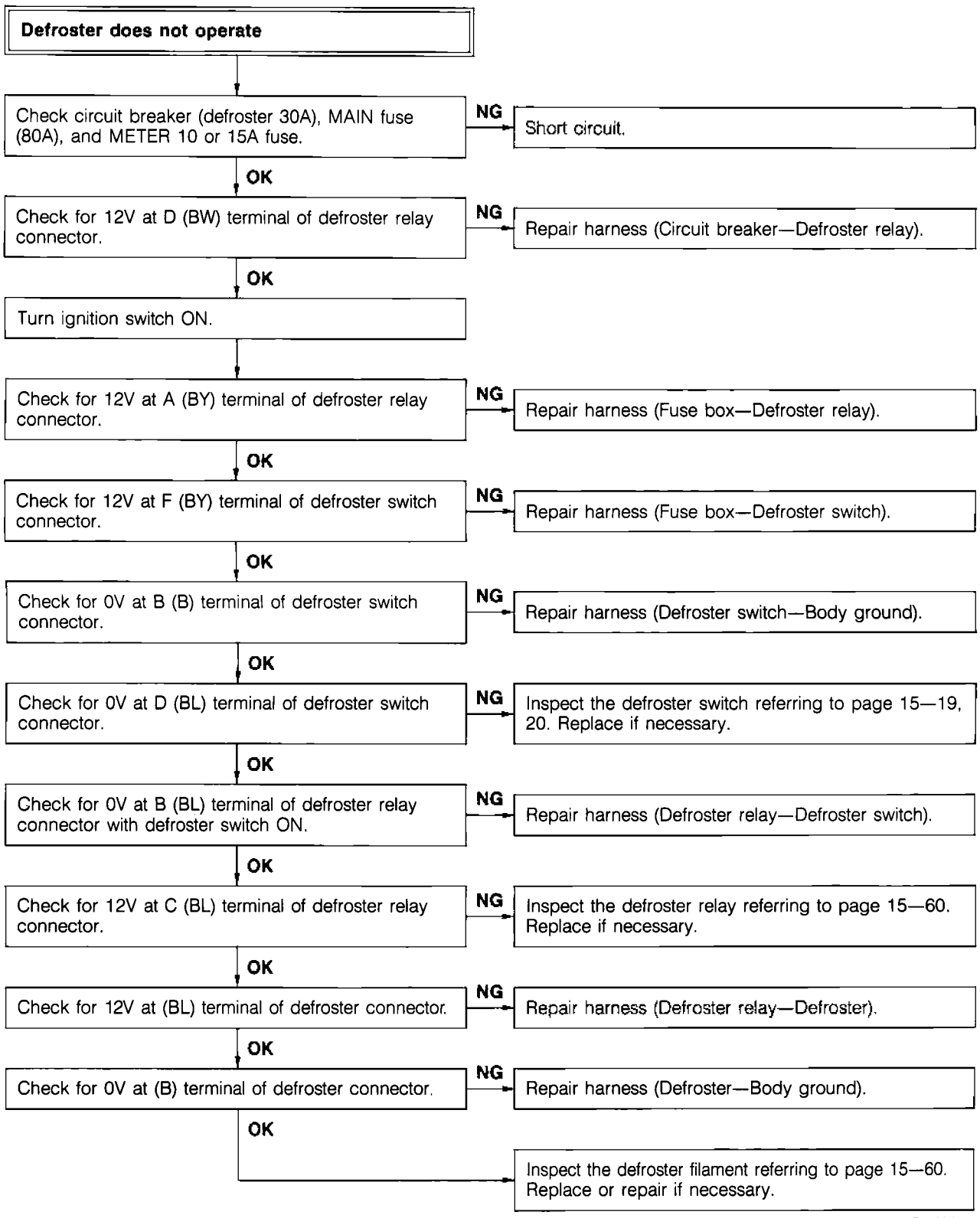
86U15X-101

CIRCUIT DIAGRAM



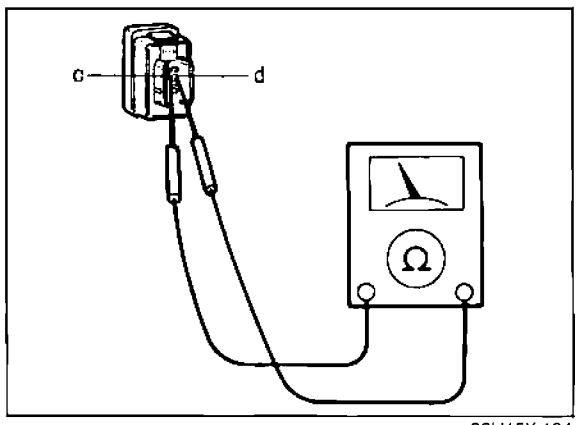
86U15X-102

TROUBLESHOOTING

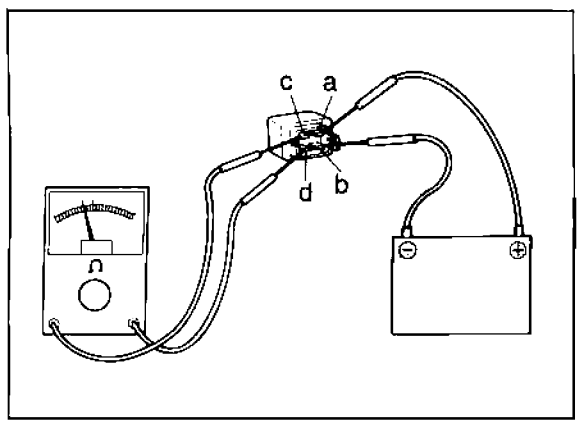


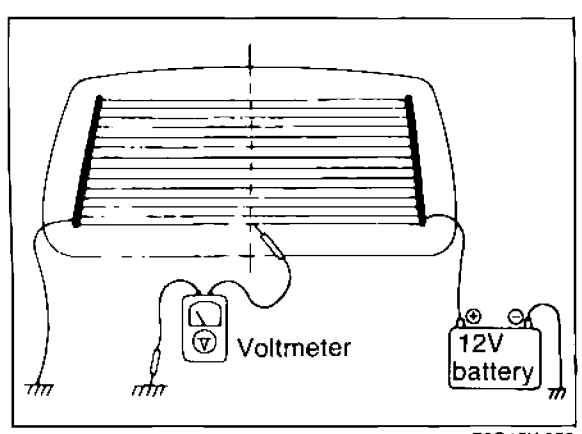
76G15X-057

15 REAR WINDOW DEFROSTER

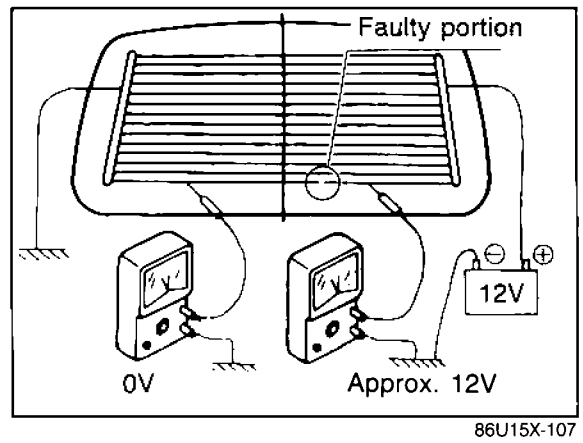


86U15X-104





76G15X-058



86U15X-107

INSPECTION

Defroster Relay

1. Check for continuity between terminals of the relay.

Connecting to		a	b	c	d
12V	ground				
—	—	○—○			
a	b			○—○	

○—○: Indicates continuity

2. If continuity is not as specified, replace the relay.

Defroster Filament

1. Turn the rear window defroster switch ON.
2. Connect the + terminal of the voltmeter to the center of each filament and the – terminal to the body. The standard voltage at the center of each filament is approximately 6V. If the meter indication is high, there is a short circuit between the center and the grounded side of the filament.
   If the indication is low or zero, the fault is between the center and positive side.

Repairing Filament

1. Use paint thinner or ethyl alcohol to clean the damaged part of the filament.
2. Attach tape to both sides of the damaged part of the filament.
3. Using a small brush or marking pen, apply silver paint (part no 2835 77 600) or equivalent to the damaged part.
4. Let the paint set for 24 hours at 20°C (68°F) to let it dry completely. (If a blow dryer is used to heat it to 60°C (140°F), it can be dried in about 30 minutes.)

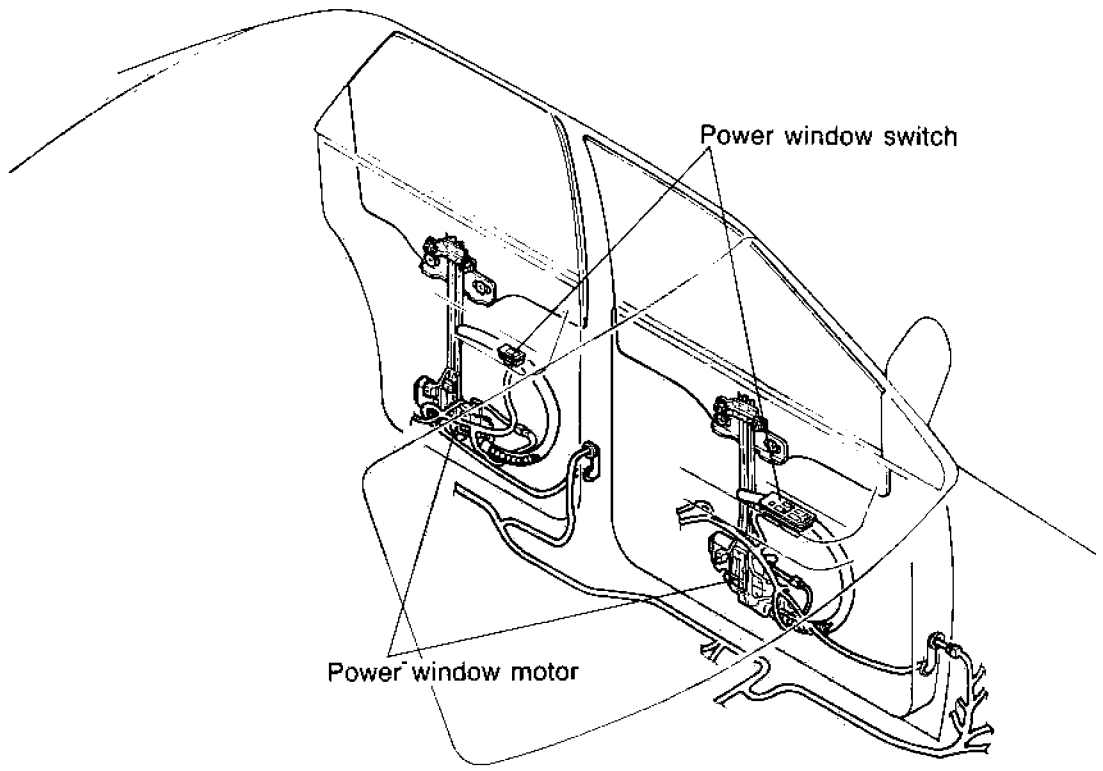
Note

a) Do not use the rear-window defroster until the paint is dry.

b) Do not use gasoline or similar solvents to clean the damaged part.

POWER WINDOW

STRUCTURAL VIEW

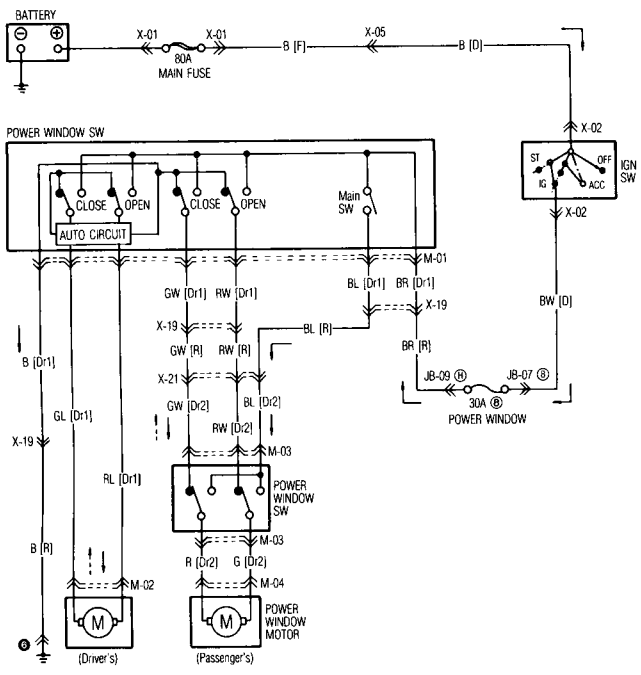


86U15X-108

15 POWER WINDOW

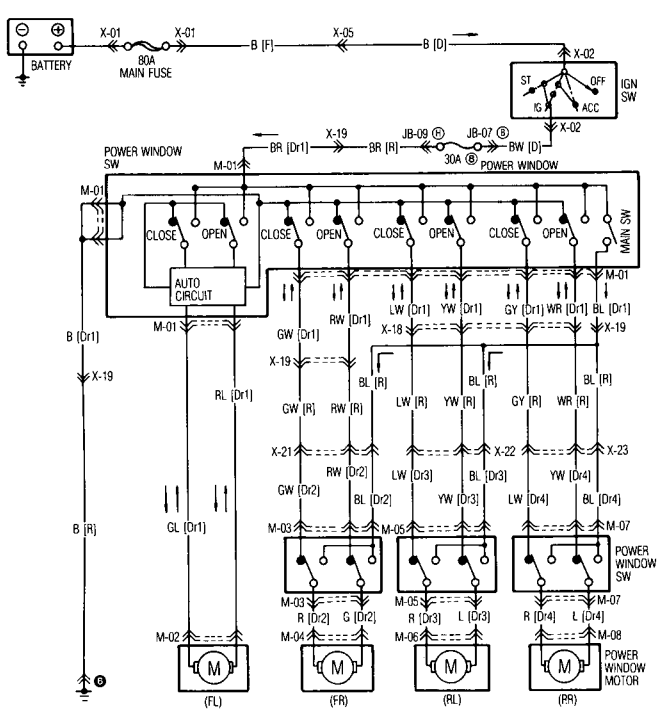
CIRCUIT DIAGRAM

(Coupe/MX-6)

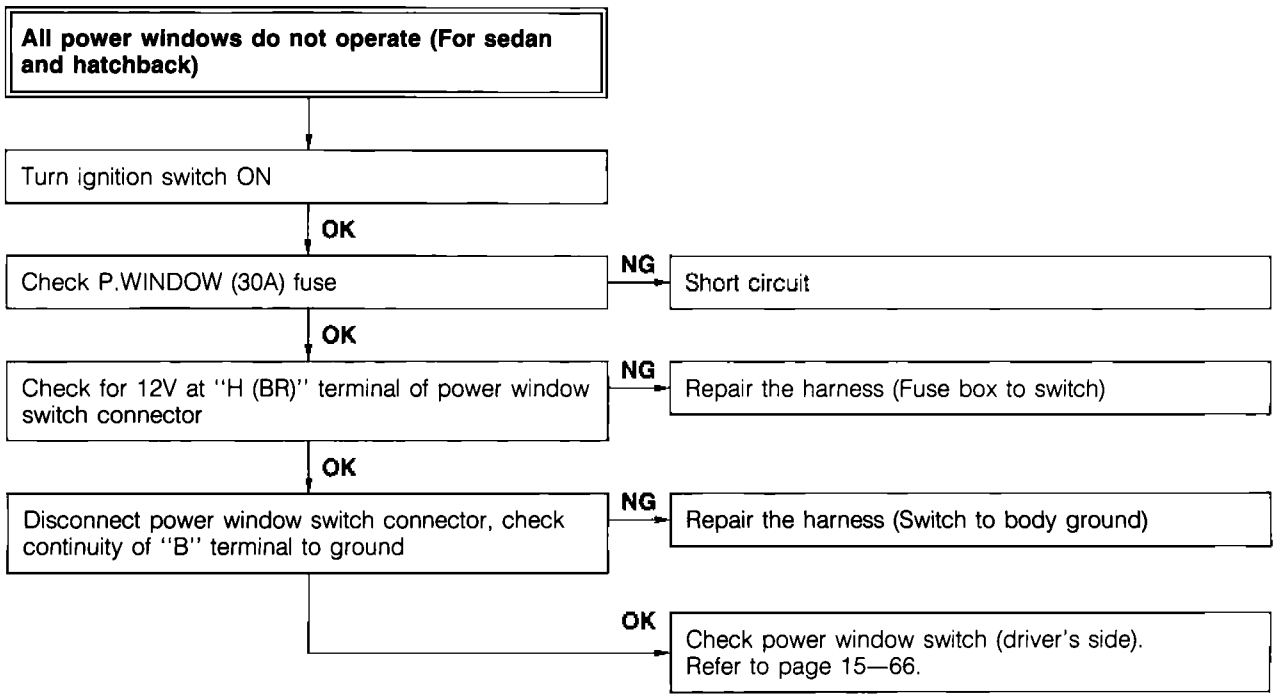


76G15X-010

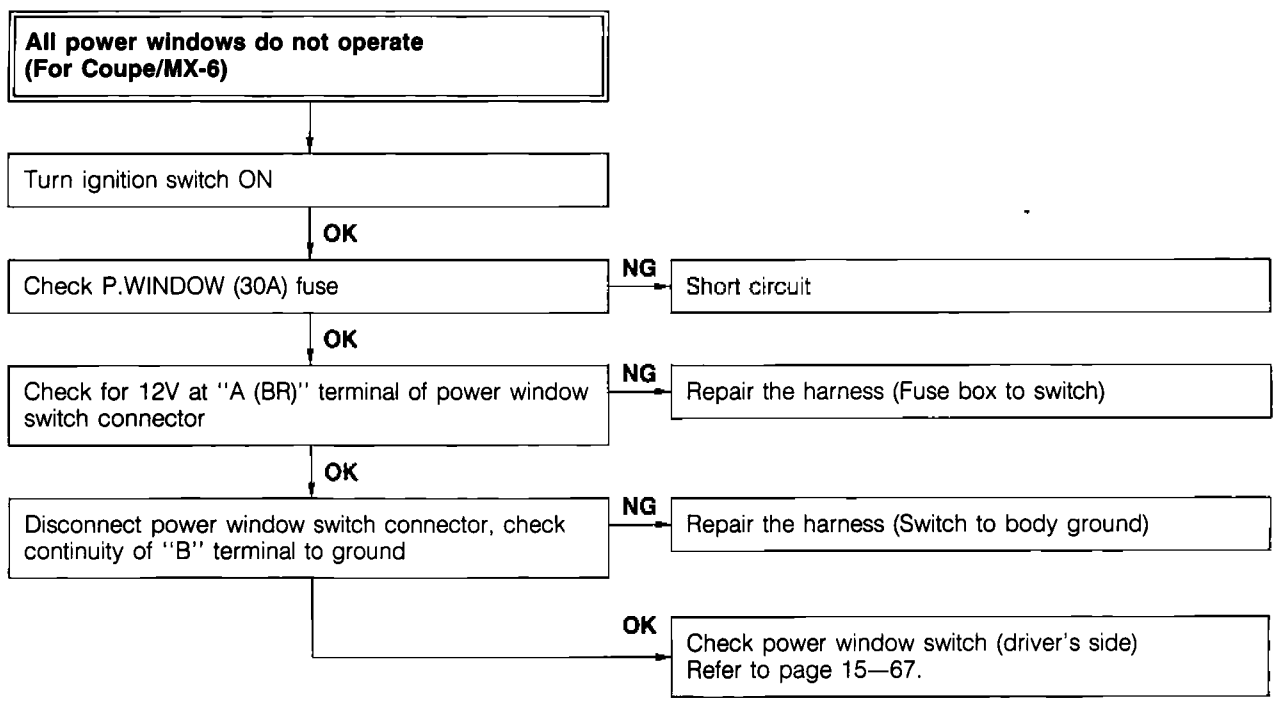
(For Sedan and Hatchback)



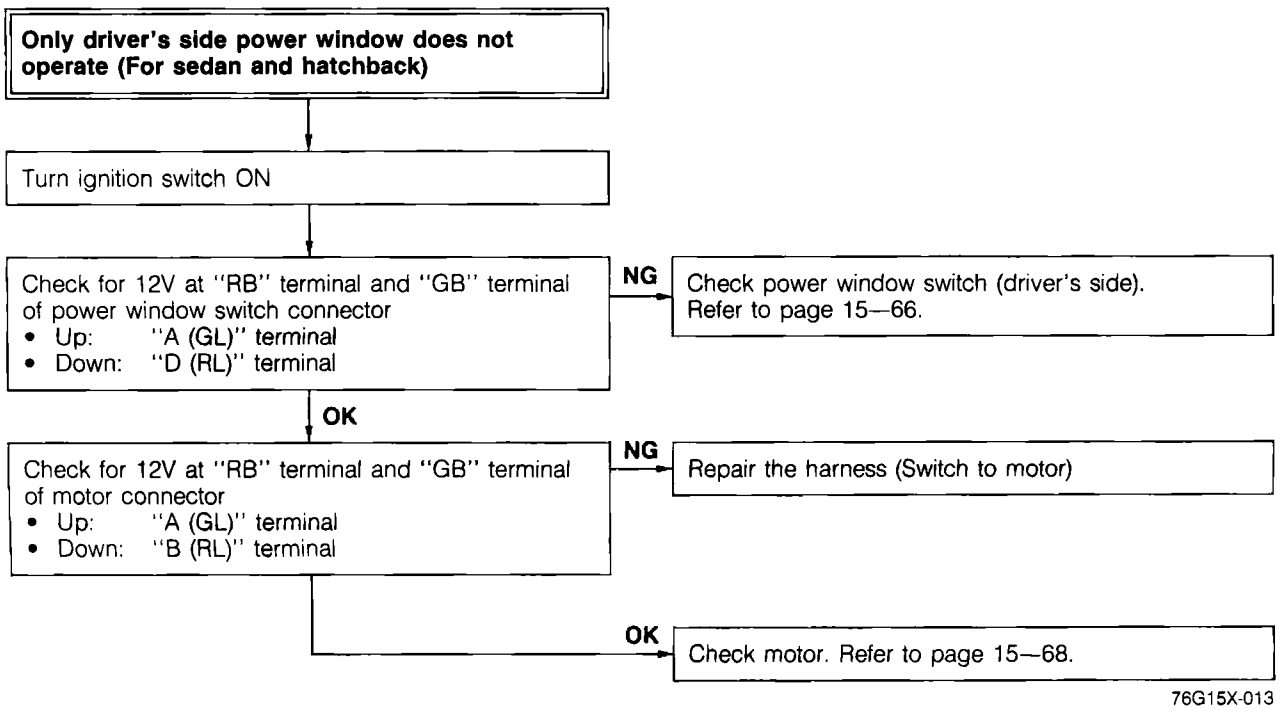
TROUBLESHOOTING



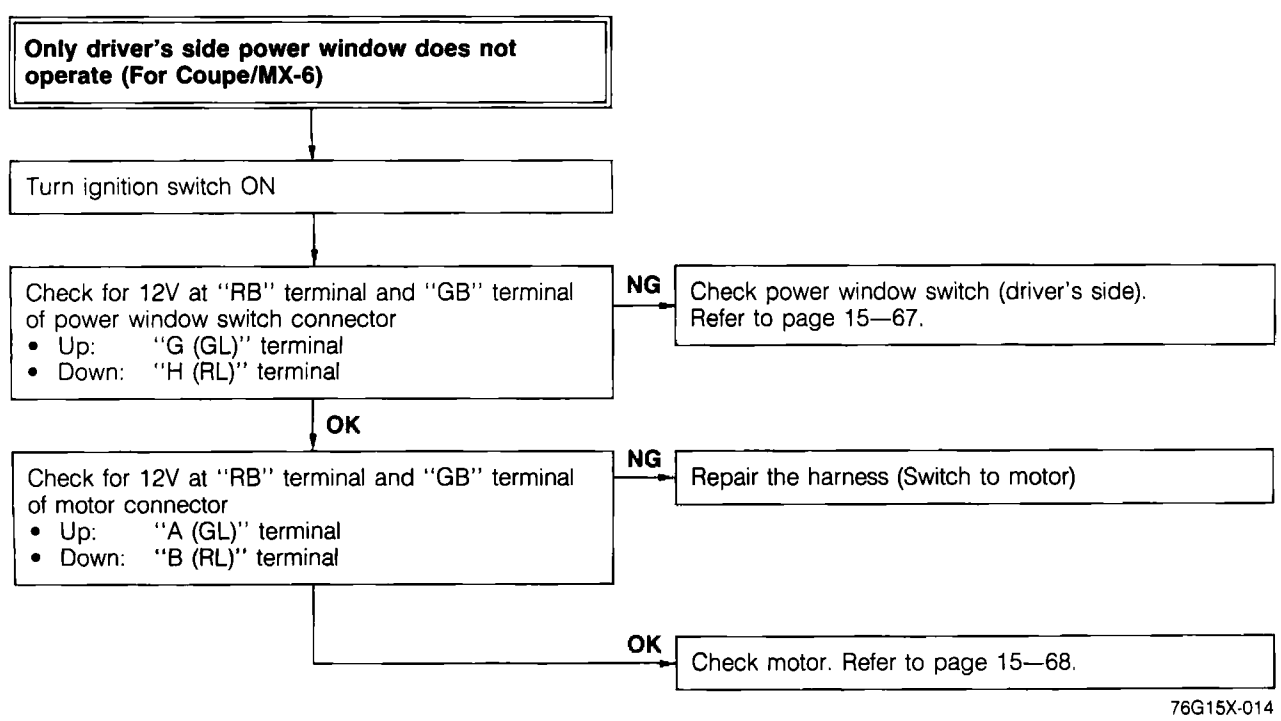
76G15X-011



76G15X-012



76G15X-013



76G15X-014

Power windows (except for driver's side) cannot be operated by main switch

↓

Turn ignition switch ON

↓

Check for 12V at terminal of power window switch connector while operating main switch (driver's side)

Door	Operation	Wire
Passenger side	Up	"GW"
	Down	"RW"
Rear left side (except Coupe)	Up	"LW"
	Down	"YW"
Rear right side (except Coupe)	Up	"GY"
	Down	"WR"

NG → Check power window switch (driver's side). Refer to page 15—66, 67.

OK ↓

Check for 12V at terminal to each door power window switch connector (5 pin) while operating main switch (driver's side)

Door	Operation	Wire
Passenger side	Up	"GW"
	Down	"RW"
Rear left side (except Coupe)	Up	"LW"
	Down	"YW"
Rear right side (except Coupe)	Up	"GY"
	Down	"WR"

NG → Repair harness (Main switch—Switch on each door)

OK ↓

Check for 12V at "R" terminal and "G" terminal of each door switch connector (5 pin) while operating main switch (driver's side)
- Up: "R" terminal
- Down: "G" terminal

NG → Check switch on each door. Refer to page 15—67.

OK ↓

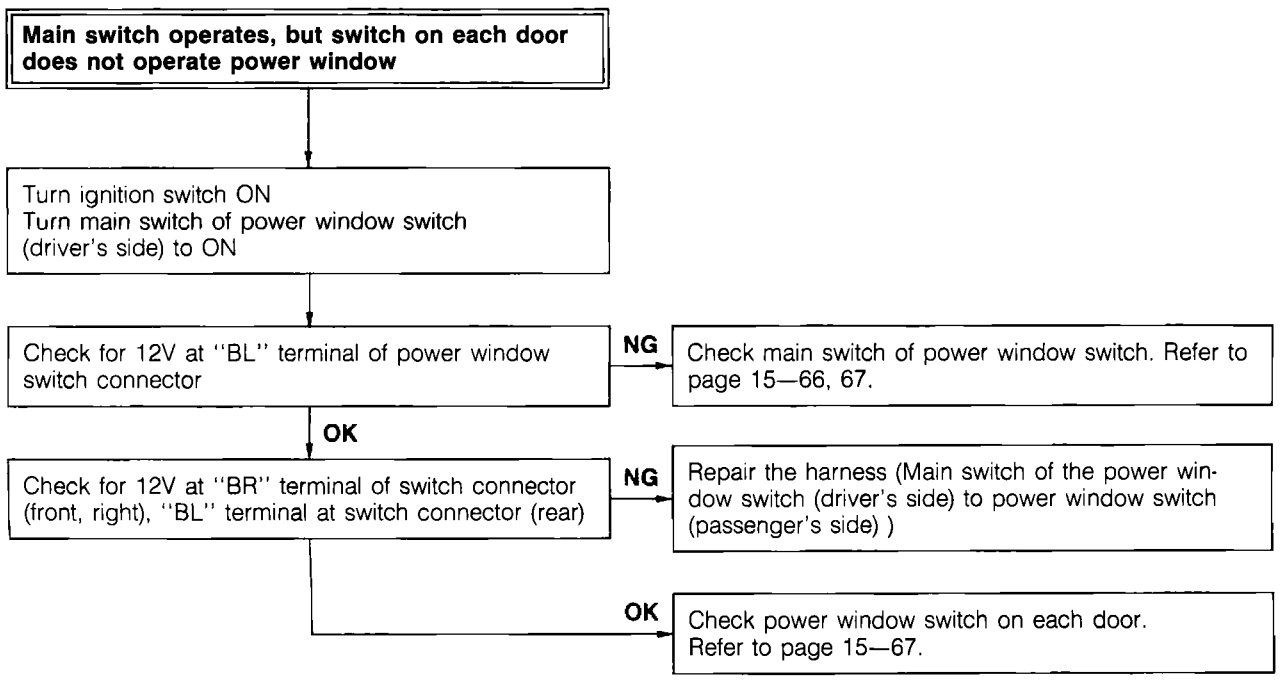
Check for 12V at "R" terminal and "G" terminal of each motor connector (2P) while operating main switch (driver's side)
- Up: "R" terminal
- Down: "G" terminal

NG → Repair harness (Switch on each door ~ Motor)

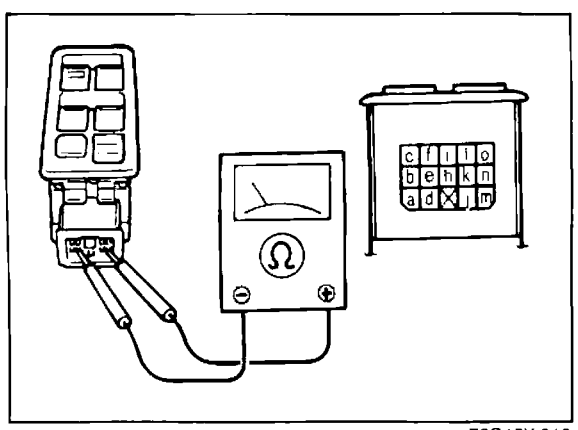
OK → Check motor. Refer to page 15—68.

Note
Use only the main switch during the checking operation.

76G15X-015



76G15X-059



76G15X-016

INSPECTION

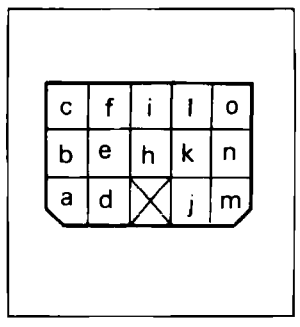
Power Window Driver's Side Switch (For Sedan and Hatchback)

Check for continuity between terminals of the switch.

Main switch

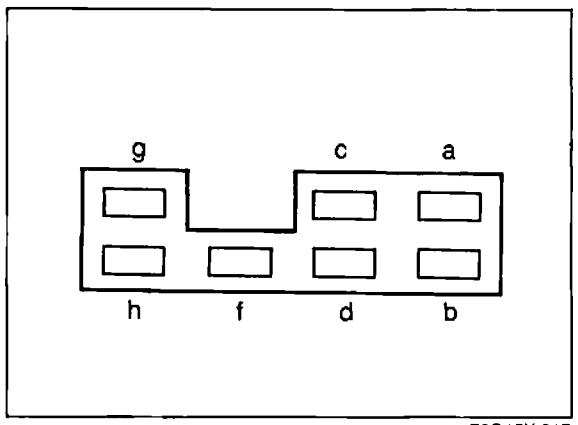
Position \ Terminal	h	i
Lock		
Unlock	○—○	○—○

○—○: Indicates continuity



Switch	Driver's side				Passenger's side				Rear right				Rear left			
Terminal / Position	h	f	d	a	h	f	m	j	h	f	e	b	h	f	n	k
UP	○		○—○	○	○		○—○	○	○		○—○	○	○		○—○	○
OFF		○—○	○	○		○—○	○	○		○—○	○	○		○—○	○	○
DOWN	○	○		○	○	○		○	○	○		○	○	○		○

○—○: Indicates continuity



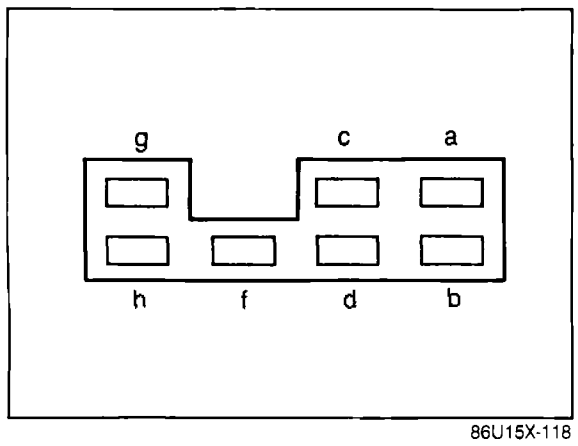
76G15X-017

(For Coupe/MX-6)
Check for continuity between terminals of the switch.

Main switch

Position \ Terminal	a	c
Lock		
Unlock	○——○	

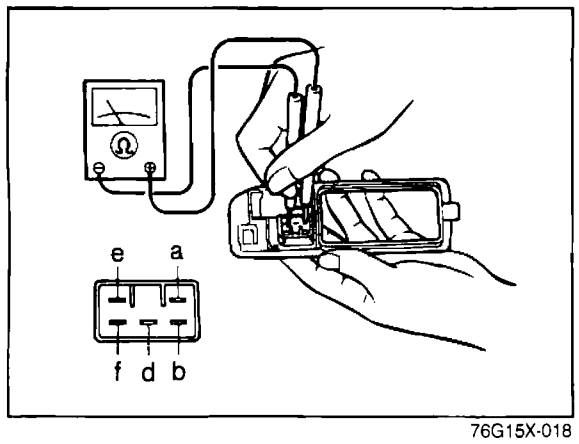
○——○: Indicates continuity



86U15X-118

Switch	Driver's side				Passenger's side			
Position \ Terminal	a	b	h	g	a	b	d	f
UP	○			○	○		○	
		○	○			○		○
OFF		○		○		○	○	
		○	○			○		○
DOWN	○		○		○			○
		○		○		○	○	

○——○: Indicates continuity

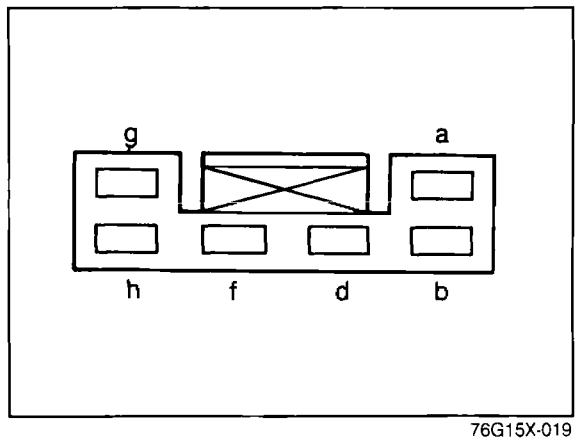


76G15X-018

Switch on Each Side
(For Sedan And Hatchback)
Check for continuity between terminals of the switch.

Position \ Terminal	a	b	d	e	f
UP	○			○	
		○	○		
OFF	○			○	
			○		○
DOWN		○		○	
			○		○

○——○: Indicates continuity



76G15X-019

(For Coupe/MX-6)
Check for continuity between terminals of the switch.

Position \ Terminal	a	b	d	f	h
UP	○			○	
		○	○		
OFF	○			○	
			○		○
DOWN		○		○	
			○		○

○——○: Indicates continuity

15 POWER WINDOW

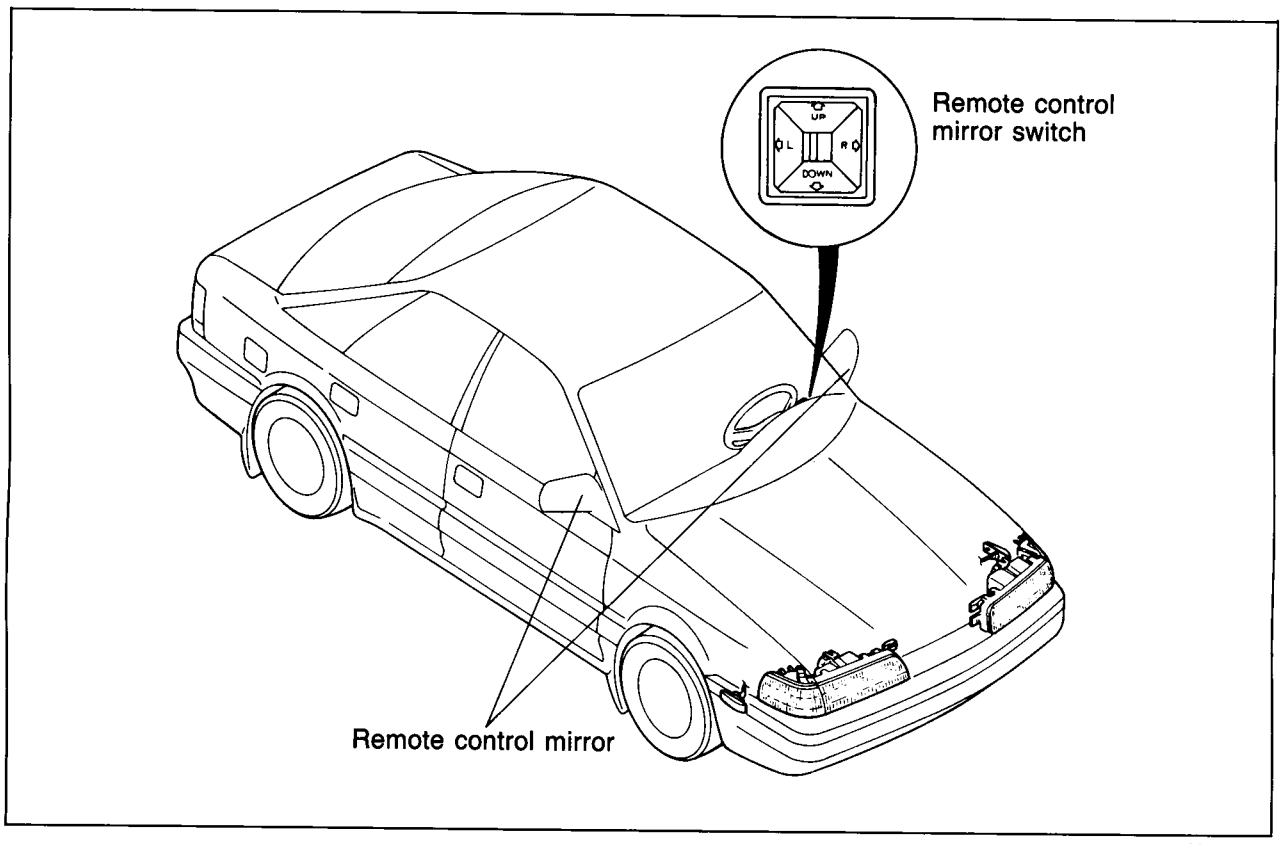
86U15X-121

Power Window Motor

1. Connect 12V to the "a" terminal and ground the "b" terminal of the motor connector, and check that the motor operates.
2. Reverse the above connections and check for reverse operation of the motor.

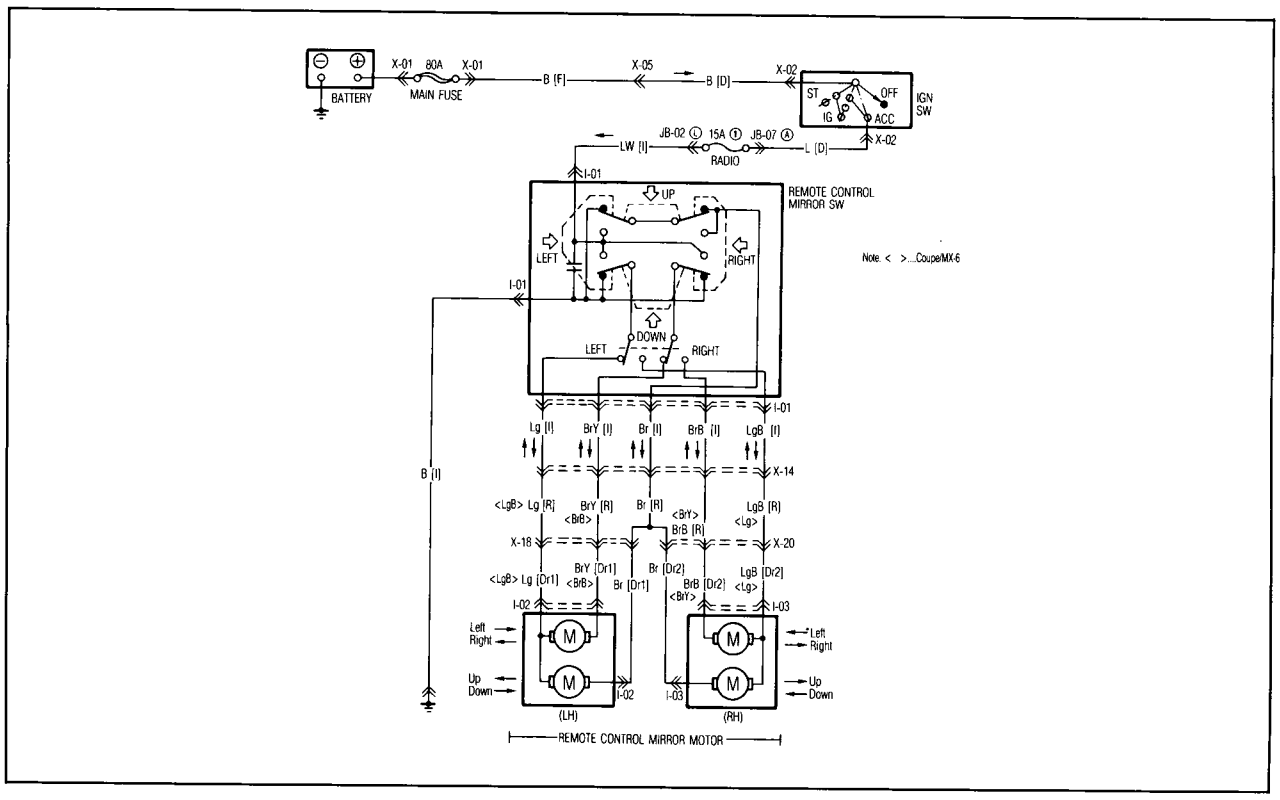
REMOTE CONTROL MIRROR

STRUCTURAL VIEW



86U15X-122

CIRCUIT DIAGRAM



86U15X-123

15 REMOTE CONTROL MIRROR

TROUBLESHOOTING

Remote control mirrors do not operate.

↓

Check the voltage between each terminal of the remote control mirror switch connector and a body ground with ignition switch in ACC.

Terminal	Voltage
G (LW)	12V
H (B)	0V

NG → Replace RADIO 15A fuse or repair the harness (Fuse box to switch, switch to body ground)

↓ OK

Check the remote control mirror switch. Refer to following inspection.

NG → Replace the switch.

↓ OK

Check for continuity between each terminals of the remote control mirror motor.

Terminal		
Br	Lg	BrY
○	○	○

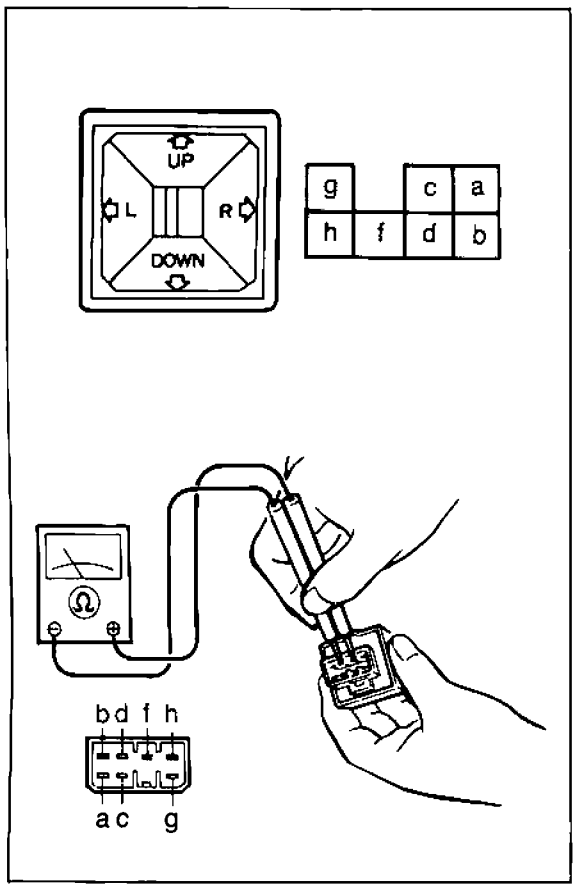
○—○: indicate continuity

NG → Replace the motor.

↓ OK

Repair the harness. (Switch to Motor)

86U15X-124



86U15X-125

INSPECTION

Remote Control Mirror Switch

1. Remove the negative battery cable.
2. Remove the remote control mirror switch.
3. Check for continuity between the terminals using an ohmmeter.

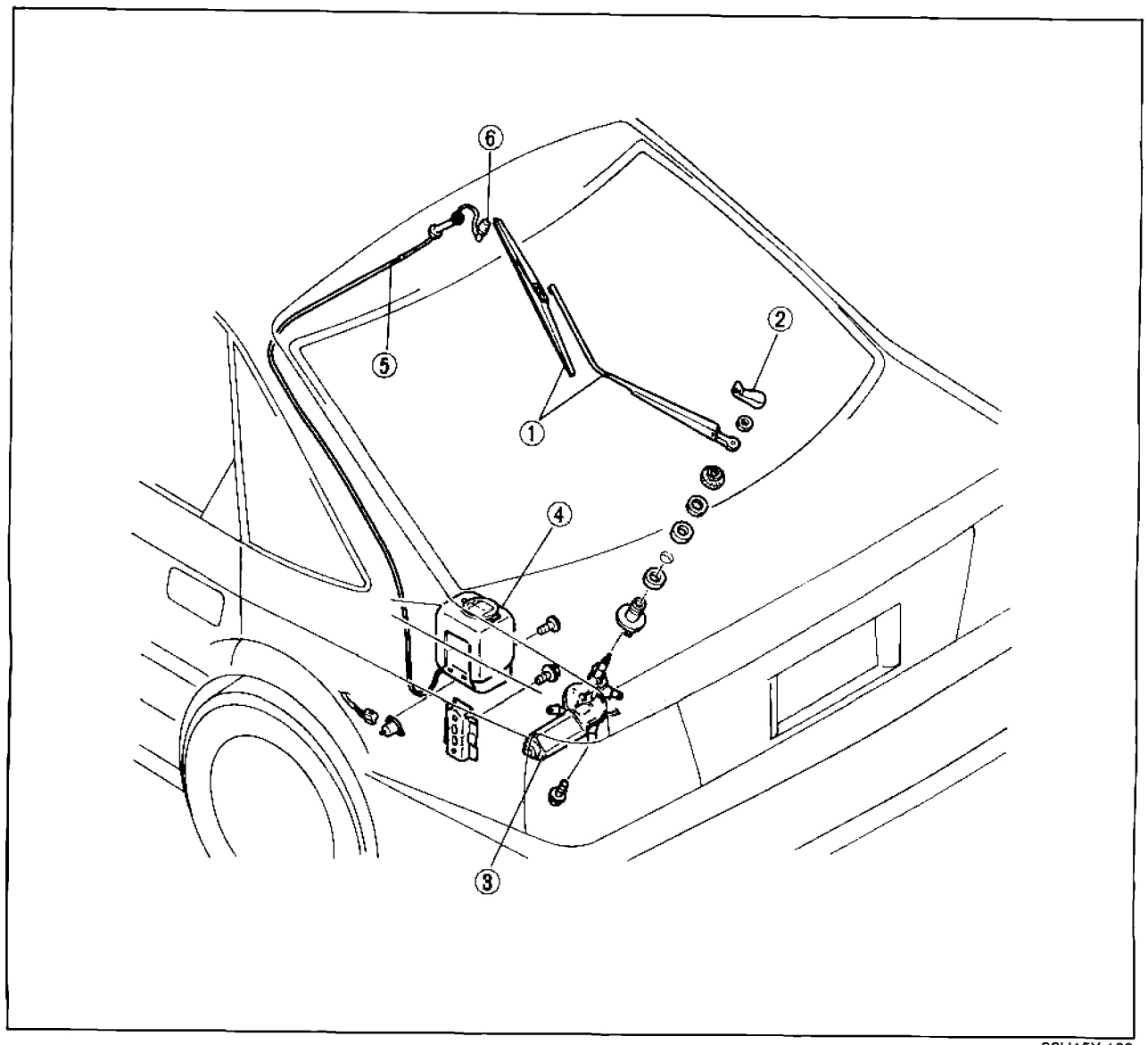
Position	Operation	g	h	a	b	f	d	c
Left	Up	○	○	○	○	○		
	Down	○	○	○	○	○		
	Left	○	○	○	○	○		
	Right	○	○	○	○	○		
Right	Up	○	○	○	○	○	○	○
	Down	○	○	○	○	○	○	○
	Left	○	○	○	○	○	○	○
	Right	○	○	○	○	○	○	○

○—○: Indicates continuity

4. If continuity is not as specified, replace the remote control mirror switch.

REAR WINDOW WIPER

STRUCTURAL VIEW

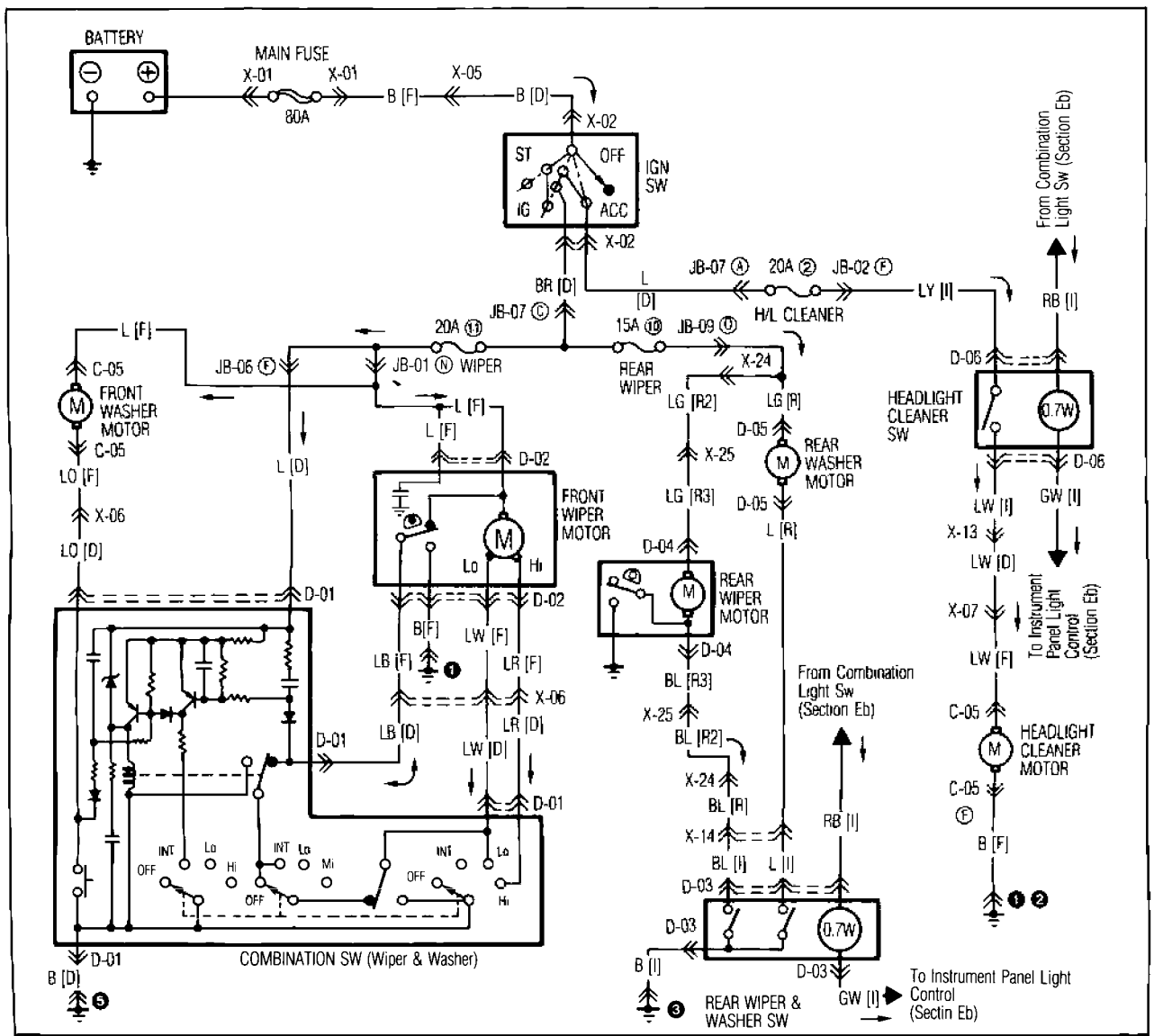


86U15X-126

1. Wiper arm and blade
2. Seal cap
3. Wiper motor
4. Washer tank and motor
5. Hose
6. Washer nozzle

15 REAR WINDOW WIPER

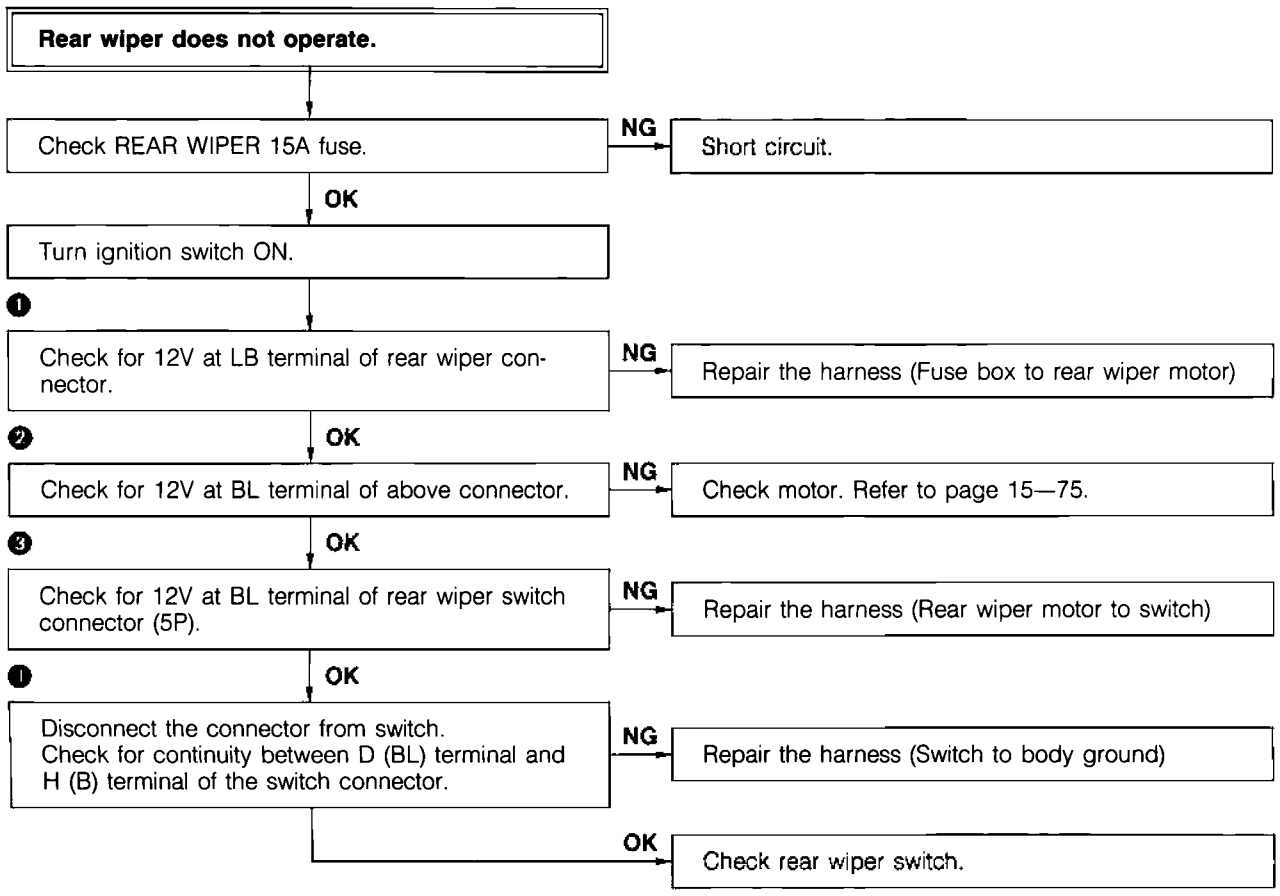
CIRCUIT DIAGRAM



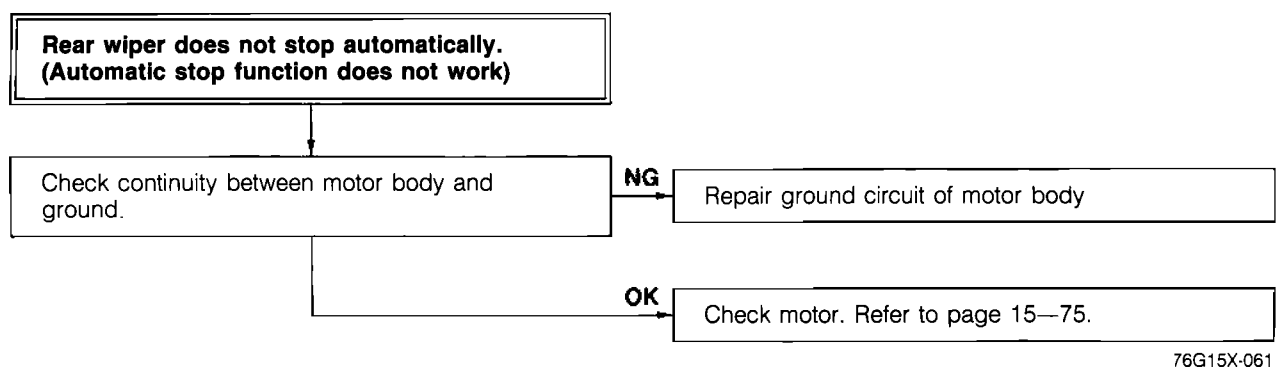
D-01 Combination Sw [D] LO L B LW LB LR	D-02 Front Wiper Motor [F] B LR LW L LB L	D-03 Rear Wiper Sw [I] * * GW (5 Door) B L BL RB	D-04 Rear Wiper Motor [R3] LG BL (5 Door)
D-05 Rear Washer Motor [R] L LG (5 Door)	D-06 Headlight Cleaner Sw [I] LY RB LW GW	C-05 Washer Motor Assembly [F] LW LY L Ⓕ B Ⓓ B LO	

86U15X-127

TROUBLESHOOTING

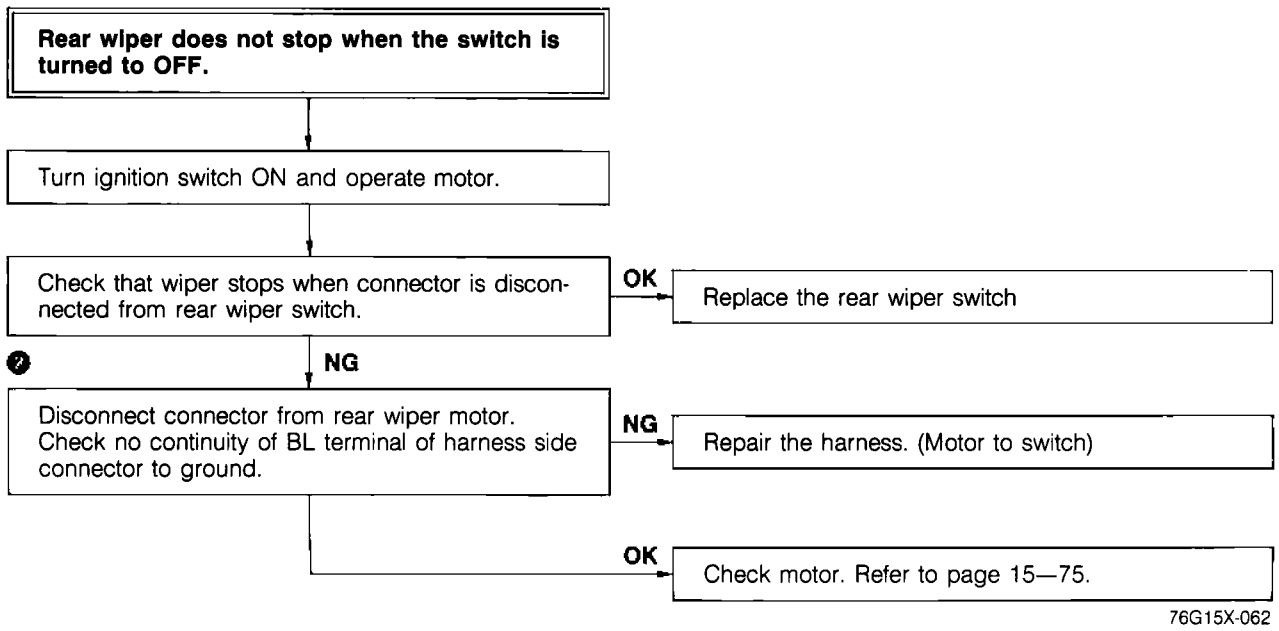


76G15X-060

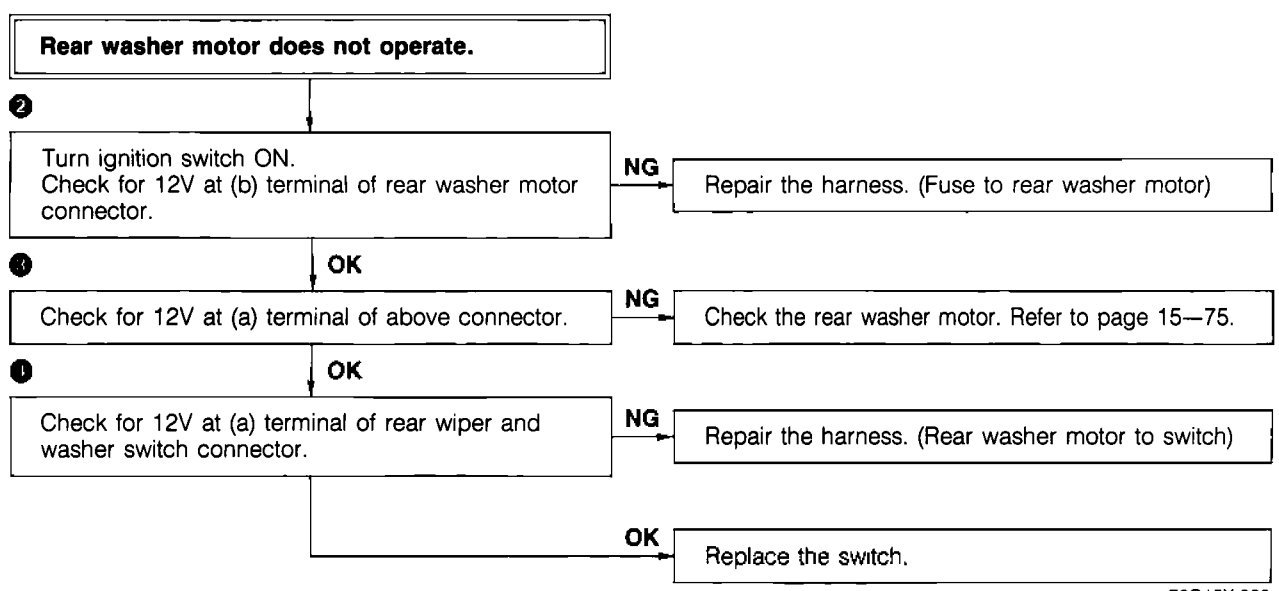


76G15X-061

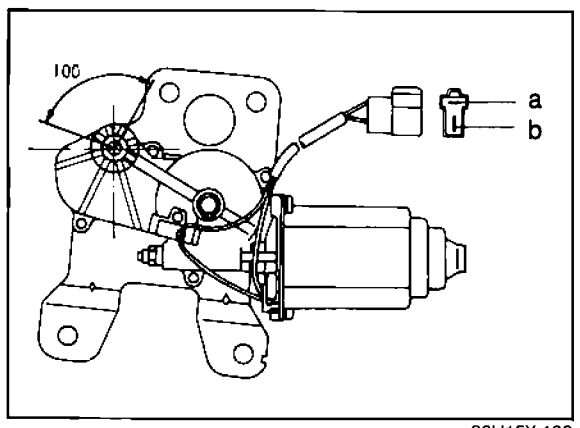
15 REAR WINDOW WIPER



76G15X-062



76G15X-063



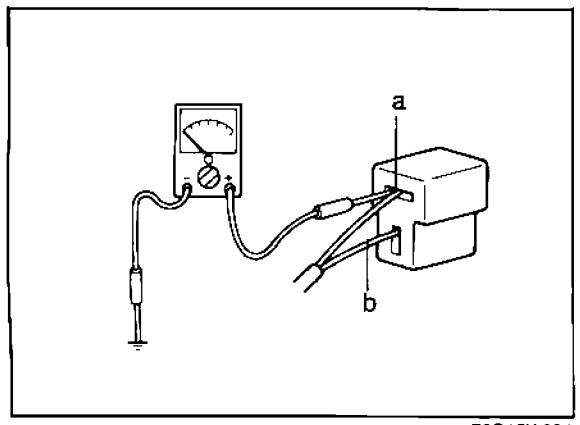
86U15X-132

INSPECTION

Operation Check of Rear Wiper Motor

1. Check that the motor operates continuously when 12V is connected to the (a) terminal and ground is connected to the (b) terminal of the motor.
2. Start the motor again.
   Disconnect the ground from the (b) terminal, and then connect the ground to the motor body immediately. Check that the motor shaft reaches the auto-stop position, and that there is conductivity through the grounding of the motor body.

Note:
Be sure to re-install the rubber seal correctly.



76G15X-094

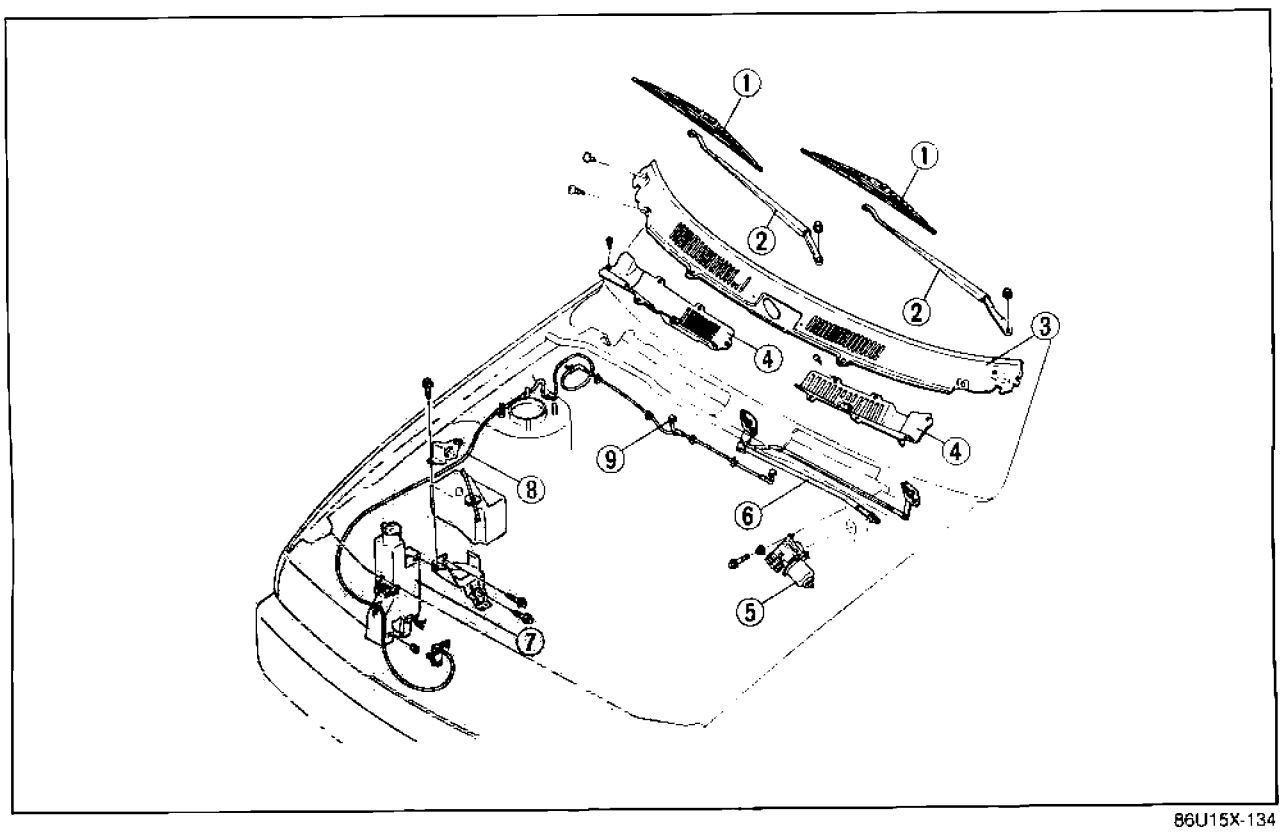
Operation Check of Rear Washer Motor

1. Using a voltmeter, measure the voltage between the (b) terminal and a body ground with the ignition switch ON.
2. If no voltage, check the fuse or repair the harness.
3. If the (b) terminal voltage is 12 V, connect the (a) terminal to a body ground.
4. If the washer motor does not operate, replace the washer motor.

15 WINDSHIELD WIPER

WINDSHIELD WIPER

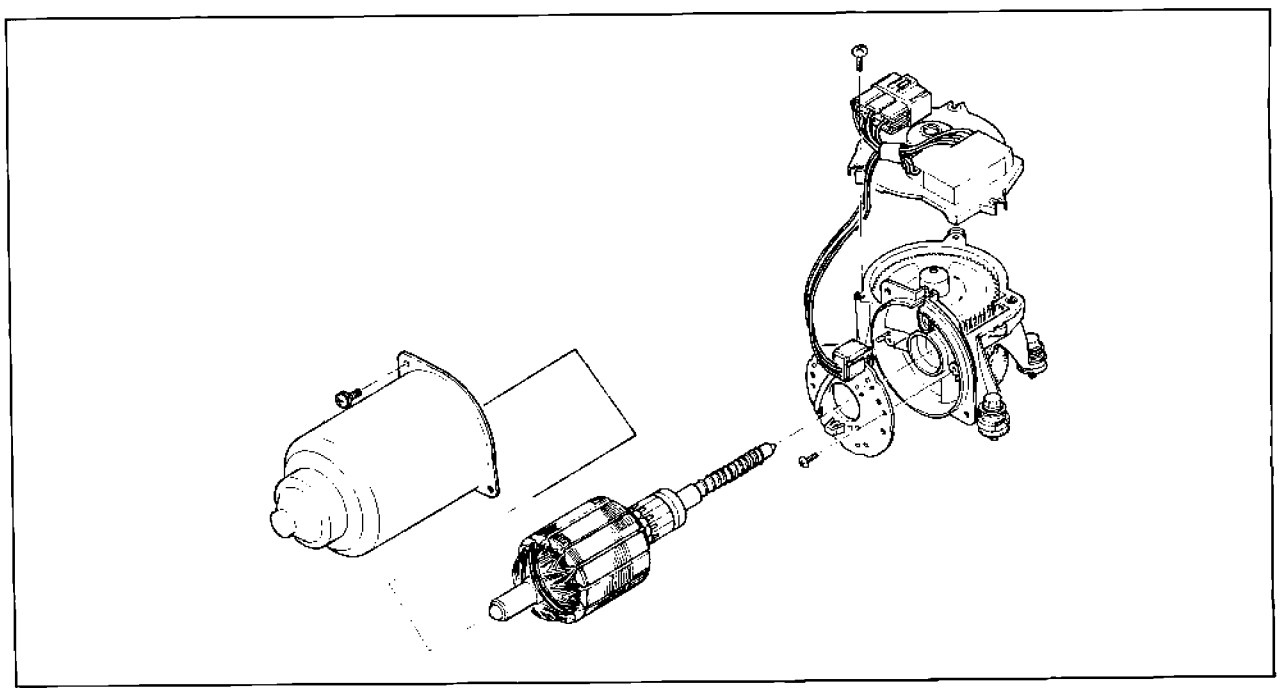
STRUCTURAL VIEW



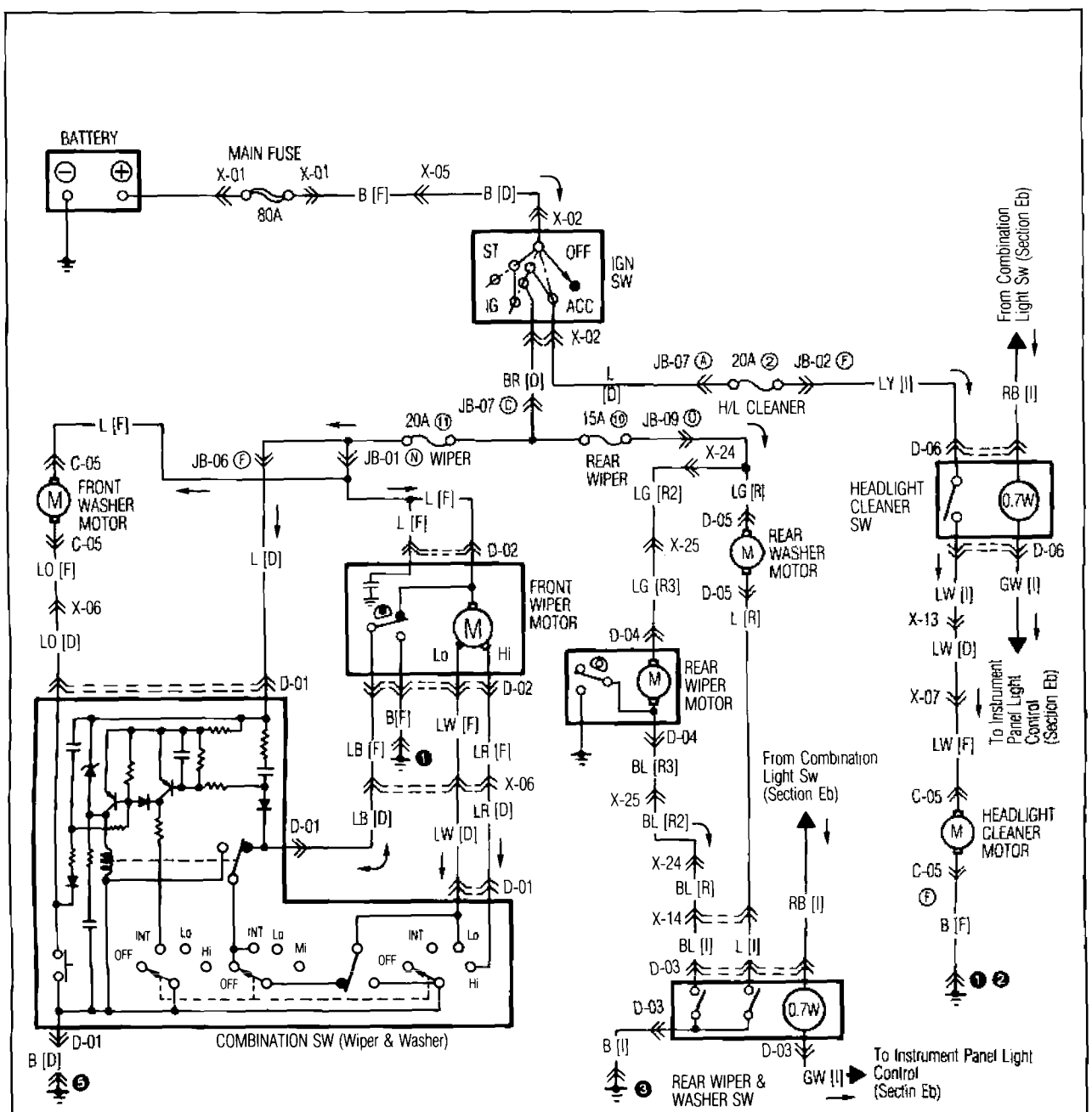
86U15X-134

1. Wiper blade
2. Wiper arm
3. Cowl grille
4. Cover
5. Wiper motor
6. Link assembly
7. Washer tank
8. Nozzle hose
9. Washer nozzle

DISASSEMBLY AND ASSEMBLY OF WIPER MOTOR



CIRCUIT DIAGRAM

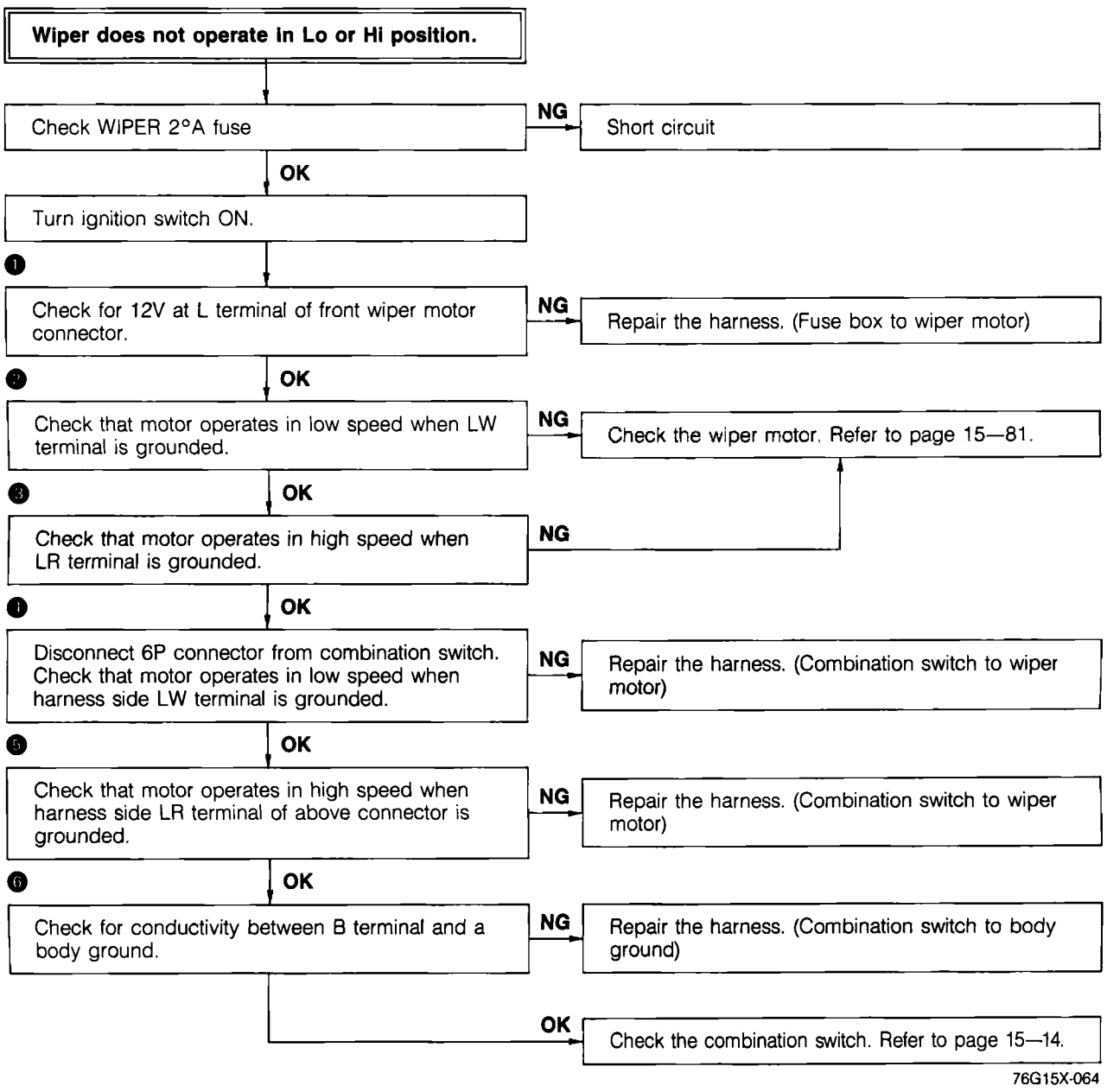


D-01 Combination Sw [D] LO L B LW LB LR	D-02 Front Wiper Motor [F] B LR LW L LB L	D-03 Rear Wiper Sw [I] * * GW B L BL RB (5 Door)	D-04 Rear Wiper Motor [R3] LG BL (5 Door)
D-05 Rear Washer Motor [R] L LG (5 Door)	D-06 Headlight Cleaner Sw [I] LY RB LW GW	C-05 Washer Motor Assembly [F] LW LY L Ⓕ B Ⓒ B LO	

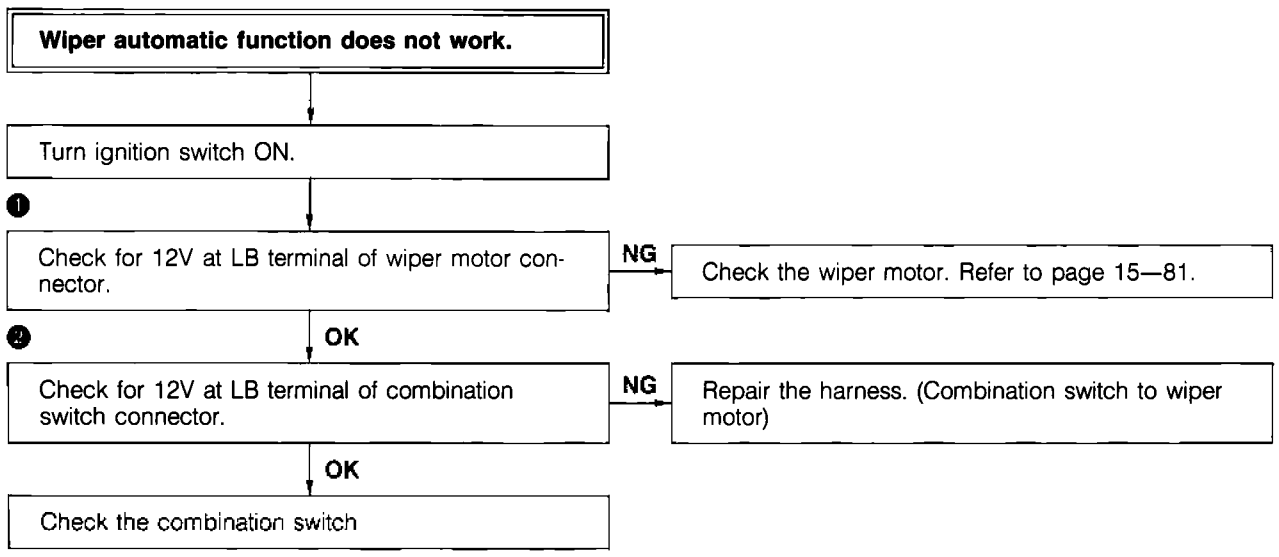
86U15X-135

15 WINDSHIELD WIPER

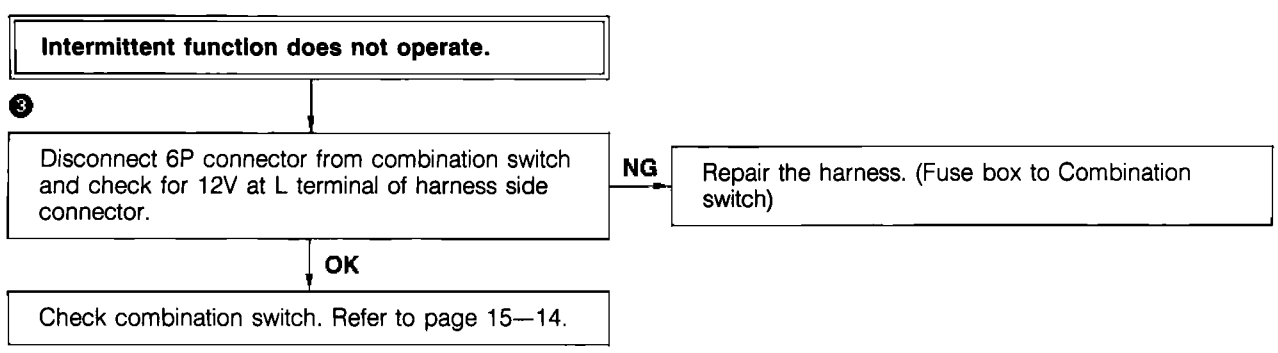
TROUBLESHOOTING



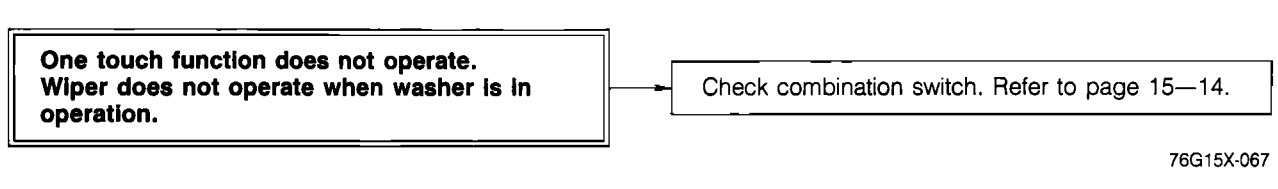
76G15X-064



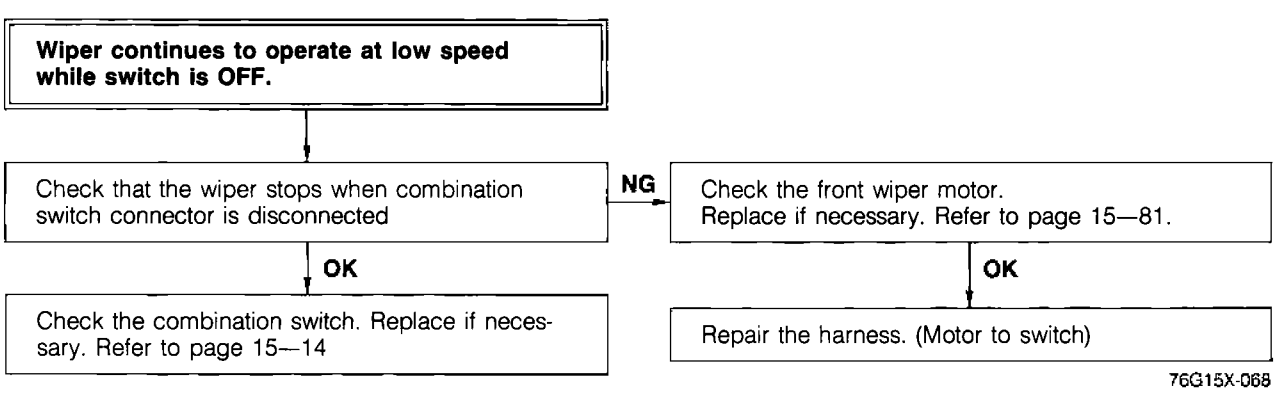
76G15X-065

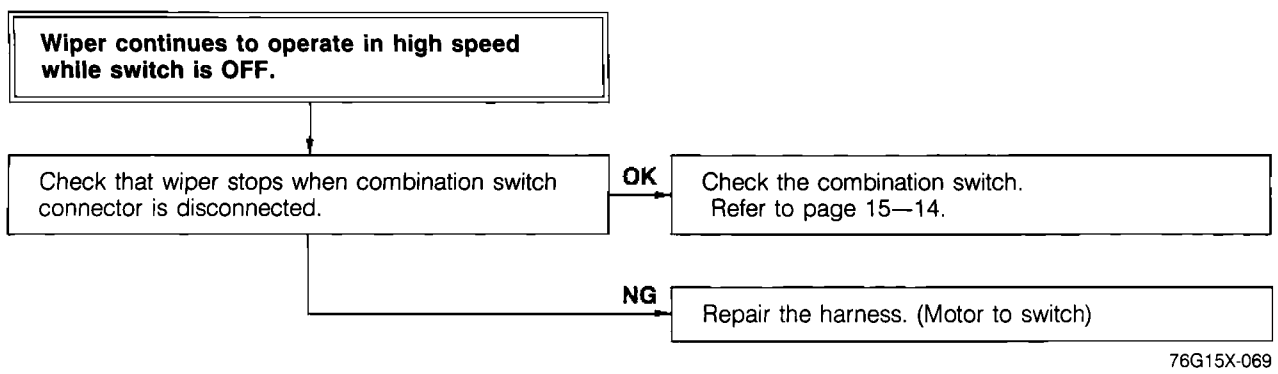


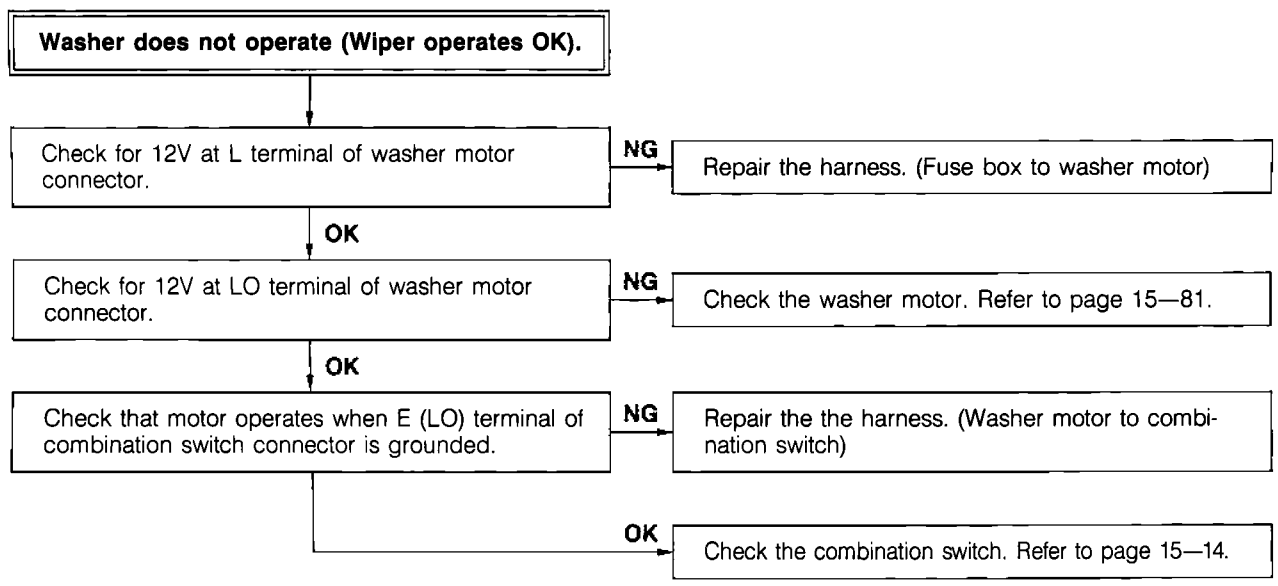
76G15X-066

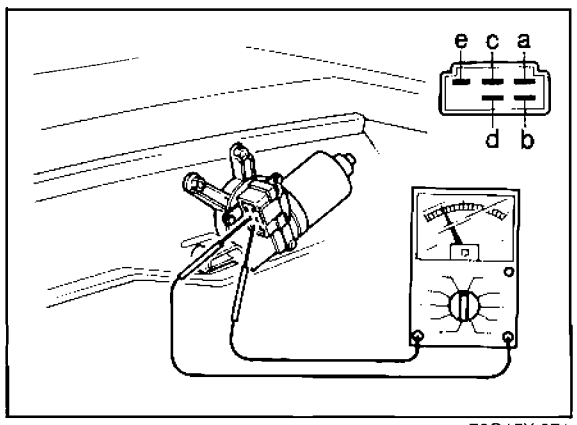


76G15X-067


Wiper continues to operate at low speed while switch is OFF.
Check that the wiper stops when combination switch connector is disconnected
NG
Check the front wiper motor. Replace if necessary. Refer to page 15—81.
OK
OK
Check the combination switch. Replace if necessary. Refer to page 15—14
Repair the harness. (Motor to switch)
76G15X-068


Wiper continues to operate in high speed while switch is OFF.
Check that wiper stops when combination switch connector is disconnected.
OK
Check the combination switch. Refer to page 15—14.
NG
Repair the harness. (Motor to switch)
76G15X-069


Washer does not operate (Wiper operates OK).
Check for 12V at L terminal of washer motor connector.
NG
Repair the harness. (Fuse box to washer motor)
OK
Check for 12V at LO terminal of washer motor connector.
NG
Check the washer motor. Refer to page 15—81.
OK
Check that motor operates when E (LO) terminal of combination switch connector is grounded.
NG
Repair the the harness. (Washer motor to combination switch)
OK
Check the combination switch. Refer to page 15—14.
76G15X-070



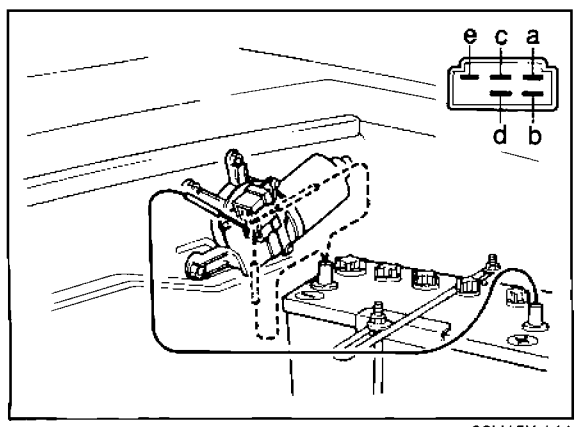
76G15X-071

INSPECTION

Wiper Motor

1. Check for continuity between the terminals when wiper in normal resting position.

Terminals	Continuity
b—a	Yes
d—c	Yes
b—d	Yes
e—d	No

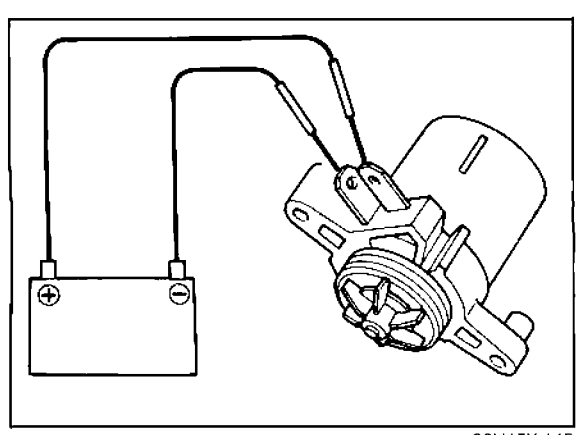


86U15X-144

Checking Operation

1. Check the operation by applying 12V between each terminal of the motor connector.

Terminal		Operation speed
12V	Ground	
b	a	Low
	c	High



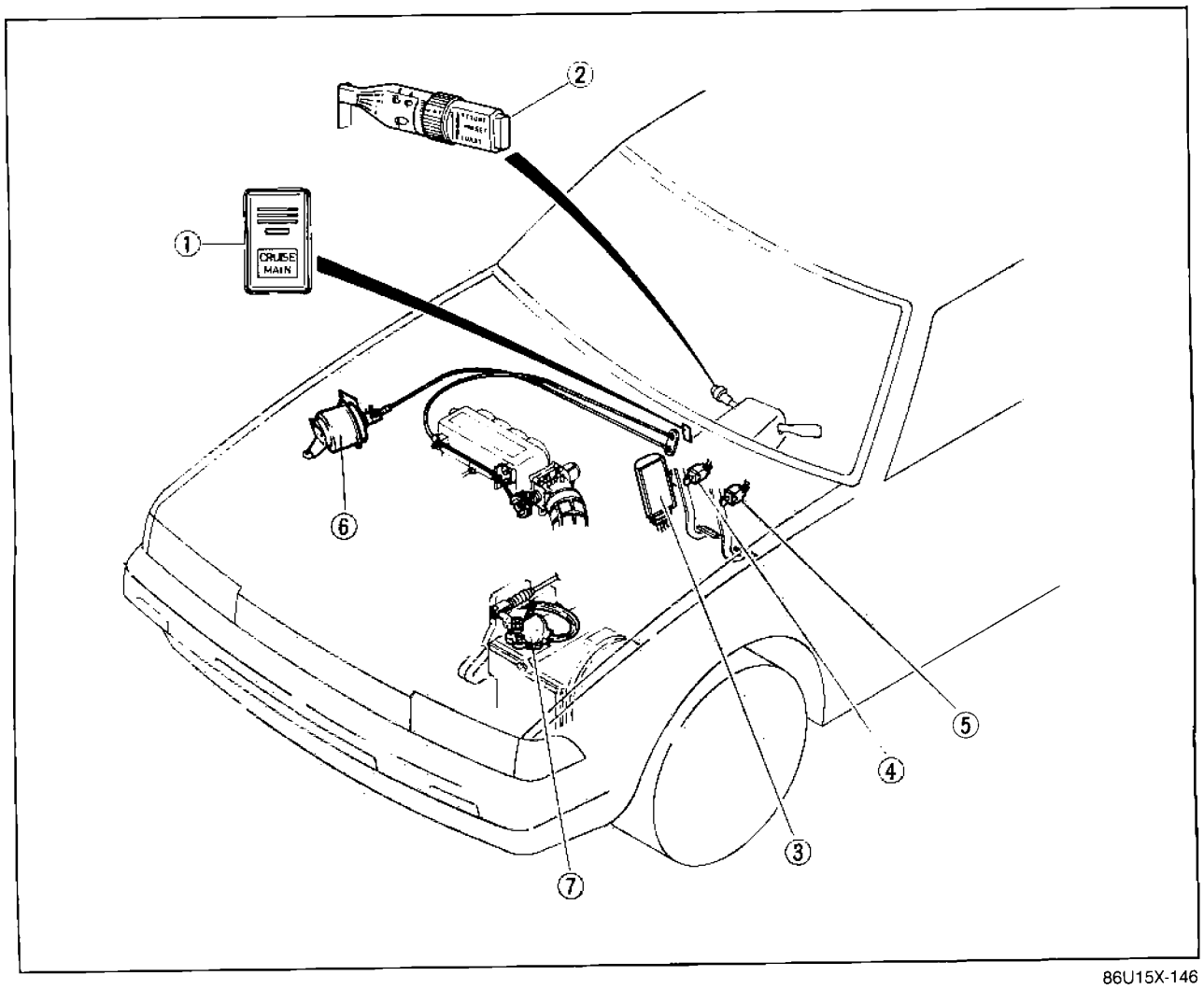
86U15X-145

Washer Motor

1. Check for continuity of the motor with an ohmmeter.
2. Connect 12V to the "a" terminal and the ground to the "b" terminal, and check that the motor operates.

CRUISE CONTROL SYSTEM

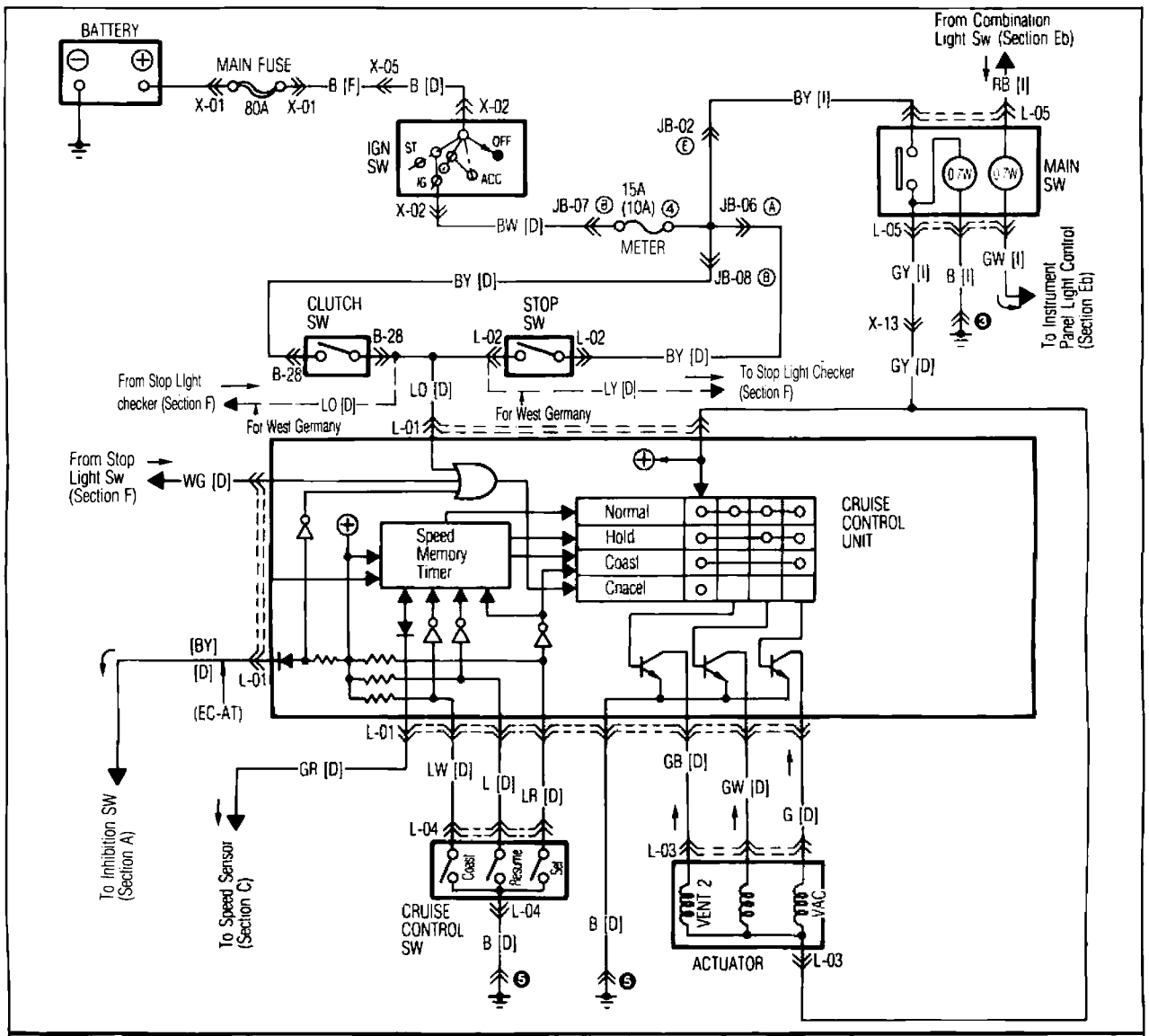
STRUCTURAL VIEW



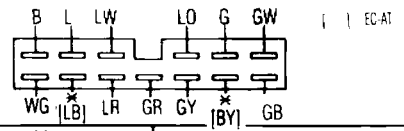
86U15X-146

1. Main switch
2. Control switch
3. Control unit
4. Stop switch
5. Clutch switch (MTX)
6. Actuator
7. Inhibitor switch (ATX)

CIRCUIT DIAGRAM



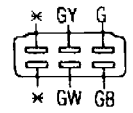
L-01 Cruise Control Unit [D]



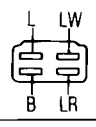
L-02 Stop Sw [D]



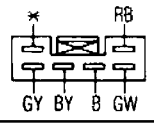
L-03 Actuator [D]



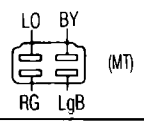
L-04 Cruise Control Sw [D]



L-05 Main Sw [I]

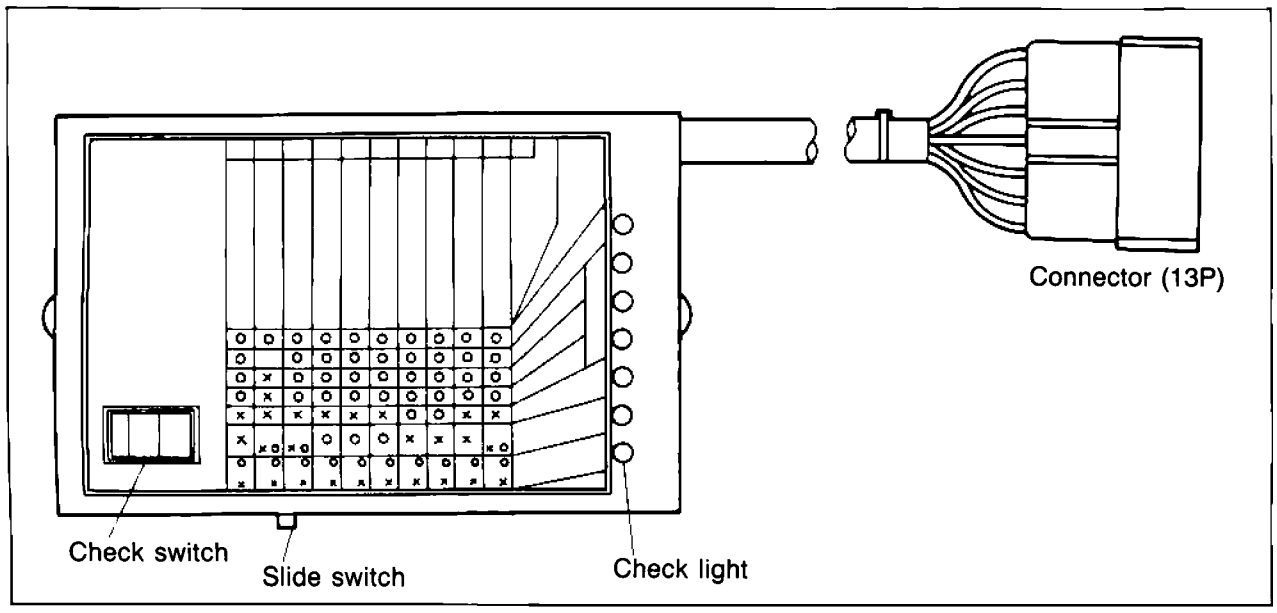


B-26 Clutch Sw [D]



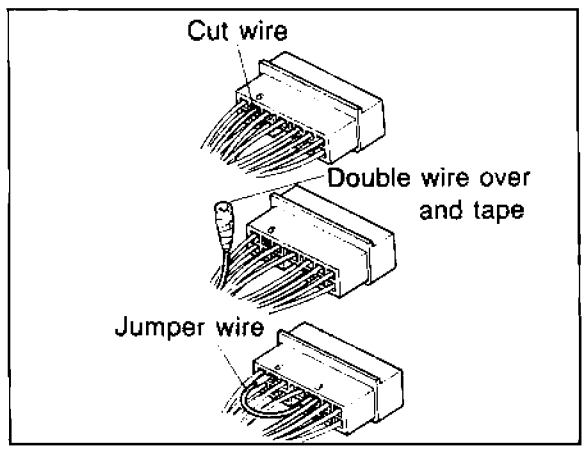
86U15X-147

ON-VEHICLE INSPECTION (USING ACC CHECKER 49 9200 010)



76G15X-072

Note:
When checking the actuator on '88 models with EC-AT using this checker, the checker should be modified as shown below in order to avoid damage of the EC-AT control unit.



Modification Procedure
1. Cut the wire at terminal no.6 indicated on ACC checker connector.
2. Tape exposed end of wire cut in step 1 as shown.

This modification does not affect the usage of the ACC checker except when used on the '81 RX-7 and 626 models. When the modified ACC checker is used on these models, use a jumper wire and jump across terminal no.6 to 3 indicated on ACC checker connector as shown.

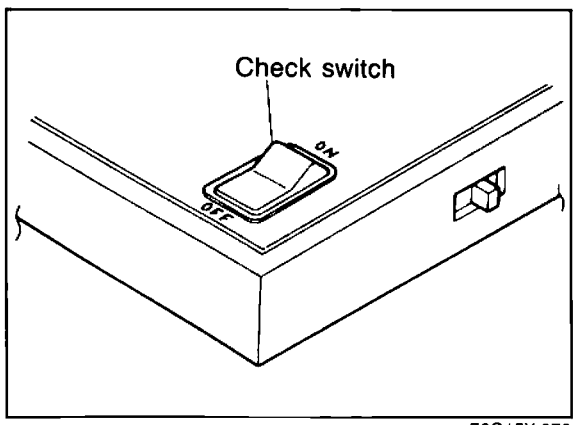
Function of the ACC CHECKER

A. Check lights

Each item is verified by a check light, as described below.

Check light	Check Items
MAIN SW.	Ignition switch, fuse, main switch and associated wiring harness terminals and connectors.
ACTUATOR—VAC	VAC coil continuity in the actuator and associated harness.
ACTUATOR—VENT 2	VENT 2 coil continuity in the actuator and associated harness.
ACTUATOR—VENT 1	VENT 1 coil continuity in the actuator and associated harness.
CLUTCH/BRAKE SW.	Clutch switch (M/T vehicles only), brake switch and associated harness
COMBINATION/INH. SW.	"SET", "COAST" and "RESUME" positions in the combination switch, inhibitor switch (A/T vehicles only), and associated harness.
GENERATOR	Speed sensor output and associated harness.

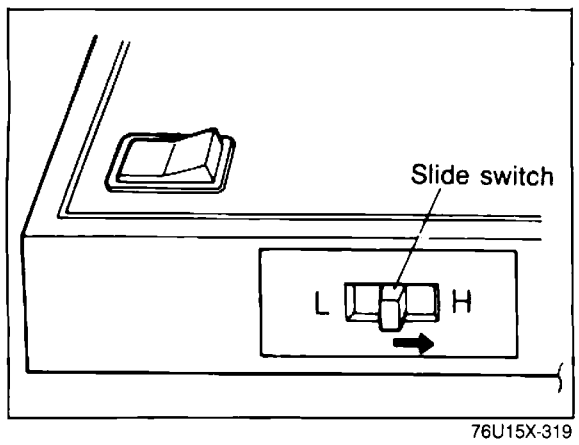
76U15X-193



76G15X-073

B. Check Switch

The check switch in the ACC checker is used to check the actuator operation while the engine is running. When the check switch is held on after the engine is started, the engine speed increases to approximately 2,000 to 3,000 rpm and is maintained at that level. When the check switch is released, the engine speed decreases to idle speed.



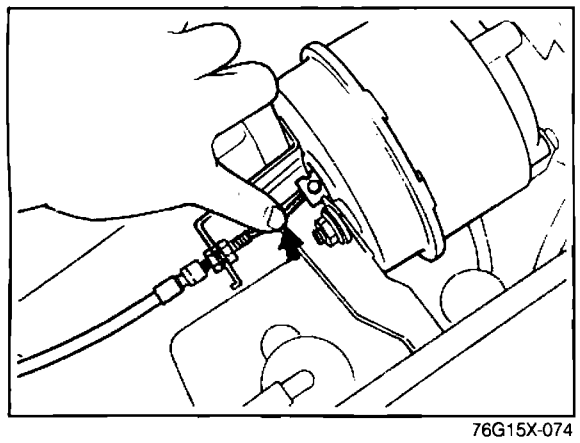
76U15X-319

C. Slide switch

Before using the check switch, first move the slide switch to the "L" position.

Then use the check switch to increase the engine rpm.

If the engine rpm stabilizes after increasing to 2,000—3,000 rpm, there is no problem. If there is no increase at all, or only a slight increase, try again after setting the slide switch to the "H" position. If there is still no increase to 2,000—3,000 rpm, adjust the free play of the actuator inner cable.



76G15X-074

Preparation

1. ACC checker installation

Depress the lock hook of the harness connector. Remove the connector from the ACC control unit after the ignition switch and main switch are turned off, and then connect the harness connector to the ACC checker.

2. Checking the free play of the actuator inner cable

Remove the clip and adjust the nut so that the actuator control cable play is as follows when the cable is pressed lightly.

Standard play: 1—3 mm (0.039—0.118 in)

Checking the System

Check table

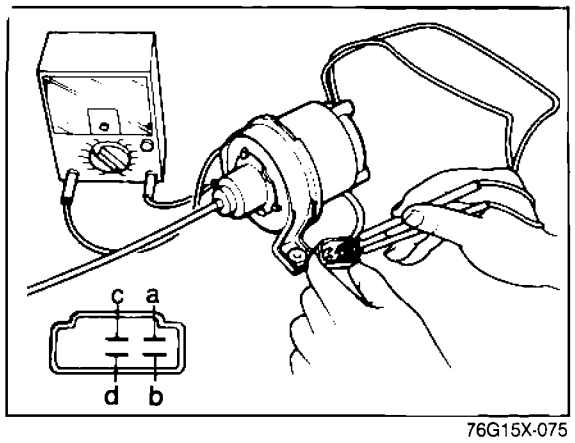
O: Represents: Light ON
X: Represents: Light OFF

CHECK ITEMS AND CONDITIONS	CHECK LIGHTS (correct response)							TROUBLESHOOTING (INCORRECT RESPONSE)
		ACTUATOR						
	MAIN SW	VAC	VENT2	VANT1	CLUTCH/BRAKE SW	CONBINATION/INH SW	GENERATOR	
1. MAIN SW. CONTINUITY: • Ignition switch ON • Main switch ON	O	O	O	O	X	A/T O M/T X	O or X	ALL LIGHTS OFF: Check ignition switch, main switch, fuse, and associated harness terminals and connectors
2. INHIBITOR SW. CONTINUITY: • Ignition and main switch ON. • Shift lever to "D" (A/T) • Depress brake pedal	O	O	O	O	X	X	O or X	COMBINATION/INH. SW. LIGHT ON: Check inhibitor switch and associated harness.
3. BRAKE SW. CONTINUITY: • Ignition and main switch ON • Shift lever to "D" (A/T) • Depress brake pedal	O	O	O	O	O	X	O or X	CLUTCH/BRAKE SW.LIGHT OFF: Check brake switch and associated harness.
4. CLUTCH SW. CONTINUITY: • Ignition switch ON • Main switch ON • Depress clutch pedal	O	O	O	O	O	X	O or X	CLUTCH/BRAKE SW. LIGHT OFF: Check clutch switch and associated harness.
5. "SET" POSITION OF COMBINATION SWITCH: • Ignition switch ON • Main switch ON • Shift lever to "D" (A/T) • Push to "SET" position of combination switch	O	O	O	O	X	O	O or X	COMBINATION/INH. SW. LIGHT OFF: Check "SET" position of combination switch and associated harness.
6. "COAST" POSITION OF COMBINATION SWITCH • Ignition switch ON • Main switch ON • Shift lever to "D" (A/T) • Turn to "COAST" position of combination switch	O	O	O	O	X	O	O or X	COMBINATION/INH. SW. LIGHT OFF: Check "COAST" position in combination switch and associated harness.
7. "RESUME" POSITION OF COMBINATION SWITCH • Ignition switch ON • Main switch ON • Shift lever to "D" (A/T) • Turn to "RESUME" position of combination switch	O	O	O	O	X	O	O or X	COMBINATION/INH. SW. LIGHT OFF: Check "RESUME" position of combination switch and associated harness.

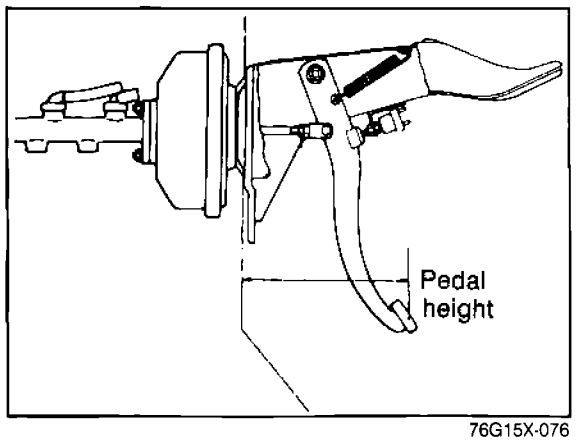
76U15X-198

CHECK ITEMS AND CONDITIONS	CHECK LIGHTS (correct response)							TROUBLESHOOTING (INCORRECT RESPONSE)
		ACTUATOR						
	MAIN SW	VAC	VENT2	VANT1	CLUTCH/BRAKE SW	CONBINATION/INH SW	GENERATOR	
8. START THE ENGINE • Shift lever to "N" position (A/T)	○	○	○	○	X	A/T ○ M/T X	○ or X	—
9. ACTUATOR OPERATION: (EGI model only) • After engine is started, set the slide switch "L" or "H". Then turn on check switch (keep in "D" position) **Note: Engine speed should increase to 2,000—3,000 rpm. If over 4,000 rpm release the switch immediately.**	○	X ↓ ○	X	X	X	A/T ○ M/T X	○ or X	If engine speed does not come up to and remain in the 2,000 to 3,000 rpm. range, check the actuator and associated harness.
10. SPEED SENSOR OUTPUT Keeping idling condition, drive vehicle slowly.	○	○	○	○	X	X	○ ↕ X	If GENERATOR LIGHT does not flash, trouble may be with speed sensor and associated harness.

76U15X-199



76G15X-075



76G15X-076

INSPECTION

Actuator

Measure the actuator solenoid resistance by using an ohmmeter.

Check terminals	Resistance
c — d	Approx. 25 to 35 ohms
c — a	
c — b	

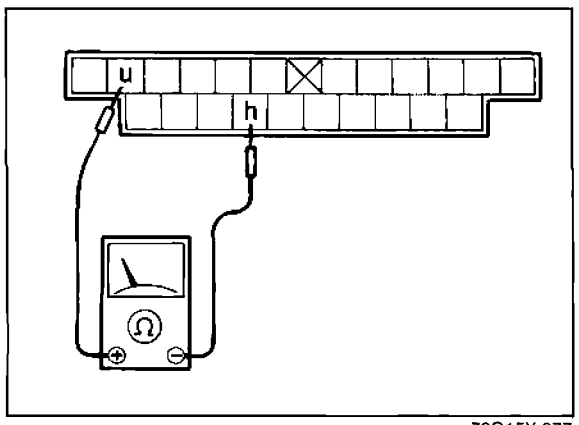
Cruise Control Unit

If there is an operation malfunction of the cruise control system, and no abnormal condition when checking above, replace the cruise control unit and check system operation.

Clutch Switch, Brake Switch

When removing these switches, turn each of them so that the corresponding pedal height agrees with the standard value.

Brake pedal height: 222 $^{+5}_{-0}$ mm (8.74 $^{+0.20}_{-0}$ in)
Clutch pedal height:
216.5 $^{+5}_{-0}$ mm (8.52 $^{+0.20}_{-0}$ in)



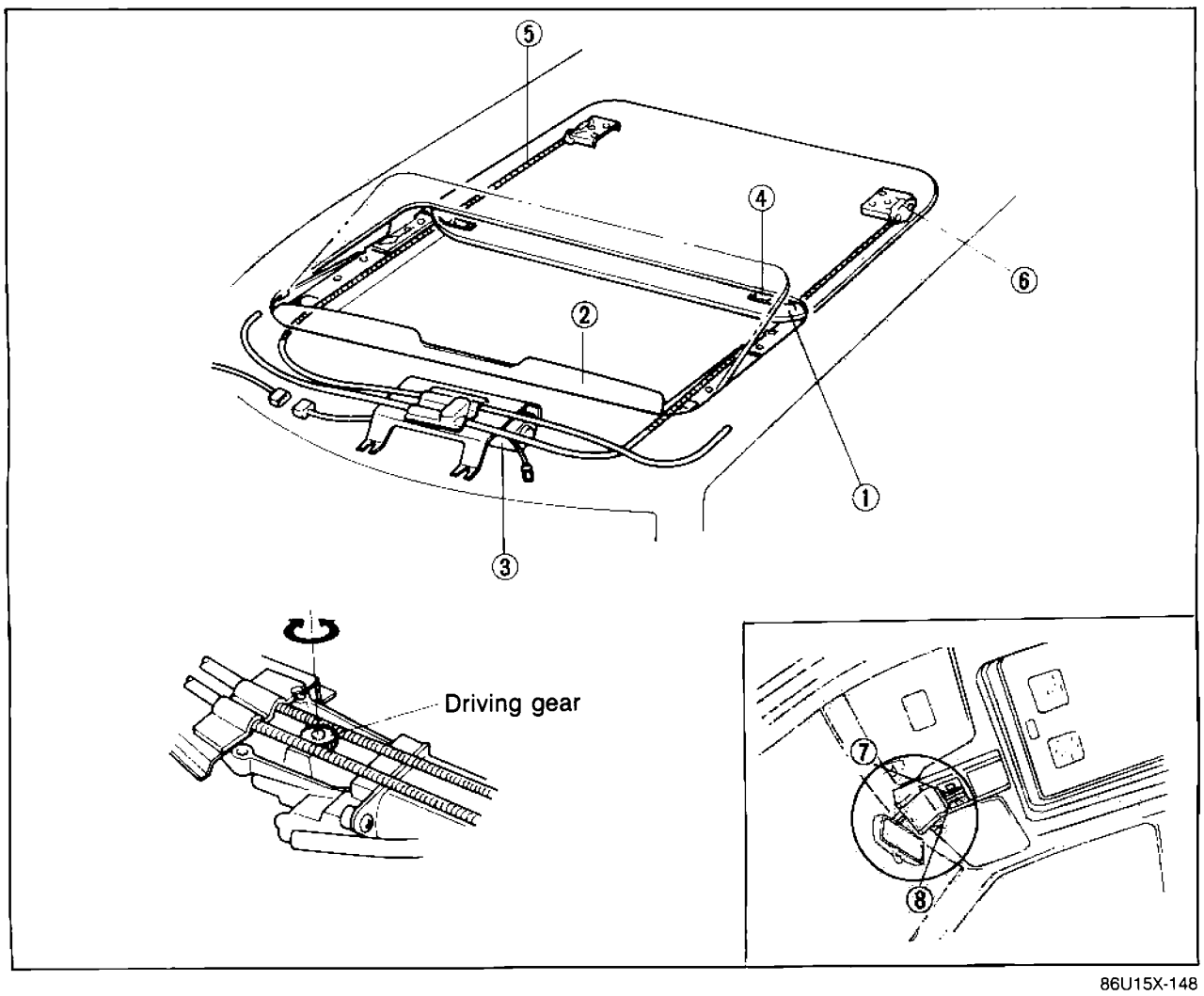
76G15X-077

Speed sensor
1. Remove the combination meter.
2. Connect an ohmmeter between "u" and "n" terminals of the 22 pin connector.
3. Confirm continuity between terminals when rotating the speedometer cable shaft.
4. If not 4 times per rotation, replace the speedometer.

Inhibitor switch
Refer to Section 7B.

SLIDING SUNROOF

STRUCTURAL VIEW

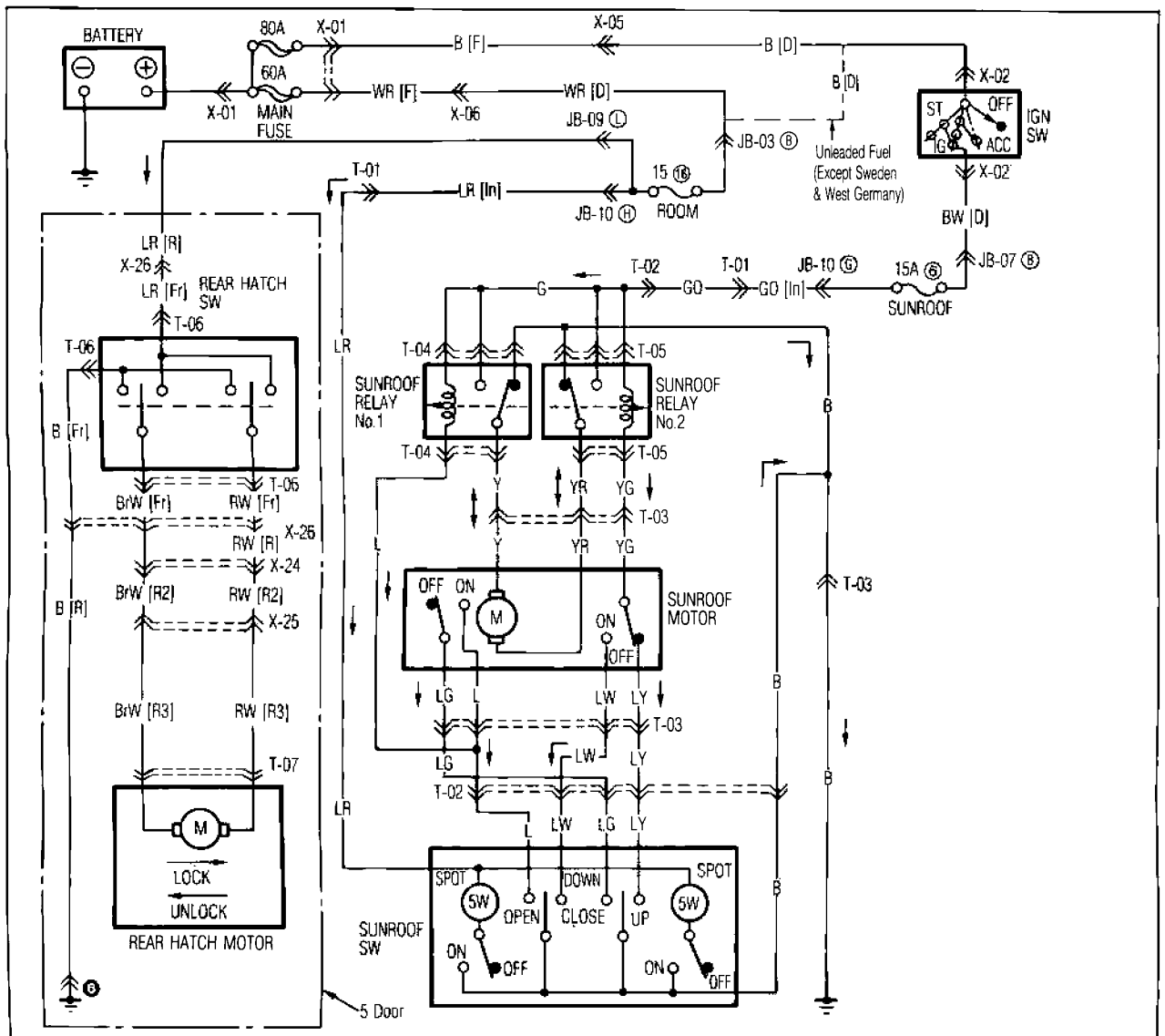


86U15X-148

1. Slide panel
2. Deflector assembly
3. Motor assembly
4. Guide bracket
5. Driving cable
6. Guide bracket assembly rear
7. Tilt up switch
8. Slide switch

15 SLIDING SUNROOF

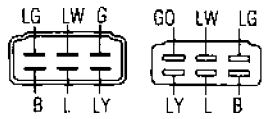
CIRCUIT DIAGRAM



T-01 Connector Between Interior Light Harness [In] and Sunroof



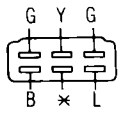
T-02 Sunroof Sw



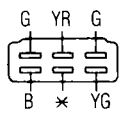
T-03 Sunroof Motor



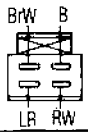
T-04 Sunroof Relay No 1



T-05 Sunroof Relay No 2

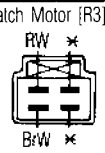


T-06 Rear Hatch Sw [R]



5 Door

T-07 Rear Hatch Motor [R3]



86U15X-149

TROUBLESHOOTING

Sunroof does not operate correctly.

↓

Check SUNROOF 15A fuse.

↓

Turn ignition switch ON

↓

Check the voltage at each terminal of the sunroof relay No. 1 and No. 2.

Relay	Terminal	Voltage
No. 1	G	12V
	G	12V
	B	0V
No. 2	G	12V
	G	12V
	B	0V

NG → Repair the harness. (Fuse box to relay, Relay to body ground)

OK ↓

Check the sunroof relays. Refer to page 15—92. → **NG** → Replace the relays.

OK ↓

Check the voltage at each terminal of the sunroof motor.

Terminal	Voltage
Y	0V
YR	0V
YG	12V

NG → Repair the harness. (Relay to motor).

OK ↓

Check the sunroof motor and limit switch. Refer to page 15—92, 93. → **NG** → Replace the motor and limit switch.

OK ↓

Check for 12V at L terminal of the sunroof motor connector. → **NG** → Repair the harness. (Relay to motor)

OK ↓

Check the voltage at each terminal of the sunroof switch connector with each roof condition.

Terminal	Roof condition	Voltage
L	Close	12V
LY		12V
LG	Open	12V
LW	Tilt up	12V
LR	Any time	12V
B		0V

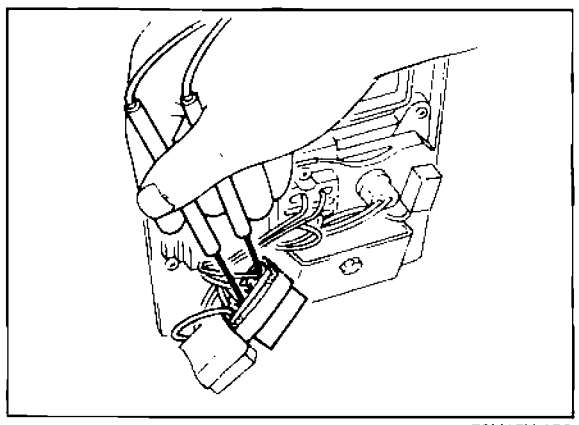
NG → Repair the harness. (Motor to switch Fuse box to switch Switch to body ground)

OK ↓

Check the sunroof switch. Replace if necessary. Refer to page 15—92.

76G15X-078

15 SLIDING SUNROOF



76U15X-156

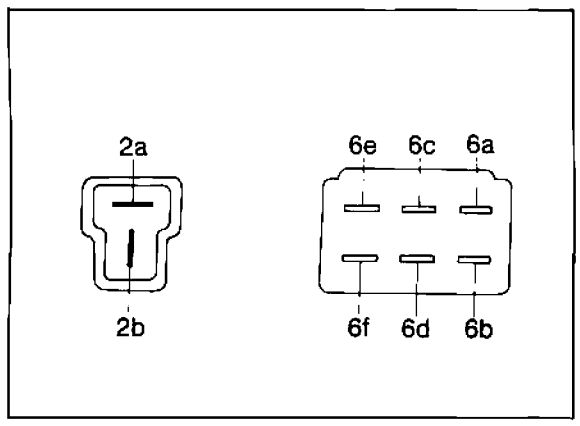
INSPECTION

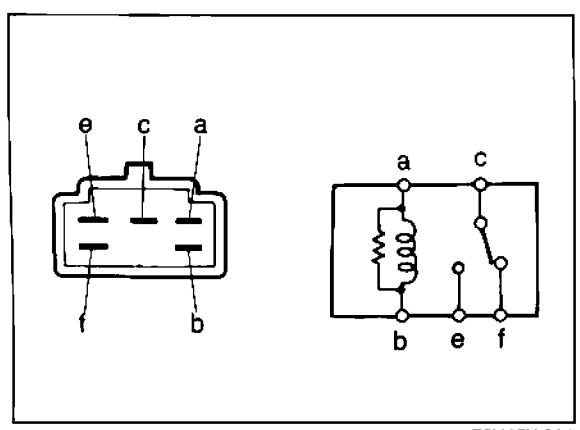
Switch

Use an ohmmeter to check the continuity of the terminals of the switch.
If continuity is not as indicated, replace the switch.

Position \ Terminal		2a	2b	6a	6b	6c	6d	6e	6f
OFF		○	——	○					
Slide SW	OPEN						○	——	○
	CLOSE					○	——	——	○
Tilt SW	UP				○	——	——	——	○
	DOWN							○	—— ○

○—○: Indicates conductive

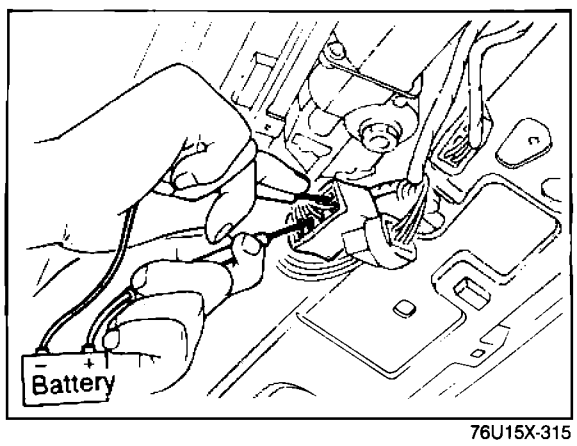




76U15X-314

Relay

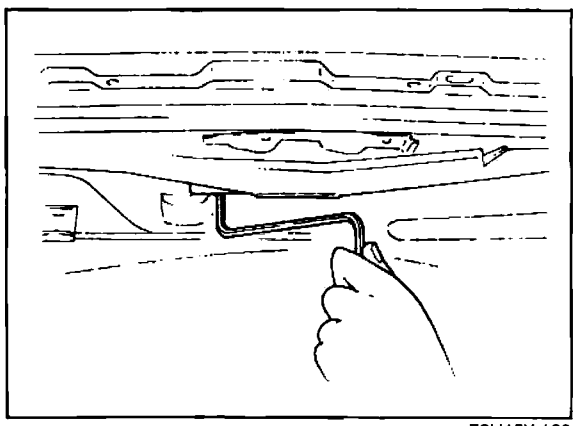
1. Check the continuity between a—b and c—f.
2. Apply power source to the terminal a.
3. Connect the negative lead to the terminal b.
4. Check the continuity between c—e.



76U15X-315

Motor

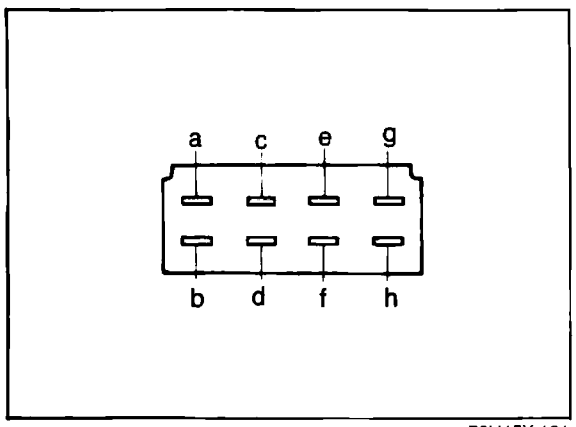
1. Disconnect the connector of the motor.
2. Apply power source to YR and connect Y to the ground.
3. Check that motor turns in the direction from the tilt up, to the closed, to the open position.
4. Reverse the connection and check motor turns from the open, to the closed, to the tilt up position.



76U15X-160

Limit Switch

1. Using hex-head wrench furnished in the glove box, set the sunroof in each position.



76U15X-161

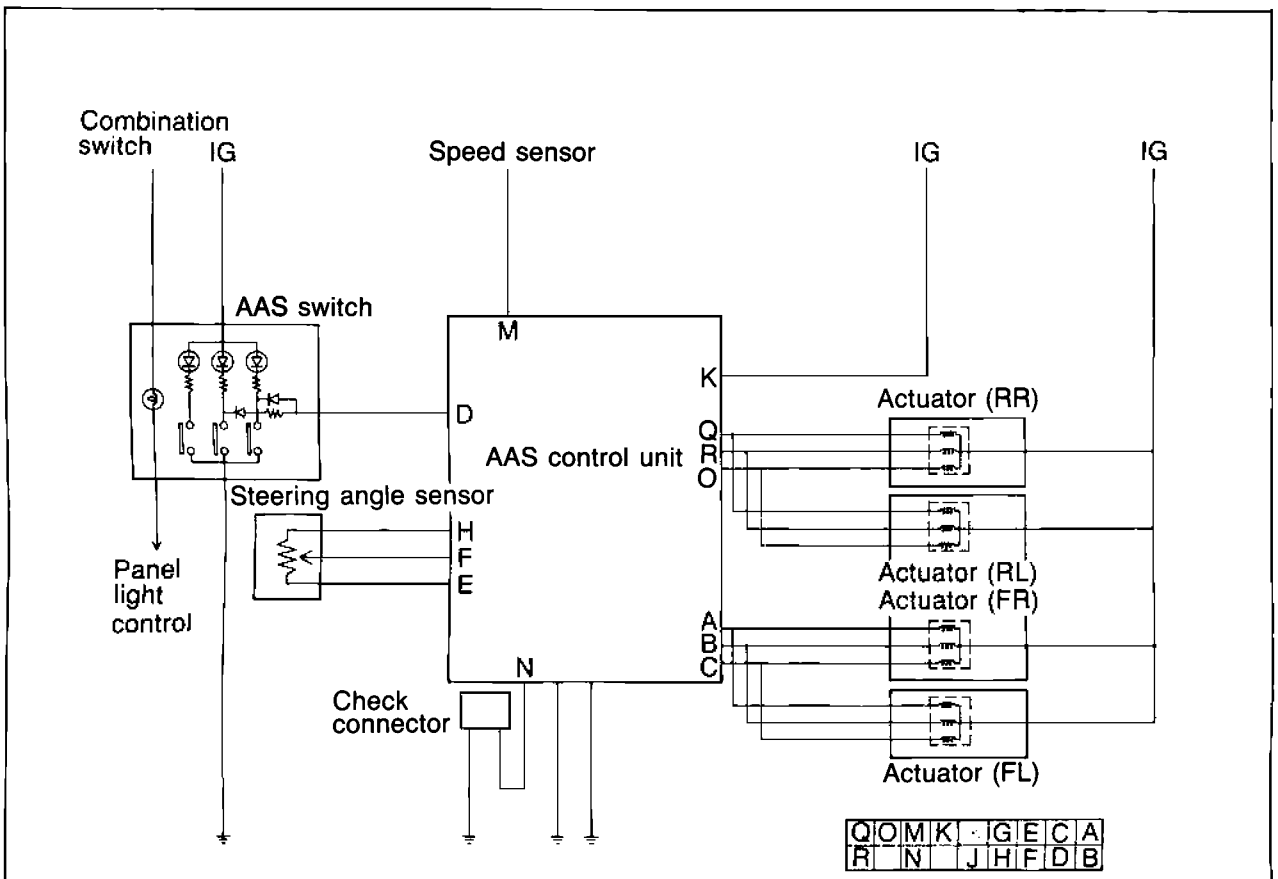
2. Use an ohmmeter to check the continuity of the terminals of the switch.

SW / Terminal color / Roof condition	LS1		LS2		
	e	d	a	b	c
	L	LG	YG	LW	LY
Open			○—○		
Close			○		○
Tilt up	○—○		○		○

○—○: Indicates conductive

AUTO ADJUSTING SUSPENSION (AAS)

CIRCUIT DIAGRAM



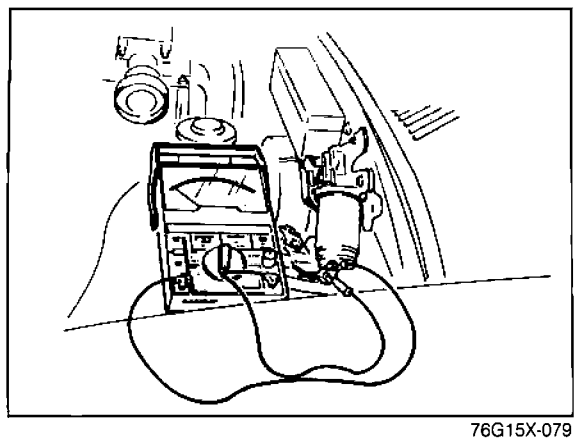
86U15X-151

TROUBLESHOOTING GUIDE

The AAS control unit has a self-diagnosis function detecting the unit itself, electrical parts for AAS system, and wiring harness open circuit, to inform mechanics. If it detects their malfunctions, outputs the output pattern to A (LW) terminal of service connector according to the settled pattern for each malfunction.

Troubleshooting against AAS system can be conducted by knowing the output pattern (See page 15—96, 97) to detect trouble location.

76G15X-020



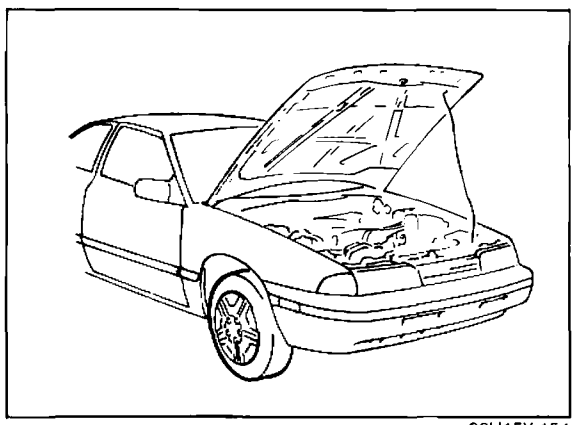
76G15X-079

TROUBLESHOOTING

How To Use Self-Diagnosis System

By using the control unit's self-diagnosis function and a voltmeter, malfunctions of the system are easily determined. When diagnosing malfunctions, follow the steps bellow.

1. Connect a voltmeter to A (LW) terminal of the service connector in engine room.
2. Read out the output patterns (See page 15—96) in following condition.

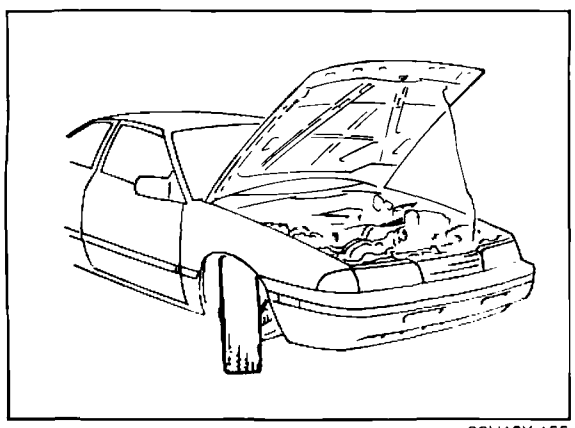


86U15X-154

Checking Condition

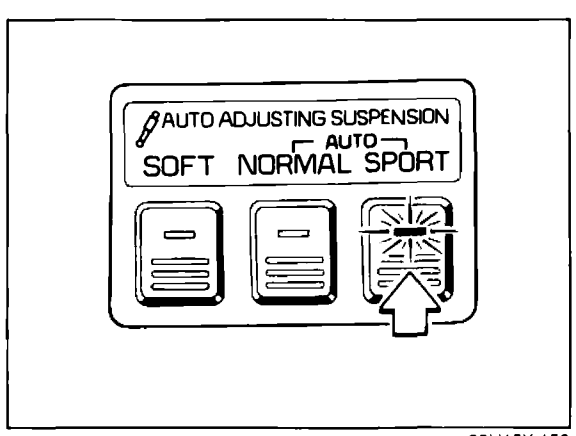
Note:
Turn the ignition switch OFF to reset the control unit before each test.

Condition A
1. Turn the ignition switch ON.
2. Set steering wheel in the straight-ahead position, and check the output pattern.



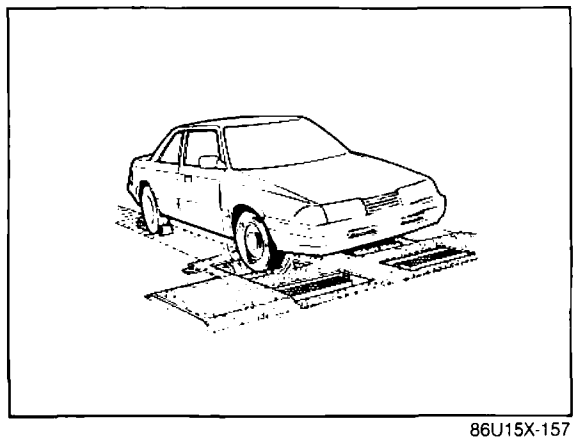
86U15X-155

Condition B
1. Turn the ignition switch ON.
2. Turn the steering wheel right and left, and check the output pattern.



86U15X-156

Condition C
1. Turn the ignition switch ON.
2. Change the AAS switch from NORMAL to SPORT or from SPORT to NORMAL, and check the output pattern.

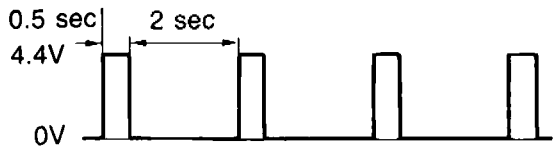
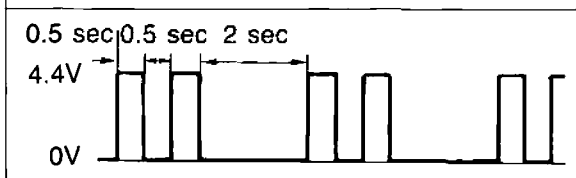
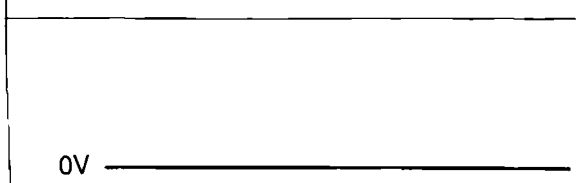
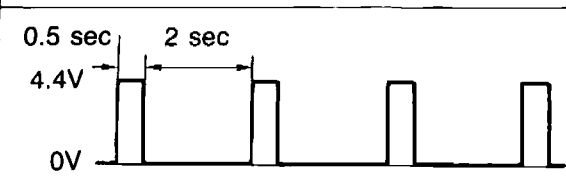
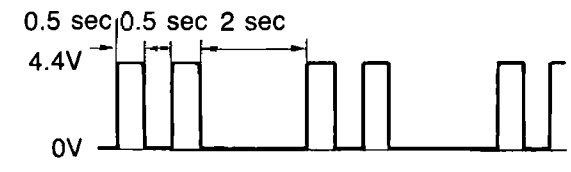
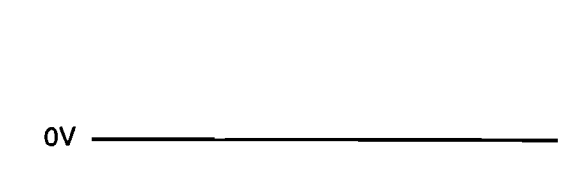
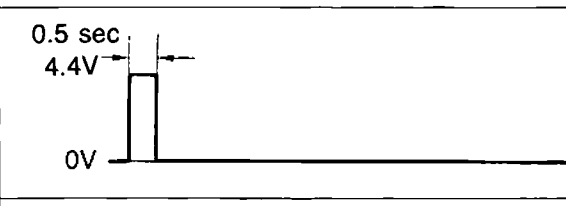
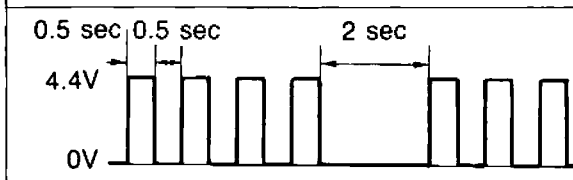
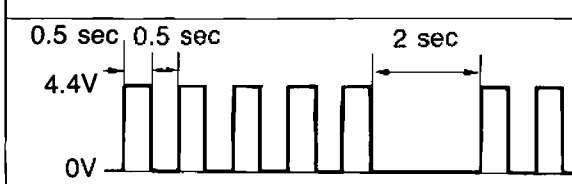


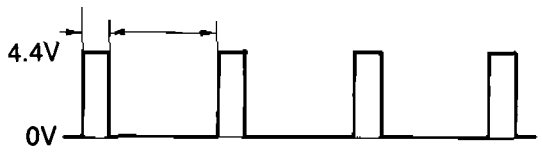
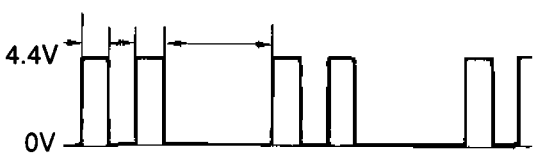
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Condition D
1. Operate the vehicle on a chassis roller.
2. Check the output pattern at above 15 km/h (9.3 mph).

Caution
a) Block the rear wheels.
b) In vehicle equipped with ABS, ABS warning light may come on, which is not a failure. The light goes off by turning ignition switch OFF and again ON.

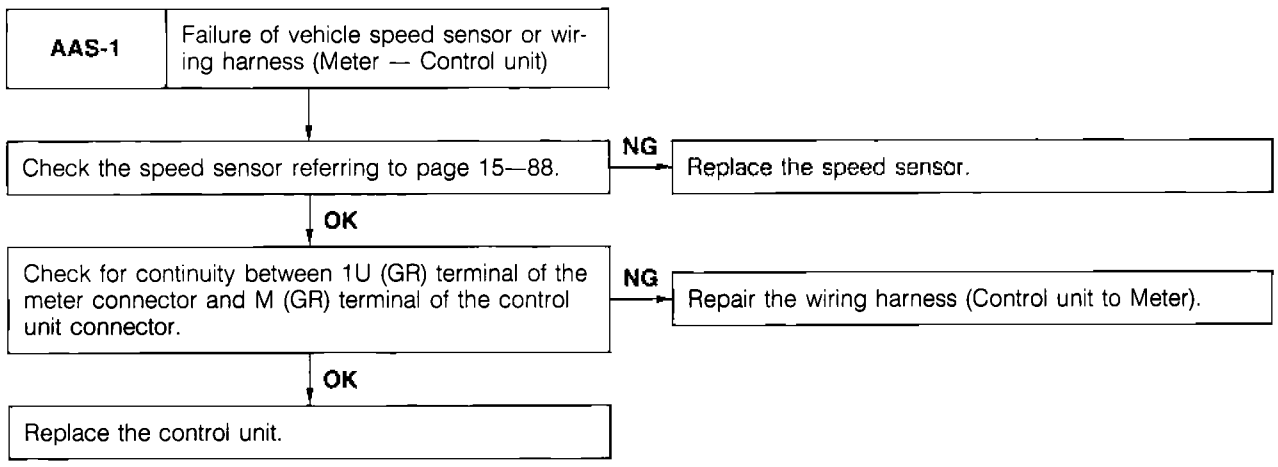
15 AUTO ADJUSTING SUSPENSION (AAS)

Condition	Output pattern	Malfunction	Flow chart No.
		Vehicle speed sensor or wiring harness (Meter — Control unit)	AAS-1 Refer to page 15—98
A Set steering wheel in straight ahead position		Steering wheel angle sensor or wiring harness (Angle sensor — Control unit)	AAS-2 Refer to page 15—98
		Normal operation or wiring harness (Fuse box — Control unit, control unit — Body ground)	AAS-3 Refer to page 15—99
		Vehicle speed sensor or wiring harness (Meter — Control unit)	AAS—1 Refer to page 15—98
B Turn the steering wheel right and left		Normal operation	—
		Wiring harness (Fuse box — Control unit, Control unit — Body ground) See page	AAS-4 Refer to page 15—99
		Normal operation	—
C Change the switch from NORMAL to SPORT or from SPORT to NORMAL		Front actuators or wiring harness (Control unit — Front right or left actuator	AAS-5 Refer to page 15—100
		Rear actuators or wiring harness (Control unit — Rear right or left actuator	AAS-6 Refer to page 15—101

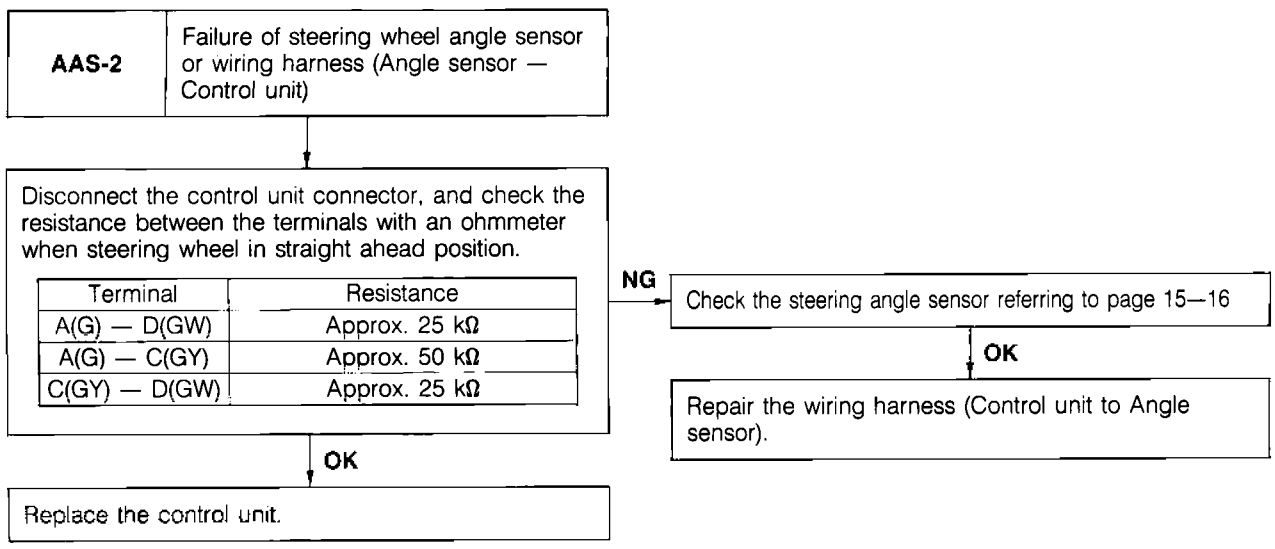
C (Cont'd)		AAS switch or wiring harness (Fuse box — Control box and AAS switch, AAS switch — Control box and Body ground)	AAS—7 Refer to page 15—102
D Operate the vehicle at above 15 km/h (9.3 mph) on a chassis roller		Normal operation	—
		Speed sensor or Steering wheel angle sensor or wiring harness (Control unit — Meter, Control unit — Angle sensor)	AAS-8 Refer to page 15—102
		Speed sensor or Wiring harness (Control unit — Meter, Fuse box — Control unit, Control unit — Body ground)	AAS-9 Refer to page 15—103

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Inspection of circuit



76G15X-081



76G15X-082

AAS-3	Normal operation or failure of the wiring harness (Fuse box to Control unit, Control unit to Body ground)

Check the voltage between each terminal of the control unit connector and a body ground with ignition ON.

Terminal	Voltage
G (B)	0V
J (B)	0V
K (BY)	Approx. 12V

OK → Normal operation.

NG

Replace TURN 15A fuse or repair the wiring harness (Fuse box to Control unit, Control unit to Body ground.)

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AAS-4	Failure of wiring harnesses (Fuse box to Control unit, Control unit to Body ground).

Check the voltage between each terminal of control unit connector and a body ground with ignition ON.

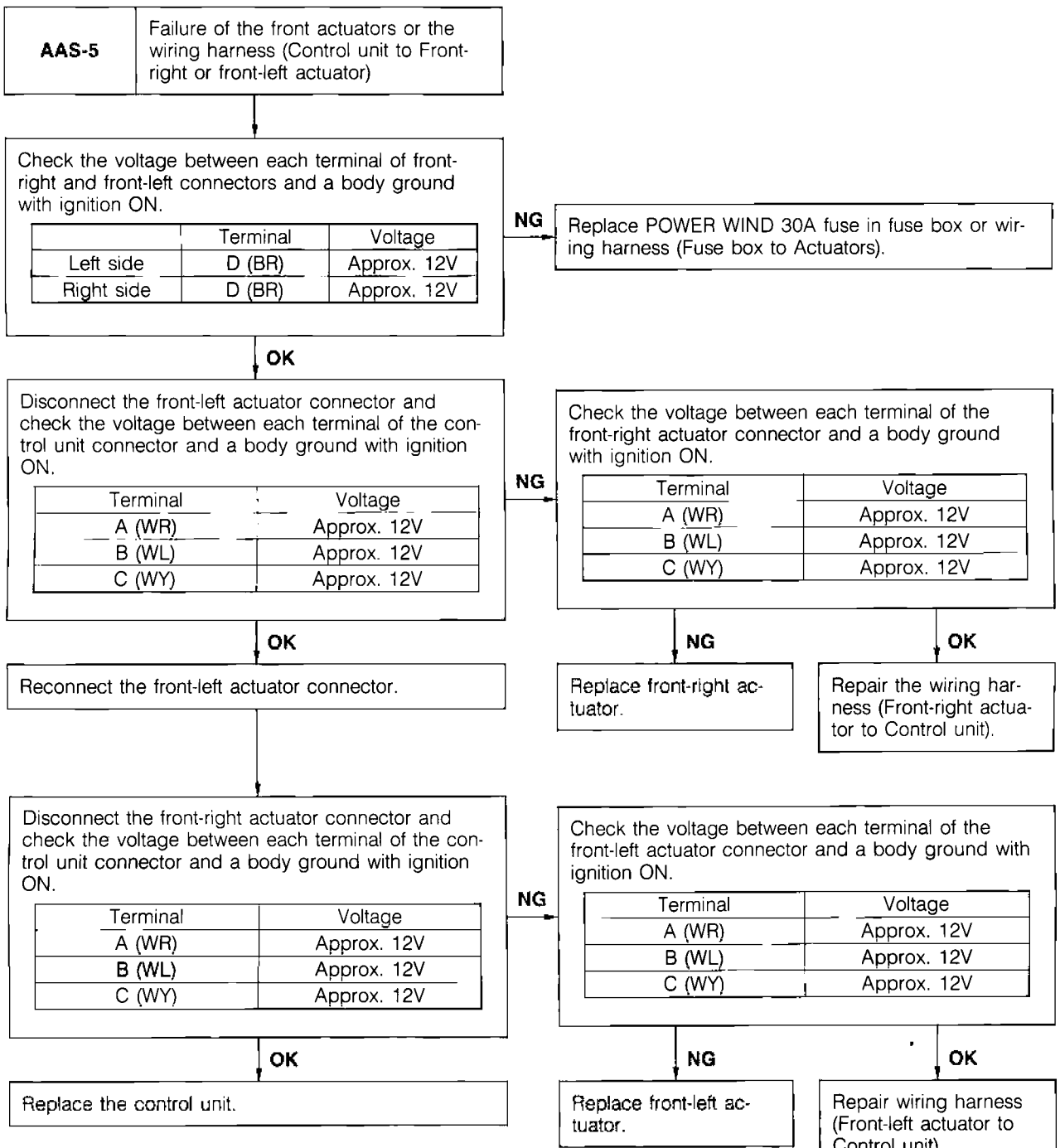
Terminals	Voltage
G (B)	0V
J (B)	0V
K (BY)	Approx. 12V

OK → Replace the control unit.

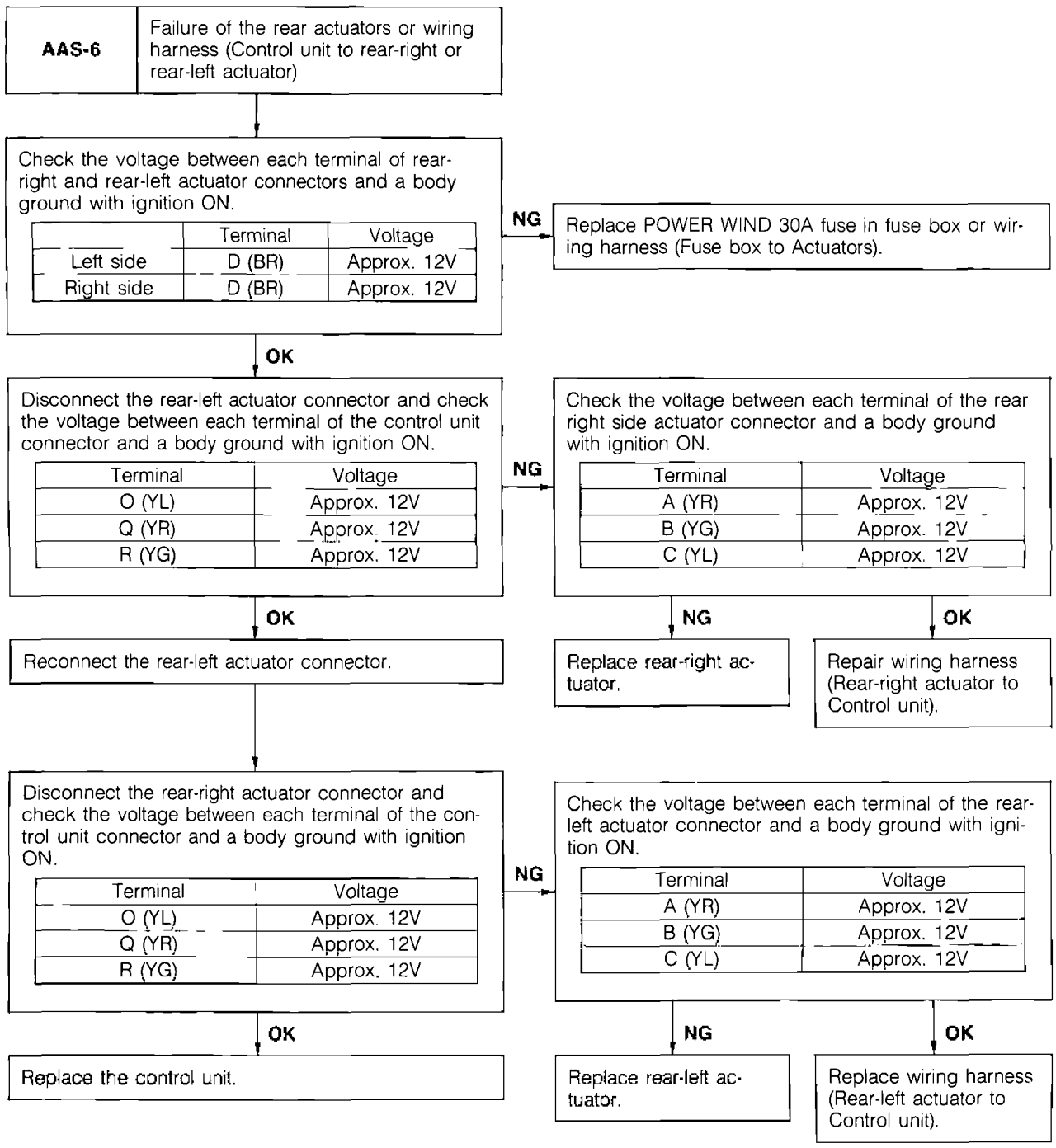
NG

Replace TURN 15A fuse or repair the wiring harnesses (Fuse box to Control unit, Control unit to Body ground.)

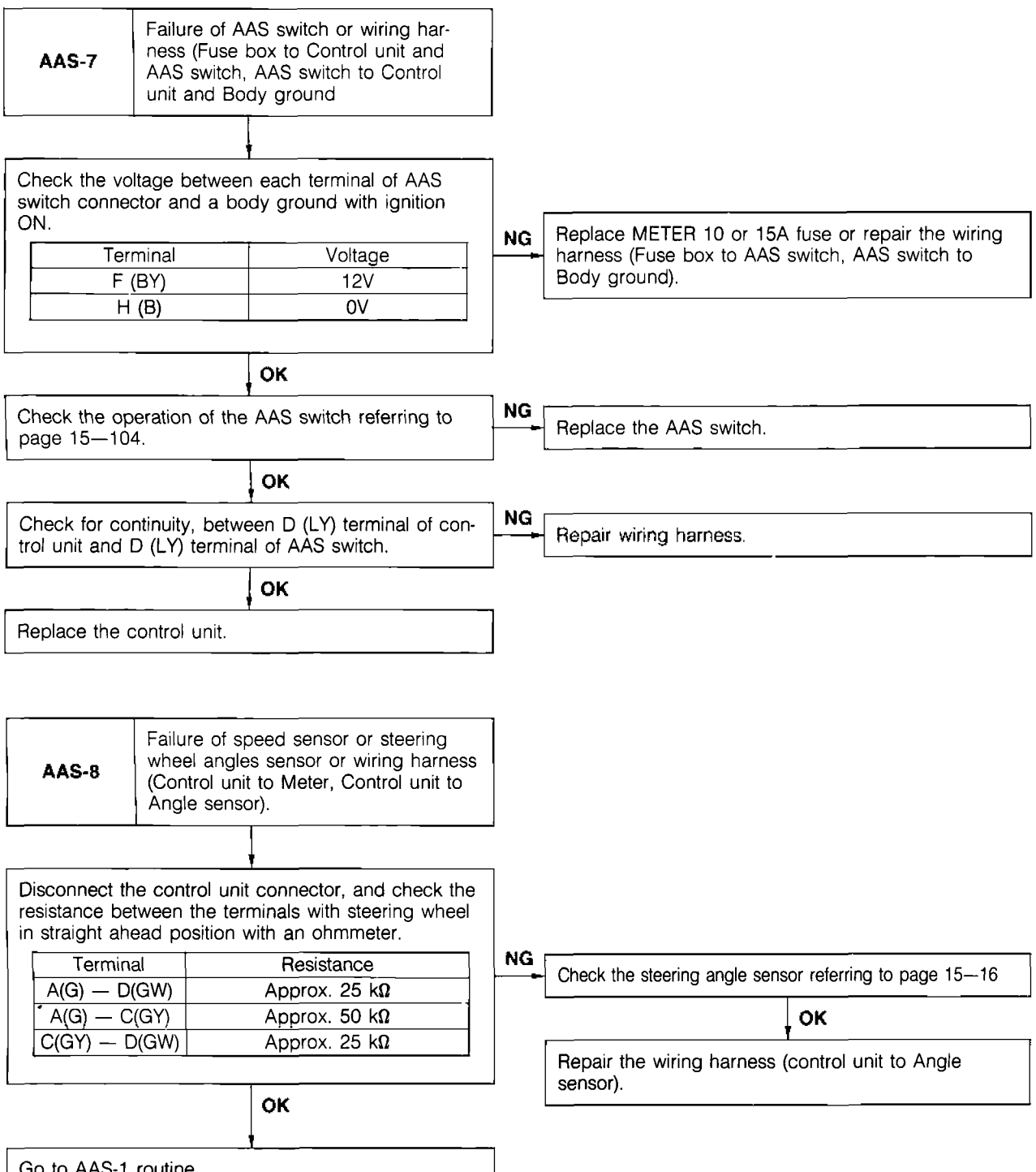
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AAS-5
Failure of the front actuators or the wiring harness (Control unit to Front-right or front-left actuator)
Check the voltage between each terminal of front-right and front-left connectors and a body ground with ignition ON.
Terminal
Voltage
Left side
D (BR)
Approx. 12V
Right side
D (BR)
Approx. 12V
NG
Replace POWER WIND 30A fuse in fuse box or wiring harness (Fuse box to Actuators).
OK
Disconnect the front-left actuator connector and check the voltage between each terminal of the control unit connector and a body ground with ignition ON.
Terminal
Voltage
A (WR)
Approx. 12V
B (WL)
Approx. 12V
C (WY)
Approx. 12V
NG
Check the voltage between each terminal of the front-right actuator connector and a body ground with ignition ON.
Terminal
Voltage
A (WR)
Approx. 12V
B (WL)
Approx. 12V
C (WY)
Approx. 12V
NG
Replace front-right actuator.
OK
Repair the wiring harness (Front-right actuator to Control unit).
OK
Reconnect the front-left actuator connector.
Disconnect the front-right actuator connector and check the voltage between each terminal of the control unit connector and a body ground with ignition ON.
Terminal
Voltage
A (WR)
Approx. 12V
B (WL)
Approx. 12V
C (WY)
Approx. 12V
NG
Check the voltage between each terminal of the front-left actuator connector and a body ground with ignition ON.
Terminal
Voltage
A (WR)
Approx. 12V
B (WL)
Approx. 12V
C (WY)
Approx. 12V
NG
Replace front-left actuator.
OK
Repair wiring harness (Front-left actuator to Control unit).
OK
Replace the control unit.

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AAS-6
Failure of the rear actuators or wiring harness (Control unit to rear-right or rear-left actuator)
Check the voltage between each terminal of rear-right and rear-left actuator connectors and a body ground with ignition ON.
Terminal
Voltage
Left side
D (BR)
Approx. 12V
Right side
D (BR)
Approx. 12V
NG
Replace POWER WIND 30A fuse in fuse box or wiring harness (Fuse box to Actuators).
OK
Disconnect the rear-left actuator connector and check the voltage between each terminal of the control unit connector and a body ground with ignition ON.
Terminal
Voltage
O (YL)
Approx. 12V
Q (YR)
Approx. 12V
R (YG)
Approx. 12V
NG
Check the voltage between each terminal of the rear right side actuator connector and a body ground with ignition ON.
Terminal
Voltage
A (YR)
Approx. 12V
B (YG)
Approx. 12V
C (YL)
Approx. 12V
NG
Replace rear-right actuator.
OK
Repair wiring harness (Rear-right actuator to Control unit).
OK
Reconnect the rear-left actuator connector.
Disconnect the rear-right actuator connector and check the voltage between each terminal of the control unit connector and a body ground with ignition ON.
Terminal
Voltage
O (YL)
Approx. 12V
Q (YR)
Approx. 12V
R (YG)
Approx. 12V
NG
Check the voltage between each terminal of the rear-left actuator connector and a body ground with ignition ON.
Terminal
Voltage
A (YR)
Approx. 12V
B (YG)
Approx. 12V
C (YL)
Approx. 12V
NG
Replace rear-left actuator.
OK
Replace wiring harness (Rear-left actuator to Control unit).
OK
Replace the control unit.

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AAS-7
Failure of AAS switch or wiring harness (Fuse box to Control unit and AAS switch, AAS switch to Control unit and Body ground
Check the voltage between each terminal of AAS switch connector and a body ground with ignition ON.
Terminal
Voltage
F (BY)
12V
H (B)
0V
NG
Replace METER 10 or 15A fuse or repair the wiring harness (Fuse box to AAS switch, AAS switch to Body ground).
OK
Check the operation of the AAS switch referring to page 15—104.
NG
Replace the AAS switch.
OK
Check for continuity, between D (LY) terminal of control unit and D (LY) terminal of AAS switch.
NG
Repair wiring harness.
OK
Replace the control unit.
AAS-8
Failure of speed sensor or steering wheel angles sensor or wiring harness (Control unit to Meter, Control unit to Angle sensor).
Disconnect the control unit connector, and check the resistance between the terminals with steering wheel in straight ahead position with an ohmmeter.
Terminal
Resistance
A(G) — D(GW)
Approx. 25 kΩ
A(G) — C(GY)
Approx. 50 kΩ
C(GY) — D(GW)
Approx. 25 kΩ
NG
Check the steering angle sensor referring to page 15—16
OK
Repair the wiring harness (control unit to Angle sensor).
OK
Go to AAS-1 routine.

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AAS-9	Failure of speed sensor or wiring harness (Control unit to Meter, Fuse box to Control unit, Control unit to Body ground)

↓

Check the voltage between each terminal of control unit connector and a body ground with ignition ON.

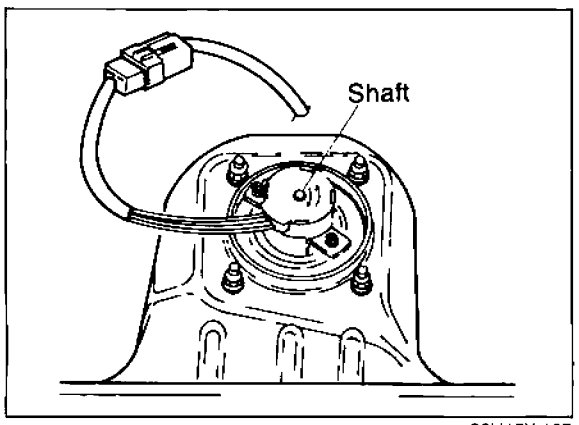
Terminal	Voltage
G (B)	0V
J (B)	0V
K (BY)	Approx. 12V

NG → Replace METER 10 or 15A fuse or repair the wiring harness (Fuse box to Control unit, Control unit to Body ground).

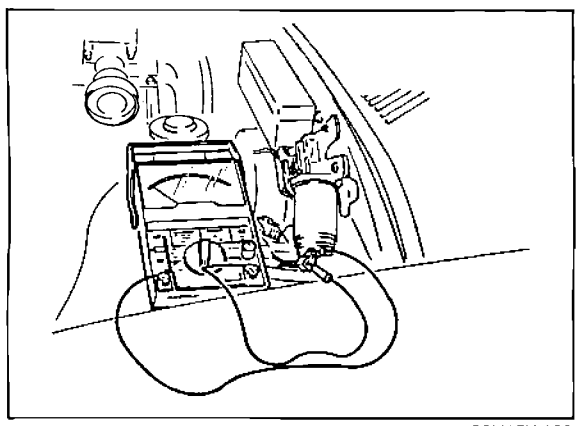
↓ **OK**

Go to AAS-1 routine.

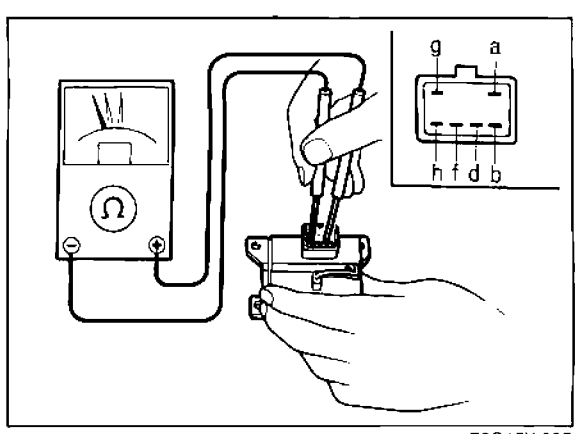
76G15X-084



86U15X-167



86U15X-168



76G15X-095

Actuator
Inspection

1. Turn the ignition switch ON.
2. Alternately switch ON the "NORMAL" and "SPORT" switches. Check whether the shaft of the actuator installed on the front and rear damper operates. (Visual inspection)
3. If the actuator does not operate, disconnect the actuator connector and check for a few ohms resistance between the terminals.

Terminal		Resistance
Front	A(WR) — D(BR)	2—8 (Ω)
	B(WL) — D(BR)	
	C(WR) — D(BR)	
Rear	A(YR) — D(BR)	
	B(YG) — D(BR)	
	C(YL)— D(BR)	

AAS Switch
Inspection

1. Use an ohmmeter to check continuity of the terminals of the switch.
2. If continuity is not as specified, replace the switch.

Position \ Terminal	a	b	d	f	g	h
SOFT	○—○			○—	—▶—	—○
NORMAL	○—○		○	○—	—▶—	—○
					—▶—	—○
SPORT	○—○		○	○—	—▶—	—○
					—▶—	—○

○—○: Indicates continuity

Steering Wheel Angle Sensor
Inspection

See page 15—16

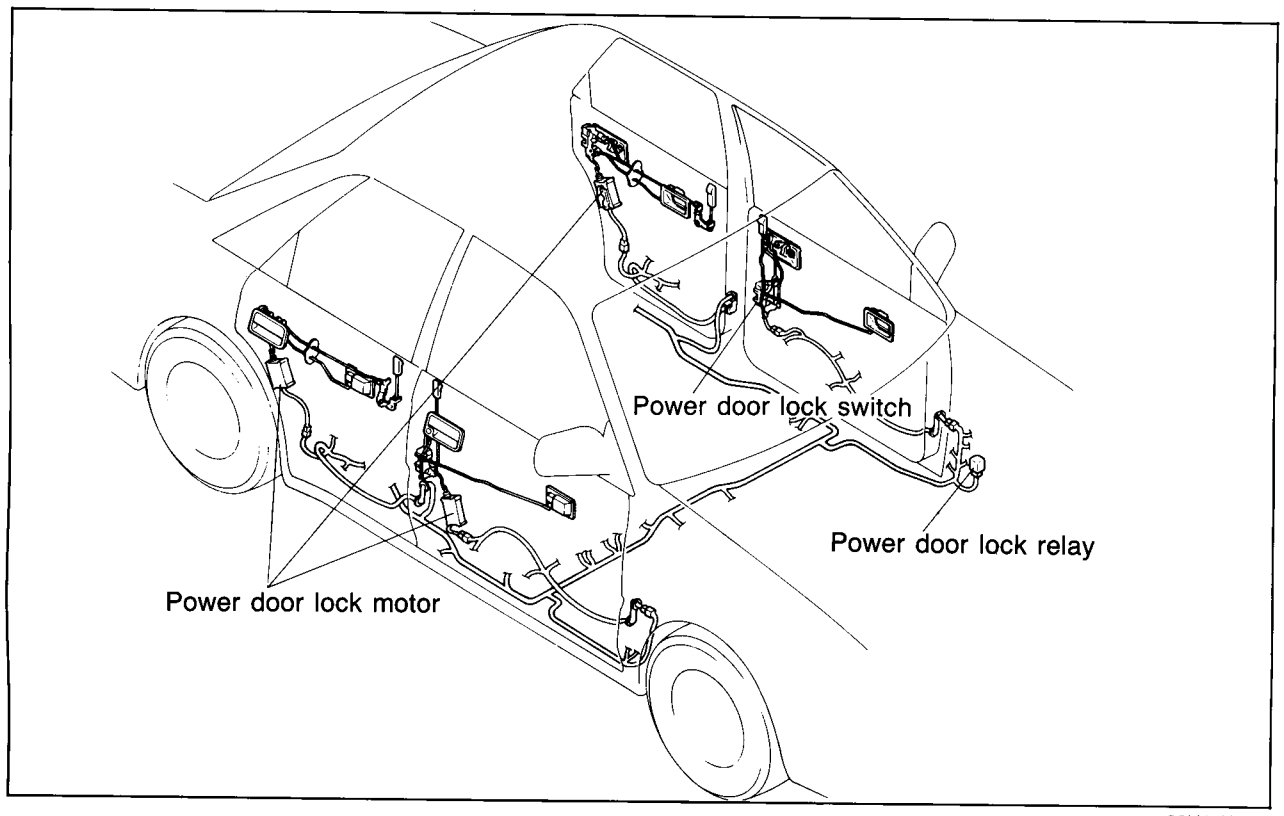
Vehicle Speed Sensor
Inspection

See page 15—88

76G15X-085

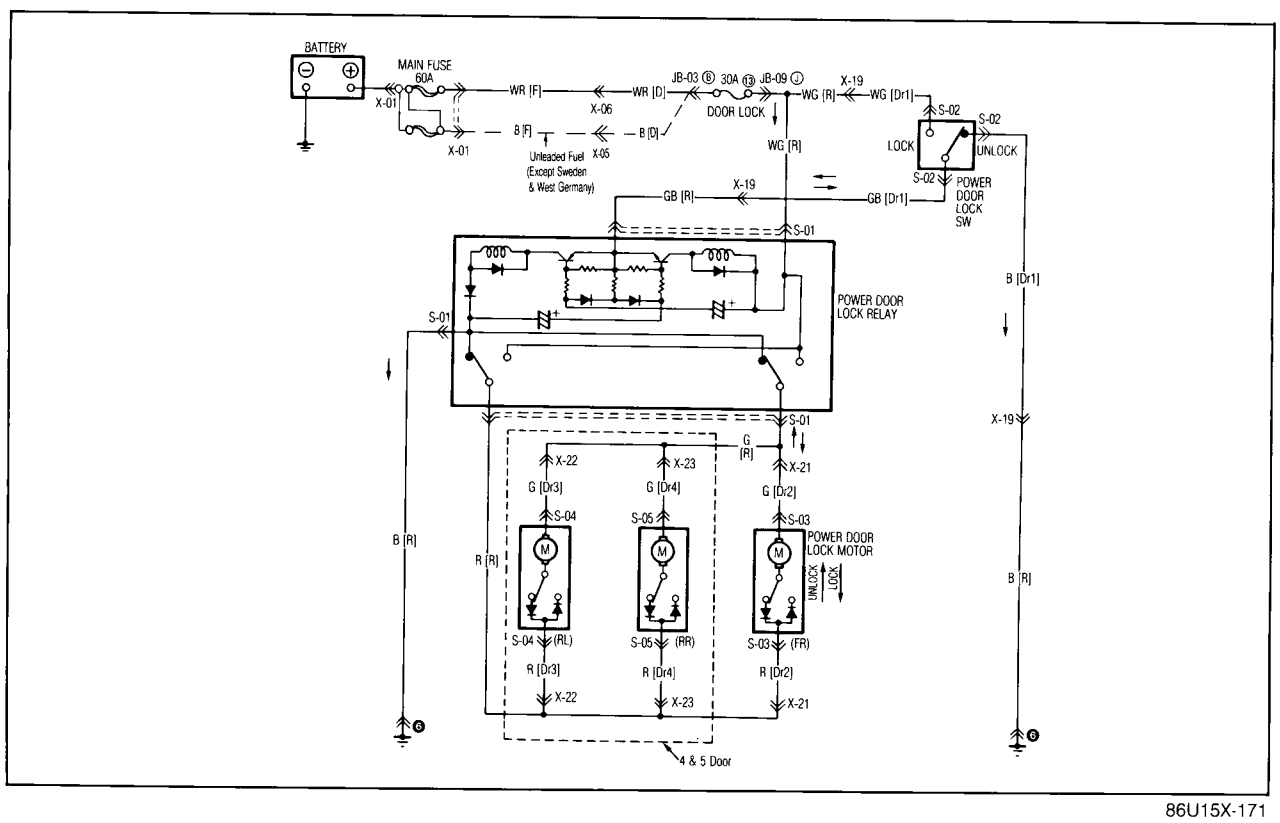
POWER DOOR LOCK

STRUCTURAL VIEW



86U15X-170

CIRCUIT DIAGRAM



86U15X-171

15 POWER DOOR LOCK

TROUBLESHOOTING

Power door lock does not operate.

Check DOOR LOCK 30A fuse.
- NG → Short circuit.
- OK ↓

Check the voltage at each terminal of the power door lock relay connector.

Terminal	Voltage
WG	12V
B	0V

- NG → Repair the harness. (Fuse box to relay, Relay to ground)
- OK ↓

Check the power door lock switch. Refer to page 15—107.
- NG → Replace the switch.
- OK ↓

Check the voltage at GB terminal of the power door lock relay with each switch condition.

Terminal	Condition	Voltage
GB	Lock	12V
	Unlock	0V

- NG → Repair the harness. (Door lock switch to relay)
- OK ↓

Check the voltage at R and G terminal of the power door lock relay with each switch condition.

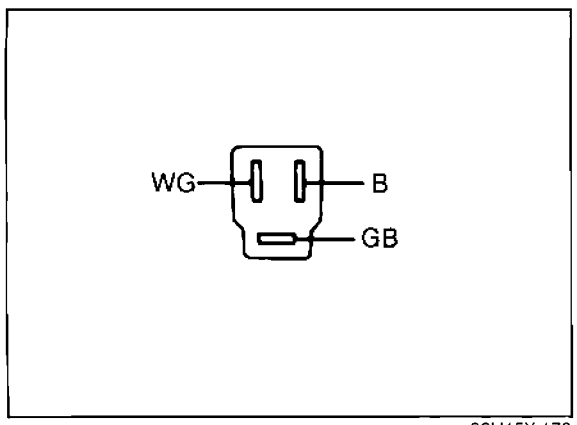
Terminal	Condition	Voltage
R	Lock	0V
	Unlock	12V
G	Lock	12V
	Unlock	0V

- NG → Replace the door lock relay.
- OK ↓

Check the power door lock motor. Refer to page 15—107.
- NG → Replace the door lock motor.
- OK ↓

Repair the harness. (Relay to each motors)

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86U15X-173

INSPECTION

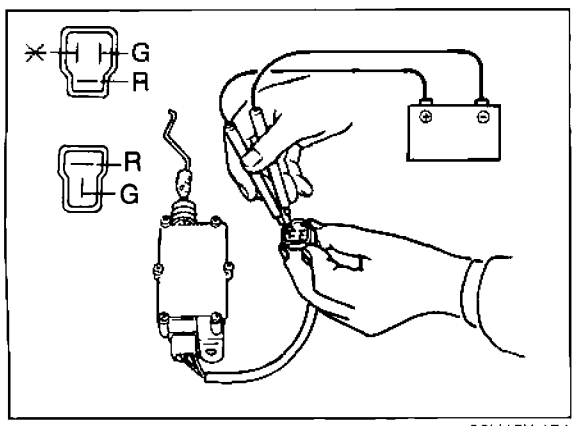
Power Door Lock Switch

1. Check for continuity of the switch with an ohmmeter.

	WG	GB	B
Lock	○——○	○——○	
Unlock		○——○	○——○

○——○: indicates continuity

2. If continuity is not as specified, replace the switch.



86U15X-174

Power Door Lock Motor

1. Check operation of the door lock actuator when the battery voltage is applied to the terminal.

Connecting to		Door lock motor
12V	ground	
G	R	LOCK (Pull)
R	G	UNLOCK (Release)

2. If not, replace the door lock motor.

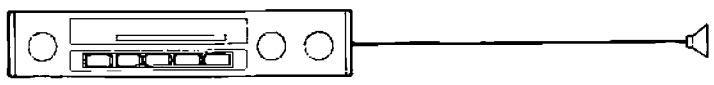
15 AUDIO SYSTEM

AUDIO SYSTEM

OUTLINE OF AUDIO

SYSTEM 1
AM RADIO (MTR)

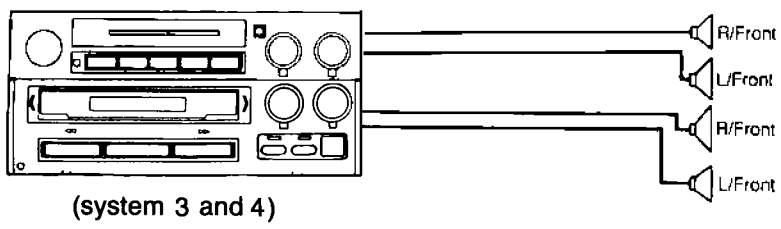
SYSTEM 2
AM/SW RADIO (MTR)



(system 1 and 2)

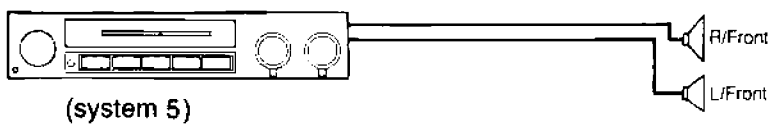
SYSTEM 3
AM RADIO (MTR) + CASSETTE TAPE PLAYER

SYSTEM 4
AM/SW RADIO (MTR) + CASSETTE TAPE PLAYER



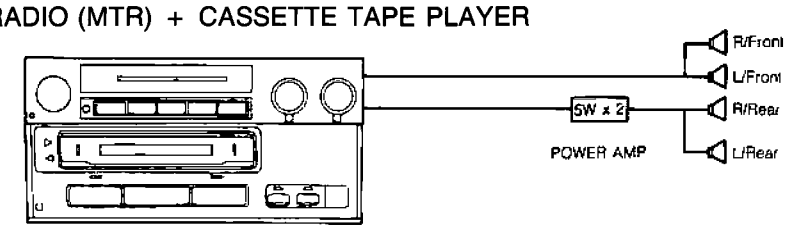
(system 3 and 4)

SYSTEM 5
AM/FM RADIO (MTR)



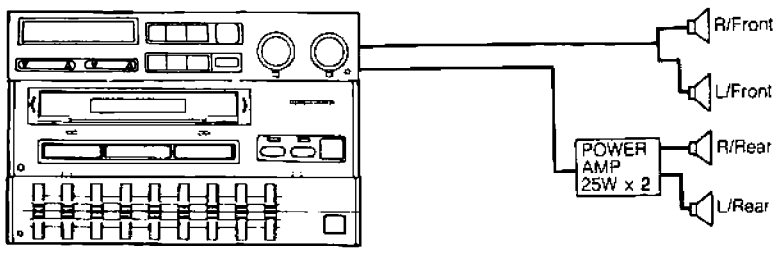
(system 5)

SYSTEM 6
AM/FM RADIO (MTR) + CASSETTE TAPE PLAYER



(system 6)

SYSTEM 7
AM/FM MULTIPLEX RADIO (ETR) + CASSETTE TAPE PLAYER + GRAPHIC EQUIALIZER

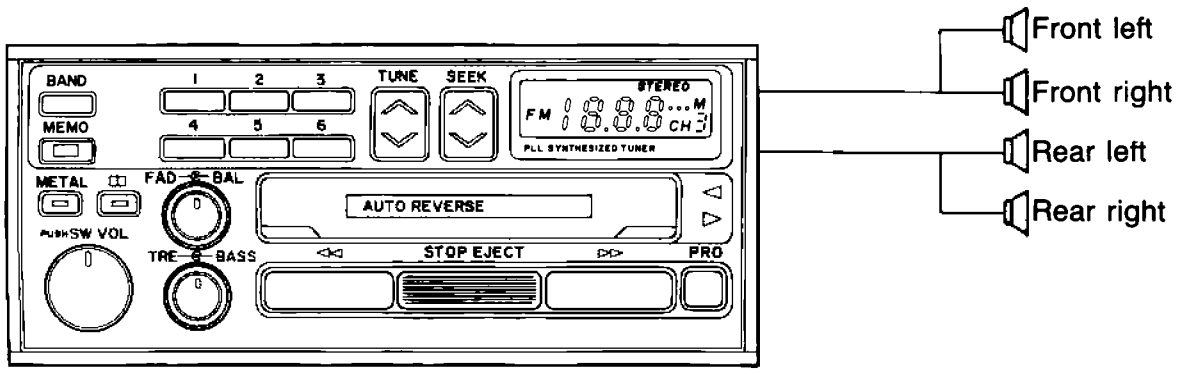


(system 7)

76G15X-021

SYSTEM 8
AM/FM/LW RADIO WITH CASSETTE TAPE PLAYER

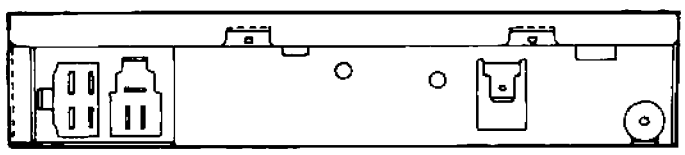
SYSTEM 9
AM/FM/SW RADIO WITH CASSETTE TAPE PLAYER

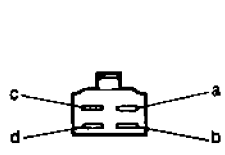


(system 8 and 9)

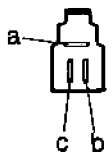
REAR CONNECTOR VIEW

AM/SW or AM RADIO (MTR)





a	Speaker-L ⊕
b	Speaker-L ⊖
c	Speaker-R ⊕
d	Speaker-R ⊖



a	
b	Illumination
c	Battery ⊕

76G15X-022

AM/FM MULTIPLEX RADIO (ETR)

a	Speaker-L ⊕
b	Speaker-L ⊖
c	Speaker-R ⊕
d	Speaker-R ⊖

To front speaker

a	Battery ⊕

a	Motor antenna (Earthed when radio is ON)
b	Illumination
c	ACC ⊕

To AMP

1	Output-F-R ⊕
2	Battery ⊕
3	Output-F-L ⊕
4	Output-F-R ⊖
5	Output-F-L ⊖
6	Ground
E	Shield ground

To AMP

To cassette deck or equalizer

1	Output-L ⊕
2	Input-L ⊕
3	ACC ⊕
4	Illumination
5	Signal ground
6	Input-R ⊕
7	Output-R ⊕
8	Not used
E	Shield ground

To cassette deck or equalizer

56G15X-085

AM/FM MULTIPLEX RADIO (MTR)

a	Antenna relay (Earth when radio is ON)
b	Illumination
c	Battery (ACC)

1	Output-R-R ⊕	Output-F-R ⊕
2	ACC ⊕	ACC ⊕
3	Output-R-L ⊕	Output-F-R ⊕
4	Output-R-R ⊖	Output-F-R ⊖
5	Output-R-L ⊖	Output-F-L ⊖
6	Ground	Ground
E	Shield ground	Shield ground

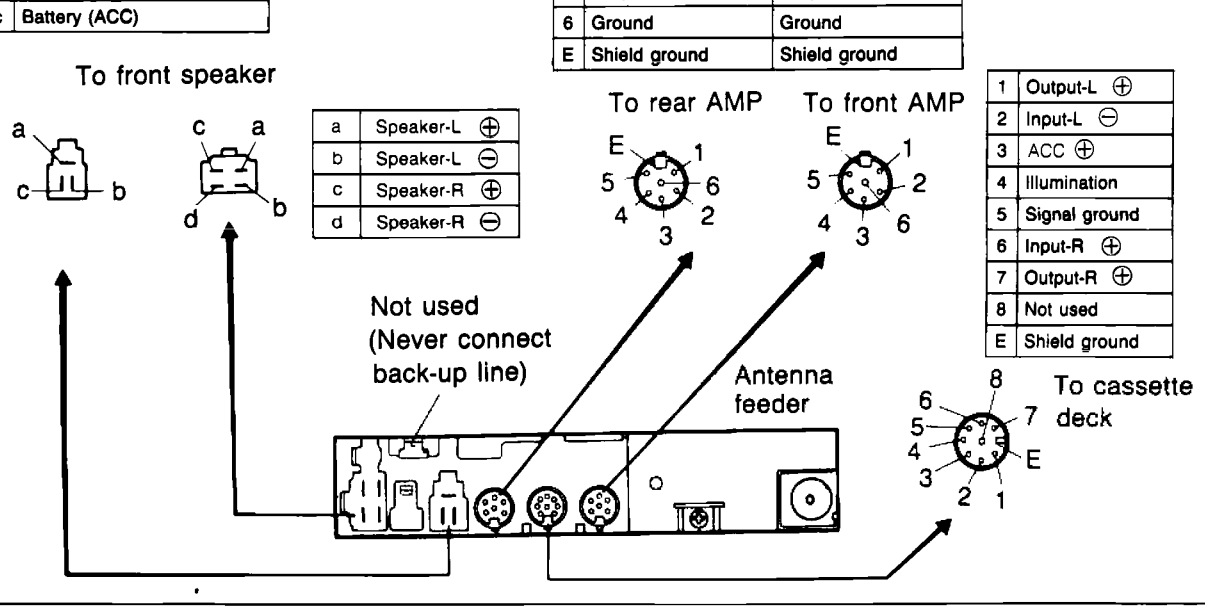
To front speaker

a	Speaker-L ⊕
b	Speaker-L ⊖
c	Speaker-R ⊕
d	Speaker-R ⊖

To rear AMP

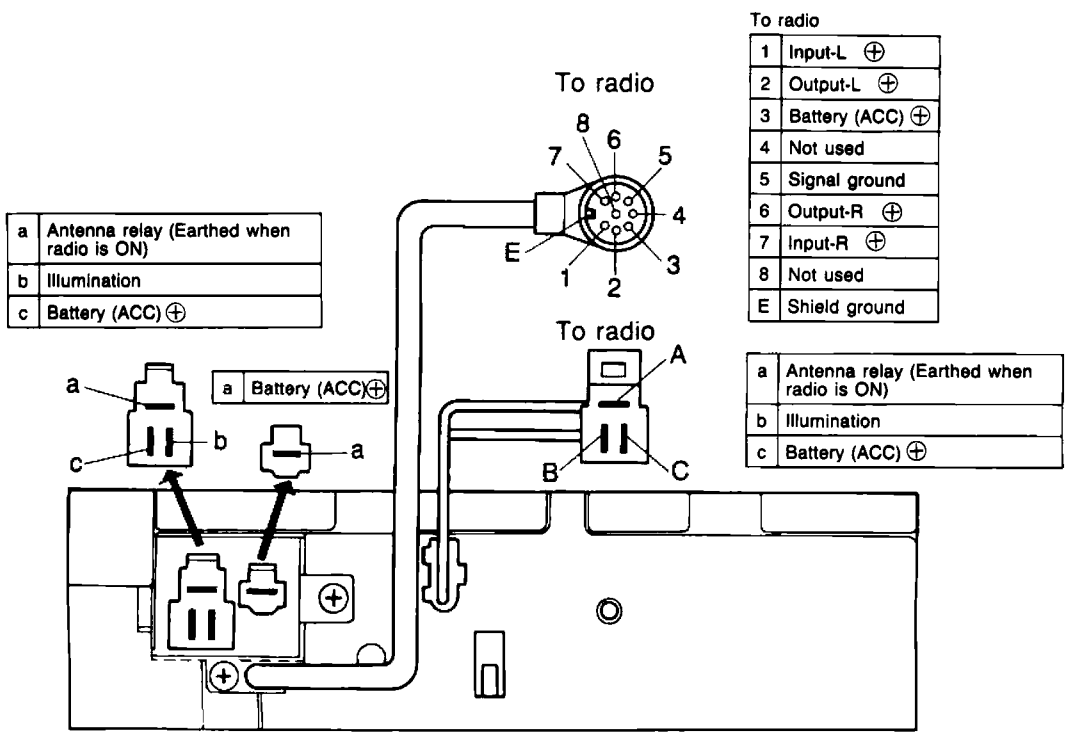
To front AMP

1	Output-L ⊕
2	Input-L ⊖
3	ACC ⊕
4	Illumination
5	Signal ground
6	Input-R ⊕
7	Output-R ⊕
8	Not used
E	Shield ground



56G15X-086

CASSETTE DECK



a	Antenna relay (Earthed when radio is ON)
b	Illumination
c	Battery (ACC) ⊕

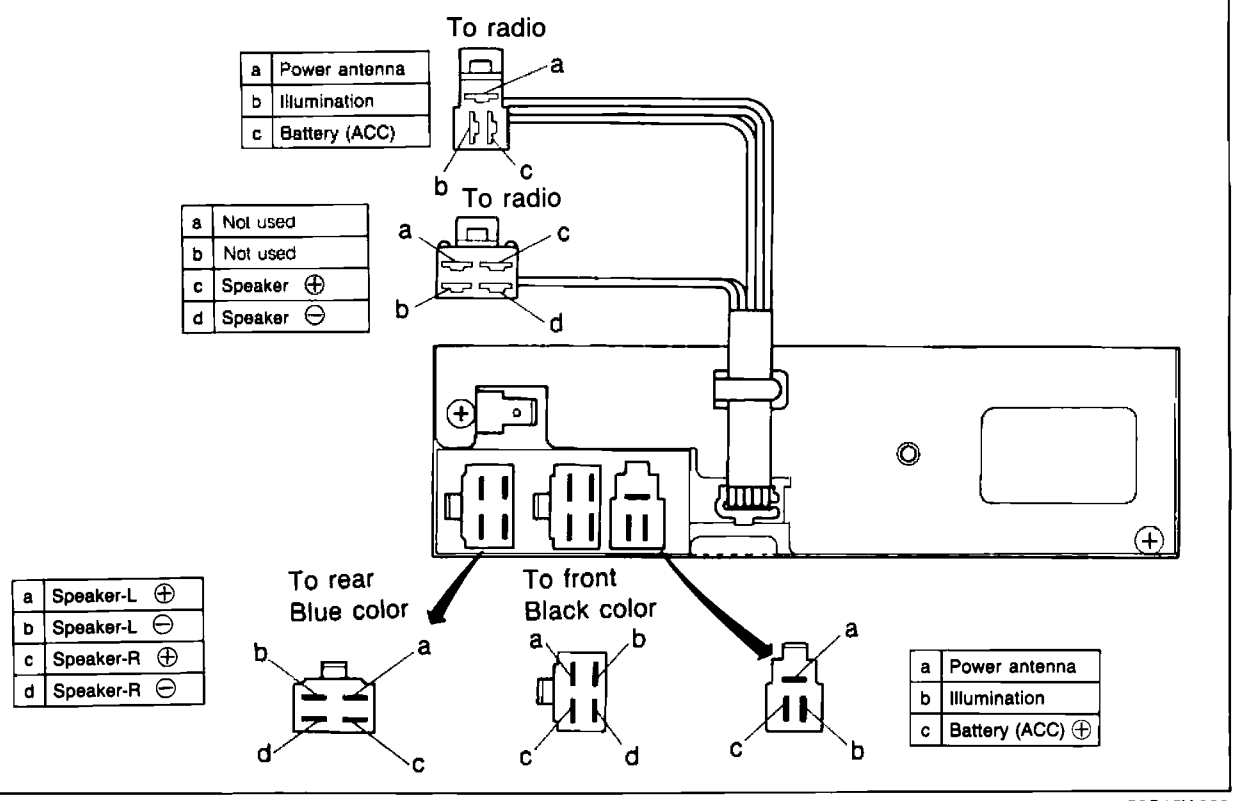
To radio

1	Input-L ⊕
2	Output-L ⊕
3	Battery (ACC) ⊕
4	Not used
5	Signal ground
6	Output-R ⊕
7	Input-R ⊕
8	Not used
E	Shield ground

a	Antenna relay (Earthed when radio is ON)
b	Illumination
c	Battery (ACC) ⊕

56G15X-088

CASSETTE DECK (SYSTEM 3 AND 4)



a	Power antenna
b	Illumination
c	Battery (ACC)

a	Not used
b	Not used
c	Speaker ⊕
d	Speaker ⊖

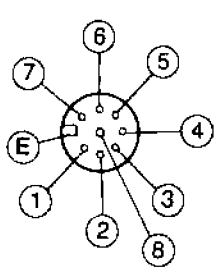
a	Speaker-L ⊕
b	Speaker-L ⊖
c	Speaker-R ⊕
d	Speaker-R ⊖

a	Power antenna
b	Illumination
c	Battery (ACC) ⊕

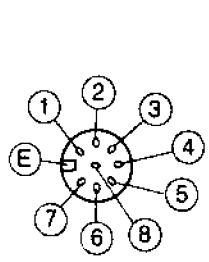
56G15X-089

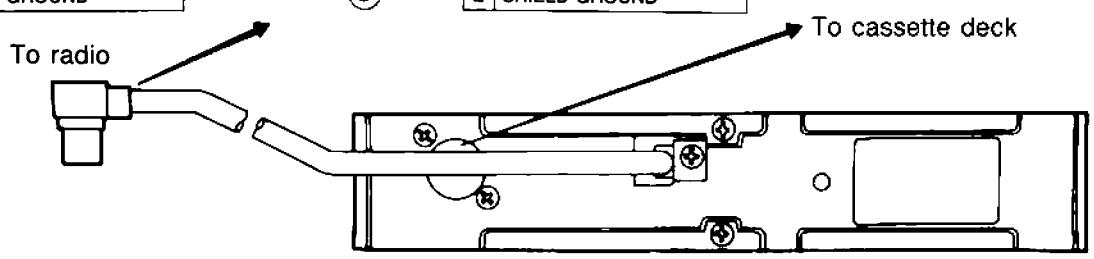
GRAPHIC EQUALIZER

1	INPUT-L ⊕
2	OUTPUT-L ⊕
3	BATTERY (ACC) ⊕
4	ILLUMINATION
5	SIGNAL GROUND
6	OUTPUT-R ⊕
7	INPUT-R ⊕
8	NOT USED
E	SHELD GROUND



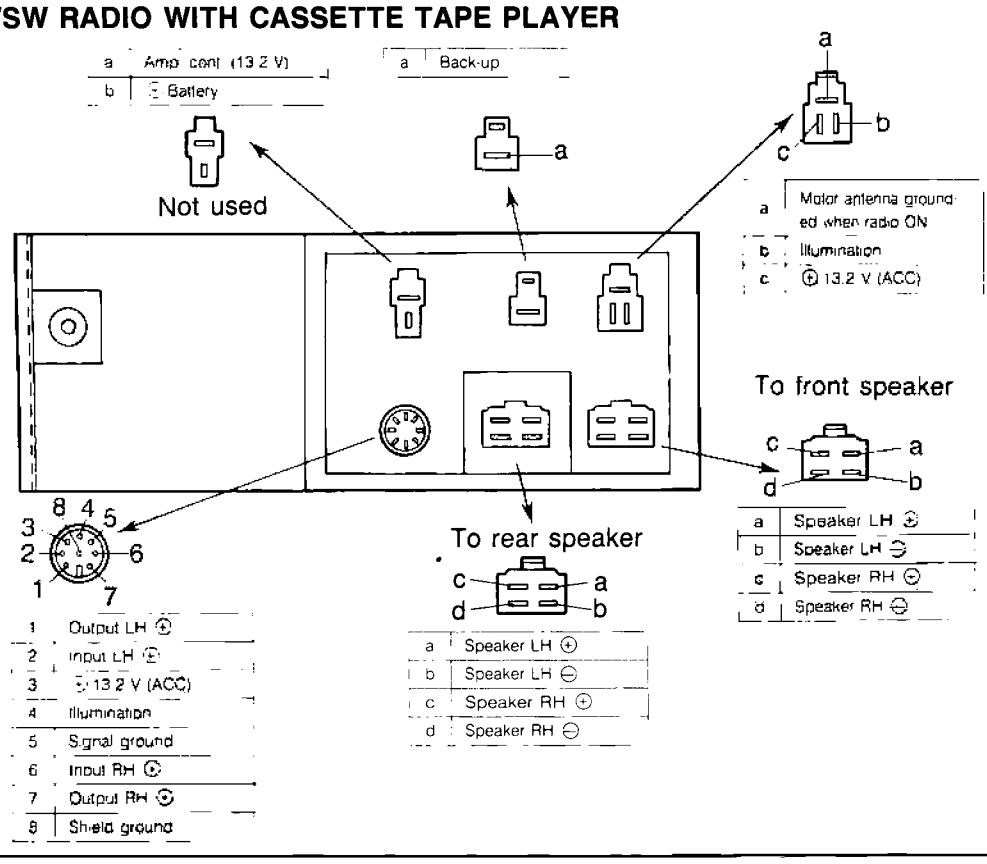
1	NOT USED
2	INPUT-L ⊕
3	BATTERY (ACC) ⊕
4	NOT USED
5	SIGNAL GROUND
6	INPUT-R ⊕
7	NOT USED
8	NOT USED
E	SHIELD GROUND





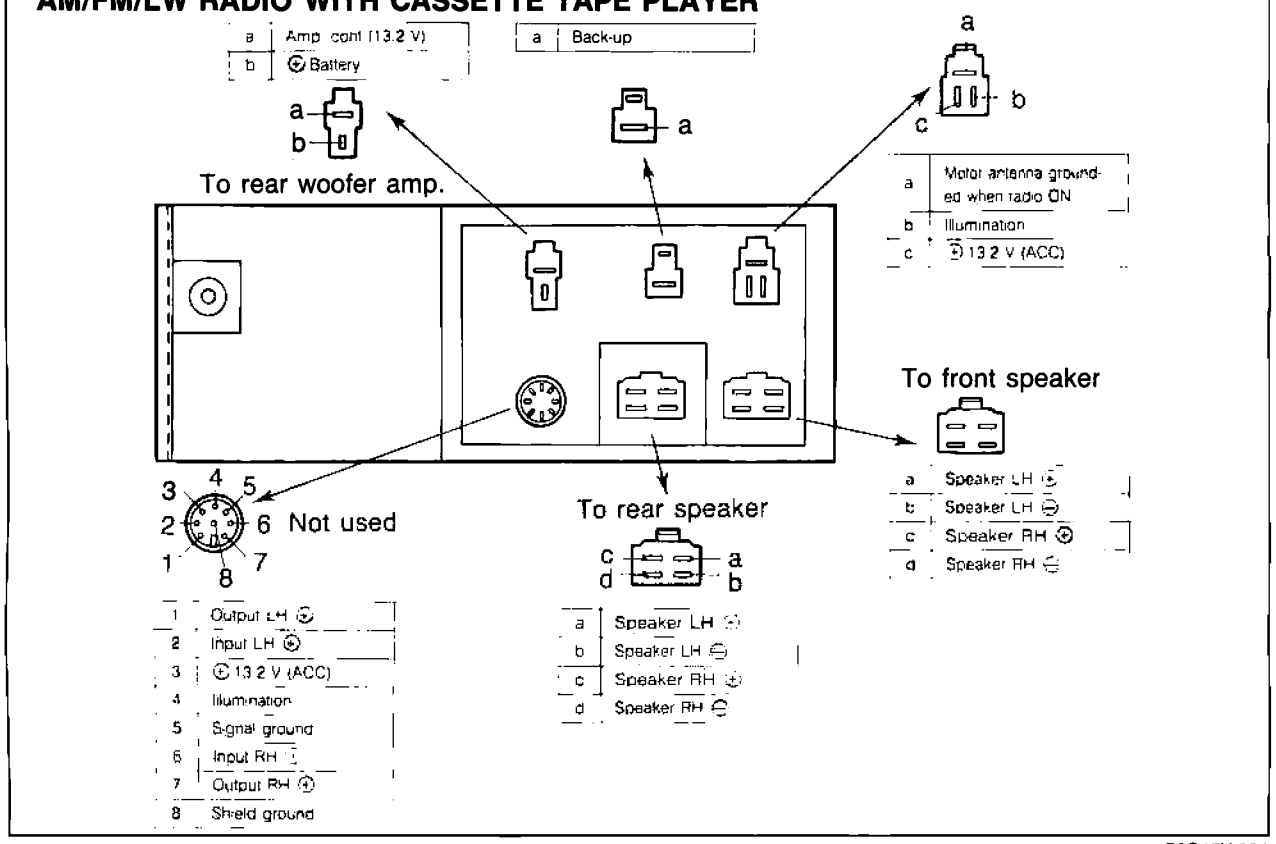
56G15X-091

AM/FM/SW RADIO WITH CASSETTE TAPE PLAYER

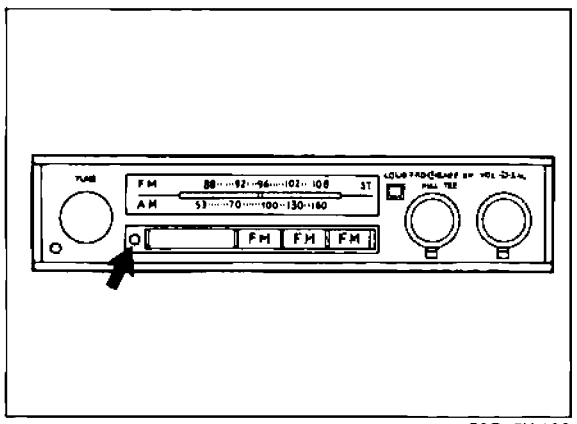


76G15X-023

AM/FM/LW RADIO WITH CASSETTE TAPE PLAYER



76G15X-024

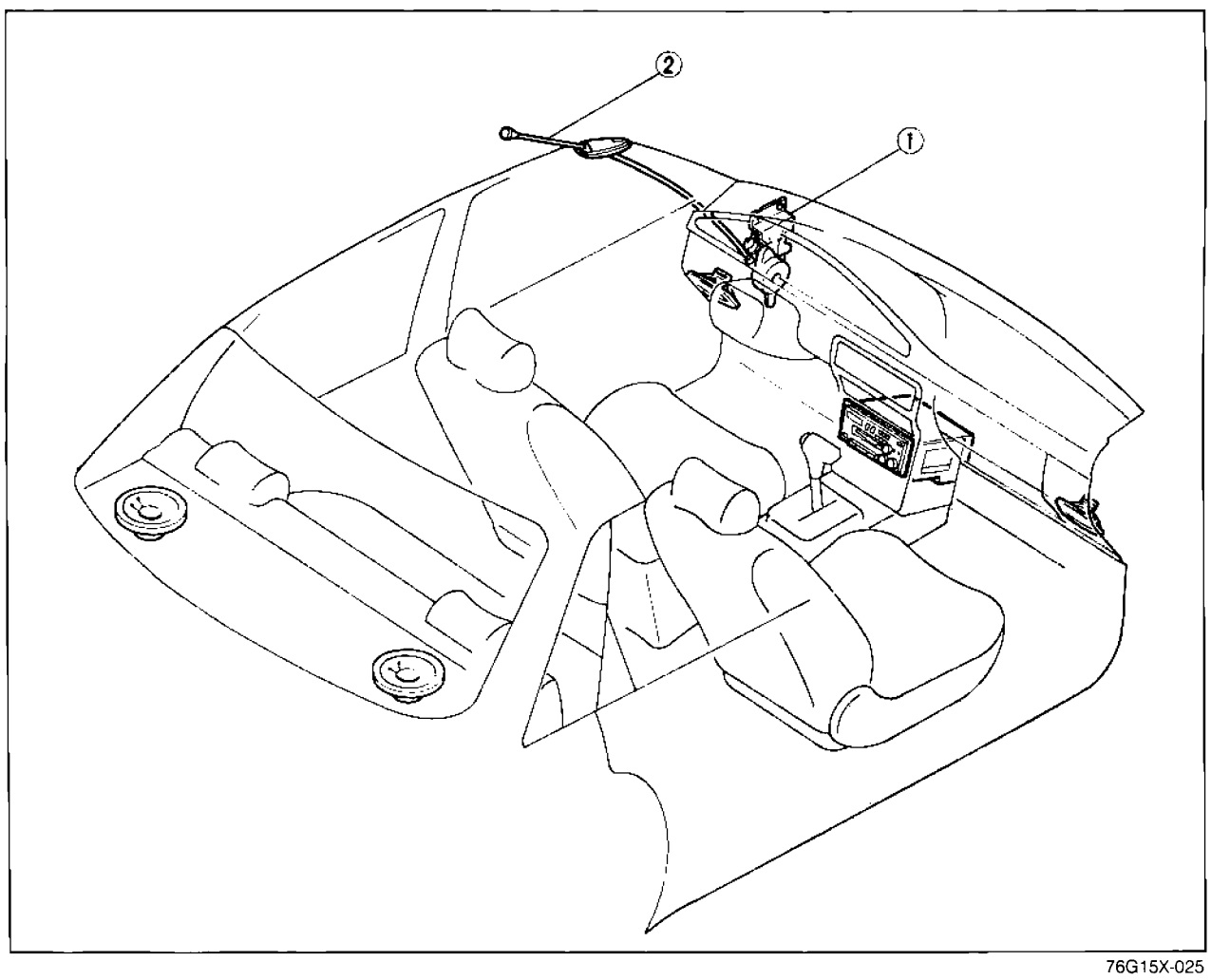


56G15X-106

ADJUSTMENT (MTR)
Antenna adjustment
Use the following adjustment procedure to obtain optimum antenna and radio reception sensitivity.
1. Extend the antenna fully.
2. Set the ignition key to ACC.
3. Turn on the radio, and set it to AM reception.
4. Tune in a distant station with a weak signal at around 1400 kHz. If such a station cannot be found, use static to make the adjustment.
5. Turn the antenna trimmer adjustment screw to the left and right to find the maximum sensitivity (of either the broadcast or the static).

Note
If there is no change in the sensitivity, either the tuned signal is too strong, or there is an antenna malfunction or broken wire.

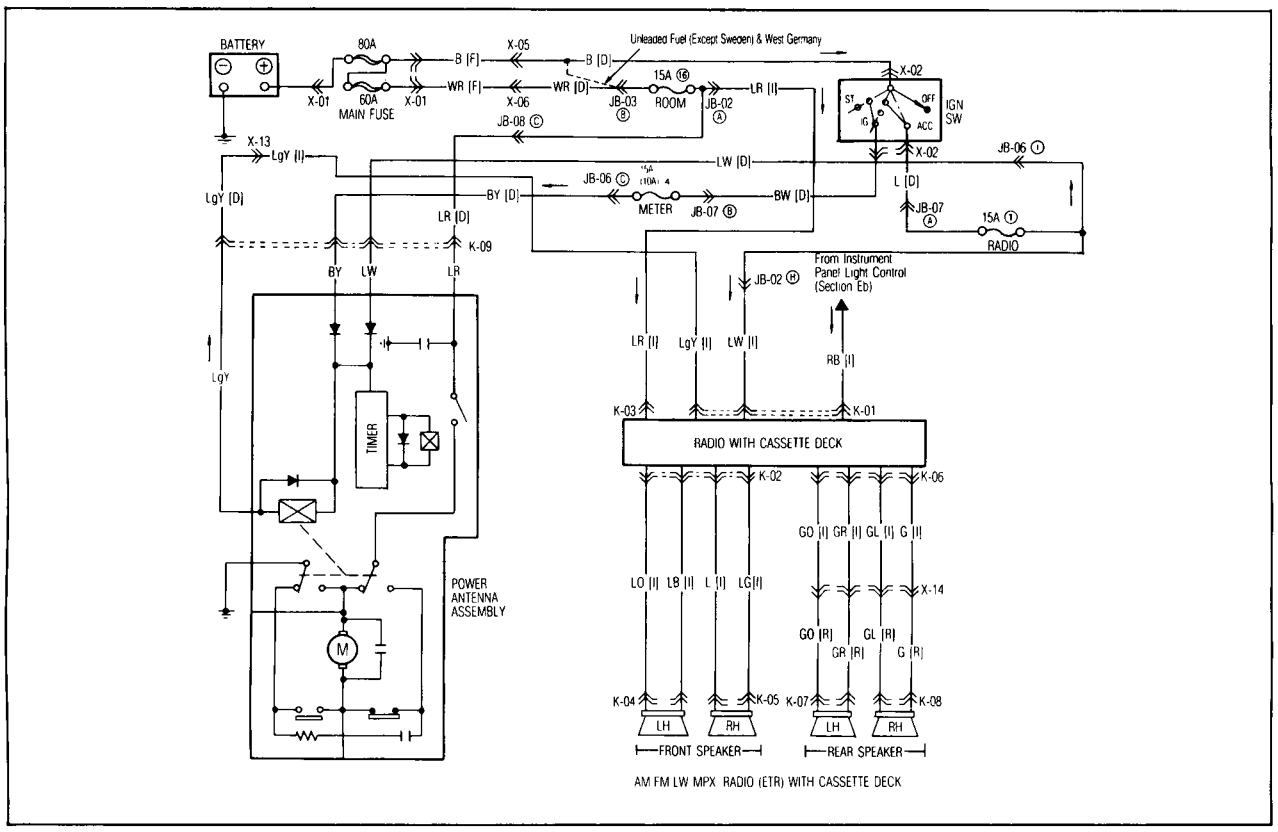
POWER ANTENNA
STRUCTURAL VIEW



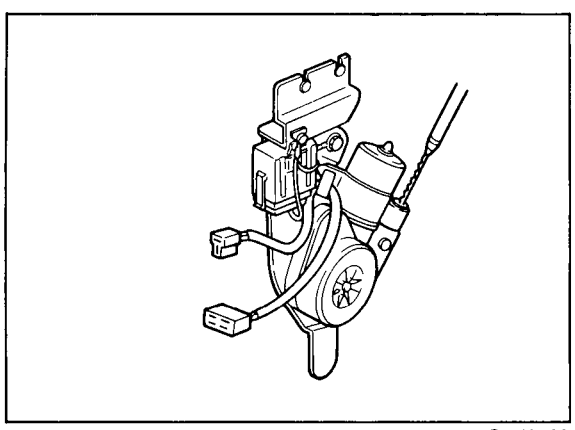
76G15X-025

1. Antenna motor
2. Antenna

Power Antenna Circuit



86U15X-194



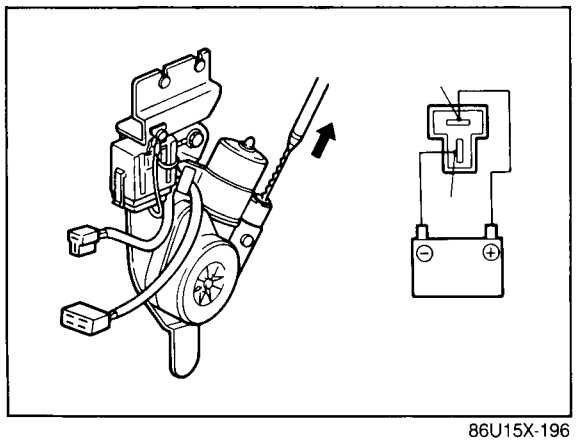
76G15X-096

Inspection Of Power Antenna Relay

1. Check the voltage at each terminal of the relay connector harness side with each condition.

Terminal	Condition	Voltage
LW	Ignition switch ACC	12V
BY	Ignition switch ON	12V
LgW	Ignition switch ACC and radio power switch ON	0V
LR	Any time	12V

If not, repair the harness.



86U15X-196

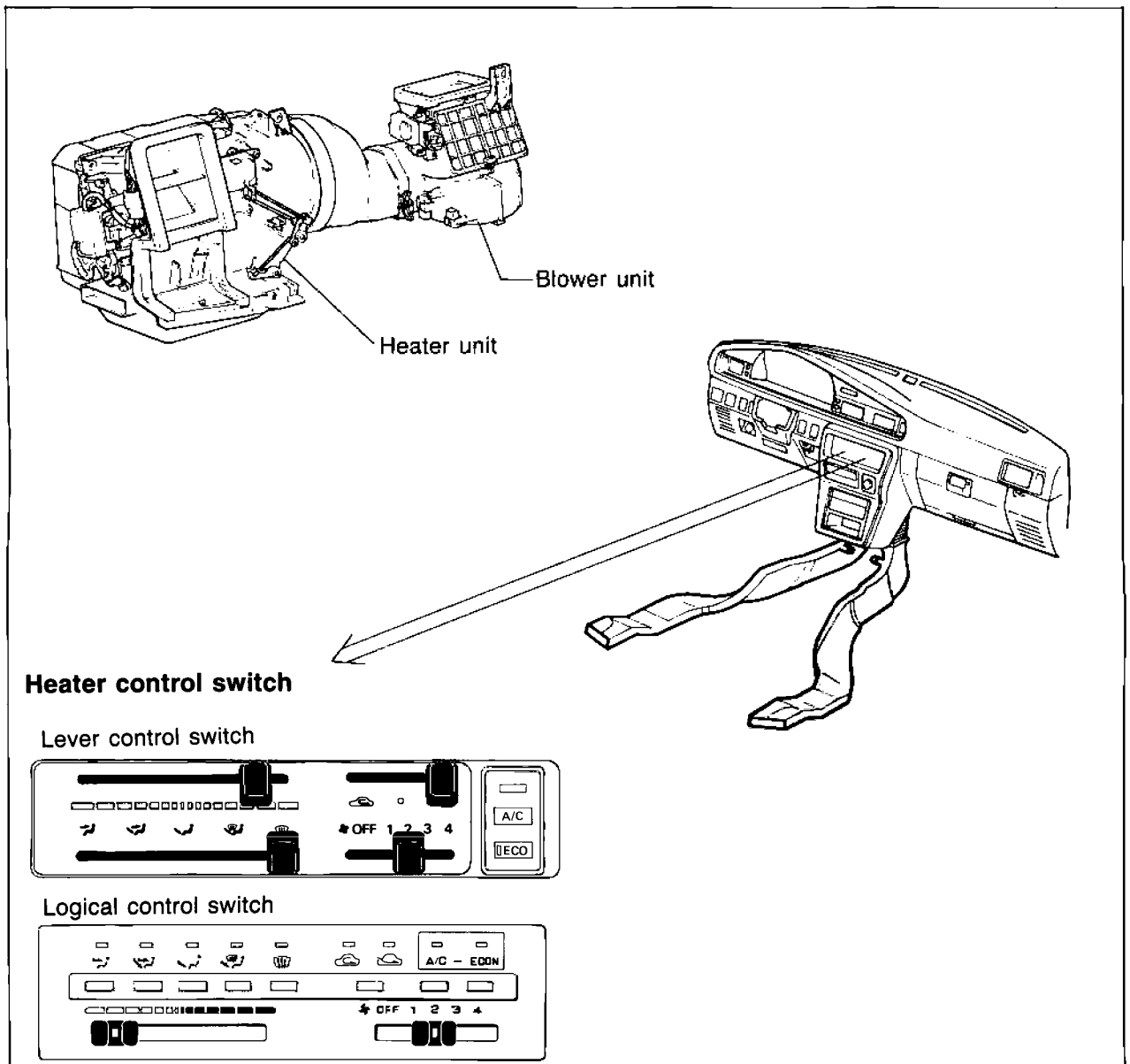
2. Turn the ignition switch on, and check the operation of the power antenna with each condition.

Condition	Antenna operation
GW wire is connected to a body ground	Rises
GW wire is not connected to a body ground	Goes down

If the power antenna does not operate, replace the power antenna relay or power antenna motor.

HEATER

STRUCTURAL VIEW

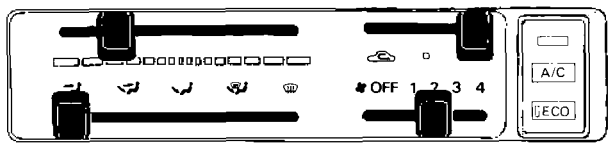


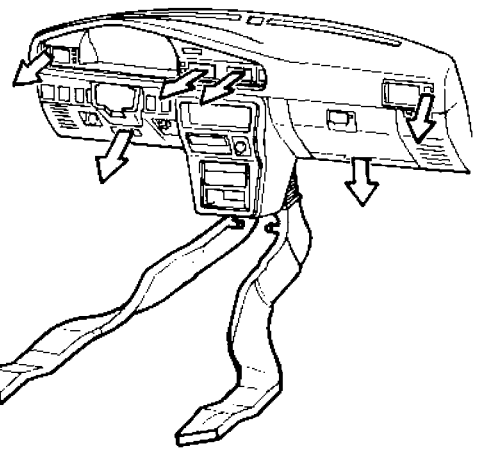
86U15X-197

AIR FLOW AT EACH MODE

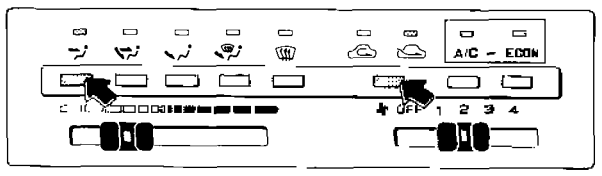
VENT mode

Type A





Type B

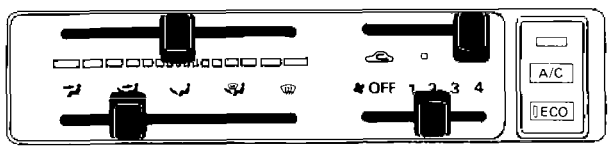


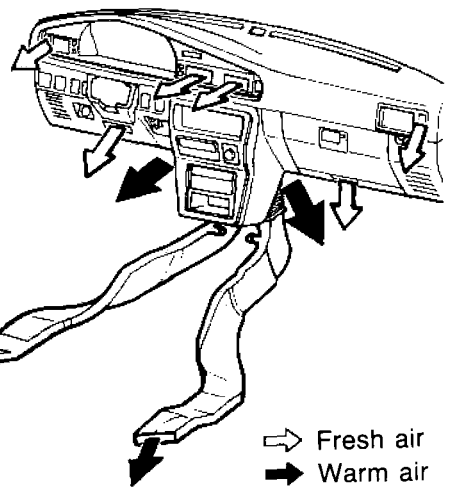
⇨ Fresh air

86U15X-198

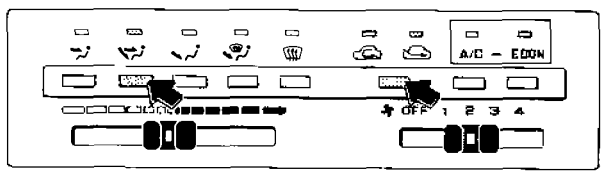
BI-LEVEL mode

Type A





Type B

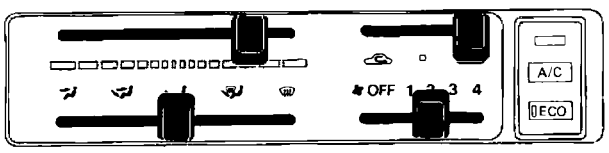


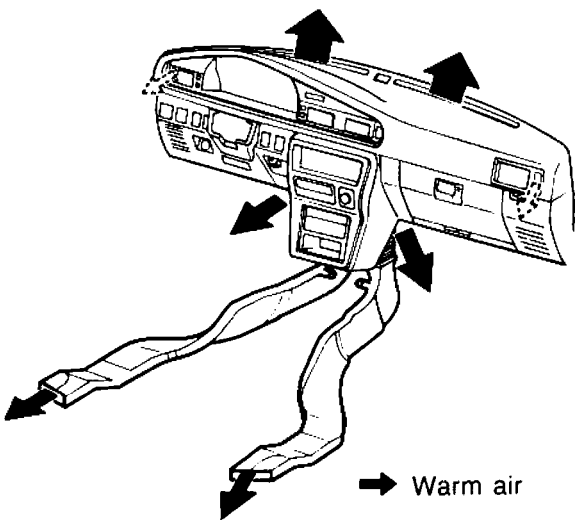
⇨ Fresh air
➡ Warm air

86U15X-199

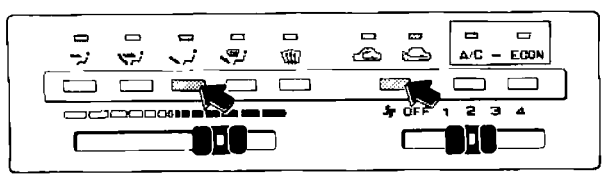
HEAT mode

Type A





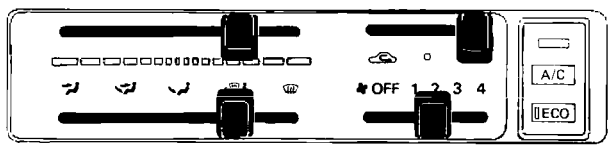
Type B

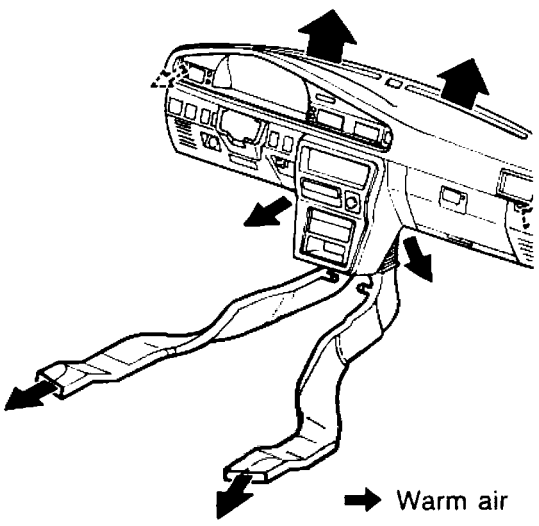


86U15X-200

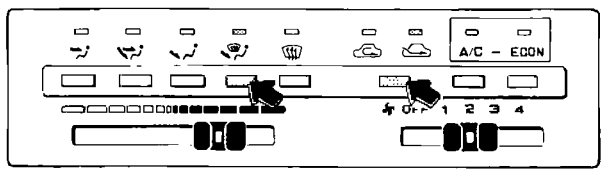
HEAT/DEF mode

Type A





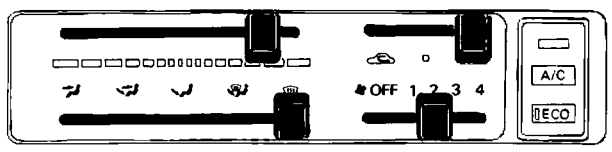
Type B

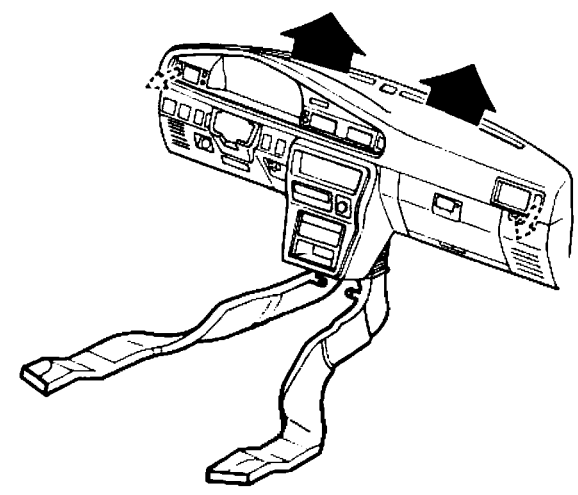


86U15X-201

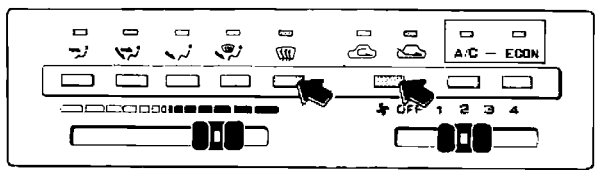
DEF mode

Type A





Type B



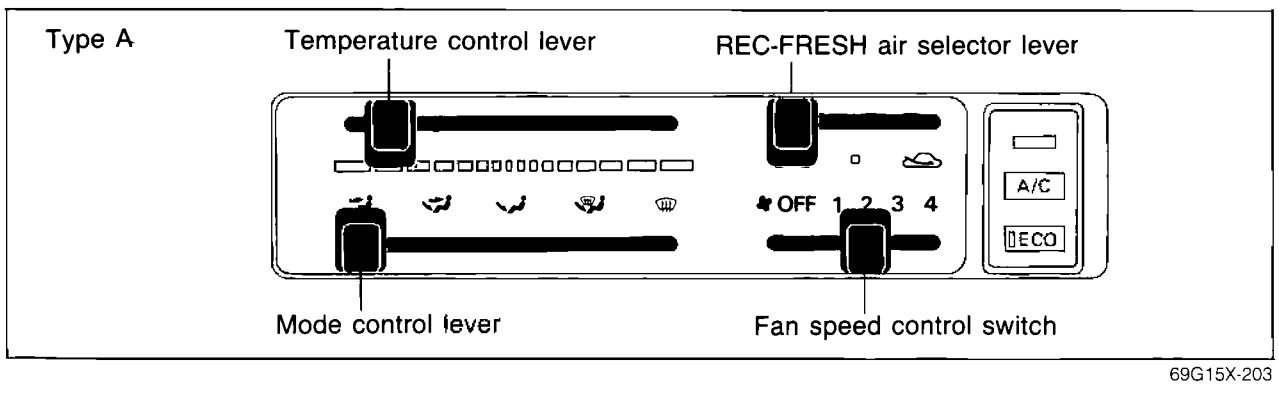
86U15X-202

RATE OF AIR FLOW

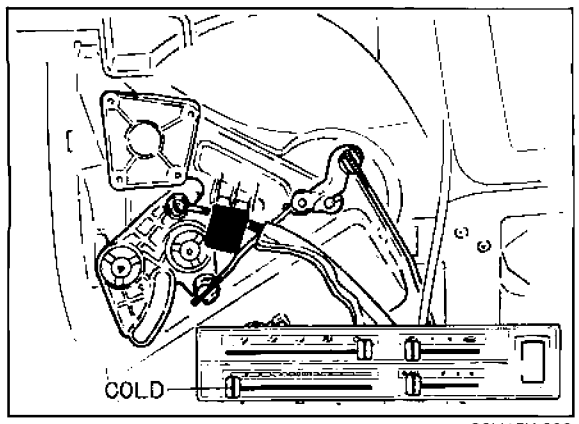
MODE	AIR	VENT OPEN	DEF OPEN	HEAT OPEN
VENT	FRESH	100%	—	—
BI-LEVEL	1/2 warm	50%	—	50%
HEAT	WARM	—	20%	80%
DEFROSTER/HEAT	WARM	—	50%	50%
DEFROSTER	WARM	—	100%	—

15 HEATER

LEVER CONTROL TYPE



69G15X-203



86U15X-203

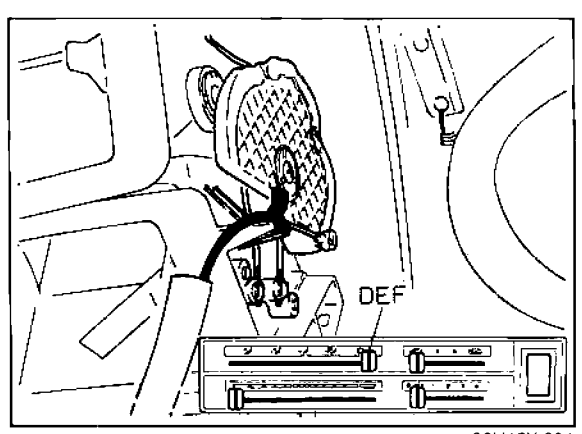
Adjustments

Air-mix door control wire

1. Set temperature control lever at MAX-COLD position.
2. Connect and clamp the control wire with the shutter lever on the heater unit all the way to the right side.

Caution

Move the temperature control lever to be sure the wire is attached. Also, be sure it can move the full stroke between HOT and COLD.



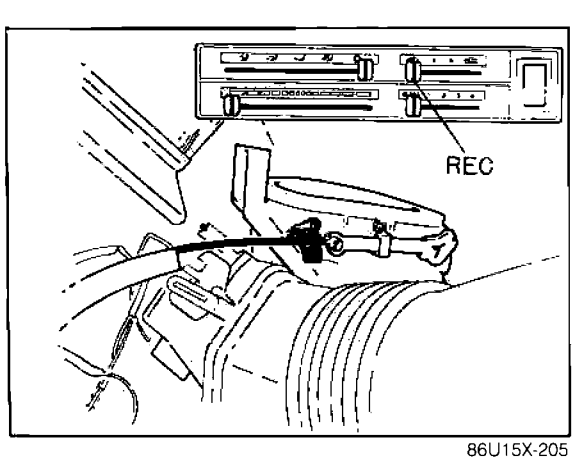
86U15X-204

Mode control wire

1. Set mode control lever to DEF position.
2. Connect and clamp the control wire with the shutter lever on the heater unit at its closest point.

Caution

Move the mode lever to be sure the wire is attached. Also, be sure it can move the full stroke between DEF and VENT.



86U15X-205

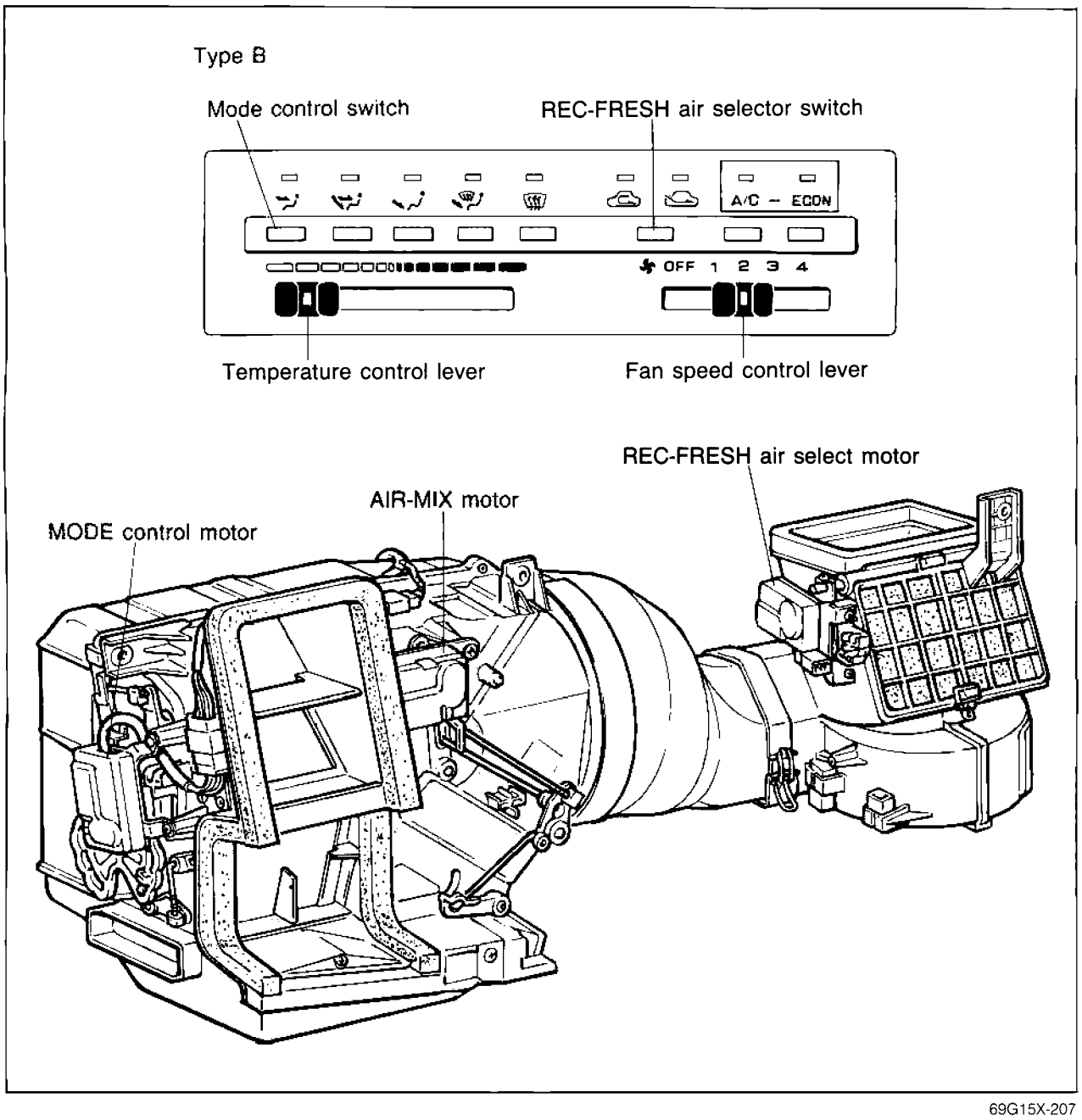
REC-FRESH air selector wire

1. Set the selector lever to REC position.
2. Connect and clamp the control wire with the shutter lever on the blower unit at its closest point.

Caution

Move the rec-fresh lever to be sure the wire is attached. Also, be sure it can move the full stroke between REC and FRESH.

LOGICAL CONTROL TYPE



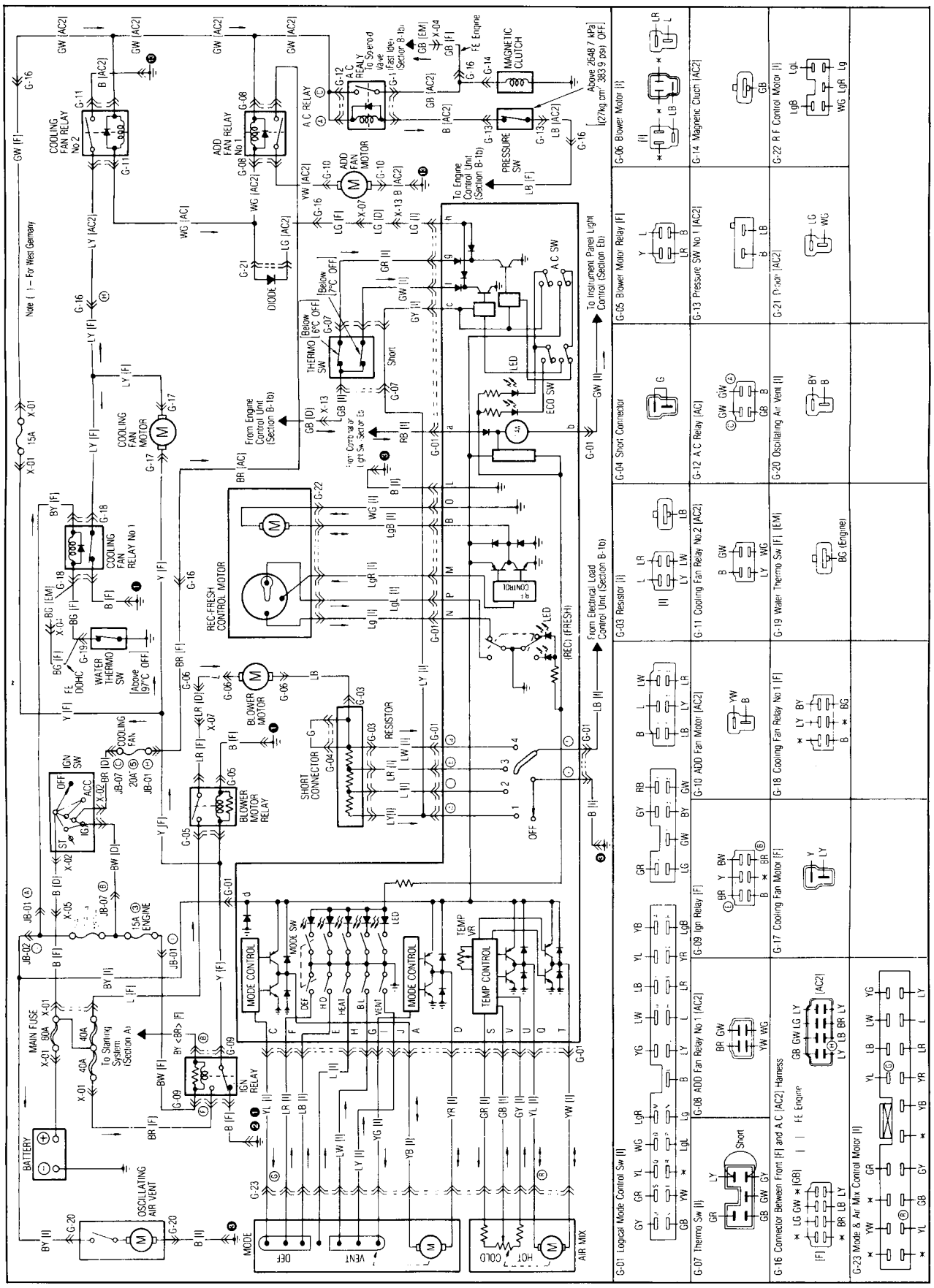
69G15X-207

Outline of Components

Part Name	Description
Logical control switch	One-touch, push type, mode control switch
MODE control motor	Controls air outlet for each mode Drives VENT, HEAT and DEF doors
AIR MIX motor	Controls air outlet temperature by operating the air mix doors
REC-FRESH air select motor	Controls intake air by driving the rec-fresh air select door

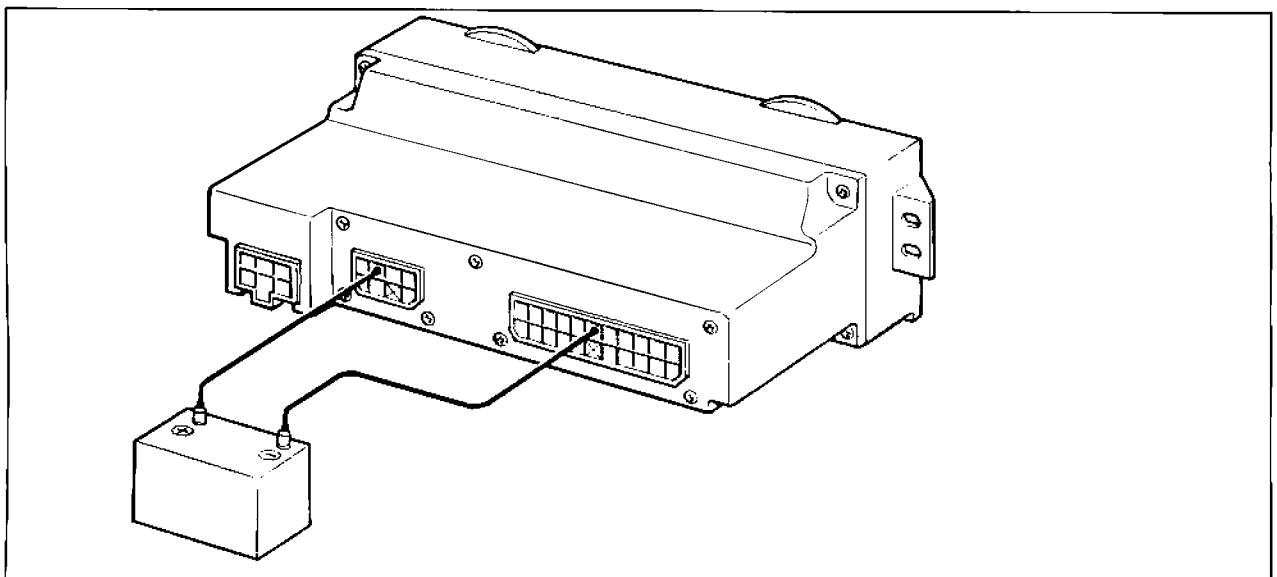
15 HEATER

Circuit Diagram



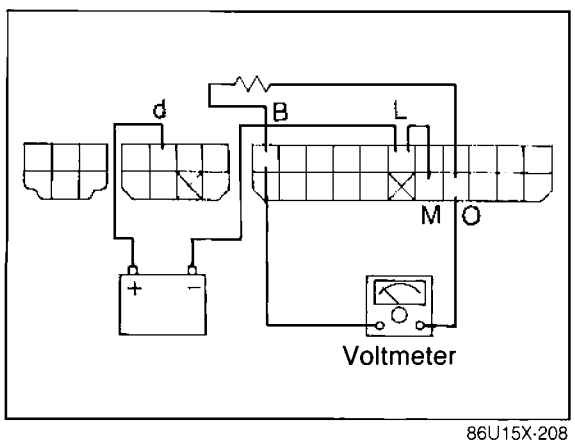
86U15X-206

LOGICON SWITCH
Inspection



Note
a) Remove the logicon switch from the vehicle.
b) Supply 12V as shown in the figure.
c) Check each circuit.

86U15X-207

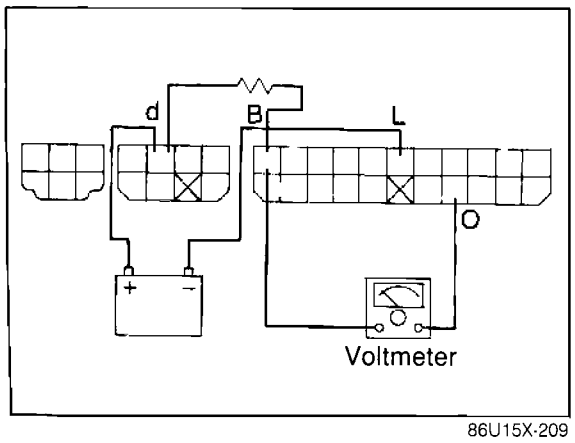


86U15X-208

Checking REC-FRESH Air Selector Circuit

1. Connect a jumper wire between M terminal and L terminal.
   Connect a resistance (at least 1 kΩ) between B terminal and O terminal, and check the voltage between these terminals using a voltmeter.

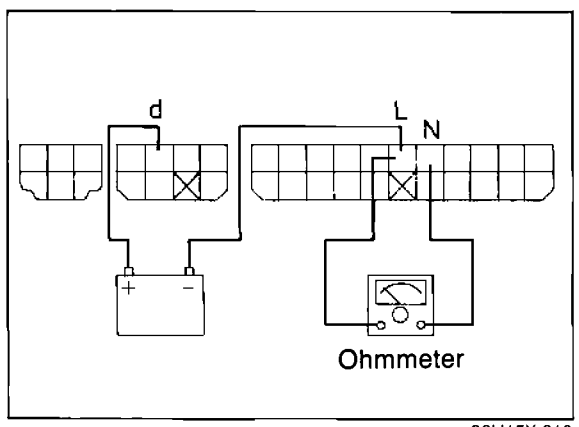
Terminals	Voltage
B — O	Approx. 12V



86U15X-209

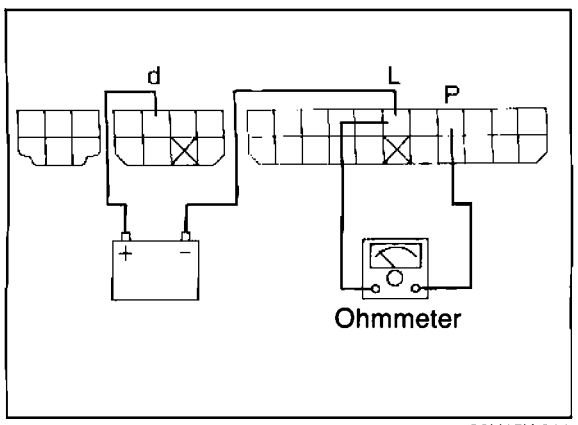
2. Connect a resistance (at least 1 kΩ) between d terminal and B terminal, and check the voltage between d terminal and O terminal using a voltmeter.

Terminals	Voltage
B — O	Less than 1V



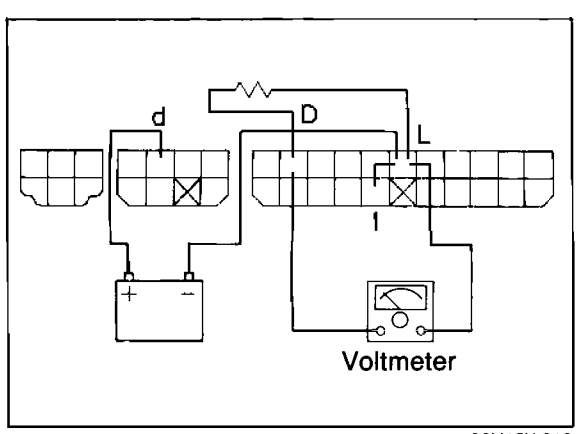
86U15X-210

3. Check for continuity between N terminal and L terminal with the REC-FRESH selector switch in FRESH position (out) using an ohmmeter.



86U15X-211

4. Check for continuity between P terminal and L terminal with the REC-FRESH air selector switch in REC position (in) using ohmmeter.

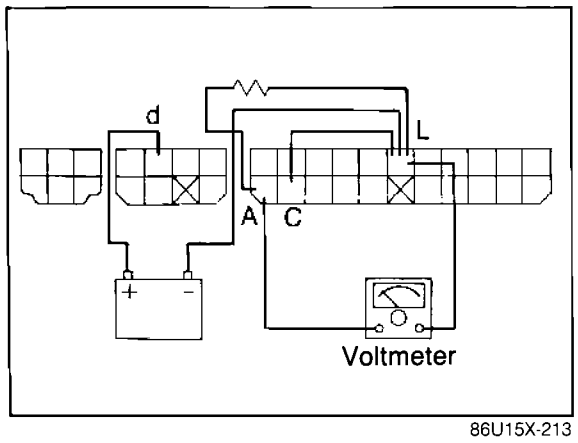


86U15X-212

Checking Mode Control Circuit

1. Connect a jumper wire between I terminal and L terminal.
   Connect a resistance (at least 1 kΩ) between D terminal and L terminal, and check the voltage between these terminals using a voltmeter.

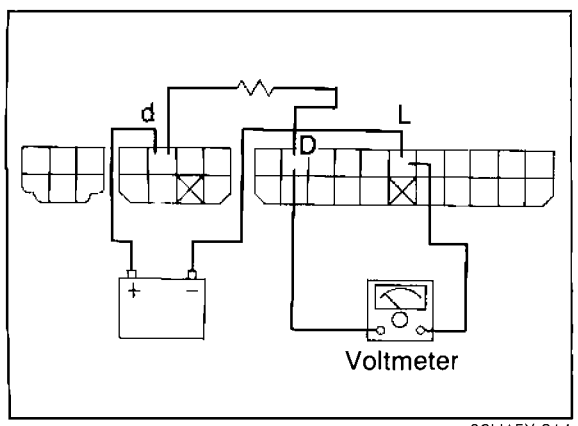
Terminals	Voltage
D — L	Approx. 12V



86U15X-213

2. Connect a jumper wire between C terminal and L terminal.
   Connect a resistance (at least 1 kΩ) between A terminal and L terminal, and check the voltage between these terminals using a voltmeter.

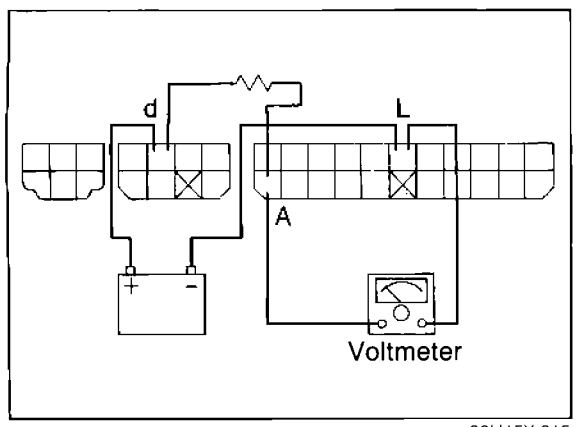
Terminals	Voltage
A — L	Approx. 12V



86U15X-214

3. Connect a resistance (at least 1 kΩ) between d terminal and D terminal, and check the voltage between D terminal and L terminal using a voltmeter.

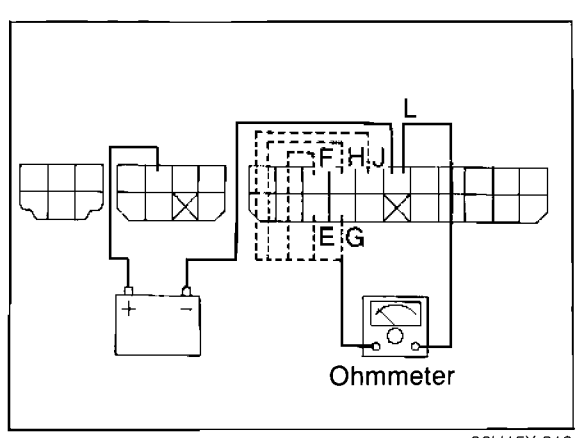
Terminals	Voltage
D — L	Less than 1V



86U15X-215

4. Connect a resistance (at least 1 kΩ) between d terminal and A terminal, and check the voltage between A terminal and L terminal using a voltmeter.

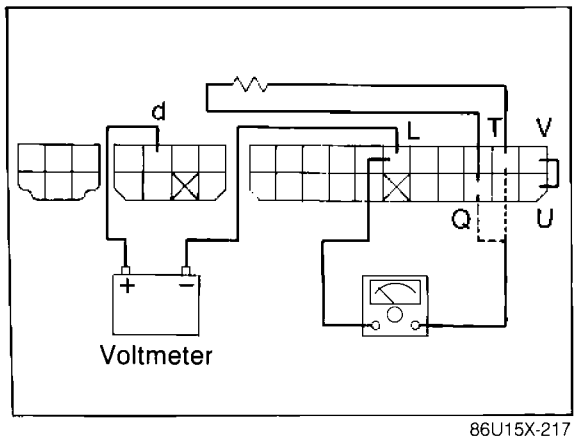
Terminal	Voltage
A — L	Less than 1V



86U15X-216

5. Check for continuity between each terminal with following condition using an ohmmeter.

Condition	Terminals	Continuity
Push the VENT switch	J — L	Yes
Push the B/L switch	G — L	Yes
Push the HEAT switch	H — L	Yes
Push the H/D switch	E — L	Yes
Push the DEF switch	F — L	Yes

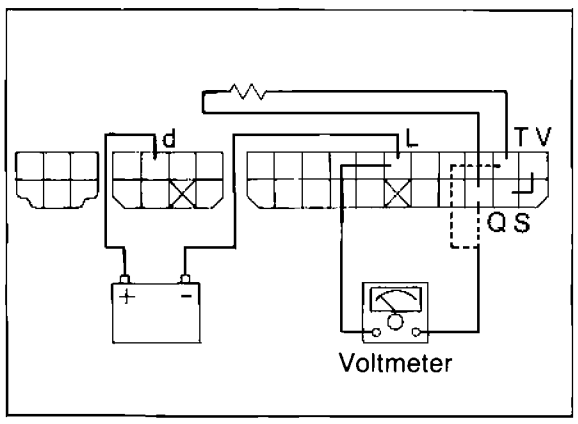


86U15X-217

Checking Air Mix Control Circuit

1. Connect a resistance (at least 1 kΩ) between Q terminal and T terminal.
   Set temperature control lever to center position between MAX HOT and MAX COLD.
   Connect a jumper wire between V terminal and U terminal, and check the voltage between each terminals.

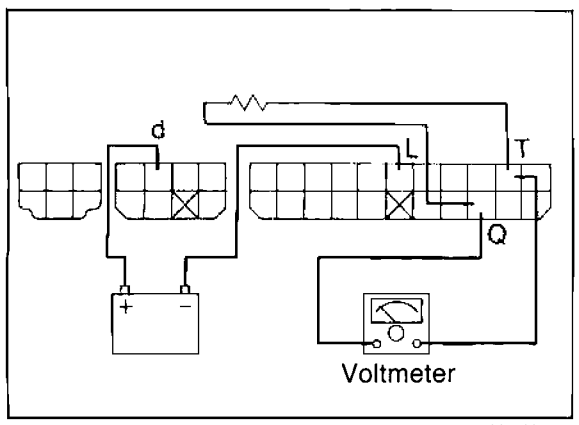
Terminals	Voltage
T — L	Approx. 12V
Q — L	Less than 1V



86U15X-218

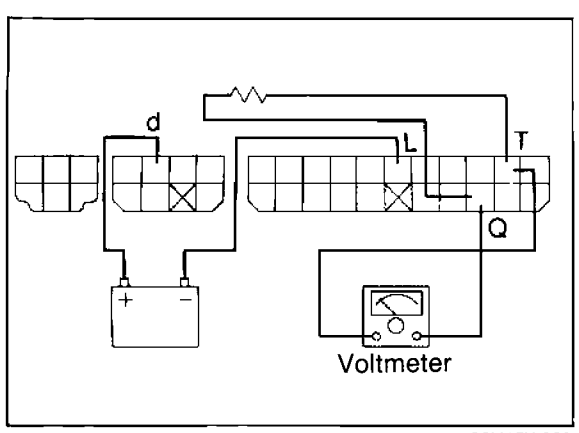
2. Connect a resistance (at least 1 kΩ) between Q terminal and T terminal.
   Set temperature control lever to center position between MAX HOT and MAX COLD. Connect a jumper wire between V terminal and S terminal, and check the voltage between each terminal using a voltmeter.

Terminals	Voltage
Q — L	Approx. 12V
T — L	Less than 1V



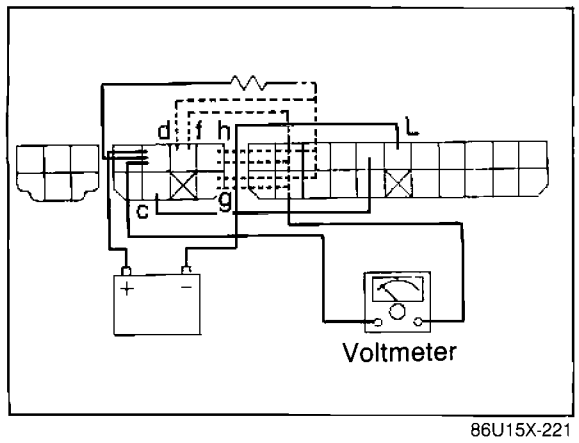
86U15X-219

3. Connect a resistance (at least 1 kΩ) between Q terminal and T terminal.
   Set temperature control lever to MAX HOT, and check that Q terminal voltage is higher than terminal t voltage.



86U15X-220

4. Connect a resistance (at least 1 kΩ) between Q terminal and terminal t.
   Set temperature control lever to MAX COLD, and check that T terminal voltage is higher than Q terminal voltage.

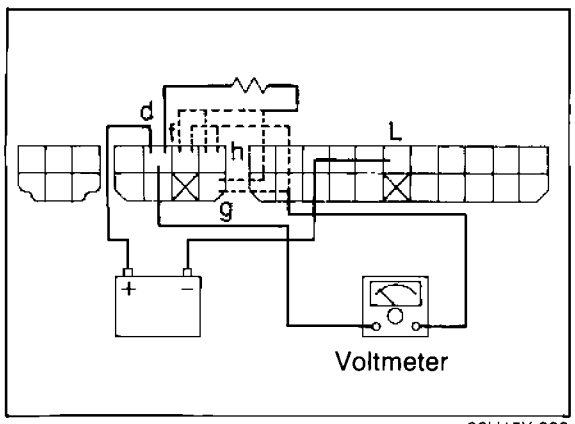


86U15X-221

Checking A/C Switch and ECO Switch Circuit

1. Turn the A/C switch off.
   Connect a jumper wire between terminal c and terminal L.
   Connect a resistance (at least 1 kΩ) between each terminals, and check the voltage between these terminals.

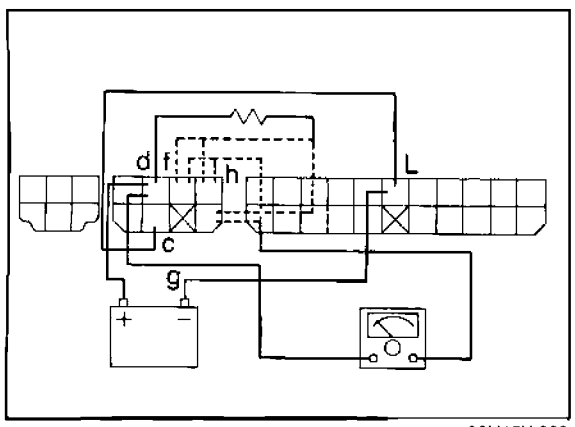
Terminals	Voltage
d — g	0V
d — f	0V
d — h	0V



86U15X-222

2. Turn the A/C switch on.
Connect a resistance (at least 1 kΩ) between each terminal, and check the voltage between these terminals.

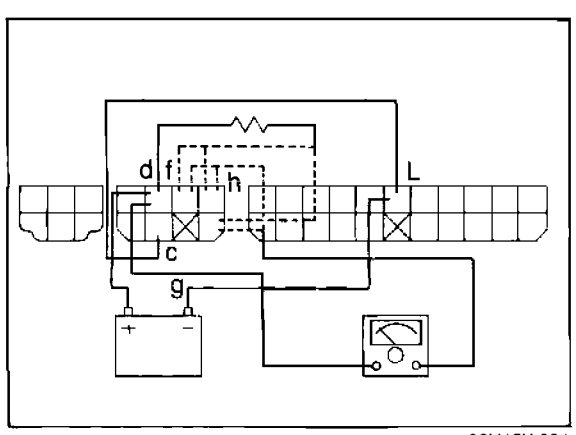
Terminals	Voltage
d — g	0V
d — f	0V
d — h	0V



86U15X-223

3. Turn the A/C switch on and the ECO switch off.
Connect a jumper wire between terminal c and L terminal.
Connect a resistance (at least 1 kΩ) between each terminals, and check the voltage between these terminals.

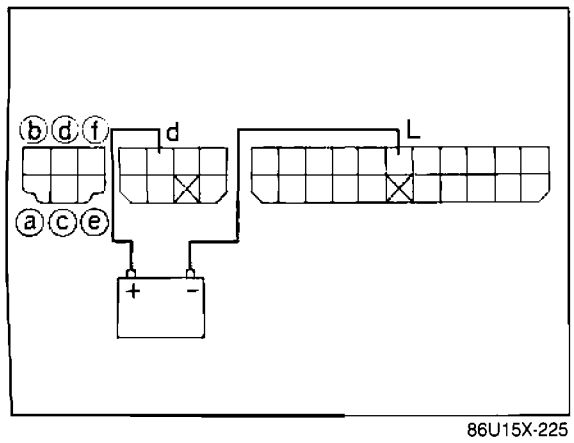
Terminals	Voltage
d — g	0V
d — f	Approx. 12V
d — h	Approx. 12V



86U15X-224

4. Turn the A/C switch and the ECO switch on.
Connect a jumper wire between terminal c and L terminal.
Connect a resistance (at least 1 kΩ) between each terminal, and check the voltage between these terminals.

Terminals	Voltage
d — g	Approx. 12V
d — f	0V
d — h	Approx. 12V

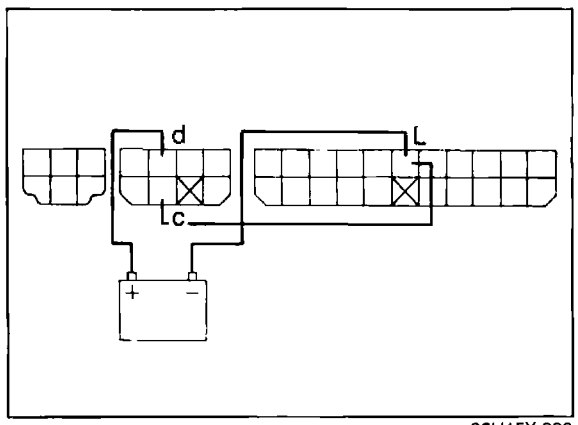


86U15X-225

Checking Fan Speed Control Lever
Check for continuity between each terminal of 6 pin connector.

Fan switch condition	ⓐ	ⓑ	ⓒ	ⓓ	ⓔ	ⓕ
OFF						
1				○—○	○—○	
2			○—	—	○	
3		○—	—	—	○	○—○
4	○—	—	—	—	○	○—○

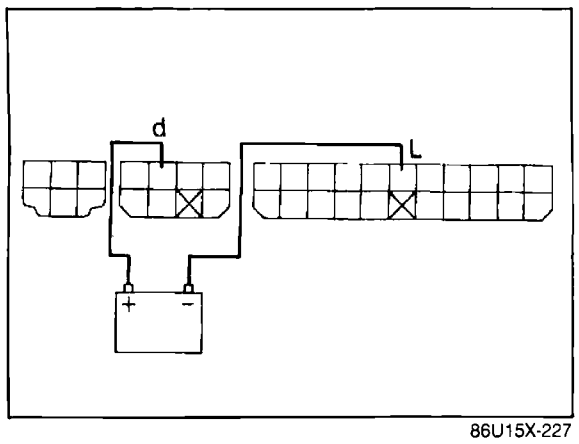
○—○: indicates continuity



86U15X-226

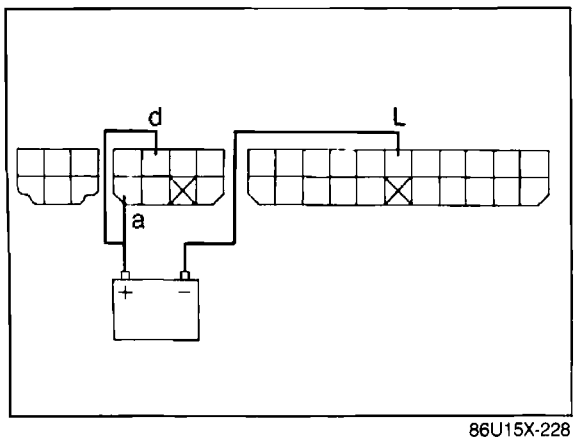
Checking Dim Indicator Circuits (Indicator circuit)

1. Connect a jumper wire between terminal c and terminal L.
   Check for illumination at A/C switch indicator with A/C switch on.
   Check for illumination at ECO switch indicator with ECO switch on.



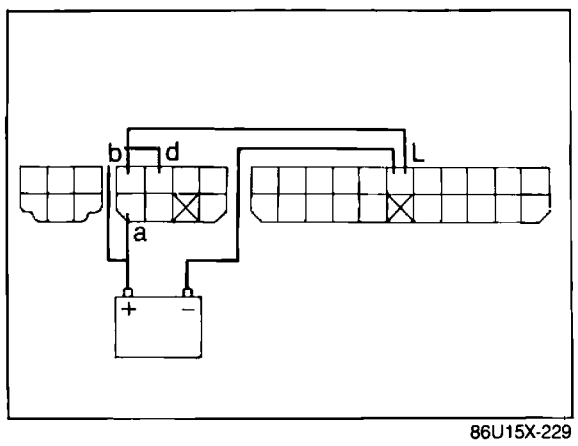
86U15X-227

2. Check that the mode control switch and REC-FRESH select switch indicators when the respective switches ON.



86U15X-228

3. Apply 12V to terminal a, and check that the indicators are dim.



86U15X-229

Checking Illumination Circuit

1. Connect a jumper wire between terminal b and terminal L.
2. Apply 12V to terminal a, and check that the indicators are dim.

16

AIR CONDITIONING SYSTEM

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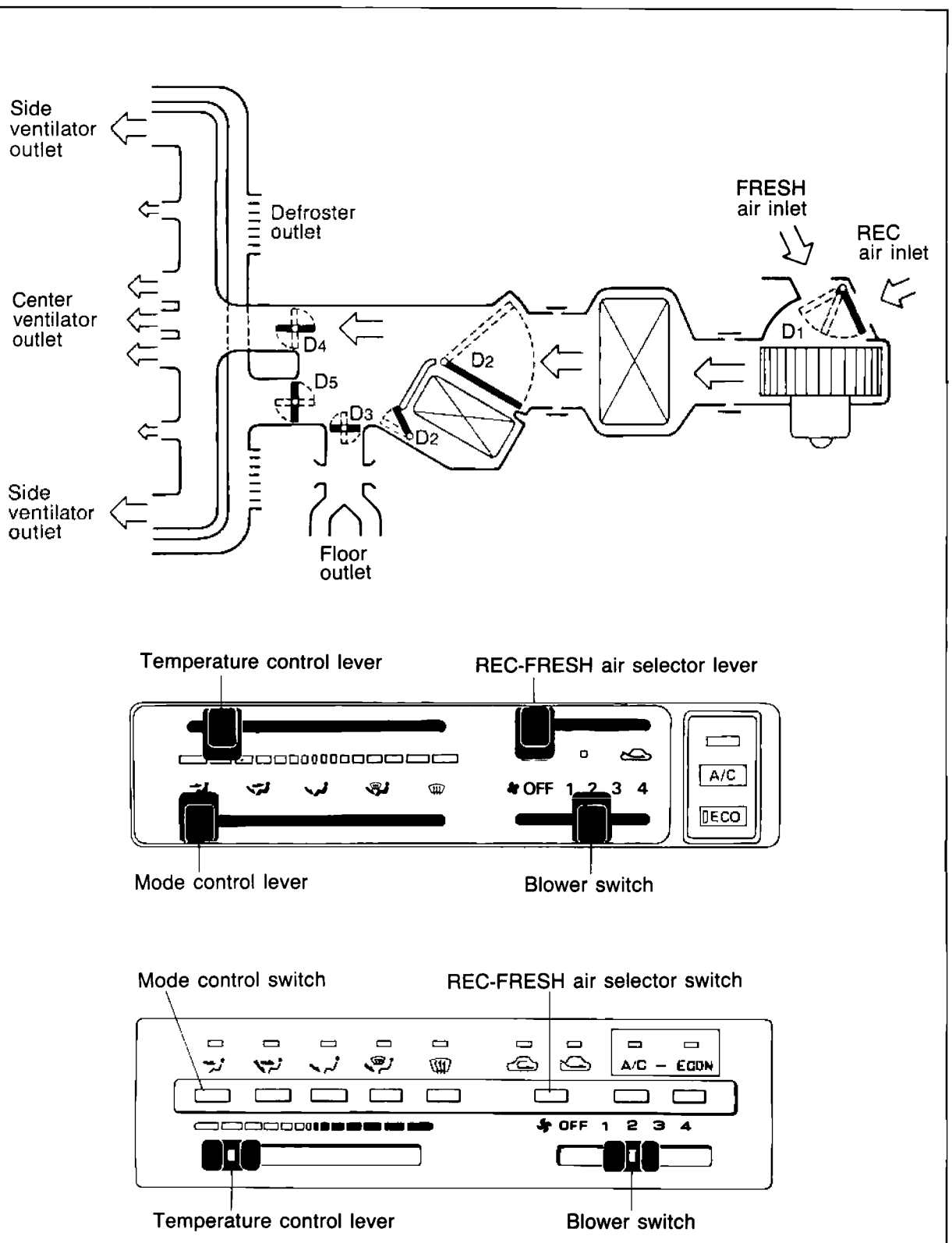
76G16X-001

16 OUTLINE

OUTLINE

AIR DISTRIBUTION

Vehicles with air conditioner



69G16X-002

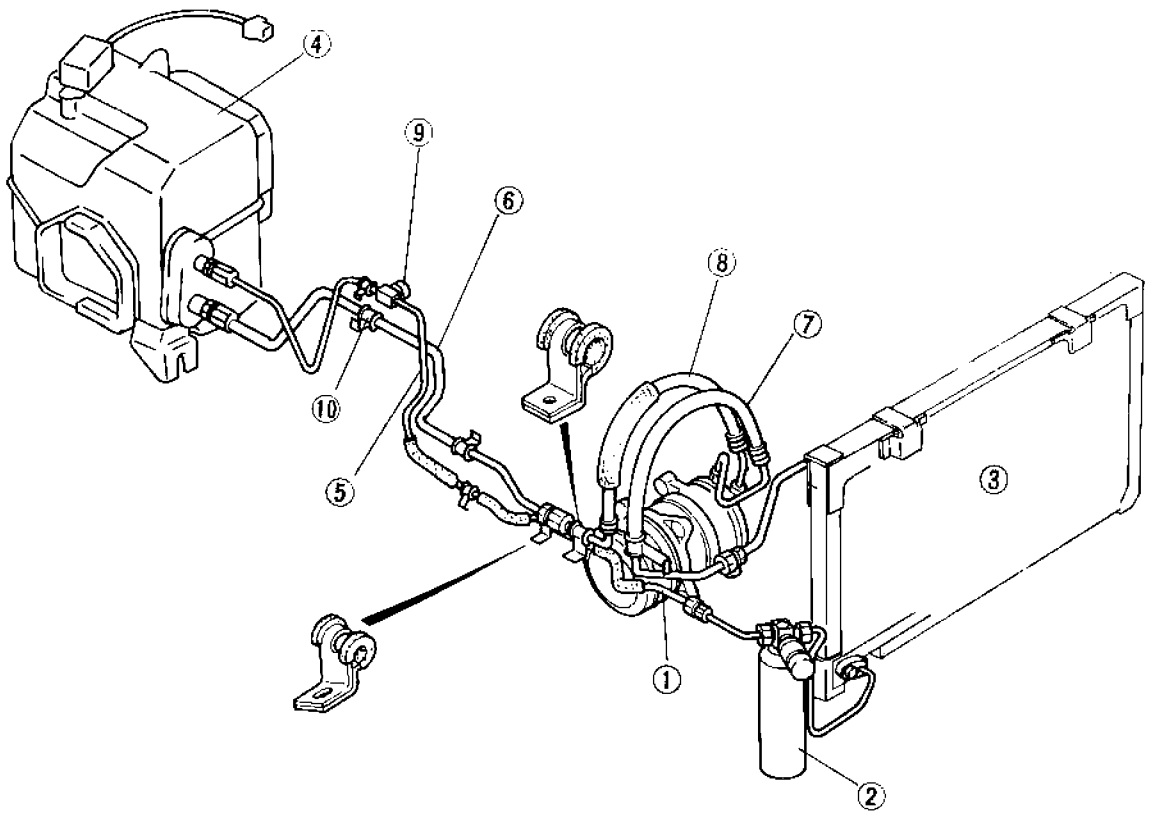
The air distribution is shown in the figure.

1. The door (D1) is used to select either fresh air from outside or recirculated air. Setting the RECIRC/FRESH control lever (switch) to the FRESH position will allow outside air to come inside. Setting the RECIRC/FRESH control lever (switch) to the RECIRC position will allow inside air to recirculate.
2. Outlet airflow is controlled by doors D3, D4, D5.
   Moving (pushing) the mode control lever (switch) opens and shuts the doors (D3, D4, D5) and creates the air passage according to the lever position.
   1) Setting the lever to the VENT position (push the VENT switch) creates the air passage to the ventilator outlets, and air comes into the passenger compartment from the ventilator outlets.
   2) Setting the lever to the BI-LEVEL position (push the BI-LEVEL switch) creates the air passage to the ventilator outlets and to the floor outlets.
   3) Setting the lever to the HEAT position (push the HEAT switch) creates the air passage to the floor outlets.
      (A little air comes from the defroster outlets.)
   4) Setting the lever to the DEF/HEAT position (push the DEF/HEAT switch) creates the air passage to the floor outlets and to the defroster outlets.
   5) Setting the lever to the DEF position (push the DEF switch) creates the air passage to the defroster outlets.
3. The cooling or heating temperature is controlled by doors D2.

76G16X-002

16 OUTLINE

AIR CONDITIONING COMPONENTS



76G16X-003

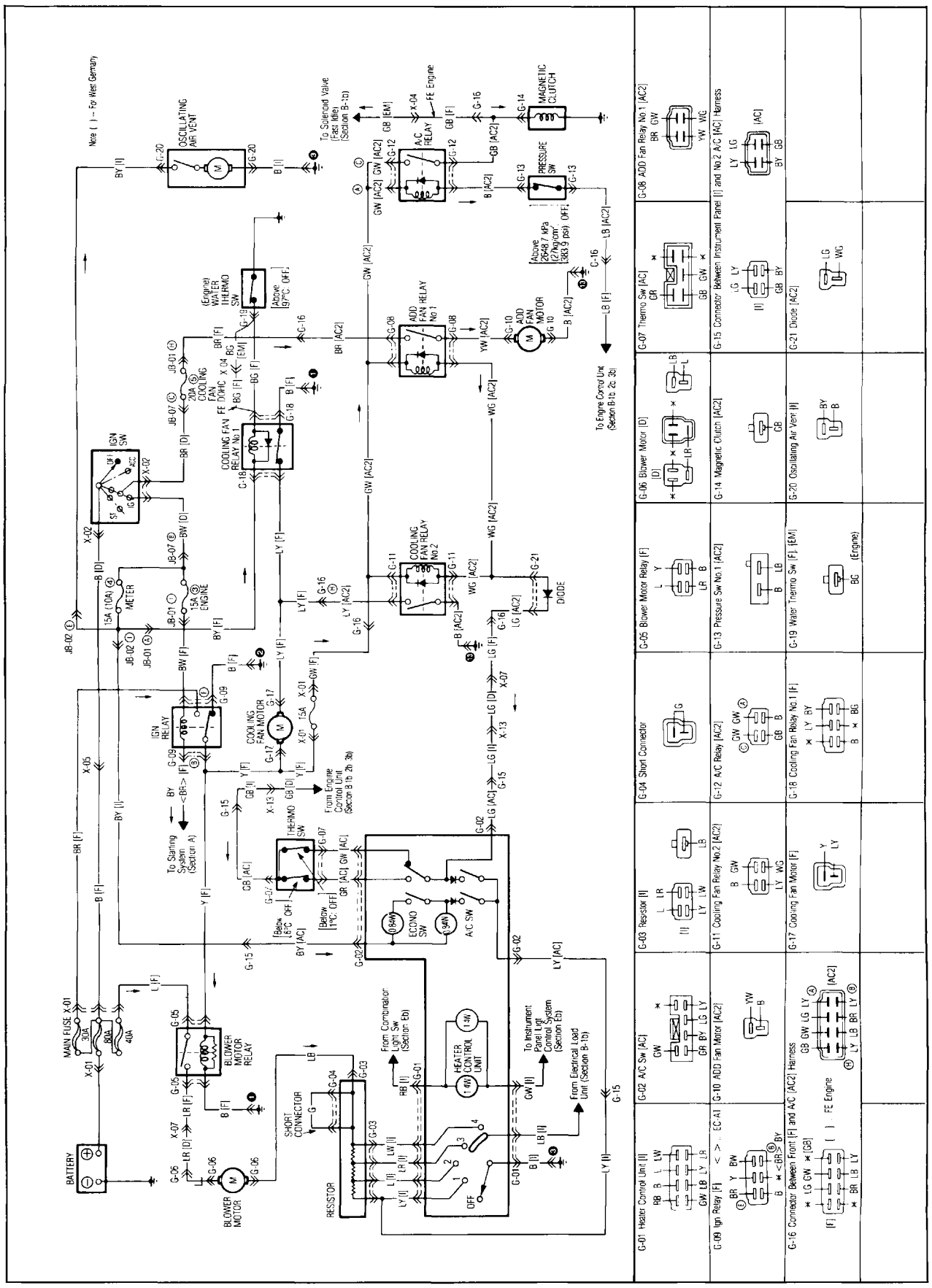
1. Compressor
2. Receiver-drier
3. Condenser
4. Cooling unit
5. High-pressure pipe
6. Low pressure pipe
7. High pressure hose
8. Low pressure hose
9. Service valve (High-pressure)
10. Service valve (Low-pressure)

TROUBLESHOOTING GUIDE

Problem	Probable cause	Remedy	Reference page
No blower operation	1. Main fuse (30 A) is open	Replace	
	2 Malfunction of the blower motor	Replace	
	3. Faulty resistor	Replace	
	4. Malfunction of the blower switch	Replace	
	5. Open or loose connection in an electrical circuit	Repair	16—6, 7
Insufficient air	1. Obstruction in the inlet of the blower unit	Remove the obstruction	16—26
	2. Clogged evaporator	Clean the evaporator with compressed air	16—27
	3. Frosted evaporator	Check the thermostat	16—30
	4. Air leakage	Check for leakage at both sides of the cooling unit	16—26
Compressor does not run, or runs insufficiently	1. Malfunction of the A/C relay	Check operation	16—30
	2. Malfunction of the thermostat	Check operation	16—30
	3. Malfunction of the refrigerant-pressure switch	Check operation	16—31
	4. Air conditioner fuse (15 A) failure	Replace	
	5. Compressor drive belt is loose	Readjust	16—23
	6. Internal problem of the compressor	Repair or replace the compressor	16—13
	7. Battery voltage too low	Recharge the battery	
	8. Layer short in the magnet coil	Replace	
	9. Clutch face dirty with oil	Clean or replace the clutch	16—13
	10. Excessive gap between the drive plate and the pulley	Adjust the gap	16—13
	11. Open circuit in the magnet coil	Replace	16—13
	12. Open circuit	Repair	16—6, 7
Refrigeration pressure is abnormal	Normal pressures are: High pressure.....**1472—1765 kPa (15—18 kg/cm^2, 214—255 psi)** Low pressure.....**197—294 kPa (2—3 kg/cm^2, 29—42 psi)** when: ambient temperature.....35°C (95°F) engine speed.....1,500 rpm		
Low pressure is too high	1. Internal malfunction of the compressor	Repair or replace the compressor	16—13
	2. Faulty contact of the sensing bulb of the expansion valve	Repair	16—26
	3. Faulty insulation of the sensing bulb of the expansion valve	Repair	16—26
	4. Expansion valve open too much	Replace	16—26
Low pressure is too low	1. Insufficient refrigerant	Charge with refrigerant	16—8
	2. Receiver-drier is clogged	Replace	16—25
	3. Expansion valve is clogged	Replace	16—26
	4. Faulty thermostat	Check operation	16—30
	5. Frosted piping	Clean or replace the piping	16—29
High pressure is too high	1. Poor cooling of condenser	Check and clean	16—24
	2. Loose cooling fan drive belt	Readjust	16—23
	3. Too much refrigerant	Discharge the excess refrigerant	16—8
	4. Air in the system	Evacuate and charge the system	16—8
High pressure is too low	1. Insufficient refrigerant	Charge with refrigerant	16—8
	2. Internal malfunction of the compressor	Repair or replace the compressor	16—13

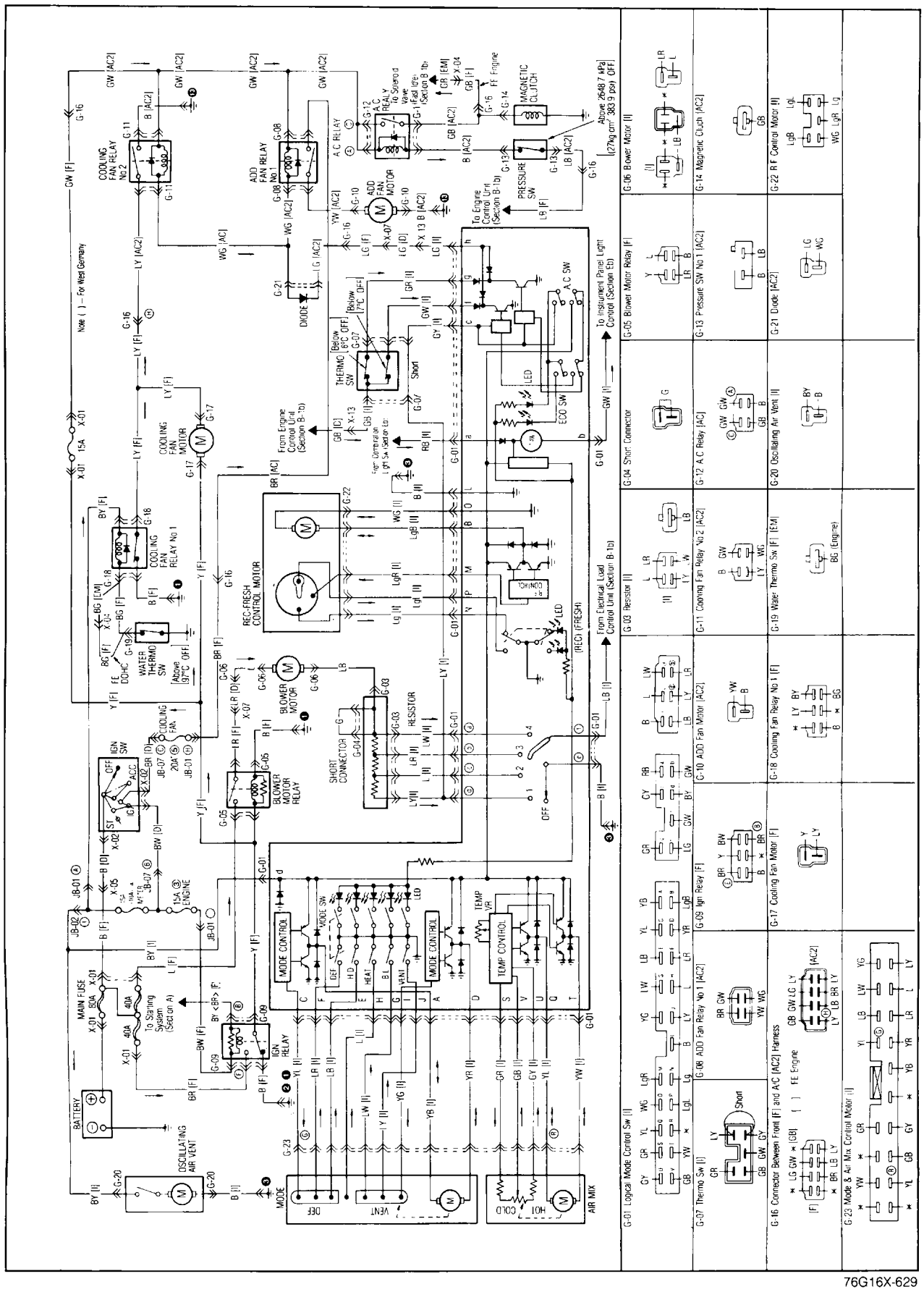
76G16X-004

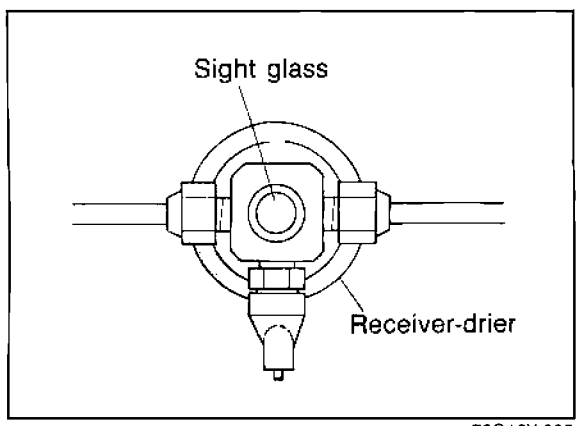
CIRCUIT DIAGRAM



76G16X-603

CIRCUIT DIAGRAM



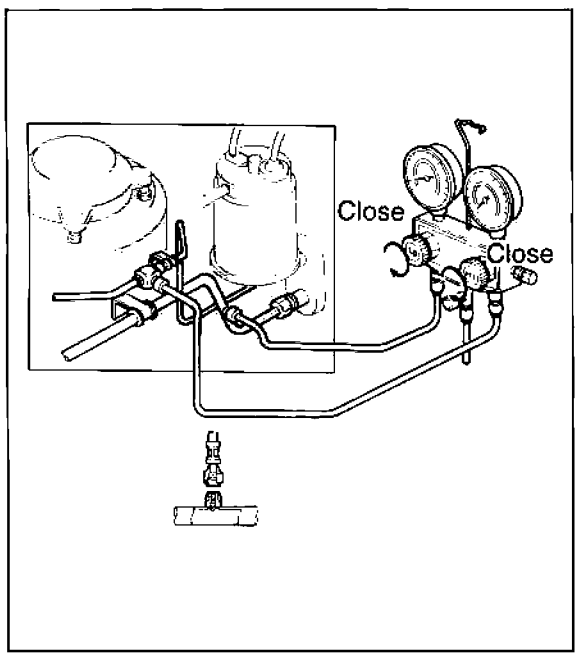


76G16X-005

REFRIGERATION SYSTEM
Checking the Refrigerant Charge

1. Run the engine at idle.
2. Operate the air conditioner at maximum cooling for a few minutes.
3. Check the amount of refrigerant by observing the sight glass on the receiver-drier. (Refer to following table.)

Item	Symptom	Amount of refrigerant	Remedy
1	Bubbles present in sight glass.	Insufficient refrigerant.	Check for leakage with a gas leak tester.
2	No bubbles present in sight glass.	No (or insufficient) refrigerant.	Refer to items 3 and 4.
3	No temperature difference between compressor inlet and outlet.	System is empty or nearly empty.	Evacuate and charge the system. Then check for leakage with a gas leak tester.
4	Temperature between compressor inlet and outlet is noticeably different.	Proper amount of (or too much) refrigerant.	Refer to items 5 and 6.
5	Immediately after the air conditioner is turned off, refrigerant in sight glass stays clear.	Too much refrigerant.	Discharge the excess refrigerant (to the specified amount).
6	When the air conditioner is turned off, refrigerant foams and then stays clear.	Proper amount of refrigerant.	Refrigerant amount is normal.

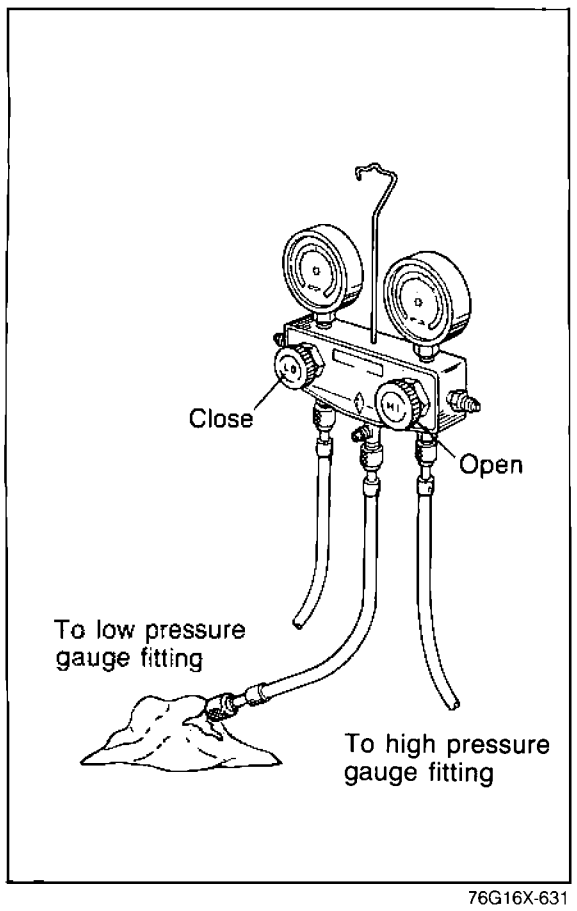


69G16X-017

Installation of the Manifold Gauge Set

Note:
Fittings for attaching the manifold gauge set are on the high and low pressure pipes.

1. Close both hand valves of the manifold gauge set.
2. Install the charging hoses in the gauge set to the fittings.
   Connect the low-pressure hose to the low-pressure gauge fitting and the high-pressure hose to the high-pressure gauge fitting.
   Tighten the hose nuts by hand.



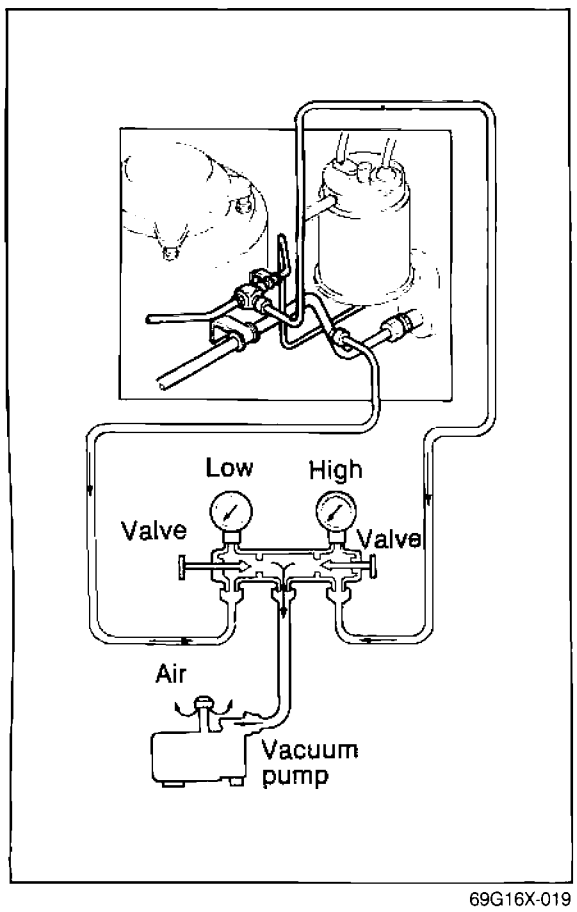
76G16X-631

Discharging the Refrigeration System

1. Connect the manifold gauge set to the system.
2. Place the free end of the center hose on a shop towel.
3. Slowly open the high pressure manual valve to adjust the refrigerant flow. Open the valve only slightly.

Caution
If refrigerant is allowed to escape too fast, the compressor oil will be drawn out of the system.

4. Check the shop towel to make sure no oil is being discharged.
   If oil is present, partially close the manual valve.
5. After the manifold gauge reading drops below **343 kPa (3.5 kg/cm^2, 50 psi)**, slowly open the low pressure manual valve.
6. As the system pressure drops, gradually open both the high- and low-pressure manual valves until both gauges read **0 kPa (0 kg/cm^2, 0 psi)**.

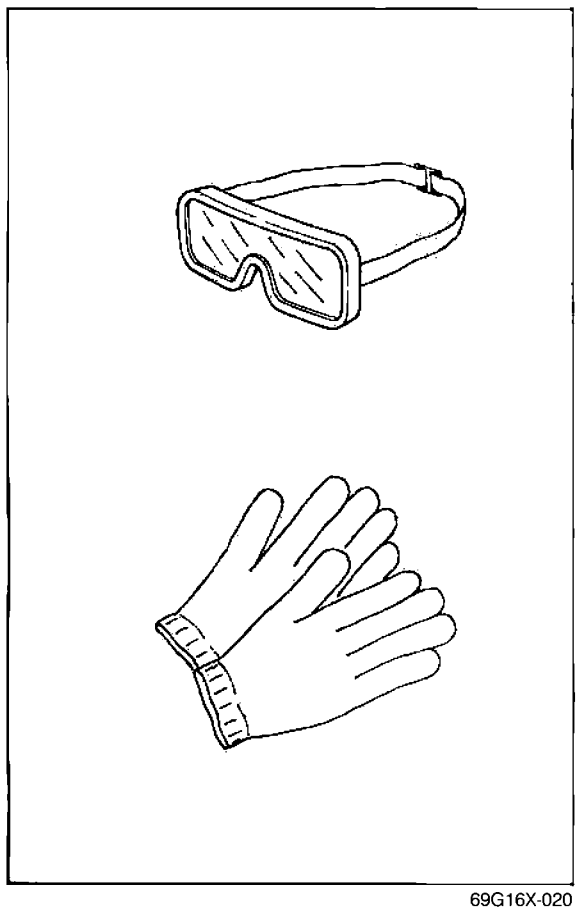


69G16X-019

Evacuation of the Refrigeration System

Whenever the air-conditioning system has been exposed to the atmosphere, it must be evacuated.

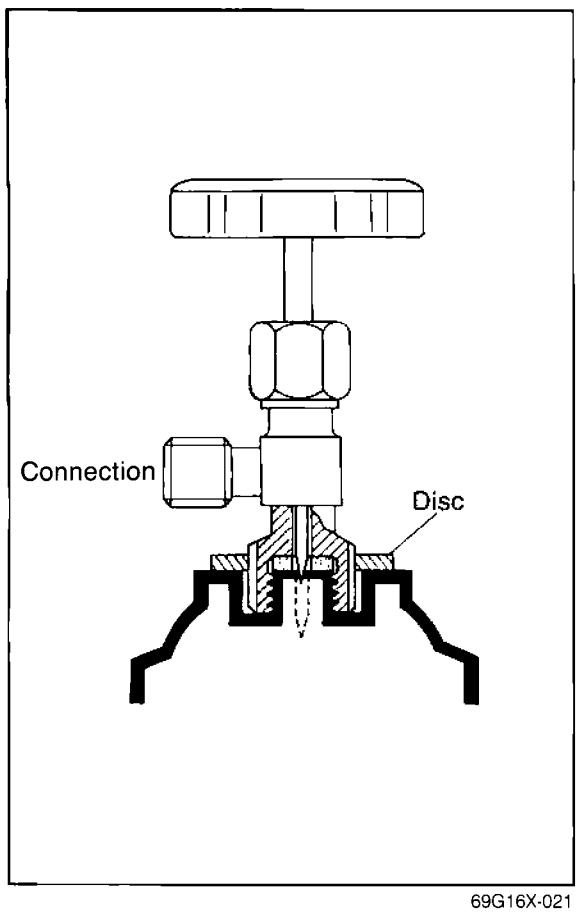
1. Connect the manifold gauge set.
2. Connect the center hose of the gauge set to the vacuum pump inlet.
3. Operate the vacuum pump, then open both manual valves.
4. When the low pressure gauge indicates approximately **710 mmHg (28 inHg)**, close both manual valves and stop the vacuum pump.
5. Check to be sure that the degree of pressure does not change after 10 minutes or more in this condition. If the pressure changes, check the system for leaks, and repair if necessary.
6. If no leaks are found, once again operate the vacuum pump and open both manual valves to obtain **760 mmHg (30 inHg)**.
7. Close both manual valves, and stop the vacuum pump.
   Disconnect the hose from the vacuum pump.



69G16X-020

Safety Precautions

1. The R-12 liquid refrigerant is highly volatile. A drop of it on the skin of your hand could result in localized frostbite. When handling the refrigerant, be sure to wear gloves.
2. If the refrigerant splashes into your eyes, wash them with clean water immediately. It is standard practice to wear goggles or glasses to protect your eyes, and gloves to protect your hands.
3. The R-12 container is a highly pressurized vessel. Never leave it in a hot place, and check to be sure that the temperature where it is stored is below **52°C (126°F)**.
4. A halide leak detector is often used to check the system for refrigerant leakage. Remember that R-12, upon coming into contact with flame (this detector burns like propane to produce a small flame), produces phosgene, a toxic gas.



69G16X-021

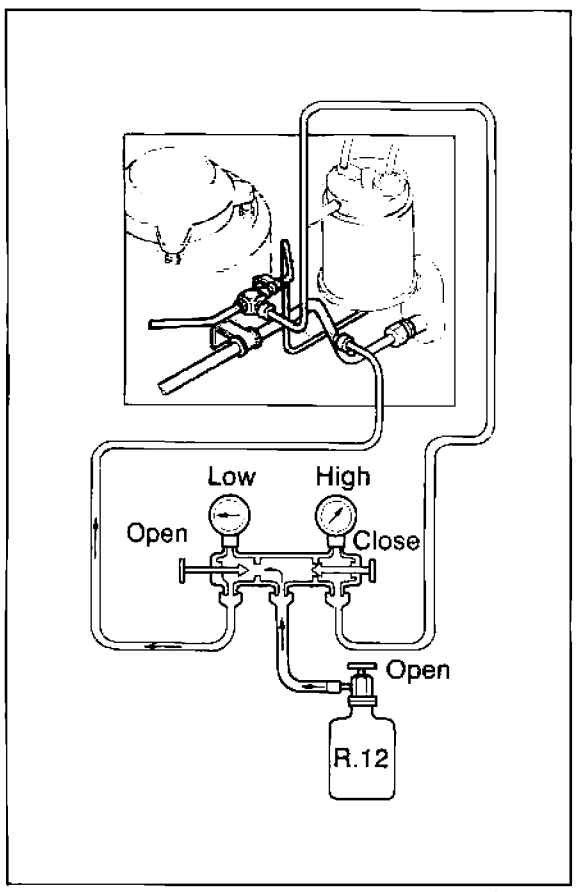
Refrigerant Container Service Valve

1. Before connecting the valve to the refrigerant container, turn the handle fully counterclockwise.
2. Turn the disc counterclockwise until it reaches its highest position.
3. Connect the center hose to the valve fitting. Turn the disc fully clockwise by hand.
4. Turn the handle clockwise to make a hole in the sealed tap.
5. Turn the handle fully counterclockwise to fill the center hose with air. Do not open the high- and low-pressure manual valves.
6. Loosen the center hose nut connected to the center fitting of the manifold gauge.
   Allow air to escape for a few seconds, then tighten the nut.

Leak-Testing the System

After finishing the evacuation of the system, check it for leaks.

1. Install the refrigerant container valve.
2. Open the high-pressure manual valve to charge the system with refrigerant gas.
3. When the low-pressure gauge reads **98.1 kPa (1 kg/cm^2, 14.2 psi)**, close the high-pressure manual valve.
4. Using a halide gas leak detector, propane torch, or electric leak detector, check the system for leaks. If a leak is found, repair the faulty component or connection, then evacuate the system.



76G16X-632

Charging the System

1. Close both the high- and low-pressure manual valves completely after the system is evacuated.
2. Install the refrigerant container service valve.
3. Open the low-pressure manual valve and charge the system with refrigerant gas.
4. When charging the system becomes difficult, run the engine at fast idle and operate the air conditioner.

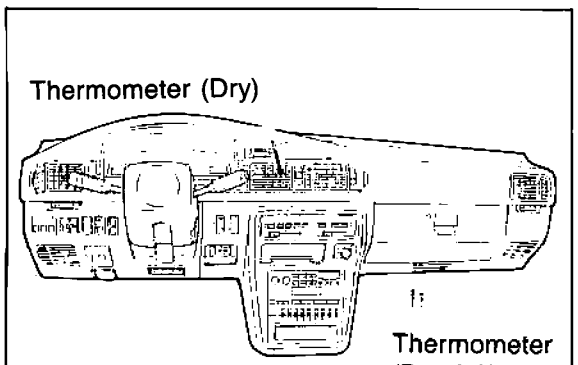
Caution
Be sure to keep the container in the upright position to prevent liquid refrigerant from being charged into the system through the suction side and possibly damaging the compressor.

5. Charge the system to the specified amount, then close the low-pressure manual valve.

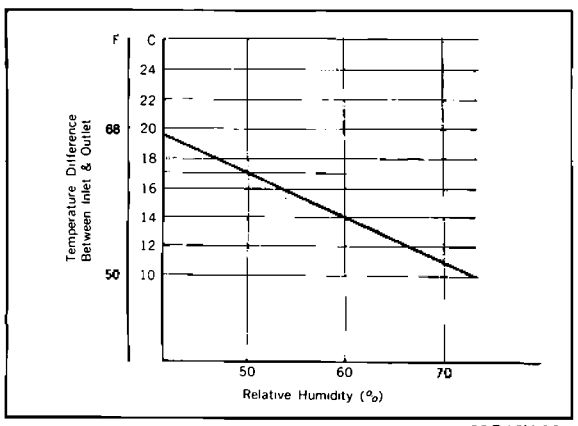
Specified amount: 800 g (28.24 oz)

Note:
If the sight glass on the receiver-drier is free of bubbles, the system is fully charged.

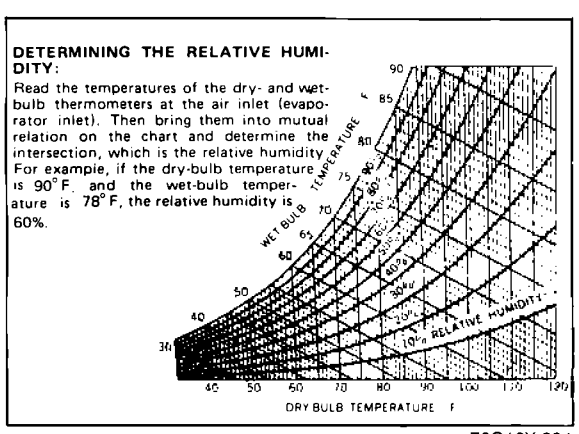
6. Close the low-pressure manual valve and the service valve of the refrigerant container.
7. Stop the air conditioner and the engine.
8. Quickly disconnect both hoses from the gauge fittings.
9. Put the cap nuts on the gauge fittings.



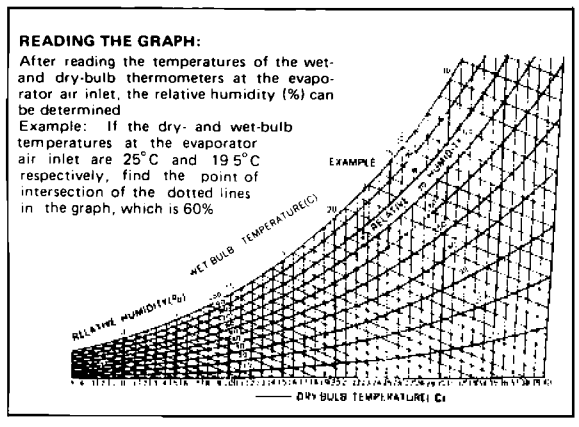
76G16X-633



69G16X-024



76G16X-634



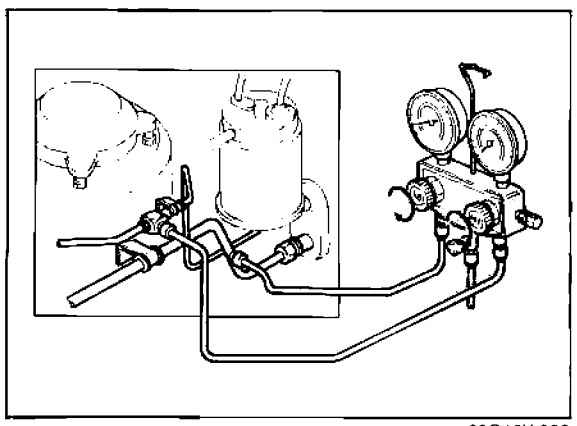
Performance Test
After finishing repairs, be sure to conduct a performance test of the air conditioning system as follows.

Procedure
1. Connect the manifold gauge set. (Refer to page 16—8)
2. Run the engine and keep the engine speed at **1750 rpm**.
3. Operate the air conditioner at MAX COOLING.
4. Open all windows and doors.
5. Insert a dry-bulb thermometer in the center of the ventilator outlet.
6. Place a dry and wet thermometer close to the inlet of the blower inlet.
7. The high pressure should be within **1374—1569 kPa (14.0—16.0 kg/cm^2, 200—227 psi)**.

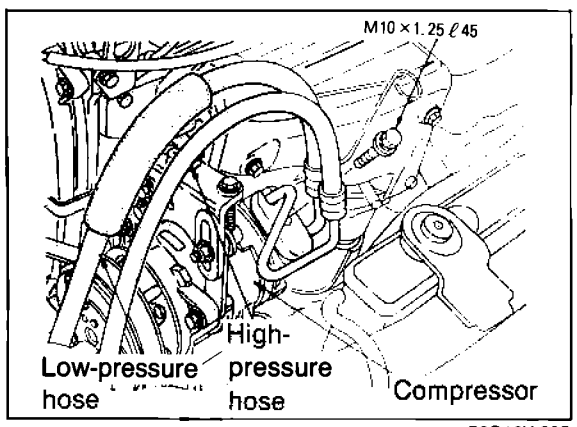
   Note:
   If the pressure is too high, pour water on the condenser; if it is too low, cover the front surface of the condenser.

8. The dry-bulb thermometer at the inlet should be within **25—35°C (77—95°F)**.
   Operate the air conditioning system in this condition until the conditions of the high and low pressure gauges and thermometers are stabilized.

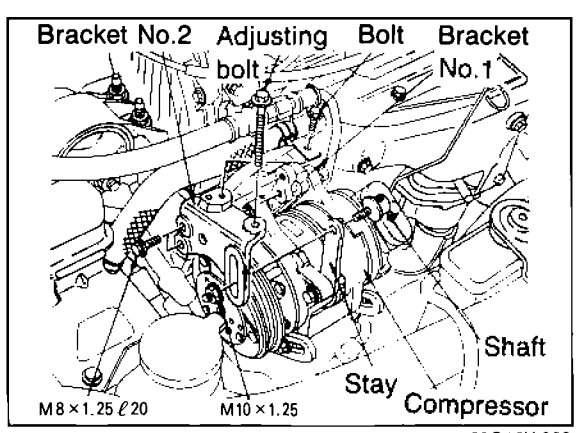
Reading the standard performance curve
1. Read the inlet temperature an get the relative humidity from the psychrometric chart.
2. Read the cool air temperature at the air outlet.
3. Determine the difference between the inlet and outlet dry-bulb temperature.
4. For example, when the difference is **17°C (30.6°F)** and the relative humidity is **60%**:
   If the closing point is the upper part of the line, cooling performance is satisfactory.



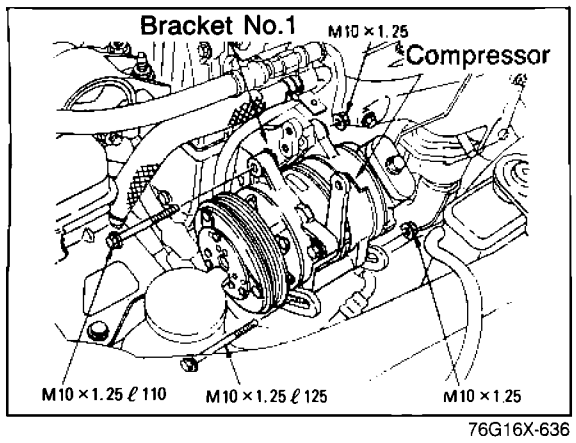
69G16X-026



76G16X-635



69G16X-028



76G16X-636

COMPRESSOR

ON-VEHICLE INSPECTION

1. Connect the manifold gauge set.
2. Run the engine at **1,500 rpm**.
3. Check the compressor flow:
   a) High pressure is not low and low pressure is not higher than normal.
   b) Metallic sound.
   c) Check to be sure that the high-pressure and low-pressure gauges show the same value immediately after the air conditioner is switched OFF. If both gauges show the same value immediately, it can be assumed that the gasket or the valve inside the compressor is damaged.
4. Stop the engine.
5. Check the shaft seal and others for leakage.
6. Inspect the drive plate pulley magnetic clutch for signs of oil.
7. Check the clearance between the drive plate and pulley. (Refer to page 16—21.)
   If any of the above checks reveal faults, repair the compressor or magnetic clutch.

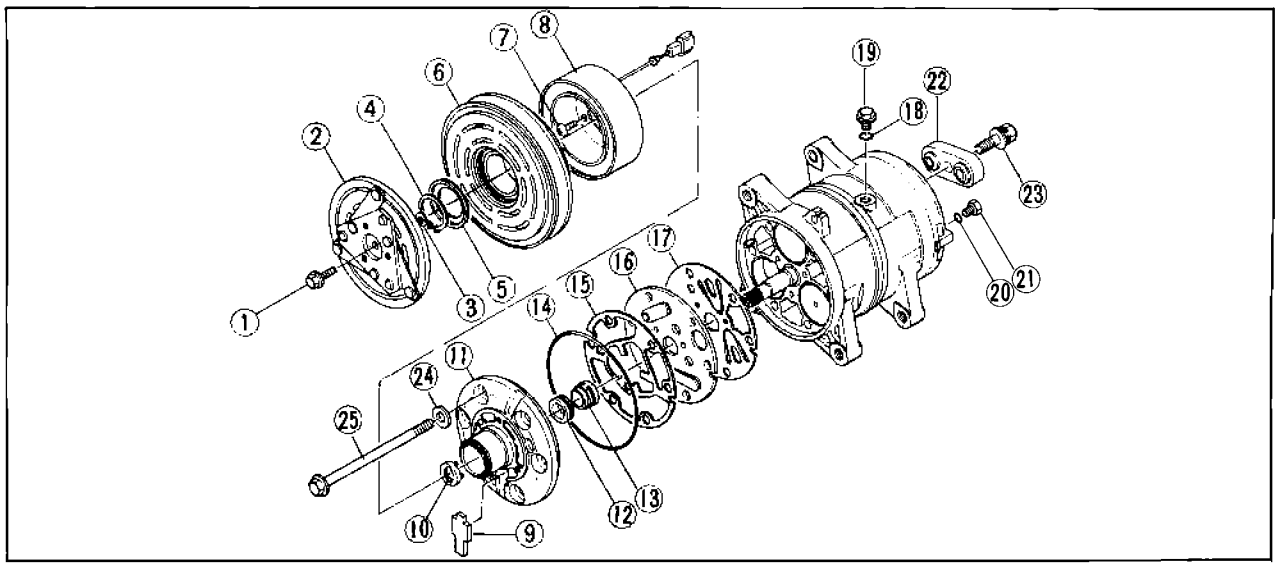
REMOVAL OF COMPRESSOR

1. Perform the Oil Return Operation. (See below.)
2. Disconnect the battery ground cable.
3. Disconnect the clutch lead wire from the wiring harness.
4. Discharge the refrigerant from the refrigeration system.
5. Disconnect the two flexible hoses. Plug the open fittings immediately to keep moisture out of the system.
6. Loosen the drive belt.
7. Remove the compressor mounting bolts and the compressor.

Oil Return Operation

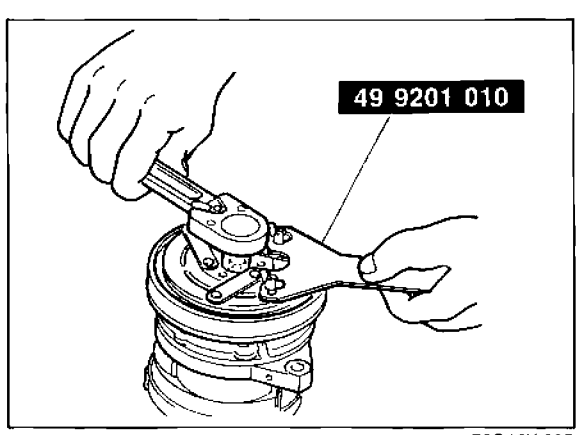
1. If the refrigerant level is low, charge the system to the specified amount.
2. Run the engine and air conditioner at idle and at maximum cooling for at least **20 minutes**.

16 COMPRESSOR



69G16X-030

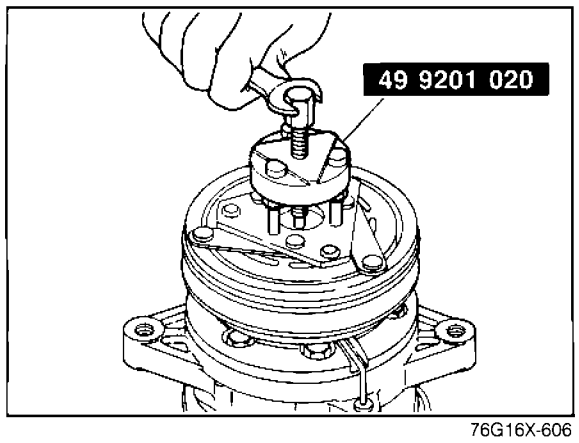
1. Bolt
2. Drive plate
3. Shim
4. Snap ring
5. Cover
6. Pulley assembly
7. Screw
8. Coil
9. Felt
10. Shaft seal cover
11. Front cylinder head
12. Seal seat
13. Shaft seal
14. O-ring
15. Gasket
16. Valve plate
17. Suction valve
18. O-ring
19. Oil filler plug
20. O-ring
21. Drain plug
22. Plate
23. Bolt
24. Gasket
25. Bolt



76G16X-605

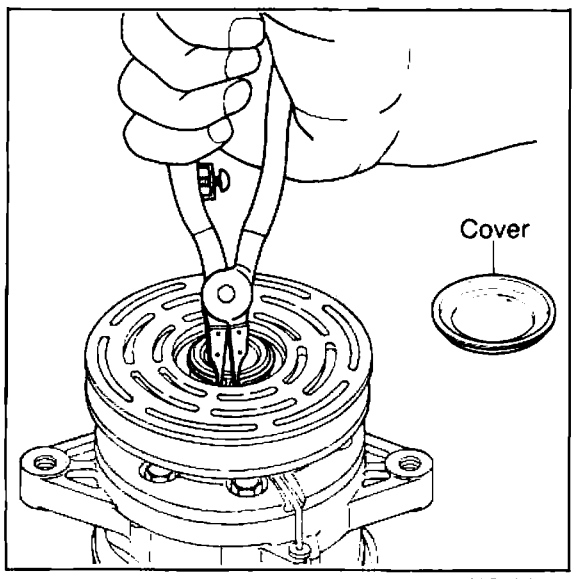
DISASSEMBLY OF MAGNETIC CLUTCH

1. Using the **SST** to prevent drive plate rotation, remove the center bolt.



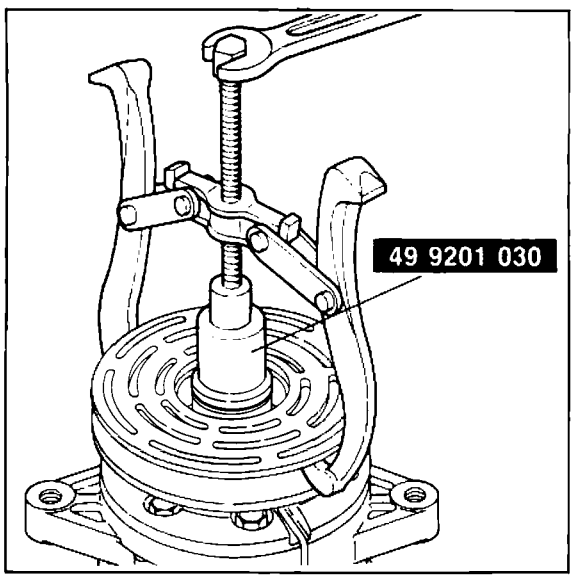
76G16X-606

2. Using the **SST**, remove the drive plate.
3. Remove the shims from either the drive shaft or the drive plate.



69G16X-033

4. Using external snap ring pliers, remove the snap ring and then the cover.



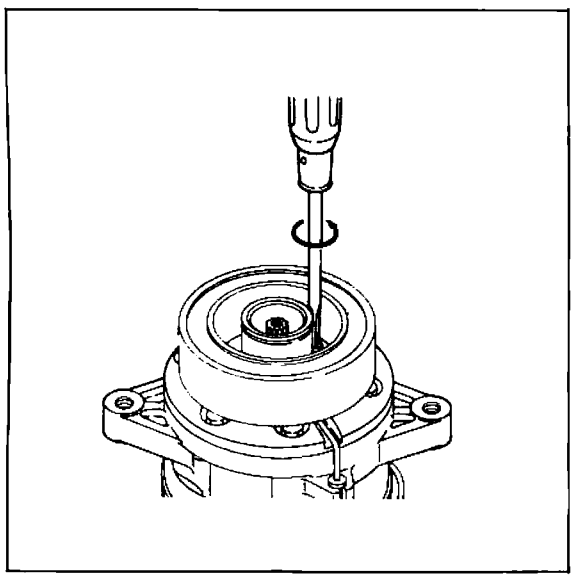
76G16X-607

5. Place the **SST** on the hub of the front head and use it to remove the pulley assembly.

   Note:
   To keep it from changing shape, hook the pulley puller's hook onto the V-pulley section.

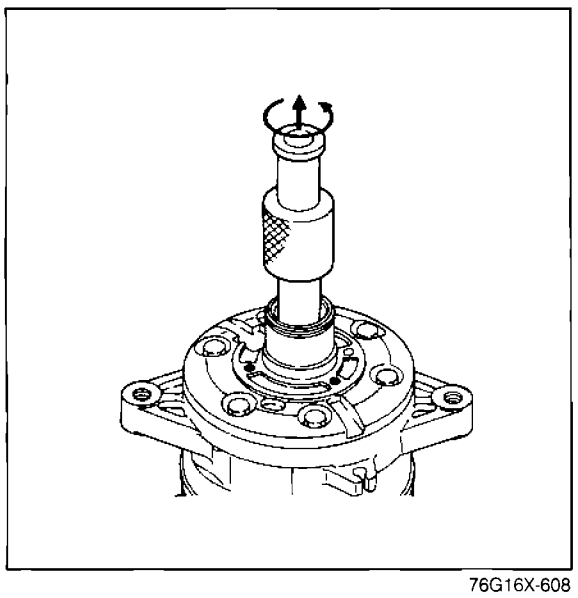
6. Remove the coil lead wire from the wire holder on the compressor.
   Remove the coil by removing the screws.

   Note:
   Do not suspend the coil by holding the lead wire.

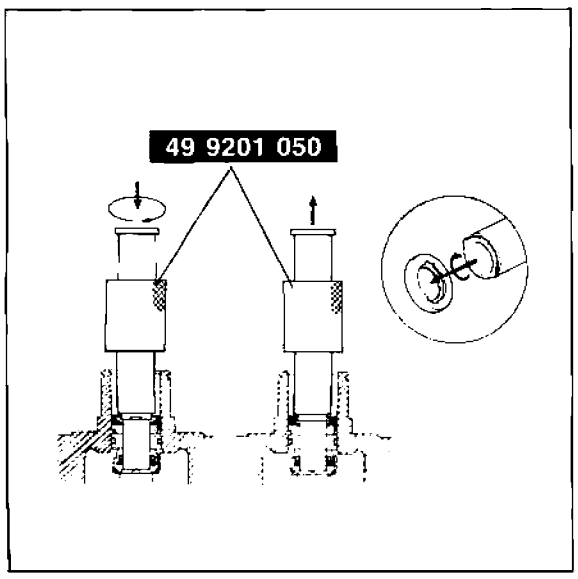


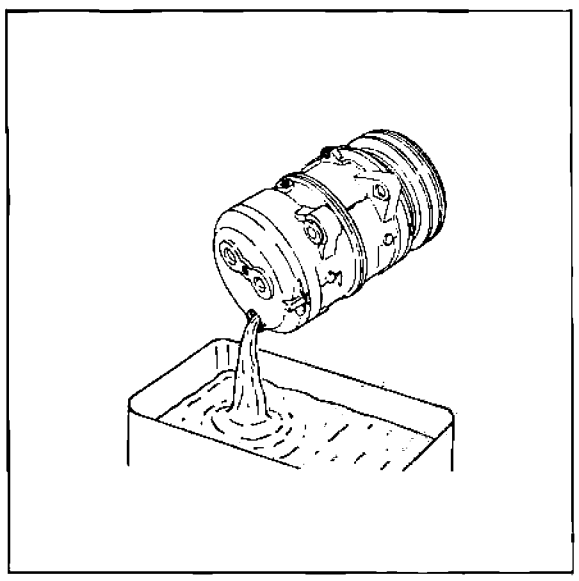
69G16X-035

7. Inspection
   a) Drive plate
      If the frictional surface shows signs of damage due to excessive heat, the drive plate and pulley should be replaced.
   b) Pulley assembly
      Check the appearance of the pulley assembly. If the frictional surface of the pulley shows signs of excessive grooving due to slippage, both the pulley and drive plate should be replaced. The frictional surfaces of the pulley assembly should be cleaned with a suitable solvent before reinstallation.
   c) Coil
      Check the coil for a loose connector or cracked insulation.
8. Remove the felt.



76G16X-608





69G16X-037

DISASSEMBLY OF COMPRESSOR

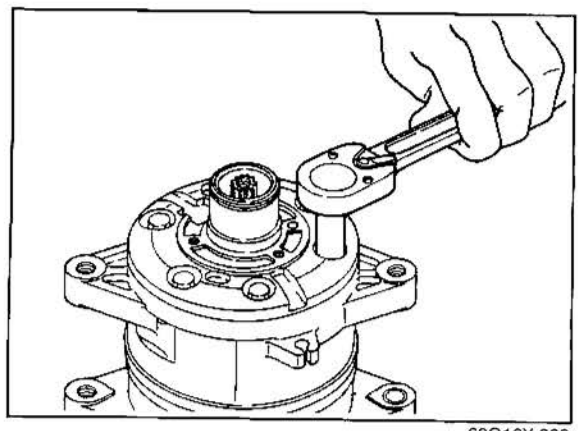
Shaft Seal Assembly

1. Using the **SST**, remove the shaft seal cover as follows: attach the remover hook to the shaft seal cover hook and draw the cover out slowly.

Compressor Oil

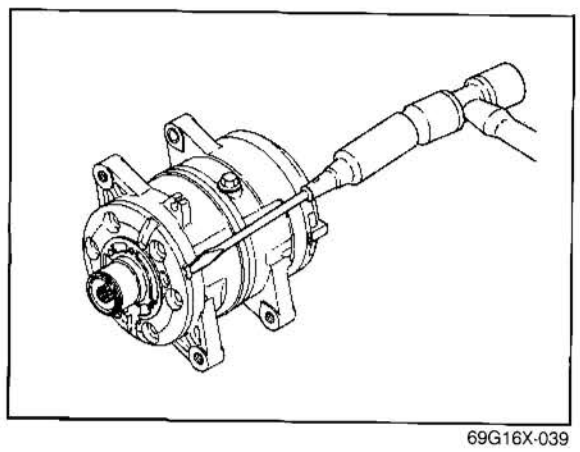
1. Remove the drain plug and the oil filler plug, then drain out the oil.
2. Measure the drained oil with a measuring cylinder.
3. Check the drained oil for any of the following conditions:
   a) Whether the opacity of the oil has increased.
   b) Whether the oil color has changed to red.
   c) Whether foreign matter, such as metal filings, etc., is present in the oil.

Note:
If the oil drained from the compressor is as described above, replaced it with new oil.



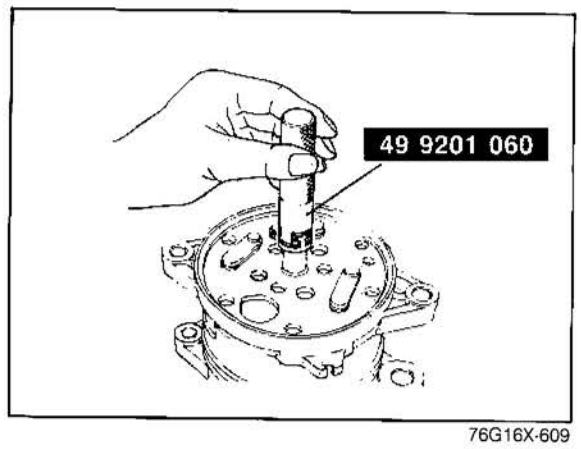
69G16X-038

4. Remove the six screws.



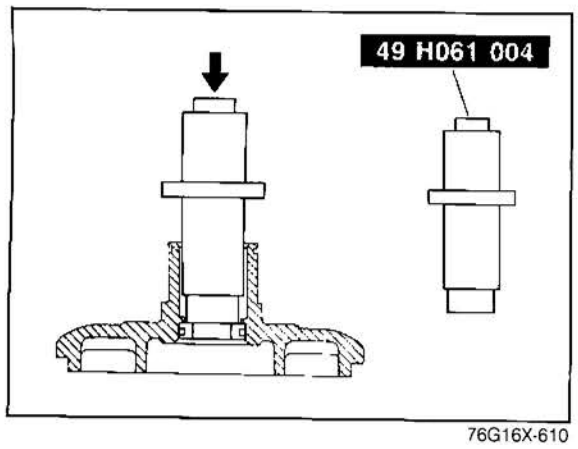
69G16X-039

5. Alternately tap two projections on the circumference of the front head with a screwdriver and plastic mallet, and remove the front head.



76G16X-609

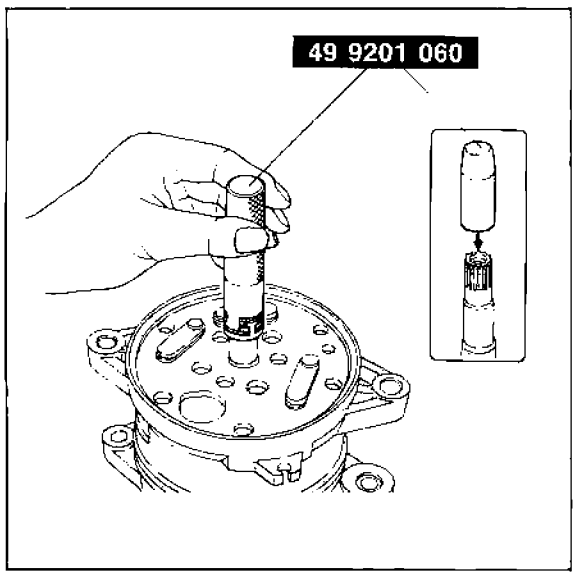
6. Using the **SST**, remove the shaft seal.



76G16X-610

7. Using the **SST**, remove the seal seat.

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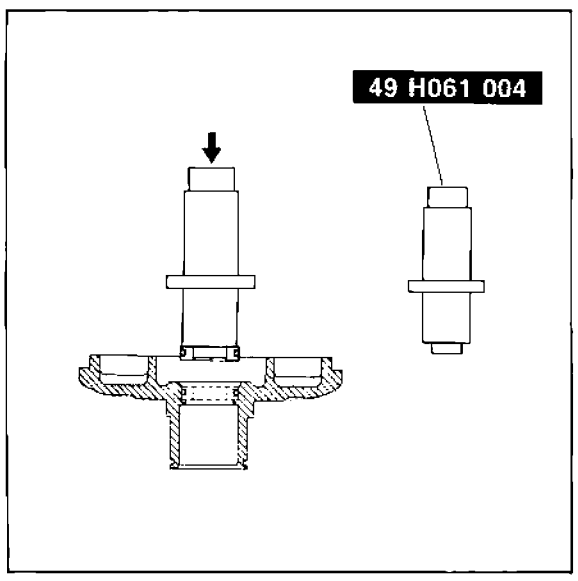
76G16X-611

ASSEMBLY OF COMPRESSOR

Shaft Seal Assembly

The shaft seal assembly should not be reused. Always use a new shaft seal kit when reassembling the compressor. Be extremely careful that the surface of the shaft seal to be installed is not scratched or damaged in any way. Be sure that the seal seat and shaft seal are free of dust or dirt which could damage the shaft seal surface.

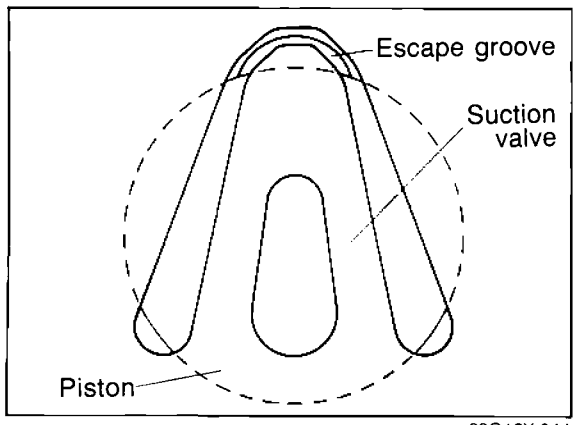
1. Clean the sealed section of the compressor.
2. Apply clean compressor oil to the new shaft seal and to the driveshaft.
   If the slip faces are dirty, clean them with thinner, and, after drying the clean faces, apply clean compressor oil to them.
3. Fit the **SST** onto the end of the driveshaft.
4. Use the **SST** to install the new shaft seal onto the driveshaft, with chamfered portion of the shaft seal retainer facing the corresponding chamfered part of the drive shaft.



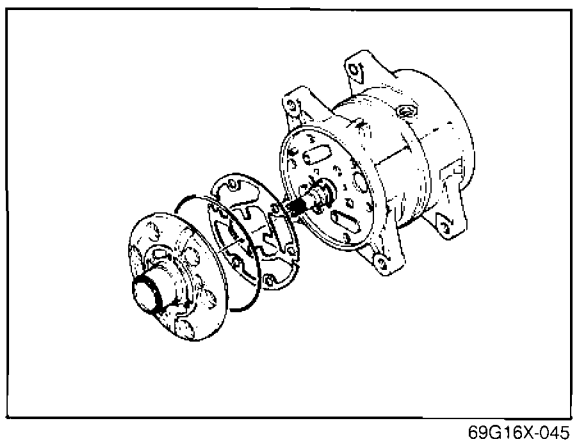
76G16X-612

5. Coat the O-ring with clean compressor oil and install it onto the seal seat.
   Coat the seal seat with clean compressor oil.
6. Use the **SST** to install the seal seat.

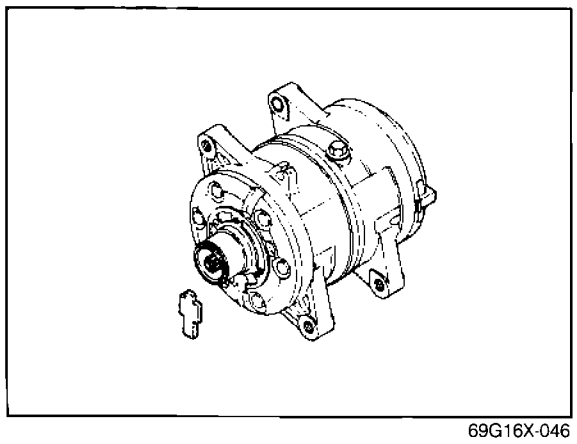
Note:
When installing the seal seat, be careful not to damage the seat surface.



69G16X-044



69G16X-045



69G16X-046

Installation of Front Cylinder Head

1. Place the cylinder shaft assembly with the front side upward.
2. Install the front suction valve so that it matches the spring pin.

Note:
Check that the valve tallies with the valve escape groove of each cylinder.

3. Install the front valve plate on the front suction valve.
4. Coat the new gasket with clean compressor oil and install it on the front valve plate.
5. Install the front cylinder head.

In case difficulty is encountered in fitting, install the cylinder head lightly with a plastic mallet.

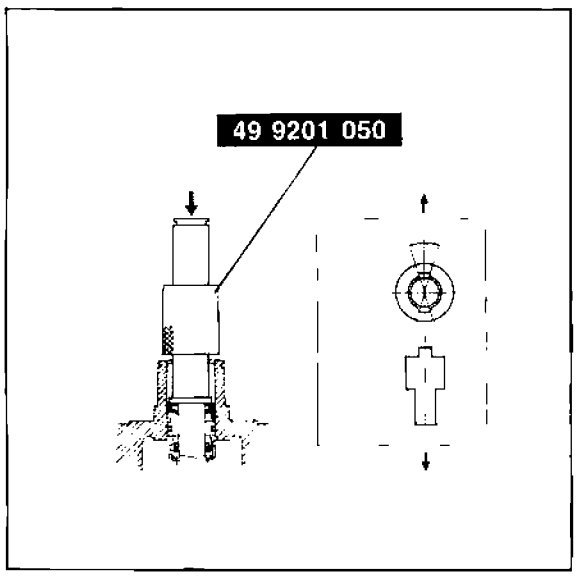
Note:
When installing the front cylinder head, be careful that you do not scratch the seat surface of the seal seat fitted onto the front cylinder head with the lip of the driveshaft.

Mount the new gasket on the through-bolts. Insert six through-bolts from the front side and tighten them to **20—24 N·m (2.0—2.4 m-kg, 14.5—17.3 ft-lb)**. Each bolt should be equally tightened more than three times to ensure the specified torque.

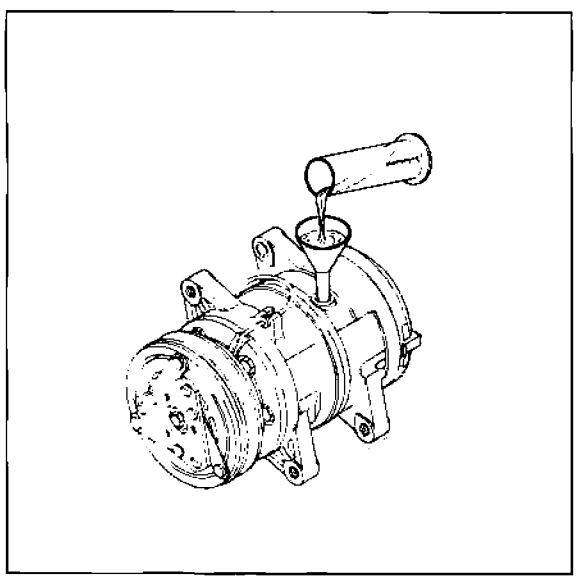
The bolts should be tightened in the order shown in the figure.

Place felt on the front cylinder head.

Turn the driveshaft 2 or 3 times by hand, and make sure that it rotates smoothly.



76G16X-613



69G16X-048

Installation of Shaft Seal Cover

1. Install the guide shaft seal on the drive shaft end.
2. Using the **SST**, install the shaft seal cover.
   Direction of the cover is shown in the figure.

Compressor Oil

Compressor Oil: FREOL DS-83P

1. Tighten the oil drain plug using a new O-ring.

   Tightening torque: 13—15 N·m (1.3—1.5 m-kg, 9.4—10.8 ft-lb)

2. Remove the oil filler plug and supply new oil through the filler.
   The charging amount is as follows:

Collected amount	Charging amount
More than 60 cc	Same as collected amount
Less than 60 cc	60 cc

3. Tighten the oil filler plug, using a new O-ring.

   Tightening torque: 13—15 N·m (1.3—1.5 m-kg, 9.4—10.8 ft-lb)

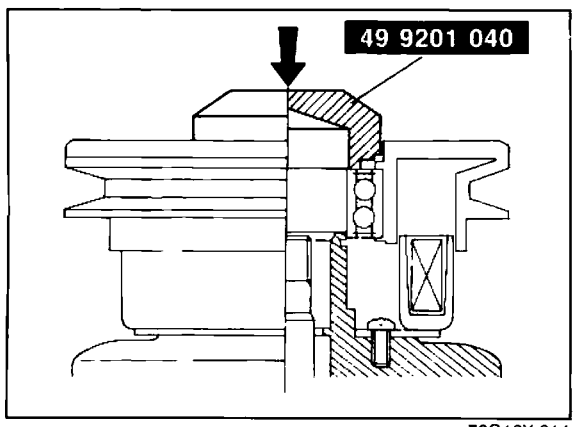
ASSEMBLY OF MAGNETIC CLUTCH

Verify that the felt is installed on the front cylinder head.

1. Install the coil onto the compressor (with the lead wires on top) and tighten the mounting screws.

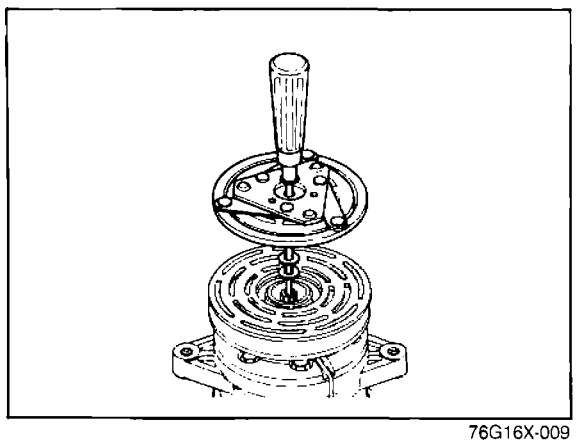
   Tightening torque: 3.9—5.9 N·m (0.4—0.6 m-kg, 2.9—4.3 ft-lb)

2. Insert the head wire into the wire holder on the compressor.



76G16X-614

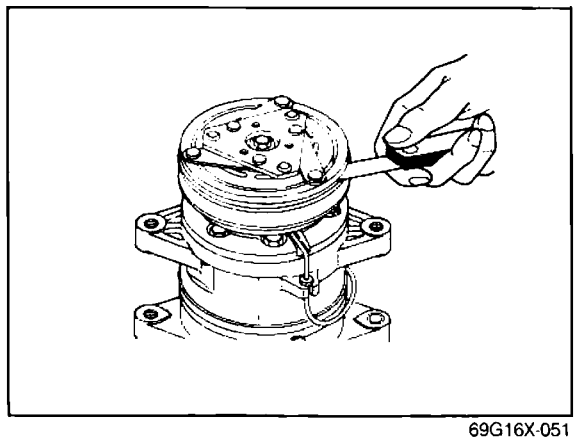
3. Install the pulley assembly by using the **SST**, then install the cover and the snap ring.



76G16X-009

4. Install the drive plate onto the drive shaft together with the original shim(s).
5. Using the **SST (49 9201 010)** to prevent the drive plate rotation, tighten the bolt. (Refer to page 16—14.)

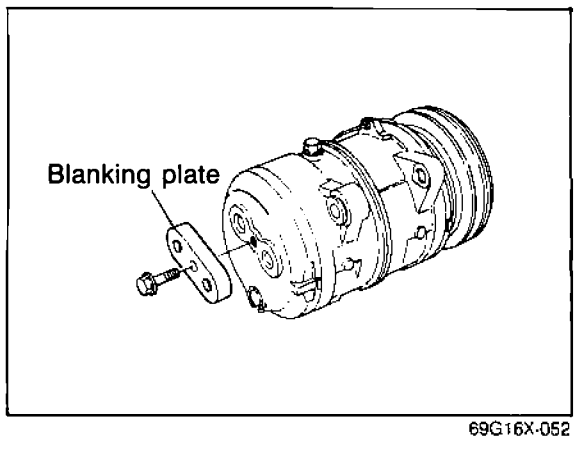
Tightening torque: 14—16 N·m (1.4—1.6 m-kg, 10.1—11.5 ft-lb)



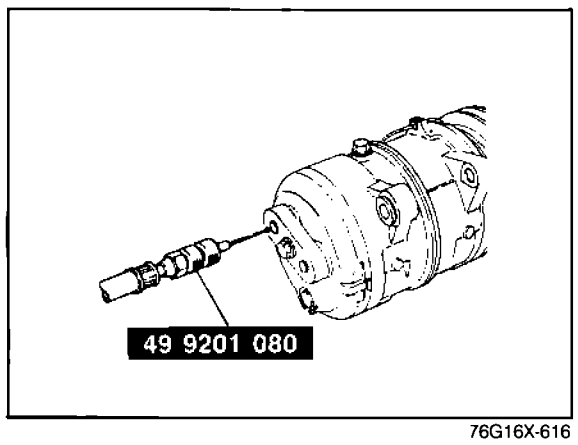
69G16X-051

6. Check that clutch clearance is between **0.3—0.6 mm (0.01—0.02 in)**. Adjust clearance by using shim(s), if necessary. Adjusting shims are available in the following thicknesses:
   0.1 mm (0.0039 in)
   0.3 mm (0.0118 in)
   0.5 mm (0.0197 in)

Standard clearance:
0.3—0.6 mm (0.01—0.02 in)



69G16X-052



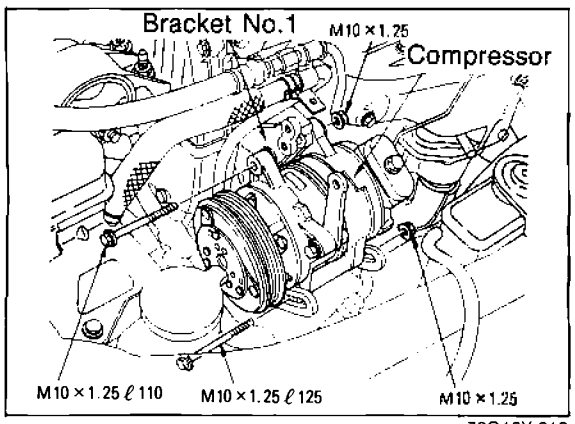
76G16X-616

PERFORMANCE TEST OF COMPRESSOR

1. Perform the leakage test
   a) Attach a blanking plate to the open rear fittings.
   b) By using the **SST**, supply the refrigerant through the suction side until the pressure becomes **50—147 kPa (0.5—1.5 kg/cm^2, 7—35 psi)**.
   c) Using a leak detector, check the compressor for leaks.
2. Evacuate the compressor and charge with refrigerant.
   Be sure the blanking plate is tight and free from moisture and contamination.

Note:
When storing a compressor, charge it with refrigerant or dry nitrogen gas to prevent corrosion.

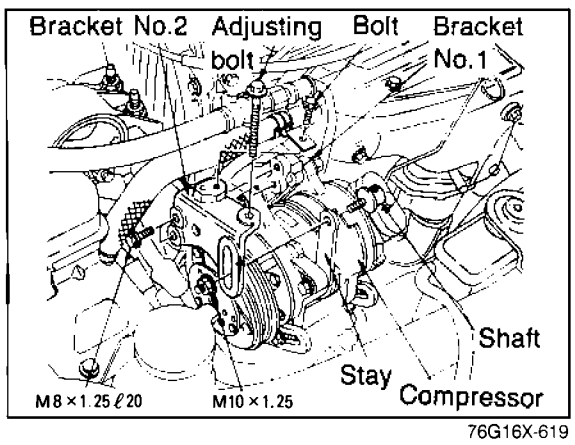
76G16X-617



76G16X-618

INSTALLATION OF THE COMPRESSOR

1. Install the compressor to the bracket No.1.

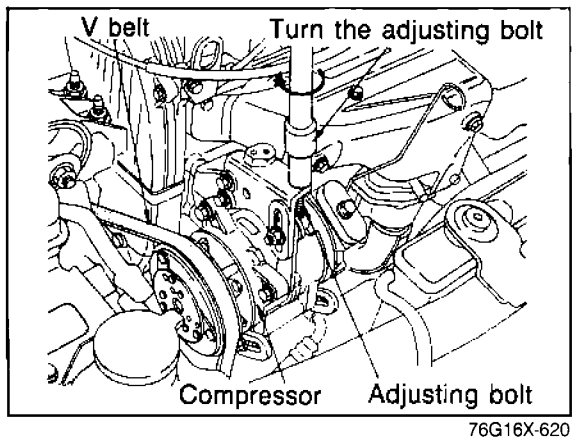


76G16X-619

2. Install the bracket No.2 to the bracket No.1 and compressor.

Note
When tighten the bracket No.1 to the bracket No.2, pull up the bracket No.2 fully.

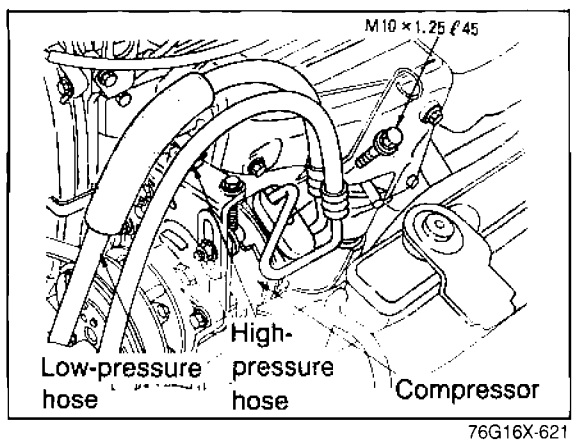
3. Install the adjusting bolt to the bracket No.2.



76G16X-620

4. Install the air conditioner drive belt, and set the air conditioner drive belt tightening the adjusting volt.

Air conditioner drive belt deflection
(When push the air conditioner belt with 10 kg)
New: 7—9 mm (0.28—0.35 in)
Used: 8—12 mm (0.31—0.47 in)



76G16X-621

5. Connect the two hoses to the compressor by tightening the bolt.

CONDENSER

ON-VEHICLE INSPECTION

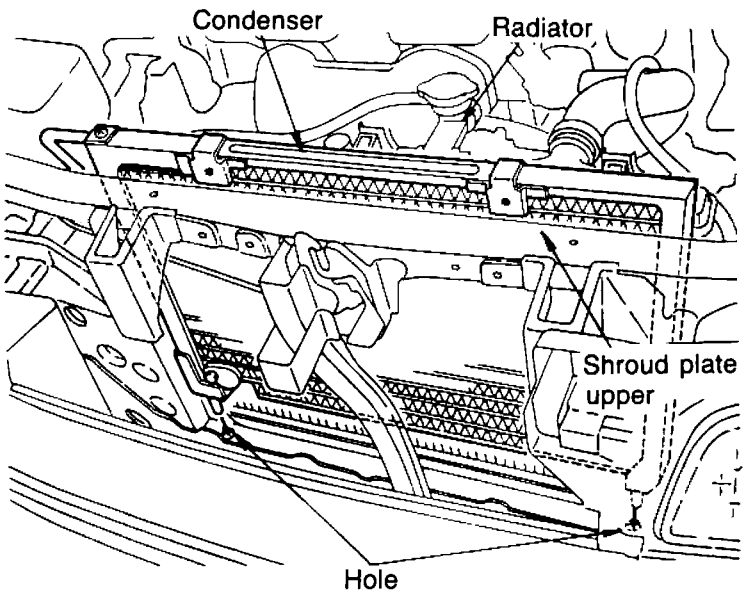
1. Check the condenser fins for blockage or damage.
   If the fins are clogged, clean them with compressed air.
   If the fins are bent, straighten them with a screwdriver or pair of pliers.
2. Check the condenser fittings for leakage.
   Repair or replace, if necessary.

REMOVAL OF CONDENSER

1. Discharge the air conditioning system. (Refer to page 16—9.)
2. Remove the front grille and the air seal cover.
3. Disconnect the discharge flexible hose from the condenser inlet fitting.
4. Disconnect the liquid line pipe from the condenser outlet fitting.

Note:
Plug the open fittings immediately to keep moisture out of the system.

6. Remove the condenser.



76G16X-637

INSTALLATION OF CONDENSER

1. Install the condenser by using the two bolts and two nuts.
2. Connect the liquid line pipe and the discharge flexible hose to the condenser.

Tightening torque:
Liquid line pipe: 15—25 N·m (1.5—2.5 m-kg, 11—18 ft-lb)
Discharge flexible hose: 15—22 N·m (1.5—2.2 m-kg, 11—16 ft-lb)

3. Install the front grille and the air seal cover.
4. If the condenser is replaced with a new one, supply compressor oil.

Compressor oil: 30 cc (1.83 cu in)

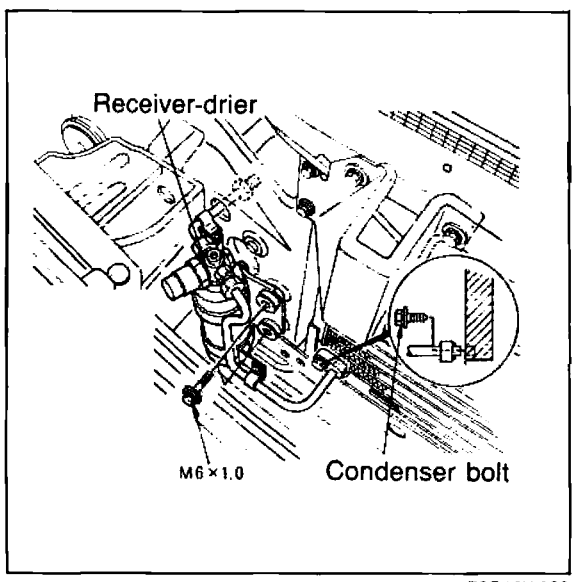
5. Evacuate, charge, and test the air conditioning system.

RECEIVER-DRIER

ON-VEHICLE INSPECTION

1. Use a leak detector to check the sight glass, the fusible plug, and the fittings for leakage. Repair or replace, if necessary.
2. Check the receiver-drier for clogging.
   a) Run the engine at fast idle with the air conditioner on.
   b) Check both inlet and outlet temperatures. If there is a great difference between the two temperatures, replace the receiver-drier.

76G16X-622



76G16X-638

REMOVAL OF RECEIVER-DRIER

1. Discharge the air conditioning system. (Refer to page 16—9)
2. Disconnect the two liquid line pipes from the receiver-drier.

   Note:
   Plug the open fittings immediately to keep moisture out of the system.

3. Remove the receiver-drier from the bracket.

INSTALLATION OF RECEIVER-DRIER

1. Install the receiver-drier onto the bracket.

   Note:
   Do not remove the blind plugs until ready for connection.

2. Connect the two liquid line pipes to the receiver-drier.

   Tightening torque:
   15—25 N·m (1.5—2.5 m-kg, 11—18 ft-lb)

3. If the receiver-drier is replaced with a new one, add compressor oil to the compressor.

   Compressor oil: 10 cc (0.61 cu in)

COOLING UNIT

ON-VEHICLE INSPECTION OF EXPANSION VALVE

1. Connect the manifold gauge set to the gauge fittings on the low- and high-pressure pipes.
2. Operate the engine at **1,500 rpm** and the air conditioner at MAX. COOLING.
3. Check the low and high pressures.
   Normal pressures are:
   Low: 197—294 kPa
   (2—3 kg/cm^2, 28—43 psi)
   High: 1472—1765 kPa
   (15—18 kg/cm^2, 210—260 psi)

If pressure is not as specified, replace the expansion valve.

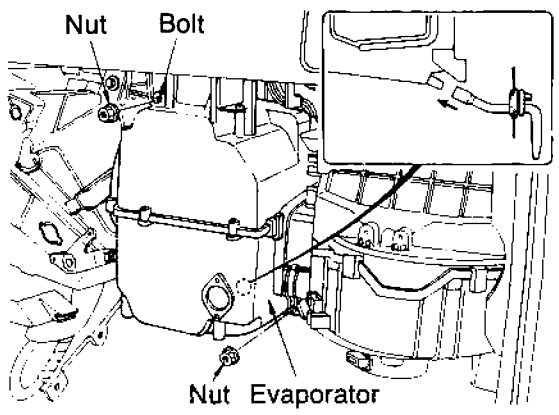
76G16X-623

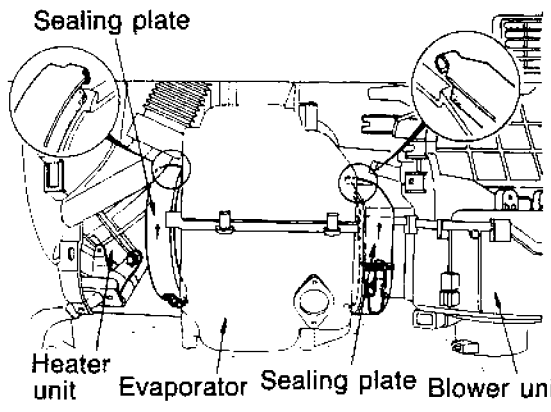
REMOVAL OF COOLING UNIT

1. Disconnect the battery ground cable.
2. Discharge the air conditioning system. (Refer to page 16—9.)
3. Disconnect the suction low-pressure pipe from the evaporator unit outlet fitting.
4. Disconnect the liquid line pipe from the evaporator unit inlet fitting.

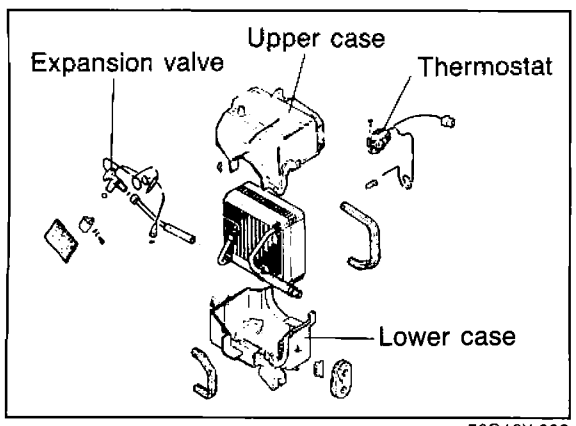
Note:
Plug all open fittings immediately to keep moisture out of the system.

5. Remove the grommets from the expansion valve.
6. Remove the instrument lower panel and the glove box.
7. Remove the sealing plates from both sides of the cooling unit.
8. Disconnect the A/C wiring harness from the evaporator unit.
9. Remove the drain hose from the cooling unit.
10. Remove the two nuts and the cooling unit.

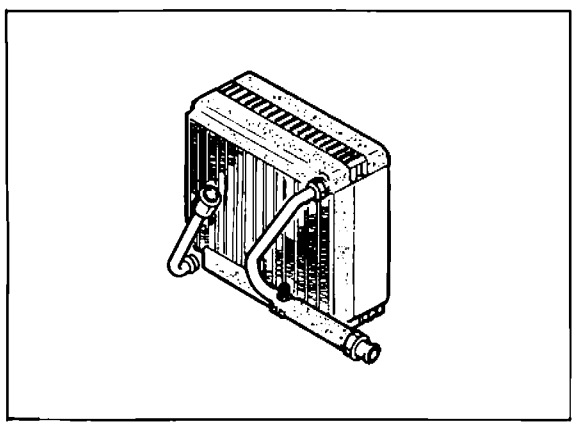




76G16X-624



76G16X-006



DISASSEMBLY OF COOLING UNIT

1. Remove the screws by using a screwdriver.
2. Remove the upper case.
3. Remove the thermostat.
4. Remove the lower case.
5. Remove the expansion valve.

INSPECTION OF EVAPORATOR

1. Check the evaporator fins for blockage. If the fins are clogged, clean them with compressed air.

   Caution:
   Never use water to clean the evaporator.

2. Check the fittings for cracks or scratches. Repair or replace, if necessary.

ASSEMBLY OF COOLING UNIT

1. Connect the expansion valve to the inlet fitting of the evaporator. Tighten the two bolts by using a wrench.

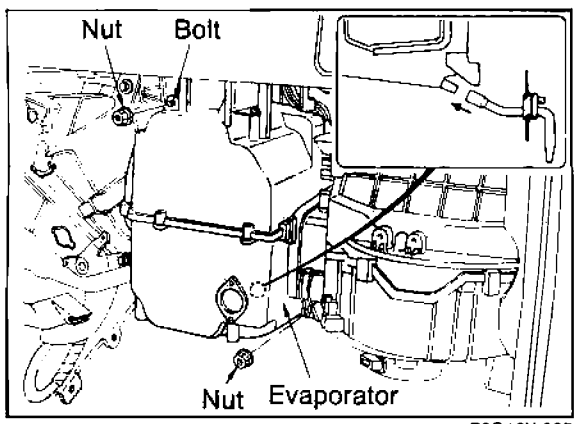
   Note:
   Be sure that the O-ring is positioned on the pipe fitting.

   Specified torque: 2.7—3.4 N·m
   (0.27—0.35 m-kg, 2.0—2.5 ft-lb)

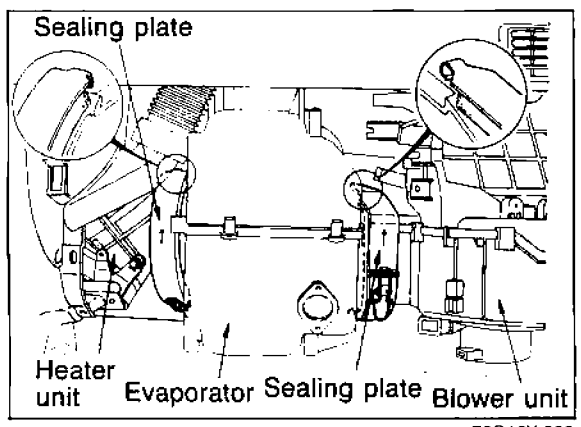
2. Install the lower case onto the evaporator.
3. Install the thermostat in its original position.
4. Install the lower case onto the evaporator.

69G16X-060

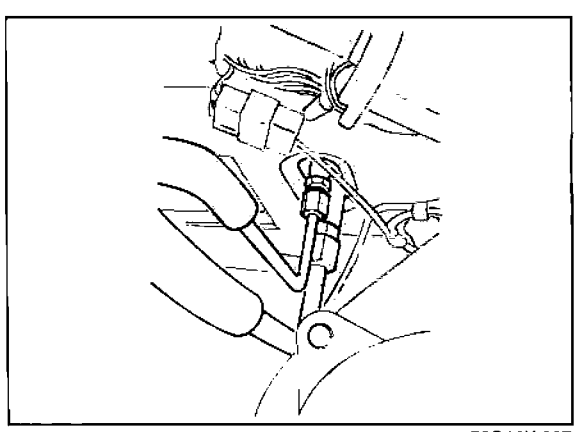
16 COOLING UNIT



76G16X-625



76G16X-626


76G16X-627

INSTALLATION OF COOLING UNIT

1. Install the cooling unit by using the two nuts.

   Note
   Adjust and position the unit so that its connections match those of the heater unit and the blower unit.

2. Connect the drain hose.
3. Join the connections on both sides by using the seal plates.
4. Connect the A/C harness to the cooling unit.
5. Connect the liquid line high-pressure pipe and suction low-pressure pipe to the cooling unit.

   Tightening torque:
   15—22 N·m (1.5—2.5 m-kg, 11—18 ft-lb)

6. Install the instrument lower panel, shower duct and glove box.
7. If the evaporator is replaced, add compressor oil to the compressor.

   Compressor oil: 50 cc (3.05 cu in)

REFRIGERANT LINES

ON-VEHICLE INSPECTION

1. Check all piping connections for leakage by using a leak detector. Replace if necessary.
2. Check that the hose and pipe clamps are not loose.
   Tighten or replace, if necessary.

REPLACEMENT OF REFRIGERANT LINES

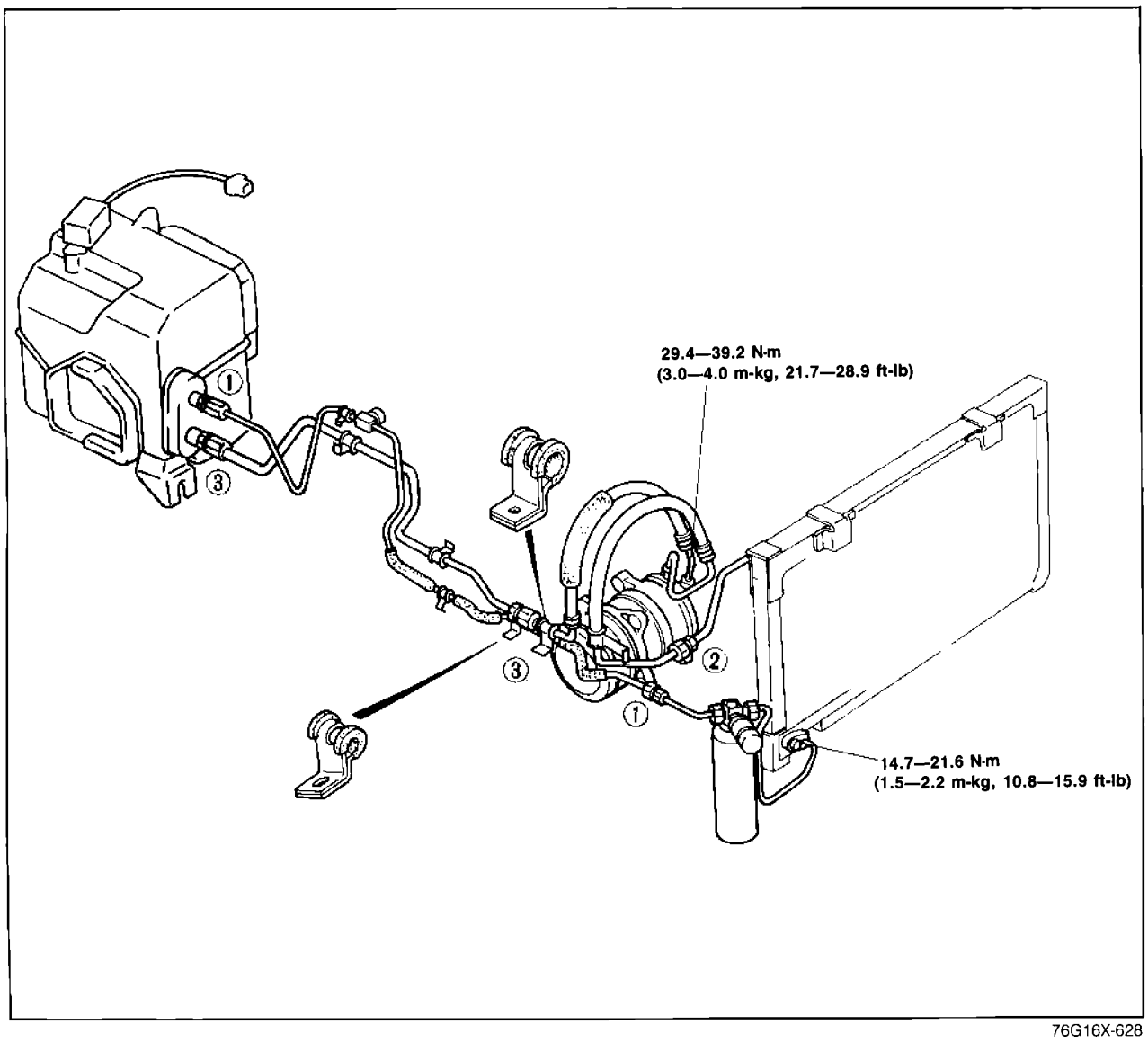
1. Discharge the air conditioning system. (Refer to page 16—9)
2. Replace the faulty pipe or hose.

Note:
Plug all open fittings immediately to keep moisture out of the system.

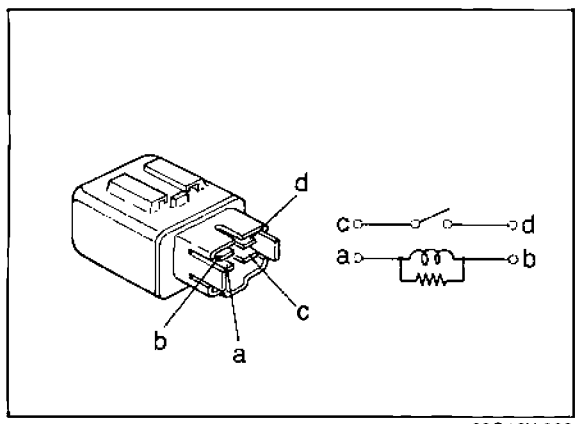
Tightening torque (fittings):

Location	Tightening torque
①	10—20 N·m (1.0—2.0 m-kg, 7.2—14.4 ft-lb)
②	15—25 N·m (1.5—2.5 m-kg, 10.8—18.0 ft-lb)
③	20—29 N·m (2.0—3.0 m-kg, 14.4—21.6 ft-lb)

3. Evacuate, charge, and test the air conditioning system. (Refer to page 16—9.)



76G16X-628



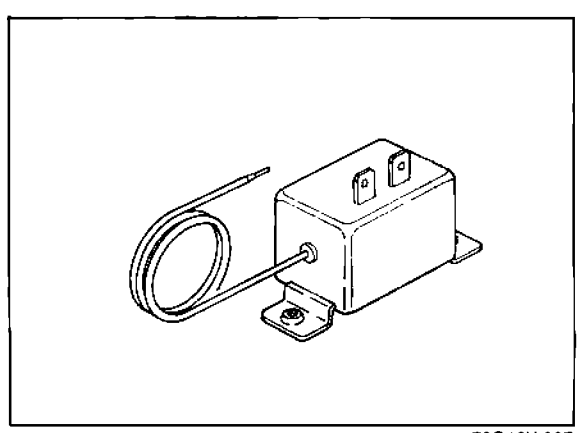
69G16X-063

A/C RELAY

REMOVAL OF RELAY
1. Disconnect the negative battery cable.
2. Disconnect the wire harness connector.
3. Remove the relay from the seal plate.

INSPECTION OF A/C RELAY
1. Using a circuit tester, check that there is continuity between terminals (a) and (b).
2. Apply 12 volts across terminals (a) and (b), and check whether there is continuity between terminals (c) and (d). Replace if necessary.

INSTALLATION OF A/C RELAY
1. Install the relay to the seal plate.
2. Connect the wire harness connector.
3. Connect the negative battery cable.



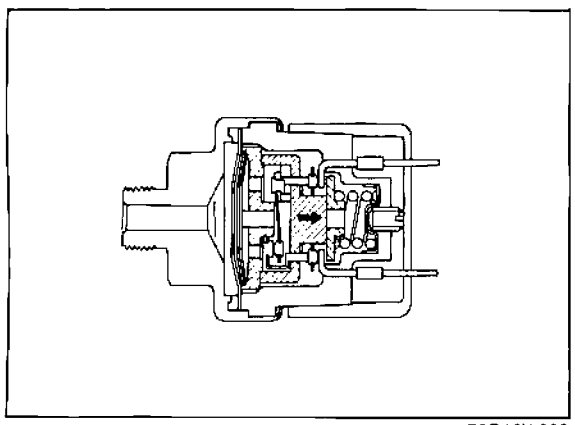
76G16X-007

THERMOSTAT

ON-VEHICLE INSPECTION
1. Operate the air conditioner at MAX. COOLING.
2. Turn the ECO switch to ON.
3. Block the air inlet of the blower unit with a thick piece of paper.
4. Check whether the relay is turned OFF when the temperature of the evaporator drops below **7°C (44.6°F)**.
5. Turn the ECO switch to OFF.
6. Check whether the relay's turned OFF when the temperature of the evaporator drops below **1°C (33.8°F)**.

REMOVAL OF THERMOSTAT
1. Disconnect the negative battery cable.
2. Disconnect the A/C wiring harness.
3. Remove the thermostat from the cooling unit.

INSTALLATION OF THERMOSTAT
1. Install the thermostat by using the two screws.
2. Connect the A/C wiring harness.
3. Connect the negative battery cable.

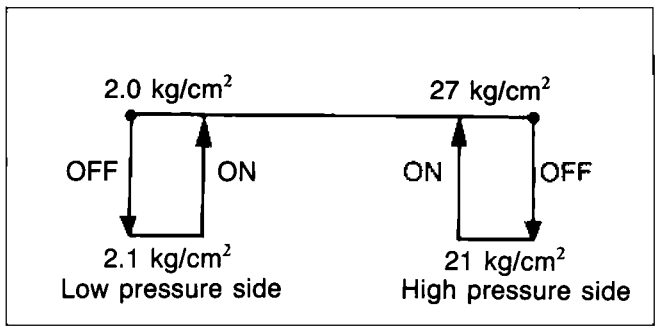


76G16X-008

REFRIGERANT PRESSURE SWITCH

- **Low-pressure side**
  If the high pressure in the system drops to below **196 kPa (2.0 kg/cm^2, 28.4 psi)** the switch cuts the compressor power supply and turns on at a pressure above **206 kPa (2.1 kg/cm^2, 30.0 psi)**.

- **High-pressure side**
  If the high pressure in the system exceeds **2,649 kPa (27 kg/cm^2, 384 psi)** the switch cuts the compressor power supply and turns on at a pressure above **2,060 kPa (21 kg/cm^2, 299 psi)**.



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30 TECHNICAL DATA

0. MEASUREMENT

Item \ Engine model			Coupe/MX-6	Sedan	Hatchback
Overall length		mm (in)	4,450 (175.2)	4,515 (177.8)	4,515 (177.8)
Overall width		mm (in)	1,690 (66.5)	1,690 (66.5)	1,690 (66.5)
Overall height (14 inch/13 inch)		mm (in)	1,360 (53.5)/1,345 (52.9)	1,410 (55.5)/1,395 (54.9)	1,375 (54.1)/1,360 (53.5)
Wheel base		mm (in)	2,515 (99.0)	2,575 (101.4)	2,575 (101.4)
Tread (14 inch/13 inch) mm (in)	Front		1,455 (57.3)/1,460 (57.5)	1,455 (57.3)/(1,460 (57.5)	1,455 (57.3)/1,460 (57.5)
	Rear		1,465 (57.7)/1,455 (57.3)	1,465 (57.7)/1,455 (57.3)	1,465 (57.7)/1,455 (57.3)

1A. ENGINE (SOHC)
12-valve

Item \ Engine model			FE 12-valve
Type			Gasoline, 4-cycle
Cylinder arrangement and number			In-line, 4-cylinders
Type of combustion chamber			Pentroof
Valve system			OHC, belt-driven
Bore x Stroke		mm (in)	86.0 x 86.0 (3.39 x 3.39)
Total piston displacement		cc (cu in)	1,998 (121.9)
Compression ratio			9.5 : 1
Compression pressure kPa (kg/cm^2, psi)-rpm	Standard		1,422 (14.5, 206)—280
	Minimum		996 (10.2, 144)—280
	Maximum difference between cylinders		196 (2.0, 28)
Valve timing	IN	Open BTDC	14°
		Close ABDC	56°
	EX	Open BBDC	69°
		Close ATDC	13°
Valve clearance		mm (in) IN	0; Maintenance free
		mm (in) EX	0; Maintenance free
Cylinder head			
Height		mm (in)	91.95—92.05 (3.620—3.624)
Distortion		mm (in) Maximum	0.15 (0.006)
Grinding limit		mm (in) Maximum	0.20 (0.008)
Valve and valve guide			
Valve head diameter		mm (in) IN	32.4—32.6 (1.276—1.283)
		mm (in) EX	33.9—34.1 (1.335—1.343)
Valve head thickness (margin)		mm (in) IN	0.8—1.2 (0.031—0.047)
		mm (in) EX	1.3—1.7 (0.051—0.067)
Valve face angle		IN	45°
		EX	45°
Valve length mm (in)	IN	Standard	115.81 (4.5594)
		Minimum	115.31 (4.5398)
	EX	Standard	116.21 (4.5752)
		Minimum	115.71 (4.5555)
Valve stem diameter		mm (in) IN	6.970—6.985 (0.2744—0.2750)
		mm (in) EX	6.965—6.980 (0.2742—0.2748)
Guide inner diameter		mm (in) IN	7.01—7.03 (0.2760—0.2768)
		mm (in) EX	7.01—7.03 (0.2760—0.2768)
Valve stem to guide clearance		mm (in) IN	0.025—0.060 (0.0010—0.0024)
		mm (in) EX	0.030—0.065 (0.0012—0.0026)
		Maximum	0.20 (0.0079)
Guide projection (Height "A")			mm (in) 19.8—20.3 (0.780—0.799)

Item			Engine model: FE 12-valve
Valve seat			
Seat angle		IN	45°
		EX	45°
Seat contact width mm (in)		IN	1.2—1.6 (0.047—0.063)
		EX	1.2—1.6 (0.047—0.063)
Seat sinking (Measure valve protruding length) mm (in)	IN	Standard	50.2 (1.976)
		Maximum	51.0 (2.008)
	EX	Standard	50.2 (1.976)
		Maximum	51.0 (2.008)
Valve spring			
Free length mm (in)	IN	Standard	49.5 (1.949)
		Minimum	49.0 (1.929)
	EX	Standard	50.4 (1.984)
		Minimum	48.7 (1.917)
Out-of-square mm (in)		Maximum	1.8 (0.071)
Setting load/height N (kg, lb)/mm (in)		IN	203—230 (20.7—23.4, 45.5—51.5)/41 (1.614)
		EX	240—272 (24.5—27.7, 53.9—60.9)/41 (1.614)
Camshaft			
Cam lobe height mm (in)	IN	Standard	41.290—41.390 (1.6256—1.6295)
		Minimum	41.140 (1.6197)
	EX	Standard	41.797—41.897 (1.6455—1.6495)
		Minimum	41.647 (1.6396)
Journal diameter mm (in)	Front and Rear (No. 1,5)		31.940—31.965 (1.2575—1.2585)
	Center (No. 2,3,4)		31.910—31.935 (1.2563—1.2573)
	Out-of-round	Maximum	0.05 (0.002)
Camshaft bearing oil clearance mm (in)	Front and Rear (No. 1,5)		0.035—0.085 (0.0014—0.0033)
	Center (No. 2,3,4)		0.065—0.115 (0.0026—0.0045)
		Maximum	0.15 (0.0059)
Camshaft runout mm (in)		Maximum	0.03 (0.0012)
Camshaft end play mm (in)		Standard	0.08—0.16 (0.003—0.006)
		Maximum	0.20 (0.008)
Rocker arm and rocker arm shaft			
Rocker arm inner diameter mm (in)			19.000—19.033 (0.748—0.749)
Rocker arm shaft diameter mm (in)			18.959—18.980 (0.746—0.747)
Rocker arm to shaft clearance mm (in)		Standard	0.020—0.074 (0.0008—0.0029)
		Maximum	0.10 (0.004)
Cylinder block			
Height mm (in)			289.0 (11.38)
Distortion mm (in)		Maximum	0.15 (0.006)
Grinding limit mm (in)			0.20 (0.008)
Cylinder bore diameter mm (in)	Standard		86.000—86.019 (3.3858—3.3866)
	0.25 (0.010) oversize		86.250—86.269 (3.3957—3.3964)
	0.50 (0.020) oversize		86.500—86.519 (3.4055—3.4062)
Cylinder bore taper and out-of-round mm (in)		Maximum	0.019 (0.0007)
Piston			
Piston diameter measured at 90° to pin bore axis and 18.0 mm (0.709 in) below oil ring groove mm (in)	Standard		85.944—85.964 (3.3836—3.3844)
	0.25 (0.010) oversize		86.194—86.214 (3.3935—3.3942)
	0.50 (0.020) oversize		86.444—86.464 (3.4033—3.4041)
Piston to cylinder clearance mm (in)		Standard	0.036—0.075 (0.0014—0.0030)
		Maximum	0.15 (0.0059)
Piston ring			
Thickness mm (in)		Top	1.47—1.49 (0.0579—0.0587)
		Second	1.47—1.49 (0.0579—0.0587)

Item		Engine model	FE 12-valve
End gap measured in cylinder	mm (in)	Top	0.20—0.35 (0.008—0.0138)
		Second	0.15—0.30 (0.006—0.012)
		Oil (rail)	0.20—0.70 (0.008—0.0276)
		Maximum	1.0 (0.039)
Ring groove width in piston	mm (in)	Top	1.52—1.54 (0.0598—0.0606)
		Second	1.52—1.54 (0.0598—0.0606)
		Oil	4.02—4.04 (0.1583—0.1591)
Clearance of piston ring to ring groove	mm (in)	Top	0.03—0.07 (0.0012—0.0028)
		Second	0.03—0.07 (0.0012—0.0028)
		Maximum	0.15 (0.006)
Piston pin			
Diameter	mm (in)		21.974—21.980 (0.8651—0.8654)
Interference in connecting rod	mm (in)		0.013—0.037 (0.0005—0.0015)
Piston to piston pin clearance	mm (in)		0.008—0.024 (0.0003—0.0009)
Installation pressure	N (kg, lb)		4,900—14,700 (500—1,500, 1,100—3,300)
Connecting rod and connecting rod bearing			
Length (Center to center)	mm (in)		151.95—152.05 (5.982—5.986)
Twisting and bending	mm (in)		0.06 (0.0024) max.
Small end bore	mm (in)		21.943—21.961 (0.8640—0.8646)
Big end bore	mm (in)		54.002—54.017 (2.1261—2.1266)
Big end width	mm (in)		26.838—26.890 (1.0566—1.0587)
Connecting rod side clearance	mm (in)	Standard	0.110—0.262 (0.004—0.010)
		Maximum	0.30 (0.012)
Crankshaft			
Crankshaft runout	mm (in)	Maximum	0.03 (0.0012)
Main journal diameter	mm (in)	Standard size	59.937—59.955 (2.3597—2.3604)
		0.25 (0.010) undersize, Standard	59.693—59.711 (2.3501—2.3508)
		0.25 (0.010) undersize, No.3	59.687—59.705 (2.3499—2.3506)
		0.50 (0.020) undersize, No. 1,2,4,5	59.443—59.461 (2.3403—2.3410)
		0.50 (0.020) undersize, No. 3	59.437—59.455 (2.3400—2.3407)
		0.75 (0.030) undersize, No. 1,2,4,5	59.193—59.211 (2.3304—2.3311)
		0.75 (0.030) undersize, No. 3	59.187—59.205 (2.3302—2.3309)
Main journal taper and out-of-round	mm (in)	Maximum	0.05 (0.0020)
Crankpin diameter	mm (in)	Standard	50.940—50.955 (2.0055—2.0061)
		0.25 (0.010) undersize	50.690—50.705 (1.9957—1.9963)
		0.50 (0.020) undersize	50.440—50.455 (1.9858—1.9864)
		0.75 (0.030) undersize	50.190—50.205 (1.9760—1.9766)
Crankpin taper and out-of-round	mm (in)	Maximum	0.05 (0.0020)
Main bearing			
Main journal bearing oil clearance	mm (in)	No. 1,2,4,5, Standard	0.025—0.043 (0.0010—0.0017)
		No. 1,2,4,5, Maximum	0.08 (0.0031)
		No. 3, Standard	0.031—0.049 (0.0012—0.0019)
		No. 3, Maximum	0.08 (0.0031)
Available undersize bearing	mm (in)		0.25 (0.010), 0.50 (0.020), 0.75 (0.030)
Crankpin bearing			
Crankpin bearing oil clearance	mm (in)	Standard	0.027—0.067 (0.0011—0.0026)
		Maximum	0.10 (0.0039)
Available undersize bearing	mm (in)		0.25 (0.010), 0.50 (0.020), 0.75 (0.030)
Thrust bearing (center main bearing)			
Crankshaft end play	mm (in)	Standard	0.08—0.18 (0.0031—0.0071)
		Maximum	0.30 (0.0118)
Bearing width	mm (in)	Standard	27.94—27.99 (1.100—1.102)
		0.25 (0.010) oversize	28.04—28.09 (1.104—1.106)
		0.50 (0.020) oversize	28.12—28.17 (1.107—1.109)
		0.75 (0.030) oversize	28.20—28.25 (1.110—1.112)

Item \ Engine model			FE 12-valve
Timing belt			
Belt deflection	mm (in)/98 N (10 kg, 22 lb)		5.5—6.5 (0.22—0.26)

8-valve

Item \ Engine model			FE 8-valve		F8		F6
			ECE	Middle East General	ECE	General	
Type			Gasoline, 4-cycle				
Cylinder arrangement and number			In-line, 4-cylinders				
Type of combustion chamber			Multispherical				
Valve system			OHC, belt-driven				
Bore x Stroke		mm (in)	86.0 x 86.0 (3.39 x 3.39)		86.0 x 77.0 (3.39 x 3.03)		81.0 x 77.0 (3.19 x 3.03)
Total piston displacement		cc (cu in)	1,998 (121.9)		1,789 (109.1)		1,587 (96.8)
Compression ratio			8.6 : 1				9.0 : 1
Compression pressure kPa (kg/cm², psi)-rpm	Standard		1,275 (13.0, 185)—270				1,128 (11.5, 164)—270
	Minimum		893 (9.1, 129)—270				790 (8.1, 114)—270
	Maximum difference between cylinders		196 (2.0, 28)				
Valve timing	IN	Open BTDC	16°	20°		17°	
		Close ABDC	54°	65°		56°	
	EX	Open BBDC	54°	65°		64°	
		Close ATDC	16°	20°		15°	
Valve clearance		mm (in) IN	0.30 (0.012)				
		mm (in) EX	0.30 (0.012)				
Cylinder head							
Height		mm (in)	91.95—92.05 (3.620—3.624)				
Distortion		mm (in) Maximum	0.15 (0.006)				
Grinding limit		mm (in) Maximum	0.20 (0.008)				
Valve and valve guide							
Valve head diameter		mm (in) IN	43.9—44.1 (1.728—1.736)				
		mm (in) EX	35.9—36.1 (1.413—1.421)				
Valve head thickness (margin)		mm (in) IN	0.8—1.2 (0.031—0.047)				
		mm (in) EX	1.3—1.7 (0.051—0.067)				
Valve face angle		IN	45°				
		EX	45°				
Valve length mm (in)	IN	Standard	111.89 (4.4051)				
		Minimum	111.39 (4.3854)				
	EX	Standard	111.69 (4.3972)				
		Minimum	111.19 (4.3776)				
Valve stem diameter		mm (in) IN	8.030—8.045 (0.3161—0.3167)				
		mm (in) EX	8.025—8.040 (0.3159—0.3165)				
Guide inner diameter		mm (in) IN	8.07—8.09 (0.3177—0.3185)				
		mm (in) EX	8.07—8.09 (0.3177—0.3185)				
Valve stem to guide clearance		mm (in) IN	0.025—0.060 (0.0010—0.0024)				
		mm (in) EX	0.030—0.065 (0.0012—0.0026)				
		Maximum	0.20 (0.0079)				
Guide projection (Height "A")		mm (in)	19.1—19.6 (0.752—0.772)				

Item			Engine model: FE 8-valve ECE	FE 8-valve Middle East General	F8	F6
Valve seat						
Seat angle		IN	45°			
		EX	45°			
Seat contact width mm (in)		IN	1.2—1.6 (0.047—0.063)			
		EX	1.2—1.6 (0.047—0.063)			
Seat sinking (Measure valve protruding length) mm (in)	IN	Standard	46.5 (1.831)			
		Maximum	48.0 (1.890)			
	EX	Standard	46.5 (1.831)			
		Maximum	48.0 (1.890)			
Valve spring						
Free length mm (in)	Outer	Standard	52.0 (2.047)	51.2 (2.016)	52.0 (2.047)	
		Minimum	51.5 (2.028)	50.6 (1.992)	51.5 (2.028)	
	Inner	Standard	44.0 (1.732)	45.7 (1.799)	44.0 (1.732)	
		Minimum	43.3 (1.705)	43.7 (1.720)	43.3 (1.705)	
Out-of-square mm (in)		Maximum	1.8 (0.071)			
Setting load/height N (kg, lb)/mm (in)		Outer	128 (13.1, 29)/136.5 (1.44)	124 (12.7, 28)/136.5 (1.44)	128 (13.1, 29)/36.5 (1.44)	
		Inner	189 (19.2, 42)/141 (1.61)	193 (19.6, 43)/141 (1.61)	189 (19.2, 42)/41 (1.61)	
Camshaft						
Cam lobe height mm (in)	IN	Standard	38.107—38.207 (1.5003—1.5042)			
		Minimum	37.957 (1.4944)			
	EX	Standard	38.110—38.210 (1.5004—1.5043)			
		Minimum	37.960 (1.4945)			
Journal diameter mm (in)	Front and Rear (No. 1,5)		31.940—32.035 (1.2575—1.2612)			
	Center (No. 2,3,4)		31.910—32.065 (1.2563—1.2624)			
	Out-of-round	Maximum	0.05 (0.002)			
Camshaft bearing oil clearance mm (in)	Front and Rear (No. 1,5)		0.035—0.085 (0.0014—0.0033)			
	Center (No. 2,3,4)		0.065—0.115 (0.0026—0.0045)			
		Maximum	0.15 (0.0059)			
Camshaft runout mm (in)		Maximum	0.03 (0.0012)			
Camshaft end play mm (in)		Standard	0.08—0.16 (0.003—0.006)			
		Maximum	0.20 (0.008)			
Rocker arm and rocker arm shaft						
Rocker arm inner diameter mm (in)			16.000—16.027 (0.6299—0.6310)			
Rocker arm shaft diameter mm (in)			15.966—15.984 (0.6286—0.6293)			
Rocker arm to shaft clearance mm (in)		Standard	0.016—0.061 (0.0006—0.0024)			
		Maximum	0.10 (0.004)			
Cylinder block						
Height mm (in)			289.0 (11.38)		268.5 (10.57)	
Distortion mm (in)		Maximum	0.15 (0.006)			
Grinding limit mm (in)			0.20 (0.008)			
Cylinder bore diameter mm (in)	Standard		86.000—86.019 (3.3858—3.3866)		81.000—81.019 (3.1890—3.1897)	
	0.25 (0.010) oversize		86.250—86.269 (3.3957—3.3964)		81.250—81.269 (3.1988—3.1996)	
	0.50 (0.020) oversize		86.500—86.519 (3.4055—3.4062)		81.500—81.519 (3.2087—3.2094)	
	0.75 (0.030) oversize		—		81.750—81.769 (3.2185—3.2192)	
	1.00 (0.039) oversize		—		82.000—82.019 (3.2283—3.2291)	
Cylinder bore taper and out-of-round mm (in)		Maximum	0.019 (0.0007)			
Piston						
Piston diameter measured at 90° to pin bore axis and 18.0 mm (0.709 in) below oil ring groove mm (in)	Standard		85.944—85.964 (3.3836—3.3844)		80.944—80.964 (3.1868—3.1876)	
	0.25 (0.010) oversize		86.194—86.214 (3.3935—3.3942)		81.194—81.214 (3.1966—3.1974)	
	0.50 (0.020) oversize		86.444—86.464 (3.4033—3.4041)		81.444—81.464 (3.2065—3.2072)	

Item \ Engine model			FE 8-valve ECE	FE 8-valve Middle East General	F8	F6
	0.75 (0.030) oversize			—		81.694—81.714 (3.2163—3.2171)
	1.00 (0.039) oversize			—		81.944—81.964 (3.2261—3.2269)
Piston and cylinder clearance mm (in)		Standard	0.036—0.075 (0.0014—0.0030)			
		Maximum	0.15 (0.0059)			
Piston ring						
Thickness mm (in)		Top	1.47—1.49 (0.0579—0.0587)			
		Second	1.47—1.49 (0.0579—0.0587)			
End gap measured in cylinder mm (in)		Top	0.20—0.35 (0.008—0.0138)			
		Second	0.15—0.30 (0.006—0.012)			
		Oil (rail)	0.20—0.70 (0.008—0.0276)			
		Maximum	1.0 (0.039)			
Ring groove width in piston mm (in)		Top	1.52—1.54 (0.0598—0.0606)			
		Second	1.52—1.54 (0.0598—0.0606)			
		Oil	4.02—4.04 (0.1583—0.1591)			
Clearance of piston ring to ring groove mm (in)		Top	0.03—0.07 (0.0012—0.0028)			
		Second	0.03—0.07 (0.0012—0.0028)			
		Maximum	0.15 (0.006)			
Piston pin						
Diameter mm (in)			21.974—21.980 (0.8651—0.8654)			
Interference in connecting rod mm (in)			0.013—0.037 (0.0005—0.0015)			
Piston to piston pin clearance mm (in)			0.008—0.024 (0.0003—0.0009)			
Installation pressure N (kg, lb)			4,900—14,700 (500—1,500, 1,100—3,300)			
Connecting rod and connecting rod bearing						
Length (Center to center) mm (in)			151.95—152.05 (5.982—5.986)			135.95—136.05 (5.352—5.356)
Twisting and bending mm (in)			0.06 (0.0024) max.			
Small end bore mm (in)			21.943—21.961 (0.8640—0.8646)			
Big end bore mm (in)			54.002—54.017 (2.1261—2.1266)			
Big end width mm (in)			26.838—26.890 (1.0566—1.0587)			
Connecting rod side clearance mm (in)		Standard	0.110—0.262 (0.004—0.010)			
		Maximum	0.30 (0.012)			
Crankshaft						
Crankshaft runout mm (in)		Maximum	0.03 (0.0012)			
Main journal diameter mm (in)	Standard size		59.937—59.955 (2.3597—2.3604)			
	0.25 (0.010) undersize	Standard	59.693—59.711 (2.3051—2.3508)			
		No. 3	59.687—59.705 (2.3499—2.3506)			
	0.50 (0.020) undersize	No. 1,2,4,5	59.443—59.461 (2.3403—2.3410)			
		No. 3	59.437—59.455 (2.3400—2.3407)			
	0.75 (0.030) undersize	No. 1,2,4,5	59.193—59.211 (2.3304—2.3311)			
		No. 3	59.187—59.205 (2.3302—2.3309)			
Main journal taper and out-of-round mm (in)		Maximum	0.05 (0.0020)			
Crankpin diameter mm (in)	Standard		50.940—50.955 (2.0055—2.0061)			
	0.25 (0.010) undersize		50.690—50.705 (1.9957—1.9963)			
	0.50 (0.020) undersize		50.440—50.455 (1.9858—1.9864)			
	0.75 (0.030) undersize		50.190—50.205 (1.9760—1.9766)			
Crankpin taper and out-of-round mm (in)		Maximum	0.05 (0.0020)			
Main bearing						
Main journal bearing oil clearance mm (in)	No. 1,2,4,5	Standard	0.025—0.043 (0.0010—0.0017)			
		Maximum	0.08 (0.0031)			
	No. 3	Standard	0.031—0.049 (0.0012—0.0019)			
		Maximum	0.08 (0.0031)			
Available undersize bearing mm (in)			0.25 (0.010), 0.50 (0.020), 0.75 (0.030)			
Crankpin bearing						
Crankpin bearing oil clearance mm (in)		Standard	0.027—0.067(0.0011—0.0026)			
		Maximum	0.10 (0.0039)			
Available undersize bearing mm (in)			0.25 (0.010), 0.50 (0.020), 0.75 (0.030)			

Item \ Engine model			FE 8-valve ECE	FE 8-valve Middle East General	F8	F6
Thrust bearing (center main bearing)						
Crankshaft end play mm (in)		Standard	0.08—0.18 (0.0031—0.0071)			
		Maximum	0.30 (0.0118)			
Bearing width mm (in)	Standard		27.94—27.99 (1.100—1.102)			
	0.25 (0.010) oversize		28.04—28.09 (1.104—1.106)			
	0.05 (0.020) oversize		28.12—28.17 (1.107—1.109)			
	0.75 (0.030) oversize		28.20—28.25 (1.110—1.112)			
Timing belt						
Belt deflection	mm (in)/98 N (10 kg, 22 lb)		5.5—6.5 (0.22—0.26)		4.0—5.0 (0.16—0.20)	

1B. ENGINE (DOHC)

Item \ Engine model			FE DOHC Leaded fuel	FE DOHC Unleaded fuel
Type			Gasoline, 4-cycle	
Cylinder arrangement and number			In-line, 4-cylinders	
Type of combustion chamber			Pentroof	
Valve system			OHC, belt-driven	
Bore x Stroke mm (in)			86.0 x 86.0 (3.39 x 3.39)	
Total piston displacement cc (cu in)			1,998 (121.9)	
Compression ratio			10.0 : 1	9.2 : 1
Compression pressure kPa (kg/cm², psi)-rpm	Standard		1,422 (14.5, 206)—290	1,373 (14.0, 199)—310
	Minimum		996 (10.2, 144)—290	961 (9.8, 139)—310
	Maximum difference between cylinders		196 (2.0, 28)	
Valve timing	IN	Open BTDC	10°	10°
		Close ABDC	60°	55°
	EX	Open BBDC	60°	55°
		Close ATDC	10°	10°
Valve clearance mm (in)		IN	0; Maintenance free	
		EX	0; Maintenance free	
Cylinder head				
Height mm (in)			133.95—134.05 (5.274—5.278)	
Distortion mm (in)		Maximum	0.15 (0.006)	
Grinding mm (in)		Maximum	0.20 (0.008)	
HLA to cylinder head clearance mm (in)		Standard	0.025—0.066 (0.0010—0.0026)	
		Maximum	0.18 (0.0071)	
Valve and valve guide				
Valve head diameter mm (in)		IN	33.6—33.8 (1.323—1.331)	
		EX	28.8—29.0 (1.134—1.142)	
Valve head thickness (margin) mm (in)		IN	1.0—1.7 (0.039—0.067)	
		EX	1.1—1.7 (0.043—0.067)	
Valve face angle		IN	45°	
		EX	45°	
Valve length mm (in)	IN	Standard	103.18 (4.0622)	
		Minimum	102.68 (4.0425)	
	EX	Standard	103.94 (4.0921)	
		Minimum	103.44 (4.0724)	
Valve stem diameter mm (in)		IN	5.970—5.985 (0.2350—0.2356)	
		EX	5.965—5.980 (0.2348—0.2354)	
Guide inner diameter mm (in)		IN	6.01—6.03 (0.2366—0.2374)	
		EX	6.01—6.03 (0.2366—0.2374)	
Valve stem to guide clearance mm (in)		IN	0.025—0.060 (0.0010—0.0024)	
		EX	0.030—0.065 (0.0012—0.0026)	
		Maximum	0.20 (0.0079)	
Guide projection (Height "A") mm (in)			11.4—11.9 (0.449—0.469)	

Item		Engine model	FE DOHC	
			Leaded fuel	Unleaded fuel
Valve seat				
Seat angle		IN	45°	
		EX	45°	
Seat contact width mm (in)		IN	1.2—1.6 (0.047—0.063)	
		EX	1.2—1.6 (0.047—0.063)	
Seat sinking (Measure valve protruding length) mm (in)	IN	Standard	36.8 (1.449)	
		Maximum	37.8 (1.488)	
	EX	Standard	36.8 (1.449)	
		Maximum	37.8 (1.488)	
Valve spring				
Free length mm (in)	Outer	Standard	39.1 (1.539)	
		Minimum	38.7 (1.524)	
	Inner	Standard	38.0 (1.496)	
		Minimum	37.7 (1.484)	
Out-of-square mm (in)		Maximum	Outer.....1.4 (0.055), Inner.....1.3 (0.051)	
Setting load/height N (kg, lb)/mm (in)		Outer	78 (8.0, 17.6)/31.5 (1.240)	
		Inner	123 (12.5, 27.5)/33.0 (1.299)	
Camshaft				
Cam lobe height mm (in)	IN	Standard	45.005—45.105 (1.772—1.776)	45.002—45.102 (1.772—1.776)
		Minimum	44.855 (1.7659)	44.852 (1.7658)
	EX	Standard	45.005—.45.105 (1.772—1.776)	45.002—45.102 (1.772—1.776)
		Minimum	44.855 (1.7659)	44.852 (1.7658)
Journal diameter mm (in)			29.940—29.965 (1.1787—1.1797)	
	Out-of-round	Maximum	0.05 (0.002)	
Camshaft bearing oil clearance mm (in)			0.035—0.085 (0.0014—0.0033)	
		Maximum	0.15 (0.0059)	
Camshaft runout mm (in)		Maximum	0.03 (0.0012)	
Camshaft end play mm (in)		Standard	0.08—0.10 (0.003—0.004)	
		Maximum	0.20 (0.008)	
Cylinder block				
Height mm (in)			289.0 (11.38)	
Distortion mm (in)		Maximum	0.15 (0.006)	
Grinding limit mm (in)			0.20 (0.008)	
Cylinder bore diameter mm (in)	Standard		86.000—86.019 (3.3858—3.3866)	
	0.25 (0.010) oversize		86.250—86.269 (3.3957—3.3964)	
	0.50 (0.020) oversize		86.500—86.519 (3.4055—3.4062)	
Cylinder bore taper and out-of-round mm (in)		Maximum	0.019 (0.0007)	
Piston				
Piston diameter measured at 90° to pin bore axis and 18.0 mm (0.709 in) below oil ring groove mm (in)	Standard		85.944—85.964 (3.3836—3.3834)	
	0.25 (0.010) oversize		86.194—86.214 (3.3935—3.3942)	
	0.50 (0.020) oversize		86.444—86.464 (3.4033—3.4041)	
Piston to cylinder clearance mm (in)		Standard	0.036—0.075 (0.0014—0.0030)	
		Maximum	0.15 (0.0059)	
Piston ring				
Thickness mm (in)		Top	1.47—1.49 (0.0579—0.0587)	
		Second	1.47—1.49 (0.0579—0.0587)	

Item		Engine model	FE DOHC	
			Leaded fuel	Unleaded fuel
End gap measured in cylinder	mm (in)	Top	0.20—0.35 (0.008—0.0138)	
		Second	0.15—0.30 (0.006—0.012)	
		Oil (rail)	0.20—0.70 (0.008—0.0276)	
		Maximum	1.0 (0.039)	
Ring groove width in piston	mm (in)	Top	1.52—1.54 (0.0598—0.0606)	
		Second	1.52—1.54 (0.0598—0.0606)	
		Oil	4.02—4.04 (0.1583—0.1591)	
Clearance of piston ring to ring groove	mm (in)	Top	0.03—0.07 (0.0012—0.0028)	
		Second	0.03—0.07 (0.0012—0.0028)	
		Maximum	0.15 (0.006)	
Piston pin				
Diameter	mm (in)		21.987—21.993 (0.8656—0.8659)	
Connecting rod to piston pin clearance	mm (in)		0.010—0.027 (0.0004—0.0011)	
Piston to piston pin clearance	mm (in)		−0.005—0.011 (−0.0002—0.0004)	
Connecting rod and connecting rod bearing				
Length (Center and center)	mm (in)		149.95—150.05 (5.904—5.907)	
Twisting and bending	mm (in)		0.06 (0.0024) max.	
Small end bore	mm (in)		22.003—22.014 (0.8663—0.8667)	
Big end bore	mm (in)		54.002—54.017 (2.1261—2.1266)	
Big end width	mm (in)		26.838—26.890 (1.0566—1.0587)	
Connecting rod side clearance	mm (in)	Standard	0.110—0.262 (0.004—0.010)	
		Maximum	0.30 (0.012)	
Crankshaft				
Crankshaft runout	mm (in)	Maximum	0.03 (0.0012)	
Main journal diameter	mm (in)	Standard size	59.937—59.955 (2.3597—2.3604)	
		0.25 (0.010) undersize	Standard	59.693—59.711 (2.3051—2.3508)
			No. 3	59.687—59.705 (2.3499—2.3506)
		0.50 (0.020) undersize	No. 1,2,4,5	59.443—59.461 (2.3403—2.3410)
			No. 3	59.437—59.455 (2.3400—2.3407)
		0.75 (0.030) undersize	No. 1,2,4,5	59.193—59.211 (2.3304—2.3311)
			No. 3	59.187—59.205 (2.3302—2.3309)
Main journal taper and out-of-round	mm (in)	Maximum	0.05 (0.0020)	
Crankpin diameter	mm (in)	Standard	50.940—50.955 (2.0055—2.0061)	
		0.25 (0.010) undersize	50.690—50.705 (1.9957—1.9963)	
		0.50 (0.020) undersize	50.440—50.455 (1.9858—1.9864)	
		0.75 (0.030) undersize	50.190—50.205 (1.9760—1.9766)	
Crankpin taper and out-of-round	mm (in)	Maximum	0.05 (0.0020)	
Main bearing				
Main journal bearing oil clearance	mm (in)	No. 1,2,4,5	Standard	0.025—0.043 (0.0010—0.0017)
			Maximum	0.08 (0.0031)
		No. 3	Standard	0.031—0.049 (0.0012—0.0019)
			Maximum	0.08 (0.0031)
Available undersize bearing	mm (in)		0.25 (0.010), 0.50 (0.020), 0.75 (0.030)	
Crankpin bearing				
Crankpin bearing oil clearance	mm (in)	Standard	0.027—0.067 (0.0011—0.0026)	
		Maximum	0.10 (0.0039)	
Available undersize bearing	mm (in)		0.25 (0.010), 0.50 (0.020), 0.75 (0.030)	
Thrust bearing (center main bearing)				
Crankshaft end play	mm (in)	Standard	0.08—0.18 (0.0031—0.0071)	
		Maximum	0.30 (0.0118)	
Bearing width	mm (in)	Standard	27.94—27.99 (1.100—1.102)	
		0.25 (0.010) oversize	28.04—28.09 (1.104—1.106)	
		0.50 (0.020) oversize	28.12—28.17 (1.107—1.109)	
		0.75 (0.030) oversize	28.20—28.25 (1.110—1.112)	
Timing belt				
Belt deflection	mm (in)/98 N (10 kg, 22 lb)		7.5—8.5 (0.30—0.33)	

1C. ENGINE (DIESEL)

Item \ Engine model			RF-CX	RF-N
Type			Diesel, 4-cycle	
Cylinder arrangement and number			In-line, 4-cylinders	
Type of combustion chamber			Swirl chamber	
Valve system			OHC, belt-driven	
Bore x Stroke mm (in)			86.0 x 86.0 (3.39 x 3.39)	
Total piston displacement cc (cu in)			1,998 (121.9)	
Compression ratio			21.1 : 1	22.7 : 1
Compression pressure kPa (kg/cm², psi)-rpm	Standard		2,943 (30, 427)-200	
	Minimum		2,649 (27, 384)-200	
	Maximum difference between cylinders		294 (3.0, 43)	
Valve timing	IN	Open BTDC	13°	13°
		Close ABDC	15°	39°
	EX	Open BBDC	60°	60°
		Close ATDC	8°	8°
Valve clearance mm (in)		IN	Cold: 0.25 (0.010), Warm: 0.30 (0.012)	
		EX	Cold: 0.35 (0.014), Warm: 0.40 (0.016)	
Cylinder head				
Height mm (in)			133.9—134.1 (5.272—5.280)	
Distortion mm (in)			0.10 (0.004) max.	
Length of cylinder head bolt below head mm (in)		Standard	113.2—113.8 (4.457—4.480)	
		Maximum	114.5 (4.508)	
Combustion chamber insert				
Recession mm (in)			0.020 (0.0008)	
Projection mm (in)			0.005 (0.0001)	
Valve and valve guide				
Valve head diameter mm (in)		IN	39.3—39.5 (1.547—1.555)	40.9—41.1 (1.610—1.618)
		EX	35.0—35.2 (1.378—1.386)	35.9—36.1 (1.413—1.421)
Valve head thickness (margin) mm (in)		IN	1.80 (0.071)	0.80 (0.031)
		EX	1.65 (0.065)	0.80 (0.031)
Valve face angle		IN	60°	45°
		EX	45°	
Valve length mm (in)		IN	106.9 (4.209)	
		EX	106.8 (4.205)	
Valve stem diameter mm (in)		IN	7.970—7.985 (0.3138—0.3144)	
		EX	7.965—7.980 (0.3136—0.3142)	
Guide inner diameter mm (in)		IN	8.025—8.045 (0.3159—0.3167)	
		EX	8.025—8.045 (0.3159—0.3167)	
Valve stem to guide clearance mm (in)		IN	0.040—0.075 (0.0016—0.0030)	
		EX	0.045—0.080 (0.0018—0.0031)	
		Maximum	0.1 (0.004)	
Guide projection (Height "A") mm (in)			8.3—8.8 (0.327—0.346)	
Valve seat				
Seat angle		IN	60°	45°
		EX	45°	
Seat contact width mm (in)		IN	1.4—1.8 (0.055—0.071)	1.7—2.3 (0.067—0.091)
		EX	1.64—2.04 (0.065—0.080)	1.7—2.3 (0.067—0.091)
Seat sinking (Measure valve recession) mm (in)	IN	Standard	0.75—1.05 (0.030—0.041)	
		Maximum	2.55 (0.100)	
	EX	Standard	0.75—1.05 (0.030—0.041)	
		Maximum	2.55 (0.100)	
Valve spring				
Free length mm (in)		Standard	45.11 (1.776)	
		Minimum	44.8 (1.764)	

Item	Engine model		RF-CX	RF-N
Out-of-square	mm (in)		1.6 (0.063)/2° max.	
Setting load/height	N (kg. lb)/mm (in)		275 (28.0, 62)/39.0 (1.535)	
Tappet				
Tappet outer diameter	mm (in)		34.95—34.97 (1.3764—1.3768)	
Tappet hole diameter	mm (in)		34.99—35.01 (1.3776—1.3787)	
Tappet to tappet hole clearance	mm (in)	Standard	0.02—0.06 (0.0008—0.0024)	
		Maximum	0.10 (0.004)	
Camshaft and camshaft caps				
Cam lobe height mm (in)	IN	Standard	42.521 (1.6741)	44.306 (1.7443)
		Minimum	42.11 (1.658)	43.90 (1.728)
	EX	Standard	45.300 (1.7835)	
		Minimum	44.90 (1.768)	
Journal diameter	mm (in)	Standard	31.959—31.975 (1.2582—1.2589)	
		Out-of-round	0.05 (0.0020) max.	
Camshaft bearing oil clearance	mm (in)	Standard	0.025—0.066 (0.0010—0.0026)	
		Maximum	0.10 (0.004)	
Camshaft run-out (deflection)	mm (in)		0.10 (0.004) max.	
Camshaft end play	mm (in)	Standard	0.02—0.15 (0.0008—0.0059)	
		Maximum	0.20 (0.008)	
Cylinder block				
Height	mm (in)		301.5 (11.87)	
Distortion	mm (in)		0.10 (0.004) max.	
Cylinder bore diameter mm (in)	Standard size		86.000—86.022 (3.3858—3.3867)	
	0.25 (0.010) oversize		86.250—86.272 (3.3957—3.3965)	
	0.50 (0.020) oversize		86.500—86.522 (3.4055—3.4064)	
Cylinder bore taper and out-of-round	mm (in)		0.022 (0.0009) max.	
Piston				
Piston diameter (Measured at 90° to pin bore axis and 19 mm (0.75 in) above the bottom of piston) mm (in)	Standard size		85.957—85.983 (3.3841—3.3852)	
	0.25 (0.010) oversize		86.207—86.233 (3.3940—3.3950)	
	0.50 (0.020) oversize		86.457—86.483 (3.4038—3.4048)	
Piston and cylinder clearance	mm (in)	Standard	0.032—0.050 (0.0013—0.0020)	
		Maximum	0.15 (0.0059)	
Piston ring				
Thickness	mm (in)	Top	1.97—1.99 (0.0776—0.0783)	
		Second	1.97—1.99 (0.0776—0.0783)	
End gap (measured in the cylinder)	mm (in)	Top	0.20—0.35 (0.008—0.014)	0.20—0.40 (0.008—0.016)
		Second	0.20—0.35 (0.008—0.014)	0.20—0.40 (0.008—0.016)
		Oil (rail)	0.20—0.40 (0.008—0.016)	
		Maximum	1.0 (0.039)	
Ring groove width in piston	mm (in)	Top	2.17—2.19 (0.0854—0.0862)	2.04—2.06 (0.0803—0.0811)
		Second	2.03—2.05 (0.0799—0.0807)	
		Oil	4.02—4.04 (0.1583—0.1591)	
Clearance of piston ring to ring groove mm (in)		Top	0.18—0.22 (0.0071—0.0087)	0.05—0.09 (0.0020—0.0035)
		Second	0.04—0.08 (0.0016—0.0031)	
		Maximum	0.2 (0.008)	
Piston pin				
Piston pin hole diameter (in piston)			29.997—30.007 (1.1810—1.1814)	24.997—25.007 (0.9841—0.9845)
Diameter	mm (in)		29.994—30.000 (1.1809—1.1811)	24.994—25.000 (0.9840—0.9843)
Clearance in connecting rod bushing	mm (in)		0.05 (0.002) max.	

Item \ Engine model			RF-CX	RF-N
Connecting rod and connecting rod bearing				
Length (Center to center)		mm (in)	151.95—152.05 (5.9823—5.9862)	
Maximum twisting and bending		mm (in)	0.080 (0.0031) per 50 (1.969)	
Small end bushing inner diameter		mm (in)	30.014—30.030 (1.1817—1.1823)	25.014—25.030 (0.9848—0.9854)
Big end bore		mm (in)	54.002—54.017 (2.1261—2.1266)	
Big end width		mm (in)	25.900—26.100 (1.0197—1.0276)	
Connecting rod side clearance	mm (in)	Standard	0.11—0.262 (0.0043—0.0103)	
		Maximum	0.30 (0.012)	
Crankshaft				
Crankshaft runout		mm (in)	0.05 (0.002) max.	
Main journal diameter	Standard size	Standard	59.937—59.955 (2.3597—2.3604)	
mm (in)		Minimum	59.89 (2.358)	
	0.25 (0.010) undersize	Standard	59.687—59.705 (2.3499—2.3506)	
		Minimum	59.64 (2.348)	
	0.50 (0.020) undersize	Standard	59.437—59.455 (2.3400—2.3407)	
		Minimum	59.39 (2.338)	
	0.75 (0.030) undersize	Standard	59.187—59.205 (2.3302—2.3309)	
		Minimum	59.14 (2.328)	
Main journal taper and out-of-round		mm (in)	0.05 (0.002) max.	
Crankpin diameter	Standard size	Standard	50.940—50.955 (2.0055—2.0061)	
mm (in)		Minimum	50.89 (2.004)	
	0.25 (0.010) undersize	Standard	50.690—50.705 (1.9957—1.9963)	
		Minimum	50.64 (1.994)	
	0.50 (0.020) undersize	Standard	50.440—50.455 (1.9858—1.9864)	
		Minimum	50.39 (1.984)	
	0.75 (0.030) undersize	Standard	50.190—50.205 (1.9760—1.9766)	
		Minimum	50.14 (1.974)	
Crankpin taper and out-of-round		mm (in)	0.05 (0.002) max.	
Main bearing				
Main journal bearing oil clearance		Standard	0.031—0.050 (0.0012—0.0020)	
mm (in)		Maximum	0.08 (0.0031)	
Available undersize bearing		mm (in)	0.25 (0.010), 0.50 (0.020), 0.75 (0.030)	
Crankpin bearing				
Crankpin bearing oil clearance	mm (in)	Standard	0.027—0.055 (0.0011—0.0022)	
		Maximum	0.08 (0.0031)	
Available undersize bearing		mm (in)	0.25 (0.010), 0.50 (0.020), 0.75 (0.030)	
Thrust bearing (center main bearing)				
Crankshaft end play	mm (in)	Standard	0.04—0.282 (0.0016—0.0111)	
		Maximum	0.30 (0.012)	
Bearing width mm (in)	Standard size		2.00—2.05 (0.0787—0.0807)	
	Oversize		2.175—2.225 (0.0856—0.0876)	
Timing belt				
Deflection		mm (in)/N (kg, lb)	9.0—11.5 (0.35—0.45)/98 (10, 22)	
Drive belt deflection				
Alternator	mm (in)	New	8—10 (0.31—0.39)	
		Used	9—11 (0.35—0.43)	
A/C compressor	mm (in)	New	8.5—9.5 (0.33—0.37)	
		Used	9.5—10.5 (0.37—0.41)	
Vacuum pump	mm (in)	New	7.5—8.5 (0.30—0.33)	
		Used	8.5—9.5 (0.33—0.37)	
P/S pump with vacuum pump	mm (in)	New	6.5—7.5 (0.26—0.30)	
		Used	7.0—8.0 (0.28—0.31)	
Pressure wave supercharger	mm (in)	New	4.0—5.0 (0.16—0.20)	
		Used	4.5—5.5 (0.18—0.22)	

30 TECHNICAL DATA

2A. LUBRICATION SYSTEM (GASOLINE)

Item \ Engine model			FE DOHC	F6, F8, FE SOHC
Lubrication method			Force-fed	
Oil pump				
Type			Trochoid gear	Crescent gear
Regulated pressure		kPa (kg/cm², psi)	490 (5.0, 71)	392 (4.0, 57)
Oil pressure	kPa (kg/cm², psi)	1,000 rpm	147—245 (1.5—2.5, 21—36)	
		3,000 rpm	343—441 (3.5—4.5, 50—64)	294—392 (3.0—4.0, 43—57)
Inner rotor tooth tip to outer rotor clearance	mm (in)	Standard	0.044—0.084 (0.0017—0.0033)	—
		Maximum	0.18 (0.0071)	
Outer rotor to body clearance	mm (in)	Standard	0.09—0.176 (0.0035—0.0069)	
		Maximum	0.20 (0.008)	
Side clearance	mm (in)	Standard	0.03—0.09 (0.0012—0.0035)	
		Maximum	0.10 (0.004)	
Inner gear tooth tip to crescent clearance	mm (in)	Standar	—	0.267—0.38 (0.011—0.015)
		Maximum		0.40 (0.016)
Outer gear tooth tip to crescent clearance	mm (in)	Standard		0.20—0.32 (0.008—0.0126)
		Maximum		0.35 (0.0138)
Outer gear to body clearance	mm (in)	Standard		0.09—0.184 (0.0035—0.0072)
		Maximum		0.20 (0.008)
Side clearance	mm (in)	Standard		0.03—0.063 (0.0012—0.0025)
		Maximum		0.10 (0.004)
Oil filter				
Type			Full flow, paper element	
Relief pressure differential		kPa (kg/cm², psi)	78—118 (0.8—1.2, 11—17)	
Oil cooler				
Type			Water cooled	
Oil pressure switch				
Activation pressure		kPa (kg/cm², psi)	29 (0.3, 4.3)	
Engine oil				
Capacity	liters (US qt, Imp qt)	Total (dry engine)	4.3 (4.5, 3.8)	
		Oil pan	3.6 (3.8, 3.2)	
		Oil filter	0.2 (0.21, 0.18)	0.3 (0.32, 0.26)
Grade (API service)			SD, SE, or SF	
Viscosity number	30°C (86°F) or over		SAE 40	
	0°C—40°C (32°F—104°F)		SAE 30	
	−10°C—20°C (14°F—68°F)		SAE 20W-20	
	−10°C—50°C (14°F—122°F) or over		SAE 20W-40 or 20W-50	
	−25°C—30°C (−13°F—86°F)		SAE 10W-30	
	−25°C—50°C (−13°F—122°F) or over		SAE 10W-40 or 10W-50	
	0°C—30°C (32°F—−22°F) or below		SAE 5W-30	
	−20°C (−4°F) or below		SAE 5W-20	

2B. LUBRICATION SYSTEM (DIESEL)

Item \ Engine moded			RF-CX	RF-N
Lubrication method			Force-fed type	
Oil pump				
Type			Trochoid gear	
Gear width		mm (in)	7 (0.28)	
Regulated pressure		kPa (kg/cm², psi)	510—618 (5.2—6.3, 74—90)	
Oil pressure	kPa (kg/cm², psi)	1,000 rpm	147—245 (1.5—2.5, 21—36)	
		3,000 rpm	343—441 (3.5—4.5, 50—64)	
Inner rotor tooth tip to outer rotor clearance	mm (in)	Standard	0.2 (0.008) or less	
		Maximum	0.24 (0.009)	
Outer rotor to pump body clearance	mm (in)	Standard	0.09—0.184 (0.0035—0.0071)	
		Maximum	0.22 (0.009)	
Side clearance	mm (in)	Standard	0.03—0.09 (0.0012—0.0036)	
		Maximum	0.14 (0.006)	
Oil filter				
Type			Combined, paper element	
Relief pressure differential		kPa (kg/cm², psi)	78—118 (0.8—1.2, 11—17)	
Oil cooler				
Type			Water cooled, 10 layer	Water cooled, 4 layer
Oil filter body				
Regulated pressure		kPa (kg/cm², psi)	402—481 (4.1—4.9, 58—70)	
Oil cooler relief pressure differential		kPa (kg/cm², psi)	177—216 (1.8—2.2, 26—31)	
Oil pressure switch				
Activation pressure		kPa (kg/cm², psi)	20—39 (0.2—0.4, 2.8—5.7)	
Engine oil				
Capacity	liters (US qt, Imp qt)	Total (dry engine)	6.1 (6.4, 5.4)	
		Oil pan	5.0 (5.3, 4.4)	
		Oil filter	0.5 (0.52, 0.44)	
Grade		API service	CC	CC, CD
Viscosity number	40°C or over (104°F) or over		SAE 40	
	0°C—40°C (32°F—100°F)		SAE 30	
	−10°C—35°C (15°F—90°F)		SAE 15W-40	
	−10°C—25°C (15°F—77°F)		SAE 20W-20	
	−25°C—30°C (−18°F—86°F)		SAE 10W-30	
	−20°C or below (4°F or below)		SAE 5W-30	

3A. COOLING SYSTEM (GASOLINE)

Item \ Engine model			FE DOHC	F6, F8, FE SOHC	
				ECE, Hong Kong Singapore	Middle East General
Cooling method			Water-cooled, forced circulation		
Water pump					
Type			Centrifugal, timing belt driven		
Impeller diameter	mm (in)		70 (2.76)		
Number of impeller blades			6		
Speed ratio			1 : 1.00	1 : 1.05	
Water seal type			Unified mechanical seal		
Thermostat					
Type			Wax, 2-stage	Wax	
Start to open	°C (°F)		Sub: 83.5–86.5 (182–188) Main: 86.5–89.5 (188–193)	86.5–89.5 (188–193)	80.5–83.5 (177–182)
Full open	°C (°F)		100 (212)		95 (203)
Lift	mm (in)		Sub: 1.5 (0.06) min. Main: 8.0 (0.31) min.	8.5 (0.33) min.	
Radiator					
Type			Corrugated fin		
Cap opening valve pressure	kPa (kg/cm², psi)		74—103 (0.75—1.05, 11—15)		
Cooling system pressure	kPa (kg/cm², psi)		103 (1.05, 15)		
Cooling fan					
Type			Electric		
Capacity	W	MTX	80		
		ATX	—	120	
Current	A	MTX	5.6—7.6		
		ATX	—	8.0—11.0	
Number of blades			4		
Outer diameter	mm (in)	MTX	320 (12.6)		
		ATX	340 (13.4)		
Switching temperature OFF → ON	°C(°F)		97 (207)		91 (196)
Coolant					
Capacity	liters (US qt, Imp qt)	With heater	7.5 (7.9, 6.6)		
		Without heater	7.0 (7.4, 6.2)		

Antifreeze solution	Protection	Mixture percentage (volume) %		Specific gravity of mixture at 20°C (68°F)
		Water	Solution	
	Above –16°C (3°F)	65	35	1.054
	Above –26°C (–15°F)	55	45	1.066
	Above –40°C (–40°F)	45	55	1.078

3B. COOLING SYSTEM (DIESEL)

Item \ Engine model		RF-CX, RF-N	
Cooling method		Water-cooled, forced circulation	
Water pump			
Type		Centrifugal, timing belt driven	
Water seal type		Unified mechanical seal	
Thermostat			
Type		Wax, two stage	
Start to open	°C (°F)	Main valve: 86.5—89.5 (188—193)	Sub valve: 78.5—81.5 (173—179)
Full open lift	mm (in)/°C (°F)	Main valve: 8.0 (0.31) min./100 (212)	Sub valve: 1.5 (0.06) min./100 (212)
Radiator			
Type		Corrugated fin	
Cap opening valve pressure	kPa (kg/cm², psi)	74—103 (0.75—1.05, 11—15)	
Cooling circuit checking pressure	kPa (kg/cm², psi)	103 (1.05, 15)	
Cooling fan			
Type		Electric	
Number of blade		4	
Outer diameter	mm (in)	340 (13.4)	
Switching temperature OFF → ON	°C (°F)	91 (196)	
Voltage	V	12	
Capacity	W-A	120—8.0-11.0	
Coolant			
Capacity liters (US qt, Imp qt)	With heater	9.5 (10.0, 8.4)	
	Without heater	9.0 (9.5, 7.9)	

Antifreeze solution	Protection	Mixture percentage (Volume)		Specific gravity of mixture at 20°C (68°F)
		Water	Solution	
	Above −16°C (3°F)	65	35	1.054
	Above −26°C (−15°F)	55	45	1.066
	Above −40°C (−40°F)	45	55	1.078

4A. FUEL AND EMISSION CONTROL SYSTEM (CARBURETOR)
F6 and F8 Engine

Engine				F6		F8	
Spec.				General	Singapore	General	ECE, Hong Kong, & Singapore
Idle speed	rpm	MTX		800 $^{+50}_{0}$			
		ATX (in N range)		—	950 $^{+50}_{0}$	900 $^{+50}_{0}$	
CO concentration	%			2.0 ± 0.5			
Carburetor							
Type				Down draft, two barrel			
Throat diameter	mm (in)	Primary		30 (1.18)			
		Secondary		34 (1.34)			
Venturi diameter	mm (in)	Primary		23.5 (0.93)			
		Secondary		29.0 (1.14)			
Main nozzle	mm (in)	Primary		2.6 (0.10)			
		Secondary		2.8 (0.11)			
Main jet	mm (in)	Primary	MTX	1.10 (0.0433)	1.09 (0.0429)	1.14 (0.045)	
			ATX		1.08 (0.0425)	1.12 (0.044)	
		Secondary		1.50 (0.059)			
Main air bleed	mm (in)	Primary	MTX	0.60 (0.024)	0.60 (0.024)	0.55 (0.022)	
			ATX		0.80 (0.031)	0.60 (0.024)	
		Secondary		0.50 (0.020)			
Slow jet	mm (in)	Primary		0.48 (0.019)	0.46 (0.018)		
		Secondary		1.00 (0.039)		1.10 (0.043)	
Slow air bleed	mm (in)	Primary	No. 1	0.80 (0.031)			
			No. 2	1.90 (0.075)			
		Secondary	No. 1	1.00 (0.039)		0.80 (0.031)	
			No. 2	0.50 (0.020)			
Power jet	mm (in)			0.50 (0.020)			
Fast idle adjustment Clearance between primary throttle valve and bore	mm (in)			1.40—1.76(0.055—0.069)		MTX: 0.48—0.64 (0.019—0 025) ATX: 0.56—0.72 (0.022—0.028)	
Float level adjustment	mm (in)	Max. fuel flow "L"		44 (17.3)			
		Clearance between float and air horn without gasket					
		Fuel stop "H"		12.5 (0.49)			
		Clearance between float and air horn/without gasket; float lowered by own weight					
Choke breaker diaphragm	mmHg (in Hg)	Start		180—240 (7.1—9.5)		100—160 (3.9—6.3)	
		Stop		290—350 (11.4—13.8)		220—280 (8.7—11.0)	
Choke opener	mmHg (in Hg)	Start		—	35—65 (1.4—2.6)	—	35—65 (1.4—2.6)
		Stop		—	130—190 (5.1—7.5)	—	130—190 (5.1—7.5)
Accelerator linkage							
Free play of cable at carburetor	mm (in)			1—3 (0.039—0.118)			
Fuel tank							
Capacity	Liters (US gal, Imp gal)			60 (15.9, 13.2)			
Fuel pump							
Type				Mechanical pump			
Delivery pressure	kPa (kg/cm², psi)			20—26 (0.20—0.27, 2.8—3.8)			
Feeding capacity	cc/min (cu in/min)			More than 860 (52.5) at idle			
Fuel filter							
Type				Paper element with magnet			
Air cleaner							
Fresh-Hot switching				Manual	Diaphragm type		
Element type				Oil permeated paper			
Fuel specification				Leaded regular			

FE Engine

Engine			8 Valve		12 Valve	8 Valve
Spec.			General	Middle East	ECE, Hong Kong, & Singapore	Unleaded Fuel (West Germany)
Idle speed	rpm	MTX	800 $^{+50}_{0}$			850
		ATX	900 $^{+50}_{0}$ (in N range)			
CO concentration	%		2.0 ± 0.5			
Carburetor						
Type			Down draft, two barrel			
Throat diameter	mm (in)	Primary	30 (1.18)			
		Secondary	34 (1.34)			
Venturi diameter	mm (in)	Primary	23.5 (0.93)			
		Secondary	29.0 (1.14)			
Main nozzle	mm (in)	Primary	2.6 (0.10)			
		Secondary	2.8 (0.11)			
Main jet	mm (in)	Primary MTX	1.14 (0.045)	1.09 (0.0429)	1.14 (0.045)	1.09 (0.0429)
		Primary ATX	1.12 (0.044)	1.08 (0.0425)	1.12 (0.044)	
		Secondary	1.55 (0.061)	1.50 (0.059)	1.55 (0.061)	1.50 (0.059)
Main air bleed	mm (in)	Primary MTX	0.50 (0.020)	0.60 (0.024)	0.50 (0.020)	0.50 (0.020)
		Primary ATX	0.55 (0.022)	0.80 (0.031)	0.55 (0.022)	
		Secondary	0.50 (0.020)			
Slow jet	mm (in)	Primary	0.46 (0.018)			
		Secondary MTX	1.10 (0.043)	1.00 (0.039)	1.10 (0.043)	0.90 (0.035)
		Secondary ATX				1.00 (0.031)
Slow air bleed	mm (in)	Primary No. 1	0.80 (0.031)			
		Primary No. 2	1.90 (0.075)			
		Secondary No. 1	0.80 (0.031)	1.00 (0.039)	0.80 (0.031)	1.00 (0.039)
		Secondary No. 2	0.50 (0.020)			
Power jet	mm (in)	MTX	0.50 (0.020)			0.50 (0.020)
		ATX				0.40 (0.016)
Fast idle adjustment Clearance between primary throttle valve and bore	mm (in)	MTX	0.48—0.64 (0.019—0.025)	1.40—1.76 (0.055—0.069)	0.48—0.64 (0.019—0.025)	1.40—1.76 (0.055—0.069)
		ATX	0.56—0.72 (0.022—0.028)		0.56—0.72 (0.022—0.028)	
Float level adjustment	mm (in)	Max. fuel flow "L" Clearance between float and air horn without gasket	44 (17.3)			
		Fuel stop "H" Clearance between float and air horn without gasket float lowered by own weight	12.5 (0.49)			
Choke breaker diaphragm	mmHg (in Hg)	Start	100—160 (3.9—6.3)	180—240 (7.1—9.4)	100—160 (3.9—6.3)	180—240 (7.1—9.4)
		Stop	220—280 (8.7—11.0)	290—350 (11.4—13.8)	220—280 (8.7—11.0)	290—350 (11.4—13.8)
Choke opener	mmHg (in Hg)	Start	—	80—120 (3.1—8.7)	30—70 (1.2—2.8)	—
		Stop	—	220—280 (8.7—11.0)	130—190 (5.1—7.5)	—
Accelerator linkage						
Free play of cable at carburetor	mm (in)		1—3 (0.039—0.118)			
Fuel tank						
Capacity	Liters (US gal, Imp gal)		60 (15.9, 13.2)			
Fuel pump						
Type			Mechanical pump			
Delivery pressure	kPa (kg/cm^2, psi)		20—26 (0.20—0.27, 2.8—3.8)		20—29 (0.20—0.30, 2.8—4.3)	20—26 (0.20—0.27, 28—38)
Feeding capacity	cc/min (cu in/min)		More than 860 (52.5) at idle			
Fuel filter						
Type			Paper element with magnet			
Air cleaner						
Fresh-Hot switching			Diaphragm	Manual	Diaphragm	Bimetal
Element type			Oil permeated paper			
Fuel specification			Leaded super Unleaded super	Leaded regular	Leaded super Unleaded super	Unleaded regular

4B. FUEL AND EMISSION CONTROL SYSTEMS (FUEL INJECTION FE)

Item			Specifications
Fuel tank capacity	Liters (US gal, Imp gal)		60 (15.9, 13.2)
Fuel pump	Type		In-tank, electric motor
	Fuel pressure kPa (kg/cm², psi)		441—588 (4.5—6.0, 64—85)
	Feeding capacity cc (cu in)/10 sec.		220 (13.4) min.
Air cleaner	Element type		Oil permeated
Accelerator cable	Deflection mm (in)		1—3 (0.04—0.12)
Idle speed	rpm		ATX: 800 $^{+50}_{0}$ (Neutral), ATX: 900 $^{+50}_{0}$ (P range)
Dash pot	Adjustment speed rpm		1,900—2,100
EGR control valve	Starts to open mmHg (in Hg)		40—60 (1.6—2.4)
Air control valve	Starts to open mmHg (in Hg)		180—280 (7.1—11)
Water thermo valve	Opened °C (°F)		Higher than 46—54 (115—129)
Water thermo switch	Opened	At radiator °C (°F)	Lower than 15—19 (59—66)
Vacuum switch valve	Starts to open mmHg (in Hg)		66—106 (2.6—4.2)
Water thermo sensor	Resistance	-20°C (-4°F) kΩ	14.5—17.8
		20°C (68°F) kΩ	2.2—2.7
		80°C (176°F) kΩ	0.28—0.35
Throttle sensor	Resistance at fully closed	B ↔ C kΩ	4—6
		A ↔ B Ω	Approx. 500
	Resistance at fully opened	A ↔ B kΩ	Approx. 4.5
	Setting	Closed at mm (in)	0.4 (0.0157)
		Open at mm (in)	0.55 (0.022)
Air flow meter	Resistance of full closed	E_2 ↔ Vs Ω	More than 20
		E_2 ↔ Vc Ω	100—300
		E_2 ↔ V_B Ω	200—400
		E_1 ↔ Fc Ω	∞
	Resistance at full open	E_1 ↔ Fc Ω	0
Intake air thermo sensor	Resistance	-20°C (-4°F) kΩ	13.6—18.4
		20°C (68°F) kΩ	2.21—2.69
		60°C (140°F) kΩ	0.493—0.667
Pressure regulator	Regulating pressure	At idling kPa (kg/cm², psi)	235—275 (2.4—2.8, 34—40)
Injector	Injection amount cc (cu in)/15 sec.		38—53 (2.3—3.2)
	Resistance Ω		12—16
Circuit opening relay	Resistance	STA ↔ E_1 Ω	15—30
		B ↔ Fc Ω	80—150
Fuel			Unleaded gasoline

4C. FUEL AND EMISSION CONTROL SYSTEM (FE DOHC)

Item \ Engine model			Unleaded fuel	Leaded fuel
Idle speed		rpm	With test connector grounded 750 ± 50	
Throttle body				
Type			Horizotal draft (2-barrel)	
Throat diameter	mm (in)	No.1	46 (1.8)	
		No. 2	40 (1.6)	
Fuel pump				
Type			Impeller (in tank)	
Output pressure		kPa (kg/cm², psi)	Main pump: 441—588 (4.5—6.0, 64—85) Transfer pump: 20—25 (0.20—0.25, 2.8—3.6)	
Feeding capacity		cc (cu in)/10 seconds	Main pump: 220 (13.4) min. Transfer pump: 190 (11.6) min.	
Fuel filter				
Type	Low-pressure side		Nylon element	
	High-pressure side		Paper element	
Pressure regulator				
Type			Diaphragm	
Regulating pressure		kPa (kg/cm², psi)	235—275 (2.4—2.8, 34—40)	
Injector				
Type			High-ohmic	
Type of drive			Voltage	
Resistance		Ω	12—16	
Injection amount		cc (cu in)/15 seconds	66—91 (4.03—5.55)	
Idle speed control valve				
Solenoid resistance		Ω	6.3—9.9	
Fuel tank				
Capacity		liters (US gal, Imp gal)	60 (15.9, 13.2) 57 (15.0, 12.5): 4-wheel steering vehicle	
Air cleaner				
Element type			Dry	
Fuel				
Specification			Unleaded (95 RON or more)	Leaded (95 RON or more)

4D. FUEL AND EMISSION CONTROL SYSTEM (DIESEL)

Item \ Engine model			RF-CX	RF-N
Idle speed		rpm	720 $^{+30}_{-20}$	
Fuel injection pump	Type		VE Type	
	Plunger diameter	mm (in)	9.0 (0.35)	8.0 (0.31)
	Cam height	mm (in)	2.2 (0.08)	
	Governor		Half all speed governor	
	Injection timing		ATDC 1°	TDC 0°
	Cam lift at injection timing	mm (in)	1 (0.04)	
Injection nozzle	Type		Throttle	
	Number of nozzle and diameter	mm (in)	1.0 (0.04) x 1	
	Injection pressure	kPa (kg/cm^2, psi)	13,240 (135, 1,920)	
Free play of cable at injection pump		mm (in)	1.0—3.0 (0.04—0.12)	
Fuel tank capacity		liters (Us gal, Imp gal)	60 (15.9, 13.2)	
Fuel filter type			Cartridge, paper element	
Air cleaner element type			Cartridge, paper element	
Fast idle speed (A/C ON)		rpm	700—750	
Cold start device	Engine speed	rpm	1,100 at below 0°C (32°F)	
	Advance degree	0°C (32°F)	6°	
		60°C (140°F)	0°	

5. ENGINE ELECTRICAL SYSTEM
Gasoline Engine

Item \ Engine			F6	F8	FE (8 VALVE)	FE (12 VALVE)	FE (DOHC)
Battery	Voltage V		12, Negative ground				
	Type and capacity (20 hour rate)		34B19L(S) (33 Ah): General 50D20L (50 Ah), 55D23L (60 Ah): ECE				
Alternator	Type		A.C.				
	Output V—A		12—70				
	Regulator type		Transistorized (built-in IC regulator)				
	Regulated voltage V		14.1—14.7				
	Brush length mm (in)	Standard	16.5 (0.650)				
		Minimum	8.0 (0.315)				
	Drive belt tension mm (in)/98 N (10 kg, 22 lb)		New: 6—8 (0.24—0.32), Used: 7—9 (0.28—0.35)				
Starter	Type		Coaxial reduction: Middle East & General (FE · carburetor) Non-reduction: Others				
	Output V—kW		12—0.85	12—0.95		12—1.4	12—0.95
	Brush length mm (in)	Standard	17.0 (0.669)		Unleaded fuel 17.0 (0.669) Others 17.5 (0.689)	17.0 (0.669)	
		Minimum	11.5 (0.453)		Unleaded fuel 11.5 (0.453) Others 10.0 (0.394)	11.5 (0.453)	
Ignition timing			6 ± 1° BTDC (Vacuum hose disconnected)				12 ± 1° BTDC (Test connector grounded)
Distributor	Type		Fully transistorized (HEI)				Electronic spark advance
	Centrifugal spark advance (crank angle/engine speed) degree/rpm		F6 –2—2/1,000 6—10/2,100 14—18/6,100 F8 –2—2/1,000 10—14/2,100 18—22/6,100 FE (8 VALVE)—Carburetor Unleaded fuel (MTX) –2—2/1,760 12—16/3,360 22—26/5,320 (ATX) –2—2/1,300 12—16/3,360 22—26/5,320 Others –2—2/1,460 10—14/2,540 22—26/5,540 FE (12 VALVE)—Carburetor –2—2/1,200 10—14/2,400 10—14/4,000 16—20/5,000 FE—Fuel injection (except FE DOHC) –2—2/1,000 10—14/2,600 10—14/4,600 16—20/5,800				

Item \ Engine		F6	F8	FE (8 VALVE)	FE (12 VALVE)	FE (DOHC)
Distributor	Vacuum spark advance (Crank angle/Vacuum) degree/mmHg (inHg)	F6 and F8 –2—2/100 6—10/300 FE (8 VALVE)—Carburetor Unleade fuel –2—2/120 8—12/245 Others (MTX) –2—2/100 16—20/250 (ATX) –2—2/100 10—14/200 FE (12 VALVE)—Carburetor –2—2/120 11—15/300 FE—Fuel injection (except FE DOHC) [A chamber] –2—2/125 18—22/300 [B chamber] –2—2/125 –6—–10/200				
Spark plug	Type	FE (8 VALVE)* NGK: BPR5ES-11, BPR6ES-11 Nippon Denso: W16EXR-U11, W20EXR-U11 Others NGK: BPR5ES, BPR6ES Nippon Denso: W16EXR-U, W20EXR-U		NGK: BCPR5E, BCPR6E Nippon Denso: Q16PR-U, Q20PR-U		NGK: Unleaded fuel BCPR5E-11 BCPR6E-11 BCPR7E-11 Leaded fuel BCPR5E BCPR6E
	Plug gap mm (in)	0.75—0.85 (0.030—0.033), FE (8 VALVE)* 1.0—1.1 (0.039—0.043)		0.7—0.8 (0.028—0.031)		1.0—1.1 (0.039—0.043)*1 0.7—0.8 (0.028—0.031)*2
Firing order		1–3–4–2				

Diesel Engine

Item \ Engine			RF-N	RF-CX
Battery	Voltage V		12, Negative ground	
	Type and capacity (20 hour rate)		80D26L (65) 50D20L, 50D20R (50)—ECE	80D26L (65) 65D23L, 65D23R (55)
Alternator	Type		A.C.	
	Output V—A		12—70	12—75
	Regulator type		Transistorized (built-in IC regulator)	
	Regulated voltage V		14.1—14.7	
	Brush length mm (in)	Standard	16.5 (0.650)	21.5 (0.846)
		Minimum	8.0 (0.315)	8.0 (0.315)
	Drive belt tension mm (in)/98 N (10 kg, 92 lb)		New: 9—11 (0.35—0.43), Used: 12—14 (0.47—0.55)	
Starter	Type		Reduction	
	Output V—kW		12—2.0, 12—2.2 (Cold area)	
	Brush length mm (in)	Standard	2.0 kW: 17.0 (0.669), 2.2 kW: 18.0 (0.709)	
		Minimum	2.0 kW: 11.0 (0.453), 2.2 kW: 11.0 (0.453)	
Firing order			1—3—4—2	

*1 Unleaded fuel model
*2 Leaded fuel model

6. CLUTCH

Item \ Engine model			F6	F8	FE	FE DOHC	RF-N	RF-CX
Clutch control								
Type			Hydraulic					
Master cylinder inner diameter		mm (in)	15.87 (0.625)					
Release cylinder inner diameter		mm (in)	19.05 (0.750)					
Clutch fluid type			DOT-3 or DOT-4, FMVSS 116, or SAE J1703					
Clutch pedal								
Type			Suspended					
Pedal ratio		LHD	6.00					
		RHD	5.96					
Full stroke		mm (in)	135 (5.31)					
Height		mm (in)	216.5—221.5 (8.524—8.720)					
Free play		mm (in)	5—13 (0.20—0.51)					
Distance to floor when clutch fully disengaged		LHD	68 (2.7) or more					
		mm (in) RHD	85 (3.3) or more					
Flywheel								
Deflection		mm (in)	0.2 (0.008) max.					
Grinding limit		mm (in)	0.5 (0.020) max.					
Clutch disc								
Type			Single dry plate					
Set load		General	3434 (350, 770)	3846 (392, 862)	4316 (440, 968)		3846 (392, 862)	—
		ECE (Except UK)	—	4022 (410, 902)	4611 (470, 1034)		4022 (410, 902)	
		UK	—	3846 (392, 862)	4611 (470, 1034)	4316 (440, 968)	3846 (392, 862)	4022 (410, 902)
Runout		mm (in)	1.0 (0.039) max.					
Wear limit		mm (in)	0.3 (0.012) from rivet head					
Outer diameter		mm (in)	200 (7.874)	215 (8.465)	225 (8.858)			
Inner diameter		mm (in)	130 (5.118)	150 (5.906)				
Facing thickness mm (in)	Flywheel side		3.5 (0.14)					
	Pressure plate side	General	4.1 (0.16)					—
		ECE (Except UK)	—	3.8 (0.15)				
		UK	—	4.1 (0.16)	3.8 (0.15)	4.1 (0.16)		3.8 (0.15)
Clutch cover								
Type			Diaphragm spring					
Runout		mm (in)	0.05 (0.0020) max.					
Grinding limit		mm (in)	0.5 (0.020)					

30 TECHNICAL DATA

7A. MANUAL TRANSAXLE

Item \ Engine model		FE DOHC Leaded	FE DOHC Unleaded	F6	FE 12 valve	FE 8 valve Carb.	FE 8 valve FI	F8	RF-N	RF-CX
Transmission										
Shift lever position		Floor shift								
Gear ratio	First	3.307								
	Second	1.833								
	Third	1.310				1.233				1.161
	Fourth	1.030				0.970			0.914	0.861
	Fifth	0.837				0.795			0.755	0.680
	Reverse	3.166								
Oil capacity	liters US qt, Imp qt)	3.35 (3.6, 3.0)								
Fluid type		ATF: DEXRON-II Above 0°F: API GL-4 or GL-5 SAE80W—90 or SAE90								
Clearance										
Clearance of lever and reverse idle gear mm (in)	Standard	0.1—0.32 (0.004—0.013)								
	Wear limit	0.5 (0.020)								
Clearance of shift fork and clutch hub sleeve mm (in)	Standard	0.2—0.4 (0.008—0.016)								
	Wear limit	0.5 (0.020)								
Clearance of synchronizer ring and gear mm (in)	Standard	1.5 (0.059)								
	Wear limit	0.8 (0.021)								
Gear thrust clearance mm (in)	First Standard	0.05—0.28 (0.002—0.011)								
	First Limit	0.3 (0.020)								
	Second Standard	0.18—0.46 (0.007—0.018)								
	Second Limit	0.5 (0.02)								
	Third Standard	0.05—0.20 (0.002—0.008)								
	Third Limit	0.25 (0.010)								
	Fourth Standard	0.17—0.37 (0.0064—0.014)								
	Fourth Limit	0.4 (0.016)								
Bearing preload of primary shaft gear		Primary shaft 0.1—0.25 N·m (1.0—2.5 cm-kg, 0.86—2.18 in-lb) Secondary shaft 0.2—0.4 N·m (2.0—4.0 cm-kg, 1.7—3.4 in-lb)								
Bearing preload adjust shim mm (in)		0.25 (0.010), 0.30 (0.012), 0.35 (0.014), 0.40 (0.016), 0.45 (0.018), 0.50 (0.020), 0.55 (0.022), 0.60 (0.024), 0.65 (0.026), 0.70 (0.028), 0.75 (0.030), 0.80 (0.031)								
Drive and differential										
Final gear	Type	Helical gear								
	Reduction ratio	4.105	3.850			4.105	3.850			4.150
Side bearing preload		1.4—2.0 N·m (14—20 cm-kg, 12—17 in-lb)								
Bearing preload adjust shim mm (in)		0.10 (0.004), 0.15 (0.006), 0.20 (0.008), 0.25 (0.010), 0.30 (0.012), 0.35 (0.014), 0.40 (0.016), 0.45 (0.018), 0.50 (0.020), 0.55 (0.022), 0.60 (0.024), 0.65 (0.026), 0.70 (0.028), 0.75 (0.030), 0.80 (0.031), 0.85 (0.033), 0.90 (0.035), 0.95 (0.037), 1.00 (0.039), 1.05 (0.041), 1.10 (0.043), 1.15 (0.045), 1.20 (0.047)								
Backlash of side gear and pinion gear mm (in)		0—0.1 (0—0.004)								

7B. AUTOMATIC TRANSAXLE (ELECTRONICALLY CONTROLLED AND 4-SPEED)

Item \ Model			G4A-EL (EC-AT)	G4A-HL (4-Speed)	
				FE engine	F8 engine
Gear ratio	1st		2.800		
	2nd		1.540		
	3rd		1.000		
	4th (OD)		0.700		
	Reverse		2.333		
Oil capacity		liters (US qt, Imp qt)	6.2 (6.6, 5.4)		
Fluid type			ATF Dexron II or M III		
Fluid level with the engine idling in P			Between F and L marks on gauge		
Stall speed					
After brake-in	D, S, L	rpm	2170—2270	2430—2530	2180—2280
	R	rpm	2130—2230	2390—2490	2140—2240
Time lag					
N → D		sec	0.5—1.0	0.4—1.2	
N → R		sec	0.5—1.0	0.4—1.5	
Line pressure					
D, S, L	Idle	kPa (kg/cm², psi)	353—432 (3.6—4.4, 51—63)	350—490 (3.6—5.0, 51—71)	
	Stall	kPa (kg/cm², psi)	873—1,040 (8.4—10.6, 127—151)	980—1230 (10.0—12.5, 142—178)	
R	Idle	kPa (kg/cm², psi)	598—942 (6.1—9.6, 87—137)	600—830 (6.1—8.5, 87—121)	
	Stall	kPa (kg/cm², psi)	1,668—2,011 (17.0—20.5, 242—292)	1470—1960 (15.0—20.0, 213—284)	
Throttle pressure					
D	Idle	kPa (kg/cm², psi)	39—88 (0.4—0.9, 6—13)	83—113 (0.85—1.15, 12—16)	
	Stall	kPa (kg/cm², psi)	471—589 (4.8—6.0, 68—85)	540—610 (5.5—6.2, 78—88)	
Governor pressure					
D	30 km/h (19 mph)	kPa (kg/cm², psi)	—	79—114 (0.81—1.16, 12—16)	82—117 (0.84—1.19, 12—17)
	55 km/h (34 mph)	kPa (kg/cm², psi)	—	146—190 (1.49—1.94, 21—28)	157—201 (1.60—2.05, 23—29)
	85 km/h (53 mph)	kPa (kg/cm², psi)	—	276—339 (2.81—3.46, 40—49)	302—366 (3.08—3.73, 44—53)

Shift point (G4A-EL)

Range Mode		Throttle condition (Throttle sensor voltage)	Shifting	Drum speed rpm	Vehicle speed km/h (mph)
Power	D	Fully opened (4.3 volt)	D1 → D2	4930—5480	54—60 (33—37)
			D2 → D3	5120—5520	102—110 (63—68)
			D3 → OD	5380—5710	165—175 (102—109)
		Half throttle (1.6—2.2 volt)	D1 → D2	3470—4180	38—45 (24—28)
			D2 → D3	4020—4420	80—88 (50—55)
			D3 → OD	3820—4530	117—139 (73—86)
			Lock-up ON (OD)	2670—3170	117—139 (73—86)
			Lock-up OFF(OD)	2510—2970	110—130 (68—81)
			OD → D3	2150—2630	94—115 (58—71)
			D3 → D2	2020—2410	62—74 (38—46)
		Kick-down	OD → D3	3490—3720	153—163 (95—101)
			OD → D2	2050—2240	90—98 (56—61)
			OD → D1	980—1120	43—49 (27—30)
			D3 → D2	2940—3200	90—98 (56—61)
			D3 → D1	1400—1500	43—46 (27—29)
			D2 → D1	2160—2300	43—46 (27—29)
Economy		Fully opened (4.3 volt)	D1 → D2	4470—5020	49—55 (30—34)
			D2 → D3	4770—5170	95—103 (59—64)
			D3 → OD	5380—5710	165—175 (102—109)
		Half throttle (1.6—2.2 volt)	D1 → D2	2830—3380	31—37 (19—23)
			D2 → D3	2960—3120	59—68 (37—42)
			D3 → OD	2870—3460	88—106 (55—66)
			Lock-up ON (OD)	2010—2420	88—106 (55—66)
			Lock-up OFF (OD)	1940—2310	85—101 (53—63)
			OD → D3	1600—1960	70—86 (43—53)
			D3 → D2	1240—1570	38—48 (24—30)
		Kick-down	OD → D3	3490—3720	153—163 (95—101)
			OD → D2	1960—2150	86—94 (53—58)
			OD → D1	980—1120	43—49 (27—30)
			D3 → D2	2800—3070	86—94 (53—58)
			D3 → D1	1400—1600	43—49 (27—30)
			D2 → D1	2160—2460	43—49 (27—30)
S		Fully opened (4.3 volt)	S1 → S2	4930—5480	54—60 (33—37)
			S2 → S3	5120—5520	102—110 (63—68)
			S4 → S3	3720—3950	163—173 (101—107)
			S3 → S2	2940—3200	90—98 (56—61)
			S2 → S1	2160—2310	43—46 (27—29)
		Half throttle (1.6—2.2 volt)	S1 → S2	3470—4180	38—45 (24—28)
			S2 → S3	4020—4420	80—88 (50—55)
			S4 → S3	3720—3950	163—173 (101—107)
			S3 → S2	2020—2410	62—74 (38—46)
L		Fully opened (4.3 volt)	L1 → L1	4930—5480	54—60 (33—37)
			L2 → L1	2160—2310	43—46 (27—29)
		Half throttle (1.6—2.2 volt)	L1 → L2	3470—4180	38—45 (24—28)
Hold	D	—	D2 → D3	850—1160	17—23 (11—14)
			D3 → D2	230—420	7—13 (4—8)
		Fully closed (0.5 volt)	OD → D3	3720—3950	163—173 (101—107)
	S		S3 → S2	2940—3200	90—98 (56—61)
	L		L2 → L1	2160—2460	43—49 (27—30)

Shift point (G4A-HL)

Range	Throttle condition	Shifting	Vehicle speed km/h (mph)	
			FE engine	F8 engine
D	Fully opened	1st → 2nd	50—65 (31—40)	47—62 (29—38)
		2nd → 3rd	100—115 (62—71)	94—109 (58—68)
	Half throttle (1/2)	1st → 2nd	17—32 (11—20)	16—31 (10—19)
		2nd → 3rd	42—57 (26—35)	
		3rd → OD	79—94 (49—58)	74—89 (46—55)
		Lock-up	74—89 (46—55)	
	Kick-down	OD → 3rd	More than 88 (55)	More than 82 (51)
		OD → 2nd	34—103 (21—64)	33—97 (20—60)
		OD → 1st	27—49 (17—30)	26—48 (16—30)
		3rd → 2nd	34—103 (21—64)	33—97 (20—60)
		3rd → 1st	11—49 (7—30)	10—48 (6—30)
		2nd → 1st	4—49 (2—30)	3—48 (2—30)
1	Fully opened	1st → 2nd	56—71 (35—44)	52—67 (32—42)
	Half throttle	1st → 2nd	56—71 (35—44)	52—67 (32—42)
	Kick-down	2nd → 1st	46—61 (29—38)	43—58 (27—36)
D	Fully opened	3rd lock-up	106—121 (66—75)	100—115 (62—71)

Item \ Model			G4A-EL (EC-AT)	G4A-HL (4-speed)	
				FE engine	F8 engine
Torque converter					
Stall torque ratio			1.700—1.900 : 1	1.900—2.100 : 1	
Bushing diameter	mm (in)	Standard	53.030 (2.088)		
		Maximum	53.076 (2.090)		
Oil pump					
Clearance					
Cam ring to oil pump cover	mm (in)	Standard	0.005—0.020 (0.0002—0.0008)		
		Maximum	0.080 (0.003)		
Rotor to oil pump cover	mm (in)	Standard	0.005—0.020 (0.0002—0.0008)		
		Maximum	0.030 (0.0012)		
Vane to oil pump cover	mm (in)	Standard	0.015—0.050 (0.0006—0.0020)		
		Maximum	0.080 (0.003)		
Seal pin to oil pump cover	mm (in)	Standard	0.005—0.020 (0.0002—0.0008)		
		Maximum	0.060 (0.002)		
Vane to rotor groove	mm (in)	Standard	0.010—0.045 (0.0004—0.0018)		
		Maximum	0.065 (0.0026)		
Sleeve outer diameter	mm (in)	Standard	28.00 (0.102)		
Rotor bushing in inner diameter	mm (in)	Standard	28.00 (1.102)		
		Maximum	28.05 (1.104)		
Seal pin outer diameter	mm (in)	Standard	5.00 (0.197)		
		Minimum	4.90 (0.193)		
Guide ring outer diameter	mm (in)	Standard	57.85 (2.278)		
		Minimum	57.70 (2.272)		
Valve outer diameter	mm (in)	Standard	12.00 (0.472)		
		Minimum	11.86 (0.467)		

30 TECHNICAL DATA

Item \ Model			G4A-EL (EC-AT)	G4A-HL (4-speed)	
				FE engine	F8 engine
Forward clutch					
Number of drive/driven plate			3/3		
Drive plate thickness	mm (in)	Standard	1.6 (0.063)		
		Minimum	1.4 (0.055)		
Forward clutch clearance		mm (in)	1.0—1.2 (0.040—0.047)		
Retaining plate sizes		mm (in)	5.9 (0.232), 6.1 (0.240), 6.3 (0.248), 6.5 (0.256), 6.7 (0.264), 8.9 (0.350)		
Coasting clutch					
Number of drive/driven plates			2/2		
Drive plate thickness	mm (in)	Standard	1.6 (0.063)		
		Minimum	1.4 (0.055)		
Coasting clutch clearance		mm (in)	1.0—1.2 (0.040—0.047)		
Retaining plate sizes		mm (in)	4.6 (0.181), 4.8 (0.189), 5.0 (0.197), 5.2 (0.205), 5.4 (0.213), 5.6 (0.220)		
Return spring free length		mm (in)	29.8 (1.173)		
Reverse clutch					
Number of drive/driven plates			2/2		
Driven plate thickness	mm (in)	Standard	1.6 (0.063)		
		Minimum	1.4 (0.055)		
Reverse clutch clearance		mm (in)	2.1—2.4 (0.083—0.094)		
Retaining plate sizes		mm (in)	6.6 (0.260), 6.8 (0.268), 7.0 (0.276), 7.2 (0.283), 7.4 (0.291), 7.6 (0.299)		
3-4 clutch					
Number of drive/driven plates			5/5	4/4	
Drive plate thickness	mm (in)	Standard	1.6 (0.063)		
		Minimum	1.4 (0.055)		
3-4 clutch clearance		mm (in)	1.3—1.5 (0.051—0.059)		
Retaining plate sizes		mm (in)	3.8 (0.150), 4.0 (0.157), 4.2 (0.165), 4.4 (0.173), 4.6 (0.181), 4.8 (0.189)	4.8 (0.819), 5.0 (0.197), 5.2 (0.205), 5.4 (0.213), 5.6 (0.220)	
Return spring free length		mm (in)	33.2 (1.307)		
Low and reverse brake					
Number of drive/driven plates			3/3	4/4	
Drive plate thickness	mm (in)	Standard	1.6 (0.063)		
		Minimum	1.4 (0.055)		
Low and reverse brake clearance		mm (in)	2.1—2.4 (0.083—0.094)		
Retaining plate sizes		mm (in)	6.8 (0.268), 7.0 (0.276), 7.2 (0.283), 7.4 (0.291), 7.6 (0.299), 7.8 (0.307)	10.0 (0.394), 10.2 (0.402), 10.4 (0.410), 10.6 (0.417), 10.8 (0.425)	
Return spring free length		mm (in)	20.5 (0.807)		
Sun gear drum bushing	mm (in)	Maximum	33.425 (1.316)		
Small sun gear bushing	mm (in)	Maximum	24.021 (0.946)		
Carrier hub					
Clearance between pinion washer and planet carrier	mm (in)	Maximum	0.2—0.7 (0.008—0.028)		
Servo					
Free length of return spring	mm (in)	Standard	43.25 (1.703)	42.0 (1.654)	43.25 (1.703)
2-3 accumulator valve					
2-3 accumulator valve spring	mm (in)	Standard	83.3 mm (3.280)	76.0 (2.992)	

Control valve spring (G4A-EL)

Spring name	Outer dia. mm (in)	Free length mm (in)	Wire dia. mm (in)	Spring color
1-2 accumulator small spring	11.0 (0.433)	88.1 (3.348)	1.4 (0.055)	Gray
1-2 accumulator large spring	16.0 (0.0630)	78.0 (3.071)	2.0 (0.079)	Blue
Bypass, servo control spring	5.0 (0.197)	33.4 (1.315)	0.55 (0.022)	Maroon
2-3 timing spring	8.3 (0.327)	26.5 (1.043)	0.8 (0.031)	—
N-R accumulator rear spring	11.1 (0.437)	62.0 (2.441)	1.2 (0.047)	Light green
N-D accumulator front spring	9.8 (0.386)	52.9 (2.083)	1.0 (0.039)	Brown
Coasting bypass spring	5.8 (0.228)	37.7 (1.484)	0.6 (0.024)	Dark blue
3-2 timing spring	8.2 (0.323)	28.6 (0.126)	0.8 (0.031)	Red
3-2 capacity spring	5.4 (0.213)	30.6 (1.205)	0.5 (0.020)	White
Throttle relief ball spring	6.6 (0.260)	21.6 (0.850)	0.8 (0.031)	—
Pressure modifier spring	8.3 (0.327)	26.5 (1.043)	0.8 (0.031)	—
Low reducing spring	8.7 (0.343)	38.3 (1.508)	0.9 (0.035)	Black
1-2 shift spring	8.7 (0.343)	41.3 (1.626)	1.0 (0.039)	Yellow
2-3, 3-4 shift spring	7.4 (0.291)	36.6 (1.441)	0.8 (0.031)	Gray
Throttle backup spring	9.65 (0.380)	26.9 (1.059)	0.55 (0.022)	Red
Throttle modulator spring	6.3 (0.248)	47.9 (1.886)	0.8 (0.031)	—
Throttle assist spring	5.15 (0.203)	32.3 (1.272)	0.55 (0.022)	Dark green
Throttle spring	5.4 (0.213)	47.2 (1.858)	0.8 (0.031)	Pink
Converter relief ball spring	6.9 (0.272)	24.1 (0.949)	0.9 (0.035)	Maroon
Orifice check valve spring	5.0 (0.197)	12.5 (0.492)	0.23 (0.009)	—
Pressure regulator spring	11.5 (0.453)	26.5 (1.043)	1.0 (0.039)	Maroon
Lock-up control spring	5.0 (0.197)	35.2 (1.386)	0.6 (0.024)	Purple

Control valve springs (G4A-HL)

Spring name		Outer dia. mm (in)	Free length mm (in)	Wire dia. mm (in)	Spring color
1-2 accumulator small spring	F8 engine	9.9 (0.400)	84.7 (3.335)	1.2 (0.047)	Red
1-2 accumulator large spring	FE engine	13.0 (0.512)	73.2 (2.881)	1.8 (0.071)	Pink
	F8 engine	16.0 (0.630)	84.7 (3.335)	2.0 (0.079)	White
Bypass spring		5.0 (0.197)	25.1 (0.988)	0.7 (0.028)	Yellow
Servo control spring		4.9 (0.193)	27.1 (1.067)	0.5 (0.020)	Light blue
2-3 timing spring		8.3 (0.327)	26.5 (1.043)	0.8 (0.031)	—
N-R accumulator rear spring		11.1 (0.437)	68.2 (2.685)	1.0 (0.039)	Blue
N-D accumulator front spring		9.8 (0.386)	60.9 (2.398)	1.1 (0.043)	Yellow
Low reducing spring		8.7 (0.343)	38.3 (1.508)	0.9 (0.035)	Black
OD release spring		6.0 (0.236)	32.6 (1.283)	0.6 (0.024)	Orange
Coasting bypass spring		5.8 (0.228)	31.3 (1.232)	0.6 (0.024)	Yellow
3-2 timing spring		8.2 (0.323)	28.55 (1.124)	0.8 (0.031)	Maroon
3-2 capacity spring		5.55 (0.219)	30.5 (1.201)	0.55 (0.022)	Light green
Throttle relief ball spring		6.6 (0.260)	20.3 (0.799)	0.8 (0.031)	Light green
1-2 shift control spring		5.5 (0.217)	46.0 (1.811)	0.5 (0.020)	Light green
1-2 shift spring		5.0 (0.197)	24.9 (0.980)	0.5 (0.020)	Gray
2-3 shift spring		6.1 (0.240)	39.7 (1.563)	0.65 (0.026)	Pink
3-4 shift spring		6.4 (0.252)	37.0 (1.457)	0.6 (0.024)	—
Throttle backup spring		6.4 (0.252)	33.5 (1.319)	0.6 (0.024)	Pink
Throttle modulator front spring		5.0 (0.197)	27.8 (1.094)	0.6 (0.024)	Red
Throttle modulator rear spring		7.15 (0.281)	30.8 (1.213)	0.85 (0.033)	Red
1 range control spring		6.15 (0.242)	39.2 (1.543)	0.65 (0.026)	White
2 range control spring		3.95 (0.156)	32.1 (1.264)	0.45 (0.018)	—
Kick-down spring		5.4 (0.213)	38.1 (1.500)	0.8 (.031)	—
Throttle assist spring		5.15 (0.203)	32.3 (1.272)	0.55 (0.022)	Dark green
Throttle spring		5.4 (0.213)	48.3 (1.902)	0.8 (0.031)	—
Converter relief ball spring		6.9 (0.272)	24.1 (0.949)	0l9 (0.035)	Maroon
Orifice check valve spring		5.0 (0.197)	12.5 (0.492)	0.23 (0.009)	—

Spring name	Outer dia. mm (in)	Free length mm (in)	Wire dia. mm (in)	Spring color
Pressure regulator spring	9.5 (0.374)	30.7 (1.209)	0.7 (0.028)	—
Lock-up control spring	7.3 (0.287)	46.2 (1.819)	0.8 (0.031)	Blue
Lock-up support spring	6.1 (0.240)	43.5 (1.713)	0.65 (0.026)	Blue
OD lock-up spring	7.1 (0.280)	66.5 (2.618)	0.8 (0.031)	Red

Item \ Model		G4A-EL (EC-AT)	G4A-HL (4-speed)	
			FE engine	F8 engine
Gear assembly				
Total end play	mm (in)	0.25—0.50 (0.010—0.020)		
End play adjust race	mm (in)	1.2 (0.047), 1.4 (0.055), 1.6 (0.063), 1.8 (0.071), 2.0 (0.079), 2.2 (0.087)		
Idle gear bearing preload	N·m (cm-kg, in-lb)	0.03—0.9 (0.3—9.0, 0.26—7.8)		
Preload adjust shims	mm (in)	0.10 (0.004), 0.12 (0.005), 0.14 (0.006), 0.16 (0.0063), 0.18 (0.007), 0.20 (0.008)		
Output gear bearing preload	N·m (cm-kg, in-lb)	0.03—0.9 (0.3—9.0, 0.26—7.8)		
Preload adjust shims	mm (in)	0.10 (0.004), 0.12 (0.005), 0.14 (0.006), 0.16 (0.0063), 0.18 (0.007), 0.20 (0.008), 0.50 (0.020)		
Drive and differential				
Final gear	Type	Helical gear		
	Reduction ratio	3,700 : 1		
Side bearing preload	N·m (cm-kg, in-lb)	2.9—3.9 (30—40, 26—35)		
Preload adjust shims	mm (in)	0.10 (0.004), 0.12 (0.005), 0.14 (0.006), 0.16 (0.0063), 0.18 (0.007), 0.20 (0.008), 0.50 (0.020), 0.70 (0.028), 1.00 (0.039)		
Backlash of side gear and pinion	mm (in) Standard	0.025—0.1 (0.001—0.004)		
	Maximum	0.5 (0.020)		
Torque converter distance "A" (Refer to page 7B—214)	mm (in)	25 (0.984)		

7C. AUTOMATIC TRANSAXLE (3-SPEED)

Item \ Engine model			FE engine	F6 engine
Model			F3A	
Gear ratio	1st		2.841	
	2nd		1.541	
	3rd		1.000	
	Reverse		2.400	
Oil capacity	Liters (US qt, Imp qt)		6.2 (6.6, 5.5)	
Fluid type			ATF Dexron-II or M-III	
Fluid level with the engine idling at P			Between F and L marks on gauge	
Stall revolution				
After brake in	rpm		2050—2150	1800—2050
Line pressure				
D, 1	Idle	kPa (kg/cm², psi)	294—392 (3—4, 43—57)	
	Stall	kPa (kg/cm², psi)	883—1079 (9—11, 128—156)	
2	Idle	kPa (kg/cm², psi)	785—1177 (8—12, 114—171)	
	Stall	kPa (kg/cm², psi)	785—1177 (8—12, 114—171)	
R	Idle	kPa (kg/cm², psi)	392—687 (4—7, 57—100)	
	Stall	kPa (kg/cm², psi)	1570—1864 (16—19, 228—270)	
Governor pressure				
D	30 km/h (19 mph)	kPa (kg/cm², psi)	78—137 (0.8—1.4, 11—20)	
	50 km/h (31 mph)	kPa (kg/cm², psi)	157—226 (1.6—2.3, 23—33)	
	85 km/h (53 mph)	kPa (kg/cm², psi)	314—402 (3.2—4.1, 46—58)	
Line pressure cut back				
Vacuum of vacuum pump			Governor pressure kPa (kg/cm², psi)	
0 mmHg (0 inHg)			98—157 (1.0—1.6, 14—23)	
200 mmHg (7.87 inHg)			39—98 (0.4 —1.0, 6—14)	
Shift point				
Range	Throttle condition (manifold vacuum)	Shifting	Shift point speed km/h (mph)	
D	Fully opened 0—100 mmHg (0—3.94 inHg)	1st → 2nd	47—57 (29—35)	44—54 (27—33)
		2nd → 3rd	106—119 (66—74)	95—108 (59—67)
		3rd → 2nd	95—103 (59—64)	86—94 (53—58)
		2nd → 1st	35—39 (22—24)	34—38 (21—24)
	Half throttle 130 mmHg (5.12 inHg)	1st → 2nd	18—31 (11—19)	18—31 (11—19)
		2nd → 3rd	39—68 (24—42)	44—73 (27—45)
	Fully closed	2nd → 1st	10—15 (6—9)	10—15 (6—9)
1	Fully closed	2nd → 1st	32—39 (20—24)	33—40 (20—25)
Torque converter				
Stall torque ratio			1.800—2.100 : 1	
Bushing inner diameter	mm (in)	Standard	33.000—33.025 (1.299—1.300)	
		Maximum	33.075 (1.302)	
Oil pump				
Clearance				
Gear and pump cover	mm (in)	Standard	0.02—0.04 (0.0008—0.0016)	
		Maximum	0.08 (0.0031)	
Outer gear and crescent	mm (in)	Standard	0.14—0.21 (0.0055—0.0083)	
		Maximum	0.25 (0.0098)	
Outer gear and housing	mm (in)	Standard	0.05—0.20 (0.002—0.0079)	
		Maximum	0.25 (0.0098)	
Oil seal ring and ring groove	mm (in)	Standard	0.04—0.16 (0.0016—0.0063)	
		Maximum	0.40 (0.0157)	
Pump housing sleeve diameter	mm (in)	Standard	37.950—37.975 (1.494—1.495)	
		Maximum	37.900 (1.492)	
Inner gear bushing inner diameter	mm (in)	Standard	38.0—38.025 (1.496—1.497)	
		Maximum	38.075 (1.499)	

Item / Engine model			FE engine	F6 engine
Front clutch				
Number of driven and drive plates			3	
Drive plate thickness	mm (in)	Standard	1.6 (0.063)	
		Minimum	1.4 (0.055)	
Front clutch clearance	mm (in)		1.6—1.8 (0.063—0.071)	
Retaining plate sizes	mm (in)		5.2 (0.205), 5.4 (0.213), 5.6 (0.220), 5.8 (0.228), 6.0 (0.236), 6.2 (0.244)	
Return spring free length	mm (in)		26.2 (1.031)	
Drum bushing inner diameter	mm (in)	Standard	44.000—44.025 (1.732—1.733)	
		Maximum	44.075 (1.735)	
Front clutch drum end play	mm (in)		0.5—0.8 (0.197—0.0315)	
End play adjust shims	mm (in)		1.3 (0.0512), 1.5 (0.0591), 1.7 (0.0669), 1.9 (0.0748), 2.1 (0.0827), 2.3 (0.0906), 2.5 (0.0984), 2.7 (0.1063)	
Rear clutch				
Number of driven and drive plates			4	
Drive plate thickness	mm (in)	Standard	1.6 (0.063)	
		Minimum	1.4 (0.055)	
Rear clutch clearance	mm (in)		0.8—1.0 (0.0315— 0.0394)	
Retaining plate sizes	mm (in)		4.8 (0.189), 5.0 (0.197), 5.2 (0.205), 5.4 (0.213), 5.6 (0.220), 5.8 (0.228), 6.0 (0.236), 6.2 (0.244)	
Return spring free length	mm (in)		26.2 (1.031)	
Low and reverse brake				
Number of low and reverse brake plates			4	
Drive plate thickness	mm (in)	Standard	1.6 (0.063)	
		Minimum	1.4 (0.055)	
Low and reverse brake clearance	mm (in)		0.8—1.05 (0.032—0.041)	
Retaining plate sizes	mm (in)		4.6 (0.181), 4.8 (0.189), 5.0 (0.197), 5.2 (0.205), 5.4 (0.213), 5.6 (0.220)	
Return spring free length	mm (in)		27.7 (1.091)	
Servo				
Return spring free length	mm (in)		48.0 (1.89)	45.5 (1.79)
Governor				
Primary spring	mm (in)	Outer diameter	9.0 (0.354)	
		Free length	17.2 (0.667)	
Secondary spring	mm (in)	Outer diameter	9.25 (0.364)	
		Free length	13.2 (0.520)	
One-way clutch				
Bushing diameter	mm (in)	Standard	129.987—130.013 (5.118—5.119)	
		Maximum	130.063 (5.121)	

Control valve springs			
Spring name	**Outer dia. mm (in)**	**Free length mm (in)**	**Wire dia. mm (in)**
Throttle backup spring	7.3 (0.287)	36.0 (1.417)	0.8 (0.031)
Downshift spring	5.55 (0.219)	21.9 (0.862)	0.55 (0.022)
2-3 shift spring	6.9 (0.272)	41.0 (1.614)	0.7 (0.028)
1-2 shift spring	6.4 (0.252)	31.63 (1.245)	0.4 (0.016)
Second lock spring	5.55 (0.219)	33.5 (1.319)	0.55 (0.022)
Pressure regulator spring	11.7 (0.461)	43.0 (1.693)	1.2 (0.047)
Throttle relief ball spring	7.0 (0.276)	11.2 (0.441)	0.9 (0.035)
Orifice check valve spring	5.0 (0.197)	15.5 (0.610)	0.23 (0.009)

Item \ Engine model		FE engine	F6 engine
Gear assembly			
Total end play	mm (in)	0.25—0.50 (0.010—0.0196)	
End play adjust races	mm (in)	1.2 (0.047), 1.4 (0.055), 1.6 (0.063), 1.8 (0.071), 2.0 (0.079), 2.2 (0.087)	
Idle gear bearing preload	N·m (cm-kg, in-lb)	0.03—0.9 (0.3—9.0, 0.26—7.81)	
Preload adjust shims	mm (in)	0.10 (0.0039), 0.12 (0.0047), 0.14 (0.0055), 0.16 (0.0063), 0.20 (0.0078), 0.50 (0.0196)	
Output gear bearing preload	N·m (cm-kg, in-lb)	0.03—0.9 (0.3—9.0, 0.26—7.81)	
Preload adjust shims	mm (in)	0.10 (0.0039), 0.12 (0.0047), 0.14 (0.0055), 0.16 (0.0063), 0.20 (0.0078), 0.50 (0.0196)	
Drive and differential			
Final gear	Type	Helical gear	
	Reduction ratio	3.450 : 1	3.631 : 1
Side bearing preload	N·m (cm-kg, in-lb)	2.1— 3.0 (21—31, 18—27)	
Preload adjust shims	mm (in)	0.10 (0.004), 0.12 (0.005), 0.14 (0.006), 0.16 (0.0063), 0.18 (0.007), 0.20 (0.008), 0.50 (0.020), 0.70 (0.028), 1.00 (0.039)	
Backlash of side gear and pinion	Standard	0.025—0.1 (0.001— 0.004)	
mm (in)	Maximum	0.5 (0.020)	
Torque converter distance A (Refer to 7C—118)	mm (in)	20 (0.787)	

9. FRONT AND REAR AXLES

Item \ Transaxle type		MTX		ATX	
		Non-Turbo	Turbo	Non-Turbo	Turbo
Driveshaft					
Joint type	Inside	Ball joint		Tripod joint	
	Outside	Ball joint		Ball joint	
Shaft length mm (in)	Right	360.0 (14.17)	355.5 (14.00)	355.5 (14.00)	348.8 (13.73)
	Left	360.0 (14.17)	355.5 (14.00)	355.5 (14.00)	348.8 (13.73)
Shaft diameter mm (in)		24 (0.94)	26 (1.02)	24 (0.94)	26 (1.02)
Front axle					
Front wheel bearing end play mm (in)		0.2 (0.0079) max.			
Rear axle					
Rear wheel bearing end play mm (in)		0.2 (0.0079) max.			

10. STEERING SYSTEM

Item \ Type			Manual steering	Power steering
Steering wheel	Outer diameter mm (in)		380 (15.0)	
	Turns lock to lock		4.32	2.93
Steering shaft and joints	Shaft type		Collapsible	
	Joint type		Cross joints (2)	
	Tilt stroke mm (in)		40 (1.6)	
Front steering gear	Type		Rack and pinion	
	Gear ratio		∞ (infinite)	
Power steering fluid	Capacity liter (US quarts, Imp quarts)	2WS	—	0.9 (0.95, 0.79)
		4WS	—	1.0 (1.06, 0.88)
	Type	2WS 4WS	—	Dexron II or M III

11. BRAKING SYSTEM

Item			Specifications
Brake pedal	Height	mm (in)	LHD & RHD 222 $^{+5}_{-0}$ (8.74 $^{+0.2}_{-0}$)
	Free play	mm (in)	4—7 (0.16—0.28)
	Reserve travel (Clearance when pedal is depressed at 589 N (60 kg, 132 lb))	mm (in)	95 (3.74) min.
	Lever ratio		4.2
	Max. stroke	mm (in)	LHD: 136.5 (5.37) RHD: 135 (5.31)
Master cylinder	Type		Tandem
	Bore	mm (in)	22.22 (0.875)
	Fluid type		DOT-3 or 4, or SAE J1703
Front disc brake	Type		Disc (ventilated)
	Thickness of pad	mm (in) Standard	10.0 (0.39)
		mm (in) Minimum	2.0 (0.08)
	Area of pad	mm^2 (in^2)	4,800 (7.44)
	Outer diameter of disc plate	mm (in)	14 or 15 inch-wheel: 264 (10.39) 13 inch-wheel: 242 (9.53)
	Thickness of disc plate	mm (in) Standard	14 or 15 inch-wheel: 24.0 (0.94) 13 inch-wheel: 20.0 (0.79)
		mm (in) Minimum	14 or 15 inch-wheel: 22.0 (0.87) 13 inch-wheel: 18.0 (0.71)
	Disc plate runout	mm (in) Maximum	0.1 (0.004)
	Wheel cylinder bore	mm (in)	53.97 (2.125)
Rear drum brake	Type		Leading-trailing
	Clearance between shoe and drum		Self-adjusting
	Thickness of lining	mm (in) Standard	(a): 4.5 (0.18) (b): 5.0 (0.20)
		mm (in) Minimum	1.0 (0.04)
	Width of lining	mm (in)	(a): 30 (1.18) (b): 25 (0.98)
	Length of lining	mm (in)	(a): 219.3 (8.63) (b): 1919 (7.56)
	Inner diameter of drum	mm (in) Standard	(a): 228.6 (9.00) (b): 200 (7.87)
		mm (in) Maximum	(a): 230.1 (9.06) (b): 201.5 (7.93)
	Wheel cylinder bore	mm (in)	17.46 (0.687)
Rear disc brake	Type		Disc (solid)
	Thickness of pad	mm (in) Standard	8.0 (0.31)
		mm (in) Minimum	1.0 (0.04)
	Area of pad	mm^2 (in^2)	2,900 (4.5)
	Outer diameter of disc plate	mm (in)	259 (10.2)
	Thickness of disc plate	mm (in) Standard	10.0 (0.40)
		mm (in) Minimum	8.0 (0.31)
	Disc plate runout	mm (in) Maximum	0.1 (0.04)
	Wheel cylinder bore	mm (in)	30.2 (1.19)
Parking brake	Type		Center lever
	Lever notches (Pulled at 98N (10 kg, 22 lb))		5—7
Power brake unit	Diameter	mm (in)	238 (9.37)
	Clearance between master cylinder piston and push rod	mm (in)	0 (0)
	Fluid pressure per treading force	kPa (kg/cm^2, psi)/N (kg, lb)	1,177 (12,171)/196 (20, 44) min. when no vacuum is applied 7,063 (72, 1,024)/196 (20, 44) min. when 500 mmHg (19.7 in Hg) vacuum is applied
Rear wheel hydraulic control devise (system)	Type		Dual proportioning valve (Non-ABS) or ABS
	Switching point	kPa (kg/cm^2, psi)	Except General LHD and RHD: 1,962 (20, 284) General LHD and RHD: 2,942 (30, 427)

(a): Except 13 inch-wheels in General LHD and RHD vehicles
(b): 13 inch-wheels in General LHD and RHD vehicles

12. WHEEL AND TIRE

Item \ Type			Standard	Temporary spare (If equipped)
Wheel	Size		5-Jx13	4-T x 15
			5 1/2-JJx14	
			6JJx15	
	Offset mm (in)		42 (1.65)	53 (2.09)
	Diameter of pitch circle mm (in)		114.3 (4.5)	
	Material		Steel or aluminum alloy	Steel
	Number of fixing nuts	13 inch-wheel	4	4 or 5
		14 inch-wheel	5	
		15 inch-wheel		
Tire	Size	13 inch-wheel	6.45-13-6PR 165SR13 165/80R13 82S 185/70HR13 185/70R13 85H	T125/70D15
		14 inch-wheel	185/70HR14 185/70R14 87H 185/70R14 88H 185/70VR14	
		15 inch-wheel	195/60R15 86H 195/60VR15	
	Air pressure kPa (kg/cm^2, psi)	Front	216 (2.2, 31) or 196 (2.0, 28) Refer to tire labels for applications	412 (4.2, 60)
		Rear	177 (1.8, 26)	
Wheel and tire	Runout mm (in)	Horizontal	Steel wheel: 2.5 (0.098), Alminum alloy wheel: 2.0 (0.079) max.	
		Vertical	2.0 (0.079) max.	
	Unbalance g (oz)	13 inch-wheel	11 (0.39) max.	
		14 inch-wheel	10 (0.35) max.	
		15 inch-wheel	9 (0.32) max.	

13. SUSPENSION

Item			Specification							
Front suspension										
Type			Strut							
Front wheel alignment	Toe-in mm (in)		0 ± 3 (0 ± 0.12)							
	Camber angle		0°17' ± 45'							
	Caster angle		1°13' ± 45'							
	King pin angle		12°47'							
Maximum front steering angle	Inner		36°26'33''							
	Outer		30°59'15''							
Stabilizer	Type		Torsion bar							
	Diameter mm (in)		20.0 (0.79)							
Shock absorbers	Standard suspension		Oil type							
	Auto adjust suspension		Low-pressure gas sealed type							
Coil springs*	Identification color		Orange	Green	Light green	Pink	Brown	Purple	Gray	Blue
	Wire diameter mm (in)		12.5 (0.49)	12.6 (0.49)	12.8 (0.50)	12.9 (0.51)	13.1 (0.52)	13.3 (0.53)	13.6 (0.54)	13.7 (0.54)
	Coil inner diameter mm (in)		147.5 (5.8)							
	Free length mm (in)		344 (13.5)	353 (13.9)	362 (14.3)	370 (14.6)	372 (14.6)	365 (14.4)	350 (13.8)	358 (14.1)
	Coil number		4.99	5.09	5.31	5.42	5.53	5.46	5.34	5.45

* Refer to pages 13—5,6,7 for coil spring applications

Item			Specification							
Rear suspension										
Type			Strut							
Rear wheel alignment	Toe-in mm (in)	2WS	0 ± 3 (0 ± 0.12)							
		4WS	3 ± 3 (0.12 ± 0.12)							
	Camber angle	2WS	–0°30' ± 45'							
		4WS	0°00' ± 45'							
Maximum rear steering angle (4WS)	Inner		5°00' ± 45'							
	Outer		5°00' ± 45'							
Stabilizer	Type		Torsion bar							
	Diameter mm (in)		16 (0.63)							
Shock absorbers	Standard suspension		Oil type							
	Auto adjust suspension		Low-pressure gas sealed type							
Coil springs*	Identification color		Orange	White	Yellow	Brown	Blue	Green	Red	Pink
	Wire diameter mm (in)		11.6 (0.45)	11.7 (0.46)	11.8 (0.46)	11.9 (0.47)	12.1 (0.48)	12.2 (0.48)	12.4 (0.49)	12.6 (0.50)
	Coil inner diameter mm (in)		127.5 (5.0)							
	Free length mm (in)		297 (11.7)	306 (12.0)	314 (12.4)	323 (12.7)	327 (12.9)	332 (13.1)	336 (13.2)	340 (13.4)
	Coil number		5.44	5.58	5.72	5.87	6.03	6.04	6.21	6.36

* Refer to pages 13—8,9,10 for coil spring applications.

15. BODY ELECTRICAL SYSTEM

Item \ Body type		Specification (W)		
		MX-6/Coupe	Sedan	Hatchback
Front exterior lights	Halogen headlight	60 + 55/55		
	Turn signal light	21		
	Position light	5		
	Side turn signal light	5		
Rear exterior lights	Back-up light	21		
		23 (Middle east)		
	License plate light	5		
	Stop/Tail light	21/5		
	Turn signal light	21		
		23 (Middle east)		
	Rear fog light	21 (ECE)		

Item	Body type	Specification (W) (BULB TRADE NO)		
		MX-6/Coupe	Sedan	Hatchback
Indicator and warning lights	Brake	1.4		
	Oil pressure	1.4		
	Fuel	1.4		
	Washer level	1.4		
	Rear	1.4		
	4WS	—	—	1.4 (ECE)
	Door	1.4		
	Seat belt	1.4		
	ABS	1.4		
	Alternator	1.4		
	High beam	3.4		
	Turn signal	3.4		
	O/D OFF	0.8		
	A/T mode	0.8 (ECE)		
	A/T position	0.8		
Interior lights	Glove compartment light	3.4		
	Interior light	10		
	Luggage compartment light	5		
Illumination lights	Motor	4.8		
	Hazard switch	1.4		
	Cigar lighter	3.4		
	Auto cruise main switch	0.5		
	AAS switch	1.4		
	Rear defroster switch	1.4		
	A/T switch	1.4		
	A/T	3.4		
	IG switch	1.4		

STANDARD BOLT AND NUT TIGHTENING TORQUE

Diameter mm (in)	Pitch mm (in)	4T			6T			8T		
		N·m	m-kg	ft-lb	N·m	m-kg	ft-lb	N·m	m-kg	ft-lb
6 (0.236)	1 (0.039)	4.2—6.2	0.43—0.63	3.1—4.6	6.9—9.8	0.7—1.0	5.0—7.2	7.8—11.8	0.8—1.2	5.8—8.8
8 (0.315)	1.25 (0.049)	9.8—14.7	1.0—1.5	7.2—10.8	16—23	1.6—2.3	12—17	18—26	1.8—2.7	13—20
10 (0.394)	1.25 (0.049)	20—28	2.0—2.9	14—21	31—46	3.2—4.1	23—34	36—54	3.7—5.5	27—40
12 (0.472)	1.5 (0.059)	34—50	3.5—5.1	25—37	55—80	5.6—8.2	41—59	63—93	6.4—9.5	46—69
14 (0.551)	1.5 (0.059)	—	—	—	75—103	7.7—10.5	56—76	102—137	10—14	75—101
16 (0.630)	1.5 (0.059)	—	—	—	116—157	12—16	85—116	156—211	16—22	115—156
18 (0.709)	1.5 (0.059)	—	—	—	167—225	17—23	123—166	221—299	23—31	163—221
20 (0.787)	1.5 (0.059)	—	—	—	231—314	24—32	171—231	308—417	31—43	227—307
22 (0.866)	1.5 (0.059)	—	—	—	314—423	32—43	231—312	417—564	43—58	307—416
24 (0.945)	1.5 (0.059)	—	—	—	475—546	41—56	298—403	536—726	55—74	396—536

40

SPECIAL TOOLS

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ENGINE ..... 40— 3
CLUTCH AND MANUAL TRANSAXLE ..... 40— 5
AUTOMATIC TRANSAXLE ..... 40— 6
FRONT AND REAR AXLE ..... 40— 7
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40 SPECIAL TOOLS

GENERAL INFORMATION

The letters "A" and "B" in the Priority column indicate the degree of importance of each tool.

A.....Indispensable

The tools ranked "A" in this list are indispensable for performing operations satisfactorily, easily, safely and efficiently. It would, therefore, be advisable for all service shops to have these tools.

B.....Selective

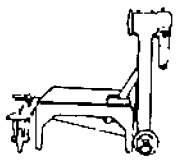
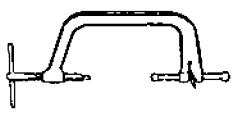
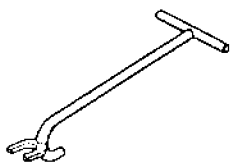
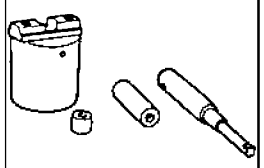
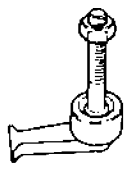
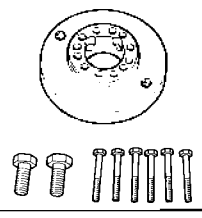
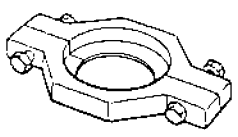
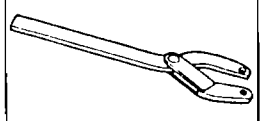
The tools in this list are not as necessary as tools ranked A, but all servise shops should have these tools if possible in order to easily perform operations for efficient repair operations.

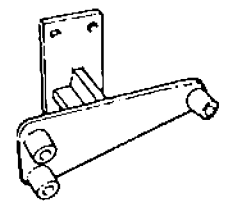
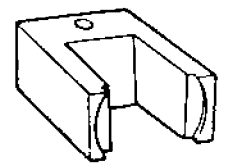
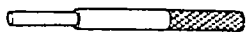
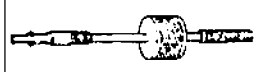
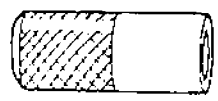
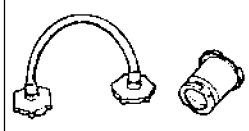
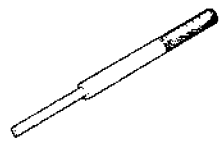
86U40X-002

Note
When ordering tool sets which consist of several tools, check the List in the Parts Catalogue or Special Service Tools Booklet (4063-11-85B) etc. to make sure that some tools are duplicated in other sets which may already have been purchased. If so, order only those new tools which are needed.

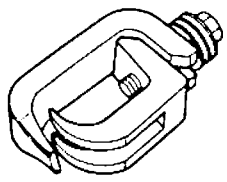
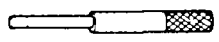
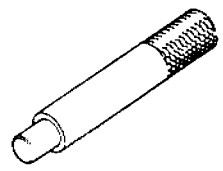
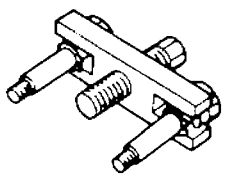
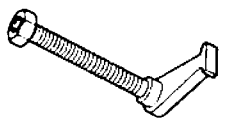
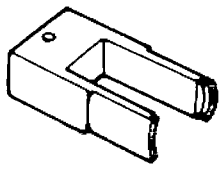
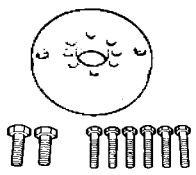
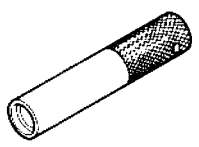
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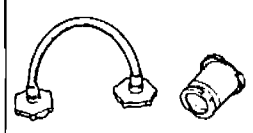
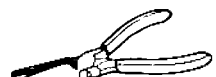
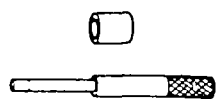
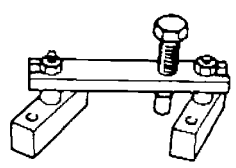
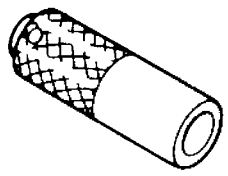
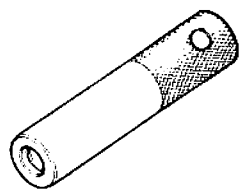
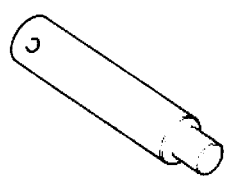
ENGINE

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0107 680A Engine stand	A	
49 0636 100A Arm, valve spring lifter	A	
49 0223 105B Lifter, valve spring (F6, F8, FE-2V)	A	
49 G030 040 Tool set, piston pin setting (F6, F8, FE SOHC)	A	
49 E301 060 Brake, ring gear	A	
49 H011 101A Lock tool, crankshaft	A	
49 0636 145 Puller, fan puller boss	A	
49 S120 710 Holder, coupling flange	A	

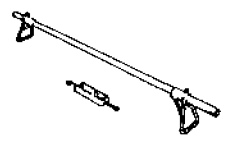
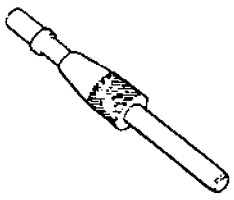
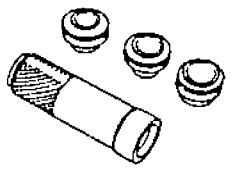
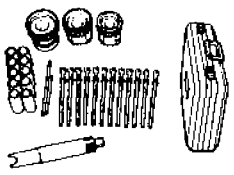
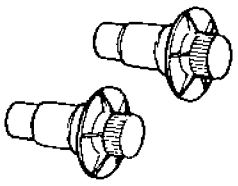
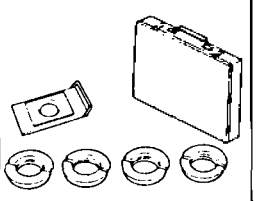
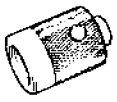
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G030 005A Hanger, engine stand	A	
49 G030 222 Pivot, valve spring lifter (F6, F8, FE SOHC)	A	
49 0249 010A Remover & installer, valve guide (FE-3V)	A	
49 1285 071 Puller bearing	A	
49 0221 251A Remove & installer, valve guide (F6, F8, FE-2V)	A	
49 G030 160 Pusher, valve seal (F6, F8, FE-2V)	A	
49 9200 146 Radiator cap tester adaptor set	A	
49 B012 005 Remover and installer valve guide (FE DOHC)	A	

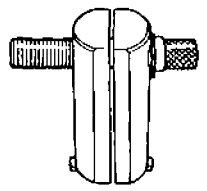
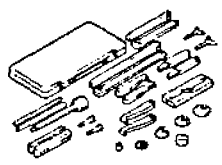
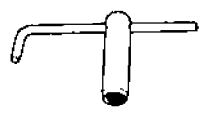
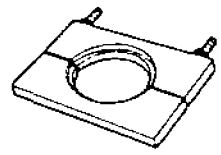
40 SPECIAL TOOLS

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 S120 220 Holder, tappet (Disel)	A	
49 0636 165A Remover & installer, valve guide (Diesel)	A	
49 0223 061 Remover &, installer, piston pin (RF-N, FE DOHC)	B	
49 S120 215A Pulley puller (Diesel)	A	
49 V101 060A Brake, ring gear (Diesel)	A	
49 S120 222 Pivot, valve spring lifter (RF-N, RF-CX, FE DOHC)	A	
49 G011 101 Lock tool, crankshaft (RF-N, RF-CX)	A	
49 H012 009 Pusher, valve seal (FE-3V)	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 9200 147 Radiator cap tester adaptor set	A	
49 S120 170 Remover, valve seal (RF-N, RF-CX, FE DOHC)	A	
49 0552 165 Remover & installer, valve guide (Diesel)	A	
49 S120 105 Compressor, valve spring (Diesel)	A	
49 S120 160 Pusher, valve seal (Diesel)	A	
49 G012 001 Collar (FE DOHC)	A	
49 G012 002 Pusher, valve seal (FE DOHC)	A	
49 G011 001 Replacer, piston pin (RF-CX)	A	

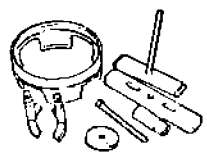
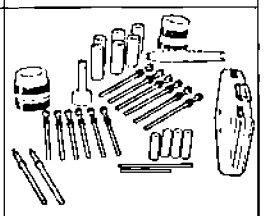
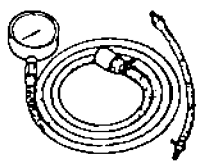
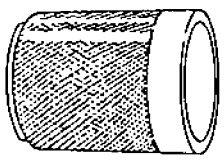
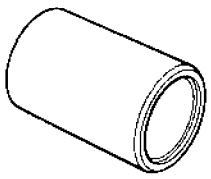
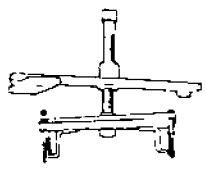
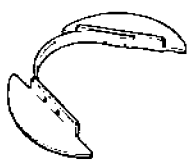
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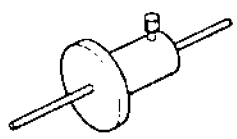
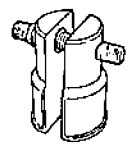
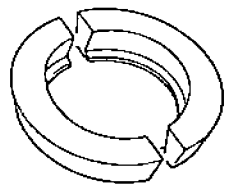
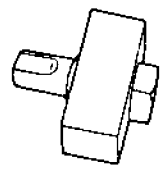
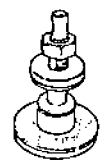
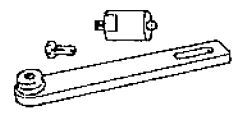
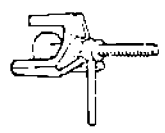
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G017 5A0 Engine support	A	
49 SE01 310 Centering tool, clutch disc	A	
49 F401 330B Installer set, bearing	B	
49 G030 380B Shim selector set	A	
49 G030 455 Holder, (differential side gear)	B	
49 G017 1A0 Remover set, bearing	A	
49 G017 202 Preload adaptor	A	

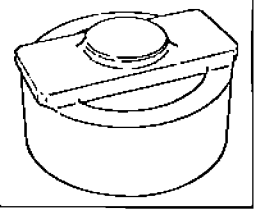
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 FT01 361 Remover, bearing	A	
49 G019 0A0 Hanger, transaxle	A	
49 0839 425C Puller set, bearing	A	
49 G030 440 Holder, primary shaft	A	
49 G030 795 Installer, oil seal	A	
49 G030 370 Removing plate	A	
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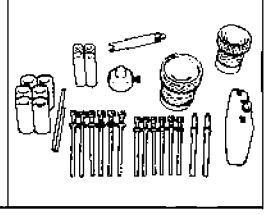
40 SPECIAL TOOLS

AUTOMATIC TRANSAXLE

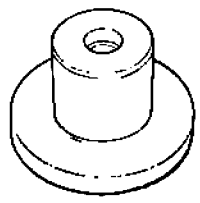
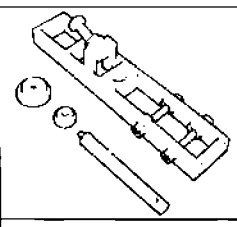
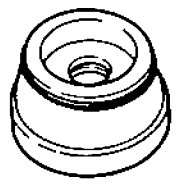
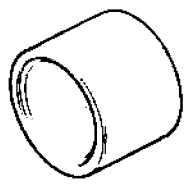
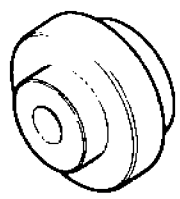
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G019 0A7A Compressor set, Return spring	A	
49 G019 0A5A Shim selector set	A	
49 0378 400A Gauge set, oil pressure	A	
49 G019 011 Bearing installer	A	
49 FT01 376 Lifter, servo piston (3AT)	A	
49 S120 785 Dsut boots installer	A	
49 FT01 377 Replacer, low reverse piston (3AT)	A	
49 FT 01 374 Holder, one way clutch position (3AT)	A	

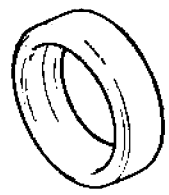
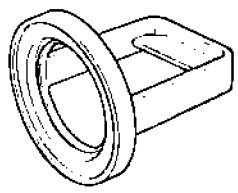
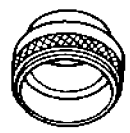
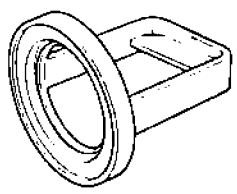
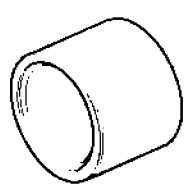
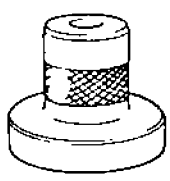
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G032 355 Adjust gauge (3AT)	B	
49 G019 9A2 Tester set, EC-AT (EC-AT)	A	
49 G019 013 Bearing remover	A	
49 G019 022 Attachment K	A	
49 FT01 439 Holder, idle gear shaft	A	
49 G019 012 Leak checker	A	
49 G019 0A2 Turbine shaft holder	A	
49 0378 375 Compressor, clutch spring (3AT)	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G019 017 Oil seal installer	A	

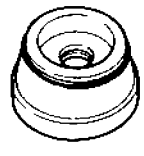
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G019 0A6A Shim selector set (3AT)	A	

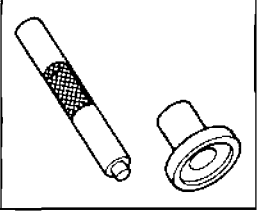
FRONT AND REAR AXLE

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 F026 102 Installer, bearing	A	
49 G033 1A1 Puller set wheel hub	A	
49 F027 007 Attachment ϕ 72	A	
49 H026 103 Support block	A	
49 G026 101 Replacer bearing	A	
49 G026 102 Replacer bearing	A	

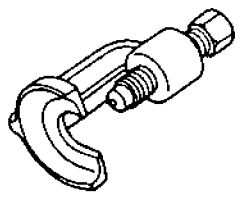
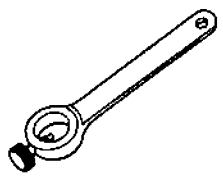
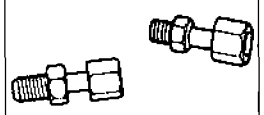
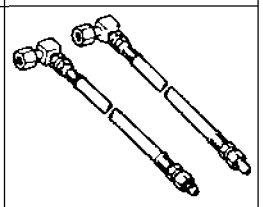
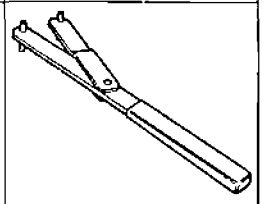
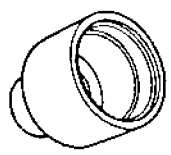
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G033 107 Installer, dust cover	A	
49 G025 001 Installer sensor rotor (ABS)	A	
49 G030 338 Attachment E	A	
49 H026 101A Installer, sensor rotor (ABS)	A	
49 G026 103 Support block	A	
49 V001 795 Installer, oil seal	A	

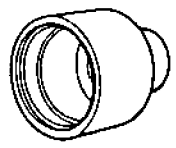
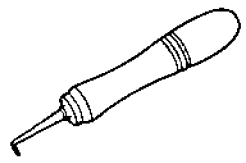
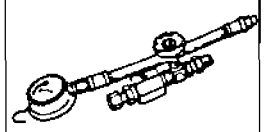
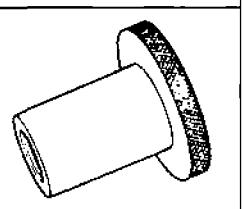
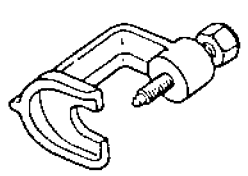
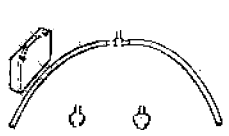
40 SPECIAL TOOLS

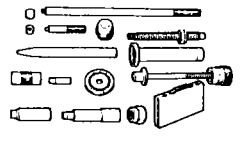
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 F027 005 Attachment 62	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 M005 795 Installer set, oil seal	A	

STEERING

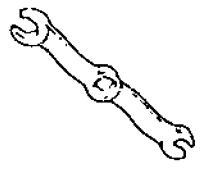
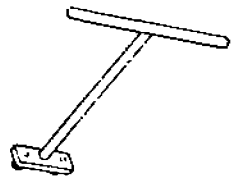
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0118 850C Puller, ball joint	B	
49 0180 510B Attachment	B	
49 B032 302 Adapter	A	
49 H002 671 Adapter, power steering gauge	A	
49 W023 585A Adjust wrench	A	
49 8038 785 Boot installer, ball joint dust cover	A	

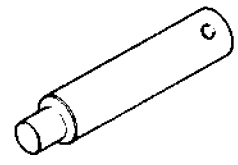
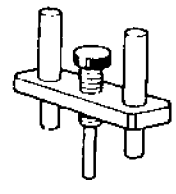
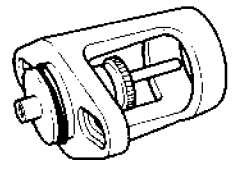
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 1243 785 Boots installer, tie rod	B	
49 0208 701A Air out tool, boot	B	
49 1232 670A Gauge set, power steering	A	
49 G033 108 Adapter, caster camber gauge	A	
49 0727 575 Puller, socket joint (4WS)	B	
49 G032 3A1 Joint hose	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G032 3A0 Repair set, power steering (ESPS)	A	

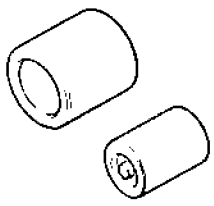
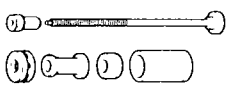
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
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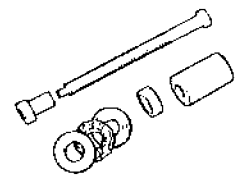
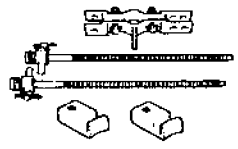
BRAKE

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0259 770B Wrench, flare nut	A	
49 0221 600C Expand tool, disc brake	B	
49 FA18 602 Wrench disc, brake piston	B	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B043 002 Bearing installer (Rear disc)	A	
49 F043 001 Adjust gauge	A	
49 B043 001 Adjust gauge (FE DOHC-R.H.D)	—	

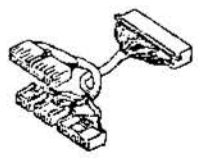
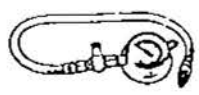
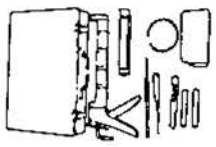
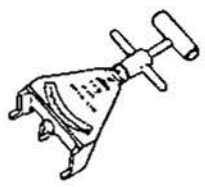
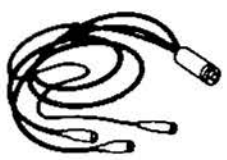
SUSPENSION

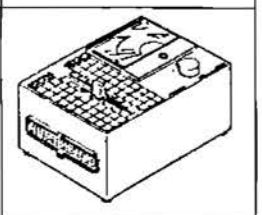
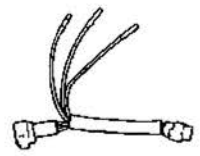
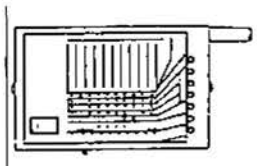
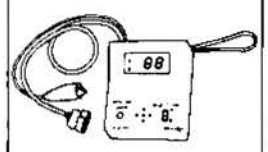
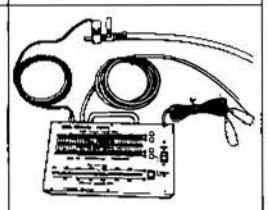
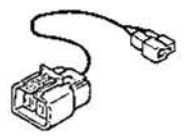
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G028 2A0 Replacer lower arm bush (4WS)	A	
49 G034 2A0 Replacer lower arm bush	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 U034 2A0 Replacer rubber bush (4WS)	A	
49 G034 1A0 Coil spring compressor	A	

40 SPECIAL TOOLS

CHECKER AND OTHER

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 F018 001 Checker lamp	A	
49 9200 163 Adapter harness	A	
49 G018 902 Injector checker	A	
49 0187 280 Oil pressure gauge	B	
49 0305 870A Tool set, window	A	
49 0839 285 Checker, fuel and thermometer	A	
49 9200 020 V-ribbed belt tension gauge	B	
49 0242 685A Switch starter	B	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 9200 162 Monitor, engine signal	A	
49 U018 003 Adapter harness	A	
49 G018 901 Adapter harness	A	
49 9200 010 ACC checker	A	
49 H018 9A1 Self-diagnosis checker	A	
49 9200 750A Multi-pressure tester	A	
49 G018 001 Adapter harness	A	
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