Mazda Protegé

1996 Workshop Manual

mazda

WARNING

Servicing a vehicle can be dangerous. If you have not received service-related training, the risks of injury and property damage increase. The recommended servicing procedures for the vehicle in this workshop manual were developed with Mazda-trained technicians in mind. This manual may be useful to non-Mazda trained technicians, but a technician with our service-related training and experience will be at less risk when performing servicing operations. However, all users of this manual are expected to know general safety procedures.

This manual contains "Warnings" and "Cautions" applicable to risks not normally encountered in a general technician's experience. They should be followed to reduce the risk of injury and the risk that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that the "Warnings" and "Cautions" are not exhaustive. It is impossible to warn of all the hazardous consequences that might result from failure to follow the procedures.

The procedures recommended and described in this manual are effective methods of performing service and repair. Some require tools specifically designed for a specific purpose. Nonrecommended procedures and tools should include consideration for safety of the technician and continued safe operation of the vehicle.

Parts should be replaced with genuine Mazda replacement parts, not parts of lesser quality. Use of a nonrecommended replacement part should include consideration for safety of the technician and continued safe operation of the vehicle.

1996 Mazda Protegé Workshop Manual

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FOREWORD

A thorough familiarization with this manual is important for proper repair and maintenance. It should always be kept in a handy place for quick and easy reference.

The contents of this manual, including 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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WARRANTY

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

Mazda Motor Corporation
HIROSHIMA, JAPAN

APPLICATION:
This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN), and related materials shown on the following page.

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VEHICLE IDENTIFICATION NUMBERS (VIN)

JM1 BB141*T0 300001—
JM1 BB142*T0 300001—
JM1 BB143*T0 300001—
JM1 BB144*T0 300001—

RELATED MATERIALS

1995 323/Protegé Service Highlights 9999-95-064F-95
1996 Protegé, MX–3, MX–5, 626/MX–6, 929, MPV, Millenia Service Highlights 9999-95-MODL-96
Engine Workshop Manual Z5–DOHC 9999-95-EWZ5-95
Engine Workshop Manual B6, BP–DOHC 9999-95-EWBP-95
Manual Transaxle Workshop Manual F25M–R 9999-95-F25M-95
Automatic Transaxle Workshop Manual FA4A–EL 9999-95-FA4A-95
1996 Protegé Wiring Diagram 9999-95-019G-96

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SAFETY INFORMATION

LUBRICANTS

Avoid prolonged and repeated contact with petroleum-based oils. Used oil may irritate the skin, and can cause skin cancer and other skin disorders.
Wash thoroughly after working with oil. We recommend water-soluble hand cleaners. Do not use kerosene, gasoline, or any other solvent to remove oil from your skin.
If repeated or prolonged contact with oil is necessary, wear protective clothing. Soiled clothing, particularly those soiled with used oils and greases containing lead, should be cleaned at regular intervals.

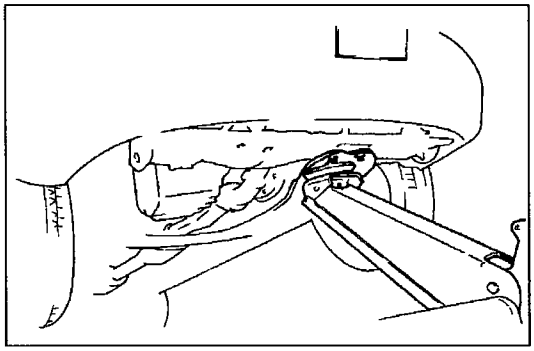
JACKING POSITIONS

Warning

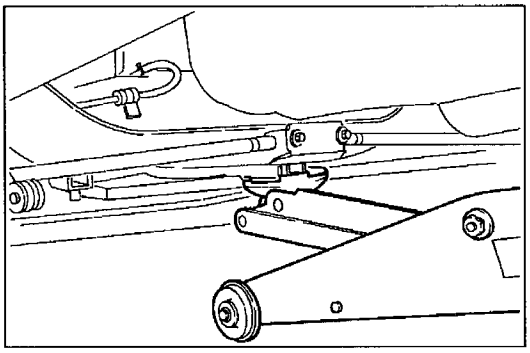
- **Improperly jacking a vehicle is dangerous. The vehicle can slip off the jack and cause serious injury. Use only the correct front and rear jacking positions and block the wheels.**

Use safety stands to support the vehicle after it has been lifted.

Front
At the front of the engine mount member

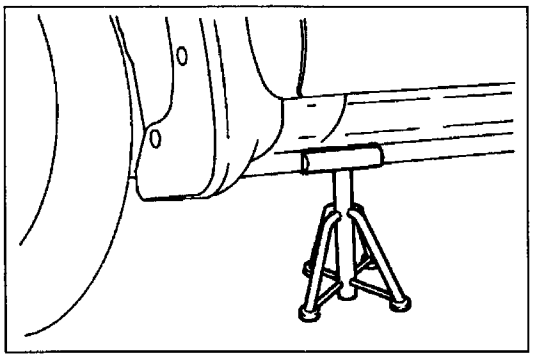


Rear
At the center of the crossmember

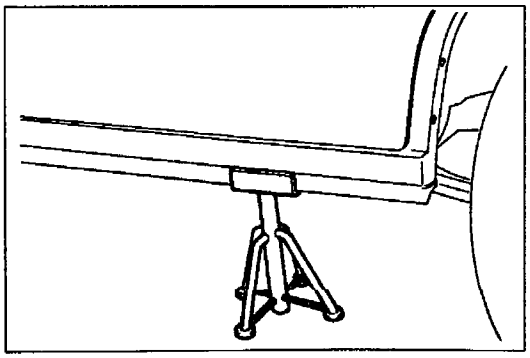


SAFETY STAND POSITIONS

Front
Both sides of the side sill

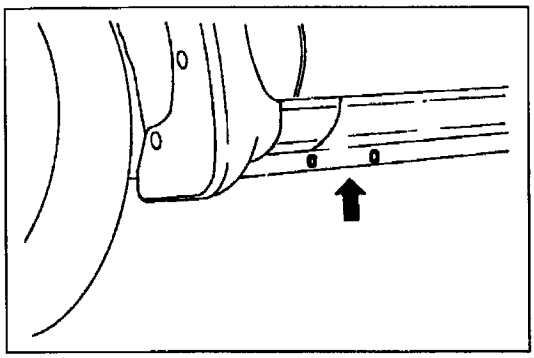


Rear
Both sides of the side sill

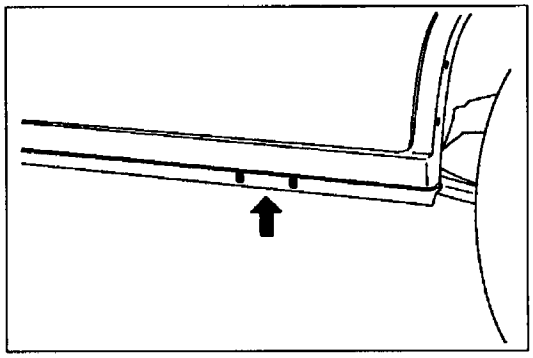


VEHICLE LIFT POSITIONS

Front
Both sides of the side sill



Rear
Both sides of the side sill



DYNAMOMETER

When test-running a vehicle on a dynamometer:

- Place a fan, preferably a vehicle-speed proportional type, in front of the vehicle.
- Connect an exhaust gas ventilation unit.
- Cool the exhaust pipes with a fan.
- Keep the area around the vehicle uncluttered.
- Watch the water temperature gauge.

COMPRESSED AIR

When using compressed air to clean or remove parts:

- Wear protective eye wear.
- Hold a rag over the opening to prevent parts from shooting out.
- Take precautions so that people around you are not struck by flying debris.

HOW TO USE THIS MANUAL

ADVISORY MESSAGES

You'll find several **Warnings**, **Cautions**, and **Notes** in this manual.

Warning

- **A Warning indicates a situation in which serious injury or death could result if the warning is ignored.**

Caution

- **A Caution indicates a situation in which damage to the vehicle could result if the caution is ignored.**

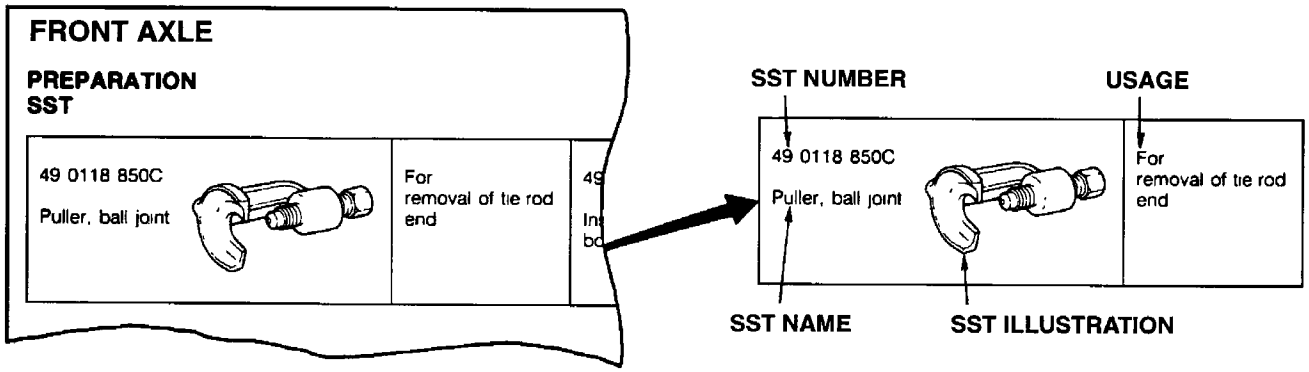
Note

- A **Note** provides added information that will help you to complete a particular procedure.

PREPARATION

This points out the needed **SSTs** for the service operation. It is best to gather all necessary **SSTs** before beginning work.

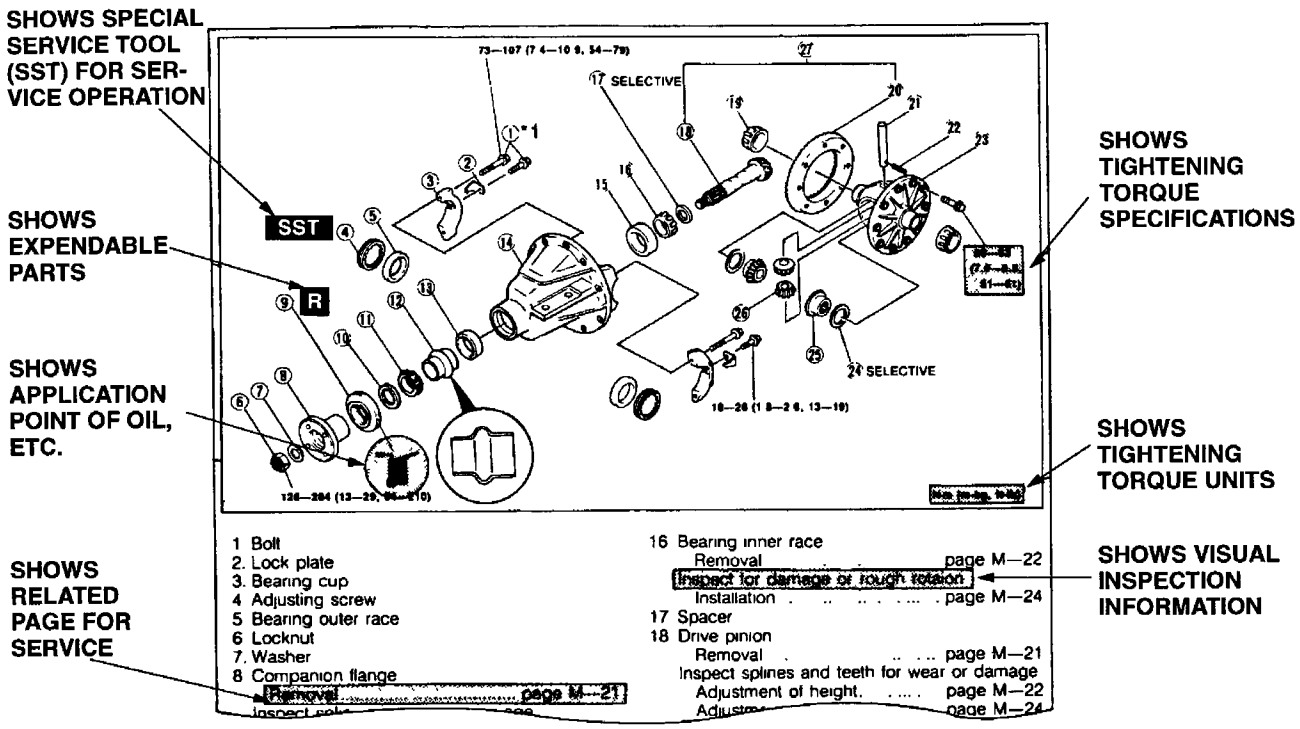
Example:



REPAIR PROCEDURE

1. Most repair operations begin with an overview illustration. It identifies the components, shows how the parts fit together, and describes visual part inspection. If a damaged or worn part is found, repair or replace it as necessary.
2. Expendable parts, tightening torques, and symbols for oil, grease, and sealant are shown in the overview illustration.
3. Pages related to service procedures are shown under the illustration. Refer to this information when servicing the related part.

Example:



*1: The numbers (①, etc.) refer to part identification and servicing procedures.

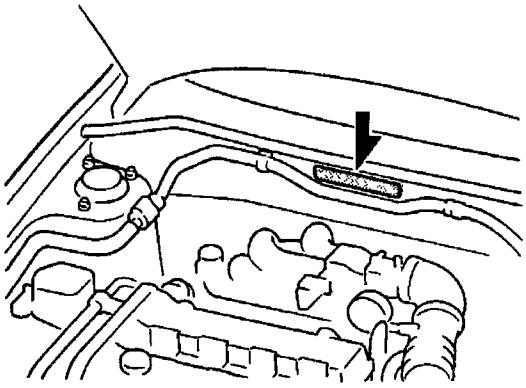
SYMBOLS

There are seven symbols indicating oil, grease, and sealant. These symbols show the points of applying such materials during service.

Symbol	Meaning	Kind
OIL	Apply oil	New engine oil or gear oil as appropriate
BRAKE FLUID	Apply brake fluid	FMVSS116: DOT–3
ATF	Apply automatic transaxle fluid	M–III or Dexron®II
GREASE	Apply grease	Appropriate grease
SEALANT	Apply sealant	Appropriate sealant
P	Apply petroleum jelly	Appropriate petroleum jelly
R	Replace part	O-ring, gasket, etc.

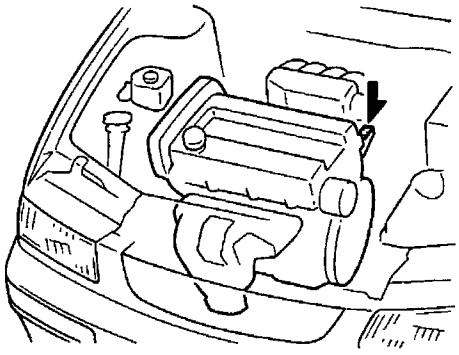
IDENTIFICATION NUMBER LOCATIONS

VEHICLE IDENTIFICATION NUMBER (VIN)

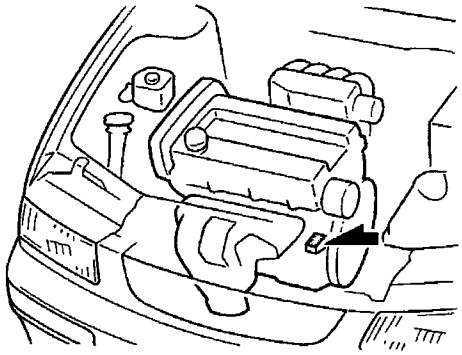


ENGINE MODEL AND NUMBER

Z5 ENGINE



BP ENGINE



ABBREVIATIONS

ABDC	After bottom dead center
ABS	Antilock brake system
ACC	Accessory
ATDC	After top dead center
ATF	Automatic transaxle fluid
ATFT V	Transaxle fluid temperature signal voltage
ATX	Automatic transaxle
BAC	Bypass air control
BARO V	Barometric pressure signal voltage
BBDC	Before bottom dead center
BLR SW	Fan switch
BRK SW	Brake switch
BTDC	Before top dead center
CDCV	Canister drain cut valve
CM	Control module
CPU	Central processing unit
D	Drive
D SW	Transaxle range switch (D range)
DEF SW	Rear window defroster switch
DRL	Daytime running light
EC-AT	Electronically controlled automatic transaxle
ECT V	Engine coolant temperature signal voltage
EGR	Exhaust gas recirculation
EGRBV	EGR boost sensor solenoid valve
EGRP V	EGR valve position signal voltage
EGRVAC	EGR solenoid valve (vacuum) duty value
EGRVENT	EGR solenoid valve (vent) duty value
E/L	Electrical load
ELR	Emergency locking retractor
EX	Exhaust
FANC	Coolant fan control
FANN	Condenser fan control
FHO2S	Heated oxygen sensor (front)
FHO2SH	Heated oxygen sensor heater (front)
FTL V	Fuel tank level signal voltage
FTP	Fuel tank pressure
FTP V	Fuel tank pressure signal voltage
HDL SW	Headlight switch
HI	High
HLA	Hydraulic lash adjuster
HU	ABS hydraulic unit
IACV	Idle air control valve
IAT V	Intake air temperature signal voltage
IG	Ignition
IGT	Ignition timing
IN	Intake
INJ	Fuel injection duration
INJ#1	Fuel injector (cylinder No.1)
INT	Intermittent
LH	Left hand
LHD	Left hand drive
LO	Low
L SW	Transaxle range switch (L or 1 range)
M	Motor
MAF V	Mass air flow signal voltage
MTX	Manual transaxle
N	Neutral
NL SW	Neutral/clutch switch
O/D	Overdrive
O/DF LP	O/D OFF indicator light
O/DF SW	O/D OFF switch
OFF	Switch off
ON	Switch on
P	Park
PCV	Positive crankcase ventilation
PRC	Pressure regulator control
PRCV	PRC solenoid valve
PRGV	Purge solenoid valve
P/S	Power steering
P/W	Power window
R	Reverse
RH	Right hand
RHO2S	Heated oxygen sensor (rear)
RLY	Relay
RPM	Engine speed
SAS	Sophisticated air bag sensor
SHIFT A	Shift solenoid A
SHIFT B	Shift solenoid B
SHIFT C	Shift solenoid C
SST	Special service tool
S SW	Transaxle range switch (S or 2 range)
ST	Start
SW	Switch
TEN	TEN terminal (Data link connector)
TDC	Top dead center
TNS	Tail number side lights
TP V	Throttle position sensor signal voltage
TURBINE	Input/turbine speed sensor
VICS	Variable inertia charging system
VICSV	VICS solenoid valve
VRAS	Vibration reducing aluminum stiffener
VS	Vehicle speed
1GR	First gear
2GR	Second gear
4GR INH	4GR inhibit signal (cruise control unit)
4SD	4 Door Sedan

UNITS

Electrical current	A (ampere)
Electric potential	V (volt)
Electric power	W (watt)
Length	mm (millimeter) in (inch)
Negative pressure	kPa (kilo Pascal) mmHg (millimeters of mercury) inHg (inches of mercury)
Positive pressure	kPa (kilo Pascal) kgf/cm^2 (kilogram force per square centimeter) psi (pounds per square inch)
Resistance	Ω (ohm)
Speed	RPM (revolution per minute)
Torque	N·m (Newton meter) kgf·m (kilogram force per meter) kgf·cm (kilogram force per centimeter) ft·lbf (foot pound) in·lbf (inch pound)
Volume	L (liter) US qt (U.S. quart) Imp qt (Imperial quart) ml (milliliter) cc (cubic centimeter) cu in (cubic inch) fl oz (fluid ounce)
Weight	g (gram) oz (ounce)

Conversion to SI Units (Système International d'Unités)

All numerical values in this manual are based on SI units. Numbers shown in conventional units are converted from these values.

Rounding off

Converted values are rounded off to the same number of places as the SI unit value. For example, if the SI unit value is 17.2 and the value after conversion is 37.84, the converted value will be rounded off to 37.8.

Upper and lower limits

When the data indicates upper and lower limits, the converted values are rounded down if the SI unit value is an upper limit and rounded up if the SI unit value is a lower limit. Therefore, converted values for the same SI unit value may differ after conversion. For example, consider 2.7 kgf/cm^2 in the following specifications:

- 210—260 kPa { 2.1—2.7 kgf/cm^2 , 30—38 psi }
- 270—310 kPa { 2.7—3.2 kgf/cm^2 , 39—45 psi }

The actual converted values for 2.7 kgf/cm^2 are 264 kPa and 38.4 psi. In the top specification, 2.7 is used as an upper limit, so its converted values are rounded down to 260 and 38. In the bottom specification, 2.7 is used as a lower limit, so its converted values are rounded up to 270 and 39.

SAE STANDARDS

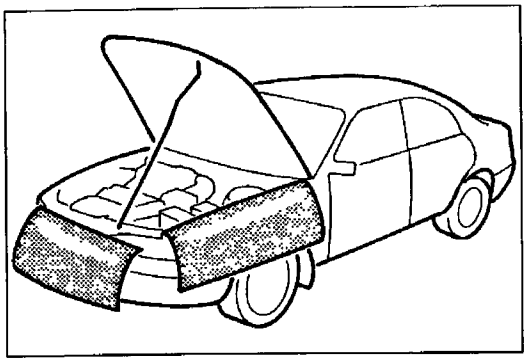
In accordance with new regulations, SAE (Society of Automotive Engineers) standard names and abbreviations are now used in this manual. The table below lists the names and abbreviations that have been used in Mazda manuals up to now and their SAE equivalents.

Previous Standard		New Standard		
Abbreviation	Name	Abbreviation	Name	Remark
—	Accelerator Pedal	AP	Accelerator Pedal	
—	Air Cleaner	ACL	Air Cleaner	
—	Air Conditioning	A/C	Air Conditioning	
—	Airflow Meter	VAF	Volume Air Flow Sensor	
—	Airflow Sensor	MAF	Mass Air Flow Sensor	
—	Alternator	GEN	Generator	
—	ATF Thermosensor	—	Transmission (Transaxle) Fluid Temperature Sensor	
—	Atmospheric Pressure	BARO	Barometric Pressure	
VB	Battery Voltage	B+	Battery Positive Voltage	
—	Catalytic Converter	OC	Oxidation Catalytic Converter	
		TWC	Three-way Catalytic Converter	
		WU-TWC	Warm Up Three-way Catalytic Converter	#1
—	Circuit Opening Relay	FPR	Fuel Pump Relay	#2
—	Clutch Position	CPP	Clutch Pedal Position	
—	Crank Angle Sensor	CMP	Camshaft Position Sensor	
—	Crank Angle Sensor 2	CKP	Crankshaft Position Sensor	
—	Diagnosis Connector	DLC	Data Link Connector	
—	Diagnosis/Self-Diagnosis	OBD	On-Board Diagnostic	
—	Direct Ignition	DLI	Distributorless Ignition	
—	EC-AT Control Unit	TCM	Transmission (Transaxle) Control Module	
EGI	Electronic Gasoline Injection System	CIS	Continuous Fuel Injection System	
—	Electronic Spark Ignition	EI	Electronic Ignition	#3
ECU	Engine Control Unit	PCM	Powertrain Control Module	#4
		ECM	Engine Control Module	
—	Engine Modification	EM	Engine Modification	
—	Engine RPM Signal	—	Engine Speed Input Signal	
—	Evaporative Emission	EVAP	Evaporative Emission	
—	Exhaust Gas Recirculation	EGR	Exhaust Gas Recirculation	
—	Fan Control	FC	Fan Control	
—	Feedback System	CLS	Closed Loop System	
—	Flexible Fuel	FF	Flexible Fuel	
—	Fuel Pump	FP	Fuel Pump	
—	Fully Closed	CTP	Closed Throttle Position	
—	Fully Open	WOT	Wide Open Throttle	
—	Ground/Earth	GND	Ground	

#1: Directly connected to the exhaust manifold
#2: In some models, there is a fuel pump relay that controls pump speed. That relay is now called the fuel pump relay (speed).
#3: Controlled by the ECM (PCM)
#4: Device that controls the engine and powertrain

Previous Standard		New Standard		
Abbreviation	Name	Abbreviation	Name	Remark
—	IC Regulator	VR	Voltage Regulator	
—	Idle Speed Control	IAC	Idle Air Control	
—	Idle Switch	—	Closed Throttle Position Switch	
—	Igniter	ICM	Ignition Control Module	
—	Inhibitor Position	TR	Transmission (Transaxle) Range	
—	Intake Air Pressure	MAP	Manifold Absolute Pressure	
—	Intake Air Thermo	IAT	Intake Air Temperature	
—	Intercooler	CAC	Charge Air Cooler	
—	Knock Sensor	KS	Knock Sensor	
—	Line Pressure Solenoid Valve	—	Pressure Control Solenoid	
—	Lock-up Position	TCC	Torque Converter Clutch	
—	Malfunction Indicator Light	MIL	Malfunction Indicator Lamp	
—	Multiport Fuel Injection	MFI	Multiport Fuel Injection	
—	Open Loop	OL	Open Loop	
—	Overdrive	4GR	Fourth Gear	
—	Oxygen Sensor	HO2S	Heated Oxygen Sensor	With heater
		O2S	Oxygen Sensor	
—	Park/Neutral Range	PNP	Park/Neutral Position	
—	Power Steering Pressure	PSP	Power Steering Pressure	
—	Pulse Generator	—	Input/Turbine Speed Sensor	
—	Reed Valve	SAPV	Secondary Air Pulse Valve	
—	Secondary Air Injection System	PAIR	Pulsed Secondary Air Injection	Pulsed injection
		AIR	Secondary Air Injection	Inject with compressor
—	Sequential Fuel Injection	SFI	Sequential Multipoint Fuel Injection	
—	Service Code(s)	DTC	Diagnostic Trouble Code(s)	
—	Spark Ignition	DI	Distributor Ignition	
—	Stoplight Switch	—	Brake Switch	
—	Test Mode	DTM	Diagnostic Test Mode	#5
—	Throttle Body	TB	Throttle Body	
—	Throttle Sensor	TP	Throttle Position Sensor	
—	Turbocharger	TC	Turbocharger	
—	Vehicle Speed Sensor	VSS	Vehicle Speed Sensor	
—	Vehicle Speed Sensor 1	—	Output Speed Sensor	
—	Water Thermo	ECT	Engine Coolant Temperature	
—	1–2 Shift Solenoid Valve	—	Shift Solenoid A	
	Shift A Solenoid Valve			
—	2–3 Shift Solenoid Valve	—	Shift Solenoid B	
	Shift B Solenoid Valve			
—	3–4 Shift Solenoid Valve	—	Shift Solenoid C	
—	3rd Gear	3GR	Third Gear	
—	—	—	Incorrect Gear Ratio	

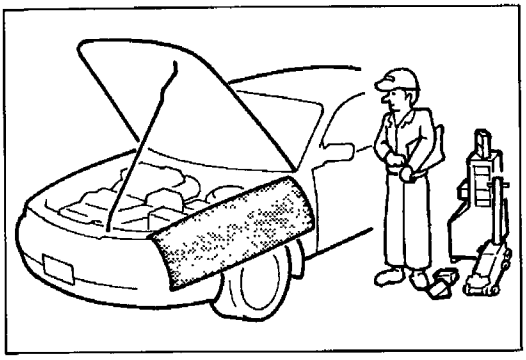
#5: Diagnostic trouble codes depend on the diagnostic test mode



FUNDAMENTAL PROCEDURES

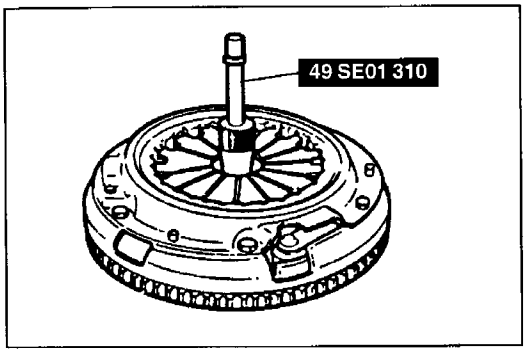
PROTECTION OF THE VEHICLE

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



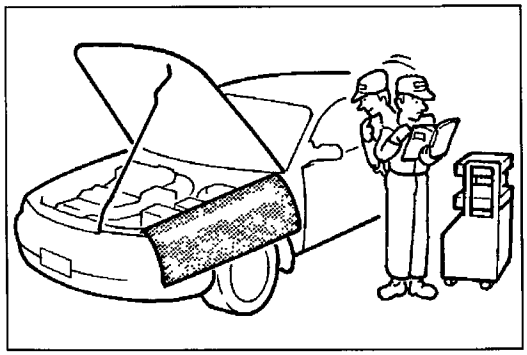
PREPARATION OF TOOLS AND MEASURING EQUIPMENT

Be sure that all necessary tools and measuring equipment are available before starting any work.



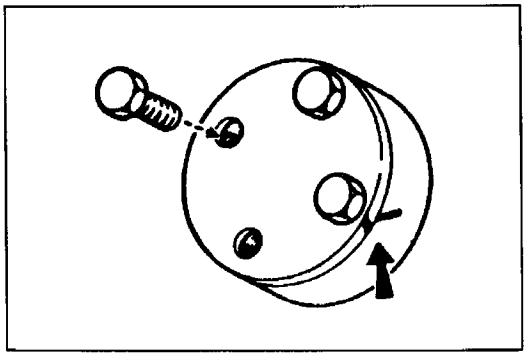
SPECIAL TOOLS

Use special tools when they are required.



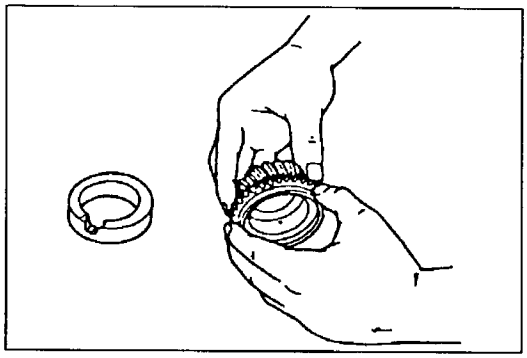
REMOVAL OF PARTS

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. After removing the part, plug all holes and ports to prevent foreign material from entering.

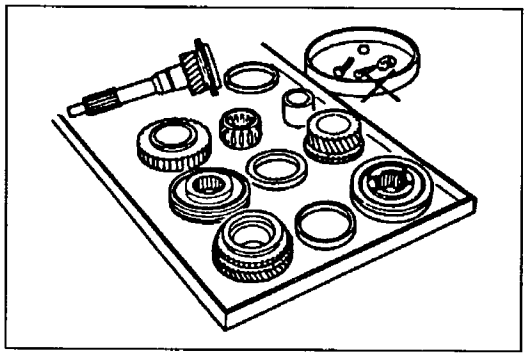


DISASSEMBLY

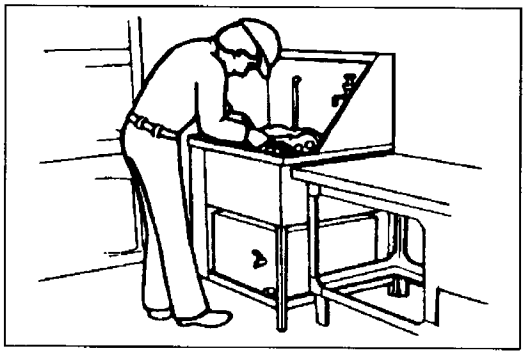
If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be disassembled in a way that will not affect their performance or external appearance and identified so that reassembly can be performed easily and efficiently.



1. Inspection of parts
When removed, each part should be carefully inspected for malfunctioning, deformation, damage, and other problems.

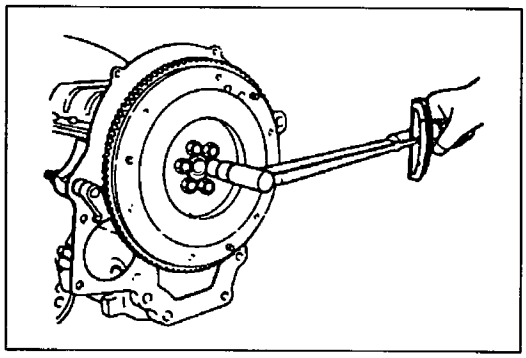


2. Arrangement of parts
All disassembled parts should be carefully arranged for reassembly.
Be sure to separate or otherwise identify the parts to be replaced from those that will be reused.



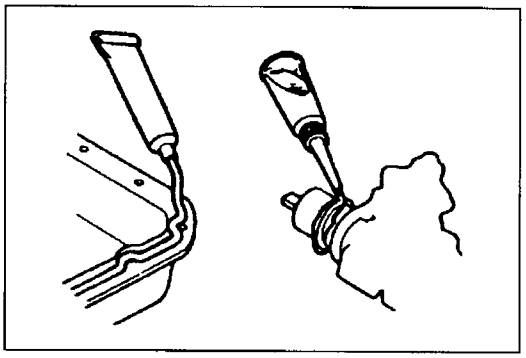
3. Cleaning parts for reuse
All parts to be reused should be carefully and thoroughly cleaned in the appropriate method.

Warning
- **Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear protective eye wear whenever using compressed air.**

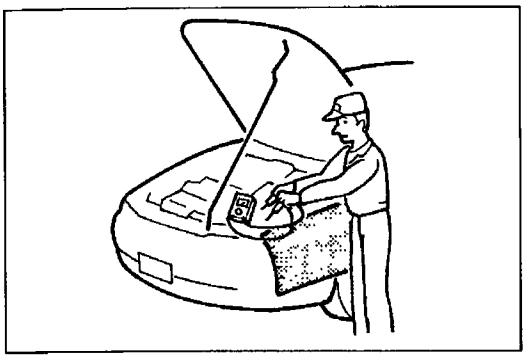


REASSEMBLY
Standard values, such as torques and certain adjustments, must be strictly observed in the reassembly of all parts.

If removed, these parts should be replaced with new ones:
1. Oil seals
2. Gaskets
3. O-rings
4. Lock washers
5. Cotter pins
6. Nylon nuts

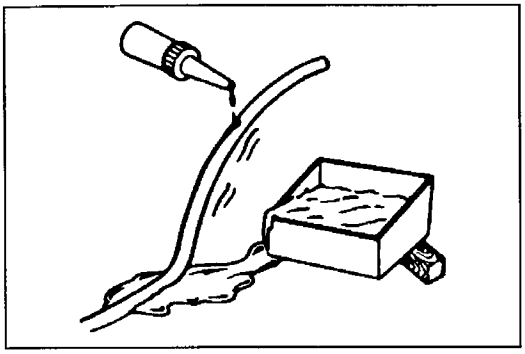


Depending on location:
1. Sealant, gaskets, or both should be applied to the specified locations. When sealant is applied, parts should be installed before the sealant hardens. Hardened sealant causes leaks.
2. Oil should be applied to the moving components of parts.
3. Specified oil or grease should be applied at the prescribed locations (such as oil seals) before reassembly.



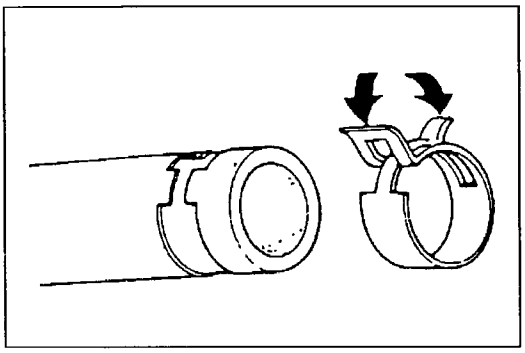
ADJUSTMENTS

Use suitable gauges and testers when making adjustments.



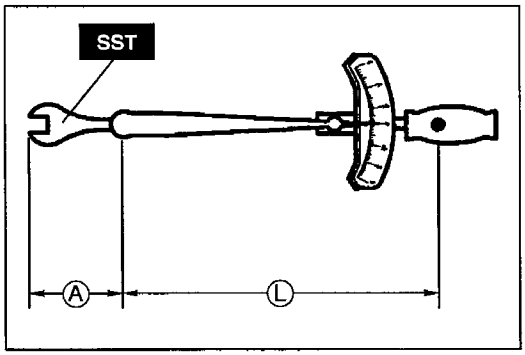
RUBBER PARTS AND TUBING

Prevent gasoline or oil from getting on rubber parts or tubing.



HOSE CLAMPS

When reinstalling, position the hose clamp in the original location on the hose, and squeeze the clamp lightly with large pliers to ensure a good fit.

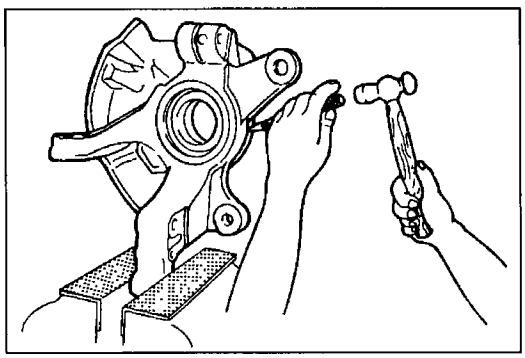


TORQUE FORMULAS

When using a torque wrench-**SST** combination, the written torque must be recalculated due to the extra length that the **SST** adds to the torque wrench. Recalculate the torque by using the following formulas. Choose the formula that applies to you.

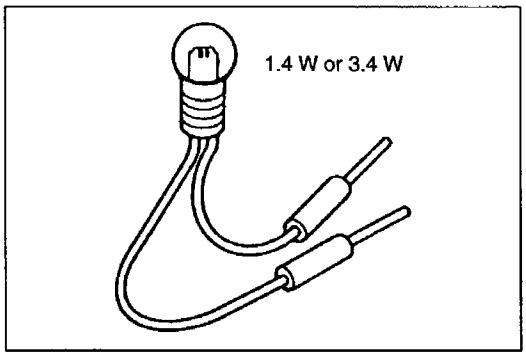
Torque Unit	Formula
N·m	N·m × [L/(L+A)]
kgf·m	kgf·m × [L/(L+A)]
kgf·cm	kgf·cm × [L/(L+A)]
ft·lbf	ft·lbf × [L/(L+A)]
in·lbf	in lbf × [L/(L+A)]

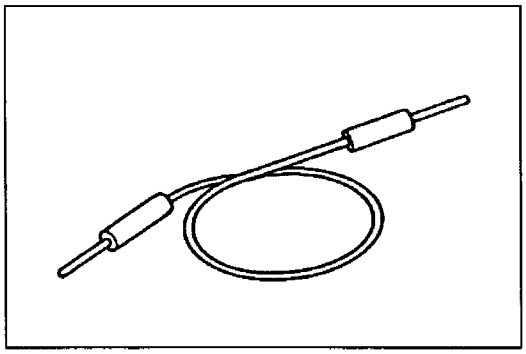
A = The length of the **SST** past the torque wrench drive.
L = The length of the torque wrench.

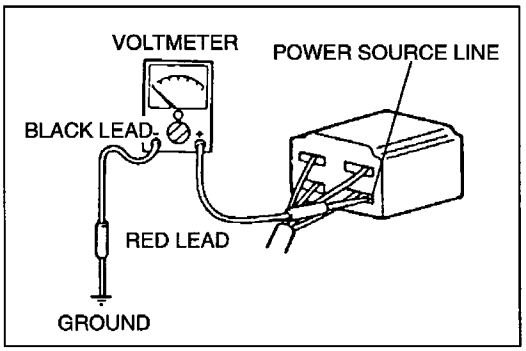


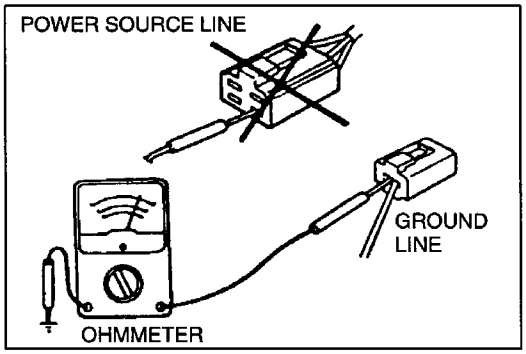
VISE

When using a vise, put protective plates in the jaws of the vise to prevent damage to parts.









ELECTRICAL TROUBLESHOOTING TOOLS

TEST LIGHT

The test light, as shown in the figure, uses a 12 V bulb. The two lead wires should be connected to probes. The test light is used for simple voltage checks and for checking for short circuits.

Caution

- **Using a bulb over 3.4 W when checking the control unit may damage the control unit.**

JUMPER WIRE

A jumper wire is used to create a temporary circuit. Connect the jumper wire between the terminals of a circuit to bypass a switch.

Caution

- **Do not connect a jumper wire from the power source line to a body ground. This may cause burning or other damage to wiring harnesses or electronic components.**

VOLTMETER

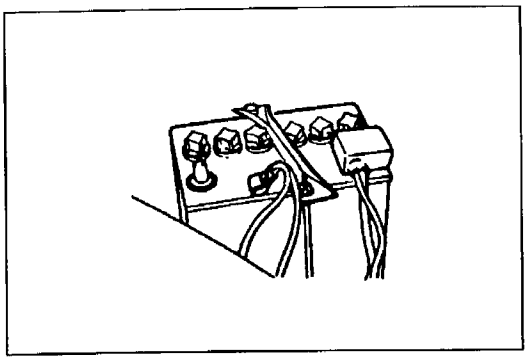
The DC voltmeter is used to measure circuit voltage. A voltmeter with a range of 15 V or more is used by connecting the positive (+) probe (red lead wire) to the point where voltage is to be measured and the negative (–) probe (black lead wire) to a body ground.

OHMMETER

The ohmmeter is used to measure the resistance between two points in a circuit, and to check for continuity and short circuits.

Caution

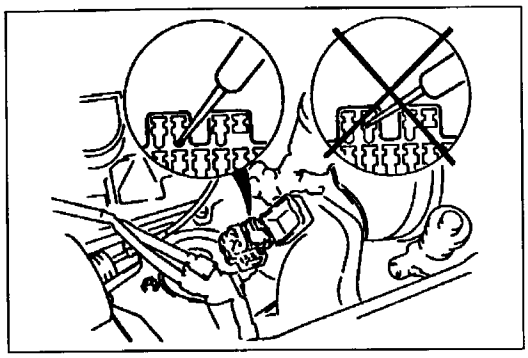
- **Do not connect the ohmmeter to any circuit to which voltage is applied. This will damage the ohmmeter.**



ELECTRICAL PARTS

BATTERY CABLE

Before disconnecting connectors or removing electrical parts, disconnect the negative battery cable.



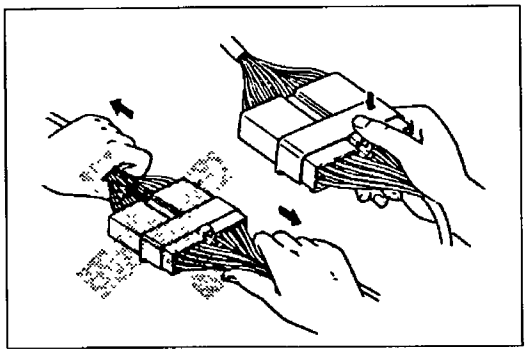
CONNECTORS

Data Link Connector

Insert the probe into the service hole when connecting a jumper wire to the data link connector.

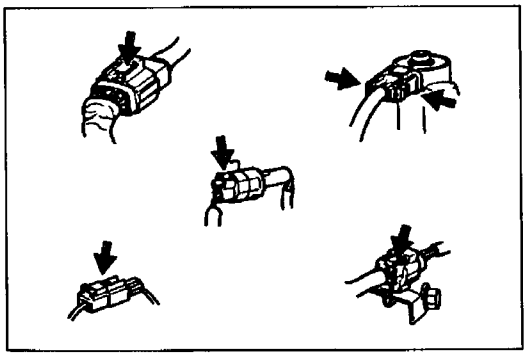
Caution

- **Inserting a jumper wire probe into the data link connector terminal may damage the terminal.**

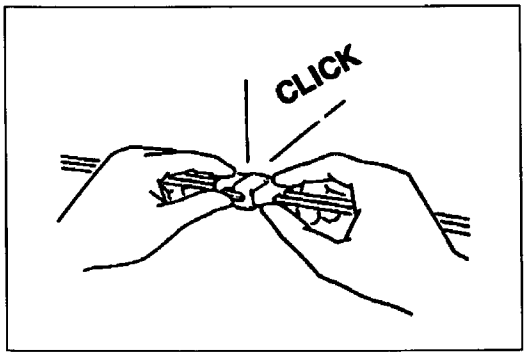


Disconnecting Connectors

When disconnecting two connectors, grasp the connectors, not the wires.

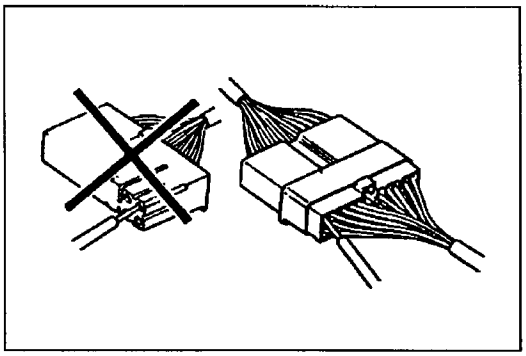


Connectors can be disconnected by pressing or pulling the lock lever as shown.



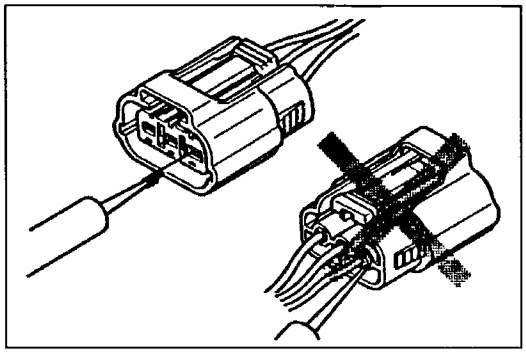
Locking Connector

When locking connectors, listen for a click that will indicate they are securely locked.



Inspection

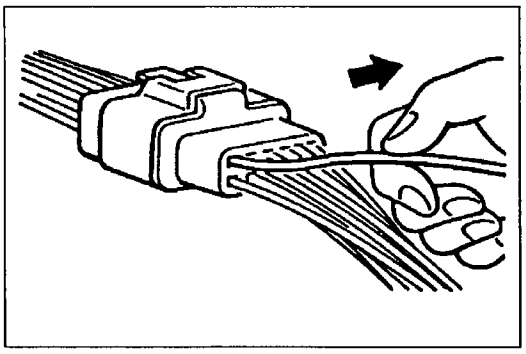
1. When a tester is used to check for continuity or to measure voltage, insert the tester probe from the wiring harness side.



2. Check the terminals of waterproof connectors from the connector side, as they cannot be accessed from the wiring harness side.

Caution

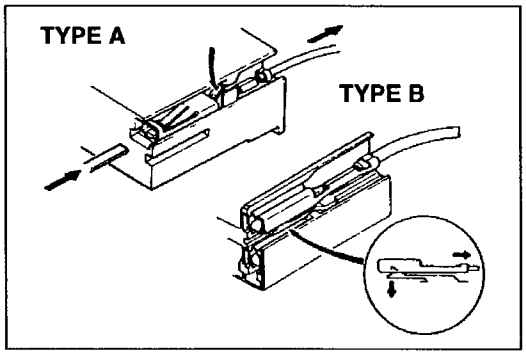
- **To prevent damage to the terminal, wrap a thin wire around the lead before inserting it into the terminal.**



TERMINALS

Inspection

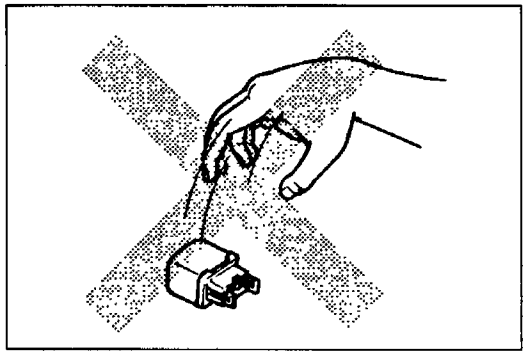
Pull lightly on individual wires to check that they are secured in the terminal.



Replacement

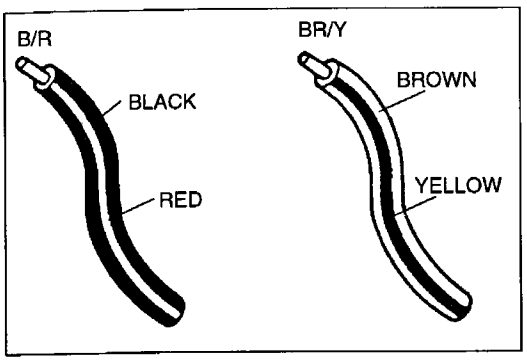
Use the appropriate tools to remove a terminal as shown. When installing a terminal, be sure to insert it until it locks securely.

Insert a thin piece of metal from the terminal side of the connector, and then, with the terminal locking tab pressed down, pull the terminal out from the connector.



SENSORS, SWITCHES, AND RELAYS

Handle sensors, switches, and relays carefully. Do not drop them or strike them against other objects.



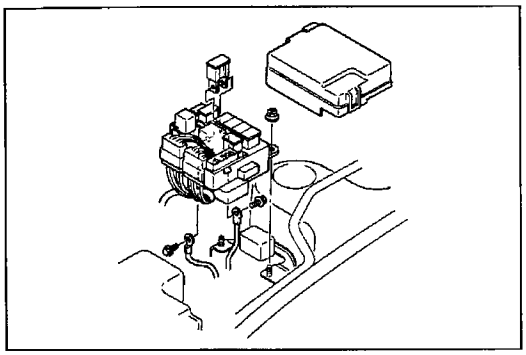
WIRING HARNESS

Wiring Color Codes

Two-color wires are indicated by a two-color code symbol.

The first letter indicates the base color of the wire and the second the color of the stripe.

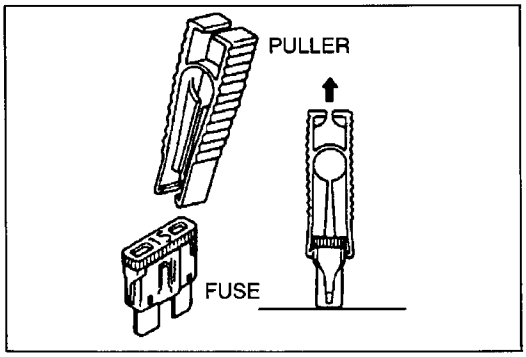
CODE	COLOR		CODE	COLOR
B	Black		O	Orange
BR	Brown		P	Pink
G	Green		R	Red
GY	Gray		V	Violet
L	Blue		W	White
LB	Light Blue		Y	Yellow
LG	Light Green		—	—



FUSE

Replacement

1. When replacing a fuse, be sure to replace it with one of the specified capacity.
   If a fuse again fails after it has been replaced, the circuit probably has a short and the wiring should be checked.
2. Be sure the negative battery terminal is disconnected before replacing a main fuse.



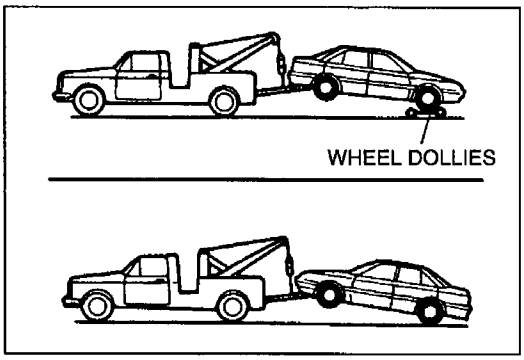
3. When replacing a pullout fuse, use the fuse puller supplied in the fuse box cover.

INSTALLATION OF RADIO SYSTEM

If a radio system is installed improperly or if a high-powered type is used, the CIS and other systems may be affected.

When the vehicle is to be equipped with a radio, observe the following precautions:

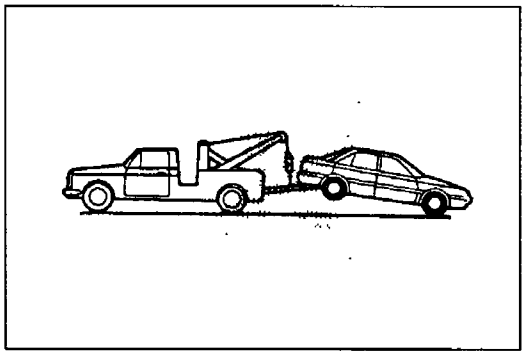
1. Install the antenna at the farthest point from control modules.
2. Install the antenna feeder as far as possible from the control module harnesses **(at least 30 cm { 11.8 in }).**
3. Ensure that the antenna and feeder are properly adjusted.
4. Do not install a high-powered radio system.



TOWING

Precautions

- Proper towing equipment is necessary to prevent damage to the vehicle.
- Laws and regulations applicable to vehicles in tow must always be observed.
- As a general rule, towed vehicles should be pulled with the driving wheels off the ground. If excessive damage or other conditions prevent towing the vehicle with the driving wheels off the ground, use wheel dollies.
- If all four wheels are on the ground, the vehicle may be towed only forward. Remember that power assist for the brakes and steering are not available when the engine is not running.



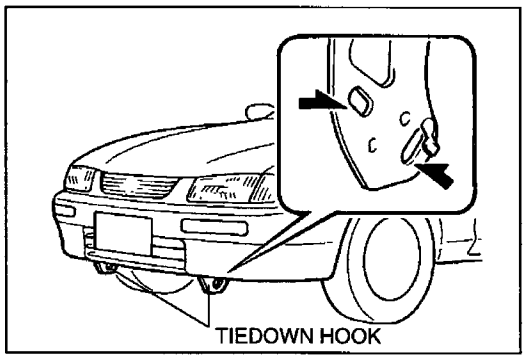
Procedure

With either automatic or manual transaxle:

1. Set the ignition switch in the ACC position.
2. Place the selector lever or shift lever in N (Neutral).
3. Release the parking brake.

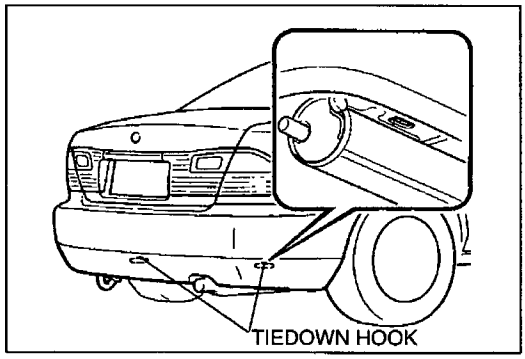
Caution

- **Do not tow the vehicle backward with driving wheels on the ground. This may cause internal damage to the transaxle.**



Caution

- **Don't use the tiedown hooks under the front and rear for towing. They are designed ONLY for tying down the vehicle when it's being transported. Using them for towing will damage the bumper.**



PRE-DELIVERY INSPECTION

PRE-DELIVERY INSPECTION TABLE

EXTERIOR

INSPECT and **ADJUST**, if necessary, the following items to specification:
- ☐ Glass, exterior bright metal, and paint for damage
- ☐ Wheel lug nuts
- ☐ Tire pressure
- ☐ All weatherstrips for damage or detachment
- ☐ Operation of hood release and lock
- ☐ Operation of fuel lid and trunk lid opener (if equipped)
- ☐ Door operation and alignment
- ☐ Headlight aiming

INSTALL the following parts:
- ☐ Wheel caps (if equipped)

UNDER HOOD—ENGINE OFF

INSPECT and **ADJUST**, if necessary, the following items to specification:
- ☐ Fuel, coolant, and hydraulic lines, fittings, connections, and components for leaks
- ☐ Engine oil level
- ☐ Power steering fluid level (if equipped)
- ☐ Brake and clutch fluid level
- ☐ Windshield washer reservoir fluid level
- ☐ Radiator coolant level and specific gravity
- ☐ Tightness of water hose clamps
- ☐ Tightness of battery terminals, electrolyte level, and specific gravity
- ☐ Manual transaxle oil level
- ☐ Drive belt(s) tension
- ☐ Accelerator cable and linkage for free movement

INTERIOR

INSTALL the following parts:
- ☐ Fuse for accessories

CHECK the operation of the following items:
- ☐ Seat controls (sliding and reclining) and headrest
- ☐ Air bag system using warning light
- ☐ Cruise set using indicator light (if equipped)
- ☐ Ignition switch and steering lock
- ☐ Power window (if equipped)
- ☐ Power door lock (if equipped)
- ☐ Door locks including child proof door locks
- ☐ Transaxle range switch (ATX only)
- ☐ All lights including warning and indicator lights
- ☐ Ignition key reminder buzzer (if equipped)
- ☐ Horn, wipers, and washers (front and rear, if equipped)
- ☐ Antenna
- ☐ Cigarette lighter and clock
- ☐ Power outside mirrors (if equipped)
- ☐ Heater, defogger, and air conditioner at various mode selections (if equipped)
- ☐ Sliding sunroof (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
- ☐ Parking brake

UNDER HOOD—ENGINE RUNNING AT OPERATING TEMPERATURE

CHECK the following items:
- ☐ Operation of idle-up system for electrical load, air conditioner or power steering (if equipped)
- ☐ Automatic transaxle fluid level
- ☐ 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

ROAD TEST

CHECK the following items:
- ☐ Brake operation
- ☐ Clutch operation
- ☐ Steering control
- ☐ Operation of meters and gauges
- ☐ Squeaks, rattles, or unusual noises
- ☐ Engine general performance
- ☐ Emergency locking retractors

AFTER ROAD TEST

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

SCHEDULED MAINTENANCE

SCHEDULED MAINTENANCE TABLE (EXCEPT CANADA)

Schedule 1 (Normal driving conditions)
The vehicle is mainly operated where none of the "unique driving conditions" apply.

Schedule 2 (Unique driving conditions)
- Repeated short-distance driving.
- Driving in dusty conditions.
- Driving with extended use of brakes.
- Driving in areas where road salt or other corrosive materials are used.
- Driving on rough or muddy roads.
- Extended periods of idling or low-speed operation.
- Driving for long prolonged periods in cold temperatures or extremely humid climates.

Schedule 1 (Normal driving conditions)

Maintenance Interval / Maintenance Item	Number of months or miles { kilometers }, whichever comes first								
	Months		6	12	18	24	30	36	42	48
	×1000	Kilometers	12	24	36	48	60	72	84	96
		Miles	7.5	15	22.5	30	37.5	45	52.5	60

Engine

Engine valve clearance (Z5 engine)								I
Engine oil	R	R	R	R	R	R	R	R
Oil filter	R	R	R	R	R	R	R	R
Tension of all drive belts				I				I
Engine timing belt (except California)	Replace every 60,000 miles { 96,000 km }							
Engine timing belt (California)	*2Inspect at 60,000 miles { 96,000 km }, and again at 90,000 miles { 144,000 km }							
	Replace every 105,000 miles { 168,000 km }							
Hose and tube for emission								I*2

Air cleaner

Air cleaner element				R				R

Ignition system

Spark plugs				R				R

Fuel system

Idle speed				I*2				I*1
Fuel filter								R*1
Fuel lines and hoses				I*2				I*1
Fuel hose (California)	Inspect every 105,000 miles {168,000 km}							

Cooling system

Cooling system				I				I
Engine coolant	Replace at first 45,000 miles { 72,000 km } or 36 months; after that, every 30,000 miles { 48,000 km } or 24 months							

Chassis and body

Brake lines, hoses, and connections				I				I
Disc brakes				I				I
Drum brakes				I				I
Steering operation and linkages				I				I
Front suspension ball joints				I				I
Drive shaft dust boots				I				I
Bolts and nuts on chassis and body				I				I
Exhaust system heat shield				I				I
All locks and hinges	L	L	L	L	L	L	L	L

Air conditioner system (if equipped)

Refrigerant amount		I		I		I		I
Compressor operation		I		I		I		I

Chart symbols:

I : Inspect and repair, clean, or replace if necessary.
R : Replace
L : Lubricate

Remarks:

- After 48 months or 60,000 miles { 96,000 km }, continue to follow the described maintenance at the recommended intervals.
  - *1 This maintenance is required for all states except California. However, we recommend that it also be performed on California vehicles.
  - *2 This maintenance is recommended by Mazda. However, it is not necessary for emission warranty coverage or manufacturer recall liability.

Schedule 2 (Unique driving conditions)

Maintenance Interval / Maintenance Item		Number of months or miles { kilometers }, whichever comes first											
	Months	4	8	12	16	20	24	28	32	36	40	44	48
	×1000 Kilometers	8	16	24	32	40	48	56	64	72	80	88	96
	×1000 Miles	5	10	15	20	25	30	35	40	45	50	55	60
Engine													
Engine valve clearance (Z5 engine)													I
Engine oil		R	R	R	R	R	R	R	R	R	R	R	R
Engine oil (Puerto Rico)		Replace every 3,000 miles { 4,800 km } (or 3 months)											
Oil filter		R	R	R	R	R	R	R	R	R	R	R	R
Tension of all drive belts							I						I
Engine timing belt (except California)		Replace every 60,000 miles { 96,000 km }											
Engine timing belt (California)		*2Inspect at 60,000 miles { 96,000 km }, and again at 90,000 miles { 144,000 km }											
		Replace every 105,000 miles { 168,000 km }											
Hose and tube for emission													I*2
Air cleaner													
Air cleaner element				I*2			R			I*2			R
Ignition system													
Spark plugs							R						R
Cooling system													
Cooling system							I						I
Engine coolant		Replace at first 45,000 miles { 72,000 km } or 36 months; after that, every 30,000 miles { 48,000 km } or 24 months											
Fuel system													
Fuel filter													R*1
Fuel lines and hoses							I*2						I*1
Idle speed							I*2						I*1
Fuel hose (California)		Inspect every 105,000 miles { 168,000 km }											
Chassis and body													
Brake lines, hoses, and connections							I						I
Drum brakes							I						I
Disc brakes				I			I			I			I
Steering operation and linkages							I						I
Front suspension ball joints							I						I
Drive shaft dust boots							I						I
Bolts and nuts on chassis and body				I			I			I			I
Exhaust system heat shield							I						I
All locks and hinges		L	L	L	L	L	L	L	L	L	L	L	L
Air conditioner system (if equipped)													
Refrigerant amount				I			I			I			I
Compressor operation				I			I			I			I

Chart symbols:

I : Inspect and repair, clean, or replace if necessary. (Inspect, and if necessary replace ..... Air cleaner element only)
R : Replace
L : Lubricate

Remarks:

- After 48 months or 60,000 miles { 96,000 km }, continue to follow the described maintenance at the recommended intervals.
  - *1 This maintenance is required for all states except California. However, we recommend that it also be performed on California vehicles.
  - *2 This maintenance is recommended by Mazda. However, it is not necessary for emission warranty coverage or manufacturer recall liability.

SCHEDULED MAINTENANCE TABLE (CANADA)

Maintenance Interval / Maintenance Item	Number of months or miles { kilometers }, whichever comes first												
	Months		5	10	15	20	25	30	35	40	45	50	55	60
	×1000	Kilometers	8	16	24	32	40	48	56	64	72	80	88	96
		Miles	5	10	15	20	25	30	35	40	45	50	55	60
Engine														
Engine valve clearance (Z5 engine)														I
Engine oil			R	R	R	R	R	R	R	R	R	R	R	R
Oil filter			R	R	R	R	R	R	R	R	R	R	R	R
Tension of all drive belts			I	I	I	I	I	I	I	I	I	I	I	I
Engine timing belt*1														R
Air cleaner														
Air cleaner element					I			R			I			R
Ignition system														
Spark plugs								R						R
Cooling system														
Engine coolant level and strength			I	I	I	I	I	I	I	I	I	I	I	I
Cooling system for leaks					I			I			I			I
Engine coolant	Replace at first 45,000 miles { 72,000 km } or 45 months; after that, every 30,000 miles { 48,000 km } or 30 months													
Fuel system														
Idle speed					I			I			I			I
Fuel lines and hoses								I*2						I
Fuel filter								R						R
PCV valve*2														I
Emission hoses and tubes														I
Chassis and body														
Automatic transaxle fluid level	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Transaxle oil (MTX and ATX)								R						R
Drive shaft dust boots								I						I
Brake lines and hoses								I						I
Brake and clutch fluid level	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Brake fluid*3								R						R
Disc brakes (front and rear)				I				I			I			I
Rear drum brakes								I						I
Tire inflation pressure and tire wear	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Tires				Rt				Rt			Rt			Rt
Power steering fluid level	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Steering operation and linkages (Includes four wheel alignment)								I						I
Suspension components (front and rear)								I						I
All chassis and body nuts and bolts				I				I			I			I
Exhaust system heat shields								I						I
All locks and hinges	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Washer fluid level	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Function of all lights	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Air conditioner system (if equipped)														
Refrigerant amount		I		I		I		I		I		I		I
Compressor operation		I		I		I		I		I		I		I

Chart symbols:

I : Inspect and repair, clean, or replace if necessary. (Inspect, and if necessary replace ... Air cleaner element only)
R : Replace
L : Lubricate
Rt : Rotation (tires)

Remarks:

- After 60 months or 60,000 miles { 96,000 km }, continue to follow the described maintenance at the recommended intervals.
  - *1 Replacement of the timing belt is required every 60,000 miles { 96,000 km }. Failure to replace this belt may result in damage to the engine.
  - *2 This maintenance is recommended by Mazda. However, it is not necessary for emission warranty coverage or manufacturer recall liability.
  - *3 This maintenance operation is recommended by Mazda.

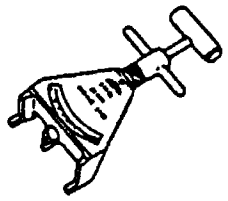
Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

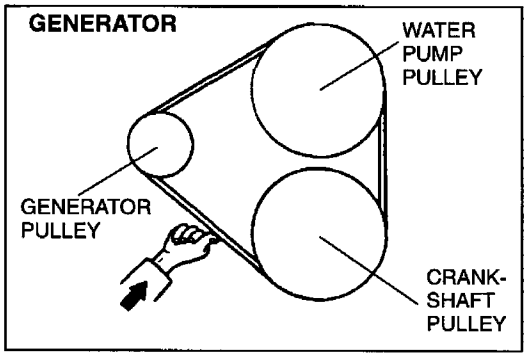
ENGINE
(Z5)

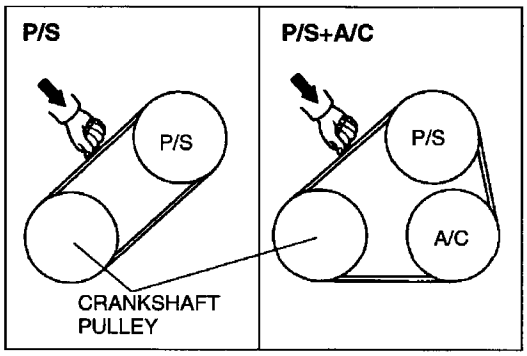
DRIVE BELT **B1– 2**
PREPARATION **B1– 2**
INSPECTION / ADJUSTMENT **B1– 2**
VALVE CLEARANCE **B1– 4**
PREPARATION **B1– 4**
INSPECTION / ADJUSTMENT **B1– 4**
COMPRESSION **B1– 7**
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TIMING BELT **B1– 8**
PREPARATION **B1– 8**
REMOVAL / INSTALLATION **B1– 8**
CYLINDER HEAD GASKET **B1–14**
PREPARATION **B1–14**
REPLACEMENT **B1–14**
FRONT OIL SEAL **B1–19**
PREPARATION **B1–19**
REPLACEMENT **B1–19**
REAR OIL SEAL **B1–20**
PREPARATION **B1–20**
REPLACEMENT **B1–20**
ENGINE **B1–21**
PREPARATION **B1–21**
REMOVAL / INSTALLATION **B1–21**
DISASSEMBLY / ASSEMBLY **B1–28**

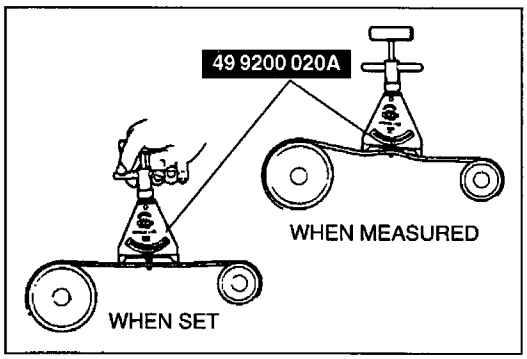
DRIVE BELT

PREPARATION
SST

49 9200 020A Tension gauge, belt		For inspection of drive belt tension







INSPECTION / ADJUSTMENT
Inspection

1. Check the drive belt deflection when the engine is cold, or at least 30 minutes after the engine has stopped. Apply moderate pressure **98 N { 10 kgf , 22 lbf }** midway between the specified pulleys.

Deflection mm { in }

Drive belt	*New	Used	Limit
Generator	5.5—7.0 { 0.22—0.27 }	6.0—7.5 { 0.24—0.29 }	8.0 { 0.31 }
P/S, P/S+A/C	8.0—9.0 { 0.32—0.35 }	9.0—10.0 { 0.36—0.39 }	11.5 { 0.45 }

*A belt that has been on a running engine for less than five minutes.

2. If the deflection is not within the specification, adjust it. (Refer to page B1–3.)

Drive belt tension check

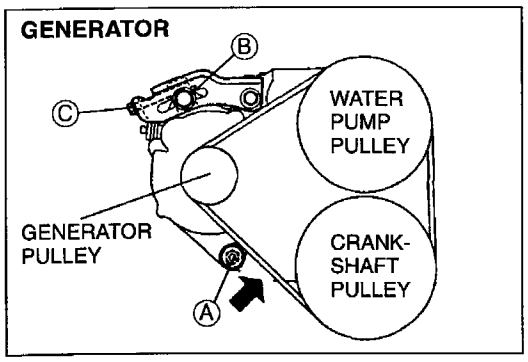
1. Belt tension can be checked in place of belt deflection. Check the drive belt tension when the engine is cold, or at least 30 minutes after the engine has stopped. Using the **SST**, check the belt tension between any two pulleys.

Tension N { kgf , lbf }

Drive belt	*New	Used	Limit
Generator	500—740 { 50—76 , 110—160 }	500—700 { 50—72 , 110—150 }	340 { 35 , 77 }
P/S, P/S+ A/C	500—580 { 50—60 , 110—130 }	430—490 { 43—50 , 95—110 }	250 { 25 , 55 }

*A belt that has been on a running engine for less than five minutes.

2. If the tension is not within the specification, adjust it. (Refer to page B1–3.)

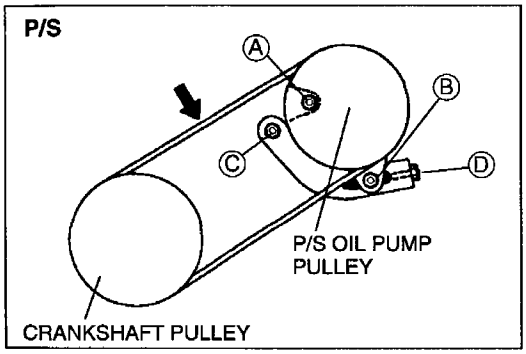


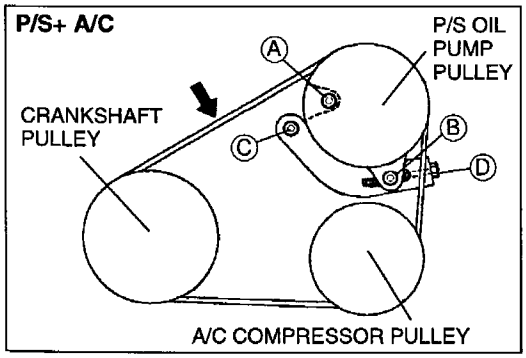
Adjustment
Generator drive belt
1. Loosen bolts Ⓐ and Ⓑ.
2. Adjust the belt deflection by turning adjusting bolt Ⓒ.

Deflection (At 98N { 10 kgf , 22 lbf })
New: 5.5—7.0 mm { 0.22—0.27 in }
Used: 6.0—7.5 mm { 0.24—0.29 in }

3. Tighten bolts Ⓐ and Ⓑ.

Tightening torque
Ⓐ: 38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }
Ⓑ: 19—25 N·m { 1.9—2.6 kgf·m , 14—18 ft·lbf }





P/S, P/S + A/C drive belt
1. Loosen the bolts and nuts marked Ⓐ, Ⓑ and Ⓒ.
2. Adjust the belt deflection by turning adjusting bolt Ⓓ.

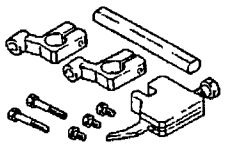
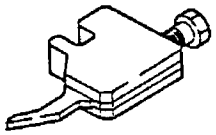
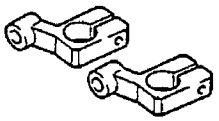
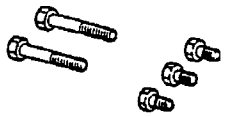
Deflection (At 98 N { 10 kgf , 22 lbf })
New: 8.0—9.0 mm { 0.32—0.35 in }
Used: 9.0—10.0 mm { 0.36—0.39 in }

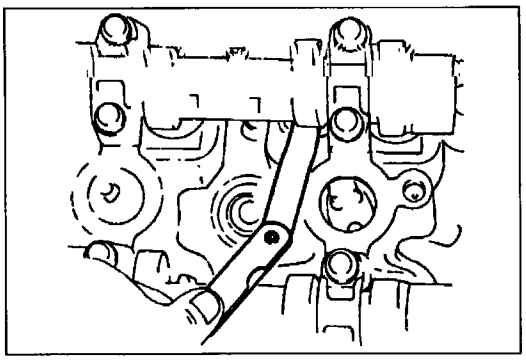
3. Tighten the bolts and nuts marked Ⓐ, Ⓑ and Ⓒ.

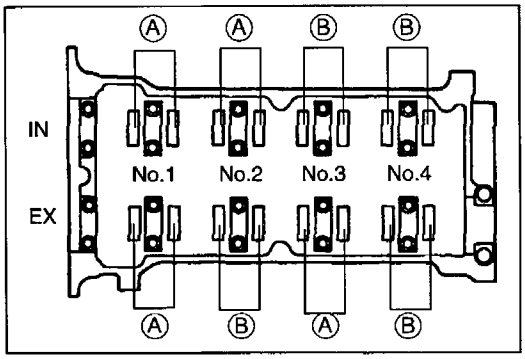
Tightening torque
Ⓐ: 44—60 N·m { 4.4—6.2 kgf·m , 32—44 ft·lbf }
Ⓑ: 38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }
Ⓒ: 38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }

VALVE CLEARANCE

PREPARATION
SST

49 T012 0A0 Holder, tappet 	For replacement of adjustment shim	49 T012 001 Body (Part of 49 T012 0A0) 	For replacement of adjustment shim
49 T012 002 Shaft (Part of 49 T012 0A0) 	For replacement of adjustment shim	49 T012 003 Clamp, shaft (Part of 49 T012 0A0) 	For replacement of adjustment shim
49 T012 004 Bolt (Part of 49 T012 0A0) 	For replacement of adjustment shim	—	—





INSPECTION / ADJUSTMENT
Inspection

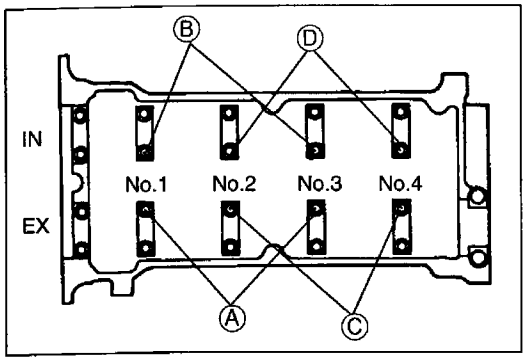
1. Remove the cylinder head cover.
2. Verify that the engine is in cold condition.
3. Measure the valve clearance.
   (1) Turn the crankshaft clockwise so that the No.1 piston is at TDC of the compression stroke.
   (2) Measure the valve clearance at Ⓐ in the figure.

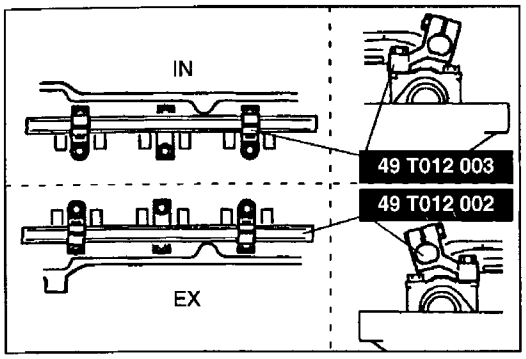
   Standard (Engine cold)
   IN: 0.25—0.31 mm { 0.010—0.012 in }
   EX: 0.25—0.31 mm { 0.010—0.012 in }

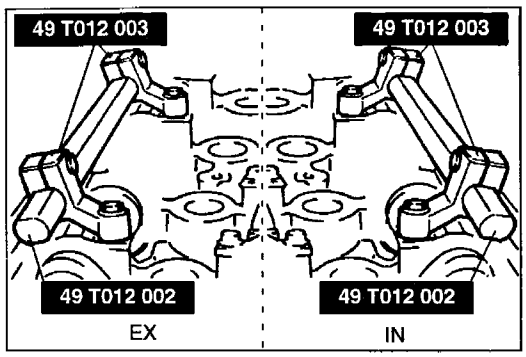
   (3) If the valve clearance exceeds the standard, replace the adjustment shim. (Refer to page B1–5.)
   (4) Turn the crankshaft 360 ° clockwise so that the No.4 piston is at TDC of the compression stroke.
   (5) Measure the valve clearance at Ⓑ in the figure.

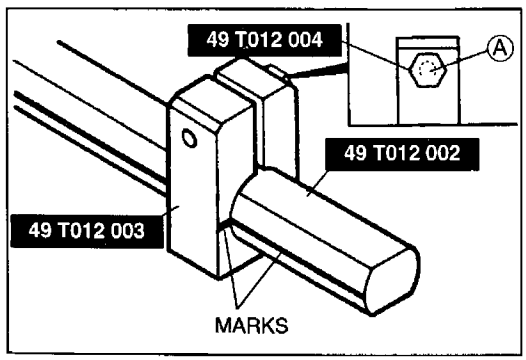
   Standard (Engine cold)
   IN: 0.25—0.31 mm { 0.010—0.012 in }
   EX: 0.25—0.31 mm { 0.010—0.012 in }

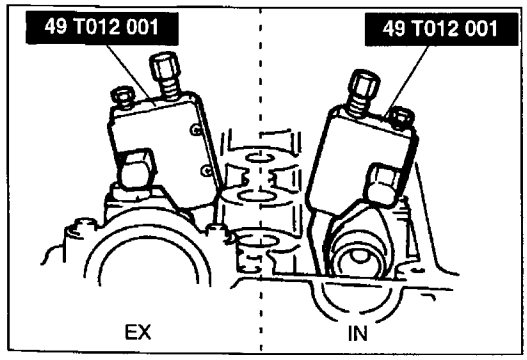
   (6) If the valve clearance exceeds the standard, replace the adjustment shim. (Refer to page B1–5.)
4. Install the cylinder head cover. (Refer to page B1–13.)











Adjustment

Perform this same procedure for all camshafts requiring valve clearance adjustment.

1. Turn the crankshaft clockwise so that the cams on the camshaft requiring valve clearance adjustment are positioned straight up.
2. Remove the camshaft cap bolts as necessary.
   Ⓐ: For EX side No.1, 2, 3 cylinder adjustment shim removal.
   Ⓑ: For IN side No.1, 2, 3 cylinder adjustment shim removal.
   Ⓒ: For EX side No.2, 3, 4 cylinder adjustment shim removal.
   Ⓓ: For IN side No.2, 3, 4 cylinder adjustment shim removal.

Note

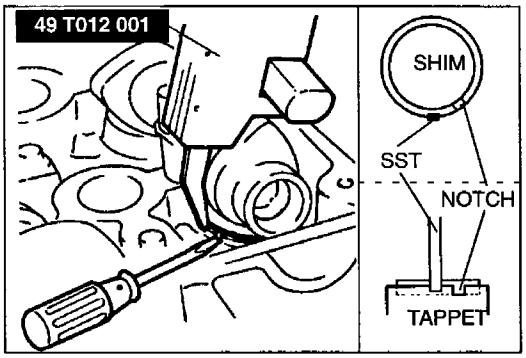
- For EX side No.2, 3 cylinder adjustment shim removal, remove bolts either Ⓐ or Ⓒ.
- For IN side No.2, 3 cylinder adjustment shim removal, remove bolts either Ⓑ or Ⓓ.

3. Install the **SSTs** on the camshaft using the camshaft cap bolt holes.

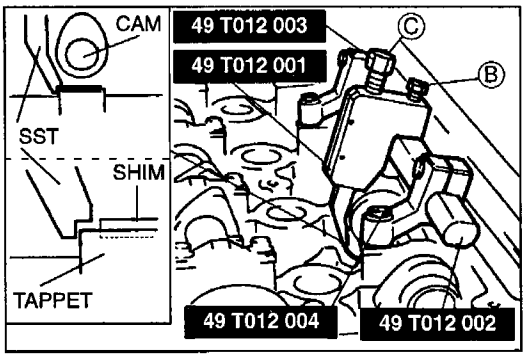
   Tightening torque: 11.3—14.2 N·m { 115—145 kgf·cm , 99.9—125 in·lbf }

4. Align the marks on the **SSTs** (shaft and shaft clamp).
5. Tighten bolts Ⓐ to secure the **SST** (shaft).

6. Face the **SST** (body) toward the center of the cylinder head, and mount it on the **SST** (shaft) at the point of adjustment shim to be replaced.



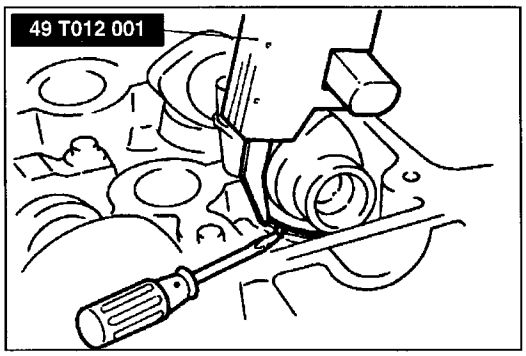
7. Face the notch of the tappet so that a fine screwdriver can be inserted.



8. Set the **SST** on the tappet by its notch.
9. Tighten bolt Ⓑ to secure the **SST** (body).

Caution
- **Cylinder head can be damaged when the tappet is pressed down.**

10. Tighten bolt Ⓒ, and press down the tappet.



11. Using a fine screwdriver, pry up the adjustment shim through the notch on the tappet. Remove the shim by using a magnet.
12. Select proper adjustment shim.

New adjustment shim
= Removed shim thickness + Measured valve clearance — Standard valve clearance (0.28 mm { 0.011 in })

13. Push the selected shim into the tappet.
14. Loosen bolt Ⓒ to allow the tappet to move up.
15. Loosen bolt Ⓑ and remove the **SST** (body).
16. Remove the **SSTs** and tighten the camshaft cap bolts.

Tightening torque: 11.3—14.2 N·m { 115—145 kgf·cm , 99.9—125 in·lbf }

17. Check the valve clearance. (Refer to page B1–4.)

COMPRESSION

INSPECTION

1. Verify that the battery is fully charged. Recharge it if necessary. (Refer to section G.)
2. Warm up the engine to the normal operating temperature.
3. Stop the engine and allow it to cool for about 10 minutes.
4. Remove the spark plugs.
5. Disconnect the distributor connectors.
6. Install a compression gauge into the No.1 spark plug hole.
7. Measure compression in the following procedure.
   (1) Fully depress the accelerator pedal or fully open the throttle valve.
   (2) Crank the engine and note the maximum gauge reading.

Compression **kPa { kgf/cm^2 , psi } –rpm**

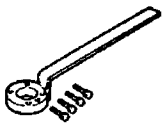
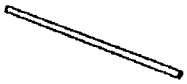
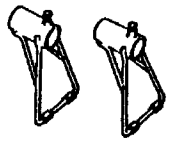
Standard	1344 { 13.7 , 195 } –300
Minimum	1010 { 10.3 , 146 } –300
Maximum difference between cylinders	196 kPa { 2.0 kgf/cm^2 , 28 psi }

   (3) Check each cylinder as above.
   (4) If the compression in one or more cylinders is low, pour a small amount of clean engine oil into the cylinder and recheck the compression.
      ① If the compression increases, the piston, piston rings, or cylinder wall may be worn.
      ② If the compression stays low, a valve may be stuck or improperly seated.
      ③ If the compression in adjacent cylinders stays low, the cylinder head gasket may be damaged or the cylinder head distorted.
8. Remove the compression gauge.
9. Connect the distributor connectors.
10. Install the spark plugs.

Tightening torque: 15—22 N·m { 1.5—2.3 kgf·m , 11—16 ft·lbf }

TIMING BELT

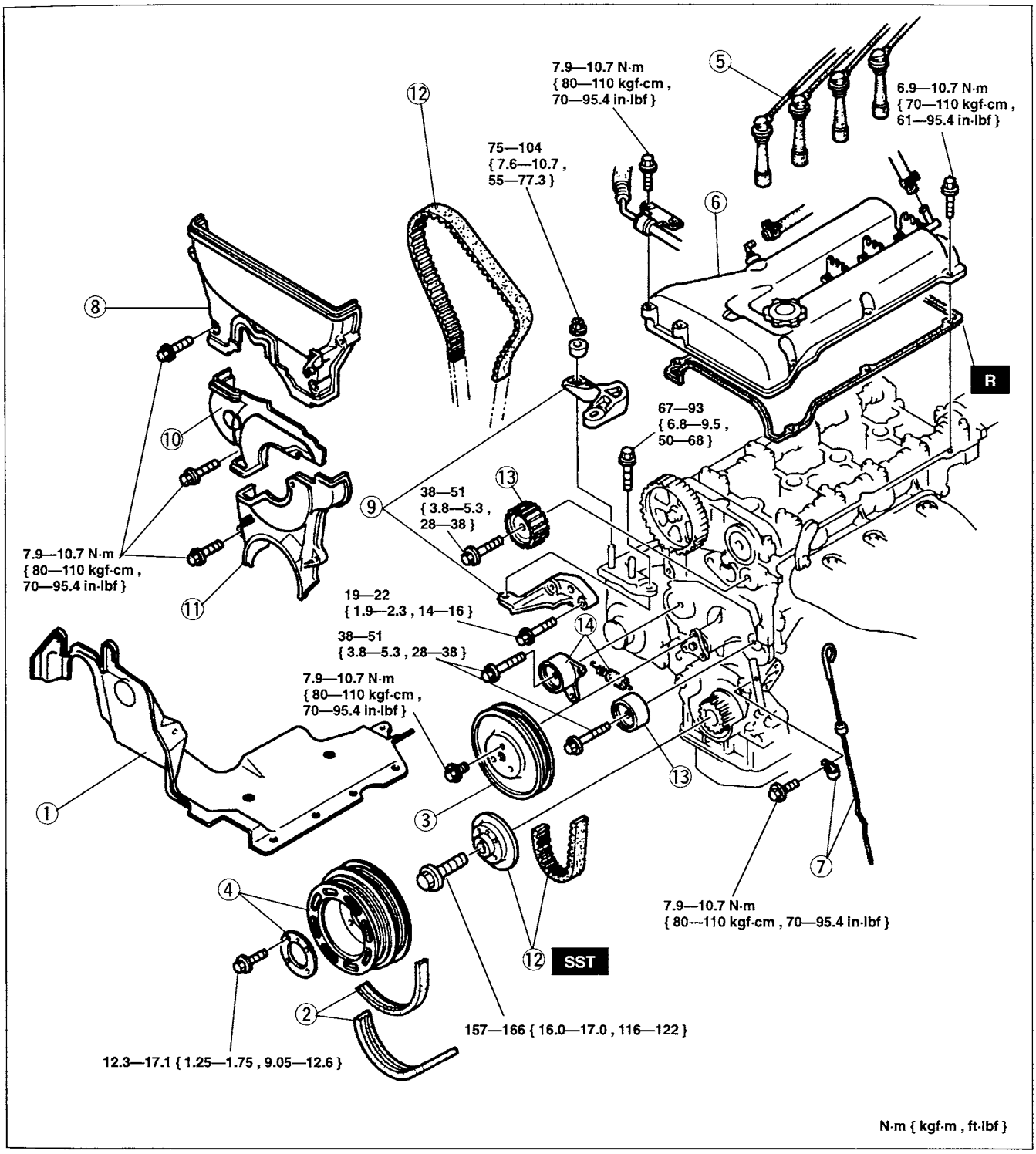
PREPARATION
SST

49 D011 102 Lock tool, crankshaft 	For prevention of crankshaft rotation	49 G017 5A0 Support, engine 	For support of engine
49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine	49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine
49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine	—	—

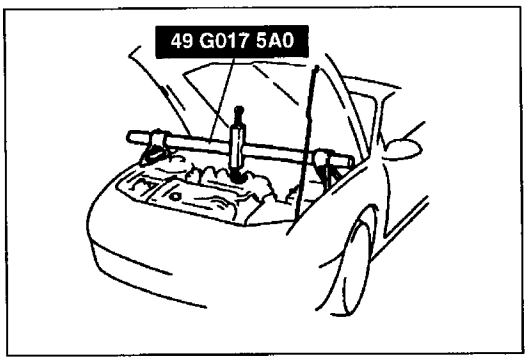
REMOVAL / INSTALLATION

Caution
- **The crankshaft position sensor rotor is on the rear of the crankshaft pulley, and can be damaged easily.**

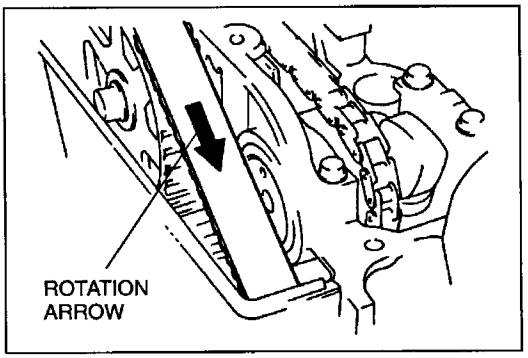
1. Disconnect the negative battery cable.
2. Remove the right front wheel.
3. Remove in the order shown in the figure, referring to **Removal Note**.
4. Install in the reverse order of removal, referring to **Installation Note**.
5. Install the right front wheel.
6. Connect the negative battery cable.
7. Start the engine and
   (1) check the pulleys and the timing belt for runout and contact.
   (2) check the ignition timing. (Refer to section F1.)



1. Splash shield (RH)
2. Drive belt
   Adjustment ..... page B1– 3
3. Water pump pulley
4. Crankshaft pulley
5. High-tension lead
6. Cylinder head cover
   Installation Note ..... page B1–13
7. Dipstick and pipe stay
8. Timing belt cover, upper
9. No.3 engine mount bracket
   Removal Note ..... page B1–10
   Installation Note ..... page B1–12
10. Timing belt cover, middle
11. Timing belt cover, lower
12. Pulley boss, timing belt
    Removal Note ..... page B1–10
    Installation Note ..... page B1–11
13. Idler pulley
14. Tensioner pulley, tensioner spring
    Installation Note ..... page B1–11

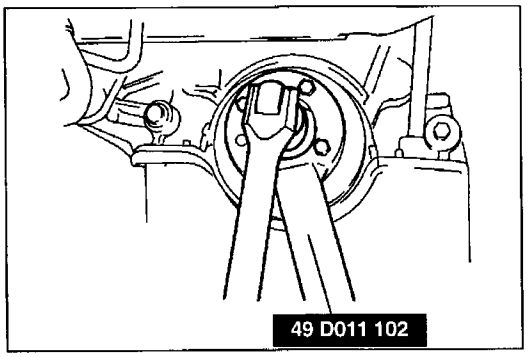


Removal Note
No.3 engine mount bracket
1. Support the engine by using the **SST**.
2. Remove the No.3 engine mount bracket.

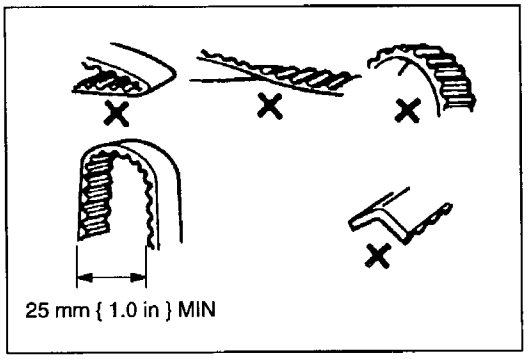


Pulley boss, timing belt

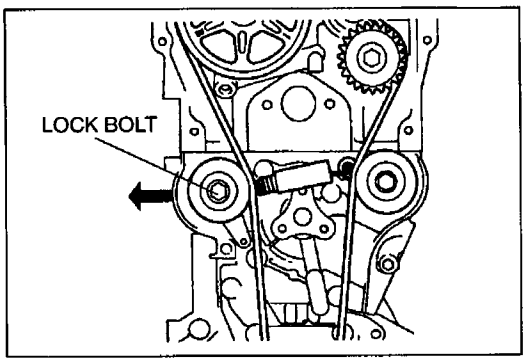
Note
- Mark the timing belt rotation on the belt for proper reinstallation.



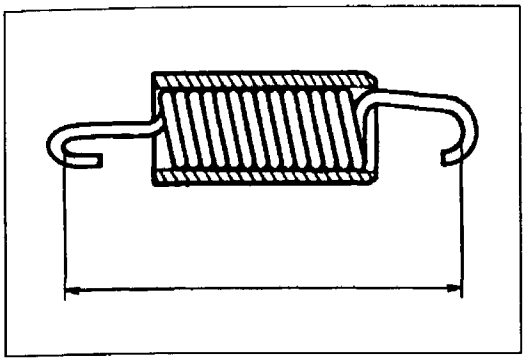
1. By using the **SST**, remove the pulley lock bolt.
2. Remove the pulley boss.



Caution
- **The following will damage the belt and shorten its life; Forcefully twisting it, turning it inside out, or allowing oil or grease on it.**



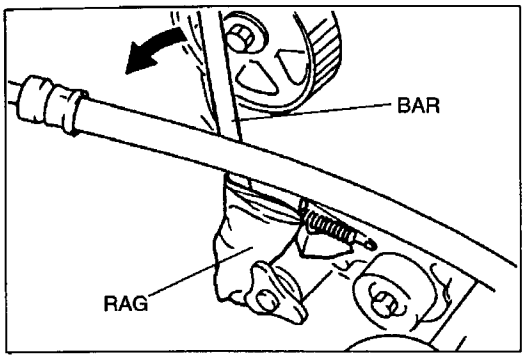
3. Loosen the tensioner pulley lock bolt.
4. Pull the tensioner pulley in the direction of the arrow to reduce tension of the timing belt, and remove the belt.



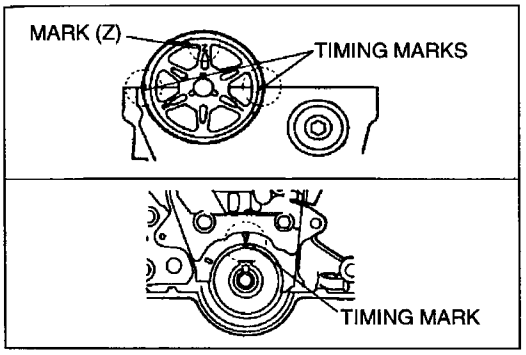
Installation Note
Tensioner pulley, tensioner spring

1. Measure the tensioner spring free length. If not within the specification, replace the tensioner spring.

   Free length: 71.0 mm { 2.80 in }

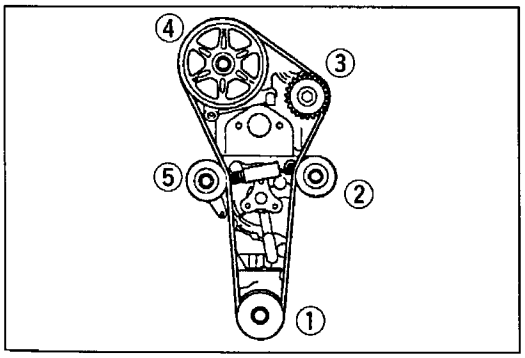


2. Install the tensioner and the tensioner spring.
3. Temporarily secure the tensioner with the spring fully extended.

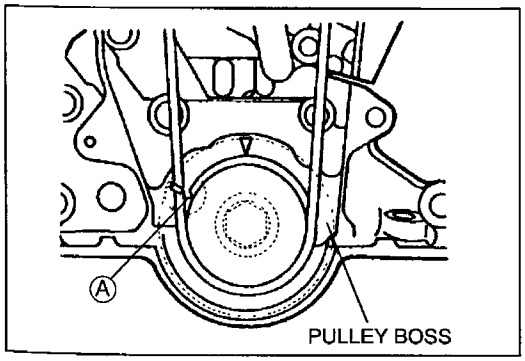


Pulley boss, timing belt

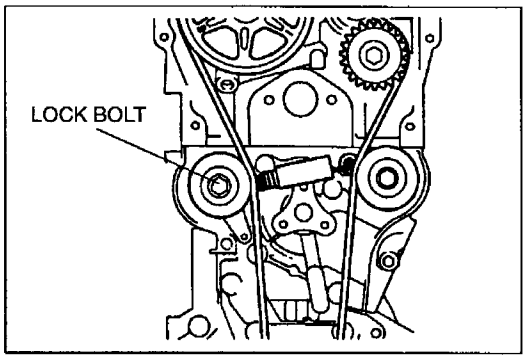
1. Verify that all timing marks are correctly aligned.



2. Install the timing belt on the pulleys in the order shown below.
   - ① Timing belt pulley
   - ② No.2 idler pulley
   - ③ No.1 idler pulley
   - ④ Camshaft pulley
   - ⑤ Tensioner pulley

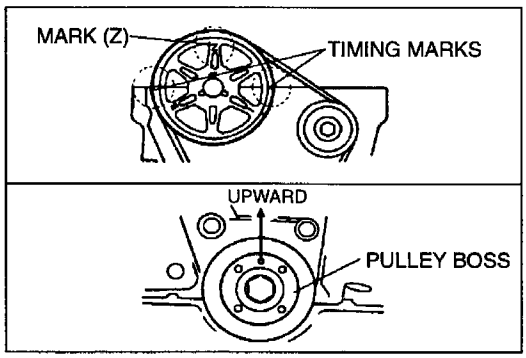


3. Install the pulley boss and pulley lock bolt. Turn the crankshaft clockwise 1 and 5/6 times, and verify that the timing mark on the timing belt pulley is aligned with timing mark Ⓐ (tensioner set mark).



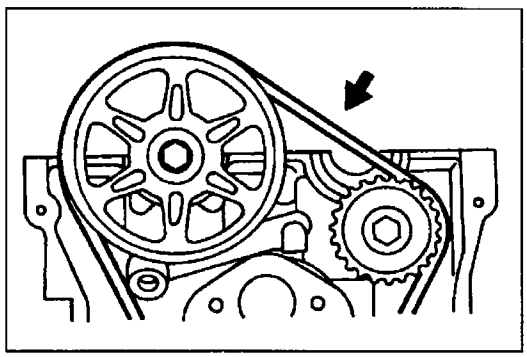
4. Loosen the tensioner lock bolt to apply tension to the timing belt. Do not apply tension other than that of the tensioner spring.
5. Tighten the tensioner pulley lock bolt.

Tightening torque:
38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }



6. Turn the crankshaft 2 and 1/6 times clockwise, and verify that all timing marks are correctly aligned.

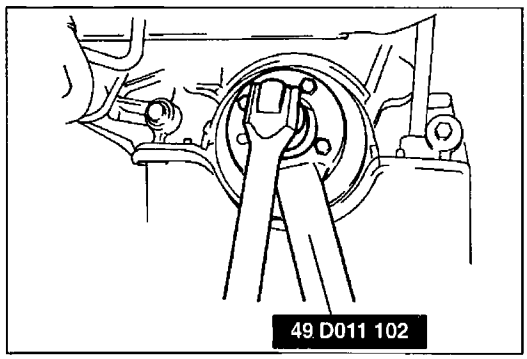
Note
- The pin on the pulley boss and the "Z" mark on the camshaft pulley must face upward.



7. Check the belt deflection at the point indicated by applying moderate pressure **98 N { 10 kgf , 22 lbf }**.

Deflection: 7.0—9.0 mm { 0.28—0.35 in }

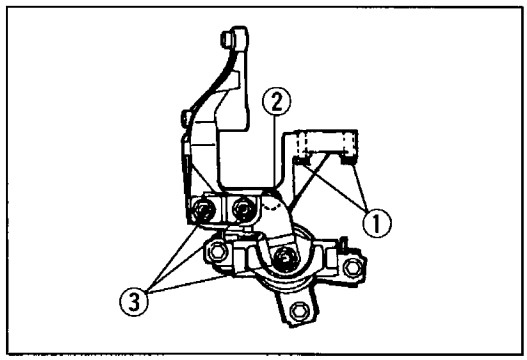
8. If the timing belt deflection is not correct, remove the timing belt and repeat from step 1.



9. Mount the **SST** on the pulley boss to hold the crankshaft. Tighten the lock bolt.

Tightening torque:
157—166 N·m { 16.0—17.0 kgf·m , 116—122 ft·lbf }

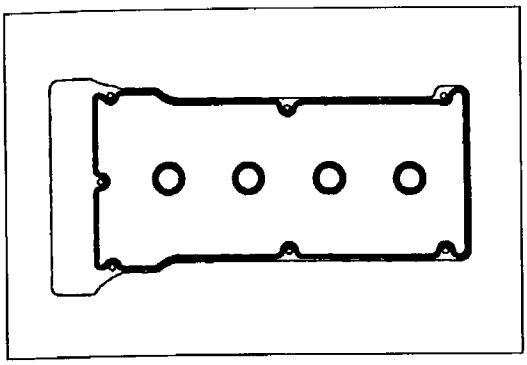
10. Remove the **SST**.



No.3 engine mount bracket
1. Install the No.3 engine mount bracket.

Tightening torque:
① 19—22 N·m { 1.9—2.3 kgf·m , 14—16 ft·lbf }
② 67—93 N·m { 6.8—9.5 kgf·m , 50—68 ft·lbf }
③ 75—104 N·m { 7.6—10.7 kgf·m , 55—77.3 ft·lbf }

2. Remove the **SST** (Support, engine).

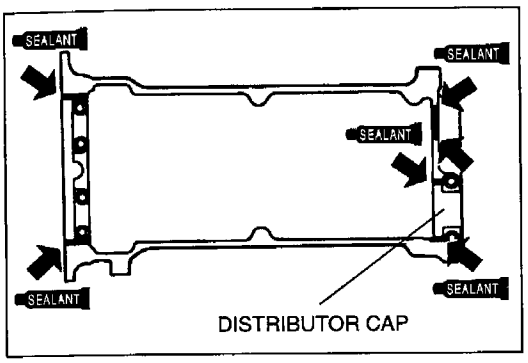


Cylinder head cover

1. Verify that the grooves on the cylinder head cover are free of oil, water and other foreign material.
2. Install the new cylinder head cover gasket into the cylinder head cover.

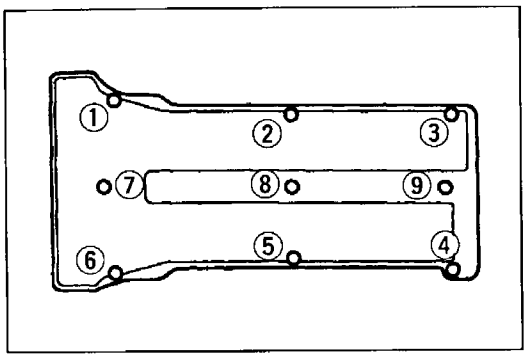
Caution

- **Silicone sealant hardens and causes oil leakage when it is left for an extended period. Therefore, install parts before sealant hardens.**



3. Apply silicone sealant to the shaded areas as shown.

Thickness: ϕ 3—4 mm { 0.12—0.15 in }



4. Install the cylinder head cover and tighten the bolts in five or six steps in the order shown.

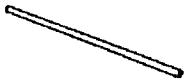
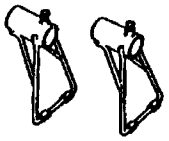
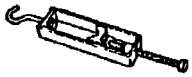
Tightening torque:
6.9—10.7 N·m { 70—110 kgf·cm , 61—95.4 in·lbf }

5. Retighten the bolts in the order shown.

Tightening torque:
6.9—10.7 N·m { 70—110 kgf·cm , 61—95.4 in·lbf }

CYLINDER HEAD GASKET

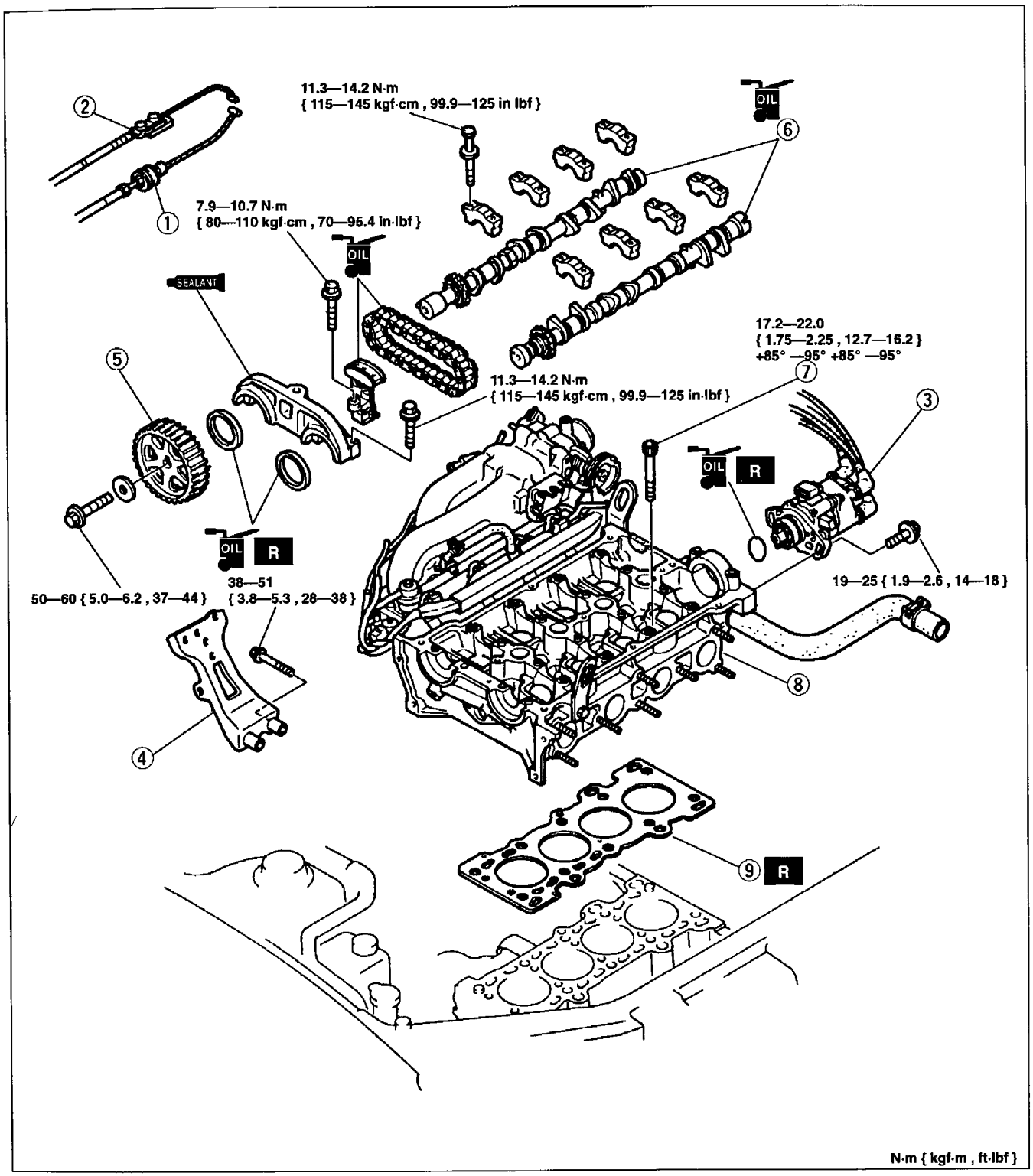
PREPARATION
SST

49 G017 5A0 Support, engine 	For support of engine	49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine
49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine	49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine

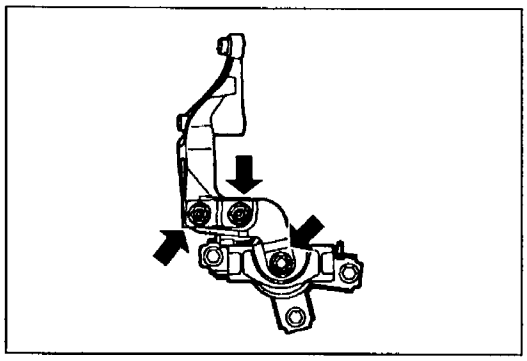
REPLACEMENT

Warning
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on section F1.**

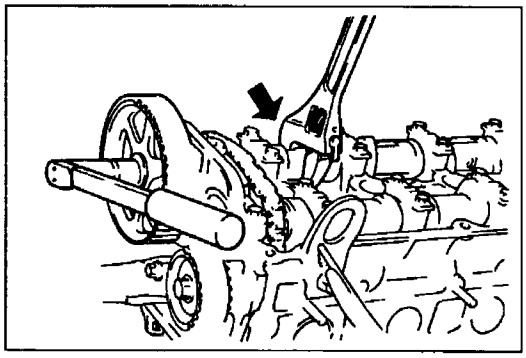
1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to section E.)
3. Remove the timing belt. (Refer to page B1–8.)
4. Remove the air cleaner and front pipe. (Refer to section F1.)
5. Remove the exhaust manifold. (Refer to section F1.)
6. Remove in the order shown in the figure, referring to **Removal Note.**
7. Install in the reverse order of removal, referring to **Installation Note.**
8. Install the exhaust manifold. (Refer to section F1.)
9. Install the front pipe and air cleaner. (Refer to secton F1.)
10. Install the timing belt. (Refer to page B1–8.)
11. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to section E.)
12. Connect the negative battery cable.
13. Start the engine and
    (1) check the engine oil and engine coolant leakage.
    (2) check the ignition timing and idle speed. (Refer to section F1.)
14. Check the compression. (Refer to page B1–7.)



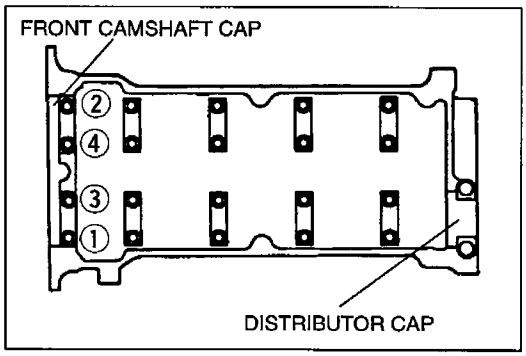
1. Accelerator cable
   Adjustment ..... section F1
2. Throttle cable (ATX)
   Adjustment ..... section K
3. Distributor
4. Intake manifold stay
5. Camshaft pulley
   Removal Note ..... page B1–16
   Installation Note ..... page B1–18
6. Camshaft
   Removal Note ..... page B1–16
   Installation Note ..... page B1–17
7. Cylinder head bolt
   Removal Note ..... page B1–16
   Installation Note ..... page B1–17
8. Cylinder head assembly
9. Cylinder head gasket



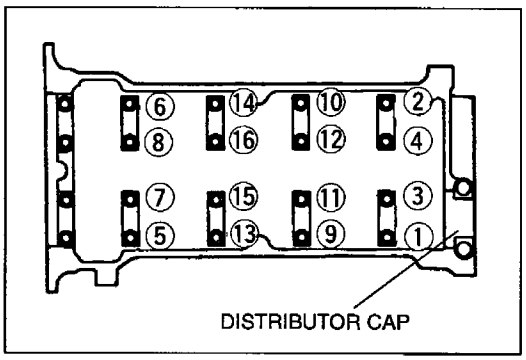
Removal Note
Camshaft pulley
1. Temporarily install the No.3 engine mount bracket to support the engine.
2. Remove the **SST** (Support, engine).



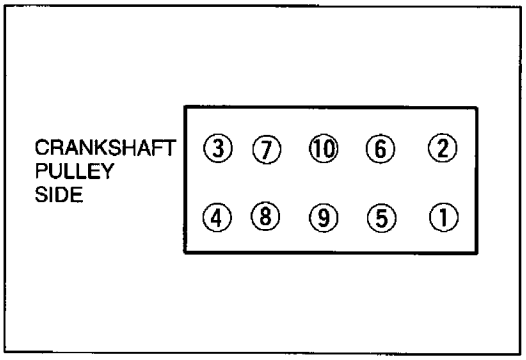
3. Hold the camshaft by using a wrench on the cast hexagon as shown, and loosen the camshaft pulley lock bolt.
4. Remove the camshaft pulley.



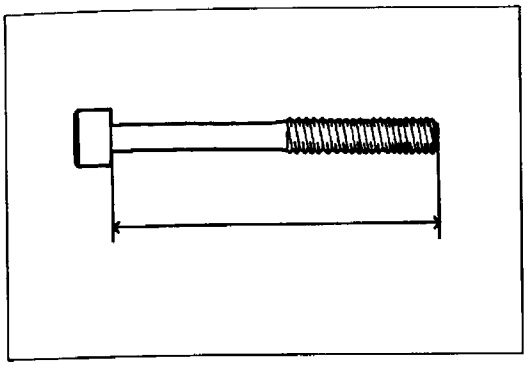
Camshaft
1. Turn the camshaft clockwise so that cams do not pressing on the tappets.
2. Loosen the front camshaft cap bolts in five or six steps in the order shown.
3. Remove the front camshaft cap bolts and the front camshaft cap.



4. Loosen the camshaft cap bolts in five or six steps in the order shown.
5. Remove the camshaft cap bolts and camshaft caps.
6. Remove the camshafts.
7. Remove the camshaft oil seals.



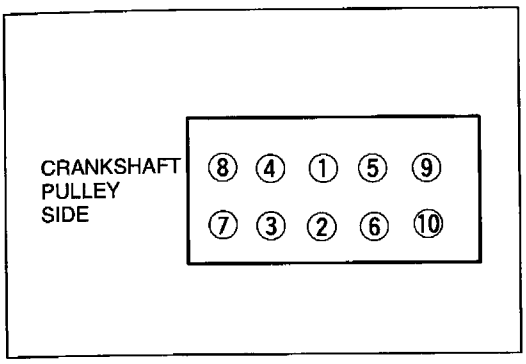
Cylinder head bolt
1. Loosen the cylinder head bolts in two or three steps in the order shown.
2. Remove the cylinder head bolts.



Installation Note
Cylinder head bolt

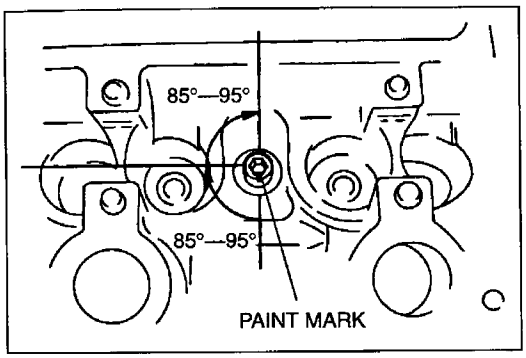
1. Before installation, measure the length of each bolt. Replace any that exceed the maximum length.

   Length: 99.2—99.8 mm { 3.91—3.92 in }
   Maximum: 100.5 mm { 3.957 in }

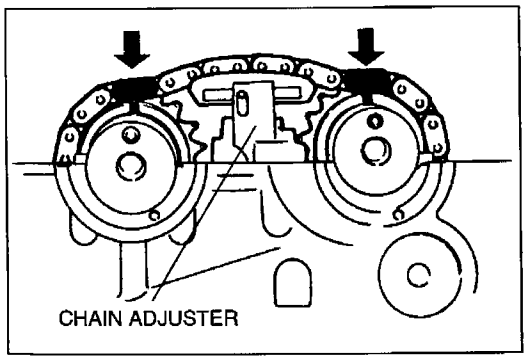


2. Tighten the cylinder head bolts in two or three steps in the order shown.

   Tightening torque: 17.2—22.0 N·m
   { 1.75—2.25 kgf·m , 12.7—16.2 ft·lbf }

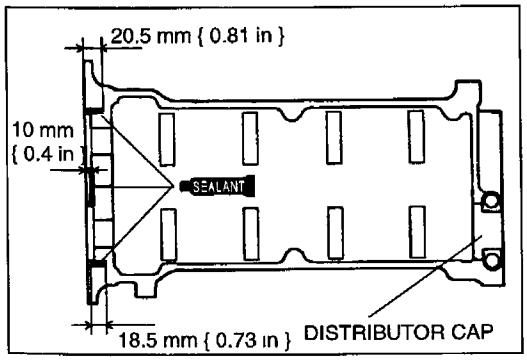


3. Put a paint mark on each bolt head.
4. Using the marks as a reference, tighten the bolts by turning each **85°—95°** in the sequence shown.
5. Further tighten each bolt by turning another **85°—95°** in the sequence shown.



Camshaft

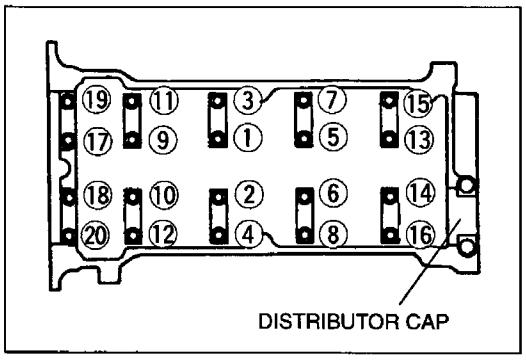
1. Before installation, insert the chain adjuster between camshafts.
2. Install the camshafts onto the cylinder head, aligning marks on the camshaft gear and the timing chain.



3. Apply silicone sealant to the shaded areas shown.

   Thickness: φ1 mm { 0.04 in }

4. Install the camshaft caps to the positions from which they were removed.



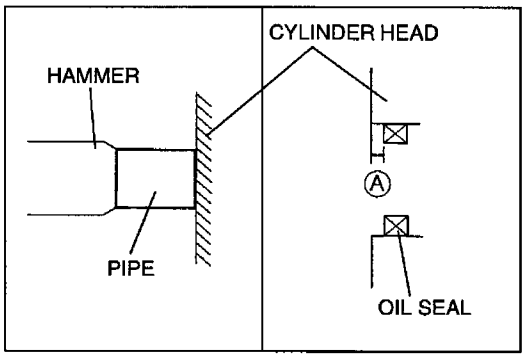
5. Hand tighten the camshaft cap bolts marked ⑤, ⑦, ②, and ④.
6. Tighten the camshaft cap bolts in five or six steps in the order shown.

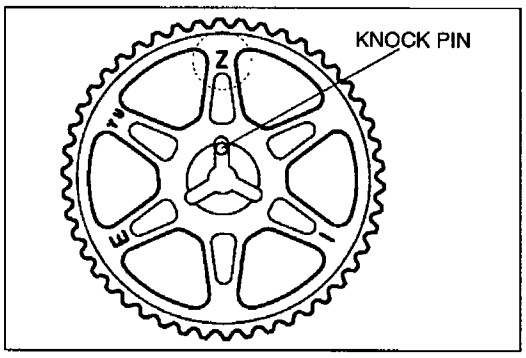
Tightening torque: 11.3—14.2 N·m
{ 115—145 kgf·cm , 99.9—125 in·lbf }

7. Apply clean engine oil to the lip of the new camshaft oil seal.
8. Push the oil seal slightly in by hand.
9. Tap the oil seal in evenly by using a pipe and a hammer.

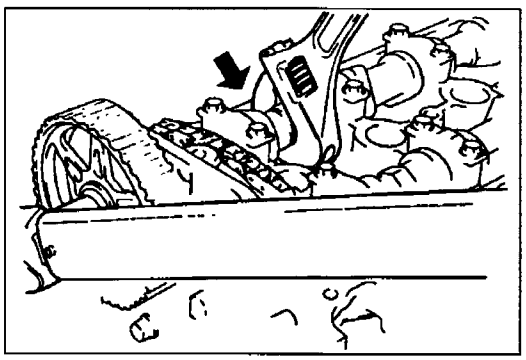
Note
- Oil seal outer diameter : 48.0 mm { 1.89 in }
- Oil seal inner diameter : 34.2 mm { 1.35 in }

Ⓐ
IN: 0—0.7 mm { 0—0.02 in }
EX: 1—1.7 mm { 0.04—0.06 in }



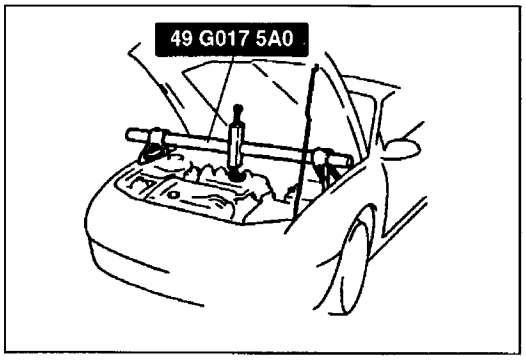


Camshaft pulley
1. Align the "Z" mark with the camshaft knock pin and install the camshaft pulley.



2. Hold the camshaft by using a wrench on the cast hexagon, and tighten the lock bolt.

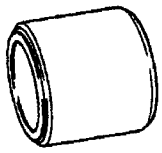
Tightening torque:
50—60 N·m { 5.0—6.2 kgf·m , 37—44 ft·lbf }

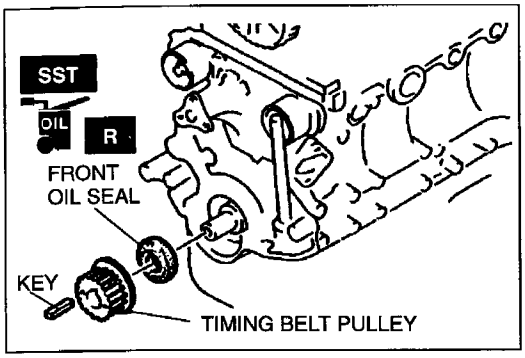


3. Support the engine by using the **SST**.
4. Remove the No.3 engine mount bracket.

FRONT OIL SEAL

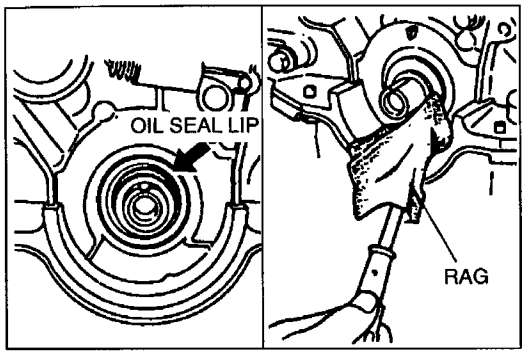
PREPARATION
SST

49 B014 001 Installer, oil seal		For installation of front oil seal

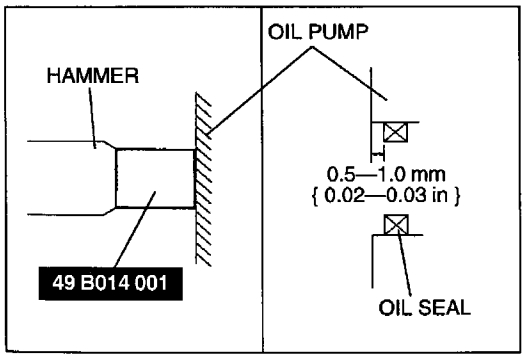


REPLACEMENT

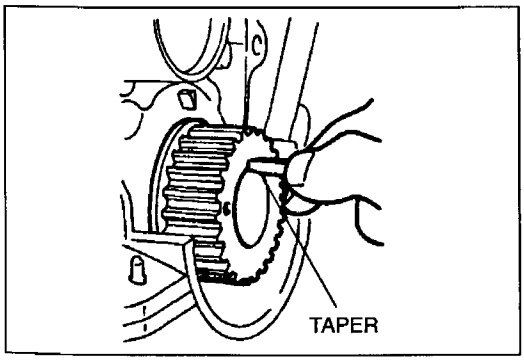
1. Disconnect the negative battery cable.
2. Remove the timing belt. (Refer to page B1–8.)
3. Remove the timing belt pulley.
4. Remove the key.



5. Cut the oil seal lip by using a razor knife.
6. Remove the oil seal by using a screwdriver protected with a rag.



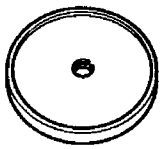
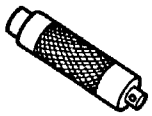
7. Apply clean engine oil to the new oil seal.
8. Push the oil seal slightly in by hand.
9. Tap the oil seal in evenly by using the **SST** and a hammer.

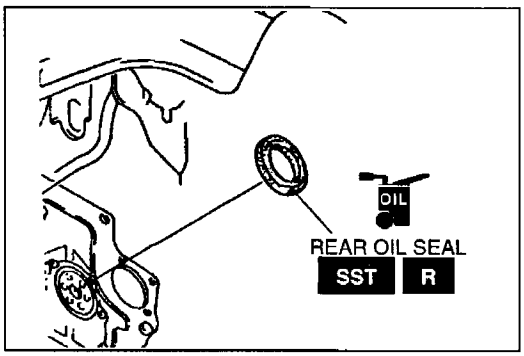


10. Install the timing belt pulley, aligning the key groove.
11. Insert the key with the tapered side toward the oil pump body.
12. Install the timing belt. (Refer to page B1–8.)
13. Connect the negative battery cable.
14. Start the engine and check the ignition timing. (Refer to section F1.)

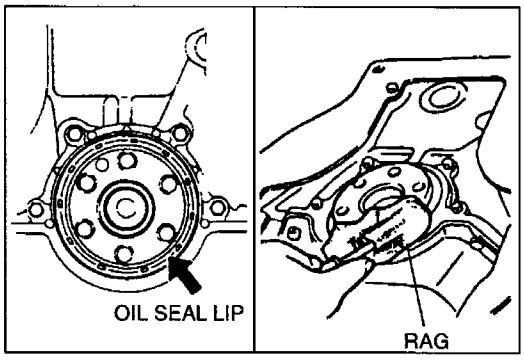
REAR OIL SEAL

PREPARATION
SST

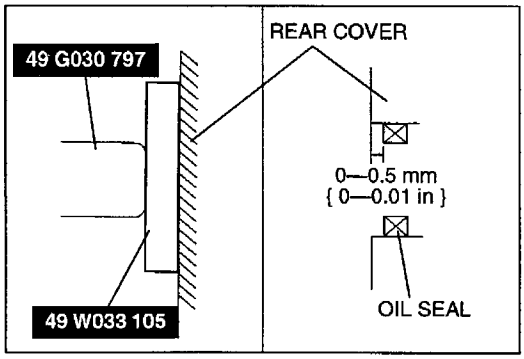
49 W033 105 Installer, oil seal 	For installation of rear oil seal	49 G030 795 Installer, oil seal 	For installation of rear oil seal
49 G030 797 Handle (Part of 49 G030 795) 	For installation of rear oil seal	—	—



REPLACEMENT
1. Disconnect the negative battery cable.
2. Remove the transaxle assembly. (Refer to section J, K.)
3. Remove the clutch cover and clutch disc (MTX). (Refer to section H.)
4. Remove the flywheel (MTX) or drive plate (ATX). (Refer to section J, K.)



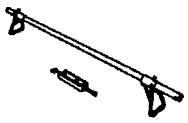
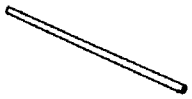
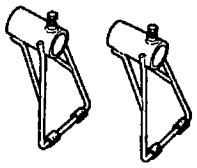
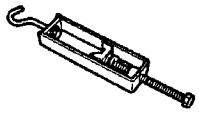
5. Cut the oil seal lip by using a razor knife.
6. Remove the oil seal by using a screwdriver protected with a rag.



7. Apply clean engine oil to the new oil seal.
8. Push the oil seal slightly in by hand.
9. Tap the oil seal in evenly by using the **SST** and a hammer.
10. Install the flywheel (MTX) or drive plate (ATX). (Refer to section J, K.)
11. Install the clutch disc and clutch cover (MTX). (Refer to section H.)
12. Install the transaxle assembly. (Refer to section J, K.)
13. Connect the negative battery cable.

ENGINE

PREPARATION
SST

49 G017 5A0 Support, engine 	For support of engine	49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine
49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine	49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine

REMOVAL / INSTALLATION
Procedure

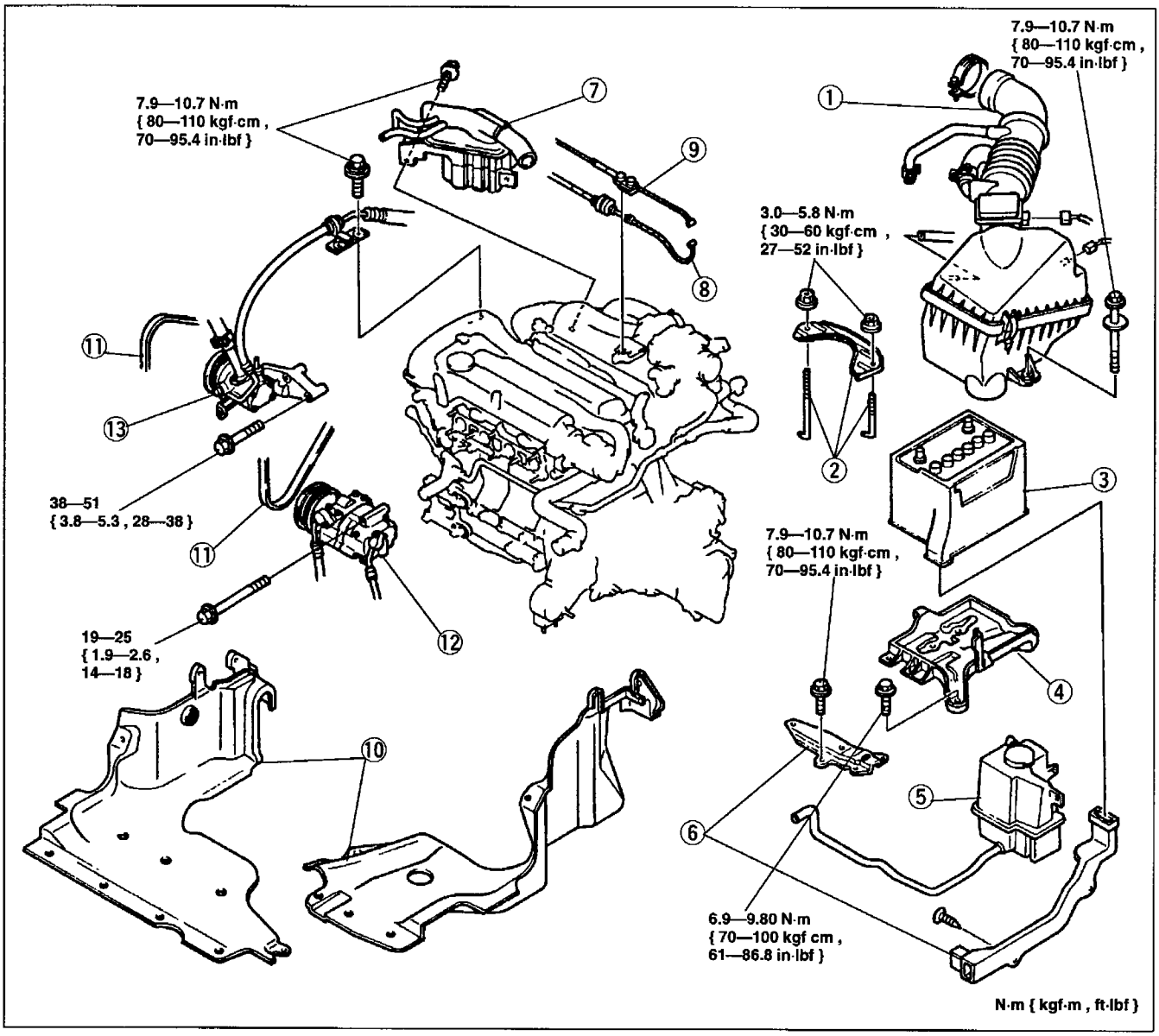
Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on section F1.**
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**

Caution
- **Cover the fuel hoses with a rag because fuel will spray out when disconnected.**

Note
- Plug the disconnected fuel hoses to prevent fuel leakage.

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to section E.)
3. Remove the hood and front wheels.
4. Drain the transaxle oil. (Refer to section J, K.)
5. Remove the radiator. (Refer to section E.)
6. Remove the three way catalytic converter and front pipe. (Refer to section F1.)
7. Remove the exhaust manifold. (Refer to section F1.)
8. Remove in the order shown in the figure, referring to **Removal Note.**
9. Install in the reverse order of removal, referring to **Installation Note.**
10. Install the exhaust manifold. (Refer to section F1.)
11. Install the front pipe and three way catalytic converter. (Refer to section F1.)
12. Install the radiator. (Refer to section E.)
13. Fill the transaxle with the specified amount and type of transaxle oil. (Refer to section J, K.)
14. Install the hood and front wheels.
15. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to section E.)
16. Connect the negative battery cable.
17. Start the engine and
    (1) check the engine oil, transaxle oil, and engine coolant leakage.
    (2) check the ignition timing and idle speed. (Refer to section F1.)
18. Turn off the engine and check the drive belt deflection. (Refer to page B1–2.)
19. Perform a road test.
20. Recheck the engine oil, transaxle oil, and engine coolant levels.

Step 1



1. Air cleaner
2. Battery clamp
3. Battery
4. Battery carrier
5. Radiator reservoir
6. Battery duct, bracket
7. Resonance chamber No.2
8. Accelerator cable
   Adjustment ..... section F1
9. Throttle cable (ATX)
   Adjustment ..... section K
10. Splash shield
11. Drive belt
    Adjustment ..... page B1–3
12. A/C compressor (if equipped)
    Removal Note ..... below
13. P/S oil pump
    Removal Note ..... below

Removal Note

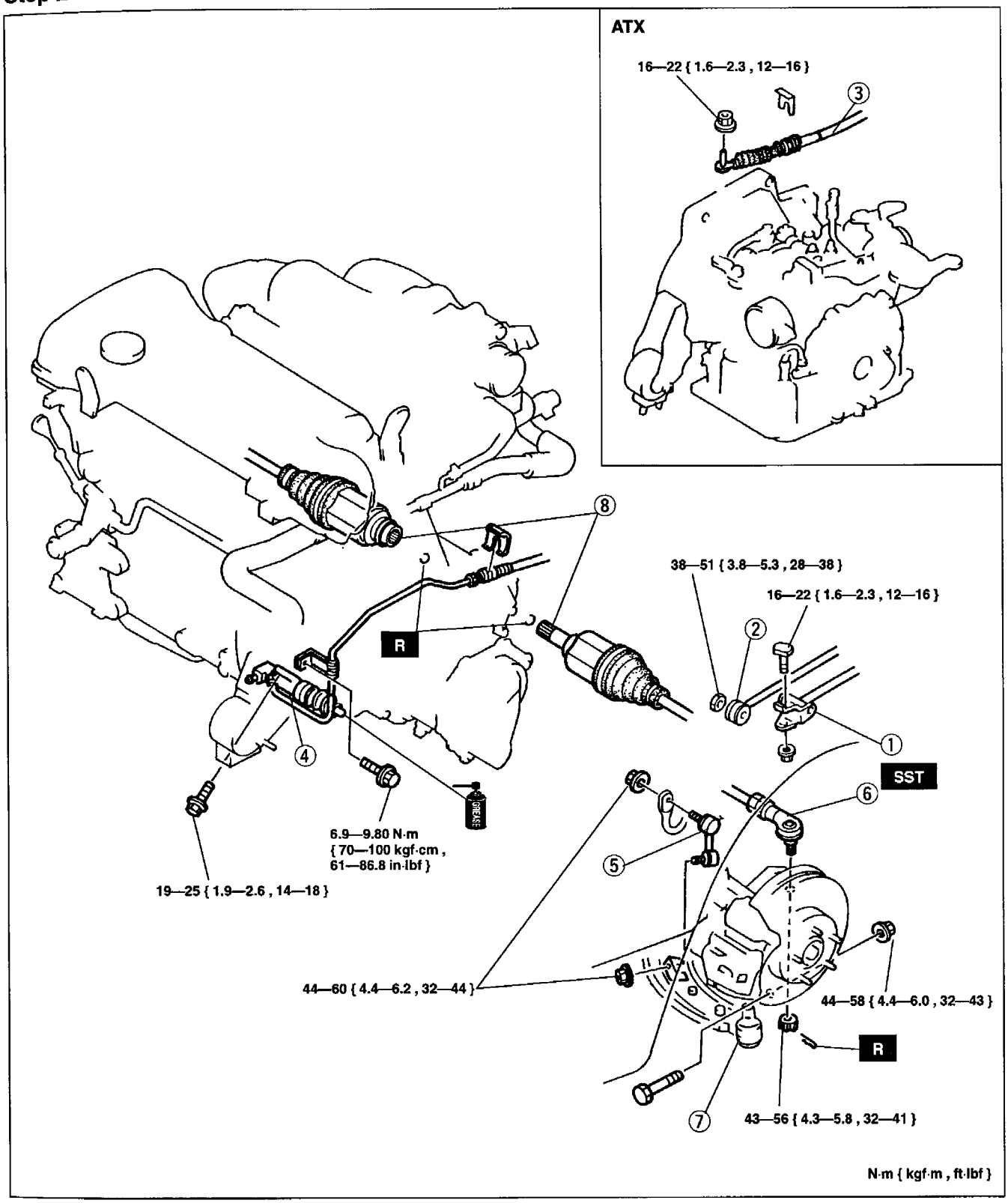
A/C compressor (if equipped)

1. Remove the A/C compressor with the hoses still connected. (Refer to section U.)
2. Position the compressor away from the engine and affix it with wire.

P/S oil pump

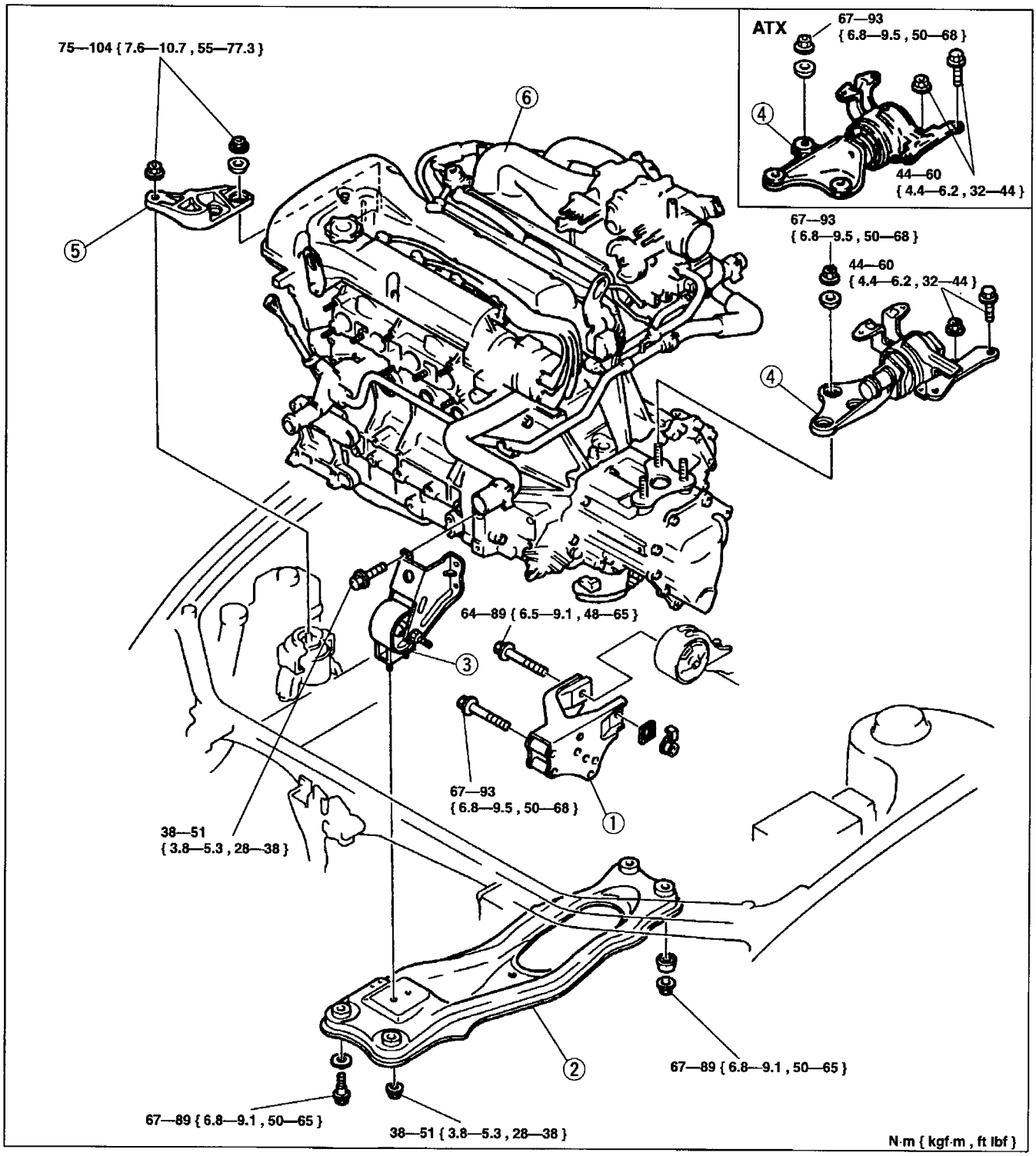
1. Remove the P/S oil pump with the hoses still connected. (Refer to section N.)
2. Position the pump away from the engine and affix it with wire

Step 2

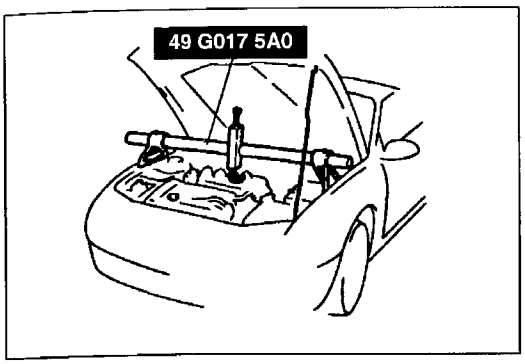


1. Control rod (MTX)
2. Extension bar (MTX)
3. Selector cable (ATX)
4. Clutch release cylinder (MTX)
   Removal / Installation ..... section H
5. Stabilizer control link
6. Outer ball joint
   Removal / Installation ..... section N
7. Lower arm
   Removal / Installation ..... section R
8. Drive shaft
   Removal / Installation ..... section M

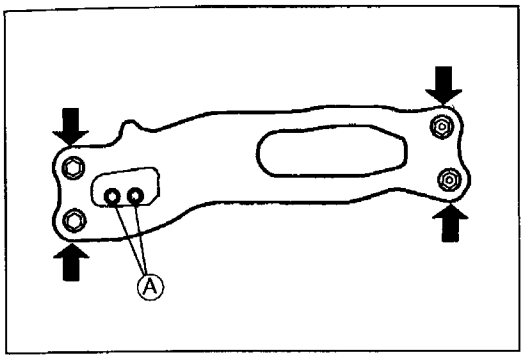
Step 3



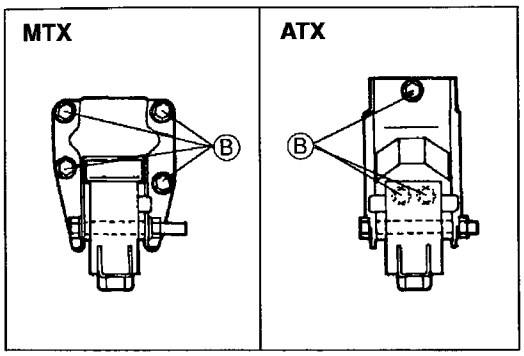
1. No.1 engine mount bracket
   - Removal Note ..... page B1–25
   - Installation Note ..... page B1–27
2. Engine mount member
   - Removal Note ..... page B1–25
   - Installation Note ..... page B1–27
3. No.2 engine mount bracket
   - Removal Note ..... page B1–25
   - Installation Note ..... page B1–26
4. No.4 engine mount bracket
   - Removal Note ..... page B1–25
   - Installation Note ..... page B1–26
5. No.3 engine mount bracket
   - Removal Note ..... page B1–25
   - Installation Note ..... page B1–26
6. Engine and transaxle assembly
   - Removal Note ..... page B1–26
   - Installation Note ..... page B1–26



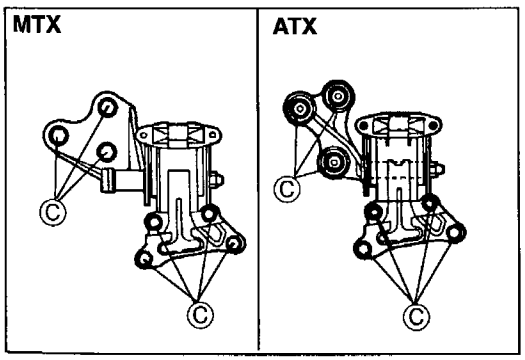
Removal Note
No.1 engine mount bracket
1. Support the engine by using the **SST**.
2. Remove the No.1 engine mount bracket.



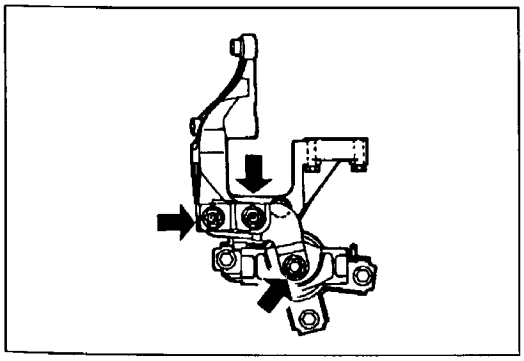
Engine mount member
1. Remove the No.2 engine mount nuts Ⓐ.
2. Remove the engine mount member bolts and nuts.
3. Remove the engine mount member.



No.2 engine mount bracket
1. Remove the No.2 engine mount bracket bolts Ⓑ.
2. Remove the No.2 engine mount bracket.



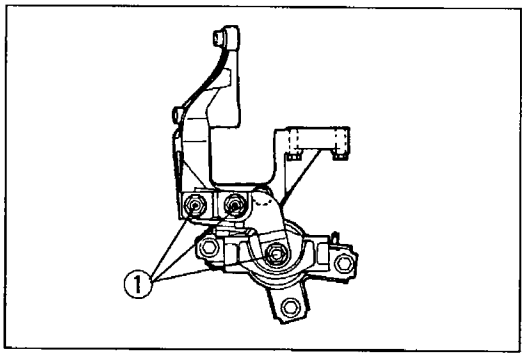
No.4 engine mount bracket
1. Remove the engine and transaxle assembly from the **SST** (Support, engine) and securely support it with the chain block.
2. Remove the No.4 engine mount bracket bolts and nuts marked Ⓒ.
3. Remove the No.4 engine mount bracket.



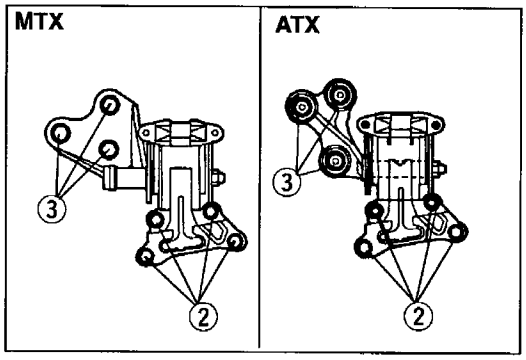
No.3 engine mount bracket
Remove the No.3 engine mount bracket nuts.

Engine and transaxle assembly
Slowly lift up the engine and transaxle assembly as a unit. Keep the engine from swinging or bumping into components in the engine compartment.

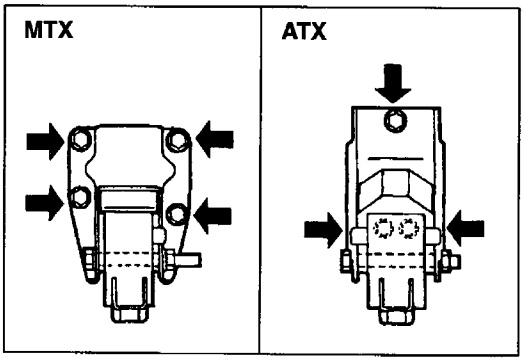
Installation Note
Engine and transaxle assembly
Slowly lower the engine and transaxle assembly as a unit. Keep the engine from swinging or bumping into components in the engine compartment.



No.3 engine mount bracket
Hand tighten No.3 engine mount bracket nuts ①.

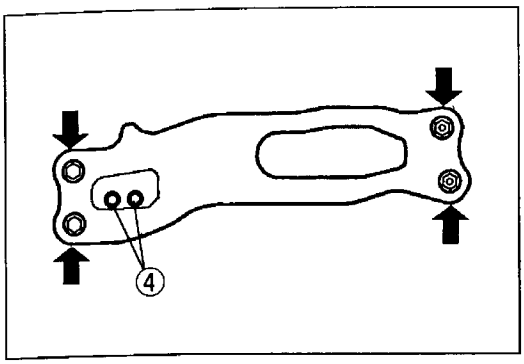


No.4 engine mount bracket
1. Hand tighten No.4 engine mount bracket bolts and nuts ②.
2. Hand tighten No.4 engine mount bracket nuts ③.



No.2 engine mount bracket
Install No.2 engine mount bracket.

Tightening torque:
38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }

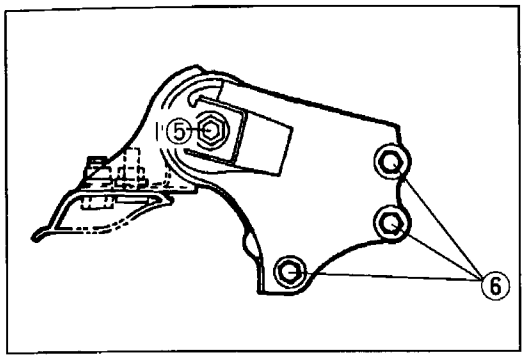


Engine mount member

1. Install the engine mount member.

Tightening torque:
67—89 N·m { 6.8—9.1 kgf·m , 50—65 ft·lbf }

2. Hand tighten No.2 engine mount nuts ④.

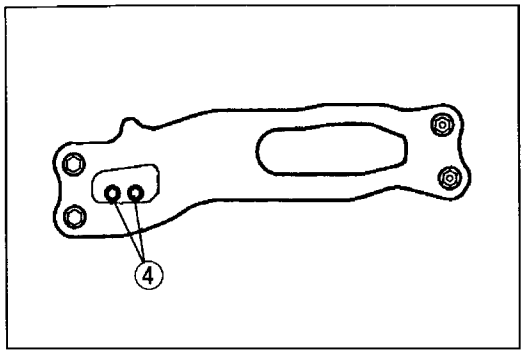


No.1 engine mount bracket

1. Tighten No.1 engine mount bracket bolts ⑤, ⑥.

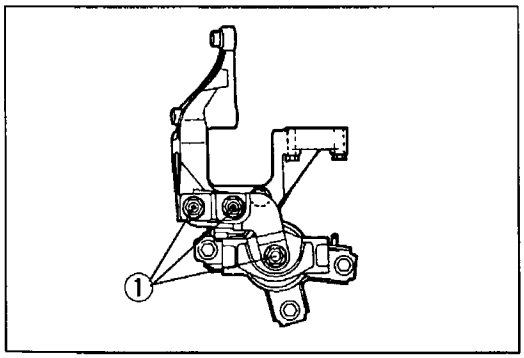
Tightening torque
⑤: 64—89 N·m { 6.5—9.1 kgf·m , 48—65 ft·lbf }
⑥: 67—93 N·m { 6.8—9.5 kgf·m , 50—68 ft·lbf }

2. Remove the chain block.



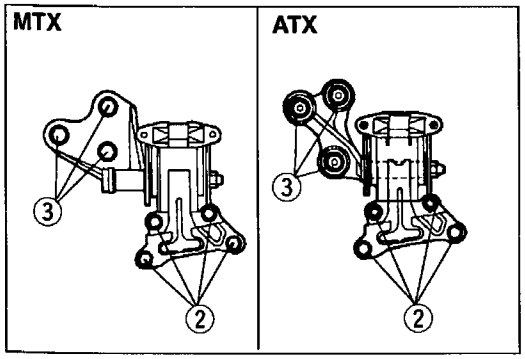
3. Tighten the engine mount bolts and nuts as follows.
   (1) No.2 engine mount.

Tightening torque
④: 38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }



(2) No.3 engine mount bracket.

Tightening torque
①: 75—104 N·m { 7.6—10.7 kgf·m , 55—77.3 ft·lbf }

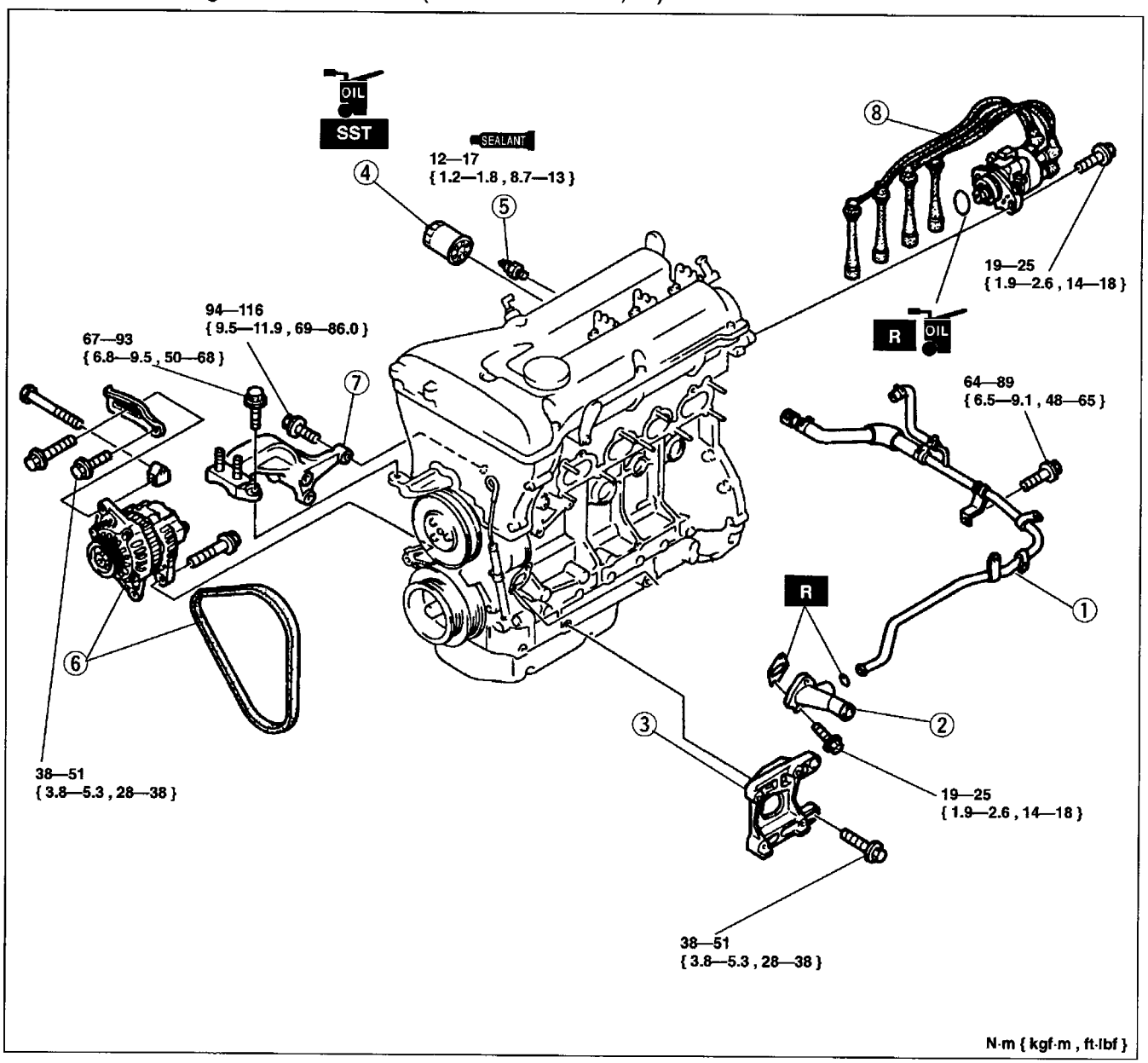


(3) No.4 engine mount bracket.

Tightening torque
②: 44—60 N·m { 4.4—6.2 kgf·m , 32—44 ft·lbf }
③: 67—93 N·m { 6.8—9.5 kgf·m , 50—68 ft·lbf }

DISASSEMBLY / ASSEMBLY

1. Disconnect the engine and transaxle. (Refer to section J, K.)
2. Remove the clutch cover and clutch disc (MTX). (Refer to section H.)
3. Remove the intake-air system and crankshaft position sensor. (Refer to section F1.)
4. Disassemble in the order shown in the figure.
5. Assemble in the reverse order of disassembly.
6. Install the intake-air system and crankshaft position sensor. (Refer to section F1.)
7. Install the clutch disc and clutch cover (MTX). (Refer to section H.)
8. Connect the engine and transaxle. (Refer to section J, K.)



1. Water bypass pipe
2. Water inlet pipe
3. A/C compressor bracket (if equipped)
4. Oil filter
   Removal / Installation ..... section D
5. Oil pressure switch
   Removal / Installation ..... section D
6. Generator and drive belt
   Adjustment ..... page B1–3
7. No.3 engine mount
8. Distributor

Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

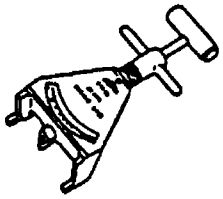
ENGINE
(BP)

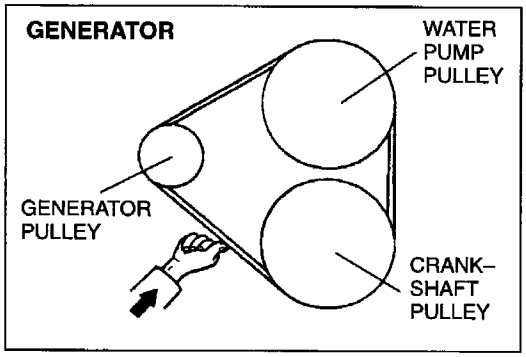
DRIVE BELT **B2– 2**
PREPARATION **B2– 2**
INSPECTION / ADJUSTMENT **B2– 2**
COMPRESSION **B2– 4**
INSPECTION **B2– 4**
TIMING BELT **B2– 5**
PREPARATION **B2– 5**
REMOVAL / INSTALLATION **B2– 5**
CYLINDER HEAD GASKET **B2–11**
PREPARATION **B2–11**
REPLACEMENT **B2–11**
HLA **B2–14**
PREPARATION **B2–14**
REMOVAL / INSPECTION / INSTALLATION ... **B2–14**
FRONT OIL SEAL **B2–18**
PREPARATION **B2–18**
REPLACEMENT **B2–18**
REAR OIL SEAL **B2–19**
PREPARATION **B2–19**
REPLACEMENT **B2–19**
ENGINE **B2–20**
PREPARATION **B2–20**
REMOVAL / INSTALLATION **B2–20**
DISASSEMBLY / ASSEMBLY **B2–27**

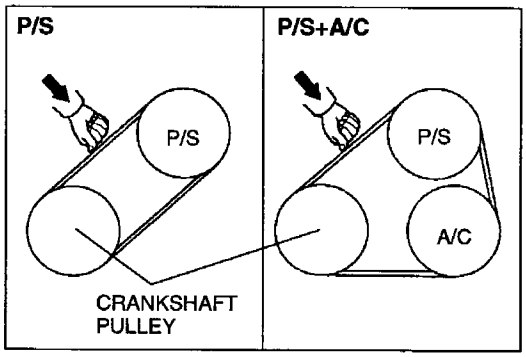
DRIVE BELT

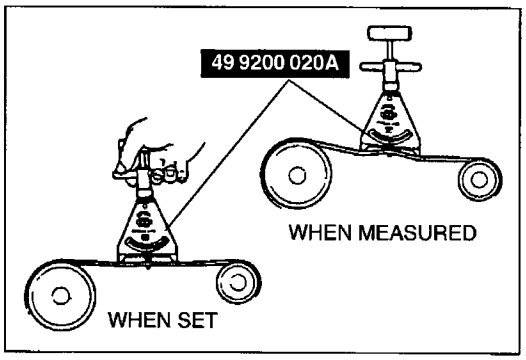
PREPARATION

SST

49 9200 020A Tension gauge, belt		For inspection of drive belt tension







INSPECTION / ADJUSTMENT

Inspection

1. Check the drive belt deflection when the engine is cold, or at least 30 minutes after the engine has stopped. Apply moderate pressure **98 N { 10 kgf , 22 lbf }** midway between the specified pulleys.

Deflection mm { in }

Drive belt	*New	Used	Limit
Generator	5.5—7.0 { 0.22—0.27 }	6.0—7.5 { 0.24—0.29 }	8.0 { 0.31 }
P/S, P/S+A/C	8.0—9.0 { 0.32—0.35 }	9.0—10.0 { 0.36—0.39 }	11.5 { 0.45 }

*A belt that has been on a running engine for less than five minutes.

2. If the deflection is not within the specification, adjust it. (Refer to page B2–3.)

Drive belt tension check

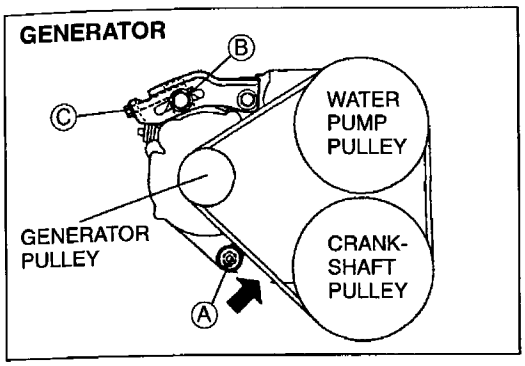
1. Belt tension can be checked in place of belt deflection. Check the drive belt tension when the engine is cold, or at least 30 minutes after the engine has stopped. Using the **SST**, check the belt tension between any two pulleys.

Tension N { kgf , lbf }

Drive belt	*New	Used	Limit
Generator	500—740 { 50—76 , 110—160 }	500—700 { 50—72 , 110—150 }	340 { 35 , 77 }
P/S, P/S+ A/C	500—580 { 50—60 , 110—130 }	430—490 { 43—50 , 95—110 }	250 { 25 , 55 }

*A belt that has been on a running engine for less than five minutes.

2. If the tension is not within the specification, adjust it. (Refer to page B2–3.)

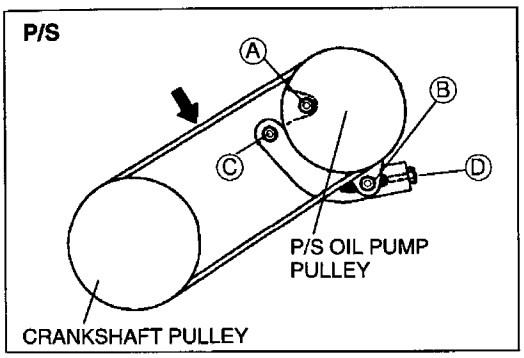


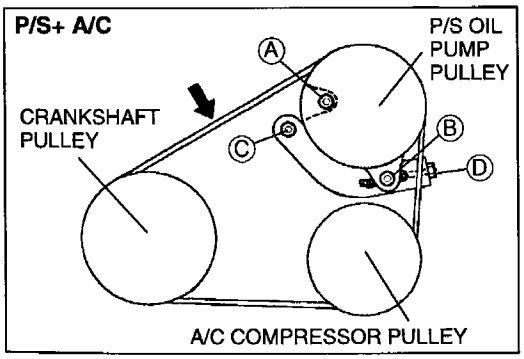
Adjustment
Generator drive belt
1. Loosen bolts Ⓐ and Ⓑ.
2. Adjust the belt deflection by turning adjusting bolt Ⓒ.

Deflection (At 98 N { 10 kgf , 22 lbf })
New : 5.5—7.0 mm { 0.22—0.27 in }
Used: 6.0—7.5 mm { 0.24—0.29 in }

3. Tighten bolts Ⓐ and Ⓑ.

Tightening torque
Ⓐ: 38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }
Ⓑ: 19—25 N·m { 1.9—2.6 kgf·m , 14—18 ft·lbf }





P/S, P/S + A/C drive belt
1. Loosen the bolts and nuts marked Ⓐ, Ⓑ and Ⓒ.
2. Adjust the belt deflection by turning adjusting bolt Ⓓ.

Deflection (At 98 N { 10 kgf , 22 lbf })
New: 8.0—9.0 mm { 0.32—0.35 in }
Used: 9.0—10.0 mm { 0.36—0.39 in }

3. Tighten the bolts and nuts marked Ⓐ, Ⓑ and Ⓒ.

Tightening torque
Ⓐ: 44—60 N·m { 4.4—6.2 kgf·m , 32—44 ft·lbf }
Ⓑ: 38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }
Ⓒ: 38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }

COMPRESSION

INSPECTION

1. Verify that the battery is fully charged. Recharge it if necessary. (Refer to section G.)
2. Warm up the engine to the normal operating temperature.
3. Stop the engine and allow it to cool for about 10 minutes.
4. Remove the spark plugs.
5. Disconnect the distributor connectors.
6. Connect a compression gauge into the No.1 spark plug hole.
7. Measure compression in the following procedure.
   (1) Fully depress the accelerator pedal or fully open the throttle valve.
   (2) Crank the engine and note the maximum gauge reading.

Compression

kPa { kgf/cm^2 , psi }–rpm

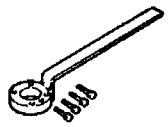
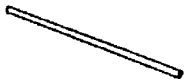
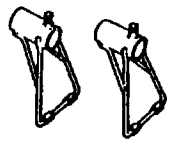
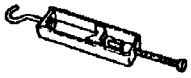
Standard	1275 { 13.0 , 185 }–300
Minimum	961 { 9.8 , 139 }–300
Maximum difference between cylinders	196 kPa { 2.0 kgf/cm^2 , 28 psi }

   (3) Check each cylinder as above.
   (4) If the compression in one or more cylinders is low, pour a small amount of clean engine oil into the cylinder and recheck the compression.
      ① If the compression increases, the piston, piston rings, or cylinder wall may be worn.
      ② If the compression stays low, a valve may be stuck or improperly seated.
      ③ If the compression in adjacent cylinders stays low, the cylinder head gasket may be damaged or the cylinder head distorted.
8. Disconnect the compression gauge.
9. Connect the distributor connectors.
10. Install the spark plugs.

Tightening torque: 15—22 N·m { 1.5—2.3 kgf·m , 11—16 ft·lbf }

TIMING BELT

PREPARATION
SST

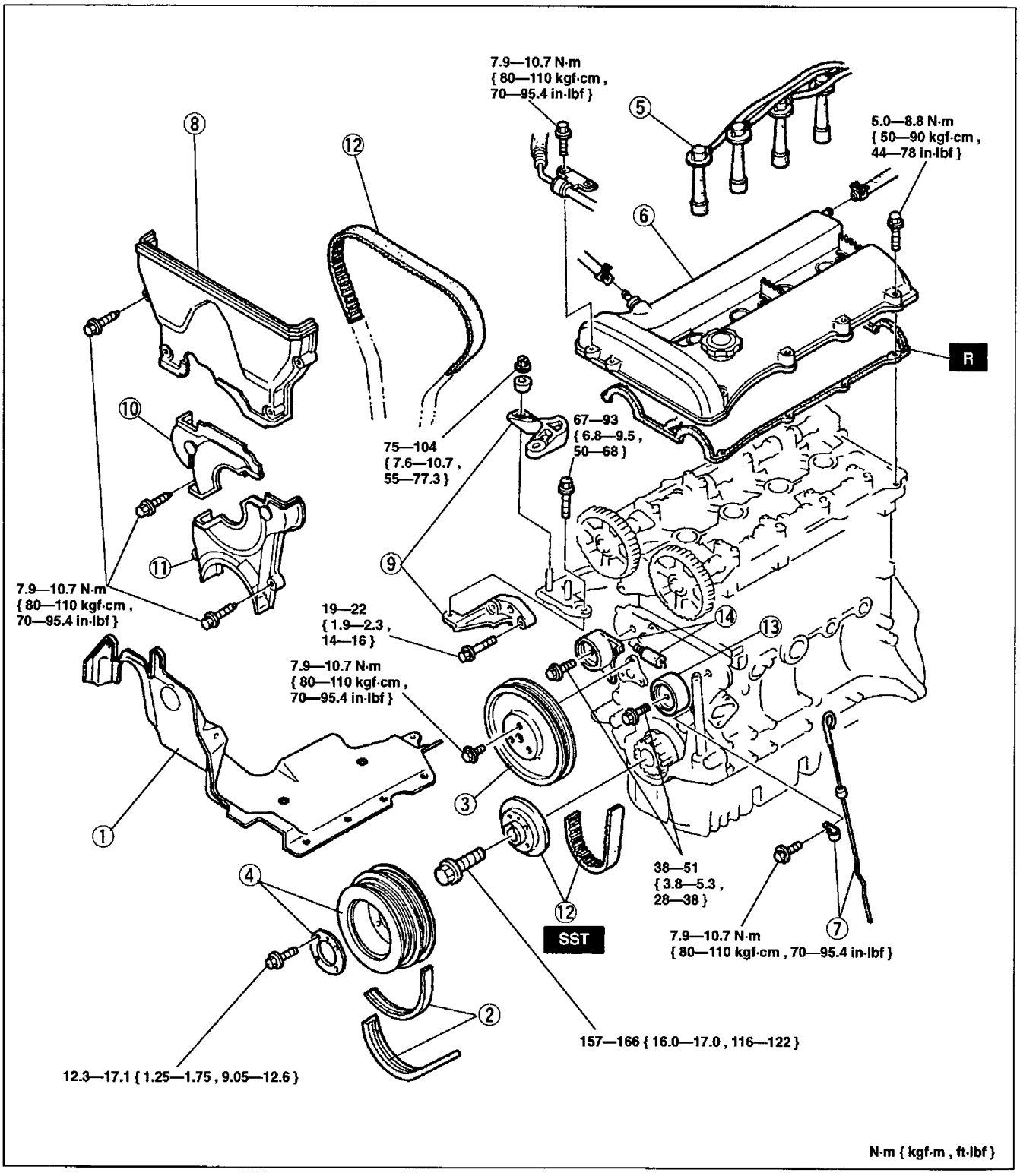
49 D011 102 Lock tool, crankshaft 	For prevention of crankshaft rotation	49 G017 5A0 Support, engine 	For support of engine
49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine	49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine
49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine	—	—

REMOVAL / INSTALLATION

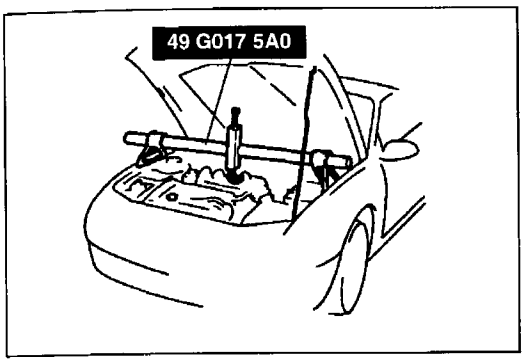
Caution

- **The crankshaft position sensor rotor is on the rear of the crankshaft pulley, and can be damaged easily.**

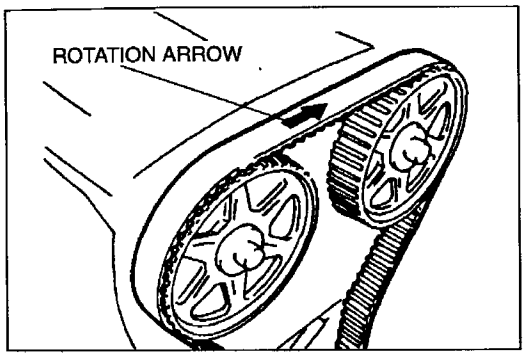
1. Disconnect the negative battery cable.
2. Remove the right front wheel.
3. Remove in the order shown in the figure, referring to **Removal Note**.
4. Install in the reverse order of removal, referring to **Installation Note**.
5. Install the right front wheel.
6. Connect the negative battery cable.
7. Start the engine and
   (1) check the pulleys and the timing belt for runout and contact.
   (2) check the ignition timing. (Refer to section F2.)



1. Splash shield (RH)
2. Drive belt
   Adjustment ..... page B2– 3
3. Water pump pulley
4. Crankshaft pulley
5. High-tension lead
6. Cylinder head cover
   Installation Note ..... page B2–10
7. Dipstick and pipe stay
8. Timing belt cover, upper
9. No.3 engine mount bracket
   Removal Note ..... below
   Installation Note ..... page B2–10
10. Timing belt cover, middle
11. Timing belt cover, lower
12. Pulley boss, timing belt
    Removal Note ..... below
    Installation Note ..... page B2– 8
13. Idler pulley
14. Tensioner pulley, tensioner spring
    Installation Note ..... page B2– 8

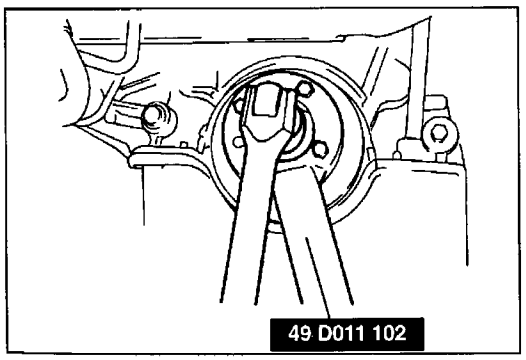


Removal Note
No.3 engine mount bracket
1. Support the engine by using the **SST**.
2. Remove the No.3 engine mount bracket.

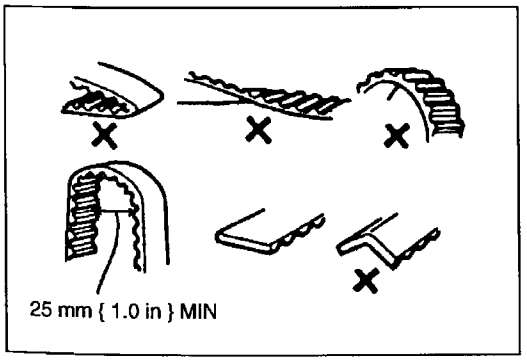


Pulley boss, timing belt

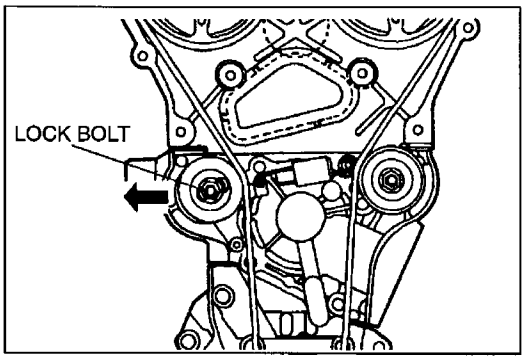
Note
- Mark the timing belt rotation on the belt for proper reinstallation.



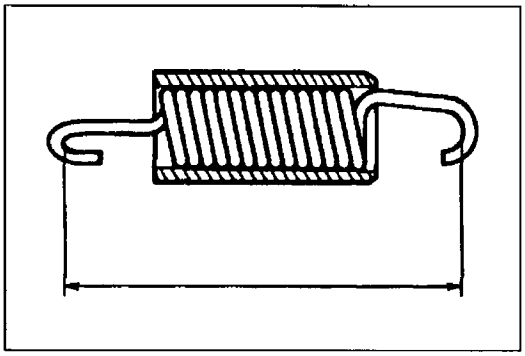
1. By using the **SST**, remove the pulley lock bolt.
2. Remove the pulley boss.



Caution
- **The following will damage the belt and shorten its life; Forcefully twisting it, turning it inside out, or allowing oil or grease on it.**



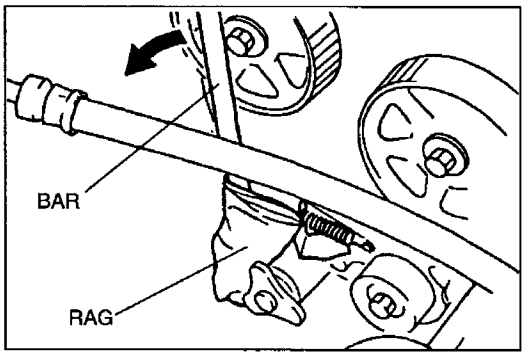
3. Loosen the tensioner pulley lock bolt.
4. Pull the tensioner pulley in the direction of the arrow to reduce tension of the timing belt, and remove the belt.



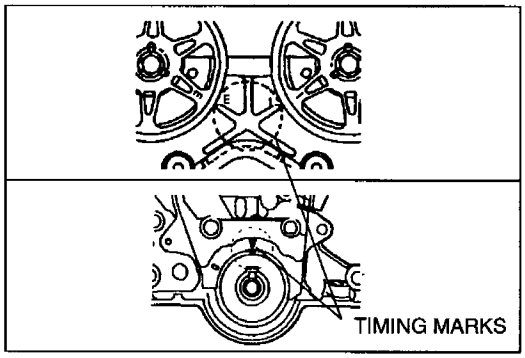
Installation Note
Tensioner pulley, tensioner spring

1. Measure the tensioner spring free length. If not within the specification, replace the tensioner spring.

   Free length: 59.2 mm { 2.33 in }

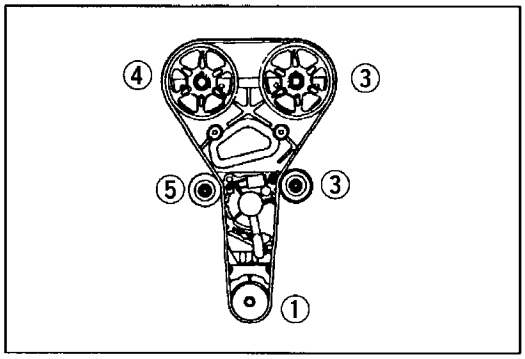


2. Install the tensioner and the tensioner spring.
3. Temporarily secure the tensioner with the spring fully extended.

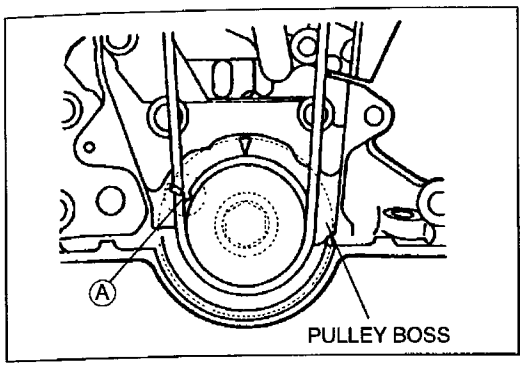


Pulley boss, timing belt

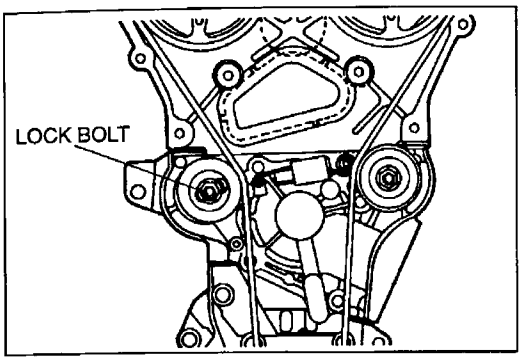
1. Verify that all timing marks are correctly aligned.



2. Install the timing belt on the pulleys in the order shown below.
   ① Timing belt pulley
   ② Idler pulley
   ③ Camshaft pulley (LH)
   ④ Camshaft pulley (RH)
   ⑤ Tensioner pulley

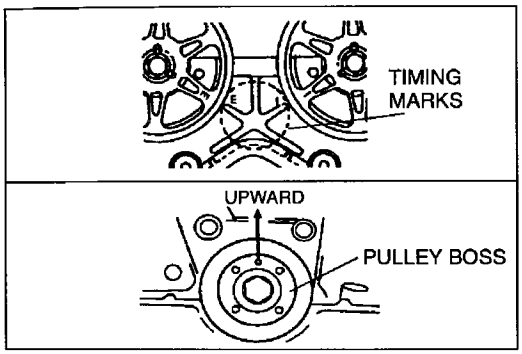


3. Install the pulley boss and pulley lock bolt. Turn the crankshaft clockwise 1 and 5/6 times, and verify that the timing mark on the timing belt pulley is aligned with timing mark Ⓐ (tensioner set mark).



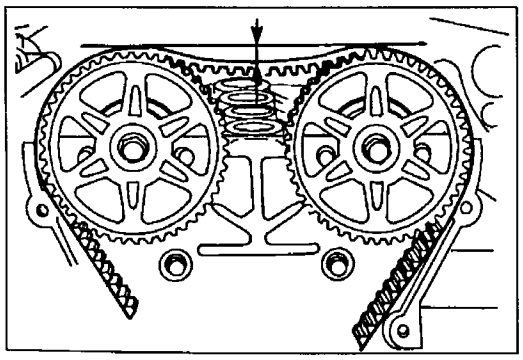
4. Loosen the tensioner lock bolt to apply tension to the timing belt. Do not apply tension other than that of the tensioner spring.
5. Tighten the tensioner pulley lock bolt.

Tightening torque:
38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }



6. Turn the crankshaft 2 and 1/6 times clockwise, and verify that all timing marks are correctly aligned.

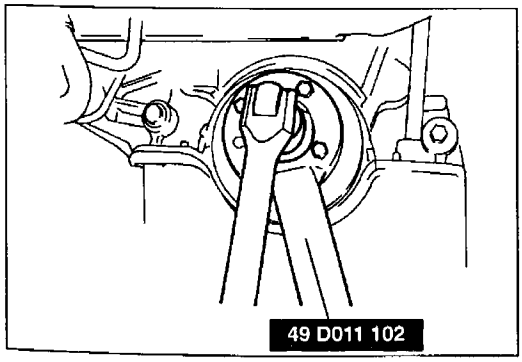
Note
- The pin on the pulley boss must face upward.



7. Check the belt deflection at the point indicated by applying moderate pressure **98 N { 10 kgf , 22 lbf }.**

Deflection: 9.0—11.5 mm { 0.36—0.45 in }

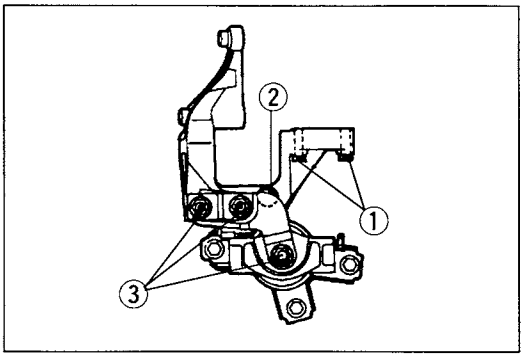
8. If the timing belt deflection is not correct, remove the timing belt and repeat from step 1.



9. Mount the **SST** on the pulley boss to hold the crankshaft. Tighten the lock bolt.

Tightening torque:
157—166 N·m { 16.0—17.0 kgf·m , 116—122 ft·lbf }

10. Remove the **SST.**

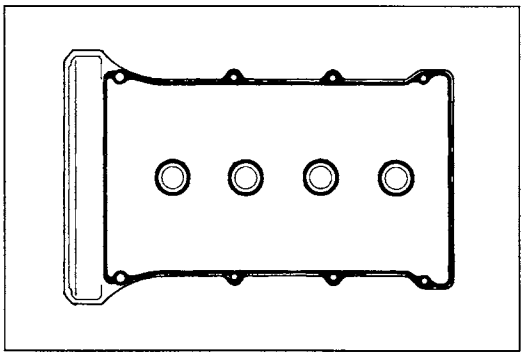


No.3 engine mount bracket

1. Install the No.3 engine mount bracket.

   Tightening torque
   ①: 19—22 N·m { 1.9—2.3 kgf·m , 14—16 ft·lbf }
   ②: 67—93 N·m { 6.8—9.5 kgf·m , 50—68 ft·lbf }
   ③: 75—104 N·m { 7.6—10.7 kgf·m , 55—77.3 ft·lbf }

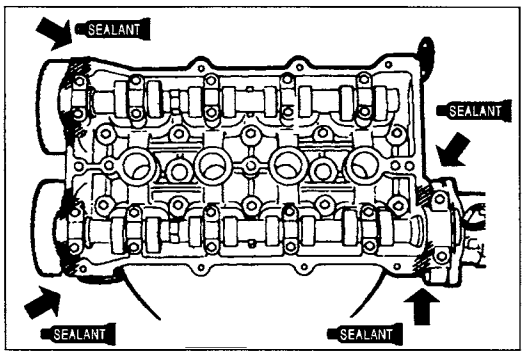
2. Remove the **SST** (Support, engine).



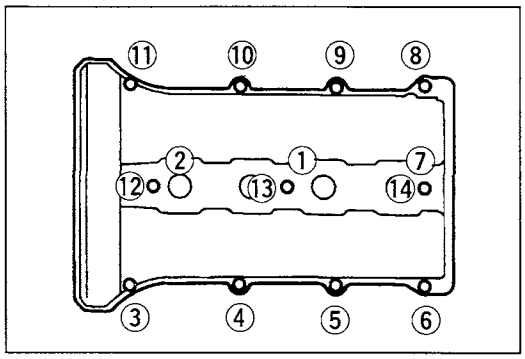
Cylinder head cover

1. Verify that the grooves on the cylinder head cover are free of oil, water and other foreign material.
2. Install the new cylinder head cover gasket into the cylinder head cover.

   Caution
   - **Silicone sealant hardens and causes oil leakage when it is left for an extended period. Therefore, install parts before sealant hardens.**



3. Apply silicone sealant to the shaded areas as shown.

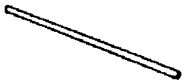
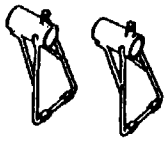


4. Install the cylinder head cover and tighten the bolts in five or six steps in the order shown.

   Tightening torque:
   5.0—8.8 N·m { 50—90 kgf·cm , 44—78 in·lbf }

CYLINDER HEAD GASKET

PREPARATION
SST

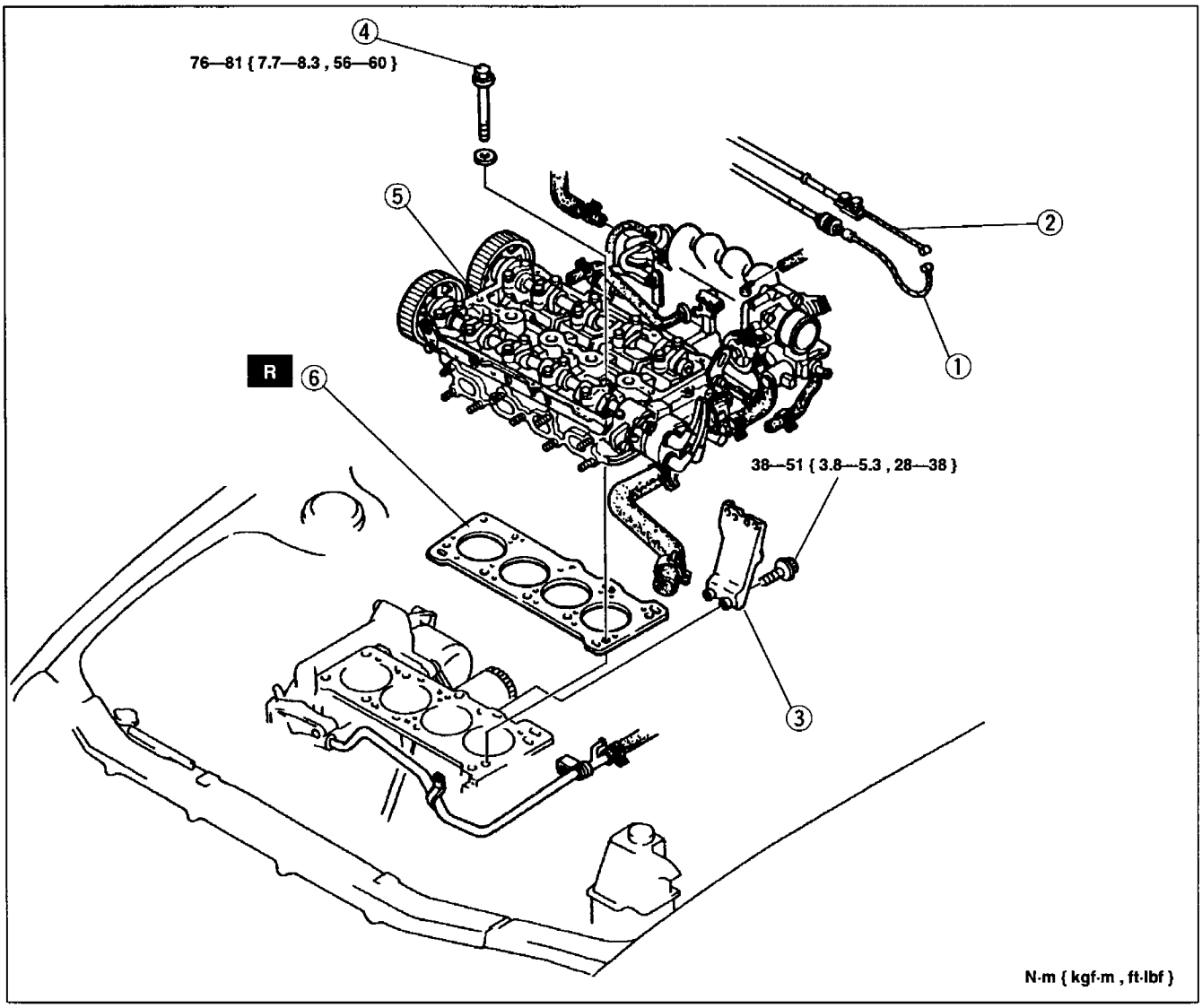
49 G017 5A0 Support, engine 	For support of engine	49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine
49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine	49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine

REPLACEMENT

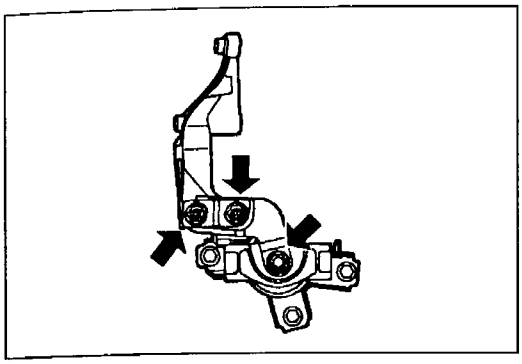
Warning

- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on section F2.**

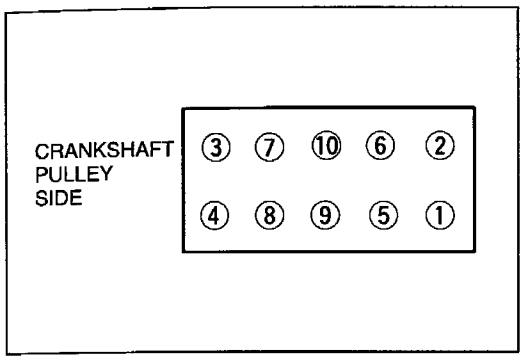
1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to section E.)
3. Remove the timing belt. (Refer to page B2–5.)
4. Remove the air cleaner and front pipe. (Refer to section F2.)
5. Remove the exhaust manifold. (Refer to section F2.)
6. Remove in the order shown in the figure, referring to **Removal Note**.
7. Install in the reverse order of removal, referring to **Installation Note**.
8. Install the exhaust manifold. (Refer to section F2.)
9. Install the front pipe and air cleaner. (Refer to secton F2.)
10. Install the timing belt. (Refer to page B2–5.)
11. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to section E.)
12. Connect the negative battery cable.
13. Start the engine and
    (1) check the engine oil and engine coolant leakage.
    (2) check the ignition timing and idle speed. (Refer to section F2.)
14. Check the compression. (Refer to page B2–4.)



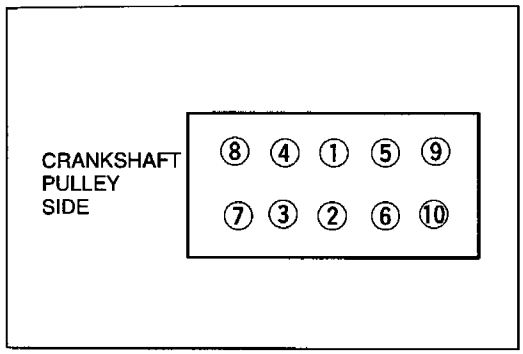
1. Accelerator cable
   Adjustment ..... section F2
2. Throttle cable (ATX)
   Adjustment ..... section K
3. Intake manifold stay
4. Cylinder head bolt
   Removal Note ..... page B2–13
   Installation Note ..... page B2–13
5. Cylinder head assembly
6. Cylinder head gasket



Removal Note
Cylinder head bolt
1. Temporarily install the No.3 engine mount bracket to support the engine.
2. Remove the **SST** (Support, engine).

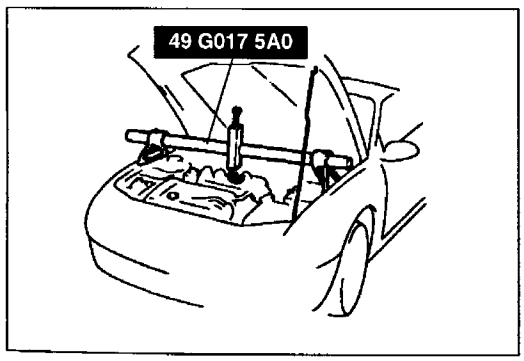


3. Loosen the cylinder head bolts in two or three steps in the order shown.
4. Remove the cylinder head bolts.



Installation Note
Cylinder head bolt
1. Tighten the cylinder head bolts in two or three steps in the order shown.

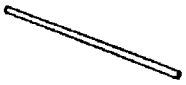
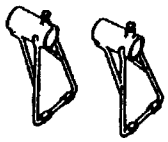
   Tightening torque:
   76—81 N·m { 7.7—8.3 kgf·m , 56—60 ft·lbf }



2. Support the engine by using the **SST**.
3. Remove the No.3 engine mount bracket.

HLA

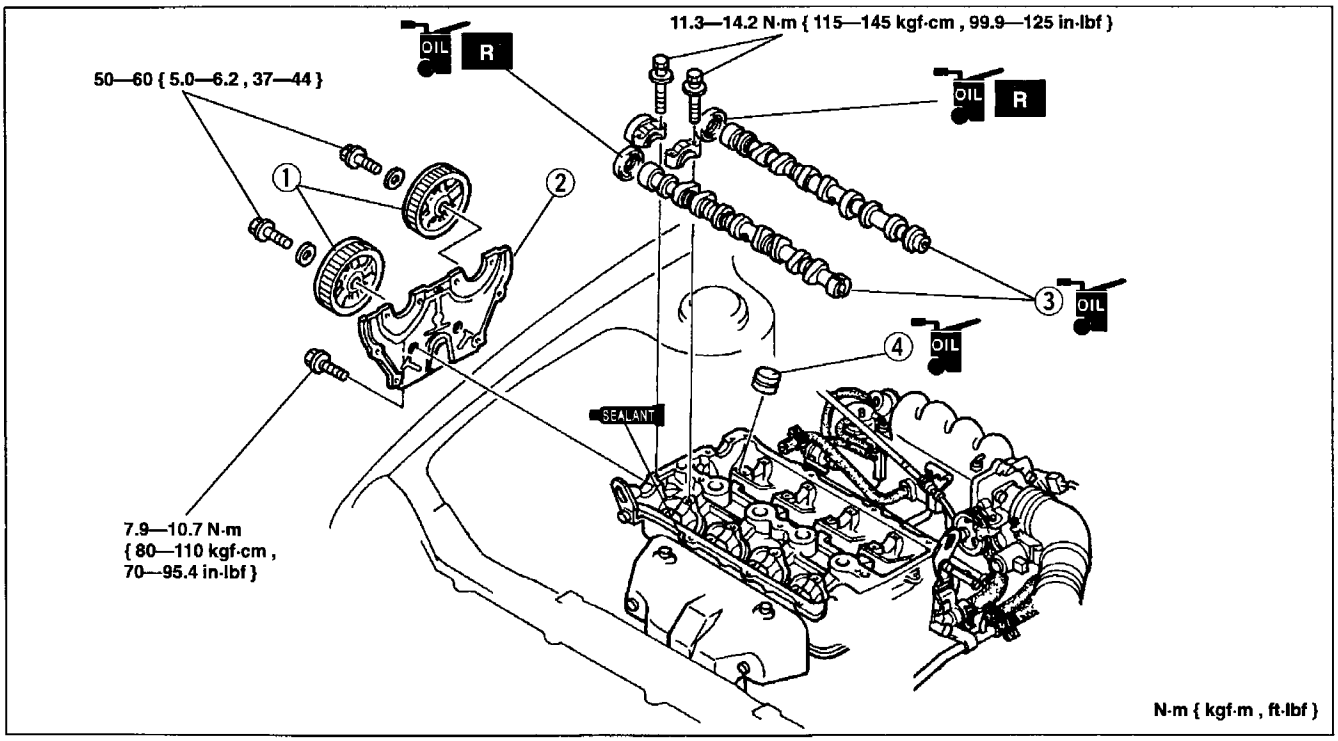
PREPARATION
SST

49 G017 5A0 Support, engine 	For support of engine	49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine
49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine	49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine

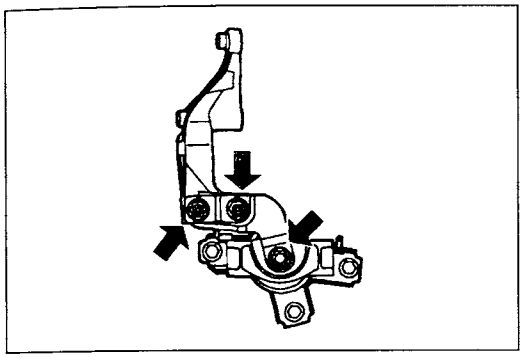
REMOVAL / INSPECTION / INSTALLATION

Caution
- **Removal and installation of the HLA must be carried out only when the problem cannot be solved by the HLA troubleshooting. (Refer to page B2–17.)**

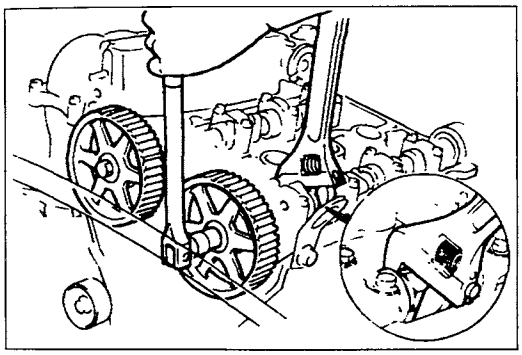
1. Disconnect the negative battery cable.
2. Remove the timing belt. (Refer to page B2–5.)
3. Remove the distributor. (Refer to section G.)
4. Remove in the order shown in the figure, referring to **Removal Note**.
5. Install in the reverse order of removal, referring to **Installation Note**.
6. Install the distributor. (Refer to section G.)
7. Install the timing belt. (Refer to page B2–5.)
8. Connect the negative battery cable.
9. Start the engine and
   (1) check the engine oil leakage.
   (2) check the ignition timing and idle speed. (Refer to section F2.)



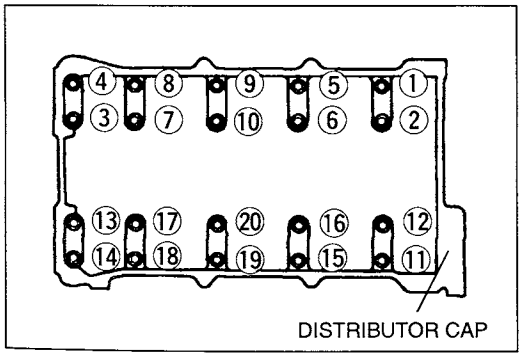
1. Camshaft pulley
   Removal Note ..... below
   Installation Note ..... page B2–16
2. Seal plate
3. Camshaft
   Removal Note ..... below
   Installation Note ..... page B2–16
4. HLA



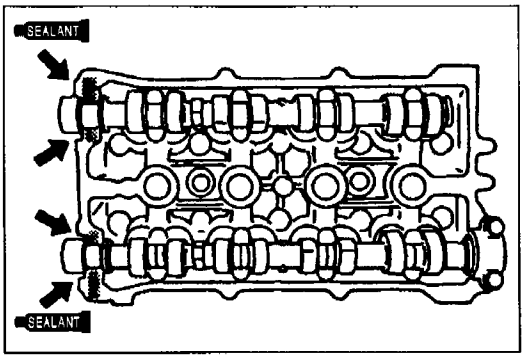
Removal Note
Camshaft pulley
1. Temporarily install the No.3 engine mount bracket to support the engine.
2. Remove the **SST** (Support, engine).



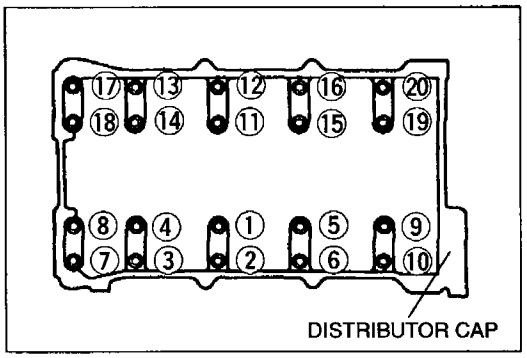
3. Hold the camshaft by using a wrench on the cast hexagon as shown, and loosen the camshaft pulley lock bolt.
4. Remove the camshaft pulley.



Camshaft
1. Rotate the camshaft clockwise so that cams do not pressing on the HLAs.
2. Loosen the camshaft cap bolts in five or six steps in the order shown.
3. Remove the camshafts.
4. Remove the camshaft oil seals.

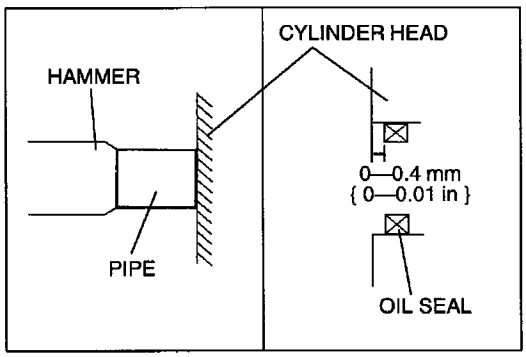


Installation Note
Camshaft
1. Install the camshafts.
2. Apply silicone sealant to the shaded areas shown.



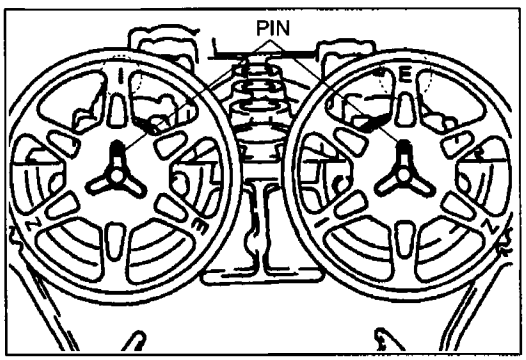
3. Install the camshaft caps.
4. Tighten the camshaft cap bolts in five or six steps in the order shown.

Tightening torque: 11.3—14.2 N·m
{ 115—145 kgf·cm , 99.9—125 in·lbf }

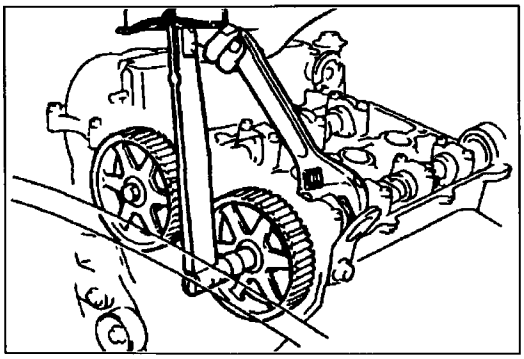


5. Apply clean engine oil to the lip of the new camshaft oil seal.
6. Push the oil seal slightly in by hand.
7. Tap the oil seal in evenly by using a pipe and a hammer.

Note
- Oil seal outer diameter: 48.0 mm { 1.89 in }
- Oil seal inner diameter: 34.2 mm { 1.35 in }

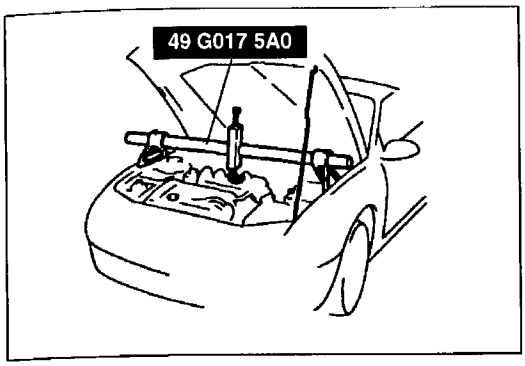


Camshaft pulley
1. Face the pin on each camshaft straight up.
2. Install the camshaft pulleys so that "I" mark (intake side) and "E" mark (exhaust side) face straight up.



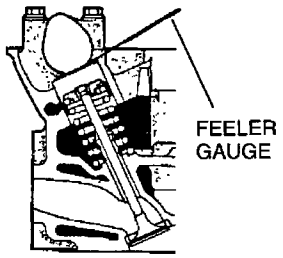
3. Hold the camshaft by using a wrench on the cast hexagon, and tighten the lock bolt.

Tightening torque:
50—60 N·m { 5.0—6.2 kgf·m , 37—44 ft·lbf }



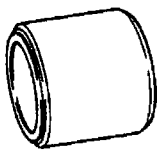
4. Support the engine by using the **SST**.
5. Remove the No.3 engine mount.

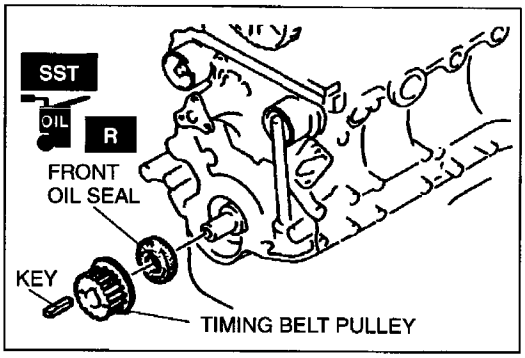
Troubleshooting Guide

Problem	Possible cause	Action
1. Noise when engine is started immediately after oil is changed.	Oil leakage in oil passage or in HLA	Run engine at 2,000—3,000 rpm. If noise stops within 20 minutes*, HLA is normal. If not, replace HLA. * Time required for engine oil to circulate within HLA includes tolerance for engine oil condition and ambient temperature.
2. Noise when engine is started after setting one day or more.		
3. Noise when engine is started after new HLA is installed.	Oil leakage in HLA	
4. Noise during idle after warm up.	Insufficient oil pressure	Check oil pressure. If lower than specification, check for cause. (Refer to section D.)
	Faulty HLA	(Refer to page B2–14.) Press down HLA by hand. If it moves, replace HLA. If it does not move, HLA normal. Measure valve clearance.  If more than 0.15 mm { 0.0059 in }, replace HLA.
5. Noise during idle after high speed running.	Incorrect oil amount	Check oil level. Drain or add oil as necessary.
	Deteriorated oil	Check oil quality. If deteriorated, replace with specified type and amount of oil.

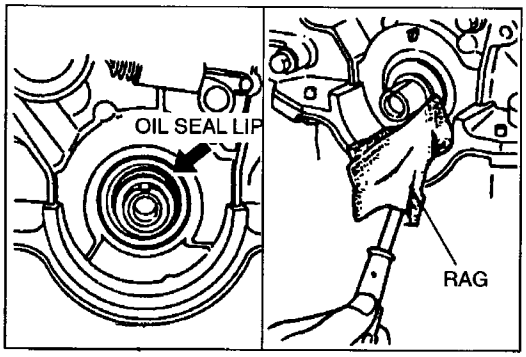
FRONT OIL SEAL

PREPARATION
SST

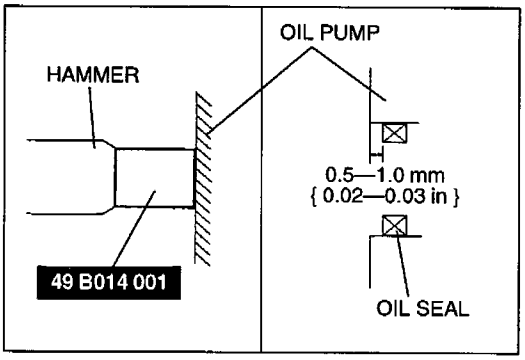
49 B014 001 Installer, oil seal		For installation of front oil seal



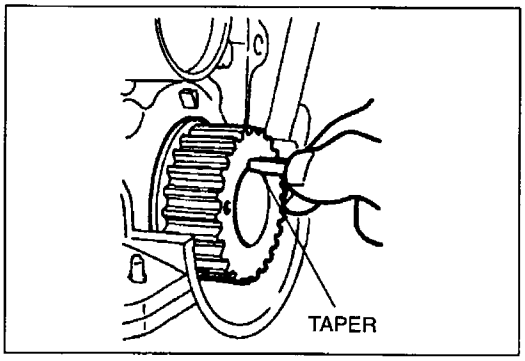
REPLACEMENT
1. Disconnect the negative battery cable.
2. Remove the timing belt. (Refer to page B2–5.)
3. Remove the timing belt pulley.
4. Remove the key.



5. Cut the oil seal lip by using a razor knife.
6. Remove the oil seal by using a screwdriver protected with a rag.



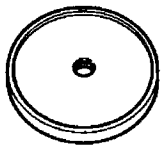
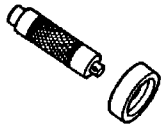
7. Apply clean engine oil to the new oil seal.
8. Push the oil seal slightly in by hand.
9. Tap the oil seal in evenly by using the **SST** and a hammer.

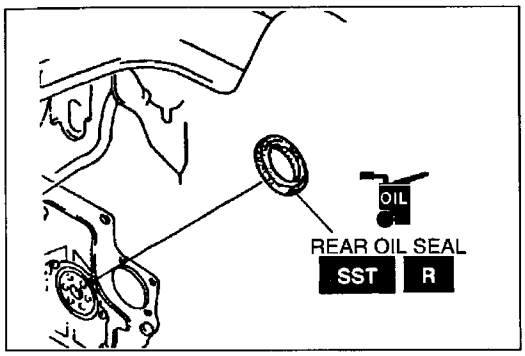


10. Install the timing belt pulley, aligning the key groove.
11. Insert the key with the tapered side toward the oil pump body.
12. Install the timing belt. (Refer to page B2–5.)
13. Connect the negative battery cable.
14. Start the engine and check the ignition timing. (Refer to section F2.)

REAR OIL SEAL

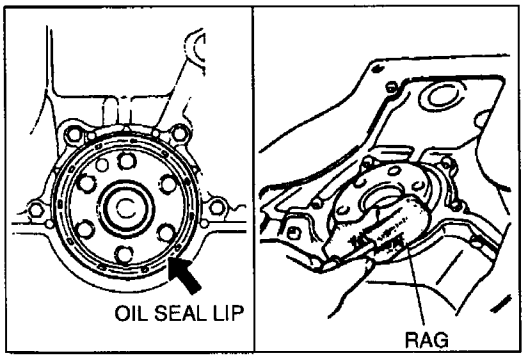
PREPARATION
SST

49 W033 105 Installer, oil seal 	For installation of rear oil seal	49 G030 795 Installer, oil seal 	For installation of rear oil seal
49 G030 797 Handle (Part of 49 G030 795) 	For installation of rear oil seal	—	—

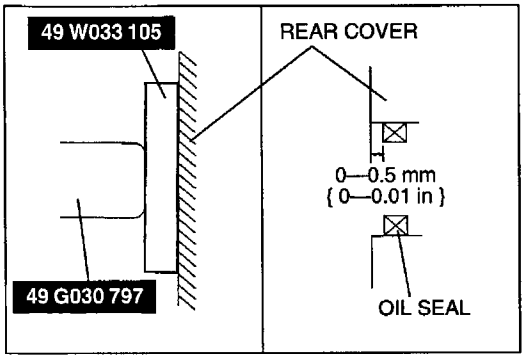


REPLACEMENT

1. Disconnect the negative battery cable.
2. Remove the transaxle assembly. (Refer to section J, K.)
3. Remove the clutch cover and clutch disc (MTX). (Refer to section H.)
4. Remove the flywheel (MTX) or drive plate (ATX). (Refer to section J, K.)



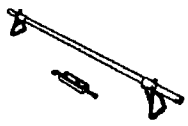
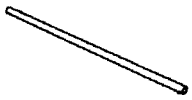
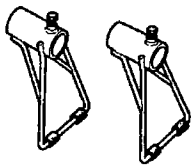
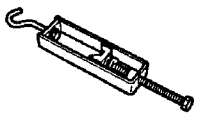
5. Cut the oil seal lip by using a razor knife.
6. Remove the oil seal by using a screwdriver protected with a rag.



7. Apply clean engine oil to the new oil seal.
8. Push the oil seal slightly in by hand.
9. Tap the oil seal in evenly by using the **SST** and a hammer.
10. Install the flywheel (MTX) or drive plate (ATX). (Refer to section J, K.)
11. Install the clutch disc and clutch cover (MTX). (Refer to section H.)
12. Install the transaxle assembly. (Refer to section J, K.)
13. Connect the negative battery cable.

ENGINE

PREPARATION
SST

49 G017 5A0 Support, engine 	For support of engine	49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine
49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine	49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine

REMOVAL / INSTALLATION
Procedure

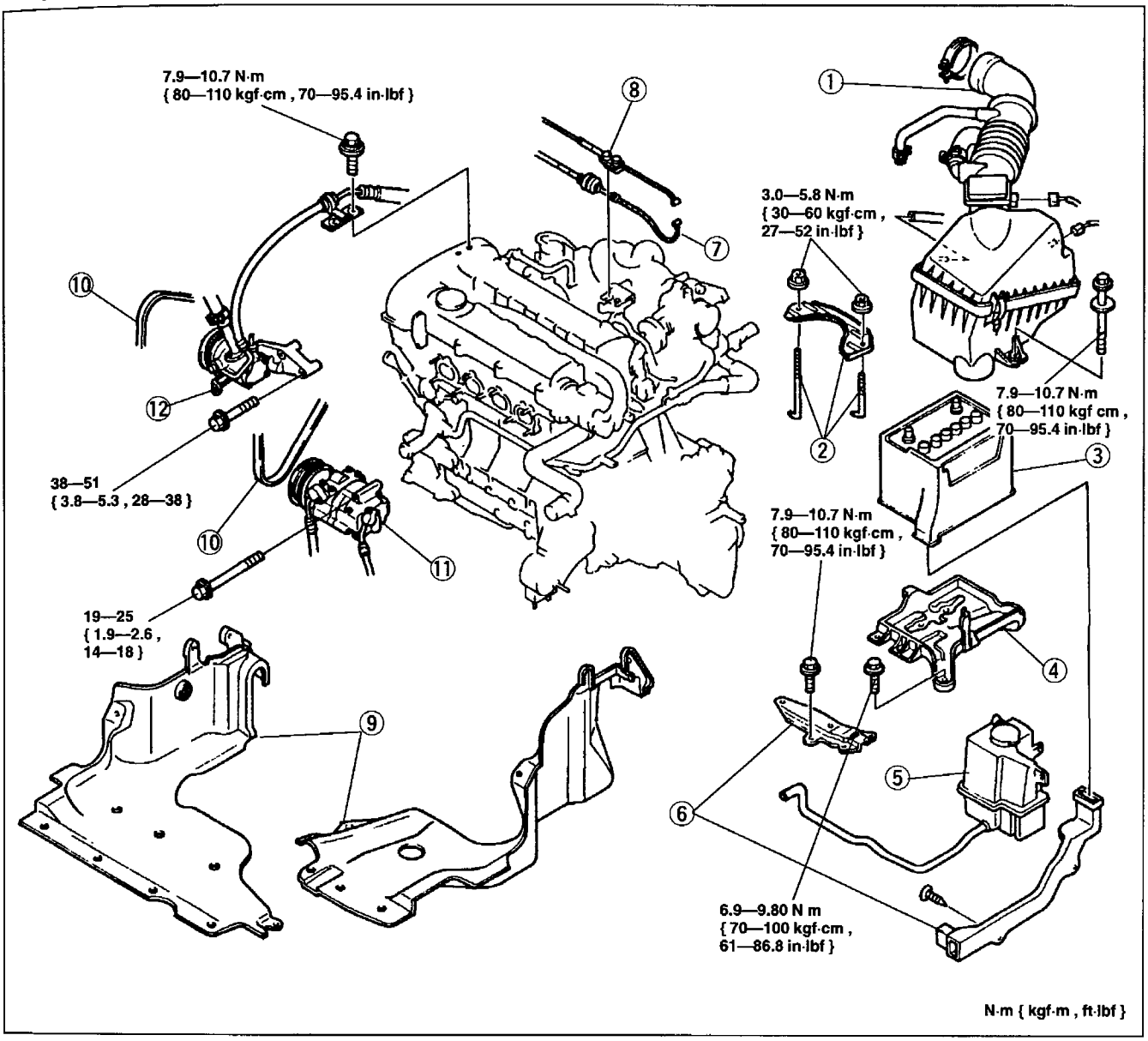
Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on section F2.**
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**

Caution
- **Cover the fuel hoses with a rag because fuel will spray out when disconnected.**

Note
- Plug the disconnected fuel hoses to prevent fuel leakage.

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to section E.)
3. Remove the hood and front wheels.
4. Drain the transaxle oil. (Refer to section J, K.)
5. Remove the radiator. (Refer to section E.)
6. Remove the transverse member. (Refer to section R.)
7. Remove the front pipe and three way catalytic converter. (Refer to section F2.)
8. Remove the exhaust manifold. (Refer to section F2.)
9. Remove in the order shown in the figure, referring to **Removal Note**.
10. Install in the reverse order of removal, referring to **Installation Note**.
11. Install the exhaust manifold. (Refer to section F2.)
12. Install the front pipe and three way catalytic converter. (Refer to section F2.)
13. Install the transverse member. (Refer to section R.)
14. Install the radiator. (Refer to section E.)
15. Fill the transaxle with the specified amount and type of transaxle oil. (Refer to section J, K.)
16. Install the hood and front wheels.
17. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to section E.)
18. Connect the negative battery cable.
19. Start the engine and
    (1) check the engine oil, transaxle oil, and engine coolant leakage.
    (2) check the ignition timing and idle speed. (Refer to section F2.)
20. Turn off the engine and check the drive belt deflection. (Refer to page B2–2.)
21. Perform a road test.
22. Recheck the engine oil, transaxle oil, and engine coolant levels.

Step 1

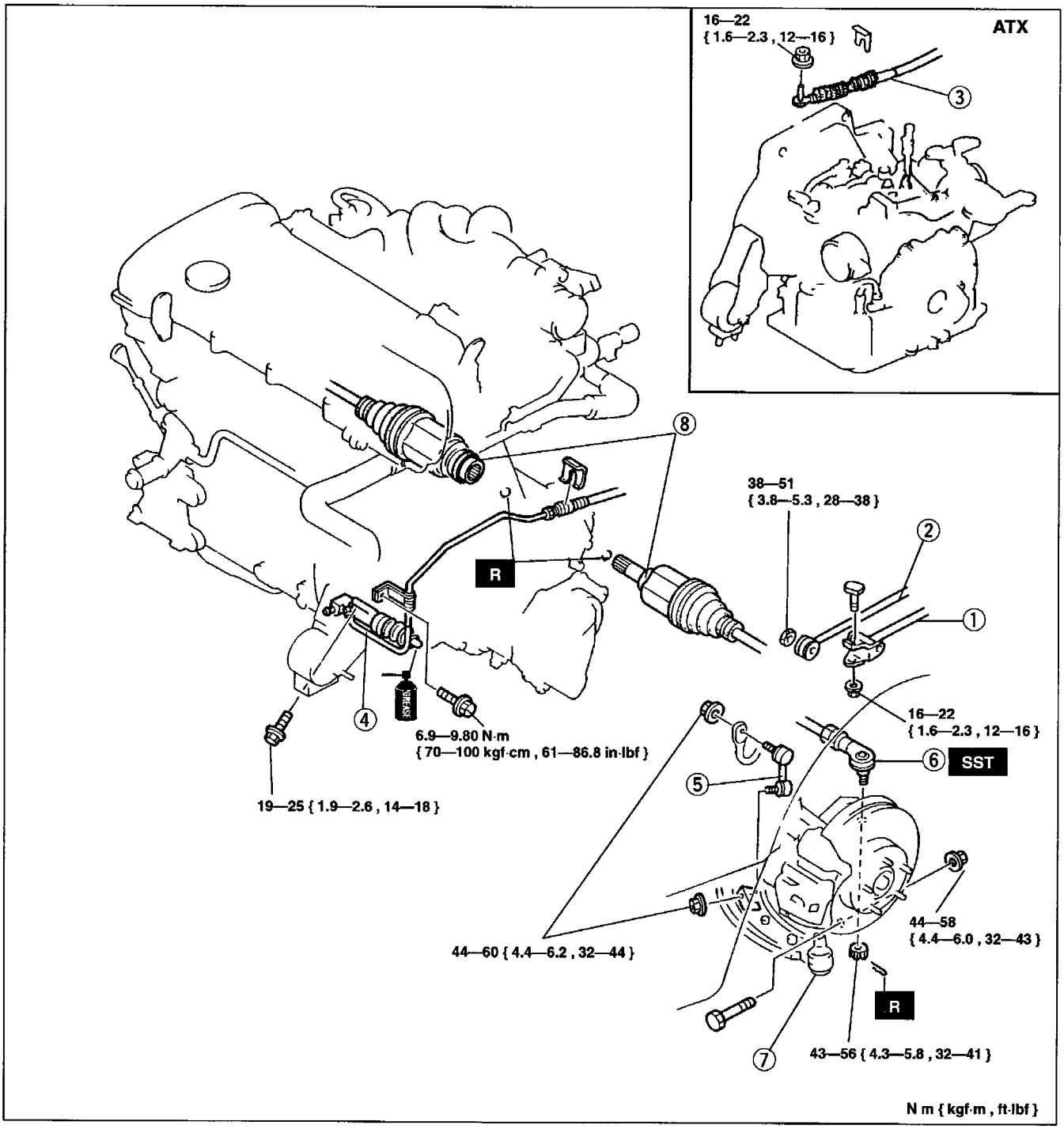


1. Air cleaner
2. Battery clamp
3. Battery
4. Battery carrier
5. Radiator reservoir
6. Battery duct, bracket
7. Accelerator cable
   Adjustment ..... section F2
8. Throttle cable (ATX)
   Adjustment ..... section K
9. Splash shield
10. Drive belt
    Adjustment ..... page B2–3
11. A/C compressor (if equipped)
    Removal Note ..... below
12. P/S oil pump
    Removal Note ..... below

Removal Note
A/C compressor (if equipped)
1. Remove the A/C compressor with the hoses still connected. (Refer to section U.)
2. Position the compressor away from the engine and affix it with wire.

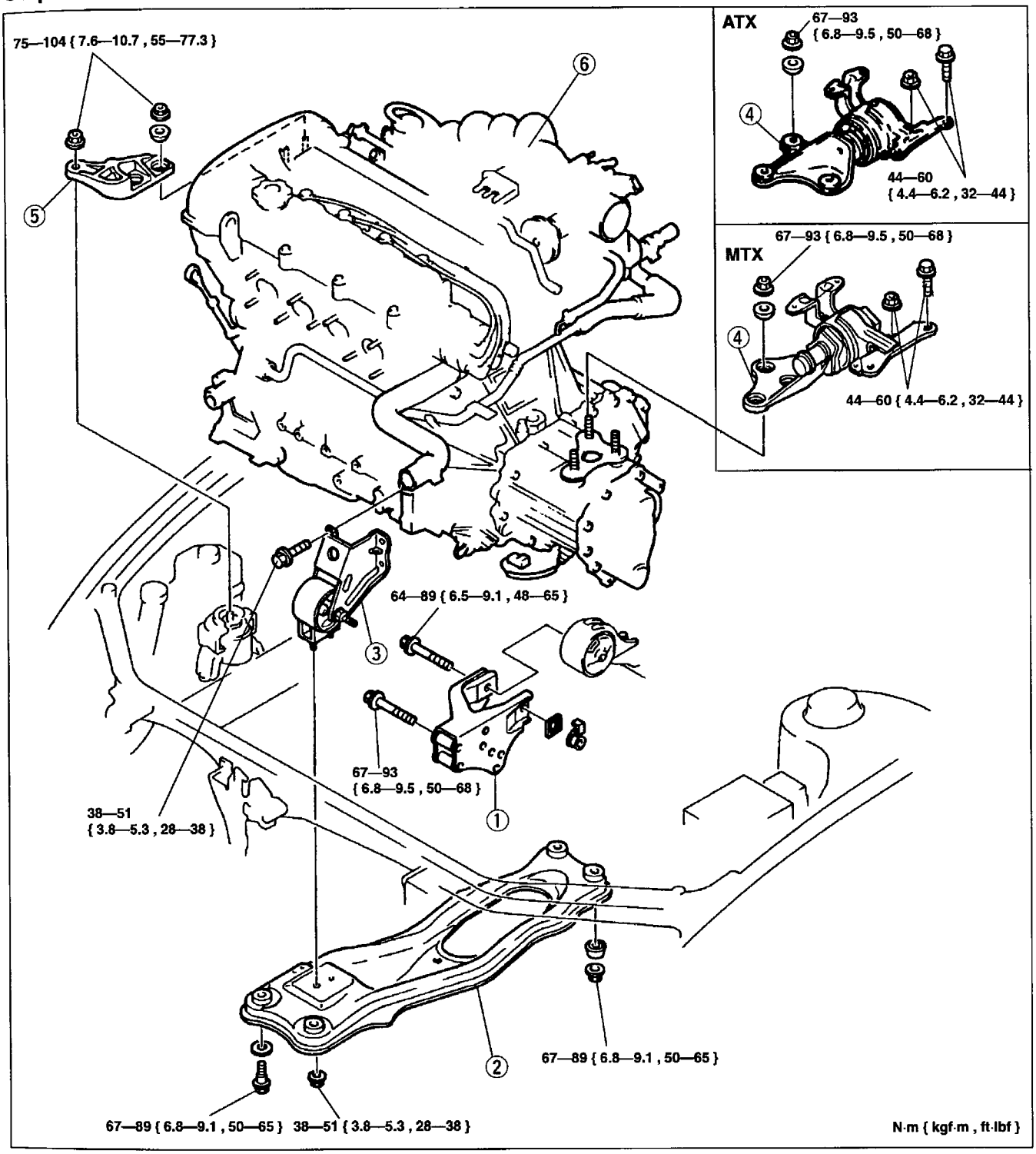
P/S oil pump
1. Remove the P/S oil pump with the hoses still connected. (Refer to section N.)
2. Position the pump away from the engine and affix it with wire.

Step 2

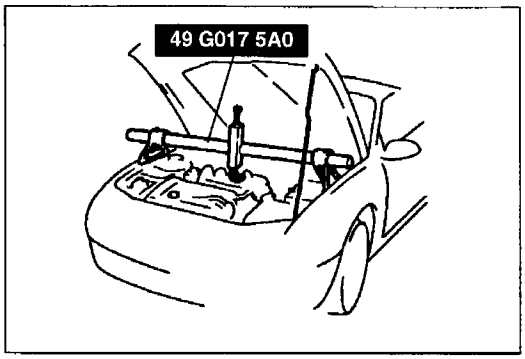


1. Control rod (MTX)
2. Extension bar (MTX)
3. Selector cable (ATX)
4. Clutch release cylinder (MTX)
   Removal / Installation ..... section H
5. Stabilizer control link
6. Outer ball joint
   Removal / Installation ..... section N
7. Lower arm
   Removal / Installation ..... section R
8. Drive shaft
   Removal / Installation ..... section M

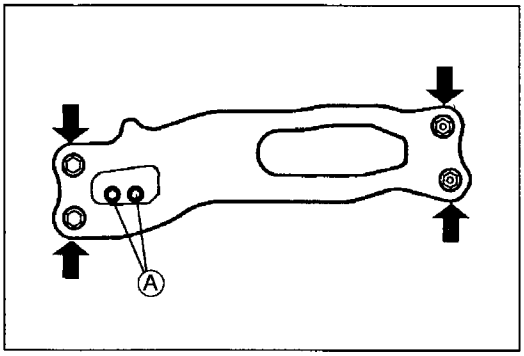
Step 3



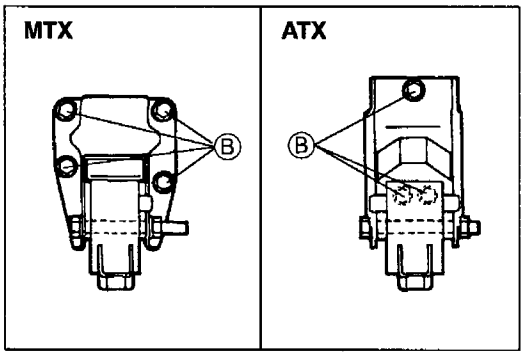
1. No.1 engine mount bracket
   - Removal Note ..... page B2–24
   - Installation Note ..... page B2–26
2. Engine mount member
   - Removal Note ..... page B2–24
   - Installation Note ..... page B2–26
3. No.2 engine mount bracket
   - Removal Note ..... page B2–24
   - Installation Note ..... page B2–25
4. No.4 engine mount bracket
   - Removal Note ..... page B2–24
   - Installation Note ..... page B2–25
5. No.3 engine mount bracket
   - Removal Note ..... page B2–24
   - Installation Note ..... page B2–25
6. Engine and transaxle assembly
   - Removal Note ..... page B2–25
   - Installation Note ..... page B2–25



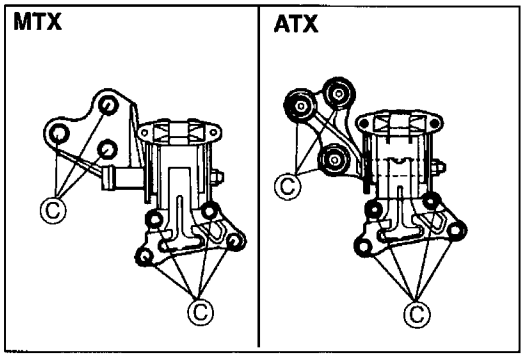
Removal Note
No.1 engine mount bracket
1. Support the engine by using the **SST**.
2. Remove the No.1 engine mount bracket.



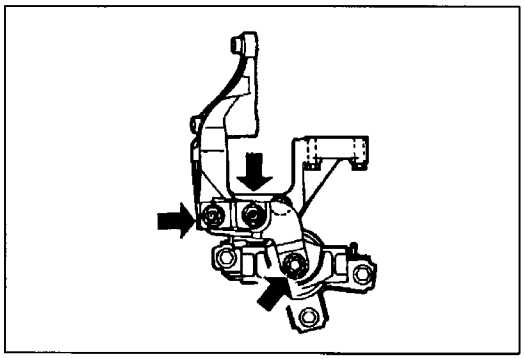
Engine mount member
1. Remove the No.2 engine mount nuts Ⓐ.
2. Remove the engine mount member bolts and nuts.
3. Remove the engine mount member.



No.2 engine mount bracket
1. Remove the No.2 engine mount bracket bolts Ⓑ.
2. Remove the No.2 engine mount bracket.



No.4 engine mount bracket
1. Remove the engine and transaxle assembly from the **SST** (Support, engine) and securely support it with the chain block.
2. Remove the No.4 engine mount bracket bolts and nuts marked Ⓒ.
3. Remove the No.4 engine mount bracket.



No.3 engine mount bracket
Remove the No.3 engine mount bracket nuts.

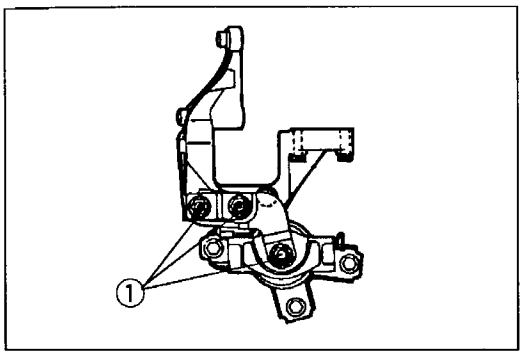
Engine and transaxle assembly

Slowly lift up the engine and transaxle assembly as a unit. Keep the engine from swinging or bumping into components in the engine compartment.

Installation Note

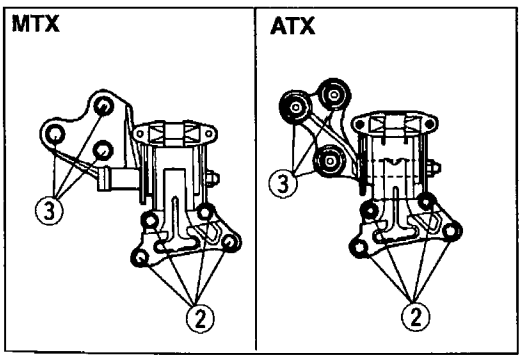
Engine and transaxle assembly

Slowly lower the engine and transaxle assembly as a unit. Keep the engine from swinging or bumping into components in the engine compartment.



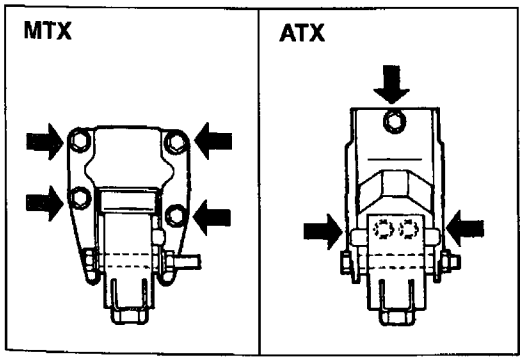
No.3 engine mount bracket

Hand tighten No.3 engine mount bracket nuts ①.



No.4 engine mount bracket

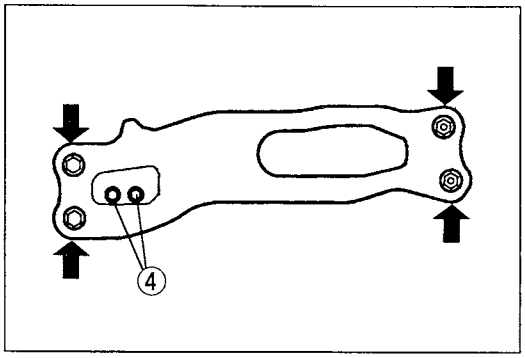
1. Hand tighten No.4 engine mount bracket bolts and nuts ②.
2. Hand tighten No.4 engine mount bracket nuts ③.



No.2 engine mount bracket

Install No.2 engine mount bracket.

Tightening torque:
38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }

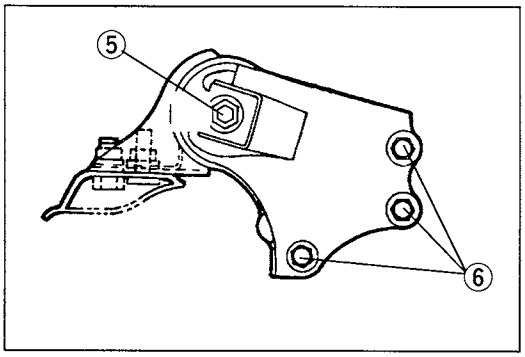


Engine mount member

1. Install the engine mount member.

   Tightening torque:
   67—89 N·m { 6.8—9.1 kgf·m , 50—65 ft·lbf }

2. Hand tighten No.2 engine mount nuts ④.

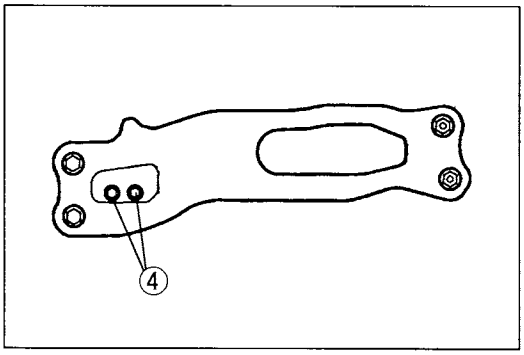


No.1 engine mount bracket

1. Tighten No.1 engine mount bracket bolts ⑤, ⑥.

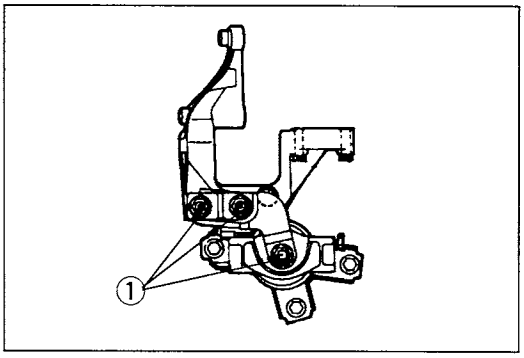
   Tightening torque
   ⑤: 64—89 N·m { 6.5—9.1 kgf·m , 48—65 ft·lbf }
   ⑥: 67—93 N·m { 6.8—9.5 kgf·m , 50—68 ft·lbf }

2. Remove the chain block.



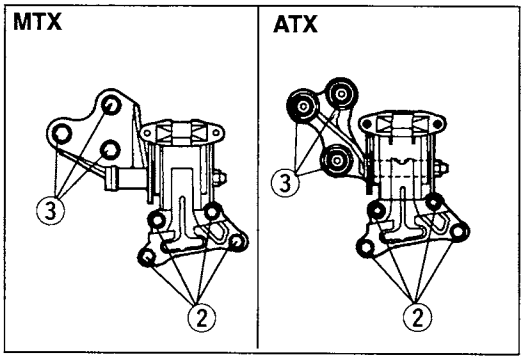
3. Tighten the engine mount bolts and nuts as follows.
   (1) No.2 engine mount

   Tightening torque
   ④: 38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }



(2) No.3 engine mount bracket

Tightening torque
①: 75—104 N·m
{ 7.6—10.7 kgf·m , 55—77.3 ft·lbf }

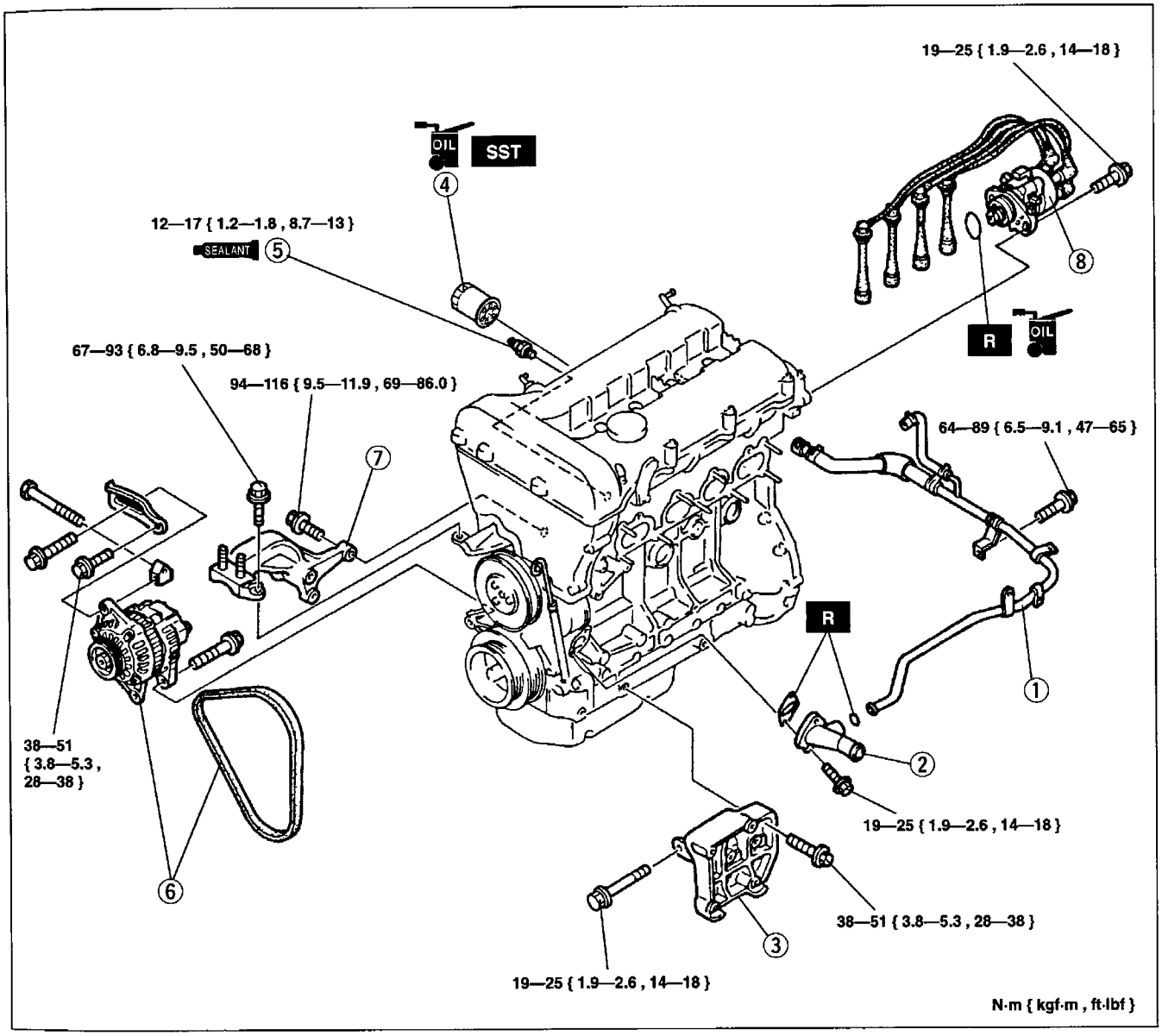


(3) No.4 engine mount bracket

Tightening torque
②: 44—60 N·m { 4.4—6.2 kgf·m , 32—44 ft·lbf }
③: 67—93 N·m { 6.8—9.5 kgf·m , 50—68 ft·lbf }

DISASSEMBLY / ASSEMBLY

1. Disconnect the engine and transaxle. (Refer to section J, K.)
2. Remove the clutch cover and clutch disc (MTX). (Refer to section H.)
3. Remove the intake-air system and crankshaft position sensor. (Refer to section F2.)
4. Disassemble in the order shown in the figure.
5. Assemble in the reverse order of disassembly.
6. Install the intake-air system and crankshaft position sensor. (Refer to section F2.)
7. Install the clutch disc and clutch cover (MTX). (Refer to section H.)
8. Connect the engine and transaxle. (Refer to section J, K.)



1. Water bypass pipe
2. Water inlet pipe
3. A/C compressor bracket (if equipped)
4. Oil filter
   Removal / Installation ..... section D
5. Oil pressure switch
   Removal / Installation ..... section D
6. Generator and drive belt
   Adjustment ..... page B2–3
7. No.3 engine mount
8. Distributor

Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

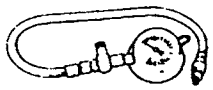
LUBRICATION SYSTEM

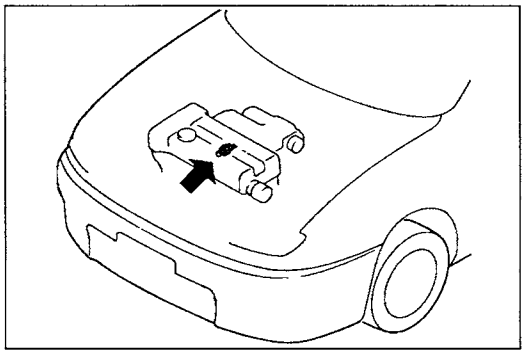
OIL PRESSURE **D–2**
PREPARATION **D–2**
INSPECTION **D–2**
ENGINE OIL **D–3**
INSPECTION **D–3**
REPLACEMENT **D–3**
OIL FILTER **D–4**
PREPARATION **D–4**
REPLACEMENT **D–4**
OIL PAN **D–4**
REMOVAL / INSTALLATION **D–4**

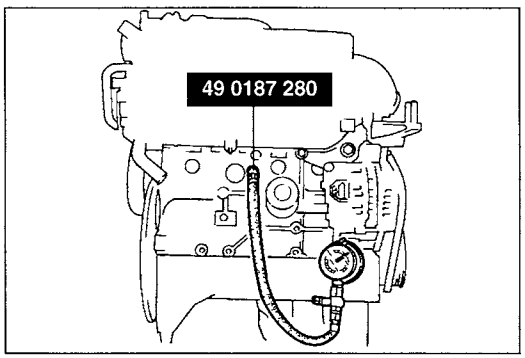
OIL PRESSURE

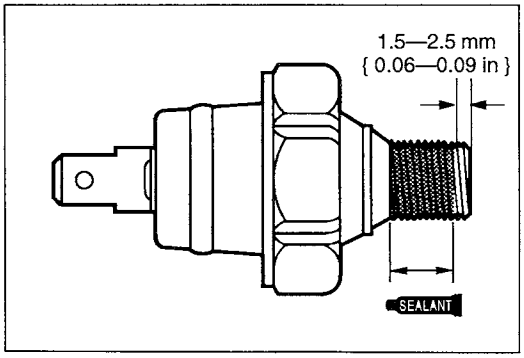
Warning
- **Continuous exposure with USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after this work.**

PREPARATION
SST

49 0187 280 Gauge, oil pressure		For inspection of oil pressure







INSPECTION
1. Remove the oil pressure switch.
2. Screw the **SST** into the oil pressure switch installation hole.
3. Warm up the engine to normal operating temperature.
4. Run the engine at the specified speed, and note the gauge readings.

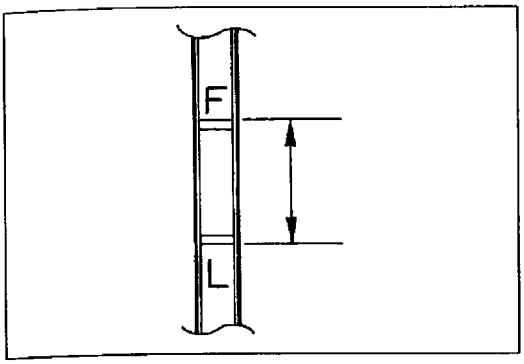
Note
- The oil pressure can vary with oil viscosity and temperature.

Oil pressure:
99—196 kPa { 1.0—2.0 kgf/cm^2 , 15—28 psi }
–1000 rpm
295—392 kPa { 3.0—4.0 kgf/cm^2 , 43—56 psi }
–3000 rpm

5. If the pressure is not as specified, check for the cause and repair or replace as necessary.
6. Apply silicone sealant to the oil pressure switch threads as shown.
7. Remove the **SST** and install the oil pressure switch.

Tightening torque:
12—17 N·m { 1.2—1.8 kgf·m , 8.7—13 ft·lbf }

8. Start the engine and check for oil leaks.



ENGINE OIL

INSPECTION

1. Position the vehicle on level ground.
2. Warm up the engine to normal operating temperature and stop it.
3. Wait for five minutes.
4. Remove the dipstick and check the oil level and condition.
5. Add or replace oil if necessary.

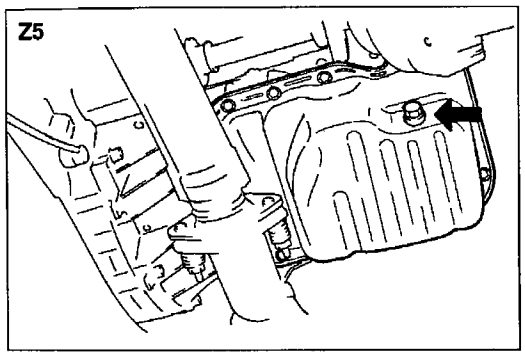
Note

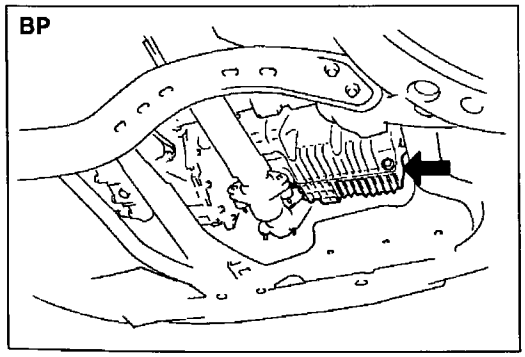
- The distance between the L and F marks on the dipstick represents 0.8 L { 0.85 US qt , 0.70 Imp qt }.

REPLACEMENT

Warning

- **When the engine and the engine oil are hot, they can badly burn. Don't burn yourself with either.**
- **A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.**
- **Continuous exposure with USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after this work.**





1. Remove the oil filler cap and the oil pan drain plug.
2. Drain the oil into a container.
3. Install the drain plug.

Tightening torque:
30—41 N·m { 3.0—4.2 kgf·m , 22—30 ft·lbf }

4. Refill the engine with the specified type and amount of engine oil.
5. Refit the oil filler cap.
6. Run the engine and check for oil leaks.
7. Check the oil level and add oil if necessary.

Note

- The actual oil level may vary from the specified capacity in some cases.

Oil capacity

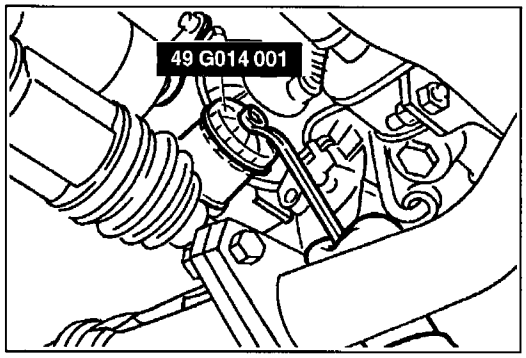
L { US qt , Imp qt }

	Z5	BP
Oil replacement	3.2 { 3.4 , 2.8 }	3.6 { 3.8 , 3.2 }
Oil and oil filter replacement	3.5 { 3.7 , 3.1 }	3.8 { 4.0 , 3.3 }
Total (dry engine)	3.6 { 3.8 , 3.2 }	4.0 { 4.2 , 3.5 }

OIL FILTER

PREPARATION
SST

49 G014 001 Wrench, oil filter		For removal / installation of oil filter



REPLACEMENT
1. Remove the oil filter by using the **SST**.
2. Use a clean rag to wipe off the mounting surface on the cylinder block.
3. Apply clean engine oil to the O-ring of the new oil filter.
4. Install the oil filter and tighten it by hand until the O-ring contacts the cylinder block.
5. Tighten the filter 1 and 1/6 turns by using the **SST**.

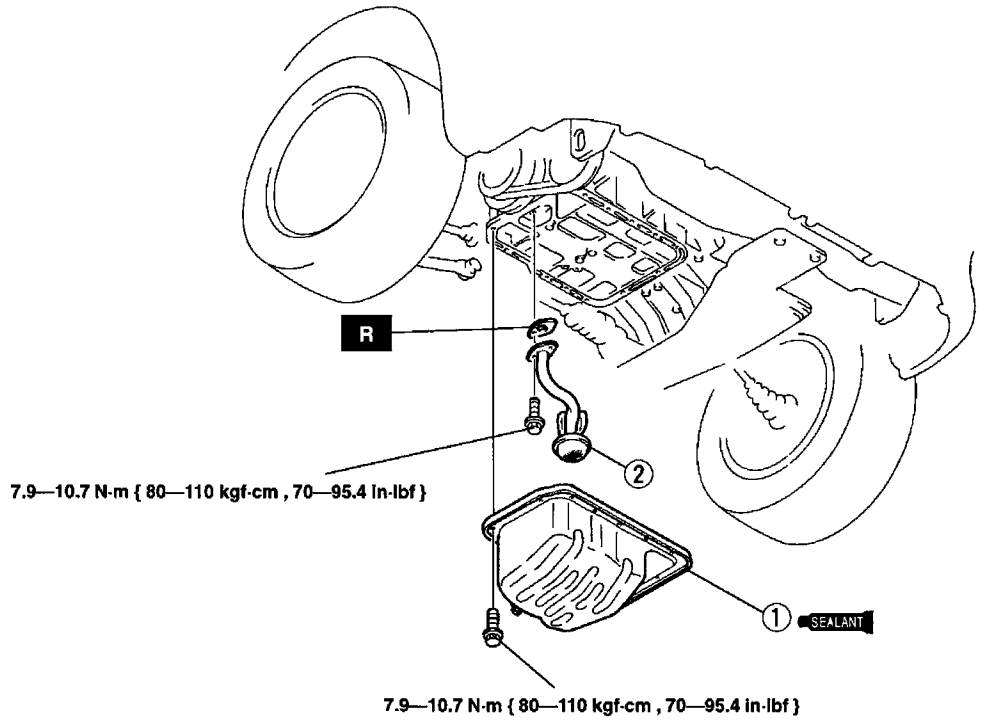
Note
- Tightening torque:
  14—17 N·m { 1.4—1.8 kgf·m , 11—13 ft·lbf }

6. Start the engine and check for oil leaks.
7. Check the oil level and add oil if necessary. (Refer to page D–3.)

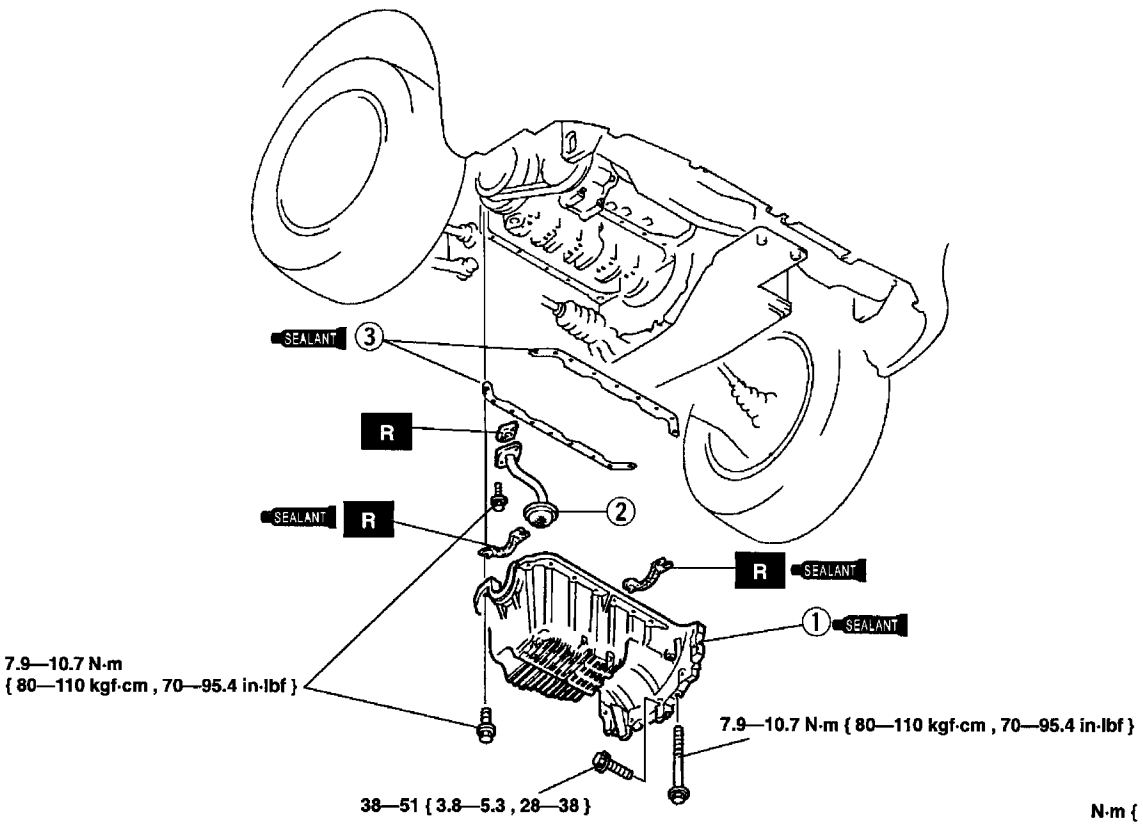
OIL PAN

REMOVAL / INSTALLATION
1. Disconnect the negative battery cable.
2. Drain the engine oil. (Refer to page D–3.)
3. Remove the splash shield (RH).
4. Remove the transverse member. (BP) (Refer to section R.)
5. Remove the front pipe and three way catalytic converter. (Refer to section F1, F2.)
6. Remove in the order shown in the figure, referring to **Removal Note**.
7. Install in the reverse order of removal, referring to **Installation Note**.
8. Install the front pipe and three way catalytic converter. (Refer to section F1, F2.)
9. Install the transverse member. (BP) (Refer to section R.)
10. Install the splash shield (RH).
11. Fill with the specified amount and type of engine oil. (Refer to page D–3.)
12. Connect the negative battery cable.
13. Start the engine and check for oil leaks.
14. Turn off the engine and check the oil level.

Z5



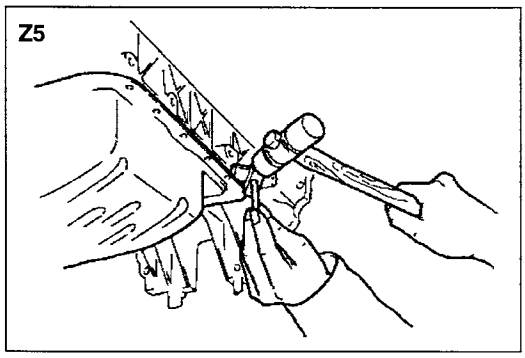
BP



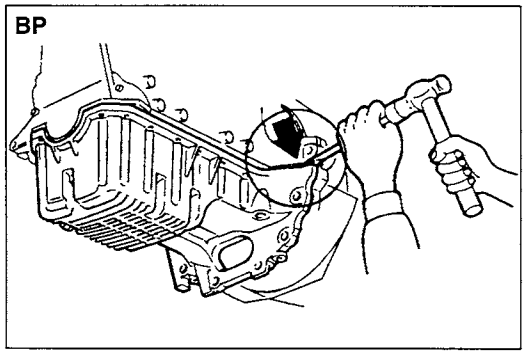
1. Oil pan
   - Removal Note ..... page D–6
   - Installation Note ..... page D–7
2. Oil strainer
3. Stiffener (BP)
   - Removal Note ..... page D–6
   - Installation Note ..... page D–7

Removal Note
Oil pan

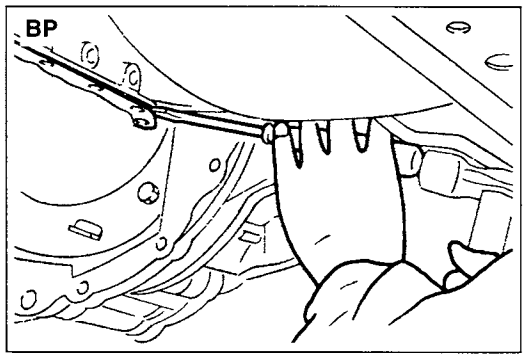
Caution
- **Pry tools can easily scratch the oil pan mounting surfaces. Prying off the oil pan can also easily bend the oil pan flange. Refer to the following instructions before removing the oil pan.**



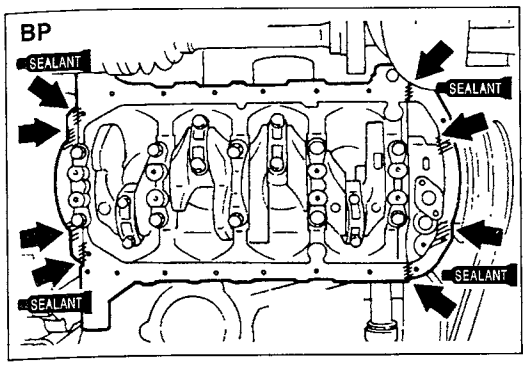
(Z5)
1. Remove the oil pan mounting bolts.
2. Insert a screwdriver or a seal cutter between the VRAS and oil pan.
3. Remove the oil pan.



(BP)
1. Remove the oil pan mounting bolts.
2. Insert a screwdriver only at the points shown in the figure.
3. Remove the oil pan.

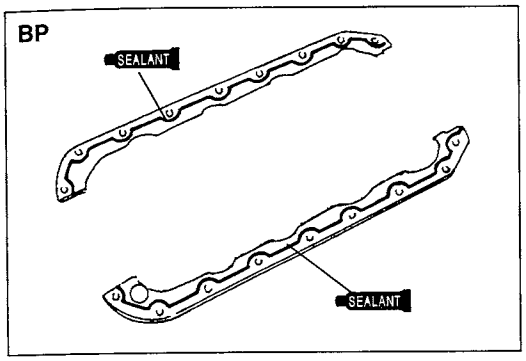


Stiffener
(BP)
1. Insert a screwdriver or a seal cutter between the stiffener and cylinder block.
2. Remove the stiffener.



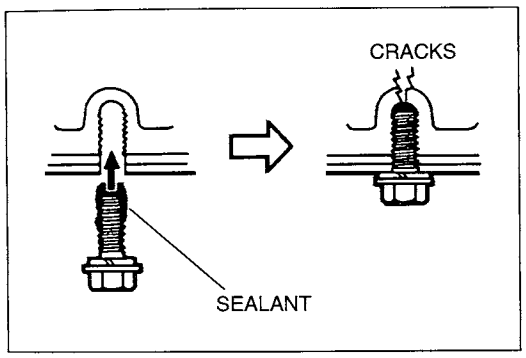
Installation Note
Stiffener
(BP)

1. Remove all foreign material from the contact surfaces of the cylinder block and stiffener.
2. Apply silicone sealant to the shaded areas of the cylinder block as shown.



3. Apply silicone sealant to the stiffener along the inside of the bolt holes.
4. Install the stiffener before sealant hardens.

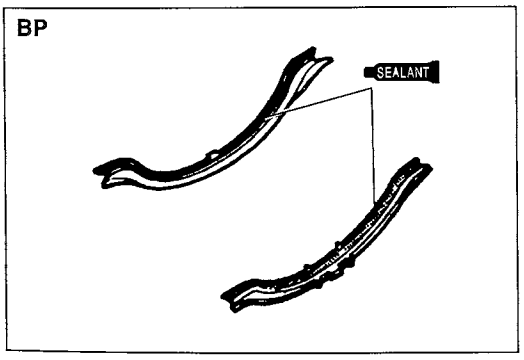
Thickness: ϕ 2.5—3.5 mm { 0.099—0.137 in }



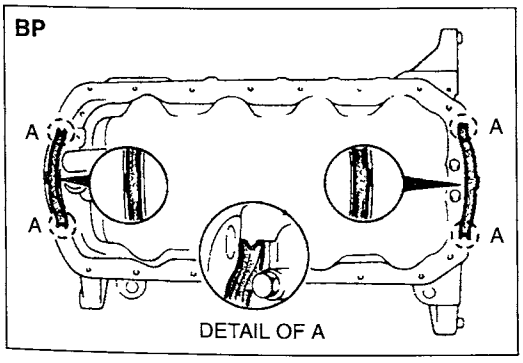
Oil pan

Caution

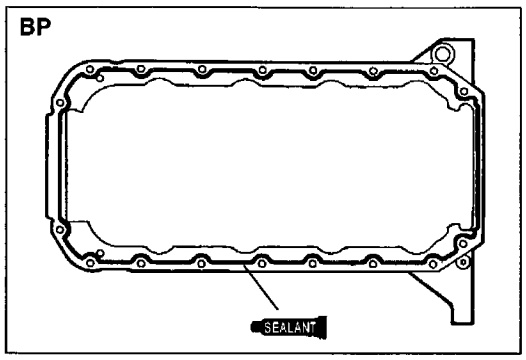
- **If the bolts are reused, remove the old sealant from the bolt threads. Tightening a bolt that has old sealant on it can cause thread damage.**

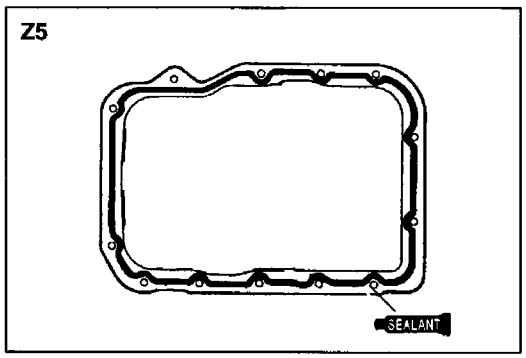


1. Apply silicone sealant to the contact surfaces of new oil pan gaskets as shown. (BP)



2. Install the new gaskets onto the oil pump body and the rear cover with the projections in the notches as shown. (BP)





3. Apply silicone sealant to the oil pan along the inside of the bolt holes and overlap the ends.
4. Install the oil pan before sealant hardens.

Thickness: ϕ 2.5—3.5 mm { 0.099—0.137 in } (BP)
ϕ 2.0—3.0 mm { 0.079—0.118 in } (Z5)

Tightening torque: 7.9—10.7 N·m
{ 80—110 kgf·cm , 70—95.4 in·lbf }

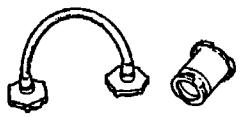
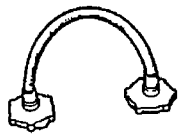
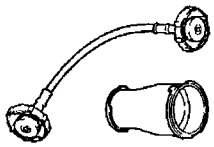
Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

COOLING SYSTEM

ENGINE COOLANT ..... E– 2
PREPARATION ..... E– 2
INSPECTION ..... E– 2
REPLACEMENT ..... E– 3
RADIATOR CAP ..... E– 5
PREPARATION ..... E– 5
INSPECTION ..... E– 5
RADIATOR ..... E– 6
REMOVAL / INSTALLATION ..... E– 6
THERMOSTAT ..... E– 7
REMOVAL / INSPECTION / INSTALLATION .... E– 7
WATER PUMP ..... E– 9
REMOVAL / INSTALLATION ..... E– 9
COOLING FAN MOTOR E–10
INSPECTION E–10
REPLACEMENT E–10
COOLING FAN RELAY E–11
INSPECTION E–11

ENGINE COOLANT

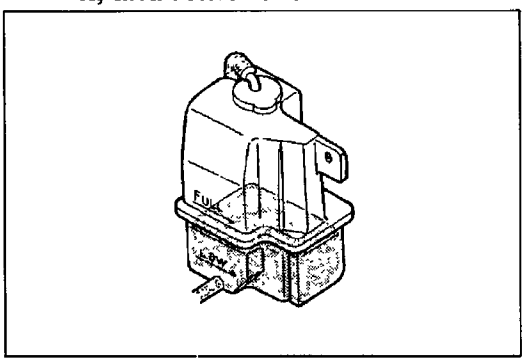
PREPARATION
SST

49 9200 145 Adapter set, radiator cap tester 	For inspection of cooling system (ATX)	49 9200 146 Adapter (Part of 49 9200 145) 	For inspection of cooling system (ATX)
49 9200 147 Adapter (Part of 49 9200 145) 	For inspection of cooling system (ATX)	49 D015 0A0 Adapter set, radiator cap tester 	For inspection of cooling system (MTX)
49 D015 002 Adapter (Part of 49 D015 0A0) 	For inspection of cooling system (MTX)	49 D015 003 Adapter (Part of 49 D015 0A0) 	For inspection of cooling system (MTX)

INSPECTION

Warning

- **Removing the radiator cap or the radiator drain plug while the engine is running, or when the engine and radiator are hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you're sure all the pressure is gone, press down on the cap—still using a cloth—turn it, and remove it.**

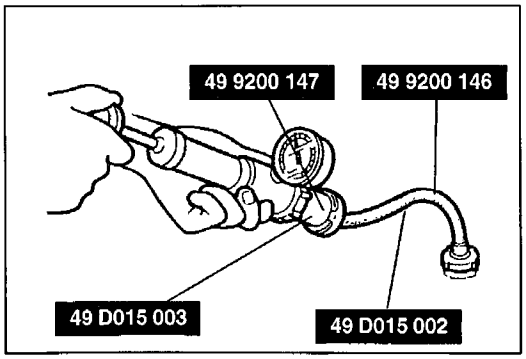


Coolant Level (Engine cold)

1. Verify that the coolant level in the radiator reservoir is between the FULL and LOW marks.
2. Add coolant if necessary.

Note

- The distance between the FULL and LOW marks on the radiator reservoir represents 0.45 L { 0.48 US qt , 0.40 Imp qt }.



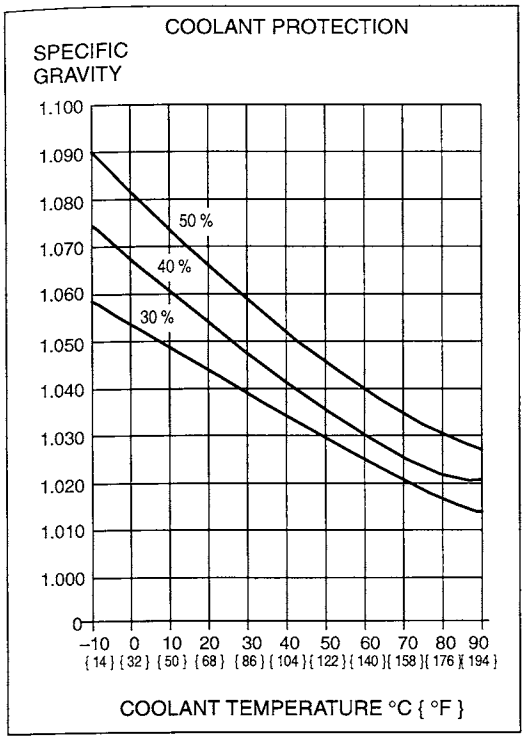
Coolant Leakage

1. Remove the radiator cap.
2. Connect a radiator cap tester and the **SST** to the radiator filler neck.
3. Apply **103 kPa { 1.05 kgf/cm^2 , 15 psi }** pressure to the system.

Caution

- **Applying more than 103 kPa { 1.05 kgf/cm^2 , 15 psi } can damage the hoses, fittings, and other components, and cause leaks.**

4. Verify that the pressure is held. If not, check the system for coolant leakage.



Coolant Protection

Caution

- **The engine has aluminum parts that can be damaged by alcohol or methanol antifreeze. Do not use alcohol or methanol in the cooling system. Use only ethylene-glycol-based coolant.**
- **Use only soft (demineralized) water in the coolant mixture. Water that contains minerals will cut down on the coolant's effectiveness.**

1. Measure the coolant temperature and specific gravity with a thermometer and a hydrometer.
2. Determine the coolant protection by referring to the graph shown.
3. If the coolant protection is not proper, add water or coolant as necessary.

Antifreeze solution mixture percentage

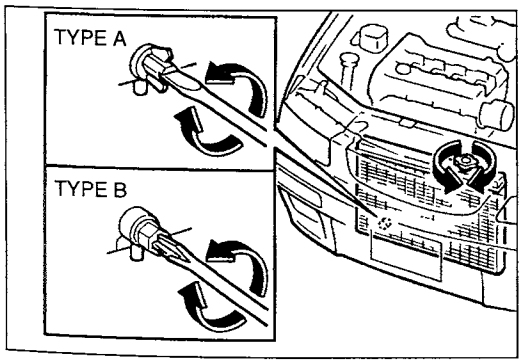
Coolant protection	Volume percentage		Gravity at 20 °C { 68 °F }
	Water	Coolant	
Above −16 °C { 3 °F }	65	35	1.054
Above −26 °C { −15 °F }	55	45	1.066
Above −40 °C { −40 °F }	45	55	1.078

REPLACEMENT

Draining

Warning

- **Removing the radiator cap or the radiator drain plug while the engine is running, or when the engine and radiator are hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you're sure all the pressure is gone, press down on the cap—still using a cloth—turn it, and remove it.**



1. Remove the radiator cap and loosen the radiator drain plug.
2. Drain the coolant into a container.

3. Flush the cooling system with water until all traces of color are gone.
4. Left the system drain completely.
5. Tighten the radiator drain plug.

Tightening torque:
0.7—1.1 N·m { 7.0—12 kgf·cm , 6.1—10 in·lbf }

Refilling

Use the proper amount and mixture of ethylene-glycol-based coolant. (Refer to Coolant Protection, page E–3.)

1. Slowly pour the coolant into the radiator up to the coolant filler port.

Filling pace: 1.0 L { 1.1 US qt , 0.9 Imp qt }/min. max.

2. Fill the radiator reservoir up to the FULL mark.
3. Fully install the radiator cap.
4. Start the engine and let it idle until it warms up.
5. If the temperature increases beyond normal, there is excessive air in the system. Stop the engine and allow it to cool; then repeat steps 1—3.
6. Run the engine at 2,200—2,800 rpm for five minutes; repeat several times.
7. Stop the engine and allow it to cool.

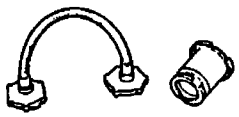
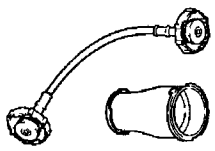
Warning

- **Removing the radiator cap or the radiator drain plug while the engine is running, or when the engine and radiator are hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you're sure all the pressure is gone, press down on the cap—still using a cloth—turn it, and remove it.**

8. Check the coolant level. If the coolant level has dropped, repeat the procedure from step 1.

RADIATOR CAP

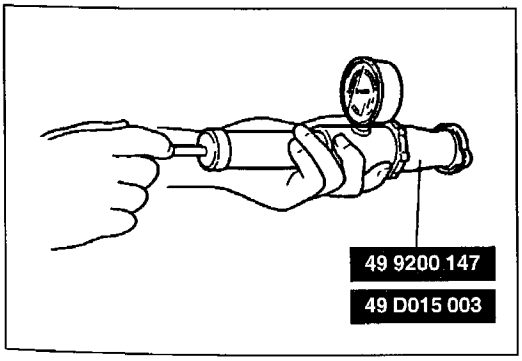
PREPARATION
SST

49 9200 145 Adapter set, radiator cap tester 	For inspection of radiator cap valve (ATX)	49 9200 147 Adapter (Part of 49 9200 145) 	For inspection of radiator cap valve (ATX)
49 D015 0A0 Adapter set, radiator cap tester 	For inspection of radiator cap valve (MTX)	49 D015 003 Adapter (Part of 49 D015 0A0) 	For inspection of radiator cap valve (MTX)

E

Warning

- **Removing the radiator cap or the radiator drain plug while the engine is running, or when the engine and radiator are hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you're sure all the pressure is gone, press down on the cap—still using a cloth—turn it, and remove it.**



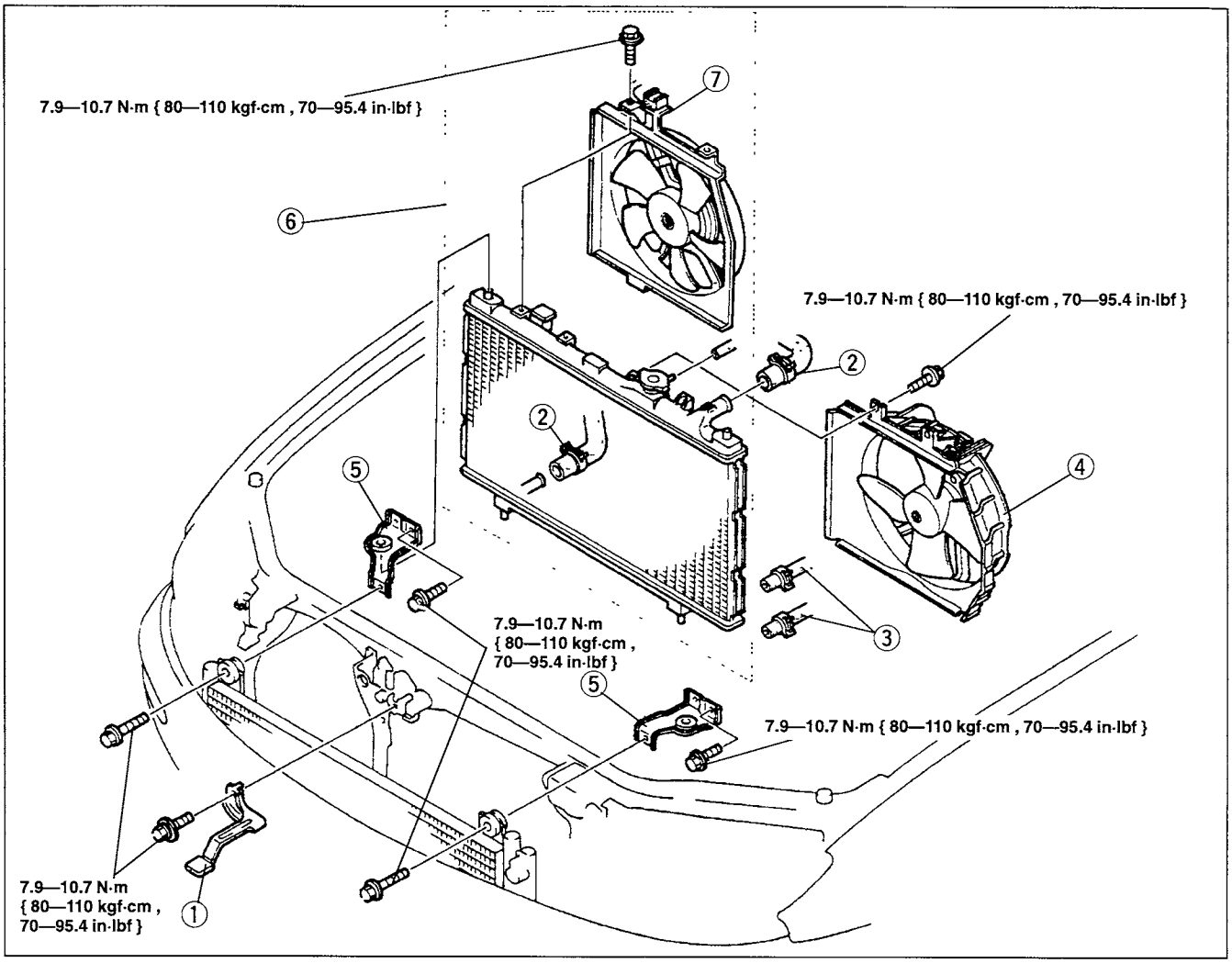
INSPECTION
Radiator Cap Valve

1. Remove the radiator cap.
2. Attach the radiator cap to a radiator cap tester with the **SST**. Apply pressure gradually to **74—102 kPa { 0.75—1.05 kgf/cm^2 , 11—14.9 psi }**.
3. Verify that the pressure is held for at least **10 seconds**.

RADIATOR

REMOVAL / INSTALLATION

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to page E–3.)
3. Remove the radiator grille. (Refer to section S1.)
4. Remove in the order shown in the figure, referring to **Removal Note**.
5. Install in the reverse order of removal, referring to **Installation Note**.
6. Install the radiator grille. (Refer to section S1.)
7. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to page E–3.)
8. Check the ATF level and add ATF if necessary. (Refer to section K.)
9. Check the ATF and coolant leaks.



1. Safety lever
2. Radiator hose
3. Oil hose (ATX)
   Installation Note ..... section K
4. Cooling fan assembly
   Removal Note ..... below
5. Radiator bracket
6. Radiator assembly
7. Condenser fan assembly (if equipped)

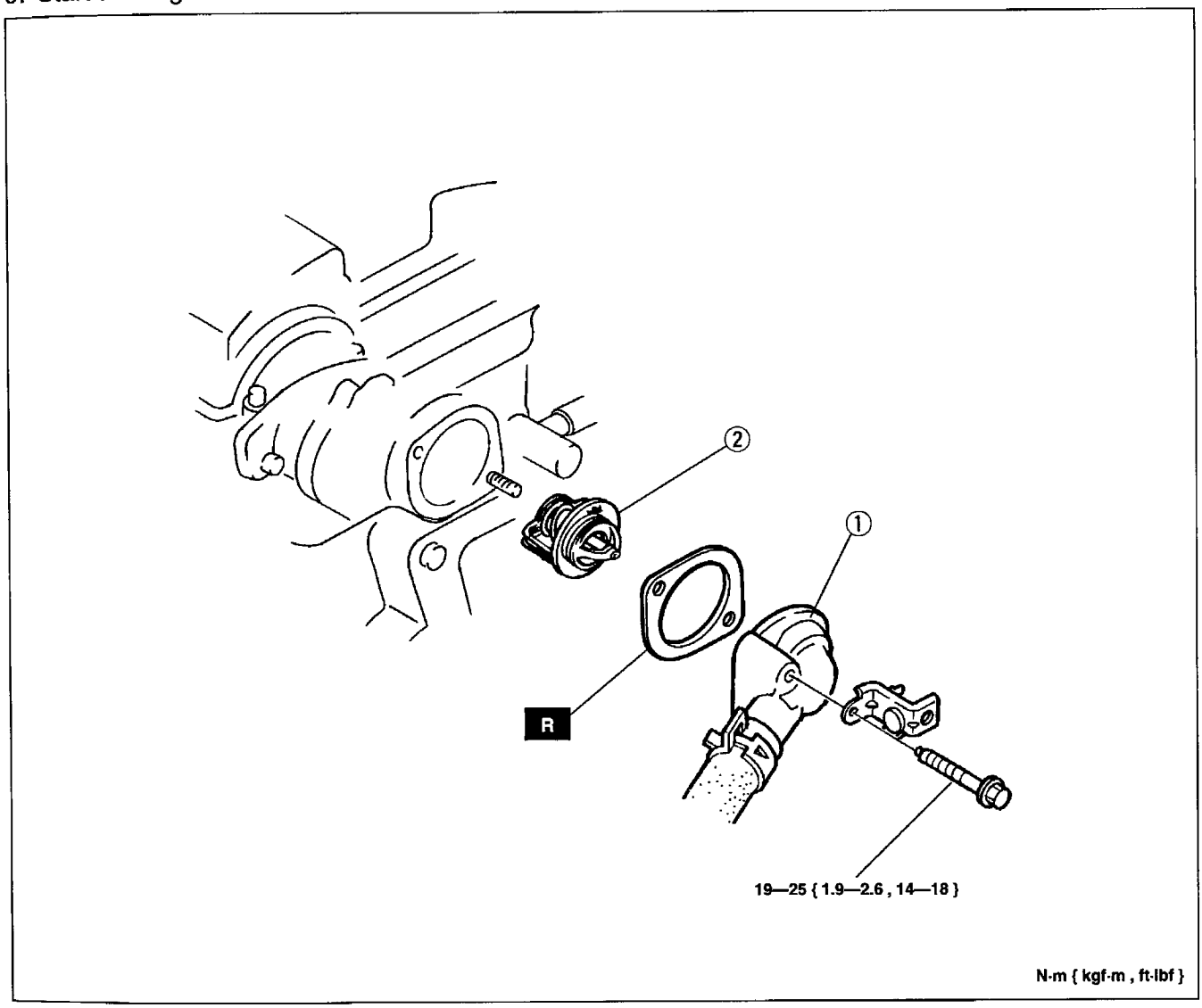
Removal Note
Cooling fan assembly

1. Move the cooling fan assembly to the engine side for easy removal of the radiator.
2. Remove the radiator, and then remove the cooling fan assembly.

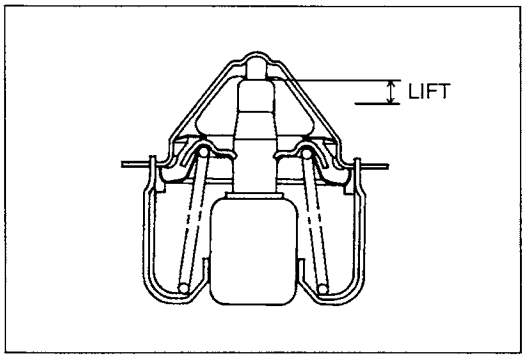
THERMOSTAT

REMOVAL / INSPECTION / INSTALLATION

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to page E–3.)
3. Remove the air cleaner. (Refer to section F1, F2.)
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal, referring to **Installation Note.**
6. Install the air cleaner. (Refer to section F1, F2.)
7. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to page E–3, 4.)
8. Connect the negative battery cable.
9. Start the engine and check for coolant leaks.

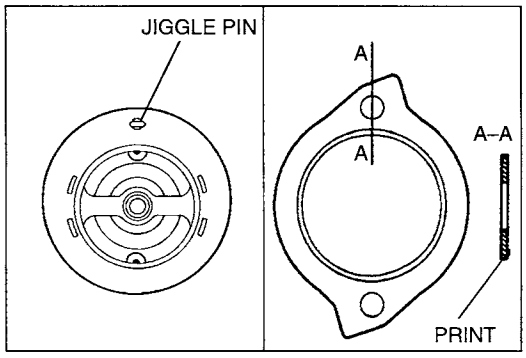


1. Thermostat cover
2. Thermostat
   Inspection ..... page E–8
   Installation Note ..... page E–8



Inspection
Thermostat
1. Visually check that the thermostat valve is airtight.
2. Place the thermostat and a thermometer in water.
3. Heat the water gradually and check the following.

Initial-opening temperature:
83.5—89.5 °C { 188—193 °F }
Full-open temperature: 100 °C { 212 °F }
Full-open lift: 8.0 mm { 0.31 in } min.

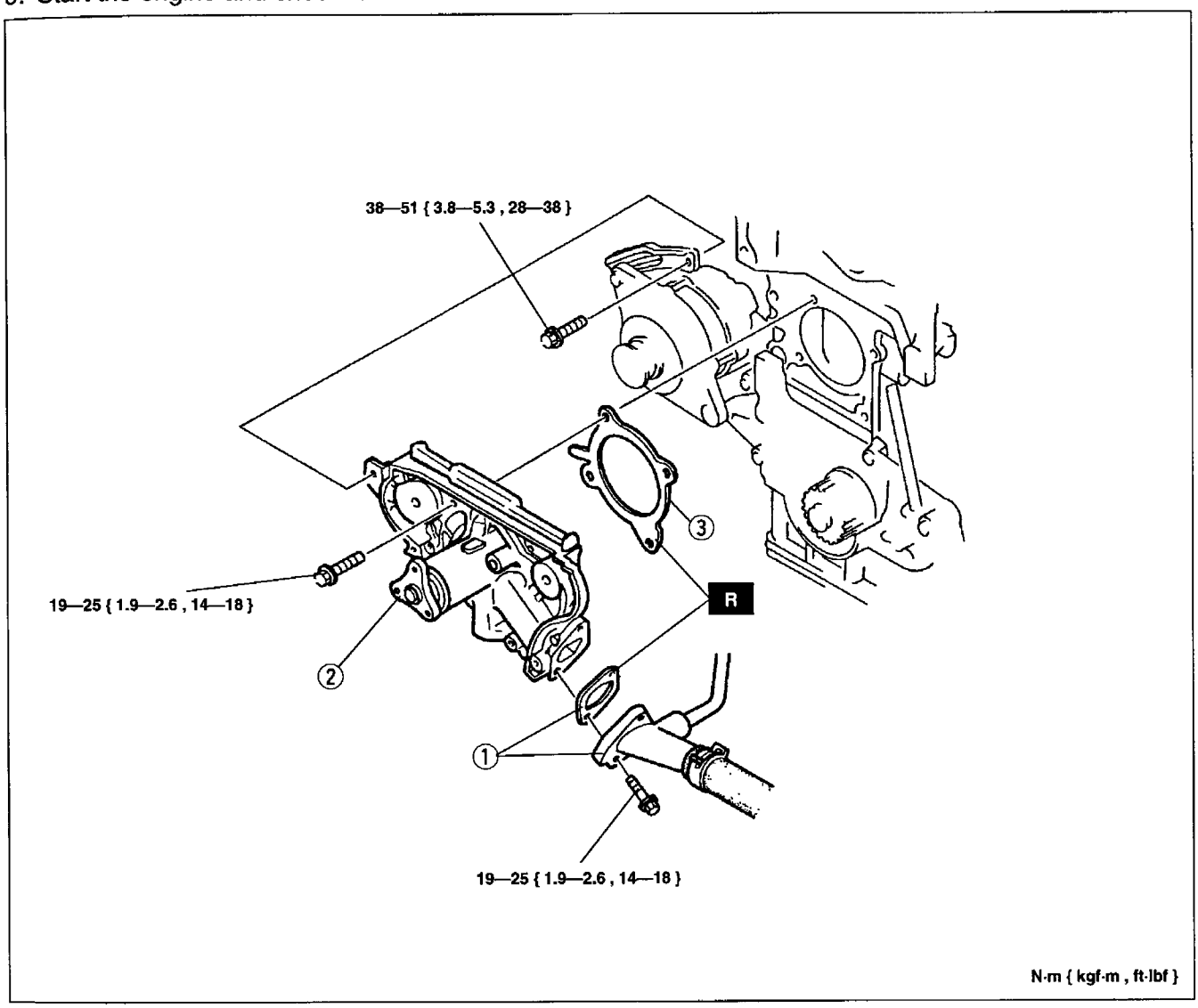


Installation Note
Thermostat
1. Install the thermostat into the cylinder head with the jiggle pin at the top.
2. Install a new gasket with the seal print side facing the cylinder head.

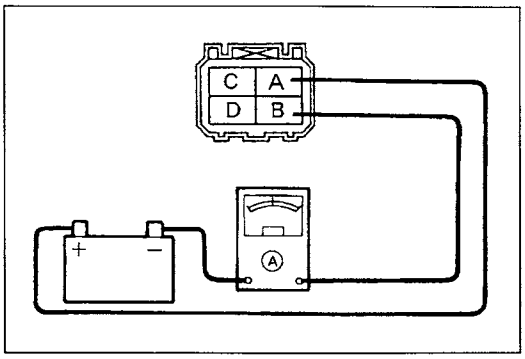
WATER PUMP

REMOVAL / INSTALLATION

1. Disconnect the negative battery cable.
2. Drain the coolant. (Refer to page E–3.)
3. Remove the timing belt. (Refer to section B1, B2.)
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal.
6. Install the timing belt. (Refer to section B1, B2.)
7. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to page E–3.)
8. Connect the negative battery cable.
9. Start the engine and check for coolant leaks.



1. Water pump inlet and gasket
2. Water pump assembly
   If the water pump is damaged, replace it. Do not repair it.
3. Water pump gasket



COOLING FAN MOTOR

INSPECTION

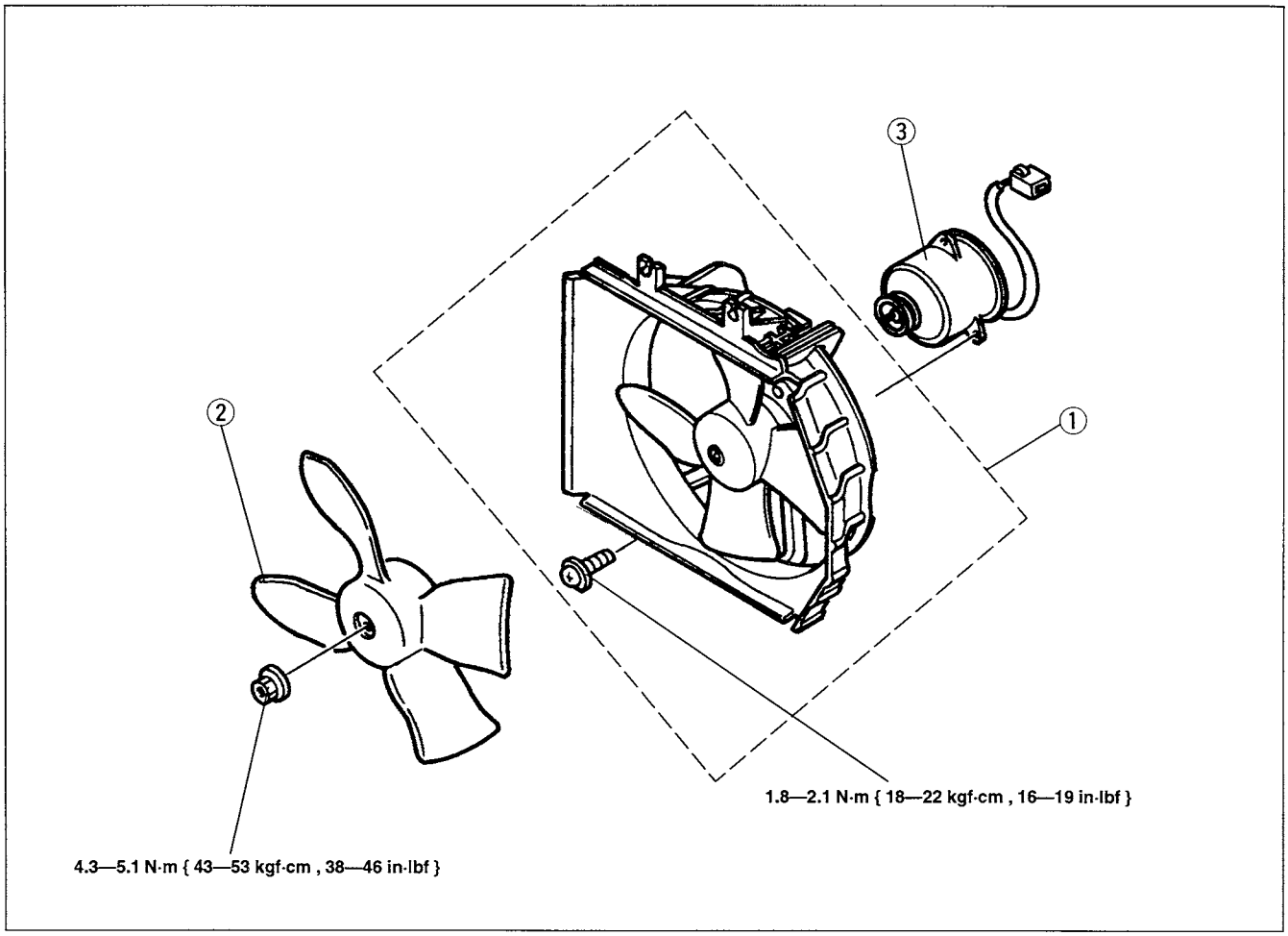
1. Verify that the battery is fully charged. (Refer to section G.)
2. Disconnect the cooling fan motor connector.
3. Connect battery positive voltage and an ammeter to the cooling fan motor connector.
4. Verify that the cooling fan motor operates smoothly at the standard current draw.

   Current: 2.6—4.2 A (Z5, BP: MTX)
   5.2—7.2 A (BP: ATX)

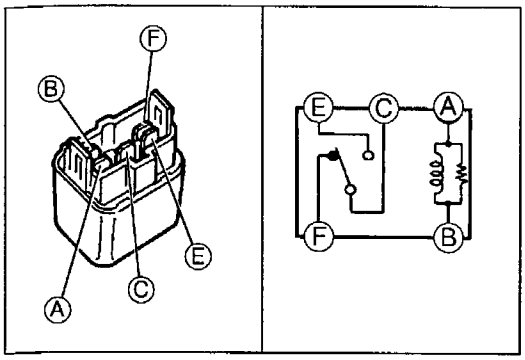
5. If not as specified, replace the cooling fan motor.

REPLACEMENT

1. Disconnect the negative battery cable.
2. Remove the radiator. (Refer to page E–6.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.
5. Install the radiator. (Refer to page E–6.)
6. Connect the negative battery cable.
7. Warm up the engine to normal operating temperature.
8. Check the cooling fan motor for smooth operation.



1. Cooling fan assembly
2. Cooling fan blade
3. Cooling fan motor



COOLING FAN RELAY

INSPECTION

1. Remove the cooling fan relay.
2. Apply battery positive voltage and check continuity between terminals of the cooling fan relay by using ohmmeter.

Specification

O—O: Continuity B+: Battery positive voltage

Step \ Terminal	A	B	C	E	F
1	O	O	O		O
2	B+	Ground	O	O	

3. If not as specified, replace the cooling fan relay.

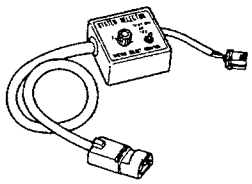
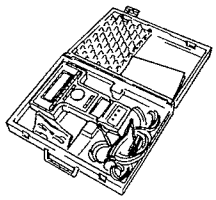
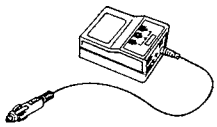
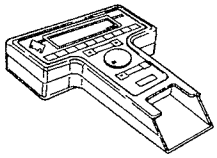
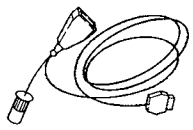
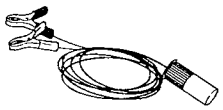
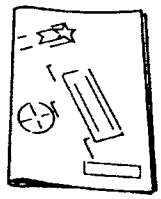
Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

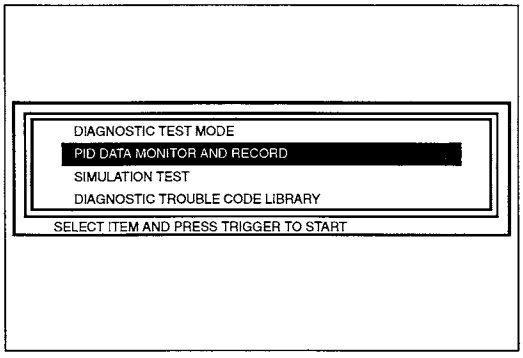
FUEL AND EMISSION CONTROL SYSTEMS (Z5)

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ENGINE TUNE-UP

PREPARATION
SST

49 B019 9A0 System Selector 	For inspection of ignition timing and idle speed	49 T088 0A0 NGS set 	For inspection of ignition timing and idle speed
49 T088 010B Program Card 	For inspection of ignition timing and idle speed	49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of ignition timing and idle speed
49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of ignition timing and idle speed	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of ignition timing and idle speed
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of ignition timing and idle speed	49 T088 008A Instruction Manual 	For inspection of ignition timing and idle speed

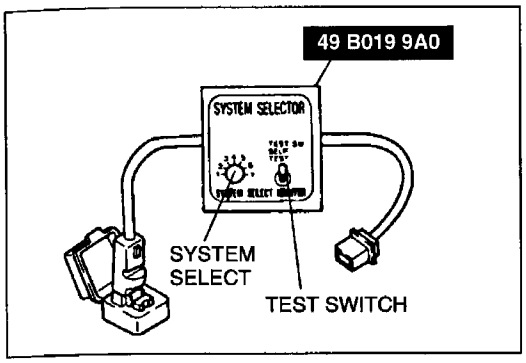


ADJUSTMENT
Preparation
1. Warm up the engine to normal operating temperature.
2. Shift the transaxle into Neutral (MTX) or P position (ATX).
3. Turn off all loads.
   - Headlight
   - Blower motor
   - Rear window defroster
   - Power steering
4. Wait until the cooling fan stops.
5. Connect the **SSTs** (NGS) to the data link connector–2 (Refer to page F1–37.) and select the PID/DATA MONITOR AND RECORD function.
6. Select the "RPM" on the NGS display.

Ignition Timing
1. Perform "Preparation". (Refer to above.)
2. Verify that the idle speed is within the specification.

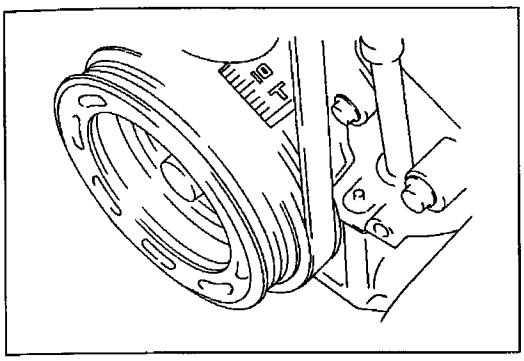
   Specification: 650—750 (700 ± 50) rpm [MTX]
   700—800 (750 ± 50) rpm [ATX]

3. If not as specified, adjust the idle speed. (Refer to page F1–3.)



4. Connect the **SST** (System Selector) data link connector.
5. Set switch A to position 1.
6. Set the test switch to SELF TEST.
7. Connect a timing light to the high-tension lead of the No.1 cylinder.
8. Verify that the timing mark (yellow) is within the specification.

Specification: BTDC 9—11 ° (10 ± 1 °)

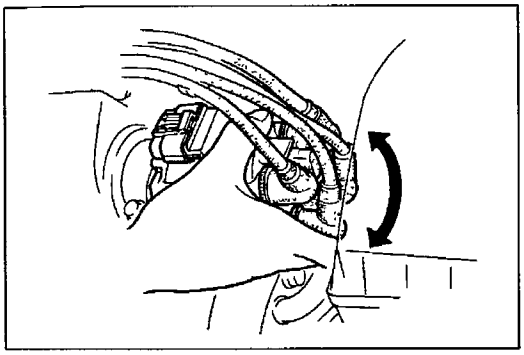


9. If not as specified, loosen the distributor lock bolts and turn the distributor to make the adjustment.
10. Tighten the distributor lock bolts to the specified torque.

Tightening torque:
19—25 N·m { 1.9—2.6 kgf·m , 14—18 ft·lbf }

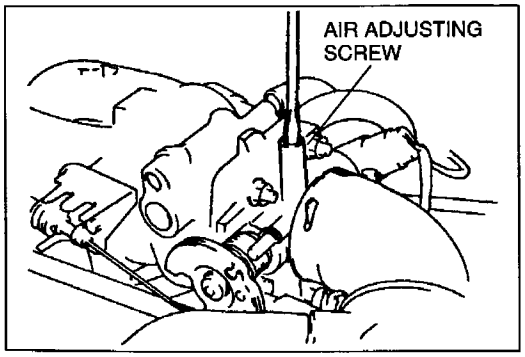
11. Disconnect the **SST** (System Selector).
12. Verify that the timing mark (yellow) is within the specification.

Specification: BTDC 6—18 °



Idle Speed
1. Perform "Preparation". (Refer to page F1–2.)
2. Connect the **SST** (System Selector) to the data link connector.
3. Set switch A to position 1.
4. Set the test switch to SELF TEST.

Caution
- **The throttle adjusting screw is set at the factory and must not be adjusted. Any adjustment will negatively effect the engine performance.**



5. Adjust the idle speed by turning the air adjusting screw.

Specification: 650—750 (700 ± 50) rpm [MTX]
700—800 (750 ± 50) rpm [ATX]

6. Disconnect the **SST** (System Selector).

Idle Up Speed
1. Perform "Preparation". (Refer to page F1–2.)
2. Verify that the idle speed is within the specification.

Specification: 650—750 (700 ± 50) rpm [MTX]
700—800 (750 ± 50) rpm [ATX]

3. If not as specified, adjust the idle speed. (Refer to page F1–3.)
4. Check the idle speed with the following load conditions.

Specification

Load condition	Idle speed (rpm)	
	MTX	ATX
Fan switch ON at 2nd or higher	650—750	700—800
Headlight switch ON		
Rear window defroster switch ON		
P/S ON	700—800	
A/C ON		

Note
- Excludes temporary idle speed drop just after the electrical loads are turned on.

5. If not as specified with all load condition, inspect the idle air control valve. (Refer to page F1–8.)
   If not as specified with some load condition, check related input switches, harnesses and connectors.

Idle Mixture
1. Perform "Preparation". (Refer to page F1–2.)
2. Verify that the idle speed and ignition timing are within the specification.
3. Insert an exhaust gas analyzer to the tailpipe.
4. Verify that the CO and HC concentrations are within the regulation.
5. If not, inspect the following.
   - On-board diagnostic system (Refer to page F1–54.)
   - Heated oxygen sensor (Refer to page F1–48.)
   - System inspection
     Intake manifold vacuum (Refer to page F1–119.)
     Fuel line pressure (Refer to page F1–120.)
     Ignition timing control (Refer to page F1–126.)
6. If the systems are normal, replace the three way catalytic converter and/or the warm up three way catalytic converter.

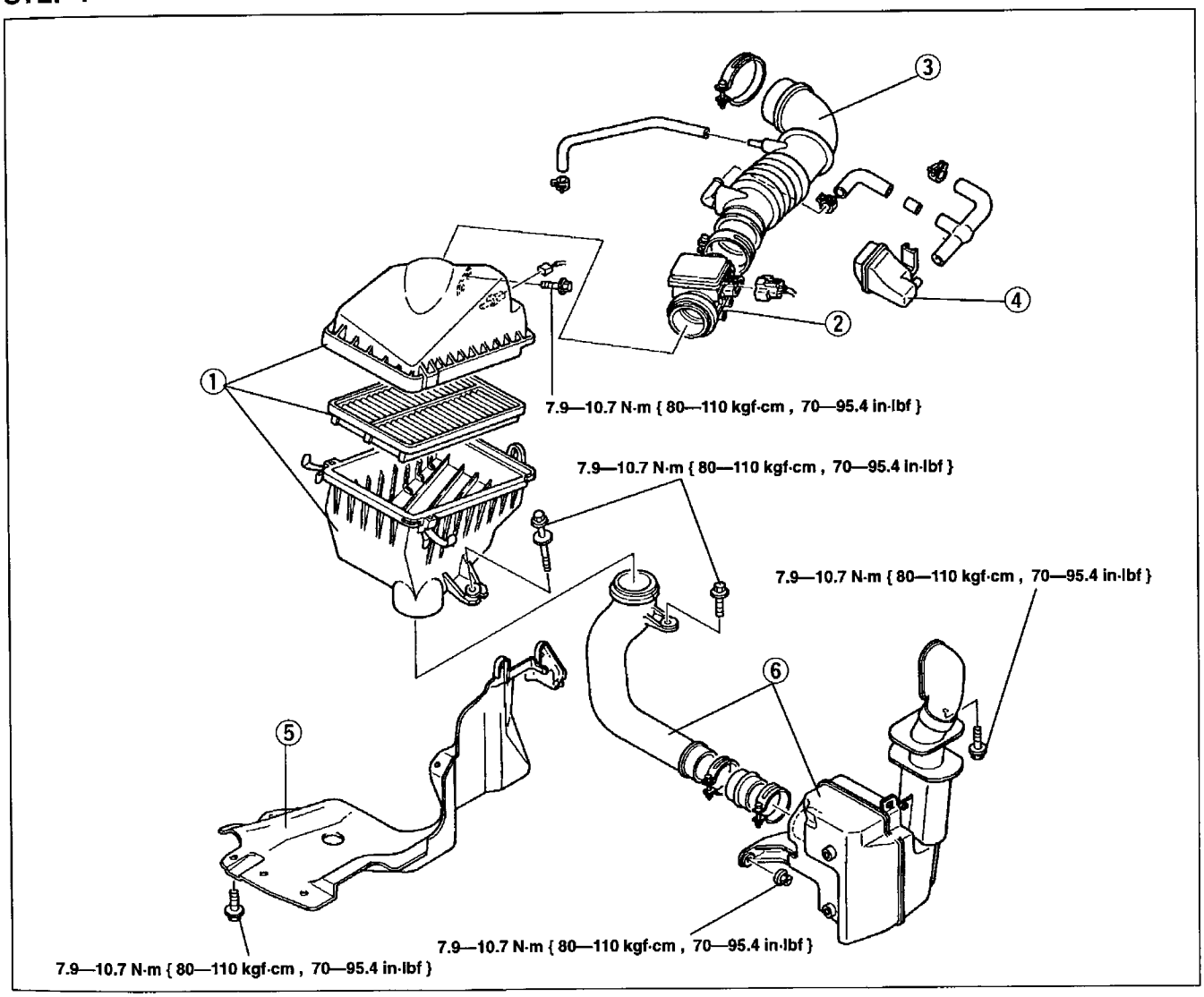
INTAKE-AIR SYSTEM

COMPONENT PARTS
Removal / Installation

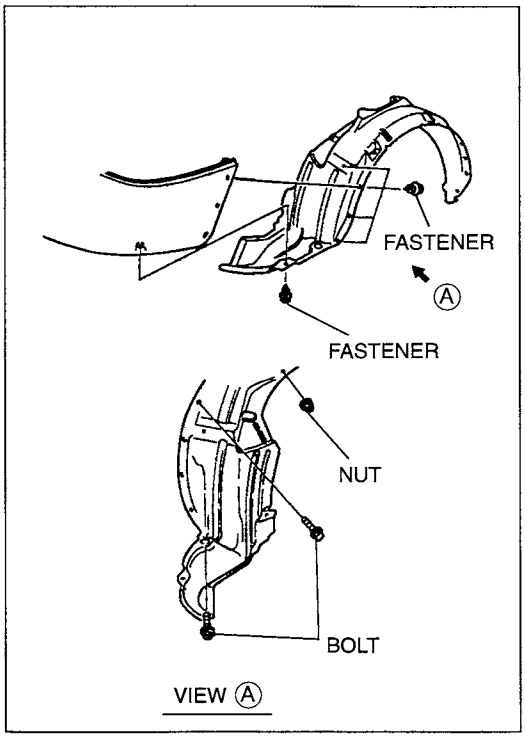
Warning
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F1–10.**

1. Disconnect the negative battery cable.
2. Drain the coolant from the radiator. (Refer to section E.)
3. Remove in the order shown in the figure, referring to **Removal note**.
4. Install in the reverse order of removal, referring to **Installation note**.
5. Refill the radiator with the specified engine coolant. (Refer to section E.)

STEP 1



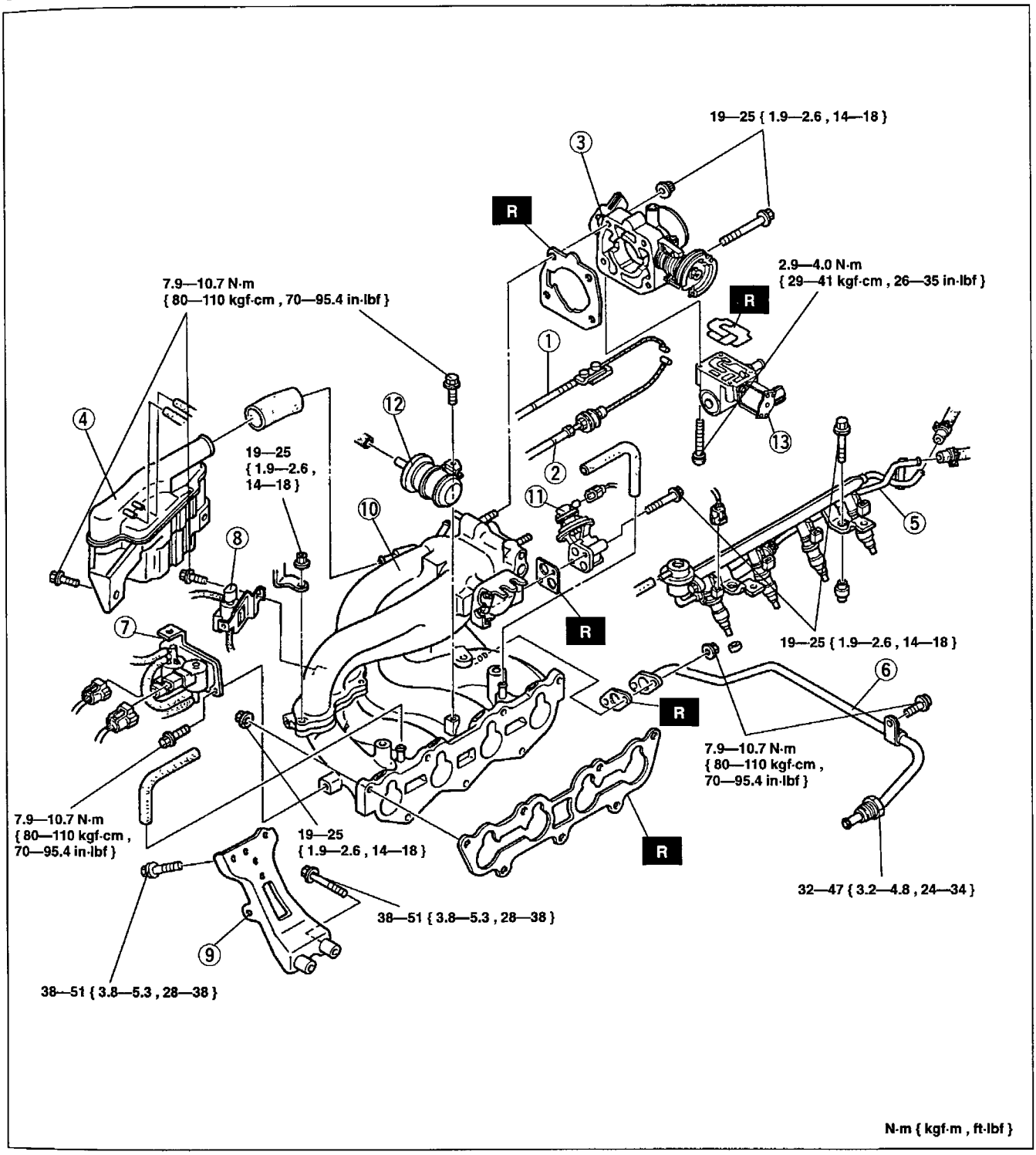
1. Air cleaner
2. Mass air flow sensor
3. Air intake hose
4. Resonance chamber
5. Splash shield
6. Fresh-air duct
   Removal note ..... page F1–6



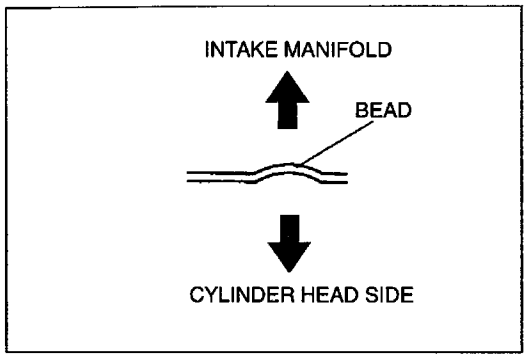
Removal note
Fresh-air duct

Before removing the fresh-air duct, remove the LH front mud guard mounting bolts, nut, and fasteners shown.

STEP 2

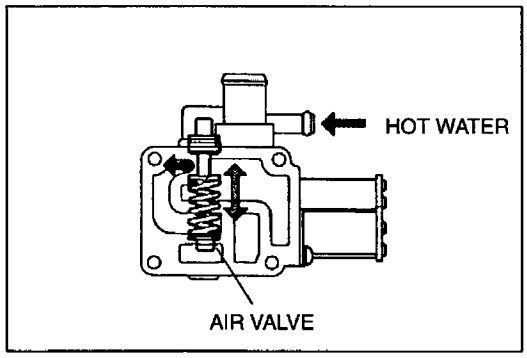


1. Throttle cable (ATX)
   Removal / Installation ..... section K
2. Accelerator cable
   Inspection / Adjustment ..... page F1–9
3. Throttle body
4. Resonance chamber
5. Fuel distributor
6. EGR pipe
7. EGR solenoid valve stay
8. PRC solenoid valve stay
9. Intake manifold stay
10. Intake manifold
    Installation note ..... page F1–8
11. EGR valve
12. Air filter
13. BAC valve



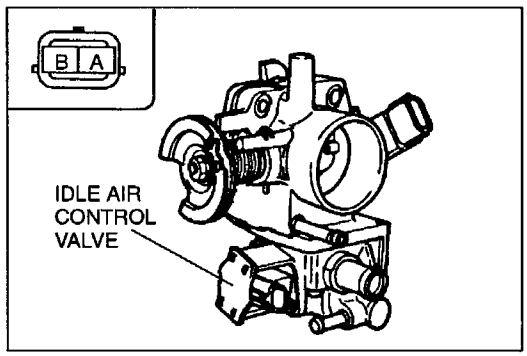
Installation note
Intake manifold

Face the bead of the gasket toward the intake manifold as shown, and install the intake manifold.



AIR VALVE
Inspection

1. Remove the BAC valve.
2. Circulate water in the BAC valve coolant passage to cool the air valve.
3. Circulate hot water in the BAC valve coolant passage and verify that the air valve operates.
4. If not, replace the BAC valve. (Refer to page F1–7.)



IDLE AIR CONTROL VALVE
Inspection

1. Verify that the ignition switch is OFF.
2. Disconnect the idle air control valve connector.
3. Measure the resistance of the idle air control valve by using an ohmmeter.

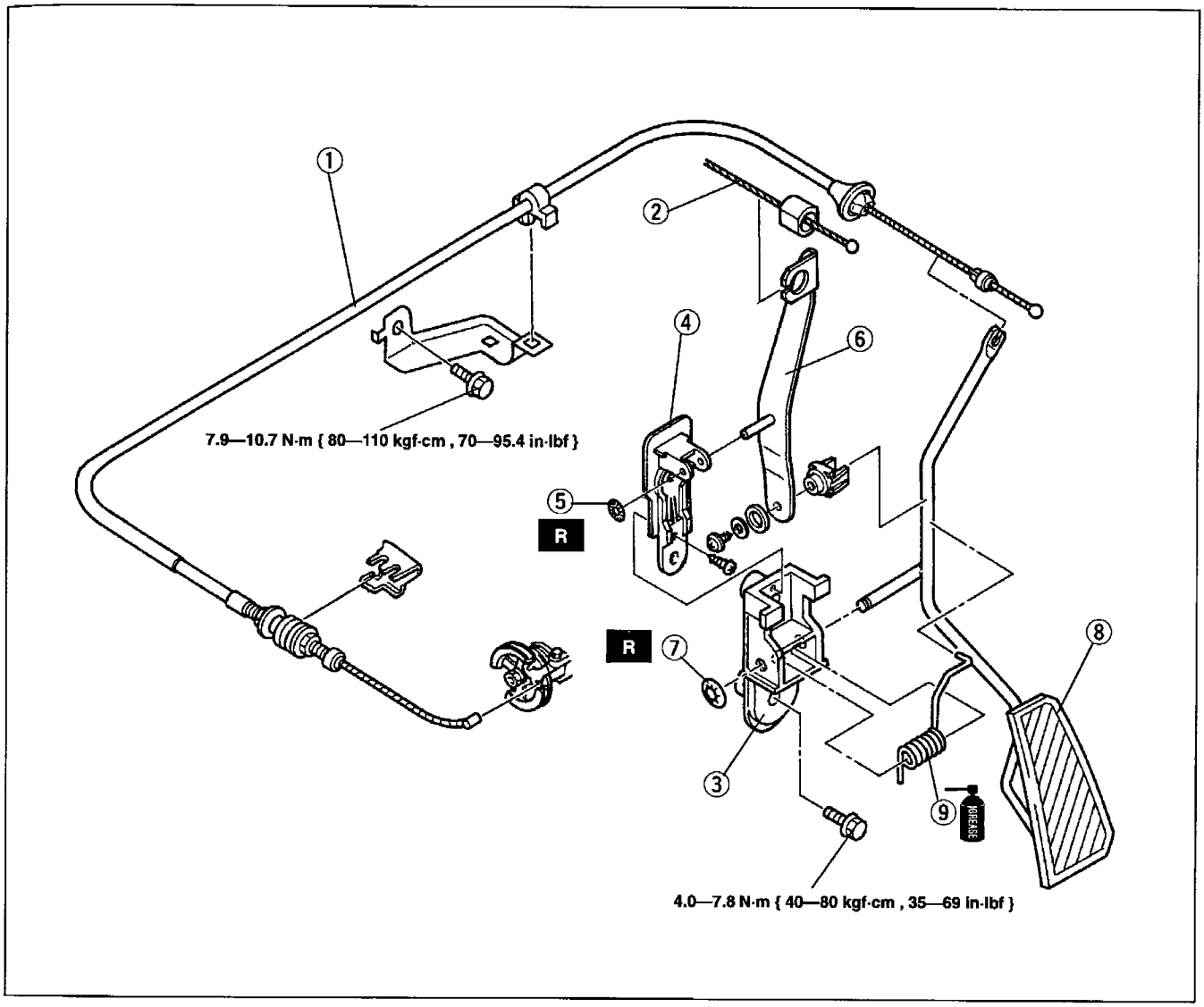
   Specification: 7.7—9.3 Ω [23 °C { 73 °F }]

4. If not as specified, replace the BAC valve. (Refer to page F1–7.)

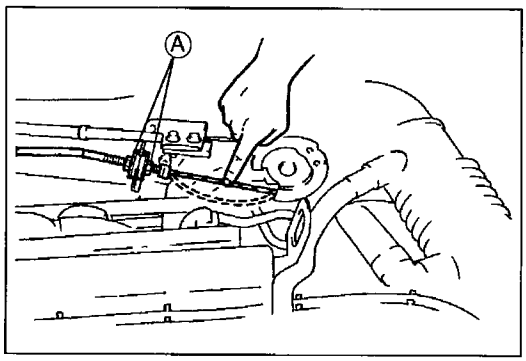
ACCELERATOR PEDAL

Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



1. Accelerator cable
   Inspection / Adjustment ..... below
2. Actuator cable (with cruise control)
3. Retainer
4. Retainer (with cruise control)
5. Snap ring (with cruise control)
6. Bracket (with cruise control)
7. Snap ring
8. Accelerator pedal
9. Return spring



ACCELERATOR CABLE

Inspection / Adjustment

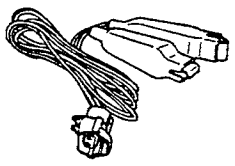
1. Verify that the throttle valve is at the closed throttle position.
2. Measure the free play of the accelerator cable.

   Free play: 1—3 mm { 0.04—0.11 in }

3. If not as specified, adjust by turning locknut Ⓐ.

FUEL SYSTEM

PREPARATION
SST

49 L018 901 Injector checker		For inspection of fuel injector

PRECAUTION
Fuel Pressure Release and Servicing Fuel System

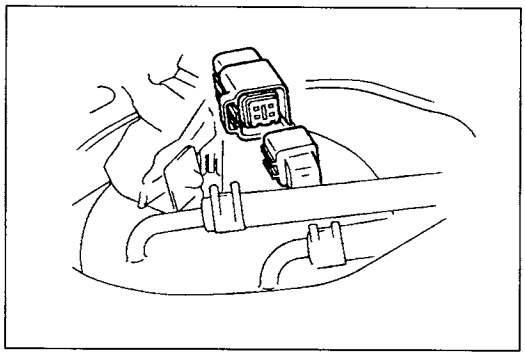
Warning

- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**

Fuel in the fuel system is under high pressure when the engine is not running.

Warning

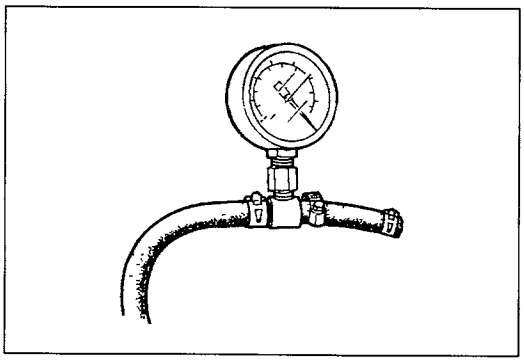
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the following "Fuel Line Safety Procedures".**



Fuel Line Safety Procedures

A. Release the fuel pressure before disconnecting a fuel line.
1. Remove the rear seat cushion. (Refer to section S.)
2. Disconnect the fuel pump connector.
3. Start the engine.
4. After the engine stalls, turn the ignition switch to OFF.
5. Connect the fuel pump connector and install the rear seat cushion.

B. Avoid leakage
1. When disconnecting a fuel line hose, wrap a rag around it to protect against fuel leakage.
2. Plug the hose after removal.



C. Install hose clamps to secure the fuel pressure gauge.

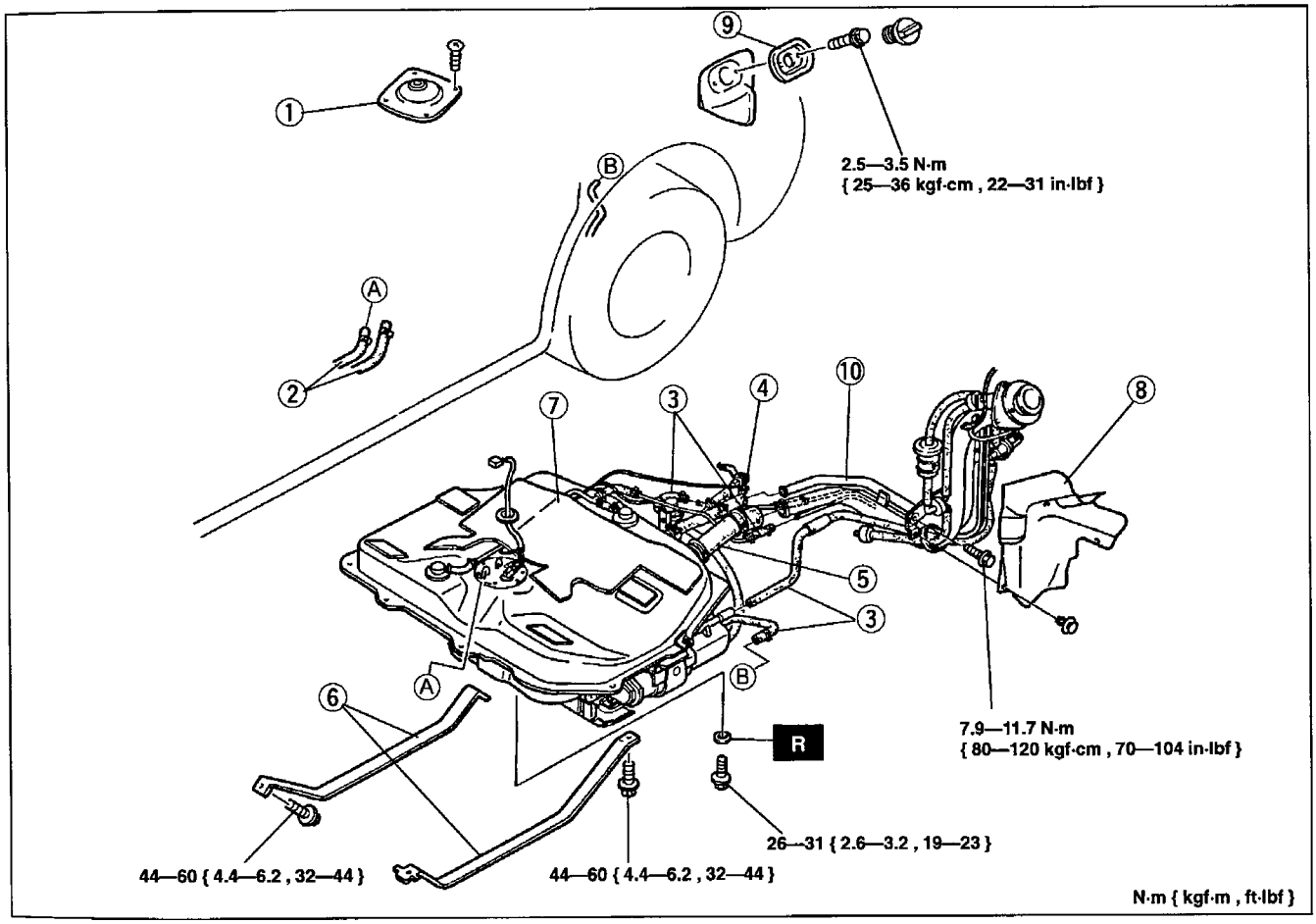
COMPONENT PARTS
Removal / Installation
Fuel tank

Warning

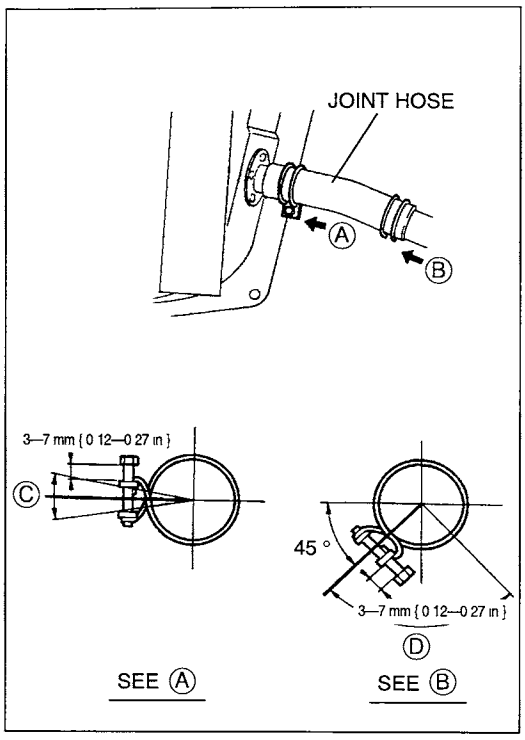
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F1–10.**
- **Repairing a fuel tank that has not been properly steam cleaned can be dangerous. Explosion or fire may cause death or serious injury. Always properly steam clean a fuel tank before repairing it.**

1. Disconnect the negative battery cable.
2. Remove the drain plug and drain the fuel from the fuel tank.
3. Remove the rear seat cushion. (Refer to section S.)
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal, referring to **Installation note.**
6. After installation, verify that the fuel tank is securely fixed.

STEP 1



1. Fuel pump cover
2. Fuel hoses
   Installation note ..... page F1–12
3. Evaporative hoses
   Installation note ..... page F1–12
4. Breather hose
   Installation note ..... page F1–12
5. Joint hose
   Installation note ..... page F1–12
6. Fuel tank straps
7. Fuel tank
8. Protector
9. Dust cover
10. Fuel filler pipe



Installation note
Fuel hoses, evaporative hoses, breather hose

- Push the ends of the fuel hoses, evaporative hoses, and breather hose onto the respective fittings.

  Specification: 25—30 mm { 0.99—1.18 in }

- Be sure the hoses are not bent or twisted.

Joint hose

- Push the ends of the joint hose onto the fitting.

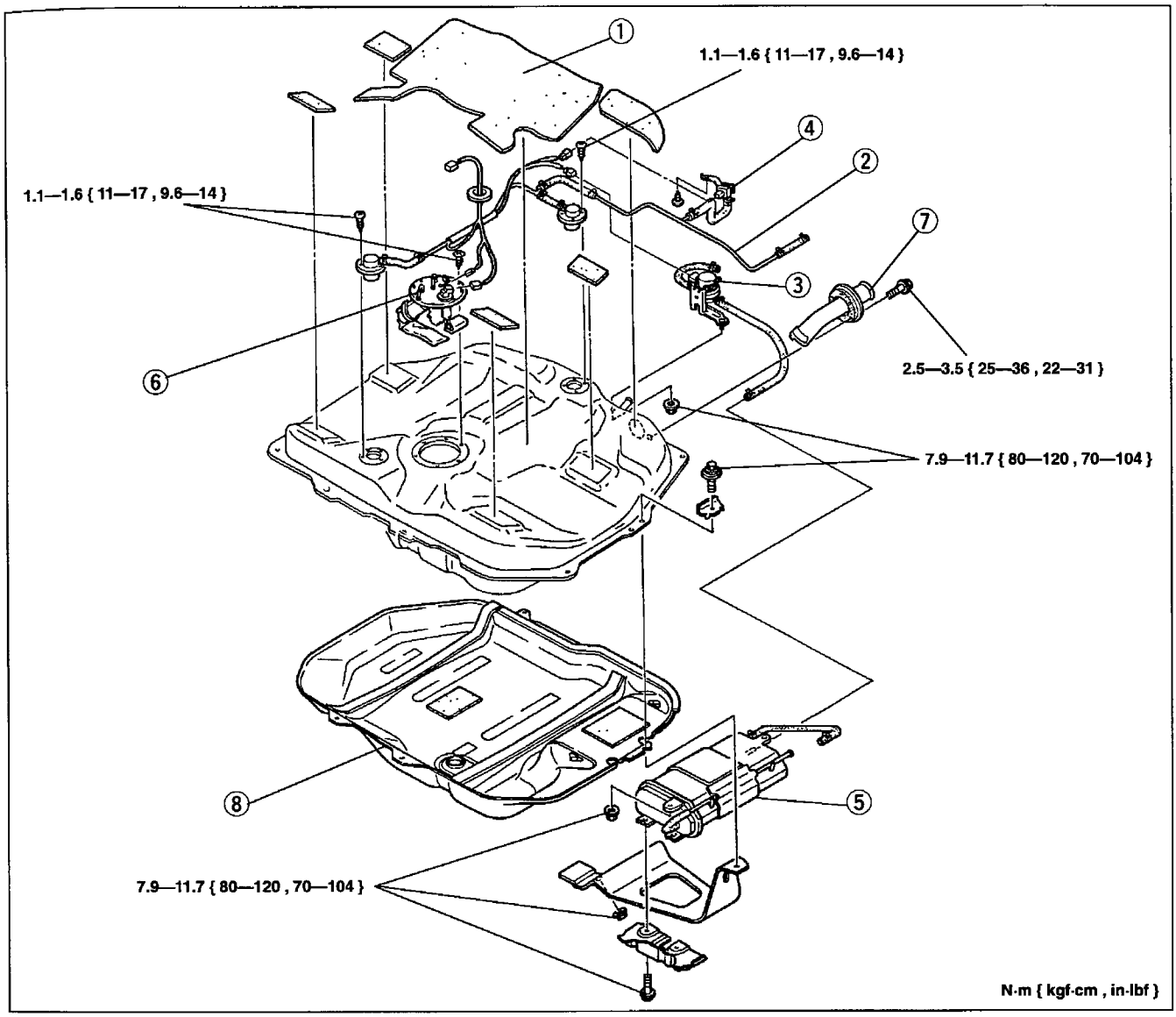
  Specification: 35—40 mm { 1.38—1.57 in }

- Install the clamps on the joint hose as shown.
- Position the tabs of each clamp within the allowable range.

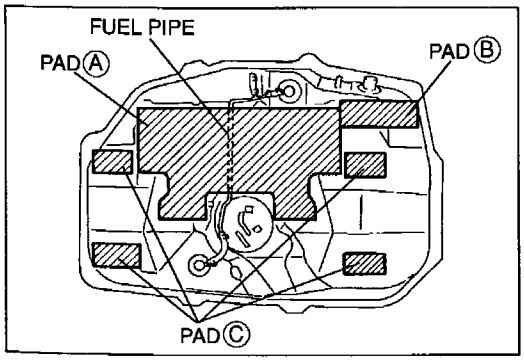
  Allowance
  Ⓒ: 10° to both directions
  Ⓓ: 90° to right

- Be sure the hose is not bent or twisted.

STEP 2



1. Pad
   Installation note ..... below
2. Fuel pipe, rollover valve
   Installation note ..... below
3. Tank pressure control valve (TPCV)
4. Fuel tank pressure sensor
5. Charcoal canister
6. Fuel pump
7. Inlet pipe
   Removal note ..... below
8. Insulator



Removal note
Inlet pipe

- Remove the inlet pipe only when replacing the non-return valve.

Installation note
Fuel pipe, pad

- Stick pad Ⓐ onto the fuel tank, over the harness (California only) and the fuel pipe as shown.
- Stick pad Ⓑ and Ⓒ onto the fuel tank as shown. (Upper surface of the fuel tank is projected for installation of pad Ⓒ.)
- Be sure the hoses are not bent or twisted.

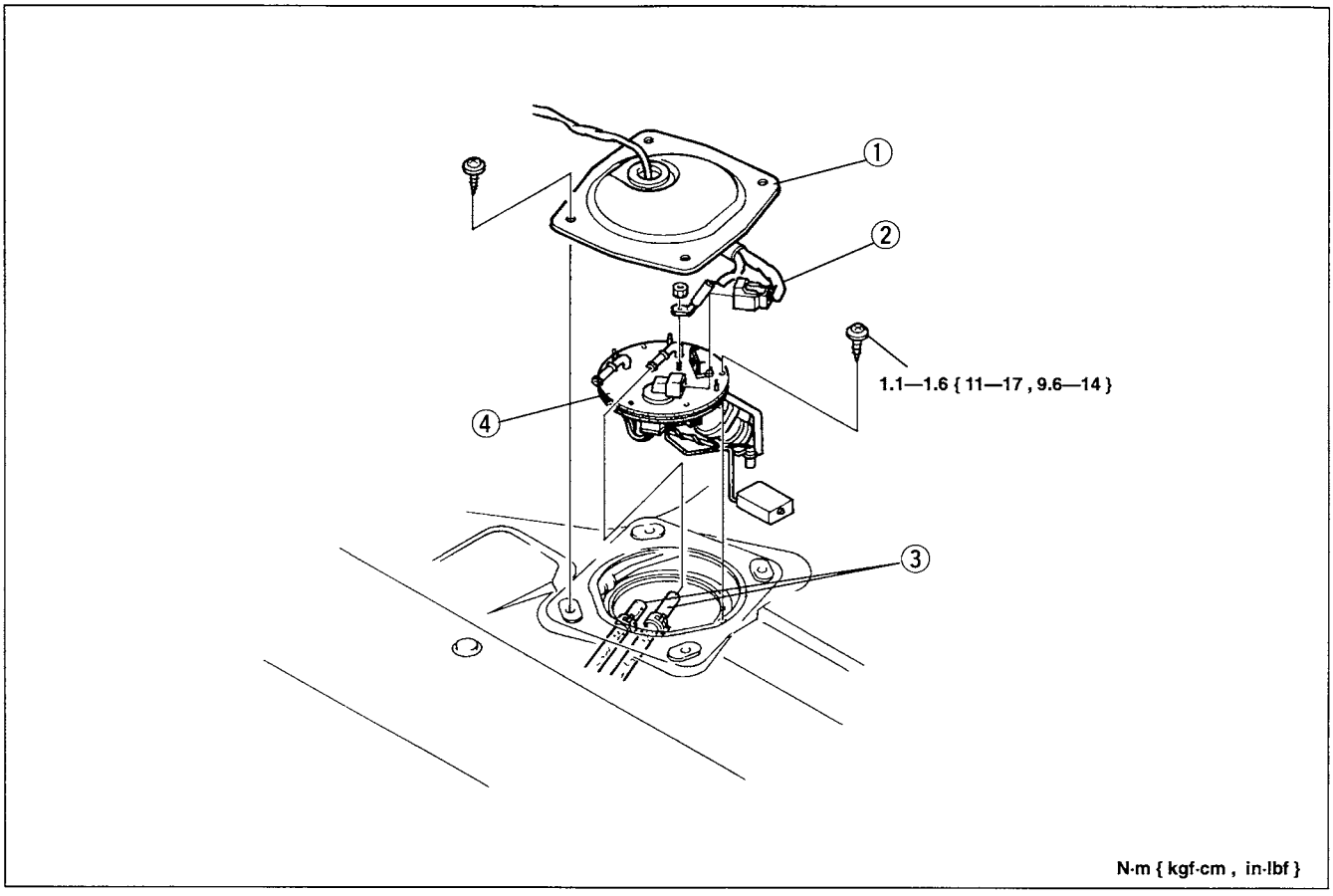
Fuel pump

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F1–10.**

1. Disconnect the negative battery cable.
2. Remove the rear seat cushion. (Refer to section S.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal, referring to **Installation note**.

STEP 1



1. Fuel pump cover
2. Fuel pump connector
3. Fuel hoses
   Installation note ..... below
4. Fuel pump

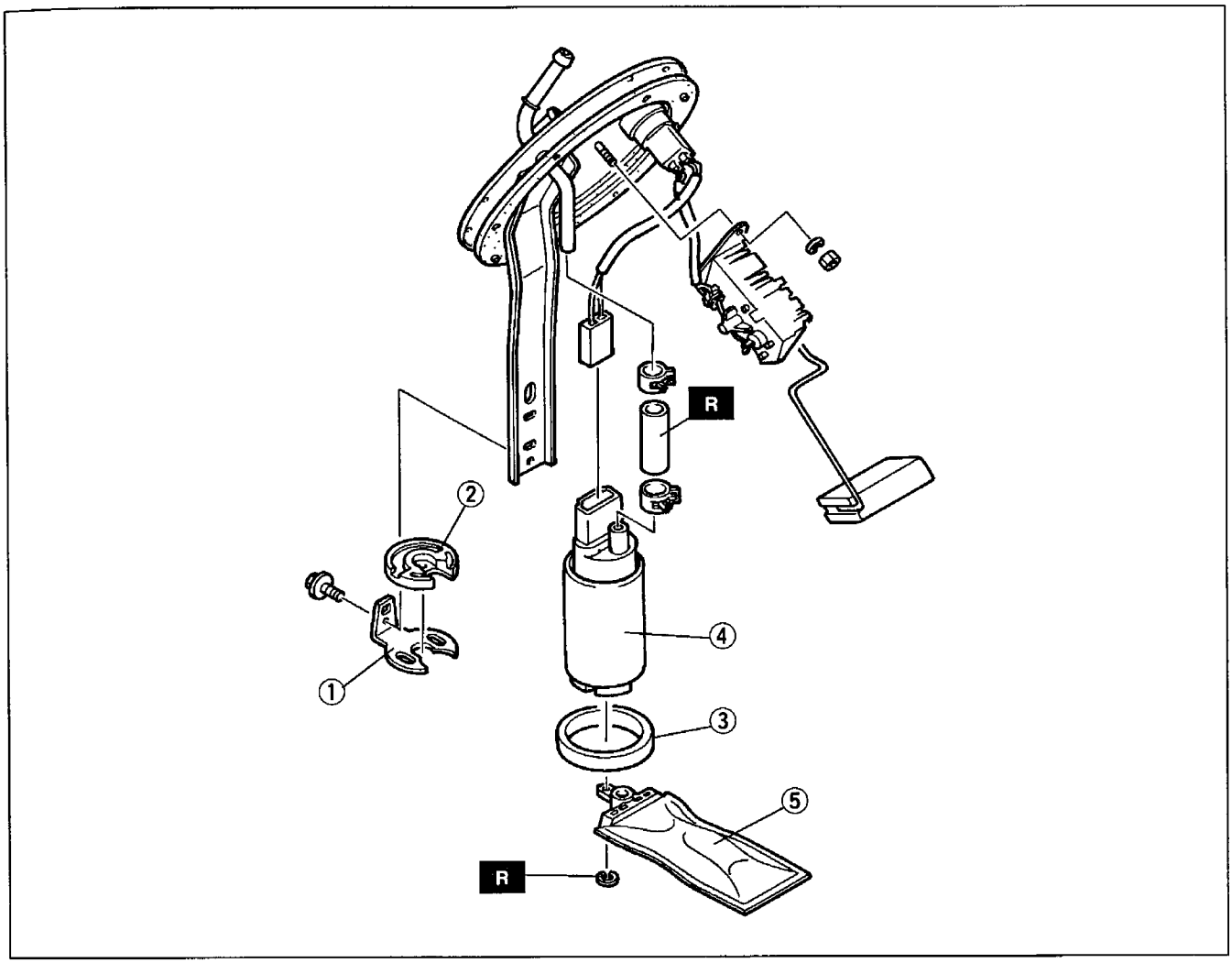
Installation note
Fuel hoses

- Push the ends of the fuel hoses onto the respective fittings.

  Specification: 25—30 mm { 0.99—1.18 in }

- Be sure the hoses are not bent or twisted.

STEP 2



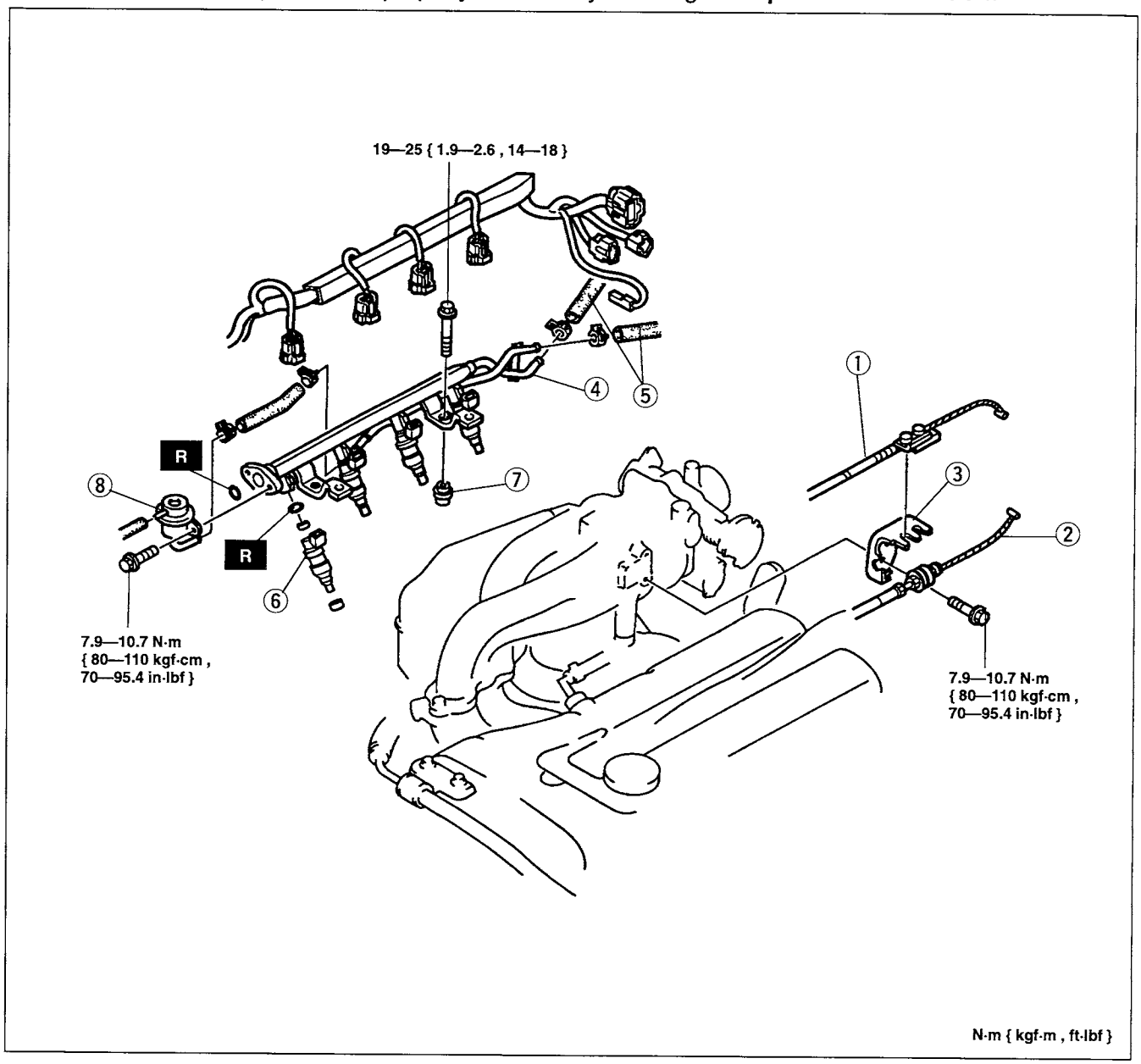
1. Bracket
2. Rubber mount
3. Band
4. Fuel pump
5. Fuel filter (low pressure side)

Fuel injector

Warning

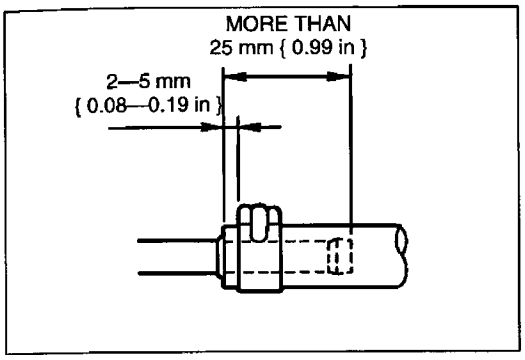
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F1–10.**

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal, referring to **Installation note**.
4. Verify that the fuel injectors are properly installed by referring to **steps after installation.**



1. Throttle cable
   Removal / Installation ..... section K
2. Accelerator cable
   Inspection / Adjustment ..... page F1–9
3. Throttle cable stay
4. Fuel distributor
5. Fuel hoses
   Installation note ..... page F1–17
6. Fuel injector
   Installation note ..... page F1–17
7. Insulator
8. Pressure regulator
   Installation note ..... page F1–17

Installation note
Fuel injector, pressure regulator
- Apply a small amount of clean engine oil to the new O-rings, and install them.



Fuel hoses
- Push the ends of the fuel hoses onto the respective fittings.

  Specification: More than 25 mm { 0.99 in }

- Install the clip on the fuel hoses.

  Specification:
  2—5 mm { 0.08—0.19 in } from the end of hose

Steps after installation
1. Connect data link connector terminals F/P and GND with a jumper wire.
2. Turn the ignition switch to ON and check for fuel leaks from the fuel distributor assembly.
3. Turn off the ignition switch and disconnect the jumper wire.
4. If leaks are found, reinstall the fuel injector.

Fuel filter (high pressure side), PRC solenoid valve, fuel pump relay

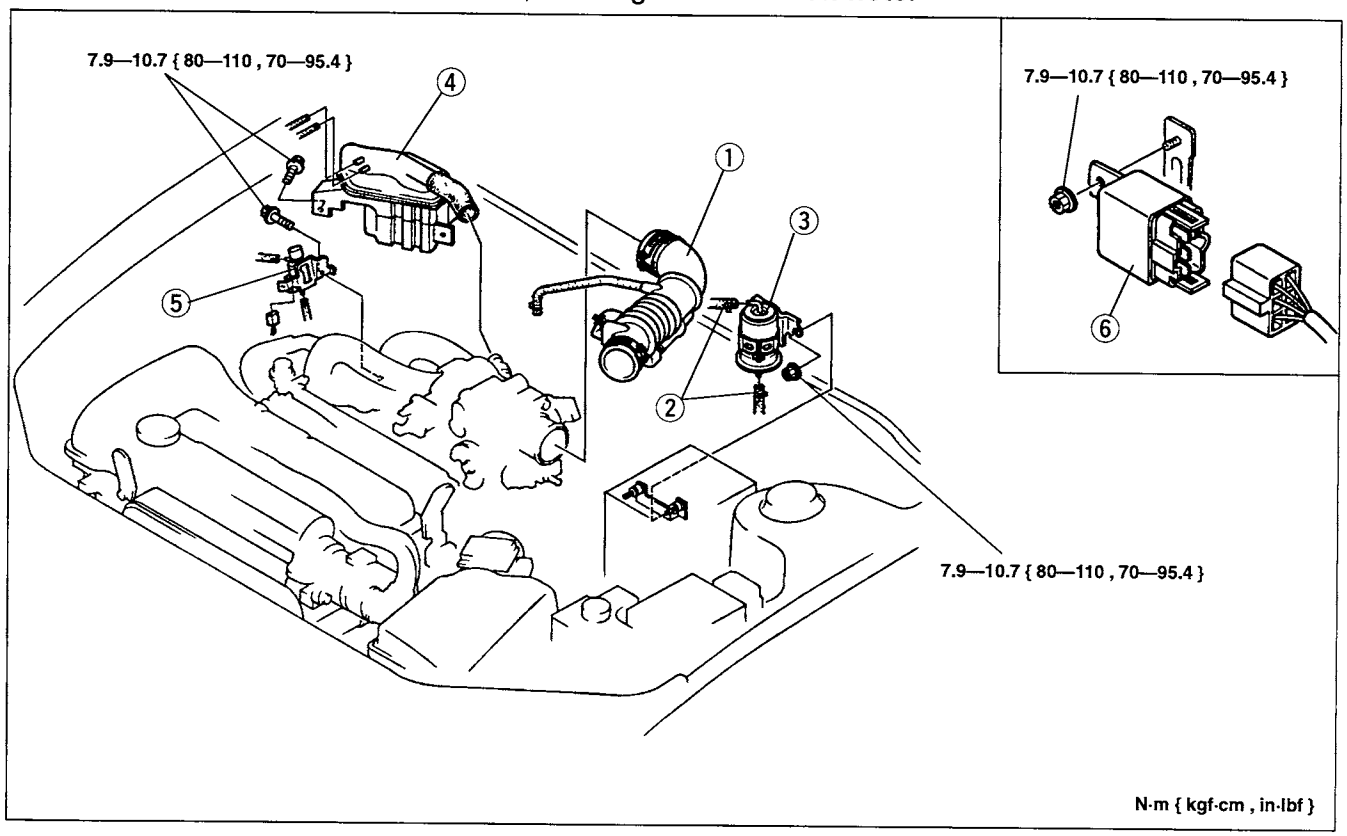
Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F1–10.**

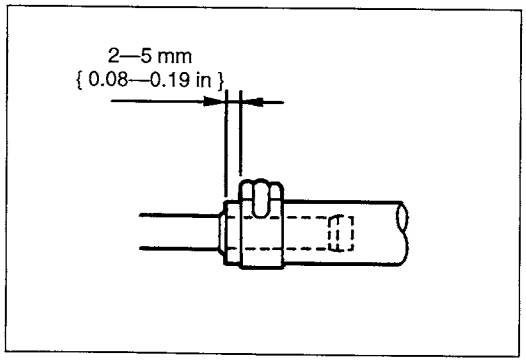
Note

- The fuel filter must be replaced at the intervals outlined in the maintenance schedule.

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure, referring to **Removal note**.
3. Install in the reverse order of removal, referring to **Installation note**.



1. Air intake hose
2. Fuel hoses
   Installation note ..... below
3. Fuel filter (high pressure side)
4. Resonance chamber
5. PRC solenoid valve (Except California)
6. Fuel pump relay
   Removal note ..... below



Removal note

Fuel pump relay

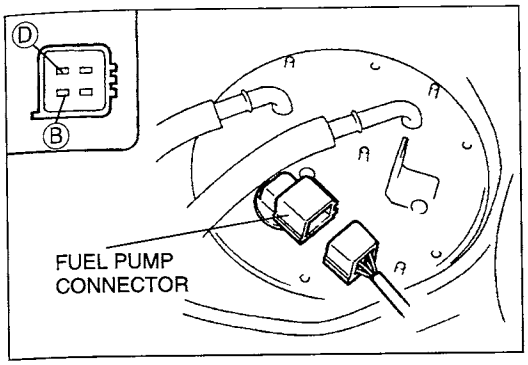
- Before removing the fuel pump relay, remove the rear console, front console and side wall. (Refer to section S.)

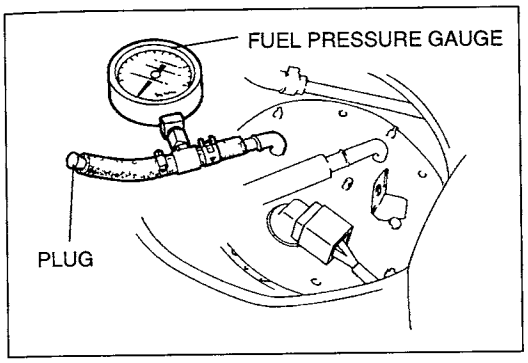
Installation note

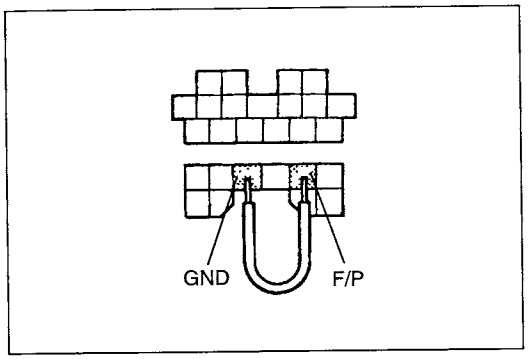
Fuel hoses

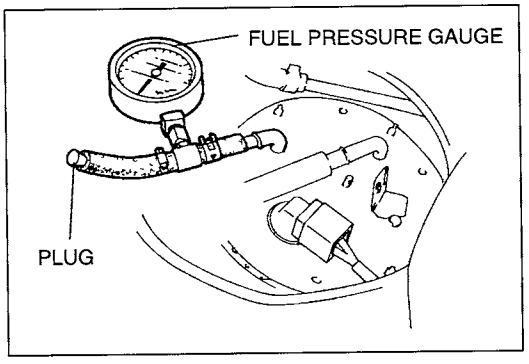
- Push the ends of the fuel hoses onto the fittings until it stops.
- Install the clip on the fuel hoses.

Specification:
2—5 mm { 0.08—0.19 in } from the end of hose









FUEL PUMP

Inspection

Fuel pump continuity

1. Remove the rear seat cushion. (Refer to section S.)
2. Remove the fuel pump cover.
3. Disconnect the fuel pump connector.
4. Check for continuity between fuel pump connector terminals B and D.
5. If there is no continuity, replace the fuel pump. (Refer to page F1–14.)

Fuel pump maximum pressure

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F1–10.**

1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge to the fuel pump and plug the outlet of the gauge as shown.
3. Connect the negative battery cable.
4. Connect data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON. Measure the fuel pump pressure.

Pressure:
500—630 kPa { 5.0—6.5 kgf/cm^2 , 72—92 psi }

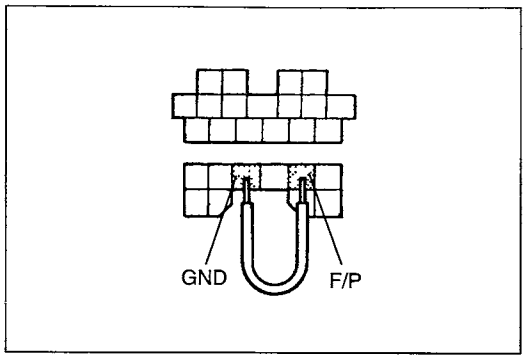
6. Turn off the ignition switch and disconnect the jumper wire.
7. If not as specified, replace the fuel pump. (Refer to page F1–14.)

Fuel pump fuel hold pressure

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F1–10.**

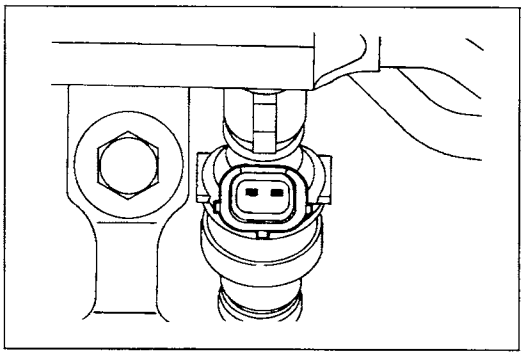
1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge to the fuel pump and plug the outlet of the gauge as shown.
3. Connect the negative battery cable.



4. Connect data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON for approx. 10 sec. to operate the fuel pump.
6. Turn off the ignition switch. Wait for 5 min., and observe the fuel pressure.

Pressure: More than 150 kPa { 1.5 kgf/cm^2 , 21 psi }

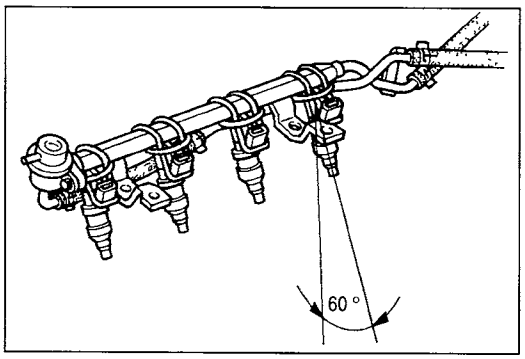
7. Disconnect the jumper wire.
8. If not as specified, replace the fuel pump. (Refer to page F1–14.)



FUEL INJECTOR
Inspection
Resistance
1. Disconnect the fuel injector connectors.
2. Measure the resistance of the fuel injectors.

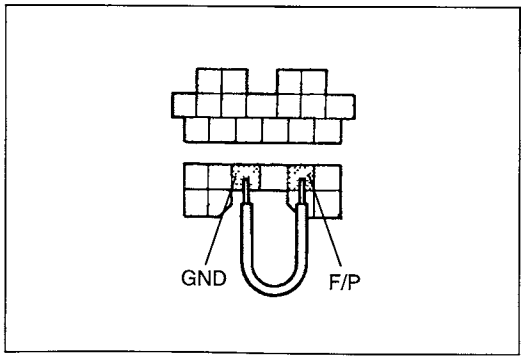
Resistance: Approx. 13.8 Ω [20 °C { 68 °F }]

3. If not as specified, replace the fuel injector. (Refer to page F1–16.)

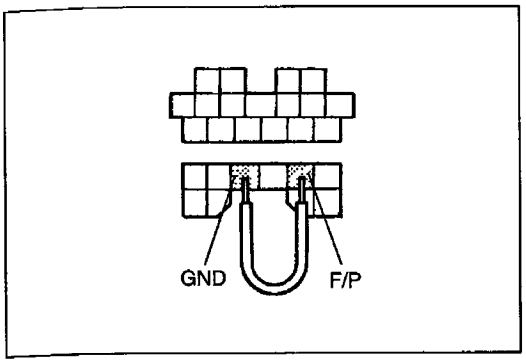


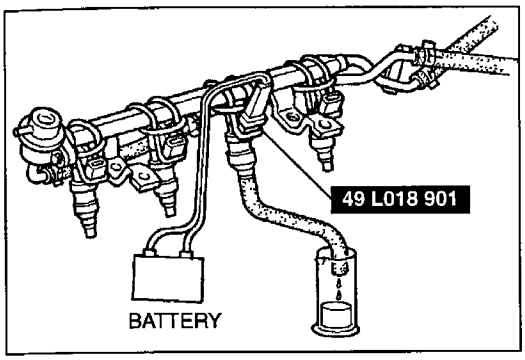
Fuel leakage test
1. Remove the fuel injectors together with the fuel distributor. (Refer to page F1–16.)
2. Fasten the fuel injectors firmly to the fuel distributor with wire and connect the fuel hoses.
3. Tilt the fuel injectors approx. 60 degrees from uplight position as shown.
4. Connect data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON and check for fuel leaks from the fuel injectors.

Fuel leakage: Less than 1 drop/2 minutes



6. Turn off the ignition switch and disconnect the jumper wire.
7. If not as specified, remove the leaking fuel injector and reinstall the fuel injector, referring to **Installation note**.
8. Recheck the fuel leakage. If not as specified, replace the fuel injector. (Refer to page F1–16.)





Volume test

1. Remove the fuel injectors together with the fuel distributor. (Refer to page F1–16.)
2. Fasten the fuel injectors firmly to the fuel distributor with wire and connect the fuel hoses.
3. Connect data link connector terminals F/P and GND by using a jumper wire.
4. Turn the ignition switch to ON.
5. Connect the **SST** as shown in the figure.
6. Measure the injection volume of each fuel injector by using a graduated container.

   Injection volume:
   39—50 ml { 39—50 cc , 1.4—1.6 fl oz }/15 sec.

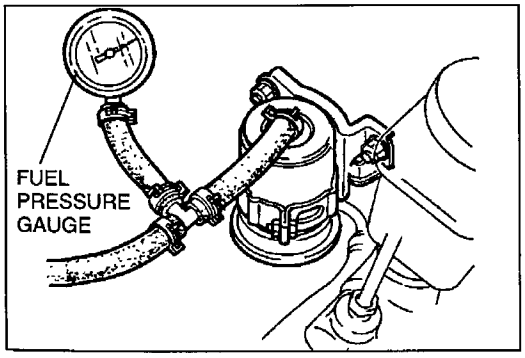
7. Turn off the ignition switch and disconnect the jumper wire.
8. If not as specified, replace the fuel injector. (Refer to page F1–16.)

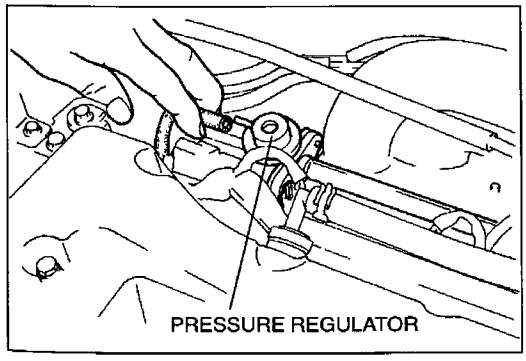
PRESSURE REGULATOR

Inspection

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F1–10.**





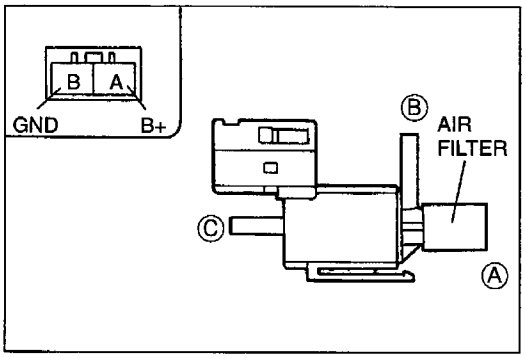
1. Disconnect the negative battery cable.
2. Remove the air intake hose. (Refer to page F1–5.)
3. Connect a fuel pressure gauge between the fuel filter (high pressure side) and the main fuel hose.
4. Install the air intake hose.
5. Connect the negative battery cable.
6. Start the engine and let it idle.
7. Carry out the intake manifold vacuum inspection. (Refer to page F1–119.)
8. Measure the fuel line pressure.

   Pressure:
   200—240 kPa { 2.0—2.4 kgf/cm^2 , 29—34 psi }

9. If not as specified, carry out the fuel line pressure inspection (Refer to page F1–120.) and inspect the PRC solenoid valve. (Refer to page F1–22.)
10. Disconnect the vacuum hose from the pressure regulator.
11. Measure the fuel line pressure.

    Pressure:
    280—310 kPa { 2.8—3.2 kgf/cm^2 , 40—45 psi }

12. If not as specified, replace the pressure regulator. (Refer to page F1–16.)



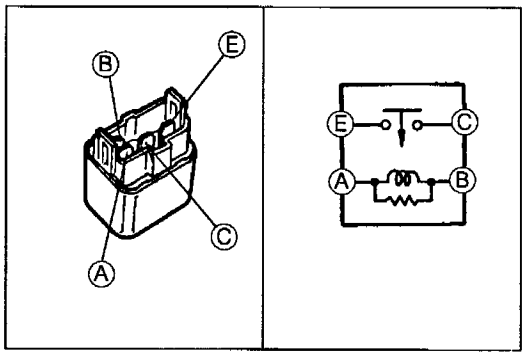
PRC SOLENOID VALVE
(Except California)
Inspection

1. Remove the PRC solenoid valve. (Refer to page F1–18.)
2. Check for air flow between ports of the solenoid valve.

O—O: Continuity O═O : Air flow B+: Battery positive voltage

Step	Terminal		Port		
	A	B	A	B	C
1	O—O			O═O	
2	B+	Ground	O═O		

3. If not as specified, replace the PRC solenoid valve.



FUEL PUMP RELAY
Inspection

1. Remove the fuel pump relay. (Refer to page F1–18.)
2. Check for continuity between terminals of the relay by using an ohmmeter.

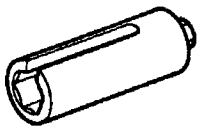
O—O: Continuity B+: Battery positive voltage

Step \ Terminal	A	B	C	E
1	O—O			
2	B+	Ground	O—O	

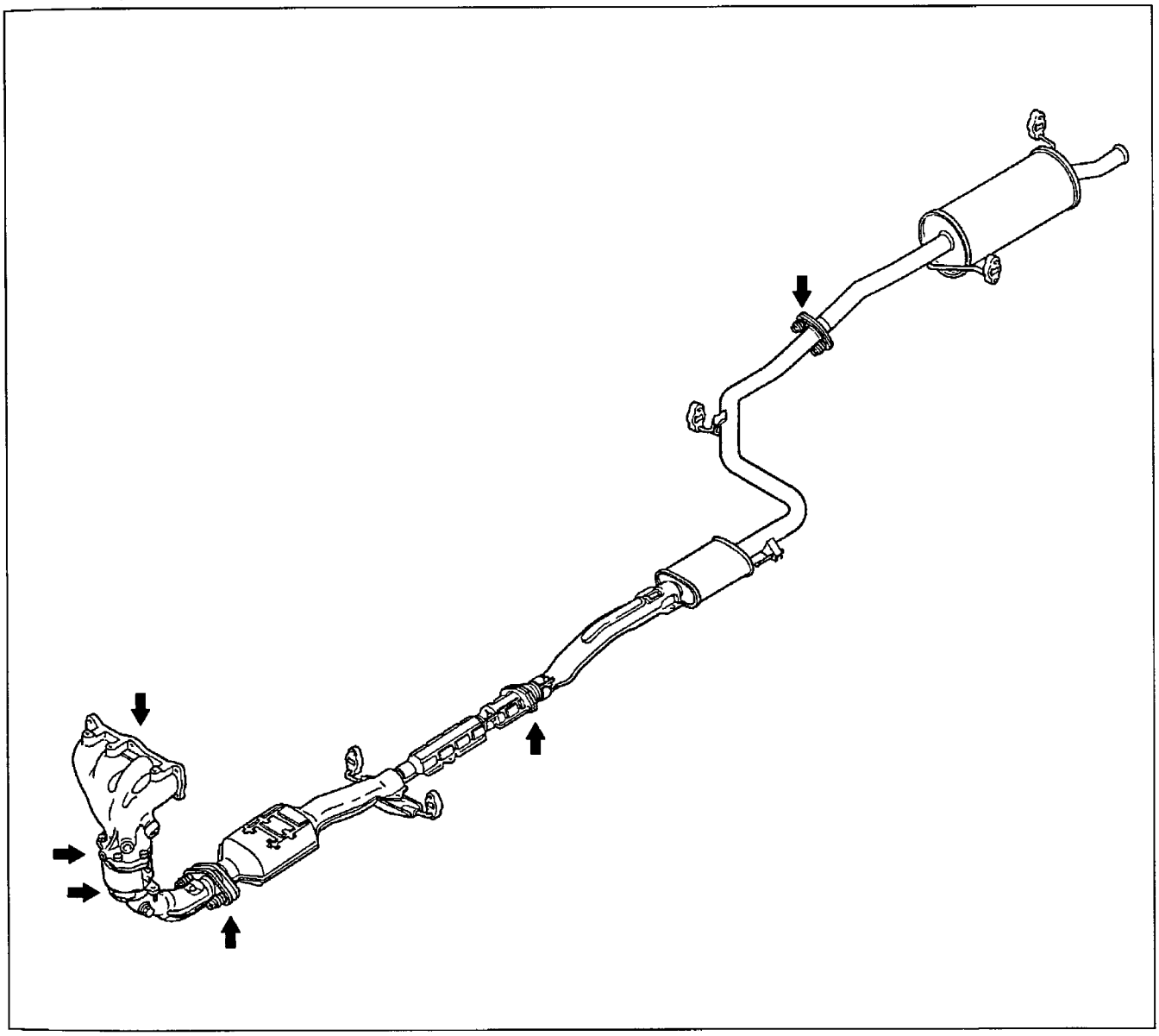
3. If not as specified, replace the fuel pump relay.

EXHAUST SYSTEM

PREPARATION
SST

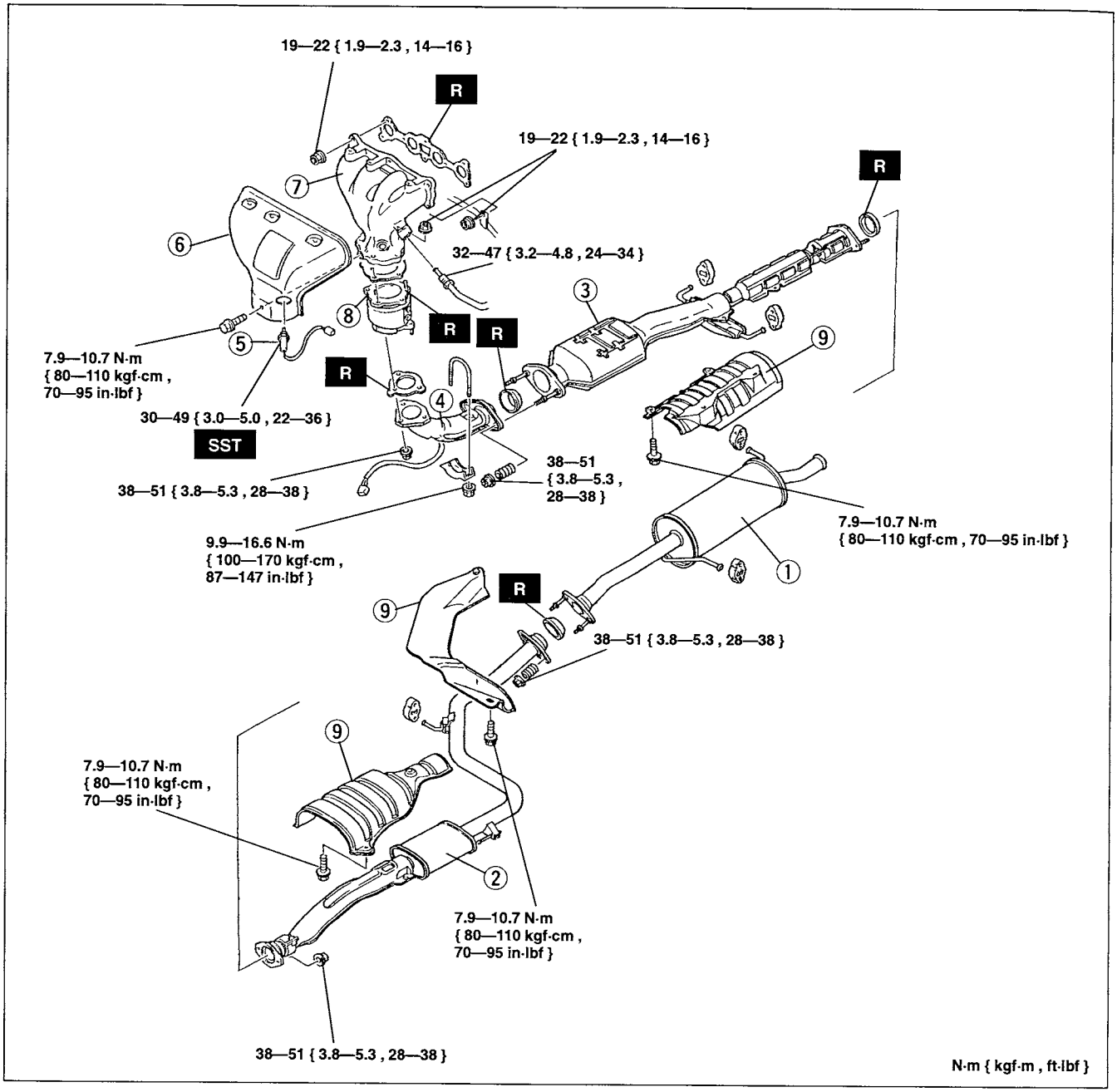
49 T018 001 Wrench, O_2 sensor		For replacement of heated oxygen sensor

COMPONENT PARTS
Inspection
1. Start the engine and check for exhaust gas leakage from each exhaust system components.
2. If leakage is found, repair or replace as necessary.

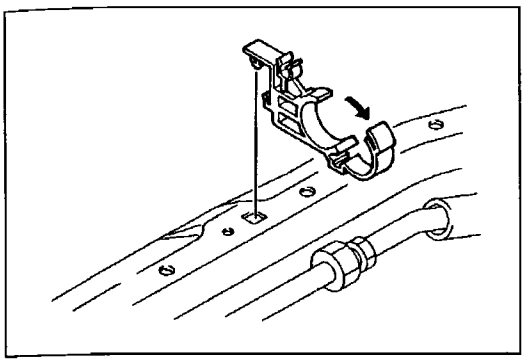


Removal / Installation

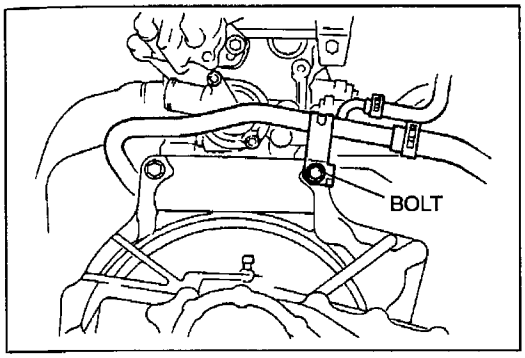
1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure, referring to **Removal note.**
3. Install in the reverse order of removal, referring to **Installation note.**



1. Main silencer
2. Presilencer
3. Three way catalytic converter
4. Front pipe
   Installation note ..... page F1–25
5. Heated oxygen sensor
6. Exhaust manifold insulator
   Removal note ..... page F1–25
7. Exhaust manifold
   Removal note ..... page F1–25
   Installation note ..... page F1–26
8. Warm up three way catalytic converter
   Installation note ..... page F1–26
9. Insulator



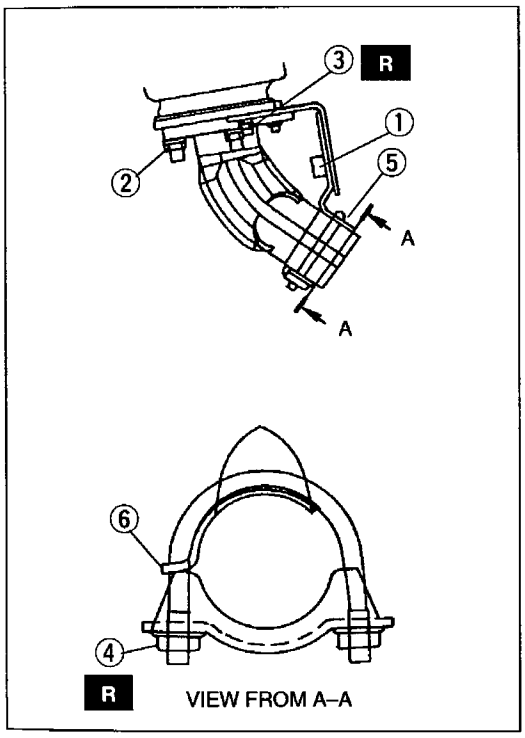
Removal note
Exhaust manifold insulator
Remove the A/C pipe stay and remove the exhaust manifold insulator from over the vehicle.



Exhaust manifold
1. Remove the air cleaner and disconnect the air hose. (Refer to page F1–5.)
2. Remove the water bypass pipe stay bolt.

   Tightening torque:
   64—89 N·m { 6.5—9.1 kgf·m , 48—65 ft·lbf }

3. Loosen the EGR pipe mounting nut.



Installation note
Front pipe
1. Hand tighten the bolts and nuts in the order shown.
2. Tighten nut ②.

   Tightening torque:
   38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }

3. Check for correct alignment at ⑤ (front pipe and bracket).
4. Check for correct alignment at ⑥ (hanger bracket and U bolt), then tighten nut ④.

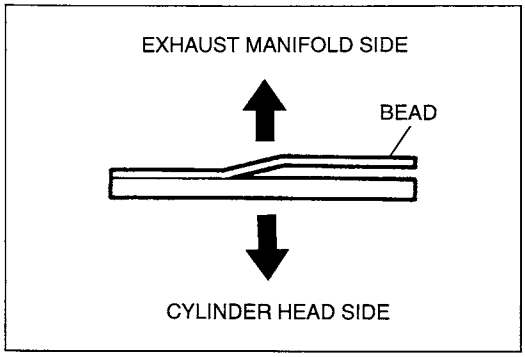
   Tightening torque:
   10—16 N·m { 100—170 kgf·cm , 87—147 in·lbf }

5. Verify that ③ (frange and bracket) contacts with ① (cylinder block and bracket), then tighten nut ③.

   Tightening torque:
   19—25 N·m { 1.9—2.6 kgf·m , 14—18 ft·lbf }

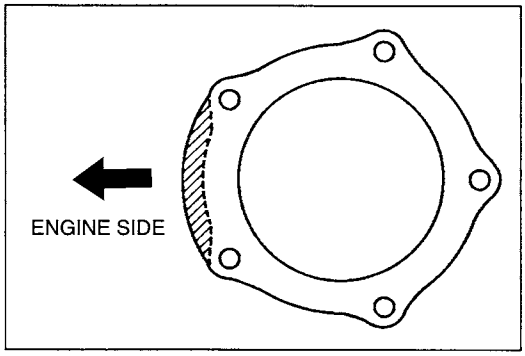
6. Tighten bolt ①.

   Tightening torque:
   38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }



Exhaust manifold

Face the bead of the gasket toward the exhaust manifold as shown, and install the exhaust manifold.



Warm up three way catalytic converter

Install the warm up three way catalytic converter with the shaded area facing toward the engine as shown.

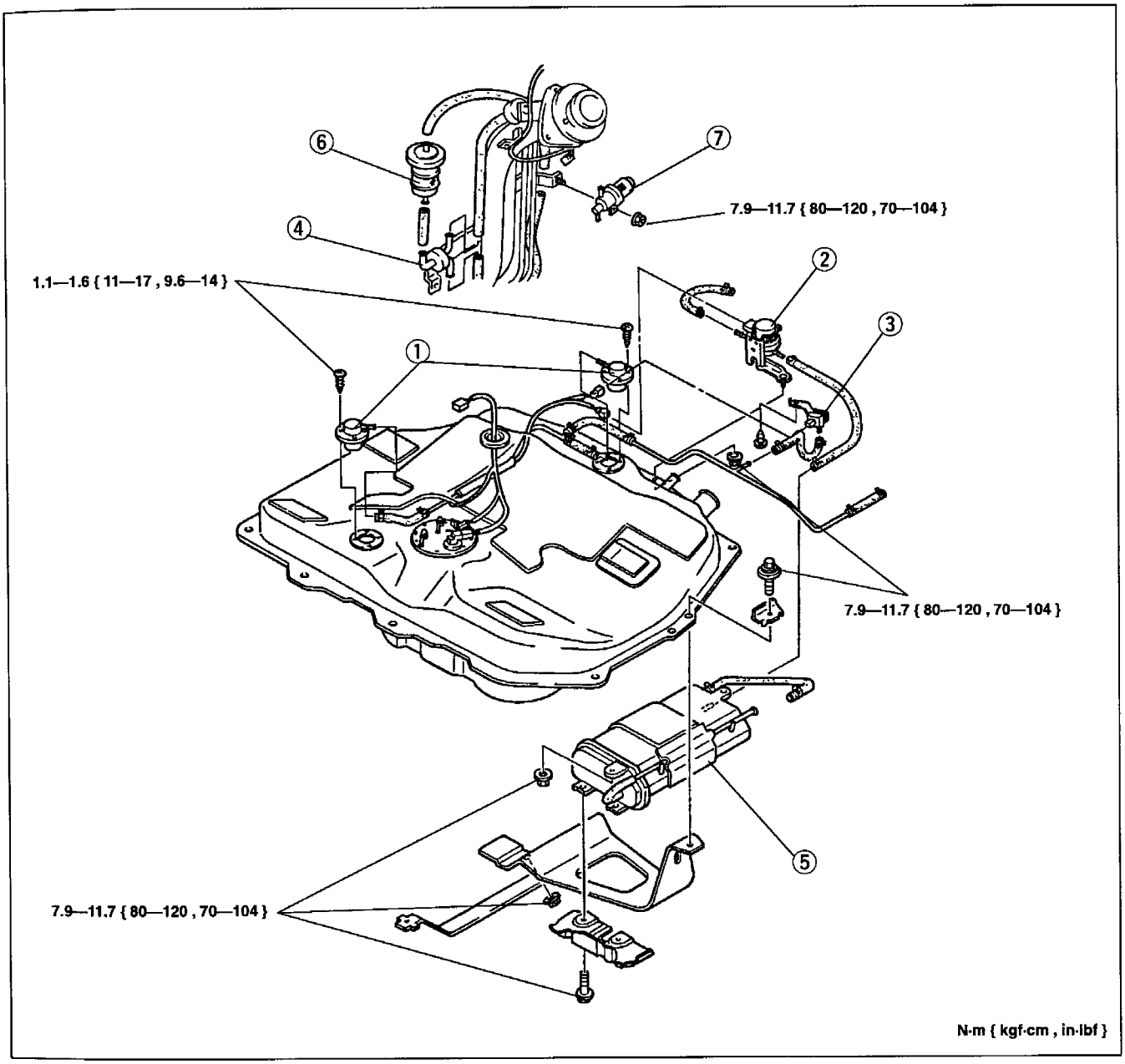
EMISSION SYSTEM

COMPONENT PARTS

Removal / Installation

Fuel tank side

1. Remove the fuel tank. (Refer to page F1–11.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal, referring to **Installation note.**

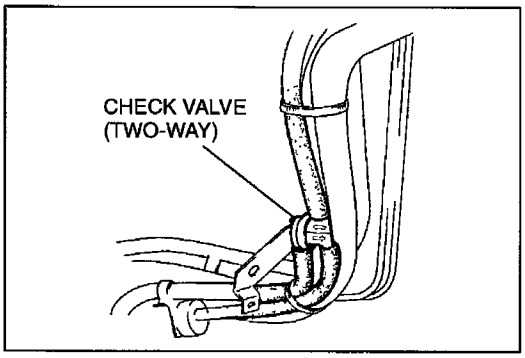


1. Rollover valve
   Installation note . . . . . page F1–28
2. Tank pressure control valve (TPCV)
   Installation note . . . . . page F1–28
3. Fuel tank pressure sensor
4. Check valve (two-way)
   Installation note . . . . . page F1–28
5. Charcoal canister
   Installation note . . . . . page F1–28
6. Air filter
7. Canister drain cut valve (CDCV)

Installation note
Rollover valve, check valve (two-way), tank pressure control valve, charcoal canister

- Push the ends of the evaporative hoses onto respective fittings.

Specification: 15—20 mm { 0.60—0.78 in }
(except charcoal canister)
: 25—30 mm { 0.99—1.18 in }
(charcoal canister)



Check valve (two-way)

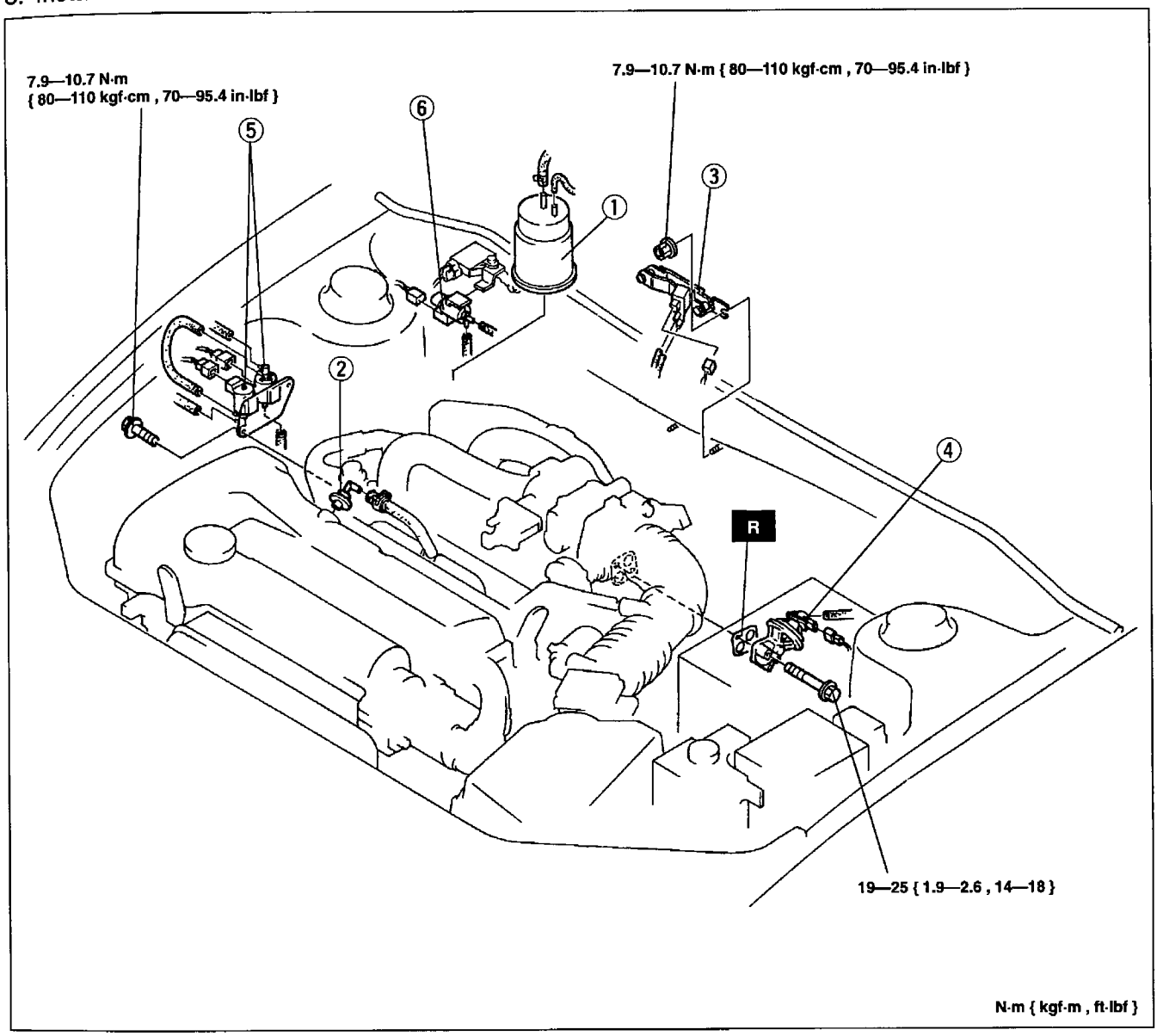
- Push the ends of the evaporative hose onto the fitting.

Specification: 15—20 mm { 0.60—0.78 in }

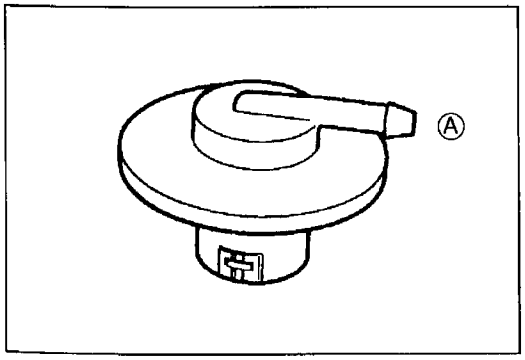
- Install the check valve (two-way) in the correct direction as shown.

Engine compartment side

1. Disconnect the negative battery cable.
2. Remove the components shown.
3. Install in the reverse order of removal.



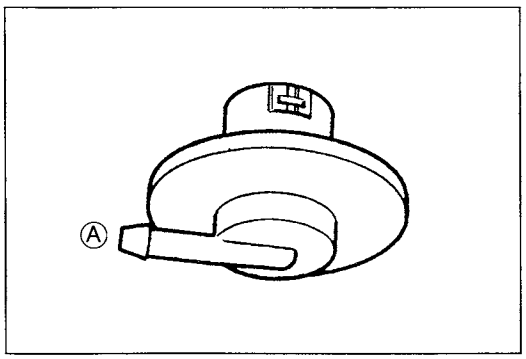
1. Catch tank
2. PCV valve
3. Purge solenoid valve
4. EGR valve
5. EGR solenoid valve
6. EGR boost sensor solenoid valve



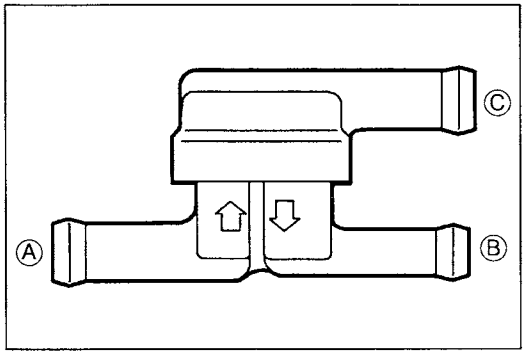
ROLLOVER VALVE

Inspection

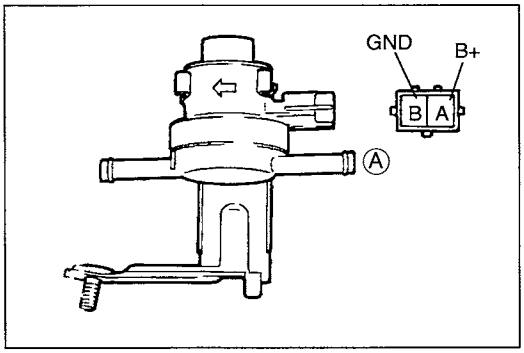
1. Remove the fuel tank. (Refer to page F1–11.)
2. Remove the rollover valve. (Refer to page F1–27.)
3. Verify that air flows through the valve from port Ⓐ when the valve is held as shown.



4. Verify that no air flows through the valve from port Ⓐ when the valve is held as shown.
5. If not as specified, replace the rollover valve.



CHECK VALVE
Inspection
Two-way
1. Remove the check valve (two-way). (Refer to page F1–27.)
2. Blow air into port Ⓐ and verify that air smoothly flows from port Ⓒ.
3. Blow air into port Ⓒ and verify that air smoothly flows from port Ⓑ.
4. If not as specified, replace the check valve (two-way).

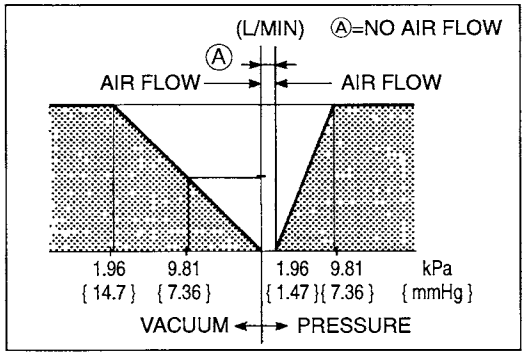


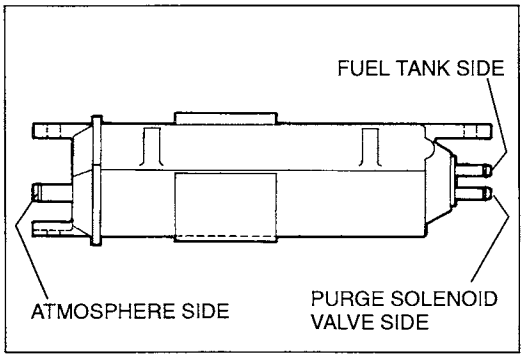
TANK PRESSURE CONTROL VALVE (TPCV)
Inspection
1. Remove the TPCV. (Refer to page F1–27.)
2. Apply pressure or vacuum to port Ⓐ of the valve by using a vacuum pump, and check for the air flow.

Specification

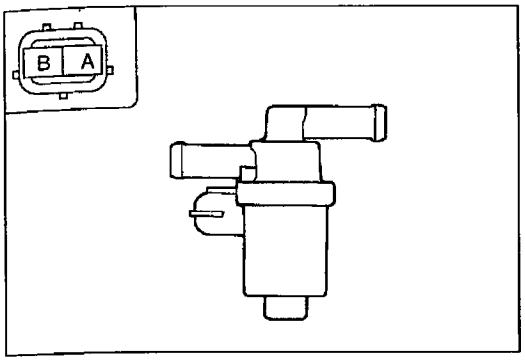
Condition	kPa { mmHg , inHg }	Air flow
Pressure	Below 1.96 { 1.47 , 0.06 }	No
	Above 9.81 { 7.36 , 0.29 }	Yes
Vacuum	Below 9.81 { 7.36 , 0.29 }	Yes

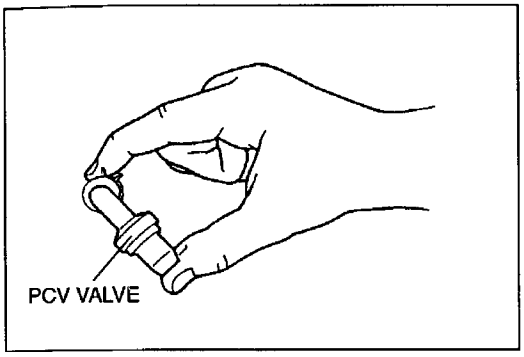
3. Apply battery positive voltage to the valve connector and apply pressure to port Ⓐ, and verify that air flows smoothly.
4. If not as specified, replace the TPCV.

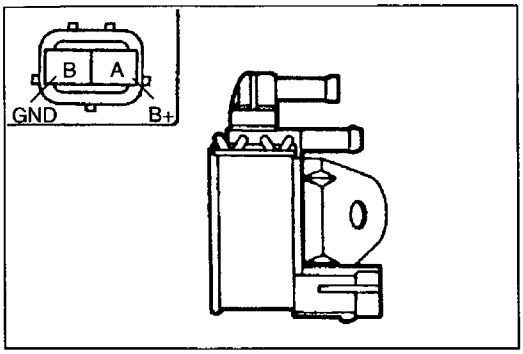


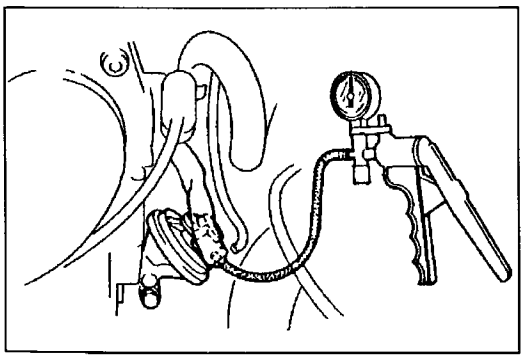


CHARCOAL CANISTER
Inspection
1. Remove the charcoal canister. (Refer to page F1–27.)
2. Plug the charcoal canister vent side port and purge solenoid valve side port.
3. Blow air into the charcoal canister and verify that no air leaks.
4. If air leaks, replace the charcoal canister.









CANISTER DRAIN CUT VALVE (CDCV)

Inspection

1. Remove the canister drain cut valve. (Refer to page F1–27.)
2. Check for air flow between ports of the solenoid valve.

O—O: Continuity O═O : Air flow B+: Battery positive voltage

Step	Terminal		Port	
	A	B	A	B
1	O——	——O	O═	═O
2	B+	Ground		

3. If not as specified, replace the canister drain cut valve.

PCV VALVE

Inspection

1. Start the engine and let it idle.
2. Disconnect the PCV valve from the cylinder head cover. (Refer to page F1–29.)
3. Block the valve opening by hand and verify that vacuum is felt.
4. If not, check the PCV hose for clogging and damage. If the hose is OK, replace the PCV valve.

PURGE SOLENOID VALVE

Inspection

1. Remove the purge solenoid valve. (Refer to page F1–29.)
2. Check for air flow between ports of the solenoid valve.

O—O: Continuity O═O : Air flow B+: Battery positive voltage

Step	Terminal		Port	
	A	B	A	B
1	O——	——O		
2	B+	Ground	O═	═O

3. If not as specified, replace the purge solenoid valve.

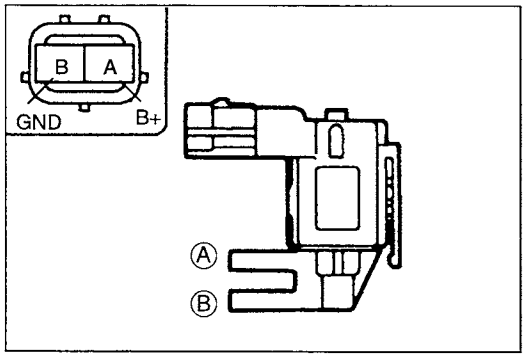
EGR VALVE

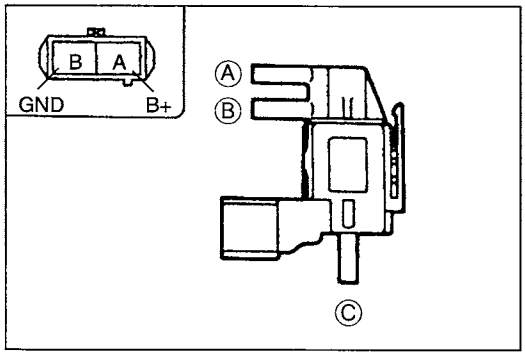
Inspection

1. Start the engine and let it idle.
2. Connect a vacuum pump as shown and apply vacuum.
3. Verify that the engine runs roughly or stalls at the specified vacuum.

Specification:
8.7—10.6 kPa { 65—79 mmHg , 2.6—3.1 inHg }

4. If not as specified, replace the EGR valve. (Refer to page F1–29.)





EGR SOLENOID VALVE

Inspection

EGR solenoid valve (vacuum)

1. Remove the EGR solenoid valve (vacuum). (Refer to page F1–29.)
2. Check for air flow between ports of the solenoid valve.

O—O: Continuity O═O : Air flow B+: Battery positive voltage

Step	Terminal		Port	
	A	B	A	B
1	O—O			
2	B+	Ground	O═O	

3. If not as specified, replace the EGR solenoid valve (vacuum).

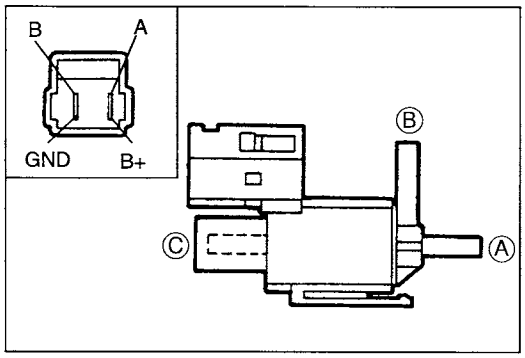
EGR solenoid valve (vent)

1. Remove the EGR solenoid valve (vent). (Refer to page F1–29.)
2. Check for air flow between ports of the solenoid valve.

O—O: Continuity O═O : Air flow B+: Battery positive voltage

Step	Terminal		Port		
	A	B	A	B	C
1	O—O		O═O	O═O	
2	B+	Ground	O═O		

3. If not as specified, replace the EGR solenoid valve (vent).



EGR BOOST SENSOR SOLENOID VALVE

Inspection

1. Remove the EGR boost sensor solenoid valve. (Refer to page F1–29.)
2. Check for air flow between ports of the solenoid valve.

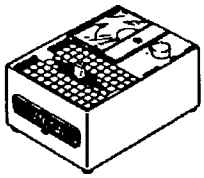
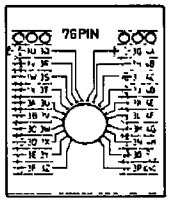
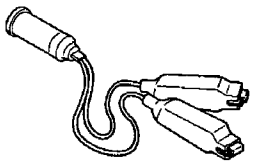
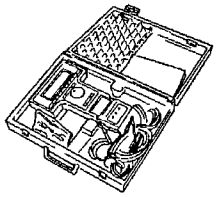
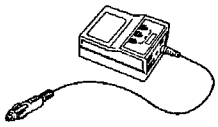
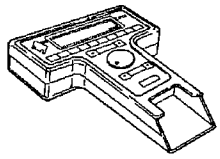
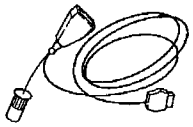
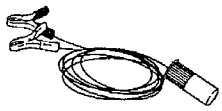
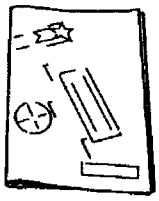
O—O: Continuity O═O : Air flow B+: Battery positive voltage

Step	Terminal		Port		
	A	B	A	B	C
1	O—O			O═O	
2	B+	Ground	O═O		

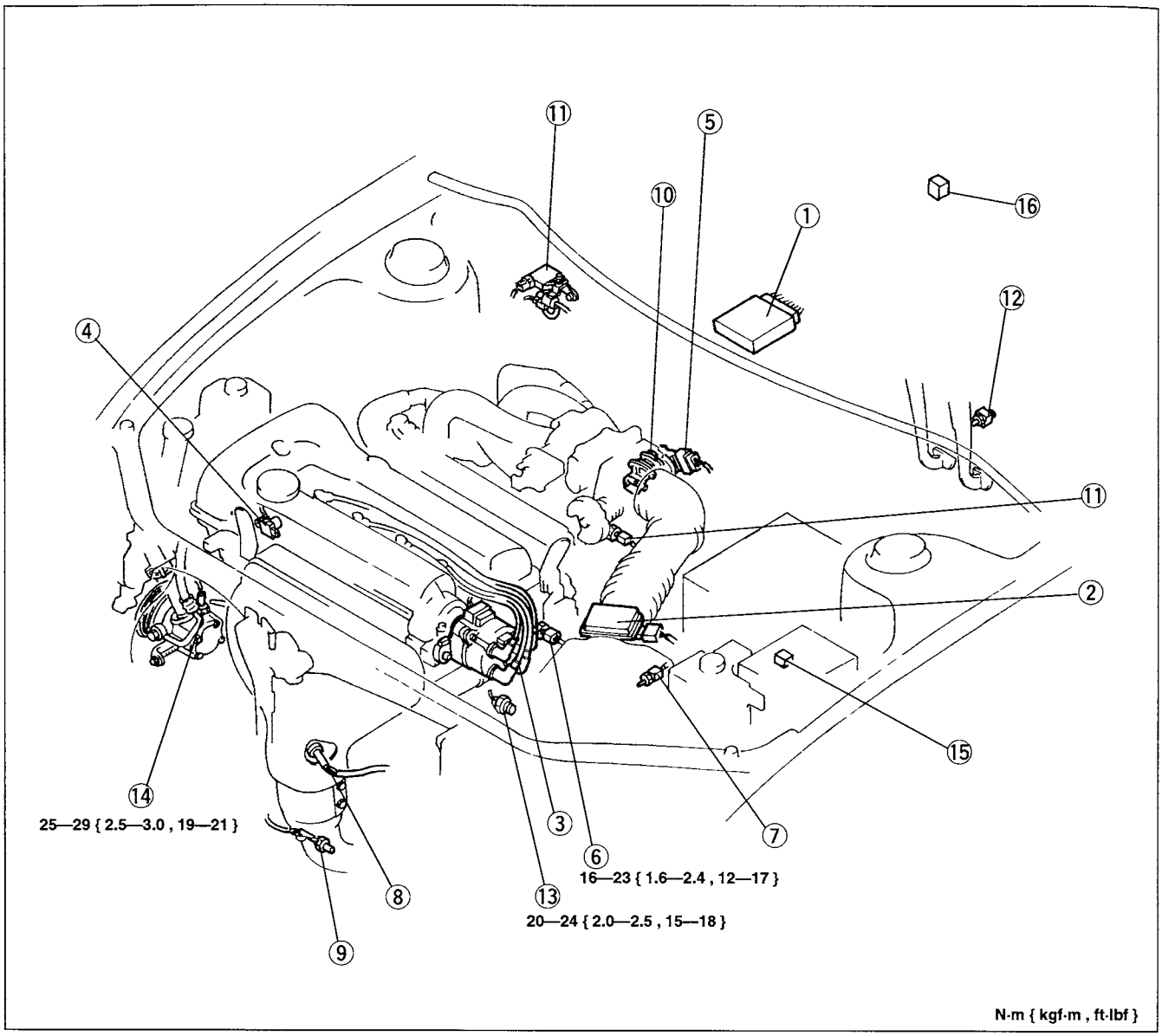
3. If not as specified, replace the EGR boost sensor solenoid valve.

CONTROL SYSTEM

PREPARATION
SST

49 9200 162A Engine Signal Monitor 	For inspection of PCM terminal voltage	49 T018 902 Harness adapter 	For inspection of PCM terminal voltage
49 F018 903 Sheet 	For inspection of PCM terminal voltage	49 D088 008 Harness adapter, Power 	For inspection of PCM terminal voltage
49 T088 0A0 NGS set 	For inspection of PCM and input/output devices	49 T088 010B Program Card 	For inspection of PCM and input/output devices
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of PCM and input/output devices	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of PCM and input/output devices
49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of PCM and input/output devices	49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of PCM and input/output devices
49 T088 008A Instruction Manual 	For inspection of PCM and input/output devices	—	—

COMPONENT PARTS

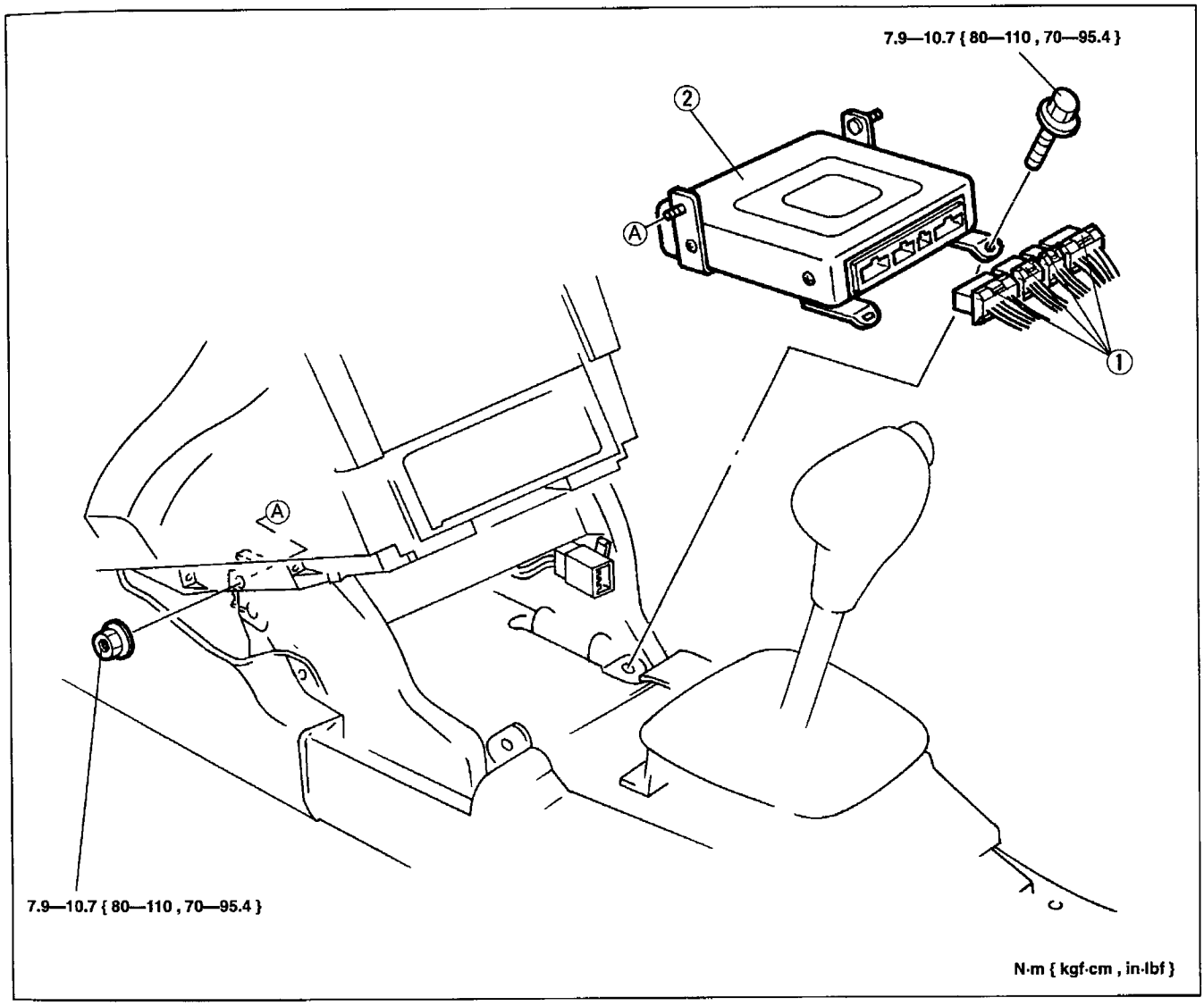


1. Powertrain control module (PCM)
   - Removal / Installation ..... page F1–35
   - Inspection ..... page F1–36
2. Mass air flow sensor
   - Inspection ..... page F1–43
3. Camshaft position sensor
   - Inspection ..... page F1–44
4. Crankshaft position sensor
   - Inspection ..... page F1–44
   - Replacement ..... page F1–45
5. Throttle position sensor
   - Inspection ..... page F1–45
   - Adjustment ..... page F1–46
6. Engine coolant temperature sensor
   - Inspection ..... page F1–48
7. Intake air temperature sensor
   - Inspection ..... page F1–48
8. Heated oxygen sensor (Front)
   - Inspection ..... page F1–48
9. Heated oxygen sensor (Rear)
   - Inspection ..... page F1–48
10. EGR valve position sensor
    - Inspection ..... page F1–49
11. EGR boost sensor
    - Inspection ..... page F1–50
12. Clutch switch
    - Inspection ..... page F1–52
    - Replacement ..... page F1–52
13. Neutral switch
    - Inspection ..... page F1–52
14. Power steering pressure switch
    - Inspection ..... page F1–52
15. Main relay
    - Inspection ..... page F1–53
16. Fuel tank pressure sensor
    - Inspection ..... page F1–51

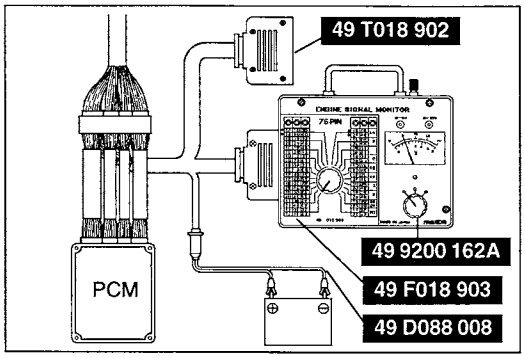
POWERTRAIN CONTROL MODULE (PCM)

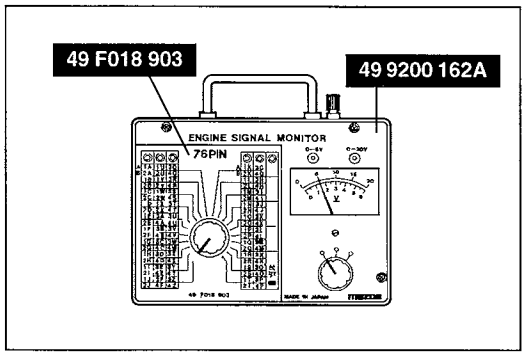
Removal / Installation

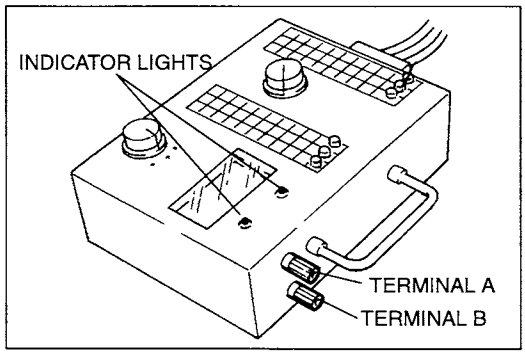
1. Disconnect the negative battery cable.
2. Remove the rear console, front console and undercover. (Refer to section S.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



1. PCM connectors
2. Powertrain control module (PCM)







Inspection

Caution

- **The PCM terminal voltages vary with cange in measuring conditions and vehicle conditions. Always carry out a total inspectioin of the input systems, output systems, and PCM to determine the cause of trouble. Otherwise, a wrong diagnosis will be made.**

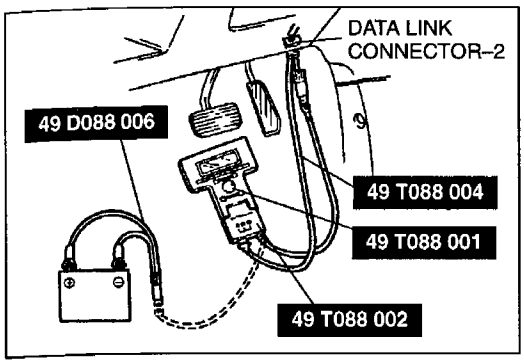
1. Disconnect the negative battery cable.
2. Remove the rear console, front console and undercover. (Refer to section S.)
3. Disconnect the PCM connector.
4. Connect the **SST** (Harness adapter) to the PCM connector.
5. Connect the **SSTs** (Engine Signal Monitor and Harness adapter, power) to the **SST** (Harness adapter). Use connector A of the harness adapter for PCM terminals 1A through 1V and 3A through 3P. Use connector B for PCM terminals 2A through 2L and 4A through 4Z.
6. Place the **SST** (Sheet) on the **SST** (Engine Signal Monitor).
7. Measure the voltage at each PCM terminal by switching the selector switch and the monitor switch.
8. If any incorrect voltage is detected, check related systems, wiring harnesses and connectors referring to the possible malfunction in the terminal voltage list.

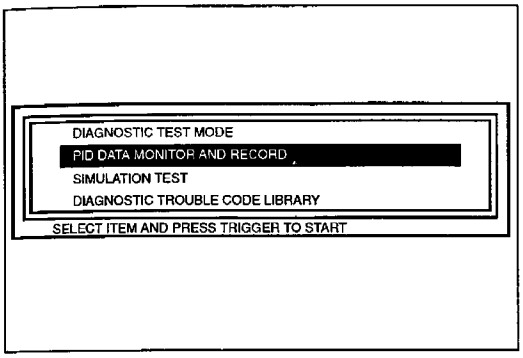
Caution

- **Disconnecting the connectors of the PCM and the SST (Harness adapter) while the battery is connected can damage the PCM and the SST (Engine Signal Monitor). Disconnect the negative battery cable and the SST (Harness adapter, power) before disconnecting the connectors.**
- **Applying voltage to terminals A and B of the SST (Engine Signal Monitor) can damage the SST (Engine Signal Monitor).**

Note

- The indicator lights of the **SST** (Engine Signal Monitor), provided for confirmation of the voltmeter range, is also used for detection of the pulse such as the fuel injector control signal, which is difficult to detect by using the voltmeter.
- Terminals A and B of the **SST** (Engine Signal Monitor) are for connection of an external instrument. By connecting an external instrument such as a circuit tester or an oscilloscope, various inspections in addition to the measurement of the PCM terminal voltages are made possible.





Using SST (NGS)

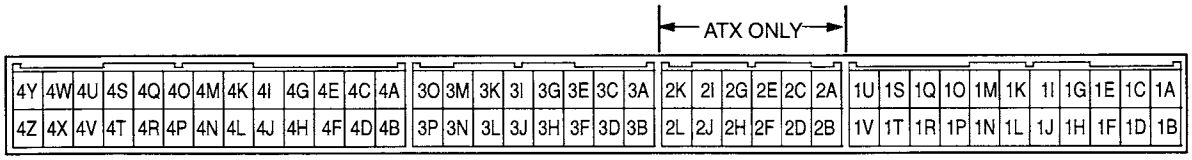
1. In the passenger compartment, connect the **SST** (NGS) to the data link connector–2 as shown in the figure.
2. Referring to the NGS operational manual, select the PID/DATA MONITOR AND RECORD function.
3. Referring to the 1996 Service Highlights, inspect each PCM input/output signal.

Note

- The PID DATA MONITOR AND RECORD function is to monitor the calculation value of input/output signals in the PCM. Deviation in the value does not always indicate malfunction in the related input/output devices.
- When normal output signal cannot be detected when all input signals are normal, replace the PCM.

Terminal voltage (Reference)

B+: Battery positive voltage
*1: In data link connector
*2: ATX only



Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
1A*2	Condenser fan control	Condenser fan relay	Idle	Condenser fan operating	Below 1.0	• Condenser fan relay (Refer to section U)
				Condenser fan stop	B+	
1B	Cooling fan control	Cooling fan relay	Ignition switch ON	Cooling fan operating/ Terminal *1TEN ground and throttle valve open	Below 1.0	• Cooling fan relay (Refer to section E)
				Cooling fan stop	B+	
1C	—	—	—		—	—
1D	Serial communication	Data link connector-2 terminal KLN	Carry out inspection according to diagnostic trouble code Diagnostic trouble code output is a part of serial communication Judgement by terminal voltage is not possible (Refer to page F1–54)		—	• On-board diagnostic system
1E	MIL	Malfunction indicator lamp	Malfunction indicator lamp OFF		B+	• PCM terminal 1E — MIL
			Malfunction indicator lamp ON		Below 1.0	
1F	—	—	—		—	—
1G	A/C control	A/C relay	Ignition switch ON		B+	• A/C relay (Refer to section U)
			Idle	A/C operating	Below 1.0	
				A/C stop	B+	
1H	Headlight	Headlight switch	Headlight switch OFF		Below 1.0	• Headlight switch (Refer to section T)
			Headlight switch ON		B+	
1I	Diagnostic test mode	Data link connector (Terminal TEN)	Ignition switch ON	Open terminal *1TEN	B+	• PCM terminal 1I – *1TEN harness
				Short terminal *1TEN	Below 1.0	
1J	Rear window defroster	Rear window defroster switch	Ignition switch ON	Rear window defroster switch OFF	Below 1.0	• Rear window defroster switch (Refer to section T)
				Rear window defroster switch ON	B+	
1K	A/C	A/C amplifier	Idle	A/C switch and blower switch ON	Below 1.2	• A/C switch • Refrigerant pressure switch • A/C amplifier (Refer to section U)
				A/C switch OFF	B+	
1L	Load/No load distinction	Neutral/clutch switch (MTX), Transaxle range switch (ATX)	Ignition switch ON	MTX Other than neutral position and clutch pedal released	B+	• Neutral switch (Refer to page F1–52) • Clutch switch (Refer to page F1–52) • Transaxle range switch (Refer to section K)
				ATX Other than P or N position		
				MTX Neutral position or clutch pedal depressed	Below 1.0	
				ATX P or N position		

B+: Battery positive voltage
*1: In data link connector
*2: ATX only

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
1M	Vehicle speed	Vehicle speed sensor	Ignition switch ON		0 or 4.0	• Vehicle speed sensor (Refer to section T)
			Driving		Approx. 3.0	
1N	DRL (CANADA)	DRL unit	Daytime running light ON		Below 1.0	• DRL unit (Refer to section T)
			Datytime running light OFF		Above 11.0	
1O	—	—	—		—	—
1P	Blower	Fan switch	Ignition switch ON	Fan switch OFF or ON at 1st	B+	• Fan switch (Refer to section U)
				Fan switch ON at 2nd or higher	Below 1.0	
1Q	Brake	Brake switch	Brake pedal released		Below 1.0	• Brake switch (Refer to section P)
			Brake pedal depressed		B+	
1R	—	—	—		—	—
1S	—	—	—		—	—
1T	—	—	—		—	—
1U	Fuel pump control	Fuel pump relay	Ignition switch ON		B+	• Fuel pump relay (Refer to page F1–22)
			Cranking		Below 1.0	
			Idle			
1V	—	—	—		—	—
*2 2A	Shift solenoid A control	Shift solenoid A	During shifting		B+	• Shift solenoid A (Refer to section K)
			Others		0	
*2 2B	Shift solenoid B control	Shift solenoid B	During shifting		B+	• Shift solenoid B (Refer to section K)
			Others		0	
*2 2C	Shift solenoid C control	Shift solenoid C	During shifting		B+	• Shift solenoid C (Refer to section K)
			Others		0	
*2 2D	Torque converter clutch solenoid control	Torque converter clutch solenoid	During shifting		B+	• Torque converter clutch solenoid (Refer to section K)
			Others		0	
*2 2E	O/D OFF indicator light control	O/D OFF indicator light	Ignition switch ON	O/D OFF mode	Below 1.0	• Instrument cluster (O/D OFF indicator) (Refer to section K)
				Others	B+	
*2 2F	D range	Transaxle range switch (D range)	Idle	D range	B+	• Transaxle range switch (Refer to section K)
				Others	0	
*2 2G	2 range	Transaxle range switch (2 range)	Idle	2 range	B+	
				Others	0	
*2 2H	1 range	Transaxle range switch (1 range)	Idle	1 range	B+	
				Others	0	
*2 2I	O/D OFF switch	O/D OFF switch	Ignition switch ON	O/D OFF switch pressed	Below 1.0	• O/D OFF switch (Refer to section K)
				O/D OFF switch released	B+	
2J	—	—	—		—	—
*2 2K	Input/turbine speed sensor	Input/turbine speed sensor (turbine)	Ignition switch ON		Approx. 2.5	• Input/turbine speed sensor (Refer to section K)
			Idle			
*2 2L	Input/turbine speed sensor ground	Input/turbine speed sensor (ground)	Constant		Below 2.5	• PCM 2L terminal continuity harness (Refer to section K)

B+: Battery positive voltage
*1: In data link connector
*2: ATX only

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
3A	Fuel tank pressure	Fuel tank pressure sensor	Ignition switch ON	Fuel tank pressure 0 kPa { 0 mmHg , 0 inHg } (Barometric Pressure)	Approx. 2.5	• Fuel tank pressure sensor
3B	Mass air flow sensor (HWP)	Mass air flow sensor	Ignition switch ON		Below 1.5	• Mass air flow sensor (Refer to page F1–43)
			Idle		1.0—2.5	
3C	Heated oxygen sensor (Front)	Heated oxygen sensor (Front)	Ignition switch ON		Approx. 0	• Heated oxygen sensor (Front) (Refer to page F1–48)
			Idle	Engine cold	0—0.9	
				After warm up	0—1.0	
			Acceleration		0.5—1.0	
			Deceleration		0—0.5	
3D	Heated oxygen sensor (Rear)	Heated oxygen sensor (Rear)	Ignition switch ON		Approx. 0	• Heated oxygen sensor (Rear) (Refer to page F1–48)
			Idle	Engine cold	Below 1.0	
				After warm up	0—1.0	
			Acceleration		0—1.0	
			Deceleration		0—1.0	
*2 3E	Transaxle fluid temperature	Trasaxle fluid temperature sensor	Ignition switch ON	Transaxle fluid temperature 20 °C { 68 °F }	Approx. 5	• Transaxle fluid temperature sensor (Refer to section K)
				Transaxle fluid temperature 130 °C { 266 °F }	Approx. 1.5	
3F	Throttle position (TVO)	Throttle position sensor	Ignition switch ON	Closed throttle position	0.3—0.7	• Throttle position sensor (Refer to page F1–45) • PCM terminal 3I voltage
				Wide open throttle	3.4—5.3	
3G	Engine coolant temperature	Engine coolant temperature sensor	Ignition switch ON	Engine coolant temp 20 °C { 68 °F }	Approx. 5.0	• Engine coolant temperature sensor (Refer to page F1–48)
				After warm up	Below 1.0	
3H	Barometric pressure/EGR boost	EGR boost sensor	Ignition switch ON		Approx. 4.5	• EGR boost sensor (Refer to page F1–50)
			Idle			
3I	Constant voltage (Vref)	Throttle position sensor EGR valve position sensor	Ignition switch ON		Approx. 5.0	• PCM terminal 4B voltage
3J	EGR valve position	EGR valve position sensor	Ignition switch ON		Approx. 0.8	• EGR valve position sensor (Refer to page F1–49) • PCM terminal 3I voltage
			Idle			
3K	Intake air temperature	Intake air temprature sensor	Ignition switch ON	Intake air temperature 20 °C { 68 °F }	Approx. 2.2	• Intake air temprature sensor (Refer to page F1–48)
3L	—	—	—		—	—
3M	Heated oxygen sensor heater	Heated oxygen sensor	Ignition switch ON	Idle	Below 1.0	• Heated oxygen sensor (Refer to page F2–48)
3N	—	—	—		—	—
3O	Analogue sensor ground	Ground	Constant		Below 1.0	• PCM 3O terminal harness (Open)

B+: Battery positive voltage
*1: In data link connector
*2: ATX only

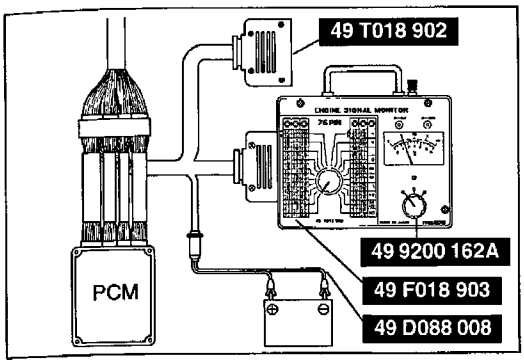
Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
3P	Power steering pressure	Power steering pressure switch	Ignition switch ON		B+	• Power steering pressure switch (Refer to page F1–52)
			Idle	P/S not operating		
				P/S operating	Below 1.0	
4A	PCM ground	Ground	Constant		Below 1.0	• PCM 4A harness (Open)
4B	Power supply	Main relay (FUEL INJ relay)	Ignition switch	OFF	Below 1.0	• Main relay (Refer to page F1–53)
				ON	B+	
4C	Fuel injector ground	Ground	Constant		Below 1.0	• PCM 4C terminal continuity harness (Open)
4D	Output device ground	Ground	Constant		Below 1.0	• PCM 4D terminal continuity harness (Open)
4E	NE⊖	Crankshaft position sensor	Ignition switch ON		Approx. 2.4	• Crankshaft position sensor (Refer to page F1–44)
			Idle			
4F	SGT	Camshaft position sensor (In distributor)	Ignition switch ON		0 or Approx. 5.0	• Camshaft position sensor (Refer to page F1–44)
			Idle		Approx. 2.0	
4G	SGC (California only)	Camshaft position sensor (In distributor)	Ignition switch ON		0 or Approx. 5.0	
			Idle		Approx. 2.5	
4H	NE⊕	Crankshaft position sensor	Ignition switch ON		Approx. 2.4	• Crankshaft position sensor (Refer to page F1–44)
			Idle			
4I	Back-up power supply	Battery	Constant		B+	• PCM 4I terminal — battery harness and connector
4J	Pressure regulator control (except California)	PRC solenoid valve	Idle (Hot condition)		Below 1.0	• PRC solenoid valve (Refer to page F1–22)
			Other		B+	
4K	—	—	—		—	—
4L	EGR boost sensor switching control	EGR boost sensor solenoid valve	Ignition switch ON		B+	• EGR boost sensor solenoid valve (Refer to page F1–28)
			Idle			
4M	Fuel level	Fuel gauge sender unit	Ignition switch ON	Full fuel	Approx. 6	• Fuel gauge sender unit (Refer to section T)
				Low fuel	Approx. 0	
4N	IGT	Ignition control module (In distributor)	Ignition switch ON		Below 1.0	• Ignition control module (Refer to section G)
			Idle		Approx. 0.3	
4O	EGR control (Vent)	EGR solenoid valve (Vent)	Ignition switch ON		B+	• EGR solenoid valve (Vent) (Refer to page F1–28)
			Idle			
4P	EGR control (Vacuum)	EGR solenoid valve (Vacuum)	Ignition switch ON		B+	• EGR solenoid valve (Vacuum) (Refer to page F1–28)
			Idle			
4Q	Idle air control	Idle air control valve	Ignition switch ON		Approx. 0.7	• Idle air control valve (Refer to page F1–8)
			Idle	After warm up (No load)	Approx. 10*	
4R	—	—	—		—	—
4S	—	—	—		—	—

* Engine Signal Monitor: Green and red lights flash

B+: Battery positive voltage
*1: In data link connector
*2: ATX only

Terminal	Signal	Connected to	Test condition	Voltage (V)	Possible malfunction
4T	Purge control	Purge solenoid valve	Ignition switch ON	B+	• Purge solenoid valve (Refer to page F1–27)
			Idle		
4U	Fuel injector control	Fuel injector No.1	Ignition switch ON	B+	• Fuel injector (Refer to page F1–20)
4V		Fuel injector No.2	Idle	B+*	
4W		Fuel injector No.3			
4X		Fuel injector No.4			
4Y	—	—	—	—	—
4Z	CDCV, TPCV control	CDCV, TPCV	Ignition switch ON	B+	• CDCV (Refer to page F1–31) • TPCV (Refer to page F1–30)
			Diagnosis executed	Below 1.0	

* Engine Signal Monitor: Green and red lights flash



MASS AIR FLOW SENSOR

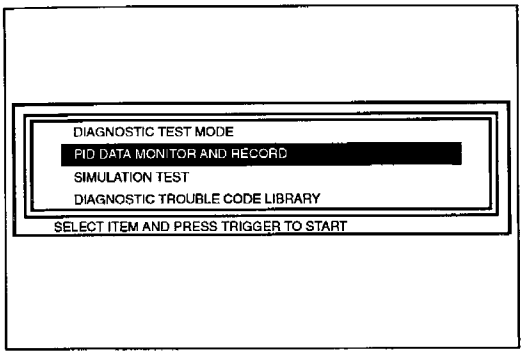
Inspection

1. Check the mass air flow sensor for damage and cracks.
2. Connect the **SSTs** (Engine signal Monitor) to the PCM. (Refer to page F1–36.)
3. Measure the voltage at PCM terminal 3B. (Refer to page F1–40.)
4. Verify that the voltage is within the specification.

Specification

Measuring condition	PCM terminal 3B voltage (V)
Ignition switch ON	Below 2.0
Idle	1.0—2.5

5. If not as specified, inspect the harness and connector between the mass air flow sensor and the PCM terminal.
6. If there is correct terminal voltage and harness continuity, replace the mass air flow sensor. (Refer to page F1–5.)



Using the NGS

1. Check the mass air flow sensor for damage and cracks.
2. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F1–37.)
3. Select the PID/DATA MONITOR AND RECORD function.
4. Select "MAF V" on the NGS display. The NGS measures and shows the voltage.

Specification

Measuring condition	Mass air flow signal Voltage (V)
Ignition switch ON	Below 1.0
Idle	1.0—2.5

5. If not as specified, inspect the harness and connector between the mass air flow sensor and the PCM terminal.
6. If there is correct terminal voltage and harness continuity, replace the mass air flow sensor. (Refer to page F1–5.)

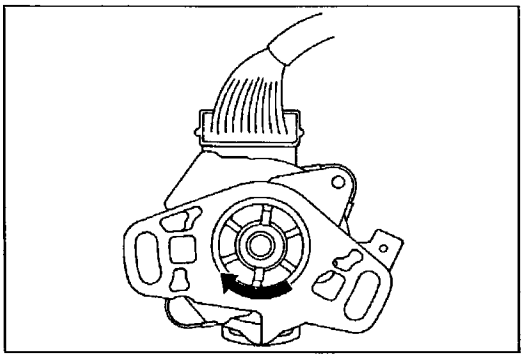
Note

- The scan tool shows the mass air flow rate and load value.

Specification

	Intake mass air flow (g/s)		Engine load calculated value (%)	
	MTX	ATX	MTX	ATX
Idle*	1.4—2.0	1.7—2.4	13.0—19.0	14.0—21.0
Engine speed 2,500 rpm*	5.0—6.4	6.2—7.8	12.0—18.0	16.0—22.0

*: No load, neutral or P position



CAMSHAFT POSITION SENSOR

Inspection

1. Remove the distributor. (Refer to section G.)
2. Disconnect the fuel injector connector.
3. Connect the distributor connector. (6-pin connector for California)

Warning

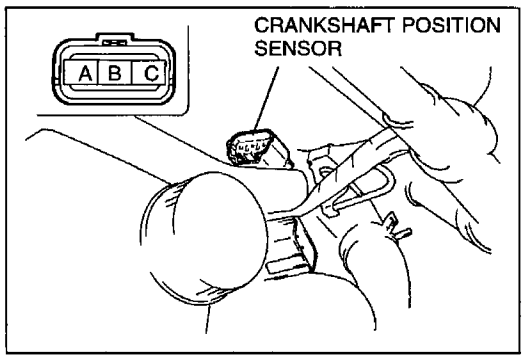
- **Turning the ignition switch on with the fuel injector connector still connected will actuate the fuel injector.**
- **Turning the ignition switch on with the high tension lead still connected will generate sparks, which can cause electrical shock. Disconnect the connector and avoid it from grounding to the vehicle body.**

4. Connect the **SSTs** (Engine Signal Monitor) to the PCM. (Refer to page F1–36.)
5. Turn the ignition switch to ON.
6. Measure the voltage at PCM terminals 4F and 4G. (Refer to page F1–41.)
7. Rotate the distributor drive by hand and check the output signal.

Specification

PCM terminal	Signal	
4F	SGT	Approx. 5 V (4 pulses/rev)
4G (CALIFORNIA)	SGC	Approx. 5 V (1 pulse/rev)

8. If not as specified, inspect the wiring harness and connector between the distributor and the PCM terminal.
9. If there is correct terminal voltage and harness continuity, replace the distributor. (Refer to section G.)



CRANKSHAFT POSITION SENSOR

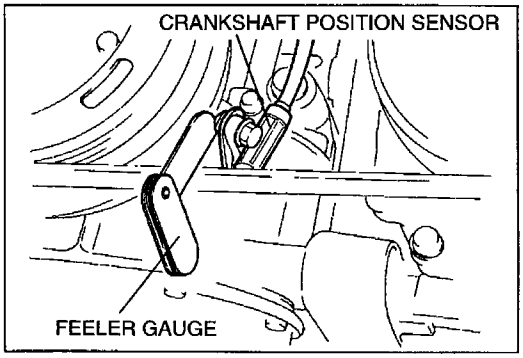
Inspection

Resistance

1. Disconnect the crankshaft position sensor connector.
2. Measure the resistance between terminals A and B by using an ohmmeter.

Specification: 500—600 Ω [20 °C { 68 °F }]

3. If not as specified, replace the crankshaft position sensor. (Refer to page F1–45.)

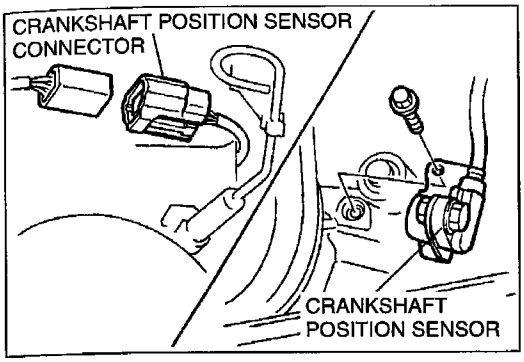


Air gap

1. Measure the air gap between the crankshaft pulley and the crankshaft position sensor by using a feeler gauge.

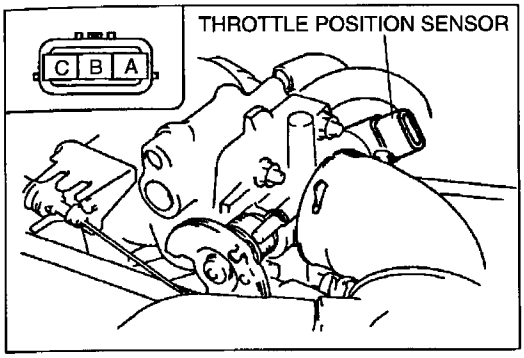
Specification: 0.5—1.5 mm { 0.020—0.059 in }

2. If not as specified, replace the crankshaft pulley or the crankshaft position sensor. (Refer to page F1–45.)



Replacement
1. Remove the undercover.
2. Remove the crankshaft position sensor.
3. Install in the reverse order of removal.

Tightening torque:
7.9—10.7 N·m { 80—110 kgf·cm , 70—95.4 in·lbf }



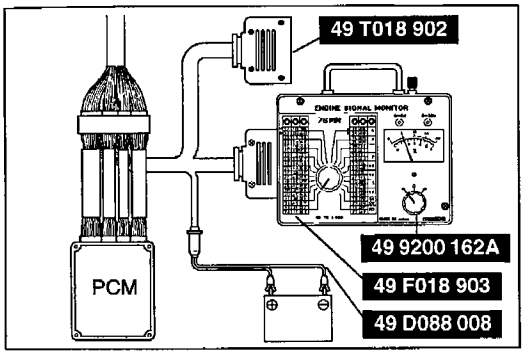
THROTTLE POSITION SENSOR

Inspection

Using ohmmeter
1. Disconnect the throttle position sensor connector.
2. Measure the resistance between throttle position sensor connector terminals A and C by using an ohmmeter.

Specification: 4.0—6.0 kΩ

3. If not as specified, replace the throttle position sensor.
4. Connect the throttle position sensor connector.
5. Adjust the throttle position sensor after installation.

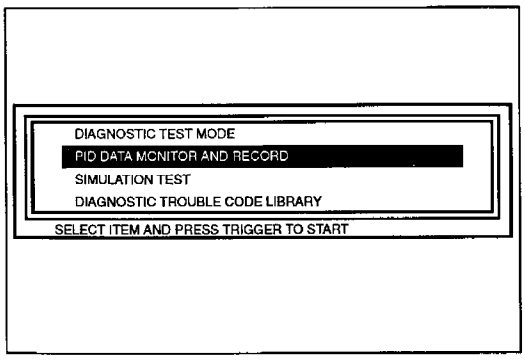


Using the Engine Signal Monitor
1. Remove the PCM. (Refer to page F1–35.)
2. Connect the **SSTs** (Engine Signal Monitor) to the PCM. (Refer to page F1–36.)
3. Verify that the throttle valve is at the closed throttle position.
4. Turn the ignition switch to ON.
5. Measure the voltage at the PCM terminal 3F. (Refer to page F1–40.)

Specification

Measuring condition	Voltage (V)
Closed throttle position	0.3—0.7
Wide open throttle	3.4—5.3
Closed throttle position→Wide open throttle	Increases smoothly

6. If not as specified, adjust the throttle position sensor.

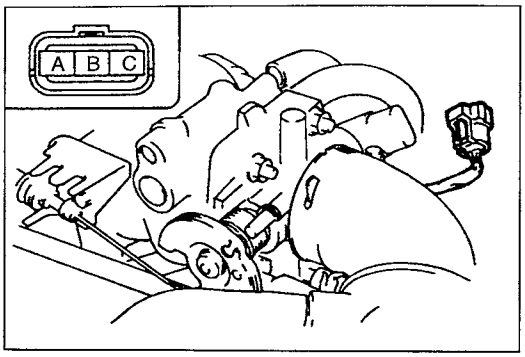


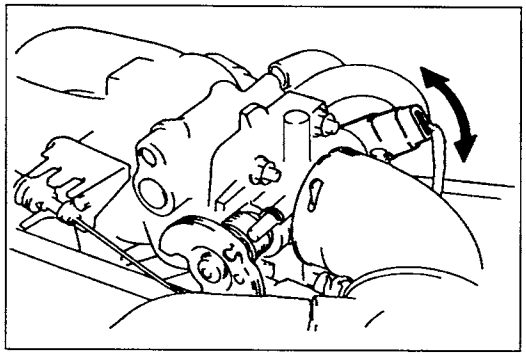
Using the NGS
1. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F1–37.)
2. Verify that the throttle valve is at the closed throttle position.
3. Select the PID/DATA MONITOR AND RECORD function.
4. Select "TP V" on the NGS display. The NGS measures and shows the voltage.

Specification

Measuring condition	Voltage (V)
Closed throttle position	0.3—0.7
Wide open throttle	3.4—5.3
Closed throttle position→Wide open throttle	Increases smoothly

5. If not as specified, adjust the throttle position sensor.





Adjustment

1. Verify that the throttle valve is at the closed throttle position.
2. Disconnect the throttle position sensor connector.
3. Turn the ignition switch to ON.
4. Measure and record the voltage at the harness side connector terminal C by using the voltmeter.

   Specification: 4.5—5.5 V

5. Connect the throttle position sensor connector.
6. Remove the PCM. (Refer to page F1–35.)
7. Connect the **SSTs** (Engine Signal Monitor) to the PCM. (Refer to page F1–36.)
8. Verify that the throttle valve is at the closed throttle position.
9. Turn the ignition switch to ON.
10. Loosen the throttle position sensor screw.
11. Adjust the throttle position sensor so that PCM terminal 3F voltage is within the specification. (Refer to page F1–40.)

Specification (closed throttle position)

Connector side terminal C Voltage (V)	PCM terminal 3F Voltage (V)
4.5—4.9	0.4—0.5
4.9—5.1	0.4—0.6
5.1—5.5	0.5—0.6

12. Tighten the throttle position sensor screw.

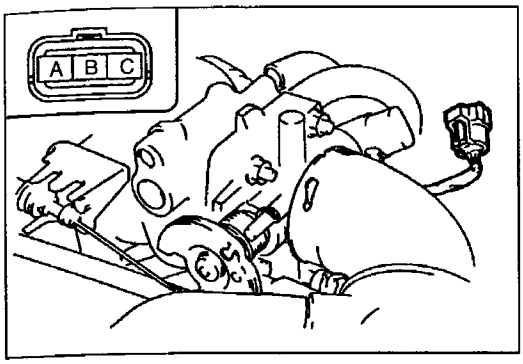
    Tightening torque:
    1.6—2.3 N·m { 16—24 kgf·cm , 14—20 in·lbf }

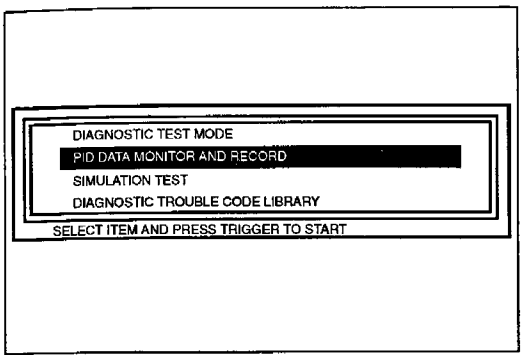
13. Fully open the throttle valve and verify that the voltage at PCM terminal 3F is within the specification.

Specification (wide open throttle)

Connector side terminal C Voltage (V)	PCM terminal 3F Voltage (V)
4.5—4.7	3.5—4.4
4.7—4.8	3.6—4.5
4.8—4.9	3.7—4.6
4.9—5.0	3.7—4.8
5.0—5.1	3.8—4.9
5.1—5.3	4.0—5.0
5.3—5.4	4.1—5.1
5.4—5.5	4.2—5.2

14. If not as specified, replace the throttle position sensor. (Refer to page F1–34.)
15. Adjust the throttle position sensor after installation.





Using the NGS

1. Verify that the throttle valve is at the closed throttle position.
2. Disconnect the throttle position sensor connector.
3. Turn the ignition switch to ON.
4. Measure and record the voltage at the harness side connector terminal C by using the voltmeter.

   Specification: 4.5—5.5 V

5. Connect the throttle position sensor connector.
6. Connect the **SSTs** (NGS) to the data link connector–2.
7. Select the PID/DATA MONITOR AND RECORD function.
8. Select the "TP V" and verify that the throttle valve is at the closed throttle position.
9. Loosen the throttle position sensor screw.
10. Adjust the throttle position sensor so that throttle position signal voltage is with in the specification.

Specification (closed throttle position)

Connector side terminal C Voltage (V)	Throttle position signal Voltage (V)
4.5—4.9	0.4—0.5
4.9—5.1	0.4—0.6
5.1—5.5	0.5—0.6

11. Tighten the throttle position sensor screw.

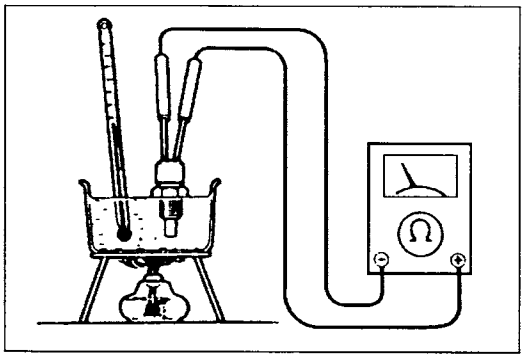
    Tightening torque:
    1.6—2.3 N·m { 16—24 kgf·cm , 14—20 in·lbf }

12. Fully open the throttle valve and verify that the voltage is within the specification.

Specification (wide open throttle)

Connector side terminal C Voltage (V)	Throttle position signal Voltage (V)
4.5—4.7	3.5—4.4
4.7—4.8	3.6—4.5
4.8—4.9	3.7—4.6
4.9—5.0	3.7—4.8
5.0—5.1	3.8—4.9
5.1—5.3	4.0—5.0
5.3—5.4	4.1—5.1
5.4—5.5	4.2—5.2

13. If not as specified, replace the throttle position sensor. (Refer to page F1–34.)
14. Adjust the throttle position sensor after installation.



ENGINE COOLANT TEMPERATURE SENSOR

Inspection

1. Remove the engine coolant temperature sensor. (Refer to page F1–34.)
2. Place the sensor in water with a thermometer, and heat the water gradually.
3. Measure the resistance of the sensor by using an ohmmeter.

Specification

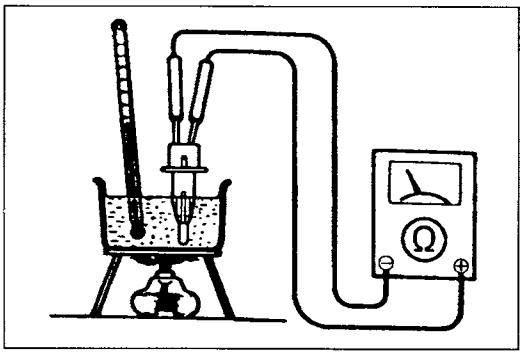
Water temperature (°C { °F })	Resistance (kΩ)
20 { 68 }	2.2—2.7
80 { 176 }	0.3—0.4

4. If not as specified, replace the engine coolant temperature sensor.

INTAKE AIR TEMPERATURE SENSOR

Inspection

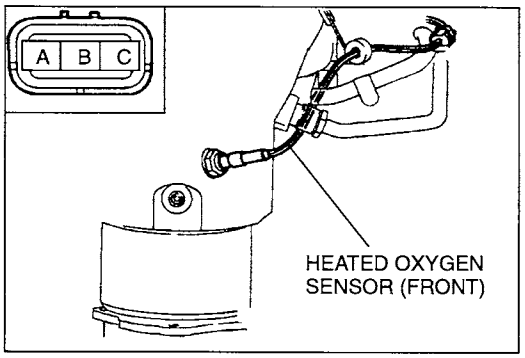
1. Remove the intake air temperature sensor. (Refer to page F1–34.)
2. Place the sensor in water with a thermometer, and heat the water gradually.
3. Measure the resistance of the sensor by using an ohmmeter.



Spcification

Water temperature (°C { °F })	Resistance (kΩ)
20 { 68 }	2.2—2.7
80 { 176 }	0.29—0.34

4. If not as specified, replace the intake air temperature sensor.

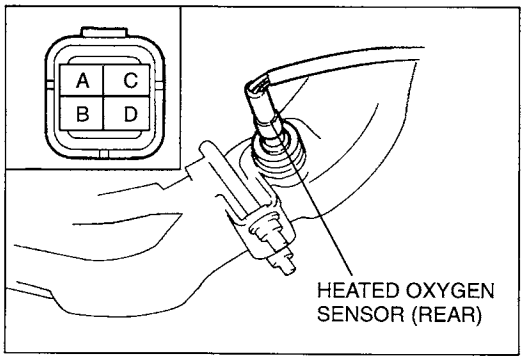


HEATED OXYGEN SENSOR

Inspection

Sensor

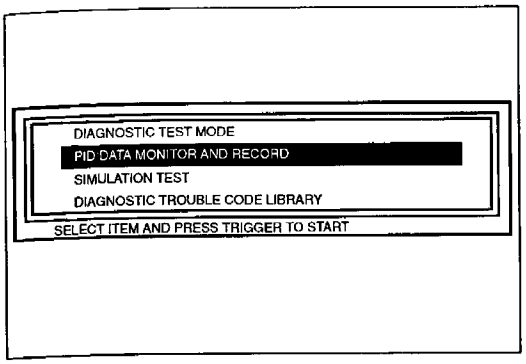
1. Warm up the engine to normal operating temperature.
2. Connect the **SSTs** (Engine Signal Monitor) to the PCM. (Refer to page F1–36.)
3. Measure the PCM terminal 3C and 3D voltages.



Spcification

Engine condition	PCM terminal 3C	PCM terminal 3D
Idle	0—1.0 V	0—1.0 V
Deceleration	0—0.5 V	0—1.0 V
Acceleration	0.5—1.0 V	0—1.0 V

4. If not as specified, inspect the following.
   - Harness and connector between heated oxygen sensor and PCM.
   - On-board diagnostic system (Refer to page F1–54.)
   - System inspection
     Intake manifold vacuum (Refer to page F1–119.)
     Fuel line pressure (Refer to page F1–120.)
5. If all the systems are OK, replace the heated oxygen sensor. (Refer to page F1–24.)



Using the NGS

1. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F1–37.)
2. Select the PID/DATA MONITOR AND RECORD function.
3. Select "FHO2S", "RHO2S" on the NGS display. The NGS measures and shows the voltage.

Spcification

Engine condition	FHO2S voltage (V)	RHO2S voltage (V)
Idle	0—1.0	0—1.0
Deceleration	0—0.5	0—1.0
Acceleration	0.5—1.0	0—1.0

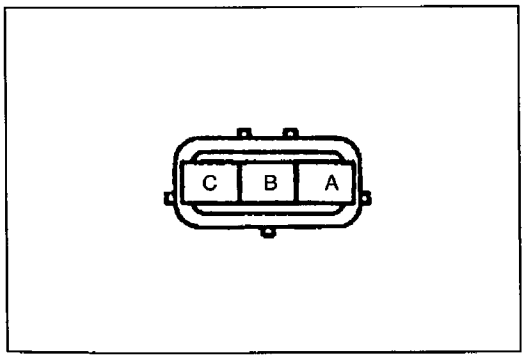
4. If not as specified, inspect the following.
   - Harness and connector between heated oxygen sensor and PCM.
   - On-board diagnostic system (Refer to page F1–54.)
   - System inspection
     Intake manifold vacuum (Refer to page F1–119.)
     Fuel line pressure (Refer to page F1–120.)
5. If all the systems are OK, replace the heated oxygen sensor. (Refer to page F1–24.)

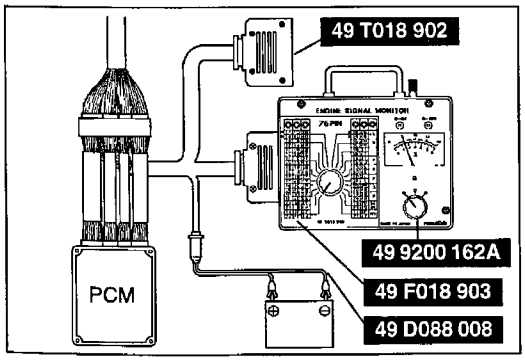
Heater

1. Disconnect the heated oxygen sensor connector.
2. Measure the resistance between heated oxygen sensor terminals B and C (Front) or D and C (Rear) by using an ohmmeter.

   Specification: Approx. 6 Ω [20 °C { 68 °F }]

3. If not as specified, replace the heated oxygen sensor. (Refer to page F1–24.)





EGR VALVE POSITION SENSOR

Inspection

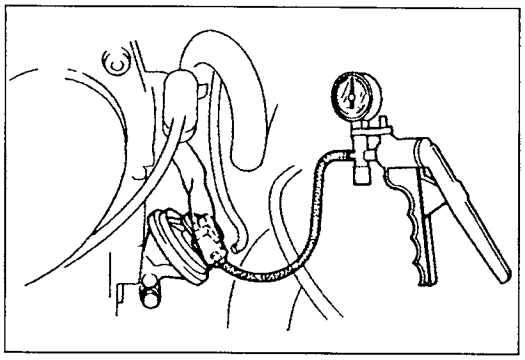
1. Disconnect the EGR valve position sensor connector.
2. Measure the resistance between terminals A and B by using an ohmmeter.

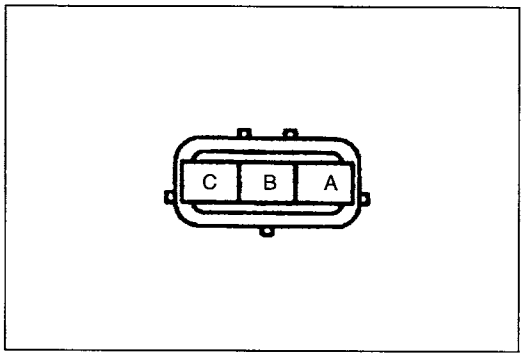
   Specification: 2.7 kΩ

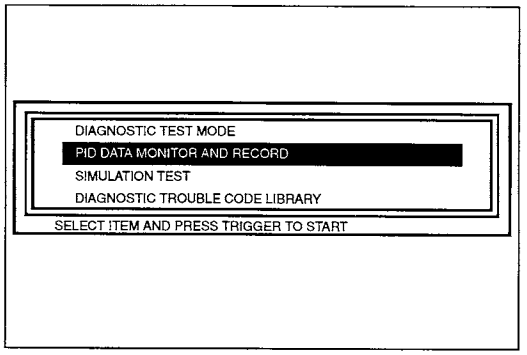
3. If not as specified, replace the EGR valve. (Refer to page F1–25.)
4. Connect the EGR valve position sensor connector.
5. Connect the **SSTs** (Engine Signal Monitor) to the PCM.
6. Disconnect the vacuum hose from the vacuum tube and install a vacuum pump to the valve.
7. Turn the ignition switch to ON.
8. Measure the voltage at the PCM terminal 3J.

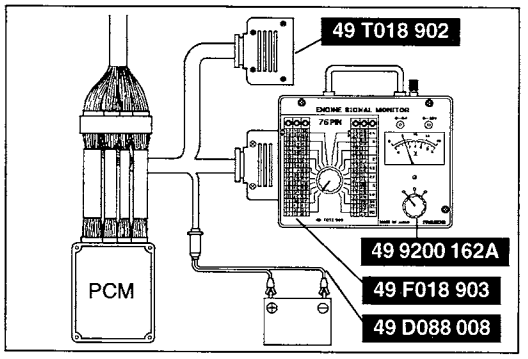
Spcification

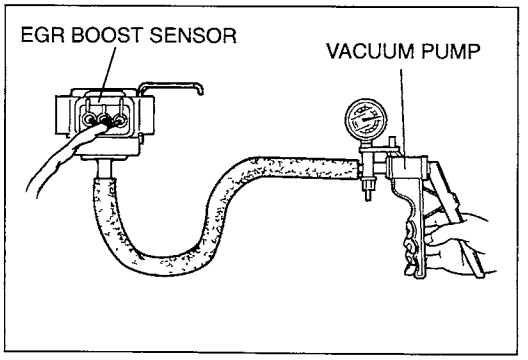
Vacuum	PCM terminal 3J voltage (V)
0 kPa { 0 mmHg , 0 inHg }	Approx. 0.8
Approx. 17 kPa { 128 mmHg , 5.04 inHg }	Approx. 4.9











9. If not as specified, inspect the harness and connector between the EGR valve position sensor and the PCM terminal.
10. If these harness and connector are OK, replace the EGR valve. (Refer to page F1–25.)

Using the NGS

1. Disconnect the EGR valve position sensor connector.
2. Measure the resistance between terminals A and B of the connector by using an ohmmeter.

   Specification: 2.7 kΩ

3. If not as specified, replace the EGR valve. (Refer to page F1–25.)
4. Connect the EGR valve position sensor connector.
5. Connect the air intake hose.
6. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F1–37.)
7. Select the PID/DATA MONITOR AND RECORD function.
8. Disconnect the vacuum hose from the vacuum tube and install a vacuum pump to the valve.
9. Select the "EGRP V" on the NGS display. The NGS measures and shows the voltage.

Specification

Vacuum	EGR valve position signal voltage (V)
0 kPa { 0 mmHg , 0 inHg }	Approx. 0.8
Approx. 17 kPa { 128 mmHg , 5.04 inHg }	Approx. 4.9

10. If not as specified, inspect the harness and connector between the EGR valve position sensor and the PCM terminal.
11. If these harness and connector are OK, replace the EGR valve. (Refer to page F1–25.)

EGR BOOST SENSOR

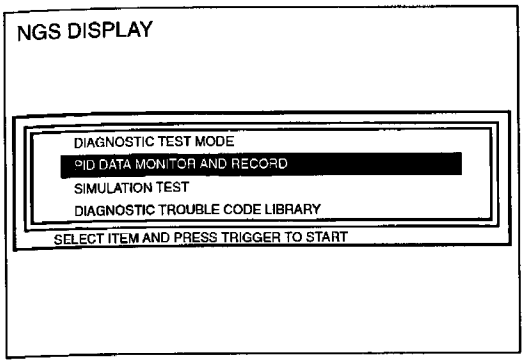
Inspection

1. Connect the **SSTs** (Engine Signal Monitor) to the PCM. (Refer to page F1–36.)
2. Apply vacuum to the EGR boost sensor by using a vacuum pump. Measure the pressure at PCM terminal 3H.

Specification

Vacuum	PCM terminal 3H voltage (V)
86.3 kPa { 660 mmHg , 26.0 inHg }	Approx. 0.3
61.3 kPa { 460 mmHg , 18.1 inHg }	Approx. 1.6
6.3 kPa { 47.5 mmHg , 1.9 inHg }	Approx. 4.4

3. If not as specified, replace the EGR boost sensor. (Refer to page F1–34.)



Using the NGS

1. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F1–37.)
2. Select the PID/DATA MONITOR AND RECORD function.
3. Apply vacuum to the EGR boost sensor by using a vacuum pump.
4. Select "BARO V" on the NGS display. The NGS measures and shows the voltage.

Specification

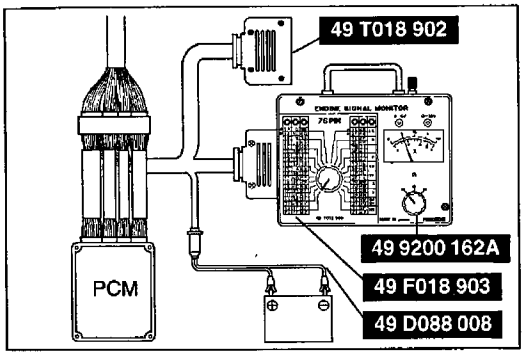
Vacuum	Barometric pressure signal voltage (V)
86.3 kPa { 660 mmHg , 26.0 inHg }	Approx. 0.3
61.3 kPa { 460 mmHg , 18.1 inHg }	Approx. 1.6
6.3 kPa { 47.5 mmHg , 1.9 inHg }	Approx. 4.4

5. If not as specified, replace the EGR boost sensor. (Refer to page F1–34.)

FUEL TANK PRESSURE SENSOR

Inspection

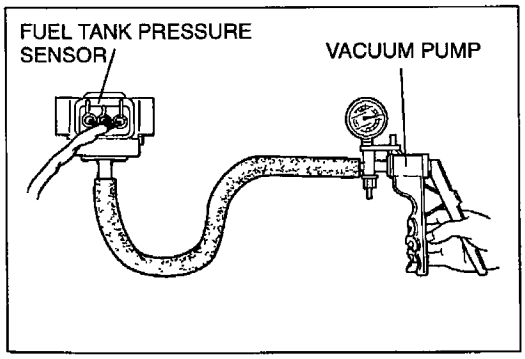
1. Connect the **SSTs** (Engine Signal Monitor) to the PCM. (Refer to page F1–36.)
2. Apply vacuum to the fuel tank pressure sensor by using a vacuum pump. Measure the pressure at PCM terminal 3A.



Specification

Vacuum	PCM terminal 3A voltage (V)
0 kPa { 0 mmHg , 0 inHg }	Approx. 2.5
6.7 kPa { 50 mmHg , 2.0 inHg }	Approx. 0.5

3. If not as specified, replace the fuel tank pressure sensor. (Refer to page F1–13.)



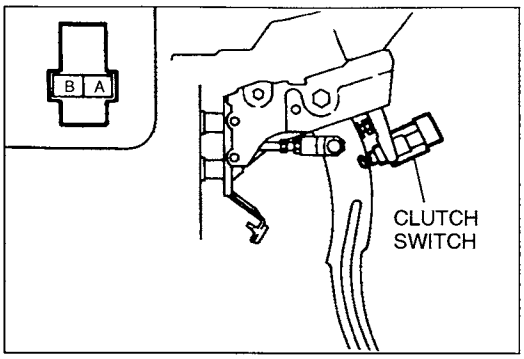
Using the NGS

1. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F1–37.)
2. Select the PID/DATA MONITOR AND RECORD function.
3. Apply vacuum to the fuel tank pressure sensor by using a vacuum pump.
4. Select "FTP V" on the NGS display. The NGS measures and shows the voltage.

Specification

Vacuum	Fuel tank pressure signal voltage (V)
0 kPa { 0 mmHg , 0 inHg }	Approx. 2.5
6.7 kPa { 50 mmHg , 2.0 inHg }	Approx. 0.5

5. If not as specified, replace the fuel tank pressure sensor. (Refer to page F1–13.)



CLUTCH SWITCH

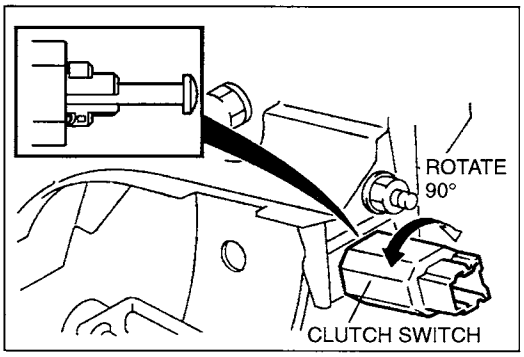
Inspection

1. Disconnect the clutch switch connector.
2. Check for continuity between terminals of the clutch switch by using an ohmmeter.

O—O: Continuity

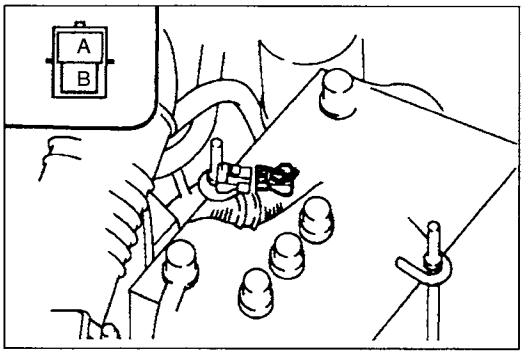
Condition \ Terminal	A	B
Clutch pedal not depressed		
Clutch pedal depressed	O	O

3. If not as specified, replace the clutch switch.



Replacement

Install the clutch switch as shown in the figure.



NEUTRAL SWITCH

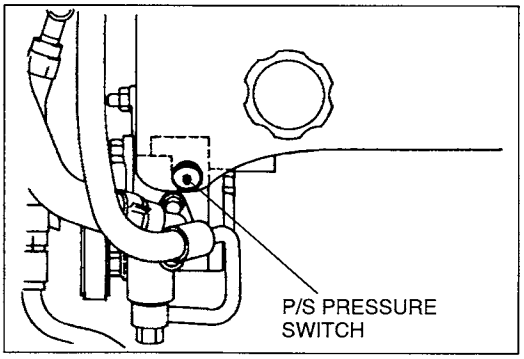
Inspection

1. Disconnect the neutral switch connector.
2. Check for continuity between terminals of the neutral switch by using an ohmmeter.

O—O: Continuity

Condition \ Terminal	A	B
Neutral position	O	O
Others		

3. If not as specified, replace the neutral switch. (Refer to page F1–34.)



POWER STEERING PRESSURE SWITCH

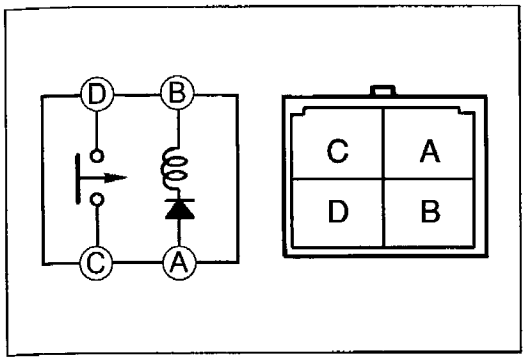
Inspection

1. Disconnect the power steering pressure switch connector.
2. Start the engine.
3. Check for the continuity between power steering pressure switch terminal and a ground by using an ohmmeter.

O—O: Continuity

Condition \ Terminal	A	Ground
Steering wheel not turned		
Steering wheel being turned	O	O

4. If not as specified, replace the power steering pressure switch. (Refer to page F1–34.)



MAIN RELAY

Inspection

1. Remove the main relay. (Refer to page F1–34.)
2. Check the continuity between the relay terminals by using an ohmmeter.

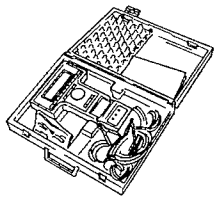
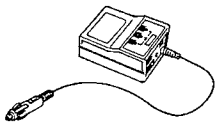
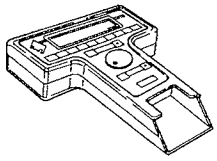
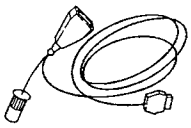
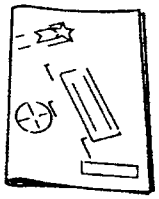
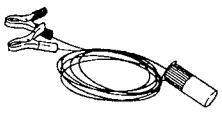
O—O: Continuity B+: Battery positive voltage

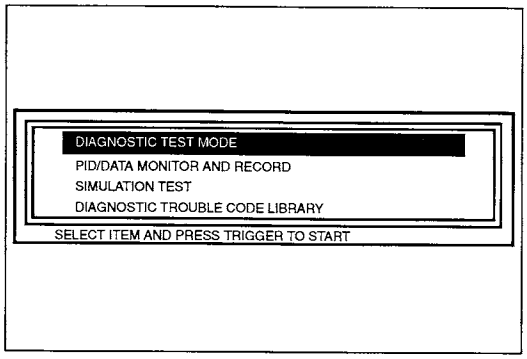
Step \ Terminal	A	B	C	D
1	O	O		
2	Ground	B+	O	O

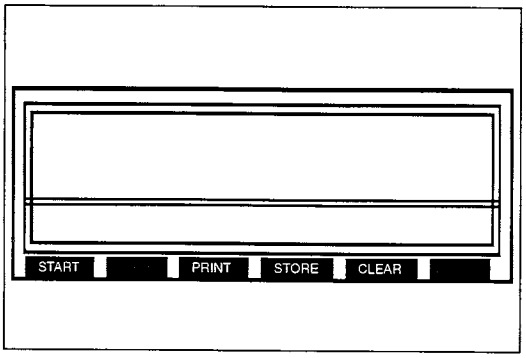
3. If not as specified, replace the main relay.

ON-BOARD DIAGNOSTIC SYSTEM

PREPARATION
SST

49 T088 0A0 NGS set 	For diagnosis of PCM and input/output systems	49 T088 010B Program Card 	For diagnosis of PCM and input/output systems
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For diagnosis of PCM and input/output systems	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For diagnosis of PCM and input/output systems
49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For diagnosis of PCM and input/output systems	49 T088 008A Instruction Manual 	For diagnosis of PCM and input/output systems
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For diagnosis of PCM and input/output systems	—	—





DIAGNOSTIC TROUBLE CODE NUMBER
Inspection
1. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F1–37.)
2. Refer to the manufacturer-provided instruction manual for the NGS operation.
3. Select "DIAGNOSTIC TEST MODE" function and press trigger.
4. When "NO CODES RECEIVED/SYSTEM PASSED" is displayed, all systems monitord are judged OK.
5. When any of the diagnostic trouble codes is displayed, carry out troubleshooting according to the code. (Refer to page F1–55.)
6. If "LINK MONITOR ERROR" is displayed, check connection of the NGS.
7. After all problems have been repaired, carry out "After Repair Procedure." (Refer to below.)

After Repair Procedure
1. After repairs, connect the NGS to the data link connector–2.
2. Select "CLEAR" function and erase diagnostic trouble codes from the PCM memory.
3. Perform diagnostic trouble code inspection again and verify that no diagnostic trouble codes are displayed.

Diagnostic Trouble Code Numbers

DTC	Display on the NGS	Condition	Page
P0100	MAF/VAF—CIRCUIT MALFUNCTION	Mass air flow circuit malfunction	F1–57
P0110	IAT—CIRCUIT MALFUNCTION	Intake air temperature circuit malfunction	F1–58
P0115	ECT—CIRCUIT MALFUNCTION	Engine coolant temperature circuit malfunction	F1–59
P0120	TP—CIRCUIT MALFUNCTION	Throttle position circuit malfunction	F1–60
P0125	EXCESSIVE TIME TO ENTER CLOSED LOOP	Excessive time to enter closed loop fuel control	F1–61
P0130	O2S 11—CIRCUIT MALFUNCTION	O_2 sensor circuit malfunction	F1–61
P0134	O2S 11—CIRCUIT NO ACTIVITY DETECTED	O_2 sensor circuit no activity detected	F1–62
P0135	O2S 11—HEATER CIRCUIT MALFUNCTION	O_2 sensor heater circuit malfunction	F1–63
P0140	O2S 12—CIRCUIT NO ACTIVITY DETECTED	O_2 sensor circuit no activity detected	F1–64
P0170	BANK 1—FUEL TRIM MALFUNCTION	Fuel trim malfunction	F1–65
P0300	RANDOM MISFIRE DETECTED	Random misfire detected	F1–66
P0301	CYLINDER 1 MISFIRE DETECTED	Cylinder 1 misfire detected	F1–67
P0302	CYLINDER 2 MISFIRE DETECTED	Cylinder 2 misfire detected	F1–68
P0303	CYLINDER 3 MISFIRE DETECTED	Cylinder 3 misfire detected	F1–69
P0304	CYLINDER 4 MISFIRE DETECTED	Cylinder 4 misfire detected	F1–70
P0335	CRANKSHAFT POS SENSOR—CKT MALFUNCTION	Crankshaft position sensor circuit malfunction	F1–71
P0340	CAMSHAFT POS SENSOR—CKT MALFUNCTION	Camshaft position sensor circuit malfunction	F1–72
P0400	EGR—FLOW MALFUNCTION	Exhaust gas recirculation flow malfunction	F1–73
P0420	BANK 1 CAT EFFICIENCY BELOW LIMIT	Catalyst system effciency below threshold	F1–73
P0440	EVAP SYSTEM—MALFUNCTION	Evaporative emission control system malfunction	F1–74

DTC	Display on the NGS	Condition	Page
P0443	EVAP SYSTEM—PURGE CTRL VALVE CKT MALF	Evaporative emission control system purge control valve circuit malfunction	F1–75
P0450	EVAP SYSTEM—PRESSURE SEN MALFUNCTION	Evaporative emission control system pressure sensor malfunction	F1–76
P0500	VEHICLE SPEED SENSOR—MALFUNCTION	Vehicle speed sensor malfunction	F1–77
P0505	IDLE CONTROL SYSTEM—MALFUNCTION	Idle control system malfunction	F1–78
P0703	TORQUE CONV/BRAKE SW—MALFUNCTION	Brake switch input malfunction	F1–79
P1000	MORE DRIVING NEEDED TO COMPLETE TEST	Check of all OBD-II system is not complete since last memory clear	F1–79
P1170	HO2S11—INVERSION	Heated oxygen sensor (Front) (Inversion)	F1–80
P1195	EGRBS—OPEN OR SHORT	EGR boost sensor open or short	F1–81
P1250	PRC—OPEN OR SHORT (Except California)	PRC solenoid valve open or short	F1–82
P1345	SGC SIGNAL—NO SGC SIGNAL (California)	No SGC signal	F1–83
P1402	EGRS—OPEN OR SHORT	EGR valve position sensor open or short	F1–84
P1449	CDCV—OPEN OR SHORT	Canister drain cut valve open or short	F1–85
P1455	FUEL TANK LEVEL SENSOR—OPEN OR SHORT	Fuel gauge sender unit circuit open or short	F1–86
P1485	EGR (VACUUM)—OPEN OR SHORT	EGR solenoid valve (vacuum) open or short	F1–87
P1486	EGR (VENT)—OPEN OR SHORT	EGR solenoid valve (vent) open or short	F1–88
P1487	EGRCHK SOL.—OPEN OR SHORT	EGR boost sensor solenoid valve open or short	F1–89
P1608	PCME (CPU)—MALFUNCTION	PCM (CPU) malfunction	F1–90
P1794	BAT—BAT OR CIRCUIT FAIL	Battery or circuit malfunction	F1–90
P1797	PNS—OPEN OR SHORT	P or N range or neutral/clutch switch open or short	F1–91

Diagnostic trouble code No. P0100	MAF/VAF—CIRCUIT MALFUNCTION
Symptom	Input voltage from mass air flow sensor is below 0.6 V or above 4.9 V when ignition switch is turned on
Possible cause	• Mass air flow sensor malfunction • Open or short circuit in wiring from main relay terminal D to mass air flow sensor terminal C • Open or short circuit in wiring from PCM terminal 3B to mass air flow sensor terminal B • Open circuit in wiring from PCM terminal 4A to mass air flow sensor terminal A

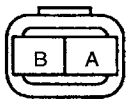
STEP	INSPECTION		ACTION
1	Does mass air flow sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3B voltage OK? ☞ page F1–39	Yes	Go to step 6
		No	Go to next step
3	Disconnect mass air flow sensor connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal C?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — Mass air flow sensor terminal C)
4	Is there continuity between harness side connector terminal A and PCM terminal 4A?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between harness side connector terminal B and PCM terminal 3B	Yes	Replace mass air flow sensor ☞ page F1–5
		No	Repair or replace wiring harness
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0110	IAT—CIRCUIT MALFUNCTION
Symptom	Input from intake air temperature sensor is below 0.1 V or above 4.8 V when ignition switch is turned on
Possible cause	• Intake air temperature sensor malfunction • Open or short circuit in wiring from intake air temperature sensor terminal A to PCM terminal 3K • Open or short circuit in wiring from intake air temperature sensor terminal B to PCM terminal 3O

STEP	INSPECTION		ACTION
1	Does intake air temperature sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3K voltage OK? ☞ **page F1–40**	Yes	Go to step 6
		No	Go to next step
3	Disconnect intake air temperature sensor connector. Turn ignition switch to ON. Is there 5 V at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3K — Intake air temperature sensor terminal A)
4	Is there continuity between harness side connector terminal B and PCM terminal 3O?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is intake air temperature sensor OK? ☞ **page F1–48**	Yes	Go to next step
		No	Replace intake air temperature sensor ☞ **page F1–34**
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Intermittent poor connection of harness of connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0115	**ECT—CIRCUIT MALFUNCTION**
Symptom	Input voltage from engine coolant temperature sensor is below 0.2 V or above 4.9 V when ignition switch is turned on
Possible cause	• Engine coolant temperature sensor malfunction • Open or short circuit in wiring from engine coolant temperature sensor terminal A to PCM terminal 3G • Open or short circuit in wiring from engine coolant temperature sensor terminal B to PCM terminal 3O

STEP	INSPECTION		ACTION
1	Does engine coolant temperature sensor or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3G voltage OK? ☞ **page F1–40**	Yes	Go to step 6
		No	Go to next step
3	Disconnect engine coolant temperature sensor connector. Turn ignition switch ON. Is there 5 V at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3G — Engine coolant temperature sensor terminal A)
4	Is there continuity between harness side connector terminal B and PCM terminal 3O?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is engine coolant temperature sensor OK? ☞ **page F1–48**	Yes	Go to next step
		No	Replace engine coolant temperature sensor ☞ **page F1–34**
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0120	TP—CIRCUIT MALFUNCTION
Symptom	Input voltage from throttle position sensor is below 0.1 V or above 4.7 V when ignition switch is turned on
Possible cause	• Throttle position sensor malfunction • Open or short circuit in wiring from throttle position sensor terminal A to PCM terminal 3O • Open or short circuit in wiring from throttle position sensor terminal B to PCM terminal 3F • Open or short circuit in wiring from throttle position sensor terminal C to PCM terminal 3I

STEP	INSPECTION		ACTION
1	Does throttle position sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3F voltage OK? ☞ page F1–40	Yes	Go to next step
		No	Go to step 4
3	Is voltage increase linear according to throttle valve opening angle?	Yes	Go to step 7
		No	Replace throttle position sensor ☞ page F1–34
4	Disconnect throttle position sensor connector. Turn ignition switch to ON. Is there 5 V harness side at connector terminal C?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3I — Throttle position sensor terminal C)
5	Is there continuity between harness side connector terminal A and PCM terminal 3O?	Yes	Go to next step
		No	Repair or replace wiring harness
6	Is there continuity between harness side connector terminal C and PCM terminal 3I?	Yes	Replace throttle position sensor ☞ page F1–34
		No	Repair or replace wiring harness
7	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0125	EXCESSIVE TIME TO ENTER CLOSED LOOP
Symptom	Engine coolant temperature sensor signal does not rise normally because of engine coolant system malfunction
Possible cause	• Engine coolant temperature sensor malfunction • Thermostat malfunction • Engine cooling fan system malfunction • Water pump malfunction • Engine coolant passage clogged or leaks • Engine coolant, level and protection

STEP	INSPECTION		ACTION
1	Is cooling fan control system OK? ☞ page F1–130	Yes	Go to next step
		No	Repair or replace cooling fan system
2	Is engine coolant temperature sensor resistance OK? ☞ page F1–48	Yes	Go to next step
		No	Replace engine coolant temperature sensor
3	Is cooling system OK? ☞ section E	Yes	Go to next step
		No	Repair or replace
4	Erase diagnostic trouble code from memory. Is some code No. present after *rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Temporary system malfunction

* During normal driving

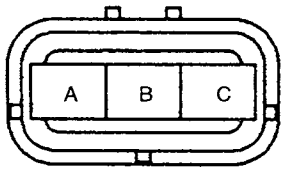
Diagnostic trouble code No. P0130	O2S 11—CIRCUIT MALFUNCTION
Symptom	• Heated oxygen sensor (Front) deterioration • Leakage in exhaust system

STEP	INSPECTION		ACTION
1	Is heated oxygen sensor (Front) OK? ☞ page F1–48	Yes	Go to next step
		No	Repair or replace heated oxygen sensor (Front) ☞ page F1–34
2	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

* During normal driving

Diagnostic trouble code No. P0134	**O2S 11—CIRCUIT NO ACTIVITY DETECTED**
Symptom	When heated oxygen sensor (Front) signal does not exceed 0.5 V after engine is started, or stays below 0.5 V for two minutes after engine has reached normal operating temperature and runing at 1,500 rpm or over
Possible cause	• Heated oxygen sensor (Front) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front) terminal A to PCM terminal 3C • Intake-air system, fuel system, ignition system malfunction

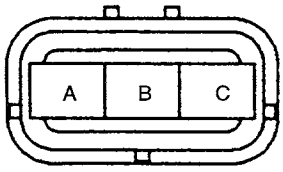
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3I voltage OK? ☞ **page F1–40**	Yes	Go to step 5
		No	Go to next step
3	Disconnect heated oxygen sensor (Front) connector. Is there continuity between harness side connector terminal A and PCM terminal 3C?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Are following units OK? Fuel injector ☞ **page F1–20** Pressure regulator ☞ **page F1–21** Mass air flow sensor ☞ **page F1–43** Engine coolant temperature sensor ☞ **page F1–48** Spark plug ☞ **section G** Air suction (Air/Fuel ratio rich or lean)	Yes	Replace heated oxygen sensor (Front) and go to next step ☞ **page F1–34**
		No	Repair or replace
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0135	O2S 11—HEATER CIRCUIT MALFUNCTION
Symptom	Open or short circuit is observed in heated oxygen sensor heater (Front) system when ignition switch is turned on
Possible cause	• Heated oxygen sensor heater (Front) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front) terminal C to ignition switch • Open or short circuit in wiring from heated oxygen sensor (Front) terminal B to PCM terminal 3M

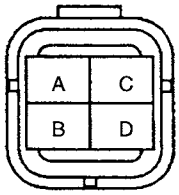
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3M voltage OK? ☞ page F1–40	Yes	Go to step 6
		No	Go to next step
3	Disconnect heated oxygen sensor (Front) connector and turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal C?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Ignition switch — Heated oxygen sensor (Front) terminal C)
4	Is there continuity between harness side connector terminal B and PCM terminal 3M?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between harness side connector terminals B and C?	Yes	Go to next step
		No	Replace heated oxygen sensor (Front) ☞ page F1–34
6	Erase diagnostic trouble code from memory. Is same code No. pressent after rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0140	O2S 12—CIRCUIT NO ACTIVITY DETECTED
Symptom	When heated oxygen sensor (Rear) signal does not exceed 0.5 V after engine is started, or stays below 0.5 V for two minutes after engine has reached normal operating temperature and running at 1,500 rpm or over
Possible cause	• Heated oxygen sensor (Rear) malfunction • Open or short circuit in wiring from (Rear) heated oxygen sensor (Rear) terminal A to PCM terminal 3D • Open circuit in wiring from heated oxygen sensor (Rear) terminal B to PCM terminal 3O. • Intake-air system, fuel system or ignition system malfunction

STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Rear) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3D voltage OK? ☞ **page F1–40**	Yes	Go to step 6
		No	Go to next step
3	Disconnect heated oxygen sensor (Rear) connector. Is there continuity between harness side connector terminal B and PCM terminal 3O?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between harness side connector terminal A and PCM terminal 3D?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Are following units OK? Fuel injector ☞ **page F1–20** Pressure regulator ☞ **page F1–21** Mass air flow sensor ☞ **page F1–43** Engine coolant temperature sensor ☞ **page F1–48** Spark plug ☞ **section G** Air suction (Air/Fuel ratio rich)	Yes	Replace heated oxygen sensor (Rear) ☞ **page F1–34**
		No	Repair or replace
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0170	BANK 1—FUEL TRIM MALFUNCTION
Symptom	Air/fuel ratio stays rich or lean longer than specified period because of system malfunction
Possible cause	• Pressure regulator malfunction • Fuel injector malfunction • Fuel pump malfunction • Engine coolant temperature sensor malfunction • Mass air flow sensor malfunction • Heated oxygen sensor malfunction • Purge solenoid valve malfunction • Leakage in intake-air system • PCM malfunction • Open or short circuit in wiring between PCM terminals 4U, 4V, 4W, 4X to fuel injector • Intake air temperature sensor malfunction • EGR boost sensor malfunction • PCV valve malfunction

STEP	INSPECTION		ACTION
1	Is there air leakage in intake-air system components? ☞ page F1–119	Yes	Repair or replace intake-air system
		No	Go to next step
2	Is fuel line pressure OK? ☞ page F1–120	Yes	Go to step 5
		No	Go to next step
3	Is fuel pump maximum pressure OK? ☞ page F1–19	Yes	Go to next step
		No	Repair or replace fuel pump ☞ page F1–13, 14
4	Is pressure regulator OK? ☞ page F1–21	Yes	Go to next step
		No	Replace pressure regulator ☞ page F1–16
5	Is fuel injector OK? ☞ page F1–20	Yes	Go to next step
		No	Replace fuel injector ☞ page F1–16
6	Is engine coolant temperature sensor OK? ☞ page F1–48	Yes	Go to next step
		No	Replace engine coolant temperature sensor ☞ page F1–34
7	Is mass air flow sensor OK? ☞ page F1–43	Yes	Go to next step
		No	Replace mass air flow sensor ☞ page F1–5
8	Is throttle position sensor OK? ☞ page F1–45	Yes	Go to next step
		No	Adjust throttle position sensor ☞ page F1–46
9	Is intake air temperature sensor OK? ☞ page F1–48	Yes	Go to next step
		No	Replace intake air temperatur sensor ☞ page F1–34
10	Is EGR boost sensor OK? ☞ page F1–50	Yes	Go to next step
		No	Replace EGR boost sensor ☞ page F1–34
11	Is purge solenoid valve OK? ☞ page F1–27	Yes	Go to next step
		No	Replace purge solenoid valve ☞ page F1–25
12	Is PCV valve OK? ☞ page F1–27	Yes	Go to next step
		No	Replace PCV valve ☞ page F1–25
13	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Temporary system malfunction

* During idling

Diagnostic trouble code No. P0300	RANDOM MISFIRE DETECTED
Symptom	PCM input signal from crankshaft position sensor signal is irregular
Possible cause	• Ignition system malfunction • Low fuel • Low battery positive voltage • Fuel system malfunction • Insufficient compression • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system OK? ☞ **section G**	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap correct? ☞ **page F1–44**	Yes	Go to next step
		No	Repair or replace crankshaft position sensor ☞ **page F1–45**
3	Is fuel system OK? ☞ **page F1–10**	Yes	Go to next step
		No	Repair or replace as necessary
4	Is exhaust gas recirculation control system OK? ☞ **page F1–129**	Yes	Go to next step
		No	Repair or replace as necessary
5	Is compression at all cylinders normal? ☞ **section B1**	Yes	Go to next step
		No	Repair or replace as necessary
6	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0301	CYLINDER 1 MISFIRE DETECTED
Symptom	PCM input signal from crankshaft position sensor signal for cylinder No.1 is irregular
Possible cause	• Ignition system of cylinder No.1 malfunction • Low fuel • Low battery positive voltage • Fuel system malfunction • Insufficient compression in cylinder No.1 • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system of cylinder No.1 OK? ☞ **section G**	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap OK? ☞ **page F1–44**	Yes	Go to next step
		No	Repair or replace crankshaft position sensor ☞ **page F1–45**
3	Is fuel injector at cylinder No.1 OK? ☞ **page F1–20**	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.1 ☞ **page F1–16**
4	Is fuel system OK? ☞ **page F1–10**	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation control system OK? ☞ **page F1–129**	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compression at cylinder No.1 normal? ☞ **section B1**	Yes	Go to next step
		No	Repair or replace as necessary
7	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0302	CYLINDER 2 MISFIRE DETECTED
Symptom	PCM input signal from crankshaft position sensor signal for cylinder No.2 is irregular
Possible cause	• Ignition system of cylinder No.2 malfunction • Low fuel • Low battery positive voltage • Fuel system malfunction • Insufficient compression in cylinder No.2 • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system of cylinder No.2 OK? ☞ **section G**	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap OK? ☞ **page F1–44**	Yes	Go to next step
		No	Repair or replace crankshaft position sensor ☞ **page F1–45**
3	Is fuel injector at cylinder No.2 OK? ☞ **page F1–20**	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.2 ☞ **page F1–16**
4	Is fuel system OK? ☞ **page F1–10**	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation control system OK? ☞ **page F1–129**	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compression at cylinder No.2 normal? ☞ **section B1**	Yes	Go to next step
		No	Repair or replace as necessary
7	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0303	CYLINDER 3 MISFIRE DETECTED
Symptom	PCM input signal from crankshaft position sensor signal for cylinder No.3 is irregular
Possible cause	• Ignition system of cylinder No.3 malfunction • Low fuel • Low battery positive voltage • Fuel system malfunction • Insufficient compression in cylinder No.3 • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system of cylinder No.3 OK? ☞ **section G**	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap OK? ☞ **page F1–44**	Yes	Go to next step
		No	Repair or replace crankshaft position sensor ☞ **page F1–45**
3	Is fuel injector at cylinder No.3 OK? ☞ **page F1–20**	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.3 ☞ **page F1–16**
4	Is fuel system OK? ☞ **page F1–10**	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation control system OK? ☞ **page F1–129**	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compressionat cylinder No.3 normal? ☞ **section B1**	Yes	Go to next step
		No	Repair or replace as necessary
7	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Temporary system malfunction

* During normal driving

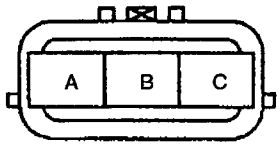
Diagnostic trouble code No. P0304	CYLINDER 4 MISFIRE DETECTED
Symptom	PCM input signal from crankshaft position sensor signal for cylinder No.4 is irregular
Possible cause	• Ignition system of cylinder No.4 malfunction • Low fuel • Low battery positive voltage • Fuel system malfunction • Insufficient compression in cylinder No.4 • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system of cylinder No.4 OK? ☞ **section G**	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap OK? ☞ **page F1–44**	Yes	Go to next step
		No	Repair or replace crankshaft position sensor ☞ **page F1–45**
3	Is fuel injector at cylinder No.4 OK? ☞ **page F1–20**	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.4 ☞ **page F1–16**
4	Is fuel system OK? ☞ **page F1–10**	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation control system OK? ☞ **page F1–129**	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compression at cylinder No.4 normal? ☞ **section B1**	Yes	Go to next step
		No	Repair or replace as necessary
7	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0335	CRANKSHAFT POS SENSOR—CKT MALFUNCTION
Symptom	No NE signal input from crankshaft position sensor for 1.5 seconds while engine running
Possible cause	• Crankshaft position sensor malfunction • Open or short circuit in wiring from PCM terminal 4E to crankshaft position sensor terminal B • Open or short circuit in wiring from PCM terminal 4H to crankshaft position sensor terminal A

STEP	INSPECTION		ACTION
1	Does crankshaft position sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Disconnect crankshaft position sensor connector. Is there continuity between harness side connector terminal B and PCM terminal 4E? Is there continuity between harness side connector terminal A and PCM terminal 4H?	Yes	Go to next step
		No	Repair or replace wiring harness
3	Is crankshaft position sensor air gap OK? ☞ **page F1–44**	Yes	Go to next step
		No	Replace crankshaft position sensor or crankshaft pulley ☞ **page F1–45** ☞ **section B1**
4	Is crankshaft position sensor OK? ☞ **page F1–44**	Yes	Go to next step
		No	Replace crankshaft position sensor ☞ **page F1–45**
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0340	CAMSHAFT POS SENSOR—CKT MALFUNCTION
Symptom	No SGT signal input from camshaft position sensor for 4.2 seconds while engine running
Possible cause	• Camshaft position sensor malfunction • Open or short circuit in wiring from PCM terminal 4F to distributor terminal C • Open or short circuit in wiring from PCM terminal 4A to distributor terminal A

STEP	INSPECTION		ACTION
1	Does distributor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Disconnect distributor connector. Is there continuity between harness side connector terminal C and PCM terminal 4F? Is there continuity between harness side connector terminal A and PCM terminal 4A?	Yes	Go to next step
		No	Repair or replace wiring harness
3	Is camshaft position sensor OK? ☞ **page F1–44**	Yes	Go to next step
		No	Replace distributor ☞ **section G**
4	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



CALIFORNIA



EXCEPT CALIFORNIA

HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0400	EGR—FLOW MALFUNCTION
Symptom	Exhaust gas recirculation system does not function normally because of electrical or mechanical trouble
Possible cause	• EGR valve malfunction • EGR boost sensor malfunction • EGR boost sensor solenoid valve malfunction • EGR valve position sensor malfunction • EGR solenoid valve (vacuum, vent) malfunction • Clogs or leakage in piping connecting following units EGR boost sensor, EGR boost sensor solenoid valve and intake manifold Air cleaner housing, EGR solenoid valve (vent) and EGR valve Intake manifold, EGR solenoid valve (vaccum) and EGR valve Warm up three way catalytic converter

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code for EGR solenoid valve (vaccum, vent), EGR boost sensor solenoid valve or EGR boost sensor displayed?	Yes	Carry out inspection as required according to diagnostic trouble code
		No	Go to next step
2	Is EGR valve position sensor OK? ☞ page F1–49	Yes	Go to next step
		No	Repair or replace EGR valve ☞ page F1–25
3	Check each hose for damage. Are they OK? • Intake manifold—EGR solenoid valve (vent) • EGR solenoid valve (vent)—EGR solenoid valve (vaccum) • EGR solenoid valve (vaccum)-EGR valve	Yes	Go to next step
		No	Repair or replace as necessary
4	EGR boost sensor OK? ☞ page F1–50	Yes	Go to next step
		No	Replace EGR boost sensor ☞ page F1–34
5	Check each hose for damage. Are tthey OK? • EGR passage—EGR boost sensor solenoid valve • EGR boost sensor—EGR boost sensor solenoid valve	Yes	Go to next step
		No	Repair or replace as necessary
6	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Temporary system malfunction

* During driving when coolant temperature is over 55 ° C { 131 ° F } and engine speed is over 1,000 rpm (10 km/h { 6.2 mph })

Diagnostic trouble code No. P0420	BANK 1 CAT EFFICIENCY BELOW LIMIT
Symptom	• Warm up three way catalytic converter deterioration • Leakage in exhaust system

STEP	INSPECTION		ACTION
1	Is heated oxygen sensor (Rear) OK? ☞ page F1–48	Yes	Replace warm up three way catalytic converter ☞ page F1–30
		No	Replace heated oxygen sensor (Rear) ☞ page F1–34

Diagnostic trouble code No. P0440	EVAP SYSTEM—MALFUNCTION
Symptom	Evaporative emission control system does not function normally because of mechanical trouble
Possible cause	• Purge solenoid valve • Charcoal canister malfunction • Check valve malfunction • Fuel vapor valve malfunction • Clogs or leakage in piping connecting following units Intake manifold and purge solenoid valve Purge solenoid valve and charcoal canister Charcoal canister, check valve, and fuel vapor valve

STEP	INSPECTION		ACTION
1	Is PCM terminal 4T voltage OK? ☞ page F1–42	Yes	Go to next step
		No	Inspect purge solenoid valve ☞ page F1–27
2	Are evaporative emission control system-related hose free of clogs and leakage?	Yes	Go to next step
		No	Repair or replace as necessary
3	Is charcoal canister OK? ☞ page F1–26	Yes	Go to next step
		No	Repair or replace as necessary
4	Is check valve OK? ☞ page F1–26	Yes	Go to next step
		No	Repair or replace as necessary
5	Is rollover valve OK? ☞ page F1–25	Yes	Go to next step
		No	Repair or replace as necessary
6	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Temporary system malfunction

* During driving after engine warm-up

Diagnostic trouble code No. P0443	EVAP SYSTEM—PURGE CTRL VALVE CKT—MALF
Symptom	Open or short circuit is observed in purge solenoid valve system when ignition switch is turned on
Possible cause	• Purge solenoid valve malfunction • Open or short circuit in wiring from purge solenoid valve terminal A to main relay terminal D • Open or short circuit in wiring from purge solenoid valve terminal B to PCM terminal 4T

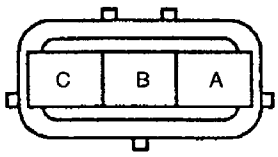
STEP	INSPECTION		ACTION
1	Does purge solenoid valve connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4T voltage OK? ☞ page F1–42	Yes	Go to step 6
		No	Go to next step
3	Disconnect purge solenoid valve connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — Purge solenoid valve terminal A)
4	Is there continuity between harness side connector terminal B and PCM terminal 4T?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between purge solenoid valve connector terminals A and B?	Yes	Go to next step
		No	Replace purge solenoid valve
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0450	EVAP SYSTEM—PRESSURE SEN MALFUNCTION
Symptom	Input voltage from fuel tank pressure sensor is below 0.1 V or above 4.8 V when ignition switch is turned on
Possible cause	• Fuel tank pressure sensor malfunction • Open or short circuit in wiring from PCM terminal 3I to fuel tank pressure sensor terminal C • Open or short circuit in wiring from PCM terminal 3A to fuel tank pressure sensor terminal B • Open circuit in wiring from PCM terminal 3O to fuel tank pressure sensor terminal A

STEP	INSPECTION		ACTION
1	Does fuel tank pressure sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3A voltage OK? ☞ page F1–40	Yes	Go to step 6
		No	Go to next step
3	Are fuel tank pressure sensor and connecting hose free of freezing, breaking, and clogs?	Yes	Repair or replace
		No	Go to next step
4	Disconnect fuel tank pressure sensor connector. Turn ignition switch to ON. Is there 5 V at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3I — Fuel tank pressure sensor terminal C)
5	Is fuel tank pressure sensor OK? ☞ page F1–51	Yes	Replace fuel tank pressure sensor
		No	Repair or replace wiring harness
6	Erase diagnostic trouble code from memory. Is same code present after rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Intermittent poor connector of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0500	VEHICLE SPEED SENSOR—MALFUNCTION
Symptom	No vehicle speed sensor signal input from vehicle speed sensor while driving
Possible cause	• Speedometer sensor malfunction • Open or short circuit in wiring from ignition switch to speedometer sensor • Open or short circuit in wiring from speedometer sensor to GND • Open or short circuit in wiring from speedometer sensor to vehicle speed sensor • Open or short circuit in wiring from vehicle speed sensor to PCM terminal 1M

STEP	INSPECTION		ACTION
1	Does vehicle speed sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 1M voltage OK? ☞ page F1–39	Yes	Go to step 5
		No	Go to next step
3	Is there continuity between vehicle speed sensor terminal and PCM terminal 1M?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between vehicle speed sensor and speedometer sensor terminals? ☞ section T	Yes	Go to next step
		No	Repair or replace speedometer sensor and wiring harness ☞ section T
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

Diagnostic trouble code No. P0505	**IDLE CONTROL SYSTEM—MALFUNCTION**
Symptom	• Mechanical trouble is observed in idle air control system • Open or short circuit is observed in idle air control system when ignition switch is turned on
Possible cause	• Idle air control valve malfunction • Leakage in intake-air system • Open or short circuit in wiring from idle air control valve terminal A to main relay terminal D • Open or short circuit in wiring from idle air control valve terminal B to PCM terminal 4Q

STEP	INSPECTION		ACTION
1	Does idle air control valve connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4Q voltage OK? ☞ **page F1–41**	Yes	Go to step 6
		No	Go to next step
3	Disconnect idle air control valve connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — Idle air control valve terminal A)
4	Is there continuity between harness side connector terminal B and PCM terminal 4Q?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between idle air control valve connector terminals A and B?	Yes	Go to next step
		No	Replace BAC valve ☞ **page F1–7**
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0703	TORQUE CONV/BRAKE SW—MALFUNCTION
Symptom	No signal input from brake switch to PCM when brake pedal is kept depressed for more than 33 seconds, or signal input when brake pedal is not depressed
Possible cause	• Brake switch malfunction • Open or short circuit in wiring from PCM terminal 1Q to brake switch terminal • Open or short circuit in wiring from brake switch terminal to battery terminal

STEP	INSPECTION		ACTION
1	Does brake switch connector or PCM connector have poor connection?	Yes	Repair or replace
		No	Go to next step
2	Is PCM terminal 1Q voltage OK? ☞ page F1–39	Yes	Go to step 4
		No	Go to next step
3	Is there continuity between brake switch terminal and PCM terminal 1Q?	Yes	Check for open or short circuit in wiring harness. (Battery — Brake switch) Check brake switch. ☞ section P
		No	Repair or replace wiring harness
4	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

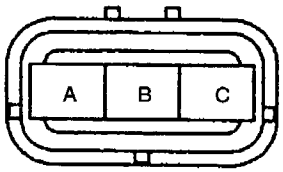
Diagnostic trouble code No. P1000	MORE DRIVING NEEDED TO COMPLETE TEST
Possible cause	Following diagnostic trouble code detection conditions not satisfied

Diagnosed circuit	Code No.
Excessive time to enter closed loop fuel control	P0125
O_2 sensor circuit malfunction	P0130
O_2 sensor heater circuit malfunction	P0135
Fuel trim malfunction	P0170
Random misfire detected Cylinder 1 misfire detected Cylinder 2 misfire detected Cylinder 3 misfire detected Cylinder 4 misfire detected	P0300, P0301 P0302, P0303 P0304
Exhaust gas recirculation flow malfunction	P0400
Catalyst system efficiency below threshold	P0420
Evaporative emission control system malfunction	P0440

Note
• DTC No.P1000 will be deleted while the MIL is illuminated.

Diagnostic trouble code No. P1170	**HO2S 11—INVERSION**
Symptom	Heated oxygen sensor (Front) signal remains unchanged for more than 20 seconds after engine is in feedback zone
Possible cause	• Heated oxygen sensor (Front) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front) terminal A to PCM terminal 3C • Intake-air system, fuel system, ignition system malfunction

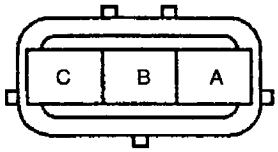
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3C voltage OK? ☞ **page F1–40**	Yes	Go to step 5
		No	Go to next step
3	Disconnect heated oxygen sensor (Front) connector. Is there continuity between harness side connector terminal A and PCM terminal 3C?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Are following units OK? Fuel injector ☞ **page F1–20** Pressure regulator ☞ **page F1–21** Mass air flow sensor ☞ **page F1–43** Engine coolant temperature sensor ☞ **page F1–48** Spark plug ☞ **section G** Air suction (Air/Fuel ratio rich or lean)	Yes	Replace heated oxygen sensor (Front) ☞ **page F1–34**
		No	Repair or replace
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1195	EGRBS—OPEN OR SHORT
Symptom	Input voltage from EGR boost sensor is below 0.2 V or above 4.9 V when ignition switch is turned on
Possible cause	• EGR boost sensor malfunction • Open or short circuit in wiring from PCM terminal 3H to EGR boost sensor terminal B • Open or short circuit in wiring from PCM terminal 3I to EGR boost sensor terminal C • Open circuit in wiring from PCM terminal 3O to EGR boost sensor terminal A

STEP	INSPECTION		ACTION
1	Does EGR boost sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3H voltage OK? ☞ page F1–40	Yes	Go to step 5
		No	Go to next step
3	Disconnect EGR boost sensor connector. Turn ignition switch to ON. Is there 5V at harness side connector terminal C?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3I — EGR boost sensor terminal C)
4	Is there continuity between connector terminal A and PCM terminal 3O?	Yes	Replace EGR boost sensor
		No	Repair or replace wiring harness.
5	Erase diagnostic trouble code from memory. Is same code present after rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness.)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1250	PRC—OPEN OR SHORT
Symptom	Open or short circuit is observed in PRC solenoid valve system when ignition switch is turned on
Possible cause	• PRC solenoid valve malfunction • Open or short circuit in wiring from PRC solenoid valve terminal A to main relay terminal D • Open or short circuit in wiring from PRC solenoid valve terminal B to PCM terminal 4J

STEP	INSPECTION		ACTION
1	Does PRC solenoid valve connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4J voltage OK? ☞ page F1–41	Yes	Go to step 6
		No	Go to next step
3	Disconnect PRC solenoid valve connector. Turn ignition switch ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — PRC solenoid valve terminal A)
4	Is there continuity between harness side connector terminal B and PCM terminal 4J?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between PRC solenoid valve terminals A and B?	Yes	Go to next step
		No	Replace PRC solenoid valve ☞ page F1–18
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1345	SGC SIGNAL—NO SGC SIGNAL
Symptom	No SGC signal input from camshaft position sensor while engine rotates five cycles
Possible cause	• Camshaft position sensor malfunction • Open or short circuit in wiring from PCM terminal 4A to distributor terminal A • Open or short circuit in wiring from PCM terminal 4G to distributor terminal D

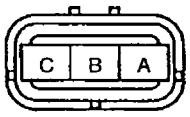
STEP	INSPECTION		ACTION
1	Does camshaft position sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Disconnect distributor connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal B?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — Distributor terminal B)
3	Is there continuity between harness side connector terminal C and PCM terminal 4G?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is PCM terminal 4G voltage OK? ☞ page F1–41	Yes	Go to step 6
		No	Go to next step
5	Is camshaft position sensor OK? ☞ page F1–44	Yes	Go to next step
		No	Replace distributor ☞ section G
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking.	Yes	Replace PCM ☞ page F1–35
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1402	**EGRS—OPEN OR SHORT**
Symptom	Input voltage from EGR valve position sensor is below 0.2 V or above 4.8 V when ignition switch is turned on
Possible cause	• EGR valve position sensor malfunction • Open or short circuit in wiring from EGR valve position sensor terminal B to PCM terminal 3I • Open or short circuit in wiring from EGR valve position sensor terminal C to PCM terminal 3J • Open or short circuit in wiring from EGR valve position sensor terminal A to PCM terminal 3O

STEP	INSPECTION		ACTION
1	Does EGR valve position sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3J voltage OK? ☞ **page F1–40**	Yes	Go to step 7
		No	Go to next step
3	Disconnect EGR valve position sensor connector. Turn ignition switch ON. Is there 5 V at harness side connector terminal B?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3I — EGR valve position sensor terminal B)
4	Is there continuity between harness side connector terminal C and PCM terminal 3J?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between harness side connector terminal A and PCM terminal 3O?	Yes	Go to next step
		No	Repair or replace wiring harness
6	Is resistance of EGR valve position sensor OK? ☞ **page F1–49**	Yes	Go to next step
		No	Replace EGR valve ☞ **page F1–25**
7	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1449	**CDCV—OPEN OR SHORT**
Symptom	Open or short circuit is observed in canister drain cut valve or tank pressure control valve system when ignition switch is turned on
Possible cause	• Canister drain cut valve malfunction • Tank pressure control valve malfunction • Open or short circuit in wiring from canister drain cut valve terminal A to main relay terminal D • Open or short circuit in wiring from canister drain cut valve terminal B to PCM terminal 4Z • Open or short circuit in wiring from tank pressure control valve terminal A to main relay terminal D • Open or short circuit in wiring from tank pressure control valve terminal B to PCM terminal 4Z

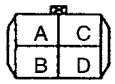
STEP	INSPECTION		ACTION
1	Does canister drain cut valve connector, tank pressure control valve connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4Z voltage OK? ☞ **page F1–42**	Yes	Go to step
		No	Go to next step
3	Disconnect canister drain cut valve connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Main relay terminal D — Canister drain cut valve terminal A)
4	Disconnect tank pressure control valve connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Main relay terminal D — Tank pressure control valve terminal A)
5	Is there continuity between canister drain cut valve harness side connector terminal B and PCM terminal 4Z?	Yes	Go to next step
		No	Repair or replace wiring harness
6	Is there continuity between tank pressure control valve harness side connector terminal B and PCM terminal 4Z?	Yes	Go to next step
		No	Repair or replace wiring harness
7	Is there continuity between canister drain cut valve terminals A and B?	Yes	Go to next step
		No	Replace canister drain cut valve
8	Is there continuity between tank pressure control valve terminals A and B?	Yes	Go to next step
		No	Replace tank pressure control valve
9	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



TPCV, CDCV
HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1455	FUEL TANK LEVEL SENSOR—OPEN OR SHORT
Symptom	Input voltage from fuel tank level sensor is 0 V or above 4.98 V when ignition switch is turned on
Possible cause	• Fuel gauge sender unit malfunction • Open or short circuit in wiring from fuel pump connector terminal C to PCM terminal 4M

STEP	INSPECTION		ACTION
1	Does fuel pump connector or PCM 4M connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4M voltage OK? ☞ **page F1–41**	Yes	Go to step 7
		No	Go to next step
3	Is there continuity between fuel pump side connector terminal C and PCM terminal 4M?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is fuel gauge sender unit OK? ☞ **section T**	Yes	Go to next step
		No	Replace fuel gauge sender unit
5	Is fuel gauge OK? ☞ **section T**	Yes	Go to next step
		No	Repair or replace
6	Is there continuity between fuel pump harness side connector terminal C and instrument cluster?	Yes	Go to step 7
		No	Repair or replace wiring harness
7	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F1–35**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1485	**EGR (VACUUM)—OPEN OR SHORT**
Symptom	Open or short circuit is observed in EGR solenoid valve (vacuum) system when ignition switch is turned on
Possible cause	• EGR solenoid valve (vacuum) malfunction • Open or short circuit in wiring from EGR solenoid valve (vacuum) terminal A to main relay terminal D • Open or short circuit in wiring fro EGR solenoid valve (vacuum) terminal B to PCM terminal 4P

STEP	INSPECTION		ACTION
1	Does EGR solenoid valve (vacuum) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4P voltage OK? ☞ **page F1–41**	Yes	Go to step 6
		No	Go to next step
3	Disconnect EGR solenoid valve connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — EGR solenoid valve (vacuum) terminal A)
4	Is there continuity between harness side connector terminal B and PCM terminal 4P?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between EGR solenoid valve (vacuum) terminals A and B?	Yes	Go to next step
		No	Replace EGR solenoid valve (vacuum) ☞ **page F1–25**
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking.	Yes	Replace PCM ☞ **page F1–35**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1486	EGR (VENT)—OPEN OR SHORT
Symptom	Open or short circuit is observed in EGR solenoid valve (vent) system when ignition switch is turned on
Possible cause	• EGR solenoid valve (vent) malfunction • Open or short circuit in wiring from EGR solenoid valve (vent) terminal A to main relay terminal D • Open or short circuit in wiring from EGR solenoid valve (vent) terminal B to PCM terminal 4O

STEP	INSPECTION		ACTION
1	Does EGR solenoid valve (vent) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4O voltage OK? ☞ page F1–41	Yes	Go to step 6
		No	Go to next step
3	Disconnect EGR solenoid vale (vent) connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — EGR solenoid valve (vent) terminal A)
4	Is there continuity between harness side connector terminal B and PCM terminal 4O?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between EGR solenoid valve (vent) terminals A and B?	Yes	Go to next step
		No	Replace EGR solenoid valve (vent) ☞ page F1–25
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking.	Yes	Replace PCM ☞ page F1–35
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1487	EGRCHK SOL.—OPEN OR SHORT
Symptom	Open or short circuit is observed in EGR boost sensor solenoid valve system when ignition switch is turned on
Possible cause	• EGR boost sensor solenoid valve malfunction • Open or short circuit in wiring from EGR boost sensor solenoid valve terminal A to main relay terminal D • Open or short circuit in wiring from EGR boost sensor solenoid valve B to PCM terminal 4L

STEP	INSPECTION		ACTION
1	Does EGR boost sensor solenoid valve connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4P voltage OK? ☞ page F1–41	Yes	Go to step 6
		No	Go to next step
3	Disconnect EGR boost sensor solenoid valve connector. Turn ignition switch to ON. Is there battery positive at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Main relay terminal D — EGR boost sensor solenoid valve terminal A)
4	Is there continuity between harness side connector terminal B and PCM terminal 4P?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between EGR boost sensor solenoid valve terminals A and B?	Yes	Go to next step
		No	Replace EGR boost sensor solenoid valve ☞ page F1–25
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1608	PCME (CPU)—MALFUNCTION	
Symptom	PCM does not read diagnostic trouble codes from output devices	
Possible cause	• PCM malfunction	
STEP	INSPECTION	ACTION
—	—	Replace PCM ☞ page F1–35

Diagnostic trouble code No. P1794	BAT—BAT OR CIRCUIT FAIL		
Symptom	Battery positive voltage is not constantly applied to PCM terminal 4I		
Possible cause	• Battery malfunction • Open or short circuit in wiring from PCM terminal 4I to batterry positive cable • Burnt fuse		
STEP	INSPECTION		ACTION
1	Is battery fully charged? ☞ section G	Yes	Go to next step
		No	Charge battery ☞ section G
2	Does battery positive voltage present at PCM terminal 4I?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (PCM terminal 4I — Battery)
3	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

Diagnostic trouble code No. P1797	PNS—OPEN OR SHORT
Symptom	• PCM judges N position for more than 33 seconds when shift lever is in D range • PCM judges neutral/clutch switch OFF for more than 5 seconds while vehicle stopped and engine running
Possible cause	• Transaxle range switch malfunction • Clutch/neutral switch malfunction • PCM malfunction • Open or short circuit in wiring from transaxle range switch terminal H or neutral/clutch switch terminal to PCM terminal 1L

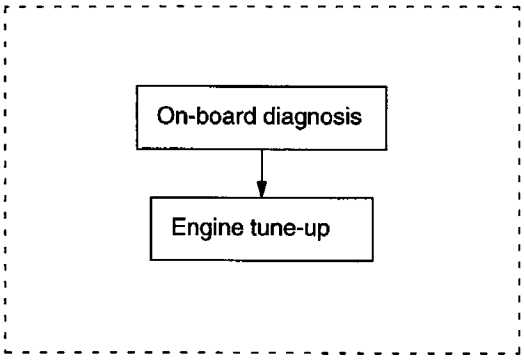
STEP	INSPECTION		ACTION
1	Does PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 1L voltage OK? ☞ page F1–38	Yes	Go to step 5
		No	Go to next step
3	Is there continuity between transaxle range switch terminal H or clutch/neutral switch terminal and PCM terminal 1L?	Yes	Go to next step
		No	Repair or replace wiring harness
4	(ATX) Is transaxle range switch OK? ☞ section K (MTX) Is neutral/clutch switch OK? ☞ page F1–52	Yes	Go to next step
		No	Repair or replace transaxle range switch or neutral/clutch switch ☞ section K, page F1–52
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F1–35
		No	Intermitent poor connection of harness or connector (Repair connector and/or harness)

TROUBLESHOOTING

USING THIS SECTION

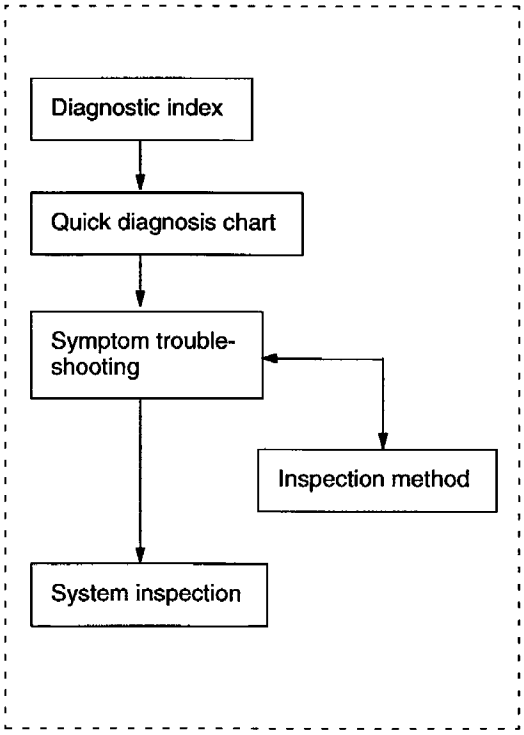
Procedure

Service section



- If diagnostic trouble codes present, carry out inspection required by the code indicated. (Refer to page F1–54.)
- If engine operates, carry out engine tune-up. (Refer to page F1–2.)

Troubleshooting section



- If problems can not be solved by following procedure in service section, go to troubleshooting section.
- Choose item that most closely corresponds to actual symptom. (Refer to page F1–95.)
- Referring to quick diagnosis chart, assume systems related to the problem. (Refer to page F1–96.)
- Referring to symptom troubleshooting, locate the cause of trouble. (Refer to page F1–98.)
- Inspect the suspected faulty system and repair or replace as necessary.

Description

Diagnostic index

- The diagnostic index is for quick reference of all trouble symptoms in the symptom troubleshooting.
- Detailed description of each symptom enables correct inspection.

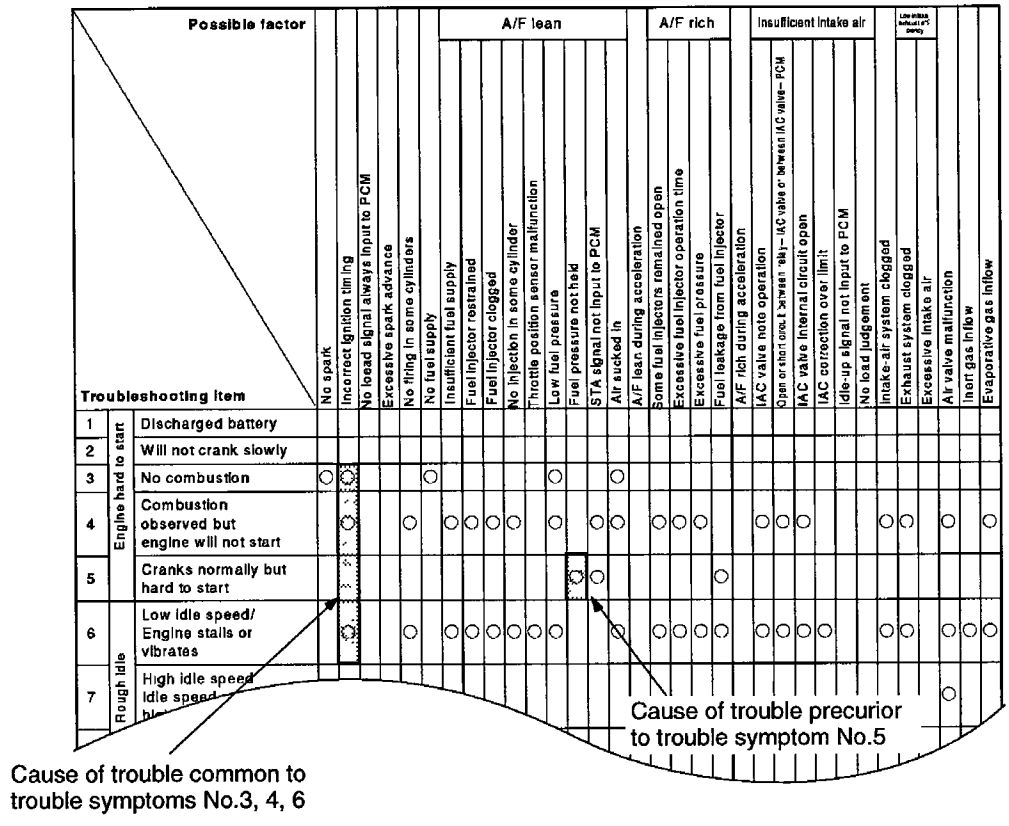
DIAGNOSTIC INDEX

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
1	Engine hard to start	Discharged battery	—	F1–98
2		Will not crank or cranks slowly	—	F1–98
3		No combustion	Engine cranks at normal speed but shows no sign of firing	F1–99
4		Combustion observed but engine will not start	Engine shows combustion while cranking but will not continue to run when ignition switch is turned from STA to ON	F1–100
5		Cranks normally but hard to start	Engine cranks at normal speed but requires excessive cranking time before starting Engine runs normally at idle after started	F1–102
6	Rough idle	Low idle speed/Engine stalls or vibrates	Engine idles at low speed, stalls, or vibrates when engine is cold, hot, or normal temperature	F1–103
7		High idle speed	Idle speed excessively high and will not go down after warm-up	F1–105
			...peed excessively high and requires times to be	—

Quick diagnosis chart

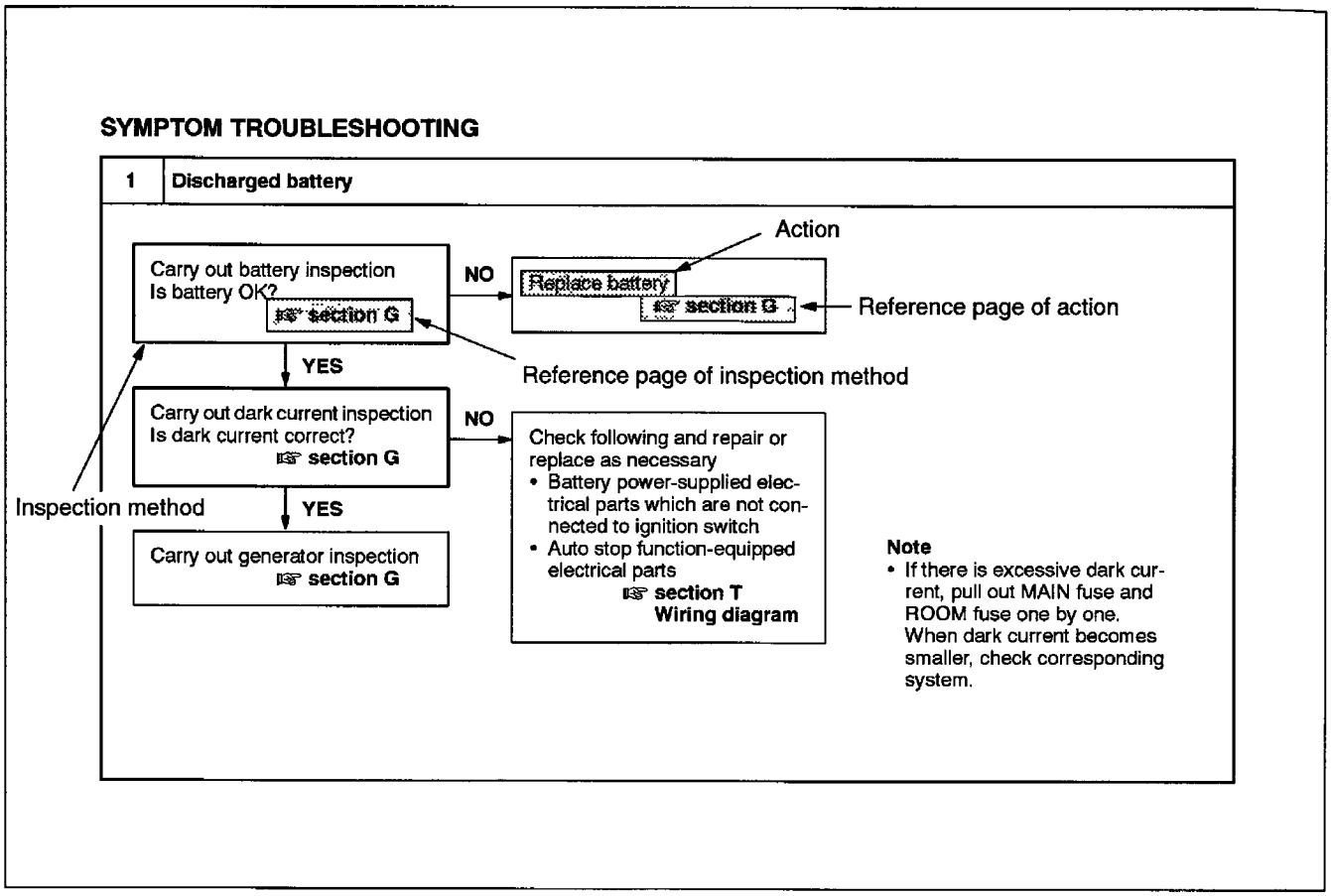
- Troubleshooting index shows relationship between trouble symptoms and suspected faulty parts.
- This index is for quick location of the cause of trouble. In case several problems exist, a common cause that may be related to them can also be easily found.

QUICK DIAGNOSIS CHART



Symptom troubleshooting

- Symptom troubleshooting shows diagnosis procedure, inspection method, and proper action to take for each trouble symptom.



Inspection method

- Inspection methods necessary for troubleshooting are shown per each trouble symptom.
- Efficient troubleshooting is made possible by following this inspection method.

System inspection

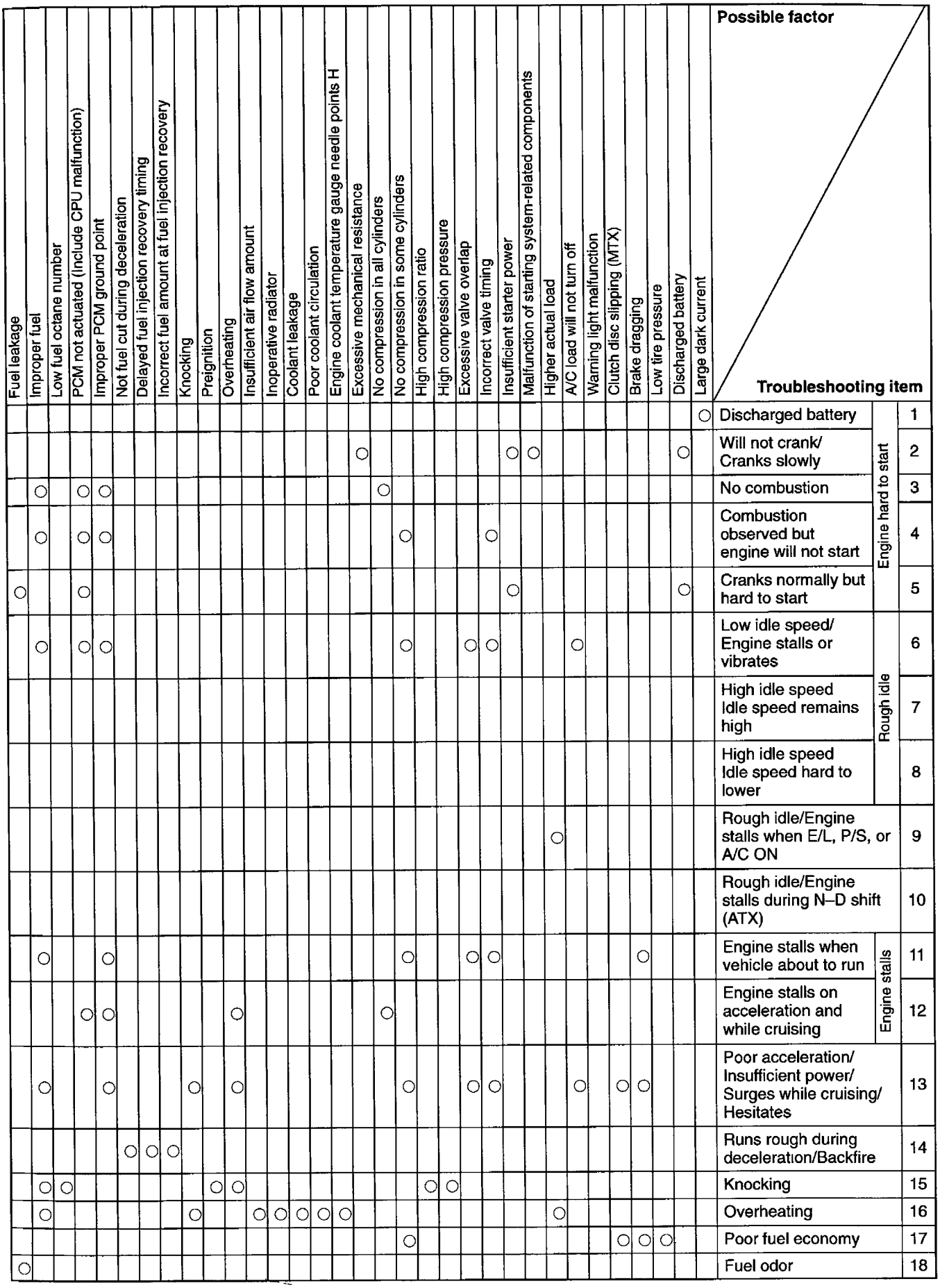
- Inspection items necessary for troubleshooting are shown per each system.
- Efficient troubleshooting is made possible by this system inspection.

DIAGNOSTIC INDEX

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
1	Engine hard to start	Discharged battery	—	F1–98
2		Will not crank or cranks slowly	—	F1–98
3		No combustion	Engine cranks at normal speed but shows no sign of firing	F1–99
4		Combustion observed but engine will not start	Engine shows combustion while cranking but will not continue to run when ignition switch is turned from STA to ON	F1–100
5		Cranks normally but hard to start	Engine cranks at normal speed but requires excessive cranking time before starting Engine runs normally at idle after started	F1–102
6	Rough idle	Low idle speed/Engine stalls or vibrates	Engine idles at low speed, stalls, or vibrates when engine is cold, hot, or normal temperature	F1–103
7		High idle speed Idle speed remains high	Idle speed excessively high and will not go down after warm-up	F1–105
8		High idle speed Idle speed hard to lower	Idle speed excessively high and requires times to be lowered to normal speed after warm-up	F1–106
9	Engine stalls	Rough idle/Engine stalls when E/L, P/S, or A/C ON	Engine runs normally at idle with no load but stalls or vibrates excessively when load (E/L, P/S, or A/C) is ON	F1–106
10		Rough idle/Engine stalls during N–D shift (ATX)	Engine runs normally at idle but stalls or vibrates excessively during N–D shift	F1–107
11		Engine stalls when vehicle about to run	—	F1–108
12		Engine stalls on acceleration and while cruising	—	F1–109
13	Poor acceleration/Insufficient power/Surges while cruising/Hesitates		—	F1–110
14	Runs rough during deceleration/Backfire		Engine runs rough during deceleration, and abnormal combustion occures in exhaust system	F1–112
15	Knocking		—	F1–113
16	Overheating		—	F1–114
17	Poor fuel economy		Fuel consumption increased excessively though no sudden starting, acceleration, or braking carried out	F1–115
18	Fuel odor		Fuel odor in passenger or engine compartment	F1–116

QUICK DIAGNOSIS CHART

		Possible factor / Troubleshooting item	No spark	Incorrect ignition timing	No load signal always input to PCM	Excessive spark advance	No firing in some cylinders	No fuel supply	A/F lean: Insufficient fuel supply	A/F lean: Fuel injector restrained	A/F lean: Fuel injector clogged	A/F lean: No injection in some cylinder	A/F lean: Throttle position sensor malfunction	A/F lean: Low fuel pressure	A/F lean: Fuel pressure not held	A/F lean: Air sucked in	A/F lean during acceleration	A/F rich: Some fuel injectors remained open	A/F rich: Excessive fuel injector operation time	A/F rich: Excessive fuel pressure	A/F rich: Fuel leakage from fuel injector	A/F rich during acceleration	Insufficient intake air: IAC valve not operation	Insufficient intake air: Open or short circuit between relay—IAC valve or between IAC valve—PCM	Insufficient intake air: IAC valve internal circuit open	Insufficient intake air: IAC correction over limit	Insufficient intake air: Idle-up signal not input to PCM	Insufficient intake air: No load judgement	Low intake/exhaust efficiency: Intake-air system clogged	Low intake/exhaust efficiency: Exhaust system clogged	Low intake/exhaust efficiency: Excessive intake air	Air valve malfunction	Inert gas inflow	Evaporative gas inflow	Evaporative gas leakage
1	Engine hard to start	Discharged battery																																	
2	Engine hard to start	Will not crank/ Cranks slowly																																	
3	Engine hard to start	No combustion	○	○				○						○		○																			
4	Engine hard to start	Combustion observed but engine will not start		○			○		○	○	○	○		○		○		○	○	○			○	○	○				○	○		○		○	
5	Engine hard to start	Cranks normally but hard to start													○						○														○
6	Rough idle	Low idle speed/ Engine stalls or vibrates		○			○		○	○	○	○	○	○		○		○	○	○	○		○	○	○	○			○	○		○	○	○	
7	Rough idle	High idle speed Idle speed remains high																														○			
8	Rough idle	High idle speed Idle speed hard to lower																														○			
9		Rough idle/Engine stalls when E/L, P/S, or A/C ON																					○			○	○								
10		Rough idle/Engine stalls during N–D shift (ATX)																					○			○		○							
11	Engine stalls	Engine stalls when vehicle about to run		○			○		○	○	○	○	○	○		○	○	○	○	○	○	○							○	○			○		
12	Engine stalls	Engine stalls on acceleration and while cruising	○					○						○		○																			
13		Poor acceleration/ Insufficient power/ Surges while cruising/ Hesitates		○	○		○		○	○	○	○	○	○		○	○	○	○	○	○	○							○	○			○		
14		Runs rough during deceleration/Backfire					○											○			○					○									
15		Knocking				○			○	○	○	○	○	○		○																			
16		Overheating																																	
17		Poor fuel economy		○			○											○	○	○	○								○	○					
18		Fuel odor																																	○


Possible factor
Troubleshooting item
Fuel leakage
Improper fuel
Low fuel octane number
PCM not actuated (Include CPU malfunction)
Improper PCM ground point
Not fuel cut during deceleration
Delayed fuel injection recovery timing
Incorrect fuel amount at fuel injection recovery
Knocking
Preignition
Overheating
Insufficient air flow amount
Inoperative radiator
Coolant leakage
Poor coolant circulation
Engine coolant temperature gauge needle points H
Excessive mechanical resistance
No compression in all cylinders
No compression in some cylinders
High compression ratio
High compression pressure
Excessive valve overlap
Incorrect valve timing
Insufficient starter power
Malfunction of starting system-related components
Higher actual load
A/C load will not turn off
Warning light malfunction
Clutch disc slipping (MTX)
Brake dragging
Low tire pressure
Discharged battery
Large dark current
Engine hard to start
Rough idle
Engine stalls
1 Discharged battery
2 Will not crank/ Cranks slowly
3 No combustion
4 Combustion observed but engine will not start
5 Cranks normally but hard to start
6 Low idle speed/ Engine stalls or vibrates
7 High idle speed Idle speed remains high
8 High idle speed Idle speed hard to lower
9 Rough idle/Engine stalls when E/L, P/S, or A/C ON
10 Rough idle/Engine stalls during N–D shift (ATX)
11 Engine stalls when vehicle about to run
12 Engine stalls on acceleration and while cruising
13 Poor acceleration/ Insufficient power/ Surges while cruising/ Hesitates
14 Runs rough during deceleration/Backfire
15 Knocking
16 Overheating
17 Poor fuel economy
18 Fuel odor

SYMPTOM TROUBLESHOOTING

1 Discharged battery

Carry out battery inspection
Is battery OK?
☞ **section G**

NO → Replace battery
☞ **section G**

YES ↓

Carry out dark current inspection
Is dark current correct?
☞ **section G**

NO → Check following and repair or replace as necessary
- Battery power-supplied electrical parts which are not connected to ignition switch
- Auto stop function-equipped electrical parts
☞ **section T Wiring diagram**

YES ↓

Carry out generator inspection
☞ **section G**

Note
- If there is excessive dark current, pull out MAIN fuse and ROOM fuse one by one. When dark current becomes smaller, check corresponding system.

2 Will not crank or cranks slowly

Is battery discharged?

YES → Go to Symptom troubleshooting No.1 "Discharged battery"

NO ↓

Carry out starter inspection
Is starter OK?
☞ **section G**

NO → Repair or replace

YES ↓

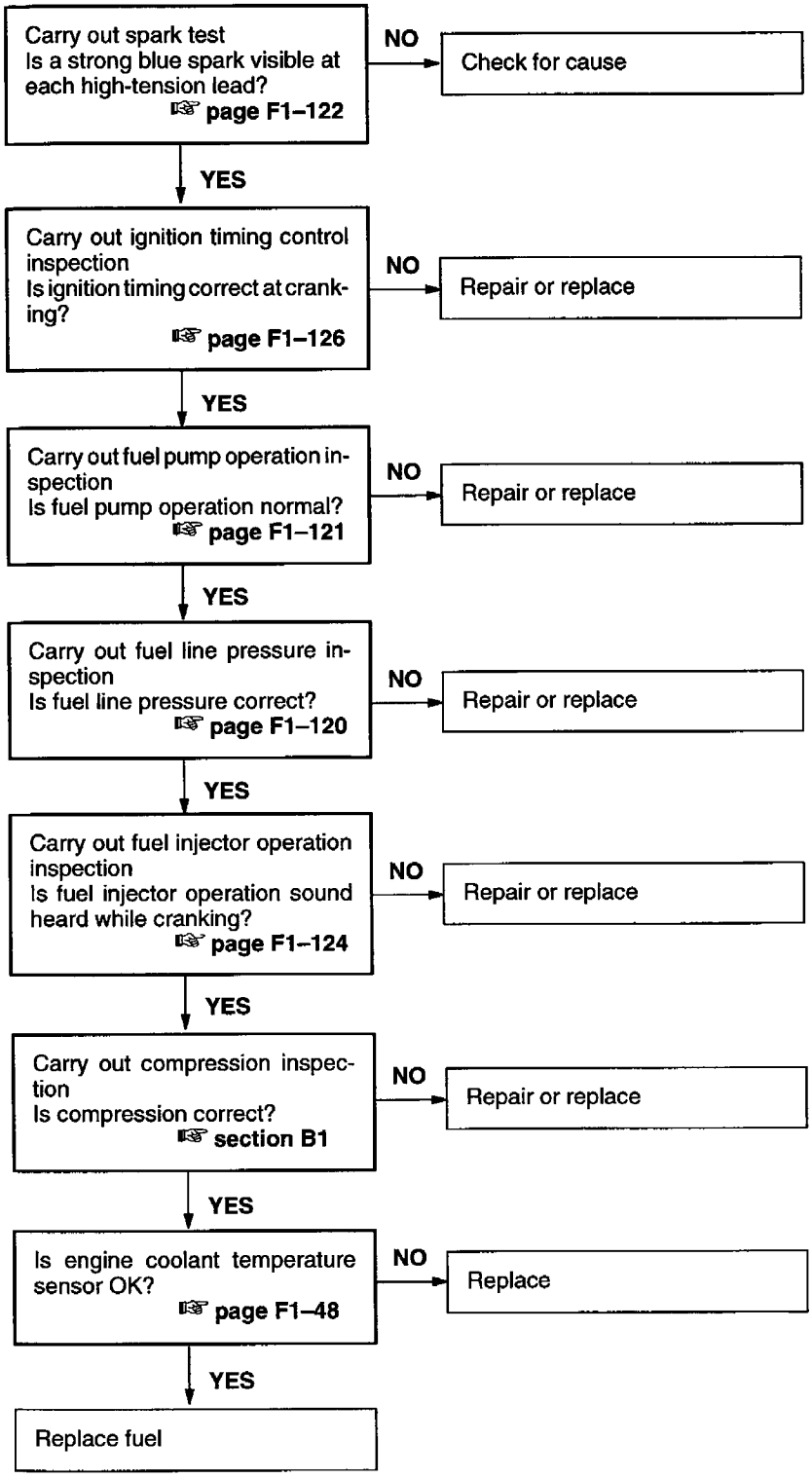
(ATX) Check signal of following
Are signals normal?
☞ **page F1–38**
- Transaxle range switch

NO → Repair or replace

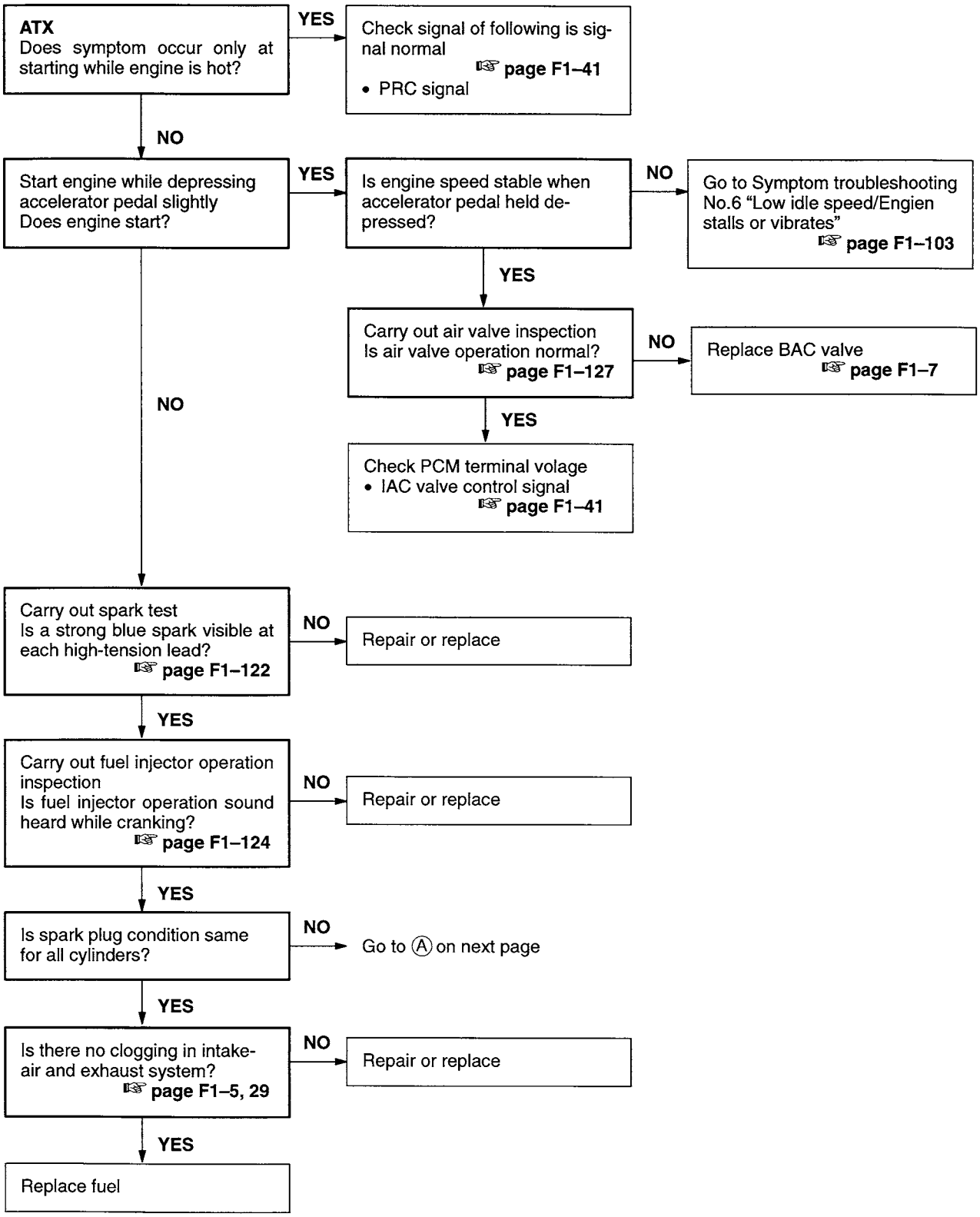
YES ↓

Carry out engine inspection
(internal damage)
☞ **section B1**

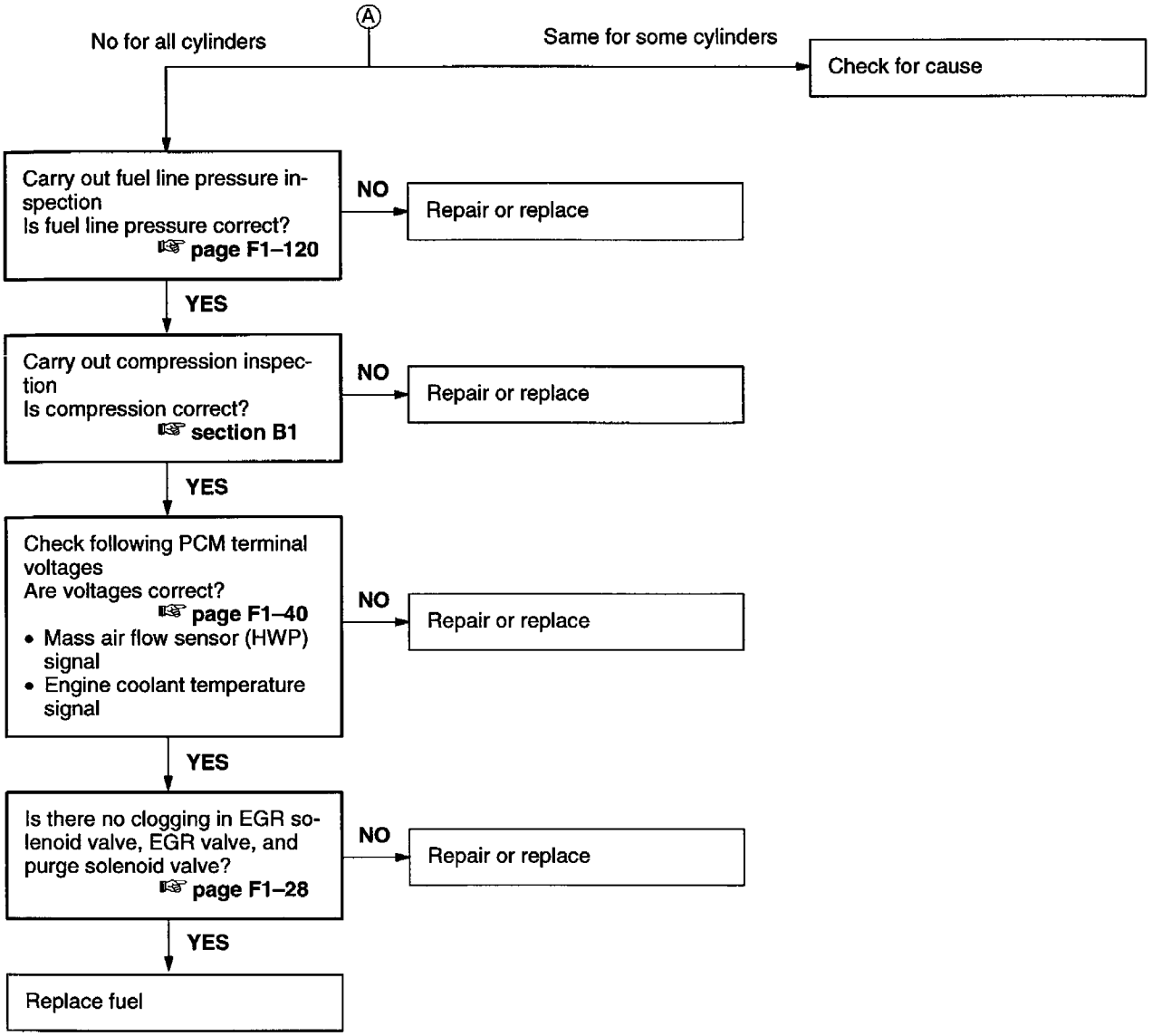
3	No combstion



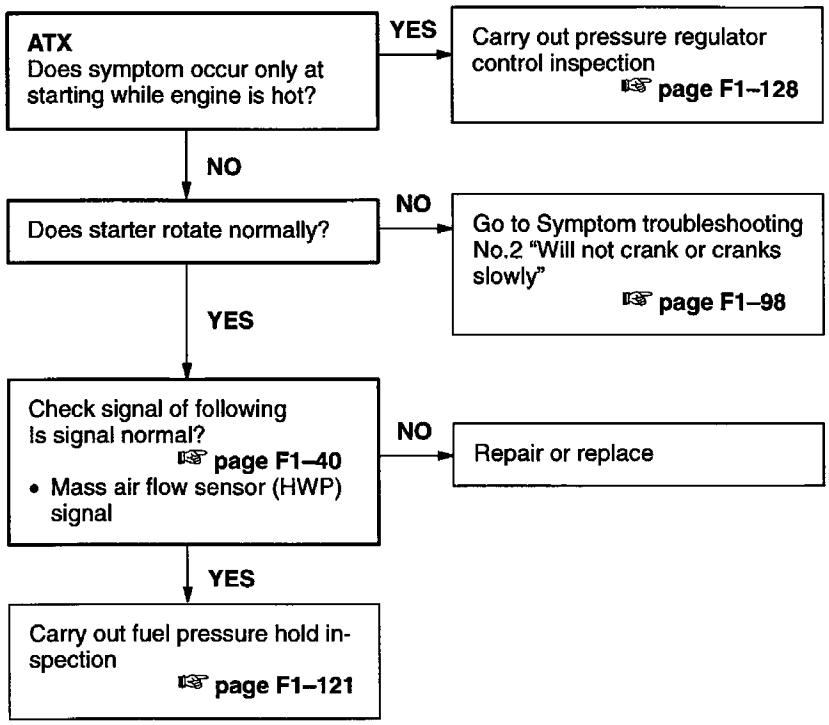
4	Combustion observed but engine will not start



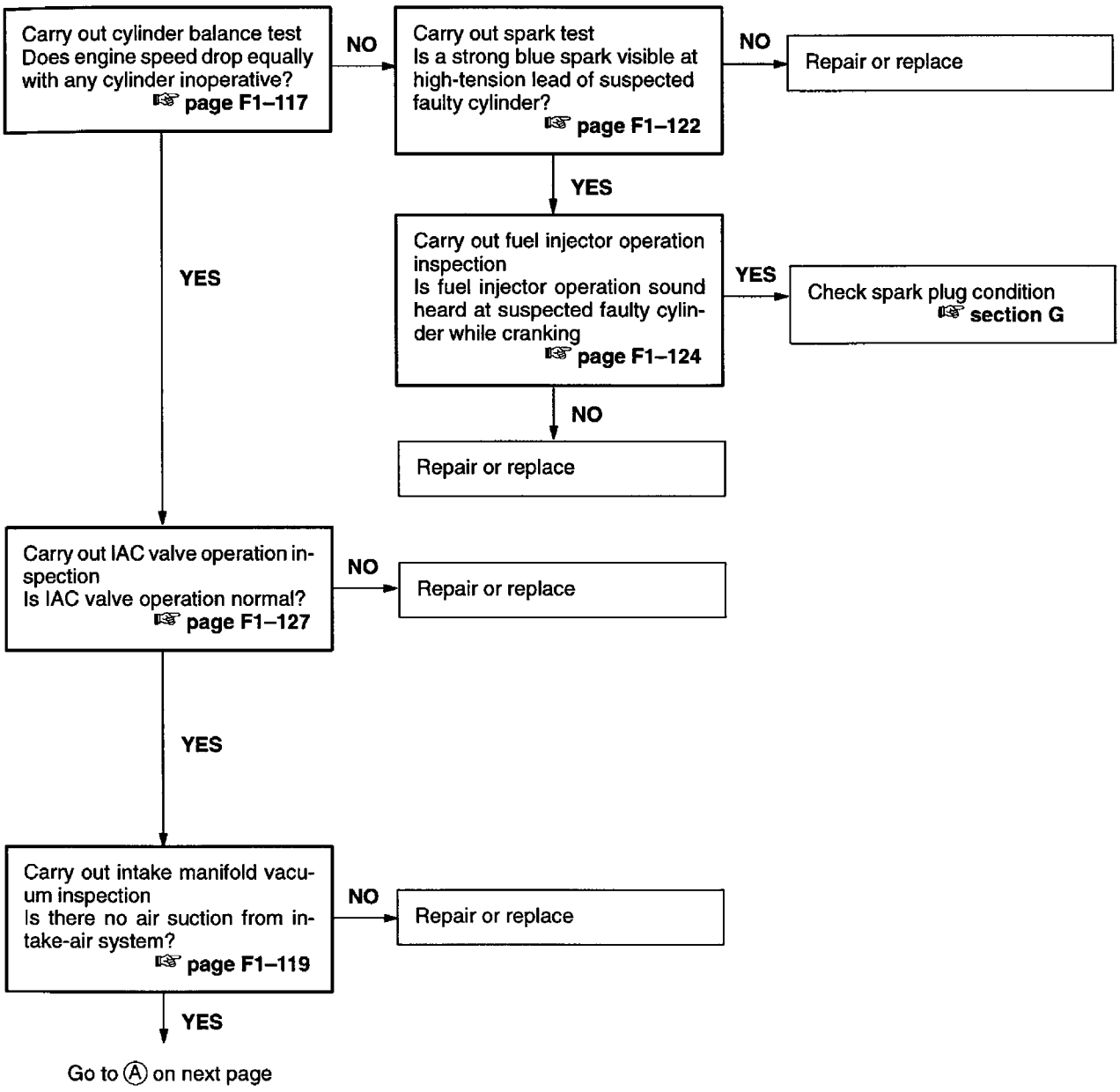
4 Combustion observed but engine will not start (cont'd)



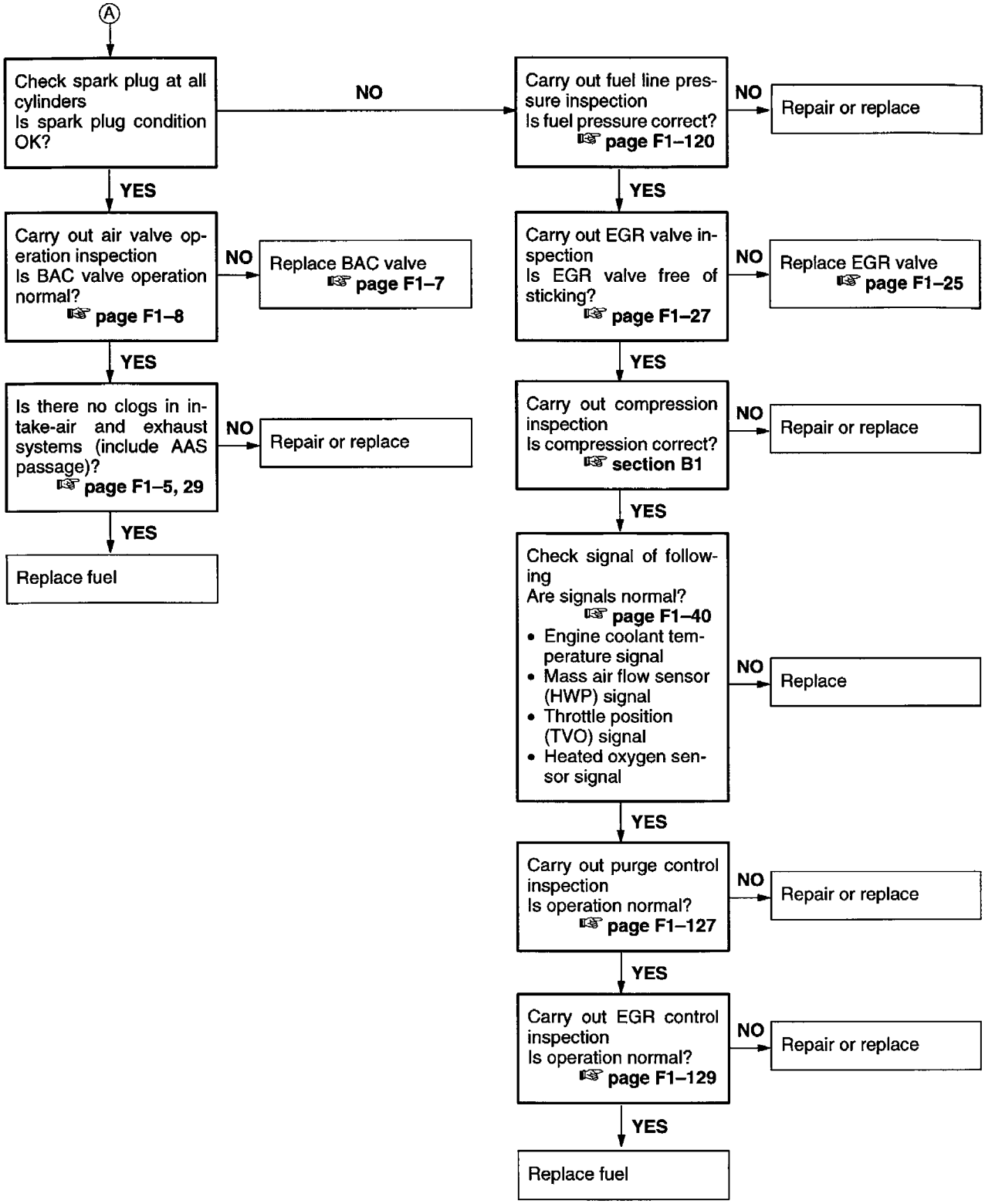
5 Cranks normally but hard to start



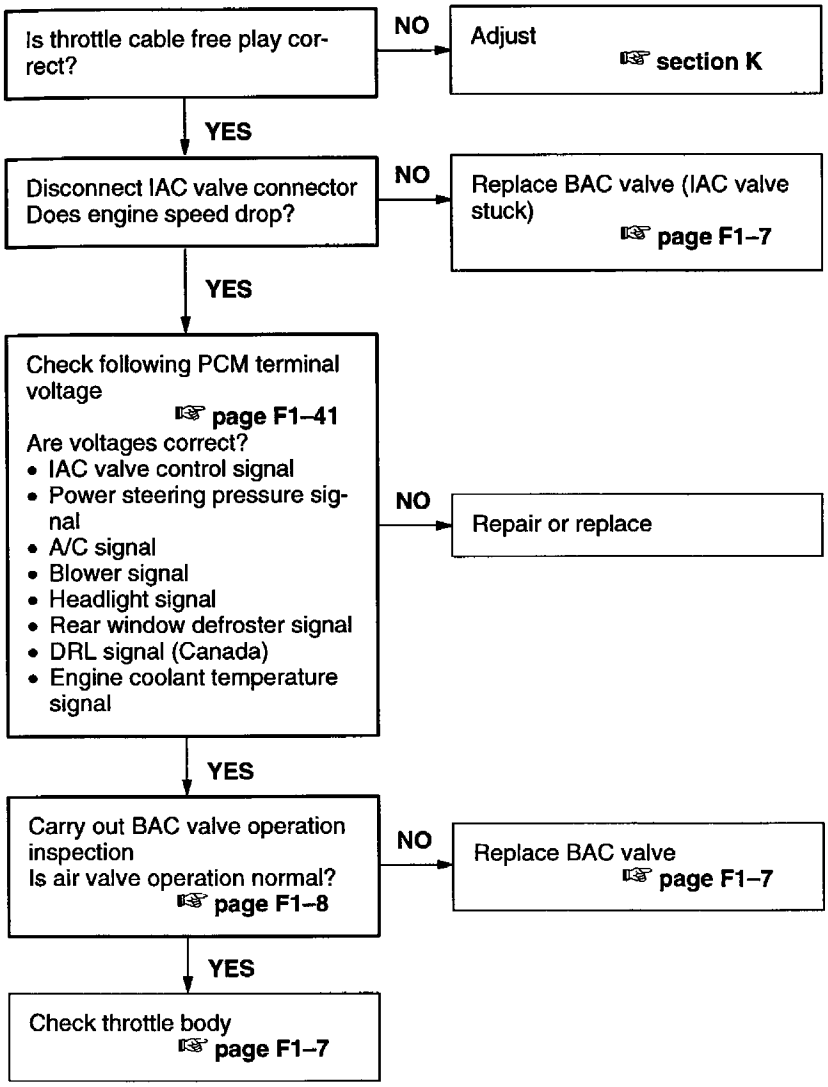
6 Low idle speed/Engine stalls or vibrates



6 Low idle speed/Engine stalls or vibrates (cont'd)



7 High idle speed
Idle speed remains high



8 High idle speed
Idle speed hard to lower

Carry out BAC valve operation inspection
Is BAC valve operation normal?
☞ **page F1–123**

NO → Repair or replace

YES ↓

Check throttle body
☞ **page F1–7**

9 Rough idle/Engine stalls when E/L, P/S, or A/C ON

① Symptom occur while E/L (blower, headlight, rear window defroster) operating

Check following PCM terminal voltage
Are signals normal?
☞ **page F1–39**
- Blower motor signal
- Headlight signal
- Rear window defroster signal

② Symptom occur while P/S operating

Check following PCM terminal voltage
Is voltage correct?
☞ **page F1–41**
- Power steering pressure signal

NO → Repair or replace

YES ↓

Check the P/S pump
☞ **section N**

③ Symptom occur while A/C operating

Check following PCM terminal voltage
Is voltage correct?
☞ **page F1–38**
- A/C signal

NO → Repair or replace

YES ↓

Check A/C compressor
☞ **section U**

④ Symptom occur regardless of load condition

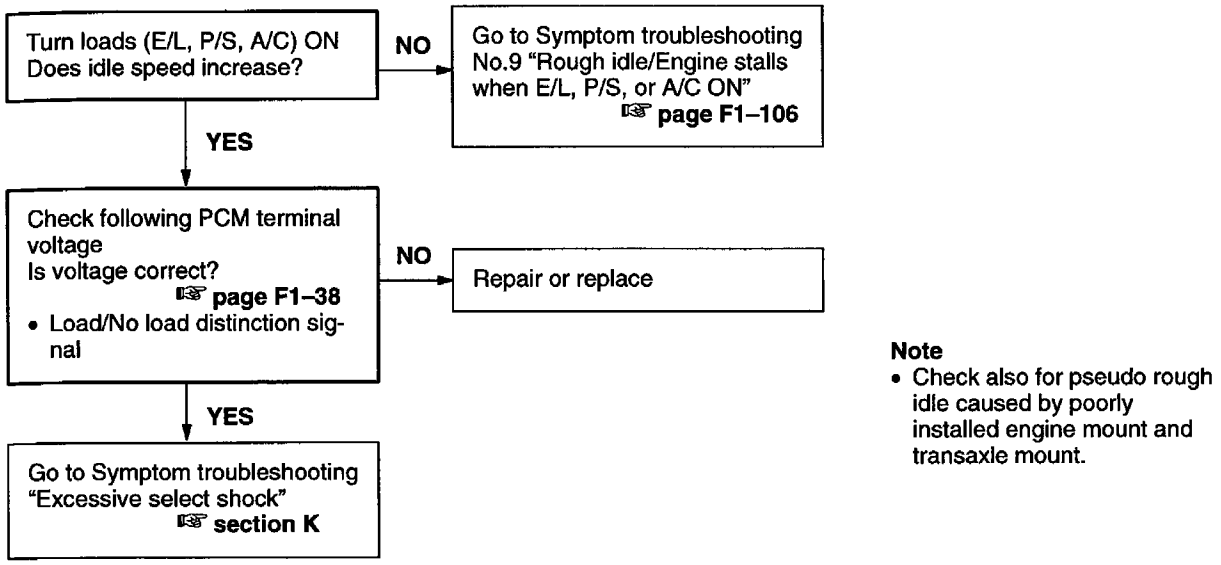
Disconnect IAC valve connector
Does engine speed drop?

NO → Replace BAC valve (IAC valve stuck)
☞ **page F1–7**

YES ↓

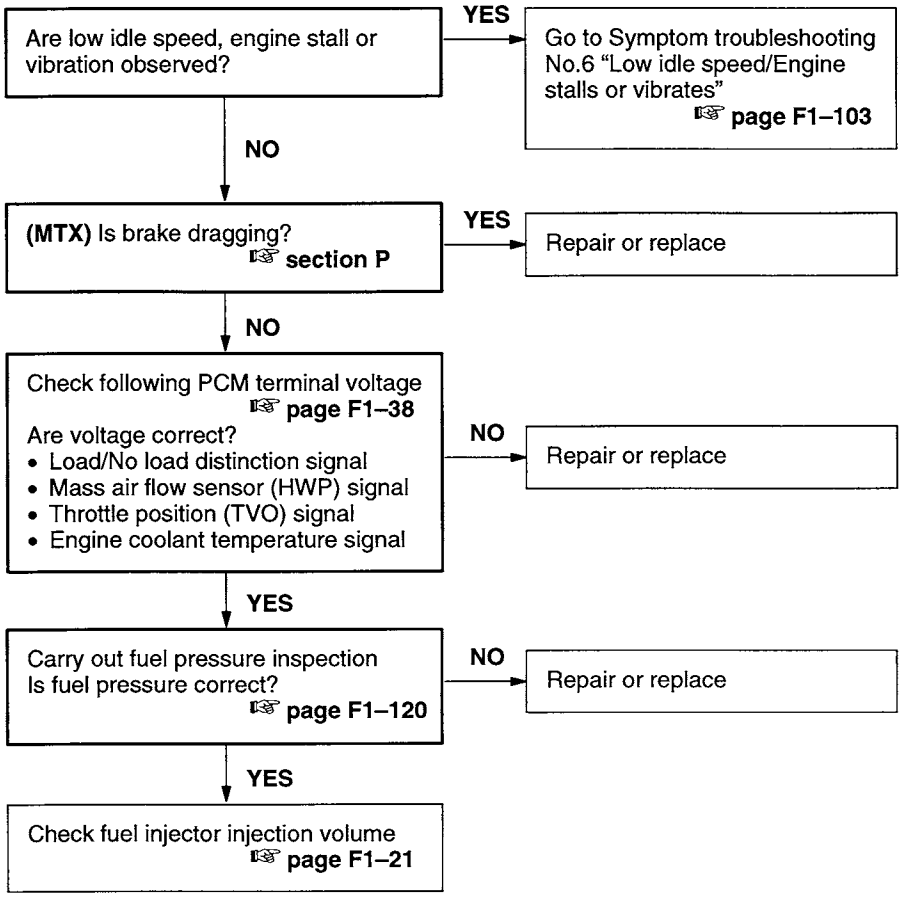
Check following PCM terminal voltage
☞ **page F1–41**
- IAC valve control signal

10 Rough idle/Engine stalls during N–D shift (ATX)

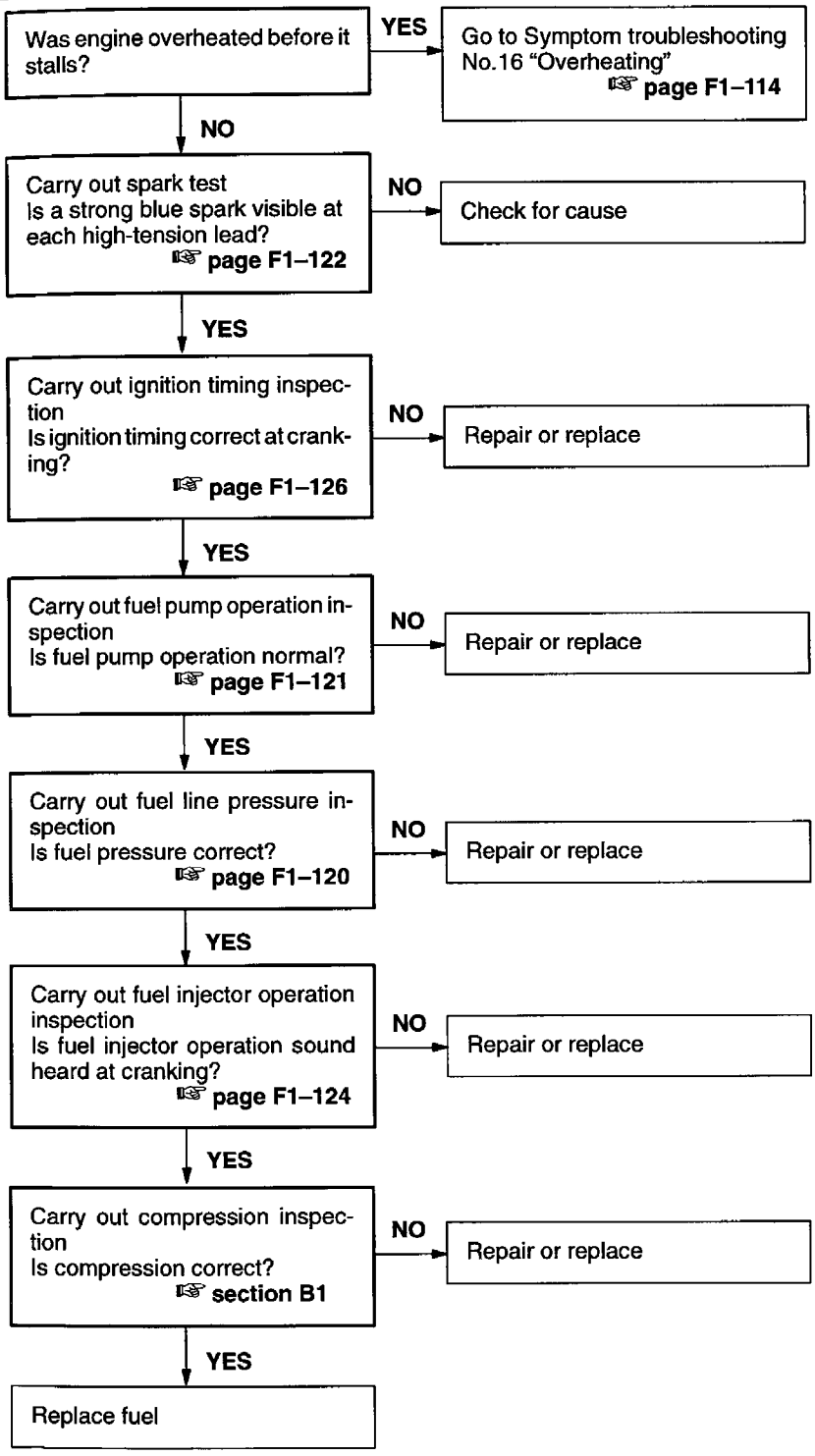


Note
- Check also for pseudo rough idle caused by poorly installed engine mount and transaxle mount.

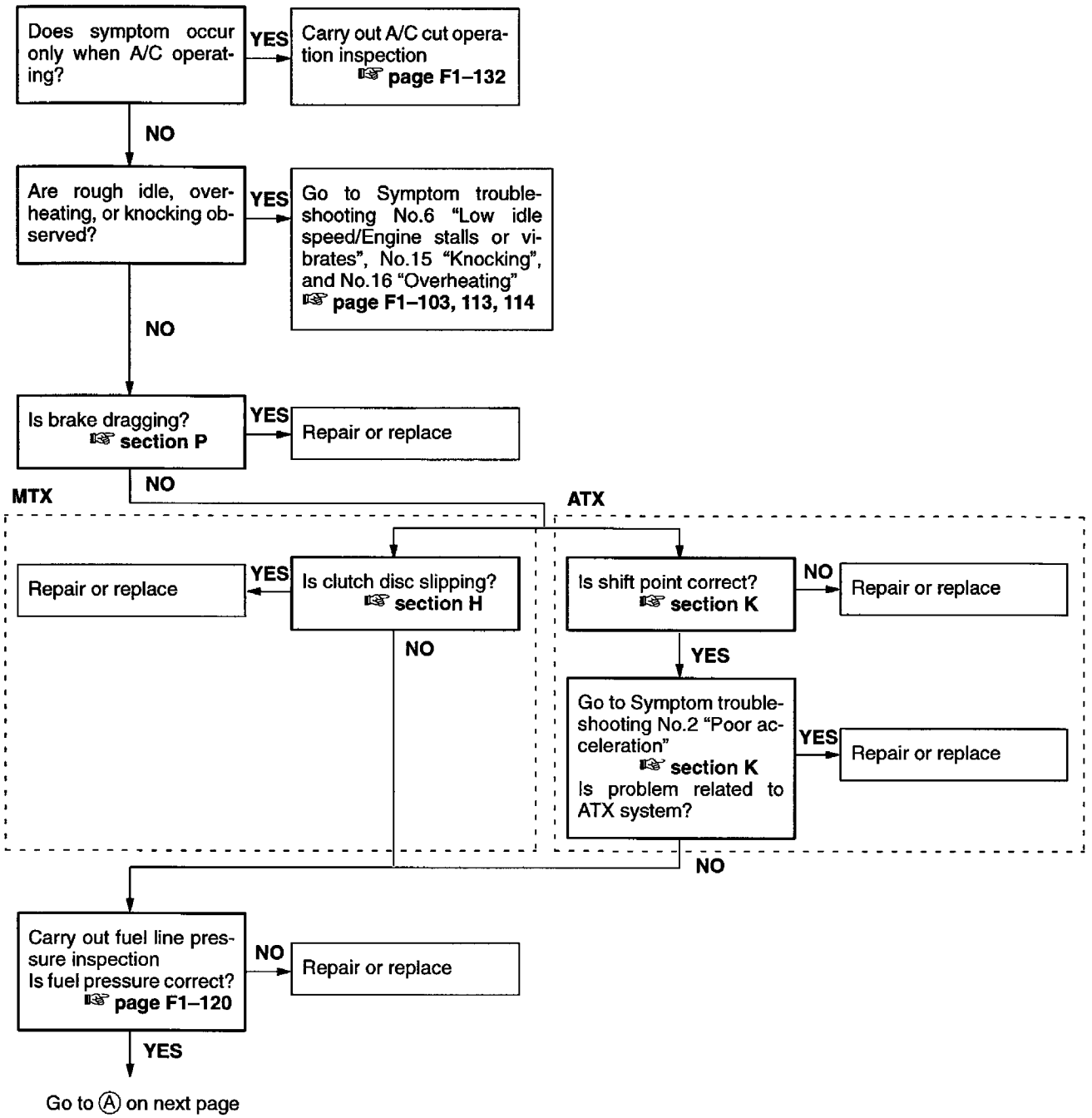
11 Engine stalls when vehicle about to run



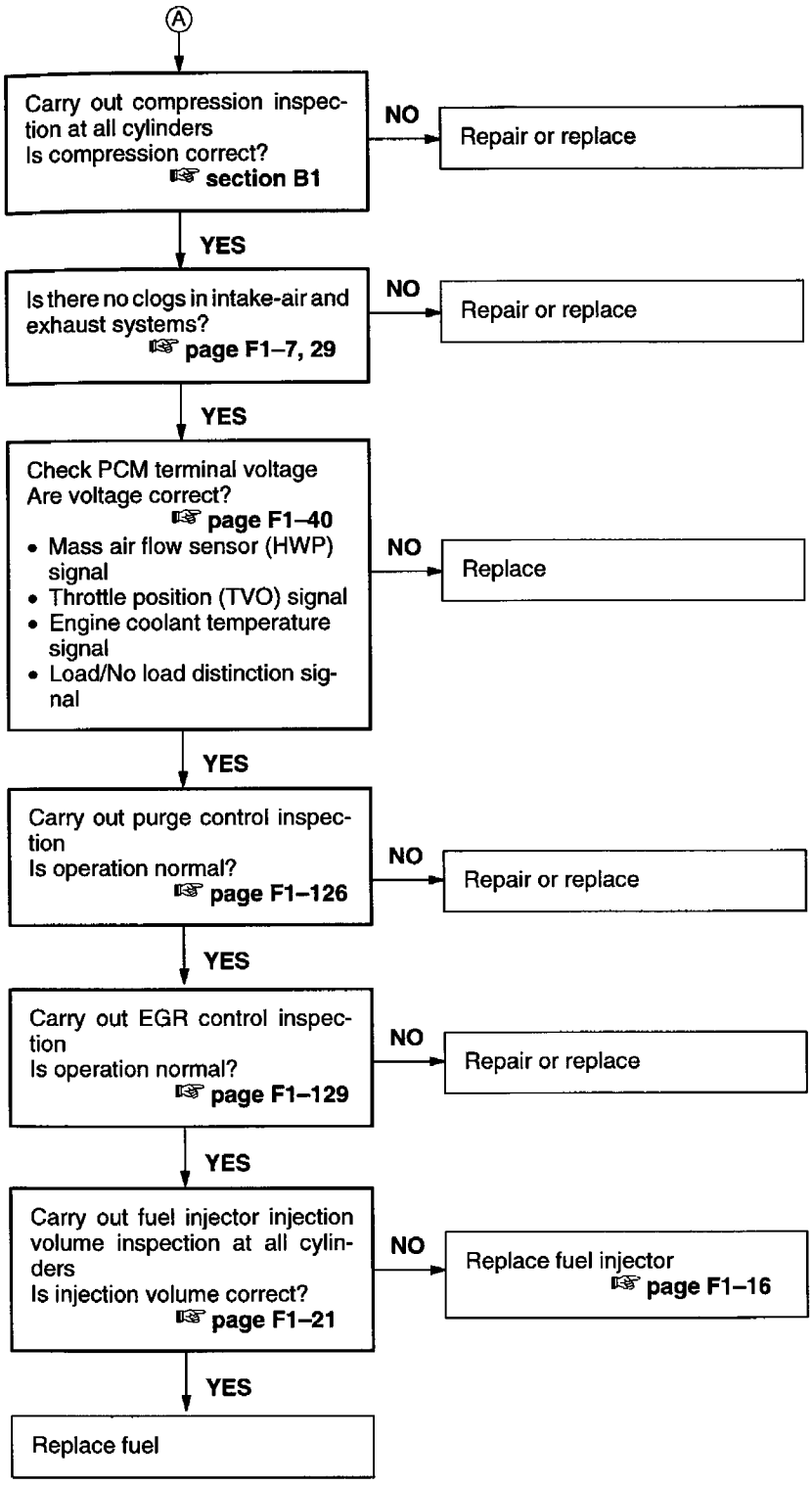
12 Engine stalls on acceleration and while cruising



13 Poor acceleration/Insufficient power/Surges while cruising/Hesitates

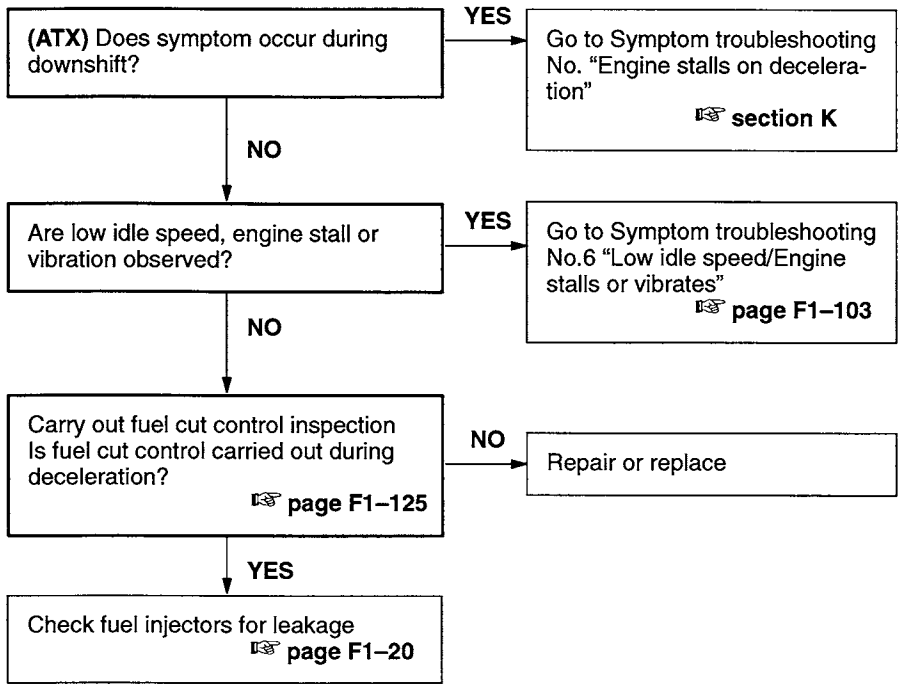


13 Poor acceleration/Insufficient power/Surges while cruising/Hesitates (Cont'd)

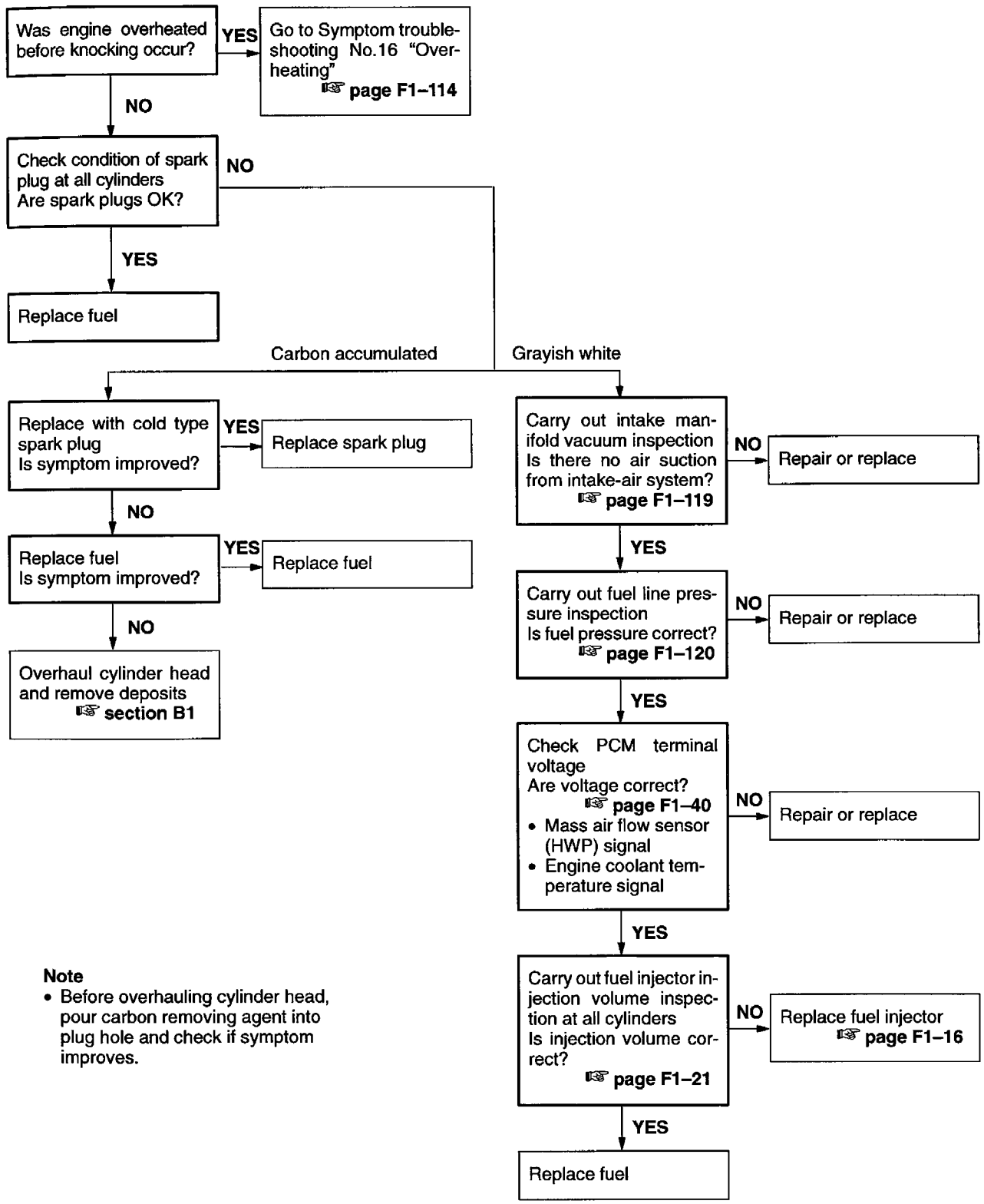


Note
- When symptom occur only when vehicle driving under heavy load condition, also check for leakage from ignition system (ignition coil, high-tension lead, spark plug)

14	Runs rough during deceleration/Backfire

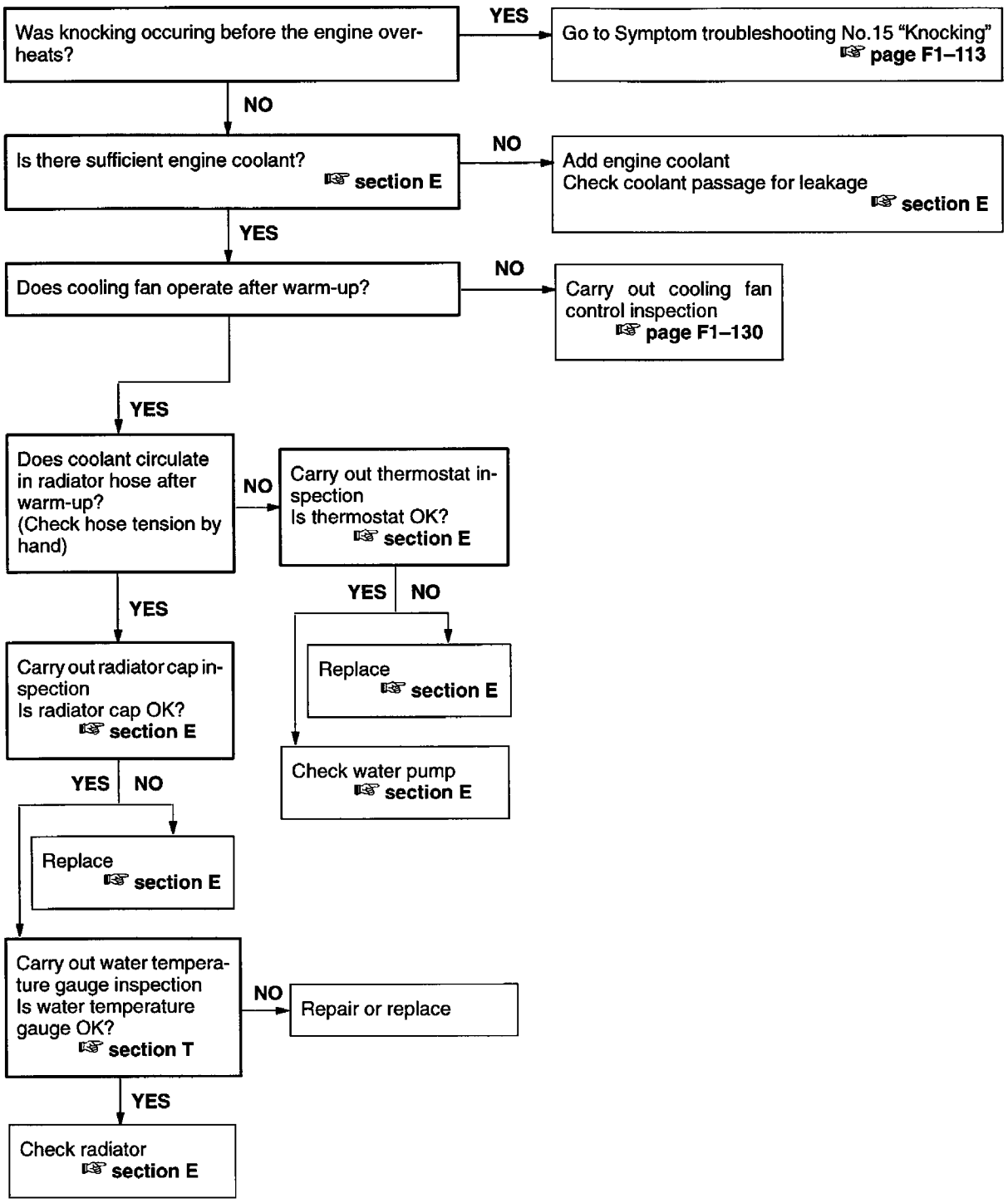


15 Knocking

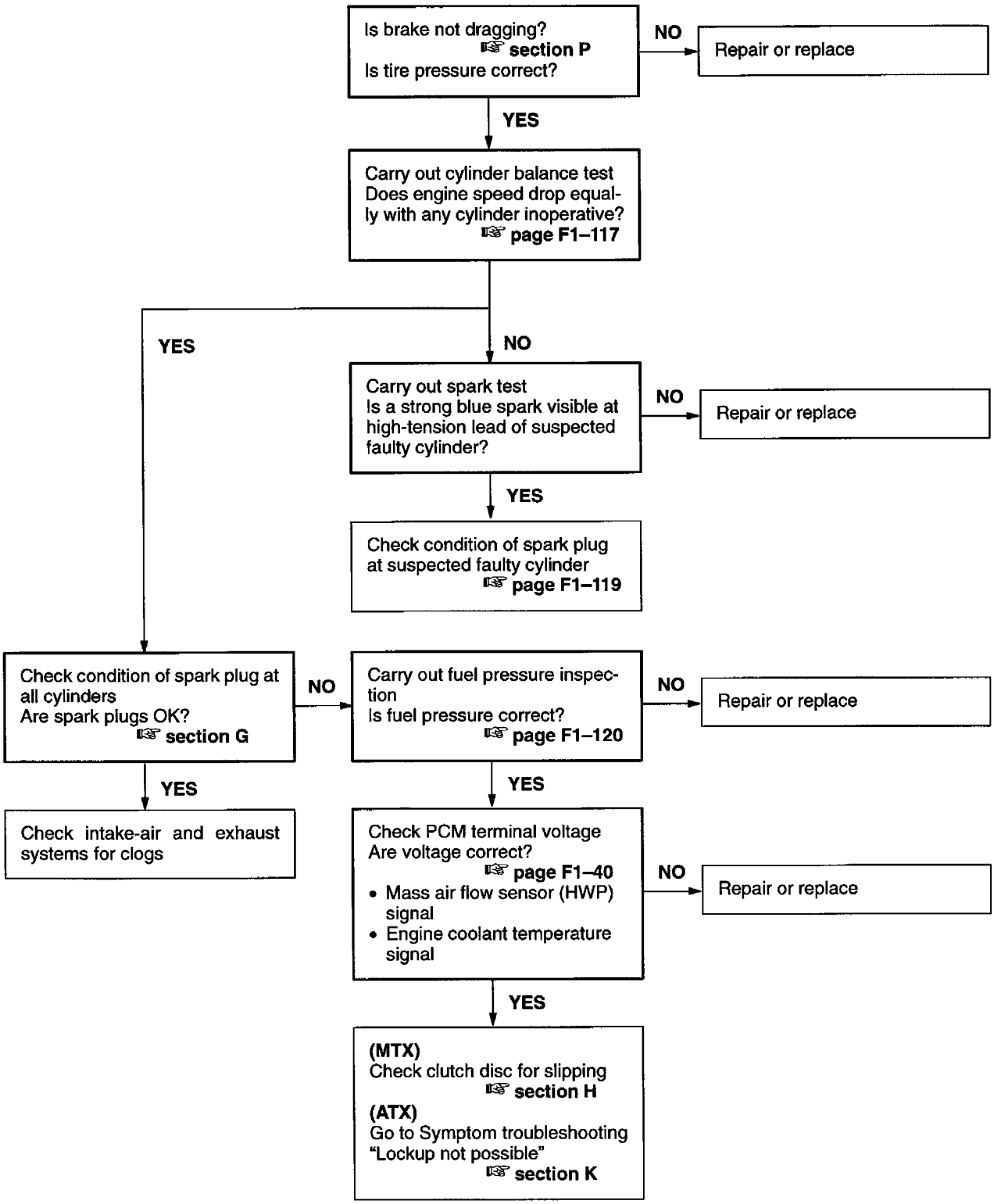


Note
- Before overhauling cylinder head, pour carbon removing agent into plug hole and check if symptom improves.

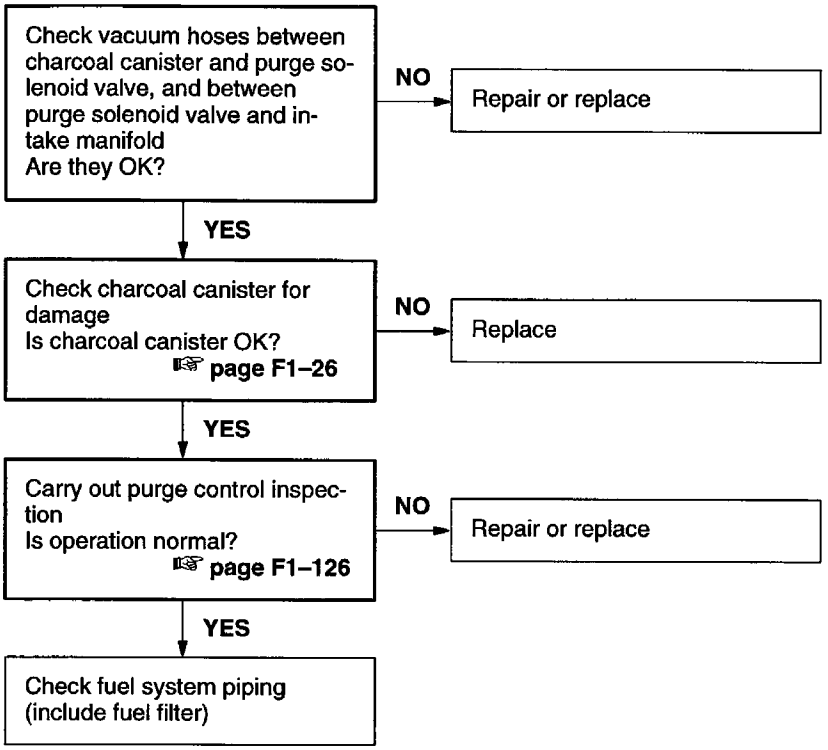
16 Overheating



17 Poor fuel economy



18 Fuel odor

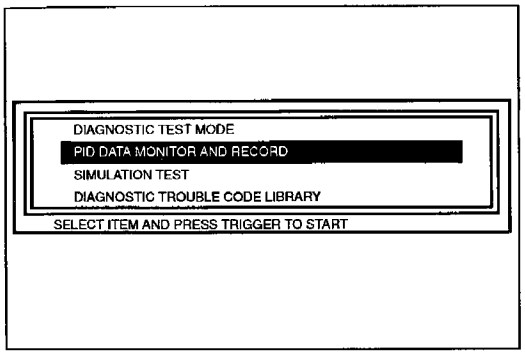

Check vacuum hoses between charcoal canister and purge solenoid valve, and between purge solenoid valve and intake manifold
Are they OK?
NO
Repair or replace
YES
Check charcoal canister for damage
Is charcoal canister OK?
☞ page F1–26
NO
Replace
YES
Carry out purge control inspection
Is operation normal?
☞ page F1–126
NO
Repair or replace
YES
Check fuel system piping (include fuel filter)

DIAGNOSTIC INSPECTION
Cylinder Balance Test
Purpose
The purpose of the cylinder balance test is to find weak or non-contributing cylinders. In this test, the high-tension leads are disconnected one by one to shut off the ignition in each cylinder while the engine is running. The engine speed drop caused by this operation is measured and compared with each other, and the cylinder condition is judged. If all the engine speed decrease amounts are almost the same with any of the cylinder inoperative, there will be no weak or non-contributing cylinder. Engine speed different from others indicates that the corresponding cylinder is considered to be weak or non-contributing.

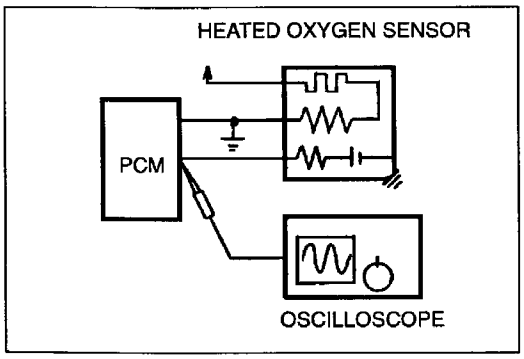
Warning
- **High-voltage in ignition system can cause strong electrical shock. Avoid direct contact to the vehicle body during the cylinder balance test.**
- **High-voltage spark will negatively effect the engine control. To prevent this, ground the high-tension lead and keep away from sensors and harnesses.**

Caution
- **Cylinder balance test can overheat and damage the three way catalytic converter.**

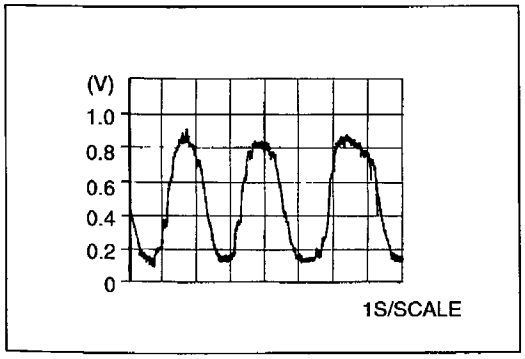
Note
- Diagnostic trouble codes (No. P0300, P0301, P0302, P0303, and P0304) will be stored in the PCM memory during the cylinder balance test. Carry out "After Repair Procedure" and erase these codes after this test. (Refer to page F1–54.)



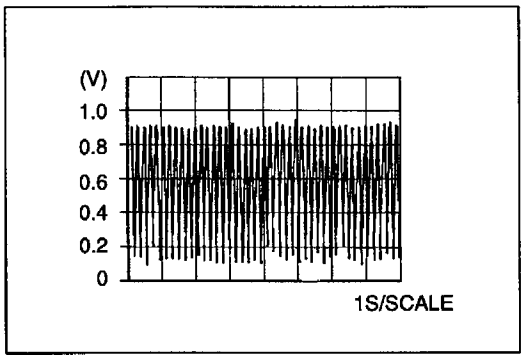
Procedure
1. Connect the **SSTs** (NGS) to the data link connector–2 and select the PID/DATA MONITOR AND RECORD function. (Refer to page F1–54.)
2. Select the "RPM" on the NGS display.
3. Start the engine and let it idle.
4. Disconnect each high-tension lead and measure the engine speed.
5. Compare the engine speed decrease amounts.



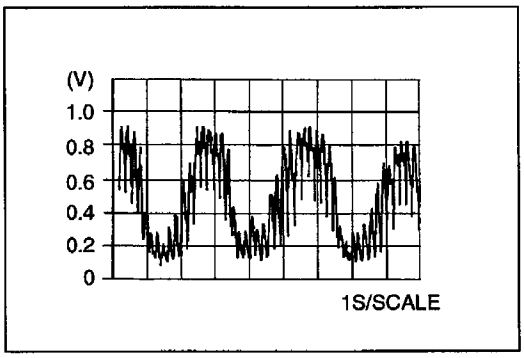
Inspection using an oscilloscope
1. Trouble detection by heated oxygen sensor output pulse.



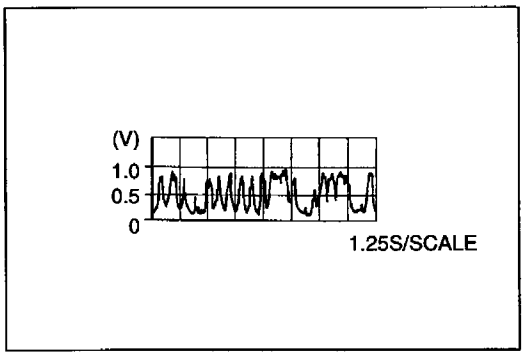
(1) When normal
Engine condition
No-load idling after warm-up



(2) No injection in one cylinder
Engine condition
No-load idling after warm-up
Pulse detected
Pulse cycle extremely short

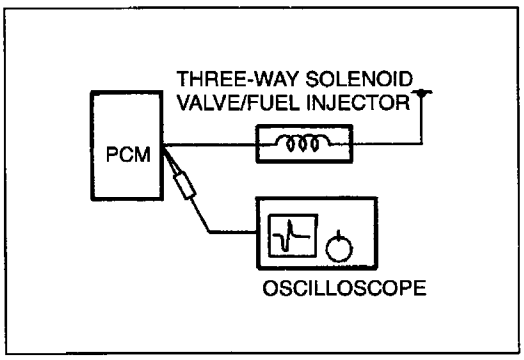


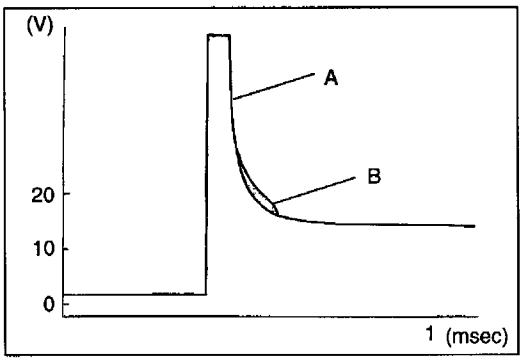
(3) No ignition in one cylinder
Engine condition
No-load idling after warm-up
Pulse detected
Pulse cycle longer than normal pulse
Rich spike caused by unburnt gas in misfiring cylinder observed



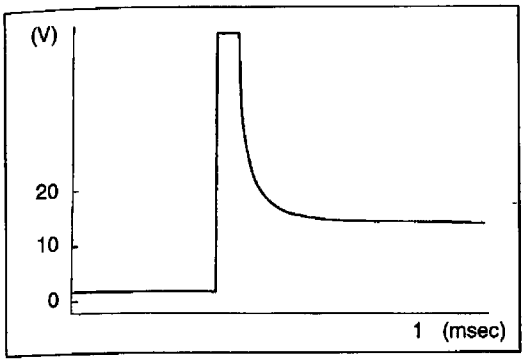
(4) Exhaust gas flown in cylinder
Engine condition
No-load idling after warm-up
Pulse detected
Pulse width and cycle irregular

2. Plunger sticking detection using an oscilloscope.





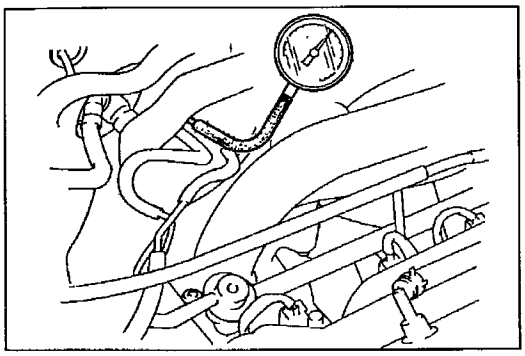
(1) When normal
Counter electromotive voltage A, generated when the three-way solenoid valve or the fuel injector is turned off from on, shows irregular convergence because induced electromotive voltage B, generated by the plunger return operation, is added to it.



(2) When plunger stuck
When the plunger is stuck, pulse convergence is smooth because no induced electromotive voltage B is generated.

Trouble judgement by spark plug conditions

Condition	Possible cause	page
Carbon accumulated on some spark plugs only	Fuel leakage from fuel injector Damaged spark plug (Cracked insulator) Low compression	☞ page F1–20 ☞ section G ☞ section B1
Some spark plugs wet	Excessive fuel injection from fuel injector Damaged spark plug Low compression	☞ page F1–20 ☞ section G ☞ section B1
Some spark plugs look grayish white	Insufficient fuel injection from fuel injector	☞ page F1–20



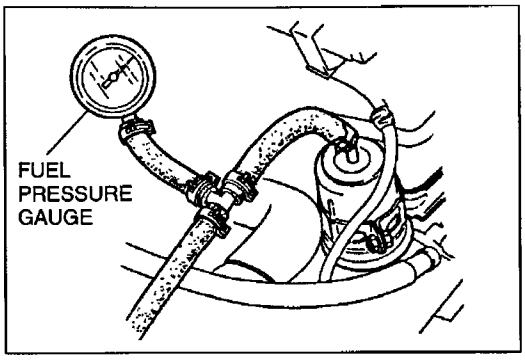
SYSTEM INSPECTION

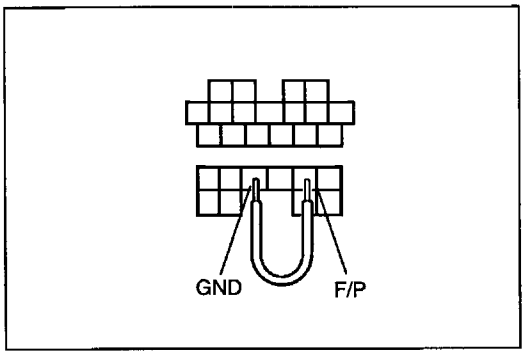
Intake Manifold Vacuum Inspection

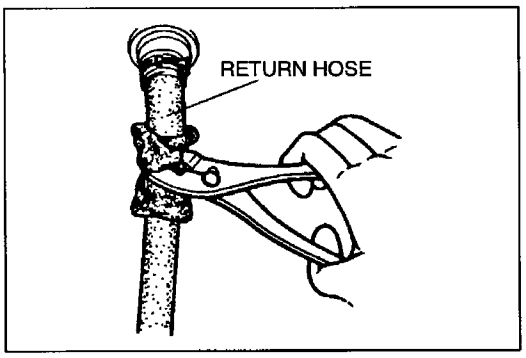
1. Verify that the intake-air system hoses are fitted securely.
2. Disconnect the vacuum hose from the pressure regulator and connect to vacuum gauge as shown.
3. Start the engine and let it idle.
4. Measure the intake manifold vacuum by using a vacuum gauge.

   Vacuum: More than 60 kPa { 450 mmHg , 18 inHg }

5. If not as specified, check following
   - Air suction at:
     Throttle body installation point
     Intake manifold installation point
     PCV valve installation point
   - Accelerator cable free play (Refer to page F1–9.)
   - Engine compression (Refer to section B1.)







Fuel Line Pressure Inspection

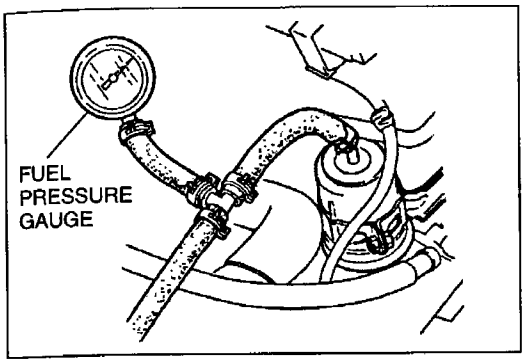
Warning

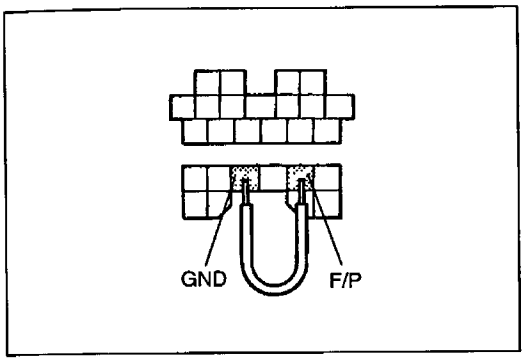
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F1–10.**

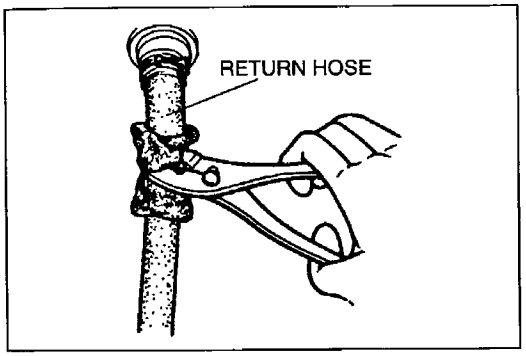
1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge between the fuel filter (high pressure side) and fuel distributor.
3. Connect the negative battery cable.
4. Connect data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON and measure the fuel line pressure.

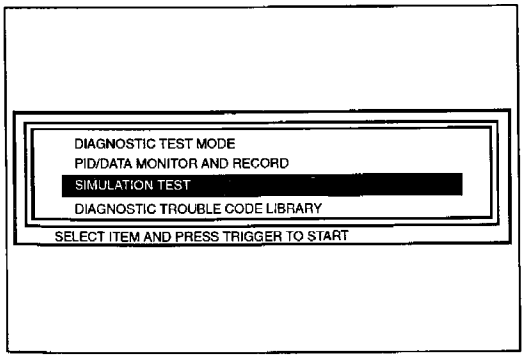
Specification:
270—310 kPa { 2.7—3.2 kgf/cm^2 , 39—45 psi }

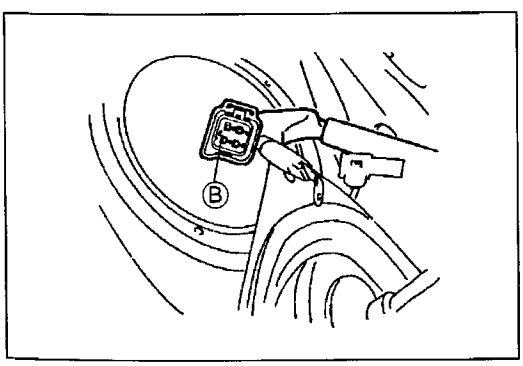
6. Turn off the ignition switch and disconnect the jumper wire.
7. If the pressure is higher than specified, check the fuel pump maximum pressure. (Refer to page F1–19.)
   If normal, check the pressure regulator, or fuel return hose is clogged.
8. If the pressure is lower than specified, measure the fuel line pressure with pinching the return hose.
   - If the fuel line pressure quickly increases, check the pressure regulator and PRC solenoid valve. (Refer to page F1–22.)
   - If the fuel line pressure gradually increases, check the fuel pump maximum pressure. (Refer to page F1–19.)
9. If the pressure is normal, check the clogging between fuel pump and pressure regulator.











Fuel Pressure Hold Inspection

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F1–10.**

1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge between the fuel filter (high pressure side) and fuel distributor.
3. Connect the negative battery cable.
4. Connect data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON for approx. 10 sec. to operate the fuel pump.
6. Turn off the ignition switch. Wait for 5 min., and measure the fuel pressure.

Specification:
More than 150 kPa { 1.5 kgf/cm^2 , 21 psi }

7. Disconnect the jumper wire.
8. If the pressure is lower than specified, measure the fuel line pressure with pinching the return hose.
   - If the fuel line pressure holds, replace the pressure regulator. (Refer to page F1–7.)
   - If the fuel line pressure dose not hold, check the fuel pump fuel hold pressure. (Refer to page F1–19.)
     If the fuel pump fuel hold pressure is normal, check the fuel leaks from fuel line and fuel injector.

Fuel Pump Operation Inspection

1. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F1–37.)
2. Remove the fuel filler cap.
3. Turn the ignition switch to ON.
4. Select the SIMULATION TEST function on the NGS display.
5. Turn the fuel pump relay from OFF to ON by using the "FP RLY". Operate the fuel pump relay and check if operation sound of the fuel pump is heard.
   (1) If the operation sound is heard, do as follows.
      I. Measure the voltage at terminal B of the fuel pump connector (harness side).
      Voltage: Battery positive voltage (Ignition switch: ON)
      II. If the voltage is correct, check the following.
      - Continuity of the fuel pump
        (Refer to page F1–19.)

      III. If the voltage is not correct, check the following.
      - Wiring harnesses and connectors
        (Fuel pump relay — Fuel pump)

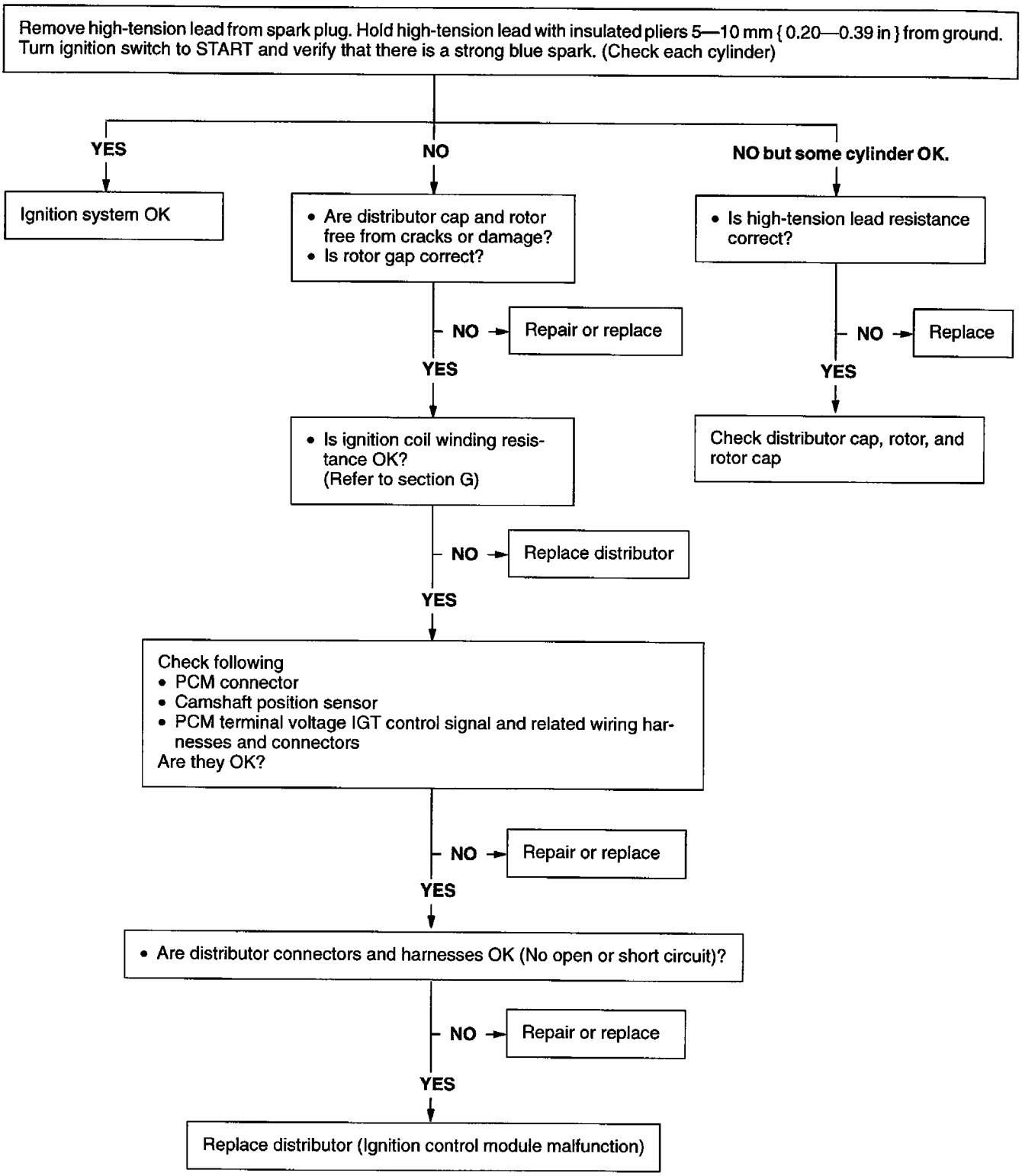
   (2) If the operation sound is not heard, check the following.
   - Fuel pump relay (Refer to page F1–22.)
   - Wiring harnesses and connectors
     (Main relay — Fuel pump relay — PCM)

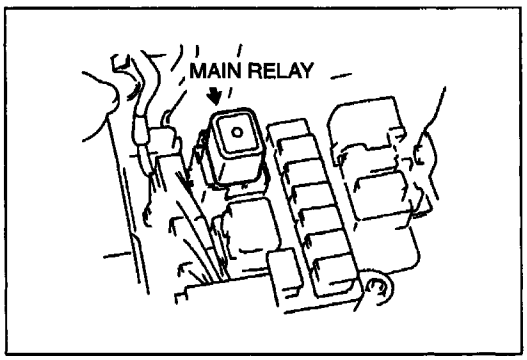
Spark Test

1. Remove the rear seat cushion. (Refer to section S.)
2. Disconnect the fuel pump connector. (Refer to page F1–13.)
3. Verify that each high-tension lead and connector is connected properly.
4. Inspect the ignition system in the following procedure.

Warning

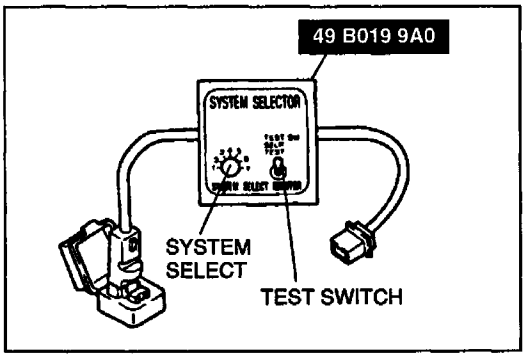
- **High voltage in the ignition system can cause strong electrical shock. Avoid direct contact to the vehicle body during the following spark test.**

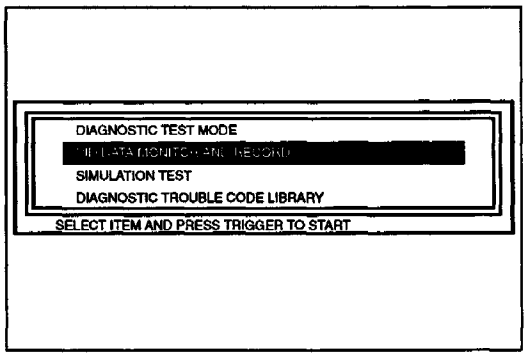




Main Relay Operation Inspection

1. Verify that the main relay clicks when the ignition switch is turned to ON and OFF.
2. If there is no operation sound, inspect the following.
   - Main relay (Refer to page F1–53.)
   - Harness and connector between ignition switch and main relay.

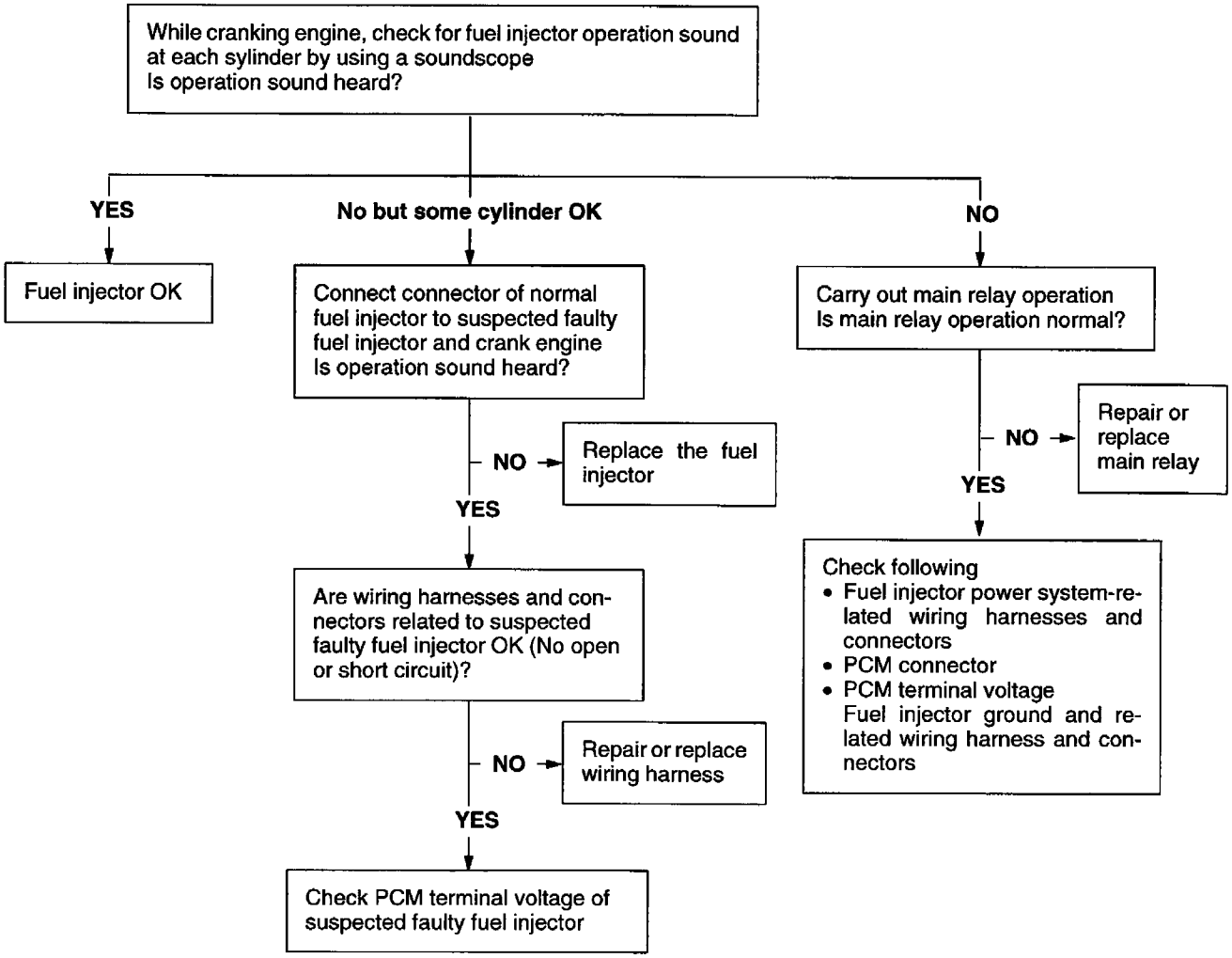




BAC Valve Operation Inspection

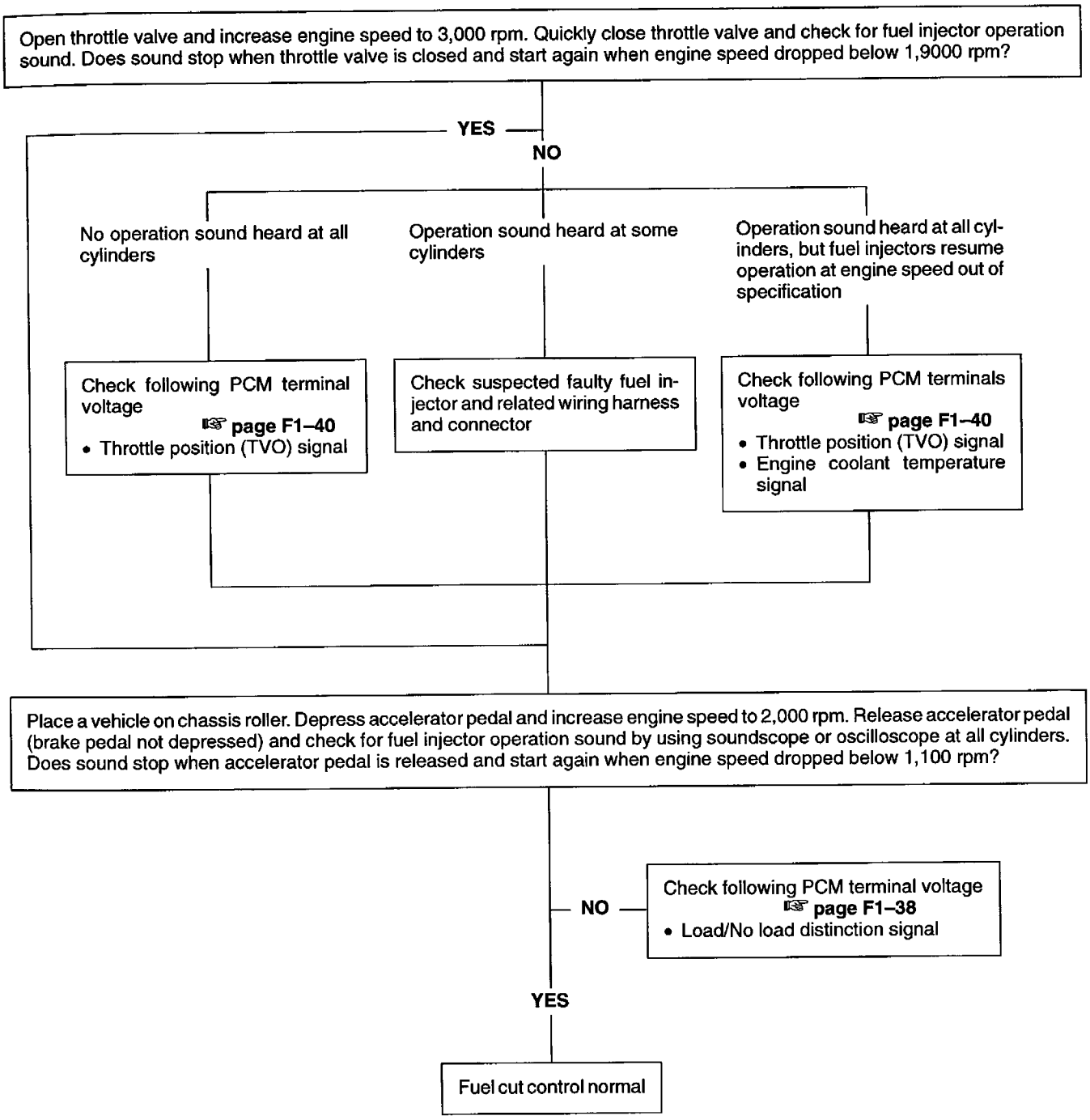
1. Connect the **SST** (System Selector) to the data link connector.
2. Set switch A to position 1.
3. Set the test switch to SELF TEST.
4. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F1–37.)
5. Select the PID/DATA MONITOR AND RECORD function.
6. Verify that the engine is cold condition, and start the engine.
7. Select the "RPM" on the NGS display.
8. Verify that the engine speed decreases as the engine warms up.
9. Disconnect the **SST** (System Selector).
10. If the engine speed will not decrease or decreases slowly, check the water hose connected to BAC valve for leakage and clogs. (Refer to section E.)
11. If the water hose is OK, inspect the following.
    - Air valve (Refer to page F1–8.)
    - IAC valve (Refer to page F1–8.)

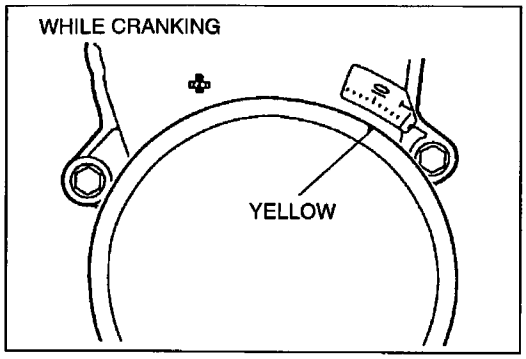
Fuel Injector Operation Inspection

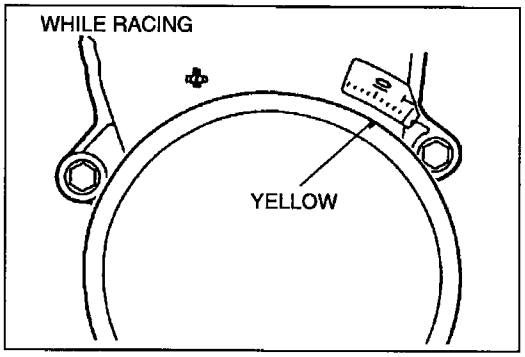


Fuel Cut Control Inspection

1. Warm up the engine to normal operating temperature.
2. Turn off the A/C switch.
3. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F1–37.)
4. Select the PID/DATA MONITOR AND RECORD function on the NGS display.
5. Select the "RPM".
6. Using a soundscope, listen for the fuel injector operation sound at all cylinders.







Ignition Timing Control Inspection

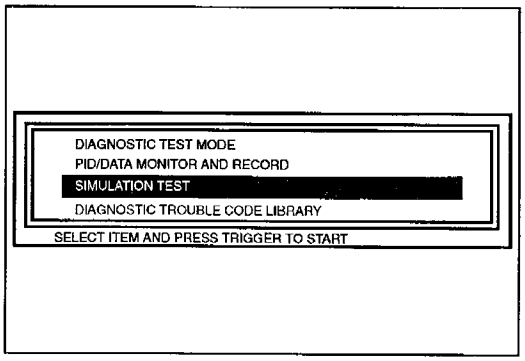
1. Connect a timing light to the engine.
2. Crank the engine.
3. Verify that the timing mark (yellow) on the crankshaft pulley and the mark on the timing belt cover are aligned.

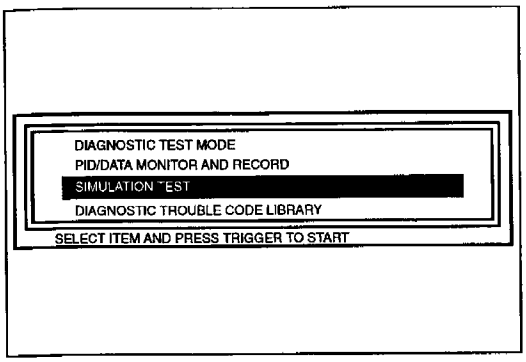
   Specification: BTDC 6—8°

4. If not as specified, loosen the lock bolt and adjust by turning the distributor.
5. If adjustment by turning distributor is not possible, check the following.
   - PCM terminal voltage
     IGT control signal and related wiring harnesses and connectors.
   - Camshaft position sensor (Refer to page F1–44.)
   - Ignition control module (Refer to section G) and related wiring harnesses and connectors.
6. Warm up the engine to normal operation temperature.
7. Verify that the ignition timing is correct.
   (Refer to page F1–2.)
8. Increase the engine speed and verify that the ignition timing advances accordingly.
9. If not, check the following.
   - Mass air flow sensor (Refer to page F1–43.)

Purge Control Inspection

1. Start and warm up the engine to normal operating temperature.
2. Let the engine idle.
3. Disconnect the vacuum hose between the purge solenoid valve and the charcoal canister.
4. Put a finger to the purge solenoid valve and verify that there is no vacuum applied.
5. If there is vacuum, do as follows.
   (1) Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F1–37.)
   (2) Verify that diagnostic trouble code No. P0443 is not displayed. If code No. P0443 is shown, carry out troubleshooting of the code No. P0443.
   (Refer to page F1–75.)
   (3) If diagnostic trouble codes are not shown, check the following.
   - Purge solenoid valve (Refer to page F1–27.)
6. Reconnect the vacuum hose.
7. Connect the **SSTs** (NGS) to the data link connector–2.
8. Select the SIMULATION TEST function on the NGS display.
9. Increase the duty value of the purge solenoid valve from 0% to 100% by using the "PRGV". Operate the purge solenoid valve and check if the idle condition changes.



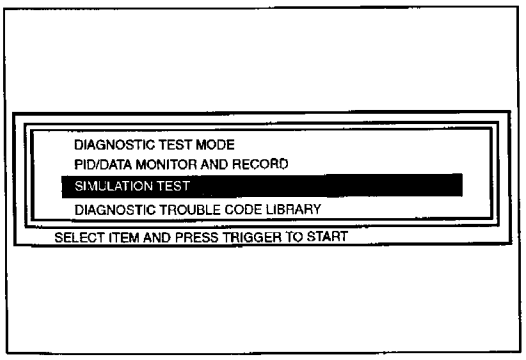


10. If the condition does not change, do as follows.
    (1) Turn the ignition switch to ON.
    (2) Verify that diagnostic trouble code No. P0443 is not displayed. If code No. P0443 is shown, carry out troubleshooting of the code No. P0443. (Refer to page F1–75.)
    (3) Select the SIMULATION TEST function on the NGS display.
    (4) Increase duty value of the purge solenoid valve from 0% to 100% by using the "PRGV". Operate the purge solenoid valve and check if the operation sound of the valve is heard.

        I. If the operation sound is heard, check the following.
           • Loose or damaged vacuum hose
        II. If the operation sound is not heard, check the following.
           • Purge solenoid valve (Refer to page F1–27.)

Idle Air Control Inspection

1. Start the engine and run it at idle.
2. Disconnect the IAC valve connector and verify that the engine rotation changes.
3. If the engine condition will not change, do as follows.
    (1) Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F1–37.)
    (2) Vefity that diagnostic trouble code No. P0505 is not displayed. If code No. P0505 is shown, carry out troubleshooting of the code No. P0505.
    (3) Select the SIMULATION TEST function on the NGS display.
    (4) Change the duty value of the IAC valve to 100% by using the "IACV" and vefity that the idle speed increases.
        a. If the idle speed increases, replace the PCM. (Refer to page F1–35.)
        b. If the idle speed does not change. Replace the IAC valve. (Refer to page F1–7.)
4. Warm up the engine to normal operating temperature and run it at idle.
5. Turn the electrical loads ON and vefity that the engine speed is with in the specification.

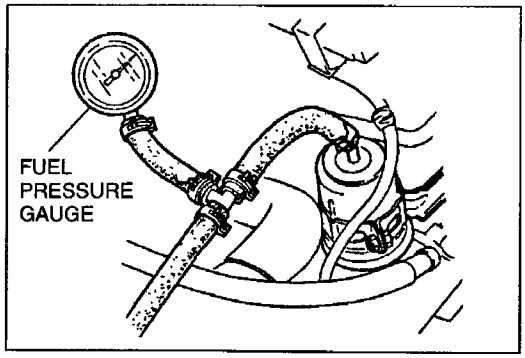


Engine speed (rpm)

Load condition	Idle speed (rpm)	
	MTX	ATX
Fan switch ON at 2nd or higher	650—750	700—800
Headlight switch ON		
Rear window defroster switch ON		
P/S ON	700—800	
A/C ON		

Note
- Excludes temporary idle speed drop just after the electrical loads are turned on.

6. If not as specified, check the related switches and wiring harnesses.



Pressure Regulator Control Inspection
System Inspection

Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures". (Refer to page F1–10.)**

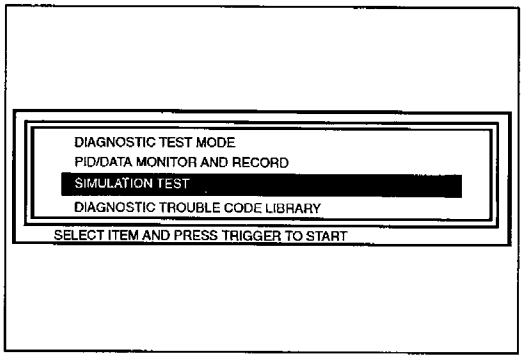
1. Install the fuel pressure gauge.
2. Measure the fuel pressure under the following conditions.

Specifications

	Fuel pressure kPa { kgf/cm², psi }		
Idling	216—264 { 2.2—2.7 , 32—38 }	216—264 { 2.2—2.7 , 32—38 }	More than 284 { 2.9 , 41.2 }
During 150 sec. of hot start	More than 284 { 2.9 , 41.2 }		
After 150 sec. of hot start	216—264 { 2.2—2.7 , 32—38 }		
Judgement	Normal	Not normal (Perform Inspection 1)	Not normal (Perform Inspection 2)

3. If the fuel pressure is not within the specification. Carry out either Inspection 1 or Inspection 2.

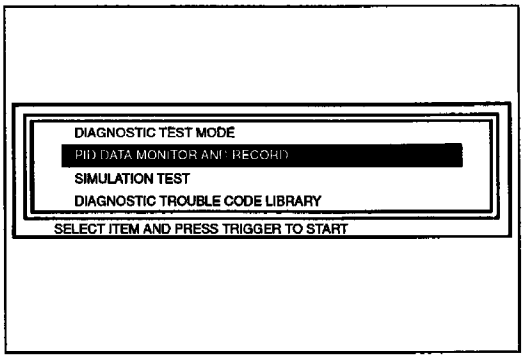
Inspection 1
1. Stop the engine.
2. Connect the **SSTs** (NGS) to the data link connector–2.
3. Verify that diagnostic trouble code No. P1250 is not displayed. If code No. P1250 is shown. Carry out troubleshooting of the code No. P1250. (Refer to page F1–82.)
4. Start the engine and run it at idle.
5. Select the SIMULATION TEST function on the NGS display.
6. Turn the PRC solenoid valve from OFF to ON by using the "PRCV" and check if the fuel pressure changes.

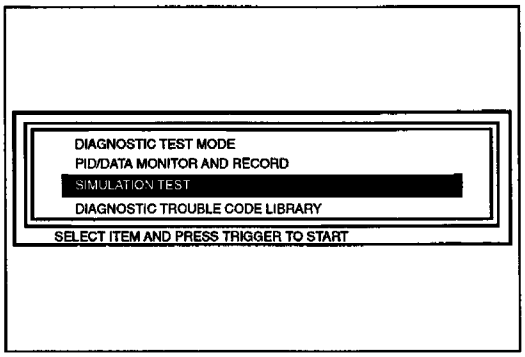


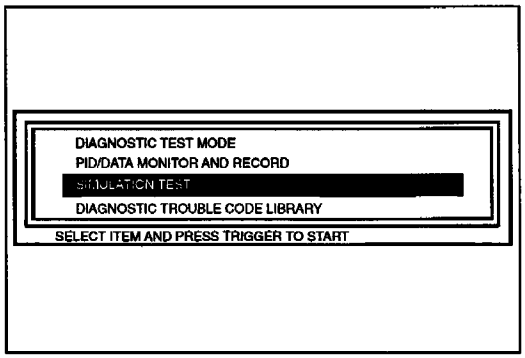
(1) If the pressure changes, check the following
- PCM terminal voltage (Refer to page F1–40.)
- Engine coolant temperature signal
- Intake air temperature signal
- Throttle position signal

(2) If the pressure does not change, do as follows.
I. Stop the engine.
II. Turn the ignition switch to ON.
III. Turn the PRC solenoid valve from OFF to ON by using the "PRCV" and check if the operation sound of the valve is heard.
a. If the operation sound is heard, check the following.
- Pressure regulator (Refer to page F1–21.)

b. If the operation sound is not heard, check the following.
- PRC solenoid valve (Refer to page F1–22.)







Inspection 2

1. Stop the engine.
2. Connect the **SSTs** (NGS) to the data link connector–2.
3. Verify that diagnostic trouble code No. P1250 is not displayed. If code No. P1250 is shown. Carry out troubleshooting of the code No. (Refer to page F1–82.)
4. Select the PID/DATA MONITOR AND RECORD function on the NGS display.
5. Select the "PRCV" and verify that the PRC solenoid valve is OFF.
6. If the PRC solenoid valve is ON, check the following.
   - PCM terminal voltage (Refer to page F1–40.)
   - Engine coolant temperature signal
   - Intake air temperature signal
7. Select the SIMULATION TEST function on the NGS display.
8. Turn the PRC solenoid valve from OFF to ON using the "PRCV" and check if the operation sound of the valve is heard.

   (1) If the operation sound is heard, check the following.
   - Loose or damaged vacuum hose between the pressure regulator, PRC solenoid valve, and intake manifold.

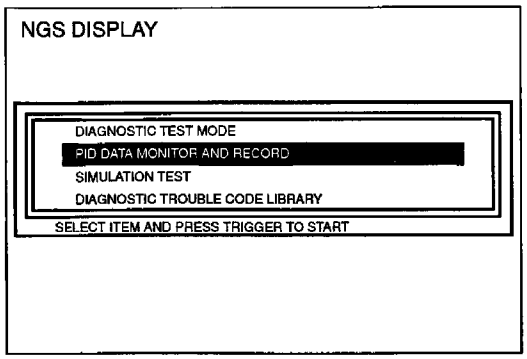
   (2) If the operation sound is not heard, check the following.
   - PRC solenoid valve (Refer to page F1–22.)

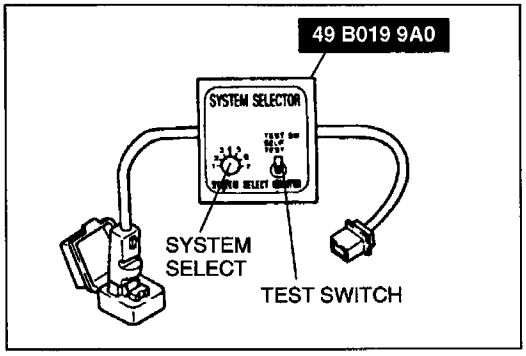
EGR Control Inspection

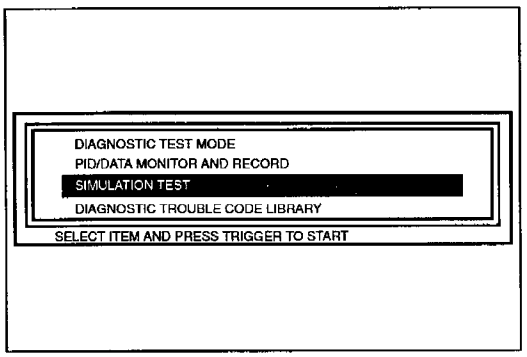
1. Connect the **SSTs** (NGS) to the data link connector–2.
2. Start the engine and let it idle.
3. Select the SIMULATION TEST function on the NGS display.
4. Increase the duty value of EGR solenoid valve (vacuum) from 0% to 100% by using the "EGRVAC". Operate the EGR solenoid valve (vacuum) and check if the engine speed becomes unstable or the engine stalls.
5. If the engine speed will not change, stop the engine and do as follows.
   (1) Turn the ignition switch to ON.
   (2) Verify that diagnostic trouble code No. P1485, P1486 is not displayed. If code No. P1485, P1486 is shown, carry out troubleshooting of the code No. P1485, P1486. (Refer to page F1–87.)
   (3) Increase the duty value of the EGR solenoid valve (vacuum) from 0% to 100% by using the "EGRVAC". Operate the EGR solenoid valve and check if operation sound of the valve is heard.

   I. If the operation sound is heard, check the following.
   - Loose or damaged vacuum hose
   - EGR valve (Refer to page F1–27.)
   - EGR solenoid valve (vent) (Refer to page F1–28.)

   II. If the operation sound is not heard, check the following.
   - EGR solenoid valve (vacuum) (Refer to page F1–28.)







Cooling Fan Control Inspection

1. Verify that the engine is cold.
2. Turn the ignition switch to ON.
3. Verify that the cooling fan is not operating.
4. If the cooling fan is operating, do as follows.
   (1) Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–37.)
   (2) Select the PID/DATA MONITOR AND RECORD function on the NGS display.
   (3) Select the "FANC" and verify that the cooling fan control signal is OFF.

   I. If the cooling fan control signal is ON, check the following.
   - PCM terminal voltage (Refer to page F1–40.)
   - Engine coolant temperature signal

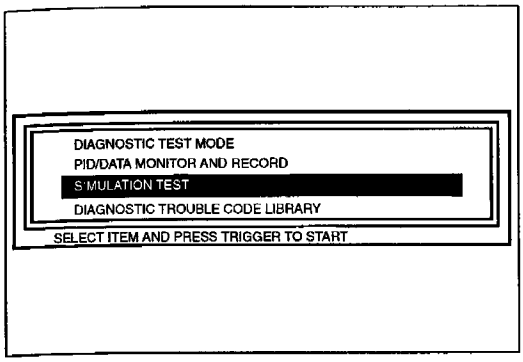
   II. If the cooling fan control signal is OFF, check the following.
   - Cooling fan relay (Refer to page section E.)
   - Short circuit in wiring harnesses and connectors (Main relay — Cooling fan relay — PCM)

5. Connect the **SST** (System Selector) to the data link connector.
6. Set switch A to position 1.
7. Set the test switch to SELF TEST.
8. Depress the accelerator pedal and verify that the cooling fan operates.
9. If the cooling fan does not operate, do as follows.
   (1) Connect the **SSTs** (NGS) to the data link connector–2.
   (2) Select the SIMULATION TEST function on the NGS display.
   (3) Turn the cooling fan relay from OFF to ON by using the "FANC" and check for the cooling fan operation.

   I. If the cooling fan operates, check the following.
   - PCM terminal voltage (Refer to page F1–38.)
   - Test mode signal
   - Throttle position signal

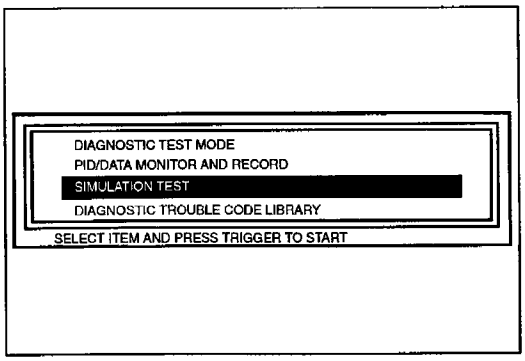
   II. If the cooling fan does not operate, do as follows.
   a. Turn the cooling fan relay from OFF to ON by using the simulation function. Operate the cooling fan relay and check it the operation sound of the relay is heard.
   b. If the operation sound is heard, check the following.
   - Wiring harnesses and connectors (Cooling fan relay — Cooling fan motor)
   - Cooling fan motor (Refer to section E.)

   c. If the operation sound is not heard, check the following.
   - Cooling fan relay (Refer to section E.)
   - Open circuit in wiring harnesses and connectors (Main relay — Cooling fan relay — PCM)



Condenser Fan Relay

1. Verify that engine is cold and the A/C switch and fan switch are OFF.
2. Start the engine and let it idle.
3. Verify that the condenser fan is not operating.
4. If the condenser fan is operating, check the short circuit in wiring between condenser fan relay and PCM terminal1A.
5. Turn the A/C switch and fan switch on.
6. Verify that the condenser fan is operating.
7. Turn the A/C switch and fan switch off.
8. If the condenser fan does not operate, do as follows
   (1) Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F1–37.)
   (2) Select the SIMULATION TEST function on the NGS display.
   (3) Turn the condenser fan relay from OFF to ON by using the "FANN" and check for the condenser fan operation.
      I. If the condenser fan operates, check the following.
         • PCM terminal voltage (Refer to page F1–38.)
         • A/C signal
      II. If the condenser fan does not operate, do as follows.
         a. Turn the condenser fan relay from OFF to ON by using the simulation function. Operate the condenser fan relay and check if the operation sound of the relay is heard.
         b. If the operation sound is heard, check the following.
            • Wiring harness and connectors
            (Condenser fan relay — Condenser fan motor)
            • Condenser fan motor (Refer to section U.)
         c. If the operation sound is not heard, check the following.
            • Condenser fan relay (Refer to section U.)
            • Open circuit in wiring harness and connectors
            (Main relay — Condenser fan relay — PCM)



A/C Cut-off Control Inspection

1. Start the engine and let it idle.
2. Turn the A/C switch and the fan switch ON.
3. Fully open the throttle valve. Then 3—6 seconds after, check if the operation sound of the A/C compressor electromagnetic clutch is heard.
4. If the operation sound is not heard, do as follows.
   (1) Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F1–37.)
   (2) Select the SIMULATION TEST function on the NGS display.
   (3) Turn the A/C relay from OFF to ON by using the "A/C RLY" function and check for the operation sound of the relay.
      I. If the operation sound is heard, check the following.
         • PCM terminal voltage (Refer to page F1–38.)
           • Load/no load judgement signal
           • Throttle position signal
      II. If the operation sound is not heard, check the following.
         • A/C relay (Refer to section U.)
         • Open circuit in wiring harnesses and connectors (Main relay — A/C relay — PCM)

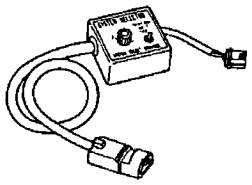
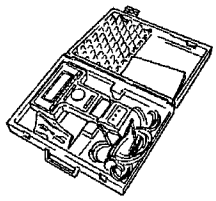
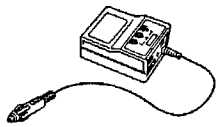
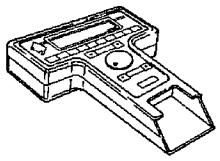
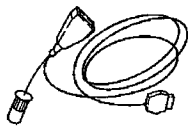
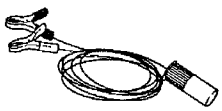
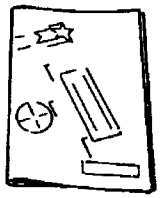
Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

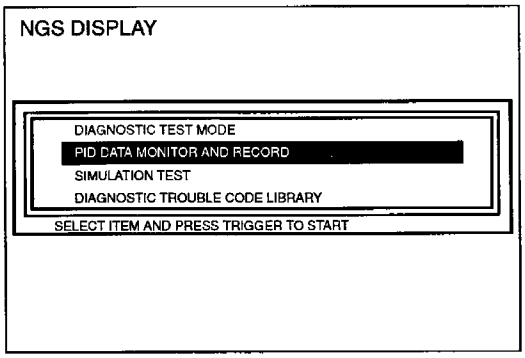
FUEL AND EMISSION CONTROL SYSTEMS (BP)

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ENGINE TUNE-UP

PREPARATION
SST

49 B019 9A0 System Selector 	For inspection of ignition timing and idle speed	49 T088 0A0 NGS set 	For inspection of ignition timing and idle speed
49 T088 010B Program Card 	For inspection of ignition timing and idle speed	49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of ignition timing and idle speed
49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of ignition timing and idle speed	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of ignition timing and idle speed
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of ignition timing and idle speed	49 T088 008A Instruction Manual 	For inspection of ignition timing and idle speed

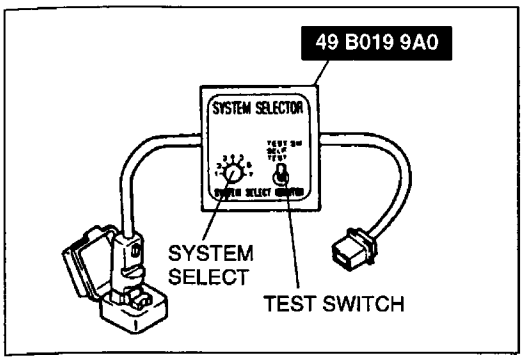


ADJUSTMENT
Preparation
1. Warm up the engine to normal operating temperature.
2. Shift the transaxle into Neutral (MTX) or P position (ATX).
3. Turn off all loads.
   - Headlight
   - Blower motor
   - Rear window defroster
   - Power steering
4. Wait until the cooling fan stops.
5. Connect the **SSTs** (NGS) to the data link connector–2 (Refer to page F2–38.) and select the PID/DATA MONITOR AND RECORD function.
6. Select the "RPM" on the NGS display.

Ignition Timing
1. Perform "Preparation". (Refer to above.)
2. Verify that the idle speed is within the specification.

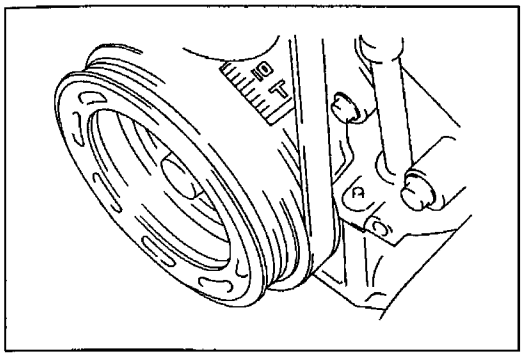
   Specification: 700—800 (750 ± 50) rpm

3. If not as specified, adjust the idle speed. (Refer to page F2–3.)



4. Connect the **SST** (System Selector) to the data link connector.
5. Set switch A to position 1.
6. Set the test switch to SELF TEST.
7. Connect a timing light to the high-tension lead of the No.1 cylinder.
8. Verify that the timing mark (white) is within the specification.

Specification: BTDC –1—1 ° (0 ± 1 °)

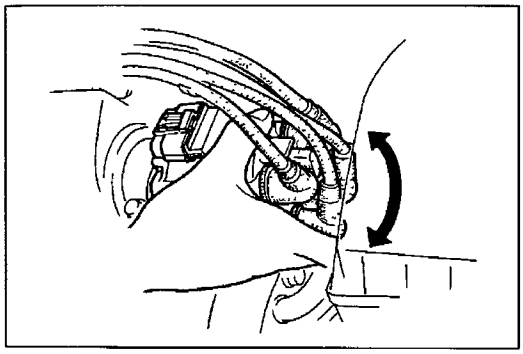


9. If not as specified, loosen the distributor lock bolts and turn the distributor to make the adjustment.
10. Tighten the distributor lock bolts to the specified torque.

Tightening torque:
19—25 N·m { 1.9—2.6 kgf·m , 14—18 ft·lbf }

11. Disconnect the **SST** (System Selector).
12. Verify that the ignition timing is within the specification.

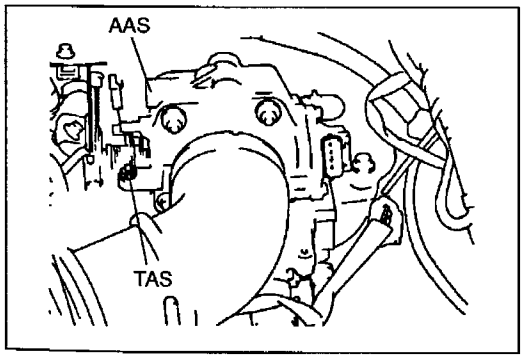
Specification: BTDC 6—18 °



Idle Speed
1. Perform "Preparation". (Refer to page F2–2.)
2. Connect the **SST** (System Selector) to the data link connector.
3. Set switch A to position 1.
4. Set the test switch to SELF TEST.
5. Adjust the idle speed by turning the air adjusting screw.

Specification: 700—800 (750 ± 50) rpm

Caution
- **The throttle adjusting screw is set at the factory and must not be adjusted. Any adjustment will negatively effect the engine performance.**



6. Disconnect the **SST** (System Selector).

Idle Up Speed
1. Perform "Preparation". (Refer to page F2–2.)
2. Verify that the idle speed is within the specification.

Specification: 700—800 (750 ± 50) rpm

3. If not as specified, adjust the idle speed.
4. Check the idle speed with the following load conditions.

Specification

Load condition	Idle speed (rpm)	
	MTX	ATX
Fan switch ON at 2nd or higher	700—800	700—800
Headlight switch ON		
Rear window defroster switch ON		
P/S ON		
A/C ON		

Note
- Excludes temporary idle speed drop just after the electrical loads are turned on.

5. If not as specified with all load condition, inspect the idle air control valve. (Refer to page F2–8.)
   If not as specified with each load condition, check related input switches, harnesses and connectors.

Idle Mixture
1. Perform "Preparation". (Refer to page F2–2.)
2. Verify that the idle speed and ignition timing are within the specification.
3. Insert an exhaust gas analyzer to the tailpipe.
4. Verify that the CO and HC concentrations are within the regulation.
5. If not, inspect the following.
   - On-board diagnostic system (Refer to page F2–54.)
   - Heated oxygen sensors (Refer to page F2–48.)
   - System inspection
     Intake manifold vacuum (Refer to page F2–119.)
     Fuel line pressure (Refer to page F2–120.)
     Ignition timing control (Refer to page F2–127.)
6. If the systems are normal, replace the three way catalytic converter.

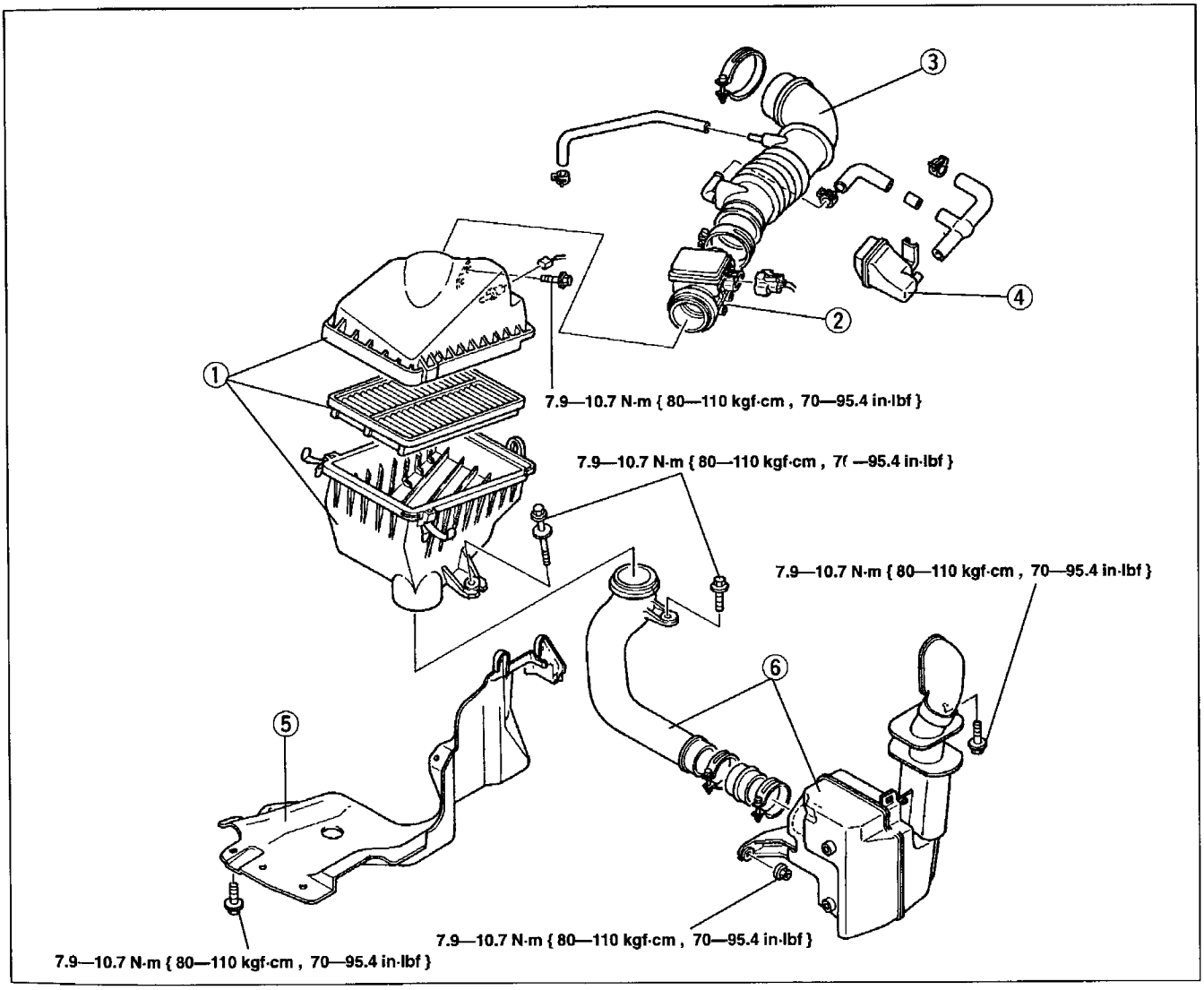
INTAKE-AIR SYSTEM

COMPONENT PARTS
Removal / Installation

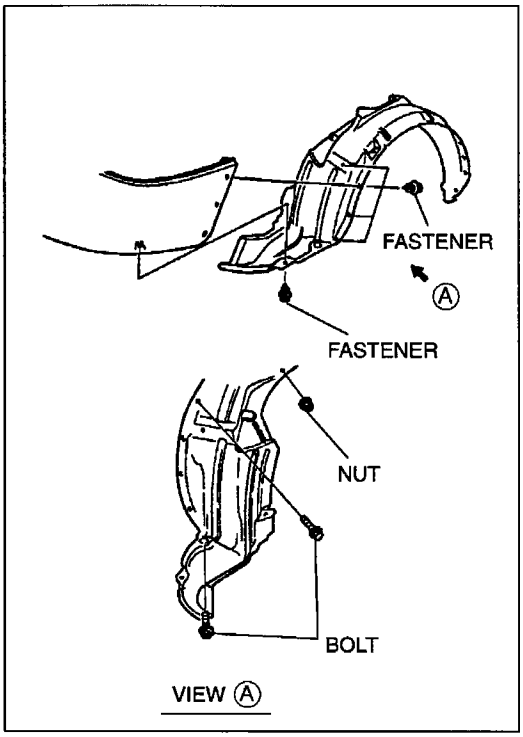
Warning
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F2–11.**

1. Disconnect the negative battery cable.
2. Drain the engine coolant from the radiator. (Refer to section E.)
3. Remove in the order shown in the figure, referring to **Removal note.**
4. Install in the reverse order of removal, referring to **Installation note.**
5. Refill the radiator with the specified engine coolant. (Refer to section E.)

STEP 1



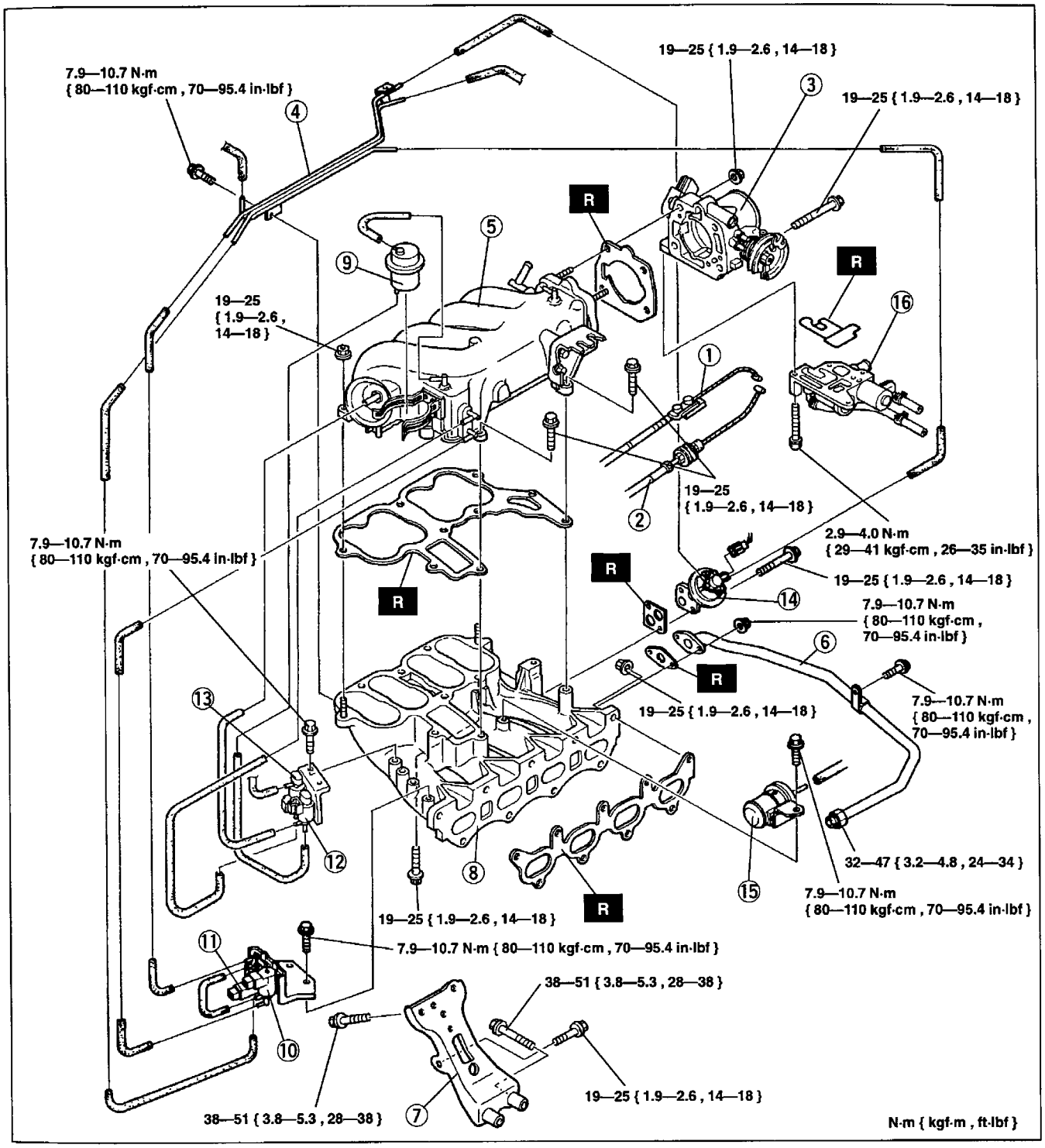
1. Air cleaner
2. Mass air flow sensor
3. Air intake hose
4. Resonance chamber
5. Splash shield
6. Fresh-air duct
   Removal note ..... page F2–6



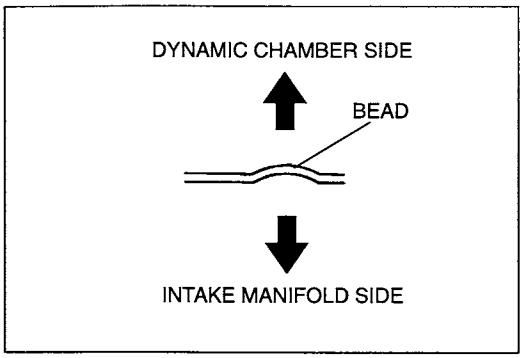
Removal note
Fresh-air duct

Before removing the fresh-air duct, remove the LH front mud guard mounting bolts, nut, and fasteners shown.

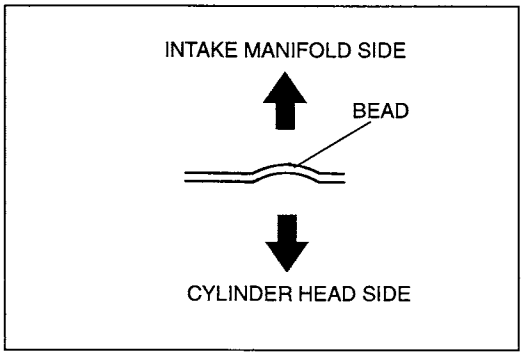
STEP 2



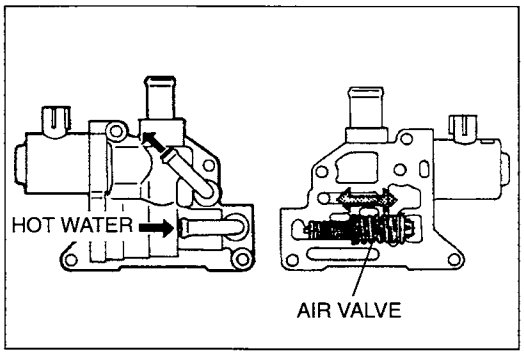
1. Throttle cable (ATX)
   Removal / Installation ..... section K
2. Accelerator cable
   Inspection / Adjustment ..... page F2–10
3. Throttle body
4. Vacuum pipe
5. Dynamic chamber
   Installation note ..... page F2– 8
6. EGR pipe
7. Intake manifold stay
8. Intake manifold
   Installation note ..... page F2–8
9. Vacuum chamber
10. EGR solenoid valve (vacuum)
11. EGR solenoid valve (vent)
12. VICS solenoid valve
13. PRC solenoid valve
14. EGR valve
15. Air filter
16. BAC valve



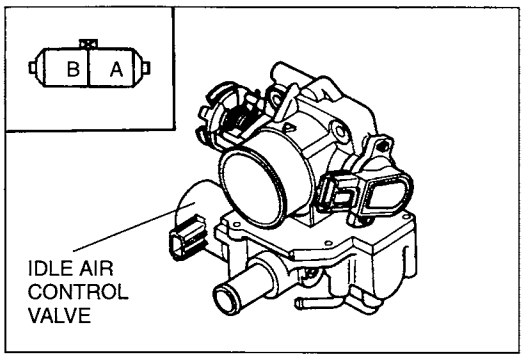
Installation note
Dynamic chamber
Face the bead of the gasket as shown, and install the dynamic chamber.



Intake manifold
Face the bead of the gasket toward the intake manifold as shown, and install the intake manifold.



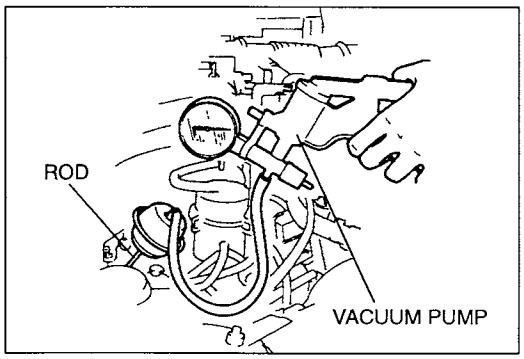
AIR VALVE
Inspection
1. Remove the BAC valve. (Refer to page F2–7.)
2. Circulate water in the BAC valve coolant passage to cool the air valve.
3. Circulate hot water in the BAC valve coolant passage and verify that the air valve operates.
4. If not operates, replace the BAC valve.



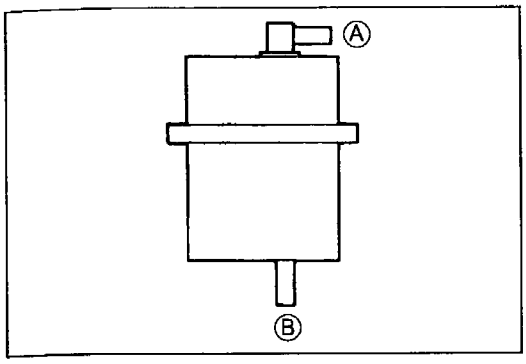
IDLE AIR CONTROL VALVE
Inspection
1. Verify that the ignition switch is OFF.
2. Disconnect the idle air control valve connector.
3. Measure the resistance of the idle air control valve by using an ohmmeter.

   Specification: 10.7—12.3 Ω [20 °C { 68 °F }]

4. If not as specified, replace the BAC valve. (Refer to page F2–7.)



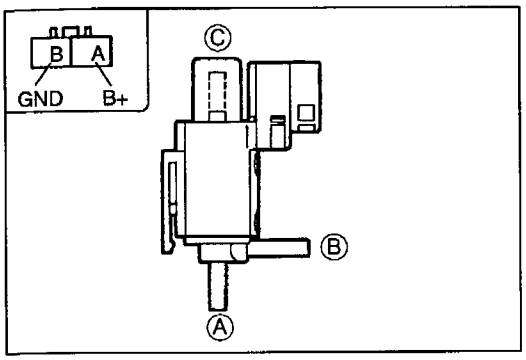
SHUTTER VALVE ACTUATOR
Inspection
1. Connect a vacuum pump to the shutter valve actuator as shown.
2. Apply vacuum of 4.0 kPa { 30 mmHg } and verify that the rod is pulled into the actuator.
3. Apply vacuum of 25.3 kPa { 190 mmHg } and verify that the actuator opens completely (rod fully pulled in).
4. Is not as specified, replace the shutter valve actuator together with the dynamic chamber. (Refer to page F2–7.)



VACUUM CHAMBER

Inspection

1. Remove the vacuum chamber. (Refer to page F2–7.)
2. Visually inspect the outer surface for damage.
3. Blow air from port A and verify that there is no airflow.
4. Blow air from port B and verify that there is airflow.
5. If not as specified, replace the vacuum chamber.



VICS SOLENOID VALVE

Inspection

1. Remove the VICS solenoid valve. (Refer to page F2–7.)
2. Check for air flow between ports of the solenoid valve.

○—○: Continuity ○═○: Air flow B+: Battery positive voltage

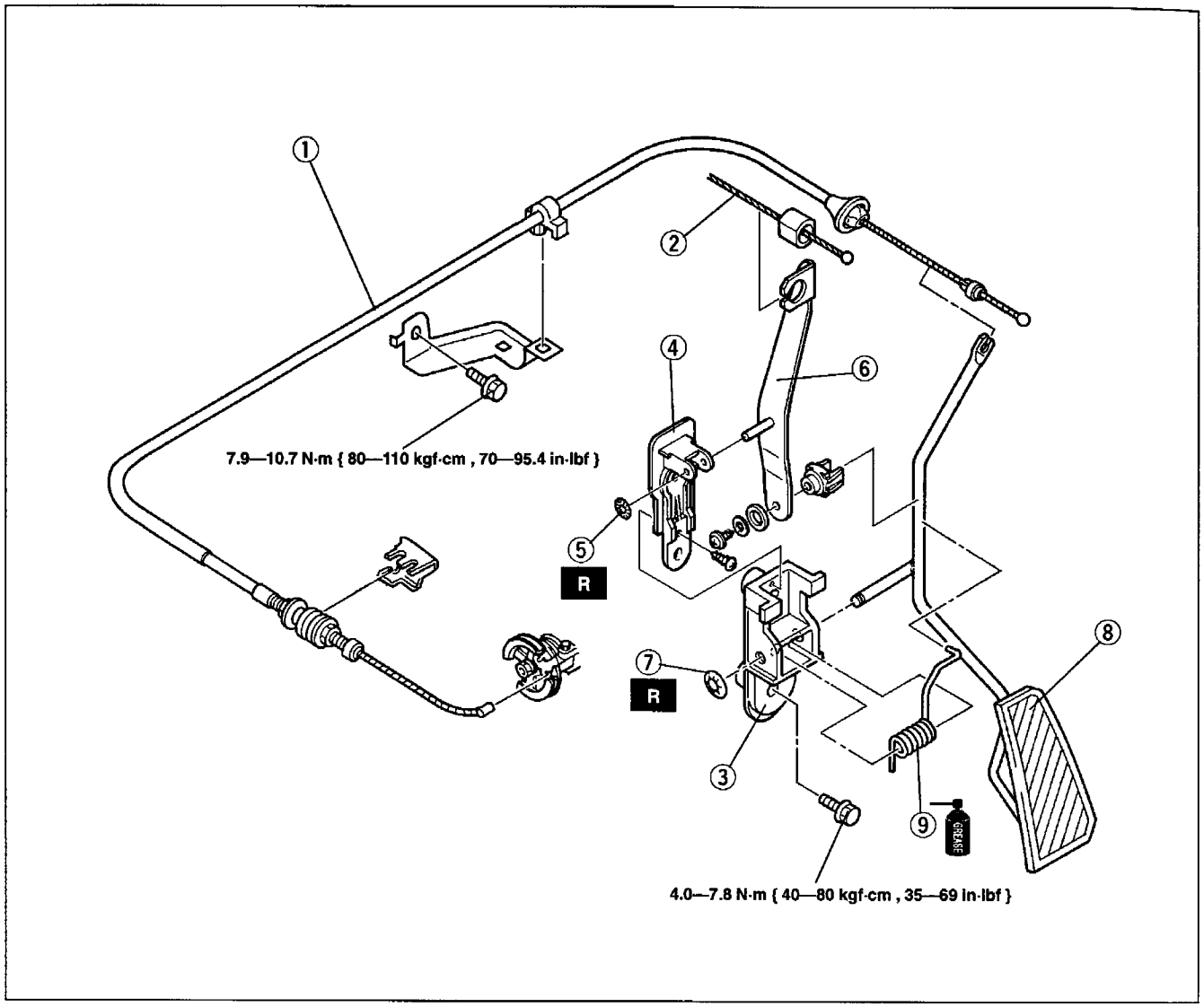
Step	Terminal		Port		
	A	B	A	B	C
1	○—○			○═○	
2	B+	Ground	○═○		

3. If not as specified, replace the VICS solenoid valve.

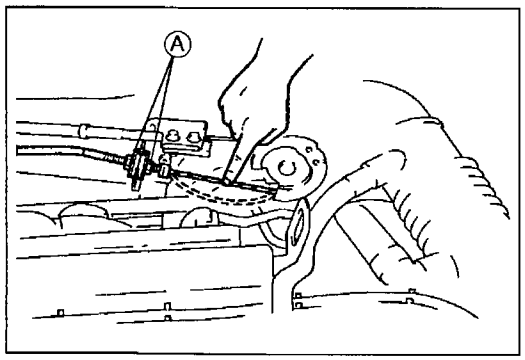
ACCELERATOR PEDAL

Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



1. Accelerator cable
   Inspection / Adjustment ..... below
2. Actuator cable (with cruise control)
3. Retainer
4. Retainer (with cruise control)
5. Snap ring (with cruise control)
6. Bracket (with cruise control)
7. Snap ring
8. Accelerator pedal
9. Return spring



ACCELERATOR CABLE

Inspection / Adjustment

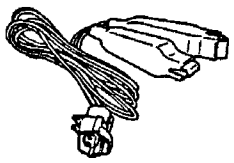
1. Verify that the throttle valve is at the closed throttle position.
2. Measure the free play of the accelerator cable.

   Free play: 1—3 mm { 0.04—0.11 in }

3. If not as specified, adjust by turning locknut Ⓐ.

FUEL SYSTEM

PREPARATION
SST

49 L018 901 Injector checker		For inspection of fuel injector

PRECAUTION
Fuel Pressure Release and Servicing Fuel System

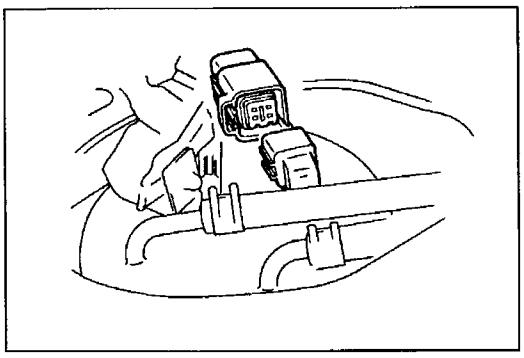
Warning

- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**

Fuel in the fuel system is under high pressure when the engine is not running.

Warning

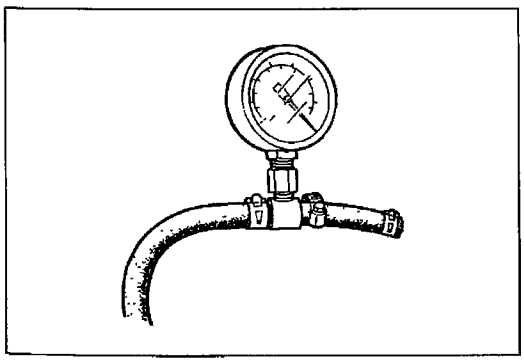
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the following "Fuel Line Safety Procedures".**



Fuel Line Safety Procedures

A. Release the fuel pressure before disconnecting a fuel line.
1. Remove the rear seat cushion. (Refer to section S.)
2. Disconnect the fuel pump connector.
3. Start the engine.
4. After the engine stalls, turn the ignition switch to OFF.
5. Connect the fuel pump connector and install the rear seat cushion.

B. Avoid leakage
1. When disconnecting a fuel line hose, wrap a rag around it to protect against fuel leakage.
2. Plug the hose after removal.



C. Install hose clamps to secure the fuel pressure gauge.

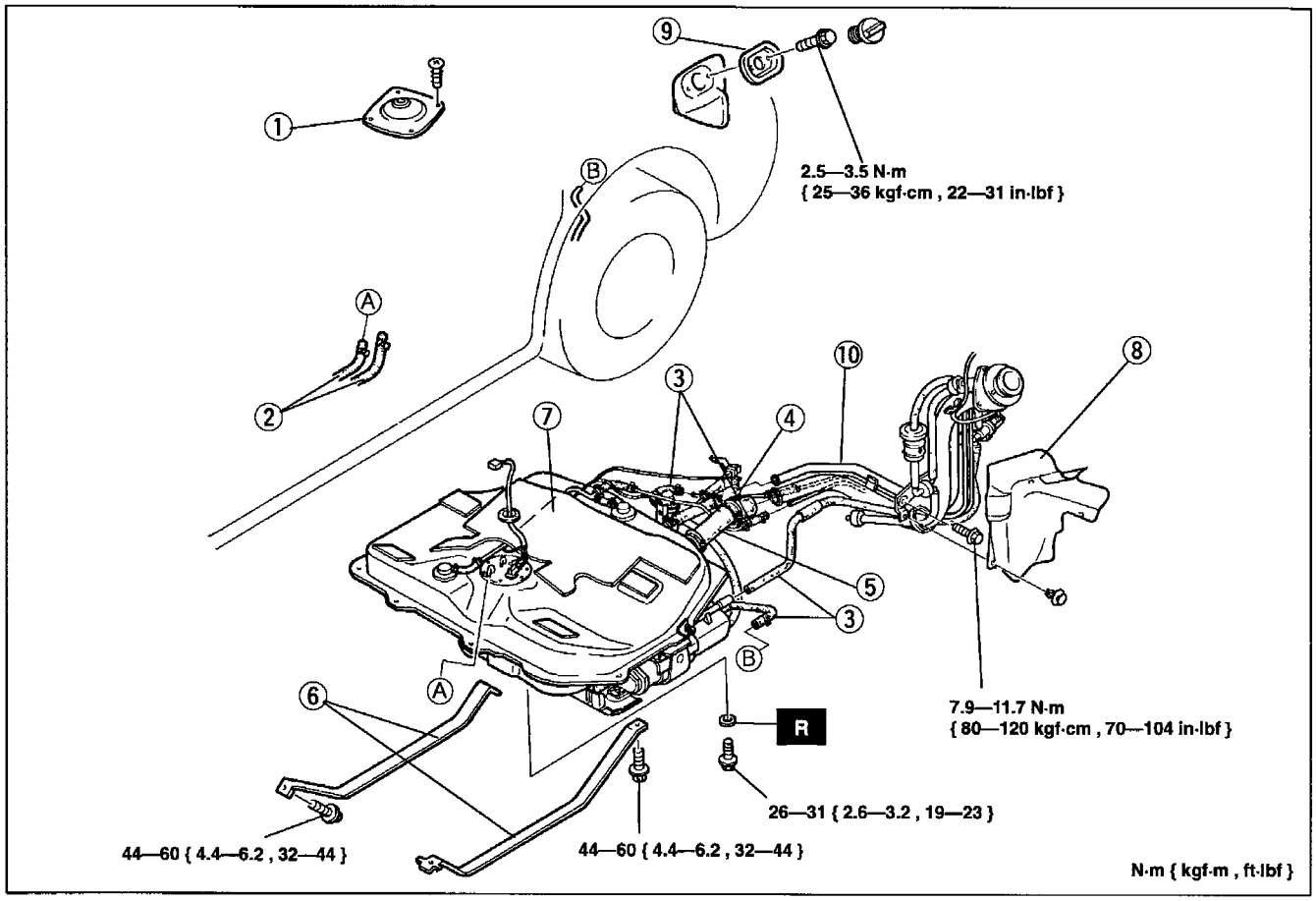
COMPONENT PARTS
Removal / Installation
Fuel tank

Warning

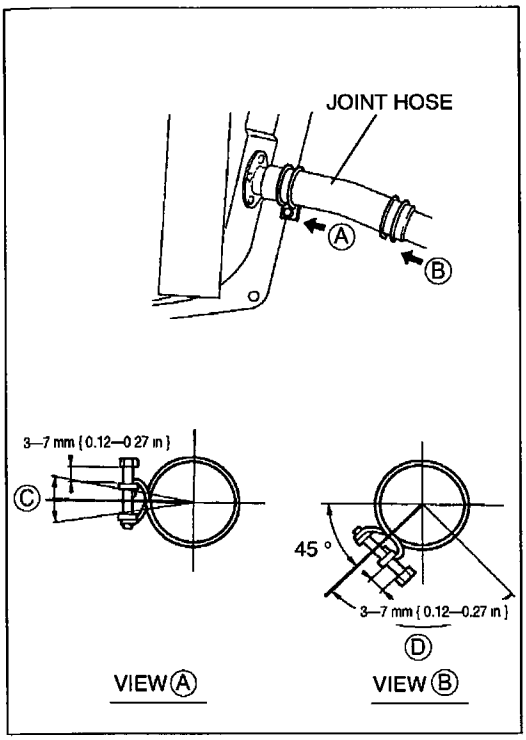
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F2–11.**
- **Repairing a fuel tank that has not been properly steam cleaned can be dangerous. Explosion or fire may cause death or serious injury. Always properly steam clean a fuel tank before repairing it.**

1. Disconnect the negative battery cable.
2. Remove the drain plug and drain the fuel from the fuel tank.
3. Remove the rear seat cushion. (Refer to section S.)
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal, referring to **Installation note.**
6. After installation, verify that the fuel tank is securely fixed.

STEP 1



1. Fuel pump cover
2. Fuel hose
   Installation note ..... page F2–13
3. Evaporative hose
   Installation note ..... page F2–13
4. Breather hose
   Installation note ..... page F2–13
5. Joint hose
   Installation note ..... page F2–13
6. Fuel tank strap
7. Fuel tank
8. Protector
9. Dust cover
10. Fuel filler pipe



Installation note
Fuel hoses, evaporative hoses, breather hose

- Push the ends of the fuel hoses, evaporative hoses, and breather hose onto the respective fittings.

  Specification: 25—30 mm { 0.99—1.18 in }

- Be sure the hoses are not bent or twisted.

Joint hose

- Push the ends of the joint hose onto the fitting.

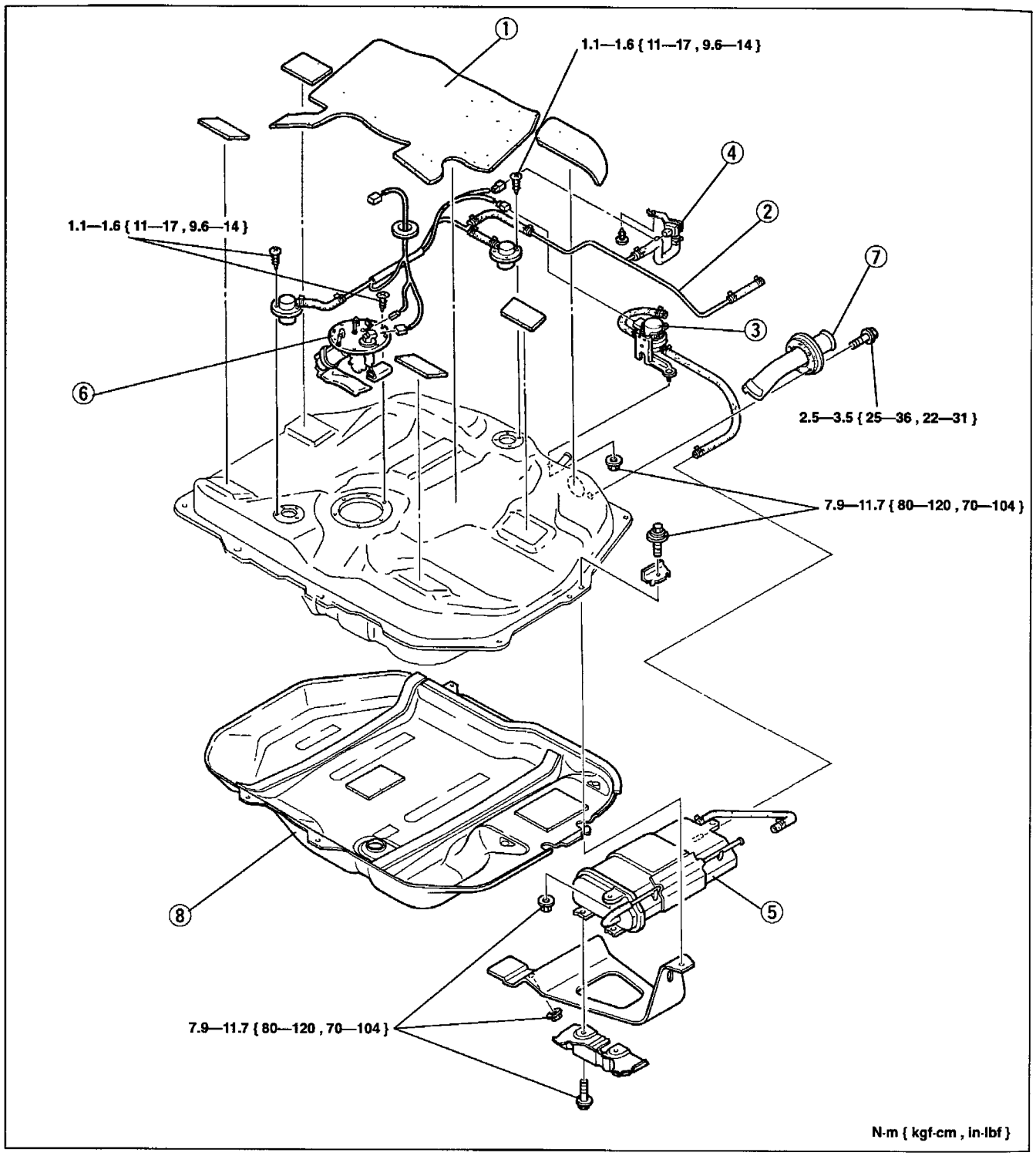
  Specification: 35—40 mm { 1.38—1.57 in }

- Install the clamps on the joint hose as shown.
- Position the tabs of each clamp within the allowable range.

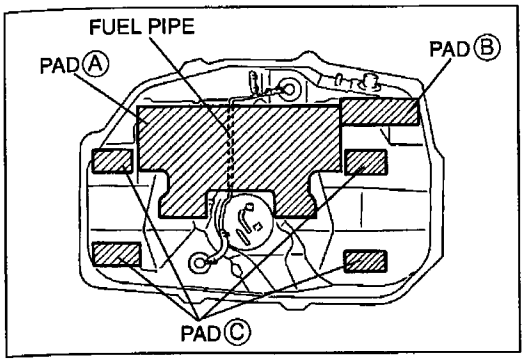
  Allowance
  Ⓒ: 10° to both directions
  Ⓓ: 90° to right

- Be sure the hose is not bent or twisted.

STEP 2



1. Pad
   Installation note ..... page F2–15
2. Fuel pipe, rollover valve
   Installation note ..... page F2–15
3. Tank pressure control valve (TPCV)
4. Fuel tank pressure sensor
5. Charcoal canister
6. Fuel pump
7. Inlet pipe
   Removal note ..... page F2–15
8. Insulator



Removal note
Inlet pipe
- Remove the inlet pipe only when replacing the non-return valve.

Installation note
Fuel pipe, pad
- Stick pad Ⓐ onto the fuel tank, over the harness (California only) and the fuel pipe as shown.
- Stick pads Ⓑ and Ⓒ onto the fuel tank as shown. (Upper surface of the fuel tank is projected for installation of pads Ⓒ.)
- Be sure the hoses are not bent or twisted.

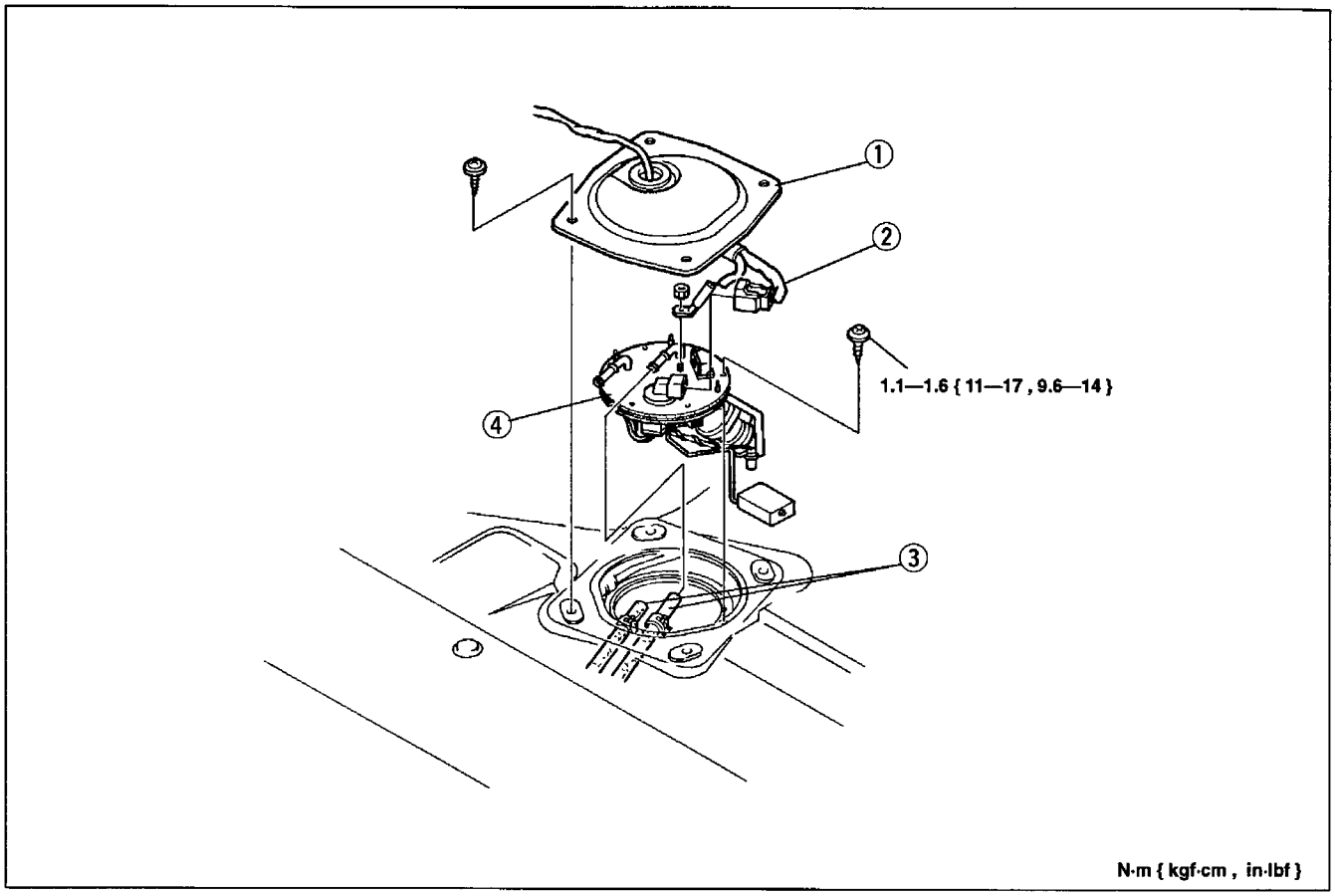
Fuel pump

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F2–11.**

1. Disconnect the negative battery cable.
2. Remove the rear seat cushion. (Refer to section S.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal, referring to **Installation note**.

STEP 1



1. Fuel pump cover
2. Fuel pump connector
3. Fuel hoses
   Installation note ..... below
4. Fuel pump

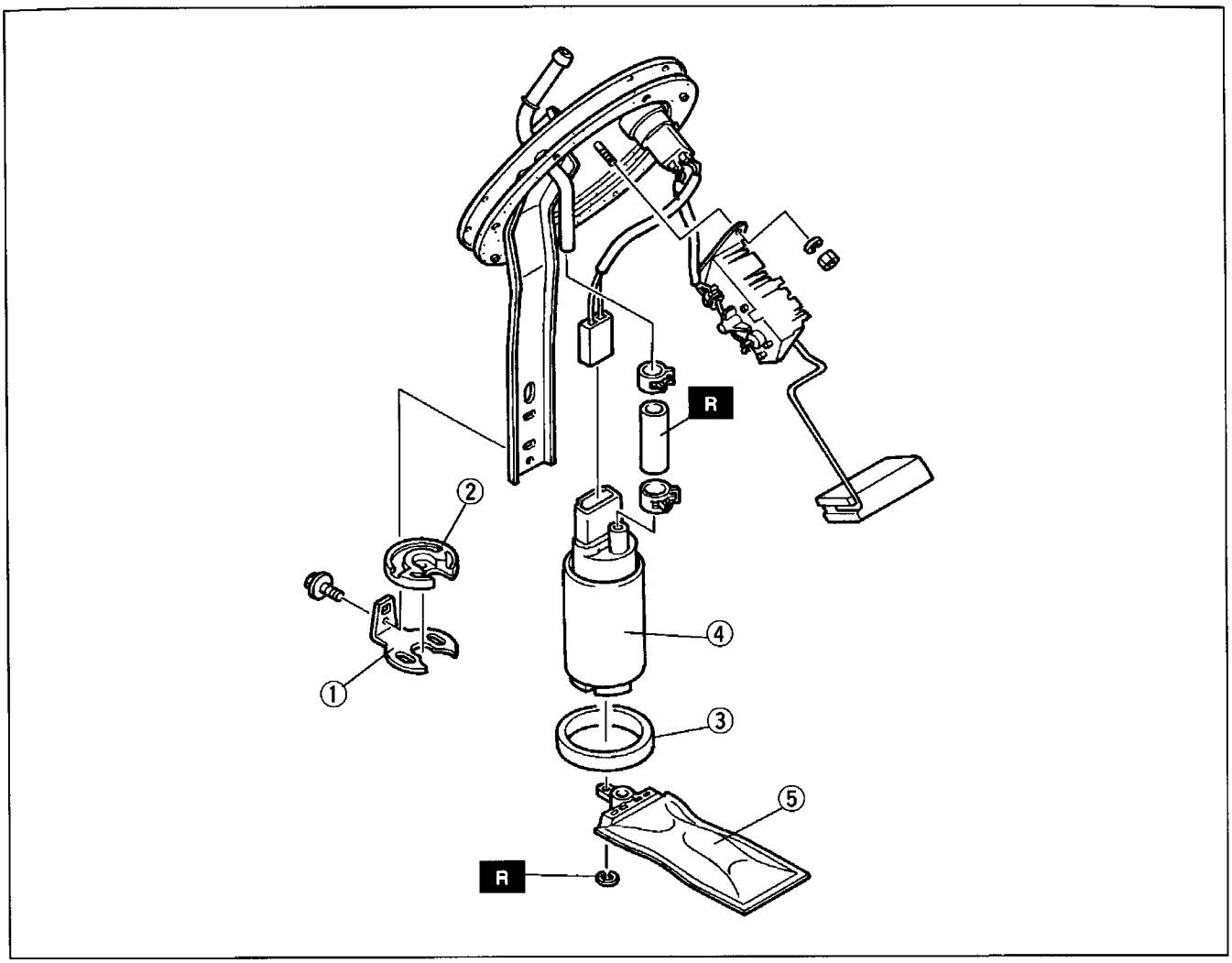
Installation note
Fuel hoses

- Push the ends of the fuel hoses onto the respective fittings.

  Specification: 25—30 mm { 0.99—1.18 in }

- Be sure the hoses are not bent or twisted.

STEP 2



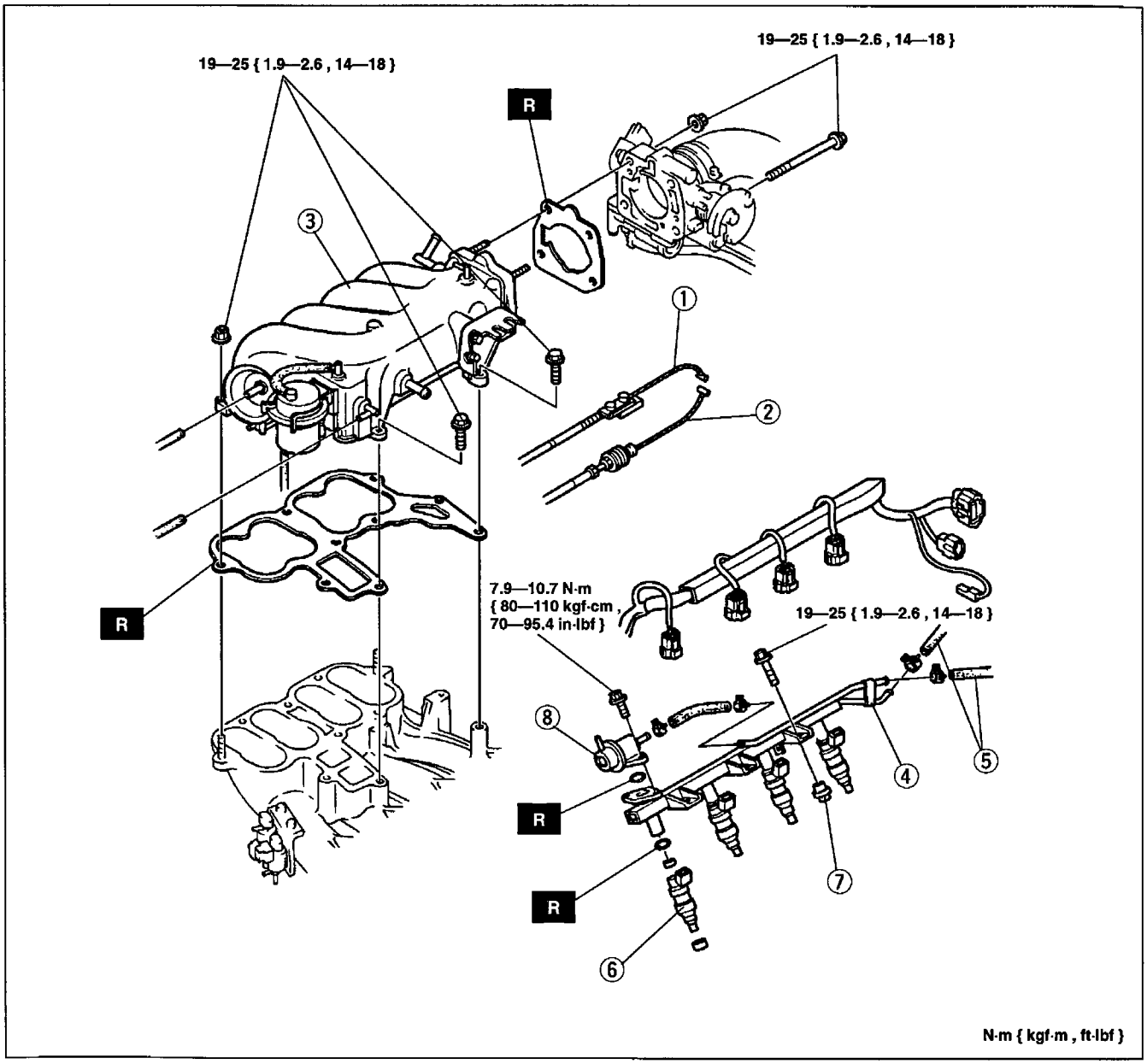
1. Bracket
2. Rubber mount
3. Band
4. Fuel pump
5. Fuel filter (low pressure side)

Fuel injector

Warning

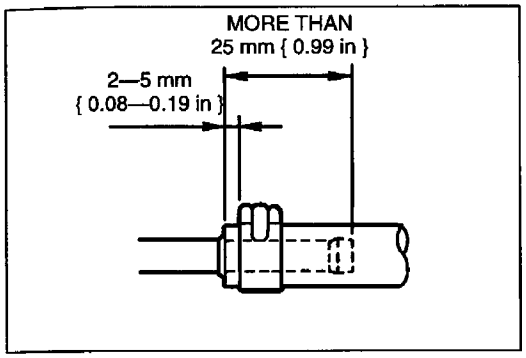
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F2–11.**

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal, referring to **Installation note**.
4. Verify that the fuel injectors are properly installed by referring to **Steps after installation**.



1. Throttle cable
   Removal / Installation ..... section K
2. Accelerator cable
   Inspection / Adjustment ..... page F2–10
3. Dynamic chamber
4. Fuel distributor
5. Fuel hoses
   Installation note ..... page F2–19
6. Fuel injector
   Installation note ..... page F2–19
7. Insulator
8. Pressure regulator
   Installation note ..... page F2–19

Installation note
Fuel injector, pressure regulator
- Apply a small amount of clean engine oil to the new O-rings, and install them.



Fuel hoses
- Push the ends of the fuel hoses onto the respective fittings.

  Specification: More than 25 mm { 0.99 in }

- Install the clips on the fuel hoses.

  Specification:
  2—5 mm { 0.08—0.19 in } from the end of hose

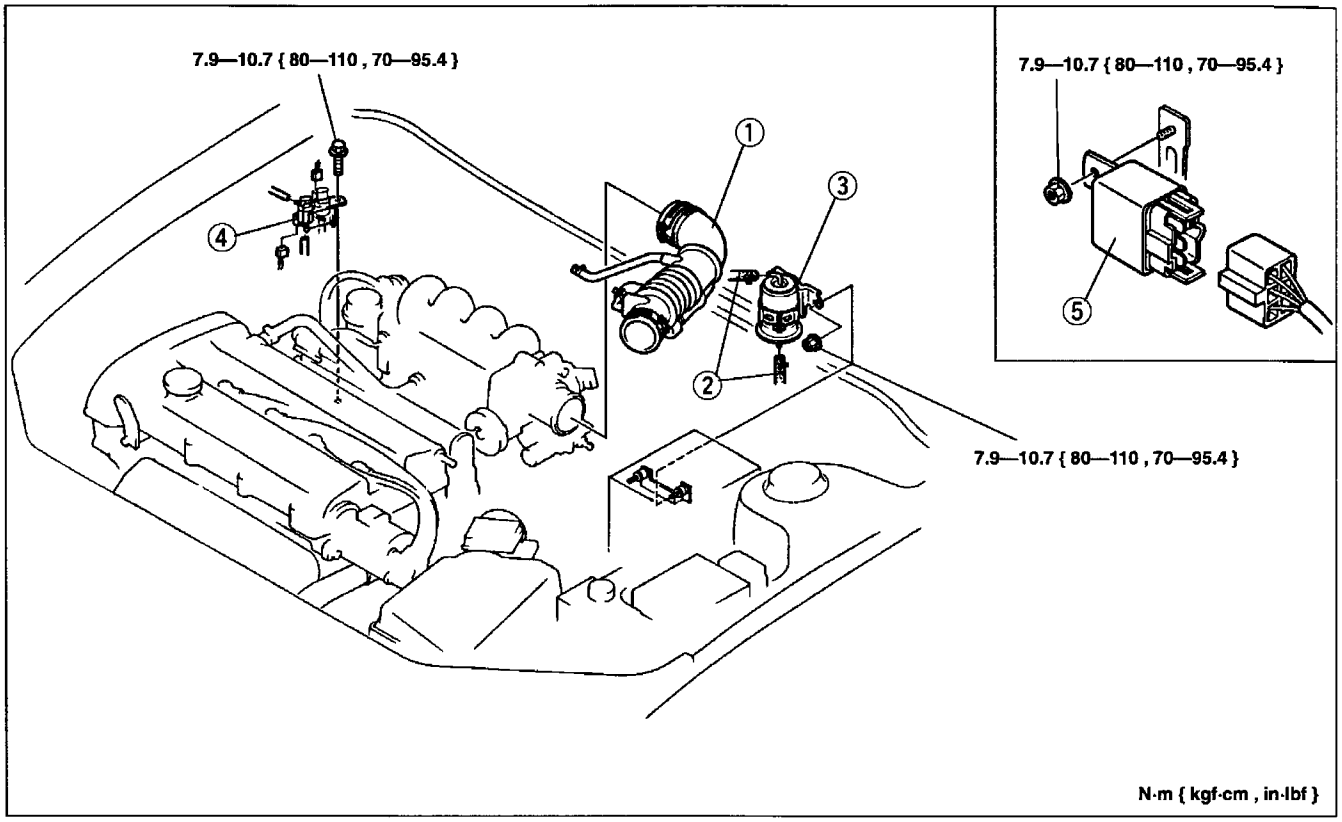
Steps after installation
1. Connect data link connector terminals F/P and GND with a jumper wire.
2. Turn the ignition switch to ON and check for fuel leaks from the fuel distributor assembly.
3. Turn off the ignition switch and disconnect the jumper wire.
4. If leaks are found, reinstall the fuel injector.

Fuel filter (high pressure side), PRC solenoid valve, fuel pump relay

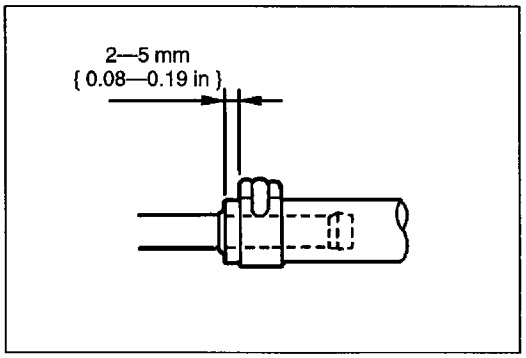
Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F2–11.**

Note
- The fuel filter must be replaced at the intervals outlined in the maintenance schedule.

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure, referring to **Removal note**.
3. Install in the reverse order of removal, referring to **Installation note**.



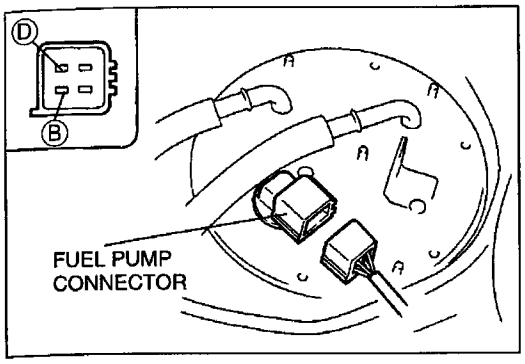
1. Air intake hose
2. Fuel hoses
   Installation note ..... below
3. Fuel filter (high pressure side)
4. PRC solenoid valve (ATX)
5. Fuel pump relay
   Removal note ..... below

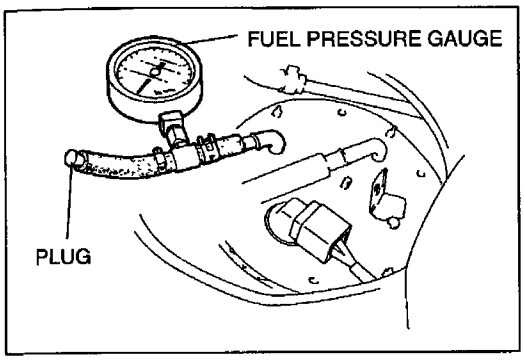


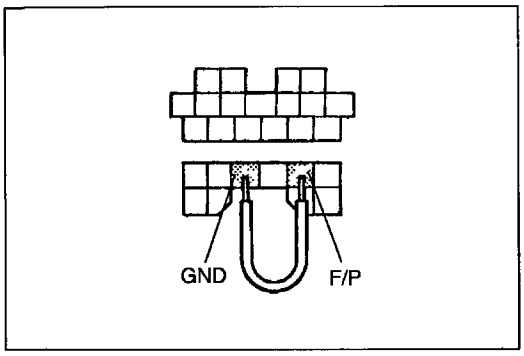
Removal note
Fuel pump relay
- Before removing the fuel pump relay, remove the rear console, front console and side wall. (Refer to section S.)

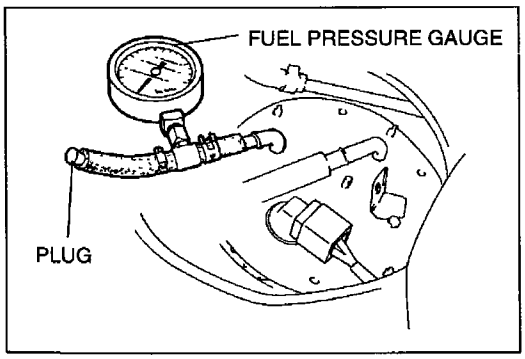
Installation note
Fuel hoses
- Push the ends of the fuel hoses onto the fittings until it stops.
- Install the clips on the fuel hoses.

Specification:
2—5 mm { 0.08—0.19 in } from the end of hose









FUEL PUMP

Inspection

Fuel pump continuity

1. Remove the rear seat cushion. (Refer to section S.)
2. Remove the fuel pump cover.
3. Disconnect the fuel pump connector.
4. Check for continuity between fuel pump connector terminals B and D.
5. If there is no continuity, replace the fuel pump. (Refer to page F2–16.)

Fuel pump maximum pressure

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F2–11.**

1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge to the fuel pump and plug the outlet of the gauge as shown.
3. Connect the negative battery cable.
4. Connect data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON. Measure the fuel pump pressure.

   Pressure:
   500—630 kPa { 5.0—6.5 kgf/cm^2 , 72—92 psi }

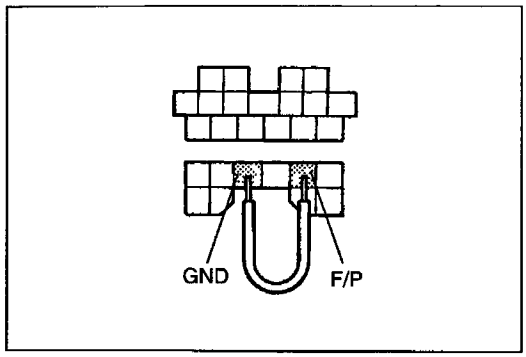
6. Turn off the ignition switch and disconnect the jumper wire.
7. If not as specified, replace the fuel pump. (Refer to page F2–16.)

Fuel pump fuel hold pressure

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F2–11.**

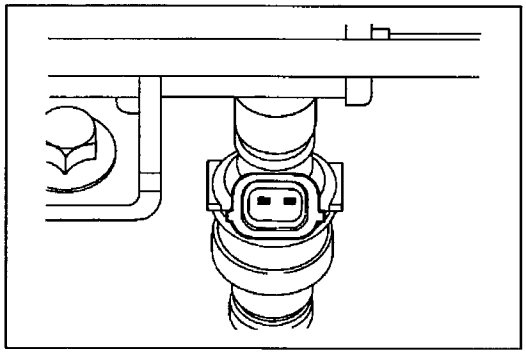
1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge to the fuel pump and plug the outlet of the gauge as shown.
3. Connect the negative battery cable.



4. Connect data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON for approx. 10 sec. to operate the fuel pump.
6. Turn off the ignition switch. Wait for 5 min., and observe the fuel pressure.

   Pressure: More than 150 kPa { 1.5 kgf/cm^2 , 21 psi }

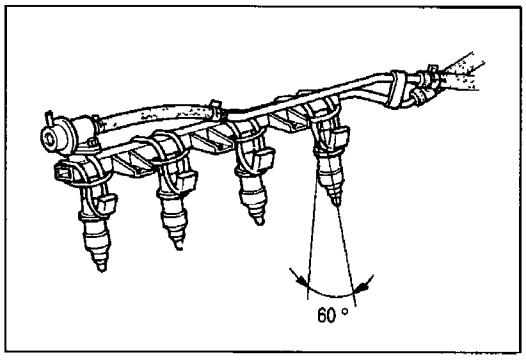
7. Disconnect the jumper wire.
8. If not as specified, replace the fuel pump. (Refer to page F2–16.)



FUEL INJECTOR
Inspection
Resistance
1. Disconnect the fuel injector connectors.
2. Measure the resistance of the fuel injectors.

   Resistance: Approx. 13.8 Ω [20 °C { 68 °F }]

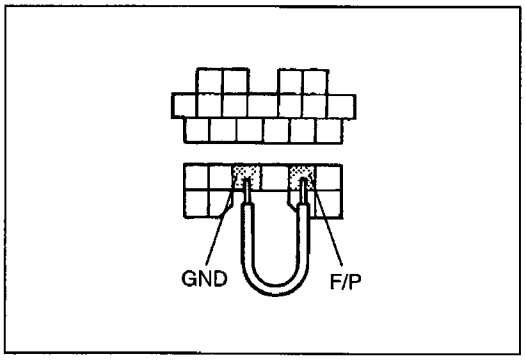
3. If not as specified, replace the fuel injector. (Refer to page F2–18.)

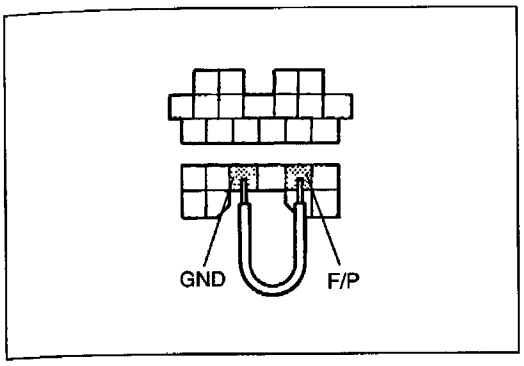


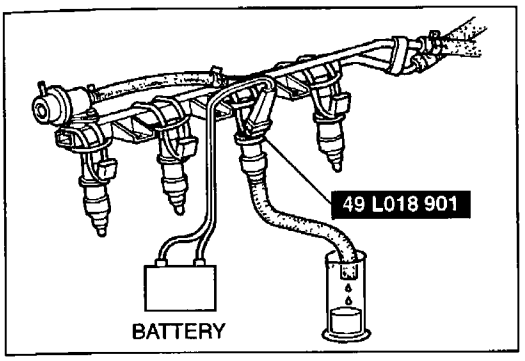
Fuel leakage test
1. Remove the fuel injectors together with the fuel distributor. (Refer to page F2–18.)
2. Fasten the fuel injectors firmly to the fuel distributor with wire and connect the fuel hoses.
3. Tilt the fuel injectors approx. 60 degrees from uplight position as shown.
4. Connect data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON and check for fuel leaks from the fuel injectors.

   Fuel leakage: Less than 1 drop/2 minutes

6. Turn off the ignition switch and disconnect the jumper wire.
7. If not as specified, remove the leaking fuel injector and reinstall the fuel injector, referring to **Installation note**.
8. Recheck the fuel leakage. If not as specified, replace the fuel injector. (Refer to page F2–18.)







Volume test

1. Remove the fuel injectors together with the fuel distributor. (Refer to page F2–18.)
2. Fasten the fuel injectors firmly to the fuel distributor with wire and connect the fuel hoses.
3. Connect data link connector terminals F/P and GND by using a jumper wire.
4. Turn the ignition switch to ON.
5. Connect the **SST** as shown in the figure.
6. Measure the injection volume of each fuel injector by using a graduated container.

   Injection volume:
   59—76 ml { 59—76 cc , 2.0—2.5 fl oz }/15 sec.

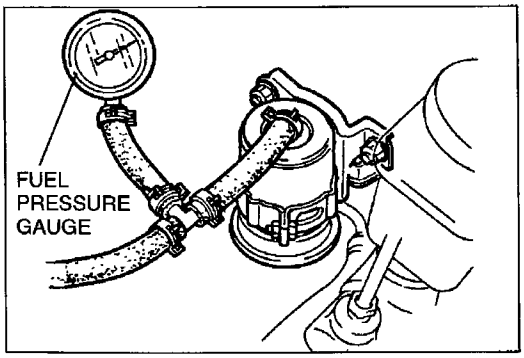
7. Turn off the ignition switch and disconnect the jumper wire.
8. If not as specified, replace the fuel injector. (Refer to page F2–18.)

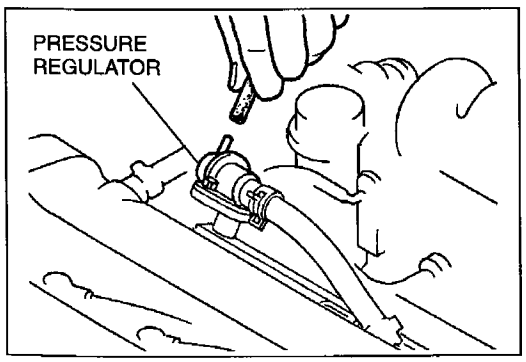
PRESSURE REGULATOR

Inspection

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F2–11.**





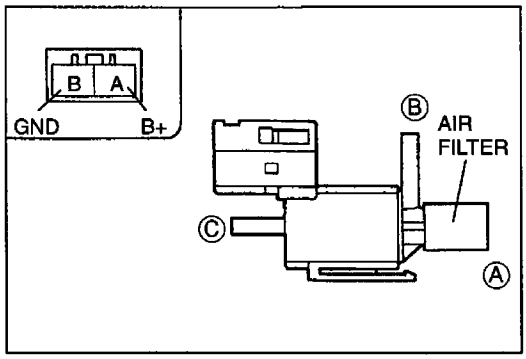
1. Disconnect the negative battery cable.
2. Remove the air intake hose. (Refer to page F2–5.)
3. Connect a fuel pressure gauge between the fuel filter (high pressure side) and the main fuel hose.
4. Install the air intake hose.
5. Connect the negative battery cable.
6. Start the engine and let it idle.
7. Carry out the intake manifold vacuum inspection. (Refer to page F2–119.)
8. Measure the fuel line pressure.

   Pressure:
   200—240 kPa { 2.0—2.4 kgf/cm^2 , 29—34 psi }

9. If not as specified, carry out the fuel line pressure inspection (Refer to page F2–121.) and inspect the PRC solenoid valve. (Refer to page F2–24.)
10. Disconnect the vacuum hose from the pressure regulator.
11. Measure the fuel line pressure.

    Pressure:
    280—310 kPa { 2.8—3.2 kgf/cm^2 , 40—45 psi }

12. If not as specified, replace the pressure regulator. (Refer to page F2–18.)



PRC SOLENOID VALVE

ATX

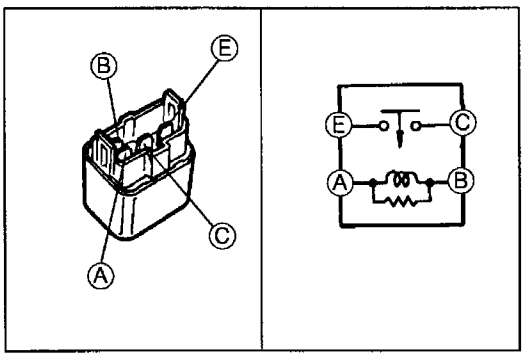
Inspection

1. Remove the PRC solenoid valve. (Refer to page F2–20.)
2. Check for air flow between ports of the solenoid valve.

O—O: Continuity O═O : Air flow B+: Battery positive voltage

Step	Terminal		Port		
	A	B	A	B	C
1	O—O			O═O	
2	B+	Ground	O═O		

3. If not as specified, replace the PRC solenoid valve.



FUEL PUMP RELAY

Inspection

1. Remove the fuel pump relay. (Refer to page F2–20.)
2. Check for continuity between terminals of the relay by using an ohmmeter.

O—O: Continuity B+: Battery positive voltage

Step \ Terminal	A	B	C	E
1	O—O			
2	B+	Ground	O—O	

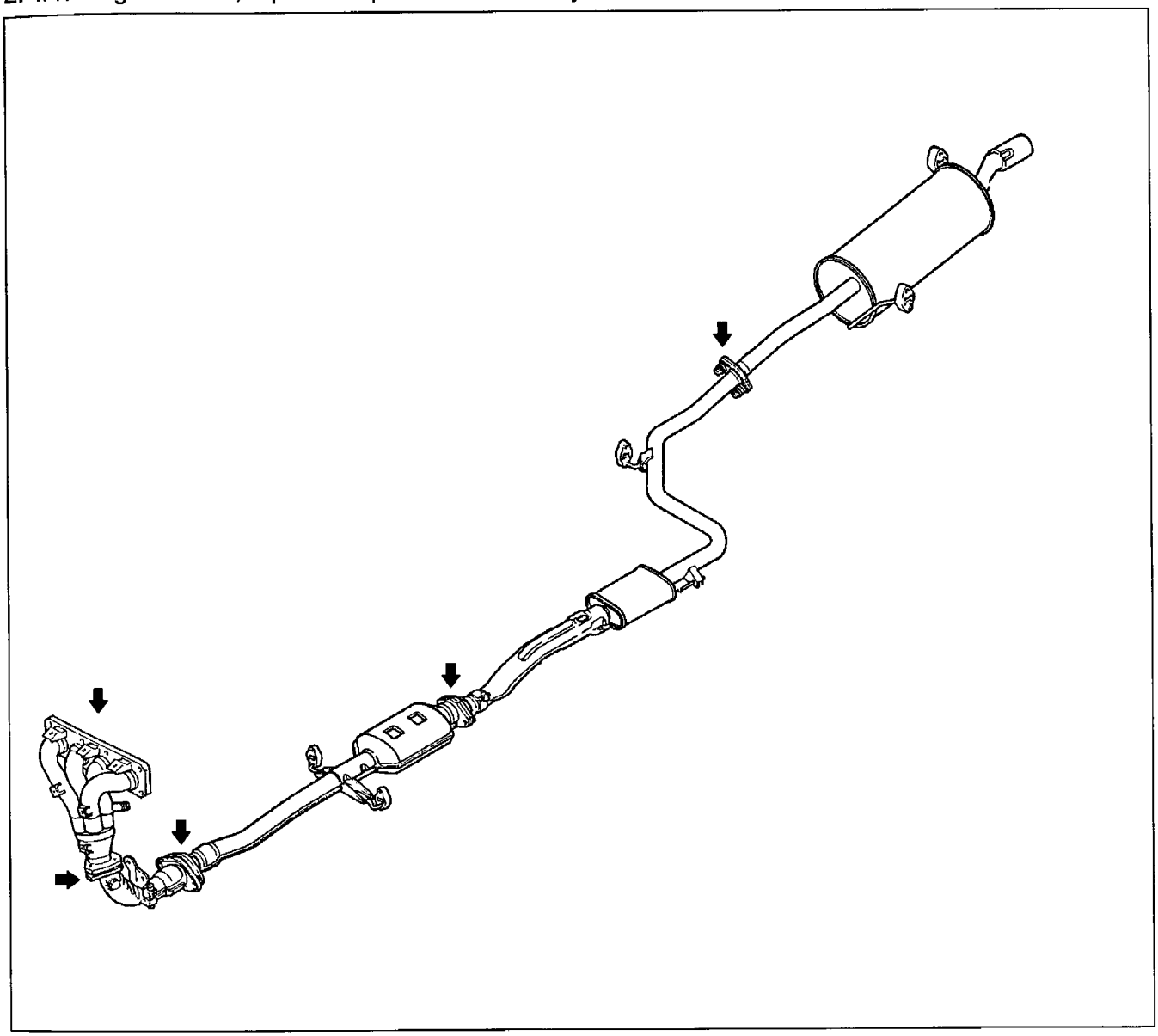
3. If not as specified, replace the fuel pump relay.

EXHAUST SYSTEM

COMPONENT PARTS

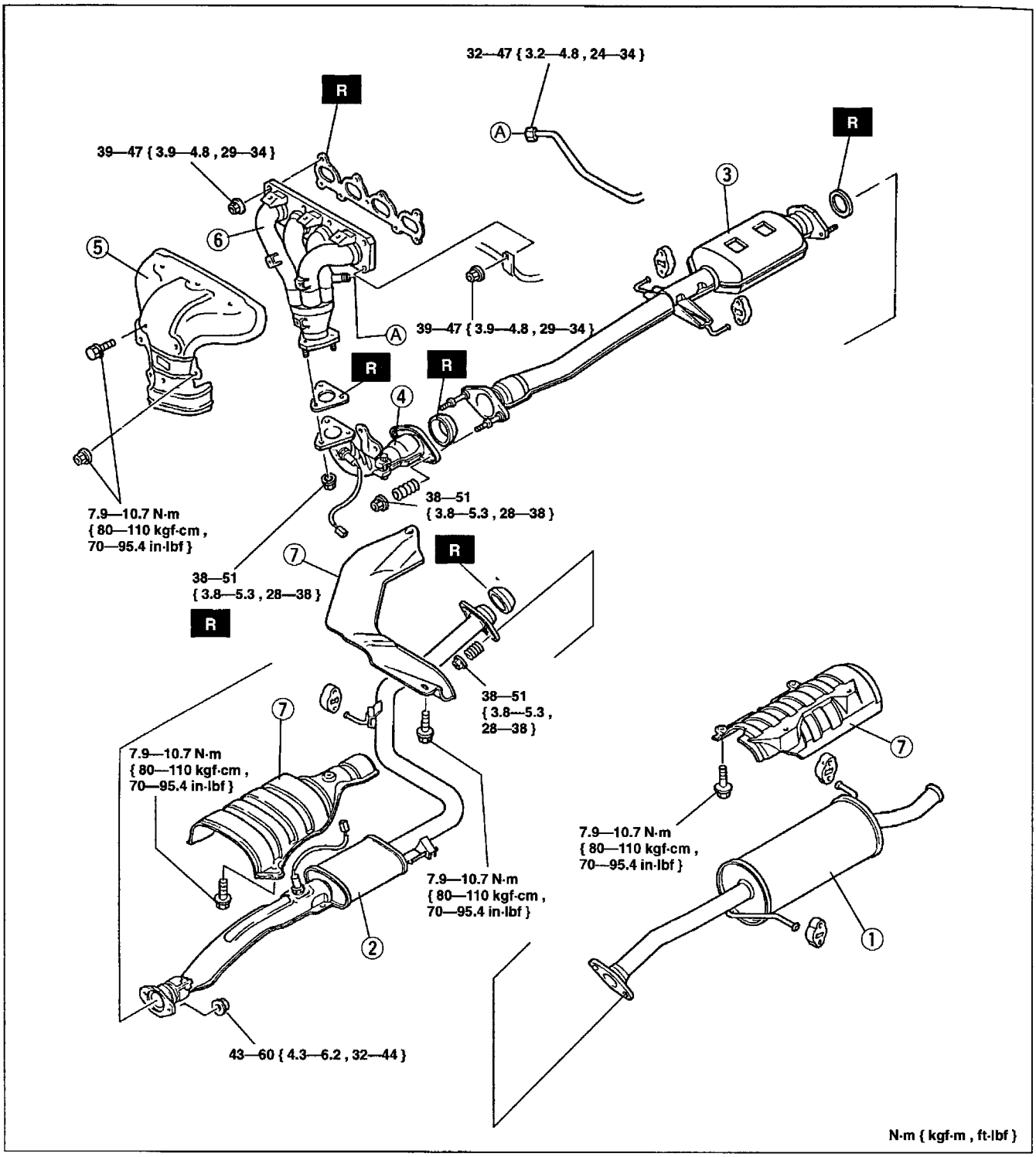
Inspection

1. Start the engine and check for exhaust gas leakage from each exhaust system components.
2. If leakage is found, repair or replace as necessary.

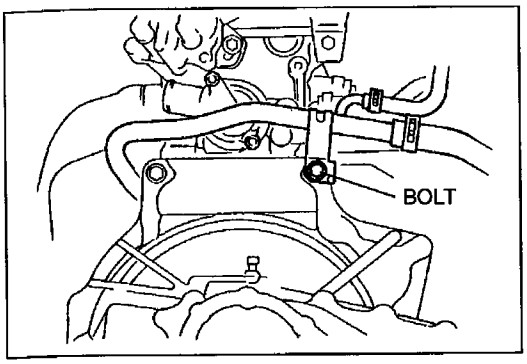


Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the condenser fan. (Refer to section U.)
3. Remove in the order shown in the figure, referring to **Removal note.**
4. Install in the reverse order of removal, referring to **Installation note.**



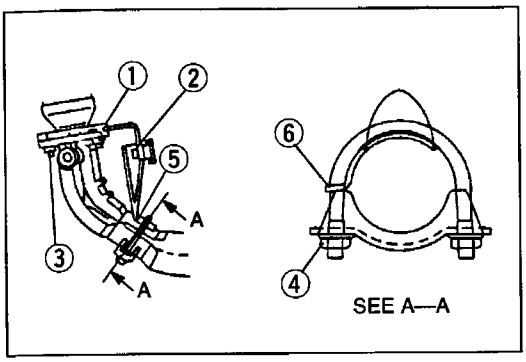
1. Main silencer
2. Presilencer
3. Three way catalytic converter
4. Front pipe
   Installation note ..... page F2–27
5. Exhaust manifold insulator
6. Exhaust manifold
   Removal note ..... page F2–27
7. Insulator



Removal note
Exhaust manifold

1. Remove the air cleaner and disconnect the air hose. (Refer to page F2–5.)
2. Remove the water bypass pipe stay bolt.

Tightening torque:
64—89 N·m { 6.5—9.1 kgf·m , 48—65 ft·lbf }



Installation note
Front pipe

1. Hand tighten bolts and nuts in the order shown.
2. Tighten nut ③.

Tightening torque:
38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }

3. Check for correct alignment at ⑤ (front pipe and bracket) and at ② (block and bracket).
4. Check for correct alignment at ⑥ (hanger bracket and U bolt), then tighten nut ④.

Tightening torque:
10—16 N·m { 100—170 kgf·cm , 87—147 in·lbf }

5. Verify that ③ (flange and bracket) contacts with ② (block and bracket), then tighten nut ①.

Tightening torque:
19—25 N·m { 1.9—2.6 kgf·m , 14—18 ft·lbf }

6. Tighten bolt ②.

Tightening torque:
38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }

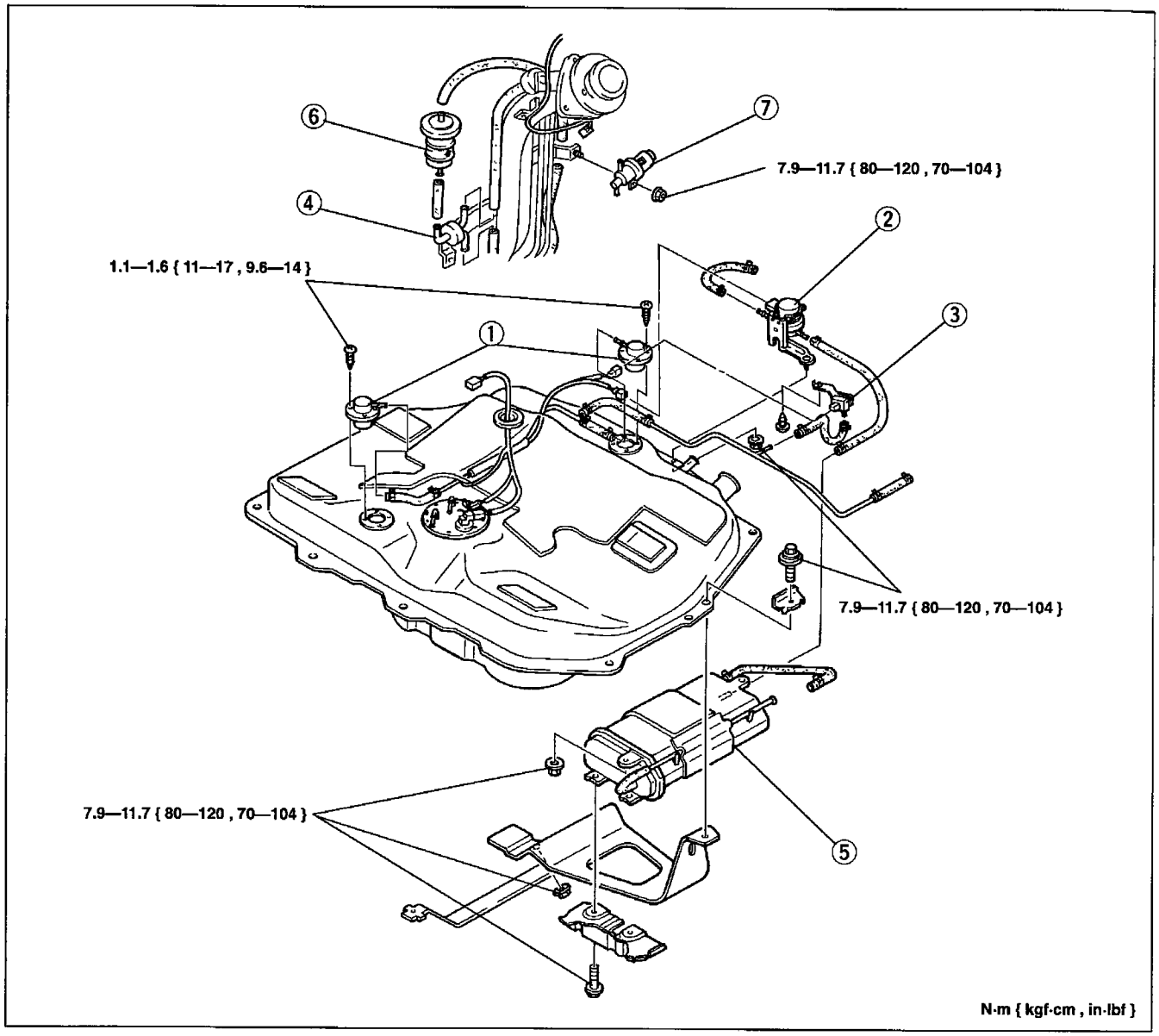
EMISSION SYSTEM

COMPONENT PARTS

Removal / Installation

Fuel tank side

1. Remove the fuel tank. (Refer to page F2–12, 13.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal, referring to **Installation note**.

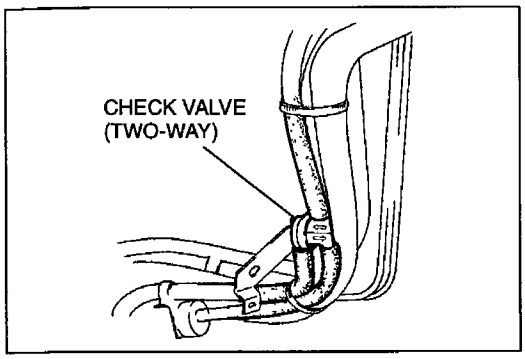


1. Rollover valve
   Installation note ..... page F2–29
2. Tank pressure control valve (TPCV)
   Installation note ..... page F2–29
3. Fuel tank pressure sensor
4. Check valve (two-way)
   Installation note ..... page F2–29
5. Charcoal canister
   Installation note ..... page F2–29
6. Air filter
7. Canister drain cut valve (CDCV)

Installation note
Rollover valve, check valve (two-way), tank pressure control valve, charcoal canister

- Push the ends of the evaporative hoses onto respective fittings.

Specification: 15—20 mm { 0.60—0.78 in }
(except charcoal canister)
: 25—30 mm { 0.99—1.18 in }
(charcoal canister)



Check valve (two-way)

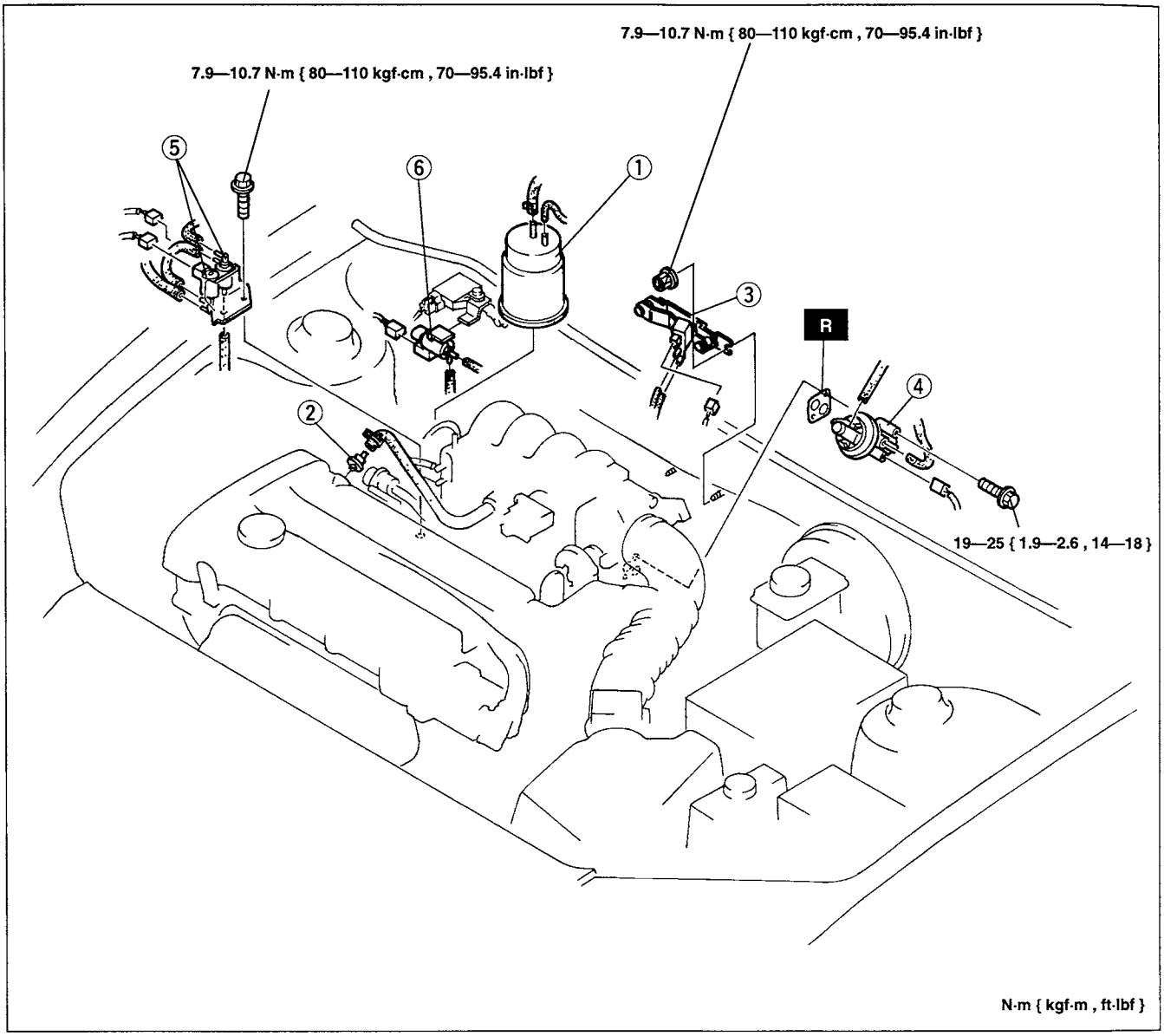
- Push the end of the evaporative hose onto the fitting.

Specification: 15—20 mm { 0.60—0.78 in }

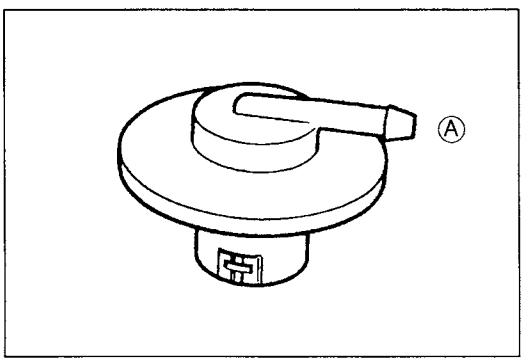
- Install the check valve (two-way) in the correct direction as shown.

Engine compartment side

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



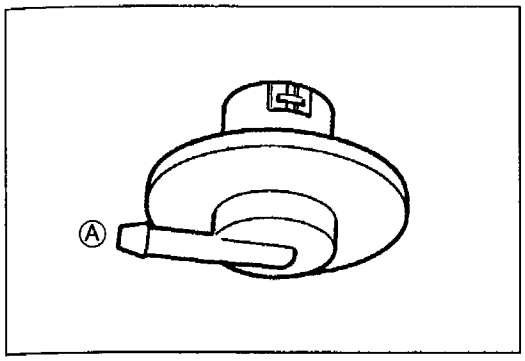
1. Catch tank
2. PCV valve
3. Purge solenoid valve
4. EGR valve
5. EGR solenoid valve
6. EGR boost sensor solenoid valve



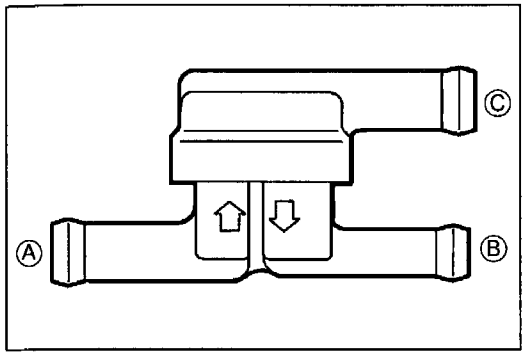
ROLLOVER VALVE

Inspection

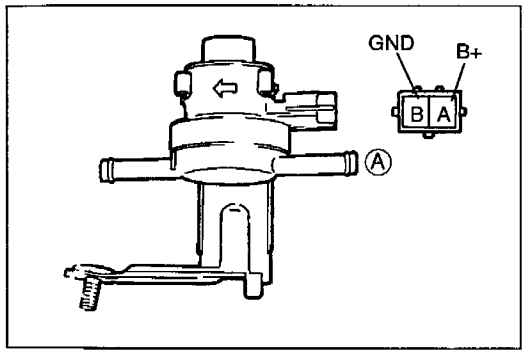
1. Remove the fuel tank. (Refer to page F2–12, 13.)
2. Remove the rollover valve. (Refer to page F2–28.)
3. Verify that air flows through the valve from port Ⓐ when the valve is held as shown.



4. Verify that no air flows through the valve from port Ⓐ when the valve is held as shown.
5. If not as specified, replace the rollover valve.



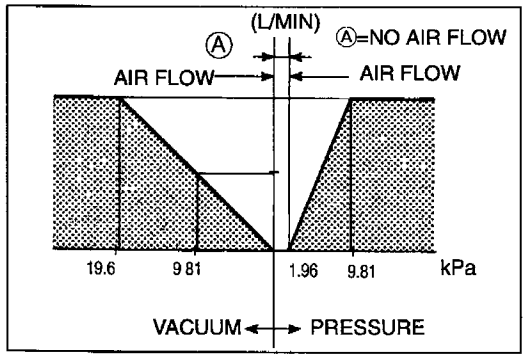
CHECK VALVE
Inspection
Two-way
1. Remove the check valve (two-way). (Refer to page F2–28.)
2. Blow air into port Ⓐ and verify that air smoothly flows from port Ⓒ.
3. Blow air into port Ⓒ and verify that air smoothly flows from port Ⓑ.
4. If not as specified, replace the check valve (two-way).



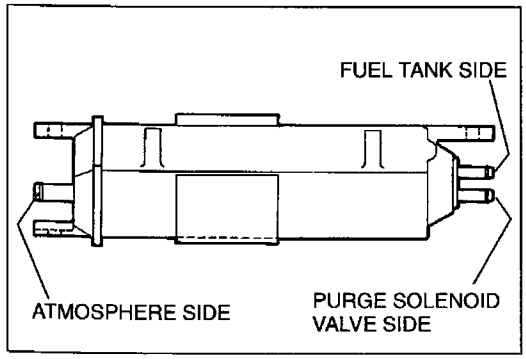
TANK PRESSURE CONTROL VALVE (TPCV)
Inspection
1. Remove the TPCV. (Refer to page F2–28.)
2. Apply pressure or vacuum to port Ⓐ of the valve by using a vacuum pump, and check for the air flow.

Specification

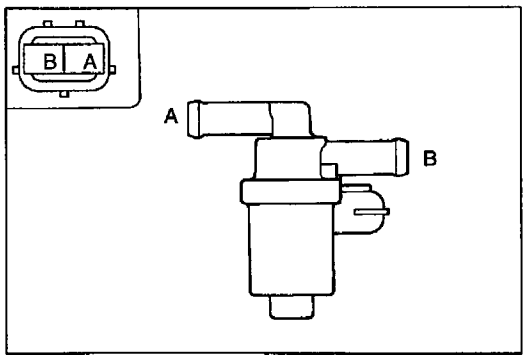
Condition	kPa { mmHg , inHg }	Air flow
Pressure	Below 1.96 { 1.47 , 0.06 }	No
	Above 9.81 { 7.36 , 0.29 }	Yes
Vacuum	Below 9.81 { 7.36 , 0.29 }	Yes



3. Apply battery positive voltage to the valve connector and apply pressure to port Ⓐ, and verify that air flows smoothly.
4. If not as specified, replace the TPCV.



CHARCOAL CANISTER
Inspection
1. Remove the charcoal canister. (Refer to page F2–28.)
2. Plug the charcoal canister atomosphere side port and purge solenoid valve side port.
3. Blow air into the charcoal canister and verify that no air leaks.
4. If air leaks, replace the charcoal canister.



CANISTER DRAIN CUT VALVE (CDCV)

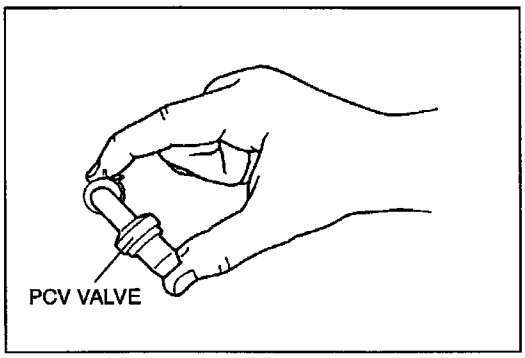
Inspection

1. Remove the valve. (Refer to page F2–28.)
2. Check for air flow between ports of the solenoid valve.

O—O: Continuity O═O : Air flow B+: Battery positive voltage

Step	Terminal		Port	
	A	B	A	B
1	O	O	O	O
2	B+	Ground		

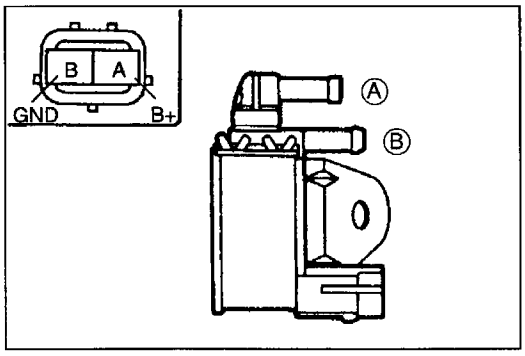
3. If not as specified, replace the canister drain cut valve.



PCV VALVE

Inspection

1. Start the engine and let it idle.
2. Disconnect the PCV valve from the cylinder head cover. (Refer to page F2–30.)
3. Block the valve opening by hand and verify that vacuum is felt.
4. If not, check the PCV hose for clogging and damage. If the hose is OK, replace the PCV valve.



PURGE SOLENOID VALVE

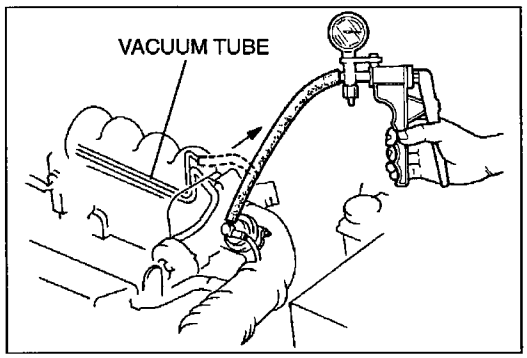
Inspection

1. Remove the purge solenoid valve. (Refer to page F2–30.)
2. Check for air flow between ports of the solenoid valve.

O—O: Continuity O═O : Air flow B+: Battery positive voltage

Step	Terminal		Port	
	A	B	A	B
1	O	O		
2	B+	Ground	O	O

3. If not as specified, replace the purge solenoid valve.



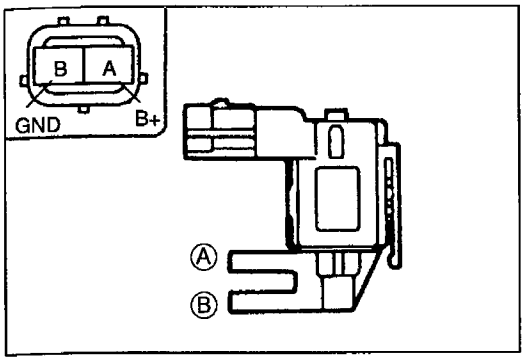
EGR VALVE

Inspection

1. Start the engine and let it idle.
2. Disconnect the vacuum hose from the vacuum tube and install a vacuum pump to the valve.
3. Verify that the engine runs roughly or stalls at the specified vacuum.

Specification:
8.7—10.6 kPa { 65—79 mmHg , 2.6—3.1 inHg }

4. If not as specified, replace the EGR valve. (Refer to page F2–30.)



EGR SOLENOID VALVE

Inspection

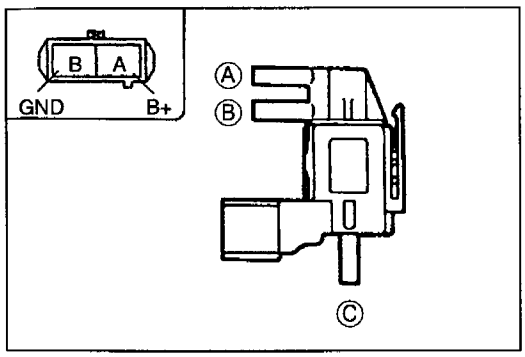
EGR solenoid valve (vacuum)

1. Remove the EGR solenoid valve (vacuum). (Refer to page F2–30.)
2. Check for air flow between ports of the solenoid valve.

O—O: Continuity O═O : Air flow B+: Battery positive voltage

Step	Terminal		Port	
	A	B	A	B
1	O—O			
2	B+	Ground	O═O	

3. If not as specified, replace the EGR solenoid valve (vacuum).



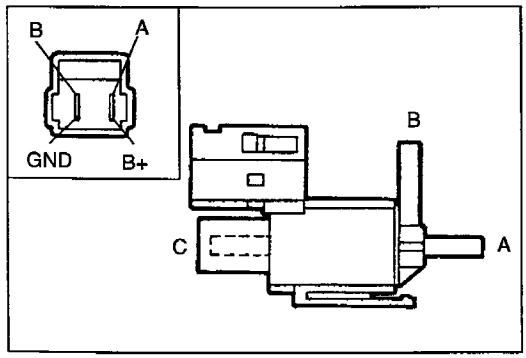
EGR solenoid valve (vent)

1. Remove the EGR solenoid valve (vent). (Refer to page F2–30.)
2. Check for air flow between ports of the solenoid valve.

O—O: Continuity O═O : Air flow B+: Battery positive voltage

Step	Terminal		Port		
	A	B	A	B	C
1	O—O		O═O═O		
2	B+	Ground	O═O		

3. If not as specified, replace the EGR solenoid valve (vent).



EGR BOOST SENSOR SOLENOID VALVE

Inspection

1. Remove the EGR boost sensor solenoid valve. (Refer to page F2–30.)
2. Check for air flow between ports of the solenoid valve.

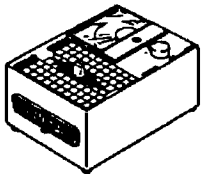
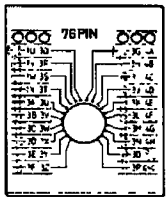
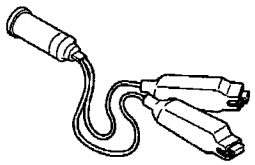
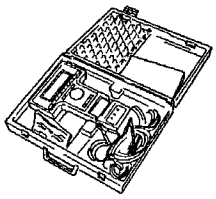
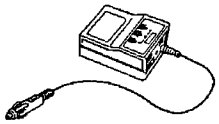
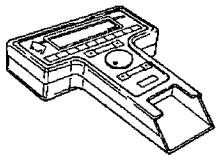
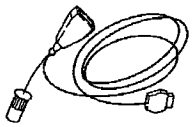
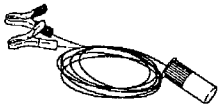
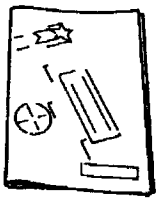
O—O: Continuity O═O : Air flow B+: Battery positive voltage

Step	Terminal		Port		
	A	B	A	B	C
1	O—O			O═O	
2	B+	Ground	O═O		

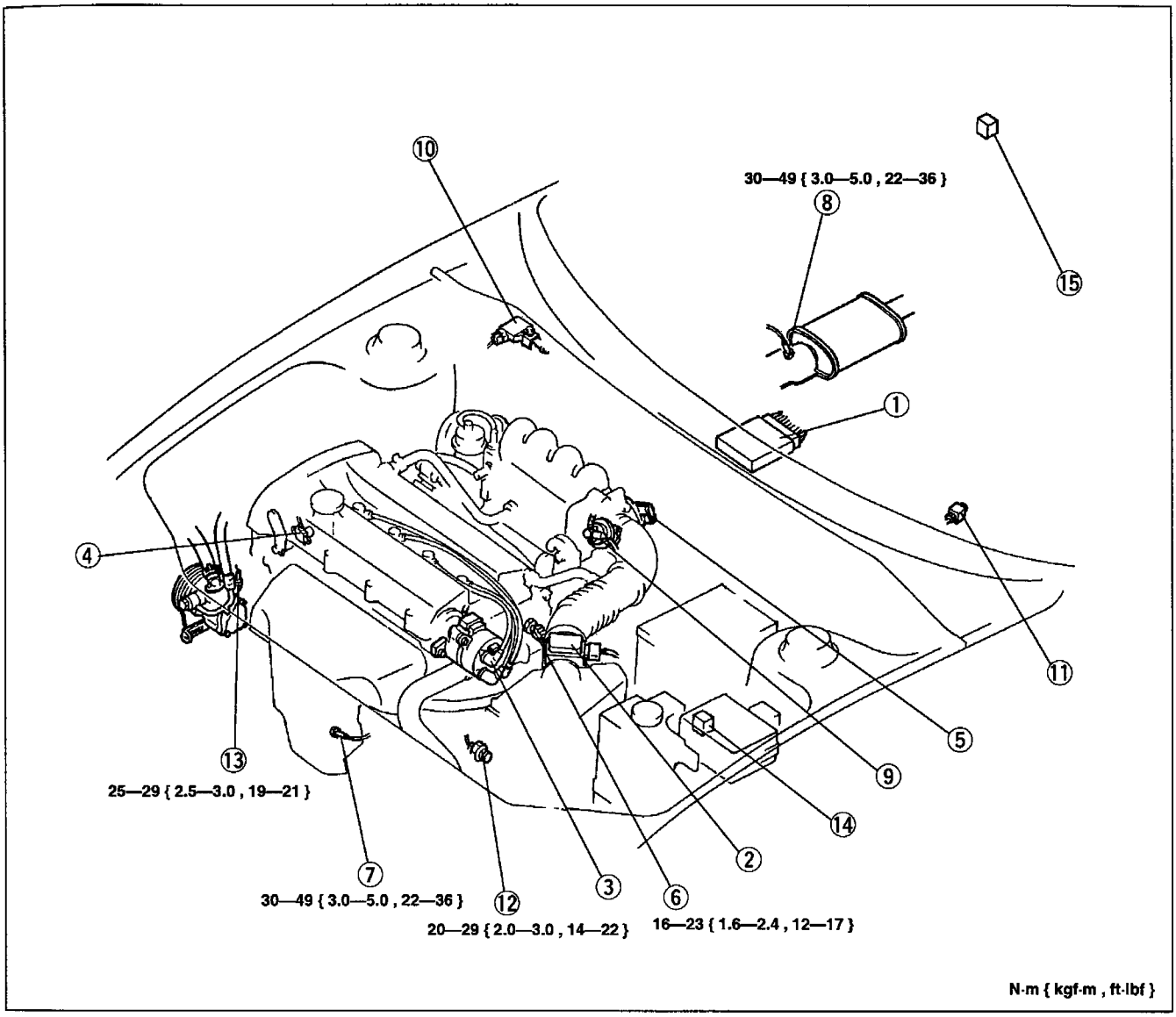
3. If not as specified, replace the EGR boost sensor solenoid valve.

CONTROL SYSTEM

PREPARATION
SST

49 9200 162A Engine Signal Monitor 	For inspection of PCM terminal voltage	49 T018 902 Harness adapter 	For inspection of PCM terminal voltage
49 F018 903 Sheet 	For inspection of PCM terminal voltage	49 D088 008 Harness adapter, Power 	For inspection of PCM terminal voltage
49 T088 0A0 NGS set 	For inspection of PCM and input/output devices	49 T088 010B Program Card 	For inspection of PCM and input/output devices
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of PCM and input/output devices	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of PCM and input/output devices
49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of PCM and input/output devices	49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of PCM and input/output devices
49 T088 008A Instruction Manual 	For inspection of PCM and input/output devices	—	—

COMPONENT PARTS

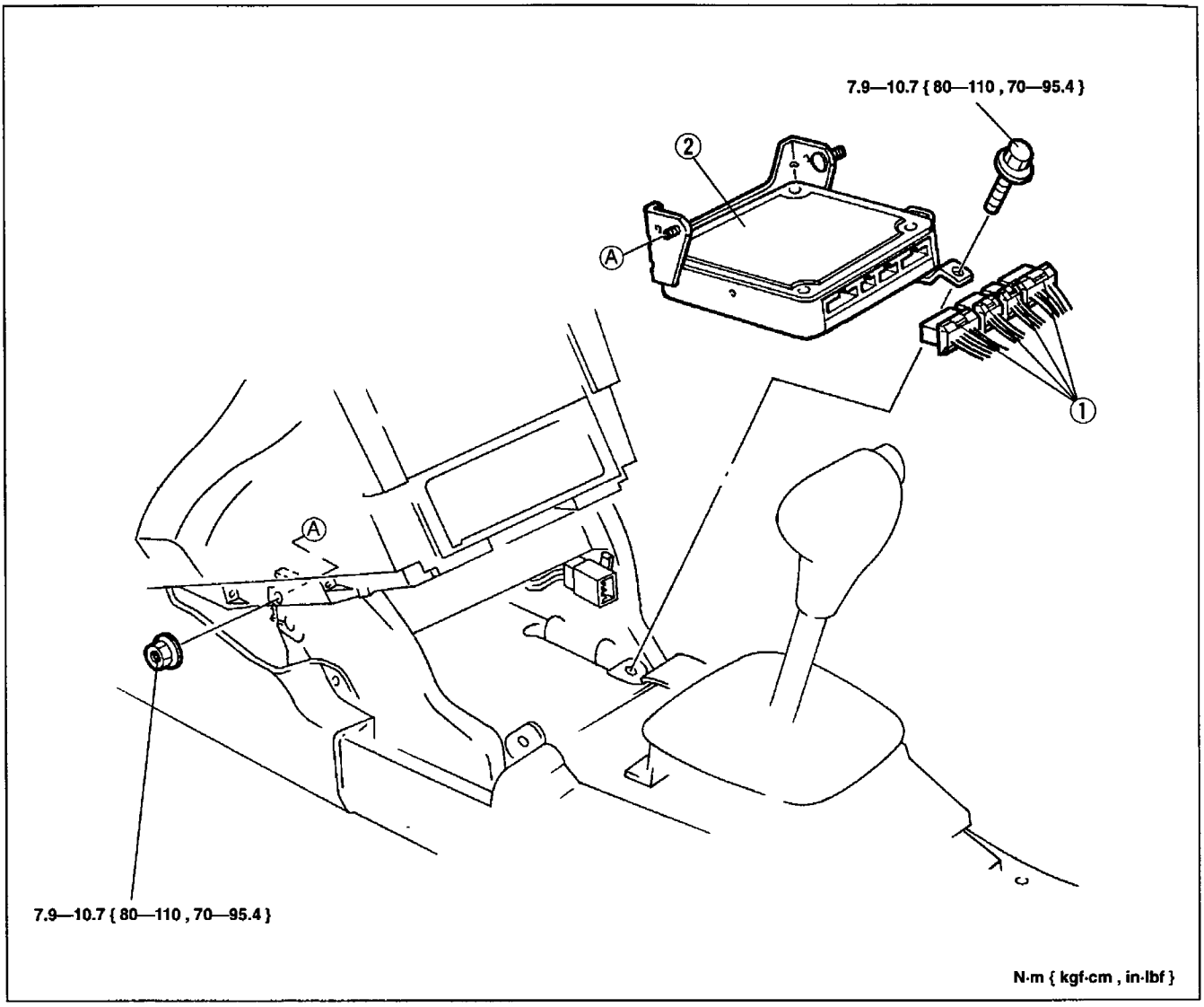


1. Powertrain control module (PCM)
   - Removal / Installation ..... page F2–36
   - Inspection ..... page F2–37
2. Mass air flow sensor (Include intake air temperature sensor)
   - Inspection ..... page F2–44
   - Removal / Installation ..... page F2– 5
3. Camshaft position sensor
   - Inspection ..... page F2–45
4. Crankshaft position sensor
   - Inspection ..... page F2–45
   - Replacement ..... page F2–46
5. Throttle position sensor
   - Inspection ..... page F2–46
   - Adjustment ..... page F2–47
   - Replacement ..... page F2–48
6. Engine coolant temperature sensor
   - Inspection ..... page F2–48
7. Heated oxygen sensor (Front)
   - Inspection ..... page F2–48
8. Heated oxygen sensor (Rear)
   - Inspection ..... page F2–48
9. EGR valve position sensor
   - Inspection ..... page F2–49
10. EGR boost sensor
    - Inspection ..... page F2–50
11. Clutch switch
    - Inspection ..... page F2–52
    - Replacement ..... page F2–52
12. Neutral switch
    - Inspection ..... page F2–52
13. Power steering pressure switch
    - Inspection ..... page F2–52
14. Main relay
    - Inspection ..... page F2–53
15. Fuel tank pressure sensor
    - Inspection ..... page F2–51

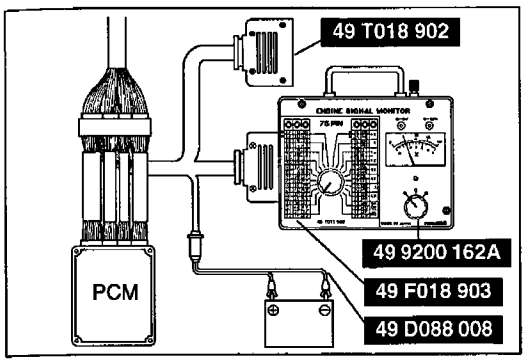
POWERTRAIN CONTROL MODULE (PCM)

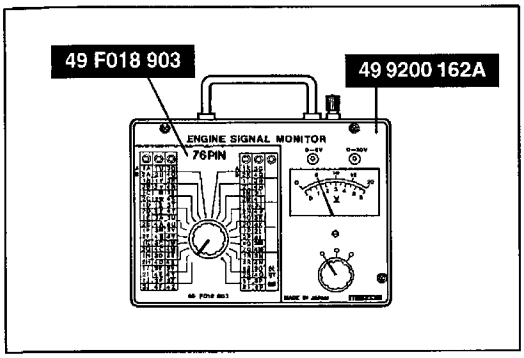
Removal / Installation

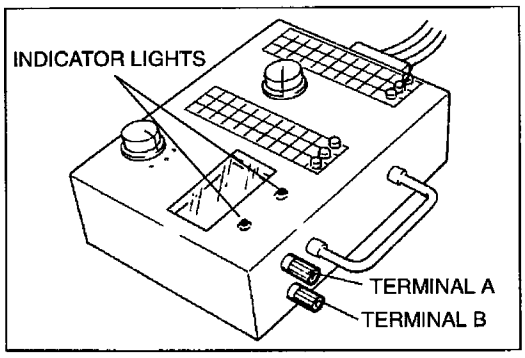
1. Disconnect the negative battery cable.
2. Remove the rear console, front console and undercover. (Refer to section S.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



1. PCM connectors
2. Powertrain control module (PCM)







Inspection

Caution

- **The PCM terminal voltages vary with cange in measuring conditions and vehicle conditions. Always carry out a total inspection of the input systems, output systems, and PCM to determine the cause of trouble. Otherwise, a wrong diagnosis will be made.**

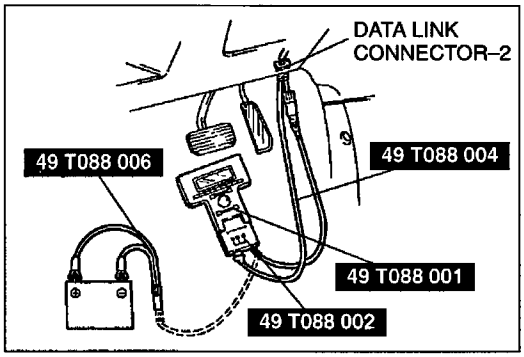
1. Disconnect the negative battery cable.
2. Remove the rear console, front console and undercover. (Refer to section S.)
3. Disconnect the PCM connector.
4. Connect the **SST** (Harness adapter) to the PCM connector.
5. Connect the **SSTs** (Engine Signal Monitor and Harness adapter, power) to the **SST** (Harness adapter). Use connector A of the harness adapter for PCM terminals 1A through 1V and 3A through 3P. Use connector B for PCM terminals 2A through 2L and 4A through 4Z.
6. Place the **SST** (Sheet) on the **SST** (Engine Signal Monitor).
7. Measure the voltage at each PCM terminal by switching the selector switch and the monitor switch.
8. If any incorrect voltage is detected, check related systems, wiring harnesses and connectors referring to the possible malfunction in the terminal voltage list.

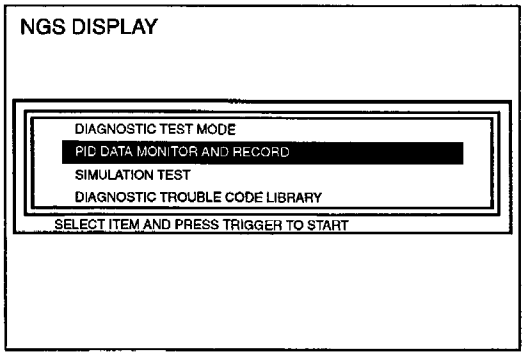
Caution

- **Disconnecting the connectors of the PCM and the SST (Harness adapter) while the battery is connected can damage the PCM and the SST (Engine Signal Monitor). Disconnect the negative battery cable and the SST (Harness adapter, power) before disconnecting the connectors.**
- **Applying voltage to terminals A and B of the SST (Engine Signal Monitor) can damage the SST (Engine Signal Monitor).**

Note

- The indicator lights of the **SST** (Engine Signal Monitor), provided for confirmation of the voltmeter range, is also used for detection of the pulse such as the fuel injector control signal, which is difficult to detect by using the voltmeter.
- Terminals A and B of the **SST** (Engine Signal Monitor) are for connection of an external instrument. By connecting an external instrument such as a circuit tester or an oscilloscope, various inspections in addition to the measurement of the PCM terminal voltages are made possible.





Using the SSTs (NGS)

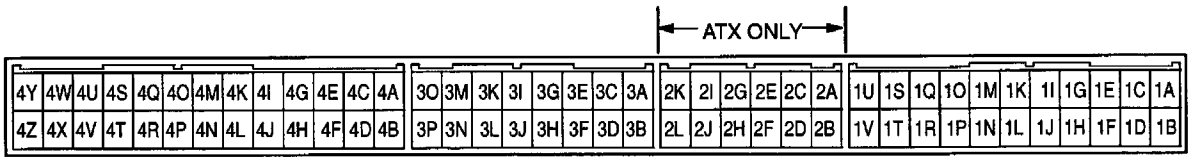
1. In the passenger compartment, connect the **SSTs** (NGS) to the data link connector–2 as shown in the figure.
2. Referring to the NGS instruction manual, select the "PID/DATA MONITOR AND RECORD" function.
3. Referring to the 1996 Service Highlights, inspect each PCM input/output signal.

Note

- The "PID/DATA MONITOR AND RECORD" function is to monitor the calculation value of input/output signals in the PCM. Deviation in the value does not always indicate malfunction in the related input/output devices.
- When normal output signal cannot be detected when all input signals are normal, replace the PCM.

Terminal voltage (Reference)

B+: Battery positive voltage
*1: In data link connector
*2: ATX only



Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
1A	Cooling fan control	Cooling fan relay	Ignition switch ON	Cooling fan operating/ Terminal *1TEN ground and throttle valve open	Below 1.0	• Cooling fan relay (Refer to section E)
				Cooling fan stop	B+	
1B*2	Condenser fan control	Condenser fan relay	Idle	Condenser fan operating	Below 1.0	• Condenser fan relay (Refer to section U)
				Condenser fan stop	B+	
1C	—	—	—		—	—
1D	Serial communication	Data link connector–2 terminal KLN	Carry out inspection according to diagnostic trouble code Diagnostic trouble code output is a part of serial communication Judgement by terminal voltage is not possible (Refer to page F2–54)		—	• On-board diagnostic system
1E	MIL	Malfunction indicator lamp	Malfunction indicator lamp OFF		B+	• PCM terminal 1E — MIL
			Malfunction indicator lamp ON		Below 2.0	
1F	—	—	—		—	—
1G	A/C control	A/C relay	Ignition switch ON		B+	• A/C relay (Refer to section U)
			Idle	A/C operating	Below 2.0	
				A/C stop	B+	
1H	Headlight	Headlight switch	Headlight switch OFF		Below 1.0	• Headlight switch (Refer to section T)
			Headlight switch ON		B+	
1I	Diagnostic test mode	Data link connector (Terminal TEN)	Ignition switch ON	Open terminal *1TEN	B+	• PCM terminal 1I – *1TEN harness
				Short terminal *1TEN	Below 1.0	
1J	Rear window defroster	Rear window defroster switch	Ignition switch ON	Rear window defroster switch OFF	Below 1.0	• Rear window defroster switch (Refer to section T)
				Rear window defroster switch ON	B+	
1K	A/C	A/C amplifier	Idle	A/C switch and fan switch ON	Approx. 2.0	• A/C switch • Refrigerant pressure switch • A/C amplifier (Refer to section U)
				A/C switch OFF	B+	
1L	Load/No load distinction	Neutral/clutch switch (MTX), Transaxle range switch (ATX)	Ignition switch ON	MTX Other than neutral position and clutch pedal released	B+	• Neutral switch (Refer to page F2–52) • Clutch switch (Refer to page F2–52) • Transaxle range switch (Refer to section K)
				ATX Other than P and N positions		
				MTX Neutral position or clutch pedal depressed	Below 1.0	
				ATX P or N position		

B+: Battery positive voltage
*1: In data link connector
*2: ATX only

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
1M	Vehicle speed	Vehicle speed sensor	Ignition switch ON		0 or 4.0	• Vehicle speed sensor (Refer to section T)
			Driving		Approx. 3.0	
1N	DRL (CANADA)	DRL relay	Daytime running light ON		Below 2.0	• DRL relay (Refer to section T)
			Daytime running light OFF		B+	
1O	—	—	—		—	—
1P	Blower	Fan switch	Ignition switch ON	Fan switch OFF or ON at 1st	B+	• Fan switch (Refer to section U)
				Fan switch ON at 2nd or higher	Below 1.0	
1Q	Brake	Brake switch	Brake pedal released		Below 1.0	• Brake switch (Refer to section P)
			Brake pedal depressed		B+	
1R	—	—	—		—	—
1S	—	—	—		—	—
1T	—	—	—		—	—
1U	Fuel pump control	Fuel pump relay	Ignition switch ON		B+	• Fuel pump relay (Refer to page F2–24)
			Cranking		Below 2.0	
			Idle			
1V	—	—	—		—	—
*2 2A	Shift solenoid A control	Shift solenoid A	During shifting		B+	• Shift solenoid A (Refer to section K)
			Others		Below 1.0	
*2 2B	Shift solenoid B control	Shift solenoid B	During shifting		B+	• Shift solenoid B (Refer to section K)
			Others		Below 1.0	
*2 2C	Shift solenoid C control	Shift solenoid C	During shifting		B+	• Shift solenoid C (Refer to section K)
			Others		Below 1.0	
*2 2D	Torque converter clutch solenoid valve control	Torque converter clutch solenoid valve	During shifting		B+	• Torque converter clutch solenoid valve (Refer to section K)
			Others		Below 1.0	
*2 2E	O/D OFF indicator light control	O/D OFF indicator light	Ignition switch ON	O/D OFF mode	Below 2.0	• Instrument cluster (O/D OFF indicator) (Refer to section K)
				Others	B+	
*2 2F	D range	Transaxle range switch (D range)	Idle	D range	B+	• Transaxle range switch (Refer to section K)
				Others	Below 1.0	
*2 2G	2 range	Transaxle range switch (2 range)	Idle	2 range	B+	
				Others	Below 1.0	
*2 2H	1 range	Transaxle range switch (1 range)	Idle	1 range	B+	
				Others	Below 1.0	
*2 2I	O/D OFF switch	O/D OFF switch	Ignition switch ON	O/D OFF switch pressed	Below 1.0	• O/D OFF switch (Refer to section K)
				O/D OFF switch released	B+	
2J	—	—	—		—	—
*2 2K	Input/turbine speed sensor	Input/turbine speed sensor (turbine)	Ignition switch ON		Approx. 1.0	• Input/turbine speed sensor (Refer to section K)
			Idle			
*2 2L	Input/turbine speed sensor ground	Input/turbine speed sensor (ground)	Constant		Below 1.0	• PCM 2L terminal continuity harness (Refer to section K)

B+: Battery positive voltage
*1: In data link connector
*2: ATX only

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
3A	Fuel tank pressure	Fuel tank pressure sensor	Ignition switch ON	Fuel tank pressure 0 kPa { 0 mmHg , 0 inHg } (Barometric pressure)	Approx. 2.5	• Fuel tank pressure sensor (Refer to page F2–51)
3B	Mass air flow sensor (VGP)	Mass air flow sensor	Ignition switch ON		Below 1.0	• Mass air flow sensor (Refer to page F2–44)
			Idle		1.0—2.0	
3C	Heated oxygen sensor (Front)	Heated oxygen sensor (Front)	Ignition switch ON		Approx. 0	• Heated oxygen sensor (Front) (Refer to page F2–48)
			Idle	Engine cold	0.1—0.9	
				After warm up	Below 1.0	
			Acceleration		0.5—1.0	
			Deceleration		0—0.5	
3D	Heated oxygen sensor (Rear)	Heated oxygen sensor (Rear)	Ignition switch ON		Approx. 0	• Heated oxygen sensor (Rear) (Refer to page F2–48)
			Idle	Engine cold	Below 1.0	
				After warm up	Below 1.0	
			Acceleration		0—1.0	
			Deceleration		0—1.0	
*2 3E	Transaxle fluid temperature	Trasaxle fluid temperature sensor	Ignition switch ON	Transaxle fluid temperature 20 °C { 68 °F }	Approx. 4.0	• Transaxle fluid temperature sensor (Refer to section K)
				Transaxle fluid temperature 130 °C { 266 °F }	Approx. 1.5	
3F	Throttle position (TVO)	Throttle position sensor	Ignition switch ON	Closed throttle position	0.3—1.0	• Throttle position sensor (Refer to page F2–46) • PCM terminal 3I voltage
				Wide open throttle	2.8—4.5	
3G	Engine coolant temperature	Engine coolant temperature sensor	Ignition switch ON	Engine coolant temp 20 °C { 68 °F }	Approx. 3.1	• Engine coolant temperature sensor (Refer to page F2–48)
				After warm up	Below 1.0	
3H	EGR boost/ Barometric pressure	EGR boost sensor	Ignition switch ON		Approx. 4.5	• EGR boost sensor (Refer to page F2–51)
			Idle			
3I	Constant voltage (Vref)	Throttle position sensor EGR valve position sensor	Ignition switch ON		Approx. 5.0	• PCM terminal 4B voltage
3J	EGR valve position	EGR valve position sensor	Ignition switch ON		Approx. 0.8	• EGR valve position sensor (Refer to page F2–49) • PCM terminal 3I voltage
			Idle			
3K	Intake air temperature	Intake air temprature sensor	Ignition switch ON	Intake air temperature 20 °C { 68 °F }	Approx. 2.5	• Mass air flow sensor (Refer to page F2–44)
3L	—	—	—		—	—
3M	Heated oxygen sensor heater	Heated oxygen sensor (Front)	Ignition switch ON	Idle	Below 2.0	• Heated oxygen sensor (Refer to page F2–48)
3N	—	—	—		—	—
3O	Analogue sensor ground	Ground	Constant		Below 1.0	• PCM 3O terminal harness (Open)
3P	Power steering pressure	Power steering pressure switch	Ignition switch ON		B+	• Power steering pressure switch (Refer to page F2–53)
			Idle	P/S not operating		
				P/S operating	Below 1.0	

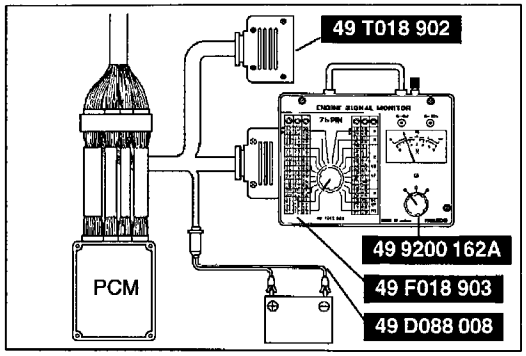
B+: Battery positive voltage
*1: In data link connector
*2: ATX only

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
4A	PCM ground	Ground	Constant		Below 1.0	• PCM 4A harness (Open)
4B	Power supply	Main relay (FUEL INJ relay)	Ignition switch	OFF	Below 1.0	• Main relay (Refer to page F2–53)
				ON	B+	
4C	Fuel injector ground	Ground	Constant		Below 1.0	• PCM 4C terminal continuity harness (Open)
4D	Output device ground	Ground	Constant		Below 1.0	• PCM 4D terminal continuity harness (Open)
4E	NE⊖	Crankshaft position sensor	Ignition switch ON		Below 1.0	• Crankshaft position sensor (Refer to page F2–45)
			Idle		Below 1.0	
4F	SGT	Camshaft position sensor (In distributor)	Ignition switch ON		0 or Approx. 5.0	• Camshaft position sensor (Refer to page F2–45)
			Idle		Approx. 2.0	
4G	—	—	—		—	—
4H	NE⊕	Crankshaft position sensor	Ignition switch ON		Below 1.0	• Crankshaft position sensor (Refer to page F2–45)
			Idle		Below 1.0	
4I	Back-up power supply	Battery	Constant		B+	• PCM 4I terminal — battery harness and connector
*2 4J	Pressure regulator control	PRC solenoid valve	Idle (After hot start approx. 149 sec)		Below 3.0	• PRC solenoid valve (Refer to page F2–24)
			Other		B+	
4K	VICS control	VICS solenoid valve	Ignition switch ON	Engine speed below 4900 rpm	Below 1.0	• VICS solenoid valve (Refer to page F2–9)
				Engine speed above 4900 rpm	B+	
4L	EGR boost sensor switching control	EGR boost sensor solenoid valve	Ignition switch ON		Below 3.0	• EGR boost sensor solenoid valve (Refer to page F2–33)
			Idle			
4M	Fuel level	Fuel gauge sender unit	Ignition switch ON	full fuel	Approx. 6	• Fuel gauge sender unit (Refer to section T)
				low fuel	Approx. 0	
4N	IGT	Ignition control module (In distributor)	Ignition switch ON		Below 1.0	• Ignition control module (Refer to section G)
			Idle		Approx. 0.3	
4O	EGR control (Vent)	EGR solenoid valve (Vent)	Ignition switch ON		B+	• EGR solenoid valve (Vent) (Refer to page F2–33)
			Idle			
4P	EGR control (Vacuum)	EGR solenoid valve (Vacuum)	Ignition switch ON		B+	• EGR solenoid valve (Vacuum) (Refer to page F2–33)
			Idle			
4Q	Idle air control	Idle air control valve	Ignition switch ON		Below 4.8	• Idle air control valve (Refer to page F2–8)
			Idle	After warm up (No load)	Approx. 10	
4R	—	—	—		—	—
4S	—	—	—		—	—
4T	Purge control	Purge solenoid valve	Ignition switch ON		B+	• Purge solenoid valve (Refer to page F2–32)
			Idle			

B+: Battery positive voltage
*1: In data link connector
*2: ATX only

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
4U	Fuel injector control	Fuel injector No.1	Ignition switch ON		B+	• Fuel injector (Refer to page F2–22)
4V		Fuel injector No.2	Idle		B+*	
4W		Fuel injector No.3				
4X		Fuel injector No.4				
4Y	—	—	—		—	—
4Z	CDCV, TPCV control	CDCV, TPCV	Ignition switch ON		B+	• CDCV (Refer to page F2–32) • TPCV (Refer to page F2–32)
			Diagnosis executed		Below 1.0	

* Engine Signal Monitor: Green and red lights flash



MASS AIR FLOW SENSOR

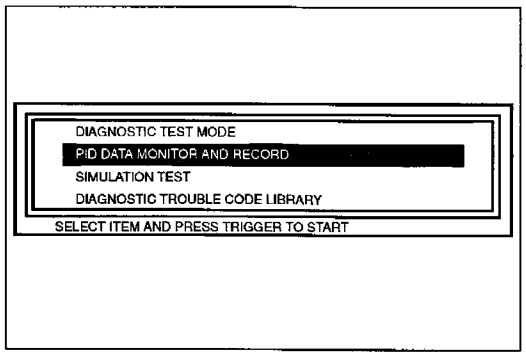
Inspection

1. Check the mass air flow sensor for damage and cracks.
2. Connect the **SSTs** (Engine Signal Monitor) to the PCM. (Refer to page F2–37.)
3. Measure the voltage at PCM terminal 3B. (Refer to page F2–41.)
4. Verify that the voltage is within the specification.

Specification

Measuring condition	PCM terminal 3B voltage (V)
Ignition switch ON	Below 1.0
Idle	1.0—2.0

5. If not as specified, inspect the harness and connector between the mass air flow sensor and the PCM terminal.
6. If there is correct terminal voltage and harness continuity, replace the mass air flow sensor. (Refer to page F2–5.)



Using the NGS

1. Check the mass air flow sensor for damage and cracks.
2. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
3. Select the PID/DATA MONITOR AND RECORD function.
4. Select "MAF V" on the NGS display. The NGS measures and shows the voltage.

Specification

Measuring condition	Mass air flow signal Voltage (V)
Ignition switch ON	Below 1.0
Idle	1.0—2.0

5. If not as specified, inspect the harness and connector between the mass air flow sensor and the PCM terminal.
6. If there is correct terminal voltage and harness continuity, replace the mass air flow sensor. (Refer to page F2–5.)

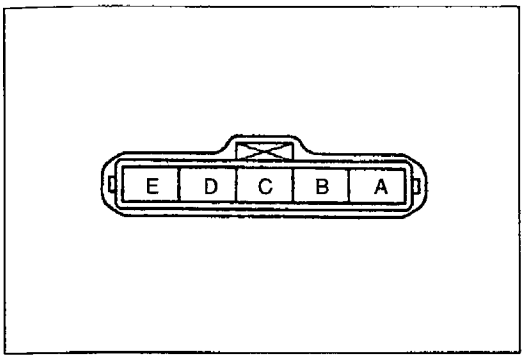
Note

- The scan tool shows the mass air flow rate and load value.

Specification

	Intake mass air flow (g/s)		Engine load calculated value (%)	
	MTX	ATX	MTX	ATX
Idle	2.0—2.9	2.3—3.1	15.0—19.0	16.7—21.0
Engine speed 2,500 rpm*	6.6—7.8	7.6—8.9	13.7—17.0	16.0—19.0

*: No load, neutral or P position



Intake air temperature sensor

1. Disconnect the mass air flow sensor connector.
2. Measure the resistance between terminals C and D by using an ohmmeter.

   Specification: 2.21—2.69 kΩ [20 °C { 68 °F }]

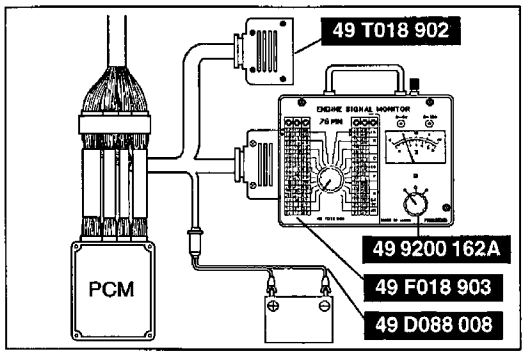
3. If not as specified, replace the mass air flow sensor. (Refer to page F2–5.)

CAMSHAFT POSITION SENSOR

Inspection

1. Remove the distributor. (Refer to section G.)
2. Disconnect the fuel injector connector.
3. Connect the distributor connector.

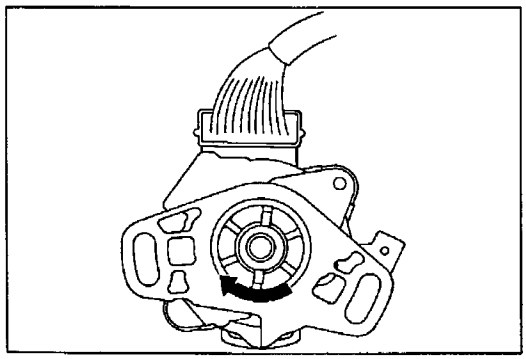
   Warning
   - **Turning the ignition switch on with the fuel injector connector still connected will actuate the fuel injector.**
   - **Turning the ignition switch on with the hightension lead still connected will generate sparks, which can cause electrical shock. Disconnect the hightension lead and avoid it from grounding to the vehicle body.**



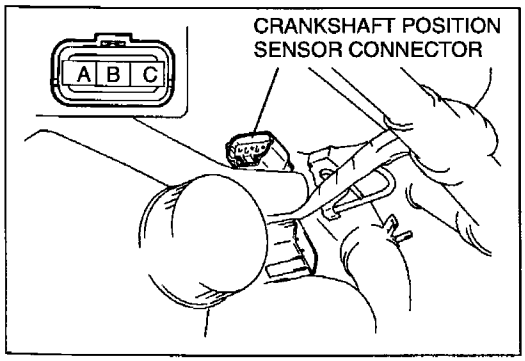
4. Connect the **SSTs** (Engine Signal Monitor) to the PCM. (Refer to page F2–37.)
5. Turn the ignition switch to ON.
6. Measure the voltage at PCM terminals 4F.
7. Rotate the distributor drive by hand and check the output signal.

Specification

PCM terminal	Signal	
4F	SGT	Approx. 5 V (4 pulses/rev)



8. If not as specified, inspect the wiring harness and connector between the distributor and the PCM terminal.
9. If there is correct terminal voltage and harness continuity, replace the distributor. (Refer to section G.)



CRANKSHAFT POSITION SENSOR

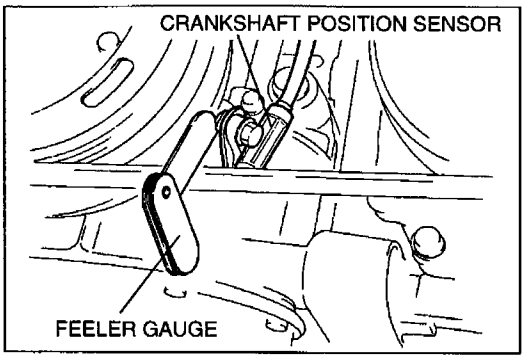
Inspection

Resistance

1. Disconnect the crankshaft position sensor connector.
2. Measure the resistance between terminals A and B by using an ohmmeter.

   Specification: 500—600 Ω [20 °C { 68 °F }]

3. If not as specified, replace the crankshaft position sensor. (Refer to page F2–46.)

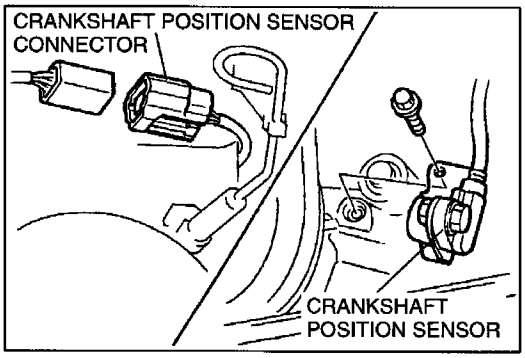


Air gap

1. Measure the air gap between the crankshaft pulley and the crankshaft position sensor by using a feeler gauge.

   Specification: 0.5—1.5 mm { 0.020—0.059 in }

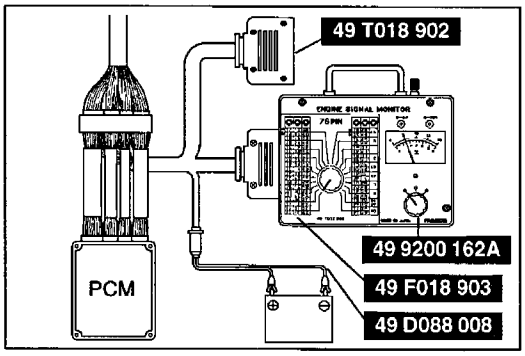
2. If not as specified, replace the crankshaft pulley or the crankshaft position sensor. (Refer to below.)



Replacement

1. Remove the undercover.
2. Remove the crankshaft position sensor.
3. Install in the reverse order of removal.

   Tightening torque:
   7.9—10.7 N·m { 80—110 kgf·cm , 70—95.4 in·lbf }



THROTTLE POSITION SENSOR

Inspection

1. Connect the **SSTs** (Engine Signal Monitor) to the PCM. (Refer to page F2–37.)
2. Verify that the throttle valve is at the closed throttle position.
3. Turn the ignition switch to ON.
4. Measure the voltage at PCM terminal 3F.

   Specification:
   Closed throttle position: 0.3—1.0 V
   Wide open throttle: 2.8—4.5 V
   (Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)

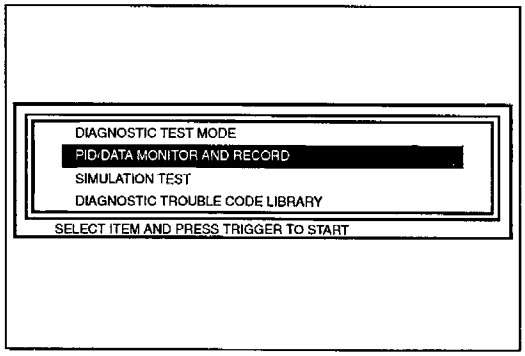
5. If not as specified, adjust the throttle position sensor. (Refer to page F2–47.)

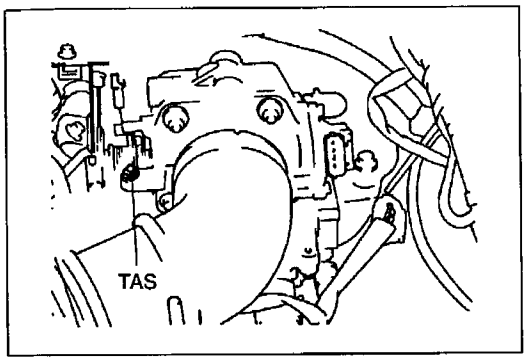
Using the NGS

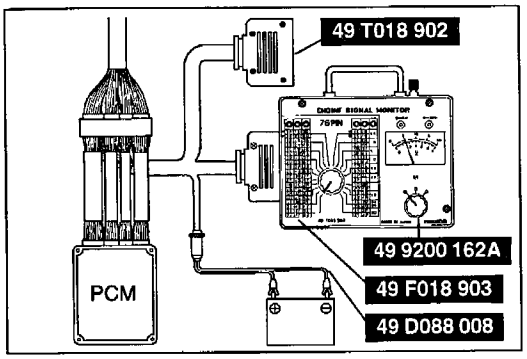
1. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
2. Verify that the throttle valve is at the closed throttle position.
3. Select the PID/DATA MONITOR AND RECORD function.
4. Select "TP V" on the NGS display. The NGS measures and shows the voltage.

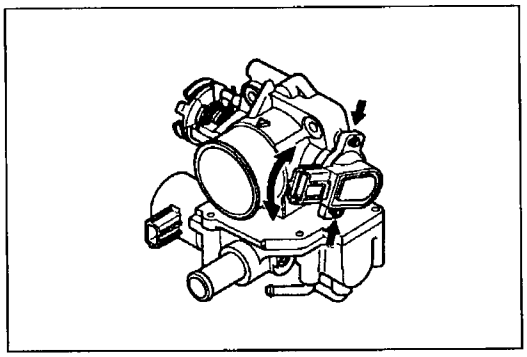
   Specification:
   Closed throttle position: 0.3—1.0 V
   Wide open throttle: 2.8—4.5 V
   (Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)

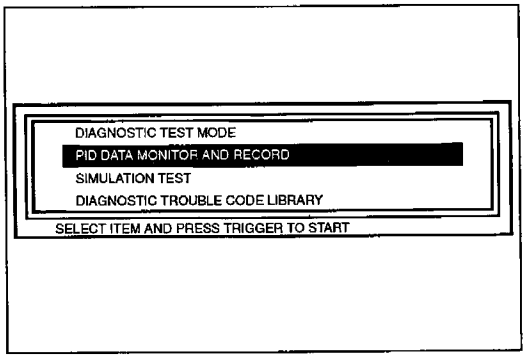
5. If not as specified, adjust the throttle position sensor. (Refer to page F2–47.)











Adjustment

Caution
- **The throttle position sensor is adjusted at the factory before shipment. Unnecessaly adjustment will negatively effect the engine performance.**
- **Adjusting the throttle position sensor by using the throttle adjusting screw (TAS) will negatively effect the engine performance.**

1. Connect the **SSTs** (Engine Signal Monitor) to the PCM. (Refer to page F2–37.)
2. Verify that the throttle valve is at the closed throttle position.
3. Loosen the attaching screws.
4. Turn the ignition switch to ON.
5. Adjust the throttle position sensor so that the PCM terminal 3F voltage is as specified.

   Specification:
   Closed throttle position: 0.5—0.6 V

6. Tighten the attaching screws.

   Tightening torque:
   1.6—2.3 N·m { 16—24 kgf·cm , 14—20 in·lbf }

7. Fully open the throttle valve and verify that the voltage is with in the specification.

   Specification
   Wide open throttle: 2.8—4.5 V
   (Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)

8. If not as specified, inspect the throttle position sensor harness.
9. If the harness is OK, replace the throttle position sensor.

Using the NGS
1. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
2. Select the PID/DATA MONITOR AND RECORD function.
3. Verify that the throttle valve is at the closed throttle position.
4. Loosen the attaching screws.
5. Select the "TP V" on the NGS display.
6. Adjust the throttle position sensor so that the throttle position signal voltage is as specified.

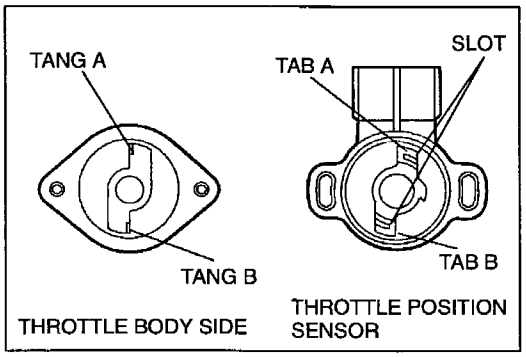
   Specification
   Closed throttle position: 0.5—0.6

7. Tighten the attaching screws.

   Tightening torque:
   1.6—2.3 N·m { 16—24 kgf·cm , 14—20 in·lbf }

8. Fully open the throttle valve and verify that the voltage is with in the specification.

   Specification
   Wide open throttle: 2.8—4.5 V
   (Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)



9. If not as specified, inspect the throttle position sensor harness.
10. If the harness is OK, replace the throttle position sensor.

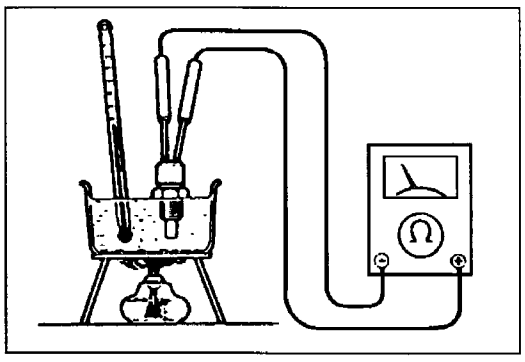
Replacement

1. Disconnect the throttle position sensor connector.
2. Remove the attaching screws.
3. Remove the throttle position sensor.
4. Verify that the throttle valve is fully closed.
5. Open the throttle valve slightly and catch the tang of the throttle body on the throttle position sensor plastic tabs. Align tang A on throttle body with tab A on throttle position sensor. Note tangs on the throttle body mate with the tab on the throttle position sensor on the side of the tab without a slot.
6. Position the throttle position sensor on the throttle body so that the mounting holes align.
7. Install and hand tighten the attaching screws.
8. Release the throttle.
9. Adjust the throttle position sensor output voltage. (Refer to page F2–47.)

ENGINE COOLANT TEMPERATURE SENSOR

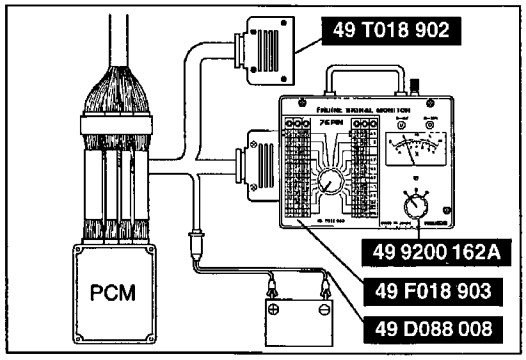
Inspection

1. Remove the engine coolant temperature sensor. (Refer to page F2–35.)
2. Place the sensor in water with a thermometer, and heat the water gradually.
3. Measure the resistance of the sensor by using an ohmmeter.



Specification

Water temperature (°C { °F })	Resistance (kΩ)
20 { 68 }	2.2—2.7
80 { 176 }	0.3—0.4



4. If not as specified, replace the engine coolant temperature sensor.

HEATED OXYGEN SENSOR

Inspection

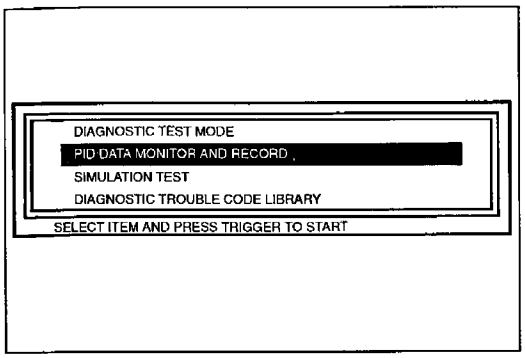
Sensor

1. Warm up the engine to normal operating temperature.
2. Connect the **SSTs** (Engine Signal Monitor) to the PCM. (Refer to page F2–37.)
3. Measure the PCM terminal 3C and 3D voltages.

Spcification

Engine condition	PCM terminal 3C	PCM terminal 3D
Idle	Below 1.0 V	Below 1.0 V
Deceleration	0—0.5 V	0—1.0 V
Acceleration	0.5—1.0 V	0—1.0 V

4. If not as specified, inspect the following.
   - Harness and connector between heated oxygen sensor and PCM.
   - On-board diagnostic system (Refer to page F2–54.)
   - System inspection
     Intake manifold vacuum (Refer to page F2–119.)
     Fuel line pressure (Refer to page F2–120.)
5. If all the systems are OK, replace the heated oxygen sensor. (Refer to page F2–35.)



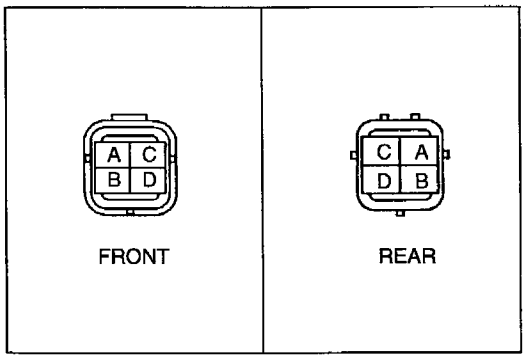
Using the NGS

1. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
2. Select the PID/DATA MONITOR AND RECORD function.
3. Select "FHO2S", "RHO2S" on the NGS display. The NGS measures and shows the voltage.

Spcification

Engine condition	FHO2S voltage (V)	RHO2S voltage (V)
Idle	Below 1.0	Below 1.0
Deceleration	0—0.5	0—1.0
Acceleration	0.5—1.0	0—1.0

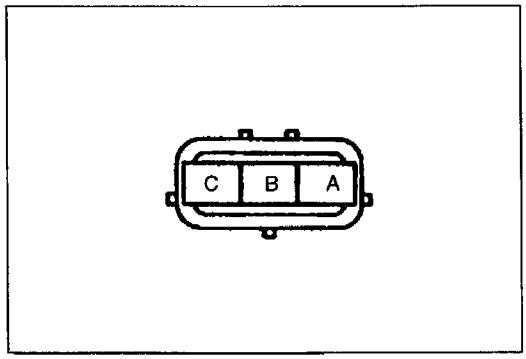
4. If not as specified, inspect the following.
   - Harness and connector between heated oxygen sensor and PCM.
   - On-board diagnostic system (Refer to page F2–54.)
   - System inspection
     Intake manifold vacuum (Refer to page F2–119.)
     Fuel line pressure (Refer to page F2–120.)
5. If all the systems are OK, replace the heated oxygen sensor. (Refer to page F2–35.)



Heater

1. Disconnect the heated oxygen sensor connector.
2. Measure the resistance between heated oxygen sensor terminals D and C by using an ohmmeter.

   Specification: Approx. 13 Ω [20 °C { 68 °F }] (Front)
   Approx. 6 Ω [20 °C { 68 °F }] (Rear)

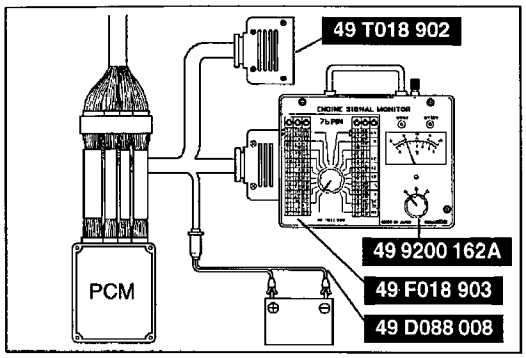


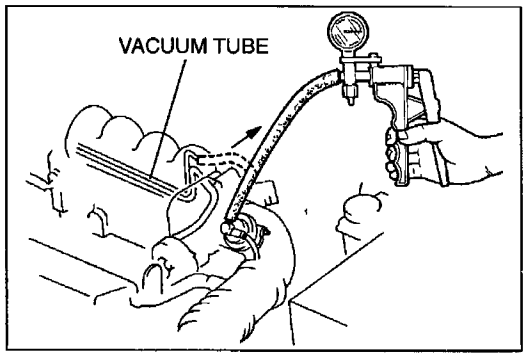
3. If not as specified, replace the heated oxygen sensor. (Refer to page F2–35.)

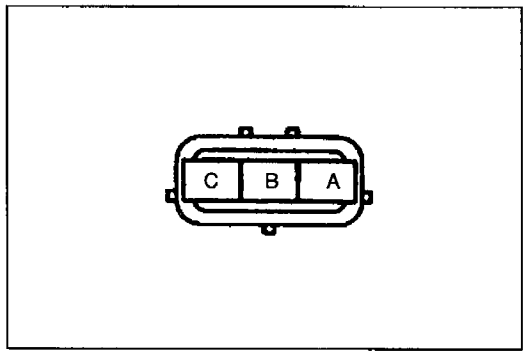
EGR VALVE POSITION SENSOR

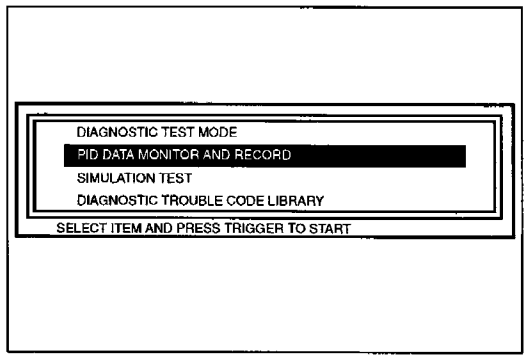
Inspection

1. Remove the air intake hose. (Refer to page F2–5.)
2. Disconnect the EGR valve position sensor connector.
3. Measure the resistance between terminals A and B by using an ohmmeter.









Specification: 2.7 kΩ

4. If not as specified, replace the EGR valve. (Refer to page F2–30.)
5. Connect the EGR valve position sensor connector.
6. Connect the air intake hose.
7. Connect the **SSTs** (Engine Signal Monitor) to the PCM.
8. Disconnect the vacuum hose from the vacuum tube and install a vacuum pump to the valve.
9. Turn the ignition switch to ON.
10. Measure the voltage at the PCM terminal 3J.

Spcification

Vacuum	PCM terminal 3J voltage (V)
0 kPa { 0 mmHg , 0 inHg }	Approx. 0.8
Approx. 17 kPa { 128 mmHg , 5.04 inHg }	Approx. 4.9

11. If not as specified, inspect the harness and connector between the EGR valve position sensor and the PCM terminal.
12. If these harness and connector are OK, replace the EGR valve. (Refer to page F2–30.)

Using the NGS

1. Remove the air intake hose. (Refer to page F2–5.)
2. Disconnect the EGR valve position sensor connector.
3. Measure the resistance between terminals A and B of the connector by using an ohmmeter.

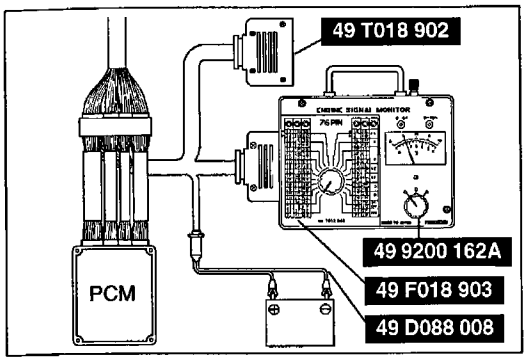
Specification: 2.7 kΩ

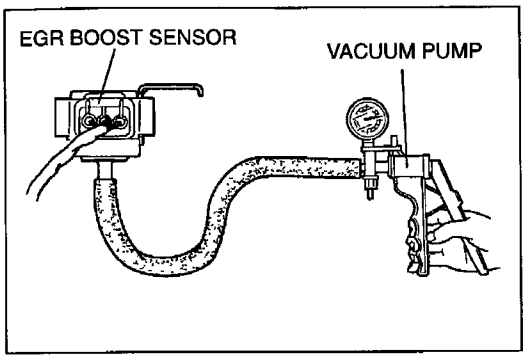
4. If not as specified, replace the EGR valve. (Refer to page F2–30.)
5. Connect the EGR valve position sensor connector.
6. Connect the air intake hose.
7. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
8. Select the PID/DATA MONITOR AND RECORD function.
9. Disconnect the vacuum hose from the vacuum tube and install a vacuum pump to the valve.
10. Select the "EGRP V" on the NGS display. The NGS measures and shows the voltage.

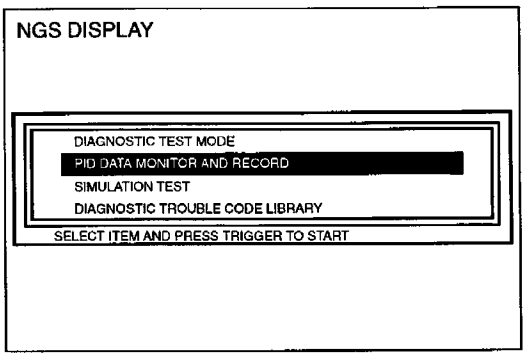
Specification

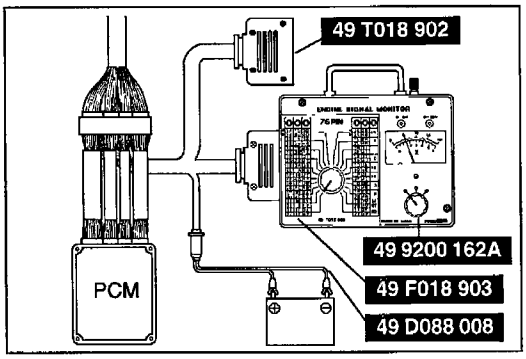
Vacuum	EGR valve position signal voltage (V)
0 kPa { 0 mmHg , 0 inHg }	Approx. 0.8
Approx. 17 kPa { 128 mmHg , 5.04 inHg }	Approx. 4.9

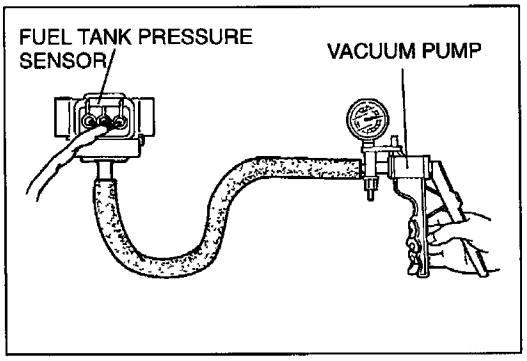
11. If not as specified, inspect the harness and connector between the EGR valve position sensor and the PCM terminal.
12. If these harness and connector are OK, replace the EGR valve. (Refer to page F2–30.)











EGR BOOST SENSOR

Inspection

1. Connect the **SSTs** (Engine Signal Monitor) to the PCM. (Refer to page F2–37.)
2. Apply vacuum to the EGR boost sensor by using a vacuum pump. Measure the pressure at PCM terminal 3H.

Specification

Vacuum	PCM terminal 3H voltage (V)
86.3 kPa { 660 mmHg , 26.0 inHg }	Approx. 0.3
61.3 kPa { 460 mmHg , 18.1 inHg }	Approx. 1.6
6.3 kPa { 47.5 mmHg , 1.9 inHg }	Approx. 4.4

3. If not as specified, replace the EGR boost sensor. (Refer to page F2–35.)

Using the NGS

1. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
2. Select the PID/DATA MONITOR AND RECORD function.
3. Apply vacuum to the EGR boost sensor by using a vacuum pump.
4. Select "BARO V" on the NGS display. The NGS measures and shows the voltage.

Specification

Vacuum	Barometric pressure signal voltage (V)
86.3 kPa { 660 mmHg , 26.0 inHg }	Approx. 0.3
61.3 kPa { 460 mmHg , 18.1 inHg }	Approx. 1.6
6.3 kPa { 47.5 mmHg , 1.9 inHg }	Approx. 4.4

5. If not as specified, replace the EGR boost sensor. (Refer to page F2–35.)

FUEL TANK PRESSURE SENSOR

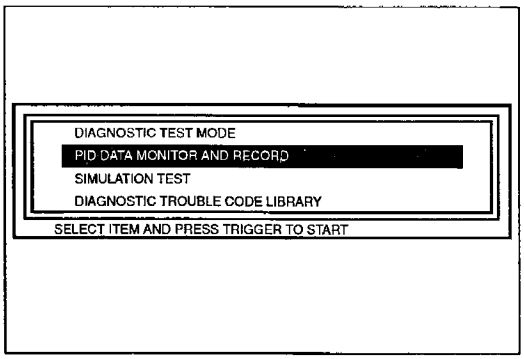
Inspection

1. Connect the **SSTs** (Engine Signal Monitor) to the PCM. (Refer to page F2–37.)
2. Apply vacuum to the fuel tank pressure sensor by using a vacuum pump. Measure the pressure at PCM terminal 3A.

Specification

Vacuum	PCM terminal 3A voltage (V)
0 kPa { 0 mmHg , 0 inHg }	Approx. 2.5
6.7 kPa { 50 mmHg , 2.0 inHg }	Approx. 0.5

3. If not as specified, replace the fuel tank pressure sensor. (Refer to page F2–14.)



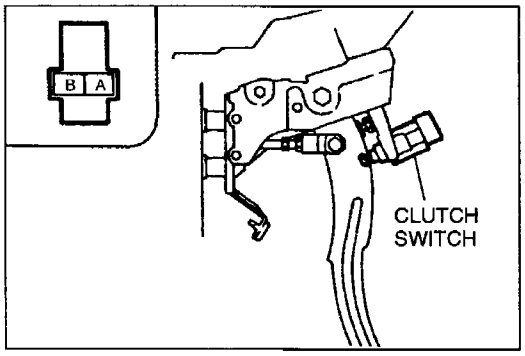
Using the NGS

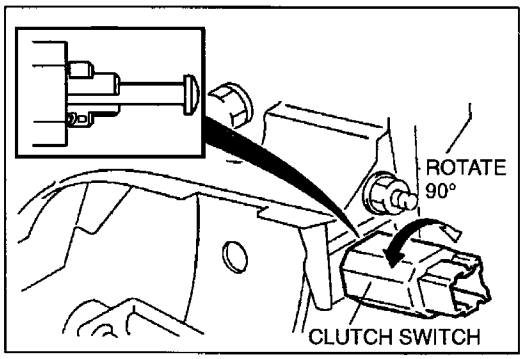
1. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
2. Select the PID/DATA MONITOR AND RECORD function.
3. Apply vacuum to the fuel tank pressure sensor by using a vacuum pump.
4. Select "FTP V" on the NGS display. The NGS measures and shows the voltage.

Specification

Vacuum	Fuel tank pressure signal voltage (V)
0 kPa { 0 mmHg , 0 inHg }	Approx. 2.5
6.7 kPa { 50 mmHg , 2.0 inHg }	Approx. 0.5

5. If not as specified, replace the fuel tank pressure sensor. (Refer to page F2–14.)





CLUTCH SWITCH

Inspection

1. Disconnect the clutch switch connector.
2. Check for continuity between terminals of the clutch switch by using an ohmmeter.

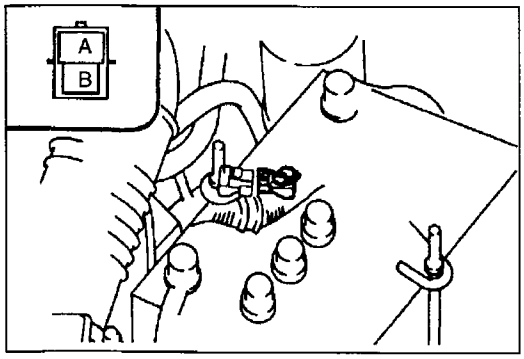
O—O: Continuity

Condition \ Terminal	A	B
Clutch pedal not depressed		
Clutch pedal depressed	O	O

3. If not as specified, replace the clutch switch.

Replacement

Install the clutch switch as shown in the figure.



NEUTRAL SWITCH

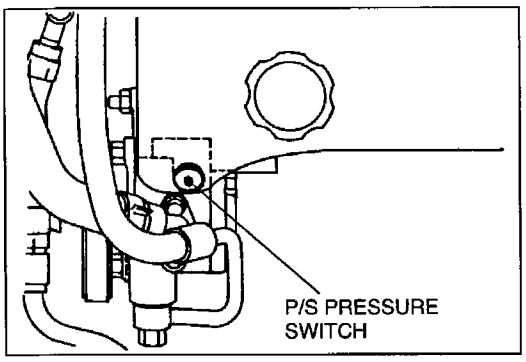
Inspection

1. Disconnect the neutral switch connector.
2. Check for continuity between terminals of the neutral switch by using an ohmmeter.

O—O: Continuity

Condition \ Terminal	A	B
Neutral position	O	O
Others		

3. If not as specified, replace the neutral switch. (Refer to page F2–35.)



POWER STEERING PRESSURE SWITCH

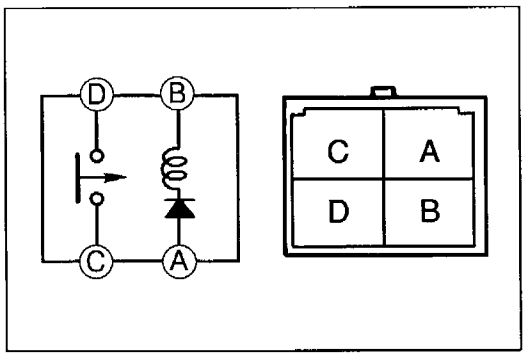
Inspection

1. Disconnect the power steering pressure switch connector.
2. Start the engine.
3. Check for the continuity between power steering pressure switch terminal and a ground by using an ohmmeter.

O—O: Continuity

Condition \ Terminal	A	Ground
Steering wheel not turned		
Steering wheel being turned	O	O

4. If not as specified, replace the power steering pressure switch. (Refer to page F2–35.)



MAIN RELAY

Inspection

1. Remove the main relay. (Refer to page F2–35.)
2. Check the continuity between the relay terminals by using an ohmmeter.

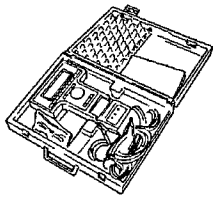
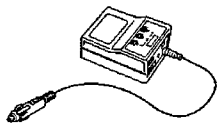
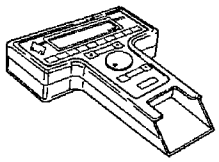
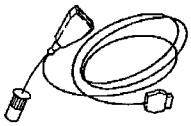
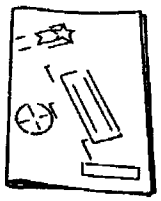
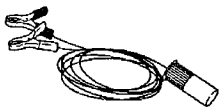
O—O: Continuity B+: Battery positive voltage

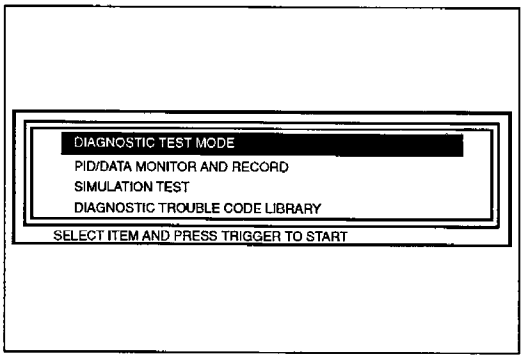
Step \ Terminal	A	B	C	D
1	O	O		
2	Ground	B+	O	O

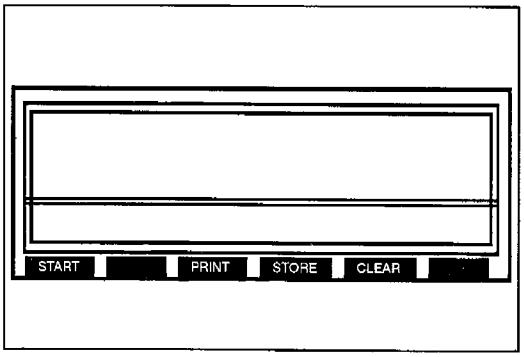
3. If not as specified, replace the main relay.

ON-BOARD DIAGNOSTIC SYSTEM

PREPARATION
SST

49 T088 0A0 NGS set 	For diagnosis of PCM and input/output systems	49 T088 010B Program Card 	For diagnosis of PCM and input/output systems
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For diagnosis of PCM and input/output systems	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For diagnosis of PCM and input/output systems
49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For diagnosis of PCM and input/output systems	49 T088 008A Instruction Manual 	For diagnosis of PCM and input/output systems
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For diagnosis of PCM and input/output systems	—	—





DIAGNOSTIC TROUBLE CODE NUMBER
Inspection

1. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
2. Refer to the manufacturer-provided instruction manual for the NGS operation.
3. Select "DIAGNOSTIC TEST MODE" function and press trigger.
4. When "NO CODES RECEIVED/SYSTEM PASSED" is displayed, all systems monitord are judged OK.
5. When any of the diagnostic trouble codes is displayed, carry out troubleshooting according to the code. (Refer to page F2–55.)
6. If "LINK MONITOR ERROR" is displayed, check connection of the NGS.
7. After all problems have been repaired, carry out "After Repair Procedure." (Refer to below.)

After Repair Procedure

1. After repairs, connect the NGS to the data link connector–2.
2. Select "CLEAR" function and erase diagnostic trouble codes from the PCM memory.
3. Perform diagnostic trouble code inspection again and verify that no diagnostic trouble codes are displayed.

Diagnostic Trouble Code Numbers

DTC	Display on the NGS	Condition	Page
P0100	MAF/VAF—CIRCUIT MALFUNCTION	Mass air flow circuit malfunction	F2–57
P0110	IAT—CIRCUIT MALFUNCTION	Intake air temperature circuit malfunction	F2–58
P0115	ECT—CIRCUIT MALFUNCTION	Engine coolant temperature circuit malfunction	F2–59
P0120	TP—CIRCUIT MALFUNCTION	Throttle position circuit malfunction	F2–60
P0125	EXCESSIVE TIME TO ENTER CLOSED LOOP	Excessive time to enter closed loop fuel control	F2–61
P0130	O2S 11—CIRCUIT MALFUNCTION	O_2 sensor circuit malfunction	F2–61
P0134	O2S 11—CIRCUIT NO ACTIVITY DETECTED	O_2 sensor circuit no activity detected	F2–62
P0135	O2S 11—HEATER CIRCUIT MALFUNCTION	O_2 sensor heater circuit malfunction	F2–63
P0140	O2S 12—CIRCUIT NO ACTIVITY DETECTED	O_2 sensor circuit no activity detected	F2–64
P0170	BANK 1—FUEL TRIM MALFUNCTION	Fuel trim malfunction	F2–65
P0300	RANDOM MISFIRE DETECTED	Random misfire detected	F2–66
P0301	CYLINDER 1 MISFIRE DETECTED	Cylinder 1 misfire detected	F2–67
P0302	CYLINDER 2 MISFIRE DETECTED	Cylinder 2 misfire detected	F2–68
P0303	CYLINDER 3 MISFIRE DETECTED	Cylinder 3 misfire detected	F2–69
P0304	CYLINDER 4 MISFIRE DETECTED	Cylinder 4 misfire detected	F2–70
P0335	CRANKSHAFT POS SENSOR—CKT MALFUNCTION	Crankshaft position sensor circuit malfunction	F2–71
P0340	CAMSHAFT POS SENSOR—CKT MALFUNCTION	Camshaft position sensor circuit malfunction	F2–72
P0400	EGR—FLOW MALFUNCTION	Exhaust gas recirculation flow malfunction	F2–73
P0420	BANK 1 CAT EFFICIENCY BELOW LIMIT	Catalyst system effciency below threshold	F2–73
P0440	EVAP SYSTEM—MALFUNCTION	Evaporative emission control system malfunction	F2–74

DTC	Display on the NGS	Condition	Page
P0443	EVAP SYSTEM—PURGE CTRL VALVE CKT MALF	Evaporative emission control system purge control valve circuit malfunction	F2–75
P0450	EVAP SYSTEM—PRESSURE SEN MALFUNCTION	Evaporative emission control system pressure sensor malfunction	F2–76
P0500	VEHICLE SPEED SENSOR—MALFUNCTION	Vehicle speed sensor malfunction	F2–77
P0505	IDLE CONTROL SYSTEM—MALFUNCTION	Idle control system malfunction	F2–78
P0703	TORQUE CONV/BRAKE SW—MALFUNCTION	Brake switch input malfunction	F2–79
P1000	MORE DRIVING NEEDED TO COMPLETE TEST	Check of all OBD-II system is not complete since last memory clear	F2–79
P1170	HO2S 11—INVERSION	Heated oxygen sensor (Front) (Inversion)	F2–80
P1195	EGRBS—OPEN OR SHORT	EGR boost sensor open or short	F2–81
P1250	PRC—OPEN OR SHORT	PRC solenoid valve open or short (ATX only)	F2–82
P1402	EGRS—OPEN OR SHORT	EGR valve position sensor open or short	F2–83
P1449	CDCV—OPEN OR SHORT	Canister drain cut valve open or short	F2–84
P1455	FUEL TANK LEVEL SENSOR—OPEN OR SHORT	Fuel gauge sender unit circuit open or short	F2–85
P1485	EGR (VACUUM)—OPEN OR SHORT	EGR solenoid valve (vacuum) open or short	F2–86
P1486	EGR (VENT)—OPEN OR SHORT	EGR solenoid valve (vent) open or short	F2–87
P1487	EGRCHK SOL.—OPEN OR SHORT	EGR boost sensor solenoid valve open or short	F2–88
P1523	VICS—OPEN OR SHORT	VICS solenoid valve open or short	F2–89
P1608	PCME (CPU)—MALFUNCTION	PCM (CPU) malfunction	F2–90
P1794	BAT—BAT OR CIRCUIT FAIL	Battery or circuit malfunction	F2–90
P1797	PNS—OPEN OR SHORT	P or N range or neutral/clutch switch signal open or short	F2–91

Diagnostic trouble code No. P0100	MAF/VAF—CIRCUIT MALFUNCTION
Symptom	Input voltage from mass air flow sensor is below 0.2 V or above 4.9 V when ignition switch is turned on
Possible cause	• Mass air flow sensor malfunction • Open or short circuit in wiring from main relay terminal D to mass air flow sensor terminal A • Open or short circuit in wiring from PCM terminal 3B to mass air flow sensor terminal B • Open circuit in wiring from PCM terminal 4A to mass air flow sensor terminal E

STEP	INSPECTION		ACTION
1	Does mass air flow sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3B voltage OK? ☞ page F2–39	Yes	Go to step 6
		No	Go to next step
3	Disconnect mass air flow sensor connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — Mass air flow sensor terminal A)
4	Is there continuity between harness side connector terminal E and PCM terminal 4A?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between harness side connector terminal B and PCM terminal 3B?	Yes	Replace mass air flow sensor ☞ page F2–5
		No	Repair or replace wiring harness
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0110	IAT—CIRCUIT MALFUNCTION
Symptom	Input from intake air temperature sensor is below 0.1 V or above 4.8 V when ignition switch is turned on
Possible cause	• Intake air temperature sensor malfunction • Open or short circuit in wiring from mass air flow sensor terminal C to PCM terminal 3K • Open or short circuit in wiring from mass air flow sensor terminal D to PCM terminal 3O

STEP	INSPECTION		ACTION
1	Does mass air flow sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3K voltage OK? ☞ **page F2–39**	Yes	Go to step 6
		No	Go to next step
3	Disconnect mass air flow sensor connector. Turn ignition switch to ON. Is there 5 V at harness side connector terminal C?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3K — Mass air flow sensor terminal C)
4	Is there continuity between harness side connector terminal D and PCM terminal 3O?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is intake air temperature sensor OK? ☞ **page F2–45**	Yes	Go to next step
		No	Replace Mass air flow sensor ☞ **page F2–5**
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F2–36**
		No	Intermittent poor connection of harness of connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0115	ECT—CIRCUIT MALFUNCTION
Symptom	Input voltage from engine coolant temperature sensor is below 0.2 V or above 4.9 V when ignition switch is turned on
Possible cause	• Engine coolant temperature sensor malfunction • Open or short circuit in wiring from engine coolant temperature sensor terminal A to PCM terminal 3G • Open or short circuit in wiring from engine coolant temperature sensor terminal B to PCM terminal 3O

STEP	INSPECTION		ACTION
1	Does engine coolant temperature sensor or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3G voltage OK? ☞ page F2–39	Yes	Go to step 6
		No	Go to next step
3	Disconnect engine coolant temperature sensor connector. Turn ignition switch ON. Is there 5 V at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3G — Engine coolant temperature sensor terminal A)
4	Is there continuity between harness side connector terminal B and PCM terminal 3O?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is engine coolant temperature sensor OK? ☞ page F2–48	Yes	Go to next step
		No	Replace engine coolant temperature sensor ☞ page F2–35
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0120	TP—CIRCUIT MALFUNCTION
Symptom	Input voltage from throttle position sensor is below 0.1 V or above 4.7 V when ignition switch is turned on
Possible cause	• Throttle position sensor malfunction • Open or short circuit in wiring from throttle position sensor terminal A to PCM terminal 3O • Open or short circuit in wiring from throttle position sensor terminal C to PCM terminal 3F • Open or short circuit in wiring from throttle position sensor terminal D to PCM terminal 3I

STEP	INSPECTION		ACTION
1	Does throttle position sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3F voltage OK? ☞ **page F2–39**	Yes	Go to next step
		No	Go to step 4
3	Is voltage increase linear according to throttle valve opening angle?	Yes	Go to step 7
		No	Replace throttle position sensor ☞ **page F2–46**
4	Disconnect throttle position sensor connector. Turn ignition switch to ON. Is there 5 V at harness side connector terminal D?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3I — Throttle position sensor terminal D)
5	Is there continuity between harness side connector terminal A and PCM terminal 3O?	Yes	Go to next step
		No	Repair or replace wiring harness
6	Is there continuity between harness side connector terminal D and PCM terminal 3I?	Yes	Replace throttle position sensor ☞ **page F2–47**
		No	Repair or replace wiring harness
7	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F2–36**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0125	EXCESSIVE TIME TO ENTER CLOSED LOOP
Symptom	Engine coolant temperature sensor signal does not rise normally because of engine coolant system malfunction
Possible cause	• Engine coolant temperature sensor malfunction • Thermostat malfunction • Cooling system malfunction • Water pump malfunction • Engine coolant passage clogged or leaks • Engine coolant level and protection incorrect

STEP	INSPECTION		ACTION
1	Is electrical fan control system OK? ☞ page F2–132	Yes	Go to next step
		No	Repair or replace engine coolant fan system
2	Is engine coolant temperature sensor resistance OK? ☞ page F2–48	Yes	Go to next step
		No	Replace engine coolant temperature sensor
3	Is cooling system OK? ☞ section E	Yes	Go to next step
		No	Repair or replace
4	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Temporary system malfunction

* During normal driving

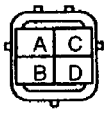
Diagnostic trouble code No. P0130	O2S 11—CIRCUIT MALFUNCTION
Symptom	• Heated oxygen sensor (Front) deterioration • Leakage in exhaust system

STEP	INSPECTION		ACTION
1	Is heated oxygen sensor (Front) OK? ☞ page F2–48	Yes	Go to next step
		No	Repair or replace heated oxygen sensor (Front) ☞ page F2–35
2	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

* During normal driving

Diagnostic trouble code No. P0134	O2S 11—CIRCUIT NO ACTIVITY DETECTED
Symptom	When heated oxygen sensor (Front) signal does not exceed 0.5 V after engine is started, or stays below 0.5 V for two minutes after engine has reached normal operating temperature and runing at 1,500 rpm or over
Possible cause	• Low fuel • Heated oxygen sensor (Front) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front) terminal A to PCM terminal 3C • Intake-air system, fuel system, ignition system malfunction

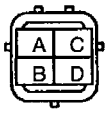
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3D voltage OK? ☞ **page F2–39**	Yes	Go to step 5
		No	Go to next step
3	Disconnect heated oxygen sensor (Front) connector. Is there continuity between harness side connector terminal A and PCM terminal 3C?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Are following units OK? Fuel injector ☞ **page F2–22** Pressure regulator ☞ **page F2–23** Mass air flow sensor ☞ **page F2–44** Engine coolant temperature sensor ☞ **page F2–48** Spark plug ☞ **section G** Air suction (Air/Fuel ratio rich or lean)	Yes	Replace heated oxygen sensor (Front) and go to next step ☞ **page F2–35**
		No	Repair or replace
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F2–36**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0135	O2S 11—HEATER CIRCUIT MALFUNCTION
Symptom	Open or short circuit is observed in heated oxygen sensor heater (Front) system when ignition switch is turned on
Possible cause	• Heated oxygen sensor heater (Front) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front) terminal C to ignition switch • Open or short circuit in wiring from heated oxygen sensor (Front) terminal D to PCM terminal 3M

STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3M voltage OK? ☞ page F2–39	Yes	Go to step 6
		No	Go to next step
3	Disconnect heated oxygen sensor (Front) harness side connector and turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal C?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. [Ignition switch — Heated oxygen sensor (Front) terminal C]
4	Is there continuity between harness side connector terminal D and PCM terminal 3M?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between harness side connector terminals A and C?	Yes	Go to next step
		No	Replace heated oxygen sensor (Front) ☞ page F2–35
6	Erase diagnostic trouble code from memory. Is same code No. pressent after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0140	O2S 12—CIRCUIT NO ACTIVITY DETECTED
Symptom	When heated oxygen sensor (Rear) signal does not exceed 0.5 V after engine is started, or stays below 0.5 V for two minutes after engine has reached normal operating temperature and running at 1,500 rpm or over
Possible cause	• Low fuel • Heated oxygen sensor (Rear) malfunction • Open or short circuit in wiring from (Rear) heated oxygen sensor (Rear) terminal A to PCM terminal 3D • Open circuit in wiring from heated oxygen sensor (Rear) terminal B to PCM terminal 3O. • Intake-air system, fuel system or ignition system malfunction

STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Rear) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3D voltage OK? ☞ **page F2–39**	Yes	Go to step 6
		No	Go to next step
3	Disconnect heated oxygen sensor (Rear) connector. Is there continuity between harness side connector terminal B and PCM terminal 3O?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between harness side connector terminal A and PCM terminal 3D?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Are following units OK? Fuel injector ☞ **page F2–22** Pressure regulator ☞ **page F2–23** Mass air flow sensor ☞ **page F2–44** Engine coolant temperature sensor ☞ **page F2–48** Spark plug ☞ **section G** Air suction (Air/Fuel ratio rich)	Yes	Replace heated oxygen sensor (Rear) ☞ **page F2–35**
		No	Repair or replace
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F2–36**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0170	BANK 1—FUEL TRIM MALFUNCTION
Symptom	Air/fuel ratio stays rich or lean longer than specified period because of system malfunction
Possible cause	• Low fuel • Pressure regulator malfunction • Fuel injector malfunction • Fuel pump malfunction • Engine coolant temperature sensor malfunction • Mass air flow sensor malfunction • Heated oxygen sensor malfunction • Purge solenoid valve malfunction • Leakage in intake-air system • PCM malfunction • Open or short circuit in wiring between PCM terminals 4U, 4V, 4W, 4X to fuel injector • Intake air temperature sensor malfunction • EGR boost sensor malfunction • PCV valve malfunction

STEP	INSPECTION		ACTION
1	Is there air leakage in intake-air system components? ☞ page F2–119	Yes	Repair or replace intake-air system
		No	Go to next step
2	Is fuel line pressure OK? ☞ page F2–121	Yes	Go to step 5
		No	Go to next step
3	Is fuel pump maximum pressure OK? ☞ page F2–21	Yes	Go to next step
		No	Repair or replace fuel pump ☞ page F2–21
4	Is pressure regulator OK? ☞ page F2–23	Yes	Go to next step
		No	Replace pressure regulator ☞ page F2–23
5	Is fuel injector OK? ☞ page F2–22	Yes	Go to next step
		No	Replace fuel injector ☞ page F2–22
6	Is engine coolant temperature sensor OK? ☞ page F2–48	Yes	Go to next step
		No	Replace engine coolant temperature sensor ☞ page F2–35
7	Is mass air flow sensor OK? ☞ page F2–44	Yes	Go to next step
		No	Replace mass air flow sensor ☞ page F2–5
8	Is throttle position sensor OK? ☞ page F2–46	Yes	Go to next step
		No	Adjust throttle position sensor ☞ page F2–47
9	Is intake air temperature sensor OK? ☞ page F2–45	Yes	Go to next step
		No	Replace mass air flow sensor ☞ page F2–5
10	Is EGR boost sensor OK? ☞ page F2–50	Yes	Go to next step
		No	Replace EGR boost sensor ☞ page F2–35
11	Is purge solenoid valve OK? ☞ page F2–33	Yes	Go to next step
		No	Replace purge solenoid valve ☞ page F2–30
12	Is PCV valve OK? ☞ page F2–33	Yes	Go to next step
		No	Replace PCV valve
13	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Temporary system malfunction

* During Idling

Diagnostic trouble code No. P0300	RANDOM MISFIRE DETECTED
Symptom	PCM input signal from crankshaft position sensor signal is irregular
Possible cause	• Ignition system malfunction • Low fuel • Low battery positive voltage • Fuel system malfunction • Insufficient compression • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system OK? ☞ **section G**	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap correct? ☞ **page F2–46**	Yes	Go to next step
		No	Repair or replace crankshaft position sensor ☞ **page F2–46**
3	Is fuel system OK? ☞ **page F2–11**	Yes	Go to next step
		No	Repair or replace as necessary
4	Is exhaust gas recirculation system OK? ☞ **page F2–130**	Yes	Go to next step
		No	Repair or replace as necessary
5	Is compression at all cylinders normal? ☞ **section B2**	Yes	Go to next step
		No	Repair or replace as necessary
6	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ **page F2–36**
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0301	CYLINDER 1 MISFIRE DETECTED
Symptom	PCM input signal from crankshaft position sensor signal for cylinder No.1 is irregular
Possible cause	• Ignition system of cylinder No.1 malfunction • Low fuel • Low battery positive voltage • Fuel system malfunction • Insufficient compression in cylinder No.1 • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system of cylinder No.1 OK? ☞ **section G**	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap OK? ☞ **page F2–46**	Yes	Go to next step
		No	Repair or replace crankshaft position sensor ☞ **page F2–46**
3	Is fuel injector at cylinder No.1 OK? ☞ **page F2–126**	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.1 ☞ **page F2–22**
4	Is fuel system OK? ☞ **page F2–11**	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation system OK? ☞ **page F2–130**	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compression at cylinder No.1 normal? ☞ **section B2**	Yes	Go to next step
		No	Repair or replace as necessary
7	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ **page F2–36**
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0302	CYLINDER 2 MISFIRE DETECTED
Symptom	PCM input signal from crankshaft position sensor signal for cylinder No.2 is irregular
Possible cause	• Ignition system of cylinder No.2 malfunction • Low fuel • Low battery positive voltage • Fuel system malfunction • Insufficient compression in cylinder No.2 • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system of cylinder No.2 OK? ☞ **section G**	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap OK? ☞ **page F2–46**	Yes	Go to next step
		No	Repair or replace crankshaft position sensor ☞ **page F2–46**
3	Is fuel injector at cylinder No.2 OK? ☞ **page F2–126**	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.2 ☞ **page F2–22**
4	Is fuel system OK? ☞ **page F2–11**	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation system OK? ☞ **page F2–130**	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compression at cylinder No.2 normal? ☞ **section B2**	Yes	Go to next step
		No	Repair or replace as necessary
7	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ **page F2–36**
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0303	CYLINDER 3 MISFIRE DETECTED
Symptom	PCM input signal from crankshaft position sensor signal for cylinder No.3 is irregular
Possible cause	• Ignition system of cylinder No.3 malfunction • Low fuel • Low battery positive voltage • Fuel system malfunction • Insufficient compression in cylinder No.3 • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system of cylinder No.3 OK? ☞ **section G**	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap OK? ☞ **page F2–46**	Yes	Go to next step
		No	Repair or replace crankshaft position sensor ☞ **page F2–46**
3	Is fuel injector at cylinder No.3 OK? ☞ **page F2–126**	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.3 ☞ **page F2–22**
4	Is fuel system OK? ☞ **page F2–11**	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation system OK? ☞ **page F2–130**	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compression at cylinder No.3 normal? ☞ **section B2**	Yes	Go to next step
		No	Repair or replace as necessary
7	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ **page F2–36**
		No	Temporary system malfunction

* During normal driving

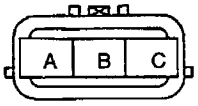
Diagnostic trouble code No. P0304	CYLINDER 4 MISFIRE DETECTED
Symptom	PCM input signal from crankshaft position sensor signal for cylinder No.4 is irregular
Possible cause	• Ignition system of cylinder No.4 malfunction • Low fuel • Low battery positive voltage • Fuel system malfunction • Insufficient compression in cylinder No.4 • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system of cylinder No.4 OK? ☞ **section G**	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap OK? ☞ **page F2–46**	Yes	Go to next step
		No	Repair or replace crankshaft position sensor ☞ **page F2–46**
3	Is fuel injector at cylinder No.4 OK? ☞ **page F2–126**	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.4 ☞ **page F2–22**
4	Is fuel system OK? ☞ **page F2–11**	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation system OK? ☞ **page F2–130**	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compression at cylinder No.4 normal? ☞ **section B2**	Yes	Go to next step
		No	Repair or replace as necessary
7	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ **page F2–36**
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0335	CRANKSHAFT POS SENSOR—CKT MALFUNCTION
Symptom	No NE signal input from crankshaft position sensor for 1.5 seconds while engine running
Possible cause	• Crankshaft position sensor malfunction • Open or short circuit in wiring from PCM terminal 4E to crankshaft position sensor terminal B • Open or short circuit in wiring from PCM terminal 4H to crankshaft position sensor terminal A

STEP	INSPECTION		ACTION
1	Does crankshaft position sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Disconnect crankshaft position sensor connector. Is there continuity between harness side connector terminal B and PCM terminal 4E? Is there continuity between harness side connector terminal A and PCM terminal 4H?	Yes	Go to next step
		No	Repair or replace wiring harness
3	Is crankshaft position sensor air gap OK? ☞ **page F2–46**	Yes	Go to next step
		No	Replace crankshaft position sensor or crankshaft pulley ☞ **page F2–46** ☞ **section B2**
4	Is crankshaft position sensor OK? ☞ **page F2–45**	Yes	Go to next step
		No	Replace crankshaft position sensor ☞ **page F2–46**
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F2–36**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0340	CAMSHAFT POS SENSOR—CKT MALFUNCTION
Symptom	No SGT signal input from camshaft position sensor for 4.2 seconds while engine running
Possible cause	• Camshaft position sensor malfunction • Open or short circuit in wiring from PCM terminal 4F to distributor terminal C • Open or short circuit in wiring from PCM terminal 4A to distributor terminal A

STEP	INSPECTION		ACTION
1	Does distributor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Disconnect distributor connector. Is there continuity between harness side connector terminal C and PCM terminal 4F? Is there continuity between harness side connector terminal A and PCM terminal 4A?	Yes	Go to next step
		No	Repair or replace wiring harness
3	Is camshaft position sensor OK? ☞ page F2–45	Yes	Go to next step
		No	Replace distributor ☞ section G
4	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0400	EGR—FLOW MALFUNCTION
Symptom	Exhaust gas recirculation system does not function normally because of electrical or mechanical trouble

Possible cause	• EGR valve malfunction
	• EGR boost sensor malfunction
	• EGR boost sensor solenoid valve malfunction
	• EGR valve position sensor malfunction
	• EGR solenoid valve (vacuum, vent) malfunction
	• Clogs or leakage in piping connecting following units
	  • EGR boost sensor, EGR boost sensor solenoid valve and intake manifold
	  • Air cleaner, EGR solenoid valve (vent) and EGR valve
	  • Intake manifold, EGR solenoid valve (vaccum) and EGR valve

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code for EGR solenoid valve (vaccum, vent), EGR boost sensor solenoid valve or EGR boost sensor displayed?	Yes	Carry out inspection as required according to diagnostic trouble code
		No	Go to next step
2	Is EGR valve position sensor OK? ☞ page F2–49	Yes	Go to next step
		No	Repair or replace EGR valve ☞ page F2–32
3	Check each hose for damage. Are they OK? • Intake manifold—EGR solenoid valve (vent) • EGR solenoid valve (vent)—EGR solenoid valve (vaccum) • EGR solenoid valve (vaccum)—EGR valve	Yes	Go to next step
		No	Repair or replace as necessary
4	EGR boost sensor OK? ☞ page F2–50	Yes	Go to next step
		No	Replace EGR boost sensor ☞ page F2–35
5	Check each hose for damage. Are they OK? • EGR passage—EGR boost sensor solenoid valve • EGR boost sensor—EGR boost sensor solenoid valve	Yes	Go to next step
		No	Repair or replace as necessary
6	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Temporary system malfunction

* During driving when coolant temperature is over 55 ° C { 131 ° F } and engine speed is over 1,000 rpm [10 km/h { 6.2 mph }]

Diagnostic trouble code No. P0420	BANK 1 CAT EFFICIENCY BELOW LIMIT
Symptom	• Three way catalytic converter deterioration • Leakage in exhaust system

STEP	INSPECTION		ACTION
1	Is heated oxygen sensor (Rear) OK? ☞ page F2–48	Yes	Replace three way catalytic converter ☞ page F2–26
		No	Replace heated oxygen sensor (Rear) ☞ page F2–35

Diagnostic trouble code No. P0440	EVAP SYSTEM—MALFUNCTION
Symptom	Evaporative emission control system does not function normally because of mechanical trouble

Possible cause	• Purge solenoid valve malfunction
	• Charcoal canister malfunction
	• Check valve malfunction
	• Fuel vapor valve malfunction
	• Clogs or leakage in piping connecting following units
	  • Intake manifold and purge solenoid valve
	  • Purge solenoid valve and charcoal canister
	  • Charcoal canister, check valve, and fuel vapor valve

STEP	INSPECTION		ACTION
1	Is PCM terminal 4T voltage OK? ☞ page F2–39	Yes	Go to next step
		No	Inspect purge solenoid valve ☞ page F2–32
2	Are evaporative emission control system-related hose free of clogs and leakage?	Yes	Go to next step
		No	Repair or replace as necessary
3	Is charcoal canister OK? ☞ page F2–31	Yes	Go to next step
		No	Repair or replace as necessary
4	Is check valve OK? ☞ page F2–31	Yes	Go to next step
		No	Repair or replace as necessary
5	Is rollover valve OK? ☞ page F2–31	Yes	Go to next step
		No	Repair or replace as necessary
6	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Temporary system malfunction

* During driving after engine warm-up

Diagnostic trouble code No. P0443	EVAP SYSTEM—PURGE CTRL VALVE CKT MALF
Symptom	Open or short circuit is observed in purge solenoid valve system when ignition switch is turned on
Possible cause	• Purge solenoid valve malfunction • Open or short circuit in wiring from purge solenoid valve terminal A to main relay terminal D • Open or short circuit in wiring from purge solenoid valve terminal B to PCM terminal 4T

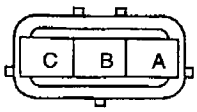
STEP	INSPECTION		ACTION
1	Does purge solenoid valve connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4T voltage OK? ☞ page F2–39	Yes	Go to step 6
		No	Go to next step
3	Disconnect purge solenoid valve connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — Purge solenoid valve terminal A)
4	Is there continuity between harness side connector terminal B and PCM terminal 4T?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between purge solenoid valve connector terminals A and B?	Yes	Go to next step
		No	Replace purge solenoid valve
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0450	EVAP SYSTEM—PRESSURE SEN MALFUNCTION
Symptom	Input voltage from fuel tank pressure sensor is below 0.1 V or above 4.8 V when ignition switch is turned on
Possible cause	• Fuel tank pressure sensor malfunction • Open or short circuit in wiring from PCM terminal 3I to fuel tank pressure sensor terminal C • Open or short circuit in wiring from PCM terminal 3A to fuel tank pressure sensor terminal B • Open circuit in wiring from PCM terminal 3O to fuel tank pressure sensor terminal A

STEP	INSPECTION		ACTION
1	Does fuel tank pressure sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3A voltage OK? ☞ page F2–39	Yes	Go to step 6
		No	Go to next step
3	Are fuel tank pressure sensor and connecting hose free of freezing, breakage, and clogs?	Yes	Repair or replace
		No	Go to next step
4	Disconnect fuel tank pressure sensor connector. Turn ignition switch to ON. Is there 5 V at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3I — Fuel tank pressure sensor terminal C)
5	Is fuel tank pressure sensor OK? ☞ page F2–51	Yes	Replace fuel tank pressure sensor
		No	Repair or replace wiring harness
6	Erase diagnostic trouble code from memory. Is same code present after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connector of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0500	VEHICLE SPEED SENSOR—MALFUNCTION
Symptom	No vehicle speed sensor signal input from vehicle speed sensor while driving
Possible cause	• Speedometer sensor malfunction • Open or short circuit in wiring from ignition switch to speedometer sensor • Open or short circuit in wiring from speedometer sensor to GND • Open or short circuit in wiring from speedometer sensor to vehicle speed sensor • Open or short circuit in wiring from vehicle speed sensor to PCM terminal 1M

STEP	INSPECTION		ACTION
1	Does vehicle speed sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 1M voltage OK? ☞ **page F2–39**	Yes	Go to step 5
		No	Go to next step
3	Is there continuity between vehicle speed sensor terminal and PCM terminal 1M?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between vehicle speed sensor and speedometer sensor terminals? ☞ **section T**	Yes	Go to next step
		No	Repair or replace speedometer sensor and wiring harness ☞ **section T**
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F2–36**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

Diagnostic trouble code No. P0505	**IDLE CONTROL SYSTEM—MALFUNCTION**
Symptom	• Mechanical trouble is observed in idle air control system • Open or short circuit is observed in idle air control system when ignition switch is turned on
Possible cause	• Idle air control valve malfunction • Leakage in intake-air system • Open or short circuit in wiring from idle air control valve terminal A to main relay terminal D • Open or short circuit in wiring from idle air control valve terminal B to PCM terminal 4Q

STEP	INSPECTION		ACTION
1	Does idle air control valve connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4Q voltage OK? ☞ **page F2–39**	Yes	Go to step 6
		No	Go to next step
3	Disconnect idle air control valve connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — Idle air control valve terminal A)
4	Is there continuity between harness side connector terminal B and PCM terminal 4Q?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between idle air control valve connector terminals A and B?	Yes	Go to next step
		No	Replace BAC valve ☞ **page F2–7**
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F2–36**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P0703	TORQUE CONV/BRAKE SW—MALFUNCTION
Symptom	No signal input from brake switch to PCM when brake pedal is kept depressed for more than 33 seconds, or signal input when brake pedal is not depressed for more than 15 seconds
Possible cause	• Brake switch malfunction • Open or short circuit in wiring from PCM terminal 1Q to brake switch terminal • Open or short circuit in wiring from brake switch terminal to battery terminal

STEP	INSPECTION		ACTION
1	Does brake switch connector or PCM connector have poor connection?	Yes	Repair or replace
		No	Go to next step
2	Is PCM terminal 1Q voltage OK? ☞ page F2–39	Yes	Go to step 4
		No	Go to next step
3	Is there continuity between brake switch terminal and PCM terminal 1Q?	Yes	Check for open or short circuit in wiring harness. (Battery — Brake switch) Check brake switch. ☞ section P
		No	Repair or replace wiring harness
4	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

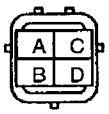
Diagnostic trouble code No. P1000	MORE DRIVING NEEDED TO COMPLETE TEST
Possible cause	Following diagnostic trouble code detection conditions not satisfied

Diagnosed circuit	Code No.
Excessive time to enter closed loop fuel control	P0125
O_2 sensor circuit malfunction	P0130
O_2 sensor heater circuit malfunction	P0135
Fuel trim malfunction	P0170
Random misfire detected Cylinder 1 misfire detected Cylinder 2 misfire detected Cylinder 3 misfire detected Cylinder 4 misfire detected	P0300 P0301 P0302 P0303 P0304
Exhaust gas recirculation flow malfunction	P0400
Catalyst system efficiency below threshold	P0420
Evaporative emission control system malfunction	P0440

Note
• DTC No.P1000 will be deleted while the MIL is illuminated

Diagnostic trouble code No. P1170	**HO2S 11—INVERSION**
Symptom	Heated oxygen sensor (Front) signal remains unchanged for more than 20 seconds after engine is in feedback zone
Possible cause	• Low fuel • Heated oxygen sensor (Front) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front) terminal A to PCM terminal 3C • Intake-air system, fuel system, ignition system malfunction

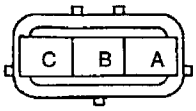
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3C voltage OK? ☞ **page F2–39**	Yes	Go to step 5
		No	Go to next step
3	Disconnect heated oxygen sensor (Front) connector. Is there continuity between harness side connector terminal A and PCM terminal 3C?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Are following units OK? Fuel injector ☞ **page F2–22** Pressure regulator ☞ **page F2–23** Mass air flow sensor ☞ **page F2–44** Engine coolant temperature sensor ☞ **page F2–48** Spark plug ☞ **section G** Air suction (Air/Fuel ratio rich or lean)	Yes	Replace heated oxygen sensor (Front) ☞ **page F2–35**
		No	Repair or replace
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F2–36**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1195	EGRBS—OPEN OR SHORT
Symptom	Input voltage from EGR boost sensor is below 0.1 V or above 4.9 V when ignition switch is turned on
Possible cause	• EGR boost sensor malfunction • Open or short circuit in wiring from PCM terminal 3H to EGR boost sensor terminal B • Open or short circuit in wiring from PCM terminal 3I to EGR boost sensor terminal C • Open circuit in wiring from PCM terminal 3O to EGR boost sensor terminal A

STEP	INSPECTION		ACTION
1	Does EGR boost sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3H voltage OK? ☞ page F2–39	Yes	Go to step 5
		No	Go to next step
3	Disconnect EGR boost sensor connector. Turn ignition switch to ON. Is there 5V at harness side connector terminal C?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3I — EGR boost sensor terminal C)
4	Is there continuity between connector terminal A and PCM terminal 3O?	Yes	Replace EGR boost sensor
		No	Repair or replace wiring harness.
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness.)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1250	PRC OPEN OR SHORT
Symptom	Open or short circuit is observed in PRC solenoid valve system when ignition switch is turned on
Possible cause	• PRC solenoid valve malfunction • Open or short circuit in wiring from PRC solenoid valve terminal A to main relay terminal D • Open or short circuit in wiring from PRC solenoid valve terminal B to PCM terminal 4J

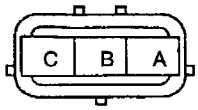
STEP	INSPECTION		ACTION
1	Does PRC solenoid valve connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4J voltage OK? ☞ **page F2–39**	Yes	Go to step 6
		No	Go to next step
3	Disconnect PRC solenoid valve connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — PRC solenoid valve terminal A)
4	Is there continuity between harness side connector terminal B and PCM terminal 4J?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between PRC solenoid valve terminals A and B?	Yes	Go to next step
		No	Replace PRC solenoid valve ☞ **page F2–12**
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ **page F2–36**
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1402	EGRS—OPEN OR SHORT
Symptom	Input voltage from EGR valve position sensor is below 0.2 V or above 4.8 V when ignition switch is turned on
Possible cause	• EGR valve position sensor malfunction • Open or short circuit in wiring from EGR valve position sensor terminal B to PCM terminal 3I • Open or short circuit in wiring from EGR valve position sensor terminal C to PCM terminal 3J • Open or short circuit in wiring from EGR valve position sensor terminal A to PCM terminal 3O

STEP	INSPECTION		ACTION
1	Does EGR valve position sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3J voltage OK? ☞ page F2–39	Yes	Go to step 7
		No	Go to next step
3	Disconnect EGR valve position sensor connector. Turn ignition switch ON. Is there 5 V at harness side connector terminal B?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3I — EGR valve position sensor terminal B)
4	Is there continuity between harness side connector terminal C and PCM terminal 3J?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between harness side connector terminal A and PCM terminal 3O?	Yes	Go to next step
		No	Repair or replace wiring harness
6	Is resistance of EGR valve position sensor OK? ☞ page F2–49	Yes	Go to next step
		No	Replace EGR valve ☞ page F2–30
7	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1449	CDCV—OPEN OR SHORT
Symptom	Open or short circuit is observed in canister drain cut valve or tank pressure control valve system when ignition switch is turned on
Possible cause	• Canister drain cut valve malfunction • Tank pressure control valve malfunction • Open or short circuit in wiring from canister drain cut valve terminal A to main relay terminal D • Open or short circuit in wiring from canister drain cut valve terminal B to PCM terminal 4Z • Open or short circuit in wiring from tank pressure control valve terminal A to main relay terminal D • Open or short circuit in wiring from tank pressure control valve terminal B to PCM terminal 4Z

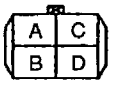
STEP	INSPECTION		ACTION
1	Does canister drain cut valve connector, tank pressure control valve connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4Z voltage OK? ☞ page F2–39	Yes	Go to step
		No	Go to next step
3	Disconnect canister drain cut valve connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Main relay terminal D — Canister drain cut valve terminal A)
4	Disconnect tank pressure control valve connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Main relay terminal D — Tank pressure control valve terminal A)
5	Is there continuity between canister drain cut valve harness side connector terminal B and PCM terminal 4Z?	Yes	Go to next step
		No	Repair or replace wiring harness
6	Is there continuity between tank pressure control valve harness side connector terminal B and PCM terminal 4Z?	Yes	Go to next step
		No	Repair or replace wiring harness
7	Is there continuity between canister drain cut valve terminals A and B?	Yes	Go to next step
		No	Replace canister drain cut valve
8	Is there continuity between tank pressure control valve terminals A and B?	Yes	Go to next step
		No	Replace tank pressure control valve
9	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



TPCV, CDCV
HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1455	FUEL TANK LEVEL SENSOR—OPEN OR SHORT
Symptom	Input voltage from fuel tank level sensor is 0 V or above 4.98 V when ignition switch is turned on
Possible cause	• Fuel gauge sender unit malfunction • Open or short circuit in wiring from fuel pump connector terminal C to PCM terminal 4M

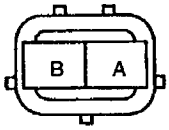
STEP	INSPECTION		ACTION
1	Does fuel pump connector or PCM 4M connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4M voltage OK? ☞ page F2–39	Yes	Go to step 7
		No	Go to next step
3	Is there continuity between fuel pump side connector terminal C and PCM terminal 4M?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is fuel gauge sender unit OK? ☞ section T	Yes	Go to next step
		No	Replace fuel gauge sender unit
5	Is fuel gauge OK? ☞ section T	Yes	Go to next step
		No	Repair or replace
6	Is there continuity between fuel pump harness side connector terminal C and instrument cluster?	Yes	Go to step 7
		No	Repair or replace wiring harness
7	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1485	EGR (VACUUM)—OPEN OR SHORT
Symptom	Open or short circuit is observed in EGR solenoid valve (vacuum) system when ignition switch is turned on
Possible cause	• EGR solenoid valve (vacuum) malfunction • Open or short circuit in wiring from EGR solenoid valve (vacuum) terminal A to main relay terminal D • Open or short circuit in wiring from EGR solenoid valve (vacuum) terminal B to PCM terminal 4P

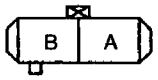
STEP	INSPECTION		ACTION
1	Does EGR solenoid valve (vacuum) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4P voltage OK? ☞ page F2–39	Yes	Go to step 6
		No	Go to next step
3	Disconnect EGR solenoid valve connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. [Main relay terminal D — EGR solenoid valve (vacuum) terminal A]
4	Is there continuity between harness side connector terminal B and PCM terminal 4P?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between EGR solenoid valve (vacuum) terminals A and B?	Yes	Go to next step
		No	Replace EGR solenoid valve (vacuum) ☞ page F2–33
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1486	EGR (VENT)—OPEN OR SHORT
Symptom	Open or short circuit is observed in EGR solenoid valve (vent) system when ignition switch is turned on
Possible cause	• EGR solenoid valve (vent) malfunction • Open or short circuit in wiring from EGR solenoid valve (vent) terminal A to main relay terminal D • Open or short circuit in wiring from EGR solenoid valve (vent) terminal B to PCM terminal 4O

STEP	INSPECTION		ACTION
1	Does EGR solenoid valve (vent) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4O voltage OK? ☞ page F2–39	Yes	Go to step 6
		No	Go to next step
3	Disconnect EGR solenoid valve (vent) connector. Turn ignition switch to ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. [Main relay terminal D — EGR solenoid valve (vent) terminal A]
4	Is there continuity between harness side connector terminal B and PCM terminal 4O?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between EGR solenoid valve (vent) terminals A and B?	Yes	Go to next step
		No	Replace EGR solenoid valve (vent) ☞ page F2–33
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1487	EGRCHK SOL.—OPEN OR SHORT
Symptom	Open or short circuit is observed in EGR boost sensor solenoid valve system when ignition switch is turned on
Possible cause	• EGR boost sensor solenoid valve malfunction • Open or short circuit in wiring from EGR boost sensor solenoid valve terminal A to main relay terminal D • Open or short circuit in wiring from EGR boost sensor solenoid valve B to PCM terminal 4L

STEP	INSPECTION		ACTION
1	Does EGR boost sensor solenoid valve connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4P voltage OK? ☞ page F2–39	Yes	Go to step 6
		No	Go to next step
3	Disconnect EGR boost sensor solenoid valve connector. Turn ignition switch to ON. Is there battery positive at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (Main relay terminal D — EGR boost sensor solenoid valve terminal A)
4	Is there continuity between harness side connector terminal B and PCM terminal 4P?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between EGR boost sensor solenoid valve terminals A and B?	Yes	Go to next step
		No	Replace EGR boost sensor solenoid valve ☞ page F2–33
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1523	VICS—OPEN OR SHORT
Symptom	Open or short circuit is observed in VICS solenoid valve system when ignition switch is turned on
Possible cause	• VICS solenoid valve malfunction • Open or short circuit in wiring from ignition switch to VICS solenoid valve, and from VICS solenoid valve to PCM terminal 4K

STEP	INSPECTION		ACTION
1	Does VICS solenoid valve connector PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Disconnect purge solenoid valve connector. Turn ignition switch is ON. Is there battery positive voltage at harness side connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Harness side connector terminal A — Main relay)
3	Is there continuity between harness side connector terminal B and PCM terminal 4K?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between VICS solenoid valve terminals? ☞ page F2–9	Yes	Go to next step
		No	Replace VICS solenoid valve
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connection of harness or connector (Repair or replace onnector and/or harness)



HARNESS SIDE CONNECTOR
(VIEW FROM BEHIND OF CONNECTOR)

Diagnostic trouble code No. P1608	PCME (CPU)—MALFUNCTION	
Symptom	PCM does not read diagnostic trouble codes from output devices	
Possible cause	• PCM malfunction	
STEP	INSPECTION	ACTION
—	—	Replace PCM ☞ page F2–36

Diagnostic trouble code No. P1794	BAT—BAT OR CIRCUIT FAIL		
Symptom	Battery positive voltage is not constantly applied to PCM terminal 4I		
Possible cause	• Battery malfunction • Open or short circuit in wiring from PCM terminal 4I to positive battery cable • Burnt fuse		
STEP	INSPECTION		ACTION
1	Is battery fully charged? ☞ section G	Yes	Go to next step
		No	Charge battery ☞ section G
2	Does battery positive voltage present at PCM terminal 4I?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (PCM terminal 4I — Battery)
3	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

Diagnostic trouble code No. P1797	PNS—OPEN OR SHORT
Symptom	• PCM judges N position for more than 33 seconds when shift lever is in D range • PCM judges neutral/clutch switch OFF for more than 5 seconds while vehicle stopped and engine running
Possible cause	• Transaxle range switch malfunction • Clutch/neutral switch malfunction • PCM malfunction • Open or short circuit in wiring from transaxle range switch terminal H or neutral/clutch switch terminal to PCM terminal 1L

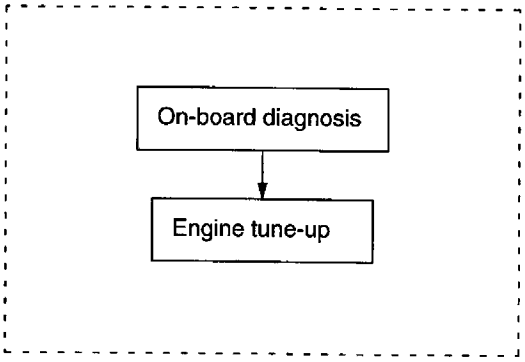
STEP	INSPECTION		ACTION
1	Does PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 1L voltage OK? ☞ page F2–39	Yes	Go to step 5
		No	Go to next step
3	Is there continuity between transaxle range switch terminal H or clutch/neutral switch terminal and PCM terminal 1L?	Yes	Go to next step
		No	Repair or replace wiring harness
4	(ATX) Is transaxle range switch OK? ☞ section K (MTX) Is neutral/clutch switch OK? ☞ page F2–52	Yes	Go to next step
		No	Repair or replace transaxle range switch or neutral/clutch switch ☞ section K, page F2–52
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM ☞ page F2–36
		No	Intermitent poor connection of harness or connector (Repair connector and/or harness)

TROUBLESHOOTING

USING THIS SECTION

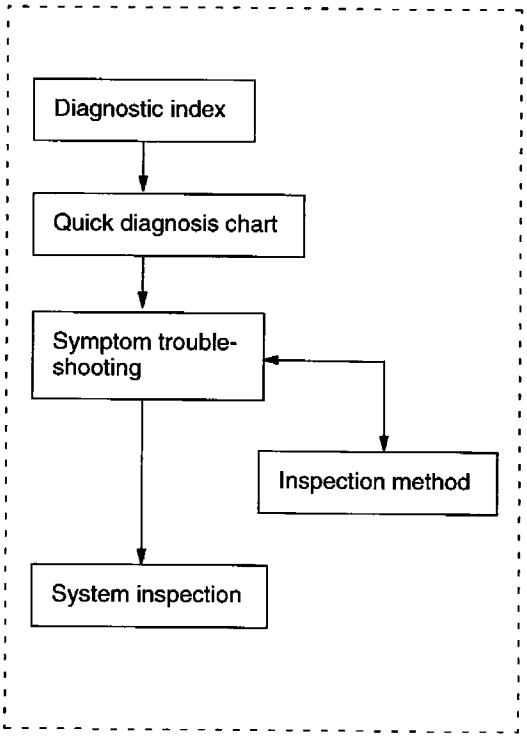
Procedure

Service section



- If diagnostic trouble codes present, carry out inspection required by the code indicated.
(Refer to page F2–54.)
- If engine operates, carry out engine tune-up.
(Refer to page F2–2.)

Troubleshooting section



- If problems can not be solved by following procedure in service section, go to troubleshooting section.
- Choose item that most closely corresponds to actual symptom. (Refer to page F2–95.)
- Referring to quick diagnosis chart, assume systems related to the problem. (Refer to page F2–96.)
- Referring to symptom troubleshooting, locate the cause of trouble. (Refer to page F2–98.)
- Inspect the suspected faulty system and repair or replace as necessary.

Description

Diagnostic index

- The diagnostic index is for quick reference of all trouble symptoms in the symptom troubleshooting.
- Detailed description of each symptom enables correct inspection.

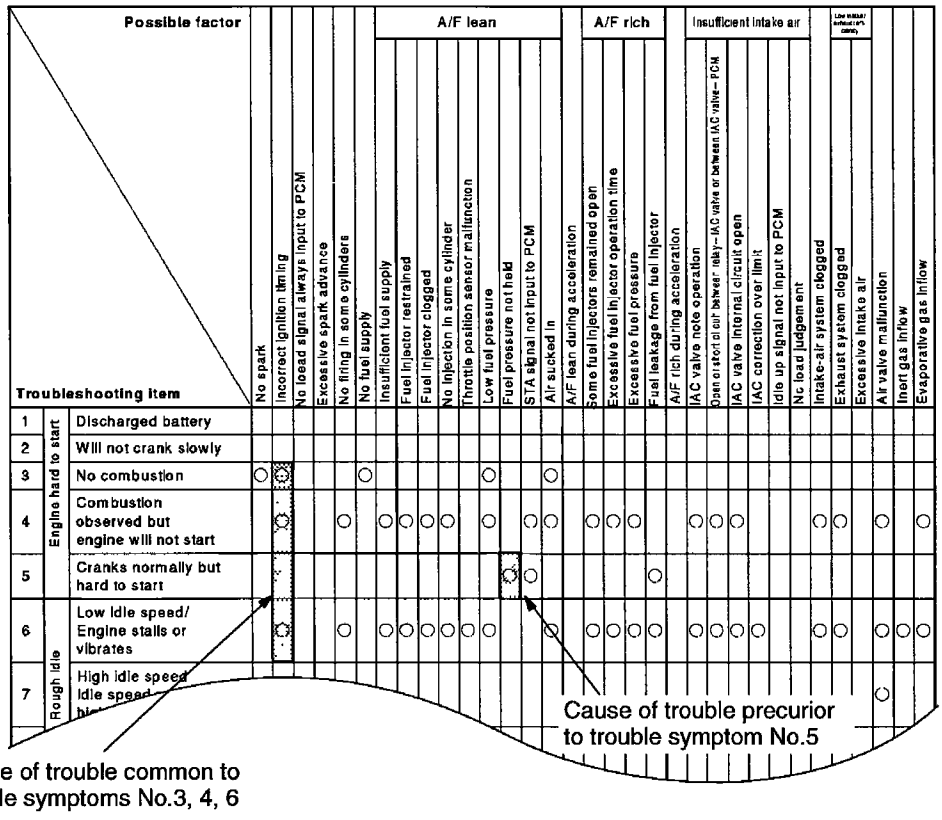
DIAGNOSTIC INDEX

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
1	Engine hard to start	Discharged battery	—	F2–100
2		Will not crank or cranks slowly	—	F2–100
3		No combustion	Engine cranks at normal speed but shows no sign of firing	F2–101
4		Combustion observed but engine will not start	Engine shows combustion while cranking but will not continue to run when ignition switch is turned from STA to ON	F2–103
5		Cranks normally but hard to start	Engine cranks at normal speed but requires excessive cranking time before starting Engine runs normally at idle after started	F2–105
6	Idle	Low idle speed/Engine stalls or vibrates	Engine idles at low speed, stalls, or vibrates when engine is cold, hot, or normal temperature	F2–106
7			Idle speed excessively high and will not go down after warm up ...ively high and requires times to be...	F2–108

Quick diagnosis chart

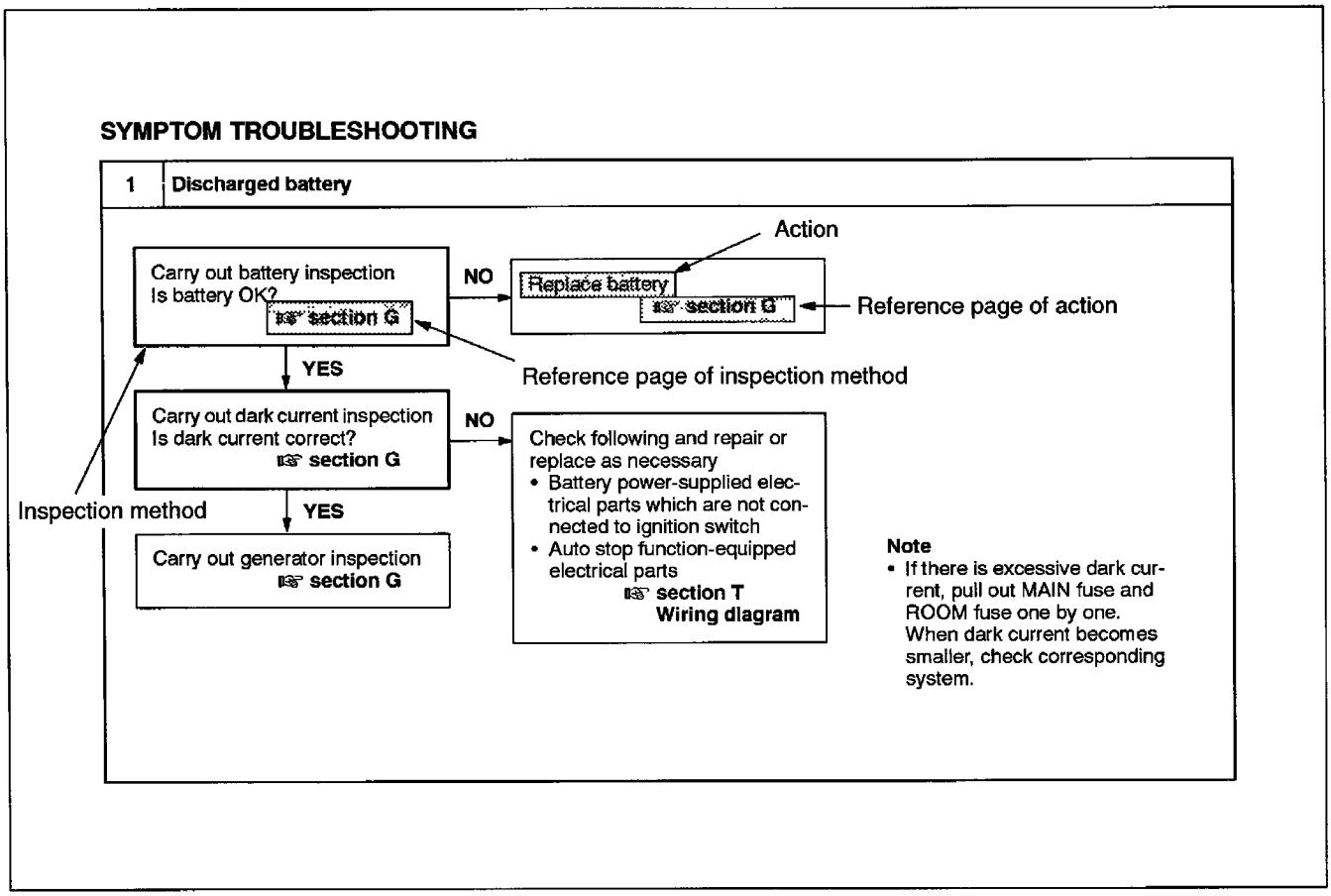
- Troubleshooting index shows relationship between trouble symptoms and suspected faulty parts.
- This index is for quick location of the cause of trouble. In case several problems exist, a common cause that may be related to them can also be easily found.

QUICK DIAGNOSIS CHART



Symptom troubleshooting

- Symptom troubleshooting shows diagnosis procedure, inspection method, and proper action to take for each trouble symptom.



Inspection method

- Inspection methods necessary for troubleshooting are shown per each trouble symptom.
- Efficient troubleshooting is made possible by following this inspection method.

System inspection

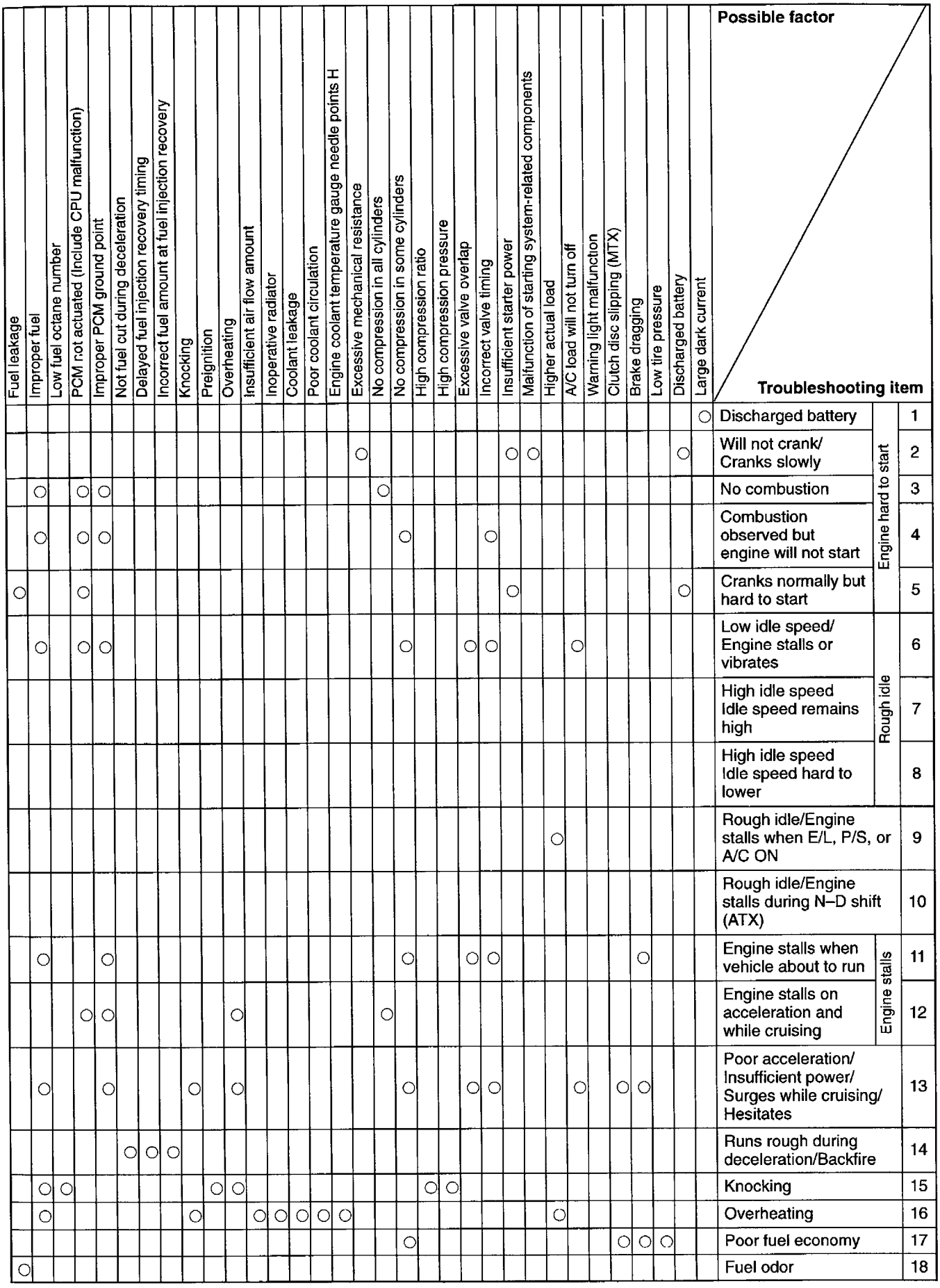
- Inspection items necessary for troubleshooting are shown per each system.
- Efficient troubleshooting is made possible by this system inspection.

DIAGNOSTIC INDEX

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
1	Engine hard to start	Discharged battery	—	F2–98
2		Will not crank or cranks slowly	—	F2–98
3		No combustion	Engine cranks at normal speed but shows no sign of firing	F2–99
4		Combustion observed but engine will not start	Engine shows combustion while cranking but will not continue to run when ignition switch is turned from STA to ON	F2–100
5		Cranks normally but hard to start	Engine cranks at normal speed but requires excessive cranking time before starting Engine runs normally at idle after started	F2–102
6	Rough idle	Low idle speed/Engine stalls or vibrates	Engine idles at low speed, stalls, or vibrates when engine is cold, hot, or normal temperature	F2–103
7		High idle speed Idle speed remains high	Idle speed excessively high and will not go down after warm-up	F2–105
8		High idle speed Idle speed hard to lower	Idle speed excessively high and requires times to be lowered to normal speed after warm-up	F2–106
9	Engine stalls	Rough idle/Engine stalls when E/L, P/S, or A/C ON	Engine runs normally at idle with no load but stalls or vibrates excessively when load (E/L, P/S, or A/C) is ON	F2–106
10		Rough idle/Engine stalls during N–D shift (ATX)	Engine runs normally at idle but stalls or vibrates excessively during N–D shift	F2–107
11		Engine stalls when vehicle about to run	—	F2–108
12		Engine stalls on acceleration and while cruising	—	F2–109
13	Poor acceleration/Insufficient power/Surges while cruising/Hesitates		—	F2–110
14	Runs rough during deceleration/Backfire		Engine runs rough during deceleration, and abnormal combustion occures in exhaust system	F2–112
15	Knocking		—	F2–113
16	Overheating		—	F2–114
17	Poor fuel economy		Fuel consumption increased excessively though no sudden starting, acceleration, or braking carried out	F2–115
18	Fuel odor		Fuel odor in passenger or engine compartment	F2–116

QUICK DIAGNOSIS CHART

Troubleshooting item \ Possible factor			No spark	Incorrect ignition timing	No load signal always input to PCM	Excessive spark advance	No firing in some cylinders	No fuel supply	A/F lean: Insufficient fuel supply	A/F lean: Fuel injector restrained	A/F lean: Fuel injector clogged	A/F lean: No injection in some cylinder	A/F lean: Throttle position sensor malfunction	A/F lean: Low fuel pressure	A/F lean: Fuel pressure not held	A/F lean: Air sucked in	A/F lean during acceleration	A/F rich: Some fuel injectors remained open	A/F rich: Excessive fuel injector operation time	A/F rich: Excessive fuel pressure	A/F rich: Fuel leakage from fuel injector	A/F rich during acceleration	Insufficient intake air: IAC valve not operation	Insufficient intake air: Open or short circuit between relay—IAC valve or between IAC valve—PCM	Insufficient intake air: IAC valve internal circuit open	Insufficient intake air: IAC correction over limit	Insufficient intake air: Idle-up signal not input to PCM	Insufficient intake air: No load judgement	Low intake/exhaust efficiency: Intake-air system clogged	Low intake/exhaust efficiency: Exhaust system clogged	Low intake/exhaust efficiency: Excessive intake air	Air valve malfunction	Inert gas inflow	Evaporative gas inflow	Evaporative gas leakage
1	Engine hard to start	Discharged battery																																
2	Engine hard to start	Will not crank/ Cranks slowly																																
3	Engine hard to start	No combustion	○	○				○						○		○																		
4	Engine hard to start	Combustion observed but engine will not start		○			○		○	○	○	○		○		○		○	○	○			○	○	○				○	○			○	
5	Engine hard to start	Cranks normally but hard to start													○						○													○
6	Rough idle	Low idle speed/ Engine stalls or vibrates		○			○		○	○	○	○	○	○		○		○	○	○	○		○	○	○	○			○	○		○	○	
7	Rough idle	High idle speed Idle speed remains high																														○		
8	Rough idle	High idle speed Idle speed hard to lower																														○		
9		Rough idle/Engine stalls when E/L, P/S, or A/C ON																					○			○	○							
10		Rough idle/Engine stalls during N–D shift (ATX)																					○			○		○						
11	Engine stalls	Engine stalls when vehicle about to run		○			○		○	○	○	○	○	○		○	○	○	○	○	○	○							○	○			○	
12	Engine stalls	Engine stalls on acceleration and while cruising	○					○						○		○																		
13		Poor acceleration/ Insufficient power/ Surges while cruising/ Hesitates		○	○		○		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○							○	○			○	
14		Runs rough during deceleration/Backfire					○											○			○					○								
15		Knocking				○			○	○	○	○	○	○		○																		
16		Overheating																																
17		Poor fuel economy		○			○											○	○	○	○								○	○				
18		Fuel odor																																○



Possible factor / Troubleshooting item			
Discharged battery	Engine hard to start		1
Will not crank/ Cranks slowly			2
No combustion			3
Combustion observed but engine will not start			4
Cranks normally but hard to start			5
Low idle speed/ Engine stalls or vibrates	Rough idle		6
High idle speed Idle speed remains high			7
High idle speed Idle speed hard to lower			8
Rough idle/Engine stalls when E/L, P/S, or A/C ON			9
Rough idle/Engine stalls during N–D shift (ATX)			10
Engine stalls when vehicle about to run	Engine stalls		11
Engine stalls on acceleration and while cruising			12
Poor acceleration/ Insufficient power/ Surges while cruising/ Hesitates			13
Runs rough during deceleration/Backfire			14
Knocking			15
Overheating			16
Poor fuel economy			17
Fuel odor			18

SYMPTOM TROUBLESHOOTING

1 Discharged battery

Carry out battery inspection
Is battery OK?
☞ **section G**

NO → Replace battery
☞ **section G**

YES ↓

Carry out dark current inspection
Is dark current correct?
☞ **section G**

NO → Check following and repair or replace as necessary
- Battery power-supplied electrical parts which are not connected to ignition switch
- Auto stop function-equipped electrical parts
☞ **section T Wiring diagram**

YES ↓

Carry out generator inspection
☞ **section G**

Note
- If there is excessive dark current, pull out MAIN fuse and ROOM fuse one by one. When dark current becomes smaller, check corresponding system.

2 Will not crank or cranks slowly

Is battery discharged?

YES → Go to Symptom troubleshooting No.1 "Discharged battery"

NO ↓

Carry out starter inspection
Is starter OK?
☞ **section G**

NO → Repair or replace

YES ↓

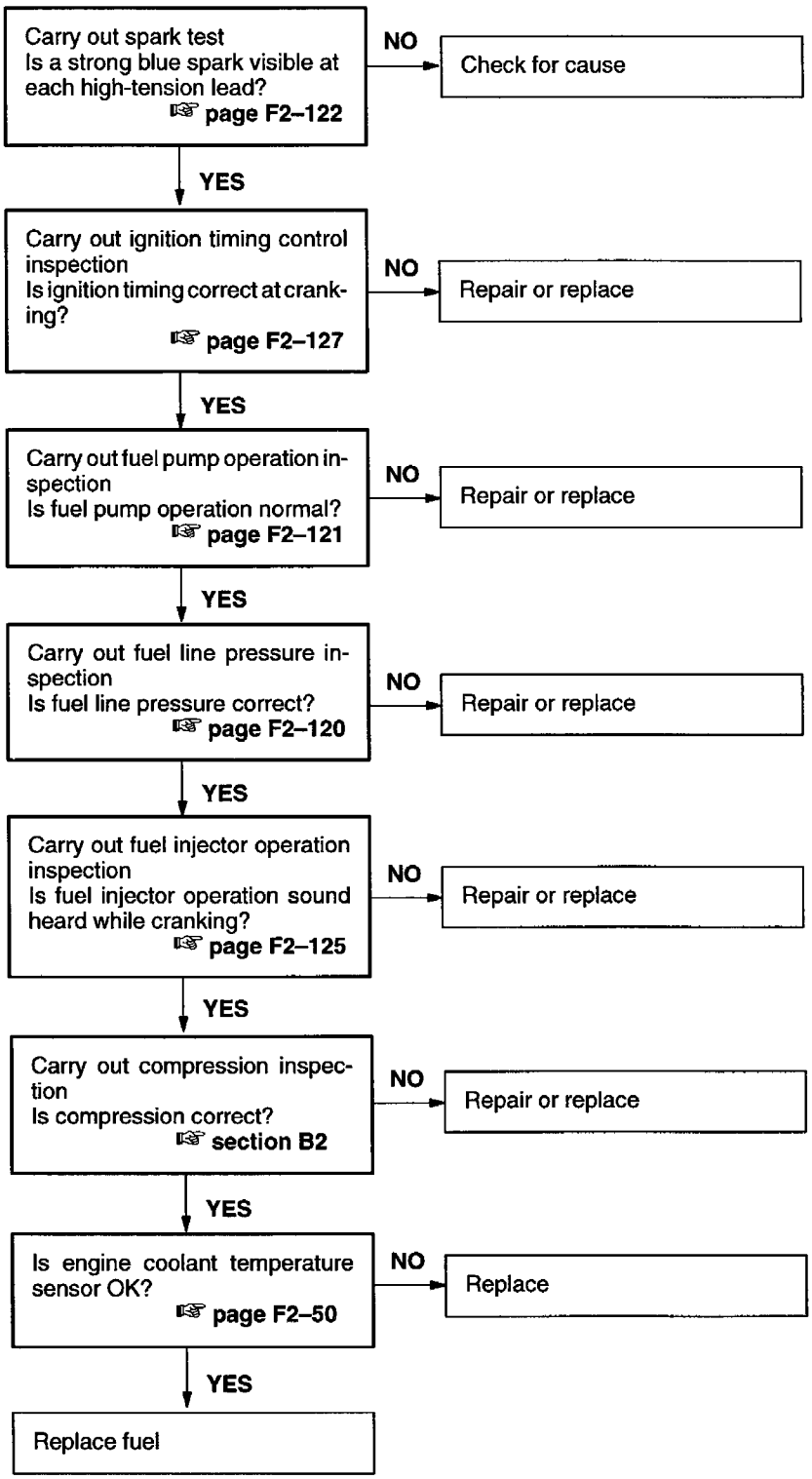
(ATX) Check signal of following
Are signals normal?
☞ **page F2–39**
- Transaxle range switch

NO → Repair or replace

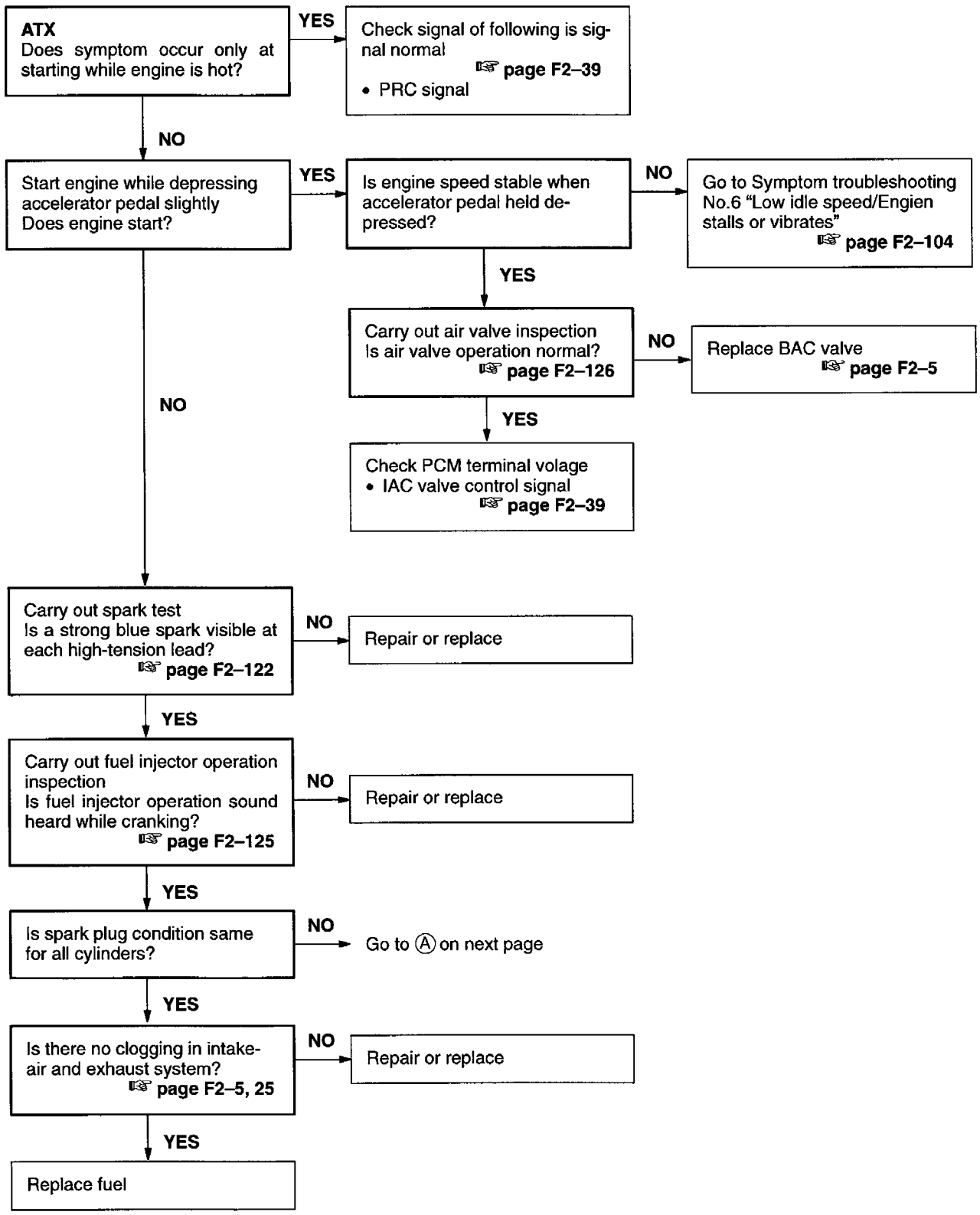
YES ↓

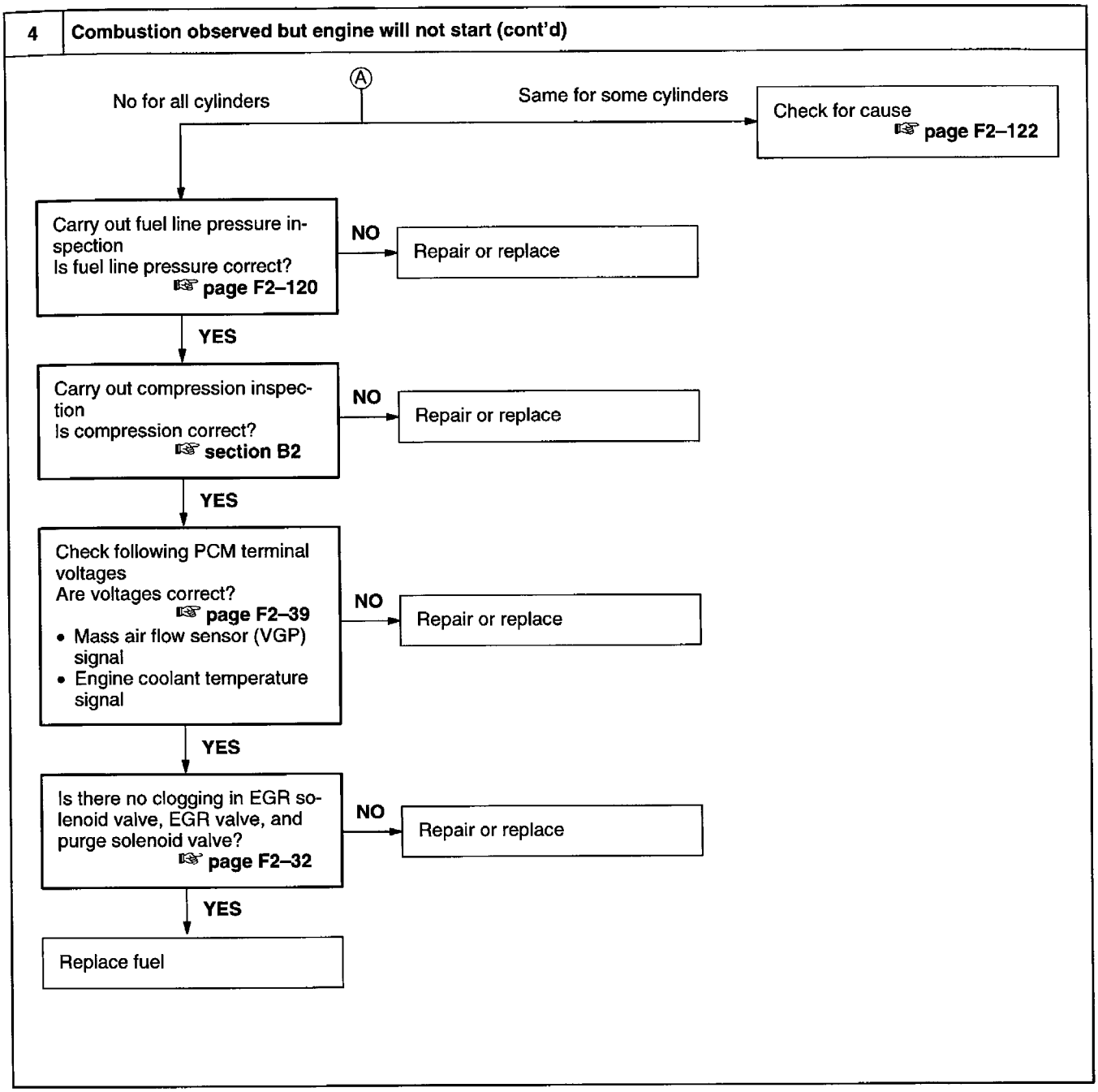
Carry out engine inspection (internal damage)
☞ **section B2**

3	No combstion

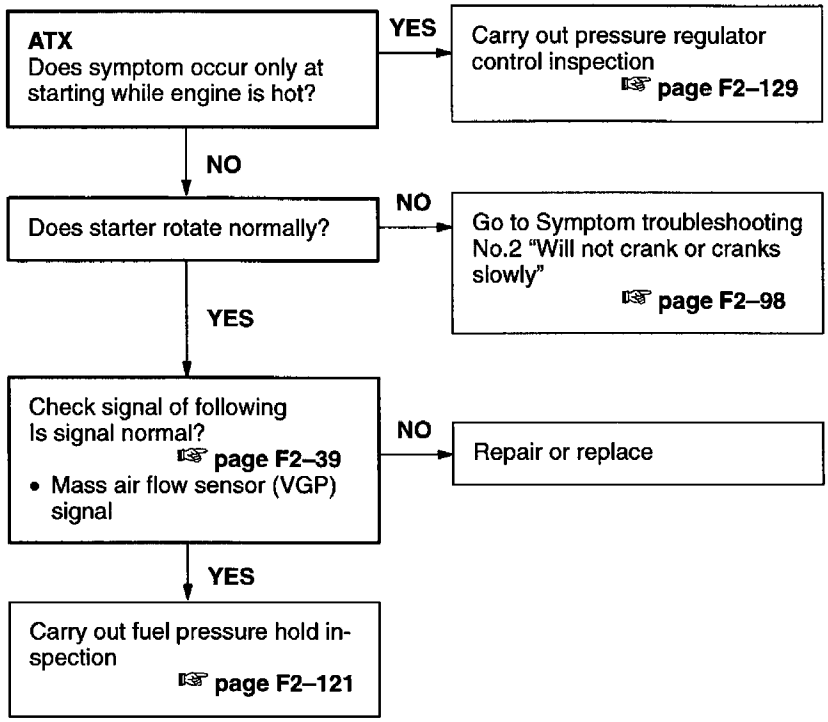


4 Combustion observed but engine will not start

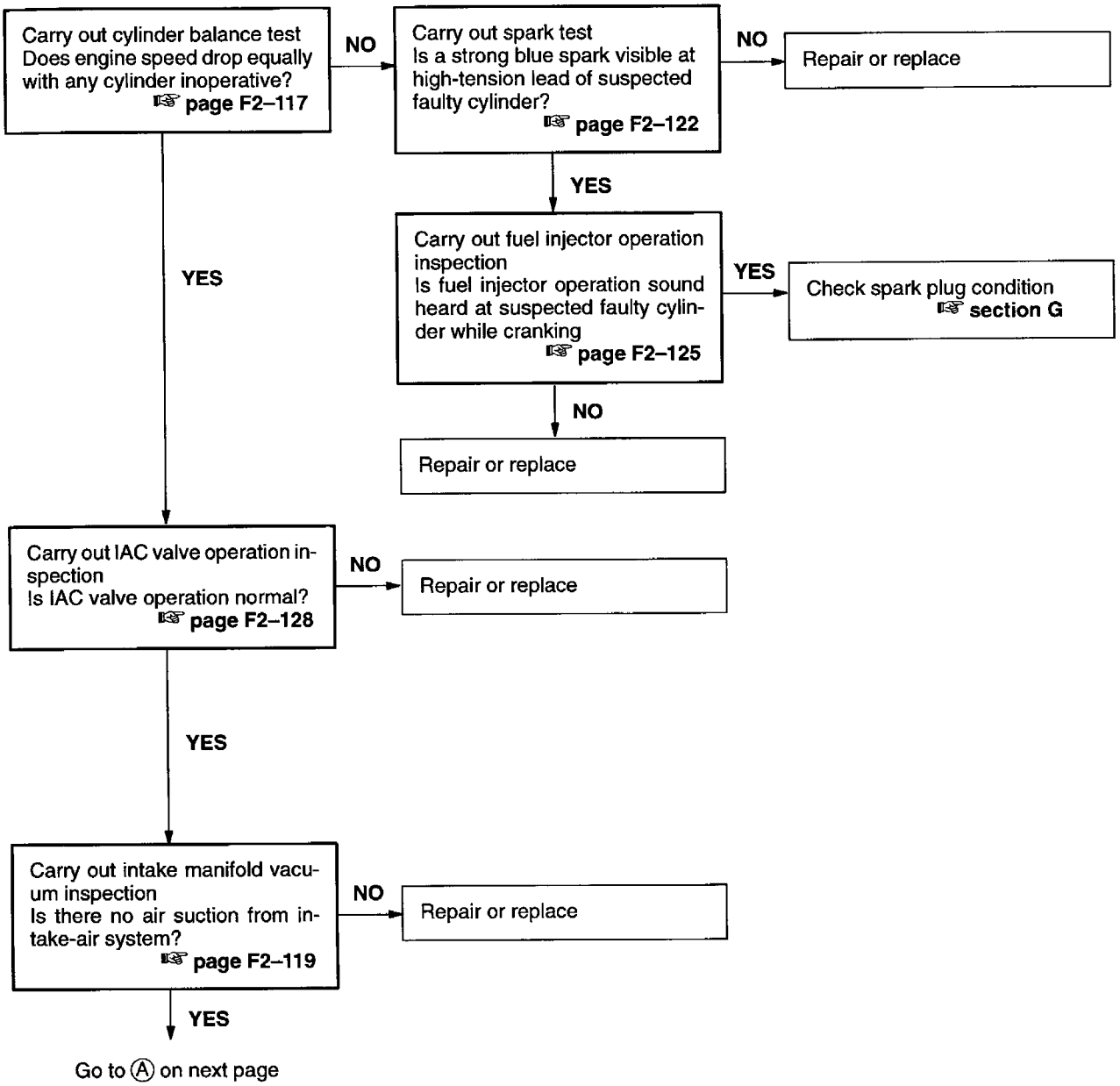



4
Combustion observed but engine will not start (cont'd)
Ⓐ
No for all cylinders
Same for some cylinders
Check for cause
☞ page F2–122
Carry out fuel line pressure inspection
Is fuel line pressure correct?
☞ page F2–120
NO
Repair or replace
YES
Carry out compression inspection
Is compression correct?
☞ section B2
NO
Repair or replace
YES
Check following PCM terminal voltages
Are voltages correct?
☞ page F2–39
• Mass air flow sensor (VGP) signal
• Engine coolant temperature signal
NO
Repair or replace
YES
Is there no clogging in EGR solenoid valve, EGR valve, and purge solenoid valve?
☞ page F2–32
NO
Repair or replace
YES
Replace fuel

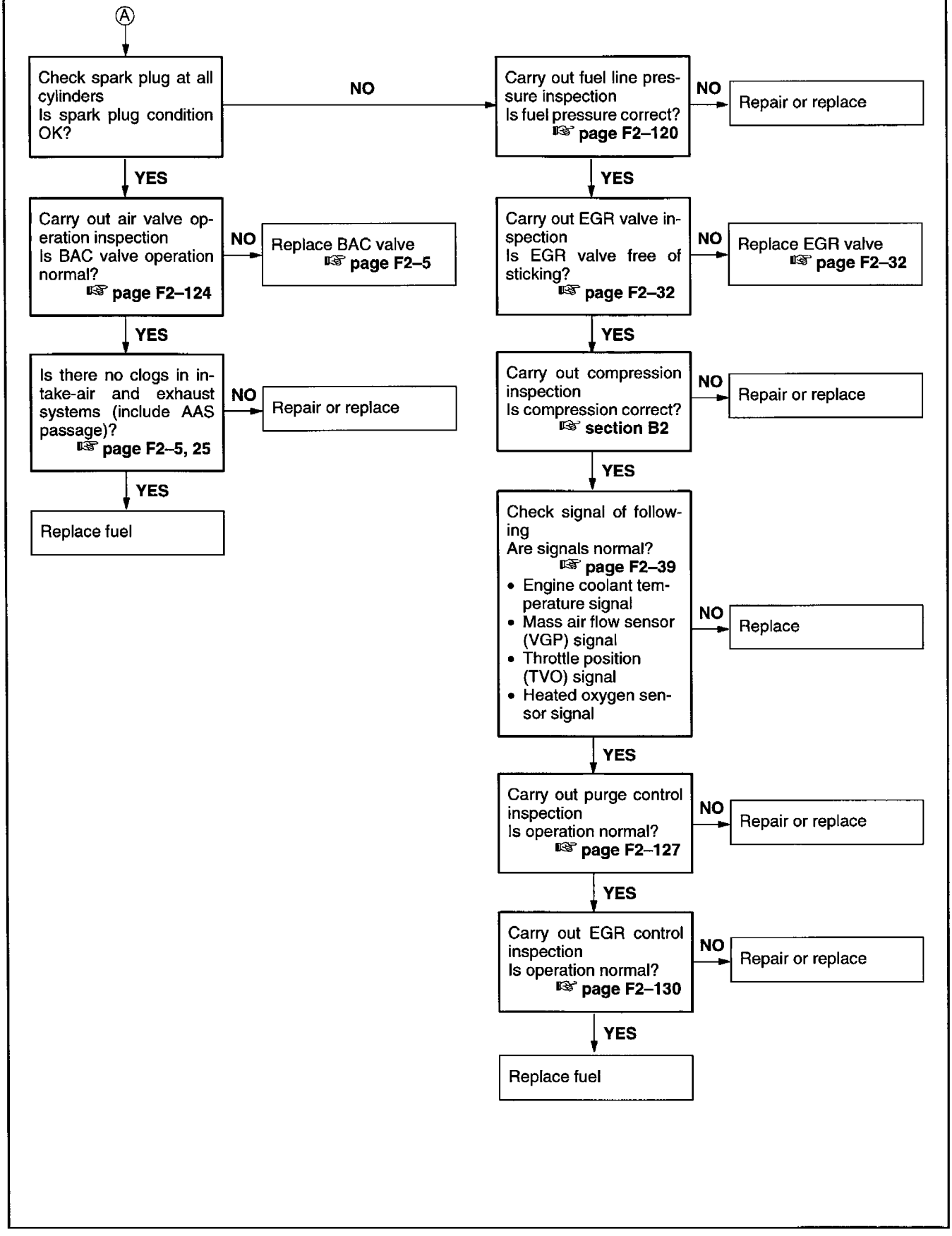
5	Cranks normally but hard to start



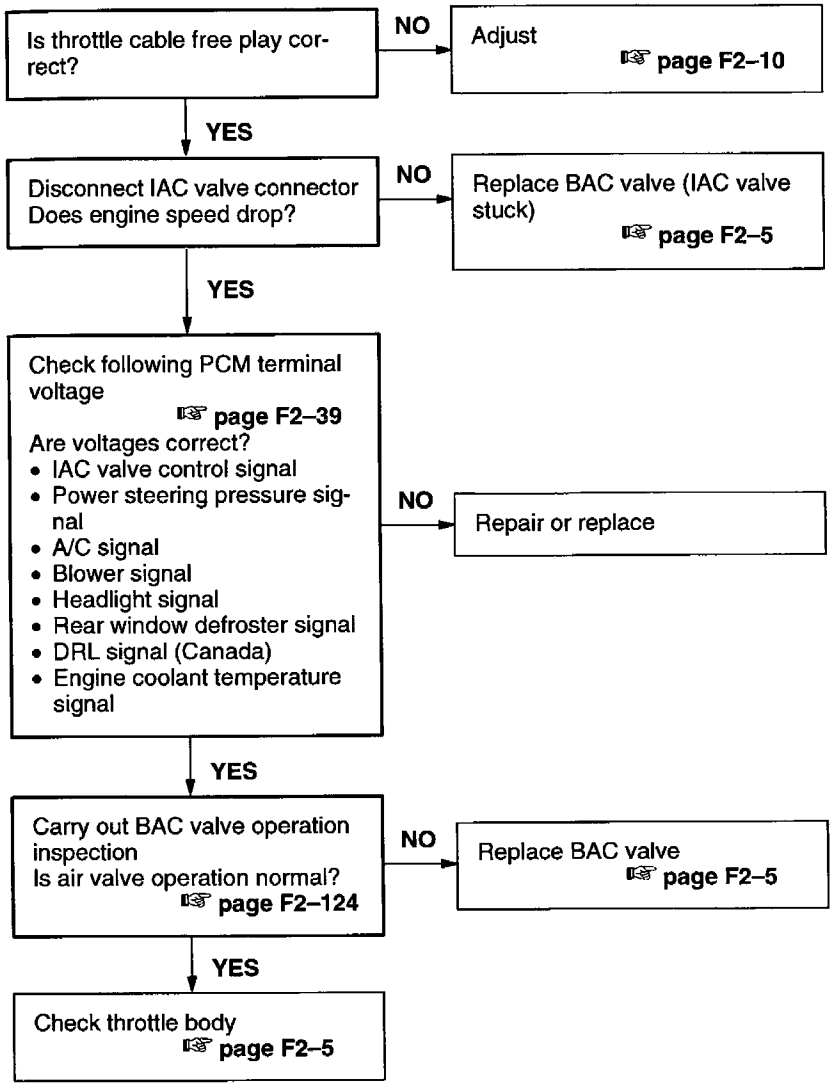
6 Low idle speed/Engine stalls or vibrates



6 Low idle speed/Engine stalls or vibrates (cont'd)



7 High idle speed
Idle speed remains high



8 High idle speed
Idle speed hard to lower

Carry out BAC valve operation inspection
Is BAC valve operation normal?
☞ **page F2–124**

NO → Repair or replace

YES ↓

Check throttle body
☞ **page F2–5**

9 Rough idle/Engine stalls when E/L, P/S, or A/C ON

① Symptom occur while E/L (blower, headlight, rear window defroster) operating

Check following PCM terminal voltage
Are signals normal?
☞ **page F2–39**
- Blower motor signal
- Headlight signal
- Rear window defroster signal

② Symptom occur while P/S operating

Check following PCM terminal voltage
Is voltage correct?
☞ **page F2–39**
- Power steering pressure signal

NO → Repair or replace

YES ↓

Check the P/S pump
☞ **section N**

③ Symptom occur while A/C operating

Check following PCM terminal voltage
Is voltage correct?
☞ **page F2–39**
- A/C signal

NO → Repair or replace

YES ↓

Check A/C compressor
☞ **section U**

④ Symptom occur regardless of load condition

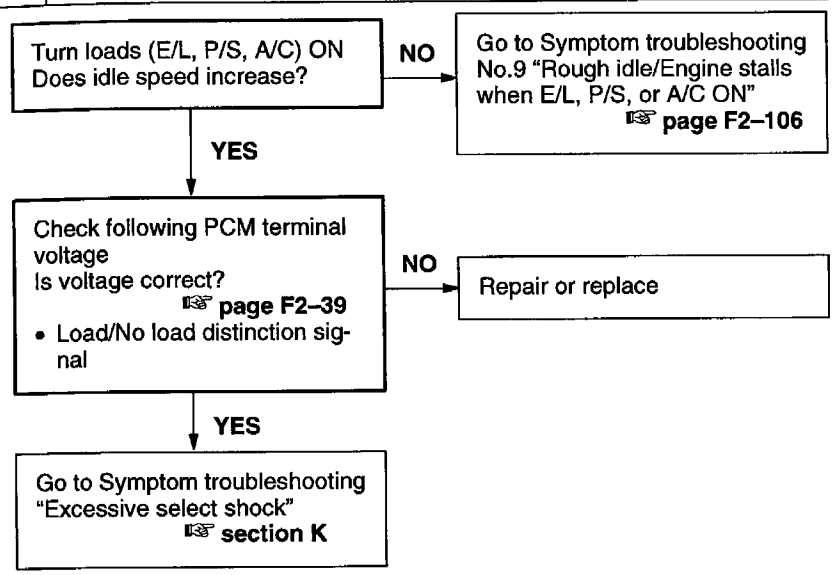
Disconnect IAC valve connector
Does engine speed drop?

NO → Replace BAC valve (IAC valve stuck)
☞ **page F2–5**

YES ↓

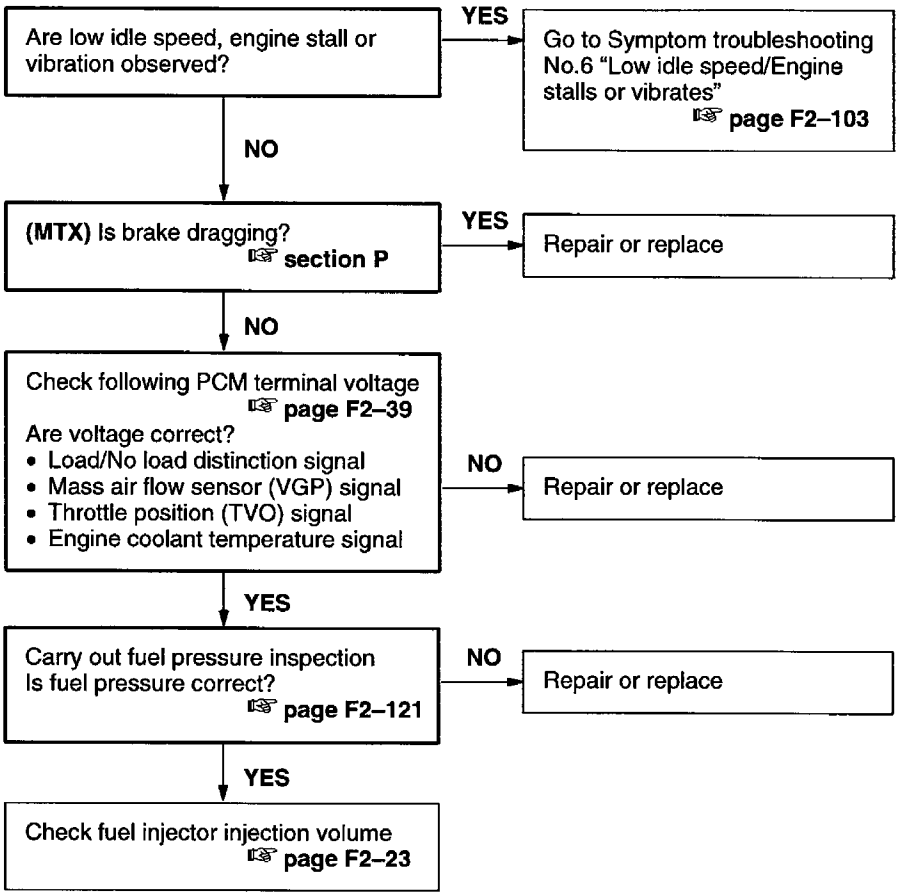
Check following PCM terminal voltage
☞ **page F2–39**
- IAC valve control signal

10 Rough idle/Engine stalls during N–D shift (ATX)

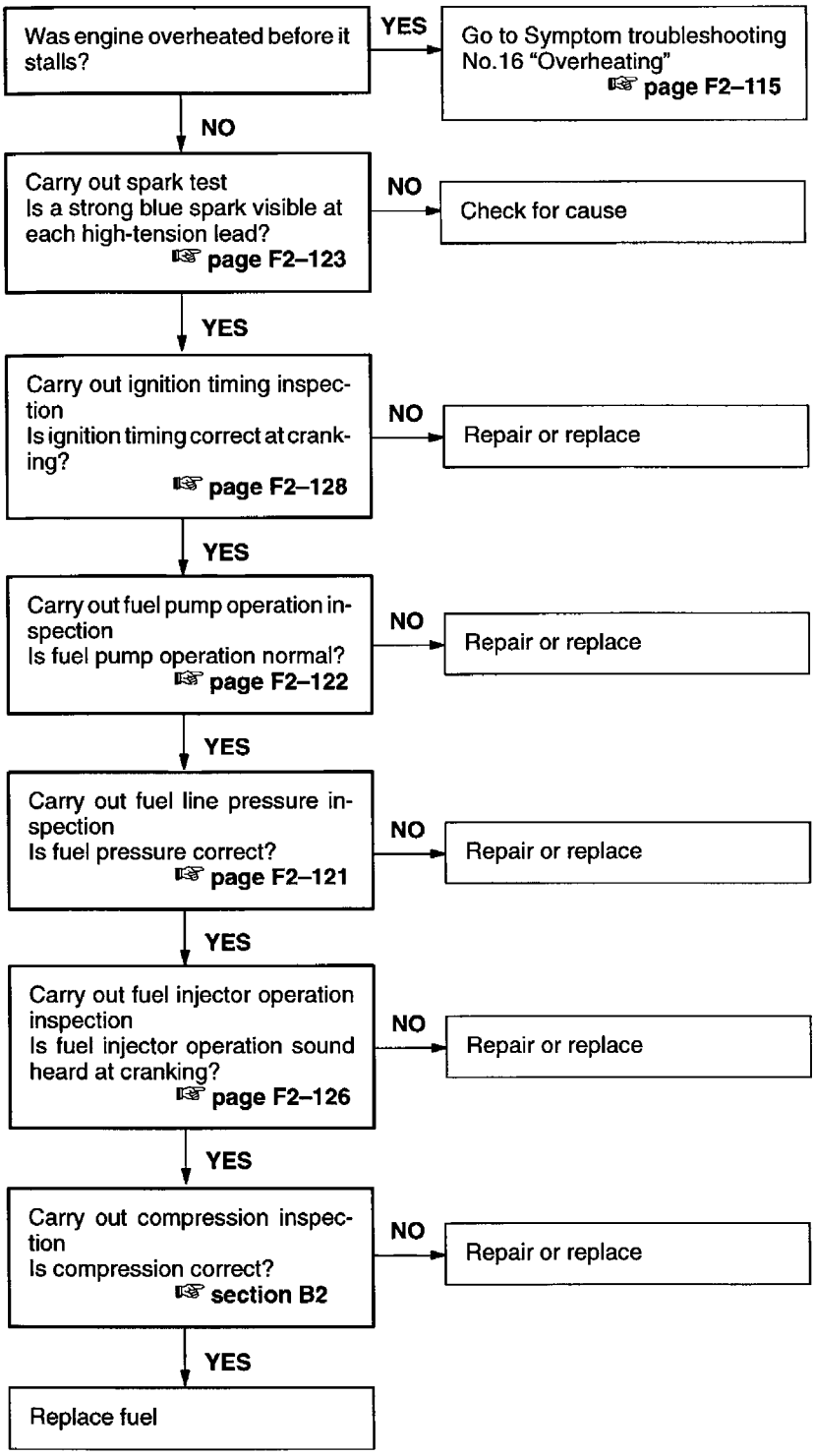


Note
- Check also for pseudo rough idle caused by poorly installed engine mount and transaxle mount.

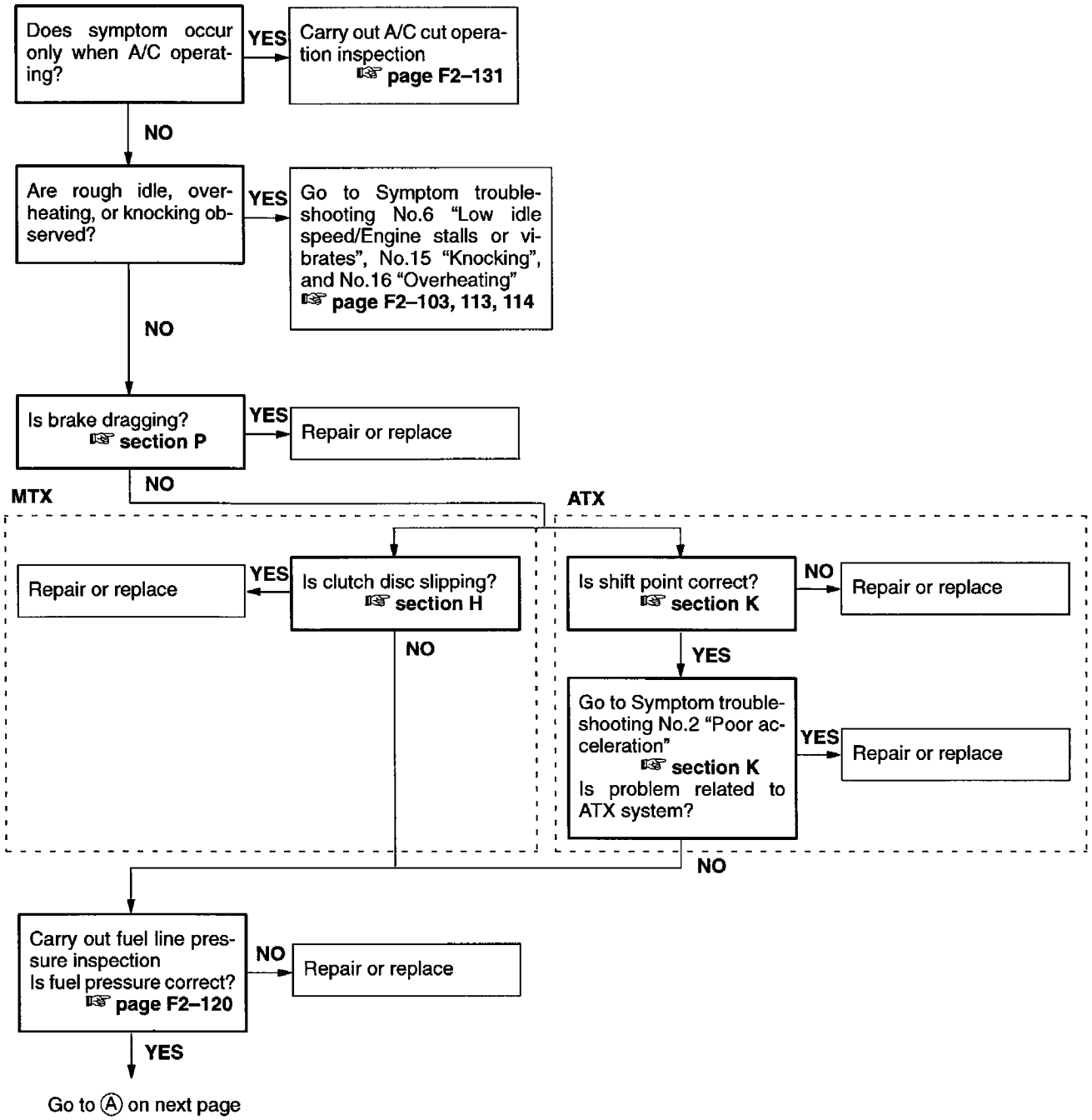
11 Engine stalls when vehicle about to run



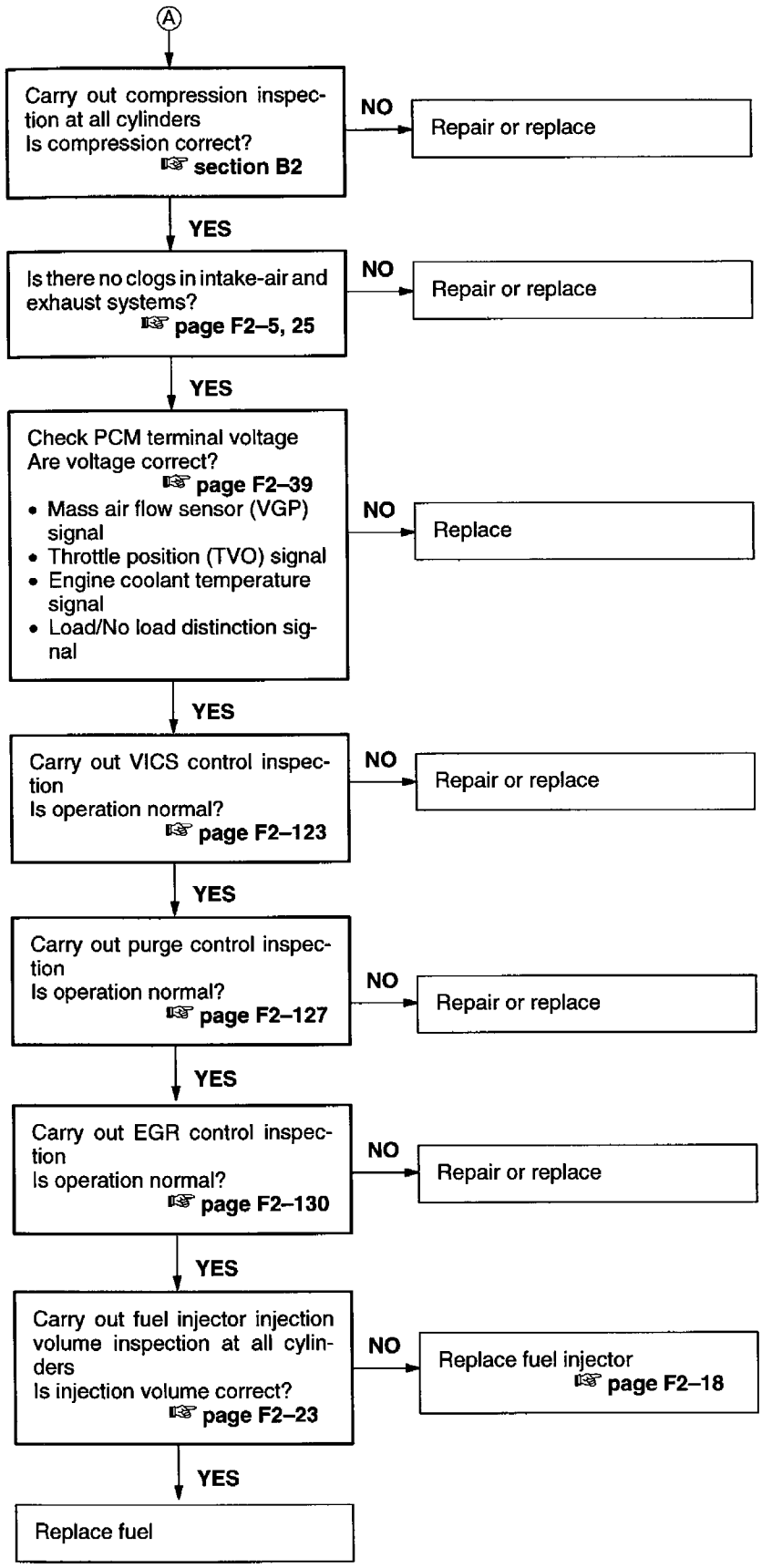
12 Engine stalls on acceleration and while cruising



13 Poor acceleration/Insufficient power/Surges while cruising/Hesitates



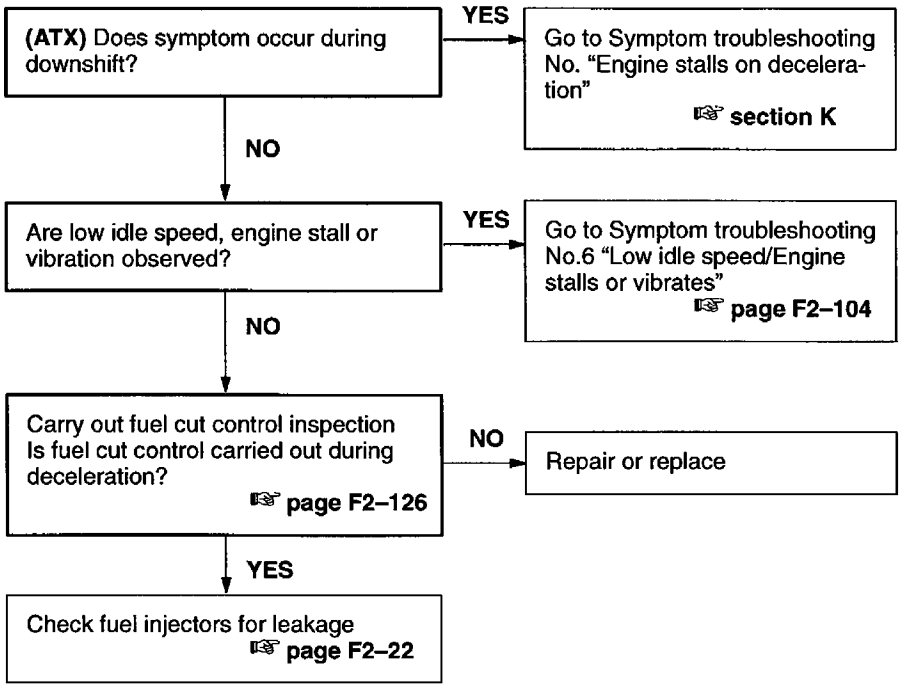
13 Poor acceleration/Insufficient power/Surges while cruising/Hesitates (Cont'd)



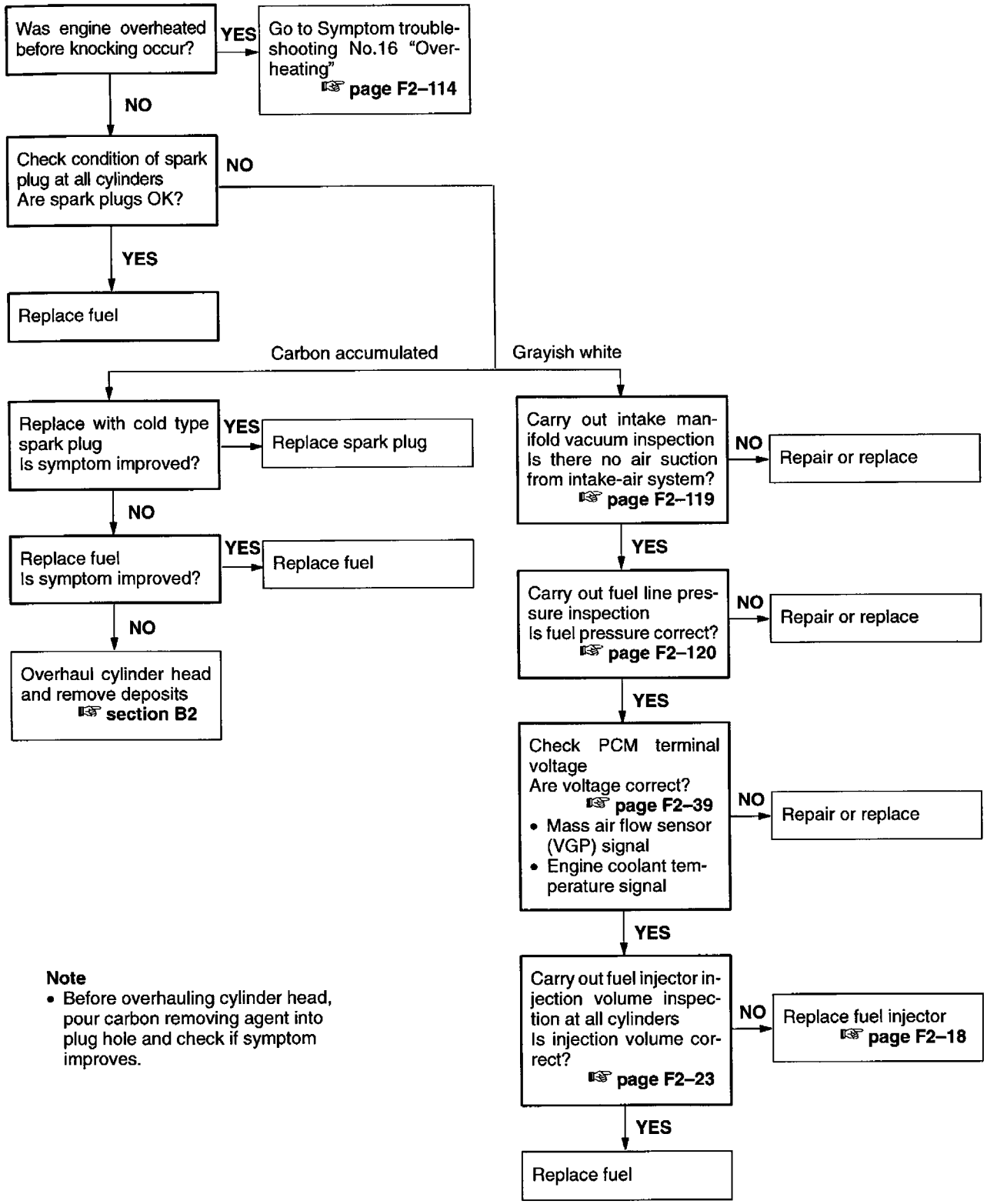
Note

- When symptom occur only when vehicle driving under heavy load condition, also check for leakage from ignition system (ignition coil, high-tension lead, spark plug)

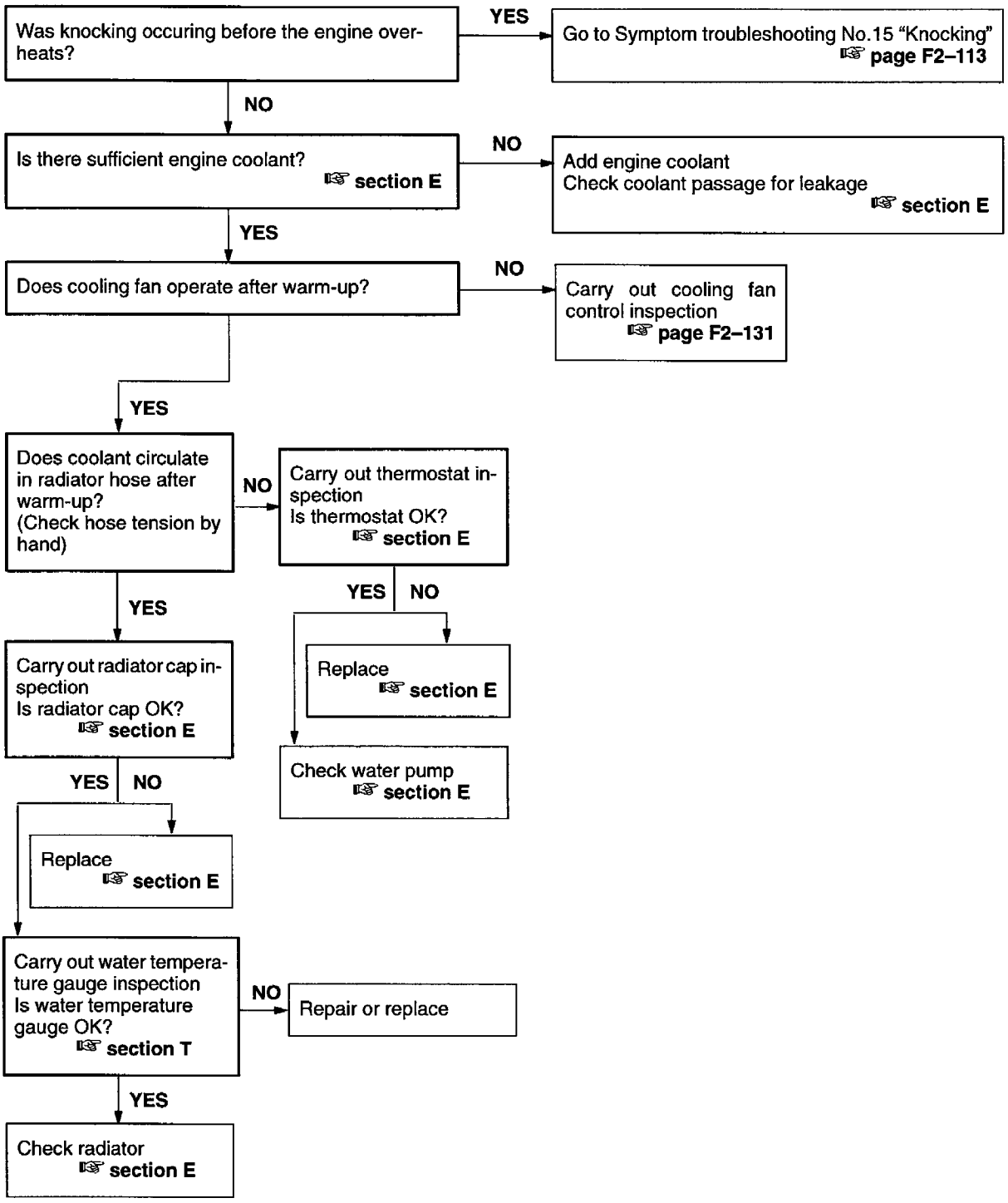
14	Runs rough during deceleration/Backfire



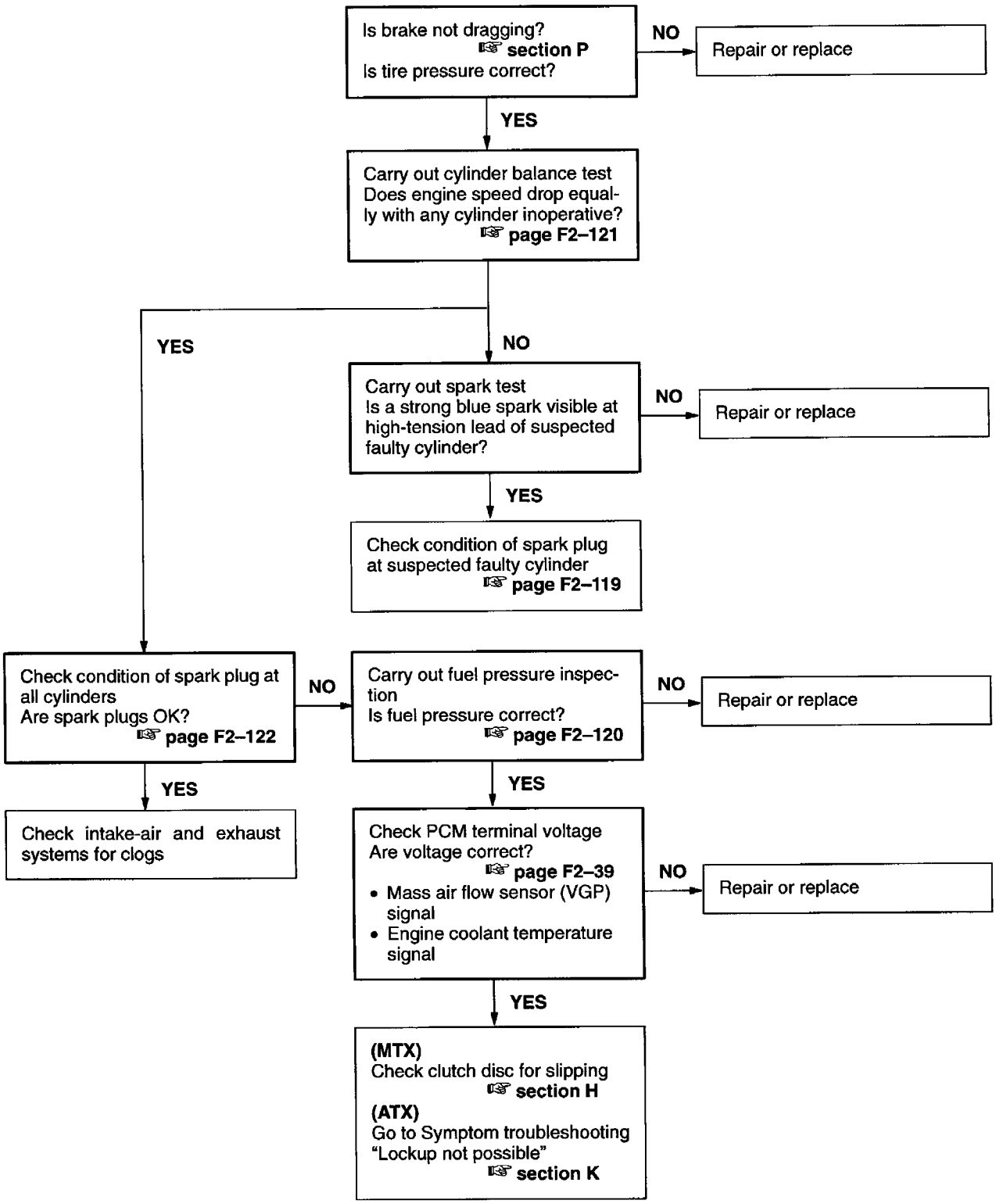
15 Knocking


Was engine overheated before knocking occur?
YES
Go to Symptom troubleshooting No.16 "Overheating"
☞ page F2–114
NO
Check condition of spark plug at all cylinders Are spark plugs OK?
NO
YES
Replace fuel
Carbon accumulated
Grayish white
Replace with cold type spark plug Is symptom improved?
YES
Replace spark plug
NO
Replace fuel Is symptom improved?
YES
Replace fuel
NO
Overhaul cylinder head and remove deposits
☞ section B2
Carry out intake manifold vacuum inspection Is there no air suction from intake-air system?
☞ page F2–119
NO
Repair or replace
YES
Carry out fuel line pressure inspection Is fuel pressure correct?
☞ page F2–120
NO
Repair or replace
YES
Check PCM terminal voltage Are voltage correct?
☞ page F2–39
• Mass air flow sensor (VGP) signal
• Engine coolant temperature signal
NO
Repair or replace
YES
Carry out fuel injector injection volume inspection at all cylinders Is injection volume correct?
☞ page F2–23
NO
Replace fuel injector
☞ page F2–18
YES
Replace fuel
Note
• Before overhauling cylinder head, pour carbon removing agent into plug hole and check if symptom improves.

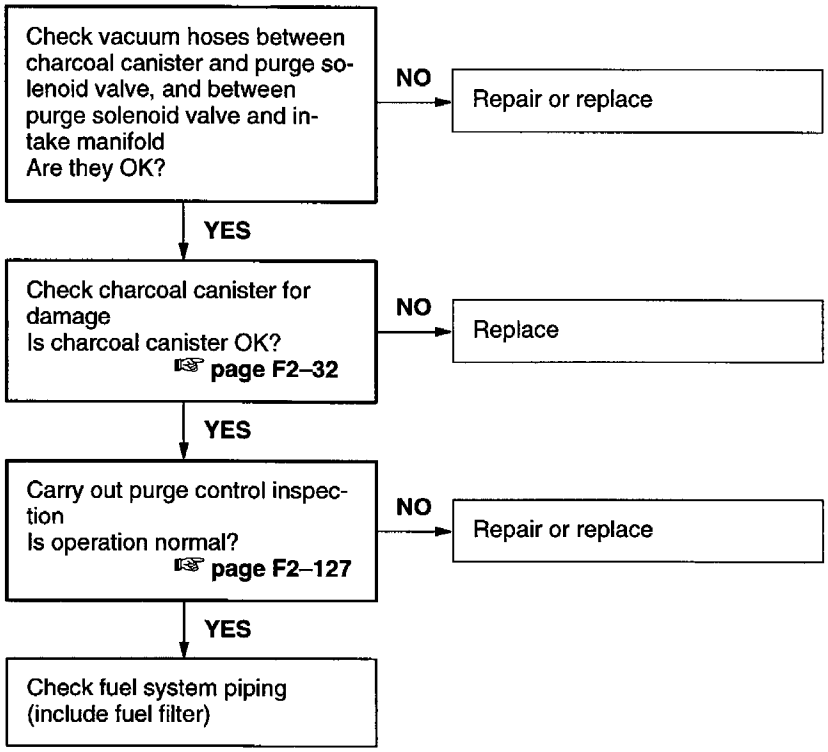
16 Overheating



17 Poor fuel economy



18	Fuel odor

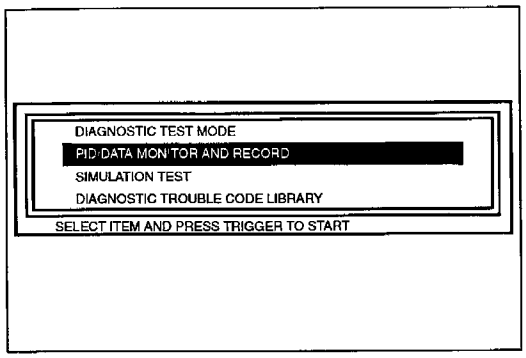

Check vacuum hoses between charcoal canister and purge solenoid valve, and between purge solenoid valve and intake manifold
Are they OK?
NO
Repair or replace
YES
Check charcoal canister for damage
Is charcoal canister OK?
☞ page F2–32
NO
Replace
YES
Carry out purge control inspection
Is operation normal?
☞ page F2–127
NO
Repair or replace
YES
Check fuel system piping (include fuel filter)

DIAGNOSTIC INSPECTION
Cylinder Balance Test
Purpose
The purpose of the cylinder balance test is to find weak or non-contributing cylinders. In this test, the high-tension leads are disconnected one by one to shut off the ignition in each cylinder while the engine is running. The engine speed drop caused by this operation is measured and compared with each other, and the cylinder condition is judged. If all the engine speed decrease amounts are almost the same with any of the cylinder inoperative, there will be no weak or non-contributing cylinder. Engine speed different from others indicates that the corresponding cylinder is considered to be weak or non-contributing.

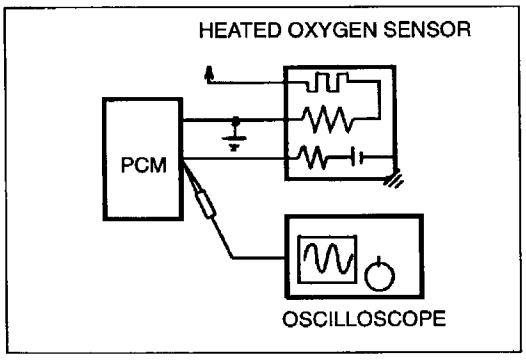
Warning
- **High-voltage in ignition system can cause strong electrical shock. Avoid direct contact to the vehicle body during the cylinder balance test.**
- **High-voltage spark will negatively effect the engine control. To prevent this, ground the high-tension lead and keep away from sensors and harnesses.**

Caution
- **Cylinder balance test can overheat and damage the three way catalytic converter.**

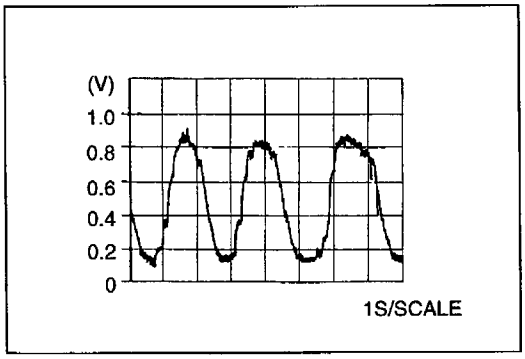
Note
- Diagnostic trouble codes (No. P0300, P0301, P0302, P0303, and P0304) will be stored in the PCM memory during the cylinder balance test. Carry out "After Repair Procedure" and erase these codes after this test. (Refer to page F2–54.)



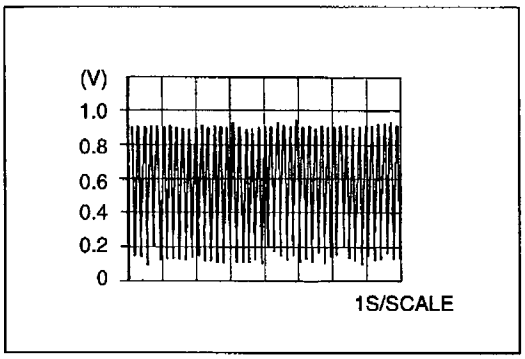
Procedure
1. Connect the **SSTs** (NGS) to the data link connector–2 and select the PID/DATA MONITOR AND RECORD function. (Refer to page F2–38.)
2. Select the "RPM" on the NGS display.
3. Start the engine and let it idle.
4. Disconnect each high-tension lead and measure the engine speed.
5. Compare the engine speed decrease amounts.



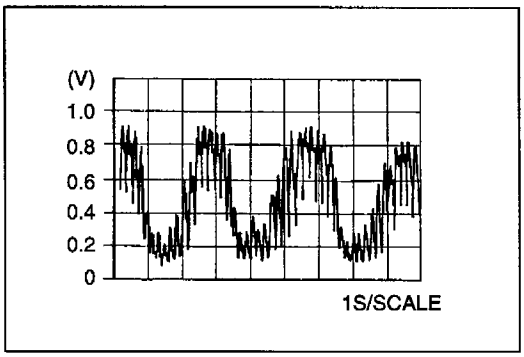
Inspection using an oscilloscope
1. Trouble detection by heated oxygen sensor output pulse.



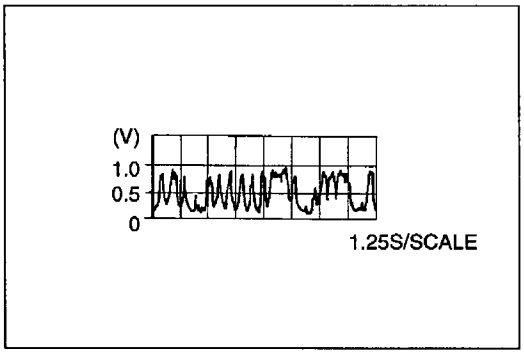
(1) When normal
Engine condition
No-load idling after warm-up



(2) No injection in one cylinder
Engine condition
No-load idling after warm-up
Pulse detected
Pulse cycle extremely short

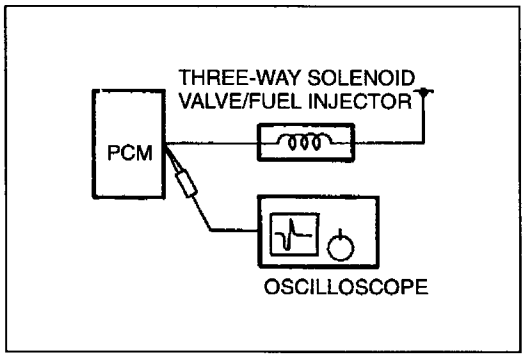


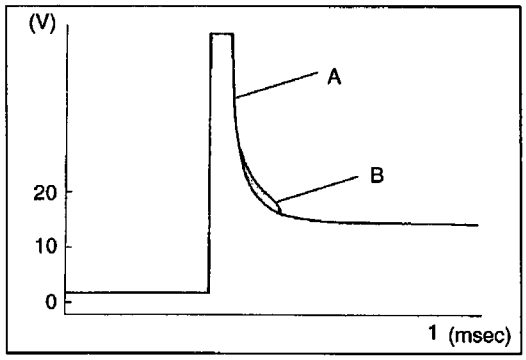
(3) No ignition in one cylinder
Engine condition
No-load idling after warm-up
Pulse detected
Pulse cycle longer than normal pulse
Rich spike caused by unburnt gas in misfiring cylinder observed



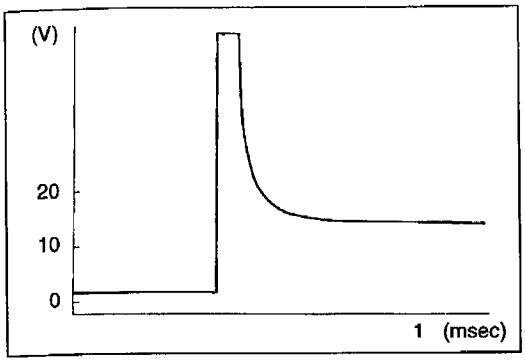
(4) Exhaust gas flown in cylinder
Engine condition
No-load idling after warm-up
Pulse detected
Pulse width and cycle irregular

2. Plunger sticking detection using an oscilloscope.





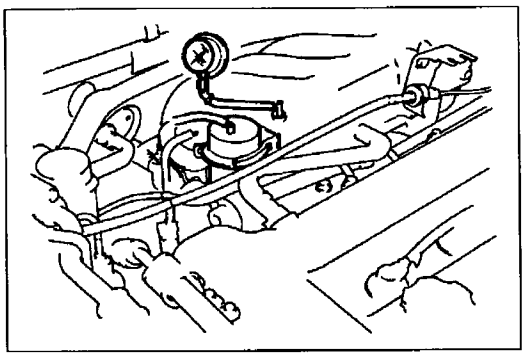
(1) When normal
Counter electromotive voltage A, generated when the three-way solenoid valve or the fuel injector is turned off from on, shows irregular convergence because induced electromotive voltage B, generated by the plunger return operation, is added to it.



(2) When plunger stuck
When the plunger is stuck, pulse convergence is smooth because no induced electromotive voltage B is generated.

Trouble judgement by spark plug conditions

Condition	Possible cause	page
Carbon accumulated on some spark plugs only	Fuel leakage from fuel injector Damaged spark plug (Cracked insulator) Low compression	☞ **page F2–22** ☞ **section G** ☞ **section B2**
Some spark plugs wet	Excessive fuel injection from fuel injector Damaged spark plug Low compression	☞ **page F2–23** ☞ **section G** ☞ **section B2**
Some spark plugs look grayish white	Insufficient fuel injection from fuel injector	☞ **page F2–23**



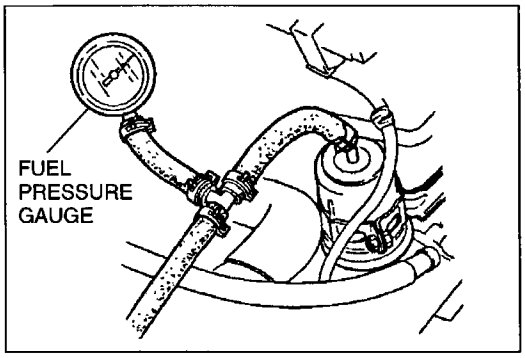
SYSTEM INSPECTION

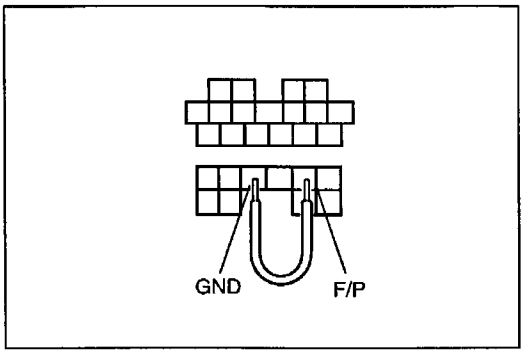
Intake Manifold Vacuum Inspection

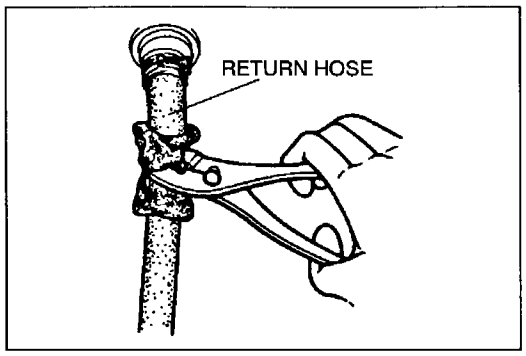
1. Verify that the intake-air system hoses are fitted securely.
2. Disconnect the vacuum hose from the pressure regulator and connect to vacuum gauge as shown.
3. Start the engine and let it idle.
4. Measure the intake manifold vacuum by using a vacuum gauge.

   Vacuum: More than 60 kPa { 450 mmHg , 18 inHg }

5. If not as specified, check following
   - Air suction at:
     Throttle body installation point
     Intake manifold installation point
     PCV valve installation point
   - Accelerator cable free play (Refer to page F2–10.)
   - Engine compression (Refer to section B2.)







Fuel Line Pressure Inspection

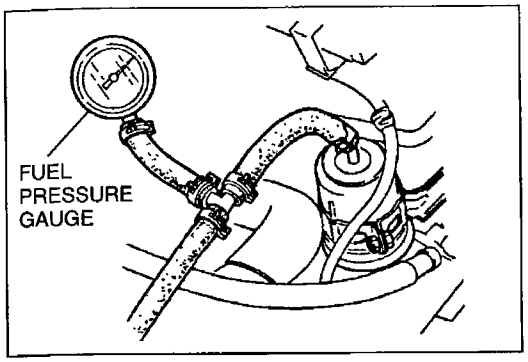
Warning

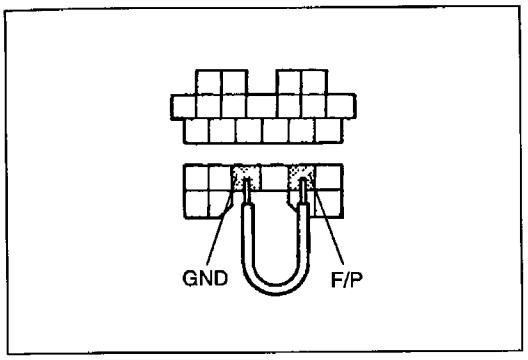
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F2–11.**

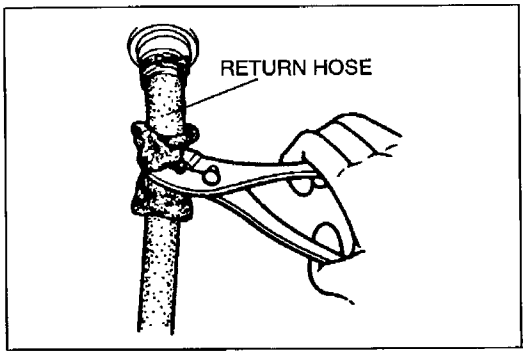
1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge between the fuel filter (high pressure side) and fuel distributor.
3. Connect the negative battery cable.
4. Connect data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON and measure the fuel line pressure.

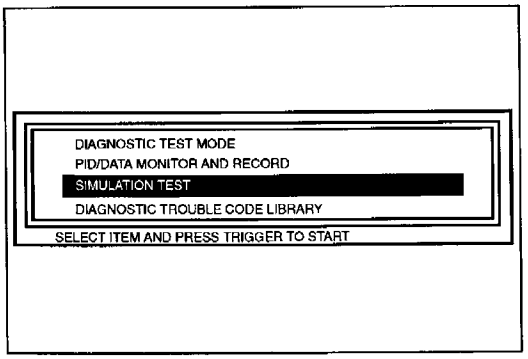
   Specification:
   280—310 kPa { 2.8—3.2 kgf/cm^2 , 40—45 psi }

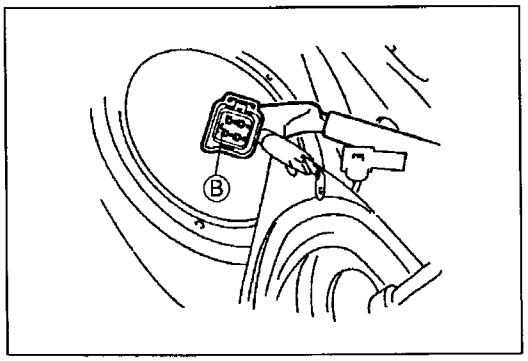
6. Turn off the ignition switch and disconnect the jumper wire.
7. If the pressure is higher than specified, check the fuel pump maximum pressure. (Refer to page F2–21.)
   If normal, check the pressure regulator, or fuel return hose is clogged.
8. If the pressure is lower than specified, measure the fuel line pressure with pinching the return hose.
   - If the fuel line pressure quickly increases, check the pressure regulator. (Refer to page F2–23, 24.)
   - If the fuel line pressure gradually increases, check the fuel pump maximum pressure. (Refer to page F2–21.)
9. If the pressure is normal, check the clogging between fuel pump and pressure regulator.











Fuel Pressure Hold Inspection

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F2–11.**

1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge between the fuel filter (high pressure side) and fuel distributor.
3. Connect the negative battery cable.
4. Connect data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON for approx. 10 sec. to operate the fuel pump.
6. Turn off the ignition switch. Wait for 5 min., and measure the fuel pressure.

Specification:
More than 150 kPa { 1.5 kgf/cm^2 , 21 psi }

7. Disconnect the jumper wire.
8. If the pressure is lower than specified, measure the fuel line pressure with pinching the return hose.
   - If the fuel line pressure holds, replace the pressure regulator. (Refer to page F2–18.)
   - If the fuel line pressure dose not hold, check the fuel pump fuel hold pressure. (Refer to page F2–21.)
     If the fuel pump fuel hold pressure is normal, check the fuel leaks from fuel line and fuel injector.

Fuel Pump Operation Inspection

1. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
2. Remove the fuel filler cap.
3. Turn the ignition switch to ON.
4. Select the SIMULATION TEST function on the NGS display.
5. Turn the fuel pump relay from OFF to ON by using the "FP RLY". Operate the fuel pump relay and check if operation sound of the fuel pump is heard.
   (1) If the operation sound is heard, do as follows.
      I. Measure the voltage at terminal B of the fuel pump connector (harness side).
      Voltage: Battery positive voltage (Ignition switch: ON)
      II. If the voltage is correct, check the following.
      - Continuity of the fuel pump
        (Refer to page F2–21.)

      III. If the voltage is not correct, check the following.
      - Wiring harnesses and connectors
        (Fuel pump relay — Fuel pump)

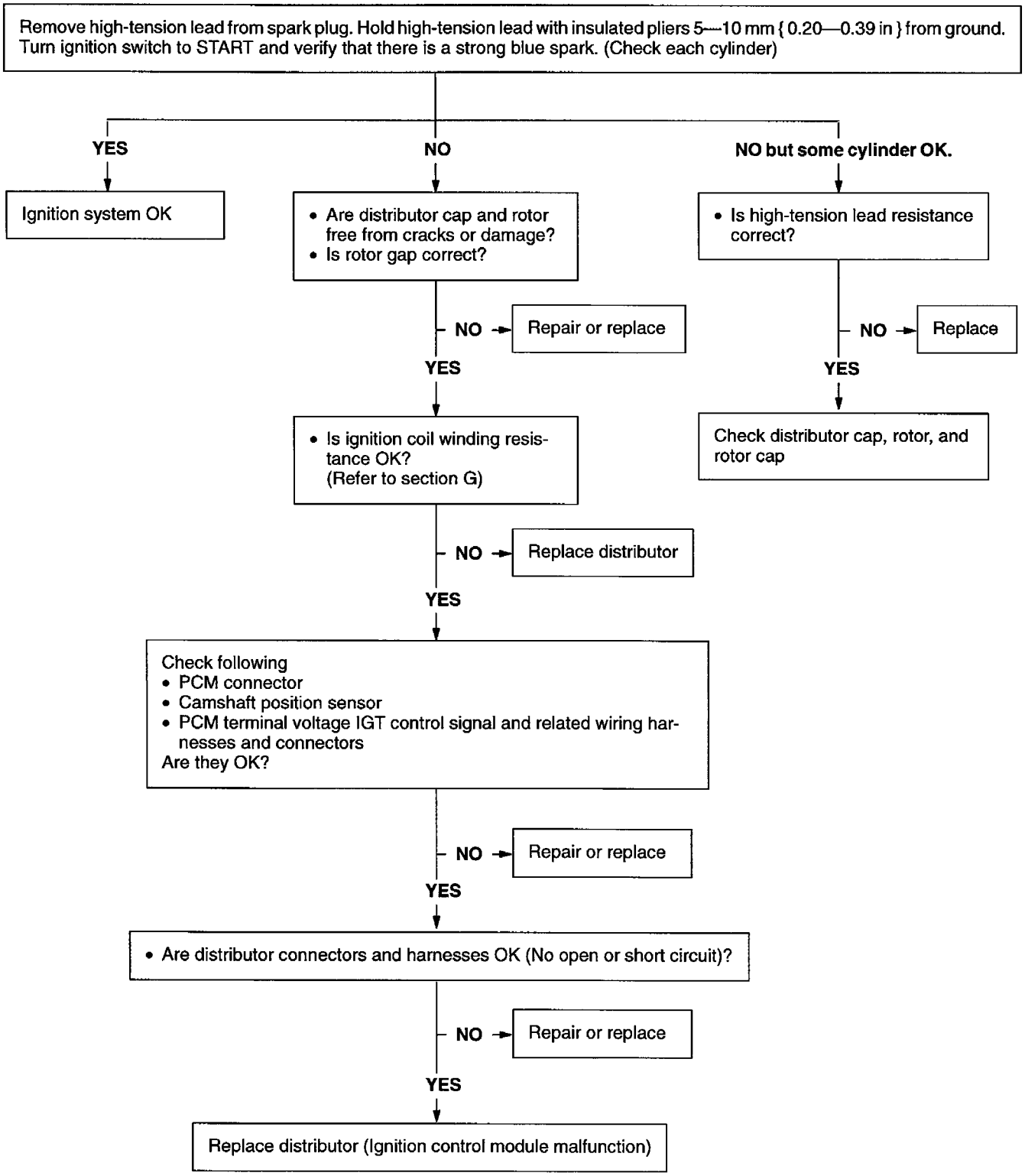
   (2) If the operation sound is not heard, check the following.
      - Fuel pump relay (Refer to page F2–24.)
      - Wiring harnesses and connectors
        (Main relay — Fuel pump relay — PCM)

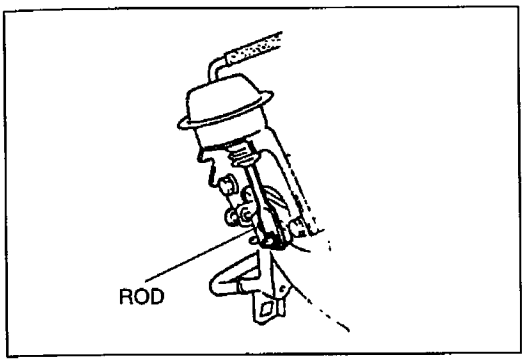
Spark Test

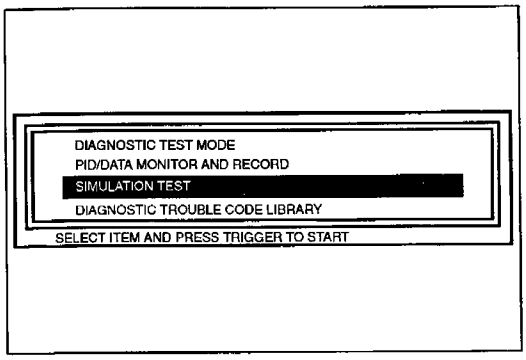
1. Remove the rear seat cushion. (Refer to section S.)
2. Disconnect the fuel pump connector. (Refer to page F2–16.)
3. Verify that each high-tension lead and connector is connected properly.
4. Inspect the ignition system in the following procedure.

Warning

- **High voltage in the ignition system can cause strong electrical shock. Avoid direct contact to the vehicle body during the following spark test.**







VICS Operation Inspection

1. Start the engine.
2. Verify that the rod of the VICS shutter valve actuator is pulled.
3. If the rod is not pulled, do as follows.
   (1) Stop the engine.
   (2) Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
   (3) Verify that diagnostic trouble code No. P1523 is not displayed. If code No. P1523 is shown, carry out trouble shooting of the code No. P1523. (Refer to page F2–89.)
   (4) If diagnostic trouble codes are not shown, do as follows.
      I. Start the engine and run it at idle.
      II. Select the SIMULATION TEST function on the NGS display.
      III. Turn the VICS solenoid valve from ON to OFF by using the "VICSV" and check if operation sound of the solenoid valve is heard.
      IV. If the operation sound is heard, check the following.
         • Loose or damaged vacuum hose and vacuum chamber
         • Shutter valve actuator (Refer to page F2–8.)
      V. If the operation sound is not heard, check the following.
         • VICS solenoid valve (Refer to page F2–9.)
4. Check the rod operation under the following conditions.

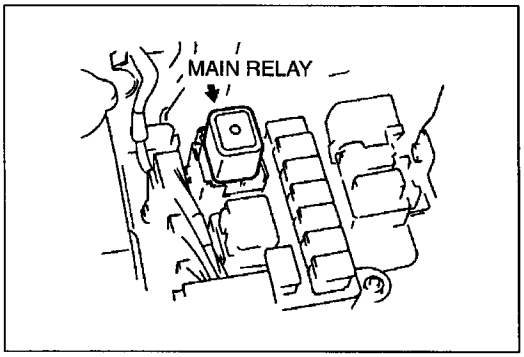
Rod operation

Engine speed (rpm)	4900	
Shutter valve actuator	Not operate	Operate

5. If the rod operation is not as specified, do as follows.
   (1) Stop the engine.
   (2) Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
   (3) Verify that diagnostic trouble code No. P1523 is not displayed. If code No. P1523 is shown, carry out troubleshooting of the code No. P1523. (Refer to page F2–89.)
   (4) If diagnostic trouble codes are not shown, do as follows.
      I. Start the engine and run it at idle.
      II. Select the SIMULATION TEST function on the NGS display.
      III. Turn the VICS solenoid valve from ON to OFF by using the "VICSV" and check if operation sound of the solenoid valve is heard.
      IV. If the operation sound is heard, check the following.
         • Shutter valve actuator (Refer to page F2–8.)
      V. If the operation sound is not heard, check the following.
         • VICS solenoid valve (Refer to page F2–9.)

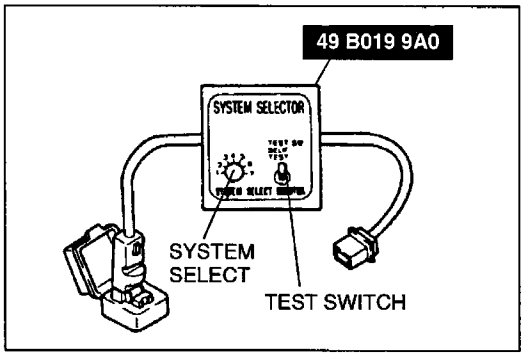
Note

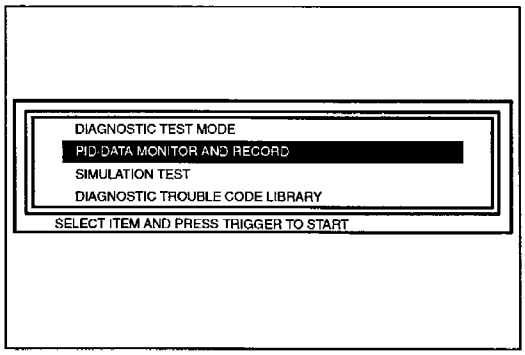
- The shutter valve actuator rod extends for five seconds after the engine is started.



Main Relay Operation Inspection

1. Verify that the main relay clicks when the ignition switch is turned to ON and OFF.
2. If there is no operation sound, inspect the following.
   - Main relay (Refer to page F2–53.)
   - Harness and connector between ignition switch and main relay.

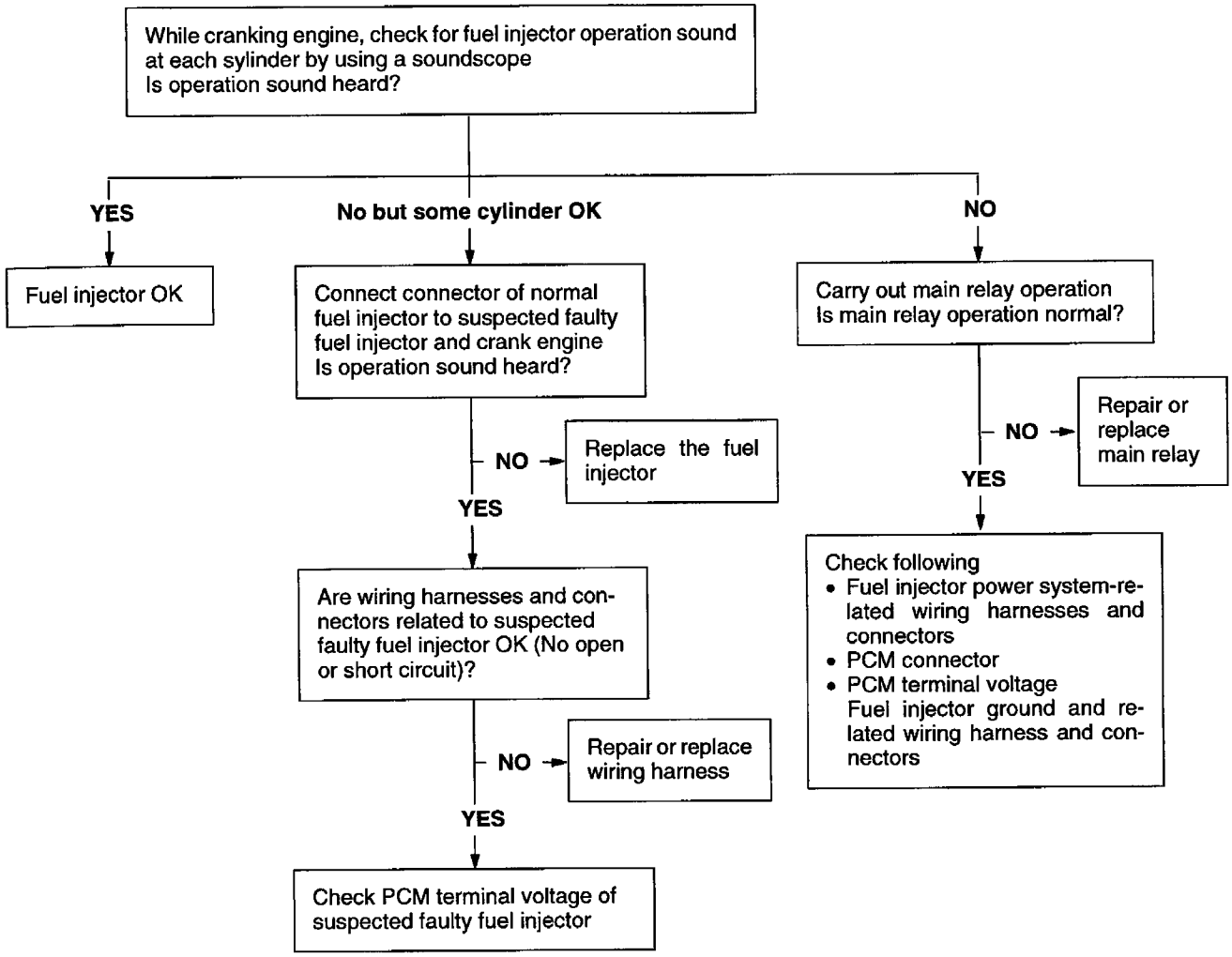




BAC Valve Operation Inspection

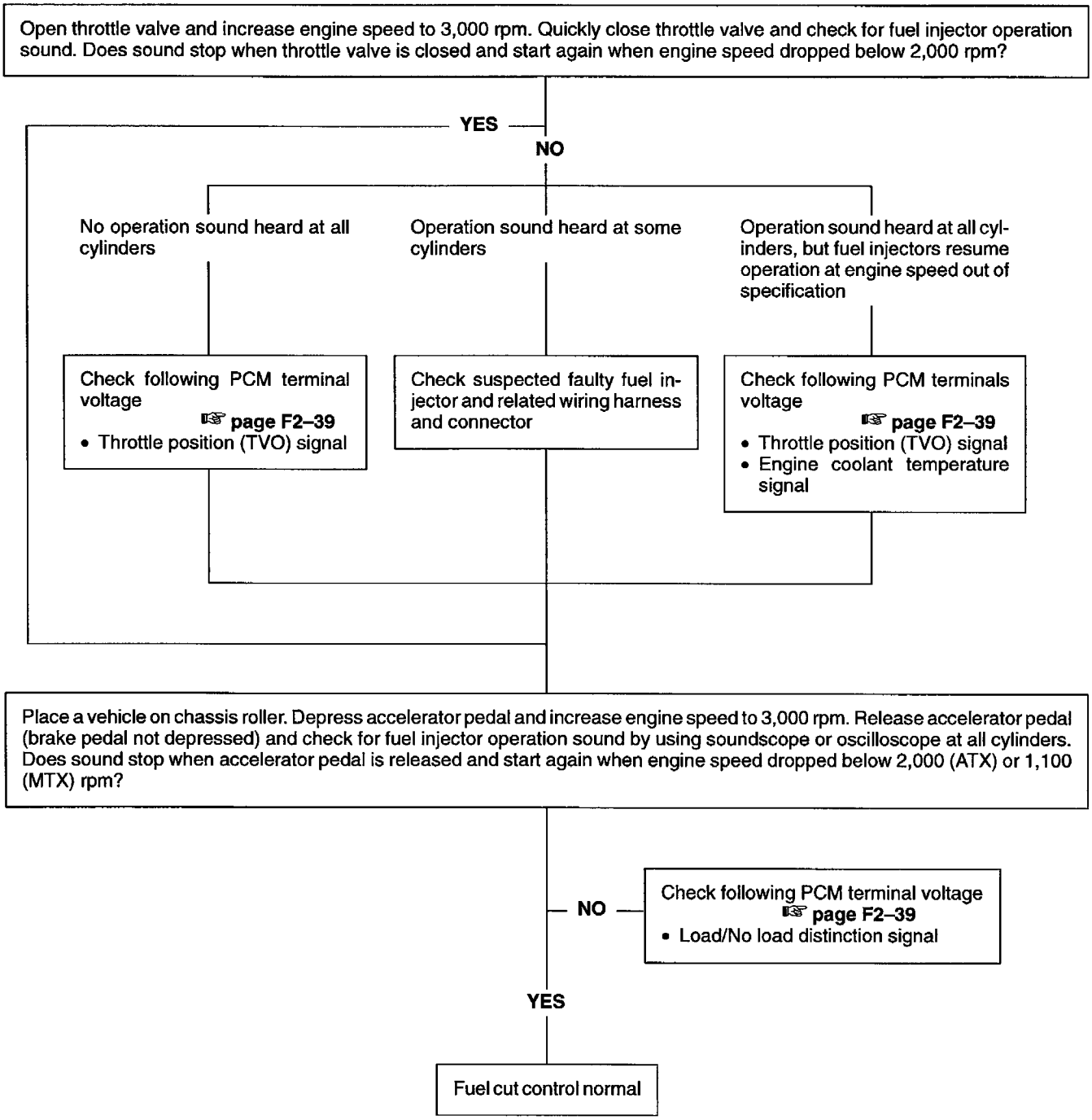
1. Connect the **SST** (System Selector) to the data link connector.
2. Set switch A to position 1.
3. Set the test switch to SELF TEST.
4. Connect the **SSTs** (NGS) to the data link connector–2.
5. Select the PID/DATA MONITOR AND RECORD function.
6. Verify that the engine is cold condition, and start the engine.
7. Select the "RPM" on the NGS display.
8. Verify that the engine speed decreases as the engine warms up.
9. Disconnect the **SST** (System Selector).
10. If the engine speed will not decrease or decreases slowly, check the water hose connected to BAC valve for leakage and clogs. (Refer to section E.)
11. If the water hose is OK, inspect the following.
    - Air valve (Refer to page F2–8.)
    - IAC valve (Refer to page F2–8.)

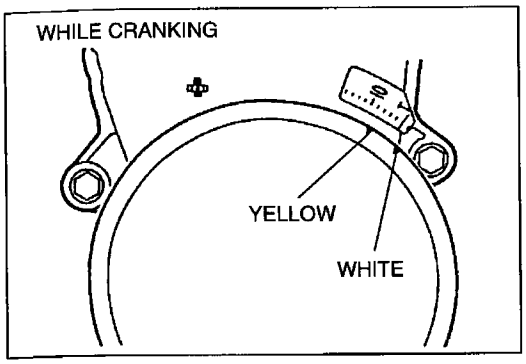
Fuel Injector Operation Inspection

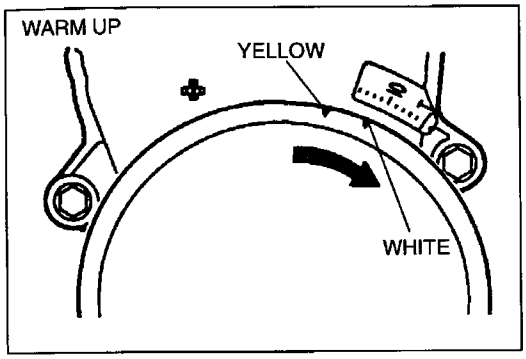


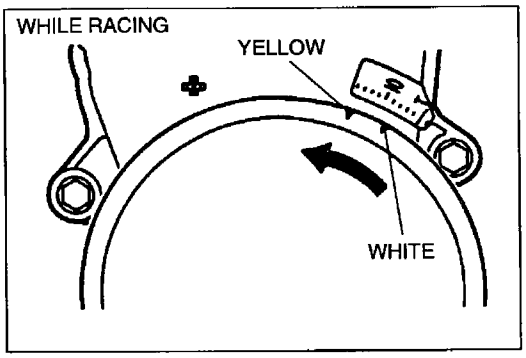
Fuel Cut Control Inspection

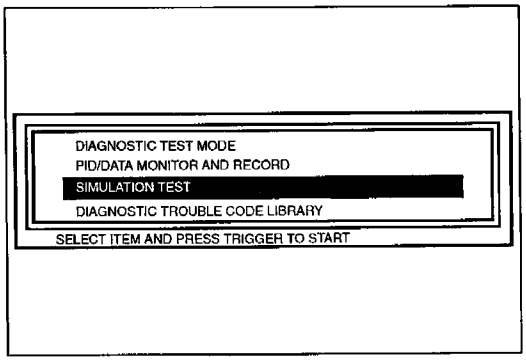
1. Warm up the engine to normal operating temperature.
2. Turn off the A/C switch.
3. Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
4. Select the PID/DATA MONITOR AND RECORD function on the NGS display.
5. Select the "RPM".
6. Using a soundscope, listen for the fuel injector operation sound at all cylinders.











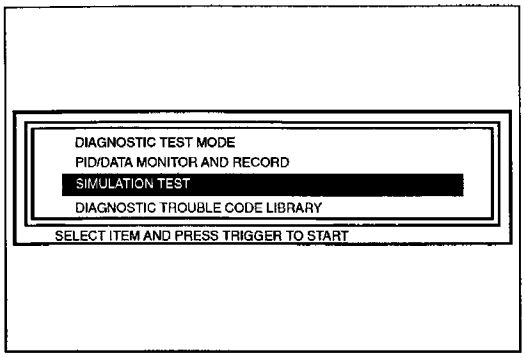
Ignition Timing Control Inspection

1. Connect a timing light to the engine.
2. Crank the engine.
3. Verify that the timing mark (yellow) on the crankshaft pulley and the mark on the timing belt cover are aligned.

   Specification: BTDC 6—8 ° (7 ± 1 °)
4. If not as specified, loosen the lock bolt and adjust by turning distributor.
5. If adjustment by turning distributor is not possible, check following.
   - PCM terminal voltage
     IGT control signal and related wiring harnesses and connectors.
   - Camshaft position sensor (Refer to page F2–45.)
   - Ignition control module (Refer to section G) and related wiring harnesses and connectors.
6. Connect the **SST** (System Selector) to the data link connector.
7. Set switch A to position 1.
8. Set the test switch to SELF TEST.
9. Start the engine.
10. Verify that spark retards as the engine warm up.
11. If not, check the following.
    - Engine coolant temperature sensor
      (Refer to page F2–48.)
12. Disconnect the **SST** (System Selector).
13. Warm up the engine to normal operation temperature.
14. Verify that the ignition timing is correct.
    (Refer to page F2–2.)
15. Increase the engine speed and verify that the ignition timing advances accordingly.
16. If not, check following
    - Mass air flow sensor (Refer to page F2–44.)

Purge Control Inspection

1. Start and warm up the engine to normal operating temperature.
2. Let the engine idle.
3. Disconnect the vacuum hose between the purge solenoid valve and the charcoal canister.
4. Put a finger to the purge solenoid valve and verify that there is no vacuum applied.
5. If there is vacuum, do as follows.
   (1) Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
   (2) Verify that diagnostic trouble code No. P0443 is not displayed. If code No. P0443 is shown, carry out troubleshooting of the code No. P0443.
   (Refer to page F2–75.)
   (3) If diagnostic trouble codes are not shown, check the following.
   - Purge solenoid valve (Refer to page F2–32.)
6. Reconnect the vacuum hose.
7. Connect the **SSTs** (NGS) to the data link connector–2.
8. Select the SIMULATION TEST function on the NGS display.
9. Increase the duty value of the purge solenoid valve from 0% to 100% by using the "PRGV". Operate the purge solenoid valve and check if the idle condition changes.

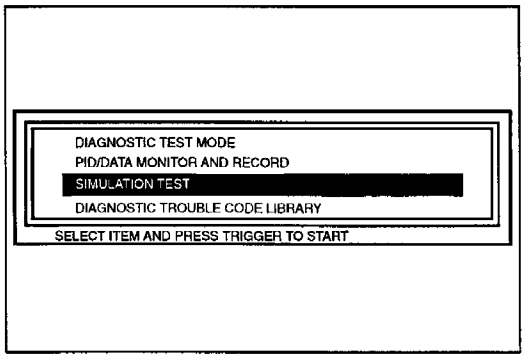


10. If the condition does not change, do as follows.
    (1) Turn the ignition switch to ON.
    (2) Verify that diagnostic trouble code No. P0443 is not displayed. If code No. P0443 is shown, carry out troubleshooting of the code No. P0443. (Refer to page F2–75.)
    (3) Select the SIMULATION TEST function on the NGS display.
    (4) Increase duty value of the purge solenoid valve from 0% to 100% by using the "PRGV". Operate the purge solenoid valve and check if the operation sound of the valve is heard.

        I. If the operation sound is heard, check the following.
           • Loose or damaged vacuum hose
        II. If the operation sound is not heard, check the following.
           • Purge solenoid valve (Refer to page F2–32.)

Idle Air Control Inspection

1. Start the engine and run it at idle.
2. Disconnect the IAC valve connector and verify that the engine rotation changes.
3. If the engine condition will not change, do as follows.
    (1) Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
    (2) Vefity that diagnostic trouble code No. P0505 is not displayed. If code No. P0505 is shown, carry out troubleshooting of the code No. P0505.
    (3) Select the SIMULATION TEST function on the NGS display.
    (4) Change the duty value of the IAC valve to 100% by using the "IACV" and vefity that the idle speed increases.
        a. If the idle speed increases, replace the PCM. (Refer to page F2–36.)
        b. If the idle speed does not change. Replace the IAC valve. (Refer to page F2–7.)
4. Warm up the engine to normal operating temperature and run it at idle.
5. Turn the electrical loads ON and vefity that the engine speed is with in the specification.



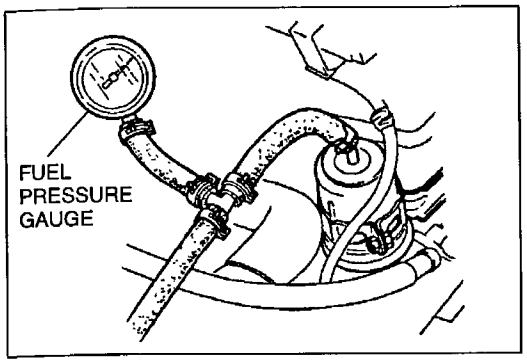
Engine speed (rpm)

Load condition	Idle speed (rpm)	
	MTX	ATX
Fan switch ON at 2nd or higher	700—800	700—800
Headlight switch ON		
Rear window defroster switch ON		
P/S ON		
A/C ON		

Note

- Excludes temporary idle speed drop just after the electrical loads are turned on.

6. If not as specified, check the related switches and wiring harnesses.



Pressure Regulator Control Inspection

Warning

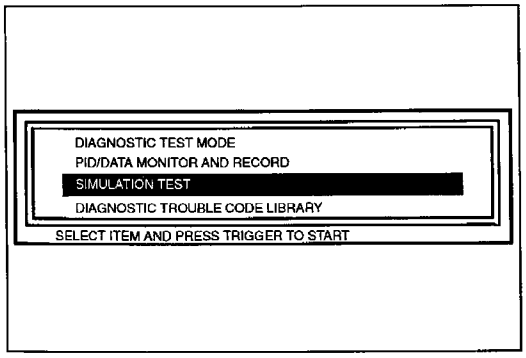
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures". (Refer to page F2–11.)**

1. Install the fuel pressure gauge.
2. Measure the fuel pressure under the following conditions.

Specifications

	Fuel pressure kPa { kgf/cm², psi }		
Idling	216—264 { 2.2—2.7 , 32—38 }	216—264 { 2.2—2.7 , 32—38 }	More than 284 { 2.9 , 41.2 }
During 150 sec. of hot start	More than 284 { 2.9 , 41.2 }		
After 150 sec. of hot start	216—264 { 2.2—2.7 , 32—38 }		
Judgement	Normal	Not normal (Perform Inspection 1)	Not normal (Perform Inspection 2)

3. If the fuel pressure is not within the specification. Carry out either Inspection 1 or Inspection 2.



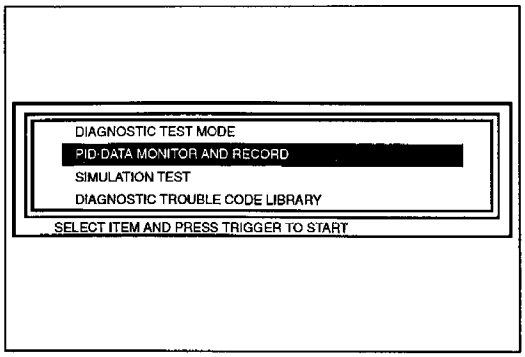
Inspection 1

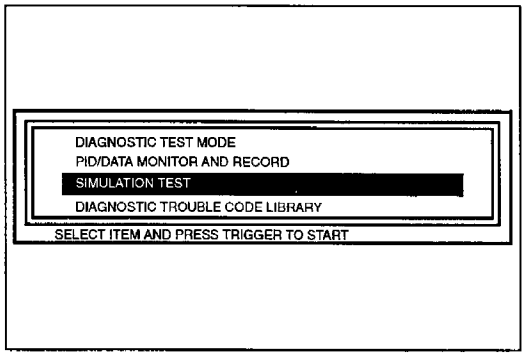
1. Stop the engine.
2. Connect the **SSTs** (NGS) to the data link connector–2.
3. Verify that diagnostic trouble code No. P1250 is not displayed. If code No. P1250 is shown. Carry out troubleshooting of the code No. P1250. (Refer to page F2–82.)
4. Start the engine and run it at idle.
5. Select the SIMULATION TEST function on the NGS display.
6. Turn the PRC solenoid valve from OFF to ON by using the "PRCV" and check if the fuel pressure changes.

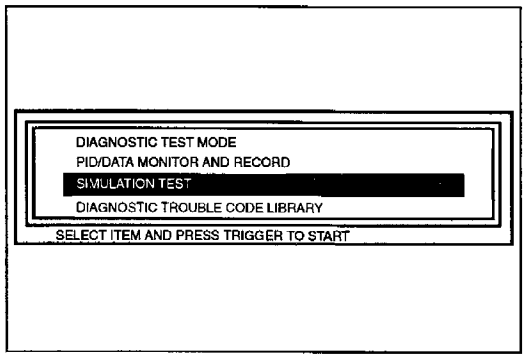
   (1) If the pressure changes, check the following
   - PCM terminal voltage (Refer to page F2–39.)
   - Engine coolant temperature signal
   - Intake air temperature signal
   - Throttle position signal

   (2) If the pressure does not change, do as follows.
   I. Stop the engine.
   II. Turn the ignition switch to ON.
   III. Turn the PRC solenoid valve from OFF to ON by using the "PRCV" and check if the operation sound of the valve is heard.
   a. If the operation sound is heard, check the following.
   - Pressure regulator (Refer to page F2–23.)

   b. If the operation sound is not heard, check the following.
   - PRC solenoid valve (Refer to page F2–24.)







Inspection 2

1. Stop the engine.
2. Connect the **SSTs** (NGS) to the data link connector–2.
3. Verify that diagnostic trouble code No. P1250 is not displayed. If code No. P1250 is shown. Carry out troubleshooting of the code No. (Refer to page F2–82.)
4. Select the PID/DATA MONITOR AND RECORD function on the NGS display.
5. Select the "PRCV" and verify that the PRC solenoid valve is OFF.
6. If the PRC solenoid valve is ON, check the following.
   - PCM terminal voltage (Refer to page F2–39.)
   - Engine coolant temperature signal
   - Intake air temperature signal
7. Select the SIMULATION TEST function on the NGS display.
8. Turn the PRC solenoid valve from OFF to ON using the "PRCV" and check if the operation sound of the valve is heard.

   (1) If the operation sound is heard, check the following.
   - Loose or damaged vacuum hose between the pressure regulator, PRC solenoid valve, and intake manifold.

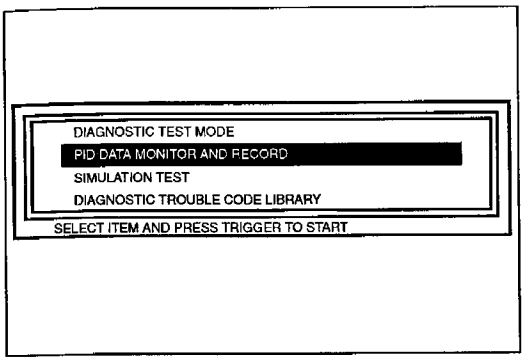
   (2) If the operation sound is not heard, check the following.
   - PRC solenoid valve (Refer to page F2–24.)

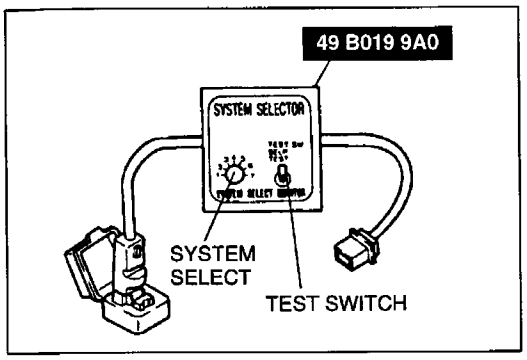
EGR Control Inspection

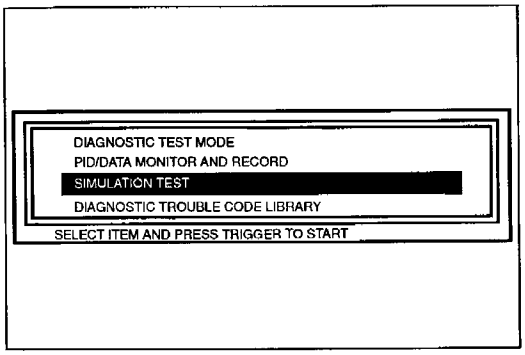
1. Connect the **SSTs** (NGS) to the data link connector–2.
2. Start the engine and let it idle.
3. Select the SIMULATION TEST function on the NGS display.
4. Increase the duty value of EGR solenoid valve (vacuum) from 0% to 100% by using the "EGRVAC". Operate the EGR solenoid valve (vacuum) and check if the engine speed becomes unstable or the engine stalls.
5. If the engine speed will not change, stop the engine and do as follows.
   (1) Turn the ignition switch to ON.
   (2) Verify that diagnostic trouble code No. P1485, P1486 is not displayed. If code No. P1485, P1486 is shown, carry out troubleshooting of the code No. P1485, P1486. (Refer to page F2–87.)
   (3) Increase the duty value of the EGR solenoid valve (vacuum) from 0% to 100% by using the "EGRVAC". Operate the EGR solenoid valve and check if operation sound of the valve is heard.

   I. If the operation sound is heard, check the following.
   - Loose or damaged vacuum hose
   - EGR valve (Refer to page F2–32.)
   - EGR solenoid valve (vent) (Refer to page F2–33.)

   II. If the operation sound is not heard, check the following.
   - EGR solenoid valve (vacuum) (Refer to page F2–33.)







Cooling Fan Control Inspection

1. Verify that the engine is cold.
2. Turn the ignition switch to ON.
3. Verify that the cooling fan is not operating.
4. If the cooling fan is operating, do as follows.
   (1) Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
   (2) Select the PID/DATA MONITOR AND RECORD function on the NGS display.
   (3) Select the "FANC" and verify that the cooling fan control signal is OFF.

   I. If the cooling fan control signal is ON, check the following.
   - PCM terminal voltage (Refer to page F2–39.)
   - Engine coolant temperature signal

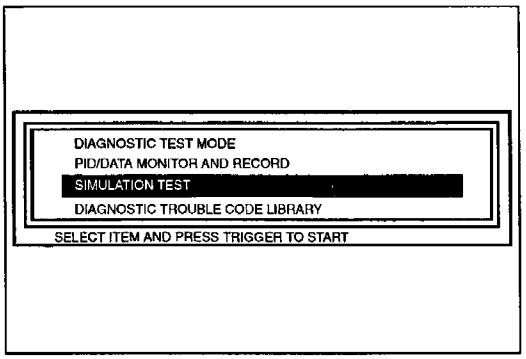
   II. If the cooling fan control signal is OFF, check the following.
   - Cooling fan relay (Refer to page section E.)
   - Short circuit in wiring harnesses and connectors (Main relay — Cooling fan relay — PCM)

5. Connect the **SST** (System Selector) to the data link connector.
6. Set switch A to position 1.
7. Set the test switch to SELF TEST.
8. Depress the accelerator pedal and verify that the cooling fan operates.
9. If the cooling fan does not operate, do as follows.
   (1) Connect the **SSTs** (NGS) to the data link connector–2.
   (2) Select the SIMULATION TEST function on the NGS display.
   (3) Turn the cooling fan relay from OFF to ON by using the "FANC" and check for the cooling fan operation.

   I. If the cooling fan operates, check the following.
   - PCM terminal voltage (Refer to page F2–39.)
   - Test mode signal
   - Throttle position signal

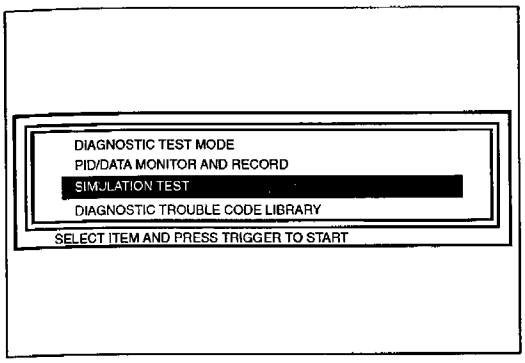
   II. If the cooling fan does not operate, do as follows.
   a. Turn the cooling fan relay from OFF to ON by using the simulation function. Operate the cooling fan relay and check it the operation sound of the relay is heard.
   b. If the operation sound is heard, check the following.
   - Wiring harnesses and connectors (Cooling fan relay — Cooling fan motor)
   - Cooling fan motor (Refer to section E.)

   c. If the operation sound is not heard, check the following.
   - Cooling fan relay (Refer to section E.)
   - Open circuit in wiring harnesses and connectors (Main relay — Cooling fan relay — PCM)



Condenser Fan Relay

1. Verify that the A/C switch and fan switch are OFF.
2. Start the engine and let it idle.
3. Verify that the condenser fan is not operating.
4. If the condenser fan is operating, check the short circuit in wiring between condenser fan relay and PCM terminal1B.
5. Turn the A/C switch and fan switch on.
6. Verify that the condenser fan is operating.
7. Turn the A/C switch and fan switch off.
8. If the condenser fan does not operate, do as follows
   (1) Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
   (2) Select the SIMULATION TEST function on the NGS display.
   (3) Turn the condenser fan relay from OFF to ON by using the "FANN" and check for the condenser fan operation.
      I. If the condenser fan operates, check the following.
         • PCM terminal voltage (Refer to page F2–39.)
         • A/C signal
      II. If the condenser fan does not operate, do as follows.
         a. Turn the condenser fan relay from OFF to ON by using the simulation function. Operate the condenser fan relay and check if the operation sound of the relay is heard.
         b. If the operation sound is heard, check the following.
            • Wiring harness and connectors (Condenser fan relay — Condenser fan motor)
            • Condenser fan motor (Refer to section U.)
         c. If the operation sound is not heard, check the following.
            • Condenser fan relay (Refer to section U.)
            • Open circuit in wiring harness and connectors (Main relay — Condenser fan relay — PCM)



A/C Cut-off Control Inspection

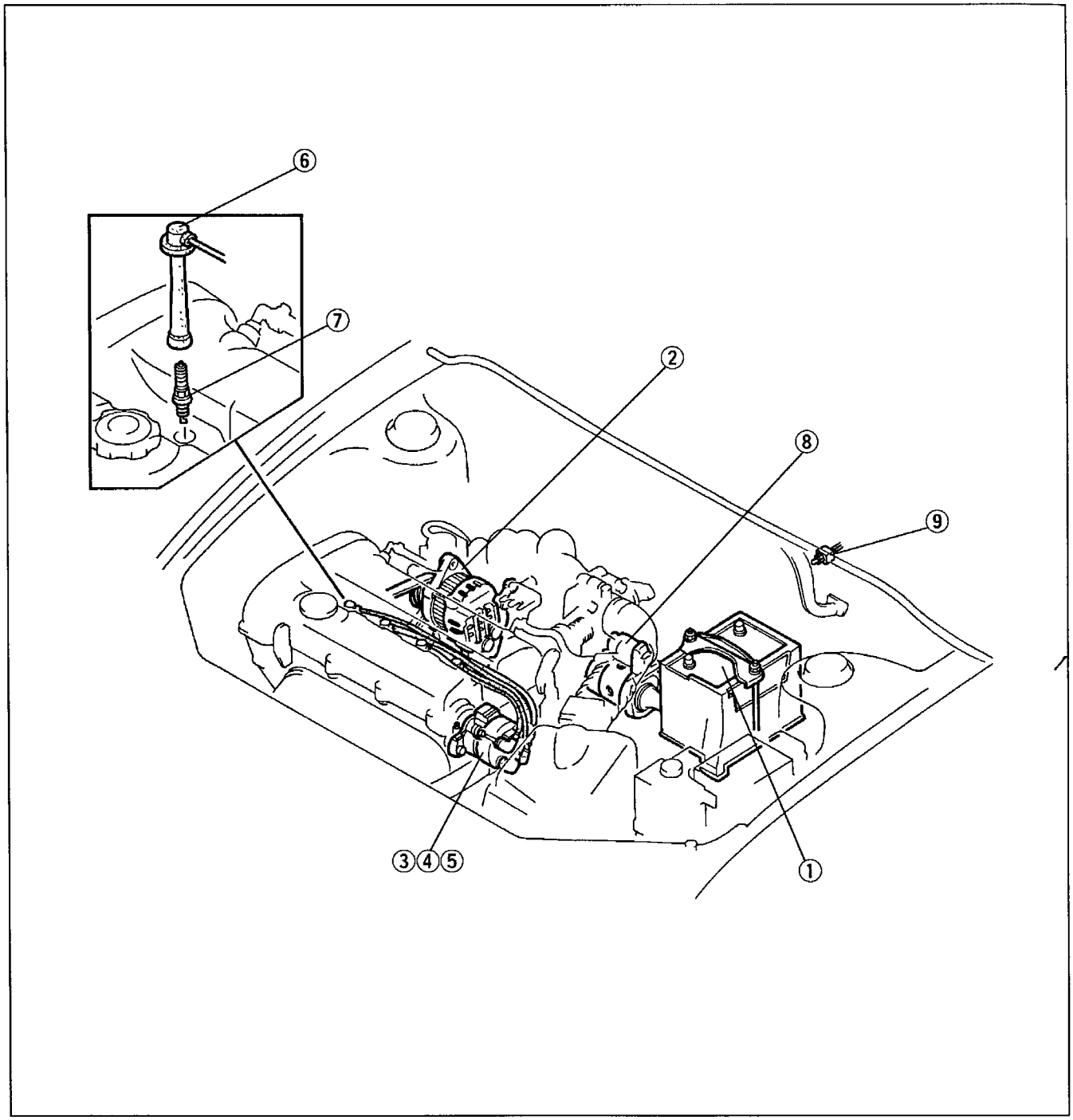
1. Start the engine and let it idle.
2. Turn the A/C switch and the fan switch ON.
3. Fully open the throttle valve. Then 3—6 seconds after, check if the operation sound of the A/C compressor electromagnetic clutch is heard.
4. If the operation sound is not heard, do as follows.
   (1) Connect the **SSTs** (NGS) to the data link connector–2. (Refer to page F2–38.)
   (2) Select the SIMULATION TEST function on the NGS display.
   (3) Turn the A/C relay from OFF to ON by using the "A/C RLY" function and check for the operation sound of the relay.
      I. If the operation sound is heard, check the following.
         • PCM terminal voltage (Refer to page F2–39.)
           • Load/no load judgement signal
           • Throttle position signal
      II. If the operation sound is not heard, check the following.
         • A/C relay (Refer to section U.)
         • Open circuit in wiring harnesses and connectors (Main relay — A/C relay — PCM)

Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

ENGINE ELECTRICAL SYSTEM

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OUTLINE

SPECIFICATIONS

Item \ Engine/Transaxle				Z5		BP	
				MTX	ATX	MTX	ATX
Battery	Electrolyte gravity			1.27—1.29 [20 °C { 68 °F }]			
	Dark current*1		mA	Max. 20			
Generator	Output		V—A	12—65		12—70	
	Rotor resistance (Between slip rings)		Ω	2.5—2.9 [20 °C { 68 °F }]		3.5—4.5 [20 °C { 68 °F }]	
	Brush length	Standard	mm { in }	20.0 { 0.79 }		16.5 { 0.65 }	
		Minimum	mm { in }	5.0 { 0.20 }		8.0 { 0.32 }	
	Brush spring force	Standard	N { kgf , lbf }	4.71—5.88 { 0.48—0.60 , 1.06—1.32 }		3.14—4.31 { 0.32—0.44 , 0.71—0.96 }	
		Minimum	N { kgf , lbf }	2.36—3.13 { 0.24—0.32 , 0.53—0.70 }		1.57—2.35 { 0.16—0.24 , 0.36—0.52 }	
Ignition coil	Resistance	Primary coil*2	Ω	0.49—0.73 [20 °C { 68 °F }]		—	
		Secondary coil	kΩ	20—31 [20 °C { 68 °F }]			
Distributor	Gap		mm { in }	0.9 { 0.04 }			
	Firing order			1—3—4—2			
High-tension lead	Resistance		kΩ/m	16 [20 °C { 68 °F }]			
Spark plug	Plug gap		mm { in }	1.0—1.1 { 0.040—0.043 }			
	Resistance		kΩ	3.0—7.5 [20 °C { 68 °F }]			
	Tightening torque		N·m { kgf·m , ft·lbf }	15—22 { 1.5—2.3 , 11—16 }			
Starter	Commutator diameter	Standard	mm { in }	32.0 { 1.26 }		29.4 { 1.16 }	
		Minimum	mm { in }	31.4 { 1.24 }		28.8 { 1.14 }	
	Brush length	Standard	mm { in }	17.0 { 0.67 }		12.5 { 0.49 }	
		Minimum	mm { in }	11.5 { 0.46 }		7.0 { 0.28 }	
	Brush spring force	Standard	N { kgf , lbf }	20.6 { 2.10 , 4.62 }		17.7 { 1.80 , 3.96 }	
		Minimum	N { kgf , lbf }	6.86 { 0.70 , 1.54 }		5.88 { 0.60 , 1.32 }	
	Pinion gap		mm { in }	0.5—2.0 { 0.020—0.078 }			

*1 Dark current is the constant flow of current present when the ignition switch is OFF (i.e., audio unit, clock, etc.).
*2 Measurement is available for California models only.

CHARGING SYSTEM

BATTERY

Inspection

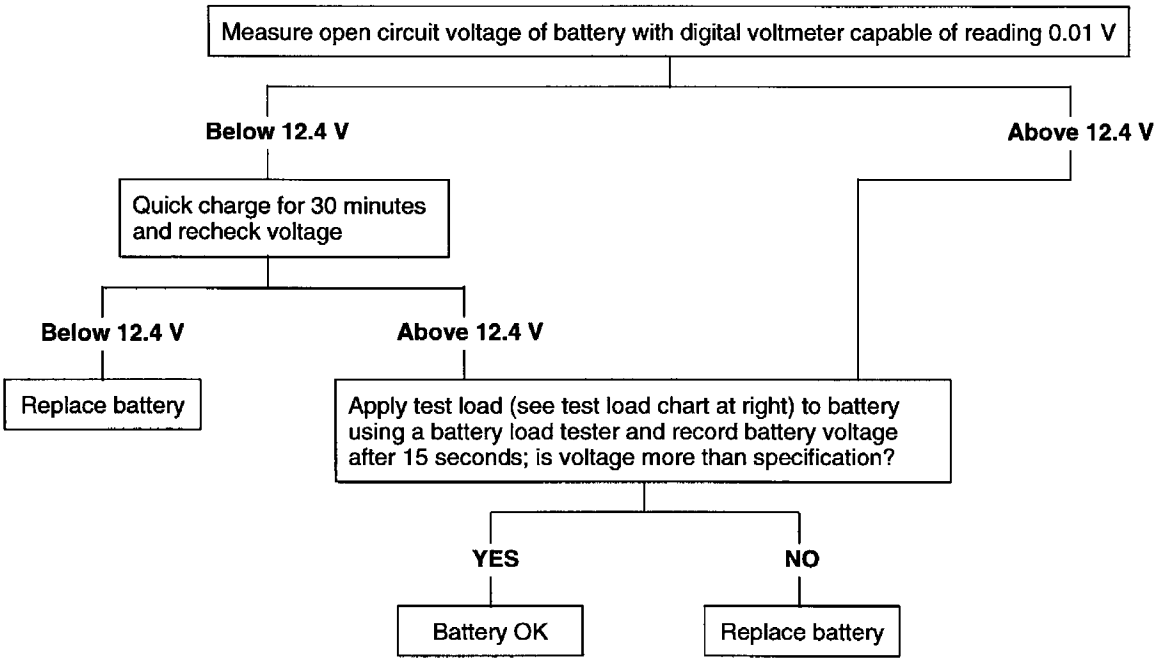
Warning

- **Hydrogen gas is produced during normal battery operation. A battery-related explosion can cause serious injury. Keep all flames (including cigarettes), heat, and sparks away from the top and surrounding area of open battery cells.**

Caution

- **To prevent damage to electrical components or the battery, turn all accessories off and stop the engine before performing maintenance or recharging the battery.**

Check the battery in the following procedure.

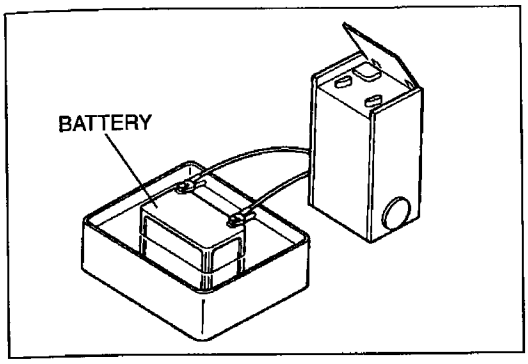


Test load chart

Battery	Load (A)
50D 20L	150
55D 23L	180

Battery voltage with load

Approximate battery temp.	Minimum voltage (V)
21 °C { 70 °F }	9.6
15 °C { 60 °F }	9.5
10 °C { 50 °F }	9.4
4 °C { 40 °F }	9.3
– 1 °C { 30 °F }	9.1
– 7 °C { 20 °F }	8.9
–12 °C { 10 °F }	8.7
–18 °C { 0 °F }	8.5



Recharging

Caution

- **When disconnecting the battery, remove the negative cable first and install it last to prevent damage to electrical components or the battery.**
- **Do not quick charge for over 30 minutes. It will damage the battery.**

1. Place a battery in a pan of water to prevent it from overheating. The water level should come up about halfway on the battery. Keep water off the top of the battery.
2. Connect a battery charger to the battery.
3. Adjust the charging current as follows.

Battery type (5 hour rate)	Slow charge (A)	Quick charge (A)
50D 20L (40)	4.0—5.0	25
55D 23L (48)	4.5—5.5	30

4. After the battery has been recharged, measure the battery voltage and verify that the battery keeps specified voltage for more than 1 hour.

   Specification: Above 12.4 V

5. If not as specified, replace the battery.

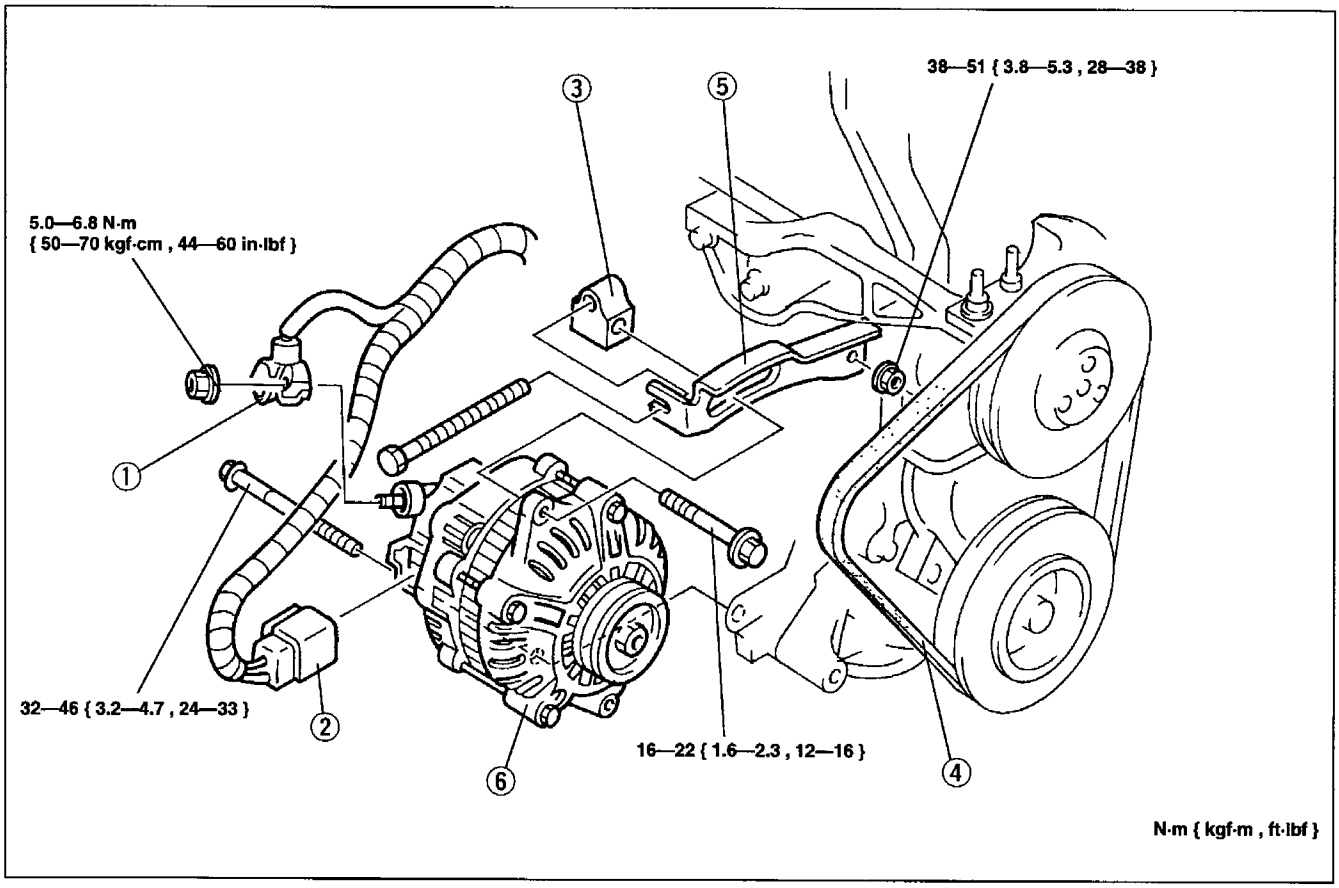
GENERATOR
Removal / Installation

Warning
- **When the battery cables are connected, touching the vehicle body with generator terminal B will generate sparks. This can cause personal injury, fire, and damage to the electrical components. Always disconnect the battery before performing the following operation.**

Caution
- **Reversing the battery connections or using high-voltage testers will damage the rectifier.**
- **Do not start the engine while the connector is disconnected from terminals L and S. It can damage the generator.**

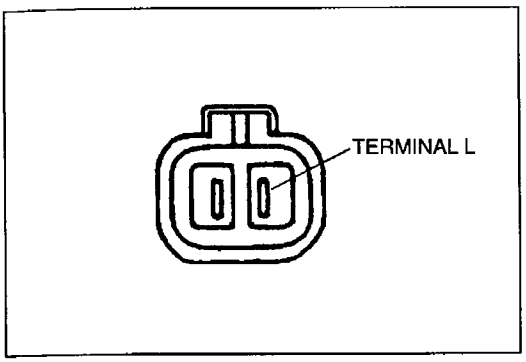
Note
- Battery positive voltage is always present at generator terminal B when the battery is connected.

1. Disconnect the negative battery cable.
2. Remove the pressure pipe stay. (BP) (Refer to section N.)
3. Remove the EGR solenoid valve bracket. (BP) (Refer to section F2.)
4. Remove in the order shown in the figure, referring to **Removal note**.
5. Install in the reverse order of removal.



1. Terminal B wire
2. Connector
3. Belt tensioner
4. Drive belt
   Removal / Installation ..... sections B1, B2
5. Generator stay (BP)
6. Generator
   Removal note ..... below

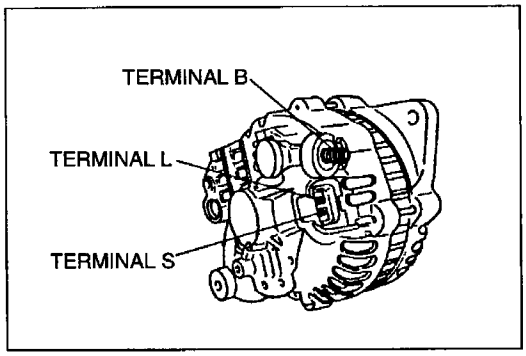
Removal note
Remove the generator from over the vehicle.



Inspection

Warning light inspection

1. Verify that the battery is fully charged.
2. Verify that the drive belt tension is within the specification. (Refer to sections B1, B2.)
3. Turn the ignition switch to ON and verify that the generator warning light illuminates.
4. If not, check the generator warning light and wiring harnesses between the battery and generator warning light, and between the battery and generator terminal L.
5. Turn the ignition switch to START and verify that the generator warning light goes out after engine starts.
6. If not, inspect the generator.



Generator inspection

1. Verify that the drive belt tension is within the specification. (Refer to sections B1, B2.)
2. Turn off all electrical loads.
3. Turn the ignition switch to START and verify that the generator turns smoothly without any noise while the engine is running.
4. Measure the voltage at the terminals shown in the table.

Standard voltage

B+: Battery positive voltage

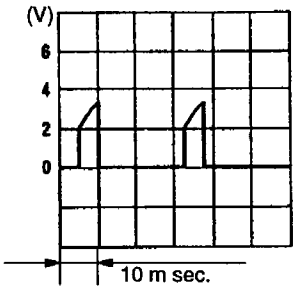
Terminal	Ignition switch ON	Idle [20 °C { 68 °F }]
B	B+	14.1—14.7 V
L	Approx. 1 V	14.1—14.7 V
S	B+	14.1—14.7 V

5. Measure the current at terminal B as shown in the table.

Standard current

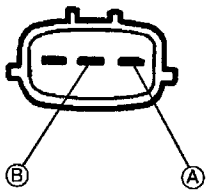
Terminal	Idle (A)	2,000 rpm (A)
B	55	70

6. If the voltage and/or current are not as specified, turn on the following electrical loads one by one. Verify that the current at generator terminal B increases accordingly.
   - **Headlight**
   - **Blower motor**
   - **Rear window defroster**
7. If not, disassemble and inspect the generator.

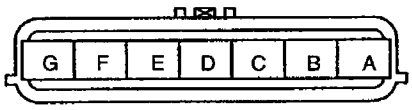


IGNITION CONTROL MODULE DRIVE SIGNAL WHEN IDLING WITH NO LOAD

Z5 CALIFORNIA MODELS



EXCEPT Z5 CALIFORNIA MODELS



IGNITION SYSTEM

IGNITION CONTROL MODULE

Inspection

Check the distributor cap, ignition coil, ignition control module-related terminal voltages, distributor-related wiring harnesses and the distributor connector. If all of these are normal and still no firing is observed, replace the distributor.

Note

- If the ignition control module drive signal pulse output is not normal, check the related input signals.

IGNITION COIL

Inspection

Primary coil winding

Z5 California models only

1. Disconnect the distributor connector.
2. Measure the resistance between terminals A and B by using an ohmmeter.

   Specification: 0.49—0.73 Ω [20 °C { 68 °F }]

3. If not as specified, replace the distributor.

Secondary coil winding

1. Disconnect the distributor connector.
2. Remove the distributor cap.
3. Measure the resistance between terminal A (G*1) and the body by using an ohmmeter.

   *1 Except Z5 california models

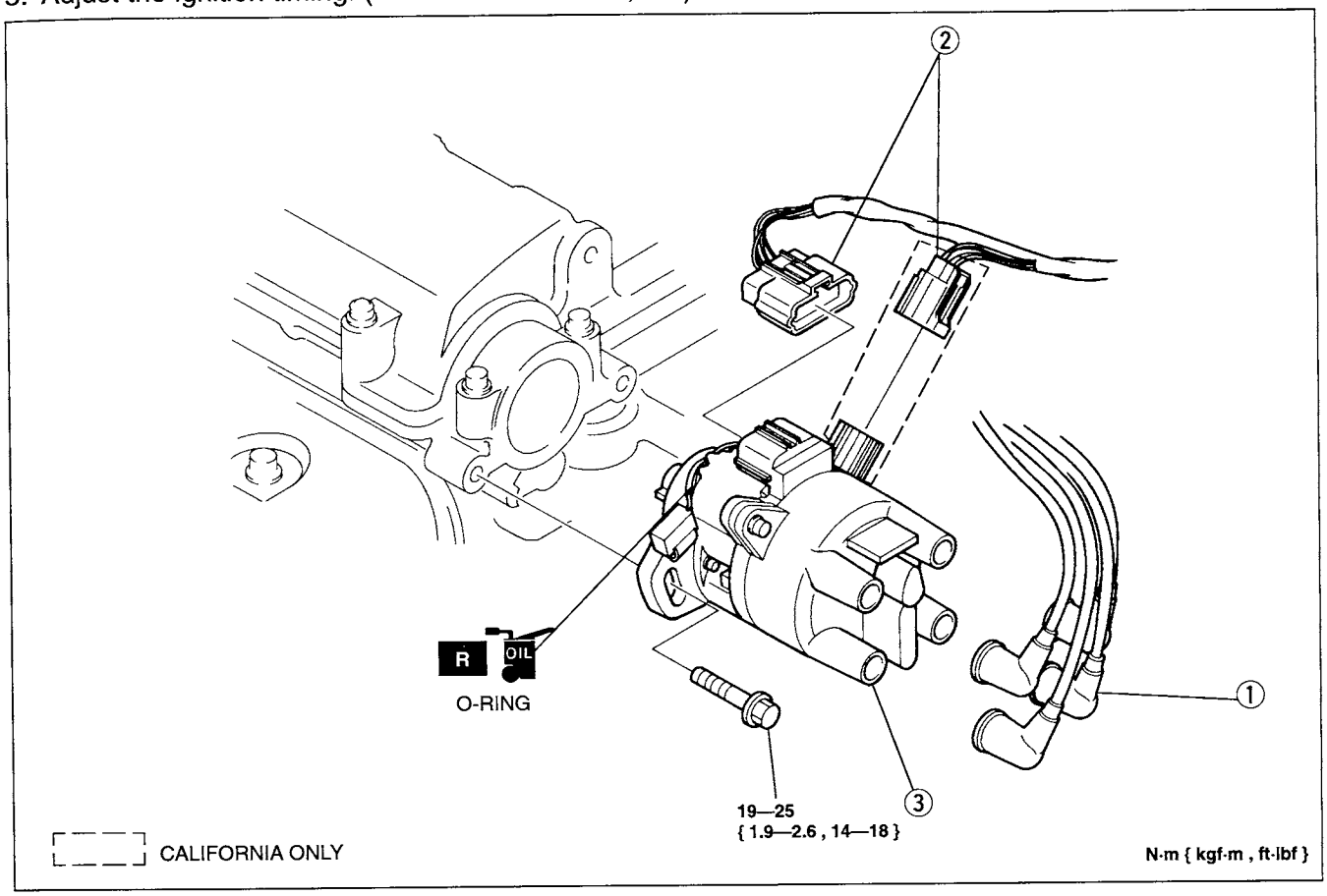
   Specification: 20—31 kΩ [20 °C { 68 °F }]

4. If not as specified, replace the distributor.

DISTRIBUTOR

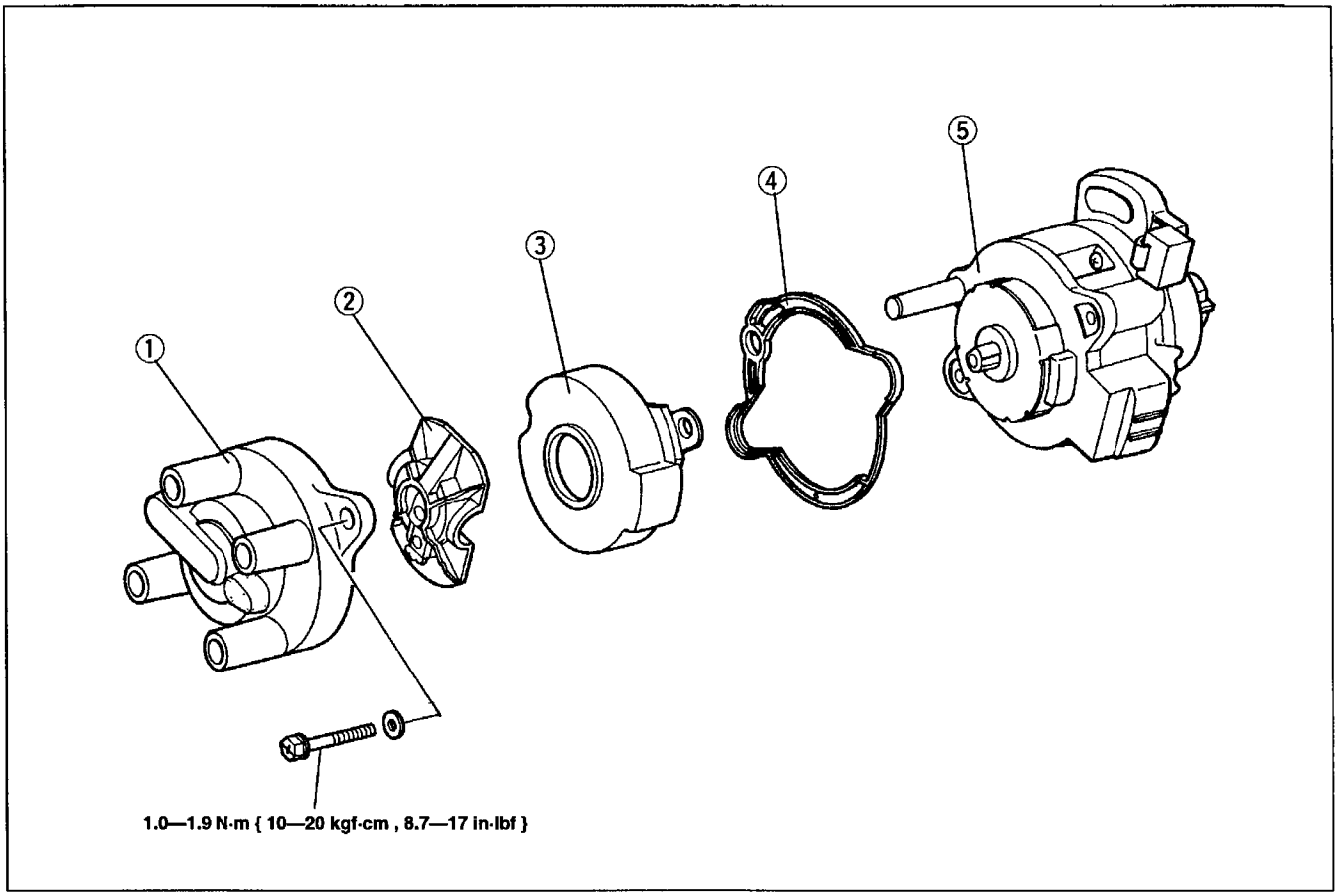
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the air cleaner. (Refer to sections F1, F2.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.
5. Adjust the ignition timing. (Refer to sections F1, F2.)



1. High-tension lead
2. Connector
3. Distributor

Disassembly / Assembly
1. Remove the distributor.
2. Disassemble in the order shown in the figure.
3. Assemble in the reverse order of disassembly.



1. Distributor cap
2. Rotor
3. Cover
4. Packing
5. Distributor
   (Incorporates camshaft position sensor, ignition control module, and ignition coil)

HIGH-TENSION LEAD
Removal / Installation

Caution
- **Reinstall the high-tension leads to their original positions. Incorrect installation can damage the leads and cause power loss, and negatively effect electronic components.**

Inspection
1. Measure the resistance of the high-tension leads.

   Specification: 16 kΩ per 1.00 m { 3.28 ft } [20 °C { 68 °F }]

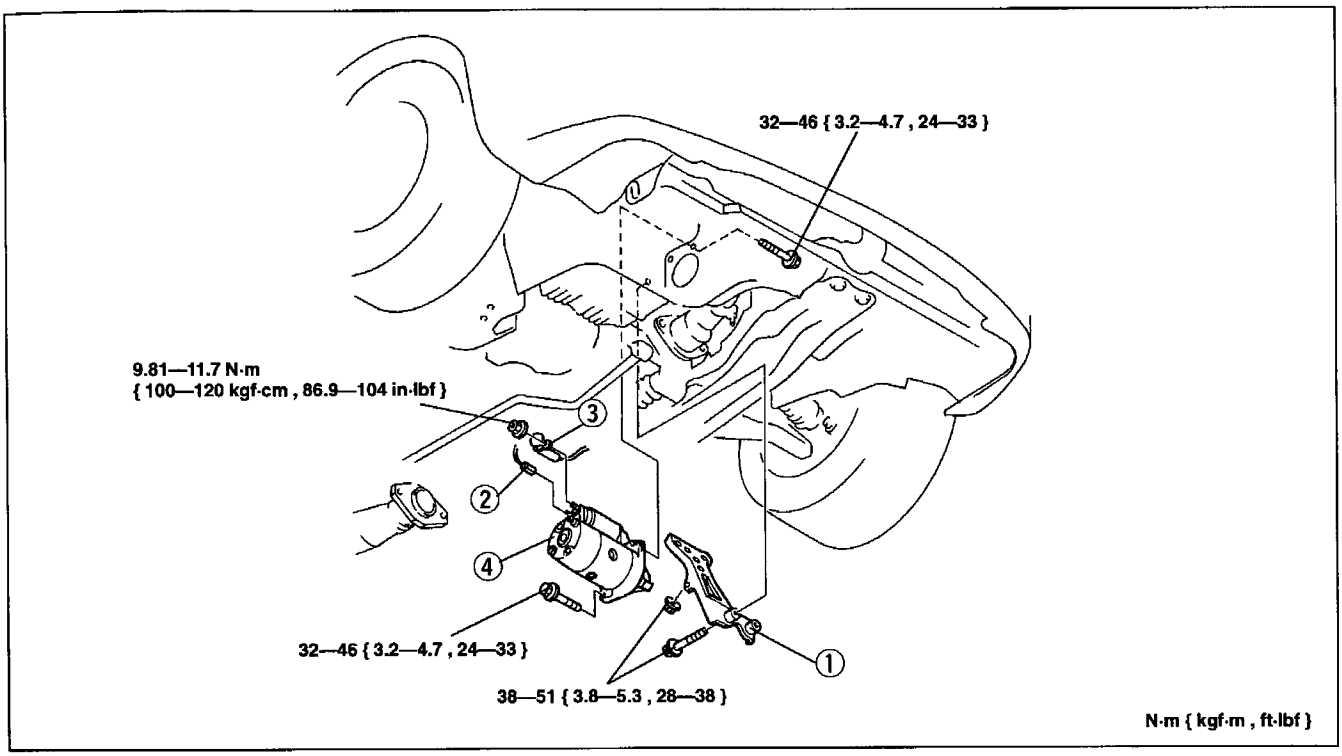
2. If not as specified, replace the high-tension lead.

STARTING SYSTEM

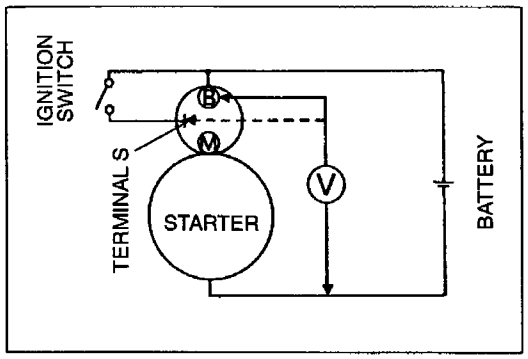
STARTER

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the air cleaner. (Refer to sections F1, F2.)
3. Remove the three way catalytic converter. (Refer to sections F1, F2.)
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal.



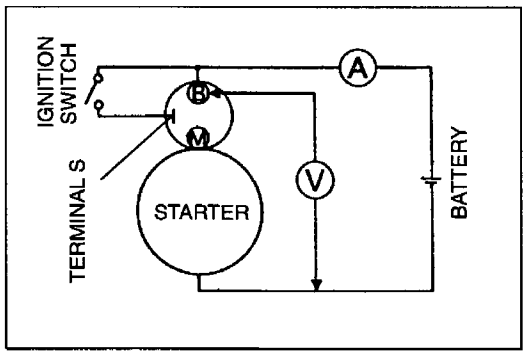
1. Intake manifold stay
2. Terminal S connector
3. Terminal B wire
4. Starter



Inspection
On-vehicle inspection
1. Verify that the battery is fully charged.
2. Crank the engine and verify that the starter turns smoothly without any noise.
3. If not as specified, measure the voltage at terminals S and B when the ignition switch is in START position.

   Voltage: 8 V min.

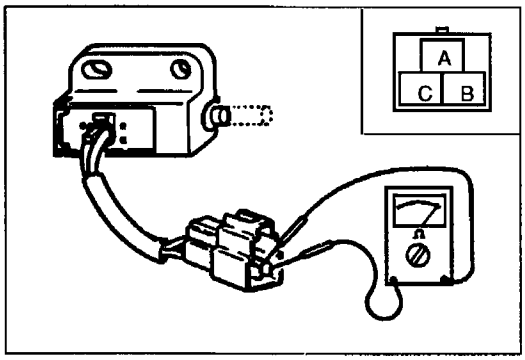
4. If the voltage is within the specification, remove the starter and inspect the magnetic switch and the starter.
5. If the voltage is not as specified, check the wiring harness, ignition switch, starter interlock switch (MTX), and transaxle range switch (ATX).



No load test
1. Connect the starter, battery, voltmeter and ammeter as shown.
2. Measure the voltage, current, and speed as shown below.

Engine	Z5		BP	
Transaxle	MTX	ATX	MTX	ATX
Voltage (V)	11.5		11.5	11
Current (A)	Max. 60		Max. 60	Max. 90
Speed (rpm)	Min. 6,500		Min. 6,600	Min. 2,800

3. If not as specified, repair or replace inner parts as necessary.



STARTER INTERLOCK SWITCH
Inspection
1. Disconnect the starter interlock switch connector.
2. Check for continuity between terminals of the starter interlock switch by using an ohmmeter.

O—O: Continuity

Terminal / Condition	B	C
Clutch pedal not depressed		
Clutch pedal depressed	O	O

3. If not as specified, replace the starter interlock switch.

Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

CLUTCH

GENERAL PROCEDURES ..... H– 2
CLUTCH FLUID ..... H– 2
PREPARATION ..... H– 2
INSPECTION ..... H– 2
REPLACEMENT/AIR BLEEDING ..... H– 2
CLUTCH PEDAL ..... H– 3
INSPECTION / ADJUSTMENT ..... H– 3
REMOVAL / INSTALLATION ..... H– 4
CLUTCH MASTER CYLINDER ..... H– 5
PREPARATION ..... H– 5
REMOVAL / INSTALLATION ..... H– 5
DISASSEMBLY / ASSEMBLY ..... H– 6
CLUTCH RELEASE CYLINDER ..... H– 7
PREPARATION ..... H– 7
REMOVAL / INSTALLATION ..... H– 7
DISASSEMBLY / ASSEMBLY ..... H– 8
CLUTCH UNIT ..... H– 9
PREPARATION ..... H– 9
REMOVAL / INSTALLATION H–10
CLUTCH COVER H–13
INSPECTION H–13
CLUTCH DISC H–13
INSPECTION H–13
CLUTCH RELEASE COLLAR H–14
INSPECTION H–14
PILOT BEARING H–14
INSPECTION H–14
FLYWHEEL H–14
INSPECTION H–14

GENERAL PROCEDURES

Clutch pipe

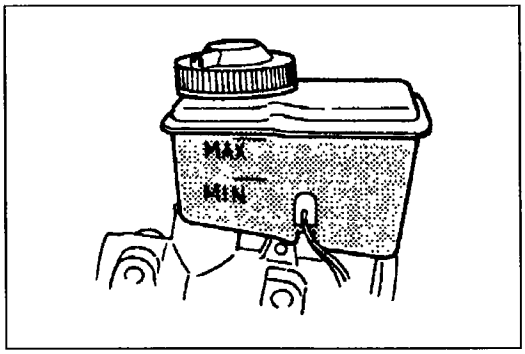
- If a clutch pipe(s) has been disconnected anytime during the procedure, add brake fluid, bleed the clutch, and inspect for leakage after the procedure has been completed.
- If removing the clutch pipe, remove it by using the **SST** (49 0259 770B). If installing the clutch pipe, modify the clutch pipe tightening torque to allow for use of a torque wrench-**SST** (49 0259 770B) combination, and then tighten the clutch pipe by using the **SST** (49 0259 770B).
  (Refer to section GI "Torque Formulas".)

CLUTCH FLUID

PREPARATION

SST

49 0259 770B Wrench, flare nut 	For air bleeding



INSPECTION

Note

- A common reservoir is used for the clutch and brake system fluid.
- The fluid in the reservoir must be maintained between the MIN / MAX level during replacement.

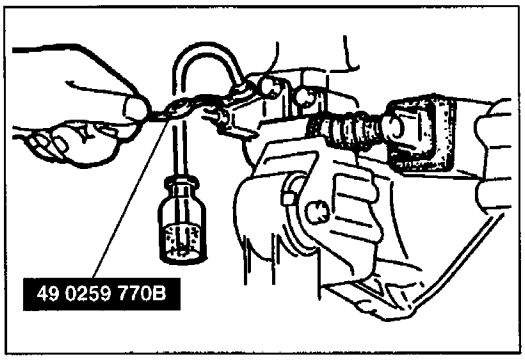
REPLACEMENT/AIR BLEEDING

Caution

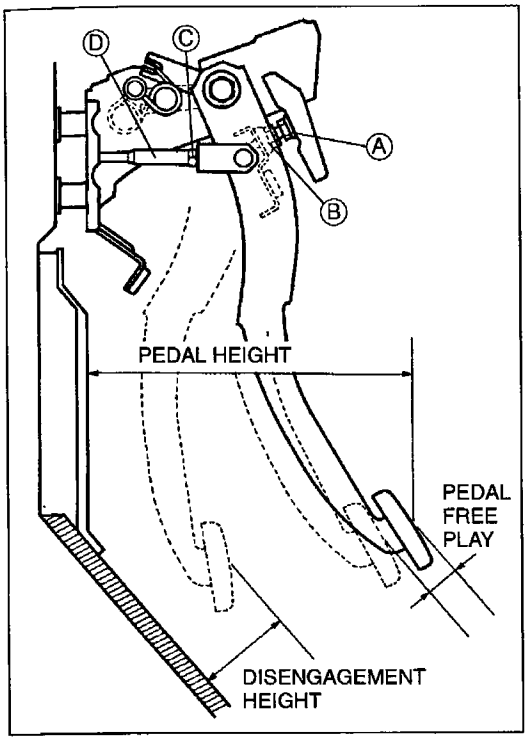
- **Be careful not to spill the fluid on a painted surface. If this should happen, wash it off immediately.**
- **Do not mix different brands of fluid.**
- **Do not reuse the clutch fluid that was drained.**

1. Drain the brake fluid from the master cylinder through a wheel cylinder. (Refer to section P.)
2. Remove the bleeder cap from the clutch release cylinder and attach a vinyl hose to the bleeder plug.
3. Place the other end of the vinyl hose in a clear container.
4. Slowly pump the clutch pedal several times.
5. With the clutch pedal depressed, loosen the bleeder screw with the **SST** to let the fluid escape. Close the bleeder screw with the **SST.**
6. Repeat Steps 4 and 5 until only clean fluid is seen.
7. Tighten the bleeder screw.

   Tightening torque:
   5.9—8.8 N·m { 60—90 kgf·cm , 53—78 in·lbf }



8. Bleed the air from the brake system. (Refer to section P.)
9. Add fluid to the MAX mark.



CLUTCH PEDAL

INSPECTION / ADJUSTMENT

Height

1. Measure the distance from the upper surface of the pedal pad to the carpet.

   Pedal height:
   212—217 mm { 8.35—8.54 in } (with carpet)

2. If necessary, adjust the pedal height by turning locknut Ⓐ and adjustment bolt Ⓑ.

Free play

1. Depress the clutch pedal by hand until clutch resistance is felt, and measure the pedal free play.

   Free play: 0.7—3.4 mm { 0.03—0.13 in }
   Total free play: 5.6—15.0 mm { 0.22—0.59 in }

2. If necessary, adjust the pedal free play by turning locknut Ⓒ and adjusting push rod Ⓓ.
3. Verify that the disengagement height (from the upper surface of the pedal pad to the carpet) is correct when the pedal is fully depressed.

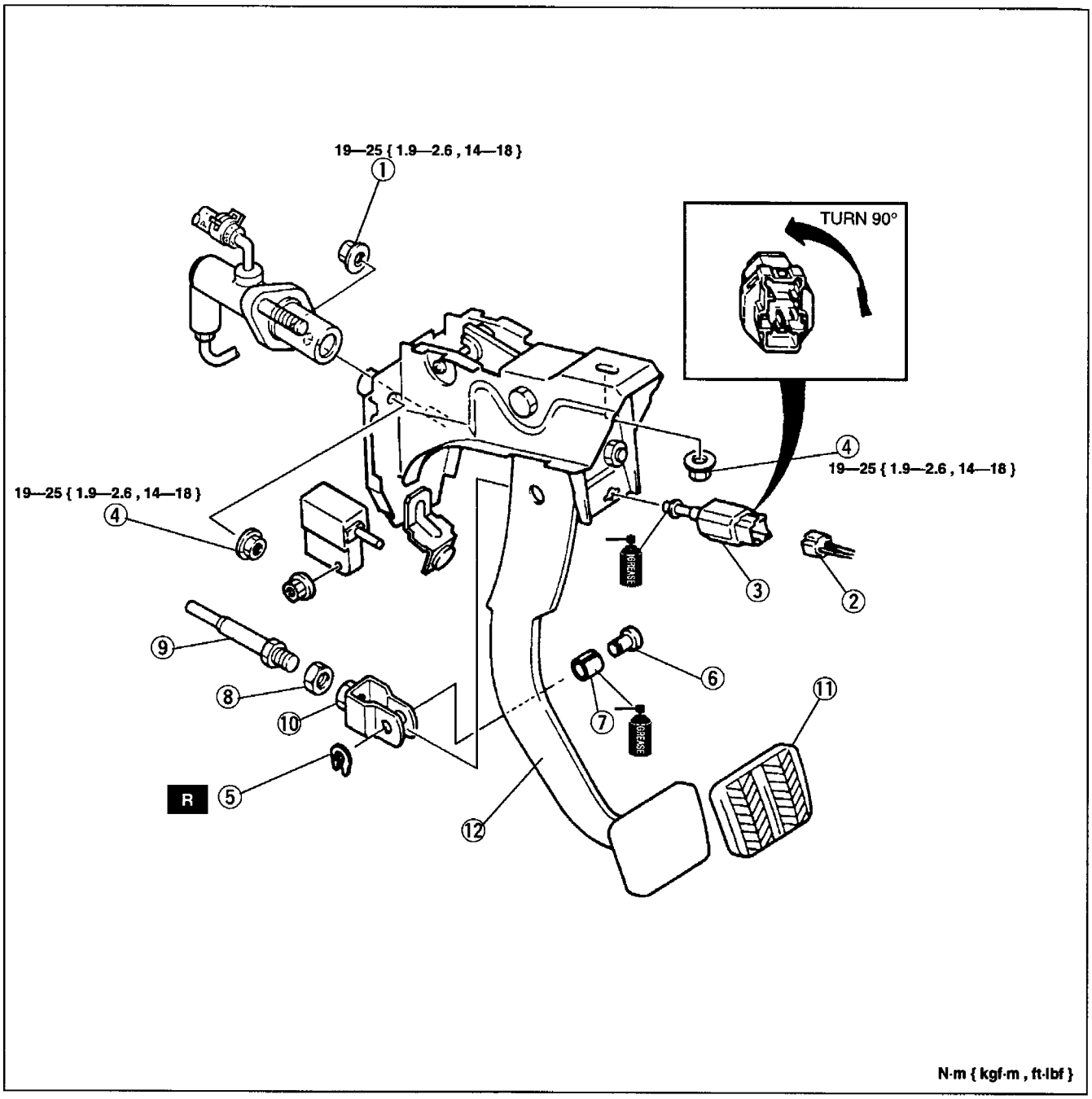
   Minimum disengagement height:
   59 mm { 2.3 in } (with carpet)

REMOVAL / INSTALLATION

1. Remove in the order shown in the figure.

Note
- Apply lithium-based grease to the bushing before installation.

2. Install in the reverse order of removal.
3. After installation, adjust the clutch pedal. (Refer to page H–3.)



1. Nut
2. Clutch switch connector
3. Clutch switch
4. Nut
5. Clip
6. Pin
7. Bushing
8. Nut
9. Push rod
10. Fork
11. Pedal pad
12. Clutch pedal

CLUTCH MASTER CYLINDER

PREPARATION
SST

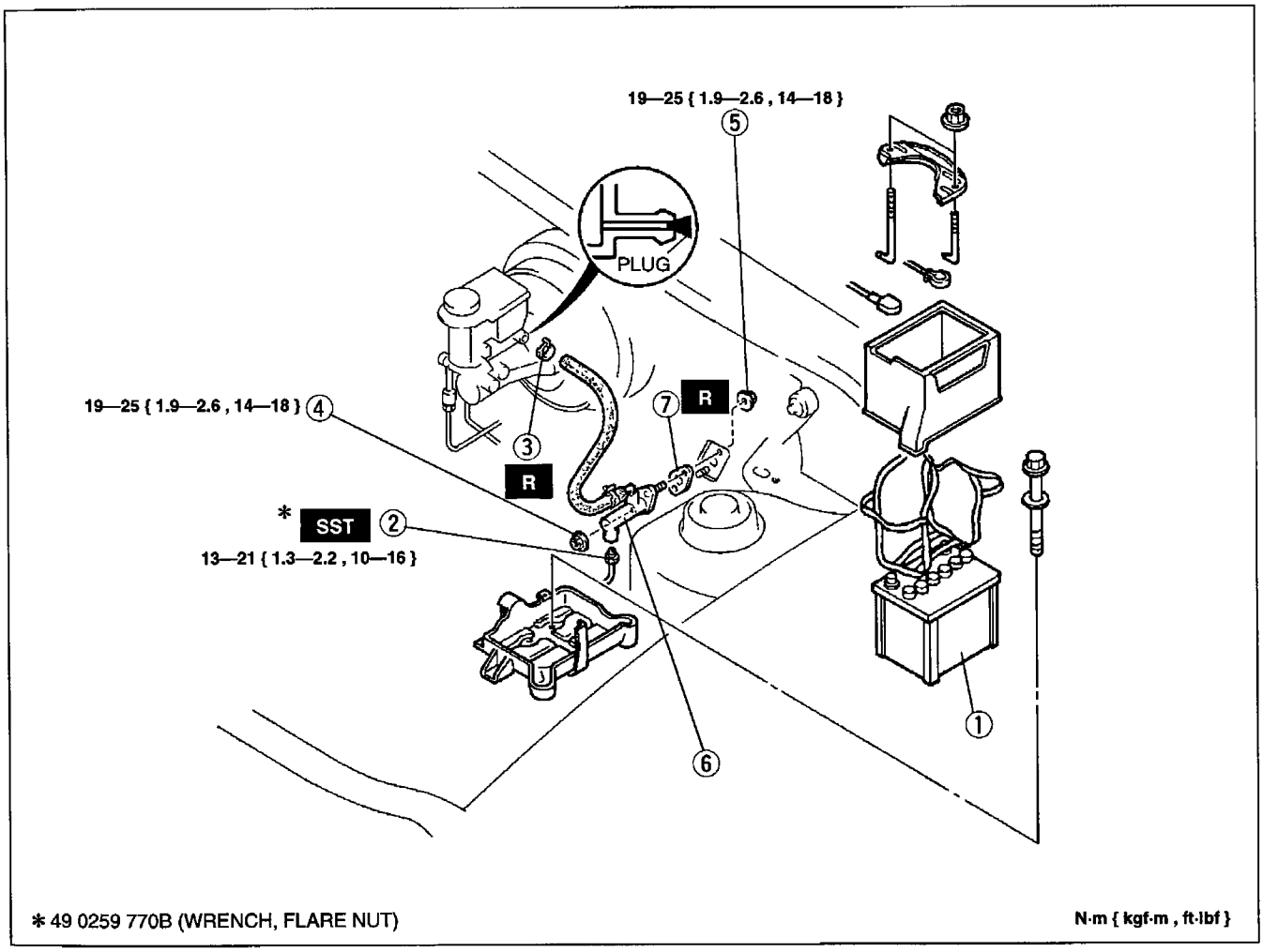
49 0259 770B Wrench, flare nut		For disconnecting/ connecting clutch pipe

REMOVAL / INSTALLATION

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.**

H

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.
3. After installation, inspect and adjust the clutch pedal. (Refer to page H–3.)



1. Battery
2. Clutch pipe
3. Clip
4. Nut
5. Nut
6. Clutch master cylinder
   Disassembly / Assembly ..... page H–6
7. Gasket

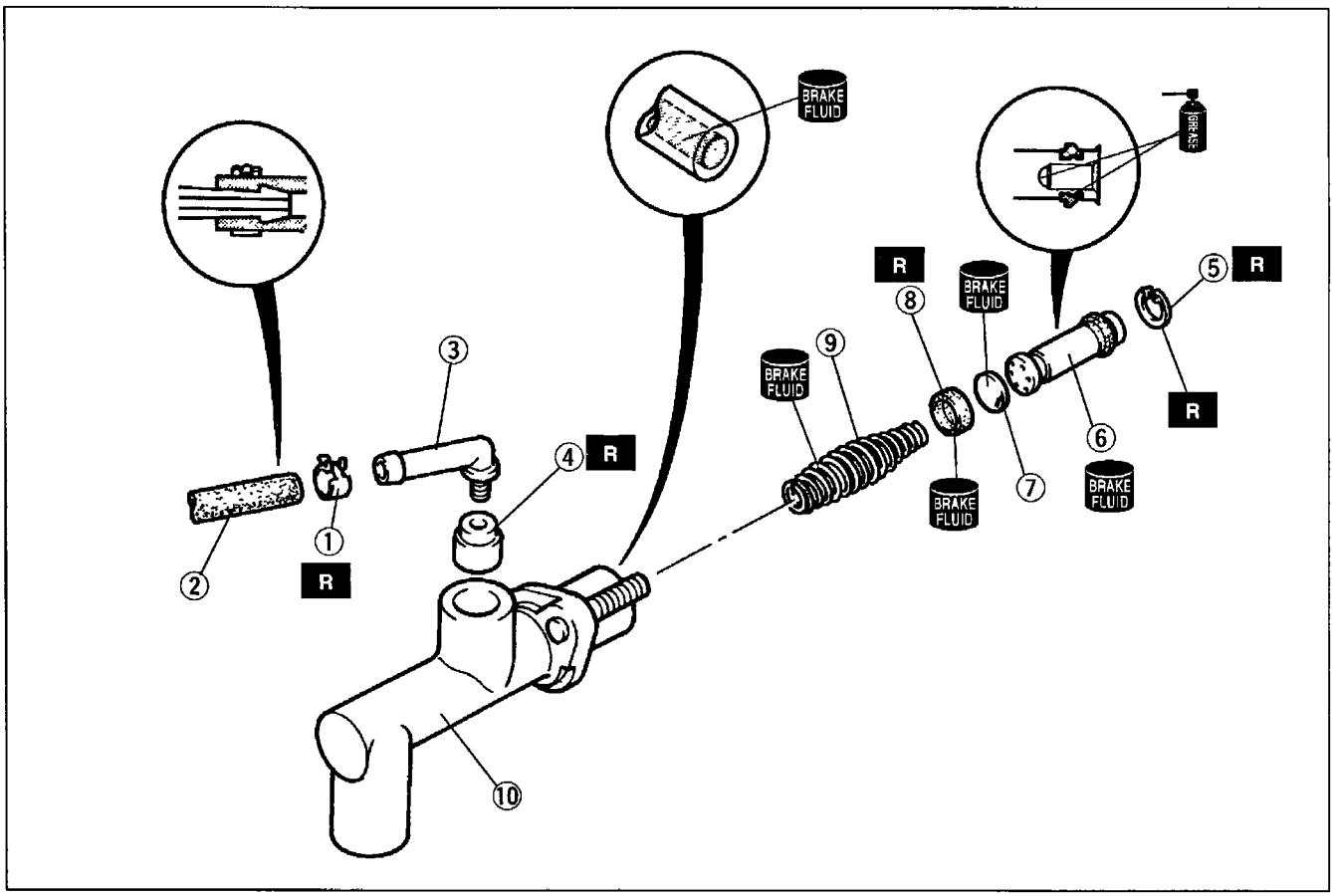
DISASSEMBLY / ASSEMBLY

1. Disassemble in the order shown in the figure, referring to **Disassembly Note.**

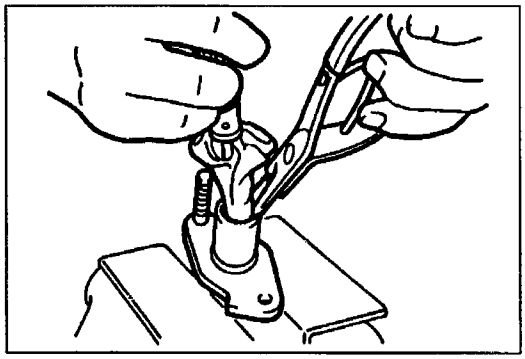
Warning

- **Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear protective eyewear whenever using compressed air.**

2. Wipe all parts, and clean all ports, passages, and inner parts with compressed air.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note.**



1. Clip
2. Hose
3. Joint
4. Bushing
5. Snap ring
   Disassembly / Assembly Note ..... below
6. Piston and secondary cup assembly
7. Spacer
8. Primary cup
   Inspect for wear and cracks
9. Return spring
10. Clutch master cylinder body



Disassembly / Assembly Note

Snap ring

Hold the piston down with a cloth-wrapped pin punch. If disassembling, remove the snap ring; if assembling, install it.

CLUTCH RELEASE CYLINDER

PREPARATION
SST

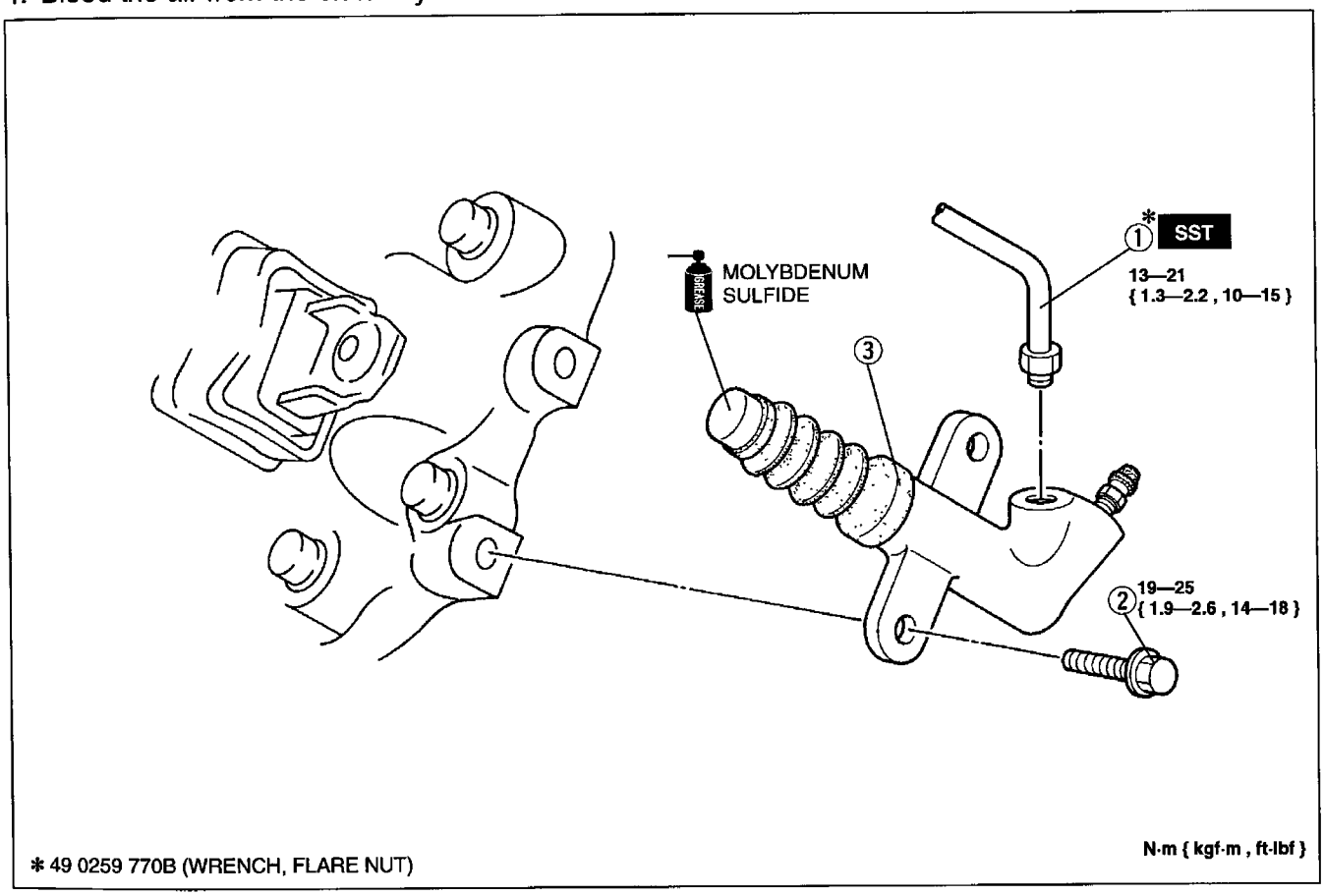
49 0259 770B Wrench, flare nut		For disconecting/ connecting clutch pipe

REMOVAL / INSTALLATION

Caution
- **Clutch fluid will damage painted surfaces. If clutch fluid does get on a painted surface, wipe it off immediately.**

H

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.
3. Plug the clutch pipe after removing it to avoid leakage.
4. Bleed the air from the clutch system after installation.



1. Clutch pipe
2. Bolt
3. Clutch release cylinder
   Disassembly / Assembly ..... page H–8

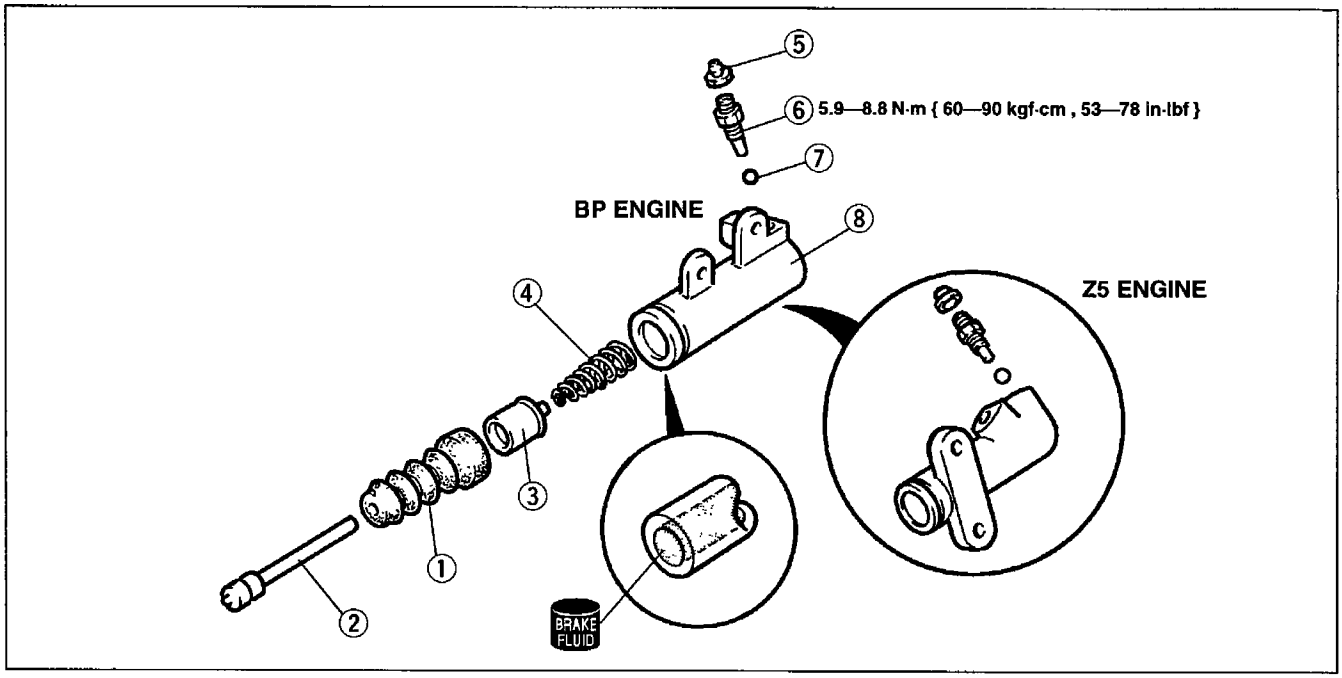
DISASSEMBLY / ASSEMBLY

1. Disassemble in the order shown in the figure.

Warning

- **Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear protective eye wear whenever using compressed air.**

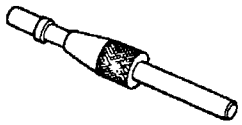
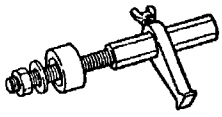
2. Wipe all parts, and clean all ports, passages, and inner parts with compressed air.
3. Assemble in the reverse order of disassembly.



1. Boot
2. Push rod
3. Piston and cup assembly
4. Spring
5. Bleeder cap
6. Bleeder screw
7. Steel ball
8. Clutch release cylinder body

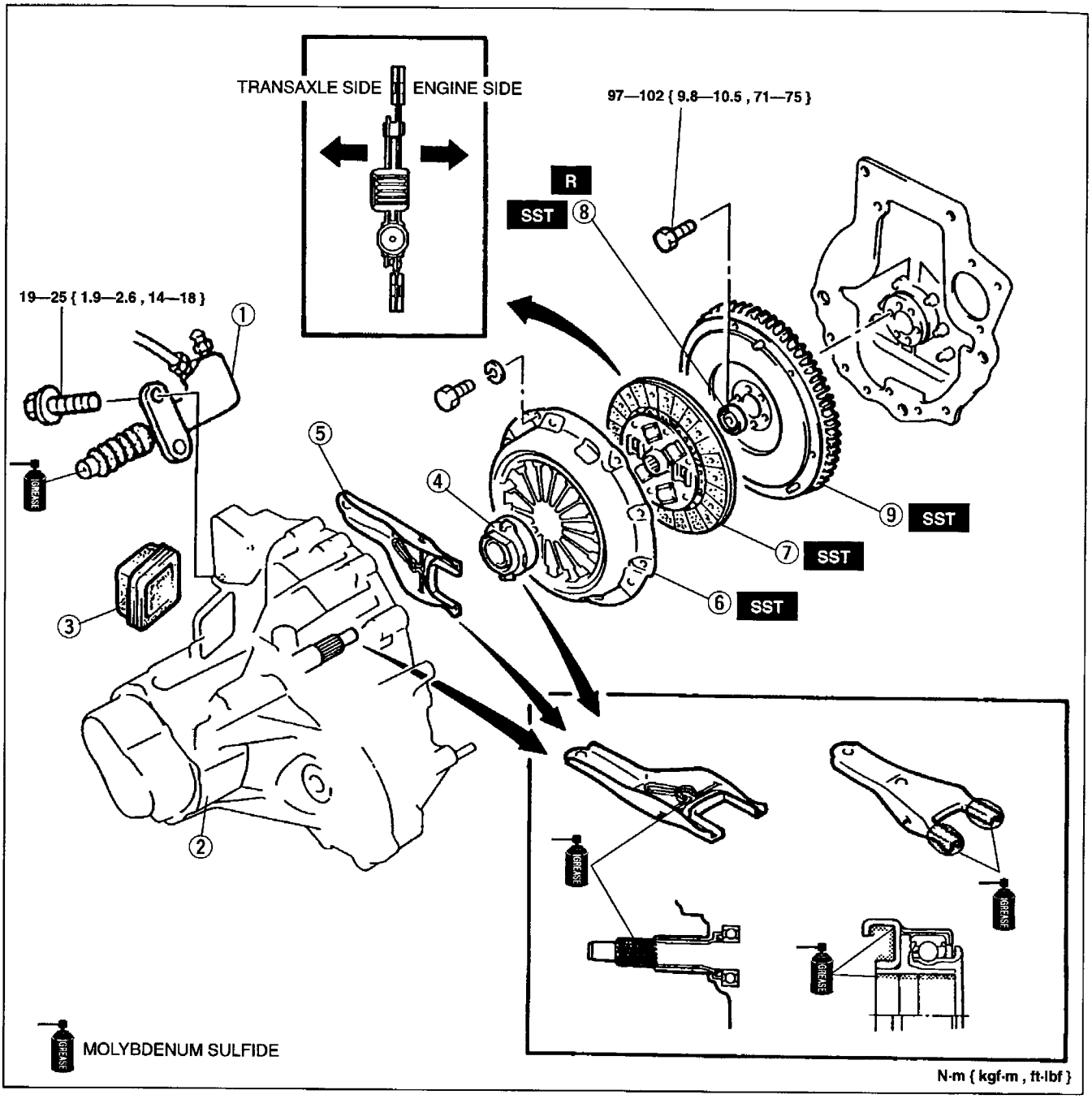
CLUTCH UNIT

PREPARATION
SST

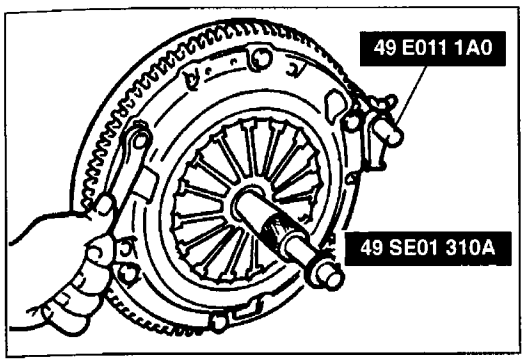
49 SE01 310A Centering tool, clutch disc 	For support of clutch disc	49 1285 071 Puller, bearing 	For removal of pilot bearing
49 1285 073 Chuck (Part of 49 1285 071) 	For removal of pilot bearing	49 E011 1A0 Brake, ring gear 	For prevention of engine rotation
49 E011 103 Shaft (Part of 49 E011 1A0) 	For prevention of engine rotation	49 E011 105 Stopper (Part of 49 E011 1A0) 	For prevention of engine rotation
49 E011 104 Collar (Part of 49 E011 1A0) 	For prevention of engine rotation	—	—

REMOVAL / INSTALLATION

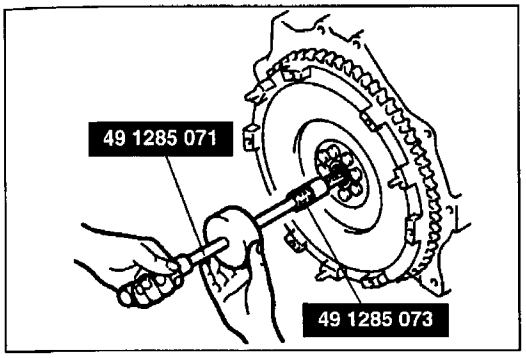
1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Install in the reverse order of removal, referring to **Installation Note**.



1. Clutch release cylinder
2. Transaxle
   Service ..... section J1, J2
3. Boot
4. Clutch release collar
   Inspection ..... page H–14
5. Clutch release fork
6. Clutch cover
   Removal Note ..... page H–11
   Inspection ..... page H–13
   Installation Note ..... page H–12
7. Clutch disc
   Removal Note ..... page H–11
   Inspection ..... page H–13
   Installation Note ..... page H–12
8. Pilot bearing
   Inspection ..... page H–14
   Removal Note ..... page H–11
   Installation Note ..... page H–11
9. Flywheel
   Removal Note ..... page H–11
   Inspection ..... page H–14
   Installation Note ..... page H–11



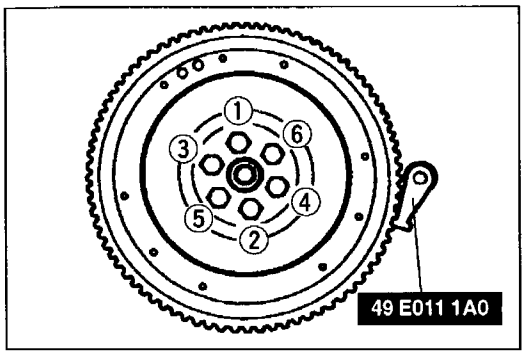
Removal Note
Clutch cover and clutch disc
1. Install the **SSTs**.
2. Loosen each bolt one turn at a time in a crisscross pattern until the spring tension is released.
3. Remove the clutch cover and disc.



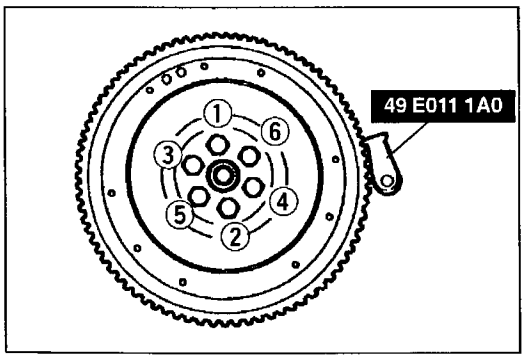
Pilot bearing

Note
- The pilot bearing does not need to be removed unless you are replacing it.

Use the **SSTs** to remove the pilot bearing.

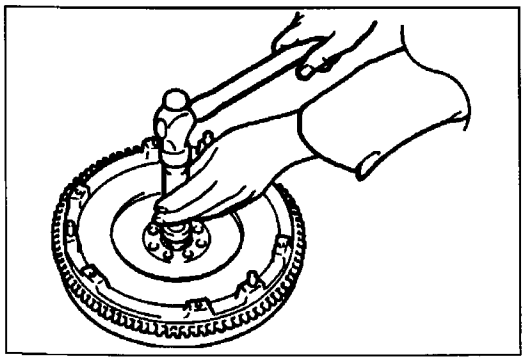


Flywheel
1. Hold the flywheel by using the **SST**.
2. Remove the bolts evenly and gradually in the pattern shown.
3. Remove the flywheel.
4. Inspect for oil leakage from the crankshaft rear oil seal. If there is any such leakage or if the oil seal is damaged, refer to section B and replace the crankshaft oil seal.



Installation Note
Flywheel
1. Install the flywheel to the crankshaft.
2. Hand-tighten the flywheel installation bolts.
3. Install the **SST** to the flywheel.
4. Tighten the flywheel installation bolts in the pattern shown in the figure.

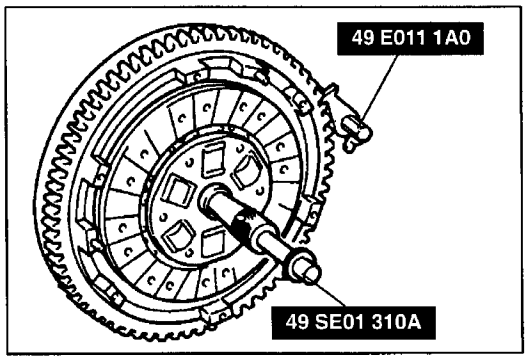
Tightening torque:
97—102 N·m { 9.8—10.5 kgf·m , 71—75 ft·lbf }



Pilot bearing
Install a new pilot bearing by using a suitable pipe.

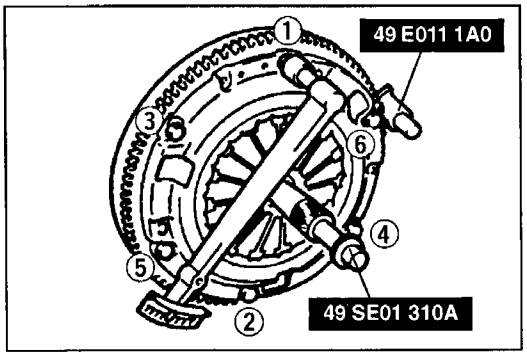
Pipe outer diameter: 35.0 mm { 1.38 in }

Bearing installation depth:
0—0.4 mm { 0—0.016 in }



Clutch disc

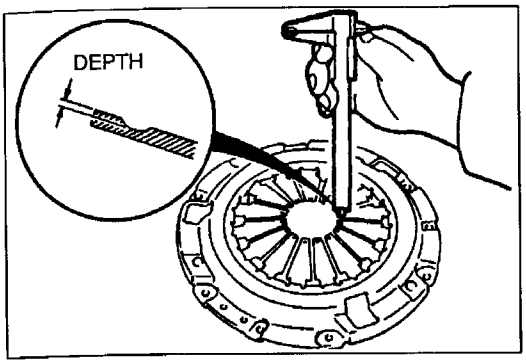
Hold the clutch disc in position by using the **SSTs**.



Clutch cover

1. Install the **SSTs**.
2. Tighten the bolts evenly and gradually in the pattern shown.

Tightening torque:
18—26 N·m { 1.8—2.7 kgf·m , 14—19 ft·lbf }

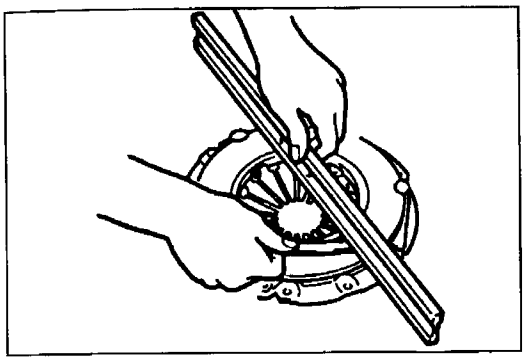


CLUTCH COVER

INSPECTION

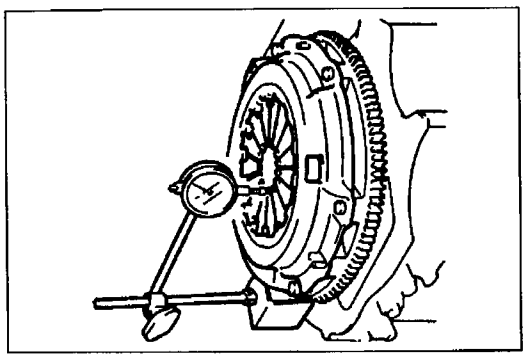
1. Measure the wear of the diaphragm spring fingers.

   Depth: 0.5 mm { 0.020 in } max.



2. Measure the flatness of the pressure plate surface by using a straightedge and a feeler gauge as shown in the figure.

   Maximum clearance: 0.5 mm { 0.020 in }



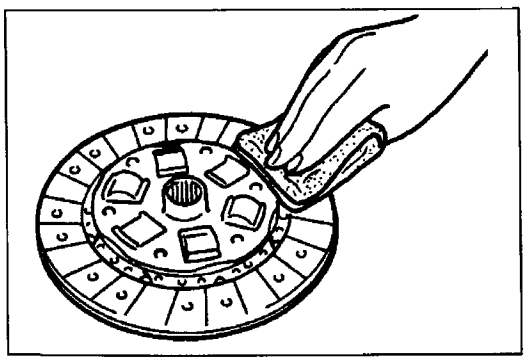
Note

- When checking the diaphragm spring fingers, mount a dial indicator on the cylinder block.

3. Rotate the flywheel and check for misaligned diaphragm spring fingers.

   Misalignment: 0.6 mm { 0.0236 in } max.

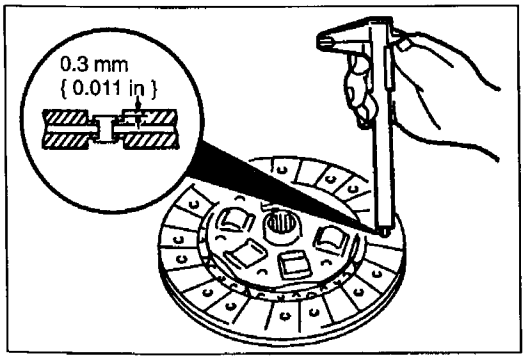
4. Replace the clutch cover if not as specified.



CLUTCH DISC

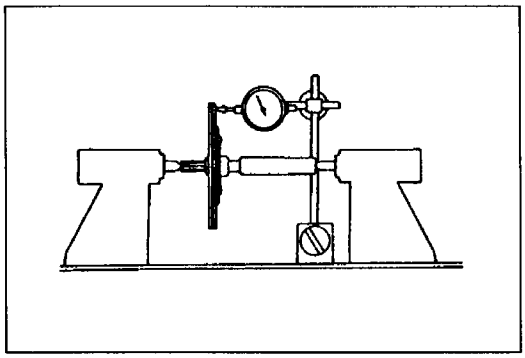
INSPECTION

1. Inspect the contact surface of the clutch disc for scoring, cracks, burning, and oil contamination.
2. Remove minor scoring or burning with emery paper. Repair if scoring or burning is major. Replace if cracked or oil-soaked.
3. Inspect for loose facing rivets and dampers. Replace the clutch disc if either is loose.



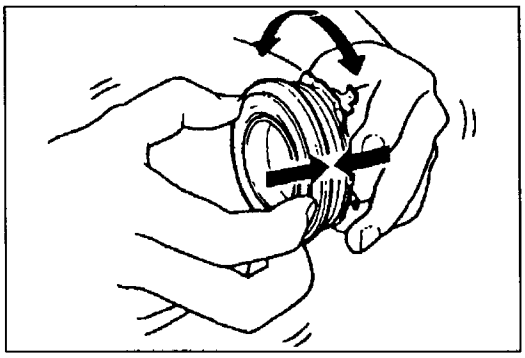
4. Using vernier calipers, measure the thickness of the lining at a rivet head on both sides. Replace the clutch disc if its thickness is less than the minimum.

   Thickness: 0.3 mm { 0.012 in } min.



5. Measure the clutch disc runout with a dial indicator. Replace the clutch disc if runout is excessive.

Runout: 0.7 mm { 0.0276 in } max.

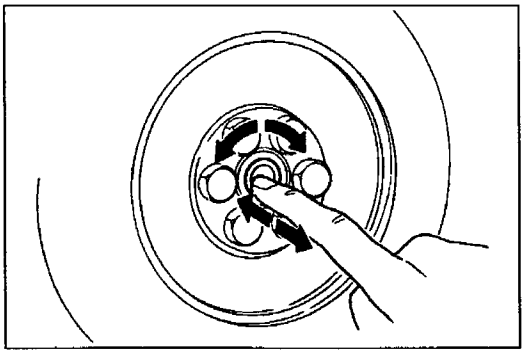


CLUTCH RELEASE COLLAR

INSPECTION

Caution
- **Cleaning the clutch release collar with cleaning fluids or a steam cleaner can wash the grease out of the sealed bearing.**

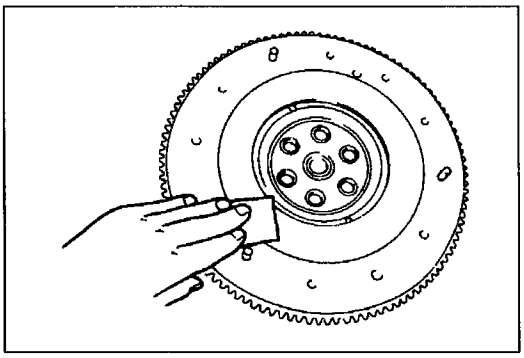
1. Turn the collar while applying force in the axial direction.
2. If the collar sticks or has excessive resistance, replace it.



PILOT BEARING

INSPECTION

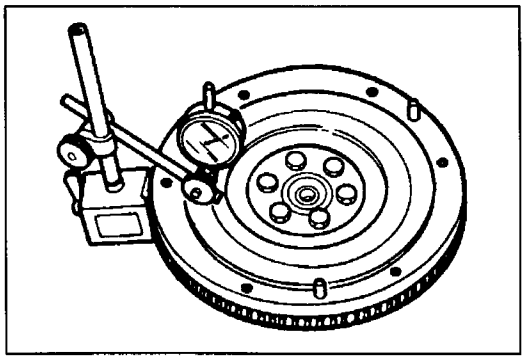
1. Without removing the pilot bearing from the flywheel, turn the bearing while applying force in the axial direction.
2. If the bearing sticks or has excessive resistance, replace it.



FLYWHEEL

INSPECTION

1. Inspect the contact surface for scoring, cracks, and burning.
2. Remove minor scoring or burning with emery paper. Repair if scoring or burning is major; replace if cracked.



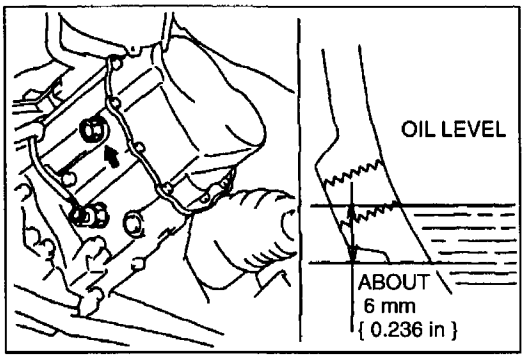
3. Inspect the ring gear teeth for wear and damage. If necessary, replace the ring gear.
4. Install a dial indicator on the cylinder block.
5. Measure the flywheel runout with the dial indicator. Replace the flywheel if runout is excessive.

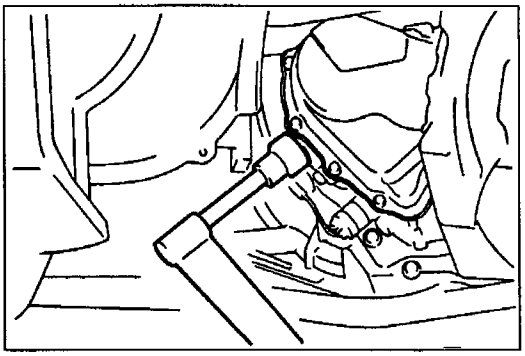
Runout: 0.2 mm { 0.0079 in } max.

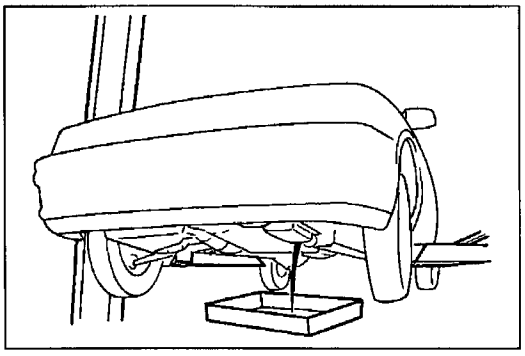
Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

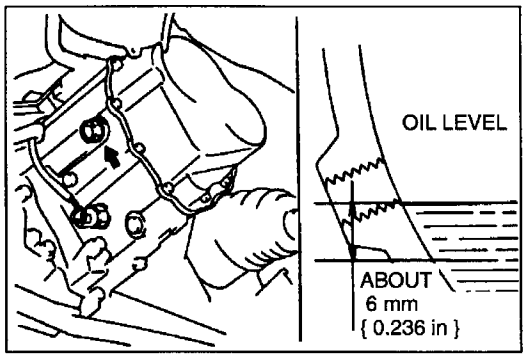
MANUAL TRANSAXLE (F25M–R)

TRANSAXLE OIL **J–2**
INSPECTION **J–2**
REPLACEMENT **J–2**
OIL SEAL (DIFFERENTIAL) **J–3**
PREPARATION **J–3**
REPLACEMENT **J–3**
OIL SEAL (CHANGE ROD ASSEMBLY) **J–3**
REPLACEMENT **J–3**
TRANSAXLE **J–5**
PREPARATION **J–5**
REMOVAL / INSTALLATION **J–6**
SHIFT MECHANISM **J–9**
DISASSEMBLY / ASSEMBLY **J–9**









TRANSAXLE OIL

INSPECTION

Note
- Park the vehicle on level ground.

1. Remove the oil level plug and the washer.
2. Verify that the oil is near the bottom of the plug port.
3. If the oil level is low, add the specified amount and type of oil through the oil level plug hole.

Specified oil
Grade: API service GL–4 or GL–5
Viscosity: All season SAE 75W–90
Above 10 °C { 50 °F } SAE 80W–90

4. Install a new washer and the oil level plug.

Tightening torque:
40—58 N·m { 4.0—6.0 kgf·m , 29—43 ft·lbf }

REPLACEMENT

1. Remove the drain plug and the washer.
2. Drain the oil into a suitable container.
3. Install a new washer and the drain plug.

Tightening torque:
40—58 N·m { 4.0—6.0 kgf·m , 29—43 ft·lbf }

4. Remove the oil level plug and the washer. Add the specified amount and type of oil through the oil level plug hole until the level reaches the bottom of the oil level plug hole.

Specified oil
Grade: API service GL–4 or GL–5
Viscosity: All season SAE 75W–90
Above 10 °C { 50 °F } SAE 80W–90

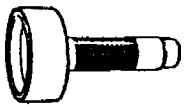
Capacity: 2.68 L { 2.83 US qt , 2.36 Imp qt }

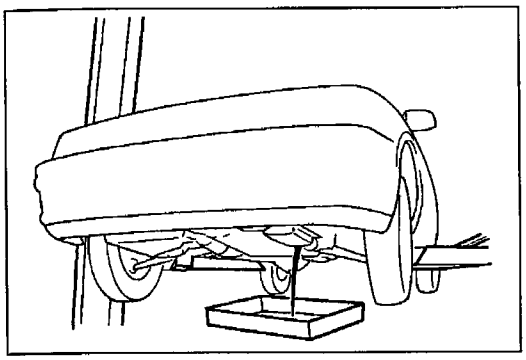
5. Install a new washer and the oil level plug.

Tightening torque:
40—58 N·m { 4.0—6.0 kgf·m , 29—43 ft·lbf }

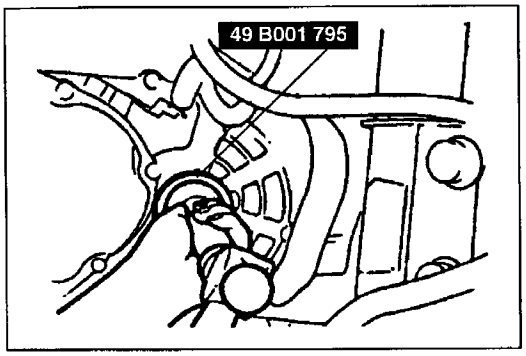
OIL SEAL (DIFFERENTIAL)

PREPARATION
SST

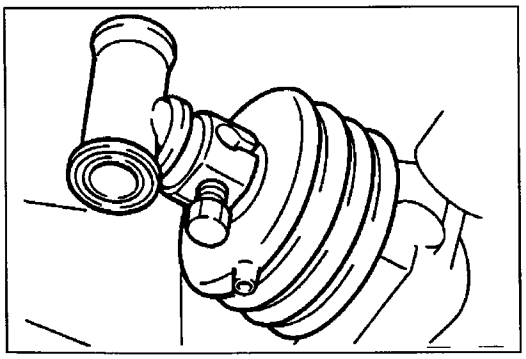
49 B001 795 Installer, oil seal		For installation of oil seal



REPLACEMENT
1. Drain the transaxle oil. (Refer to page J–2.)
2. Separate the drive shaft and joint shaft from the transaxle. (Refer to section M.)
3. Remove the oil seal by using a screwdriver.

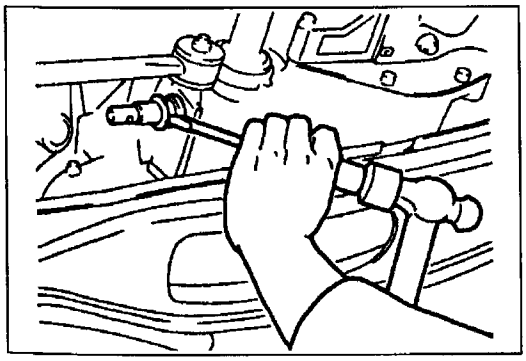


4. Using the **SST** and a hammer, tap the new oil seal in evenly until the **SST** contacts the transaxle case.
5. Coat the oil seal lip with transaxle oil.
6. Insert the drive shaft and joint shaft to the transaxle. (Refer to section M.)
7. Add the specified amount and type of transaxle oil. (Refer to page J–2.)

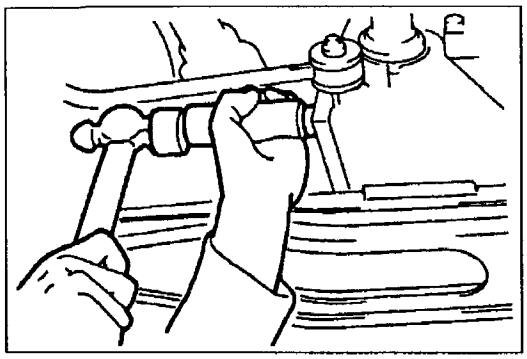


OIL SEAL (CHANGE ROD ASSEMBLY)

REPLACEMENT
1. Drain the transaxle oil. (Refer to page J–2.)
2. Remove the transverse member.
3. Disconnect the change control rod from the transaxle.
4. Remove the joint and boot from the change rod assembly.

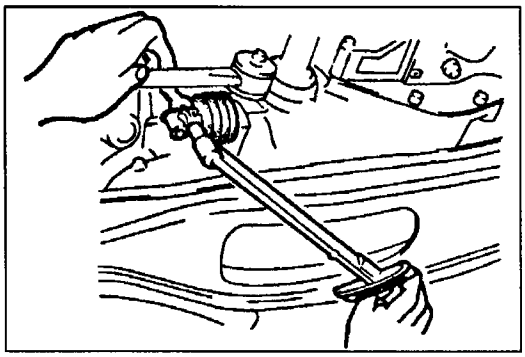


5. Remove the oil seal by using a screwdriver.



6. Apply the specified oil to the lip of the oil seal.
7. Install the new oil seal by using a suitable pipe.

Outer diameter of pipe: 26.0 mm { 1.02 in }



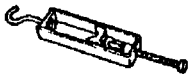
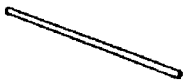
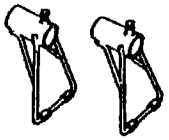
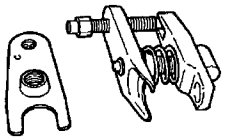
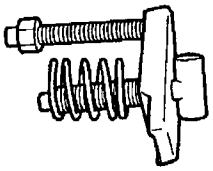
8. Position the boot hole downward, and install the boot onto the oil seal.
9. Install the joint to the change rod assembly.

Tightening torque:
16—22 N·m { 1.6—2.3 kgf·m , 12—16 ft·lbf }

10. Cover the change rod assembly with the boot hole facing downward.
11. Install the change control rod.
12. Install the transverse member.
13. Add the specified amount and type of transaxle oil. (Refer to page J–2.)

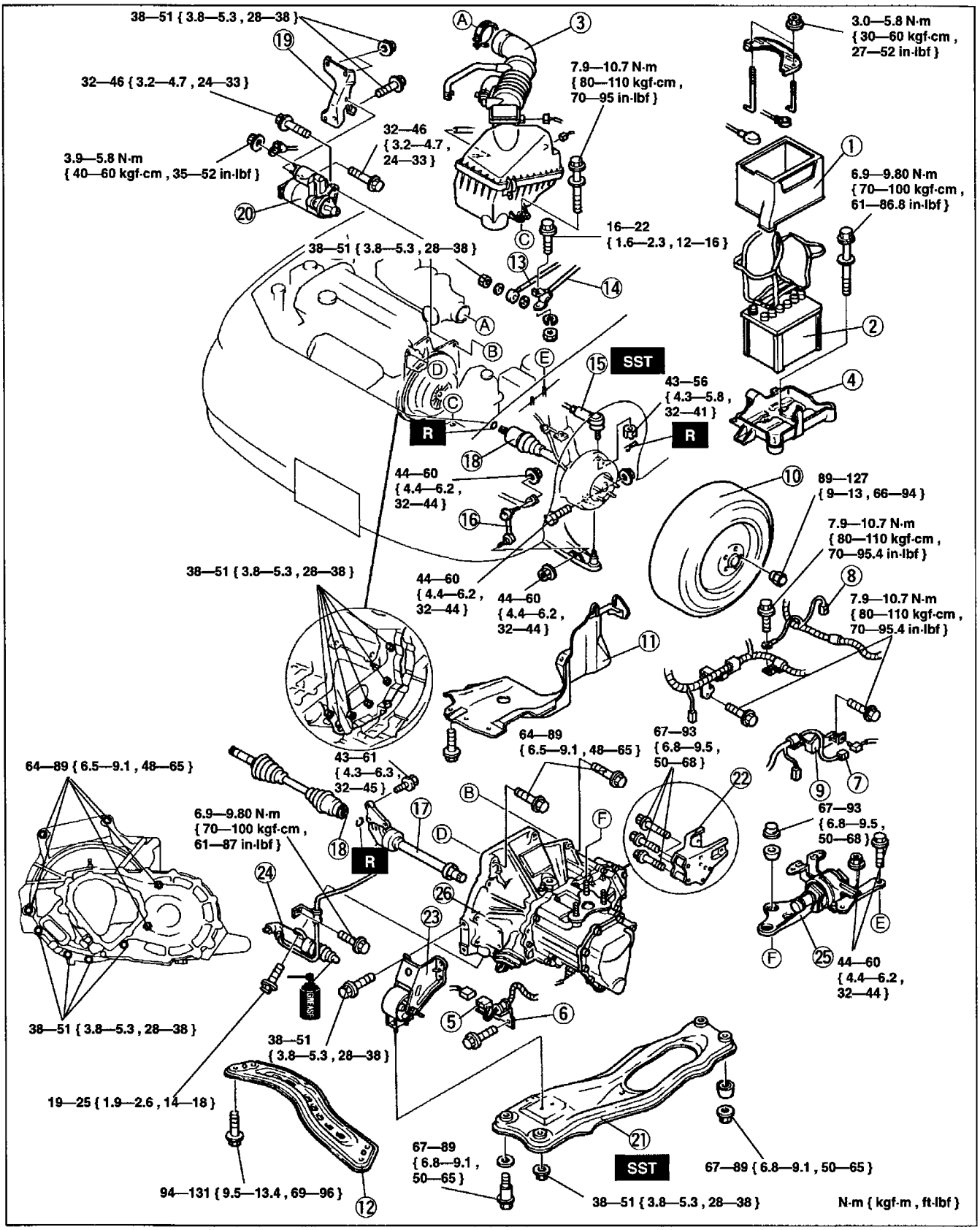
TRANSAXLE

PREPARATION
SST

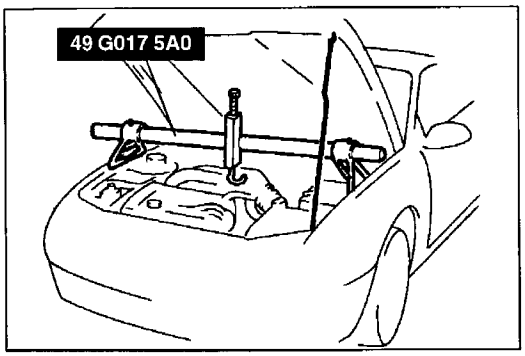
49 G017 5A0 Support, engine 	For support of engine	49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine
49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine	49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine
49 T028 3A0 Puller set, ball joint 	For removal of tie-rod end	49 T028 303 Body (Part of 49 T028 3A0) 	For removal of tie-rod end
49 T028 304 Attachment (Part of 49 T028 3A0) 	For removal of tie-rod end	—	—

REMOVAL / INSTALLATION

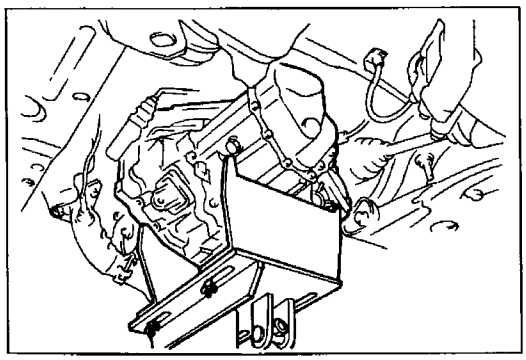
1. Drain the transaxle oil. (Refer to page J–2.)
2. Remove in the order shown in the figure, referring to **Removal Note**.
3. Install in the reverse order of removal, referring to **Installation Note**.
4. Add the specified amount and type of transaxle oil. (Refer to page J–2.)
5. Warm up the engine and transaxle, inspect for oil leakage, and check transaxle operation.



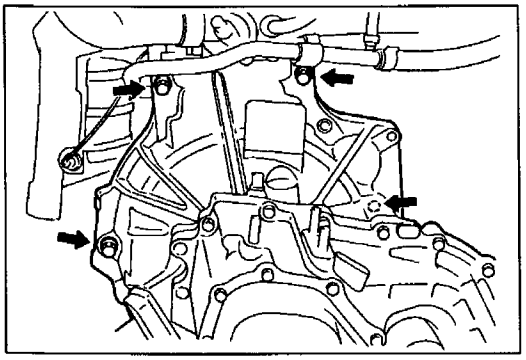
1. Battery box
2. Battery
3. Air cleaner assembly
4. Battery carrier
5. Back-up light switch connector
6. Back-up light switch connector bracket
7. Neutral switch connector
8. Vehicle speedometer sensor connector
9. Harness bracket
10. Wheel and tire
11. Splash shield
12. Transverse member
13. Extension bar
14. Change control rod
15. Tie-rod end
    Service ..... section N
16. Stabilizer control link
17. Joint shaft
    Service ..... section M
18. Drive shafts
    Service ..... section M
19. Intake manifold bracket
20. Starter
21. Engine mounting member
    Removal Note ..... below
    Installation Note ..... page J–8
22. No.1 engine mount
    Installation Note ..... page J–8
23. No.2 engine mount
    Installation Note ..... page J–8
24. Clutch release cylinder
25. No.4 engine mount
26. Transaxle
    Removal Note ..... below
    Installation Note ..... page J–8



Removal Note
Engine mounting member
1. Suspend the engine by using the **SST**.
2. Remove the engine mounting member.

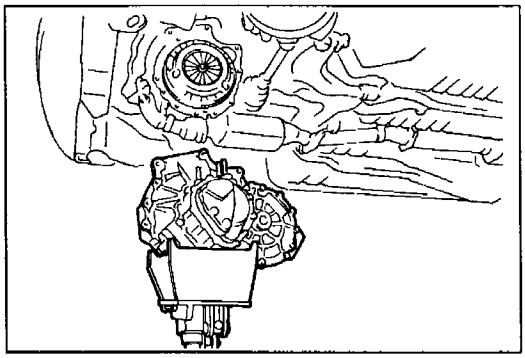


Transaxle
1. Loosen the **SST** (engine support) and lean the engine toward the transaxle.
2. Support the transaxle on a jack.
3. Remove the transaxle bolts.
4. Remove the transaxle.



Warning
- **Do not allow the transaxle to fall from the jack.**

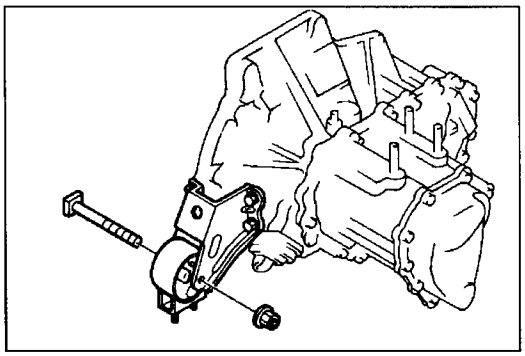
5. Remove the transaxle mounting bolts.
6. Remove the transaxle.



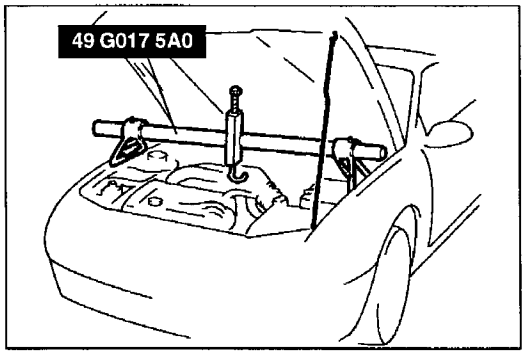
Installation Note
Transaxle
1. Set the transaxle on a jack and carefully lift into place.
2. Install the transaxle mounting bolts.

Tightening torque:
64—89 N·m { 6.5—9.1 kgf·m , 48—65 ft·lbf }

3. Hand-tighten the No.4 engine mount bolts and nuts.



No.2 engine mount
Hand-tighten the No.2 engine mount rubber nut.

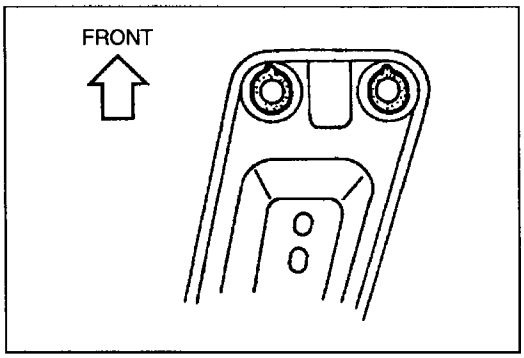


No.1 engine mount

Caution
- **Misaligning the bolts will cause damage to the bolt holes.**

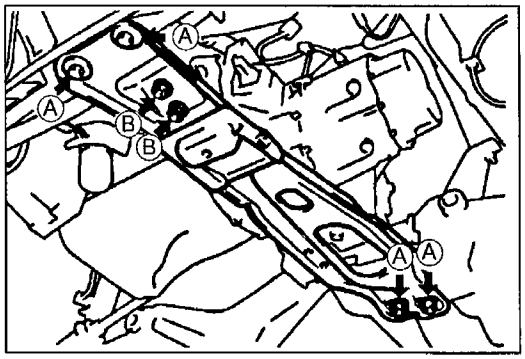
1. Use the **SST** (engine support) to make sure the transaxle bolt holes and No.1 engine mount meet evenly.
2. After the 3 bolts are set in the holes, tighten the bolts to the specified torque.

Tightening torque:
67—93 N·m { 6.8—9.5 kgf·m , 50—68 ft·lbf }



Engine mounting member

Note
- Verify that the engine mount rubbers are installed as shown.
- Put the No.1 engine mount stud bolts in the installation holes when installing the engine mounting member.

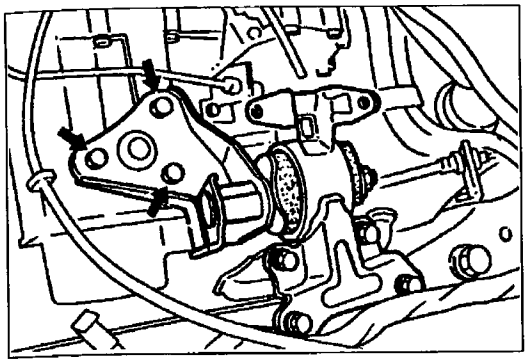


1. Install the bolts and nuts as shown.

Tightening torque
A: 67—89 N·m { 6.8—9.1 kgf·m , 50—65 ft·lbf }
B: 38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }

2. Tighten the No.2 engine mount rubber nut.

Tightening torque:
67—93 N·m { 6.8—9.5 kgf·m , 50—68 ft·lbf }



3. Tighten the No.4 engine mount bolts and nuts.

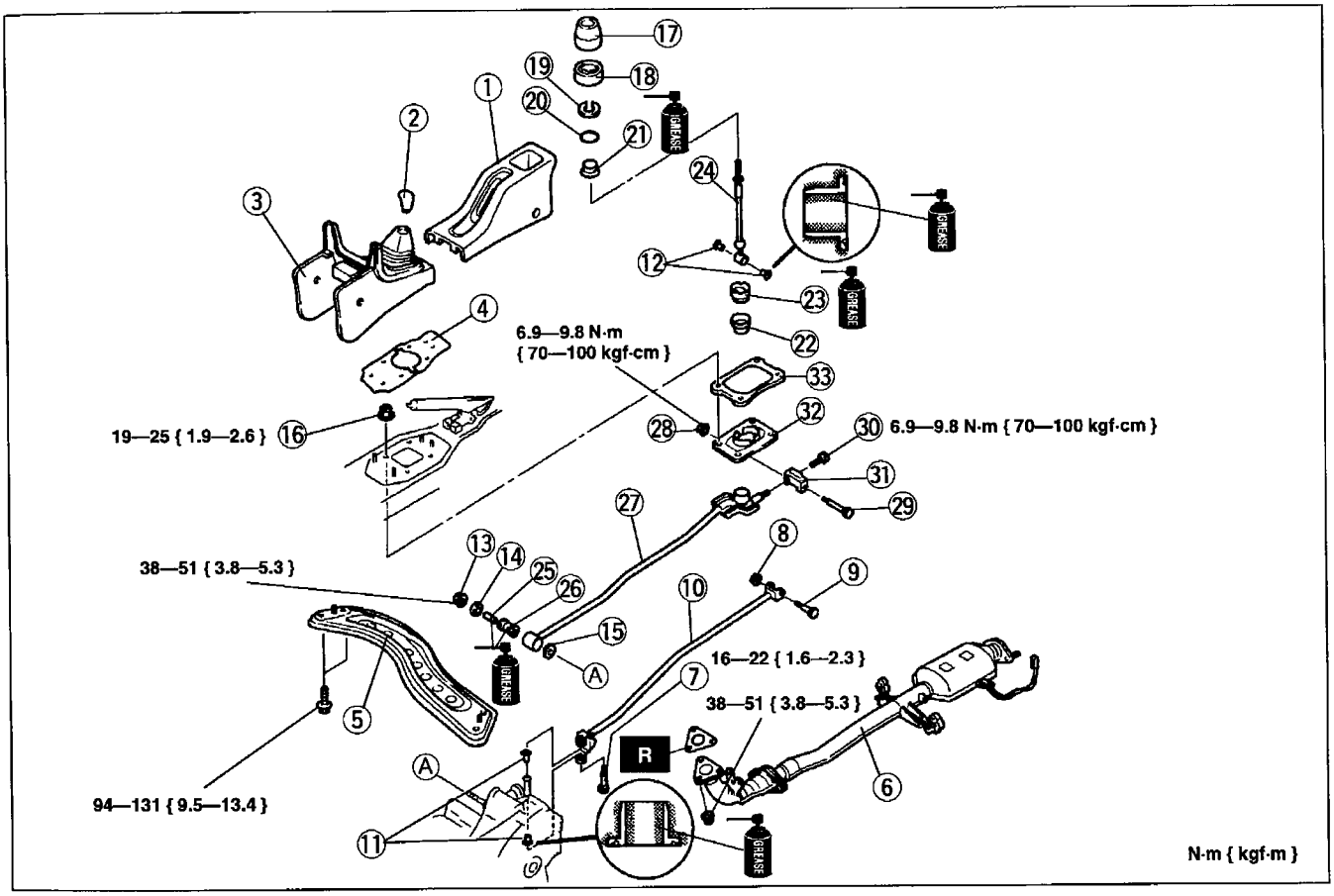
   Tightening torque:
   67—93 N·m { 6.8—9.5 kgf·m , 50—68 ft·lbf }

4. Remove the **SST** (engine support).

SHIFT MECHANISM

DISASSEMBLY / ASSEMBLY

1. Disassemble in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly.



1. Rear console
2. Shift lever knob
3. Front console
4. Insulator
5. Transverse member
6. Front exhaust pipe
7. Bolt
8. Nut
9. Bolt
10. Control rod
11. Bushings
12. Bushings
13. Nut
14. Washer
15. Washer
16. Nut (lever bracket)
17. Assist boot
18. Mounting rubber boot
19. Retaining ring
20. O-ring
21. Upper ball seat
22. Boot
23. Lower ball seat
24. Gear shift lever
25. Pipe
26. Bushing
27. Extension bar
28. Nut
29. Bolt
30. Bolt
31. Rubber mount
32. Lever bracket
33. Insulator

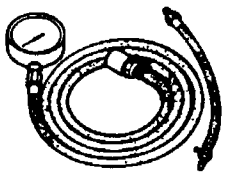
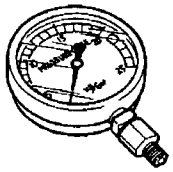
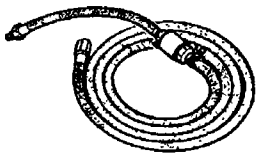
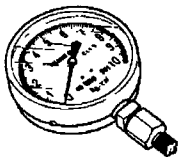
Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

AUTOMATIC TRANSAXLE (FA4A-EL)

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MECHANICAL SYSTEM TEST PREPARATION ..... K- 2
LINE PRESSURE TEST ..... K- 3
STALL TEST ..... K- 5
TIME LAG TEST ..... K- 6
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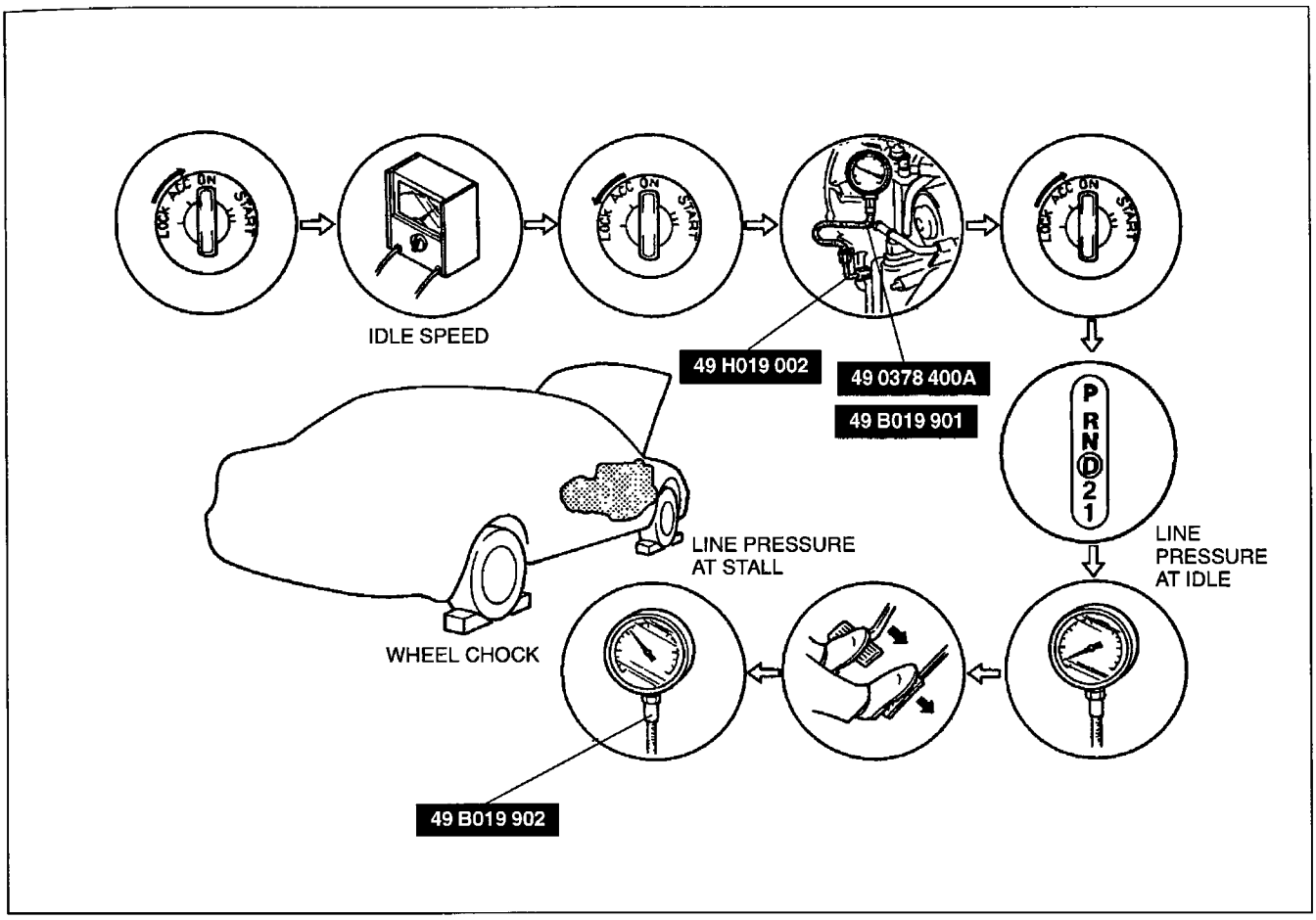
MECHANICAL SYSTEM TEST

PREPARATION
SST

49 0378 400B Oil pressure gauge set 	For oil pressure test	49 B019 902 Oil pressure gauge (Part of 49 0378 400B) 	For oil pressure test
49 B019 903 Hose (Part of 49 0378 400B) 	For oil pressure test	49 B019 901 Oil pressure gauge 	For oil pressure test
49 H019 002 Adapter 	For oil pressure test	—	—

MECHANICAL SYSTEM TEST PREPARATION
1. Engage the parking brake and use wheel chocks at the front and rear of the wheels.
2. Check the engine coolant (Refer to section E.)
3. Check the engine oil (Refer to section B.)
4. Check the ATF levels (Refer to page K–10.)
5. Check the idle speed and ignition timing in P position (Refer to section F1, F2.)

LINE PRESSURE TEST
Procedure



Warning
- **Draining the ATF when it is hot is dangerous. Hot ATF can shoot out when the square-head plug is removed, causing burns and serious injury. Wait until the transaxle and ATF are cool before draining the ATF.**

1. Connect the **SSTs** (49 H019 002, 49 B019 901, and 49 B019 903) to the line pressure inspection port.
2. Shift the selector lever to D range and read the line pressure at idle.
3. Connect the **SST** (49 B019 902) to the line pressure inspection port.

Caution
- **If the accelerator pedal is pressed for longer than 5 seconds while the brake pedal is depressed, the transaxle could be damaged. Therefore, do steps 4 and 5 within 5 seconds of each other.**

4. Firmly depress the brake pedal with the left foot, and then gradually depress the accelerator pedal with the right.
5. When the engine speed no longer increases, quickly read the line pressure and release the accelerator.
6. Shift the selector to N position and let the engine idle for 1 minute or more to cool the ATF.
7. Read the line pressure at idle and at the engine stall speed for the remaining ranges in the same manner.
   (1) 2 range
   (2) 1 range
   (3) R position
8. Shift the selector lever to D range and disconnect the solenoid valve connector. (Refer to page K–34.)
9. Read the line pressure at idle and at the engine stall speed in the same manner.
10. Connect the solenoid connector. (Refer to page K–34.)

Specified line pressure:

Range/Position	Line pressure kPa { kgf/cm^2 , psi }			
	Idle		Stall	
	Z5	BP	Z5	BP
D, D (solenoid connector disconnected), 2, 1	430—550 { 4.3—5.7 , 62—81 }		920—1,040 { 9.3—10.7 , 140—152 }	
R	730—870 { 7.4—8.9 , 110—120 }		1,500—1,700 { 15.2—17.4 , 217—247 }	

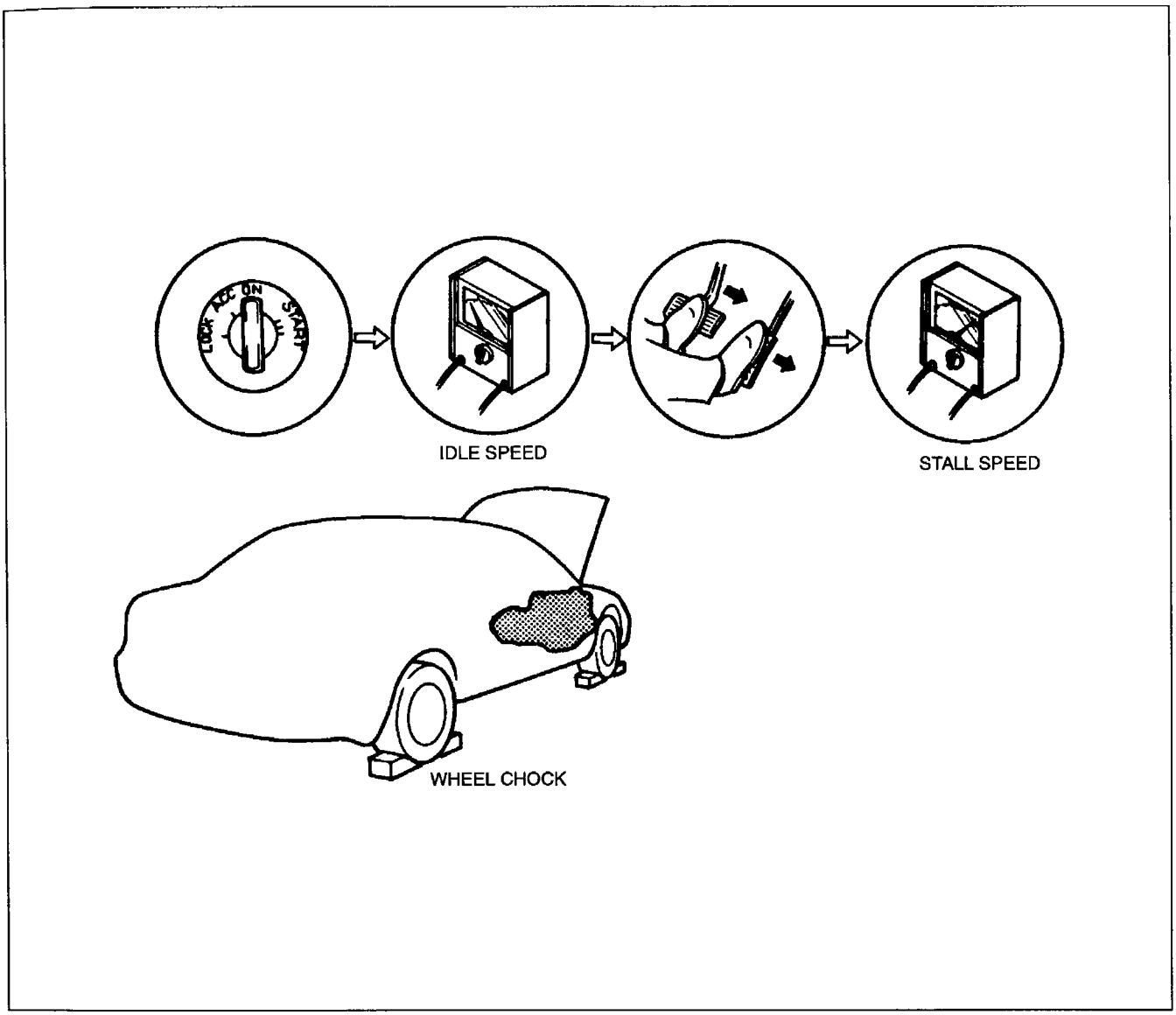
11. Install a new square head plug in the line pressure inspection port.

Tightening torque: 5.0—9.8 N·m { 50—100 kgf·cm , 44—86 in·lbf }

Evaluation of Line Pressure Test

Line pressure	Possible cause
Below specification in R position and all ranges	Worn oil pump Fluid leaking from oil pump, control valve body, or transaxle case Pressure regulator valve sticking Throttle cable misadjusted Throttle valve sticking Throttle modulator valve sticking
Below specification in D, 2, and 1 ranges	Fluid leaking from hydraulic circuit of forward clutch
Below specification in 2 range	Fluid leaking from hydraulic circuit of 2–4 brake band
Below specification in 1 range and R position	Fluid leaking from hydraulic circuit of low and reverse brake
Below specification in D range (solenoid connector disconnected)	Fluid leaking from hydraulic circuit of 3–4 clutch
Below specification in R position	Fluid leaking from hydraulic circuit of reverse clutch
Above specification in R position and all ranges	Throttle valve sticking Throttle modulator valve sticking Pressure regulator valve sticking Throttle cable misadjusted

STALL TEST
Procedure



1. Shift the selector lever to D range.

Caution
- **If the accelerator pedal is depressed for longer than 5 seconds while the brake pedal is depressed, the transaxle could be damaged. Therefore, do steps 2 and 3 within 5 seconds of each other.**

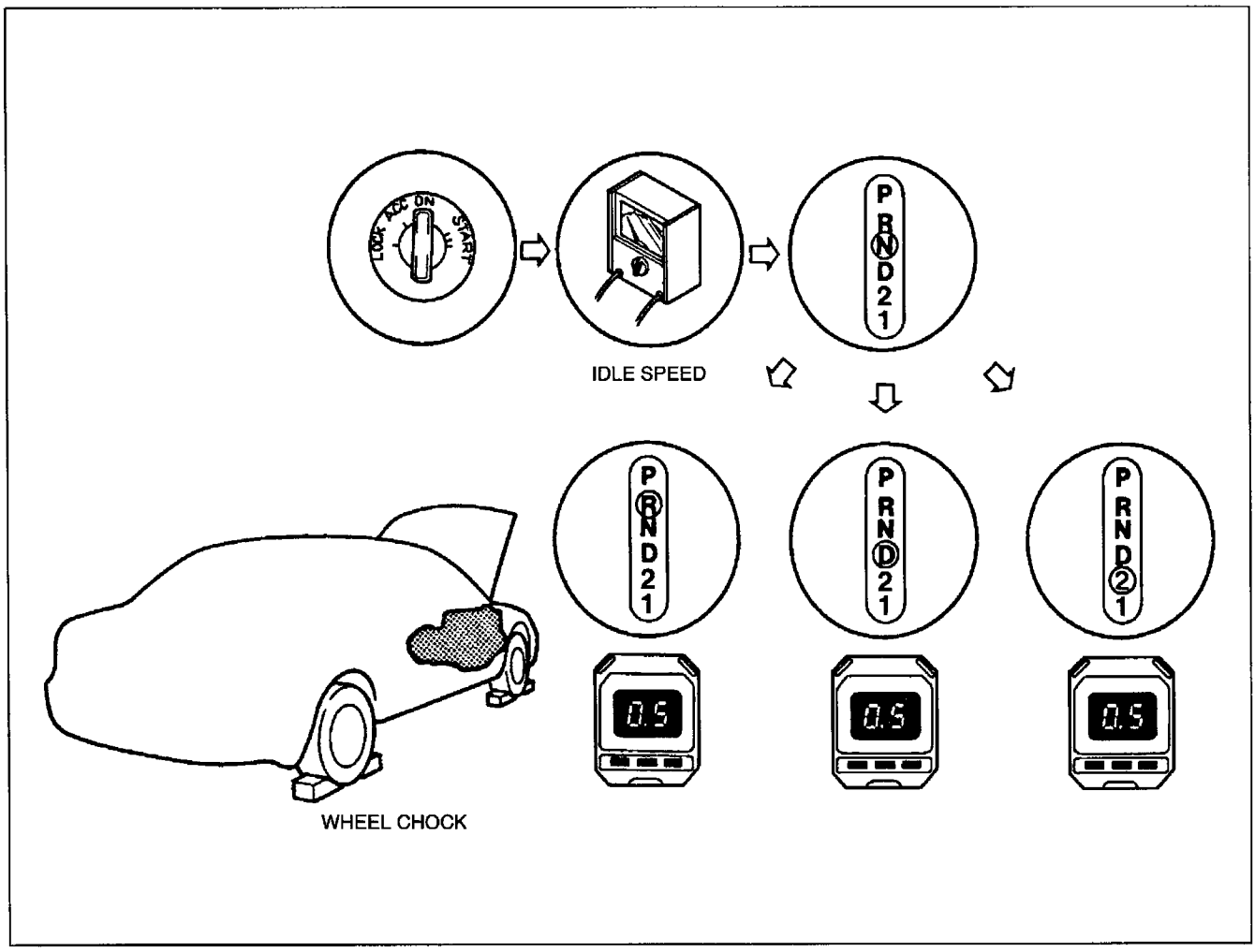
2. Firmly depress the brake pedal with the left foot, and then gradually depress the accelerator pedal with the right.
3. When the engine speed no longer increases, quickly read the engine speed and release the accelerator.
4. Shift the selector to N position and let the engine idle for 1 minute or more to cool the ATF.
5. Perform stall tests for the remaining ranges and position in the same manner.
   (1) 2 range
   (2) 1 range
   (3) R position

Engine stall speed
Z5: 1,950—2,250 rpm
BP: 2,200—2,500 rpm

Evaluation of Stall Test

Condition		Possible Cause	
Above specification	In R position and 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 range	Forward clutch slipping One-way clutch 1 slipping One-way clutch 2 slipping	
	In 2 range	2–4 brake band slipping	
	In R position	Low and reverse brake slipping Reverse clutch slipping Perform road test to determine whether problem is low and reverse brake or reverse clutch a) Engine braking felt in 1 range... Reverse clutch b) Engine braking not felt in 1 range ... Low and reverse brake	
Below specification in R position and all ranges		Engine out of tune	
		One-way clutch slipping within torque converter	

TIME LAG TEST
Procedure



1. Shift the selector from N position to D range.
2. Use a stopwatch to measure the time it takes from shifting until shock is felt.
3. Shift the selector lever to N position and run the engine at idle speed for at least 1 minute.
4. Do the time lag test for the following shifts in the same manner. Make three measurements for each test and average the results.
5. While depressing the brake pedal, perform the test for the following shifts in the same manner.
   (1) N position→D range
   (2) N position→2 range
   (3) N position→R position

Time lag:
N position→D range ... approx. 0.5—0.6 seconds
N position→2 range ... approx. 0.5—0.7 seconds
N position→R position ... approx. 0.6—0.7 seconds

Evaluation of Time Lag Test

Condition		Possible Cause
N position→D range shift	Above specification	Insufficient line pressure Forward clutch slipping One-way clutch 1 slipping One-way clutch 2 slipping
	Below specification	N–D accumulator not operating properly Excessive line pressure
N position→2 range shift	Above specification	Insufficient line pressure Forward clutch slipping 2–4 brake band slipping One-way clutch 1 slipping
	Below specification	1–2 accumulator not operating properly Excessive line pressure
N position→R position shift	Above specification	Insufficient line pressure Low and reverse brake slipping Reverse clutch slipping
	Below specification	N–R accumulator not operating properly Excessive line pressure

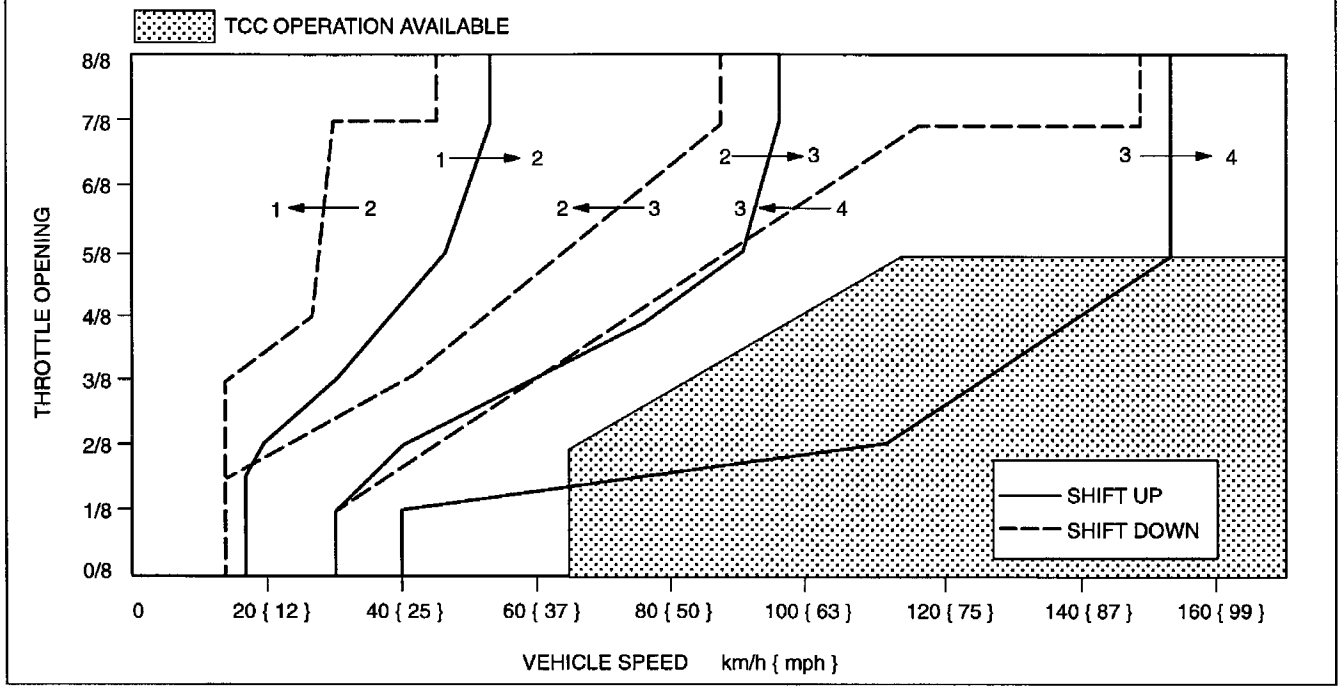
ROAD TEST

ROAD TEST PREPARATION

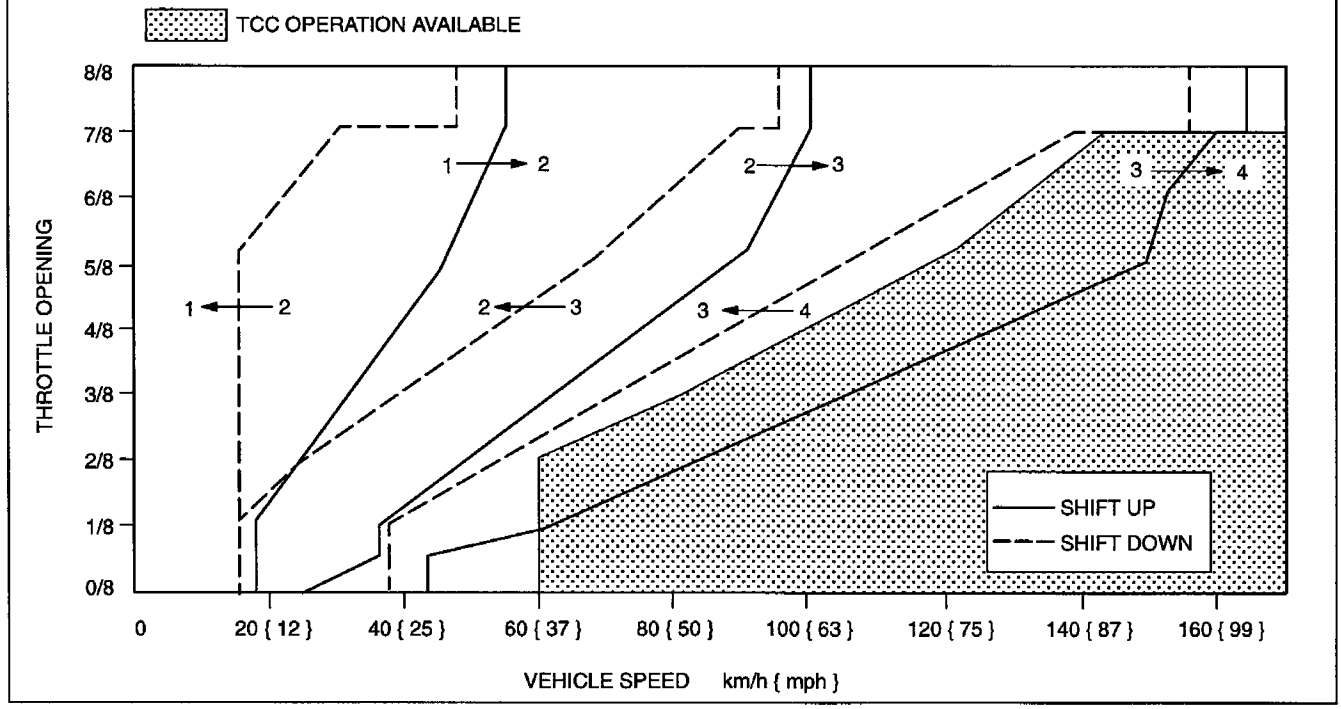
1. Check and correct as necessary, the engine coolant, engine oil, and ATF levels before testing.
2. Warm up the engine thoroughly to raise the ATF temperature to operating level (60—70 °C { 140—158 °F }).
3. Check the idle speed and ignition timing in P position. (Refer to section F1, F2.)

SHIFT DIAGRAM

D RANGE (EXCEPT O/D OFF MODE) ⟨Z5⟩



D RANGE (EXCEPT O/D OFF MODE) ⟨BP⟩



D RANGE TEST

D range (Except O/D OFF mode)

1. Shift the selector lever to D range.
2. Accelerate the vehicle to half throttle and wide open throttle.
3. Verify that 1–2, 2–3, and 3–4 upshifts and downshifts are obtained. The shift points must be as shown in the table below.
4. Drive the vehicle in fourth, third, and second gears and verify that kickdown occurs for 4→3, 4→2, 3→2, 3→1, 2→1, and that the shift points are as shown in the table below.
5. Decelerate the vehicle and verify that engine braking effect is felt in fourth and third gears.

Note

- There is torque converter clutch non-operation in the following conditions.
  1. The engine coolant temperature is below 62 °C { 144 °F }.
  2. The closed throttle position switch is ON.
  3. The brake switch is ON.

6. Drive the vehicle and verify that torque converter clutch operation is obtained.

D range (O/D OFF mode)

1. Turn the O/D OFF switch from OFF to ON.
2. Accelerate the vehicle to half throttle and wide open throttle, and verify that 1–2 and 2–3 upshift and downshift are obtained. The shift points must be as shown in the table below.
3. Drive the vehicle in third and second gears and verify that kickdown occurs for 3→2, 3→1, 2→1, and that the shift points are as shown in the table below.
4. Decelerate the vehicle and verify that engine braking effect is felt in third gear.

Shift Point

Range/Mode		Throttle condition	Shift	Vehicle speed (km/h { mph })		Turbine speed (rpm)	
				Z5	BP	Z5	BP
D	Except O/D OFF mode	Wide open throttle	1GR→2GR	52—58 { 32—36 }	53—59 { 33—36 }	5,600—6,200	5,300—5,850
			2GR→3GR	94—102 { 58—63 }	98—106 { 61—65 }	5,600—6,000	5,400—5,800
			3GR→4GR	149—159 { 92—99 }	162—172 { 101—106 }	5,750—6,100	5,800—6,100
		Half throttle	1GR→2GR	33—43 { 20—27 }	33—42 { 21—26 }	3,600—4,600	3,300—4,150
			2GR→3GR	64—84 { 40—52 }	66—85 { 41—52 }	3,800—4,950	3,650—4,650
			3GR→4GR	127—152 { 79—94 }	112—142 { 70—88 }	4,900—5,800	4,000—5,050
			TCC ON (4GR)	127—152 { 79—94 }	92—120 { 57—74 }	4,900—5,800	2,300—2,950
		Closed throttle position	4GR→3GR	27—33 { 17—20 }	33—39 { 21—24 }	750—850	850—950
			3GR→1GR	11—17 { 7—11 }	12—18 { 8—11 }	450—650	450—600
		Kickdown (wide open throttle)	4GR→3GR	143—153 { 87—95 }	151—161 { 94—99 }	3,850—4,100	3,800—4,000
			3GR→2GR	84—94 { 52—57 }	91—99 { 56—61 }	3,250—3,600	3,250—3,500
			2GR→1GR	42—48 { 27—29 }	44—50 { 27—31 }	2,500—2,800	2,450—2,700
	O/D OFF mode	Wide open throttle	1GR→2GR	52—58 { 32—36 }	53—59 { 33—36 }	5,600—6,200	5,300—5,850
			2GR→3GR	94—102 { 58—63 }	98—106 { 61—65 }	5,600—6,000	5,400—5,800
		Half throttle	1GR→2GR	33—42 { 20—27 }	32—41 { 20—25 }	3,600—4,600	3,200—4,050
			2GR→3GR	64—84 { 40—52 }	66—85 { 41—52 }	3,800—4,950	3,650—4,650
		Closed throttle position	4GR→3GR	149—155 { 92—96 }	162—168 { 100—104 }	4,050—4,150	4,050—4,150
			3GR→1GR	11—17 { 7—11 }	12—18 { 8—11 }	450—650	450—600
		Kickdown (wide open throttle)	3GR→2GR	84—92 { 52—57 }	91—99 { 57—61 }	3,250—3,600	3,250—3,500
			2GR→1GR	42—48 { 27—29 }	44—50 { 27—31 }	2,500—2,800	2,450—2,700

2 RANGE TEST
2 range
1. Shift the selector lever to 2 range.
2. Accelerate the vehicle to half throttle and wide open throttle, and verify that second gear is held.
3. Decelerate the vehicle and verify that engine braking effect is felt.

Shift Point

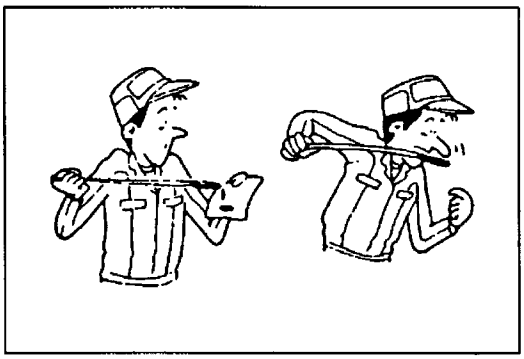
Range	Throttle condition	Shift	Vehicle speed (km/h { mph })		Turbine speed (rpm)	
			Z5	BP	Z5	BP
2	—	4GR→3GR	149—155 { 92—96 }	162—168 { 100—104 }	4,050—4,150	4,050—4,150
		3GR→2GR	93—99 { 58—61 }	97—103 { 60—63 }	3,600—3,800	3,450—3,650

1 RANGE TEST
1 range
1. Shift the selector lever to 1 range.
2. Accelerate the vehicle with half throttle and wide open throttle, and verify that first gear is held.
3. Decelerate the vehicle and verify that engine braking effect is felt.

Shift Point

Range	Throttle condition	Shift	Vehicle speed (km/h { mph })		Turbine speed (rpm)	
			Z5	BP	Z5	BP
1	—	2GR→1GR	42—48 { 26—29 }	44—50 { 27—31 }	2,500—2,800	2,450—2,700

P POSITION TEST
Shift into P position on a gentle slope, release the brake, and verify that the vehicle does not roll.



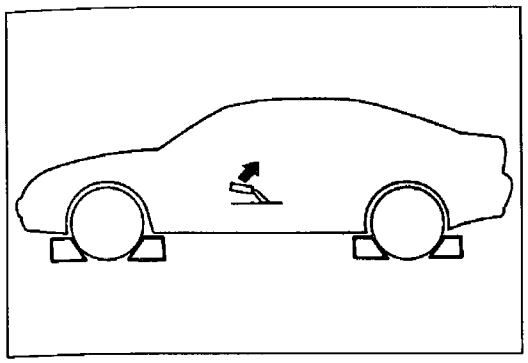
AUTOMATIC TRANSAXLE FLUID (ATF)

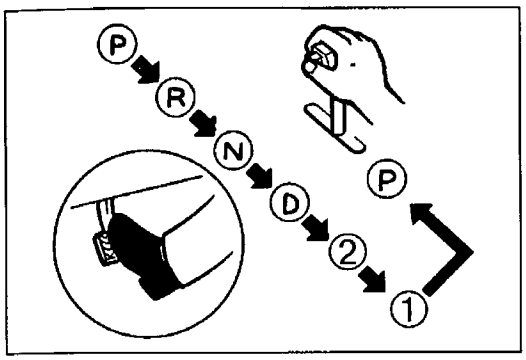
ATF
Inspection
Condition
One way of determining whether the transaxle should be disassembled is by noting:
1. If the ATF is muddy or varnished.
2. If the ATF smells strange.

ATF condition

Color	Condition
Clear red	Normal
Dark	Powertrain components damaged
Light pink	Water in the ATF
Reddish-brown	Deterioration of the ATF

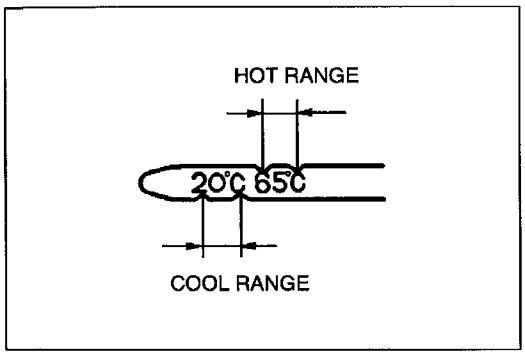
3. If ATF condition is not OK, repair as follows
   - Dark color condition
     Overhaul transaxle and repair or replace parts as necessary.
   - Light pink and/or reddish-brown condition.
     Replace ATF.





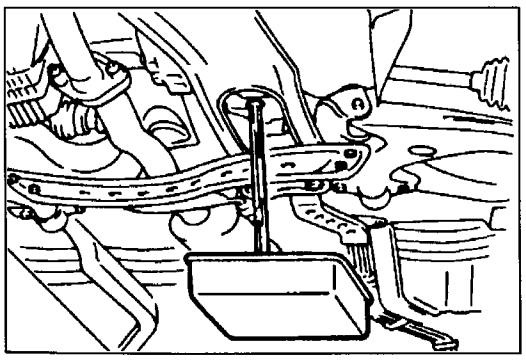
Level

1. Park the vehicle on level ground.
2. Apply the parking brake and position wheel chocks securely to prevent the vehicle from rolling.
3. If necessary, inspect the ATF before warming up the engine. In this case, use the cool range **(15—25 °C { 59—77 °F })**.
4. Warm up the engine until the ATF reaches **60—70 °C { 140—158 °F }**.
5. While depressing the brake pedal, shift the selector lever to each range (P—1), pausing momentarily in each range.
6. Shift back to P position.



7. While the engine is idling, ensure that the dipstick is in the HOT **65 °C { 149 °F }** range. Add ATF to the specification if necessary.

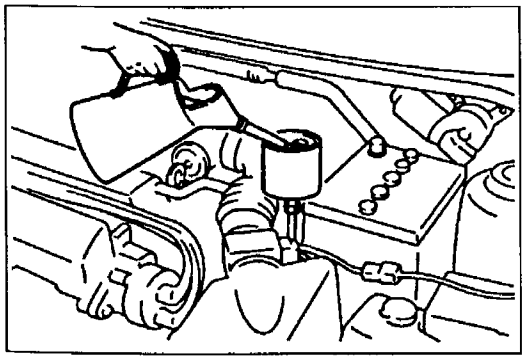
   ATF type: M–III or Dexron®II



Replacement

1. Remove the dipstick.
2. Remove the drain plug and washer.
3. Drain the ATF into a suitable container.
4. Install a new washer and the drain plug.

   Tightening torque:
   40—53 N·m { 4.0—5.5 kgf·m , 29—39 ft·lbf }



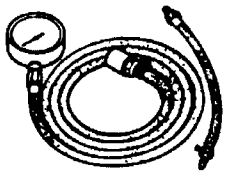
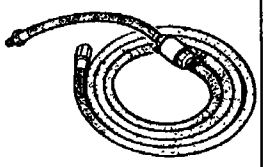
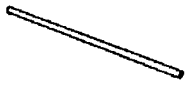
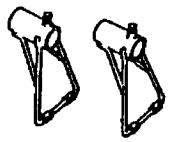
5. Remove the dipstick and add the specified amount and type of ATF through the oil filler tube.

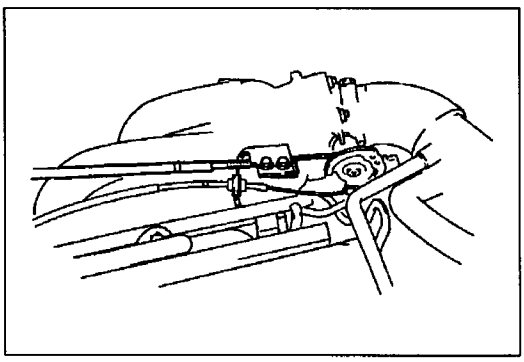
   ATF type: M–III or Dexron®II
   Capacity: 4.9 L { 5.2 US qt , 4.3 Imp qt }

6. Install the dipstick.
7. Ensure that the dipstick is in the HOT **65 °C { 149 °F }** range.
8. Add ATF to the specified level if necessary.

THROTTLE CABLE

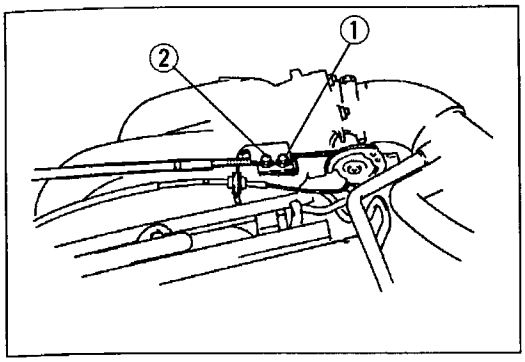
PREPARATION
SST

49 0378 400B Oil pressure gauge set 	For adjustment of throttle cable	49 B019 902 Oil pressure gauge (Part of 49 0378 400B) 	For adjustment of throttle cable
49 B019 903 Hose (Part of 49 0378 400B) 	For adjustment of throttle cable	49 B019 901 Oil pressure gauge 	For adjustment of throttle cable
49 H019 002 Adapter 	For adjustment of throttle cable	49 G017 5A0 Support, engine 	For support of engine
49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine	49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine
49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine	—	—



THROTTLE CABLE
Inspection

1. Check the cable and housing for damage.
2. Verify that the accelerator operates smoothly.
3. Replace the throttle cable assembly if necessary.

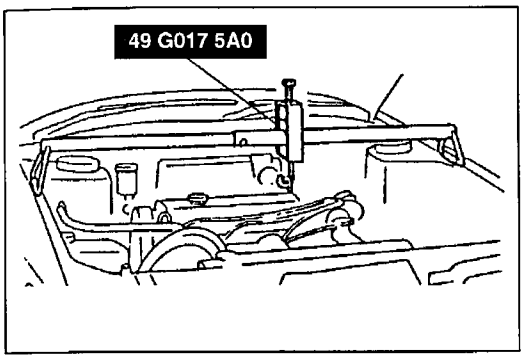


Replacement

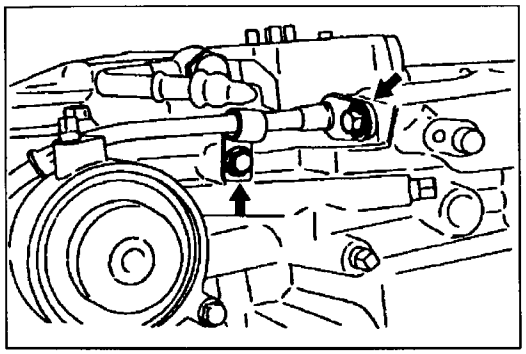
1. Remove the throttle cable from the throttle lever (throttle body).

   Note
   - Loosen bolt ① first.

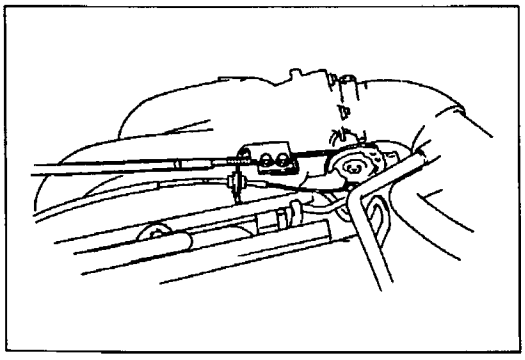
2. Loosen and remove bolts ① and ②.
3. Remove the throttle cable from the bracket.



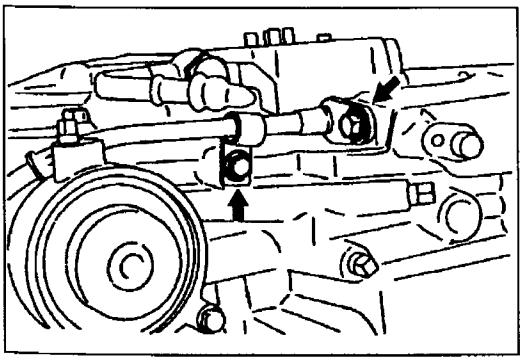
4. Remove the splash shield.
5. Drain the ATF into a container.
6. Suspend the engine by using the **SST**.
7. Remove the transverse member (BP).
8. Remove the engine mounting member.
9. Remove the oil pan and gasket.
10. Remove the control valve body. (Refer to page K–43.)



11. Remove the throttle cable from the throttle cam.
12. Remove the mounting bolts and throttle cable from the transaxle.

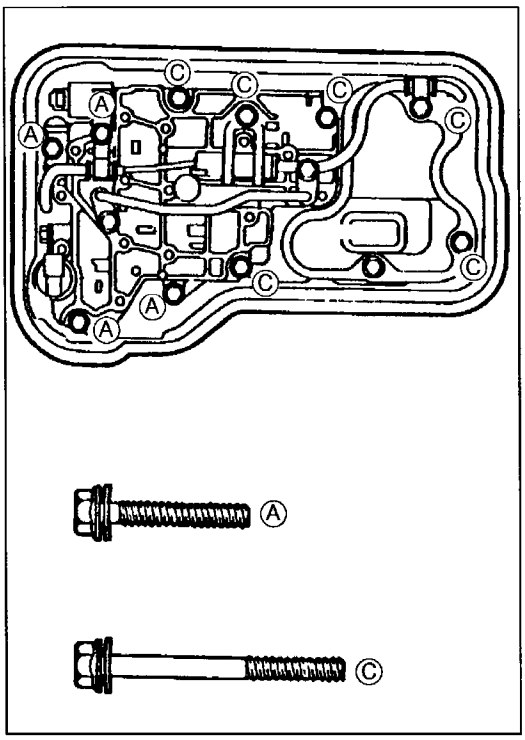


13. Install a new throttle cable to the throttle cam.
14. Connect the throttle cable to the throttle lever (throttle body).



15. Install new bolts in the areas indicated in the figure and tighten them to the specified torque.

    Tightening torque:
    7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }



16. Install the control valve body.

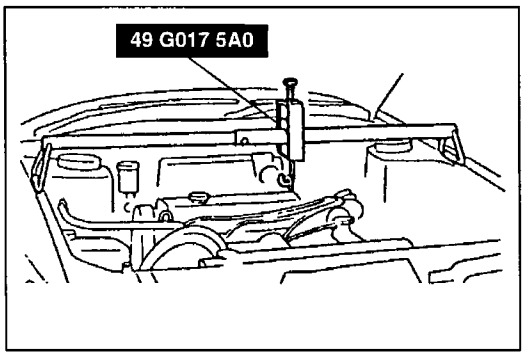
Bolt length (measured from below the head)
Ⓐ: 30 mm { 1.18 in }
Ⓒ: 50 mm { 1.97 in }

Tightening torque:
7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }

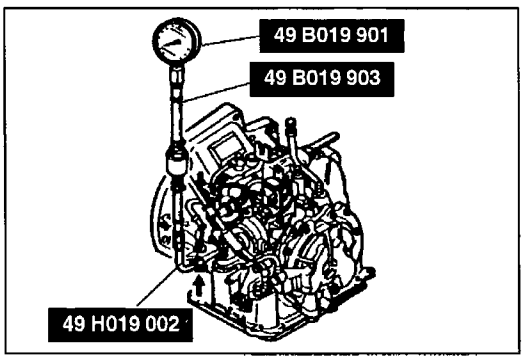
Note
- Lightly apply sealant to both sides of the gasket.

17. Install a new gasket and install the oil pan.

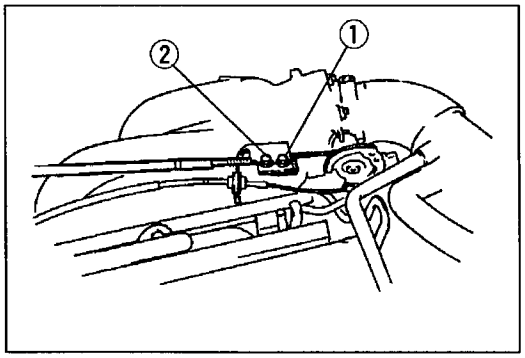
Tightening torque:
8.4—10.7 N·m { 85—110 kgf·cm , 74—95 in·lbf }



18. Install the engine mounting member. (Refer to page K–43.)
19. Install the transverse member (BP).
20. Remove the **SST**.
21. Install the splash shield.
22. Add ATF, and with the engine idling, check the ATF level and check for leaks. (Refer to page K–10.)
23. Adjust the throttle cable as follows.



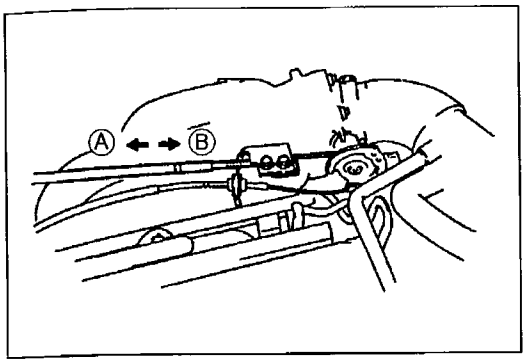
Adjustment
1. Remove the square-head plug L and install the **SSTs**.
2. Shift into P position and start the engine. Warm up the engine to normal operating temperature, and adjust the idle speed if necessary. (Refer to section F1, F2.)



Caution
- **Loosen bolt ① first.**

3. Loosen bolts ① and ②.
4. Verify that the throttle lever is closed throttle position.
5. Tighten bolt ①.

Tightening torque:
6.9—9.8 N·m { 70—100 kgf·cm , 61—86 in·lbf }



6. Pull the throttle cable in the direction of arrow Ⓐ as shown in the figure until the line pressure exceeds the specified pressure.

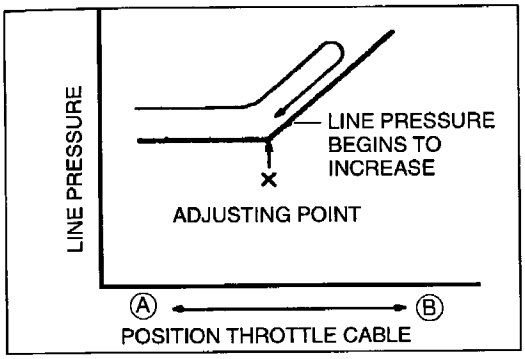
Caution
- **If the line pressure will not decrease to the adjustment pressure, tighten bolt ② with the line pressure at the closest point (point X) to the adjustment pressure.**

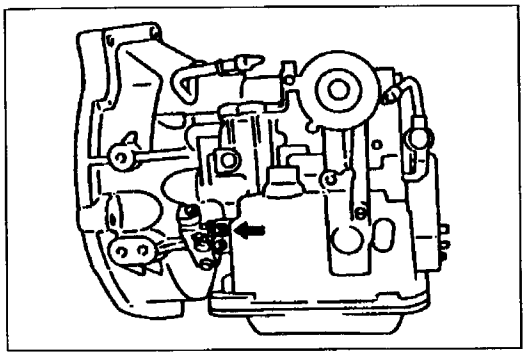
7. Push the throttle cable in the direction of arrow Ⓑ until the line pressure decreases to the adjustment pressure.

Adjustment pressure:
490 kPa { 5.0 kgf/cm^2 , 71 psi } (Engine is idling)

8. Tighten bolt ②.

Tightening torque:
6.9—9.8 N·m { 70—100 kgf·cm , 61—86 in·lbf }





9. Stop the engine and verify that the throttle cable moves smoothly.
10. Restart the engine and accelerate it slightly, then run it at idle.
11. Verify that the line pressure is within specification.

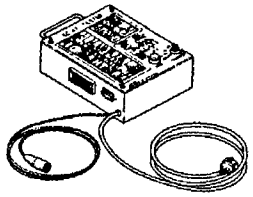
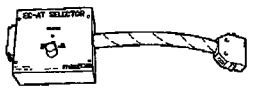
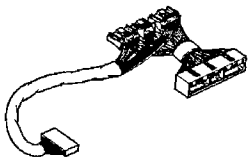
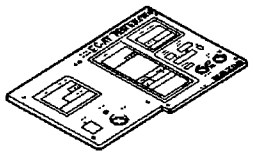
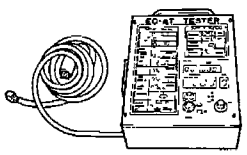
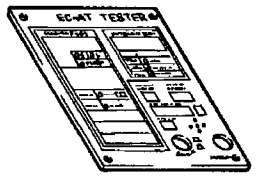
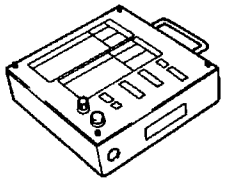
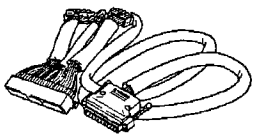
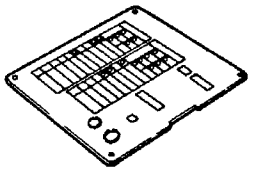
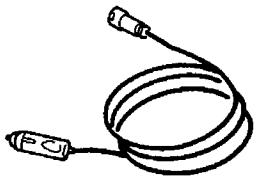
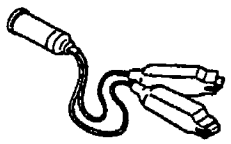
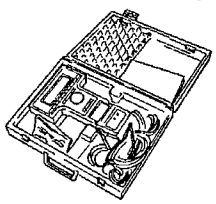
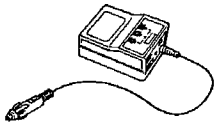
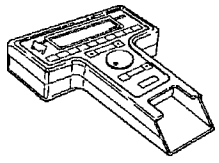
Specified pressure:
422—558 kPa { 4.3—5.7 kgf/cm^2 , 62—81 psi }
(Engine is idling)

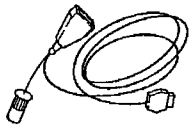
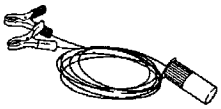
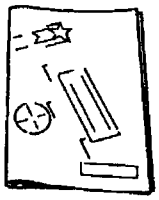
12. If not correct, repeat from step 3.
13. Stop the engine.
14. Remove the **SSTs** and install a new square-head plug L.

Tightening torque:
5.0—9.8 N·m { 50—100 kgf·cm , 44—86 in·lbf }

ELECTRICAL SIGNAL INSPECTION

PREPARATION
SST

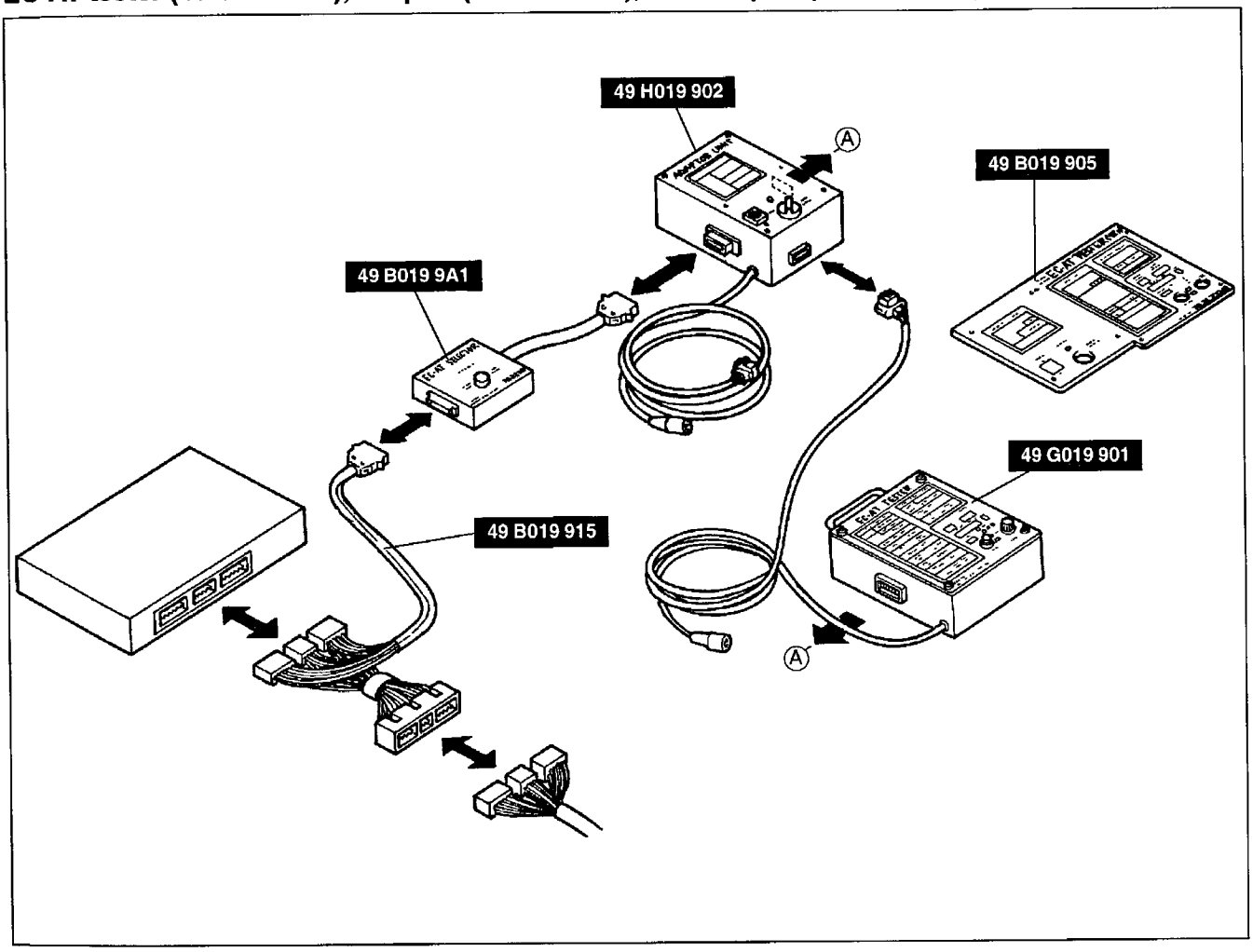
49 G019 901 EC-AT Tester 	For inspection of electrical signal	49 H019 902 Adapter 	For inspection of electrical signal
49 B019 9A1 Adapter 	For inspection of electrical signal	49 B019 915 Harness Adapter 	For inspection of electrical signal
49 B019 905 Panel 	For inspection of electrical signal	49 G019 901B EC-AT Tester 	For inspection of electrical signal
49 B019 904 Panel 	For inspection of electrical signal	49 G019 901C EC-AT Tester 	For inspection of electrical signal
49 B019 913A Harness Adapter 	For inspection of electrical signal	49 E019 903 Panel 	For inspection of electrical signal
49 G019 929 Power Harness 	For inspection of electrical signal	49 D088 008 Harness Adapter Power 	For inspection of electrical signal
49 T088 0A0 NGS set 	For inspection of electrical signal	49 T088 010B Program Card 	For inspection of electrical signal
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of electrical signal	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of electrical signal

49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of electrical signal	49 T088 009 Case (Part of 49 T088 0A0) 	For inspection of electrical signal
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of electrical signal	49 T088 008 Instruction Manual 	For inspection of electrical signal

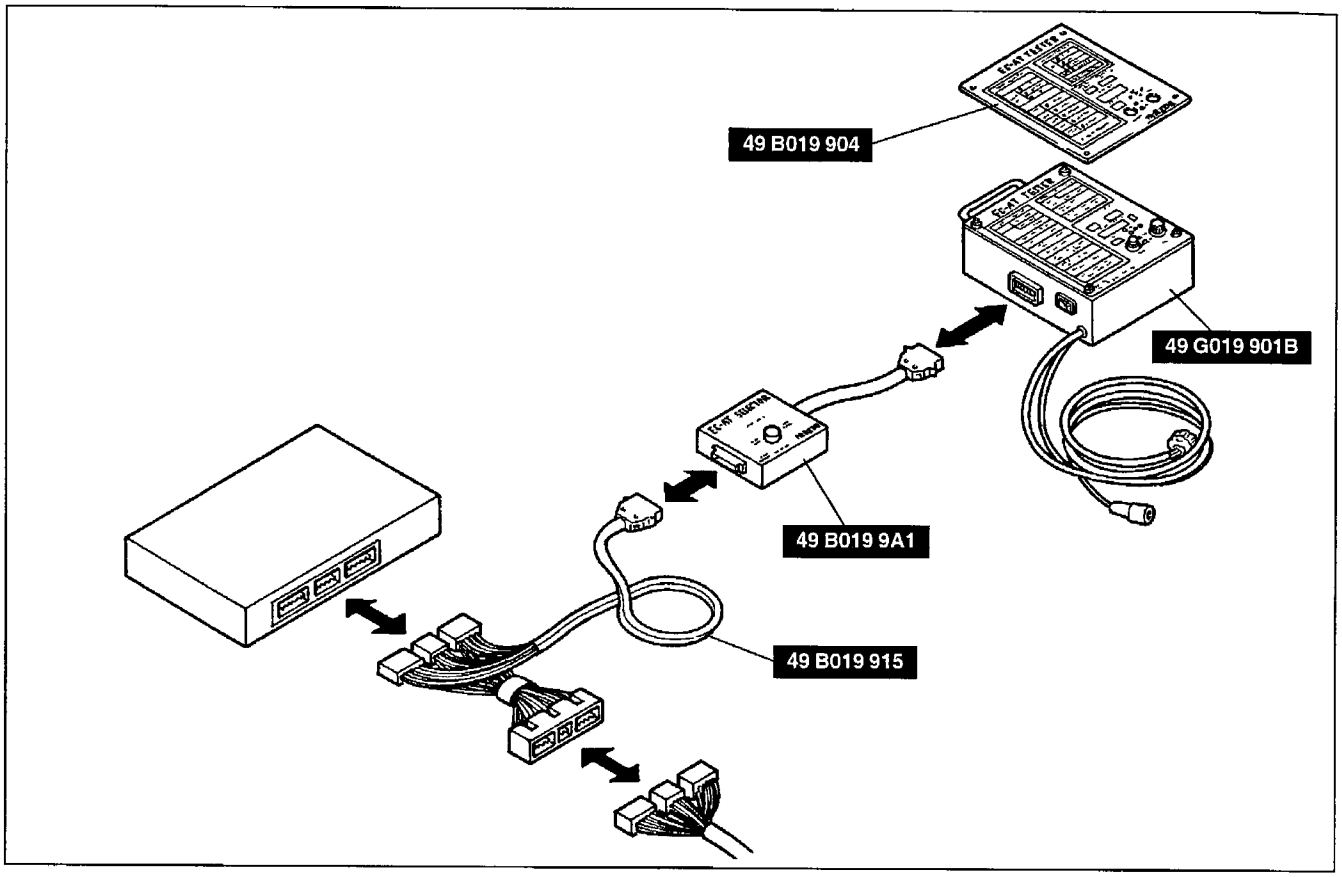
ELECTRICAL SIGNAL INSPECTION

Assembly of SST

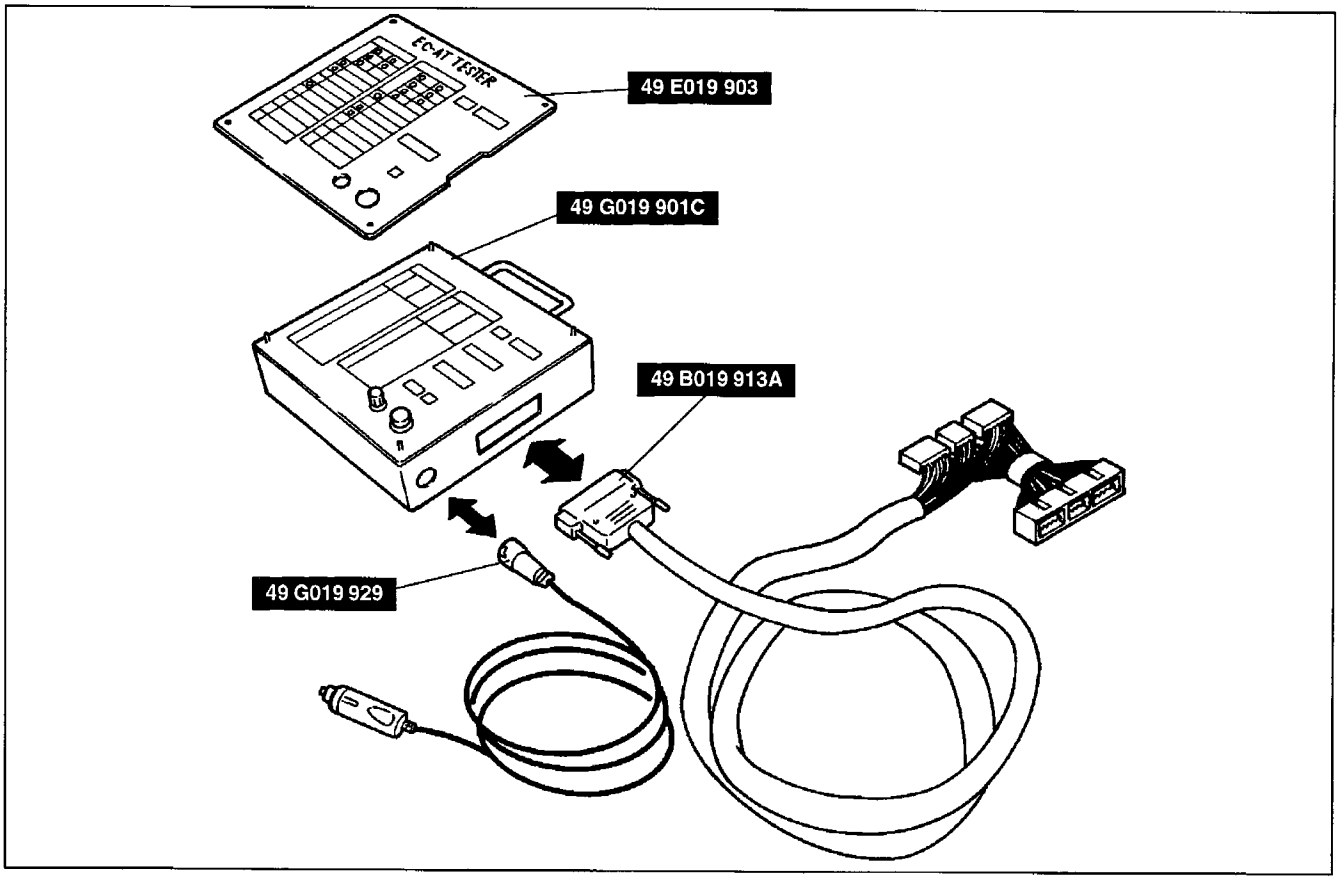
EC-AT tester (49 G019 901), adapter (49 H019 902), and adapter (49 B019 9A1)



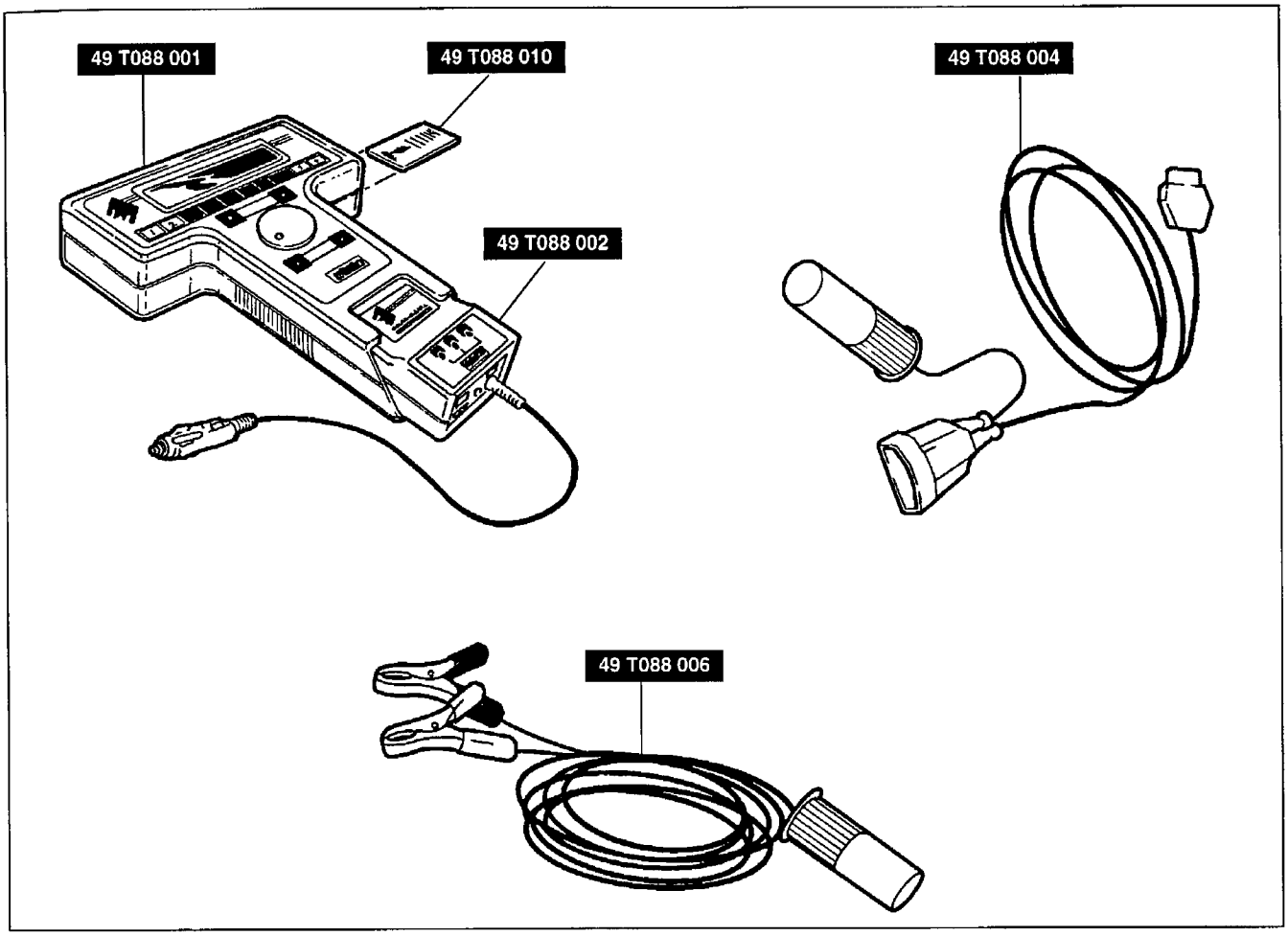
EC-AT tester (49 G019 901B) and adapter (49 B019 9A1)

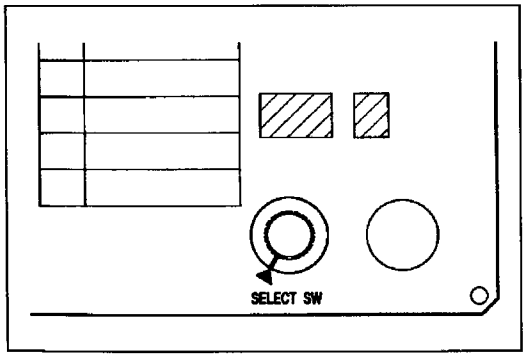


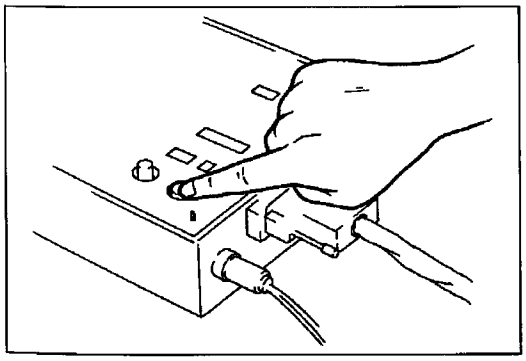
EC-AT tester (49 G019 901C)



NGS



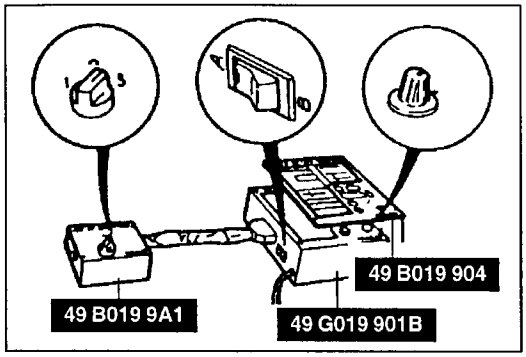




Inspection Procedure

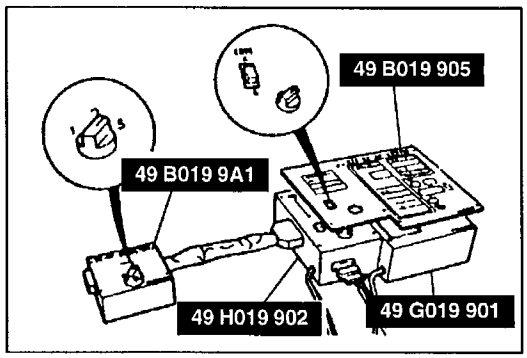
Caution
- **Do not connect the NGS to the data link connector 2 when the EC-AT tester is connected to the powertrain control module.**
  Doing so can cause incorrect test results.

When using the EC-AT tester (49 G019 901C)
1. Assemble the **SST.** (Refer to page K–18.)
2. Turn the EC-AT tester select switch to the ▲ mark on the panel.
3. Turn the ignition switch and the EC-AT tester main switch to ON.
4. Check the indication of the respective light or digital display in each condition, referring to the indication table on the following page.



When using the EC-AT tester (49 G019 901B)

1. Assemble the **SST**. (Refer to page K–18.)
2. Set the EC-AT selector switch to position 3.
3. Set the EC-AT tester vehicle switch to the 323 position.
4. Set the EC-AT tester select switch to position A.
5. Turn the ignition switch and the EC-AT tester main switch to ON.
6. Check the indication of the respective light or digital display in each condition, referring to the indication table on the following page.



When using the EC-AT tester (49 G019 901) and adapter unit (49 H019 902)

1. Assemble the **SST**. (Refer to page K–17.)
2. Set the EC-AT selector switch to position 3.
3. Set the adapter unit vehicle switch to the 323 position.
4. Set the adapter unit select switch to position A.
5. Turn the ignition switch and the EC-AT tester main switch to ON.
6. Check the indication of the respective light or digital display in each condition, referring to the indication table on the following page.

When using the NGS

1. Assemble the **SST** (NGS). (Refer to page K–19.)
2. Select the PID DATA MONITOR AND RECORD function. (Refer to section F1, F2.)

Indication Table Of Light And Digital Display
EC-AT tester (49 G019 901)

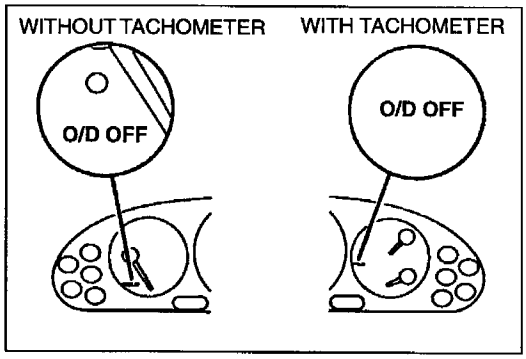
Item		Indication	Condition	Possible cause
Input (Light)				
Transaxle range switch (INHIBITOR SW)	P, N	ON	P or N position	Transaxle range switch or wiring
		OFF	R position, all ranges	
	D	ON	D range	
		OFF	Other ranges, all positions	
	2 (S)	ON	2 range	
		OFF	Other ranges, all positions	
	1 (L)	ON	1 range	
		OFF	Other ranges, all positions	
Engine coolant temperature switch (WATER THERMO SW)		Not used		
Transaxle fluid temperature sensor (ATF THERMOSENSOR)		ON	ATF temperature above 130 °C { 266 °F }	Transaxle fluid temperature sensor or wiring
		OF	ATF temperature below 130 °C { 266 °F }	
O/D OFF switch (HOLD SW)		ON	O/D OFF switch released	O/D OFF switch or wiring
		OFF	O/D OFF switch depressed	
Closed throttle position switch (IDLE SW)		ON	Closed throttle position	Closed throttle position switch or wiring
		OFF	Other position	
Brake switch (BRAKE LIGHT SW)		ON	Brake pedal depressed	Brake switch or wiring
		OFF	Brake pedal released	
Input (Digital Display)				
Throttle position sensor voltage (THROTTLE SENSOR V.)		PCM terminal voltage	Constant	Throttle position sensor or wiring
VEHICLE SPEED km/h		Vehicle speed	Vehicle moving	Vehicle speed sensor, vehicle speedometer sensor, or wiring
DRUM SPEED rpm		Drum speed	All the time	Input/turbine speed sensor or wiring
Output (Light)				
SOLENOID VALVE	Shift solenoid A (1–2)	ON	2GR, 3GR, or 4GR	Powertrain control module, shift solenoid A, or wiring
		OFF	1GR	
	Shift solenoid B (2–3)	ON	1GR or 2GR	Powertrain control module, shift solenoid B, or wiring
		OFF	3GR or 4GR	
	Shift solenoid C (3–4)	ON	1GR, 2GR, or 4GR	Powertrain control module, shift solenoid C, or wiring
		OFF	3GR	
	TCC (LOCK-UP)	ON	TCC operation	Powertrain control module, TCC solenoid valve, or wiring
		OFF	TCC non-operation	
SHIFT SIGNAL		Not used		
O/D OFF indicator light (HOLD INDICATOR)		Not used		
Output (Digital Display)				
GEAR		1	First gear	—
		2	Second gear	
		3	Third gear	
		4	Fourth gear	

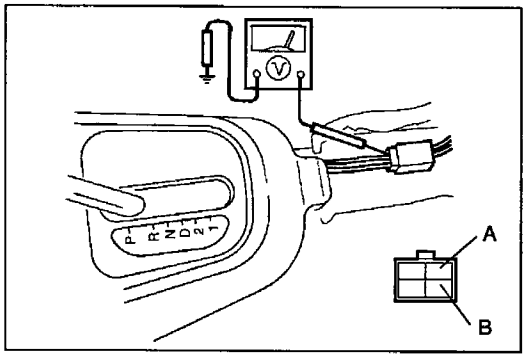
EC-AT tester (49 G019 901B)

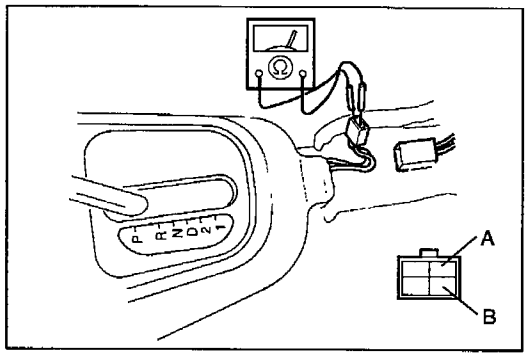
Item		Indication	Condition	Possible cause
Input (Light)				
Transaxle range switch (INHIBITOR SW)	P, N	ON	P or N position	Transaxle range switch or wiring
		OFF	R position, all ranges	
	D	ON	D range	
		OFF	Other ranges, all positions	
	2 (S)	ON	2 range	
		OFF	Other ranges, all positions	
	1 (L)	ON	1 range	
		OFF	Other ranges, all positions	
Engine coolant temperature switch (WATER THERMO SW)		Not used		
Transaxle fluid temperature sensor (ATF THERMOSENSOR)		ON	ATF temperature above 130 °C { 266 °F }	Transaxle fluid temperature sensor or wiring
		OFF	ATF temperature below 130 °C { 266 °F }	
O/D OFF switch (HOLD SW)		ON	O/D OFF switch released	O/D OFF switch or wiring
		OFF	O/D OFF switch depressed	
Closed throttle position switch (IDLE SW)		ON	Closed throttle position	Closed throttle position switch or wiring
		OFF	Other position	
Brake switch (BRAKE LIGHT SW)		ON	Brake pedal depressed	Brake switch or wiring
		OFF	Brake pedal released	
Input (Digital Display)				
Throttle position sensor voltage (THROTTLE SENSOR V.)		PCM terminal voltage	Constant	Throttle position sensor or wiring
VEHICLE SPEED km/h		Vehicle speed	Vehicle moving	Vehicle speed sensor, vehicle speedometer sensor, or wiring
DRUM SPEED rpm		Drum speed	All the time	Input/turbine speed sensor or wiring
Output (Light)				
SOLENOID VALVE	Shift solenoid A (1–2)	ON	2GR, 3GR, or 4GR	Powertrain control module, shift solenoid A, or wiring
		OFF	1GR	
	Shift solenoid B (2–3)	ON	1GR or 2GR	Powertrain control module, shift solenoid B, or wiring
		OFF	3GR or 4GR	
	Shift solenoid C (3–4)	ON	1GR, 2GR, or 4GR	Powertrain control module, shift solenoid C, or wiring
		OFF	3GR	
	TCC (LOCK-UP)	ON	TCC operation	Powertrain control module, TCC solenoid valve, or wiring
		OFF	TCC non-operation	
SHIFT SIGNAL		Not used		
O/D OFF indicator light (HOLD INDICATOR)		Not used		
Output (Digital Display)				
GEAR		1	First gear	—
		2	Second gear	
		3	Third gear	
		4	Fourth gear	

EC-AT tester (49 G019 901C)

Item		Indication	Condition	Possible cause
Input (Light)				
TRANSMISSION RANGE SWITCH	P/N	ON	P or N position	Transaxle range switch or wiring
		OFF	R position, all ranges	
	D	ON	D range	
		OFF	Other ranges, all positions	
	2 (S)	ON	2 range	
		OFF	Other ranges, all positions	
	1 (L)	ON	1 range	
		OFF	Other ranges, all positions	
HOLD/O/D OFF SWITCH		ON	O/D OFF switch depressed	O/D OFF switch or wiring
		OFF	O/D OFF switch released	
BRAKE SWITCH		ON	Brake pedal depressed	Brake switch or wiring
		OFF	Brake pedal released	
CLOSED THROTTLE POSITION SWITCH		ON	Closed throttle position	Closed throttle position switch or wiring
		OFF	Other position	
4GR INHIBIT SIGNAL		ON	RESUME/ACCEL switch ON or vehicle speed 8 km/h { 5 mph } lower than preset speed (Driving vehicle cruise control operation)	Cruise control module, switch, or wiring
		OFF	RESUME/ACCEL switch OFF and vehicle speed kept at preset speed (driving vehicle, cruise control operation and not cruise control operation)	
Input (Digital Display)				
THROTTLE POSITION SENSOR (V)		PCM terminal voltage	Constant	Throttle position sensor or wiring
VEHICLE SPEED (km/h)		Vehicle speed	Vehicle moving	Vehicle speed sensor, vehicle speedometer sensor, or wiring
TURBINE SPEED (rpm)		Drum speed	All the time	Input/turbine speed sensor or wiring
Transaxle fluid temperature sensor (TFT SENSOR) (V)		PCM terminal voltage	ATF temperature 10 °C { 50 °F }: ATF temperature 40 °C { 104 °F }:	Transaxle fluid temperature sensor or wiring
Output (Light)				
SOLENOID VALVE	Shift solenoid A (SHIFT A)	ON	2GR, 3GR, or 4GR	Powertrain control module, shift solenoid A, or wiring
		OFF	1GR	
	Shift solenoid B (SHIFT B)	ON	1GR or 2GR	Powertrain control module, shift solenoid B, or wiring
		OFF	3GR or 4GR	
	Shift solenoid C (SHIFT C)	ON	1GR, 2GR, or 4GR	Powertrain control module, shift solenoid C, or wiring
		OFF	3GR	
	Torque converter clutch (TCC CONTROL)	ON	TCC operation	Powertrain control module, TCC solenoid valve, or wiring
		OFF	TCC non-operation	
HOLD/O/D OFF INDICATOR LIGHT		ON	O/D OFF mode	Powrtrain control module, O/D OFF indicator light, or wiring
		OFF	Except O/D OFF mode	
Output (Digital Display)				
GEAR POSITION		1	First gear	—
		2	Second gear	
		3	Third gear	
		4	Fourth gear	







ELECTRICAL SYSTEM COMPONENTS

O/D OFF SWITCH

Inspection

Inspection of operation

1. Turn the ignition switch ON.
2. Verify that the O/D OFF indicator light is not illuminated. Depress the O/D OFF switch and verify that the O/D OFF indicator light illuminates.
3. If not as specified, check the terminal voltage of the O/D OFF switch.

Inspection of voltage

1. Remove the rear console and front console.
2. Turn the ignition switch to ON.
3. Measure the voltage at the O/D OFF switch connector terminals.

B+: Battery positive voltage

Position	Connector terminal	
	A	B
Normal (V)	B+	0
Depressed (V)	0	0

4. If not as specified, check for continuity at the O/D OFF switch.

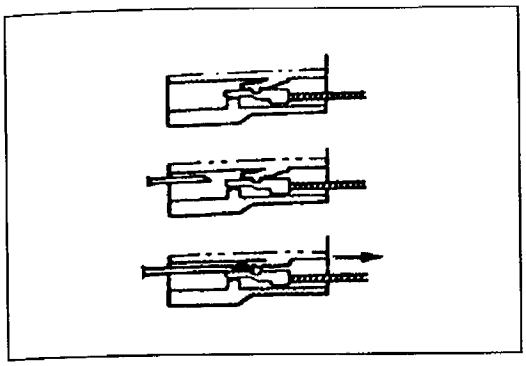
Inspection of continuity

1. Disconnect the negative battery cable.
2. Disconnect the O/D OFF switch connector.
3. Check for continuity at the O/D OFF switch.

O—O: Continuity

Position	Connector terminal	
	A	B
Normal		
Depressed	O	O

4. If not as specified, replace the selector lever knob. (Refer to page K–52.)
5. If the switch is OK, check the wiring harness. (O/D OFF switch — Powertrain control module, O/D OFF switch — Body ground.)
6. Connect the O/D OFF switch connecter.
7. Install the front console and rear console.
8. Connect the negative battery cable.

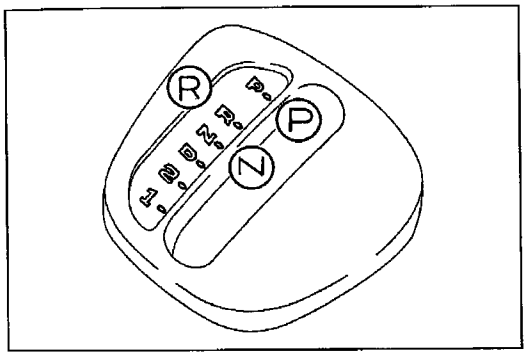


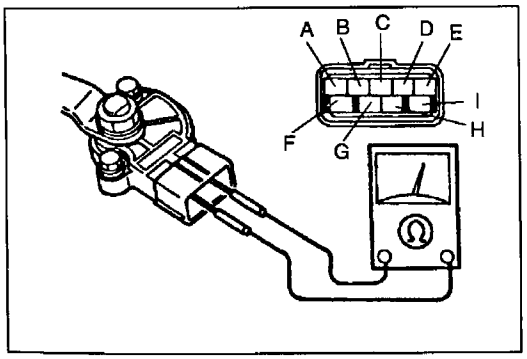
Replacement

1. Disconnect the negative battery cable.
2. Remove the rear console and front console.
3. Remove the indicator panel installation screws.
4. Disconnect the connector and remove the O/D OFF switch terminals.
5. Remove the selector lever knob.
6. Install a new selector lever knob.

Tightening torque:
2.0—2.9 N·m { 20—30 kgf·cm , 18—26 in·lbf }

7. Install the O/D OFF switch terminals and connect the connector.
8. Install the indicator panel installation screws. (Refer to page K–52.)
9. Install the front console and rear console.
10. Connect the negative battery cable.





TRANSAXLE RANGE SWITCH

Inspection

Inspection of operation

1. Verify that the starter operates only with the ignition switch at the START position and the selector lever in P and N positions.
2. Verify that the back-up lights illuminate when shifted to R position with the ignition switch in ON position.
3. Verify that the position of the selector lever and the selector indicator light of the instrument cluster are aligned.
4. Check the transaxle range switch, if not as specified.

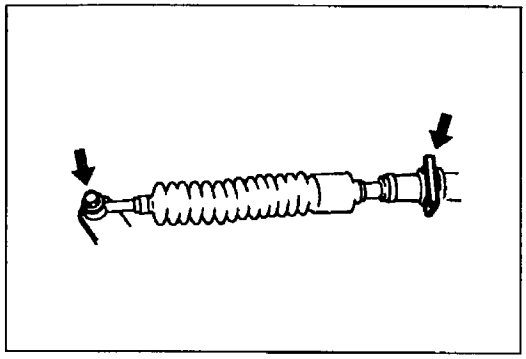
Inspection of continuity

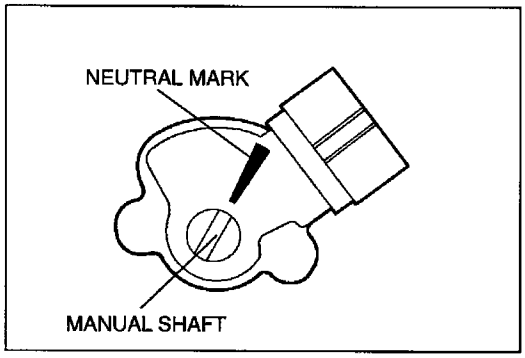
1. Disconnect the negative battery cable.
2. Remove the battery, air cleaner assembly, and battery carrier.
3. Disconnect the transaxle range switch connector.
4. Check for continuity at the transaxle range switch.

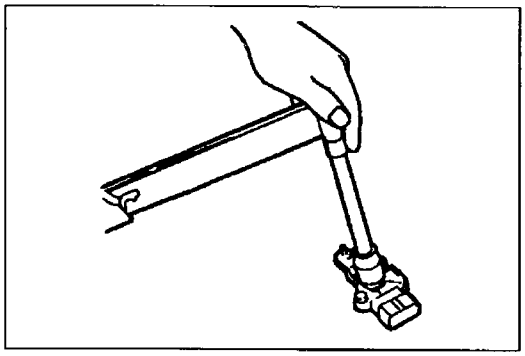
O—O: Continuity

Position / Range	Connector terminal								
	A	B	C	D	E	F	G	H	I
P	O				O				
						O			O
R	O			O					
N	O							O	
						O			O
D	O	O							
2	O						O		
1	O		O						

5. If not as specified, replace or adjust the transaxle range switch.
6. Connect the transaxle range switch connector.
7. Install the battery carrier, air cleaner assembly, and battery.
8. Connect the negative battery cable.







Replacement

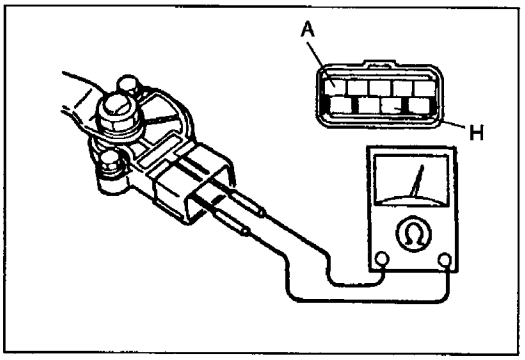
1. Disconnect the negative battery cable.
2. Remove the battery, air cleaner assembly, and battery carrier.
3. Disconnect the transaxle range switch connector.
4. Remove the nut and clip, and disconnect the selector cable.
5. Remove the manual shaft nut.
6. Remove the lever.
7. Remove the transaxle range switch.
8. Rotate the manual shaft to the N position.
9. Turn the transaxle range switch so that the neutral mark is in line with the flat, straight surfaces on either side of the manual shaft.
10. Hand-tighten the transaxle range switch bolts.
11. Verify that there is continuity between terminals A and H of the transaxle range switch connector.
12. Tighten the transaxle range switch mounting bolts.

Tightening torque:
7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }

13. Install the lever.
14. Tighten the manual shaft nut by using a torque wrench.

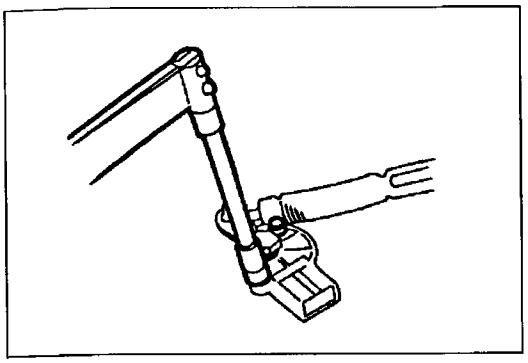
Tightening torque:
32—46 N·m { 3.2—4.7 kgf·m , 24—33 ft·lbf }

15. Verify that selector lever range position and transaxle range switch are aligned; then connect the selector cable and install a new clip.
16. Check for continuity at the transaxle range switch. (Refer to page K–25.)
17. Connect the transaxle range switch connector.
18. Install the battery carrier, air cleaner assembly, and battery.
19. Connect the negative battery cable.
20. Check operation of the transaxle range switch. (Refer to page K–25.)



Adjustment

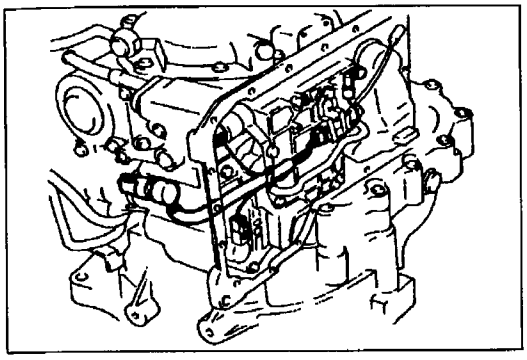
1. Disconnect the negative battery cable.
2. Remove the battery, air cleaner assembly, and battery carrier.
3. Remove the nut and clip, and disconnect the selector cable.
4. Rotate the manual shaft to the N position.
5. Disconnect the transaxle range switch connector.
6. Loosely tighten the transaxle range switch mounting bolts.
7. Connect an ohmmeter between terminals A and H.
8. Adjust the switch to the point where there is continuity between the terminals.



9. Tighten the transaxle range switch mounting bolts.

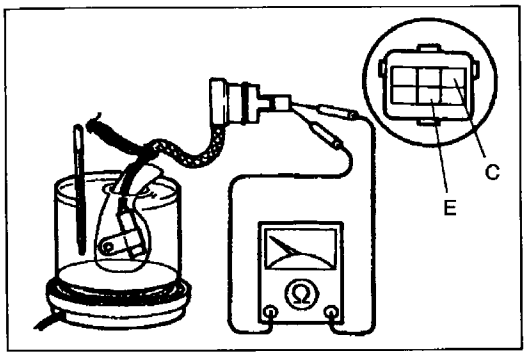
   Tightening torque:
   7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }

10. Verify that the selector lever range position and transaxle range switch are aligned.
11. Connect the transaxle range switch connector.
12. Connect the selector cable and install the nut and a new clip.
13. Install the battery carrier, air cleaner assembly, and battery.



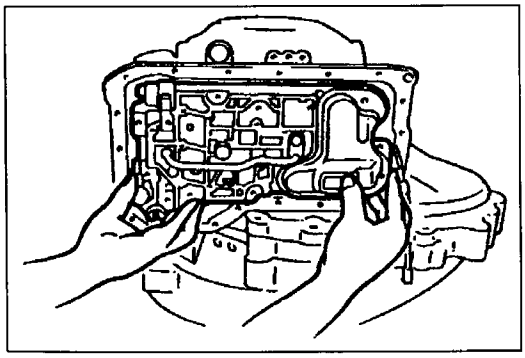
TRANSAXLE FLUID TEMPERATURE SENSOR
Inspection

1. Remove the control valve body. (Refer to page K–43.)

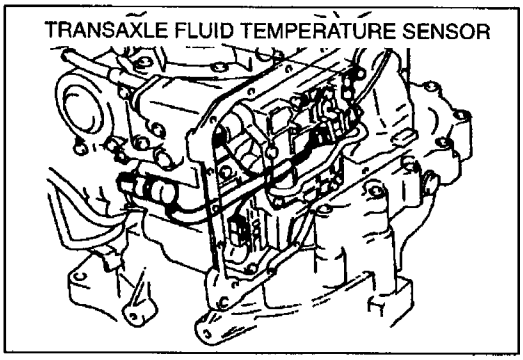


2. Place the transaxle fluid temperature sensor in ATF along with a thermometer as shown, and heat the ATF gradually.
3. Measure the resistance between terminals C and E of the transaxle fluid temperature sensor.

ATF temperature °C { °F }	Resistance (kΩ)
20 { 68 }	21.0—25.0
40 { 104 }	10.0—12.1
60 { 140 }	5.4—6.3
80 { 176 }	3.0—3.4
100 { 212 }	1.7—2.0
120 { 248 }	1.1—1.2
130 { 266 }	0.86—0.92

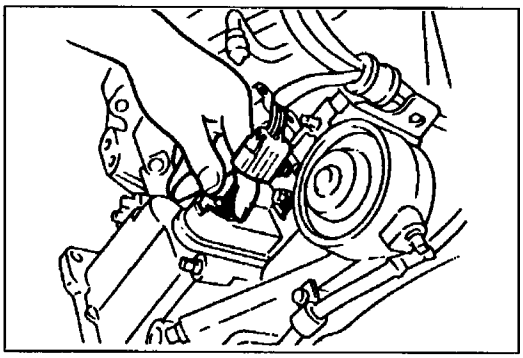


4. If not correct, replace the transaxle fluid temperature sensor.
5. Install the control valve body. (Refer to page K–43.)

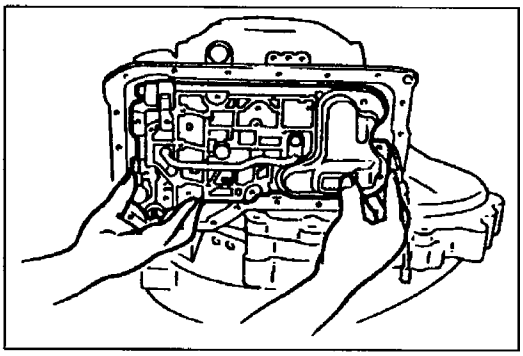


Replacement

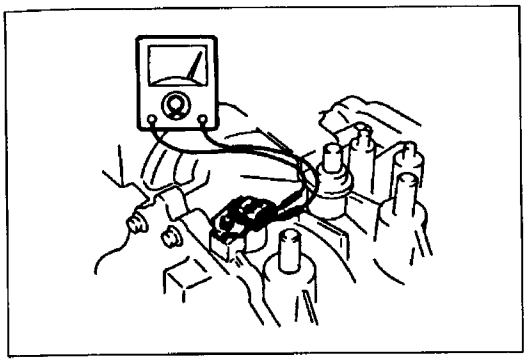
1. Remove the control valve body. (Refer to page K–43.)



2. Apply ATF to a new O-ring and install it on a new solenoid valve connector.
3. Install the solenoid connector into the transaxle case.



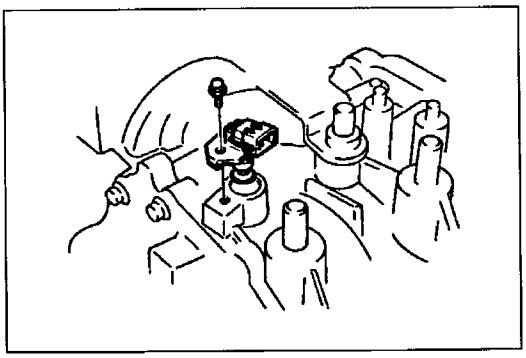
4. Install the control valve body. (Refer to page K–43.)
5. Connect the negative battery cable.
6. Carry out the time lag test and line pressure test. (Refer to page K–2.)
7. Carry out the road test. (Refer to page K–8.)



INPUT/TURBINE SPEED SENSOR
Inspection
Inspection of resistance
1. Disconnect the negative battery cable.
2. Remove the battery, air cleaner assembly, and battery carrier.
3. Disconnect the input/turbine speed sensor connector.
4. Measure the resistance between the terminals of the input/turbine speed sensor.

   Resistance: 200—400 Ω
   (ATF temperature: –40—160 °C { –40—320 °F })

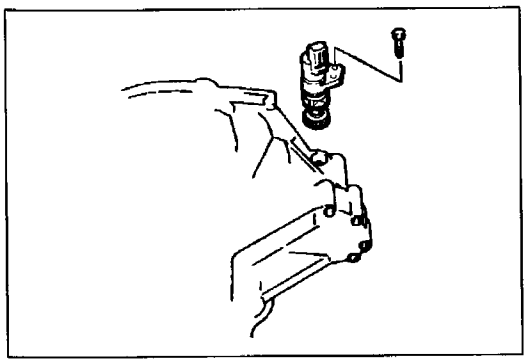
5. If not correct, replace the input/turbine speed sensor.
6. Connect the input/turbine speed sensor connector.
7. Install the battery carrier, air cleaner assembly, and battery.
8. Connect the negative battery cable.



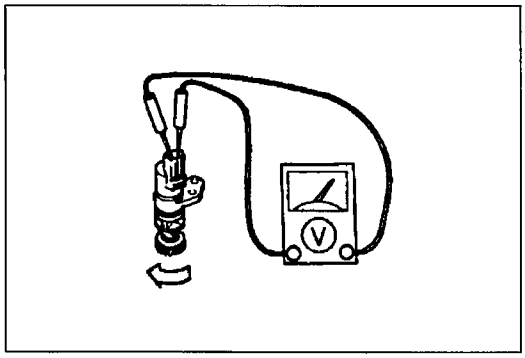
Replacement
1. Disconnect the negative battery cable.
2. Remove the battery, air cleaner assembly, and battery carrier.
3. Disconnect the input/turbine speed sensor connector.
4. Remove the input/turbine speed sensor.
5. Apply ATF to a new O-ring and install it on a new input/turbine speed sensor.
6. Install the input/turbine speed sensor.

   Tightening torque:
   7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }

7. Connect the input/turbine speed sensor connector.
8. Install the battery carrier, air cleaner assembly, and battery.
9. Connect the negative battery cable.



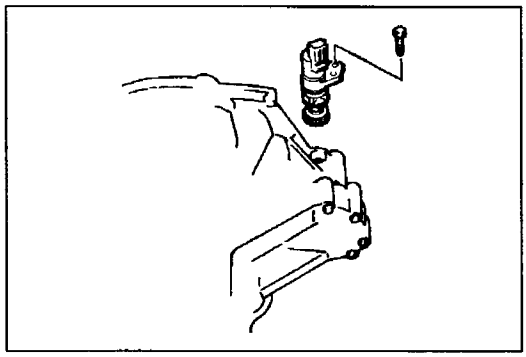
VEHICLE SPEEDOMETER SENSOR
Inspection
Inspection of voltage
1. Remove the vehicle speedometer sensor.



2. Measure the voltage between the terminals of the vehicle speedometer sensor while rotating the driven gear.

Meter needle	Action
Moves slightly under 5 V	Repair wiring harness (Instrument cluster — Vehicle speedometer sensor)
Does not move	Replace vehicle speedometer sensor

3. Install the vehicle speedometer sensor.

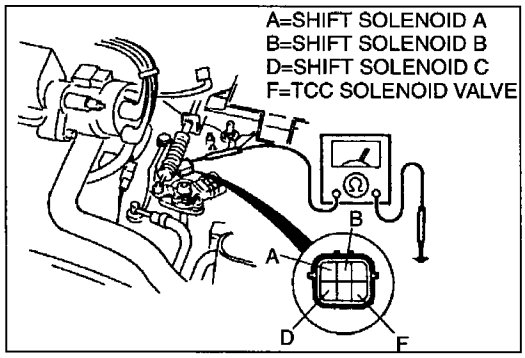


Replacement

1. Disconnect the negative battery cable.
2. Remove the battery, air cleaner assembly, and battery carrier.
3. Disconnect the vehicle speedometer sensor connector.
4. Remove the vehicle speedometer sensor.
5. Apply ATF to a new O-ring and install it on a new vehicle speedometer sensor.
6. Install the vehicle speedometer sensor.

   Tightening torque:
   7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }

7. Connect the vehicle speedometer sensor connector.
8. Install the battery carrier, air cleaner assembly and the battery.
9. Connect the negative battery cable.



SOLENOID VALVES

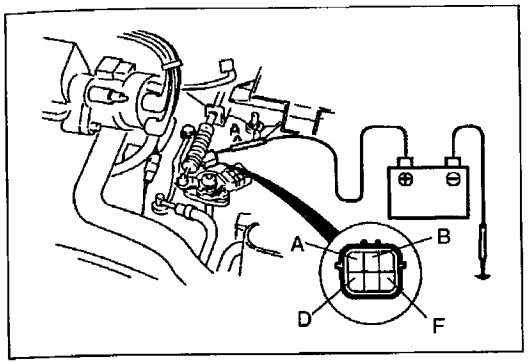
Inspection

Inspection of resistance

1. Disconnect the negative battery cable.
2. Remove the battery and air cleaner assembly.
3. Disconnect the solenoid connector.
4. Measure the resistance between each terminal (A, B, D, F) and a ground.

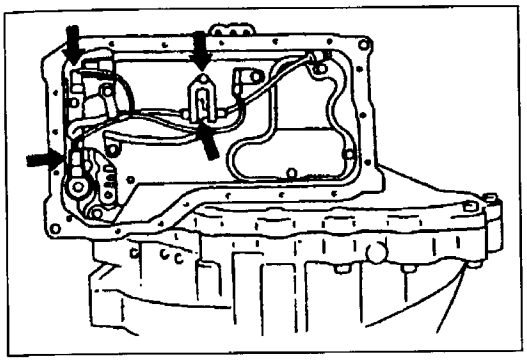
   Resistance: 13—27 Ω

5. If not as specified, replace the solenoid valve. (Refer to page K–31.)
6. Connect the solenoid connector.
7. Install the air cleaner assembly and battery.
8. Connect the negative battery cable.



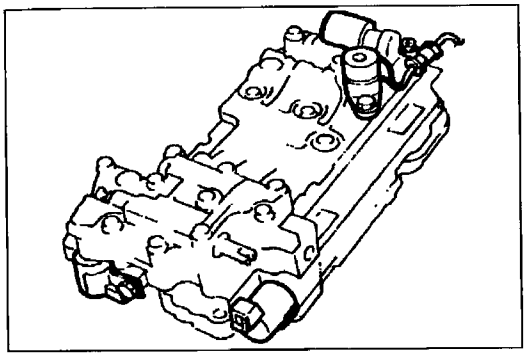
Inspection of operation

1. Disconnect the negative battery cable.
2. Disconnect the solenoid connector.
3. Inspect the voltage at terminals A—F and listen for a "click" sound at all solenoid valves.
4. If the "click" is not heard, replace the solenoid valve.



Replacement

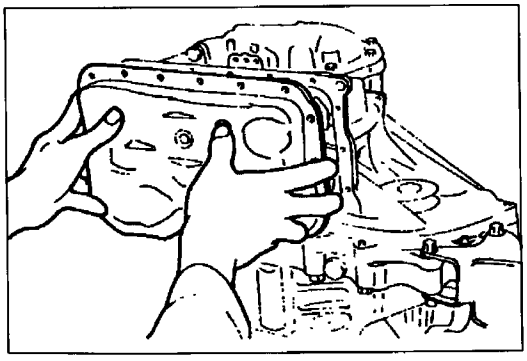
1. Disconnect the solenoid connector.
2. Remove the control valve body. (Refer to page K–43.)



3. Remove the solenoid valve.
4. Apply ATF to a new O-ring and install it, a new solenoid valve, and the oil strainer assembly.

   Tightening torque:
   7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }

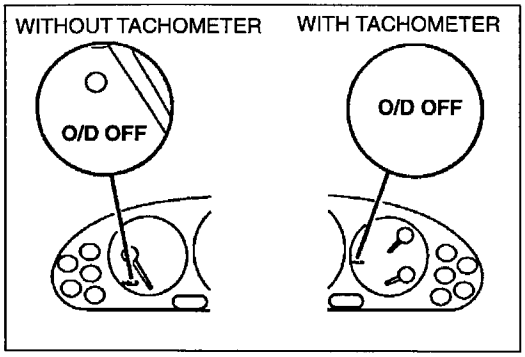
5. Install the control valve body. (Refer to page K–43.)

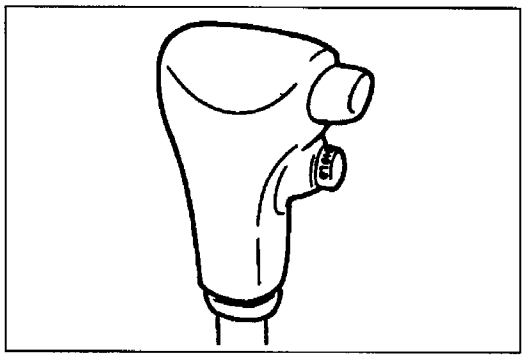


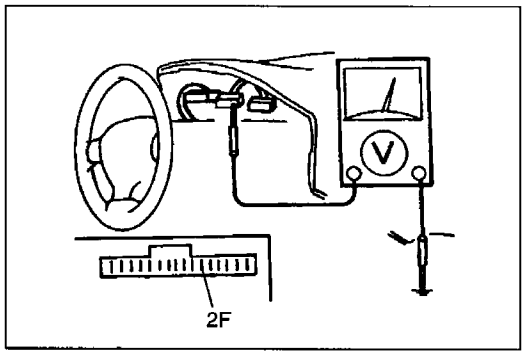
6. Lightly apply silicone sealant to both sides of a new oil pan gasket.
7. Install the new gasket and install the oil pan.

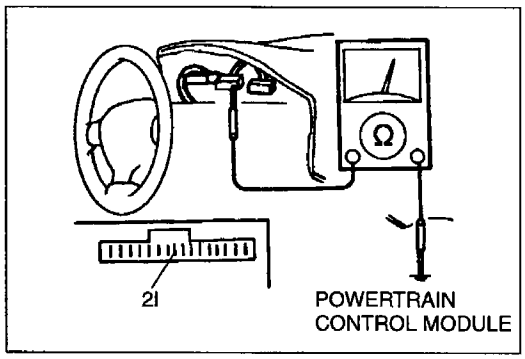
   Tightening torque:
   8.4—10.7 N·m { 85—110 kgf·cm , 74—95 in·lbf }

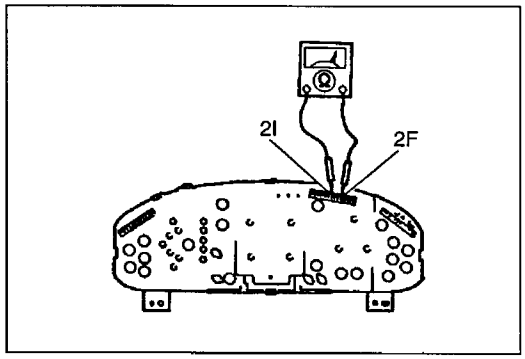
8. Connect the solenoid connector.
9. Connect the negative battery cable.
10. Carry out the time lag test and line pressure test. (Refer to page K–2.)
11. Carry out the road test. (Refer to page K–8.)











O/D OFF INDICATOR LIGHT

Inspection

Inspection of operation

1. Turn the ignition switch ON.

Note

- The O/D OFF indicator light will flash if a malfunction exists in any of the EC-AT system components.

2. Verify that O/D OFF indicator light is not illuminated.
3. Depress the switch and verify that the O/D OFF indicator light illuminates.
4. If the O/D OFF indicator light function is not as specified, check the O/D OFF switch (page K–24), and then check the terminal voltage of the O/D OFF indicator light.

Inspection of voltage

1. Remove the instrument cluster. (Refer to section T1, T2.)
2. Turn the ignition switch ON.
3. Measure voltage between terminal 2F and the ground.

B+: Battery positive voltage

Voltage	Action
B+	Go to next step
Other	• Replace METER fuse • Repair wiring harness (METER fuse — Instrument cluster)

Inspection of continuity

1. Disconnect the negative battery cable.
2. Disconnect the instrument cluster connector.
3. Check for continuity between terminal 2I and powertrain control module terminal 2E.

O—O: Continuity

Terminals / Condition	2I	2E
O/D OFF switch ON	O	O
O/D OFF switch OFF		

4. If not correct, check the wiring harness (Instrument cluster — powertrain control module).
5. If correct, go to the next step.
6. Check for continuity between terminals 2I and 2F.

O—O: Continuity

Terminals / Condition	2I	2F
Normal	O	O

7. If not correct, replace the instrument cluster or bulb.
8. Install the instrument cluster. (Refer to section T1, T2.)
9. Connect the negative battery cable.

POWERTRAIN CONTROL MODULE
Inspection

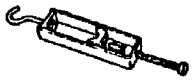
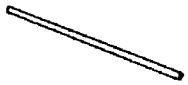
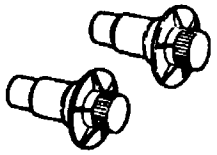
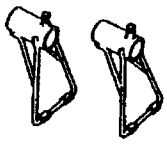
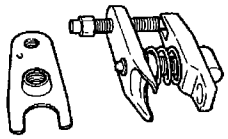
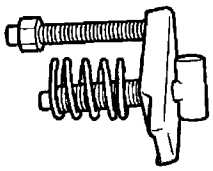
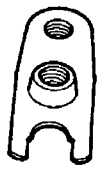
Note
- As the powertrain control module is integrated, refer to section F1, F2 for the terminal voltage.

TRANSAXLE

TRANSAXLE UNIT (REMOVAL / INSTALLATION)

Preparation

SST

49 G017 5A0 Support, engine 	For support of engine	49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine
49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine	49 G030 455 Holder, diff. side gear 	For holding side gear
49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine	49 T028 3A0 Puller, Ball joint set 	For removal of tie-rod end
49 T028 303 Body (Part of 49 T028 3A0) 	For removal of tie-rod end	49 T028 304 Attachment (Part of 49 T028 3A0) 	For removal of tie-rod end

Removal / Installation

The oil pan could contain small chips, shavings, and other particles helpful in checking the condition of the transaxle and diagnosing certain problems.

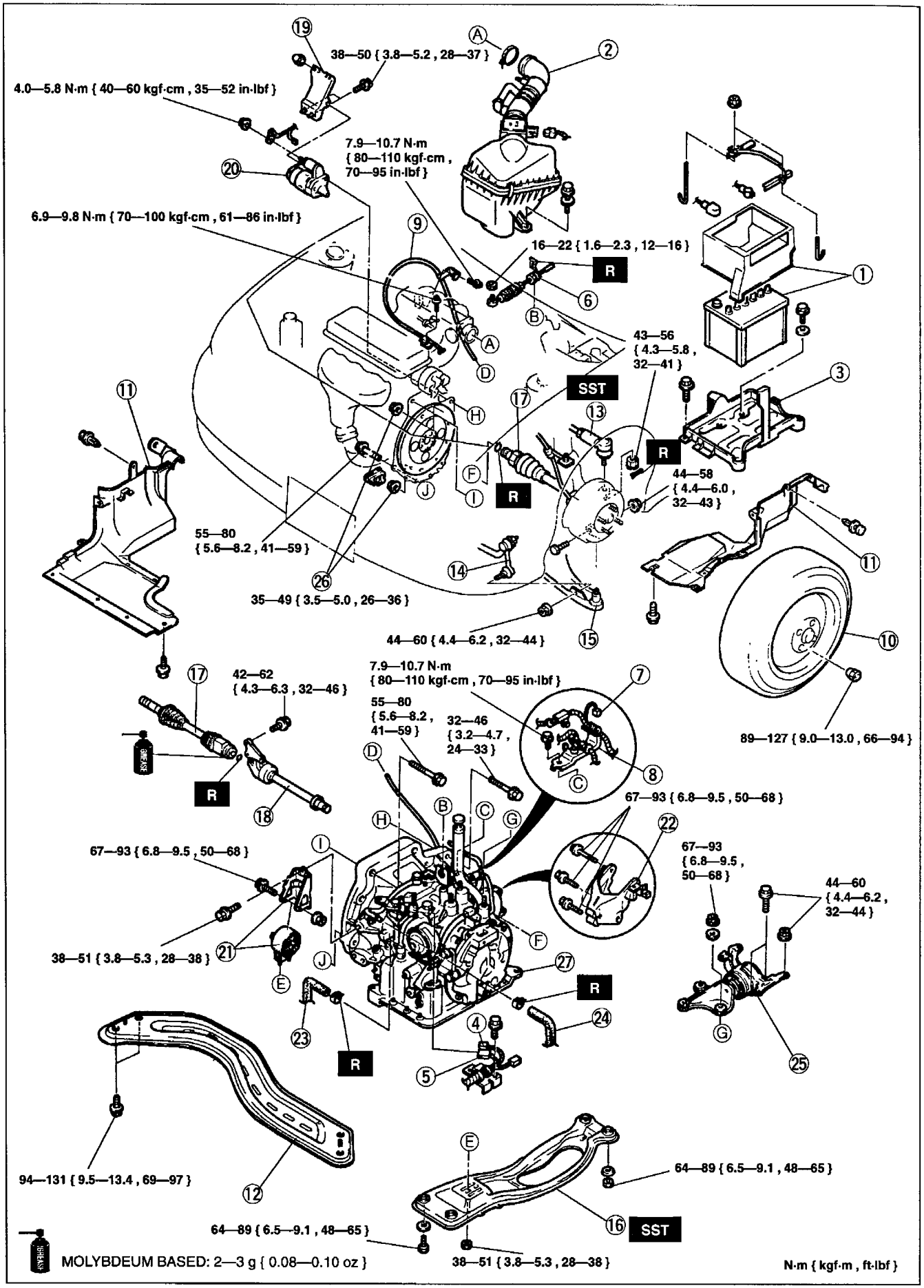
To ensure that all foreign particles stay in the oil pan, make sure that the transaxle is never tipped completely over while the oil pan is still installed.

1. Disconnect the negative battery cable.
2. Raise the vehicle on a vehicle hoist.
3. Drain the ATF into a container.
4. Remove in the order shown in the figure, referring to **Removal Note**.
5. After removal, remove the oil pan to check the condition of the transaxle.
6. Install the reverse order of removal, referring to **Installation Note**.
7. Fill the transaxle with the specified ATF after installation. (Refer to page K–10.)
8. Check for leakage of ATF from all connecting points.
9. Connector the negative battery cable.
10. Check the operation of the transaxle range switch. (Refer to page K–25.)
11. Check the operation of the selector lever. (Refer to page K–52.)
12. Carry out the mechanical system test. (Refer to page K–2.)

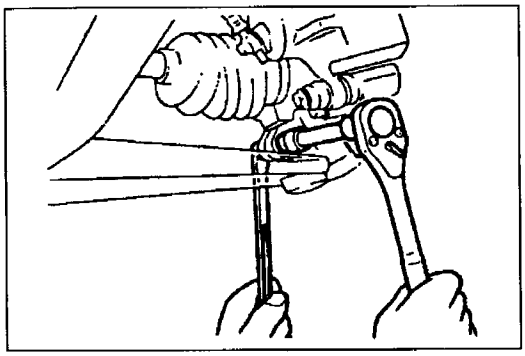
Service item \ Test item	Line pressure test	Stall test	Time lag test
Automatic transaxle replacement	○		
Automatic transaxle overhaul	○	○	○
Torque converter replacement	○	○	
Oil pump replacement	○		
Clutch system replacement	○		
Differential replacement	○		

○: Test to be performed after work

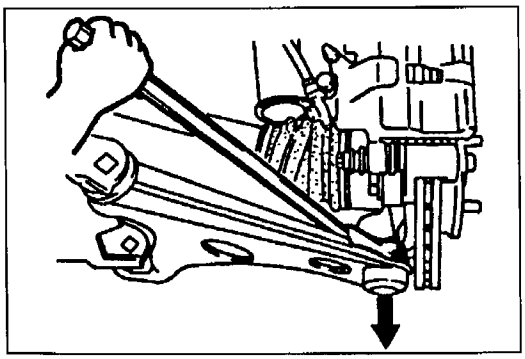
13. Carry out the road test. (Refer to page K–8.)


4.0—5.8 N·m { 40—60 kgf·cm , 35—52 in·lbf }
38—50 { 3.8—5.2 , 28—37 }
7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }
6.9—9.8 N·m { 70—100 kgf·cm , 61—86 in·lbf }
16—22 { 1.6—2.3 , 12—16 }
R
43—56 { 4.3—5.8 , 32—41 }
SST
44—58 { 4.4—6.0 , 32—43 }
55—80 { 5.6—8.2 , 41—59 }
35—49 { 3.5—5.0 , 26—36 }
44—60 { 4.4—6.2 , 32—44 }
89—127 { 9.0—13.0 , 66—94 }
42—62 { 4.3—6.3 , 32—46 }
7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }
55—80 { 5.6—8.2 , 41—59 }
32—46 { 3.2—4.7 , 24—33 }
67—93 { 6.8—9.5 , 50—68 }
38—51 { 3.8—5.3 , 28—38 }
94—131 { 9.5—13.4 , 69—97 }
64—89 { 6.5—9.1 , 48—65 }
MOLYBDEUM BASED: 2—3 g { 0.08—0.10 oz }
N·m { kgf·m , ft·lbf }

1. Battery and battery cover
2. Air cleaner assembly
3. Battery carrier
4. Solenoid connector
5. Transaxle range switch connector
6. Selector cable
7. Vehicle speedometer sensor connector
8. Harness bracket
9. Throttle cable
10. Wheels and tires
11. Splash shields
12. Transverse member (BP)
13. Tie-rod end
    Service ..... section N
14. Stabilizer control link
15. Lower arm
    Removal note ..... page K–37
16. Engine mounting member
    Removal note ..... page K–37
    Installation note ..... page K–41
17. Drive shaft
    Removal note ..... page K–38
    Installation note ..... page K–40
18. Joint shaft (BP)
    Installation note ..... page K–40
19. Manifold bracket
20. Starter
21. No.2 engine mount
    Installation note ..... page K–40
22. No.1 engine mount
    Installation note ..... page K–40
23. Oil hose (inner)
24. Oil hose (outer)
25. No.4 engine mount
    Installation note ..... page K–39
26. Torque converter nuts
    Removal note ..... page K–38
    Installation note ..... page K–39
27. Transaxle
    Removal note ..... page K–38
    Installation note ..... page K–39

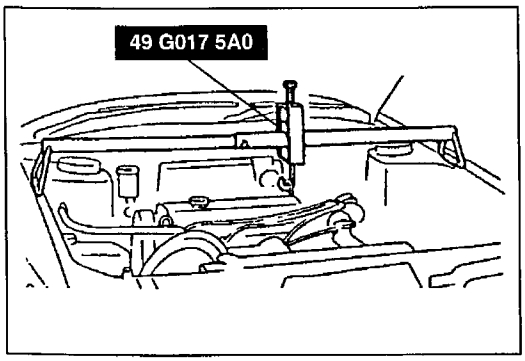


Removal note
Lower arm
1. Remove the clinch bolt from the lower arm ball joints.

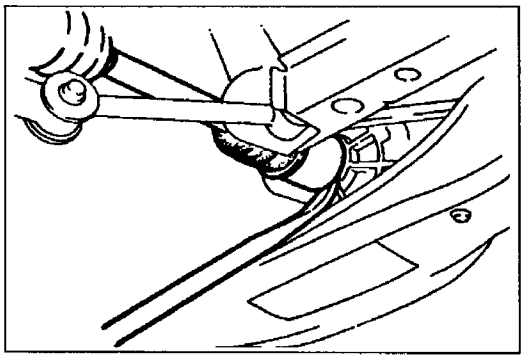


Caution
- **Wrap a rag around the ball joint dust seal to protect it from damage.**

2. Pry the lower arm out of the knuckle.



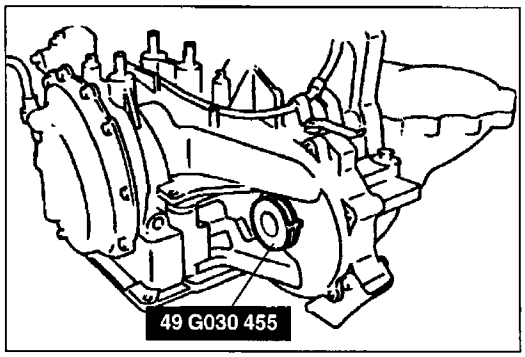
Engine mounting member
1. Support the engine by using the **SST** before removing the engine mounting member.
2. Remove the engine mounting member.



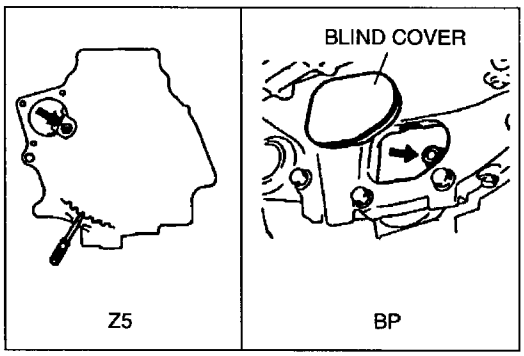
Drive shafts

Caution
- **The oil seal is easily damaged by the sharp edges of the drive shaft splines. Do not let the splines contact the oil seal.**

1. Separate the right side drive shaft from the transaxle by prying with a bar inserted between the outer ring and the transaxle.
2. Suspend the drive shaft by using a rope.

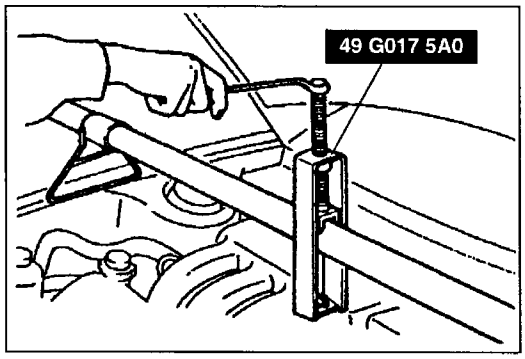


3. Install the **SST** into the transaxle to hold the side gears.



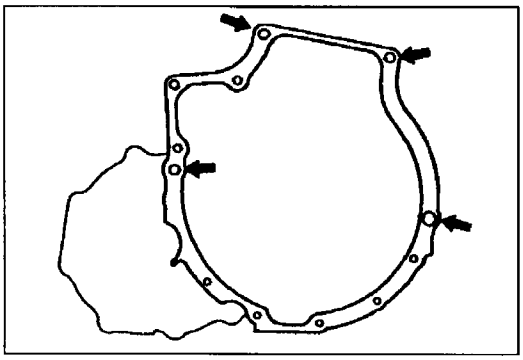
Torque converter nuts

Hold the drive plate and remove the torque converter nuts.



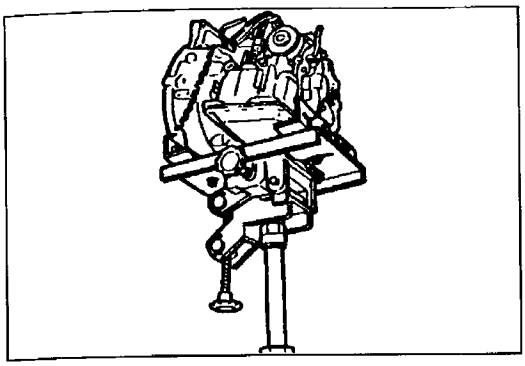
Transaxle

1. Loosen the **SST** and lean the engine toward the transaxle.
2. Support the transaxle on a jack, making sure that it does not fall from the jack.

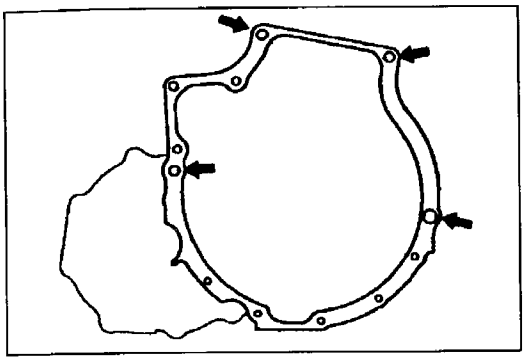


Caution
- **Do not allow the transaxle to lean toward the torque converter side.**

3. Remove the transaxle mounting bolts.
4. Remove the transaxle.

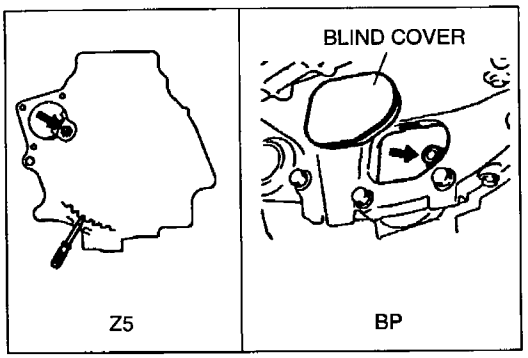


Installation note
Transaxle
1. Set the transaxle on a jack and make sure that it does not fall.



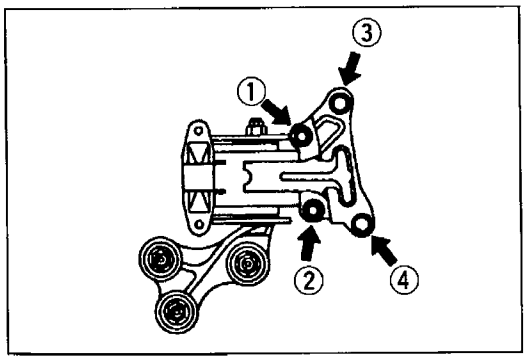
2. Istall the transaxle mounting bolts.

Tightening torque:
55—80 N·m { 5.6—8.2 kgf·m , 41—59 ft·lbf }



Torque converter nuts
Hold the drive plate and install the torque converter nuts.

Tightening torque:
35—49 N·m { 3.5—5.0 kgf·m , 26—36 ft·lbf }

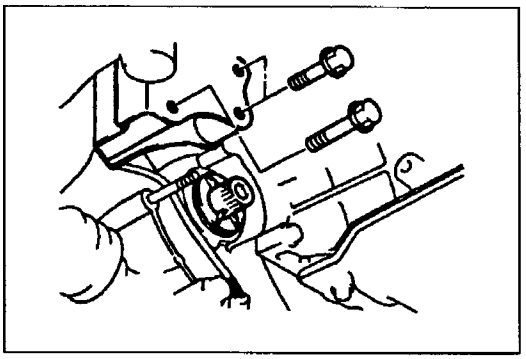


No.4 engine mount
1. Install the No.4 engine mount.
2. Hand-tighten the nuts of transaxle side.
3. Tighten the nuts and bolts of the body side, as shown in the figure.

Tightening torque:
44—60 N·m { 4.4—6.2 kgf·m , 32—44 ft·lbf }

4. Tighten the nuts on the transaxle side.

Tightening torque:
67—93 N·m { 6.8—9.5 kgf·m , 50—68 ft·lbf }

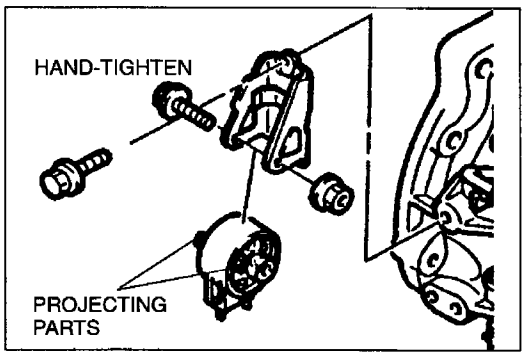


No.1 engine mount

Caution
- **Misaligning the bolts will cause damage to the bolt holes.**

1. Use the **SST** (49 G017 5A0) to make sure the transaxle bolt holes and the No.1 engine mount meet evenly.
2. After the 3 bolts are set in the holes, tighten the bolts to the specified torque.

Tightening torque:
67—93 N·m { 6.8—9.5 kgf·m , 50—68 ft·lbf }

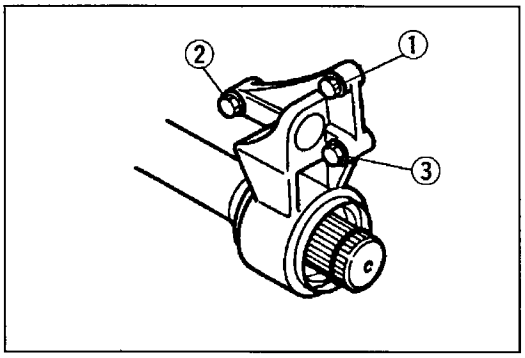


No.2 engine mount
1. Install the engine mount bracket to the transaxle, as shown in the figure.

Tightening torque:
38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }

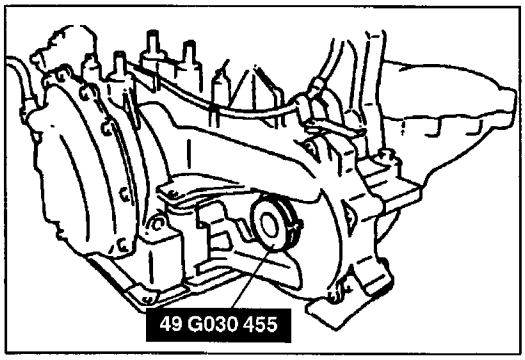
2. Hand-tighten the nuts and bolts of the engine mount rubber.

Tightening torque:
67—93 N·m { 6.8—9.5 kgf·m , 50—68 ft·lbf }



Joint shaft (BP)
1. Insert the joint shaft to the transaxle.
2. Install the joint shaft to the cylinder block and tighten the bolts in the order shown.

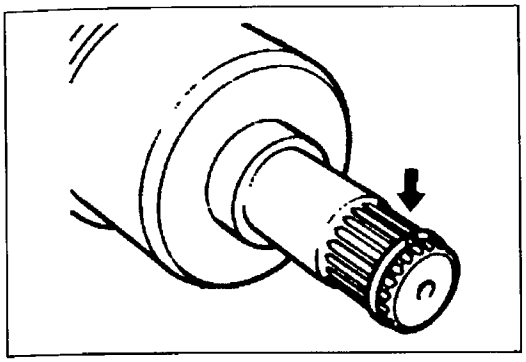
Tightening torque:
42—62 N·m { 4.3—6.3 kgf·m , 32—46 ft·lbf }



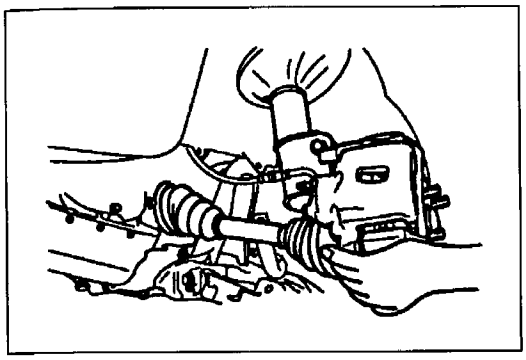
Drive shafts
1. Inspect the oil seal for damage.

Caution
- **The oil seal is easily damaged by the sharp edges of the drive shaft splines. Do not let the splines contact the oil seal.**

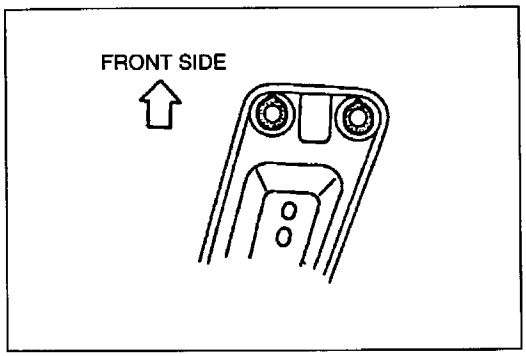
2. Remove the **SST** from the transaxle case.



3. Install the clip with the ends facing upward. (Refer to section N.)



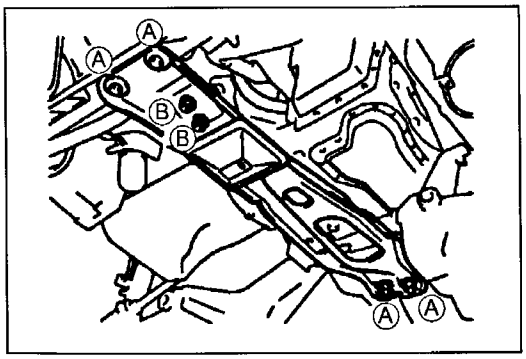
4. Apply ATF to the oil seal lip. Install the drive shaft.
5. Verify that the drive shaft is correctly seated by pulling on the shaft. It must not slide out.



Engine mounting member

Note
- Verify that the engine mount rubbers are installed as shown.
- Put the No.2 engine mount stud bolts in the installation holes when installing the engine mounting member.

1. Install the bolts and nuts as shown.



Tightening torque
Ⓐ: 64—89 N·m { 6.5—9.1 kgf·m , 48—65 ft·lbf }
Ⓑ: 38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }

2. Tighten the No.2 engine mount rubber nut and bolt.

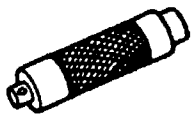
Tightening torque:
67—93 N·m { 6.8—9.5 kgf·m , 50—68 ft·lbf }

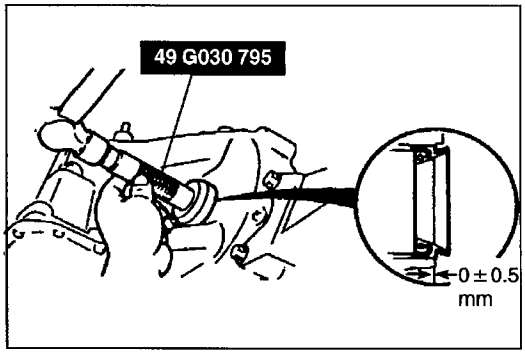
3. Remove the **SST** (49 G017 5A0).

OIL SEAL (TRANSAXLE)

Preparation

SST

49 G030 795 Installer, oil seal 	For installation of oil seal	49 G030 796 Body (Part of 49 G030 795) 	For installation of oil seal
49 G030 797 Handle (Part of 49 G030 795) 	For installation of oil seal	—	—



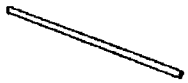
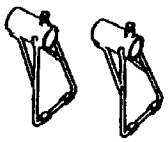
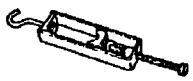
On-vehicle Replacement

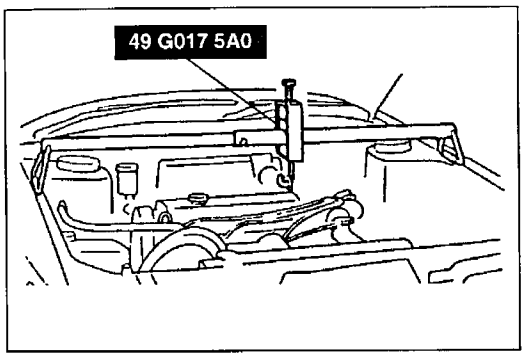
1. Remove the drive shaft and joint shaft. (Refer to page K–34.)
2. Remove the oil seal.
3. Using the **SST** and a hammer, tap a new oil seal in evenly until the **SST** contacts the transaxle case.
4. Coat the lip of the oil seal with ATF.
5. Install the drive shaft and joint shaft. (Refer to page K–34.)
6. Carry out the line pressure test. (Refer to page K–3.)
7. Carry out the road test. (Refer to page K–8.)

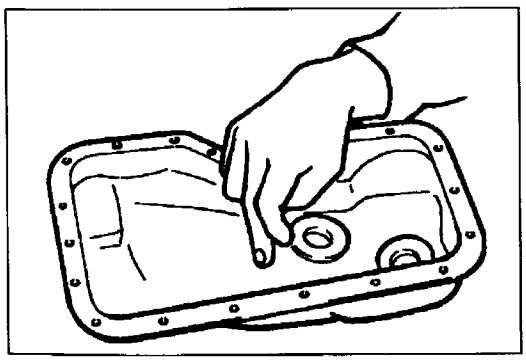
CONTROL VALVE BODY (ON-VEHICLE REMOVAL / INSTALLATION)

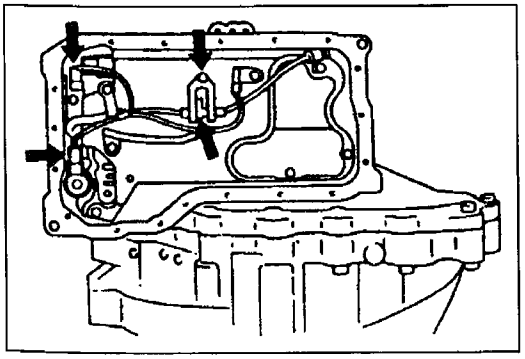
Preparation

SST

49 G017 5A0 Support, engine 	For support of engine	49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine
49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine	49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine







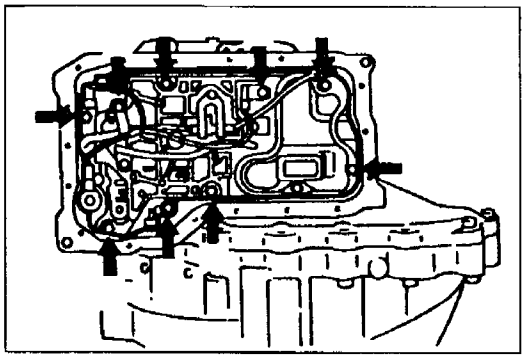
On-vehicle Removal

Warning

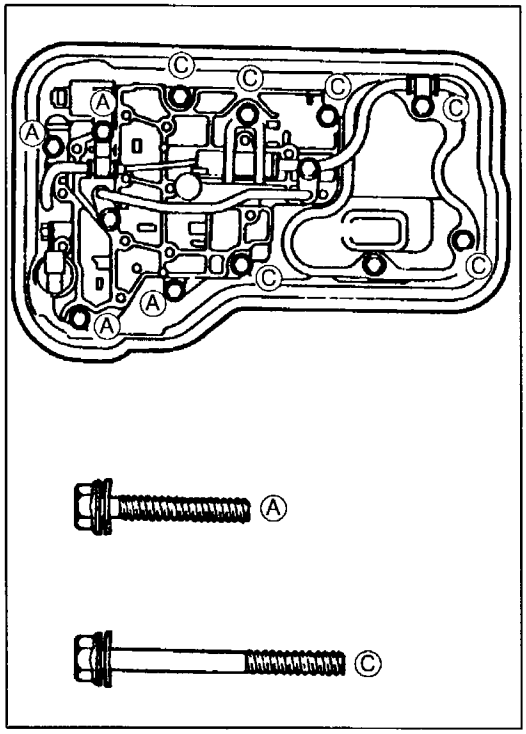
- **Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear eye protection when using compressed air to clean components.**

1. Clean the transaxle exterior thoroughly with a steam cleaner or cleaning solvent before removal.
2. Disconnect the negative battery cable.
3. Support the engine by using the **SST.**
4. Jack up the vehicle and support it with safety stands.
5. Drain the ATF into a container.
6. Remove the transverse member. (BP)
7. Remove the engine mounting member.
8. Remove the oil pan and gasket.

9. Disconnect the solenoid connectors.



10. Remove the bolts as shown is the figure.
11. Remove the control valve body.



On-vehicle Installation

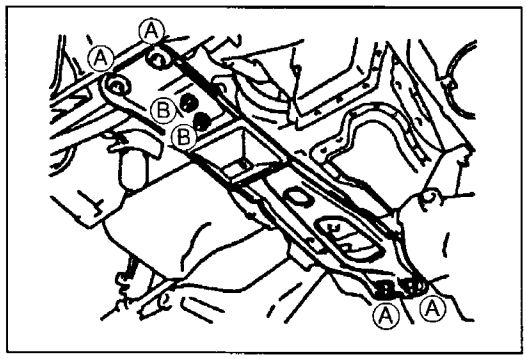
1. Install the control valve body as shown.

   Tightening torque:
   7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }

2. Connect the solenoid connectors.
3. Apply a thin coat of silicone sealant to both sides of a new gasket.
4. Install the gasket and the oil pan.

   Tightening torque:
   7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }

   Bolt length (measured from below the head)
   Ⓐ: 30 mm { 1.18 in }
   Ⓒ: 50 mm { 1.97 in }

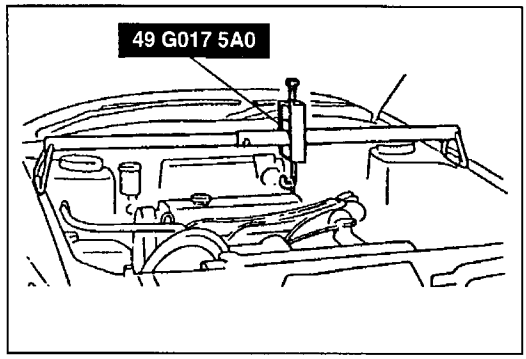


5. Install the engine mounting member.
6. Loosely install bolts Ⓐ and Ⓑ.

   Tightening torque
   Ⓐ: 64—89 N·m { 6.5—9.1 kgf·m , 48—65 ft·lbf }
   Ⓑ: 38—51 N·m { 3.8—5.2 kgf·m , 28—37 ft·lbf }

7. Install the transverse member. (BP)

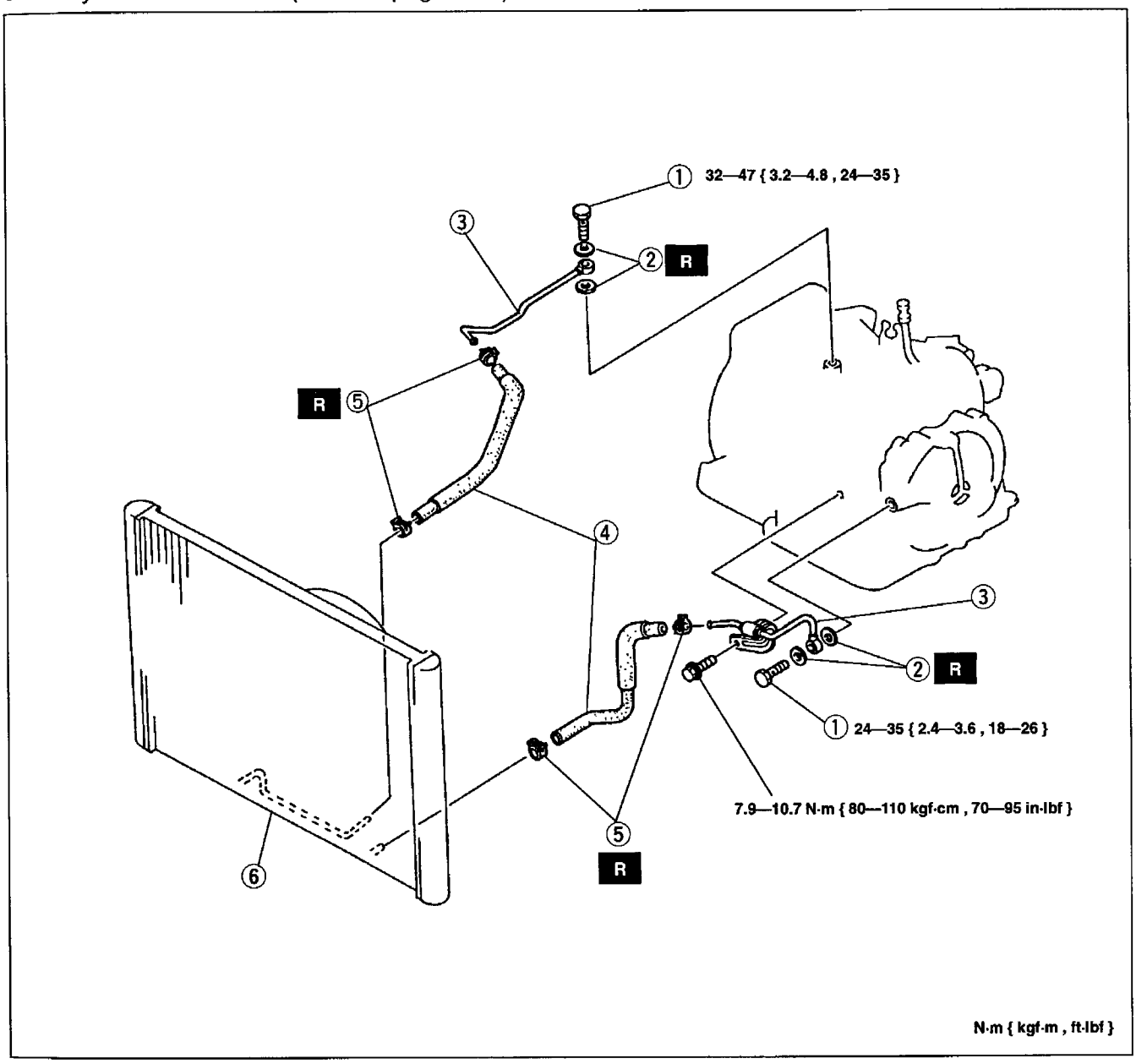
   Tightening torque:
   94—131 N·m { 9.5—13.4 kgf·m , 69—97 ft·lbf }



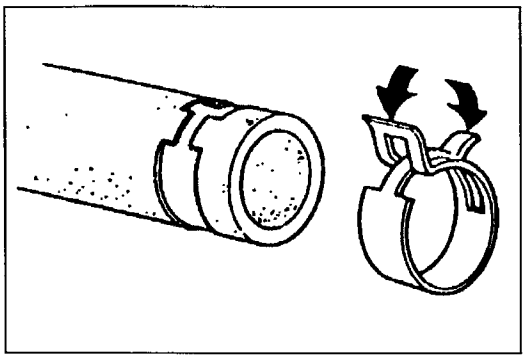
8. Remove the **SST** from the engine.
9. Pour in ATF and, with the engine idling, check the ATF level and check for leaks. (Refer to page K–10.)
10. Carry out the time lag test and line pressure test. (Refer to page K–2.)
11. Carry out the road test. (Refer to page K–8.)

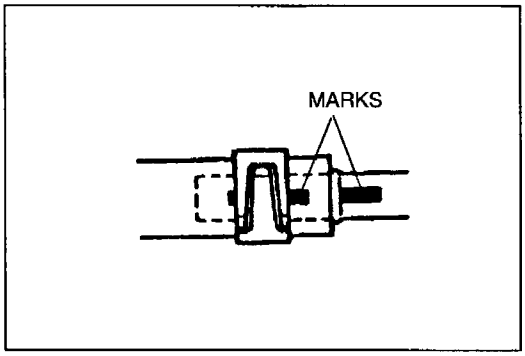
OIL COOLER

OIL COOLER
Removal / Installation
1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal, referring to **Installation Note**.
4. Add ATF to the specified level.
5. Connect the negative battery cable.
6. Inspect for oil leakage from the oil pipes and oil hoses.
7. Inspect the ATF level and condition. (Refer to page K–10.)
8. Carry out the line pressure test. (Refer to page K–2.)
9. Carry out the road test. (Refer to page K–8.)



1. Connector bolts
2. Washers
3. Oil pipe
4. Oil hose
   Installation note ..... page K–46
5. Hose clamp
6. Radiator
   Service ..... section E



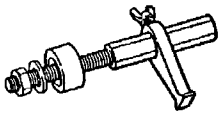
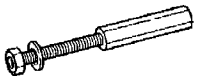


Installation note
Oil hose

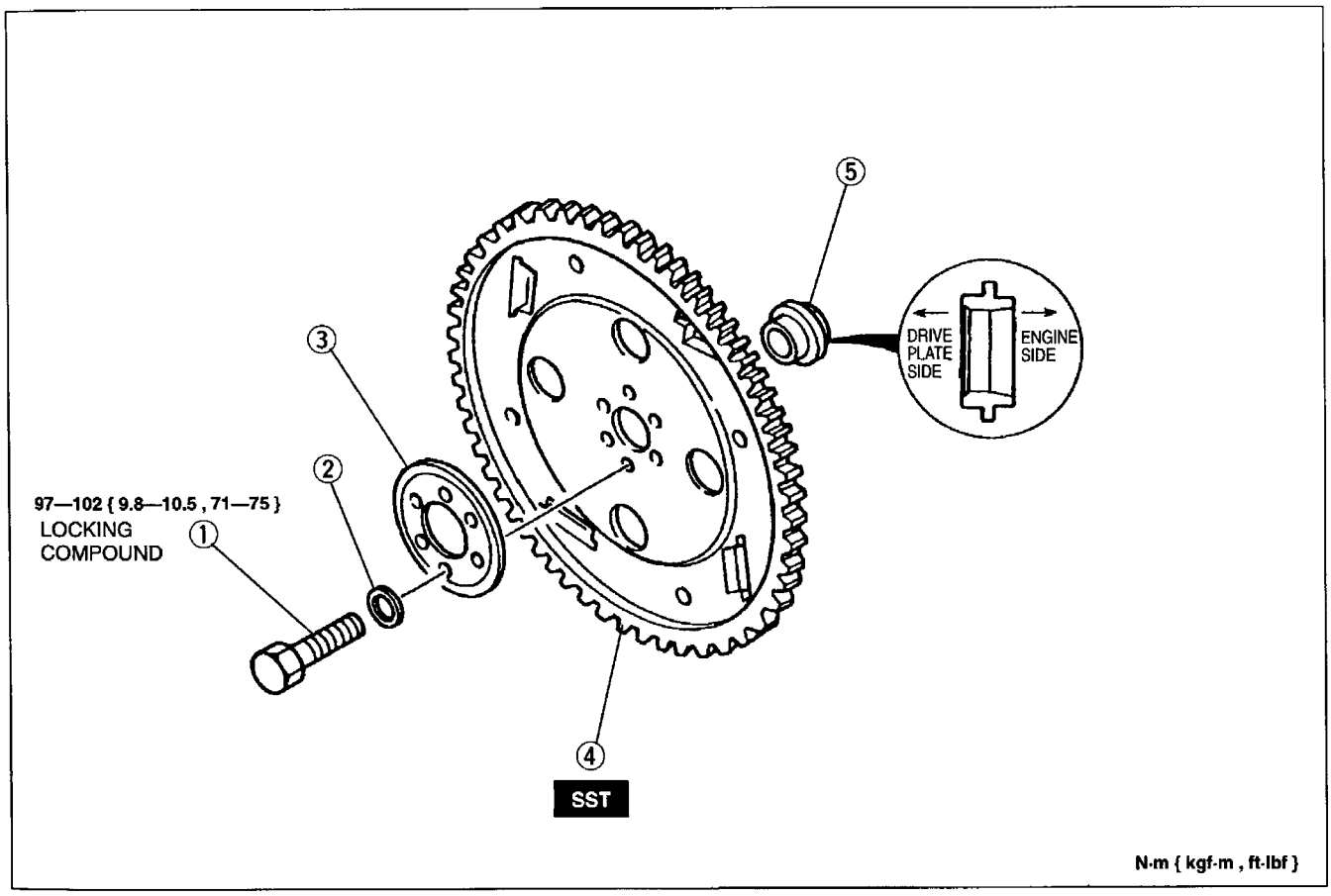
1. Align the marks, and slide the oil hose onto the oil pipe until it is fully seated as shown.
2. Install the hose clamp onto the hose. If reusing the hose, install the new hose clamp exactly into the mark left by the previous hose clamp.
3. Verify that the hose clamp does not interfere with any other parts.

DRIVE PLATE

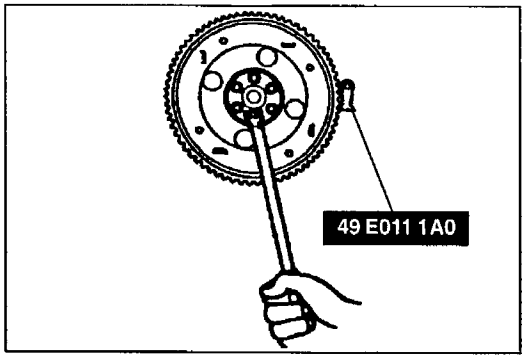
PREPARATION
SST

49 E011 1A0 Brake set, ring gear 	For holding drive plate	49 E011 103 Shaft (Part of 49 E011 1A0) 	For holding drive plate
49 E011 104 Collar (Part of 49 E011 1A0) 	For holding drive plate	49 E011 105 Stopper (Part of 49 E011 1A0) 	For holding drive plate

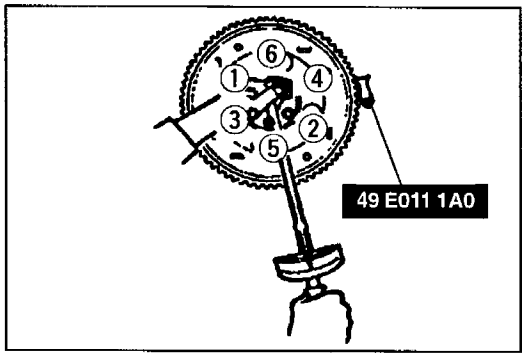
DRIVE PLATE
Removal / Installation
1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Install in the reverse order of removal, referring to **Installation Note**.



1. Bolts
2. Washers
3. Backing plate
4. Drive plate
   Removal note ..... page K–48
   Installation note ..... page K–48
5. Adapter

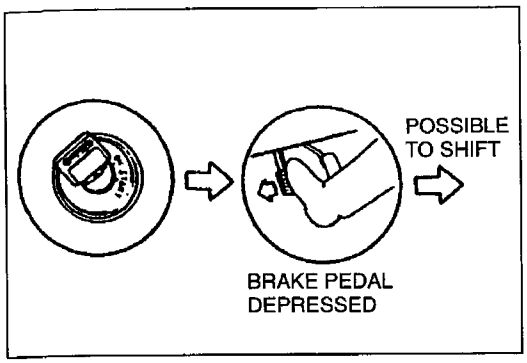


Removal note
Drive plate
1. Set the **SST** against the drive plate.
2. Remove the bolts and the drive plate.



Installation note
Drive plate
1. Set the **SST** against the drive plate.
2. Gradually tighten the drive plate mounting bolts in the order shown.

Tightening torque:
97—102 N·m { 9.8—10.5 kgf·m , 71—75 ft·lbf }

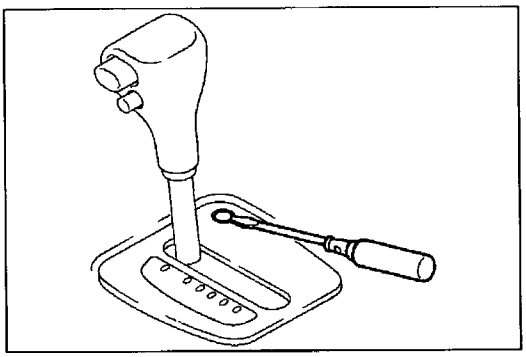


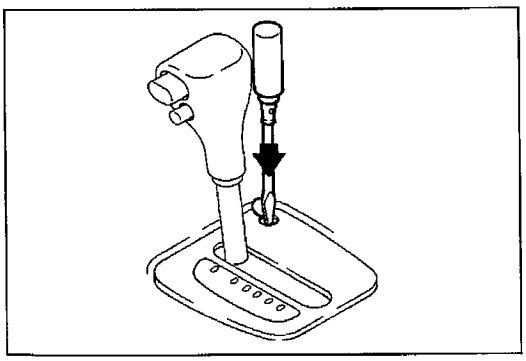
SHIFT MECHANISM

SHIFT-LOCK

Inspection

1. Turn the ignition switch to ON (engine OFF).
2. Verify that the selector lever is in P position.
3. Without the brake pedal depressed, verify that the selector lever cannot be shifted from P position.
4. Depress the brake pedal and verify that the selector lever can be shifted from P position.
5. If not as specified, check the P position switch continuity and/or shift-lock actuator terminal voltage and continuity. (Refer to pages K–51.)

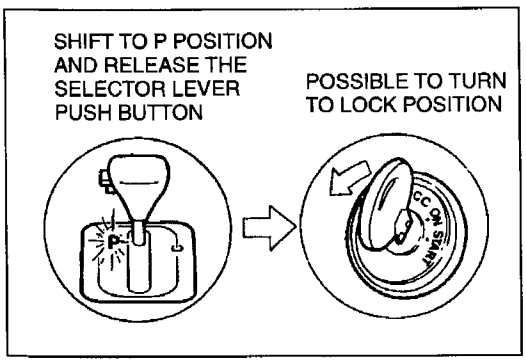




EMERGENCY OVERRIDE BUTTON

Inspection

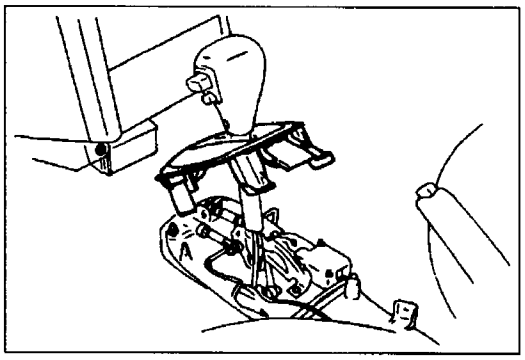
1. Turn the ignition switch to OFF.
2. Verify that the selector lever is in P position.
3. Without the brake pedal depressed, verify that the selector lever cannot be shifted from P position.
4. Remove the cover on the indicator panel by using a screwdriver.
5. Insert a screwdriver into the emergency override button and push down. Verify that the selector lever can be shifted from P position.
6. If not as specified, replace the emergency override button.



KEY INTERLOCK

Inspection

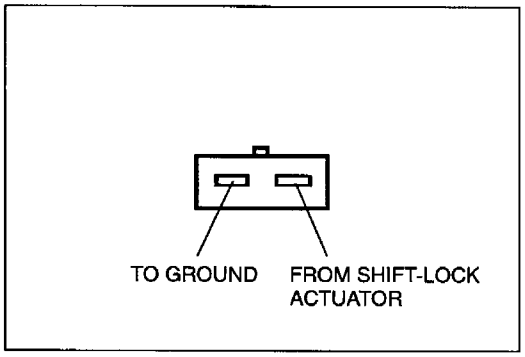
1. Turn the ignition switch to ON (engine OFF).
2. Shift the selector lever to R position.
3. Verify that the ignition key cannot be turned to LOCK position.
4. Shift the selector lever to P position.
5. Verify that the ignition key can be turned to LOCK position.
6. If not as specified, inspect and repair as necessary.



P POSITION SWITCH

Inspection

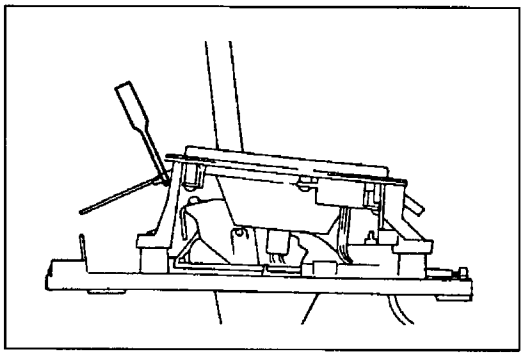
1. Disconnect the negative battery cable.
2. Remove the rear console and front console.
3. Remove the indicator panel screws and lift up the indicator panel.
4. Disconnect the P position switch connector.



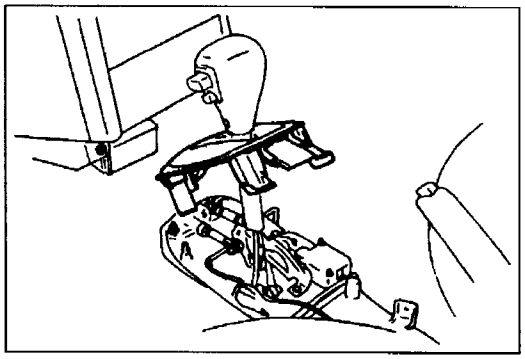
5. Check for continuity between the terminals.

Position/Range	Selector lever release button	Continuity
P	Released	Yes
	Depressed	No
Except P	—	No

6. If not as specified, replace the P position switch.
7. Connect the connector.

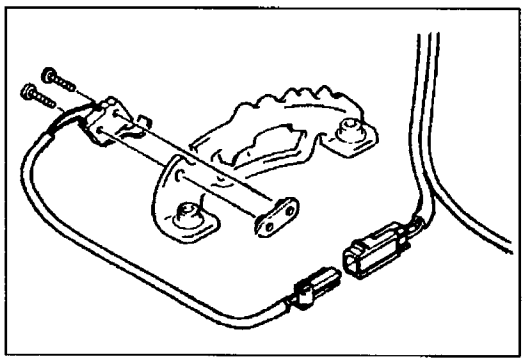


8. Install and adjust the indicator panel. (Refer to page K–52.)
9. Install the front console and rear console.
10. Connect the negative battery cable.
11. Check for correct operation of the shift-lock system. (Refer to page K–49.)

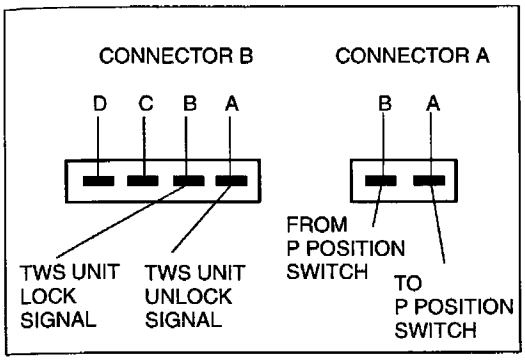


Replacement

1. Disconnect the negative battery cable.
2. Remove the rear console and front console.
3. Remove the indicator panel screws and lift up the indicator panel.
4. Disconnect the connector.
5. Remove the P position switch.



6. Install a new P position switch.
7. Connect the connector.
8. Install and adjust the indicator panel. (Refer to page K–52.)
9. Install the front console and rear console.
10. Connect the negative battery cable.
11. Check for correct operation of the shift-lock system. (Refer to page K–49.)



SHIFT-LOCK ACTUATOR

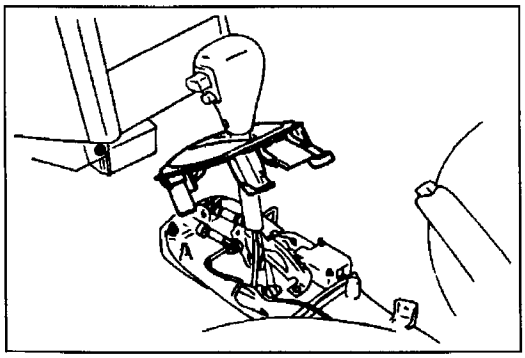
Inspection

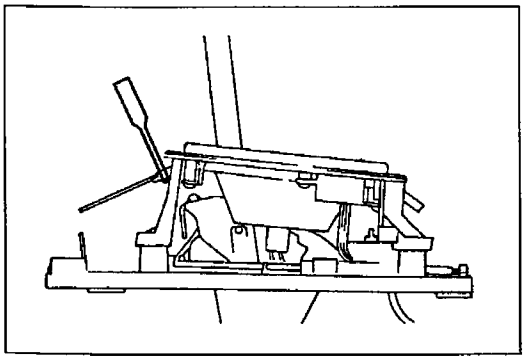
1. Remove the rear console and front console.
2. Shift the selector lever to P position.
3. Turn the ignition switch to ON (engine OFF), and check for terminal voltage and continuity, referring to the chart on page K–51 as follows.

B+: Battery positive voltage

Check terminal		⊖ Probe connected to		Measurement type	Condition	Measurement value
Connector	Terminal	Connector	Terminal			
B	A	Body		Voltage (V)	Brake pedal released→depressed	0→B+
B	B	Body		Voltage (V)	Except P position→P position	0→B+
A	A	B	B	Continuity	Selector lever release button released	Continuity
A	B	B	B	Continuity	Constant	Continuity

4. If not as specified, repair the wiring harness and/or replace the shift-lock actuator.
5. Install the front console and rear console.
6. Verify correct operation of the shift-lock system. (Refer to page K–49.)



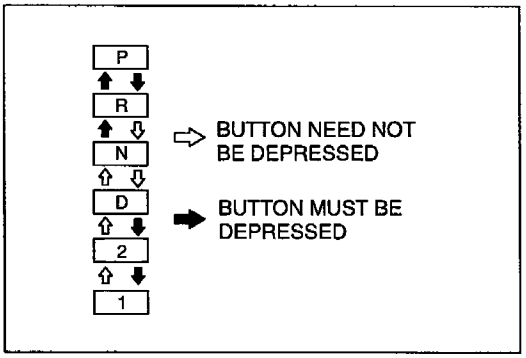


Replacement

1. Disconnect the negative battery cable.
2. Remove the rear console and front console.
3. Remove the indicator screws and lift up the indicator panel.
4. Disconnect the shift-lock actuator connector.
5. Disconnect the P position switch connector.
6. Remove the shift-lock actuator.
7. Install a new shift-lock actuator.

Tightening torque:
1.3—1.8 N·m { 13—19 kgf·cm , 12—16 in·lbf }

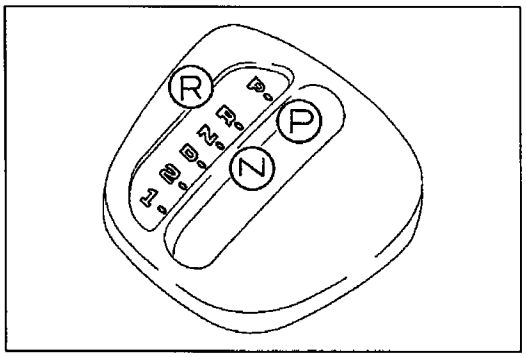
8. Connect the P position switch connector.
9. Connect the shift-lock actuator connector.
10. Install and adjust the indicator panel. (Refer to page K–52.)
11. Install the front console and rear console.
12. Connect the negative battery cable.
13. Verify correct operation of the shift-lock system. (Refer to page K–49.)

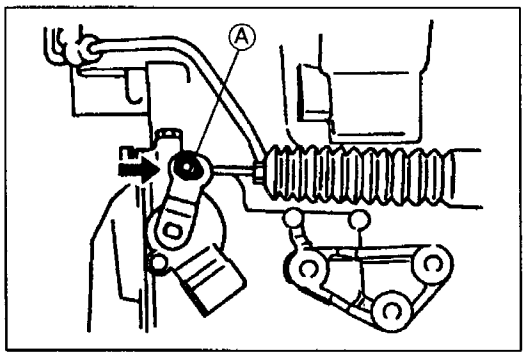


SELECTOR LEVER

Inspection

1. Turn the ignition switch to ON (engine OFF).
2. With the brake pedal depressed, verify that there is a "click" at each range when shifted in the pattern shown.
3. Verify that the selector lever can only be shifted as shown.
4. Verify that there is a "click" at each range position when shifted from P position to 1 range.
5. Verify that the position of the selector lever and the selector illumination light are aligned.
6. If not as specified, adjust the indicator panel as follows.
7. Verify that the vehicle operates in each selected range.

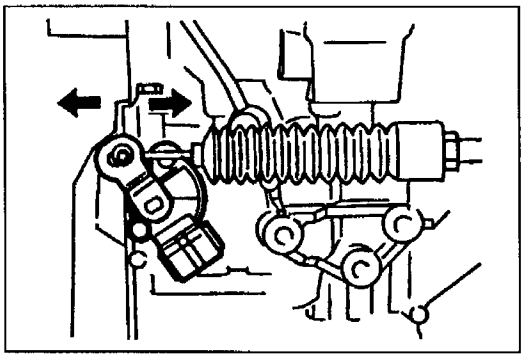




Adjustment

Selector cable

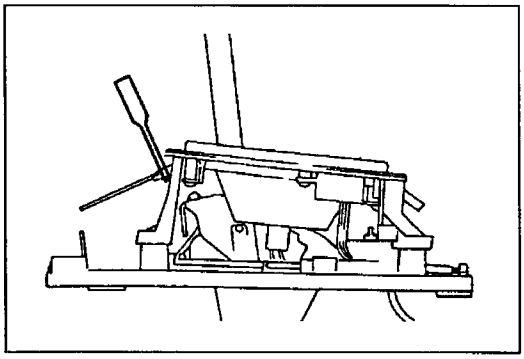
1. Remove the battery, air cleaner assembly, and battery carrier.
2. Shift the selector lever to P position.
3. Loosen nut Ⓐ as shown in the figure.
4. Push the selector cable in the direction of the arrow until it doesn't move any further.



5. Position the selector cable so that there is no load in the direction of the arrows, and tighten the nut.

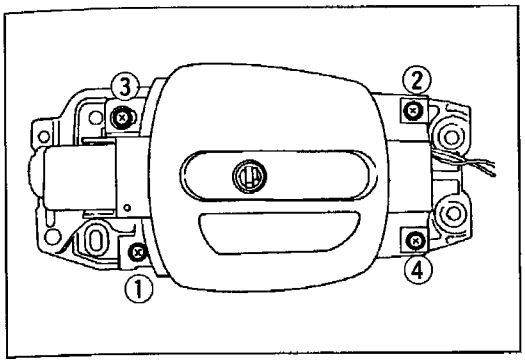
   Tightening torque:
   16—22 N·m { 1.6—2.3 kgf·m , 12—16 ft·lbf }

6. Install the battery carrier, air cleaner assembly, and battery.
7. Shift the selector lever from P position to 1 range, and make sure that there is no interference from other components in that area.



Indicator panel

1. Shift the selector lever to P position.
2. Loosen the indicator panel screws.
3. Align the alignment screw in the slider with the holes in the indicator panel. Installs suitable heavy-gauge wire to hold the slider.



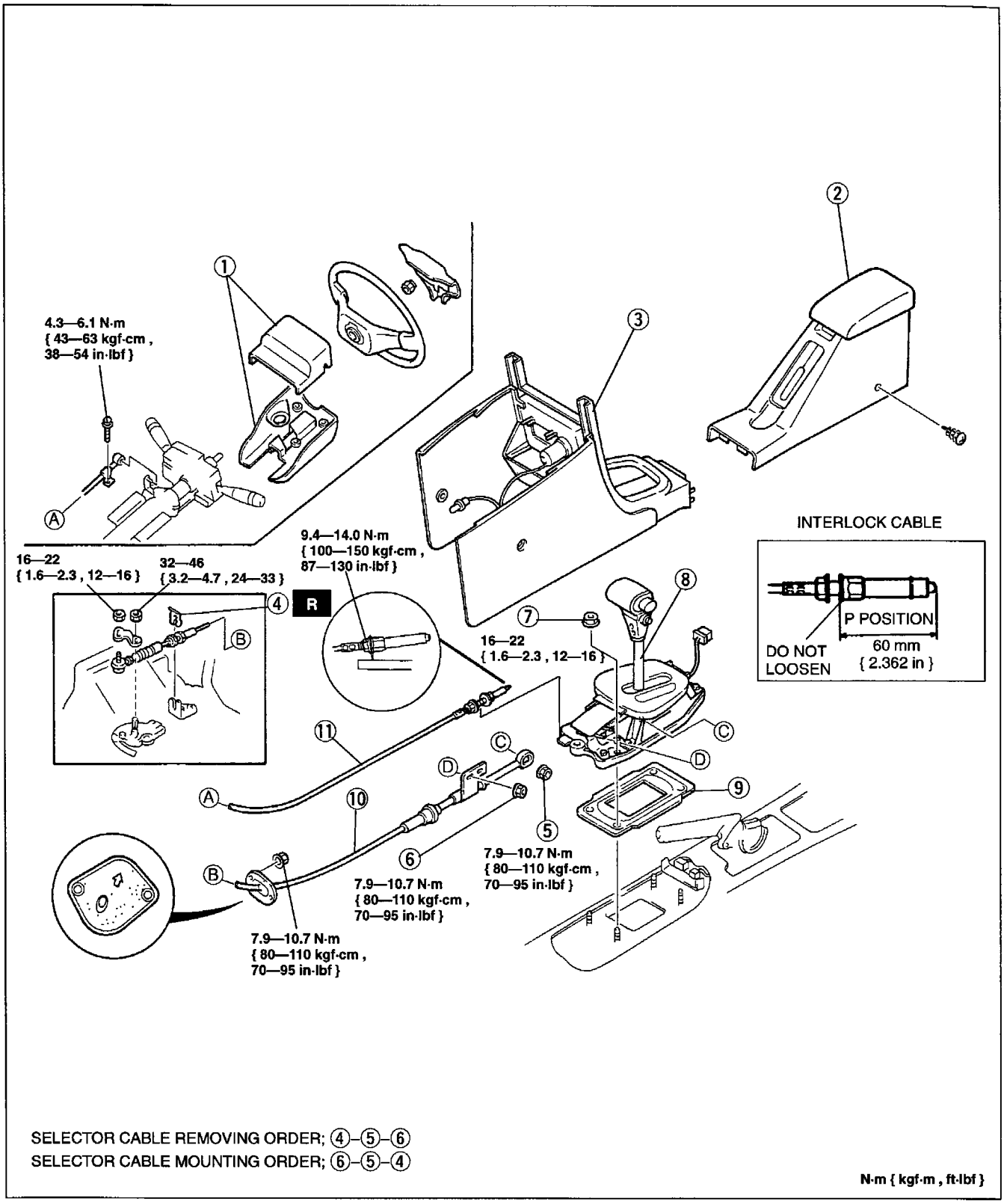
4. Tighten the indicator panel screws in the order shown in the figure.

   Tightening torque:
   2.0—2.9 N·m { 20—30 kgf·cm , 18—26 in·lbf }

5. Remove the wire.
6. Verify that the selector lever properly aligns with the indicator in all ranges and positions.

Removal / Installation

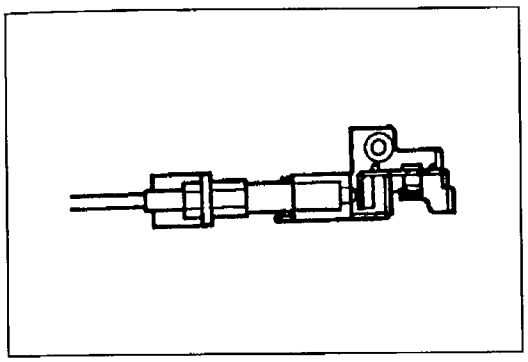
1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal, referring to **Installation Note**.
4. Connect the negative battery cable.
5. Verify correct operation of the shift-lock system. (Refer to page K–49.)



SELECTOR CABLE REMOVING ORDER; ④–⑤–⑥
SELECTOR CABLE MOUNTING ORDER; ⑥–⑤–④

N·m { kgf·m , ft·lbf }

1. Steering column cover
2. Rear console
3. Front console
4. Clip
   Installation note ..... page K–56
5. Nut
6. Nut
   Installation note ..... page K–55
7. Nut
8. Selector lever
   Inspection ..... page K–52
   Adjustment ..... page K–52
   Disassembly / Assembly ..... page K–57
9. Insulator
10. Selector cable
11. Interlock cable
    Installation note ..... page K–55



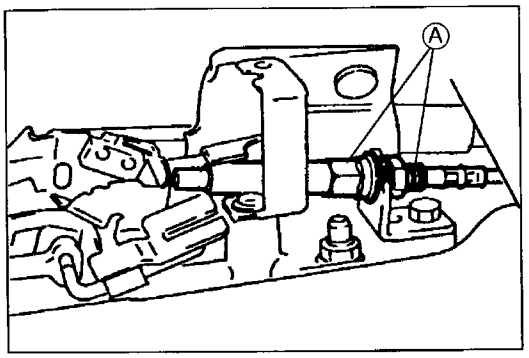
Installation note
Interlock cable

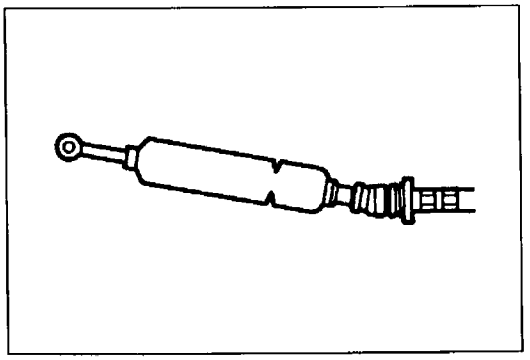
1. Shift the selector lever from P position to 1 range.
2. Install the interlock cable so that the tip touches the operating lever.

Caution
- **Do not damage the outer sleeve Ⓐ when pulling or turning the interlock cable.**

3. Install the interlock cable into the bracket groove, then tighten the nut.

Tightening torque:
9.9—14.0 N·m { 100—150 kgf·cm , 87—130 in·lbf }

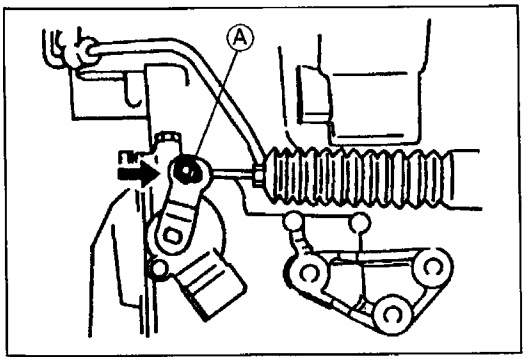




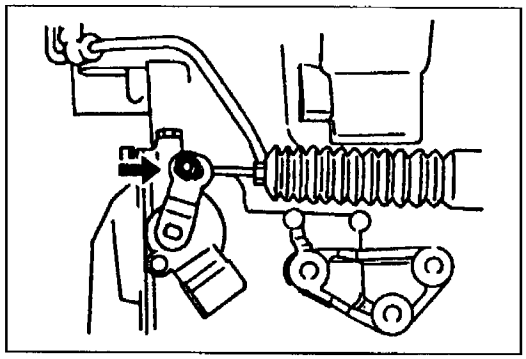
Nut

1. Shift the selector lever and manual shaft to P position.

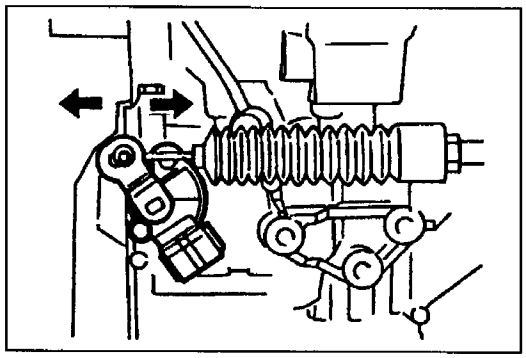
Caution
- **Bending the selector cable in the manner shown in the figure will damage the cable and cause it to become loose during shifting. When handling and installing the selector cable, hold it straight.**



2. After verifying that the selector cable boot is not twisted, install the selector cable to the selector lever, then tighten nut Ⓐ.



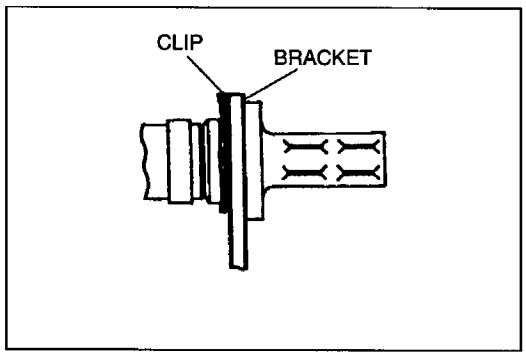
3. Push the selector cable in the direction of the arrow until it doesn't move any further.



4. Position the selector cable so that there is no load in the direction of the arrows, and tighten the nut.

   Tightening torque:
   16—22 N·m { 1.6—2.3 kgf·m , 12—16 ft·lbf }

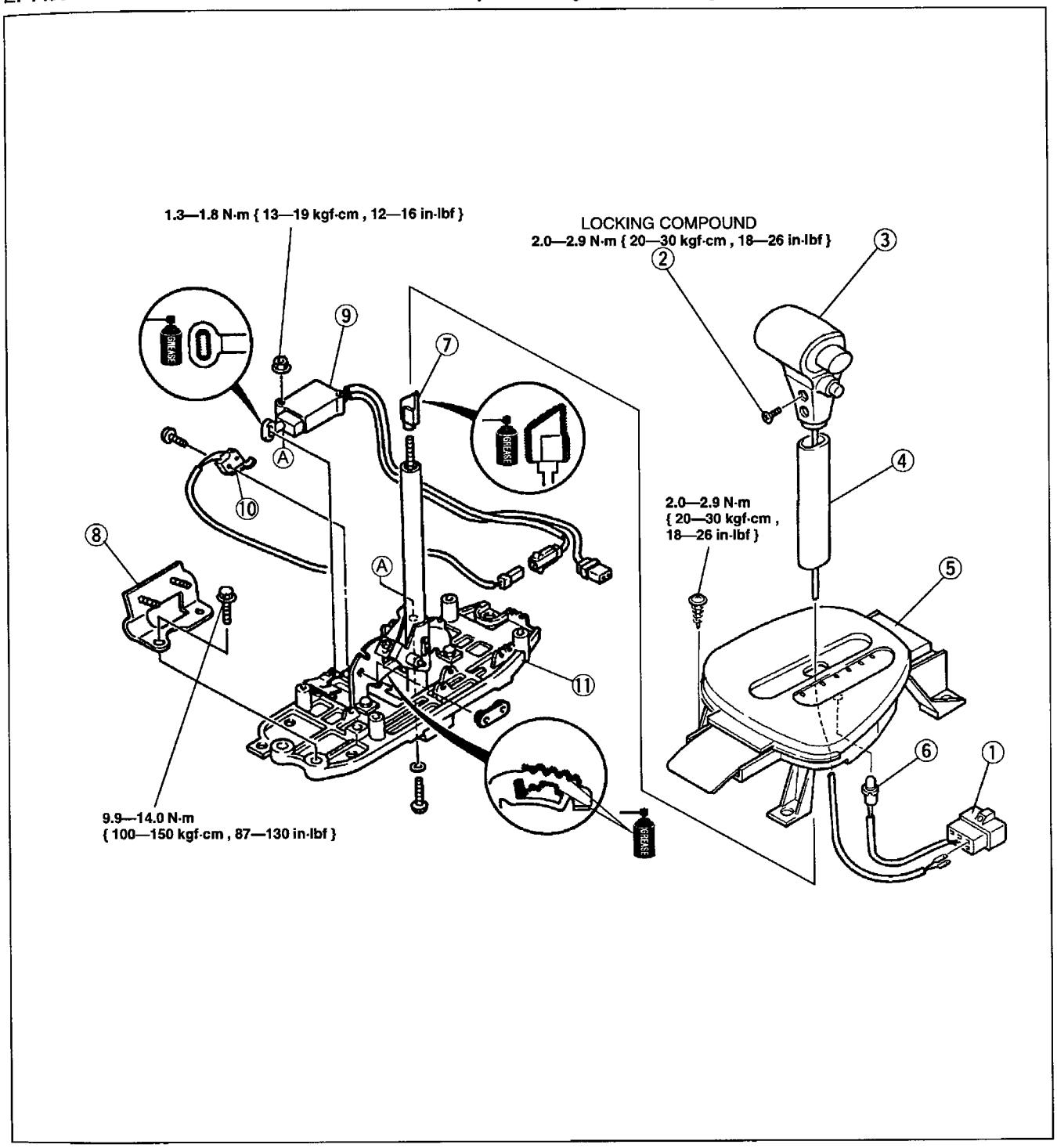
5. Shift the selector lever from P position to 1 range, and make sure that there is no interference from other components in that area.



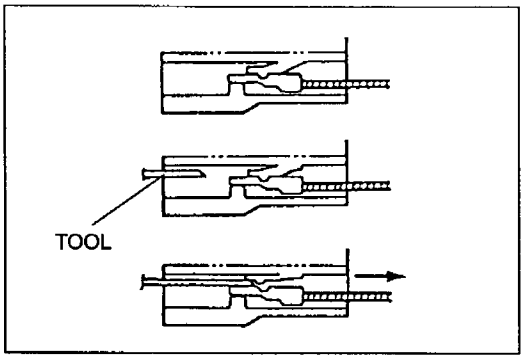
Clip
Install a new clip flush to the selector cable bracket.

Disassembly / Assembly

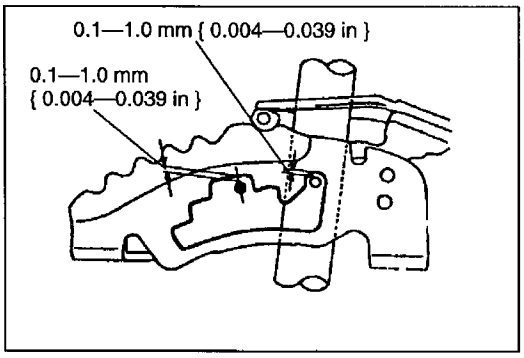
1. Disassemble in the order shown in the figure, referring to **Disassembly Note.**
2. Assemble in the reverse order of disassembly, referring to **Assembly Note.**



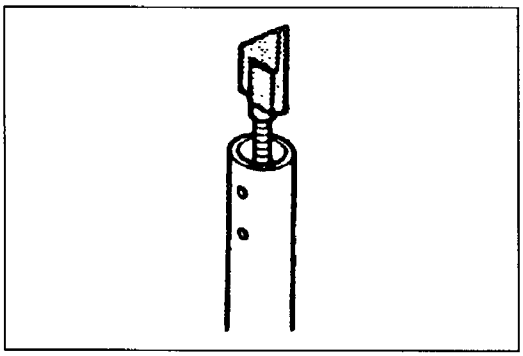
1. Connector
   Disassembly note ..... page K–58
2. Screws
3. Selector lever knob
4. Cover
5. Indicator panel
   Assembly note ..... page K–58
6. Selector illumination light
7. Cam
   Assembly note ..... page K–58
8. Selector cable bracket
9. Shift-lock actuator
   Inspection ..... page K–51
10. P position switch
    Inspection ..... page K–50
11. Selector lever



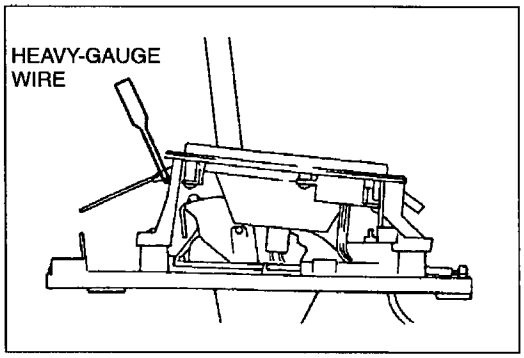
Disassembly note
Connector
1. Insert a thin piece of metal from the terminal side of the connector, and press down the terminal locking tab.
2. Pull the terminal out of the connector.



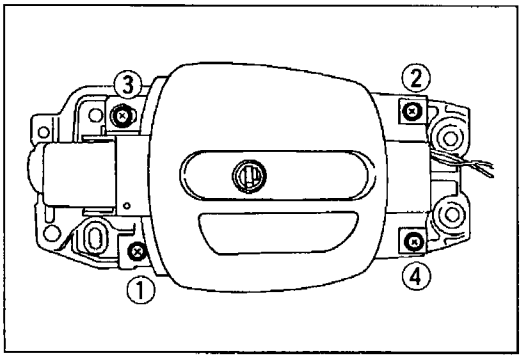
Assembly note
Cam
1. Loosely install the cam to the push rod.
2. Adjust the clearance between the guide plate and the guide pin by turning the cam.
3. Clearance can be made smaller by turning the cam clockwise.
4. Install the selector lever knob and verify that the clearance is as specified.
5. If the clearance is not as specified, repeat from Step 2.
6. Remove the selector lever knob.



7. Apply grease to the cam as shown.



Indicator panel
1. Shift the selector lever to P position.
2. Align the alignment screws in the slider with the holes in the indicator panel. Install heavy-gauge wire to hold the slider.
3. Temporary install the indicator panel to the selector lever bracket.



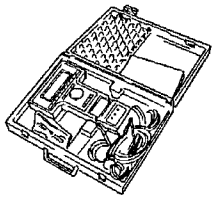
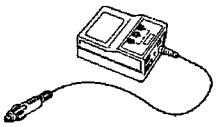
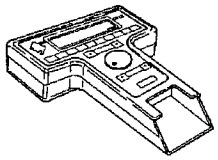
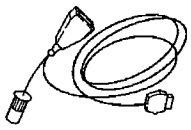
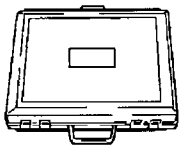
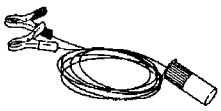
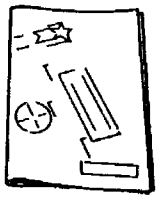
4. Tighten the indicator panel screws in the order shown in the figure.

   Tightening torque:
   2.0—2.9 N·m { 20—30 kgf·cm , 18—26 in·lbf }

5. Remove the wire.
6. Verify that the selector lever properly aligns with the indicator panel in all ranges and positions.

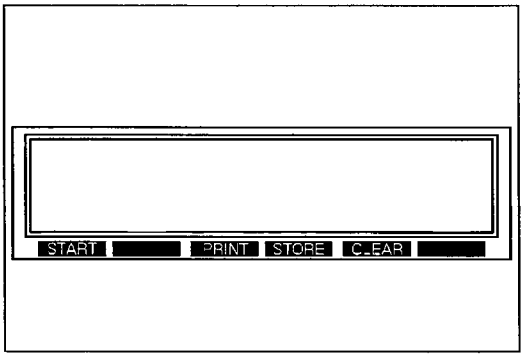
ON-BOARD DIAGNOSTIC SYSTEM

PREPARATION
SST

49 T088 0A0 NGS set 	For diagnosis of EC-AT	49 T088 010B Program Card 	For diagnosis of EC-AT
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For diagnosis of EC-AT	49 T088 001 Control unit (Part of 49 T088 0A0) 	For diagnosis of EC-AT
49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For diagnosis of EC-AT	49 T088 009 Case (Part of 49 T088 0A0) 	For diagnosis of EC-AT
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For diagnosis of EC-AT	49 T088 008 Instruction Manual 	For diagnosis of EC-AT

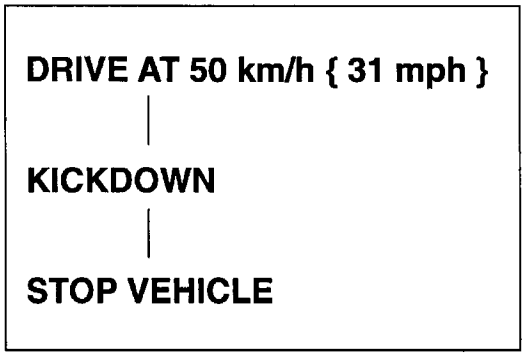
DIAGNOSTIC TROUBLE CODE
Inspection Procedure

1. Connect the **SST** (NGS) to the data link connector 2 and battery.
2. Turn the ignition switch to ON.
3. Check the diagnostic trouble code(s). (Refer to section F1, F2.)
4. If a diagnostic trouble code(s) is displayed, check for the cause by using the number on the diagnostic trouble code table. (Repair as necessary.)
5. Following repairs, do the After-Repair procedure to verify that there are no remaining codes.



After-Repair Procedure

1. Cancel the diagnostic trouble code memory by using the **SST** (NGS). (Refer to section F1, F2.)
2. Remove the **SST** (NGS) from the data link connector 2.



3. Drive the vehicle at 50 km/h { 31 mph }, and depress the accelerator pedal fully to activate kickdown. Stop the vehicle gradually.

4. Connect the **SST** (NGS) to the data link connector 2 and battery.
5. Turn the ignition switch to ON.
6. Verify that no diagnostic trouble codes are displayed. (Refer to section F1, F2.)
7. Remove the **SST** from the data link connector 2.

Troubleshooting

- If a diagnostic trouble code is shown on the **SST**, check for the cause by using the chart related to the code shown.

Diagnostic Trouble Code

Code No.	Display on the NGS	Condition	Page
P0705	TRANS RANGE SENSOR — CKT MALFUNCTION	Transaxle Range Switch	K–62
P0710	TRANS FLUID TEMP SENS — CKT MALFUNCTION	Transaxle Fluid Temperature Sensor	K–63
P0715	INPUT/TSS CIRCUIT MALFUNCTION	Input/Turbine Speed Sensor	K–64
P0731	GEAR 1 INCORRECT RATIO	Gear 1 Incorrect Ratio	K–65
P0732	GEAR 2 INCORRECT RATIO	Gear 2 Incorrect Ratio	K–66
P0733	GEAR 3 INCORRECT RATIO	Gear 3 Incorrect Ratio	K–67
P0734	GEAR 4 INCORRECT RATIO	Gear 4 Incorrect Ratio	K–68
P0740	TORQUE CONV CLUTCH SYS — MALFUNCTION	Torque Converter Clutch System Malfunction	K–69
P0750	SHIFT SOLENOID A — MALFUNCTION	Shift Solenoid A	K–70
P0755	SHIFT SOLENOID B — MALFUNCTION	Shift Solenoid B	K–71
P0760	SHIFT SOLENOID C — MALFUNCTION	Shift Solenoid C	K–72
P1743	SOLENOID TCC — OPEN OR SHORT	Torque converter clutch solenoid valve	K–73

DIAGNOSTIC TROUBLE CODE P0705	TRANS RANGE SENSOR — CKT MALFUNCTION (Transaxle Range Switch)
DETAILS	No input signal or input of two or more signals from transaxle range switch
POSSIBLE CAUSE	• Transaxle range switch malfunction • Damaged wiring or connectors between transaxle range switch and powertrain control module • Powertrain control module malfunction

STEP	INSPECTION		ACTION
1	Are powertrain control module or transaxle range switch connections at the connector(s) and connector pins OK?	**Yes**	Go to next step
		No	Repair or replace connector(s) Inspection step 6 • Yes: Go to next step • No: End of flowchart
2	Check EC-AT tester display • Connect the EC-AT tester to powertrain control module • Are transaxle range switch range and EC-AT tester display correct? ☞ **page K–16**	**Yes**	Go to step 6
		No	Go to next step
3	Check for continuity between terminals of transaxle range switch and powertrain control module • Disconnect negative battery cable • Disconnect transaxle range switch and powertrain control module connectors • Is there continuity between the terminals?	**Yes**	Go to next step
		No	Repair or replace connectors and wiring Go to step 2 • When **Yes**, go to step 6 • When **No**, go to next step
4	Check for continuity between terminals of the transaxle range switch as follows • Disconnect negative battery cable • Disconnect transaxle range switch connector • Is there continuity between the terminals?	**Yes**	Go to next step
		No	Repair or adjust transaxle range switch ☞ **page K–25** Go to step 2 • When **Yes**, go to step 6 • When **No**, go to next step
5	Check for continuity between terminals of transaxle range switch and main relay • Disconnect negative battery cable • Disconnect transaxle range switch and main relay • Is there continuity between the terminals?	**Yes**	Go to next step
		No	Repair or replace connectors and wiring
6	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ **page K–60**	**Yes**	Replace powertrain control module ☞ **section F1, F2**
		No	Problem is a temporary poor connection of wiring or connectors, and should be investigated further

Item	Indication	Condition
P/N	ON	P or N position
	OFF	R position, all ranges
D	ON	D range
	OFF	Other ranges, all positions
2	ON	2 range
	OFF	Other ranges, all positions
1	ON	1 range
	OFF	Other ranges, all positions

DIAGNOSTIC TROUBLE CODE P0710	TRANS FLUID TEMP SENS — CKT MALFUNCTION (Transaxle Fluid Temperature Sensor)
DETAILS	Powertrain control module input voltage is less than 0.09 V or over 5.0 V
POSSIBLE CAUSE	• Transaxle fluid temperature sensor malfunction • Damaged wiring or connectors between transaxle fluid temperature sensor and powertrain control module • Powertrain control module malfunction

STEP	INSPECTION		ACTION
1	Are powertrain control module or transaxle fluid temperature sensor connections at the connector(s) and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector(s) Inspection step 5 • Yes: Go to next step • No: End of flowchart
2	Check EC-AT tester display • Connect EC-AT tester to powertrain control module • Is transaxle fluid temperature sensor voltage correct? **Voltage** **ATF temp. 20 °C { 68 °F }: Approx. 4.0 V** **130 °C { 266 °F }: Approx. 1.5 V** **☞ page K–16**	Yes	Go to step 5
		No	Go to next step
3	Check for continuity between terminals of transaxle fluid temperature sensor and powertrain control module • Disconnect negative battery cable • Disconnect transaxle fluid temperature sensor and powertrain control module connectors • Is there continuity between terminals?	Yes	Go to next step
		No	Repair or replace connectors and wiring Go to step 2 • When **Yes**, go to step 5 • When **No**, go to next step
4	Measure resistance between the transaxle fluid temperature sensor terminals • Disconnect negative battery cable • Disconnect transaxle fluid temperature sensor connector • Is resistance between terminals correct? **Resistance** **ATF temp. 20 °C { 68 °F }: 21.0—25.0 kΩ** **40 °C { 104 °F }: 10.0—12.1 kΩ** **80 °C { 176 °F }: 3.0—3.4 kΩ** **☞ page K–27**	Yes	Go to next step
		No	Replace transaxle fluid temperature sensor **☞ page K–27**
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown **☞ page K–60**	Yes	Replace powertrain control module **☞ section F1, F2**
		No	Problem is a temporary poor connection of wiring or connectors, and should be investigated further

DIAGNOSTIC TROUBLE CODE P0715	INPUT/TSS CIRCUIT MALFUNCTION (Input/Turbine Speed Sensor)
DETAILS	Signal from input/turbine speed sensor is not input to powertrain control module when vehicle is moving.
POSSIBLE CAUSE	• Input/turbine speed sensor malfunction • Damaged harness or connectors between input/turbine speed sensor and powertrain control module • Powertrain control module malfunction

STEP	INSPECTION		ACTION
1	Are powertrain control module or input/turbine speed sensor connection at the connector(s) and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector(s) Inspection step 5 • Yes: Go to next step • No: End of flowchart
2	Check EC-AT tester display • Connect EC-AT tester to powertrain control module • Is speed indicated on EC-AT tester after engine is started and vehicle is idling? ☞ **page K–16**	Yes	Go to step 5
		No	Go to next step
3	Check for continuity between terminals of input/turbine speed sensor and powertrain control module • Disconnect negative battery cable • Disconnect input/turbine speed sensor and powertrain control module connectors • Is there continuity between terminals?	Yes	Go to next step
		No	Repair or replace connectors and wiring Go to step 2 • When **Yes**, go to step 5 • When **No**, go to next step
4	Measure resistance between input/turbine speed sensor terminals • Disconnect negative battery cable • Disconnect input/turbine speed sensor connector • Is resistance between terminals correct? **Resistance: 200—400 Ω** ☞ **page K–29**	Yes	Go to next step
		No	Replace input/turbine speed sensor ☞ **page K–29**
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ **page K–60**	Yes	Replace powertrain control module ☞ **section F1, F2**
		No	Problem is a temporary poor connection of wiring or connectors, and should be investigated further

DIAGNOSTIC TROUBLE CODE P0731	GEAR 1 INCORRECT RATIO (Gear 1 Incorrect Ratio)
DETAILS	Powertrain control module output solenoid pattern of first gear when gear ratio is other than first gear
POSSIBLE CAUSE	• ATF level low • Solenoid valve malfunction • Line pressure low • Control valve stuck • Powertrain control module malfunction

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code P0750, P0755, or P0760 indicated? ☞ page K–59	Yes	Refer to flowchart for diagnostic trouble code P0750, P0755, or P0760 and, then troubleshoot ☞ page K–70, 71, 72
		No	Go to next step
2	Are amount and condition (color) of ATF OK? Check for ATF leakage at transaxle connection and gasket Color ① Transparent red: Normal ② Black: Defective part in powertrain ③ Light red: Water mixed in fluid ④ Reddish brown: Deteriorated ATF ☞ page K–10	Yes	Go to next step
		No	Adjust ATF amount or replace ATF if necessary • If ATF color is ②, measure line pressure at idle when pressure is less than specification, go to step 4 • If ATF color is ③ or ④, replace ATF
3	Is turbine speed OK under following conditions? • EC-AT tester connected to powertrain control module • Throttle is 2/8 open, and vehicle speed is 20 km/h { 12 mph } in D range (Except O/D OFF mode) **Turbine speed** **Z5: 2,150 rpm** **BP: 2,000 rpm** ☞ page K–16	Yes	Go to step 8
		No	Above specification: Go to next step Below specification: Go to step 6
4	Check line pressure in D range (Except O/D OFF mode) • Is line pressure OK? **Line pressure when in D range (Except O/D OFF mode)** **Idling: 430—550 kPa { 4.3—5.7 kgf/cm², 62—81 psi }** **Stalled: 920—1,040 kPa { 9.3—10.7 kgf/cm², 140—152 psi }** ☞ page K–3	Yes	Go to next step
		No	Repair or replace any defective parts • Line pressure is low only when in D or 2 range: ATF leakage in forward clutch circuit ☞ Automatic Transaxle Workshop Manual FA4A-EL
5	Check stall speed in D range (Except O/D OFF mode) • Is stall speed OK? **Stall speed when in D range (Except O/D OFF mode)** **Z5: 1,950—2,250 rpm** **BP: 2,200—2,500 rpm** ☞ page K–5	Yes	Go to next step
		No	Repair or replace any defective parts • High in all range: Shifting of forward clutch, one-way clutch 1 • High in D range: Shifting of one-way clutch 2
6	Inspect operation of shift solenoid A, B, C • Disconnect negative battery cable • Disconnect solenoid connector • Is it operating OK? ☞ page K–30	Yes	Go to next step ☞ Automatic Transaxle Workshop Manual FA4A-EL
		No	Replace shift solenoid A, B, or C ☞ page K–30 Go to step 2 • When **Yes**, go to step 8 • When **No**, go to next step
7	Check operation of each valve and inspect return spring • Is each valve operating OK and is return spring OK?	Yes	Go to next step
		No	Repair or replace control valve and replace return spring ☞ Automatic Transaxle Workshop Manual FA4A-EL
8	After diagnostic trouble code has been cleared, re-check if diagnostic trouble code is shown ☞ page K–60	Yes	Replace powertrain control module ☞ section F1, F2
		No	Problem is a temporary slip of clutch, and should be investigated further

DIAGNOSTIC TROUBLE CODE P0732	GEAR 2 INCORRECT RATIO (Gear 2 Incorrect Ratio)
DETAILS	Powertrain control module output solenoid pattern of second gear when gear ratio is other than second gear
POSSIBLE CAUSE	• ATF level low • Forward clutch slippage • 2–4 brake band slippage • Solenoid valve malfunction • Line pressure low • One-way clutch 1 slippage • Control valve stuck • Powertrain control module malfunction

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code P0750, P0755, or P0760 indicated? ☞ page K–59	Yes	Refer to flowchart for diagnostic trouble code P0750, P0755, or P0760 and then troubleshoot ☞ page K–70, 71, 72
		No	Go to next step
2	Are amount and condition (color) of ATF OK? Check for ATF leakage at transaxle connection and gasket Color ① Transparent red: Normal ② Black: Defective part in powertrain ③ Light red: Water mixed in fluid ④ Reddish brown: Deteriorated ATF ☞ page K–10	Yes	Go to next step
		No	Adjust ATF amount or replace ATF if necessary • If ATF color is ②, measure line pressure at idle when pressure is less than specification, go to step 4 • If ATF color is ③ or ④, replace ATF
3	Is turbine speed OK under following conditions? • EC-AT tester connected to powertrain control module • Throttle is 2/8 open, and vehicle speed is 20 km/h { 12 mph } is 2 range **Turbine speed** **Z5: 1,200 rpm** **BP: 1,100 rpm** ☞ page K–16	Yes	Go to step 8
		No	Above specification: Go to next step Below specification: Go to step 6
4	Check line pressure in D, 2 range • Is line pressure OK? **Line pressure when in D, 2 range** **Idling: 430—550 kPa { 4.3—5.7 kgf/cm², 62—81 psi }** **Stalled: 920—1,040 kPa { 9.3—10.7 kgf/cm², 140—152 psi }** ☞ page K–3	Yes	Go to next step
		No	Repair or replace any defective parts • ATF leakage in 2–4 brake band circuit • ATF leakage in forward clutch circuit ☞ Automatic Transaxle Workshop Manual FA4A-EL
5	Check stall speed in D, 2 range • Is stall speed OK? **Stall speed when in D, 2 range** **Z5: 1,950—2,250 rpm** **BP: 2,200—2,500 rpm** ☞ page K–5	Yes	Go to next step
		No	Repair or replace any defective parts • 2–4 brake band slipping • Forward clutch slipping ☞ Automatic Transaxle Workshop Manual FA4A-EL
6	Inspect operation of shift solenoid A, B, C • Disconnect negative battery cable • Disconnect solenoid connector • Is it operating OK? ☞ page K–30	Yes	Go to next step
		No	Replace shift solenoid A, B, or C ☞ page K–30 Go to step 2 • When **Yes**, go to step 8 • When **No**, go to next step
7	Check operation of each valve and inspect return spring • Is each valve operating OK and is return spring OK?	Yes	Go to next step
		No	Repair or replace control valve and replace return spring ☞ Automatic Transaxle Workshop Manual FA4A-EL
8	After diagnostic trouble code has been cleared, re-check if diagnostic trouble code is shown ☞ page K–60	Yes	Replace the powertrain control module ☞ section F1, F2
		No	Problem is a temporary slip of clutch, and should be investigated further

DIAGNOSTIC TROUBLE CODE P0733	GEAR 3 INCORRECT RATIO (Gear 3 Incorrect Ratio)
DETAILS	Powertrain control module output solenoid pattern of third gear when gear ratio is other than third gear
POSSIBLE CAUSE	• ATF level low • Forward clutch slippage • 3–4 clutch slippage • Solenoid valve malfunction • Line pressure low • One-way clutch 1 slippage • Control valve stuck • Powertrain control module malfunction

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code P0750, P0755, or P0760 indicated? ☞ page K–59	Yes	Refer to flowchart for diagnostic trouble code P0750, P0755, or P0760 and then troubleshoot ☞ page K–70, 71, 72
		No	Go to next step
2	Are amount and condition (color) of ATF OK? Check for ATF leakage at transaxle connection and gasket Color ① Transparent red: Normal ② Black: Defective part in powertrain ③ Light red: Water mixed in fluid ④ Reddish brown: Deteriorated ATF ☞ page K–10	Yes	Go to next step
		No	Adjust ATF amount or replace ATF if necessary • If ATF color is ②, measure line pressure at idle when pressure is less than specification, go to step 4. • If ATF color is ③ or ④, replace ATF
3	Is turbine speed OK under following conditions? • Solenoid connector disconnected • EC-AT tester connected to powertrain control module • Throttle is 2/8 open, and vehicle speed is 20 km/h {12 mph} in third gear in D range **Turbine speed** **Z5: 800 rpm** **BP: 750 rpm** ☞ page K–16	Yes	Go to step 8
		No	Above specification: Go to next step Below specification: Go to step 6
4	Check line pressure when solenoid connector is disconnected • Solenoid connector disconnected • Is line pressure OK? **Line pressure when third gear in D range** **Idling: 430—550 kPa { 4.3—5.7 kgf/cm², 62—81 psi }** **Stalled: 920—1,040 kPa { 9.3—10.7 kgf/cm², 140—152 psi }** ☞ page K–3	Yes	Go to next step
		No	Repair or replace any defective parts • ATF leakage in 3–4 clutch ☞ Automatic Transaxle Workshop Manual FA4A-EL
5	Check stall speed when solenoid connector is disconnected • Solenoid connector disconnected • Is stall speed OK? **Stall speed when third gear in D range** **Z5: 1,950—2,250 rpm** **BP: 2,200—2,500 rpm** ☞ page K–5	Yes	Go to next step
		No	Repair or replace any defective parts • 3–4 clutch slipping ☞ Automatic Transaxle Workshop Manual FA4A-EL
6	Inspect operation of shift solenoid A, B, C • Disconnect negative battery cable • Disconnect solenoid connector • Is it operating OK? ☞ page K–30	Yes	Go to next step
		No	Replace shift solenoid A, B, or C ☞ page K–30 Go to step 2 • When **Yes**, go to step 8 • When **No**, go to next step
7	Check operation of each valve and inspect return spring • Is each valve operating OK and is return spring OK?	Yes	Go to next step
		No	Repair or replace control valve and replace return spring ☞ Automatic Transaxle Workshop Manual FA4A-EL
8	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ page K–60	Yes	Replace powertrain control module ☞ section F1, F2
		No	Problem is a temporary slip of clutch, and should be investigated further

DIAGNOSTIC TROUBLE CODE P0734	GEAR 4 INCORRECT RATIO (Gear 4 Incorrect Ratio)
DETAILS	Powertrain control module outputs solenoid pattern of fourth gear when gear ratio is other than fourth gear.
POSSIBLE CAUSE	• ATF level low • 2–4 brake band slippage • Control valve stuck • Powertrain control module malfunction • Line pressure low • 3–4 clutch slippage • Solenoid valve malfunction

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code P0750, P0755, or P0760 indicated? ☞ page K–59	Yes	Refer to flowchart for diagnostic trouble code P0750, P0755, or P0760, and then troubleshoot ☞ page K–70, 71, 72
		No	Go to next step
2	Are amount and condition (color) of ATF OK? Check for ATF leakage at transaxle connection and gasket Color ① Transparent red: Normal ② Black: Defective part in powertrain ③ Light red: Water mixed in fluid ④ Reddish brown: Deteriorated ATF ☞ page K–10	Yes	Go to next step
		No	Adjust ATF amount or replace ATF if necessary • If ATF color is ②, measure line pressure at idle when pressure is less than specification, repair or replace any defective parts • If ATF color is ③ or ④, replace ATF
3	Is diagnostic trouble code P0732 (Gear 2 incorrect ratio) indicated? ☞ page K–59	Yes	Refer to flowchart for diagnostic trouble code P0732 (Gear 2 incorrect ratio), and then troubleshoot ☞ page K–66
		No	Go to next step
4	Is diagnostic trouble code P0733 (Gear 3 incorrect ratio) indicated? ☞ page K–59	Yes	Refer to flowchart for diagnostic trouble code P0733 (Gear 3 incorrect ratio), and then troubleshoot ☞ page K–67
		No	Go to next step
5	Inspect operation of shift solenoid A, B, C • Disconnect negative battery cable • Disconnect solenoid connector • Is it operating OK? ☞ page K–30	Yes	Go to next step
		No	Replace shift solenoid A, B, or C ☞ page K–30 Inspection step 7 • Yes: Go to next step • No: End of flowchart
6	Check operation of each valve and inspect return spring • Is each valve operating OK and is return spring OK?	Yes	Go to next step
		No	Repair or replace control valve and replace return spring ☞ Automatic Transaxle Workshop Manual FA4A-EL
7	After diagnostic trouble code has been cleared, re-check if diagnostic trouble code is shown ☞ page K–60	Yes	Replace powertrain control module ☞ section F1, F2
		No	Problem is a temporary slip of clutch, and should be investigated further

DIAGNOSTIC TROUBLE CODE P0740	TORQUE CONV CLUTCH SYS — MALFUNCTION (Torque Converter Clutch System Malfunction)
DETAILS	Signal output by powertrain control module for torque converter clutch operation, but no torque converter clutch obtained
POSSIBLE CAUSE	• ATF level low • Torque converter clutch slippage • Torque converter clutch solenoid valve malfunction • Powertrain control module malfunction • Line pressure low • Control valve stuck

STEP	INSPECTION		ACTION
1	Are amount and condition (color) of ATF OK? Check for ATF leakage at transaxle connection and gasket Color ① Transparent red: Normal ② Black: Defective part in powertrain ③ Light red: Water mixed in fluid ④ Reddish brown: Deteriorated ATF ☞ **page K–10**	**Yes**	Go to next step
		No	Adjust ATF amount or replace ATF if necessary • If ATF color is ②, disassemble transaxle and repair or replace any defective parts as necessary • If ATF color is ③ or ④, replace ATF
2	Check line pressure in D range (Except O/D OFF mode) • Is line pressure OK? **Line pressure when in D range (Except O/D OFF mode)** **Idling: 430—550 kPa { 4.3—5.7 kgf/cm², 62—81 psi }** **Stalled: 920—1,040 kPa { 9.3—10.7 kgf/cm², 140—152 psi }** ☞ **page K–3**	**Yes**	Go to next step
		No	Repair or replace any defective parts • ATF leakage in transaxle case, oil pump, control valve ☞ **Automatic Transaxle Workshop Manual FA4A-EL**
3	Inspect operation of solenoid valve • Disconnect negative battery cable • Disconnect solenoid connector • Is it operating OK? ☞ **page K–30**	**Yes**	Go to next step
		No	Replace torque converter clutch solenoid valve ☞ **page K–30**
4	Check operation of each valve and inspect return spring • Is each valve operating OK and is return spring OK?	**Yes**	Go to next step
		No	Repair or replace control valve and replace return spring ☞ **Automatic Transaxle Workshop Manual FA4A-EL**
5	Check difference between engine speed and turbine speed during torque converter clutch operation in fourth gear • Connect EC-AT tester to powertrain control module • Check difference between engine speed and turbine speed during torque converter clutch operation in fourth gear Is there a difference between engine speed and turbine speed? ☞ **page K–16**	**Yes**	Replace torque converter ☞ **Automatic Transaxle Workshop Manual FA4A-EL**
		No	Go to next step
6	After diagnostic trouble code has been cleared, re-check if diagnostic trouble code is shown ☞ **page K–60**	**Yes**	Replace powertrain control module ☞ **section F1, F2**
		No	Problem is a temporary slip of clutch, and should be investigated further

DIAGNOSTIC TROUBLE CODE P0750	SHIFT SOLENOID A—MALFUNCTION (Shift Solenoid A)
DETAILS	• Damaged wiring or connectors between shift solenoid A and powertrain control module • Short or open circuit in shift solenoid A • Short or open circuit in powertrain control module internal transistor
POSSIBLE CAUSE	• Damaged wiring or connectors between shift solenoid A and powertrain control module • Short or open circuit in shift solenoid A • Short or open circuit in powertrain control module internal transistor

STEP	INSPECTION		ACTION
1	Are powertrain control module or shift solenoid A connections at connector(s) and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector(s) Inspection step 5 • Yes: Go to next step • No: End of flowchart
2	Check EC-AT tester display • Connect EC-AT tester to powertrain control module • Is light for shift solenoid A normally off and illuminated when valve is on? ☞ **page K–16**	Yes	Go to step 5
		No	Go to next step
3	Check for continuity between terminals of shift solenoid A and powertrain control module • Disconnect negative battery cable • Disconnect solenoid connector and powertrain control module connector • Is there continuity between terminals?	Yes	Go to next step
		No	Repair or replace connectors and wiring Go to step 2 • When **Yes**, go to step 5 • When **No**, go to next step
4	Measure resistance at shift solenoid A terminal • Disconnect negative battery cable • Disconnect solenoid connector • Is resistance correct? **Resistance: 13—27 Ω** ☞ **page K–30**	Yes	Go to next step
		No	Replace shift solenoid A ☞ **page K–30**
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ **page K–60**	Yes	Replace powertrain control module ☞ **section F1, F2**
		No	Problem is a temporary poor connection of wiring or connectors, and should be investigated further

DIAGNOSTIC TROUBLE CODE P0755	SHIFT SOLENOID B—MALFUNCTION (Shift Solenoid B)
DETAILS	• Damaged wiring or connectors between shift solenoid B and powertrain control module • Short or open circuit in shift solenoid B • Short or open circuit in powertrain control module internal transistors
POSSIBLE CAUSE	• Damaged wiring or connectors between shift solenoid B and powertrain control module • Short or open circuit in shift solenoid B • Short or open circuit in powertrain control module internal transistors

STEP	INSPECTION		ACTION
1	Are powertrain control module or shift solenoid B connections at connector(s) and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector(s) Inspection step 5 • Yes: Go to next step • No: End of flowchart
2	Check EC-AT tester display • Connect EC-AT tester to powertrain control module • Is light for shift solenoid B normally off and illuminated when valve is on? ☞ page K–16	Yes	Go to step 5
		No	Go to next step
3	Check for continuity between terminals of shift solenoid B and powertrain control module • Disconnect negative battery cable • Disconnect solenoid connector and powertrain control module connector • Is there continuity between terminals?	Yes	Go to next step
		No	Repair or replace connectors and wiring Go to step 2 • When **Yes**, go to step 5 • When **No**, go to next step
4	Measure resistance at shift solenoid B terminal • Disconnect negative battery cable • Disconnect solenoid connector • Is resistance correct? **Resistance: 13—27 Ω** ☞ page K–30	Yes	Go to next step
		No	Replace shift solenoid B ☞ page K–30
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ page K–60	Yes	Replace powertrain control module ☞ section F1, F2
		No	Problem is a temporary poor connection of wiring or connectors, and should be investigated further

DIAGNOSTIC TROUBLE CODE P0760	SHIFT SOLENOID C—MALFUNCTION (Shift Solenoid C)
DETAILS	• Damaged wiring or connectors between shift solenoid C and powertrain control module • Short or open circuit in shift solenoid C • Short or open circuit in powertrain control module internal transistor
POSSIBLE CAUSE	• Damaged wiring or connectors between shift solenoid C and powertrain control module • Short or open circuit in shift solenoid C • Short or open circuit in powertrain control module internal transistor

STEP	INSPECTION		ACTION
1	Are powertrain control module or shift solenoid C connections at connector(s) and connector pins OK?	**Yes**	Go to next step
		No	Repair or replace connector(s) Inspection step 5 • Yes: Go to next step • No: End of flowchart
2	Check EC-AT tester display • Connect EC-AT tester to powertrain control module • Is light for shift solenoid C normally off and illuminated when valve is on? ☞ **page K–16**	**Yes**	Go to step 5
		No	Go to next step
3	Check for continuity between terminals of shift solenoid C and powertrain control module • Disconnect negative battery cable • Disconnect solenoid connector and powertrain control module connector • Is there continuity between terminals?	**Yes**	Go to next step
		No	Repair or replace connectors and wiring Go to step 2 • When **Yes**, go to step 5 • When **No**, go to next step
4	Measure resistance at shift solenoid C terminal • Disconnect negative battery cable • Disconnect solenoid connector • Is resistance correct? **Resistance: 13—27 Ω** ☞ **page K–30**	**Yes**	Go to next step
		No	Replace shift solenoid C ☞ **page K–30**
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ **page K–60**	**Yes**	Replace powertrain control module ☞ **section F1, F2**
		No	Problem is a temporary poor connection of wiring or connectors, and should be investigated further

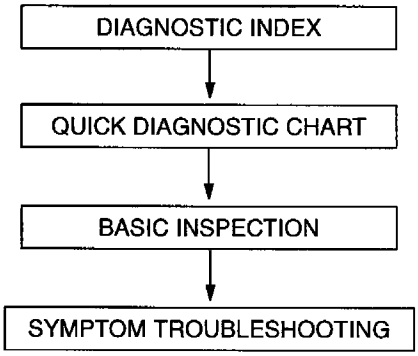
DIAGNOSTIC TROUBLE CODE P1743	SOLENOID TCC—OPEN OR SHORT (Torque converter clutch solenoid valve)
DETAILS	• Damaged wiring or connectors between torque converter clutch solenoid valve and powertrain control module • Short or open circuit in torque converter clutch solenoid valve • Short or open circuit in powertrain control module internal transistors
POSSIBLE CAUSE	• Damaged wiring or connectors between torque converter clutch solenoid valve and powertrain control module • Short or open circuit in torque converter clutch solenoid valve • Short or open circuit in powertrain control module internal transistor

STEP	INSPECTION		ACTION
1	Are transaxle control module or torque converter clutch solenoid valve connections at connector(s) and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector(s) Inspection step 5 • Yes: Go to next step • No: End of flowchart
2	Check EC-AT tester display • Connect EC-AT tester to powertrain control module • Is light for torque converter clutch solenoid valve normally off and illuminated when valve is on? ☞ page K–16	Yes	Go to step 5
		No	Go to next step
3	Check for continuity between terminals of torque converter clutch solenoid valve and powertrain control module • Disconnect negative battery cable • Disconnect solenoid connector and powertrain control module connector • Is there continuity between terminals?	Yes	Go to next step
		No	Repair or replace connectors and wiring Go to step 2 • When **Yes**, go to step 5 • When **No**, go to next step
4	Measure resistance at torque converter clutch solenoid valve terminal • Disconnect nagative battery cable • Disconnect solenoid connector • Is resistance correct? **Resistance: 13—27 Ω** ☞ page K–30	Yes	Go to next step
		No	Replace torque converter clutch solenoid valve ☞ page K–30
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ page K–60	Yes	Replace powertrain control module ☞ section F1, F2
		No	Problem is a temporary poor connection of wiring or connectors, and should be investigated further

TROUBLESHOOTING

TROUBLESHOOTING NOTES

Work Flow



- Choose the item that most closely corresponds to the actual symptom. (Refer to page K–77.)
- Estimate possible causes and verify which is effective for diagnosis in the mechanical system test. (Refer to page K–78.)
- Quickly decide the cause of the problem and check the part which might be the symptom. (Refer to page K–82.)
- Determine the cause of the trouble by using the "DIAGNOSTIC INDEX". (Refer to page K–83.)

Usage

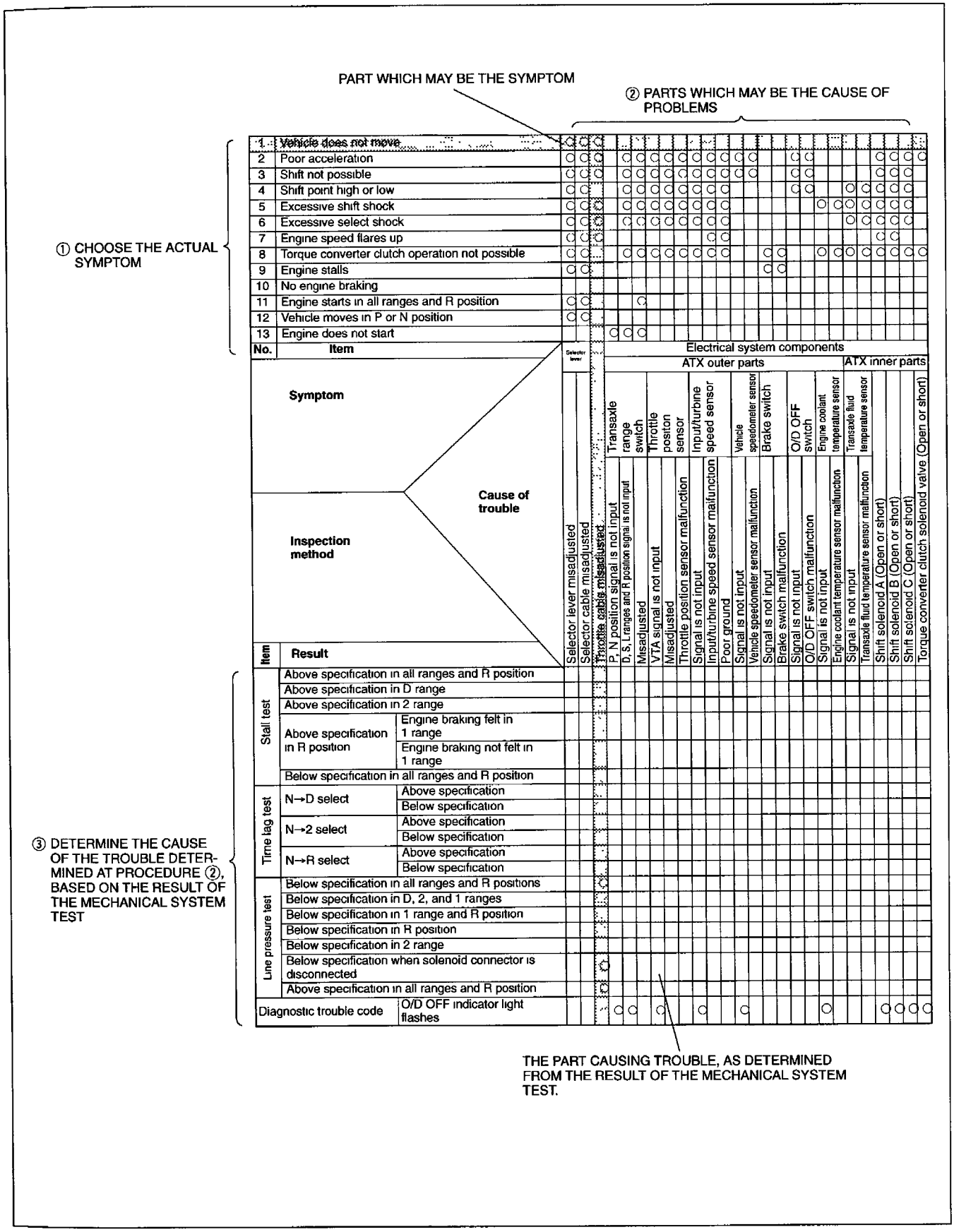
Diagnostic index

- The diagnostic index describes each troubleshooting item which is shown in the "SYMPTOM TROUBLESHOOTING CHART".
- This helps with symptom troubleshooting.

TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
No.	TROUBLE		
1	Vehicle does not move	Vehicle does not move when accelerator pedal depressed after being shifted to D, 2, 1 ranges and/or R position. Engine speed increases.	K–83
2	Poor acceleration	Vehicle speed slowly increases during acceleration Engine speed increases but the torque is not transmitted to the driving wheels	K–86
3	Shifting not possible	Single range shift (1–2, 2–3, or 3–4) only. Slip occurs inside the transaxle and engine speed increases.	K–87
4	Shift point high or low	Shift points do not match shift diagram. Shift occurs frequently.	K–92
5	Excessive shift shock	Strong shift shock felt when shifted while cruising.	K–93
6	Excessive select shock	Strong shift shock felt at idle when shifted to each range	K–97
7	Engine speed flares up	Engine flares up temporarily while cruising or when shifted.	K–101
8	Torque converter clutch operation not possible	Torque converter clutch does not operation when vehicle speed reaches torque converter clutch range	K–105
9	Engine stalls on deceleration	Strong shift shock on deceleration. Engine stops at the end of deceleration.	K–106
10	No engine braking	Engine speed drops to idle but vehicle does not slow down when accelerator pedal released during cruising at medium to high speed	K–107
11	Engine starts in all ranges and R position	—	K–108
12	Vehicle moves in P or N position	—	K–108
13	Engine does not start	Starter does not work	section

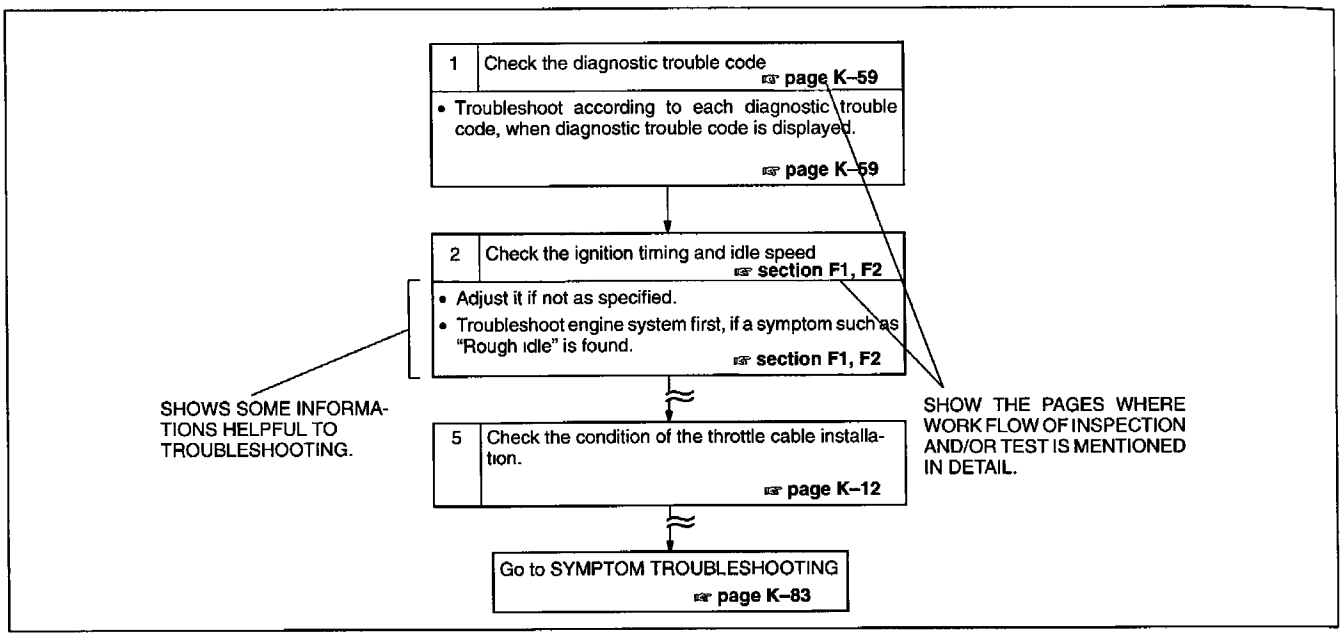
Quick diagnosis chart

- It helps you to quickly determine the relationship between the symptom and its cause in conjunction with other problems which may occur at the same time.
- The "Inspection method" section helps you to choose the most effective way to deal with the problem.



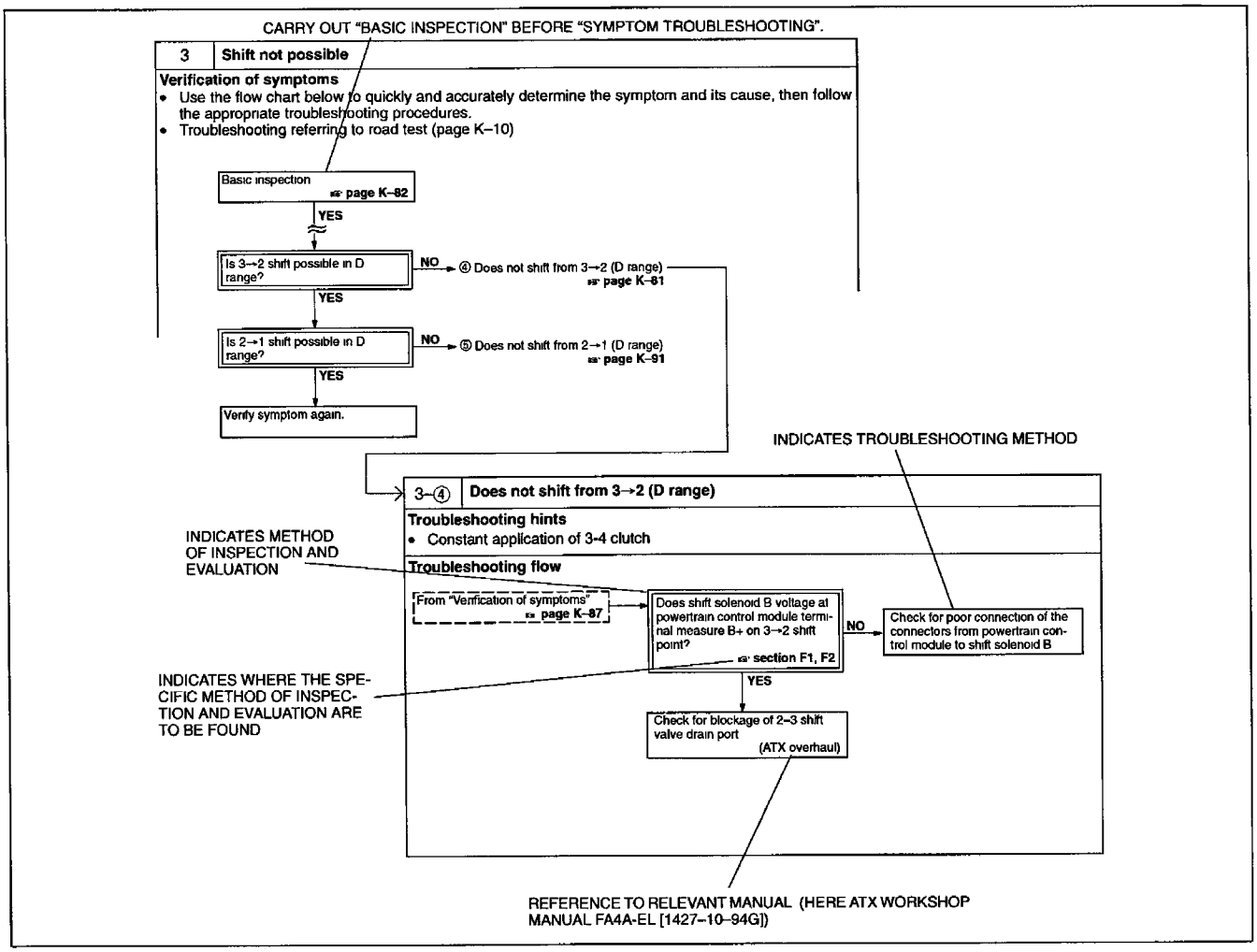
Basic inspection

- Basic inspection helps you to quickly and easily decide the cause of the problem. It also helpful to inspect the trouble part which might cause many symptoms.



Symptom troubleshooting chart

- This shows the necessary procedures to follow in the form of a flow chart.
- This chart helps you to quickly and accurately pinpoint the problem after determining the symptom.



DIAGNOSTIC INDEX

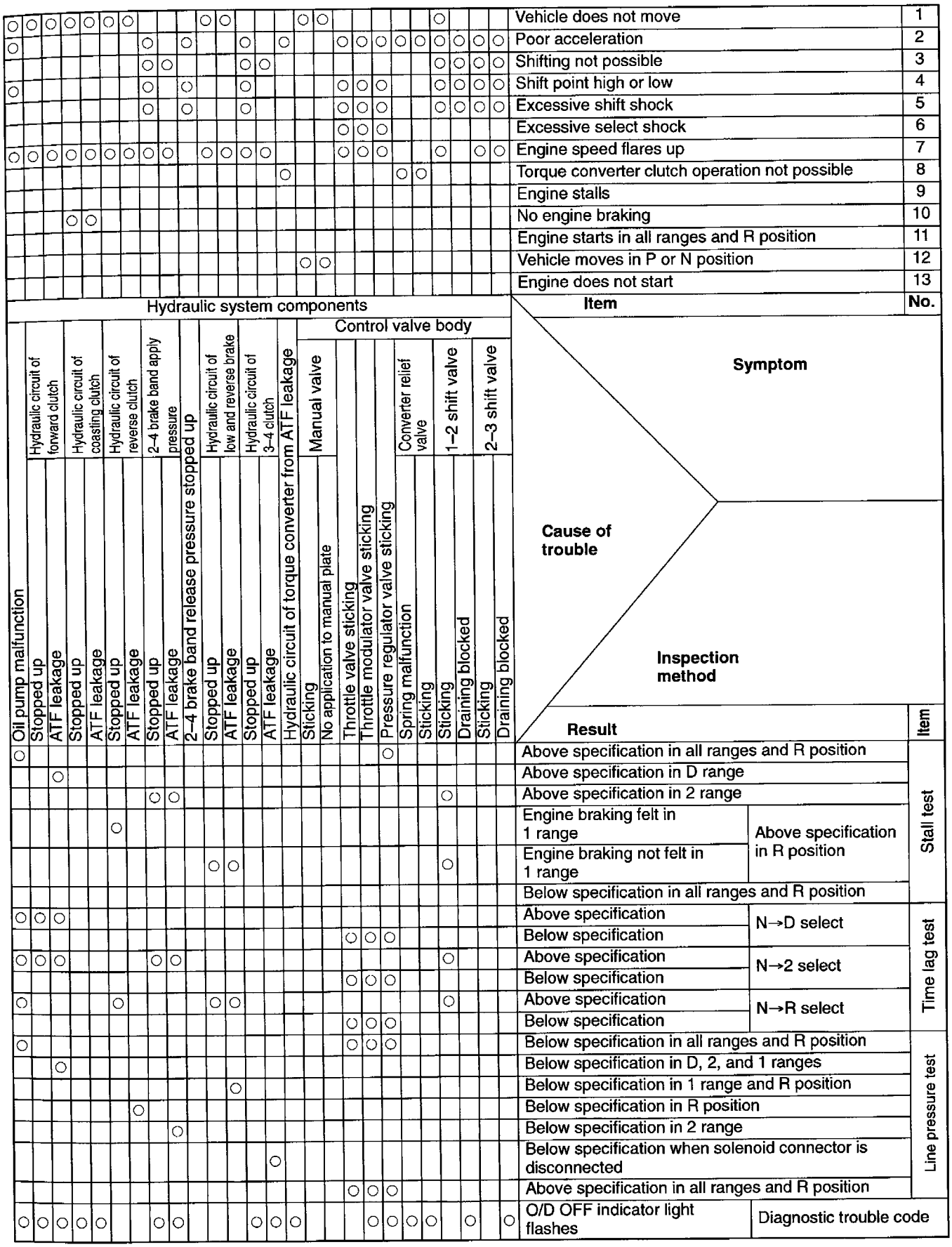
TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
No.	TROUBLE		
1	Vehicle does not move	Vehicle does not move when accelerator pedal depressed after being shifted to D, 2, 1 ranges and/or R position. Engine speed increases.	K–83
2	Poor acceleration	Vehicle speed slowly increases during acceleration. Engine speed increases but the torque is not transmitted to the driving wheels.	K–86
3	Shifting not possible	Single range shift (1–2, 2–3, or 3–4) only. Slip occurs inside the transaxle and engine speed increases.	K–87
4	Shift point high or low	Shift points do not match shift diagram. Shift occurs frequently.	K–92
5	Excessive shift shock	Strong shift shock felt when shifted while cruising.	K–93
6	Excessive select shock	Strong shift shock felt at idle when shifted to each range.	K–97
7	Engine speed flares up	Engine flares up temporarily while cruising or when shifted.	K–101
8	Torque converter clutch operation not possible	Torque converter clutch does not operation when vehicle speed reaches torque converter clutch range.	K–105
9	Engine stalls on deceleration	Strong shift shock on deceleration. Engine stops at the end of deceleration.	K–106
10	No engine braking	Engine speed drops to idle but vehicle does not slow down when accelerator pedal released during cruising at medium to high speed.	K–107
11	Engine starts in all ranges and R position	—	K–108
12	Vehicle moves in P or N position	—	K–108
13	Engine does not start	Starter does not work.	section F1, F2
14	NGS display "LINK COMMUNICATION ERROR"	—	section F1, F2

QUICK DIAGNOSIS CHART

No.	Item	Selector lever	Selector lever misadjusted	Selector cable misadjusted	Throttle cable misadjusted	Electrical system components: ATX outer parts: Transaxle range switch: P, N position signal is not input	Transaxle range switch: D, S, L ranges and R position signal is not input	Throttle positon sensor: Misadjusted	Throttle positon sensor: TVO signal is not input	Throttle position sensor malfunction	Input/turbine speed sensor: Signal is not input	Input/turbine speed sensor malfunction	Vehicle speedometer sensor: Poor ground	Vehicle speedometer sensor: Signal is not input	Vehicle speedometer sensor malfunction	Brake switch: Signal is not input	Brake switch malfunction	O/D OFF switch: Signal is not input	O/D OFF switch malfunction	Engine coolant temperature sensor: Signal is not input	Engine coolant temperature sensor malfunction	ATX inner parts: Transaxle fluid temperature sensor: Signal is not input	Transaxle fluid temperature sensor malfunction	Shift solenoid A (Open or short)	Shift solenoid B (Open or short)	Shift solenoid C (Open or short)	Torque converter clutch solenoid valve (Open or short)
1	Vehicle does not move		○	○	○																						
2	Poor acceleration		○	○	○		○	○	○	○	○	○	○	○	○	○			○	○				○	○	○	○
3	Shifting not possible		○	○	○		○	○	○	○	○	○	○	○	○	○			○	○				○	○	○	
4	Shift point high or low		○	○			○	○	○	○	○	○	○						○	○		○		○	○	○	
5	Excessive shift shock		○	○	○		○	○	○	○	○	○	○								○	○	○	○	○	○	
6	Excessive select shock		○	○	○		○	○	○	○	○	○	○										○	○	○	○	
7	Engine speed flares up		○	○	○								○	○										○	○		
8	Torque converter clutch operation not possible		○	○			○	○	○	○	○	○	○	○			○	○			○	○	○	○	○	○	○
9	Engine stalls		○	○													○	○									
10	No engine braking																										
11	Engine starts in all ranges and R position		○	○				○																			
12	Vehicle moves in P or N position		○	○																							
13	Engine does not start					○	○	○																			

Symptom / **Cause of trouble** / **Inspection method**

Item	Result		Selector lever misadjusted	Selector cable misadjusted	Throttle cable misadjusted	P, N position signal is not input	D, S, L ranges and R position signal is not input	Misadjusted	TVO signal is not input	Misadjusted	Throttle position sensor malfunction	Signal is not input	Input/turbine speed sensor malfunction	Poor ground	Signal is not input	Vehicle speedometer sensor malfunction	Signal is not input	Brake switch malfunction	Signal is not input	O/D OFF switch malfunction	Signal is not input	Engine coolant temperature sensor malfunction	Signal is not input	Transaxle fluid temperature sensor malfunction	Shift solenoid A (Open or short)	Shift solenoid B (Open or short)	Shift solenoid C (Open or short)	Torque converter clutch solenoid valve (Open or short)
Stall test	Above specification in all ranges and R position																											
	Above specification in D range																											
	Above specification in 2 range																											
	Above specification in R position	Engine braking felt in 1 range																										
		Engine braking not felt in 1 range																										
	Below specification in all ranges and R position																											
Time lag test	N→D select	Above specification																										
		Below specification																										
	N→2 select	Above specification																										
		Below specification																										
	N→R select	Above specification																										
		Below specification																										
Line pressure test	Below specification in all ranges and R position				○																							
	Below specification in D, 2, and 1 ranges																											
	Below specification in 1 range and R position																											
	Below specification in R position																											
	Below specification in 2 range																											
	Below specification when solenoid connector is disconnected				○																							
	Above specification in all ranges and R position				○																							
Diagnostic trouble code	O/D OFF indicator light flashes					○	○		○			○				○	○				○			○		○	○	○


Symptom
Cause of trouble
Inspection method
Item
No.
Vehicle does not move 1
Poor acceleration 2
Shifting not possible 3
Shift point high or low 4
Excessive shift shock 5
Excessive select shock 6
Engine speed flares up 7
Torque converter clutch operation not possible 8
Engine stalls 9
No engine braking 10
Engine starts in all ranges and R position 11
Vehicle moves in P or N position 12
Engine does not start 13
Hydraulic system components
Control valve body
Oil pump malfunction
Hydraulic circuit of forward clutch
Stopped up
ATF leakage
Hydraulic circuit of coasting clutch
Stopped up
ATF leakage
Hydraulic circuit of reverse clutch
Stopped up
ATF leakage
2–4 brake band apply pressure
Stopped up
ATF leakage
2–4 brake band release pressure stopped up
Hydraulic circuit of low and reverse brake
Stopped up
ATF leakage
Hydraulic circuit of 3–4 clutch
Stopped up
ATF leakage
Hydraulic circuit of torque converter from ATF leakage
Manual valve
Sticking
No application to manual plate
Throttle valve sticking
Throttle modulator valve sticking
Pressure regulator valve sticking
Converter relief valve
Spring malfunction
Sticking
1–2 shift valve
Sticking
Draining blocked
2–3 shift valve
Sticking
Draining blocked
Result
Item
Above specification in all ranges and R position
Above specification in D range
Above specification in 2 range
Engine braking felt in 1 range
Engine braking not felt in 1 range
Above specification in R position
Below specification in all ranges and R position
Stall test
Above specification
Below specification
N→D select
Above specification
Below specification
N→2 select
Above specification
Below specification
N→R select
Time lag test
Below specification in all ranges and R position
Below specification in D, 2, and 1 ranges
Below specification in 1 range and R position
Below specification in R position
Below specification in 2 range
Below specification when solenoid connector is disconnected
Above specification in all ranges and R position
Line pressure test
O/D OFF indicator light flashes
Diagnostic trouble code

No.	Item	Sticking	Draining port is blocked up	Bypass valve not operating properly	3-2 timing valve not operating properly	Low reducing valve sticking	Torque converter clutch control valve sticking	Shift solenoid A sticking	Shift solenoid B sticking	Shift solenoid C sticking	Torque converter clutch solenoid valve sticking	1-2 accumulator not operating properly	2-3 accumulator not operating properly	N-D accumulator not operating properly	N-R accumulator not operating properly	Torque converter clutch piston worn	Burnt	Worn, defaced	Spring malfunction	Dished plate malfunction	Worn, defaced	Spring malfunction	Dished plate malfunction	Worn, defaced	Spring malfunction	Dished plate malfanction
		Hydraulic system components														Powertrain system										
		Control valve body													Converter housing	Torque converter	Forward clutch				Coasting clutch			Reverse clutch		
		3–4 shift valve																								
1	Vehicle does not move	○					○		○								○	○			○			○		
2	Poor acceleration	○	○				○	○	○	○	○					○										
3	Shifting not possible	○	○					○	○	○																
4	Shift point high or low	○	○	○				○	○	○																
5	Excessive shift shock	○	○	○	○	○		○	○	○		○	○						○	○		○	○		○	○
6	Excessive select shock											○		○	○				○	○		○	○		○	○
7	Engine speed flares up	○	○		○			○	○	○								○			○			○		
8	Torque converter clutch operation not possible						○				○					○										
9	Engine stalls						○				○															
10	No engine braking	○								○											○					
11	Engine starts in all ranges and R position																									
12	Vehicle moves in P or N positions																									
13	Engine does not start																									

Symptom / **Cause of trouble** / **Inspection method**

Item	Result		Sticking	Draining port is blocked up	Bypass valve not operating properly	3-2 timing valve not operating properly	Low reducing valve sticking	Torque converter clutch control valve sticking	Shift solenoid A sticking	Shift solenoid B sticking	Shift solenoid C sticking	Torque converter clutch solenoid valve sticking	1-2 accumulator not operating properly	2-3 accumulator not operating properly	N-D accumulator not operating properly	N-R accumulator not operating properly	Torque converter clutch piston worn	Burnt	Worn, defaced	Spring malfunction	Dished plate malfunction	Worn, defaced	Spring malfunction	Dished plate malfunction	Worn, defaced	Spring malfunction	Dished plate malfanction
Stall test	Above specification in all ranges and R position																										
	Above specification in D range																										
	Above specification in 2 range								○										○								
	Above specification in R position	Engine braking felt in 1 range																						○			
		Engine braking not felt in 1 range							○																		
	Below specification in all ranges and R position																										
Time lag test	N→D select	Above specification																	○								
		Below specification													○												
	N→2 select	Above specification							○										○								
		Below specification											○														
	N→R select	Above specification							○																○		
		Below specification														○											
Line pressure test	Below specification in all ranges and R position																										
	Below specification in D, 2, and 1 ranges																										
	Below specification in 1 range and R position																										
	Below specification in R position																										
	Below specification in 2 range																										
	Below specification when solenoid connector is disconnected																										
	Above specification in all ranges and R position																										
Diagnostic trouble code	O/D OFF indicator light flashes		○				○				○					○	○	○									

Powertrain system: 3-4 clutch	2-4 brake band	Low and reverse brake	Item	No.
		○ ○ ○	Vehicle does not move	1
○ ○	○ ○		Poor acceleration	2
○	○	○	Shifting not possible	3
○ ○	○ ○		Shift point high or low	4
○	○	○	Excessive shift shock	5
		○	Excessive select shock	6
○	○	○ ○ ○	Engine speed flares up	7
			Torque converter clutch operation not possible	8
			Engine stalls	9
			No engine braking	10
			Engine starts in all ranges and R position	11
			Vehicle moves in P or N positions	12
			Engine does not start	13

Cause of trouble: Worn, defaced; Spring malfunction; Brake band worn, defaced; Spring malfunction; Piston stem long stroke; Piston stem short stroke; Worn defaced; One-way clutch 1 slipping; One-way clutch 2 slipping

Symptom / Inspection method

Result		Item
Above specification in all ranges and R position		Stall test
○ ○ Above specification in D range		
○ Above specification in 2 range		
Engine braking felt in 1 range	Above specification in R position	
○ Engine braking not felt in 1 range		
Below specification in all ranges and R position		
○ ○ Above specification	N→D select	Time lag test
Below specification		
○ Above specification	N→2 select	
Below specification		
○ Above specification	N→R select	
Below specification		
Below specification in all ranges and R position		Line pressure test
Below specification in D, 2, and 1 ranges		
Below specification in 1 range and R position		
Below specification in R position		
Below specification in 2 range		
Below specification when solenoid connector is disconnected		
Above specification in all ranges and R position		
○ ○ ○ ○ ○ ○ O/D OFF indicator light flashes	Diagnostic trouble code	

BASIC INSPECTION

- Check the following before carrying out symptom troubleshooting.
- When a symptom is found while carrying out basic inspection, do the troubleshooting procedure on the page referred to at the bottom of each section.

1	Check the diagnostic trouble code. ☞ page K–59
• Troubleshoot according to each diagnostic trouble code, when diagnostic trouble code is displayed. ☞ page K–59	

↓

2	Check the ignition timing and idle speed. ☞ section F1, F2
• Adjust it if not as specified. • Troubleshoot engine system first, if a symptom such as "Rough idle" is found. ☞ section F1, F2	

↓

3	Check the ATF level and condition. ☞ page K–10
• If ATF level is low, it might be oil leakage. • If ATF condition is not OK, transaxle needs overhauling. But it is better to do it after the symptom troubleshooting to repair trouble part rapidly and correctly.	

↓

4	Check the condition of the selector lever installation. Check if selector lever is properly installed. ☞ page K–52

↓

5	Check the condition of the throttle cable installation. ☞ page K–12

↓

6	Carry out the line pressure test. ☞ page K–3

↓

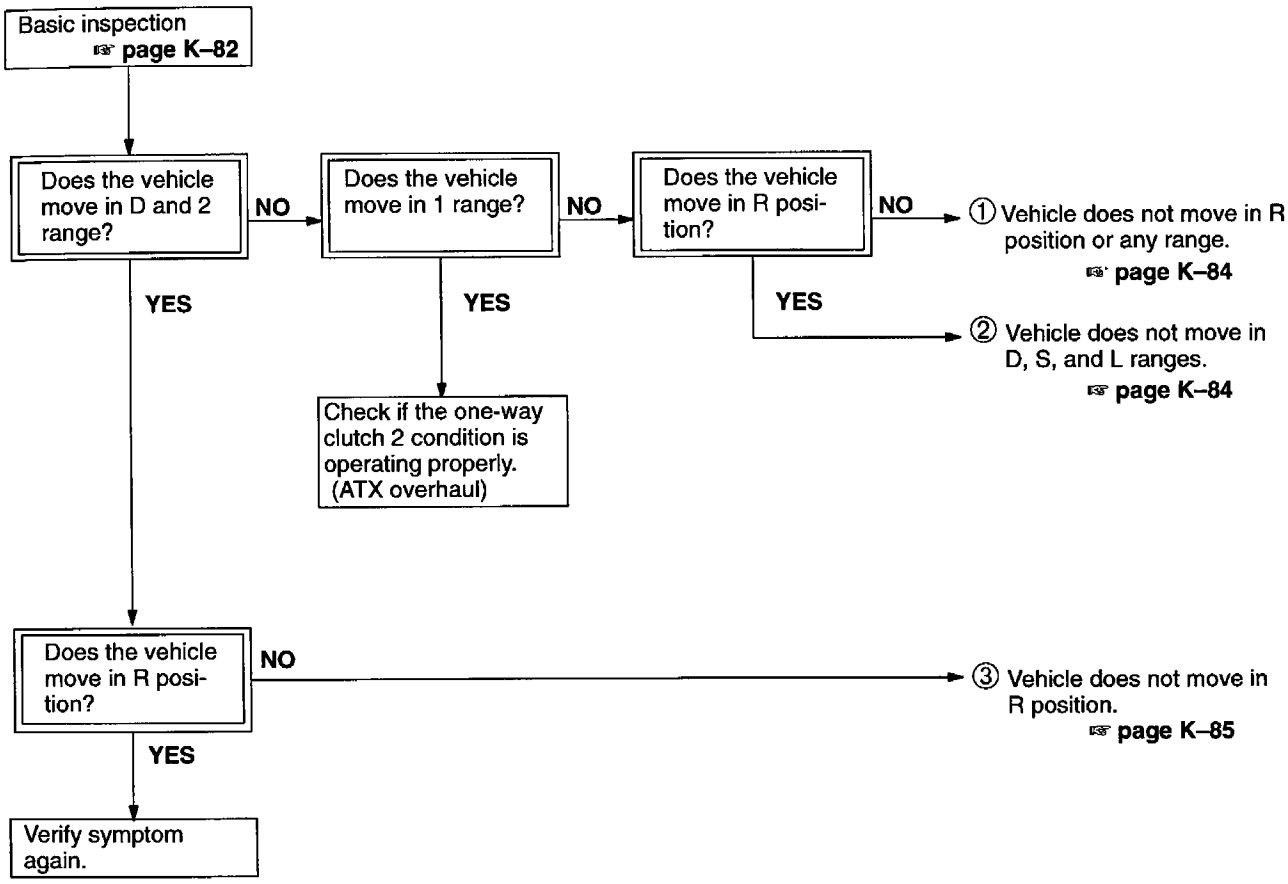
Go to SYMPTOM TROUBLESHOOTING ☞ page K–83

SYMPTOM TROUBLESHOOTING

1	Vehicle does not move

Verification of symptoms

Use the flow chart below to quickly and accurately determine the symptom and its cause, then follow the appropriate troubleshooting procedures.

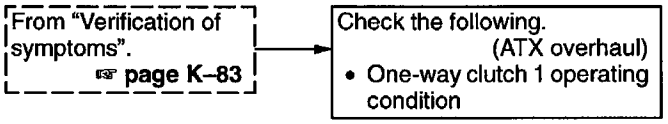


1–①	Vehicle does not move in R position or any range

Troubleshooting hints

- Throttle pressure below specification

Troubleshooting flow

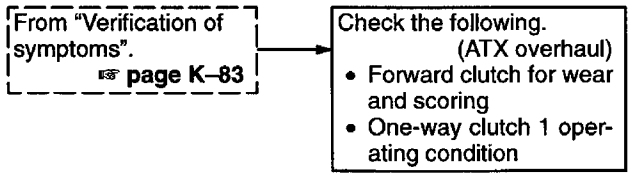


1–②	Vehicle does not move in D, 2, and 1 ranges

Troubleshooting hints

- Forward clutch slipping
- One-way clutch 1 slipping

Troubleshooting flow

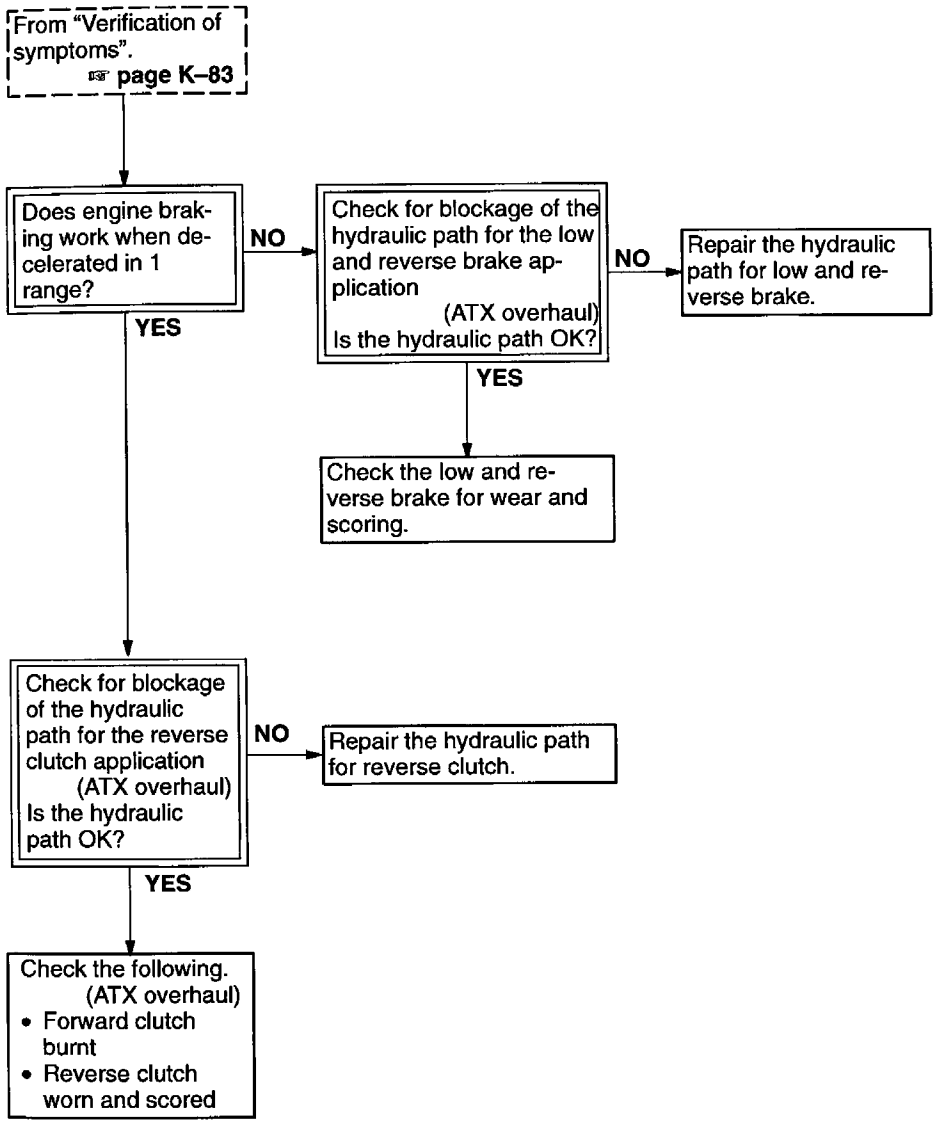


1–③ Vehicle does not move in R position

Troubleshooting hints

- Low and reverse brake slipping
- Reverse clutch slipping
- Forward clutch burnt

Troubleshooting flow

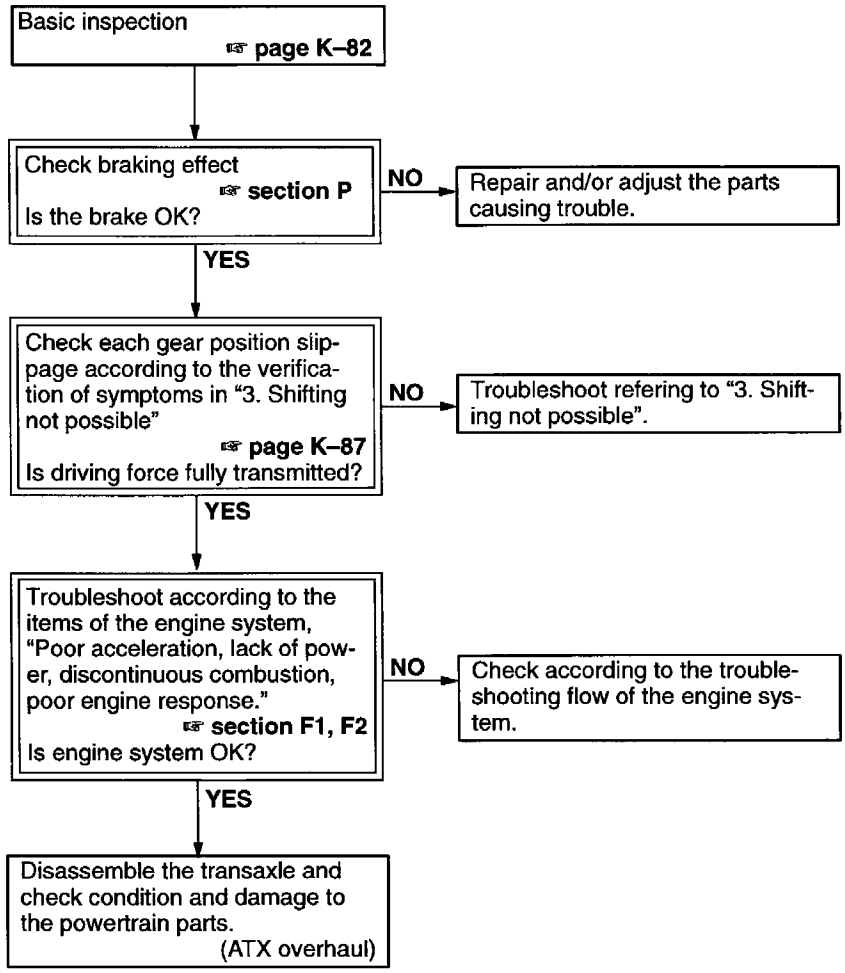


2	Poor acceleration

Troubleshooting hints

- Causes involving "3. Shifting not possible"
- Trouble with the engine system
- Braking effect
- High resistance due to damage of the transaxle

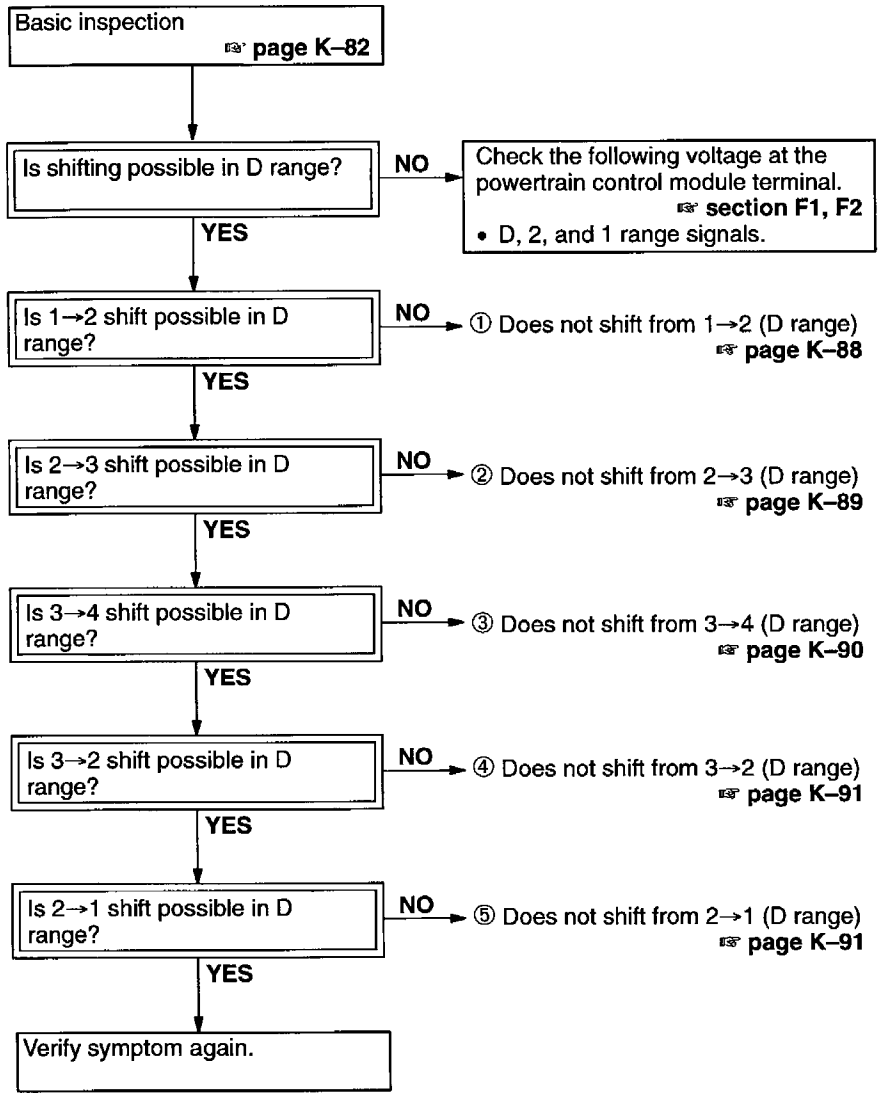
Troubleshooting flow



3	Shifting not possible

Verification of symptoms

- Use the flow chart below to quickly and accurately determine the symptom and its cause, then follow the appropriate troubleshooting procedures.
- Troubleshoot referring to road test (Refer to page K–8)

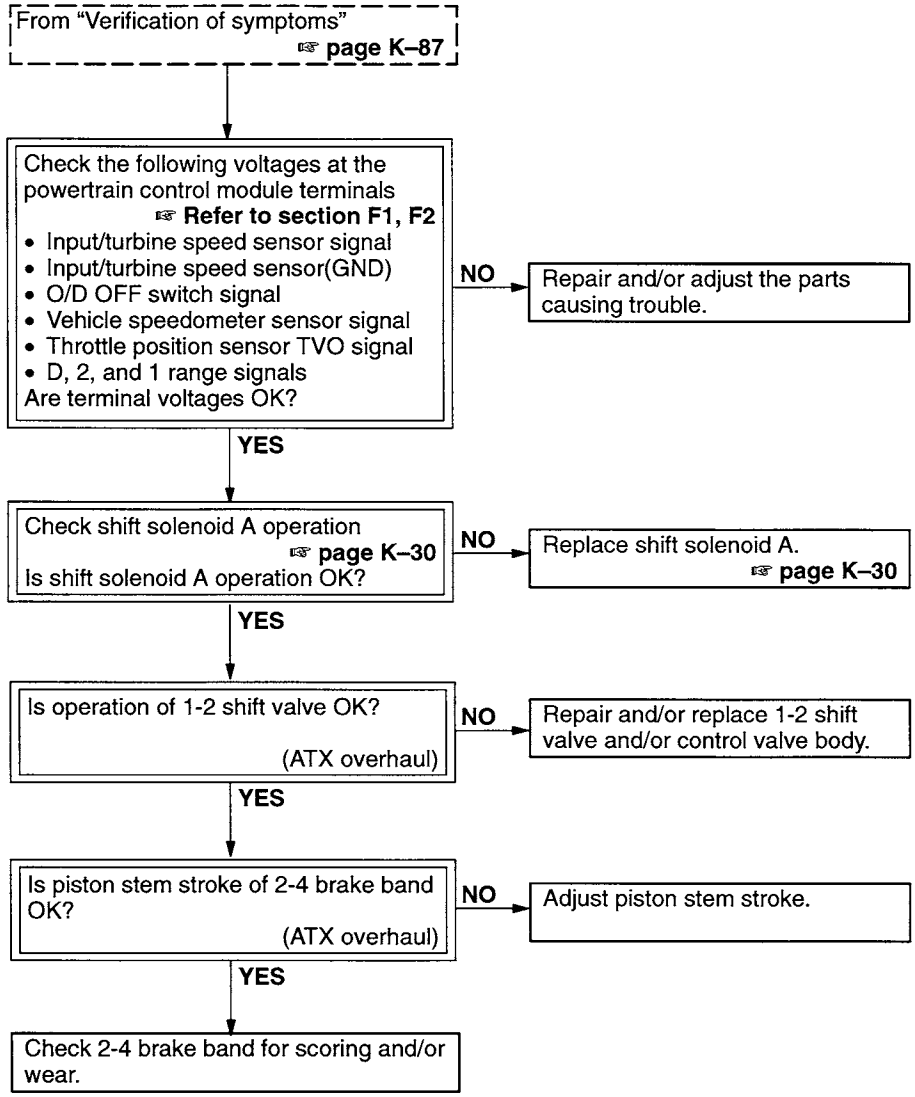


3–① Does not shift from 1→2 (D range)

Troubleshooting hints

- Malfunction of powertrain control module input signal
- No application of 2-4 brake band

Troubleshooting flow

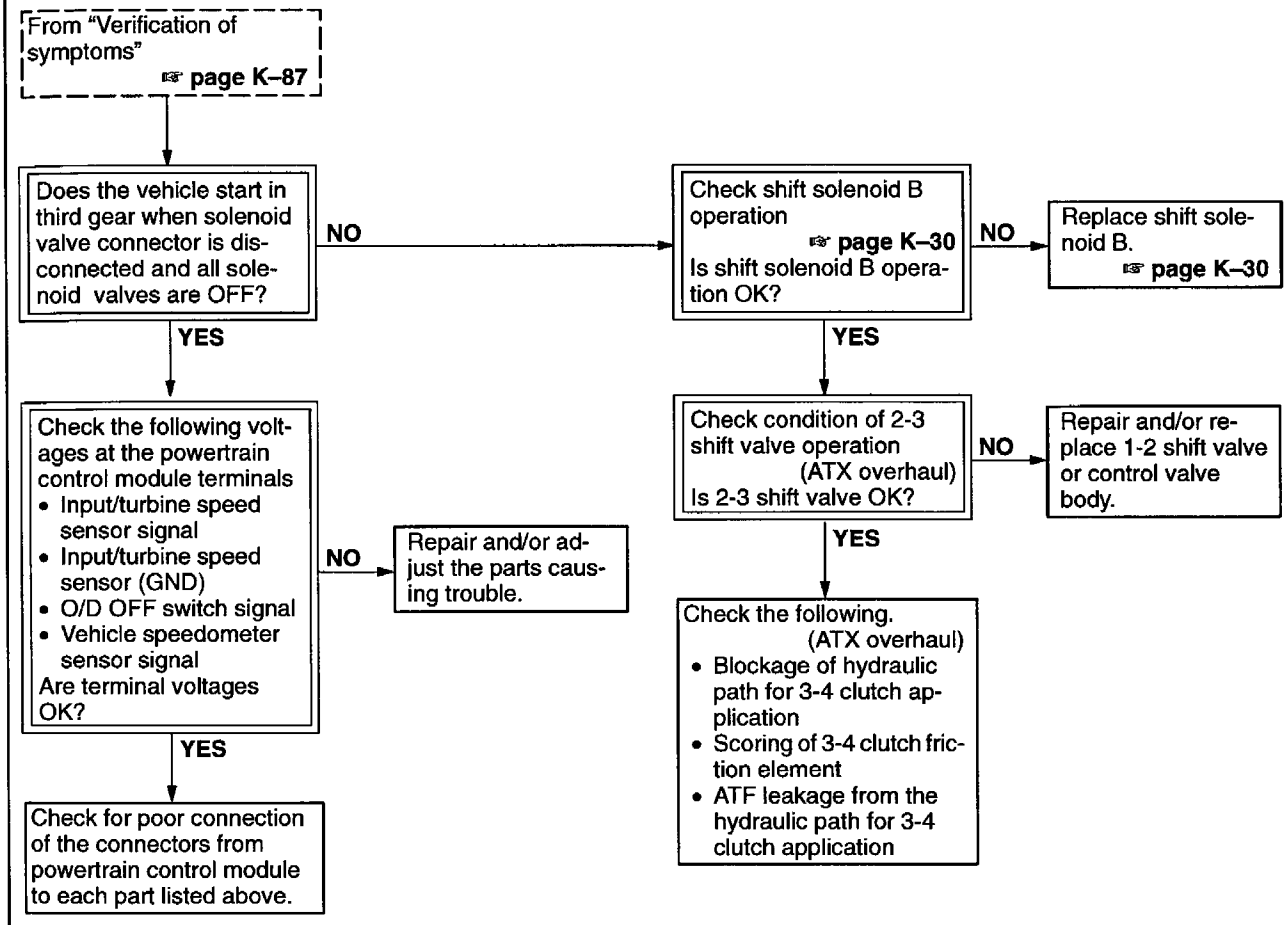


3–② Does not shift from 2→3 (D range)

Troubleshooting hints

- Malfunction of powertrain control module input signal
- No application of 3-4 clutch

Troubleshooting flow

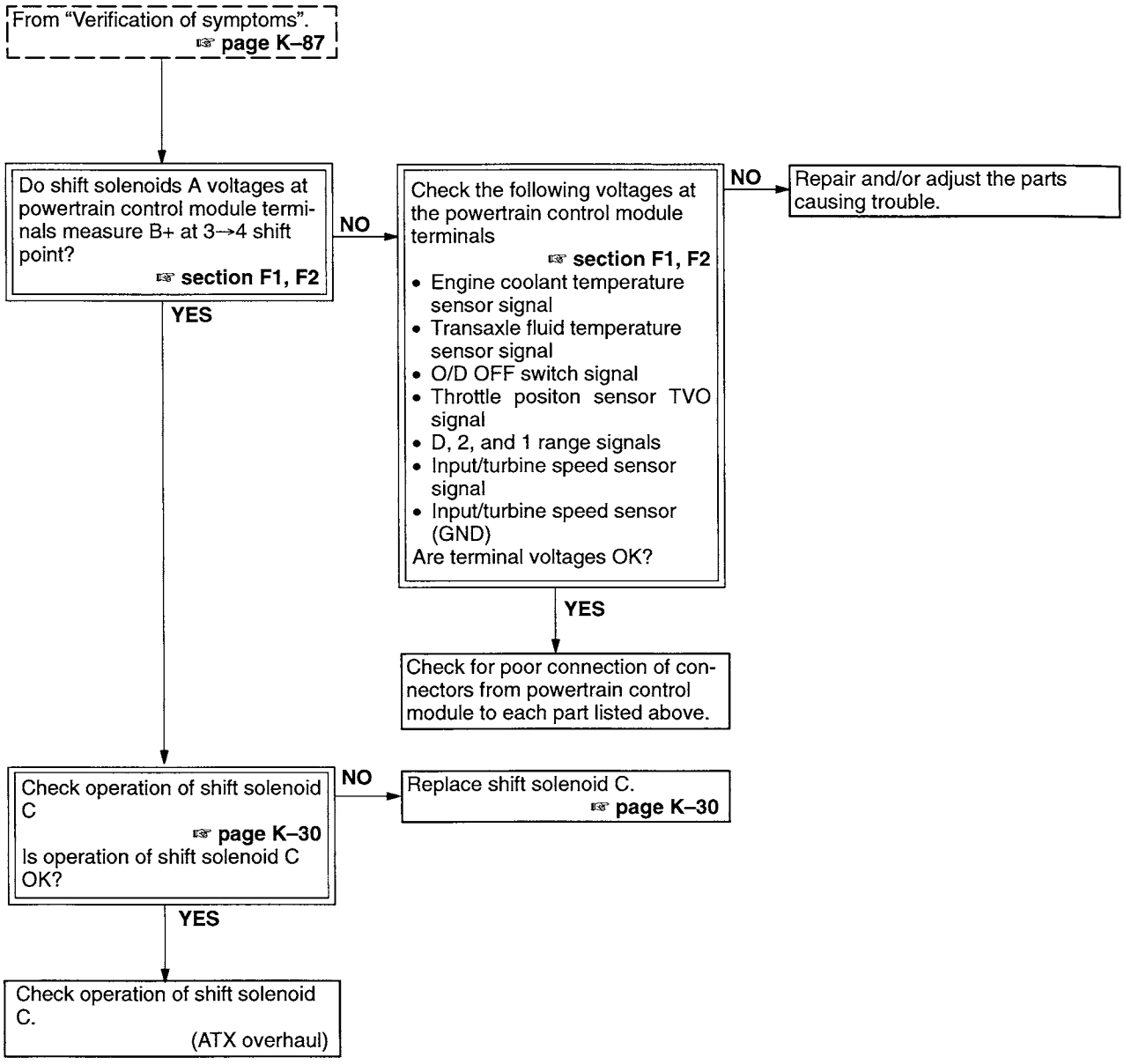


3–③	**Does not shift from 3→4 (D range)**

Troubleshooting hints

- No drainage of 2-4 brake band released pressure
- Powertrain control module judges that fourth gear shifting is not possible

Troubleshooting flow

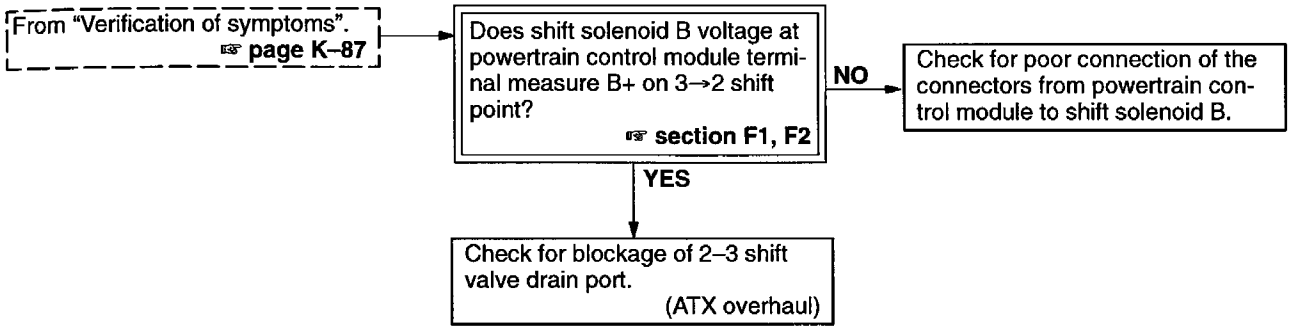


3– ④ Does not shift from 3→2 (D range)

Troubleshooting hints

- Constant application of 3-4 clutch

Troubleshooting flow

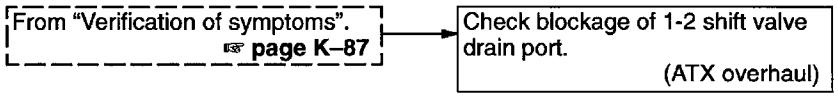


3– ⑤ Does not shift from 2→1 (D range)

Troubleshooting hints

- No drainage of 2-4 brake band applied pressure

Troubleshooting flow

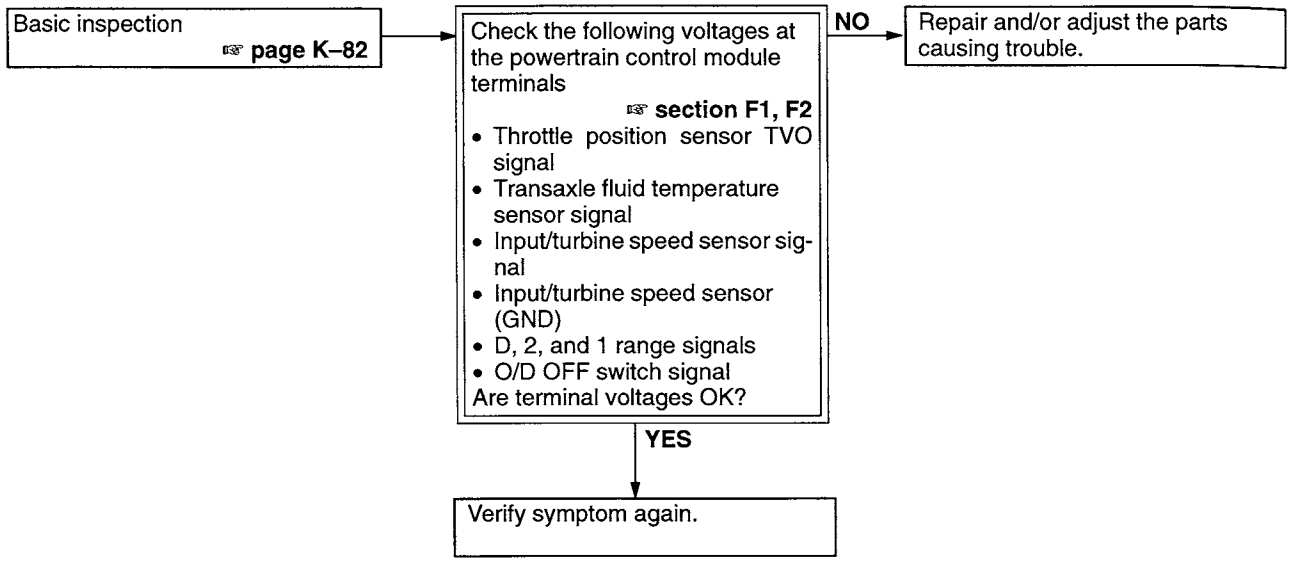


4	**Shift point high or low**

Troubleshooting hints

- Powertrain control module selects wrong mode

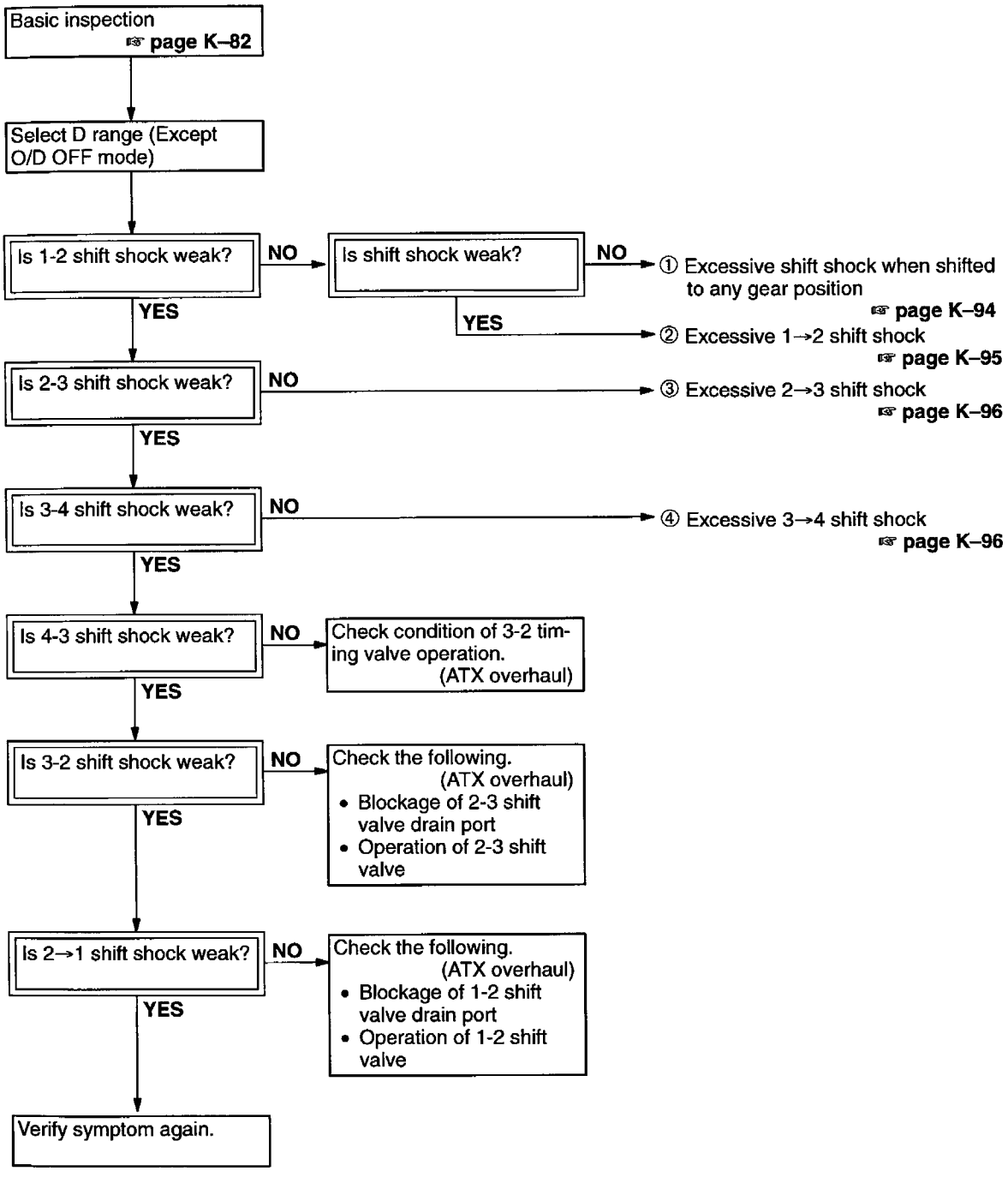
Troubleshooting flow



5	Excessive shift shock

Verification of symptoms

- Use the flow chart below to quickly and accurately determine the symptom and its cause, then follow the appropriate troubleshooting procedures.
- Troubleshoot referring to road test. (Refer to page K–8)

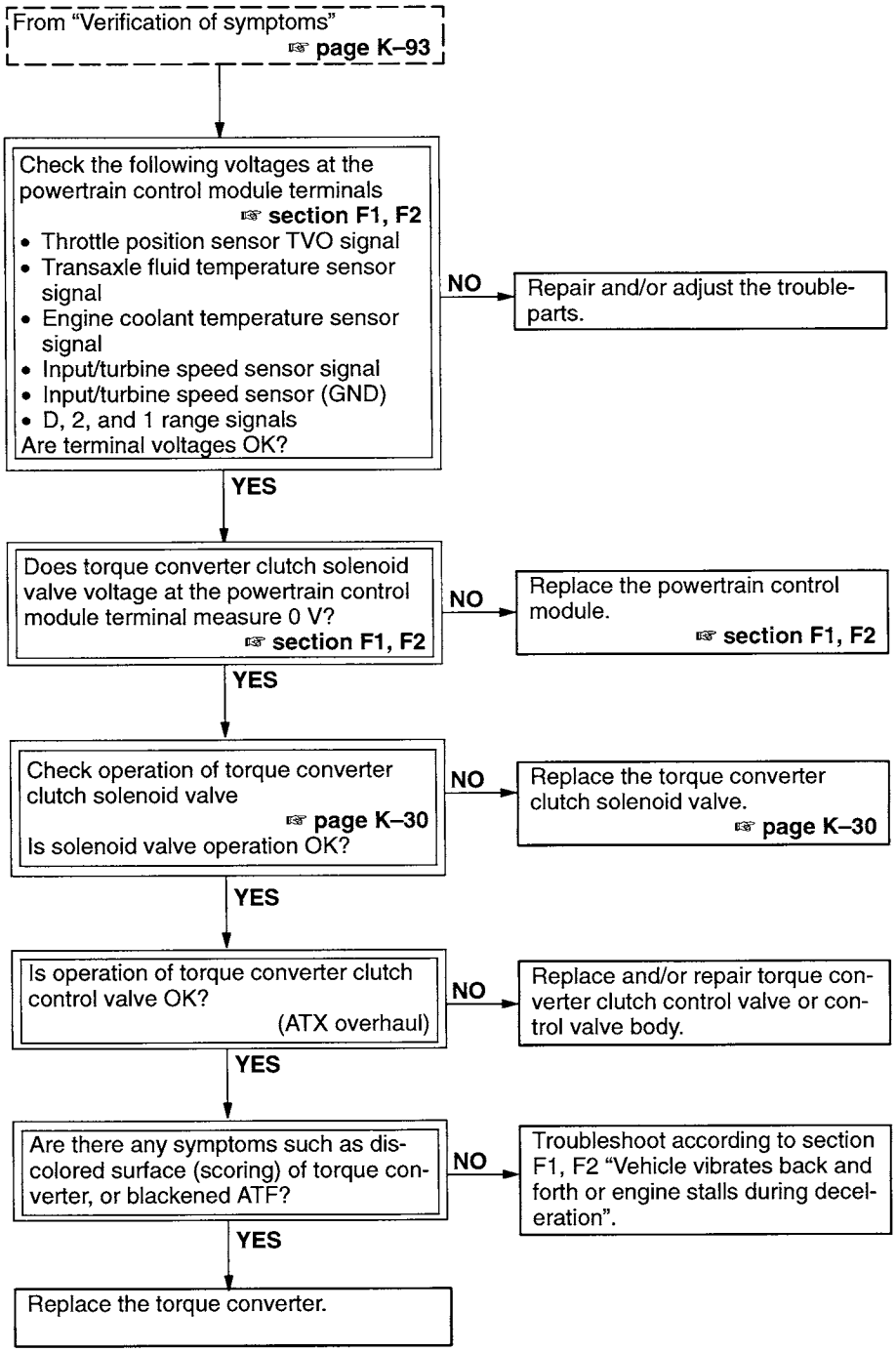


5–① Excessive shift shock when shifted to any gear position

Troubleshooting hints

- Powertrain control module input signal malfunction
- Torque converter clutch not released

Troubleshooting flow

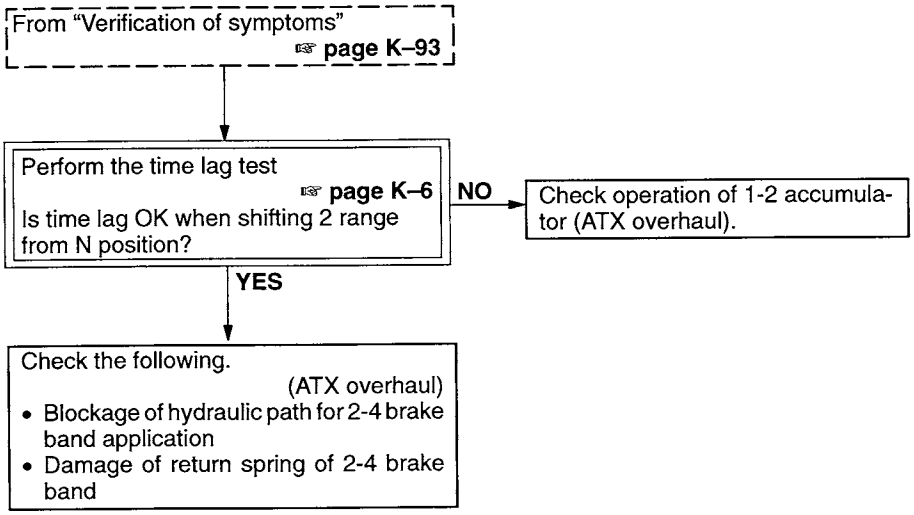


5– ② Excessive 1→2 shift shock

Troubleshooting hints

- Malfunction of 1-2 accumulator operation
- Blockage of hydraulic path for 2-4 brake application
- Damage to return spring of 2-4 brake band

Troubleshooting flow



5– ③ Excessive 2→3 shift shock

Troubleshooting hints

- Malfunction of 2-3 accumutator operation
- Malfunction of bypass valve
- Late release of 2-4 brake band
- Early/late release of 3-4 clutch application
- 3-4 clutch worn and/or scored

Troubleshooting flow

From "Verification of symptoms" ☞ page K–93 → Check the following. (ATX overhaul)

- Operation of 2-3 accumulator
- Bypass valve
- Blockage of hydraulic path for 2-4 brake band release
- 3-4 clutch worn and/or scored
- Damage to 3-4 clutch return spring
- Blockage of hydraulic path for 3-4 clutch application

5– ④ Excessive 3→4 shift shock

Troubleshooting hints

- Late drainage of 2-4 brake band pressure
- 2-4 brake band worn and/or scored

Troubleshooting flow

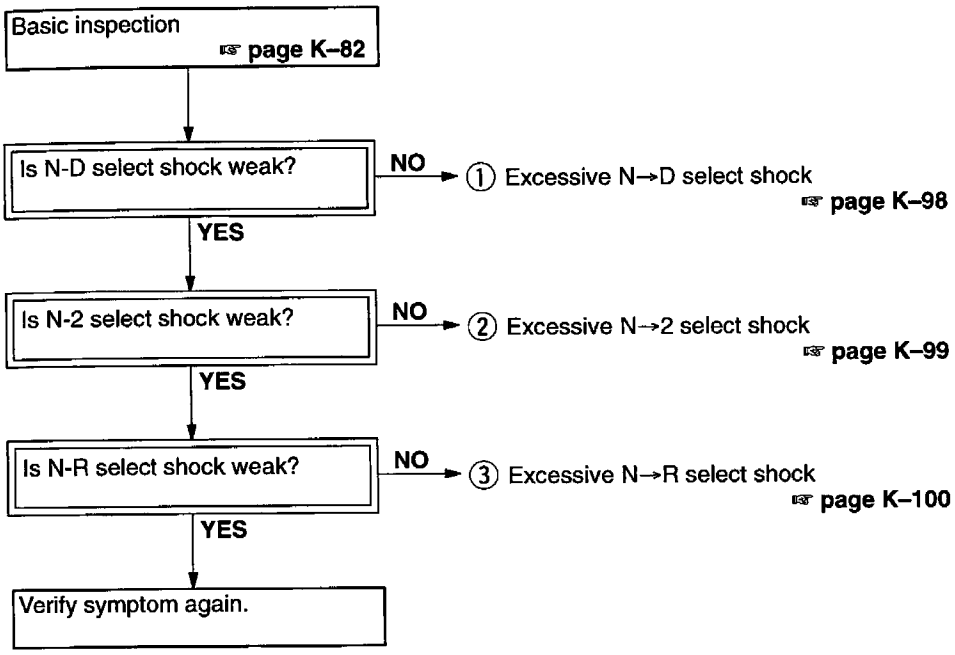
From "Verification of symptoms" ☞ page K–93 → Check the following. (ATX overhaul)

- Blockage of 3-4 shift valve drain port
- Operation of 3-4 shift valve
- 2-4 brake band for wear and/or scoring

6	Excessive select shock

Verification of symptoms

- Use the flow chart below to quickly and accurately determine the symptom and its cause, then follow the appropriate troubleshooting procedures.

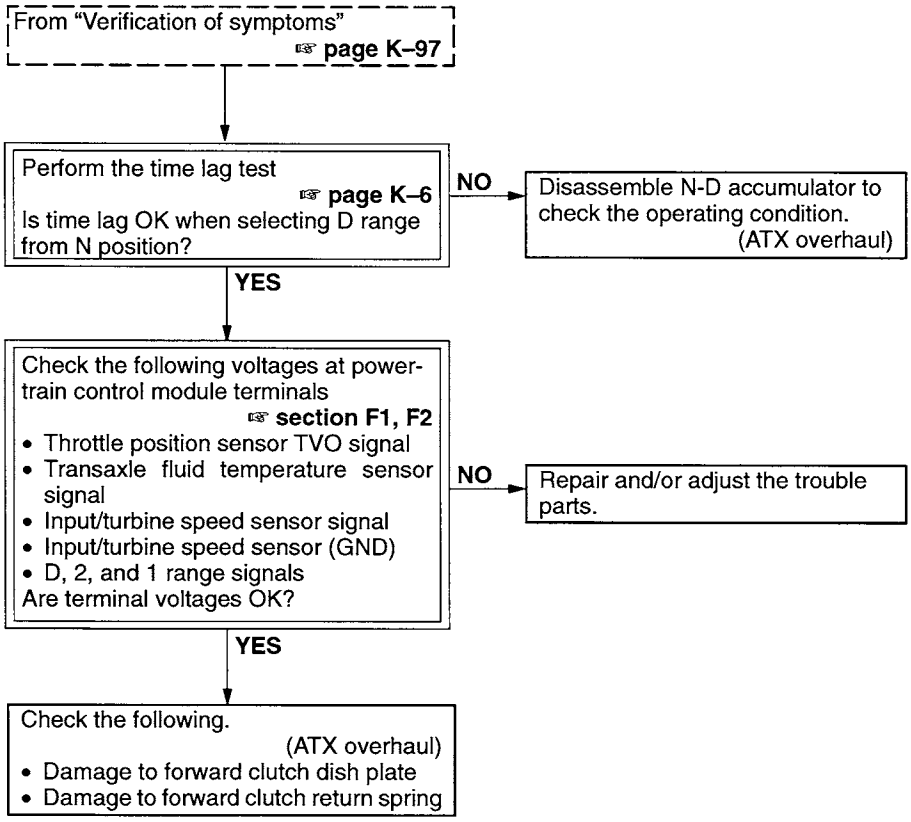


6– ① Excessive N→D select shock

Troubleshooting hints

- Powertrain control module input signal malfunction
- Malfunction of N-D accumulator operation
- Damage to forward clutch dish plate
- Damage to forward clutch return spring

Troubleshooting flow

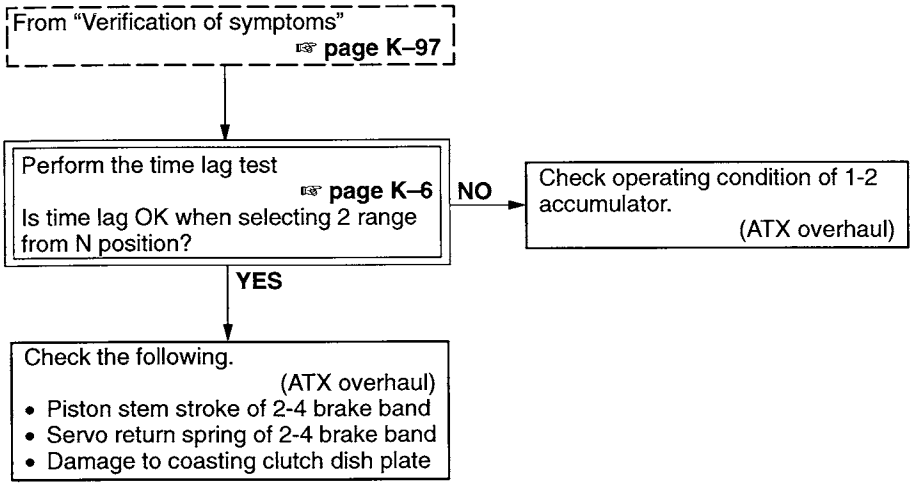


6– ② Excessive N→2 select shock

Troubleshooting hints

- Malfunction of 1-2 accumulator operation
- Piston stem short stroke of 2-4 brake band
- Damage to 2-4 brake band return spring
- Damage to coasting clutch dish plate.

Troubleshooting flow

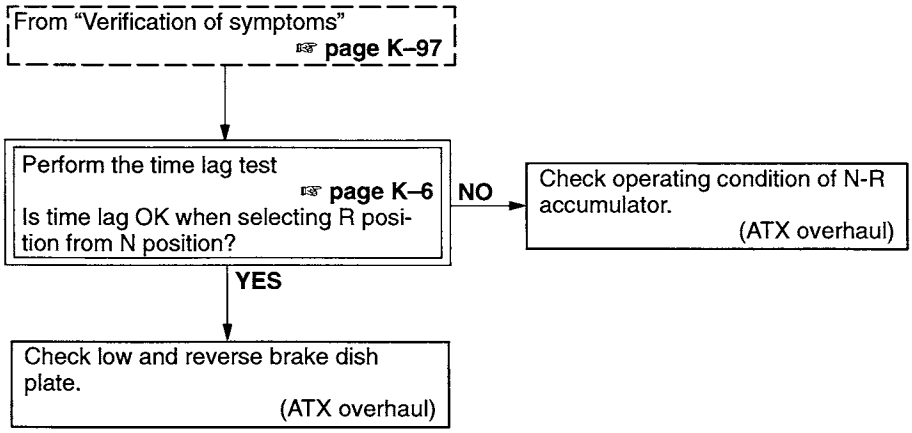


6– ③ Excessive N→R select shock

Troubleshooting hints

- Damage to low and reverse brake dish plate
- Malfunction of N-R accumulator operation

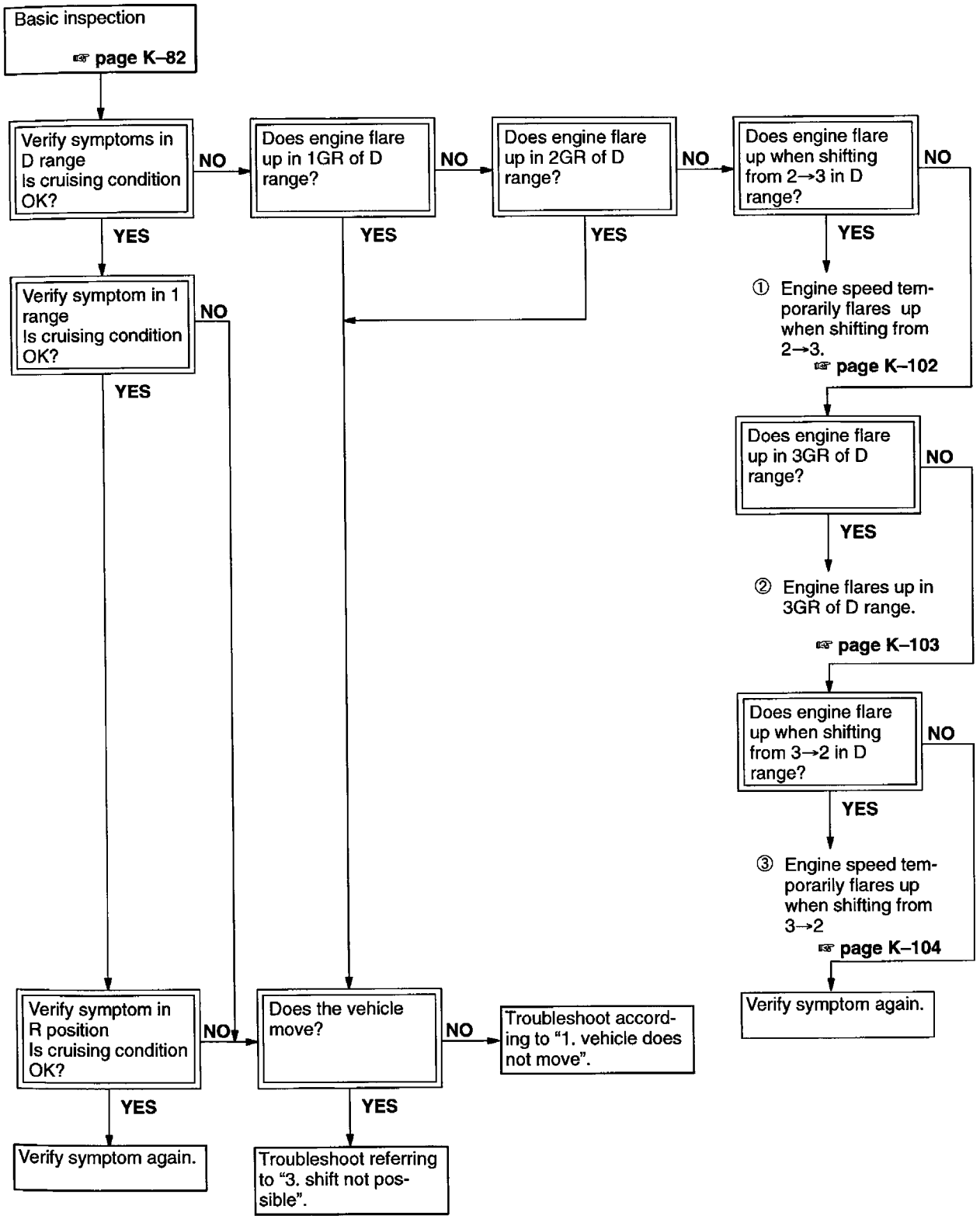
Troubleshooting flow



7 Engine speed flares up

Verification of symptoms

- Use the flow chart below to quickly and accurately determine the symptom and its cause, then follow the appropriate troubleshooting procedures.
- Troubleshoot referring to road test (Refer to page K–8)

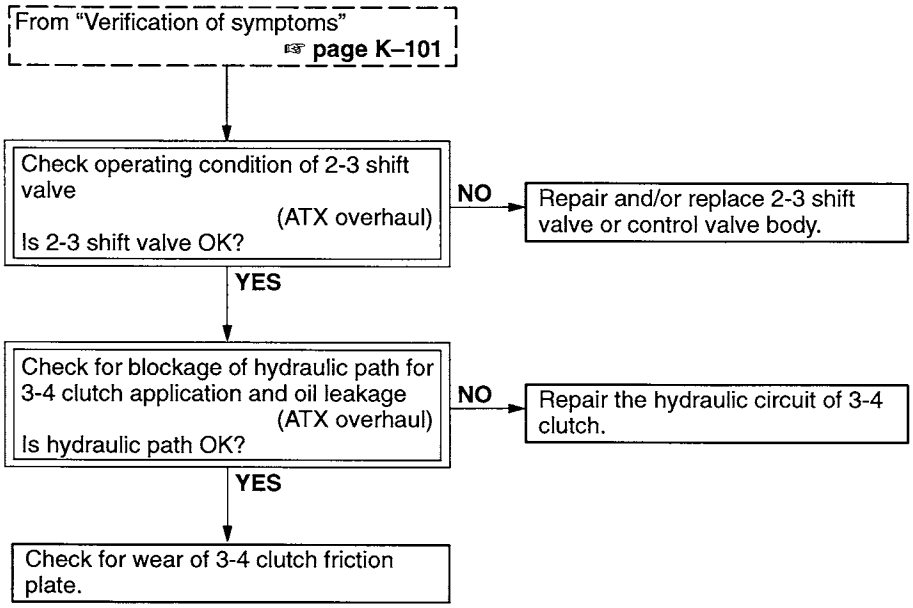


7– ① Engine speed temporarily flares up when shifting from 2→3

Troubleshooting hints

- Late application of 3-4 clutch
- 3-4 clutch worn
- Malfunction of bypass valve operation

Troubleshooting flow

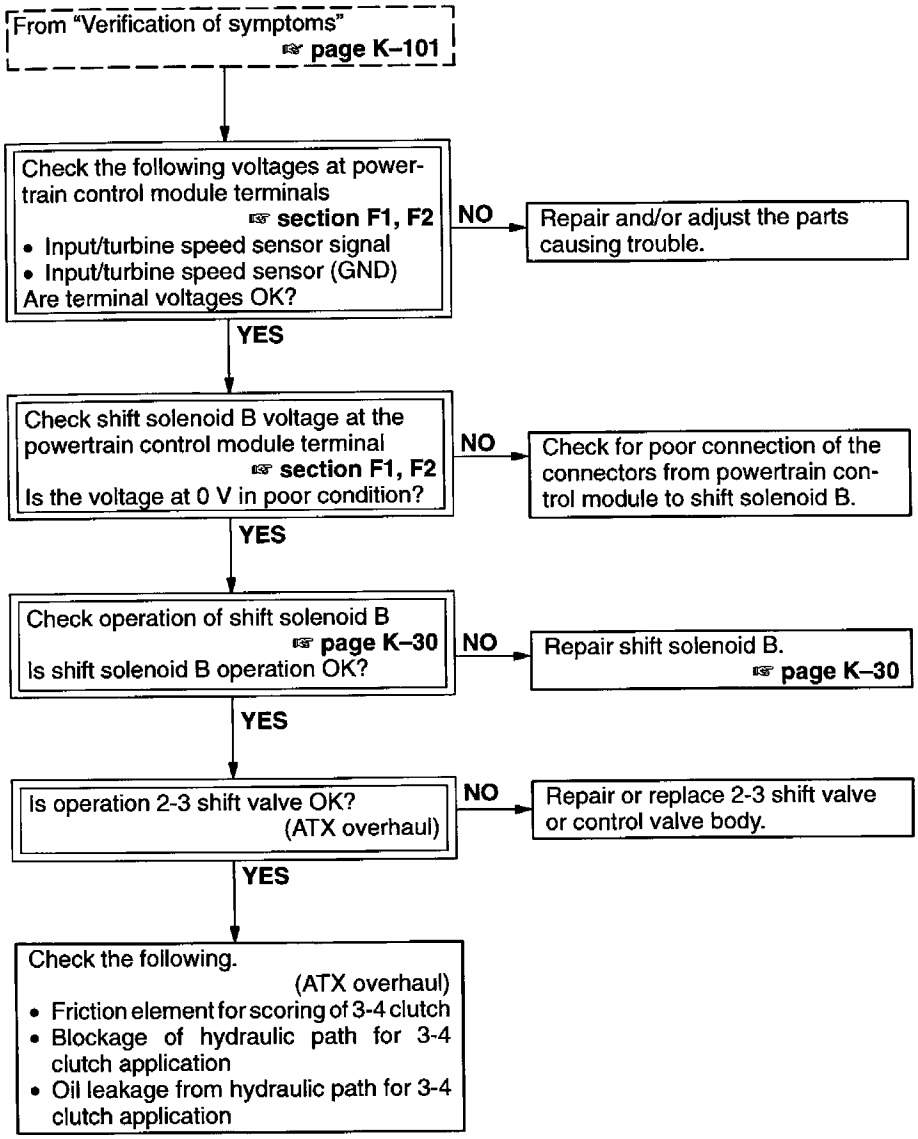


7– ② Engine speed flares up in 3GR of D and S range

Troubleshooting hints

- No application of 3-4 clutch (in first gear condition)

Troubleshooting flow

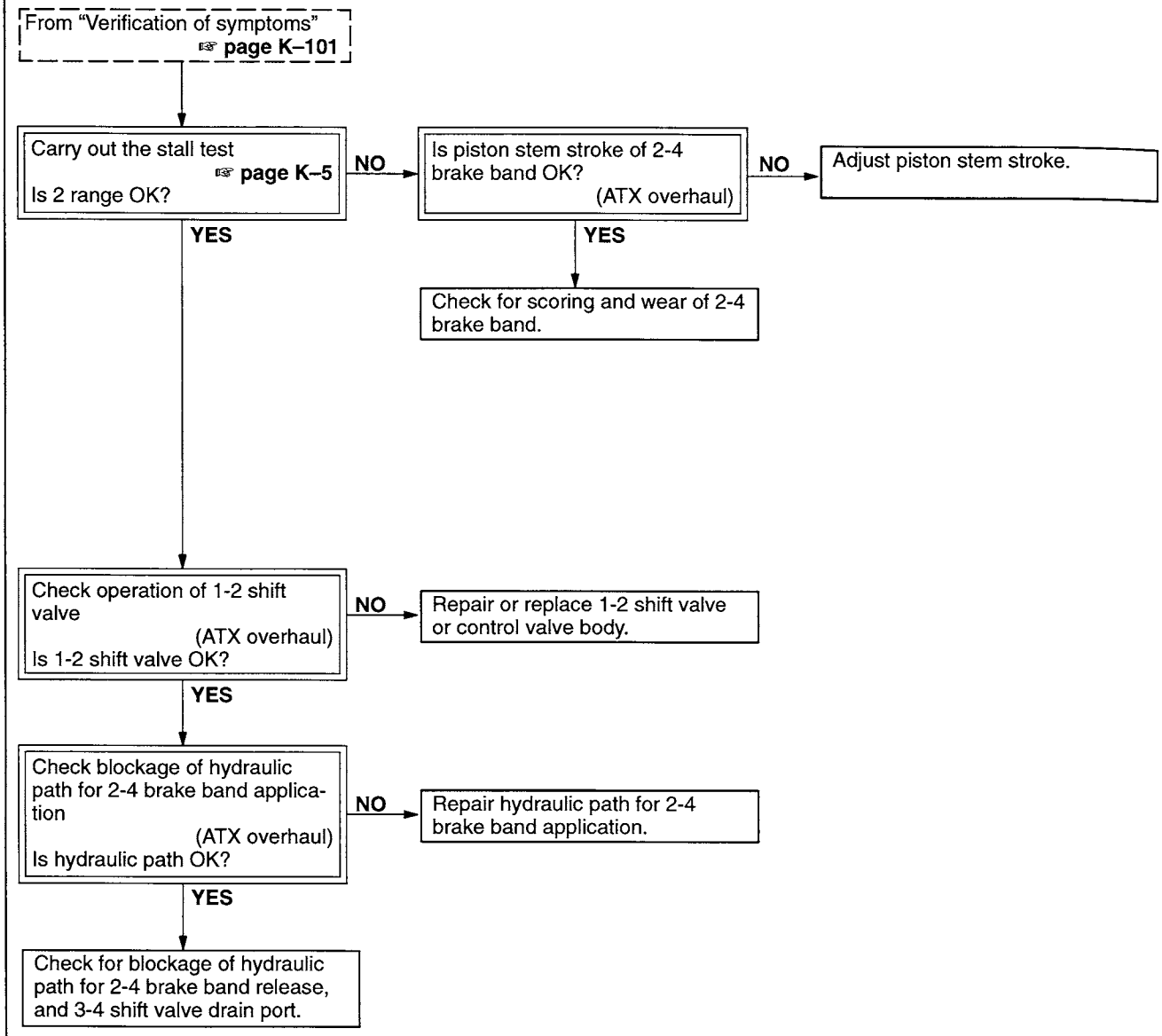


7– ③ Engine speed temporarily flares up when shifting from 3→2

Troubleshooting hints

- Late application of 2-4 brake band

Troubleshooting flow

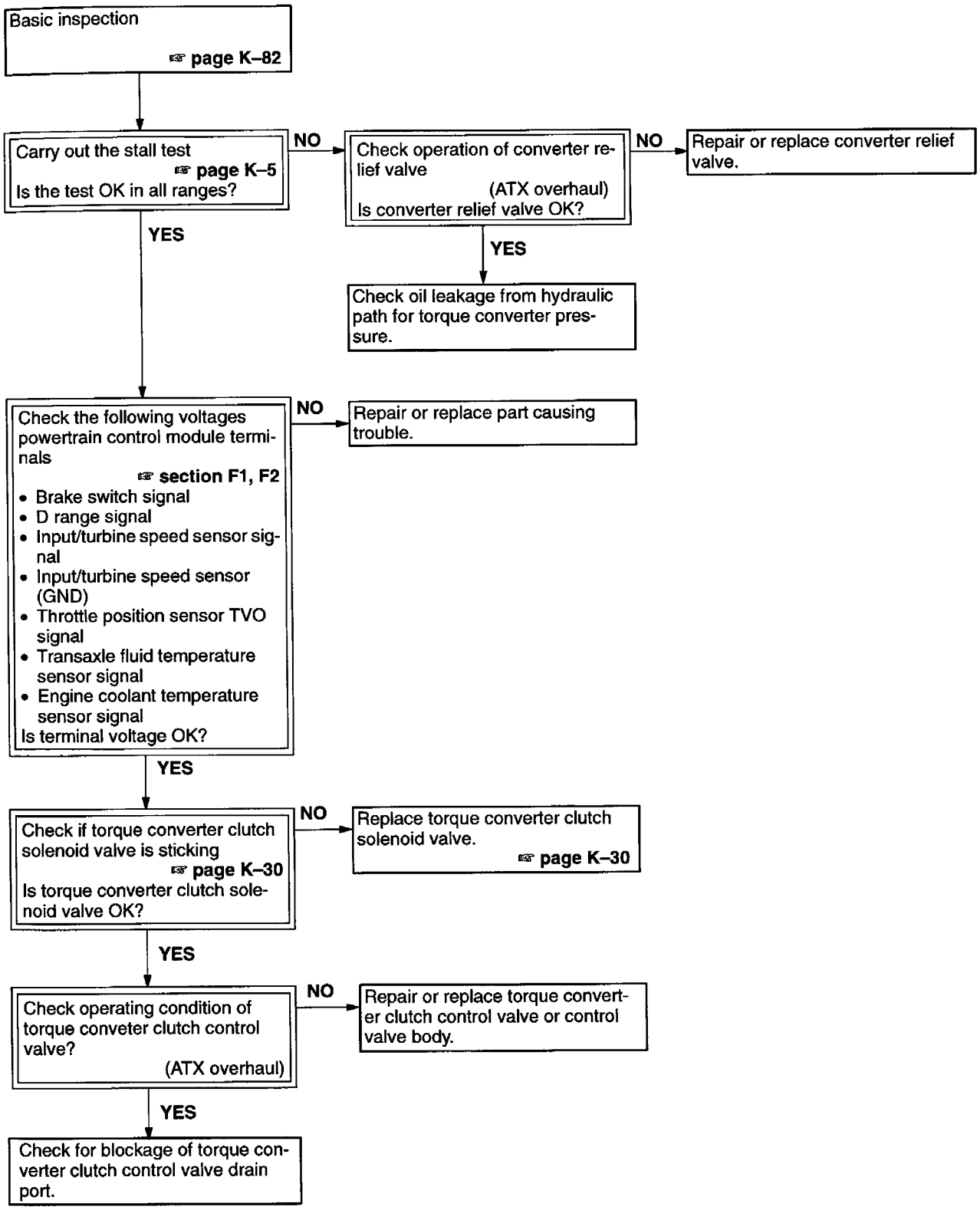


8 Torque converter clutch operation not possible

Troubleshooting hints

- Torque converter pressure low
- No application of torque converter clutch
- Transaxle control module inhibits torque converter clutch operation

Troubleshooting flow

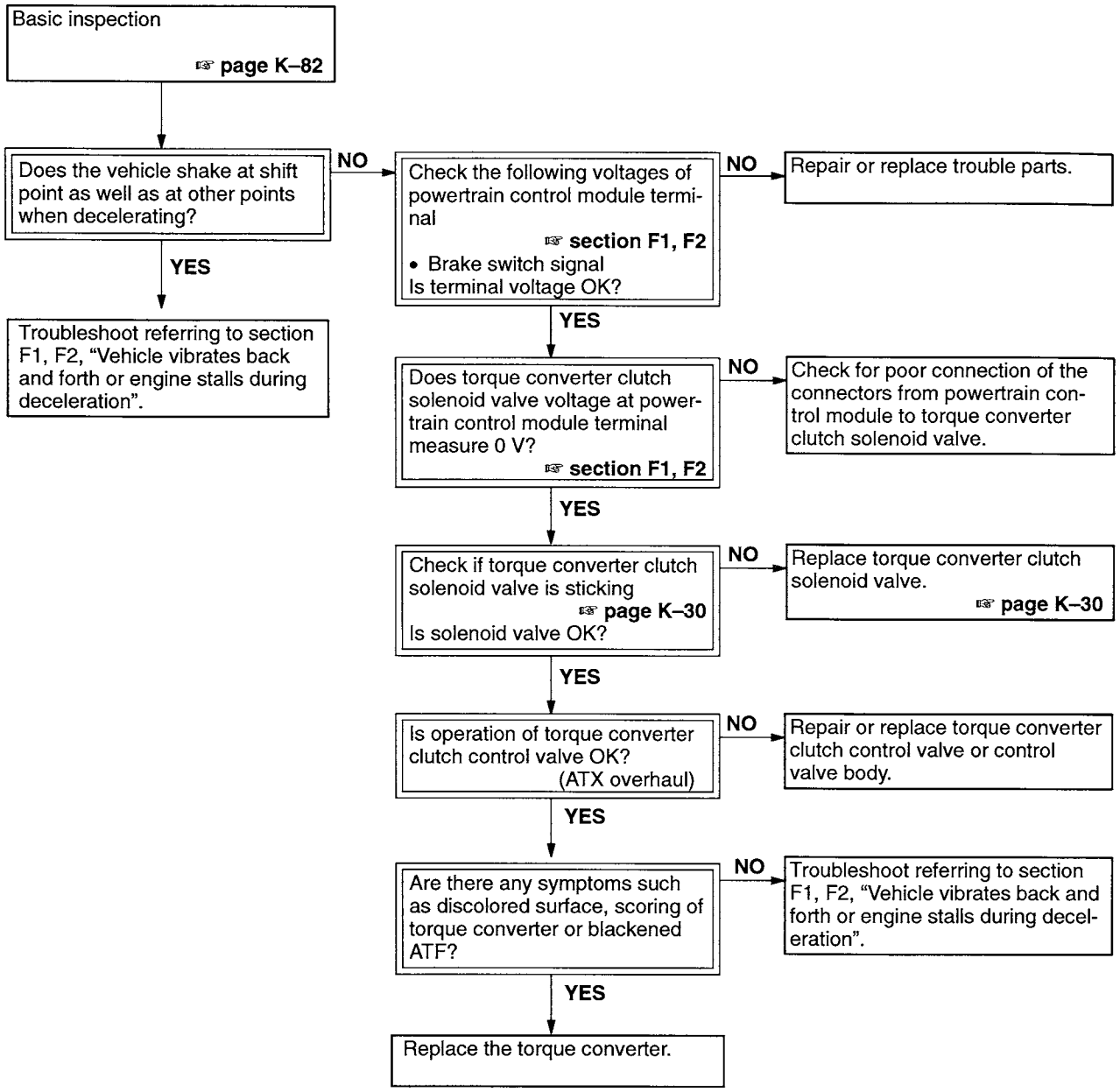


9	Engine stalls

Troubleshooting hints

- Constant application of torque converter clutch piston

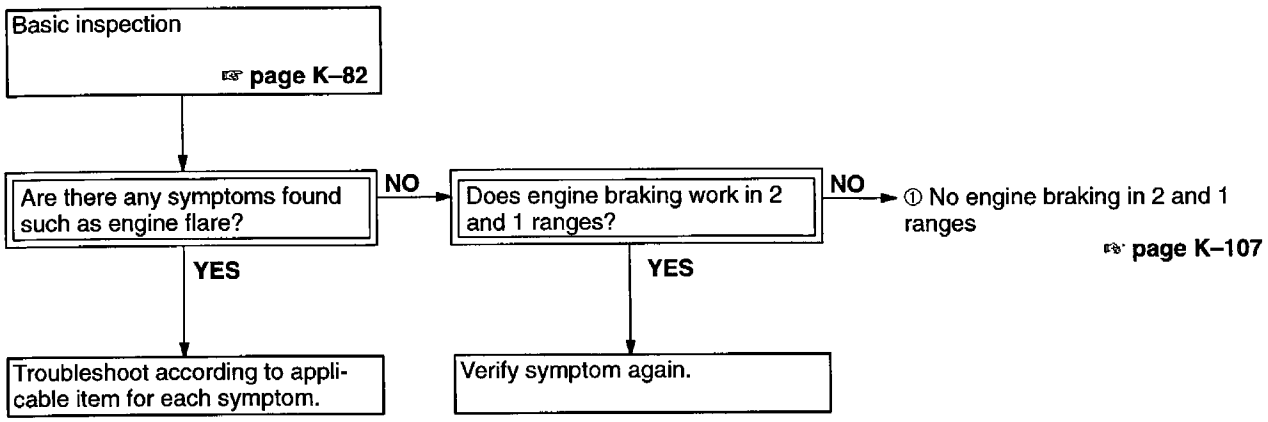
Troubleshooting flow



10 No engine braking

Verification of symptoms

Use the flowchart below to quickly and accurately determine the symptom and its cause, then follow the appropriate troubleshooting procedures.

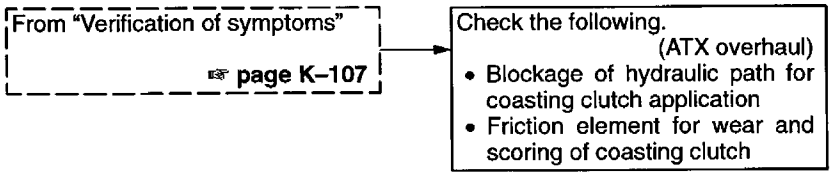


10– ① No engine braking in 2 and 1 ranges mode

Troubleshooting hints

- No application of coasting clutch

Troubleshooting flow

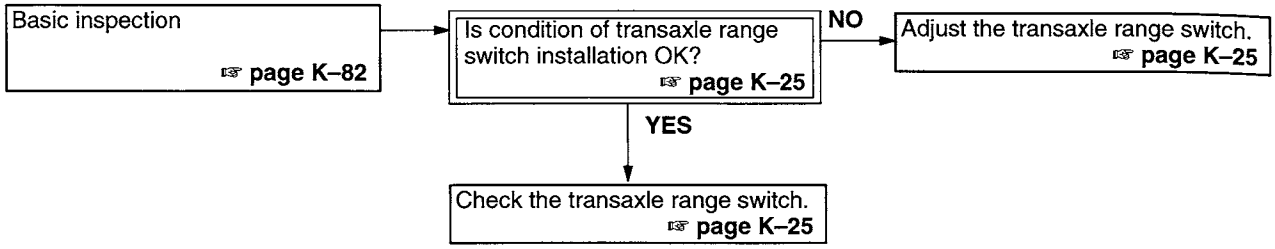


11	Will start in positions other than P or N positions

Troubleshooting hints

- Damage inside transaxle range switch

Troubleshooting flow

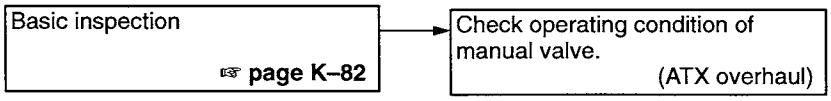


12	Vehicle moves in P or N position

Troubleshooting hints

- No transaxle of selector lever movement to manual valve

Troubleshooting flow



Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

FRONT AND REAR AXLES

OUTLINE ..... **M– 2**
SPECIFICATIONS ..... **M– 2**
GENERAL PROCEDURES ..... **M– 2**
FRONT AXLE ..... **M– 3**
PREPARATION ..... **M– 3**
WHEEL HUB, STEERING KNUCKLE ..... **M– 4**
REAR AXLE ..... **M– 9**
PREPARATION ..... **M– 9**
WHEEL HUB, HUB SPINDLE ..... **M– 9**
DRIVE SHAFT **M–13**
PREPARATION **M–13**
JOINT SHAFT **M–14**
DRIVE SHAFT **M–18**

OUTLINE

SPECIFICATIONS

Item \ Engine / Transaxle			Z5		BP	
			MTX	ATX	MTX	ATX
Front axle						
Wheel bearing type			Angular ball bearing			
Maximum wheel bearing play	mm { in }		0.05 { 0.002 }			
Rear axle						
Wheel bearing type			Unitized angular ball bearing			
Maximum wheel bearing play	mm { in }		0.05 { 0.002 }			
Drive shaft						
Joint type		Wheel side	Bell joint			
		Differential side	Tripod joint			
Length of joint (Between center of joint)	mm { in }	Right side	380.5 { 14.98 }		429.9 { 16.93 }	
		Left side	397.5 { 15.65 }	393.5 { 15.49 }	372.4 { 14.66 }	390.3 { 15.37 }
Shaft diameter	mm { in }	Right side	23 { 0.91 }			
		Left side				
Length of joint shaft	mm { in }		372.4 { 14.66 }	375.4 { 14.78 }	339.6 { 13.37 }	326.9 { 12.87 }
Joint shaft diameter			26 { 1.0 }			

GENERAL PROCEDURES

Removal / Installation, Disassembly / Assembly

- The numbers in the structural view indicate the removal and disassembly order. For installation and assembly, follow the reverse order.

Wheels and tires

- The removal and installation procedures for the wheels and tires are not mentioned in this section. If you must remove a wheel, retighten it to **89—127 N·m { 9.0—13.0 kgf·m , 66—94 ft·lbf }**.

Brake lines

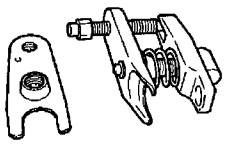
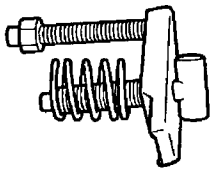
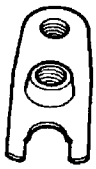
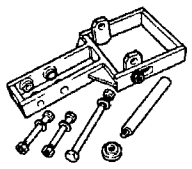
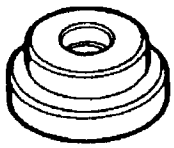
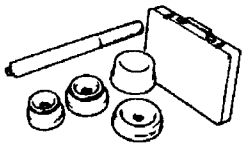
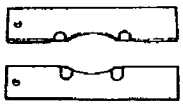
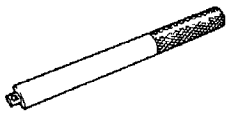
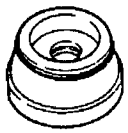
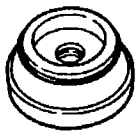
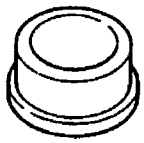
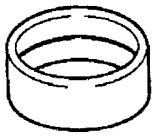
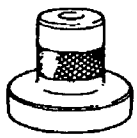
Caution

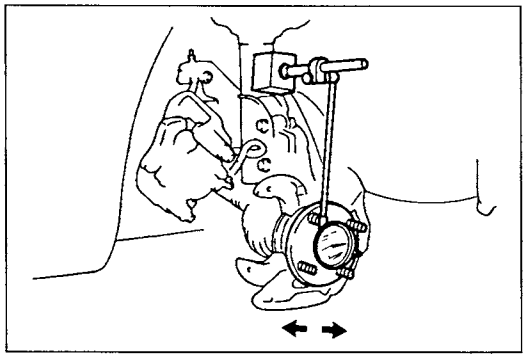
- **Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.**

- Tighten the brake pipe flare nut by using the **SST** (49 0259 770B). Be sure to modify the brake pipe flare nut tightening torque to allow for use of a torque wrench-SST combination.
  (Refer to section GI "Torque Formulas".)
- If a brake line(s) has been disconnected anytime during the procedure, add brake fluid, bleed the brakes, and inspect for leakage after the procedure has been completed.

FRONT AXLE

PREPARATION
SST

49 T028 3A0 Puller set, ball joint 	For removal of hub bolt	49 T028 303 Body (Part of 49 T028 3A0) 	For removal of hub bolt
49 T028 304 Attachment (Part of 49 T028 3A0) 	For removal of hub bolt	49 B026 1A0 Puller set, wheel hub 	For removal of wheel bearing
49 G033 102 Handle (Part of 49 B026 1A0) 	For removal of wheel hub	49 G030 727 Attachment (Part of 49 B026 1A0) 	For removal of wheel hub
49 F027 0A1 Installer set, bearing 	For installation of wheel hub assembly and wheel bearing	49 F026 103 Puller, wheel hub 	For removal of wheel hub
49 F027 003 Handle (Part of 49 F027 0A1) 	For removal of front bearing	49 F027 005 Attachment 62 (Part of 49 F027 0A1) 	For removal of wheel bearing
49 F027 007 Attachment 72 (Part of 49 F027 0A1) 	For installation of wheel bearing	49 F027 009 Attachment 68 & 77 (Part of 49 F027 0A1) 	For installation of wheel bearing
49 E033 101 Installer, dust cover 	For installation of dust cover	49 V001 795 Installer, oil seal 	For installation of oil seal



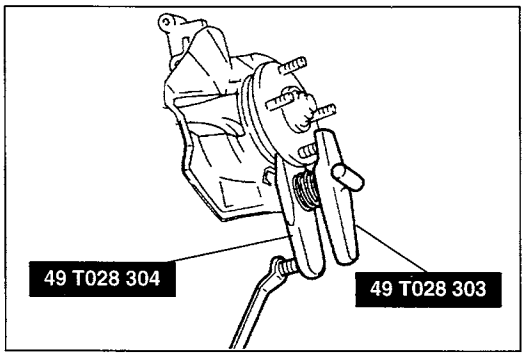
WHEEL HUB, STEERING KNUCKLE

Preinspection

Wheel bearing play

1. Remove the brake caliper assembly and disc plate.
2. Position a dial indicator against the wheel hub. Push and pull the wheel hub by hand in the axial direction and measure the wheel bearing play.
3. If the bearing play exceeds the specification, check and adjust the locknut torque or replace the wheel bearing if necessary. (Refer to page M–5.)

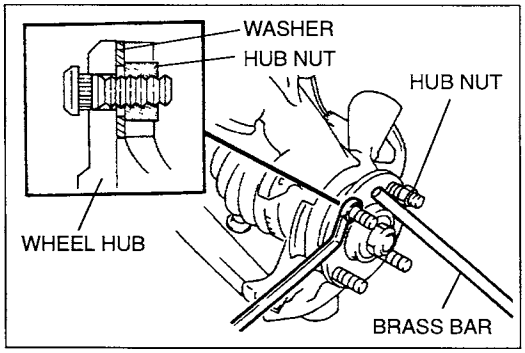
Max. wheel bearing play: 0.05 mm { 0.002 in }



On-vehicle service

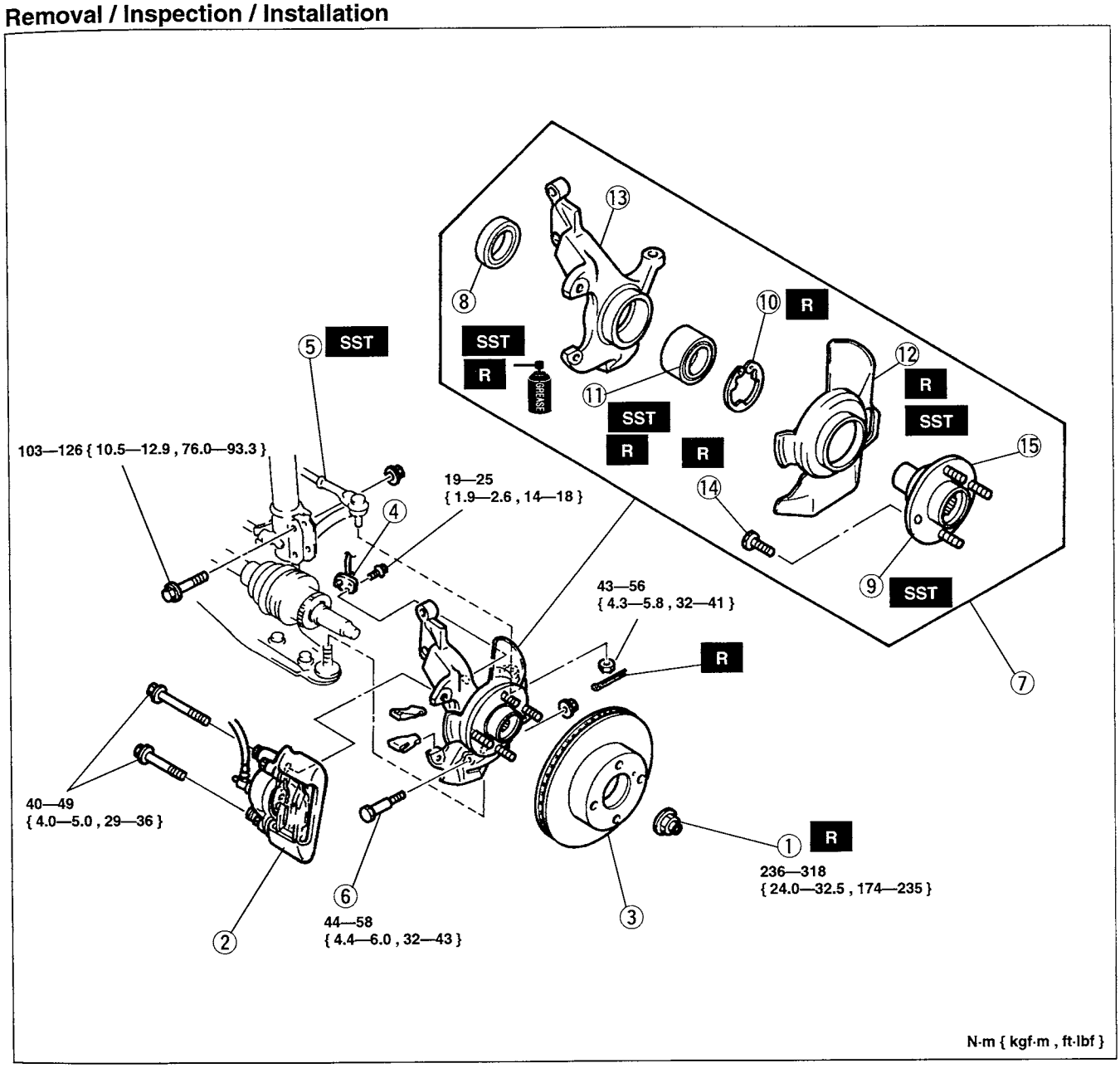
Wheel hub bolt replacement

1. Remove the hub bolt by using the **SSTs**.

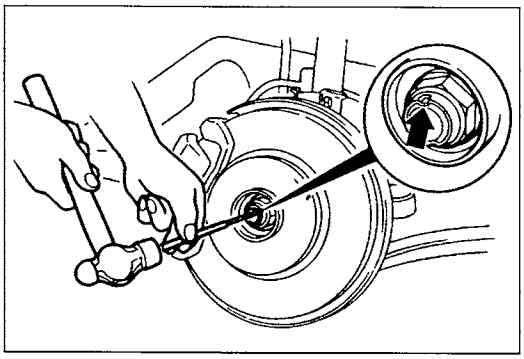


2. As shown in the figure, install the hub bolt into the wheel hub and set a washer and hub nut in the hub bolt.
3. Tighten the hub nut while holding the wheel hub by using the brass bar.

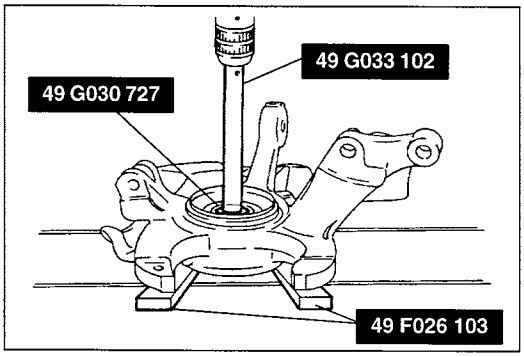
Removal / Inspection / Installation



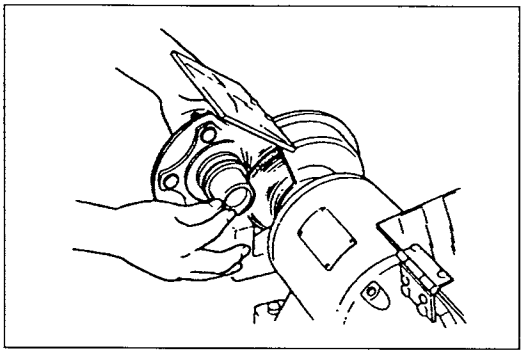
1. Locknut
   - Removal Note ..... page M–6
   - Installation Note ..... page M–8
2. Brake caliper assembly
   - Service ..... section P
3. Disc plate
   - Service ..... section P
4. ABS wheel-speed sensor
   - Service ..... section P
5. Tie-rod end
   - Service ..... section N
6. Lower arm ball joint bolt
7. Front wheel hub, steering knuckle
   - Inspect wheel hub for damage and rough rotation
8. Oil seal
   - Installation Note ..... page M–8
9. Wheel hub assembly
   - Removal Note ..... page M–6
   - Installation Note ..... page M–8
10. Snap ring
11. Wheel bearing
    - Removal Note ..... page M–6
    - Installation Note ..... page M–7
12. Dust cover
    - Removal Note ..... page M–6
    - Installation Note ..... page M–7
13. Steering knuckle
    - Inspect for cracks and damage
14. Hub bolt
    - Removal Note ..... page M–7
    - Installation Note ..... page M–7
15. Wheel hub



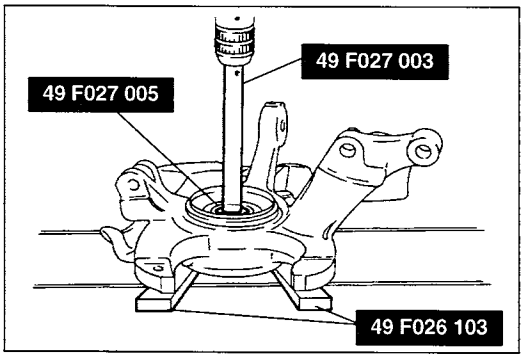
Removal note
Locknut
1. Raise the staked portion of the locknut by using a chisel.
2. Lock the hub by applying the brakes.
3. Remove the locknut.



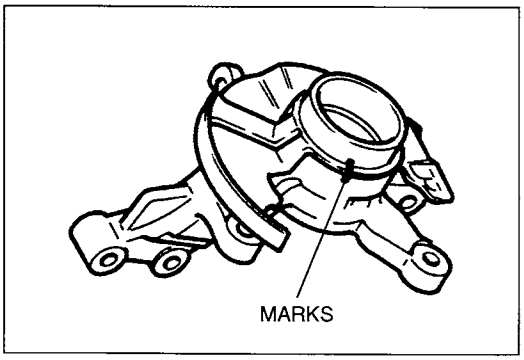
Wheel hub assembly
1. Remove the front wheel hub assembly by using the **SSTs**.



2. If the bearing inner race remains on the front wheel hub assembly, grind a section of the bearing inner race until approximately **0.5 mm { 0.02 in }** remains. Then remove it by using a chisel.



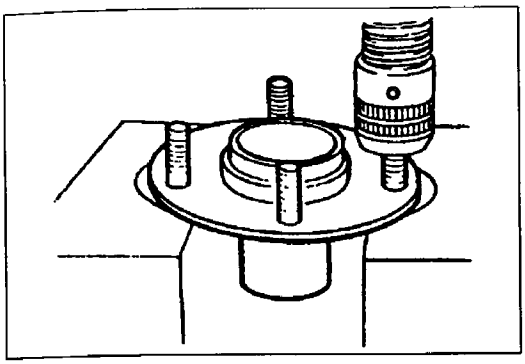
Wheel bearing
Press out the wheel bearing by using the **SSTs**.



Dust cover

Note
- The dust cover does not need to be removed unless you are replacing it.

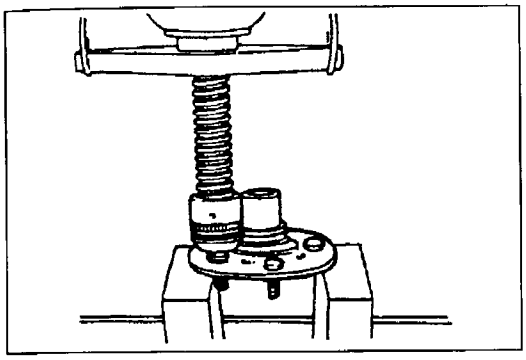
1. Mark the dust cover and steering knuckle for proper reassembly.
2. Remove the dust cover by using a chisel.



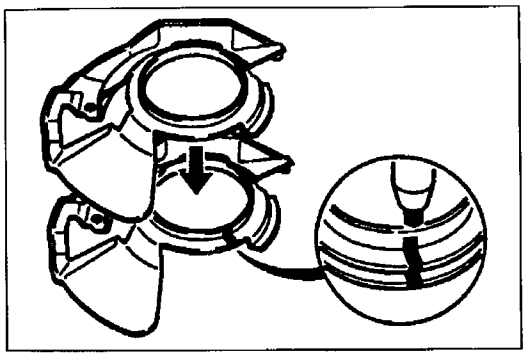
Hub bolt

Note
- The hub bolts do not need to be removed unless you are replacing them.

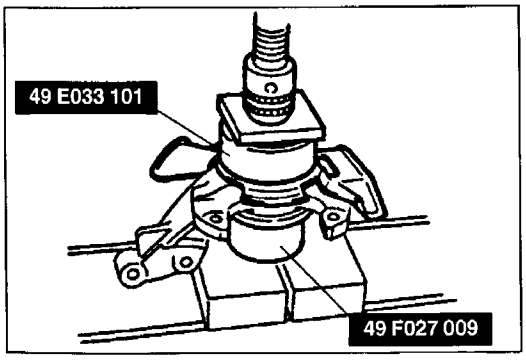
Press out the hub bolts.



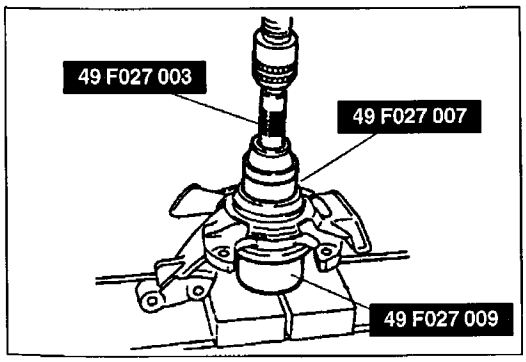
Installation note
Hub bolt
Press in new hub bolts.



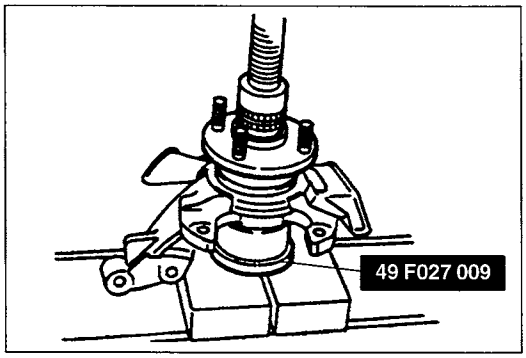
Dust cover
1. Mark the new dust cover in the same manner as the one removed.



2. Align the marks of the new dust cover and the steering knuckle.
3. Press in the dust cover by using a steel plate and the **SSTs**.

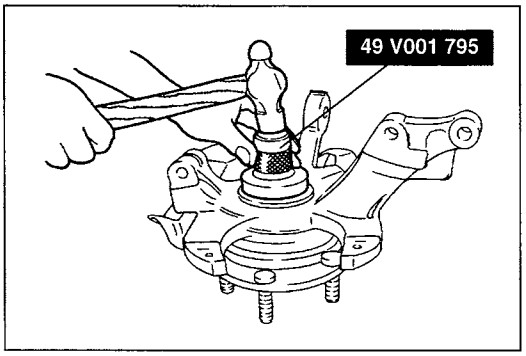


Wheel bearing
Press in the new wheel bearing by using the **SSTs**.



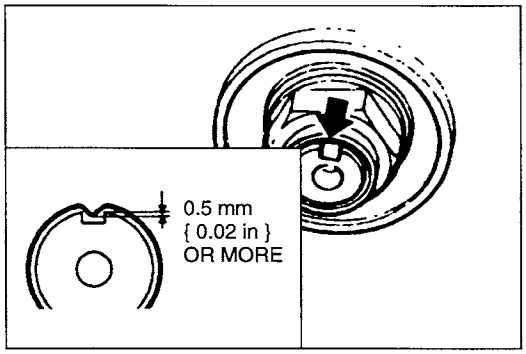
Wheel hub assembly

Press in the front wheel hub assembly by using the **SST**.



Oil seal

1. Using the **SST** and a hammer, tap a new oil seal in evenly until the **SST** contacts the steering knuckle.
2. Coat the lip of the oil seal with grease.



Locknut

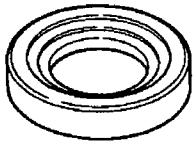
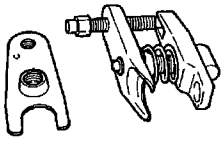
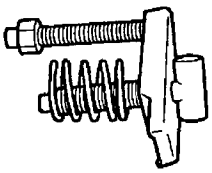
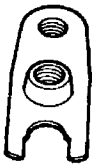
Install a new locknut and stake it as shown.

Tightening torque

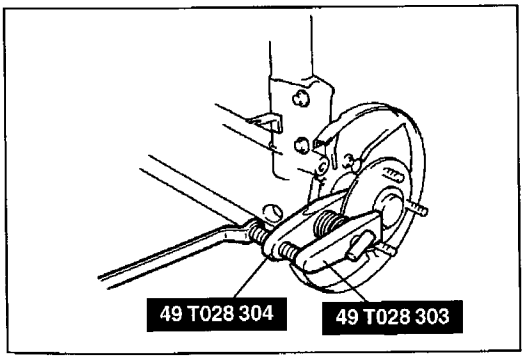
Front: 236—318 N·m
{ 24.0—32.5 kgf·m , 174—235 ft·lbf }
Rear: 177—235 N·m
{ 18.0—24.0 kgf·m , 131—173 ft·lbf }

REAR AXLE

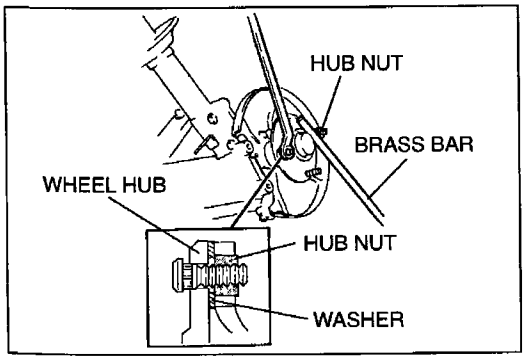
PREPARATION
SST

49 B026 103 Installer, sensor rotor 	For installation of ABS sensor rotor	49 0259 770B Wrench, flare nut 	For removal of brake pipe
49 T028 3A0 Puller set, ball joint 	For removal of hub bolt	49 T028 303 Body (Part of 49 T028 3A0) 	For removal of hub bolt
49 T028 304 Attachment (Part of 49 T028 3A0) 	For removal of hub bolt	—	—

WHEEL HUB, HUB SPINDLE
Preinspection
Wheel bearing play
Refer to page M–4

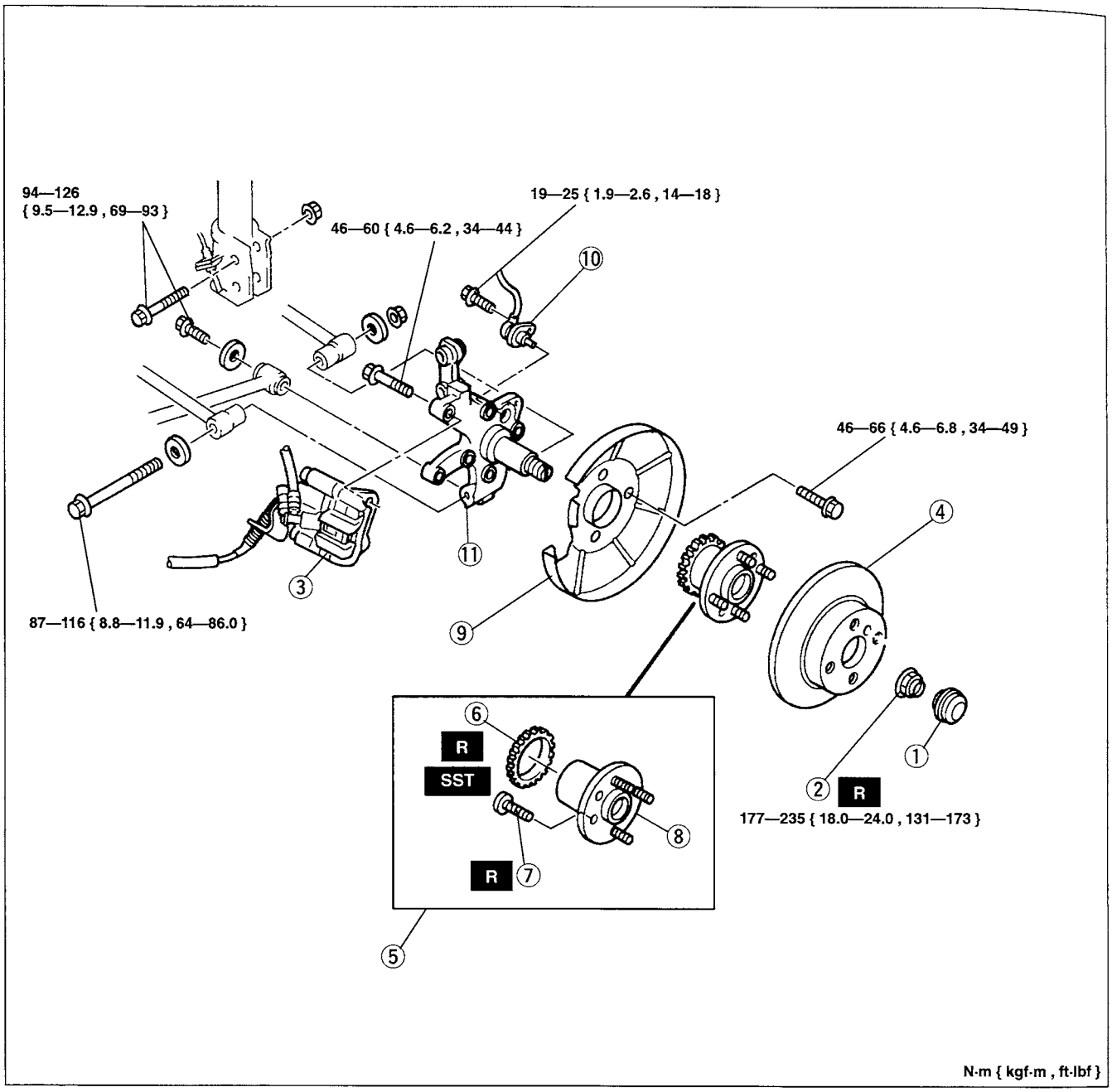


On-vehicle service
Hub bolt replacement
1. Remove the hub bolt by using the **SSTs**.

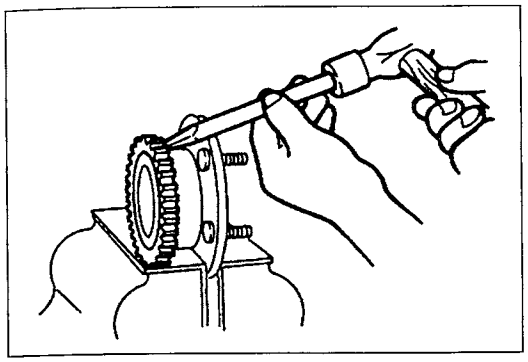


2. As shown in the figure, install the hub bolt into the wheel hub and set a washer and hub nut in the hub bolt.
3. Tighten the hub nut while holding the wheel hub by using the brass bar.

Removal / Inspection / Installation
Disc brake model



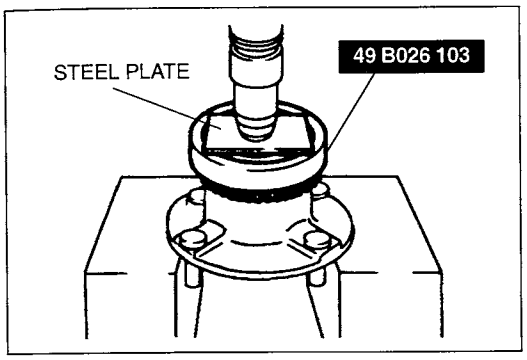
1. Hub cap
2. Locknut
   - Removal Note ..... page M–6
   - Installation Note ..... page M–8
3. Brake caliper assembly
   - Service ..... section P
4. Disc plate
   - Service ..... section P
5. Wheel hub assembly
   - Inspect for damage
   - Inspect bearing for damage and rough rotation
6. ABS sensor rotor
   - Removal Note ..... page M–11
   - Installation Note ..... page M–11
   - Service ..... section P
7. Hub bolt
   - Removal Note ..... page M– 7
   - Installation Note ..... page M– 7
8. Wheel hub
9. Dust cover
   - Inspect for damage and cracks
10. ABS wheel-speed sensor
    - Service ..... section P
11. Hub spindle
    - Inspect for damage and cracks



Removal note
ABS sensor rotor

Note
- The sensor rotor does not need to be removed unless you are replacing it.

Remove the sensor rotor by using a chisel.



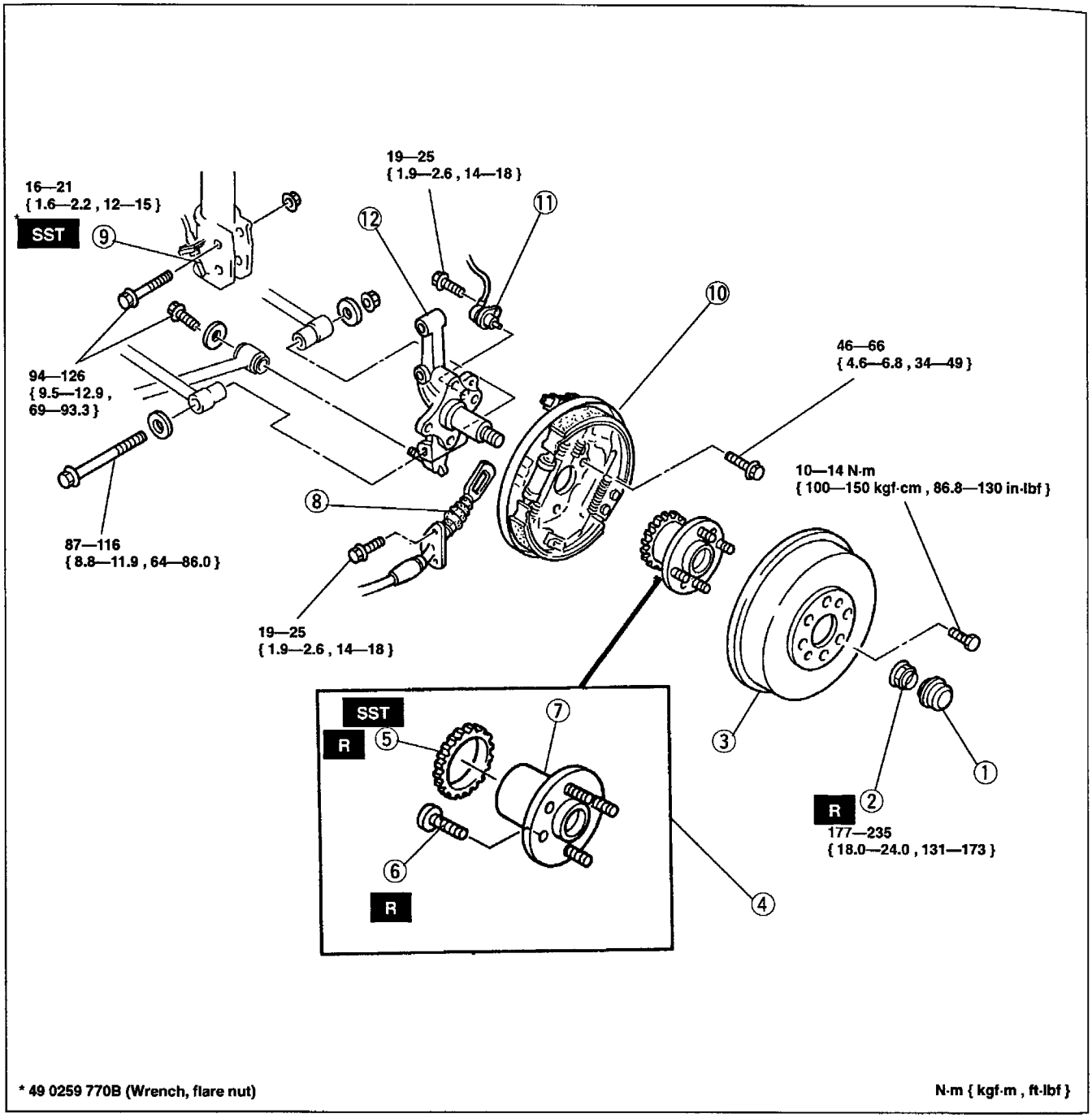
Installation note
ABS sensor rotor

1. Install a new rear ABS sensor rotor onto the wheel hub.

Note
- The ABS sensor rotor can be installed in either direction.

2. Using a steel plate and the **SST**, press the rotor on until it is flush with the wheel hub.

Drum brake model



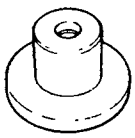
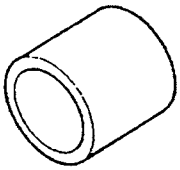
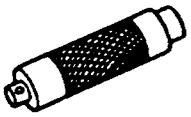
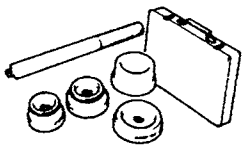
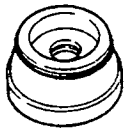
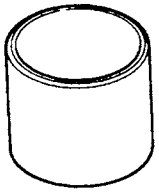
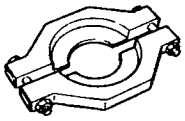
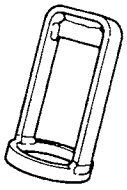
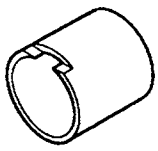
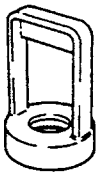
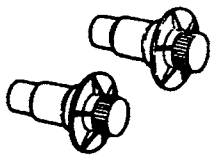
* 49 0259 770B (Wrench, flare nut)

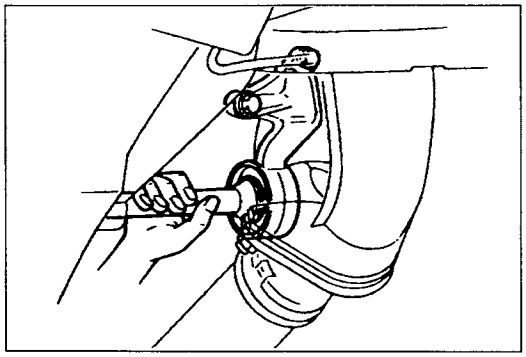
N·m { kgf·m , ft·lbf }

1. Hub cap
2. Locknut
   - Removal Note ..... page M– 6
   - Installation Note ..... page M– 8
3. Brake drum
   - Service ..... section P
4. Wheel hub assembly
   - Inspect for damage
   - Inspect bearing for damage and rough rotation
5. ABS sensor rotor
   - Removal Note ..... page M–11
   - Installation Note ..... page M–11
6. Hub bolt
   - Removal Note ..... page M–7
   - Installation Note ..... page M–7
7. Wheel hub
8. Parking brake cable
9. Brake pipe
   - Service ..... section P
10. Rear brake assembly
    - Service ..... section P
11. ABS wheel-speed sensor
    - Service ..... section P
12. Hub spindle
    - Inspect for damage and cracks

DRIVE SHAFT

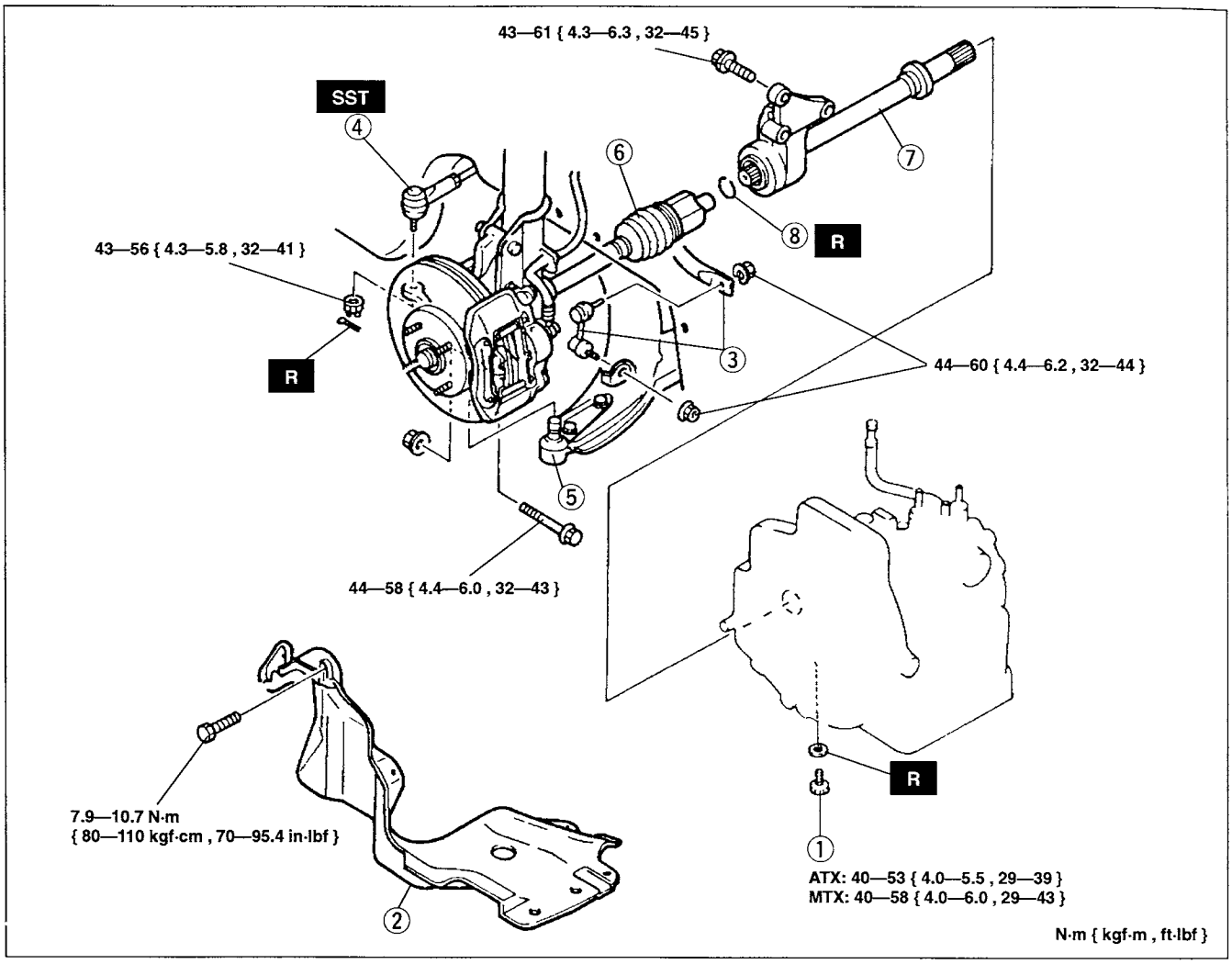
PREPARATION
SST

49 F026 102 Installer, bearing 	For removal of bearing	49 W027 003 Installer, bearing 	For installation of dust seal
49 G030 795 Installer oil seal 	For installation of dust seal	49 G030 797 Handle (Part of 49 G030 795) 	For installation of dust seal
49 F027 0A1 Installer set, bearing 	For installation of bearing	49 F027 005 Attachment 62 (Part of 49 F027 0A1) 	For installation of bearing
49 B025 004 Installer, dust, boot 	For installation of dust seal	49 H027 002 Remover, bearing 	For removal of joint shaft bearing
49 B025 003 Installer, sensor rotor 	For installation of sensor rotor	49 H034 201 Support block 	For removal of bearing
49 B025 006 Installer, sensor rotor 	For installation of sensor rotor	49 G030 455 Holder, diff. side gear 	For holding side gear

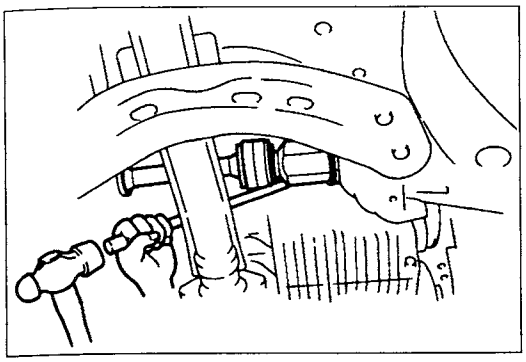


JOINT SHAFT
Preinspection
Joint shaft
1. Verify that the joint shaft is not twisted or cracked. Replace it if necessary.
2. Turn the joint shaft by hand and verify that the bearing rotates smoothly and freely. Replace it if necessary.

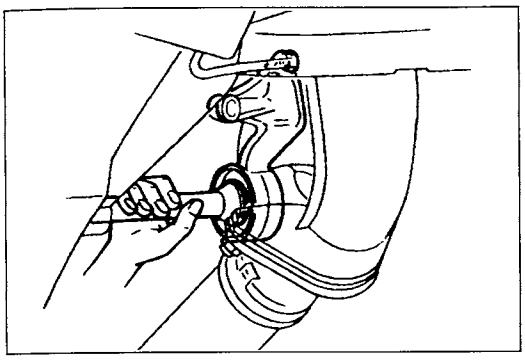
Removal / Installation
- After installation, fill the transaxle with the specified amount and type of ATF, and inspect for oil leakage. (Refer to section J, K.)



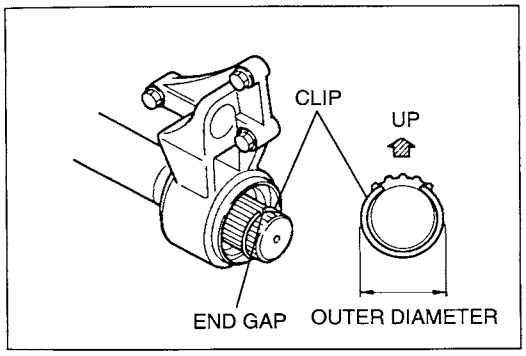
1. Drain plug
2. Splash shield(s)
3. Stabilizer control link
4. Tie-rod end
   Service ..... section N
5. Lower arm ball joint
6. Drive shaft and axle assembly
   Removal Note ..... page M–15
   Installation Note ..... page M–15
7. Joint shaft
   Removal Note ..... page M–15
   Installation Note ..... page M–15
   Disassembly / Inspection / Assembly ..... page M–16
8. Clip
   Installation Note ..... page M–15



Removal note
Drive shaft and axle assembly
Separate the right-side drive shaft from the joint shaft by hammering on a brass or copper bar inserted between them.

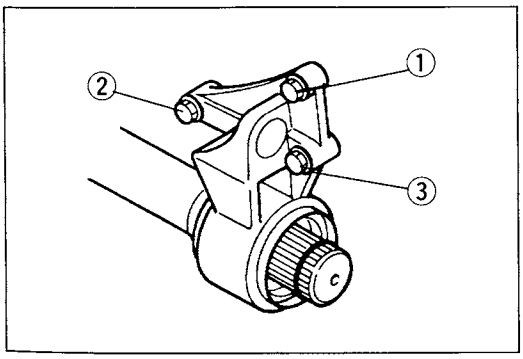


Joint shaft
Pull the joint shaft straight out.



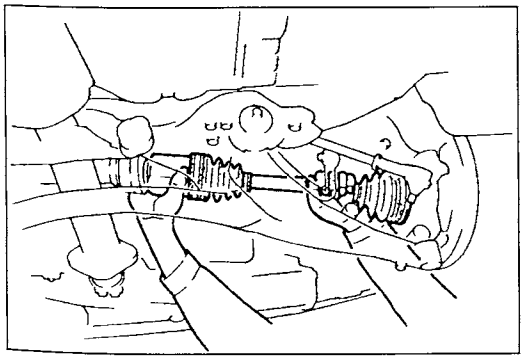
Installation note
Clip
1. Install a new clip so that the opening is facing upwards.
2. Measure the outer diameter of the clip after installing, and replace the clip if it exeeds the specifiecation.

Outer diameter: 30 mm { 1.181 in } max.



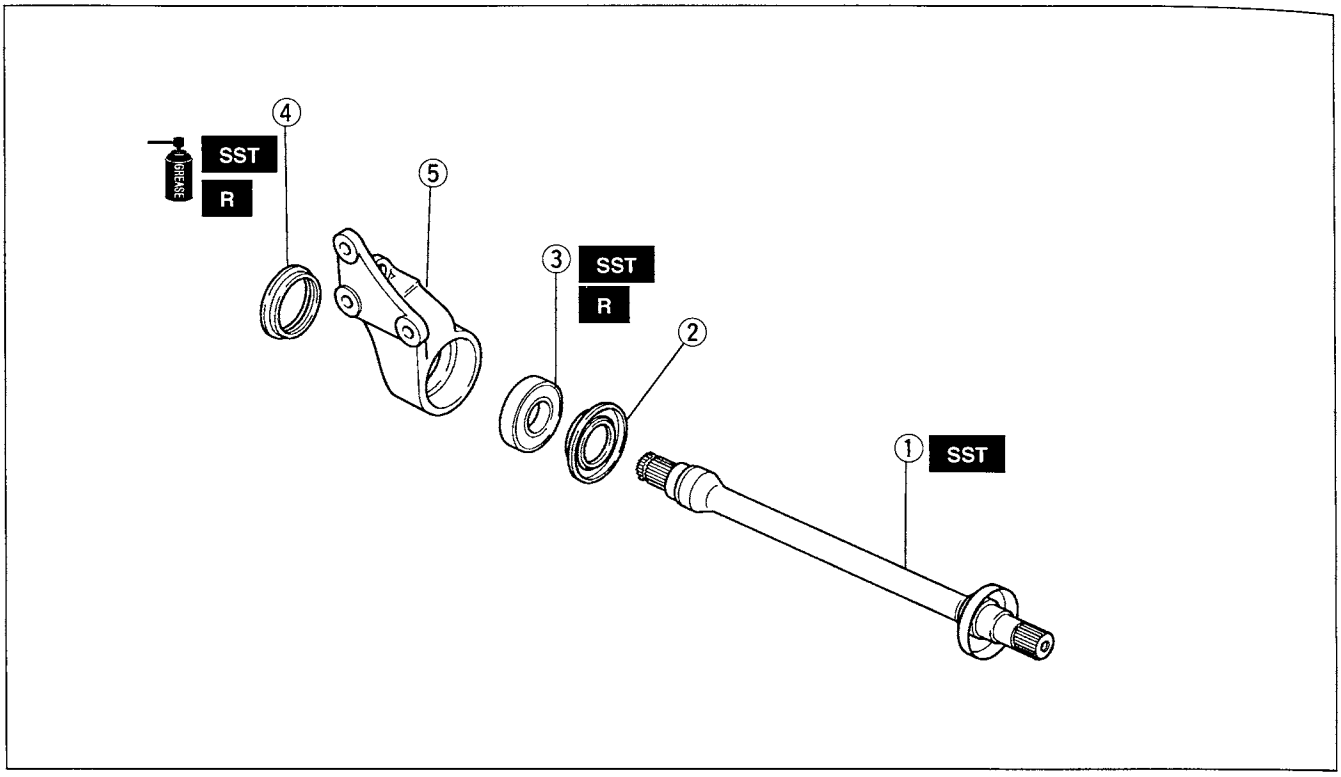
Joint shaft
Tighten the bolts in the order shown.

Tightening torque:
43—61 N·m { 4.3—6.3 kgf·m , 32—45 ft·lbf }

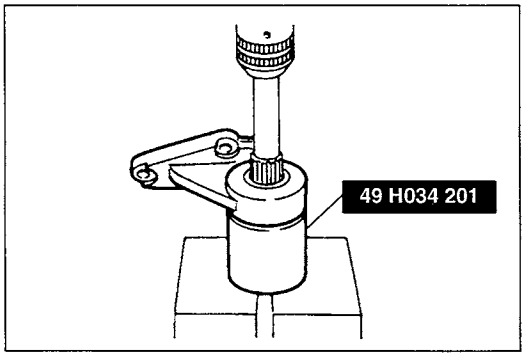


Drive shaft and axle assembly
1. Push the drive shaft onto the joint shaft.
2. After installation, pull the front hub outward to verify that the drive shaft is securely held by the clip.

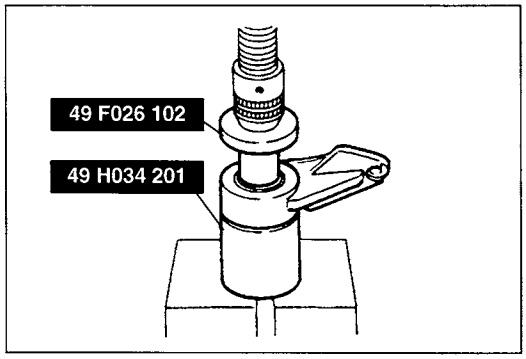
Disassembly / Inspection / Assembly



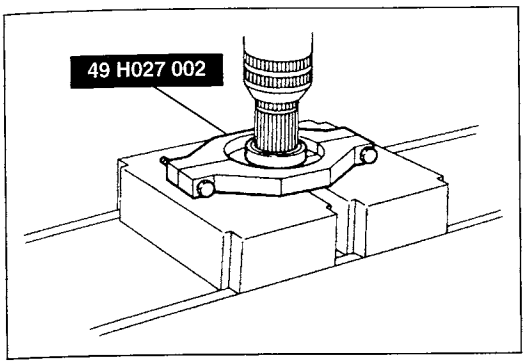
1. Joint shaft
   Inspect splines for damage and wear
   Disassembly Note ..... below
   Assembly Note ..... page M–17
2. Dust seal (differential side)
   Assembly Note ..... page M–17
3. Bearing
   Disassembly Note ..... below
   Assembly Note ..... page M–17
4. Dust seal (drive shaft side)
   Assembly Note ..... page M–17
5. Bracket



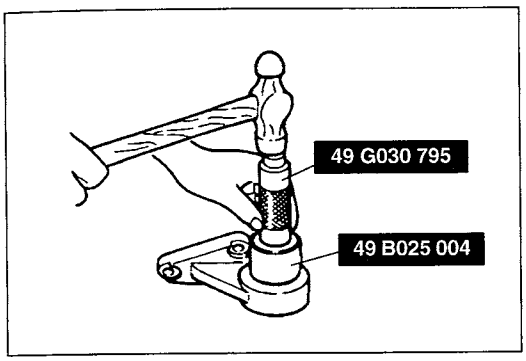
Disassembly note
Joint shaft
While holding the joint shaft, press it out by using the **SST**.



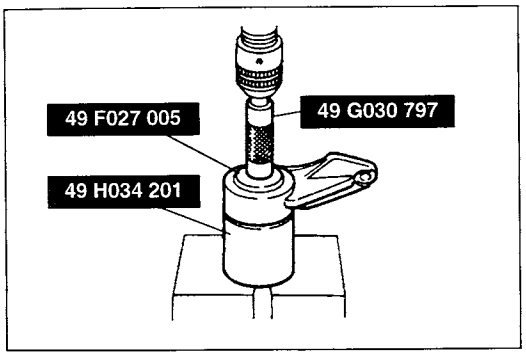
Bearing
If the bearing remains on the bracket, press out the bearing by using the **SSTs**.



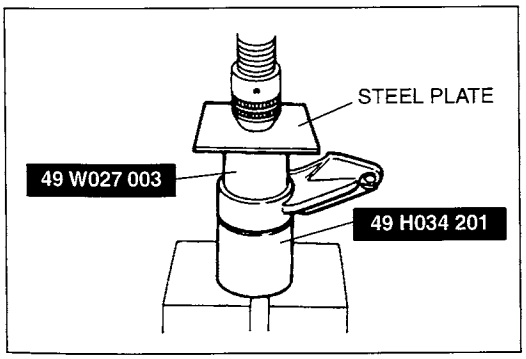
If the bearing remains on the shaft, while holding the joint shaft, press it out by using the **SST**.



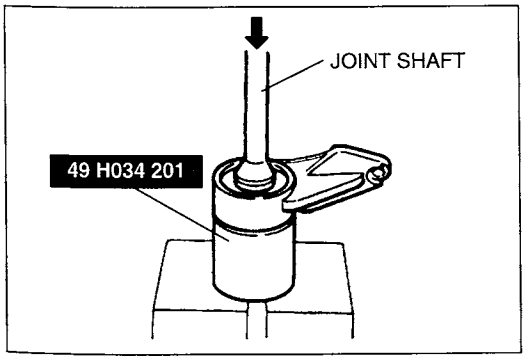
Assembly note
Dust seal (drive shaft side)
Tap in the new drive shaft side dust seal by using the **SSTs**.



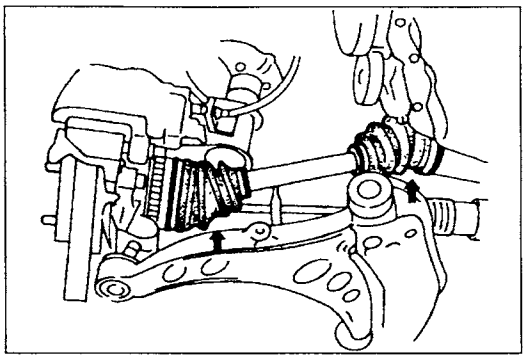
Bearing
Press in the new bearing by using the **SSTs**.



Dust seal (differential side)
Press in the new differential side dust seal by using a steel plate and the **SSTs**.



Joint shaft
Press in the joint shaft by using the **SST**.



DRIVE SHAFT

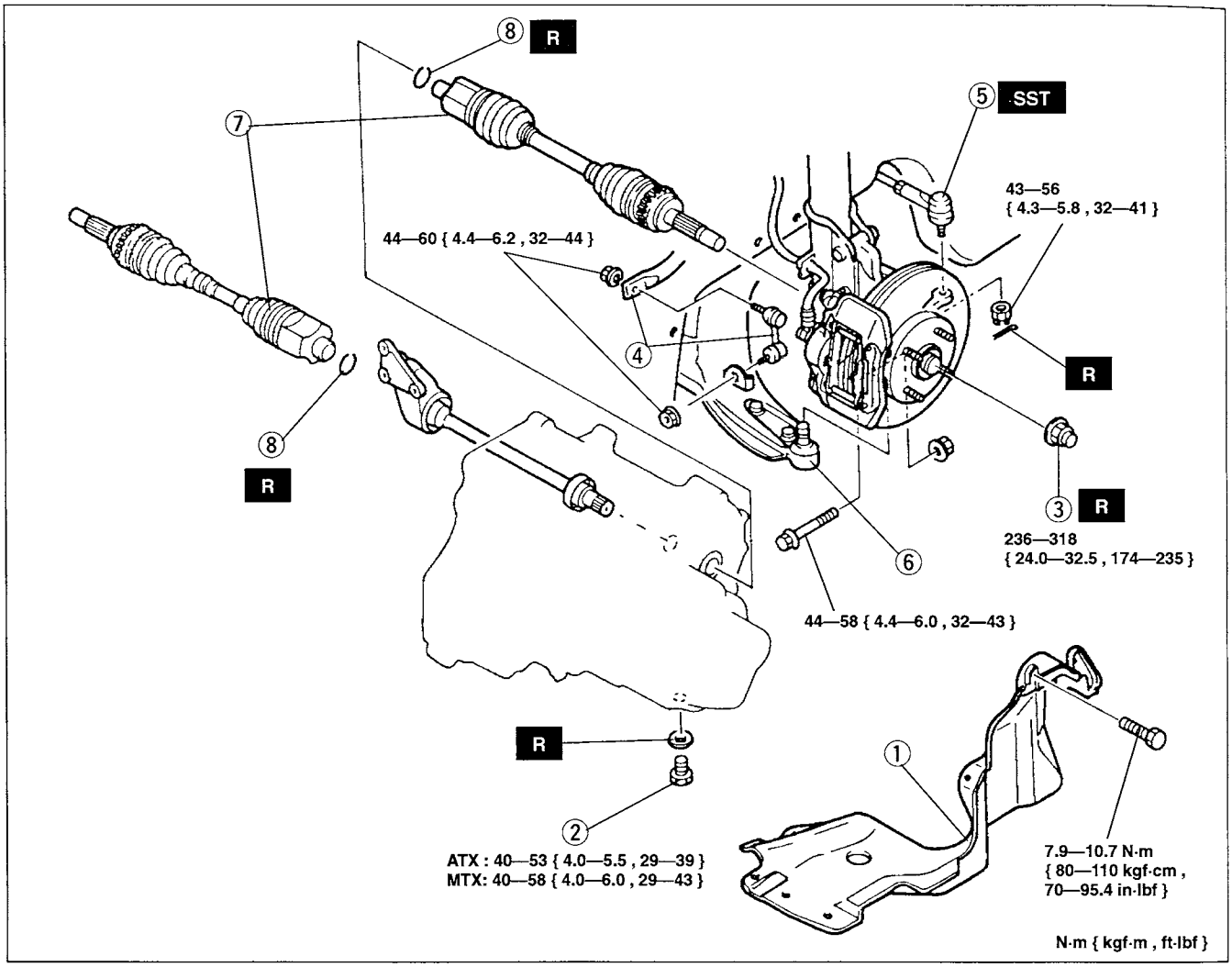
Preinspection

Drive shaft

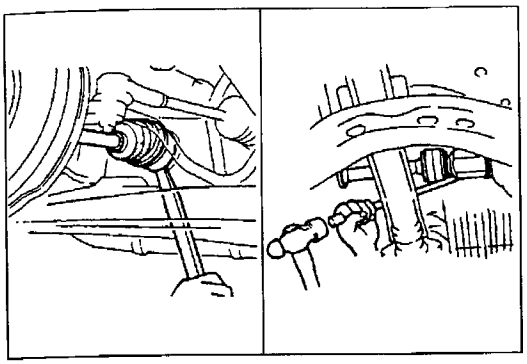
1. Check the drive shaft dust boot for cracks, damage, leaking grease, and loose boot bands.
2. Check the drive shaft for bending, cracks, and wear of joints or splines.
3. Repair or replace the drive shaft if necessary.

Removal / Installation

- After installation, fill the transaxle with the specified amount and type of oil, and inspect for oil leakage. (Refer to section J, K.)



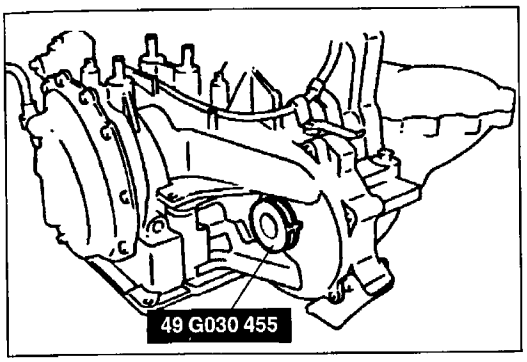
1. Splash shield
2. Drain plug
3. Locknut
   - Removal Note ..... page M–6
   - Installation Note ..... page M–8
4. Stabilizer control link
   - Service ..... section R
5. Tie-rod end
   - Service ..... section N
6. Lower arm ball joint
   - Service ..... section R
7. Drive shaft
   - Removal Note ..... page M–19
   - Installation Note ..... page M–19
   - Disassembly / Inspection / Assembly ..... page M–20
8. Clip
   - Installation Note ..... page M–15



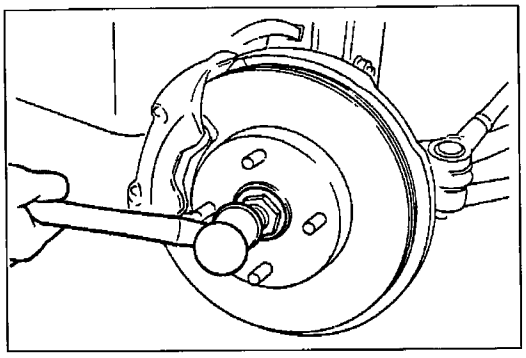
Removal note
Drive shaft

Caution
- **The sharp edges of the drive shaft snap ring can slice or puncture the oil seal. Be careful when removing the drive shaft from the transaxle.**

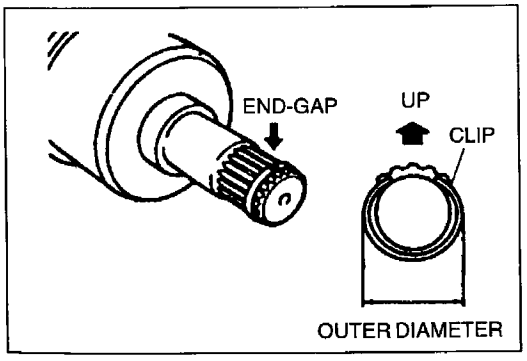
1. Separate the left-side drive shaft from the transaxle by prying with a bar inserted between the outer ring and the transaxle, as shown in the figure.



2. Separate the right-side drive shaft from the joint shaft by hammering on a brass or copper bar inserted between them.
3. Install the **SST** into the transaxle to hold the side gears. (except F25M-R).

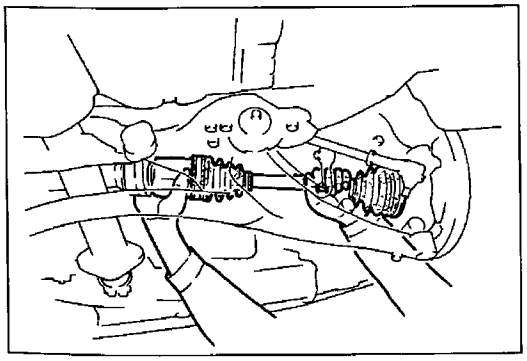


Note
- If the drive shaft will not come out of the front wheel hub easily, install an already discarded nut onto the drive shaft so that the nut is flush with the end of the drive shaft. Tap the nut with a copper hammer to loosen the drive shaft from the front wheel hub.



Installation note
Drive shaft
1. Install a new clip onto the drive shaft.
2. Measure the outer diameter of the clip after installing, and replace the clip if it exceeds the specification.

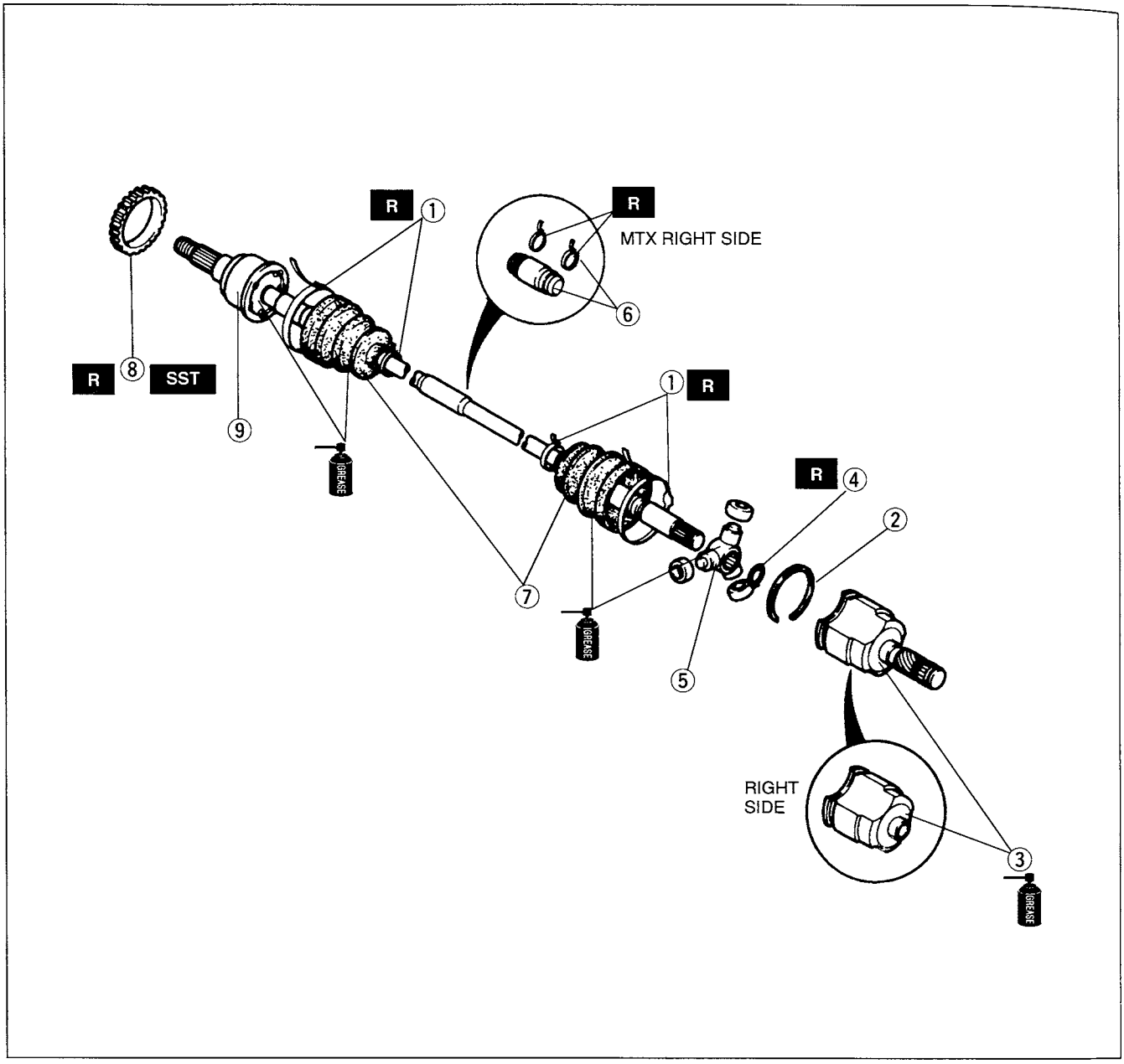
Outer diameter
BP engine MTX: 30 mm { 1.181 in }
Other models: 27 mm { 1.063 in }



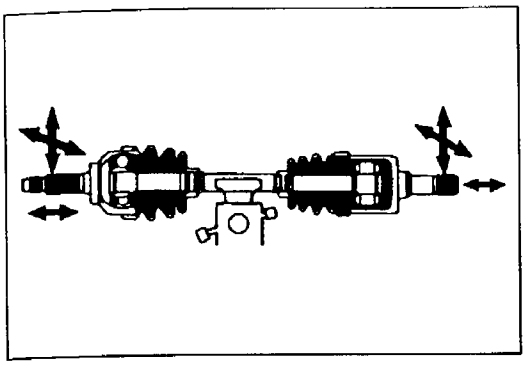
Caution
- **The sharp edges of the drive shaft snap ring can slice or puncture the oil seal. Be careful when installing the drive shaft to the transaxle.**

3. Push the drive shaft into the transaxle (left side) or joint shaft (right side).
4. After installation, pull the front hub outward to confirm that the drive shaft is securely held by the clip.

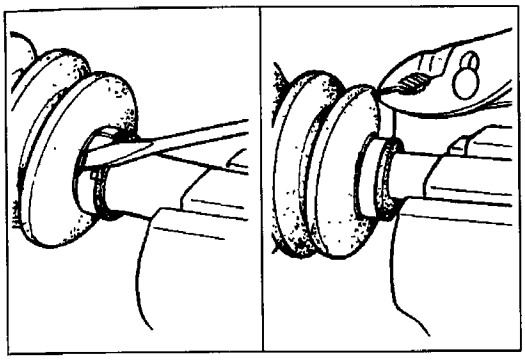
Disassembly / Inspection / Assembly



1. Boot band
   - Disassembly Note ..... page M–21
   - Assembly Note ..... page M–23
2. Stopper ring
3. Outer ring
   - Disassembly Note ..... page M–21
   - Inspect inside bore for wear, corrosion, and scoring
   - Assembly Note ..... page M–23
4. Snap ring
   - Disassembly Note ..... page M–21
   - Assembly Note ..... page M–23
5. Tripod joint
   - Disassembly Note ..... page M–21
   - Inspect for damage and wear
   - Assembly Note ..... page M–23
6. Dynamic damper
   - Assembly Note ..... page M–22
7. Boot
   - Disassembly Note ..... page M–21
   - Inspect for damage
   - Assembly Note ..... page M–22
8. ABS sensor rotor
   - Disassembly Note ..... page M–22
   - Assembly Note ..... page M–22
9. Shaft and ball joint assembly
   - Inspect splines for damage and wear
   - Inspect wheel-side joint for excessive play and rough rotation



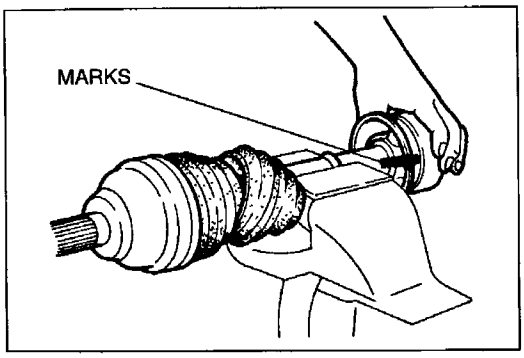
Preinspection
Drive shaft assembly
1. Move the joint the directions shown to check for excessive play and rough rotation. Replace the drive shaft if necessary.
2. Inspect boot for cracks, damage, and grease leakage. Replace it if necessary.



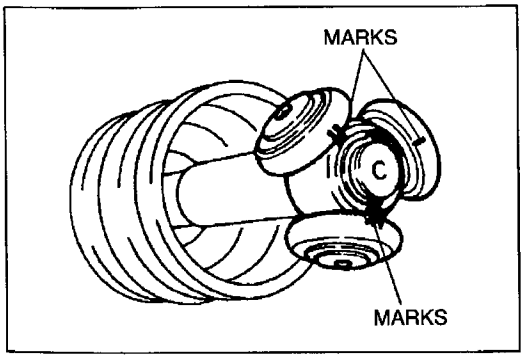
Disassembly note
Boot band

Note
- The boot band does not need to be removed unless you are replacing it.

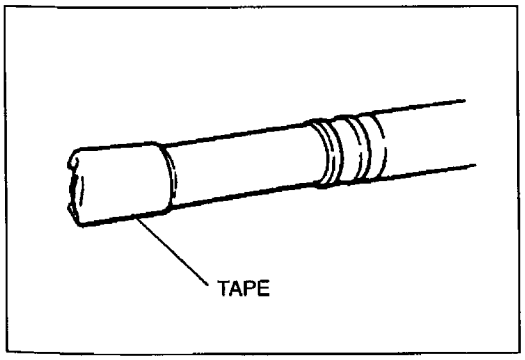
1. Pry up the locking clips of the boot band.
2. Remove the boot band by using pliers.



Outer ring
1. Mark the outer ring and the shaft for proper reassembly.
2. Remove the outer ring, being careful to keep the free rings from dropping.



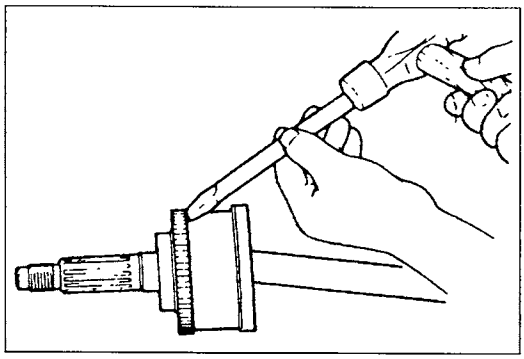
Snap ring/Tripod joint
1. Mark the shaft, tripod joint, and free rings for proper reassembly
2. Remove the snap ring by using snap-ring pliers.
3. Remove the tripod joint from the shaft by using a bar and a hammer.



Boot

Note
- The wheel-side boot does not need to be removed unless you are replacing it.

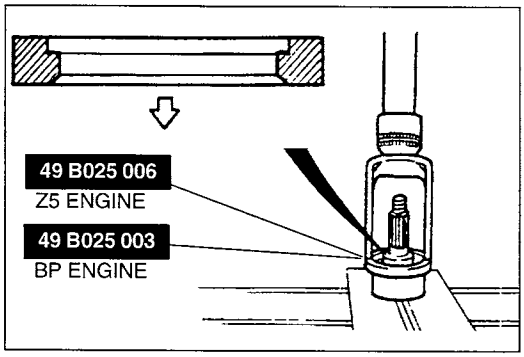
Wrap the splines of the shaft with tape to prevent damaging the boot.



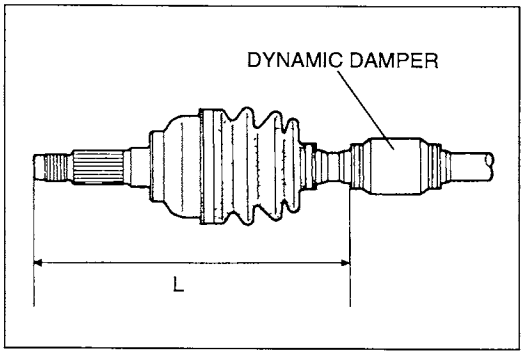
ABS sensor rotor

Note
- The sensor rotor does not need to be removed unless you are replacing it.

Tap the ABS sensor rotor off of the drive shaft by using a chisel.



Assembly note
ABS sensor rotor
Set a new ABS sensor rotor on the drive shaft in the direction shown, and press it onto the shaft assembly by using the **SST**.

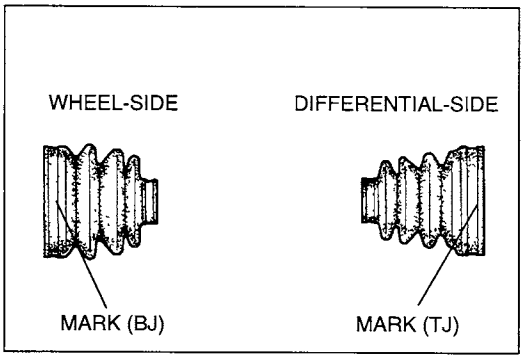


Dynamic damper
1. Install the dynamic damper as shown in the figure.

   Length L
   Z5 engine: 292—298 mm { 11.5—11.7 in }
   BP engine: 247—253 mm { 9.73—9.96 in }

2. Install the new boot band onto the dynamic damper.

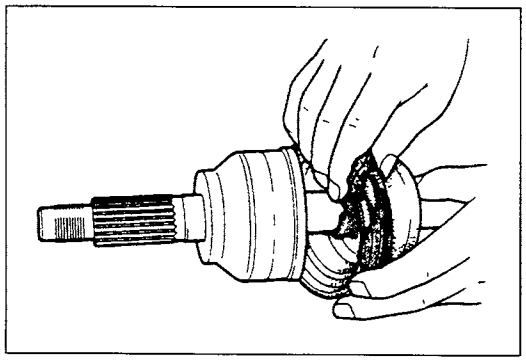
   Standard length: 292—298 mm { 11.5—11.7 in }



Boot

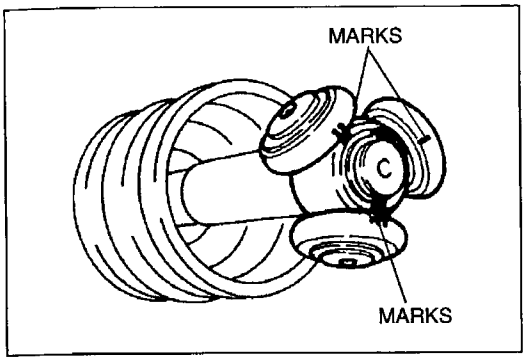
Note
- The initials TJ and BJ are stamped on the wheel-side and differential-side boots respectively.

1. Wrap the splines of the differential-side shaft, and install the wheel-side and differential-side boots.



2. Fill the wheel side boot with the grease supplied in the boot kit.

   Grease amount
   Z5 engine: 60—90 g { 2.1—3.2 oz }
   BP engine: 80—100 g { 2.8—3.5 oz }

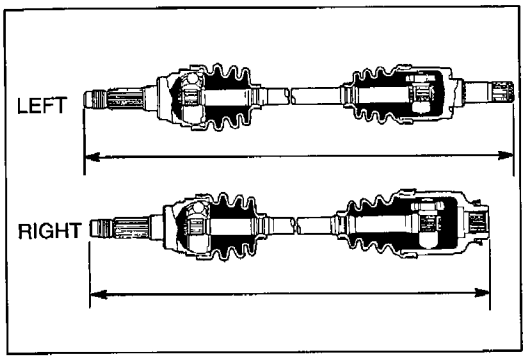


Tripod joint/Outer ring/Snap ring

1. Fill the outer ring and differential-side boot with the grease supplied in the boot kit.

   Grease amount
   Z5 engine: 115—135 g { 4.06—4.77 oz }
   BP engine: 135—155 g { 4.77—5.47 oz }

2. Align the marks and install the tripod joint and free rings.
3. Install a new snap ring by using snap-ring pliers.
4. While supporting the free rings, install the outer ring.

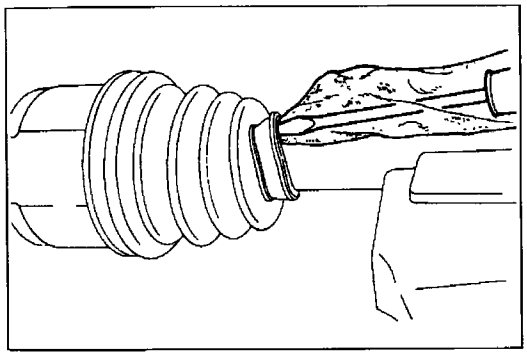


Boot band

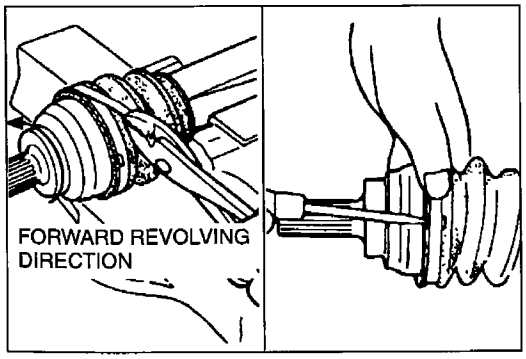
1. Verify that the boots are not dented or twisted.
2. Set the drive shaft to the standard length.

Standard length mm { in }

		Right	Left
Z5 engine	ATX	595.5—605.5 { 23.44—23.84 }	649.5—659.5 { 25.57—25.96 }
	MTX		653.5—663.5 { 25.73—26.12 }
BP engine	ATX	640.5—650.5 { 25.22—25.61 }	647.3—657.3 { 25.48—25.88 }
	MTX		633.4—643.4 { 24.94—25.33 }



3. Release any trapped air from inside the boot by using a rag-covered screwdriver.
4. Verify that the drive shaft length is within the standard.
5. If the drive shaft length is not within the standard, return to step 1.



6. Fold the new bands back by pulling on the ends with pliers, so that the ends of the bands are pointing opposite the forward revolving direction of the shaft.
7. Lock the ends of the bands by bending the locking clips.

Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

STEERING SYSTEM

OUTLINE ..... **N– 2**
SPECIFICATIONS ..... **N– 2**
GENERAL PROCEDURES ..... **N– 2**
ENGINE SPEED SENSING POWER STEERING .. **N– 3**
PREPARATION ..... **N– 3**
AIR BLEEDING ..... **N– 5**
POWER STEERING FLUID ..... **N– 6**
STEERING WHEEL AND COLUMN ..... **N– 8**
STEERING GEAR AND LINKAGE **N–12**
POWER STEERING OIL PUMP **N–24**

OUTLINE

SPECIFICATIONS

Item		Specification
Steering wheel	Outer diameter mm { in }	380 { 15.0 } or 370 { 14.6 }
	Lock-to-lock turns	3.07
Steering gear	Type	Rack and pinion
	Rack stroke mm { in }	138 { 5.43 }
Steering column and shaft	Shaft type	Collapsible
Power assist system		Engine speed sensing
Power steering fluid	Type	Dexron®II or M-III
	Fluid capacity L { US qt , Imp qt }	1.3 { 1.4 , 1.1 }

GENERAL PROCEDURES

Removal / Installation, Disassembly / Assembly
- The numbers in the structural view indicate the removal and disassembly order. For installation and assembly, follow the reverse order.

Wheels and Tires
- The removal and installation procedures for the wheels and tires are not mentioned in this section. If you must remove a wheel, retighten it to **89—127 N·m { 9.0—13.0 kgf·m , 66—94 ft·lbf }**.

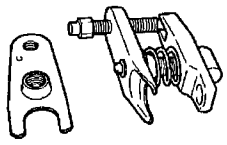
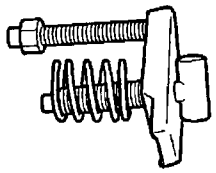
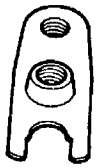
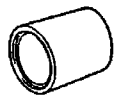
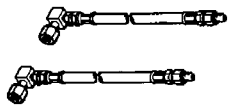
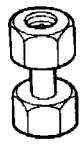
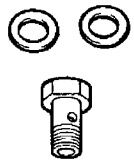
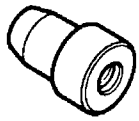
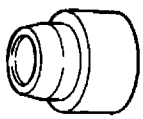
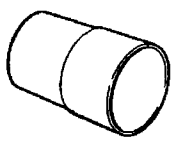
Suspension
- Tighten any part of the suspension that uses rubber bushings only after the vehicle has been lowered and unloaded.

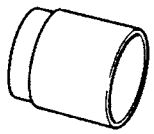
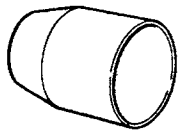
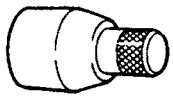
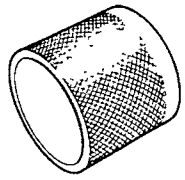
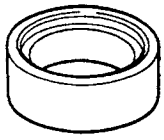
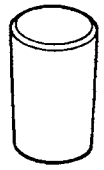
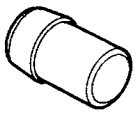
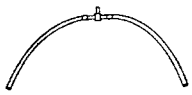
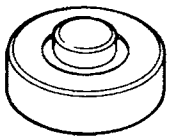
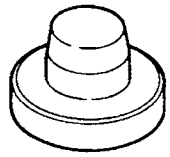
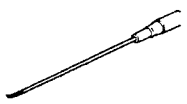
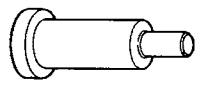
Power Steering Components
- If a power steering fluid line(s) has been disconnected anytime during the procedure, add ATF (Dexron®II or M-III), bleed the fluid line(s), and inspect for leakage after the procedure has been completed.

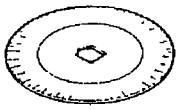
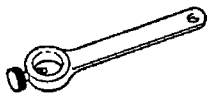
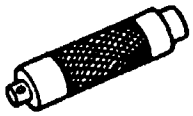
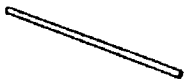
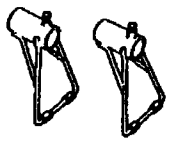
Undercover
- The removal and installation procedures for the undercover are not mentioned in this section.

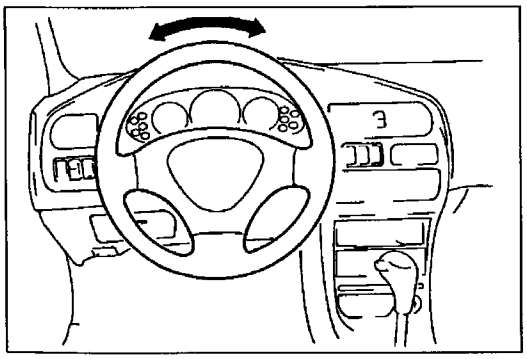
ENGINE SPEED SENSING POWER STEERING

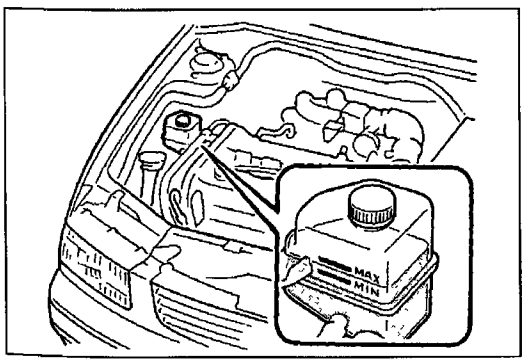
PREPARATION
SST

49 T028 3A0 Puller set, ball joint 	For removal of ball joint	49 T028 303 Body (Part of 49 T028 3A0) 	For removal of ball joint
49 T028 304 Attachment (Part of 49 T028 3A0) 	For removal of ball joint	49 F034 201 Installer, dust boot 	For installation of tie-rod end boot
49 1232 670A Gauge set, power steering 	For inspection of power steering fluid pressure	49 1232 672 Gauge (Part of 49 1232 670A) 	For inspection of power steering fluid pressure
49 1232 673 Body, valve (Part of 49 1232 670A) 	For inspection of power steering fluid pressure	49 H002 671 Adapter, power steering gauge 	For inspection of power steering fluid pressure
49 G032 3A4 Adapter, power steering gauge 	For inspection of power steering fluid pressure	49 G032 351 Adapter (Part of 49 G032 3A4) 	For inspection of power steering pressure
49 G032 352 Adapter (Part of 49 G032 3A4) 	For inspection of power steering fluid pressure	49 G032 353 Bolt (Part of 49 G032 3A4) 	For inspection of power steering fluid pressure
49 B032 307 Wrench, outer box 	For removal and installation of outer box	49 B032 308 Remover body, rod seal 	For removal of oil seal
49 B032 309 Installer body, pinion seal 	For installation of pinion seal	49 B032 310 Protector, pinion seal 	For installation of pinion seal

49 B032 311 Protector, slipper seal 	For installation of pinion shaft	49 B032 312 Protector, slipper seal 	For installation of seal ring
49 B032 313 Protector, outer box 	For installation of outer box	49 B032 314 Slipper seal former 	For form of seal ring
49 B032 316 Support block, plug 	For removal of oil seal & bearing	49 B032 317 Remover, bearing & oil seal 	For removal of oil seal & bearing
49 B032 318 Guide, rod seal 	For installation of inner guide & oil seal	49 B032 319 Protector body, rod seal 	For installation of inner guide & oil seal
49 B032 320 Wrench 	For removal and installation of locknut	49 B032 321 Adapter 	For check of cylinder air-tightness
49 G032 317 Hose 	For check of cylinder air-tightness	49 F032 303 Handle 	For removal of oil seal
49 B032 330 Installer, bearing 	For installation of plug bearing	49 B032 331 Installer, oil seal 	For installation of oil seal
49 B032 332 Remover, oil seal 	For removal of pinion oil seal	49 B032 305 Holder, power steering pump 	For disassembly / assembly of power steering oil pump

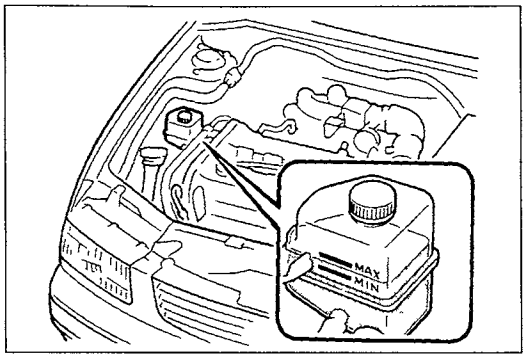
49 D032 316 Protractor 	For installation of adjusting cover	49 0180 510B Attachment, preload 	For inspection of pinion preload
49 H032 321A Hex-head wrench 	For removal and installation of adjusting cover	49 H032 301 Wrench 	For removal tie rod
49 G030 797 Handle 	For installation of pinion seal	49 G017 5A0 Support, engine 	For support of engine
49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine	49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine
49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine	—	—





AIR BLEEDING

1. Check the fluid level.
2. Jack up the vehicle and support it on safety stands.
3. Turn the steering wheel fully left and right several times with the engine not running.
4. Recheck the fluid level. If it has dropped, add fluid.
5. Repeat steps 3 and 4 until the fluid level stabilizes.
6. Lower the vehicle.
7. Start the engine and let it idle.
8. Turn the steering wheel fully left and right several times.
9. Verify that the fluid is not foamy and that the fluid level has not dropped.
10. Add fluid if necessary and repeat steps 8 and 9.



POWER STEERING FLUID
Inspection
Fluid level

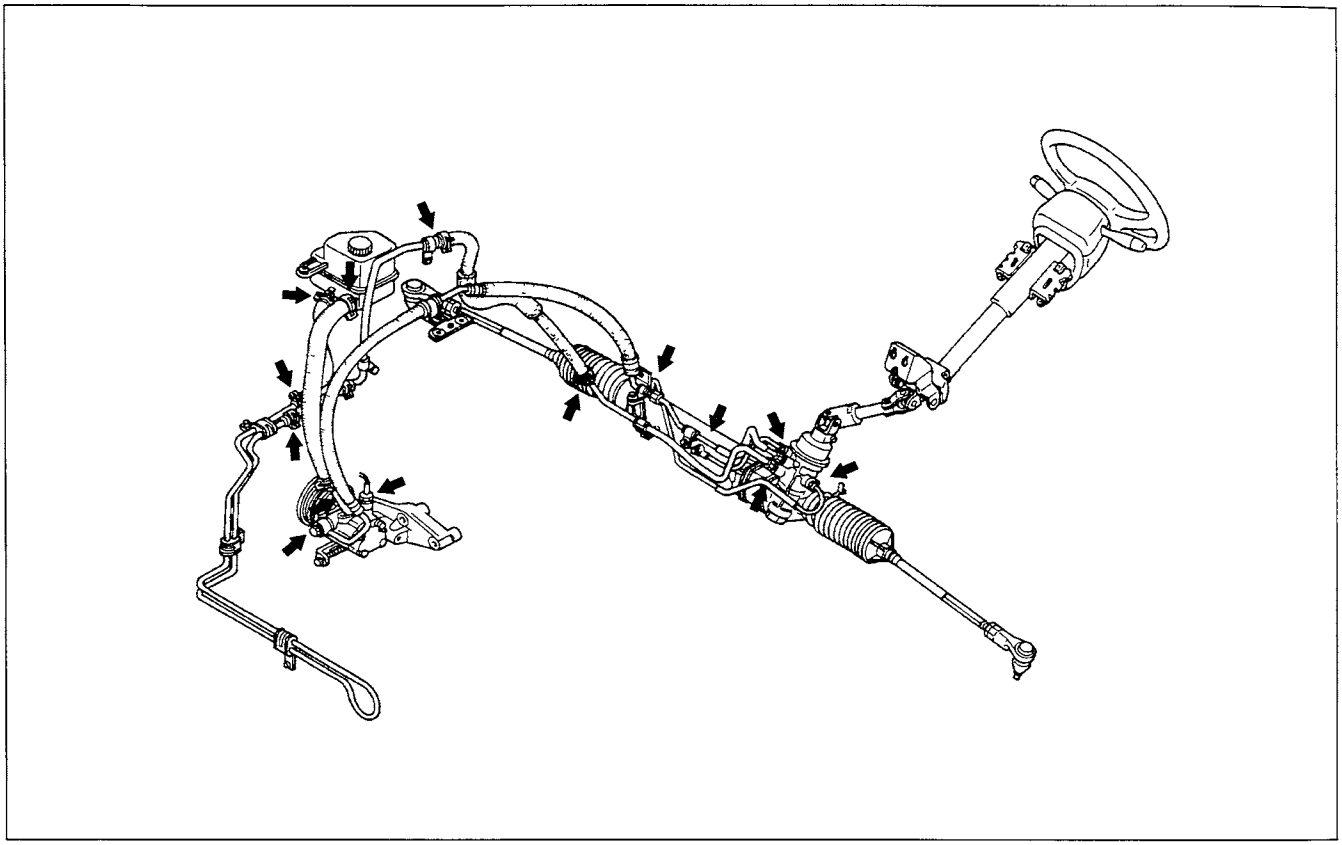
Check the power steering fluid level. Add the specified power steering fluid if necessary.

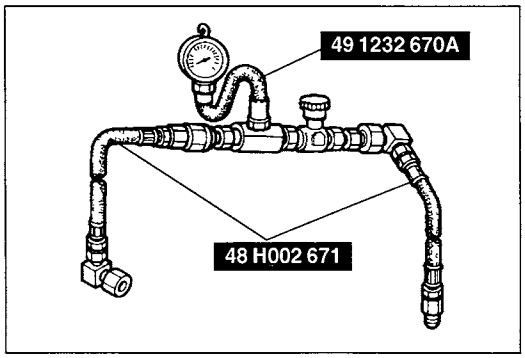
Fluid specification: ATF Dexron®II or M-III

Fluid leakage

Caution
- **Never hold the steering wheel to the extreme left or right for more than 5 seconds with the engine running. This could damage the power steering pump.**

Start the engine and let it idle. Turn the steering wheel fully left and right to apply fluid pressure. Inspect the points shown in the figure for fluid leakage.

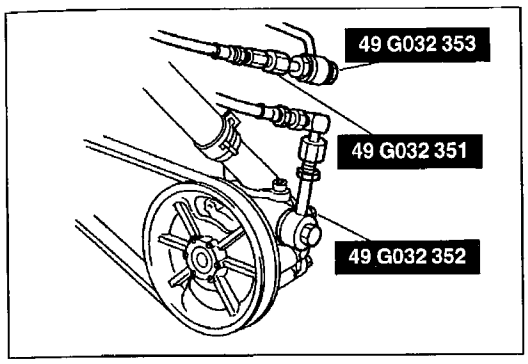




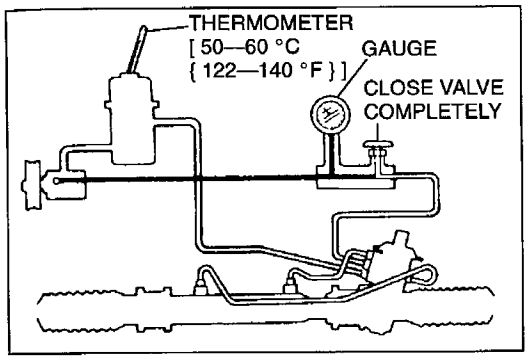
Fluid pressure

1. Assemble the **SSTs** as shown in the figure.

Tightening torque:
30—39 N·m { 3.0—4.0 kgf·m , 22—28 ft·lbf }



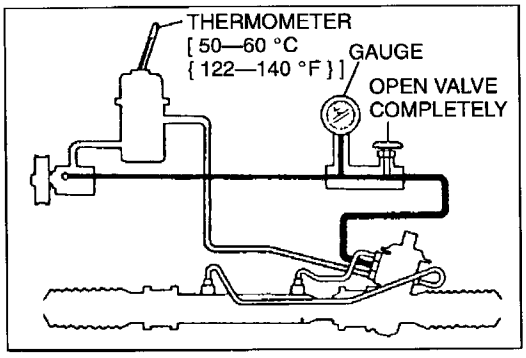
2. Mark both hose connections to ensure that the hose is reinstalled in its original position.
3. Disconnect the pressure hose from the oil pump. Attach the **SSTs** (adapters).
4. Connect the **SSTs** (gauge set) to the **SSTs** (adapters).
5. Bleed the air from the system. (Refer to page N–5.)
6. Open the gauge valve fully. Start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50—60 °C { 122—140 °F }**.



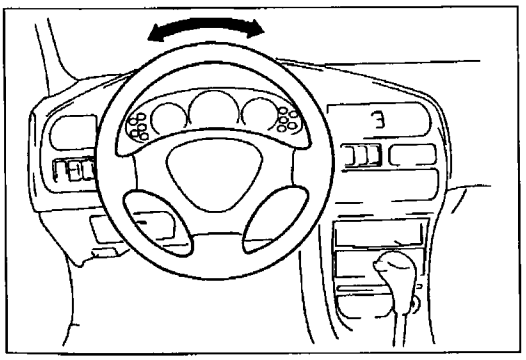
Caution
- **Do not let the valve stay closed for more than 5 seconds. The increase in fluid temperature will damage the oil pump.**

7. Close the gauge valve completely. Increase the engine speed to **1,000—1,500 rpm** and measure the fluid pressure generated by the oil pump. If the pressure is not within specification, replace the oil pump assembly. (Refer to page N–24.)

Oil pump fluid pressure: 8.58—9.32 MPa { 87.5—95.0 kgf/cm^2 , 1,244—1,350 psi }



8. Open the gauge valve fully and increase the engine speed to **1,000—1,500 rpm**.



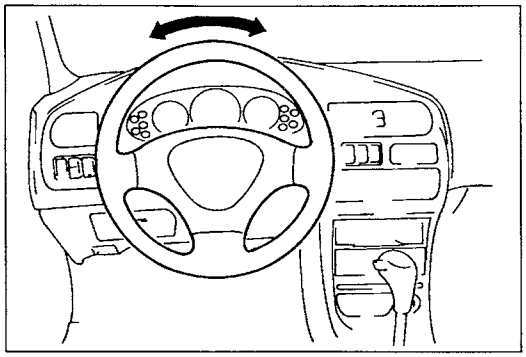
9. Turn the steering wheel fully left. Measure the fluid pressure generated within the gear housing. Turn the steering wheel fully right. Measure the fluid pressure generated within the gear housing. If the pressure is not within specification, repair or replace the steering gear assembly.

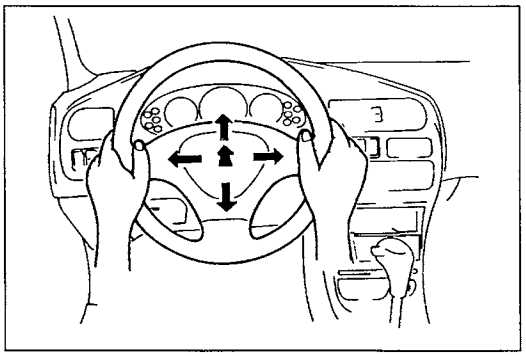
Gear housing fluid pressure: 8.58—9.32 MPa { 87.5—95.0 kgf/cm^2 , 1,244—1,350 psi }

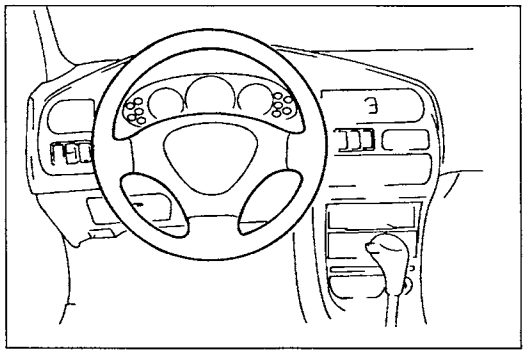
10. Remove the gauge set. Install and tighten the pressure hose to the specified torque.

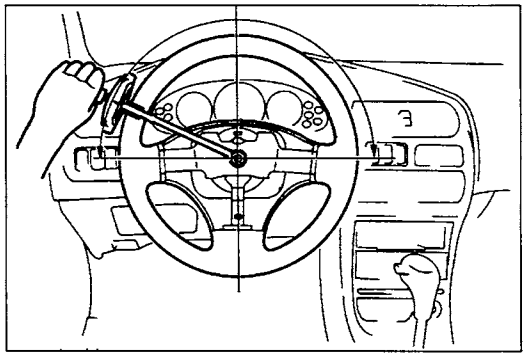
Tightening torque: 30—44 N·m { 3.0—4.5 kgf·m , 22—32 ft·lbf }

11. Bleed the air from the system. (Refer to page N–5.)









STEERING WHEEL AND COLUMN

On-vehicle Inspection

Steering wheel play

With the wheels in the straight-ahead position, gently turn the steering wheel left and right and verify that the play is within specification.

Play: 0—30 mm { 0—1.18 in }

If the play exceeds specification, either the steering joints are worn or the backlash of the steering gear is excessive.

Looseness or play of steering wheel

Move the steering wheel in the directions shown to check for column bearing and bushing wear, steering shaft joint play, steering wheel looseness, and column looseness.

Steering wheel effort

1. Check the following points:
   (1) Tire size and tire pressure
   (2) Fluid level
   (3) Drive belt deflection
2. With the vehicle on a hard, level surface, put the wheels in the straight-ahead position.
3. Start the engine and warm the power steering fluid to **50—60 °C { 122—140 °F }**.

Warning

- **Refer to section T1 for removal and installation of the air bag module.**

4. Remove the horn pad or air bag module.
5. Measure the steering wheel effort by using a torque wrench.

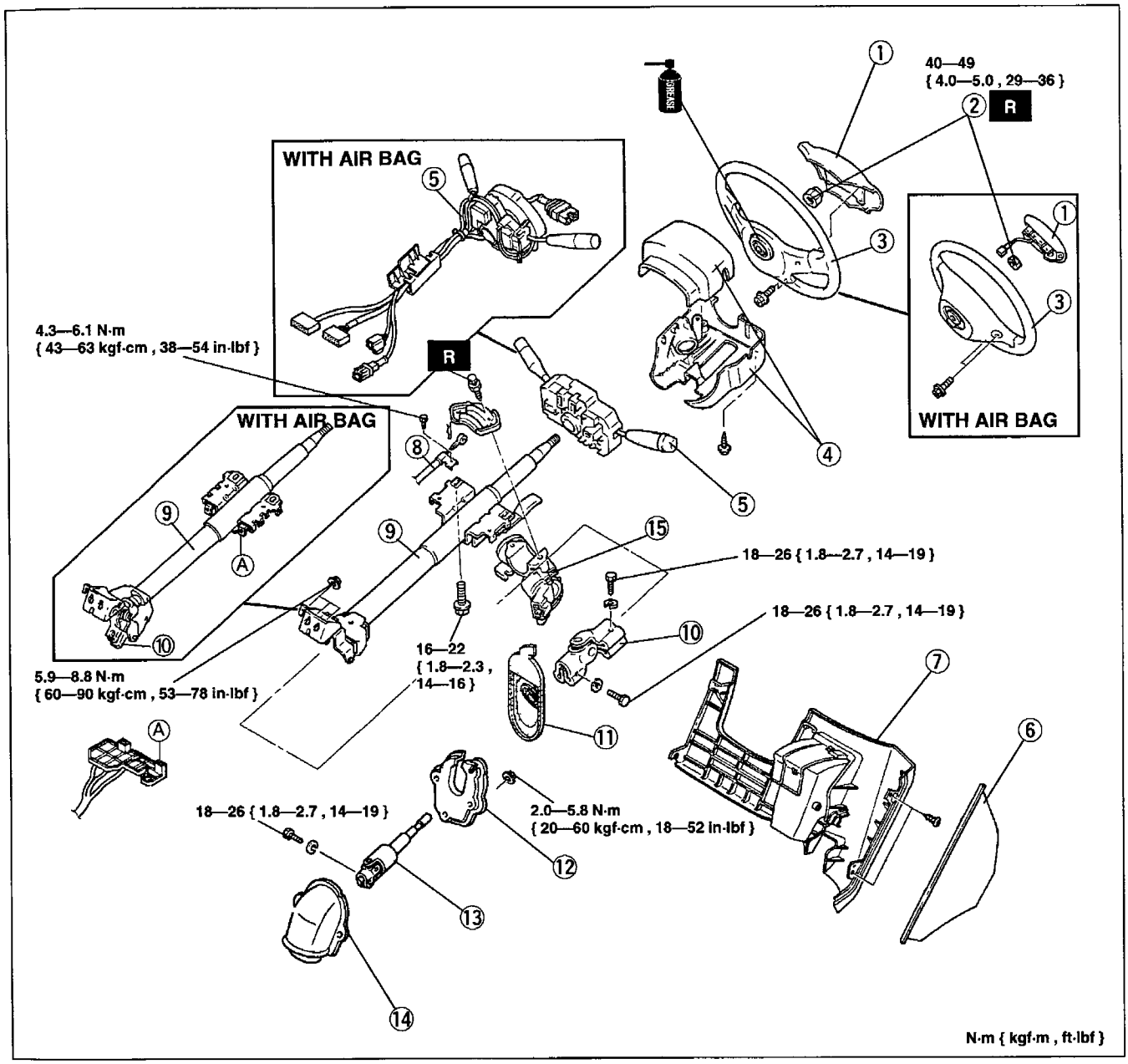
Steering wheel effort:
7.8 N·m { 80 kgf·cm , 69 in·lbf } max.

Note

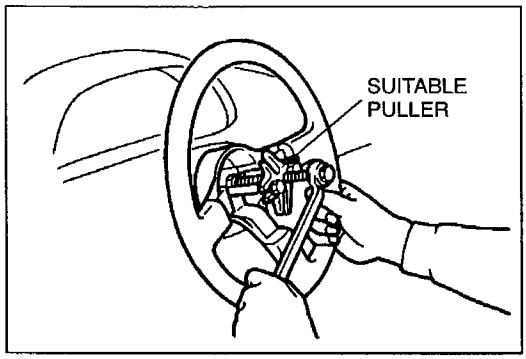
- To determine whether the steering wheel effort is satisfactory or not, carry out the inspection with another vehicle of the same model and under the same conditions, and compare the results.
- The steering wheel effort varies with the conditions below.
  a. Road condition such as dry or wet, and asphalt or concrete.
  b. Tire condition such as brand, wear, and tire pressure.

6. If not within the specification, note the following:
   (1) Air in system
   (2) Fluid leakage at hose or connections
   (3) Function of oil pump and steering gear

Removal / Inspection / Installation



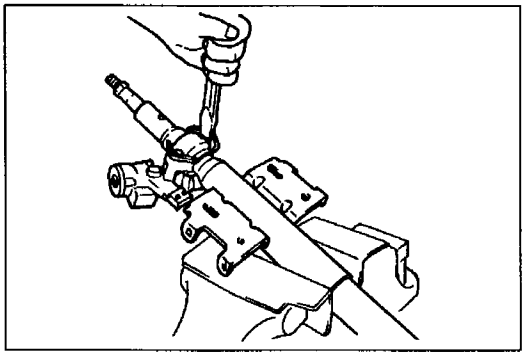
1. Horn pad or air bag module
   - Service ..... section T1
   - Installation Note ..... page N–11
2. Locknut
3. Steering wheel
   - Removal Note ..... page N–10
   - Installation Note ..... page N–11
4. Column cover
5. Combination switch
   - Removal / Installation ..... section T1
6. Side cover
7. Under cover
8. Interlock cable (ATX)
9. Steering shaft assembly
   - Inspection ..... page N–10
   - Installation Note ..... page N–11
10. Universal joint
    - Installation Note ..... page N–11
    - Inspect for looseness, abnormal noise, and sticking
11. Boot
12. Set plate
13. Intermediate shaft
    - Inspect for looseness, abnormal noise, and sticking
14. Dust cover
15. Steering lock
    - Removal Note ..... page N–10
    - Installation Note ..... page N–11
    - Inspection ..... page N–11



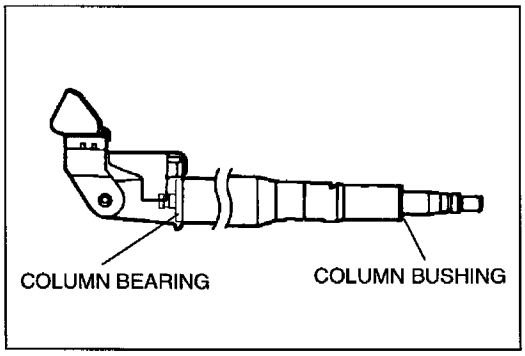
Removal note
Steering wheel

Caution
- **Do not try to remove the steering wheel by hitting the shaft with a hammer. The column will collapse.**

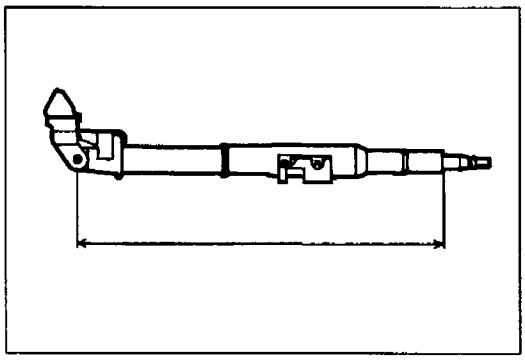
Remove the steering wheel by using a suitable puller.



Steering lock
1. Use a chisel and a hammer to make a groove in the heads of the steering lock mounting bolts.
2. Remove the bolts by using a screwdriver.
3. Remove the steering lock assembly.

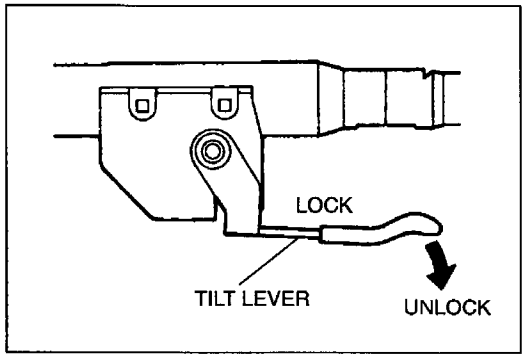


Inspection
Steering shaft assembly
Note the following and replace the steering shaft assembly if necessary.
1. Column bushing damage
2. Column bearing damage

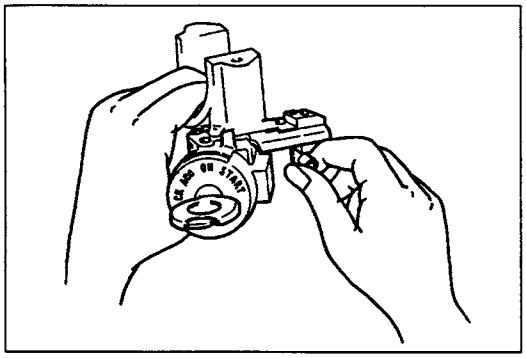


3. Steering shaft length

Length: 492.0—495.0 mm { 19.37—19.49 in }

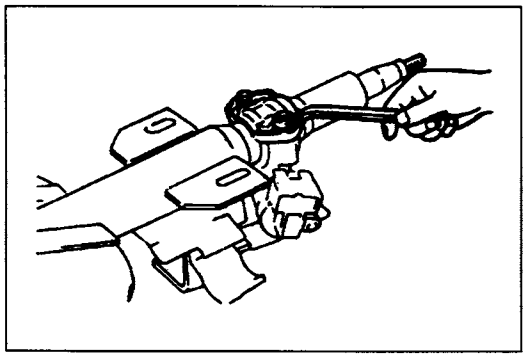


4. Tilt operation
   (1) Verify that the adjusting lever moves smoothly from unlock position to lock position.
   (2) Verify that the steering shaft is fixed firmly when the adjusting lever is locked.



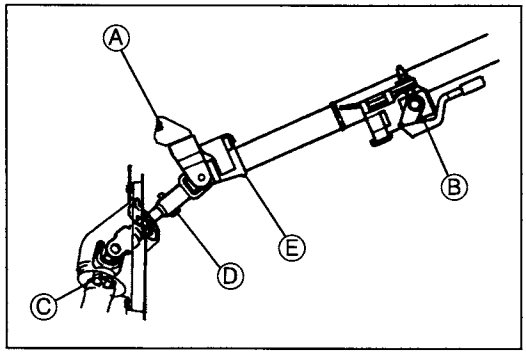
Steering lock (ATX)

Verify that the cable connector does not move when the key is in the LOCK position and that it moves freely with the key in other positions.



Installation note
Steering lock

1. Install the steering lock assembly on the jacket.
2. Verify that the lock operates correctly.
3. Install new steering lock mounting bolts.
4. Tighten the bolts until the heads break off.

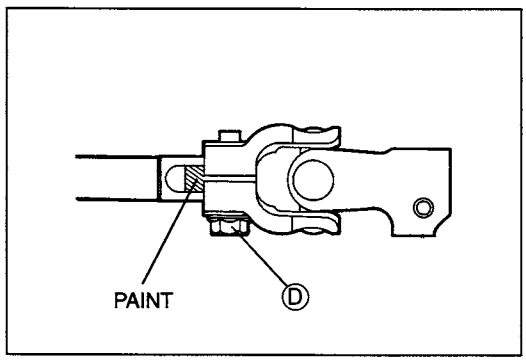


Steering shaft assembly and universal joint

Caution

- **Do not apply the shock in the axial direction of the shaft.**

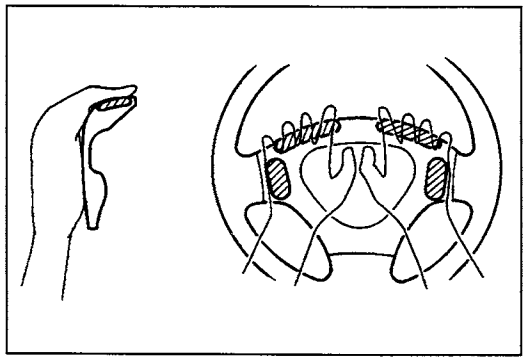
1. Tighten bolts A, B and C.
2. Tighten bolt D with the steering shaft at its upper most tilt position.



3. The paint must be visible after tightening the bolt D.
4. After installation, lightly tap the lower bracket at the E point shown by using a hammer to verify correct installation.

Steering wheel

Set the wheels in the straight-ahead position, and install the steering wheel.



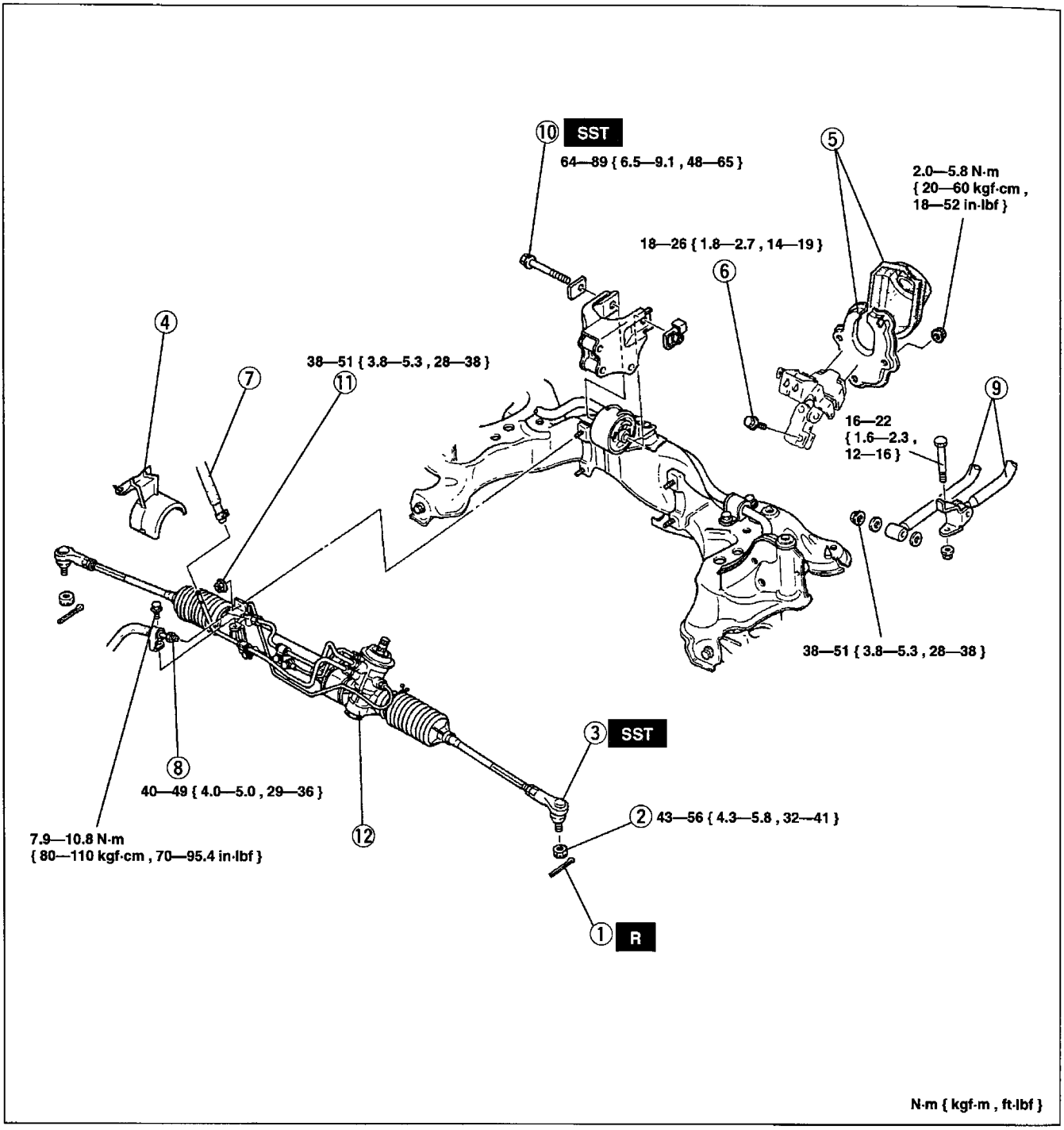
Horn pad (without air bag)

Caution

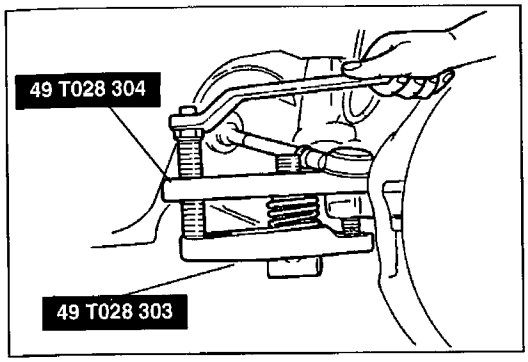
- **Do not install the horn pad by tapping or pressing on one side at a time. The energy absorbing material on the back of the horn pad will become deformed and the horn will not operate if it is not properly installed.**

Install the horn pad by lightly holding down the upper portion, then using both hands as shown in the figure, strongly and evenly press down on all sides.

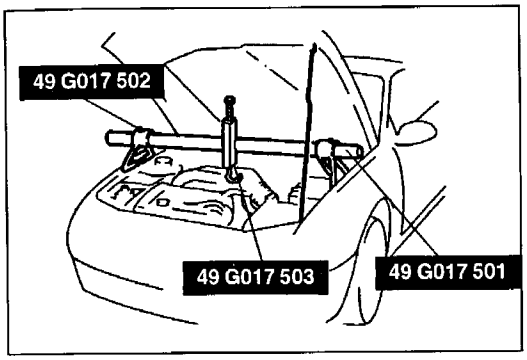
STEERING GEAR AND LINKAGE
Removal / Installation



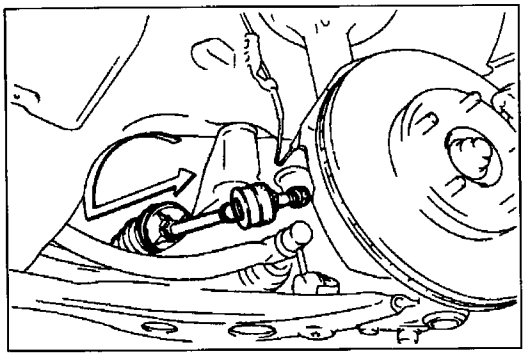
1. Cotter pin
2. Nut
3. Tie-rod end
   Removal Note ..... page N–13
4. Splash shield
5. Set plate and boot
6. Bolt (intermediate shaft)
7. Return hose
8. Pressure pipe
9. Extension bar/control rod (MTX)
10. Bolts (No.1 engine mount)
    Removal Note ..... page N–13
11. Mounting bracket nut
    Installation Note ..... page N–13
12. Steering gear and linkage
    Removal Note ..... page N–13
    Disassembly / Inspection ..... page N–14
    Assembly ..... page N–20



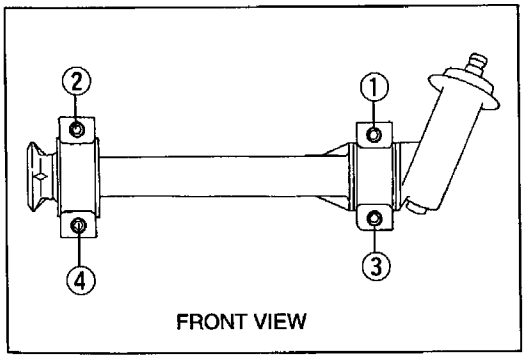
Removal note
Tie-rod end
1. Remove the tie rod nut.
2. Separate the tie-rod end from the steering knuckle by using the **SSTs**.



Bolt (No.1 engine mount)
1. Support the engine by using the **SSTs**.
2. Remove the engine mount bracket bolt.



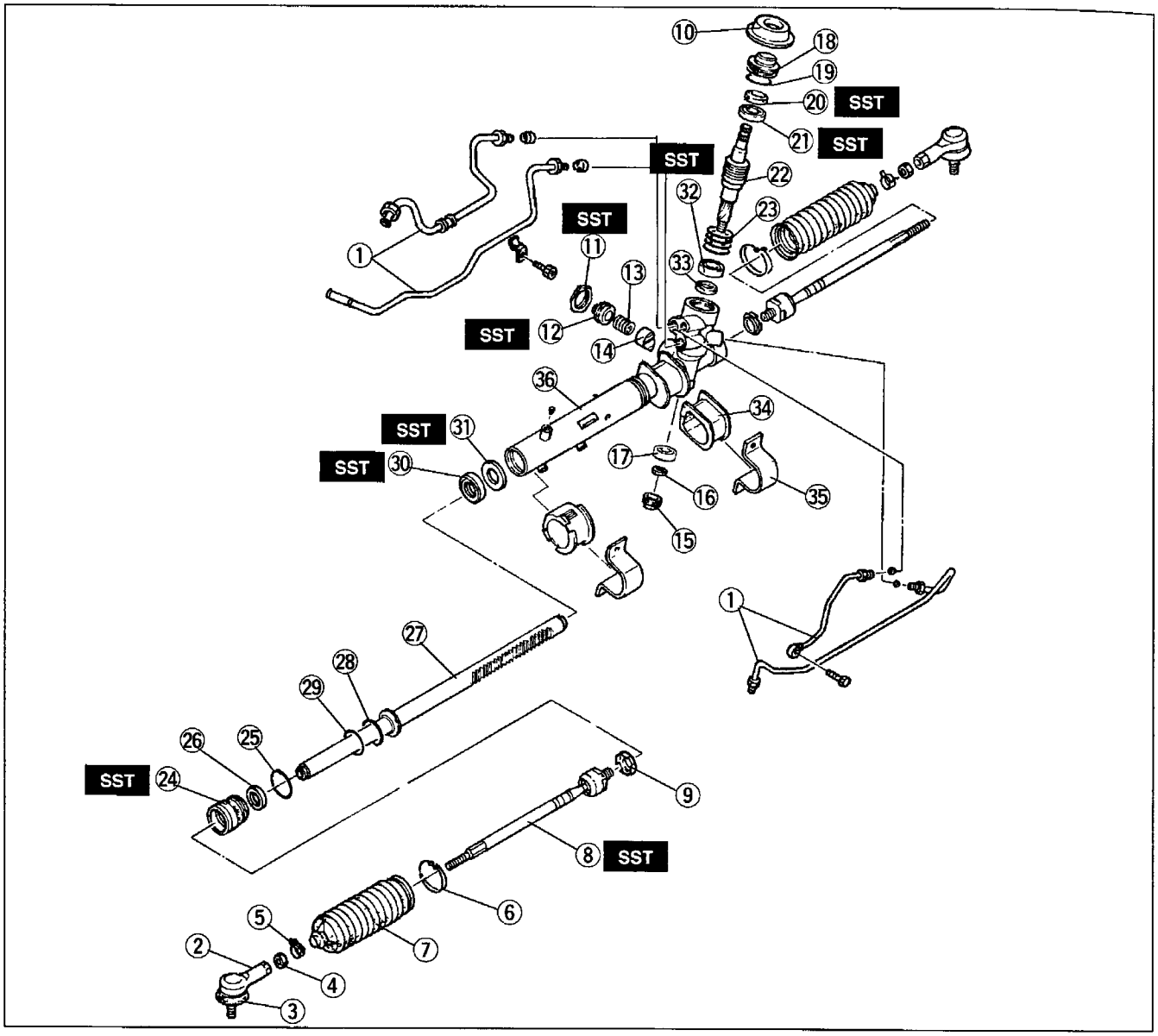
Steering gear and linkage
Remove the steering gear from the right side of the vehicle.



Installation note
Mounting bracket nuts
1. Hand-tighten the ④, ③ nuts.
2. Tighten the mounting bracket nuts to the specified torque in order shown.

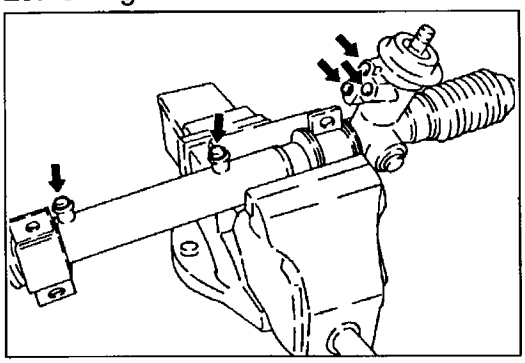
Tightening torque:
38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }

Disassembly / Inspection

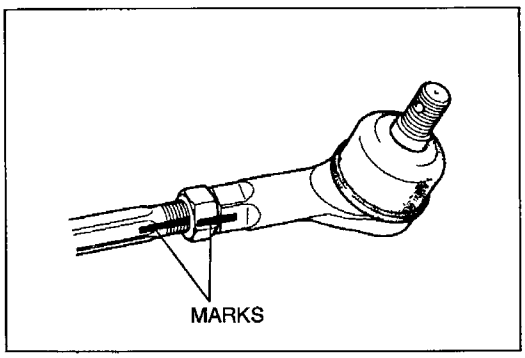


1. Oil pipe
   - Disassembly Note ..... page N–15
   - Inspect for clogging and damage
2. Tie-rod end
   - Disassembly Note ..... page N–15
   - Inspection ..... page N–17
3. Tie-rod end boot
   - Disassembly Note ..... page N–15
4. Locknut
5. Boot clamp
6. Boot wire
7. Boot
   - Inspect for cracking and tearing
8. Tie rod
   - Disassembly Note ..... page N–15
   - Inspection ..... page N–18
9. Washer
10. Dust cover
11. Locknut
    - Disassembly Note ..... page N–16
12. Adjusting cover
    - Disassembly Note ..... page N–16
13. Yoke spring
    - Inspect for damage
14. Support yoke
    - Inspect for damage
15. Housing cover
    - Disassembly Note ..... page N–16
16. Locknut
17. Bearing
18. Plug
    - Inspection ..... page N–18
19. O-ring
20. Oil seal
    - Disassembly Note ..... page N–16
21. Bearing
    - Disassembly Note ..... page N–16

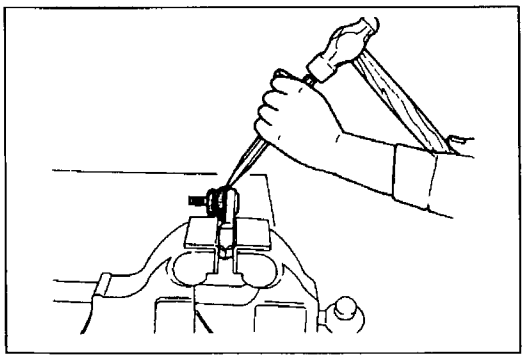
22. Pinion shaft assembly
    Inspect teeth for wear and damage
    Inspect valve for clogging, damage and wear
23. Seal ring
24. Outer box assembly
    Disassembly Note ..... page N–16
25. O-ring
26. U-gasket
27. Steering rack
    Inspection ..... page N–18
28. Seal ring
29. O-ring
30. Oil seal
    Disassembly Note ..... page N–17
31. Inner guide
    Disassembly Note ..... page N–17
32. Oil seal (pinion)
    Disassembly Note ..... page N–17
33. Collar
34. Mounting rubber
35. Mounting bracket
36. Gear housing
    Inspect for damage and cracks



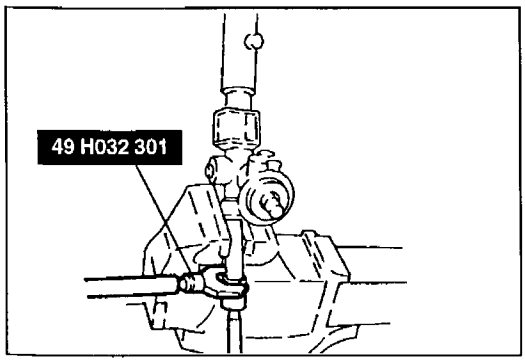
Disassembly note
Oil pipe
1. Secure the gear in a vise.
2. Remove the oil pipe.



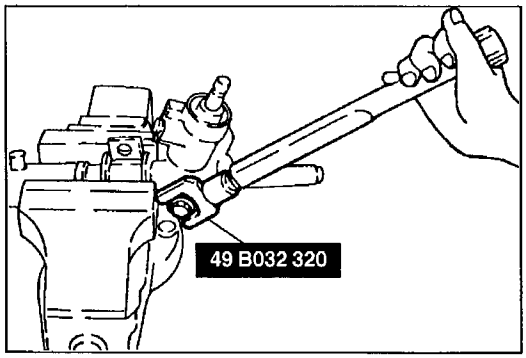
Tie-rod end
Mark the tie-rod end before loosening, for reference during installation.



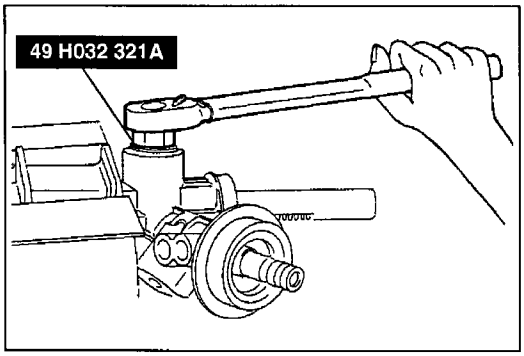
Tie-rod end boot
1. Secure the tie-rod end in a vise.
2. Place a chisel against the boot and hold it at the angle shown.
3. Remove the boot by tapping with a hammer.



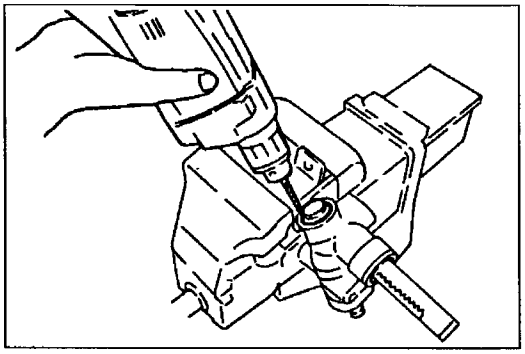
Tie rod
1. Unbend the washer.
2. Remove the tie rod by using the **SST**.



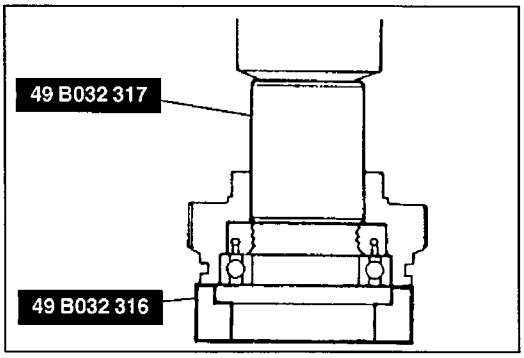
Locknut
Remove the locknut by using the **SST**.



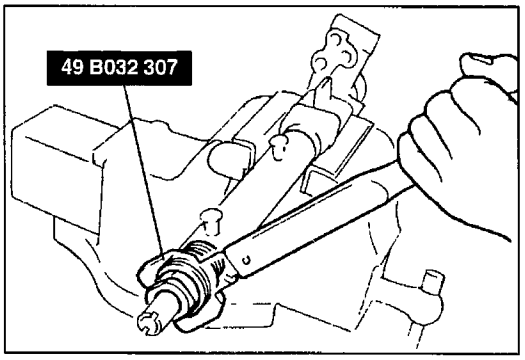
Adjusting cover
Remove the adjusting cover by using the **SST**.



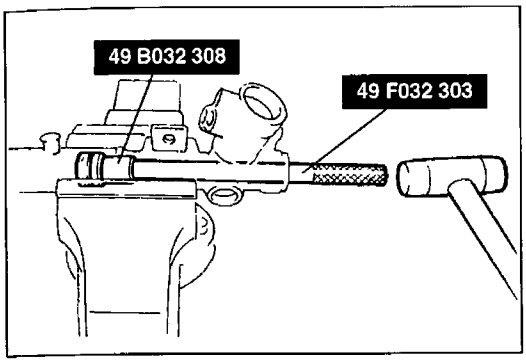
Housing cover
1. Drill away the stake areas.
2. Remove the housing cover.



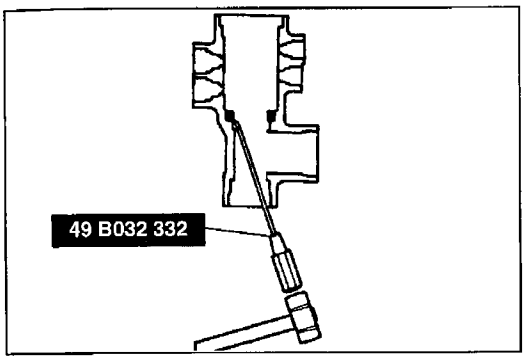
Oil seal and bearing
Remove the oil seal and bearing by using the **SSTs**.



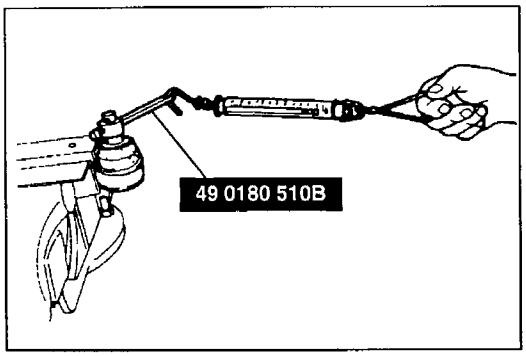
Outer box assembly
Remove the outer box by using the **SST**.



Oil seal and inner guide
Remove the oil seal and inner guide by using the **SSTs**.



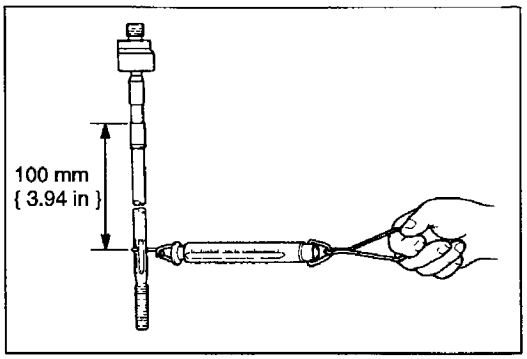
Oil seal (pinion)
Remove the oil seal by using the **SST**.



Inspection
Tie-rod end
1. Inspect the tie-rod end for damage and boot cracks. Replace it if necessary.
2. Inspect the ball joint for looseness. Replace the tie-rod end as necessary.
3. Rotate the ball joint five times.
4. Measure the rotation torque of the ball joint by using the **SST** and a pull scale.

   Rotation torque:
   0.3—2.9 N·m { 3—30 kgf·cm , 2.6—26 in·lbf }
   Pull scale reading:
   3—29 N { 0.3—3.0 kgf , 0.7—6.6 lbf }

5. If not within specification, replace the tie-rod end.

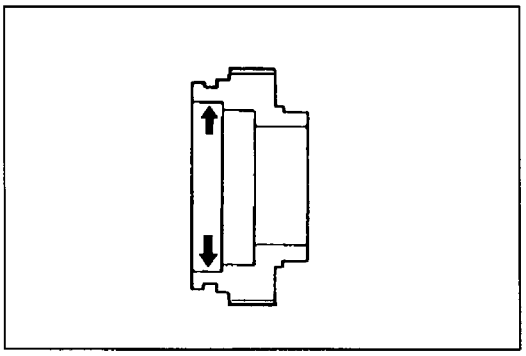


Tie rod

1. Inspect the tie rod for bending and damage. Replace it if necessary.
2. Inspect the ball joint for looseness. Replace the tie rod as necessary.
3. Swing the tie rod five times.
4. Measure the swinging torque by using a pull scale.

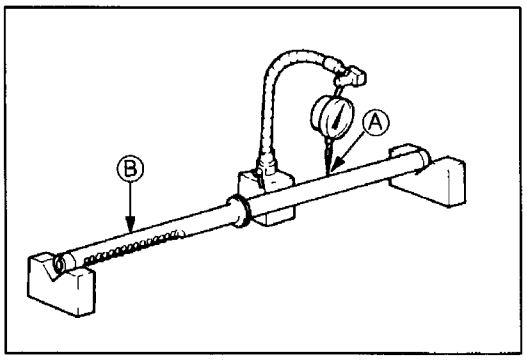
   Swinging torque:
   0.1—3.4 N·m { 1—35 kgf·cm , 0.9—30 in·lbf }
   Pull scale reading:
   0.7—21 N { 0.07—2.2 kgf , 0.16—4.8 lbf }

5. If not within specification, replace the tie rod.



Plug

Inspect for scratches or other damage at the oil seal installation inner diameter and replace it if necessary.



Steering rack

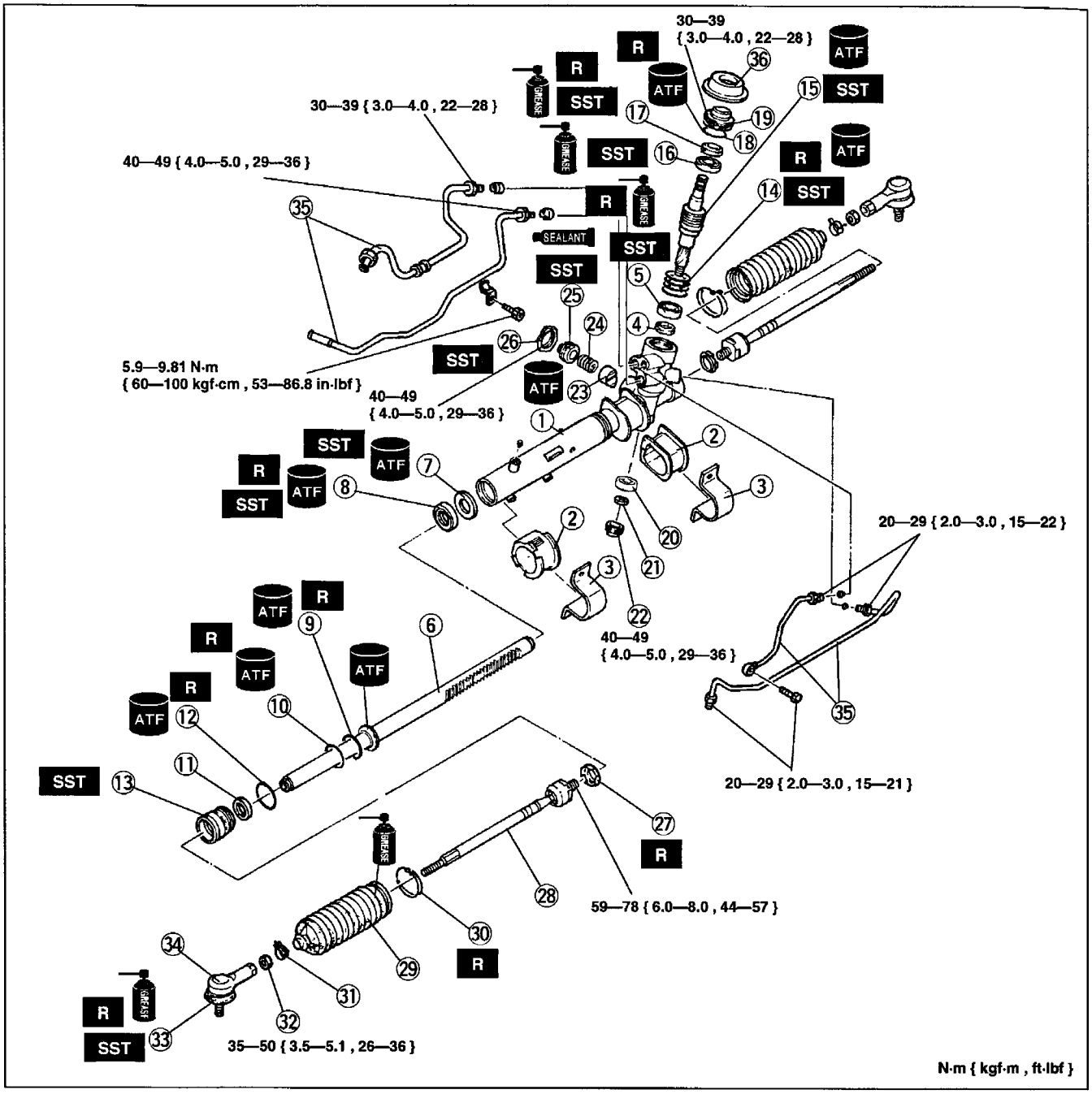
1. Inspect for cracking, damage, and tooth wear. Replace if necessary.
2. Measure the runout of the rack.

   Runout Ⓐ: 0.3 mm { 0.012 in } max.
   Ⓑ: 0.4 mm { 0.016 in } max.

3. If not within specification, replace the rack.

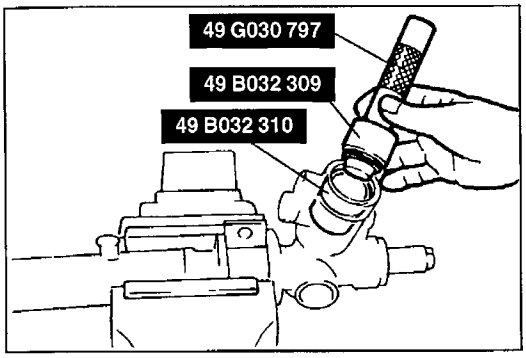
MEMO

Assembly

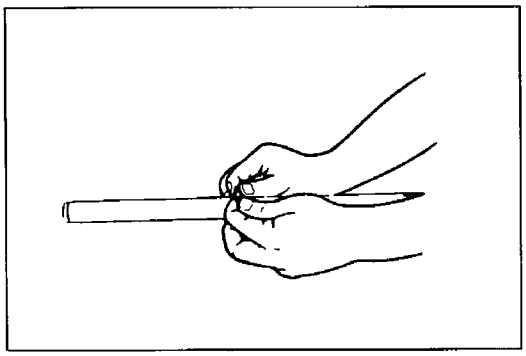


1. Gear housing
2. Mounting rubber
3. Mounting bracket
4. Collar
5. Oil seal (pinion)
   Assembly Note ..... page N–21
6. Steering rack
   Assembly Note ..... page N–21
7. Inner guide
8. Oil seal (rack)
9. O-ring
10. Seal ring
11. U-gasket
12. O-ring
13. Outer box assembly
    Assembly Note ..... page N–22
14. Seal ring
    Assembly Note ..... page N–22
15. Pinion shaft assembly
    Assembly Note ..... page N–22
16. Bearing
    Disassembly Note ..... page N–23
17. Oil seal
    Assembly Note ..... page N–23
18. O-ring
19. Plug
20. Bearing
21. Locknut

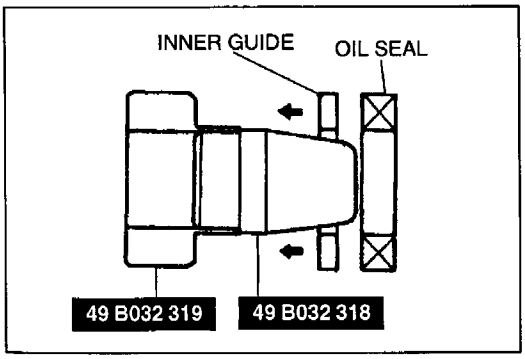
22. Housing cover
23. Support yoke
24. Yoke spring
25. Adjusting cover
    Assembly Note ..... page N–23
26. Locknut
    Assembly Note ..... page N–23
27. Washer
28. Tie rod
29. Boot
30. Boot wire
31. Boot clamp
32. Locknut
33. Tie-rod end boot
    Assembly Note ..... page N–23
34. Tie-rod end
    Assembly Note ..... page N–24
35. Oil pipe
36. Dust cover



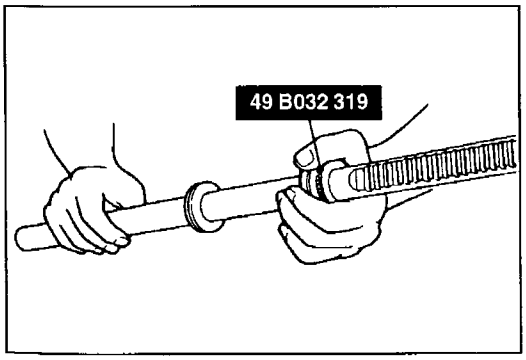
Assembly note
Oil seal (pinion)
1. Apply grease to the new oil seal.
2. Install the oil seal in the gear housing by using the **SSTs.**



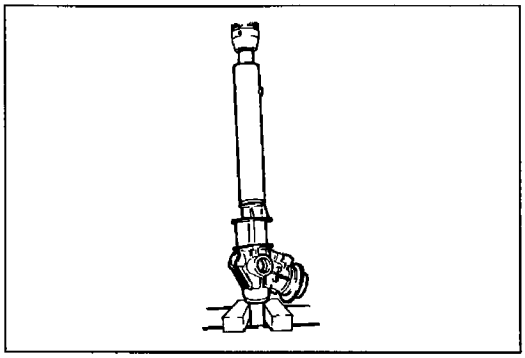
Steering rack
1. Apply ATF to a new O-ring and seal ring.
2. Install the O-ring and seal ring in the groove.
3. Hold the seal ring and O-ring.



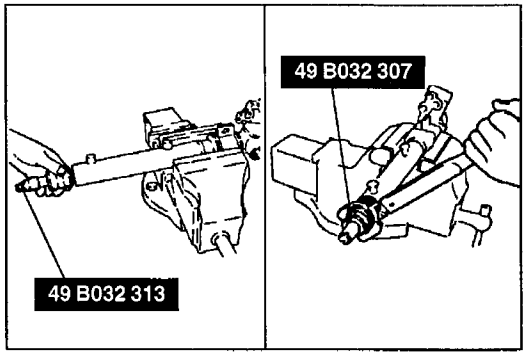
4. Apply ATF to the inner guide and oil seal.
5. Install the inner guide and oil seal to the **SST** (49 B032 319) by using the **SST** (49 B032 318).



6. Place the oil seal and inner guide at the edge of the steering rack's pinion by using the **SST.**
7. Remove the **SST.**

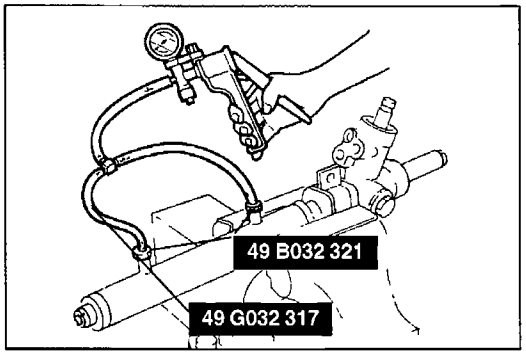


8. Install the steering rack in to gear box.
9. Press the oil seal and inner guide to the correct position.



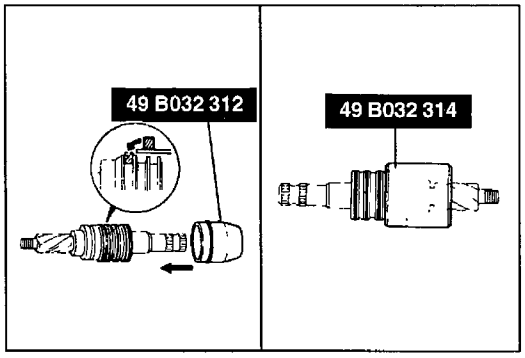
Outer box assembly

1. Install the **SST** (49 B032 313) to the steering rack.
2. Install the outer box, and use the **SST** (49 B032 307) to tighten.
3. Remove the **SST** (49 B032 313).



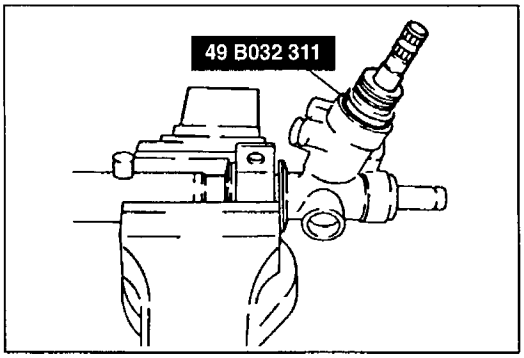
(Hermetic sealing inspection of cylinder)

1. Connect the **SST** (49 B032 321) to the cylinder housing.
2. Connect a vacuum pump to the **SST** (49 G032 317) and apply **53.3 kPa { 400 mmHg , 15.7 inHg }** vacuum.
3. Verify that vacuum is held for at least **30 seconds**. If not, replace the oil seal.



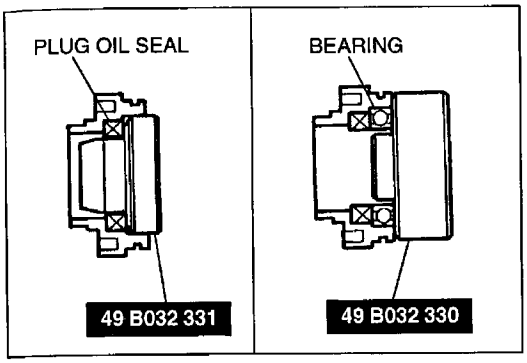
Seal ring

1. Install the new seal ring to the pinion shaft by using the **SST** (49 B032 312).
2. Slide the **SST** (49 B032 314) over the seal ring until they are set in the grooves.

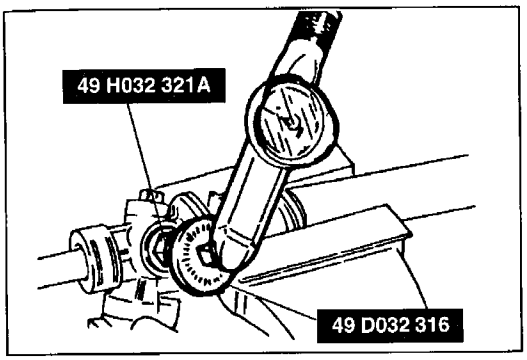


Pinion shaft assembly

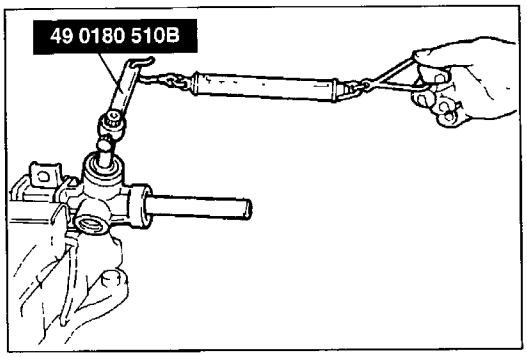
Install the pinion shaft assembly to the gear housing by using the **SST**.



Oil seal and bearing
1. Apply grease to the oil seal and bearing.
2. Install the oil seal and bearing to the plug by using the **SSTs**.



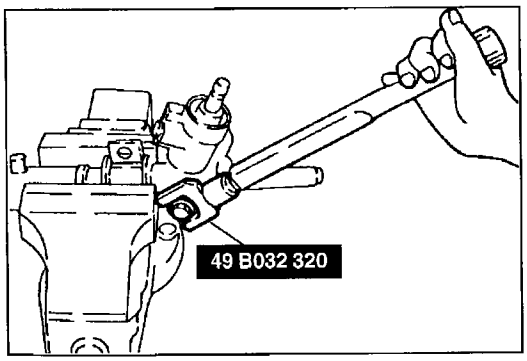
Adjusting cover and locknut
1. Apply sealant to the threads of the adjusting cover.
2. Tighten the adjusting cover to **4.9 N·m { 50 kgf·cm , 43 in·lbf }** by using the **SSTs** and return it about **45 degrees**.

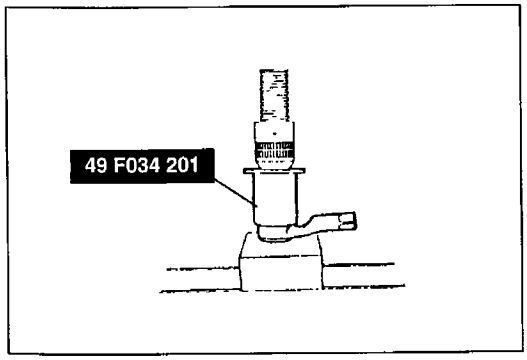


(Inspection of pinion preload)
3. Attach the **SST** and a pull scale to the pinion shaft.
4. Measure the pinion preload.

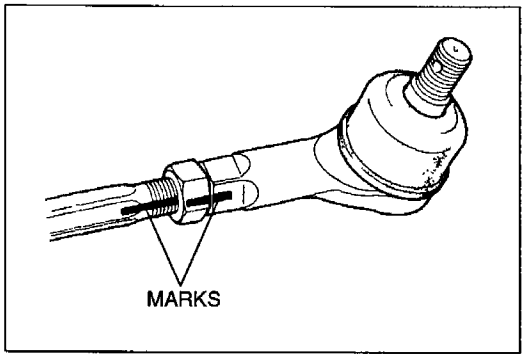
Rack position: Center ±90°
Pinion preload: 1.0—1.2 N·m
{ 10—12 kgf·cm , 8.7—10.4 in·lbf } max.
Pull scale reading:
9.9—12 N { 1.0—1.4 kgf , 2.2—2.6 lbf }

5. If not to specification, readjust by turning the adjusting cover **0—45 degrees**.
6. Apply the sealant to the threds of the locknut.
7. Tighten the locknut while holding the adjusting cover by using the **SST**.





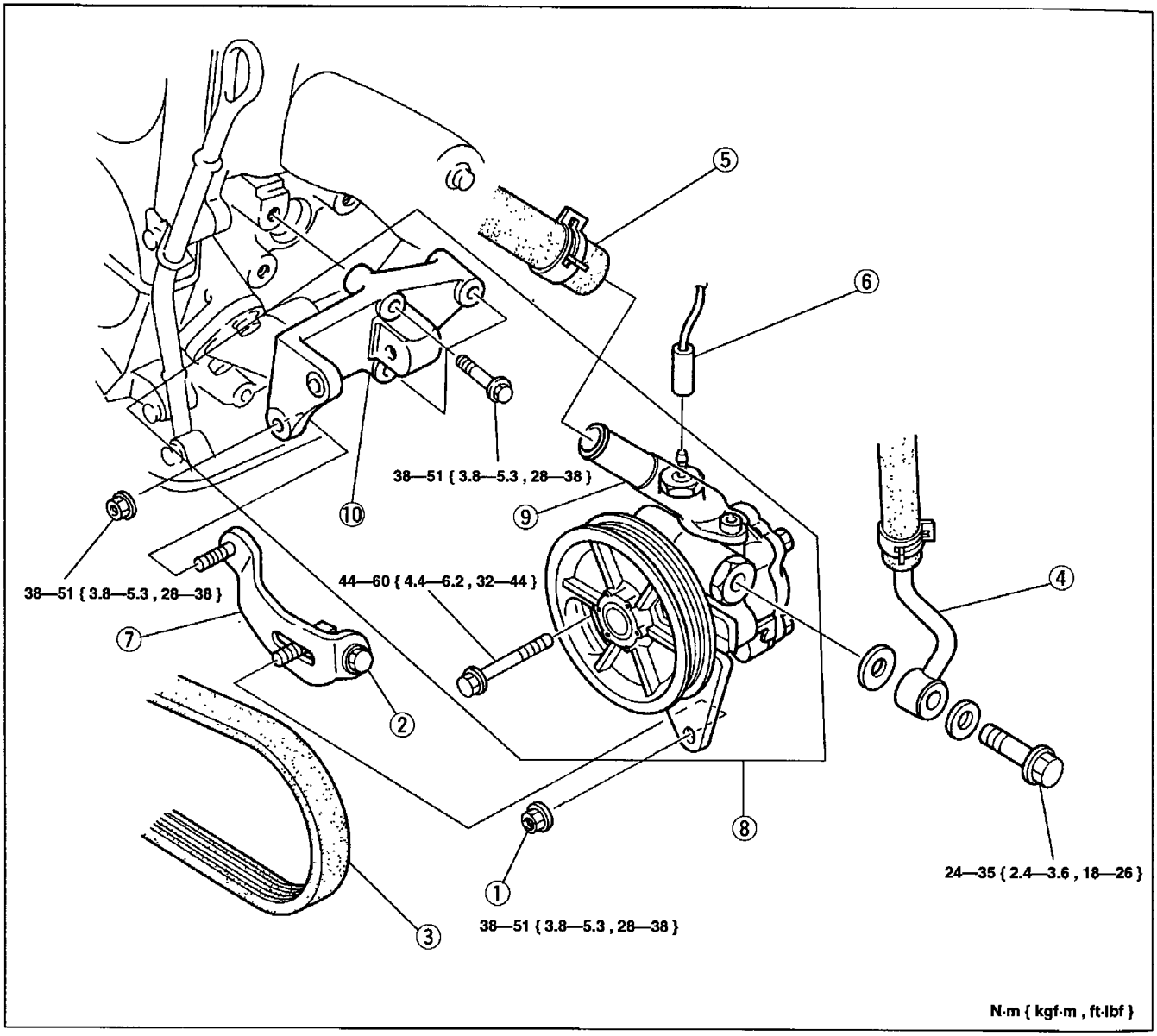
Tie-rod end boot
1. Wipe away the grease on the ball joint.
2. Put a small amount of grease (lithium-based) into the new boot and set it onto the tie-rod end.
3. Press the boot onto the tie-rod end by using the **SST** and a press.
4. Wipe away any grease expelled from the dust boot.



Tie-rod end

Install the tie-rod end, aligning the marks made before disassembly.

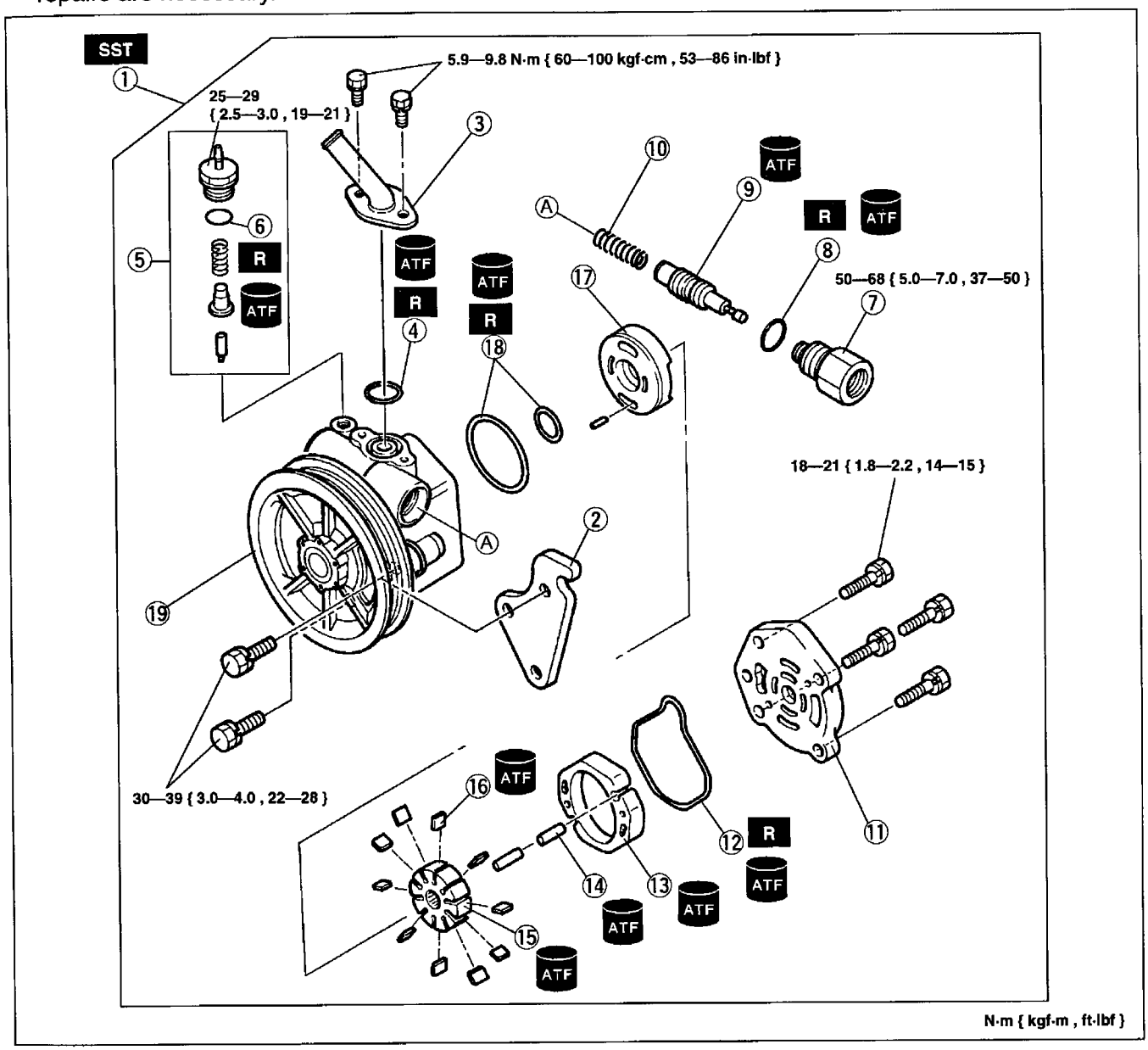
POWER STEERING OIL PUMP
Removal / Installation



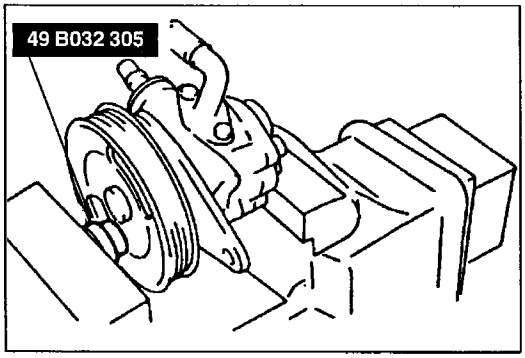
1. Locknut
2. Adjusting bolt
3. Drive belt
   Service ..... section B1, B2
4. Pressure pipe
5. Return hose
6. PSP switch connector
7. Pump bracket
8. Power steering pump bracket and pump
9. Power steering pump
   Disassembly / Inspection / Assembly ..... page N–25

Disassembly / Assembly

The following procedure is for replacement of the O-rings only. Replace the pump assembly if other repairs are necessary.

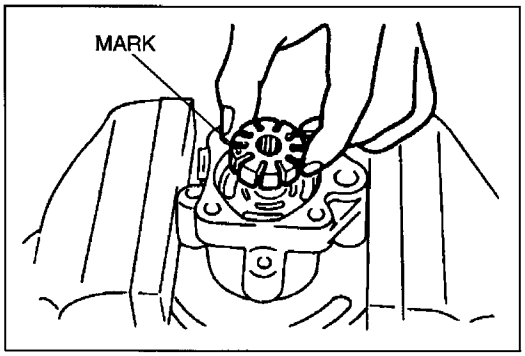


1. Oil pump
   Disassembly Note ..... page N–26
2. Bracket
3. Suction pipe
4. O-ring
5. PSP switch assembly
6. O-ring
7. Connector
8. O-ring
9. Control valve
   Inspect for clogging, cracks, and damage
10. Spring
    Inspect for weakness
11. Pump body (Rear)
    Assembly Note ..... page N–26
    Inspect for cracks, wear, and damage
12. O-ring
13. Cam ring
    Assembly Note ..... page N–26
    Inspect for wear and damage
14. Pin
15. Rotor
    Assembly Note ..... page N–26
    Inspect for wear and damage
16. Blade
    Assembly Note ..... page N–26
    Inspect for wear and damage
17. Side plate
    Inspect for wear and damage
18. O-ring
19. Pump body (Front)
    Inspect for cracks, wear, and damage

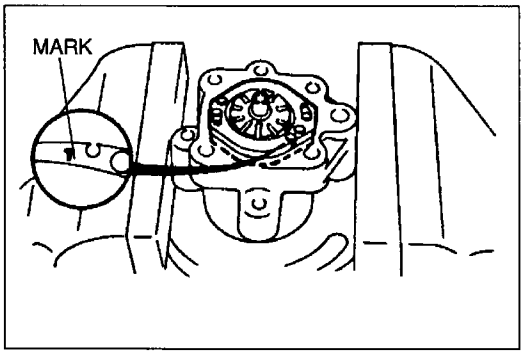


Disassembly note
Oil pump

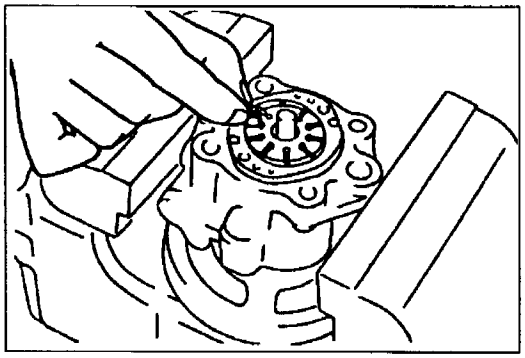
Caution
- **Use the SST to prevent damage to the pump when securing it in a vise.**



Assembly note
Rotor
Install the rotor to the shaft with rotor's identification mark facing upward.



Cam ring
Install the cam ring in the pump body (front) with the mark facing downward.



Blade
Place the blades in the rotor with the rounded edges contacting the cam.

Pump body (Rear)
After installing the pump body (rear), manually turn the shaft to verify that it rotates smoothly.

Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

BRAKING SYSTEM

OUTLINE ..... P– 2
SPECIFICATIONS ..... P– 2
GENERAL PROCEDURES ..... P– 3
CONVENTIONAL BRAKE SYSTEM ..... P– 3
PREPARATION ..... P– 3
AIR BLEEDING ..... P– 4
VACUUM LINE ..... P– 5
BRAKE PEDAL ..... P– 5
MASTER CYLINDER ..... P– 8
POWER BRAKE UNIT P–13
DUAL PROPORTIONING VALVE P–16
FRONT BRAKE (DISC) P–17
DISC PAD (FRONT) P–19
CALIPER (FRONT) P–20
REAR BRAKE (DISC) P–21
DISC PAD (REAR) P–23
CALIPER (REAR) P–24
REAR BRAKE (DRUM) P–25
WHEEL CYLINDER P–28
PARKING BRAKE SYSTEM P–28
PARKING BRAKE (LEVER TYPE) P–28
ANTILOCK BRAKE SYSTEM (ABS) P–30
PREPARATION P–30
ABS HYDRAULIC UNIT P–31
ABS CONTROL MODULE P–34
ABS RELAY P–37
ABS WHEEL-SPEED SENSOR (FRONT) P–40
ABS WHEEL-SPEED SENSOR (REAR) P–41
ON-BOARD DIAGNOSTIC FUNCTION P–42
TROUBLESHOOTING P–48

OUTLINE

SPECIFICATIONS

Item \ Engine		Z5	BP
Brake pedal	Type	Suspended	
	Pedal lever ratio	4.11	
	Max. stroke mm { in }	140 { 5.51 }	
Master cylinder	Type	Tandem (with level sensor)	
		Conventional (Non-ABS), Port-less (ABS)	
	Cylinder inner diameter mm { in }	23.8 { 0.937 }	
Front disc brake	Type	Ventilated disc	
	Cylinder bore mm { in }	54.0 { 2.12 }	
	Pad dimensions (area × thickness) mm^2 { in^2 } × mm { in }	3800 × 10 { 5.89 × 0.39 }	4300 × 10 { 6.66 × 0.39 }
	Disc plate dimensions mm { in } (outer diameter × thickness)	235 × 22 { 9.25 × 0.87 }	257 × 22 { 10.1 × 0.87 }
Rear disc brake	Type	—	Solid disc
	Cylinder bore mm { in }	—	30.2 { 1.19 }
	Pad dimensions (area × thickness) mm^2 { in^2 } × mm { in }	—	2600 × 8.0 { 4.03 × 0.31 }
	Disc plate dimensions mm { in } (outer diameter × thickness)	—	251 × 9.0 { 9.88 × 0.35 }
Rear drum brake	Type	Leading-trailing	—
	Wheel cylinder inner diameter mm { in }	19.0 { 0.75 }	—
	Lining dimensions mm { in } (width × length × thickness)	35.0 × 192.0 × 4.0 { 1.38 × 7.56 × 0.16 }	—
	Drum inner diameter mm { in }	200 { 7.87 }	—
	Shoe clearance adjustment	Automatic adjuster	—
Power brake unit	Type	Vacuum multiplier	
	Diameter mm { in }	MTX : 239 { 9.4 } ATX : 188+215 { 7.4+8.5 }	
Braking force control device	Type	Dual proportioning valve	
Brake fluid		FMVSS116: DOT3	
Parking brake	Type	Mechanical two-rear-wheel control	
	Operation system	Center lever	

GENERAL PROCEDURES

Removal / Installation, Disassembly / Assembly
- The numbers in the structural view indicate the removal and disassembly order. For installation and assembly, follow the reverse order.

Wheels and tires
- The removal and installation procedures for the wheels and tires are not mentioned in this section. If you must remove a wheel, retighten it to **89—127 N·m { 9.0—13.0 kgf·m , 66—94 ft·lbf }**.

Brake lines

Caution
- **Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.**

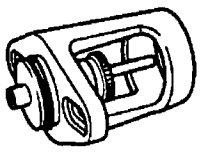
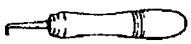
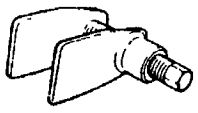
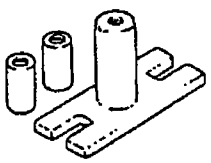
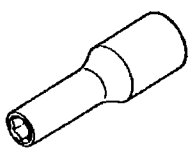
- Tighten the brake pipe flare nut by using the **SST** (49 0259 770B). Be sure to modify the brake pipe flare nut tightening torque to allow for use of a torque wrench-SST combination. (Refer to section GI "Torque Formulas".)
- If a brake line(s) has been disconnected anytime during the procedure, add brake fluid, bleed the brakes, and inspect for leakage after the procedure has been completed.

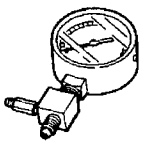
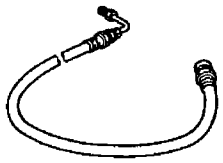
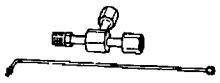
Connectors
- Disconnect the negative battery cable before doing any work that requires handling of connectors. Reconnect the negative battery cable only after the work is completed.

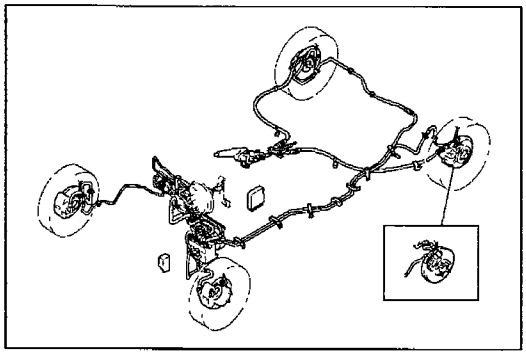
ABS components
- Make sure that there are no diagnostic trouble codes in the ABS memory after working on ABS components. If there are any codes in the memory, erase them.

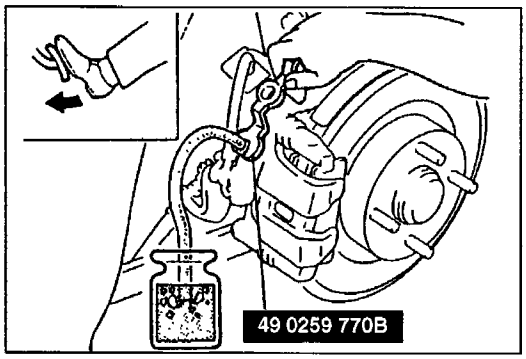
CONVENTIONAL BRAKE SYSTEM

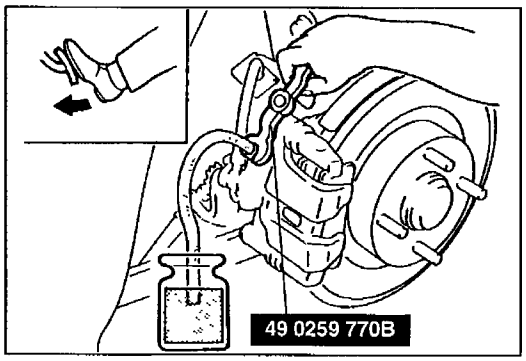
PREPARATION
SST

49 0259 770B Wrench, flare nut 	For removal of brake pipe	49 B043 001 Adjust gauge 	For adjustment of push rod clearance
49 0208 701A Air-out tool, boot 	For removal of piston seal	49 0221 600C Expand tool, disc brake 	For installation of brake pads
49 E043 003A Lock tool, turning 	For adjustment of push rod clearance	49 B043 004 Socket wrench 	For adjustment of push rod clearance

49 U043 0A0 Gauge set, oil pressure 	For inspection of brake fluid pressure	49 U043 004 Gauge, oil pressure (Part of 49 U043 0A0) 	For inspection of brake fluid pressure
49 U043 006 Hose (Part of 49 U043 0A0) 	For inspection of brake fluid pressure	49 U043 005 Joint (Part of 49 U043 0A0) 	For inspection of brake fluid pressure







AIR BLEEDING

Note

- The brakes should be bled whenever a brake line is disconnected. If a hydraulic line is disconnected at the master cylinder, start at the slave cylinder farthest from the brake master cylinder, and move to the next farthest slave cylinder until all four cylinders have been bled. If the disconnection point is anywhere except the master cylinder, start at the point closest to the disconnection, and move to the next closest slave cylinder until all four cylinders have been bled.

1. On level ground , jack up the vehicle and support it evenly on safety stands.
2. Remove the bleeder cap and attach a vinyl tube to the bleeder screw.
3. Place the other end of the vinyl tube in a clear fluid-filled container.
4. One person should depress the brake pedal a few times, and then hold it in the depressed position.
5. A second person should loosen the bleeder screw, drain out the fluid, and close the screw by using the **SST**.
6. Repeat step 4 and 5 until no air bubbles are seen. The reservoir should be kept about 3/4 full during bleeding to prevent air from reentering the lines.

Tightening torque

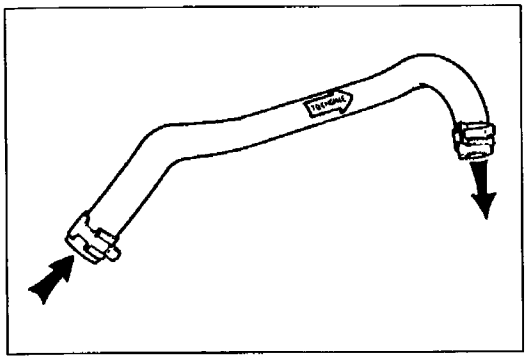
Front:

6.9—9.8 N·m { 70—100 kgf·cm , 61—86 in·lbf }

Rear:

5.9—8.8 N·m { 60—90 kgf·cm , 53—78 in·lbf }

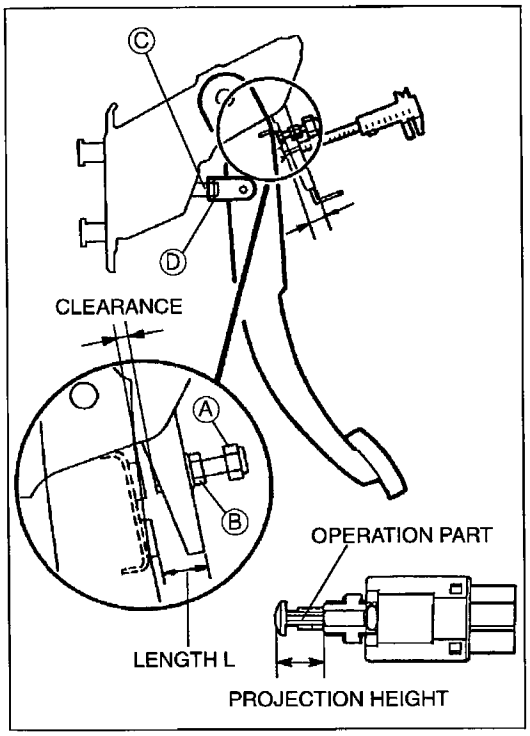
7. Check for correct brake operation.
8. Verify that there is no fluid leakage. Wipe off any spilled fluid immediately.
9. After bleeding the brakes, add brake fluid to MAX.



VACUUM LINE

Inspection

1. Remove the clamps and the hose.
2. Apply both suction and pressure to the engine-side of the hose, and verify that air flows only toward that side. If air flows in both directions or not at all, replace the vacuum hose.



BRAKE PEDAL

Inspection (On-vehicle)

Brake pedal height

Inspection

1. Remove the brake switch.
2. Measure length L.

   Length L: 17.9—21.9 mm { 0.71—0.86 in }

3. If length L is within the specification, reinstall the switch.

Adjustment

1. Loosen locknut B and turn self-locknut A until it does not contact the pedal.
2. Loosen locknut D and turn rod C to adjust the height.
3. Tighten locknut D.

   Tightening torque:
   24—34 N·m { 2.4—3.5 kgf·m , 18—25 ft·lbf }

4. Turn self-locknut A so that the clearance between self-locknut A and the pedal is **0.1—1.0 mm { 0.004—0.039 in }**.
5. Tighten locknut B.

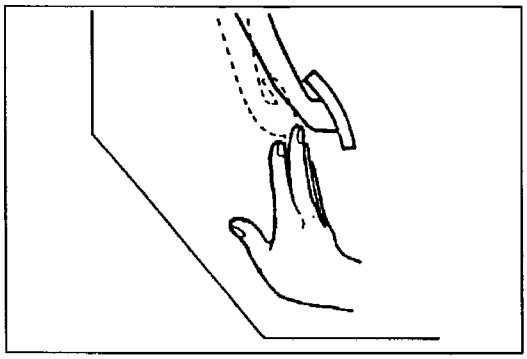
   Tightening torque:
   14—17 N·m { 1.4—1.8 kgf·m , 11—13 ft·lbf }

   Caution
   - **When the brake pedal height is adjusted, a new brake switch must be used.**
   - **The new switch can be adjusted only once.**
   - **Pulling or pushing the tip of the new brake switch can damage the inner parts.**

6. Install a new brake switch.

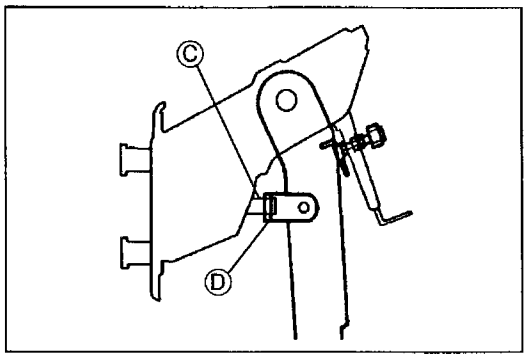
   Note
   - The new brake switch projection height is adjusted automatically in step 7.

7. Pull the brake pedal until you hear the tip of the brake switch click.
8. Inspect the pedal play and the brake light operation.
9. If the brake light does not operate, replace the brake switch and repeat steps 6—8.



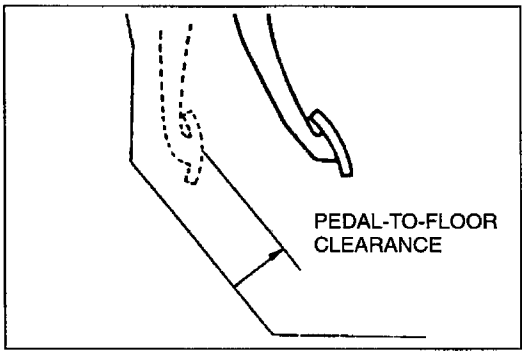
Pedal play
Inspection
1. Depress the pedal a few times to eliminate the vacuum in the system.
2. Remove the snap pin, verify that the holes in the fork and in the pedal are aligned, and reinstall the pin.
3. Gently depress the pedal by hand and check the free play (until resistance is felt).

Pedal play: 4—12 mm { 0.16—0.47 in }



Adjustment
1. Remove the snap pin and the clevis pin.
2. Loosen locknut D and turn rod C to align the holes in the fork and in the pedal.
3. Install the clevis pin and the snap pin.
4. Verify the pedal height and the brake light operation.

Tightening torque:
24—34 N·m { 2.4—3.5 kgf·m , 17—25 ft·lbf }



Pedal-to-floor clearance
Inspection

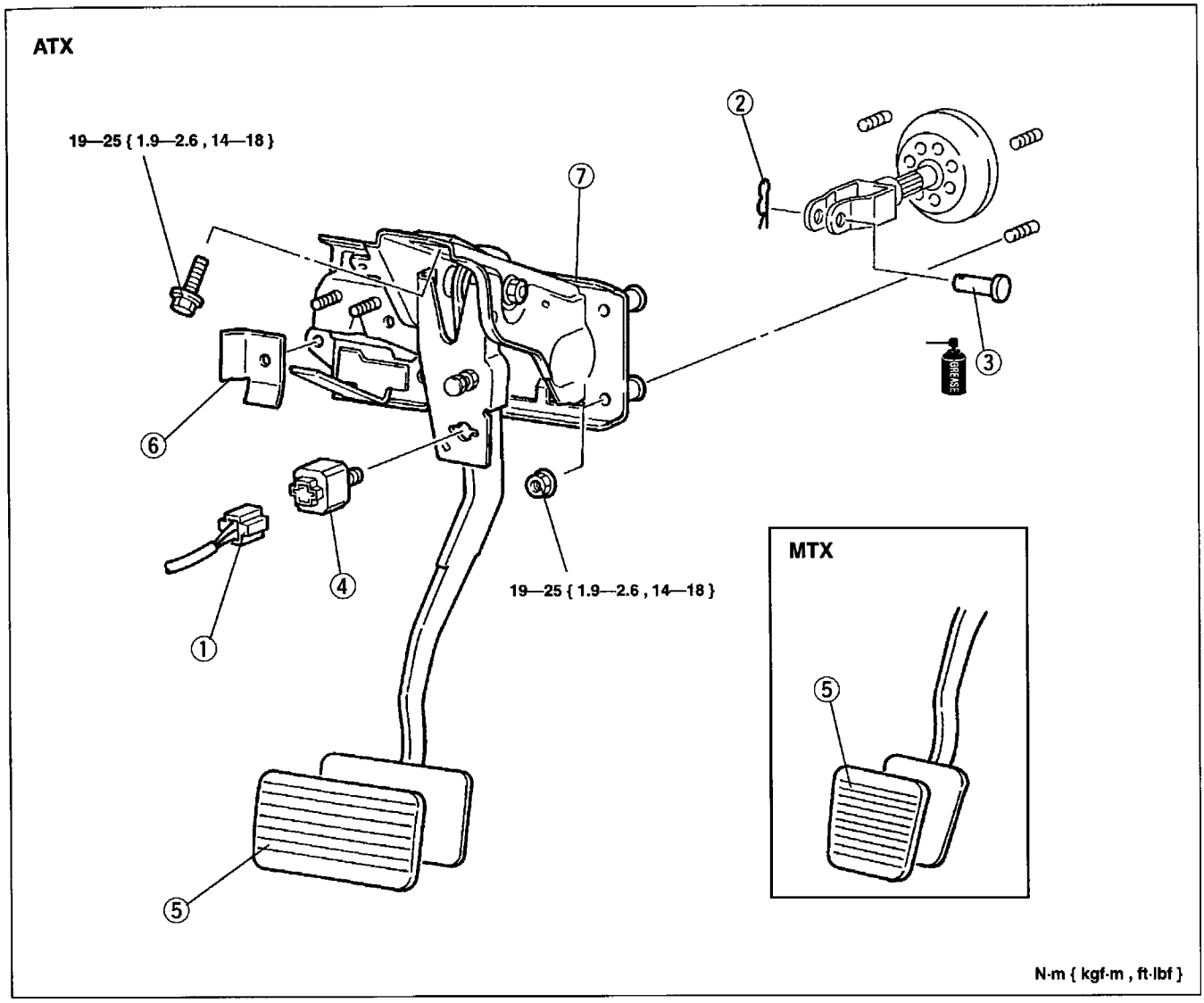
Verify that the distance from the floor panel to the pedal pad center is as specified when the pedal is depressed with a force of **590 N { 60 kgf , 130 lbf }**.

Pedal-to-floor clearance: 70 mm { 2.8 in } min.

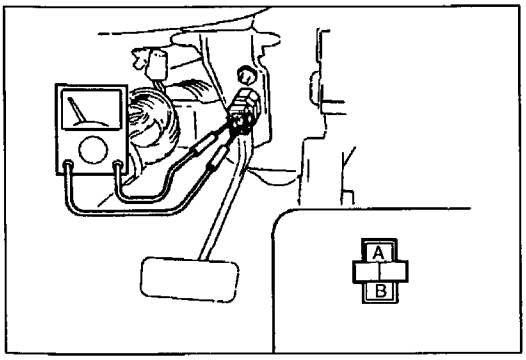
If the distance is less than specified, check for the following problems.
1. Air in brake system
2. Malfunction of automatic adjuster
3. Worn pads/shoes

Removal / Inspection / Installation

- After installation, check and adjust the pedal height and free play. (Refer to page P–6.)



1. Brake switch connector
2. Snap pin
3. Clevis pin
4. Brake switch
   Inspection ..... below
5. Pedal pad
   Inspect for wear and damage
6. Plate
7. Brake pedal assembly
   Inspect for bending and damage

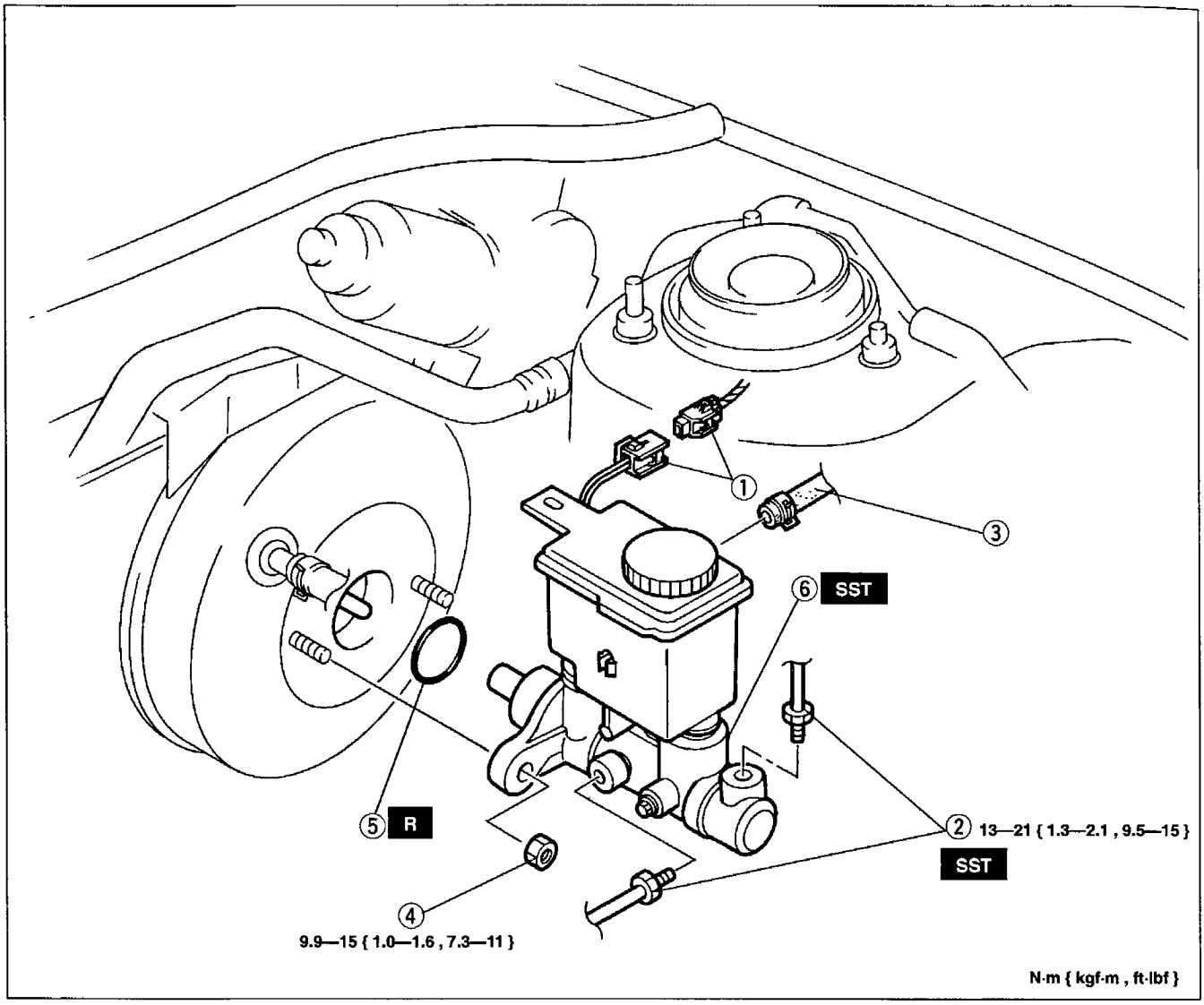


Inspection

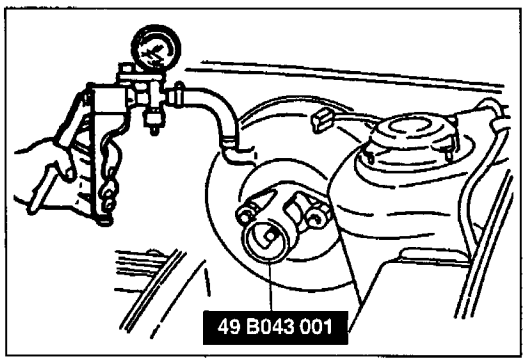
Brake switch

1. Disconnect the brake switch connector.
2. Connect an ohmmeter between terminals A and B of the brake switch.
3. Confirm continuity between the terminals when the brake pedal is depressed.

MASTER CYLINDER
Removal / Installation



1. Brake fluid level sensor connector
2. Brake pipe
3. Hose (MTX)
4. Nut
5. O-ring (ABS model)
6. Master cylinder
   Disassembly / Inspection / Assembly ..... page P–11
   Installation Note ..... below

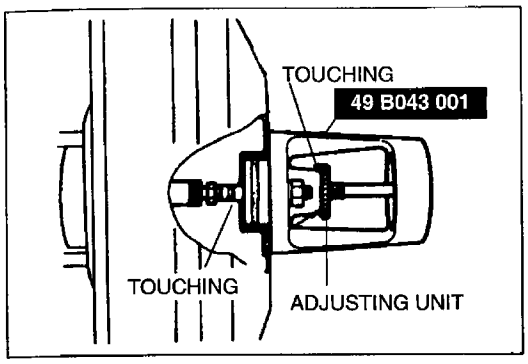


Installation Note
Master cylinder
Piston to push rod clearance

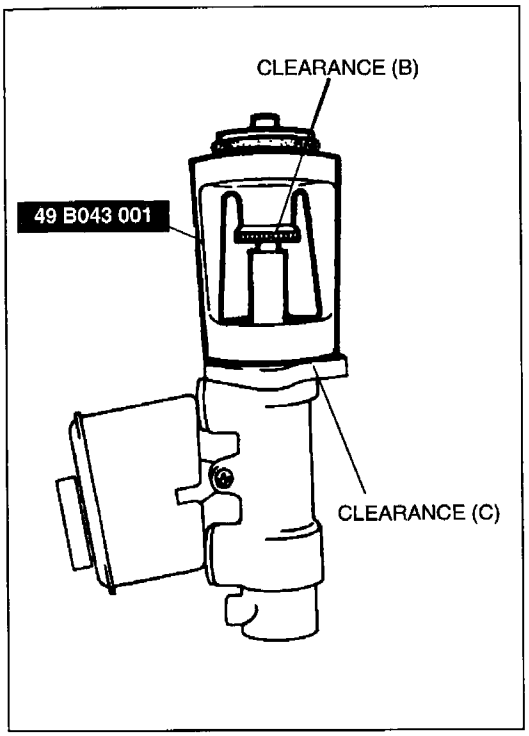
1. Turn the nut of the **SST** clockwise to fully retract the **SST** gauge rod. Attach the **SST** to the power brake unit.

   Tightening torque:
   9.8—15 N·m { 1.0—1.6 kgf·m , 7.2—11 ft·lbf }

2. Apply **66.7 kPa { 500 mmHg , 19.7 inHg }** vacuum using a vacuum pump.



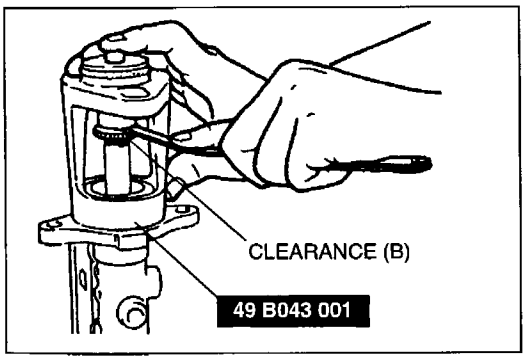
3. Turn the adjusting nut of the **SST** counterclockwise until the gauge rod just contacts the push rod end of the power brake unit.
   Push lightly on the end of the gauge rod to be sure it is seated. Verify that there is no gap between the adjusting nut and **SST** body.



4. Remove the **SST** from the power brake unit without disturbing the adjusting nut. Set the **SST** onto the master cylinder as shown in the figure.
5. Push lightly on the end of the **SST** gauge rod to be sure it is bottomed in the master cylinder piston, but do not push so hard that the piston moves. Note any clearance between the **SST** body and the adjusting nut (clearance B) or between the body and the master cylinder (clearance C). Adjust the push rod as necessary as outlined in "Adjustment" below.

Measurement	Push rod
Clearance at (B)	Too short
Clearance at (C)	Too long
No clearance at (B) or (C)	OK

P

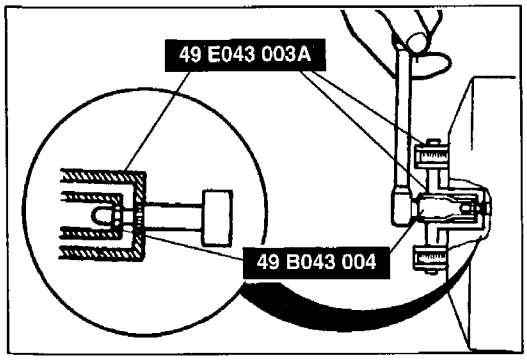


Adjustment

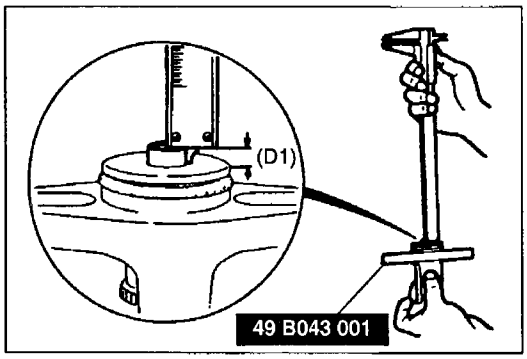
The threads of the push rod are specially designed so that the bolt becomes harder to turn past a certain point. This is to prevent the bold from coming loose. Turn the bolt only within this range when adjusting.

Clearance at B

1. Push lightly on the end of the **SST** gauge rod, and measure the clearance between the adjusting nut and the **SST** body.

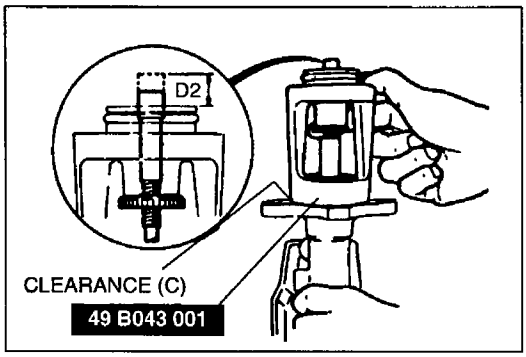


2. Using the **SSTs**, turn the nut to lengthen the power brake unit push rod to an amount equal to the clearance measured at B.

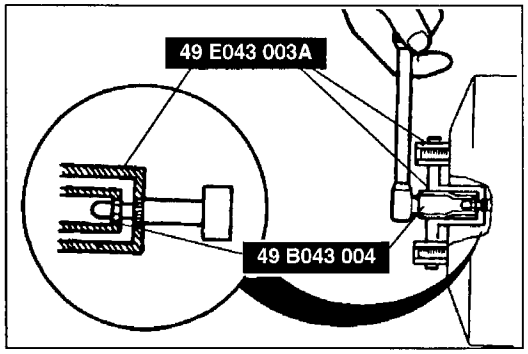


Clearance at C

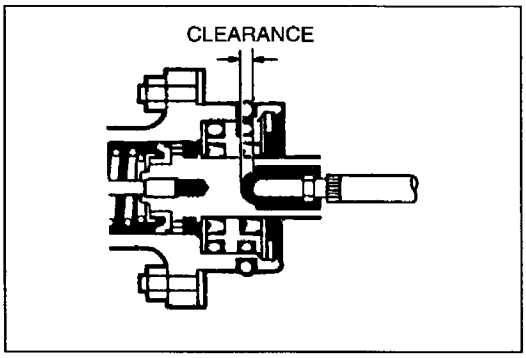
1. Measure and record height D1 of the gauge rod.



2. Turn the adjusting nut until the **SST** body sets squarely on the master cylinder. (Turn only enough for the body to touch.)
3. Measure and record height D2 of the gauge rod.



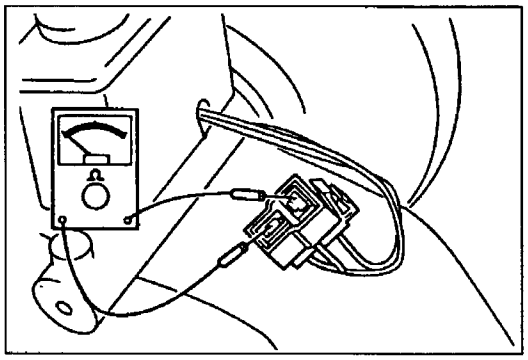
4. Subtract D1 from D2 and using the **SST**, turn the nut to shorten the power brake unit push rod an amount equal to the sum.



Note

- This adjustment produces the following clearance.

Vacuum applied to unit	Push rod to piston clearance
Approx. 66.7 kPa { 500 mmHg , 19.7 inHg }	0.1—0.4 mm { 0.0039—0.0157 in }



Inspection

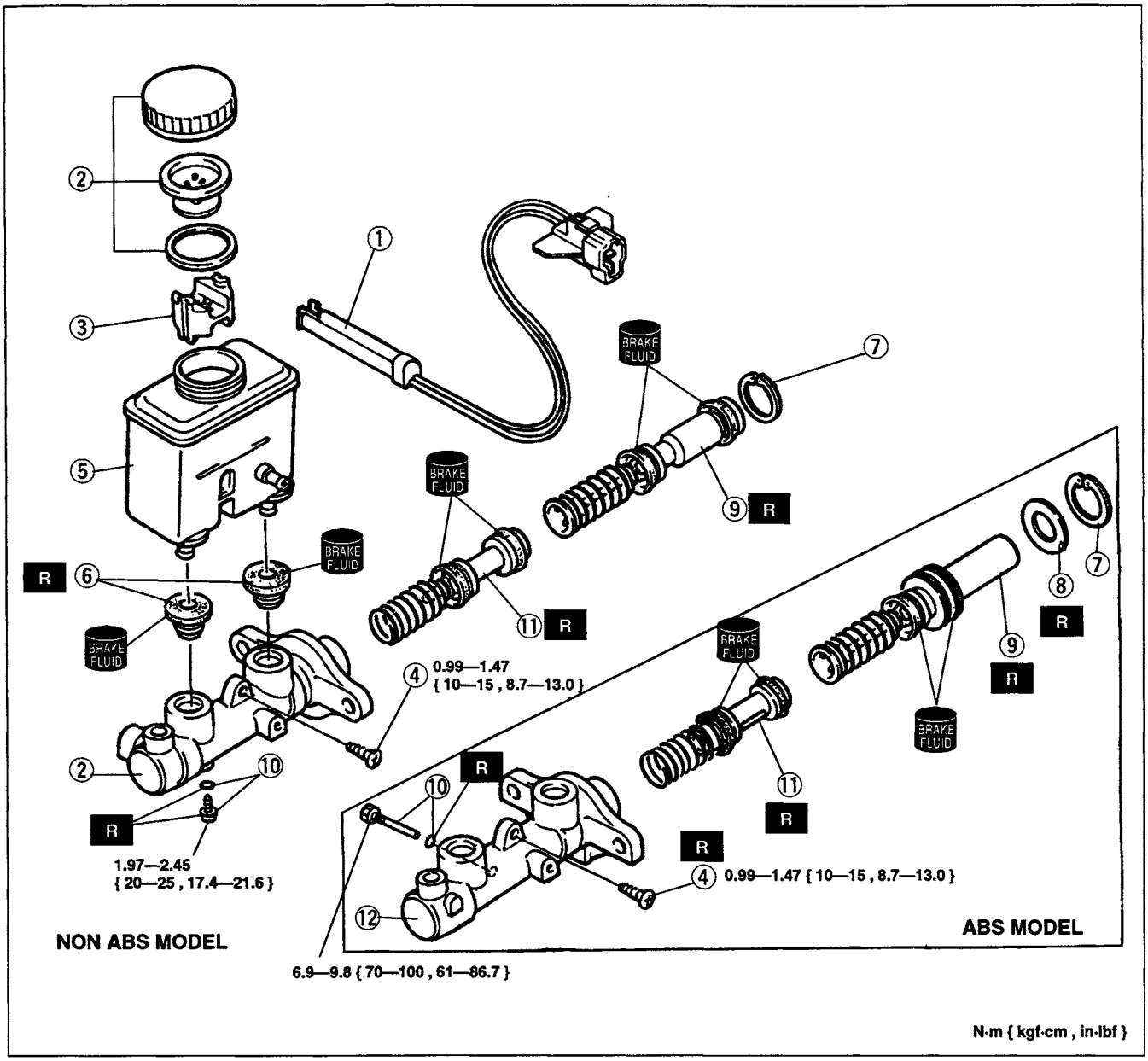
Fluid level sensor

1. Disconnect the sensor connector.
2. Connect an ohmmeter to the connector.
3. Starting with the fluid level above MIN, verify that there is no continuity.
4. Remove the brake fluid and verify continuity when the level is below MIN.
5. Replace the sensor if necessary.

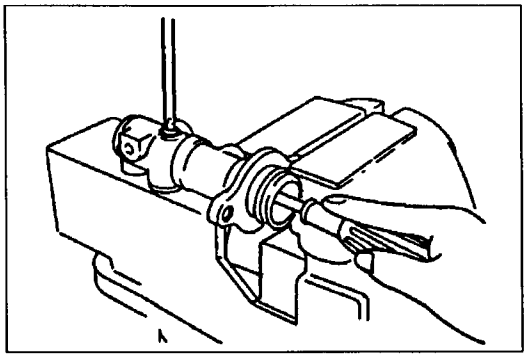
Disassembly / Inspection / Assembly

Caution

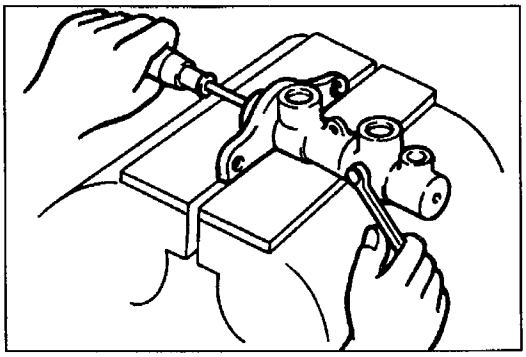
- **The brake master cylinder is made of aluminum, and can be easily damaged by tightening in a vise. When securing the master cylinder in a vise, tighten only the flange of the master cylinder.**



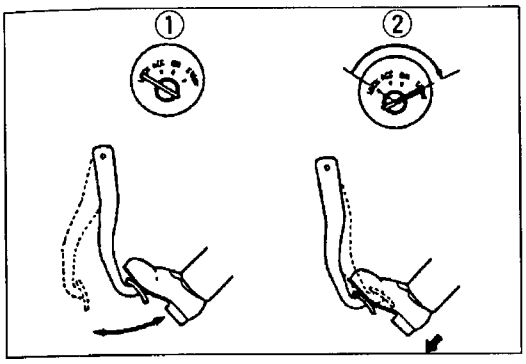
1. Fluid level sensor
   Inspection ..... page P–10
2. Cap set
3. Filter
4. Screw
5. Reservoir
   Inspect for damage and deformation
6. Bushings
7. Snap ring
8. Spacer
9. Primary piston assembly
   Inspect for abnormal wear, rust, and damage
10. Stop screw and O-ring (Non ABS model)
    Assembly Note ..... page P–12
10. Stop pin and O-ring (ABS model)
    Assembly Note ..... page P–12
11. Secondary piston assembly
    Inspect for abnormal wear, rust, and damage
12. Master cylinder body
    Inspect inside of body for corrosion



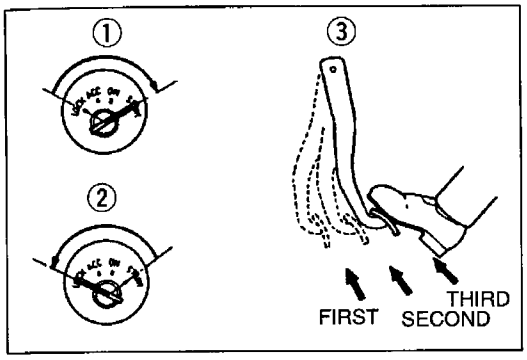
Assembly note
Stop screw and O-ring (Non ABS model)
1. Push the secondary piston assembly in fully.
2. Install and tighten a new O-ring and stop screw.
3. Push and release the piston to verify that it is held by the stop screw.



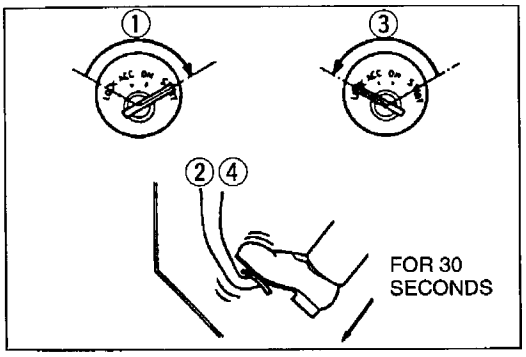
Stop pin and O-ring (ABS model)
1. Install the secondary piston assembly with the piston hole facing the stop pin.
2. Install and tighten a new O-ring and stop pin.
3. Push and release the piston to verify that it is held by the stop pin.



POWER BRAKE UNIT
Quick Inspection (on-vehicle)
Power brake unit function check (simple method)
Step 1
1. With the engine stopped, depress the pedal a few times.
2. With the pedal depressed, start the engine.
3. If the pedal moves down slightly immediately after the engine starts, the unit is operating.

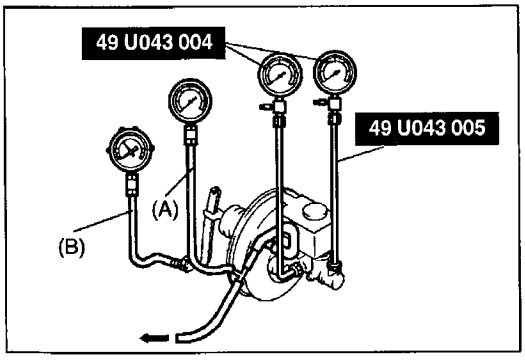


Step 2
1. Start the engine.
2. Stop the engine after it has run for **1 or 2 minutes**.
3. Depress the pedal with the usual force.
4. If the first pedal stroke is long and becomes shorter with subsequent strokes, the unit is operating.
5. If a problem is found, inspect the check valve and vacuum hose for damage and examine the installation. Repair if necessary, and inspect it again.

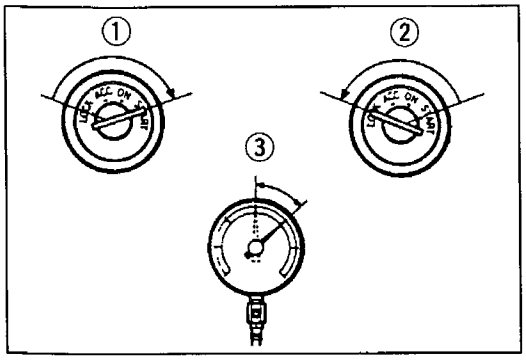


Step 3
1. Start the engine.
2. Depress the pedal with the usual force.
3. Stop the engine with the pedal depressed.
4. Hold the pedal down for **about 30 seconds**.
5. If the pedal height does not change, the unit is operating.
6. If there is a problem, inspect the check valve and vacuum hose for damage, and inspect the connection. Repair if necessary and inspect again.

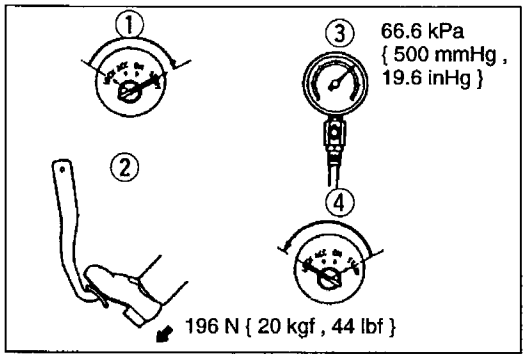
If the nature of the problem is still not clear after the 3 steps above, follow the more detailed inspection described in "Inspection using gauges" below.



(Inspection using gauges)
Connect the **SST** gauges, vacuum gauge (A), and pedal depression force gauge (B) as shown. Bleed the air from the **SST** gauges before performing the following tests.

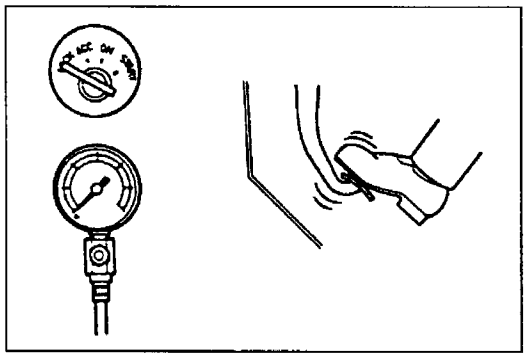


a) Checking for vacuum loss
Unloaded condition
1. Start the engine.
2. Stop the engine when the vacuum gauge reading reaches **66.6 kPa { 500 mmHg , 19.6 inHg }**.
3. Observe the vacuum gauge for **15 seconds**. If the gauge shows **63.4—66.6 kPa { 475—500 mmHg , 18.8—19.6 inHg }**, the unit is operating.



Loaded condition

1. Start the engine.
2. Depress the brake pedal with a force of **196 N { 20 kgf , 44 lbf }**.
3. With the brake pedal depressed, stop the engine when the vacuum gauge reading reaches **66.6 kPa { 500 mmHg , 19.6 inHg }**.
4. Observe the vacuum gauge for **15 seconds**. If the gauge shows **63.4—66.6 kPa { 475—500 mmHg , 18.8—19.6 inHg }**, the unit is operation.

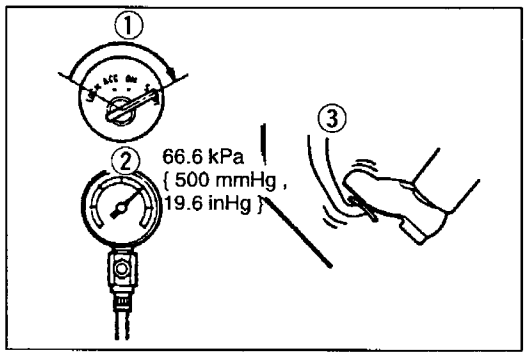


b) Checking for hydraulic pressure

1. With the engine stopped (vacuum **0 kPa { 0 mmHg , 0 inHg }**) , depress the brake pedal with a force of **196 N { 20 kgf , 44 lbf }**. If the fluid pressure is within specification, the unit is operating.

Fluid pressure

MTX: 981 kPa { 10 kgf/cm^2 , 143 psi } min.
ATX: 883 kPa { 9 kgf/cm^2 , 128 psi } min.



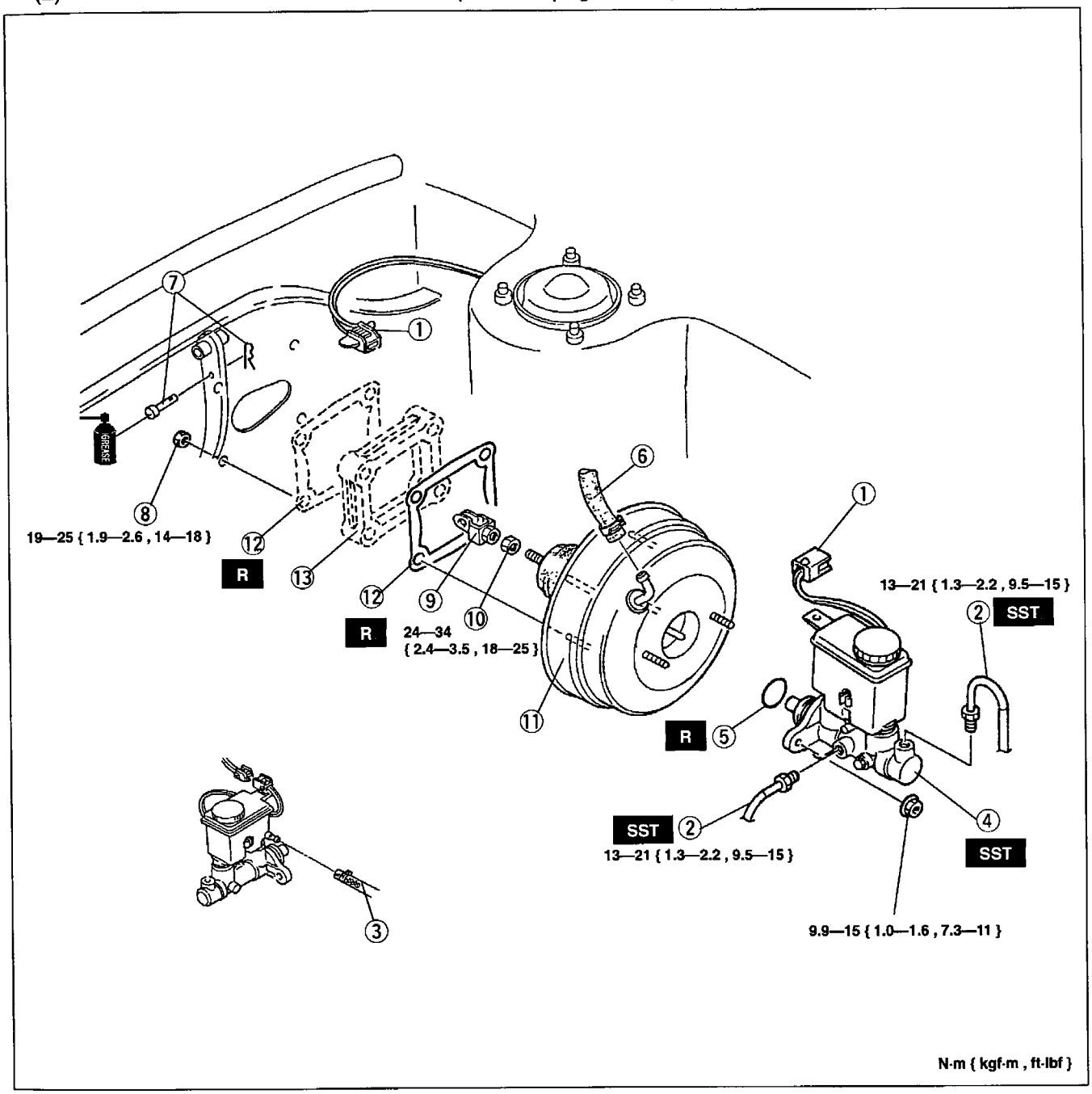
2. Start the engine. Depress the brake pedal with a force of **196 N { 20 kgf , 44 lbf }** when the vacuum reaches **66.6 kPa { 500 mmHg , 19.6 inHg }**. If the fluid pressure is within the specification, the unit is operating.

Fluid pressure

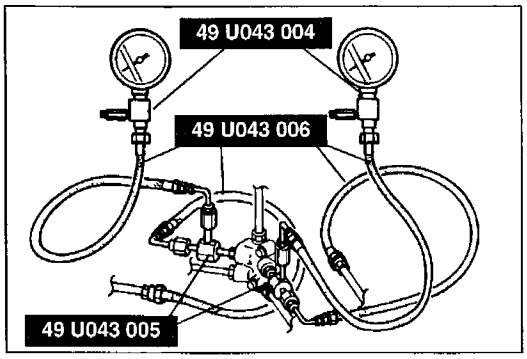
MTX: 7,160 kPa { 73 kgf/cm^2 , 1039 psi } min.
ATX: 8,240 kPa { 84 kgf/cm^2 , 1195 psi } min.

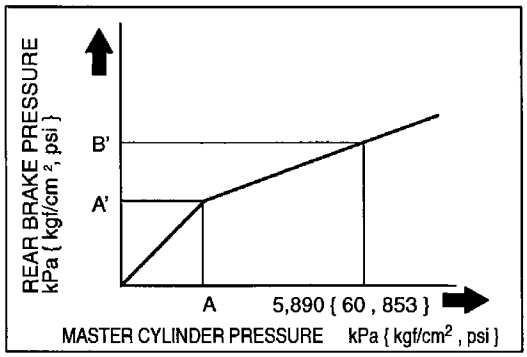
Removal / Installation

- Remove the battery.
- Take the following steps after installation.
  (1)Adjust the brake pedal. (Refer to page P–6.)
  (2)Make an on-vehicle check of the unit. (Refer to page P–13.)



1. Brake fluid level sensor connector
2. Brake pipe
3. Hose (MTX)
4. Master cylinder
   Installation Note ..... page P–8
5. O-ring (ABS model)
6. Vacuum hose
7. Snap pin and clevis pin
8. Nut
9. Fork
10. Nut
11. Power brake unit
12. Gasket
13. Spacer (MTX)





DUAL PROPORTIONING VALVE

Inspection

1. Connect the **SSTs** to the brake pipes by using the adapters as shown in the figure.

   Adapter and flare nut tightening torque:
   13—21 N·m { 1.3—2.2 kgf·m , 9.5—15 ft·lbf }

2. Bleed the air from the brake system. (Refer to page P–5.)
3. Depress the brake pedal until the master cylinder pressure equals A ; then record rear brake pressure A'.
4. Depress the brake pedal again, and apply additional pressure until the pressure reaches **5,890 kPa { 60 kgf/cm², 853 psi }**. Then record pressure B'.

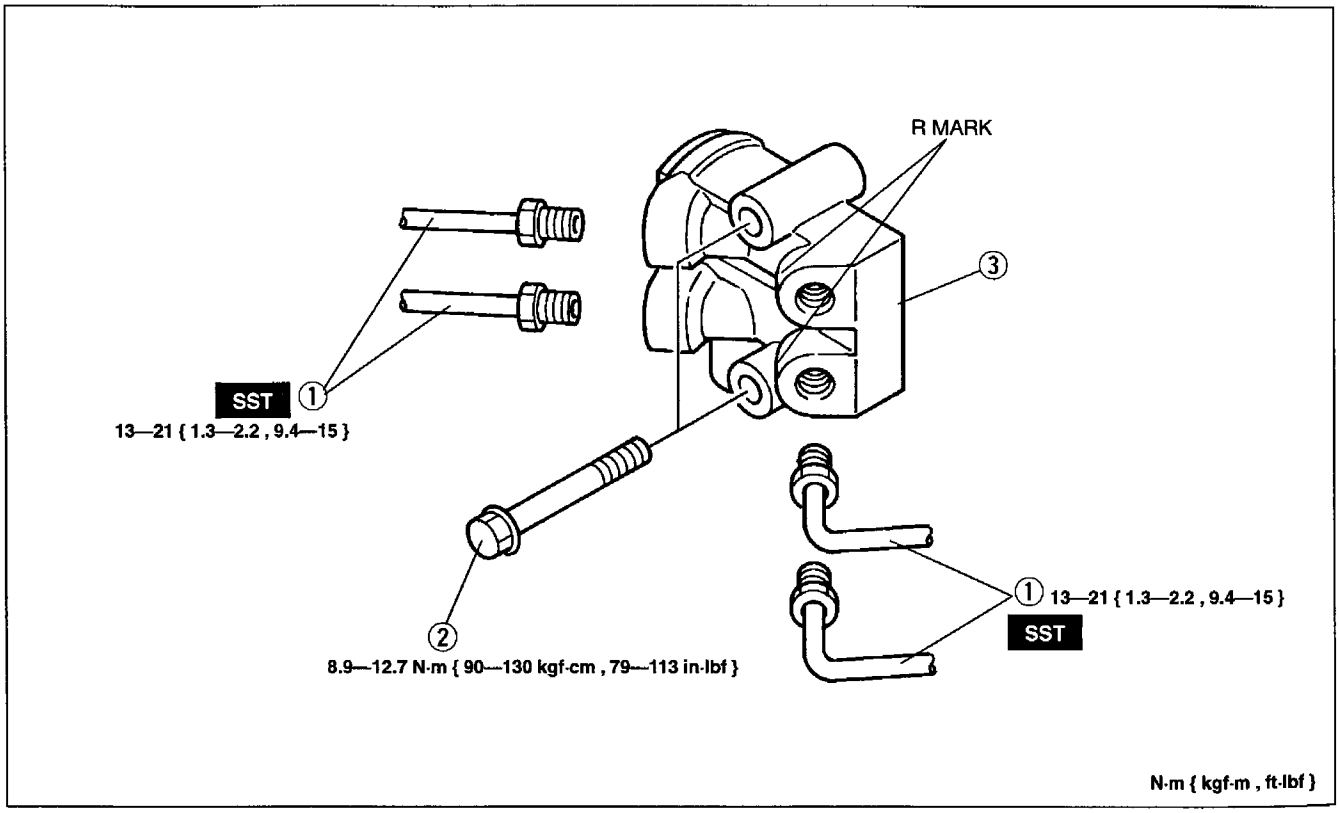
Fluid pressure

kPa { kgf/cm², psi }

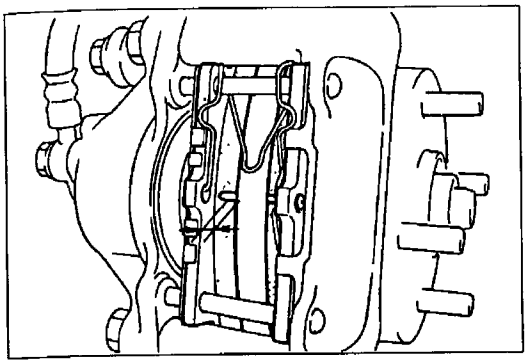
	Z5 engine non-ABS	BP engine non-ABS	Z5, BP engine with ABS
A	1,960 { 20 , 284 }	2,450 { 25 , 356 }	2,450 { 25 , 356 }
A'	1,960 { 20 , 280 } ±196 { 2 , 28 }	2,450 { 25 , 356 } ±196 { 2 , 28 }	2,450 { 25 , 356 } ±196 { 2 , 28 }
B'	2,750 { 28 , 398 } ±196 { 2 , 28 }	3,460 { 35.5 , 505 } ±294 { 3 , 43 }	3,820 { 39 , 555 } ±294 { 3 , 43 }

5. If not within specification, replace the dual proportioning valve.

Replacement



1. Brake pipe
2. Bolt
3. Dual proportioning valve



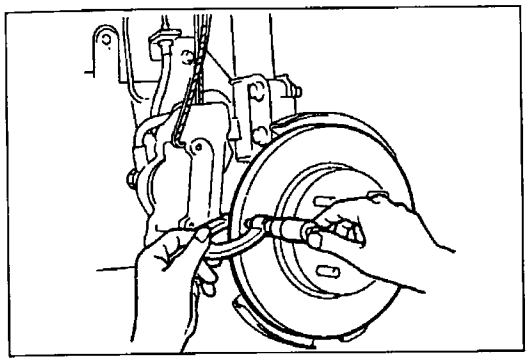
FRONT BRAKE (DISC)

Inspection (On-vehicle)

Disc pad

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the wheel and tires.
3. Verify the remaining thickness of the pads.

Thickness: 1.0 mm { 0.039 in } min.



Disc plate thickness

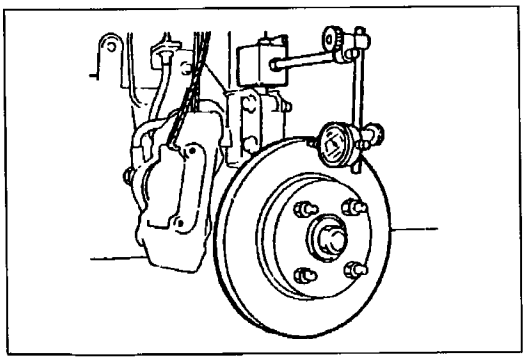
1. Measure the thickness of the disc plate.

Caution

- **When it is necessary to machine the disc plate, if the disc plate is removed from the vehicle then machined, excessive runout may result. Machine the disc plate with it installed on the vehicle.**

Standard : 22 mm { 0.8661 in }
Minimum : 20 mm { 0.7874 in }
Minimum thickness after machining by using a brake lathe on-vehicle
: 20.8 mm { 0.8189 in }

2. If the thickness is not within the specification, replace the disc plate.



Disc plate runout

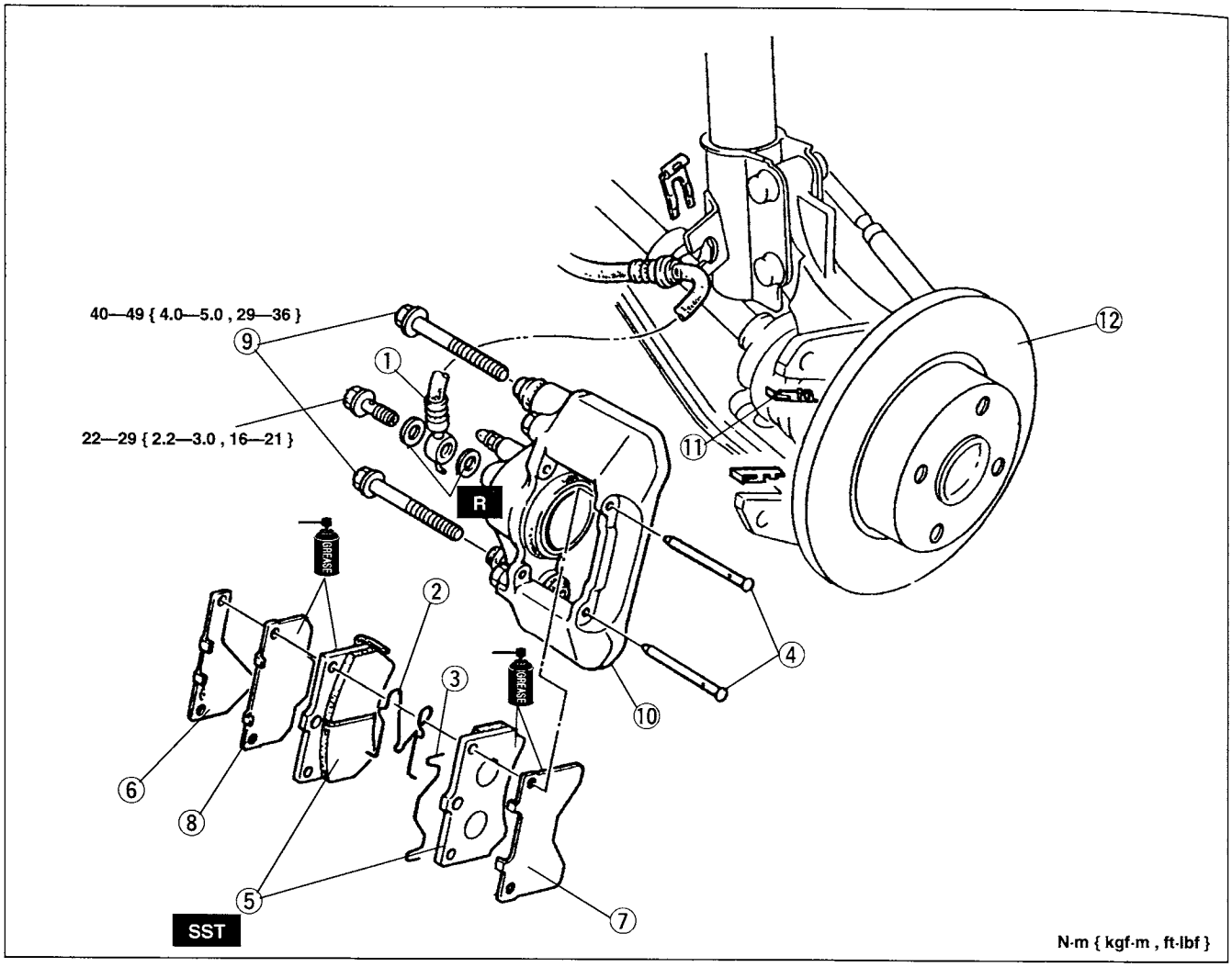
1. Verify that there is no wheel bearing looseness. (Refer to section M.)
2. Measure the runout at the outer edge of the contact surface of the disc pad.

Runout: 0.05 mm { 0.002 in } max.

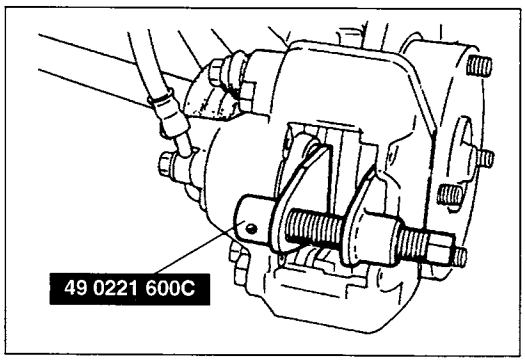
3. If the runout is not within the specification, repair or replace the disc plate.

Removal / Inspection / Installation

- After installation, depress the pedal a few times. Then rotate the wheel by hand, and verify that the brakes do not drag.



1. Flexible hose
2. M-spring
3. W-clip
4. Pad pin
5. Disc pad
   - Inspection (on-vehicle) ..... page P–17
   - Replacement ..... page P–19
   - Installation Note ..... below
6. Anti-squeak shim
7. Outer shim
8. Inner shim
9. Bolt
10. Caliper
    - Disassembly / Inspection / Assembly ..... page P–20
11. Guide plate
12. Disc plate
    - Inspection (on-vehicle) ..... page P–17

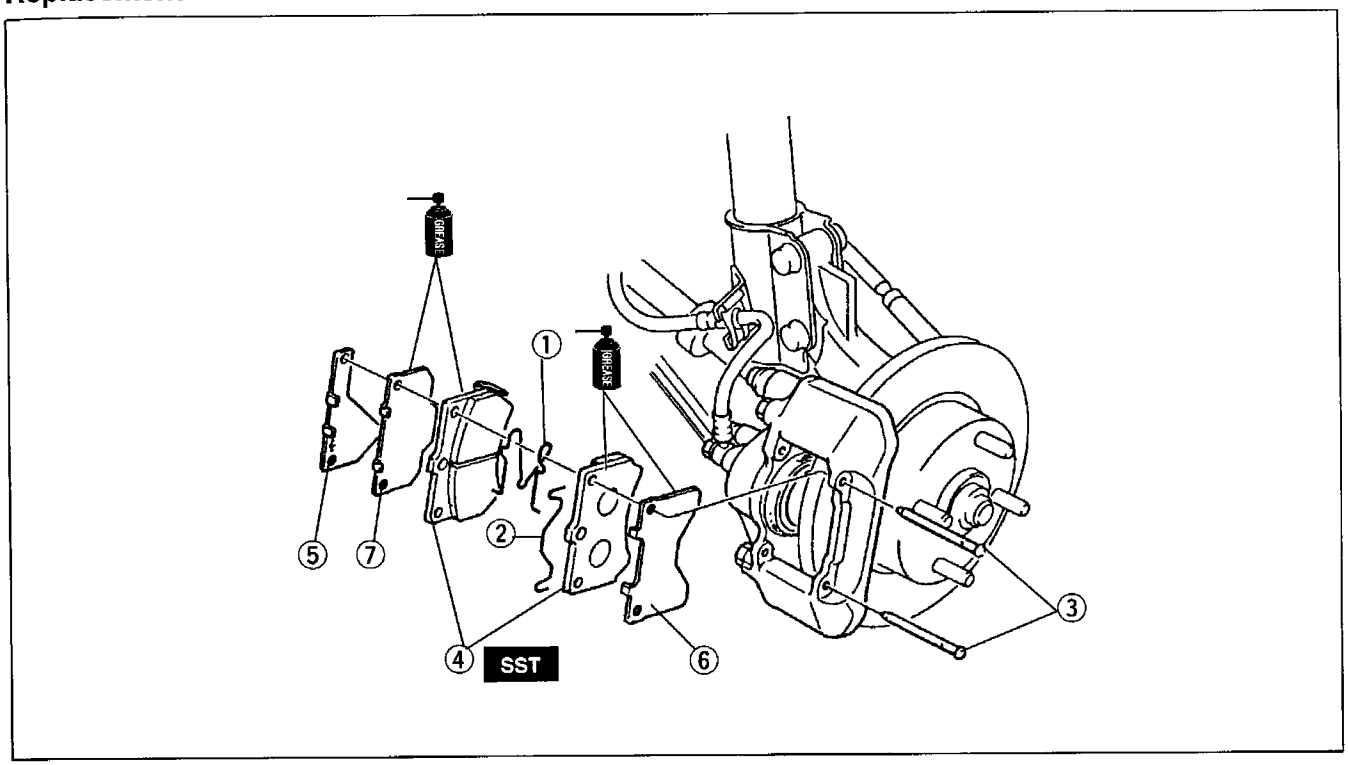


Instalation note

Disc pad

1. Push the piston fully inward by using the **SST**.
2. Install the disc pad.

DISC PAD (FRONT)
Replacement

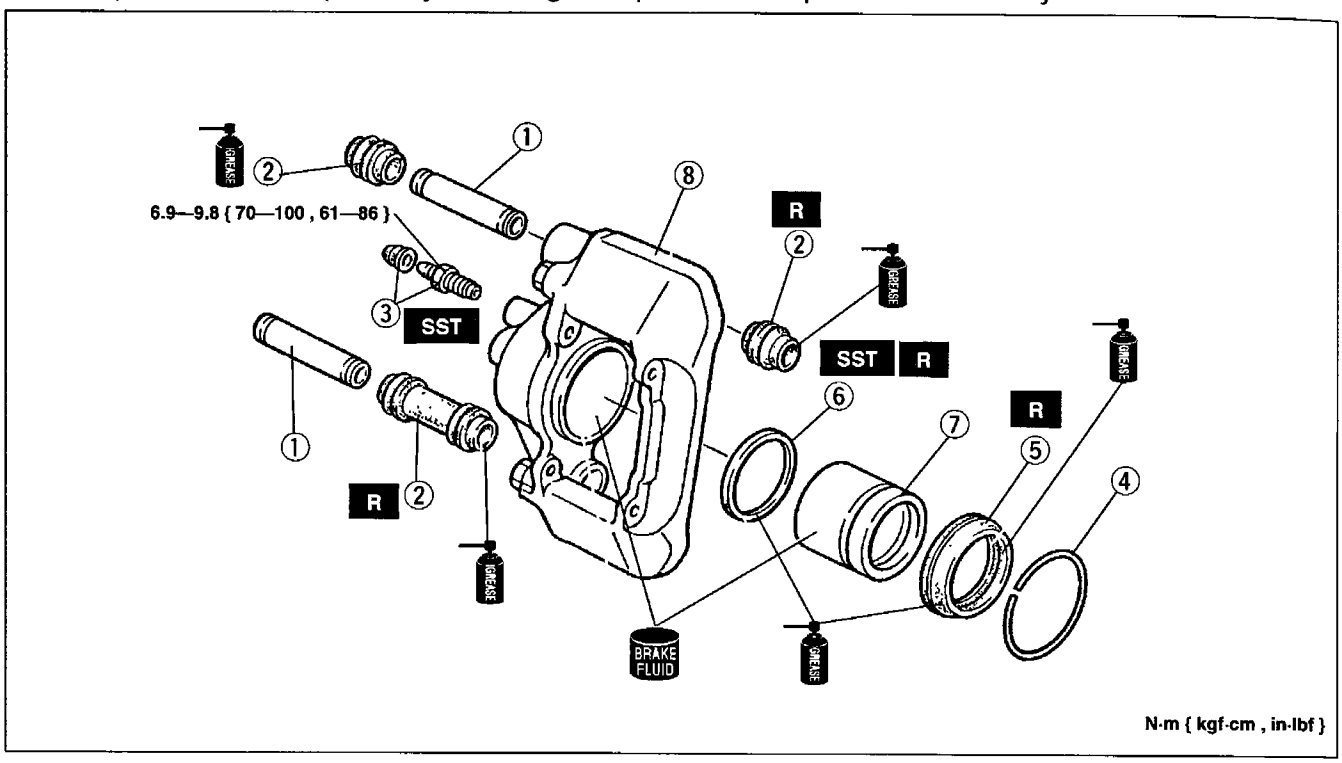


1. M-spring
2. W-clip
3. Pad pin
4. Disc pad
   Inspection (on-vehicle) . . . . . page P–17
   Installation Note . . . . . page P–18
5. Anti-squeak shim
6. Outer shim
7. Inner shim

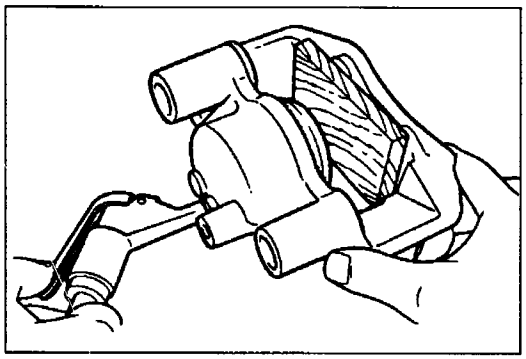
CALIPER (FRONT)

Disassembly / Inspection / Assembly

- If the piston or the caliper body is damaged, replace the caliper as an assembly.

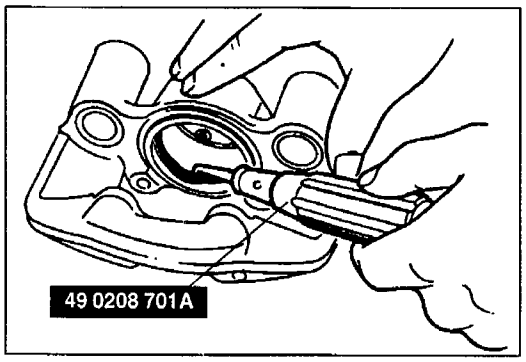


1. Sleeve
2. Boot
3. Bleeder cap, bleeder screw
4. Retaining ring
5. Dust seal
6. Piston seal
   Disassembly Note ..... below
7. Piston
   Disassembly Note ..... below
   Inspect for damage, wear, and rust
8. Caliper body
   Inspect for damage, cracks, and rust



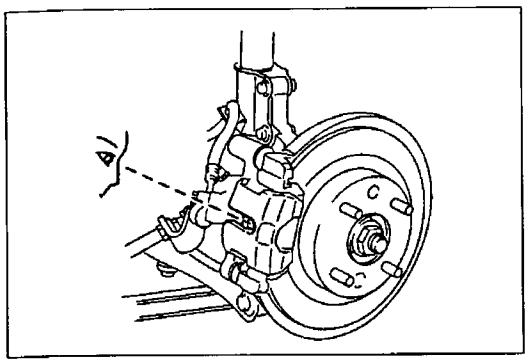
Disassembly note
Piston

1. Place a piece of wood in the caliper.
2. Gently blow compressed air through the pipe hole to force the piston out of the caliper.



Piston seal

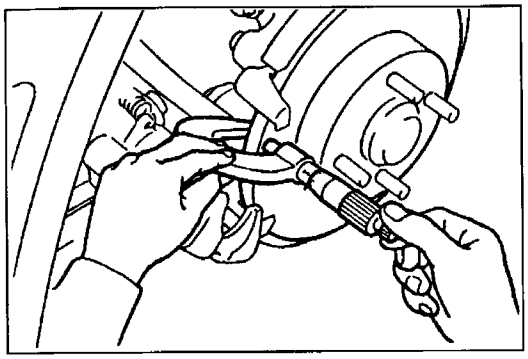
Remove the piston seal from the caliper by using the **SST**.



REAR BRAKE (DISC)
Inspection (On-vehicle)
Disc pad

1. Jack up the rear of the vehicle and support it with safety stands.
2. Remove the wheel and tires.
3. Verify the remaining thickness of the pads.

Thickness: 1.0 mm { 0.039 in } min.



Disc plate thickness

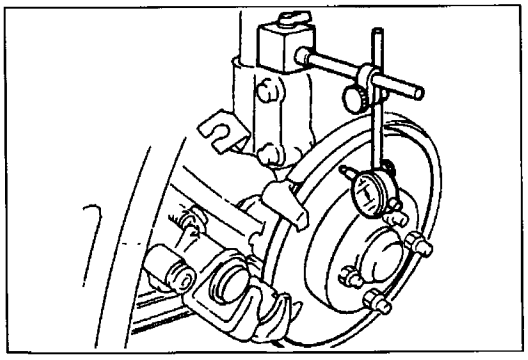
1. Measure the thickness of the disc plate.

Caution

- **When it is necessary to machine the disc plate, if the disc plate is removed from the vehicle then machined, excessive runout may result. Machine the disc plate with it installed on the vehicle.**

Standard: 9 mm { 0.3543 in }
Minimum: 7 mm { 0.2756 in }
Minimum thickness after machining by using a brake lathe on-vehicle
: 7.8 mm { 0.3071 in }

2. If the thickness is not within the specifications, replace the disc plate.



Disc plate runout

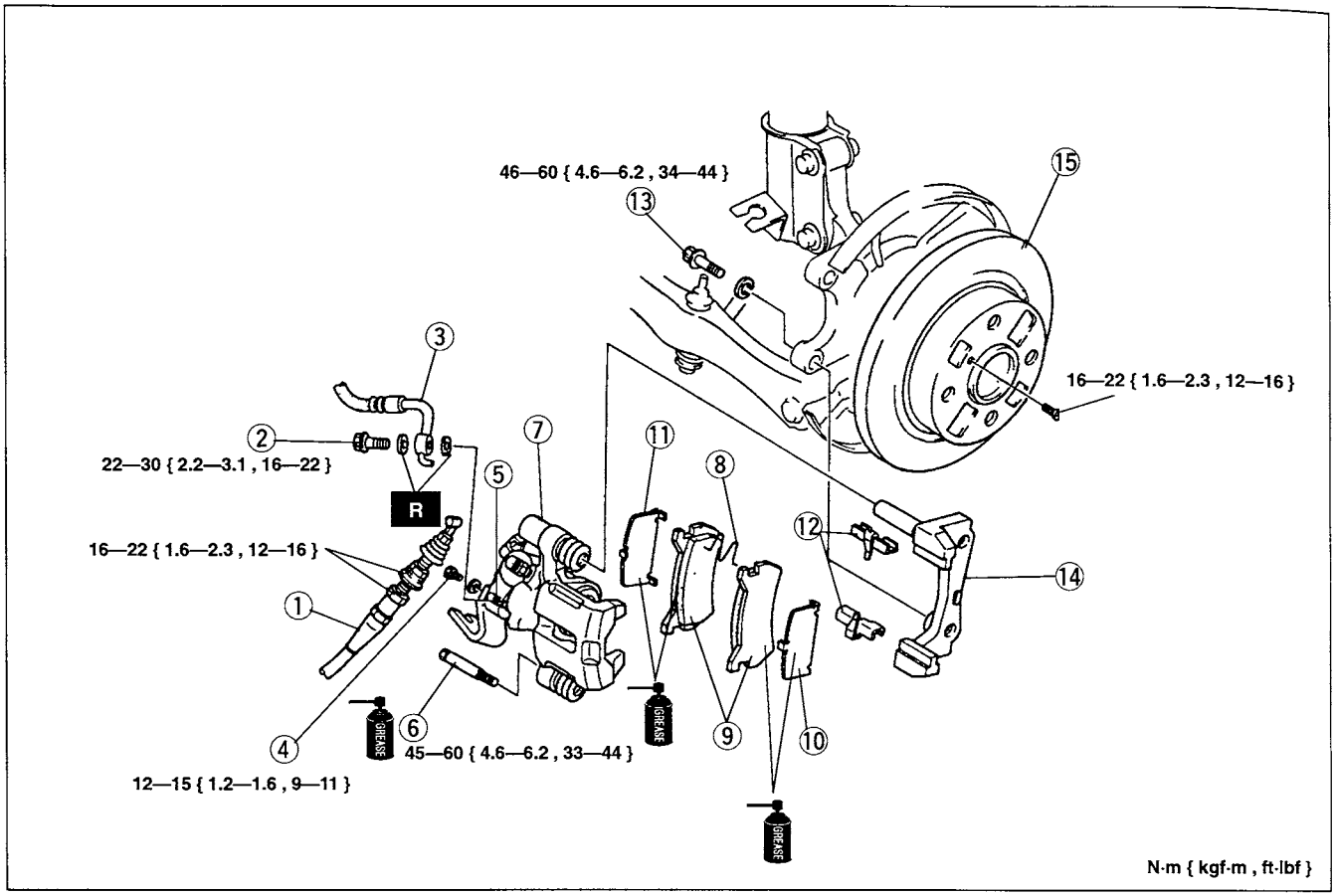
1. Verify that there is no looseness in the wheel bearing. (Refer to section M.)
2. Measure the runout at the outer edge of the contact surface of the disc pad.

Runout: 0.5 mm { 0.002 in } max.

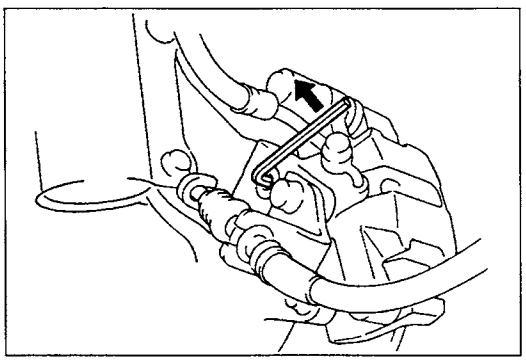
3. If the runout is not within the specification, repair or replace the disc plate.

Removal / Inspection / Installation

- After installation, depress the pedal a few times. Then rotate the wheel by hand and verify that the brakes do not drag.



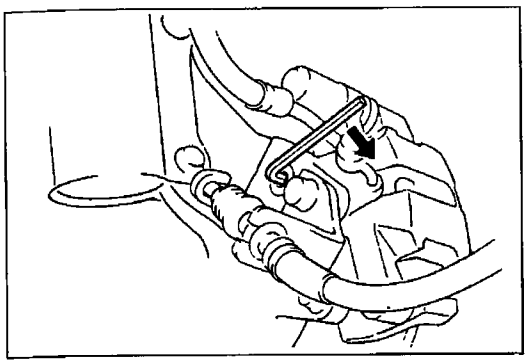
1. Parking cable, clip
   Removal / Inspection / Installation ..... page P–29
2. Connecting bolt
3. Brake hose
4. Screw plug
5. Manual adjustment gear
   Removal Note ..... below
   Installation Note ..... page P–23
6. Lock bolt
7. Caliper
   Disassembly / Inspection / Assembly ..... page P–24
8. M-spring
9. Disc pad
   Inspection (on-vehicle) ..... page P–21
   Replacement ..... page P–23
10. Outer shim
11. Inner shim
12. Guide plate
13. Bolt
14. Mounting support
15. Disc plate
    Inspection (on-vehicle) ..... page P–21



Removal note

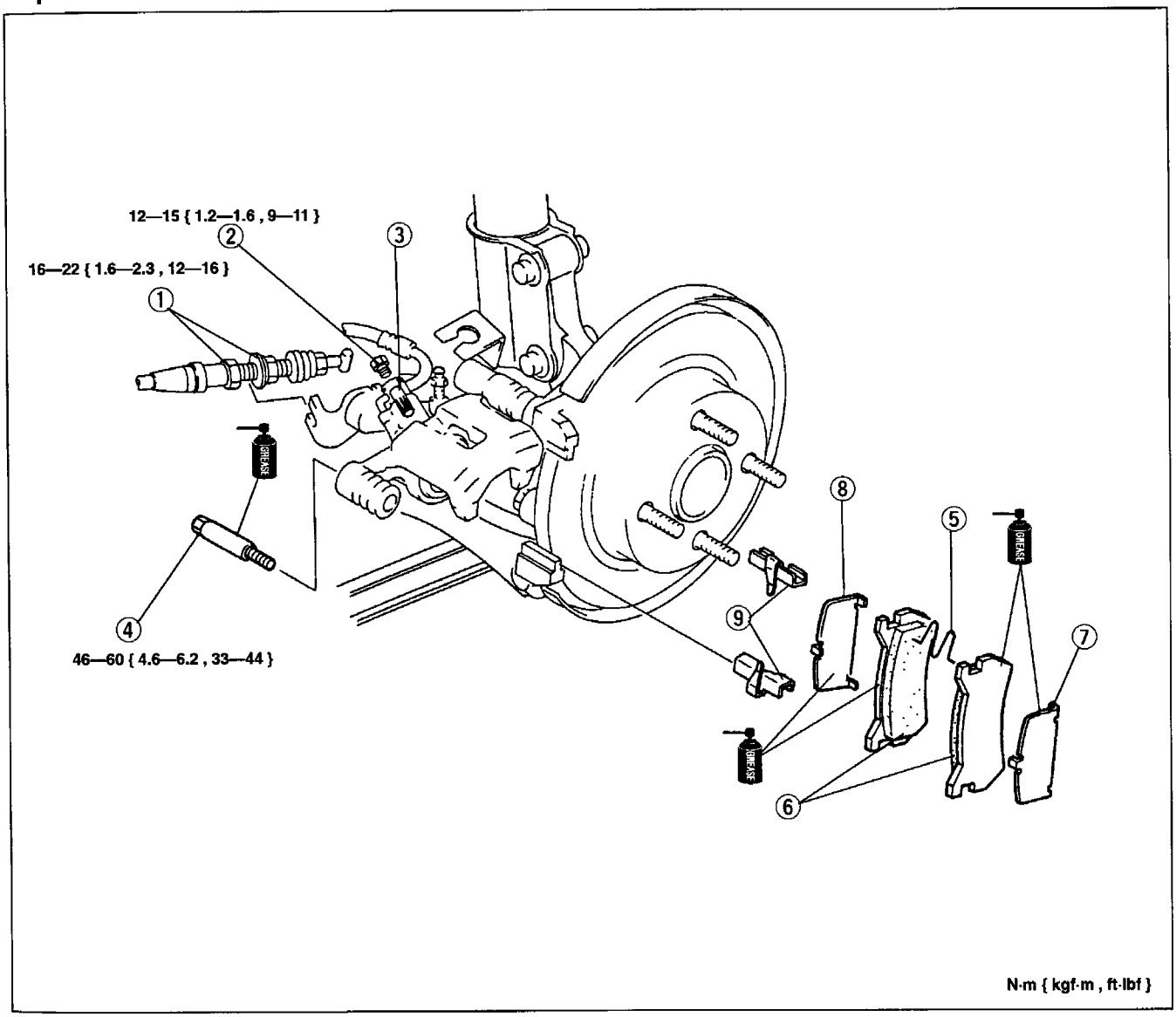
Manual adjustment gear

Turn the manual adjustment gear counterclockwise by using an Allen wrench to pull the brake caliper piston inward. (Turn until it stops.)



Installation note
Manual adjustment gear
1. Turn the manual adjustment gear clockwise until the brake pads just touch the disc plate.
2. Return the manual adjustment gear 1/3-turn.

DISC PAD (REAR)
Replacement

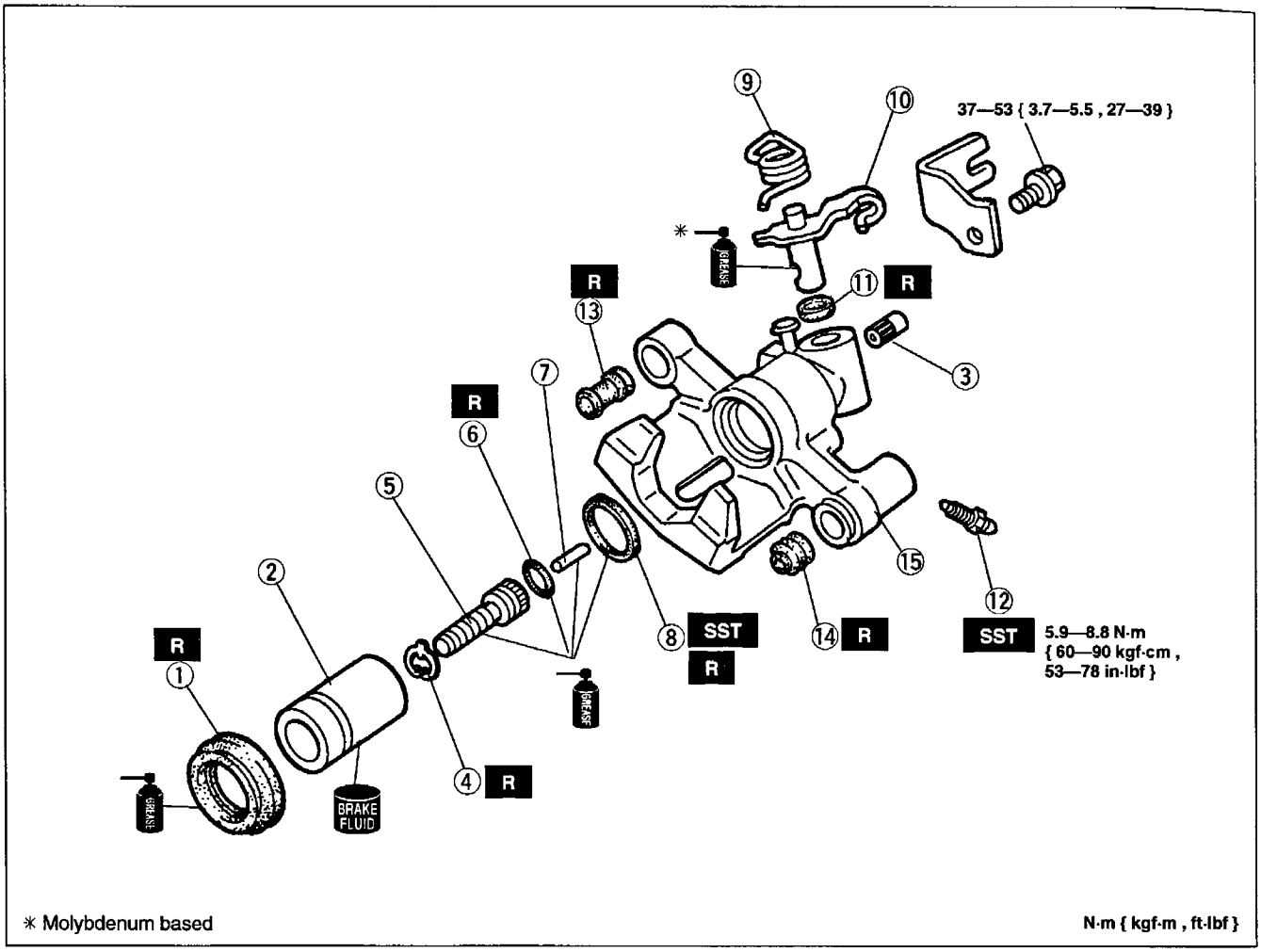


1. Parking brake cable, clip
2. Screw plug
3. Manual adjustment gear
   Removal Note ..... page P–22
   Installation Note ..... above
4. Lock bolt
5. M-spring
6. Disc pad
7. Outer shim
8. Inner shim
9. Guide plate

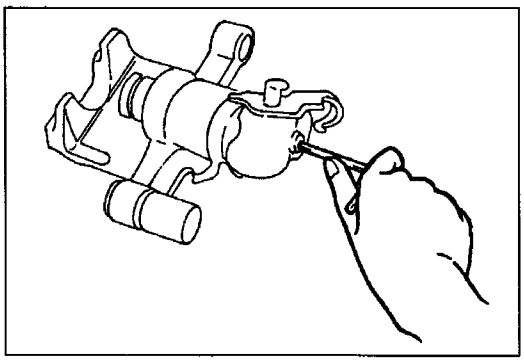
CALIPER (REAR)

Disassembly / Inspection / Assembly

- If the piston or the caliper body is damaged, replace the caliper as an assembly.



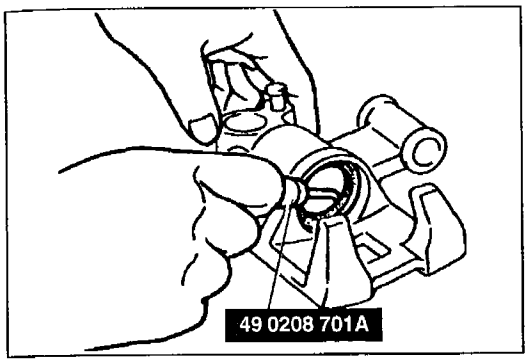
1. Dust seal
2. Piston
   Disassembly Note ..... below
   Assembly Note ..... page P–25
   Inspect for wear and rust
3. Manual adjustment gear
4. Snap ring
5. Adjusting bolt
6. O-ring
7. Connecting link
8. Piston seal
   Disassembly Note ..... page P–25
9. Spring
10. Operating lever
11. Boot
12. Bleeder cap and bleeder screw
13. Boot
14. Boot
15. Caliper body
    Inspect for damage and cracks



Disassembly note

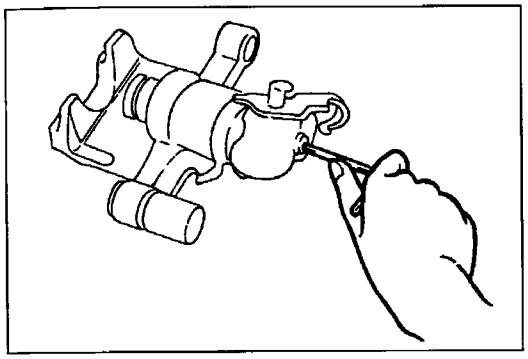
Piston

Turn the adjustment gear clockwise by using an Allen wrench to remove the piston from the adjustment gear. (Turn the adjustment gear until it becomes easy to turn.)



Piston seal

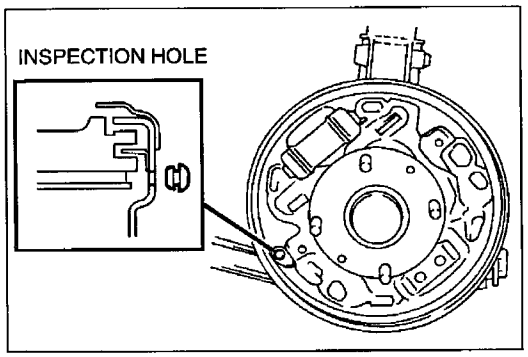
Remove the piston seal from the caliper by using the **SST.**



Assembly note

Piston

Insert the piston into the caliper and turn the adjustment gear counterclockwise by using an Allen wrench to pull the piston inward. (Turn until it stops.)



REAR BRAKE (DRUM)

Inspection (On-vehicle)

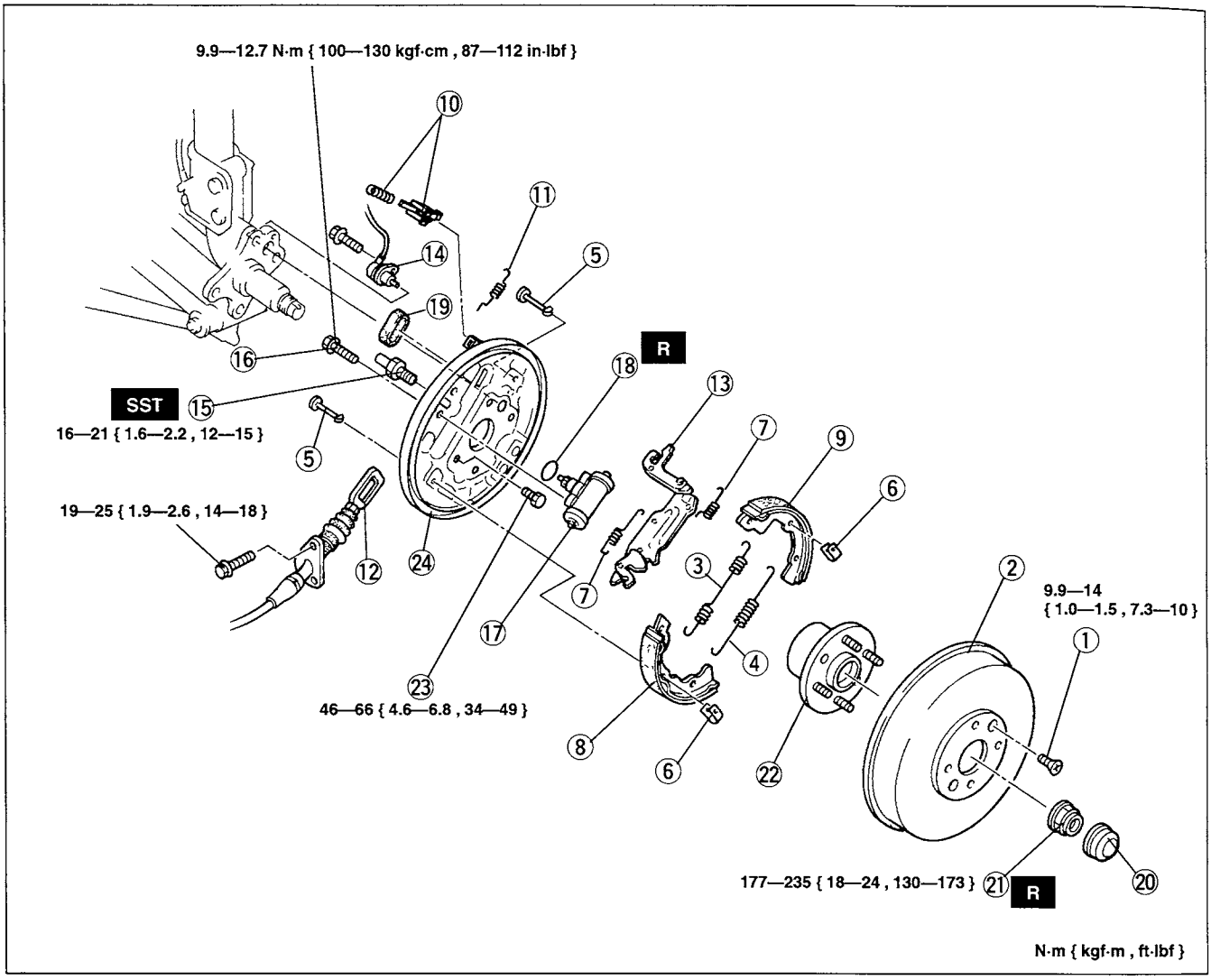
Brake shoe

1. Jack up the rear of the vehicle and support it with safety stands.
2. Remove the plug as shown in the figure, then inspect the thickness of the brake lining through the inspection hole.
3. Replace if below the limit.

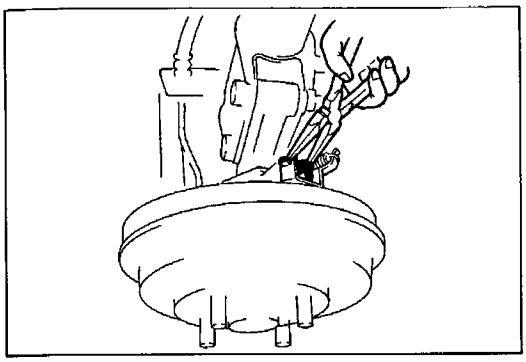
Thickness: 1.0 mm { 0.039 in } min.

Removal / Inspection / Installation

- After installation, check the following.
  (1) Depress the pedal a few times. Then rotate the wheel by hand and verify that the brakes do not drag.
  (2) Check the pedal-to-floor clearance. (Refer to page P–6.)
  (3) Check the parking brake lever stroke. (Refer to page P–28.)

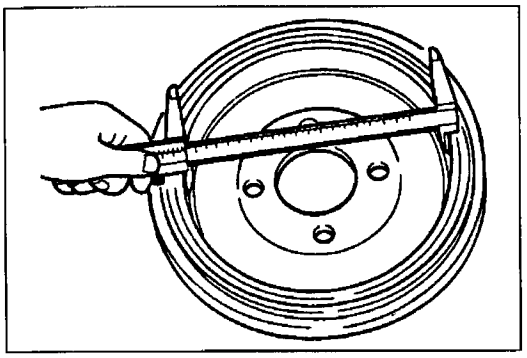


1. Screw
2. Brake drum
   Removal Note ..... page P–27
   Inspection ..... page P–27
   Installation Note ..... page P–27
3. Return spring (upper)
4. Return spring (lower)
5. Hold pin
6. Hold spring
7. Anti-rattle spring
8. Brake shoe (leading side)
   Inspection (on-vehicle) ..... page P–25
9. Brake shoe (trailing side)
   Inspection (on-vehicle) ..... page P–25
10. Stop spring and clip
11. Spring
12. Parking cable
13. Operating lever assembly
14. ABS wheel-speed sensor
    Removal / Installation ..... page P–41
    Inspection (on-vehicle) ..... page P–40
15. Brake pipe
16. Bolt
17. Wheel cylinder
    Disassembly / Inspection / Assembly ..... page P–28
18. Wheel cylinder gasket
19. Dust boot
20. Hub cap
21. Locknut
    Service ..... section M
22. Wheel hub assembly
    Service ..... section M
23. Bolt
24. Backing plate
    Inspect for damage and cracks



Removal note
Brake drum

If the brake drum is hard to remove, loosen the parking cable nut fully and secure the stopper until the operating lever returns to release the sticking of the brake drum.

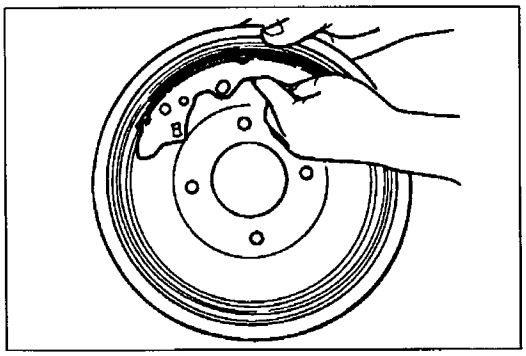


Inspection
Brake drum

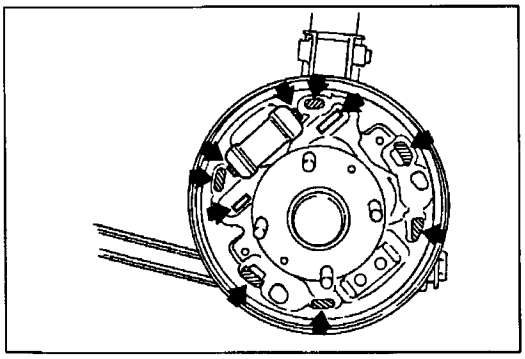
Check for the following and repair or replace parts as necessary.

(1) Drum inner diameter

Diameter limit: 201.5 mm { 7.933 in }

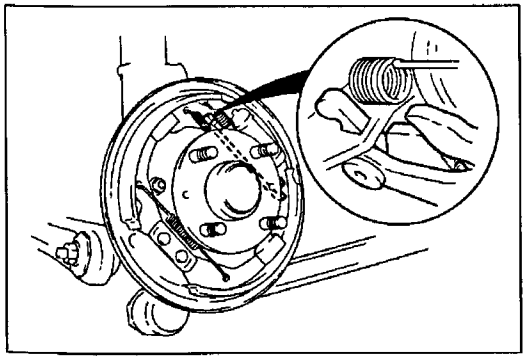


(2) Scratches, uneven or abnormal wear inside drum



Installation note
Backing plate

Before installing the brake shoes, apply grease to the points as shown.

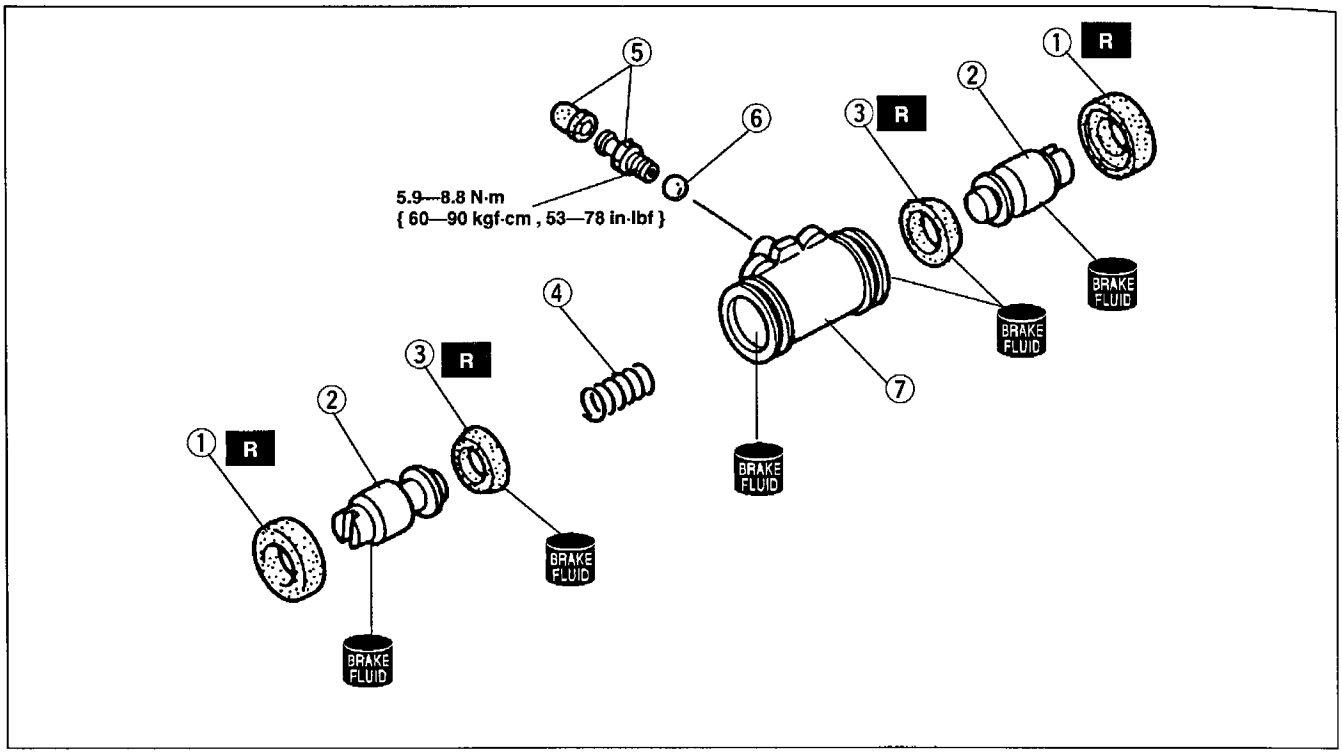


Brake drum

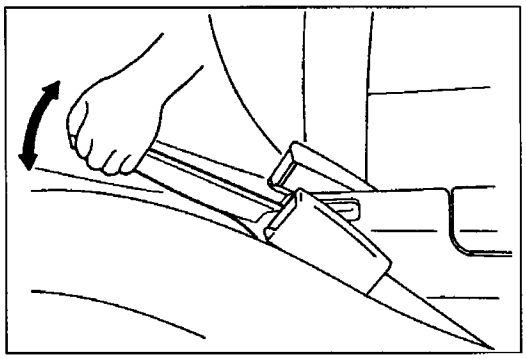
Before installing the brake drum, depress the brake pedal to verify operation of the automatic adjuster.

WHEEL CYLINDER
Disassembly / Inspection / Assembly

- If any of the metal parts are damaged, replace the wheel cylinder as an assembly.



1. Dust boot
2. Piston
   Inspect for corrosion and damage
3. Piston cup
4. Spring
5. Bleeder cap and bleeder screw
6. Steel ball
7. Wheel cylinder body
   Inspect for corrosion and damage

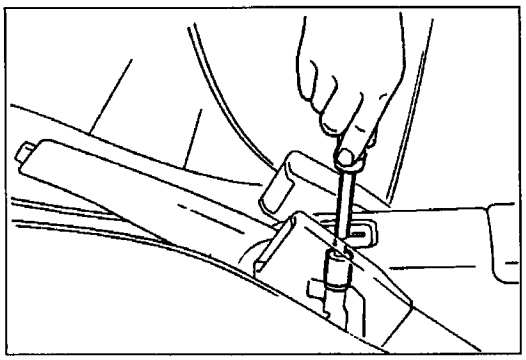


PARKING BRAKE SYSTEM

PARKING BRAKE (LEVER TYPE)
Inspection (On-vehicle)

Check that the stroke is within the specification when the parking brake lever is pulled with a force of **98 N { 10 kgf , 22 lbf }**. Adjust if necessary.

Stroke: 5—7 notches

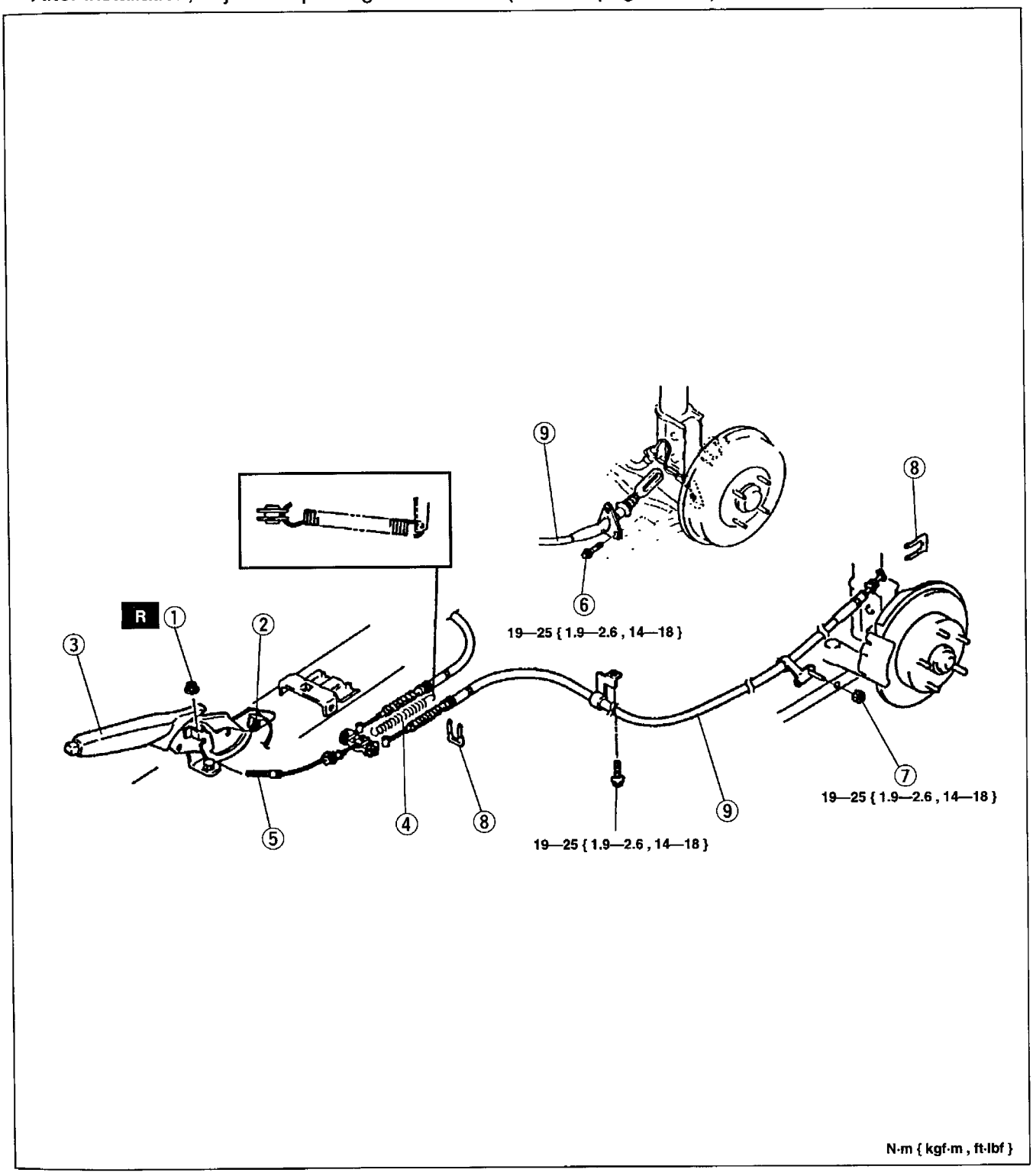


Adjustment

1. Before adjustment, start the engine and depress the brake pedal several times.
2. Stop the engine.
3. Remove the parking brake lever cover.
4. Turn the adjusting nut at the front of the parking cable.
5. 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 light illuminates.
   (2) Verify that the rear brakes do not drag.

Removal / Inspection / Installation

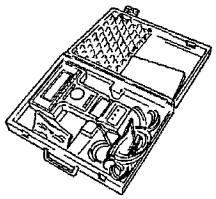
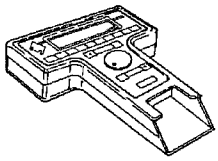
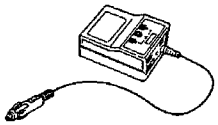
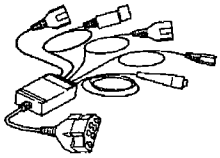
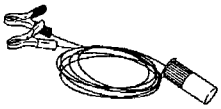
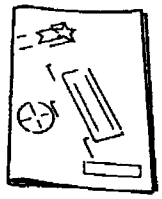
- Remove the rear console. (Refer to section S1.)
- After installation, adjust the parking lever stroke. (Refer to page P–28.)

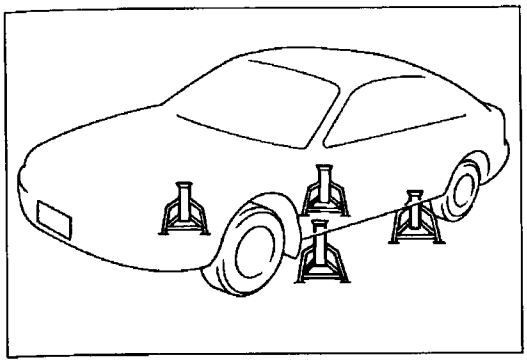


1. Adjusting nut
2. Parking brake switch
3. Parking brake lever assembly
4. Return spring
5. Front parking brake cable
   Inspect for wear and damage
6. Bolt
7. Nut
8. Clip
9. Rear parking brake cable
   Inspect for wear and damage

ANTILOCK BRAKE SYSTEM (ABS)

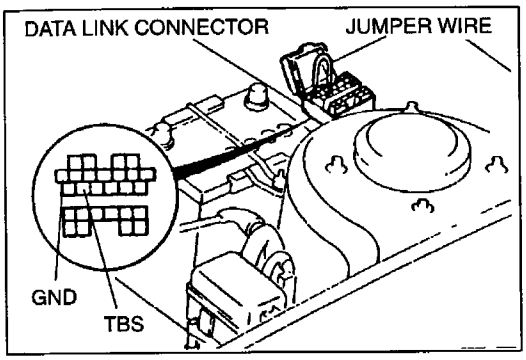
PREPARATION
SST

49 0259 770B Wrench, flare nut 	For removal and installation of brake pipe	49 T088 0A0 NGS set 	For diagnosis
49 T088 001 Control Unit (Part of 49 T088 0A0) 	For diagnosis	49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For diagnosis
49 T088 003 Super MECS Adapter (Part of 49 T088 0A0) 	For diagnosis	49 T088 005 STAR/DCL Adapter (5 pin) (Part of 49 T088 0A0) 	For diagnosis
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For diagnosis	49 T088 008A Instruction Manual 	For diagnosis
49 T088 010B Program Card 	For diagnosis	—	—

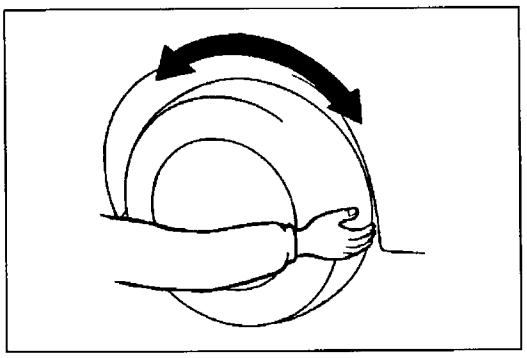


ABS HYDRAULIC UNIT
Inspection (on-vehicle)
System inspection

1. Verify that the battery is fully charged.
   With the ignition switch ON, verify that the ABS warning light goes out after **2—4 seconds**.
2. If the light stays ON after **2—4 seconds** the control module detects a failure and will not activate the hydraulic unit. Follow the troubleshooting procedures.
3. Turn the ignition switch OFF.

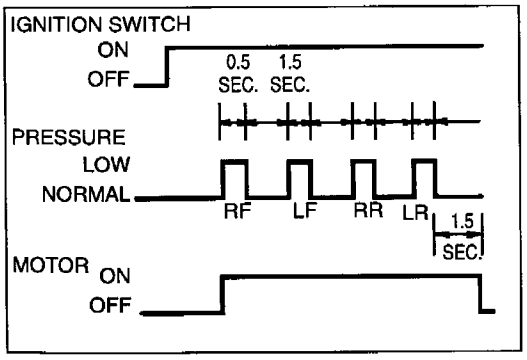


4. On level ground, jack up the vehicle and support it evenly on safety stands. Shift the transaxle to neutral or N range.
5. Release the parking brake.
6. Rotate the wheels by hand, and inspect for brake drag.
7. Using a jumper wire, connect the TBS and GND terminals of the data link connector.
8. Depress the brake pedal, and have an assistant verify that the right front wheel will not turn.

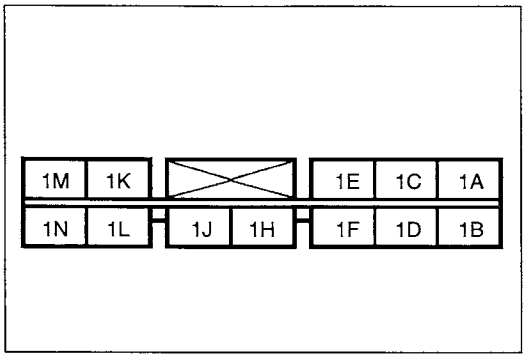


9. With the brake pedal still depressed, turn the ignition switch ON and verify that the brake is released momentarily (approx. **0.5 sec.**) and that the wheel turns when pressure-reduction operates.
10. Check operation of the remaining wheels in order: left front, right rear, left rear.
11. If steps 9 and 10 show correct operation, the following systems are OK.
    - Brake piping to ABS hydraulic unit
    - Braking system, including ABS hydraulic unit
    - Electrical system in ABS hydraulic unit (solenoid, ABS motor, etc.)
    - ABS control module, its output system (solenoid, relay, etc.) and harness.

    The following are not checked with the above steps.
    - Input system and harness of ABS control module
    - Intermittent failure
    - Fluid leakage



12. Replace the ABS hydraulic unit if necessary.

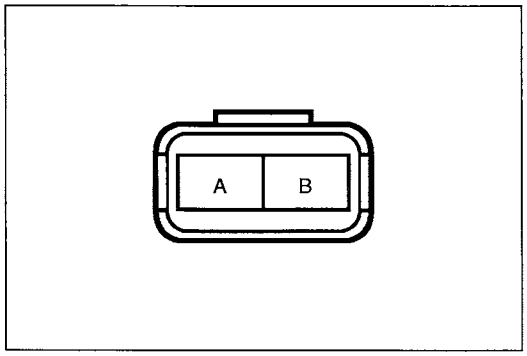


ABS motor (including harness to ABS control module)

1. Turn the ignition switch OFF and disconnect the ABS control module connector.
2. Measure the resistance between terminal 1L of the control module connector and a ground.

   Resistance: 1 Ω max.

3. If not as specified, check the wiring harness between the ABS motor and the control module, and check the ABS motor.(Refer to below.)

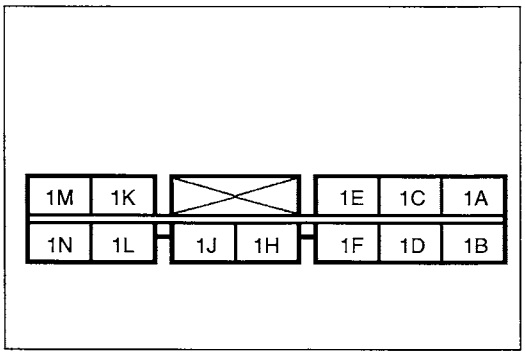


ABS motor

1. Turn the ignition switch OFF.
2. Disconnect the ABS hydraulic unit connector (2 pin).
3. Measure the resistance between the connector terminals.

   Resistance: 1 Ω max.

4. Verify that the motor operates when applying 12 V to the connector (2 pin).
5. If not as specified, repair the harness or replace the ABS hydraulic unit if necessary.

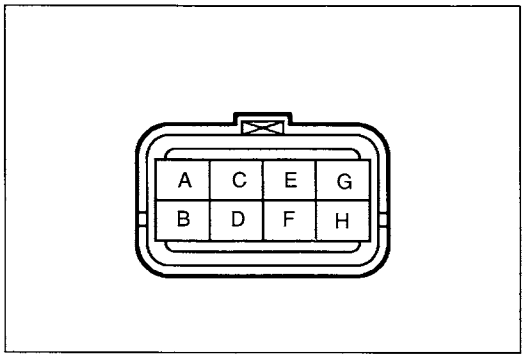


Solenoid valve
(including harness to ABS control module)

1. Turn the ignition switch OFF.
2. Measure the resistance between a ground and the following terminals at the ABS control module connector.
   Terminal: 1A: Right rear
   1B: Left front
   1C: Right front
   1D: Left rear

   Resistance: Approx. 3 Ω

3. If not as specified, check the wiring harness between the ABS hydraulic unit connector (8 pin) and the ABS control module, and check the solenoid valves.
   (Refer to below.)



Solenoid valve

1. Disconnect the ABS hydraulic unit connector (8 pin).
2. Measure the resistance between the following terminals.

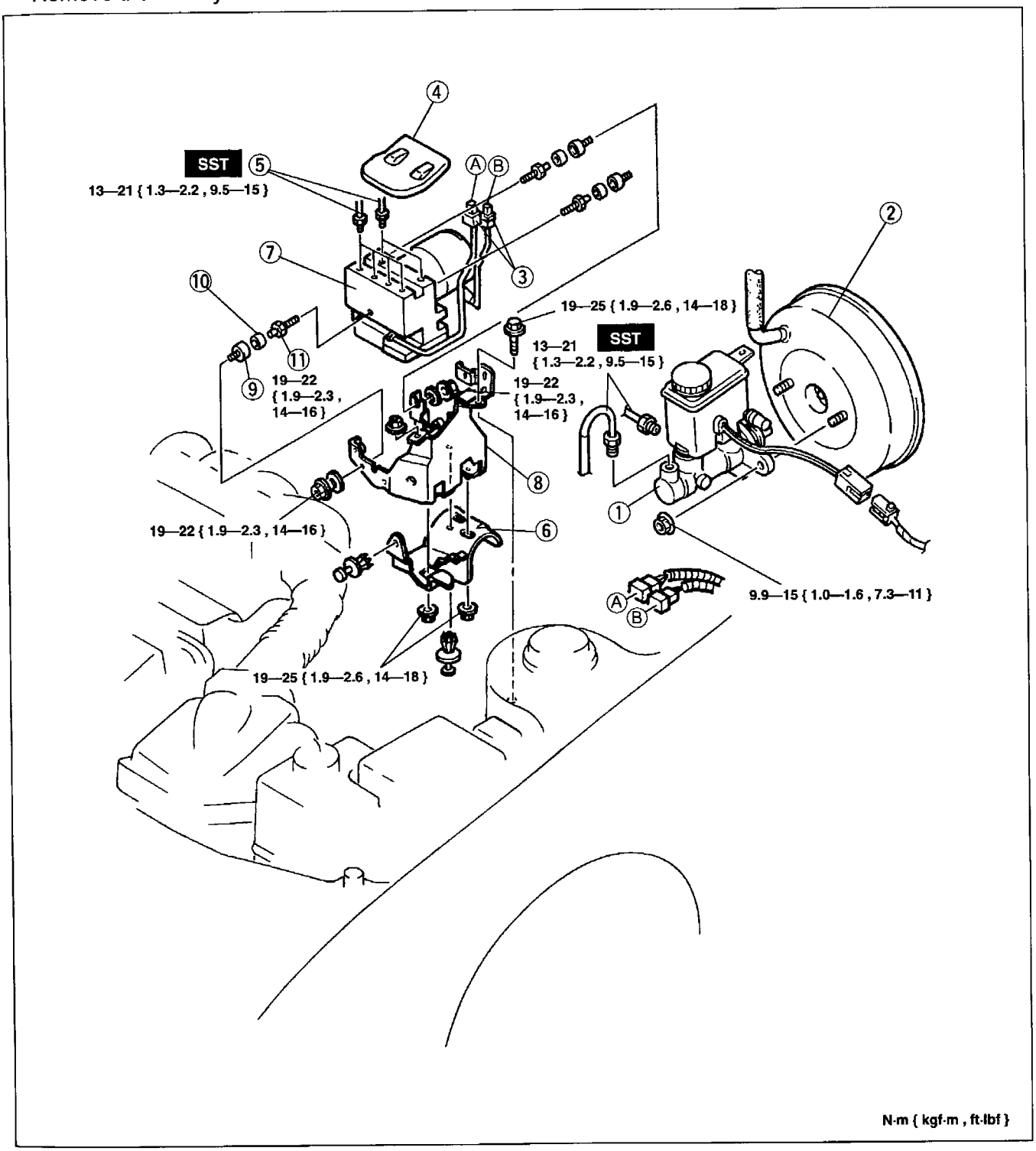
   A—H, B—G, C—F, D—E

   Resistance: Approx. 3 Ω

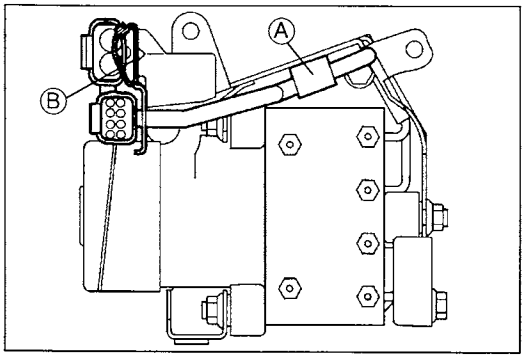
3. If not as specified, repair the hydraulic unit harness or replace the ABS hydraulic unit if necessary.

Removal / Installation

- Remove the battery and the carrier.

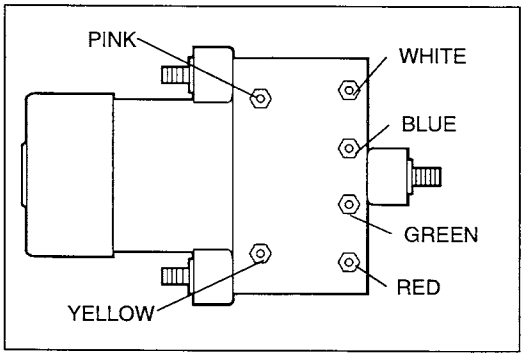


1. Master cylinder
   Removal / Installation ..... page P– 8
2. Power brake unit
   Removal / Installation ..... page P–15
3. Connector
4. Pipe holder
5. Brake pipe
   Installation Note ..... page P–34
6. Splash shield
7. ABS hydraulic unit
   Installation Note ..... page P–34
8. ABS hydraulic unit bracket
9. Casing
10. Mount
11. Hex stud



Installation note
ABS hydraulic unit

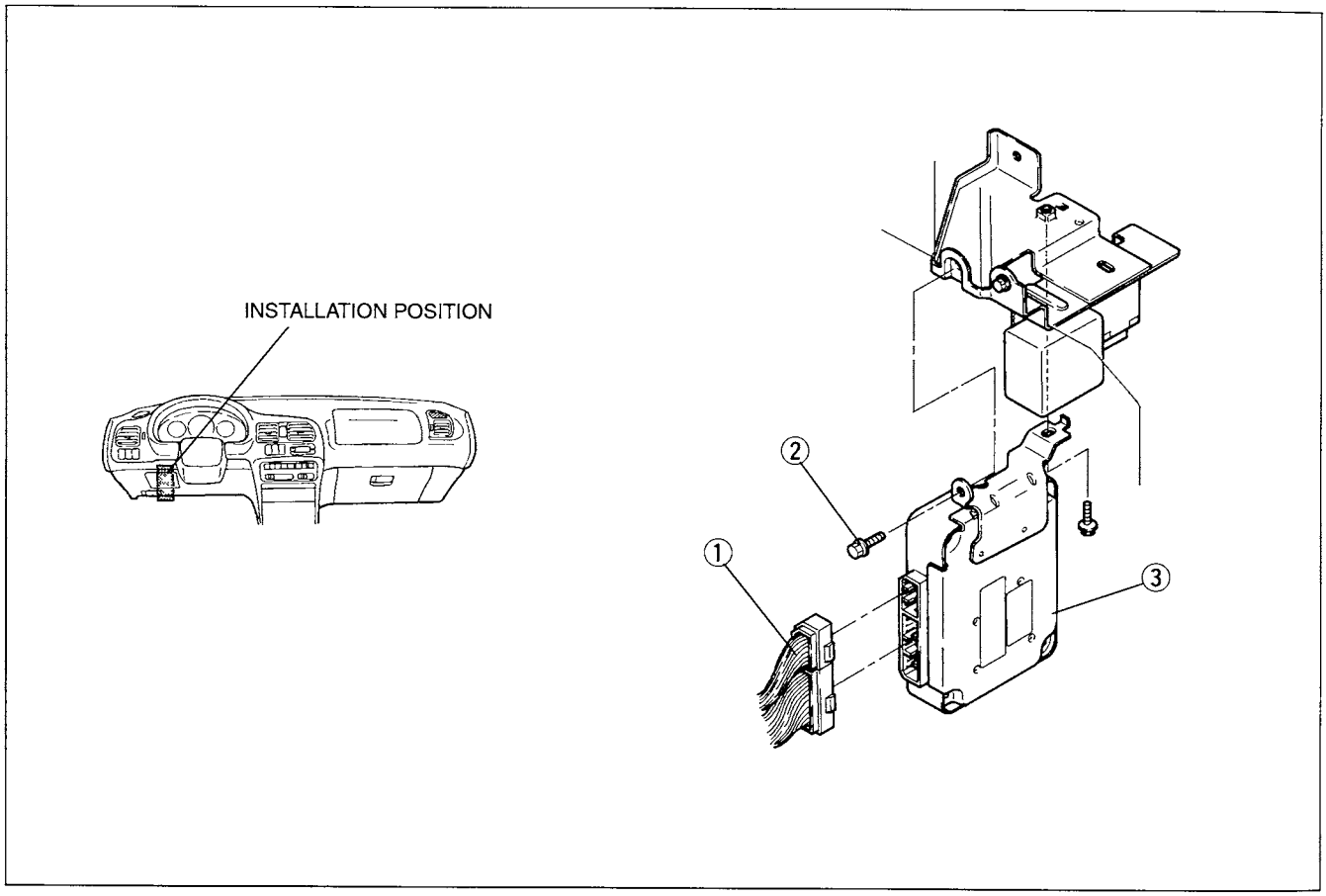
1. Clamp the harness to point A of the bracket.
2. Install the band around point B of the bracket and the harness, and tighten the band until it contacts the bracket.
3. Leave a few notches of the band and cut off the rest.



Brake pipe

Align the colors on the brake pipes with the pipe positions of the ABS hydraulic unit as indicated, and install the pipes.

ABS CONTROL MODULE
Removal / Installation



1. Connector
2. Bolt
3. ABS control module

Inspection . . . . . page P–35

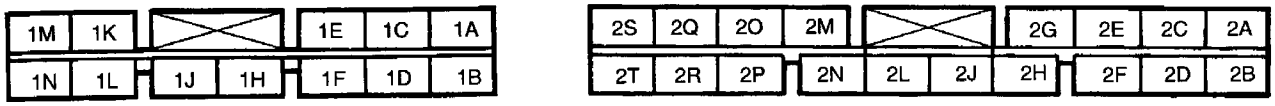
Inspection

Terminal voltage chart (reference value)

(Ignition switch is ON, and connector is connected unless indicated otherwise)

B+: Battery positive voltage

ABS CONTROL MODULE CONNECTOR



Terminal	Signal name	Connected to	Condition	Voltage	Inspection point
1A	Right rear wheel solenoid	Right rear wheel solenoid	Solenoid ON*	0—2	• Harness (HU—ABS CM) • Solenoid valve
			Ignition switch ON	B+	
1B	Left front wheel solenoid	Left front wheel solenoid	Solenoid ON*	0—2	
			Ignition switch ON	B+	
1C	Right front wheel solenoid	Right front wheel solenoid	Solenoid ON*	0—2	
			Ignition switch ON	B+	
1D	Left rear wheel solenoid	Left rear wheel solenoid	Solenoid ON*	0—2	
			Ignition switch ON	B+	
1E	Ground	Ground	—	0	• Harness condition, open circuit
1F	Ground	Ground	—	0	
1H	Battery	Ignition switch	Ignition switch ON	B+	• Harness, fuse (Battery—IG SW—ABS CM)
			Ignition switch OFF	0	
1J	—	—	—	—	—
1K	—	—	—	—	—
1L	Motor monitor	ABS motor	Motor running	B+	• Harness (HU—ABS CM)
			Motor stopped	0	
1M	Brake switch	Brake switch	Brake pedal depressed	B+	• Harness, fuse (Battery — Brake SW—ABS CM)
			Brake pedal released	0	
1N	—	—	—	—	—

* Solenoid valve is ON only when ABS is functioning. Voltage when solenoid is ON can be measured by following "ABS hydraulic unit system inspection". (Refer to page P–31.)

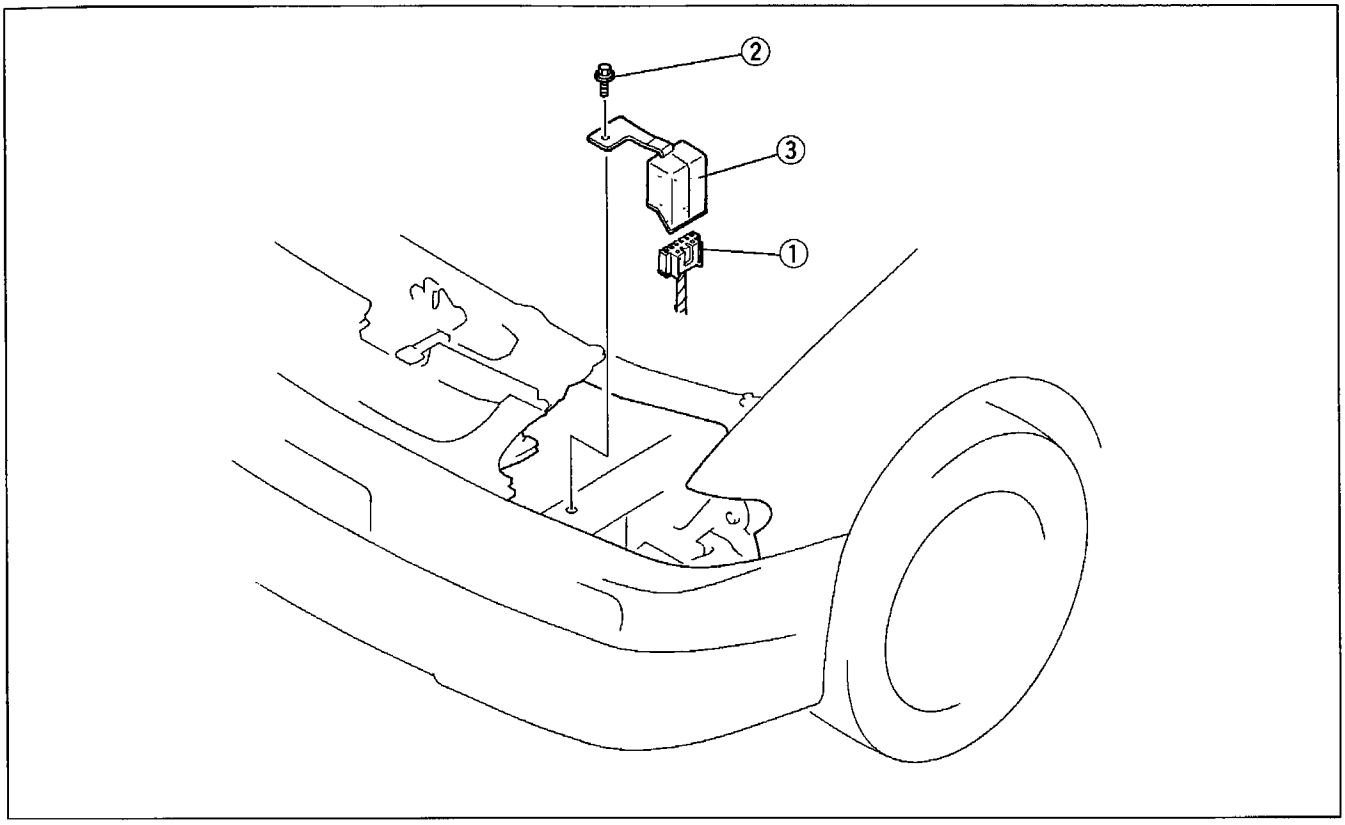
B+: Battery positive voltage

Terminal	Signal name	Connected to	Condition	Voltage	Inspection point
2A	On-board diagnosis	FBS check terminal	—	10—12	• Harness, fuse (Battery—ABS CM)
2B	On-board diagnosis	TBS check terminal	Normal mode	10—12	
			Diagnostic test mode	0	
2C	—	—	—	—	—
2D	—	—	—	—	—
2E	—	—	—	—	—
2F	—	—	—	—	—
2G	—	—	—	—	—
2H	Motor relay (coil)	Motor relay	Motor relay ON	0—2	• Harness (ABS relay—ABS CM) • Motor relay
			Motor relay OFF	B+	
2J	Fail-safe relay (coil)	Fail-safe relay	Normal	0—2	• Harness (ABS relay—ABS CM) • Fail-safe relay
			If malfunction present	B+	
2L	ABS warning light	ABS warning light	Illuminated	0	• Harness, fuse (Battery—warning light—ABS CM) • ABS warning light
			Not illuminated	B+	
2M* 2N*	Right front wheel-speed	Right front wheel-speed sensor	Vehicle stopped	0	• Harness (Wheel-speed sensor—ABS CM) • Wheel-speed sensor
			Wheel turned 1 revolution per second	0.25—3.0 (AC)	
2O* 2P*	Left front wheel-speed	Left front wheel-speed sensor	Vehicle stopped	0	
			Wheel turned 1 revolution per second	0.25—3.0 (AC)	
2Q* 2R*	Left rear wheel-speed	Left rear wheel-sensor	Vehicle stopped	0	
			Wheel turned 1 revolution per second	0.25—3.0 (AC)	
2S* 2T*	Right rear wheel-speed	Right rear wheel-speed sensor	Vehicle stopped	0	
			Wheel turned 1 revolution per second	0.25—3.0 (AC)	

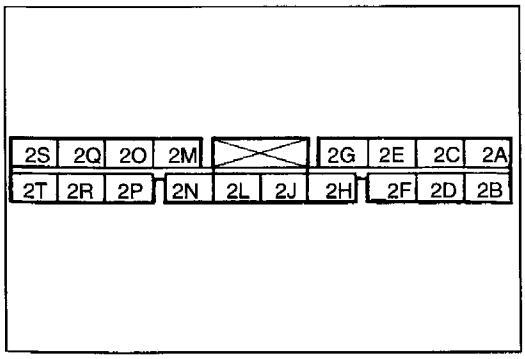
* Check following terminals in AC range: 2M—2N (right front), 2O—2P (left front), 2R—2Q (left rear), 2S—2T (right-rear)
In DC range, voltage will be approx. 1.0V (with ignition switch ON)

ABS RELAY
Removal / Inspection / Installation

Note
- The ABS relay contains the fail-safe relay and the motor relay.
- Remove the left side headlight. (Refer to section S1.)



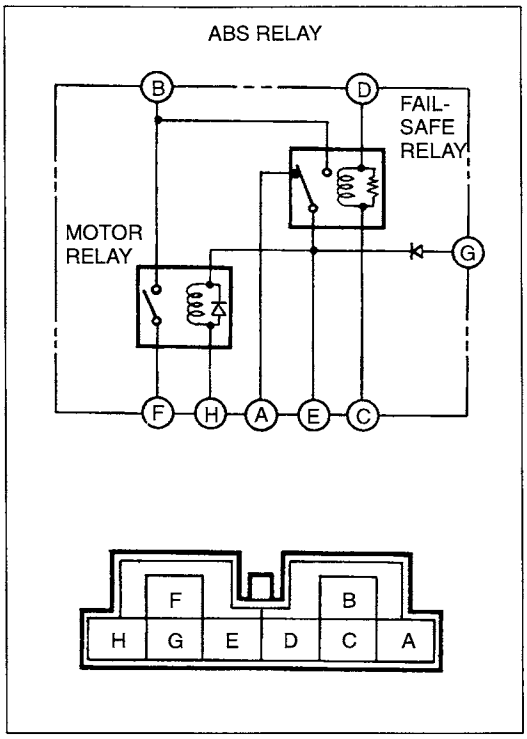
1. Connector
2. Bolt
3. ABS relay
   Inspection ..... below



Inspection
Fail-safe relay (including harness to ABS CM)
1. Turn the ignition switch OFF and disconnect the ABS control module connector.
2. Turn the ignition switch ON.
3. Connect terminal 2J of the control module connector to a ground.
4. Check the following points.

Condition	Action
Fail-safe relay in ABS relay does not click when 2J terminal grounded	• Check fail-safe relay • Check harness between fail-safe relay and ABS control module
Warning light illuminates after grounding 2J terminal	• Check fail-safe relay
1D terminal of ABS control module connector does not indicate 12 V	• Check fail-safe relay • Check harness between fail-safe relay and ABS hydraulic unit

5. If not as specified, inspect the wiring harness and the fail-safe relay. (Refer to page P–38.)



Fail-safe relay

1. Measure resistance between terminals C and D of ABS relay connector.

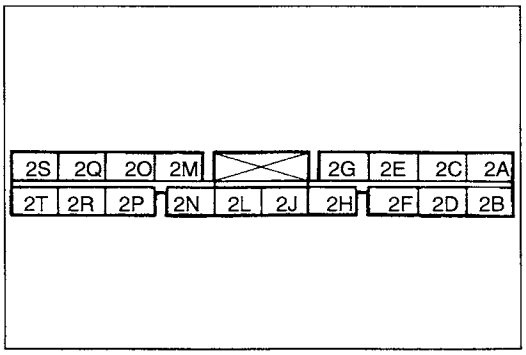
   Resistance: 60—100 Ω

2. Check for continuity between the relay terminals.

○—○: Continuity B+: Battery positive voltage

Step \ Terminal	D	C	A	E	B
1			○—○		
2	B+	GND		○—○	

3. If not as specified, replace the ABS relay.

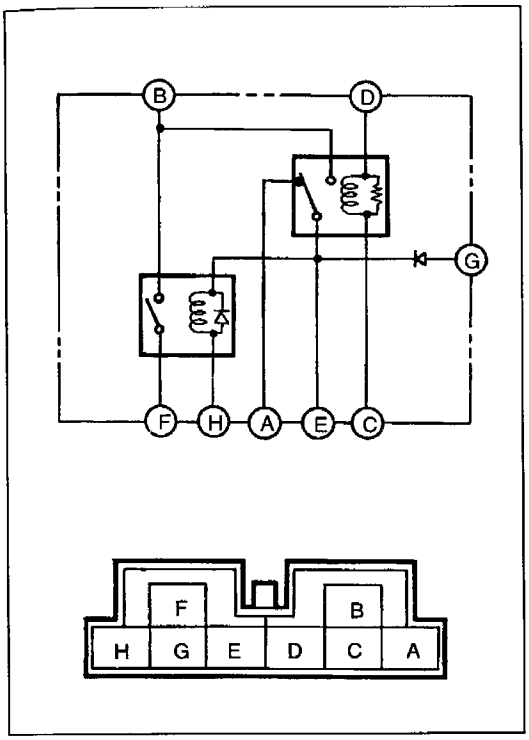


Motor relay (including harness to ABS CM)

1. Inspect the fail-safe relay.
2. Turn the ignition switch OFF and disconnect the ABS control module connector.
3. Turn the ignition switch ON.
4. Connect terminal 2J to a ground.
5. Connect terminal 2H to a ground.
6. Check the following points.
   Allowing the motor to operate for more than **two seconds** will damage the motor.

Condition	Action
Motor relay in ABS relay does not click when terminals grounded	• Check harness between motor relay and ABS control module • Check motor relay
Motor does not operate	• Check motor relay • Check harness between motor relay and motor • Check fuse

7. If not as specified, inspect the wiring harness and the motor relay. (Refer to page P–39.)



Motor relay

1. Measure the resistance between terminals E and H, or between A and H of the ABS relay connector.

   Resistance: 50—90 Ω

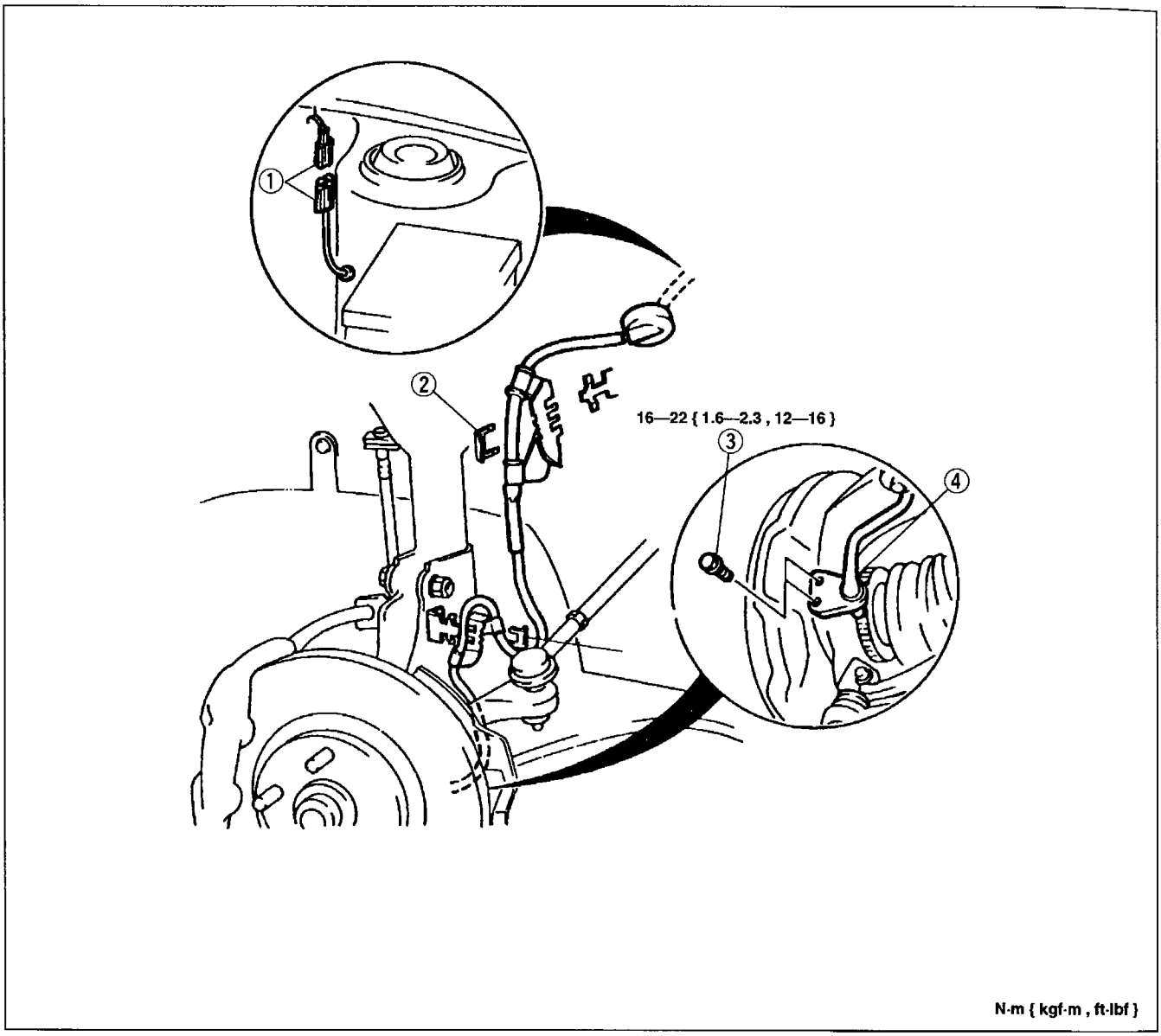
2. Check for continuity between the relay terminals.

O—O: Continuity B+: Battery positive voltage

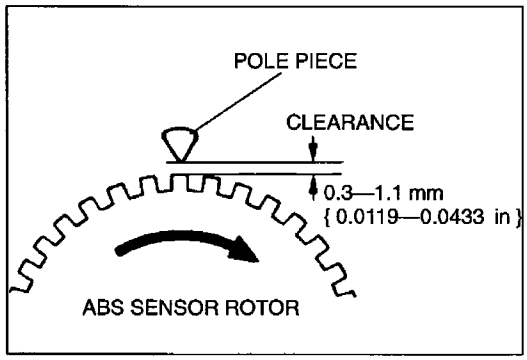
Step \ Terminal	G	H	B	F
1	O→	—O		
2	B+	GND	O—	—O

3. If not as specified, replace the ABS relay.

ABS WHEEL-SPEED SENSOR (FRONT)
Removal / Installation



1. Connector
2. Clip
3. Bolt
4. ABS wheel-speed sensor
   Inspection (on-vehicle) ..... below

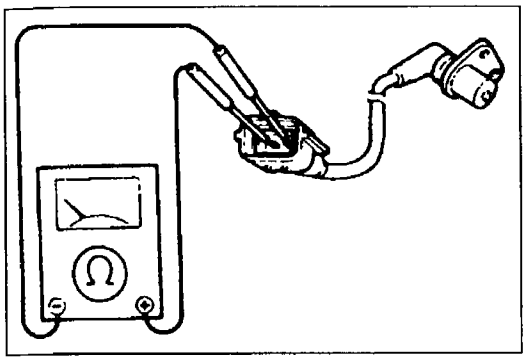


Inspection (On-vehicle)

1. Remove the wheel and tire, and inspect the sensor for looseness and damage. Replace the sensor if necessary.
2. Check the clearance between the wheel-speed sensor and the sensor rotor.

   Clearance: 0.3—1.1 mm { 0.0119—0.0433 in }

3. If not as specified, replace the ABS wheel-speed sensor or sensor rotor as necessary.



Resistance of ABS wheel-speed sensor

1. Disconnect the ABS wheel-speed sensor connector.
2. Check the resistance at the ABS wheel-speed sensor.

Resistance: 1.3—2.0 kΩ

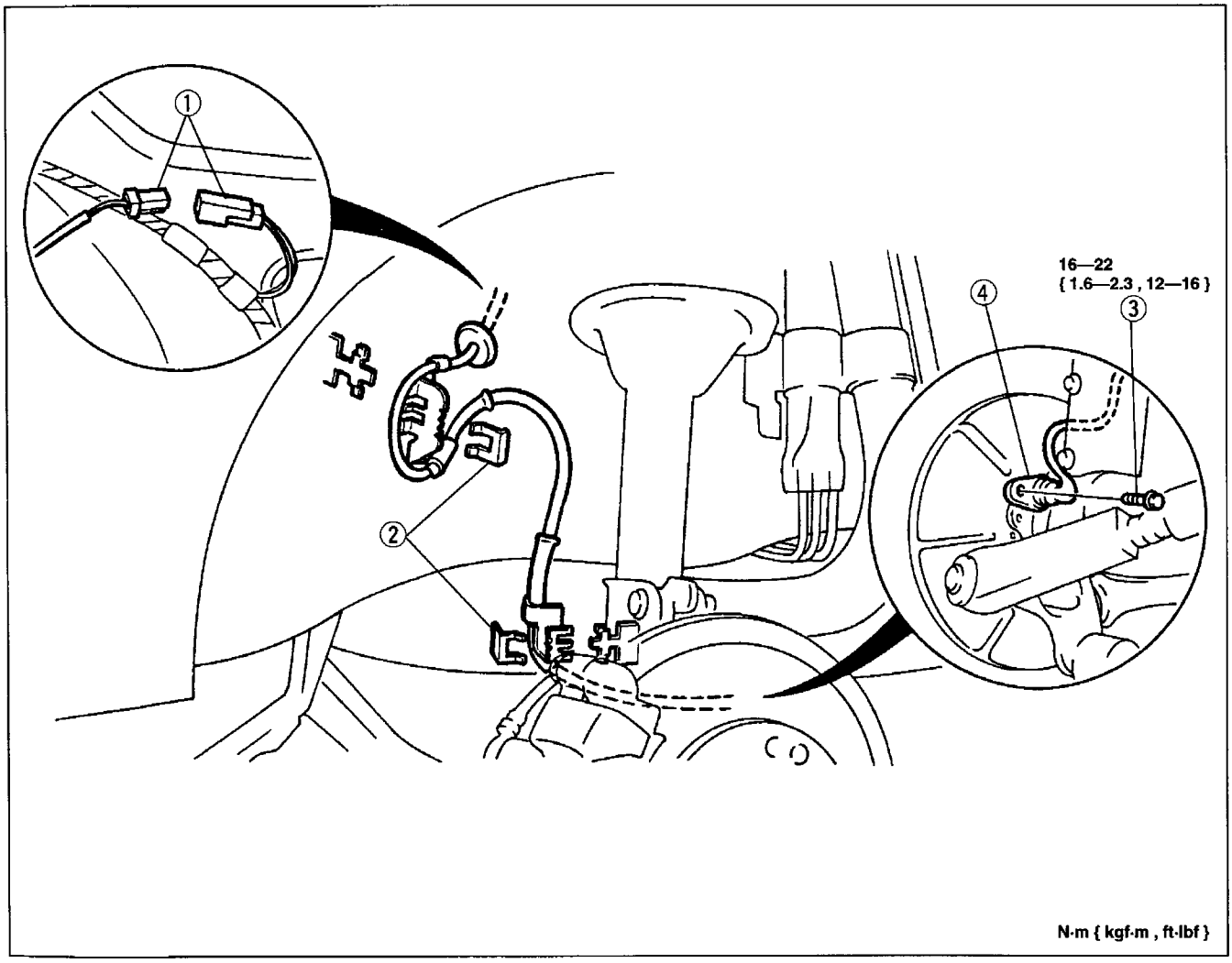
Voltage of ABS wheel-speed sensor

1. On level ground, jack up the vehicle and support it evenly on safety stands.
2. Disconnect the ABS wheel-speed sensor connector.
3. Check each wheel by rotating it at one revolution per second.

Voltage: 0.25—3.0 V (AC)

4. If not as specified, replace the ABS wheel-speed sensor or sensor rotor as necessary.

ABS WHEEL-SPEED SENSOR (REAR)
Removal / Installation



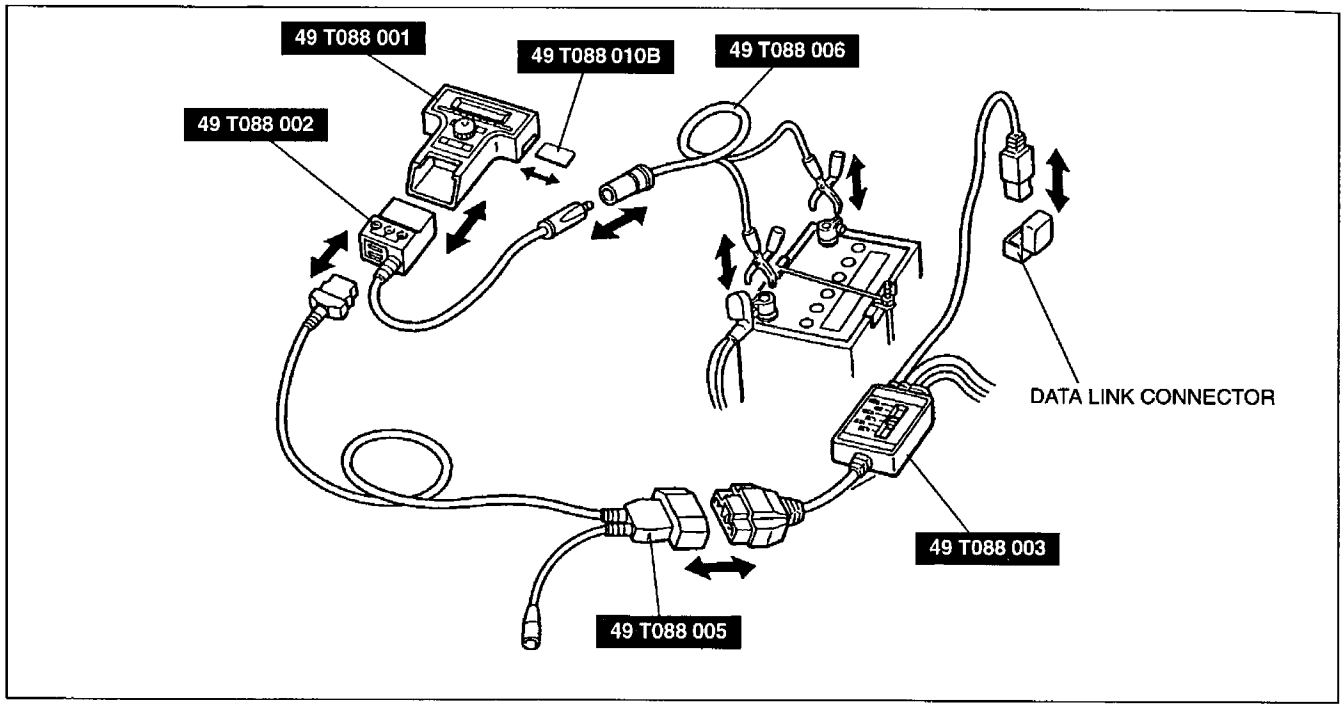
1. Connector
2. Clip
3. Bolt
4. ABS wheel-speed sensor

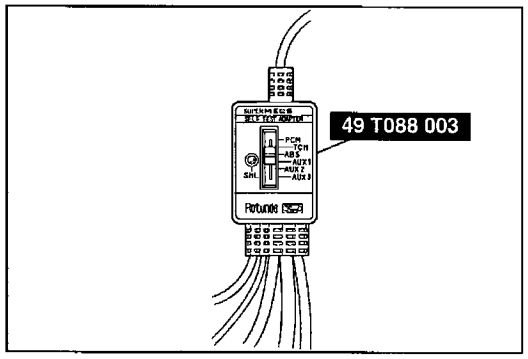
Inspection (on-vehicle) . . . . . page P–40

ON-BOARD DIAGNOSTIC FUNCTION
On-Board Diagnostic System
Inspection by diagnostic test mode
Outline

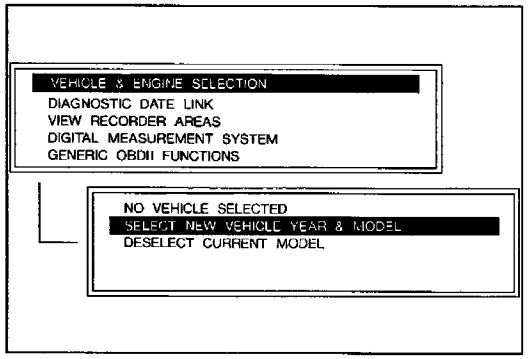
- The ABS control module contains an on-board diagnostic and memory functions to detect and indicate present and past failures.
  Read and note the diagnostic indications by using the **SST**, and take action according to the Diagnostic Trouble Code Table. (Refer to page P–44.)
- The ABS CM has a nonvolatile memory. Diagnostic trouble codes are not erased if the battery is disconnected. The memory should be cleared when servicing is finished. (Refer to page P–43.)

Inspection using NGS

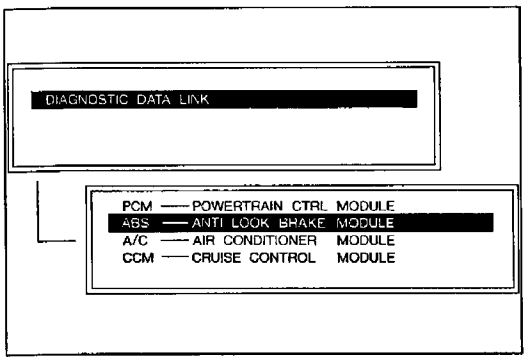




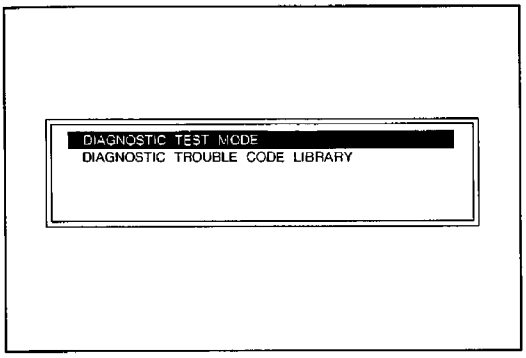
1. Connect the **SST** (NGS) to the data link connector and battery.
2. Set the **SST** (Super MECS Adapter) to ABS.



3. Select "VEHICLE & ENGINE SELECTION" on the **SST** (Control Unit) display, and then select the vehicle model, engine type, and model year.



4. Select "DIAGNOSTIC DATA LINK" on the **SST**, (Control Unit) display.
5. Select "ANTI LOCK BRAKE MODULE" on the **SST** (Control Unit) display.



6. Select "DIAGNOSTIC TEST MODE" on the **SST** (Control Unit) display.
7. (1) If a trouble code is displayed, refer to the Diagnostic trouble code table (Refer to page P–47.) and inspect the appropriate system area.
   (2) If "No codes received" is displayed, the system areas shown in the Diagnostic trouble code table are okay. Inspect another system area.

Memory cancel

The ABS control module has a nonvolatile memory. Diagnostic trouble codes are not erased if the battery is disconnected. The memory should be cleared when servicing is finished.
Diagnostic trouble codes memorized in the ABS control module are canceled by performing the following steps.

1. Connect the TBS terminal to GND at the data link connector.
2. Turn the ignition switch ON.
3. Output all memorized codes.
4. After verifying that the first code is repeated, depress the brake pedal 10 times at intervals of less than **one second (1 sec.)**.
   Diagnostic trouble codes cannot be canceled if the following occur.
   - If intervals of depressing the brake pedal exceed **one second (1 sec.)**.
   - Brake switch has failed.

   While performing the memory cancel operation, the ABS warning light is not illuminated.
   When the memory cancel operation is completed, the ABS warning light comes on for **2—3 seconds**, then goes off.
   After the memory is canceled, the ABS control module performs on-board diagnosis.

Diagnostic trouble code table

DTC	Display on the NGS	Possible cause	Page
11	WSS, SR (RH-FRONT) — OPEN OR SHORT, DEFECT	Right front wheel-speed sensor Right front sensor rotor	P–45
12	WSS, SR (LH-FRONT) — OPEN OR SHORT, DEFECT	Left front wheel-speed sensor Left front sensor rotor	
13	WSS, SR (RH-REAR) — OPEN OR SHORT, DEFECT	Right rear wheel-speed sensor Right rear sensor rotor	
14	WSS, SR (LH-REAR) — OPEN OR SHORT, DEFECT	Left rear wheel-speed sensor Left rear sensor rotor	
15*	WSS — OPEN OR SHORT	Wheel-speed sensor	P–45
22	SOLV (RH-FRONT) — OPEN OR SHORT	Right front solenoid valve	P–46
24	SOLV (LH-FRONT) — OPEN OR SHORT	Left front solenoid valve	
26	SOLV (RH-REAR) — OPEN OR SHORT	Right rear solenoid valve	
28	SOLV (LH-REAR) — OPEN OR SHORT	Left rear solenoid valve	
51	FAIL SAFE RELAY — OPEN OR SHORT, DEFECT	Fail-safe relay	P–46
53	MOTOR, MOTOR RELAY — OPEN OR SHORT, DEFECT	ABS motor Motor relay	P–47
61	ABS CONTROL UNIT — DEFECT	ABS control module	P–47

* If the ignition switch is turned OFF and the ON again, and the vehicle is then accelerated to higher than 10 km/h { 6.2 MPH }, diagnostic trouble code 15 will be replaced by a code from 11 through 14.

Diagnostic chart

Diagnostic trouble code No.11–14	ABS wheel-speed sensor (11: Right front 12: Left front 13: Right rear 14: Left rear)		
Possible cause	• Malfunction of ABS wheel-speed sensor, sensor rotor, or ABS hydraulic unit • Malfunction of related wiring harness		
STEP	**INSPECTION**		**ACTION**
1	Is ABS CM connector connected properly?	Yes	Go to next step
		No	Correct as necessary
2	Is wiring harness between ABS CM and wheel-speed sensor OK?	Yes	Go to next step
		No	Correct as necessary
3	Is ABS wheel-speed sensor OK? ☞ **page P–40**	Yes	Go to next step
		No	Replace ABS wheel-speed sensor ☞ **page P–40, 41**
4	Are there missing or damaged teeth on sensor rotor?	Yes	Replace sensor rotor ☞ **section M**
		No	Go to next step
5	Is brake switch OK? ☞ **page P–7**	Yes	Go to next step
		No	Replace brake switch ☞ **page P–7**
6	Is ABS hydraulic unit OK? ☞ **page P–31**	Yes	Go to next step
		No	Replace ABS hydraulic unit ☞ **page P–33**
7	Erase diagnostic trouble code, and recheck for diagnostic trouble codes after driving over **10 km/h { 6.2 MPH }** Is diagnostic trouble code 11—14 obtained?	Yes	Replace ABS CM ☞ **page P–34**
		No	There was a temporarily poor contact in wiring harness or connector

Diagnostic trouble code No.15	ABS wheel-speed sensor		
Possible cause	• Malfunction of ABS wheel-speed sensor • Malfunction of related wiring harness		
STEP	**INSPECTION**		**ACTION**
1	Erase diagnostic trouble code, and recheck for diagnostic trouble codes after driving over **10 km/h { 6.2 MPH }** Is diagnostic trouble code obtained?	Yes	Code of 11—14 is obtained: Go to above chart Code 15 is obtained: Replace ABS CM ☞ **page P–34**
		No	There was a temporarily poor contact in wiring harness or connector

Diagnostic trouble code No.22, 24, 26, 28	Solenoid valve (22: Right-front 24: Left front 26: Right rear 28: Left rear)
Possible cause	• Malfunction of solenoid valve • Malfunction of related wiring harness

STEP	INSPECTION		ACTION
1	Is ABS CM connector connected properly?	Yes	Go to next step
		No	Correct as necessary
2	Inspect solenoid valve including harness Is it OK? ☞ page P–32	Yes	Go to step 4
		No	Go to next step
3	Is solenoid valve OK? ☞ page P–32	Yes	Go to next step
		No	Replace ABS hydraulic unit ☞ page P–33
4	Erase diagnostic trouble code, and recheck for diagnostic trouble codes Is diagnostic trouble code 22—28 obtained?	Yes	Replace ABS CM ☞ page P–34
		No	There was a temporarily poor contact in wiring harness or connector

Diagnostic trouble code No.51	Fail-safe relay
Possible cause	• Malfunction of fail-safe relay • Malfunction of related wiring harness

STEP	INSPECTION		ACTION
1	Is engine fuse (10 A) OK?	Yes	Go to next step
		No	Replace fuse
2	Inspect fail-safe relay including harness Is it OK? ☞ page P–38	Yes	Go to step 4
		No	Go to next step
3	Is fail-safe relay OK? ☞ page P–38	Yes	Go to next step
		No	Replace ABS relay ☞ page P–37
4	Erase diagnostic trouble code, and recheck for diagnostic trouble codes Is diagnostic trouble code 51 obtained?	Yes	Replace ABS CM ☞ page P–34
		No	There was a temporarily poor contact in wiring harness or connector

Diagnostic trouble code No.53	ABS motor, motor relay
Possible cause	• Malfunction of motor or motor relay • Malfunction of related wiring harness

STEP	INSPECTION		ACTION
1	With ignition switch OFF, is motor operating?	Yes	Replace ABS relay ☞ page P–37
		No	Go to next step
2	Is ABS fuse (40 A) OK?	Yes	Go to next step
		No	Replace fuse
3	Inspect motor relay including harness Is it OK? ☞ page P–38	Yes	Go to step 7
		No	Go to next step
4	Is motor relay OK? ☞ page P–39	Yes	Go to next step
		No	Replace ABS relay ☞ page P–37
5	Inspect ABS motor, including harness Is it OK? ☞ page P–32	Yes	Go to step 7
		No	Go to next step
6	Is ABS motor OK? ☞ page P–32	Yes	Correct harness as necessary
		No	Replace ABS hydraulic unit ☞ page P–33
7	Erase diagnostic trouble code, and recheck for diagnostic trouble codes Is diagnostic trouble code 53 obtained?	Yes	Replace ABS CM ☞ page P–34
		No	There was a temporarily poor contact in wiring harness or connector

Diagnostic trouble code No.61	ABS control module
Possible cause	• Malfunction of control module

STEP	INSPECTION		ACTION
1	Erase diagnostic trouble code, and recheck for diagnostic trouble code Is diagnostic trouble code 61 obtained?	Yes	Replace ABS CM ☞ page P–34
		No	There was a temporarily poor contact in wiring harness or connector

TROUBLESHOOTING

Troubleshooting Notes

The ABS is composed of electrical components, mechanical components (ABS hydraulic unit), and the components of the standard brake system.

Fundamentally, malfunction of the ABS electrical or mechanical components is judged by the on-board diagnostic function within the ABS control module. Malfunctions are indicated by the warning light in the instrument panel. The technician can locate a malfunction by switching the system to the diagnostic test mode.

The on-board diagnostic system must be used when diagnosing malfunctions of the ABS.

Precaution

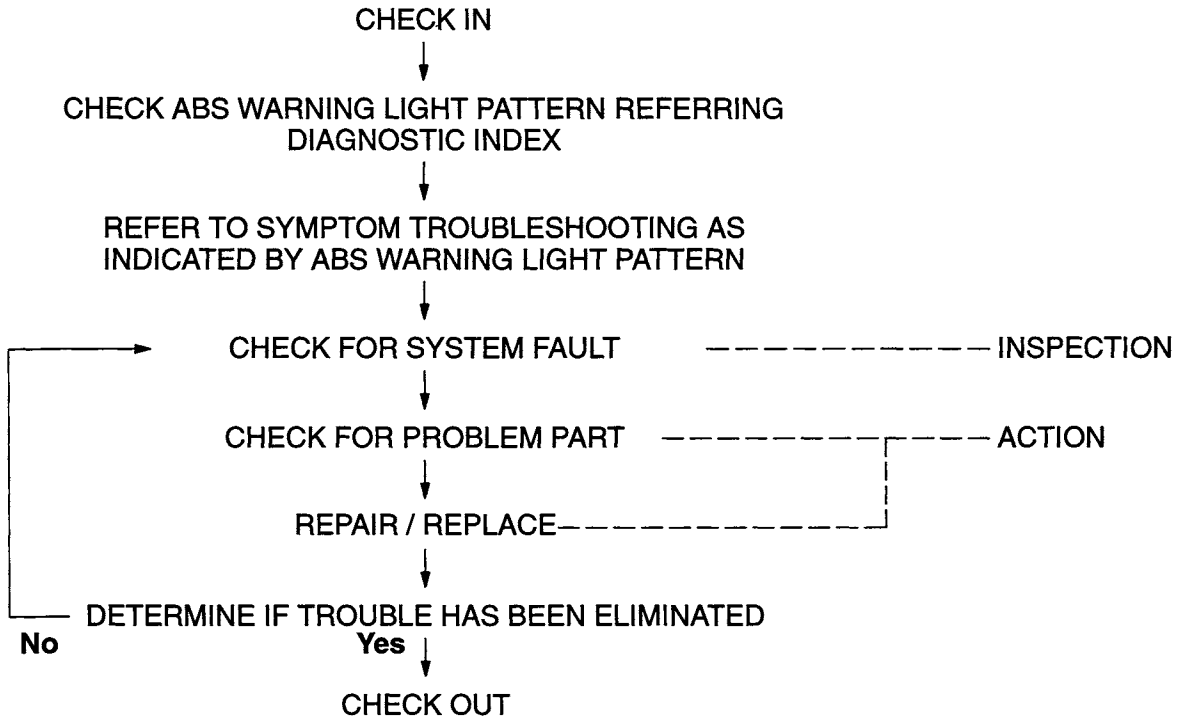
Conditions that are not malfunctions

1. Vibration can sometimes be 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. The ABS warning light may illuminate under any of the following conditions.
   - When the vehicle is travelling on snow or ice with the parking brake activated or a brake dragging at one wheel.
   - When different size tires are used.
   - When tires of different gripping performance are used.
   - When (While the vehicle is jacked up or stuck) the front wheels only are spun for **20 seconds** or more.
   - When there is insufficint battery voltage.
3. 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 also be no diagnostic trouble code entry made to the control module memory.

Diagnostic Chart

Symptom \ Cause		Input				Output				
				ABS relay		ABS hydraulic unit				
		ABS wheel-speed sensor	Brkae switch	Fail-safe relay	Motor relay	Solenoid valve	ABS motor	ABS warning light	Data link connector	ABS control module
1	ABS warning light not illuminated when ignition switch turned ON							○		
2	ABS warning light remains ON	○	○	○	○	○	○	○		○
3	ABS warning light flashes								○	

Using This Section
Work flow



Diagnostic index

TROUBLESHOOTING ITEMS		DESCRIPTION	PAGE
No.	TROUBLE		
1	ABS warning light not illuminated when ignition switch turned ON	—	below
2	ABS warning light remains ON	Warning light remains ON and ABS does not operate	P–52

No.:
Each troubleshooting item is assigned a number.

TROUBLESHOOTING ITEMS:
There are 3 troubleshooting items. Choose the item indicated by the ABS warning light.

DESCRIPTION:
Describes details of the symptom.

PAGE:
Shows the reference page.

Symptom troubleshooting

1	ABS WARNING LIGHT NOT ILLUMINATED WHEN IGNITION SWITCH TURNED ON		
DESCRIPTION		—	
[TROUBLESHOOTING HINTS] • If other warning indicators do not illuminate, METER 15 A fuse may be burnt. • Failed warning light or open in related wiring harness.			
STEP	INSPECTION		ACTION
1	Is METER 15 A fuse OK?	Yes	Go to next step
		No	Replace METER 15 A fuse
2	Is harness of ABS warning light normal?	Yes	Inspect ABS warning light bulb and replace if necessary
		No	• Inspect harness between ABS CM and ABS relay • Inspect harness between instrument panel and ABS CM • Inspect harness between inst...

DESCRIPTION:
Further describes the system. Confirm that the chart addresses the actual symptom before beginning troubleshooting.

TROUBLESHOOTING HINTS:
This describes the possible point of malfunction.

STEP:
This shows the order of troubleshooting. Proceed with troubleshooting as indicated.

INSPECTION:
This describes an inspection to quickly determine the malfunction of parts. If a detailed procedure is necessary to perform the INSPECTION, refer to the page specified by the "☞" mark.

ACTION:
This recommends the appropriate action to take as a result (Yes/No) of the INSPECTION. How to perform the actions is described on the reference page specified by the "☞" mark.

Diagnostic Index

TROUBLESHOOTING ITEMS		DESCRIPTION	PAGE
No.	TROUBLE		
1	ABS warning light not illuminated when ignition switch turned ON	—	below
2	ABS warning light remains ON	Warning light remains ON and ABS does not operate	P–52
3	ABS warning light flashes	—	P–52

Symptom Troubleshooting

1	ABS WARNING LIGHT NOT ILLUMINATED WHEN IGNITION SWITCH TURNED ON		
DESCRIPTION	—		
[TROUBLESHOOTING HINTS] • If other warning indicators do not illuminate, METER 15 A fuse may be burnt. • Failed warning light or open in related wiring harness.			
STEP	INSPECTION		ACTION
1	Is METER 15 A fuse OK?	Yes	Go to next step
		No	Replace METER 15 A fuse
2	Is harness of ABS warning light normal?	Yes	Inspect ABS warning light bulb and replace if necessary
		No	• Inspect harness between ABS CM and ABS relay • Inspect harness between instrument panel and ABS CM • Inspect harness between instrument panel and ABS relay • Inspect ABS warning light bulb Correct as necessary

2	ABS WARNING LIGHT REMAINS ON		
DESCRIPTION	ABS warning light remains ON and ABS does not operate		
[TROUBLESHOOTING HINTS] • If only ABS warning light illuminates, activate diagnostic test mode and check for diagnostic trouble code • Malfunction of battery • Malfunction of ABS warning light harness (fail-safe relay) • Malfunction of ABS control module			
STEP	**INSPECTION**		**ACTION**
1	Activate diagnostic test mode and check for diagnostic trouble codes Are there any? ☞ page P–42	Yes	Read diagnostic trouble code and follow diagnosis chart ☞ page P–44
		No	Go to next step
2	Is ABS CM connector connected?	Yes	Go to next step
		No	Connect connector
3	Is battery as specified?	Yes	Go to next step
		No	Charge or replace if necessary
4	Is ABS warning light harness normal?	Yes	Go to next step
		No	• Inspect harness between ABS CM and ABS relay • Inspect harness between instrument panel and ABS CM • Inspect harness between instrument panel and ABS relay Correct as necessary
5	Connect terminal 2J of ABS CM connector to a ground and check the following points (IG ON) • Operation sound of relay is heard • ABS warning light is not illuminated • 1D terminal of ABS CM connector indicates battery voltage	Yes	Go to next step
		No	• Inspect ABS relay (fail-safe relay) ☞ page P–38 • Inspect harness between ABS relay (fail-safe relay) and ABS CM, battery • Inspect harness between ABS relay (fail-safe relay) and ABS hydraulic unit Correct as necessary
6	Is voltage at terminals 1E, 1F and 1H of ABS CM connector and terminal 2B and 2L of ABS CM connector as specified? ☞ page P–35	Yes	Replace ABS CM
		No	• Inspect harness between ABS CM and ground • Inspect harness between ignition switch and ABS CM • Inspect harness between data link connector and ABS CM • Inspect harness between ABS warning light and ABS CM Correct as necessary

3	ABS WARNING LIGHT FLASHES		
DESCRIPTION	—		
[TROUBLESHOOTING HINTS] • Data link connector terminal TBS grounded			
STEP	**INSPECTION**		**ACTION**
1	Verify that there is no continuity between terminal TBS and GND at data link connector	Yes	Inspect ABS CM
		No	Repair short between TBS and GND

WHEELS AND TIRES

OUTLINE **Q–2**
SPECIFICATIONS **Q–2**

OUTLINE

SPECIFICATIONS

Standard tire

Item			Specification	
Wheel	Size		14×5 1/2JJ	13×5J
	Offset	mm { in }	45 { 1.77 }	
	Pitch circle diameter	mm { in }	100 { 3.94 }	
	Material		Steel or aluminum alloy	Steel
Tire	Size (air pressure	kPa { kgf/cm², psi })	P185/65R14 85S (220 { 2.2 , 32 })	P175/70R13 82S (220 { 2.2 , 32 })
	Remaining tread	mm { in }	1.6 { 0.063 }	
Wheel and tire*	Wheel and tire runout	Radial direction mm { in }	Max. 1.5 { 0.06 }	
		Lateral direction mm { in }	Max. 2.5 { 0.10 } Steel, Max. 2.0 { 0.08 } Aluminum	
	Wheel imbalance	g { oz }	Max. 10 { 0.35 } 13-inch wheel, Max. 11 { 0.39 } 14-inch wheel	

Temporary spare tire

Item			Specification
Wheel	Size		14×4T
	Offset	mm { in }	45 { 1.77 }
	Pitch circle diameter	mm { in }	100 { 3.94 }
	Material		Steel
Tire	Size		T125/70 D14 T115/70 D14
	Air pressure	kPa { kgf/cm², psi }	415 { 4.2 , 60 }
Wheel and tire	Wheel and tire runout	Radial direction mm { in }	Max. 2.5 { 0.10 }
		Lateral direction mm { in }	Max. 2.0 { 0.08 }

*Note
- One balance weight: max. 60 g { 2.1 oz }.
- If the total weight exceeds 100 g { 3.5 oz } on one side, rebalance after moving the tire around on the rim.
- Do not use more than two balance weights on the inner or outer side of the wheel.

Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

SUSPENSION

OUTLINE ..... **R- 2**
SPECIFICATIONS ..... **R- 2**
GENERAL PROCEDURES ..... **R- 3**
WHEEL ALIGNMENT ..... **R- 3**
PREINSPECTION ..... **R- 3**
FRONT WHEEL ALIGNMENT ..... **R- 4**
REAR WHEEL ALIGNMENT ..... **R- 5**
FRONT SUSPENSION (STRUT) ..... **R- 7**
PREPARATION ..... **R- 7**
FRONT SHOCK ABSORBER AND SPRING .... **R- 9**
FRONT LOWER ARM **R-16**
FRONT STABILIZER **R-19**
FRONT CROSSMEMBER **R-21**
REAR SUSPENSION (STRUT) **R-22**
PREPARATION **R-22**
REAR SHOCK ABSORBER AND SPRING **R-23**
LATERAL LINK AND TRAILING LINK **R-30**
REAR STABILIZER **R-32**
REAR CROSSMEMBER **R-34**

OUTLINE

SPECIFICATIONS

Item \ Type			BP	Z5
Suspension type			Strut	
Shock absorber type			Cylindrical, double-acting (oil-filled)	
Coil spring	Type	Front	Straight wound	
		Rear	Straight wound	
Stabilizer	Type		Torsion bar	
	Diameter mm { in }	Front	24.0 { 0.94 }	
		Rear	16.0 { 0.63 }	—
Wheel alignment (Unladen)*1				
Front	Maximum steering angle degree	Inner	40° ± 3°	
		Outer	33° ± 3°	
	Total toe-in	mm { in }	2 ± 4 { 0.08 ± 0.16 }	
		degree	0°12′ ± 0°24′	
	Camber angle*2		–0°44′ ± 1°	
	Caster angle*2		1°55′ ± 1°	
	Steering axis inclination	degree	13°22′	
Rear	Total toe-in	mm { in }	2 ± 4 { 0.08 ± 0.16 }	
		degree	0°12′ ± 0°24′	
	Camber angle*2		–0°49′ ± 1°	
	Thrust angle		0° ± 48′	

*1 Fuel tank full; radiator coolant and engine oil at specified level; spare tire, jack, and tools in designated position. Adjust to the median when carrying out wheel alignment.
*2 Difference between left and right must not exceed 1.5°.

GENERAL PROCEDURES

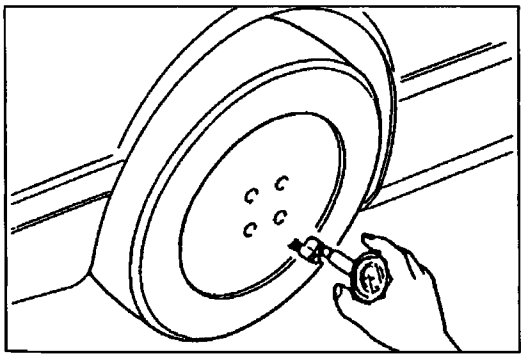
Removal / Installation
- The numbers in the structural view indicate the removal order. For installation, follow the reverse order except for the front and rear shock absorber and spring. (Refer to page R–12, R–26.)

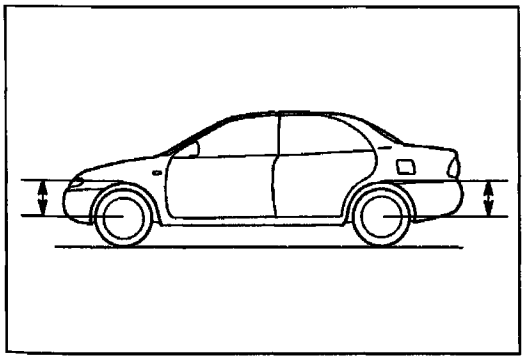
Wheel and tires
- The removal and installation procedures for the wheels and tires are not mentioned in this section. If you must remove the wheels, retighten it to **89—127 N·m { 9.0—13.0 kgf·m , 66—94 ft·lbf }**

Suspension links
- Tighten any part of the suspension that uses rubber bushings only after the vehicle has been lowered and unloaded. If a suspension part(s) has been removed anytime during the procedure, inspect the wheel alignment.

Brake pipe flare nuts
- Tighten the brake pipe flare nut by using the **SST** (49 0259 770B). Be sure to modify the brake pipe flare nut tightening torque to allow for use of a torque wrench-SST combination. (Refer to section GI "Torque Formulas".)

Power steering components
- If a power steering fluid line(s) has been disconnected anytime during the procedure add ATF (Dexron® II or M-III), bleed the fluid line(s), and inspect for leakage after the procedure has been completed.





WHEEL ALIGNMENT

PREINSPECTION
1. Check the inflation of each tire and set to the recommended pressure, if necessary.
2. Inspect the front wheel bearing play. Replace bearing (s) as necessary.
3. Inspect the wheel and tire runout of all wheels.
4. Inspect the ball joints and steering linkage for excessive looseness.
5. Place the vehicle on level ground with 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 not exceed specification.

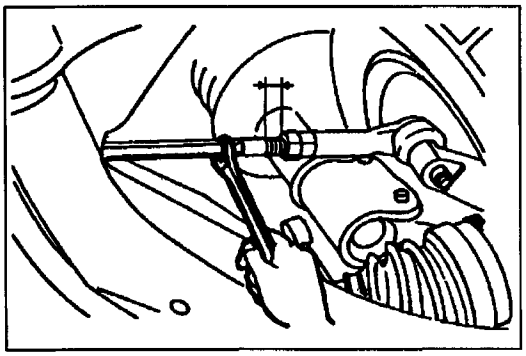
   Specification: 10 mm { 0.39 in }

7. Shake the vehicle to settle the suspension.

FRONT WHEEL ALIGNMENT
Specifications (Unladen)*1

Item			Specification
Maximum steering angle		Front	40° ± 3°
		Rear	33° ± 3°
Total toe-in		mm { in }	2 ± 4 { 0.08 ± 0.16 }
		degree	0°12′ ± 0°24′
Camber angle*2			–0°44′ ± 1°
Caster angle*2	Fuel gauge indication		—
	Full		1°55′ ± 1°
	1/4		1°52′ ± 1°
	1/2		1°49′ ± 1°
	3/4		1°46′ ± 1°
	Empty		1°43′ ± 1°
Steering axis inclination			13°22′

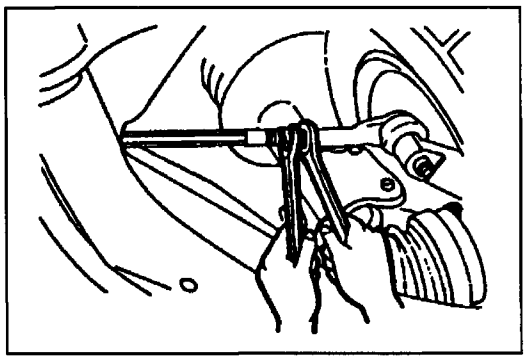
*1 Radiator coolant and engine oil at specified level; spare tire, jack, and tools in designated position. Adjust to the median when carrying out wheel alignment.
*2 Difference between left and right must not exceed 1.5°.



Maximum Steering Angle Adjustment

1. Remove the steering gear boot clamp.
2. Loosen the tie rod locknut.
3. Turn the tie rod to provide the correct maximum steering angle.

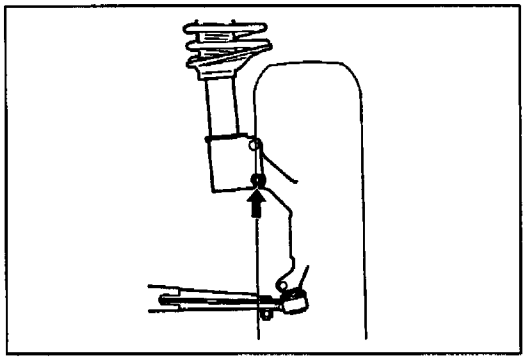
   Maximum left/right difference: 3 mm { 0.12 in }



4. After adjustment, tighten the locknut to the specified torque.

   Tightening torque:
   35—50 N·m { 3.5—5.1 kgf·m , 26—36 ft·lbf }

5. Adjust the toe-in. (Refer to page R–5.)
6. Verify that the boot is not twisted, and install the boot clamp.



Caster/Camber Adjustment (camber)

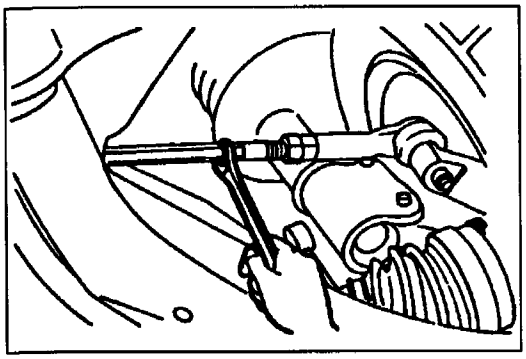
Note
- Caster is not adjustable.
- Adjusting range is **47′**.

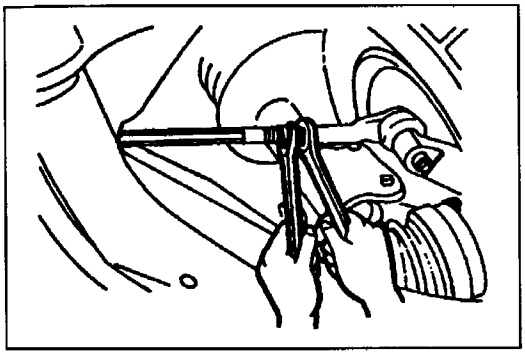
1. Jack up the vehicle and remove the wheel and tire.
2. Replace the bolt shown with an adjusting bolt.
3. Adjust the camber by moving the shock absorber and the knuckle.

4. Tighten the nut to the specified torque.

   Tightening torque: 103—126 N·m { 10.5—12.9 kgf·m , 76.0—93.3 ft·lbf }

5. Lower the vehicle after installing the wheel and tire.
6. Inspect the camber.





Total toe-in
Adjustment

1. Adjust the steering angle.
2. Remove the steering gear boot clamp.
3. Loosen the left and right tie rod locknuts and turn the tie rods equally. Both tie rods are right threaded, so turning the right tie rod toward the front of the vehicle and the left toward the rear increases toe-in.

   Note
   - Turning both tie rods one complete turn changes toe-in by about **12 mm { 0.47 in }.**

4. Tighten the tie rod locknuts to the specified torque.

   Tightening torque: 35—50 N·m { 3.5—5.1 kgf·m , 26—36 ft·lbf }

5. Verify that the boot is not twisted, and install the boot clamp.

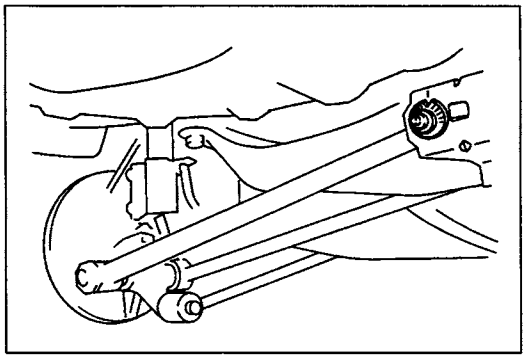
R

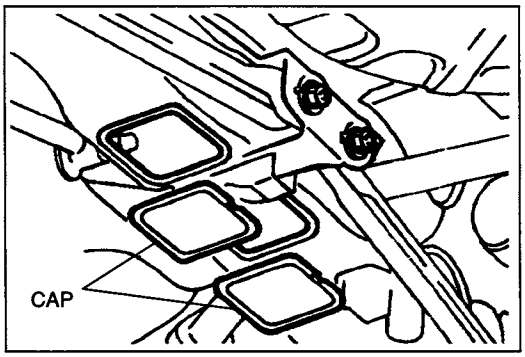
REAR WHEEL ALIGNMENT

Specifications (Unladen)*1

Item		Specifications
Total toe-in	mm { in }	2 ± 4 { 0.08 ± 0.16 }
	degree	0°12′ ± 0°24′
Camber angle*2		–0°49′ ± 1°
Thrust angle		0° ± 48′

*1 Fuel tank full; radiator coolant and engine oil at specified level; spare tire, jack, and tools in designated position. Adjust to the median when carrying out wheel alignment.
*2 Difference between left and right must not exceed 1.5°.





Total toe-in
Adjustment
In order to maintain the specified thrust angle of **0° ± 48′**, the rear toe-in setting must be adjusted. If the thrust angle cannot be adjusted to that specification, check the body dimensions.

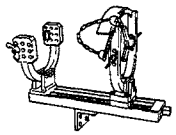
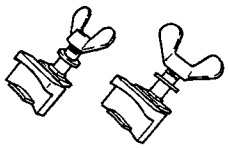
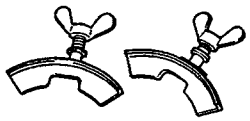
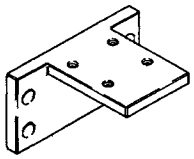
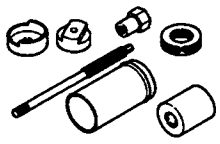
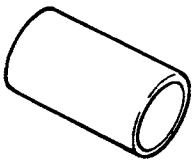
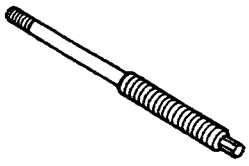
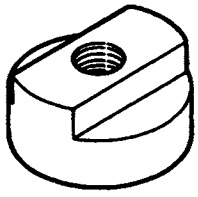
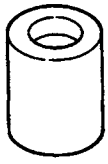
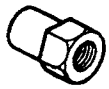
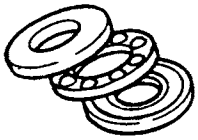
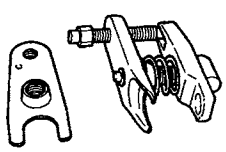
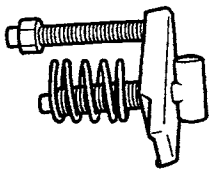
1. Remove the cap.
2. Loosen the cam nut on the lateral link.
3. Turn the adjusting cam bolt to provide the correct total toe-in as indicated.
4. Tighten the cam nut.

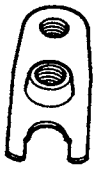
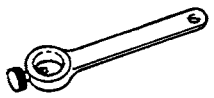
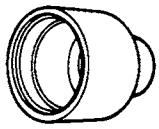
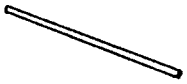
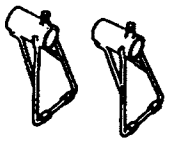
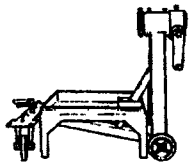
   Tightening torque:
   35—53 N·m { 3.5—5.5 kgf·m , 26—39 ft·lbf }

5. Install the cap.

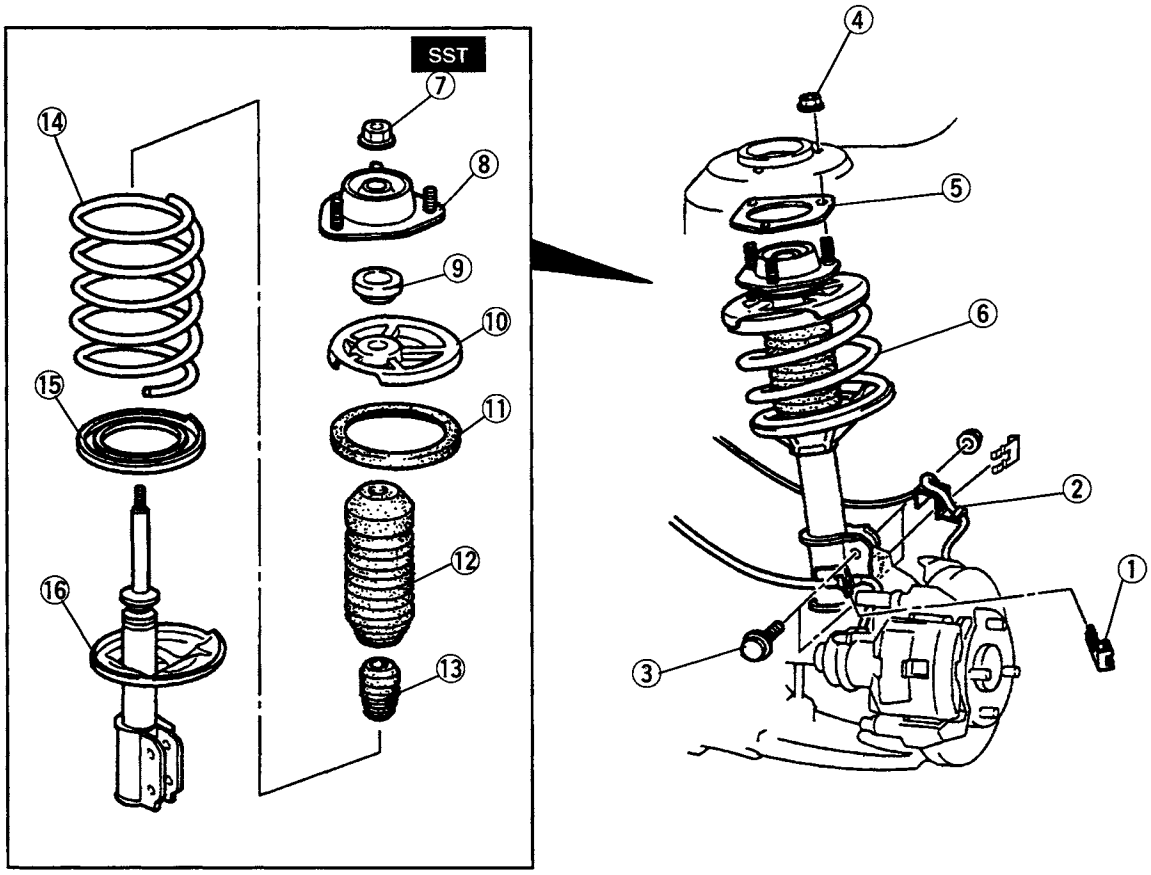
FRONT SUSPENSION (STRUT)

PREPARATION
SST

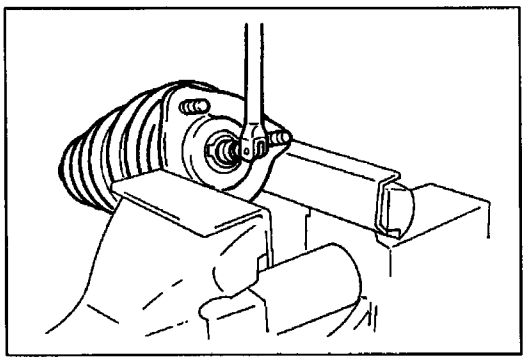
49 T034 1A0 Compressor, coil spring 	For removal and installation of coil spring	49 T034 101 Compressor, spring (Part of 49 T034 1A0) 	For removal and installation of coil spring
49 T034 102 Stand (Part of 49 T034 1A0) 	For removal and installation of coil spring	49 T034 103 Hook (Part of 49 T034 1A0) 	For removal and installation of coil spring
49 T034 104 Support (Parts of 49 T034 1A0) 	For removal and installation of coil spring	49 T034 105 Attachment 	For removal and installation of coil spring
49 B034 2A1 Replacer, rubber bushing 	For removal and installation of lower arm bushing	49 B034 202 Support block (Part of 49 B034 2A1) 	For removal and installation of lower arm bushing
49 B034 203 Guide (Part of 49 B034 2A1) 	For removal and installation of lower arm bushing	49 B034 206 Shaft (Part of 49 B034 2A1) 	For removal and installation of lower arm bushing
49 B034 207 Replacer (Part of 49 B034 2A1) 	For removal and installation of lower arm bushing	49 B034 208 Attachment (Part of 49 B034 2A1) 	For removal and installation of lower arm bushing
49 W038 002 Nut (Part of 49 B034 2A1) 	For removal and installation of lower arm bushing	49 G034 205 Bearing (Part of 49 B034 2A1) 	For removal and installation of lower arm bushing
49 T028 3A0 Puller set, ball joint 	For removal of ball joint	49 T028 303 Body (Part of 49 T028 3A0) 	For removal of ball joint

49 T028 304 Attachment (Part of 49 T028 3A0) 	For removal of ball joint	49 0180 510B Attachment, preload measuring 	For inspection of ball joint
49 1243 785 Installer, boot 	For installation of ball joint dust boot	49 G017 5A0 Support, engine 	For support of engine
49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine	49 G017 502 Support (Parts of 49 G017 5A0) 	For support of engine
49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine	49 0107 680A Engine stand 	For removal and installation of coil spring
49 G034 1A0 Compressor coil spring 	For removal and installation of coil spring	49 G034 101 Body (Part of 49 G034 1A0) 	For removal and installation of coil spring
49 G034 102 Screw (Part of 49 G034 1A0) 	For removal and installation of coil spring	49 G034 103 Arm (Part of 49 G034 1A0) 	For removal and installation of coil spring

FRONT SHOCK ABSORBER AND SPRING
Removal / Inspection



1. Clip
2. ABS wheel-speed sensor harness
3. Bolt (shock absorber and spring)
4. Nut
5. Sheet
6. Front shock absorber and spring
7. Nut (mounting rubber)
   Removal Note
   When using **SST**
   (49 T034 1A0) ..... page R–10
   When using **SST**
   (49 G034 1A0) ..... page R–10
8. Mounting rubber
   Inspect for damage, deterioration, and weakness
9. Thrust bearing
   Inspect for damage, wear, and poor lubrication
10. Upper spring seat
    Inspect for damage and cracks
11. Upper rubber spring seat
    Inspect for damage and deterioration
12. Dust cover
    Inspect for damage and deterioration
13. Bound stopper
    Inspect for damage and cracks
14. Coil spring
    Inspect for damage, deterioration, and weakness
15. Lower rubber spring seat
    Inspect for damage and cracks
16. Front shock absorber
    Inspection ..... page R–11
    Disposal of shock absorber .... page R–11

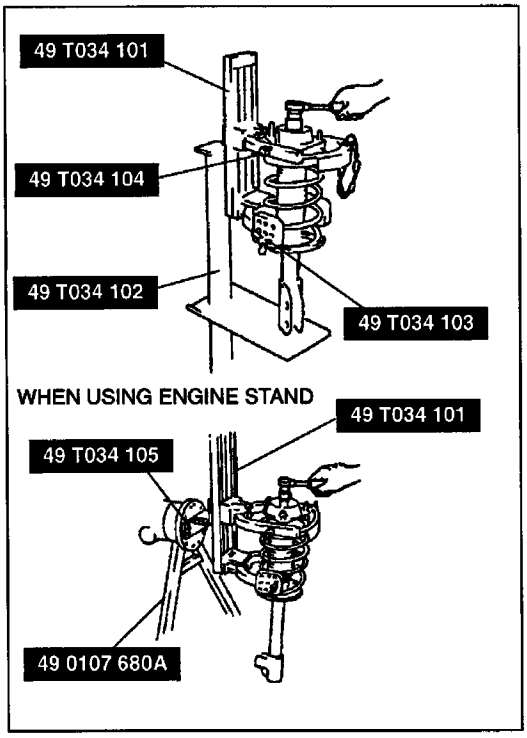


Removal note
Nut (mounting rubber)

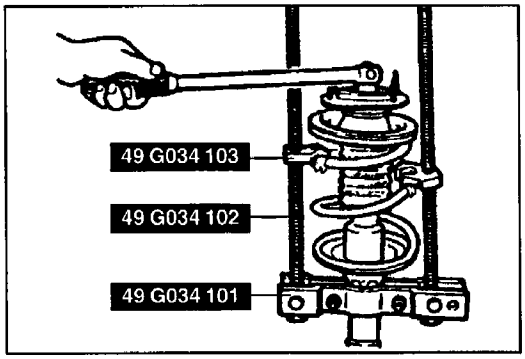
Warning
- **Removing the mounting rubber nut is dangerous. The shock absorber and spring could fly off under tremendous pressure and cause serious injury or death. Secure the shock absorber in the SST before removing the mounting rubber nut.**

Caution
- **To prevent damage to the mounting rubber, use protective plates in the jaws of the vise.**

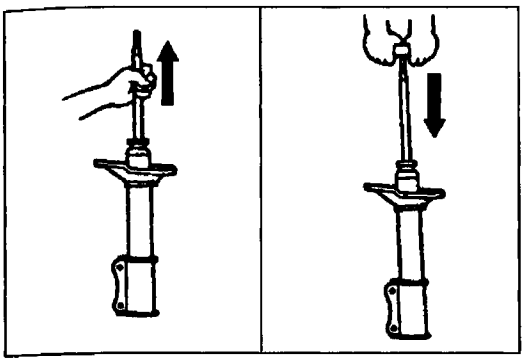
1. Secure the mounting rubber in a vise.
2. Loosen the nut several turns, but do not remove it.

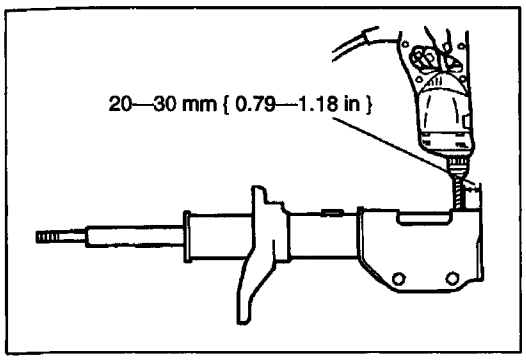


When using SST (49 T034 1A0)
3. Assemble the **SSTs**.
4. Secure the shock absorber in the **SSTs**.
5. Compress the coil spring by using the **SSTs** and remove the nut.



When using SST (49 G034 1A0)
3. Assemble the **SSTs**.
4. Compress the coil spring by using the **SST** and remove the nut.





Inspection
Front shock absorber
Check for the following and replace the shock absorber if necessary.
1. Inspect for damage and oil leakage.
2. Secure a handle to the piston rod, and compress and expand the shock piston at least three times. Verify that the operational force does not change and that there is no unusual noise.

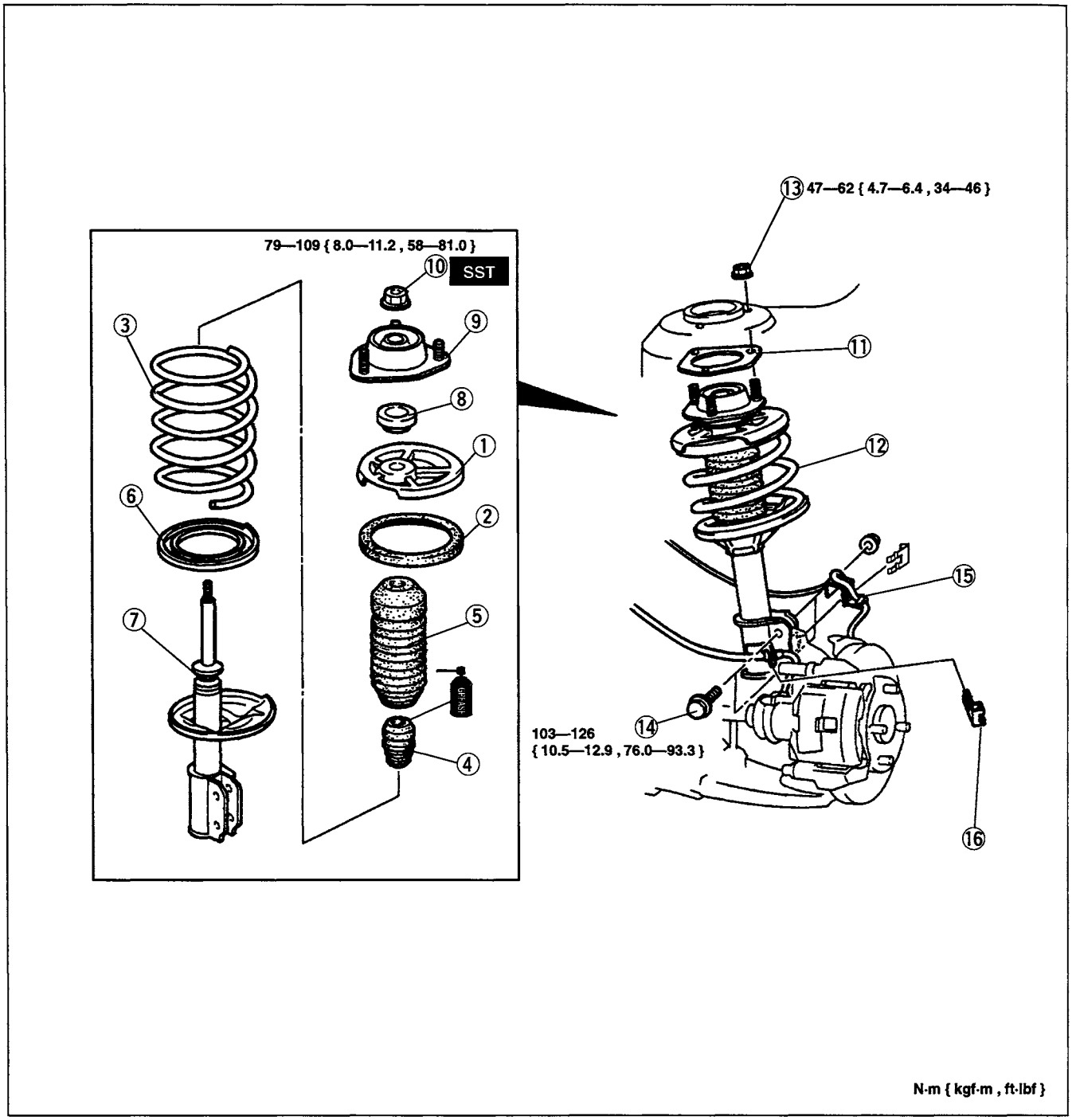
Disposal of shock absorber (if gas-charged)

Warning
- **The gas in the shock absorber is pressurized, and could spray metal chips into the eyes and face when drilling. Whenever drilling into a shock absorber, wear protective eye wear.**

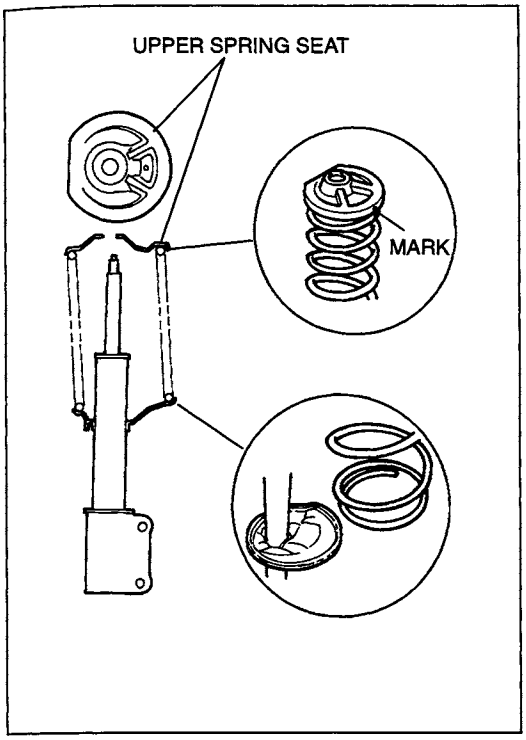
1. Clamp the shock absorber flat or with the piston downwards.
2. Drill a **2—3 mm { 0.08—0.12 in }** hole at a point **20—30 mm { 0.79—1.18 in }** from the bottom of the tube so that the gas can escape.
3. Turn the hole downwards.
4. The oil can be collected by moving the piston rod several times up and down and cutting the tube at the end.
5. Dispose of the waste oil according to the waste disposal law.

Note
- Shock absorber gas is nitrogen gas.
- Shock absorber oil is mineral oil.

Installation

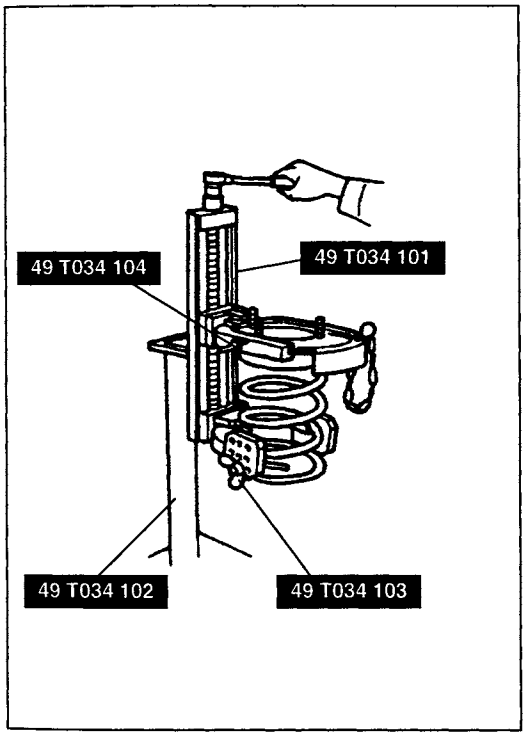


1. Upper spring seat
2. Upper rubber spring seat
3. Coil spring
   Installation Note
   When using **SST**
   (49 T034 1A0) ..... page R–13
   When using **SST**
   (49 G034 1A0) ..... page R–14
4. Bound stopper
5. Dust cover
6. Lower rubber spring seat
7. Front shock absorber
8. Thrust bearing
9. Mounting rubber
   Installation Note ..... page R–15
10. Nut (mounting rubber)
11. Sheet
12. Front shock absorber and spring
13. Nut
14. Bolt (shock absorber and spring)
15. ABS wheel-speed sensor harness
16. Clip

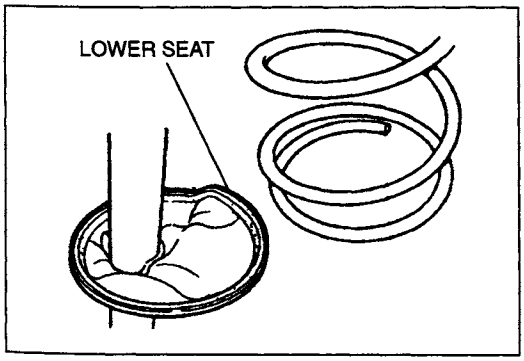


Installation note
Coil spring
When using SST (49 T034 1A0)

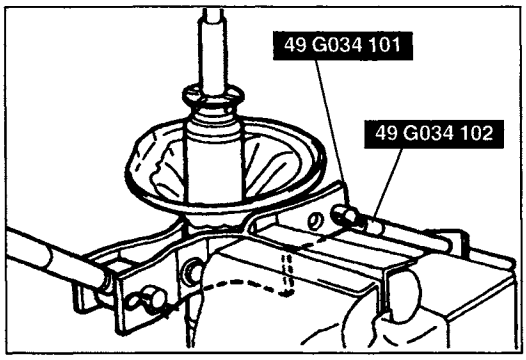
1. Temporarily assemble the upper rubber spring seat, the upper spring seat and coil spring to the shock absorber, as shown.
2. Mark the upper rubber spring seat, the upper spring seat, and coil spring for proper reassembly.



3. Align the marks of the upper spring seat and coil spring. Protect the upper spring seat and the coil spring with a piece of cloth; then assemble the **SSTs**.
4. Use the **SSTs** to compress the spring.
5. Install the bound stopper.
6. Install the dust cover.
7. Install the lower rubber spring seat.

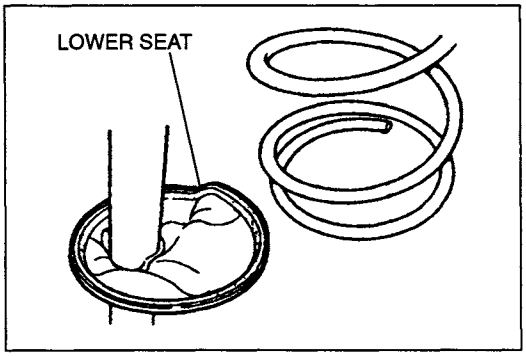


8. Install the shock absorber, fitting the end of the coil into the step of the lower seat.

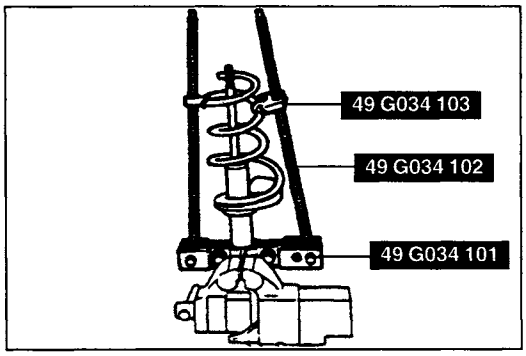


When using SST (49 G034 1A0)

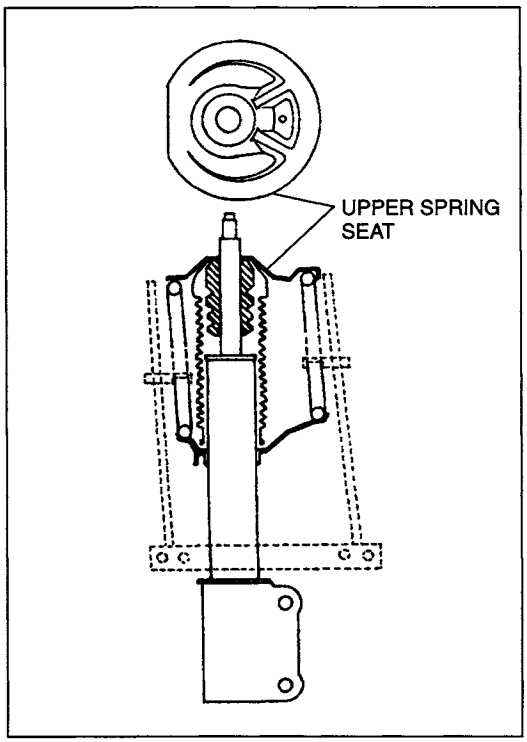
1. Assemble the **SSTs**, and secure the **SSTs** in a vise.
2. Install the lower rubber spring seat.



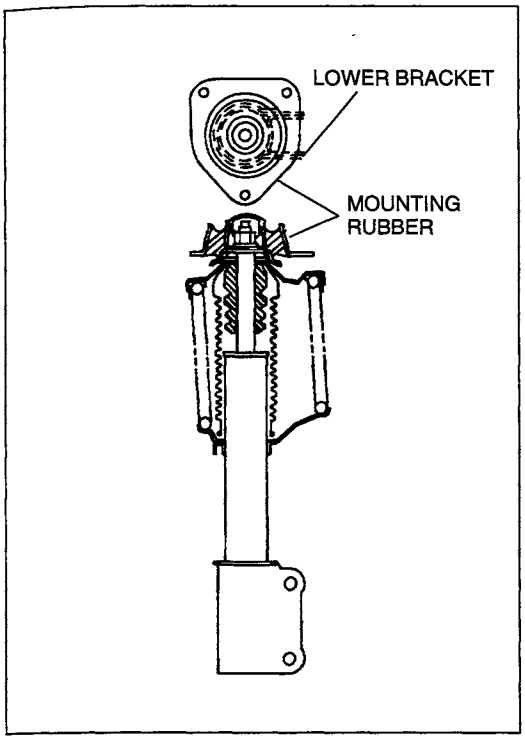
3. Install the coil spring, fitting the end of the coil into the step of the lower seat.



4. Use the **SSTs** to compress the spring.
5. Install the bound stopper.
6. Install the dust cover.

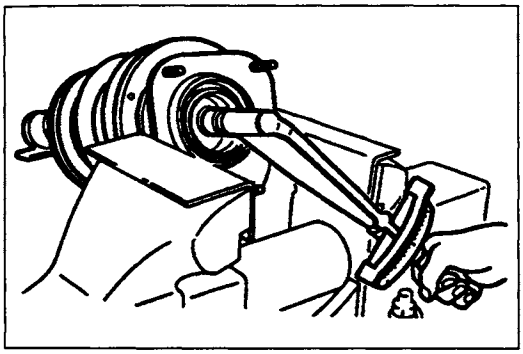


7. Install the upper spring seat to the shock absorber as shown.
8. Install the thrust bearing.



Mounting rubber

1. Install the mounting rubber, facing the direction indicator as shown.
2. Tighten the nut several turns.
3. Remove the **SST**.
4. Verify that the lower coil of the spring is seated on the step of the lower seat.



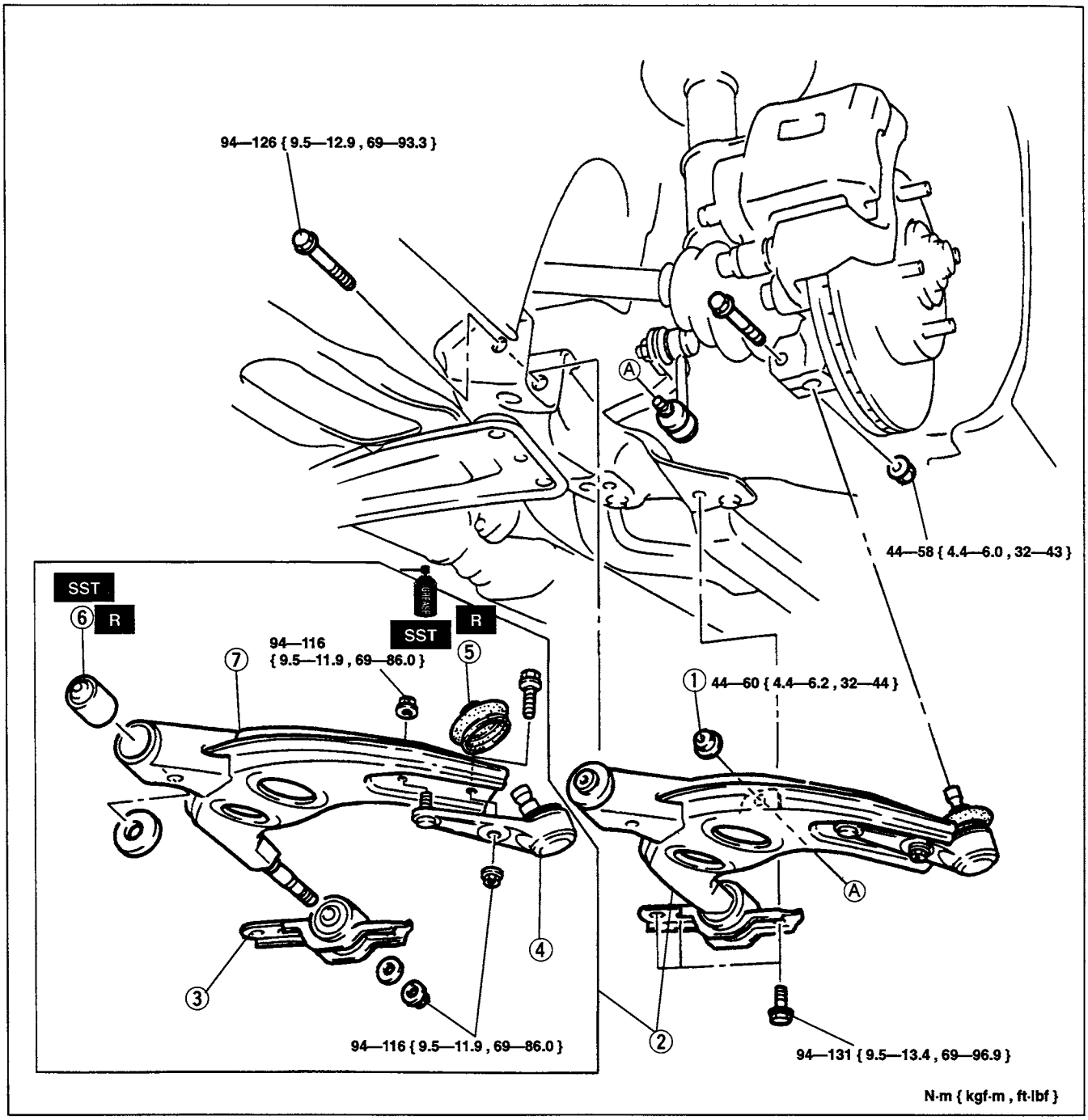
Caution

- **To prevent damage to the mounting rubber, use protective plates in the jaws of the vise.**

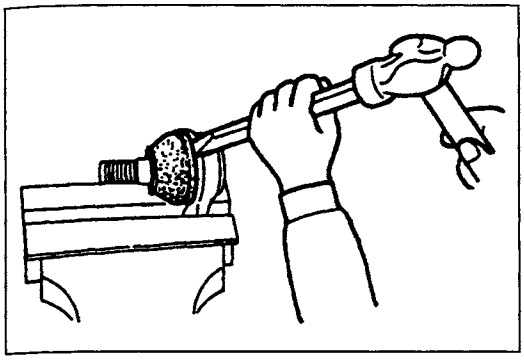
5. Secure the mounting rubber in a vise.
6. Tighten the nut.

Tightening torque:
79—109 N·m { 8.0—11.2 kgf·m , 58—81.0 ft·lbf }

FRONT LOWER ARM
Removal / Inspection / Installation

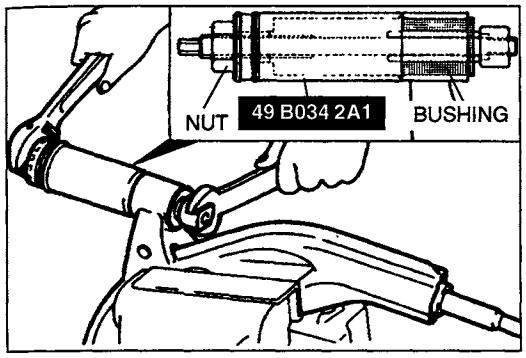


1. Nut (stabilizer control link)
2. Front lower arm assembly
3. Lower arm bushing (rear)
   Inspect for damage, oil leakage, and deterioration
4. Lower arm ball joint
   Inspection ..... page R–17
5. Dust boot
   Inspect for damage, stiffness, and deterioration
   Removal Note ..... page R–17
   Installation Note ..... page R–18
6. Lower arm bushing (front)
   Inspect for damage and deterioration
   Removal Note ..... page R–17
   Installation Note ..... page R–17
7. Front lower arm
   Inspect for damage and cracks

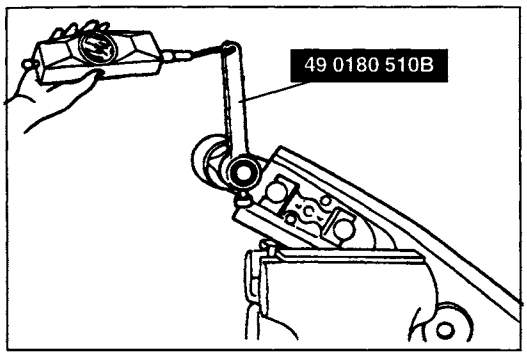


Removal note
Dust boot
Remove the dust boot by using a chisel.

Caution
- **Do not damage the ball joint.**

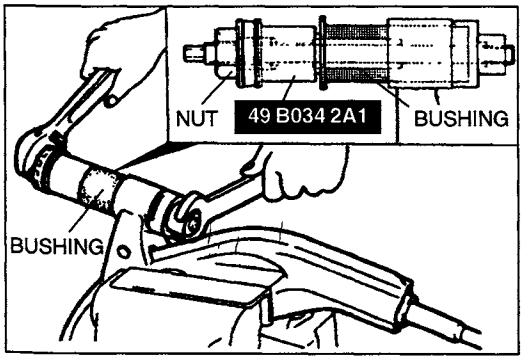


Lower arm bushing (front)
1. Cut away the projecting rubber of the lower arm bushing.
2. Set the **SST** to the lower arm and remove the bushing.

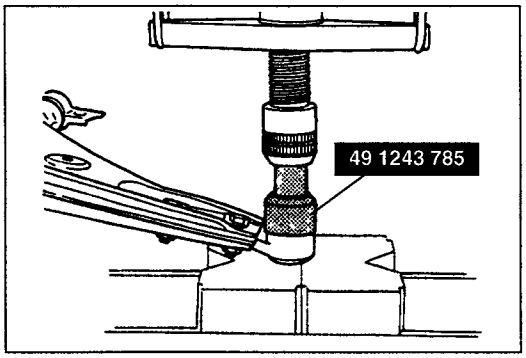


Inspection
Lower arm ball joint
1. Inspect ball joint body for damage and boot for cracks, and replace as necessary.
2. Inspect the ball joint for looseness and damage and replace as necessary.
3. Measure the ball joint preload.
   Shake and rotate the ball joint stud 5 times before measuring the preload. Attach the **SST** to the ball stud, and measure the preload by using a pull scale.

   Ball joint preload:
   1.0—4.9 N·m { 10—50 kgf·cm , 8.7—43 in·lbf }
   Pull scale reading:
   10—49 N { 1.0—5.0 kgf , 2.2—11 lbf }



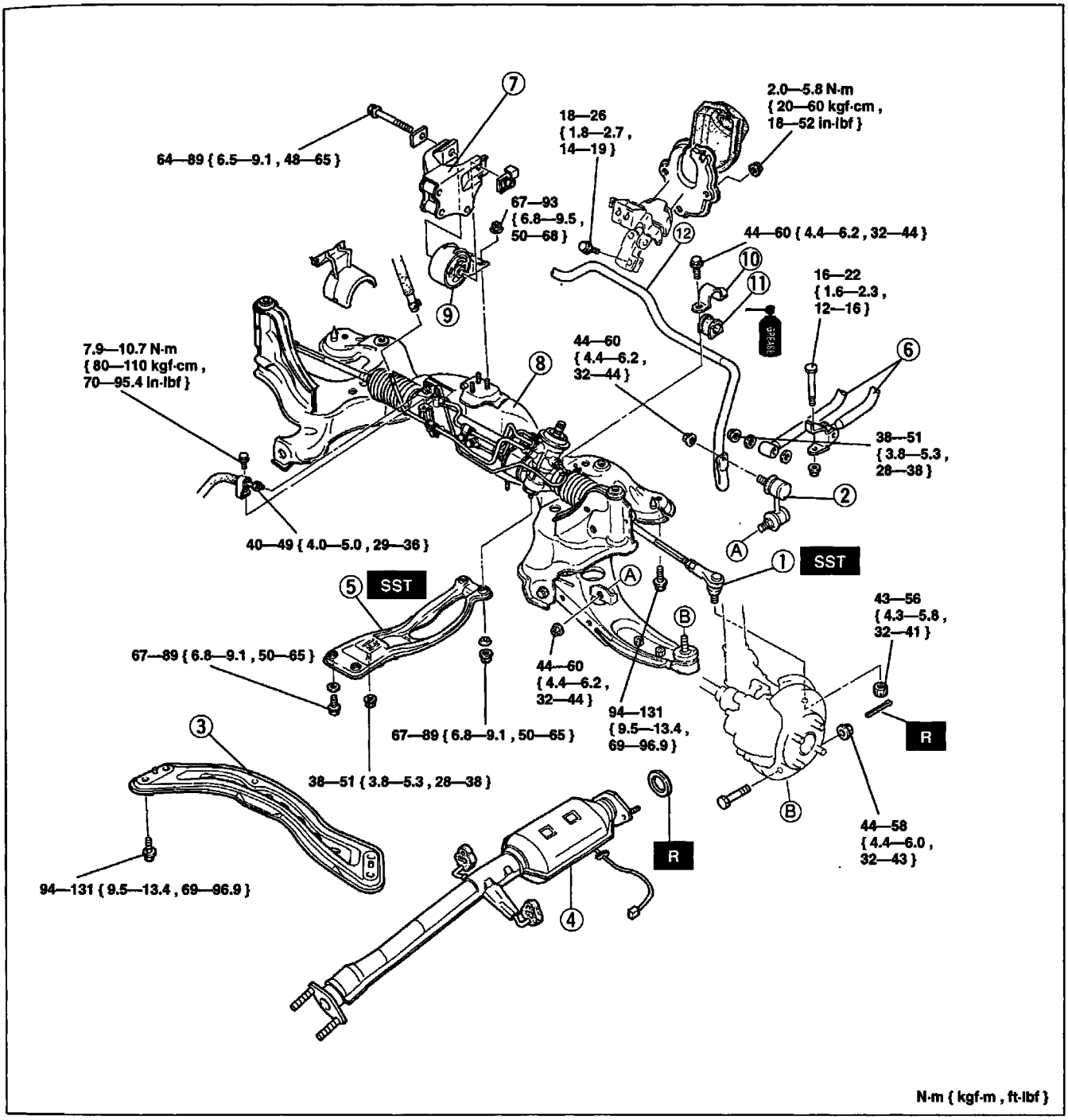
Installation note
Lower arm bushing (front)
1. Apply soapy water to the new bushing.
2. Pull the new bushing into the lower arm by using the **SST**.



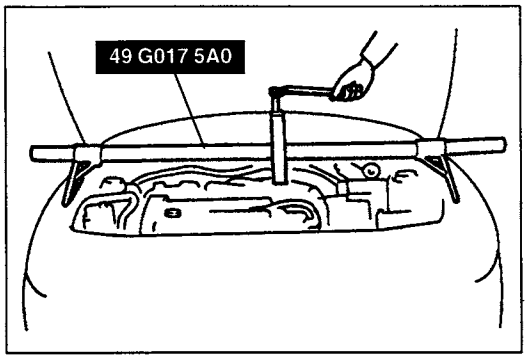
Dust boot

1. Wipe the grease off the ball stud.
2. Fill the inside of the new dust boot with grease.
3. Press the boot onto the ball joint by using the **SST**.
4. Wipe away the excess grease.

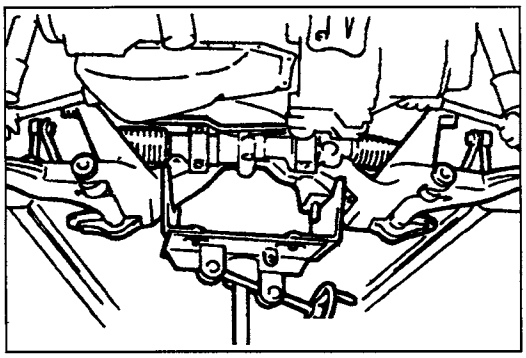
FRONT STABILIZER
Removal / Inspection / Installation



1. Tie-rod end
   Service ..... section N
2. Stabilizer control link
   Inspection ..... page R–20
3. Transverse member
4. Three-way catalytic converter
5. Engine mounting member
   Removal Note ..... page R–20
6. Change control rod and extension bar (MTX)
7. No.1 engine mount bracket
8. Lower arm, front crossmember, and steering gear assembly
   Removal Note ..... page R–20
9. No.1 engine mount
10. Stabilizer bracket
    Installation Note ..... page R–20
11. Stabilizer bushing
    Inspect for damage and weakness
    Installation Note ..... page R–20
12. Front stabilizer bar
    Inspect for damage and deformation



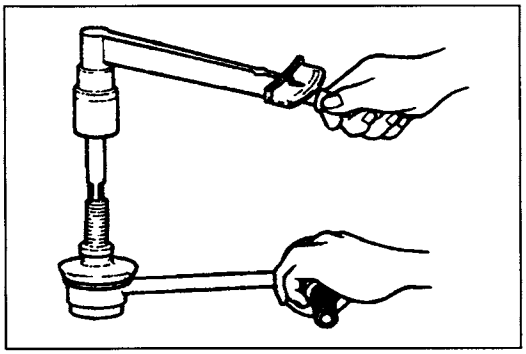
Removal note
Engine mounting member
1. Support the engine by using the **SST**.
2. Remove the engine mounting member nuts.



Lower arm, front crossmember, and steering gear assembly
1. Support the crossmember by using a jack and remove the bolts and nuts.

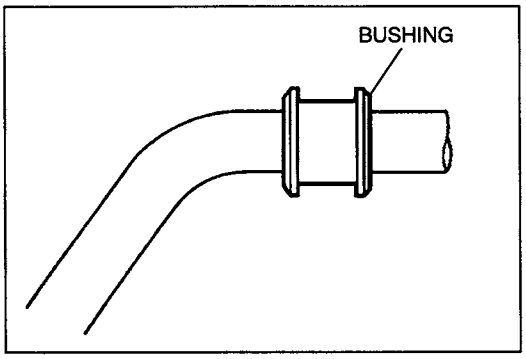
   Caution
   - **Do not let the crossmember fall.**

2. Remove the lower arm, the front crossmember, and steering gear assembly.

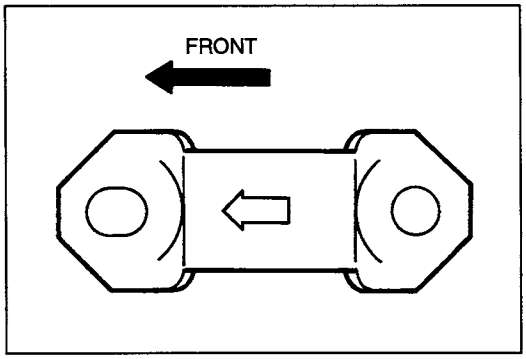


Inspection
Stabilizer control link
Check the following and replace if necessary.
1. Inspect for bending and damage.
2. Measure the ball joint starting torque.
   (a) Rock the ball joint stud side to side 10 times..
   (b) Rotate the ball joint stud 10 times.
   (c) Measure the starting torque by using a suitable Allen socket and a torque wrench.

   Starting torque:
   0.1—1.9 N·m { 1—20 kgf·cm , 0.9—17 in·lbf }

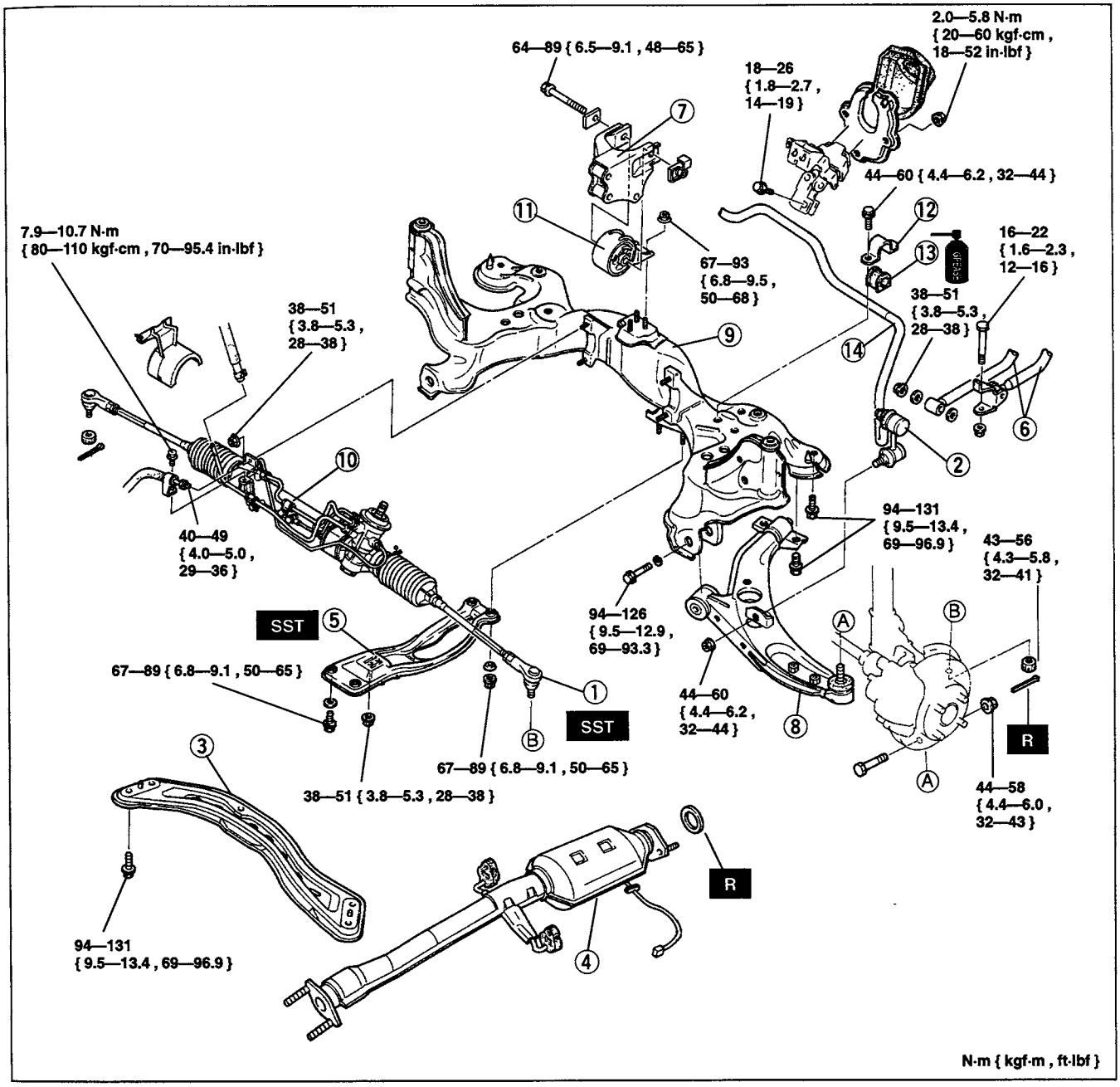


Installation note
Stabilizer bushing and bracket
1. Apply rubber grease to the inside surface of the stabilizer bushing.

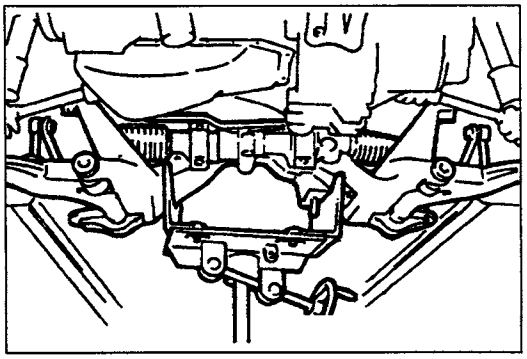


2. Install the stabilizer bracket in the direction shown.

FRONT CROSSMEMBER
Removal / Inspection / Installation



1. Tie-rod end
   Service ..... section N
2. Stabilizer control link
3. Transverse member
4. Three-way catalytic converter
5. Engine mounting member
   Removal Note ..... page R–20
6. Change control rod and extension bar (MTX)
7. No.1 engine mount bracket
8. Front lower arm
9. Front crossmember and steering gear assembly
   Inspect for damage and cracks
   Removal Note ..... page R–22
10. Steering gear assembly
    Service ..... section N
11. No.1 engine mount
12. Stabilizer bracket
    Installation Note ..... page R–20
13. Stabilizer bushing
    Inspection for damage and weakness
    Installation Note ..... page R–20
14. Front stabilizer bar
    Inspect for damage and deformation



Removal note
Front crossmember and steering gear assembly

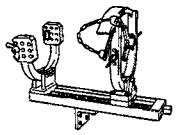
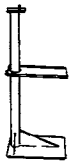
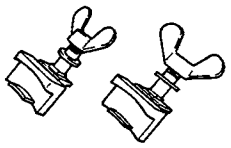
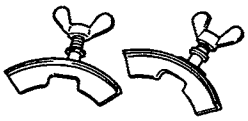
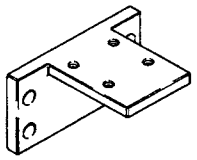
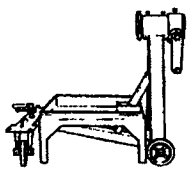
1. Support the crossmember by using a jack and remove the bolts and nuts.

   Caution
   - **Do not let the crossmember fall.**

2. Remove the front crossmember and steering gear assembly.

REAR SUSPENSION (STRUT)

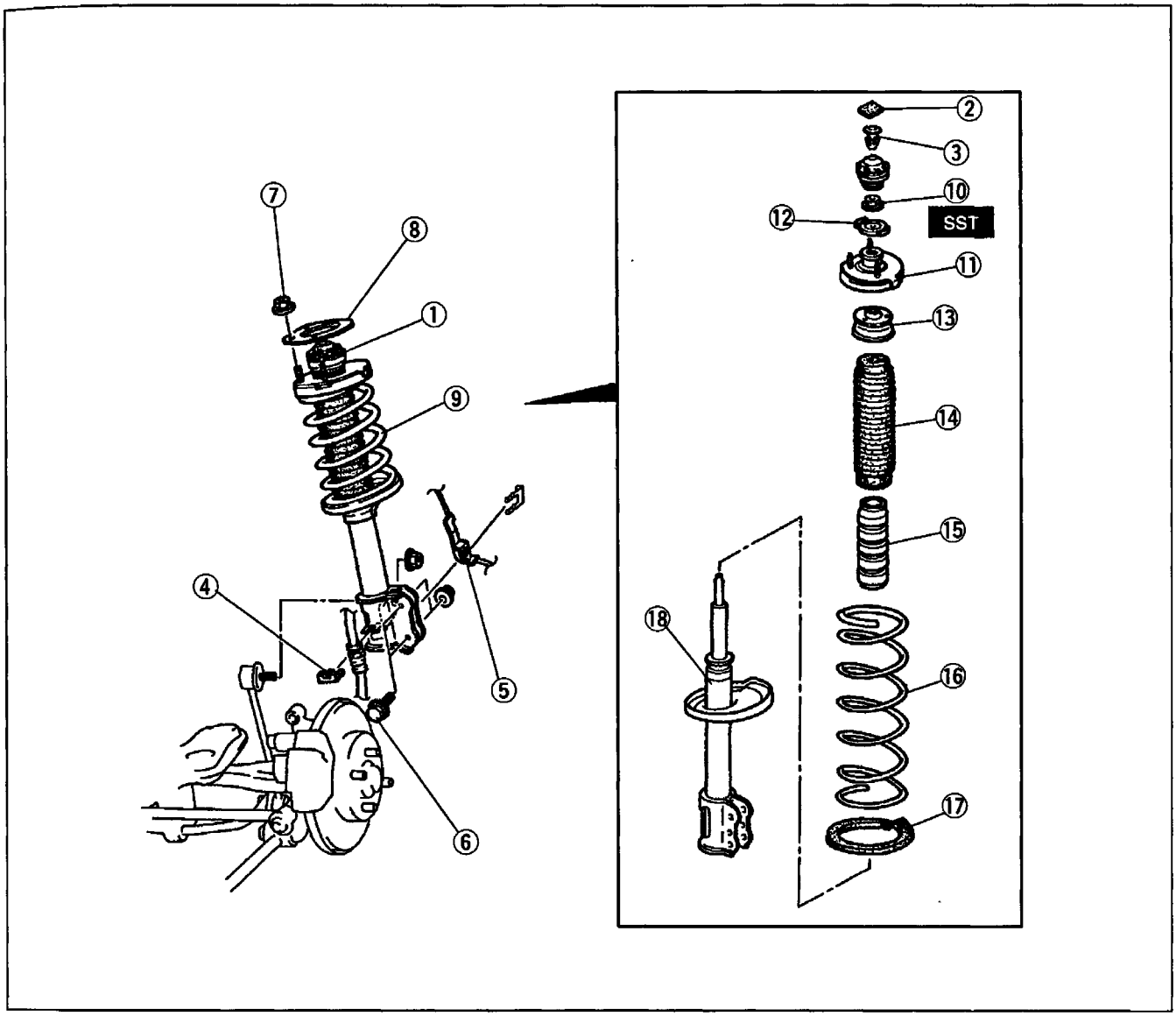
PREPARATION
SST

49 T034 1A0 Compressor, coil spring 	For removal and installation of coil spring	49 T034 101 Compressor, spring (Part of 49 T034 1A0) 	For removal and installation of coil spring
49 T034 102 Stand (Part of 49 T034 1A0) 	For removal and installation of coil spring	49 T034 103 Hook (Part of 49 T034 1A0) 	For removal and installation of coil spring
49 T034 104 Support (Parts of 49 T034 1A0) 	For removal and installation of coil spring	49 T034 105 Attachment 	For removal and installation of coil spring
49 G034 1A0 Compressor, coil spring 	For removal and installation of coil spring	49 G034 101 Body (Part of 49 G034 1A0) 	For removal and installation of coil spring
49 G034 102 Screw (Part of 49 G034 1A0) 	For removal and installation of coil spring	49 G034 103 Arm (Part of 49 G034 1A0) 	For removal and installation of coil spring
49 0107 680A Engine stand 	For removal and installation of coil spring	—	—

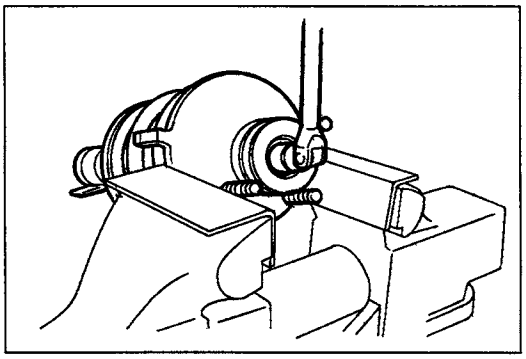
REAR SHOCK ABSORBER AND SPRING

Removal / Inspection

1. Remove the trunk side trim before service operation. (Refer to section S1.)
2. Install the trunk side trim after service operation. (Refer to section S1.)



1. Cap
2. Sponge
3. Fastener
4. Clip
5. ABS wheel-speed sensor harness
6. Shock absorber bolt
7. Nut
8. Sheet
9. Rear shock absorber and spring
10. Nut (mounting rubber)
    Removal Note
    When using **SST**
    (49 T034 1A0) ..... page R–24
    When using **SST**
    (49 G034 1A0) ..... page R–24
11. Mounting rubber
    Inspect for damage and weakness
12. Washer
13. Upper spring seat
    Inspect for damage and weakness
14. Dust cover
    Inspect for damage and cracks
15. Bound stopper
    Inspect for damage and cracks
16. Coil spring
    Inspect for damage and weakness
17. Lower spring seat
    Inspect for damage and weakness
18. Rear shock absorber
    Inspection ..... page R–24
    Disposal of shock absorber .... page R–25

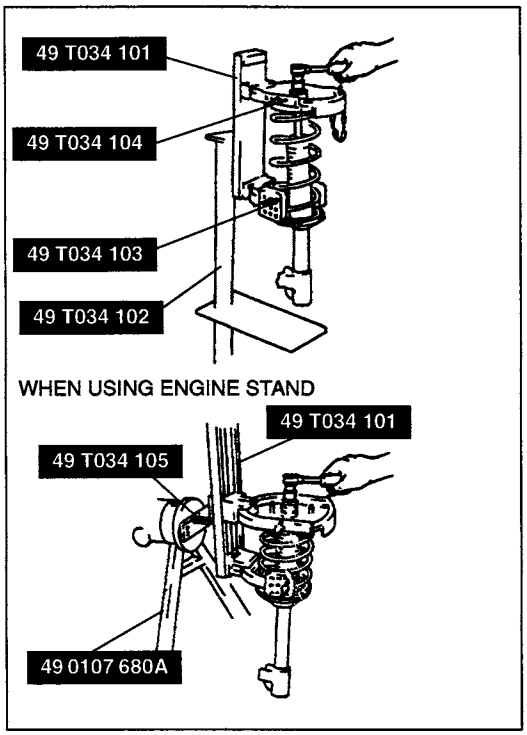


Removal note
Nut (mounting rubber)

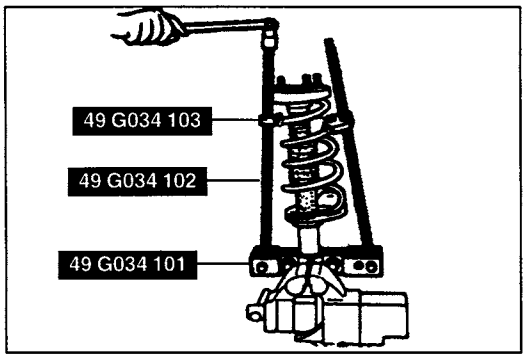
Warning
- **Removing the mounting rubber nut is dangerous. The shock absorber and spring could fly off under tremendous pressure and cause serious injury or death. Secure the shock absorber in the SST before removing the mounting rubber nut.**

Caution
- **To prevent damage to the mounting rubber, use protective plates in the jaws of the vise.**

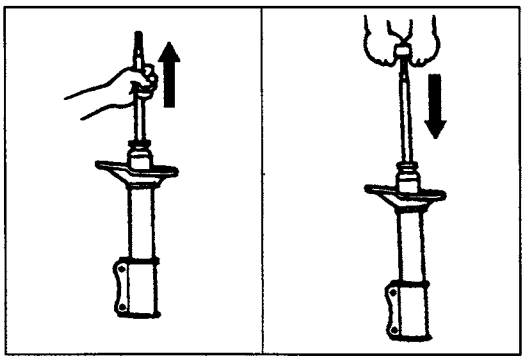
1. Secure the mounting rubber in a vise.
2. Loosen the nut several turns, but do not remove it.



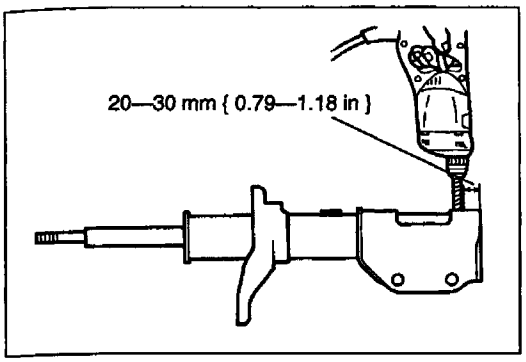
When using SST (49 T034 1A0)
3. Assemble the **SSTs**.
4. Secure the shock absorber in the **SSTs**.
5. Compress the coil spring by using the **SSTs** and remove the nut.



When using SST (49 G034 1A0)
3. Assemble the **SSTs**.
4. Compress the coil spring by using the **SST** and remove the nut.



Inspection
Rear shock absorber
Check for the following and replace the shock absorber if necessary.
1. Inspect for damage and oil leakage.
2. Secure a handle to the piston rod, and compress and expand the shock piston at least three times. Verify that the operational force does not change and that there is no unusual noise.



Disposal of shock absorber (if gas-charged)

Warning

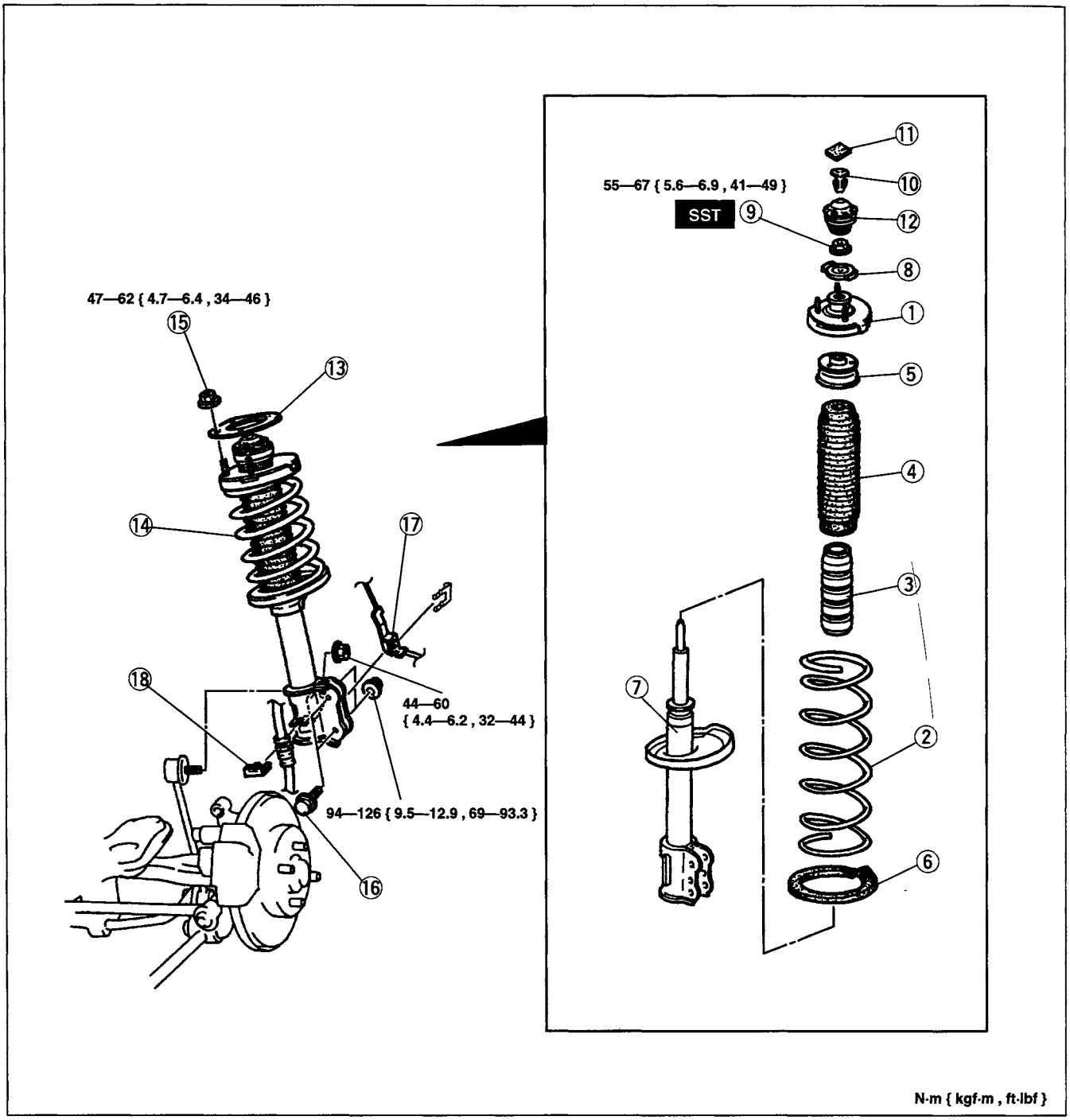
- **The gas in the shock absorber is pressured, and could spray metal chips into the eyes and face when drilling. Whenever drilling into a shock absorber, wear protective eye wear.**

1. Clamp the shock absorber flat or with the piston downwards.
2. Drill a **2—3 mm { 0.08—0.12 in }** hole at a point **20—30 mm { 0.79—1.18 in }** from the bottom of the tube so that the gas can escape.
3. Turn the hole downwards.
4. The oil can be collected by moving the piston rod several times up and down and cutting the tube at the end.
5. Dispose of the waste oil according to the waste disposal law.

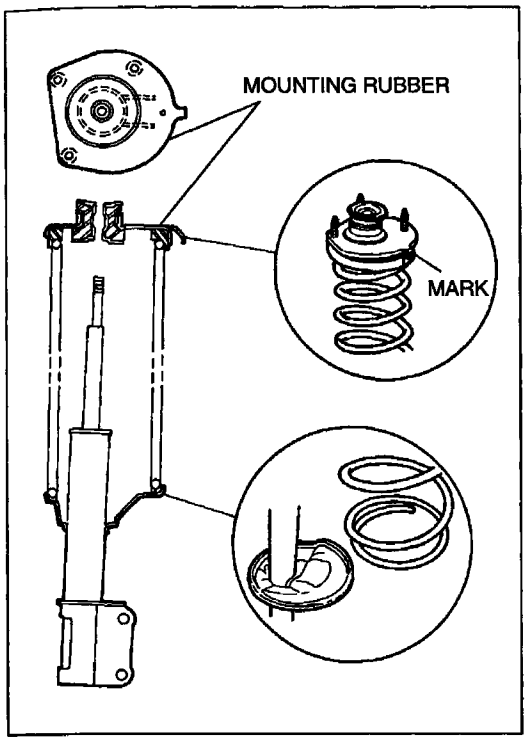
Note

- Shock absorber gas is nitrogen gas.
- Shock absorber oil is mineral oil.

Installation

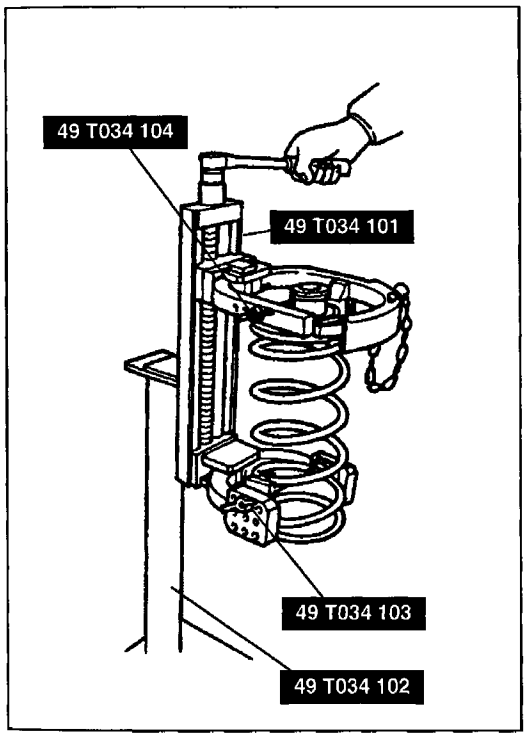


1. Mounting rubber
2. Coil spring
   Installation Note
   When using **SST**
   (49 T034 1A0) ..... page R–27
   When using **SST**
   (49 G034 1A0) ..... page R–28
3. Bound stopper
4. Dust cover
5. Upper spring seat
6. Lower spring seat
7. Rear shock absorber
8. Washer
9. Nut (mounting rubber)
   Installation Note ..... page R–29
10. Fastener
11. Sponge
12. Cap
13. Sheet
14. Rear shock absorber and spring
15. Nut
16. Shock absorber bolt
17. ABS wheel-speed sensor harness
18. Clip

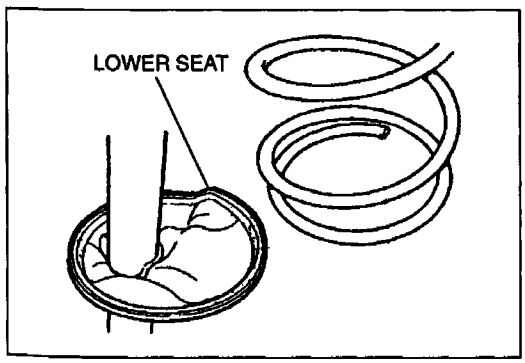


Installation note
Coil spring
When using SST (49 T034 1A0)

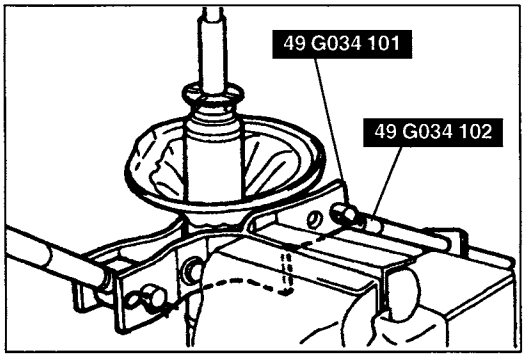
1. Temporarily assemble the upper spring seat, the mounting rubber, and coil spring to the shock absorber, as shown.
2. Mark the upper spring seat and coil spring for proper reassembly.



3. Align the marks of the upper spring seat and coil spring. Protect the upper spring seat and the coil spring with a piece of cloth; then assemble the **SSTs**.
4. Use the **SSTs** to compress the spring.

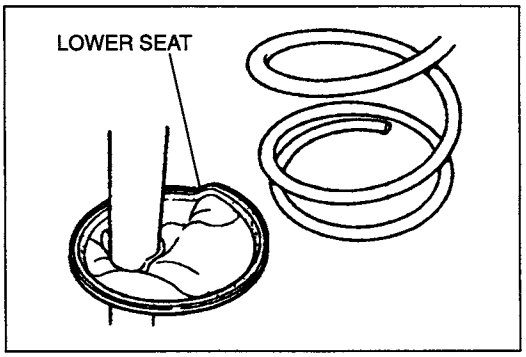


5. Install the lower spring seat.
6. Install the bound stopper.
7. Install the dust cover.
8. Install the shock absorber, fitting the end of the coil into the step of the lower seat.

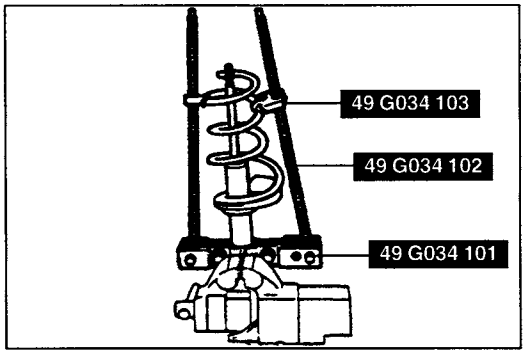


When using SST (49 G034 1A0)

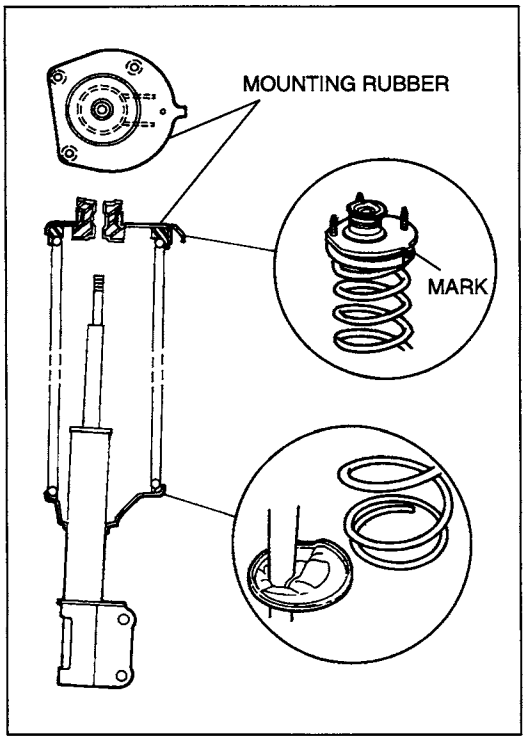
1. Assemble the **SSTs**, and secure the **SSTs** in a vise.
2. Install the lower rubber spring seat.



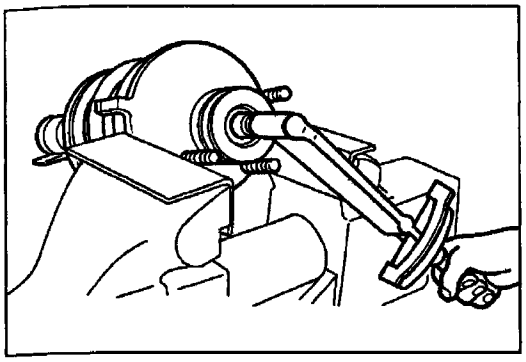
3. Install the coil spring, fitting the end of the coil into the step of the lower seat.



4. Use the **SSTs** to compress the spring.
5. Install the bound stopper.
6. Install the dust cover.



7. Install the mounting rubber to the shock absorber as shown.



Nut (mounting rubber)

1. Tighten the nut several turns.
2. Remove the **SST**.
3. Verify that the lower coil of the spring is properly seated on the step of the lower seat.

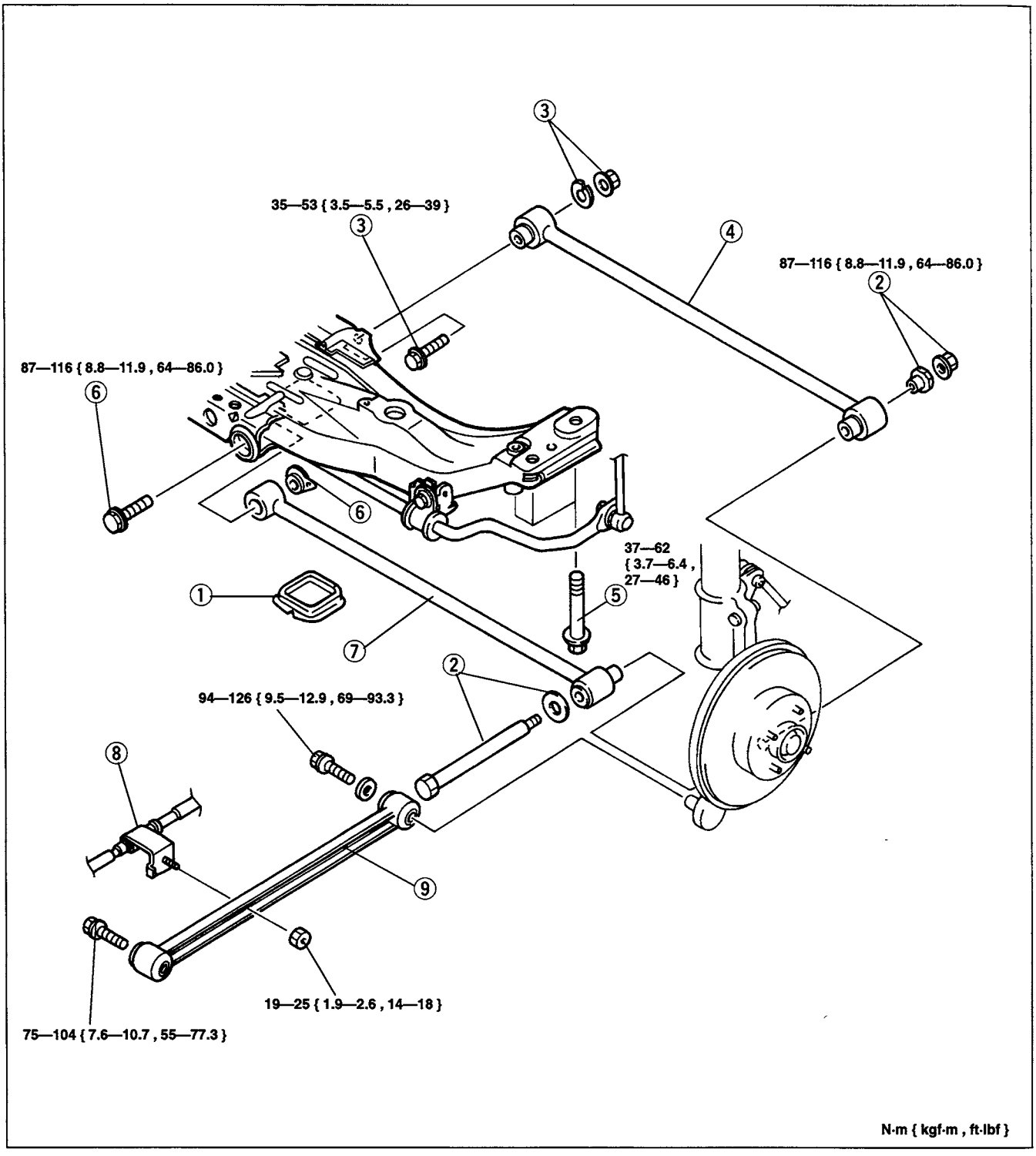
Caution

- **To prevent damage to the mounting rubber, use protective plates in the jaws of the vise.**

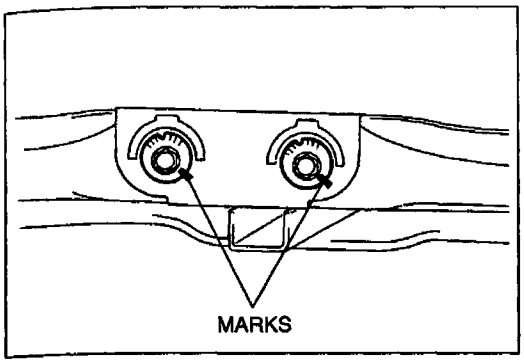
4. Secure the mounting rubber in a vise.
5. Tighten the nut.

Tightening torque:
55—67 N·m { 5.6—6.9 kgf·m , 41—49 ft·lbf }

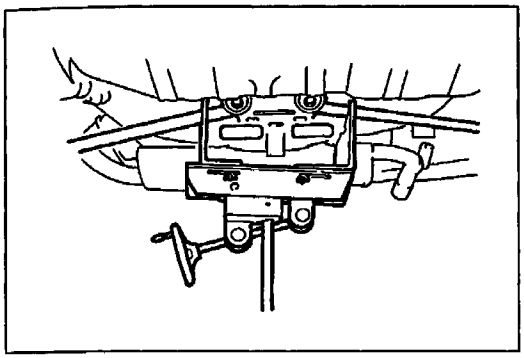
LATERAL LINK AND TRAILING LINK
Removal / Inspection / Installation



1. Cap
2. Bolt, washer, and nut
3. Nut, cam plate, and adjusting cam bolt
   Removal Note ..... page R–31
   Installation Note ..... page R–31
4. Lateral link (rear)
   Inspect for deformation
   Inspect bushing for damage
5. Bolt (crossmember)
   Removal Note ..... page R–31
6. Bolt and nut
7. Lateral link (front)
8. Brake cable bracket
9. Trailing link
   Inspect for deformation
   Inspect bushing for damage

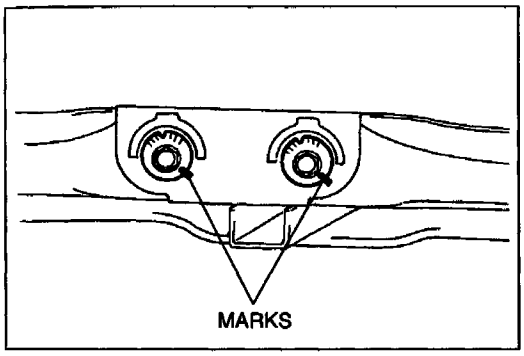


Removal note
Nut, cam plate, and adjusting cam bolt
Before loosening the nut, make a mark on the cam plate and the crossmember for reference during installation.



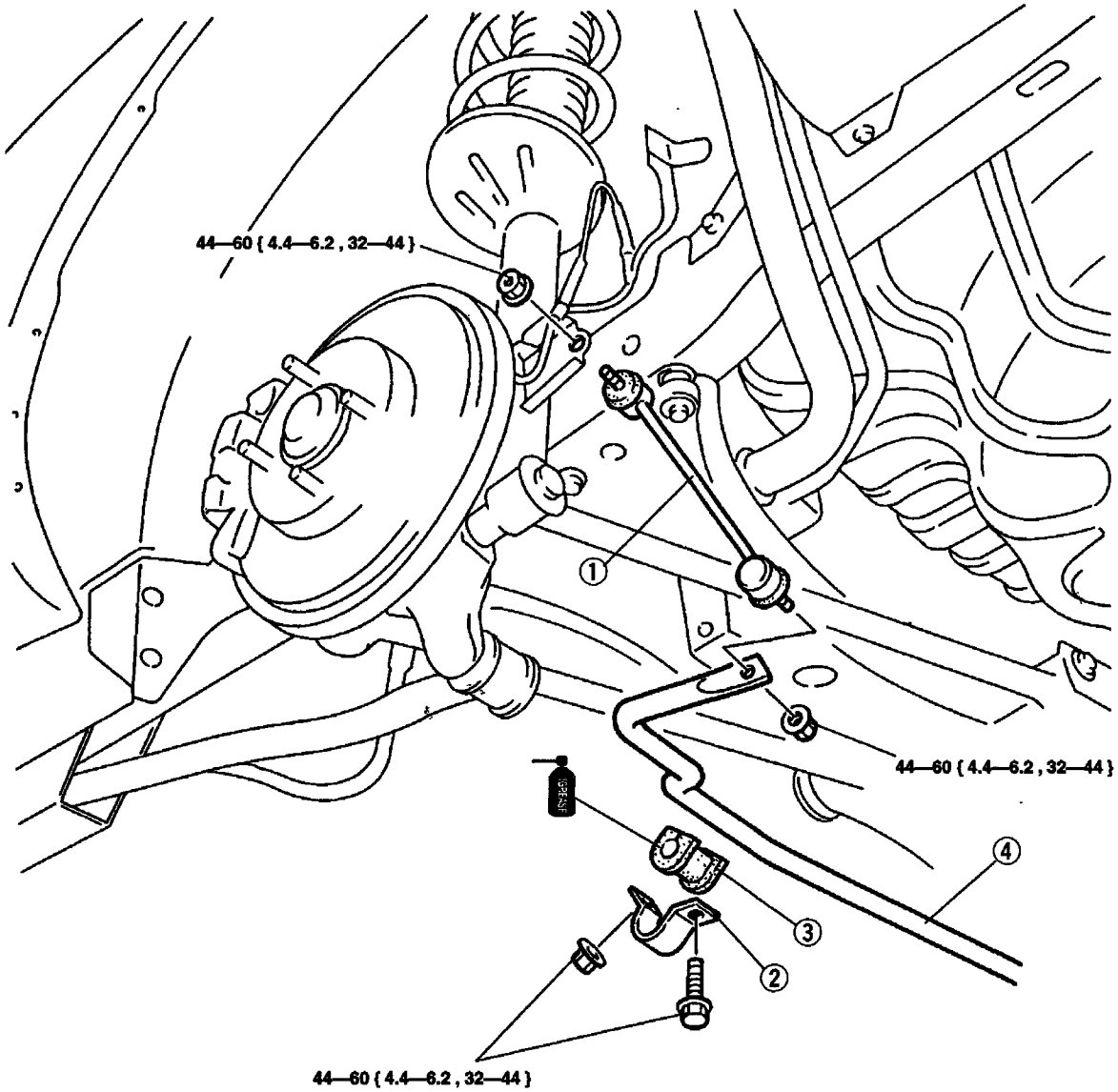
Bolt (crossmember)
Support the crossmember by using a jack and remove the bolts.

Caution
- **Do not let the crossmember fall.**

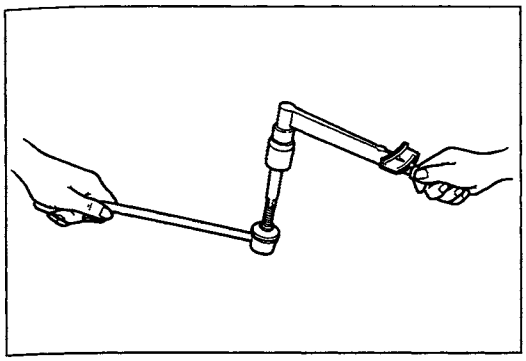


Installation note
Nut, cam plate, and adjusting cam bolt
1. Install the cam plate so that the notch faces the same direction as the adjusting cam bolt.
2. Align to the mark made before removing the adjusting cam bolt.

REAR STABILIZER
Removal / Inspection / Installation



1. Stabilizer control link
   Inspection ..... page R–33
2. Stabilizer bracket
   Installation Note ..... page R–33
3. Stabilizer bushing
   Inspect for damage and weakness
   Installation Note ..... page R–33
4. Rear stabilizer bar
   Inspect for damage and deformation



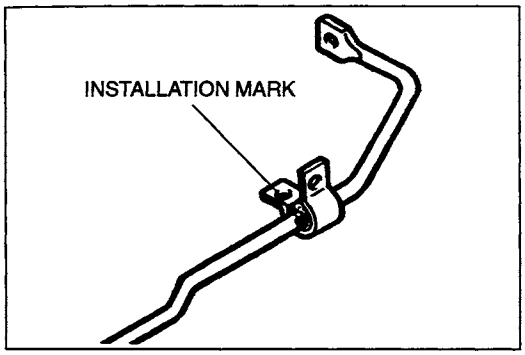
Inspection

Check the following and replace if necessary.

Stabilizer control link

1. Inspect for bending and damage.
2. Measure the ball joint starting torque.
   (a) Rock the ball joint stud side to side 10 times.
   (b) Rotate the ball joint stud 10 times.
   (c) Measure the starting torque by using a suitable Allen socket and a torque wrench.

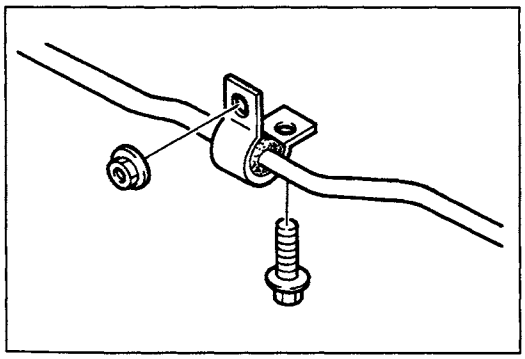
Starting torque:
0.1—1.9 N·m { 1—20 kgf·cm , 0.9—17 in·lbf }



Installation note

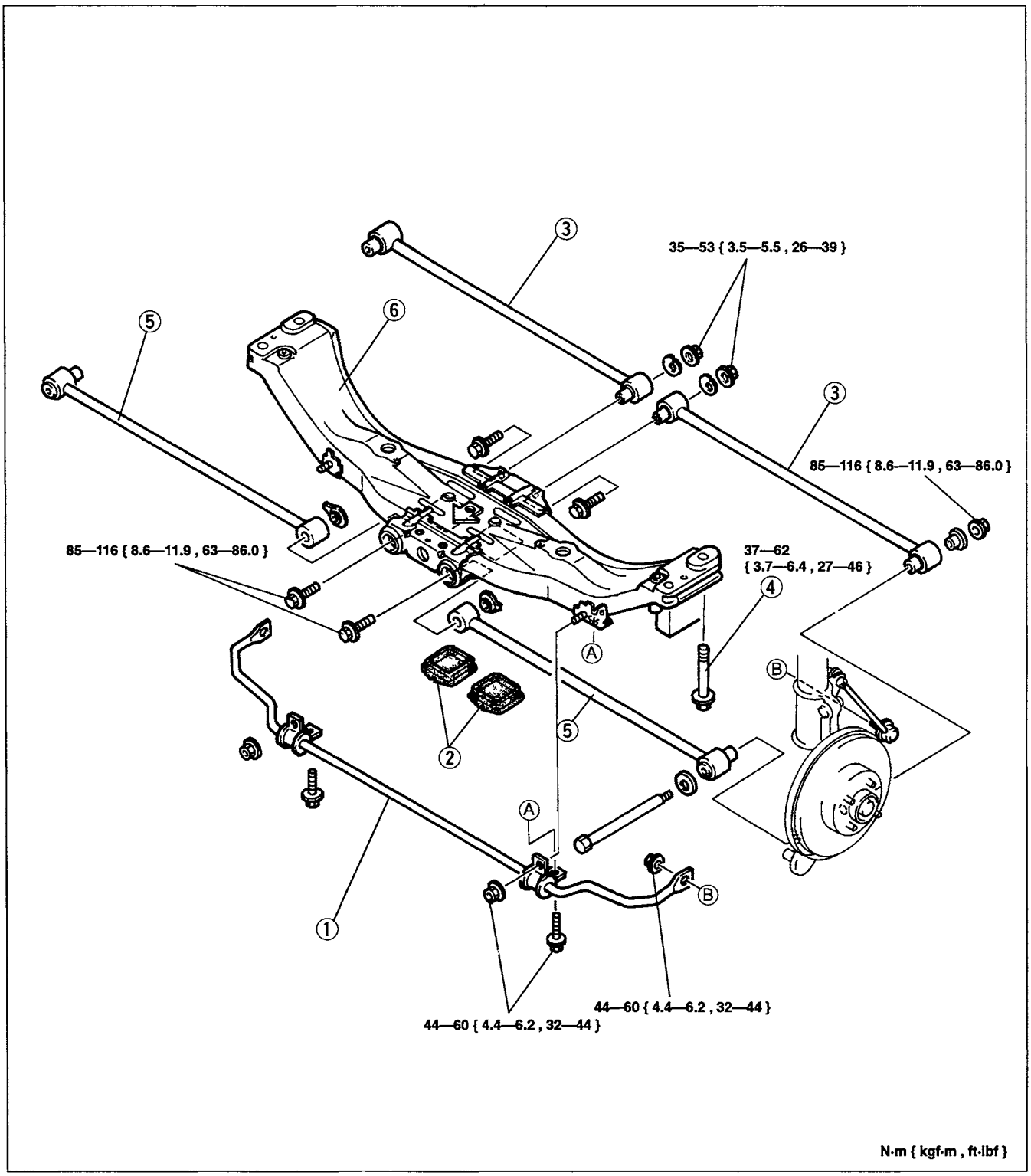
Stabilizer bushing and bracket

1. Apply rubber grease to the inside surface of the stabilizer bushing.
2. Align the bushing with the installation mark on the stabilizer bar.



3. Install the stabilizer bracket with the elliptical hole underside.
4. After temporarily tightening the bolt and nut, tighten the bolt and nut in turn.

REAR CROSSMEMBER
Removal / Inspection / Installation



1. Rear stabilizer bar
   Removal / Inspection / Installation ..... page R–32
2. Cap
3. Lateral link (rear)
   Removal / Inspection / Installation ..... page R–30
4. Bolt (crossmember)
   Removal Note ..... page R–31
5. Lateral link (front)
   Removal / Inspection / Installation ..... page R–30
6. Rear crossmember
   Inspect for damage and cracks

Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

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(4 DOOR SEDAN)

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HOOD S1- 3
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HOOD LOCK AND OPENER S1- 5
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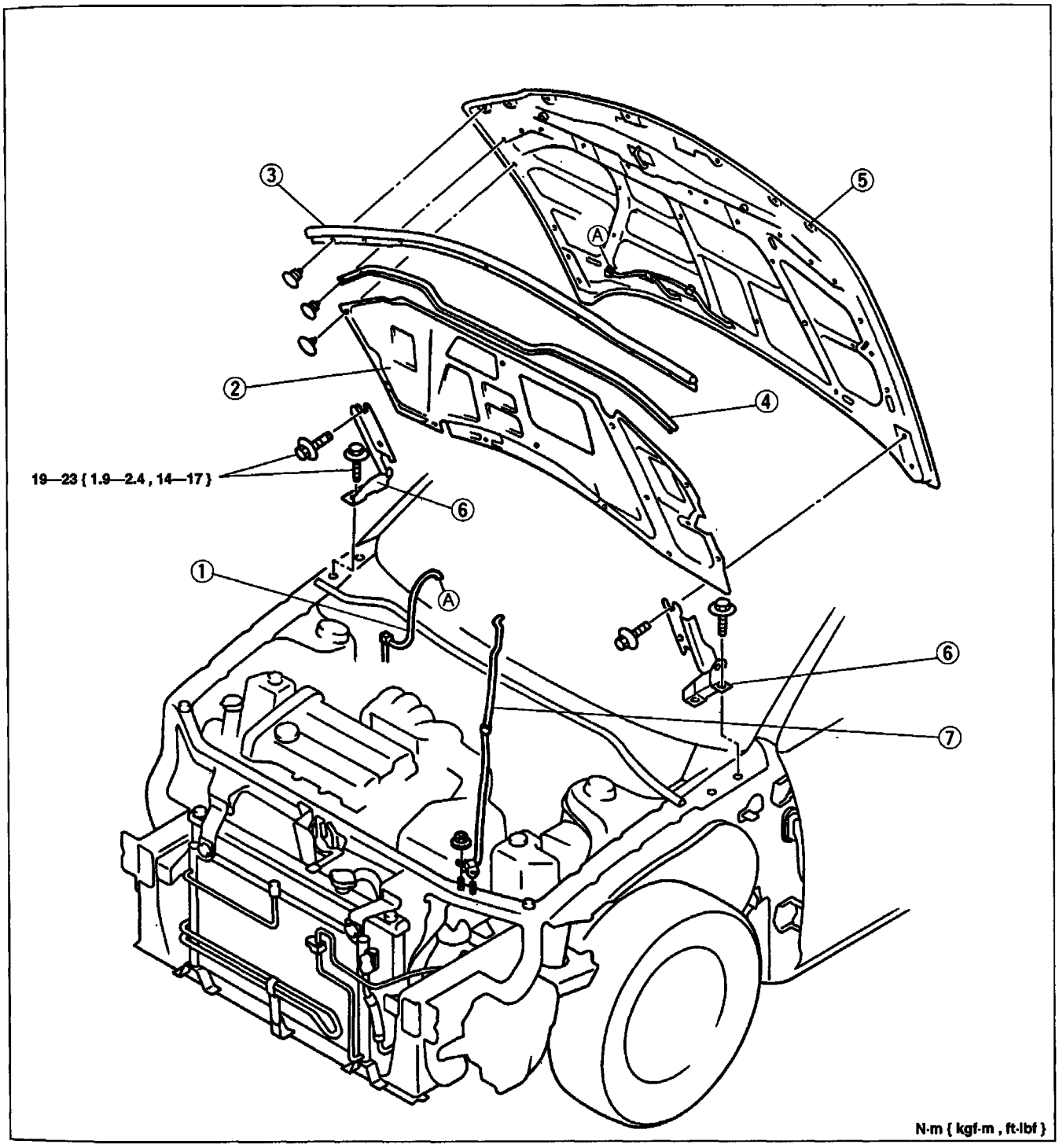
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FRONT BUCKLE S1-118
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FRONT SEAT S1-121
REAR SEAT S1-126

HOOD

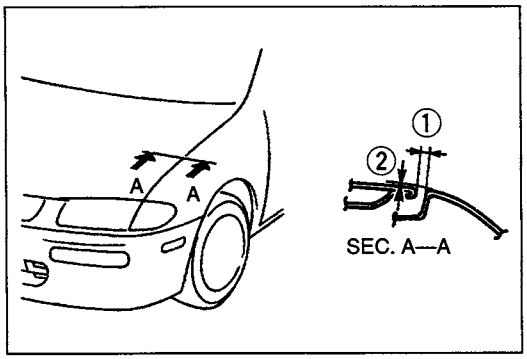
HOOD

Removal / Installation

1. Remove in the order shown in the figure. To remove the hood hinge, remove the front fender panel. (Refer to page S1–7.)
2. Install in the reverse order of removal.



1. Windshield washer pipe
2. Hood insulator
3. Parting seal weatherstrip
4. Surround seal weatherstrip
5. Hood
   Adjustment ..... page S1–4
6. Hood hinge
7. Hood stay

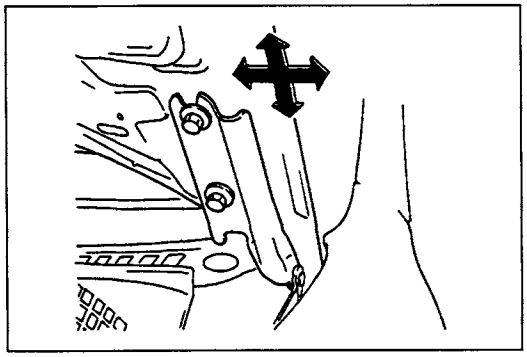


Adjustment
Hood

1. Measure the gap and height between the hood and the front fender panel.

   Clearance ①: 3.5 ± 1.0 mm { 0.14 ± 0.04 in }
   ②: 0.5 ± 1.0 mm { 0.02 ± 0.04 in }

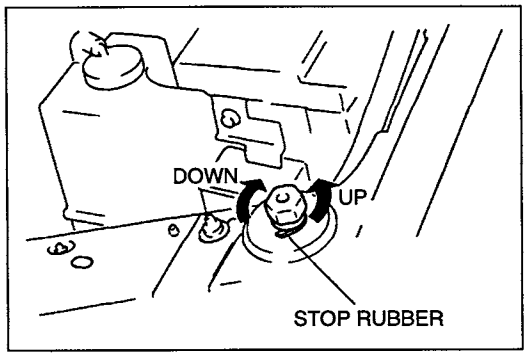
2. If not as specified, adjust the gap and height.
3. Adjust the hood lock after the hood has been aligned. (Refer to page S1–5.)



Gap

Loosen the hood-to-hinge installation bolts and reposition the hood.

Tightening torque:
19—23 N·m { 1.9—2.4 kgf·m , 14—17 ft·lbf }



Height

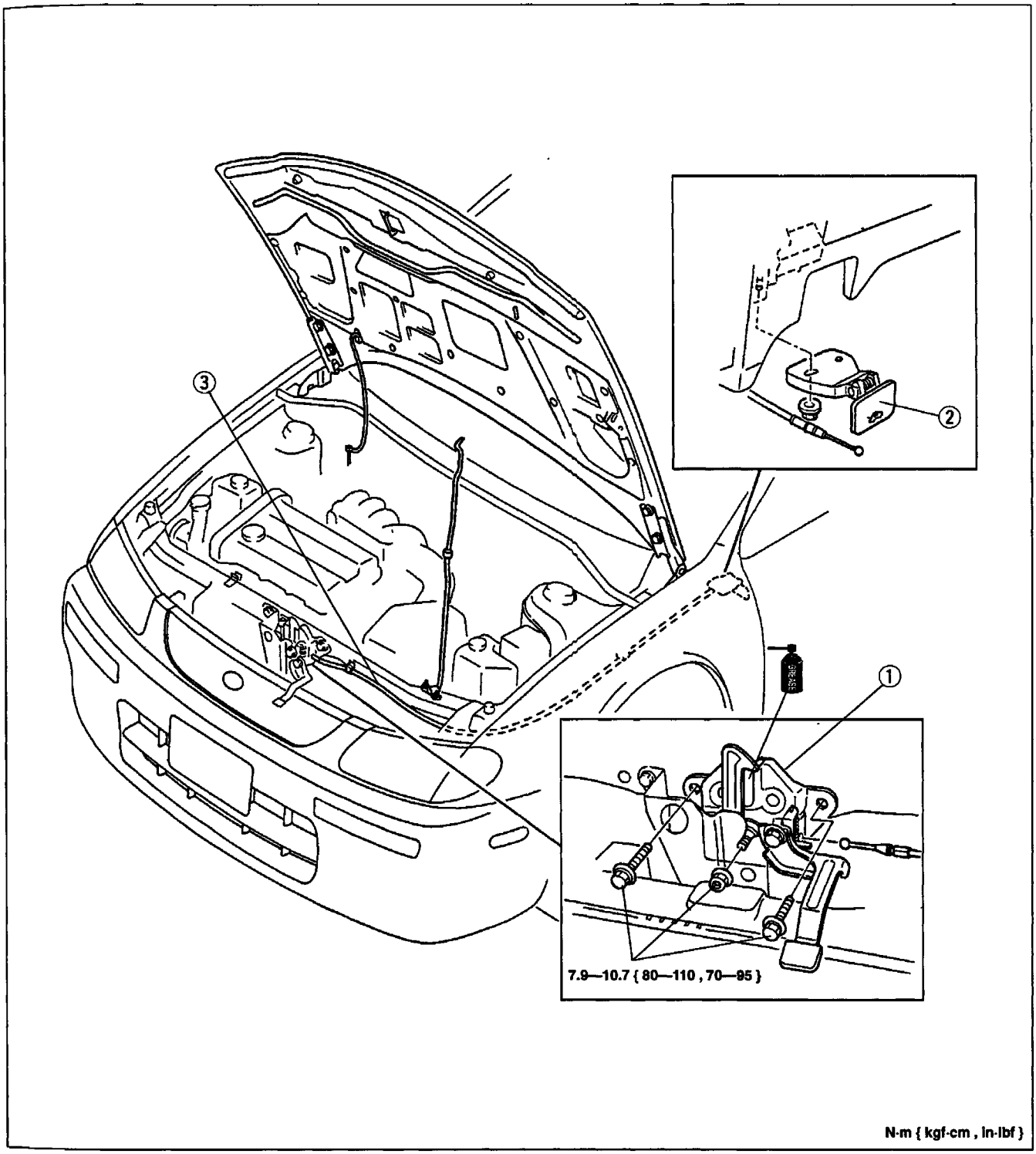
Turn the stop rubber to adjust the height of the hood.

HOOD LOCK AND OPENER

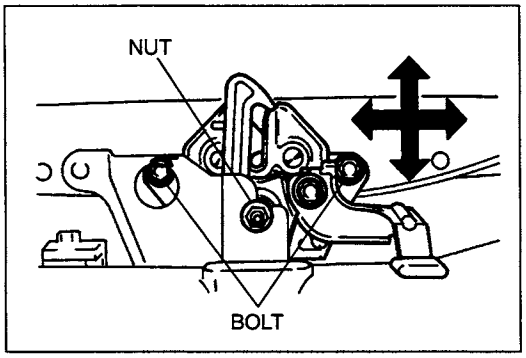
HOOD LOCK AND OPENER

Removal / Installation

1. Remove in the order shown in the figure. To remove the hood lock, remove the upper seal board. (Refer to page S1–42.) To remove the release cable, remove the left mud guard. (Refer to page S1–35.)
2. Install in the reverse order of removal.



1. Hood lock
   Adjustment ..... page S1–6
2. Hood release lever
3. Release cable



Adjustment
Hood lock

1. Verify that the hood is properly aligned. (Refer to page S1–3.)
2. Loosen the hood lock installation bolts and nut, and align the hood lock with the striker on the hood.

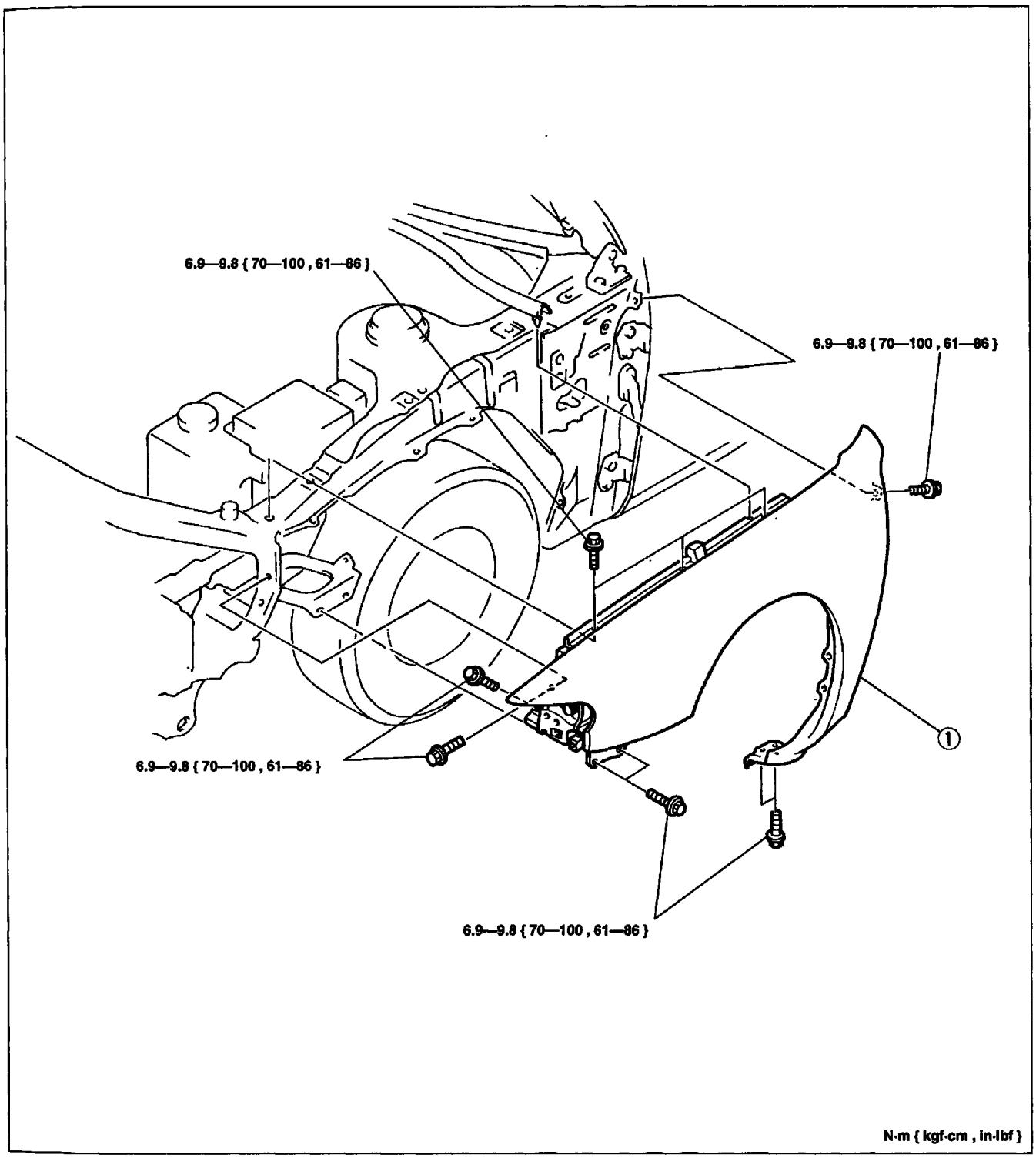
Tightening torque
Bolt:
7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }
Nut:
7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }

FRONT FENDER PANEL

FRONT FENDER PANEL

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the front bumper. (Refer to page S1–35.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



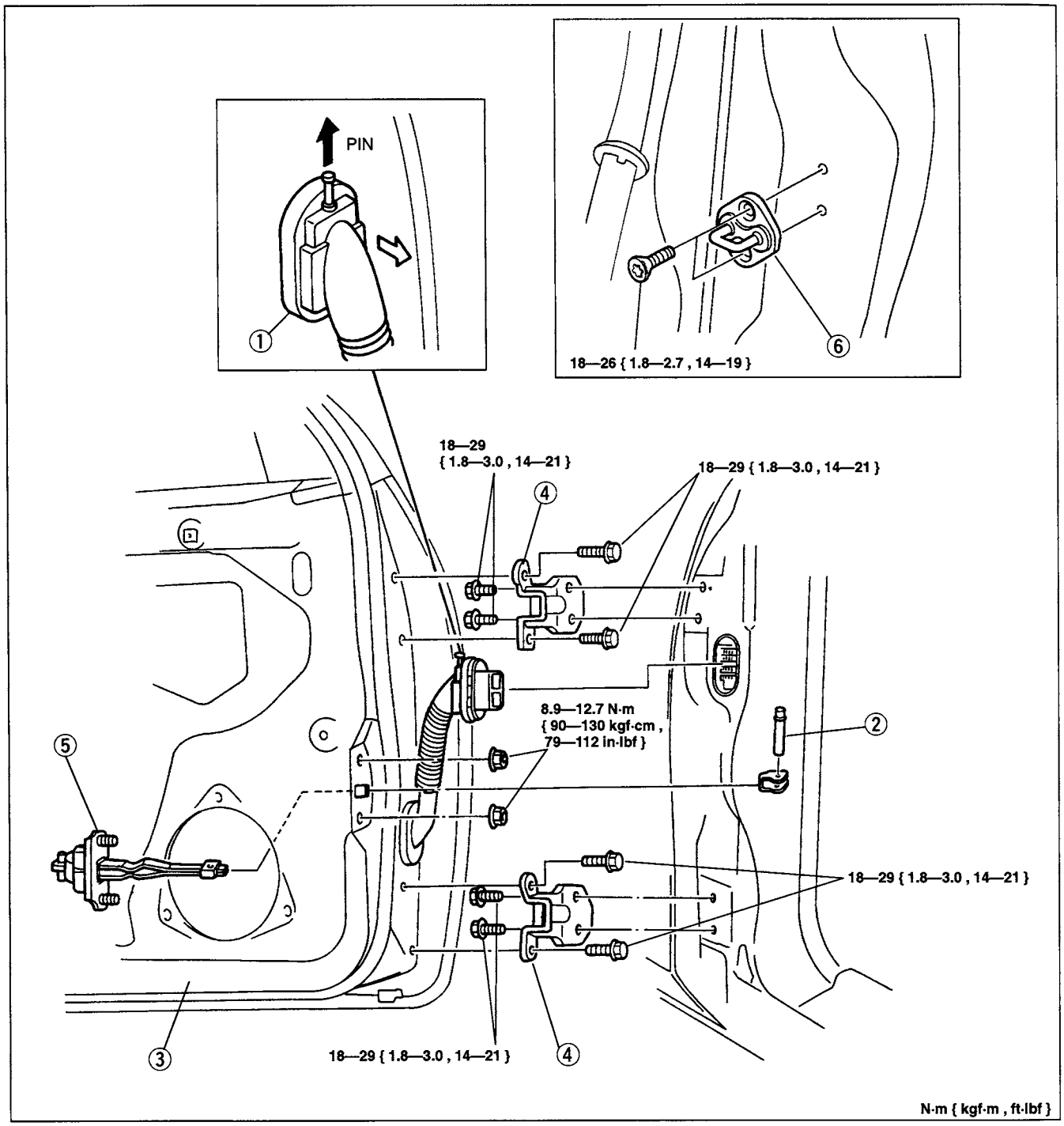
1. Front fender panel

DOOR

FRONT DOOR

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure. To remove the checker, remove the door speaker. (Refer to section T1.)
3. Install in the reverse order of removal.



1. Harness connector
2. Checker pin
3. Front door
   Adjustment ..... page S1–10
4. Door hinge
5. Checker
6. Door lock striker
   Adjustment ..... page S1–10

REAR DOOR

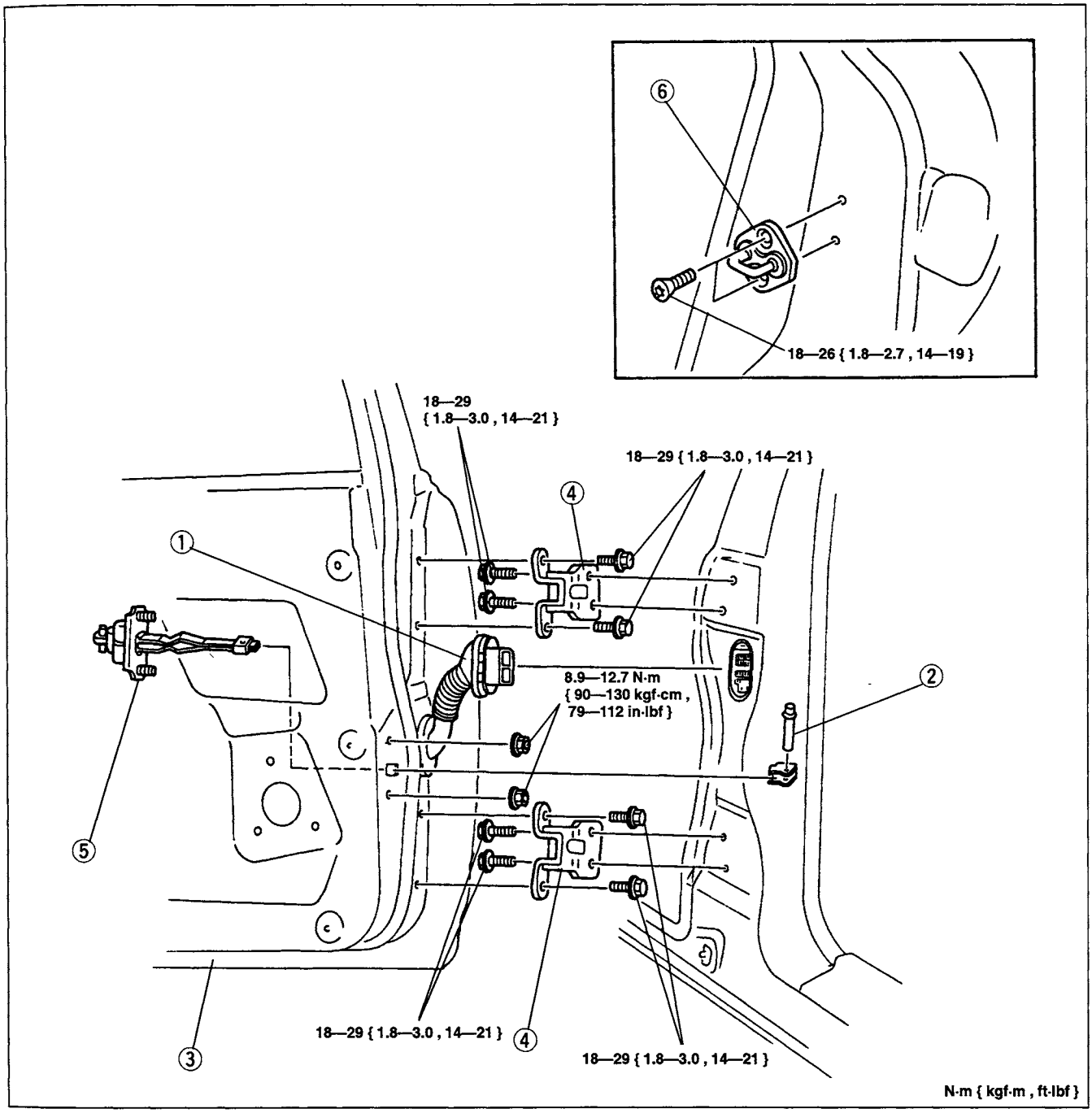
Removal / Installation

1. Disconnect the negative battery cable.

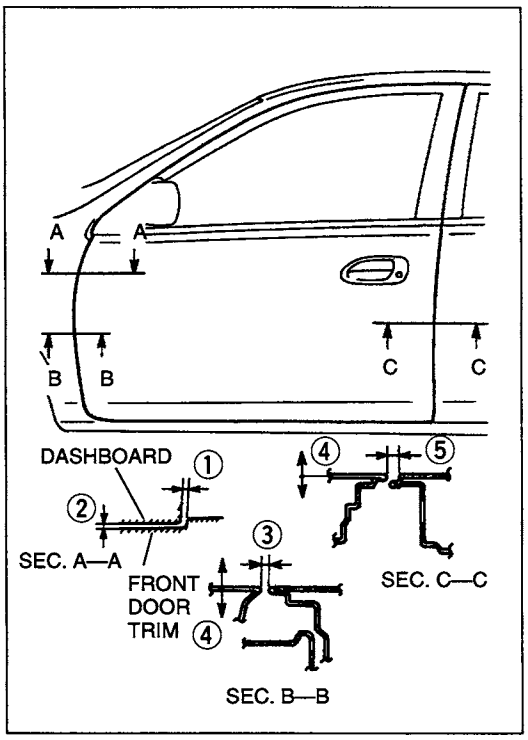
Note

- Remove the door screen carefully so that it may be reused.

2. Remove in the order shown in the figure. To remove the checker, remove the rear door trim (Refer to page S1–108.) and door screen (Refer to page S1–14).
3. Install in the reverse order of removal.



1. Harness connector
2. Checker pin
3. Rear door
   Adjustment ..... page S1–10
4. Door hinge
5. Checker
6. Door lock striker
   Adjustment ..... page S1–10



Adjustment
Front door

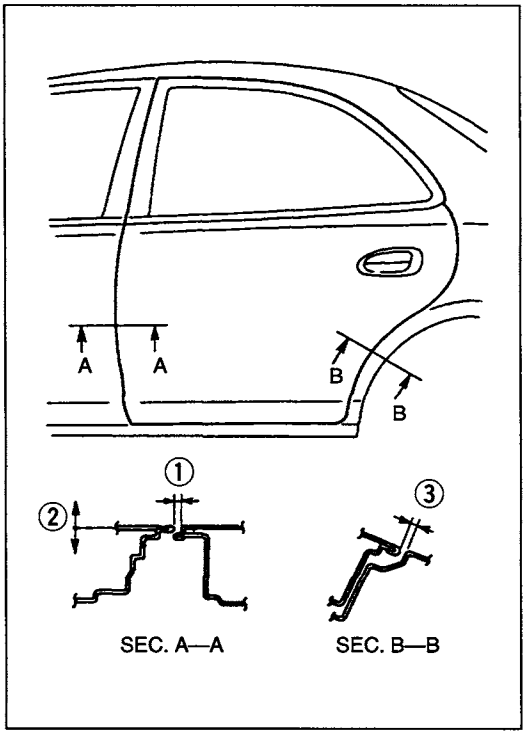
1. Verify that the front door can be closed easily and that there is no looseness or excessive clearance.

Clearance ①: **5.0 ± 3.0 mm { 0.2 ± 0.12 in }**
②: **$6.0^{+3.0}_{-4.0}$ mm { $0.24^{+0.12}_{-0.16}$ in }**
③: **4.0 ± 1.0 mm { 0.16 ± 0.04 in }**
④: **$0^{+1.0}_{-0.5}$ mm { $0^{+0.04}_{-0.02}$ in }**
⑤: **4.2 ± 1.0 mm { 0.17 ± 0.04 in }**

2. If not as specified, loosen the door-hinge-to-body mounting bolts and reposition the door.

Tightening torque:
18—29 N·m { 1.8—3.0 kgf·m , 14—21 ft·lbf }

3. Adjust the door lock striker to the front door after the front door has been aligned. (Refer below.)



Rear door

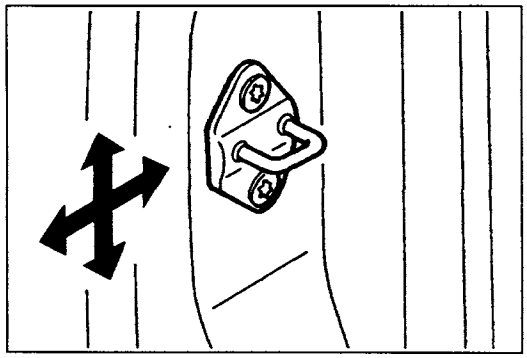
1. Verify that the rear door can be closed easily and that there is no looseness or excessive clearance.

Clearance ①: **4.2 ± 1.0 mm { 0.17 ± 0.04 in }**
②: **$0^{+1.0}_{-0.5}$ mm { $0^{+0.04}_{-0.02}$ in }**
③: **4.0 ± 1.0 mm { 0.16 ± 0.04 in }**

2. If not as specified, loosen the door-hinge-to-body mounting bolts and reposition the door.

Tightening torque:
18—29 N·m { 1.8—3.0 kgf·m , 14—21 ft·lbf }

3. Adjust the door lock striker to the rear door after the rear door has been aligned. (Refer below.)



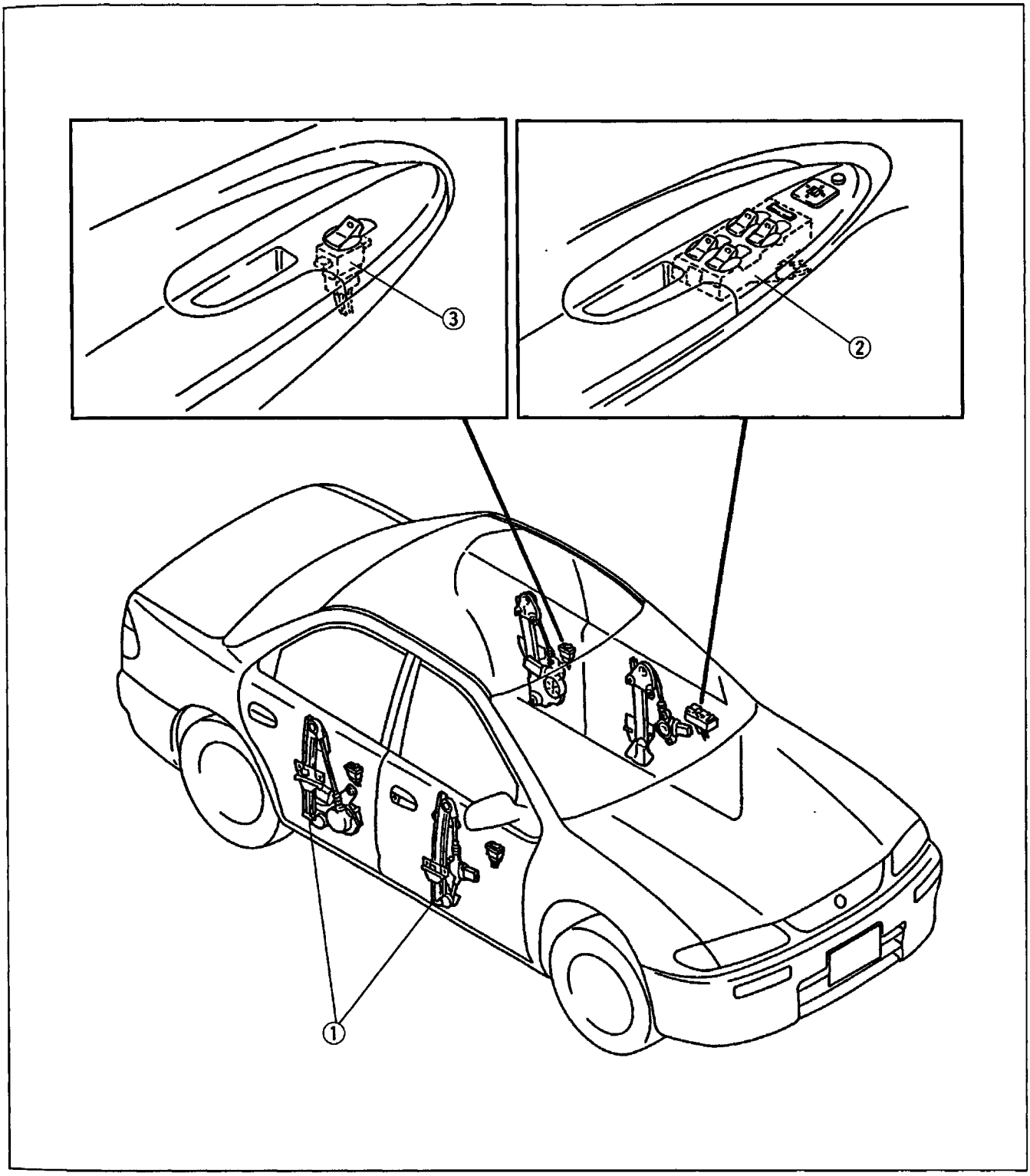
Door lock striker

1. Verify that the door can be closed easily and that there is no looseness.
2. If not correct, loosen the striker mounting screws and move the striker horizontally or vertically.

Tightening torque:
18—26 N·m { 1.8—2.7 kgf·m , 14—19 ft·lbf }

WINDOW REGULATOR, GLASS AND GUIDE

STRUCTURAL VIEW



1. Power window regulator
   - Removal / Installation (front) .. page S1–12
   - Removal / Installation (rear) .. page S1–14
   - Inspection ..... page S1–16
2. Power window main switch assembly
   - Removal / Installation ..... page S1–17
   - Inspection ..... page S1–18
3. Power window subswitch
   - Removal / Installation ..... page S1–19
   - Inspection ..... page S1–19

FRONT WINDOW REGULATOR AND GLASS

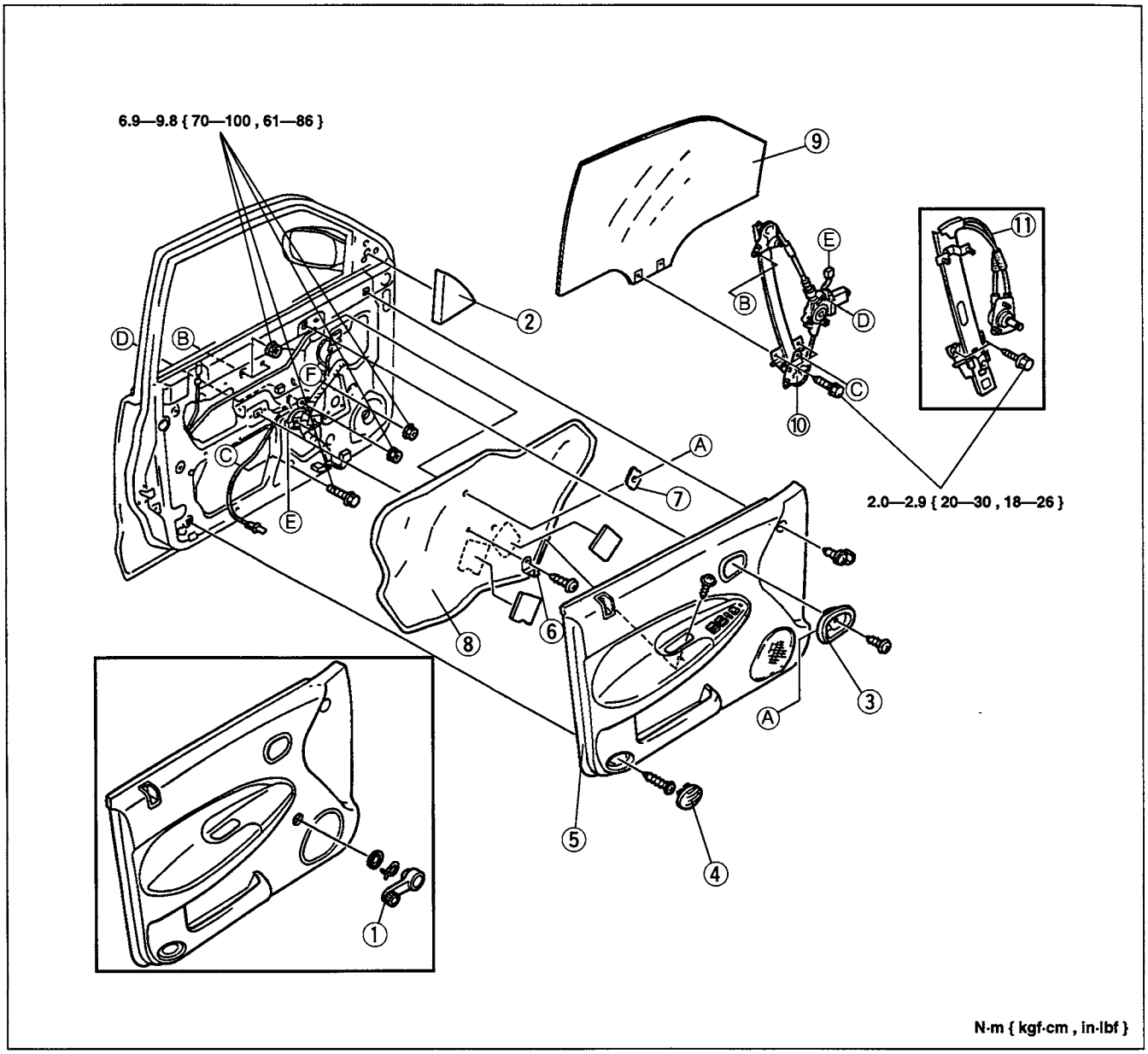
Removal / Installation

1. Lower the front door glass fully.
2. Disconnect the negative battery cable.

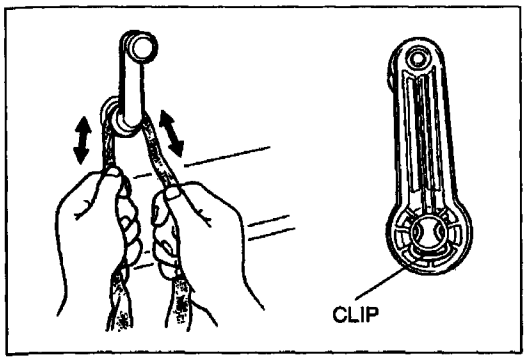
Note

- Remove the door screen carefully so that it may be reused.

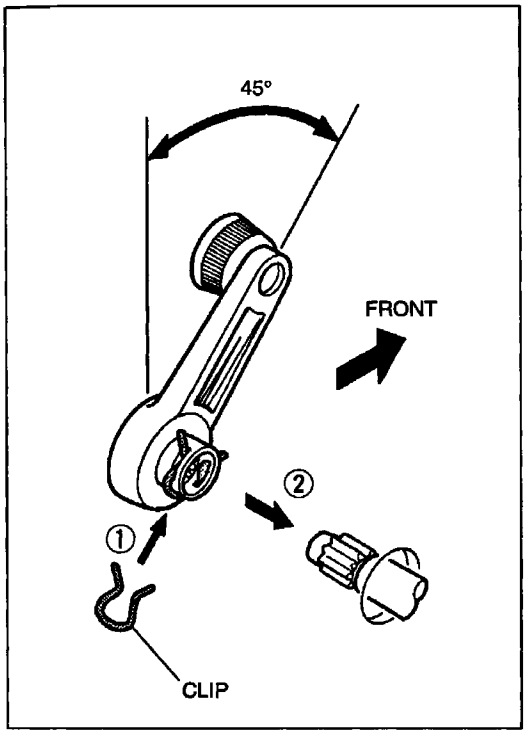
3. Remove in the order shown in the figure, referring to **Removal note**.
4. Install in the reverse order of removal, referring to **Installation note**.



1. Regulator handle
   - Removal note ..... page S1–13
   - Installation note ..... page S1–13
2. Inner garnish
3. Inner handle
4. Lens
5. Front door trim
   - Removal / Installation ..... page S1–107
6. Bracket
7. Sealing pad
8. Door screen
9. Front door glass
10. Power window regulator
11. Manual window regulator



Removal note
Regulator handle
Remove the regulator handle clip by using a rag as shown.



Installation note
Regulator handle
1. Raise the front door glass fully.
2. Install the clip in the regulator handle (①).
3. Push the regulator handle as shown (②).

REAR WINDOW REGULATOR, GLASS AND GUIDE

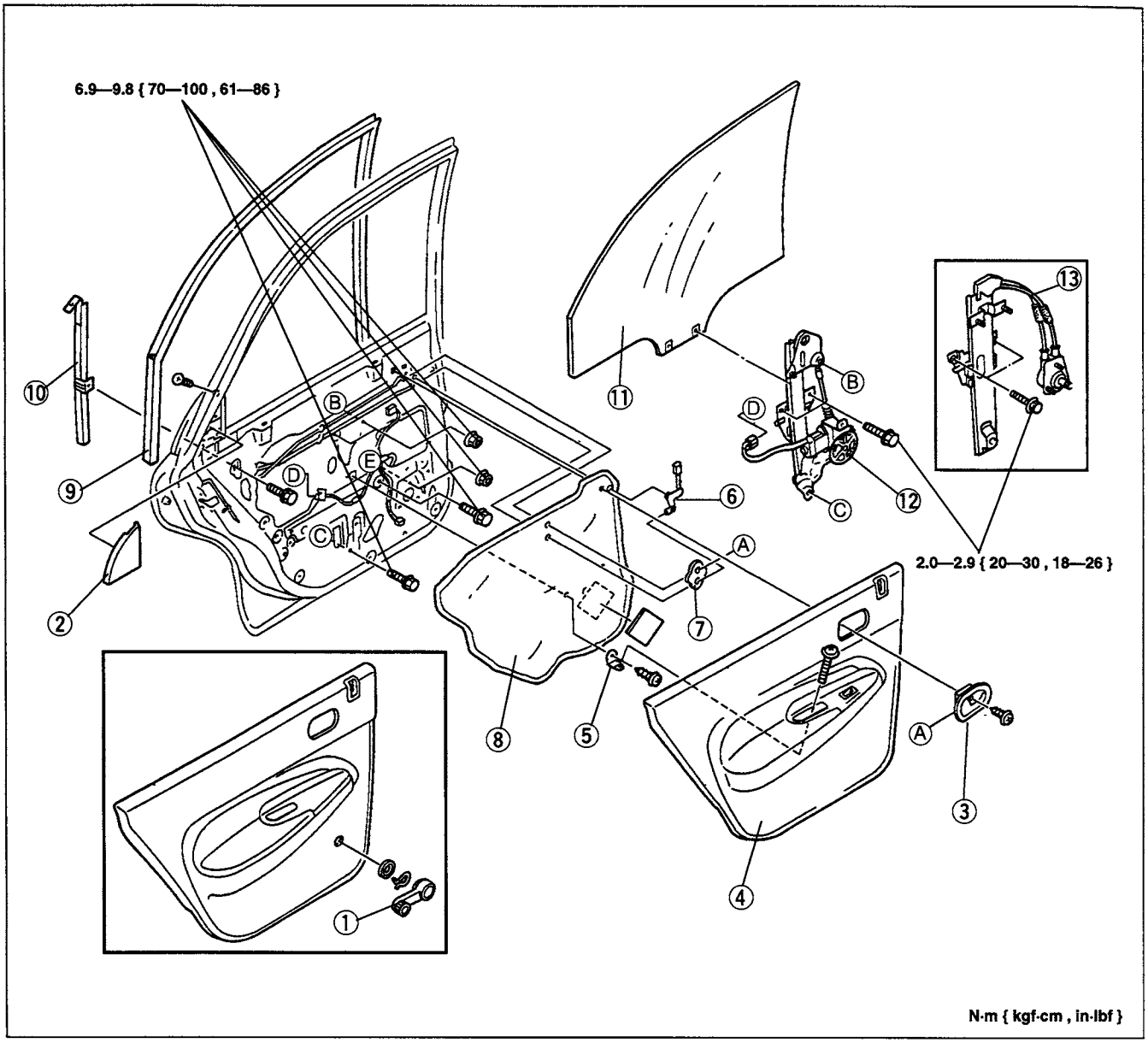
Removal / Installation

1. Lower the rear door glass fully.
2. Disconnect the negative battery cable.

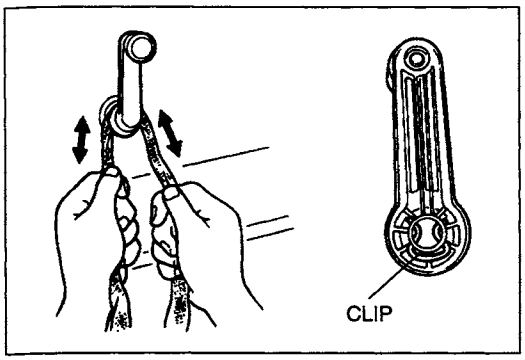
Note

- Remove the door screen carefully so that it may be reused.

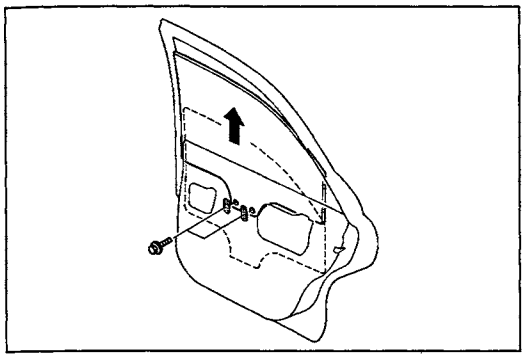
3. Remove in the order shown in the figure, referring to **Removal note**.
4. Install in the reverse order of removal, referring to **Installation note**.



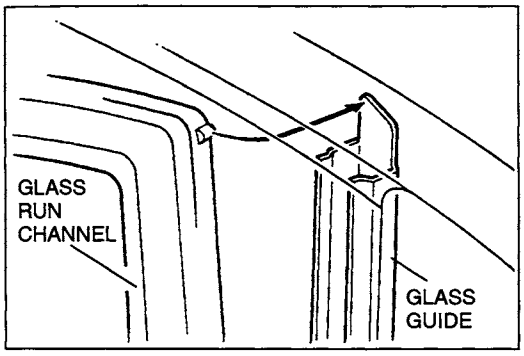
1. Regulator handle
   - Removal note ..... page S1– 15
   - Installation note ..... page S1– 15
2. Inner garnish
3. Inner handle
4. Rear door trim
   - Removal / Installation ..... page S1–108
5. Bracket
6. Door lock knob and lock bushing
7. Sealing pad
8. Door screen
9. Glass run channel
   - Installation note ..... page S1–15
10. Glass guide
11. Rear door glass
    - Removal note ..... page S1–15
12. Power window regulator
13. Manual window regulator



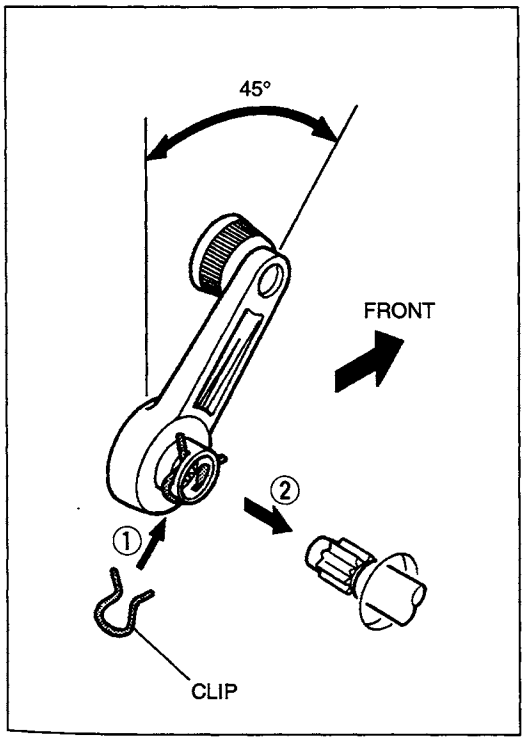
Removal note
Regulator handle
Remove the regulator handle clip by using a rag as shown.



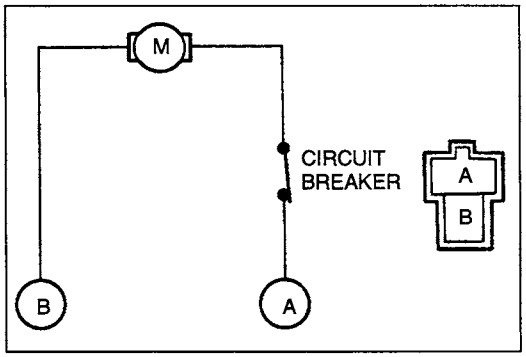
Rear door glass
1. Raise the front edge of the rear door glass about **50 mm { 2.0 in }** from the fully lowered position.
2. Remove the glass installation bolts and remove the glass from the inside of the sash.



Installation note
Glass run channel
Align the dowel of the glass run channel with the edge of the glass guide and install the glass run channel.



Regulator handle
1. Raise the rear door glass fully.
2. Install the clip in the regulator handle (①).
3. Push the regulator handle as shown (②).



POWER WINDOW REGULATOR

Inspection

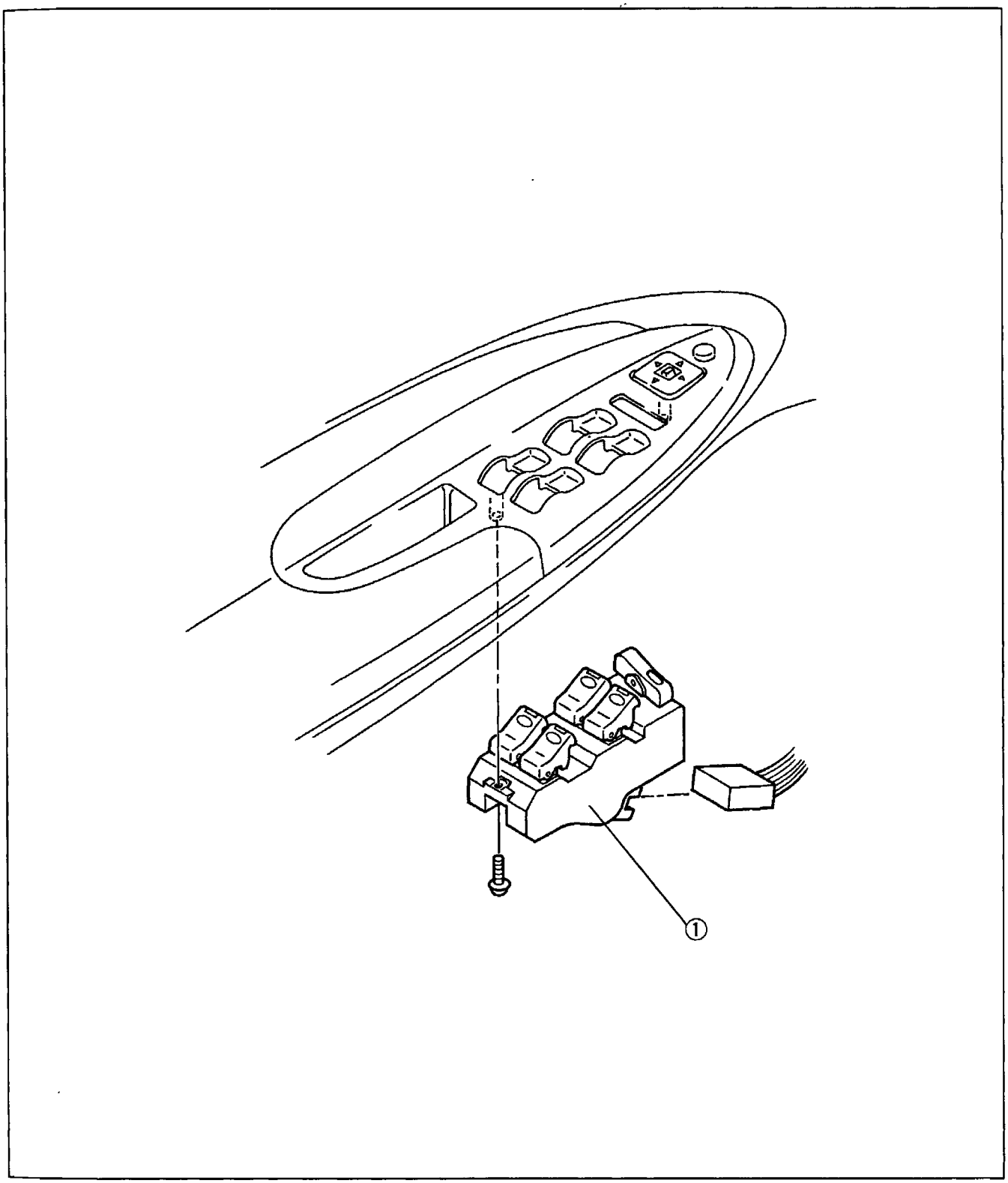
1. Remove the power window regulator. (Refer to pages S1–12, 14.)
2. Apply battery positive voltage to the power window regulator connector terminals and check the operation of the regulator.

B+: Battery positive voltage

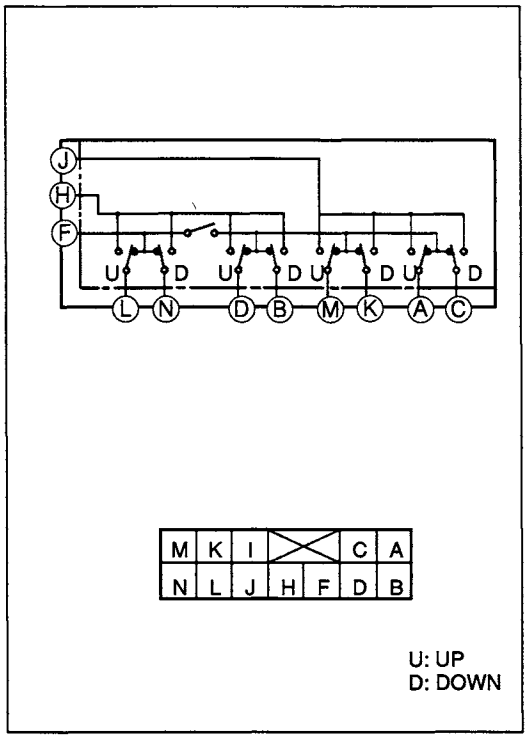
Connection		Reulator operation
B+	GND	
A	B	UP
B	A	DOWN

3. If not as specified, replace the power window regulator.

POWER WINDOW MAIN SWITCH ASSEMBLY
Removal / Installation
1. Disconnect the negative battery cable.
2. Remove the front door trim. (Refer to page S1–107.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



1. Power window main switch assembly
   Inspection ..... page S1–18



Inspection

1. Remove the power window main switch assembly. (Refer to page S1–17.)
2. Check for continuity between the terminals of the main switch assembly connector with the main switches in the following positions.
3. If not as specified, replace the power window main switch assembly.

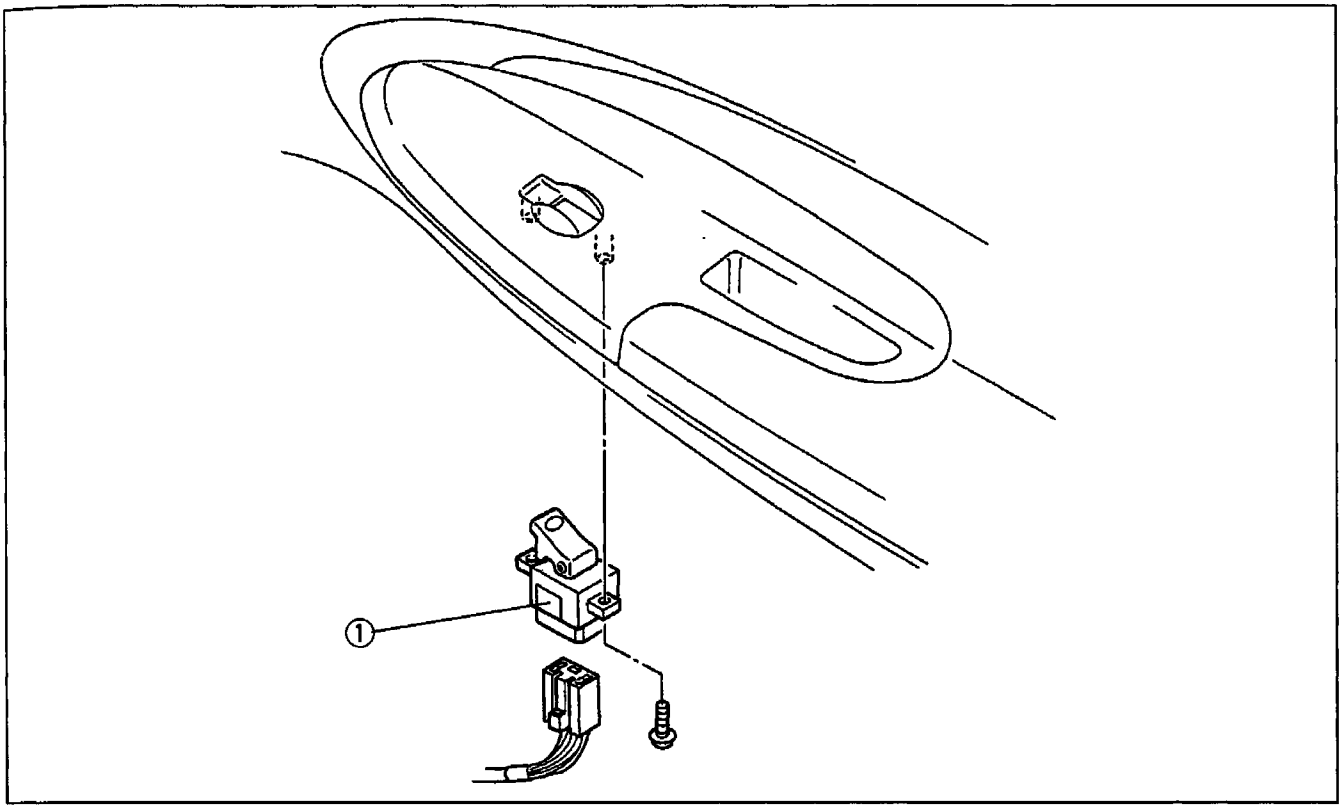
Switch / Terminal / Switch position	Driver				Passenger				Left rear				Right rear			
	L	N	H	F	D	B	H	F	M	K	J	F	A	C	J	F
UP	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
OFF (with power-cut switch at ON)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
DOWN	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
AUTO DOWN	○	○	○	○												

○—○: Continuity

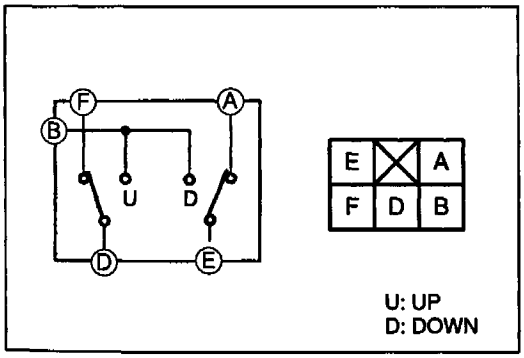
POWER WINDOW SUBSWITCH

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the passenger's/rear door trim. (Refer to pages S1–107, 108.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



1. Power window subswitch
   Inspection ..... below



Inspection

1. Remove the power window subswitch. (Refer above.)
2. Check for continuity between the terminals of the subswitch connector with the subswitch in the following positions.

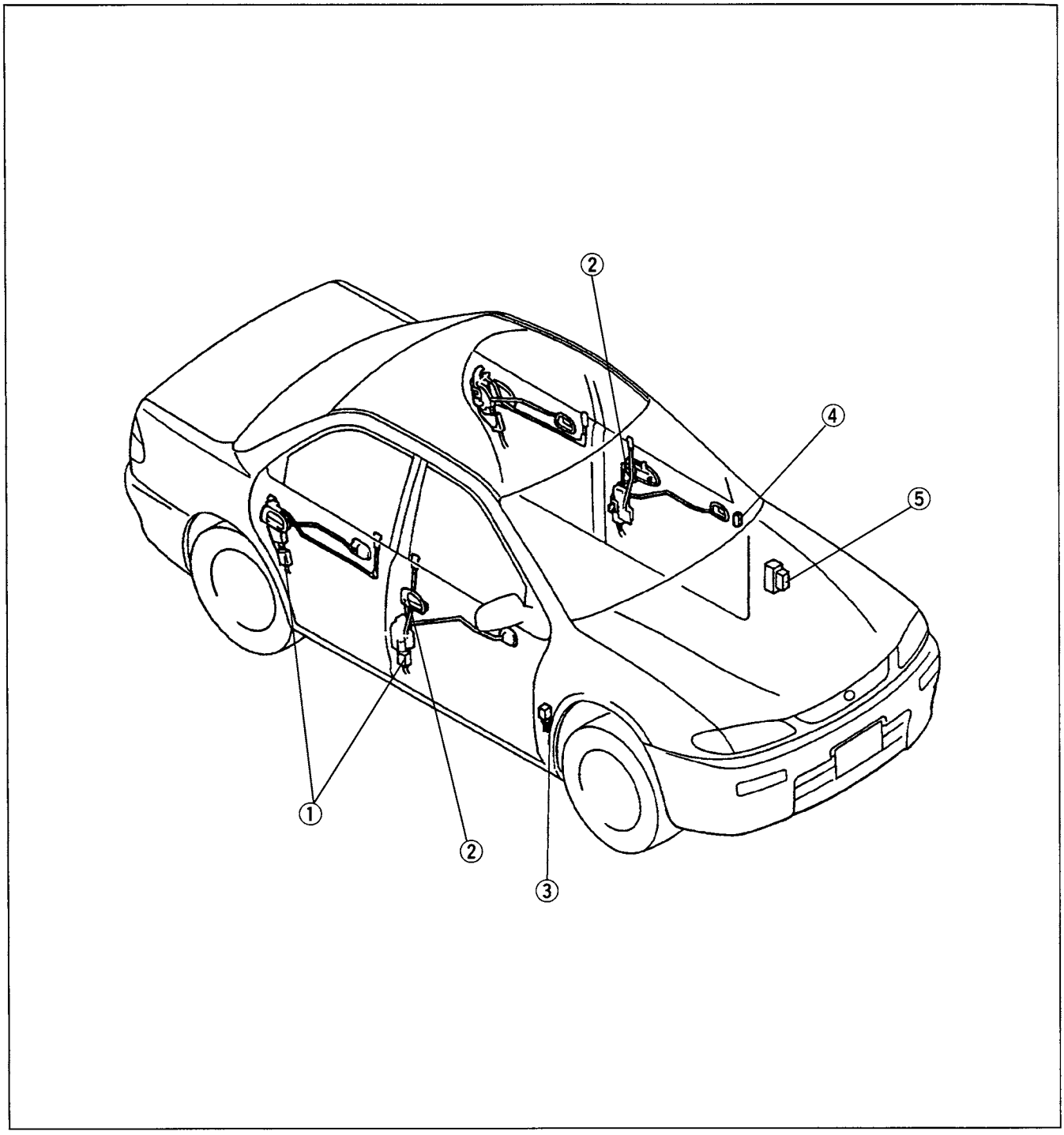
Switch position \ Terminal	A	B	D	E	F
UP	○	○	○	○	
OFF	○		○	○	○
DOWN		○	○	○	○

○—○: Continuity

3. If not as specified, replace the power window subswitch.

DOOR LOCK AND OPENER

STRUCTURAL VIEW



1. Door lock actuator (within door lock)
   - Removal / Installation (front) .. page S1–21
   - Removal / Installation (rear) .. page S1–24
2. Door key cylinder switch
   - Removal / Installation ..... page S1–23
   - Inspection ..... page S1–25
3. Door lock timer unit
   - Removal / Installation ..... page S1–27
   - Inspection ..... page S1–28
4. Door lock switch
   - Removal / Installation ..... page S1–26
   - Inspection ..... page S1–26
5. CPU
   - Removal / Installation ..... section T1
   - Inspection ..... section T1

FRONT DOOR LOCK AND OPENER

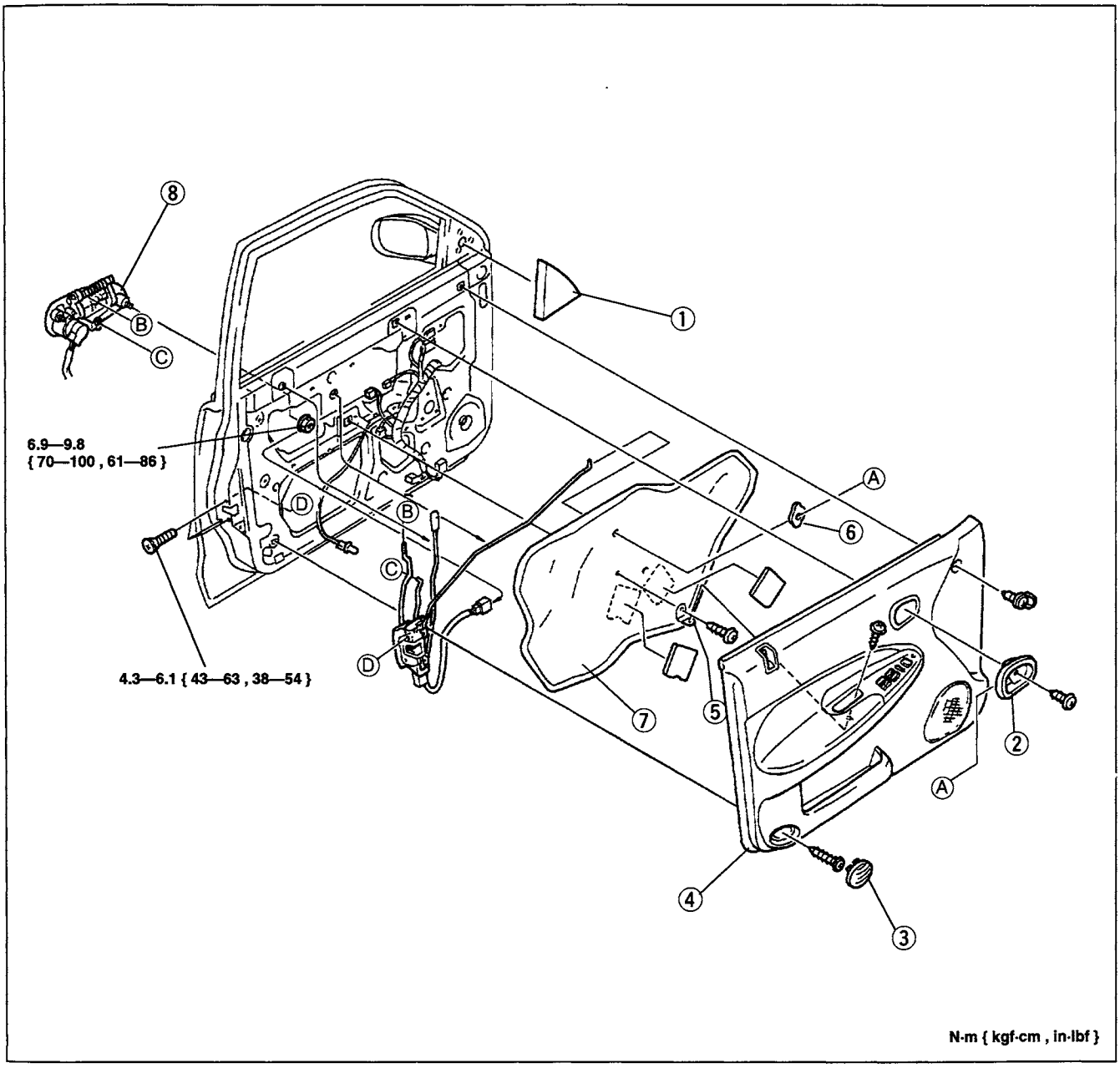
Removal / Installation

1. Raise the front door glass fully.
2. Disconnect the negative battery cable.

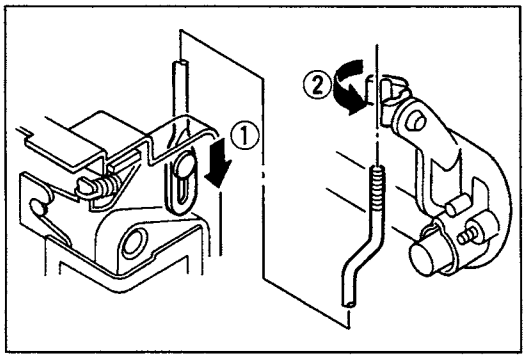
Note

- Remove the door screen carefully so that it may be reused.

3. Remove in the order shown in the figure.
4. Install in the reverse order of removal referring to **Installation note**.



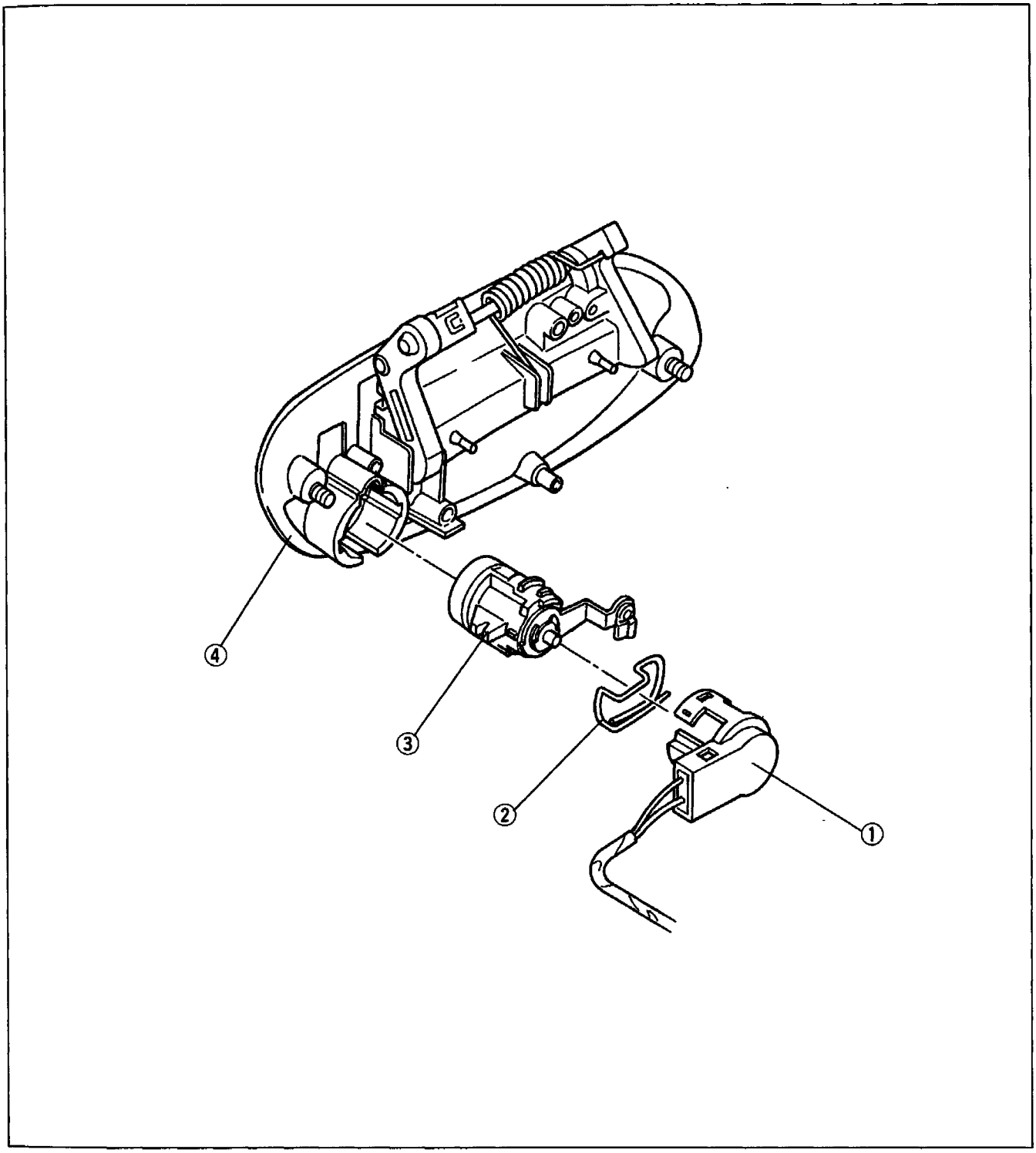
1. Inner garnish
2. Inner handle
3. Lens
4. Front door trim
   Removal / Installation ..... page S1–107
5. Bracket
6. Sealing pad
7. Door screen
8. Outer handle
   Installation note ..... page S1–22
   Disassembly / Assembly ..... page S1–23



Installation note
Outer handle
1. Lower the push rod fully.
2. Install the push rod into the outer handle joint.

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



1. Door key cylinder switch
   Inspection ..... page S1–25
2. Retainer
3. Door key cylinder
4. Outer handle

REAR DOOR LOCK AND OPENER

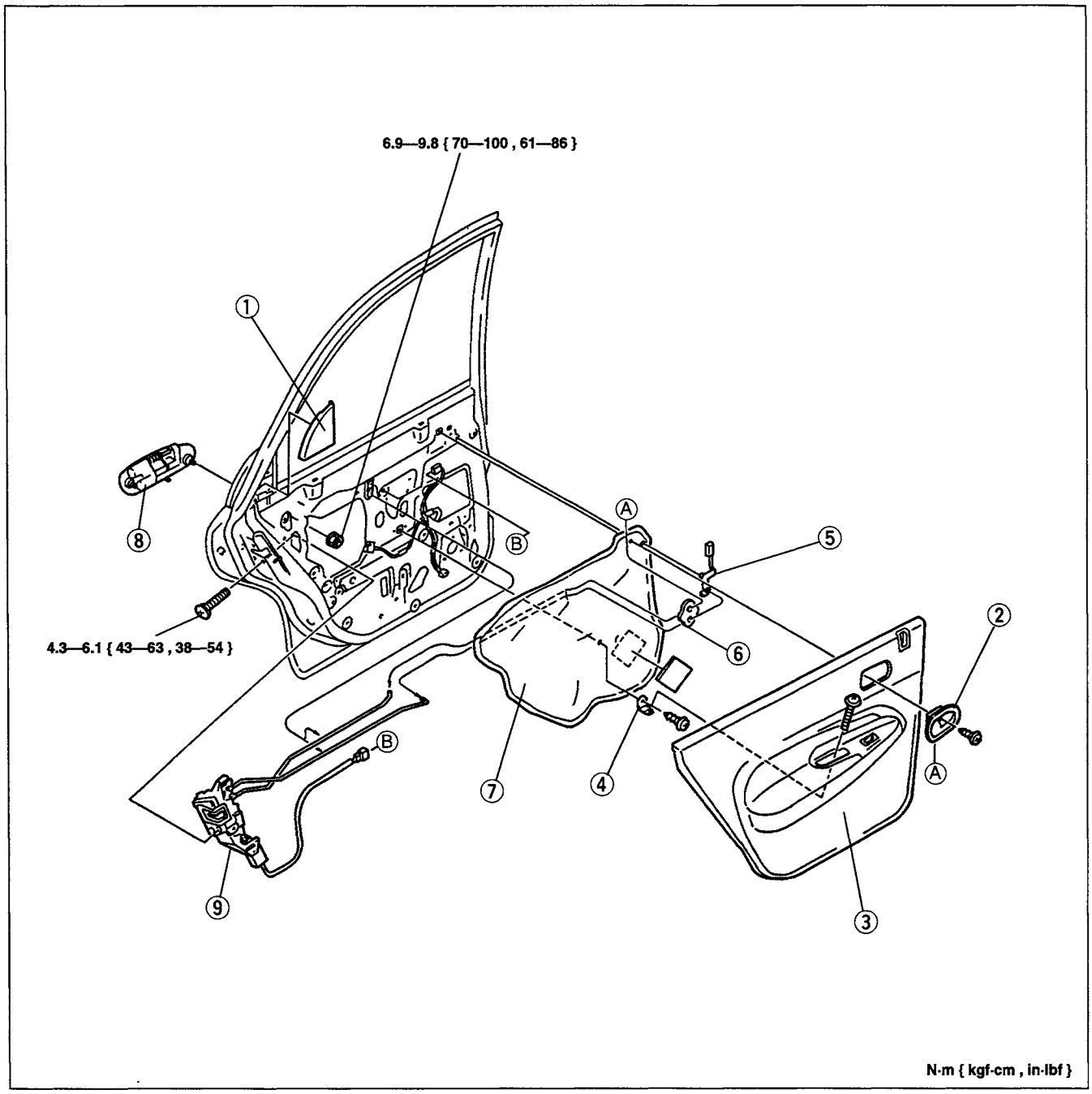
Removal / Installation

1. Raise the rear door glass fully.
2. Disconnect the negative battery cable.

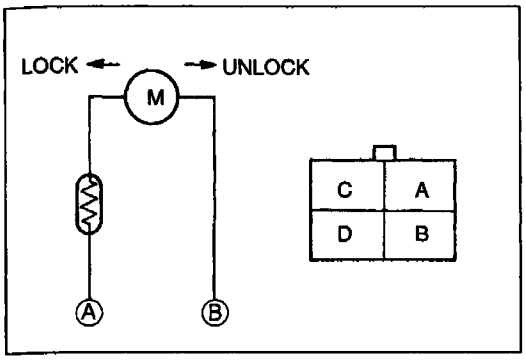
Note

- Remove the door screen carefully so that it may be reused.

3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



1. Inner garnish
2. Inner handle
3. Rear door trim
   Removal / Installation . . . . . page S1–108
4. Bracket
5. Door lock knob and lock bushing
6. Sealing pad
7. Door screen
8. Outer handle
9. Door lock



DOOR LOCK ACTUATOR (within door lock)

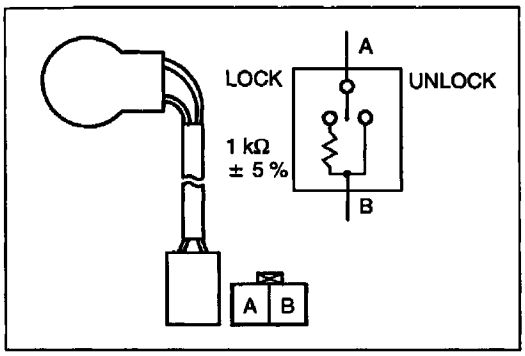
Inspection

1. Remove the door lock. (Refer to pages S1–21, 23.)
2. Apply battery positive voltage to the connector terminals and check the operation of the actuator.

B+: Battery positive voltage

Connection		Actuator operation
B+	GND	
B	A	Lock
A	B	Unlock

3. If not as specified, replace the door lock.



DOOR KEY CYLINDER SWITCH

Inspection

1. Remove the door screen. (Refer to page S1–21.)
2. Disconnect the door key cylinder switch connector.
3. Check for continuity between the terminals of the connector with the key cylinder in the following positions.

Terminal / Cylinder position	A	B
Lock	O—WW—O	1 kΩ ± 5 %
Unlock	O	O

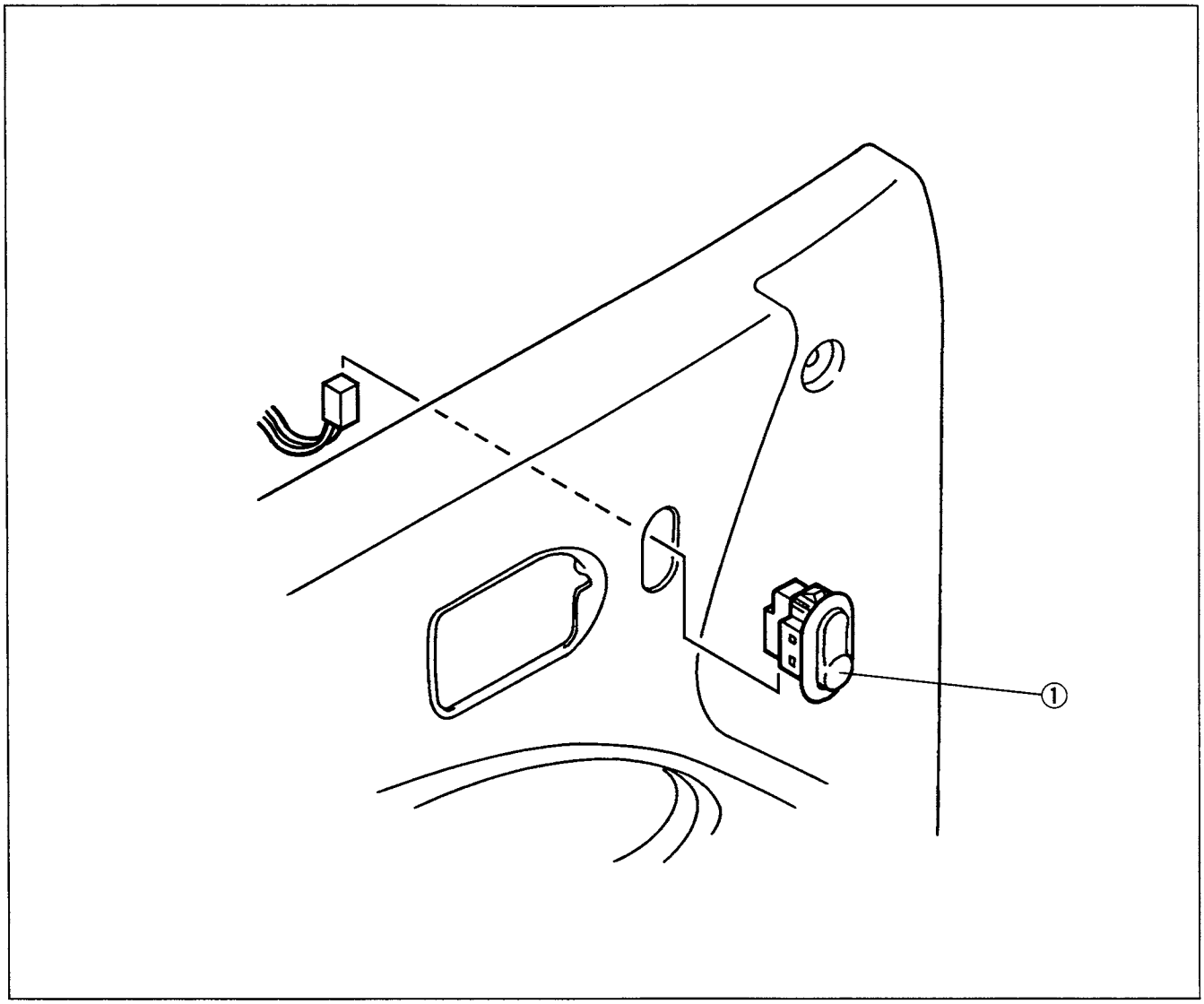
O—O: Continuity

4. If not as specified, replace the door key cylinder.

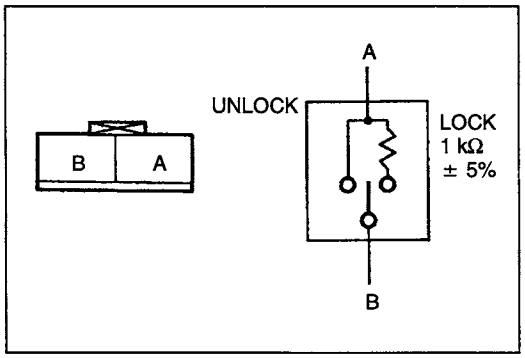
DOOR LOCK SWITCH

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the front door trim. (Refer to page S1–107.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



1. Door lock switch
   Inspection ..... below



Inspection

1. Remove the door lock switch. (Refer above.)
2. Check for continuity between the terminals of the door lock switch.

Switch position \ Terminal	A	B
Lock	○—∿∿—○ 1 kΩ ± 5 %	
Unlock	○	○

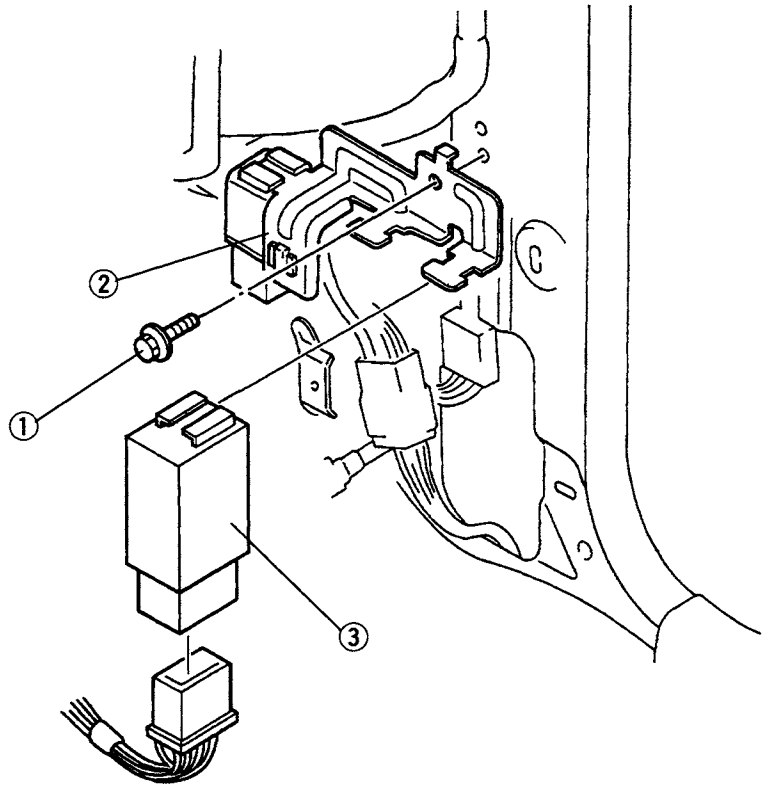
○—○: Continuity

3. If not as specified, replace the door lock switch.

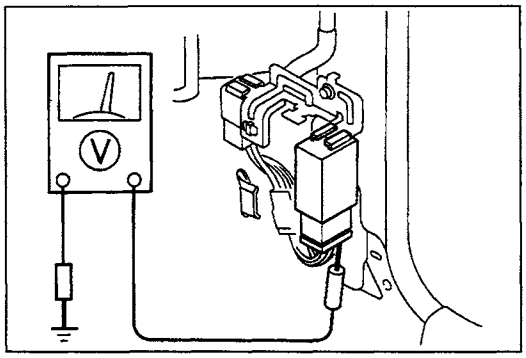
DOOR LOCK TIMER UNIT

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the right front side trim. (Refer to page S1–104.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



1. Bolt
2. Bracket
3. Door lock timer unit
   Inspection ..... page S1–28

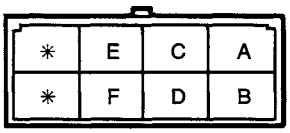


Inspection

1. Remove the right front side trim. (Refer to page S1–104.)
2. Measure the voltage at the door lock timer unit terminals. If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnesses.
3. If the parts and wiring harnesses are OK but the system still does not work properly, replace the door lock timer unit.

Terminal voltage list

B+: Battery positive voltage



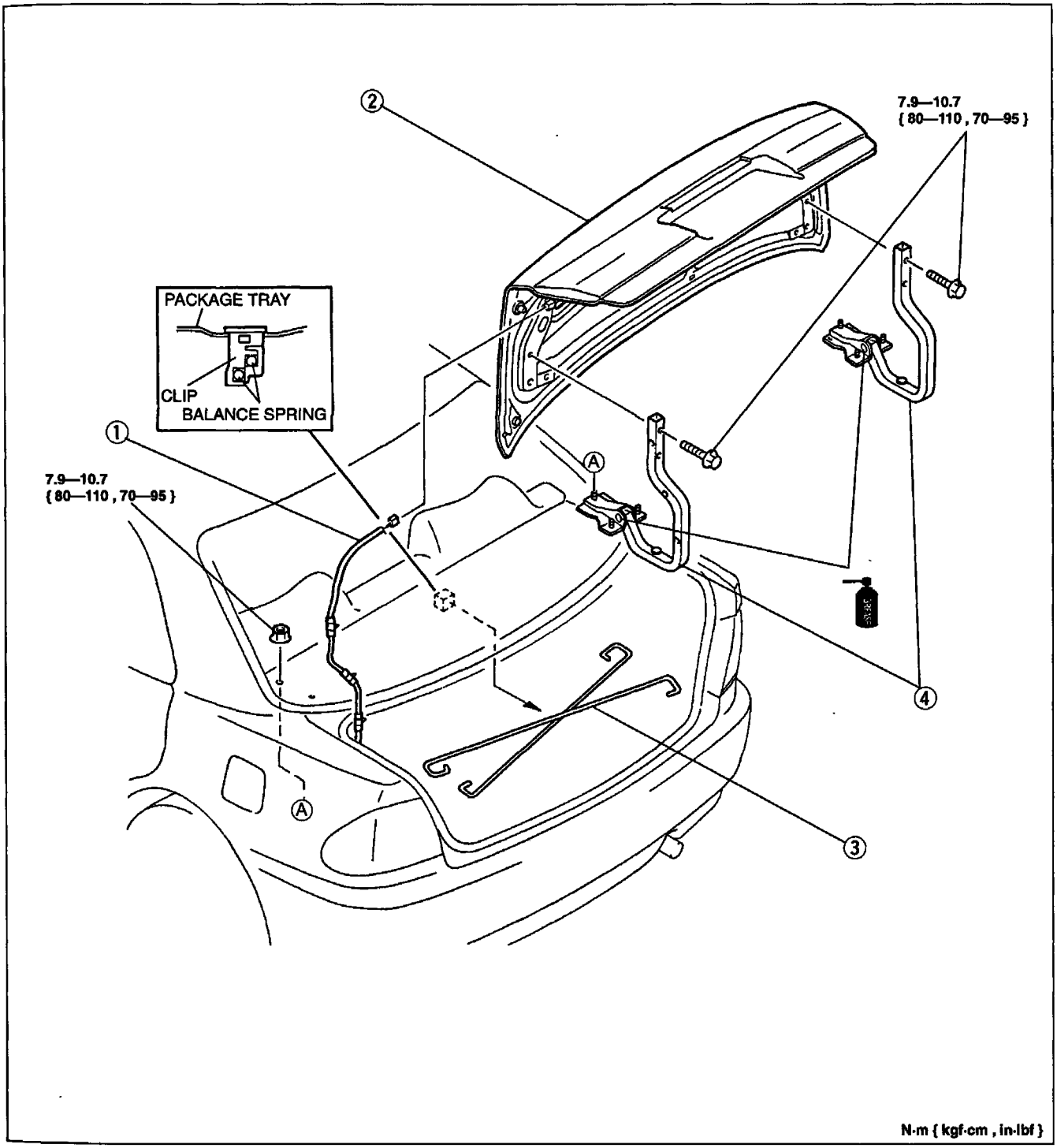
Terminal	Signal	Connection	Test condition	Voltage (V)	Inspection area
A	GND	Body ground	Continuity to ground	Continuity	GND
B	B+	Fuse (DOOR LOCK 30 A)	Constant	B+	Fuse (DOOR LOCK 30 A)
C	Door lock control	CPU	Door lock actuator unlocked	B+→0 →B+	Wiring harness (Door lock timer unit—CPU)
			Other	B+	
D	Door lock control	CPU	Door lock actuator locked	B+→0 →B+	Wiring harness (Door lock timer unit—CPU)
			Other	B+	
E	Actuator lock control	Door lock actuator	Door lock actuator locked	0→B+→0	Wiring harness (Door lock timer unit—Door lock actuator)
			Other	0	
F	Actuator lock control	Door lock actuator	Door lock actuator unlocked	0→B+→0	Wiring harness (Door lock timer unit—Door lock actuator)
			Other	0	

TRUNK LID

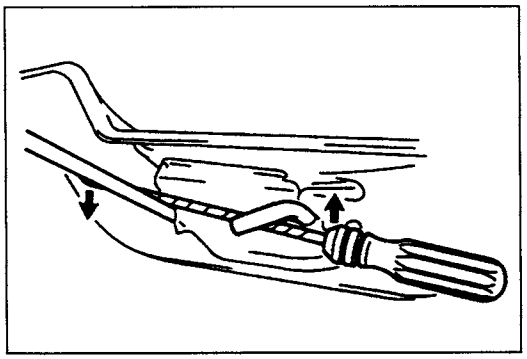
TRUNK LID

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure, referring to **Removal note**. To remove the trunk lid hinge, remove the rear package trim. (Refer to page S1–109.)
3. Install in the reverse order of removal.



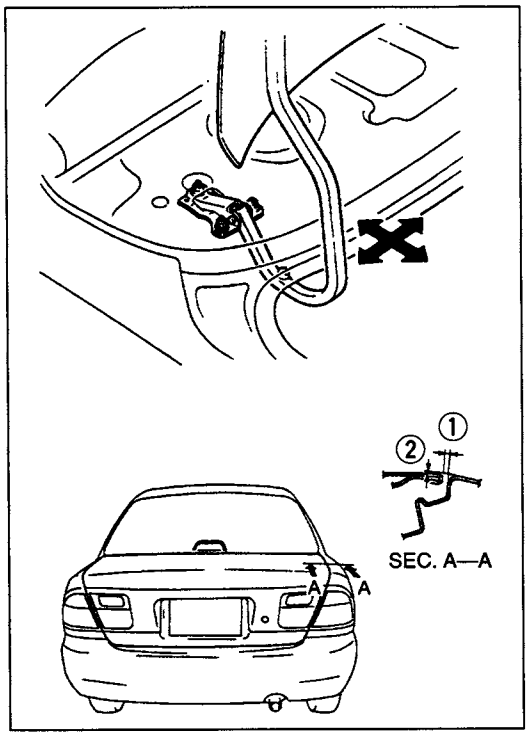
1. Harness connector
2. Trunk lid
   Adjustment ..... page S1–30
3. Balance spring
   Removal note ..... page S1–30
   Adjustment ..... page S1–30
4. Trunk lid hinge



Removal note
Balance spring

Warning
- **Removing the balance spring without removing the trunk lid can be dangerous. The trunk lid may fall and injure you. Remove the trunk lid before removing the balance spring.**

1. Lift the balance spring by using a screwdriver which has been wrapped in tape.
2. Remove the balance spring.



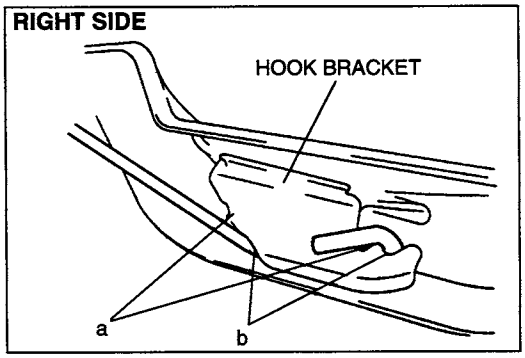
Adjustment
Trunk lid
1. Verify that the trunk lid can be closed easily and that there is no looseness or excessive clearance.

   Clearance: ① 4.0 ± 1.0 mm { 0.16 ± 0.04 in }
   ② 0.5 ± 1.0 mm { 0.02 ± 0.04 in }

2. If not as specified, loosen the trunk-lid-to-hinge mounting nuts and reposition the trunk lid.

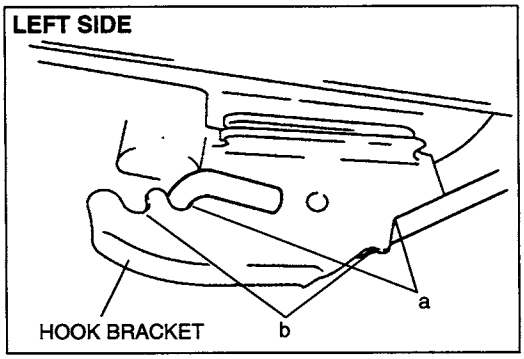
   Tightening torque:
   7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }

3. Adjust the trunk lid striker after the trunk lid has been aligned. (Refer to page S1–31.)



Balance spring
Slide the balance spring to the desired position as described below by using a screwdriver which has been wrapped in tape.

Note
- The trunk lid should raise 70—300 mm { 2.8—11.8 in } when the trunk lid is unlocked.



Tension \ Set position	Hook bracket	a	b
Standard	Right side		○
	Left side	○	
Increase	Right side		○
	Left side		○
Decrease	Right side	○	
	Left side	○	

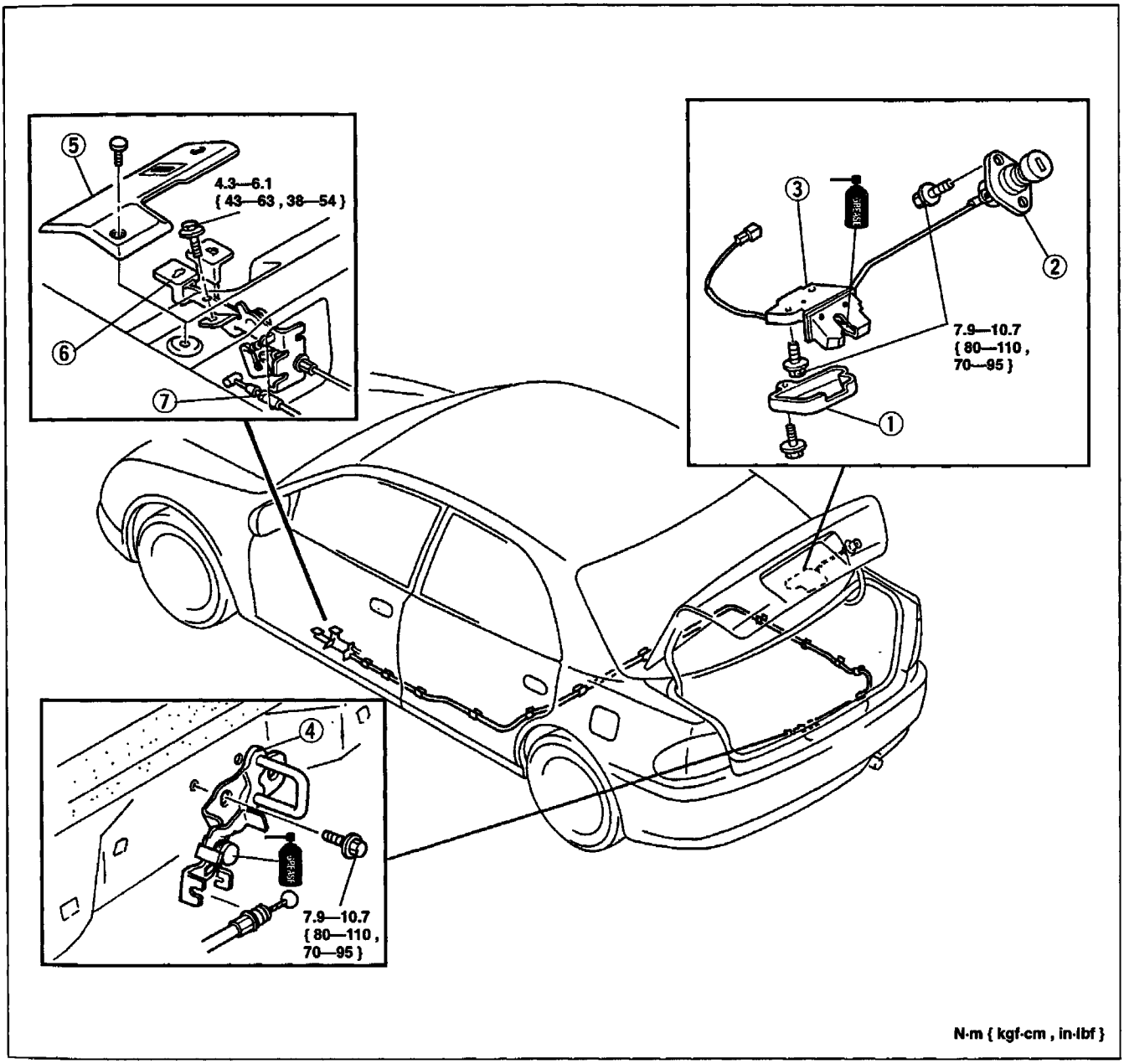
○: Position

TRUNK LID LOCK AND OPENER

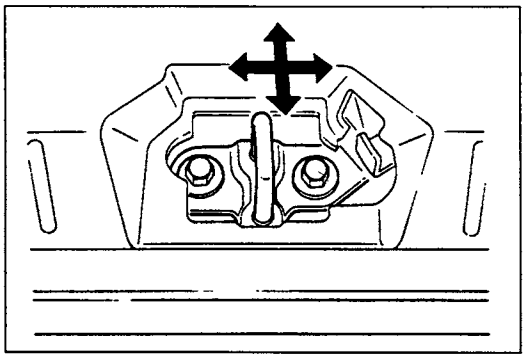
TRUNK LID LOCK AND OPENER

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure. To remove the trunk key cylinder and trunk lid lock, remove the trunk lid trim. (Refer to page S1–114.) To remove the trunk lid striker, remove the trunk end trim. (Refer to page S1–112.) To remove the trunk lid opener cable, remove the right trunk side trim (Refer to page S1–113.), rear seat back (Refer to pages S1–126, 129.), left front scuff plate (Refer to page S1–105.), and left rear scuff plate (Refer to page S1–106.), and turn over the cabin carpet (Refer to page S1–115.).
3. Install in the reverse order of removal.



1. Protector (without trunk lid trim)
2. Trunk key cylinder
3. Trunk lid lock
4. Trunk lid striker
   Adjustment ..... page S1–32
5. Cover
6. Trunk lid opener lever
7. Trunk lid opener cable



Adjustment
Trunk lid striker

1. Verify that the trunk lid is properly aligned. (Refer to page S1–29.)
2. Loosen the trunk lid striker mounting bolts and align the striker with the trunk lid lock.

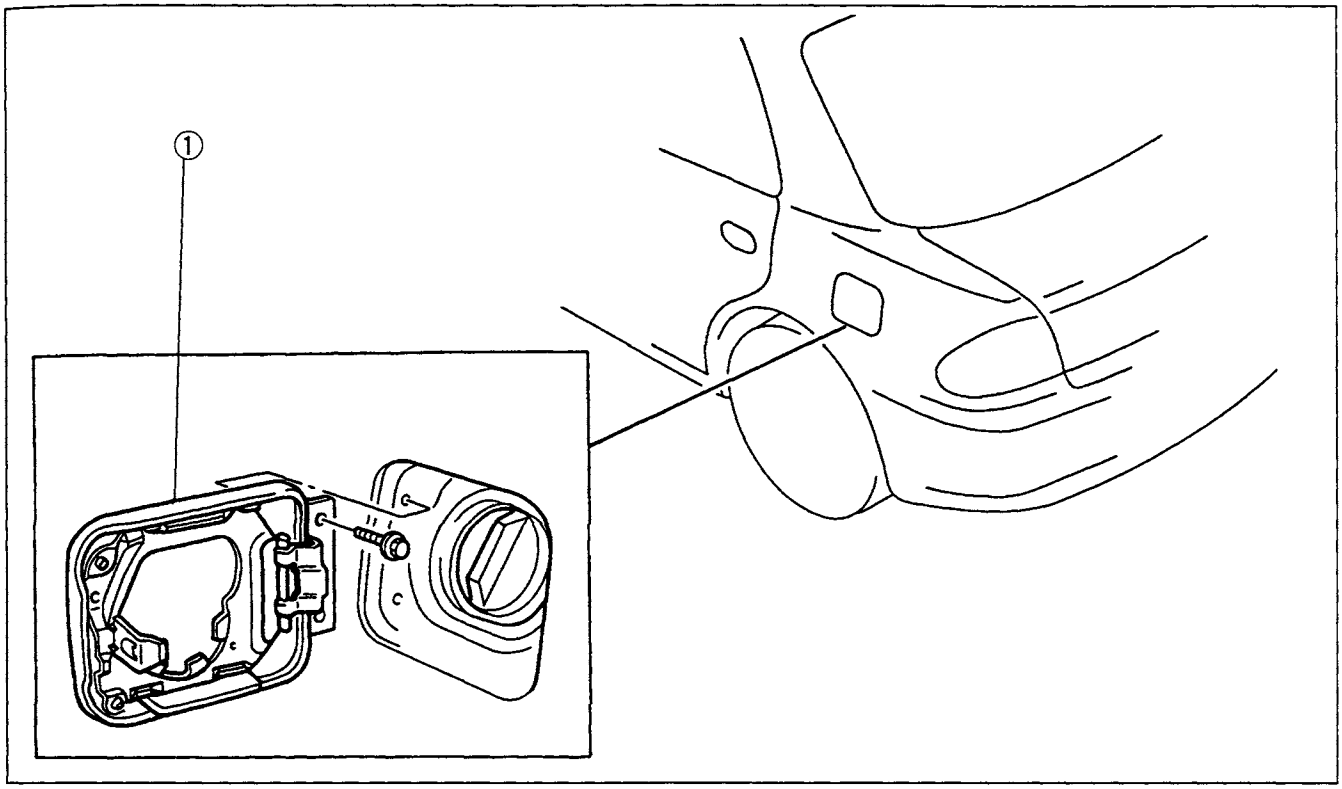
Tightening torque:
7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }

FUEL-FILLER LID

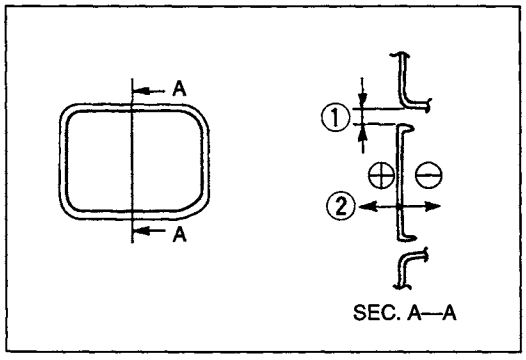
FUEL-FILLER LID

Removal / Installation

1. Remove as shown in the figure.
2. Install in the reverse order of removal.



1. Fuel-filler lid
   Adjustment ..... below



Adjustment
Fuel-filler lid

1. Verify that the fuel-filler lid can be closed easily and that there is no looseness or excessive clearance.

   Clearance ①: 3.0 ± 1.0 mm { 0.12 ± 0.04 in }
   ②: $-0.5^{+1.0}_{-0.5}$ mm { $0.02^{+0.04}_{-0.02}$ in }

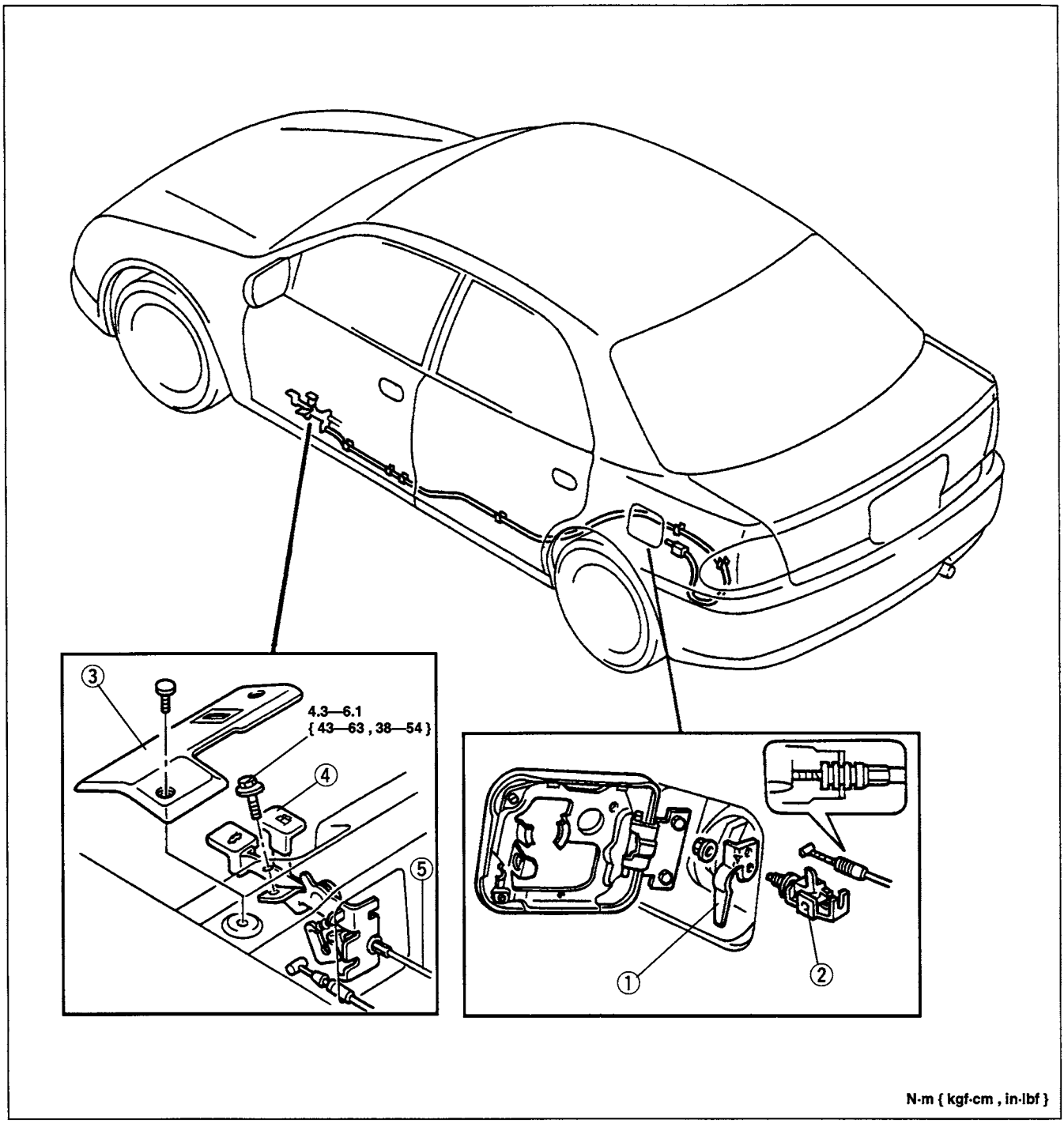
2. If not as specified, loosen the fuel-filler lid mounting bolts and reposition the fuel-filler lid.

FUEL-FILLER LID LOCK AND OPENER

FUEL-FILLER LID LOCK AND OPENER

Removal / Installation

1. Remove the left trunk side trim. (Refer to page S1–113.)
2. Remove in the order shown in the figure. To remove the fuel-filler lid opener cable, remove the rear seat back (Refer to pages S1–126, 129.), left front scuff plate (Refer to page S1–105.), and left rear scuff plate (Refer to page S1–106.), and turn over the cabin carpet (Refer to page S1–115.).
3. Install in the reverse order of removal.



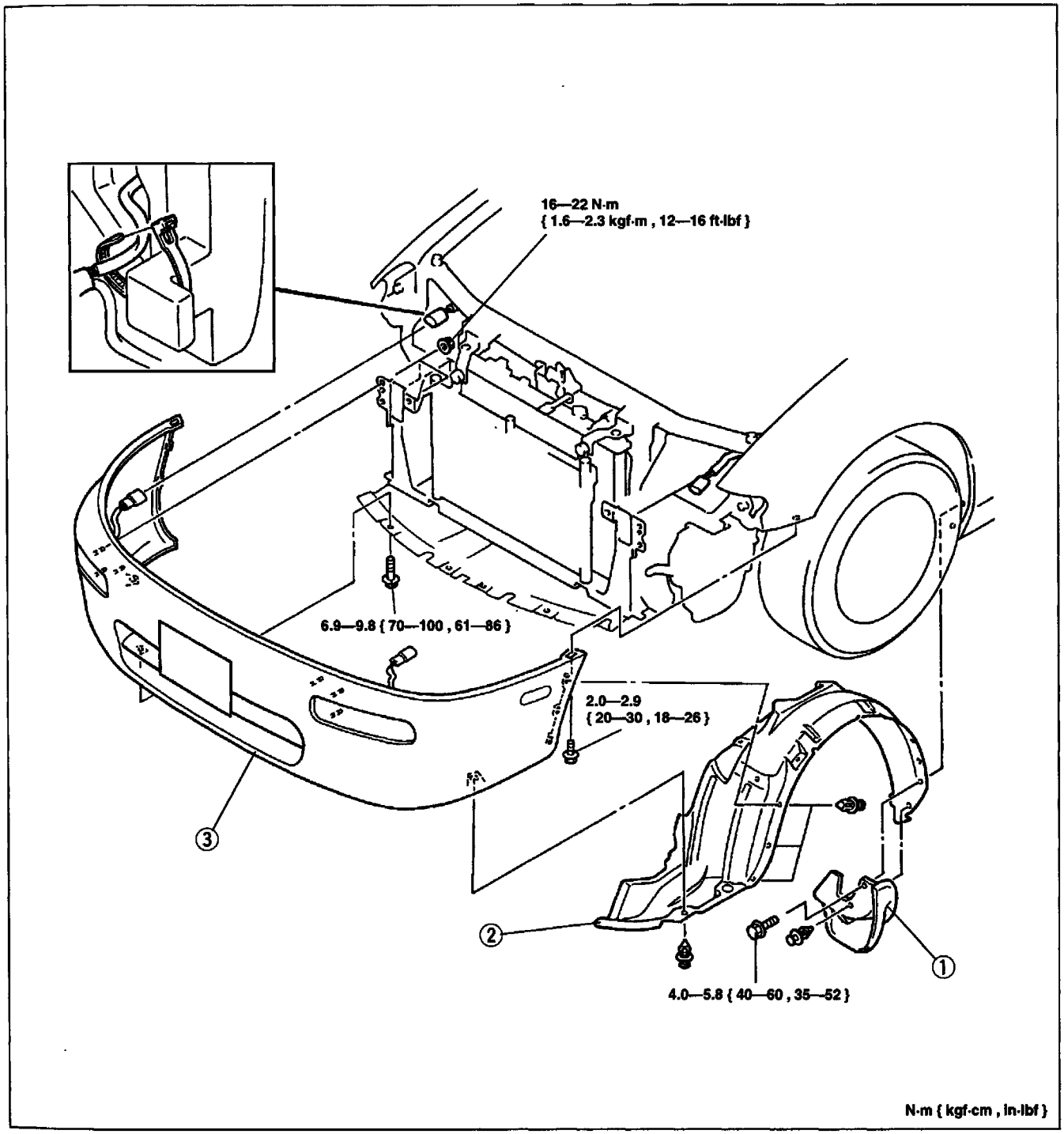
1. Lift spring
2. Fuel-filler lid opener
3. Cover
4. Fuel-filler lid opener lever
5. Fuel-filler lid opener cable

BUMPER

FRONT BUMPER

Removal / Installation

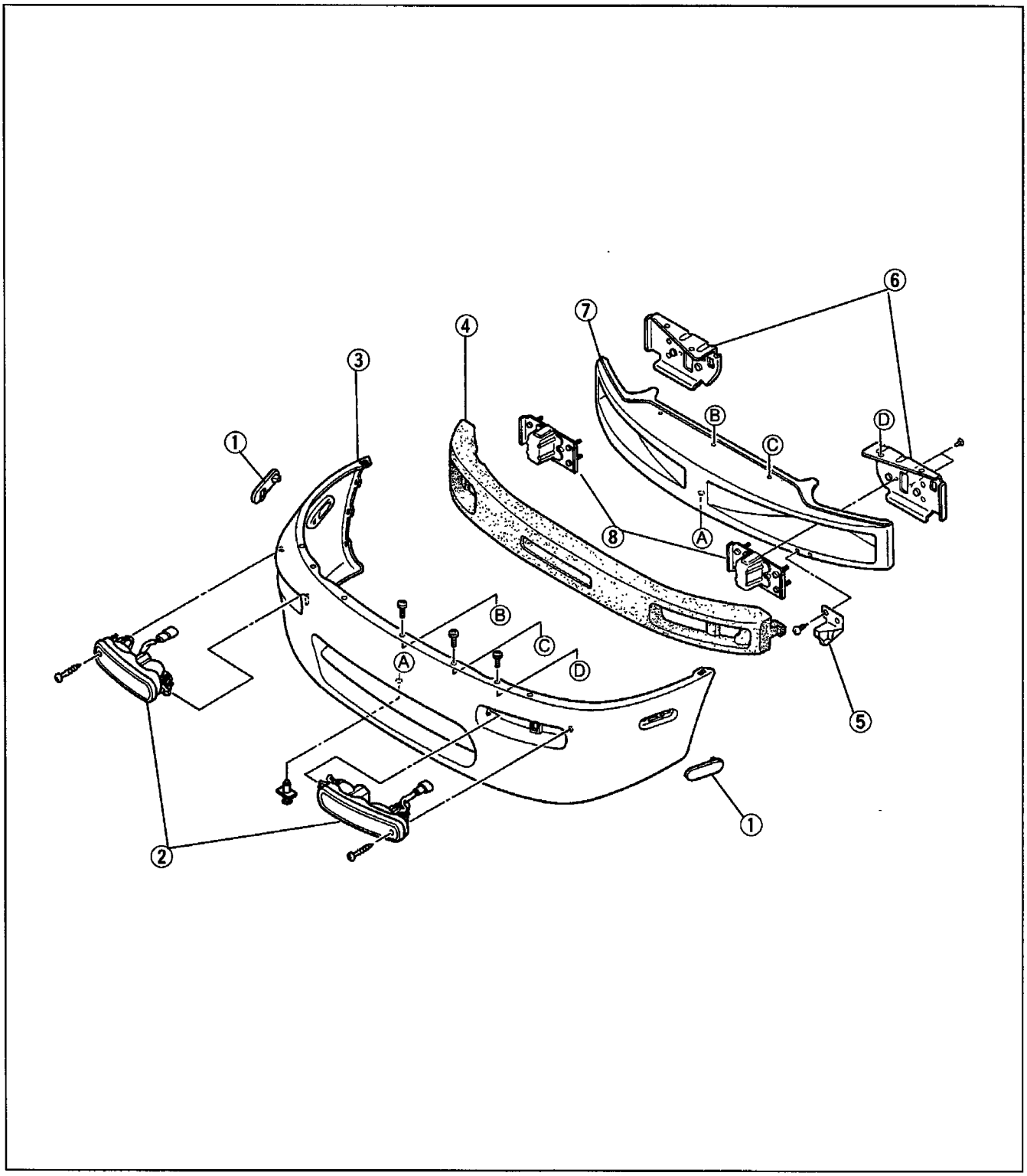
1. Disconnect the negative battery cable.
2. Remove the splash shield. (Refer to section B.)
3. Remove the radiator grille. (Refer to page S1–42.)
4. Remove the headlight. (Refer to secition T1.)
5. Remove in the order shown in the figure.
6. Install in the reverse order of removal.



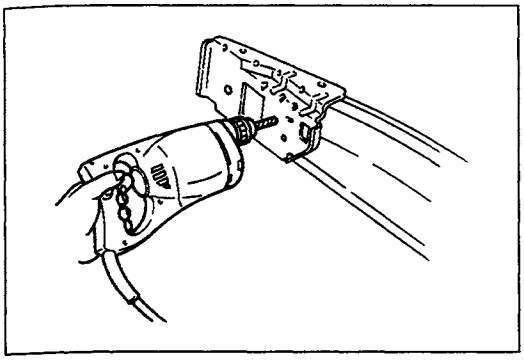
1. Front flap
2. Mud guard
3. Front bumper
   Disassembly / Assembly ..... page S1–41

Disassembly / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly note.**
2. Assemble in the reverse order of disassembly, referring to **Assembly note.**

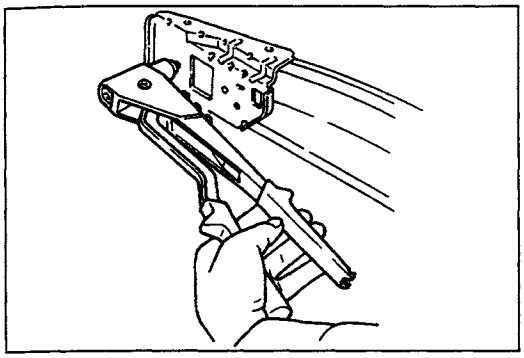


1. Front side marker light
2. Front turn light
   Removal / Installation ..... section T1
3. Front bumper fascia
4. Energy-absorbing foam
5. Front bumper panel
6. Set plate
   Disassembly note ..... page S1–37
   Assembly note ..... page S1–37
7. Front bumper reinforcement
8. Front bumper stay



Disassembly note
Set plate
Remove the rivets from the front bumper reinforcement by using a drill or cutting pliers.

Drill size: ϕ 7.5 mm { ϕ 0.30 in }

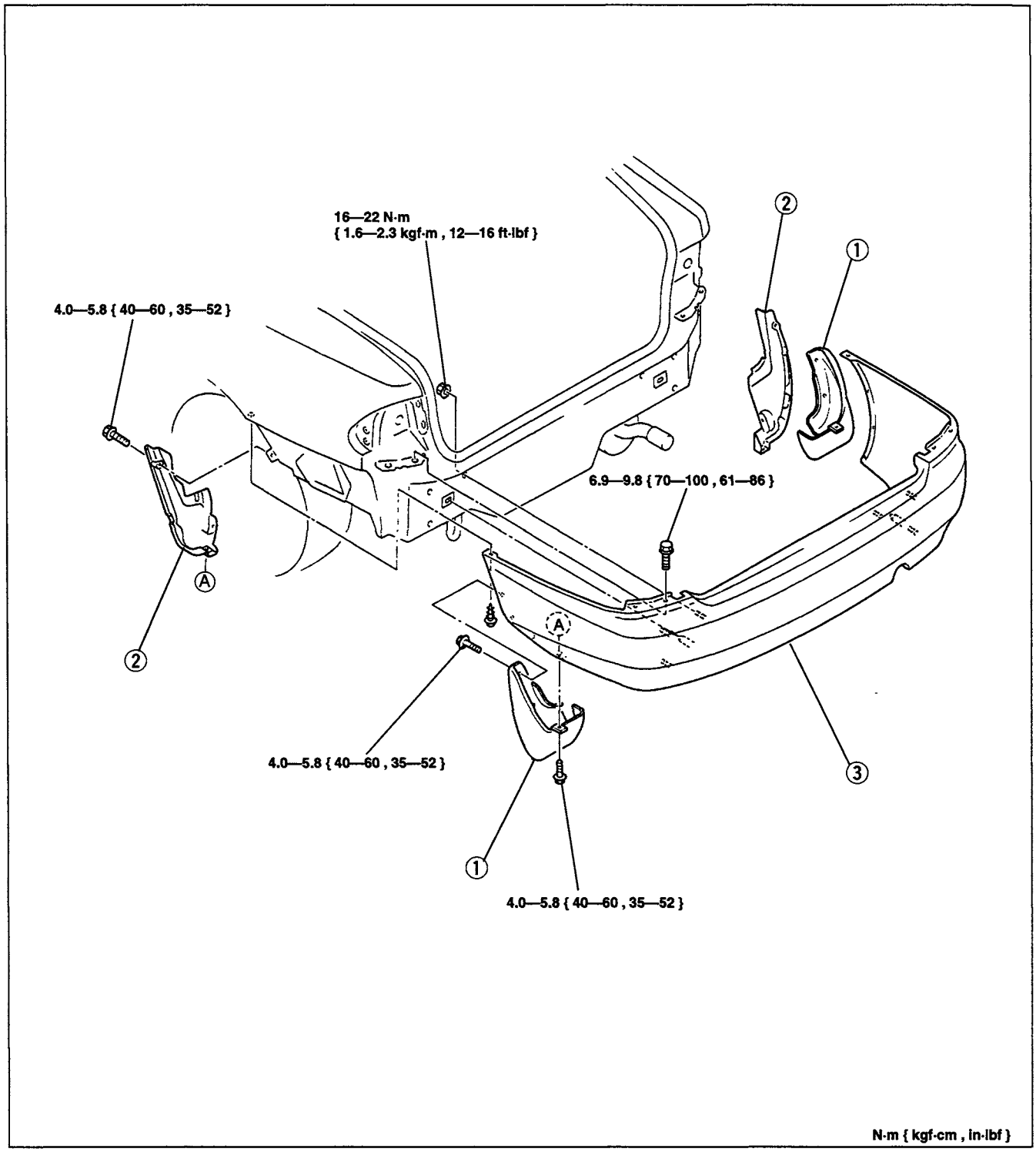


Assembly note
Set plate
Rivet the set plate to the front bumper reinforcement by using a hand riveter.

REAR BUMPER

Removal / Installation

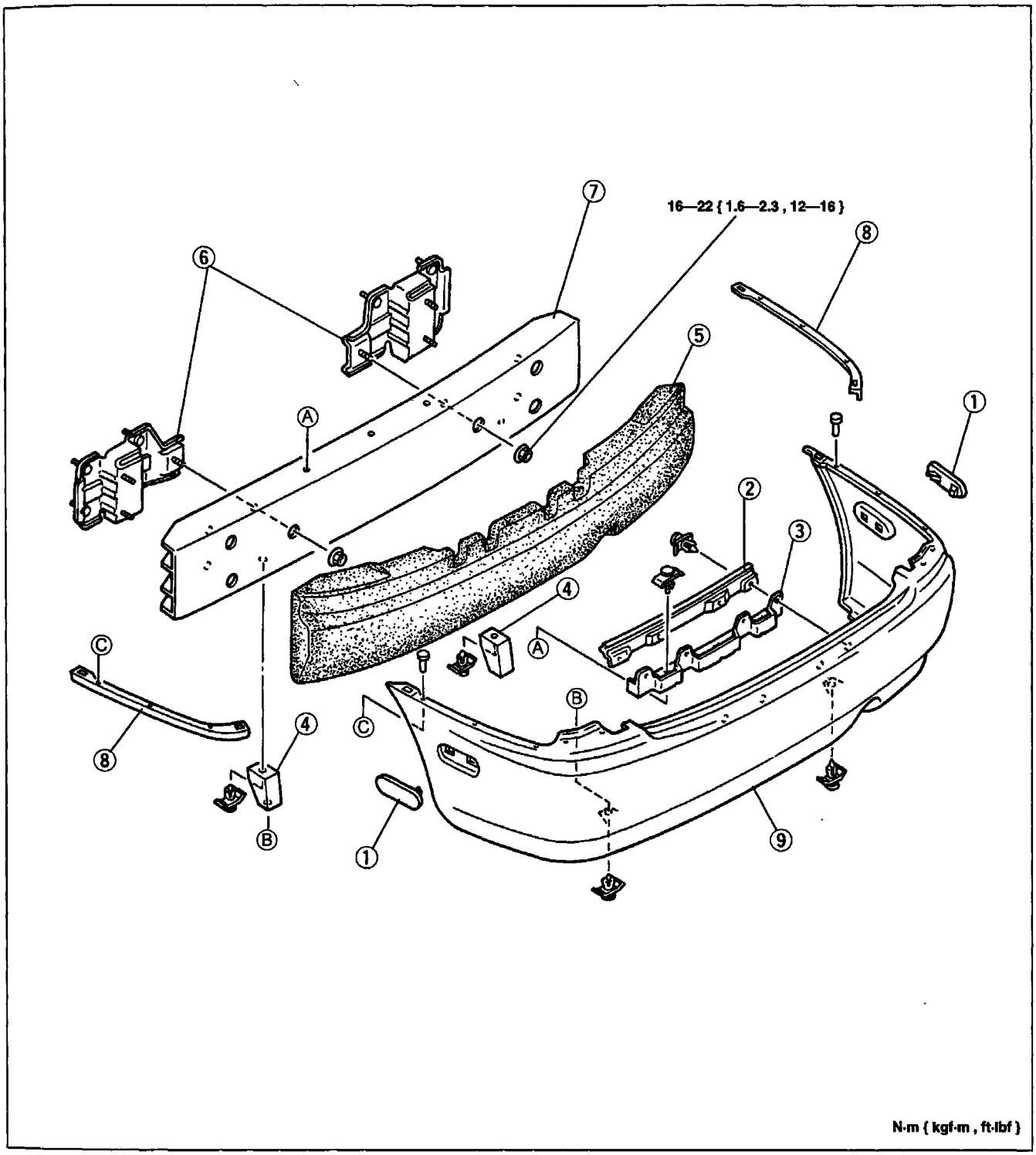
1. Disconnect the negative battery cable.
2. Remove the trunk side trim. (Refer to page S1–113.)
3. Remove the combination lights. (Refer to section T1.)
4. Remove the rear end extension. (Refer to page S1–48.)
5. Remove in the order shown in the figure, referring to **Disassembly note.**
6. Install in the reverse order of removal, referring to **Assembly note.**



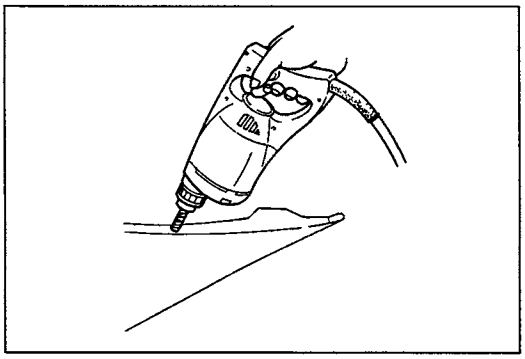
1. Rear flap
2. Splash shield
3. Rear bumper
   Disassembly / Assembly ..... page S1–39

Disassembly / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly note.**
2. Assemble in the reverse order of disassembly, referring to **Assembly note.**



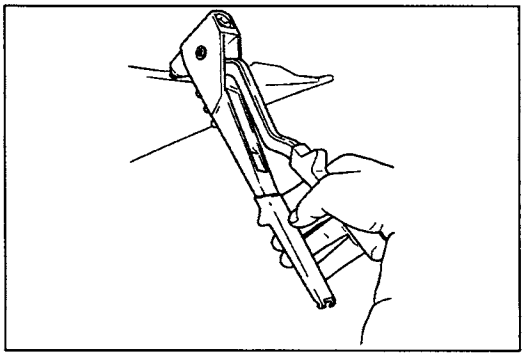
1. Rear side marker
2. Rear bumper retainer
3. Rear bumper bracket
4. Rear bumper bracket
5. Energy-absorbing foam
6. Rear bumper stay
7. Rear bumper reinforcement
8. Rear bumper guard
   - Disassembly note ..... page S1–40
   - Assembly note ..... page S1–40
9. Rear bumper fascia



Disassembly note
Rear bumper guard

Remove the rivets from the rear bumper fascia by using a drill or cutting pliers.

Drill size: ϕ 3.0 mm { ϕ 0.12 in }



Assembly note
Rear bumper guard

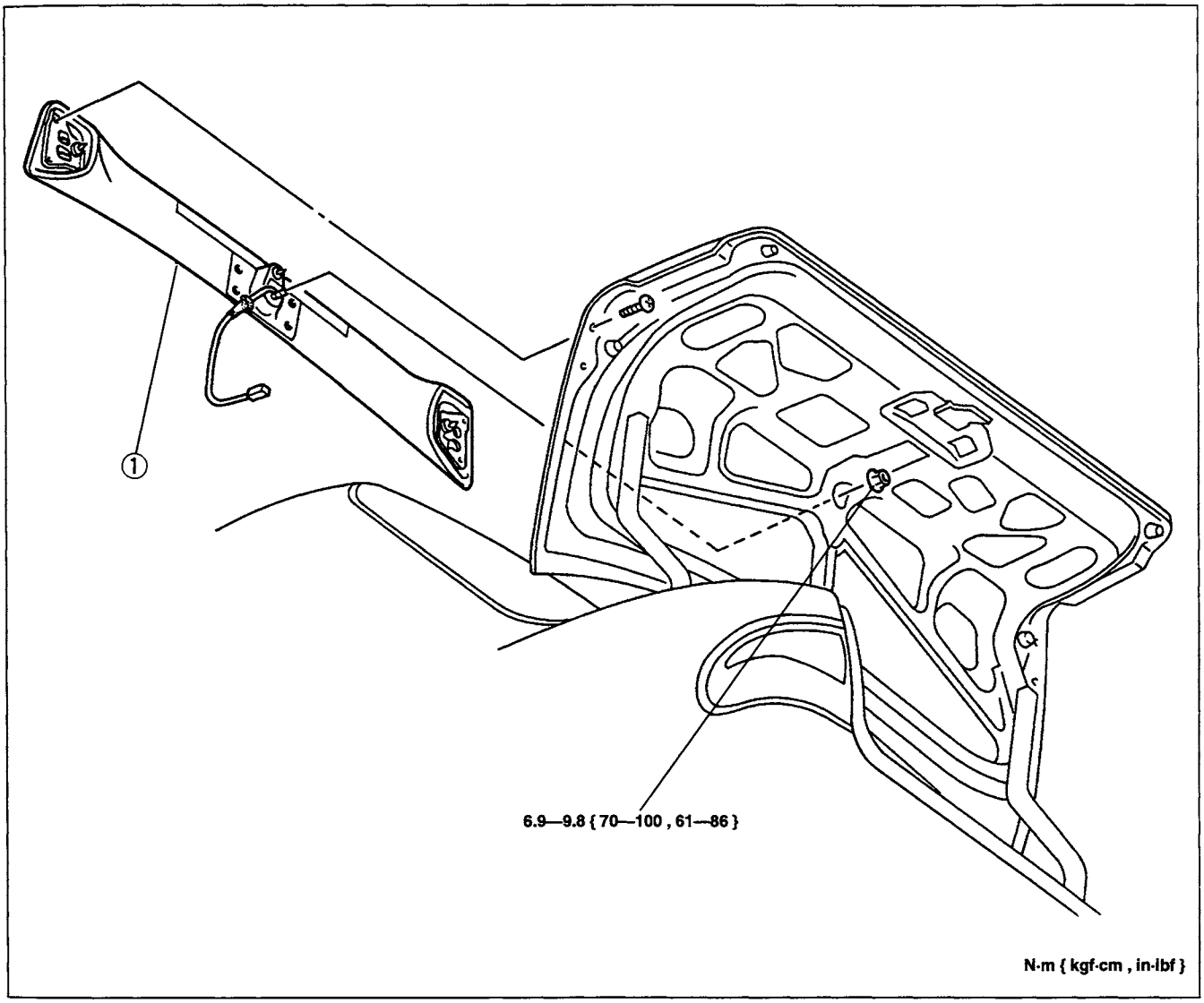
Rivet the rear bumper guard to the rear bumper fascia by using a hand riveter.

SPOILER

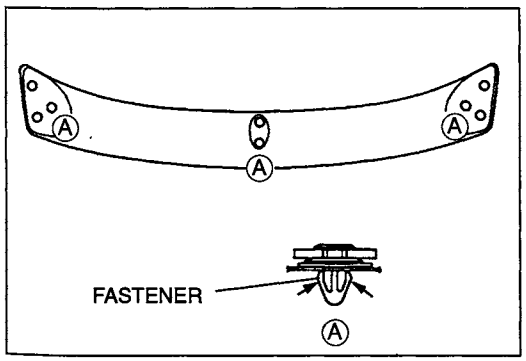
REAR SPOILER

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the trunk lid trim. (Refer to page S1–114.)
3. Remove as shown in the figure, referring to **Removal note.**
4. Install in the reverse order of removal.



1. Rear spoiler
   Removal note ..... below



Removal note

Rear spoiler

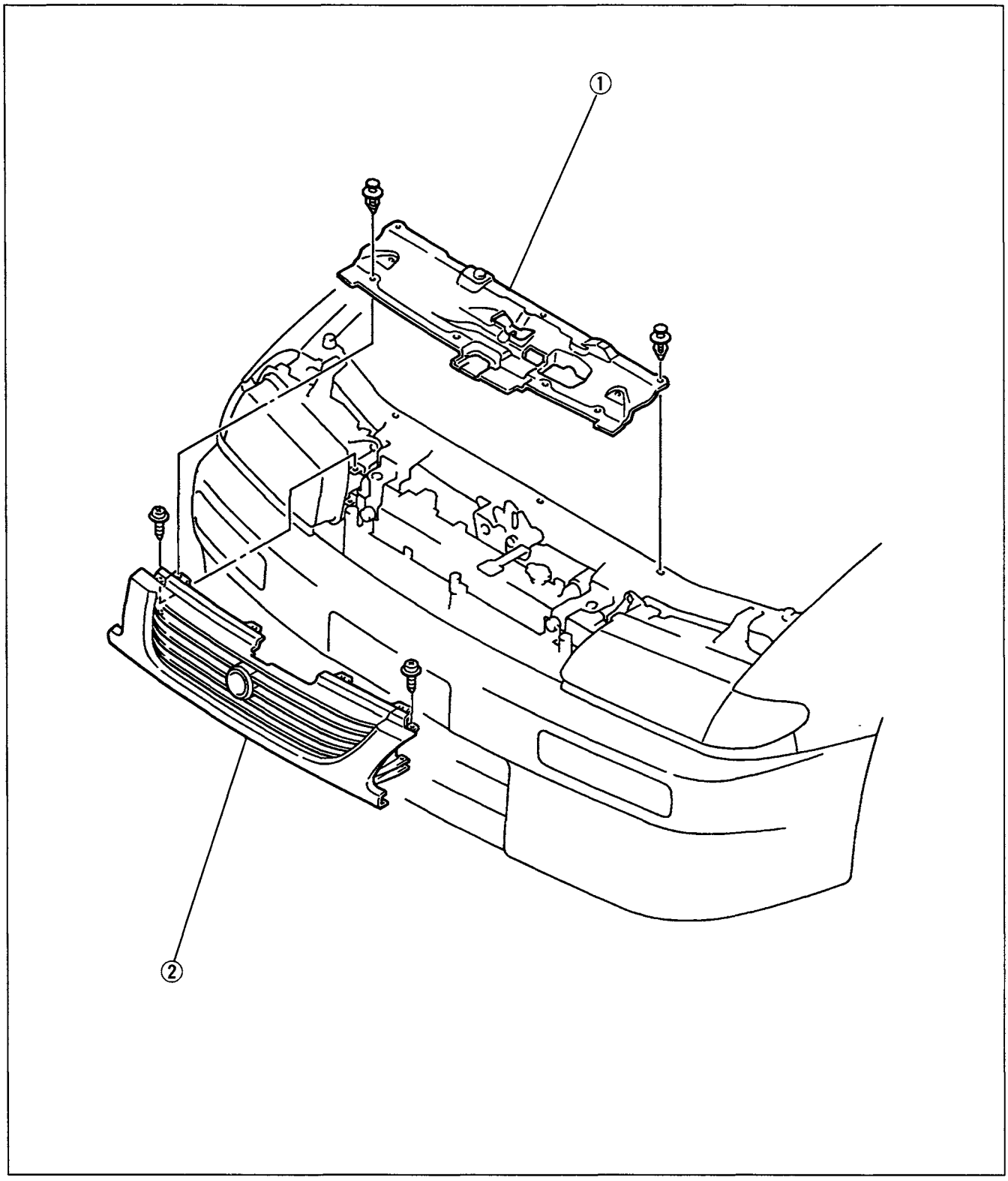
Squeeze the sides of the fastener and pull the rear spoiler upward to disengage the fasteners from the trunk lid.

RADIATOR GRILLE

RADIATOR GRILLE

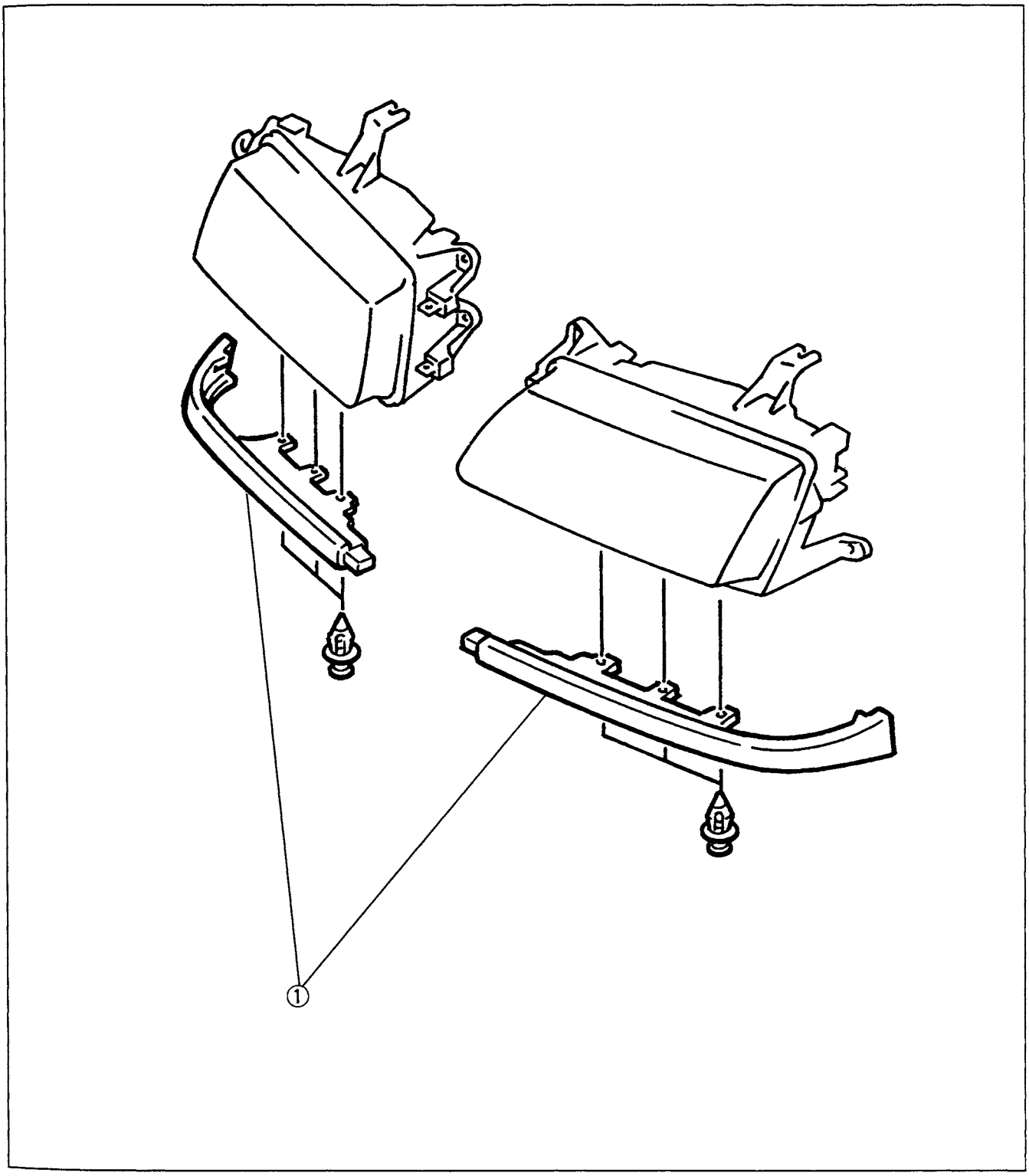
Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



1. Upper seal board
2. Radiator grille

GRILLE LOWER MOLDING
Removal / Installation
1. Disconnect the negative battery cable.
2. Remove the radiator grille. (Refer to page S1–42.)
3. Remove the headlights. (Refer to section T1.)
4. Remove as shown in the figure.
5. Install in the reverse order of removal.



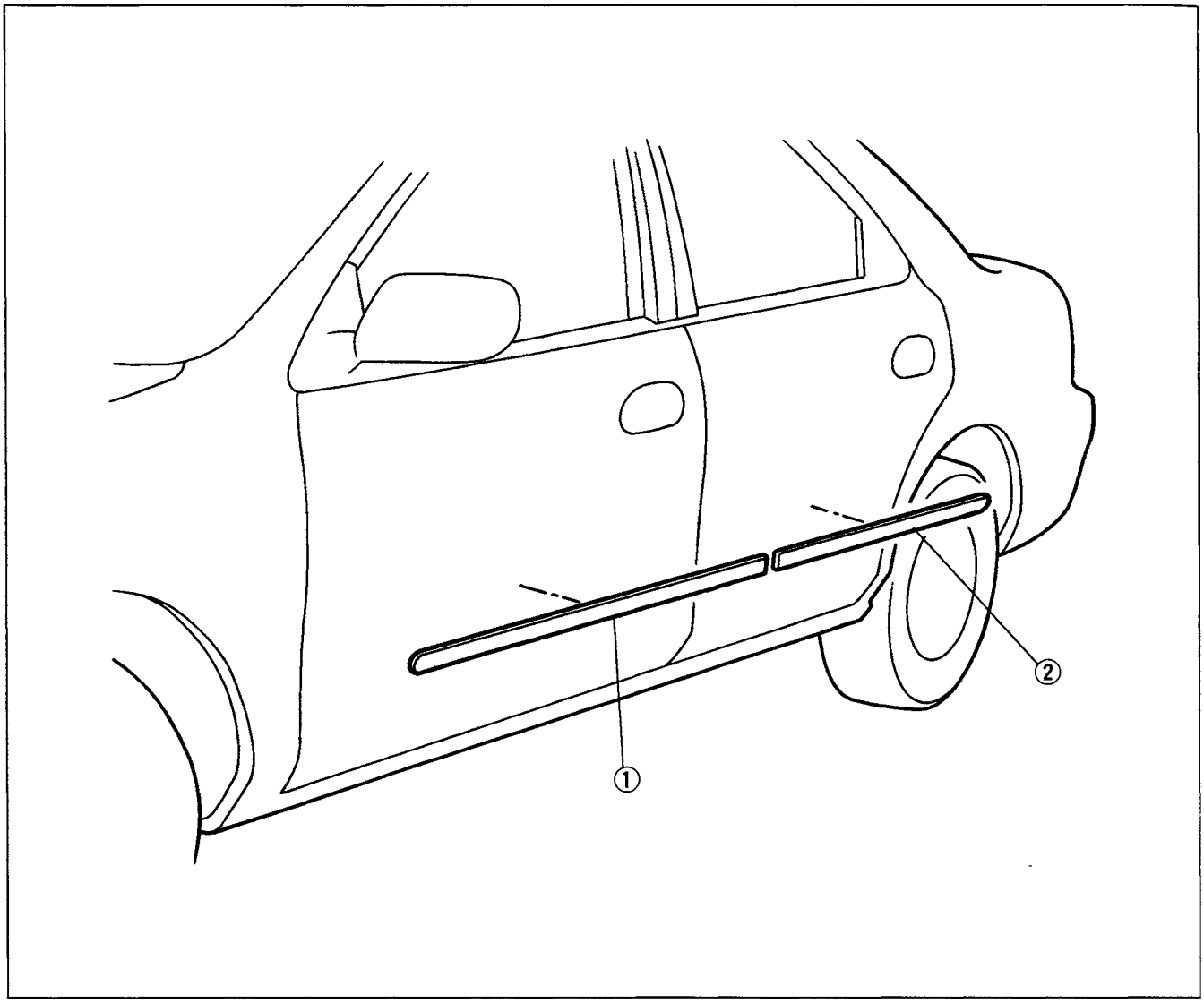
1. Grille lower molding

SIDE GARNISH

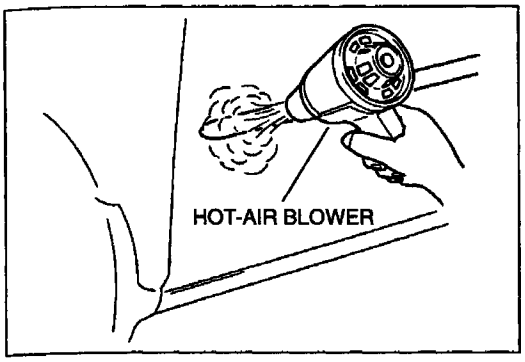
SIDE PROTECTOR

Removal / Installation

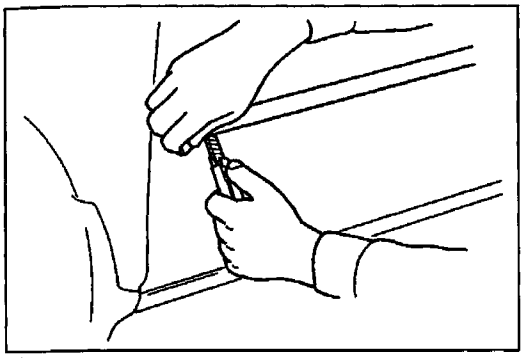
1. Remove in the order shown in the figure, referring to **Removal note**.
2. Install in the reverse order of removal, referring to **Installation note**.



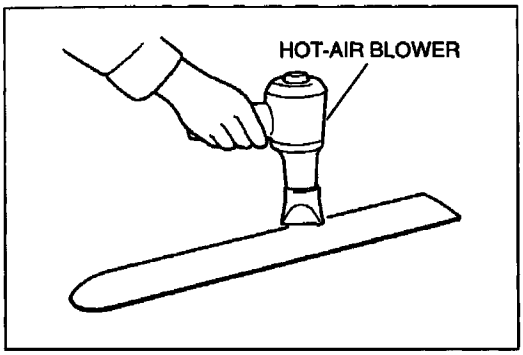
1. Protector No.1
   - Removal note ..... page S1–45
   - Installation note ..... page S1–45
2. Protector No.2
   - Removal note ..... page S1–45
   - Installation note ..... page S1–45



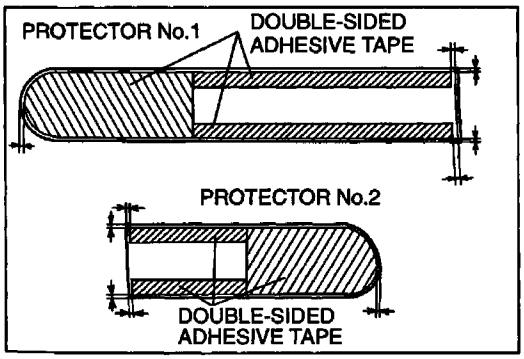
Removal note
Protector No.1, No.2
1. Soften the adhesive by using a hot-air blower.



2. Pry the protector end **20—30 mm { 0.79—1.18 in }** by using a flathead screwdriver or razor knife, being careful not to damage the painted surface.
3. Pull the separated portion to remove the protector.

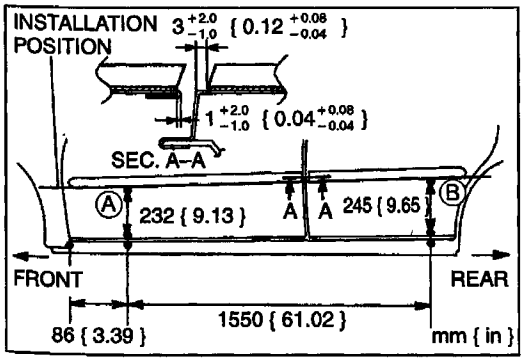


Installation note
Protector No.1, No.2
1. Use a razor knife to remove the adhesive remaining on the body and protector (if the protector will be reused). Remove as much adhesive as possible without damaging the painted surface. If the adhesive is difficult to remove, soften it with a hot-air blower.



2. Remove any grease or dirt from the adhesion surface of the protector (if the protector will be reused) and body.
3. Attach double-sided adhesive tape to the protector as shown (if the protector will be reused).

Clearance: 2 ± 1.0 mm { 0.08 ± 0.04 in }

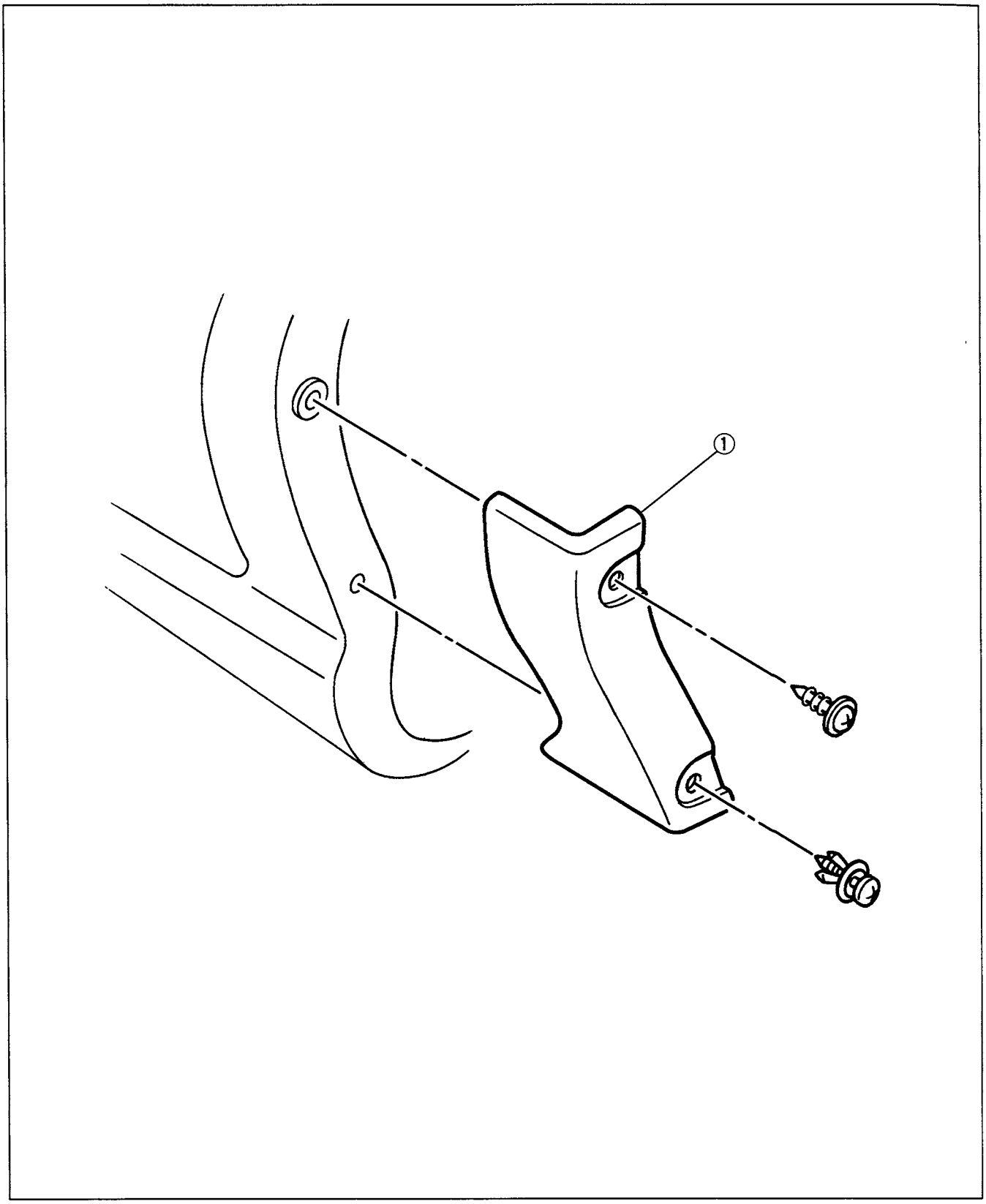


4. Draw a straight line along points Ⓐ and Ⓑ and mark the installation position by using masking tape.

Note
- Adhesion conditions deteriorate if air temperature is below **20 °C { 68 °F }**. If this occurs, heat the body before installing the protector.

5. Align the protector on the body and attach it securely.

STONE GUARD
Removal / Installation
1. Remove as shown in the figure.
2. Install in the reverse order of removal.



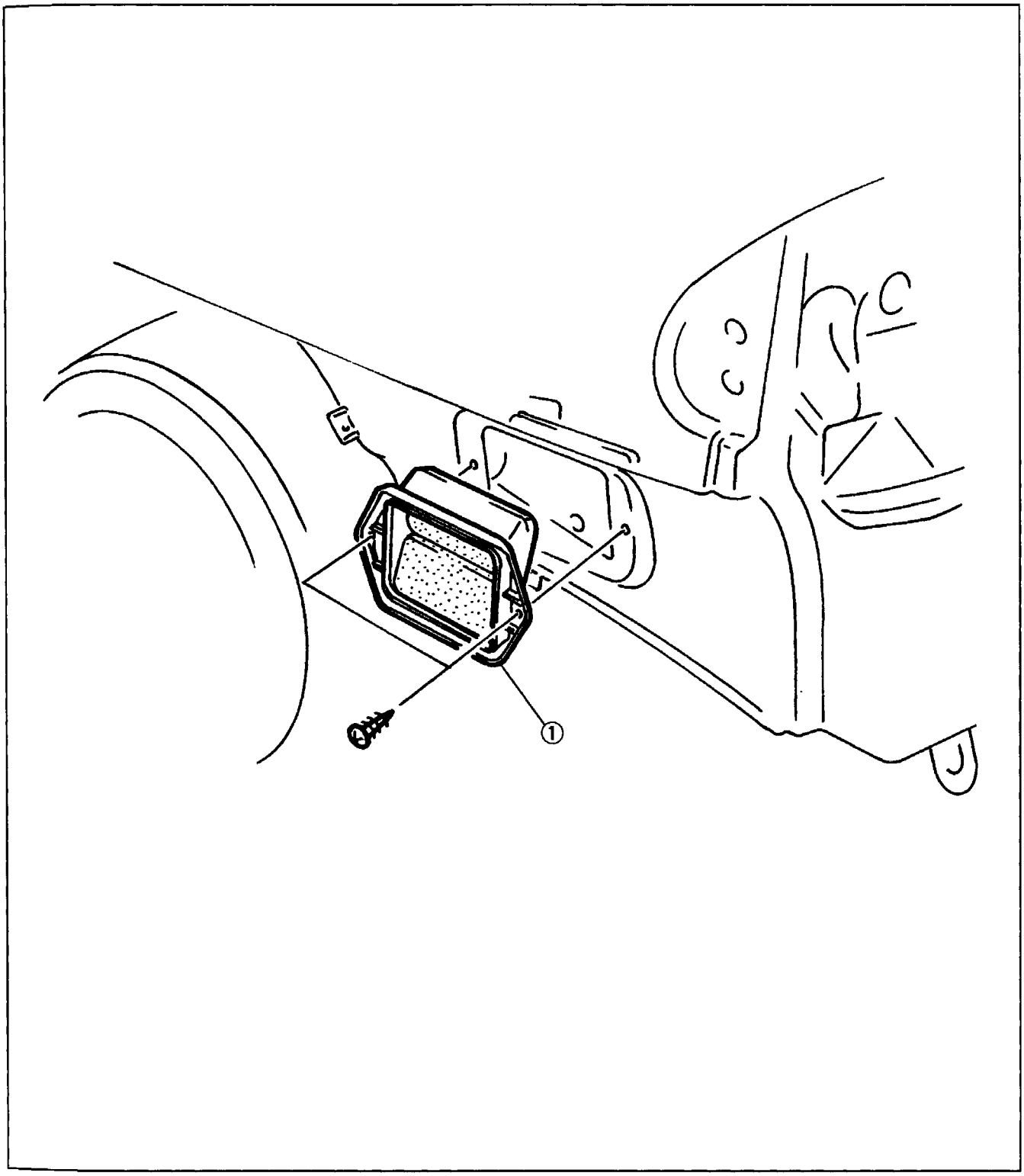
1. Stone guard

EXTRACTOR CHAMBER

EXTRACTOR CHAMBER

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the rear bumper. (Refer to page S1–38.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



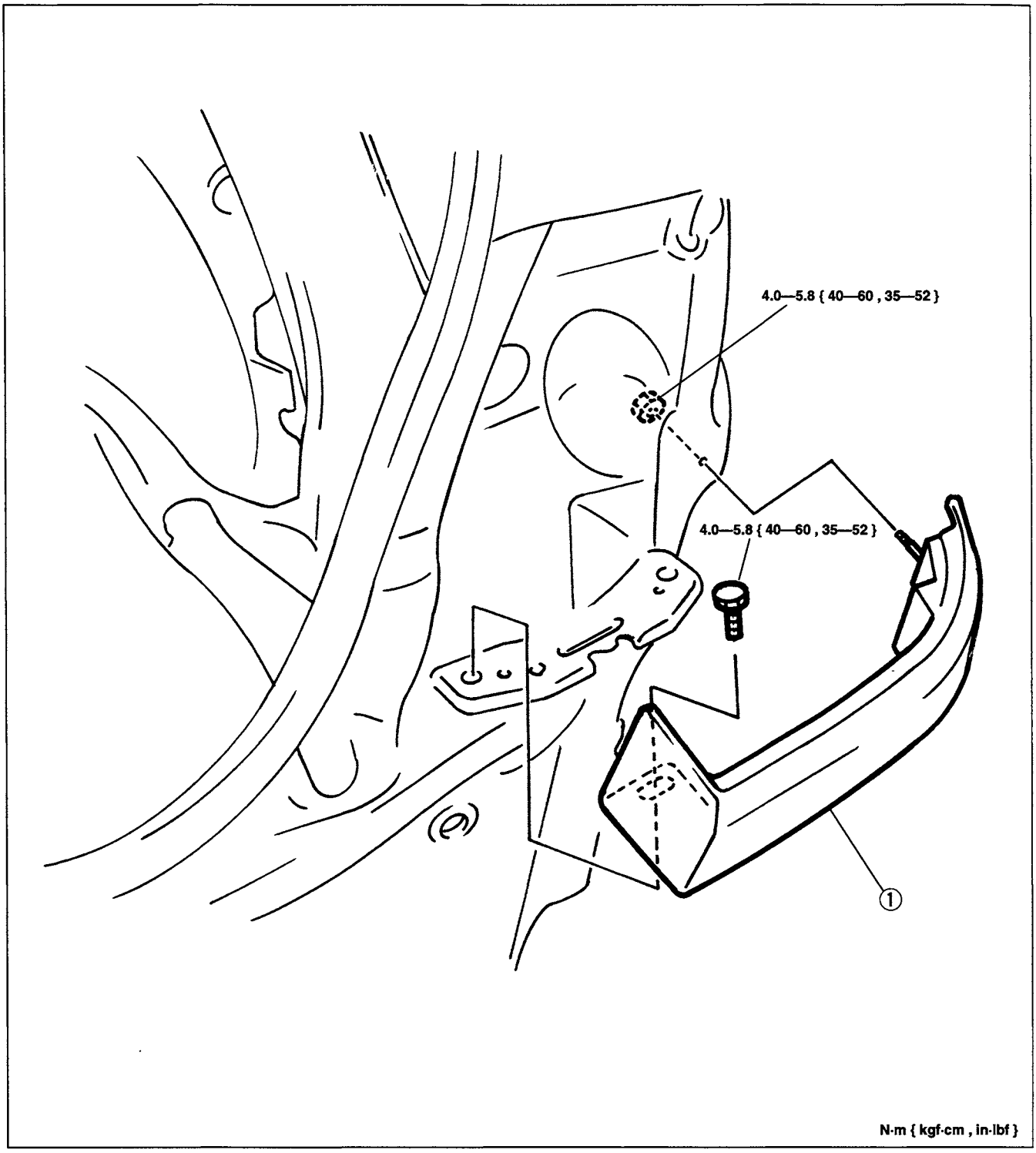
1. Extractor chamber

REAR FINISHER

REAR END EXTENSION

Removal / Installation

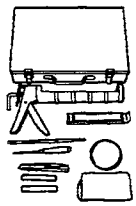
1. Disconnect the negative battery cable.
2. Remove the trunk side trim. (Refer to page S1–113.)
3. Remove the combination lights. (Refer to section T1.)
4. Remove as shown in the figure.
5. Install in the reverse order of removal.



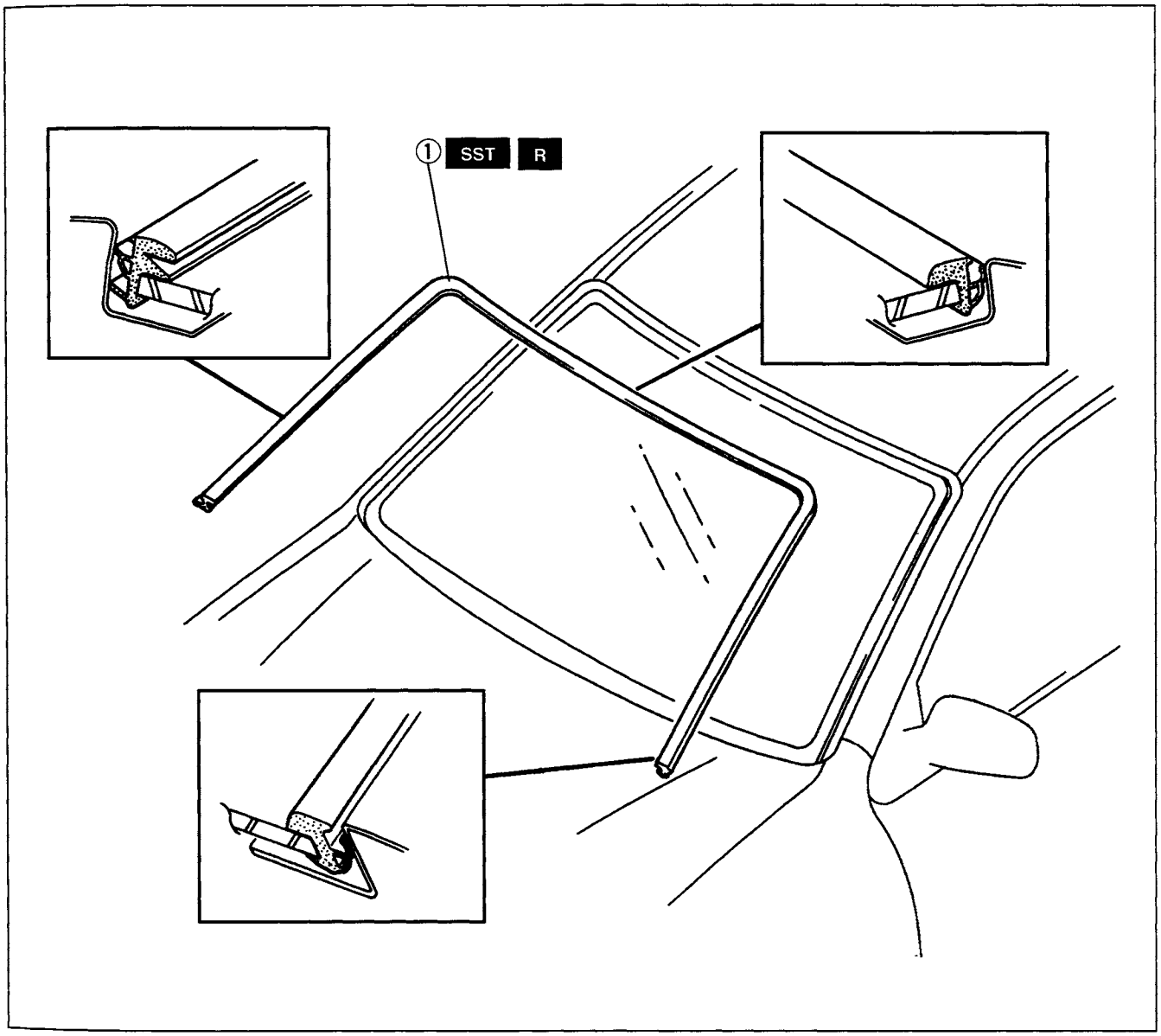
1. Rear end extension

MOLDING

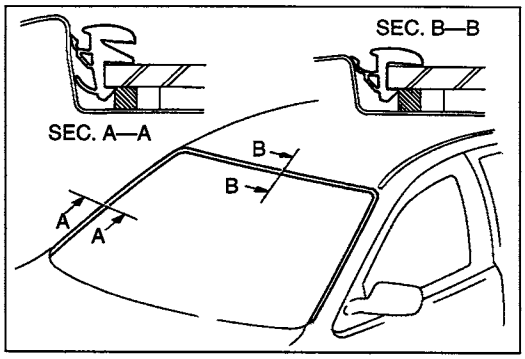
PREPARATION
SST

49 0305 870A Tool set, window		For installation of molding	49 G050 1A0 Remover, sealant 	For removal of sealant

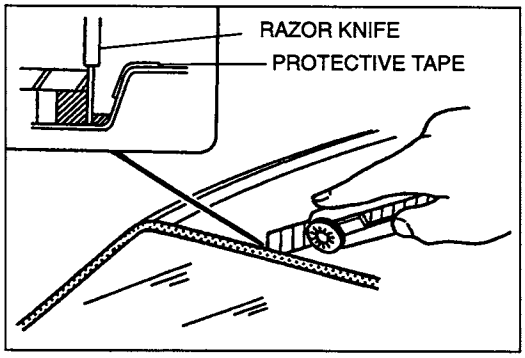
WINDSHIELD MOLDING
Removal
1. Disconnect the negative battery cable.
2. Remove the cowl grille. (Refer to page S1–58.)
3. Remove as shown in the figure, referring to **Removal note**.



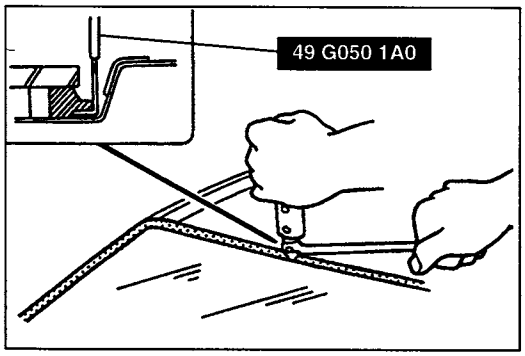
1. Windshield molding
   Removal note ..... page S1–50



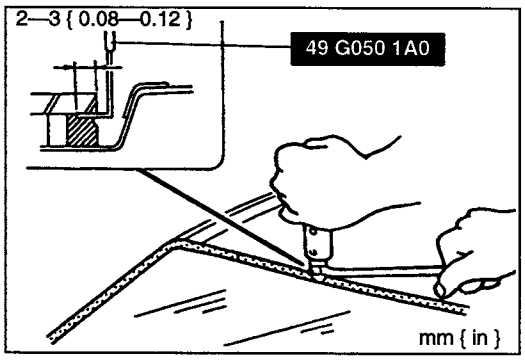
Removal note
Windshield molding
The upper molding is attached to the windshield by sealant as shown.



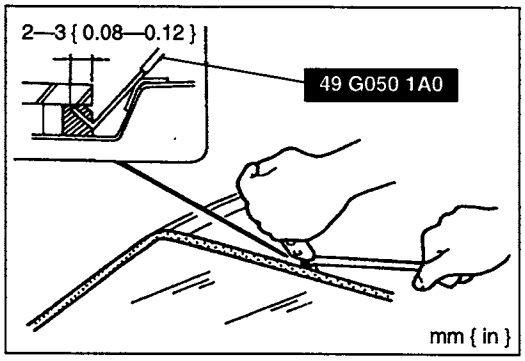
Installation
1. Apply protective tape along the edge of the body to protect it from damage.
2. Cut the sealant by using a razor knife as shown.



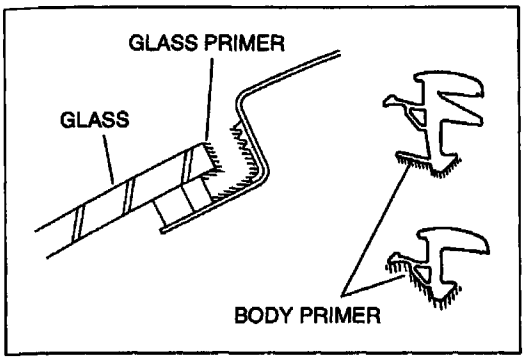
3. Insert the blade of the **SST** into the sealant, and pull on the bar to cut the sealant near the body as shown.



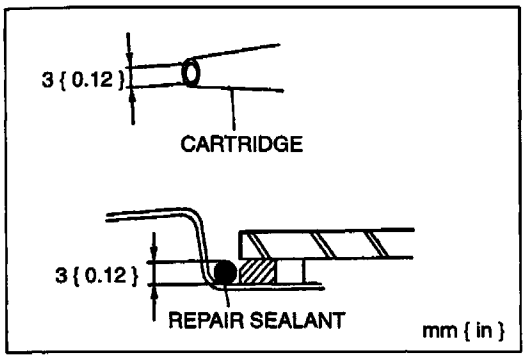
4. Insert the blade of the **SST** into the sealant, and pull on the bar to cut the sealant near the glass as shown.



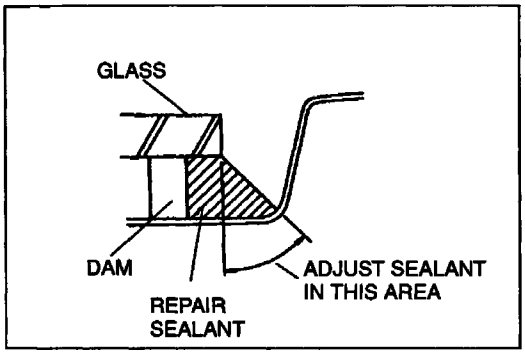
5. Remove as much sealant as possible from between the body and the glass.
6. Carefully clean around the edge of the glass and the adhesion surface of the body.



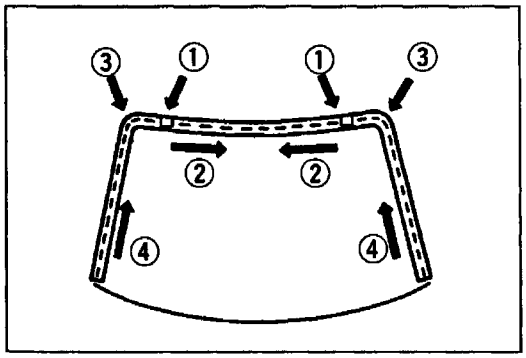
7. Apply primer onto the bonding area of the glass, body, and new windshield molding by using a brush. Use only glass primer on the glass and body primer on the body and molding. Keep the area free of dirt and grease, and do not touch the surface. Allow the primer to dry for approximately **30 minutes**.



8. Apply a **3 mm { 0.12 in }** bead of repair sealant between the glass and the body.



9. Reshape the repair sealant as shown if necessary.



10. Install the windshield molding before the sealant has hardened.
    (1) Align the marks on the molding to the roof inner line.
    (2) Install the upper part of the molding.
    (3) Install the corner part of the molding.
    (4) Install the side parts of the molding, starting from the bottom and then toward the top.

Hardening time of repair sealant

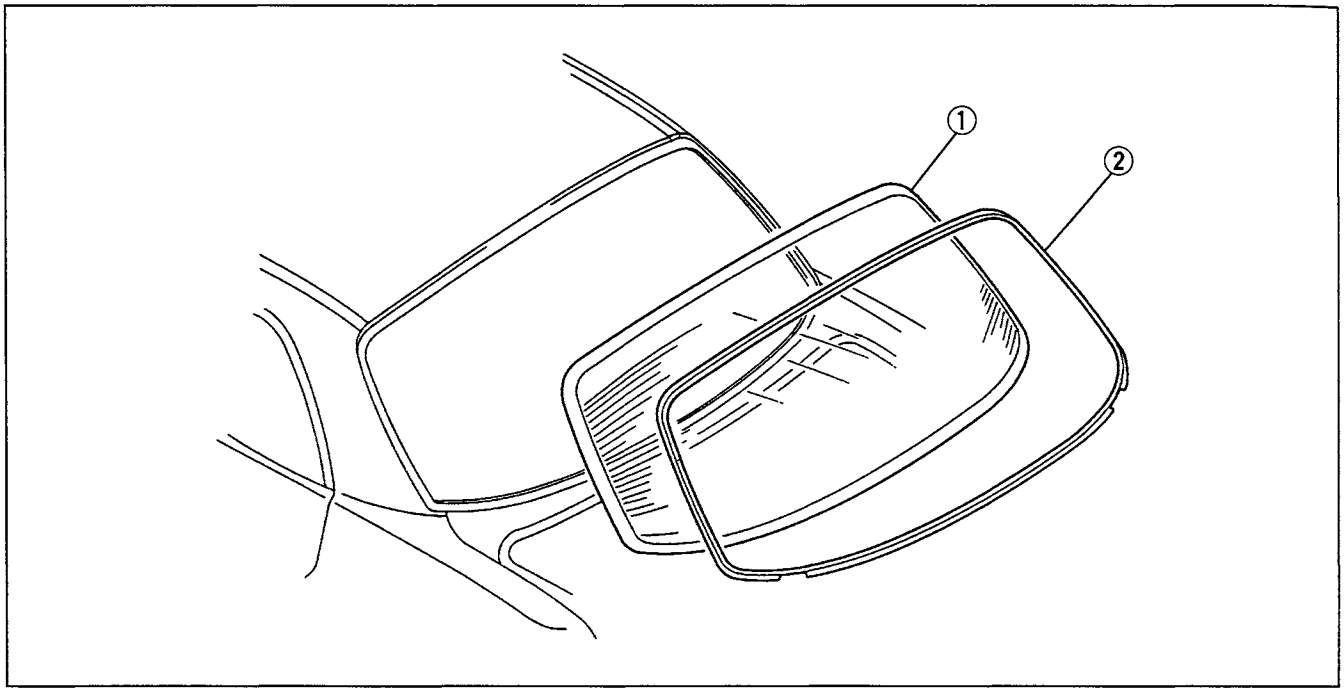
Temperature	Surface hardening time	Time required until car can be put into service
5 °C { 41 °F }	Approx. 1.5 hr	12 hr
20 °C { 68 °F }	Approx. 1 hr	4 hr
35 °C { 95 °F }	Approx. 10 min	2 hr

11. Check for water leaks. If a leak is found, wipe the water off well and repeat the installation.

REAR WINDOW MOLDING

Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.

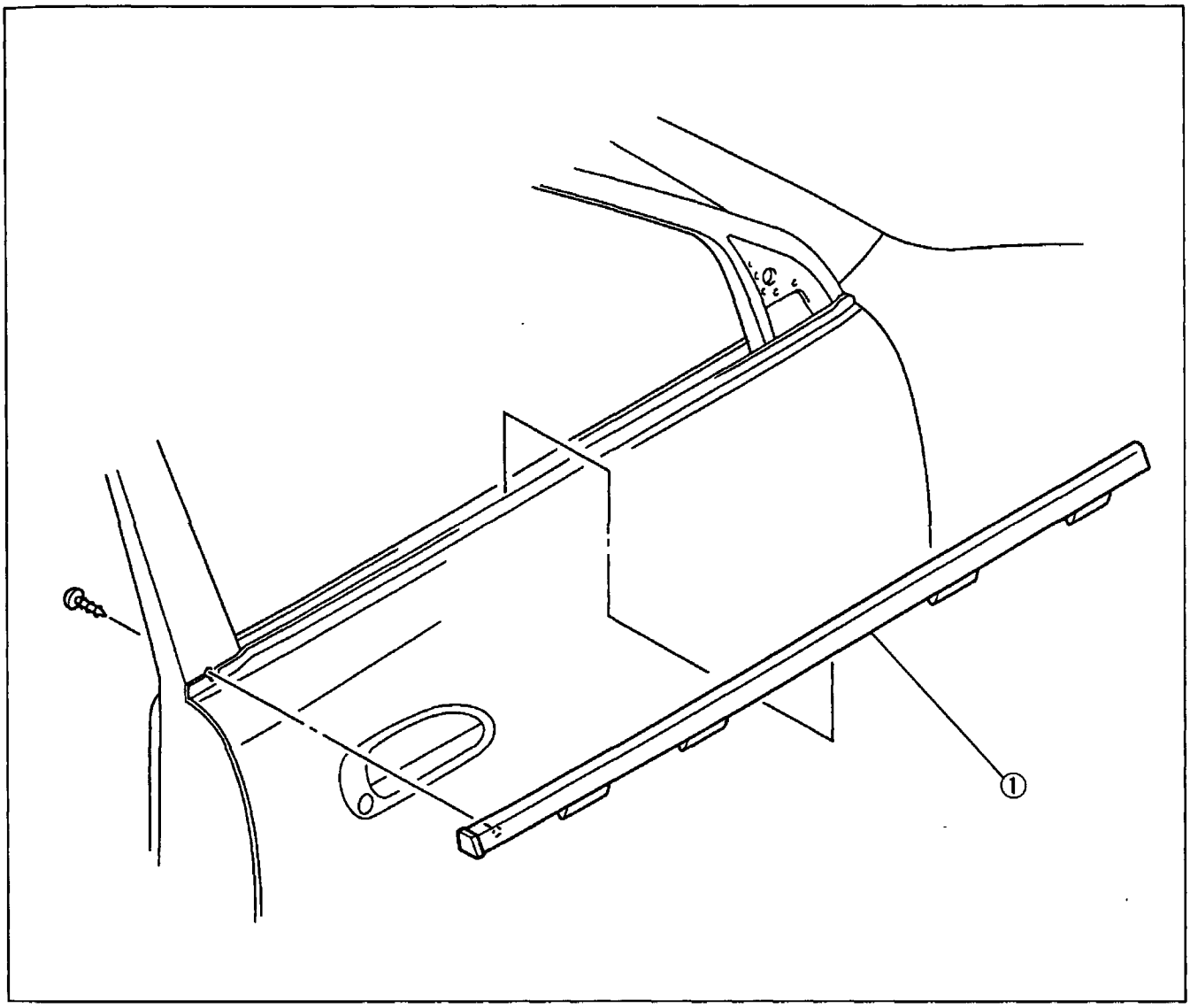


1. Rear window glass
   Removal ..... page S1–71
   Installation ..... page S1–73
2. Rear window molding

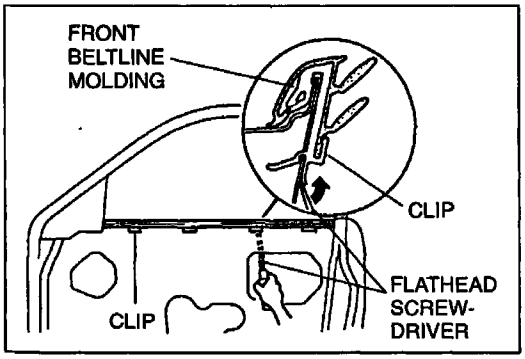
FRONT BELTLINE MOLDING

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the power outside mirror. (Refer to page S1–59.)
3. Remove the front door glass. (Refer to page S1–12.)
4. Remove as shown in the figure, referring to **Removal note**.
5. Install in the reverse order of removal.



1. Front beltline molding
   Removal note ..... below



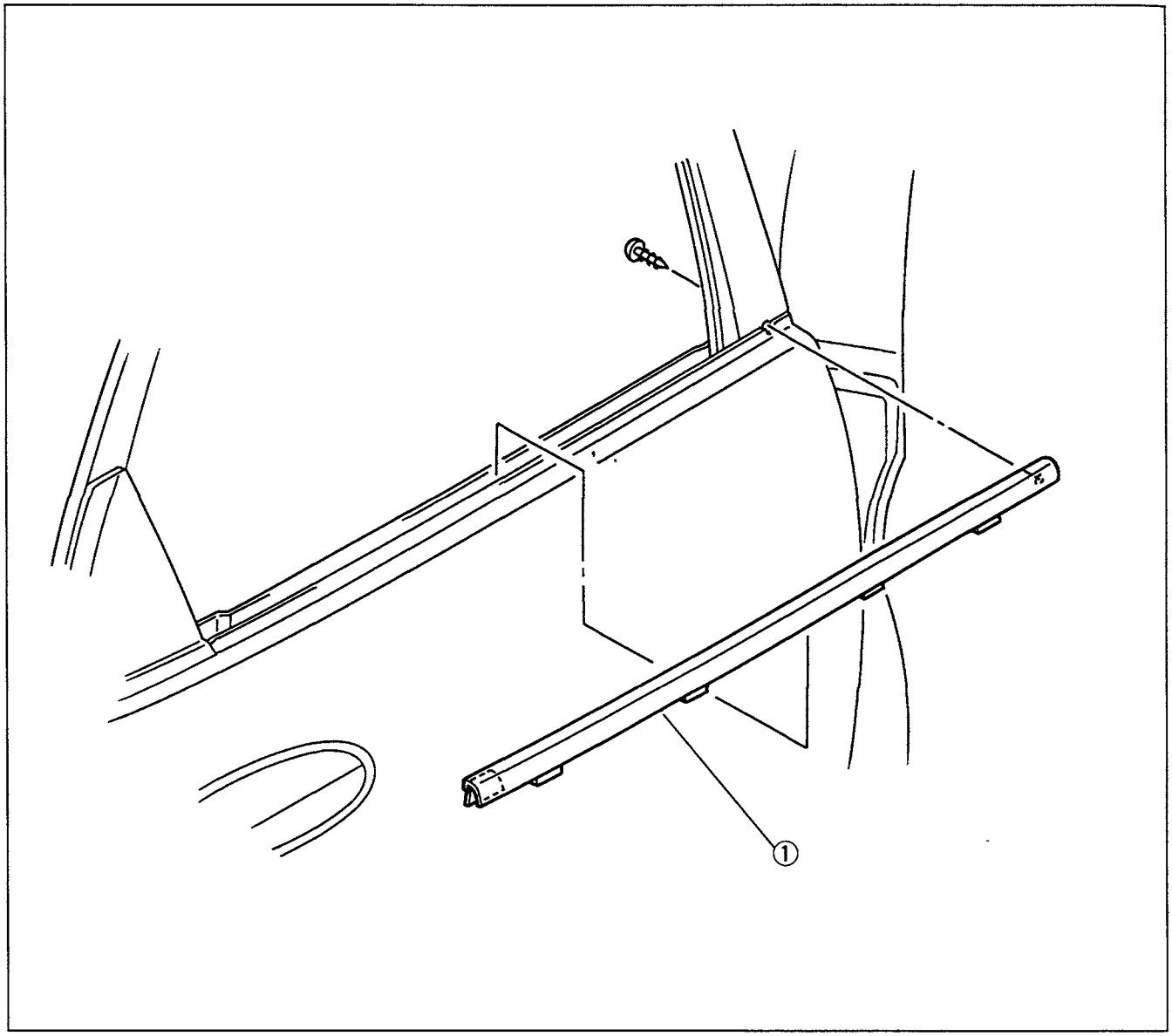
Removal note
Front beltline molding

1. Remove the installation screw.
2. Insert a flathead screwdriver which has been wrapped in tape under the clip as shown.
3. Lift the screwdriver and pull up on the molding to remove it.

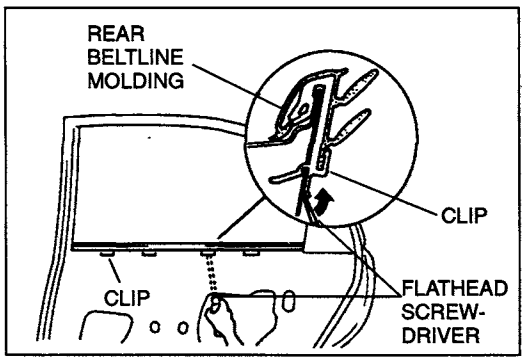
REAR BELTLINE MOLDING

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the rear door glass. (Refer to page S1–14.)
3. Remove as shown in the figure, referring to **Removal note**.
4. Install in the reverse order of removal.



1. Rear beltline molding
   Removal note ..... below



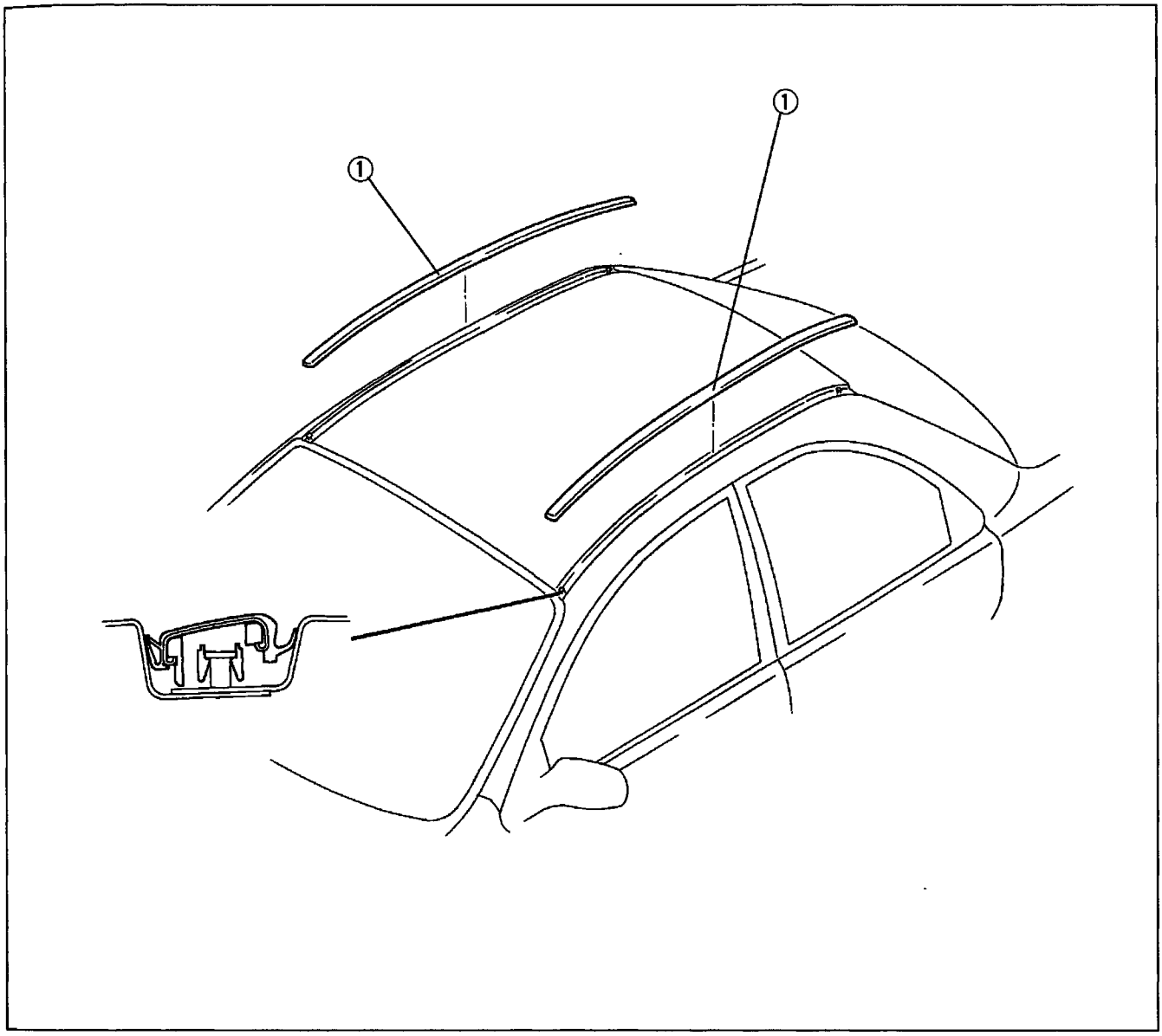
Removal note
Rear beltline molding

1. Remove the installation screw.
2. Insert a flathead screwdriver which has been wrapped in tape under the clip as shown.
3. Lift the screwdriver and pull up on the molding to remove it.

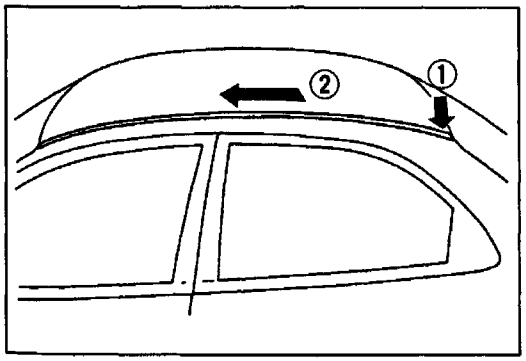
ROOF MOLDING

Removal / Installation

1. Remove as shown in the figure.
2. Install in the reverse order of removal, referring to **Installation note.**



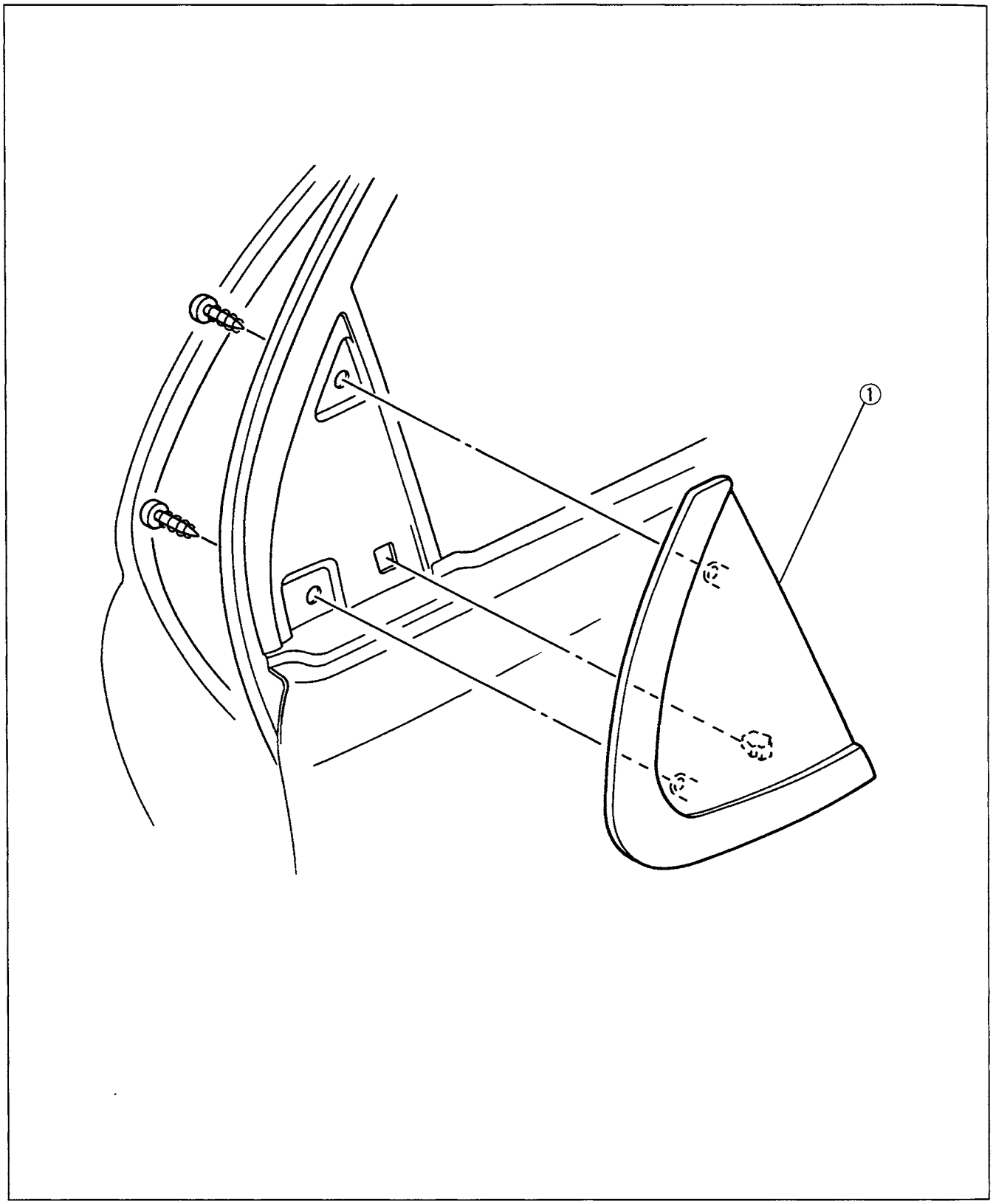
1. Roof molding
   Installation note ..... below



Installation note
Roof molding

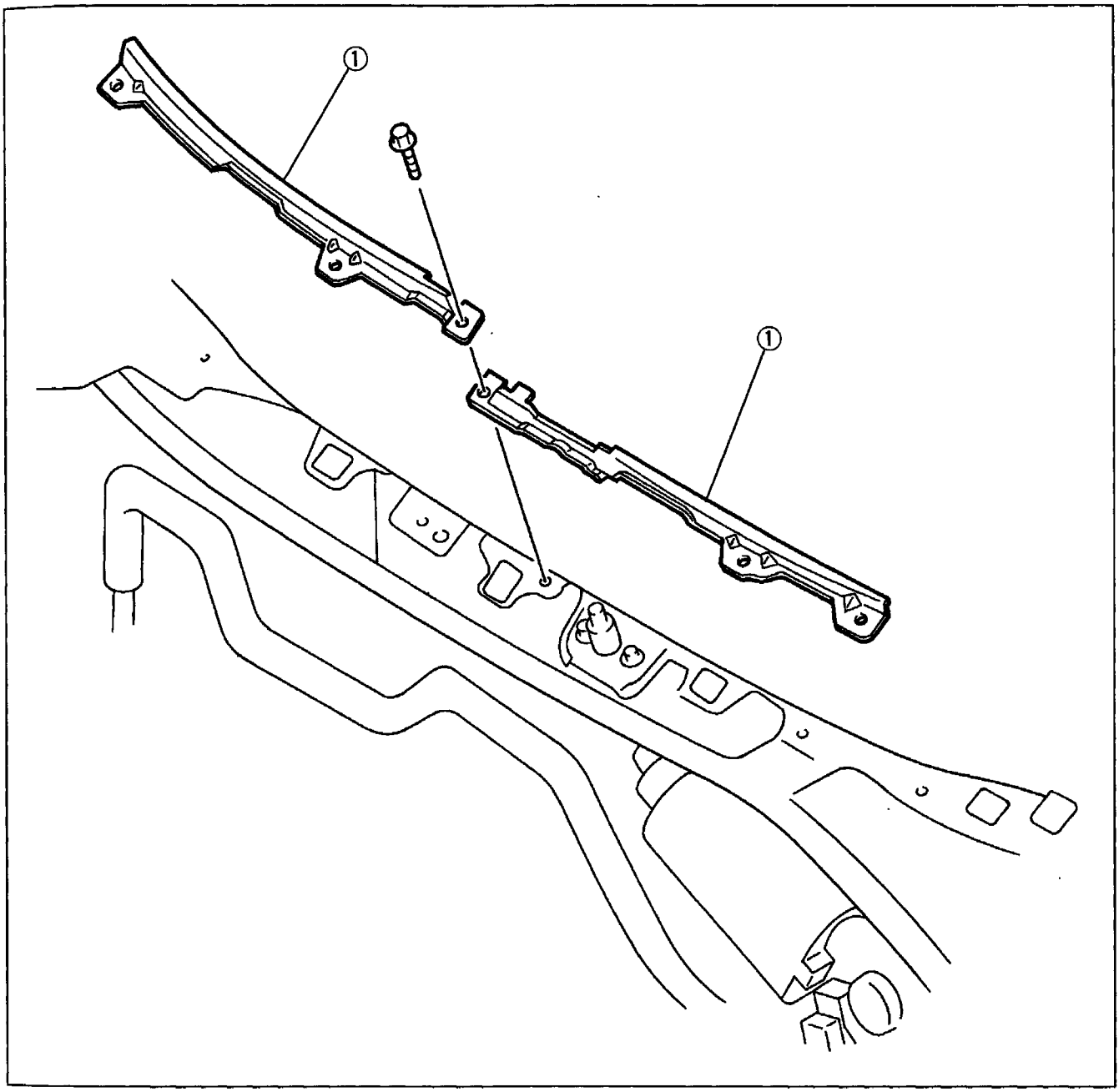
1. Locate the roof molding based on the rear end clip and press it. (①)
2. Install the roof molding pushing it down from rear toward front end. (②)

DOOR GARNISH
Removal / Installation
1. Remove the rear beltline molding. (Refer to page S1–54.)
2. Remove as shown in the figure.
3. Install in the reverse order of removal.



1. Door garnish

GLASS STOPPER
Removal / Installation
1. Disconnect the negative battery cable.
2. Remove the cowl grille. (Refer to page S1–58.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



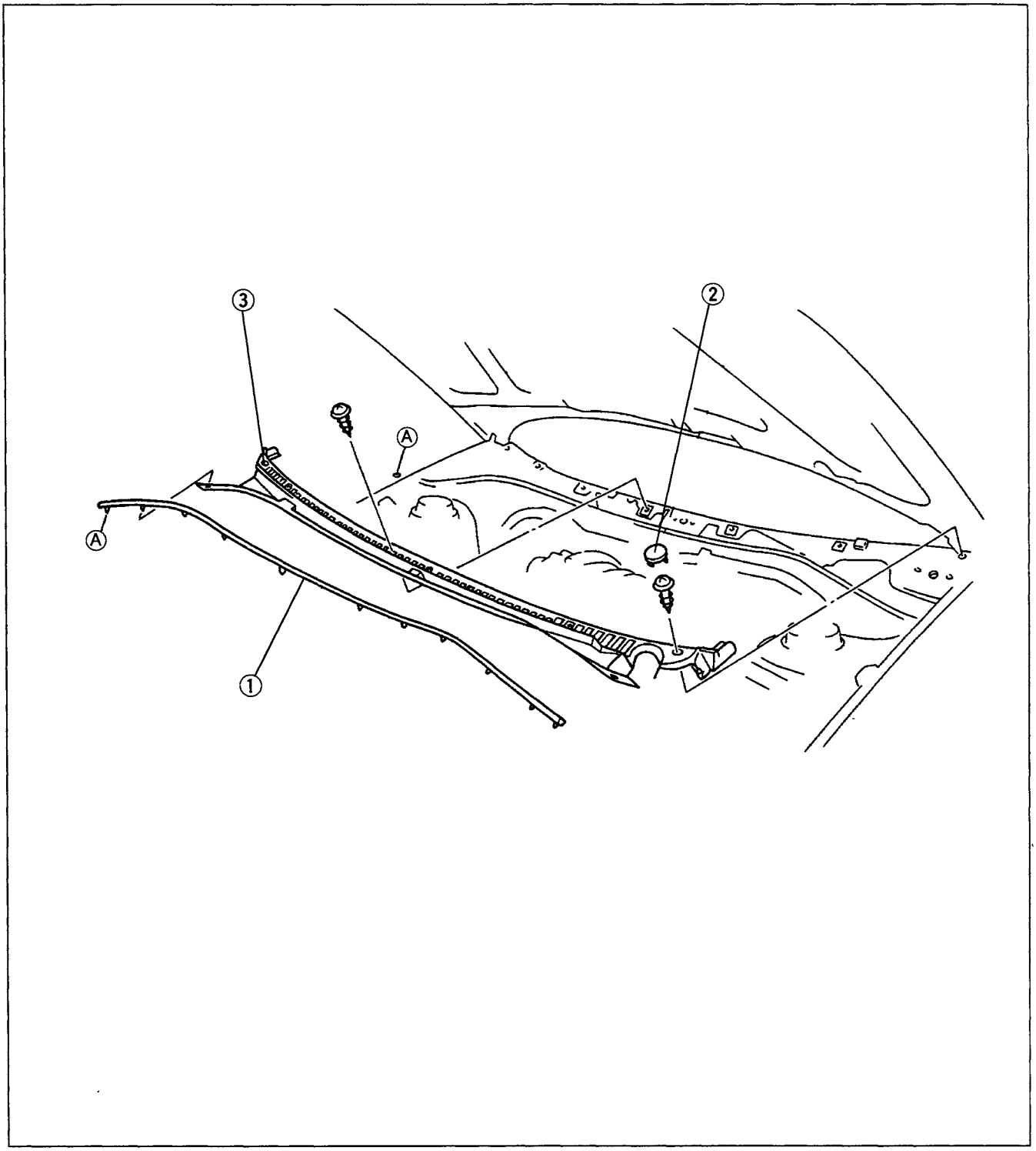
1. Glass stopper

COWL GRILLE

COWL GRILLE

Removal / Installation

1. Remove the windshield wiper arms. (Refer to section T1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



1. Cowl seal weatherstrip
2. Cowl cap
3. Cowl grille

OUTSIDE MIRROR

OUTSIDE MIRROR

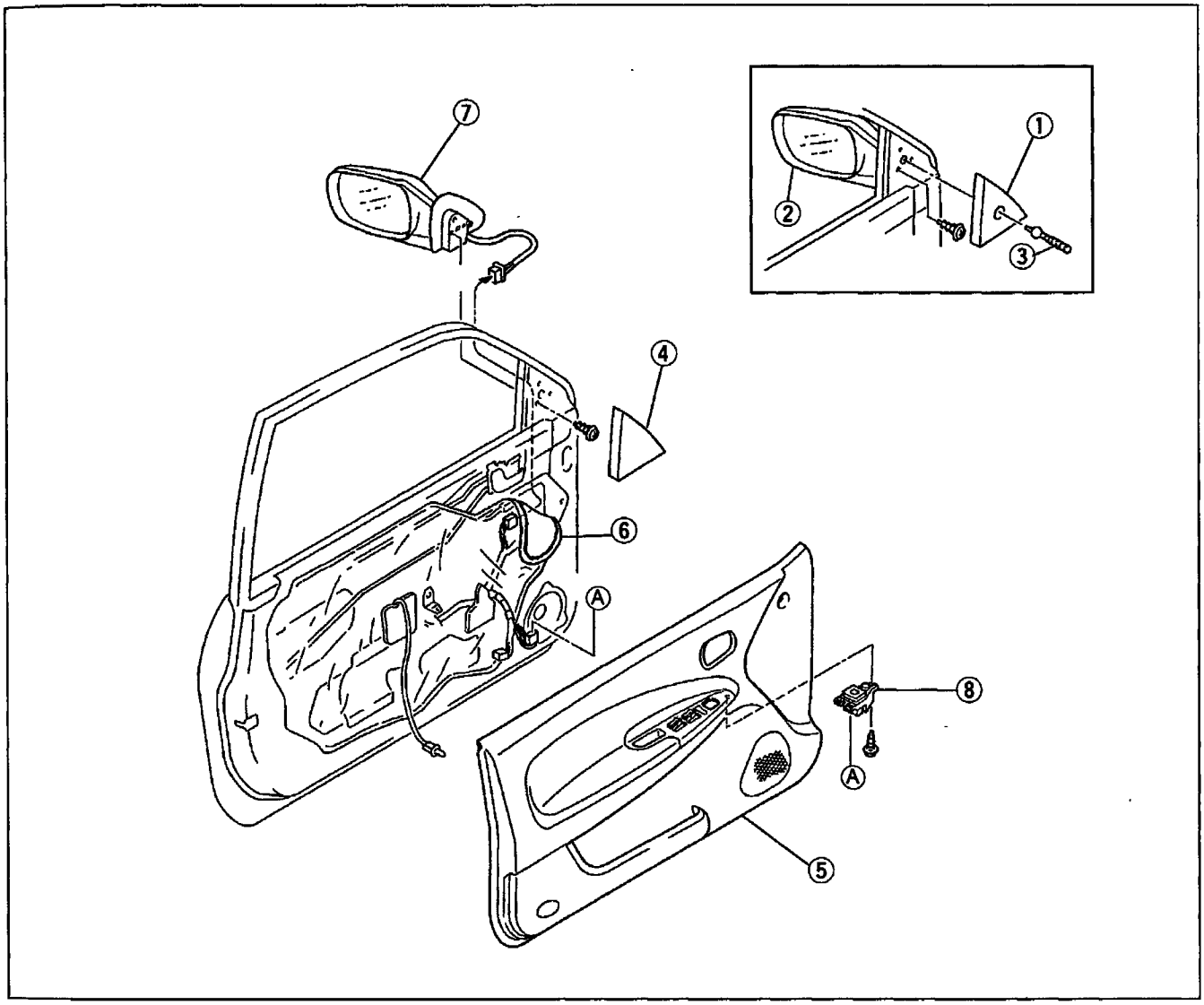
Removal / Installation

1. Disconnect the negative battery cable if equipped with a power outside mirror.

Note

- Remove the door screen carefully so that it may be reused.

2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



Manual outside mirror

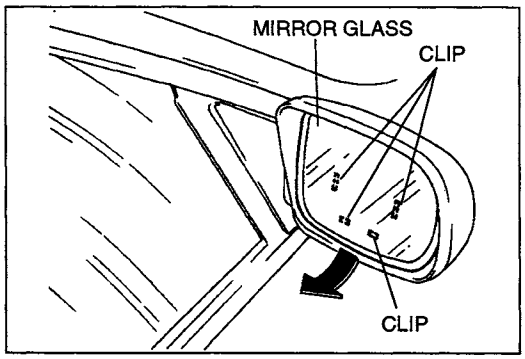
1. Inner garnish
2. Manual outside mirror
   Replacement of mirror glass . page S1– 60
3. Knob

Power outside mirror

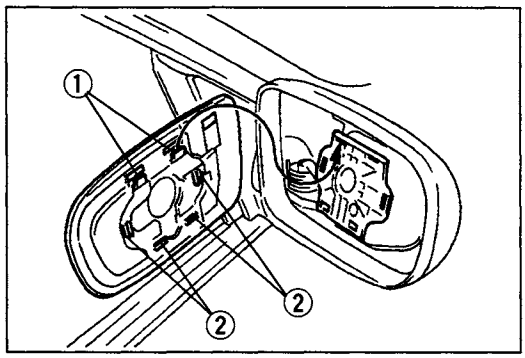
4. Inner garnish
5. Front door trim
   Removal / Installation ..... page S1–107
6. Door screen
7. Power outside mirror
   Replacement of mirror glass . page S1– 60
   Inspection ..... page S1– 61

Power outside mirror switch

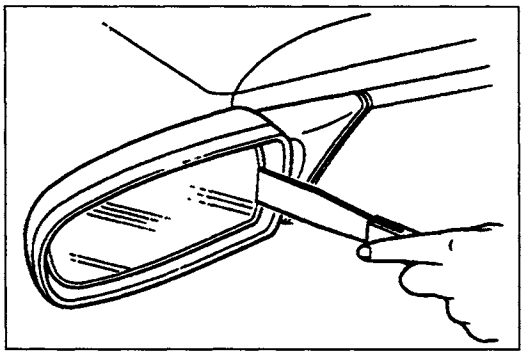
5 Front door trim
   Removal / Installation ..... page S1–107
8. Power outside mirror switch
   Inspection ..... page S1– 61



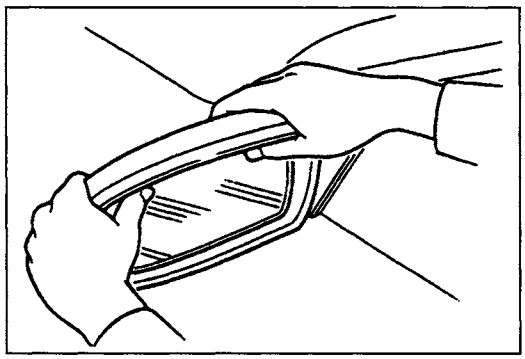
Replacement of Mirror Glass
(Power outside mirror)
Removal
1. Push the top of the mirror glass.
2. Pull the bottom of the mirror glass and remove the mirror glass from the frame.



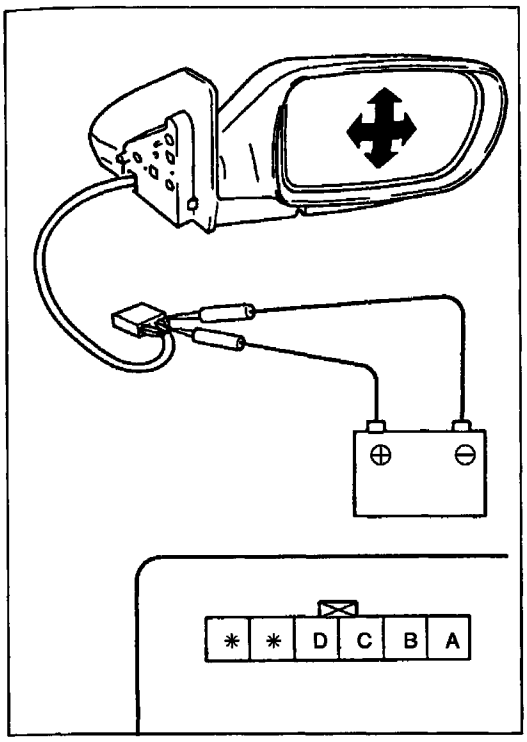
Installation
1. Hook the top of the mirror glass onto the frame.
2. Press the sides and bottom of the mirror glass onto the frame.



(Manual outside mirror)
Removal
1. Warm the frame and the mirror glass by using a hot-air blower.
2. Insert a scraper between the mirror glass and the frame, and pry the glass loose.
3. Remove the remaining adhesive.



Installation
1. Warm the adhesive surface of the frame and the mirror by using a hot-air blower. If the frame is stained with oil, degrease it.
2. Peel off the wax paper from the double-sided adhesive tape on the rear side of the new mirror glass.
3. Install the glass in the mirror frame and gently press it in to secure it.



POWER OUTSIDE MIRROR

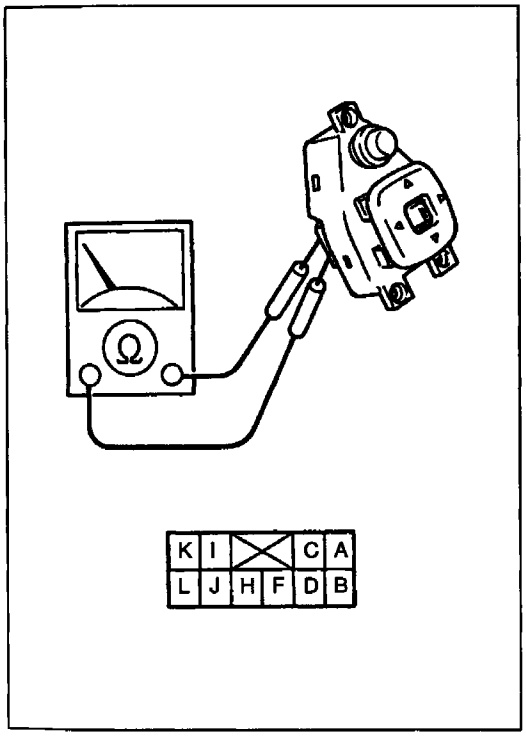
Inspection

1. Remove the power outside mirror. (Refer to page S1–59.)
2. Apply battery positive voltage and check the operation of the power outside mirror.

B+: Battery positive voltage

Connection		Mirror operation
B+	GND	
A	B	Up
B	A	Down
B	C	Left
C	B	Right

3. If not as specified, replace the power outside mirror.



POWER OUTSIDE MIRROR SWITCH

Inspection

1. Remove the power outside mirror switch. (Refer to page S1–59.)
2. Check for continuity between the switch terminals.

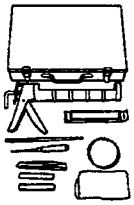
Switch position \ Terminal		D	F	H	I	J	K	L
Left	UP	○	○	○	○			○
	DOWN	○	○	○	○			
	LEFT	○	○	○				○
	RIGHT	○	○	○	○			○
Right	UP	○	○		○	○	○	
	DOWN	○	○		○	○		
	LEFT	○	○			○	○	
	RIGHT	○	○		○	○	○	

○—○: Continuity

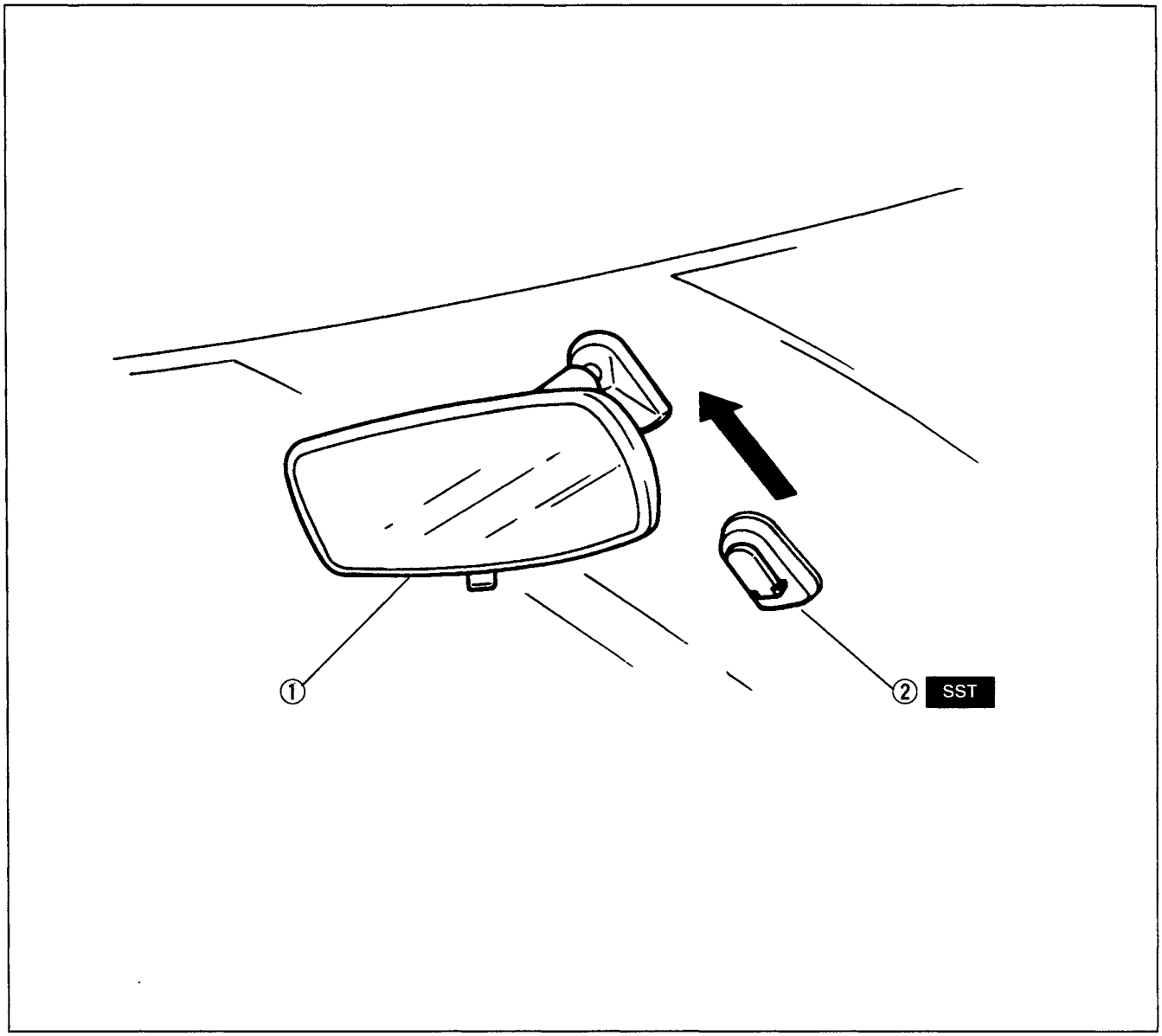
3. If not as specified, replace the power outside mirror switch.

REARVIEW MIRROR

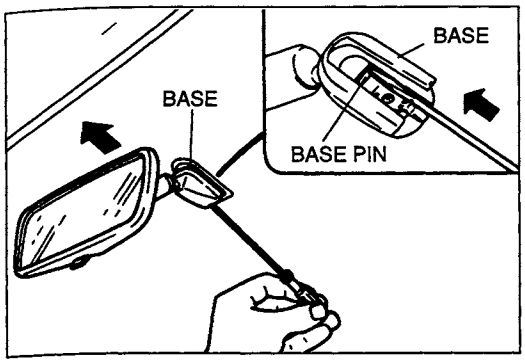
PREPARATION
SST

49 0305 870A Tool set, window		For removal / installation of base

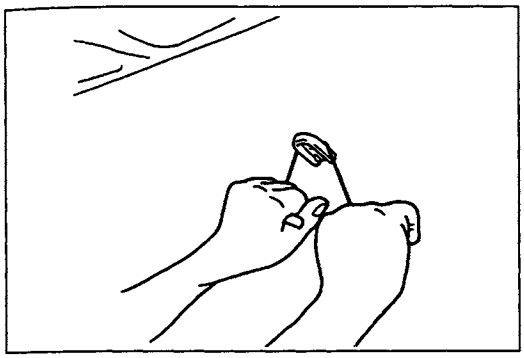
REARVIEW MIRROR
Removal / Installation
1. Remove in the order shown in the figure, referring to **Removal note**.
2. Install in the reverse order of removal, referring to **Installation note**.



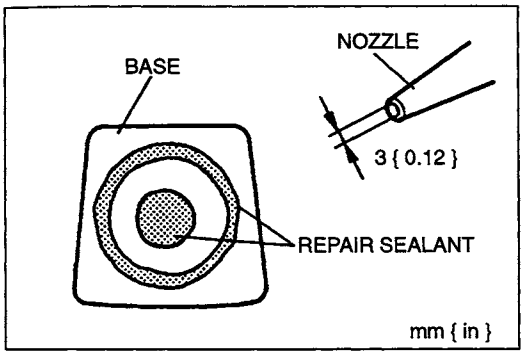
1. Rearview mirror
   Removal note ..... page S1–63
2. Base
   Removal note ..... page S1–63
   Installation note ..... page S1–63



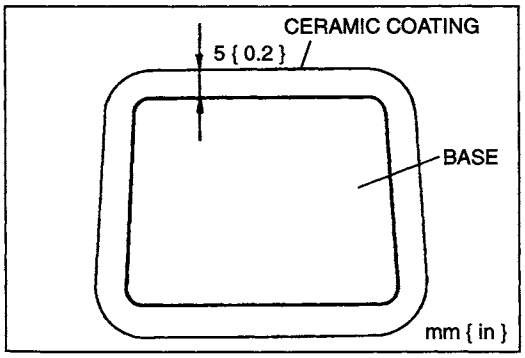
Removal note
Rearview mirror
1. Insert a flathead screwdriver between the mirror and the base.
2. Push the base pin to remove the mirror.



Base
1. Wind each end of a wire around a bar.
2. Saw through the sealant to remove the base. Use a long sawing action to spread the work over the whole length of wire to prevent it from breaking.



Installation note
Base
1. Cut away all of the original sealant by using a razor knife.
2. Clean and degrease the glass.
3. Apply primer to the glass and the base. Use only glass primer on the glass and body primer on the base. Keep the bonding area free of dirt and grease, and do not touch the surface. Allow the primer to dry for approximately **30 minutes**.
4. Apply a **3 mm { 0.12 in }** bead of repair sealant to the base.



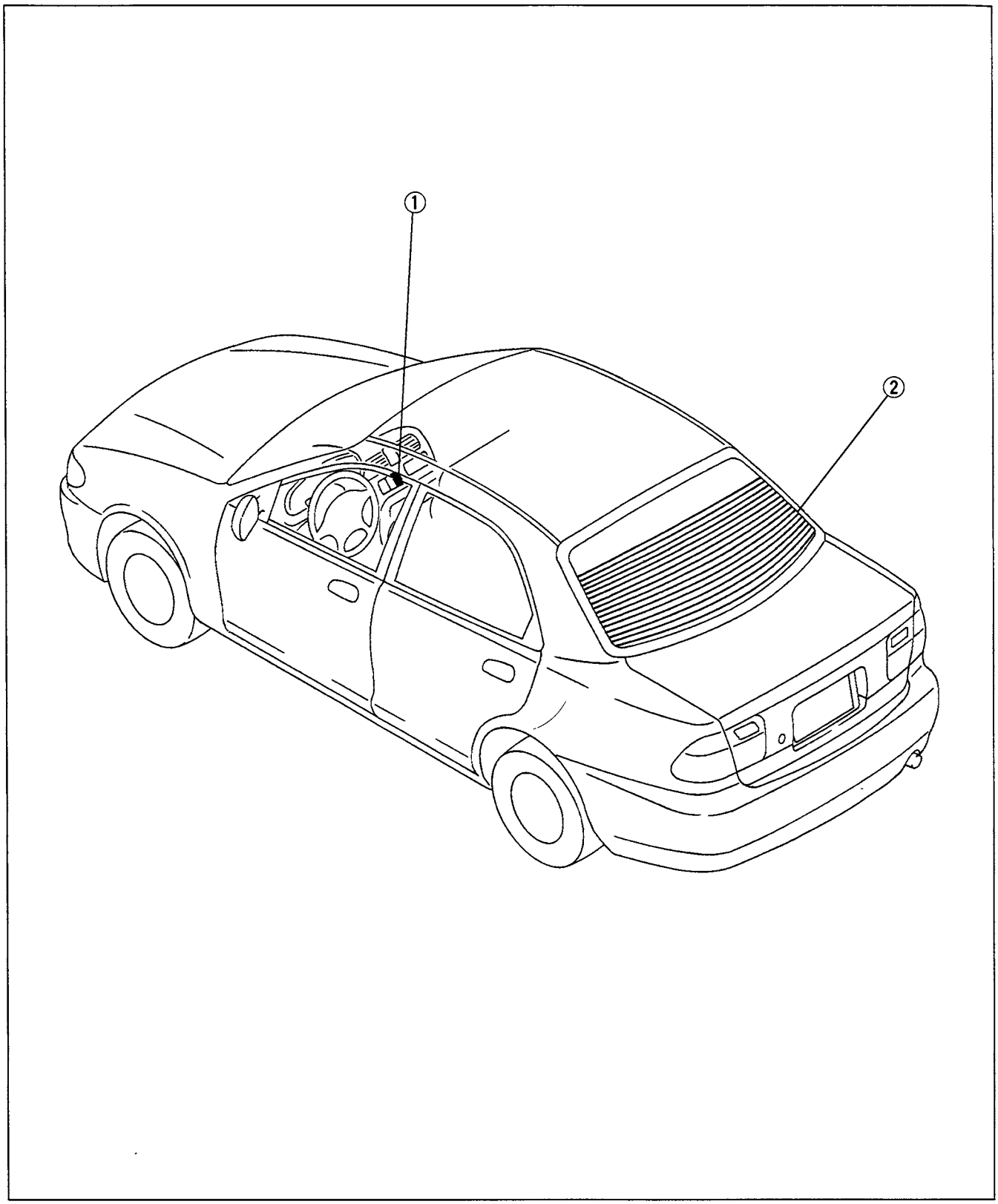
5. Center the base in the ceramic coating and press it onto the glass. Use ethyl alcohol to remove any excess repair sealant.

Hardening time of repair sealant

Temperature	Surface hardening time	Time required until car can be put into service
5 °C { 41 °F }	Approx. 1.5 hr	12 hr
20 °C { 68 °F }	Approx. 1 hr	4 hr
35 °C { 95 °F }	Approx. 10 min	2 hr

REAR WINDOW DEFROSTER

STRUCTURAL VIEW

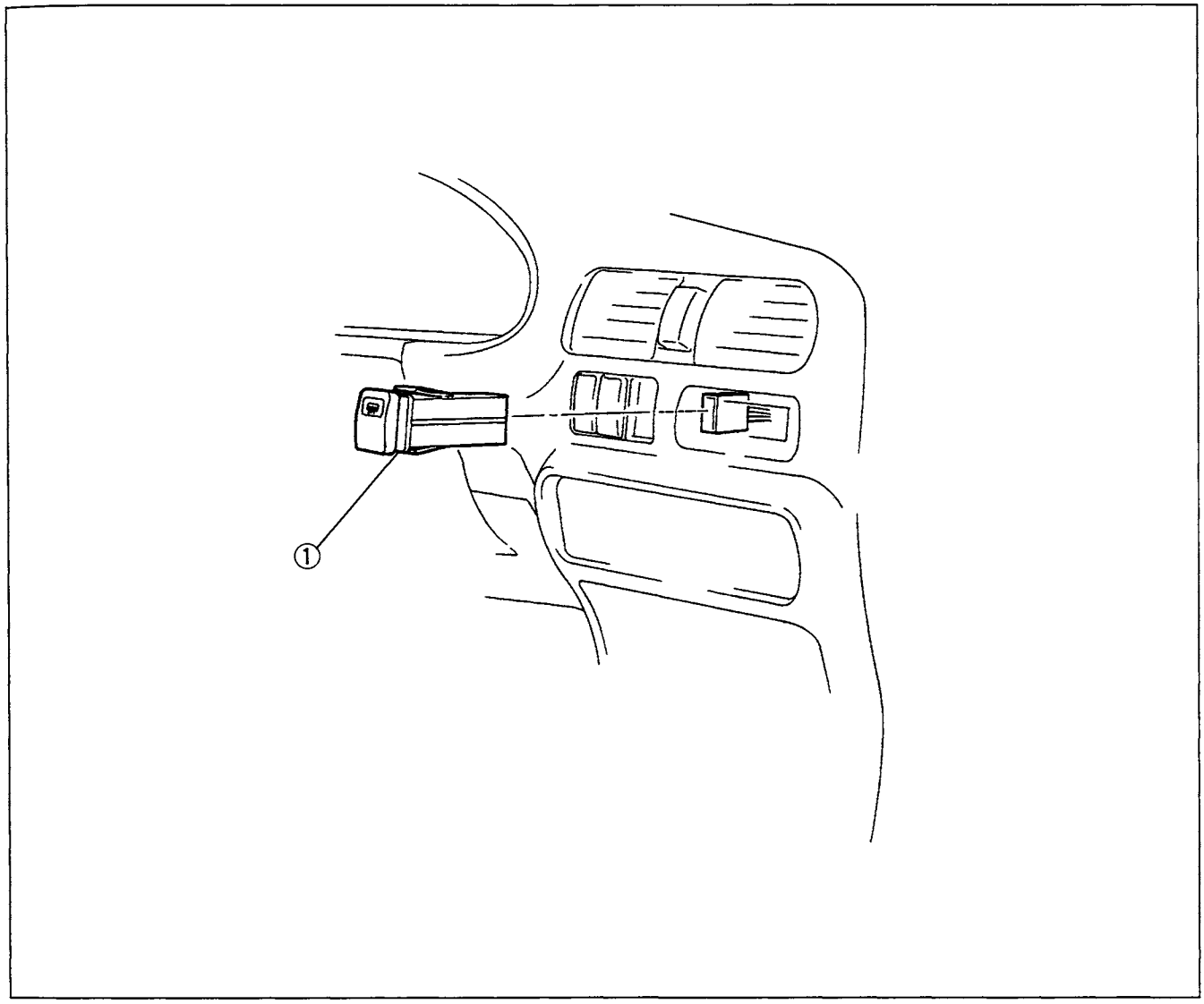


1. Rear window defroster switch
   - Removal / Installation ..... page S1–65
   - Inspection ..... page S1–65
2. Filament
   - Inspection ..... page S1–66
   - Repair ..... page S1–66

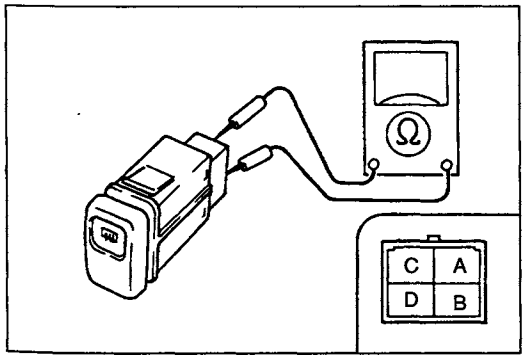
REAR WINDOW DEFROSTER SWITCH

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the meter hood. (Refer to page S1–96.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



1. Rear window defroster switch
   Inspection ..... below



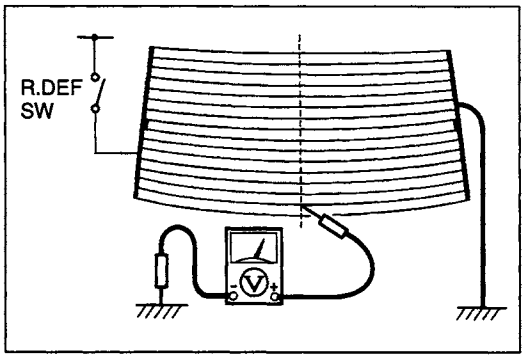
Inspection

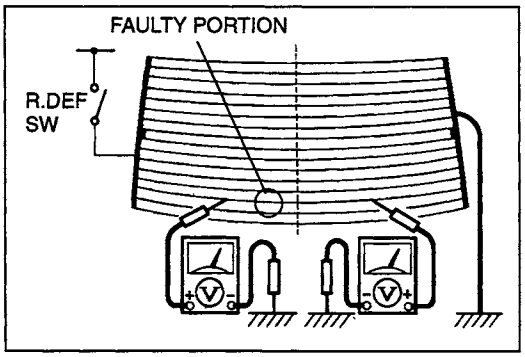
1. Remove the rear window defroster switch. (Refer above.)
2. Check for continuity between the switch terminals.

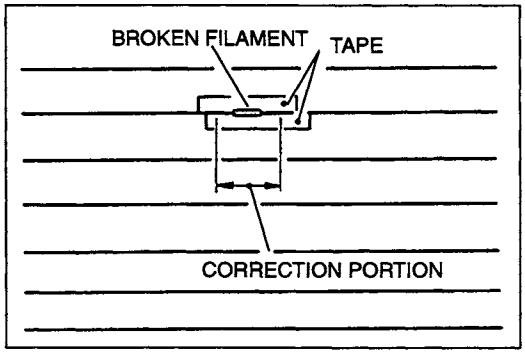
Switch position \ Terminal	B	D
ON	O——	——O
OFF		

O——O: Continuity

3. If not as specified, replace the rear window defroster switch.







FILAMENT

Inspection

1. Turn the rear window defroster switch on.
2. Connect the (+) terminal of a voltmeter to the center of each filament and the (–) terminal to the body and check the voltage.

   Standard voltage: 5—7 V

   Note
   - If the meter indication is high, there is an open circuit between the center and the ground side of the filament.
   - If the meter indication is low or zero, the malfunction is between the center and positive side of the filament.

3. If not as specified, repair the filament. (Refer below.)

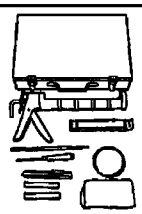
Repair

Caution
- **Use only paint thinner or ethyl alcohol for cleaning. Other solvents can damage the surrounding filament.**

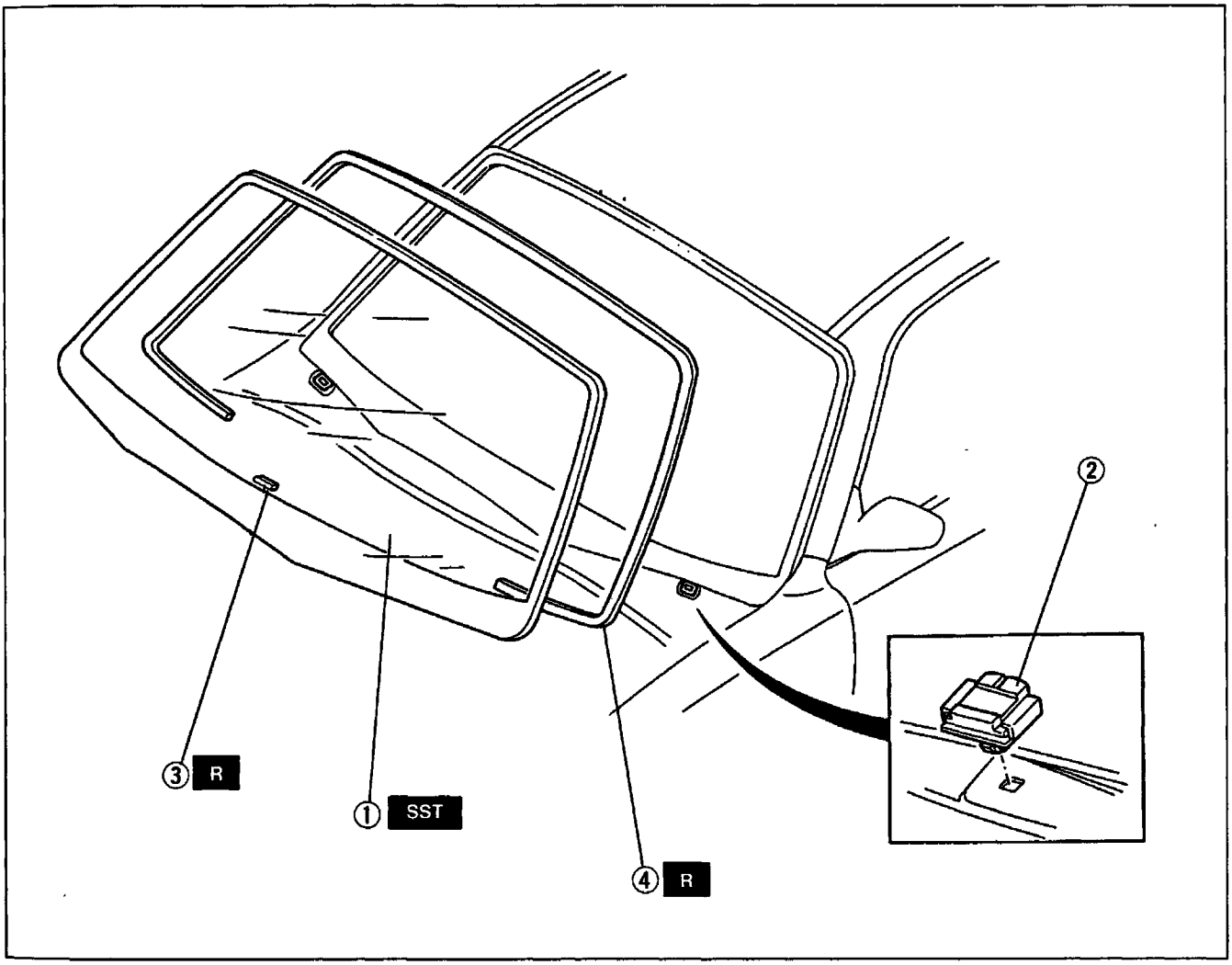
1. Use paint thinner or ethyl alcohol to clean around the damaged section of the filament.
2. Attach tape above and below the damaged section of the filament.
3. Using a small brush or marking pen, repair the filament with silver paint or equivalent.
4. Use a hot-air blower heated to **150 °C { 302 °F }** for **30 minutes** or let the paint set for **24 hours** at **25 °C { 77 °F }** to allow it to dry completely. Do not use the defroster until the paint is dry.

WINDOW GLASS

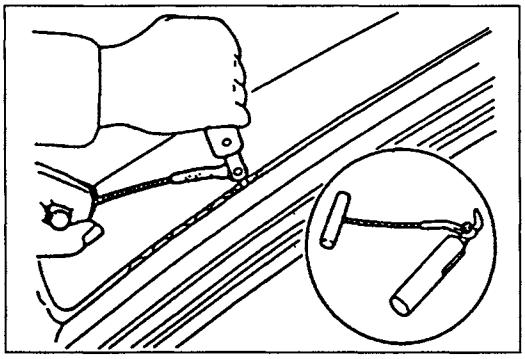
PREPARATION
SST

49 0305 870A Tool set, window		For removal / installation of glass

WINDSHIELD
Removal
1. Remove the following parts.
   a. Headliner (Refer to page S1–116.)
   b. Rearview mirror (Refer to page S1–62.)
   c. Cowl grille (Refer to page S1–58.)
   d. Windshield molding (Refer to page S1–49.)
   e. Glass stopper (Refer to page S1–57.)
2. Remove in the order shown in the figure, referring to **Removal note.**

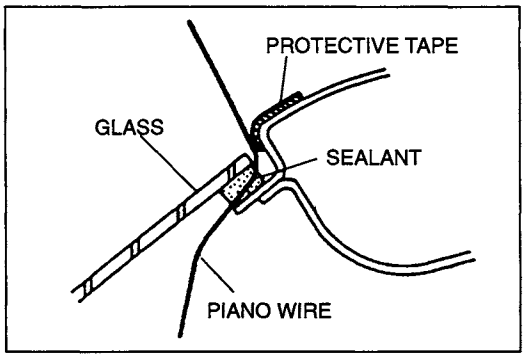


1. Windshield
   Removal note ..... page S1–68
2. Spacer A
3. Spacer B
4. Dam

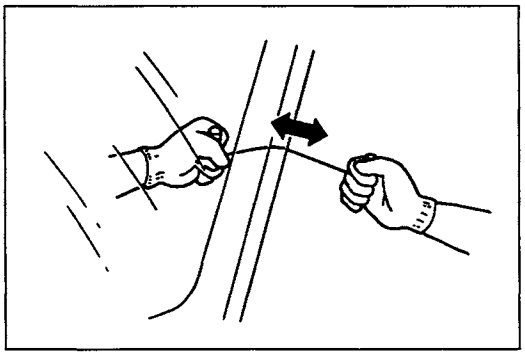


Removal note
Windshield
1. Apply protective tape along the edge of the body to protect it from damage.

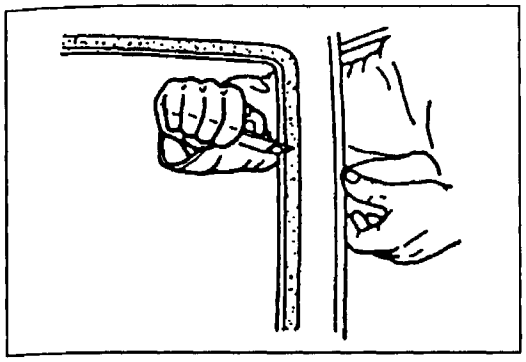
If the glass will not be reused
2. Use a tool like that shown in the figure and insert the blade into the sealant.
3. Pull it through the sealant around the edge of the glass.
4. Remove the glass.



If the glass will be reused
2. Make a hole through the sealant from the inside of the vehicle by using an awl.
3. Pass piano wire through the hole.

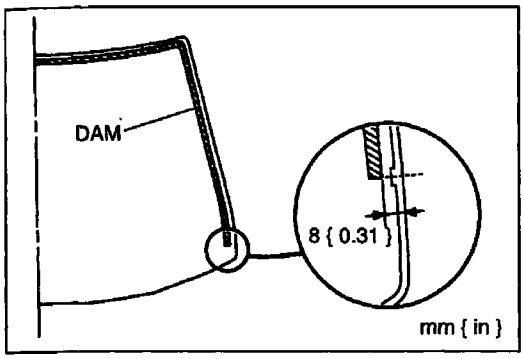


4. Wind each end of the wire around a bar.
5. Working with another person, saw through the sealant around the edge of the glass. Use a long sawing action to spread the work over the whole length of wire to prevent it from breaking. Make sure the wire does not rub on the body or the dashboard.
6. Remove the glass.

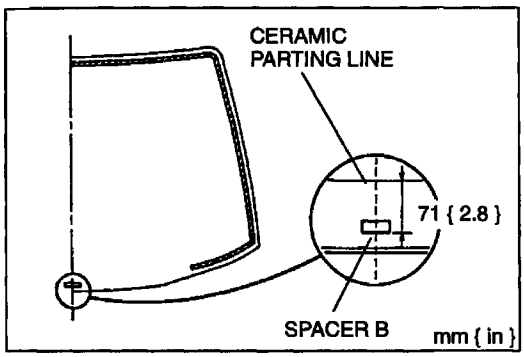


Installation

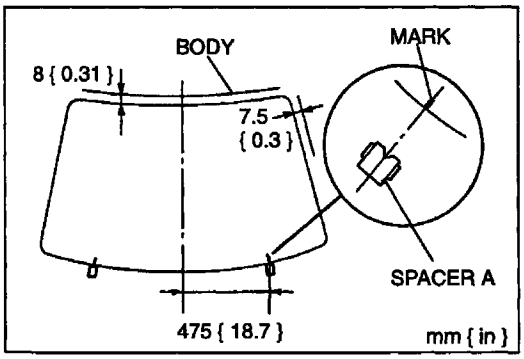
1. Cut away the old sealant by using a razor knife so that **1 to 2 mm { 0.04 to 0.08 in }** of sealant remains around the circumference of the frame. If all the sealant has come off in any one place, apply some primer after degreasing, and allow it **30 minutes** to dry. Then apply new sealant to create a **2 mm { 0.08 in }** layer.
2. Carefully clean an area **50 mm { 2.0 in }** wide around the circumference of the glass and clean the bonding area on the body.



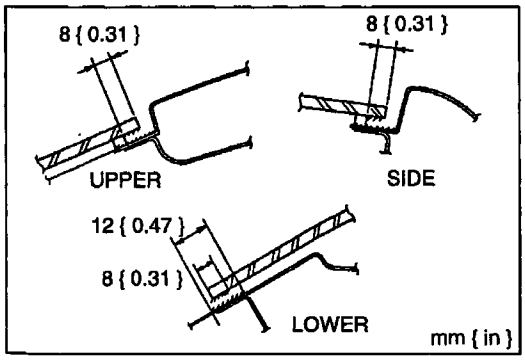
3. Securely bond a new dam **8 mm { 0.31 in }** from the edge of the glass as shown. Allow it to dry completely.



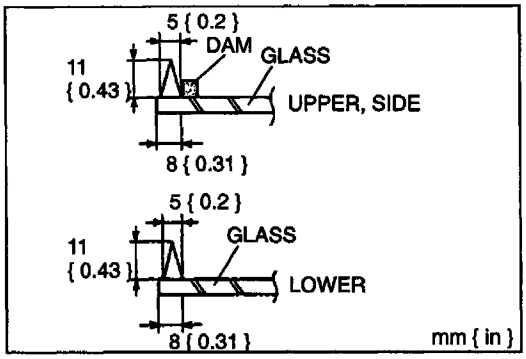
4. Securely bond spacer B to the glass as shown.



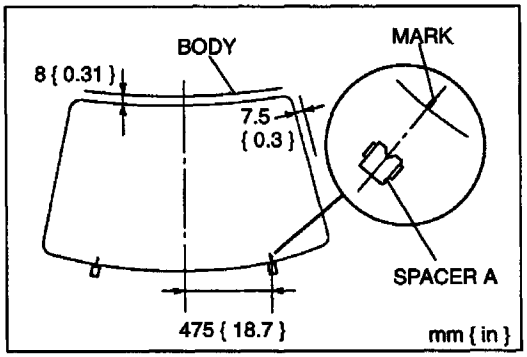
5. Install spacers A. If a spacer is damaged, replace it.
6. Temporarily install the glass onto the body and adjust the glass-to-body clearance.
7. Make a mark on the glass directly above the V-notch of spacers A.
8. Remove the glass.



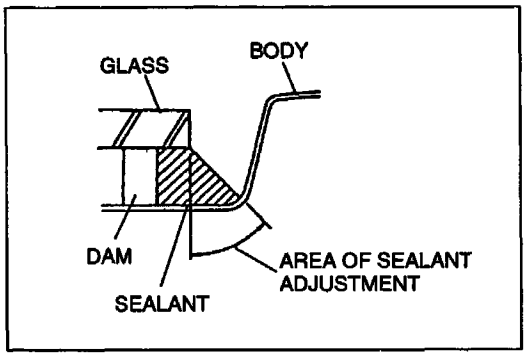
9. Apply primer to the bonding area of the glass and body by using a brush. Use only glass primer on the glass and body primer on the body. Keep the area free of dirt and grease, and do not touch the surface. Allow it to dry for approximately **30 minutes**.



10. Apply an **11 mm { 0.43 in }** high bead of repair sealant around the circumference of the glass as shown. Keep the bead of sealant smooth and even, reshaping it with a spatula where necessary. If the windshield is being reused, apply new repair sealant over the original.



11. Align the glass marks with the V–notches of spacers A and install the glass onto the body.
12. Press firmly on the glass to compress the sealant. Verify that the body-to-glass clearance is as shown.



13. Use a scraper to smooth away any sealant that oozes out. Add more sealant to any points of poor contact. Adjust the upper and side sealant as shown, if necessary.
14. To prevent the glass from being pushed out by air pressure if a door is closed, open all of the windows until the repair sealant has hardened.

Hardening time of repair sealant

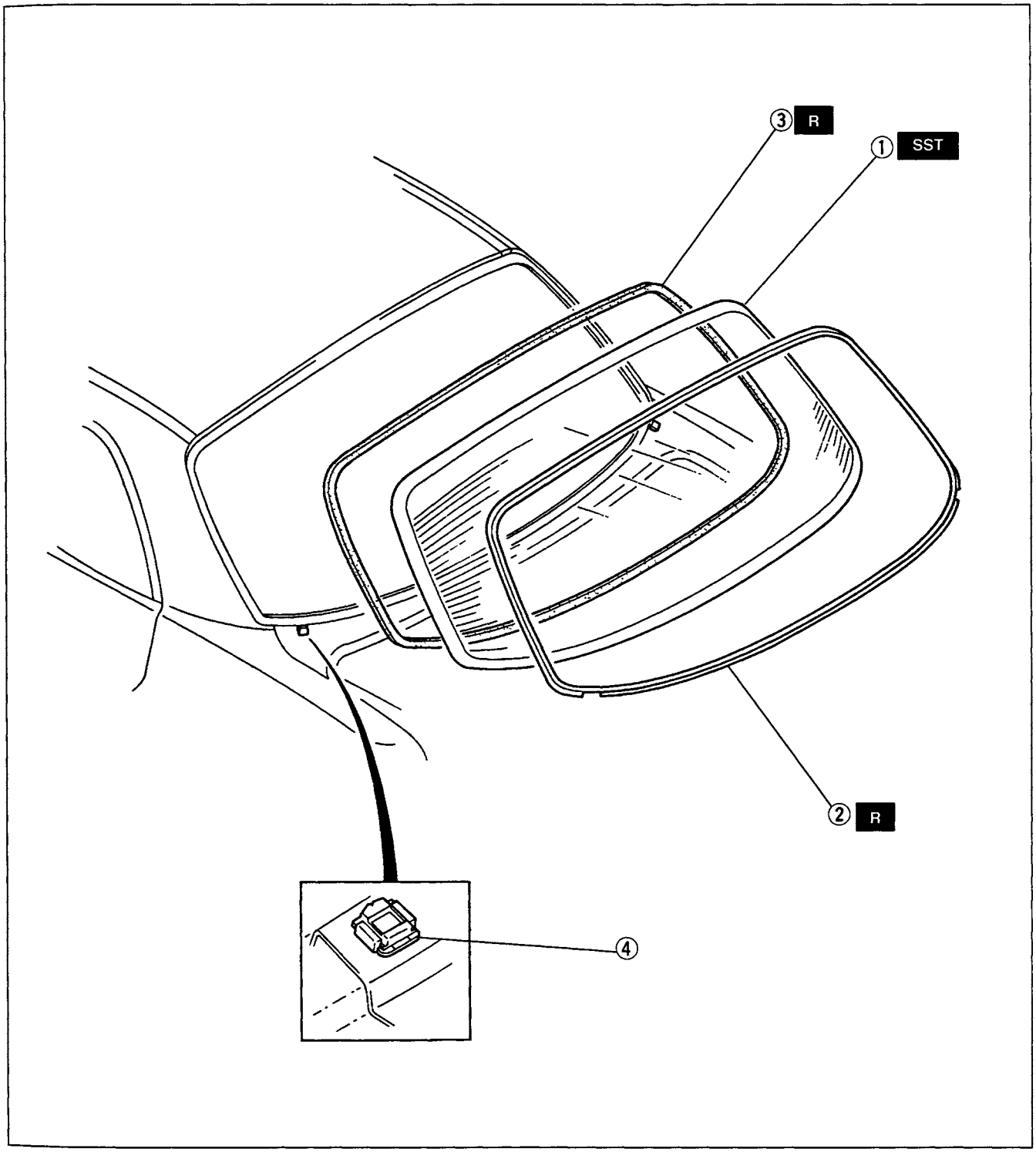
Temperature	Surface hardening time	Time required until car can be put into service
5 °C { 41 °F }	Approx. 1.5 hr	12 hr
20 °C { 68 °F }	Approx. 1 hr	4 hr
35 °C { 95 °F }	Approx. 10 min	2 hr

15. Check for water leaks. If a leak is found, wipe the water off well and reinstall the windshield.
16. Install the following parts.
    a. Glass stopper (Refer to page S1–57.)
    b. Windshield molding (Refer to page S1–49.)
    c. Cowl grille (Refer to page S1–58.)
    d. Rearview mirror (Refer to page S1–62.)
    e. Headliner (Refer to page S1–116.)

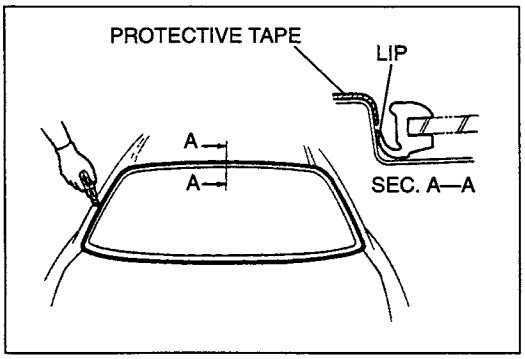
REAR WINDOW GLASS

Removal

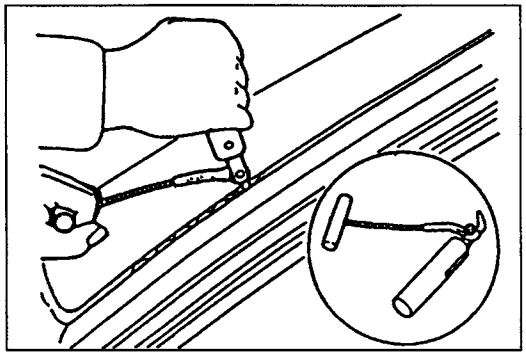
1. Remove the following parts.
   a. Headliner (Refer to page S1–116.)
   b. Rear package trim (Refer to page S1–109.)
2. Remove in the order shown in the figure, referring to **Removal note**.



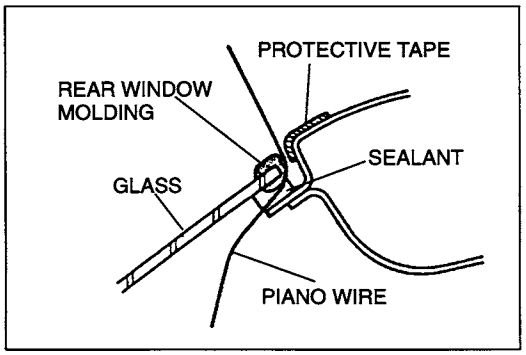
1. Rear window glass
   Removal note ..... page S1–72
2. Rear window molding
3. Dam
4. Spacer



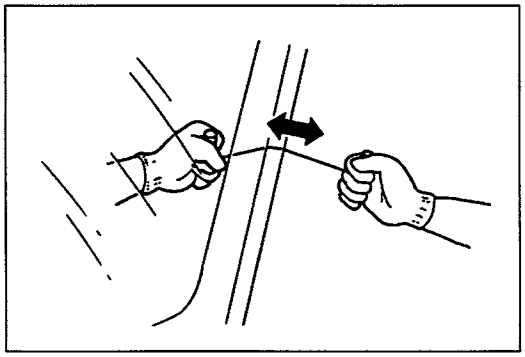
Removal note
Rear window glass
1. Apply protective tape along the edge of the body to protect it from damage.
2. Cut the lip of the rear window molding by using a razor knife and remove the lip.



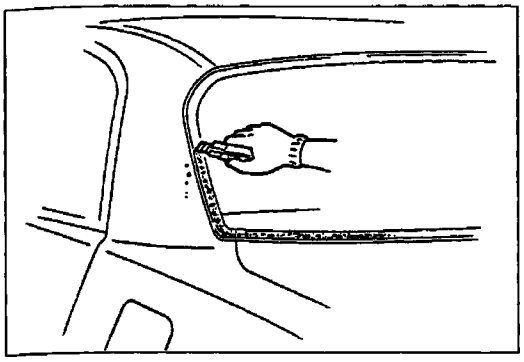
If the glass will not be reused
3. Use a tool like that shown in the figure and insert the blade into the sealant.
4. Pull it through the sealant around the edge of the glass.
5. Remove the glass.



If the glass will be reused
3. Make a hole through the sealant from the inside of the vehicle by using an awl.
4. Pass piano wire through the hole.

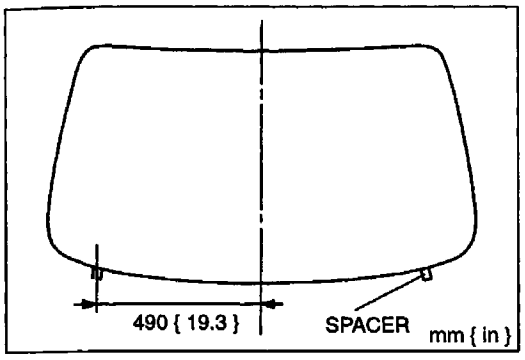


5. Wind each end of the wire around a bar.
6. Working with another person, saw through the sealant around the edge of the glass. Use a long sawing action to spread the work over the whole length of wire to prevent it from breaking. Make sure the wire does not rub on the body.
7. Remove the glass.

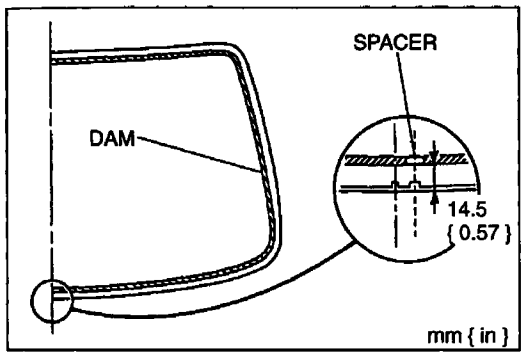


Installation

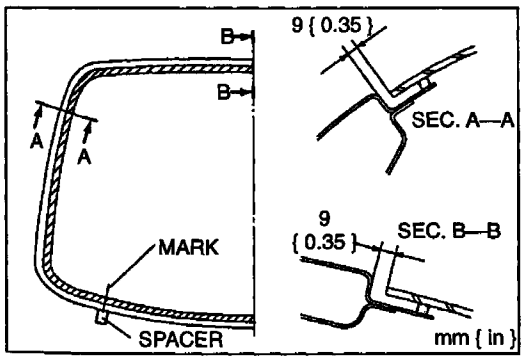
1. Cut away the old sealant by using a razor knife so that **1 to 2 mm { 0.04 to 0.08 in }** of sealant remains around the circumference of the frame. If all the sealant has come off in any one place, apply some primer after degreasing, and allow it **30 minutes** to dry. Then apply new sealant to create a **2 mm { 0.08 in }** layer.
2. Carefully clean an area **50 mm { 2.0 in }** wide around the circumference of the glass and clean the bonding area on the body.



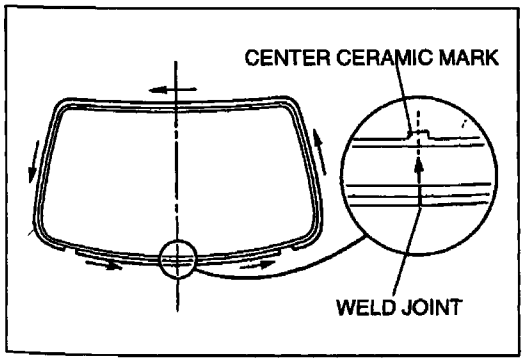
3. Install the spacers onto the body.



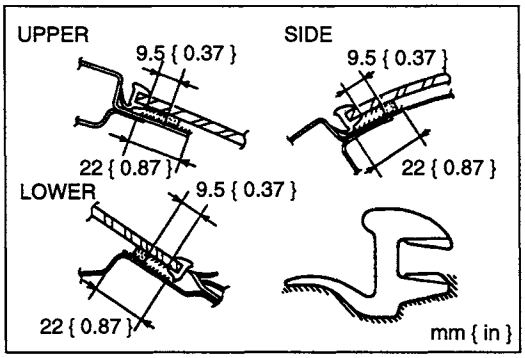
4. Install the spacer part of the dam as shown and securely bond the dam around the circumference of the glass **14.5 mm { 0.57 in }** from the edge. Allow the dam to dry completely.



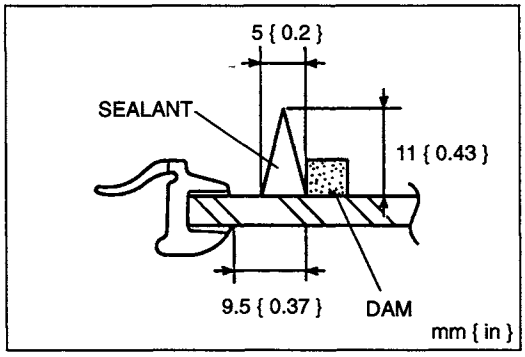
5. Temporarily install the glass onto the body and adjust the glass-to-body clearance.
6. Make a mark on the glass directly above the V-notch of the spacers.
7. Remove the glass.



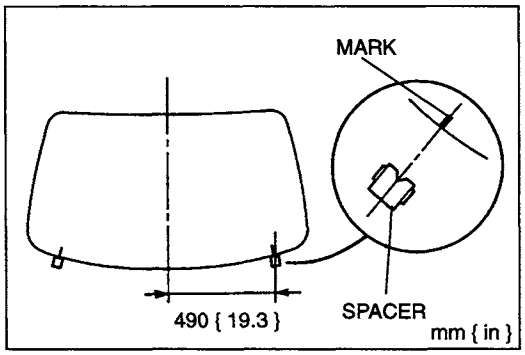
8. Install the rear window molding to the glass.
   (1) Align the weld joint of the molding with the center ceramic mark on the glass.
   (2) Attach the molding in the direction shown in the figure.



9. Apply primer to the bonding area of the molding, glass, and body by using a brush. Use only glass primer on the glass and body primer on the body and molding. Keep the area free of dirt and grease, and do not touch the surface. Allow it to dry for approximately **30 minutes**.



10. Apply an **11 mm { 0.43 in }** high bead of repair sealant around the circumference of the glass as shown. Keep the bead of sealant smooth and even, reshaping it with a spatula where necessary. If the rear window glass is being reused, apply new repair sealant over the original.



11. Align the glass marks with the V-notches of the spacers and install the glass onto the body.
12. Press firmly on the glass to compress the sealant.
13. To prevent the glass from being pushed out by air pressure if a door is closed, open all of the windows until the repair sealant has hardened.

Hardening time of repair sealant

Temperature	Surface hardening time	Time required until car can be put into service
5 °C { 41 °F }	Approx. 1.5 hr	12 hr
20 °C { 68 °F }	Approx. 1 hr	4 hr
35 °C { 95 °F }	Approx. 10 min	2 hr

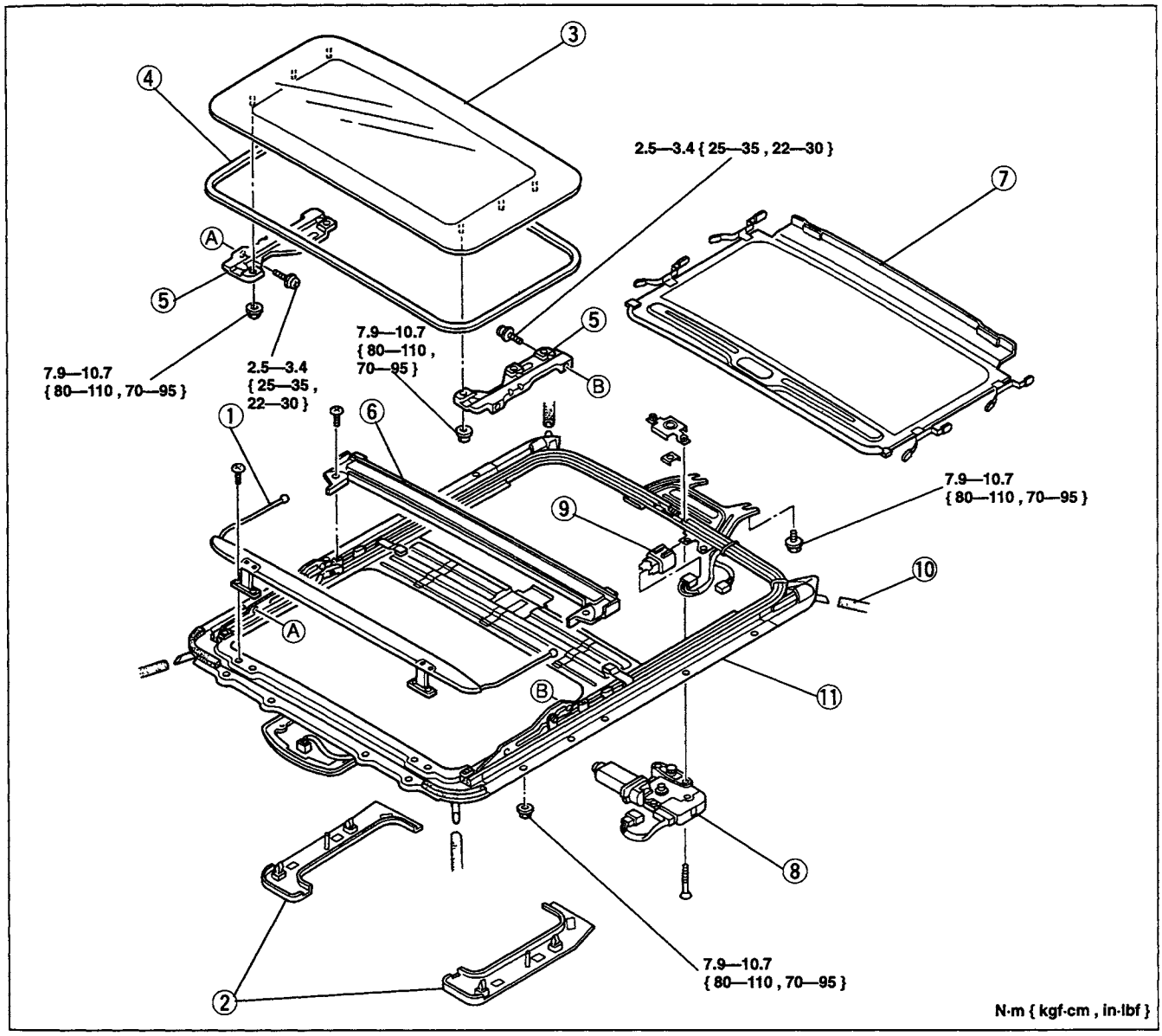
14. Check for water leaks. If a leak is found, wipe the water off well and reinstall the rear window glass.
15. Install the following parts.
    a. Rear package trim (Refer to page S1–109.)
    b. Headliner (Refer to page S1–116.)

SLIDING SUNROOF

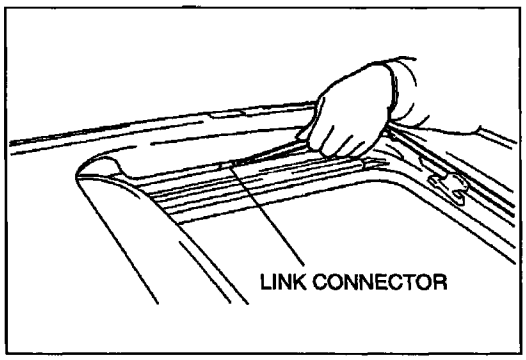
SLIDING SUNROOF

Removal / Installation

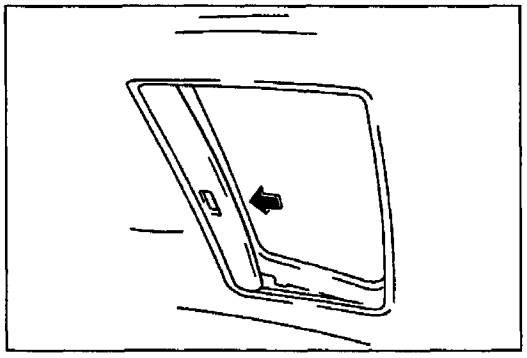
1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure, referring to **Removal note**. To remove the sunroof motor, remove the headliner. (Refer to page S1–116.)
3. Install in the reverse order of removal, referring to **Installation note**.



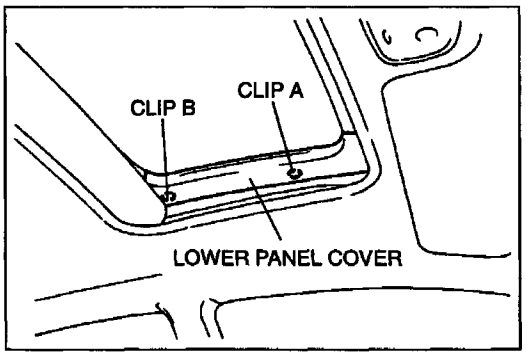
1. Deflector
   Removal note ..... page S1–76
2. Lower panel cover
   Removal note ..... page S1–76
3. Glass panel
   Removal note ..... page S1–76
   Adjustment ..... page S1–80
4. Weatherstrip
5. Lower panel
6. Drip rail
7. Sunshade
   Removal note ..... page S1–76
8. Sunroof motor
   Installation note ..... page S1–77
   Inspection ..... page S1–81
9. Sunroof relay
   Inspection ..... page S1–81
10. Drain hose
    Installation note ..... page S1–77
11. Sunroof drive unit
    Removal note ..... page S1–77
    Disassembly / Assembly ..... page S1–78



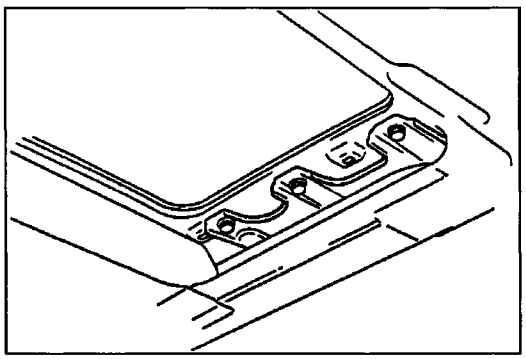
Removal note
Deflector
1. Open the glass panel.
2. Remove the link from the link connector.
3. Remove the installation screws and remove the deflector from the frame.



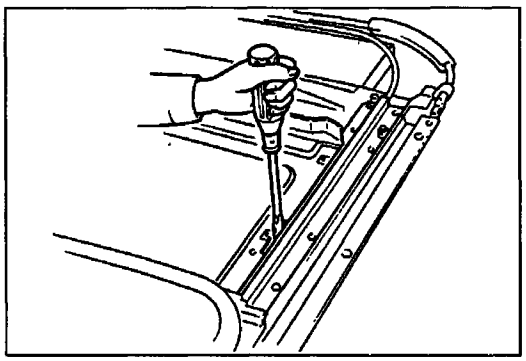
Lower panel cover
1. Open the sunshade fully.
2. Close the glass panel.



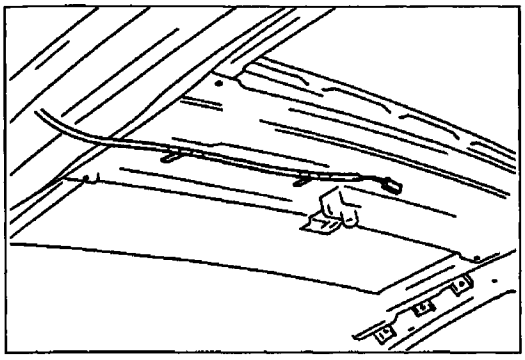
3. Pull the lower panel cover downward to disengage clips A from the body.
4. Slide the lower panel cover inside to disengage clips B from the body.



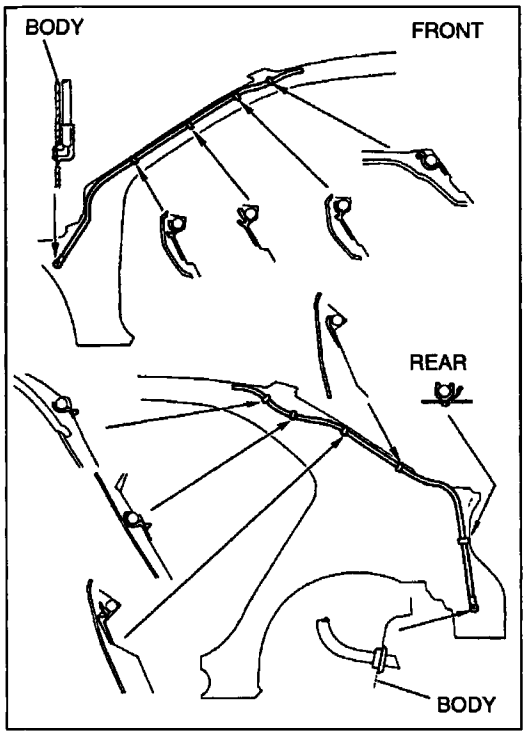
Glass panel
Close the glass panel to remove the installation nuts.



Sunshade
Remove the sunshade pins from the groove in the frame by using a flathead screwdriver which has been wrapped in tape.



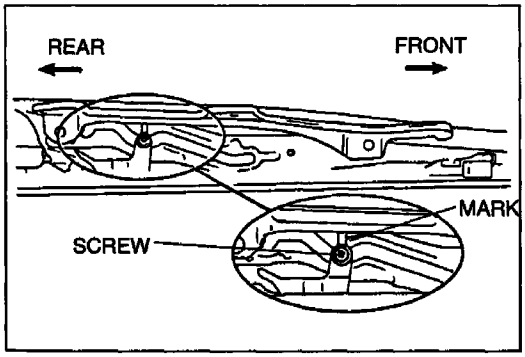
Sunroof drive unit
Remove the room light harness.



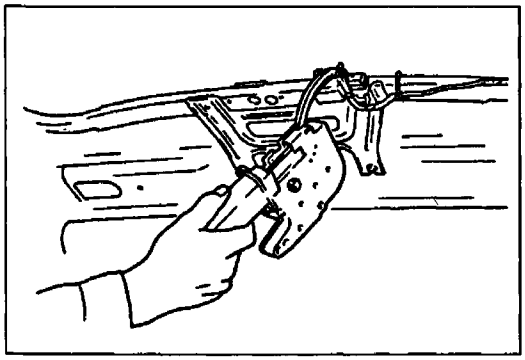
Installation note
Drain hose

Note
- Apply soapy water to the drain hose and insert it fully into the sunroof frame.

(front)
Insert one end of the hose into the sunroof frame, set the hose along the A-pillar, and insert the other end into the hinge pillar inner hole.
(rear)
Insert one end of the hose into the sunroof frame, set the hose along the rear pillar, and insert the other end into the side frame outer hole.



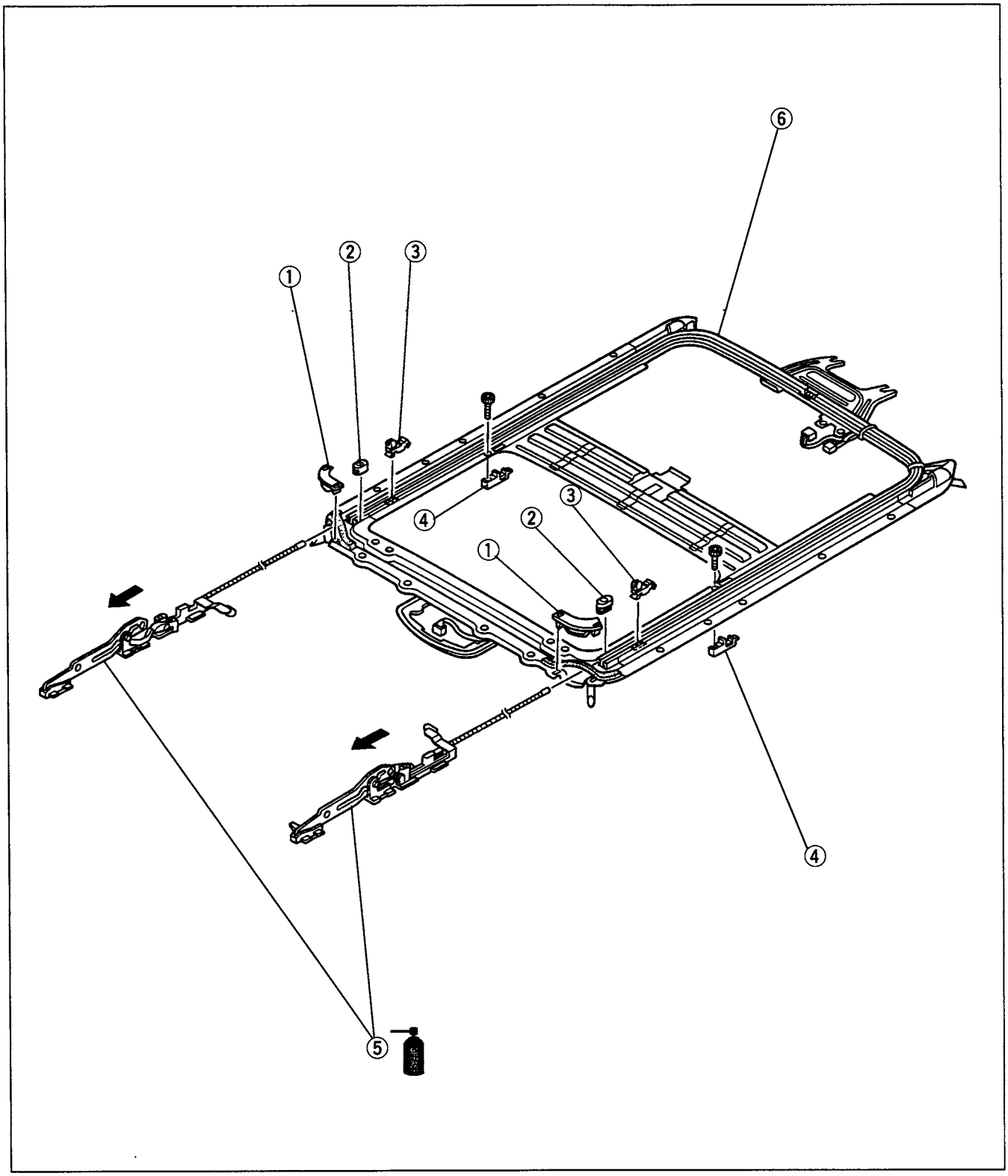
Sunroof motor
1. Move the guide by hand until the screw is aligned with the mark.



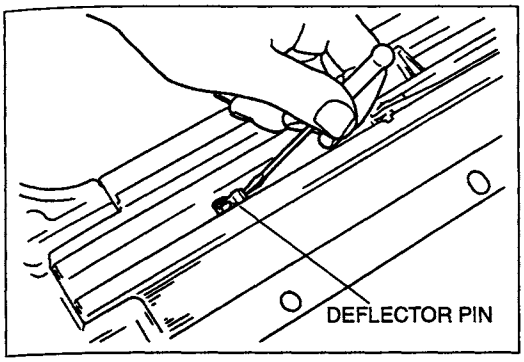
2. Connect the harness connector to the sunroof motor and overhead console.
3. Press the OPEN side of the slide switch until the motor stops. Then press the CLOSE side of the slide switch until the motor stops.
4. Install the motor to the frame.

Disassembly / Assembly

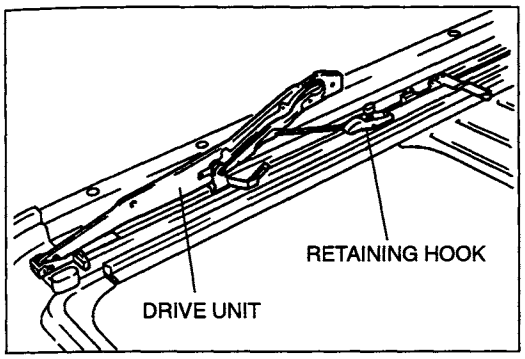
1. Disassemble in the order shown in the figure, referring to **Disassembly note.**
2. Assemble in the reverse order of disassembly, referring to **Assembly note.**



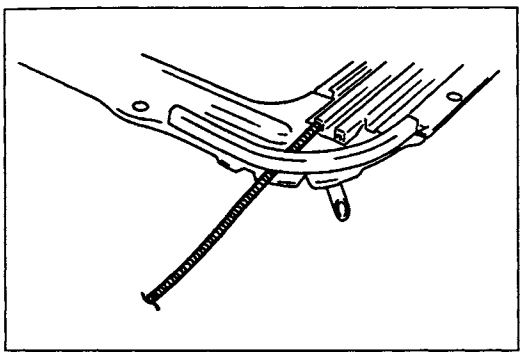
1. Rail cover
2. Guide stopper
3. Deflector pin
   Disassembly note ..... page S1–79
4. Rear guide stopper
5. Drive unit
   Disassembly note ..... page S1–79
   Assembly note ..... page S1–79
6. Frame



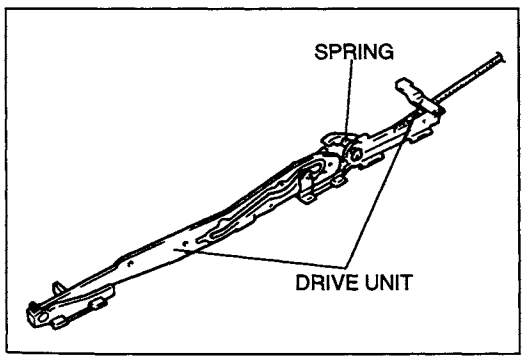
Disassembly note
Deflector pin
Lift the deflector pin by using a flathead screwdriver to remove the pin.



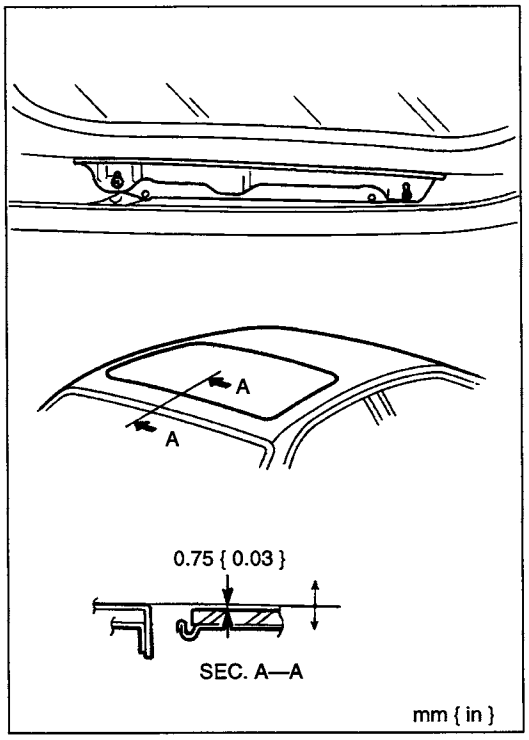
Drive unit
Push the front of the retaining hook to disengage it from the frame, and then pull the drive unit to remove it.



Assembly note
Drive unit
1. Grease the contact area of the drive unit.
2. Insert the cable into the channel of the guide rail.



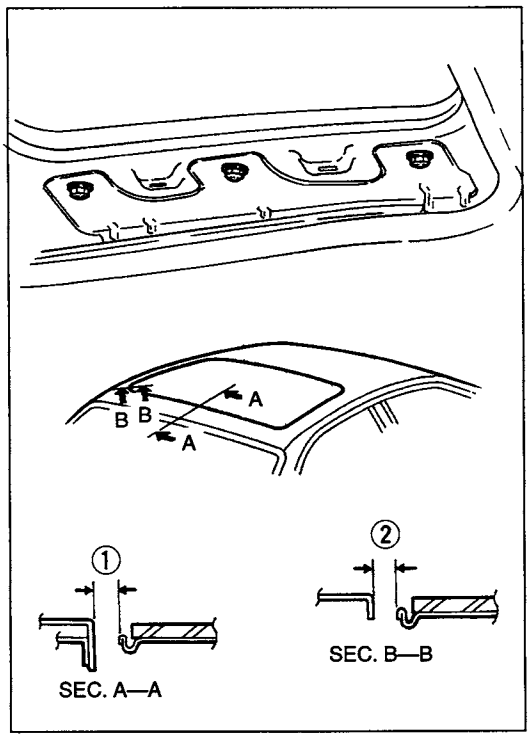
3. Verify that the spring is onto the retaining hook when the drive unit is inserted into the guide rail.



Adjustment
Glass panel
Height

1. Remove the lower panel cover. (Refer to page S1–75.)
2. Pull up on the weatherstrip surrounding the section which is to be measured.
3. Loosen the lower panel installation screw and adjust the height.

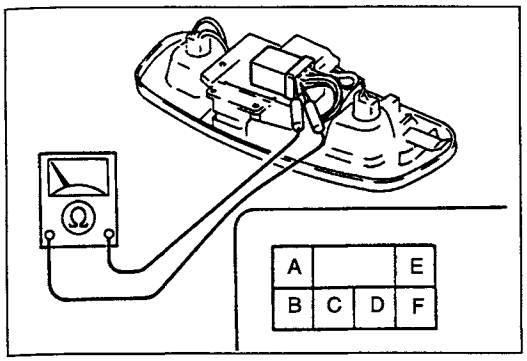
Allowable height clearance: $0^{+0.5}_{-1.5}$ mm { $0^{+0.02}_{-0.06}$ in }



Gap

1. Open the glass panel about **100 mm { 3.9 in }** from the fully closed position.
2. Pull up on the weatherstrip surrounding the section which is to be measured.
3. Fully closed the glass panel.
4. Remove the lower paner cover. (Refer to page S1–75.)
5. Loosen the glass panel installation nuts and adjust the gap.
6. Open the glass panel and install the weatherstrip.

Allowable gap clearance
①: 6.80 ± 0.35 mm { 0.27 ± 0.01 in }
②: 6.60 ± 0.40 mm { 0.26 ± 0.02 in }



SUNROOF SWITCH

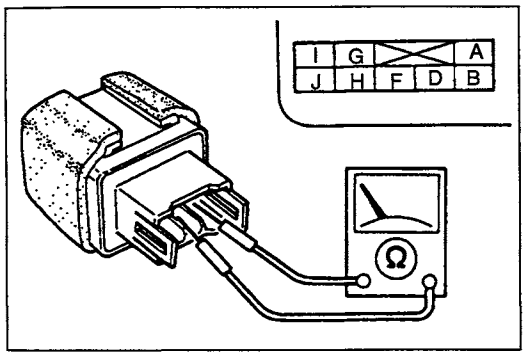
Inspection

1. Remove the overhead console. (Refer to page S1–116.)
2. Check for continuity between the terminals of the connector with the sunroof switch in the following positions.

Switch position \ Terminal	A	B	C	D	E	F
Tilt-up	○			○		
Tilt-down	○					○
Slide open	○	○				
Slide close	○		○			

○—○: Continuity

3. If not as specified, replace the sunroof switch.



SUNROOF RELAY

Inspection

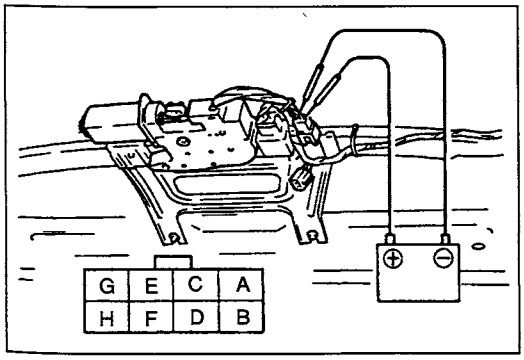
1. Remove the sunroof relay. (Refer to page S1–75.)
2. Apply battery positive voltage and check for continuity between the relay terminals.

B+: Battery positive voltage

Connection		A	B	D	G	H	I	J
B+	GND							
—	—	○	○	○		○	○	○
H	J				○		○	
H	B	○			○			

○—○: Continuity

3. If not as specified, replace the sunroof relay.

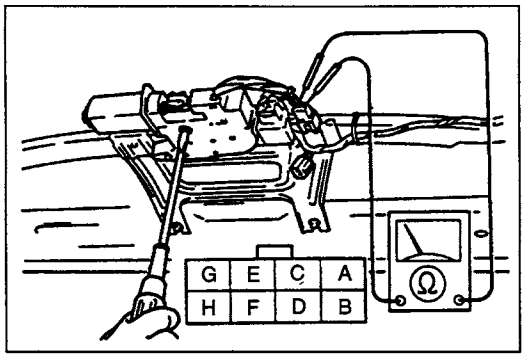


SUNROOF MOTOR

Inspection

Motor

1. Remove the headliner. (Refer to page S1–116.)
2. Disconnect the sunroof motor connector.
3. Apply battery positive voltage to terminal G and connect terminal H to ground. Verify that the motor rotates in the opening/tilt-down direction.
4. Reverse the above connections and verify that the motor rotates in the closing / tilt-up direction.
5. If not as specfied, replace the sunroof motor.



Limit switch

1. Remove the headliner. (Refer to page S1–116.)
2. Disconnect the sunroof motor connector.
3. Move the glass panel to the following positions by using a flathead screwdriver and check for continuity between the terminals of the sunroof motor connector.

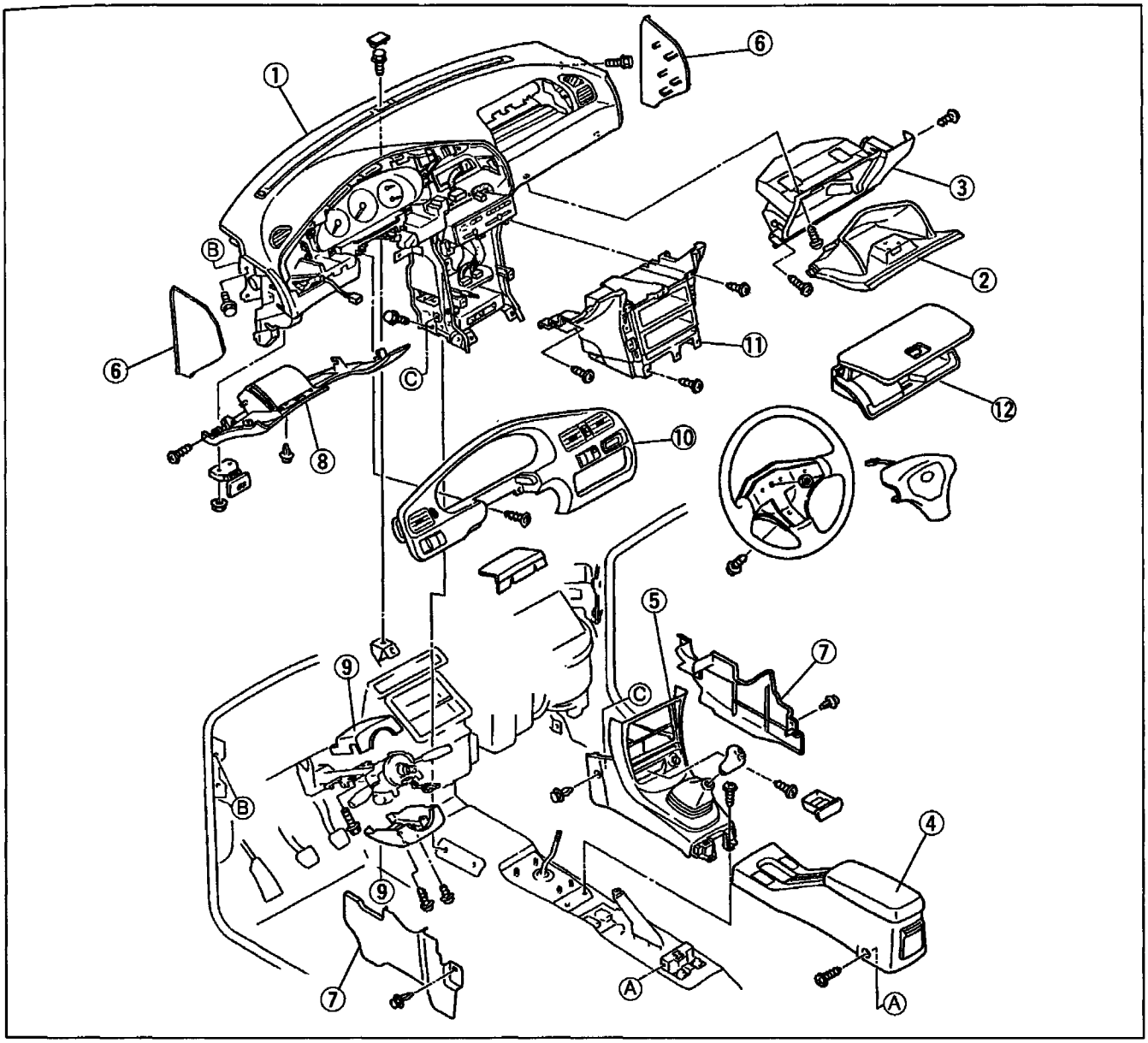
Terminal / Panel position	A	B	C	D	E	F	G	H
Open				○		○		
Closed		○	○		○	○		
Tilted up	○				○			

○—○: Continuity

4. If not as specified, replace the sunroof motor.

DASHBOARD AND CONSOLE

STRUCTURAL VIEW



1. Dashboard
Removal / Installation ..... page S1–84
Disassembly / Assembly ..... page S1–86
2. Glove compartment
Removal / Installation ..... page S1–87
Disassembly / Assembly ..... page S1–88
3. Glove compartment cover
Removal / Installation ..... page S1–88
4. Rear console
Removal / Installation ..... page S1–89
Disassembly / Assembly ..... page S1–89
5. Front console
Removal / Installation ..... page S1–90
Disassembly / Assembly ..... page S1–91
6. Side panel
Removal / Installation ..... page S1–92
7. Side wall
Removal / Installation ..... page S1–93
8. Lower panel
Removal / Installation ..... page S1–94
9. Column cover
Removal / Installation ..... page S1–95
10. Meter hood
Removal / Installation ..... page S1–96
Disassembly / Assembly ..... page S1–97
11. Center lower panel
Removal / Installation ..... page S1–97
12. Upper compartment
Removal / Installation ..... page S1–98
Disassembly / Assembly ..... page S1–99

DASHBOARD

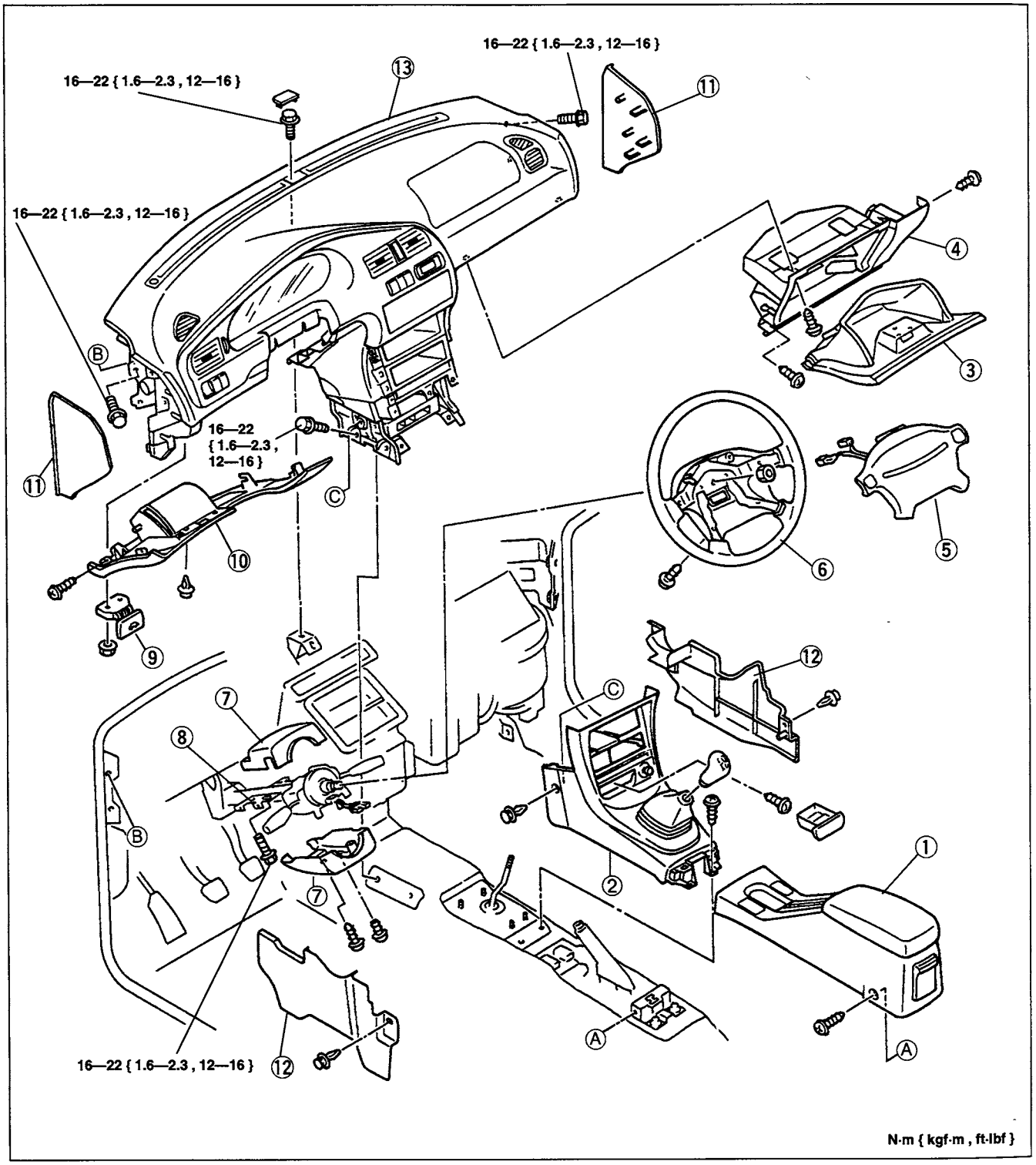
Removal / Installation

1. Disconnect the negative battery cable.

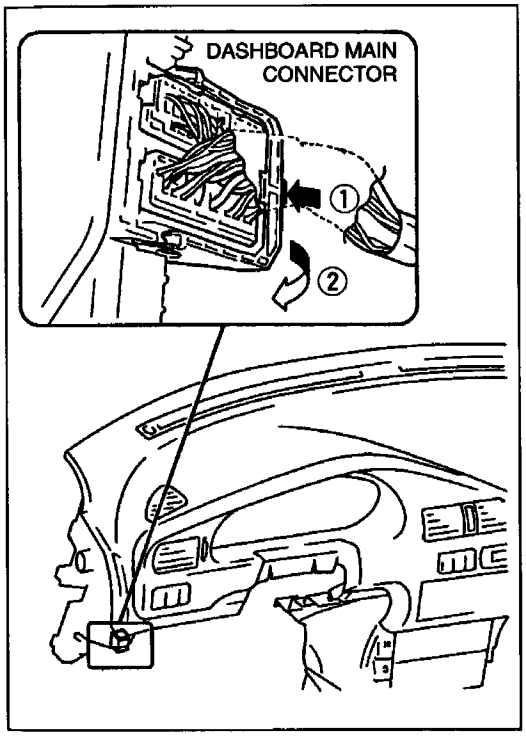
Warning

- **Handling the air bag module improperly can accidently deploy the air bag, which may seriously injure you. Read SERVICE WARNINGS, section T1, before handling the air bag module.**

2. Remove the A-pillar trim. (Refer to page S1–100.)
3. Remove in the order shown in the figure, referring to **Removal note**.
4. Install in the reverse order of removal, referring to **Installation note**.



1. Rear console
   Removal / Installation ..... page S1–89
2. Front console
   Removal / Installation ..... page S1–90
3. Glove compartment
   Removal / Installation ..... page S1–87
4. Glove compartment cover
   Removal / Installation ..... page S1–88
5. Driver-side air bag module
   Removal / Installation ..... section T1
6. Steering wheel
   Removal / Installation ..... section N
7. Column cover
   Removal / Installation ..... page S1–95
8. Steering shaft
9. Hood release lever
   Removal / Installation ..... page S1– 5
10. Lower panel
    Removal / Installation ..... page S1–94
11. Side panel
    Removal / Installation ..... page S1–92
12. Side wall
    Removal / Installation ..... page S1–93
13. Dashboard
    Removal note ..... below
    Installation note ..... below
    Disassembly / Assembly ..... page S1–86



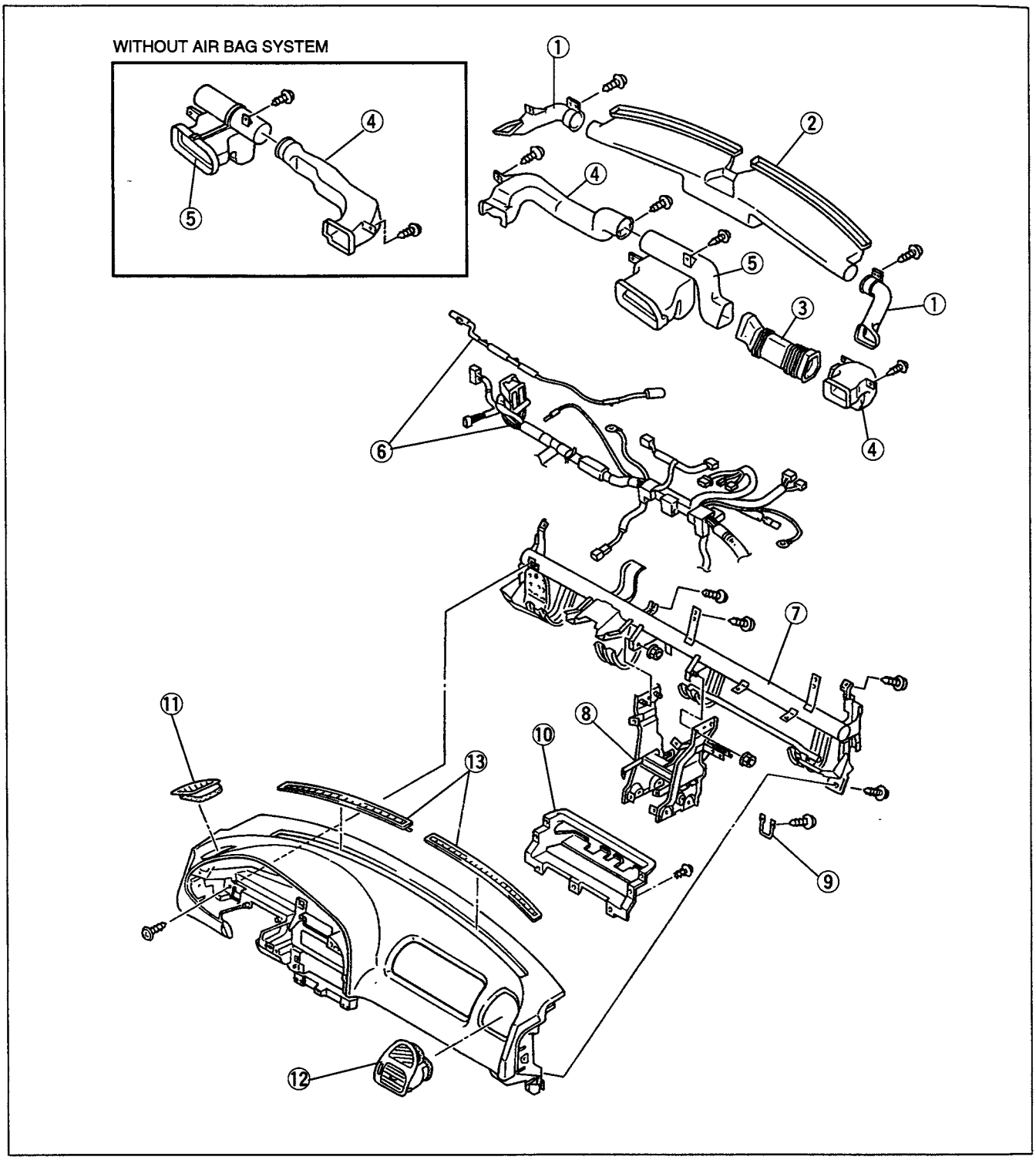
Removal note
Dashboard
With logic-type heater control unit
1. Remove the following connectors.
   a. ECM connector (Refer to section F1.)
      PCM connector (Refer to section F2.)
   b. Blower unit connector (Refer to section U.)
   c. Air mix actuator connector (Refer to section U.)
   d. Mode actuator connector (Refer to section U.)
   e. Dashboard main connector
   f. CPU connector (Refer to section T1.)
   g. Orange and blue clock spring connectors (Refer to section T1.)
2. Disconnect the cabin temperature sensor from the air duct. (Refer to section U.)

With wire-type heater control unit
1. Remove the following wires.
   a. Air mix wire (Refer to section U.)
   b. Air intake wire (Refer to section U.)
   c. Mode wire (Refer to section U.)
2. Remove the following connectors.
   a. Dashboard main connector
   b. CPU connector (Refer to section T1.)
   c. ECM connector (Refer to section F1.)
      PCM connector (Refer to section F2.)
   d. Orange and blue clock spring connectors (Refer to section T1.)

Installation note
Dashboard
On vehicles with a wire-type heater control unit, adjust each wire. (Refer to section U.)

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.

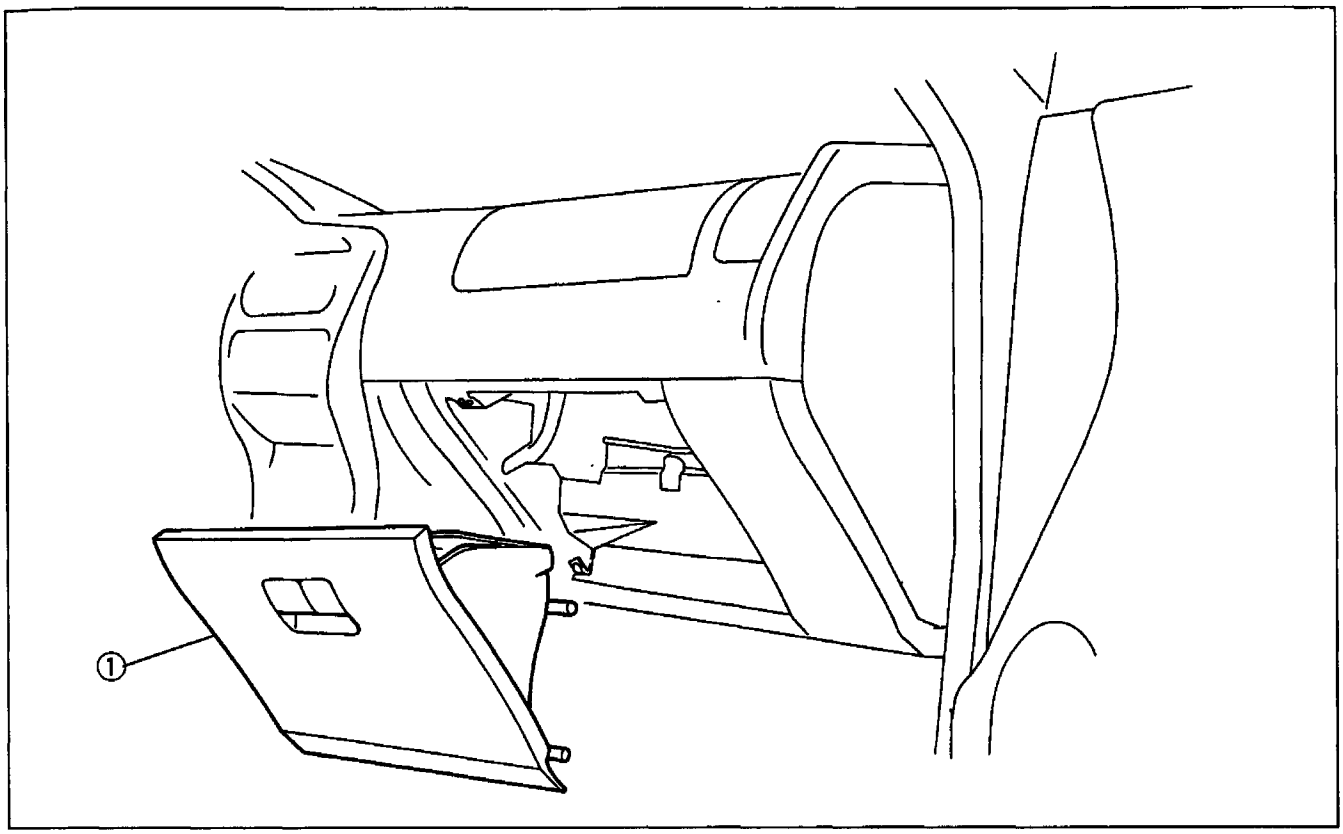


1. Side demister nozzle
2. Defroster nozzle
3. No.1 duct
4. No.2 duct
5. Center duct
6. Dashboard harness
7. Dashboard member
8. Dashboard center member
9. Glove compartment lock striker
10. Air bag case
11. Demister grille
12. Side ventilator
13. Defroster grille

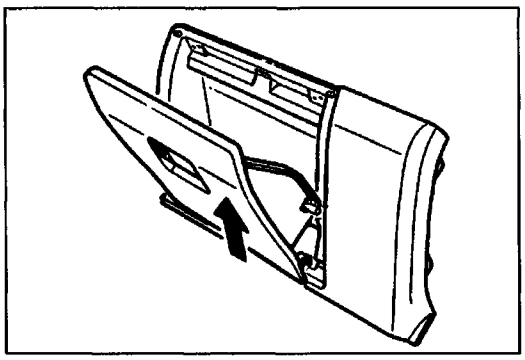
GLOVE COMPARTMENT

Removal / Installation

1. Remove as shown in the figure, referring to **Removal note.**
2. Install in the reverse order of removal.

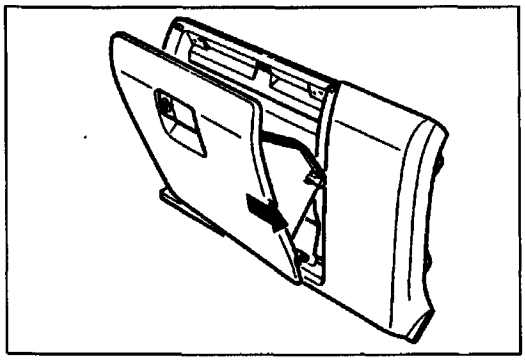


1. Glove compartment
   Removal note ..... below
   Disassembly / Assembly ..... page S1–88



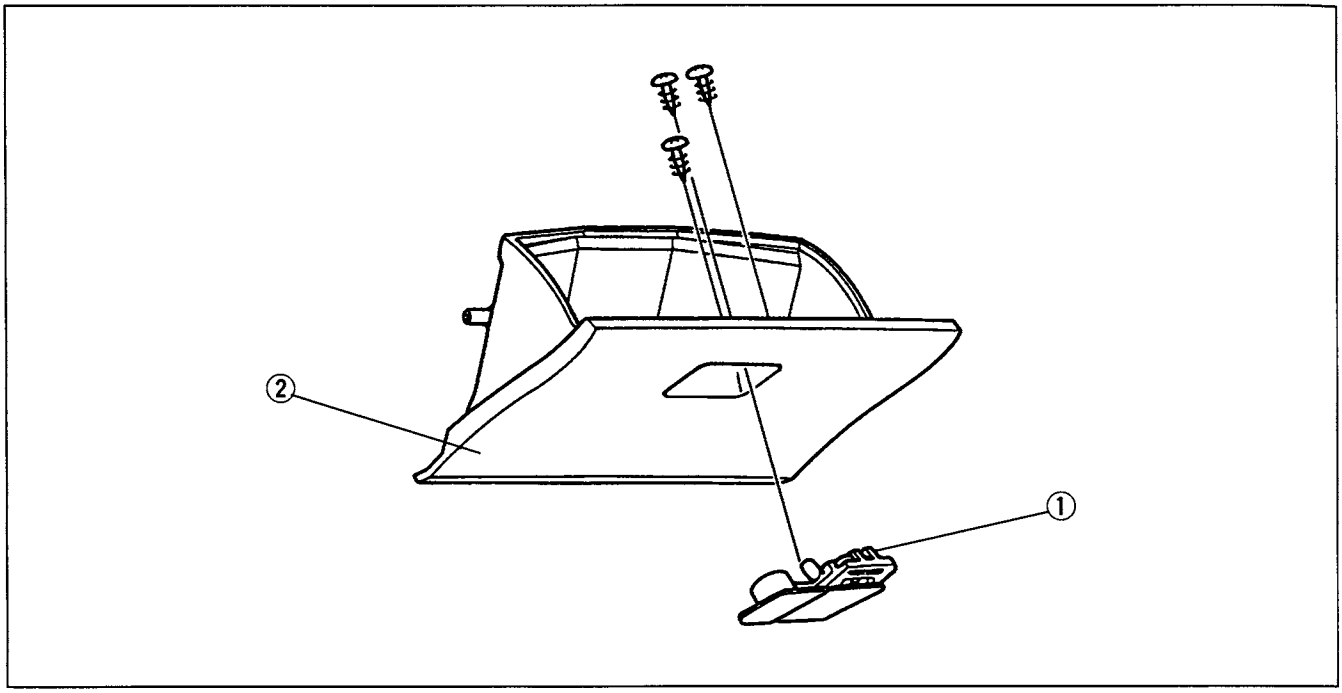
Removal note
Glove compartment

1. Open the glove compartment and pull up on the right side.



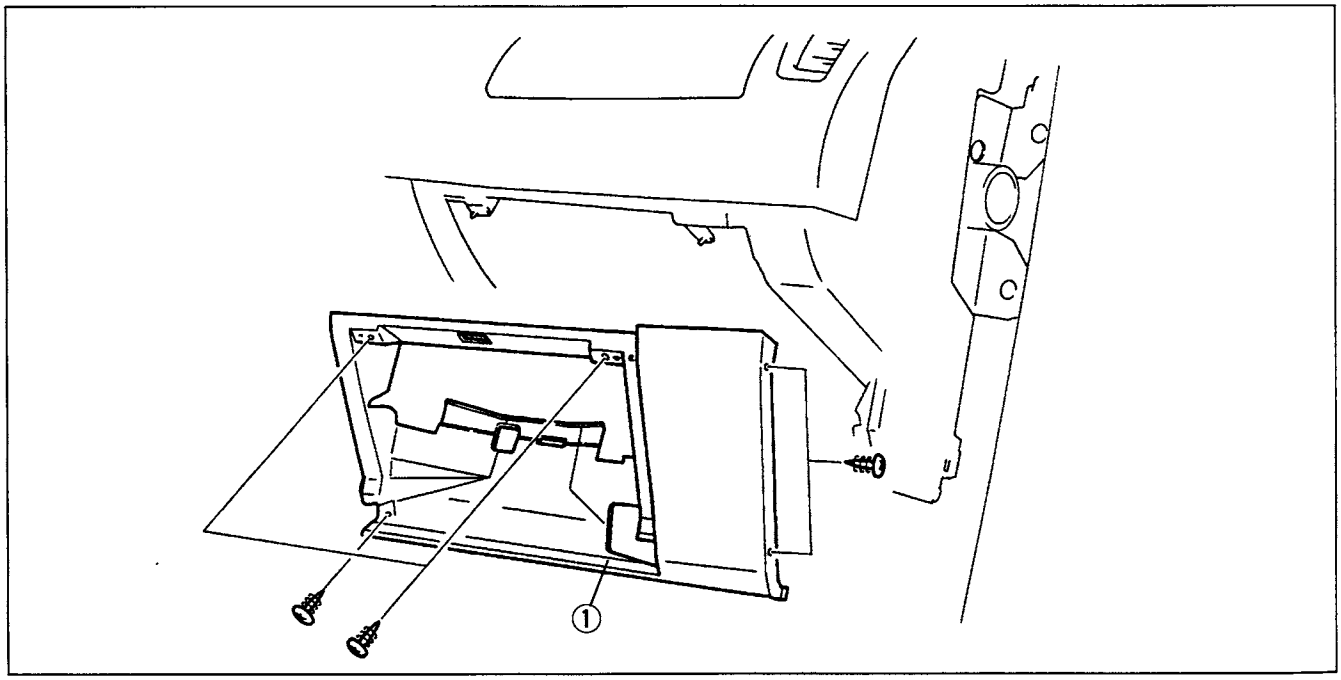
2. Slide the glove compartment to the right to remove it.

Disassembly / Assembly
1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



1. Glove compartment lock
2. Glove compartment

GLOVE COMPARTMENT COVER
Removal / Installation
1. Remove the side panel. (Refer to page S1–92.)
2. Remove the glove compartment. (Refer to page S1–87.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.

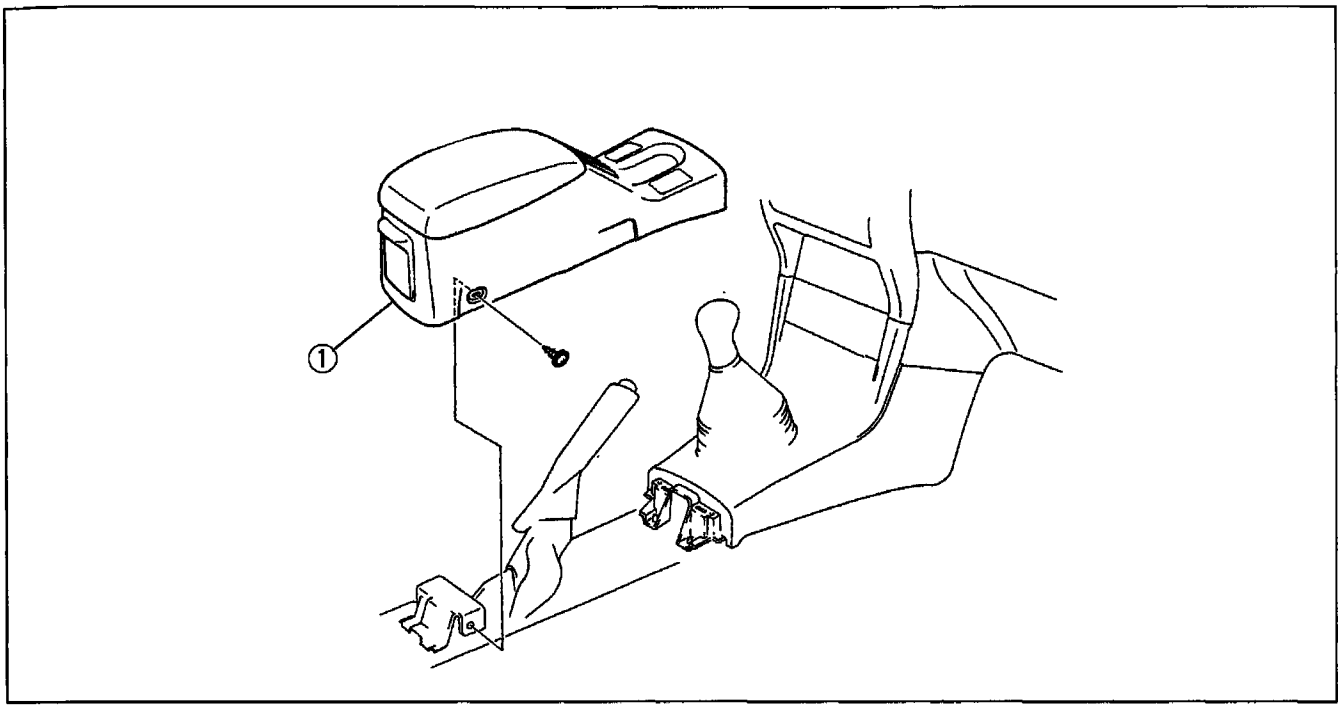


1. Glove compartment cover

REAR CONSOLE

Removal / Installation

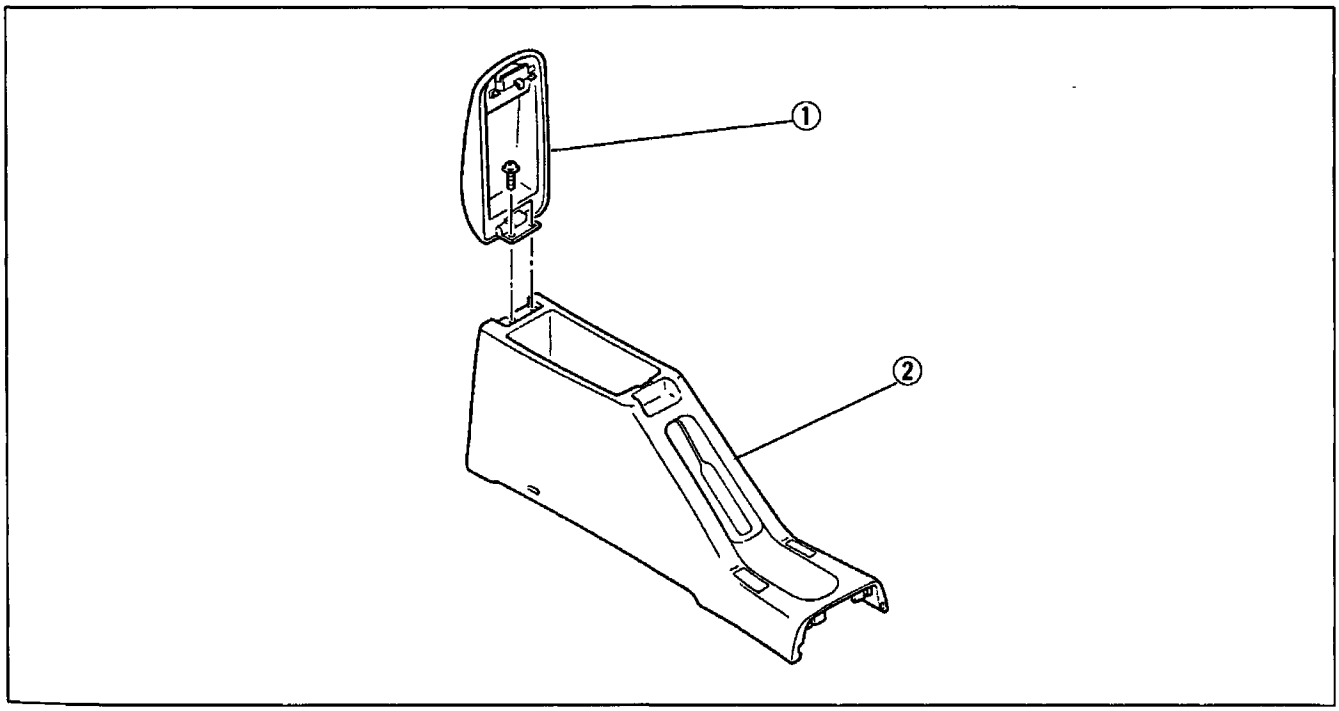
1. Remove as shown in the figure.
2. Install in the reverse order of removal.



1. Rear console
   Disassembly / Assembly ..... below

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.

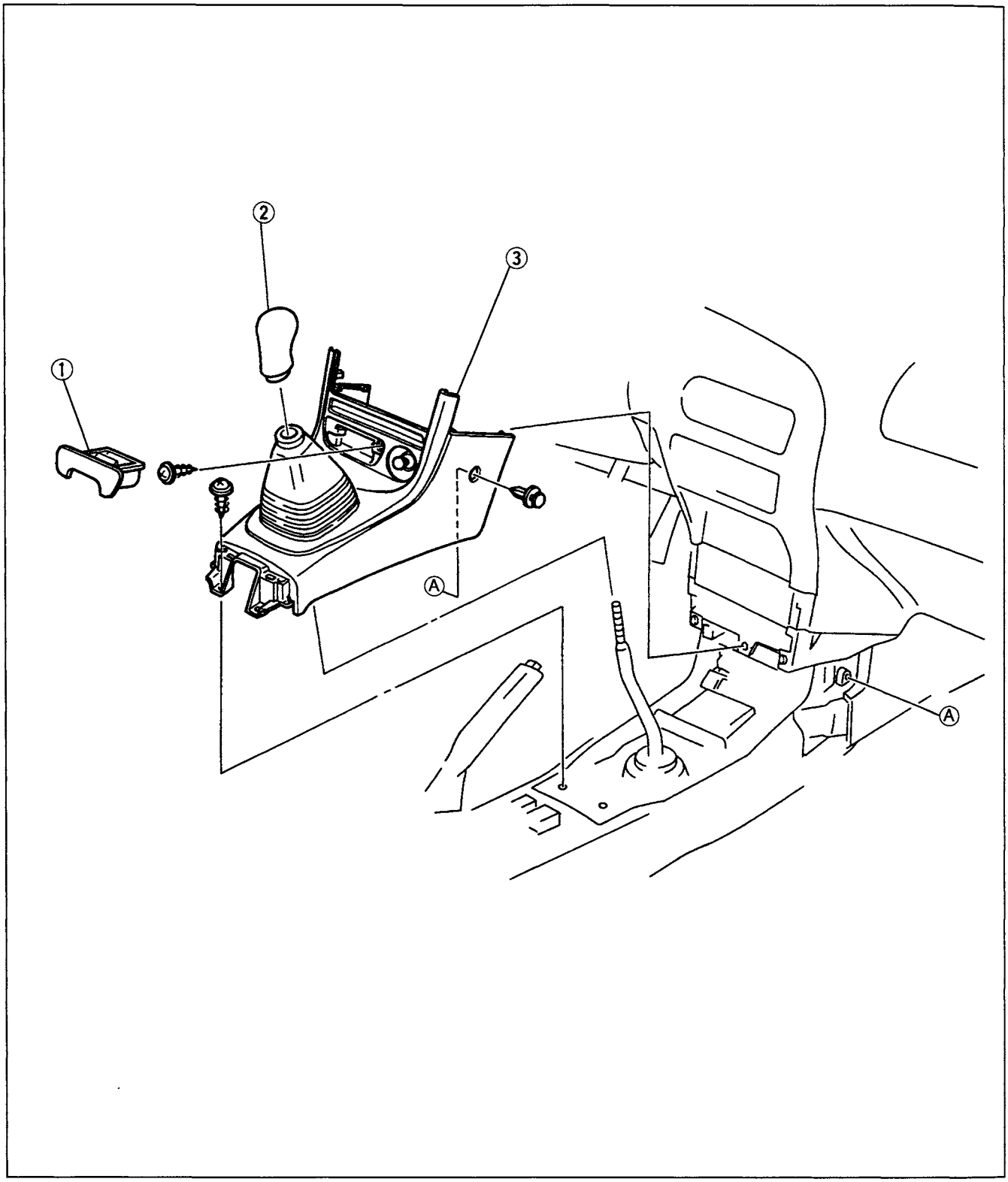


1. Rear console lid
2. Rear console

FRONT CONSOLE

Removal / Installation

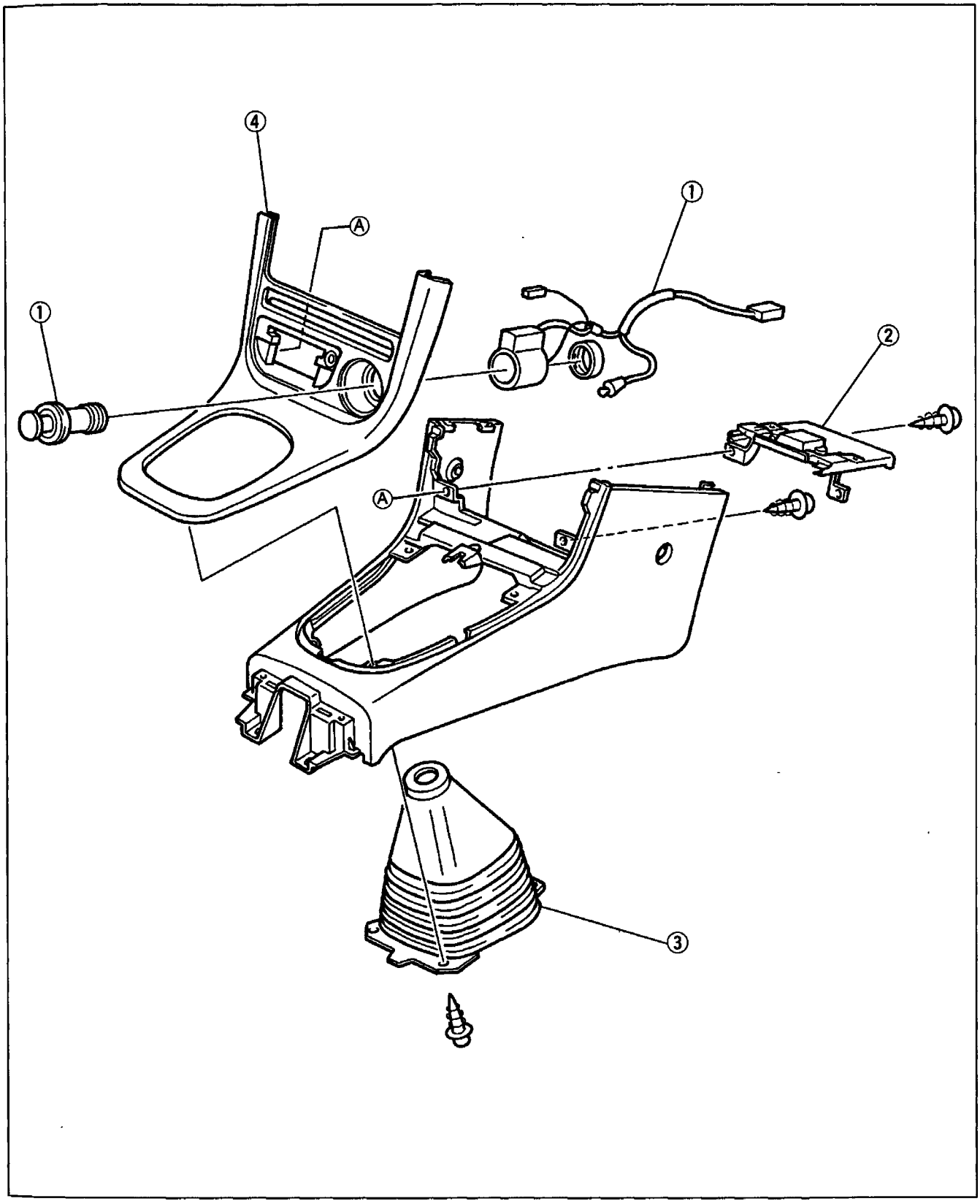
1. Disconnect the negative battery cable.
2. Remove the rear console. (Refer to page S1–89.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



1. Front ashtray
2. Shift lever knob (MTX)
3. Front console
   Disassembly / Assembly ..... page S1–91

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.

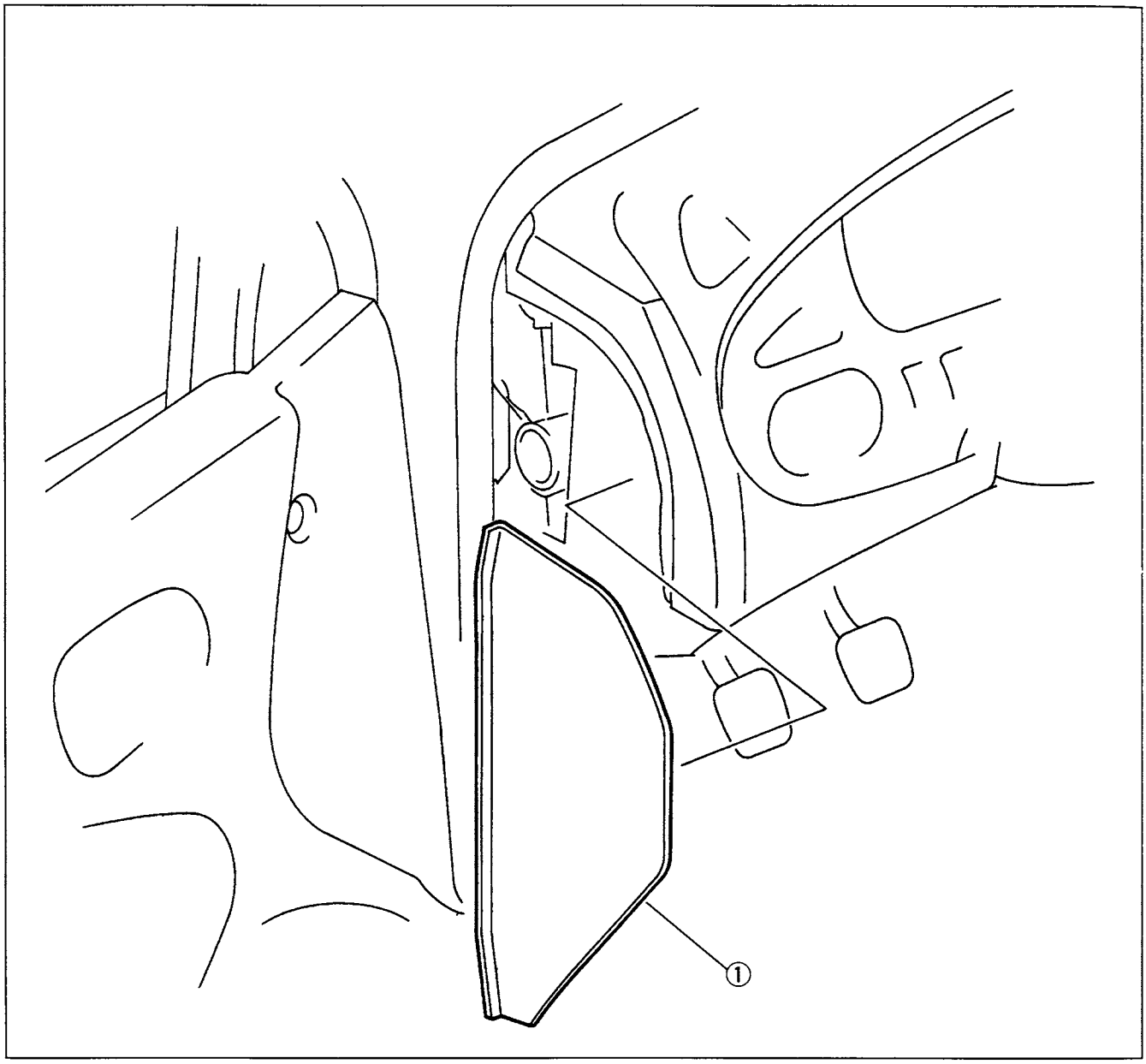


1. Cigarette lighter
2. Front ashtray bracket
3. Change boot
4. Front console panel

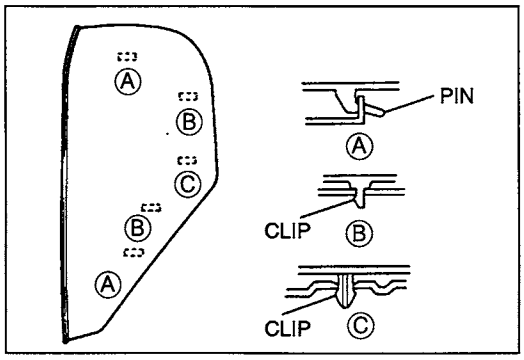
SIDE PANEL

Removal / Installation

1. Remove as shown in the figure, referring to **Removal note**.
2. Install in the reverse order of removal.



1. Side panel
   Removal note ..... below



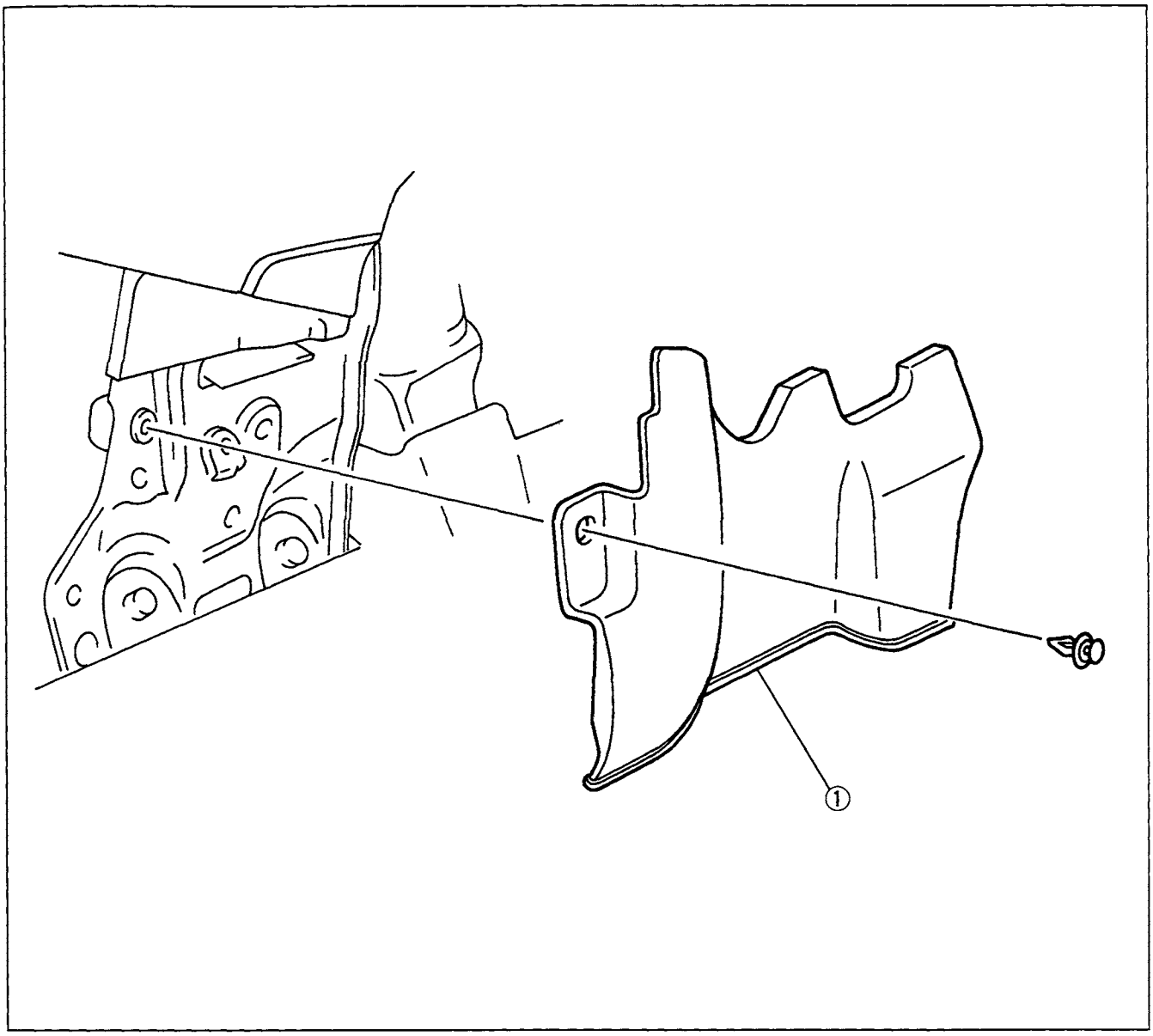
Removal note
Side panel

1. Pull the front edge of the side panel forward to remove the clips from the body.
2. Pull the side panel forward to remove the pins from the body.

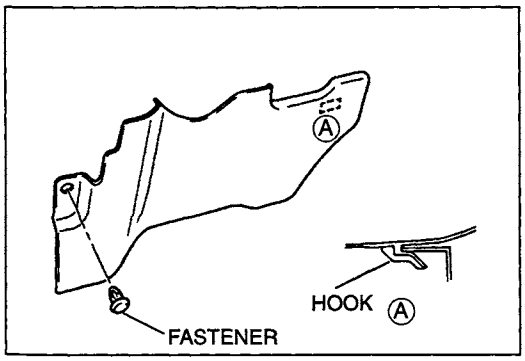
SIDE WALL

Removal / Installation

1. Remove the front console. (Refer to page S1–90.)
2. Remove as shown in the figure, referring to **Removal note**.
3. Install in the reverse order of removal.



1. Side wall
   Removal note ..... below



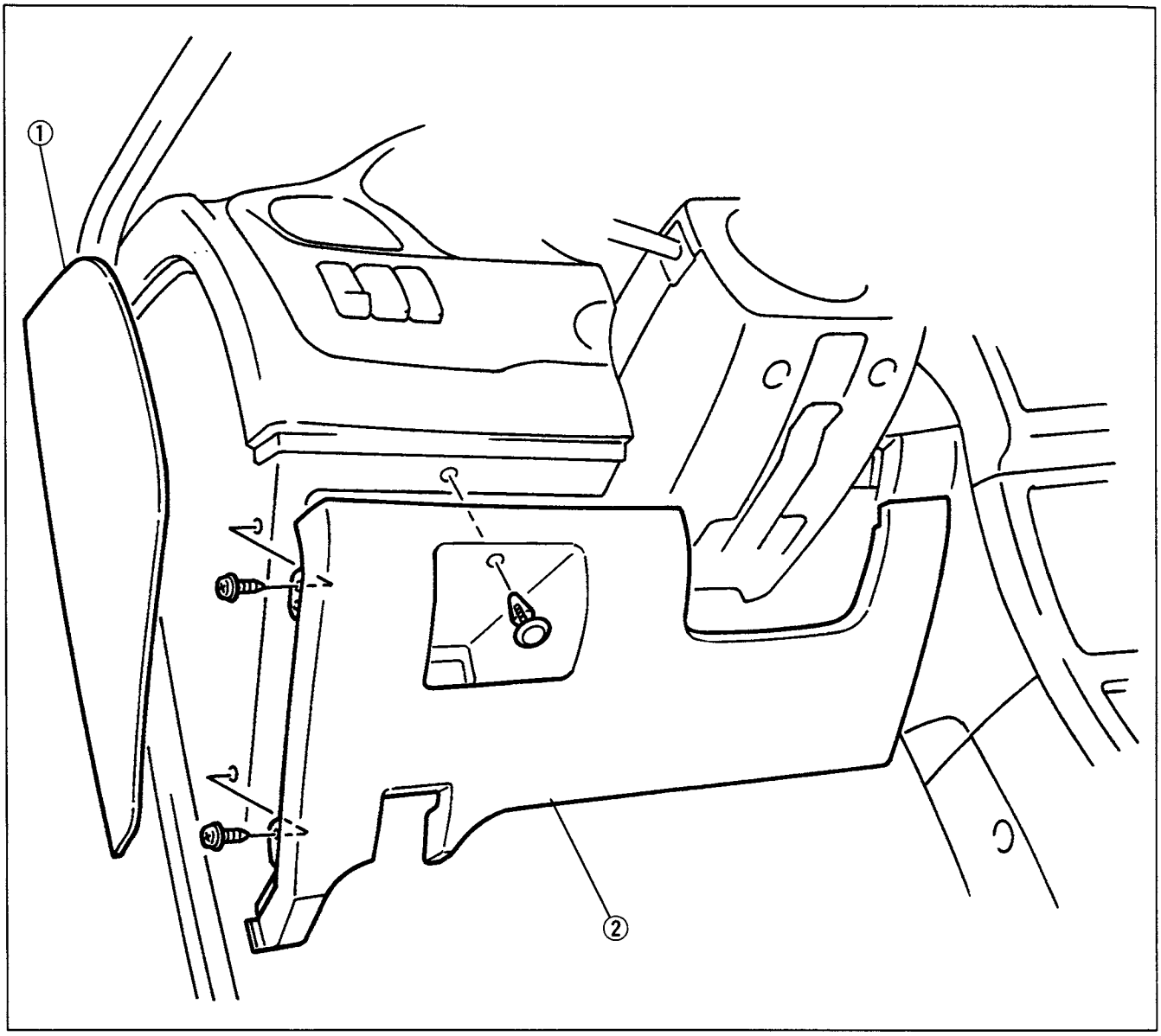
Removal note
Side wall

1. Remove the side wall installation fastener.
2. Pull the side wall forward to disengage the hook.

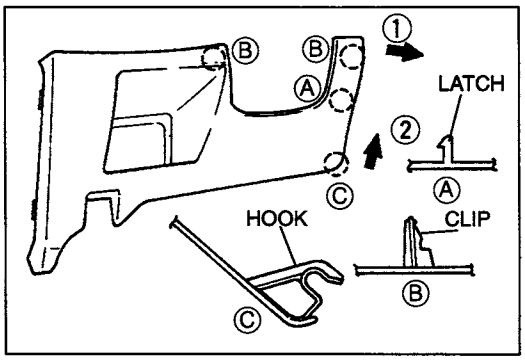
LOWER PANEL

Removal / Installation

1. Remove in the order shown in the figure, referring to **Removal note**.
2. Install in the reverse order of removal.



1. Side panel
   Removal / Installation ..... page S1–92
2. Lower panel
   Removal note ..... below



Removal note

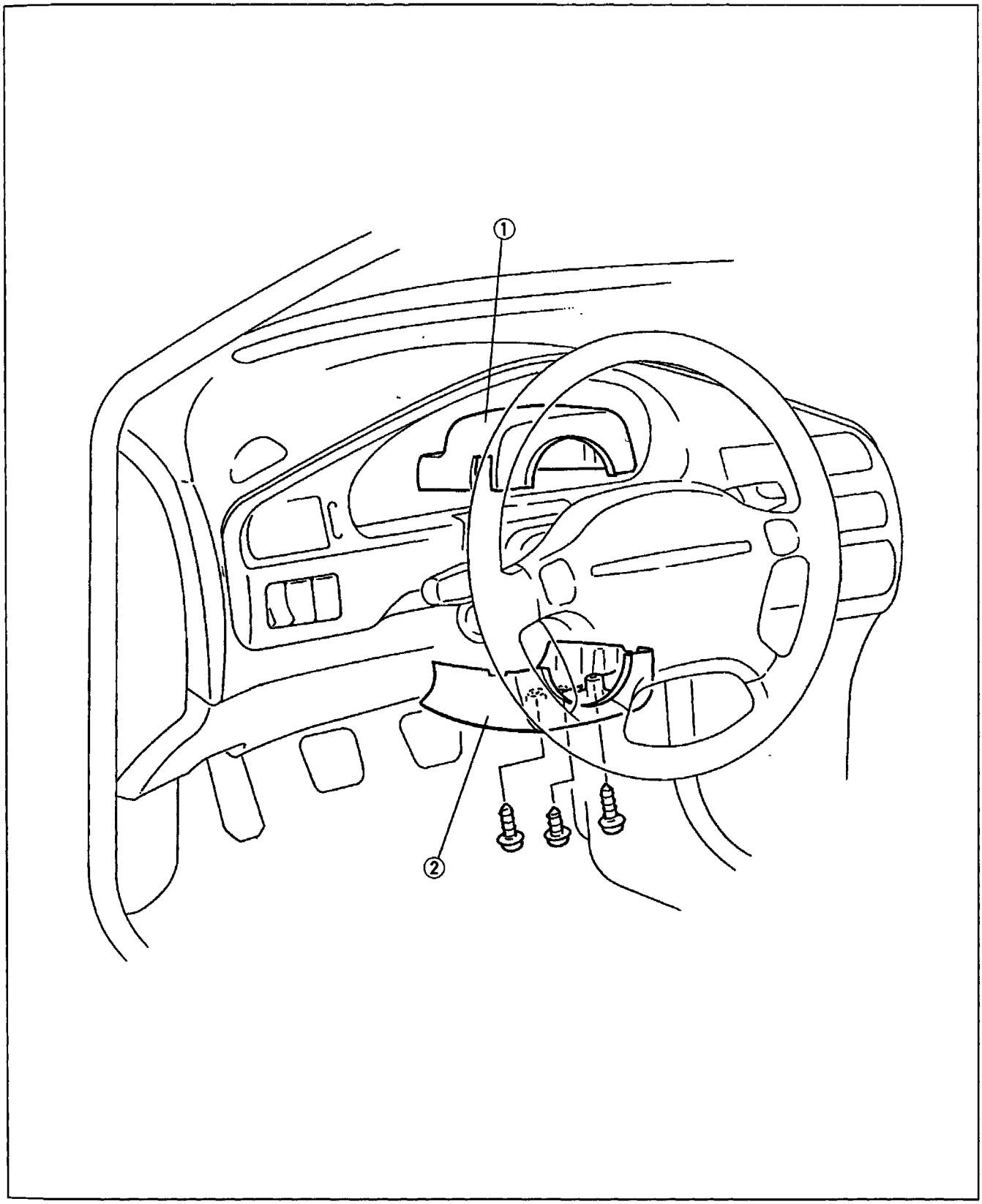
Lower panel

1. Pull the lower panel forward as indicated by arrow ① to disengage the clip from the dashboard.
2. Pull the lower panel upward as indicated by arrow ② to disengage the hook from the dashboard.

COLUMN COVER

Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order or removal.

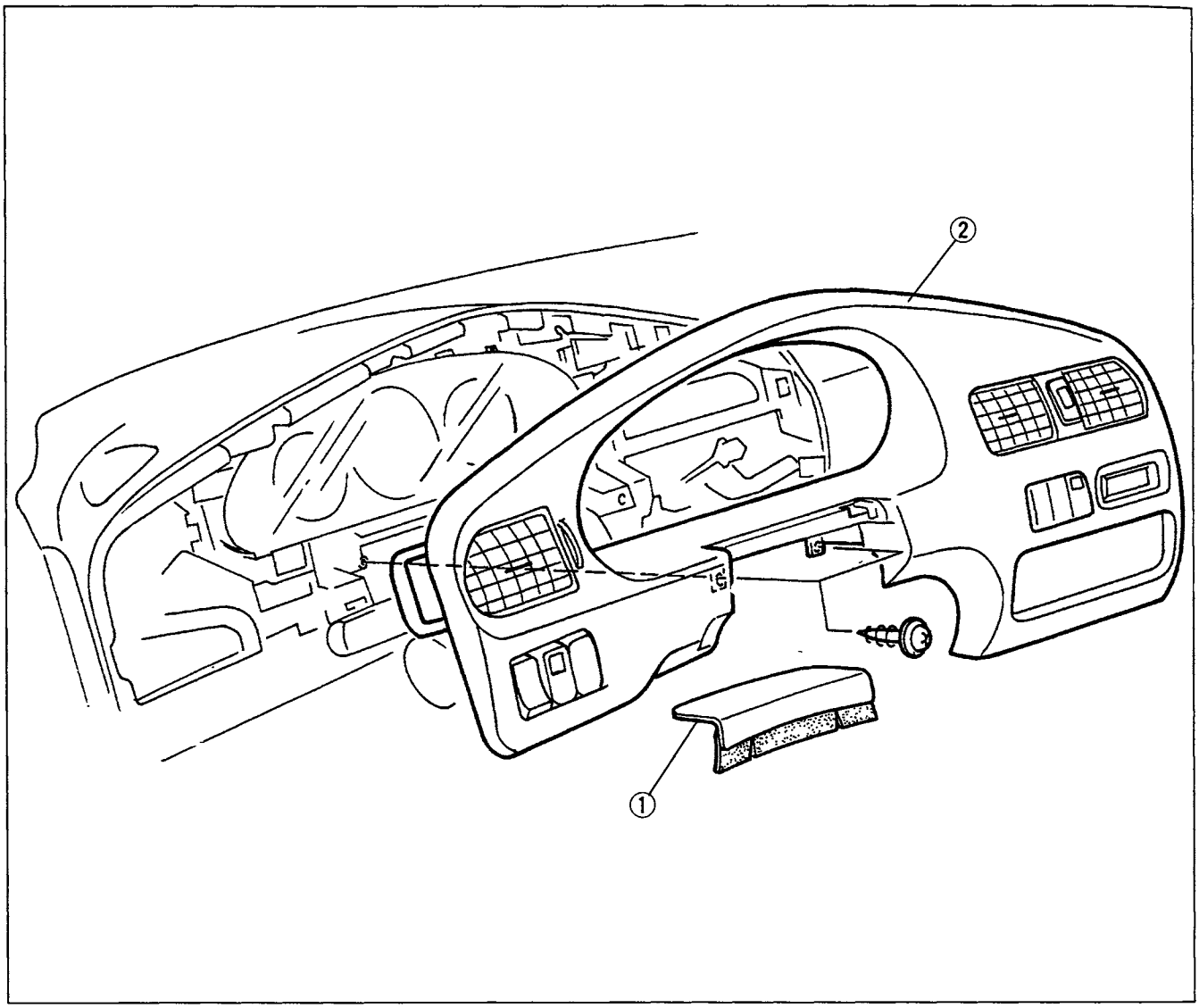


1. Upper column cover
2. Lower column cover

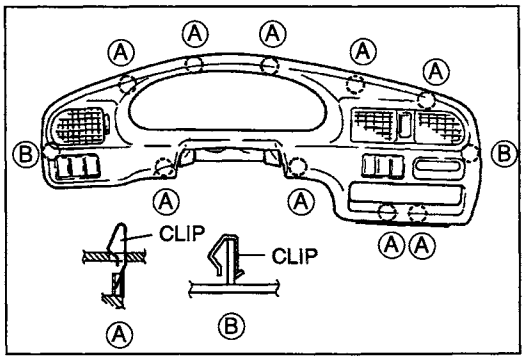
METER HOOD

Removal / Installation

1. Remove the upper column cover. (Refer to page S1–95.)
2. Remove the front console. (Refer to page S1–90.)
3. Remove in the order shown in the figure, referring to **Removal note**.
4. Install in the reverse order of removal.



1. Cover
2. Meter hood
   Removal note ..... below
   Disassembly / Assembly ..... page S1–97

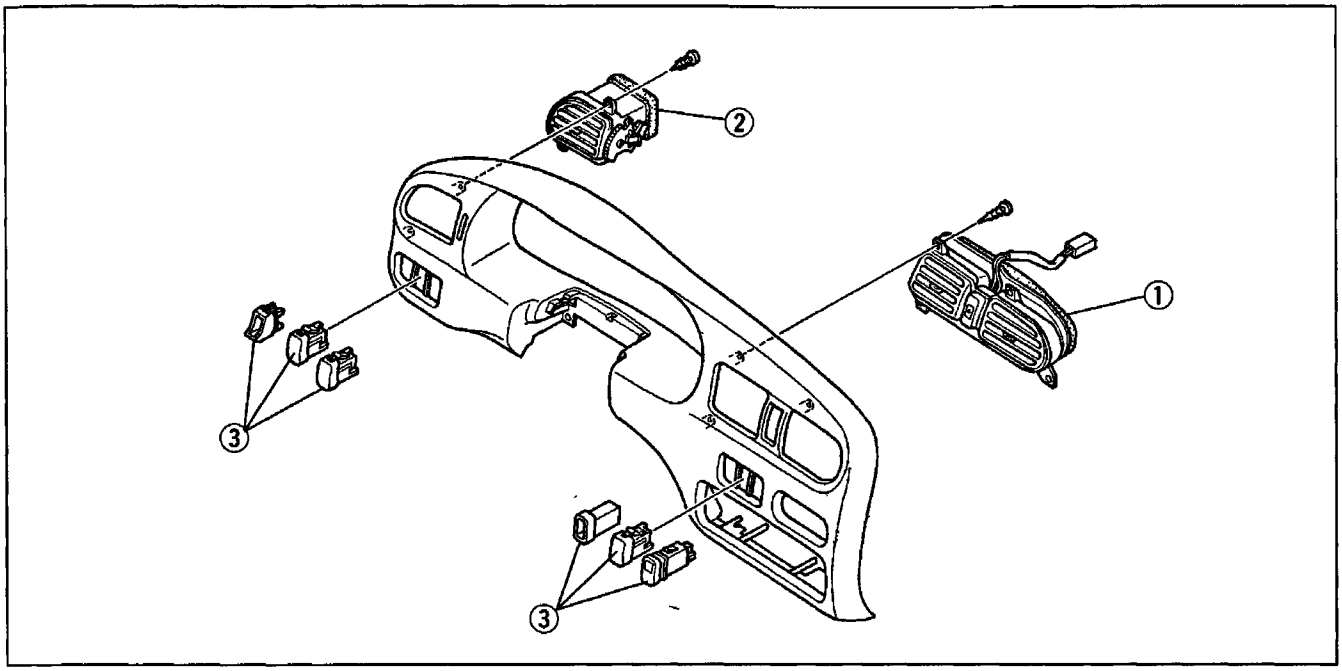


Removal note

Meter hood

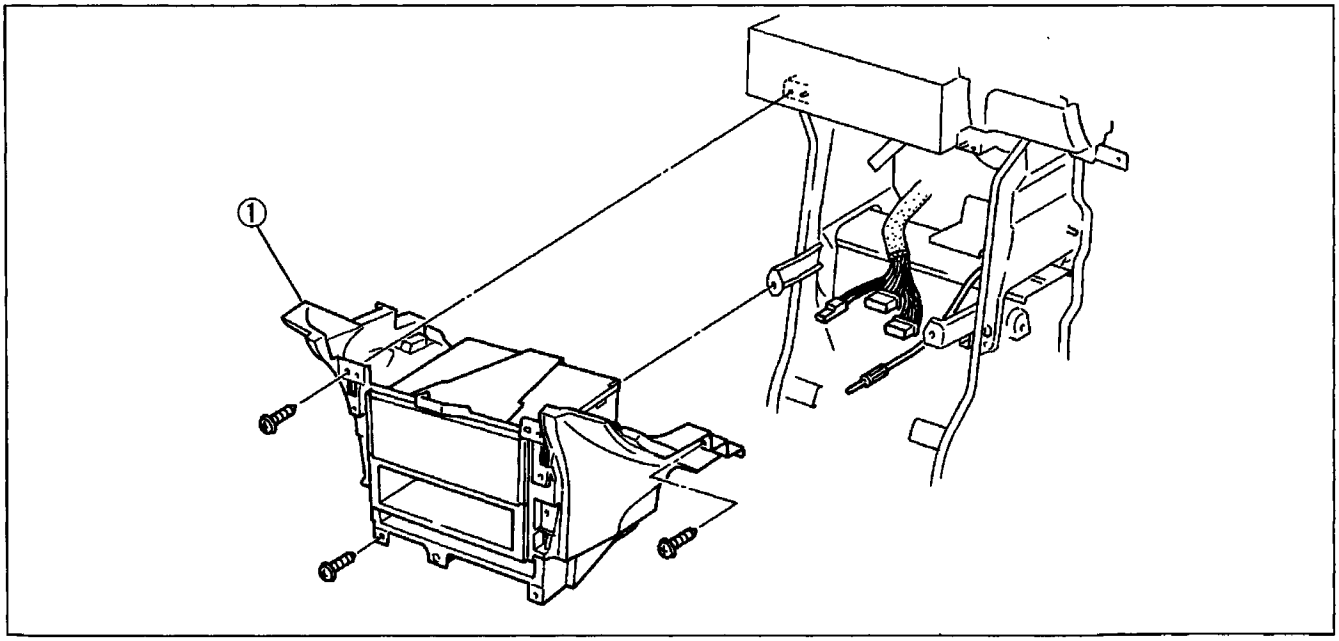
Pull the meter hood forward to disengage the clips from the body.

Disassembly / Assembly
1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



1. Louver ventilator grille
2. Side ventilator grille
3. Switch

CENTER LOWER PANEL
Removal / Installation
1. Remove the lower panel. (Refer to page S1–94.)
2. Remove the glove compartment cover. (Refer to page S1–88.)
3. Remove the front console. (Refer to page S1–90.)
4. Remove as shown in the figure.
5. Install in the reverse order of removal.

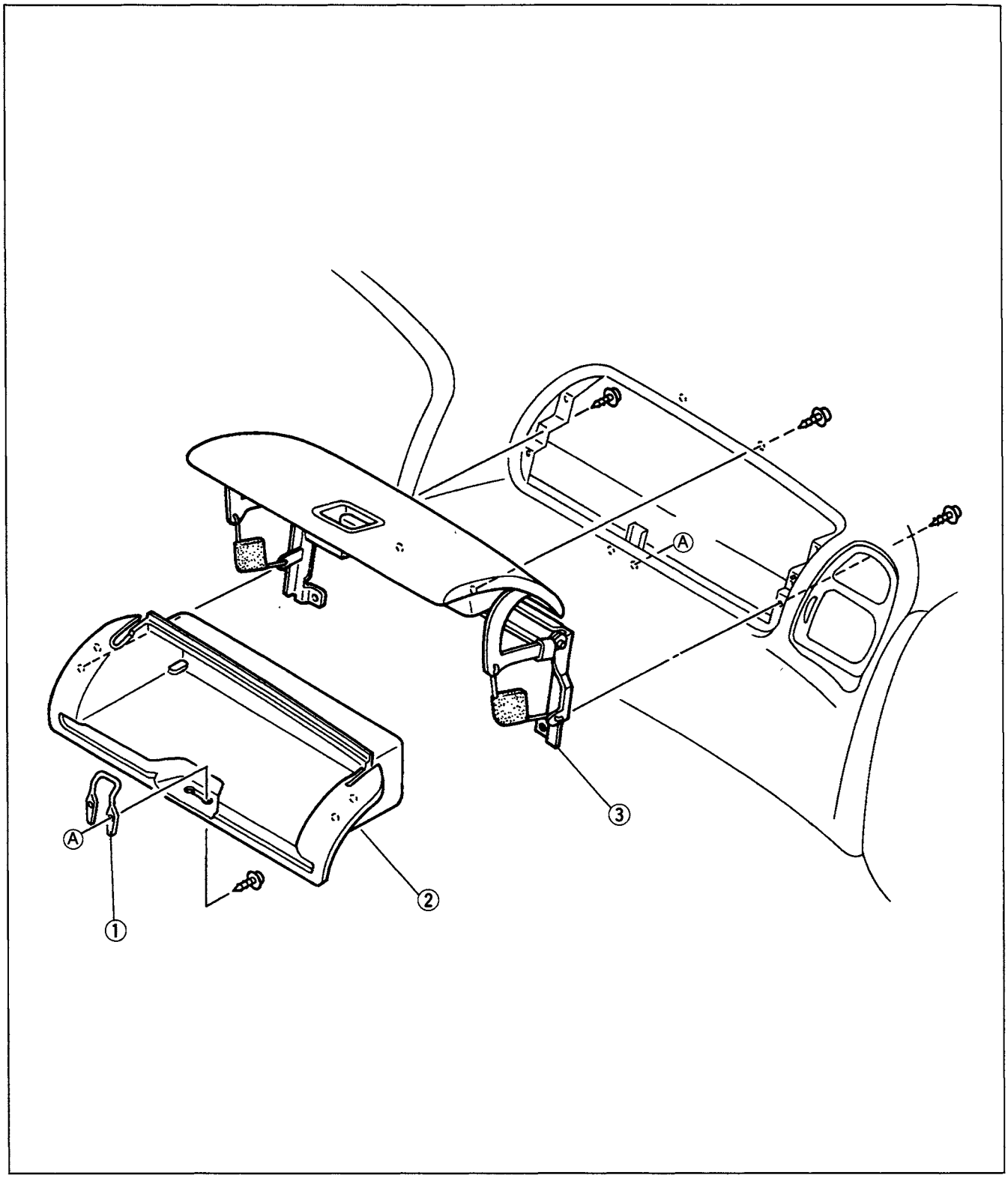


1. Center lower panel

UPPER COMPARTMENT

Removal / Installation

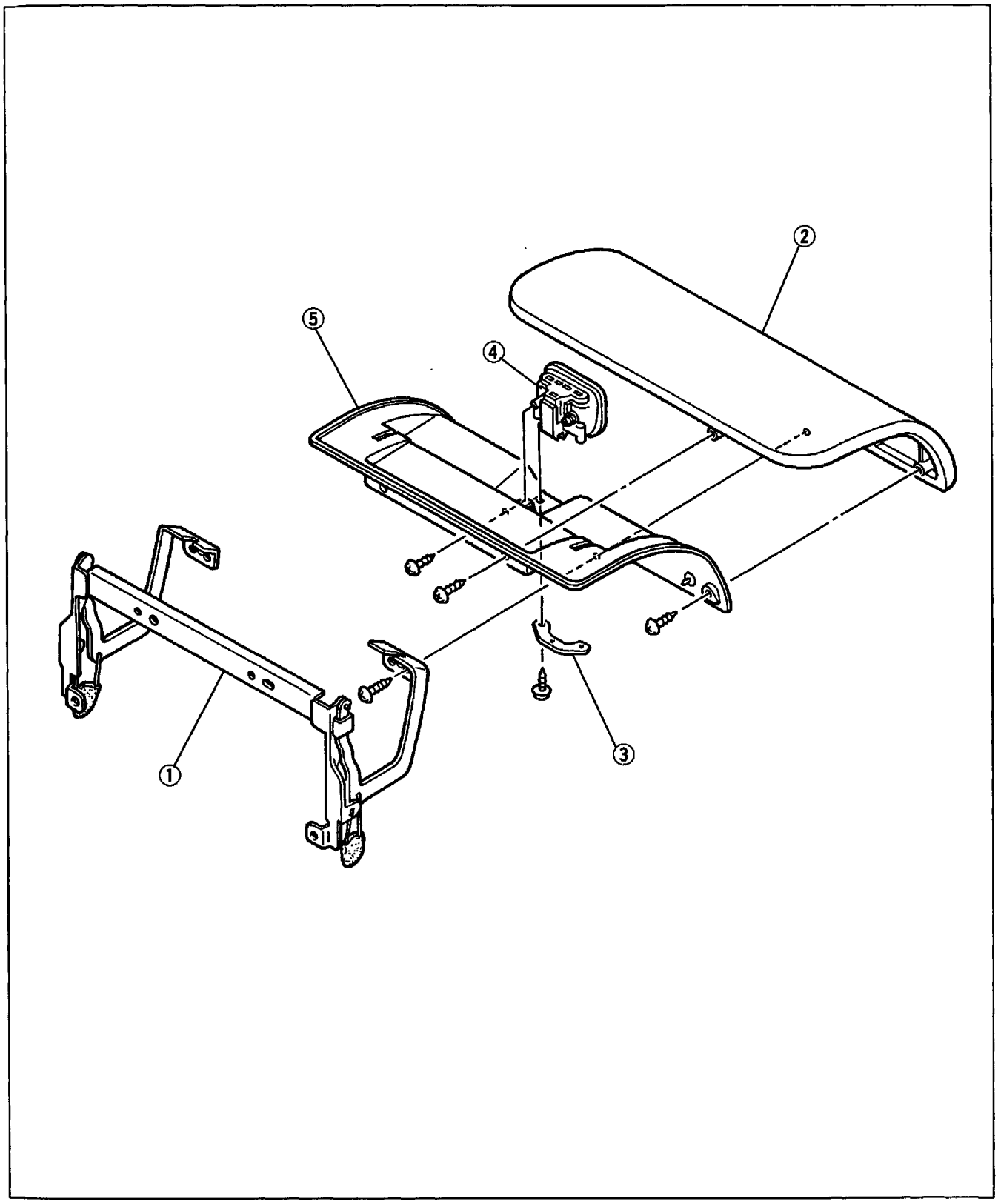
1. Remove the dashboard. (Refer to page S1–84.)
2. Remove the No.2 duct. (Refer to page S1–86.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



1. Upper compartment striker
2. Upper compartment case
3. Upper compartment lid
   Disassembly / Assembly ..... page S1–99

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



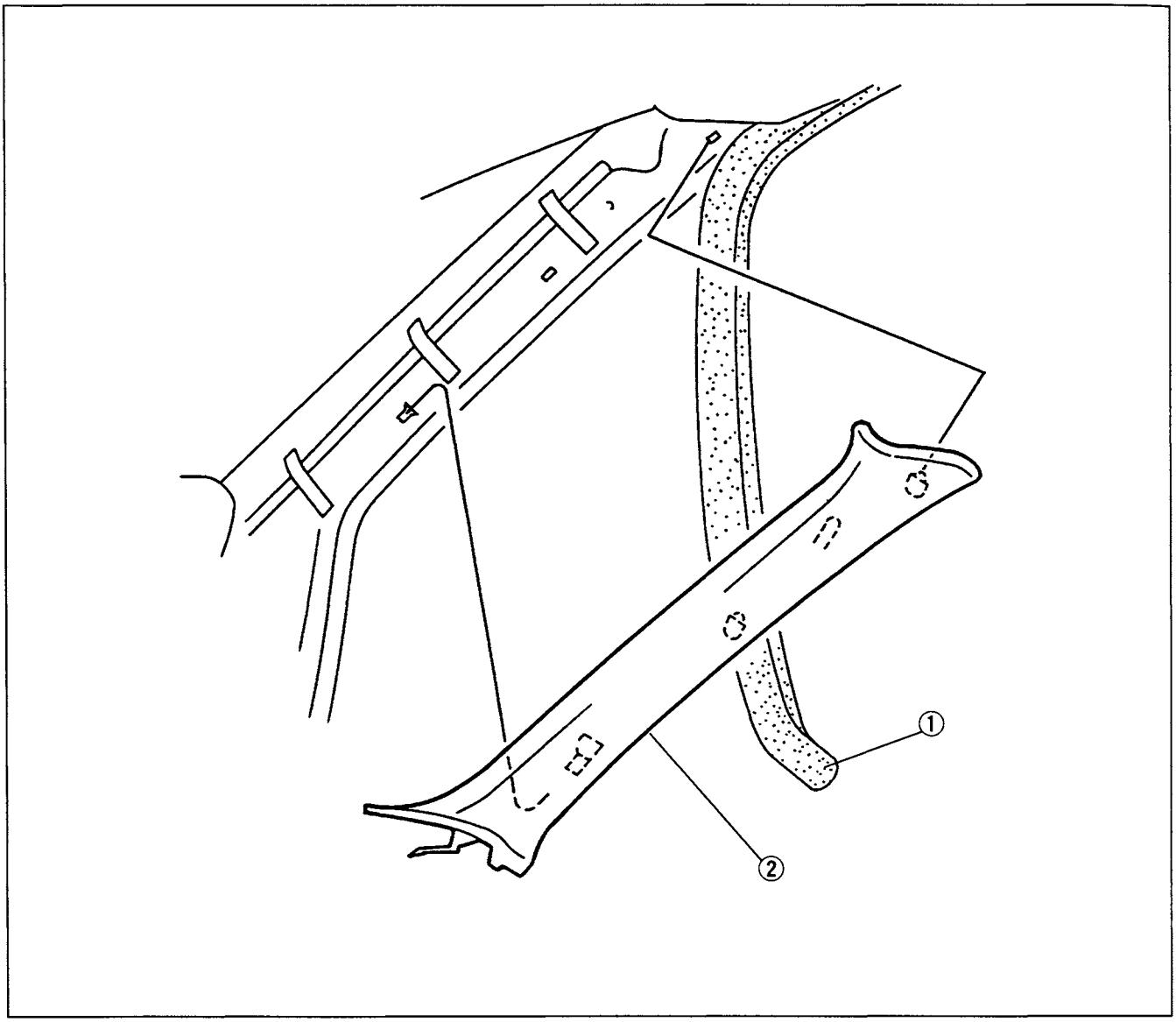
1. Upper compartment hinge
2. Upper compartment lid
3. Bracket
4. Upper compartment lock
5. Upper compartment inner lid

TRIM

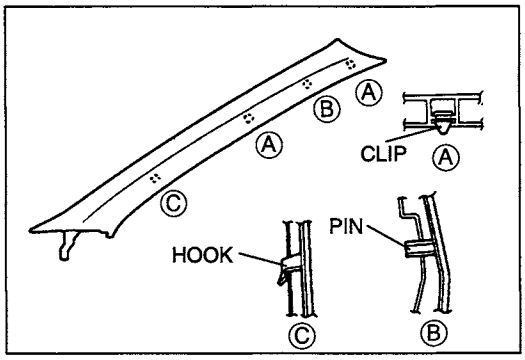
A-PILLAR TRIM

Removal / Installation

1. Remove in the order shown in the figure, referring to **Removal note**.
2. Install in the reverse order of removal.



1. Seaming welt
2. A-pillar trim
   Removal note ..... below



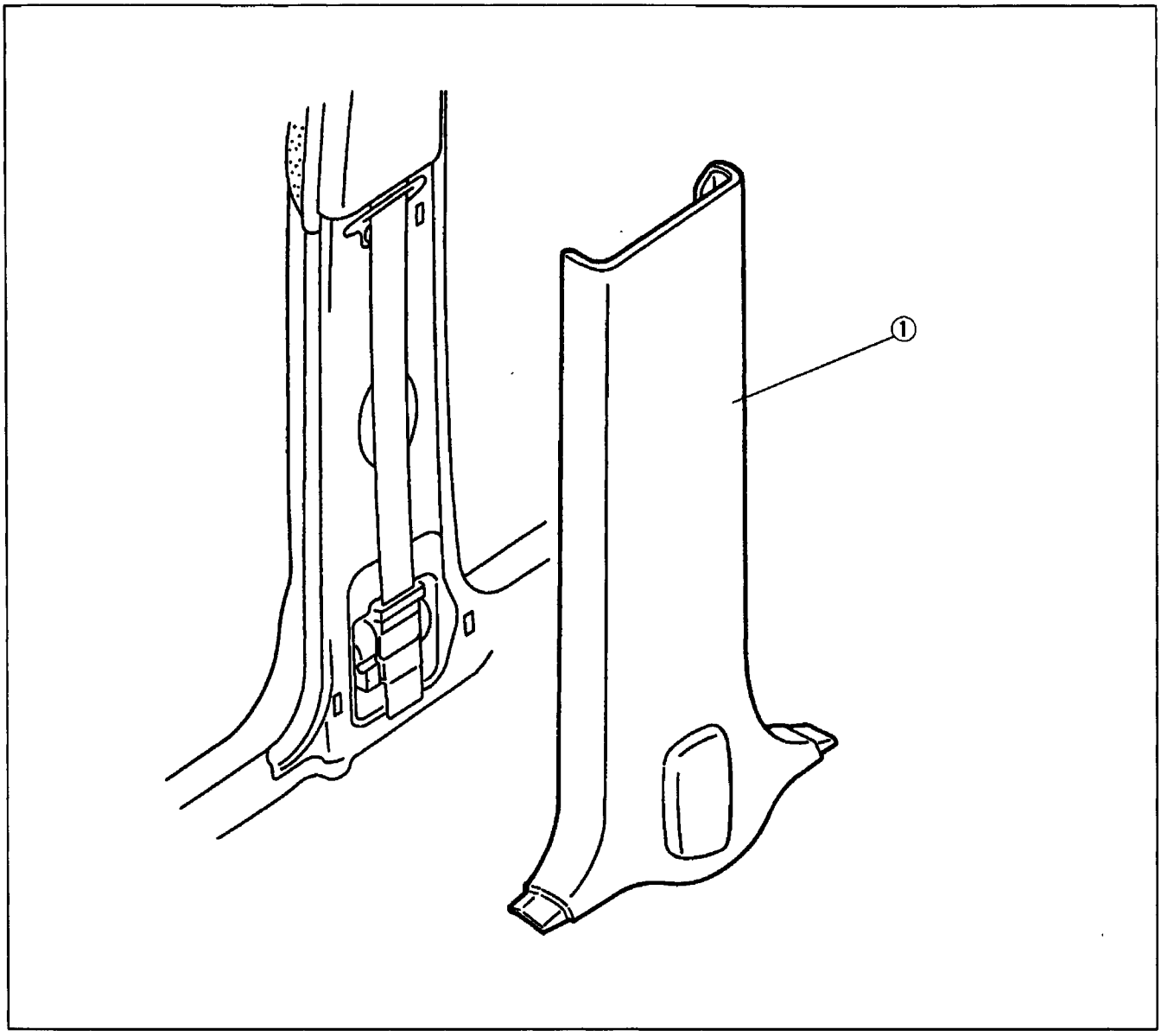
Removal note
A-pillar trim

1. Pull the A-pillar trim forward to disengage the clips and pin from the body.
2. Pull the A-pillar trim upward to disengage the hook from the body.

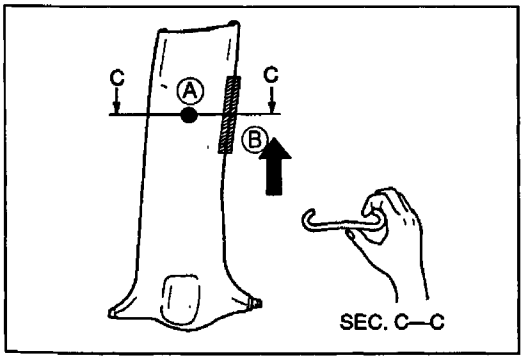
B-PILLAR LOWER TRIM

Removal / Installation

1. Remove the front scuff plate (Refer to page S1–105.) and rear scuff plate (Refer to page S1–106.).
2. Remove as shown in the figure, referring to **Removal note**.
3. Install in the reverse order of removal.



1. B-pillar lower trim
   Removal note ..... below



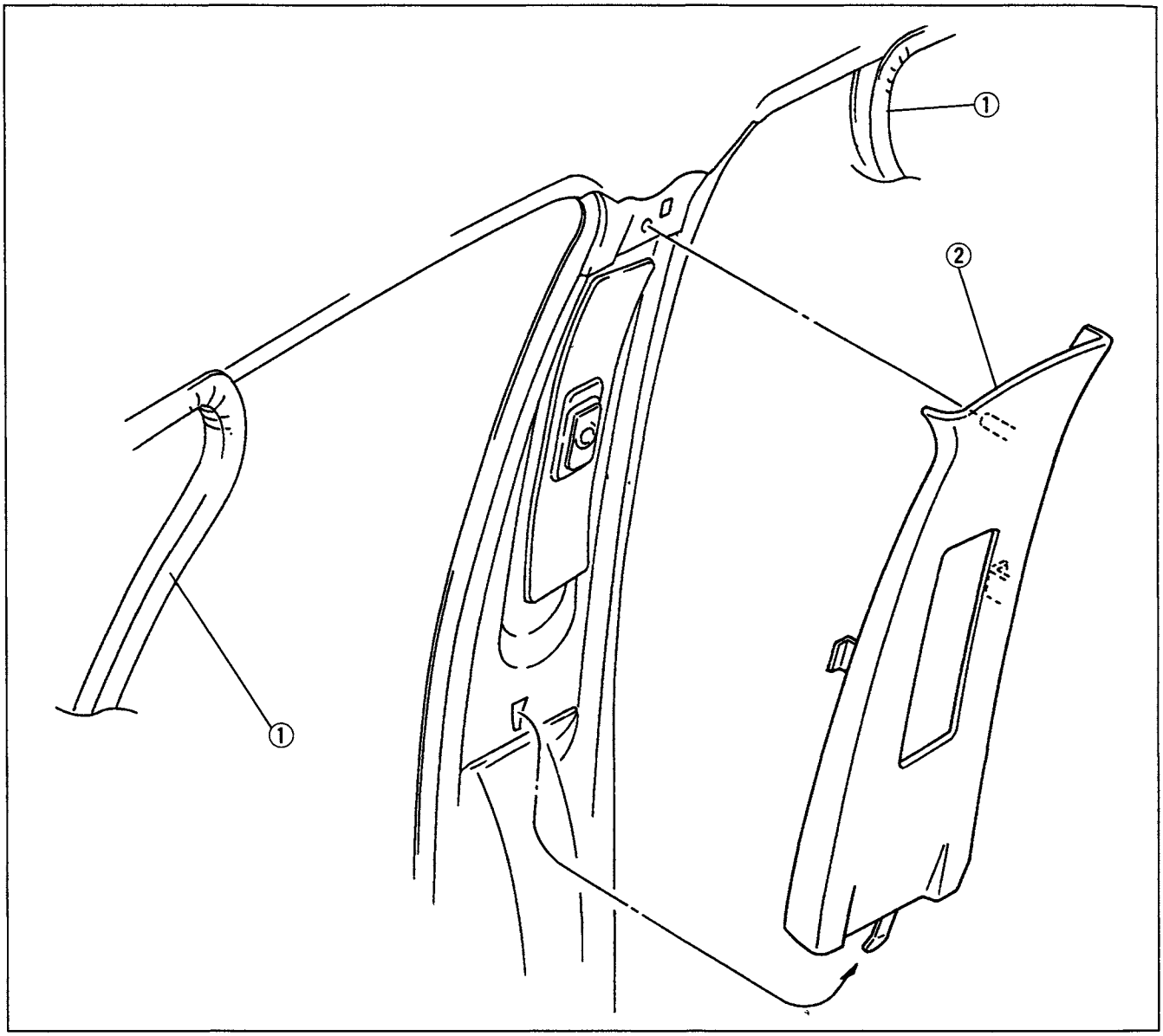
Removal note
B-pillar lower trim

1. Bend the sides of the B-pillar lower trim at area B while pushing the trim at point A as shown.
2. Pull the B-pillar lower trim upward to disengage it from the body.

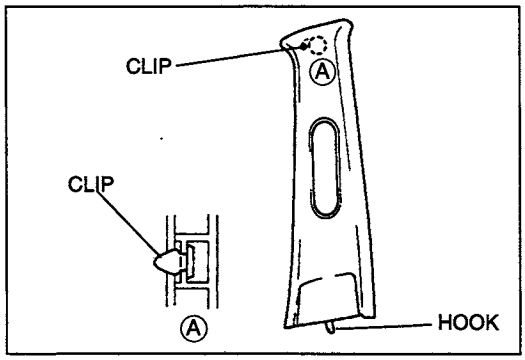
B-PILLAR UPPER TRIM

Removal / Installation

1. Remove the B-pillar lower trim. (Refer to page S1–101.)
2. Remove the front seat belt upper anchor. (Refer to page S1–117.)
3. Remove in the order shown in the figure, referring to **Removal note**.
4. Install in the reverse order of removal.



1. Seaming welt
2. B-pillar upper trim
   Removal note ..... below



Removal note

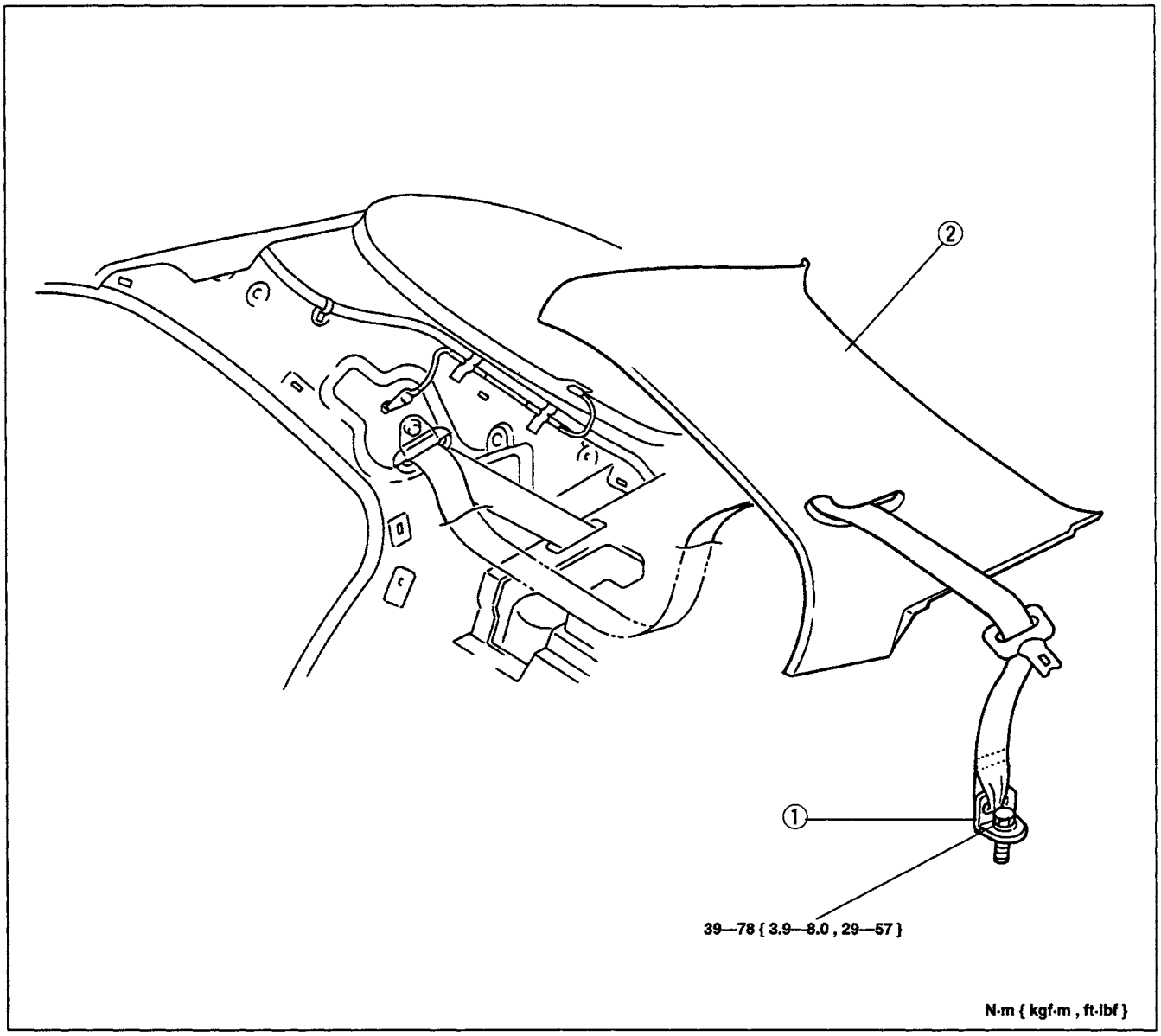
B-pillar upper trim

Pull the B-pillar upper trim to disengage the clip from the body.

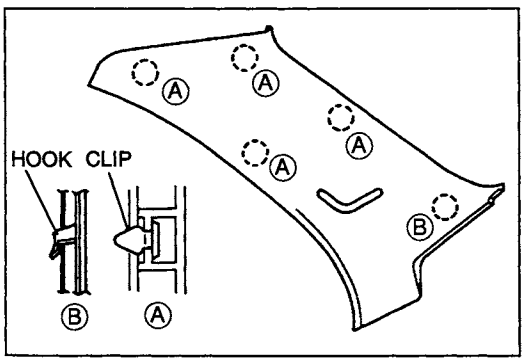
C-PILLAR TRIM

Removal / Installation

1. Remove the rear package trim. (Refer to page S1–109.)
2. Remove in the order shown in the figure, referring to **Removal note.**
3. Install in the reverse order of removal.



1. Rear seat belt lower anchor
   Removal / Installation ..... page S1–119
2. C-pillar trim
   Removal note ..... below



Removal note

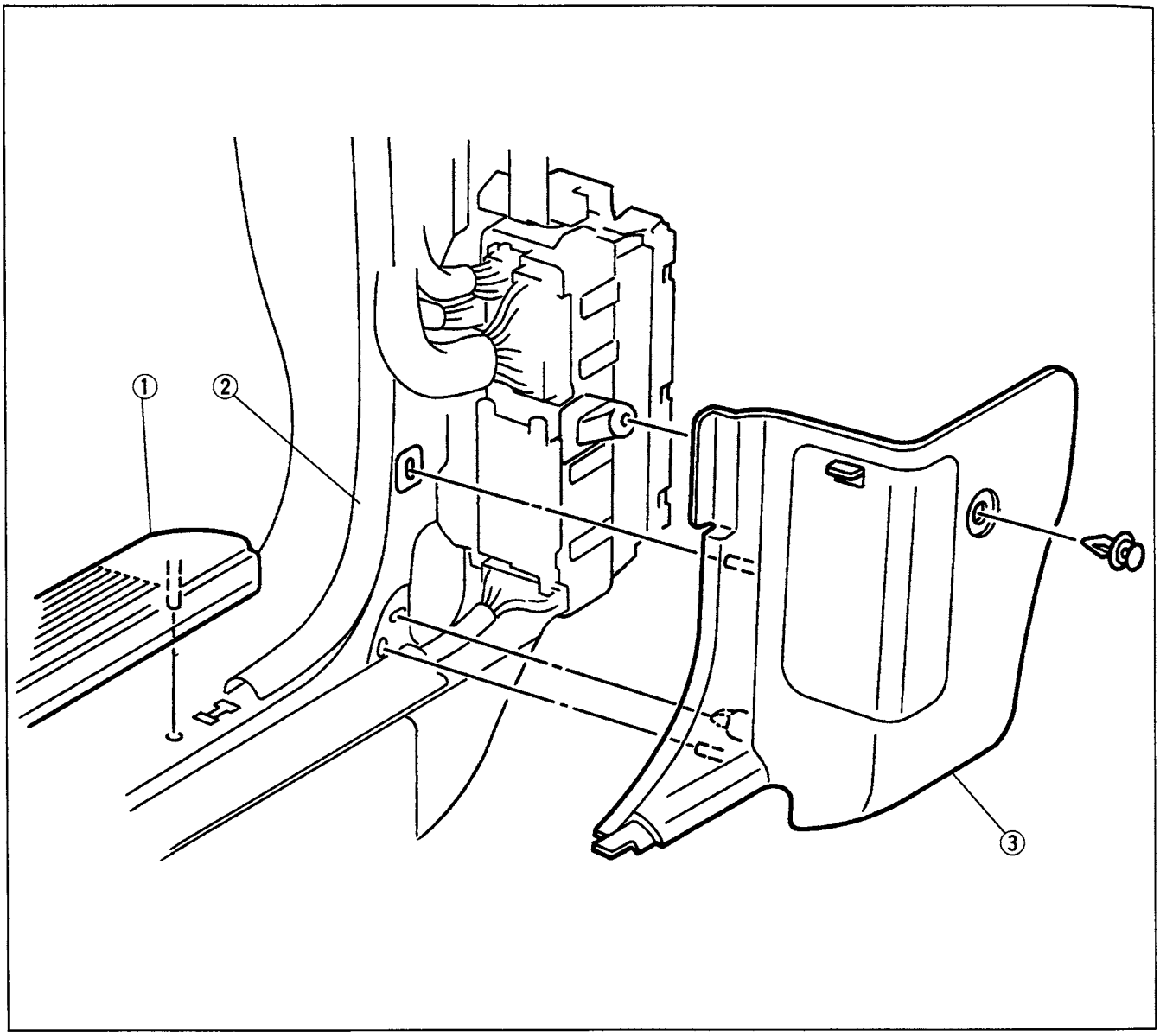
C-pillar trim

1. Pull the C-pillar trim forward to disengage the clips from the body.
2. Pull the C-pillar trim upward to disengage the hook from the body.

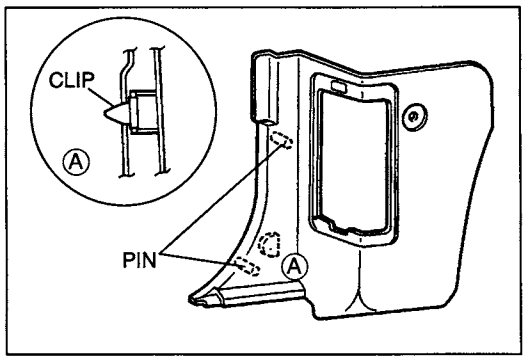
FRONT SIDE TRIM

Removal / Installation

1. Remove in the order shown in the figure, referring to **Removal note**.
2. Install in the reverse order of removal.



1. Front scuff plate
   Removal / Installation ..... page S1–105
2. Seaming welt
3. Front side trim
   Removal note ..... below



Removal note

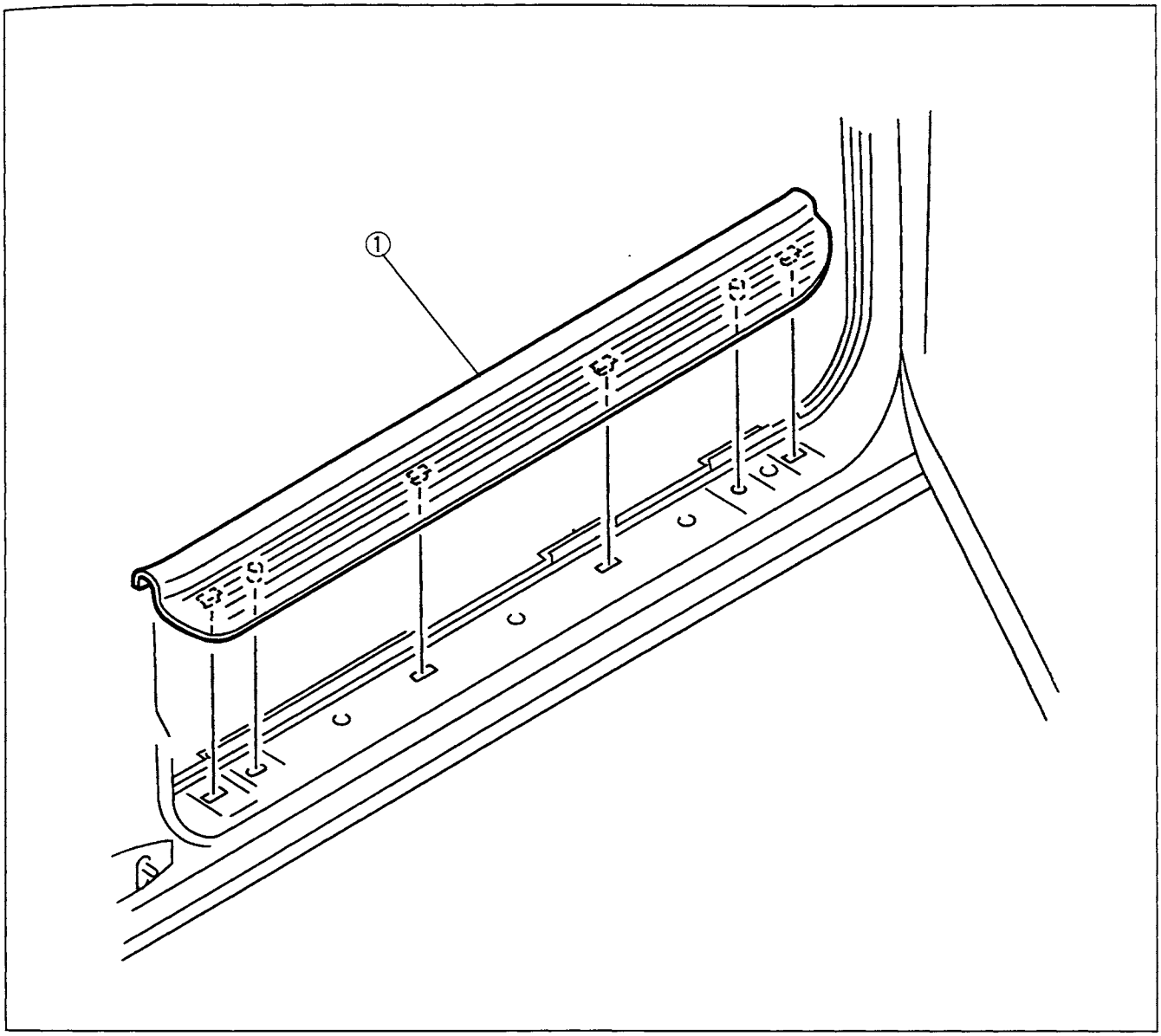
Front side trim

Pull the front side trim forward to disengage the clip and pins from the body.

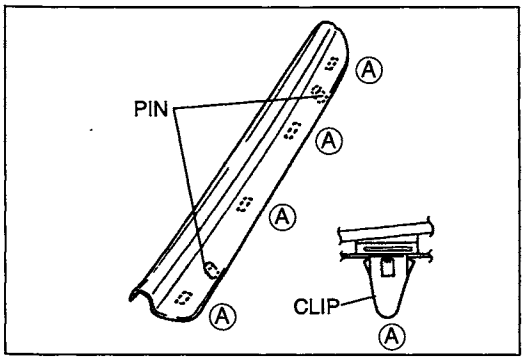
FRONT SCUFF PLATE

Removal / Installation

1. Remove as shown in the figure, referring to **Removal note.**
2. Install in the reverse order of removal.



1. Front scuff plate
   Removal note ..... below

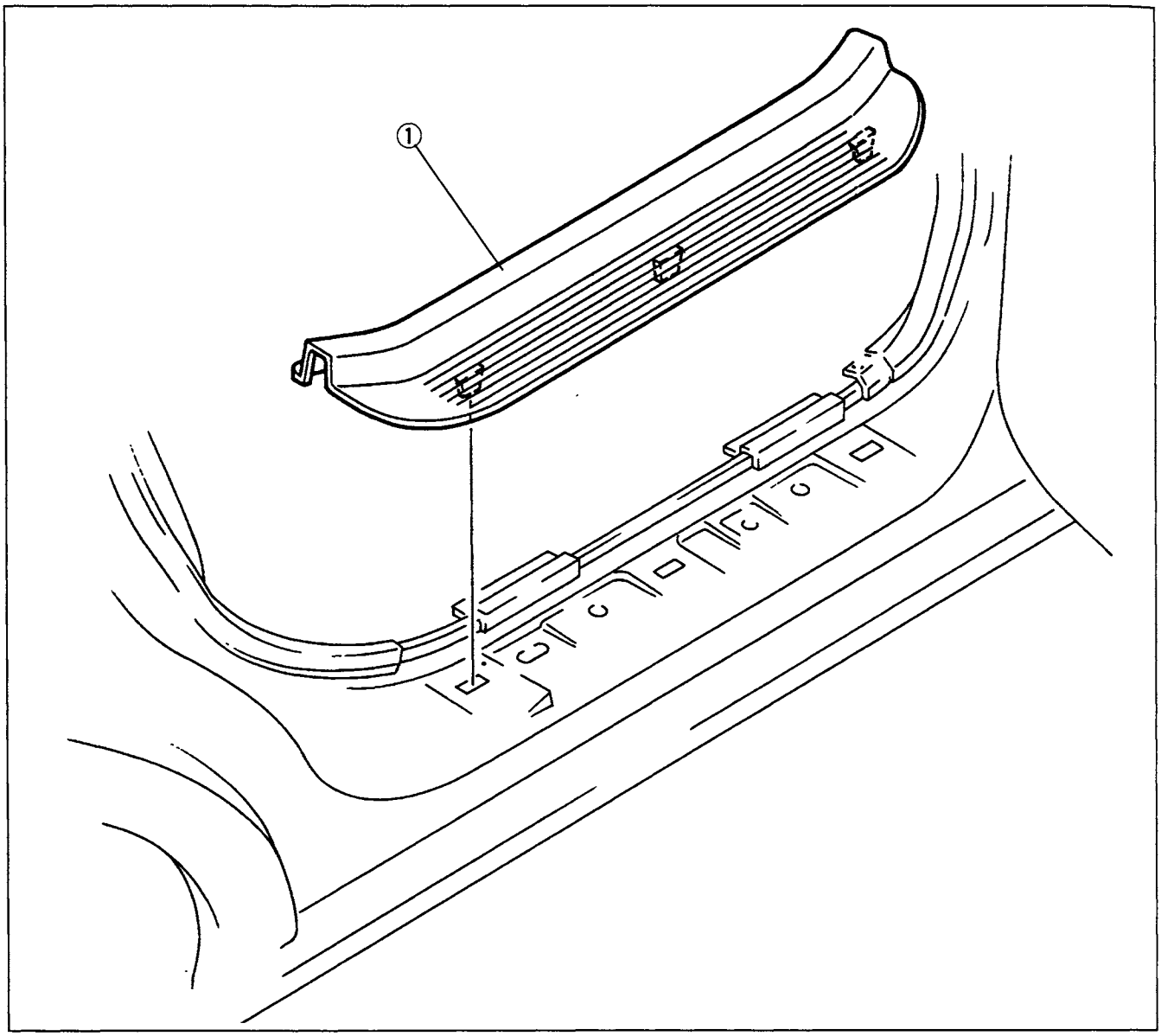


Removal note

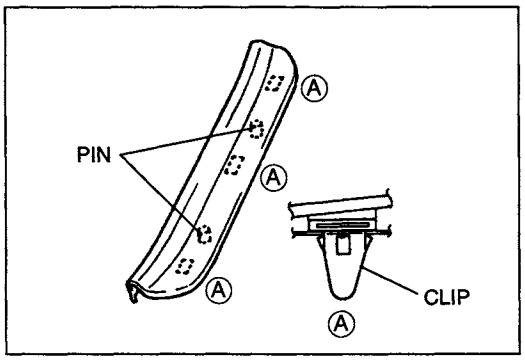
Front scuff plate

Pull the front scuff plate upward to disengage the clips and pins from the body.

REAR SCUFF PLATE
Removal / Installation
1. Remove as shown in the figure, referring to **Removal note.**
2. Install in the reverse order of removal.



1. Rear scuff plate
   Removal note ..... below

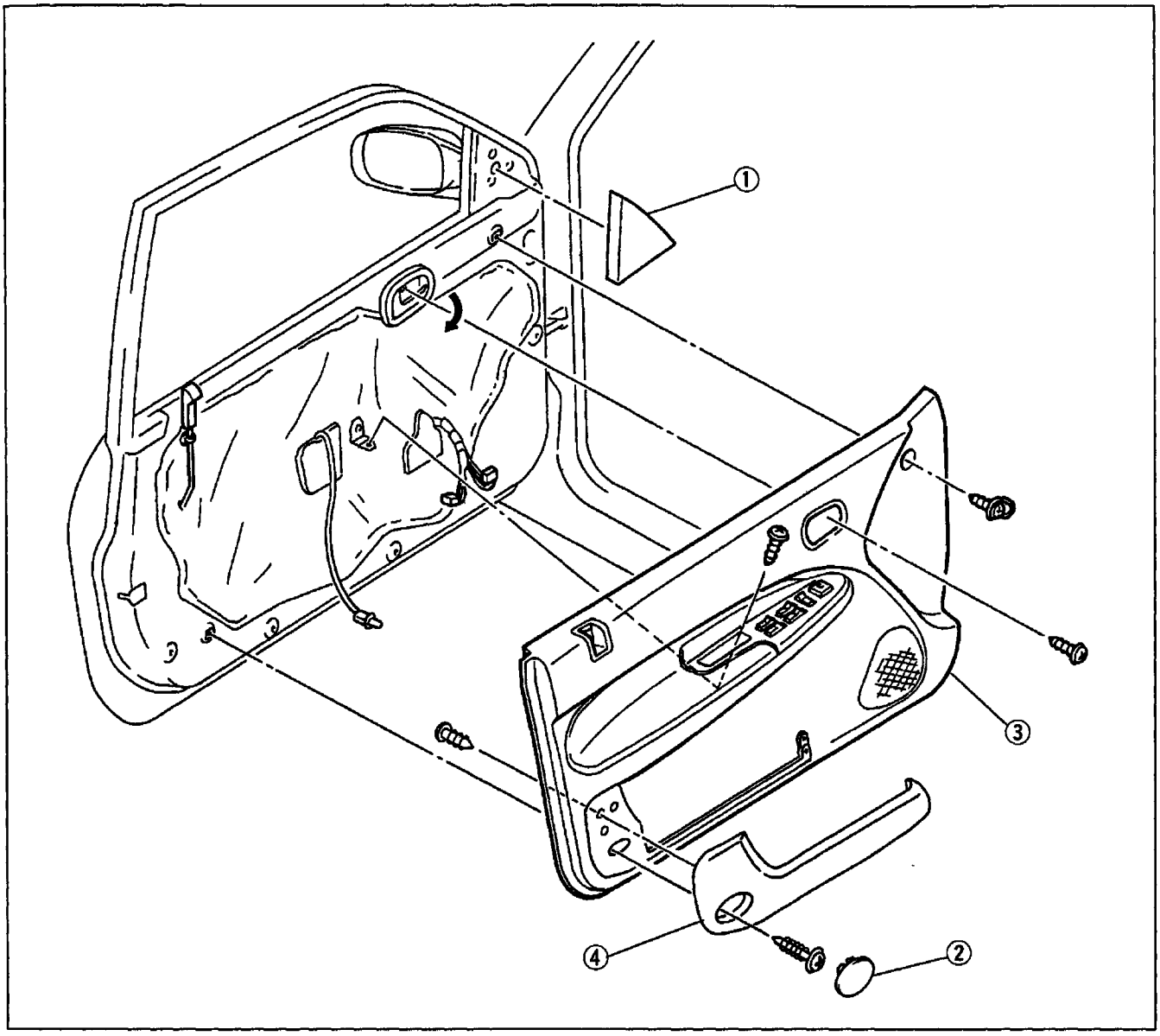


Removal note
Rear scuff plate
Pull the rear scuff plate upward to disengage the clips and pins from the body.

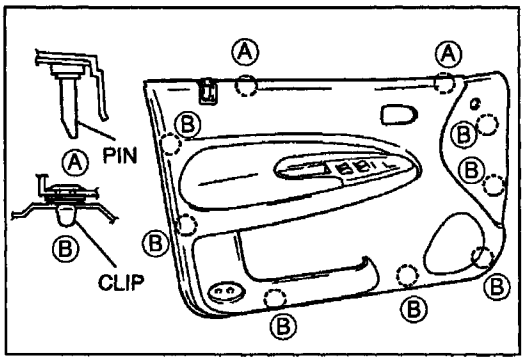
FRONT DOOR TRIM

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure, referring to **Removal note**.
3. Install in the reverse order of removal.



1. Inner garnish
2. Lens
3. Front door trim
   Removal note ..... below
4. Door trim pocket



Removal note

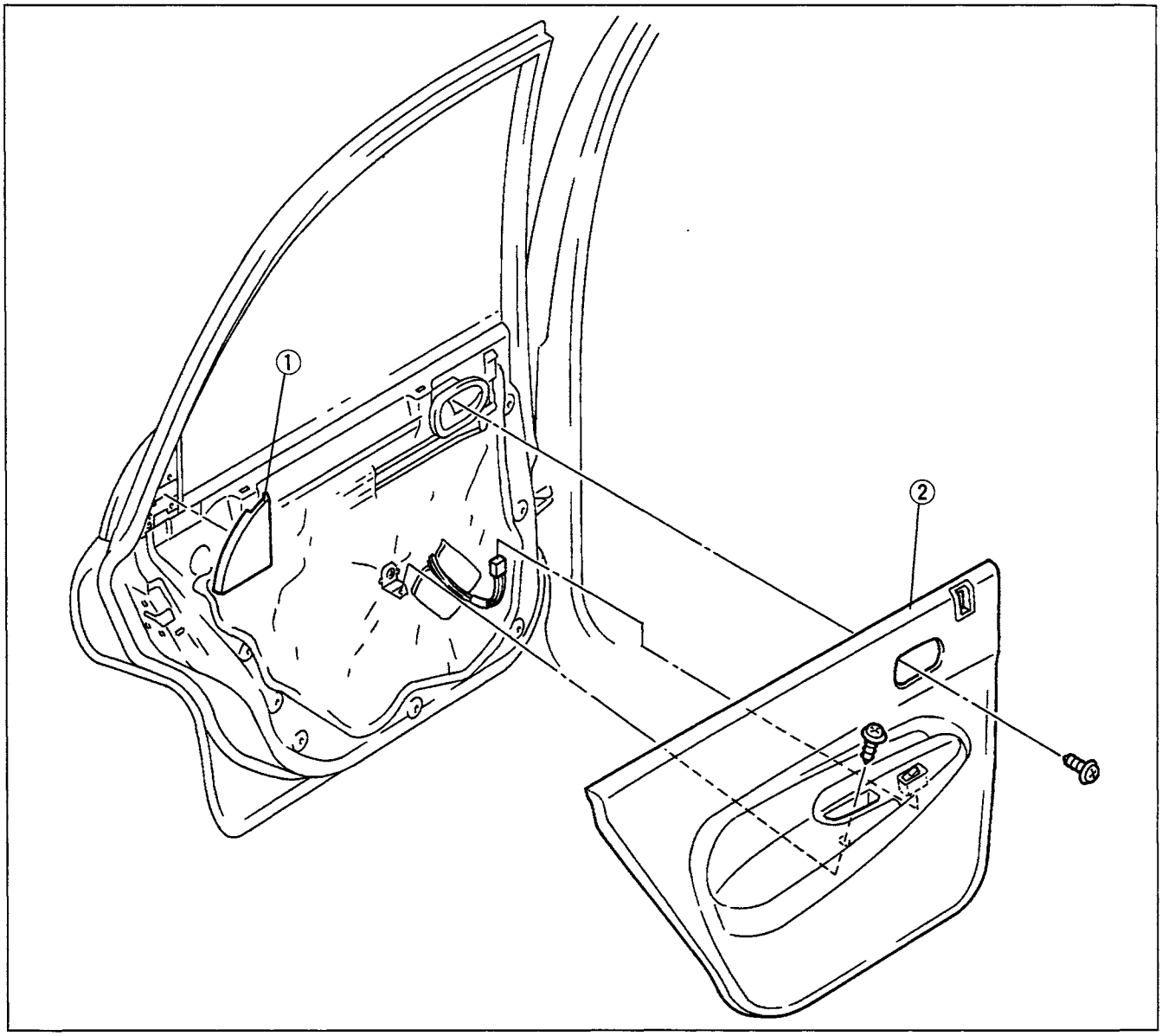
Front door trim

1. Pull the front door trim to disengage the clips from the body.
2. Lift the front door trim to disengage the pins from the body.
3. Disconnect the harness connectors.

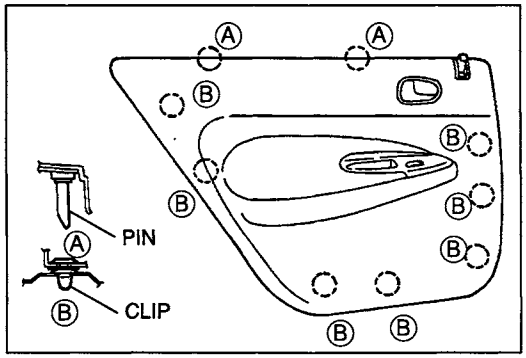
REAR DOOR TRIM

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure, referring to **Removal note**.
3. Install in the reverse order of removal.



1. Inner garnish
2. Rear door trim
   Removal note ..... below



Removal note

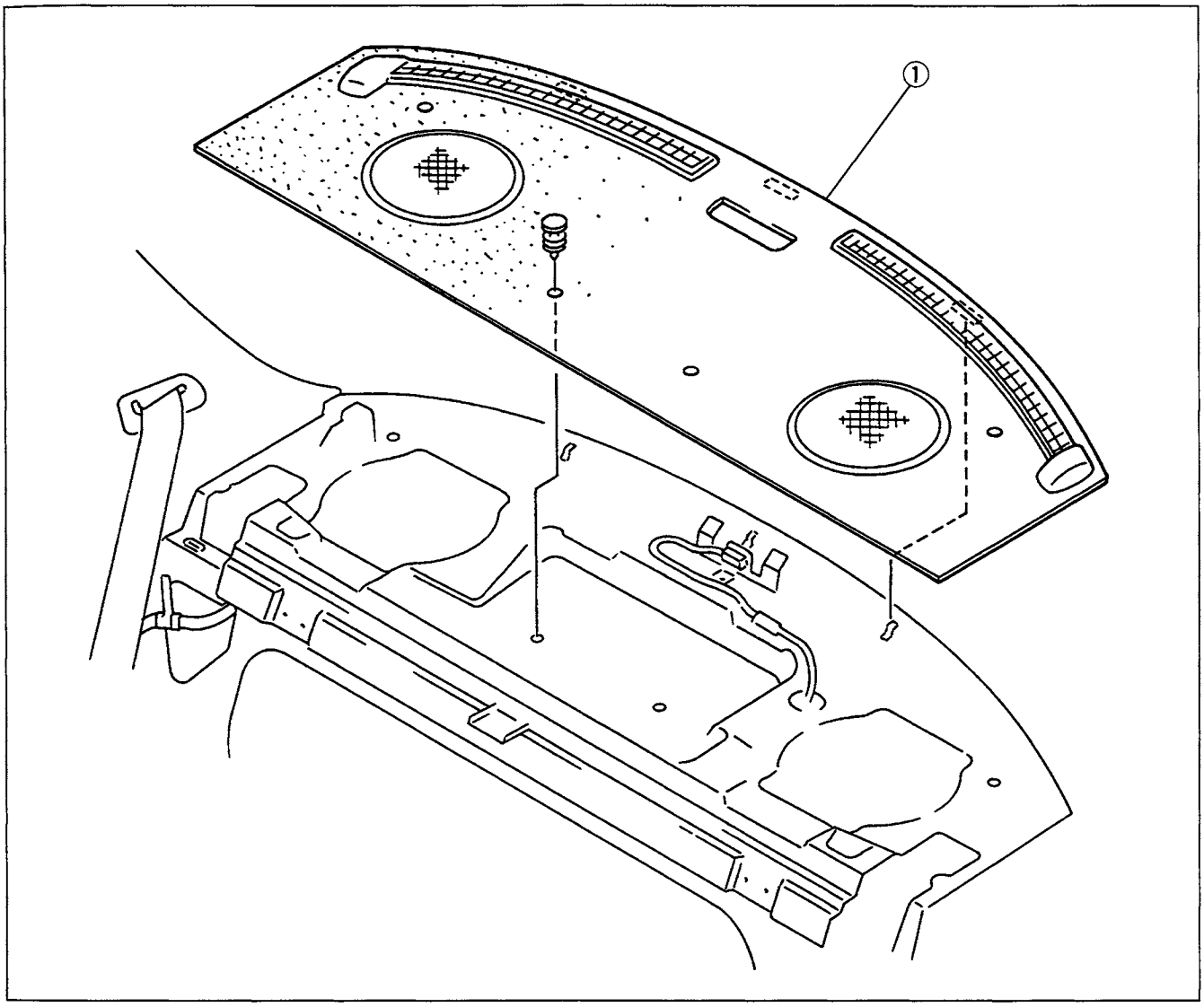
Rear door trim

1. Pull the rear door trim to disengage the clips from the body.
2. Lift the rear door trim to disengage the pins from the body.
3. Disconnect the harness connectors.

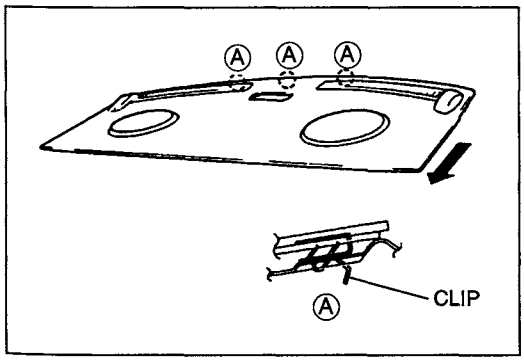
REAR PACKAGE TRIM

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the rear seat back. (Refer to pages S1–126, 129.)
3. Remove the high-mount brake light. (Refer to section T1.)
4. Remove as shown in the figure, referring to **Removal note.**
5. Install in the reverse order of removal.



1. Rear package trim
   Removal note ..... below



Removal note

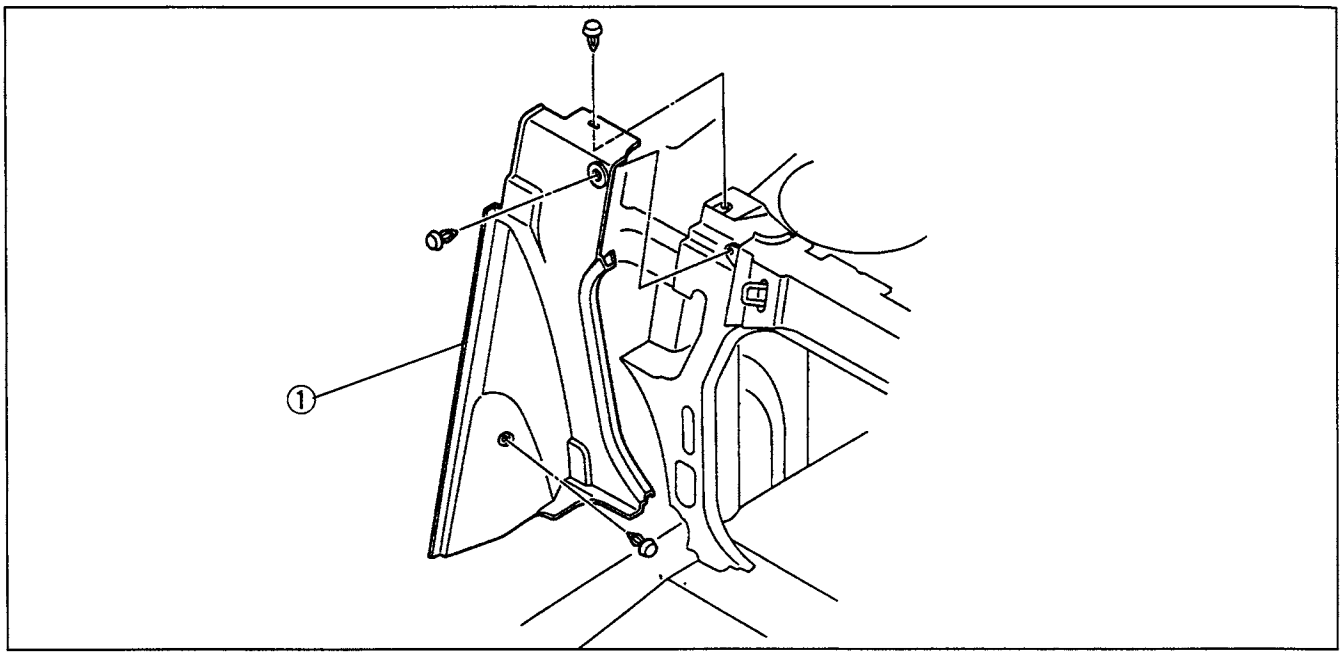
Rear package trim

Pull the rear package trim forward to disengage the clips from the body.

REAR PACKAGE FRONT SIDE TRIM

Removal / Installation

1. Remove the rear package trim. (Refer to page S1–109.)
2. Remove the rear seat back. (Refer to pages S1–126, 129.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.

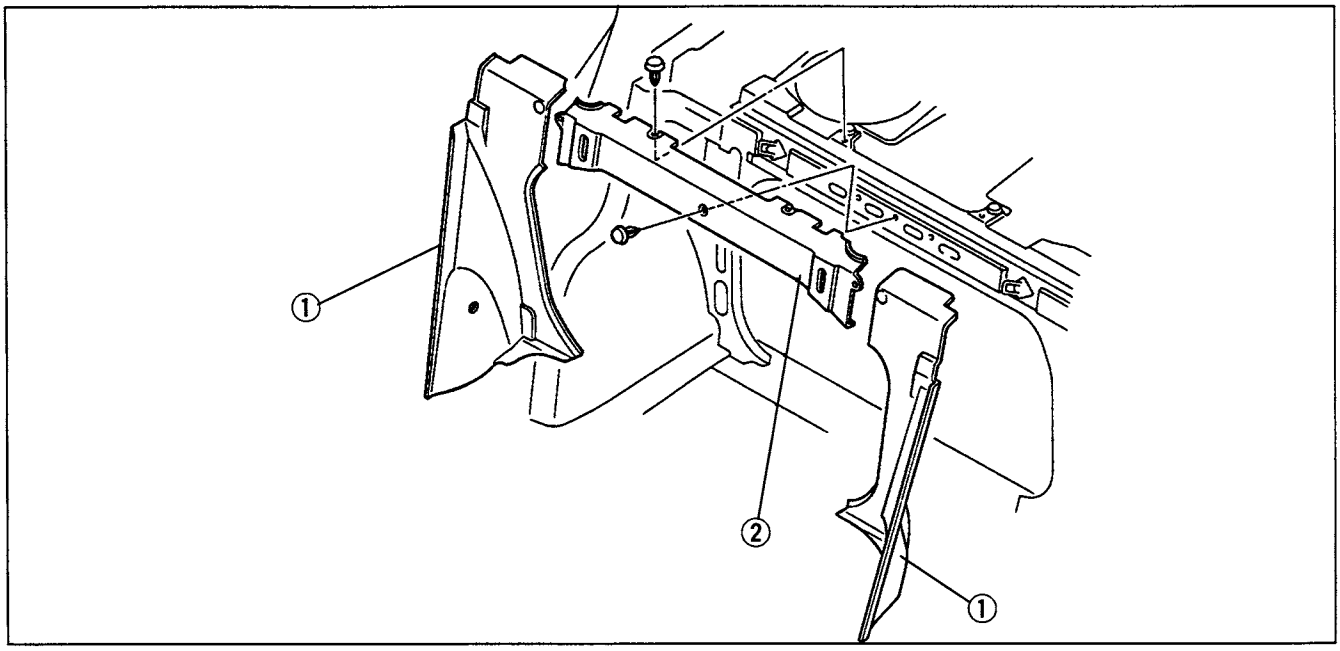


1. Rear package front side trim

REAR PACKAGE FRONT TRIM

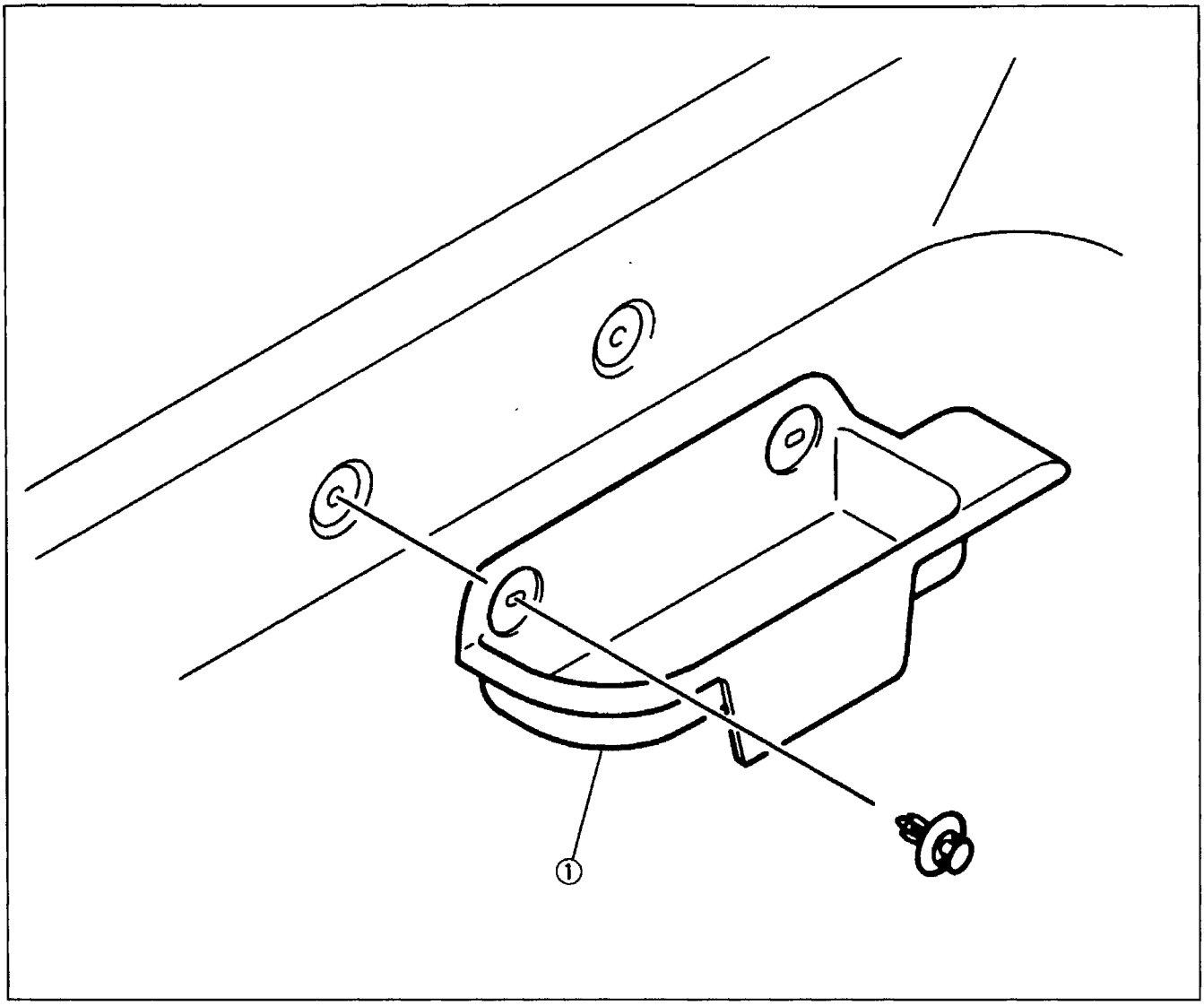
Removal / Installation

1. Remove the rear package trim. (Refer to page S1–109.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



1. Rear package front side trim
   Removal / Installation ..... above
2. Rear package front trim

SEAT SIDE COMPARTMENT
Removal / Installation
1. Remove as shown in the figure.
2. Install in the reverse order of removal.

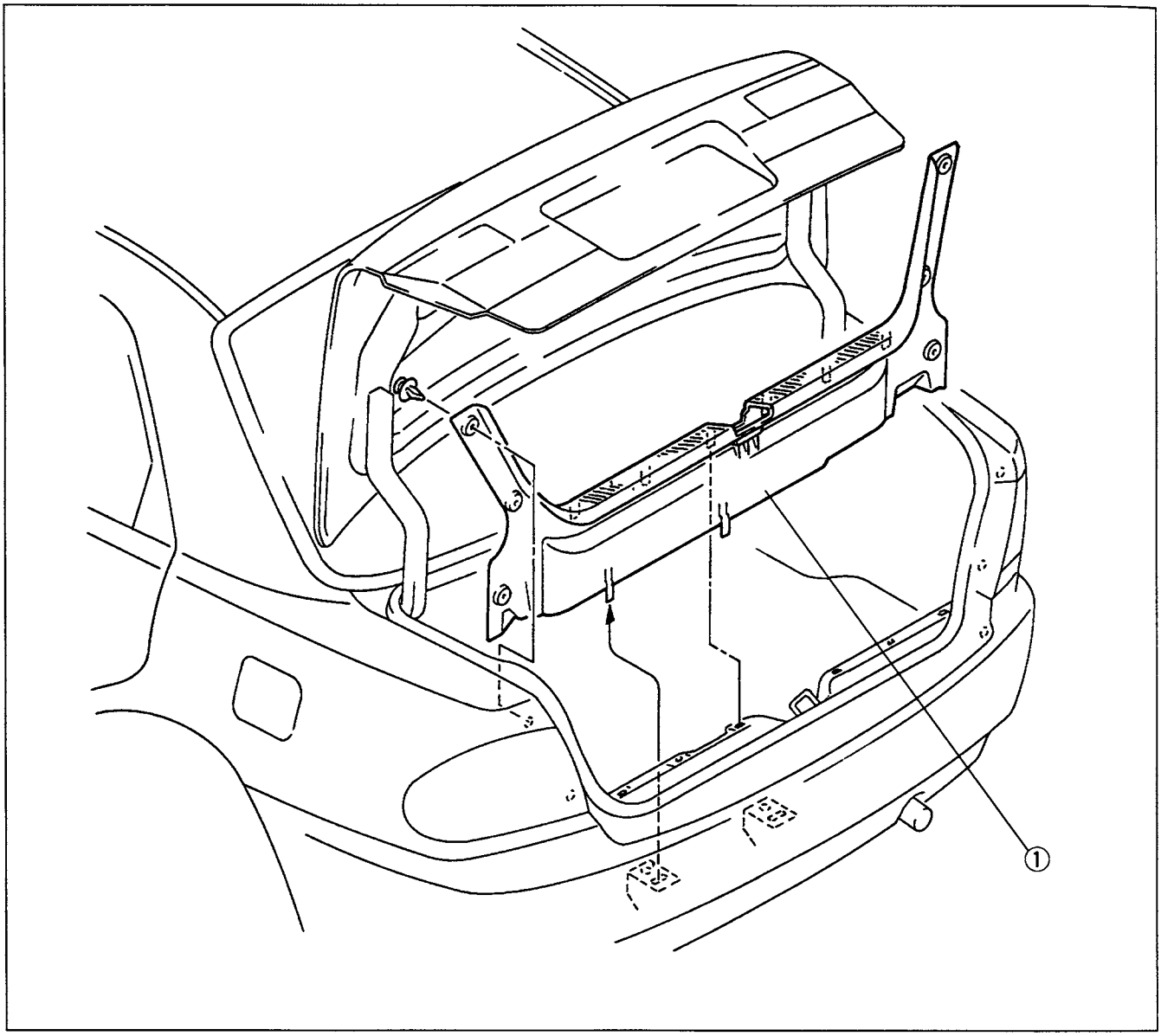


1. Seat side compartment

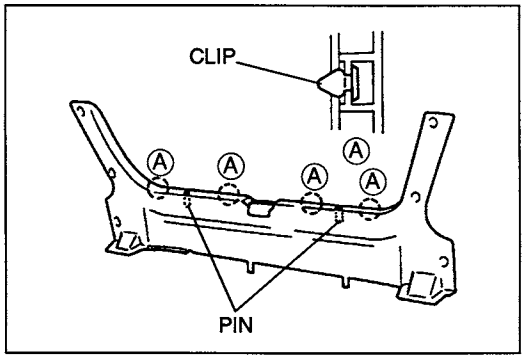
TRUNK END TRIM

Removal / Installation

1. Remove as shown in the figure, referring to **Removal note.**
2. Install in the reverse order of removal.



1. Trunk end trim
   Removal note ..... below



Removal note

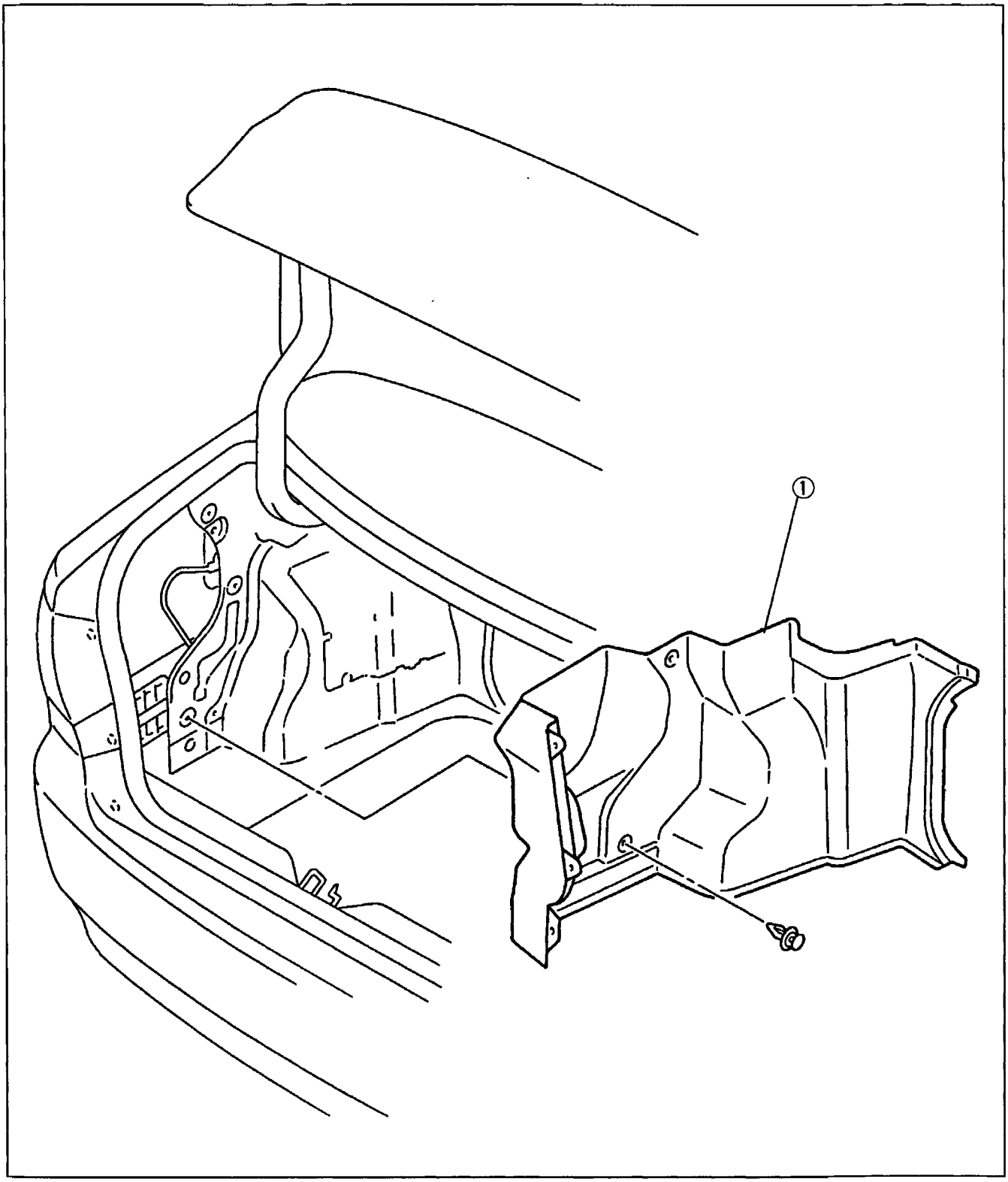
Trunk end trim

Pull the trunk end trim upward to disengage the clips and pins from the body.

TRUNK SIDE TRIM

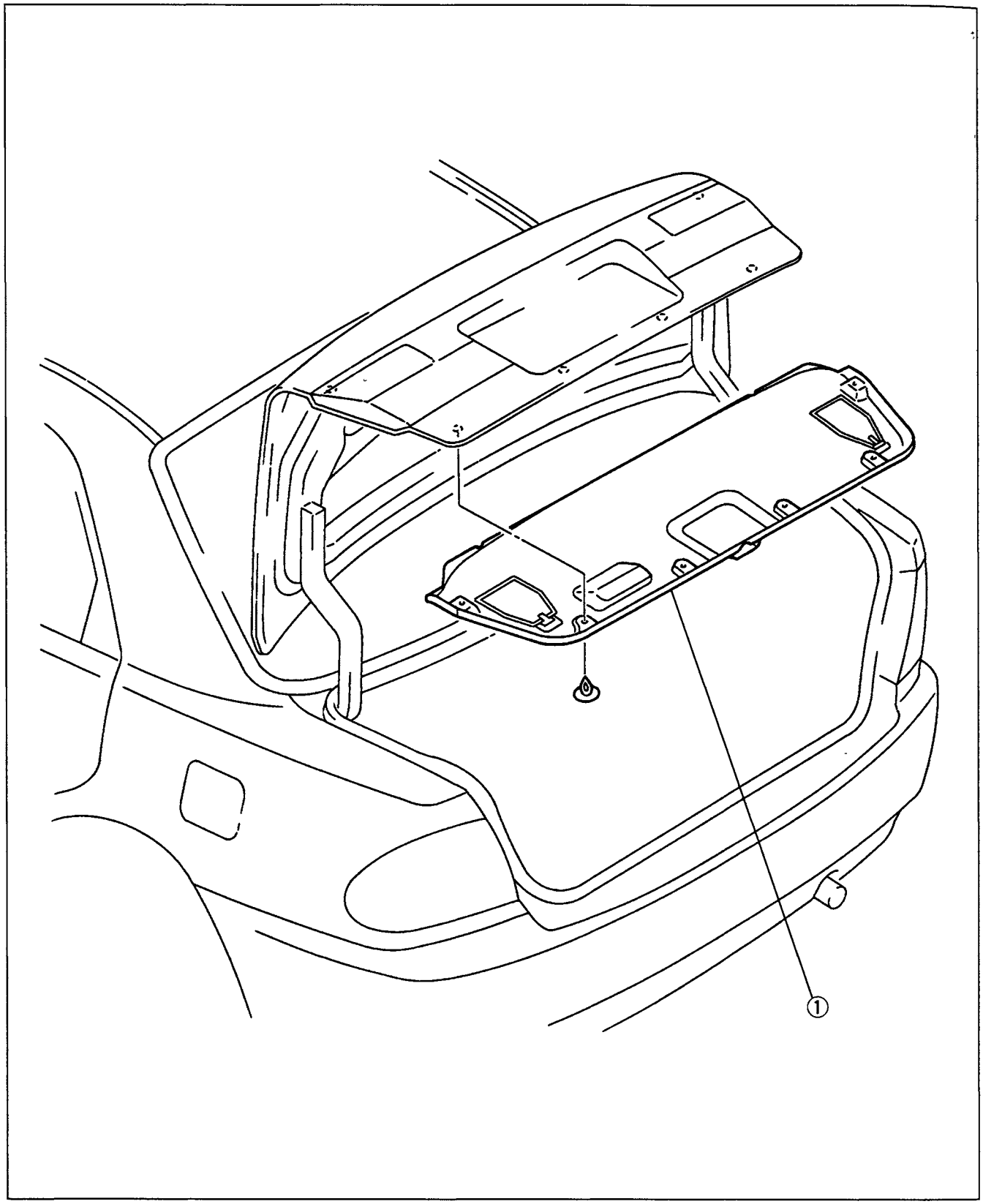
Removal / Installation

1. Remove the trunk end trim. (Refer to page S1–112.)
2. Remove the rear package front side trim. (Refer to page S1–110.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



1. Trunk side trim

TRUNK LID TRIM
Removal / Installation
1. Remove as shown in the figure.
2. Install in the reverse order of removal.



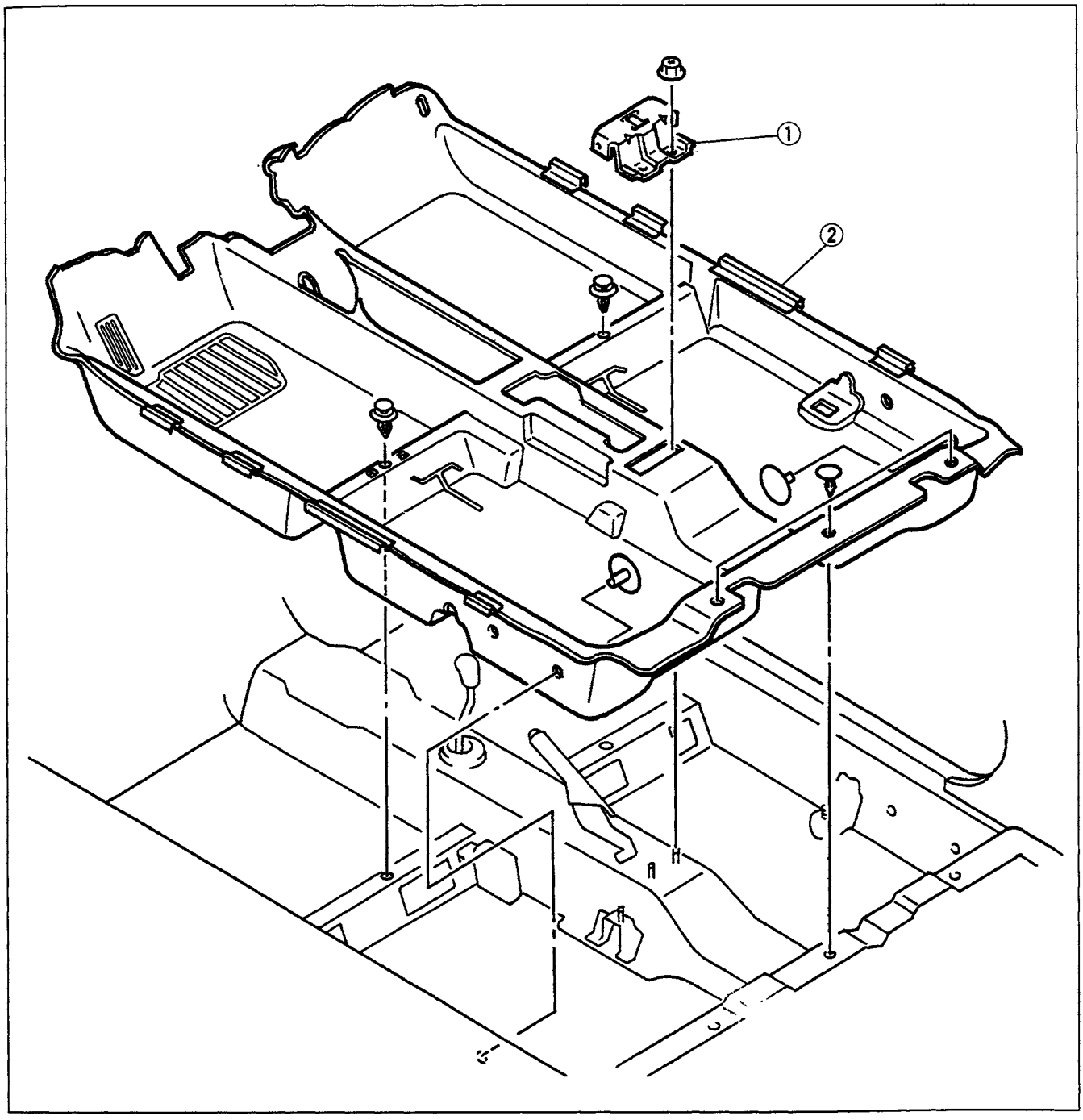
1. Trunk lid trim

FLOOR COVERING

CABIN CARPET

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the following.
   a. Dashboard and console (Refer to page S1–84.)
   b. Front seat (Refer to page S1–121.)
   c. Rear seat (Refer to page S1–126.)
   d. B-pillar lower trim (Refer to page S1–101.)
   e. Front seat belt lower anchor. (Refer to page S1–117.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



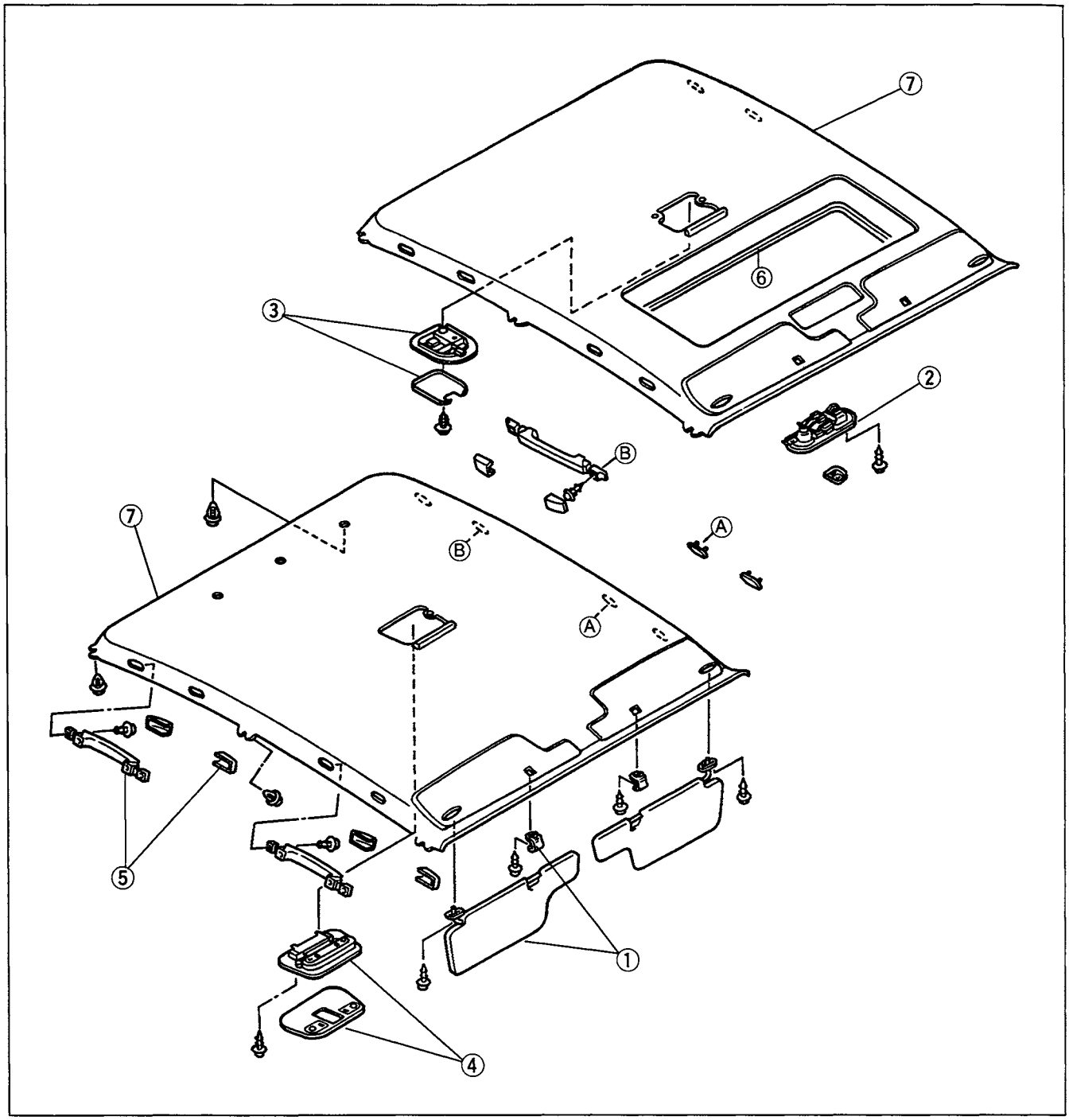
1. Rear console bracket
2. Cabin carpet

HEADLINER

HEADLINER

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the A-pillar trim (Refer to page S1–100.), B-pillar upper trim (Refer to page S1–102.), and C-pillar trim (Refer to page S1–103.).
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



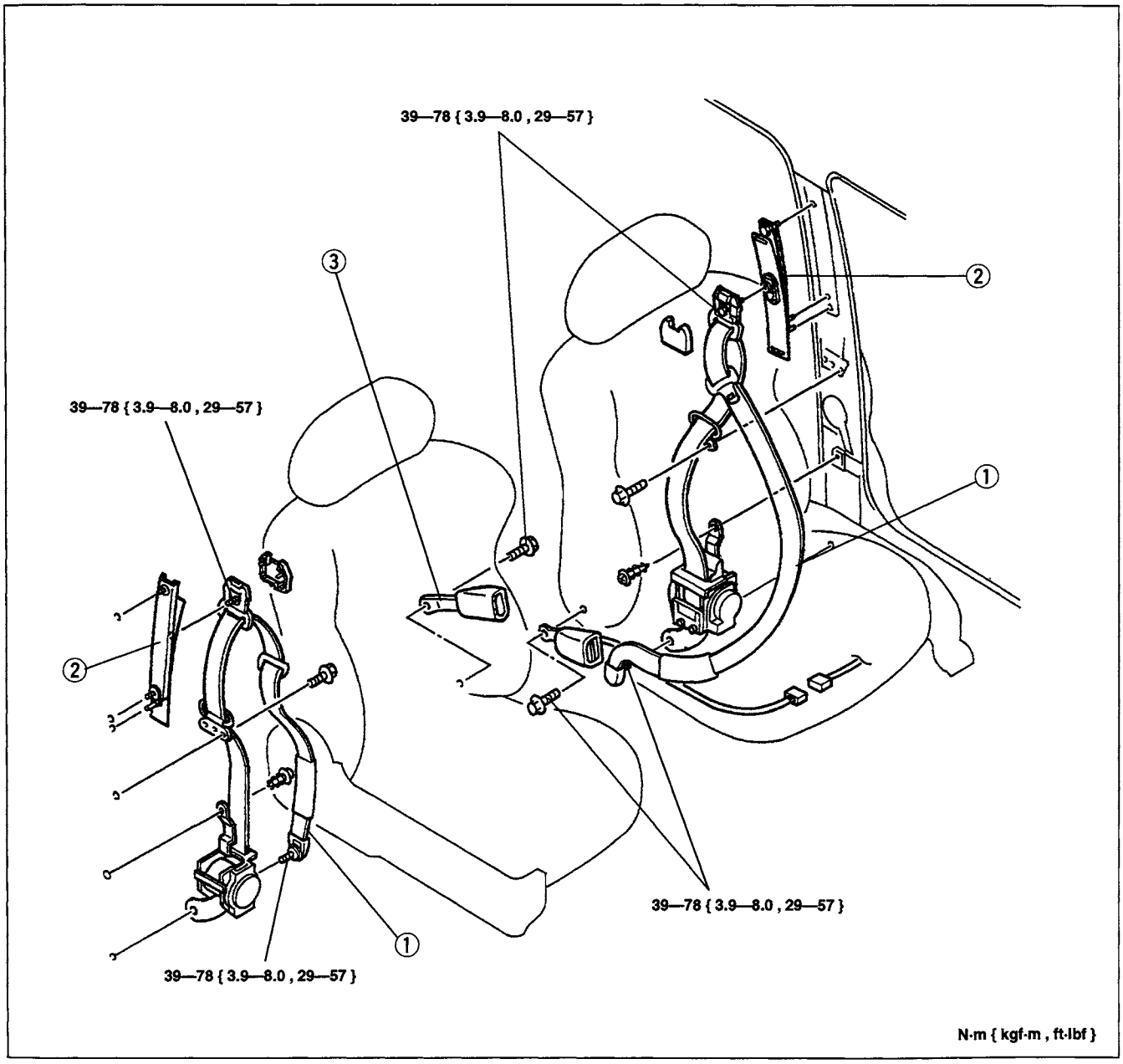
1. Sunvisor and adapter
2. Overhead console (sliding sunroof)
3. Room light (sliding sunroof)
4. Room and spot light (without sliding sunroof)
5. Assist handle
6. Seaming welt (sliding sunroof)
7. Headliner

SEAT BELT

FRONT SEAT BELT
Removal / Installation

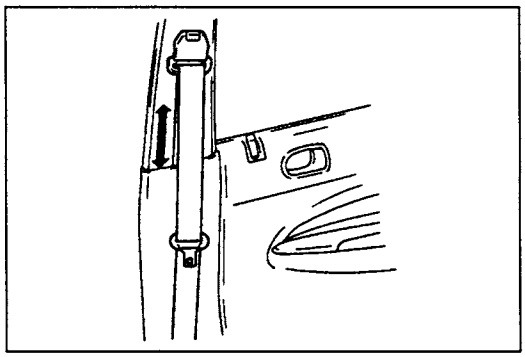
Caution
- **The ELR (emergency locking retractor) has a spring that will unwind if the retractor's cover is removed. The spring cannot be rewound by hand. If this occurs, the ELR will not work properly. Therefore, do not disassemble the retractor.**

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure. To remove the front seat belt, remove the B-pillar lower trim. (Refer to page S1–101.) To remove the anchor adjuster, remove the B-pillar upper trim. (Refer to page S1–102.)
3. Install in the reverse order of removal.

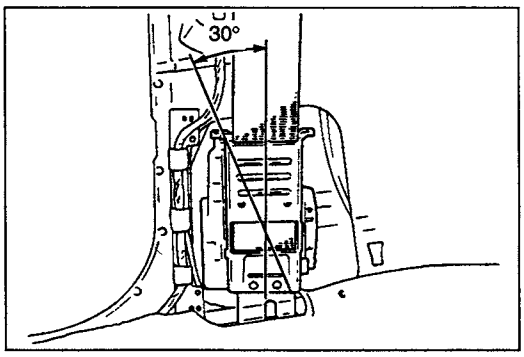


1. Front seat belt
   Inspection ..... page S1–118
2. Anchor adjuster
3. Front buckle

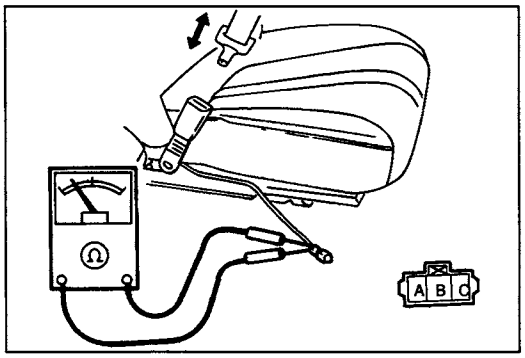
Inspection
Seat belt
1. Inspect the webbing for scars, tears, and wear.
2. Inspect the fittings for deformation and damage.
3. If a problem is found, replace the front seat belt.



ELR (emergency locking retractor)
1. Verify that the belt can be pulled out smoothly, and that it moves smoothly when worn.
2. Verify that the retractor locks when the belt is quickly pulled.



3. Remove the retractor. (Refer to page S1–117.)
4. Hold the retractor as it would be installed.
5. Slowly incline the retractor while pulling out the belt.
6. Verify that the retractor locks at approximately **30°** inclination.
7. If not as specified, replace the front seat belt.



FRONT BUCKLE
Inspection
1. Disconnect the buckle switch connector.
2. Check for continuity between the connector terminals.

Terminal / Seat belt	Driver A	Driver B
Buckled		
Unbuckled	O——	——O

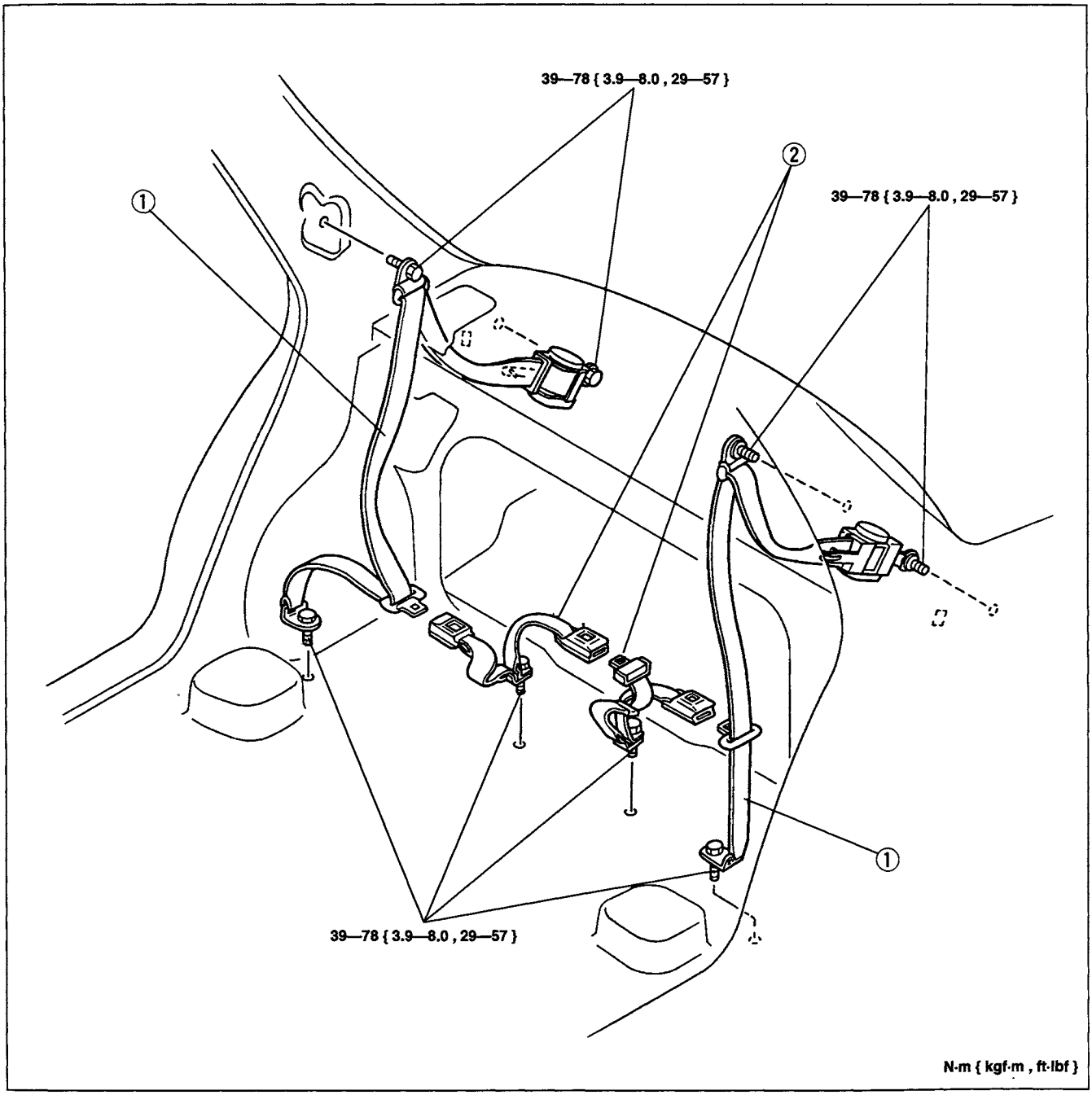
O——O: Continuity

3. If not as specified, replace the front buckle.

REAR SEAT BELT
Removal / Installation

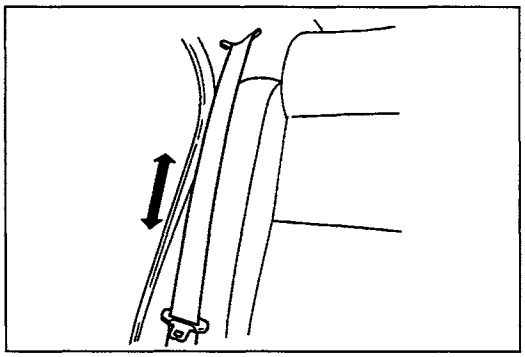
Caution
- **The ELR (emergency locking retractor) has a spring that will unwind if the retractor's cover is removed. The spring cannot be rewound by hand. If this occurs, the ELR will not work properly. Therefore, do not disassemble the retractor.**

1. Remove the rear seat cushion. (Refer to pages S1–126, 129.)
2. Remove in the order shown in the figure. To remove the rear seat belt, remove the C-pillar trim (Refer to page S1–103.) and trunk side trim (Refer to page S1–113.).
3. Install in the reverse order of removal.

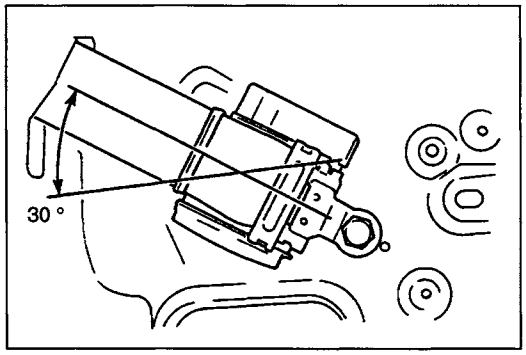


1. Rear seat belt
   Inspection ..... page S1–120
2. Rear buckle

Inspection
Seat belt
1. Inspect the webbing for scars, tears, and wear.
2. Inspect the fittings for deformation and damage.
3. If a problem is found, replace the rear seat belt.



ELR (emergency locking retractor)
1. Verify that the belt can be pulled out smoothly, and that it moves smoothly when worn.
2. Verify that the retractor locks when the belt is quickly pulled.



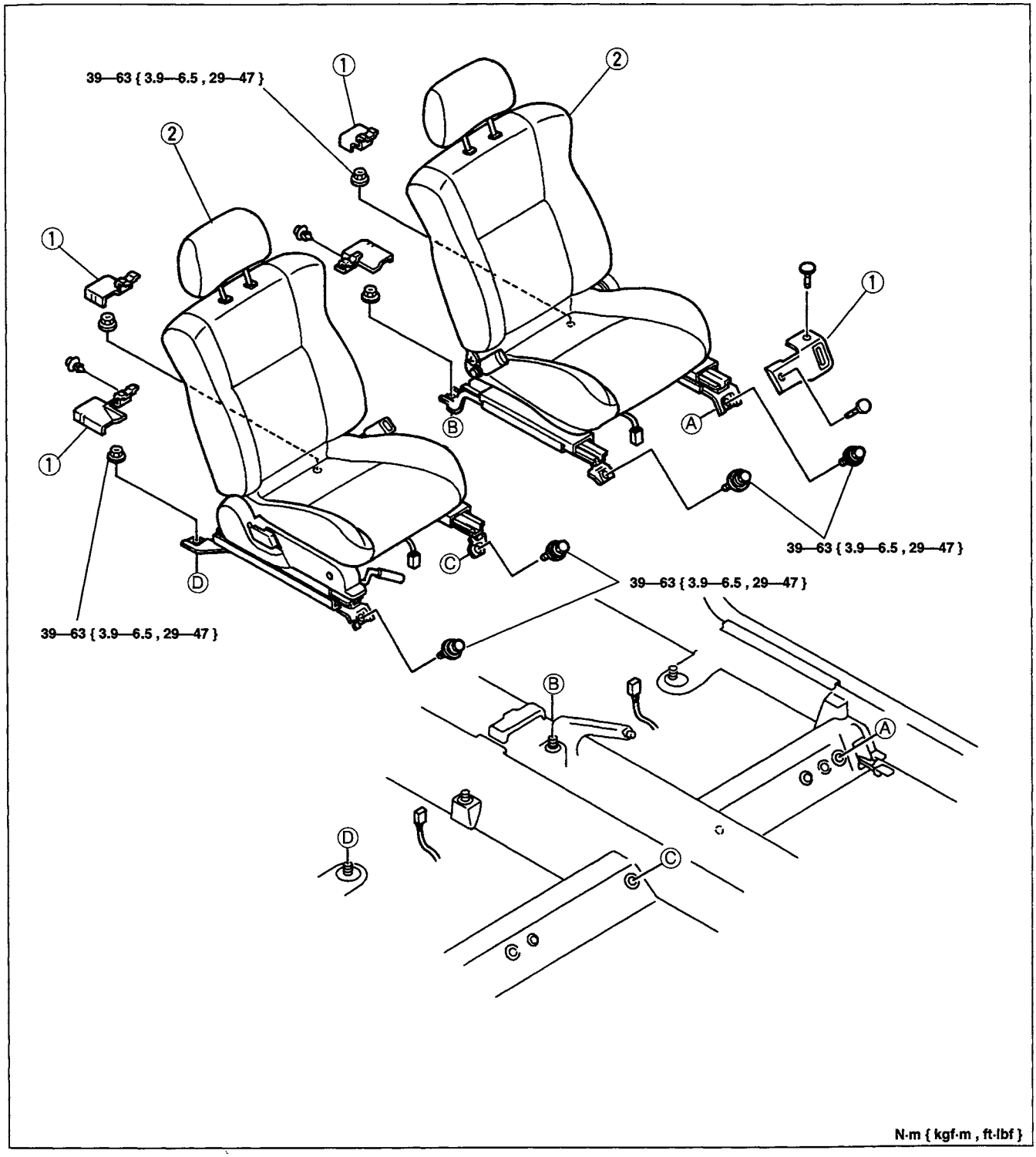
3. Remove the retractor. (Refer to page S1–119.)
4. Hold the retractor as it would be installed.
5. Slowly incline the retractor while pulling out the belt.
6. Verify that the retractor locks at approximately **30°** inclination.
7. If not as specified, replace the rear seat belt.

SEAT

FRONT SEAT

Removal / Installation

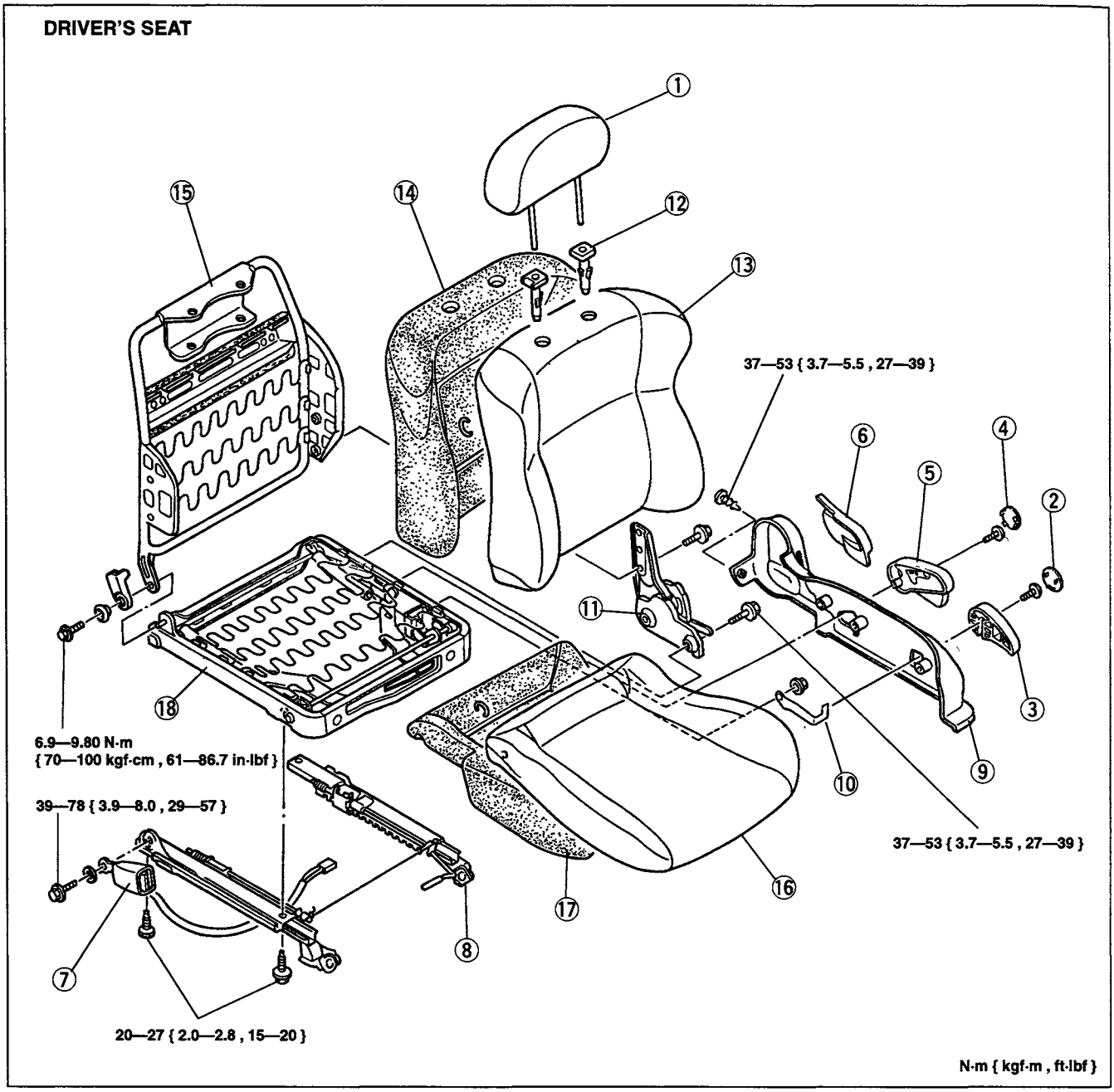
1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



1. Adjuster cover
2. Front seat
   Disassembly / Assembly .... page S1–122

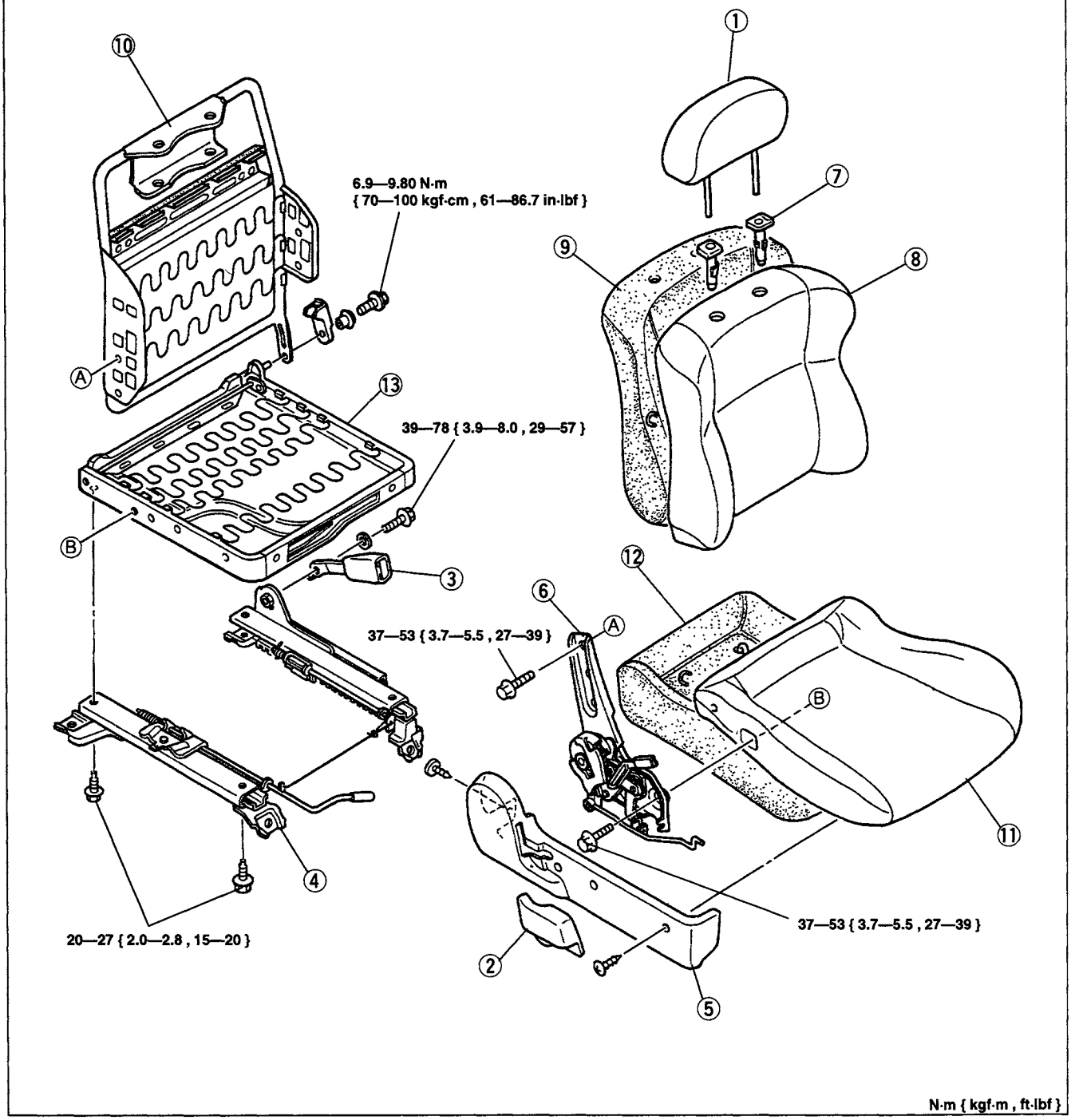
Disassembly / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly note.**
2. Assemble in the reverse order of disassembly.

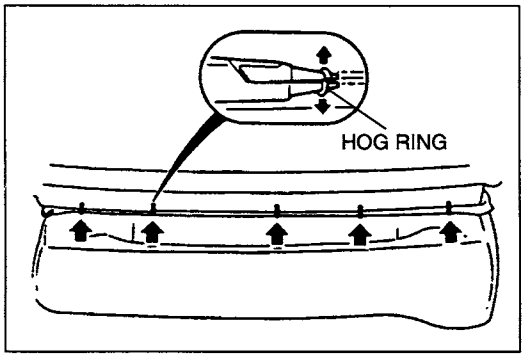


1. Headrest
2. Front-lift knob cap
3. Front-lift knob
4. Rear-lift knob cap
5. Rear-lift knob
6. Recliner knob
7. Front buckle
8. Slide adjuster
9. Seat side cover
10. Front-lift lever
11. Recliner knuckle
12. Pole guide
    Disassembly note ..... page S1–124
13. Seat back trim
    Disassembly note ..... page S1–124
14. Seat back pad
15. Seat back frame
16. Seat cushion trim
    Disassembly note ..... page S1–124
17. Seat cushion pad
18. Seat cushion frame

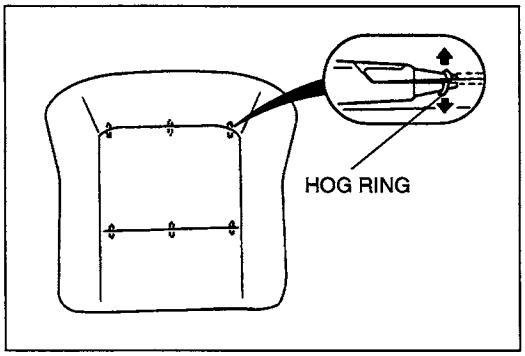
PASSENGER'S SEAT



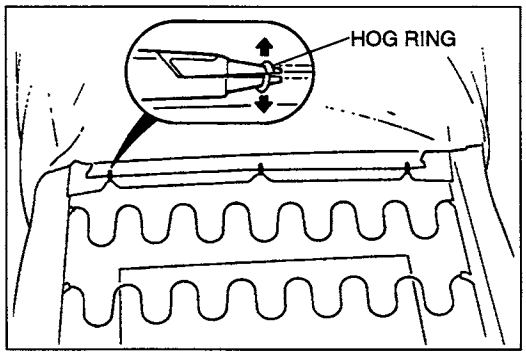
1. Headrest
2. Recliner knob
3. Front buckle
4. Slide adjuster
5. Seat side cover
6. Recliner knuckle
7. Pole guide
   Disassembly note ..... page S1–124
8. Seat back trim
   Disassembly note ..... page S1–124
9. Seat back pad
10. Seat back frame
11. Seat cushion trim
    Disassembly note ..... page S1–124
12. Seat cushion pad
13. Seat cushion frame



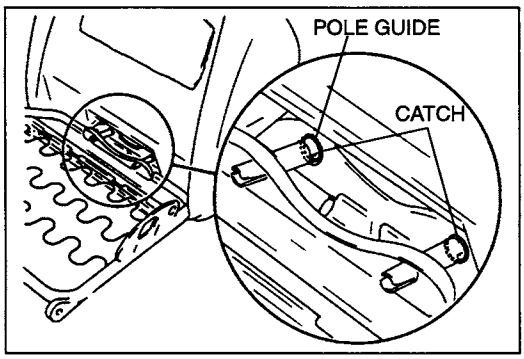
Disassembly note
Pole guide, seat back trim
1. Remove the hog rings under the seat back trim.



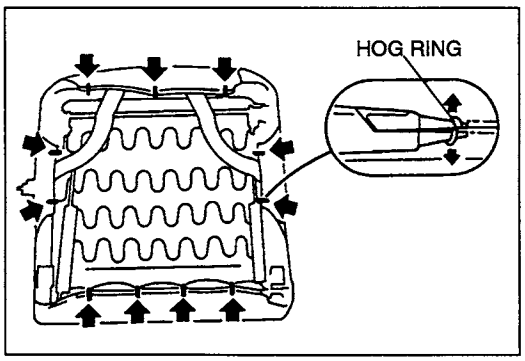
2. Turn up the seat back trim and remove the hog rings holding the trim to the pad.



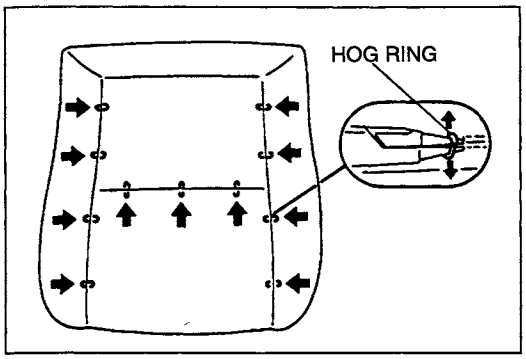
3. Turn up the seat back trim and remove the hog rings holding the trim to the frame.



4. Squeeze the catches on the pole guide by using pliers to remove the pole guide.
5. Remove the seat back trim.



Seat cushion trim
1. Remove the hog rings holding the trim to the frame.

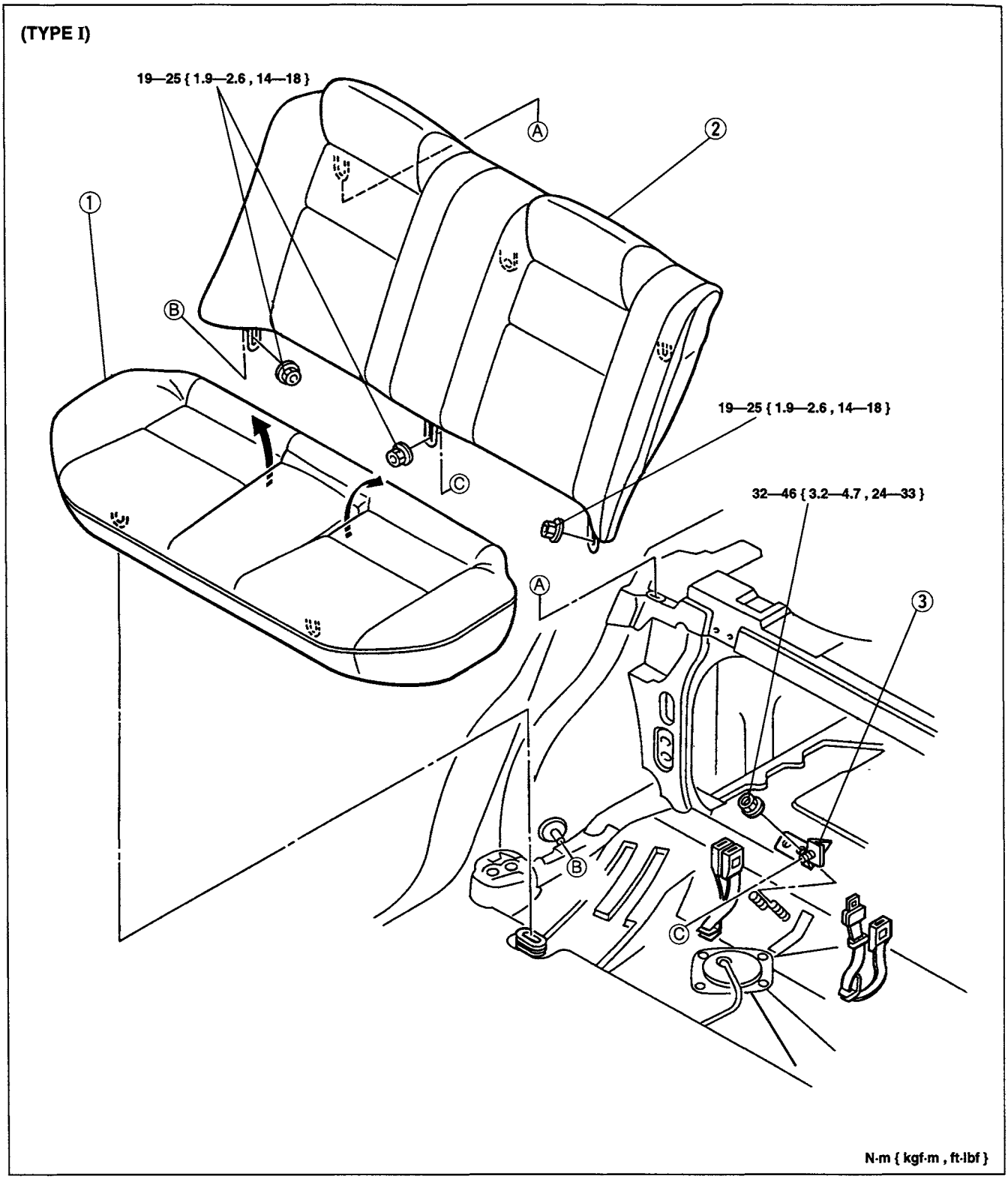


2. Turn up the seat cushion trim and remove the hog rings holding the trim to the pad.

REAR SEAT

Removal / Installation

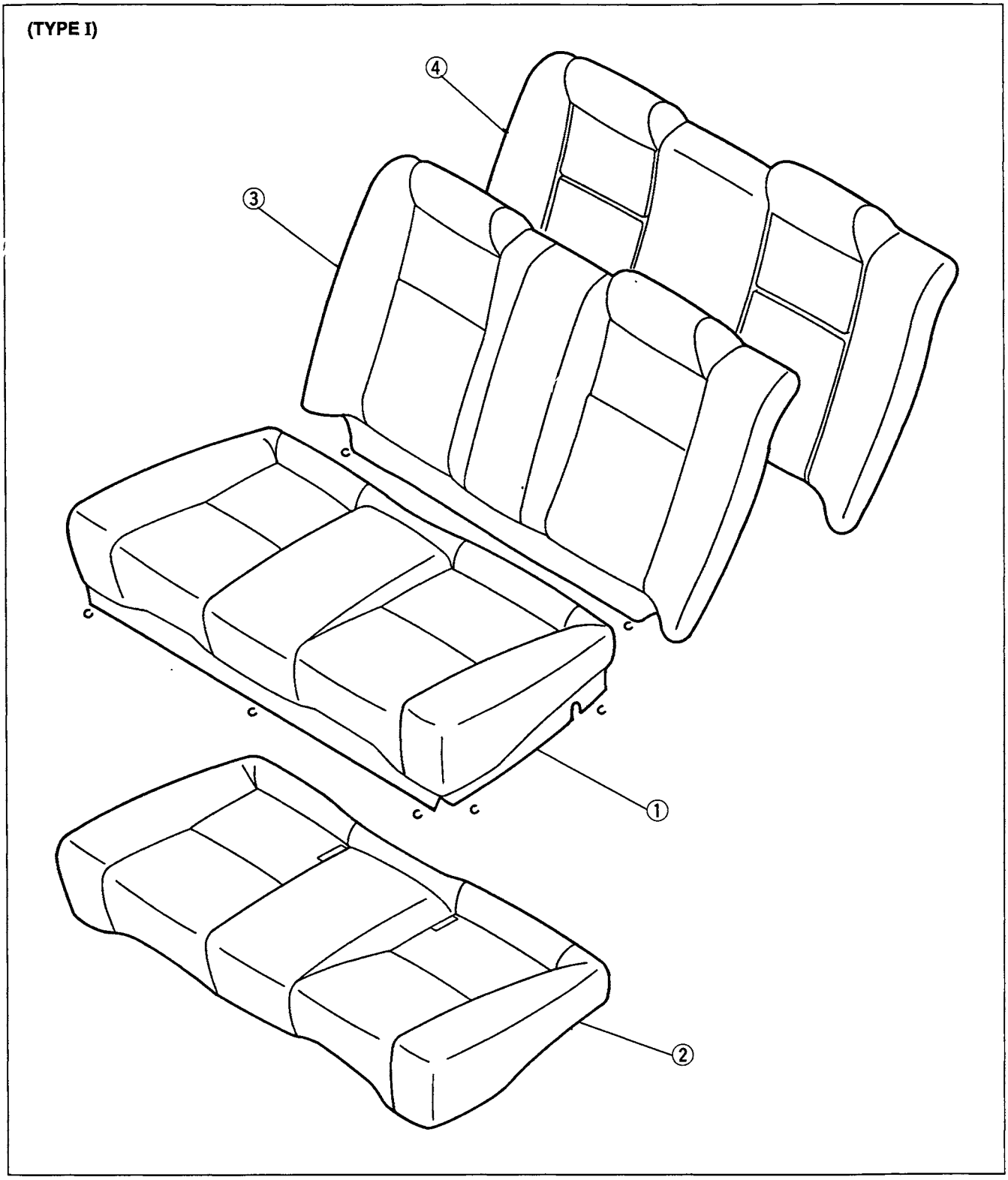
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



1. Rear seat cushion
   Disassembly / Assembly .... page S1–127
2. Rear seat back
   Disassembly / Assembly .... page S1–127
3. Rear seat back hinge

Disassembly / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly note.**
2. Assemble in the reverse order of disassembly.

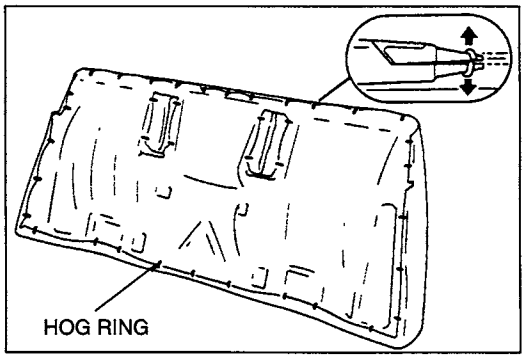


Rear seat cushion

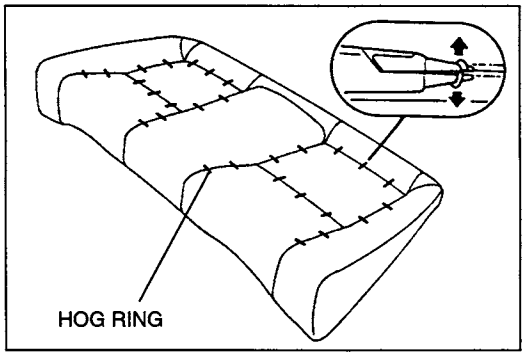
1. Rear seat cushion trim
   Disassembly note ..... page S1–128
2. Rear seat cushion pad

Rear seat back

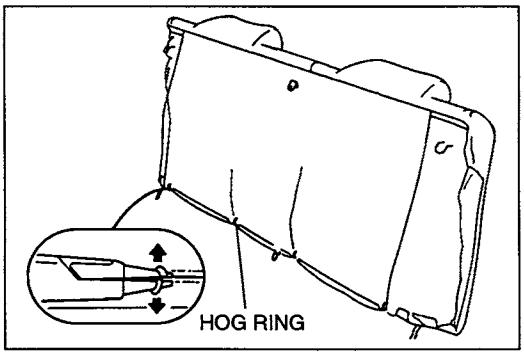
3. Rear seat back trim
   Disassembly note ..... page S1–128
4. Rear seat back pad



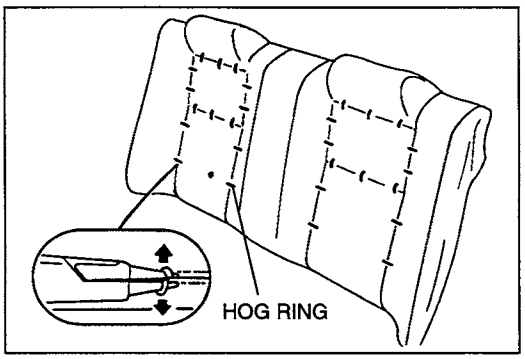
Disassembly note
Rear seat cushion trim
1. Remove the hog rings under the rear seat cushion trim.



2. Turn up the rear seat cushion trim and remove the hog rings holding the trim to the pad.



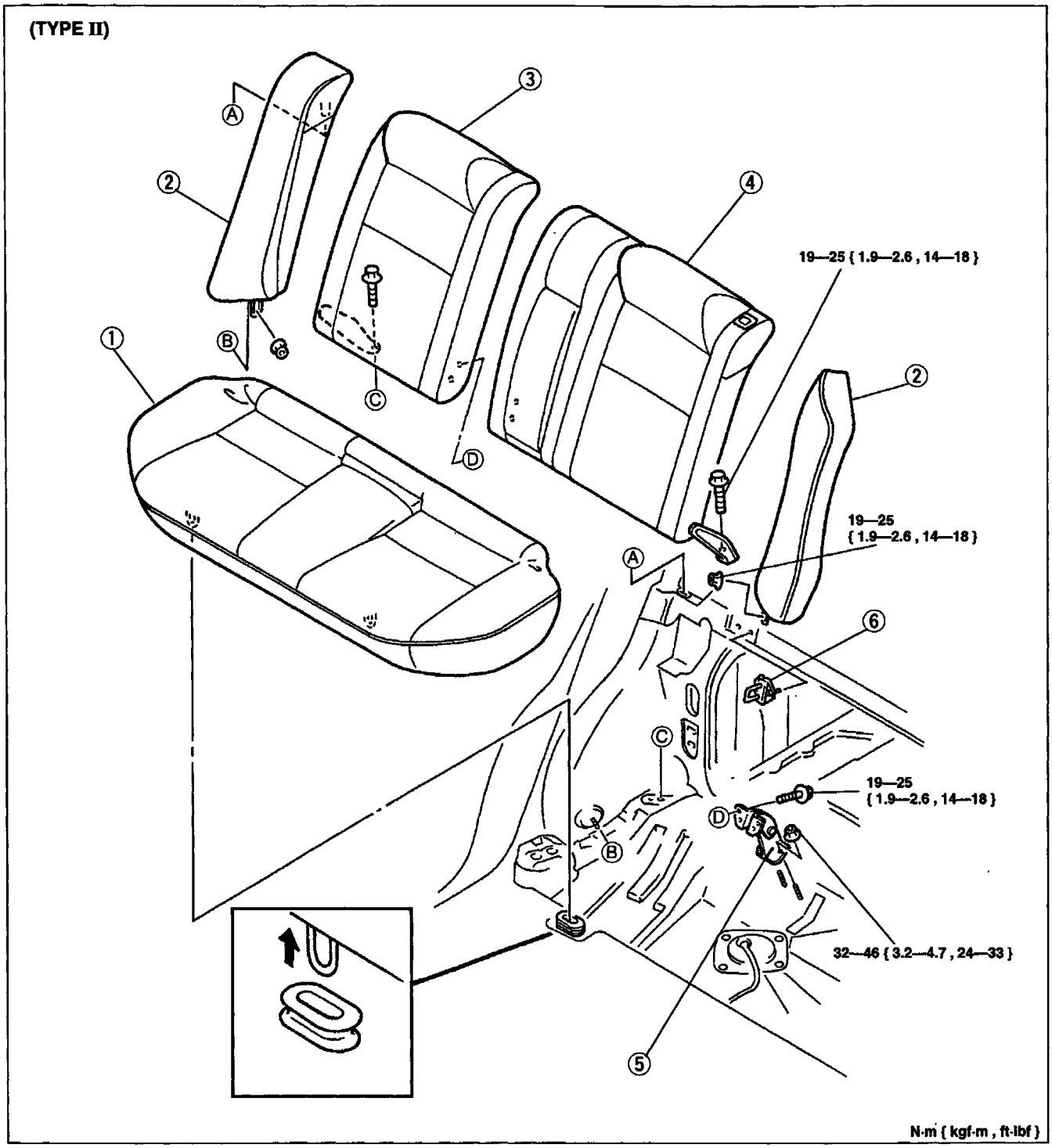
Rear seat back trim
1. Remove the hog rings on the back of the rear seat back trim.



2. Turn up the rear seat back trim and remove the hog rings holding the trim to the pad.

Removal / Installation

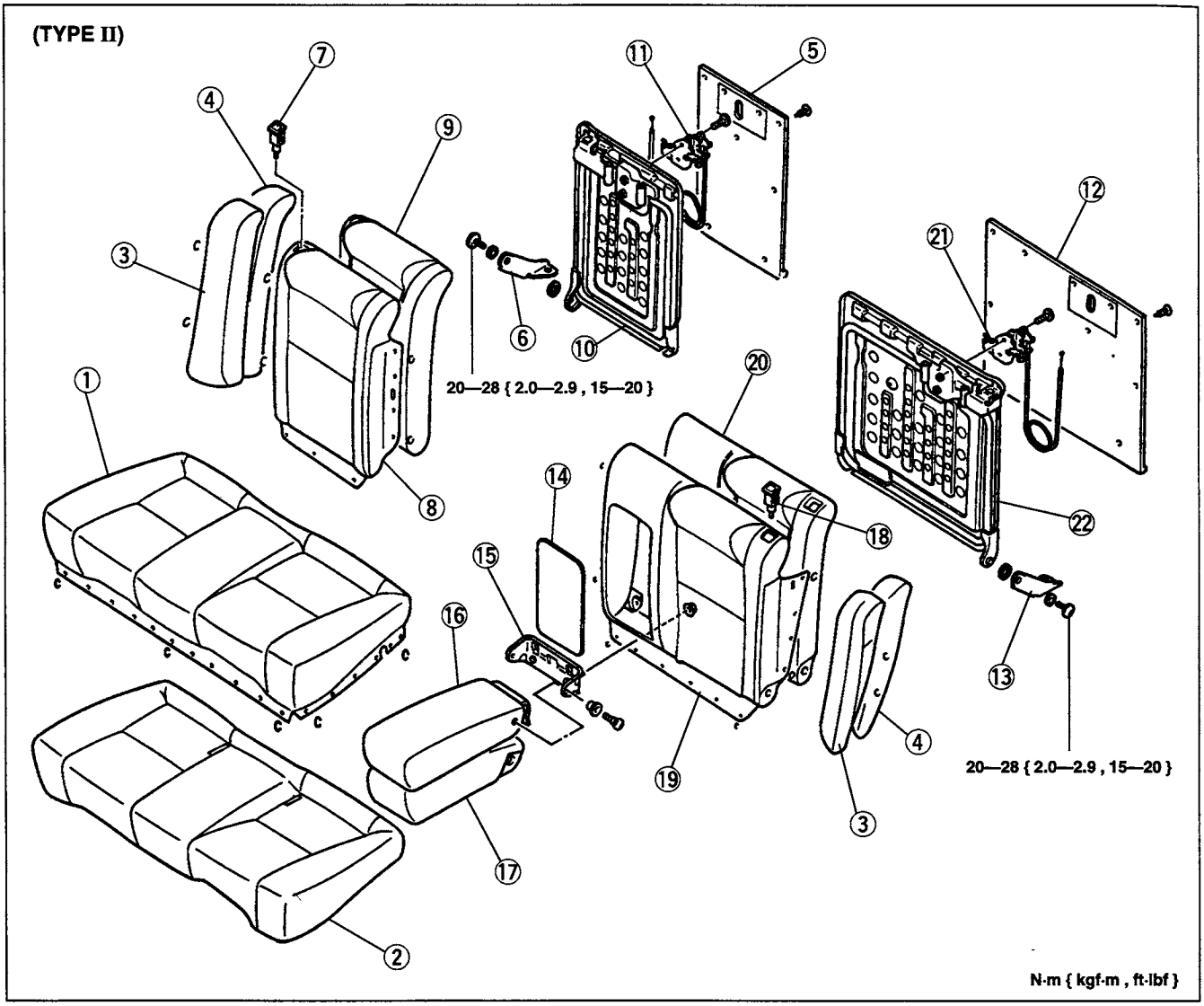
1. Remove in the order shown in the figure. To remove the rear seat back striker, remove the rear package front trim. (Refer to page S1–110.)
2. Install in the reverse order of removal.



1. Rear seat cushion
   Disassembly / Assembly .... page S1–130
2. Rear seat side bolster
   Disassembly / Assembly .... page S1–130
3. Rear seat back (RH)
   Disassembly / Assembly .... page S1–130
4. Rear seat back (LH)
   Disassembly / Assembly .... page S1–130
5. Rear seat center hinge
6. Rear seat back striker

Disassembly / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly note**.
2. Assemble in the reverse order of disassembly.

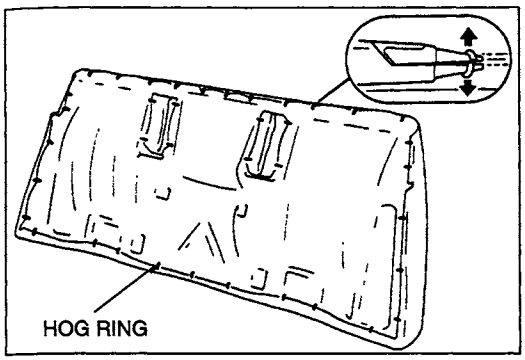


Rear seat cushion
1. Rear seat cushion trim
   Disassembly note ..... page S1–131
2. Rear seat cushion pad

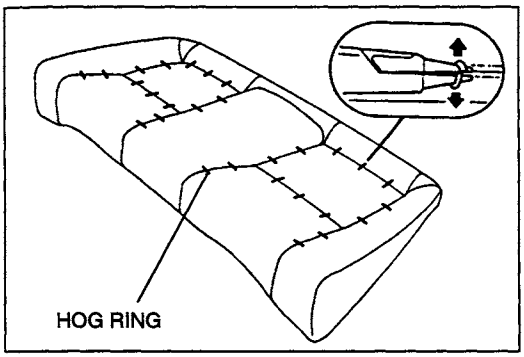
Rear seat side bolster
3. Rear seat side bolster trim
   Disassembly note ..... page S1–131
4. Rear seat side bolster pad

Rear seat back (RH)
5. Trunk mat
6. Rear seat back side hinge
7. Rear seat back lock knob
   Disassembly note ..... page S1–131
8. Rear seat back trim
   Disassembly note ..... page S1–131
9. Rear seat back pad
10. Rear seat back frame
11. Rear seat back lock

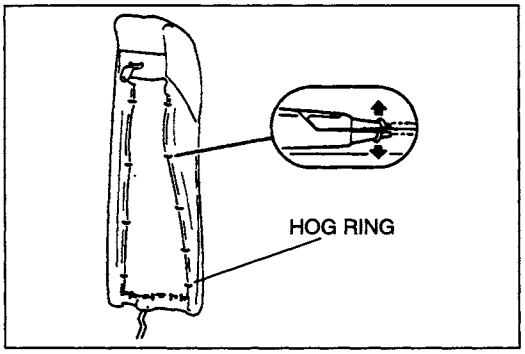
Rear seat back (LH)
12. Trunk mat
13. Rear seat back side hinge
14. Armrest board
    Disassembly note ..... page S1–132
15. Armrest bracket
16. Armrest trim
17. Armrest pad
18. Rear seat back lock knob
    Disassembly note ..... page S1–131
19. Rear seat back trim
    Disassembly note ..... page S1–132
20. Rear seat back pad
21. Rear seat back lock
22. Rear seat back frame



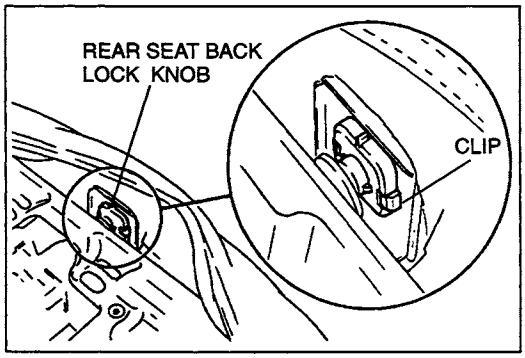
Disassembly note
Rear seat cushion trim
1. Remove the hog rings the rear seat cushion trim.



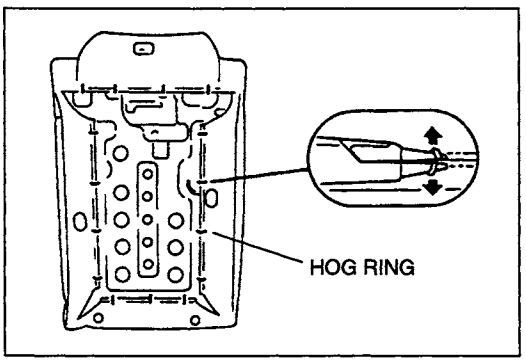
2. Turn up the rear seat cushion trim and remove the hog rings holding the trim to the pad.



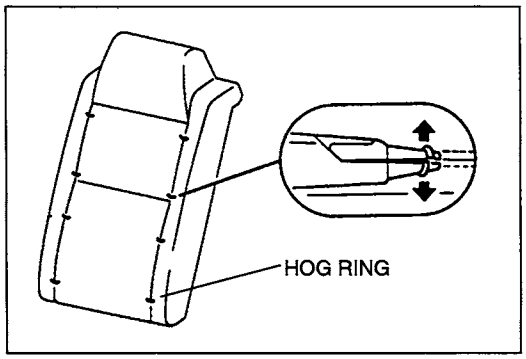
Rear seat side bolster trim
Remove the hog rings from the rear seat side bolster trim.



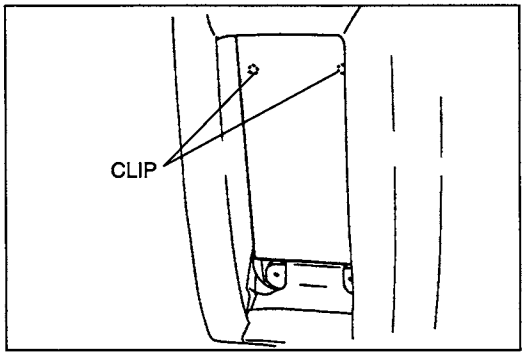
Rear seat back lock knob
Turn up the rear seat back trim and press the lock knob clips by using pliers.



Rear seat back trim (RH)
1. Remove the hog rings on the back of the rear seat back trim.

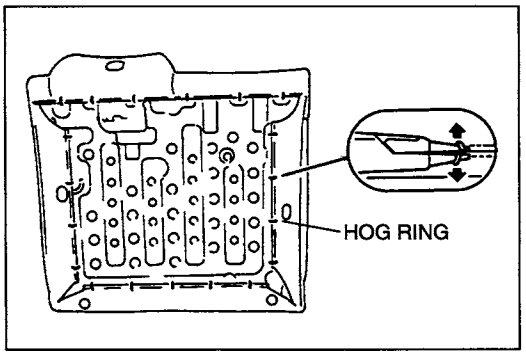


2. Turn up the rear seat back trim and remove the hog rings holding the trim to the pad.



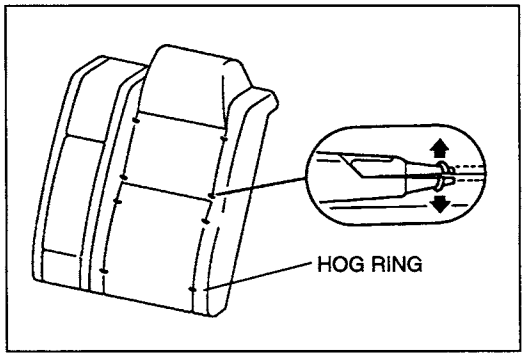
Armrest board

Pull the armrest board forward to disengage the clips from the seat back frame.



Rear seat back trim (LH)

1. Remove the hog rings on the back of the rear seat back trim.



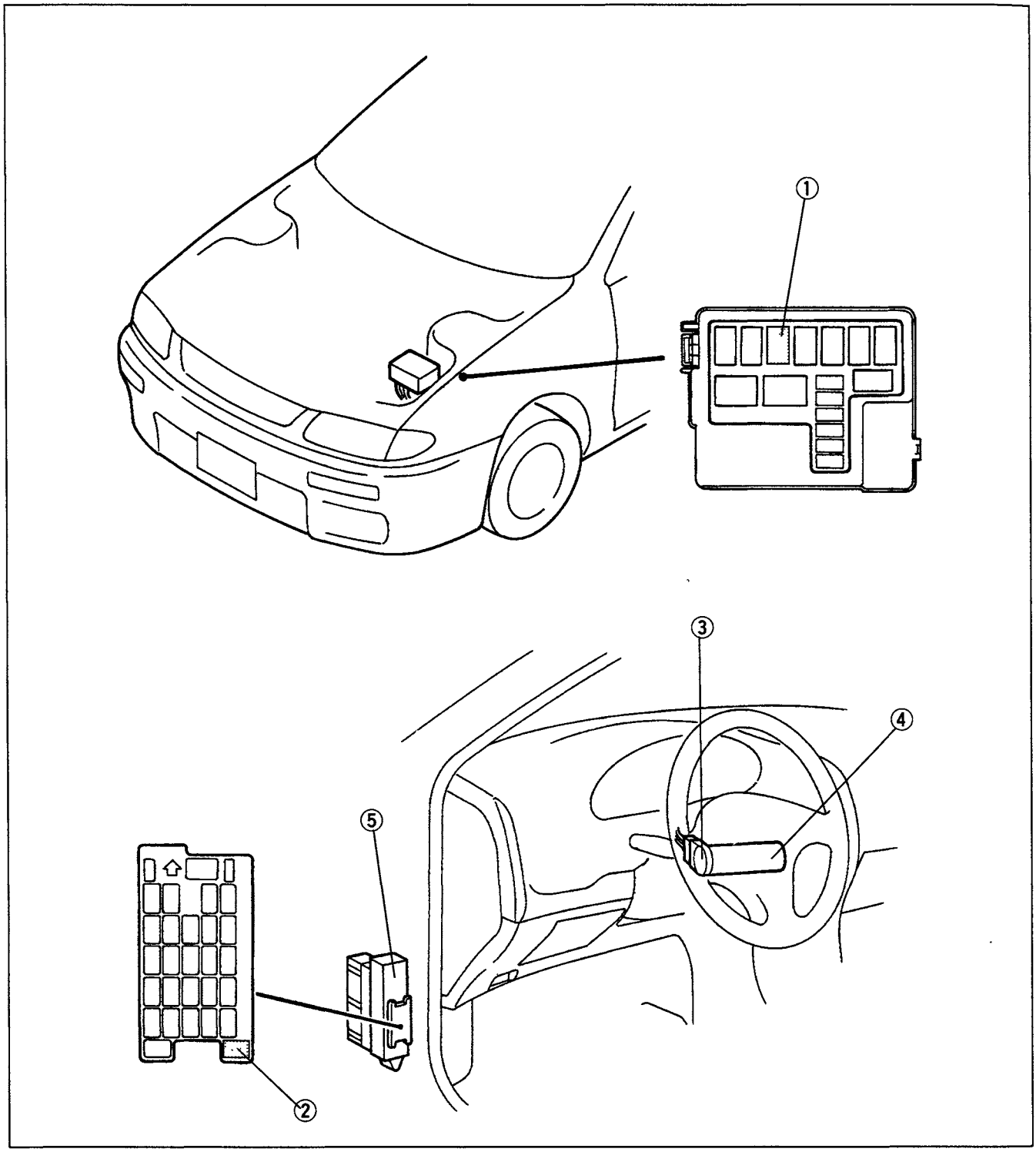
2. Turn up the rear seat back trim and remove the hog rings holding the trim to the pad.

BODY ELECTRICAL SYSTEM (4 DOOR SEDAN)

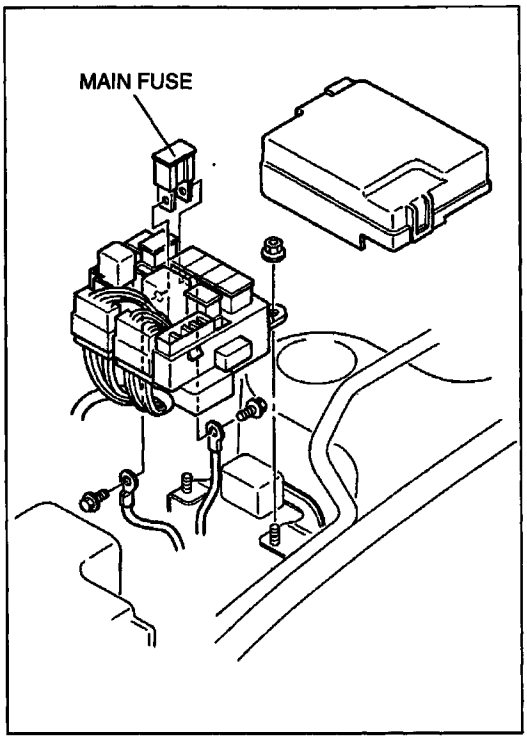
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ROOM FUSE T1– 3
IGNITION SWITCH T1– 4
KEY REMINDER SWITCH T1– 4
CPU T1– 5
STRUCTURAL VIEW T1– 5
CPU T1– 6
EXTERIOR LIGHTING SYSTEM T1–10
STRUCTURAL VIEW T1–10
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PARKING LIGHT T1–15
FRONT SIDE MARKER LIGHT T1–15
FRONT TURN LIGHT T1–16
REAR COMBINATION LIGHT T1–17
INBOARD COMBINATION LIGHT .. T1–18
LICENCE PLATE LIGHT T1–19
HIGH-MOUNT BRAKE LIGHT T1–19
COMBINATION SWITCH T1–21
HAZARD WARNING SWITCH T1–28
FLASHER UNIT T1–29
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BACK-UP LIGHT SWITCH T1–31
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SPOT LIGHT T1–34
INTERIOR LIGHT T1–35
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DOOR SWITCH T1–36
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INSPECTION OF SST (DEPLOYMENT TOOL) T1–112

POWER SYSTEM

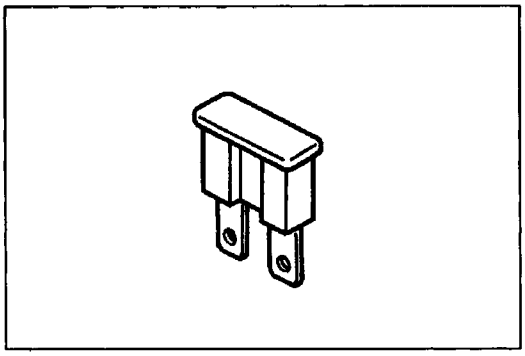
STRUCTURAL VIEW



1. MAIN fuse
   Removal / Installation ..... page T1–3
2. ROOM fuse
   Installation ..... page T1–3
3. Ignition switch
   Removal / Installation ..... page T1–4
   Inspection ..... page T1–4
4. Key reminder switch
   Inspection ..... page T1–4
5. Joint box
   Removal / Installation ..... page T1–6



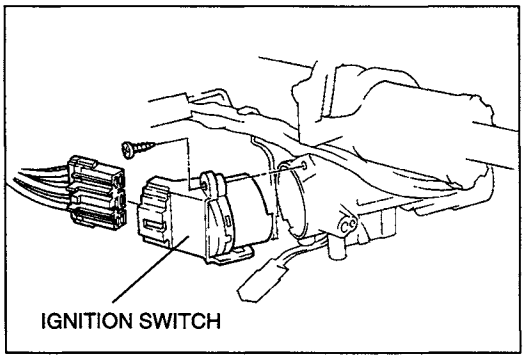
MAIN FUSE
Removal / Installation
1. Disconnect the negative battery cable.
2. Remove the main fuse block cover.
3. Remove the main fuse block mounting nuts.
4. Remove the main fuse mounting bolts.
5. Remove the MAIN fuse.
6. Install in the reverse order of removal.



ROOM FUSE
Installation

Note
- When the ROOM fuse is burnt or removed, the malfunction indicator lamp illuminates. If the ROOM fuse is replaced or installed with the ignition switch at ON, the malfunction indicator lamp will continue to illuminate.

1. Turn the ignition switch to LOCK.
2. Install the ROOM fuse.



IGNITION SWITCH

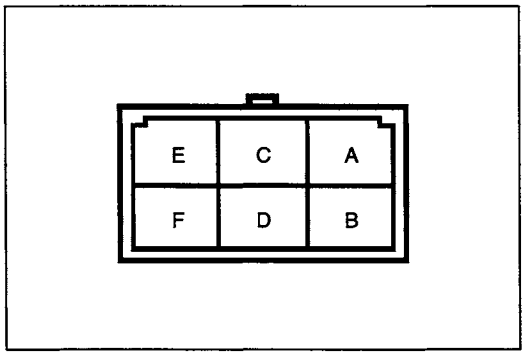
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the column cover.
   (Refer to section S1.)
3. Remove the key reminder switch connector from the ignition switch.
4. Disconnect the ignition switch connector and key reminder switch connector.

Note

- If the screw is difficult to remove, remove the steering shaft mounting bolts and lower panel to remove the ignition switch.
  (Refer to sections N and S1.)

5. Remove the screw and ignition switch.
6. Install in the reverse order of removal.



Inspection

1. Remove the ignition switch.
2. Check for continuity between the terminals of the ignition switch.

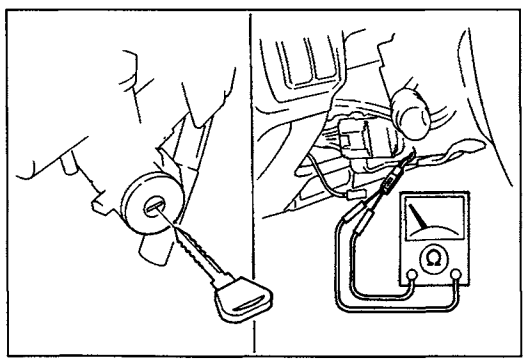
O—O : Continuity

Switch position \ Terminal	A	B	C	D	E	F
LOCK						
ACC			O			O
ON	O	O	O	O		O
START		O	O			
				O	O	

3. If not as specified, replace the ignition switch.

KEY REMINDER SWITCH

Inspection



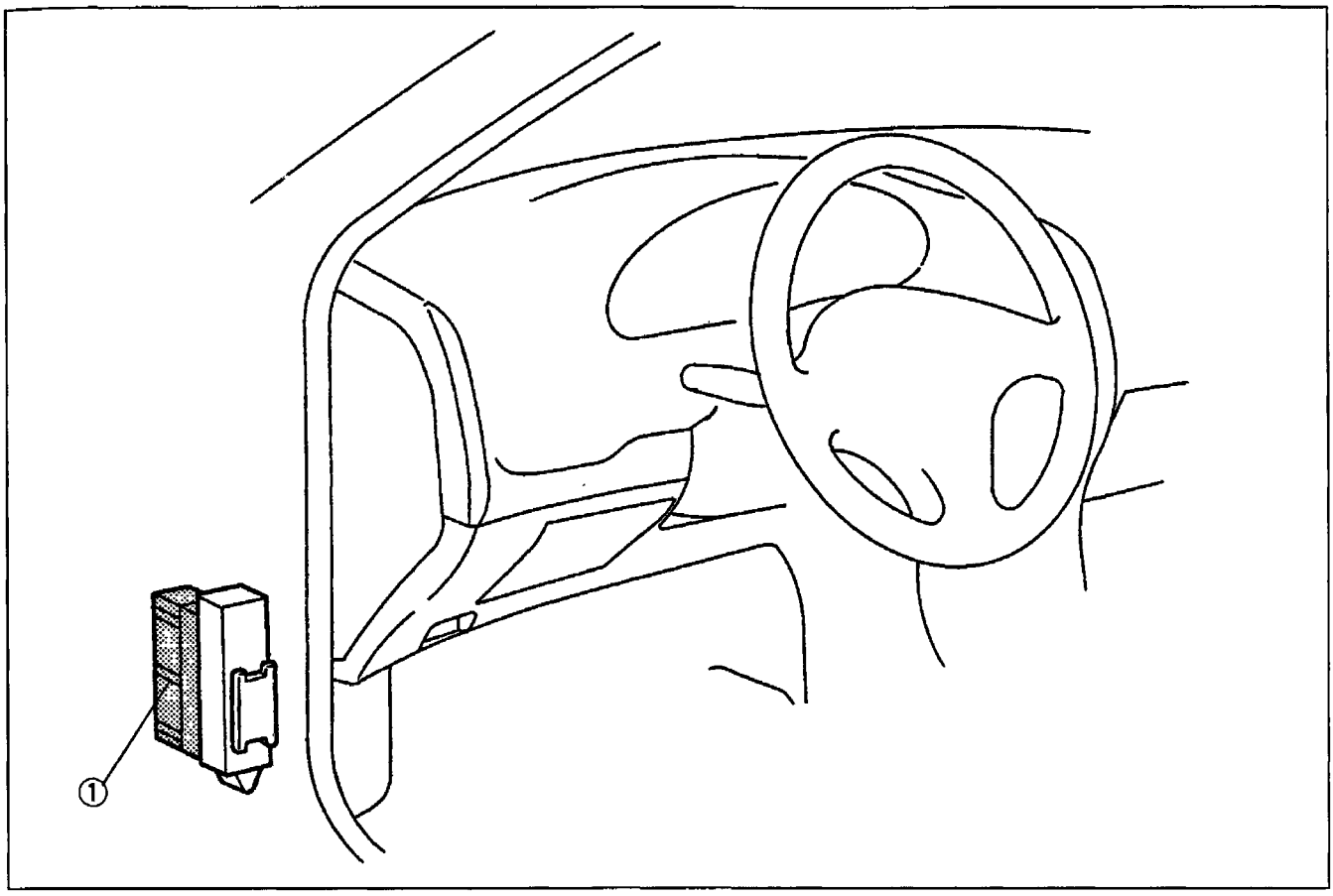
1. Remove the column cover.
   (Refer to section S1.)
2. Disconnect the key reminder switch connector.
3. Check for continuity between the terminals of the key reminder switch.

Switch condition	Continuity
Key inserted	Yes
Key removed	No

4. If not as specified, replace the steering lock.
   (Refer to section N.)

CPU

STRUCTURAL VIEW

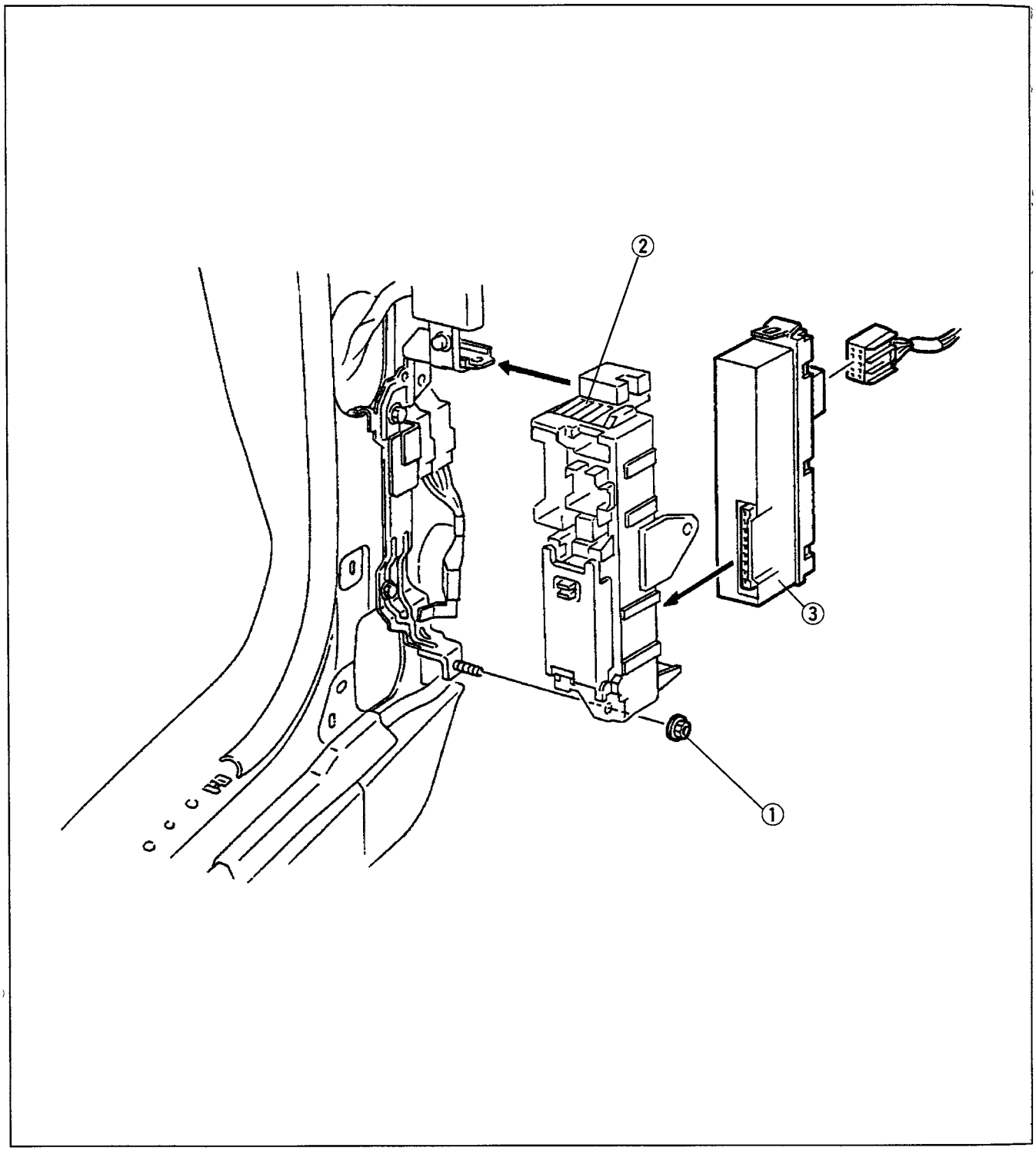


1. CPU
   Removal / Installation ..... page T1–6
   Inspection ..... page T1–7

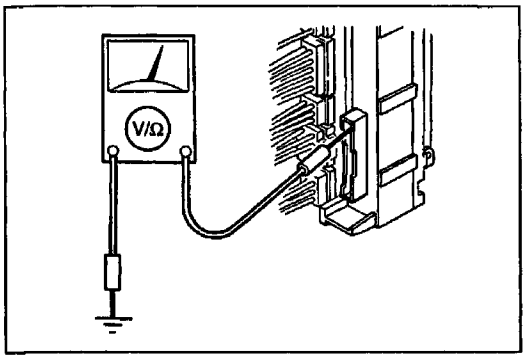
CPU

Removal / Installation

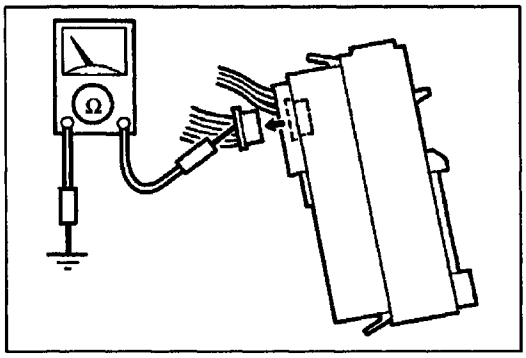
1. Disconnect the negative battery cable.
2. Remove the scuff plate and front side trim. (Refer to section S1.)
3. Disconnect the joint box connectors.
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal.



1. Nut
2. Joint box
3. CPU
   Inspection ..... page T1–7

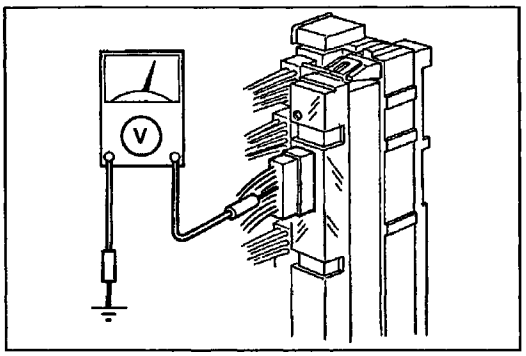


Inspection
Connector A
1. Remove the CPU from the joint box.
2. Measure the voltage at the CPU terminals from the joint box side, referring to the terminal voltage list on page T1–8.
3. If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnesses.
4. If the parts and wiring harnesses are OK but the system still does not work properly, replace the CPU. (Refer to page T1–6.)



Connector B
1. Follow the appropriate procedure, referring to the terminal voltage list on page T1–9.

Terminal 2I
(1) Disconnect the CPU connector.
(2) Check for continuity between the terminal of the CPU connector and ground.



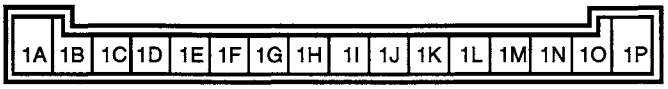
Terminals except 2I
(1) Install the CPU onto the joint box.
(2) Measure the voltage at the CPU terminals.

2. If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnesses.
3. If the parts and wiring harnesses are OK but the system still does not work properly, replace the CPU. (Refer to page T1–6.)

Terminal voltage list (Reference)

B+: Battery positive voltage

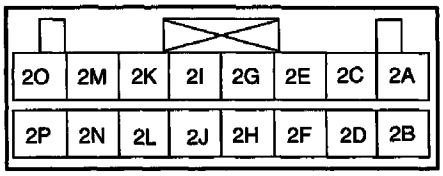
CONNECTOR A



Terminal	Signal	Connection	Test condition		Voltage/ Continuity	Inspection area
1A	—	—	—		—	—
1B	—	—	—		—	—
1C	ACC	RADIO 15 A fuse	Ignition switch at ACC		B+	RADIO 15 A fuse
1D	—	—	—		—	—
1E	—	—	—		—	—
1F	Interior light	Interior light	Interior light switch at DOOR		B+	• ROOM 15 A fuse • Interior light
1G	CPU ground	GND	Constant: check for continuity to ground		Yes	—
1H	Door open/closed	Door switch (except driver)	Any door open: check for continuity to ground		Yes	Door switch
			All doors closed: check for continuity to ground		No	
1I	—	—	—		—	—
1J	+B	ROOM 15 A fuse	Constant		B+	ROOM 15 A fuse
1K	Key inserted	Key reminder switch	Ignition key inserted		B+	• ROOM 15 A fuse • Key reminder switch
1L	TNS	TNS relay	Parking light illuminated		B+	• TAIL 15 A fuse • TNS relay
1M	IG1	METER 15 A fuse	Ignition switch at ON		B+	METER 15 A fuse
1N	Seat belt warning	• Seat belt warning light • Buckle switch	Ignition switch at ON	Seat belt fastened	B+	• METER 15 A fuse • Instrument cluster • Buckle switch
				Seat belt unfastened	0 V	
1O	Door open/closed	Door switch (driver)	Door open: check for continuity to ground		Yes	Door switch
			Door closed: check for continuity to ground		No	
1P	—	—	—		—	—

B+: Battery positive voltage

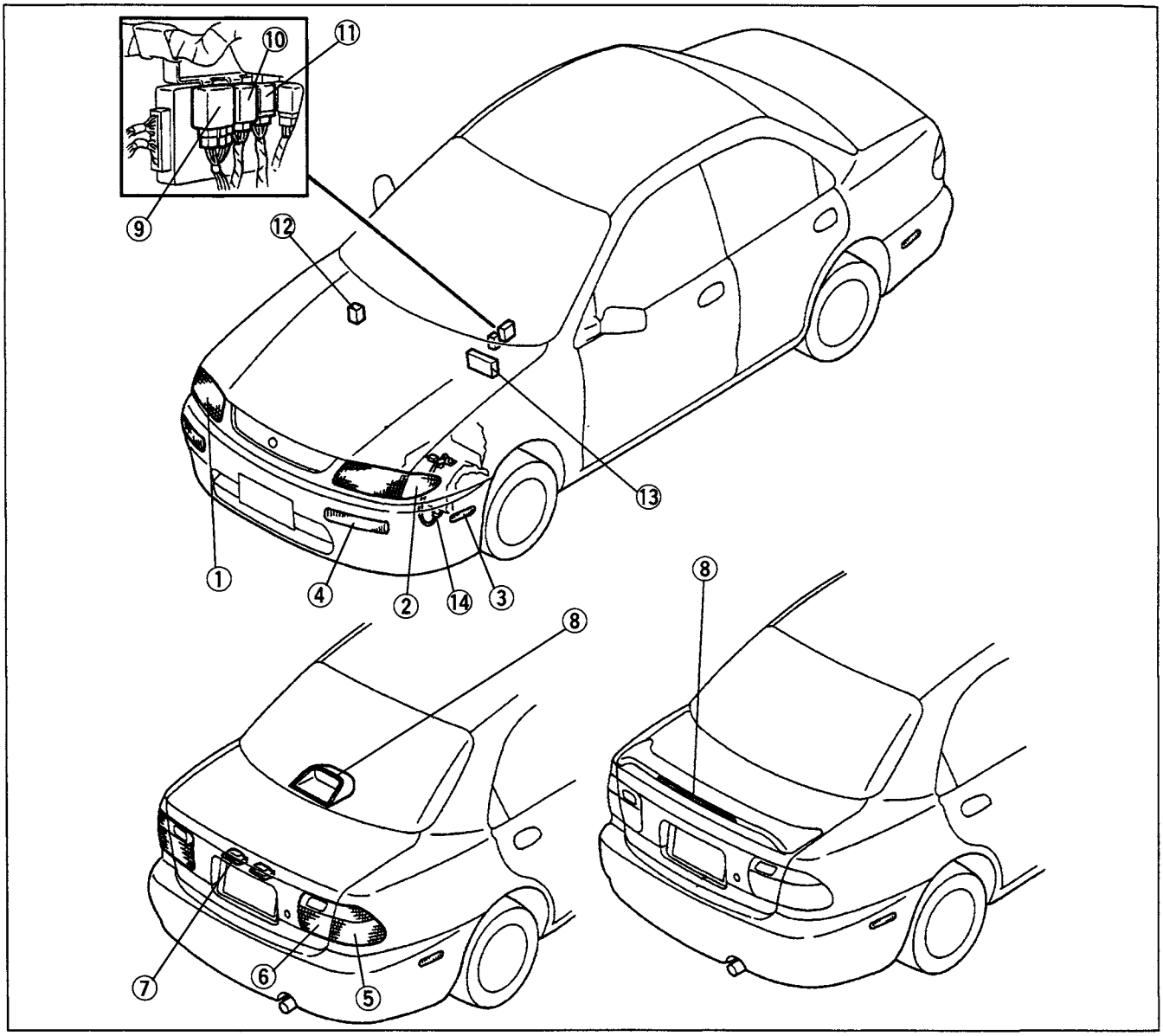
CONNECTOR B



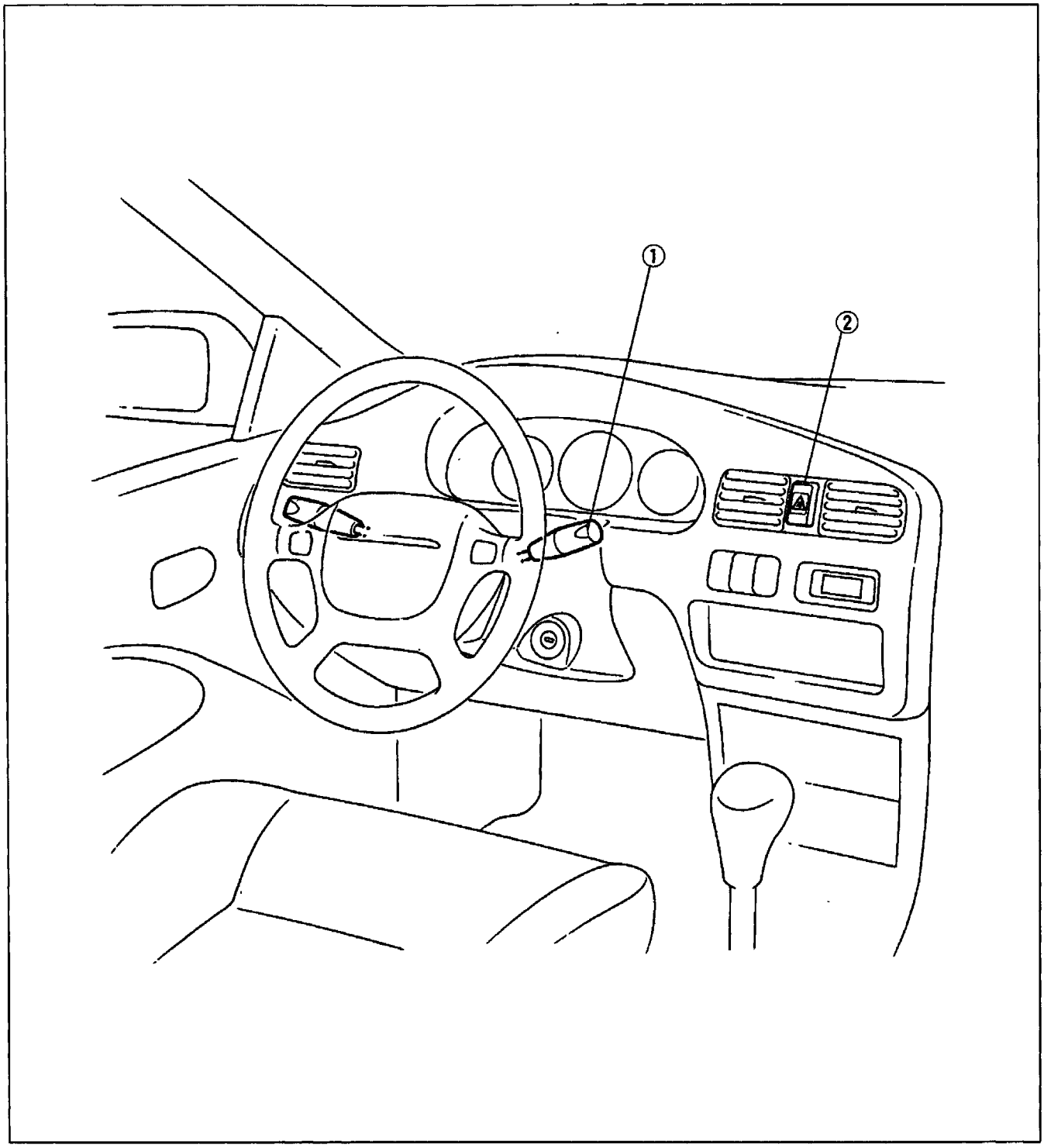
Terminal	Signal	Connection	Test condition		Voltage/ Continuity	Inspection area
2A	Power door lock control	Door lock timer unit	For 0.27 seconds after driver's door key cylinder switch is unlocked		0 V	• D.LOCK 30 A fuse • Door lock timer unit
			Other		B+	
2B	—	—	—		—	—
2C	Power door lock control	Door lock timer unit	For 0.27 seconds after driver's door key cylinder switch is locked		0 V	• D.LOCK 30 A fuse • Door lock timer unit
			Other		B+	
2D	DRL	DRL relay	Ignition switch at ON		B+	• A/C 10 A fuse • DRL relay
2E	DRL	Combination switch	Headlight illuminated		B+	Combination switch
2F	Brake light	Brake switch	Brake light illuminated		B+	Brake switch
2G	Shift-lock control (lock)	Shift-lock actuator	Ignition switch at ON and selector lever at P range	Brake pedal depressed	0 V	• Shift-lock actuator • P range switch
				Brake pedal released	B+	
2H	Shift-lock control (unlock)	Shift-lock actuator	Ignition switch at ON and selector lever at P range	For 1 second after brake pedal is depressed	0 V	• Shift-lock actuator • P range switch
				Other	B+	
2I	Parking brake	Parking brake switch	Parking brake pulled: check for continuity to ground		Yes	Parking brake switch
			Parking brake released: check for continuity to ground		No	
2J	Key cylinder	Door key cylinder switch (passenger)	At lock position		2.5 V	Door key cylinder switch
			At unlock position		0 V	
			Other		5 V	
2K	Brake system warning	• Brake system warning light • Brake fluid level sensor	Ignition switch at ON	Brake system warning light illuminated	0 V	• METER 15 A fuse • Instrument cluster • Brake fluid level sensor
				Other	B+	
2L	Key cylinder	Door key cylinder switch (driver)	At lock position		2.5 V	Door key cylinder switch
			At unlock position		0 V	
			Other		5 V	
2M	—	—	—		—	—
2N	DRL	Combination switch	Headlight switch on	Dimmer switch at high position	B+	Combination switch
				Other	0 V	
2O	—	—	—		—	—
2P	—	—	—		—	—

EXTERIOR LIGHTING SYSTEM

STRUCTURAL VIEW



1. Headlight
   - Removal / Installation ..... page T1–12
   - Aiming ..... page T1–13
   - Bulb replacement ..... page T1–14
2. Parking light
   - Removal / Installation ..... page T1–15
3. Front side marker light
   - Removal / Installation ..... page T1–15
4. Front turn light
   - Removal / Installation ..... page T1–16
5. Rear combination light
   - Removal / Installation ..... page T1–17
6. Inboard combination light
   - Removal / Installation ..... page T1–18
   - Bulb replacement ..... page T1–18
7. Licence plate light
   - Removal / Installation ..... page T1–19
8. High-mount brake light
   - Removal / Installation ..... page T1–19
   - Bulb replacement ..... page T1–20
9. Flasher unit
   - Removal / Installation ..... page T1–29
   - Inspection ..... page T1–29
10. Headlight relay
    - Inspection ..... page T1–30
11. TNS relay
    - Inspection ..... page T1–30
12. DRL relay
    - Inspection ..... page T1–30
13. DRL resistor
    - Inspection ..... page T1–30
14. Back-up light switch
    - Removal / Installation ..... page T1–31
    - Inspection ..... page T1–31



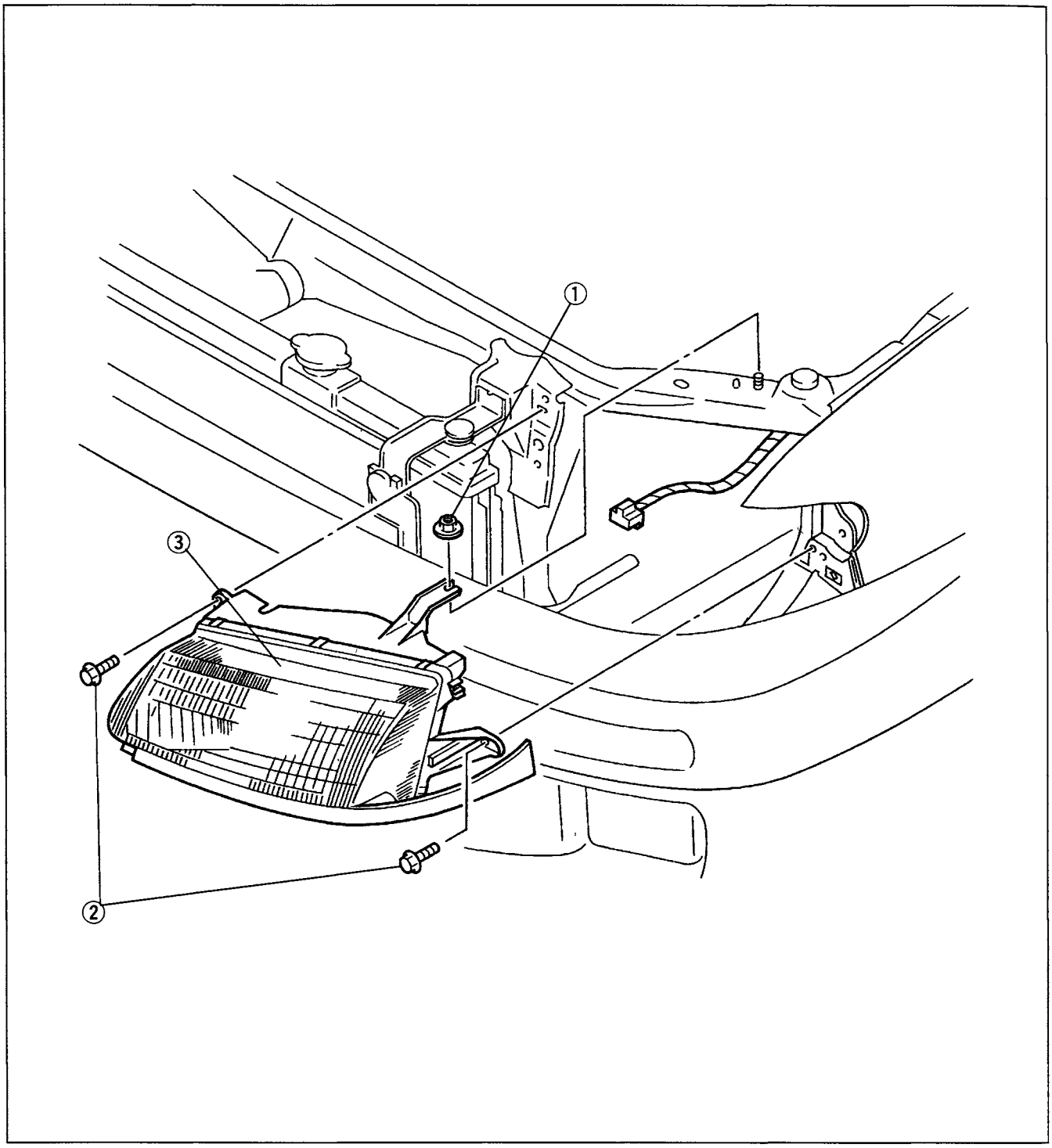
1. Combination switch
   - Removal / Installation ..... page T1–21
   - Disassembly / Assembly ..... page T1–23
   - Inspection ..... page T1–24
   - Adjustment ..... page T1–27

2. Hazard warning switch
   - Removal / Installation ..... page T1–28
   - Inspection ..... page T1–28

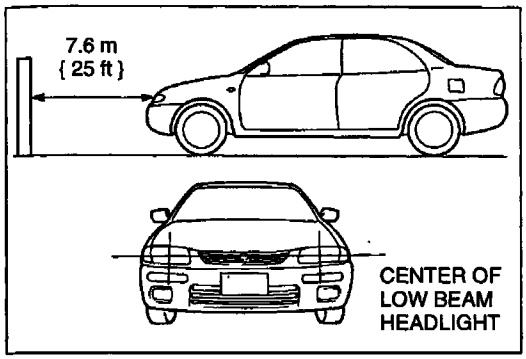
HEADLIGHT

Removal / Installation

1. Remove the radiator grille and upper seal board.
   (Refer to section S1.)
2. Remove the parking light.
   (Refer to page T1–15.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



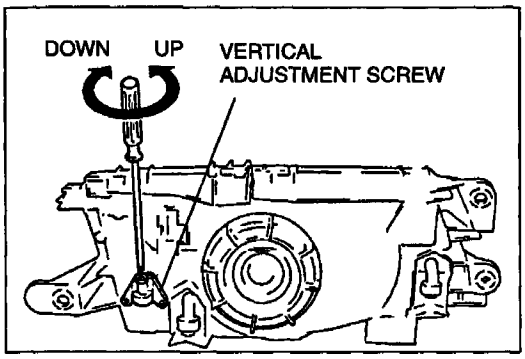
1. Nut
2. Bolts
3. Headlight
   Aiming ..... page T1–13
   Bulb replacement ..... page T1–14



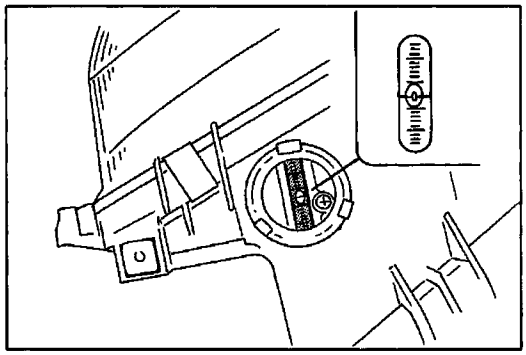
Aiming

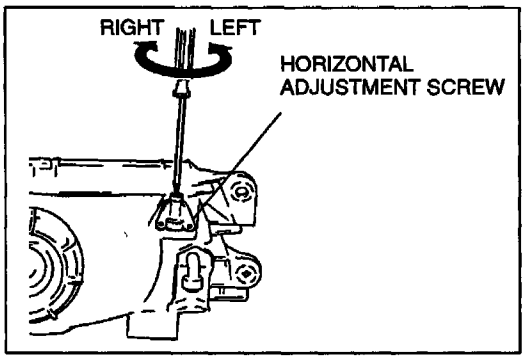
Vertical-horizonal aiming method

1. Adjust the tire air pressure to specification. (Refer to section Q.)
2. Fill the fuel tank and remove excess cargo.
3. Position the unloaded vehicle on a flat level surface.
4. Position the vehicle straight ahead to the headlight tester. Set the distance between the headlight and the tester to 7.6 m { 25 ft }.
5. Disconnect the connector of the other headlight.

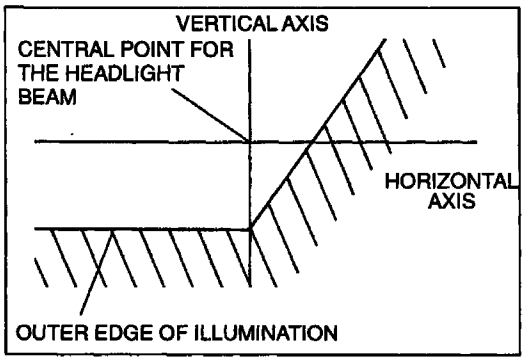


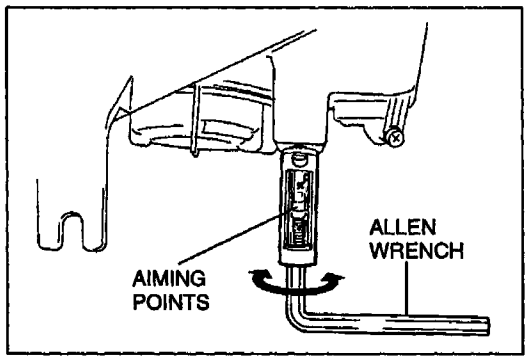
6. Adjust the up/down position of the headlight by using the vertical aiming gauge. Make sure the bubble in the gauge is within the two lines on either side of the center "0".





7. Turn the headlights on at low beam.
8. Adjust the headlights by turning the horizontal adjustment screw until the field of illumination is as shown.

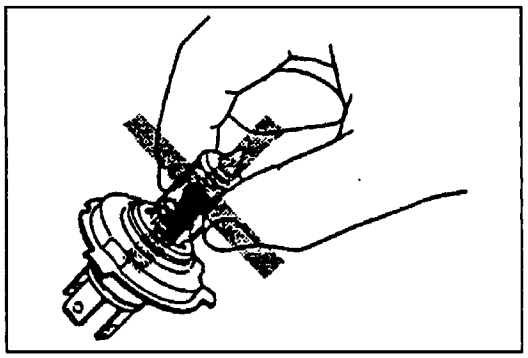




9. Align the aiming points by using an Allen wrench.
10. Do this procedure for both RH and LH headlights.

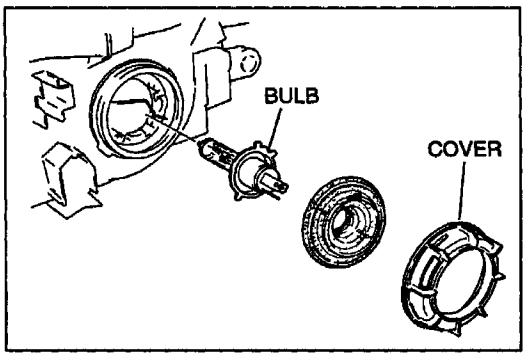
Note

- Simple aiming adjustments can be done correctly by following the above procedures, by turning the horizontal adjustment screw, and by aligning the aiming points.



Warning

- **If the glass surface of a halogen bulb is touched with bare hands, natural body oil could cause the bulb to overheat when it is lit. Because a halogen bulb contains pressurized gas, this overheating will cause the bulb to burst. The flying glass may seriously injure you. Hold the metal flange, not the glass, when replacing the bulb.**

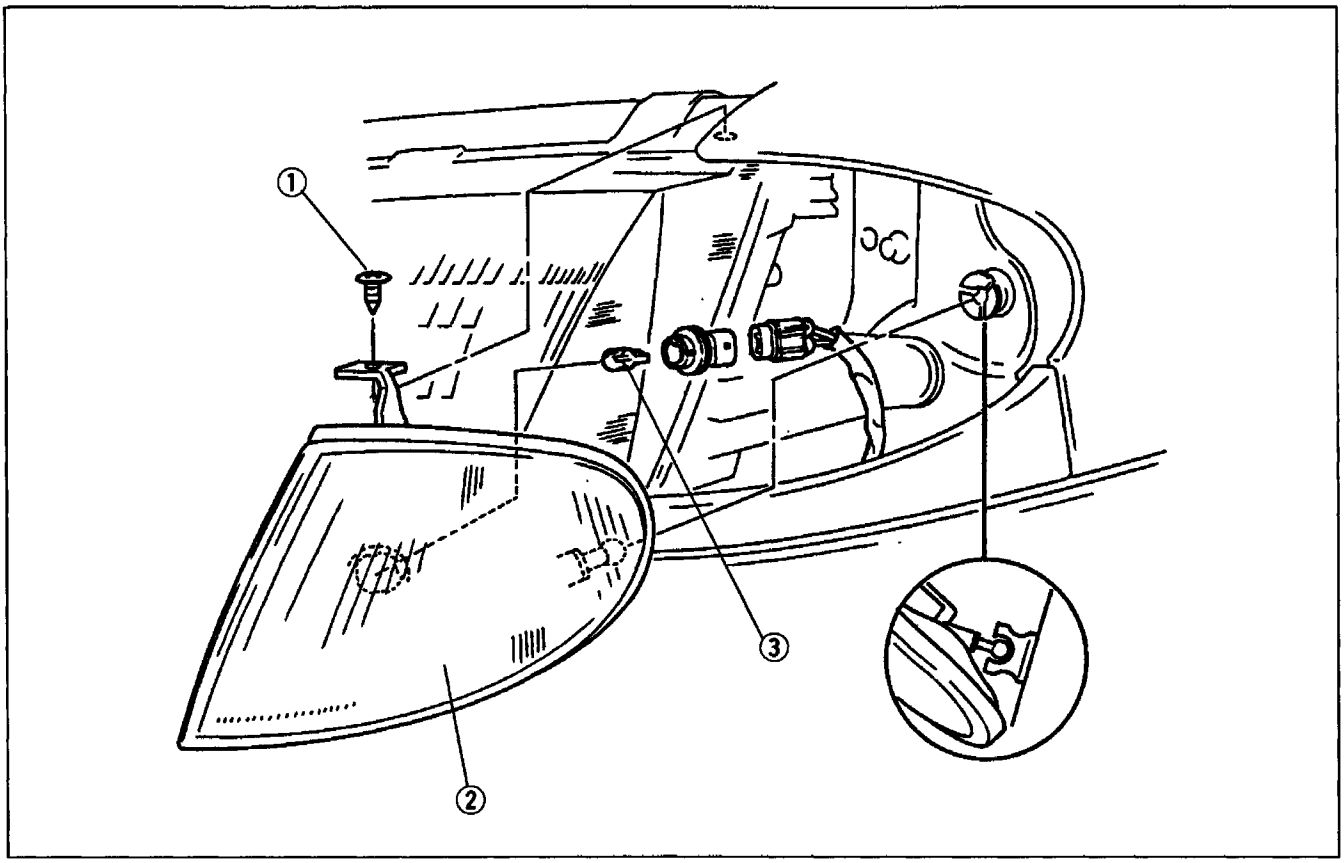


Bulb Replacement

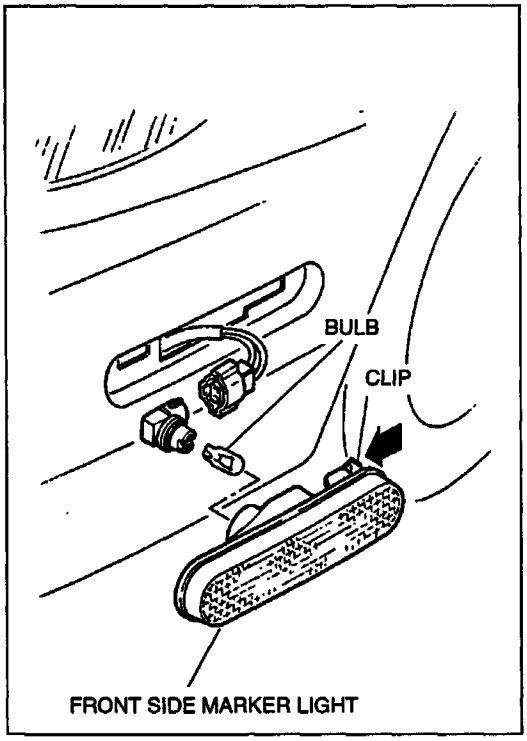
1. Disconnect the headlight connector.
2. Remove the cover.
3. Remove the headlight bulb.
4. Install in the reverse order of removal.

Headlight bulb: High/Low 60/55 W

PARKING LIGHT
Removal / Installation
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



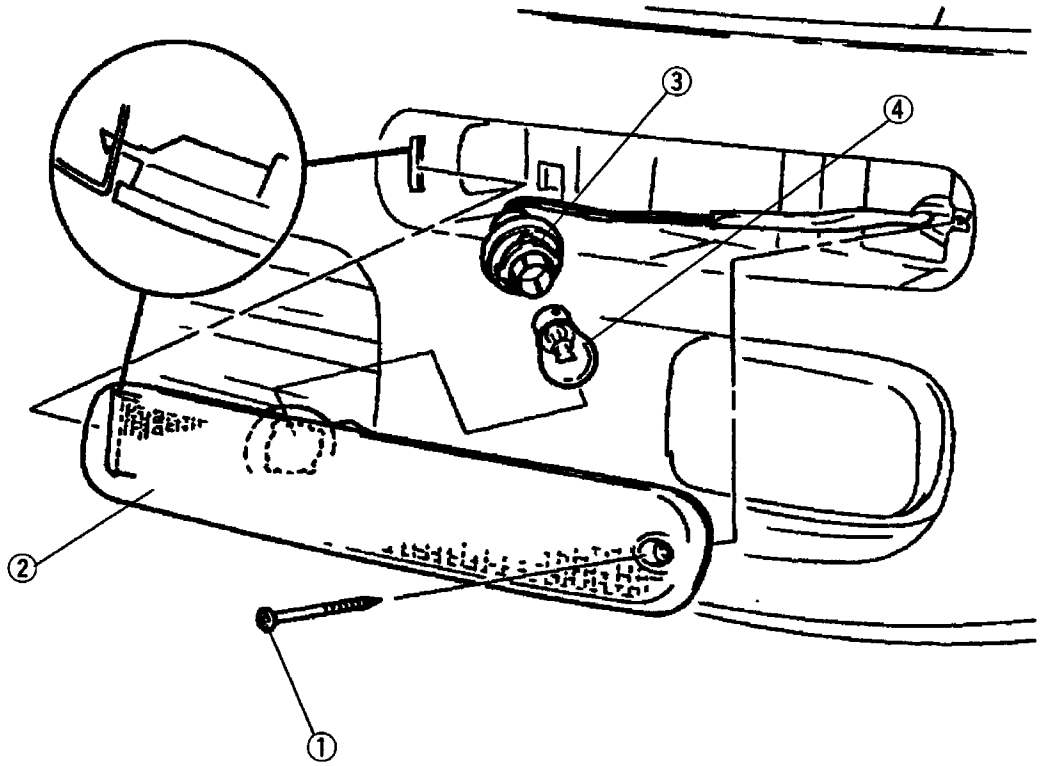
1. Screw
2. Parking light
3. Bulb (5 W)



FRONT SIDE MARKER LIGHT
Removal / Installation
1. Turn over the front mud guard.
2. Remove the front side marker light by pressing on the side with the cut-away tab then pulling out the light.
3. Remove the socket and bulb.
4. Install in the reverse order of removal.

Front side marker light bulb: 3.8 W

FRONT TURN LIGHT
Removal / Installation
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.

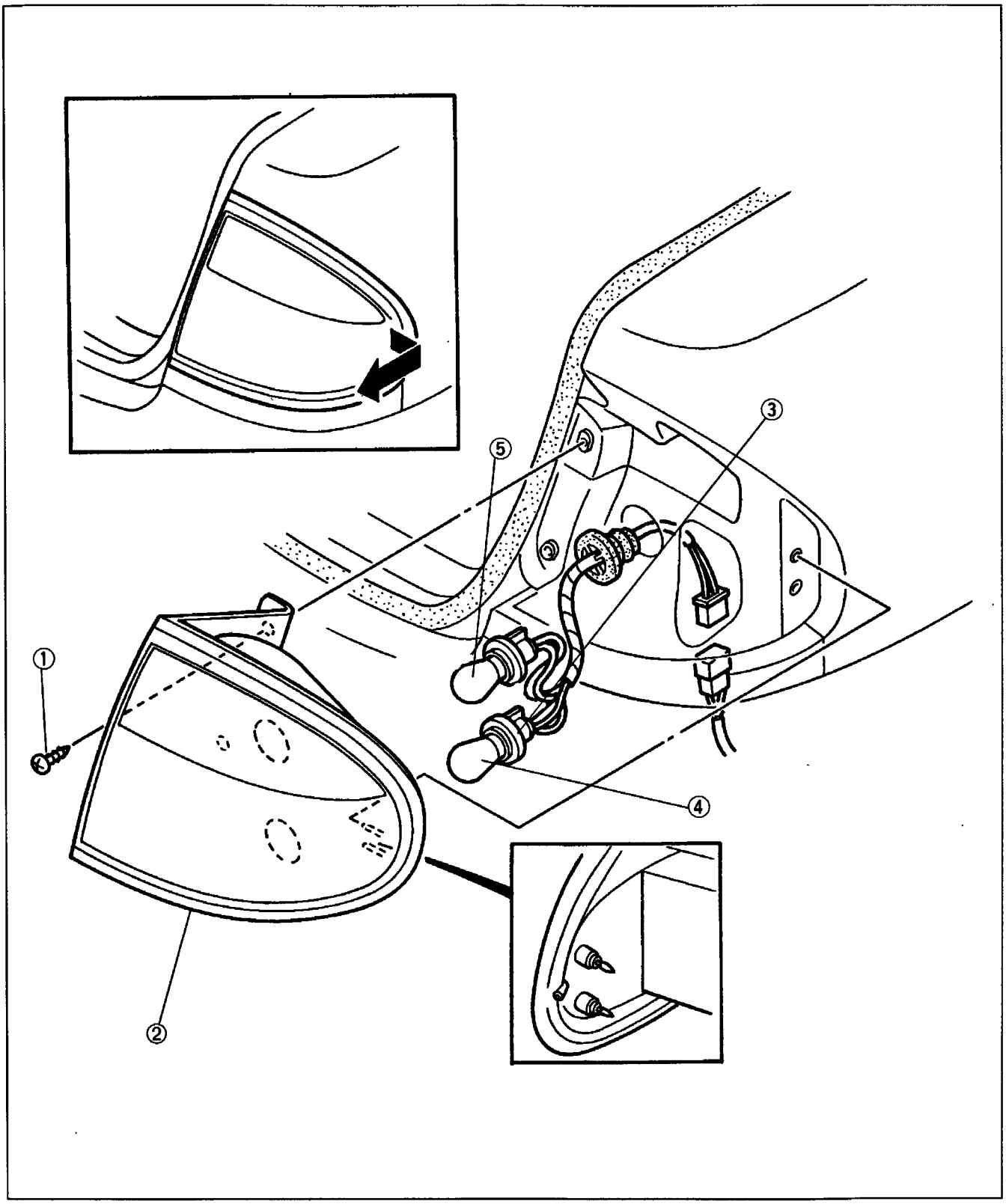


1. Screw
2. Front turn light
3. Socket
4. Bulb (27 W)

REAR COMBINATION LIGHT

Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.

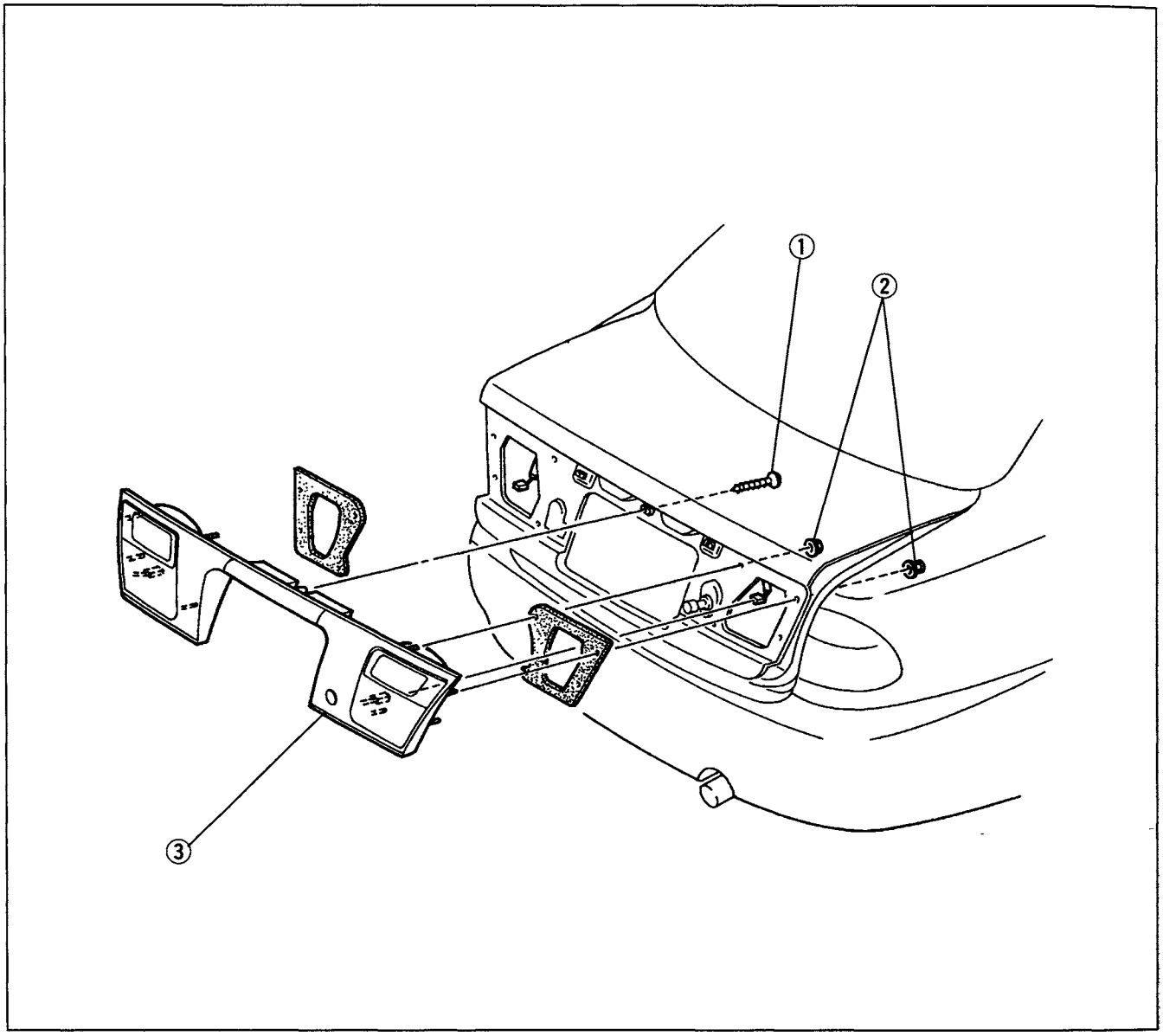


1. Screw
2. Rear combination light
3. Socket
4. Bulb (brake light/taillight: 27/8 W)
5. Bulb (rear turn light: 27 W)

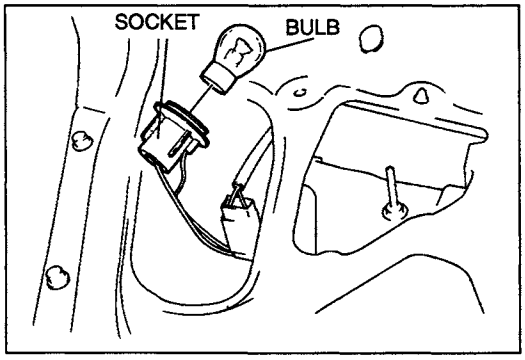
INBOARD COMBINATION LIGHT

Removal / Installation

1. Remove the trunk lid trim.
   (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



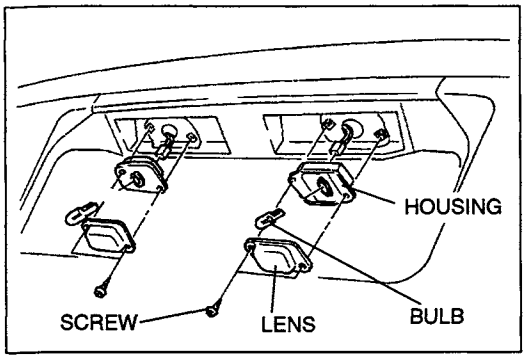
1. Screw
2. Nuts
3. Inboard combination light



Bulb replacement

1. Remove the trunk lid trim.
   (Refer to section S1.)
2. Remove the socket.
3. Remove the bulb.
4. Install in the reverse order of removal.

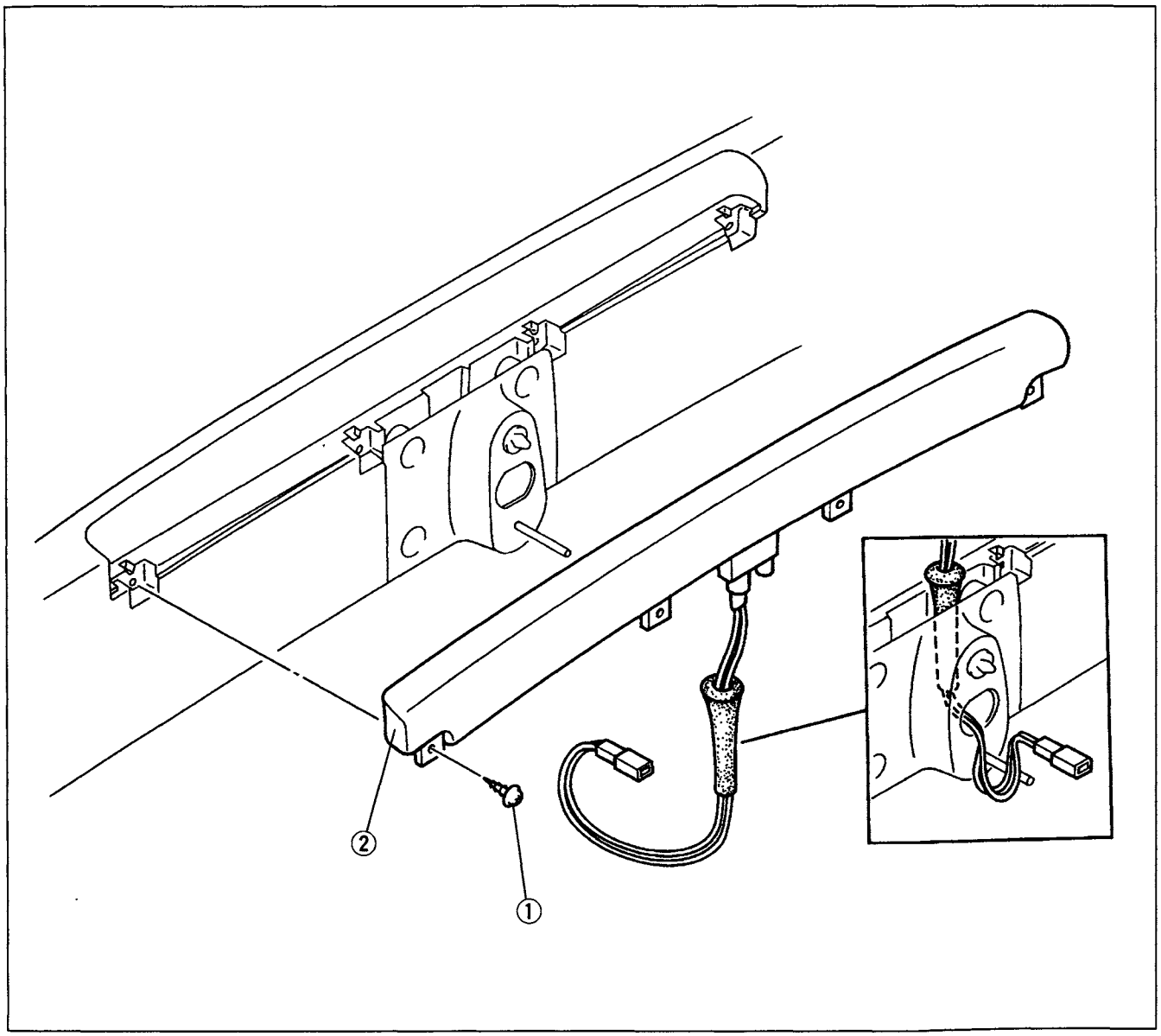
Back-up light bulb: 21 W



LICENCE PLATE LIGHT
Removal / Installation
1. Remove the screws.
2. Remove the lens.
3. Disconnect the licence plate light connector.
4. Remove the housing.
5. Remove the bulb.
6. Install in the reverse order of removal.

Licence plate light bulb: 5 W

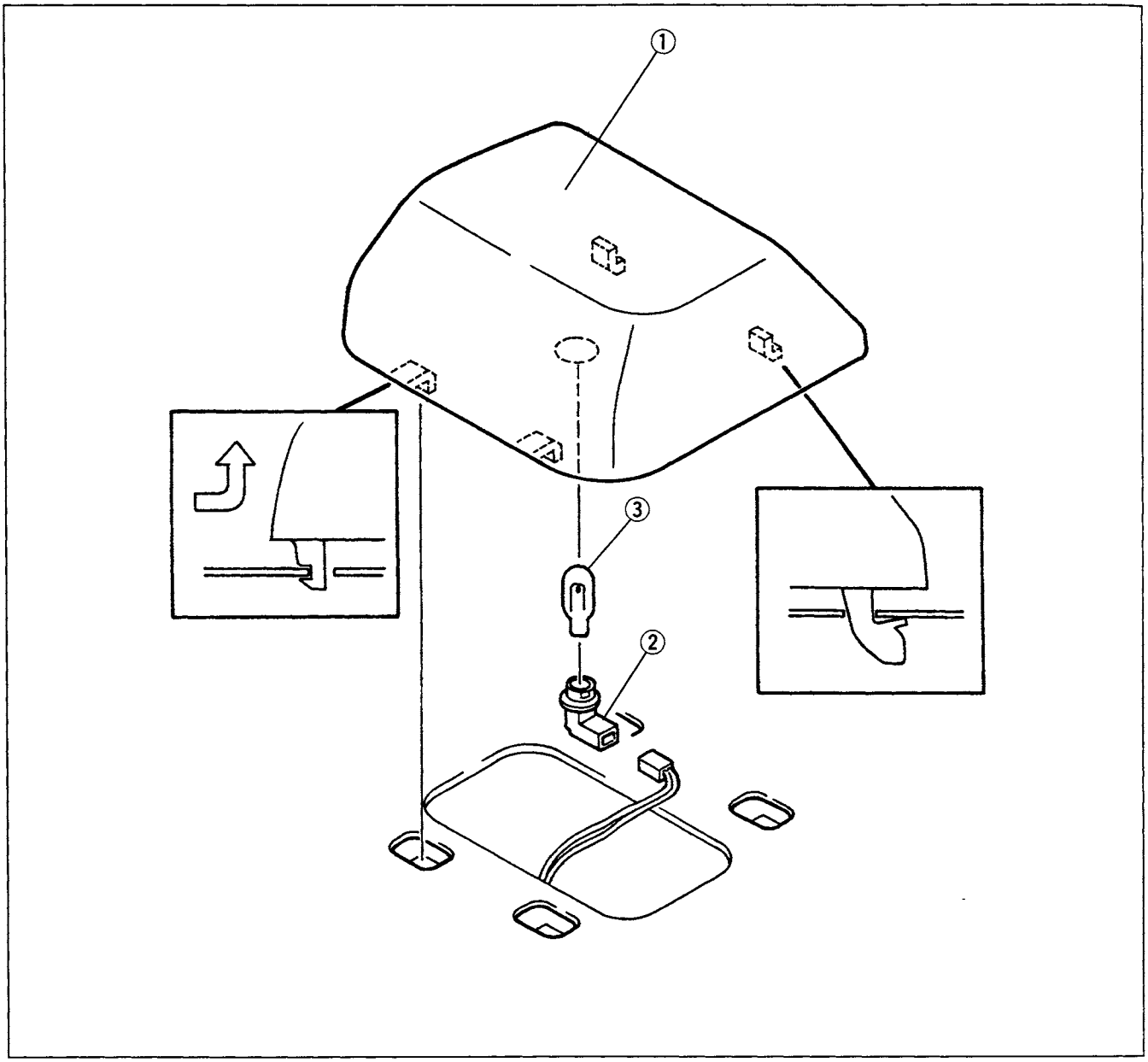
HIGH-MOUNT BRAKE LIGHT
Removal / Installation
With rear spoiler
1. Remove the rear spoiler.
   (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



1. Screw
2. High-mount brake light

Without rear spoiler

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



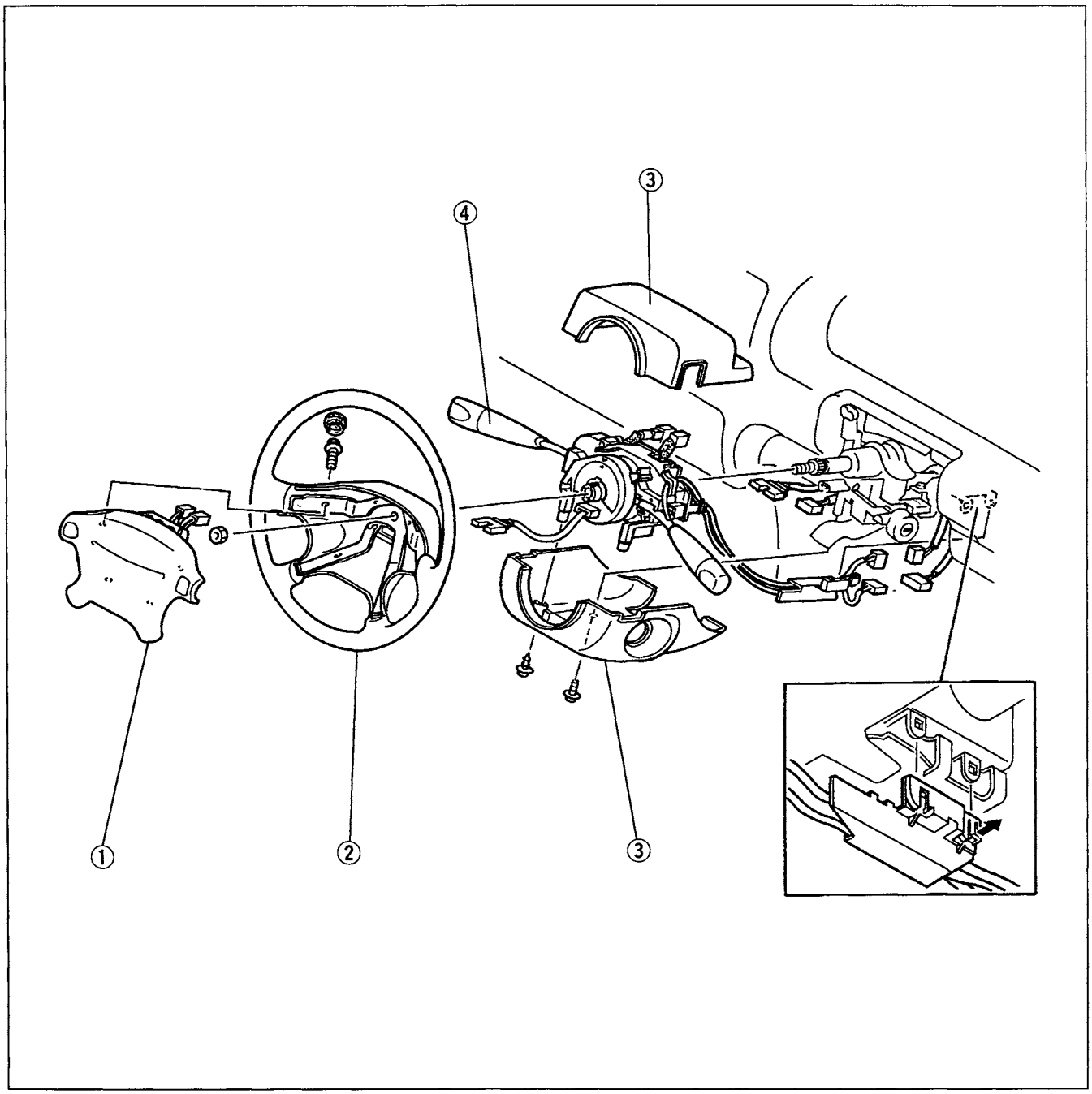
1. High-mount brake light
2. Socket
3. Bulb (18 W)

COMBINATION SWITCH
Removal / Installation
With air bag system

Warning

- **Handling the air bag module improperly can accidently deploy the air bag, which may seriously injure you. Read SERVICE WARNINGS, page T1–98, before handling the air bag module.**

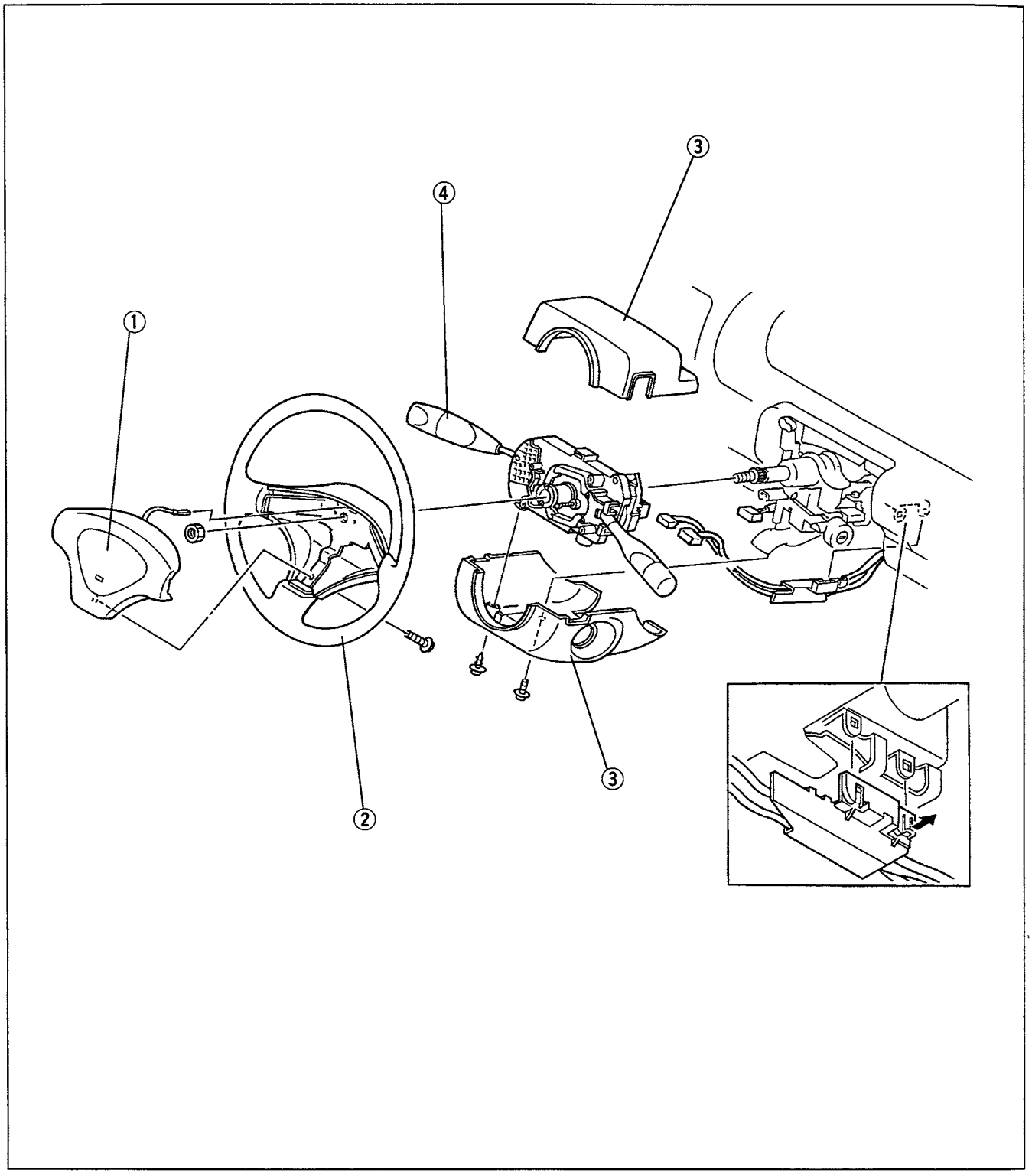
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



1. Air bag module
   Removal / Installation ..... page T1–107
2. Steering wheel
   Removal / Installation ..... section N
3. Column cover
   Removal / Installation ..... section S1
4. Combination switch
   Inspection ..... page T1–24
   Adjustment ..... page T1–27

Without air bag system

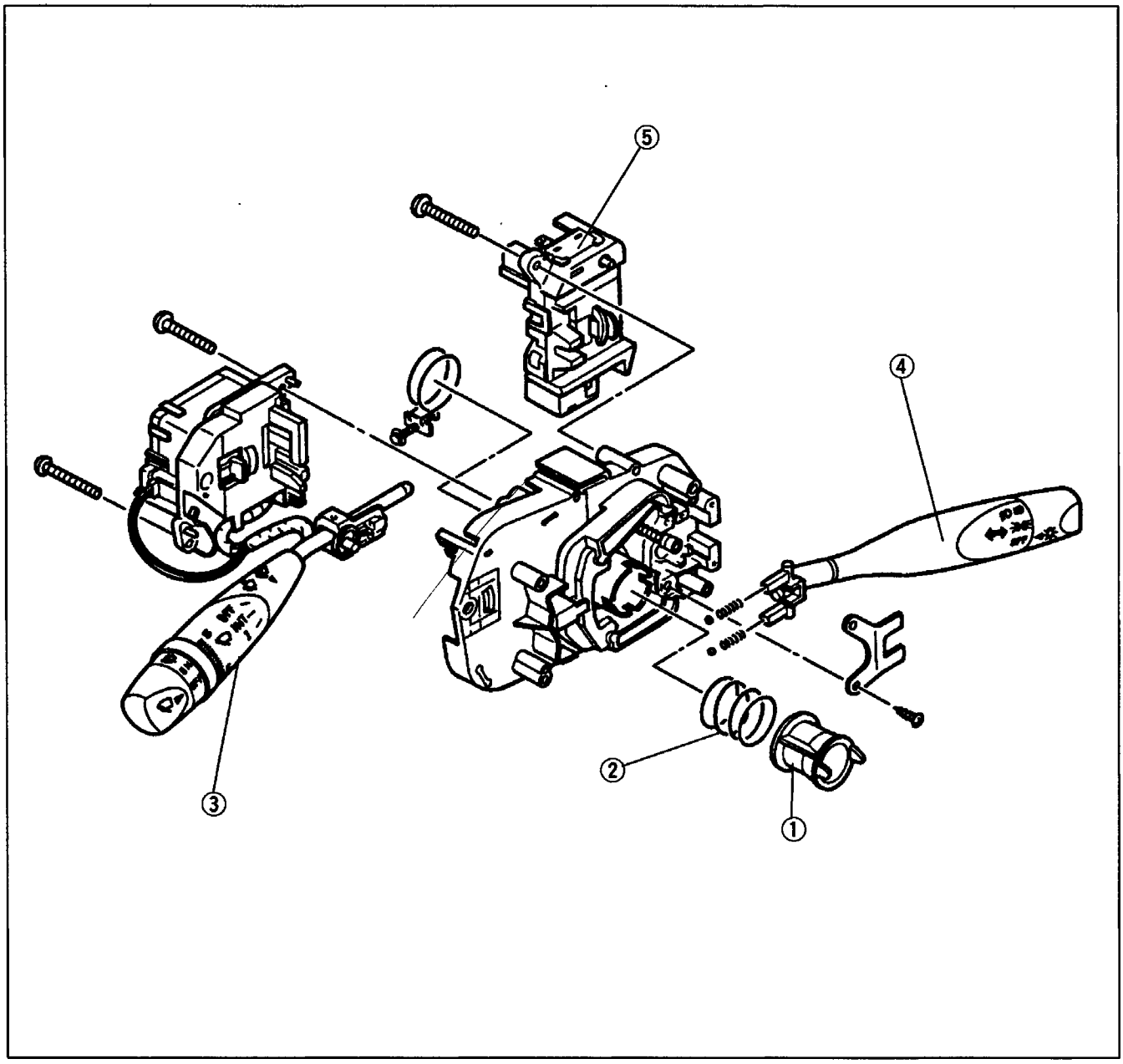
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



1. Horn cap
   Removal / Installation ..... section N
2. Steering wheel
   Removal / Installation ..... section N
3. Column cover
   Removal / Installation ..... section S1
4. Combination switch
   Disassembly / Assembly ..... page T1–23
   Inspection ..... page T1–26

Disassembly / Assembly
Without air bag system
1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.

Caution
- **The combination switch on vehicles with an air bag has a clock spring that will unwind if the switch is disassembled. The spring cannot be rewound by hand. If this occurs, the combination switch will not work properly. Therefore, do not disassemble the combination switch if an air bag is installed.**

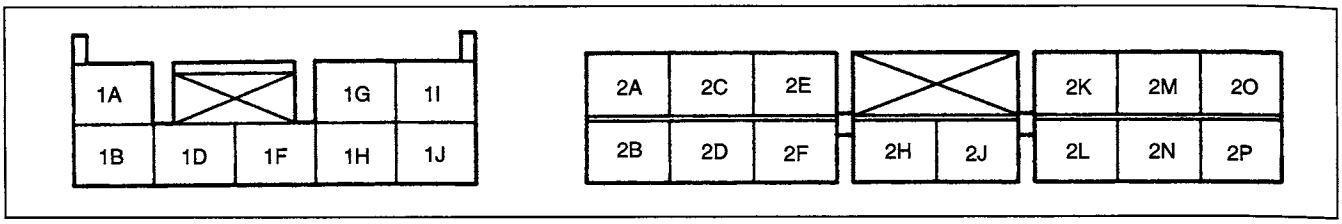


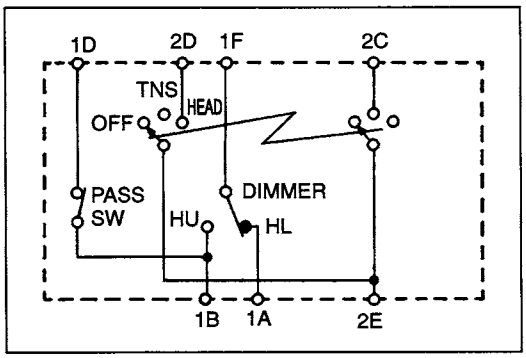
1. Cancel cam
2. Spring
3. Wiper lever
4. Light lever
5. Light unit

Inspection

With air bag system

1. Check for continuity between the switch terminals as indicated below.
2. If not as specified, replace the combination switch.

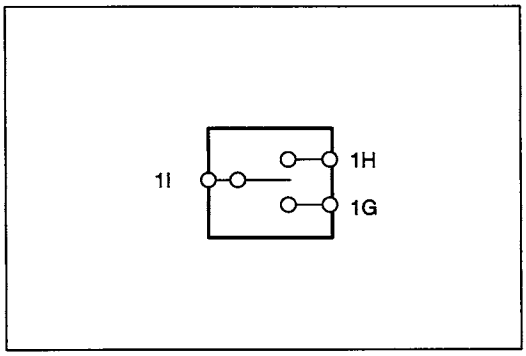




Headlight switch

○—○: Continuity

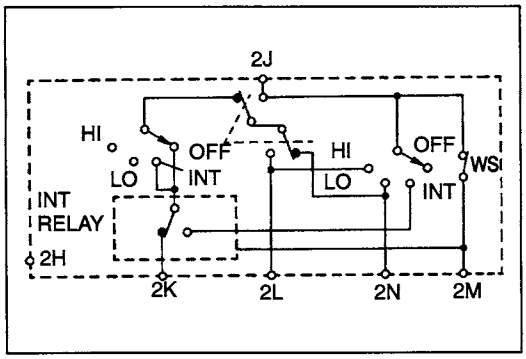
Light	Dimmer	Terminal / Flash-to-pass	2E	2C	2D	1F	1A	1B	1D
OFF	—	OFF							
		ON						○	○
Parking	—	OFF	○	○					
		ON	○	○				○	○
Headlight	LO	OFF	○	○	○	○	○		
		ON	○	○	○	○	○	○	○
	HI	—	○	○	○	○		○	



Turn switch

○—○: Continuity

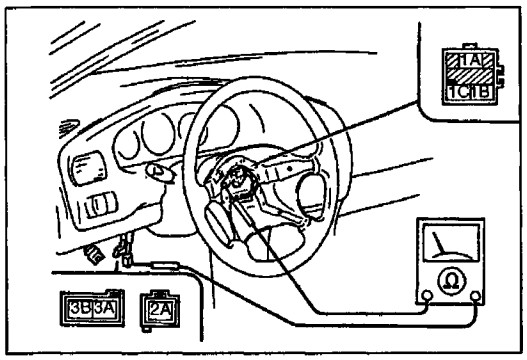
Switch position	1I	1H	1G
Left	○	○	
OFF			
Right	○		○



Windshield wiper and washer switch

○—○: Continuity

Switch position		One-touch	2K	2L	2N	2J	2M
Wiper switch	OFF	OFF	○		○		
		ON		○		○	
	INT		○		○		
	LO				○	○	
	HI			○		○	
Washer switch	ON					○	○



Clock spring

Warning

- **Handling the air bag module improperly can accidently deploy the air bag, which may seriously injure you. Read SERVICE WARNINGS, page T1–98, before handling the air bag module.**

1. Remove the driver-side air bag module. (Refer to page T1–107.)
2. Check for continuity between the terminals of the clock spring connector.

O—O: Continuity

Step \ Terminal	1A	1B	1C	2A	3A	3B
1	O			O		
2		O			O	
3			O			O

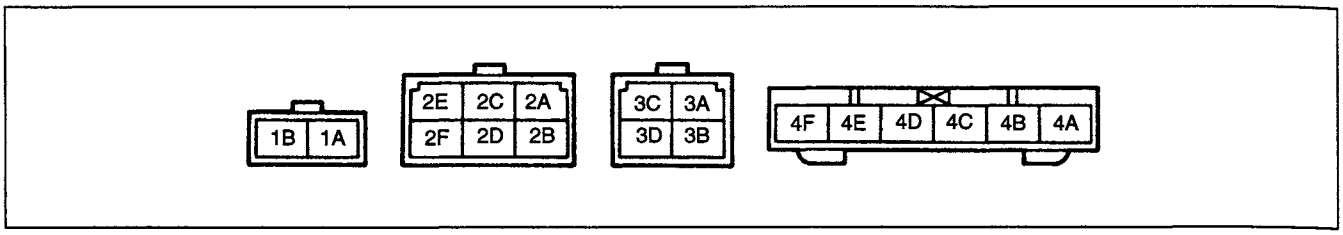
Note

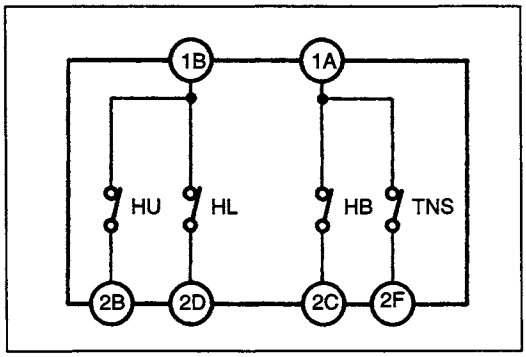
- When terminals 3A and 3B are disconnected from the vehicle's main harness, they are shorted to prevent unexpected air bag deployment.

3. If not as specified, replace the combination switch. (Refer to page T1–21.)

Without air bag system

1. Check for continuity between the terminals as indicated below.
2. If not as specified, replace the necessary parts.

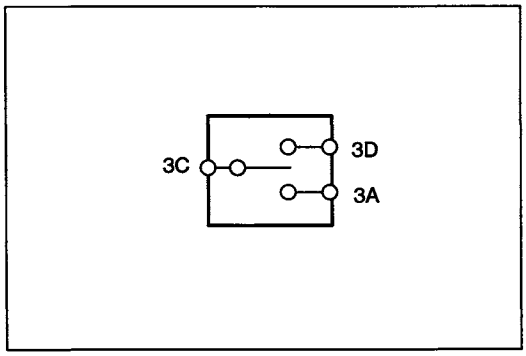




Headlight switch

○—○: Continuity

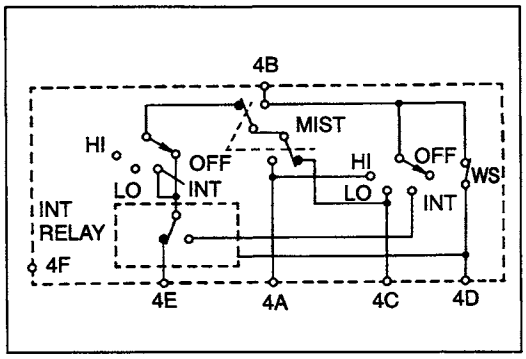
Light	Dimmer	Flash-to-pass	Terminal 1B	2B	2D	1A	2F	2C
OFF	—	OFF						
		ON	○	○				
Parking	—	OFF				○	○	
		ON	○	○		○	○	
Headlight	LO	OFF	○		○	○	○	○
		ON	○	○		○	○	○
	HI	—	○	○		○	○	○



Turn switch

○—○: Continuity

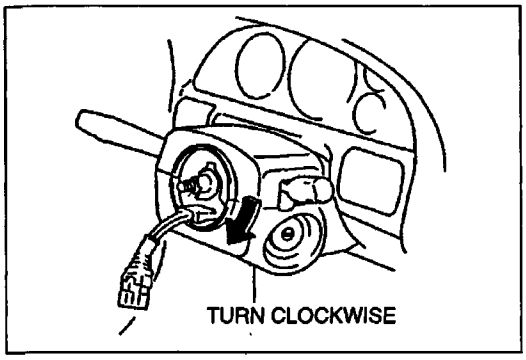
Switch position	Terminal 3C	3A	3D
Left	○	○	
OFF			
Right	○		○



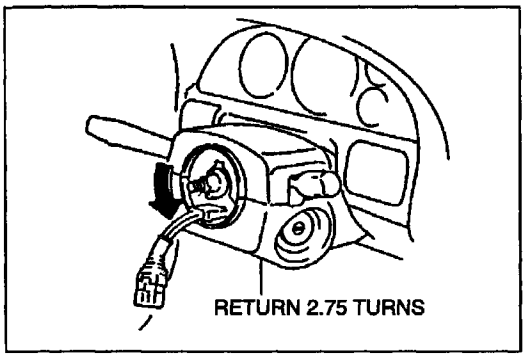
Windshield wiper and washer switch

○—○: Continuity

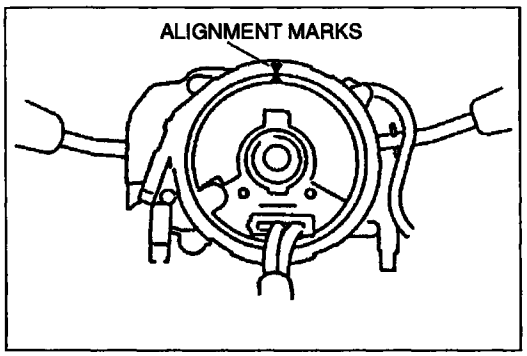
Switch position		One-touch	Terminal 4E	4A	4C	4B	4D
Wiper switch	OFF	OFF	○		○		
		ON		○		○	
	INT		○		○		
	LO				○	○	
	HI			○		○	
Washer switch	ON					○	○



Adjustment
Clock spring
Before installing the steering wheel, adjust the clock spring.
1. Set the front wheels straight ahead.
2. Turn the clock spring clockwise until it stops. Do not force it.



3. Turn the clock spring counterclockwise 2.75 turns.

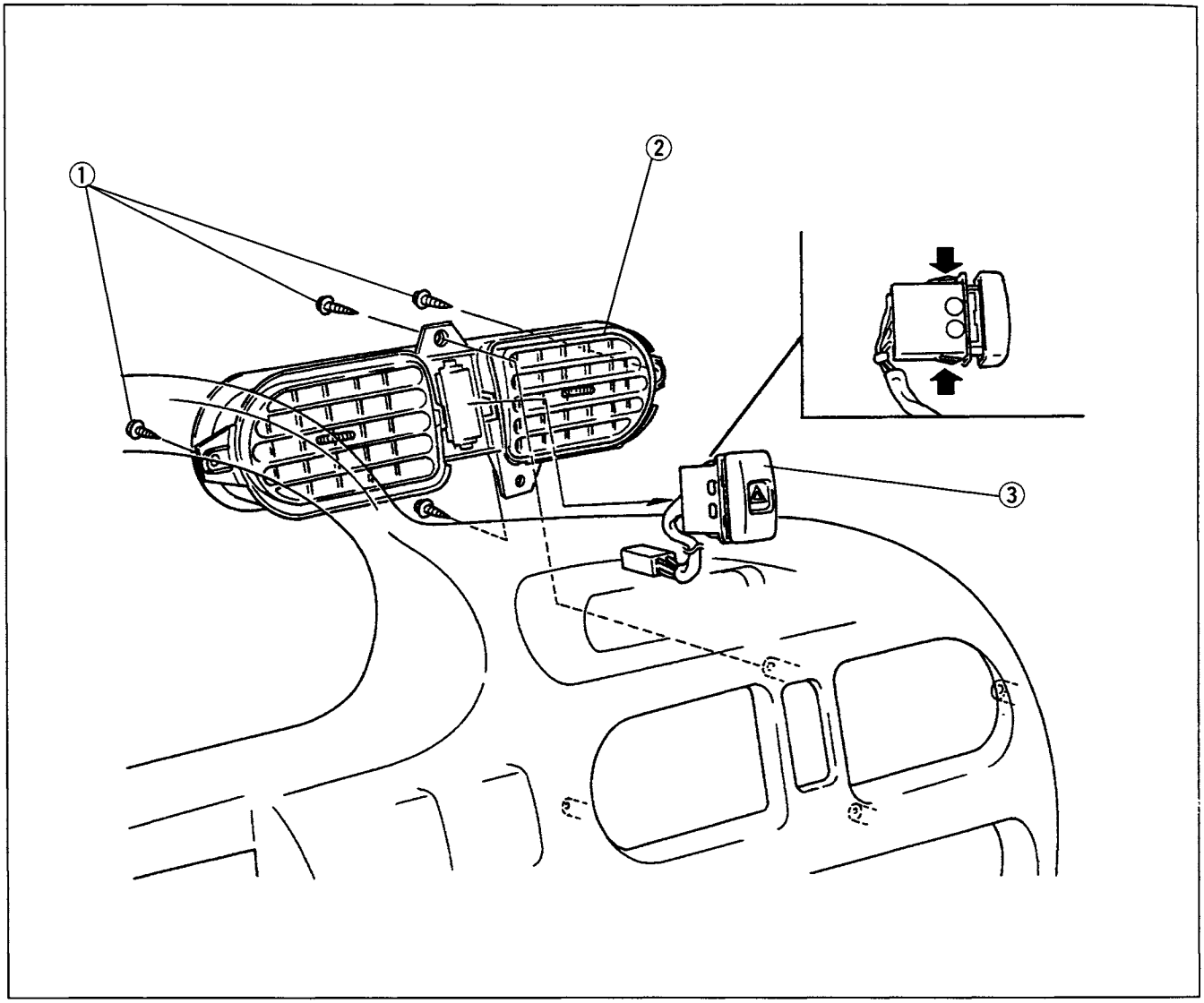


4. Align the mark on the clock spring connector with that on the outer housing.

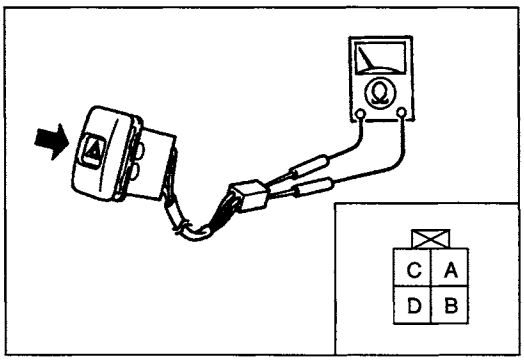
HAZARD WARNING SWITCH

Removal / Installation

1. Remove the meter hood.
   (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



1. Screws
2. Louver ventilation grille
3. Hazard warning switch



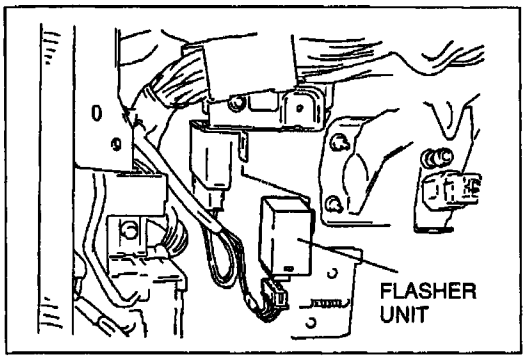
Inspection

1. Remove the hazard warning switch.
2. Check for continuity between the switch terminals as indicated below.

O—O: Continuity O—⓪—O : Bulb

Switch position \ Terminal	A	B	C	D
OFF	O—⓪—O			
ON	O—⓪—O		O—O	

3. If not as specified, replace the hazard warning switch.

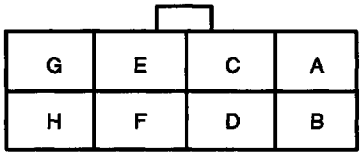


FLASHER UNIT
Removal / Installation
1. Remove the lower panel.
   (Refer to section S1.)
2. Disconnect the flasher unit connector.
3. Remove the flasher unit.
4. Install in the reverse order of removal.

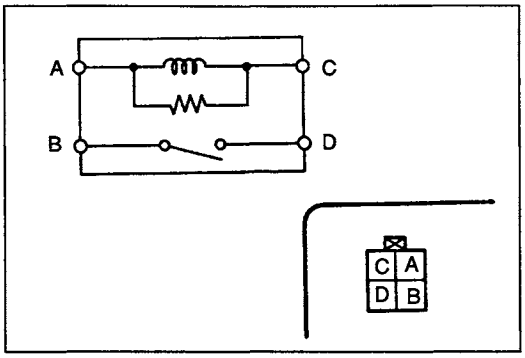
Inspection
1. Remove the lower panel.
   (Refer to section S1.)
2. Measure the voltage at the flasher unit terminals as indicated below.
3. If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnesses.
4. If the parts and wiring harnesses are OK but the system still does not work properly, replace the flasher unit.

Terminal voltage list (Reference)

B+: Battery positive voltage



Terminal	Connection	Test condition	Voltage	Inspection area
A	GND	Constant: check for continuity to ground	Yes	GND
B	—	—	—	—
C	Hazard warning switch	Hazard warning switch: on	0 V	Hazard warning switch
		Hazard warning switch: off	B+	
D	Turn signal light (LH)	Turn signal light (LH) flashes	Alternates 0 V and B+	Turn signal light (LH)
		Other	0 V	
E	Turn switch (RH)	Ignition switch and turn switch (RH): on	B+	Turn switch (RH)
		Other	0 V	
F	Turn switch (LH)	Ignition switch and turn switch (LH): on	B+	Turn switch (LH)
		Other	0 V	
G	Turn signal light (RH)	Turn signal light (RH) flashes	Alternates 0 V and B+	Turn signal light (RH)
		Other	0 V	
H	B+	Constant	B+	HAZARD 15 A fuse



HEADLIGHT RELAY

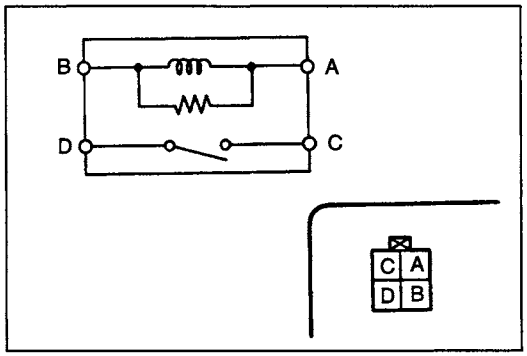
Inspection

1. Apply battery positive voltage and check for continuity between the relay terminals.

O—O: Continuity B+: Battery positive voltage

Step \ Terminal	A	C	B	D
1	O—O			
2	GND	B+	O—O	

2. If not as specified, replace the headlight relay.



TNS RELAY

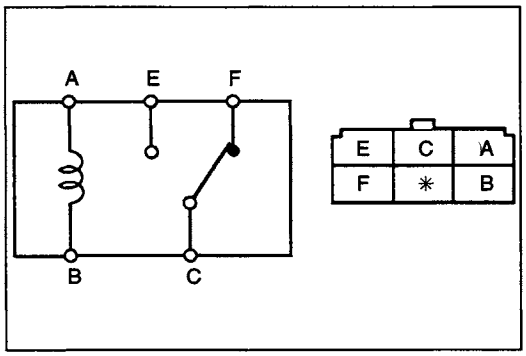
Inspection

1. Apply battery positive voltage and check for continuity between the relay terminals.

O—O: Continuity B+: Battery positive voltage

Step \ Terminal	A	B	C	D
1	O—O			
2	GND	B+	O—O	

2. If not as specified, replace the TNS relay.



DRL RELAY

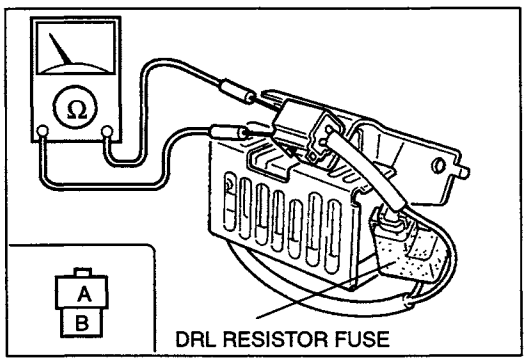
Inspection

1. Apply battery positive voltage and check for continuity between the relay terminals.

O—O: Continuity B+: Battery positive voltage

Step \ Terminal	A	B	C	F	E
1	O—O		O—O		
2	B+	GND	O	O	

2. If not as specified, replace the DRL relay.

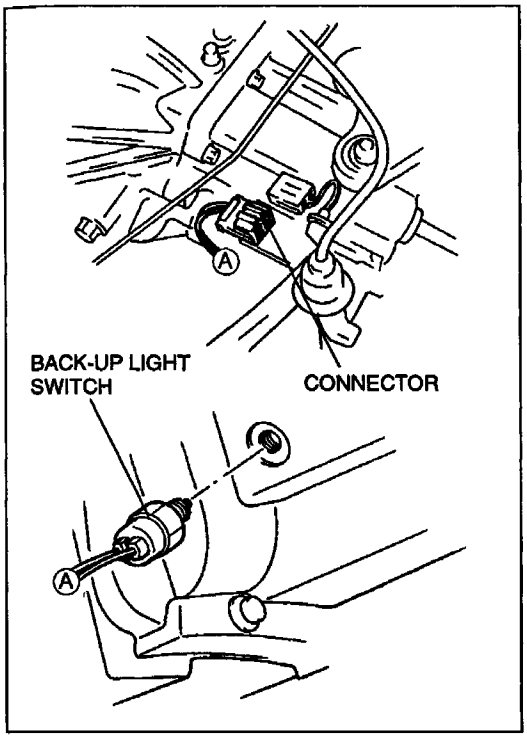


DRL RESISTOR

Inspection

1. Check for continuity between terminals A and B of the DRL resistor.
2. If there is no continuity, replace the DRL resistor or DRL resistor fuse.

Resistance: 0.3 Ω

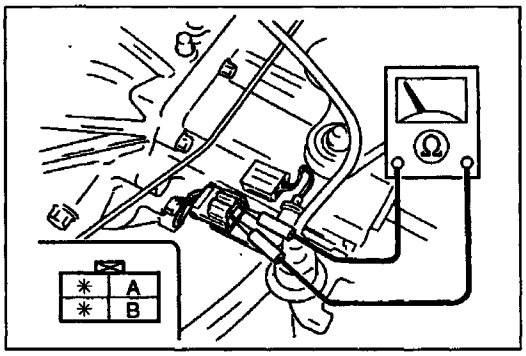


BACK-UP LIGHT SWITCH

Removal / Installation

1. Disconnect the back-up light switch connector.
2. Remove the splash shield.
   (Refer to section B.)
3. Remove the back-up light switch.
4. Install in the reverse order of removal.

Tightening torque:
20—29 N·m { 2.0—3.0 kgf·m , 15—21 ft·lbf }



Inspection

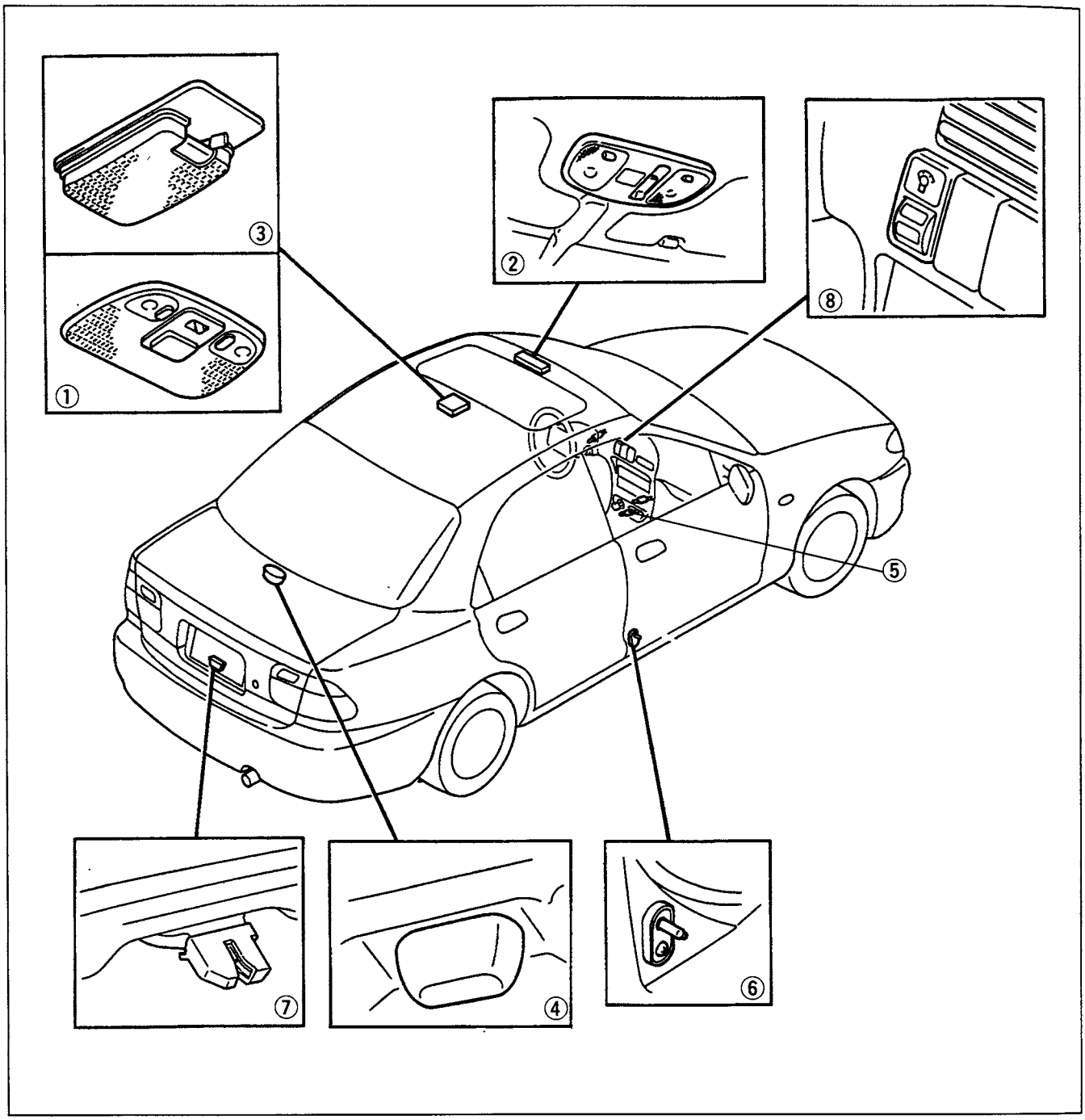
1. Disconnect the back-up light switch connector.
2. Check for continuity between switch terminals A and B.

Shift lever position	Continuity
Reverse	Yes
Other	No

3. If not as specified, replace the back-up light switch.

INTERIOR LIGHTING SYSTEM

STRUCTURAL VIEW

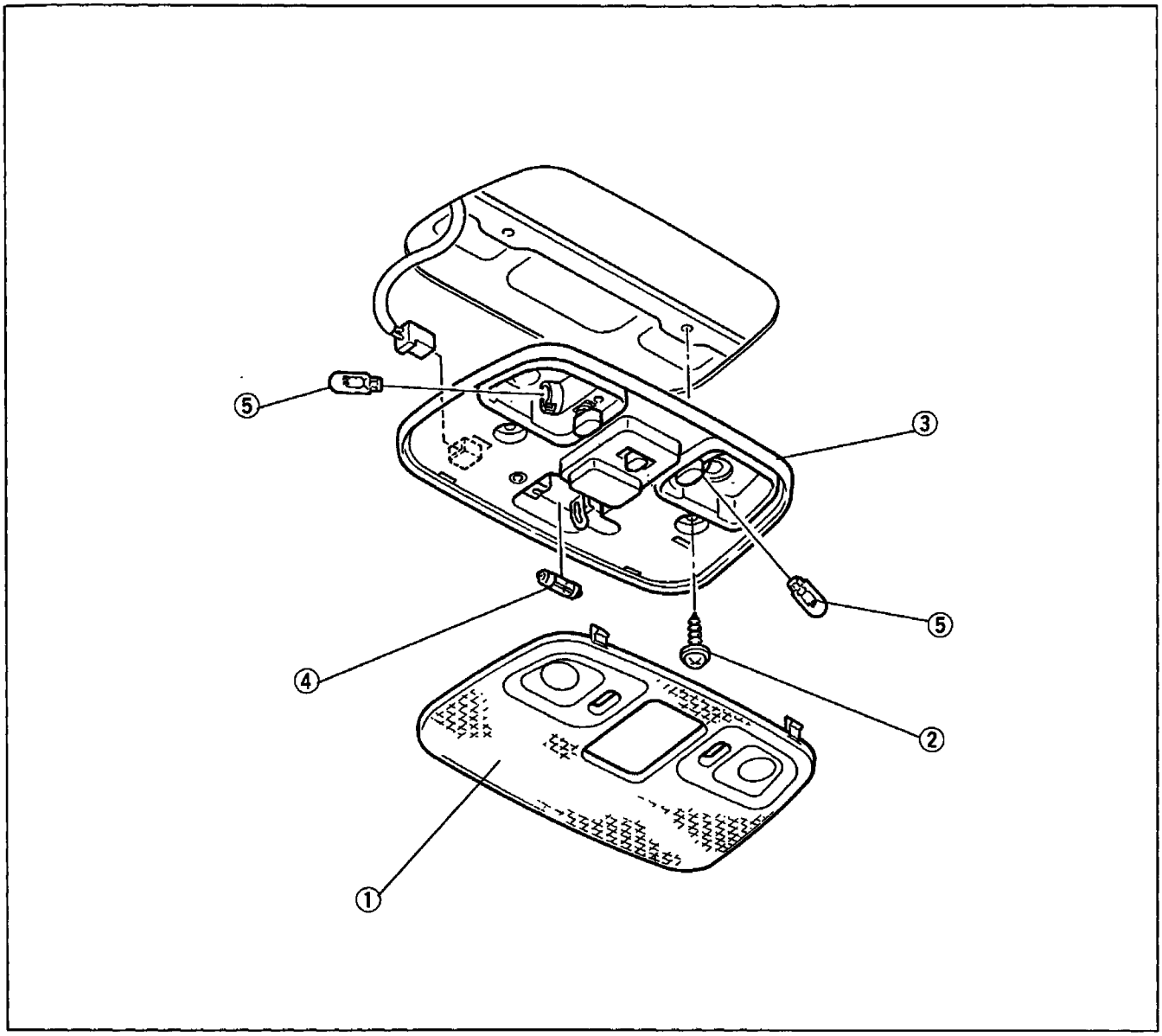


1. Interior and spot light
   Removal / Installation ..... page T1–33
2. Spot light
   Removal / Installation ..... page T1–34
3. Interior light
   Removal / Installation ..... page T1–35
4. Trunk compartment light
   Bulb replacement ..... page T1–36
5. Front ashtray illumination
   Bulb replacement ..... page T1–36
6. Door switch
   Removal / Installation ..... page T1–36
   Inspection ..... page T1–36
7. Trunk compartment light switch
   Inspection ..... page T1–37
8. Panel light control switch
   Removal / Installation ..... page T1–37

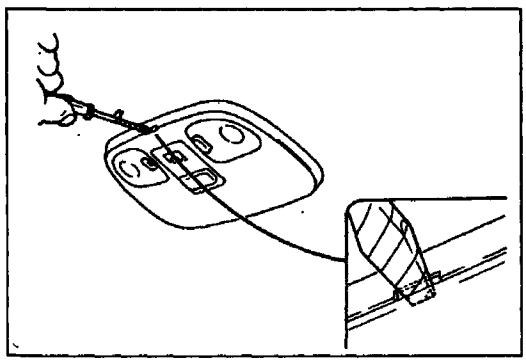
INTERIOR AND SPOT LIGHT

Removal / Installation

1. Remove in the order shown in the figure, referring to **Removal note**.
2. Install in the reverse order of removal.



1. Lens
   Removal note ..... below
2. Screw
3. Housing
4. Bulb (10 W)
5. Bulb (5 W × 2)

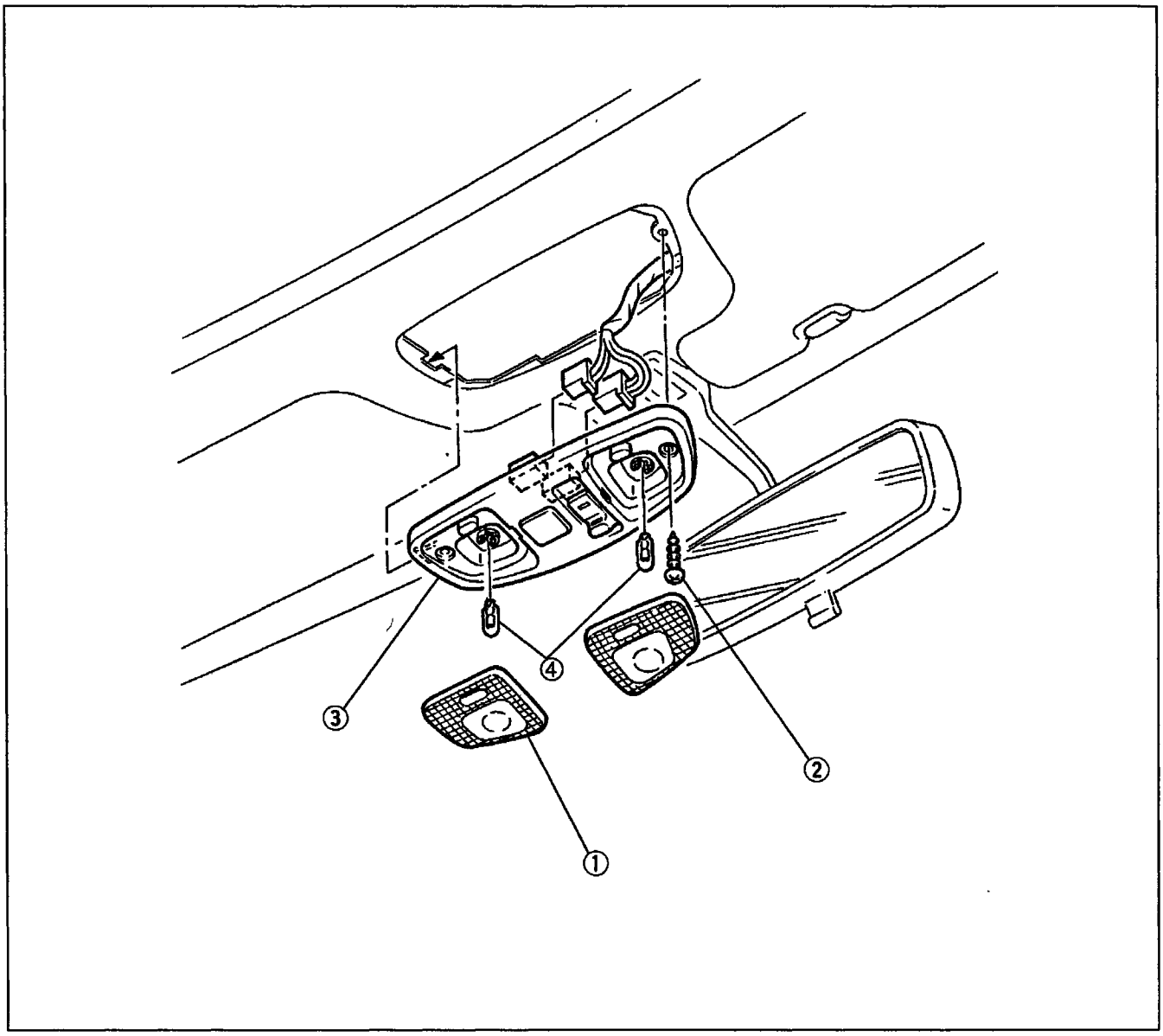


Removal note

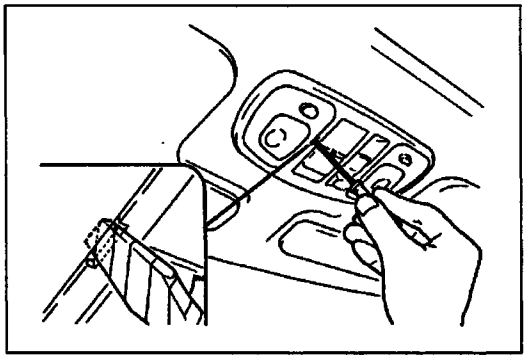
Lens

1. Insert a flathead screwdriver which has been wrapped in tape into the service hole between the lens and the housing.
2. Twist the screwdriver to remove the lens.

SPOT LIGHT
Removal / Installation
1. Remove in the order shown in the figure, referring to **Removal note**.
2. Install in the reverse order of removal.



1. Lens
   Removal note ..... below
2. Screw
3. Housing
4. Bulbs (5 W × 2)

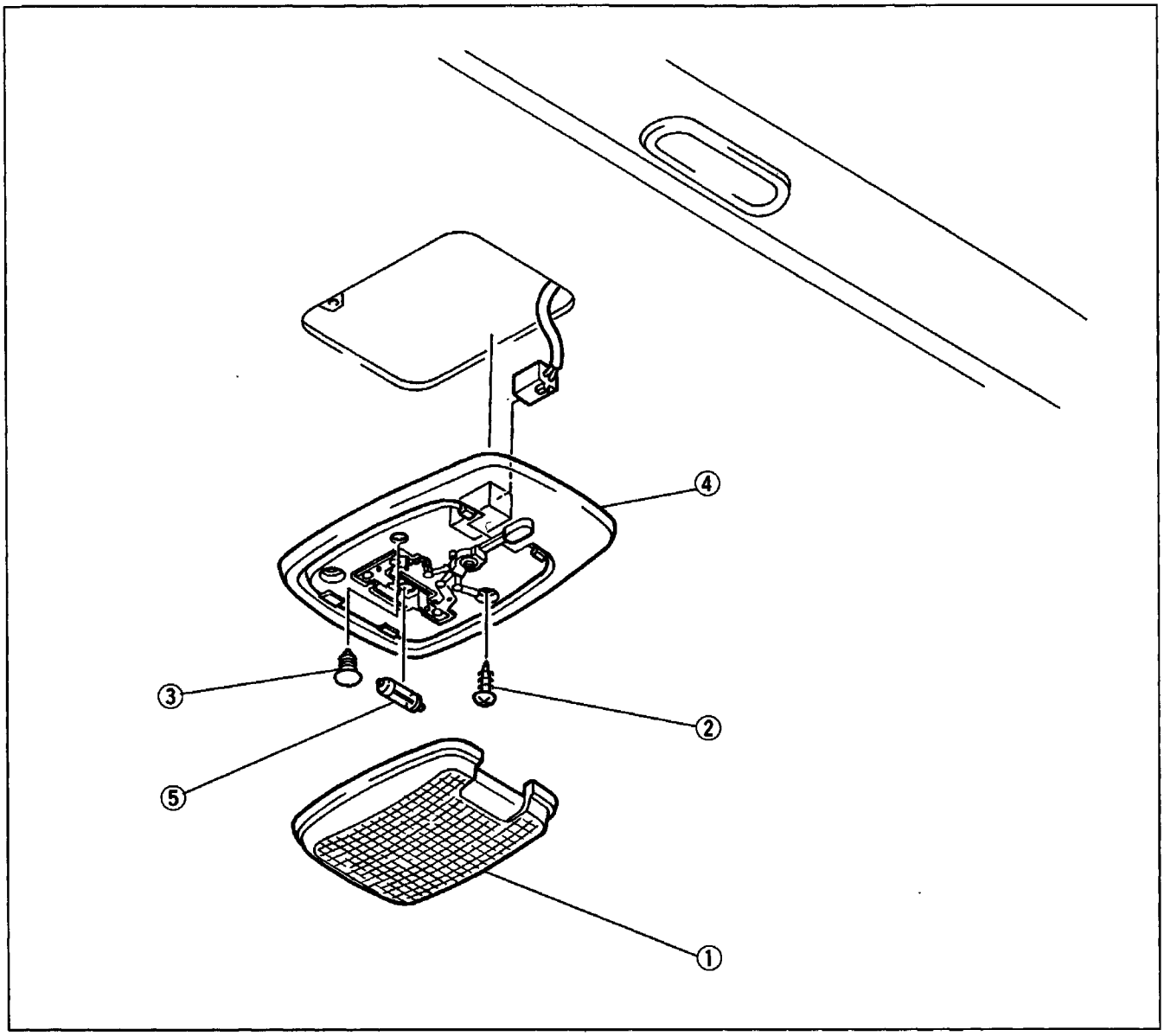


Removal note
Lens
1. Insert a flathead screwdriver which has been wrapped in tape into the service hole between the lens and the housing.
2. Twist the screwdriver to remove the lens.

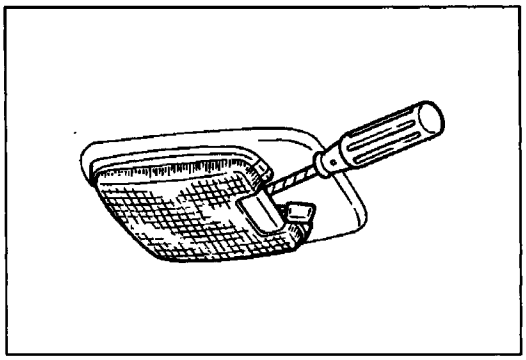
INTERIOR LIGHT

Removal / Installation

1. Remove in the order shown in the figure, referring to **Removal note**.
2. Install in the reverse order of removal.



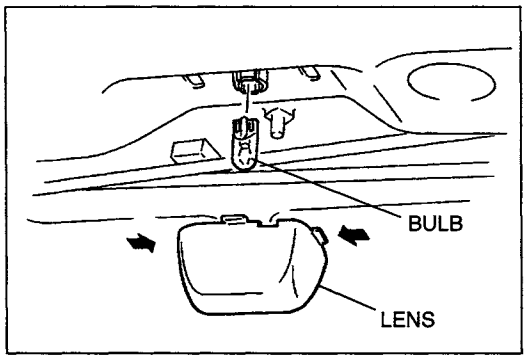
1. Lens
   Removal note ..... below
2. Screw
3. Fastener
4. Housing
5. Bulb (10 W)



Removal note

Lens

1. Insert a flathead screwdriver which has been wrapped in tape as shown in the figure.
2. Twist the screwdriver to remove the lens.

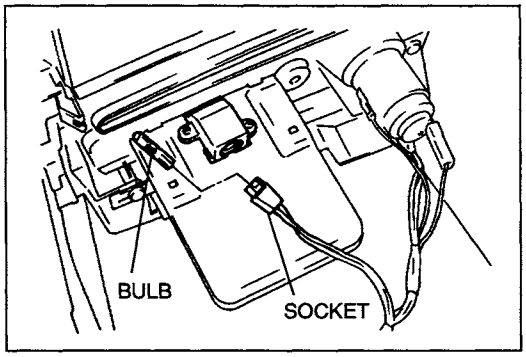


TRUNK COMPARTMENT LIGHT

Bulb Replacement

1. Push the sides of the lens and pull to remove it.
2. Remove the trunk compartment light bulb.
3. Install in the reverse order of removal.

Trunk compartment light bulb: 5 W

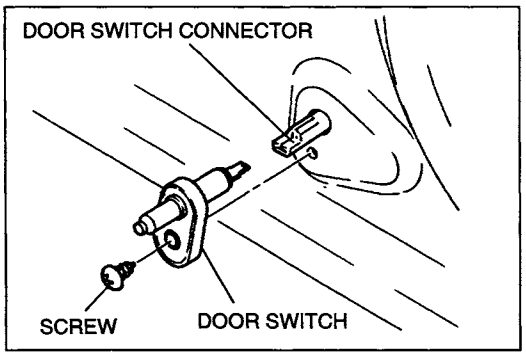


FRONT ASHTRAY ILLUMINATION

Bulb Replacement

1. Remove the front console.
   (Refer to section S1.)
2. Remove the socket and remove the front ashtray illumination bulb.
3. Install in the reverse order of removal.

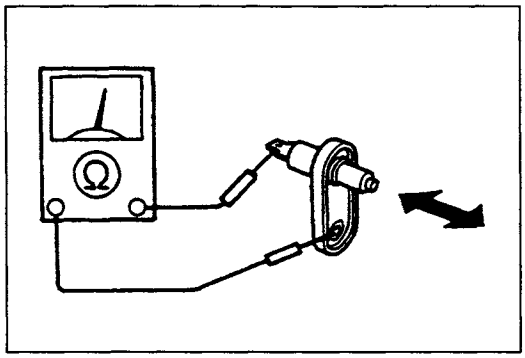
Front ashtray illumination bulb: 1.4 W



DOOR SWITCH

Removal / Installation

1. Remove the screw and remove the door switch.
2. Disconnect the door switch connector and remove the door switch.
3. Install in the reverse order of removal.

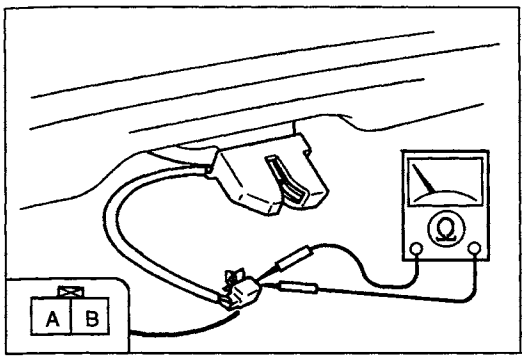


Inspection

1. Remove the door switch.
2. Check for continuity between the switch terminal and the switch body as shown in the figure.

Switch condition	Continuity
Pressed	No
Released	Yes

3. If not as specified, replace the door switch.

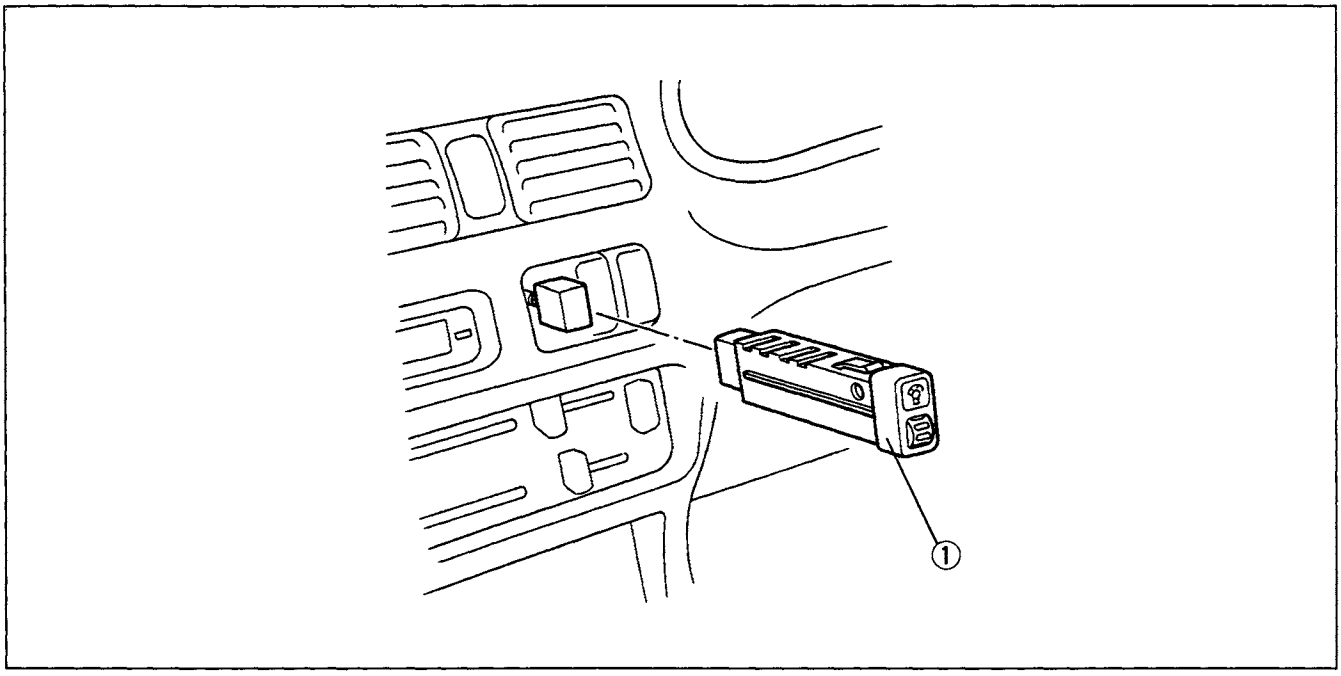


TRUNK COMPARTMENT LIGHT SWITCH
Inspection
1. Remove the trunk lid trim.
   (Refer to section S1.)
2. Disconnect the trunk compartment light switch connector.
3. Check for continuity between terminals A and B of the trunk compartment light switch.

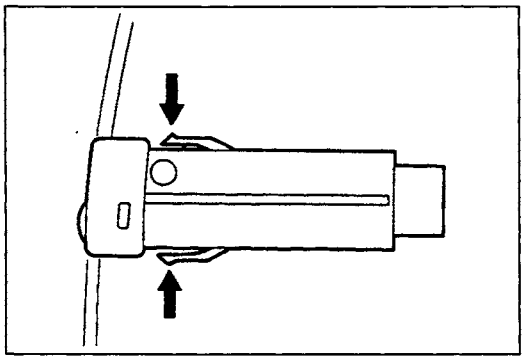
Switch condition	Continuity
Pressed (Trunk lid closed)	No
Released (Trunk lid open)	Yes

4. If not as specified, replace the trunk lid lock.
   (Refer to section S1.)

PANEL LIGHT CONTROL SWITCH
Removal / Installation
1. Remove the meter hood.
   (Refer to section S1.)
2. Remove in the order shown in the figure, referring to **Removal note**.
3. Install in the reverse order of removal.



1. Panel light control switch
   Removal note ..... below

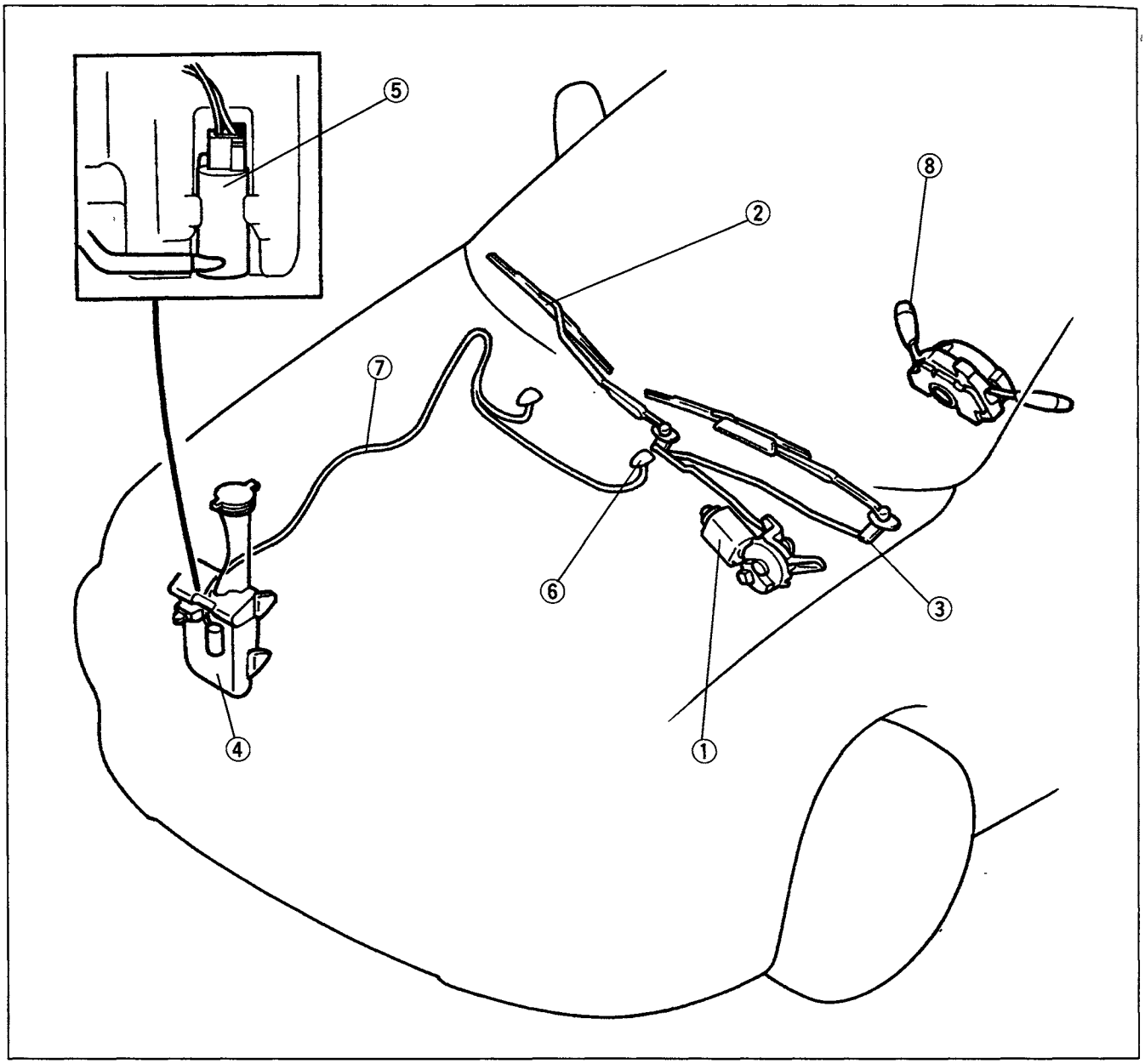


Removal note
Panel light control switch
Push the sides of the switch and pull to remove it.

WINDSHIELD WIPER AND WASHER

STRUCTURAL VIEW

Windshield Wiper and Washer System

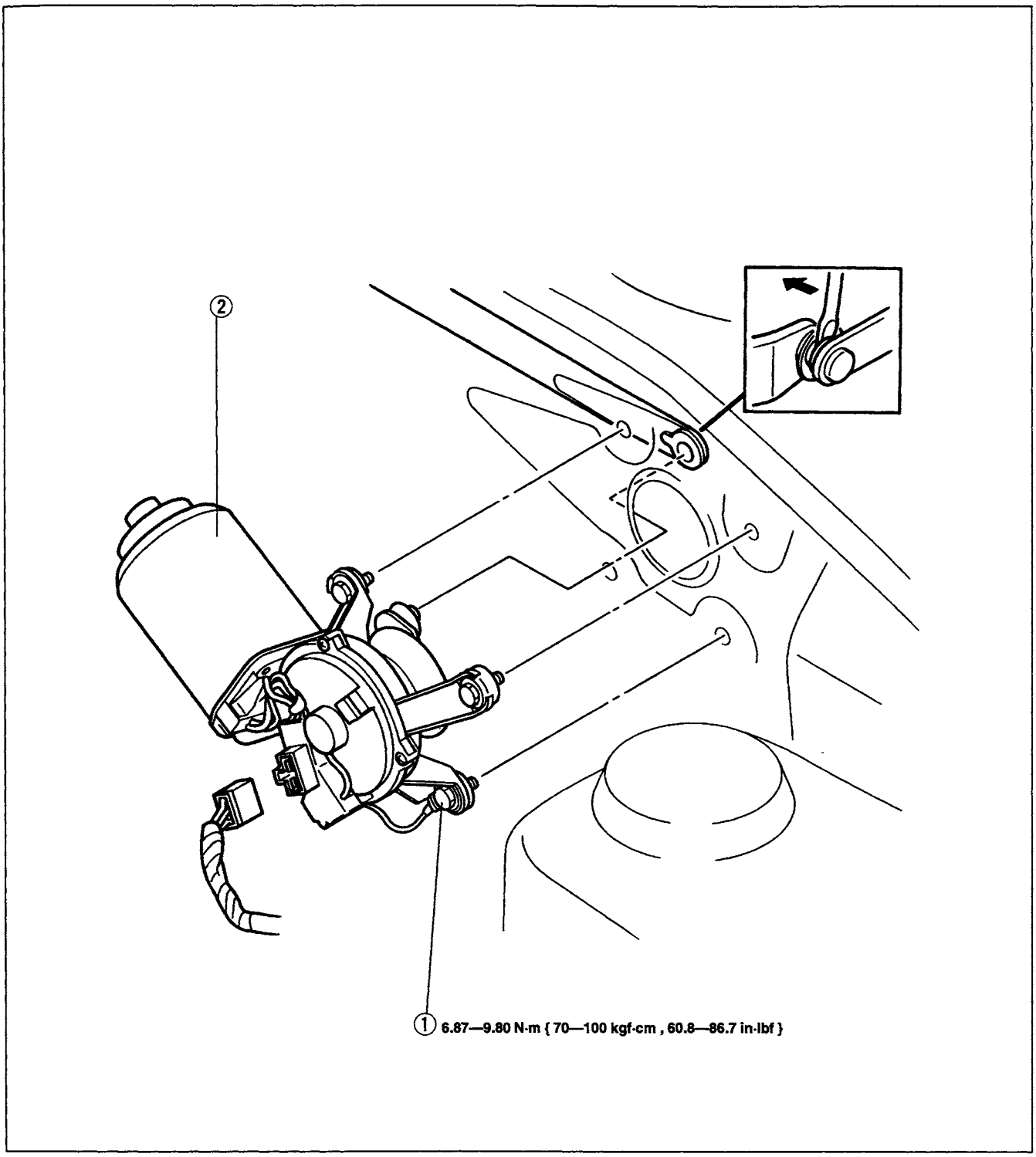


1. Windshield wiper motor
   - Removal / Installation ..... page T1–39
   - Disassembly / Assembly ..... page T1–40
   - Inspection ..... page T1–41
2. Windshield wiper arm and blade
   - Removal / Installation ..... page T1–42
   - Adjustment ..... page T1–43
3. Windshield wiper link
   - Removal / Installation ..... page T1–44
4. Windshield washer tank
   - Removal / Installation ..... page T1–45
5. Windshield washer motor
   - Removal / Installation ..... page T1–45
   - Inspection ..... page T1–45
6. Windshield washer nozzle
   - Removal ..... page T1–46
   - Installation ..... page T1–46
   - Adjustment ..... page T1–47
7. Windshield washer pipe
   - Removal / Installation ..... page T1–47
8. Combination switch
   - Removal / Installation ..... page T1–21
   - Disassembly / Assembly ..... page T1–23
   - Inspection ..... page T1–24
   - Adjustment ..... page T1–27

WINDSHIELD WIPER MOTOR

Removal / Installation

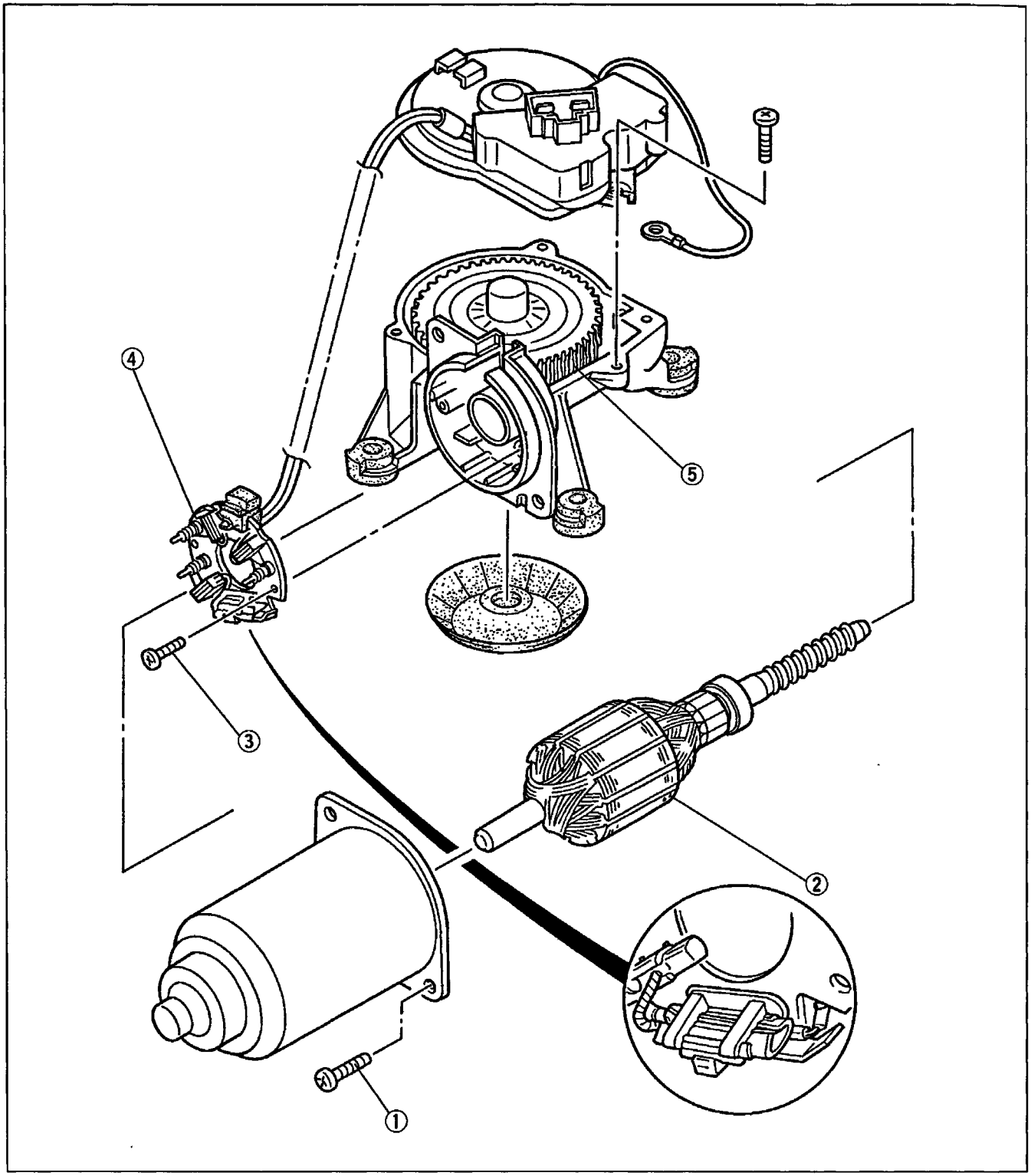
1. Remove the cowl grille.
   (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



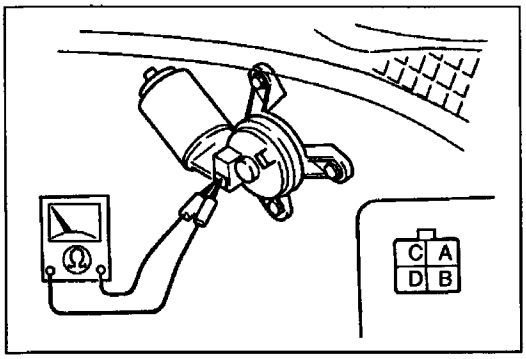
1. Bolt
2. Windshield wiper motor
   Disassembly / Assembly ..... page T1–40
   Inspection ..... page T1–41

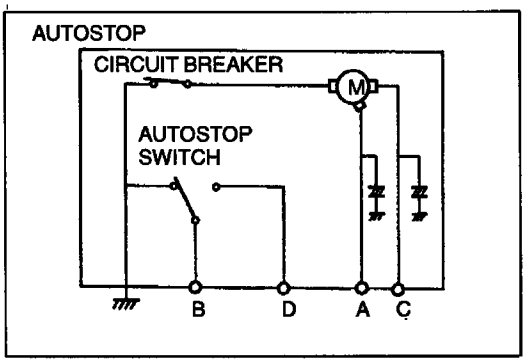
Disassembly / Assembly

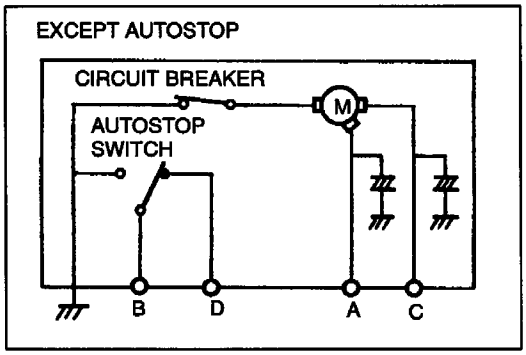
1. Remove the windshield wiper motor.
   (Refer to page T1–39.)
2. Disassemble in the order shown in the figure.
3. Assemble in the reverse order of disassembly.

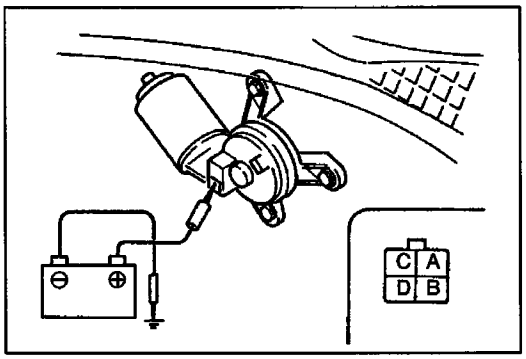


1. Screw
2. Armature
3. Screw
4. Brush plate holder
5. Motor gear shaft









Inspection

1. Ignition switch is LOCK while the windshield wiper is operating.

   Note
   - Verify that the windshield wiper does not stop in the proper park position.

2. Disconnect the windshield wiper motor connector.
3. Check for continuity between the motor terminals as indicated below.

○—○: Continuity

Windshield wiper motor position \ Terminal	A	B	C	D
Autostop	○	○	○	

4. Connect the windshield wiper motor connector.
5. Wiper switch is OFF while windshield wiper is operating.

   Note
   - Verify that the windshield wiper stops in the park position.

6. Disconnect the windshield wiper motor connector.
7. Check for continuity between the motor terminals as indicated below.

○—○: Continuity

Windshield wiper motor position \ Terminal	A	B	C	D
Except autostop	○		○	
		○		○

8. Connect battery positive voltage to the terminals of the windshield wiper motor connector and ground to a bare metal part of the vehicle. Verify that the windshield wiper motor operates as indicated below.

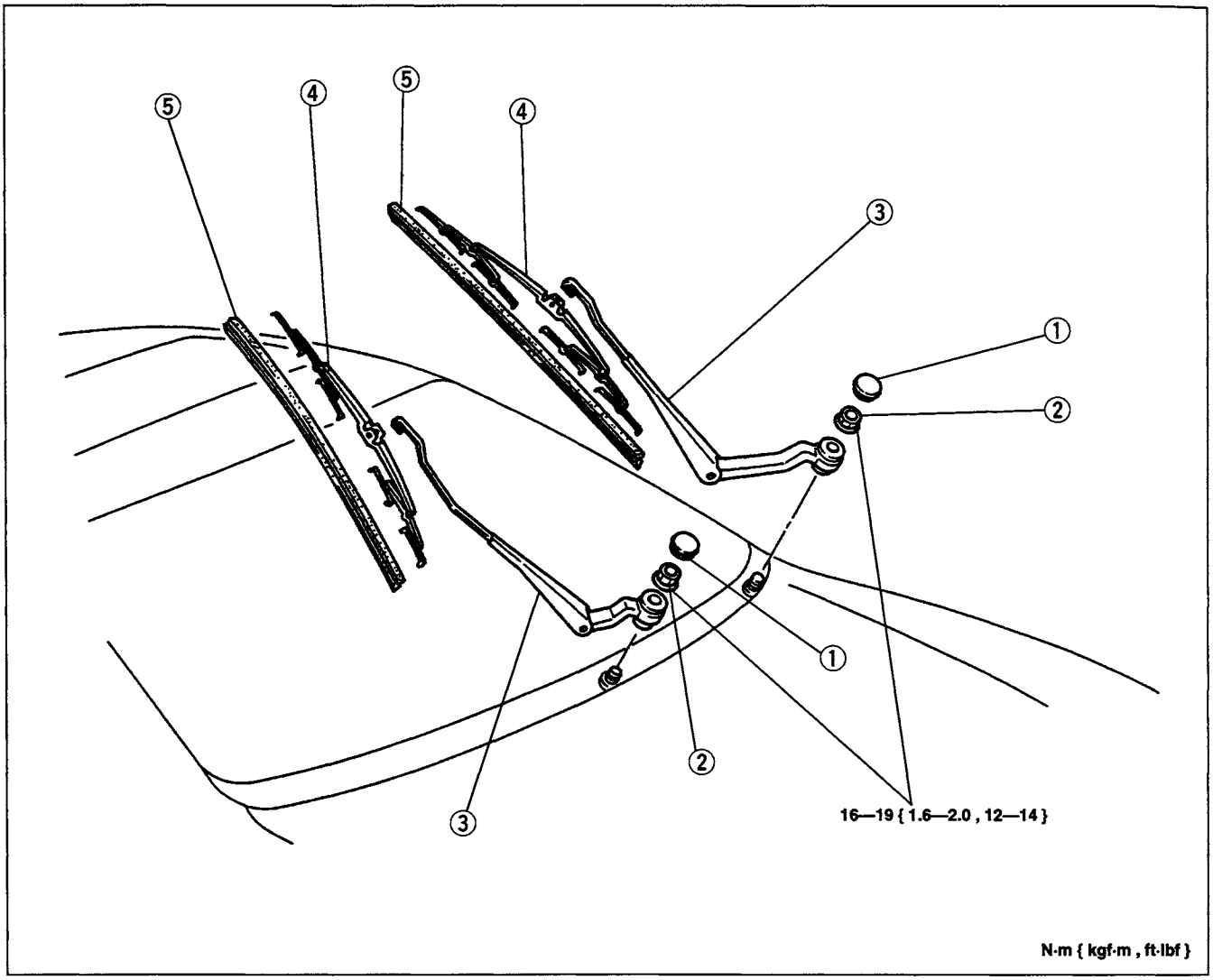
Terminal	Operation speed
C	Low
A	High

9. If not as specified, replace the necessary parts. (Refer to page T1–40.)

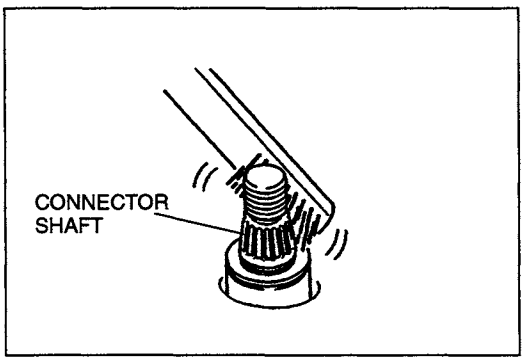
WINDSHIELD WIPER ARM AND BLADE

Removal / Installation

1. Remove the cowl grille.
   (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal, referring to **Installation note**.



1. Cap
2. Nut
3. Windshield wiper arm
   Adjustment ..... page T1–43
   Installation note ..... below
4. Windshield wiper blade
5. Rubber brush



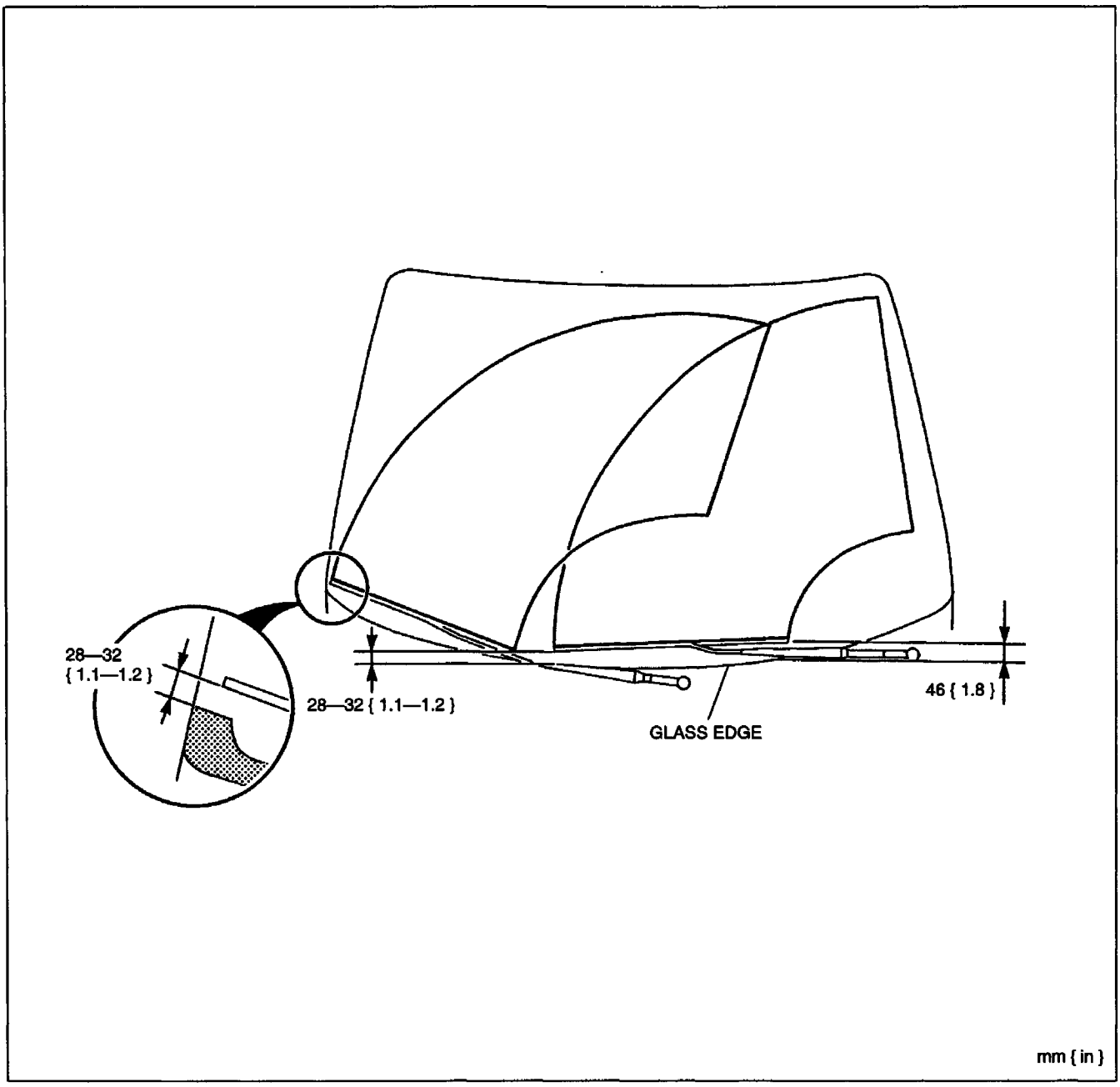
Installation note

Windshield wiper arm

Clean the wiper arm connector shafts with a wire brush before installing the wiper arms.

Adjustment

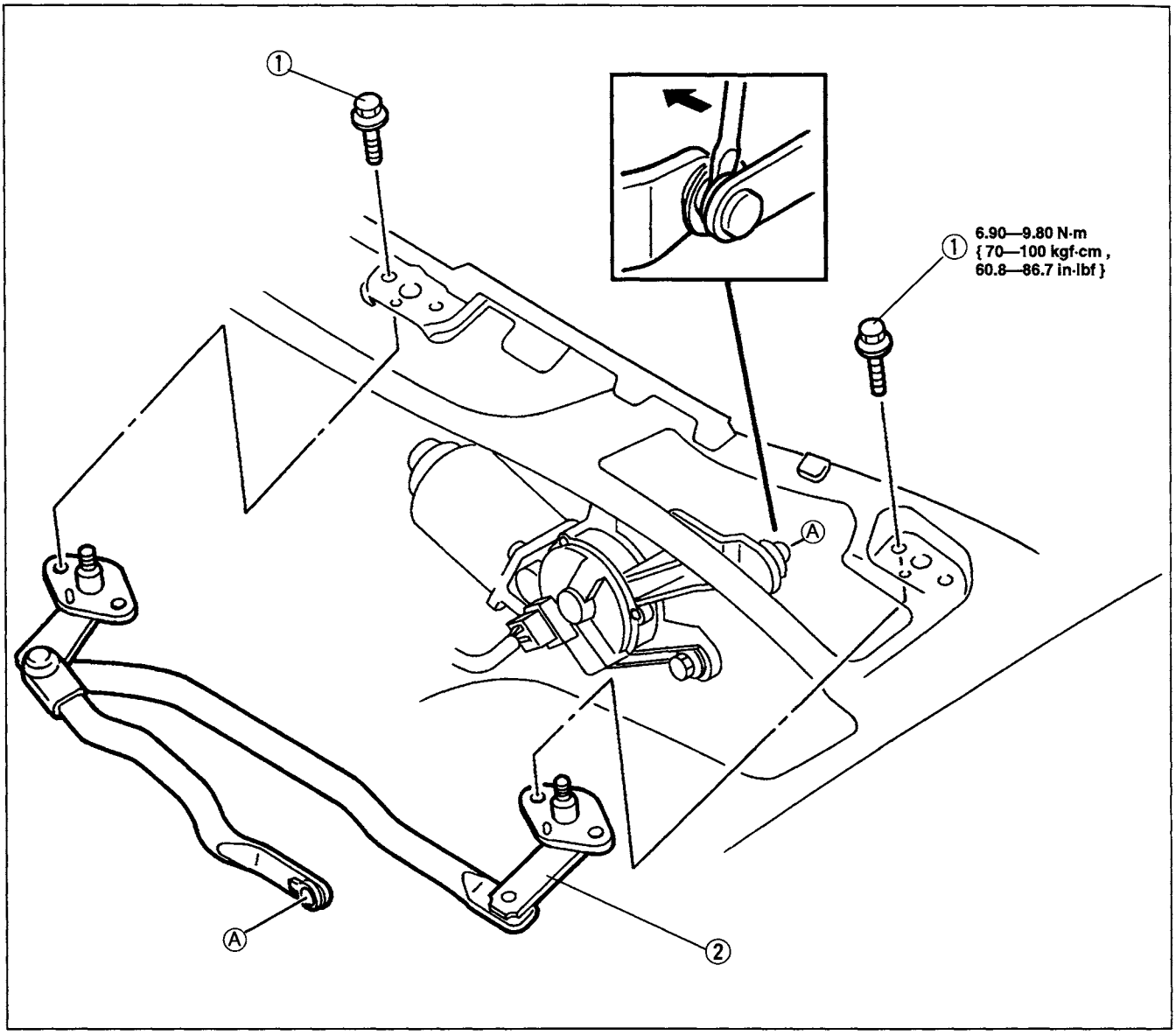
1. Operate the windshield wiper motor to set the wipers in the park position.
2. Set the arm height as shown.



WINDSHIELD WIPER LINK

Removal / Installation

1. Remove the windshield wiper arms.
   (Refer to page T1–42.)
2. Remove the cowl grille.
   (Refer to section S1.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.

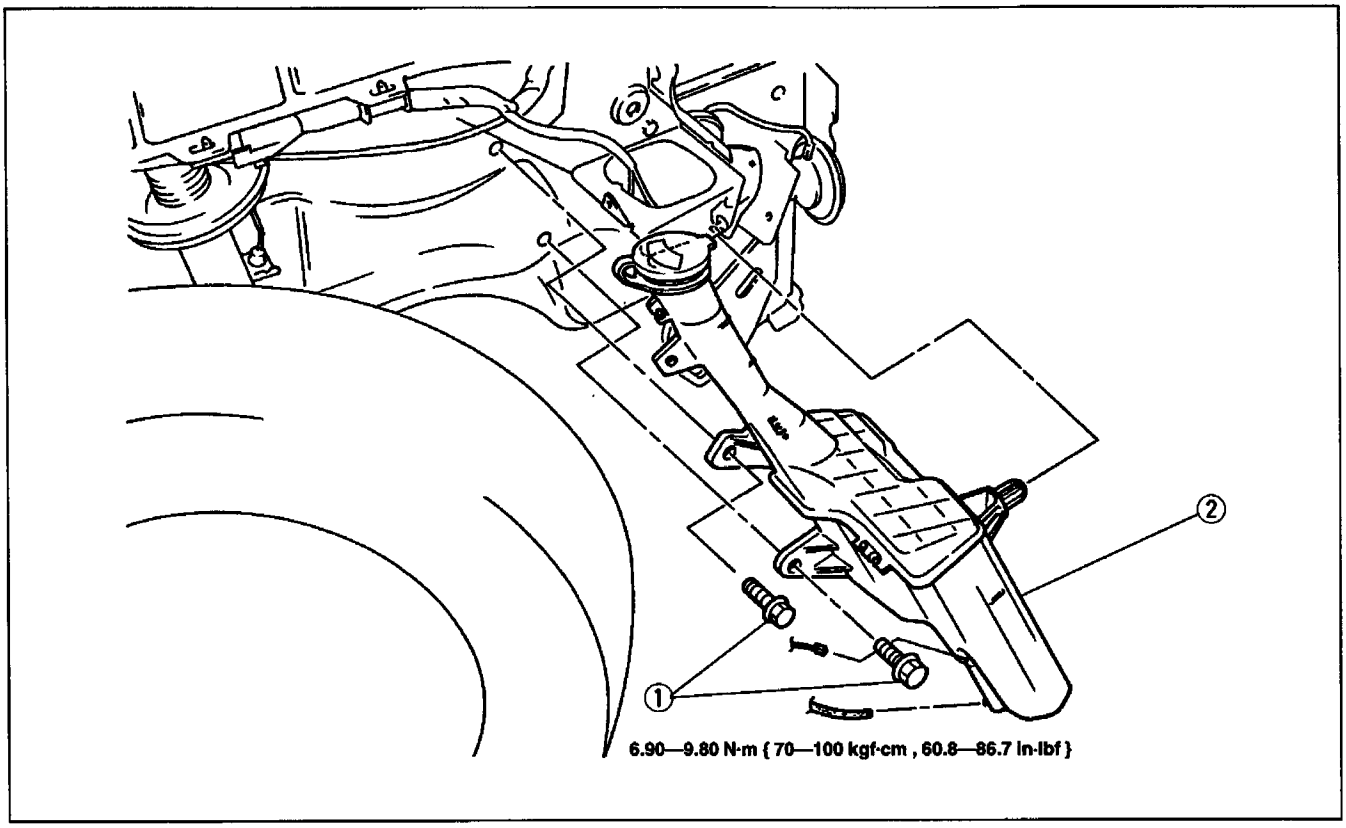


1. Bolt
2. Windshield wiper link

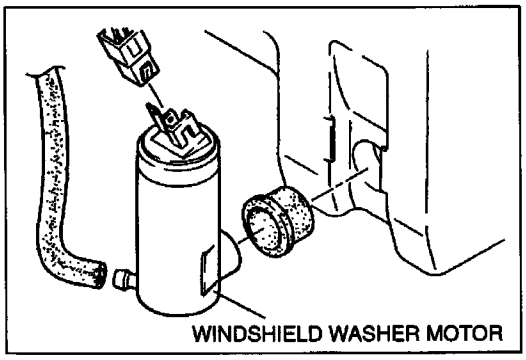
WINDSHIELD WASHER TANK

Removal / Installation

1. Remove the right mud guard.
   (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



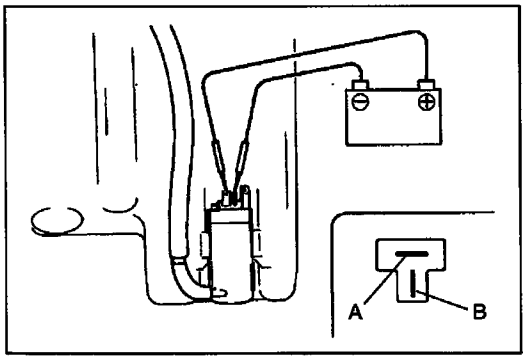
1. Bolts
2. Windshield washer tank



WINDSHIELD WASHER MOTOR

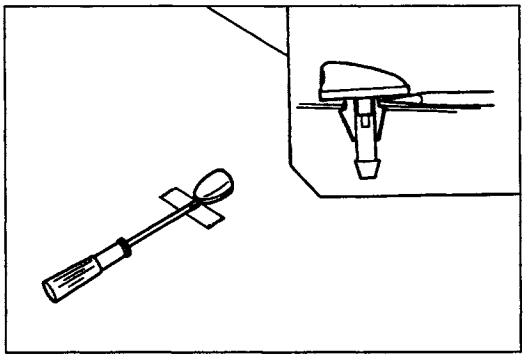
Removal / Installation

1. Remove the windshield washer tank.
2. Extract the washer fluid.
3. Remove the windshield washer motor as shown.
4. Install in the reverse order of removal.



Inspection

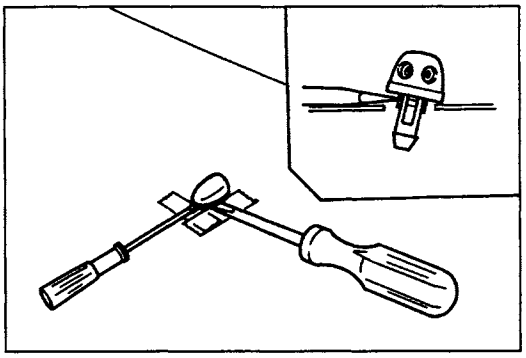
1. Remove the right mud guard.
   (Refer to section S1.)
2. Disconnect the windshield washer motor connector.
3. Connect battery positive voltage to terminal B and ground to terminal A of the motor.
4. Verify that the windshield washer motor operates.
5. If the motor does not operate, replace it.



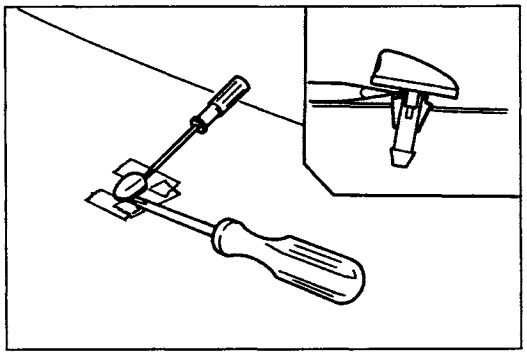
WINDSHIELD WASHER NOZZLE

Removal

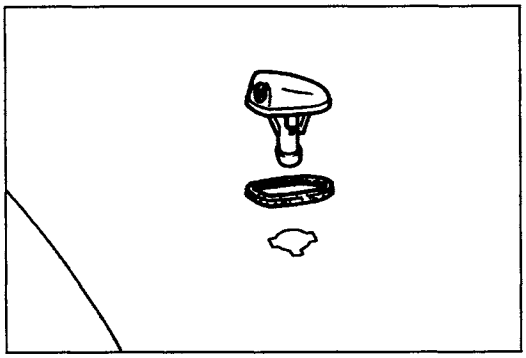
1. Apply protective tape to the body around the washer nozzle.
2. Insert a flathead screwdriver which has been wrapped in tape under the rear of the nozzle and push the nozzle clip.



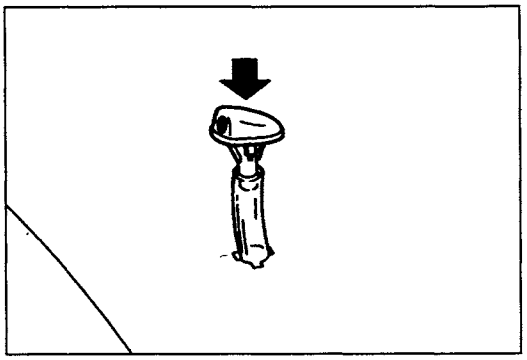
3. Insert another flathead screwdriver which has been wrapped in tape under the side of the nozzle.



4. Remove the first screwdriver and insert it under the front of the nozzle.



5. Disconnect the washer pipe from the washer nozzle to remove the nozzle.

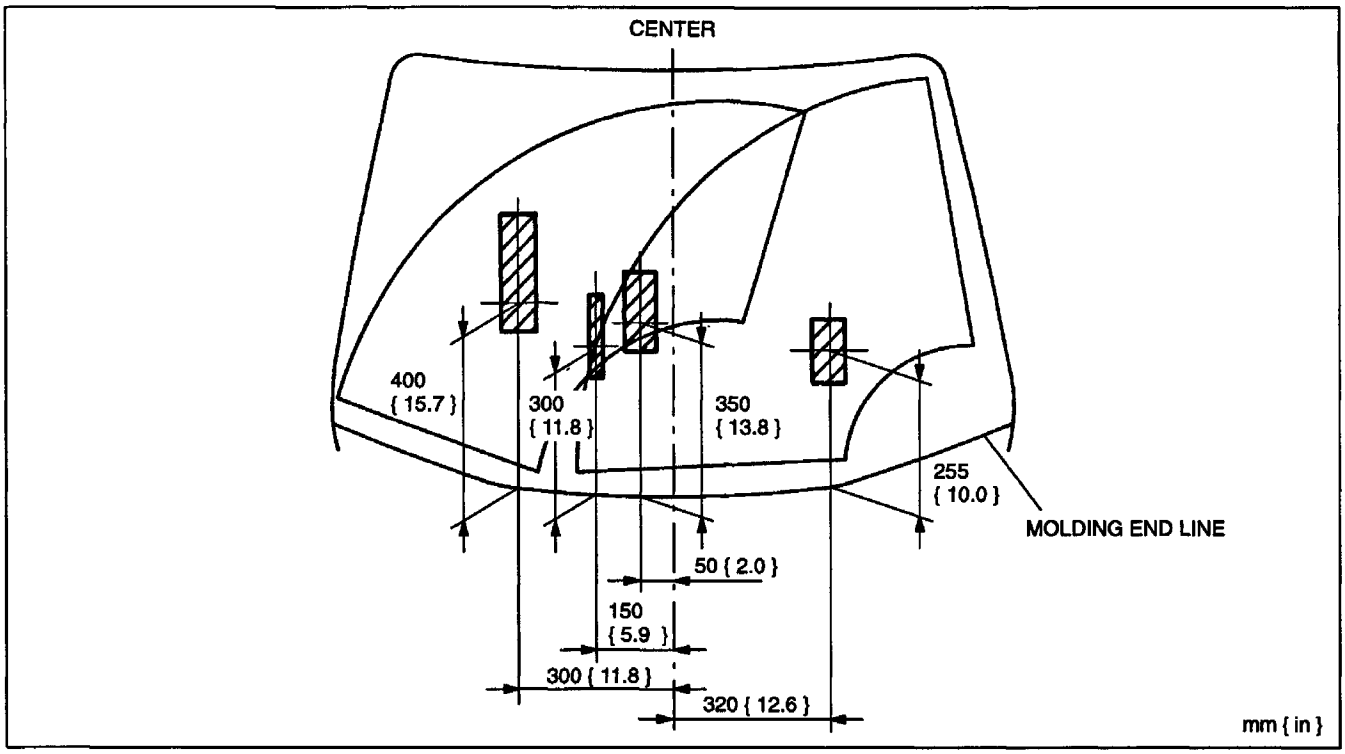


Installation

1. Connect the washer pipe to the washer nozzle.
2. Push the washer nozzle into the installation hole.

Adjustment

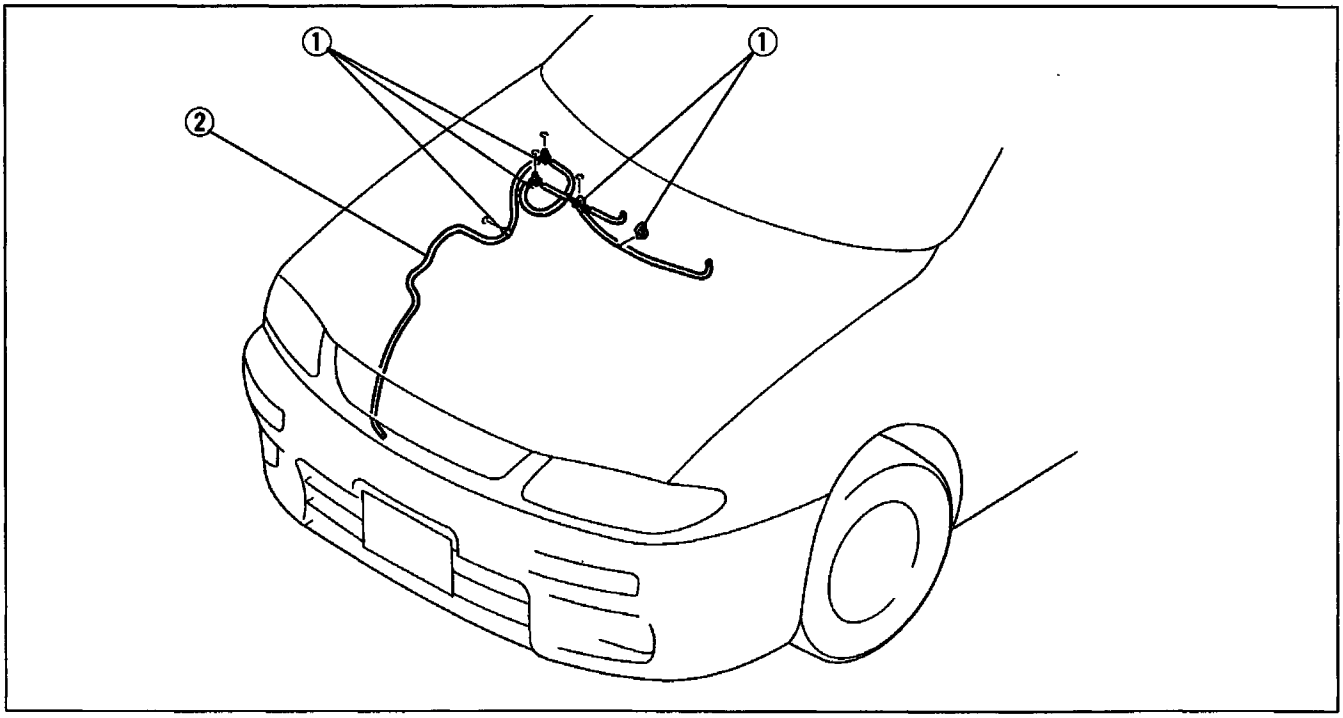
Adjust the windshield washer nozzle direction as shown in the figure by using a needle or equivalent tool.



WINDSHIELD WASHER PIPE

Removal / Installation

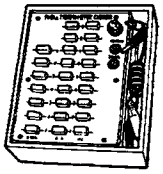
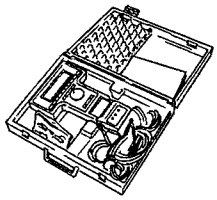
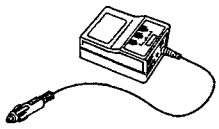
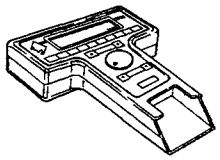
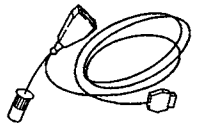
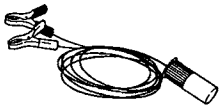
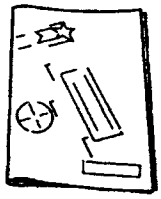
1. Remove the hood insulator and mud guard. (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



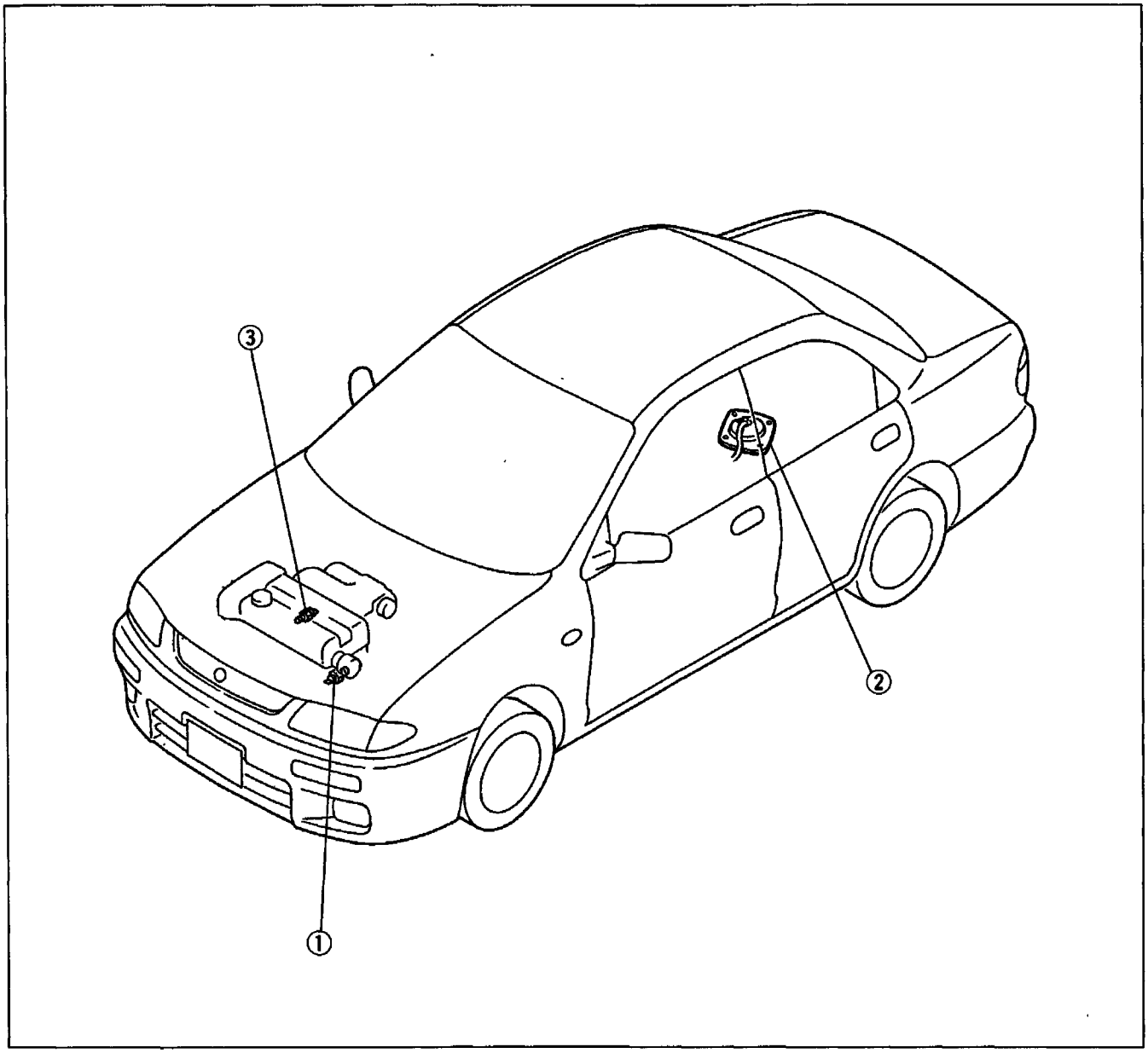
1. Clips
2. Windshield washer pipe

INSTRUMENT CLUSTER

PREPARATION
SST

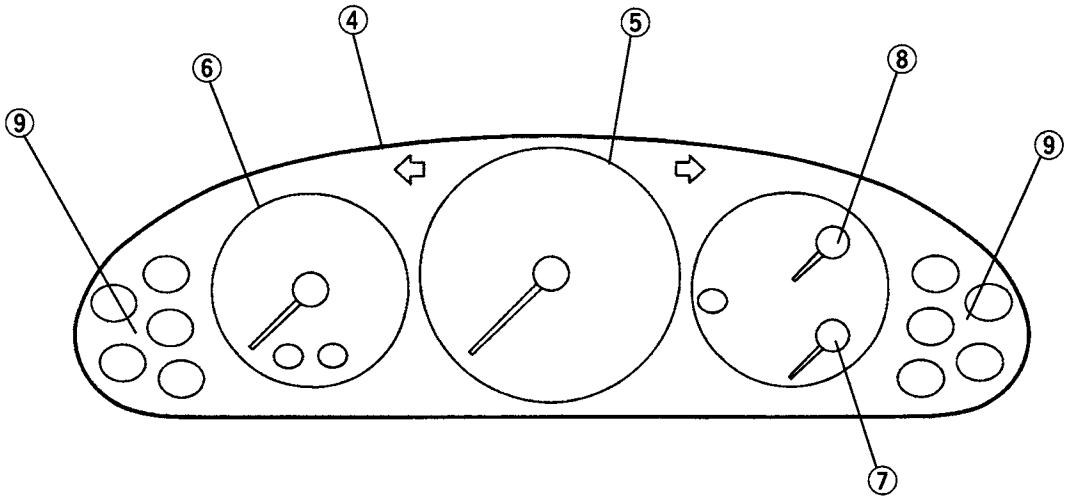
49 0839 285 Checker, fuel thermometer 	For inspection of fuel and water temperature gauges	49 T088 0A0 NGS set 	For inspection of tachometer
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of tachometer	49 T088 010B Program Card 	For inspection of tachometer
49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of tachometer	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of tachometer
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of tachometer	49 T088 008A Instruction Manual 	For inspection of tachometer

STRUCTURAL VIEW

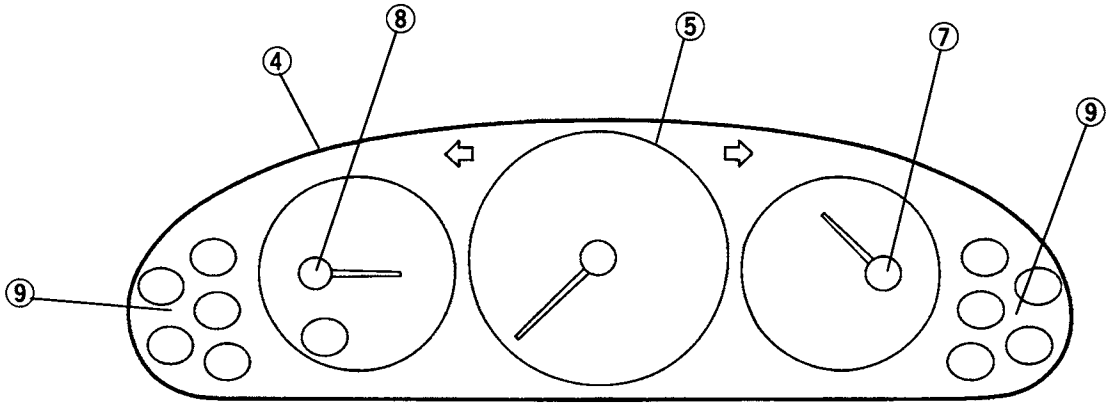


1. Water temperature sender unit
   Removal / Installation ..... page T1–55
   Inspection ..... page T1–56
2. Fuel gauge sender unit
   Inspection ..... page T1–56
3. Oil pressure switch
   Inspection ..... page T1–58

WITH TACHOMETER



WITHOUT TACHOMETER

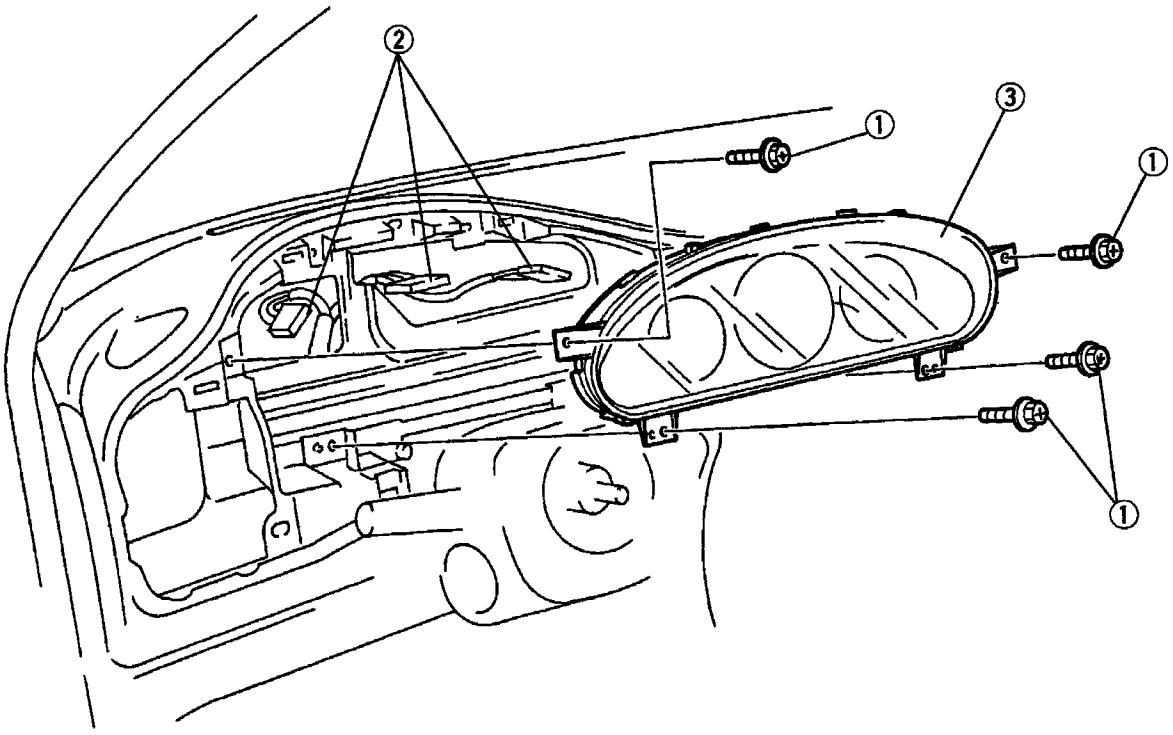


4. Instrument cluster
   - Removal / Installation ..... page T1–51
   - Disassembly / Assembly ..... page T1–52
5. Speedometer
   - Inspection ..... page T1–54
6. Tachometer
   - Inspection ..... page T1–54
7. Fuel gauge
   - Inspection ..... page T1–55
8. Water temperature gauge
   - Inspection ..... page T1–54
9. Warning and indicator light
   - Structural view ..... page T1–57
   - Bulb replacement ..... page T1–58

INSTRUMENT CLUSTER

Removal / Installation

1. Remove the meter hood.
   (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.

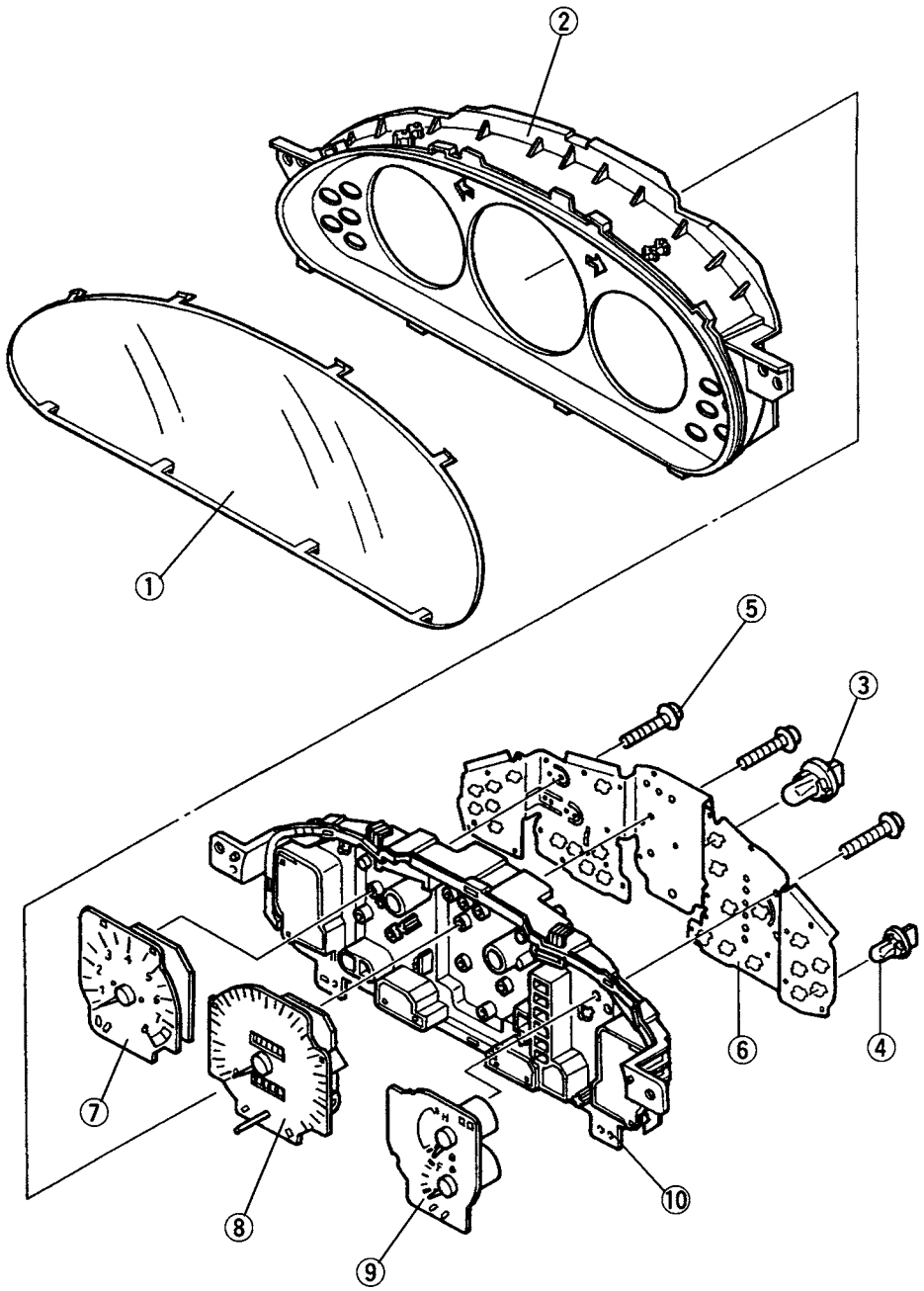


1. Screws
2. Connectors
3. Instrument cluster
   Disassembly / Assembly ..... page T1–52

Disassembly / Assembly

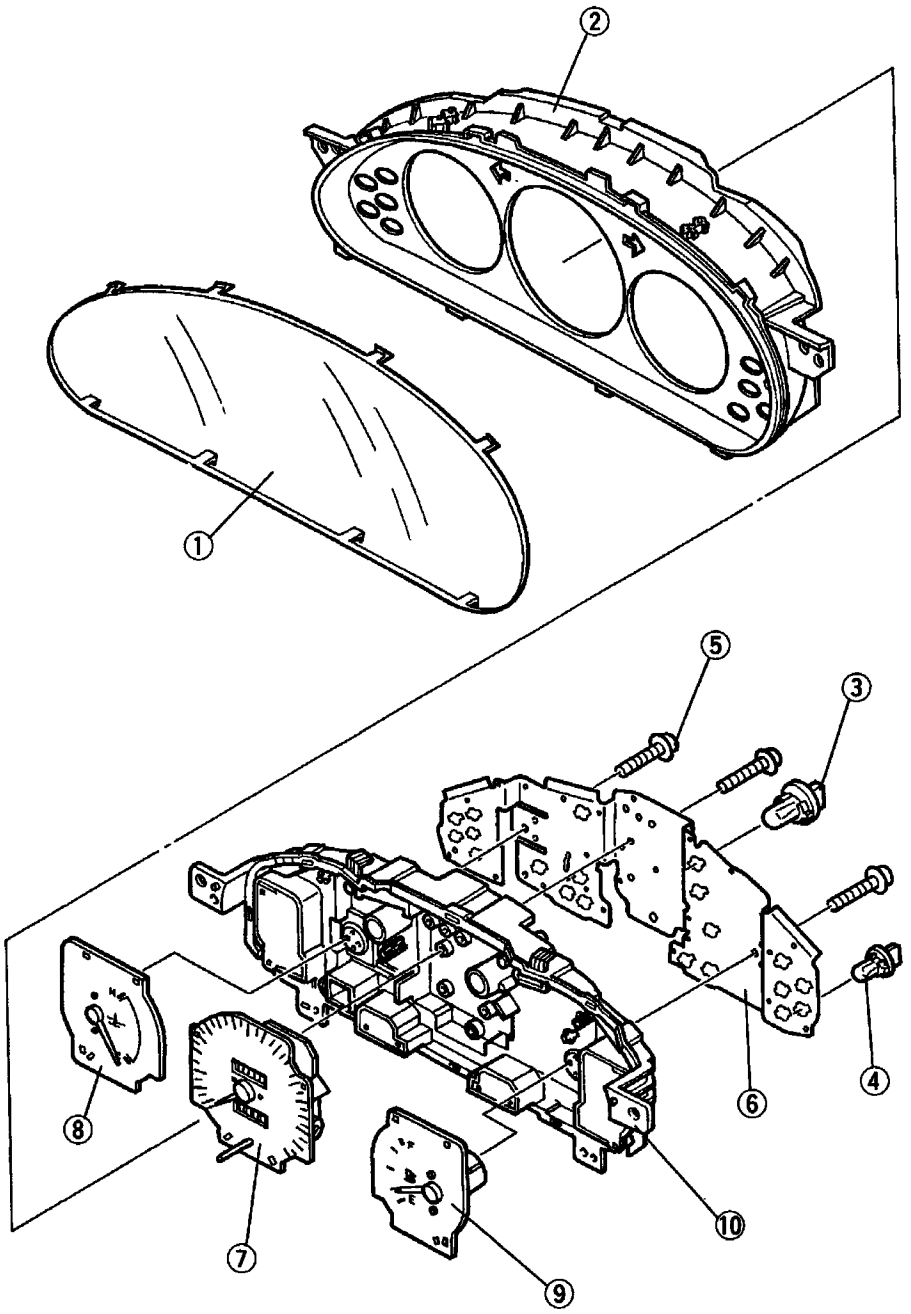
1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.

WITH TACHOMETER

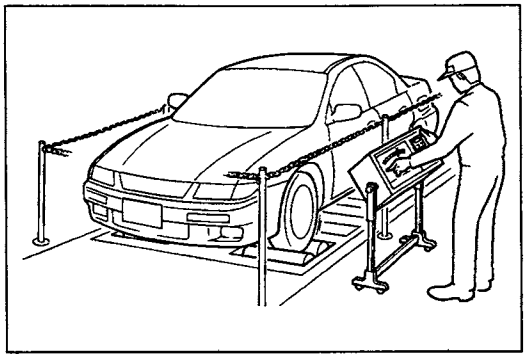


1. Glass front
2. Window plate
3. Socket
4. Bulb
5. Screw
6. Print plate
7. Tachometer
8. Speedometer
9. Fuel and water temperature gauges
10. Case

WITHOUT TACHOMETER



1. Glass front
2. Window plate
3. Socket
4. Bulb
5. Screw
6. Print plate
7. Speedometer
8. Water temperature gauge
9. Fuel gauge
10. Case



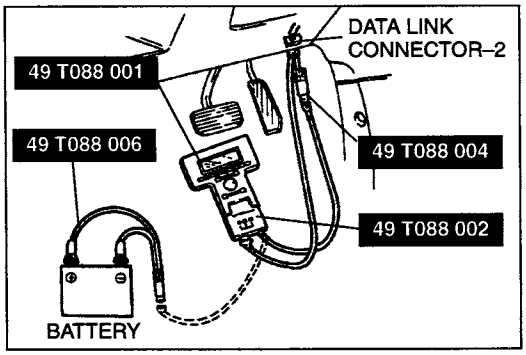
SPEEDOMETER

Inspection

1. Move the vehicle onto a speedometer tester.
2. Raise the vehicle speed and verify that the speedometer needle corresponds to the tester needle.
3. If the speedometer does not operate or the indication error is excessive, inspect the vehicle speedometer sensor and wiring harness.
4. If the vehicle speedometer sensor and wiring harness are OK, replace the speedometer.
   (Refer to pages T1–51, 52.)

Vehicle speed (km/h)	Meter indication (km/h)
40	36.0—46.0
90	81.0—103.5

Vehicle speed (MPH)	Meter indication (MPH)
30	27.0—34.5
80	72.0—92.0



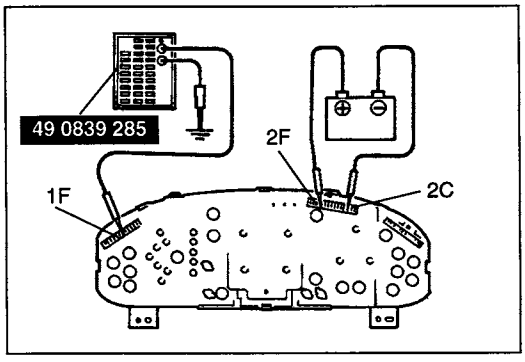
TACHOMETER

Inspection

1. Connect the **SST** (NGS) to the data link connector–2 and battery.
2. Referring to the NGS operational manual, select the PID DATA MONITOR function.
3. Using the PID DATA MONITOR function, measure the engine speed.
4. Compare the values of the vehicle tachometer and the **SST** (NGS).

Engine speed (rpm)	Meter indication (rpm)
650	552.5—708.5
6,000	5,820—6,540

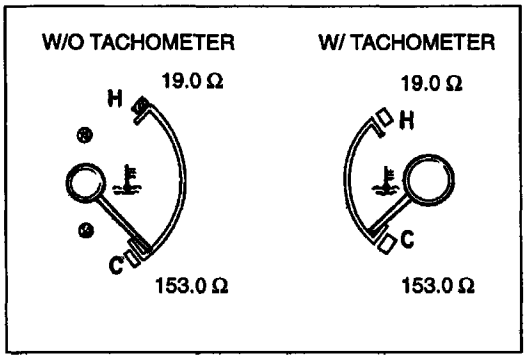
5. If not as specified, inspect the wiring harness.
   (distributor — instrument cluster)
6. If the wiring harness is normal, replace the tachometer.
   (Refer to pages T1–51, 52.)



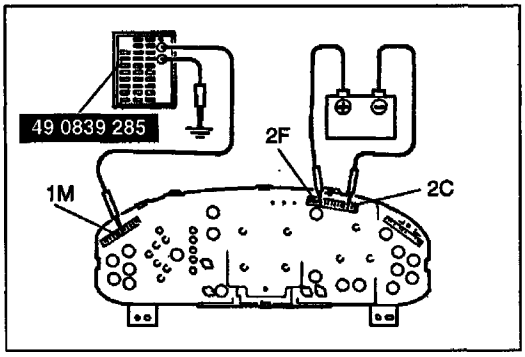
WATER TEMPERATURE GAUGE

Inspection

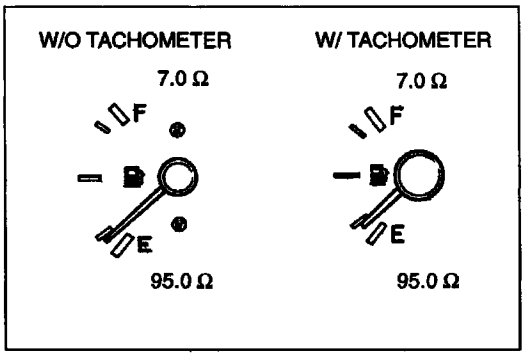
1. Remove the instrument cluster.
   (Refer to page T1–51.)
2. Connect battery positive voltage to terminal 2F and ground to terminal 2C of the instrument cluster.
3. Connect the positive (+) lead of the **SST** to terminal 1F of the instrument cluster and the negative (–) lead to ground.



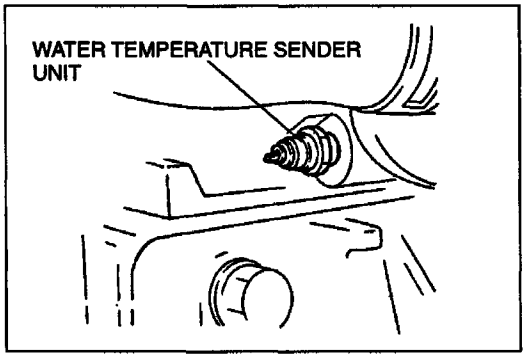
4. Verify that the water temperature gauge indicates the values shown in the figure.
5. If not as specified, replace the water temperature gauge.



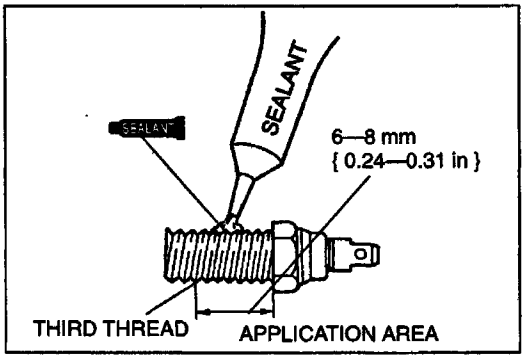
FUEL GAUGE
Inspection
1. Remove the instrument cluster. (Refer to page T1–51.)
2. Connect battery positive voltage to terminal 2F and ground to terminal 2C of the instrument cluster.
3. Connect the positive (+) lead of the **SST** to terminal 1M of the instrument cluster and the negative (–) lead to ground.



4. Verify that the fuel gauge indicates the values shown in the figure.
5. If not as specified, replace the fuel gauge.

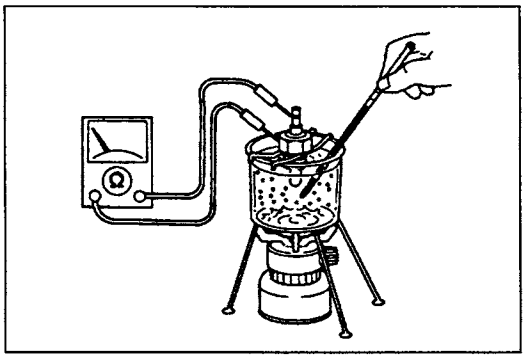


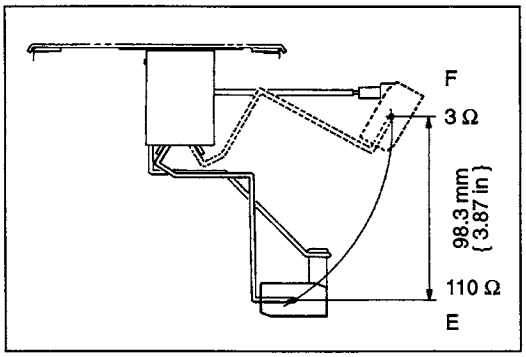
WATER TEMPERATURE SENDER UNIT
Removal / Installation
1. Disconnect the water temperature sender unit connector.
2. Remove the water temperature sender unit.



3. Before installing the unit, apply sealant from the third thread to the top thread.
4. Install in the reverse order of removal.

Tightening torque:
6.4—9.3 N·m { 65—95 kgf·cm , 57—82 in·lbf }





Inspection

1. Remove the water temperature sender unit.
2. Place the sender unit in a container of water.
3. Heat the water gradually, and measure the resistance of the sender unit.

Temperature °C { °F }	50 { 122 }
Resistance Ω	192.4—259.6

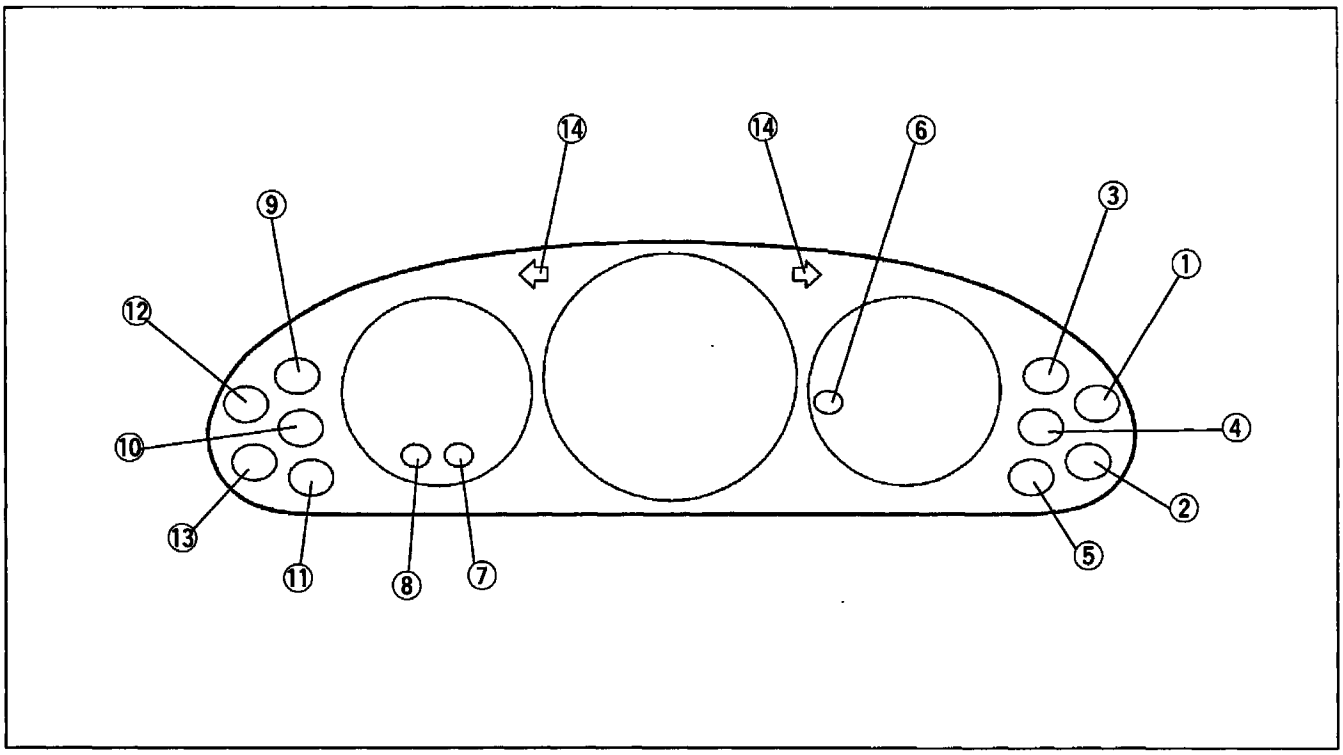
4. If not as specified, replace the water temperature sender unit.

FUEL GAUGE SENDER UNIT

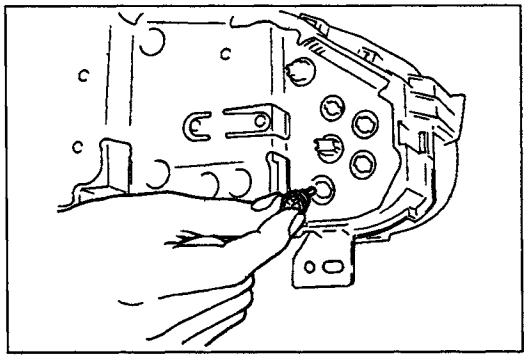
Inspection

1. Remove the fuel gauge sender unit. (Refer to sections F1 and F2.)
2. Connect an ohmmeter between the terminals of the sender unit.
3. Measure the resistance while slowly moving the unit arm from point E to point F.
4. If not as specified, replace the fuel gauge sender unit.

WARNING AND INDICATOR LIGHT
Structural View

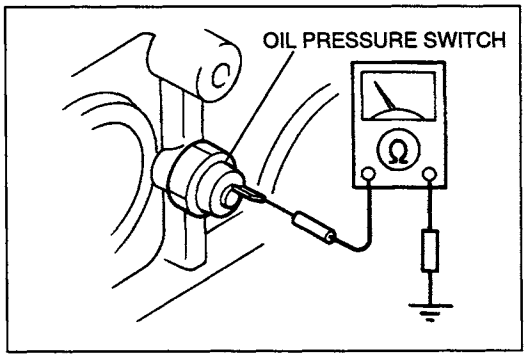


	Bulb		Specification
1	Rear window defroster indicator light	Without tachometer	1.4 W
2	ABS warning light		1.4 W
3	Rear window defroster indicator light	With tachometer	1.4 W
	Cruise set indicator light	Without tachometer	1.4 W
4	Door ajar warning light	With tachometer	1.4 W or 3.4 W
	High beam indicator light	Without tachometer	3.4 W
5	Oil pressure warning light		1.4 W
6	HOLD indicator light	With tachometer	1.4 W
7	High beam indicator light	With tachometer	3.4 W
8	Generator warning light	With tachometer	1.4 W
	HOLD indicator light	Without tachometer	1.4 W
9	Cruise set indicator light	With tachometer	1.4 W
	Air bag system warning light	Without tachometer	1.4 W
10	Air bag system warning light	With tachometer	1.4 W
	Generator warning light	Without tachometer	1.4 W
11	Brake system warning light		1.4 W
12	MIL		1.4 W
13	Seat belt warning light		1.4 W
14	Turn signal indicator light		3.4 W × 2
—	Instrument cluster illumination		3.4 W × 3 1.4 W × 2



Bulb Replacement

1. Remove the instrument cluster.
   (Refer to page T1–51.)
2. Replace the bulb as shown in the figure.



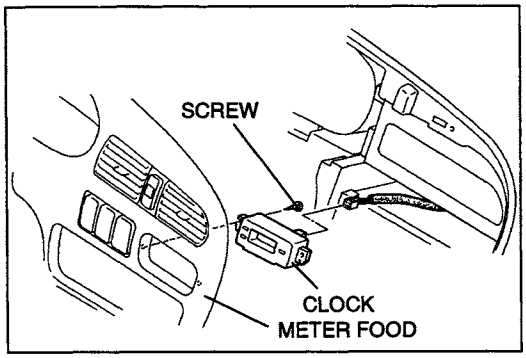
OIL PRESSURE SWITCH

Inspection

1. Disconnect the oil pressure switch connector.
2. Check for continuity between the terminals of the oil pressure switch and ground.

Engine condition	Continuity
Running	No
Stopped	Yes

3. If not as specified, measure the oil pressure.
   (Refer to section D.)
4. If the oil pressure is normal, replace the oil pressure switch.
   (Refer to section D.)



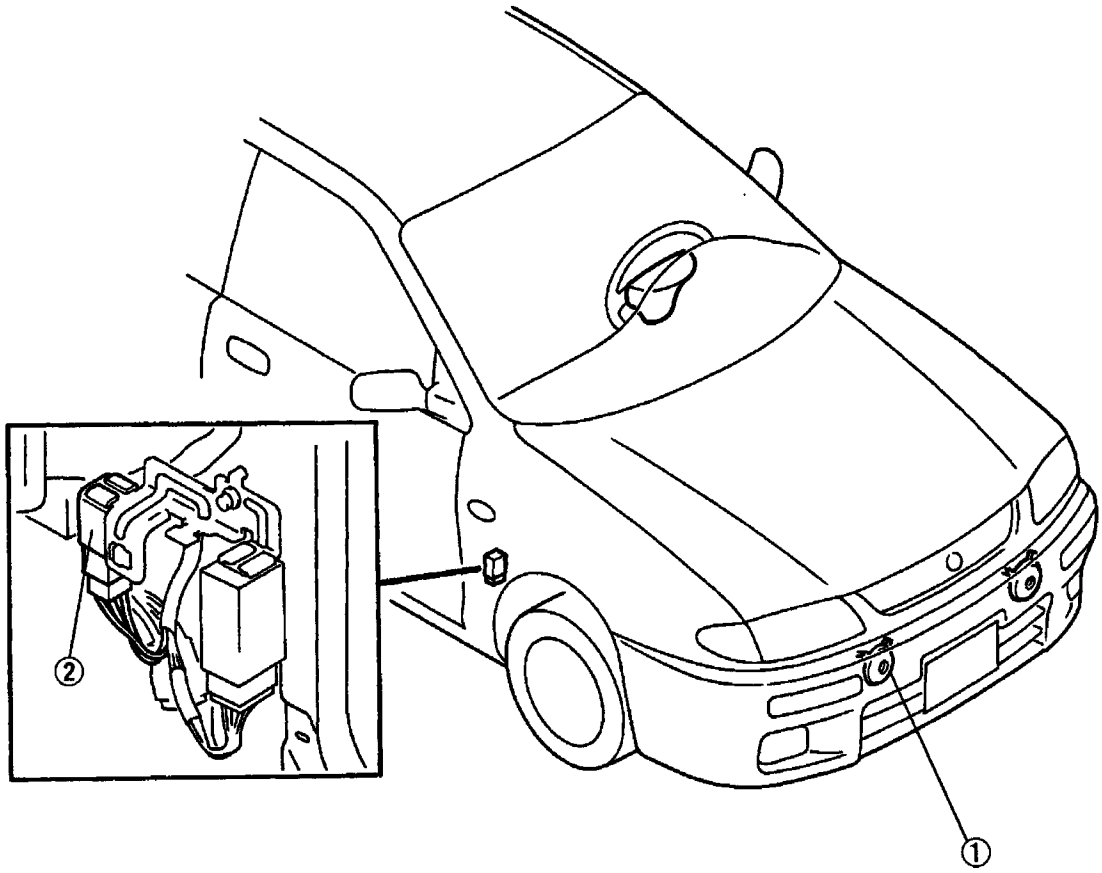
CLOCK

Removal / Installation

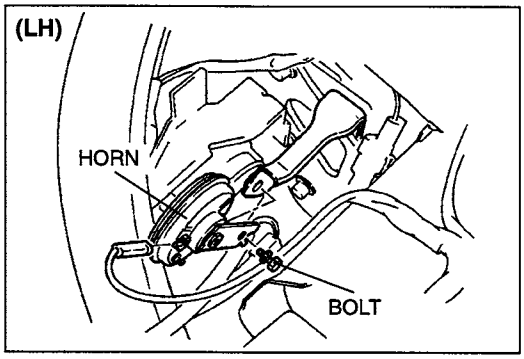
1. Remove the meter hood.
   (Refer to section S1.)
2. Remove the screws and the clock.
3. Install in the reverse order of removal.

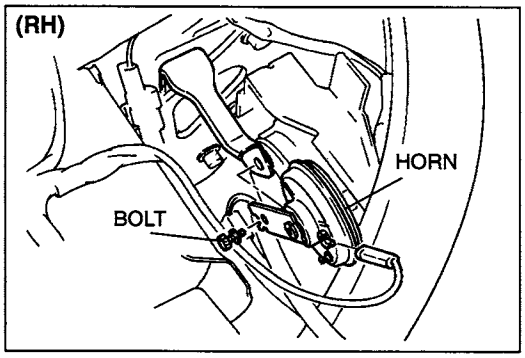
HORN

STRUCTURAL VIEW

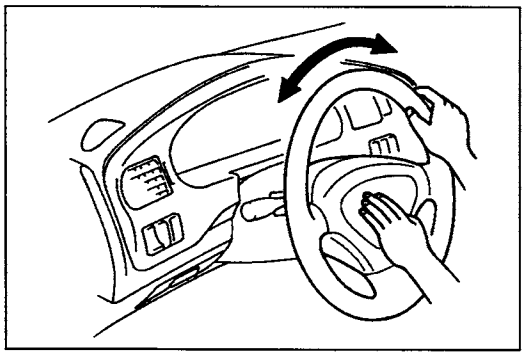


1. Horn
   - Removal / Installation ..... page T1–60
   - On-vehicle inspection ..... page T1–60
2. Horn relay
   - Removal / Installation ..... page T1–60
   - Inspection ..... page T1–60

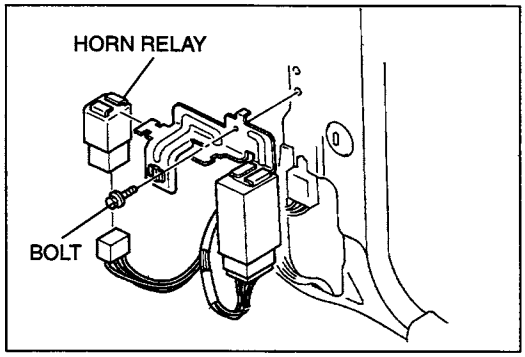




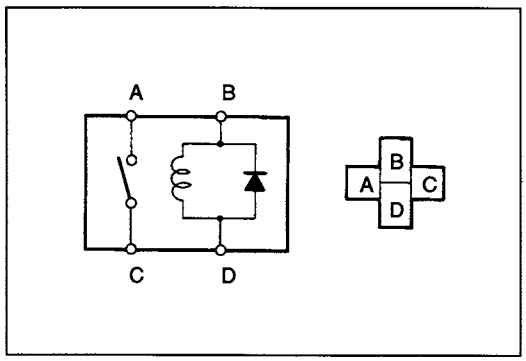
HORN
Removal / Installation
1. Remove the headlight.
   (Refer to page T1–12.)
2. Disconnect the horn connector.
3. Remove the bolt and the horn.
4. Install in the reverse order of removal.



On-vehicle Inspection
While turning the steering wheel, verify that horn sounds when the horn switch is pressed.



HORN RELAY
Removal / Installation
1. Remove the scuff plate and front side trim.
   (Refer to section S1.)
2. Disconnect the horn relay connector
3. Remove the bolt and the bracket.
4. Remove the horn relay.
5. Install in the reverse order of removal.



Inspection
1. Apply battery positive voltage and check for continuity between the relay terminals.

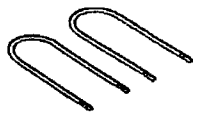
O—O: Continuity B+: Battery positive voltage

Step \ Terminal	D	B	A	C
1	O—O			
2	GND	B+	O	—O

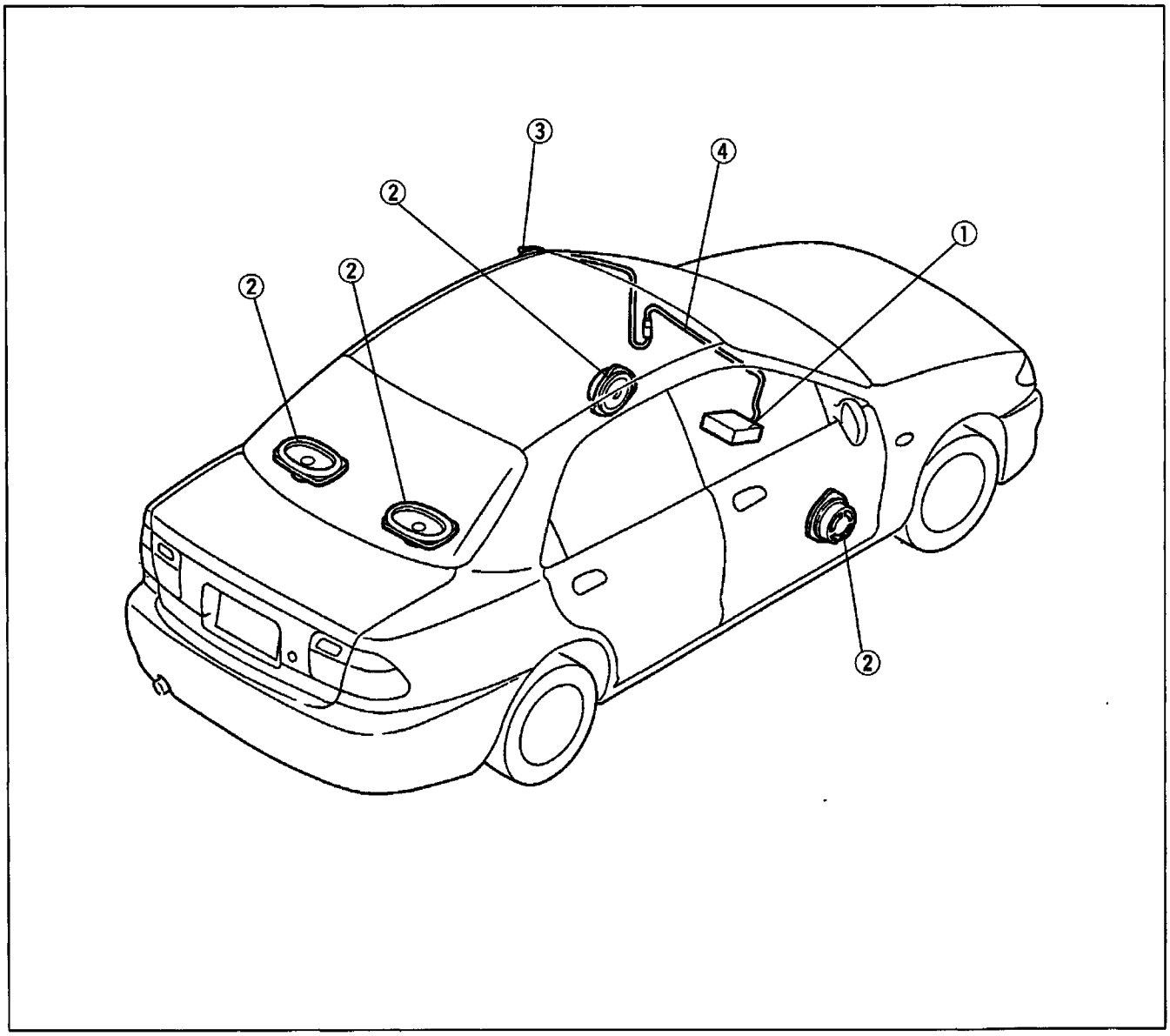
2. If not as specified, replace the horn relay.

AUDIO

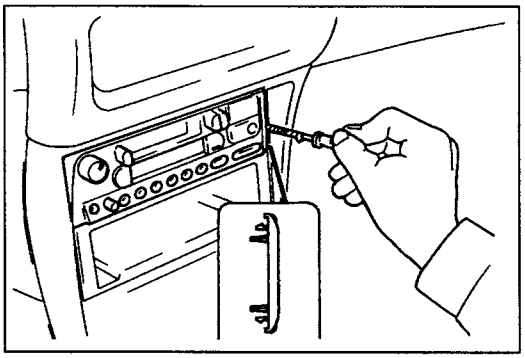
PREPARATION
SST

49 UN01 050 Radio removing tool		For removal of audio unit

STRUCTURAL VIEW



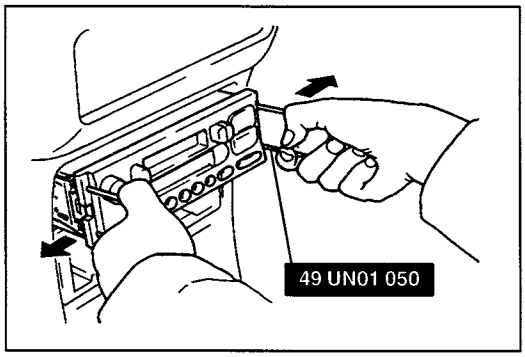
1. Audio unit
   - Removal ..... page T1–62
   - Installation ..... page T1–62
2. Speaker
   - Removal / Installation ..... page T1–63
   - Inspection ..... page T1–64
3. Roof antenna
   - Removal ..... page T1–64
   - Installation ..... page T1–64
   - Inspection ..... page T1–65
4. Antenna feeder
   - Removal / Installation ..... page T1–65
   - Inspection ..... page T1–66



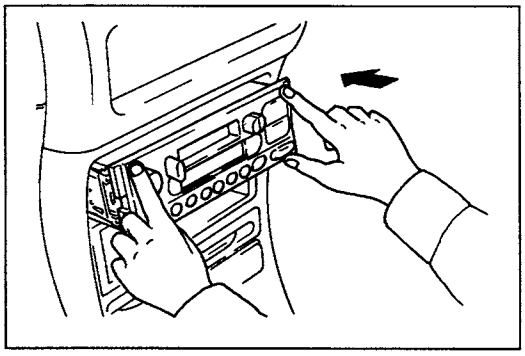
AUDIO UNIT

Removal

1. Pry out the audio unit service hole covers by using a flat-head screwdriver which has been wrapped in tape. Keep the hole covers for reinstallation.



2. With the beveled parts of the **SST** facing inward, insert them into the audio unit.
3. Pull the **SST** outward and rearward to slide out the audio unit.
4. Disconnect the connector and antenna jack.



Installation

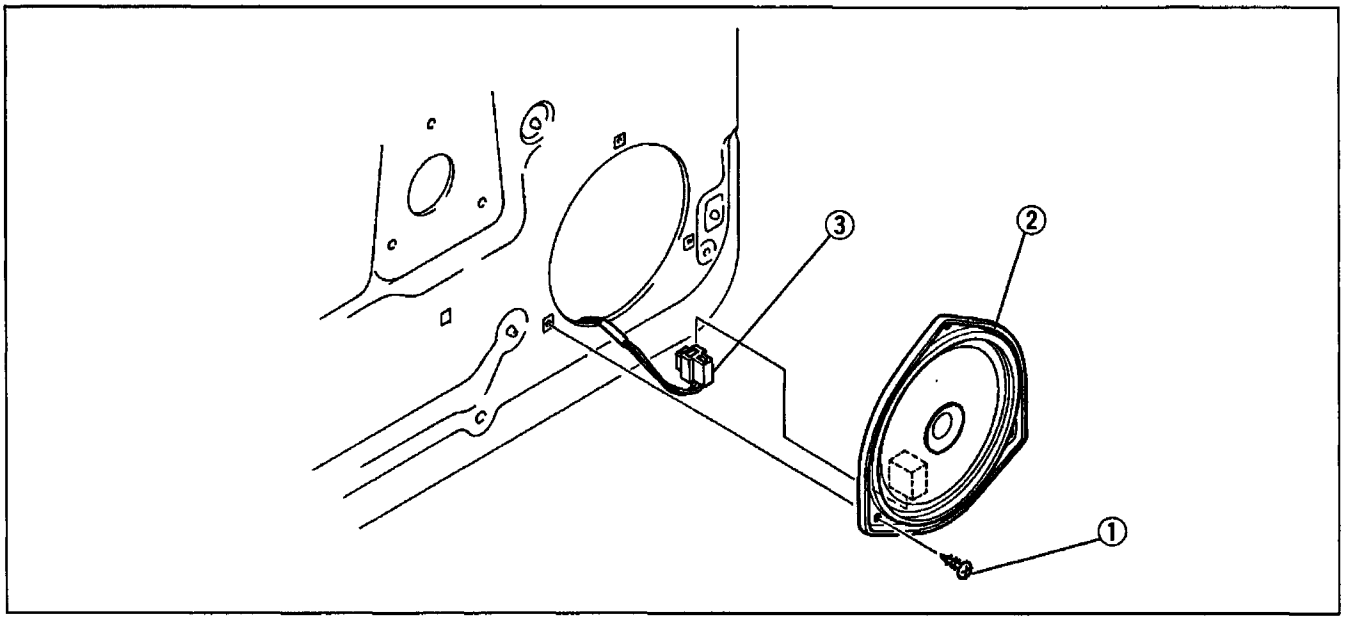
1. Install the audio unit service hole covers.
2. Connect the audio unit connector and antenna jack.
3. Insert the audio unit until each clip clicks. Verify that the wiring harness and antenna feeder are not caught between the audio unit and the dashboard.

SPEAKER

Removal / Installation

Door speaker

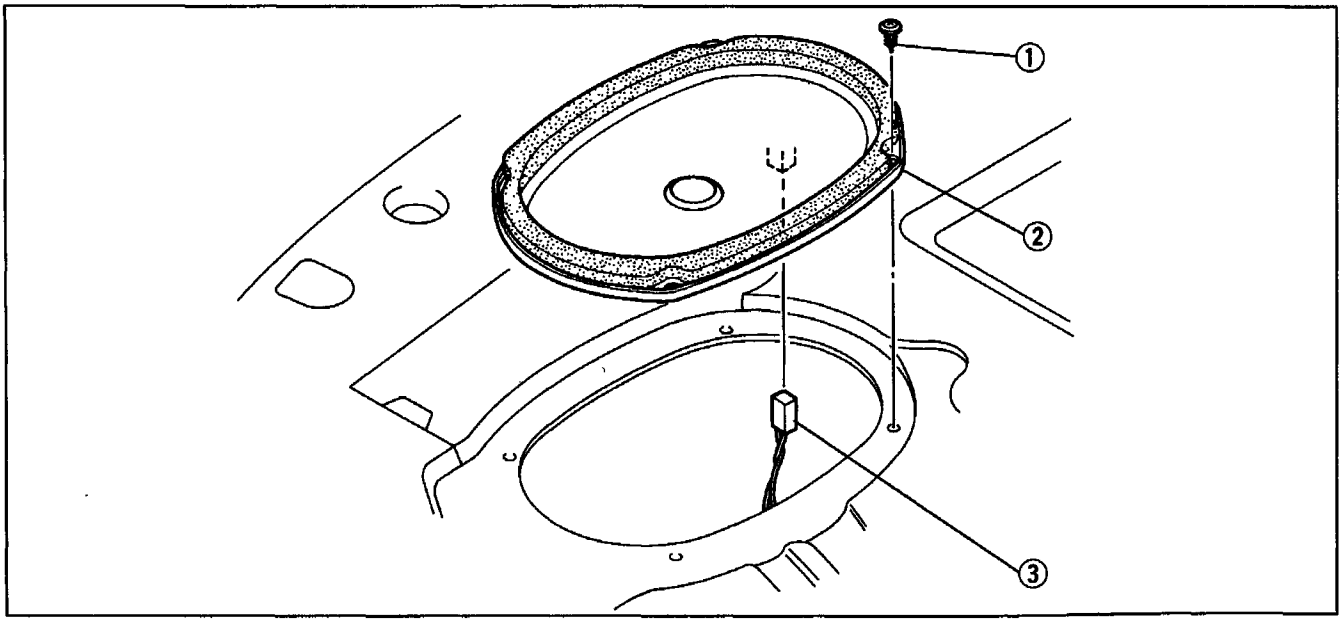
1. Remove the front door trim.
   (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



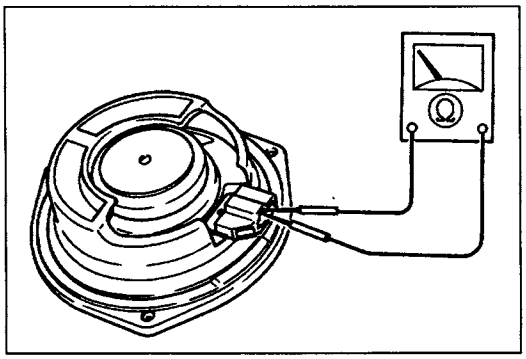
1. Screw
2. Door speaker
3. Door speaker connector

Rear speaker

1. Remove the rear package trim.
   (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



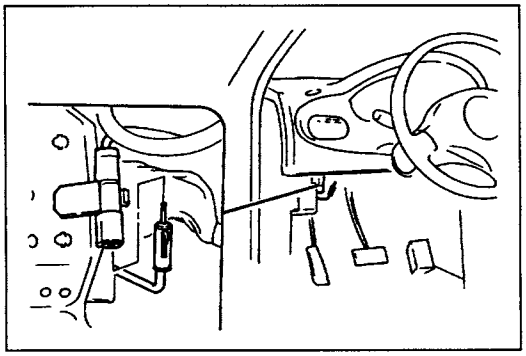
1. Screw
2. Rear speaker
3. Rear speaker connector



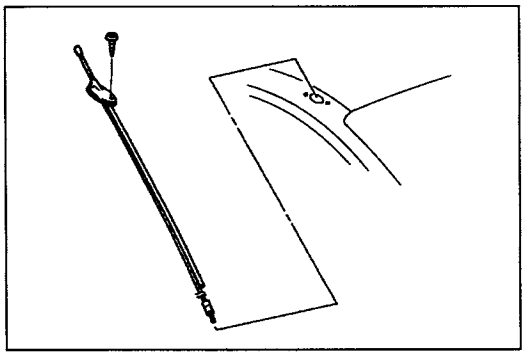
Inspection
1. Remove the speaker. (Refer to page T1–63.)
2. Measure the resistance between the terminals of the speaker.

   Resistance: 4 Ω

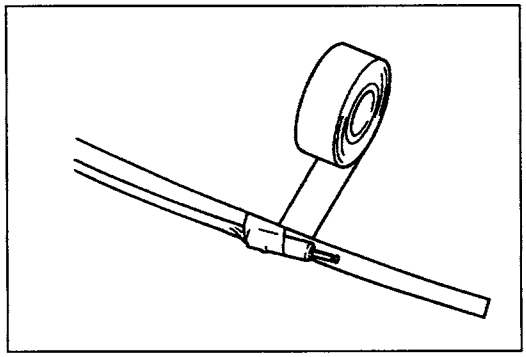
3. Touch the leads of an ohmmeter to the speaker terminals and verify that the speaker clicks.
4. If not as specified, replace the speaker.



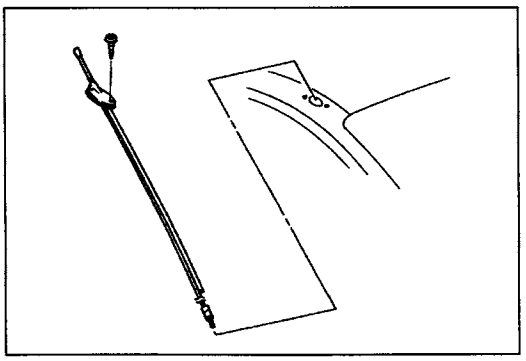
ROOF ANTENNA
Removal
1. Remove the lower panel. (Refer to section S1.)
2. Disconnect the antenna jack.



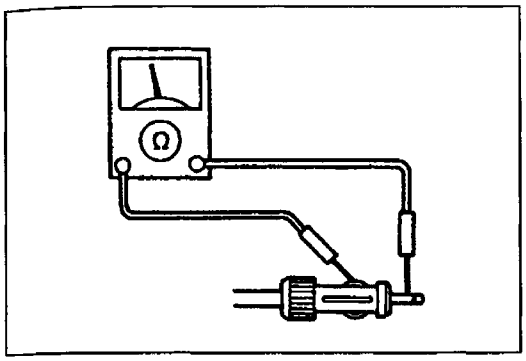
3. Remove the screw and pull out the roof antenna.



Installation
1. Tape the antenna jack to the drain pipe.



2. Pass the antenna feeder and drain pipe through the A-pillar from the hole in the roof.
3. Connect the antenna feeder and install the roof antenna.

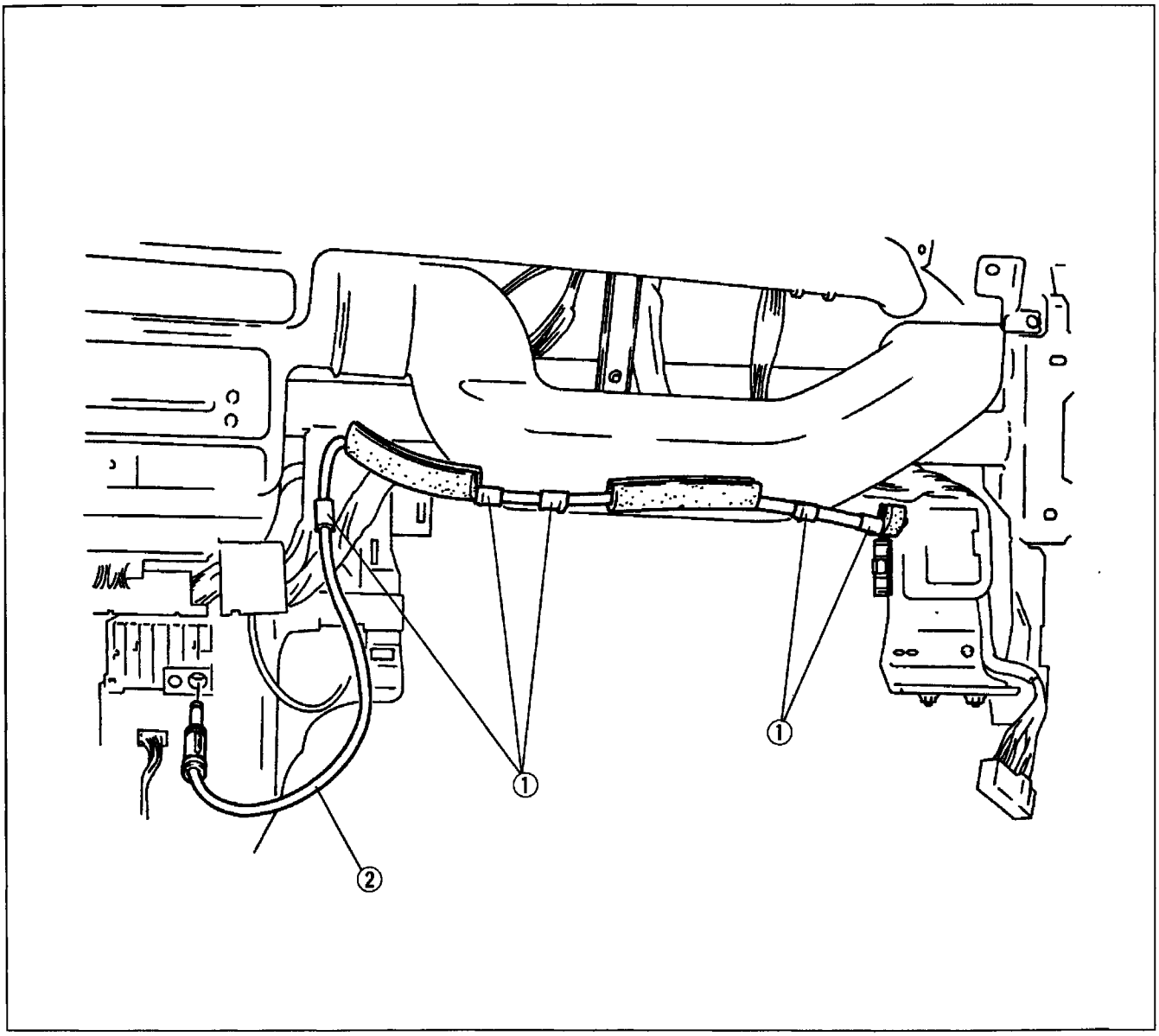


Inspection
1. Remove the lower panel.
   (Refer to section S1.)
2. Disconnect the antenna jack.
3. Check the antenna by using an ohmmeter.

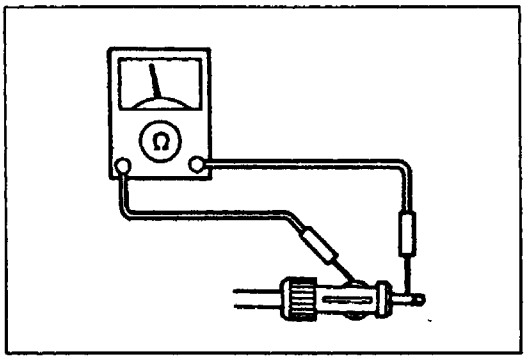
   Resistance: Infinite

4. If not as specified, replace the roof antenna.
   (Refer to page T1–64.)

ANTENNA FEEDER
Removal / Installation
1. Remove the dashboard.
   (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



1. Clips
2. Antenna feeder



Inspection

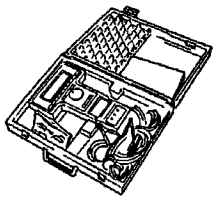
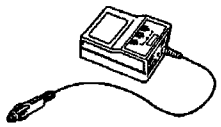
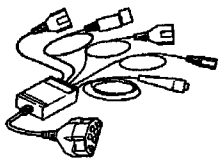
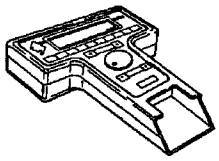
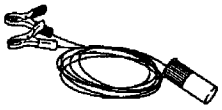
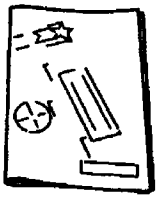
1. Remove the audio unit.
   (Refer to page T1–62.)
2. Disconnect the antenna jack.
3. Check the antenna by using an ohmmeter.

   Resistance: Infinite

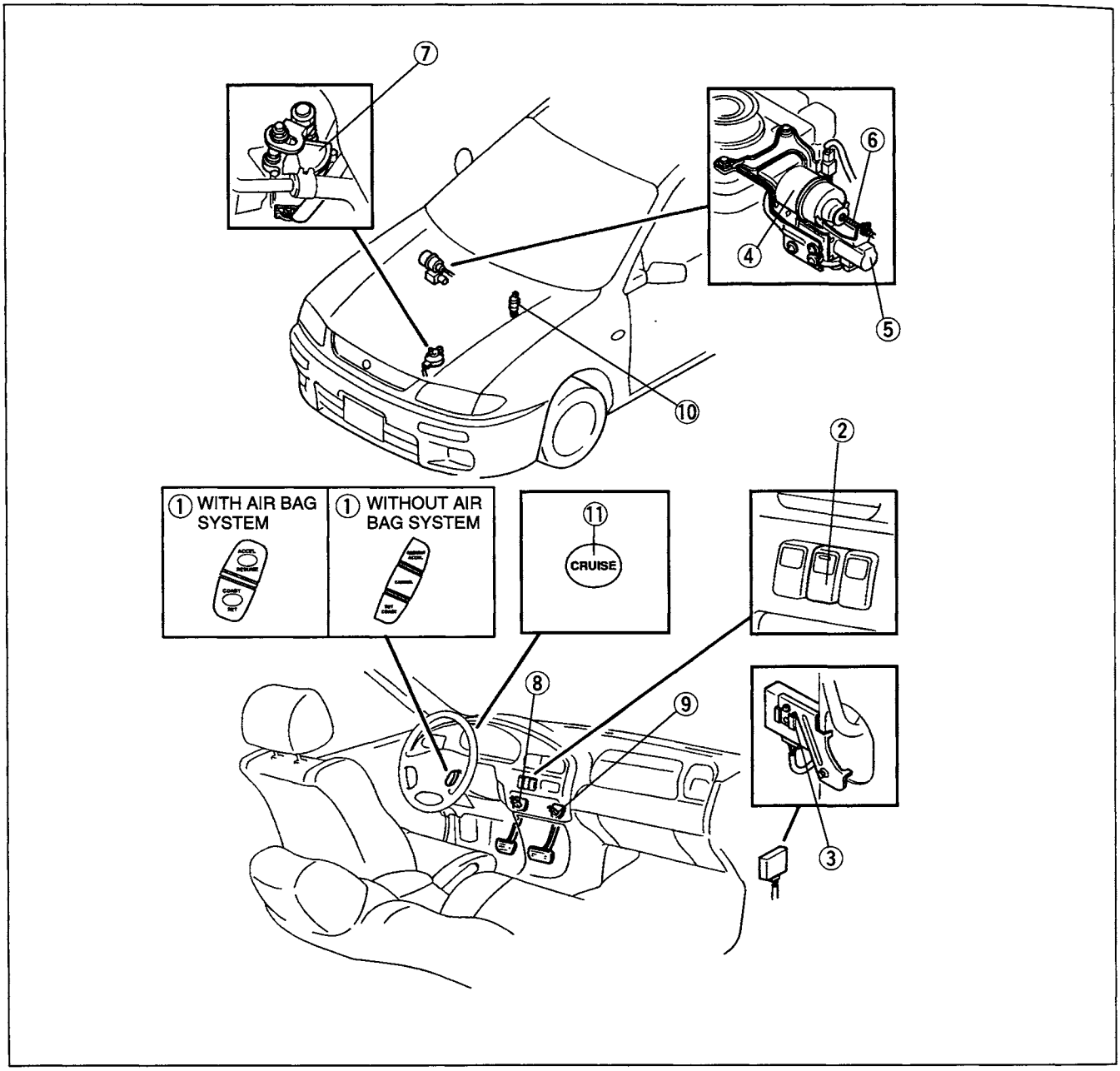
4. If not as specified, replace the antenna feeder.

CRUISE CONTROL SYSTEM

PREPARATION
SST

49 T088 0A0 NGS set		For diagnosis of cruise control system	49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For diagnosis of cruise control system
49 T088 003 Super MECS Adapter (Part of 49 T088 0A0)		For diagnosis of cruise control system	49 T088 010B Program Card 	For diagnosis of cruise control system
49 T088 001 Control Unit (Part of 49 T088 0A0)		For diagnosis of cruise control system	49 T088 005 STAR/DCL Adapter (5 pin) (Part of 49 T088 0A0) 	For diagnosis of cruise control system
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0)		For diagnosis of cruise control system	49 T088 008A Instruction Manual 	For diagnosis of cruise control system

STRUCTURAL VIEW



1. Cruise control switch
   - Removal / Installation ..... page T1–94
   - Inspection ..... page T1–95
2. Cruise control main switch
   - Removal / Installation ..... page T1–96
   - Inspection ..... page T1–96
3. Cruise control module
   - Removal / Installation ..... page T1–89
   - Inspection ..... page T1–90
4. Cruise actuator
   - Removal / Installation ..... page T1–91
   - Inspection ..... page T1–92
5. Vacuum pump
   - Removal / Installation ..... page T1–92
   - Inspection ..... page T1–93
6. Actuator cable
   - Removal / Installation ..... page T1–93
   - Adjustment ..... page T1–93
7. Transaxle range switch
   - Removal / Installation ..... section K
   - Inspection ..... section K
8. Clutch switch
   - Removal / Installation ..... section F1, F2
   - Inspection ..... section F1, F2
9. Brake switch
   - Removal / Installation ..... section P
   - Inspection ..... section P
10. Vehicle speedometer sensor
    - Removal / Installation ..... section K
    - Inspection ..... section K
11. Cruise set indicator light (in instrument cluster)

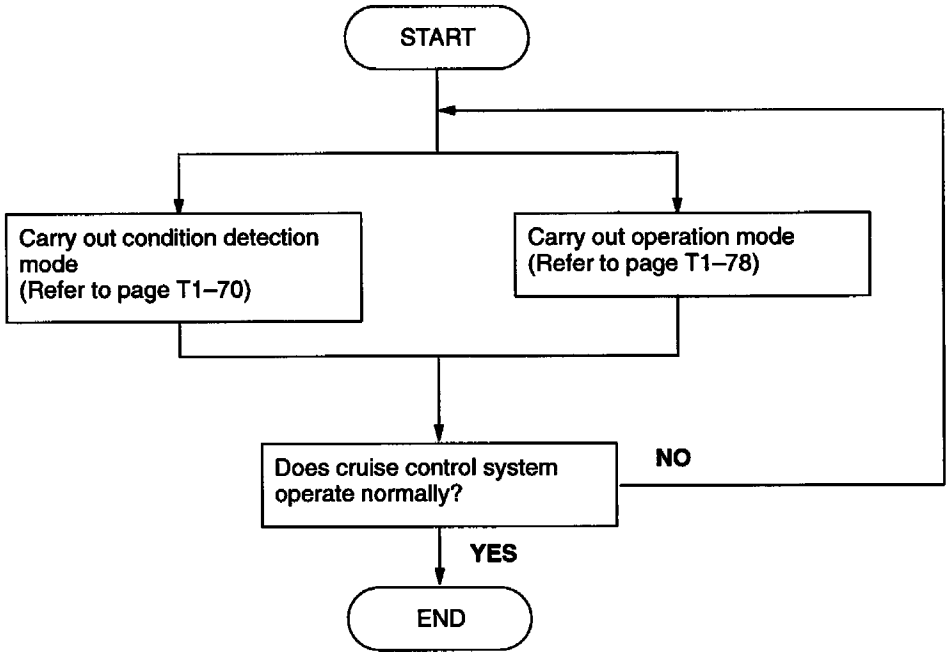
ON-BOARD DIAGNOSTIC

Outline

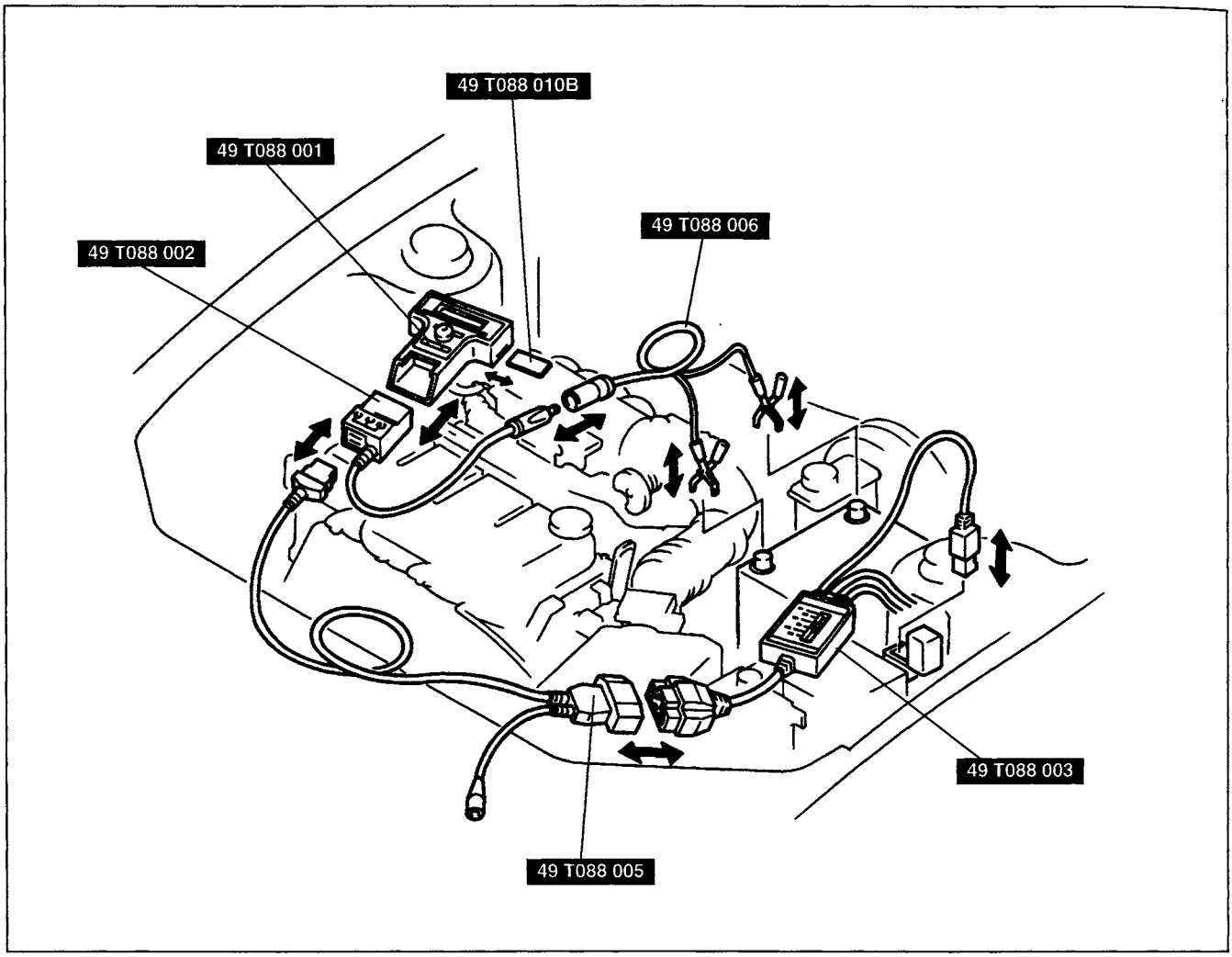
- There are two on-board diagnostic functions: Condition Detection Mode, which indicates troubles in the system; and Operation Mode, which checks for and indicates correct operation of the input signals to the control module.
- The two functions can be done by using either of the following methods:
  1) Checking the output of the data link connector by using the **SST** (NGS set)
  2) Checking the flashing pattern of the cruise set indicator light

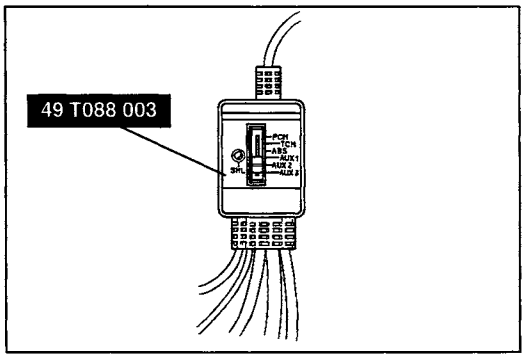
Operation Order

Use Condition Detection Mode or Operation Mode or both to inspect the cruise control system. Either diagnostic function can be done before the other. If one diagnostic function does not locate the trouble, carry out the other function.

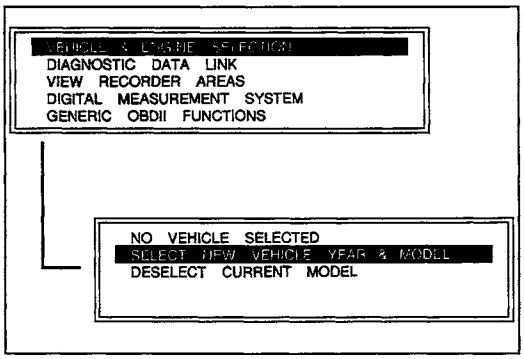


Condition Detection Mode Using NGS

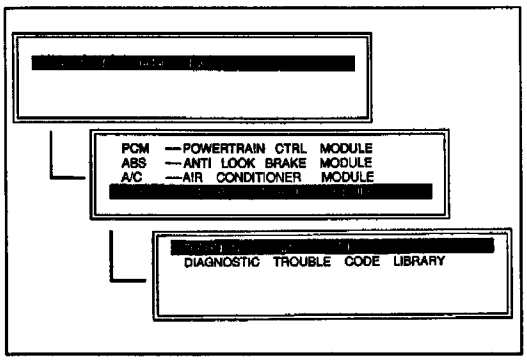




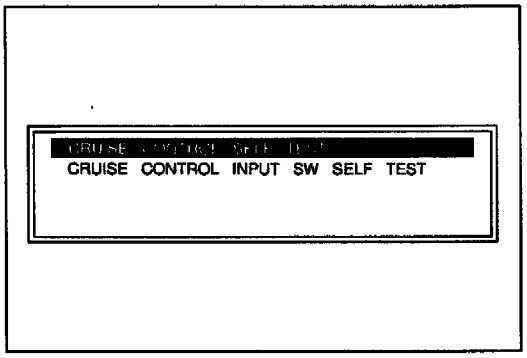
1. Position the vehicle on a chassis roller.
2. Connect the **SST** (NGS) to the data link connector and battery.
3. Set the **SST** (Super MECS Adapter) to AUX 2.



4. Select "VEHICLE & ENGINE SELECTION" on the **SST** (Control Unit) display, and then select the vehicle model, engine type, and model year.



5. Select "DIAGNOSTIC DATA LINK" on the **SST** (Control Unit) display.
6. Select "CCM-CRUISE CONTROL MODULE" on the **SST** (Control Unit) display, and then select the "DIAGNOSTIC TEST MODE".
7. Increase the vehicle speed over 16 km/h { 10 MPH }.

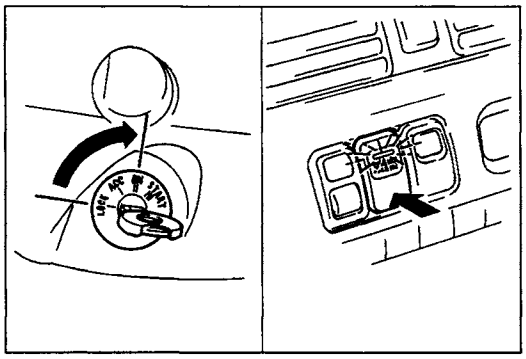


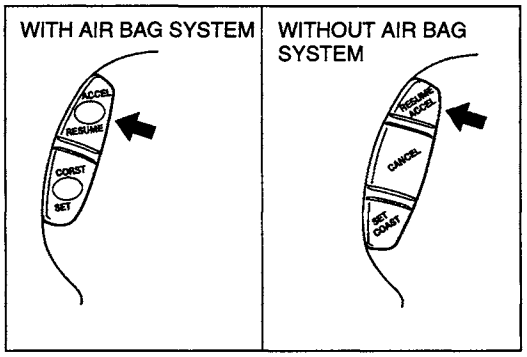
8. Select "CRUISE CONTROL SELF TEST" on the **SST** (Control Unit) display.
9. (1) If a diagnostic trouble code is displayed, refer to the diagnostic trouble code table (Refer to page T1–72) and inspect the appropriate system area.
   (2) If "NO CODES RECEIVED" is displayed, the system areas shown in the diagnostic trouble code table are OK. Inspect another system area.
10. After the problems are corrected, repeat the condition detection mode procedure to verify that the system is operating normally.

Cancel

To cancel condition detection mode, do any one of the following:

- Turn the cruise control main switch off.
- Turn the ignition switch to LOCK.





Using cruise set indicator light

Reference

- If the RESUME/ACCEL switch on the cruise control switch is malfunctioning, the cruise set indicator light will not give a correct indication when you inspect the system. Use the **SST** (NGS set) to determine the cause of the malfunction.
  (Refer to page T1–70.)

Inspection

1. Turn the ignition switch to ON.
2. Turn the cruise control main switch on.
3. Press and hold the RESUME/ACCEL switch for at least 3 seconds to activate the on-board diagnostic. The cruise set indicator light will illuminate for 3 seconds and then go out for at least 2 seconds.
4. If a problem is present, the cruise set indicator light will flash in one of the patterns shown below. If there is no problem in the system, the light will not flash.

Cancel

To cancel condition detection mode, do any one of the following:

- Turn the cruise control main switch off.
- Turn the ignition switch to LOCK.
- Drive the vehicle at over 16 km/h { 10 MPH }.

Diagnostic trouble code table

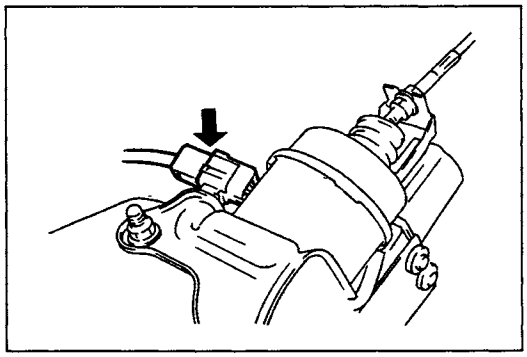
If there are two or more problems in the cruise control system, the problem with the highest priority will be indicated.

Priority	DTC	Display on the NGS	Possible cause	Inspection area	Refer to page
1	1	ACTUATOR — CIRCUIT MALFUNCTION	• Vacuum pump • Cruise control module • Defective wiring harness	• Vacuum pump connector • Vacuum pump • Wiring harness (Cruise control module — Vacuum pump)	T1–73
2	5	STOP FUSE — CIRCUIT MALFUNCTION	• Burnt STOP 15 A fuse • Brake switch • Defective wiring harness	• STOP 15 A fuse • Brake switch connector • Brake switch • Wiring harness (STOP 15 A fuse — Brake switch — Cruise control module)	T1–75
3	7	BRAKE SW — DEFECT	• Brake switches are on simultaneously	Brake switch	T1–76
4	11	SET/COAST SW — DEFECT (ALWAYS ON)	• Cruise control switch	Cruise control switch (SET/COAST switch)	T1–77
5	12	RESUME/ACCEL SW — DEFECT (ALWAYS ON)	• Cruise control switch	Cruise control switch (RESUME/ACCEL switch)	T1–77
6	15	CRUISE CONTROL MODULE — DEFECT	• Cruise control module	—	T1–77

Troubleshooting

Flowchart No.1	Symptom	Diagnostic trouble code 1

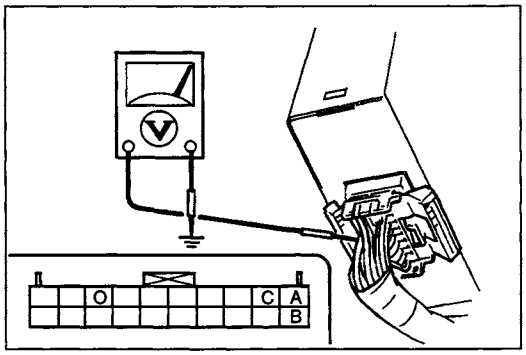
Possible cause
- Damaged cruise control module
- Damaged vacuum pump
- Open or short circuit in wiring harness
- Poor connection of connector



Step 1

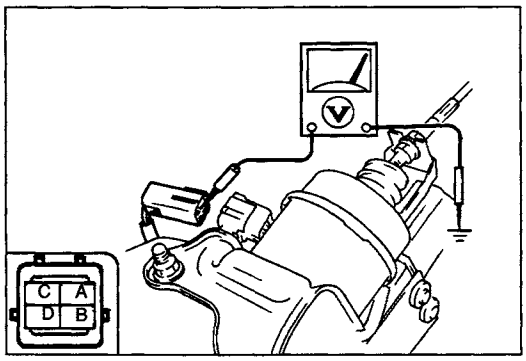
Make sure the vacuum pump connector is securely connected to the vacuum pump.

Connection	Action
OK	Go to Step 2
Poor	Reconnect connector



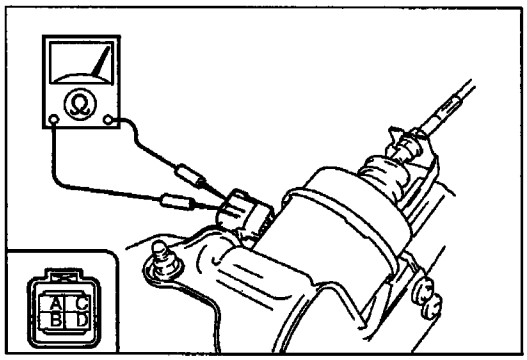
Step 2
1. Pull out the cruise control module with the cruise control module connector connected. (Refer to page T1–89.)
2. Turn the ignition switch to ON.
3. Turn the cruise control main switch on.
4. Measure the voltage at the terminals of the cruise control module connector.

Terminal	Voltage	Action
A (G/L) B (G/B) C (G/Y)	About 9 V	Measure voltage at terminals O
	Other	Go to Step 3
O (P)	About 9 V	Go to Step 5
	Other	Replace cruise control module (Refer to page T1–89)



Step 3
1. Turn the ignition switch to LOCK.
2. Disconnect the vacuum pump connector.
3. Turn the ignition switch to ON.
4. Turn the cruise control main switch on.
5. Measure the voltage at terminal A (P) of the vacuum pump connector.

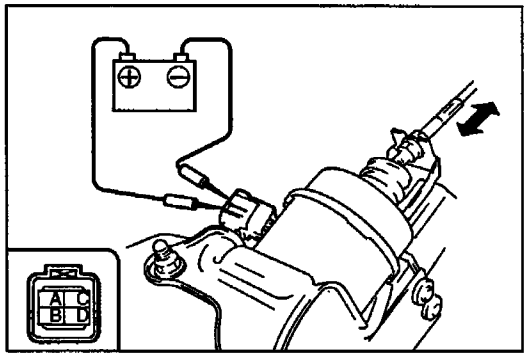
Voltage	Action
About 9 V	Go to Step 4
Other	Go to Step 5



Step 4

1. Measure the resistance between the vacuum pump terminals.

Terminals	Resistance (Ω)
A—C	55
A—B	
A—D	6
B—C	110
B—D	60
C—D	

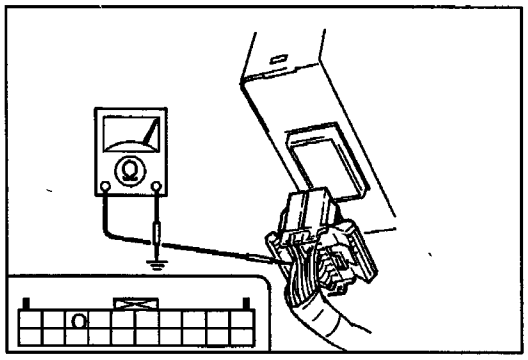


2. Connect battery positive voltage and verify the operation of the actuator cable as indicated below.

B+: Battery positive voltage

Step	Terminal connection				Actuator cable operation
	A	B	C	D	
1	GND	B+	B+	B+	Pull
2	GND	B+	B+	—	Hold
3	GND	B+	—	—	Extend
4	—	—	—	—	Release

3. If correct, repair the wiring harness (cruise control module — vacuum pump).
4. If not as specified, replace the vacuum pump. (Refer to page T1–92.)



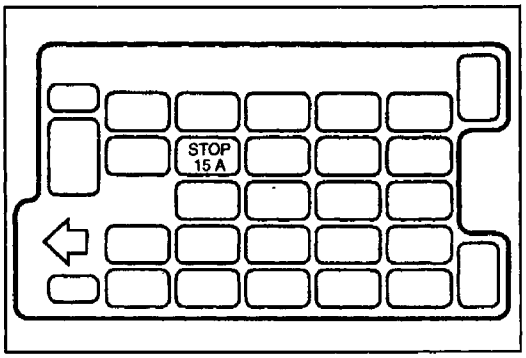
Step 5

1. Turn the ignition switch to LOCK.
2. Disconnect the cruise control module connector.
3. Connect terminal A (P) of the vacuum pump connector to ground.
4. Check for continuity between terminal O (P) of the cruise control module connector and ground.

Continuity	Action
Yes	Replace cruise control module (Refer to page T1–89)
No	Repair wiring harness (Cruise control module — Vacuum pump)

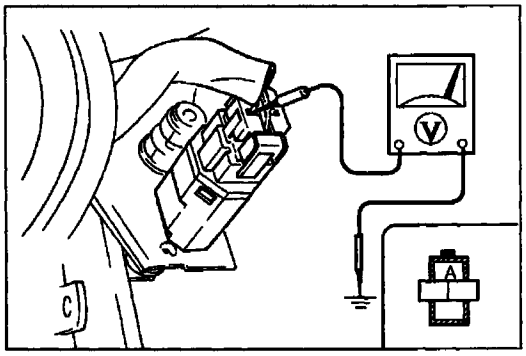
Flowchart No.2	Symptom	Diagnostic trouble code 5

Possible cause
- Burnt STOP 15 A fuse
- Damaged brake switch
- Open or short circuit in wiring harness
- Poor connection of connector



Step 1
Check the STOP 15 A fuse in the fuse block.

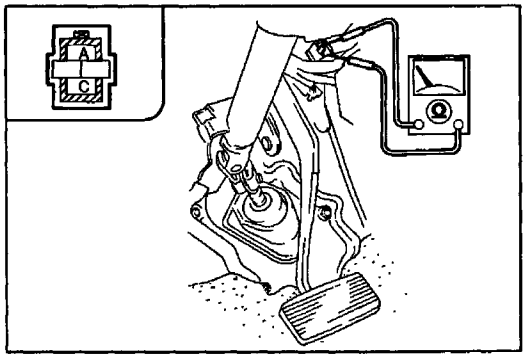
Fuse	Action
OK	Go to Step 2
Burnt	Replace fuse after checking and repairing wiring harness



Step 2
Measure the voltage at terminal A of the brake switch connector.

B+: Battery positive voltage

Voltage	Action
B+	Go to Step 3
Other	Repair wiring harness (STOP 15 A fuse — Brake switch)



Step 3
1. Disconnect the brake switch connector.
2. Check for continuity between the switch terminals.

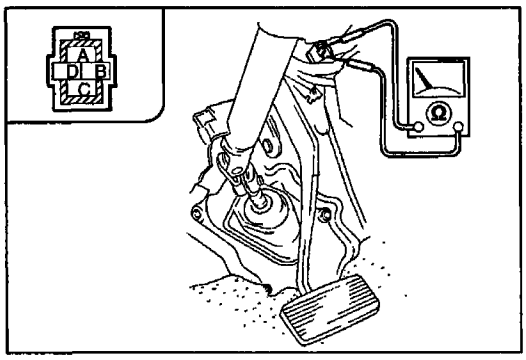
O—O: Continuity

Brake pedal	Terminal	
	A	C
Released		
Depressed	O	O

3. If not as specified, replace the brake switch. (Refer to section P.)

Flowchart No.3	Symptom	Diagnostic trouble code 7

Possible cause
- Damaged cruise control module
- Damaged brake switch



Remedy
1. Disconnect the brake switch connector.
2. Check for continuity between the switch terminals.

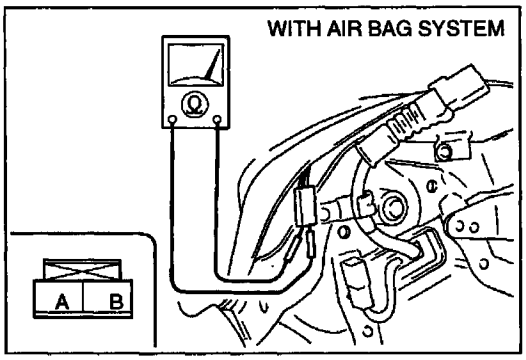
O—O: Continuity

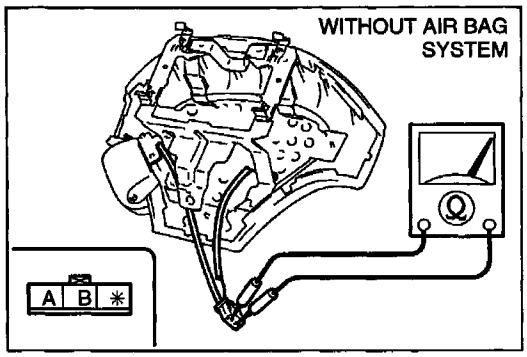
Brake pedal	Terminal			
	A	C	B	D
Released			O—O	
Depressed	O—O			

3. If correct, replace the cruise control module. (Refer to page T1–89.)
4. If not as specified, replace the brake switch. (Refer to section P.)

Flowchart No.4	Symptom	Diagnostic trouble code 11 or 12

Possible cause
- Damaged cruise control module
- Damaged cruise control switch





Remedy

Warning
- **Handling the air bag module improperly can accidently deploy the air bag, which may serously injure you. Read SERVICE WARNINGS, page T1–98, before handling the air bag module.**

1. Remove the driver-side air bag module.
   (Refer to page T1–107.)
   (With air bag system)
   Remove the horn pad.
   (Without air bag system)
2. Disconnect the cruise control switch connector.
3. Measure the resistance between the switch terminals.

○∿∿○ : Resistance ○—○: Continuity

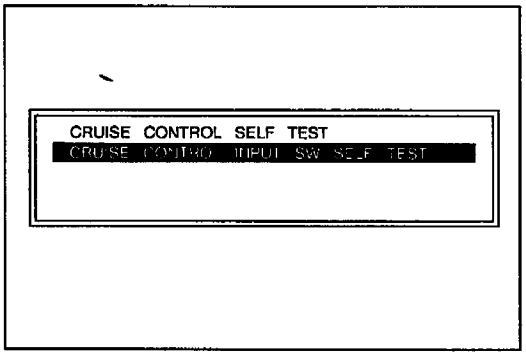
Terminal / Switch position	A	B
SET/COAST	○—∿∿—	—○ 240 Ω
RES/ACCEL	○—∿—	—○ 910 Ω
CANCEL (without air bag system)	○—	—○

4. If correct, replace the cruise control module.
   (Refer to page T1–89.)
5. If not as specified, replace the cruise control switch.
   (Refer to page T1–94.)

Flowchart No.5	Symptom	Diagnostic trouble code 15

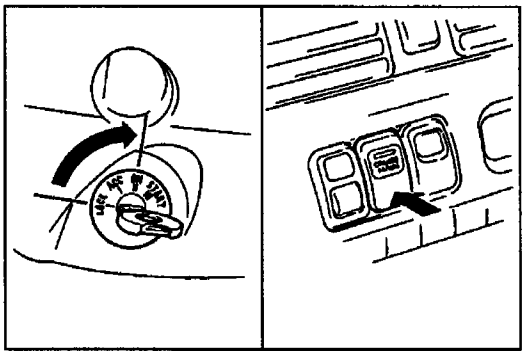
Possible cause
- Damaged cruise control module

Remedy
Replace the cruise control module.
(Refer to page T1–89.)



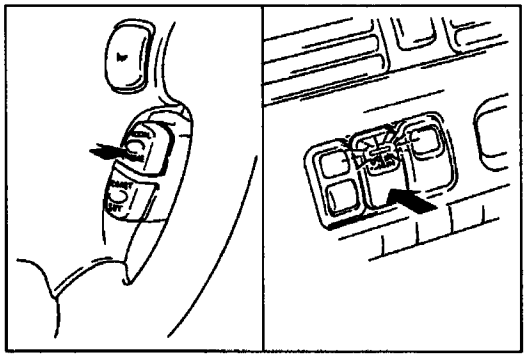
Operation Mode
Using NGS

1. Carry out steps 1—6 of the condition detection mode procedure.
   (Refer to page T1–70.)
2. Select "CRUISE CONTROL INPUT SW SELF TEST" on the **SST** (Control Unit) display.
3. Operate each switch as it is shown on the **SST** (Control Unit) display and note the diagnostic trouble code.
4. Refer to the diagnostic trouble code table on page T1–80. If the diagnostic trouble code shown in the table does not appear on the **SST** (Control Unit) display, inspect the corresponding system area.
5. After the problems are corrected, repeat the operation mode procedure to verify that the system is operating normally.



Inspection

1. Turn the ignition switch to ON.
2. Turn the cruise control main switch off.
3. Shift the transaxle to D or R range. (ATX)
   Do not depress the clutch pedal. (MTX)

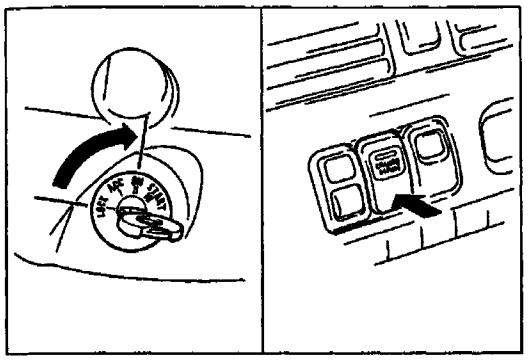


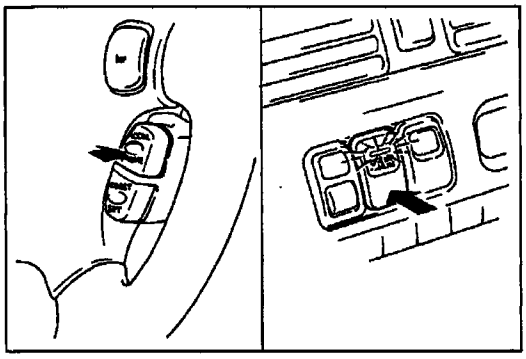
4. Press the RESUME/ACCEL switch and the cruise control main switch simultaneously to activate system inspection.
5. Operate each switch as described and note the diagnostic trouble code pattern. If the correct diagnostic trouble code pattern is not indicated, inspect the corresponding system area.

Cancel

To cancel operation mode, do any one of the following:

- Turn the cruise control main switch off.
- Turn the ignition switch to LOCK.





Using cruise set indicator light
Inspection
1. Turn the ignition switch to ON.
2. Turn the cruise control main switch off.
3. Shift the transaxle to D or R range. (ATX)
   Do not depress the clutch pedal. (MTX)
4. Press the RESUME/ACCEL switch and the cruise control main switch simultaneously to activate system inspection. (The cruise set indicator light will illuminate.)
5. Operate each switch as described and note the diagnostic trouble code pattern. If the cruise set indicator light does not flash, inspect the corresponding system area.

Cancel
To cancel operation mode, do any one of the following:
- Turn the cruise control main switch off.
- Turn the ignition switch to LOCK.

Diagnostic trouble code table

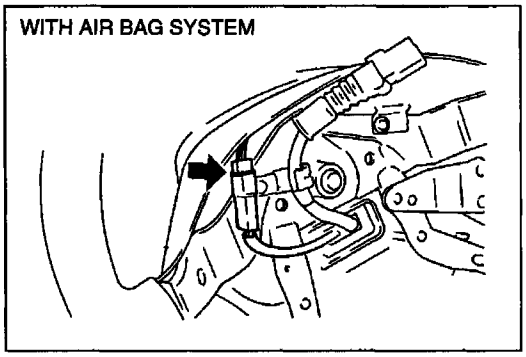
The table below shows the code numbers and flash patterns that will be indicated if the system is operating correctly.

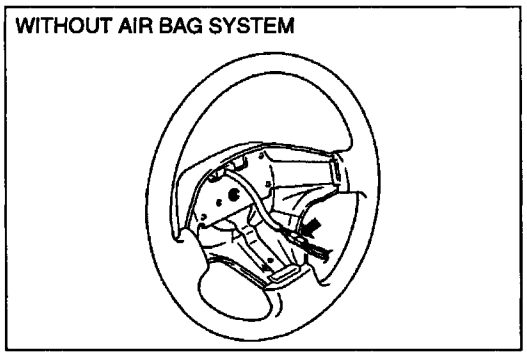
Procedure	DTC	Display on the NGS	Possible cause	Inspection area	Refer to page
Press SET/ COAST switch	21	SET/COAST SW — PRESS	• Cruise control switch (SET/COAST) • Cruise control module	• Cruise control switch connector • Cruise control switch	T1–81
Press RESUME/ ACCEL switch	22	RESUME/ACCEL SW — PRESS	Cruise control module	Cruise control switch connector	T1–82
Depress brake pedal	31	BRAKE PEDAL — DEPRESS	• Burnt STOP 15 A fuse • Brake switch • Cruise control module • Defective wiring harness	• STOP 15 A fuse • Brake switch • Wiring harness (STOP 15 A fuse — Brake switch and cruise control module, Cruise control module — Brake switch)	T1–83
ATX: Shift selector lever to P or N position	35	P OR N RANGE (NEUTRAL POSITION) — SHIFT	• Transaxle range switch • Cruise control module • Defective wiring harness	• Transaxle range switch connector • Transaxle range switch • Wiring harness (Ignition switch — Transaxle range switch, Cruise control module — Transaxle range switch)	T1–84
MTX: Depress clutch pedal			• Clutch switch • Cruise control module • Defective wiring harness	• Clutch switch connector • Clutch switch • Wiring harness (Ignition switch — Clutch switch, Ignition switch — —Cruise control module — Clutch switch — GND)	T1–86
Drive vehicle above 40 km/h { 25 MPH }	37	VEHICLE SPEED — ABOVE 40 km/h { 25 MPH }	• Instrument cluster • Vehicle speedometer sensor • Cruise control module • Defective wiring harness	• Instrument cluster connector • Vehicle speedometer sensor connector • Vehicle speedometer sensor • Wiring harness (Instrument cluster — Vehicle speedometer sensor, Cruise control module — Instrument cluster)	T1–87

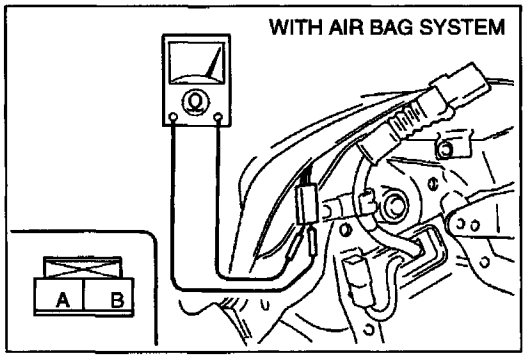
Troubleshooting

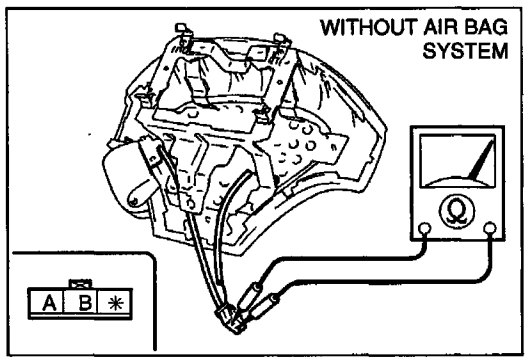
Flowchart No.1	Symptom	Diagnostic trouble code 21 is not indicated

Possible cause
- Damaged cruise control module
- Damaged cruise control switch
- Poor connection of connector









Step 1

Warning
- **Handling the air bag module improperly can accidently deploy the air bag, which may seriously injure you. Read SERVICE WARNINGS, page T1–98, before handling the air bag module.**

1. Remove the driver-side air bag module.
   (Refer to page T1–107.)
   (With air bag system)
   Remove the horn pad.
   (Without air bag system)
2. Make sure the cruise control switch connector is securely connected to the cruise control switch.

Connection	Action
OK	Go to Step 2
Poor	Reconnect connector

Step 2

1. Disconnect the cruise control switch connector.
2. Measure the resistance between the switch terminals.

O-WW-O : Resistance

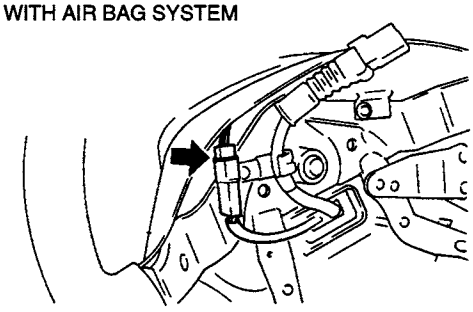
Switch position \ Terminal	A	B
SET/COAST	O—WW—	—O 240 Ω

3. If correct, replace the cruise control module.
   (Refer to page T1–89.)
4. If not as specified, replace the cruise control switch.
   (Refer to page T1–94.)

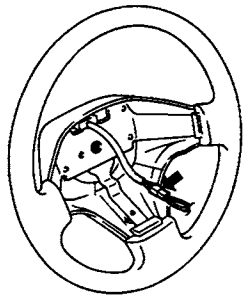
Flowchart No.2	Symptom	Diagnostic trouble code 22 is not indicated

Possible cause
- Damaged cruise control module
- Poor connection of connector

WITH AIR BAG SYSTEM



WITHOUT AIR BAG SYSTEM



Remedy

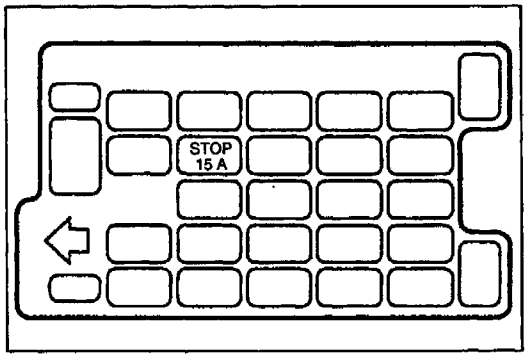
Warning
- **Handling the air bag module improperly can accidently deploy the air bag, which may seriously injure you. Read SERVICE WARNINGS, page T1–98, before handling the air bag module.**

1. Remove the driver-side air bag modue.
   (Refer to page T1–107.)
   (With air bag system)
   Remove the horn pad.
   (Without air bag module)
2. Make sure the cruise control switch connector is securely connected to the cruise control switch.

Connection	Action
OK	Replace the cruise control module (Refer to page T1–89)
Poor	Reconnect connector

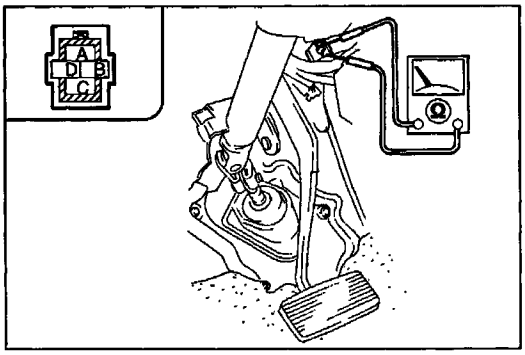
Flowchart No.3	Symptom	Diagnostic trouble code 31 is not indicated

Possible cause
- Burnt STOP 15 A fuse
- Damaged cruise control module
- Damaged brake switch
- Open or short circuit in wiring harness
- Poor connection of connector



Step 1
Check the STOP 15 A fuse in the fuse block.

Fuse	Action
OK	Go to Step 2
Burnt	Replace fuse after checking and repairing wiring harness

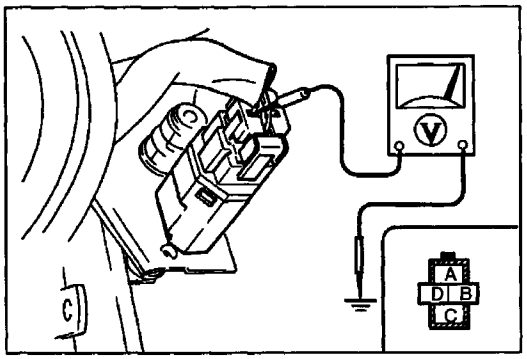


Step 2
1. Disconnect the brake switch connector.
2. Check for continuity between the switch terminals.

O—O: Continuity

Brake pedal	Terminal			
	A	C	B	D
Released			O—O	
Depressed	O—O			

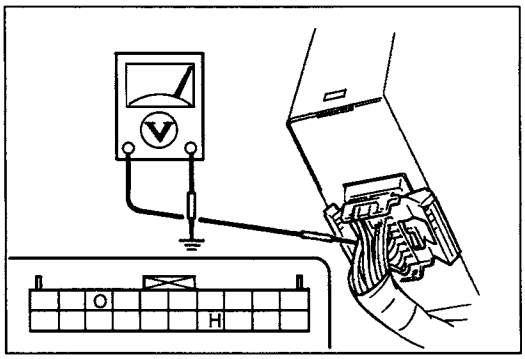
3. If correct, reconnect the brake switch connector and go to Step 3.
4. If not as specified, replace the brake switch. (Refer to section P.)



Step 3
1. Turn the ignition switch to ON.
2. Turn the cruise control main switch on.
3. Measure the voltage at the terminals of the brake switch connector.

B+: Battery positive voltage

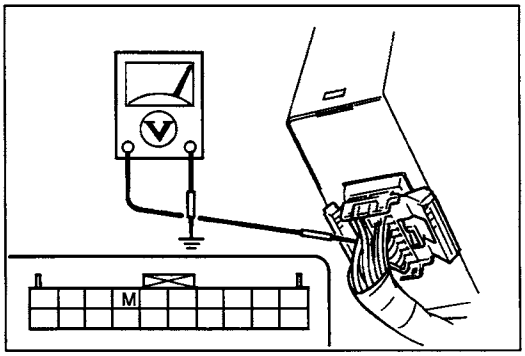
Terminal	Voltage	Action
A (G)	B+	Measure voltage at terminals B and D
	Other	Repair wiring harness (STOP 15 A fuse — Brake switch)
B (P) D (V)	About 9 V	Go to Step 4
	Other	Repair wiring harness (Cruise control module — Brake switch)



Step 4
1. Pull out the cruise control module with the cruise control module connector connected.
   (Refer to page T1–89.)
2. Measure the voltage at the terminals of the cruise control module connector.

B+: Battery positive voltage

Terminal	Voltage	Action
H (V) O (P)	About 9 V	Go to Step 5
	Other	Replace cruise control module (Refer to page T1–89)



Step 5
1. Depress the brake pedal.
2. Measure the voltage at terminal M (G/Y) of the cruise control module connector.

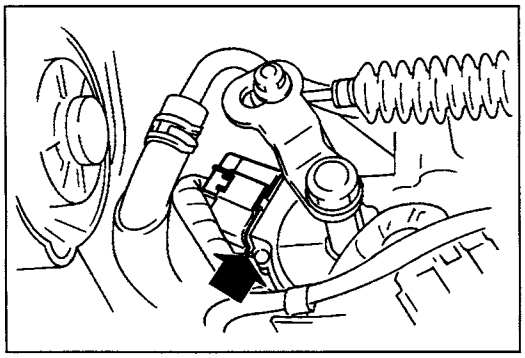
B+: Battery positive voltage

Voltage	Action
B+	Replace cruise control module (Refer to page T1–89)
Other	Repair wiring harness (Cruise control module — Brake switch)

Flowchart No.4	Symptom	Diagnostic trouble code 35 is not indicated

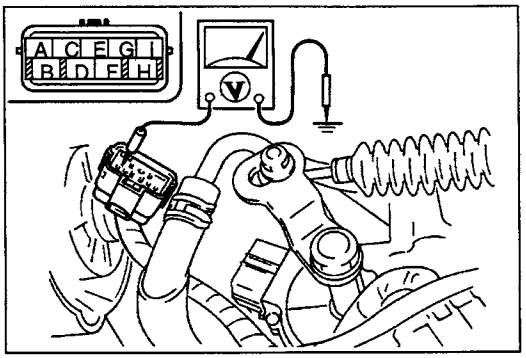
(ATX vehicle)

Possible cause
- Damaged cruise control module
- Damaged transaxle range switch
- Open or short circuit in wiring harness
- Poor connection of connector



Step 1
1. Remove the air cleaner.
   (Refer to sections F1, F2.)
2. Make sure the transaxle range switch connector is securely connected to the transaxle range switch.

Connection	Action
OK	Go to Step 2
Poor	Reconnect connector

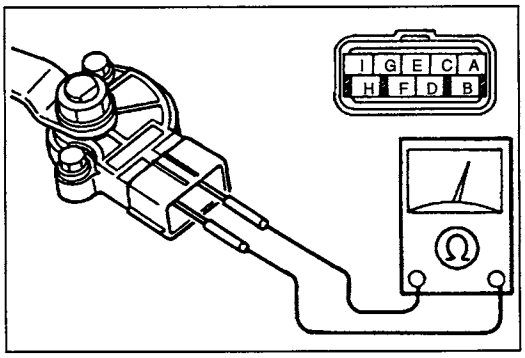


Step 2

1. Disconnect the transaxle range switch connector.
2. Turn the ignition switch to ON.
3. Measure the voltage at terminal H (B/L) of the transaxle range switch connector.

B+: Battery positive voltage

Voltage	Action
B+	Go to Step 3
Other	Repair wiring harness (Ignition switch — Transaxle range switch)



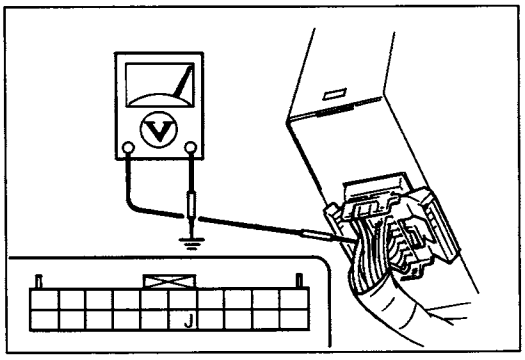
Step 3

1. Check for continuity between the transaxle range switch terminals.

O—O: Continuity

Position	Terminal								
	A	B	C	D	E	F	G	H	I
P		O						O	
	O								O
R			O						O
N		O						O	
				O					O
D							O		O
S						O			O
L					O				O

2. If correct, reconnect the transaxle range switch connector and go to Step 4.
3. If not as specified, replace or adjust the transaxle range switch.
   (Refer to section K.)



Step 4

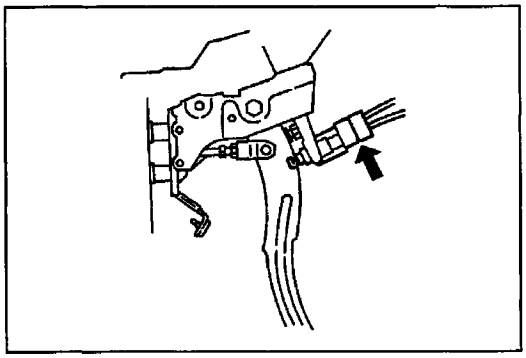
1. Turn the ignition switch to LOCK.
2. Pull out the cruise control module with the cruise control module connector connected.
   (Refer to page T1–89.)
3. Turn the ignition switch to ON.
4. Measure the voltage at terminal J (B/L) of the cruise control module connector.

B+: Battery positive voltage

Voltage	Action
B+	Replace cruise control module (Refer to page T1–89)
Other	Repair wiring harness (Cruise control module — Transaxle range switch)

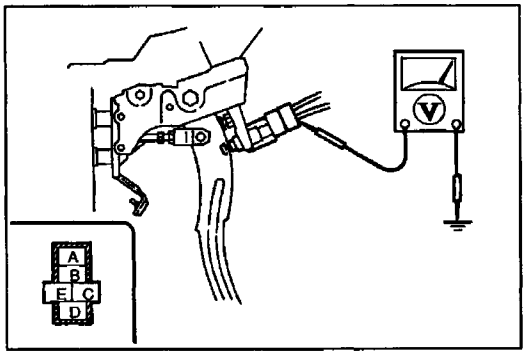
(MTX vehicle)

Possible cause
- Damaged cruise control module
- Damaged clutch switch
- Open or short circuit in wiring harness
- Poor connection of connector



Step 1
Make sure the clutch switch connector is securely connected to the clutch switch.

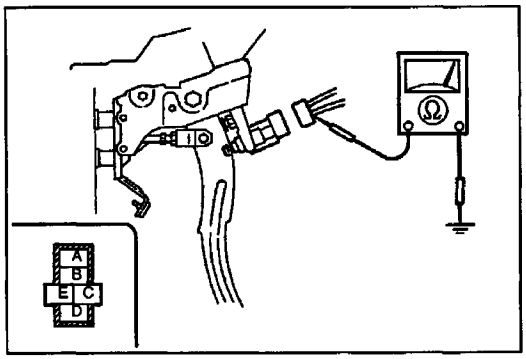
Connection	Action
OK	Go to Step 2
Poor	Reconnect connector



Step 2
1. Turn the ignition switch to ON
2. Measure the voltage at terminal C (BR/B) [USA] or (B/L) [CANADA] of the clutch switch connector.

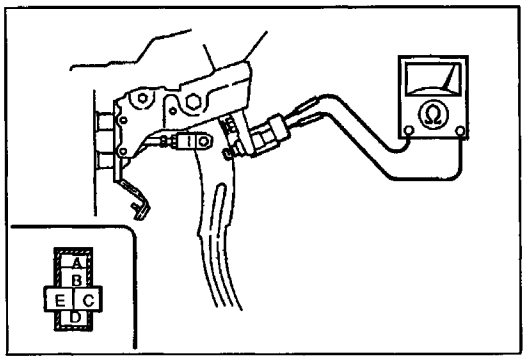
B+: Battery positive voltage

Voltage	Action
B+	Go to Step 3
Other	Repair wiring harness (Ignition switch — Clutch switch)



Step 3
1. Turn the ignition switch to LOCK.
2. Disconnect the clutch switch connector.
3. Check for continuity between terminal E (B) of the clutch switch connector and ground.

Continuity	Action
Yes	Go to Step 4
No	Repair wiring harness (Clutch switch — GND)

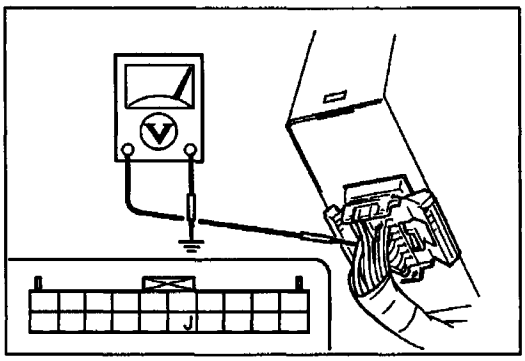


Step 4
1. Check for continuity between the clutch switch terminals.

O—O: Continuity

Clutch pedal	Terminal	
	C	E
Depressed	O	O
Released		

2. If correct, reconnect the clutch switch connector and go to step 5.
3. If not as specified, replace the clutch switch. (Refer to section F1, F2.)



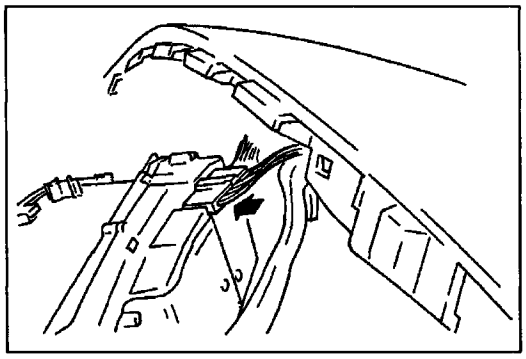
Step 5
1. Remove the cruise control module. (Refer to page T1–89.)
2. Turn the ignition switch to ON.
3. Measure the voltage at terminal J (B/L) of the cruise control module connector.

B+: Battery positive voltage

Voltage	Action
B+	Replace cruise control module (Refer to page T1–89)
Other	Repair wiring harness (Ignition switch — Cruise control module)

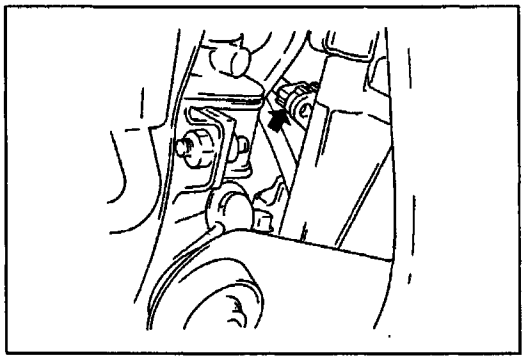
Flowchart No.5	Symptom	Diagnostic trouble code 37 is not indicated

Possible cause
- Damaged cruise control module
- Damaged instrument cluster
- Damaged vehicle speedometer sensor
- Open or short circuit in wiring harness
- Poor connection of connector



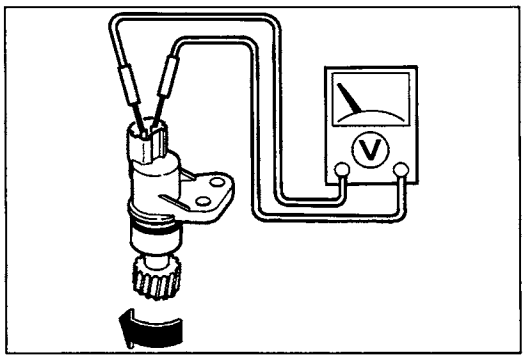
Step 1
1. Remove the instrument cluster. (Refer to page T1–51.)
2. Make sure the instrument cluster connector is securely connected to the instrument cluster.

Connection	Action
OK	Go to Step 2
Poor	Reconnect connector



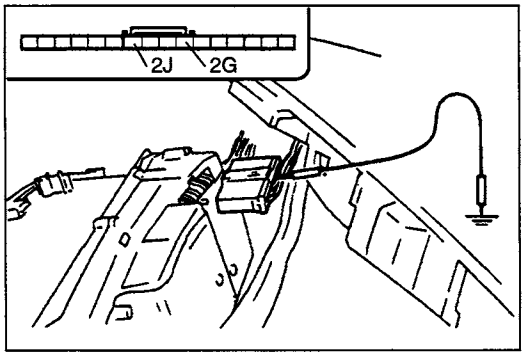
Step 2
1. Remove the splash shield. (Refer to section K.)
2. Remove the undercover. (Refer to section K.)
3. Make sure the vehicle speedometer sensor connector is securely connected to the vehicle speedometer sensor.

Connection	Action
OK	Go to Step 3
Poor	Reconnect connector

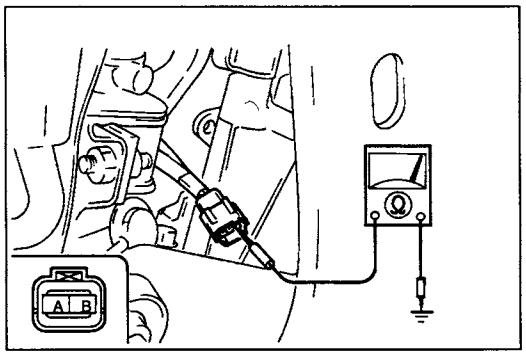


Step 3
1. Remove the vehicle speedometer sensor. (Refer to section K.)
2. Measure the voltage between the terminals of the vehicle speedometer sensor while rotating the driven gear.

Meter needle	Action
Moves slightly under 5 V	Install vehicle speedometer sensor and go to Step 4
Does not move	Replace vehicle speedometer sensor (Refer to section K)

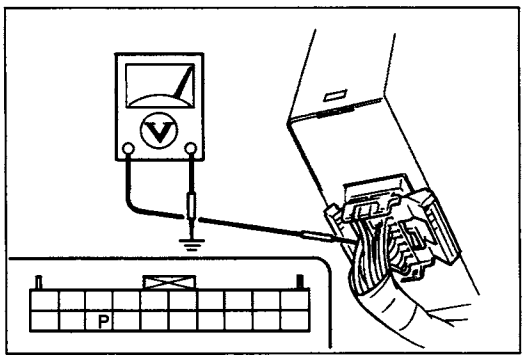


Step 4
1. Disconnect the instrument cluster connector.
2. Connect terminals 2G (GY/L) and 2J (LG/R) of the instrument cluster connector to ground.



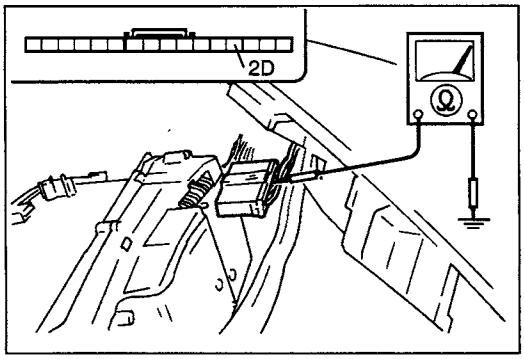
3. Check for continuity between terminals A (LG/R) and B (GY/L) of the vehicle speedometer sensor connector and ground.

Continuity	Action
Yes	Reconnect instrument cluster connector and go to Step 5
No	Repair wiring harness (Instrument cluster — Vehicle speedometer sensor)



Step 5
1. Pull out the cruise control module with the cruise control module connector connected. (Refer to page T1–89.)
2. Measure the voltage at terminal P (G/R) of the cruise control module connector while rotating the front tires.

Voltage	Action
2—3 V	Replace cruise control module (Refer to page T1–89)
Other	Go to step 6



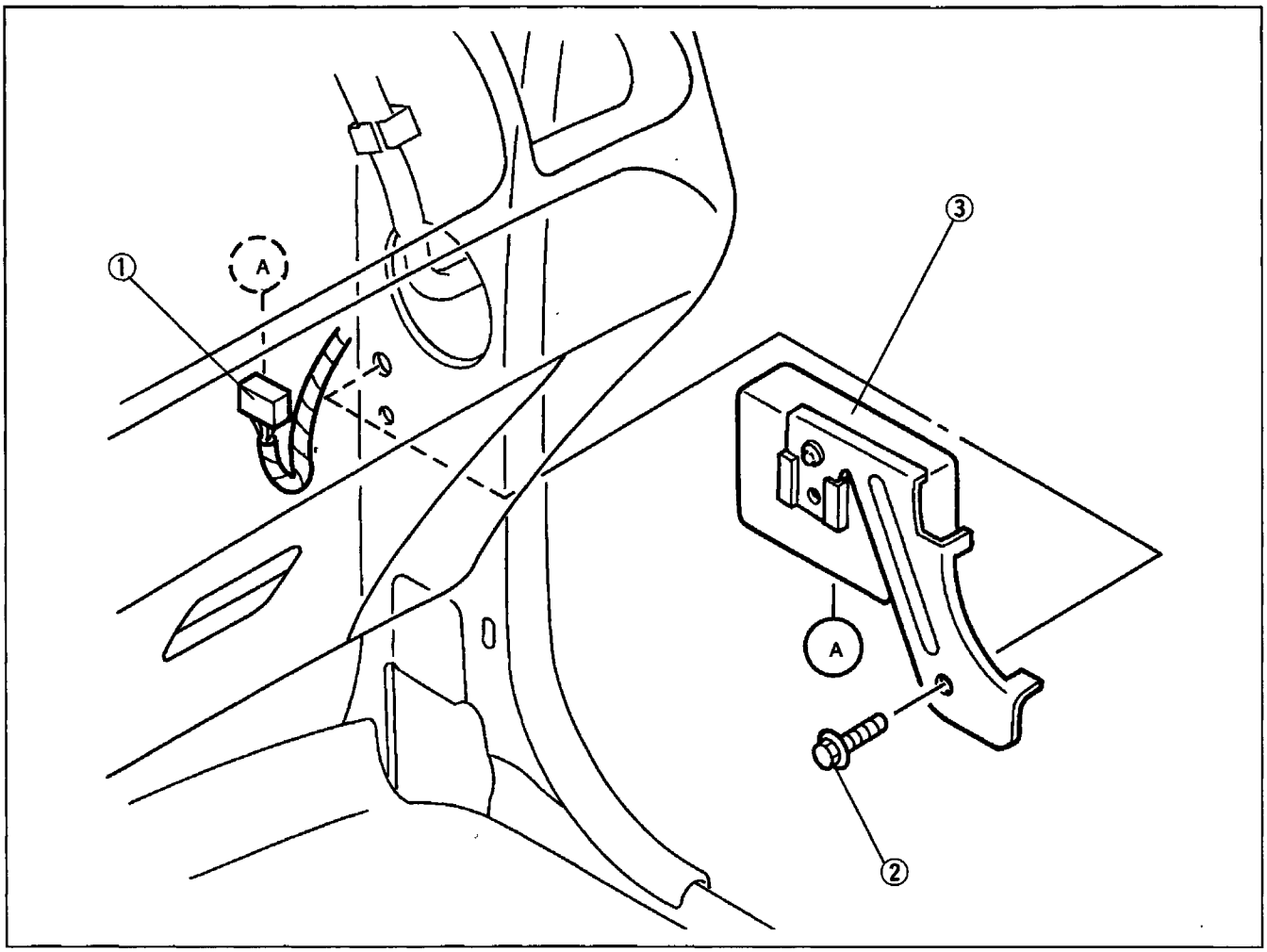
Step 6
1. Disconnect the instrument cluster connector.
2. Disconnect the cruise control module connector.
3. Connect terminal P (G/R) of the cruise control module connector to ground.
4. Check for continuity between terminal 2D (G/R) of the instrument cluster connector and ground.

Continuity	Action
Yes	Replace instrument cluster (Refer to page T1–51)
No	Repair wiring harness (Cruise control module — Instrument cluster)

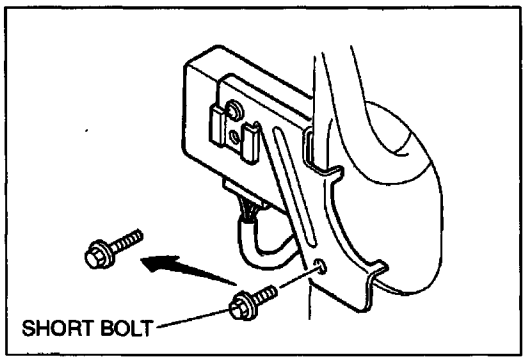
CRUISE CONTROL MODULE

Removal / Installation

1. Remove the door lock timer unit.
   (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal, referring to **Installation note**.
4. Carry out on-board diagnostic inspection.
   (Refer to page T1–69.)



1. Connector
2. Bolt
   Installation note ..... below
3. Cruise control module
   Installation note ..... below
   Inspection ..... page T1–90



Installation note

Bolt and cruise control module

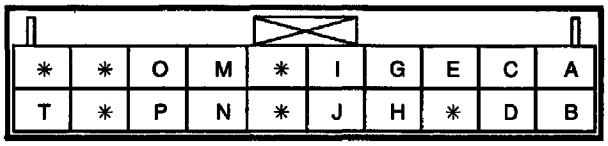
Because the space between the factory-installed bolt and the blower unit is narrow, use a short bolt when reinstalling the cruise control module.

Inspection

1. Pull out the cruise control module with the cruise control module connector connected. (Refer to page T1–89.)
2. Measure the voltage at the cruise control module terminals as indicated below.
3. If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnesses.
4. If the parts and wiring harnesses are OK but the system still does not work properly, replace the cruise control module.

Terminal voltage list (Reference)

B+: Battery positive voltage



Terminal	Signal	Connection	Test condition		Voltage	Inspection area
A	Cruise actuator on signal	Vacuum pump (control valve)	Ignition switch at ON	Cruise control main switch on	9 V	• METER 15 A fuse • Cruise control main switch • Vacuum pump
				Other	0 V	
B	Cruise actuator on signal	Vacuum pump (motor)	Ignition switch at ON	Cruise control main switch on	9 V	• METER 15 A fuse • Cruise control main switch • Brake switch • Vacuum pump
				Other	0 V	
C	Cruise actuator on signal	Vacuum pump (release valve)	Ignition switch at ON	Cruise control main switch on	9 V	• METER 15 A fuse • Cruise control main switch • Brake switch • Vacuum pump
				Other	0 V	
D	IG1	Instrument cluster (cruise set indicator light)	Ignition switch at ON		B+	• METER 15 A fuse • Cruise set indicator light bulb
			Cruise set indicator light illuminated		0 V	
E	Cruise control main switch on/off signal	Cruise control main switch	Ignition switch at ON	Cruise control main switch off side pushed	0 V	• METER 15 A fuse • Cruise control main switch
				Other	B+	
F	—	—	—		—	—
G	O/D off signal	PCM	Ignition switch at ON		B+	PCM
H	Cruise actuator on signal	Vacuum pump	Ignition switch at ON and cruise control main switch on	Release brake pedal	B+	• METER 15 A fuse • Cruise control main switch
				Depress brake pedal	9 V	
I	TEST signal	Data link connector	—		—	—
J	ATX Selector lever position signal	Transaxle range switch	Ignition switch at ON	N or P range	0 V	Transaxle range switch
				Other	B+	
	MTX Clutch switch on signal	Clutch switch	Ignition switch at ON	Depress clutch pedal	0 V	Clutch switch
				Other	B+	
K	—	—	—		—	—
L	—	—	—		—	—

Cont'd

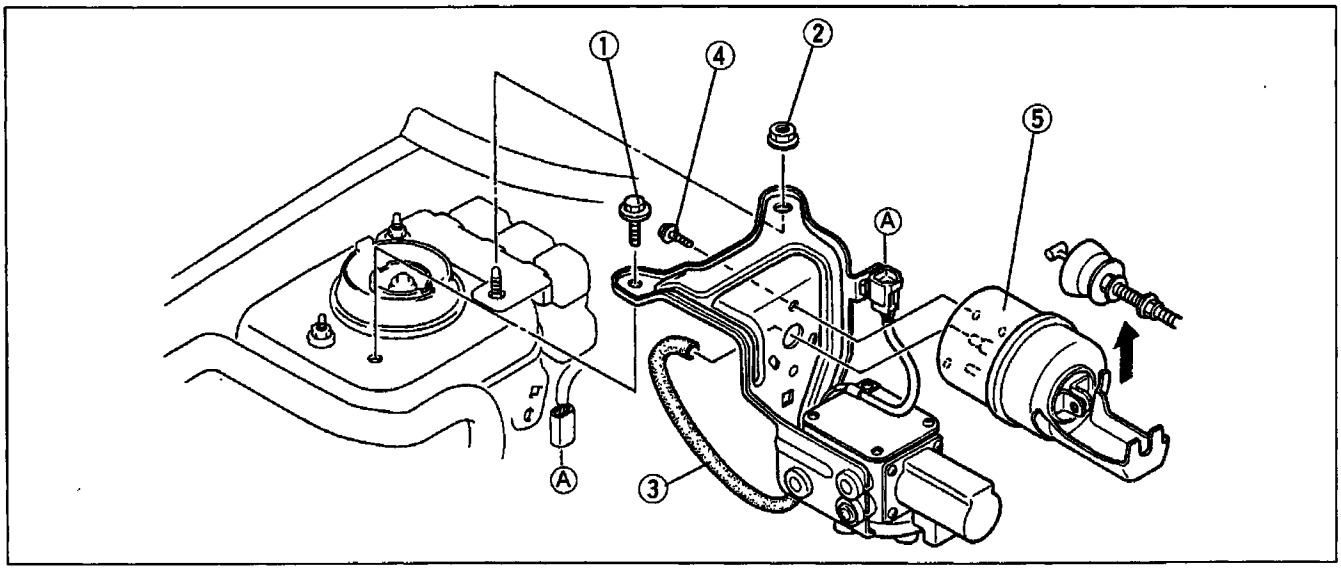
B+: Battery positive voltage

Terminal	Signal	Connection	Test condition		Voltage/ Continuity	Inspection area
M	Brake on signal	Brake switch	Depress brake pedal		B+	• STOP 15 A fuse • Brake switch
			Other		0 V	
N	Cruise control switch on signal	Cruise control switch	Ignition switch at ON and cruise control main switch on		5 V	• METER 15 A fuse • Cruise control main switch • Clock spring • Cruise control switch
			Ignition switch at ON and cruise control main switch on	SET/COAST switch pushed	0 V	
				RESUME/ACCEL switch pushed	0 V	
				CANCEL switch pushed (without air bag system)	0 V	
O	Brake on signal	Brake switch	Ignition switch at ON and cruise control main switch on	Release brake pedal	B+	• METER 15 A fuse • Cruise control main switch • Brake switch
				Depress brake pedal	0 V	
P	Vehicle speedometer sensor on signal	Vehicle speedometer sensor	Front tires rotating		Alternates 0 V and 5 V	• Vehicle speedometer sensor • Instrument cluster
Q	—	—	—		—	—
R	—	—	—		—	—
S	—	—	—		—	—
T	GND	GND	Check for continuity to ground		Yes	GND

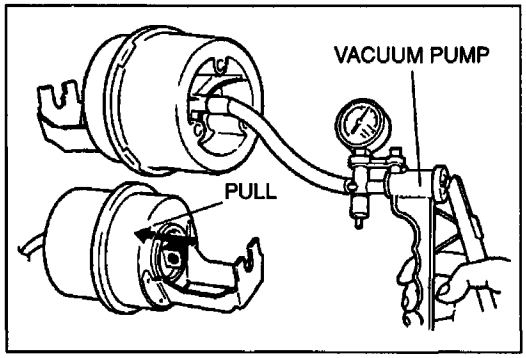
CRUISE ACTUATOR

Removal / Installation

1. Remove the actuator cable.
   (Refer to page T1–93.)
2. Disconnect the vacuum pump connector.
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.
5. Adjust the actuator cable.
   (Refer to page T1–93.)



1. Bolt
2. Nut
3. Vacuum hose
4. Screw
5. Cruise actuator
   Inspection ..... page T1–92



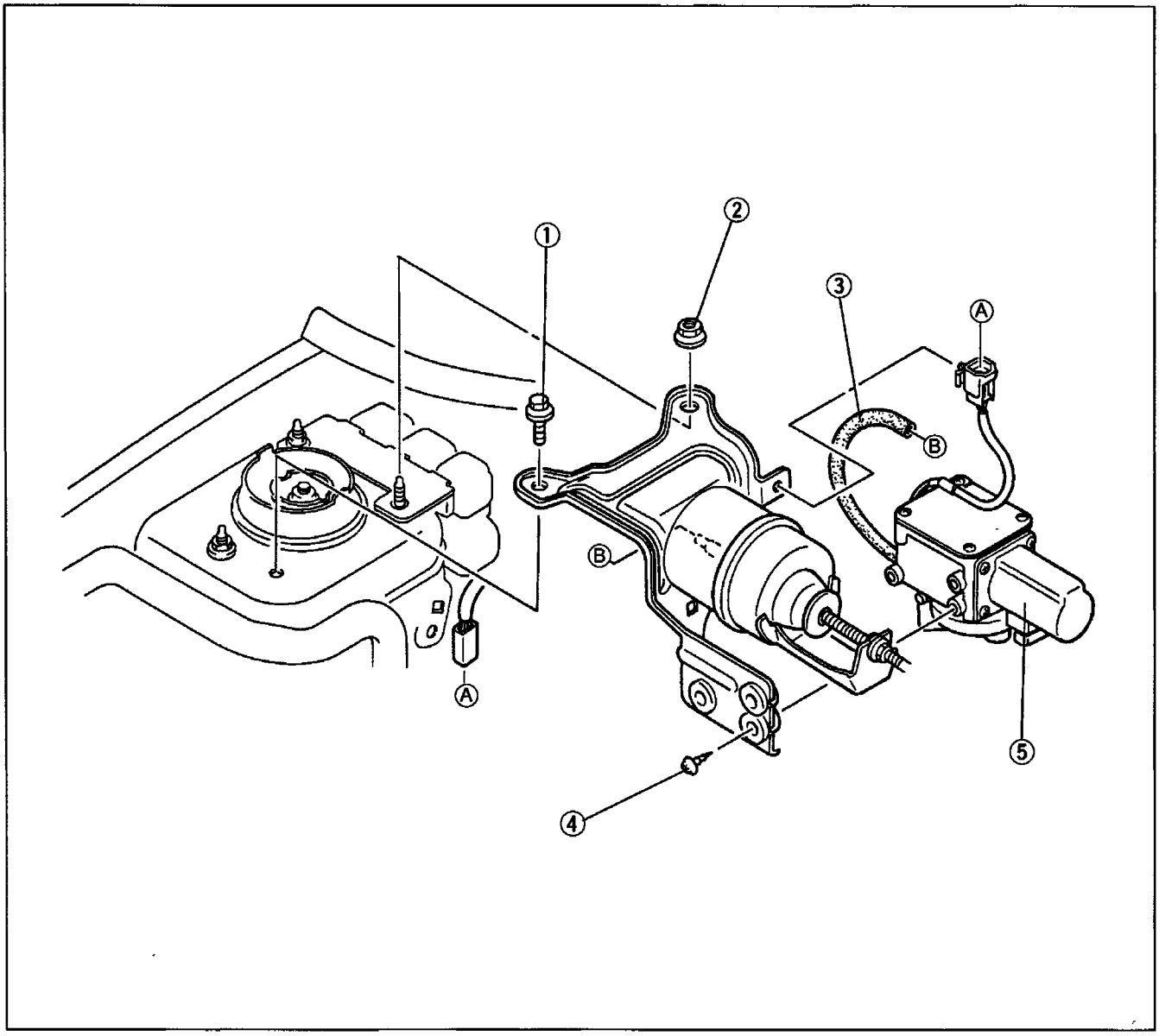
Inspection

1. Remove the cruise actuator. (Refer to page T1–91.)
2. Connect a vacuum pump to the cruise actuator.
3. Verify that the diaphragm of the cruise actuator is pulled when applying a vacuum of more than **38.7 kPa { 290 mmHg , 11.4 inHg }**.
4. If not as specified, replace the cruise actuator. (Refer to page T1–91.)

VACUUM PUMP

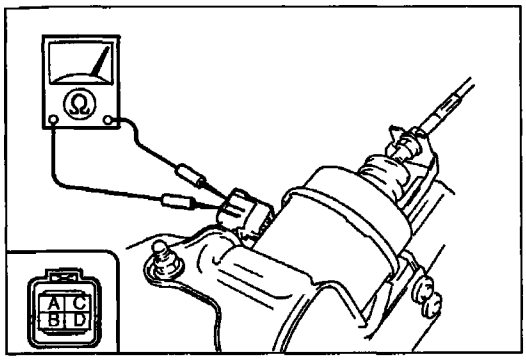
Removal / Installation

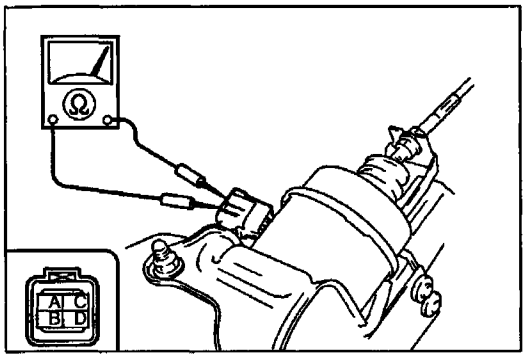
1. Disconnect the vacuum pump connector.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.

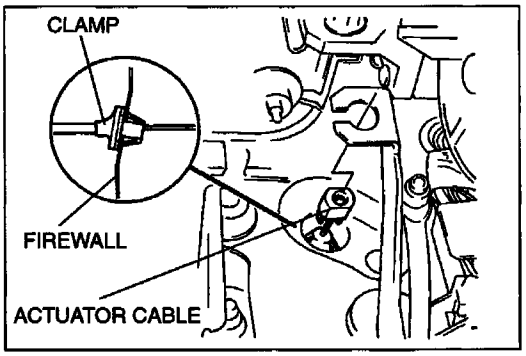


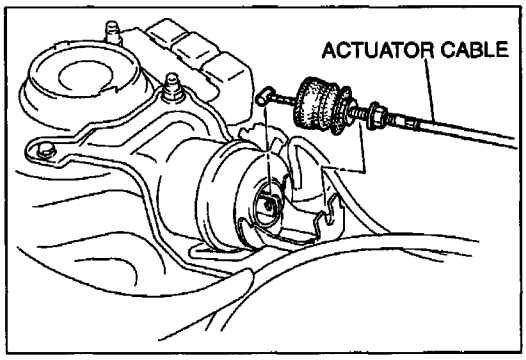
1. Bolt
2. Nut
3. Vacuum hose
4. Screw
5. Vacuum pump

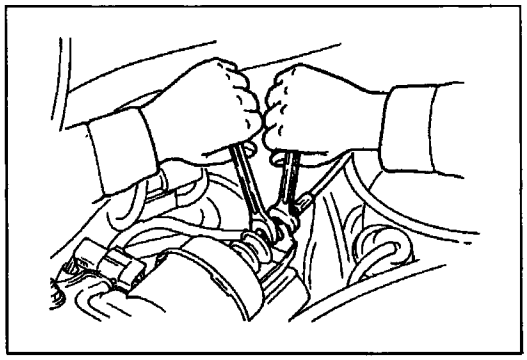
Inspection ..... page T1–93











Inspection

1. Disconnect the vacuum pump connector
2. Measure the resistance between the cruise actuator terminals.

Terminals	Resistance (Ω)
A—C	55
A—B	
A—D	6
B—C	110
B—D	60
C—D	

3. Connect battery positive voltage and verify the operation of the actuator cable as indicated below.

B+: Battery positive voltage

Step	Terminal connection				Actuator cable operation
	A	B	C	D	
1	B+	GND	GND	GND	Pull
2	B+	GND	GND	—	Hold
3	B+	GND	—	—	Extend
4	—	—	—	—	Release

4. If not as specified, replace the vacuum pump. (Refer to page T1–92.)

ACTUATOR CABLE

Removal / Installation

1. Disconnect the actuator cable from the accelerator pedal.
2. Remove the clamp at the inside of the firewall.
3. Loosen the nut and remove the actuator cable from the cruise actuator.
4. Install in the reverse order of removal.

Adjustment

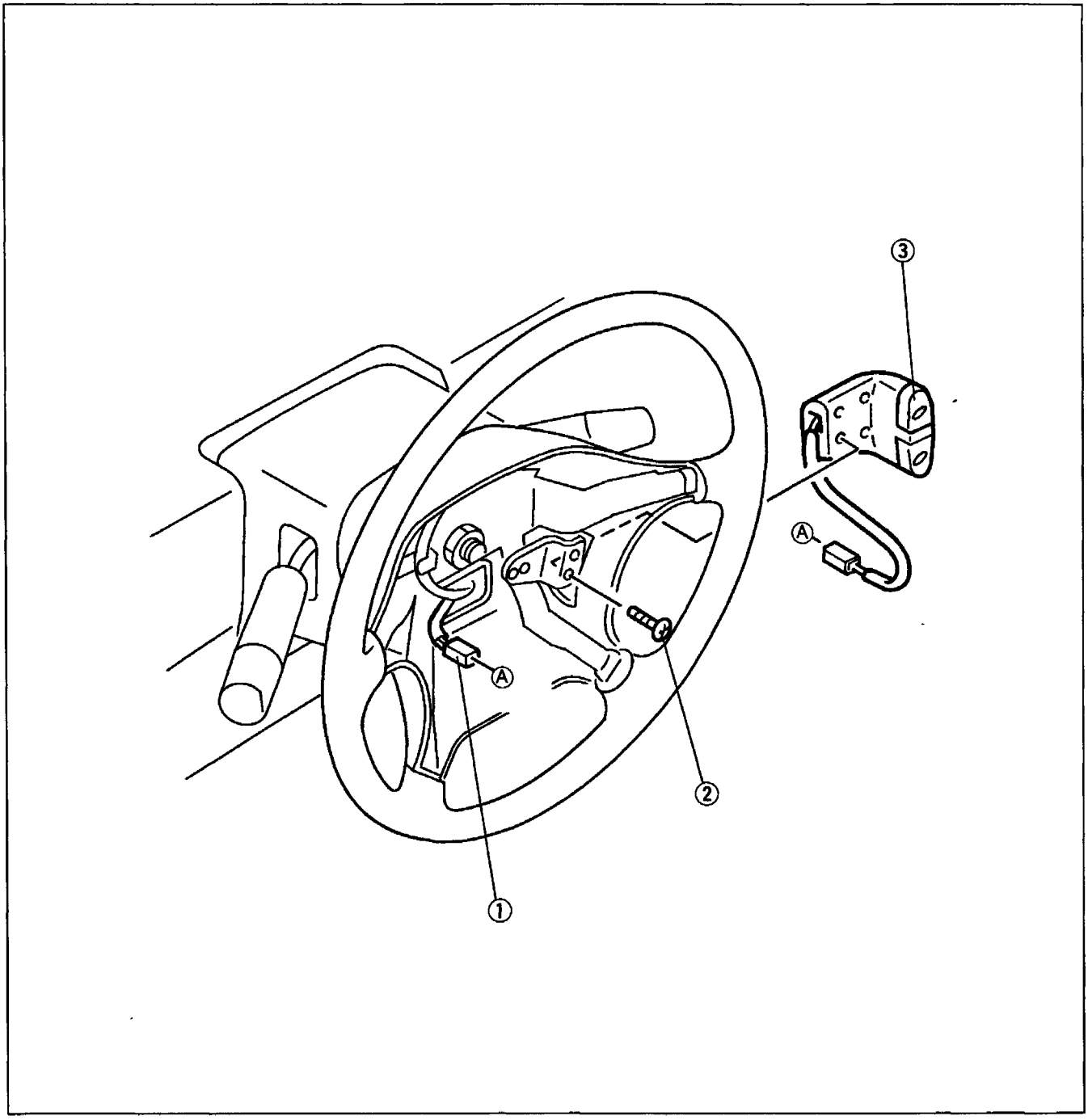
Adjust the nut so that actuator cable free play is as specified, when the actuator cable is pressed lightly.

Cable play on bolt the cruise actuator side and throttle body side: 1.0—5.0 mm { 0.04—0.19 in }

CRUISE CONTROL SWITCH
Removal / Installation
With air bag system

Warning
- **Handling the air bag module improperly can accidently deploy the air bag, which may seriously injure you. Read SERVICE WARNINGS, page T1–98, before handling the air bag module.**

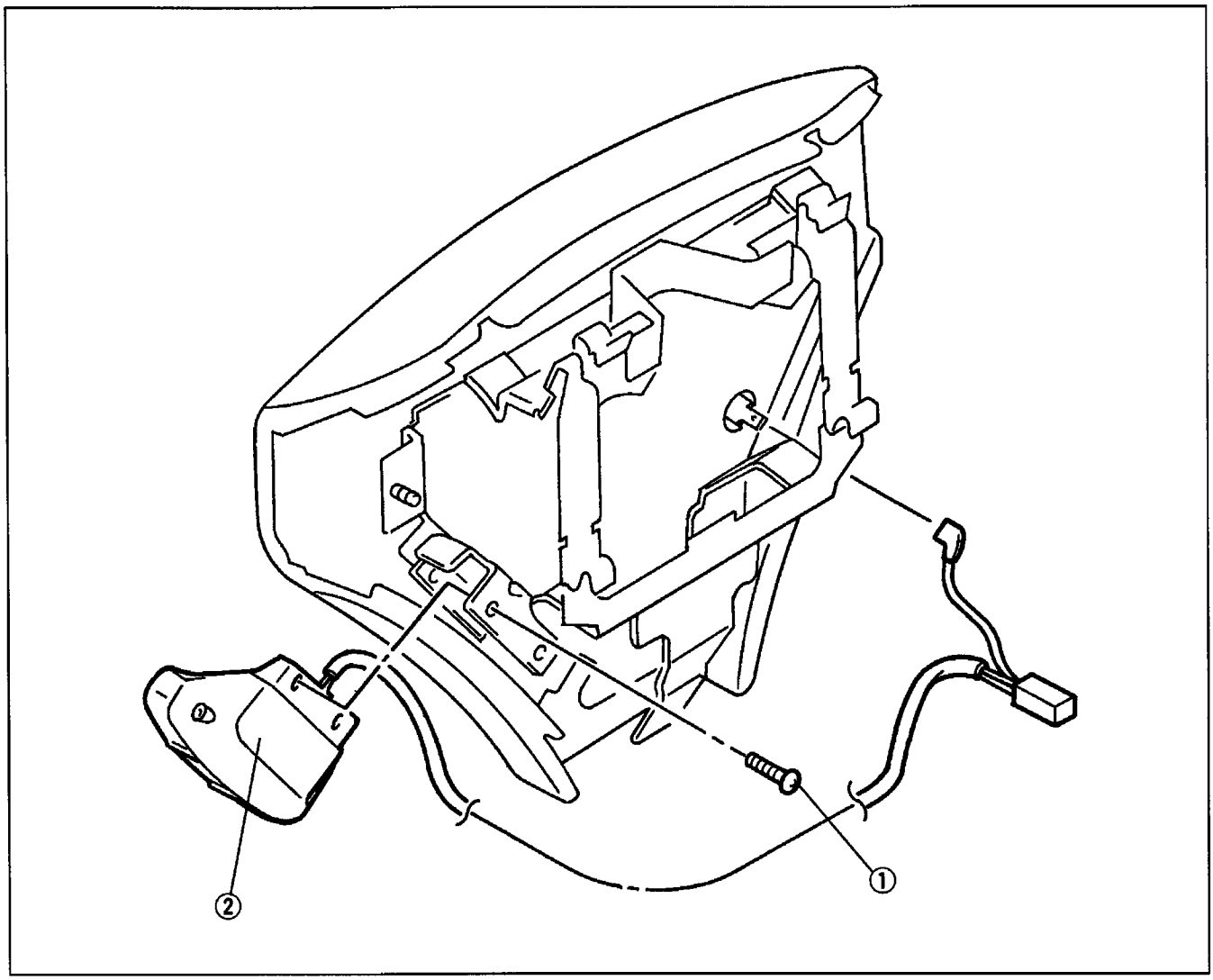
1. Remove the driver-side air bag module.
   (Refer to page T1–107.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



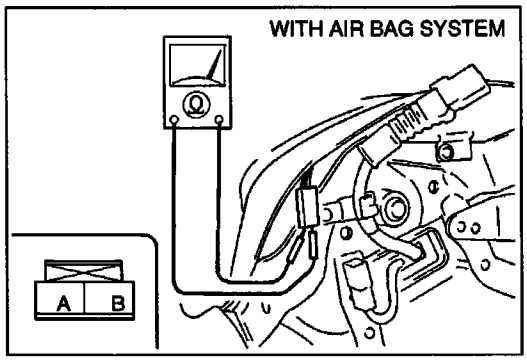
1. Connector
2. Screw
3. Cruise control switch
   Inspection ..... page T1–95

Without air bag system

1. Remove the horn pad.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



1. Screw
2. Cruise control switch
   Inspection ..... below



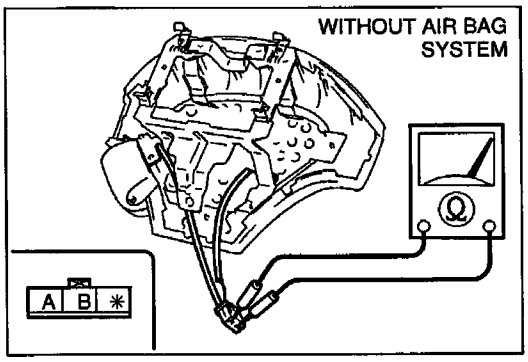
Inspection

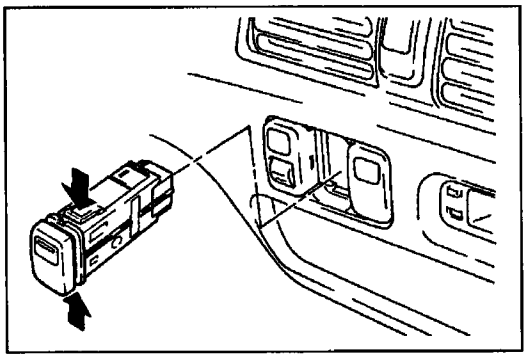
1. Remove the driver-side air bag module.
   (Refer to page T1–107.)
   (With air bag system)
   Remove the horn pad.
   (Without air bag system)
2. Check for continuity between the switch terminals.

○∿∿○ : Resistance ○—○: Continuity

Terminal / Switch position	A	B
SET/COAST	○∿∿	∿∿○ 240 Ω
RES/ACCEL	○∿∿	∿∿○ 910 Ω
CANCEL (without air bag system)	○	○

3. If not as specified, replace the cruise control switch.

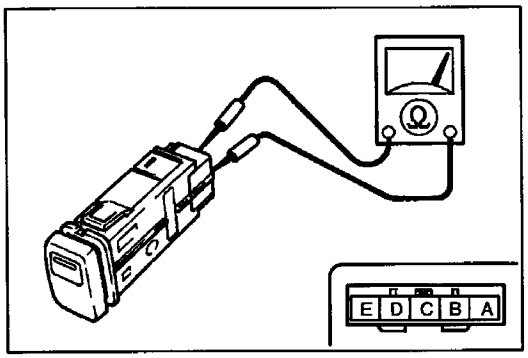




CRUISE CONTROL MAIN SWITCH

Removal / Installation

1. Remove the meter hood.
   (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



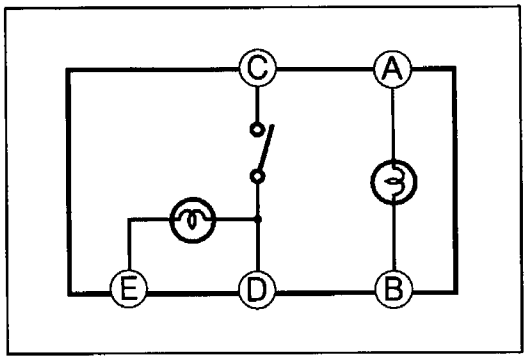
Inspection

1. Remove the cruise control main switch.
2. Check for continuity between the switch terminals.

○—○: Continuity ○—⓪—○ : Bulb

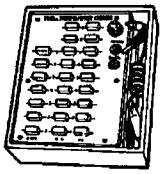
Switch position \ Terminal		C	D	E	A	B
Cruise control main switch	ON	○	○—⓪—○		○—⓪—○	
	OFF		○—⓪—○		○—⓪—○	

3. If not as specified, replace the cruise control main switch.

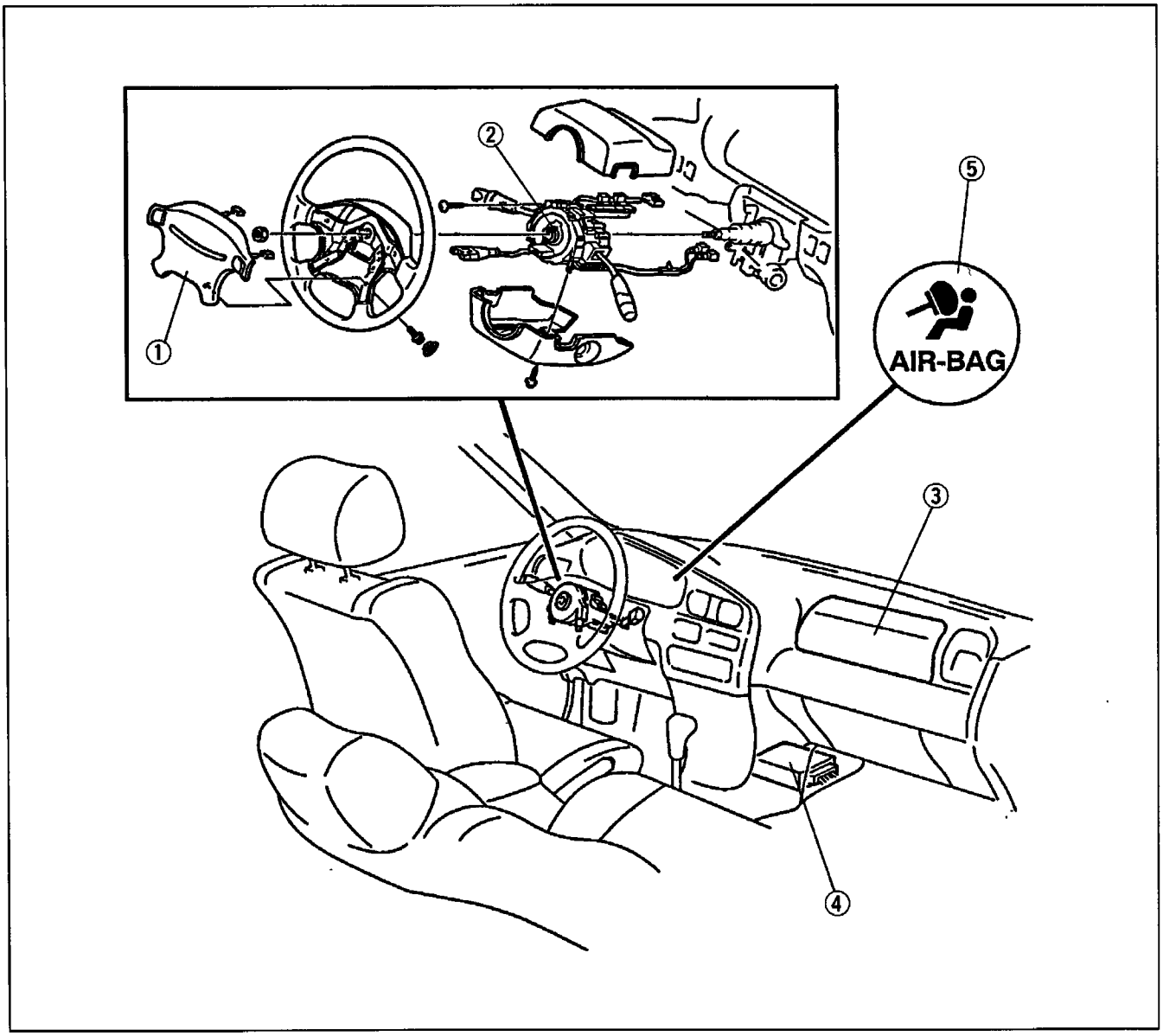


AIR BAG SYSTEM

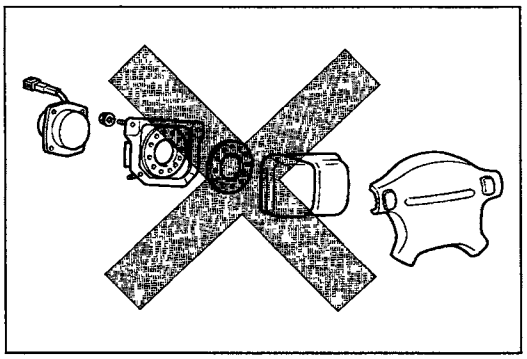
PREPARATION
SST

49 0839 285 Checker, fuel thermometer		For inspection of air bag system	49 H066 002 Deployment tool 	For deployment of air bag module

STRUCTURAL VIEW



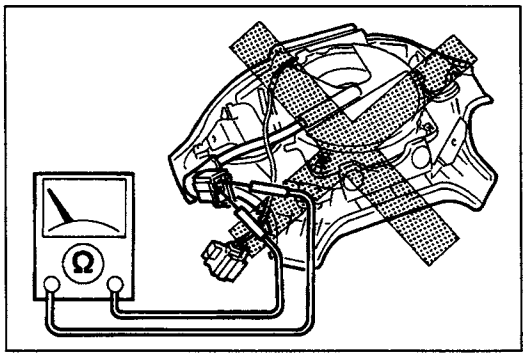
1. Driver-side air bag module
   Removal / Installation ..... page T1–107
   Disposal procedure ..... page T1–110
2. Clock spring
   Inspection ..... page T1– 25
3. Passenger-side air bag module
   Removal / Installation ..... page T1–108
   Disposal procedure ..... page T1–110
4. SAS unit
   Removal / Installation ..... page T1–109
5. Air bag system warning light



SERVICE WARNINGS

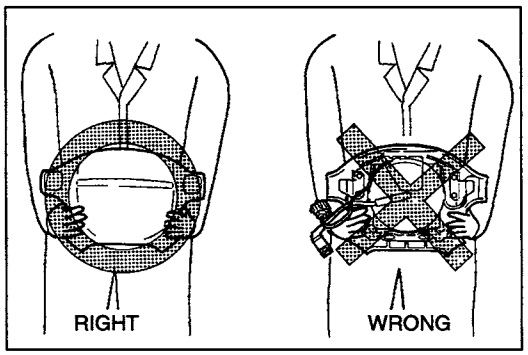
Component Disassembly

- **Disassembling and reassembling the components of the air bag system can render the system inoperative, which may result in serious injury or death in the event of an accident. Do not disassemble any air bag system components.**



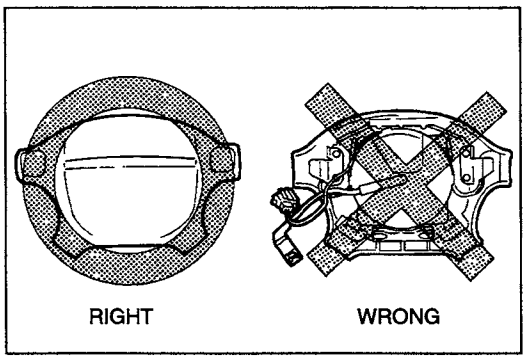
Air Bag Module Inspection

- **Inspecting the air bag module with an ohmmeter can deploy the air bag, which can cause serious injury. Do not use an ohmmeter to inspect the air bag module.**

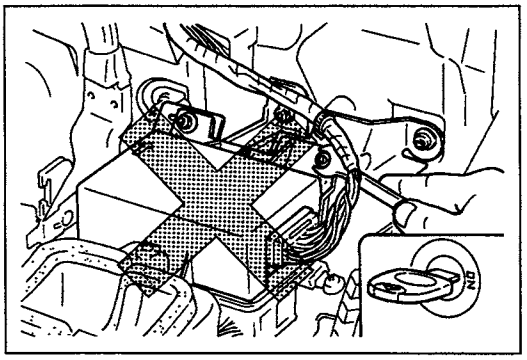


Air Bag Module Handling

- **A live (undeployed) air bag may accidently deploy when it is handled and cause serious injury. When carrying a live air bag module, point the trim cover away from your body to lesson the chance of injury in case it deploys.**

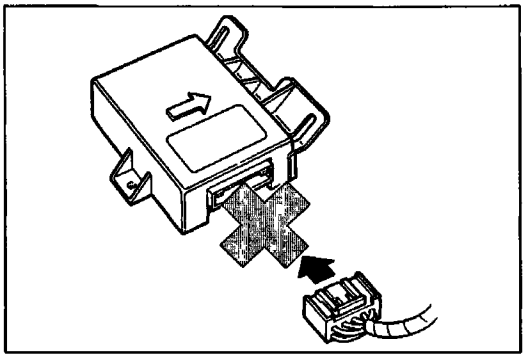


- **A live air bag placed face down on a surface is dangerous. If the air bag deploys, the motion of the module can cause serious injury. Always face the trim cover up to reduce the motion of the module in case it accidently deploys.**

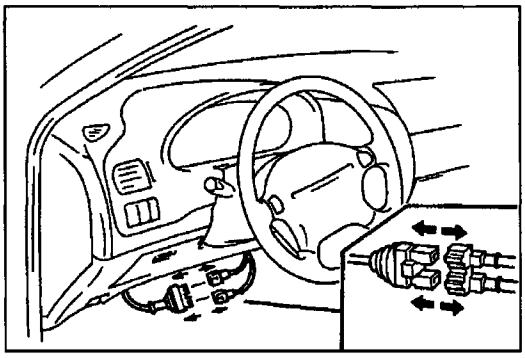


SAS unit Handling

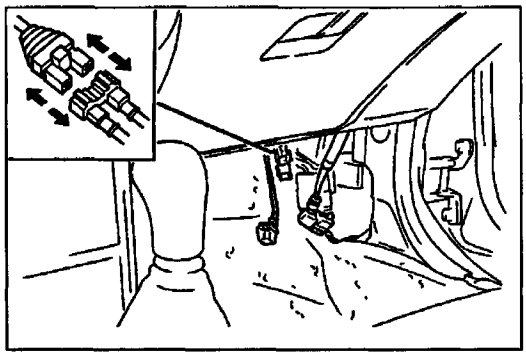
- **Disconnecting the SAS unit connector or removing the SAS unit with the ignition switch at ON can cause the air bags to deploy, which may seriously injure you. Before disconnecting the SAS unit connector or removing the SAS unit, turn the ignition switch to LOCK.**



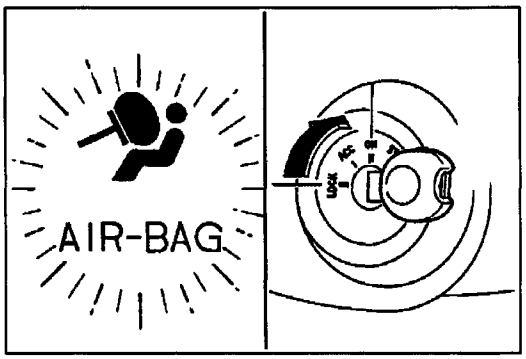
- **Connecting the SAS unit connector before installing the SAS unit is dangerous. The shock of installation can cause the air bags to deploy, which may seriously injure you. Before connecting the SAS-unit connector, firmly mount the SAS unit to the vehicle.**



GENERAL PROCEDURES
Before Servicing
1. Turn the ignition switch to LOCK.
2. Disconnect the negative battery cable and wait for more than one minute to allow the backup power supply to deplete its stored power.
3. Disconnect the orange and blue clock spring connectors.



4. Remove the passenger-side scuff plate and front side trim.
   (Refer to section S1.)
5. Disconnect the orange and blue passenger-side air bag module connector.



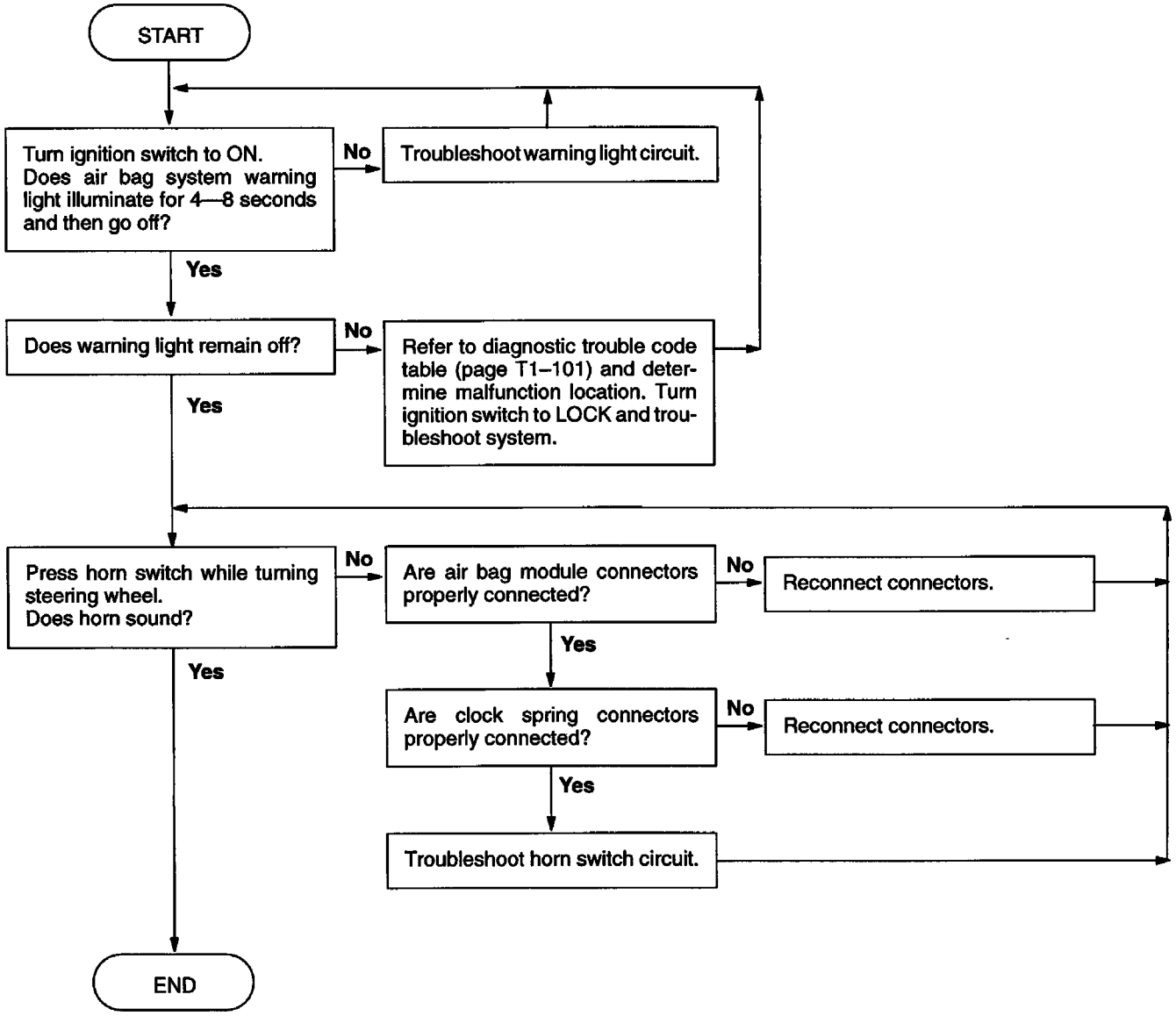
After Servicing
1. Connect the negative battery cable.
2. Turn the ignition switch to ON.
3. Verify that the air bag system warning light illuminates for 4—8 seconds and then goes off.

TROUBLESHOOTING

Troubleshooting Procedure

The SAS unit has an on-board diagnosis function that flashes or illuminates the air bag system warning light to indicate trouble in the air bag system. The trouble can be determined by the warning light illumination or flashing pattern. If the light does not illuminate but the system still has trouble, a warning buzzer will sound 5 cycles of 5 times each.

Flowchart

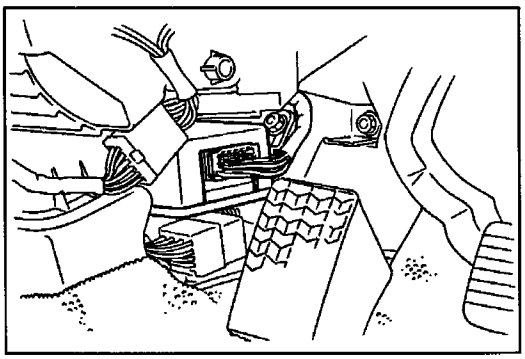


Diagnostic Trouble Code Table

Priority	Code No.	Warning light indication	Possible cause	Inspection area	Refer to page
1	0	Remains on	SAS unit	SAS unit connector	T1–101
2	3		Battery	• Battery • Wiring harness (Battery — ENGINE 10 A fuse — SAS unit, Battery — METER 15 A fuse — SAS unit)	T1–102
3	6		Driver-side air bag module	• Clock spring • Wiring harness (Clock spring — SAS unit)	T1–103
4	7		Passenger-side air bag module	Wiring harness (Passenger-side air bag module — SAS unit)	T1–105

Flowchart No.1	Symptom	Air bag system warning light remains on

Possible cause
- Damaged SAS unit
- Open or short circuit in wiring harness
- Poor connection of connector



Remedy

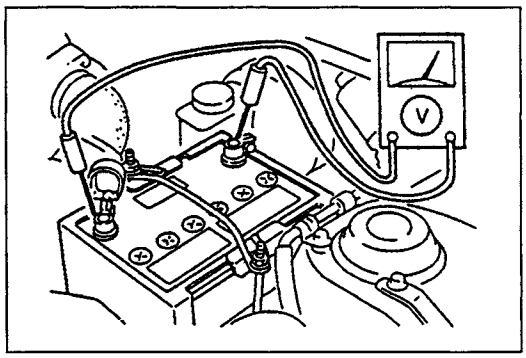
Warning
- **Handling the SAS unit improperly can accidently deploy the air bags, which may seriously injure you. Read SERVICE WARNINGS, page T1–98, before handling the SAS unit.**

1. Carry out the "Before Servicing" procedure under GENERAL PROCEDURES, page T1–99.
2. Remove the right side wall. (Refer to section S1.)
3. Make sure the SAS unit connector is securely connected to the SAS unit.

Connection	Action
OK	Replace SAS unit (Refer to page T1–109)
Poor	Reconnect connector

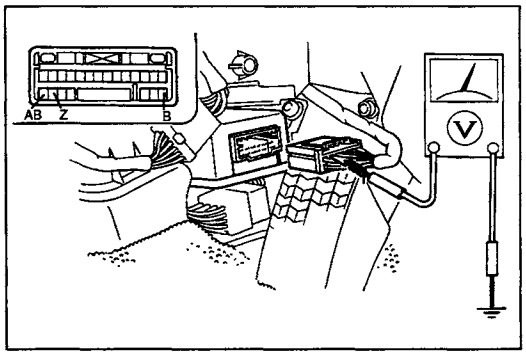
Flowchart No.2	Symptom	Diagnostic trouble code 3

Possible cause
- Weak battery
- Poor connection of connector



Step 1
Measure the battery voltage.

Voltage	Action
More than 8 V	Go to Step 2
Less than 8 V	Battery is weak Check charge/discharge system (Refer to section G)



Step 2

Warning
- **Handling the SAS unit improperly can accidently deploy the air bags, which may seriously injure you. Read SERVICE WARNINGS, page T1–98, before handling the SAS unit.**

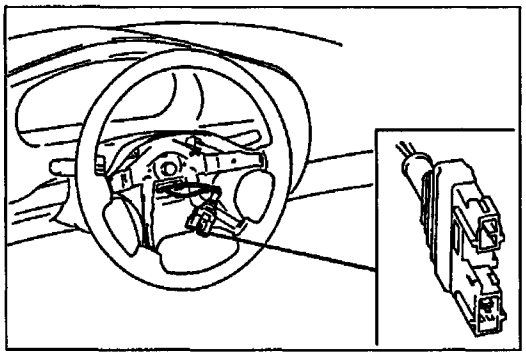
1. Carry out the "Before Servicing" procedure under GENERAL PROCEDURES, page T1–99.
2. Remove the right side wall.
   (Refer to section S1.)
3. Disconnect the SAS unit connector.
4. Connect the negative battery cable.
5. Turn the ignition switch to ON.
6. Measure the voltage at the terminals of the SAS unit connector.

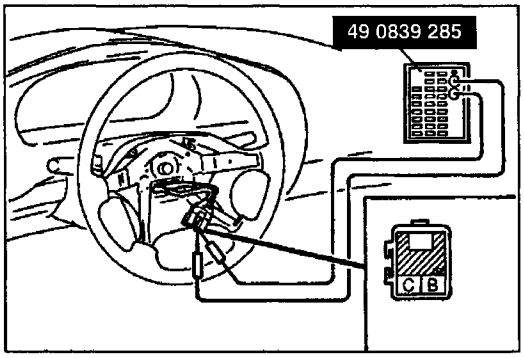
Terminal	Voltage	Action
B (B/W) Z (B/W)	More than 8 V	Measure voltage at terminal AB
	Less than 8 V	Repair wiring harness (Battery — ENGINE 10 A fuse — SAS unit)
AB (B/Y)	More than 8 V	Replace SAS unit (Refer to page T1–109)
	Less than 8 V	Repair wiring harness (Battery — METER 15 A fuse — SAS unit)

Flowchart No.3	Symptom	Diagnostic trouble code 6

Possible cause
- Damaged driver-side air bag module
- Damaged clock spring
- Damaged SAS unit
- Open or short circuit in wiring harness
- Poor connection of connector

Warning
- **Handling the air bag module and SAS unit improperly can accidently deploy the air bag, which may seriously injure you. Read SERVICE WARNINGS, page T1–98, before handling the air bag module and SAS unit.**



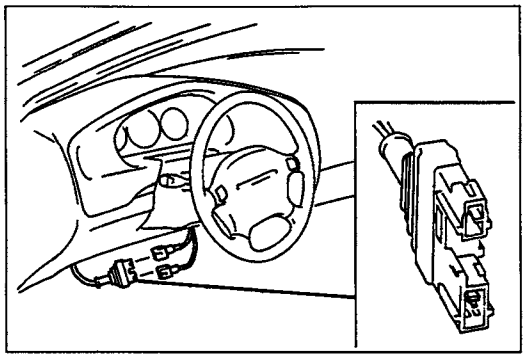


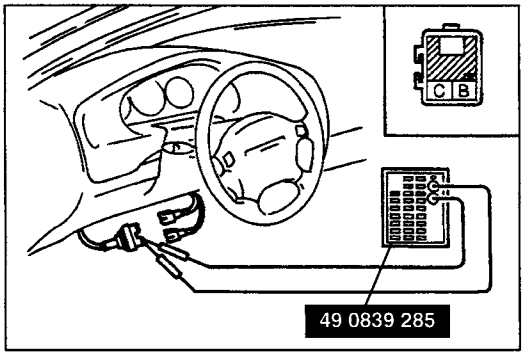
Step 1
1. Carry out the "Before Servicing" procedure under GENERAL PROCEDURES, page T1–99.
2. Remove the driver-side air bag module. (Refer to page T1–107.)
3. Verify that the driver-side air bag module connector pin is not broken.

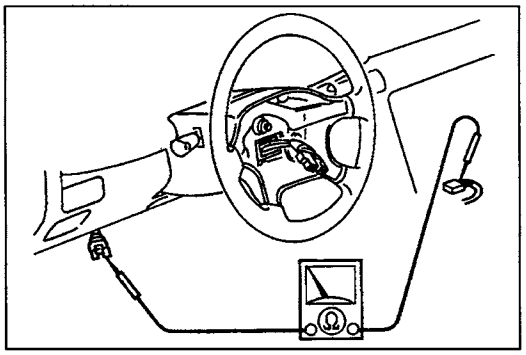
Pin	Action
OK	Go to Step 2
Broken	Replace combination switch (Refer to page T1–21)

Step 2
1. Connect the leads of the **SST** to terminals B and C of the driver-side air bag module connector.
2. Set the resistance of the **SST** to 2 ohms.
3. Connect the clock spring connector.
4. Connect the negative battery cable.
5. Turn the ignition switch to ON and check the diagnostic trouble code.

Diagnostic trouble code	Action
6	Go to Step 3
Other	Replace driver-side air bag module (Refer to page T–107)







Step 3
1. Turn the ignition switch to LOCK.
2. Disconnect the negative battery cable and wait for more than one minute to allow the backup power supply to deplete its stored power.
3. Disconnect the clock spring connector.
4. Verify that the clock spring connector.

Pin	Action
OK	Go to Step 4
Broken	Repair wiring harness (Clock spring — SAS unit)

Step 4
1. Connect the leads of the **SST** to terminals B and C of the clock spring connector.
2. Set the resistance of the **SST** to 2 ohms.
3. Connect the negative battery cable.
4. Turn the ignition switch to ON and check the diagnostic trouble code.

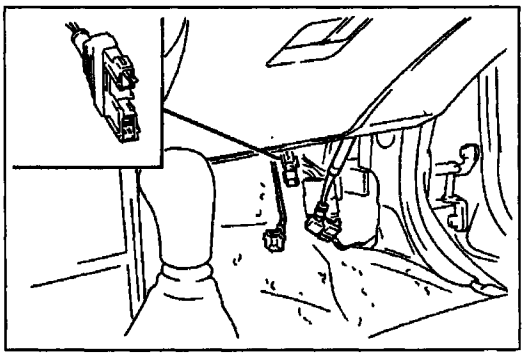
Diagnostic trouble code	Action
6	Go to Step 5
Other	Replace combination switch (Refer to page T1–21)

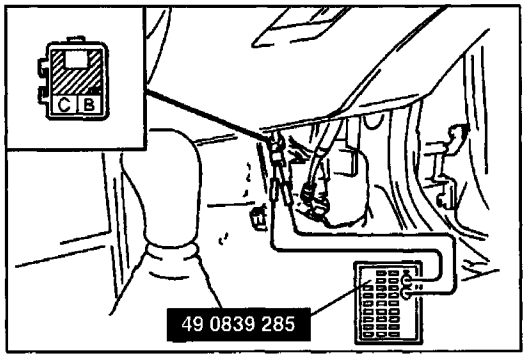
Step 5
1. Turn the ignition switch to LOCK.
2. Disconnect the negative battery cable and wait for more than one minute to allow the backup power supply to deplete its stored power.
3. Remove the right side wall. (Refer to section S1.)
4. Disconnect the SAS unit connector.
5. Check the wiring harness between the terminals of the SAS unit connector and the clock spring connector for the following.
   - Ground short circuit
   - Line short circuit
   - Open circuit
6. If the wiring harness is normal, replace the SAS unit. (Refer to page T1–109.)
7. If the wiring harness is faulty, repair it. (Clock spring — SAS unit)

Flowchart No.4	Symptom	Diagnostic trouble code 7

Possible cause
- Damaged passenger-side air bag module
- Damaged SAS unit
- Open or short circuit in wiring harness
- Poor connection of connector

Warning
- **Handling the air bag module and SAS unit improperly can accidently deploy the air bag, which may seriously injure you. Read SERVICE WARNINGS, page T1–98, before handling the air bag module and SAS unit.**



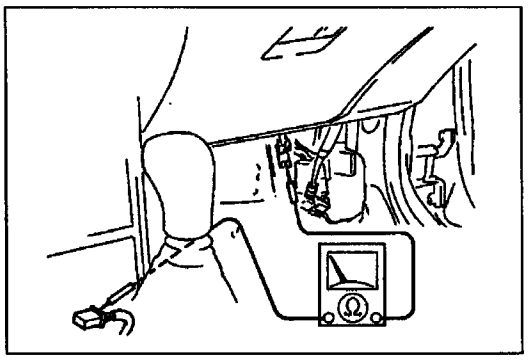


Step 1
1. Carry out the "Before Servicing" procedure under GENERAL PROCEDURES, page T1–99.
2. Verify that the passenger-side air bag module connector pin is not broken.

Pin	Action
OK	Go to Step 2
Broken	Repair wiring harness (Passenger-side air bag module — SAS unit)

Step 2
1. Connect the leads of the **SST** to terminals B and C of the passenger-side air bag module connector.
2. Set the resistance of the **SST** to 2 ohms.
3. Connect the clock spring connector.
4. Connect the negative battery cable.
5. Turn the ignition switch to ON and check the diagnostic trouble code.

Diagnostic trouble code	Action
7	Go to Step 3
Other	Replace passenger-side air bag module (Refer to page T1–108)



Step 3

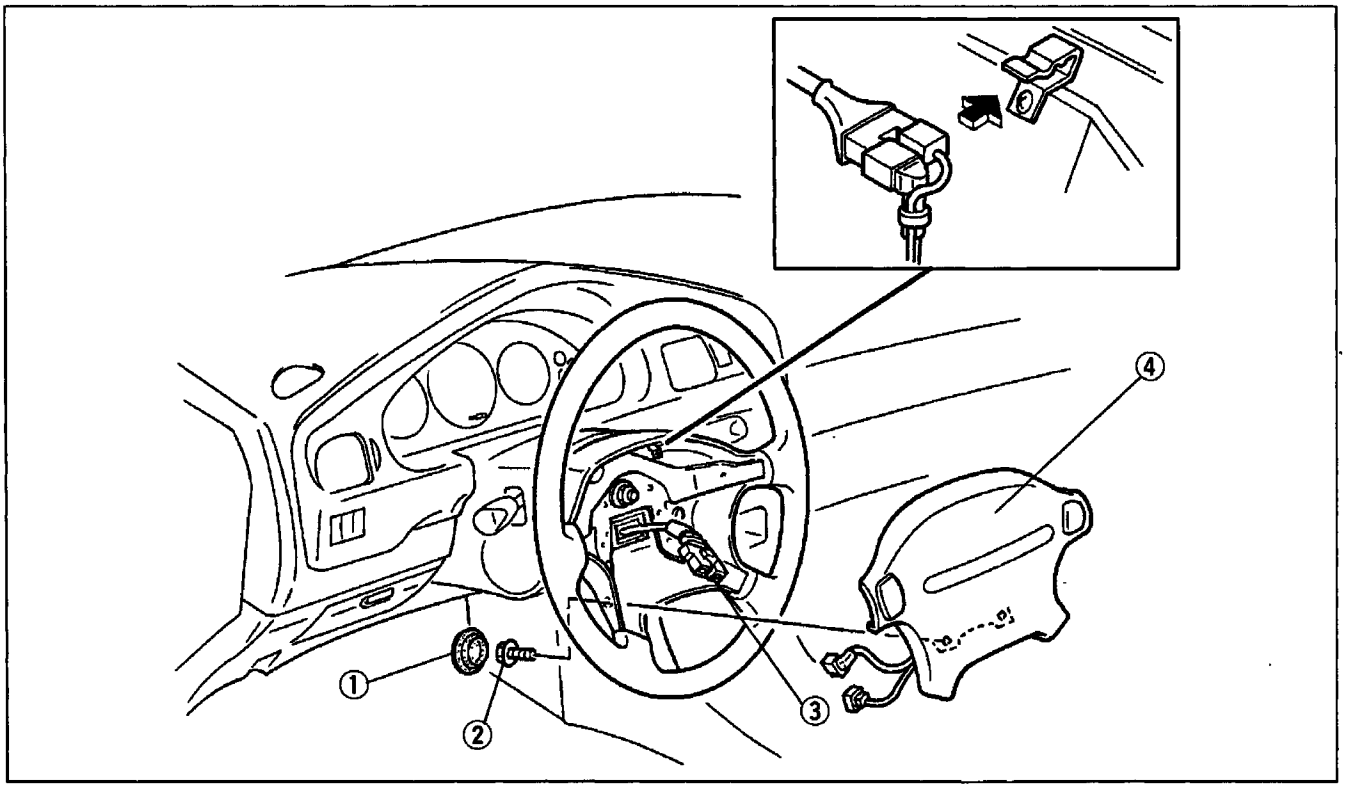
1. Turn the ignition switch to LOCK.
2. Disconnect the negative battery cable and wait for more than one minute to allow the backup power supply to deplete its stored power.
3. Disconnect the clock spring connector.
4. Remove the right side wall.
   (Refer to section S1.)
5. Disconnect the SAS unit connector.
6. Check the wiring harness between the terminals of the SAS unit connector and the passenger-side air bag module connector for the following.
   - Ground short circuit
   - Line short circuit
   - Open circuit
7. If the wiring harness is normal, replace the SAS unit.
   (Refer to page T1–109.)
8. If the wiring harness is faulty, repair it.
   (Passenger-side air bag module — SAS unit)

DRIVER-SIDE AIR BAG MODULE
Removal / Installation

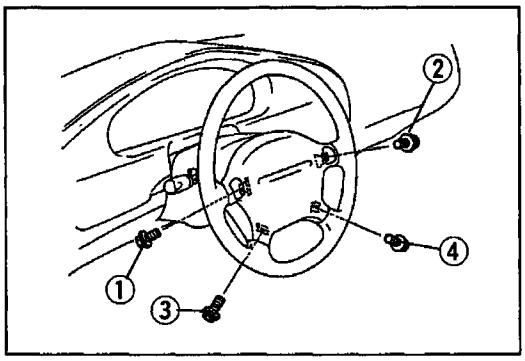
Warning
- **Handling the air bag module improperly can accidently deploy the air bag, which may seriously injure you. Read SERVICE WARNINGS, page T1–98, before handling the air bag module.**

Warning
- **Installing the driver-side air bag module when a service code 6 is not indicated can accidently deploy the air bag, which can cause serious injury. Carry out the proper troubleshooting procedures and verify that service code 6 is indicated before installing the driver-side air bag module.**

1. Carry out the "Before Servicing" procedure under GENERAL PROCEDURES, page T1–99.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal, referring to **Installation note**.
4. Follow the troubleshooting flowchart (page T1–100) to verify that the air bag system is operating normally.



1. Cover
2. Bolt
   Installation note ..... below
3. Connector
4. Driver-side air bag module



Installation note
Bolts
Tighten the bolts in the order shown in the figure.

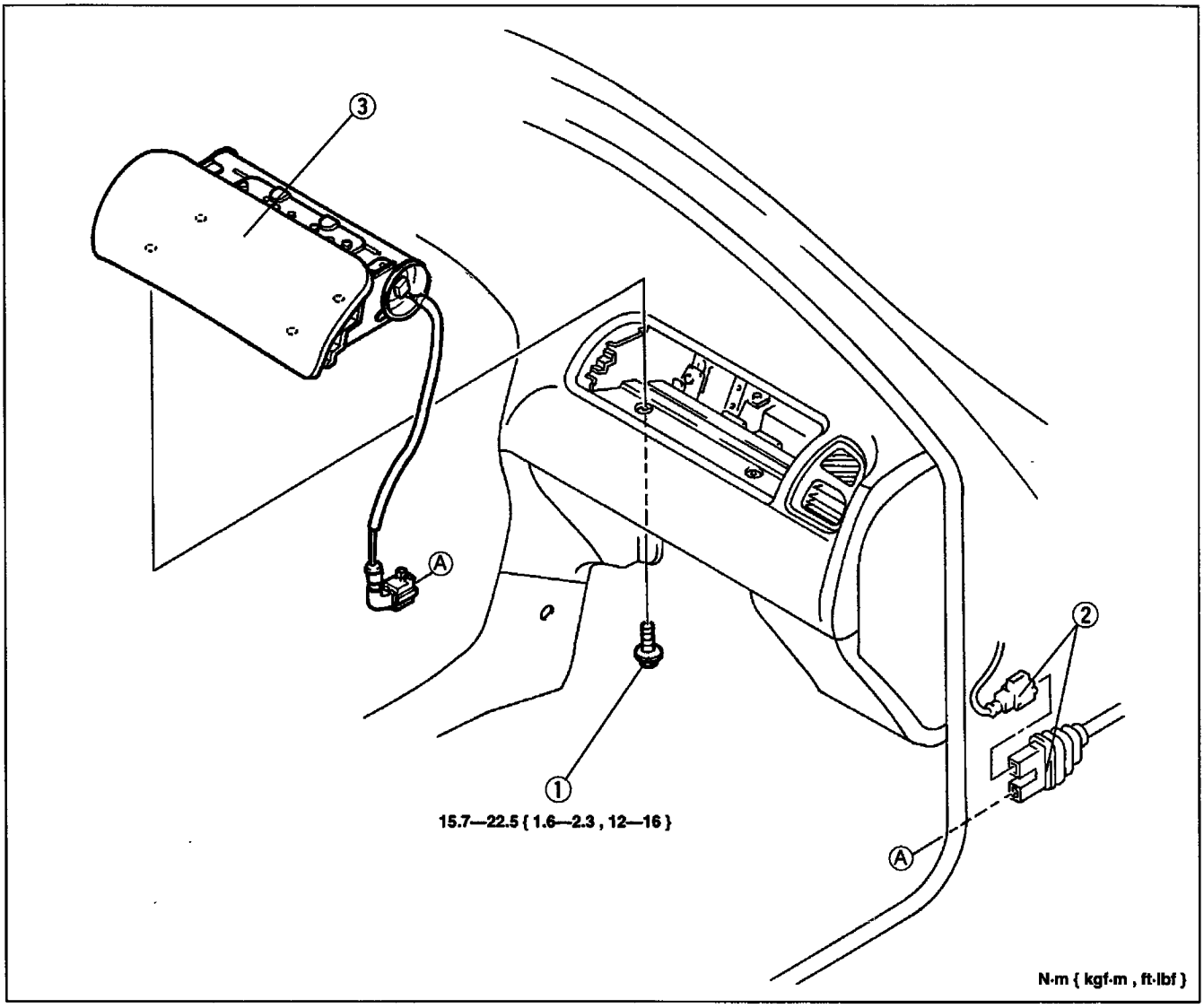
Tightening torque:
7.9—11.7 N·m { 80—120 kgf·cm , 70—104 in·lbf }

PASSENGER-SIDE AIR BAG MODULE
Removal / Installation

Warning
- **Handling the air bag module improperly can accidently deploy the air bag, which may seriously injure you. Read SERVICE WARNINGS, page T1–98, before handling the air bag module.**

Warning
- **Installing the passenger-side air bag module when a service code 7 is not indicated can accidently deploy the air bag, which can cause serious injury. Carry out the proper troubleshooting procedures and verify that service code 7 is indicated before installing the passenger-side air bag module.**

1. Carry out the "Before Servicing" procedure under GENERAL PROCEDURES, page T1–99.
2. Remove the glove compartment cover.
   (Refer to section S1.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.
5. Follow the troubleshooting flowchart (page T1–100) to verify that the air bag system is operating normally.

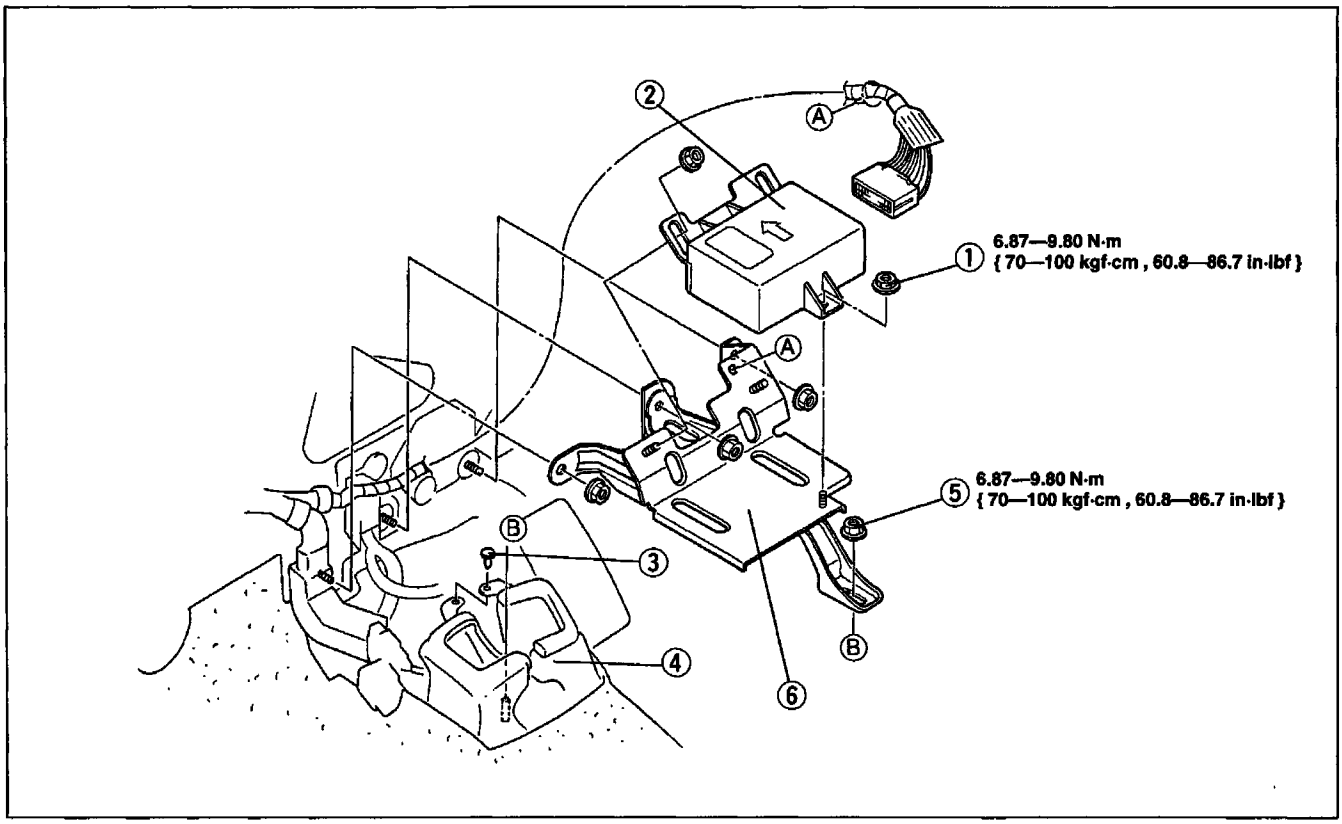


1. Bolt
2. Connectors
3. Passenger-side air bag module

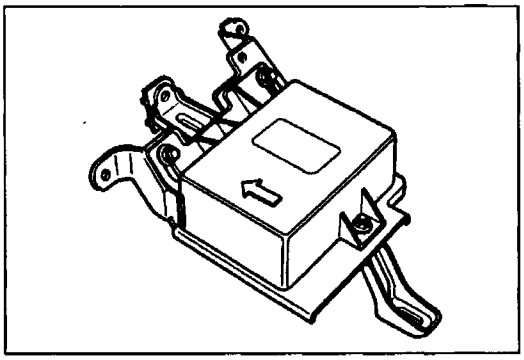
SAS UNIT
Removal / Installation

Warning
- **Handling the SAS unit improperly can accidently deploy the air bags, which may seriously injure you. Read SERVICE WARNINGS, page T1–98, before handling the SAS unit.**

1. Carry out the "Before Servicing" procedure under GENERAL PROCEDURES, page T1–99.
2. Remove the heater unit.
   (Refer to section U.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal, referring to **Installation note.**
5. Follow the troubleshooting flowchart (page T1–100) to verify that the air bag system is operating normally.



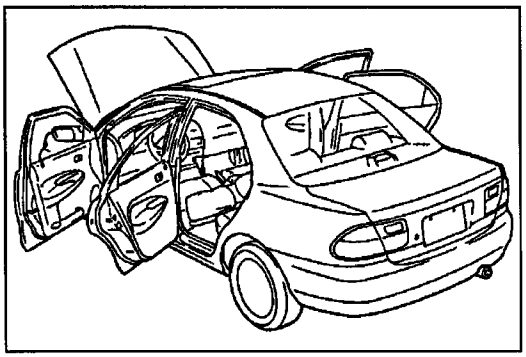
1. Nuts
2. SAS unit
   Installation note ..... below
3. Fastener
4. Rear heat duct
5. Nut
6. Bracket
   Installation note ..... below



Installation note
SAS unit and bracket
1. Locate the SAS unit and bracket with the arrow on the SAS unit facing toward the front of vehicle. Install them and tighten the nuts to the specified torque.
2. If the mounting area is damaged, carefully repair the area to its original shape before installation.

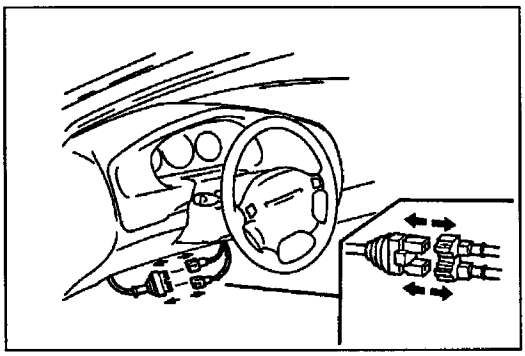
AIR BAG MODULE DISPOSAL PROCEDURE

Before scrapping a vehicle with an undeployed air bag module, deploy the air bag. Never dispose of a live air bag module. If the **SST** is not available, consult the nearest Mazda representative for assistance.



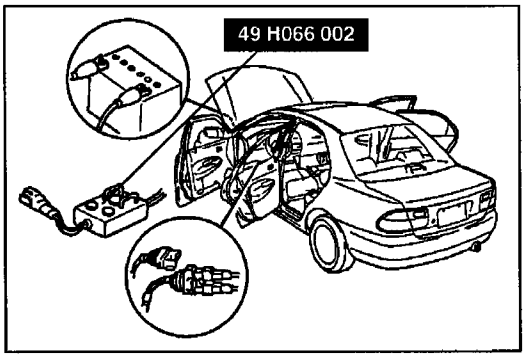
Air Bag Deployment

1. Move the vehicle to an open space, away from strong winds, and open all of the vehicle's doors.
2. Disconnect the negative battery cable and wait for more than one minute to allow the backup power supply to deplete its stored power.
3. Follow the appropriate procedure for the driver-side or passenger-side air bag module.

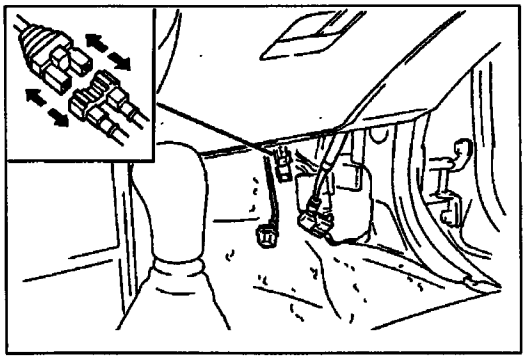


Driver-side air bag

(1) Make sure the air bag module is firmly mounted to the steering wheel.
(2) Disconnect the orange and blue clock spring connectors.

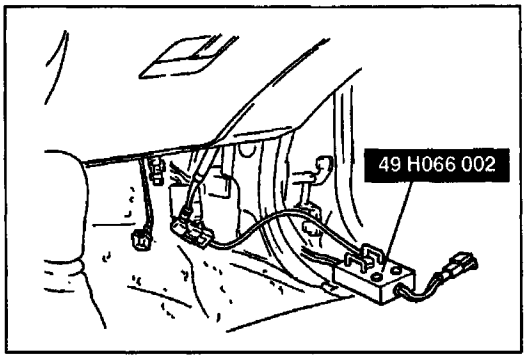


(3) Inspect the **SST**.
(Refer to page T1–112.)
(4) Connect the **SST** to the clock spring connector as shown in the figure.

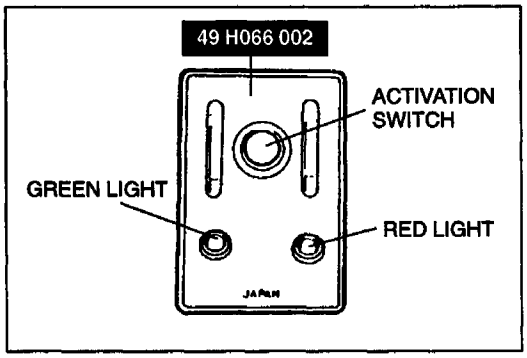


Passenger-side air bag

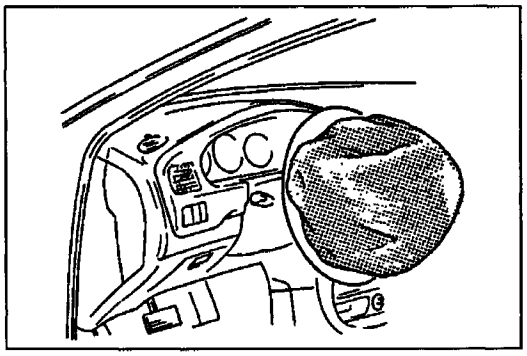
(1) Make sure the air bag module is firmly mounted to the dashboard.
(2) Remove the passenger-side scuff plate and front side trim.
(Refer to section S1.)
(3) Disconnect the orange and blue passenger-side air bag module connector.



*(4) Inspect the **SST**.
(Refer to page T1–112.)
(5) Connect the **SST** to the passenger-side air bag module connector as shown in the figure.



4. Connect the red clip of the **SST** to the positive battery terminal and the black clip to the negative terminal.
5. Verify that the red light on the **SST** is illuminated.
6. Make sure all persons are standing at least **6 m { 20 ft }** from the vehicle.
7. Press the activation switch on the **SST** to deploy the air bag.

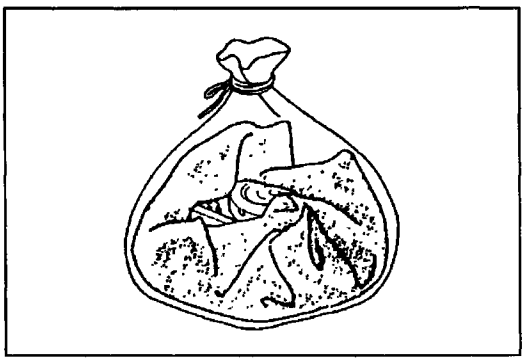


Air Bag Disposal

Warning
- **The air bag is very hot immediately after it deploys. You can be burned. Do not touch the air bag module for at least 15 minutes after deployment.**

Warning
- **Pouring water on a deployed air bag is dangerous. The water will mix the residual gases to form a gas that can make breathing difficult if inhaled. Do not pour water on the deployed air bag module.**

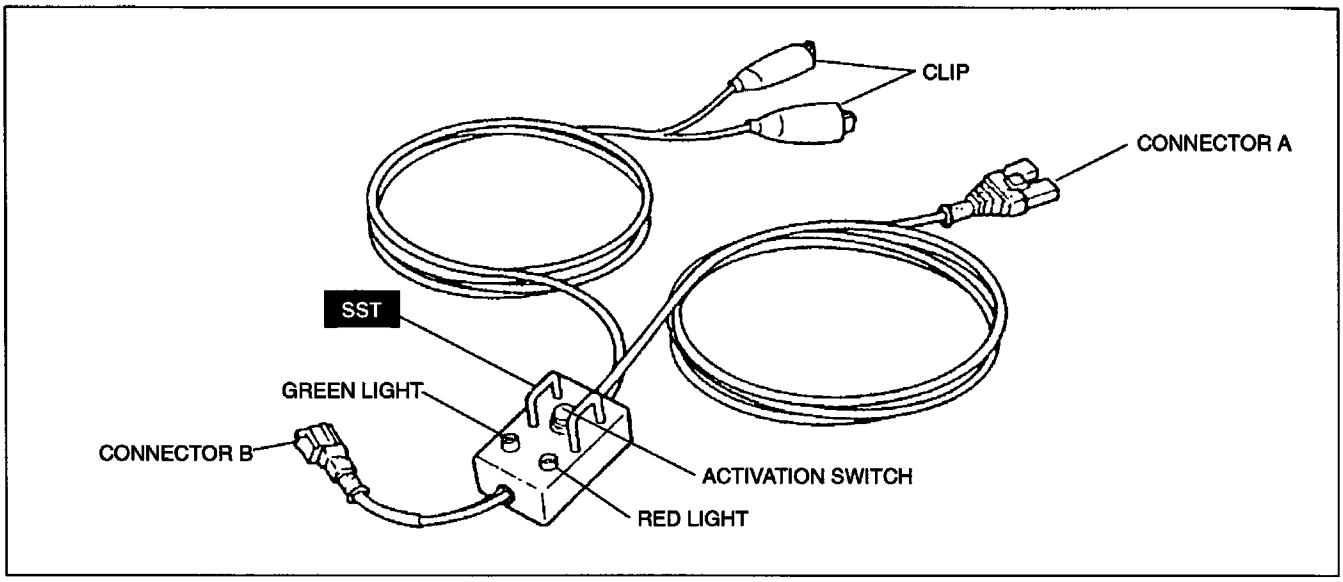
Warning
- **A deployed air bag module may contain deposits of sodium hydroxide, a caustic by-product of the gas-generated combustion. If this substance gets in your eyes or on your hands, it can cause irritation and itching. When handling a deployed air bag module, wear gloves and safety glasses.**

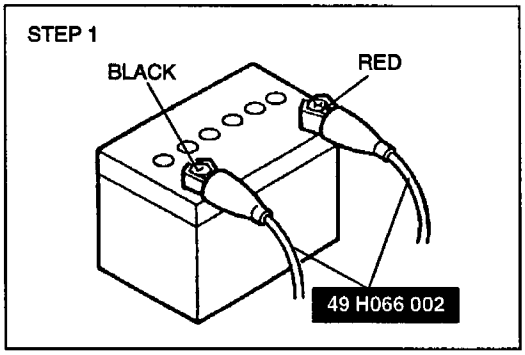


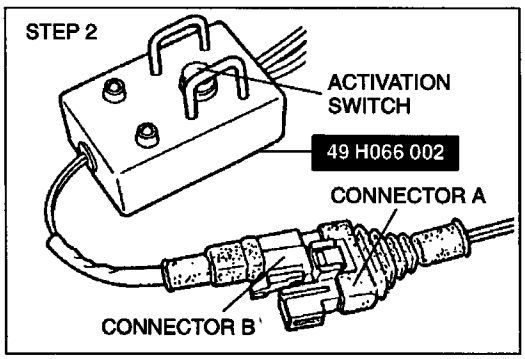
1. Put on gloves and safety glasses.
2. Place the deployed air bag module in a plastic bag, seal it, and then dispose of it.
3. Wash your hands after removing your gloves.

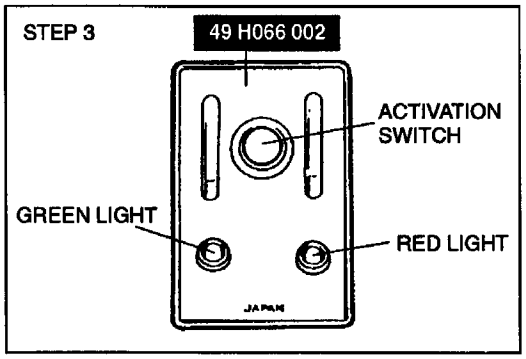
INSPECTION OF SST (DEPLOYMENT TOOL)

- Use the **SST** to deploy a live air bag module before disposing of it.
- Before connecting the **SST** to the clock spring connector or air bag module connector, inspect the operation of the **SST**.









Inspection Procedure

1. Follow the steps below to inspect the operation of the **SST**.

Step	Inspection procedure	Light condition	
		Green	Red
1	Connect red clip to positive battery terminal and black clip to negative battery terminal.	ON	OFF
2	Connect connectors A and B of **SST**.	OFF	ON
3	Press activation switch.	ON	OFF

2. If not as specified, do not use the **SST** because it may cause the air bag to unexpectedly deploy upon connection to the harnesses.

Before beginning any service procedure, refer to section T1 of this manual for air bag system service warnings.

HEATER AND AIR CONDITIONER SYSTEMS

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R–134a SYSTEM INTRODUCTION

OUTLINE

- R–12 and other fluorocarbons now used in air conditioners can destroy the ozone layer in the stratosphere. The result is an increase in hazardous ultraviolet rays which over time can adversely affect both human health and the biosphere. Because of this concern, Mazda has chosen to use R–134a (HFC–134a), a hydrofluorocarbon-based refrigerant that does not deplete the ozone layer, in this vehicle.
- R–12 and R–134a are not interchangeable; system parts and system service tools also differ. The table below compares the two systems.(Maintenance–related items only)

Refrigerant Systems

Part	R–12 system	R–134a system	Remarks
Refrigerant	Chlorofluoro-carbon–12 (CFC–12) (CCl_2F_2)	Hydrofluoro-carbon–134a (HFC–134a) (CH_2FCF_3)	If the refrigerants are mixed or one refrigerant is used in a system that requires the other, the compressor oil will separate from the refrigerant and not circulate within the system. This can damage the A/C compressor. In addition, mixing R–134a with R–12 or using R–134a instead of R–12 in an R–12 system can lower the durability of the NBR O-ring and dissolve the fluorine rubber O-rings. If the fluorine rubber O-rings are dissolved, refrigerant may leak.
Compressor oil	Mineral oil	Polyalkylene glycol oil (PAG oil) [SP10]	Special compressor oils for R–134a air conditioning systems are developed by each air conditioning vendor. Therefore, use only the specified oil for each model vehicle. If a PAG oil other than the specified type is used, the A/C compressor and refrigerant system can be damaged. If the compressor oils are mixed or one compressor oil is used in a system that requires the other, the refrigerant will separate from the compressor oil and not circulate within the system. This can damage the A/C compressor. Mixing PAG oil with mineral oil or using PAG oil instead of mineral oil in an R–12 system can lower the durability of the NBR and fluorine rubber O-rings.
O-ring	Nitrile butadiene rubber (NBR) Fluorine rubber	High-circulated nitrile butadiene rubber (HNBR)	If an NBR O-ring is used in an R–134a system, the PAG oil and R–134a will lower the durability of the O-ring. If a fluorine rubber O-ring is used in an R–134a system, the R–134a will dissolve the O-ring and cause the refrigerant to leak.
Joint nuts	Inch threads	Metric threads	Thread standards for joint nuts connecting cooler pipes and hoses have been changed to avoid connecting R–12 system parts with R–134a system parts.
Joint blocks	—	—	The bolt sizes and part measurements for joint blocks connecting cooler pipes and cooler hoses have been changed to avoid connecting R–12 system parts with R–134a system parts.
Charging valve	Screw-on type HI: 3/8—24 UNF LO: 7/16—20 UNF	Quick-connect type HI: 16 mm { 0.6 in } dia. LO: 13 mm { 0.5 in } dia.	The shape of the charging valve differs for each system to avoid confusion. The quick-connect type charging valve prevents refrigerant from leaking when the charging hose is connected to the valve.

Service Tools

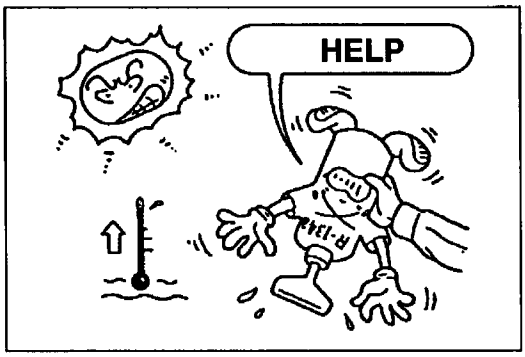
Part	R–12 system	R–134a system	Remarks
Tool joints	Inch threads	Metric threads	Thread standards for tool joints have been changed to avoid connecting R–12 system tools with R–134a system tools.
Charging valve joints	Screw-on type HI: 3/8—24 UNF LO: 7/16—20 UNF	Quick-connect type HI: 16 mm { 0.6 in } dia. LO: 13 mm { 0.5 in } dia.	The shape of the charging valve joints differ for each system to avoid confusion. The quick-connect type charging valve joint prevents refrigerant from leaking when the charging hose is connected to the valve.
Manifold gauge	High-pressure-side maximum reading: 2.9 MPa { 30 kgf/cm^2, 430 psi }	High-pressure-side maximum reading: 3.5 MPa { 35 kgf/cm^2, 500 psi }	R–134a requires a higher pressure to condense than R–12.
Gas leak tester	Gas type Electric type	Electric type	A gas leak tester reacts with chlorine in R–12 to indicate the location of a leak. This kind of tester does not work with an R–134a system, however, because R–134a has no chlorine. Two kinds of electric testers are available: those that work exclusively with one system or the other, and those that work with both. A tester built only for R–12 systems cannot be used with an R–134a system.

SERVICE WARNINGS

Using/Handling Unapproved Refrigerant

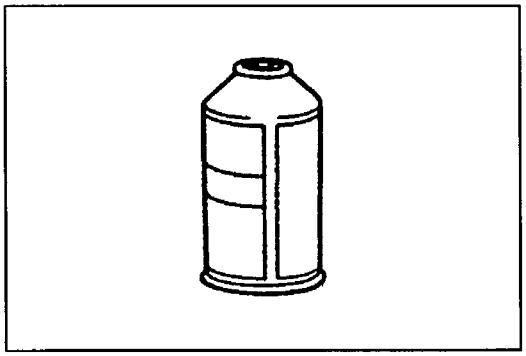
*** Using a flammable refrigerant, such as OZ–12, in this vehicle is dangerous. In an accident, the refrigerant may catch fire, resulting in serious injury or death. When servicing this vehicle, use only R–134a.**

*** Checking for system leaks on a vehicle that has been serviced with flammable refrigerant, such as OZ–12, is dangerous. Conventional leak detectors use an electronically generated arc which can ignite the refrigerant, causing serous injury or death. If a flammable refrigerant may have been used to service the system, or if you suspect a flammable refrigerant has been used, contact the local fire marshall or EPA office for information on handling the refrigerant.**



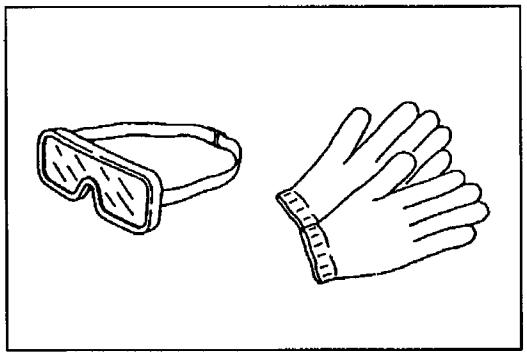
Servicing Refrigerant System

- Do not allow the refrigerant to leak near fire or any kind of heat. A poisonous gas may be generated if the refrigerant gas contacts fire or heat such as from cigarettes and heaters.
  When carrying out any operation that can cause refrigerant leakage, extinguish or remove the above-mentioned heat sources and maintain adequate ventilation.



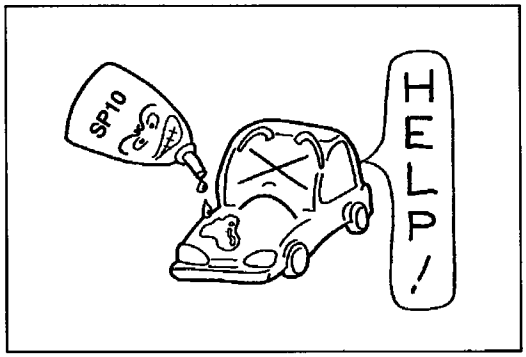
Storing Refrigerant

- The refrigerant container is highly pressurized. If it is subjected to high heat, it could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Store the refrigerant at temperatures below 40 °C { 104 °F }.



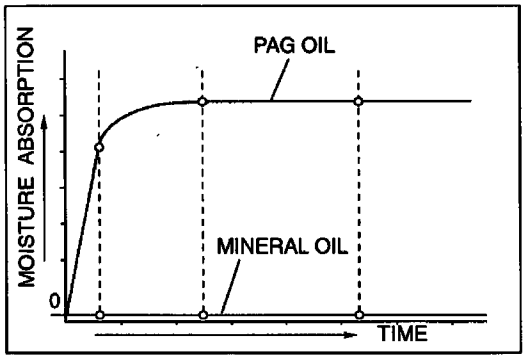
Handling Refrigerant

- Handling liquid refrigerant is dangerous. A drop of it on the skin can result in localized frostbite. When handling the refrigerant, wear gloves and safety goggles. If refrigerant splashes into the eyes, immediately wash them with clean water and consult a doctor.



SERVICE CAUTIONS
Compressor Oil (SP10)

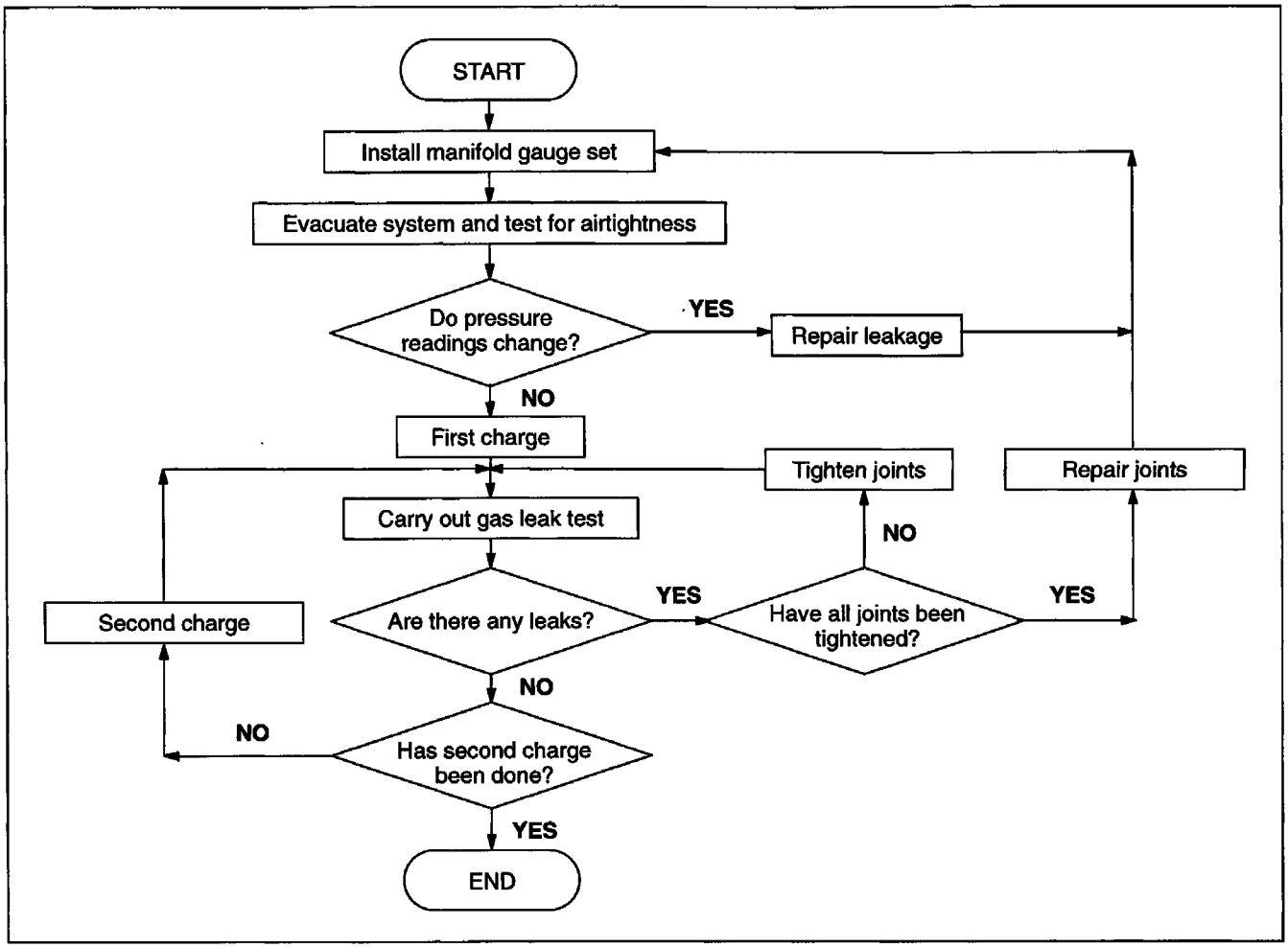
- Do not spill compressor oil on the vehicle. A drop of compressor oil on the vehicle surface can eat away at the paint. If oil gets on the vehicle, wipe it off immediately.

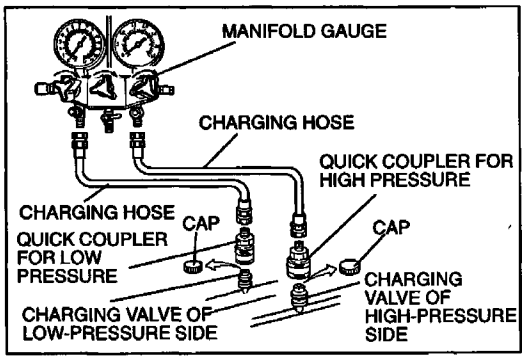


- PAG oil has a higher moisture absorption efficiency than the previously used mineral oil. If moisture mixes with the compressor oil, the refrigerant system could be damaged. Therefore, install caps immediately after using the compressor oil or removing refrigerant system parts to prevent moisture absorption.

REFRIGERANT SYSTEM SERVICE PROCEDURES

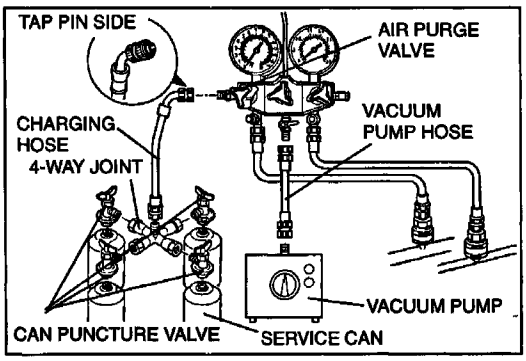
CHARGING PROCEDURE FLOW





MANIFOLD GAUGE SET INSTALLATION

1. Fully close the valves of the manifold gauge.
2. Connect charging hoses to the high- and low-pressure side joints of the manifold gauge.
3. Connect quick couplers to the ends of the charging hoses.
4. Remove the caps from the high- and low-pressure side charging valves.
5. Connect the quick couplers to the charging valves.

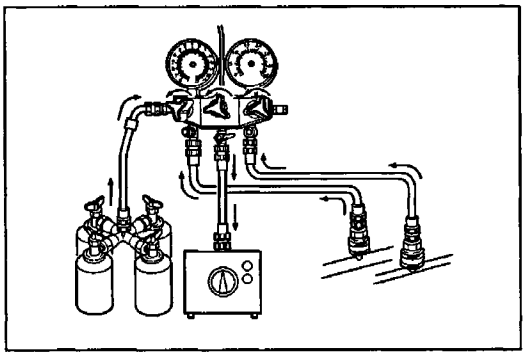


CHARGING

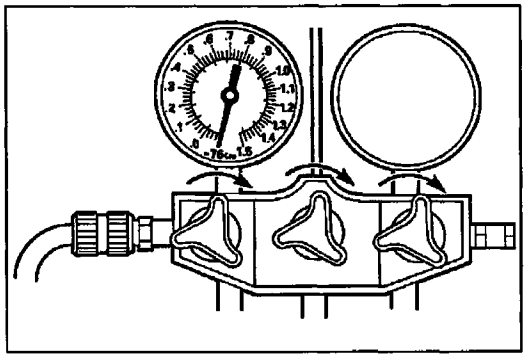
1. Install the manifold gauge set. (Refer to page U–5.)
2. Connect the tap pin side of the charging hose to the air purge valve of the manifold gauge.
3. Connect the vacuum pump hose to the center joint of the manifold gauge.
4. Connect the vacuum pump hose to the vacuum pump.
5. Connect can puncture valves to a 4-way joint.
6. Fully open the can puncture valves and connect service cans to the valves.

   Regular amount of refrigerant: 600 g { 21.2 oz }

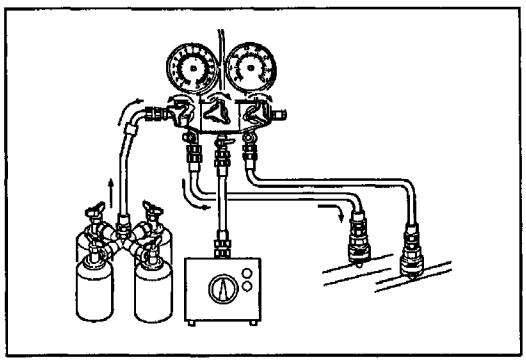
7. Fully close any can puncture valve that is not connected to a service can.
8. Connect the 4-way joint to the charging hose that is connected to the gauge set air purge valve.



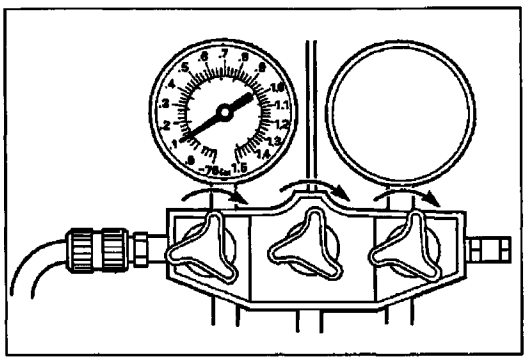
9. Open all the valves of the manifold gauge.
10. Start the vacuum pump and let it operate for **15 minutes**.



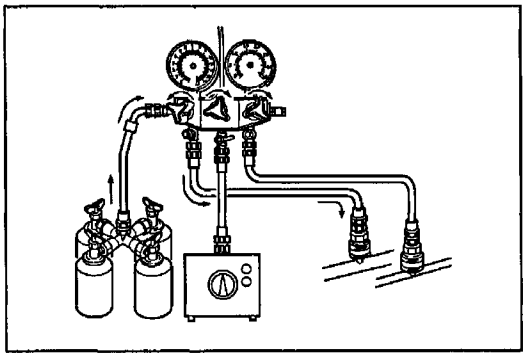
11. After 15 minutes, verify that the high- and low-pressure-side readings of the manifold gauge are at **–101 kPa { –760 mmHg , –29.9 inHg }** . Close each valve of the manifold gauge.
12. Stop the vacuum pump and wait for about **5 minutes**.
13. After 5 minutes, check the low-pressure-side reading of the manifold gauge. If the reading has changed, check for leaks and then repeat from step 9. If reading has not changed, go to step 14.



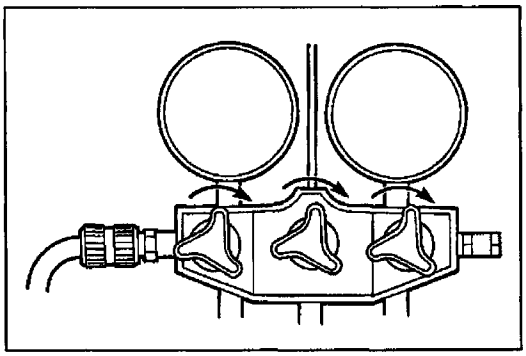
14. Open the service cans by using the can puncture valves.
15. Open the low-pressure side valve of the manifold gauge and charge with refrigerant until the low-pressure-side reading is at **100 kPa { 1 kgf/cm^2 , 10 psi }** .



16. Close the low-pressure side valve of the manifold gauge.
17. Check for leaks by using a gas leak tester. If there are no leaks, go to step 18. If a leak is found at a loose joint, tighten the joint and check for leaks again. If there is still a leak at the same joint, discharge the refrigerant and then repair the joint. Repeat the charging procedure from step 9. If there are no leaks after tightening the joint, go to step 18.



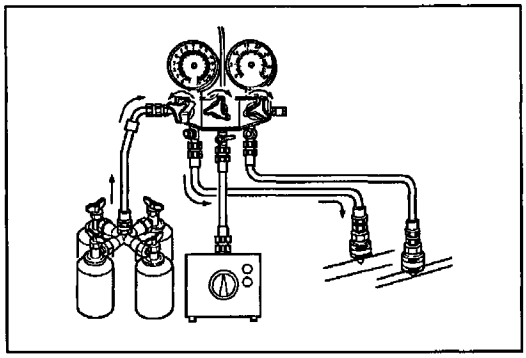
18. Open the low-pressure side valve of the manifold gauge and charge with half the regular amount of refrigerant.



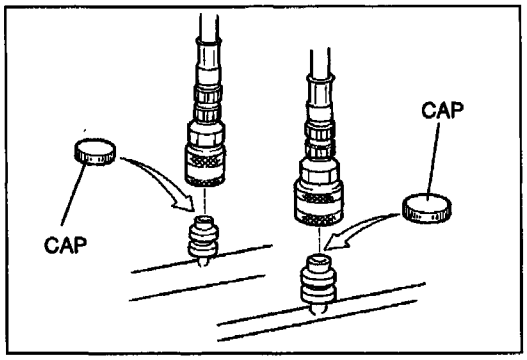
19. Close the low-pressure side valve of the manifold gauge.

Warning

- **Running the engine with the high-pressure side valve open is dangerous. Pressure within the service cans will increase and the cans could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Therefore, do not open the high-pressure side valve while the engine is running.**



20. Start the engine and actuate the A/C compressor.
21. Open the low-pressure side valve of the gauge set and charge with the remaining refrigerant.
22. Close the low-pressure side valve of the manifold gauge.
23. Stop the engine and A/C compressor.
24. Check for leaks by using a gas leak tester. If there are no leaks, go to step 25. If a leak is found at a loose joint, tighten the joint and check for leaks again. If there is still a leak at the same joint, discharge the refrigerant and then repair the joint. Repeat the charging procedure from step 9. If there are no leaks after tightening the joint, go to step 25.
25. Disconnect the high- and low-pressure-side quick couplers from the charging valves.
26. Install the caps to the charging valves.

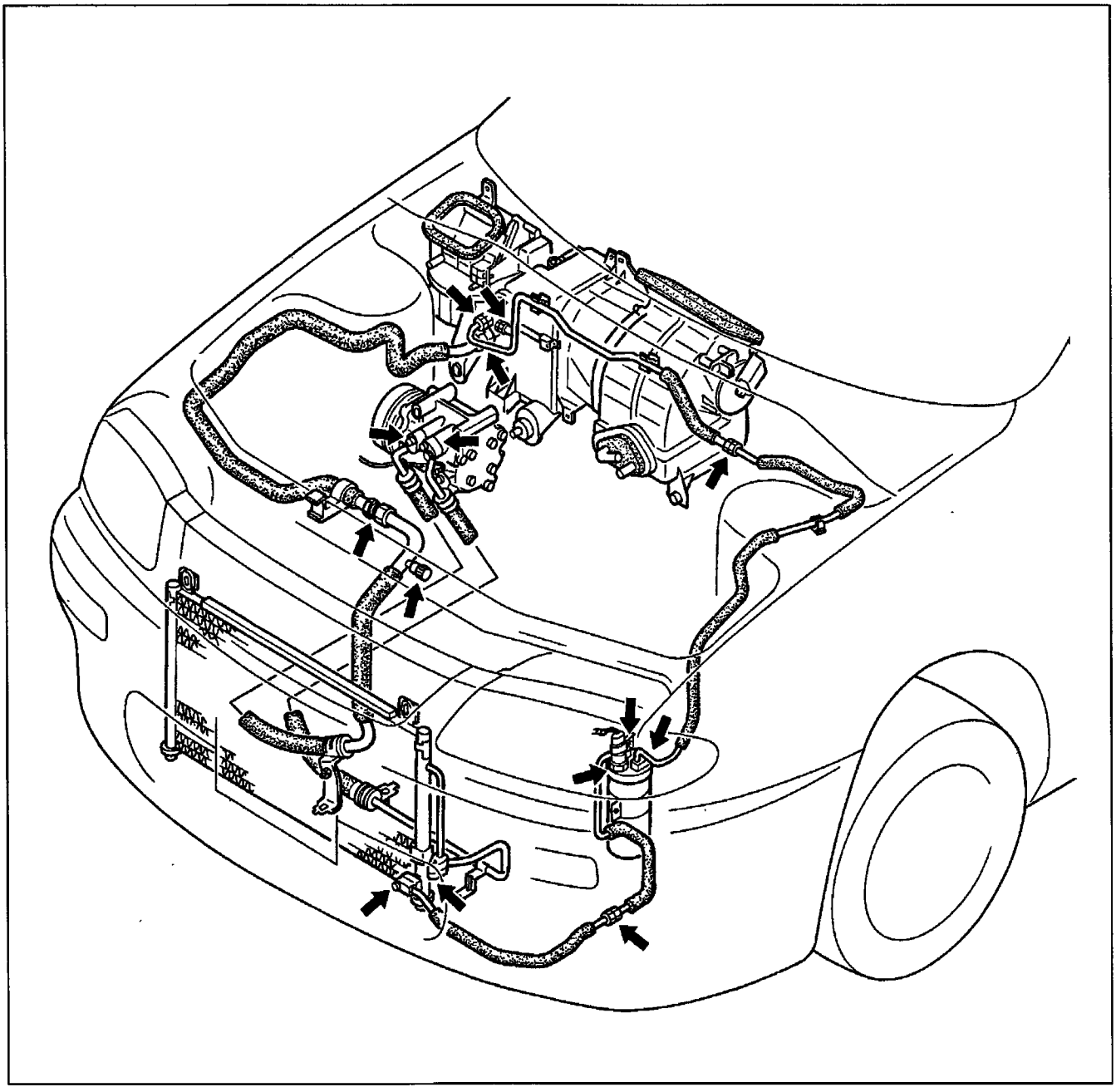


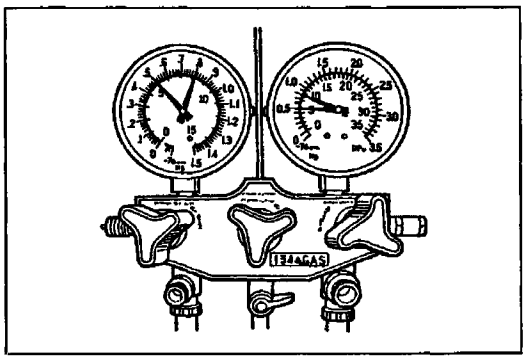
GAS LEAK TEST

Warning

- **Improperly handling flammable substances is dangerous. It could result in injury or death. Before checking for gas leakage, read the "SERVICE WARNINGS". (Refer to page U–3.)**

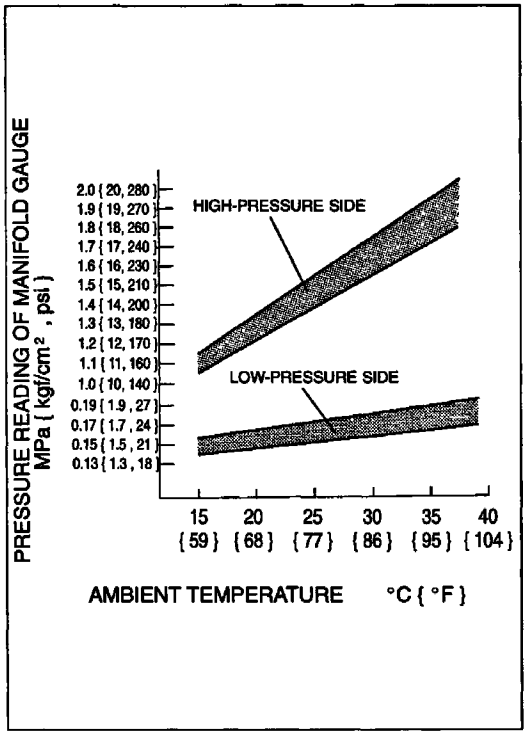
1. Check for oil stains on the connections shown below.
2. If there is no oil stain, go to step 4.
3. If there is an oil stain, check for a loose connection. If it's loose, tighten the connection to the specified torque and refill the oil and recharge the refrigerant. (Refer to page U–6.) If the connection is properly tightened, replace the O-ring and, if necessary, other parts. Refill the oil and recharge the refrigerant. (Refer to page U–6.)
4. Check for leaks at the connections by using the gas leak tester.
5. If there is leakage, check for a loose connection. If it's loose, tighten the connection to the specified torque and refill the oil and recharge the refrigerant. (Refer to page U–6.) If the connection is properly tightened, replace the O-ring and, if necessary, other parts. Refill the oil and recharge the refrigerant. (Refer to page U–6.)





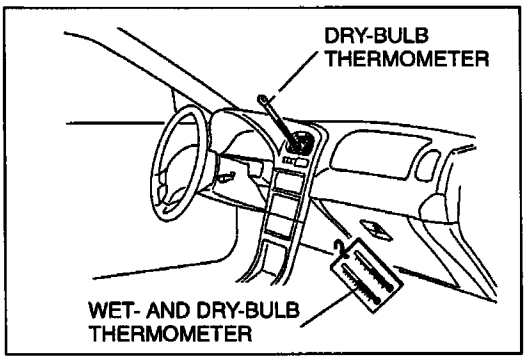
REFRIGERANT CHARGE CHECK

1. Install the manifold gauge set. (Refer to page U–5.)
2. Check the refrigerant pressure reading with the engine stopped.
3. Verify that the high- and low-pressure-side readings of the manifold gauge are at **493—788 kPa { 5.02—8.04 kgf/cm^2 , 72—114 psi }**. If the pressure readings are lower than specified, recharge the refrigerant. (Refer to page U–6.) If the pressure readings are within specification but there is insufficient cooling, go to the next step. If the pressure readings are within specification and there are no leaks, the refrigerant amount is OK.
4. Start the engine and run it at a constant **2,000 rpm**.
5. Turn the A/C switch on, set the fan switch at MAX–HI, and set the air intake mode at REC.
6. If the A/C compressor is short-cycling, note the low-pressure-side reading at which the magnetic clutch kicks out.
7. If the pressure is **170 kPa { 1.7 kgf/cm^2 , 24 psi }** or lower, evacuate and recharge the refrigerant system with the proper amount of refrigerant. (Refer to page U–6.) If the pressure is **210 kPa { 2.1 kgf/cm^2 , 30 psi }** or higher, inspect the thermoswitch. (Refer to page U–34.)



REFRIGERANT PRESSURE CHECK

1. Install the manifold gauge set. (Refer to page U–5.)
2. Close the front doors and the front windows.
3. Warm up the engine and run it at a constant **1,500 rpm**.
4. Set the fan switch at the 4th position.
5. Turn the A/C switch on.
6. Set the REC/FRESH lever to RECIRCULATE. (wire type)
7. Turn the REC switch on. (logic type)
8. Set the mode lever to VENT. (wire type)
9. Turn the VENT switch on. (logic type)
10. Set the temperature control lever to MAX COLD.
11. Measure the ambient temperature and the high- and low-pressure-side readings of manifold gauge.
12. If the high- and low-pressure-side readings are in the shaded zones shown in the figure, refrigerant system is normal. If the readings are abnormal, refer to flowchart No.13 and troubleshoot the system. (Refer to page U–59.)



PERFORMANCE TEST

After servicing the refrigerant system, test its performance.

1. Install the manifold gauge set. (Refer to page U–5.)
2. Place a dry-bulb thermometer in the center ventilator outlet.
3. Place a wet- and dry-bulb thermometer at the blower inlet.
4. Open the all doors and the all windows.
5. Warm up the engine and run it at constant **1,500 rpm.**
6. Turn the A/C switch on.
7. Set the fan switch at the 4th position.
8. Set the REC/FRESH lever to RECIRCULATE. (wire type)
9. Turn the REC switch on. (logic type)
10. Set the mode lever to VENT. (wire type)
11. Turn the VENT switch on. (logic type)
12. Set the temperature control lever to MAX COLD.
13. Wait until the air conditioner output temperature stabilizes.

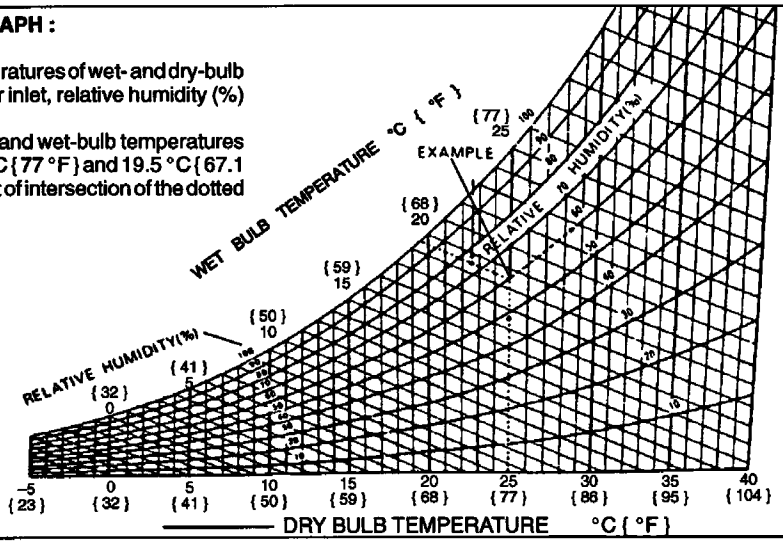
Stabilized condition
Blower inlet temperature: 25—35 °C { 77—95 °F }

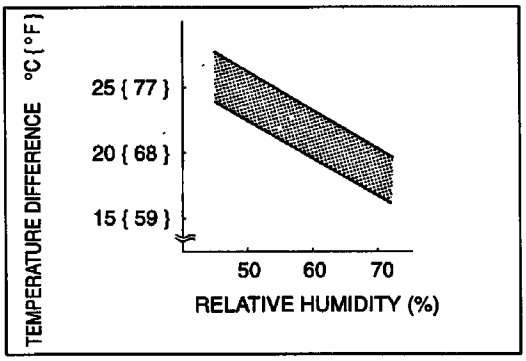
High-pressure-side reading:
1.3—1.6 MPa { 13—17 kgf/cm^2 , 190—240 psi }

14. After the air conditioning stabilizes, read the wet- and dry-bulb thermometer, and then calculate the relative humidity by using the graph below.

HOW TO READ THE GRAPH :

After measuring the temperatures of wet- and dry-bulb thermometer at the blower inlet, relative humidity (%) can be obtained.
Example; Supposing dry- and wet-bulb temperatures at the blower inlet are 25 °C{77 °F} and 19.5 °C{67.1 °F}, respectively, the point of intersection of the dotted lines in the graph is 60%.

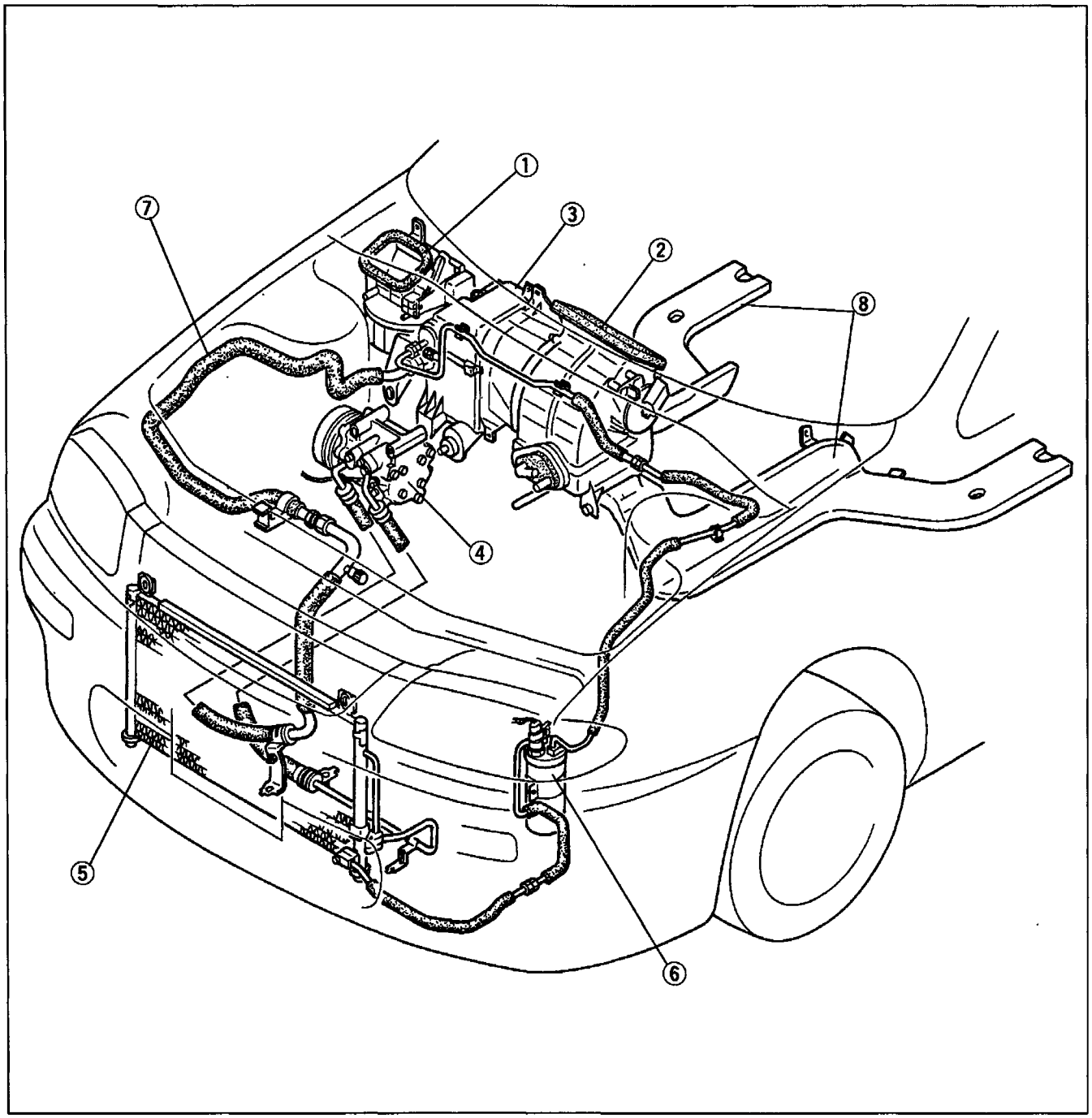




15. Read the dry-bulb thermometer at the air outlet, and calculate the temperature difference between the center ventilator outlet and the blower inlet.
16. Verify that the intersection of the temperature difference and the relative humidity is in the shaded zone.
17. If the performance is abnormal, troubleshoot the system. (Refer to page U–47.)

BASIC SYSTEM

STRUCTURAL VIEW

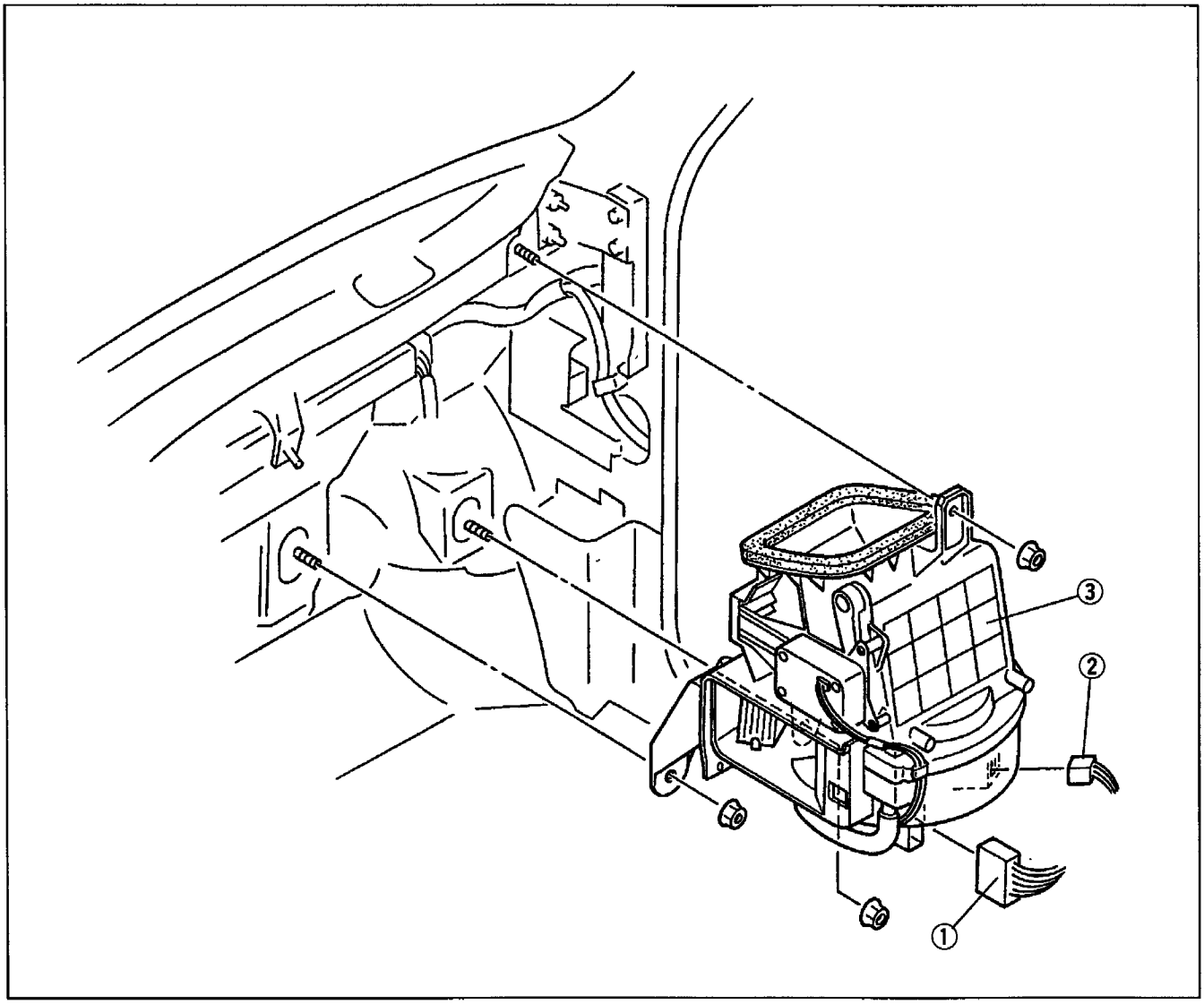


1. Blower unit
   - Removal / Installation ..... page U–12
   - Disassembly / Assembly .. page U–13
2. Heater unit
   - Removal / Installation ..... page U–14
   - Disassembly / Assembly .. page U–15
   - Inspection ..... page U–16
3. Cooling unit
   - Removal / Installation ..... page U–17
   - Disassembly / Assembly .. page U–18
   - Inspection ..... page U–19
4. A/C compressor
   - Removal / Installation ..... page U–20
5. Condenser
   - Removal / Installation ..... page U–21
   - Inspection ..... page U–21
6. Receiver/drier
   - Removal / Installation ..... page U–22
7. Refrigerant lines
   - Removal / Installation ..... page U–23
8. Rear heat duct
   - Removal / Installation ..... page U–25

BLOWER UNIT

Removal / Installation

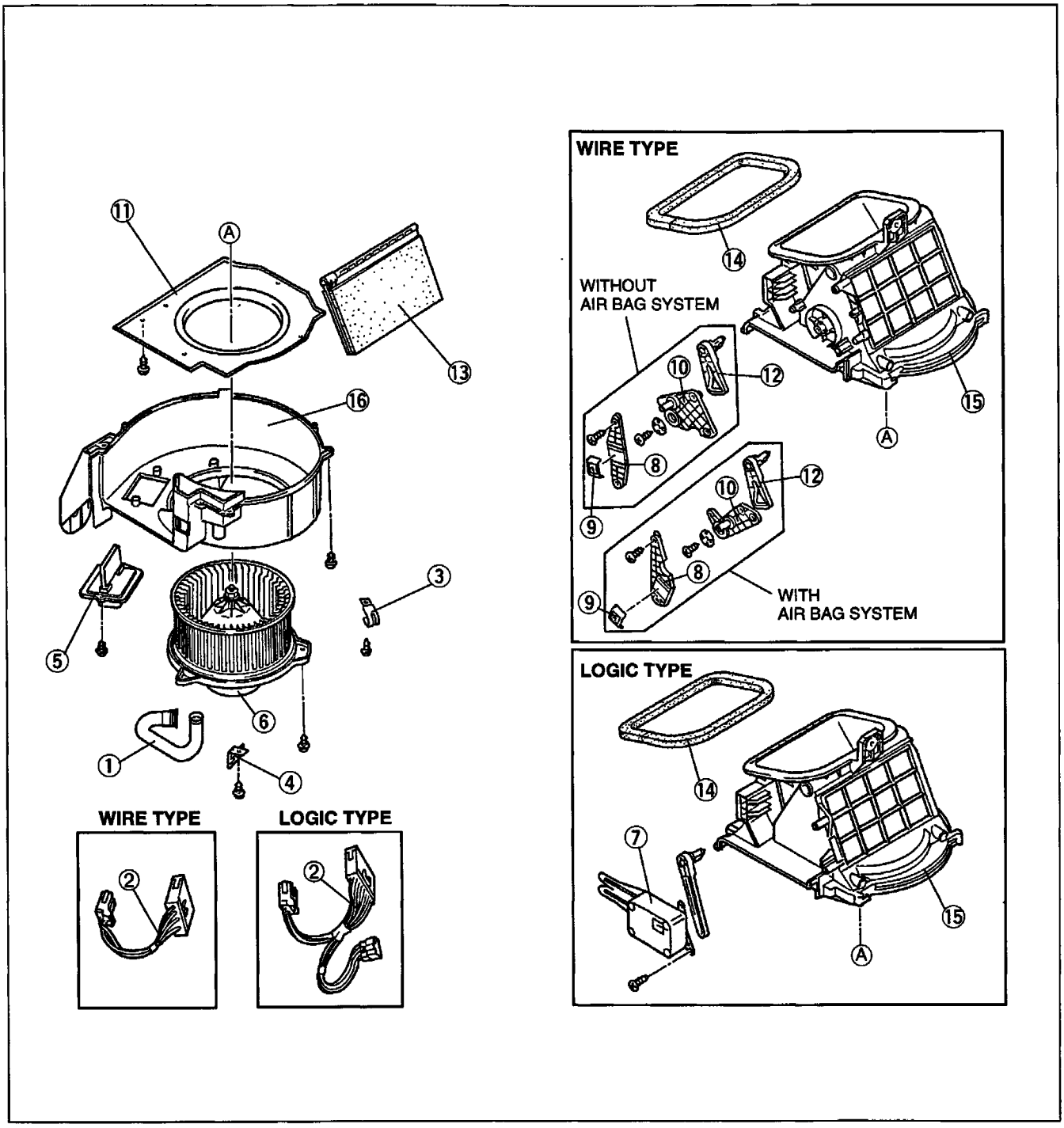
1. Remove the dashboard. (Refer to section S1.)
2. Remove the cooling unit. (Refer to page U–17.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



1. Blower unit connector
2. Blower motor connector
3. Blower unit
   Disassembly / Assembly .... page U–13

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.

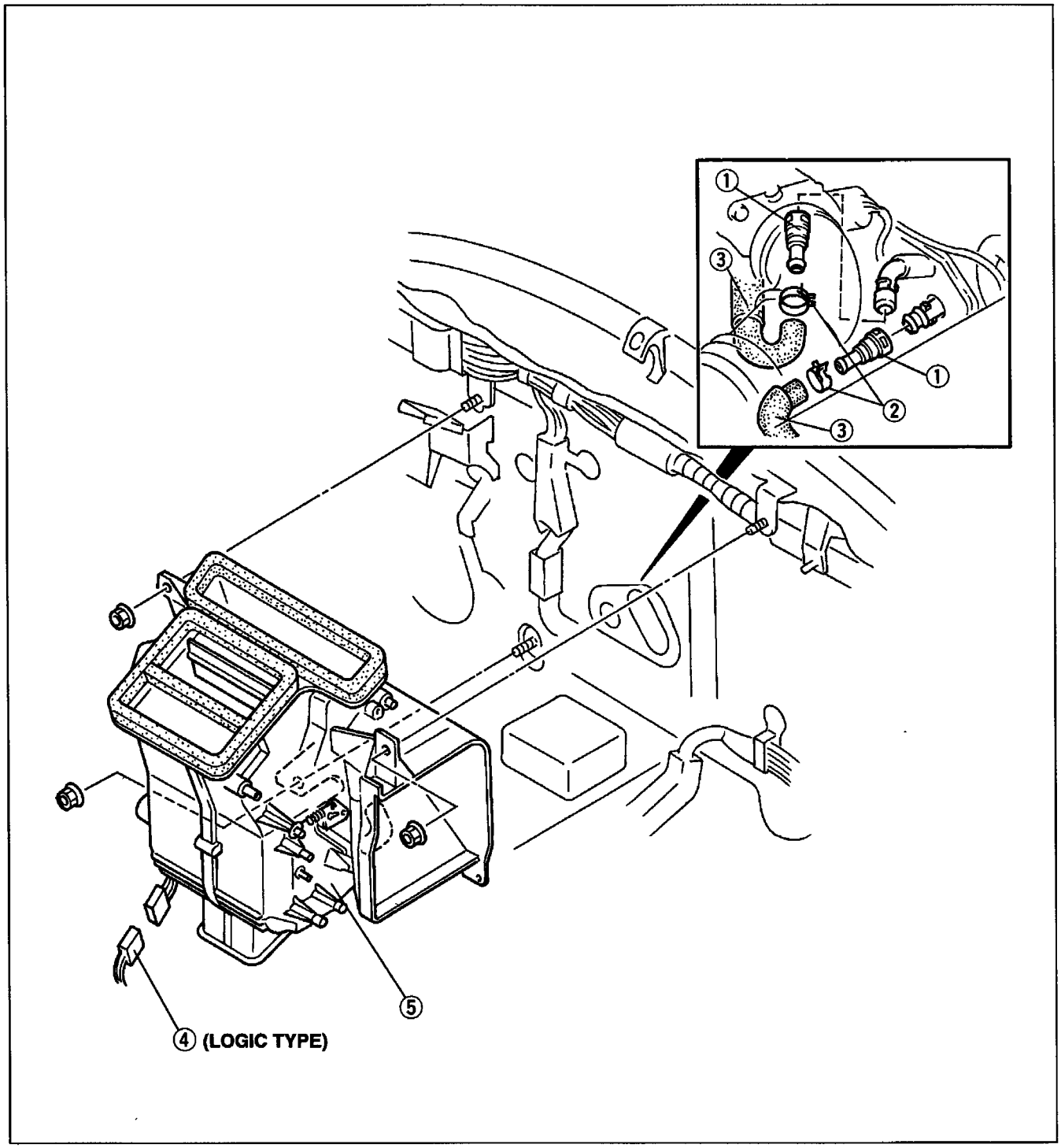


1. Air hose
2. Blower harness
3. Harness clip
4. Connector bracket
5. Resistor
6. Blower motor
7. Air intake actuator
8. Wire clamp bracket
9. Wire clamp
10. Air intake link
11. Air guider
12. Air intake crank
13. Air intake door
14. Polyurethane protector
15. Blower case (top)
16. Blower case (bottom)

HEATER UNIT

Removal / Installation

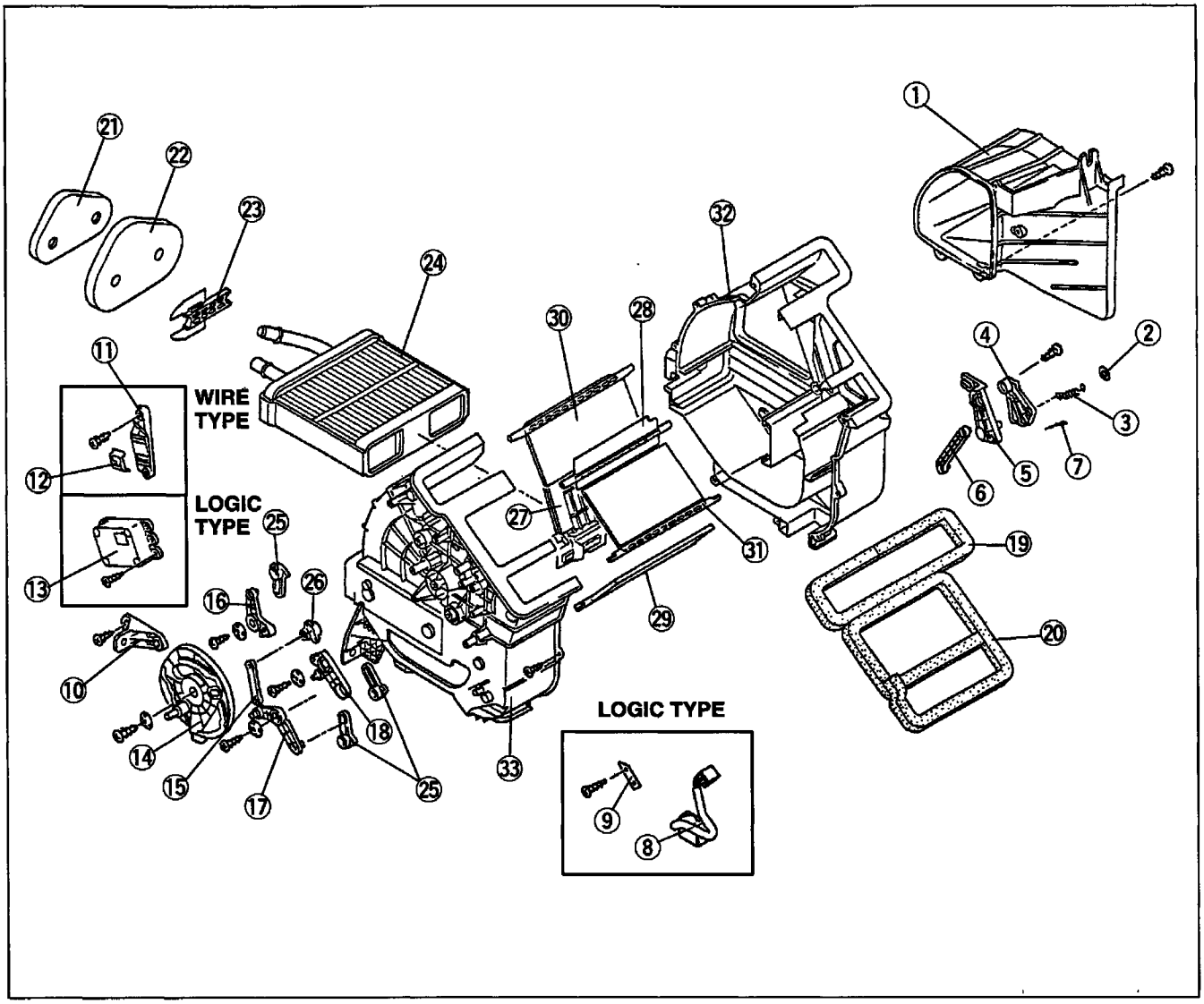
1. Drain the engine coolant. (Refer to section E.)
2. Remove the dashboard. (Refer to section S1.)
3. Remove the cooling unit. (Refer to page U–17.)
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal.



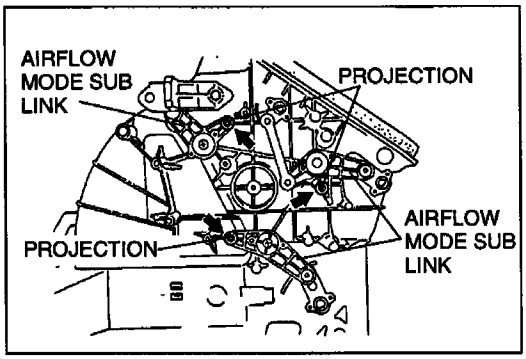
1. Quick connector
2. Hose clamp
3. Heater hose
4. Heater unit connector
5. Heater unit
   Disassembly / Assembly .... page U–15
   Inspection ..... page U–16

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly, referring to **Assembly note**. Do not apply extra grease to the links.

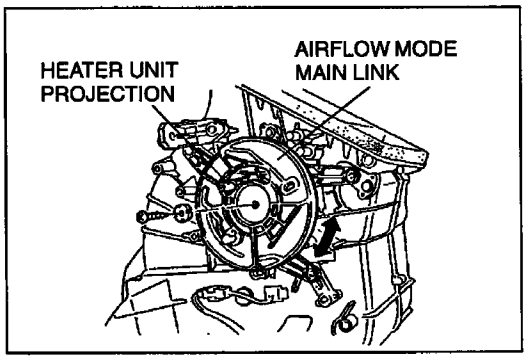


1. Duct
2. Push nut
3. Spring
4. Air mix crank
5. Air mix link
6. Air mix rod
7. Air mix wire clamp
8. Heater harness
9. Connector bracket
10. Heater unit bracket
11. Wire clamp bracket
12. Airflow mode wire clamp
13. Airflow mode actuator
14. Airflow mode main link
    Assembly note ..... page U–16
15. Airflow mode rod
16. Airflow mode sub link (DEFROSTER)
17. Airflow mode sub link (HEAT)
18. Airflow mode sub link (VENT)
19. Polyurethane protector (DEFROSTER)
20. Polyurethane protector (VENT)
21. Polyurethane foam
22. Polyurethane foam
23. Seal plate
24. Heater core
    Inspection ..... page U–16
25. Airflow mode crank
26. Side VENT crank
27. Air mix door
28. Side VENT door
29. HEAT door
30. DEFROSTER door
31. Center VENT door
32. Heater case (1)
33. Heater case (2)

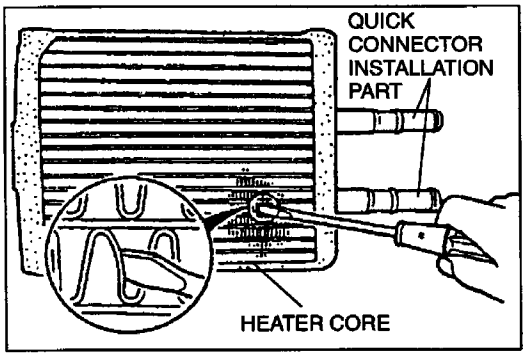


Assembly note
Airflow mode main link

1. Turn the projections of each airflow mode sub link outward.



2. Set the airflow mode main link to the heater unit as shown in the figure.
3. Press the airflow mode main link and rotate it in the direction of the arrow. Set the projections of each airflow mode sub link into the grooves of the airflow mode main link.
4. Rotate the airflow mode main link and verify that each mode is accessed properly.
5. Secure the airflow mode main link.



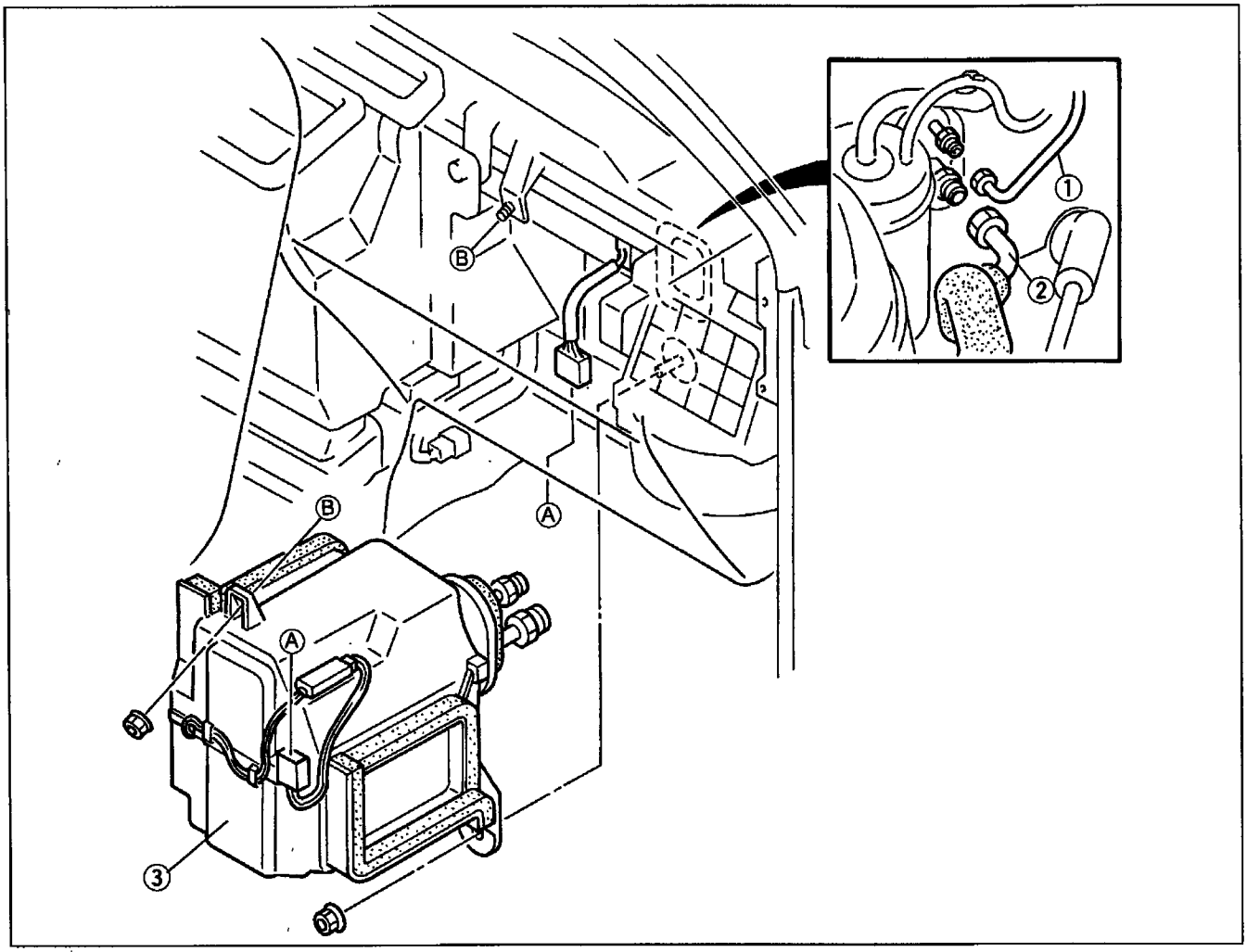
Inspection
Heater core

1. Disassemble the heater unit. (Refer to page U–15.)
2. Check for cracks, damage, and coolant leakage. Repair or replace the heater core if necessary.
3. Check for bent fins. If they are bent, use a flat-head screwdriver to straighten them.
4. Verify that the heater core inlet and outlet are not distorted or damaged. If the quick connector installation part is damaged, replace the heater core. (Refer to page U–15.)

COOLING UNIT

Removal / Installation

1. Discharge the refrigerant from the system.
2. Remove the side panel, glove compartment, and glove compartment cover. (Refer to section S1.)
3. If the air bag system is installed, remove the No.1 duct. (Refer to section S1.)
4. If the air bag system is installed, disconnect the air intake wire from the air intake link of the blower unit. (wire type)
5. Remove in the order shown in the figure. Do not allow compressor oil to spill. Immediately plug all open fittings to keep moisture and dirt out of the system.
6. Install in the reverse order of removal, referring to **Installation note**.
7. Adjust the air intake wire, charge the system and test its performance. (Refer to pages U–6 and 10.)



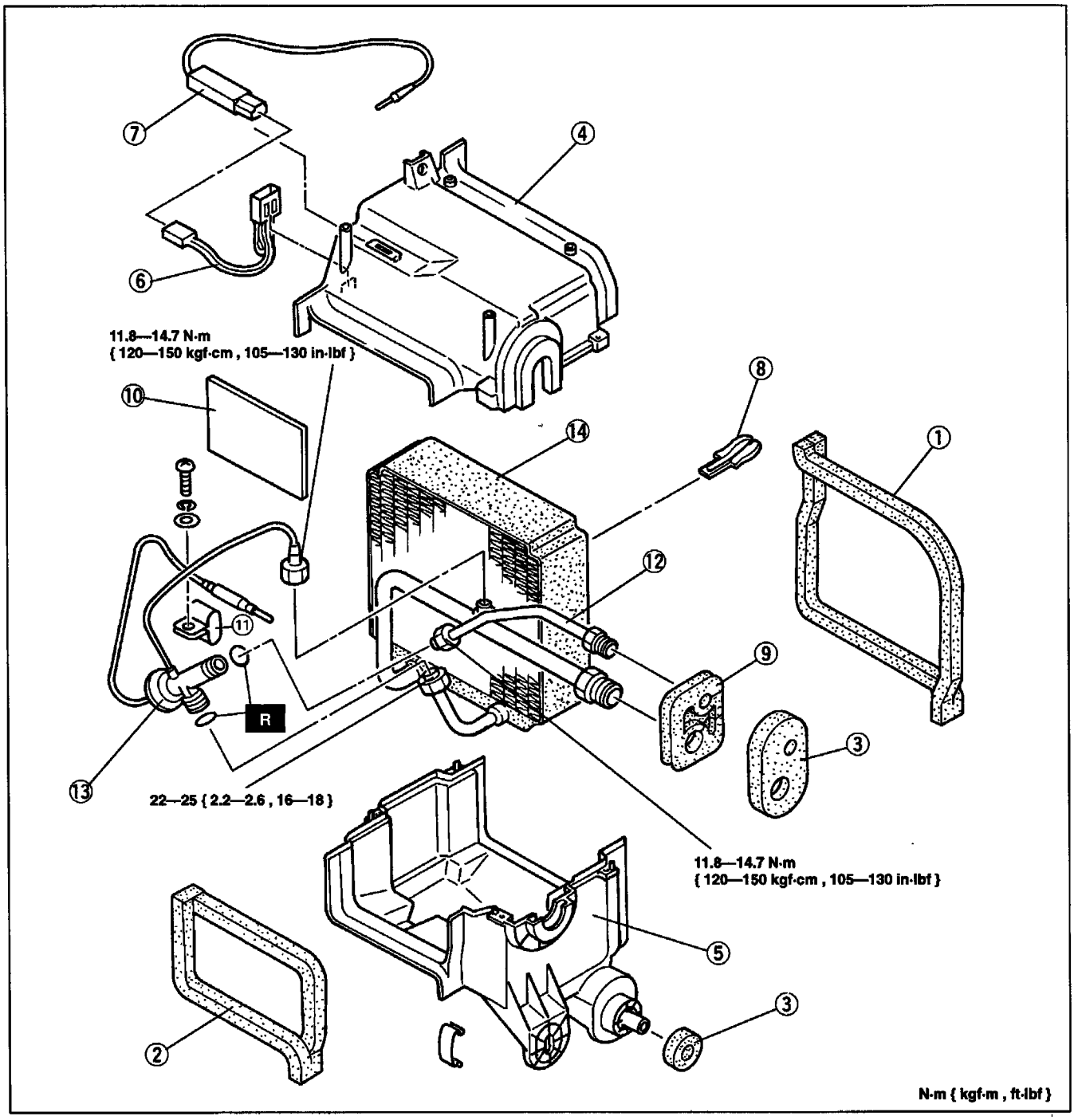
1. Cooler pipe No.4
   Removal / Installation ..... page U–23
2. Cooler pipe No.5
   Removal / Installation ..... page U–23
3. Cooling unit
   Installation note ..... below
   Disassembly / Assembly .... page U–18
   Inspection ..... page U–19

Installation note

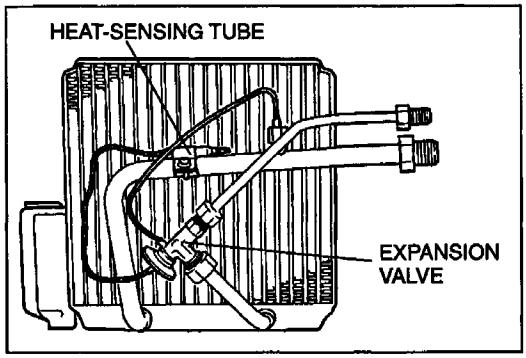
When installing a new cooling unit (evaporator), add **50 ml { 50 cc , 1.7 fl oz }** of compressor oil through the high-pressure side of the A/C compressor.

Disassembly / Assembly

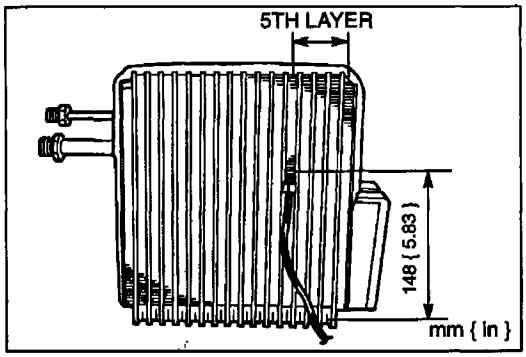
1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly, referring to **Assembly note**.



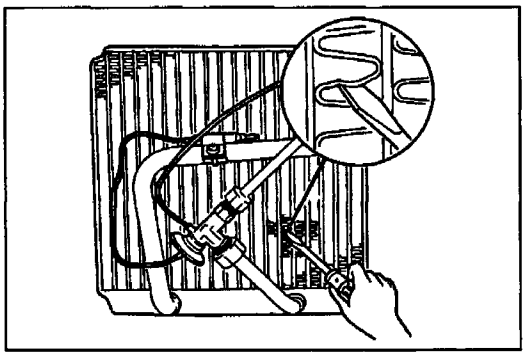
1. Polyurethane protector (heater side)
2. Polyurethane protector (blower side)
3. Polyurethane foam
4. Cooler case (top)
5. Cooler case (bottom)
6. A/C amplifier
7. Thermoswitch
   Assembly note ..... page U–19
8. Sensor clamp
9. Rubber protector
10. Sponge rubber
11. Bracket
12. Pipe
13. Expansion valve
    Assembly note ..... page U–19
14. Evaporator
    Inspection ..... page U–19



Assembly note
Expansion valve
1. Replace the O-rings at the expansion valve joints.
2. Apply compressor oil to the O-rings and connect the joints.
3. Tighten the joint to the specified torque by using two open-end wrenches. (Refer to page U–24.)
4. Assemble the heat-sensing tube as shown in the figure.



Thermoswitch
Assemble the sensor part of the thermoswitch as shown in the figure.

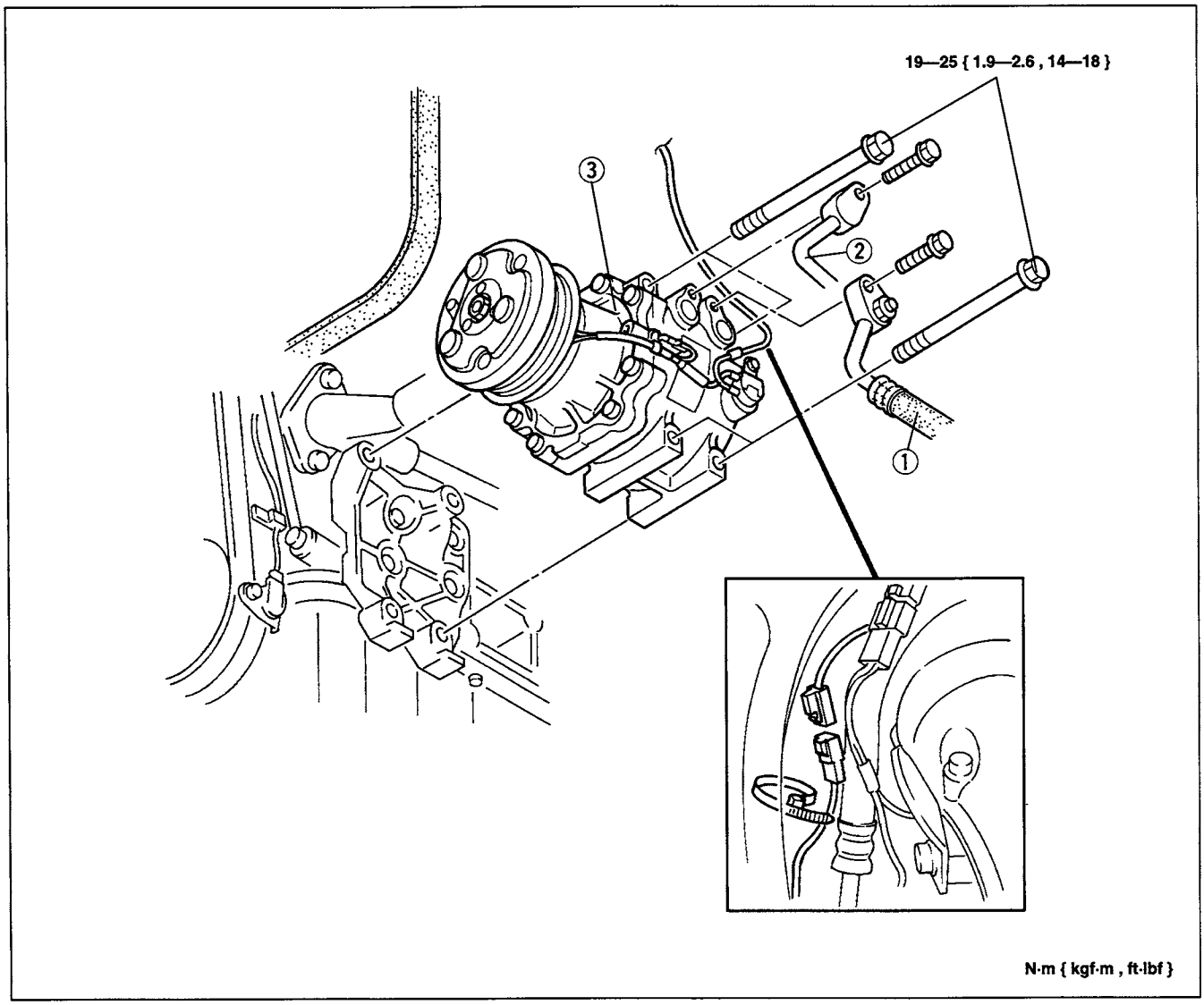


Inspection
Evaporator
1. Disassemble the cooling unit. (Refer to page U–18.)
2. Check for cracks, damage and oil leakage. Repair or replace the evaporator if necessary.
3. Check for bent fins. If they are bent, use a flat-head screwdriver to straighten them.

A/C COMPRESSOR

Removal / Installation

1. Discharge the refrigerant from the system.
2. Remove the undercover, splash shield (RH), and A/C drive belt. (Refer to section B1 or B2.)
3. Remove in the order shown in the figure. Do not allow compressor oil to spill. Immediately plug all open fittings to keep moisture out of the system.
4. Install in the reverse order of removal, referring to **Installation note**.
5. Charge the system and test its performance. (Refer to pages U–6 and 10.)



1. Flexible hose (HI)
   Removal / Installation ..... page U–23
2. Flexible hose (LO)
   Removal / Installation ..... page U–23
3. A/C compressor
   Installation note ..... below

Installation note

Follow the procedure below when replacing the A/C compressor with a new one:

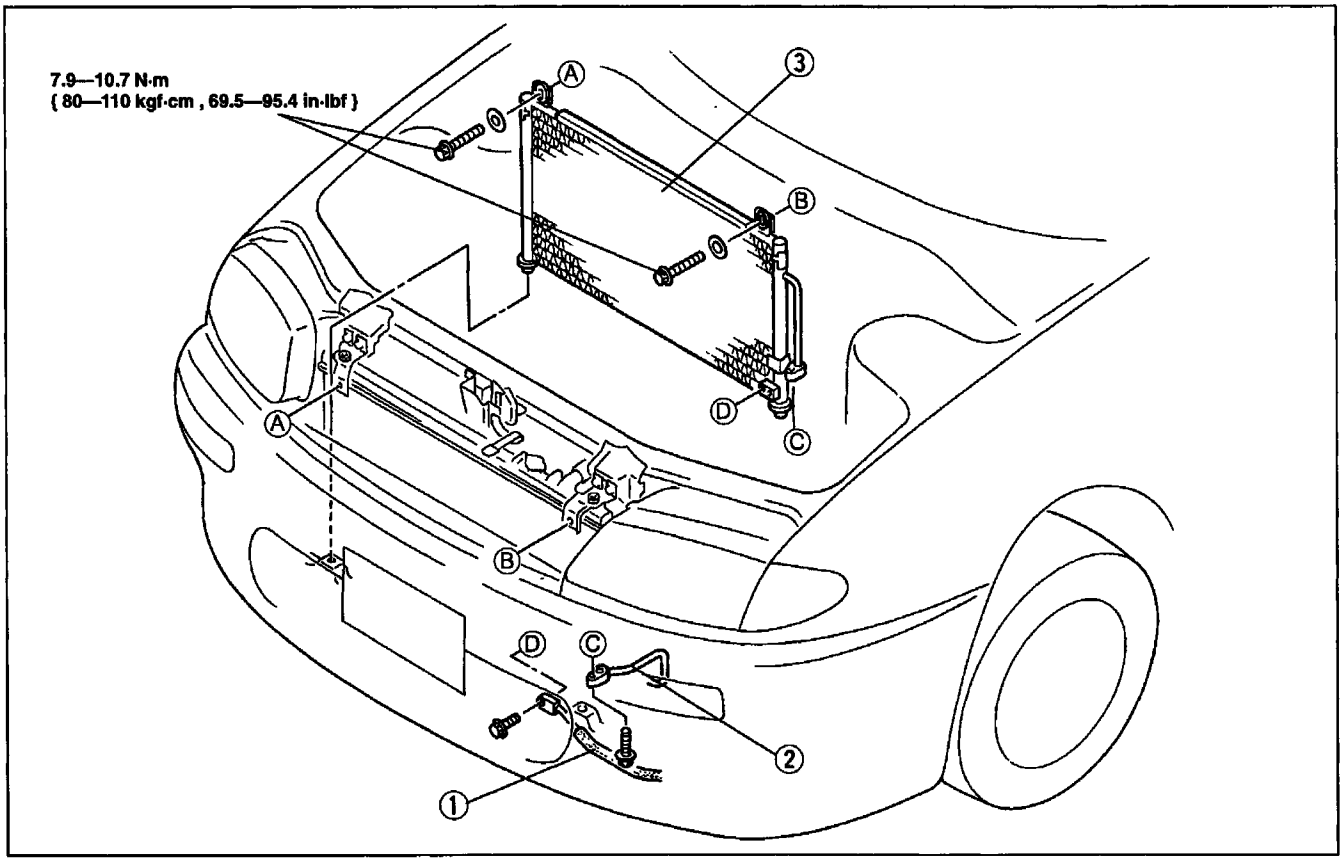
1. Measure the amount of compressor oil remaining in the old A/C compressor.
2. Remove the following amount of compressor oil from the new A/C compressor.

Compressor oil to be removed
= 120 ml { 120 cc , 4.06 fl oz } – [compressor oil from old A/C compressor + 5—10 ml { 5—10 cc , 0.2—0.3 fl oz }]

CONDENSER

Removal / Installation

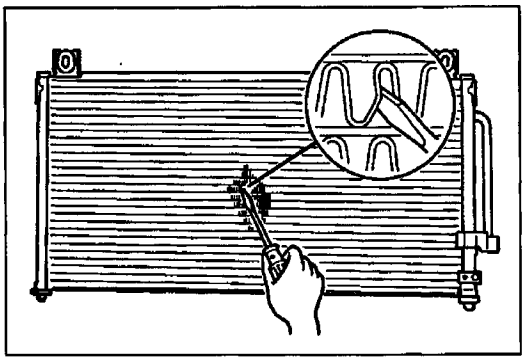
1. Discharge the refrigerant from the system.
2. Remove the upper seal board. (Refer to section E.)
3. Remove the radiator grille. (Refer to section S1.)
4. Remove the undercover. (Refer to section B1 or B2.)
5. Remove in the order shown in the figure. Do not allow compressor oil to spill. Immediately plug all open fittings to keep moisture out of the system.
6. Install in the reverse order of removal, referring to **Installation note.**
7. Charge the system and test its performance. (Refer to pages U–6 and 10.)



1. Cooler pipe No.1
   Removal / Installation ..... page U–23
2. Flexible hose (HI)
   Removal / Installation ..... page U–23
3. Condenser
   Installation note ..... below
   Inspection ..... below

Installation note

When installing a new condenser, add **15 ml { 15 cc , 0.5 fl oz }** of compressor oil through the high-pressure side of the A/C compressor.



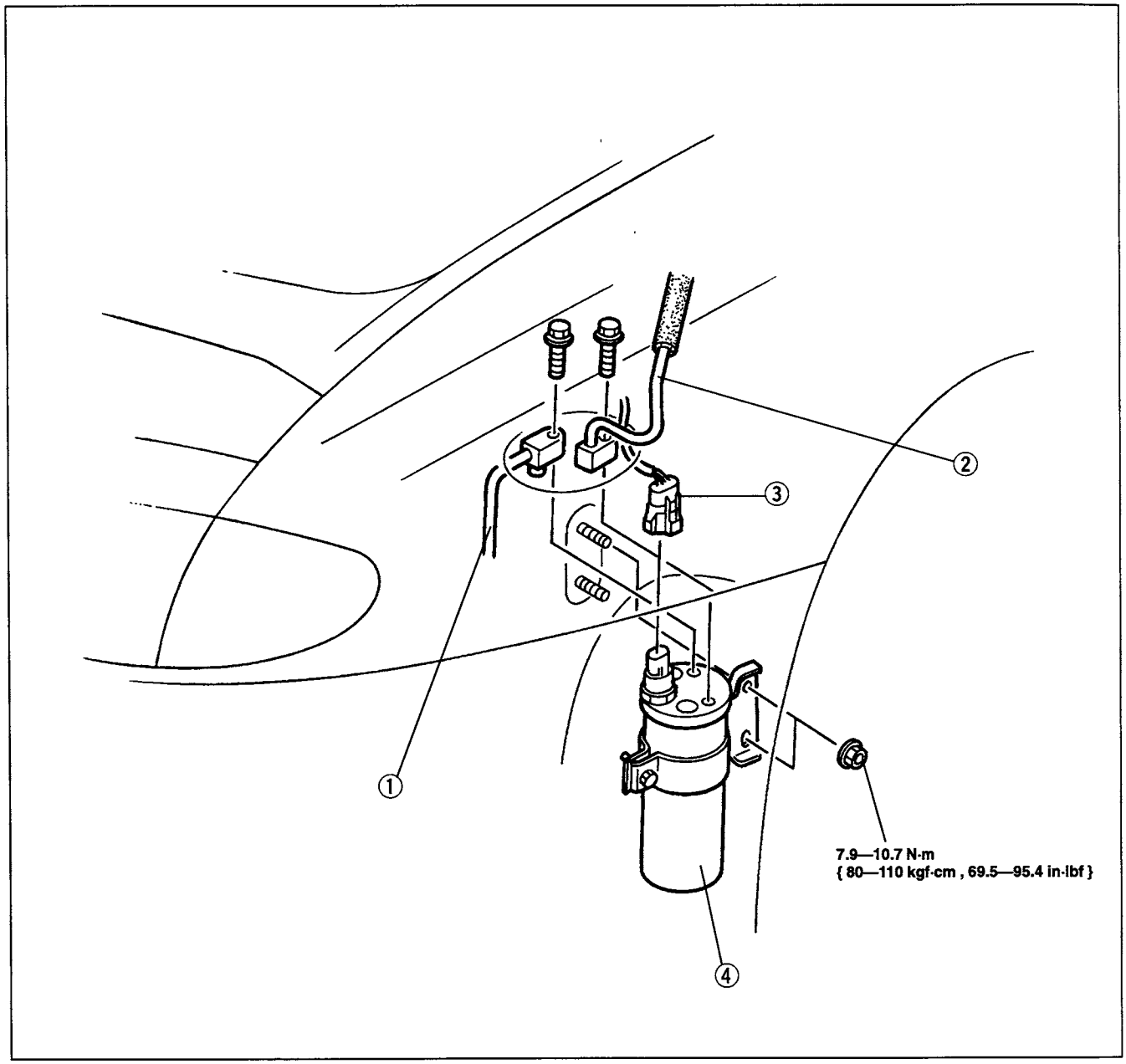
Inspection

1. Check for cracks, damage, and oil leakage. Repair or replace the condenser if necessary.
2. Check for bent fins. If they are bent, use a flat-head screwdriver to straighten them.

RECEIVER/DRIER

Removal / Installation

1. Discharge the refrigerant from the system.
2. Remove the undercover and the splash shield (LH). (Refer to section B1 or B2.)
3. Remove the mud guard (LH). (Refer to section S1.)
4. Remove in the order shown in the figure. Do not allow compressor oil to spill. Immediately plug all open fittings to keep moisture out of the system.
5. Install in the reverse order of removal, referring to **Installation note**.
6. Charge the system and test its performance. (Refer to pages U–6 and 10.)



1. Cooler pipe No.2
   Removal / Installation ..... page U–23
2. Cooler pipe No.3
   Removal / Installation ..... page U–23
3. Refrigerant pressure switch connector
4. Receiver/drier
   Installation note ..... below

Installation note

When installing a new receiver/drier, add **10 ml { 10 cc , 0.3 fl oz }** of compressor oil through the high-pressure side of the A/C compressor.

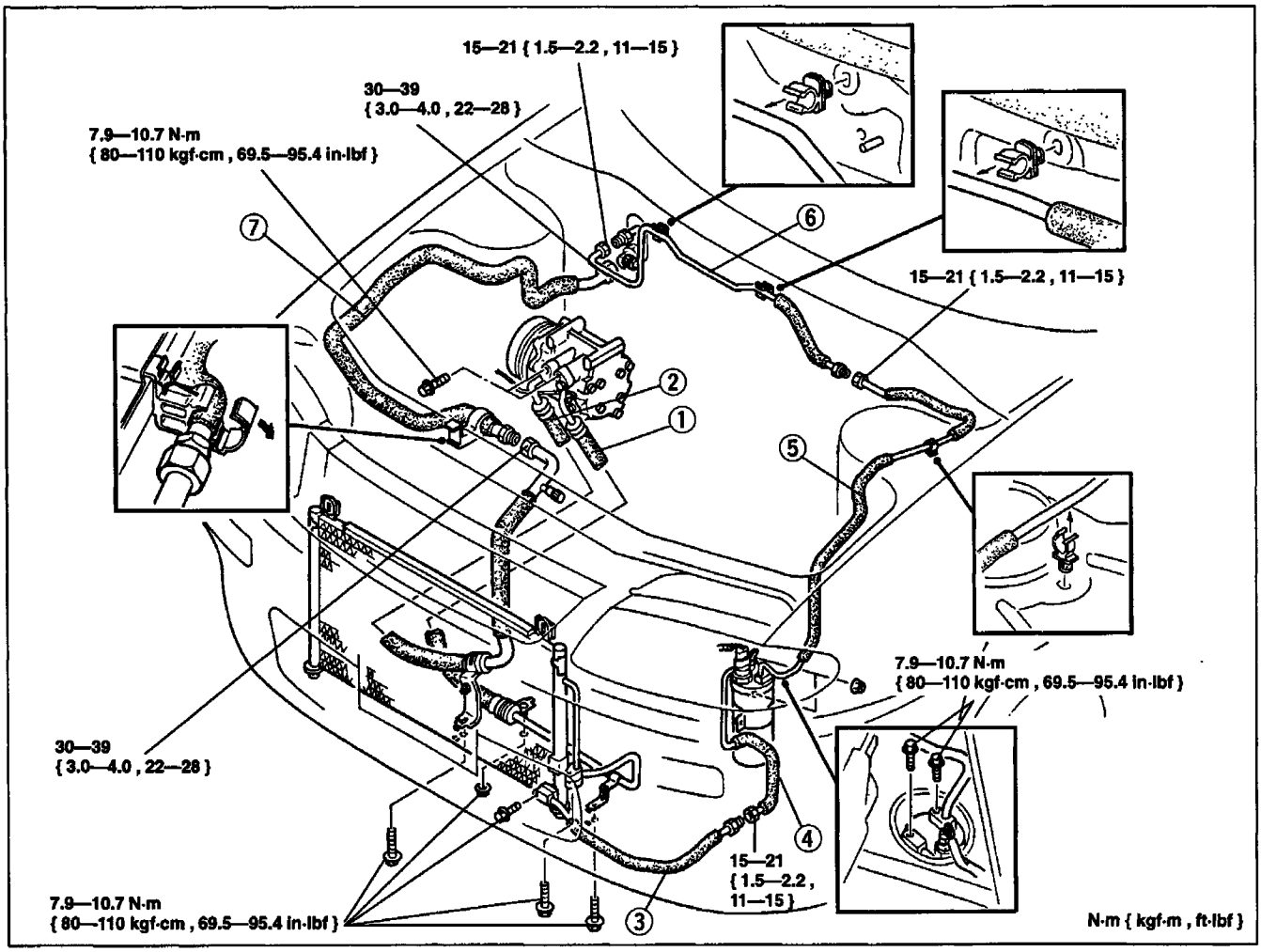
REFRIGERANT LINES

Removal / Installation

1. Discharge the refrigerant from the system.
2. Remove the following parts, depending on pipe and hose to be removed.

Cooler pipe/hose to be removed	Parts to be removed	Section
Flexible hose (HI)	Undercover, Splash shields, Engine mount member	B1, B2
Flexible hose (LO)	Undercover, Splash shield (RH)	B1, B2
Cooler pipe No.1, No.2	Undercover, Splash shield (LH)	B1, B2
	Mud guard (LH)	S1
Cooler pipe No.4, No.5	Charcoal canister	F1, F2
	Cruise actuator (if equipped)	T1

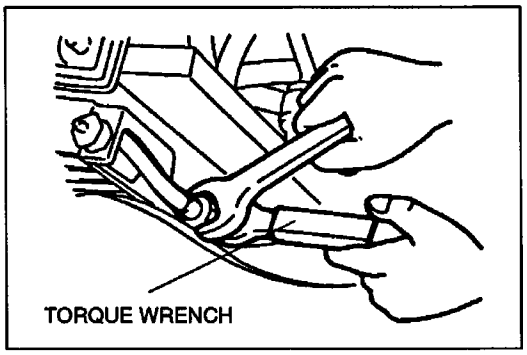
3. Remove as shown in the figure. Do not allow compressor oil to spill. Immediately plug all open fittings to keep moisture out of the system.
4. Install in the reverse order of removal, referring to **Installation note**.
5. Charge the system and test its performance. (Refer to pages U–6 and 10.)



1. Flexible hose (HI)
   Installation note ..... page U–24
2. Flexible hose (LO)
   Installation note ..... page U–24
3. Cooler pipe No.1
   Installation note ..... page U–24
4. Cooler pipe No.2
   Installation note ..... page U–24
5. Cooler pipe No.3
   Installation note ..... page U–24
6. Cooler pipe No.4
   Installation note ..... page U–24
7. Cooler pipe No.5
   Installation note ..... page U–24

Installation note

1. Replace the O-rings at the pipe and/or hose joints, when installing pipes.
2. Apply compressor oil to the O-rings and connect the joints.
3. When installing a new cooler pipe or flexible hose, add **10 ml { 10 cc , 0.3 fl oz }** of compressor oil through the high-pressure side of the A/C compressor.

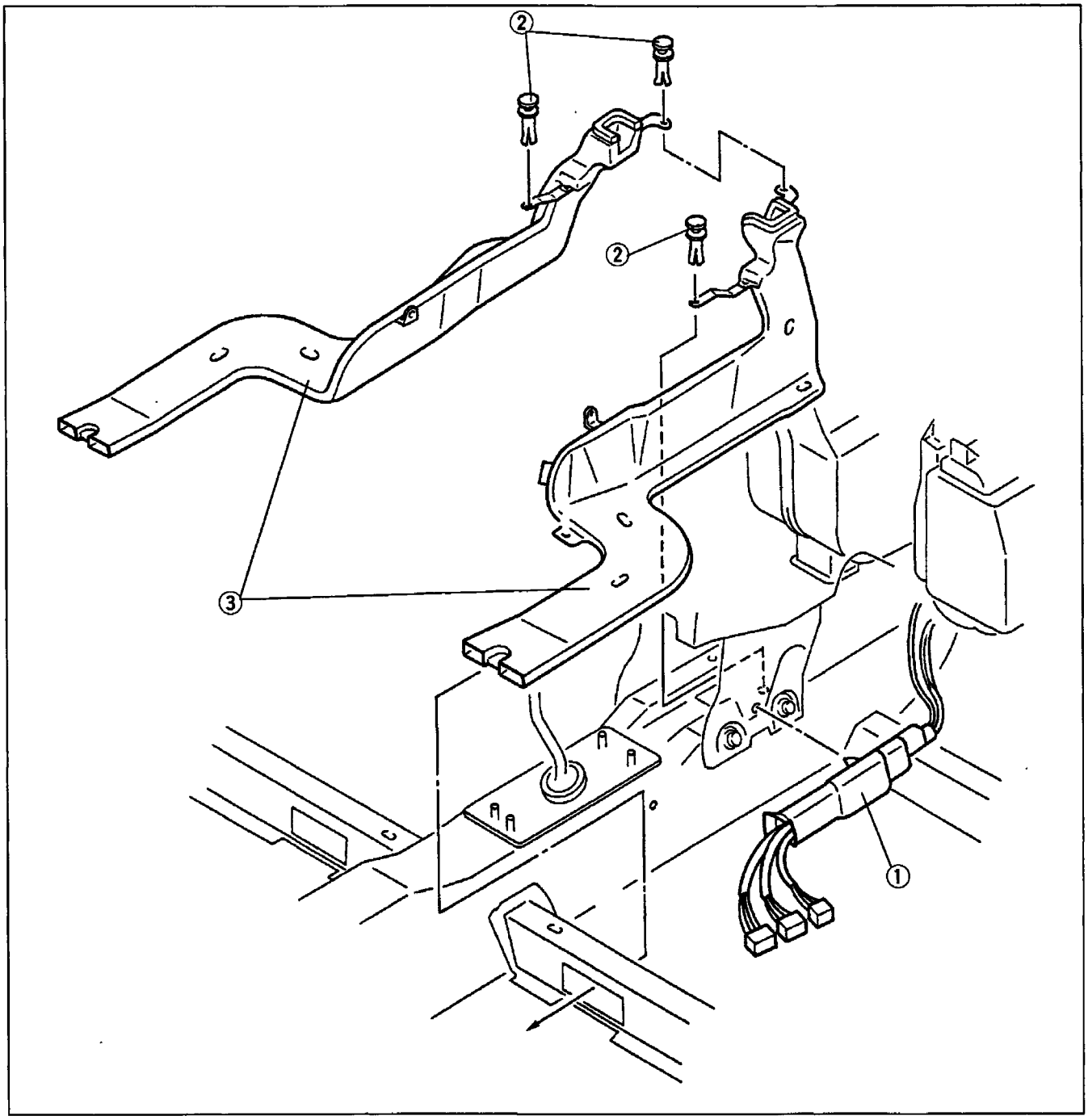


4. Tighten the joints.
   (1) Verify that the O-rings are installed.
   (2) Tighten the nut or bolt of the joint by hand.
   (3) Fix the bracket and clip installed on the hose or pipe to the vehicle.
   (4) Tighten the joint to the specified torque. If it is nut joint, tighten in the procedure as the figure.

REAR HEAT DUCT

Removal / Installation

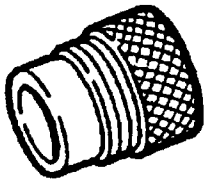
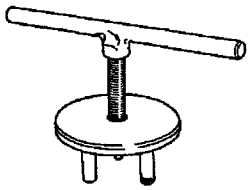
1. Remove the front seat. (Refer to section S1.)
2. Remove the center console and side wall. (Refer to section S1.)
3. Remove the PCM. (Refer to section F1 or F2.)
4. Remove the front scuff plate and front side trim, and turn over the floor covering. (Refer to section S1.)
5. Remove in the order shown in the figure.
6. Install in the reverse order of removal.



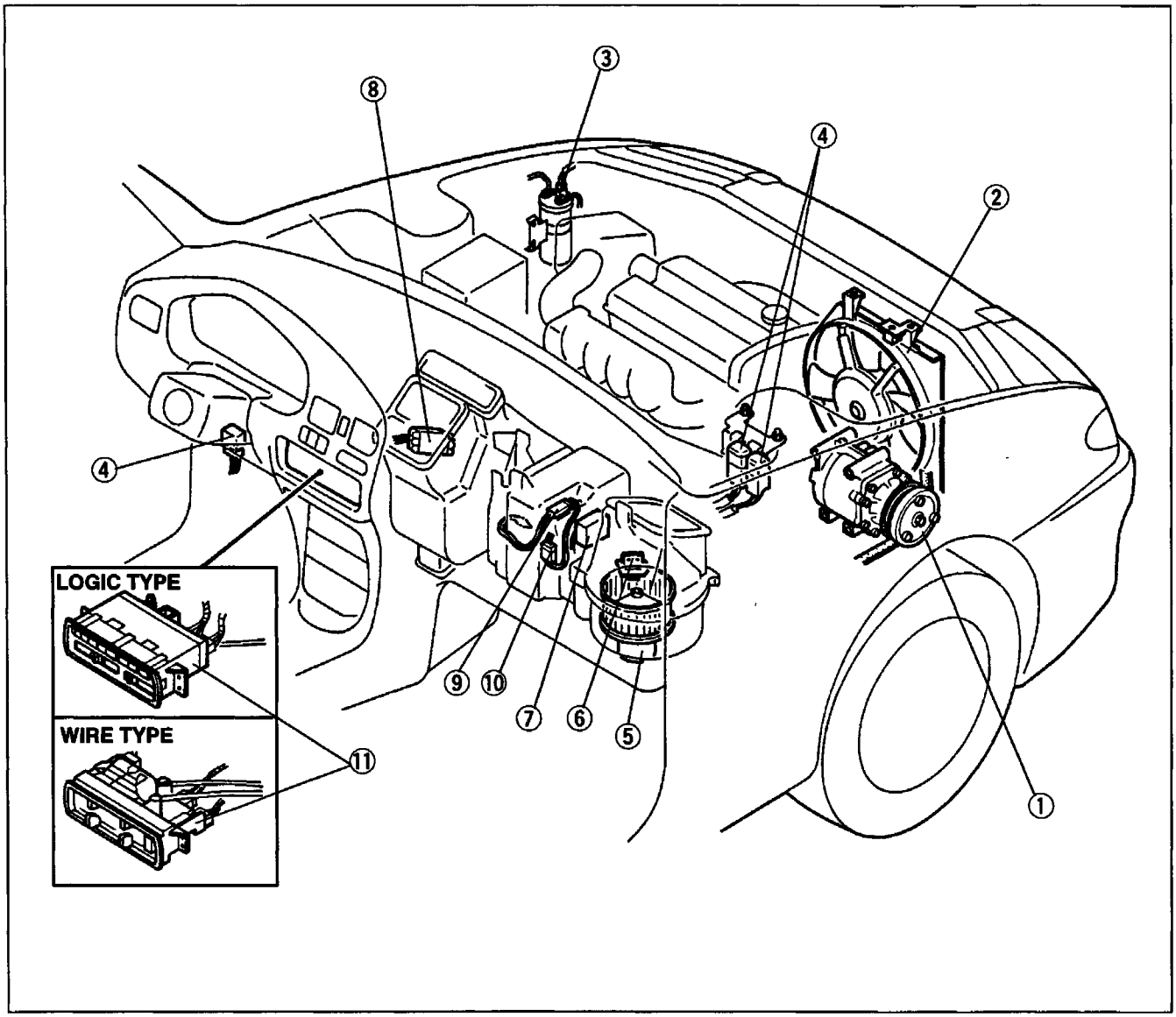
1. PCM harness
2. Fastener
3. Rear heat duct

CONTROL SYSTEM

PREPARATION
SST

49 B061 010 A/C clutch holder 	For prevention of A/C compressor pulley rotation	49 G032 311 Oil seal and spacer installer guide 	For installation of A/C compressor pulley
49 B061 013 Pressure plate remover 	For removal of pressure plate	—	—

STRUCTURAL VIEW

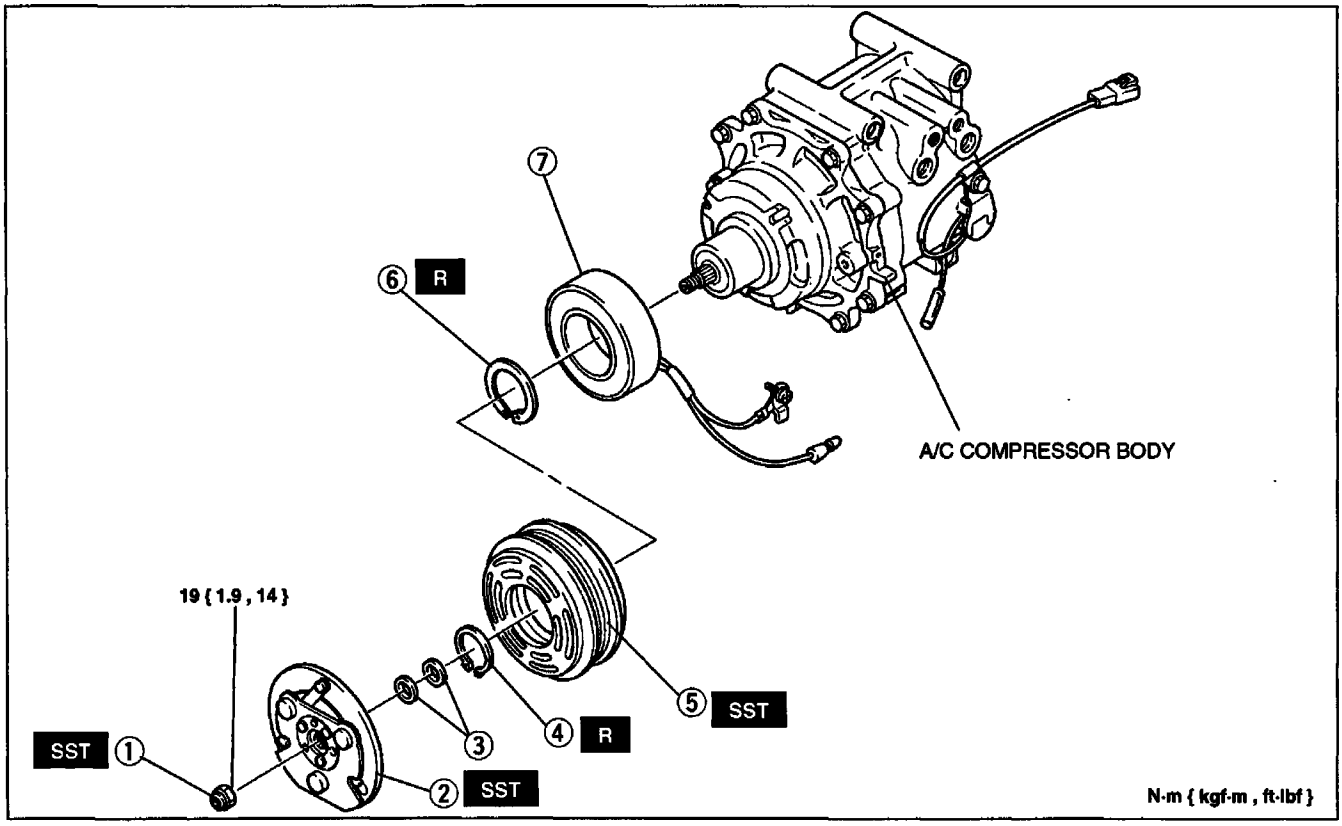


1. Magnetic clutch
Disassembly / Assembly ..... below
Inspection ..... page U–29
2. Condenser fan
Removal / Installation ..... page U–30
Inspection ..... page U–30
3. Refrigerant pressure switch
Removal / Installation ..... page U–31
Inspection ..... page U–31
4. Relay
Removal / Installation ..... page U–31
Inspection ..... page U–32
5. Blower motor
Removal / Installation ..... page U–32
Inspection ..... page U–32
6. Resistor
Removal / Installation ..... page U–32
Inspection ..... page U–32
7. Air intake actuator
Removal / Installation ..... page U–33
Inspection ..... page U–33
8. Airflow mode actuator
Removal / Installation ..... page U–33
Inspection ..... page U–33
9. Thermoswitch
Removal / Installation ..... page U–34
Inspection ..... page U–34
10. A/C amplifier
Removal / Installation ..... page U–34
Inspection ..... page U–34
11. Heater control unit
Removal / Installation ..... page U–36
Disassembly / Assembly .... page U–39
Inspection ..... page U–41

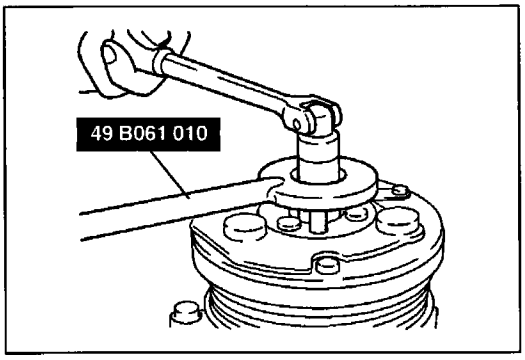
MAGNETIC CLUTCH

Disassembly / Assembly

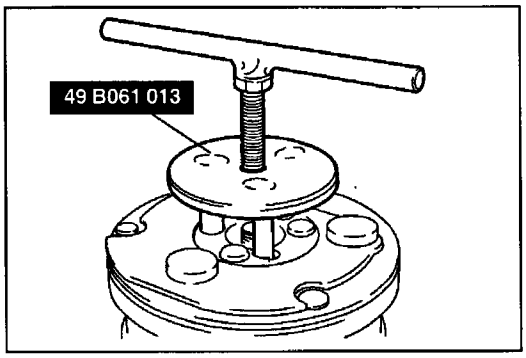
1. Remove the A/C compressor. (Refer to page U–20.)
2. Disassemble in the order shown in the figure, referring to **Disassembly note.**
3. Assemble in the reverse order of disassembly, referring to **Assembly note.**



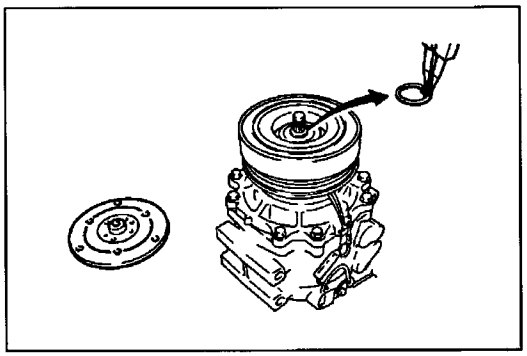
1. Center nut
Disassembly note ..... page U–28
2. Pressure plate
Disassembly note ..... page U–28
Assembly note ..... page U–29
3. Shim
4. Snap ring
5. A/C compressor pulley
Disassembly note ..... page U–28
Assembly note ..... page U–29
6. Snap ring
7. Stator
Assembly note ..... page U–28
Inspection ..... page U–29



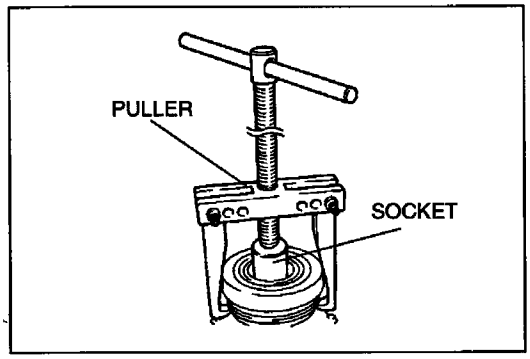
Disassembly note
Center nut
Hold the pressure plate in place by using the **SST** and remove the center nut.



Pressure plate
If the pressure plate cannot be removed by hand, use the **SST** as shown in the figure.

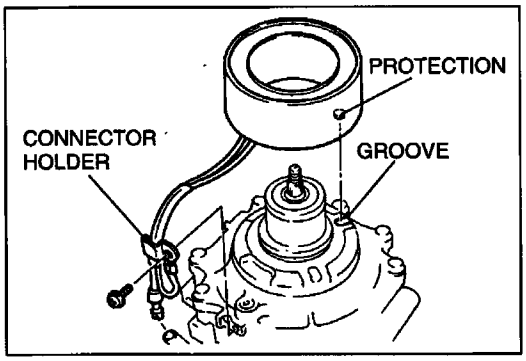


A/C compressor pulley
1. Remove the snap ring by using snap-ring pliers.

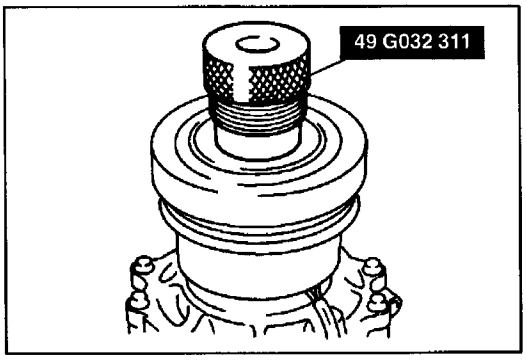


Caution
- **The edge of the puller can damage the drive belt groove. Avoid contact of the puller to the pulley groove.**

2. Set a **25 mm { 1.0 in }** socket and a puller on the A/C compressor as shown in the figure.
3. Turn the shaft of the puller to remove the A/C compressor pulley.

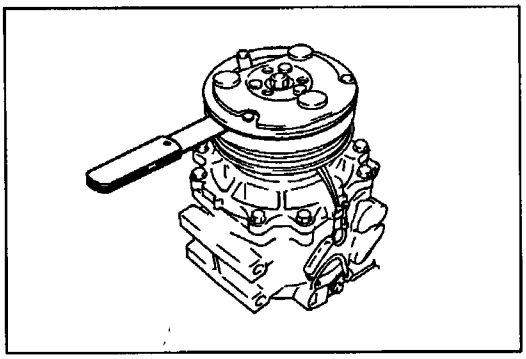


Assembly note
Stator
1. Set the projection of the stator to the A/C compressor body groove as shown in the figure.
2. Connect the connector and install the connector holder.



A/C compressor pulley

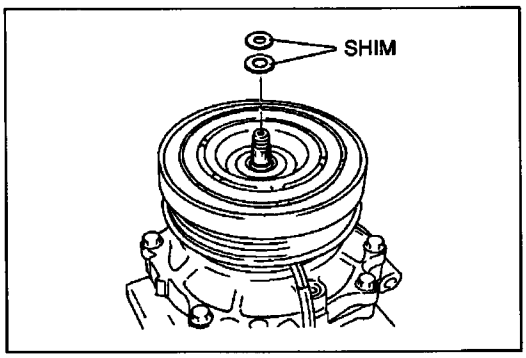
1. Remove all foreign material from the boss of the A/C compressor and inside the bearing of the A/C compressor pulley.
2. Set the **SST** as shown in the figure.
3. Press the **SST** to assemble the A/C compressor pulley.



Pressure plate

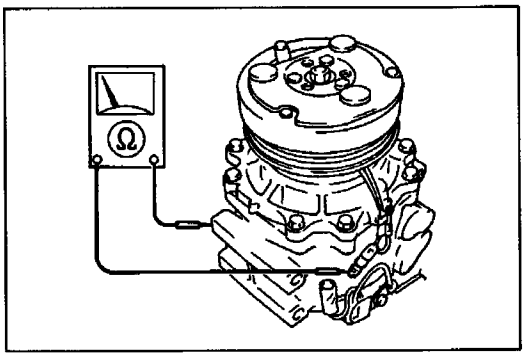
1. Adjust the clearance between the pressure plate and the A/C compressor pulley.
   (1) Set the A/C compressor on a level block.
   (2) Rotate the A/C compressor pulley and measure the clearance between the A/C compressor pulley and the pressure plate by using a thickness gauge.

   Clearance: 0.35—0.65 mm { 0.014—0.025 in }



2. If not as specified, install shims to adjust the clearance.

   Adjustment shim size:
   0.1 mm { 0.004 in }, 0.2 mm { 0.008 in },
   0.4 mm { 0.016 in }, 0.5 mm { 0.02 in }



Inspection
Stator

1. Disconnect the stator connector.
2. Measure the resistance between the stator connector and the A/C compressor body.

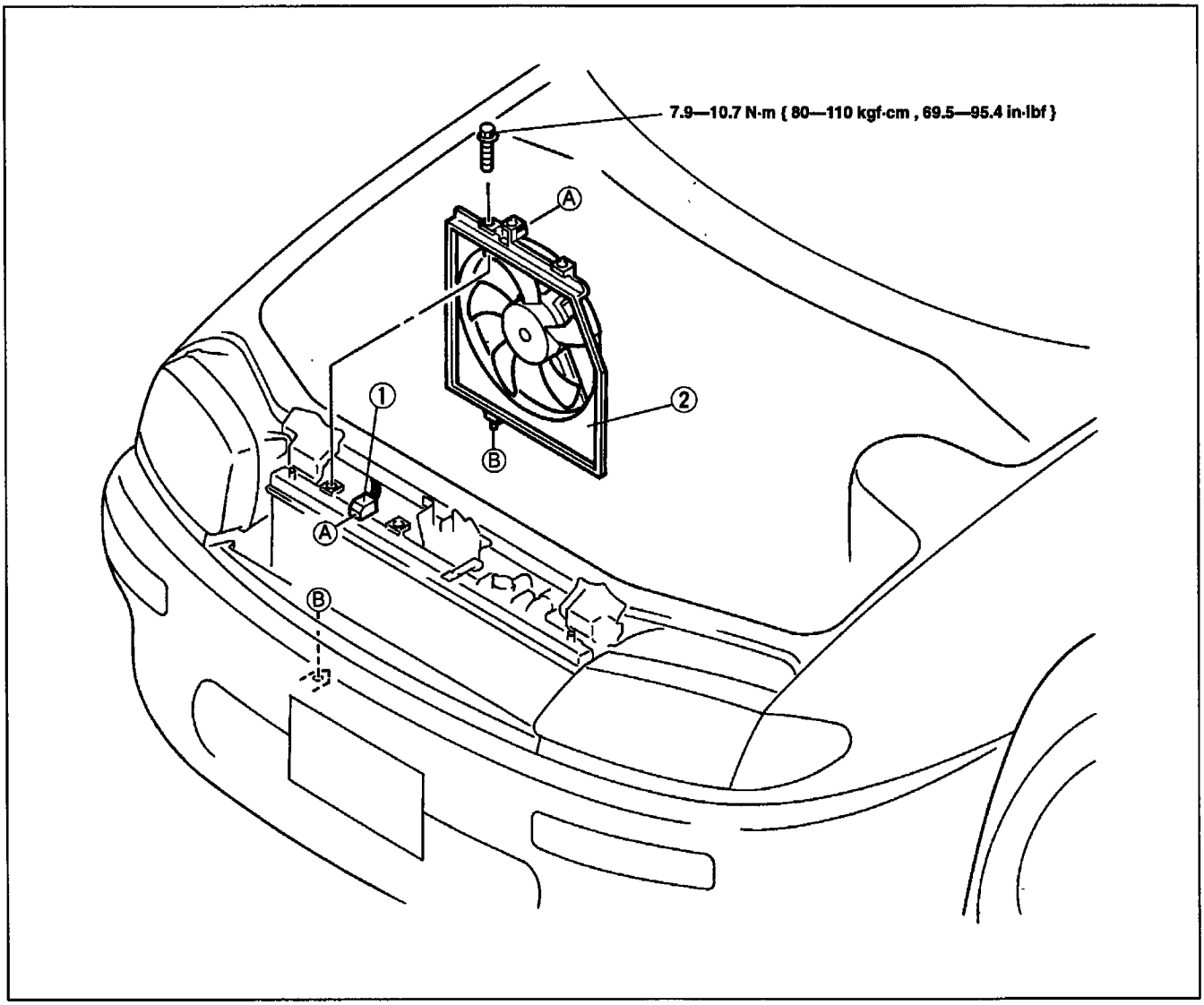
   Resistance: 3.05—3.35 Ω [at 20 °C { 68 °F }]

3. If not as specified, replace the stator.

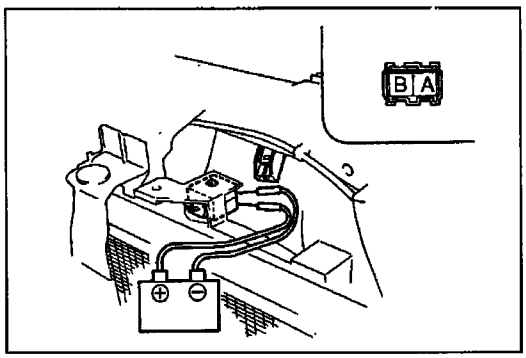
CONDENSER FAN

Removal / Installation

1. Remove the upper seal board, radiator grille, and radiator brackets. (Refer to sections E, S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.

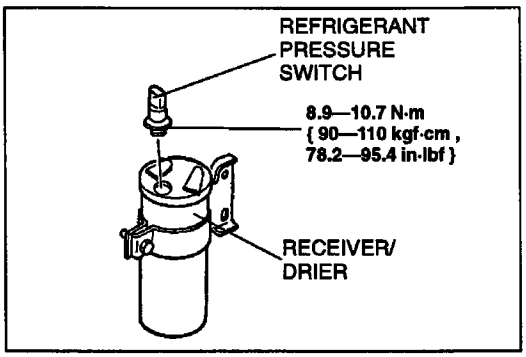


1. Condenser fan connector
2. Condenser fan
   Inspection ..... below



Inspection

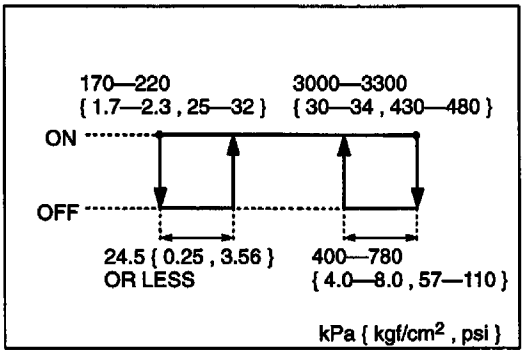
1. Disconnect the condenser fan connector.
2. Connect battery positive voltage to terminal A and ground to terminal B of the condenser fan and check its operation.
3. If condenser fan does not operate, replace the condenser fan.



REFRIGERANT PRESSURE SWITCH

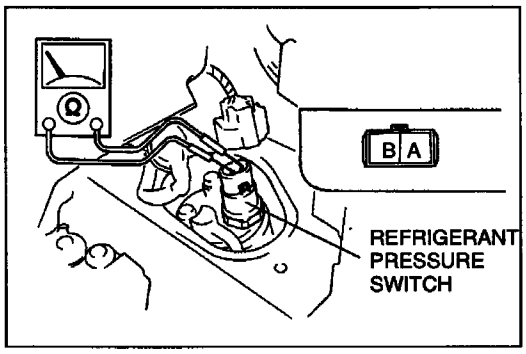
Removal / Installation

1. Remove the receiver/drier. (Refer to page U–22.)
2. Remove the refrigerant pressure switch from the receiver/drier. Immediately plug the open fitting to keep moisture out of the system.
3. Install in the reverse order of removal. Before installing the refrigerant pressure switch, apply compressor oil to the O-ring and connect the joint.
4. Charge the system and test its performance. (Refer to pages U–6 and 10.)



Inspection

1. Install the manifold gauge set. (Refer to page U–5.)
2. Make sure that the high-pressure side is in the ON range shown in the figure.



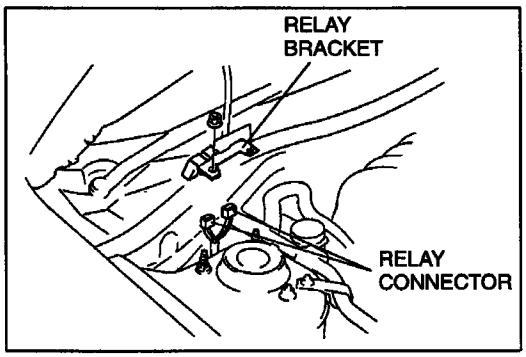
3. Disconnect the refrigerant pressure switch connector.
4. Verify that there is continuity between terminals A and B of the refrigerant pressure switch.
5. If there is no continuity, replace the refrigerant pressure switch.

RELAY

Removal / Installation

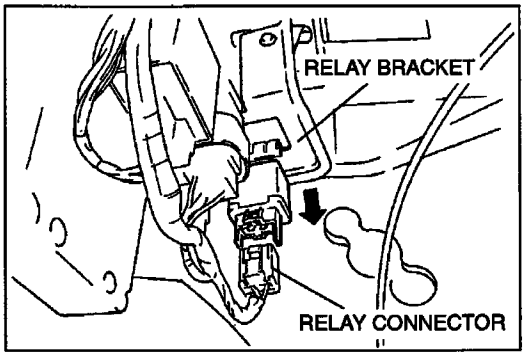
A/C relay, condenser fan relay

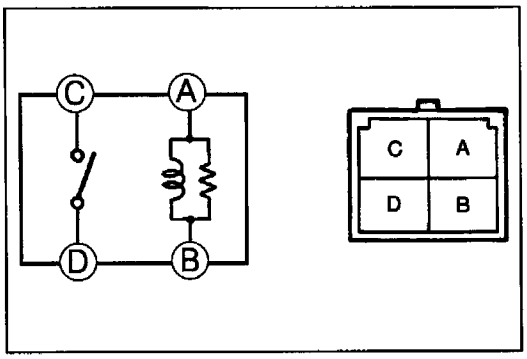
1. If the cruise control system is installed, remove the cruise actuator with the actuator cable still connected and position it away from the suspension tower.
2. Remove the relay bracket.
3. Disconnect the relay connectors.
4. Install in the reverse order of removal.



Blower relay

1. Disconnect the relay connector.
2. Remove the blower relay from the relay bracket.
3. Install in the reverse order of removal.



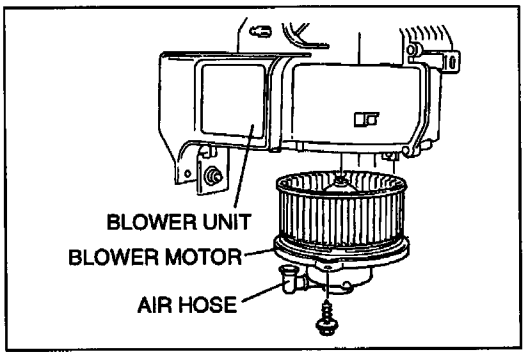


Inspection
A/C relay, condenser fan relay, blower reray
1. Remove the relay. (Refer to page U–31.)
2. Connect battery positive voltage and check for continuity between terminals of the relay.

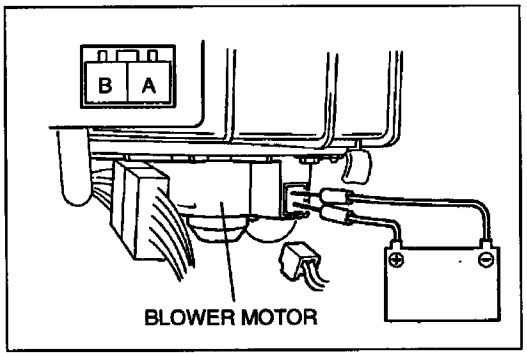
○—○: Continuity B+: Battery positive voltage

Connection		A	B	C	D
B+	GND				
—	—	○	○		
A	B			○	○

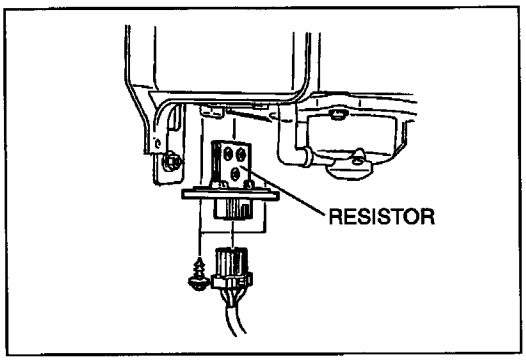
3. If not as specified, replace the relay.



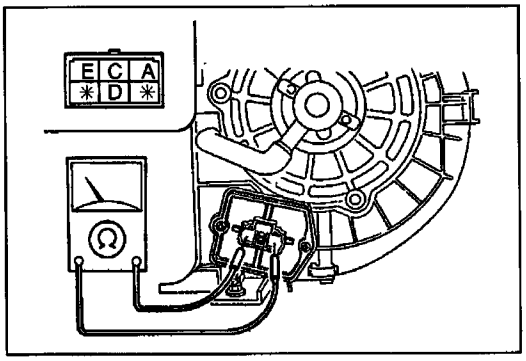
BLOWER MOTOR
Removal / Installation
1. Remove the blower motor cover.
2. Disconnect the blower motor connector.
3. Remove the blower motor connector from the connector blacket.
4. Remove the air hose.
5. Remove the screws and the blower motor.
6. Install in the reverse order of removal.



Inspection
1. Disconnect the blower motor connector.
2. Connect battery positive voltage to terminal B and ground to terminal A of the blower motor. Verify that the blower motor operates.
3. If blower motor does not operate, replace the blower motor.



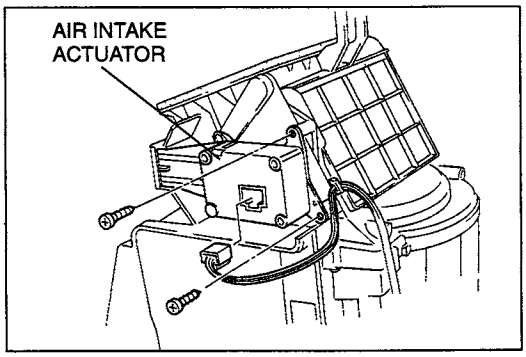
RESISTOR
Removal / Installtion
1. Disconnect the resistor connector.
2. Remove the screws and the resistor.
3. Install in the reverse order of removal.



Inspection
1. Disconnect the resistor connector.
2. Verify that the resistance between terminals of the resistor is as shown below.

Terminal	Resistance (Ω)
C—D	0.3—0.6
C—E	1.0—1.6
C—A	2.8—6.0

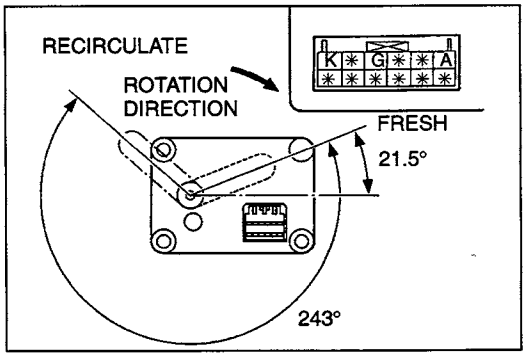
3. If not as specified, replace the resistor.



AIR INTAKE ACTUATOR

Removal / Installation

1. Remove the glove compartment and the glove compartment cover. (Refer to section S1.)
2. If the air bag system is installed, remove the No.1 duct. (Refer to section S1.)
3. Pull out the air intake actuator by removing the screws.
4. Disconnect the air intake actuator connector and remove the air intake actuator.
5. Install in the reverse order of removal.

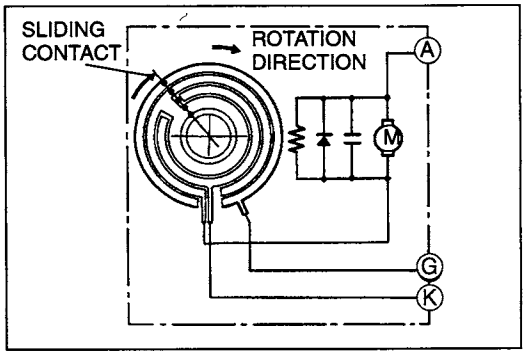


Inspection

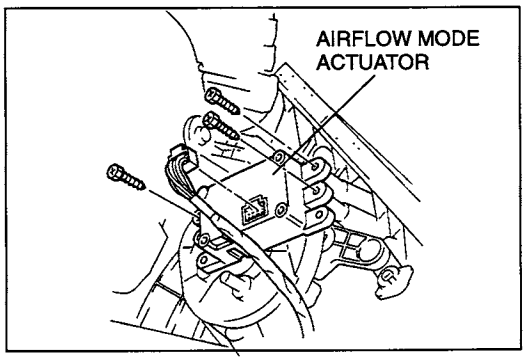
1. Remove the air intake actuator.
2. Connect battery positive voltage to terminal A and ground to terminal G or K of the air intake actuator.
3. Verify that the air intake actuator operates as shown below.

B+: Battery positive voltage

Connection		Movement
B+	GND	
A	G	FRESH to RECIRCULATE
A	K	RECIRCULATE to FRESH



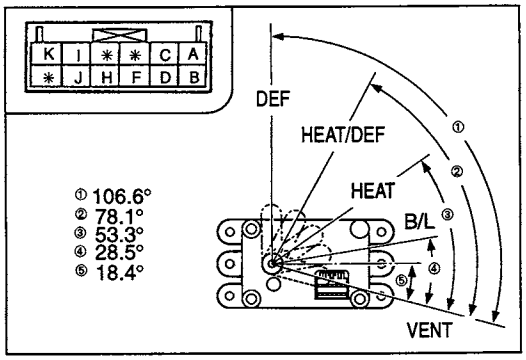
4. If not as specified, replace the air intake actuator.



AIRFLOW MODE ACTUATOR

Removal / Installation

1. Disconnect the airflow mode actuator connector.
2. Remove the screws and the airflow mode actuator.
3. Install in the reverse order of removal.

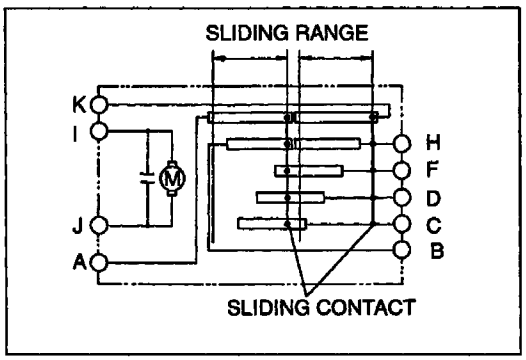


Inspection

1. Remove the airflow mode actuator.
2. Connect battery positive voltage to terminal J or I and ground to terminal I or J of the airflow mode actuator.
3. Verify that the airflow mode actuator operates as shown below.

B+: Battery positive voltage

Connection		Movement
B+	GND	
J	I	VENT to DEFROSTER
I	J	DEFROSTER to VENT



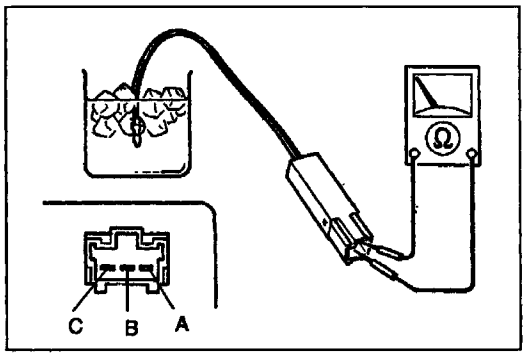
4. Check for continuity between the terminals of the airflow mode actuator as shown below.

O—O: Continuity

Terminal / Mode	A	B	C	D	F	H	K
VENT			O	O	O	O	O
BI-LEVEL	O	O		O	O	O	O
HEAT	O	O	O		O	O	O
HEAT/DEF	O	O	O	O		O	O
DEFROSTER	O	O	O	O	O		

5. If not as specified, replace the airflow mode actuator.

THERMOSWITCH
Removal / Installation
1. Remove the cooling unit. (Refer to page U–17.)
2. Remove the thermoswitch from the cooling unit. (Refer to page U–18.)
3. Install in the reverse order of removal.



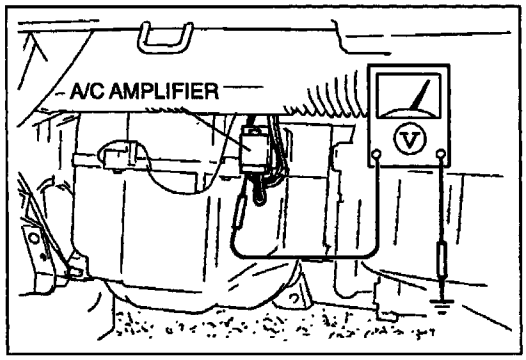
Inspection
1. Remove the thermoswitch.
2. Immerse the sensor part of the thermoswitch in a container of ice water.
3. Check for continuity between terminals A and B of the thermoswitch.

O—O: Continuity

Temperature / Terminal	A	B
3.6 °C { 38 °F } or more	O	O
0.8 °C { 33 °F } or less		

4. If not as specified, replace the thermoswitch.

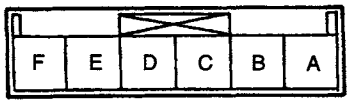
A/C AMPLIFIER
Removal / Installation
1. Remove the cooling unit. (Refer to page U–17.)
2. Remove the A/C amplifier from the cooling unit. (Refer to page U–18.)
3. Install in the reverse order of removal.



Inspection
1. Remove the glove compartment and the glove compartment cover. (Refer to section S1.)
2. Start the engine.
3. Measure the voltage at the terminals of the A/C amplifier connector and refer to the terminal voltage list. (Refer to page U–35.)
4. If not as specified, inspect the appropriate area.
5. If the inspection area is OK, replace the A/C amplifier.

Terminal voltage (Reference)

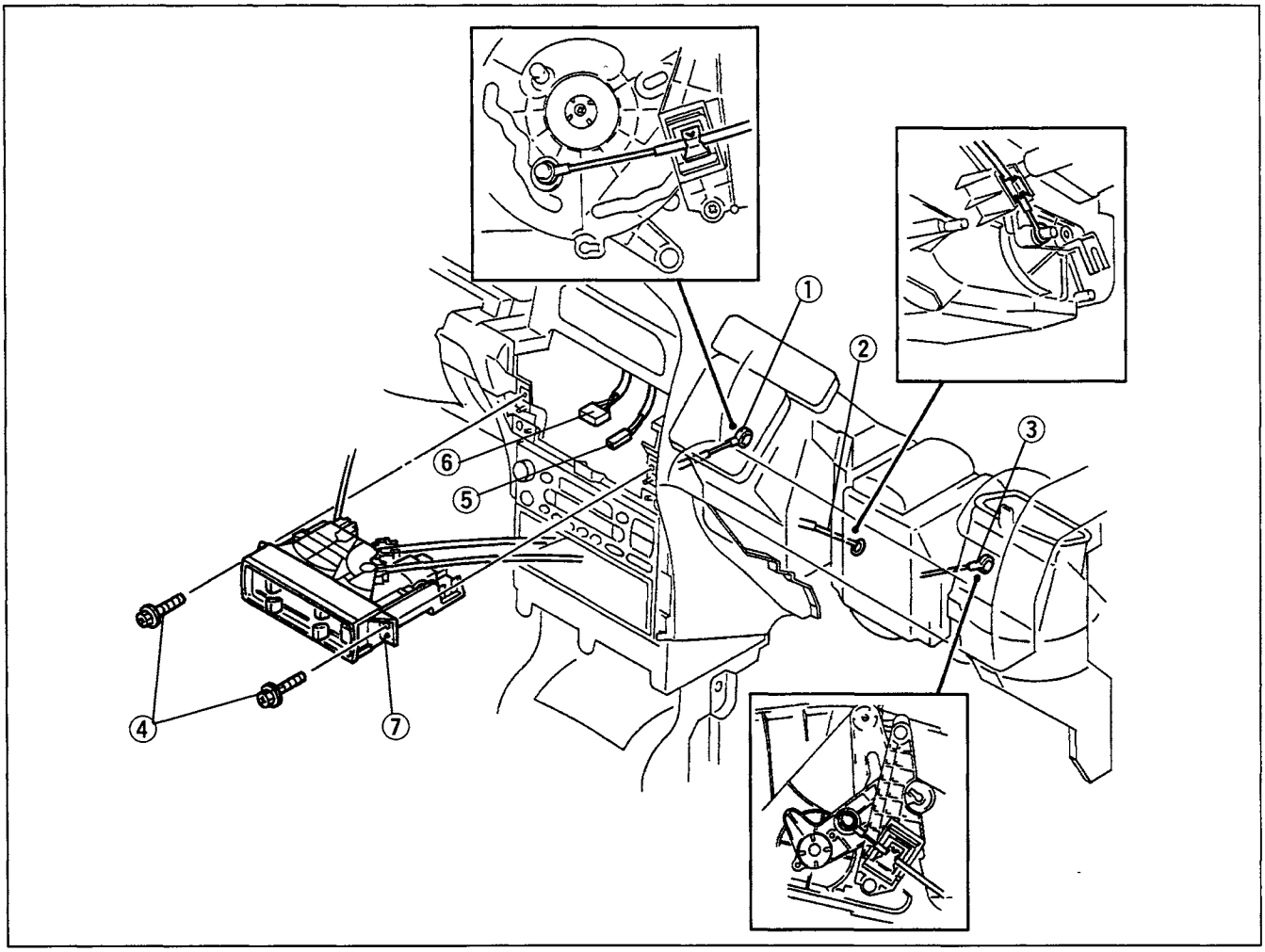
B+: Battery positive voltage



Terminal	Signal name	Connection	Test condition	Voltage (V)	Inspection area
A	IG2	A/C 10 A fuse	Ignition switch at ON	B+	• Continuity [Fuse—A/C amplifier: A/C 10 A—A] • A/C 10 A fuse
			Ignition switch at LOCK, ACC, START	0	
B	A/C signal	Refrigerant pressure switch	Magnetic clutch on	MAX. 1	• Continuity [PCM—Refrigerant pressure switch: 1K—B, Refrigerant pressure switch—A/C amplifier: A—B] • Terminal voltage of A/C amplifier (C) • Refrigerant pressure switch (Refer to page U–31) • PCM (Refer to section F1 or F2)
			Magnetic clutch off	B+	
C	A/C switch signal	• A/C switch (wire type) • Heater control unit (logic type)	A/C switch off	B+	Terminal voltage of A/C amplifier (A)
			A/C switch on and fan switch at 1st position	0	(Wire type) • Continuity [A/C amplifier—A/C switch: C—D, Fan switch (B)—GND] • A/C switch (Refer to page U–42) • Fan switch (Refer to page U–41)
					(Logic type) • Continuity [A/C amplifier-Heater control unit: C—B, Heater control unit—Fan switch: D—D, Fan switch (B)—Ground] • Heater control unit (Refer to page U–42) • Fan switch (Refer to page U–41)
D	—	—	—	—	—
E	—	—	—	—	—
F	—	—	—	—	—

HEATER CONTROL UNIT
Removal / Installation
Wire type

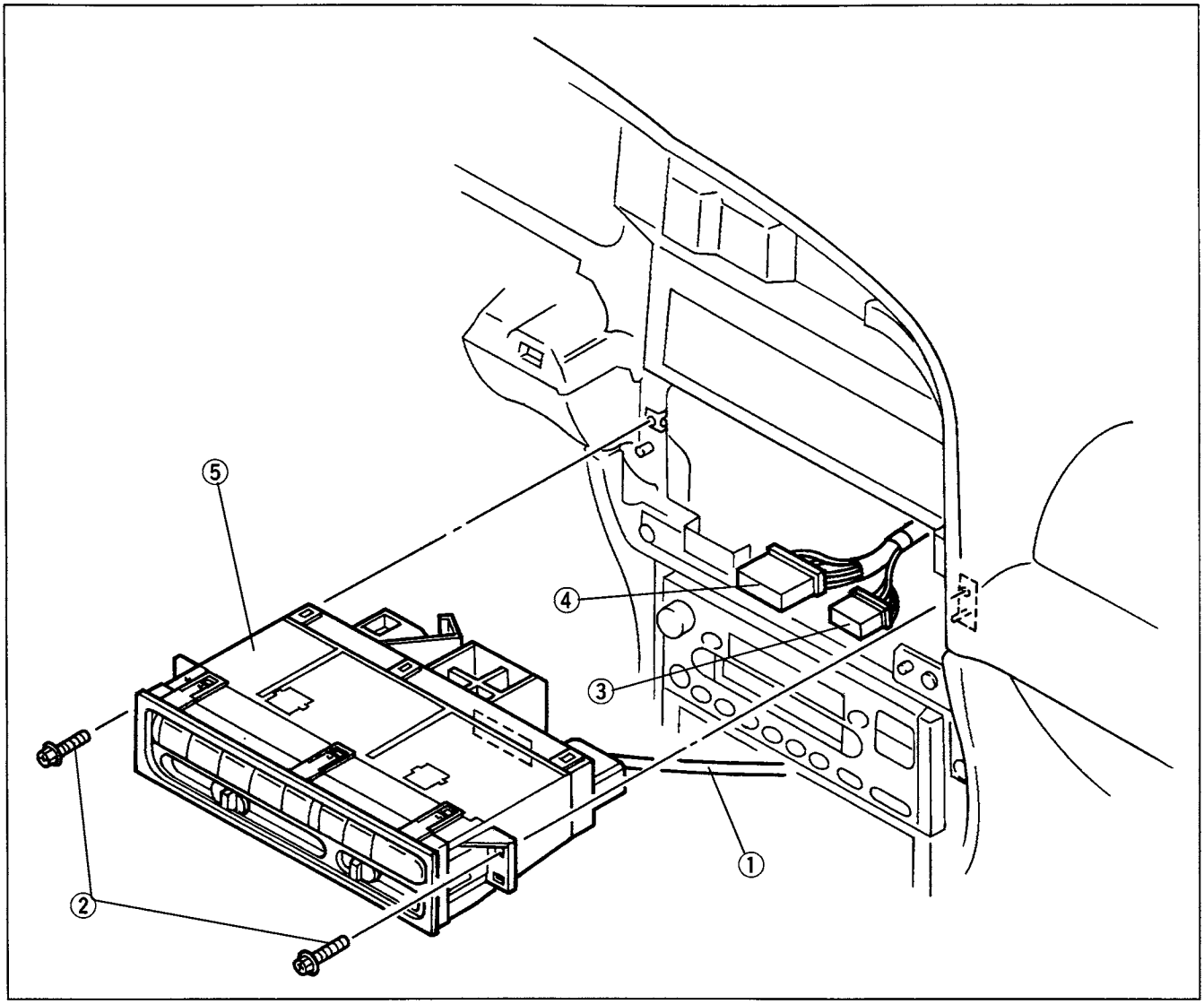
1. Remove the meter hood, side panel, glove compartment, and glove compartment cover. (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



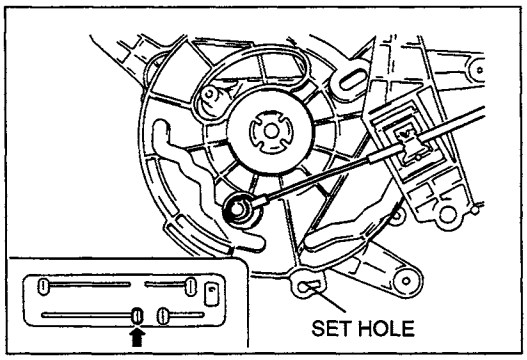
1. Airflow mode wire
   Wire adjustment ..... page U–38
2. Air mix wire
   Wire adjustment ..... page U–38
3. Air intake wire
   Wire adjustment ..... page U–38
4. Screw
5. Fan switch connector
6. Heater control unit connector
7. Heater control unit
   Disassembly / Assembly ..... page U–39

Logic type

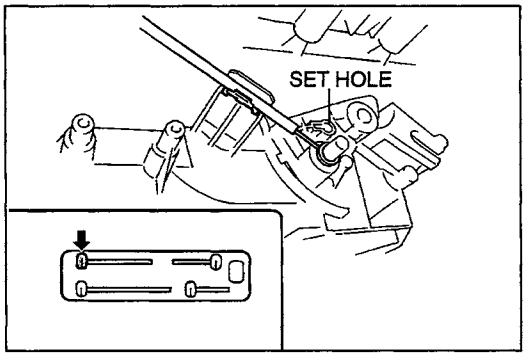
1. Remove the meter hood. (Refer to section S1.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



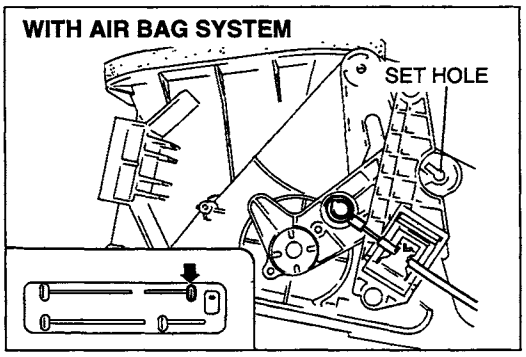
1. Air mix wire
   Wire adjustment ..... page U–38
2. Screw
3. Fan switch connector
4. Heater control unit connector
5. Heater control unit
   Disassembly / Assembly ..... page U–40



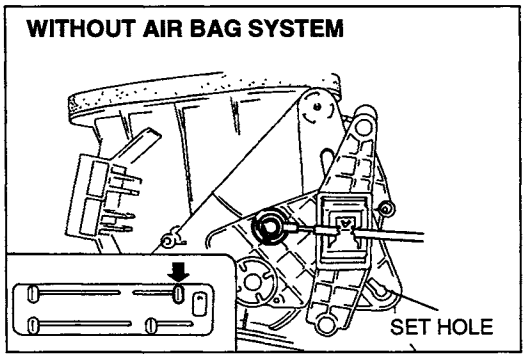
Wire Adjustment
Airflow mode wire
1. Set the MODE lever at DEFROSTER.
2. Connect the airflow mode wire to the airflow mode main link.
3. Set the airflow mode main link to DEFROSTER and insert a screwdriver (ϕ5) into the set hole. Clamp the airflow mode wire.
4. Verify that the MODE lever moves in its full stroke.



Air mix wire
1. Set the temperature control lever at MAX COLD.
2. Connect the air mix wire to the air mix link.
3. Set the air mix link to MAX COLD and insert a screwdriver (ϕ5) into the set hole. Clamp the air mix wire.
4. Verify that the temperature control lever moves in its full stroke.

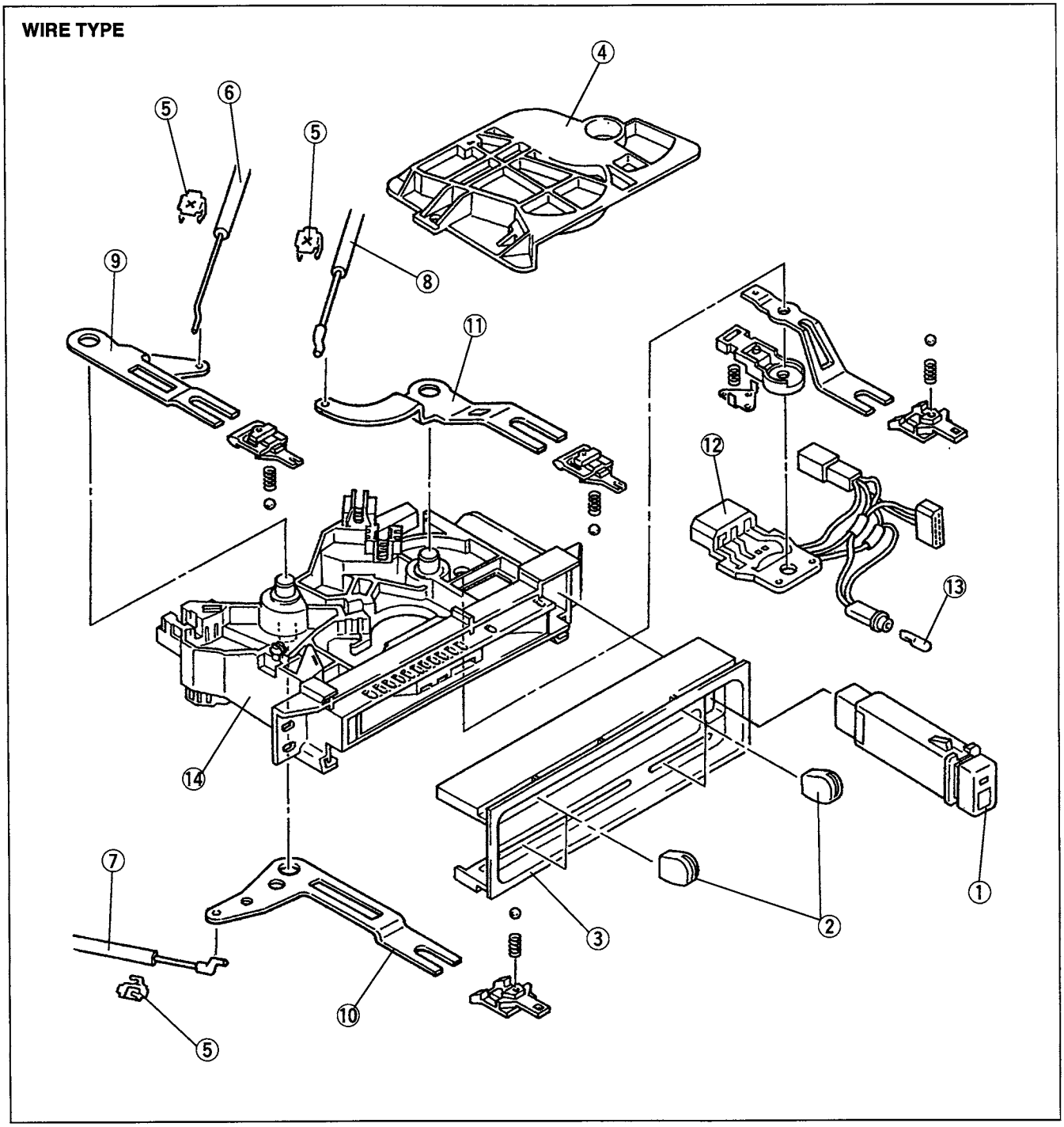


Air intake wire
1. Set the REC/FRESH lever at FRESH.
2. Connect the air intake wire to the air intake link.
3. Set the air intake link to FRESH and insert a screwdriver (ϕ5) into the set hole. Clamp the air intake wire.
4. Verify that the REC/FRESH lever moves in its full stroke.



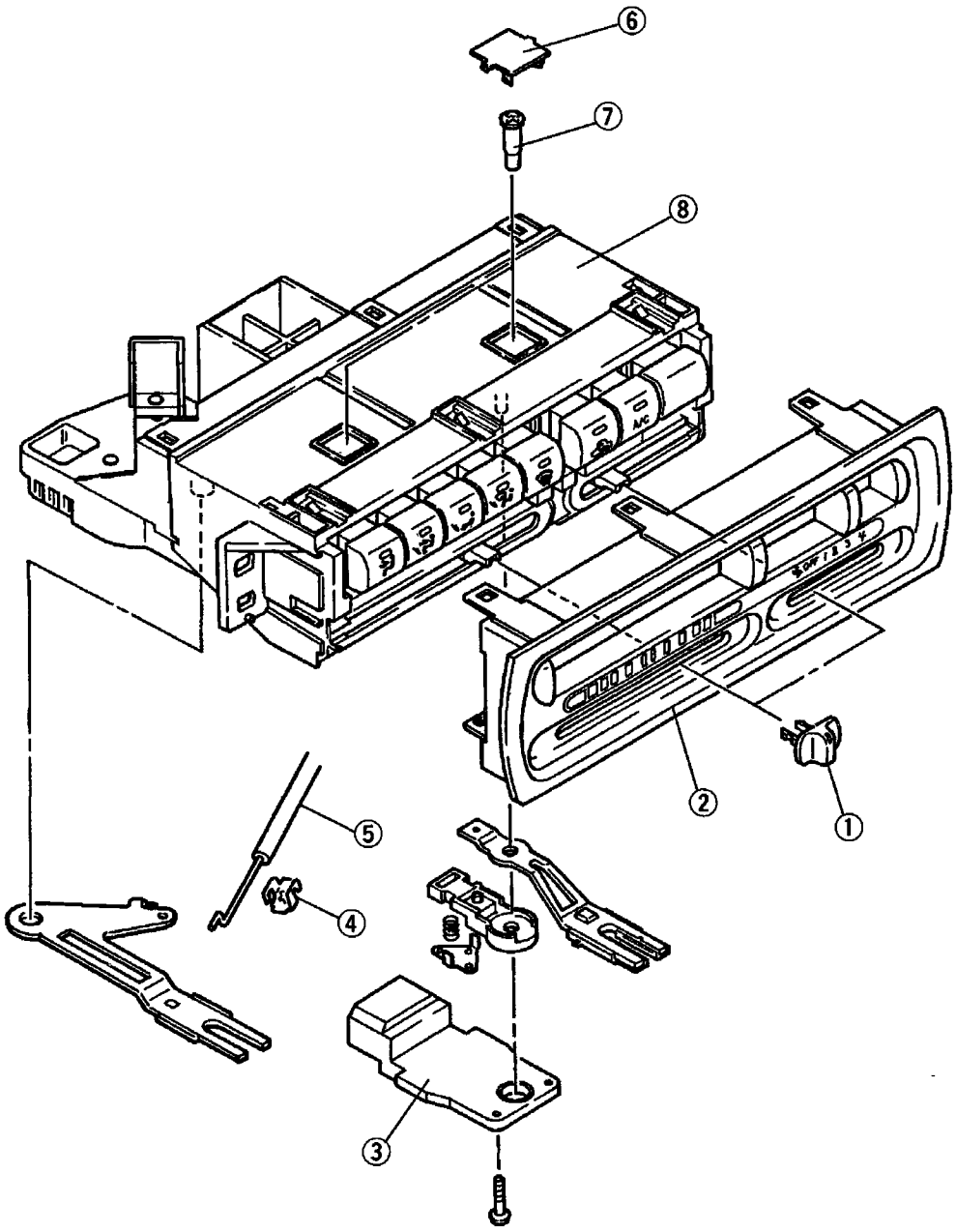
Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of removal.

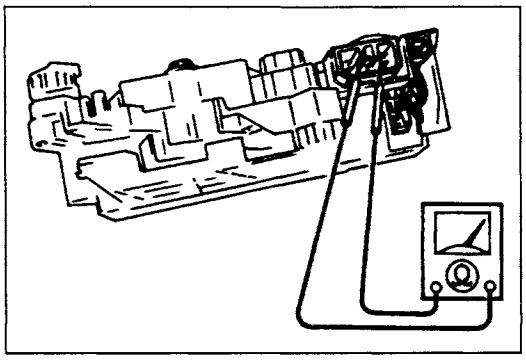


1. A/C switch
   Inspection ..... page U–42
2. Knobs
3. Switch panel
4. Cover
5. Clip
6. Air mix wire
7. Airflow mode wire
8. Air intake wire
9. Temperature control lever
10. MODE lever
11. REC/FRESH lever
12. Fan switch
    Inspection ..... page U–41
13. Bulb
14. Switch body

LOGIC TYPE

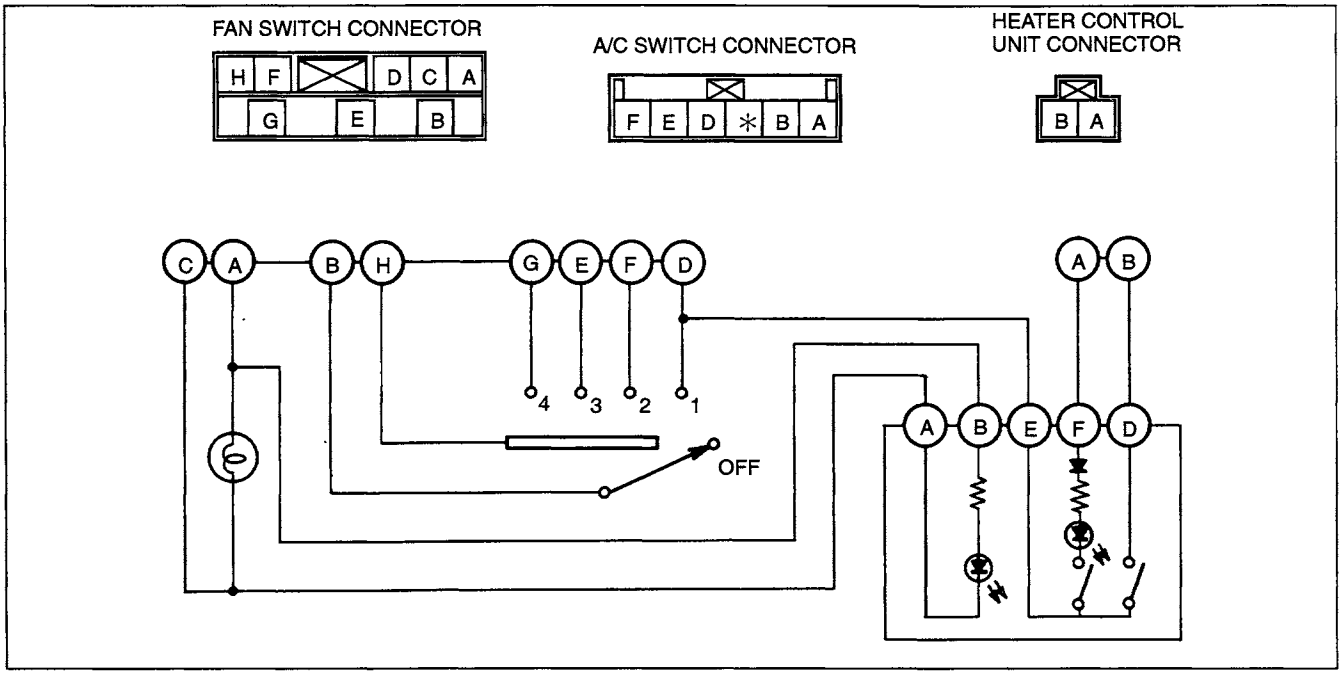


1. Knob
2. Switch panel
3. Fan switch
   Inspection ..... page U–41
4. Clip
5. Air mix wire
6. Cover
7. Bulb
8. Switch body
   Inspection ..... page U–42



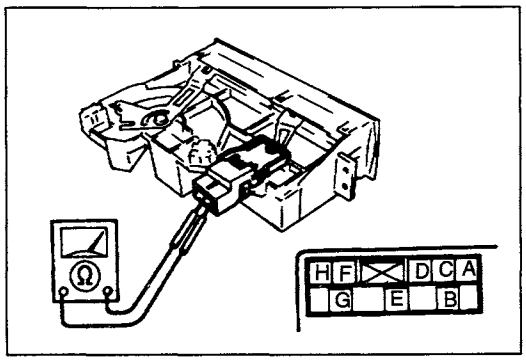
Inspection
Fan switch
Wire type

1. Check for continuity between the terminals of the fan switch.
2. If not as specified, replace the fan switch.



○—○: Continuity

Terminal / Switch position	Fan switch								A/C switch					Heater control unit	
	A	B	C	D	E	F	G	H	A	B	D	E	F	A	B
Constant	○		○	○					○	○	○	○	○	○	○
OFF															
1		○		○											
2		○				○		○							
3		○			○			○							
4		○					○	○							



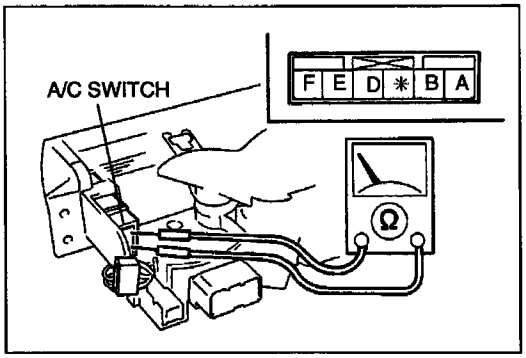
Logic type

1. Check for continuity between the termianls of the fan switch.

○—○: Continuity

Terminal / Switch position	B	D	E	F	G	H
OFF						
1	○	○				
2	○			○		○
3	○		○			○
4	○				○	○

2. If not as specified, replace the fan switch.



A/C switch (wire type)

1. Check for continuity between the termianls of the A/C switch.

O—O: Continuity

A/C switch	D	E
OFF		
ON	O	O

2. Turn the A/C switch on.
3. Connect battery positive voltage and ground to the terminals of the A/C switch.

B+: Battery positive voltage

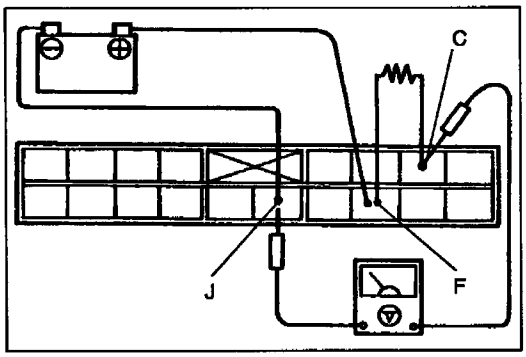
B+	GND
B	A
F	E

4. Verify that the light-emitting diode illuminates.
5. If not as specified, replace the A/C switch.

Switch body (logic type)

Preparation

Connect battery positive voltage to terminal F and ground to terminal J.



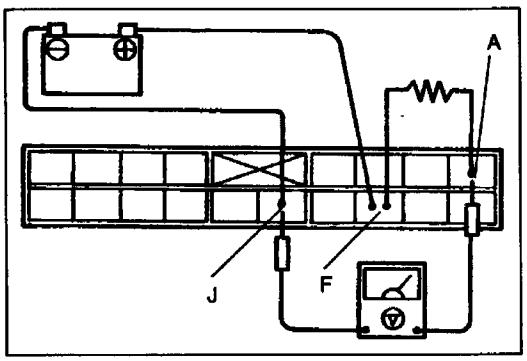
REC switch

1. Connect a 1 kΩ resistor between terminals C and F.
2. Turn the REC switch on, and measure the voltage between terminals C and J.

B+: Battery positive voltage

REC switch	Voltage
ON	1 V or less
OFF	B+

3. If not as specified, replace the heater control unit.

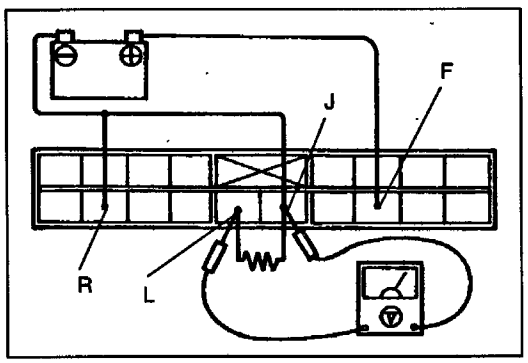


4. Connect a 1 kΩ resistor between terminals A and F.
5. Turn the REC switch off, and measure the voltage between terminals A and J.

B+: Battery positive voltage

REC switch	Voltage
OFF	1 V or less
ON	B+

6. If not as specified, replace the heater control unit.



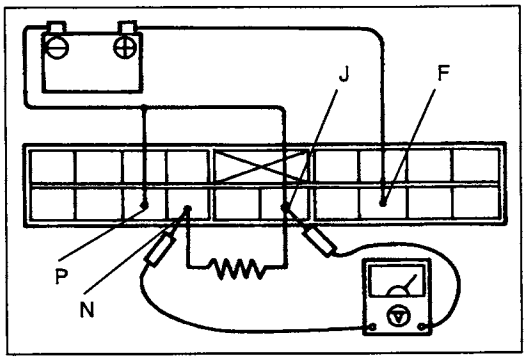
MODE switch

1. Connect a 1 kΩ resistor between terminals J and L.
2. Connect a jumper wire between terminals J (or negative battery terminal) and R.
3. Measure the voltage between terminals J and L.

B+: Battery positive voltage

Terminal	Voltage
J — L	B+

4. If not as specified, replace the heater control unit.

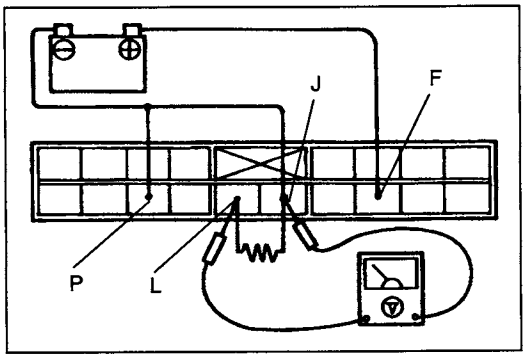


5. Connect a 1 kΩ resistor between terminals J and N.
6. Connect a jumper wire between terminals J (or negative battery terminal) and P.
7. Measure the voltage between terminals J and N.

B+: Battery positive voltage

Terminal	Voltage
J — N	B+

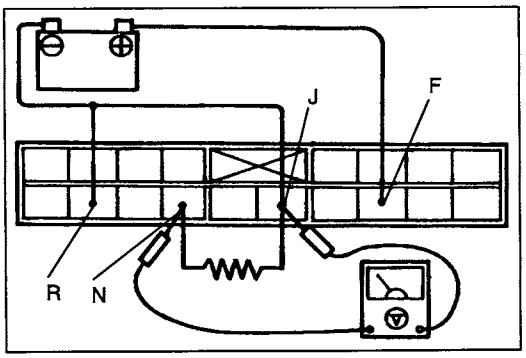
8. If not as specified, replace the heater control unit.



9. Connect a 1 kΩ resistor between terminals J and L.
10. Connect a jumper wire between terminals J (or negative battery terminal) and P.
11. Measure the voltage between terminals J and L.

Terminal	Voltage
J — L	1 V or less

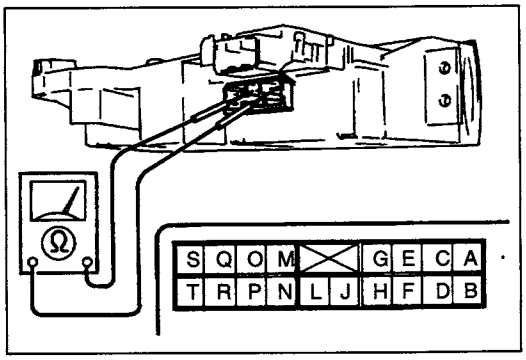
12. If not as specified, replace the heater control unit.



13. Connect a 1 kΩ resistor between terminals J and N.
14. Connect a jumper wire between terminals J (or negative battery terminal) and R.
15. Measure the voltage between terminals J and N.

Terminal	Voltage
J — N	1 V or less

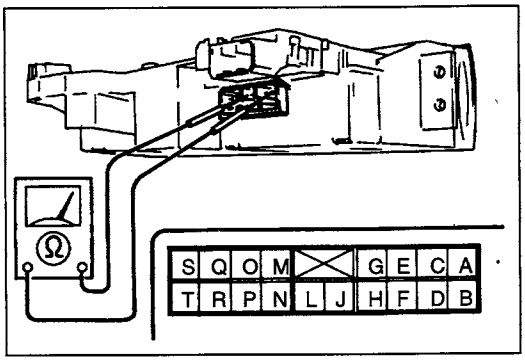
16. If not as specified, replace the heater control unit.



17. Check for continuity between the following terminals while pressing the MODE switches.

O——O: Continuity

Switch \ Terminal	J	T	S	Q	O	M
VENT	O	O				
BI-LEVEL	O		O			
HEAT	O			O		
HEAT/DEF	O				O	
DEFROSTER	O					O



18. If not as specified, replace the heater control unit.

A/C switch (if equipped)

1. Check for continuity between terminals B and D while pressing the A/C switch.

O——O: Continuity

A/C switch \ Terminal	B	D
OFF		
ON	O	O

2. If not as specified, replace the heater control unit.

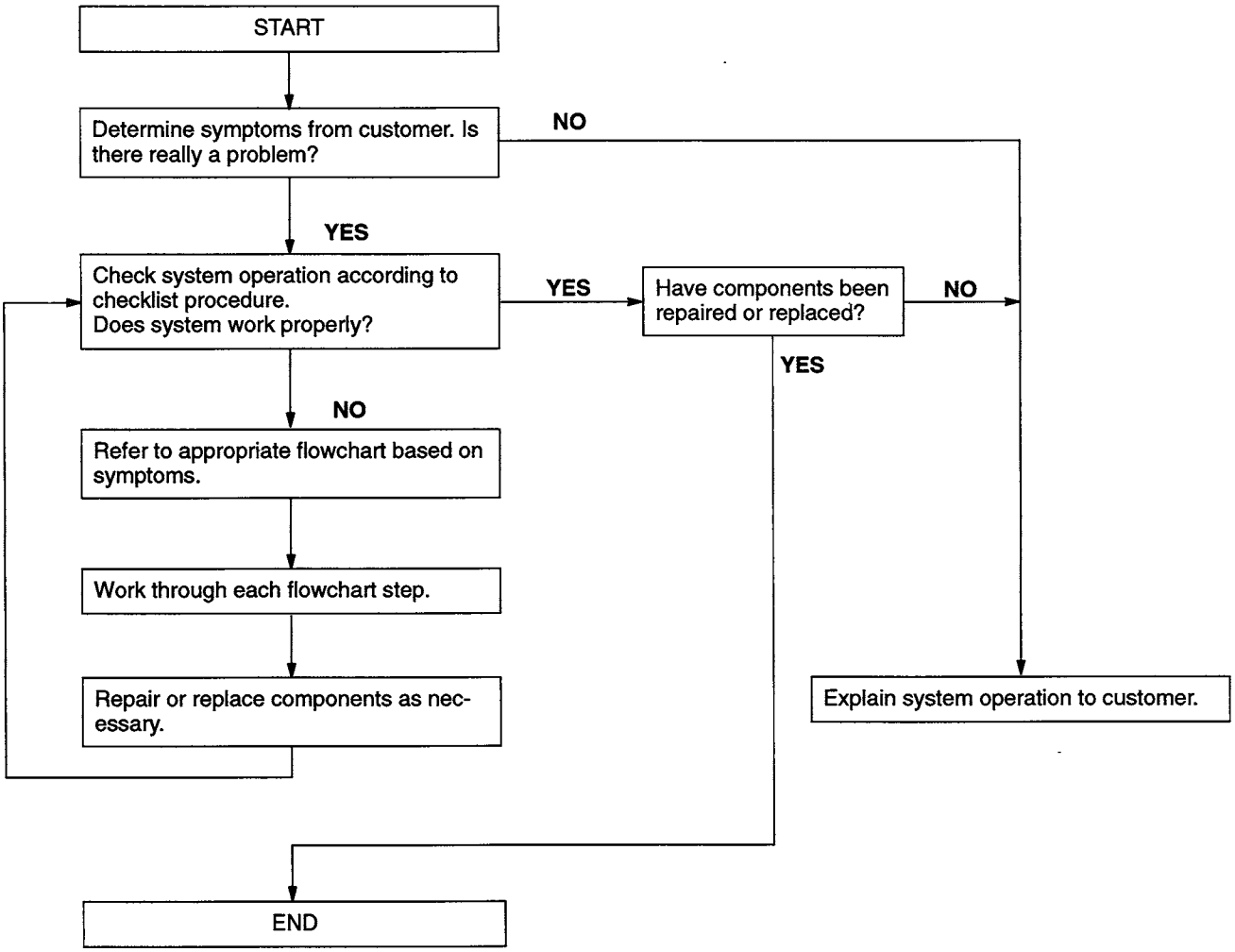
TROUBLESHOOTING

TROUBLESHOOTING NOTES

- Precise understanding of customer complaints is the key to diagnosing problems.
- Diagnosis of air conditioning system problems can be difficult because of the surrounding temperatures. Therefore, checking the system operation is important. Further checking the system operation in a logical order is necessary for the accurate understanding of problems.

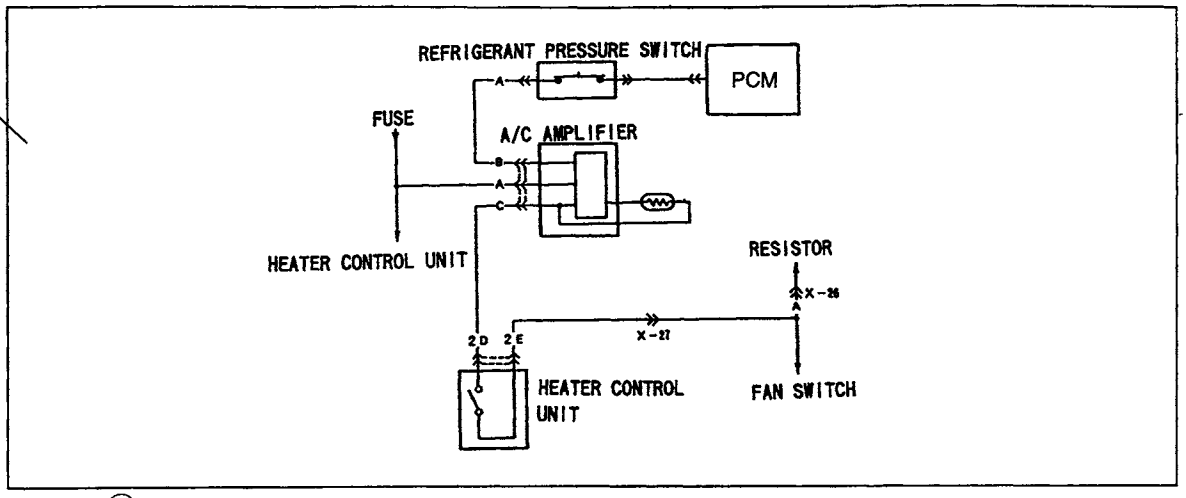
USING THIS SECTION

When troubleshooting, follow the procedure shown below.



- Note the following points when using the flowcharts.

Flowchart No.	A/C signal system inspection	Symptom·····Magnetic clutch, condenser fan, and A/C compressor idle-up do not operate
5		Related parts···A/C amplifier, refrigerant pressure switch, heater control unit, PCM, wiring harness



②

③

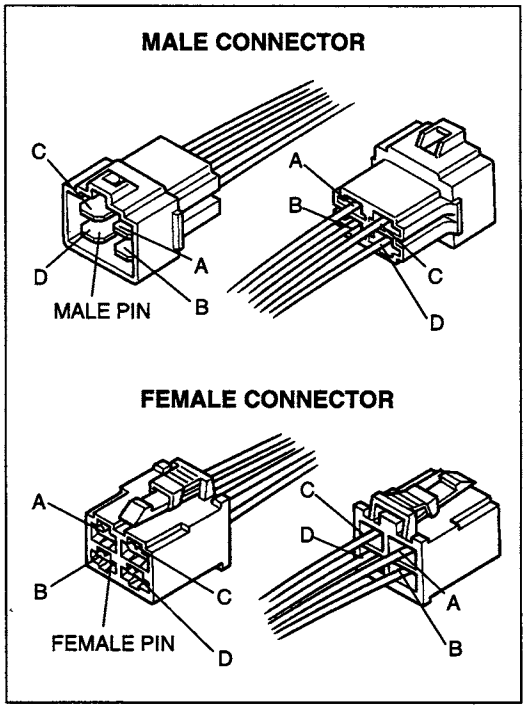
B+:Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
3	1)Connect jumper wire between terminal B or C of A/C amplifier connector (female) and ground. 2)Verify that temperature around evaporator temperature sensor is 3.5℃ (38.3°F) or more. 3)Start engine. 4)Do magnetic clutch and condenser fan operate?	Jumper wire between terminal B and ground	YES	Disconnect jumper wire from terminal B and connect to terminal C.
			NO	Repair wiring harness [Refrigerant pressure switch—A/C amplifier:A—B]
		Jumper wire between terminal C and ground	YES	Remove jumper wire and go to Step 4
			NO	Check A/C amplifier (Refer to page U—36)
4	Measure voltage at terminal of heater control unit connector (female:16-pin). ⑥	2D ⑥	B+	Go to step 5
			Other	Repair wiring harness [A/C amplifier—heater control unit:C—2D]
5	1)Turn the ignition switch to OFF. 2)Disconnect midway connector (X—26). ⑦ 3)Is there continuity between terminals of heater control unit connector (female:16-pin) and midway connector (female)?	2E—A	YES	Replace heater control unit (Refer to page U—34)
			NO	Repair wiring harness [Heater control unit—midway connector:2E—A]

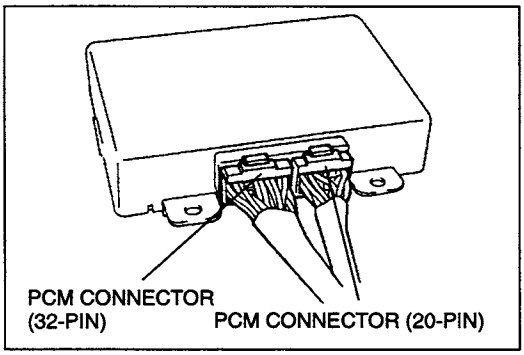
⑤

④

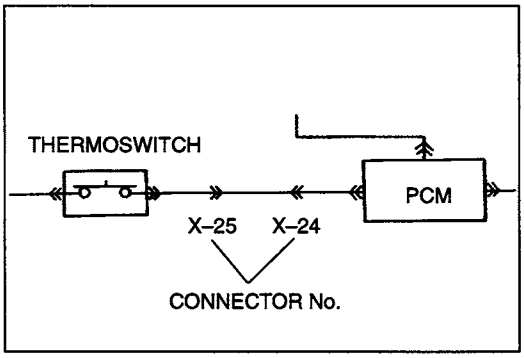
1. Only those parts, connectors, and harnesses that are directly related to the item being checked are indicated in the wiring diagram.
2. Follow the steps in order when troubleshooting the system.
3. Before inspection, turn all switches to OFF. When moving from step to step, keep the switches, connectors, and jumper wire in their former position unless otherwise instructed.
   Before connecting or disconnecting a jumper wire, turn the ignition switch to LOCK to prevent burning the electrical parts. After the jumper wire is connected or disconnected, the ignition switch can be turned to ON again.
4. When checking for continuity of the wiring harness, the terminal names are shown under "Terminal" and their corresponding connector names are shown under "Inspection procedure." When repairing the wiring harness, the terminal names and the corresponding part names to which they are connected are shown under "Action."



5. Inspect connectors from either the male or female side stated after the connector name.



6. When more than one connector is attached to the same part, the pin number enclosed in ( ) after the connector name distinguishes the connectors.
   The wiring diagram connector number shown before alphabet letter distinguishes the terminals.



7. When more than one harness connects two different parts, the wiring diagram connector number enclosed in ( ) after the connector name distinguishes the connectors.

TROUBLESHOOTING

Checklists

Determine symptoms of the problem based on the customer's complaints. Refer to the fuse checklist and match the symptoms obtained from the customer with those listed in the table. Check the appropriate fuse. If the fuse is OK, operate the system. Determine the general area of the problem; for example, airflow, idle-up, or temperature.

Look at the main checklist and locate the general problem area (first column). Follow each step of the instructions for the specific system (second column). If the system does not operate properly (third column), determine the symptoms and corresponding flowchart number (fourth and fifth columns). Refer to the appropriate flowchart and troubleshoot the system.

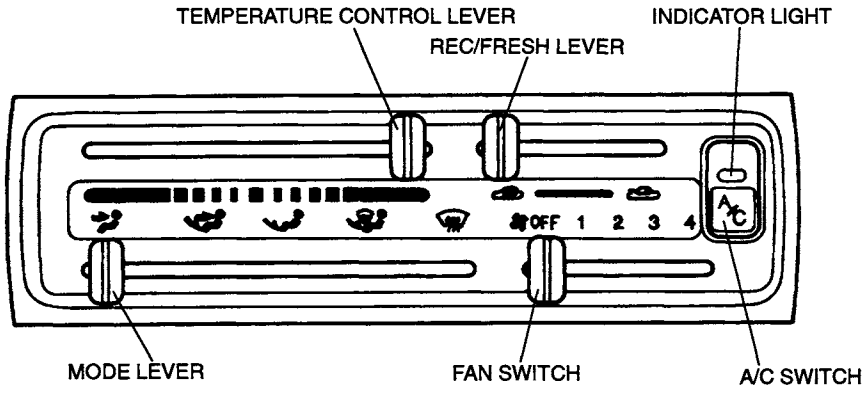
Fuse checklist

Symptom	Related fuse
Entire control system does not operate	A/C 10 A (fuse block)
Blower motor does not operate	HEATER 40 A
Condenser fan does not operate	AD FAN 30 A
A/C compressor idle-up operates, but magnetic clutch and condenser fan do not operate	TURN 10 A
Magnetic clutch does not operate	A/C 10 A (main fuse block)

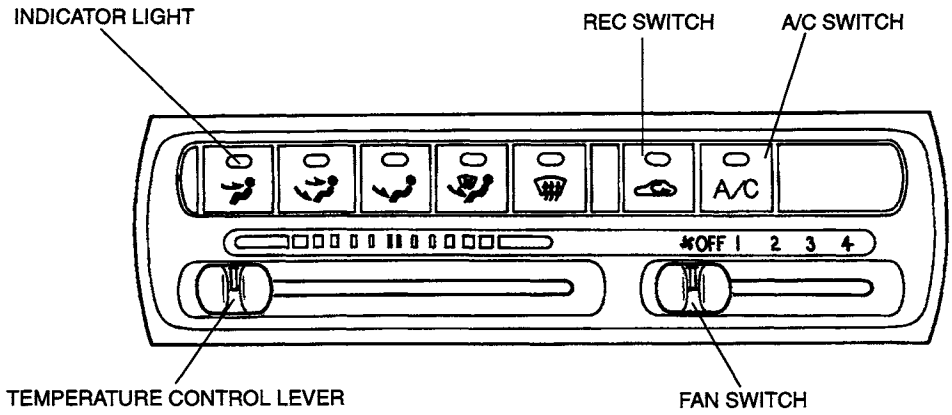
Main checklist

Start and warm up the engine so that the engine coolant temperature reaches 40—100 °C { 104—212 °F }. Keep the engine running while doing the procedures.

WIRE TYPE



LOGIC TYPE



General problem area	Procedure	Proper operation	Symptom	Flowchart No. (Reference)
Entire control system	(Wire type) Operate fan switch and A/C switch.	Following control system parts operate when switches are operated: • Indicator light of A/C switch • Blower motor • Magnetic clutch • Condenser fan	Control system does not operate and illuminate	1 (page U–50)
	(Logic type) Operate fan switch, REC switch, MODE switch, and A/C switch.	Following control system parts operate when switches are operated: • Indicator light of each switch • Blower motor • Air intake actuator • Airflow mode actuator • Magnetic clutch • Condenser fan	Control system does not operate and illuminate	1 (page U–50)
			Airflow mode actuator does not operate and indicator light of each switch does not illuminate	2 (page U–50)
			Each actuator does not operate and indicator light of each switch does not illuminate	3 (page U–50)
Air outlet volume system	Set fan switch in order at 1st, 2nd, 3rd, and 4th.	Blower motor operates according to fan switch operation	Blower motor does not operate	6 (page U–51)
			Blower motor does not operate properly with fan switch at 1st, 2nd, 3rd, or 4th	7 (page U–52)
Air intake mode system	(Wire type) 1. Set fan switch at 4th. 2. Set REC/FRESH lever in order at each air intake mode.	Air intake wire (air intake mode) operates (changes) according to REC/FRESH lever operation	Air intake mode does not change	Wire adjustment (page U–38)
	(Logic type) 1. Set fan switch at 4th. 2. Set REC switch in order at each air intake mode.	Air intake actuator (air intake mode) operates (changes) according to REC switch operation	Air intake actuator does not operate	8 (page U–53)
Airflow mode system	(Wire type) 1. Set fan switch at 4th. 2. Set MODE lever in order at each airflow mode.	Airflow mode wire (airflow mode) operates (changes) according to MODE lever operation	Airflow mode does not change	Wire adjustment (page U–38)
	(Logic type) 1. Set fan switch at 4th. 2. Set MODE switch in order at each airflow mode.	Airflow mode actuator (airflow mode) operates (changes) according to MODE switch operation	Airflow mode actuator does not operate properly	9 (page U–54)
Electrical load idle-up system	Set fan switch in order at 1st, 2nd, 3rd, and 4th. (Electrical load should be blower motor only.)	Electrical load idle-up operates with fan switch at 2nd, 3rd, and 4th	Electrical load idle-up does not operate with fan switch at 2nd, 3rd, and/or 4th	4 (page U–50)

General problem area	Procedure	Proper operation	Symptom	Flowchart No. (Reference)
Air outlet temperature system	1. Set fan switch at 4th. 2. Change temperature control lever from MAX COLD to MAX HOT.	Air mix wire (air outlet temperature) operates (changes) according to temperature control lever	Air outlet temperature does not change	Wire adjustment (page U–38)
	3. Turn A/C switch on.	Magnetic clutch, condenser fan, and A/C compressor idle-up operate	Magnetic clutch, condenser fan, and A/C compressor idle-up do not operate	10 (page U–55)
			A/C compressor idle-up operates, but magnetic clutch and condenser fan do not operate	5 (page U–50)
			Only magnetic clutch does not operate	11 (page U–57)
			Only condenser fan does not operate	12 (page U–58)
			Magnetic clutch, condenser fan, and A/C compressor idle-up operate, but cool air does not discharged or air cooling ability is low	13 (page U–59)

Flowcharts

Flowchart No.	A/C main power source system inspection	Symptom ..... Control system does not operate and illuminate
1		Related parts .... Wiring harness

Remedy
(Wire type)
Repair the wiring harness [Fuse—A/C amplifier: A/C 10 A—A].
(Logic type)
Repair the wiring harness [Fuse—Heater control unit: A/C 10 A—F].

Flowchart No.	Heater control unit power source system inspection (logic type only)	Symptom ..... Airflow mode actuator does not operate and indicator light of each switch does not illuminate
2		Related parts .... Heater control unit, wiring harness

Remedy
Check for continuity between the A/C 10 A fuse and terminal F of the heater control unit.
If there is continuity, replace the heater control unit. (Refer to page U–37.)

Flowchart No.	Heater contorl unit ground system inspection (logic type only)	Symptom ..... Each actuator does not operate and indicator light of each switch does not illuminate
3		Related parts .... Heater control unit, wiring harness

Remedy
Check for continuity between terminal J of the heater control unit and ground.
If there is continuity, replace the heater control unit. (Refer to page U–37.)

Flowchart No.	Electrical load idle-up system inspection	Symptom ..... Electrical load idle-up does not operate with fan switch at 2nd, 3rd, and/or 4th
4		Related parts .... Fan switch, PCM, wiring harness

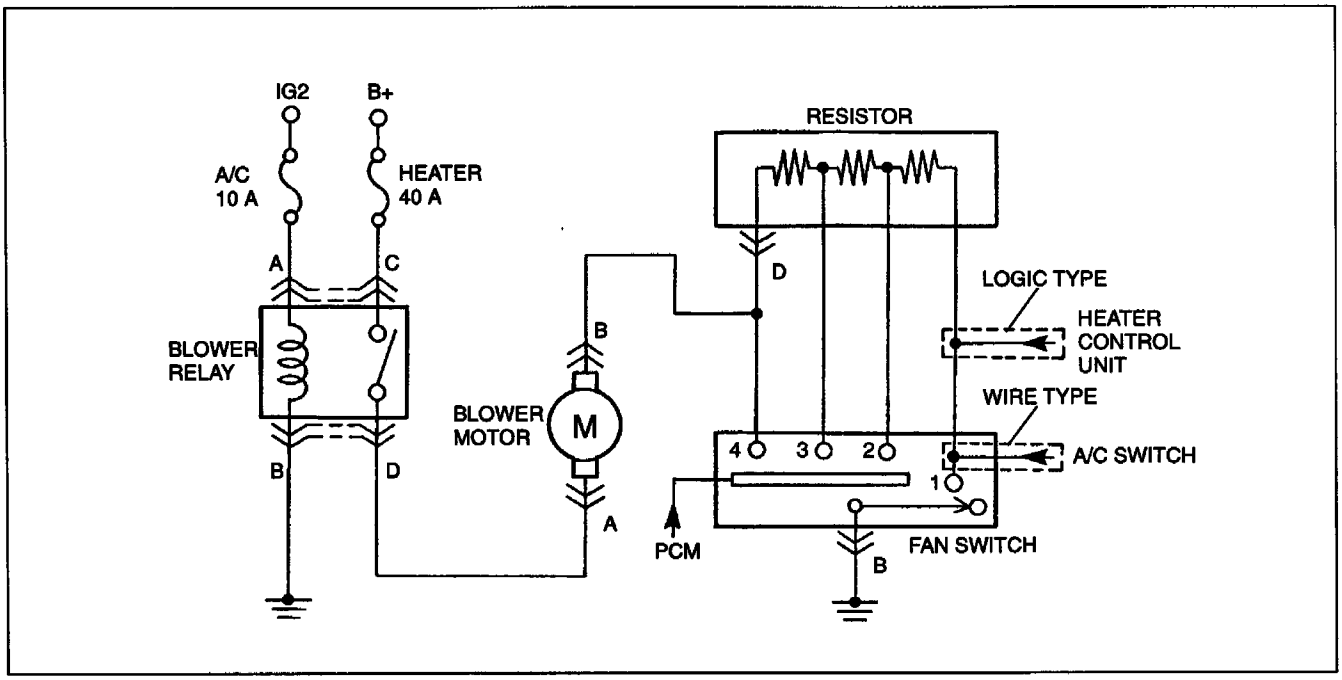
Remedy
Check the following parts. Repair or replace any abnormal parts.
1. Wiring harness [PCM—Fan switch: 1P—H]
2. Fan switch (Refer to page U–41)
3. Terminal 1P of PCM (Refer to section F1 or F2)

Flowchart No.	A/C power source system inspection	Symptom ..... A/C compressor idle-up operates, but magnetic clutch and condenser fan do not operate
5		Related parts .... PCM (BP MTX, Z5 MTX), wiring harness

Remedy
(BP MTX, Z5 MTX)
Check the following parts. Repair or replace any abnormal parts. If the parts are normal, check the PCM, (Refer to section F1 or F2.)
1. Wiring harness [Fuse—A/C relay: TURN 10 A—A]
2. Wiring harness [A/C relay—PCM: B—1G]

(BP ATX, Z5 ATX)
Repair the wiring harness [Fuse—A/C relay: TURN 10 A—A].

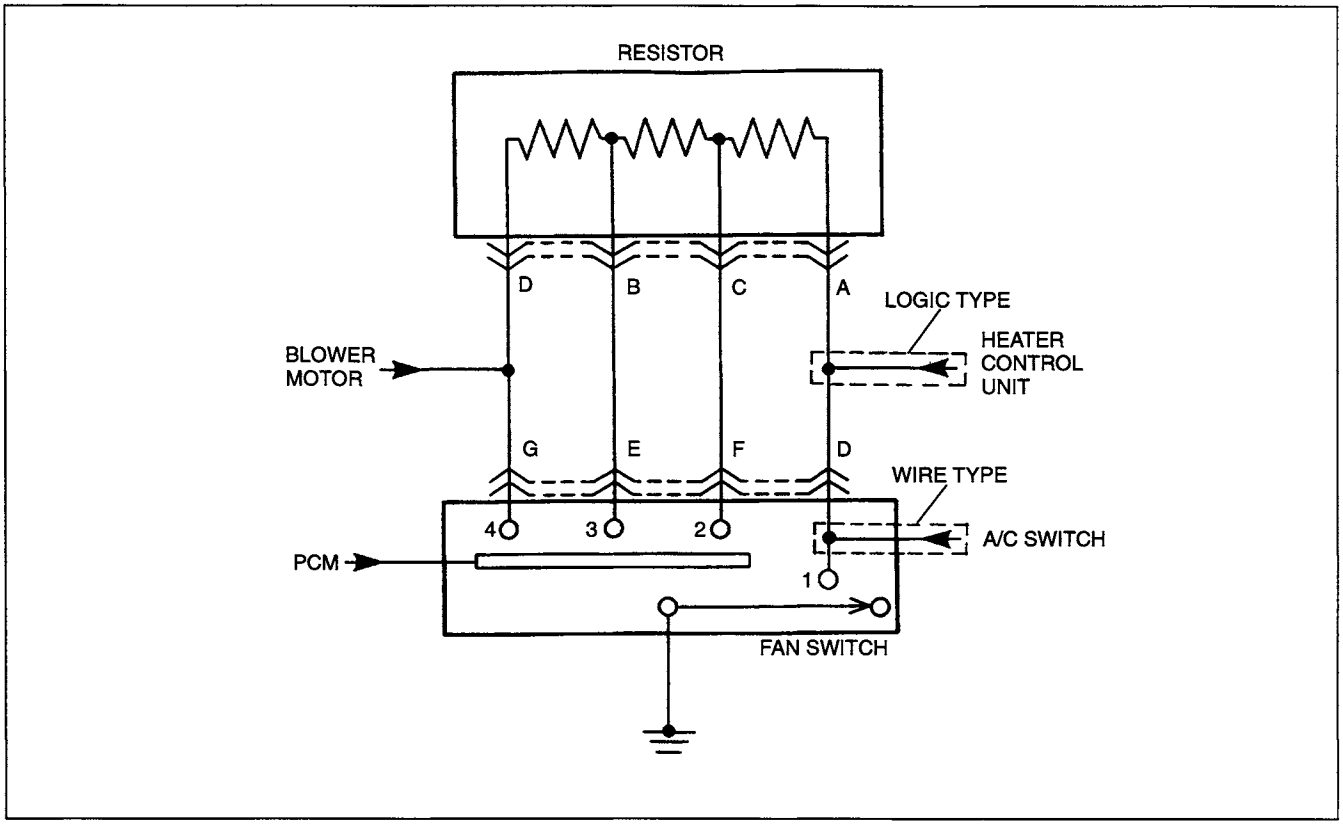
Flowchart No.	Blower motor system inspection	Symptom ..... Blower motor does not operate
6		Related parts ... Blower motor, blower relay, fan switch, wiring harness



B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
1	1) Turn ignition switch to ON. 2) Measure voltage at terminal of resistor connector (female).	D	B+	Go to Step 4
			Other	Go to Step 2
2	Measure voltage at terminals of blower motor connector (female).	A	B+	Check terminal B
			Other	Go to Step 3
		B	B+	Repair wiring harness [Blower motor — Resistor: B—D]
			Other	Replace blower motor (Refer to page U–32)
3	Measure voltage at terminals of blower relay connector (female).	D	B+	Repair wiring harness [Blower relay — Blower motor: D—A]
			Other	Check terminal C
		C	B+	Check terminal A
			Other	Repair wiring harness [Fuse—Blower relay: HEATER 40 A—C]
		A	B+	Check terminal B
			Other	Repair wiring harness [Fuse—Blower relay: A/C 10 A—A]
		B	B+	Repair wiring harness [Blower relay (B)—GND]
			Other	Replace blower relay (Refer to page U–31)
4	1) Turn ignition switch to LOCK. 2) Disconnect fan switch connector. 3) Is there continuity between terminal of fan switch connector (female) and ground?	B—Ground	YES	Replace fan switch (Refer to page U–39 or U–40)
			NO	Repair wiring harness [Fan switch (B)—GND]

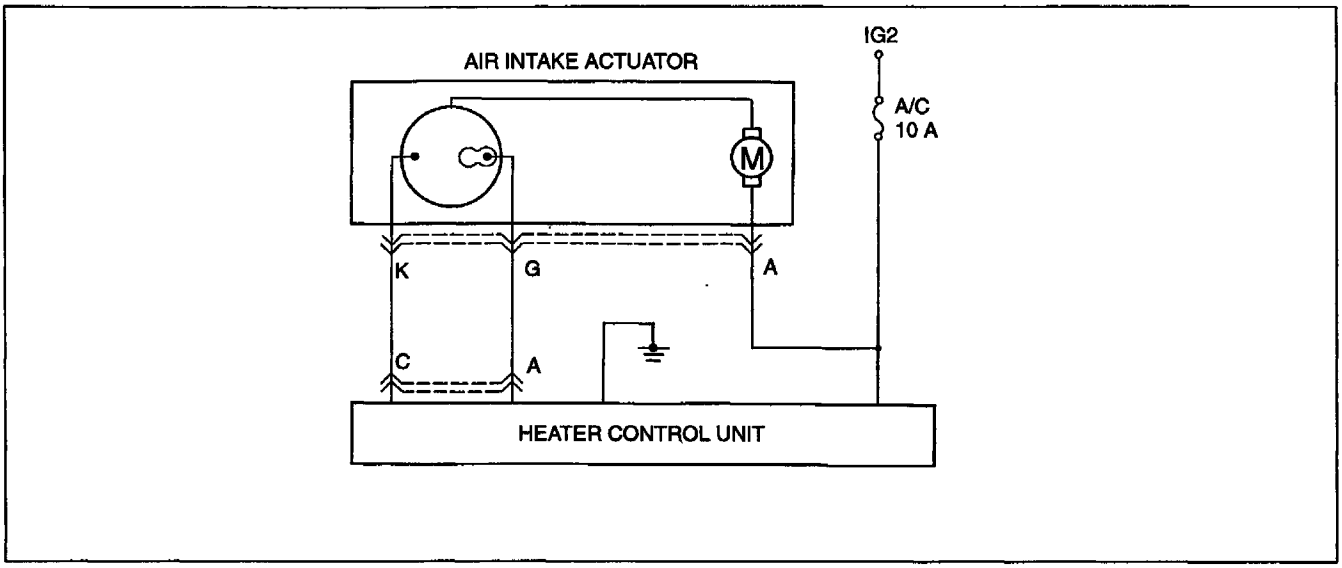
Flowchart No.	Fan switch system inspection	Symptom ..... Blower motor does not operate properly with fan switch at 1st, 2nd, 3rd, or 4th
7		Related parts ... Resistor, fan switch, wiring harness



B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
1	1) Turn ignition switch to ON. 2) Measure voltage at terminals of resistor connector (female).	D	B+	Check terminals A, B and C
			Other	Repair wiring harness [Blower motor—Resistor: B—D]
		A, B, C	B+ (all)	Go to Step 2
			Other (Portion)	Replace resistor (Refer to page U–32)
2	Measure voltage at terminals of fan switch connector (female).	G	B+	Check terminal E
			Other	Repair wiring harness [Resistor—Fan switch: D—G]
		E	B+	Check terminal F
			Other	Repair wiring harness [Resistor—Fan switch: B—E]
		F	B+	Check terminal D
			Other	Repair wiring harness [Resistor—Fan switch: C—F]
		D	B+	Replace fan switch (Refer to page U–39 or U–40)
			Other	Repair wiring harness [Resistor—Fan switch: A—D]

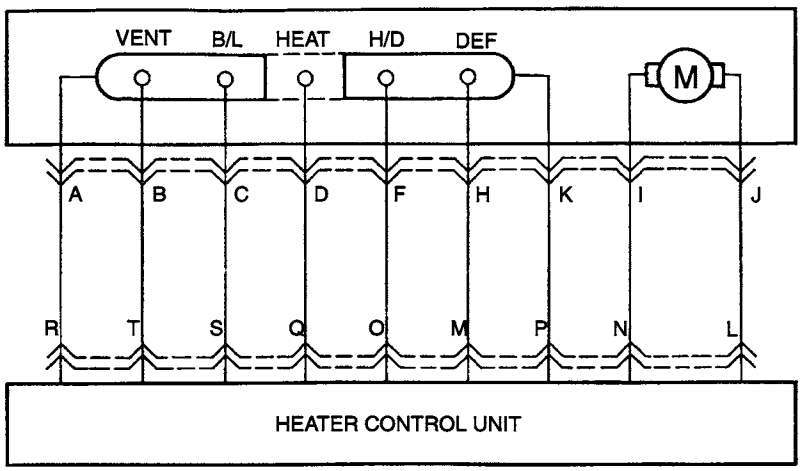
Flowchart No.	Air intake actuator system inspection (logic type only)	Symptom ..... Air intake actuator does not operate
8		Related parts ... Blower unit, air intake actuator, heater control unit, wiring harness



B+: Battery positive voltage

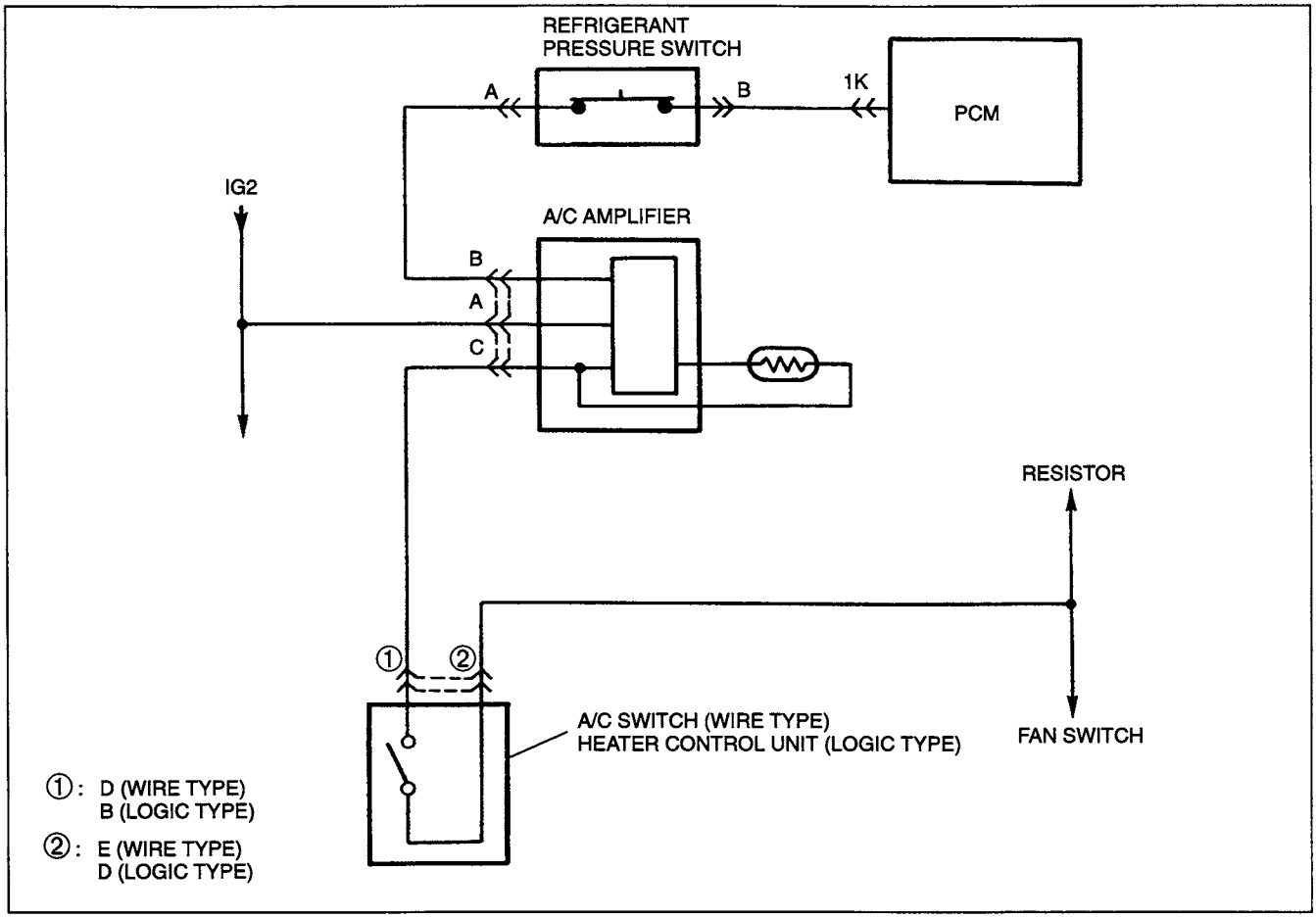
Step	Inspection procedure	Terminal	Result	Action
1	1) Remove air intake actuator. (Refer to page U–33.) 2) Turn ignition switch to ON. 3) Set fan switch at 4th. 4) Operate air intake crank by hand. 5) Does air intake mode change smoothly from RECIRCULATE to FRESH?	—	YES	Go to Step 2
			NO	Check blower unit
2	1) Turn fan switch off. 2) Measure voltage at terminal of air intake actuator connector (female).	A	B+	Go to Step 3
			Other	Repair wiring harness [Fuse—Air intake actuator: A/C 10 A—A]
3	1) Turn ignition switch to LOCK. 2) Turn REC switch on. 3) Is there continuity between terminal of air intake actuator connector (female) and ground?	K—ground	YES	Go to Step 4
			NO	Go to Step 5
4	1) Turn REC switch off. 2) Is there continuity between terminal of air intake actuator connector (female) and ground?	G—ground	YES	Replace air intake actuator (Refer to page U–33)
			NO	Go to Step 5
5	1) Disconnect heater control unit connector. 2) Is there continuity between terminals of air intake actuator connector (female) and heater control unit connector (female)?	G—A K—C	YES (all)	Replace heater control unit (Refer to page U–37)
			NO (partial)	Repair wiring harness that has no continuity (Air intake actuator—Heater control unit)

Flowchart No.	Airflow mode actuator system inspection (logic type only)	Symptom ..... Airflow mode actuator does not operate properly
9		Related parts ... Heater unit, airflow mode actuator, heater control unit, wiring harness



Step	Inspection procedure	Terminal	Result	Action
1	1) Remove airflow mode actuator. (Refer to page U–33.) 2) Turn ignition switch to ON. 3) Set fan switch at 4th. 4) Operate airflow mode main link by hand. 5) Does airflow mode change smoothly to VENT, BI-LEVEL, HEAT, HEAT/DEF, and DEFROSTER?	—	YES	Go to Step 2
			NO	Check heater unit
2	1) Check airflow mode actuator. (Refer to page U–33.) 2) Does airflow mode actuator operate properly?	—	YES	Go to Step 3
			NO	Replace airflow mode actuator (Refer to page U–33)
3	1) Turn ignition switch to LOCK. 2) Disconnect heater control unit connector. 3) Is there continuity between terminals of airflow mode actuator connector (female) and heater control unit connector (female)?	J—L, I—N, K—P, H—M, F—O, D—Q, C—S, B—T, A—R	YES (all)	Replace heater control unit (Refer to page U–37)
			NO (partial)	Repair wiring harness that has no continuity (Airflow mode actuator—Heater contorl unit)

Flowchart No.	A/C signal system inspection	Symptom ..... Magnetic clutch, condenser fan, and A/C compressor idle-up do not operate
10		Related parts ... PCM, refrigerant pressure switch, A/C amplifier, A/C switch (wire type), fan switch (wire type), heater contorl unit (logic type), wiring harness

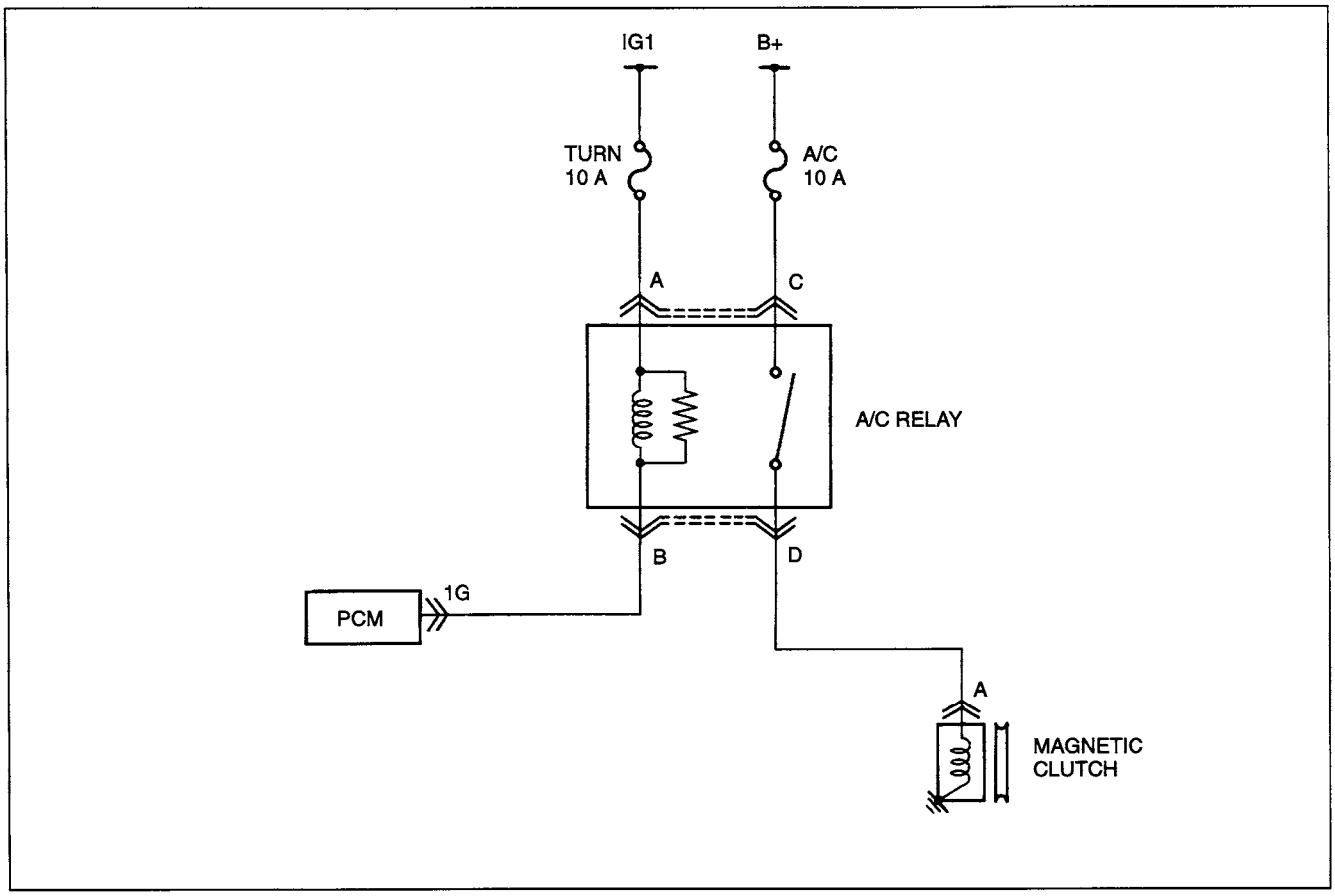


Step	Inspection procedure	Terminal	Result	Action
1	1) Disconnect refrigerant pressure switch connector. 2) Connect jumper wire between terminal B of refrigerant pressure switch connector (female) and ground. 3) Start engine. 4) Do magnetic clutch, condenser fan, and A/C compressor idle-up operate?	—	YES	Remove jumper wire and go to Step 2
			NO	Check for continuity between wiring harness of PCM and refrigerant pressure switch: [1K—B], and check PCM (Refer to section F1 or F2)
2	1) Turn ignition switch to LOCK. 2) Is there continuity between terminals of refrigerant pressure switch connector (male)?	B—A	YES	Connect refrigerant pressure switch connector and go to Step 3
			NO	Check refrigerant pressure switch (Refer to page U–31)
3	1) Connect jumper wire between terminal B or C of A/C amplifier connector (female) and ground. 2) Verify that temperature around sensor part of thermoswitch is 3.6 °C { 38 °F } or more. 3) Start engine. 4) Do magnetic clutch, condenser fan, and A/C compressor idle-up operate?	Jumper wire between terminal B and ground	YES	Disconnect jumper wire from terminal B and connect to terminal C
			NO	Repair wiring harness [Refrigerant pressure switch—A/C amplifier: A—B]
		Jumper wire between terminal C and ground	YES	Remove jumper wire and go to Step 4 (wire type) or Step 6 (logic type)
			NO	Check A/C amplifier (Refer to page U–34)

B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
4	Measure voltage at terminal of A/C switch connector (female).	D	B+	Go to Step 5
			Other	Repair wiring harness [A/C amplifier—A/C switch: C—D]
5	1) Turn ignition switch to LOCK. 2) Disconnect A/C switch connector. 3) Turn A/C switch on. 4) Is there continuity between terminals of A/C switch connector (male)?	D—E	YES	Replace fan switch (Refer to page U–39)
			NO	Replace A/C switch (Refer to page U–39)
6	Measure voltage at terminal of heater contorl unit connector (female).	B	B+	Go to Step 7
			Other	Repair wiring harness [A/C amplifier—Heater control unit: C—B]
7	1) Turn ignition switch to LOCK. 2) Disconnect heater contorl unit connector. 3) Turn A/C switch on. 4) Is there continuity between terminals of heater control unit connector (male)?	B—D	YES	Repair wiring harness [Heater control unit—Fan switch: B—D]
			NO	Replace heater control unit (Refer to page U–37)

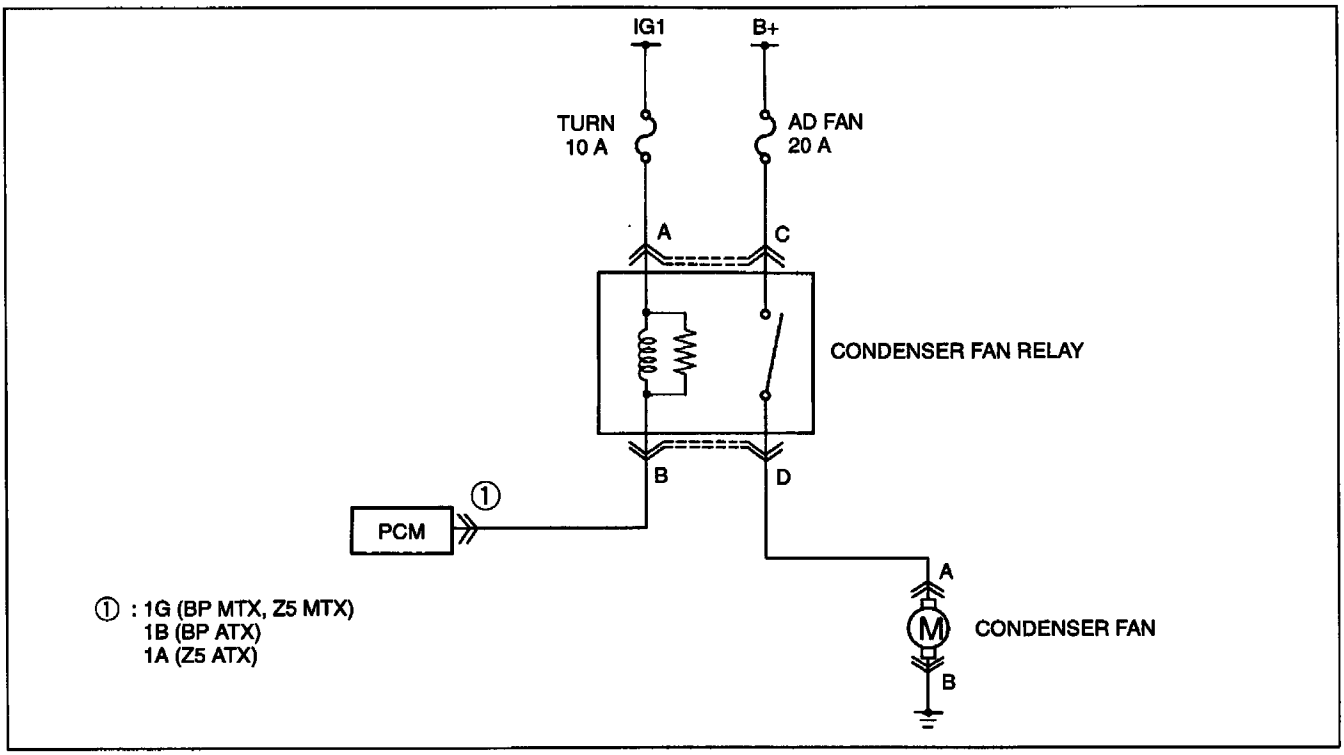
Flowchart No.	Magnetic clutch system inspection	Symptom ..... Only magnetic clutch does not operate
11		Related parts ... A/C relay, magnetic clutch, PCM (BP ATX, Z5 ATX), wiring harness



B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
1	1) Connect jumper wire between terminal B of A/C relay connector and ground. 2) Start engine. 3) Does magnetic clutch operate?	—	YES	Check for continuity between wiring harness of A/C relay and PCM [B—1G], and check PCM (BP ATX, Z5 ATX) (Refer to section F1 or F2)
			NO	Go to Step 2
2	Measure voltage at terminals of A/C relay connecter (female).	D	B+	Go to Step 3
			Other	Check terminal C
		C	B+	Check terminal A
			Other	Repair wiring harness [Fuse—A/C relay: A/C 10 A—C]
		A	B+	Replace A/C relay (Refer to page U–31)
			Other	Repair wiring harness [Fuse—A/C relay: TURN 10 A—A]
3	Measure voltage at terminal of magnetic clutch connector (female).	A	B+	Check magnetic clutch (Refer to page U–29)
			Other	Repair wiring harness [A/C relay — Magnetic clutch: D—A]

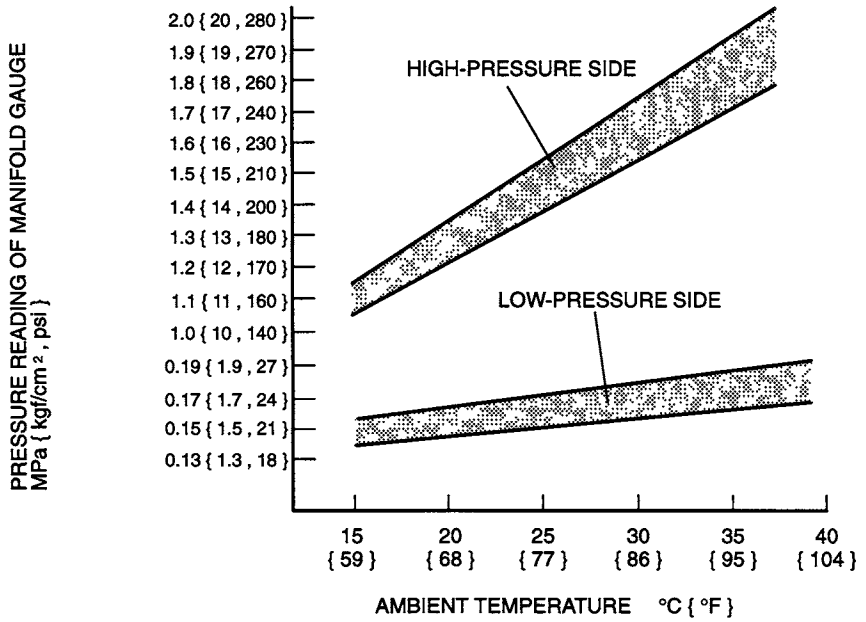
Flowchart No.	Condenser fan system inspection	Symptom ..... Only condenser fan does not operate
12		Related parts ... Condenser fan relay, condenser fan, PCM (BP ATX, Z5 ATX), wiring harness



B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
1	1) Connect jumper wire between terminal B of condenser fan relay connector (female) and ground. 2) Start engine. 3) Does condenser fan operate?	—	YES	Check for continuity between wiring harness of condenser fan relay and PCM [B—1G: BP MTX, Z5 MTX/B—1B: BP ATX/B—1A: Z5 ATX], and check PCM (BP ATX, Z5 ATX) (Refer to section F1 or F2)
			NO	Go to Step 2
2	Measure voltage at terminals of condenser fan relay connector (female).	D	B+	Go to Step 3
			Other	Check terminal C
		C	B+	Check terminal A
			Other	Repair wiring harness [Fuse—Condenser fan relay: AD FAN 30 A—C]
		A	B+	Replace condenser fan relay (Refer to page U–31)
			Other	Repair wiring harness [Fuse—Condenser fan relay: TURN 10 A—A]
3	Measure voltage at terminals of condenser fan connector (female).	A	B+	Check terminal B
			Other	Repair wiring harness [Condenser fan relay —Condenser fan: D—A]
		B	B+	Repair wiring harness [Condenser fan (B) —GND]
			Other	Replace condenser fan (Refer to page U–30)

Flowchart No.	Refrigerant system inspection	Symptom ..... Magnetic clutch, condenser fan, and A/C compressor idle-up operate, but cool air does not discharged or air cooling ability is low
13		Related parts ... Refrigerant system



Step	Inspection procedure	Result	Action
1	Conduct refrigerant pressure check. (Refer to page U–9.)	High- and low-pressure-side readings are higher than normal	Go to Step 2
		High- and low-pressure-side readings are lower than normal	Go to Step 3
		High-pressure-side reading is a little lower than normal; low-pressure-side reading is a little higher than normal	Go to Step 4
		High-pressure-side reading rises to normal pressure range and then drops below range; low-pressure-side reading is negative	Go to Step 5
		No difference between high- and low-pressure-side readings	Improper compression of A/C compressor Replace A/C compressor (Refer to page U–20)
2	Are condenser fins clogged or damaged?	YES	Insufficient refrigeration in condenser Clean or repair condenser fins (Refer to page U–21)
		NO	Too much refrigerant Adjust refrigerant amount

Step	Inspection procedure	Result	Action
3	1) Conduct gas leak test. (Refer to page U–8.) 2) Are there any oil stains or gas leaks?	YES	Take a necessary measure, depending on the result of "gas leak test" (Refer to page U–8)
		NO	Insufficient refrigerant due to secular leakage Insufficient charging Regulate refrigerant amount (Refer to page U–6)
4	Is heat-sensing tube in its proper position and securely connected to evaporator outlet pipe? (Refer to page U–19.)	YES	Expansion valve opening too wide because of expansion valve malfunction Replace expansion valve (Refer to page U–18)
		NO	Expansion valve opening too wide because of improper heat-sensing tube installation Reinstall heat-sensing tube (Refer to page U–19)
5	1) Turn off fan switch and wait for about 10 minutes. 2) Set fan switch at 4th. 3) Are pressure readings normal immediately after A/C compressor is turned on?	YES	Expansion valve clogged due to frozen moisture Replace receiver/drier (Refer to page U–22)
		NO	Go to Step 6
6	Is heat-sensing tube in its proper position?	YES	Expansion valve clogged with foreign material Expansion valve closing too wide because of expansion valve malfunction or heat-sensing tube leakage Replace expansion valve (Refer to page U–18)
		NO	Expansion valve closing too wide because of improper heat-sensing tube installation Reinstall heat-sensing tube (Refer to page U–19)

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