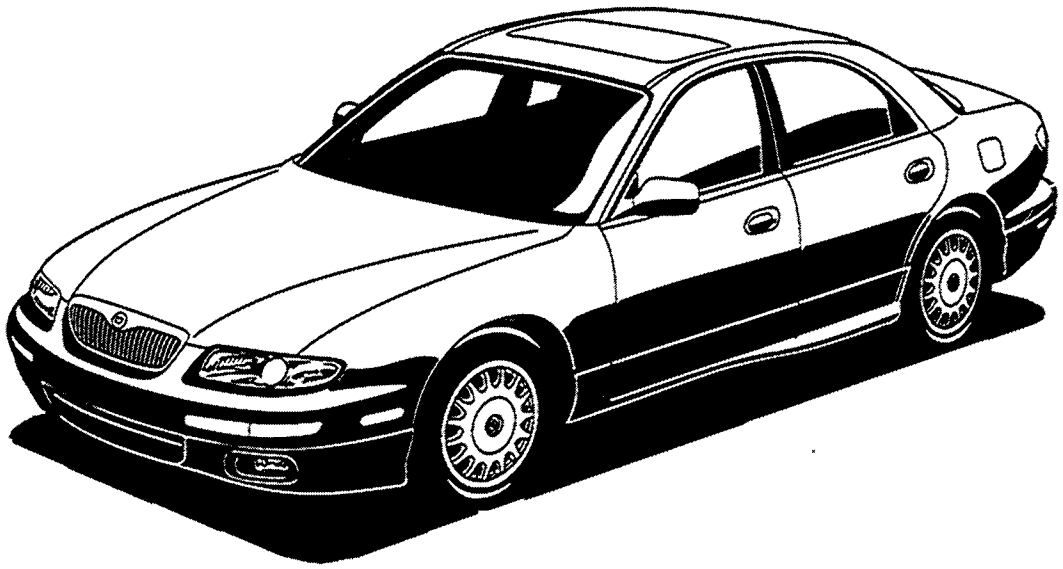
millenia



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 Millenia Workshop Manual

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Engine	KL	B1
	KJ	B2
Lubrication System	KL, KJ	D
Cooling System	KL, KJ	E
Fuel and Emission Control Systems	KL	F1
	KJ	F2
Engine Electrical System		G
Automatic Transaxle	GF4A-EL	K1
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Wheels and Tires		Q
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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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Part No. 9999–95–058B–96

VEHICLE IDENTIFICATION NUMBERS (VIN)

JM1 TA221*T1 200001—
JM1 TA222*T1 200001—

RELATED MATERIALS

MILLENIA Service Highlights 9999-95-095F-95
1996 Protegé, MX-3, MX-5, 626/MX-6, 929,
MPV, Millenia Service Highlights 9999-95-MODL-96
MILLENIA Wiring Diagram 9999-95-036G-96
Engine Workshop Manual KL 9999-95-EWKL-95
Engine Workshop Manual KJ 9999-95-EWKJ-95
ATX Workshop Manual GF4A-EL 9999-95-GF4A-95
ATX Workshop Manual LJ4A-EL 9999-95-LJ4A-95

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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.

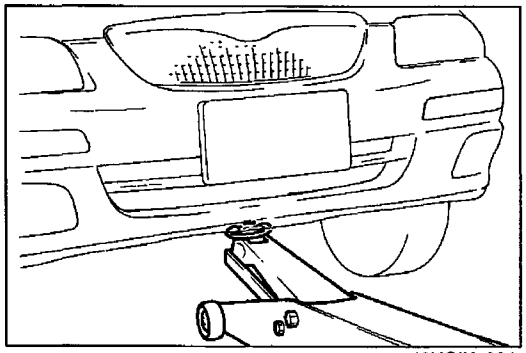
JACKING POSITIONS

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.**

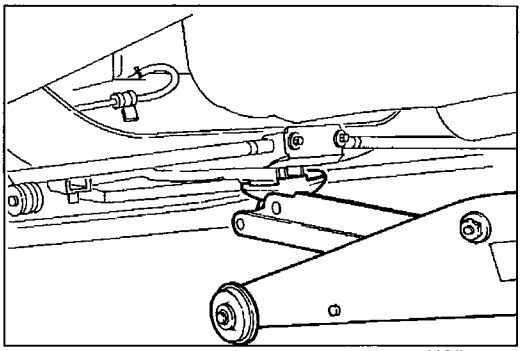
Use safety stands to support the vehicle after it has been lifted.

Front
At the center of the crossmember



46UGIX-004

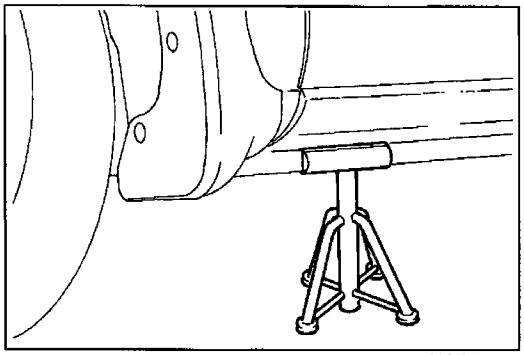
Rear
At the center of the crossmember



46UGIX-005

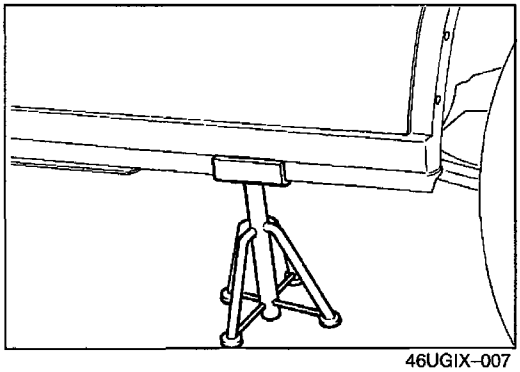
SAFETY STAND POSITIONS

Front
Both sides of the vehicle



46UGIX-006

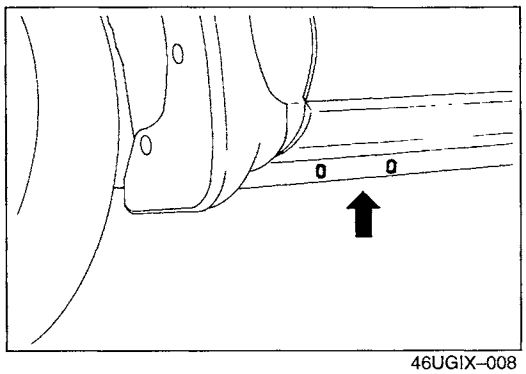
Rear
Both sides of the vehicle



46UGIX-007

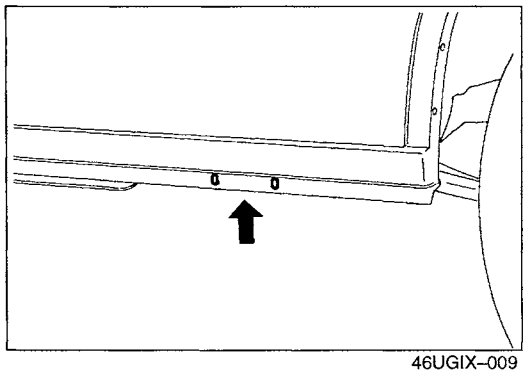
VEHICLE LIFT POSITIONS

Front



46UGIX-008

Rear



46UGIX-009

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.**

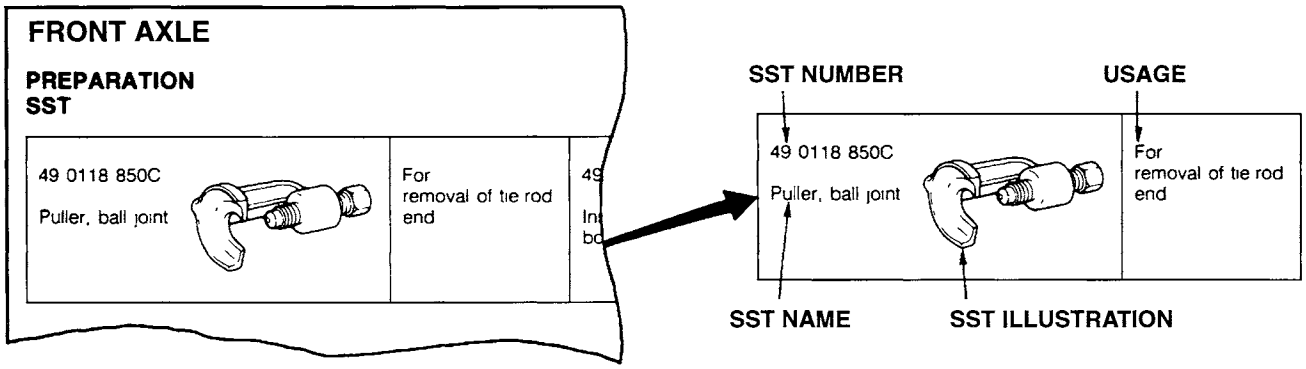
Note

- 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.

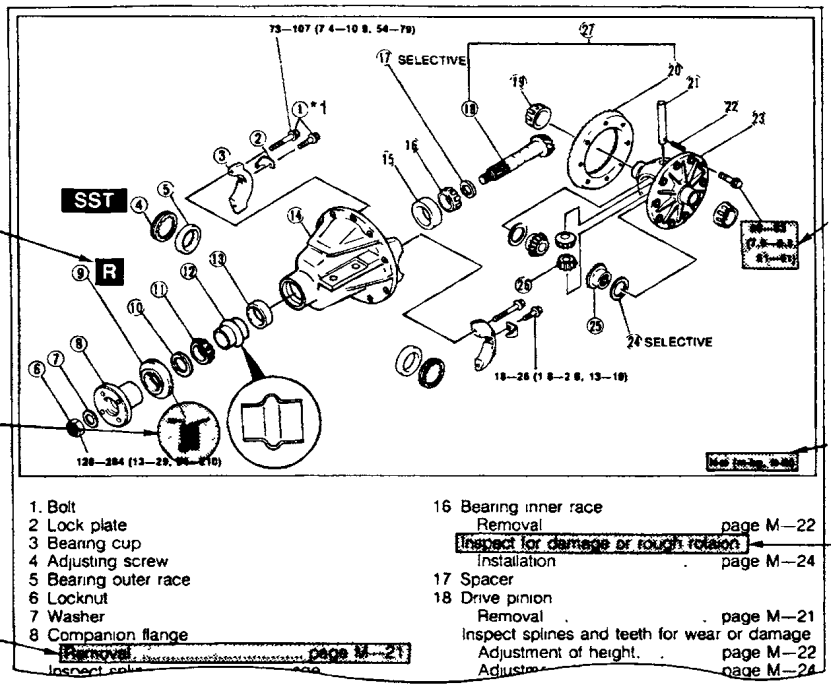
Example:



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.

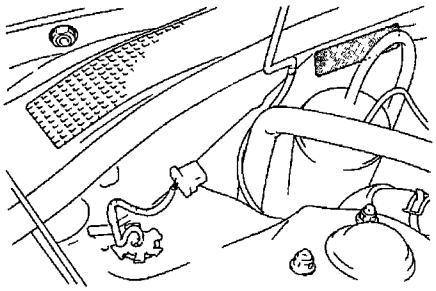
SYMBOLS

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.

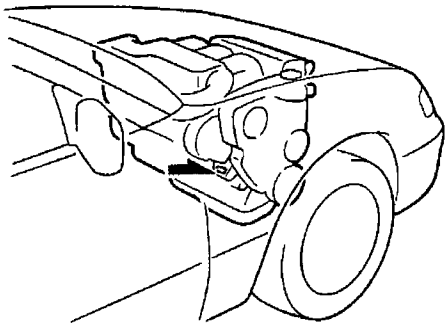
IDENTIFICATION NUMBER LOCATIONS

VEHICLE IDENTIFICATION NUMBER (VIN)

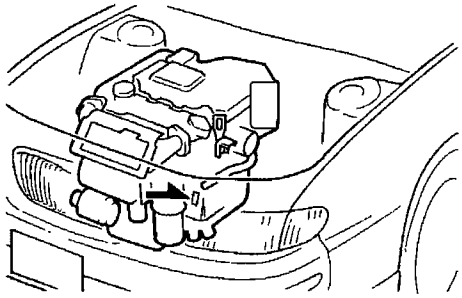


ENGINE MODEL AND NUMBER

KL



KJ



46UGIX–017

ABBREVIATIONS

ABDC	After bottom dead center
ABS	Antilock brake system
ABVVAC	ABV solenoid valve (vacuum) duty value
ABVVENT	ABV solenoid valve (vent) duty value
ACC	Accessory
A/CL V	A/C load signal voltage
A/C RLY	A/C relay
AMB	Ambient
AMP	Amplifier
ATDC	After top dead center
ATF	Automatic transaxle fluid
ATFT	Transaxle fluid temperature
ATFT V	Transaxle fluid temperature signal voltage
ATX	Automatic transaxle
BAC	Bypass air control
BARO V	Barometric pressure signal voltage
BTDC	Before top dead center
BLR SW	Fan switch
BRK SW	Brake switch
BYPAIR1	Bypass air solenoid valve No.1
BYPAIR2	Bypass air solenoid valve No.2
CACBYP	Charge air cooler bypass solenoid valve
CM	Control module
CPU	Central processing unit
CU	Control unit
DEF	Defroster
DEF SW	Rear window defroster switch
D SW	Transaxle range switch (D range)
DRL	Daytime running light
EC-AT	Electronically controlled automatic transaxle
ECT V	Engine coolant temperature signal voltage
EGR	Exhaust gas recirculation
EGRB	EGR boost
EGRB V	EGR boost signal voltage
EGRP V	EGR valve position signal voltage
EGRVAC	EGR solenoid valve (vacuum) duty value
EGRVENT	EGR solenoid valve (vent) duty value
EGRBV	EGR boost sensor solenoid valve
E/L	Electrical load
ESA	Electronic spark advance
ESPS	Engine speed sensing power steering
EX	Exhaust
FANC	Coolant fan control
FANCH	Coolant fan control (hi)
FANCLNL	Coolant fan, condenser fan control (low)
FANCN	Coolant fan, condenser fan control
FHO2SHL	Heated oxygen sensor heater (front LH)
FHO2SHR	Heated oxygen sensor heater (front RH)
FHO2S L	Heated oxygen sensor (front LH)
FHO2S R	Heated oxygen sensor (front RH)
FP RLY	Fuel pump relay
FPRR	Fuel pump resister and relay
HACPZS	High air charging pressure zone signal
HEAT	HEATER
HDL SW	Headlight switch
HI	High
HLA	Hydraulic lash adjuster
HU	ABS hydraulic unit
IACV	Idle air control valve
IATDC	Intake air temperature (dynamic chamber)
IATDC V	Intake air temperature signal voltage (dynamic chamber)
IATLC	Intake air temperature (lysholm compressor)
IATLC V	Intake air temperature signal voltage (lysholm compressor)
IAT V	Intake air temperature signal voltage
IC	Integrated circuit
I/F	Interface
IG	Ignition
IGT	Ignition timing
IN	Intake
INJ L	Fuel injection duration (left bank)
INJ R	Fuel injection duration (right bank)
INT	Intermittent
KR	Knocking retard
L/C	Lysholm compressor
LH	Left hand
LHD	Left hand drive
LINE	LINE pressure solenoid valve duty value
L SW	Transaxle range switch (L or 1 range)
LO	Low
M	Motor
MAP V	Manifold absolute pressure signal voltage
MAF V	Mass air flow signal voltage
NA	Not applicable
NGS	New generation star tester
O/D	Over drive
O/DF LP	O/D OFF indicator light
O/DF SW	O/D OFF switch
PCV	Positive crankcase ventilation
PRC	Pressure regulator control
PRCV	PRC solenoid valve
PRG	Purge
PRGV	Purge solenoid valve
P/S	Power steering
REC	Recirculate
RH	Right hand
RHO2SH	Heated oxygen sensor heater (rear)
RHO2S L	Heated oxygen seosr (rear LH)
RHO2S R	Heated oxygen sensor (rear RH)
RPM	Engine speed
R SW	Transaxle range switch (R position)
RTQ1	Reduce torque signal 1
RTQ2	Reduce torque signal 2
SAS	Sophisticated air bag sensor
SHIFT A	Shift solenoid A
SHIFT B	Shift solenoid B
SHIFT C	Shift solenoid C
SRS	Supplemental restraint system
SST	Special service tool
S SW	Transaxle range switch (S or 2 range)
ST	Start
SVCM	Solar ventilation control module
SW	Switch
TCC	Torque converter clutch solenoid valve
TCC CON	Torque converter clutch control solenoid valve
TCS	Traction control system
TCS INH	Torque reduction inhibit signal
TDC	Top dead center
TEN	TEN terminal (data link connector)
TNS	Tail number side lights
TP V	Throttle position sensor signal voltage
TURBIN	Input/turbine speed sensor
TQR/ECT	Torque reduced/Engine coolant temperature signal
VRIS	Variable resonance induction system
VRISV1	VRIS solenoid valve No.1
VRISV2	VRIS solenoid valve No.2
VS	Vehicle speed
1GR	First gear
2GR	Second gear
2WS	2-wheel steering
3–2TIME	3–2 Timing solenoid valve

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

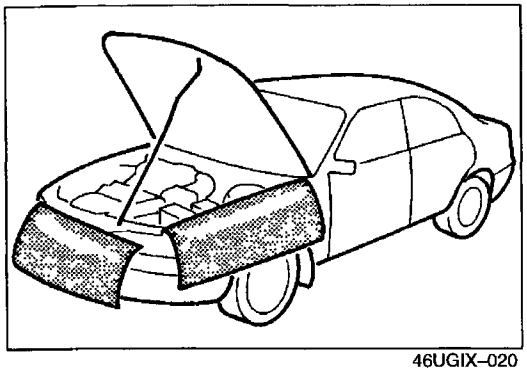
In accordance with new regulations, SAE (Society of Automotive Engineers) standard names and abbreviations are now used in this manual. The table below lists the names and abbreviations that have been used in Mazda manuals up to now and their SAE equivalents.

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	

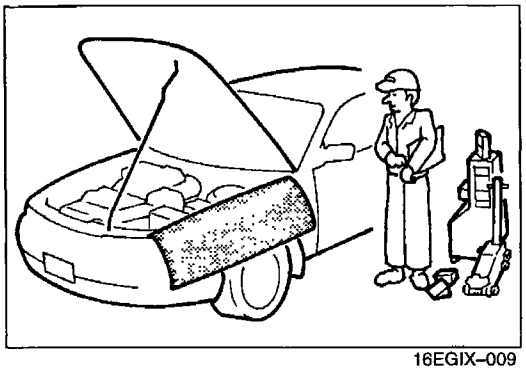
#5: Diagnostic trouble codes depend on the diagnostic test mode


46UGIX-020

FUNDAMENTAL PROCEDURES

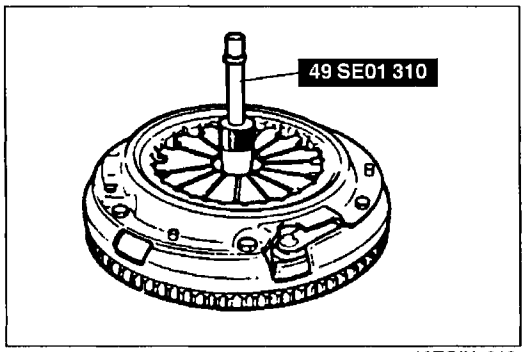
PROTECTION OF THE VEHICLE

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


16EGIX-009

PREPARATION OF TOOLS AND MEASURING EQUIPMENT

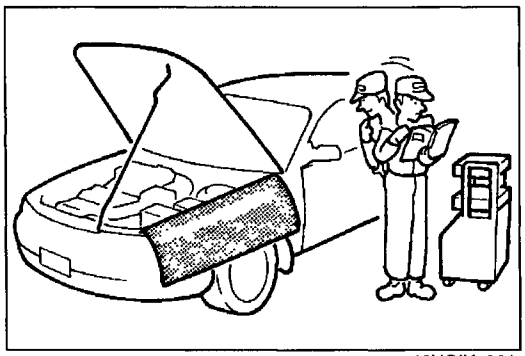
Be sure that all necessary tools and measuring equipment are available before starting any work.



16EGIX-010

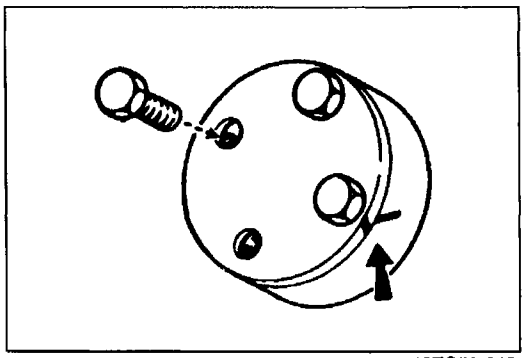
SPECIAL TOOLS

Use special tools when they are required.


46UGIX-021

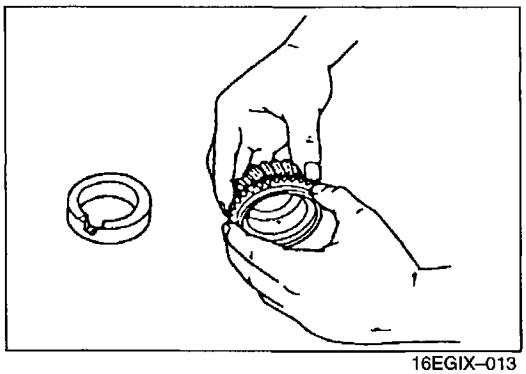
REMOVAL OF PARTS

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.

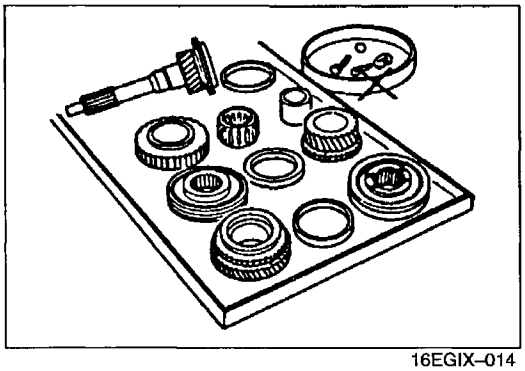

16EGIX-012

DISASSEMBLY

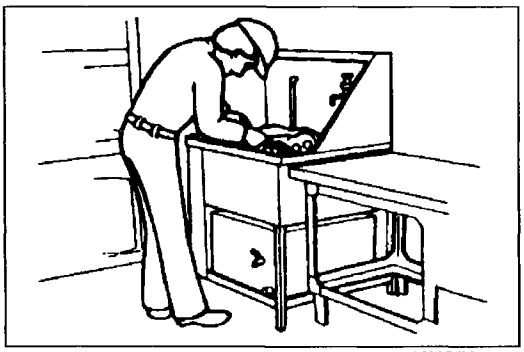
If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be disassembled in a way that will not affect their performance or external appearance and identified so that reassembly can be performed easily and efficiently.


16EGIX-013

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


16EGIX-014

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.

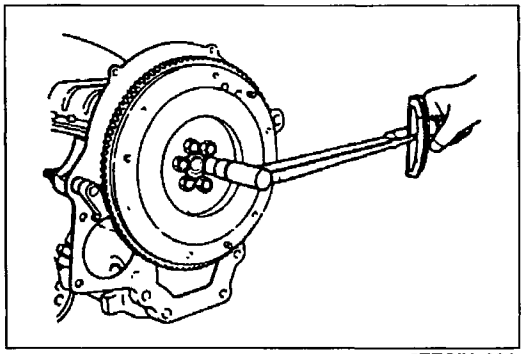

46UGIX-022

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

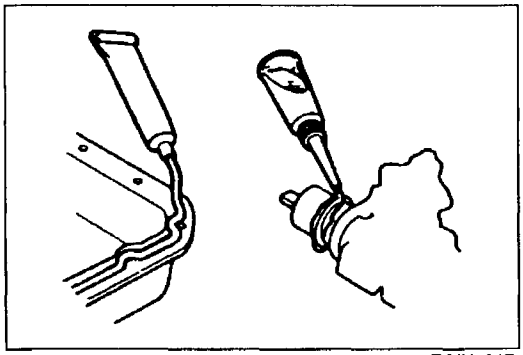
Warning
- **Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear protective eye wear whenever using compressed air.**

REASSEMBLY

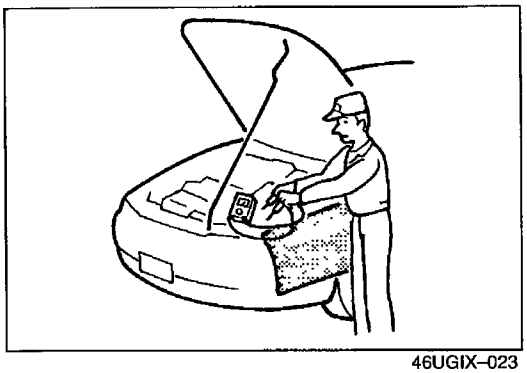
Standard values, such as torques and certain adjustments, must be strictly observed in the reassembly of all parts.


3ZEGIX-004

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


16EGIX-017

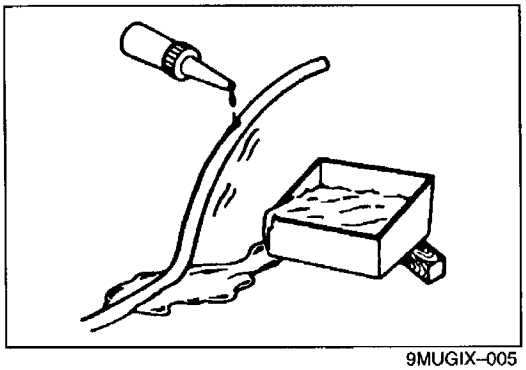
Depending on location:
1. Sealant should be applied to gaskets.
2. Oil should be applied to the moving components of parts.
3. Specified oil or grease should be applied at the prescribed locations (such as oil seals) before reassembly.



46UGIX–023

ADJUSTMENTS

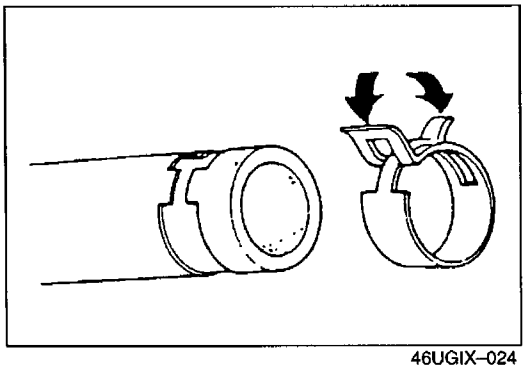
Use suitable gauges and testers when making adjustments.



9MUGIX–005

RUBBER PARTS AND TUBING

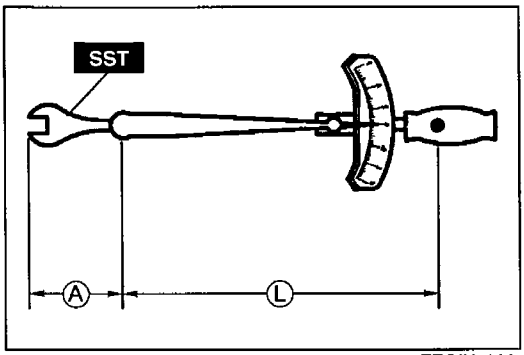
Prevent gasoline or oil from getting on rubber parts or tubing.



46UGIX–024

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.



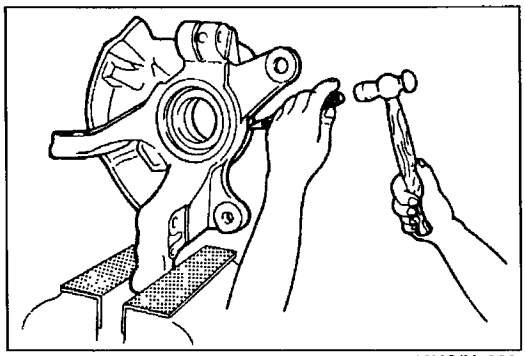
3ZEGIX–009

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	L&A Unit
N·m	N m × [L/(L+A)]	centimeter
kgf m	kgf·m × [L/(L+A)]	centimeter
kgf·cm	kgf cm × [L/(L+A)]	centimeter
ft·lbf	ft·lbf × [L/(L+A)]	inch
in lbf	in lbf × [L/(L+A)]	inch

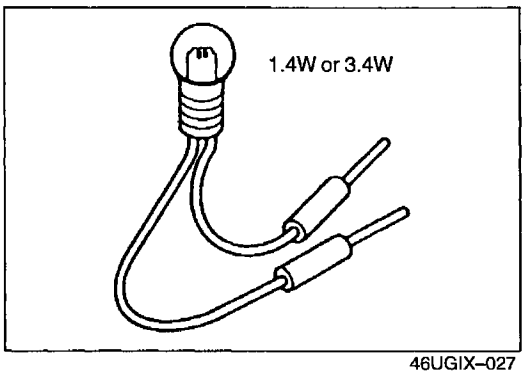
A = The length of the **SST** past the torque wrench drive.
L = The length of the torque wrench.



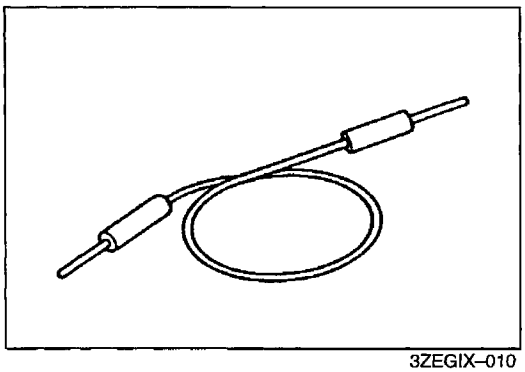
46UGIX–026

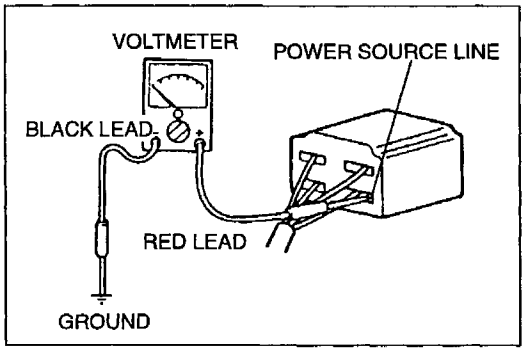
VISE

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

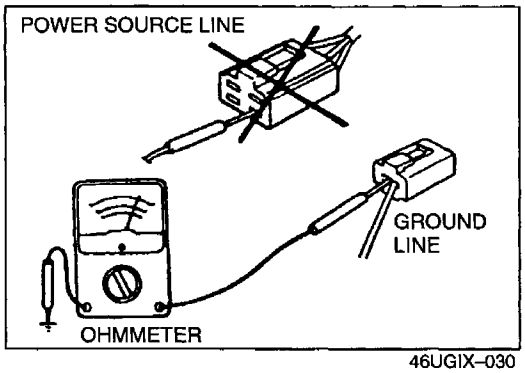


46UGIX–027


3ZEGIX–010



46UGIX–029



46UGIX–030

ELECTRICAL TROUBLESHOOTING TOOLS

TEST LIGHT

The test light, as shown in the figure, uses a 12V 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 3.4W 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

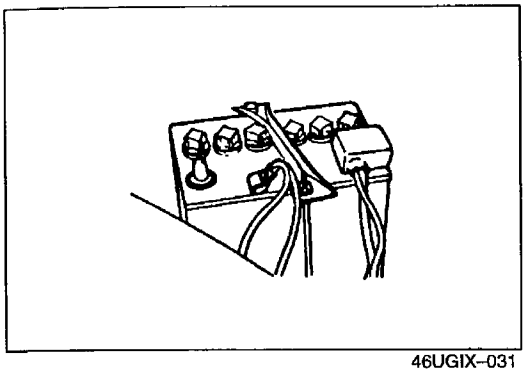
The DC voltmeter is used to measure circuit voltage. A voltmeter with a range of 15V or more is used by connecting the positive (+) probe (red lead wire) to the point where voltage is to be measured and the negative (–) probe (black lead wire) to a body ground.

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.**

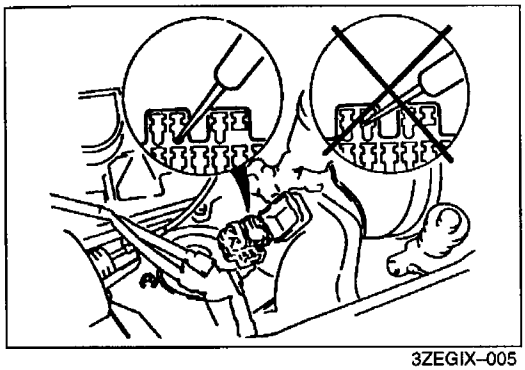


46UGIX-031

ELECTRICAL PARTS

BATTERY CABLE

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



3ZEGIX-005

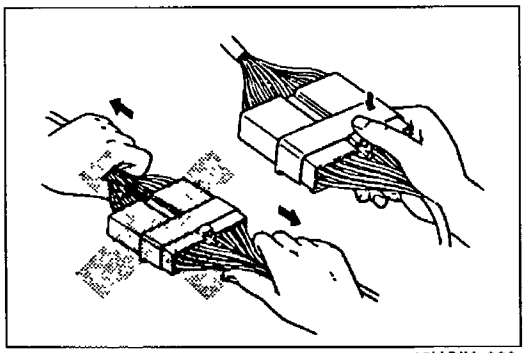
CONNECTORS

Data Link Connector

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

Caution

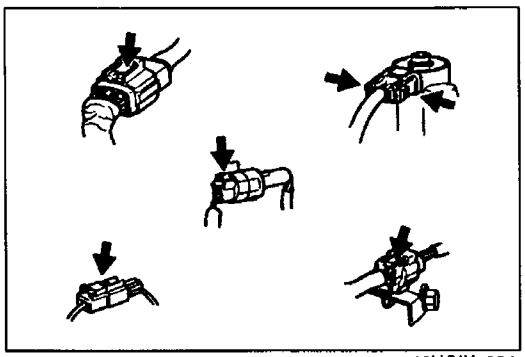
- **Inserting a jumper wire probe into the data link connector terminal may damage the terminal.**



46UGIX-033

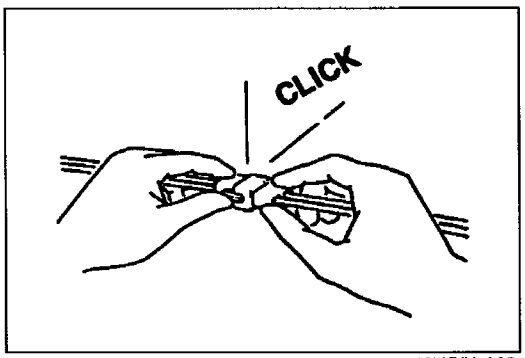
Disconnecting Connectors

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



46UGIX-034

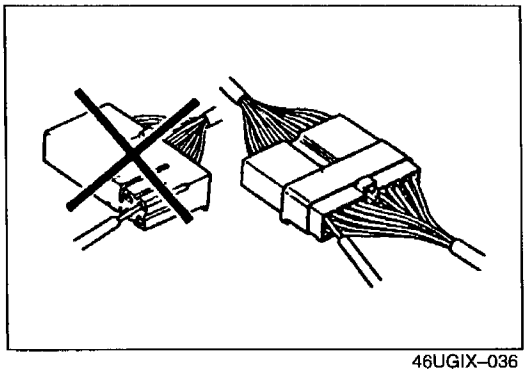
Connectors can be disconnected by pressing or pulling the lock lever as shown.



46UGIX-035

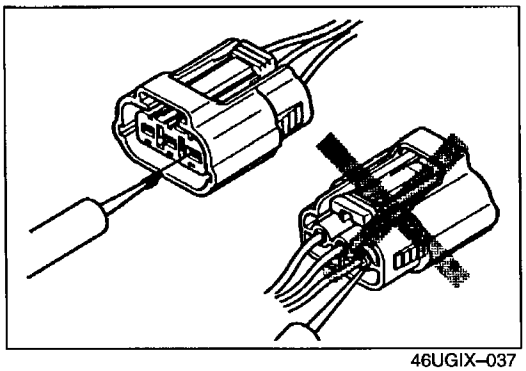
Locking connector

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


46UGIX–036

Inspection

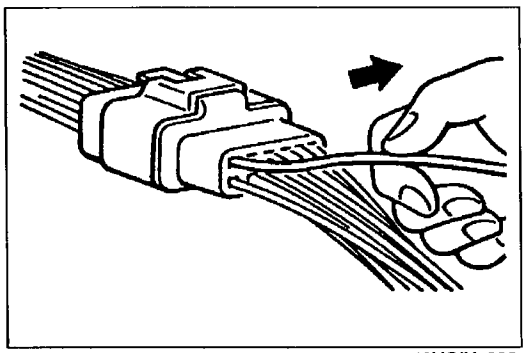
1. When a tester is used to check for continuity or to measure voltage, insert the tester probe from the wiring harness side.


46UGIX–037

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

Caution

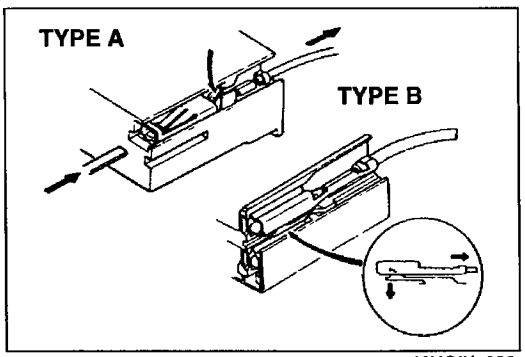
- **To prevent damage to the terminal, wrap a thin wire around the lead before inserting it into the terminal.**


46UGIX–038

TERMINALS

Inspection

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

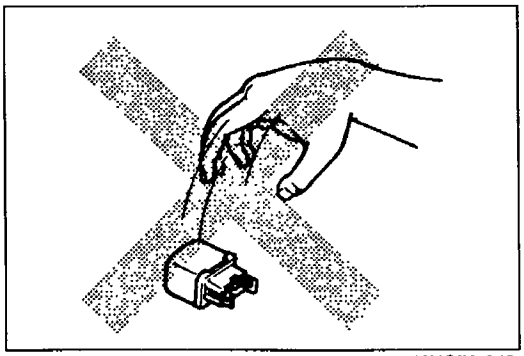


46UGIX–039

Replacement

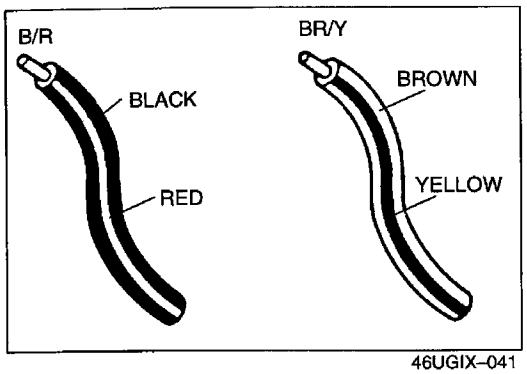
Use the appropriate tools to remove a terminal as shown. When installing a terminal, be sure to insert it until it locks securely.

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.


46UGIX–040

SENSORS, SWITCHES, AND RELAYS

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



46UGIX-041

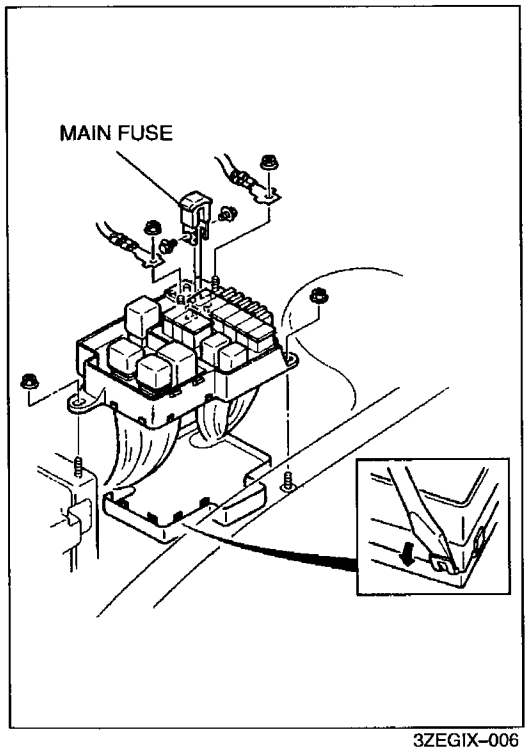
WIRING HARNESS

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		—	—



3ZEGIX-006

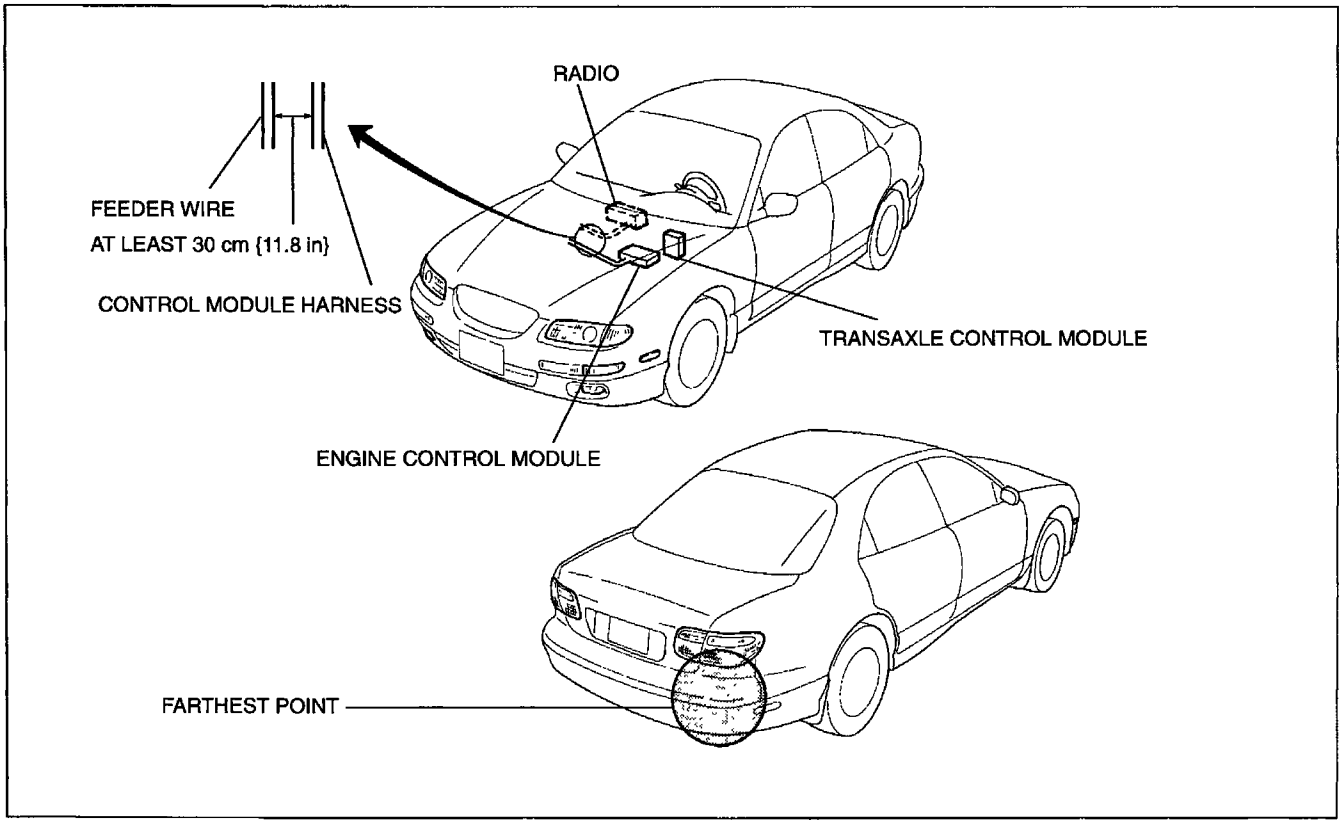
FUSE

Replacement

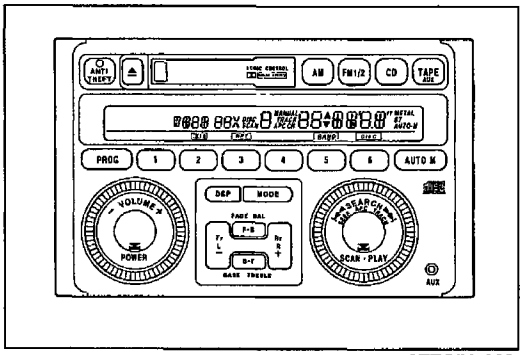
1. When replacing a fuse, be sure to replace it with one of the specified capacity.
   If a fuse again fails after it has been replaced, the circuit probably has a short and the wiring should be checked.
2. Be sure the negative battery terminal is disconnected before replacing a main fuse (120A).

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.



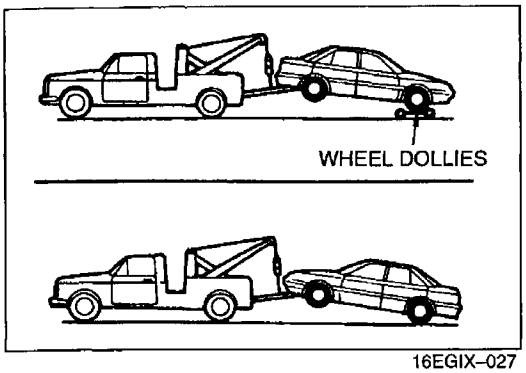
3ZEGIX–007



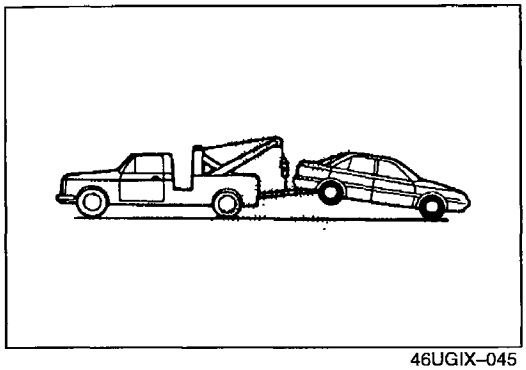
3ZEGIX–008

AUDIO ANTITHEFT SYSTEM

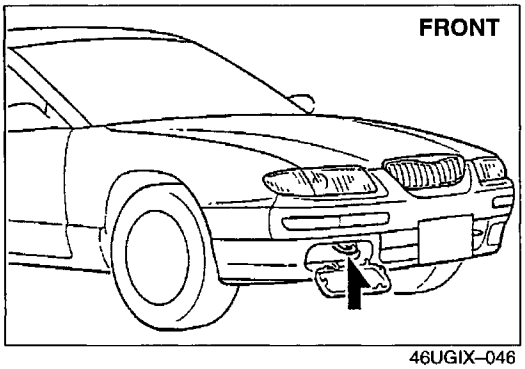
An audio with an antitheft function is optionally available. Before removing the negative battery terminal or disconnecting the audio power source, obtain the code number and deactivate the audio antitheft system.
(Refer to section T.)



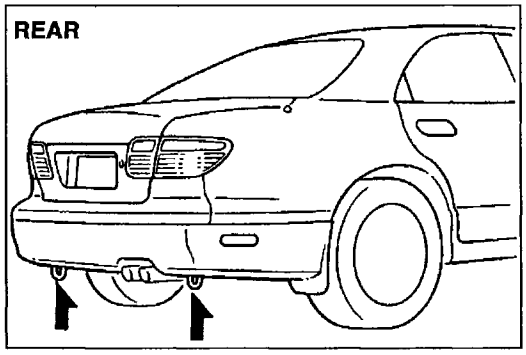
16EGIX-027



46UGIX-045



46UGIX-046



TOWING

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.

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 hook loops 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.**

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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 (KJ 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 (KL engine)						I				I
Drive belts (KJ engine)			Replace every 105,000 miles {168,000 km}							
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 (KL engine)			Replace every 30,000 miles {48,000 km}							
Spark plugs (KJ engine)			Replace every 60,000 miles {96,000 km}							
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
Automatic transaxle fluid level						I				I
Steering operation and linkages						I				I
Front and rear 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
Body inspection (paint, corrosion)			I	I	I	I	I	I	I	I
Air conditioner system (if equipped)										
Compressor operation				I		I		I		I

Chart symbols:

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

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 (KJ 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 (KL engine)							I						I
Drive belts (KJ engine)		Replace every 105,000 miles {168,000 km}											
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 (KL engine)		Replace every 30,000 miles {48,000 km}											
Spark plugs (KJ engine)		Replace every 60,000 miles {96,000 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											
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
Automatic transaxle fluid level							I						I
Disc brakes				I			I			I			I
Steering operation and linkages							I						I
Front and rear 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
Body inspection (paint, corrosion)		I	I	I	I	I	I	I	I	I	I	I	I
Air conditioner system (if equipped)													
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

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 (KJ 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 (KL engine)			I	I	I	I	I	I	I	I	I	I	I	I
Drive belts*1 (KJ engine)			Replace every 168,000 km {105,000 miles}											
Engine timing belt*1														R
Air cleaner														
Air cleaner element					I			R			I			R
Ignition system														
Spark plugs (KL engine)								R						R
Spark plugs (KJ engine)														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 transmission fluid level			I	I	I	I	I	I	I	I	I	I	I	I
Automatic transaxle fluid								R						R
Drive shaft dust boots								I						I
Brake lines and hoses								I						I
Brake fluid level			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
Tire inflation pressure and tire wear			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
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
Washer fluid level			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
Air conditioner system (if equipped)														
Compressor operation				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.

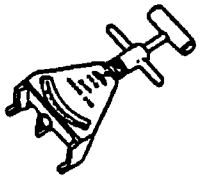
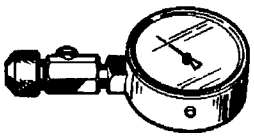
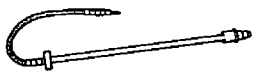
Before beginning any service procedure, refer to section T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

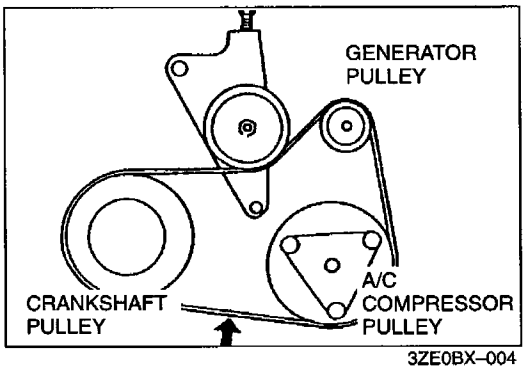
ENGINE
(KL)

ENGINE TUNE-UP **B1– 2**
PREPARATION **B1– 2**
DRIVE BELT **B1– 2**
COMPRESSION **B1– 4**
ON-VEHICLE MAINTENANCE **B1– 5**
PREPARATION **B1– 5**
TIMING BELT **B1– 6**
CYLINDER HEAD GASKET **B1–12**
HLA **B1–20**
FRONT OIL SEAL **B1–22**
REAR OIL SEAL **B1–24**
REMOVAL / INSTALLATION **B1–26**
PREPARATION **B1–26**
PROCEDURE **B1–26**

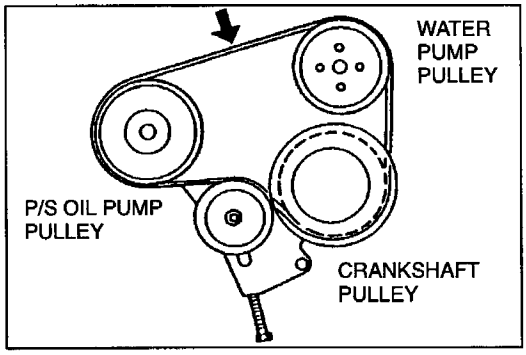
ENGINE TUNE-UP

PREPARATION
SST

49 9200 020A Tension gauge, belt 	For inspection of drive belt tension	49 H010 103 Gauge, compression 	For inspection of compression
49 H010 104 Adaptor 	For inspection of compression	—	—



3ZE0BX–004



DRIVE BELT
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.

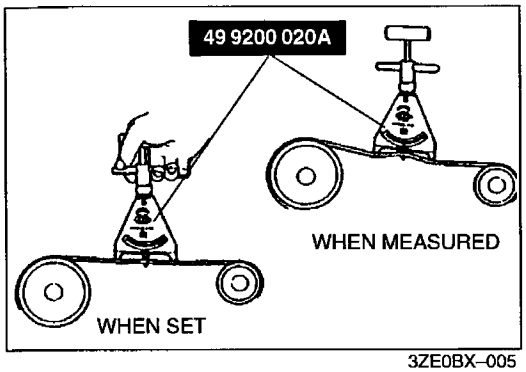
Deflection

mm {in}

Drive belt	*New	Used	Limit
Generator	5.5—6.5 {0.22—0.25}	6.5—7.5 {0.26—0.29}	8.0 {0.31}
P/S oil pump	6.0—7.0 {0.24—0.27}	7.0—8.0 {0.28—0.31}	9.0 {0.35}

*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.)



3ZE0BX-005

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.

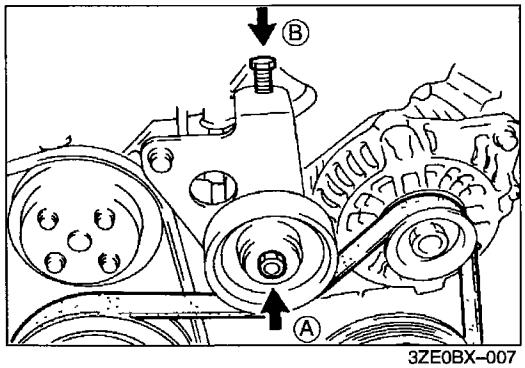
Tension

N {kgf, lbf}

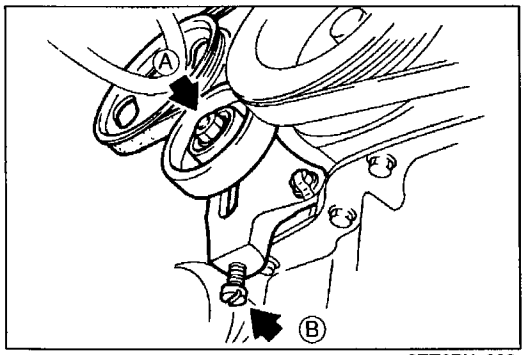
Drive belt	*New	Used	Limit
Generator	690—880 {70—90, 160—190}	500—680 {50—70, 110—150}	440 {45, 99}
P/S oil pump	540—680 {55—70, 130—150}	400—530 {40—55, 88—120}	340 {35, 77}

*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 below.)



3ZE0BX-007



3ZE0BX-008

Adjustment

Generator drive belt

1. Loosen idler pulley locknut Ⓐ.
2. Adjust the belt deflection by turning adjusting bolt Ⓑ.

Deflection
New: 5.5—6.5 mm {0.22—0.25 in}
Used: 6.5—7.5 mm {0.26—0.29 in}

3. Tighten idler pulley locknut Ⓐ.

Tightening torque:
32—46 N·m {3.2—4.7 kgf·m, 24—33 ft·lbf}

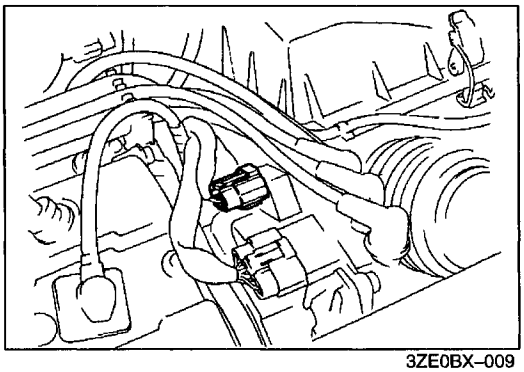
P/S oil pump drive belt

1. Loosen idler pulley locknut Ⓐ.
2. Adjust the belt deflection by turning adjusting bolt Ⓑ.

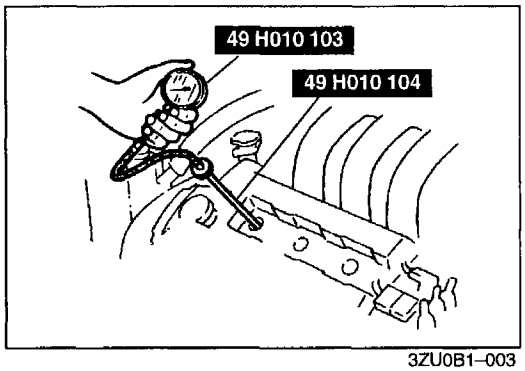
Deflection
New: 6.0—7.0 mm {0.24—0.27 in}
Used: 7.0—8.0 mm {0.28—0.31 in}

3. Tighten idler pulley locknut Ⓐ.

Tightening torque:
32—46 N·m {3.2—4.7 kgf·m, 24—33 ft·lbf}



3ZE0BX-009



3ZU0B1-003

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. (Refer to section G.)
5. Disconnect the distributor connector.
6. Install the **SST** into the No.1 spark plug hole.
7. Fully depress the accelerator pedal and crank the engine.
8. Note the maximum gauge reading.
9. Check each cylinder as above.

Compression

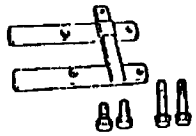
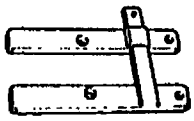
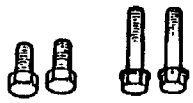
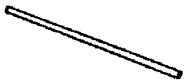
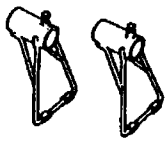
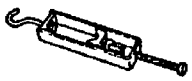
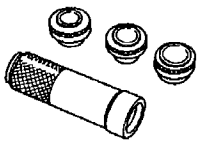
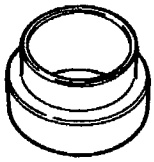
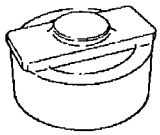
kPa {kgf/cm^2, psi}–rpm

Standard	1,400 {14.3, 203}–250
Minimum	981 {10.0, 142}–250
Maximum difference between cylinders	196 kPa {2.0 kgf/cm^2, 28 psi}

10. 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.
11. Remove the **SST**.
12. Connect the distributor connector.
13. Install the spark plugs. (Refer to section G.)

ON-VEHICLE MAINTENANCE

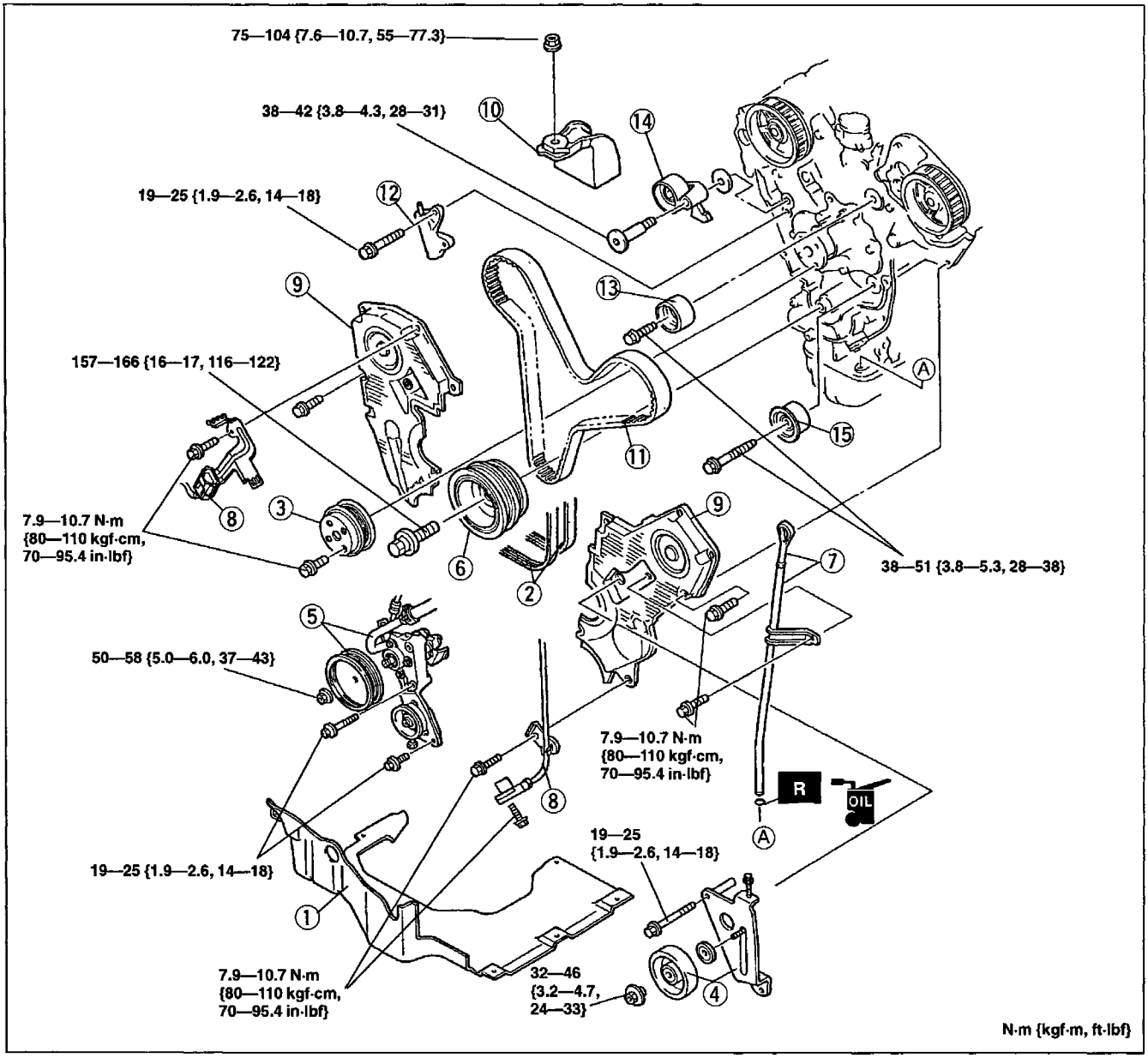
PREPARATION
SST

49 S120 710 Holder, coupling flange 	For prevention of crankshaft rotation	49 E011 1A1 Set, holder 	For prevention of crankshaft rotation
49 E011 101 Holder (Part of 49 E011 1A1) 	For prevention of crankshaft rotation	49 E011 102 Bolts (Part of 49 E011 1A1) 	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
49 F401 330B Installer set, bearing 	For installation of camshaft oil seal	49 F401 337A Attachment C (Part of 49 F401 330B) 	For installation of camshaft oil seal
49 G019 017 Installer, oil seal 	For installation of rear oil seal	—	—

TIMING BELT

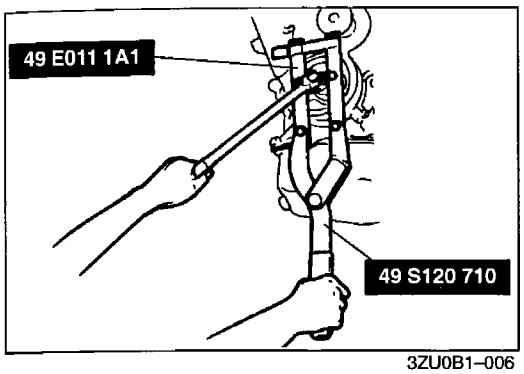
Removal / Installation

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**.



3ZU0B1-005

1. Splash shield (RH)
2. Drive belt
   Adjustment ..... page B1– 3
3. Water pump pulley
4. Idler pulley and bracket
5. P/S oil pump
   Removal / Installation ..... section N
6. Crankshaft pulley
   Removal Note ..... page B1– 7
   Installation Note ..... page B1–11
7. Dipstick and pipe
8. Crankshaft position sensor
9. Timing belt cover
10. No.3 engine mount sub bracket
    Removal Note ..... page B1– 7
    Installation Note ..... page B1–11
11. Timing belt
    Removal Note ..... page B1– 7
    Installation Note ..... page B1– 9
12. Timing belt auto tensioner
    Installation Note ..... page B1– 8
13. No.1 idler pulley
14. Tensioner pulley
15. No.2 idler pulley

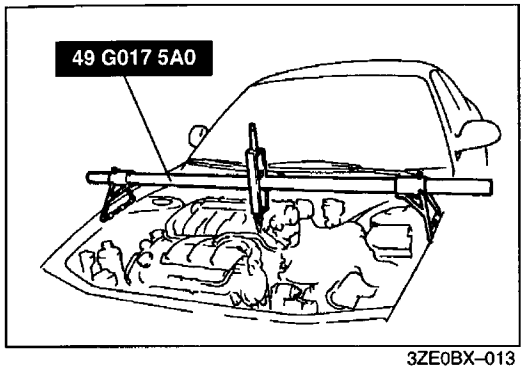


3ZU0B1–006

Removal Note
Crankshaft pulley
1. Install the **SST** to the crankshaft pulley.

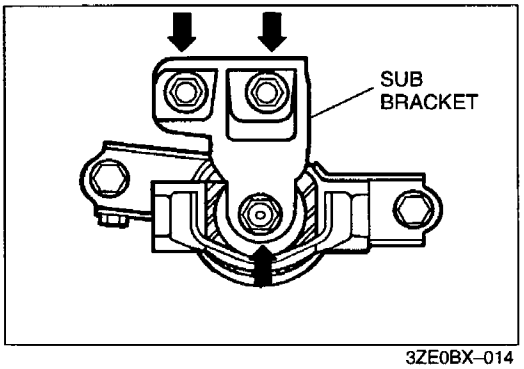
Caution
- **The crankshaft position sensor rotor is on the rear of the crankshaft pulley, and can be damaged easily.**

2. Remove the crankshaft pulley bolt and the crankshaft pulley.



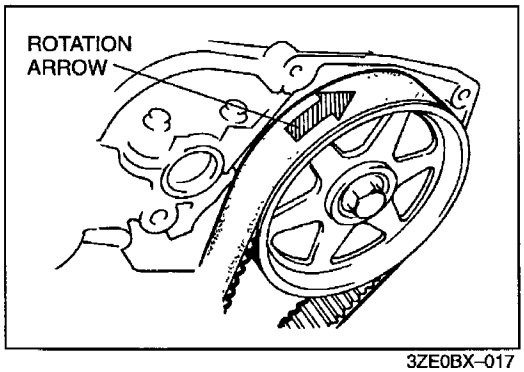
3ZE0BX–013

No.3 engine mount sub bracket
1. Support the engine by using the **SST**.



3ZE0BX–014

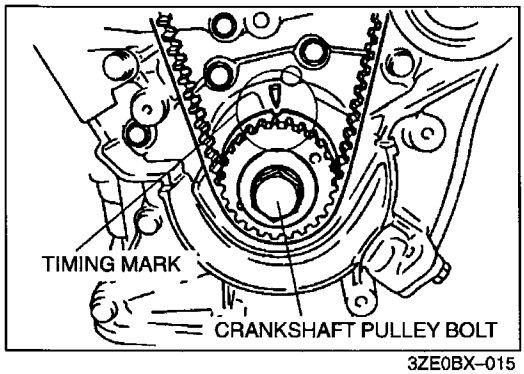
2. Remove the No.3 engine mount sub bracket.



3ZE0BX–017

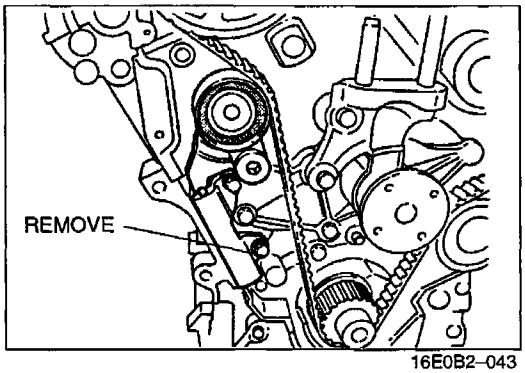
Timing belt

Note
- Mark the timing belt rotation on the belt for proper re-installation.



3ZE0BX–015

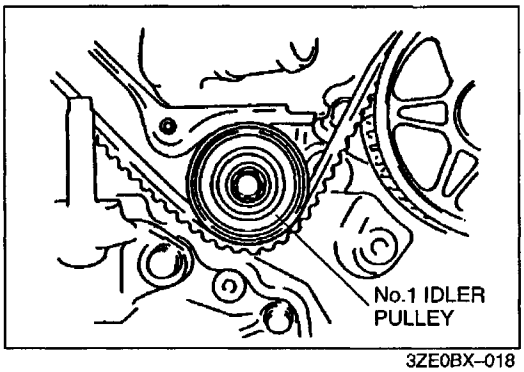
1. Install the crankshaft pulley bolt into the crankshaft.
2. Turn the crankshaft clockwise and align the timing marks. (No.1 piston is at TDC of the compression stroke.)



16E0B2-043

Caution
- **When removing the bolt, hold the tensioner so that the bolt holes are aligned, otherwise the threads can be damaged.**

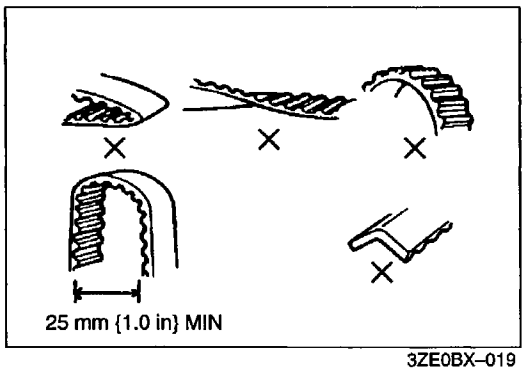
3. Loosen the auto tensioner bolts and remove the lower bolt.



3ZE0BX-018

Caution
- **When removing the pulley bolt, hold the pulley so that the bolt holes are aligned, otherwise the threads can be damaged.**

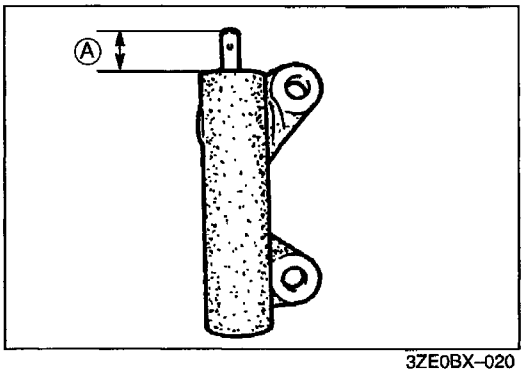
4. Remove the No.1 idler pulley.



3ZE0BX-019

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

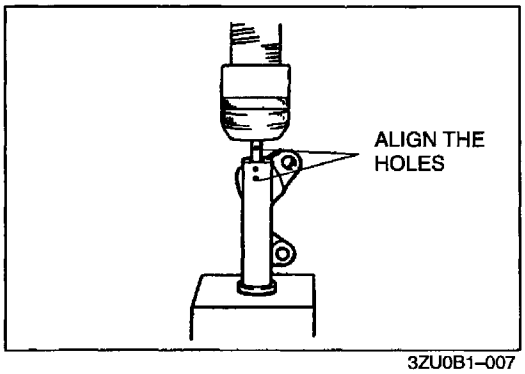
5. Remove the timing belt.



3ZE0BX-020

Installation Note
Timing belt auto tensioner
1. Measure the tensioner rod length Ⓐ. Replace the auto tensioner if necessary.
2. Check the auto tensioner for oil leakage. Replace the auto tensioner if necessary.

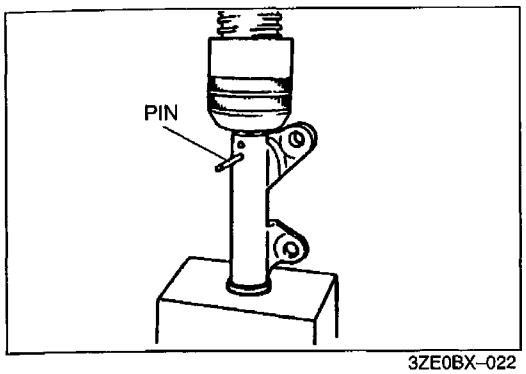
Projection Ⓐ (Free length): 14—16 mm {0.56—0.62 in}



3ZU0B1-007

Caution
- **Applying pressure of more than 9.8 kN {1,000 kgf, 2,200 lbf} can damage the auto tensioner.**

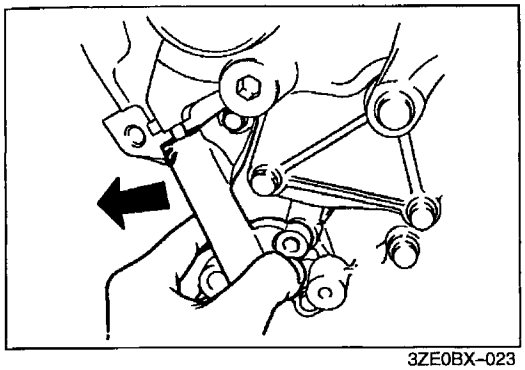
3. Slowly press in the tensioner rod by using a press.



3ZE0BX-022

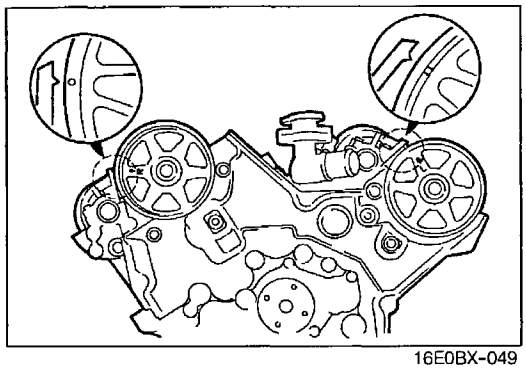
4. Insert a pin into the second hole in the body as shown to hold the tensioner rod.

Pin diameter: 1.6 mm {0.063 in}


3ZE0BX-023

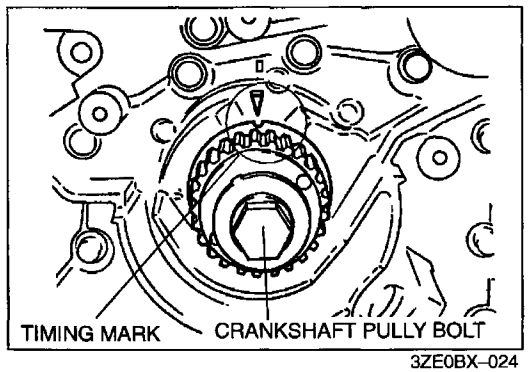
Note
- This must be done to reduce the timing belt resistance when the idler pulley is installed.

5. Set the tensioner in place and hand tighten the tensioner upper bolt.


16E0BX-049

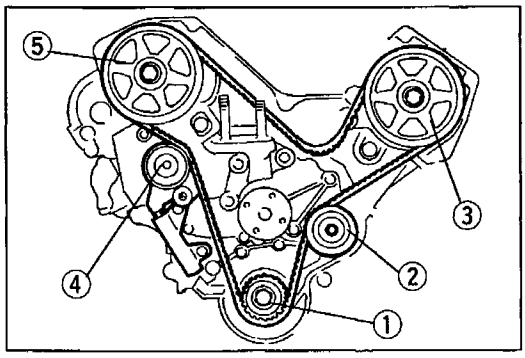
Timing belt

1. Turn the camshafts clockwise and align the timing marks.

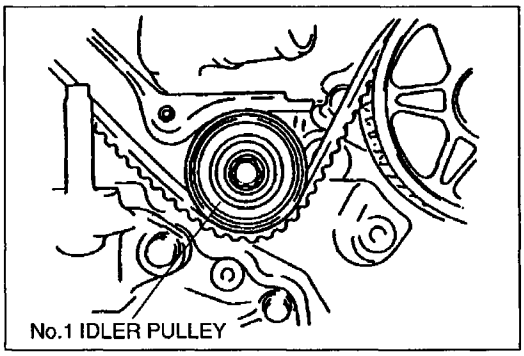


3ZE0BX-024

2. Using the crankshaft pulley bolt, turn the crankshaft clockwise and align the timing marks.

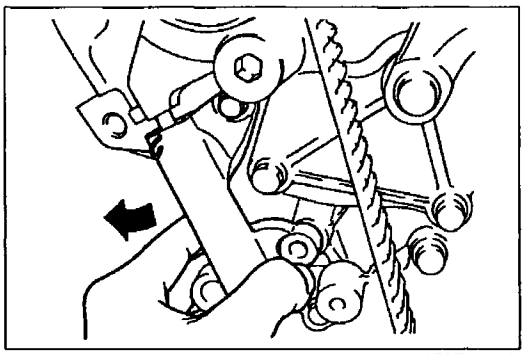


3. With the No.1 idler pulley removed, install the timing belt on the pulleys in the order shown below.
   ① Timing belt pulley
   ② No.2 idler pulley
   ③ Camshaft pulley (LH)
   ④ Tensioner pulley
   ⑤ Camshaft pulley (RH)
4. Verify that there is tension between pulleys ③ and ①, and between pulleys ① and ⑤.



5. Install the No.1 idler pulley while applying the pressure on the timing belt.

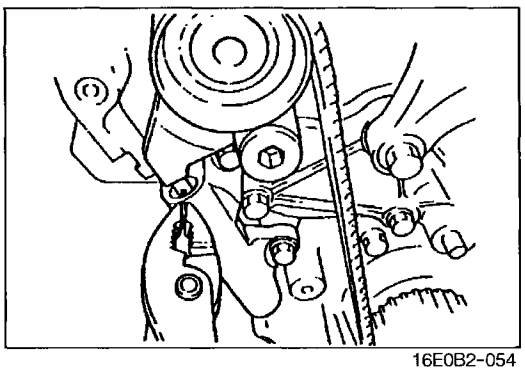
   Tightening torque:
   38—51 N·m {3.8—5.3 kgf·m, 28—38 ft·lbf}



16E0B2-053

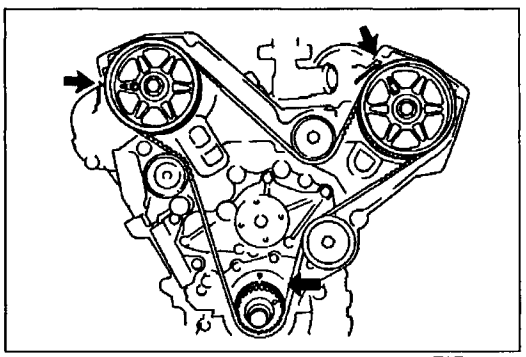
6. Push the auto tensioner in the direction of the arrow and tighten the bolts.

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



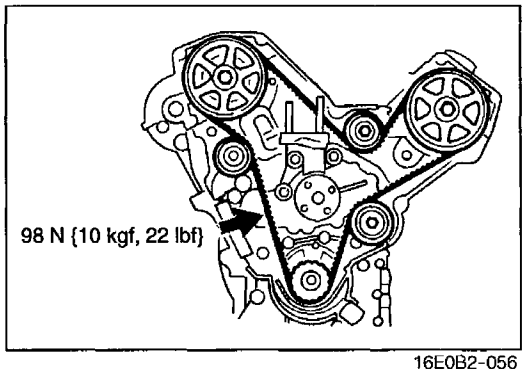
16E0B2-054

7. Remove the pin from the auto tensioner to apply tension to the belt.



16E0B2-055

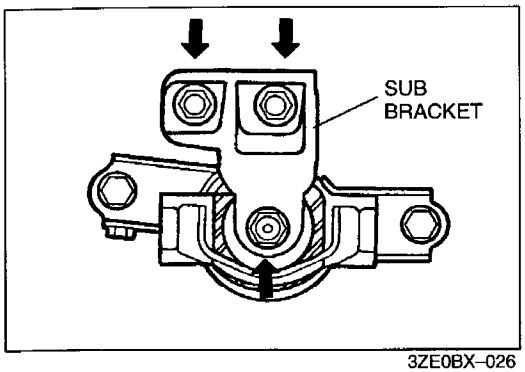
8. Turn the crankshaft clockwise twice, and align the timing marks.
9. Verify that all timing marks are correctly aligned. If not, remove the timing belt and repeat from timing belt auto tensioner installation. (Refer to page B1–8.)



16E0B2-056

10. Check the timing belt deflection by applying moderate pressure **98 N {10 kgf, 22 lbf}** midway between the timing belt pulley and the tensioner pulley. If not correct, replace the auto tensioner.

    Deflection: 6.0—8.0 mm {0.24—0.31 in}

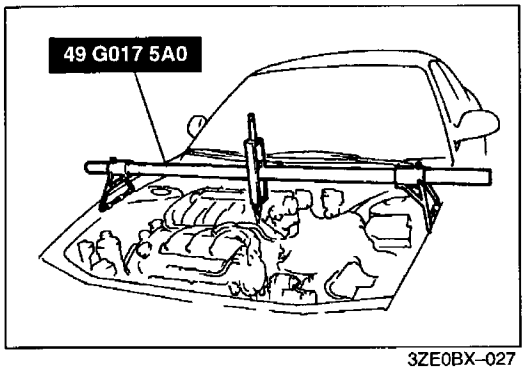


3ZE0BX–026

No.3 engine mount sub bracket

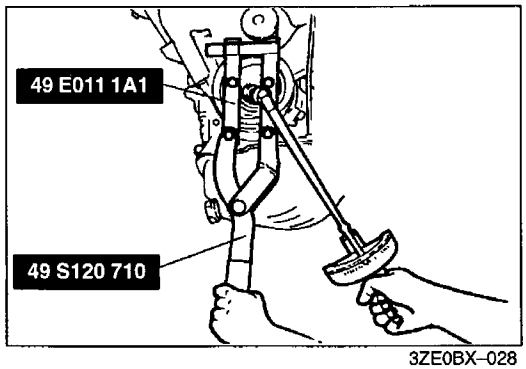
1. Install the No.3 engine mount sub bracket.

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



3ZE0BX–027

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



3ZE0BX–028

Crankshaft pulley

1. Remove the crankshaft pulley bolt.
2. Install the crankshaft pulley and hand tighten the crankshaft pulley bolt.
3. Install the **SST** to the crankshaft pulley.
4. Tighten the crankshaft pulley bolt.

Tightening torque:
157—166 N·m {16—17 kgf·m, 116—122 ft·lbf}

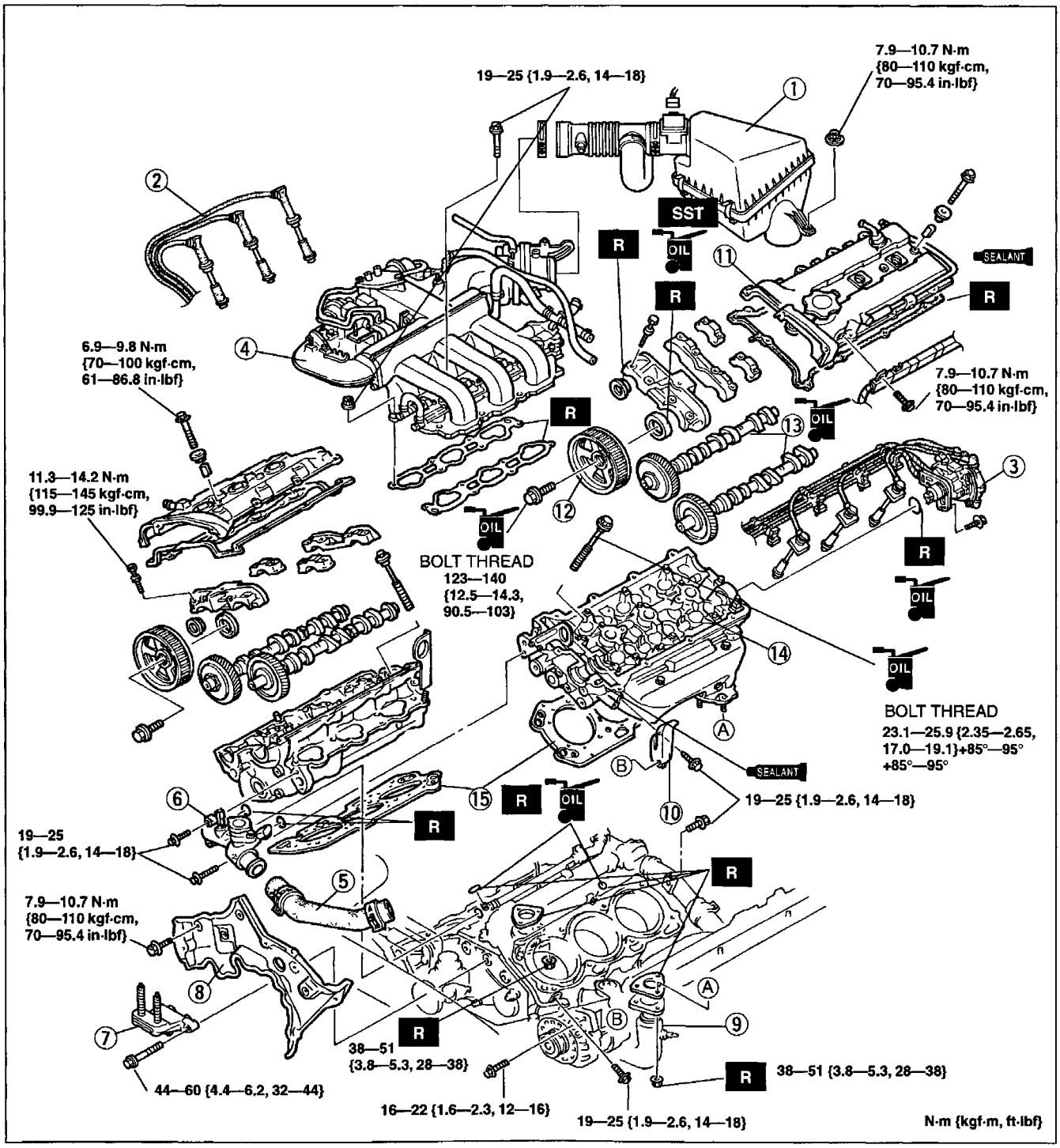
Steps After Installation

1. Install the right front wheel.
2. Start the engine and check follows:
   - Runout or contact of pulley or drive belt
   - Ignition timing (Refer to section F1.)
3. Turn off the engine and check the drive belt deflection. (Refer to page B1–2.)

CYLINDER HEAD GASKET
Replacement

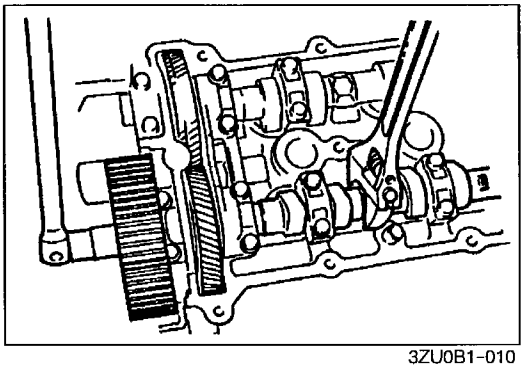
Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on section F1.**

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to section E.)
3. Remove the timing belt. (Refer to page B1–6.)
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**.



3ZU0B1–009

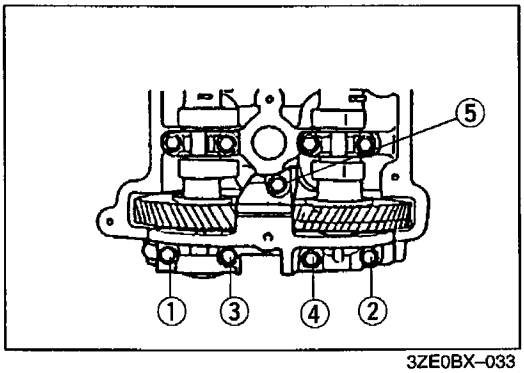
1. Air cleaner assembly
   Removal / Installation ..... section F1
2. High-tension lead
3. Distributor
   Removal / Installation ..... section G
4. Intake manifold assembly
   Removal / Installation ..... section F1
5. Upper radiator hose
6. Water outlet
7. No.3 engine mount bracket
8. Seal plate
9. Front pipe
10. Generator stay
11. Cylinder head cover
    Installation Note ..... page B1–18
12. Camshaft pulley
    Removal Note ..... below
    Installation Note ..... page B1–18
13. Camshaft
    Removal Note ..... below
    Installation Note ..... page B1–16
14. Cylinder head
    Removal Note ..... page B1–14
    Installation Note ..... page B1–15
15. Cylinder head gasket
    Installation Note ..... page B1–15



3ZU0B1-010

Removal Note
Camshaft pulley

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



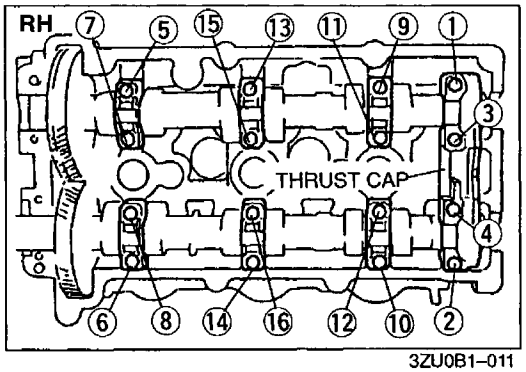
3ZE0BX-033

Camshaft

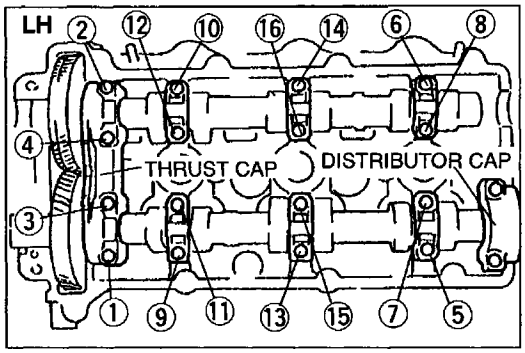
Caution
- **When the camshaft lobe is pressing on the HLA, removing the camshaft cap can damage the cylinder head thrust journal support.**

1. Loosen the front camshaft cap bolts in five or six steps in the order shown.
2. Remove the front camshaft cap bolts and the front camshaft caps.

Note
- Bolt ⑤ fits only the right cylinder head.



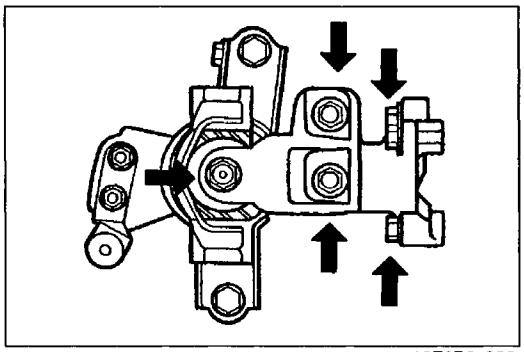
3ZU0B1-011



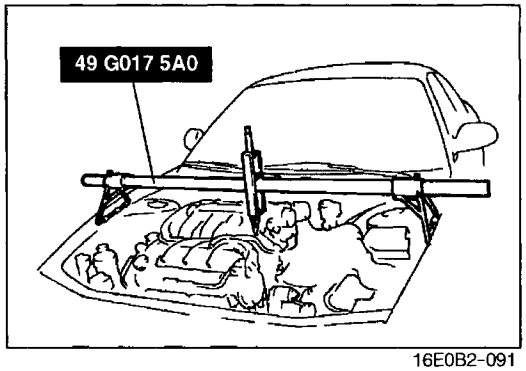
3. Loosen the camshaft cap bolts gradually in five or six steps in the order shown.

Caution
- **Remove the thrust caps only after removing all camshaft caps. Otherwise, the thrust caps can be damaged.**

4. Remove the camshaft cap bolts and camshaft caps.
5. Remove the camshafts.

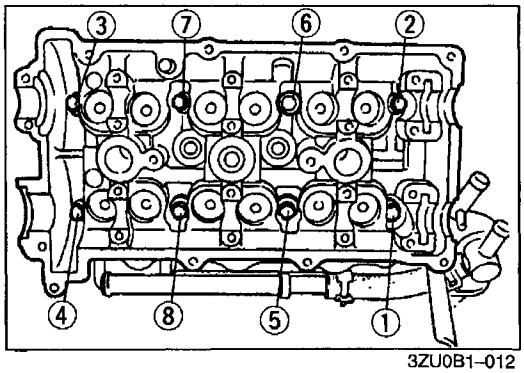

16E0B2-086

Cylinder head
1. Temporarily install the No.3 engine mount bracket to support the engine.



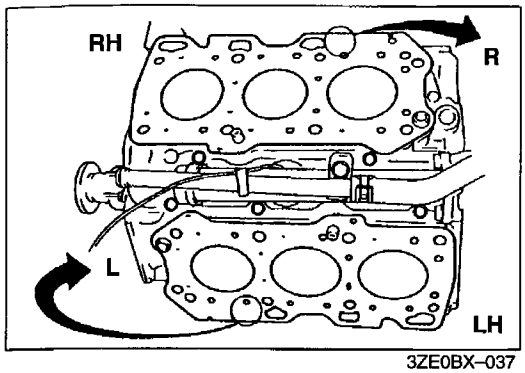
16E0B2-091

2. Remove the **SST**.



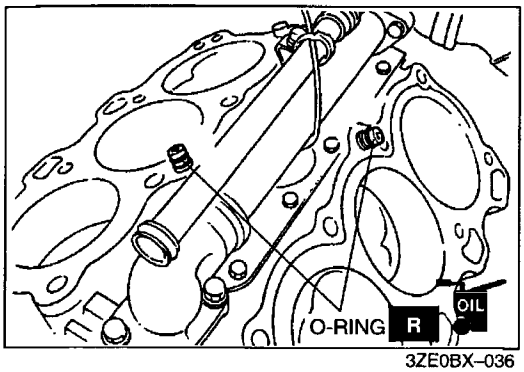
3ZU0B1-012

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



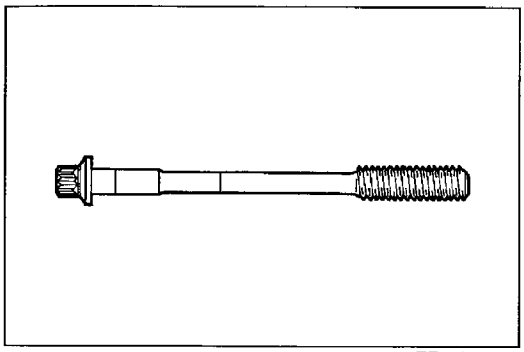
3ZE0BX-037

Installation Note
Cylinder head gasket
Install the new cylinder head gaskets on the cylinder block. (RH is R mark, LH is L mark)



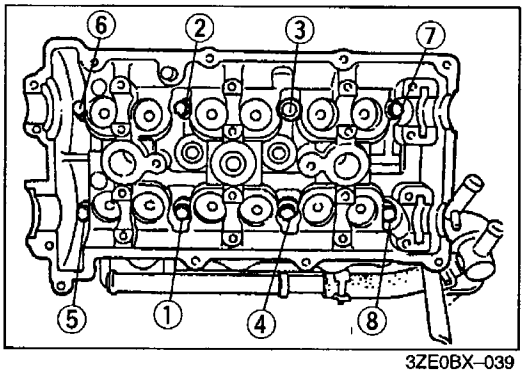
3ZE0BX-036

Cylinder head
1. Apply clean engine oil to new O-ring and install them to the oil control plugs.
2. Install the cylinder head to the cylinder block.


3ZE0BX-038

3. Tighten the cylinder head bolts as described below.
   (1) Before installation, measure the length of each bolt. Replace any that exceed the maximum length.

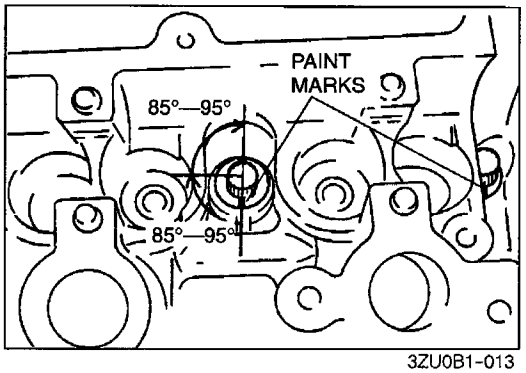
   Length: 131.2—131.8 mm {5.166—5.188 in}
   Maximum: 132.5 mm {5.217 in}



3ZE0BX-039

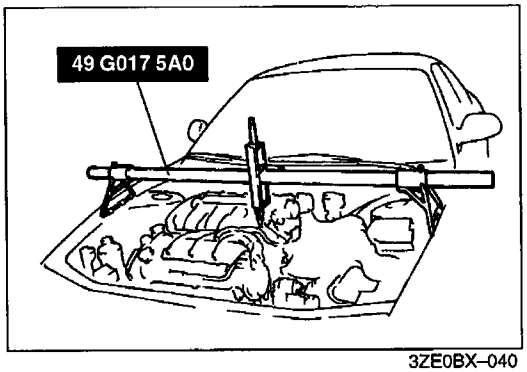
   (2) Apply clean engine oil to the threads and the seat face of each bolt and install them.
   (3) Tighten the bolts in two or three steps in the order shown.

   Tightening torque: 23.1—25.9 N·m {2.35—2.65 kgf·m, 17.0—19.1 ft·lbf}



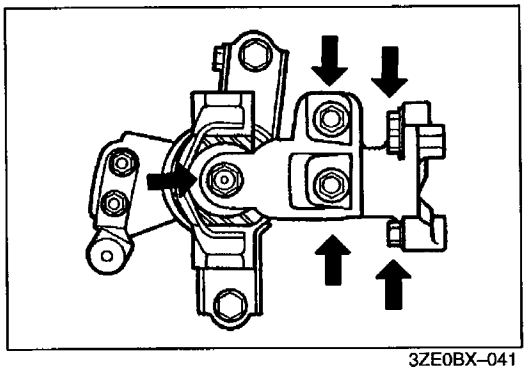
3ZU0B1-013

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

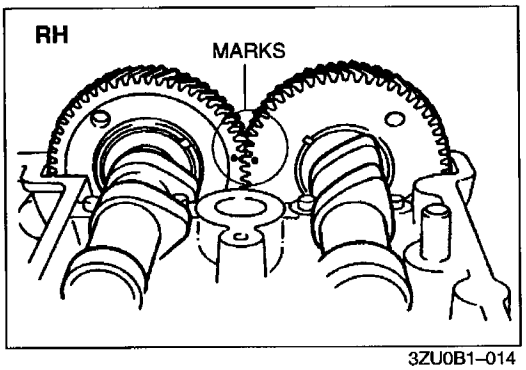


3ZE0BX–040

4. Support the engine by using the **SST.**


3ZE0BX–041

5. Remove the No.3 engine mount bracket.

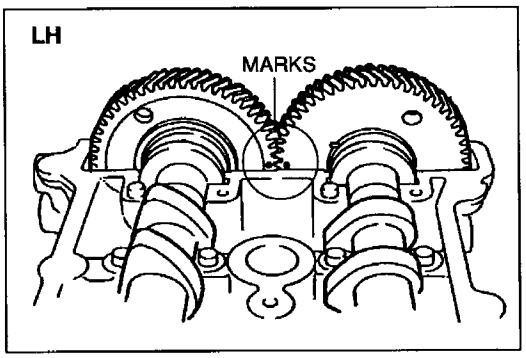


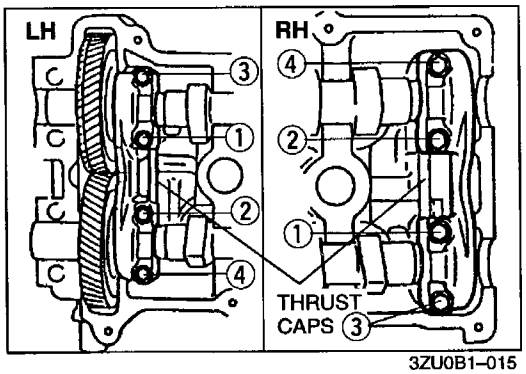
3ZU0B1–014

Camshaft

Caution
- **Camshafts must be assembled in the following procedure. Otherwise, camshaft can be broken or damaged because there is little camshaft clearance.**

1. Apply clean engine oil to the camshaft journals, camshaft lobes, and camshaft gears.
2. Install the camshafts so that the intake camshaft gear mark and exhaust camshaft gear mark align.

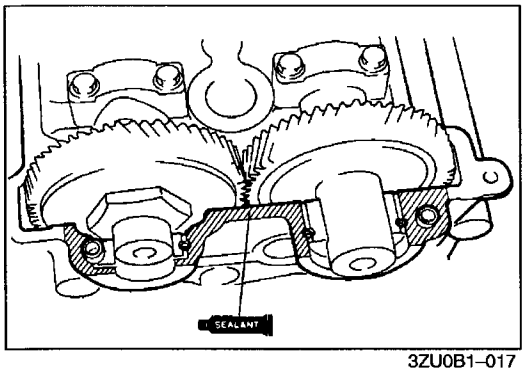




3ZU0B1–015

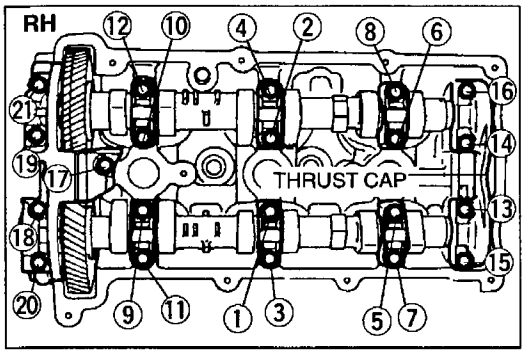
Caution
- **Install the thrust caps (RH is 5 mark, LH is B mark) first. Otherwise, camshaft can be broken or damaged.**

3. Install the thrust caps onto the cylinder head. Hand tighten the cap bolts gradually five or six steps in the order shown, until the thrust caps fully seated on the cylinder head.



3ZU0B1-017

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



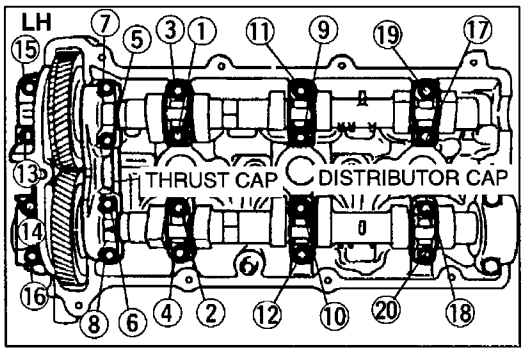
3ZU0B1-016

5. Install the camshaft caps according to their identification marks, and hand tighten the bolts.

Note
- RH: numbers
- LH: letters

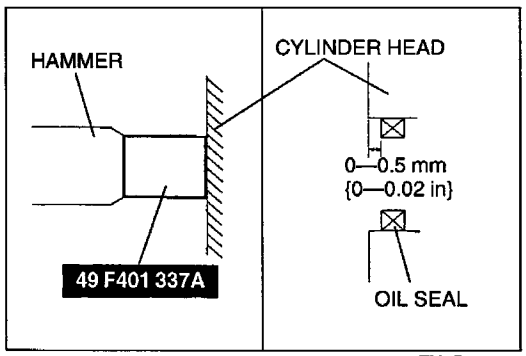
6. Tighten the bolts in the order shown.

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



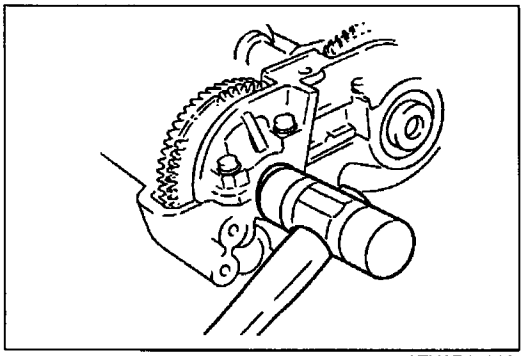
7. Retighten the bolts in the order shown.

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



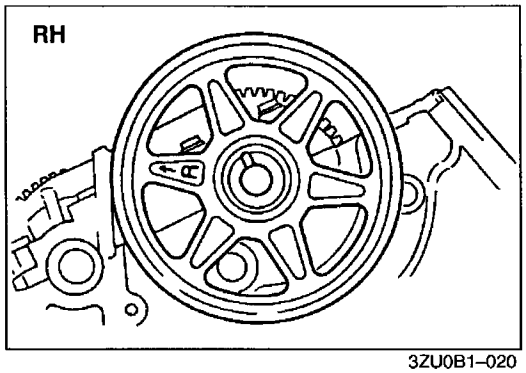
3ZU0B1-018

8. Apply clean engine oil to the lip of the new camshaft oil seal.
9. Push the oil seal slightly in by hand.
10. Tap the camshaft oil seal in evenly with the **SST** and a hammer.



3ZU0B1-019

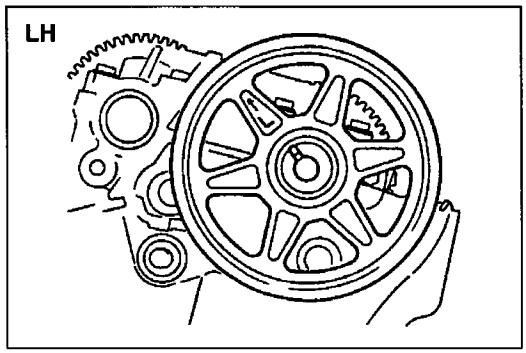
11. Tap in the new blind cap by using a plastic hammer.



3ZU0B1-020

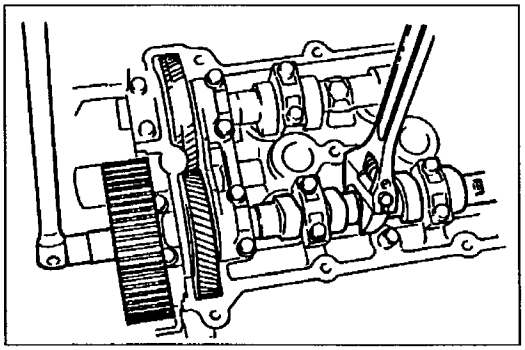
Camshaft pulley

1. Install the camshaft pulley so that the "R" mark (RH) can be seen and the timing mark aligns with the camshaft knock pin.



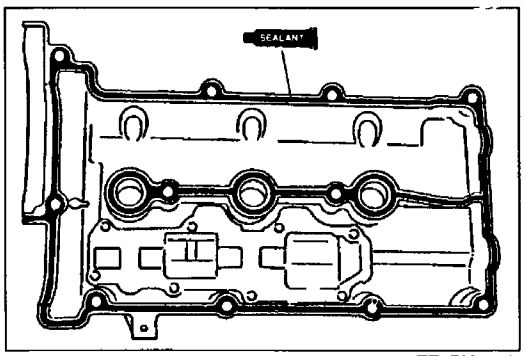
3ZU0B1-021

2. Install the camshaft pulley so that the "L" mark (LH) can be seen and the timing mark aligns with the camshaft knock pin.


16A0B2-016

3. Apply clean engine oil to the lock bolt threads and hand tighten the lock bolt.
4. Hold the camshaft by using a wrench on the cast hexagon as shown, and tighten the bolt.

Tightening torque:
123—140 N·m {12.5—14.3 kgf·m, 90.5—103 ft·lbf}



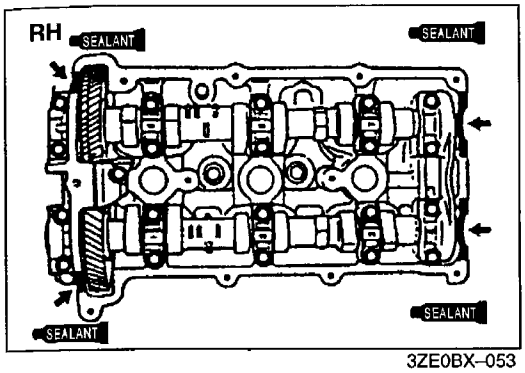
3ZE0BX-052

Cylinder head cover

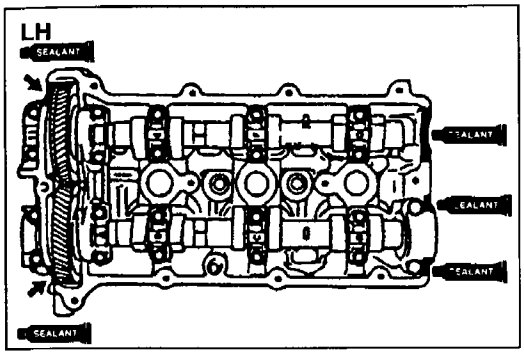
Caution
- **Silicone sealant hardens and causes oil leakage when it is left for an extended period. Therefore, install parts within five minutes of applying sealant.**

1. Apply silicone sealant to the cylinder head cover as shown.
2. Install the new cylinder head cover gasket into the cylinder head cover.

Thickness: ϕ1.0—2.0 mm {0.04—0.07 in}

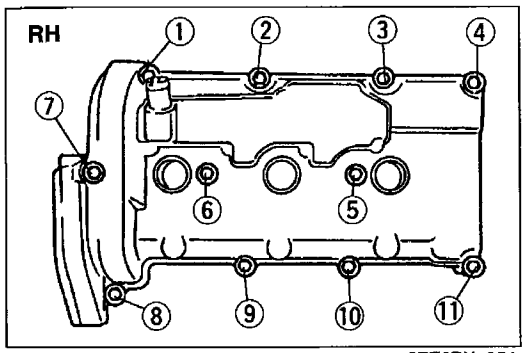


3ZE0BX–053

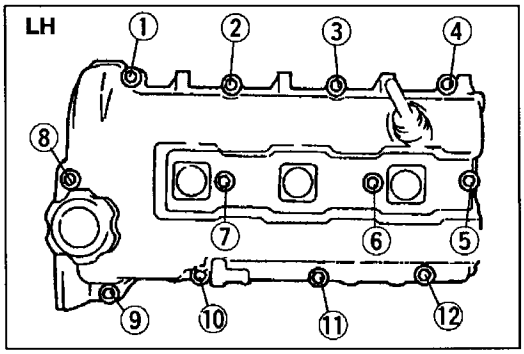


3. Apply silicone sealant to the shaded areas as shown.

Thickness: ϕ1.5—2.5 mm {0.06—0.09 in}



3ZE0BX–054



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

Tightening torque:
6.9—9.8 N·m {70—100 kgf·cm, 61—86.8 in·lbf}

5. Retighten RH ⑤, ⑥ and LH ⑥, ⑦ cylinder head cover bolts.

Tightening torque:
6.9—9.8 N·m {70—100 kgf·cm, 61—86.8 in·lbf}

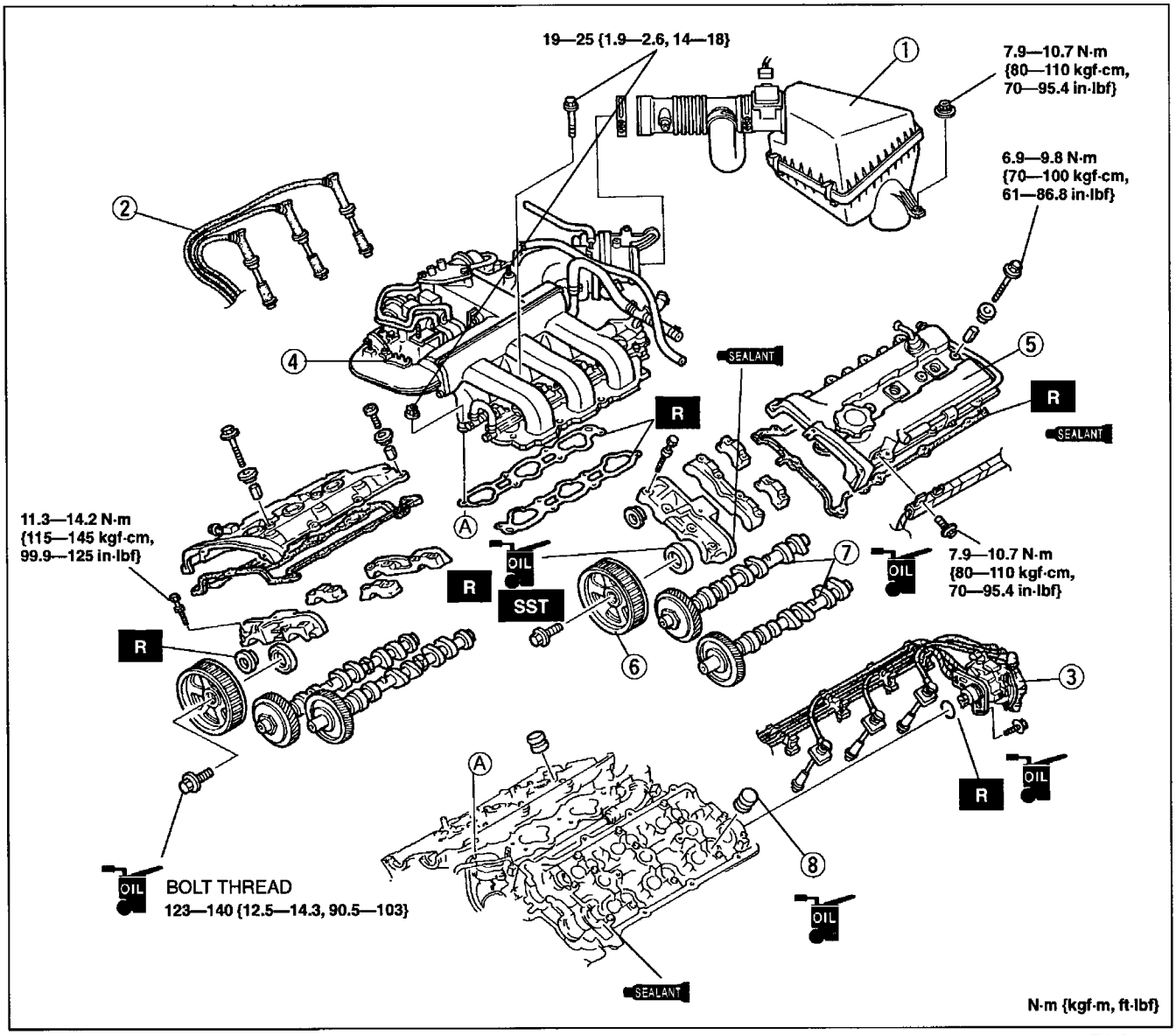
Steps After Installation

1. Install the timing belt. (Refer to page B1–6.)
2. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to section E.)
3. 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.)
   (3) check the operation of the emission control system. (Refer to section F1.)
4. Turn off the engine and check the drive belt deflection. (Refer to page B1–2.)
5. Recheck the engine oil and engine coolant levels.

HLA
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 B1–21.)**

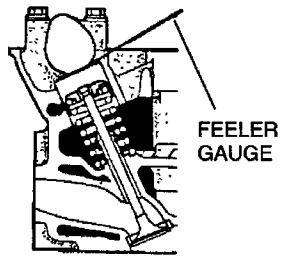
1. Disconnect the negative battery cable.
2. Remove the timing belt. (Refer to page B1–6.)
3. Remove in the order shown in the figure, referring to **Removal Note**.
4. Install in the reverse order of removal, referring to **Installation Note**.



3ZU0B1–023

1. Air cleaner assembly
   Removal / Installation ..... section F1
2. High-tension lead
3. Distributor
   Removal / Installation ..... section G
4. Intake manifold assembly
   Removal / Installation ..... section F1
5. Cylinder head cover
   Installation Note ..... page B–18
6. Camshaft pulley
   Removal Note ..... page B1–13
   Installation Note ..... page B1–18
7. Camshaft
   Removal Note ..... page B1–13
   Installation Note ..... page B1–16
8. HLA

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 B1–20.) 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.

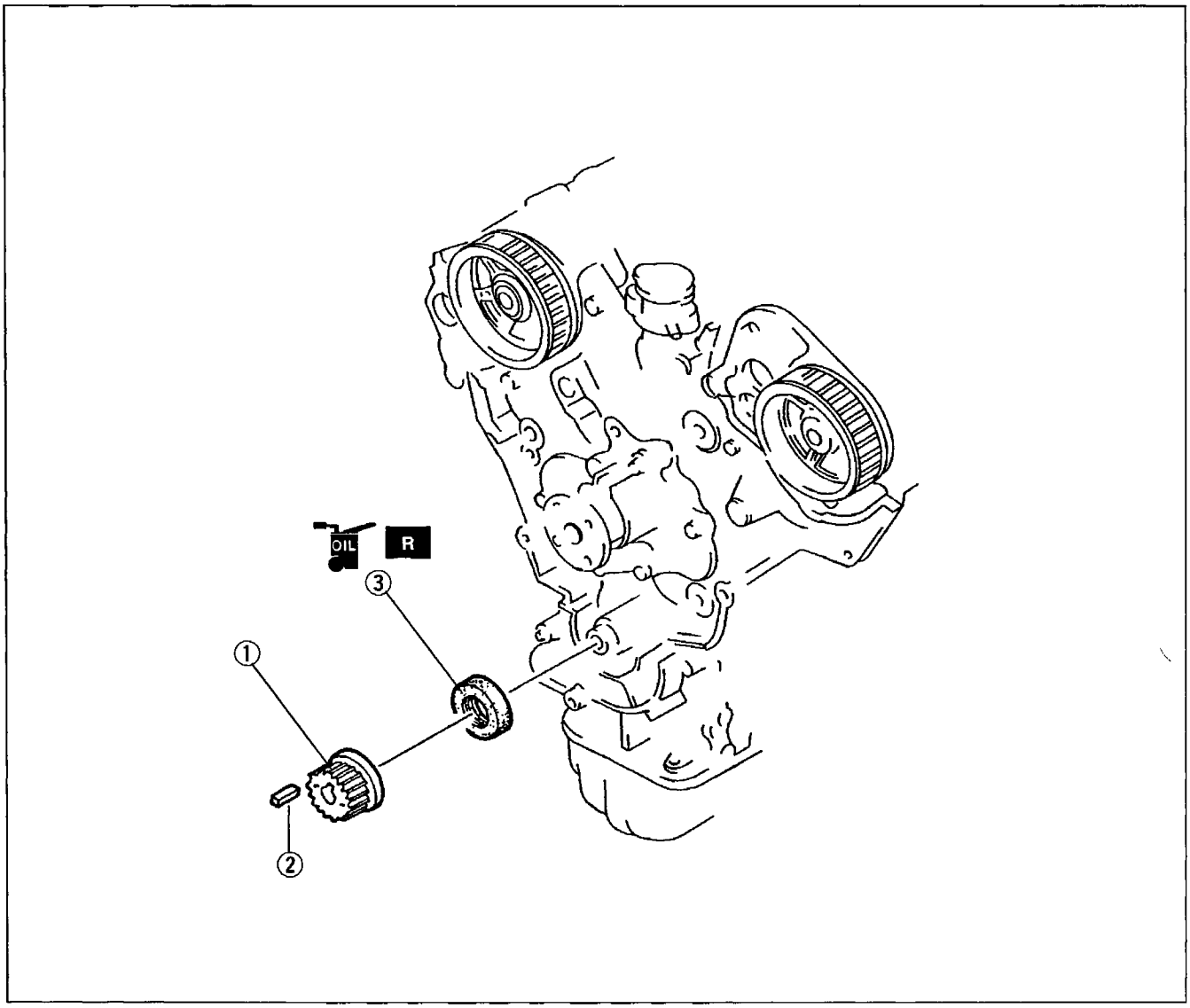
Steps After Installation

1. Install the timing belt. (Refer to page B1–6.)
2. Fill the engine with the specified amount and type of engine oil. (Refer to section D.)
3. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to section E.)
4. Start the engine and
   (1) check for engine oil and engine coolant leakage.
   (2) check the ignition timing, idle speed. (Refer to section F1.)
   (3) check the operation of emission control system. (Refer to section F1.)
5. Turn off the engine and check the drive belt deflection. (Refer to page B1–2.)
6. Perform a road test.
7. Recheck the engine oil and engine coolant levels.

FRONT OIL SEAL

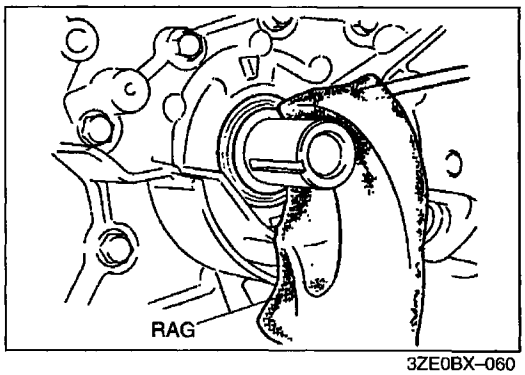
Replacement

1. Disconnect the negative battery cable.
2. Remove the timing belt. (Refer to page B1–6.)
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**.



3ZU0B1–025

1. Timing belt pulley
2. Key
3. Oil seal
   Removal Note ..... below
   Installation Note ..... page B1–23

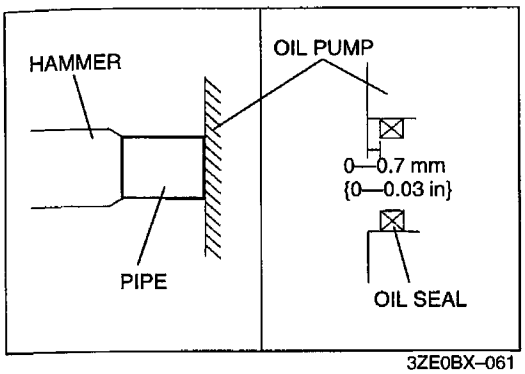


3ZE0BX–060

Removal Note

Oil seal

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



3ZE0BX–061

Installation Note
Oil seal
1. Apply clean engine oil to the new oil seal.
2. Push the oil seal slightly in by hand.
3. Tap the oil seal in evenly by using a pipe and a hammer.

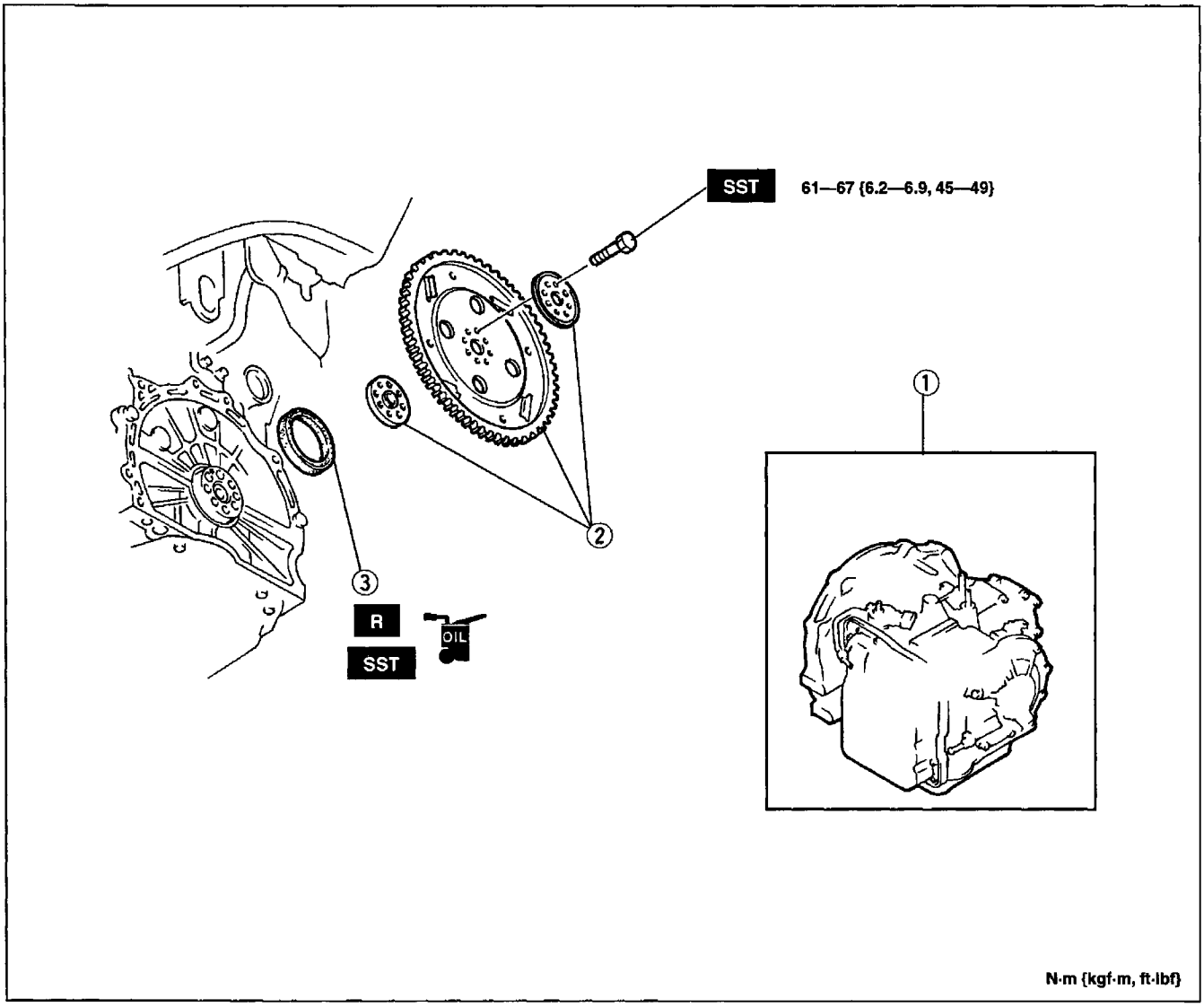
Note
- Oil seal outer diameter: 54.5 mm {2.15 in}
- Oil seal inner diameter: 43.0 mm {1.69 in}

Steps After Installation
1. Install the timing belt. (Refer to page B1–6.)
2. Start the engine and check the following:
   - Ignition timing (Refer to section F1.)

REAR OIL SEAL

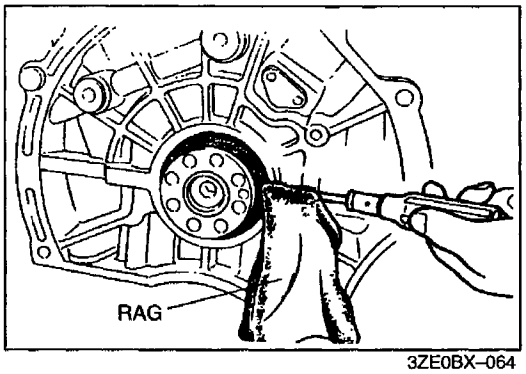
Replacement

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**.



3ZU0B1-027

1. Automatic transaxle
   Removal / Installation ..... section K1
2. Drive plate, backing plate, adapter
   Removal / Installation ..... section K1
3. Oil seal
   Removal Note ..... below
   Installation Note ..... page B1–25

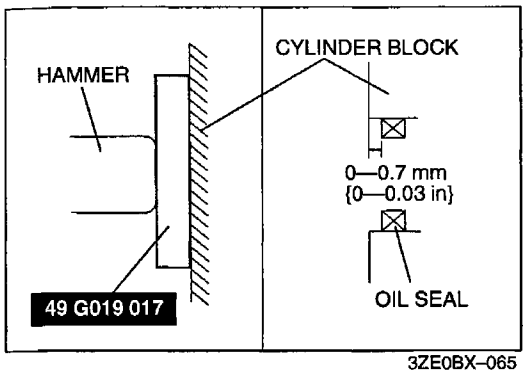


3ZE0BX-064

Removal Note

Oil seal

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

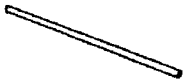
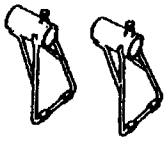


Installation Note
Oil seal
1. Apply clean engine oil to the new oil seal.
2. Push the oil seal slightly in by hand.
3. Tap the oil seal in evenly by using the **SST** and a hammer.

Steps After Installation
Start the engine and perform engine adjustments if necessary.

REMOVAL / INSTALLATION

PREPARATION
SST

49 G017 5A0 Support, engine 	For support of engine	49 G017 501 Bar (Parts 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

PROCEDURE

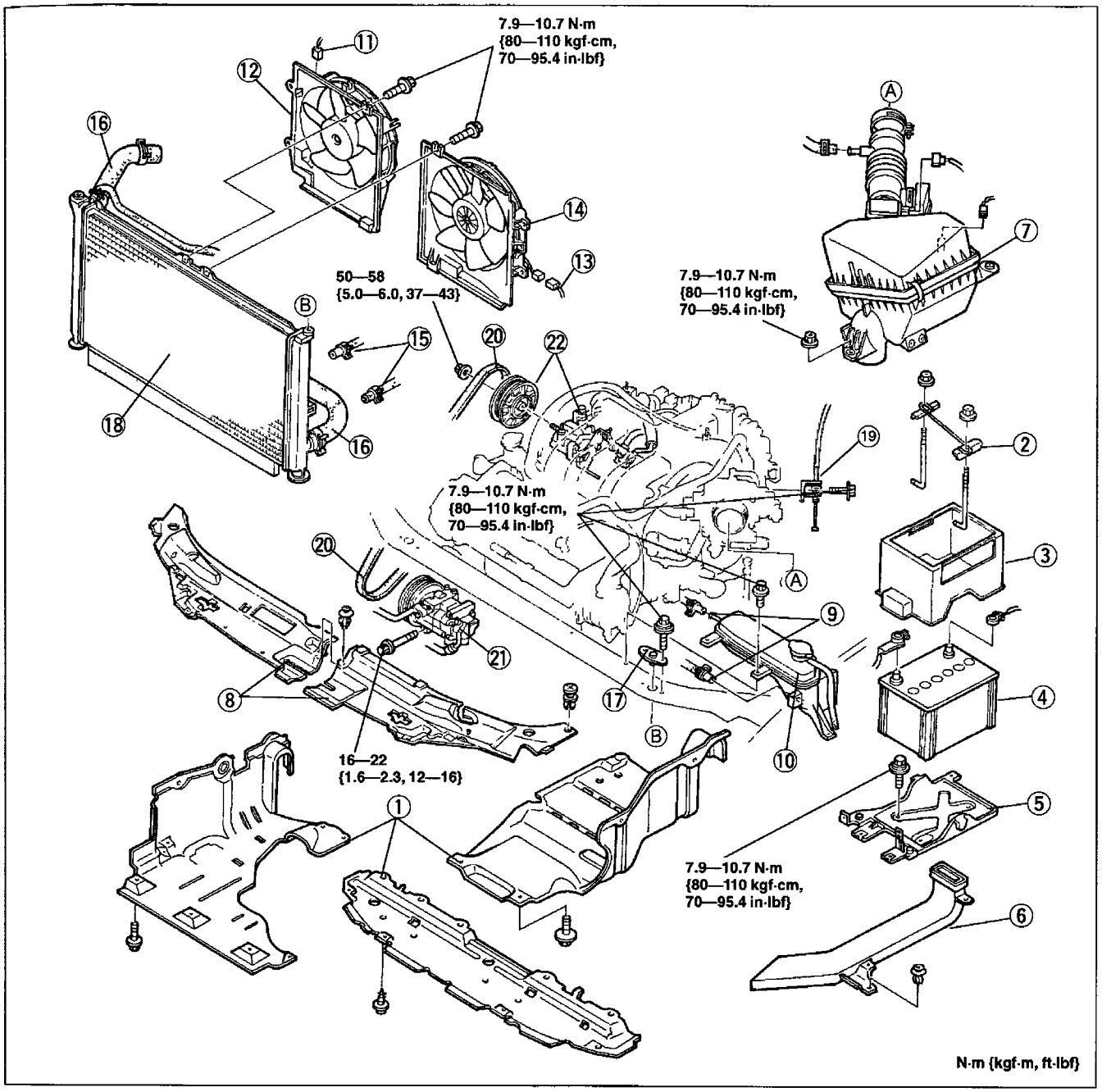
Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on section F1.**
- **Fuel vapor is hazardous. It can very easily ignite, causing 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.) and ATF. (Refer to section K1.)
3. Remove the hood and front wheels.
4. Remove in the order shown in the figure, refering to **Removal Note**.
5. Install in the reverse order of removal, referring to **Installation Note**.

Step 1



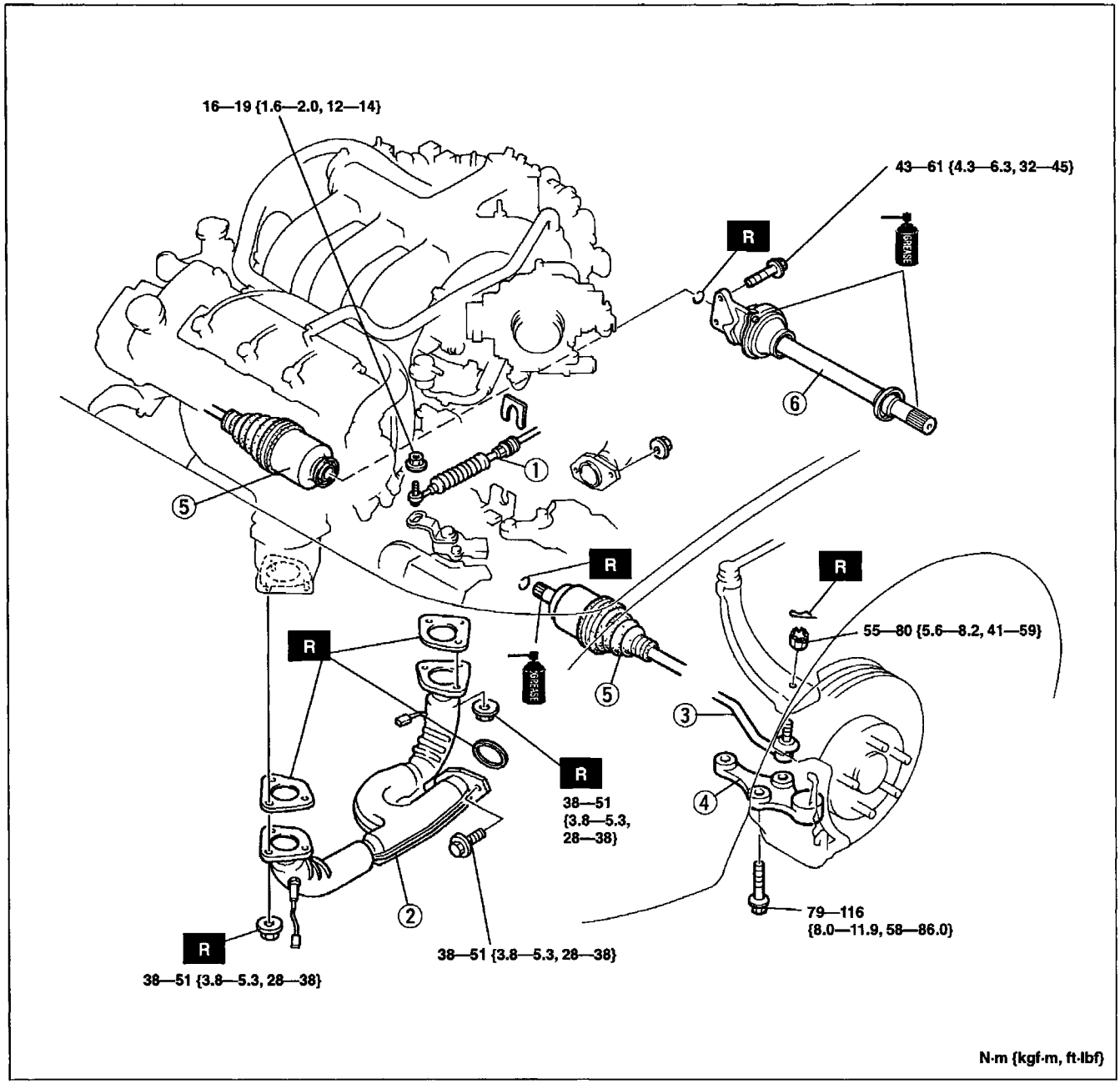
3ZU0B1-029

1. Splash shiled
2. Battery clamp
3. Battery cover
4. Battery
5. Battery carrier
6. Battery duct
7. Air cleaner assembly
   Removal / Installation ..... section F1
8. Upper seal board
9. Radiator reservoir hose
10. Radiator reservoir
11. Condenser fan motor connector
12. Condenser fan assembly
13. Cooling fan motor connector
14. Cooling fan assembly
15. Oil cooler hose
16. Radiator hose
17. Radiator bracket
18. Radiator
19. Accelerator cable
    Removal / Installation ..... section F1
20. Drive belt
    Adjustment ..... page B1– 3
21. A/C compressor
    Removal Note ..... page B1–28
22. P/S oil pump
    Removal Note ..... page B1–28

Removal Note
A/C compressor
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.

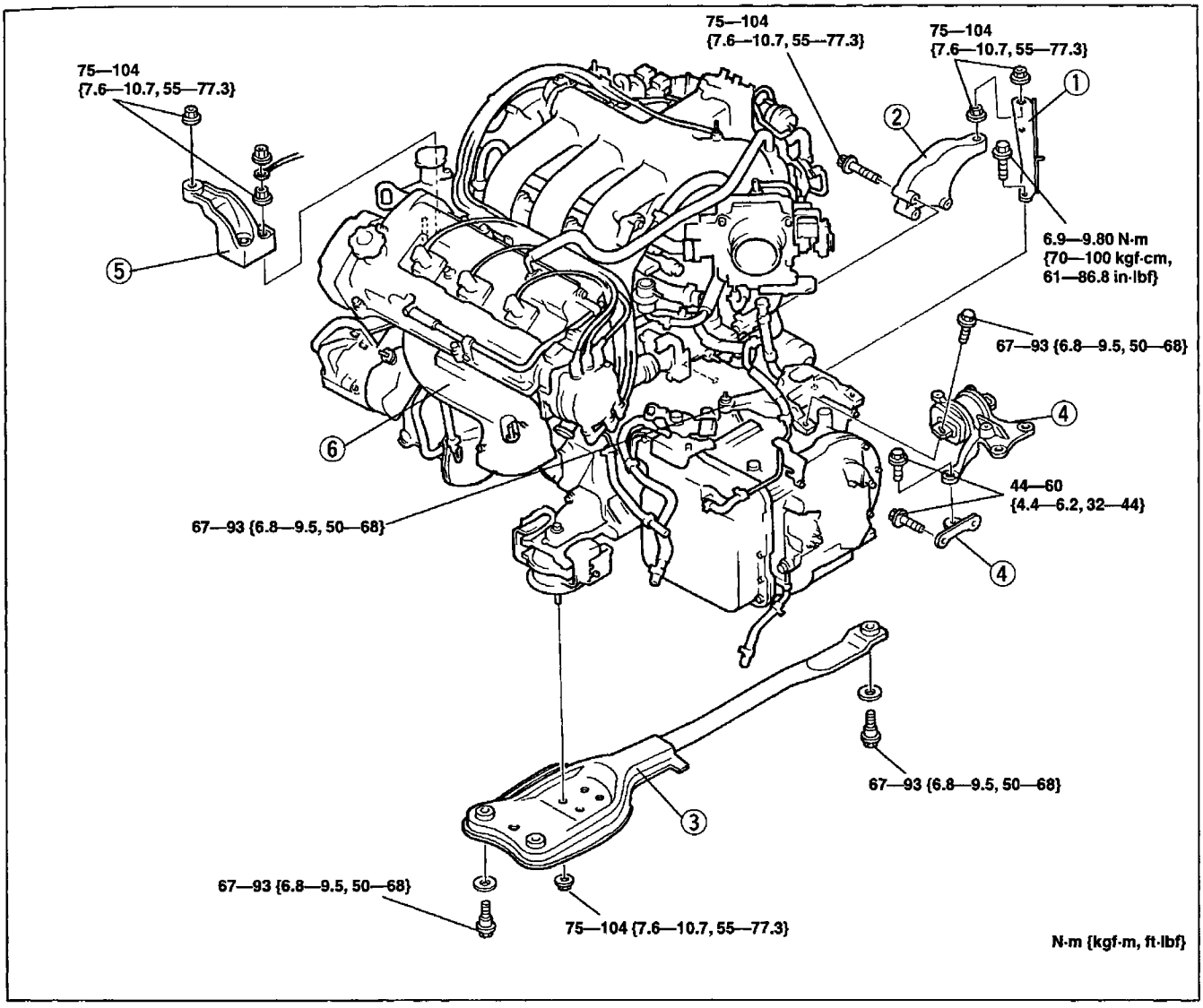
Step 2



3ZU0B1-030

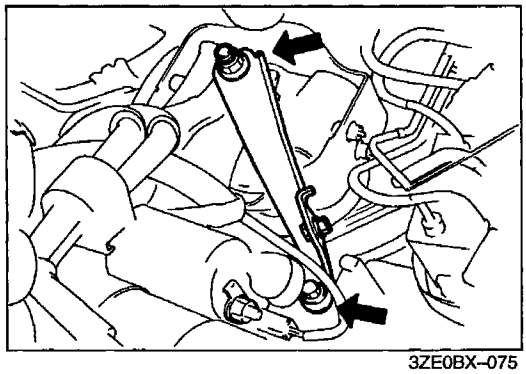
1. Selector cable
2. Front pipe
3. Upper lateral link ball joint
   Removal / Installation ..... section R
4. Lower ball joint
   Removal / Installation ..... section R
5. Drive shaft
   Removal / Installation ..... section M
6. Joint shaft
   Removal / Installation ..... section M

Step 3



3ZU0B1–031

1. No.1 engine mount stay
   - Removal Note ..... below
   - Installation Note ..... page B1–32
2. No.1 engine mount bracket
   - Removal Note ..... page B1–30
   - Installation Note ..... page B1–32
3. Engine mount member
   - Removal Note ..... page B1–30
   - Installation Note ..... page B1–32
4. No.4 engine mount bracket
   - Removal Note ..... page B1–30
   - Installation Note ..... page B1–32
5. No.3 engine mount sub bracket
   - Removal Note ..... page B1–31
   - Installation Note ..... page B1–31
6. Engine and transaxle assembly
   - Removal Note ..... page B1–31
   - Installation Note ..... page B1–31

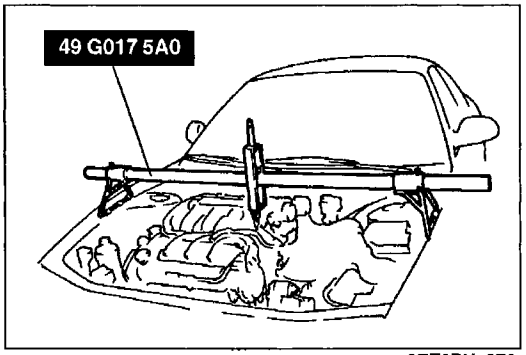


3ZE0BX–075

Removal Note

No.1 engine mount stay

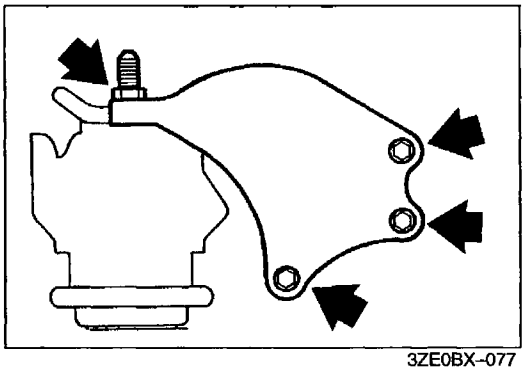
Remove the No.1 engine mount stay.



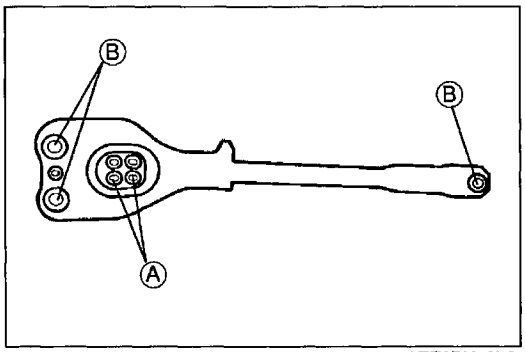
3ZE0BX-076

No.1 engine mount bracket

1. Support the engine by using the **SST**.


3ZE0BX-077

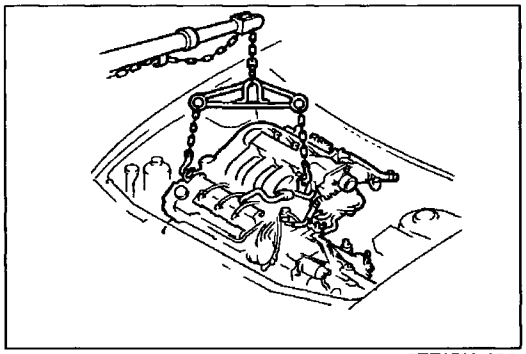
2. Remove the No.1 engine mount bracket.



3ZE0BX-078

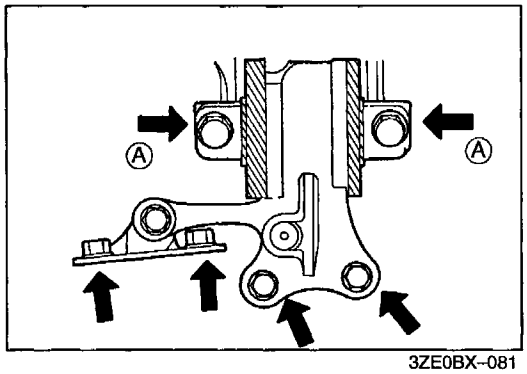
Engine mount member

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


3ZE0BX-080

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. Slightly lift up the engine and transaxle assembly until No.3 and No.4 engine mounts are free from the engine weight.

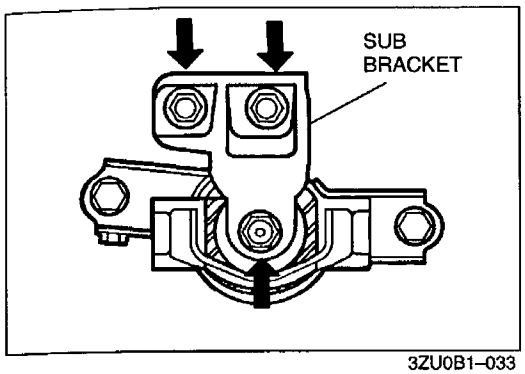


3ZE0BX-081

Caution

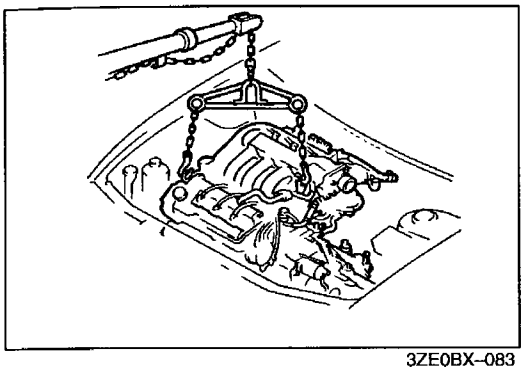
- **Engine load can damage the No.4 engine mount bolt Ⓐ holes when removing the bolts.**

3. Remove the No.4 engine mount bracket.

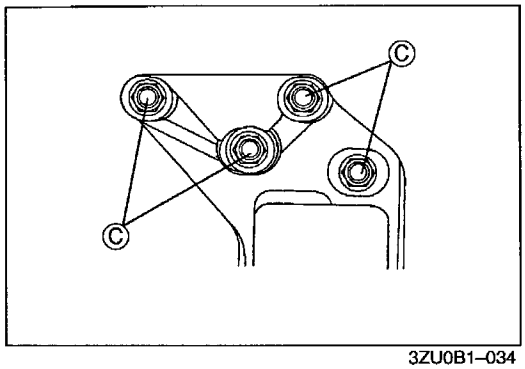


3ZU0B1–033

No.3 engine mount sub bracket
1. Remove the No.3 engine mount sub bracket nuts.
2. Remove the No.3 engine mount sub bracket.

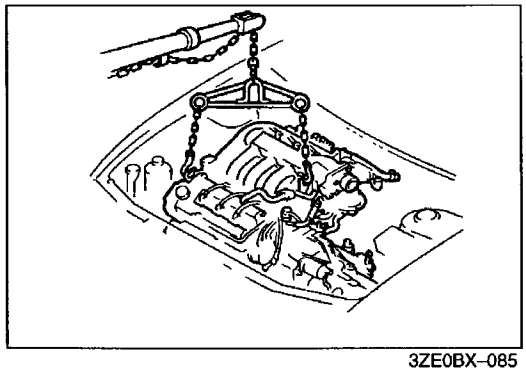

3ZE0BX–083

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.

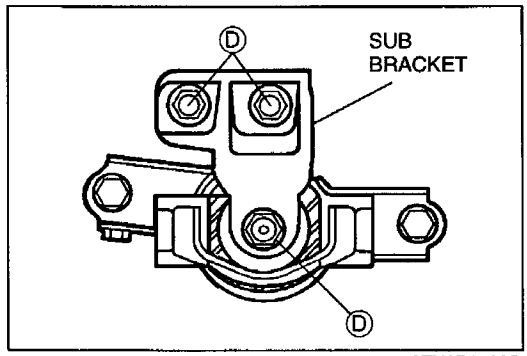


3ZU0B1–034

Installation Note
Engine and transaxle assembly
1. Loosen No.4 engine mount bracket nuts Ⓒ.
2. Hand tighten No.4 engine mount bracket nuts Ⓒ.

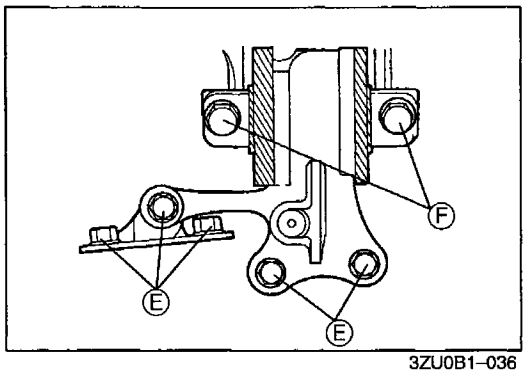

3ZE0BX–085

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



3ZU0B1–035

No.3 engine mount sub bracket
1. Install the No.3 engine mount sub bracket.
2. Hand tighten No.3 engine mount sub bracket nuts Ⓓ.



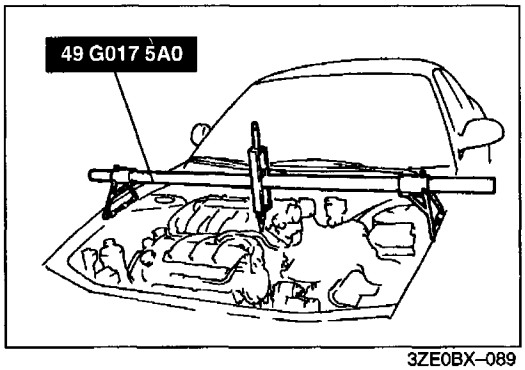
3ZU0B1-036

No.4 engine mount bracket

1. Install the No.4 engine mount bracket.

   Tightening torque
   Ⓔ: 44—60 N·m {4.4—6.2 kgf·m, 32—44 ft·lbf}

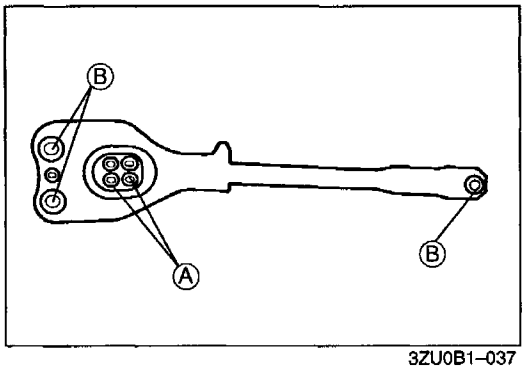
2. Hand tighten No.4 engine mount bracket bolts Ⓕ.



3ZE0BX-089

Engine mount member

1. Remove the engine and transaxle assembly from the chain block and securely support it with the **SST** (support, engine).

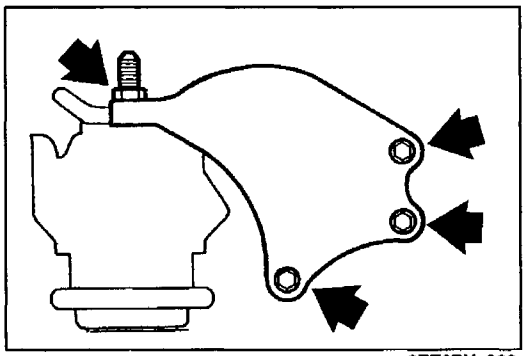


3ZU0B1-037

2. Install engine mount member bolts Ⓑ.

   Tightening torque
   Ⓑ: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

3. Hand tighten No.2 engine mount nuts Ⓐ.

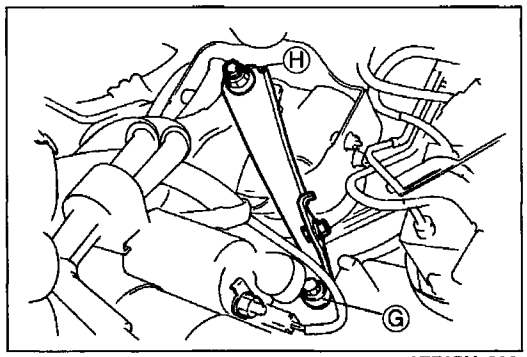

3ZE0BX-092

No.1 engine mount bracket

1. Install the No.1 engine mount bracket.

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

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

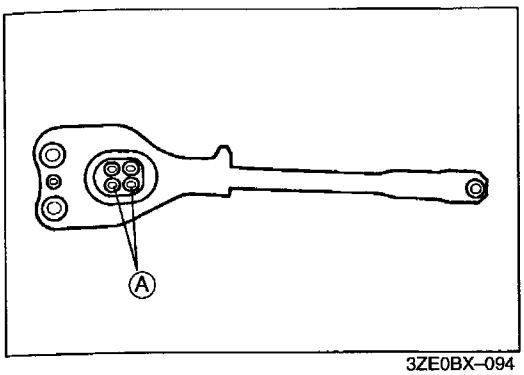


3ZE0BX-093

No.1 engine mount stay

1. Install the No.1 engine mount stay.

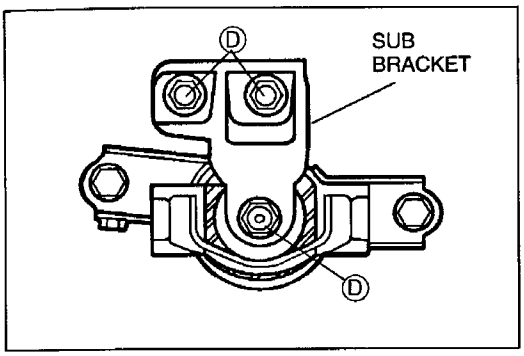
   Tightening torque
   Ⓖ: 6.9—9.80 N·m
   {70—100 kgf·cm, 61—86.8 in·lbf}
   Ⓗ: 75—104 N·m {7.6—10.7 kgf·m, 55—77.3 ft·lbf}



3ZE0BX-094

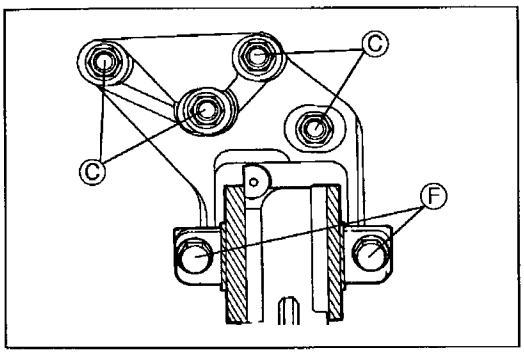
2. Tighten No.2 engine mount nuts Ⓐ.

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



3. Tighten No.3 engine mount sub bracket nuts Ⓓ.

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



4. Tighten No.4 engine mount nuts Ⓒ and bolts Ⓕ.

Tightening torque
Ⓒ, Ⓕ: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

Steps After Installation
1. Fill the engine with the specified amount and type of engine oil. (Refer to section D.)
2. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to section E.)
3. Fill the automatic transaxle with the specified amount and type of ATF. (Refer to section K1.)
4. Install the hood and front wheels.
5. Start the engine and
   (1) check the engine oil, ATF, and engine coolant leakage.
   (2) check the ignition timing and idle speed. (Refer to section F1.)
   (3) check the operation of emission control system. (Refer to section F1.)
6. Turn off the engine and check the drive belt deflection. (Refer to page B1–2.)
7. Perform a road test.
8. Recheck the engine oil, ATF, and engine coolant levels.

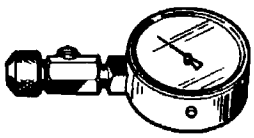
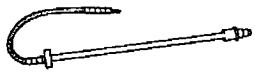
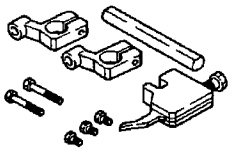
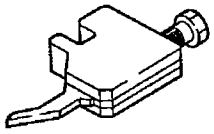
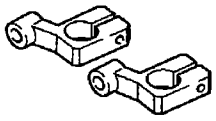
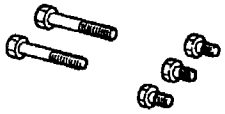
Before beginning any service procedure, refer to section T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

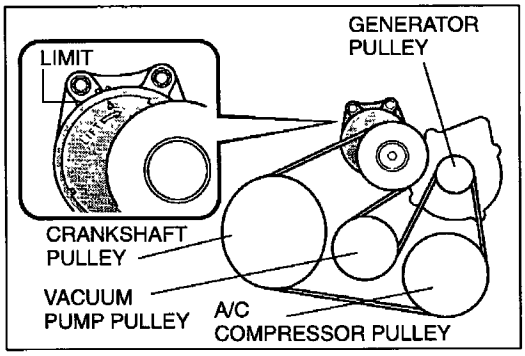
ENGINE
(KJ)

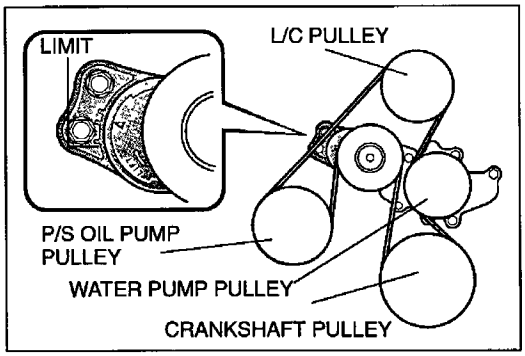
ENGINE TUNE-UP **B2– 2**
PREPARATION **B2– 2**
DRIVE BELT **B2– 2**
VALVE CLEARANCE **B2– 4**
COMPRESSION **B2– 7**
ON-VEHICLE MAINTENANCE **B2– 8**
PREPARATION **B2– 8**
TIMING BELT **B2– 9**
CYLINDER HEAD GASKET **B2–14**
FRONT OIL SEAL **B2–22**
REAR OIL SEAL **B2–24**
REMOVAL / INSTALLATION **B2–26**
PREPARATION **B2–26**
PROCEDURE **B2–26**

ENGINE TUNE-UP

PREPARATION
SST

49 H010 103 Gauge, compression 	For inspection of compression	49 H010 104 Adaptor 	For inspection of compression
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	—	—

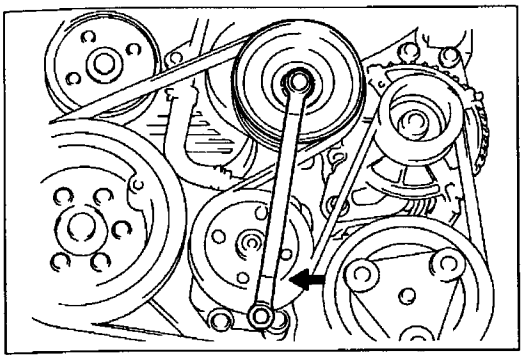


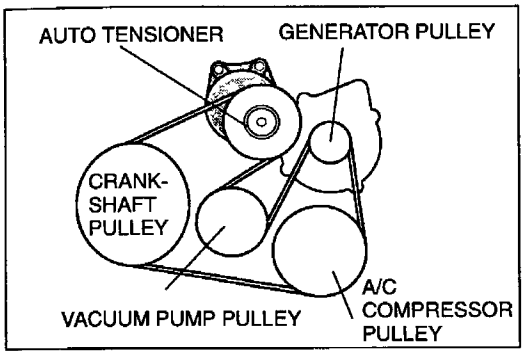


DRIVE BELT
Inspection

Note
- Drive belt deflection/tension check is not necessary because of the use of the drive belt auto tensioner.

Check that the drive belt auto tensioner indicator mark is not exceeding the limit. If exceeded, replace the drive belt.



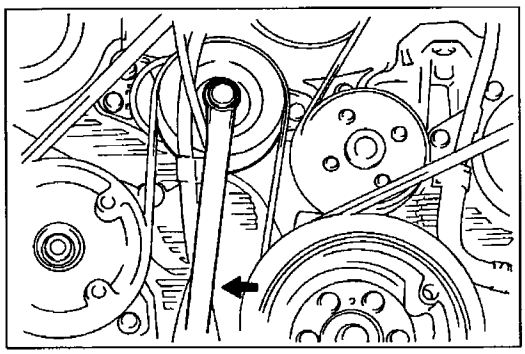


Replacement
Generator drive belt

1. Remove the splash shield (RH) and dust cover. (Refer to page B2–9.)
2. Set the wrench on the tensioner pulley lock bolt as shown.

Caution
- **Do not apply torque over 47 N·m {4.8 kgf·m, 35 ft·lbf} to the lock bolt. It can damage the tensioner.**

3. Using a wrench, turn the tensioner pulley lock bolt clockwise to relieve tension to the drive belt.
4. Remove the drive belt.
5. Reinstall the drive belt or install a new drive belt.
6. Check that the drive belt auto tensioner indicator mark is not exceeding the limit. (Refer to page B2–2.) If exceeded, replace the drive belt.
7. Install the splash shield (RH) and dust cover. (Refer to page B2–9.)

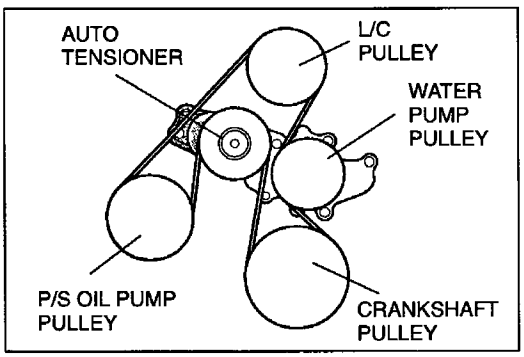


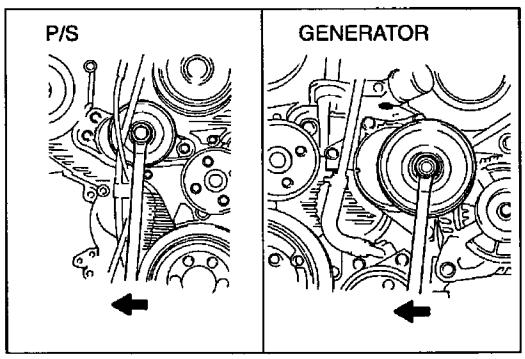
P/S oil pump drive belt

1. Remove the generator drive belt. (Refer to above.)
2. Set the wrench on the tensioner pulley lock bolt as shown.

Caution
- **Do not apply torque over 47 N·m {4.8 kgf·m, 35 ft·lbf} to the lock bolt. It can damage the tensioner.**

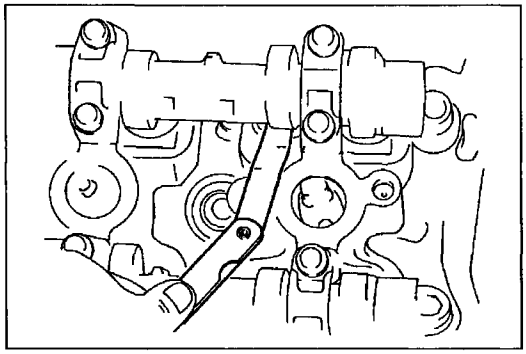
3. Using a wrench, turn the tensioner pulley lock bolt clockwise to relieve tension to the drive belt.
4. Remove the drive belt.
5. Reinstall the drive belt or install a new drive belt.
6. Check that the drive belt auto tensioner indicator mark is not exceeding the limit. (Refer to page B2–2.) If exceeded, replace the drive belt.
7. Install the generator drive belt. (Refer to above.)

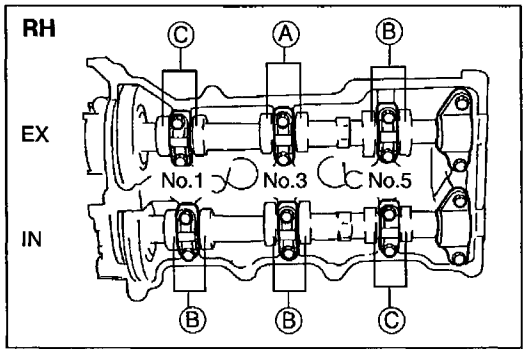


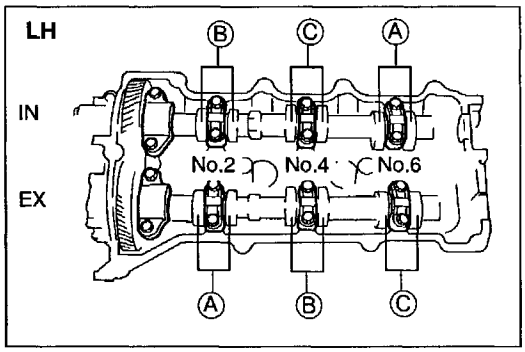


Drive belt auto tensioner
Inspection

1. Remove the drive belts. (Refer to above.)
2. Verify that the drive belt auto tensioner moves smoothly in the operational direction. Replace the drive belt auto tensioner if necessary. (Refer to page B2–9.)
3. Turn the drive belt auto tensioner pulley by hand and verify that it rotates smoothly. Replace the drive belt auto tensioner if necessary. (Refer to page B2–9.)
4. Install the drive belts. (Refer to above.)







VALVE CLEARANCE
Inspection / Adjustment
Inspection

1. Remove the intake manifold. (Refer to section F2.)
2. Remove the cylinder head cover.
3. Verify that the engine is in cold condition.
4. 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 clearances at Ⓐ in the figure.

   Standard (Engine cold)
   IN: 0.27—0.33 mm {0.011—0.012 in}
   EX: 0.27—0.33 mm {0.011—0.012 in}

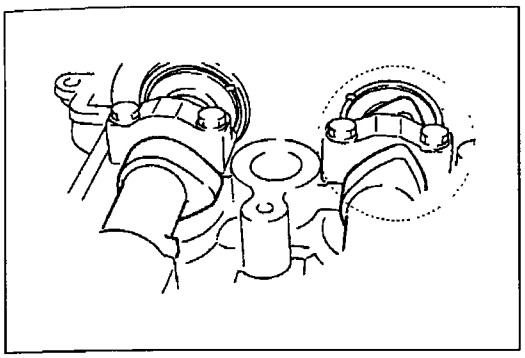
   (3) If the valve clearance exceeds the standard, replace the adjustment shim.
   (4) Turn the crankshaft approx. 240° clockwise so that the No.3 piston is at TDC of the compression stroke.
   (5) Measure the valve clearances at Ⓑ in the figure.

   Standard (Engine cold)
   IN: 0.27—0.33 mm {0.011—0.012 in}
   EX: 0.27—0.33 mm {0.011—0.012 in}

   (6) If the valve clearance exceeds the standard, replace the adjustment shim.
   (7) Turn the crankshaft approx. 240° clockwise so that the No.5 piston is at TDC of the compression stroke.
   (8) Measure the valve clearances at Ⓒ in the figure.

   Standard (Engine cold)
   IN: 0.27—0.33 mm {0.011—0.012 in}
   EX: 0.27—0.33 mm {0.011—0.012 in}

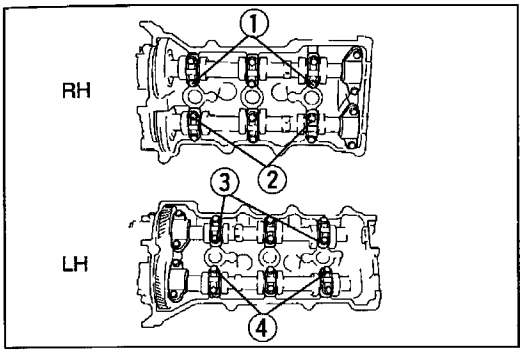
   (9) If the valve clearance exceeds the standard, replace the adjustment shim.
5. Install the cylinder head cover. (Refer to page B2–20.)
6. Install the intake manifold. (Refer to section F2.)



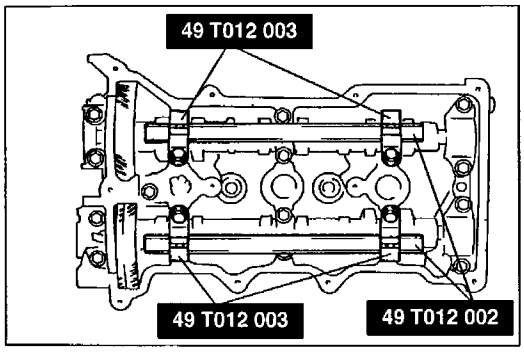
Adjustment

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 points straight up.

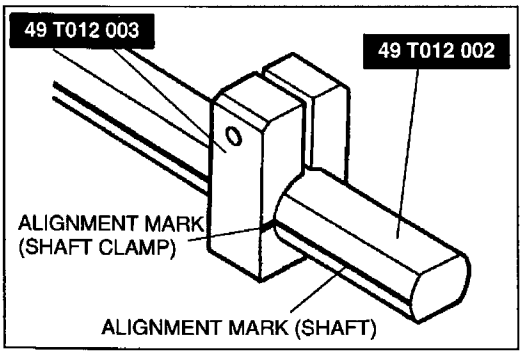


2. Remove the camshaft cap bolts as necessary.
   ①: For RH exhaust side adjustment shim removal
   ②: For RH intake side adjustment shim removal
   ③: For LH intake side adjustment shim removal
   ④: For LH exhaust side adjustment shim removal

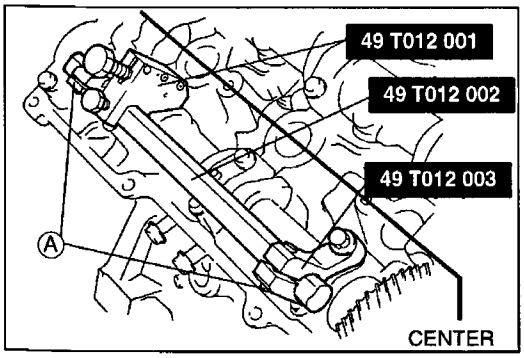


3. Install the **SSTs** as shown.

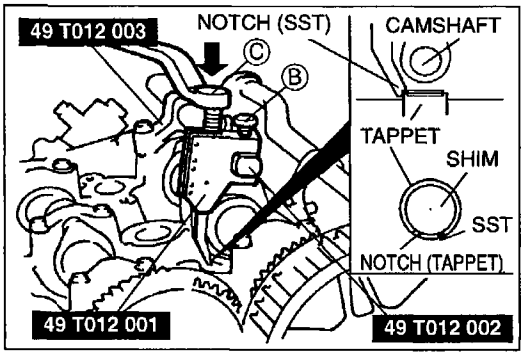
   Tightening torque:
   11.3—14.2 N·m {115—145 kgf·cm, 99.9—125 in·lbf}



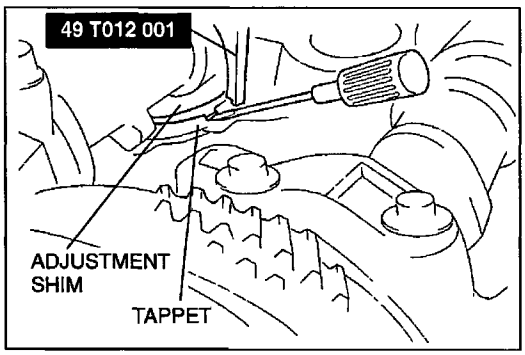
4. Align the marks on the **SSTs** (shaft and shaft clamp).



5. Face the **SST** (body) toward the center of the cylinder head, and mount it on the camshaft using the camshaft cap bolt holes.
6. Tighten bolts Ⓐ to secure the **SST** (shaft).

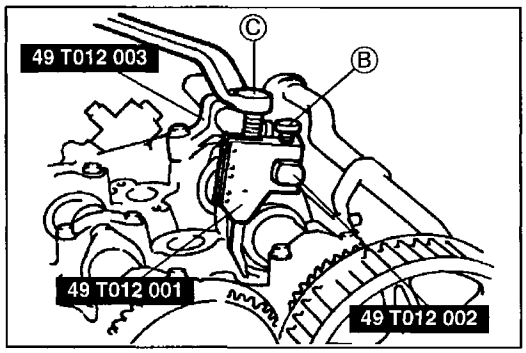


7. Face the notch of the tappet so that a fine screwdriver can be inserted.
8. Set the **SST** on the tappet by its notch.
9. Tighten bolt Ⓑ to secure the **SST** (body).
10. Tighten bolt Ⓒ, and press down the tappet.



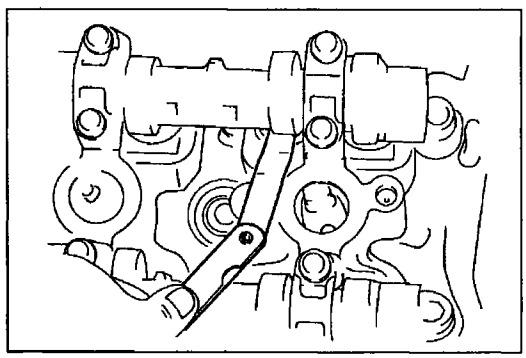
11. Using a fine screwdriver, pry up the adjustment shim through the notch on the tappet. Remove the shim by using a magnet.
12. Select proper adjustment shim.

New adjustment shim
= Removed shim thickness + Measured valve clearance – Standard valve clearance (0.3 mm {0.012 in})



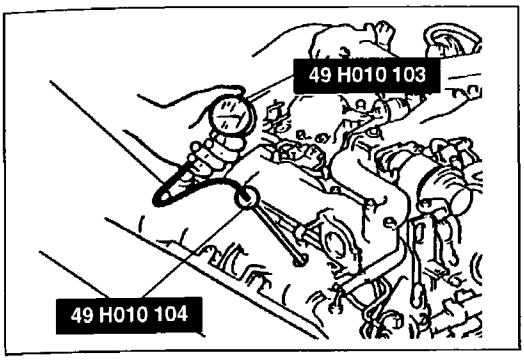
13. Push the selected shim into the tappet.
14. Loosen bolt Ⓒ to allow the tappet to move up.
15. Loosen bolt Ⓑ and remove the **SST** (body).
16. Remove the **SSTs** and tighten the camshaft cap bolts.

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



17. Check the valve clearance.

Standard (Engine cold)
IN: 0.27—0.33 mm {0.011—0.012 in}
EX: 0.27—0.33 mm {0.011—0.012 in}



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. (Refer to section G.)
5. Install the **SST** into the No.1 spark plug hole.
6. Fully depress the accelerator pedal and crank the engine.
7. Note the maximum gauge reading.
8. Check each cylinder as above.

Compression

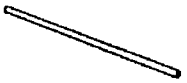
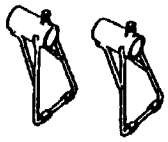
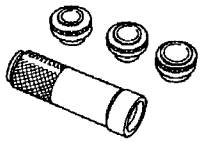
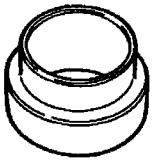
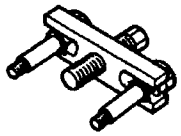
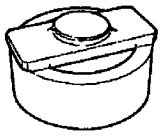
kPa {kgf/cm^2, psi}–rpm

Standard	1,270 {13.0, 185}–300
Minimum	981 {10.0, 143}–300
Maximum difference between cylinders	196 kPa {2.0 kgf/cm^2, 28 psi}

9. 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.
10. Remove the **SST.**
11. Install the spark plugs. (Refer to section G.)

ON-VEHICLE MAINTENANCE

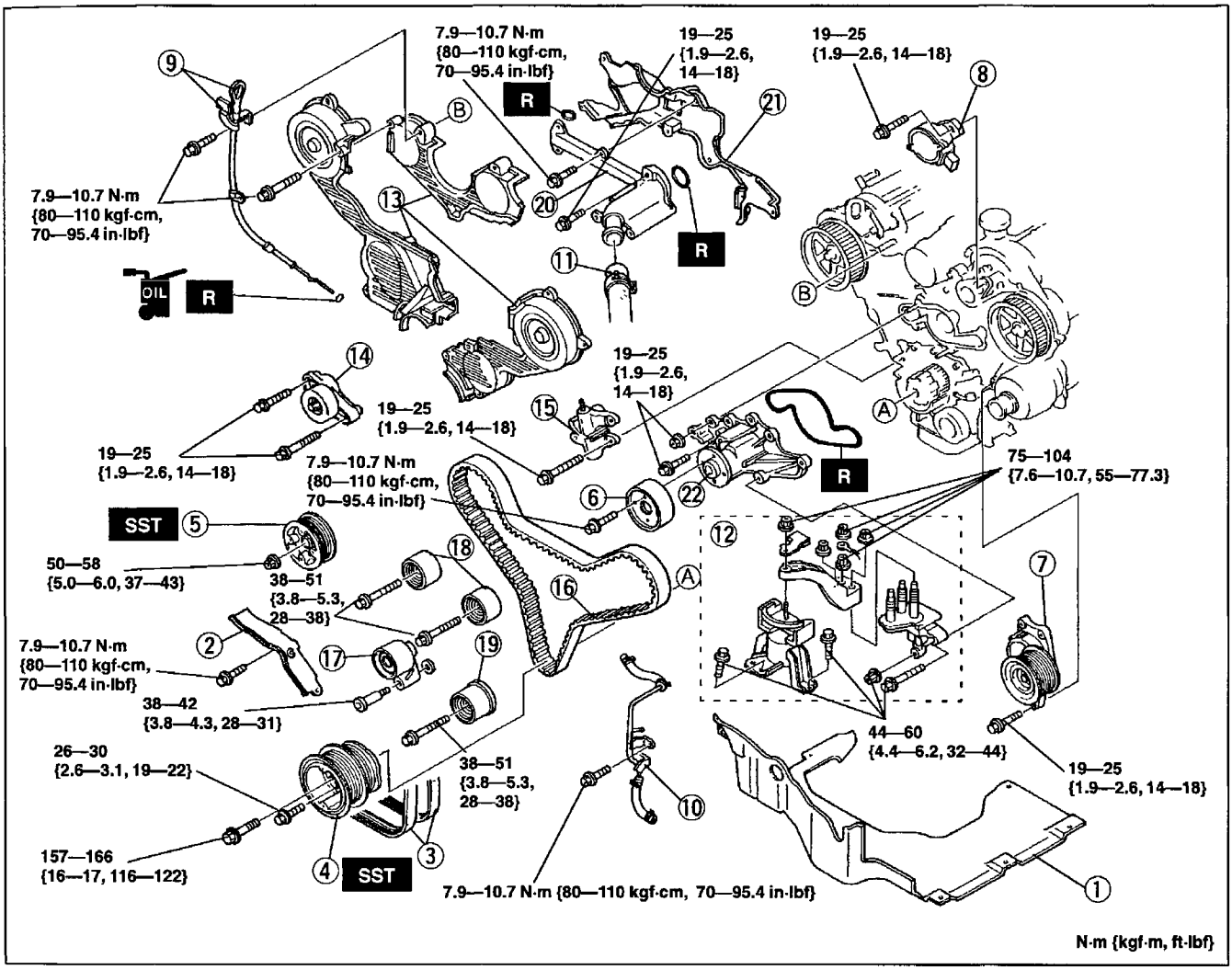
PREPARATION
SST

49 S120 710 Holder, coupling flange 	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	49 F401 330B Installer set, bearing 	For installation of camshaft oil seal
49 F401 337A Attachment C (Part of 49 F401 330B) 	For installation of camshaft oil seal	49 S120 215A Puller, pulley 	For removal of timing belt pulley
49 G019 017 Installer, oil seal 	For installation of rear oil seal	—	—

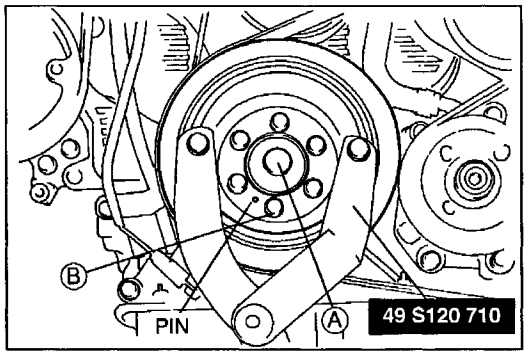
TIMING BELT

Removal / Installation

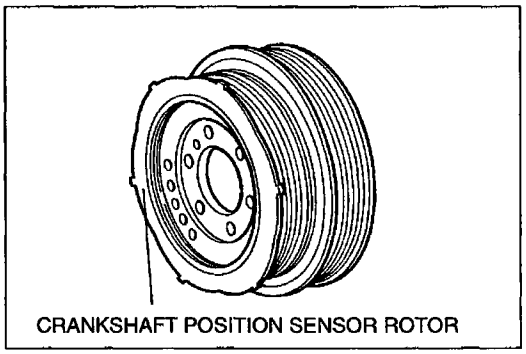
1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to section E.)
3. Remove the right front wheel.
4. Remove in the order shown in the figure, referring to **Removal Note**.
5. Install in the reverse order of removal, referring to **Installation Note**.



1. Splash shield (RH)
2. Dust cover
3. Drive belt
   Replacement ..... page B2– 3
4. Crankshaft pulley
   Removal Note ..... page B2–10
   Installation Note ..... page B2–13
5. P/S oil pump pulley
   Removal / Installation ..... section N
6. Water pump pulley
7. Drive belt auto tensioner (Generator)
8. Camshaft position sensor
   Removal / Installation ..... section F2
9. Dipstick and pipe
10. Vacuum pipe
11. Upper radiator hose
12. No.3 engine mount
    Removal Note ..... page B2–10
    Installation Note ..... page B2–13
13. Timing belt cover
14. Drive belt auto tensioner (P/S)
15. Timing belt auto tensioner
    Installation Note ..... page B2–11
16. Timing belt
    Removal Note ..... page B2–10
    Installation Note ..... page B2–12
17. Tensioner pulley
18. No.1 idler pulley
19. No.2 idler pulley
20. Water outlet pipe
21. Seal plate
22. Water pump

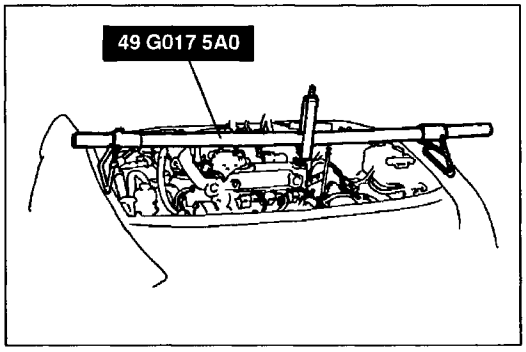


Removal Note
Crankshaft pulley
1. Turn the crankshaft clockwise and face the pin on the crankshaft pulley downward.
2. Mount the **SST** to on the crankshaft pulley to hold the crankshaft.
3. Remove timing belt pulley bolt Ⓐ, then crankshaft pulley bolts Ⓑ.

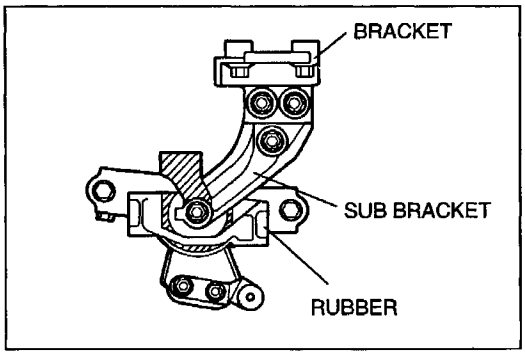


Caution
- **The crankshaft position sensor rotor is on the rear of the crankshaft pulley, and can be damaged easily.**

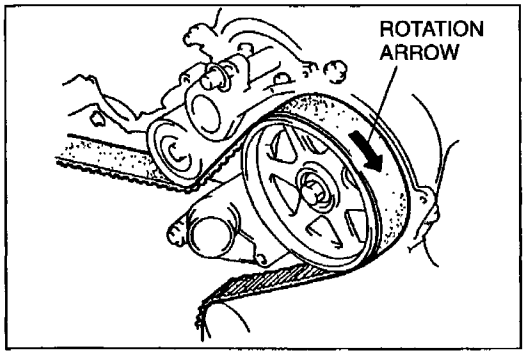
4. Remove the crankshaft pulley.



No.3 engine mount
1. Support the engine by using the **SST**.

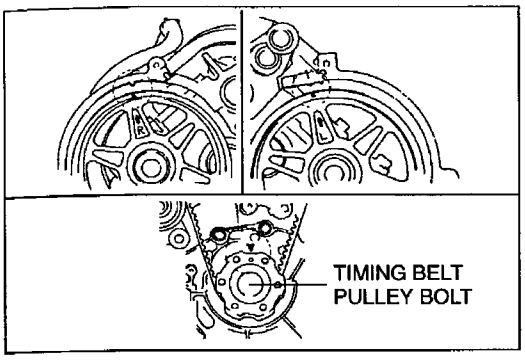


2. Remove the No.3 engine mount sub bracket.
3. Remove the No.3 engine mount rubber.
4. Remove the No.3 engine mount bracket.

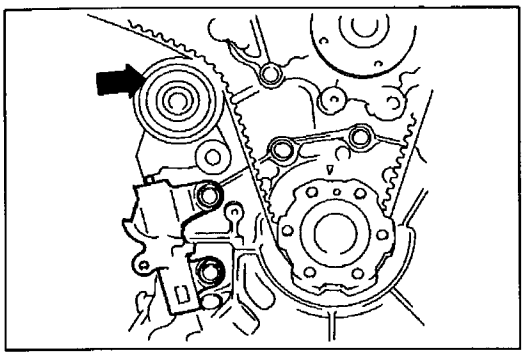


Timing belt

Note
- Mark the timing belt rotation on the belt for proper re-installation.

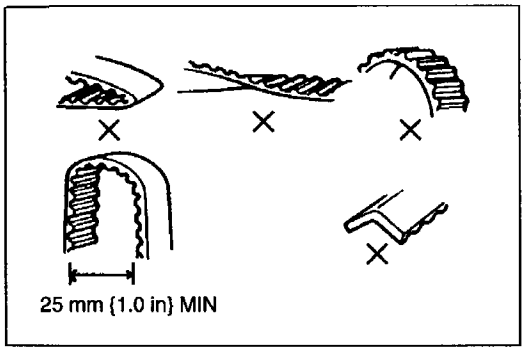


1. Install the timing belt pulley bolt into the crankshaft.
2. Turn the crankshaft clockwise and align the all timing marks. (No.1 piston is at TDC of the compression stroke.)



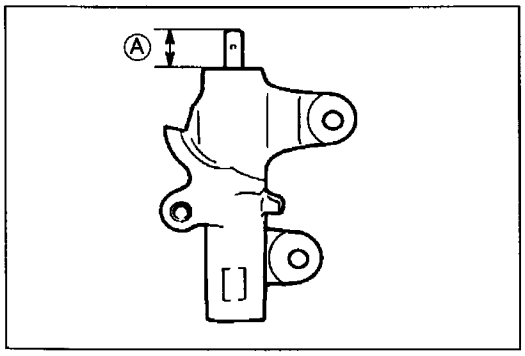
Caution
- **When removing the bolt, hold the tensioner so that the bolt holes are aligned, otherwise the threads can be damaged.**

3. Remove the auto tensioner.



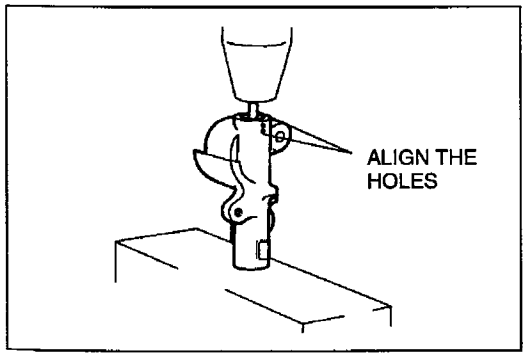
Caution
- **The following will damage the belt and shorten its life; Forcefully twisting it, turning it inside out, bending it, or allowing oil or grease on it.**

4. Remove the timing belt.



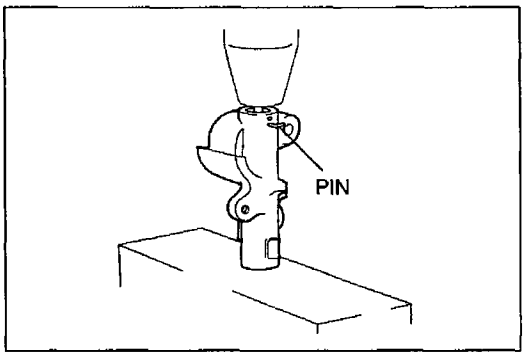
Installation Note
Timing belt auto tensioner
1. Measure the auto tensioner rod projection Ⓐ. Replace the auto tensioner if necessary.
2. Check the auto tensioner for oil leakage. Replace the auto tensioner if necessary.

Projection Ⓐ (Free length): 14—16 mm {0.56—0.62 in}



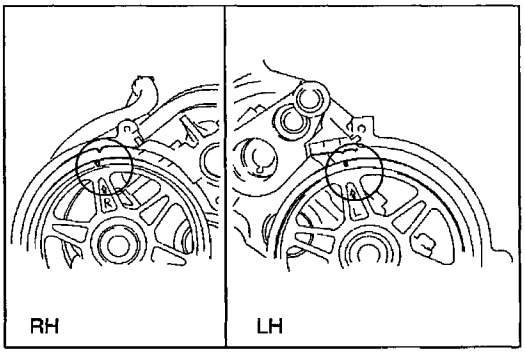
Caution
- **Applying pressure of more than 9.8 kN {1,000 kgf, 2,200 lbf} can damage the auto tensioner.**

3. Slowly press in the tensioner rod by using a press.



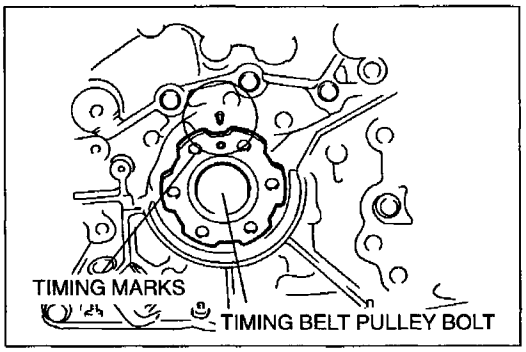
4. Insert a pin into the second hole in the body as shown to hold the tensioner rod.

   Pin diameter: 1.6 mm {0.063 in}

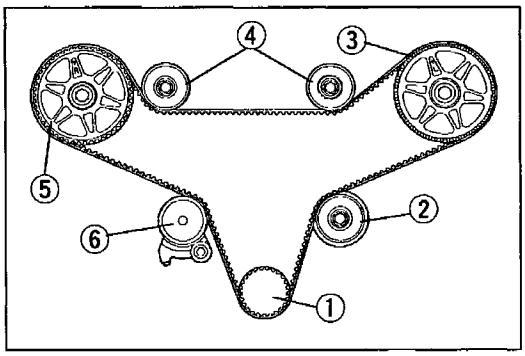


Timing belt

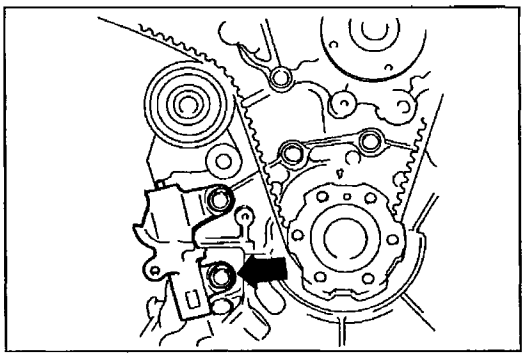
1. Turn the camshafts clockwise and align the timing marks.



2. Using the timing belt pulley bolt, turn the crankshaft clockwise and align the timing marks.

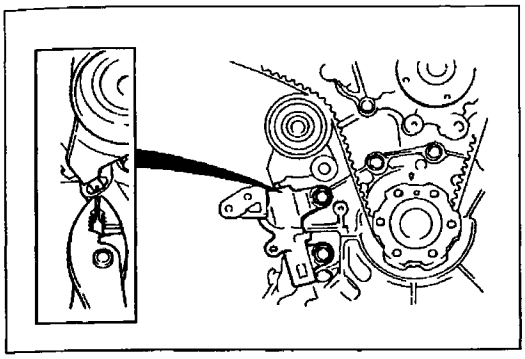


3. Install the timing belt on the pulleys in the order shown below.
   ① Timing belt pulley
   ② No.2 idler pulley
   ③ Camshaft pulley (LH)
   ④ No.1 idler pulleys
   ⑤ Camshaft pulley (RH)
   ⑥ Tensioner pulley

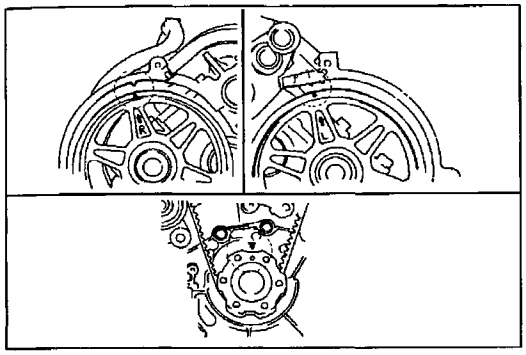


4. Tighten the bolts while pressing the auto tensioner in the direction of the arrow, then tighten the auto tensioner mounting bolts to the specified torque.

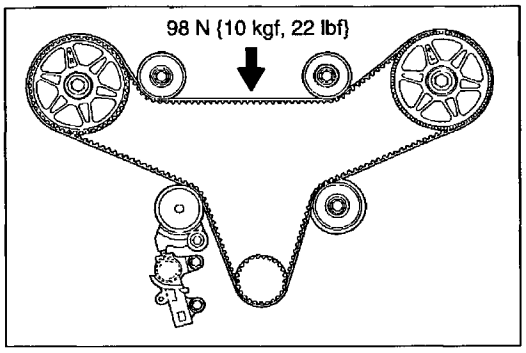
   Tightening torque:
   19—25 N·m {1.9—2.6 kgf·m, 14—18 ft·lbf}



5. Remove the pin from the auto tensioner to apply tension to the belt.

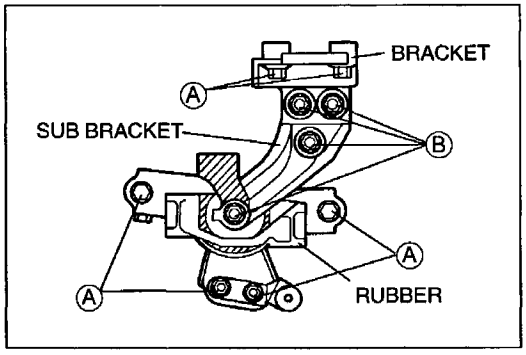


6. Turn the crankshaft clockwise twice, and align the timing marks.
7. Verify that all timing marks are correctly aligned. If not, remove the timing belt and repeat from timing belt auto tensioner installation. (Refer to page B2–11.)



8. Check the timing belt deflection by applying moderate pressure **98 N {10 kgf, 22 lbf}** midway between the No.1 idler pulleys. If not correct, replace the auto tensioner.

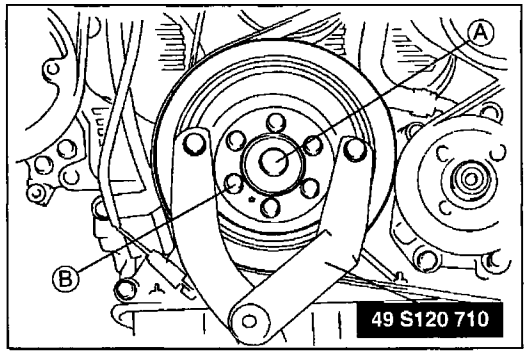
Deflection: 6.0—8.0 mm {0.24—0.31 in}



No.3 Engine mount
1. Install the No.3 engine mount bracket.
2. Install the No.3 engine mount rubber.
3. Install the No.3 engine mount sub bracket.

Tightening torque
Ⓐ: 44—60 N·m {4.4—6.2 kgf·m, 32—44 ft·lbf}
Ⓑ: 75—104 N·m {7.6—10.7 kgf·m, 55—77.3 ft·lbf}

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



Crankshaft pulley
1. Remove timing belt pulley bolt Ⓐ.
2. Install the crankshaft pulley and hand tighten bolt Ⓐ and bolts Ⓑ.
3. Mount the **SST** on the crankshaft pulley to hold the crankshaft.
4. Tighten pulley bolts Ⓑ, then crankshaft pulley bolt Ⓐ.

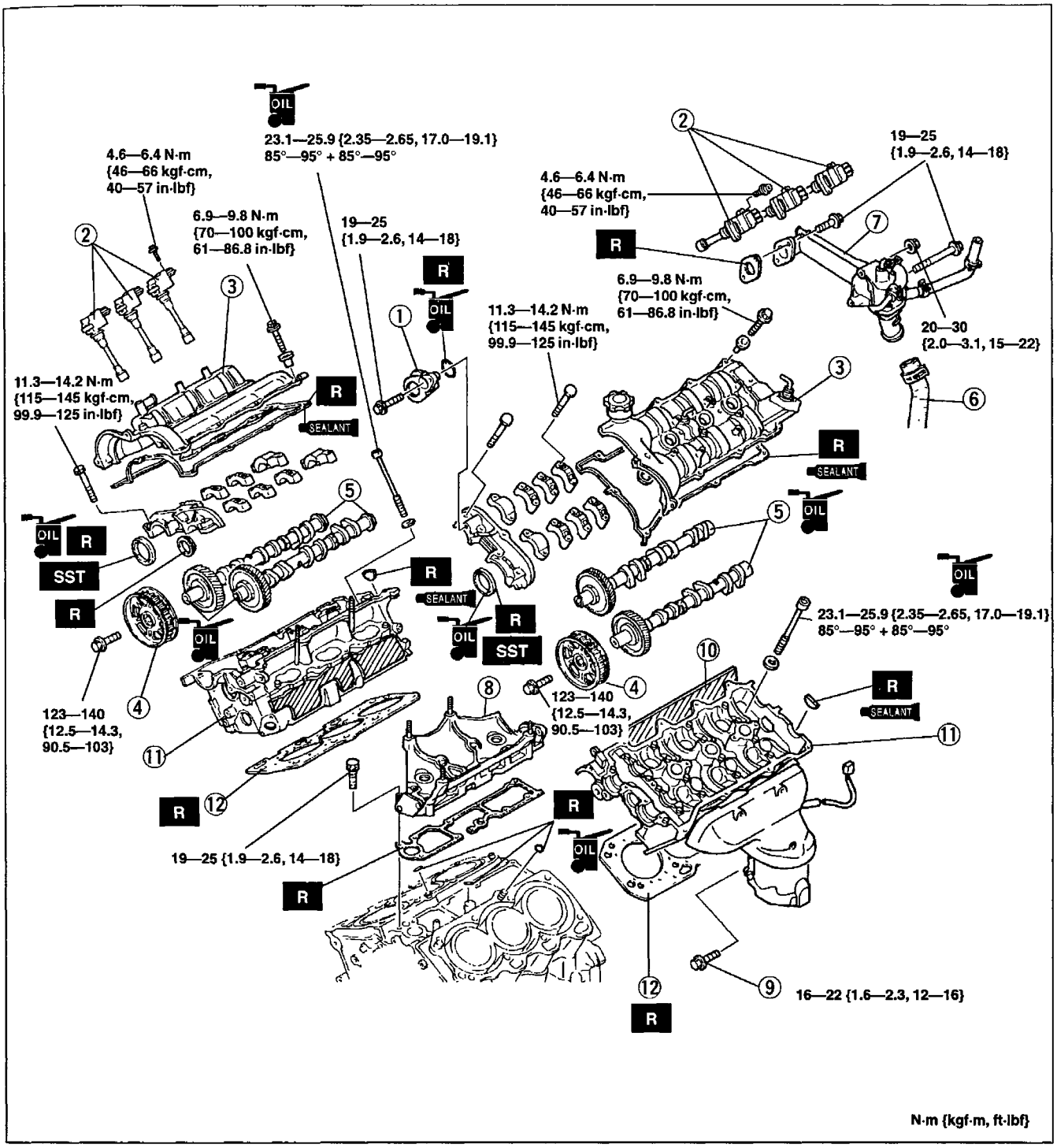
Tightening torque
Ⓐ: 157—166 N·m {16—17 kgf·m, 116—122 ft·lbf}
Ⓑ: 26—30 N·m {2.6—3.1 kgf·m, 19—22 ft·lbf}

Steps After Installation
1. Install the right front wheel.
2. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to section E.)
3. Start the engine and check follows:
   - Runout or contact of pulley or drive belt
   - Ignition timing (Refer to section F2.)
4. Turn off the engine and check the drive belt. (Refer to page B2–2.)
5. Recheck the engine coolant level.

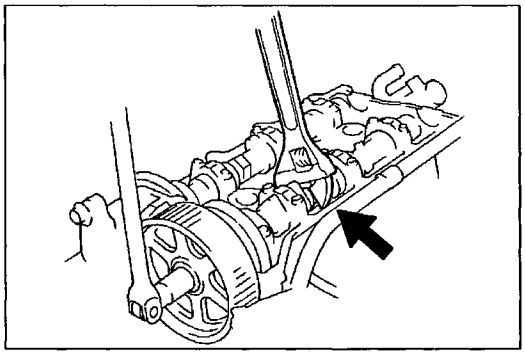
CYLINDER HEAD GASKET
Replacement

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.**

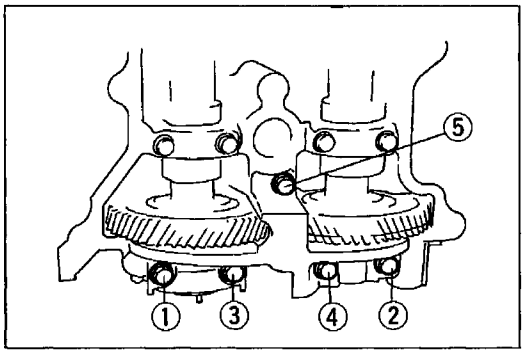
1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to section E.)
3. Remove the front pipe, three way catalytic converter (RH), Lysholm compressor and intake manifold. (Refer to section F2.)
4. Remove the timing belt. (Refer to page B2–9.)
5. Remove in the order shown in the figure, referring to **Removal Note.**
6. Install in the reverse order of removal, referring to **Installation Note.**



1. Spacer
2. Ignition coil
   Removal / Installation ..... section G
3. Cylinder head cover
   Installation Note ..... page B2–20
4. Camshaft pulley
   Removal Note ..... page B2–16
   Installation Note ..... page B2–20
5. Camshaft
   Removal Note ..... page B2–16
   Installation Note ..... page B2–19
6. Lower radiator hose
7. Water inlet pipe
8. Lysholm compressor bracket
   Removal / Installation ..... section F2
9. Generator bolt
10. Rubber insulator (LH)
11. Cylinder head
    Removal Note ..... page B2–16
    Installation Note ..... page B2–17
12. Cylinder head gasket
    Installation Note ..... page B2–17

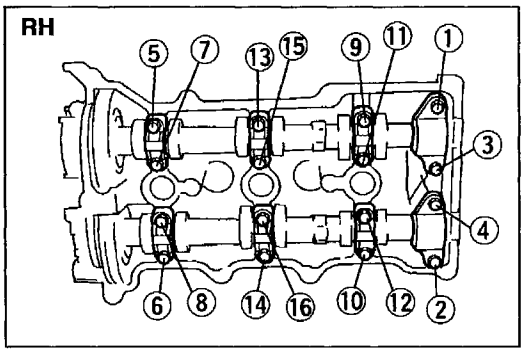


Removal Note
Camshaft pulley
1. Hold the camshaft by using a wrench on the cast hexagon as shown, and remove the camshaft pulley lock bolt.
2. Remove the camshaft pulley.



Camshaft
1. Turn the camshaft clockwise by using a wrench on the cast hexagon until the camshaft lobes are not pressing the adjustment shims.
2. Loosen the front camshaft cap bolts in five or six steps in the order shown.
3. Remove the front camshaft cap bolts and front camshaft caps.

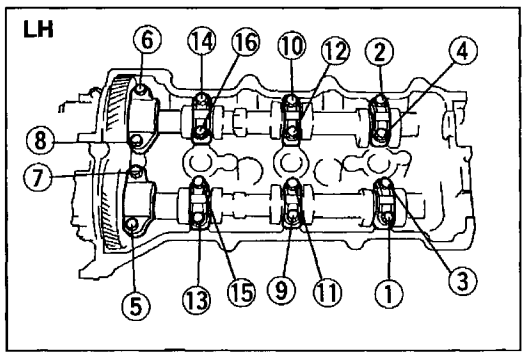
Note
- Bolt ⑤ fits only the right cylinder head.

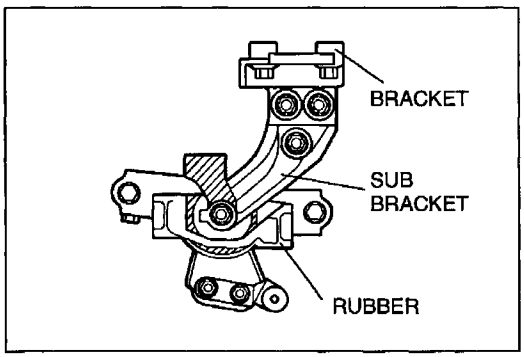


4. Loosen the camshaft cap bolts gradually in five or six steps in the order shown.

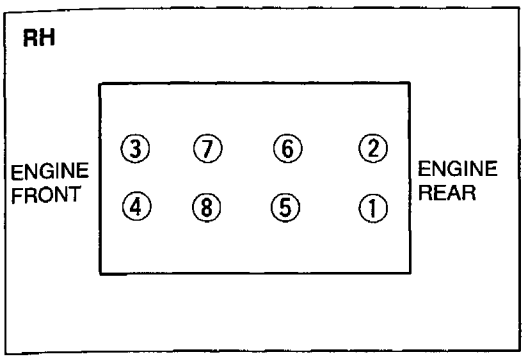
Caution
- **Remove the thrust caps only after removing all camshaft caps. Otherwise, the thrust caps can be damaged.**

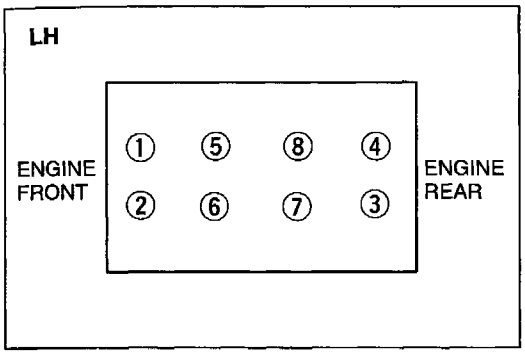
5. Remove the camshaft cap bolts and camshaft caps.
6. Remove the camshafts.





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

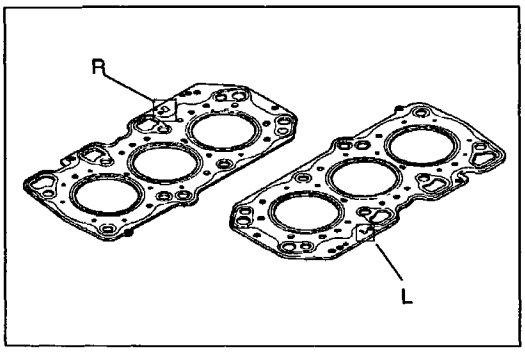




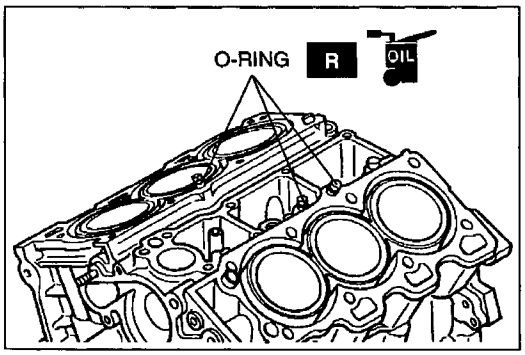
3. Loosen the cylinder head bolts in two or three steps in the order shown.
4. Remove the cylinder head bolts.

Caution
- **Removing the LH cylinder head with the rubber insulator still installed can damage the knock sensor harness.**

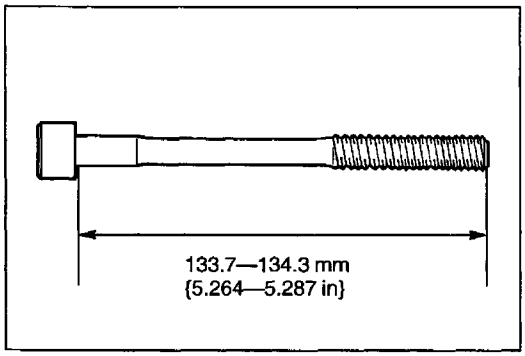
5. Remove the cylinder heads.



Installation Note
Cylinder head gasket
Install the new cylinder head gaskets on the cylinder block. (The RH gasket is marked R; the LH gasket is marked L.)

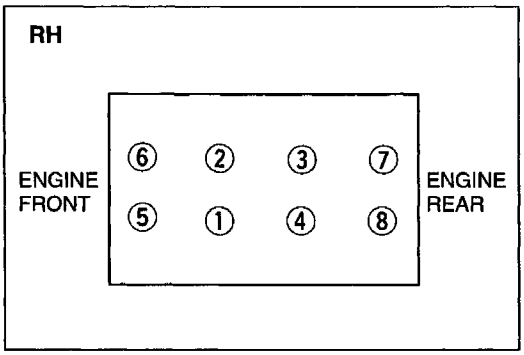


Cylinder head
1. Apply clean engine oil to new O-ring and install them to the oil control plugs.
2. Install the cylinder head to the cylinder block.



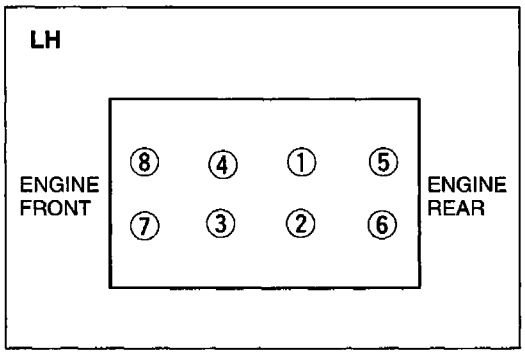
3. Tighten the cylinder head bolts as described below.
   (1) Before installation, measure the length of each bolt. Replace any that exceed the maximum length.

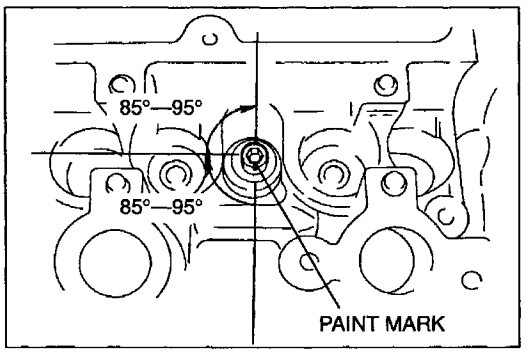
Length
Standard: 133.7—134.3 mm {5.264—5.287 in}
Maximum: 135.0 mm {5.315 in}



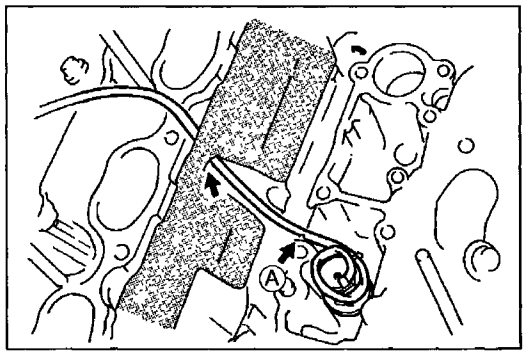
(2) Apply clean engine oil to the threads and the seat face of each bolt and install them.
(3) Tighten the bolts in two or three steps in the order shown.

Tightening torque:
23.1—25.9 N·m {2.35—2.65 kgf·m, 17.0—19.1 ft·lbf}

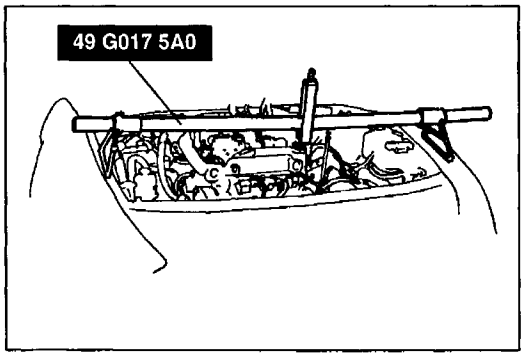




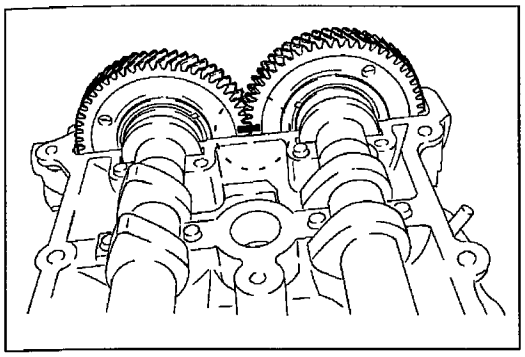
(4) Put a paint mark on each bolt head.
(5) Using the marks as a reference, tighten the bolts by turning each **85°–95°** in the sequence shown.
(6) Further tighten each bolt by turning another **85°–95°**.

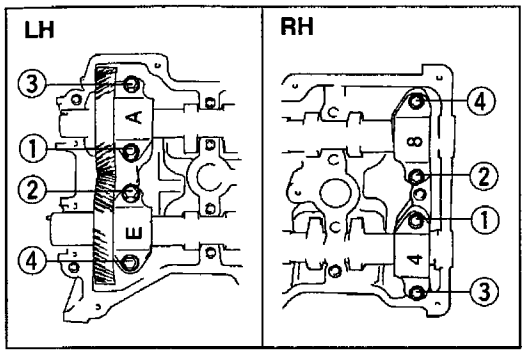


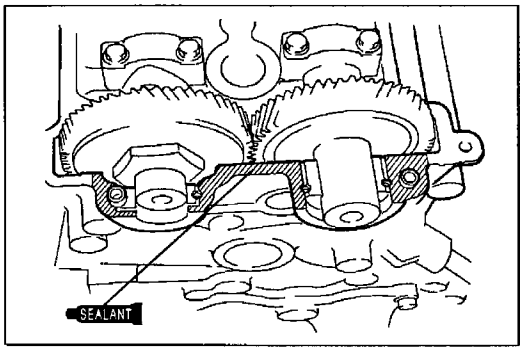
4. Fit the knock sensor harness into the drill hole Ⓐ on the cylinder block.
5. Pass the harness under the rubber insulator on the LH cylinder head.

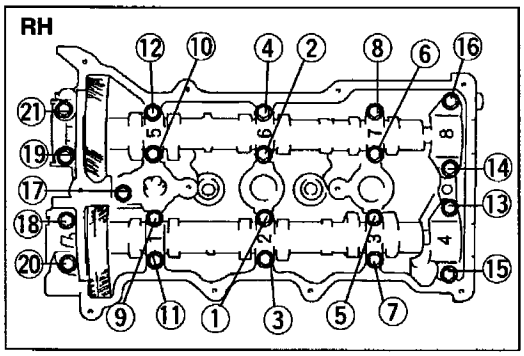


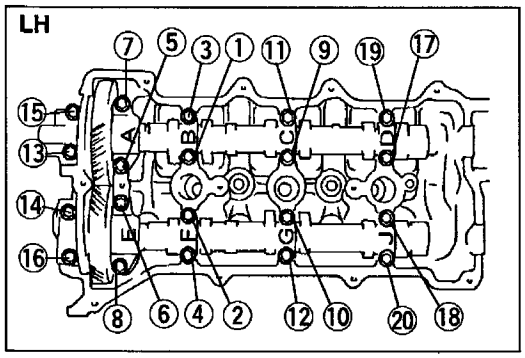
6. Support the engine by using the **SST**.
7. Remove the No.3 engine mount.











Camshaft

Caution
- **Camshafts must be assembled in the following procedure. Otherwise, camshaft can be broken or damaged because there is little camshaft thrust clearance.**
- **There is a stamp mark and a scribed line on the camshaft gear. Use the scribed line for the timing mark.**

1. Apply clean engine oil to the camshaft journals, camshaft lobes, and camshaft gears.
2. Install the camshafts so that the intake camshaft gear mark and exhaust camshaft gear mark align.

Caution
- **Install the thrust caps (RH is 4, 8 marks, LH is A, E marks) first. Otherwise, camshaft can be broken or damaged.**

3. Install the thrust caps onto the cylinder heads. Hand tighten the bolts gradually in five or six steps in the order shown, until the thrust caps seated on the cylinder heads.

Caution
- **Excessive silicone sealant will get into the cylinder head and cause the piston seizure.**

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

Thickness: ϕ1.5—2.5 mm {0.06—0.09 in}

5. Install the camshaft caps according to their identification marks, and hand tighten the bolts.

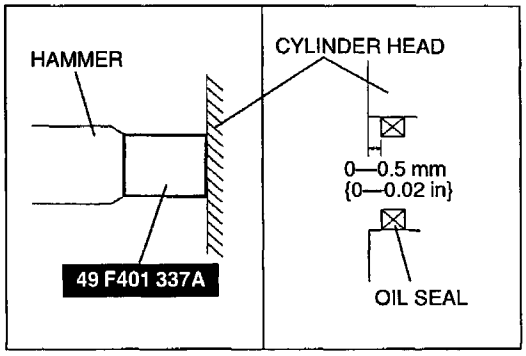
Note
- RH: numbers
- LH: letters

6. Tighten the bolts in the order shown.

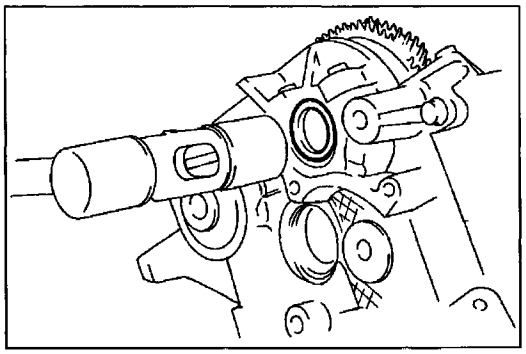
Tightening torque:
11.3—14.2 N·m {115—145 kgf·cm, 99.9—125 in·lbf}

7. Retighten the bolts in the order shown.

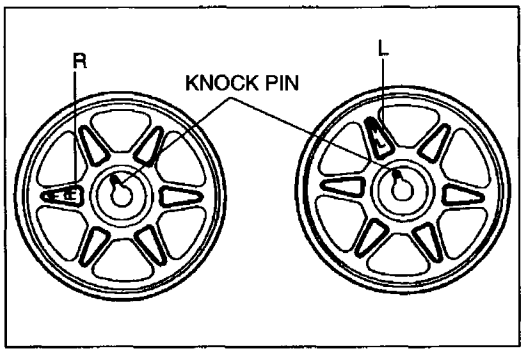
Tightening torque:
11.3—14.2 N·m {115—145 kgf·cm, 99.9—125 in·lbf}



8. Apply clean engine oil to the lip of the new camshaft oil seal.
9. Push the oil seal slightly in by hand.
10. Tap the camshaft oil seal in evenly with the **SST** and a hammer.

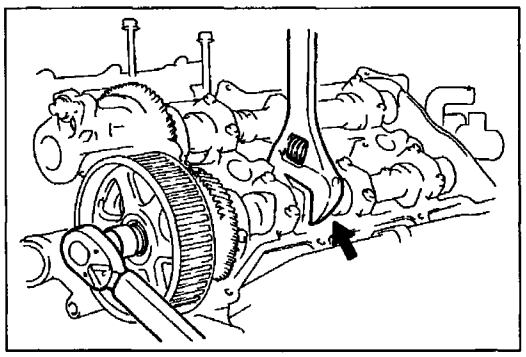


11. Tap in the new blind cap by using a plastic hammer.



Camshaft pulley

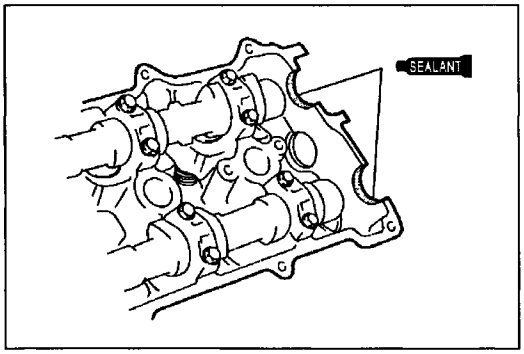
1. Install the camshaft pulley so that the "R" mark (RH) can be seen and the timing mark aligns with the camshaft knock pin.
2. Install the camshaft pulley so that the "L" mark (LH) can be seen and the timing mark aligns with the camshaft knock pin.



3. Apply clean engine oil to the lock bolt threads and hand tighten the lock bolt.
4. Hold the camshaft by using a wrench on the cast hexagon as shown, and tighten the bolt.

   Tightening torque:
   123—140 N·m {12.5—14.3 kgf·m, 90.5—103 ft·lbf}

5. Measure the valve clearances. (Refer to page B2–4.)

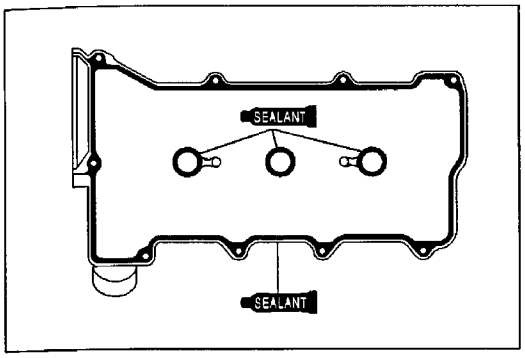


Cylinder head cover

Caution

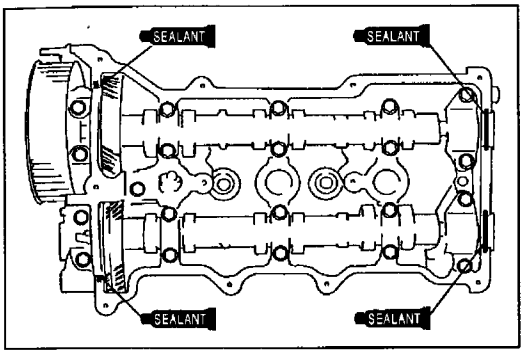
- **Silicone sealant hardens and causes oil leakage when it is left for an extended period. Therefore, install parts within five minutes of applying sealant.**

1. Apply silicone sealant to the shaded areas as shown.
2. Install the new blind covers.



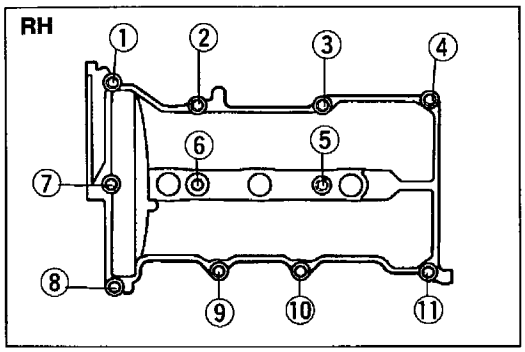
3. Apply silicone sealant to the cylinder head cover as shown.
4. Install the new cylinder head cover gasket into the cylinder head cover.

Thickness: ϕ1.0—2.0 mm {0.04—0.07 in}



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

Thickness: ϕ1.5—2.5 mm {0.06—0.09 in}

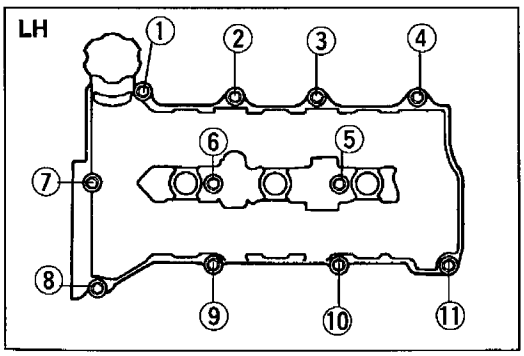


6. Install the cylinder head cover and tighten the bolts in five or six steps in the order shown.

Tightening torque:
6.9—9.8 N·m {70—100 kgf·cm, 61—86.8 in·lbf}

7. Retighten RH ⑤, ⑥ and LH ⑤, ⑥ cylinder head cover bolts.

Tightening torque:
6.9—9.8 N·m {70—100 kgf·cm, 61—86.8 in·lbf}



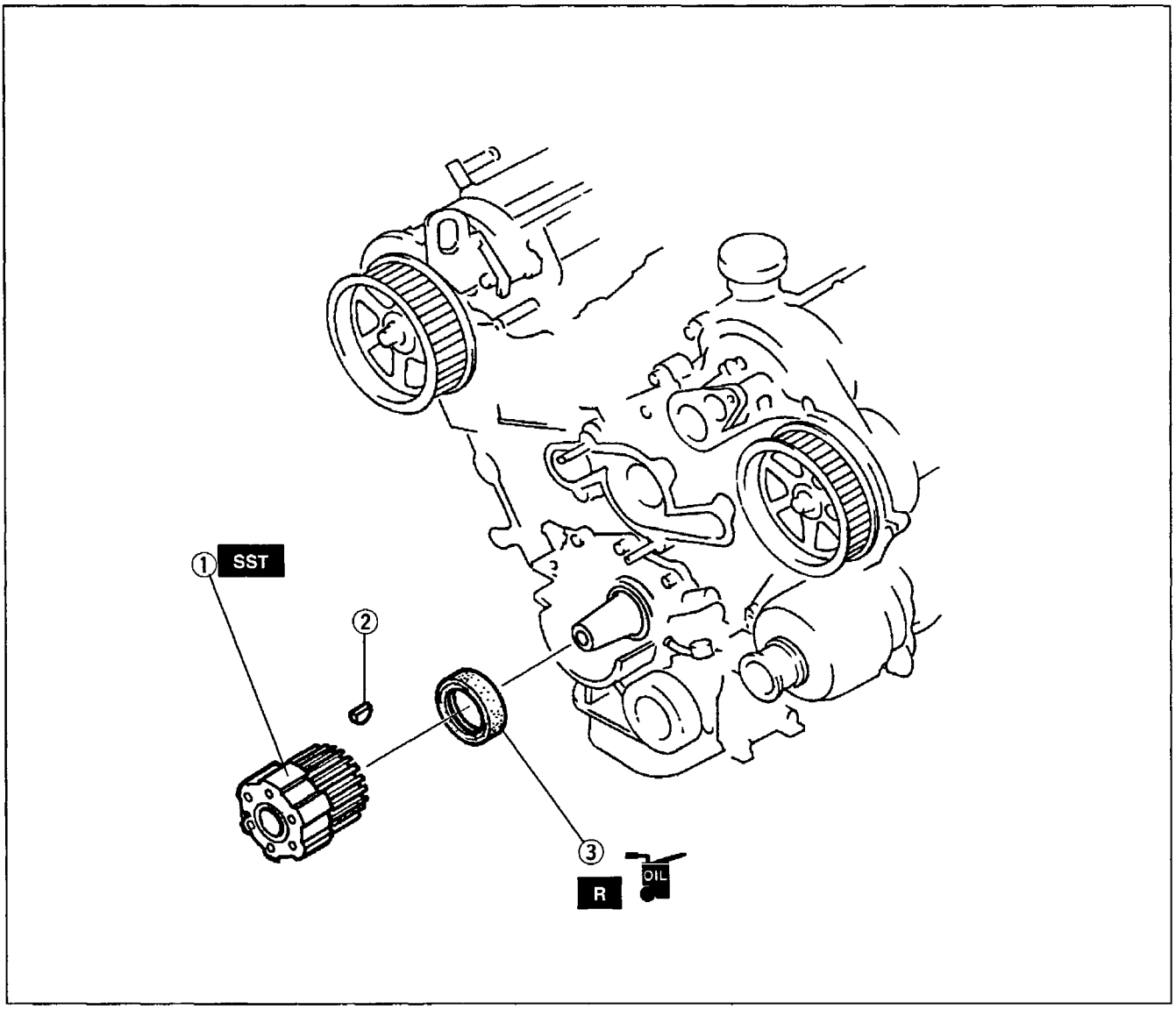
Steps After Installation

1. Install the timing belt. (Refer to page B2–9.)
2. Install the intake manifold, Lysholm compressor, three way catalytic converter and front pipe. (Refer to section F2.)
3. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to section E.)
4. 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.)
   (3) check the operation of the emission control system. (Refer to section F2.)
5. Turn off the engine and check the drive belt. (Refer to page B2–2.)
6. Recheck the engine oil and engine coolant levels.

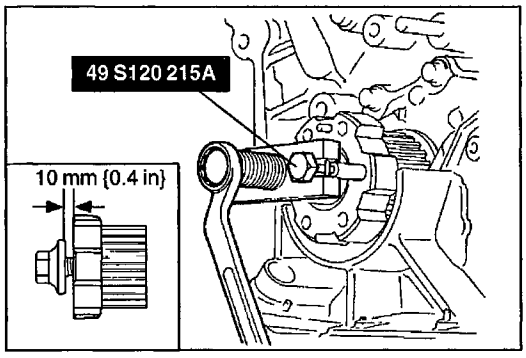
FRONT OIL SEAL

Replacement

1. Disconnect the negative battery cable.
2. Remove the timing belt. (Refer to page B2–9.)
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**.



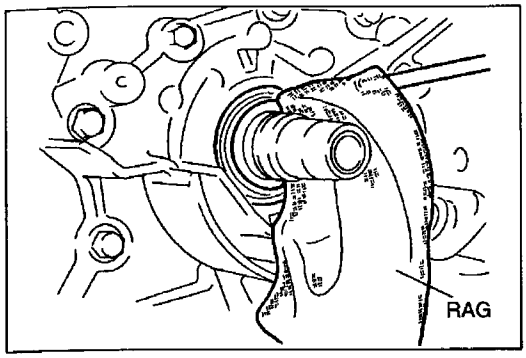
1. Timing belt pulley
   Removal Note ..... below
2. Key
3. Oil seal
   Removal Note ..... page B2–23
   Installation Note ..... page B2–23



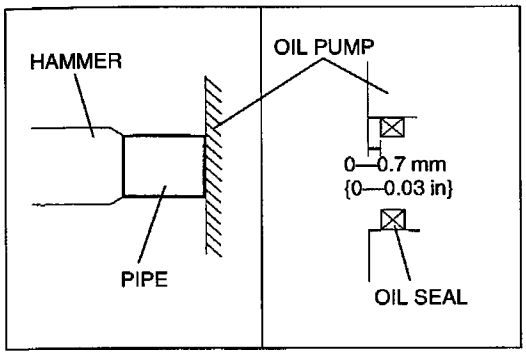
Removal Note

Timing belt pulley

1. Install the timing belt pulley lock bolt to the timing belt pulley. Leave approx. **10 mm {0.4 in}** clearance between them.
2. Install the **SST** to the timing belt pulley as shown.
3. Gradually tighten the bolts of the **SST**.
4. Remove the timing belt pulley.



Oil seal
1. Cut the oil seal lip by using a razor knife.
2. Remove the oil seal by using a screwdriver protected with a rag.



Installation Note
Oil seal
1. Apply clean engine oil to the new oil seal.
2. Push the oil seal slightly in by hand.
3. Tap the oil seal in evenly by using a pipe and a hammer.

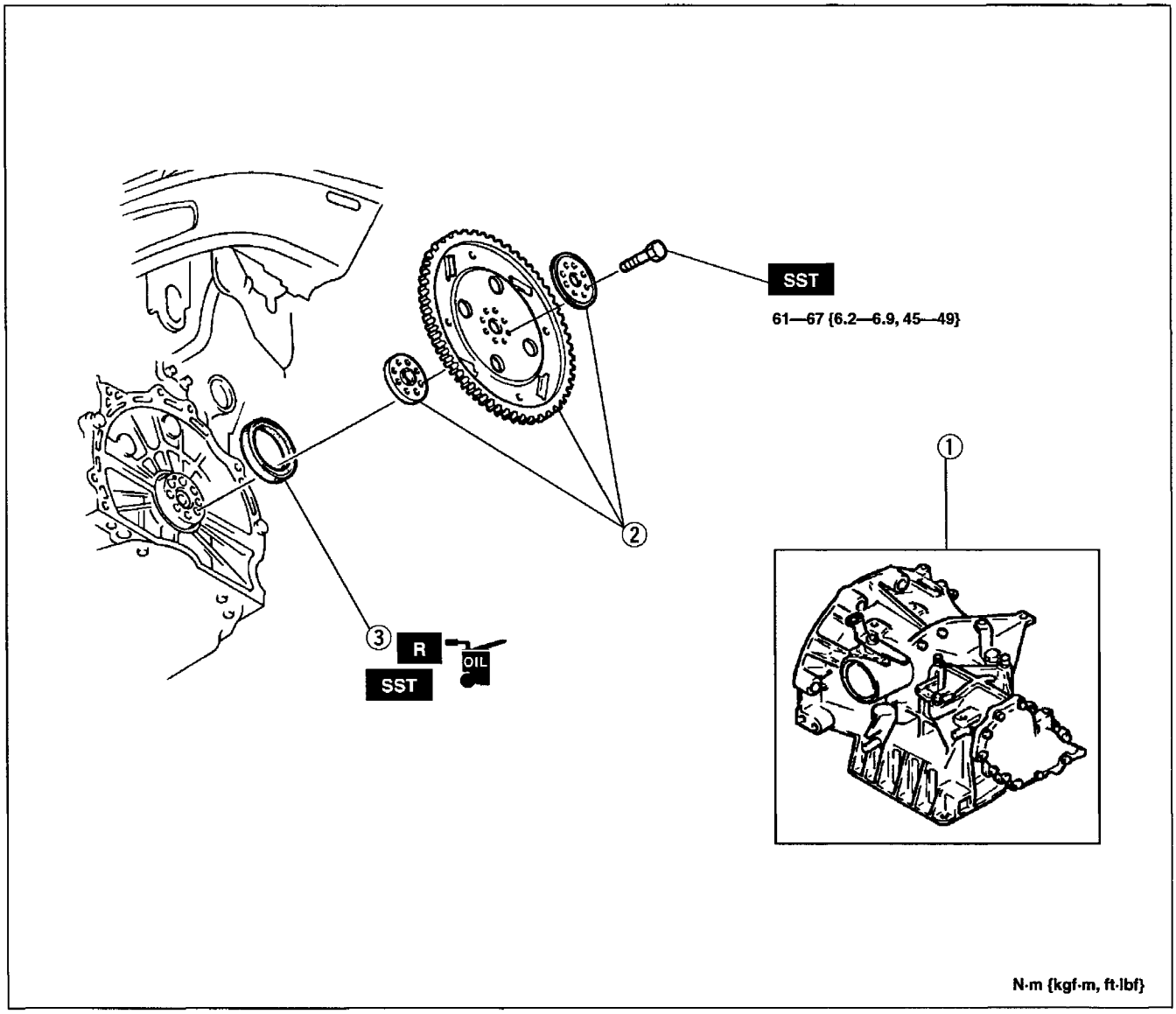
Note
- Oil seal outer diameter: 54.5 mm {2.15 in}
- Oil seal inner diameter: 43.0 mm {1.69 in}

Steps After Installation
1. Install the timing belt. (Refer to page B2–9.)
2. Start the engine and check the following.
   - Ignition timing (Refer to section F2.)

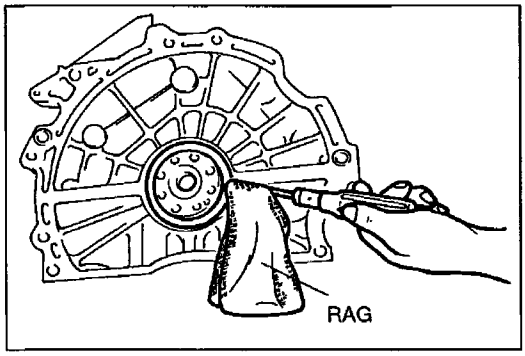
REAR OIL SEAL

Replacement

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**.



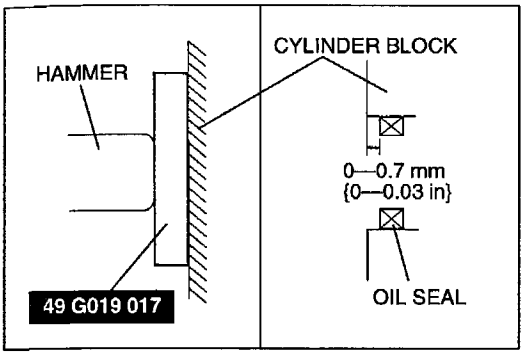
1. Automatic transaxle
   Removal / Installation ..... section K2
2. Drive plate, backing plate, adapter
   Removal / Installation ..... section K2
3. Oil seal
   Removal Note ..... below
   Installation Note ..... page B2–25



Removal Note

Oil seal

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

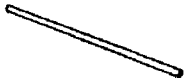
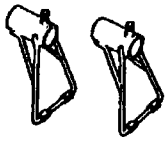


Installation Note
Oil seal
1. Apply clean engine oil to the new oil seal.
2. Push the oil seal slightly in by hand.
3. Tap the oil seal in evenly by using the **SST** and a hammer.

Steps After Installation
Start the engine and perform engine adjustments if necessary.

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

PROCEDURE

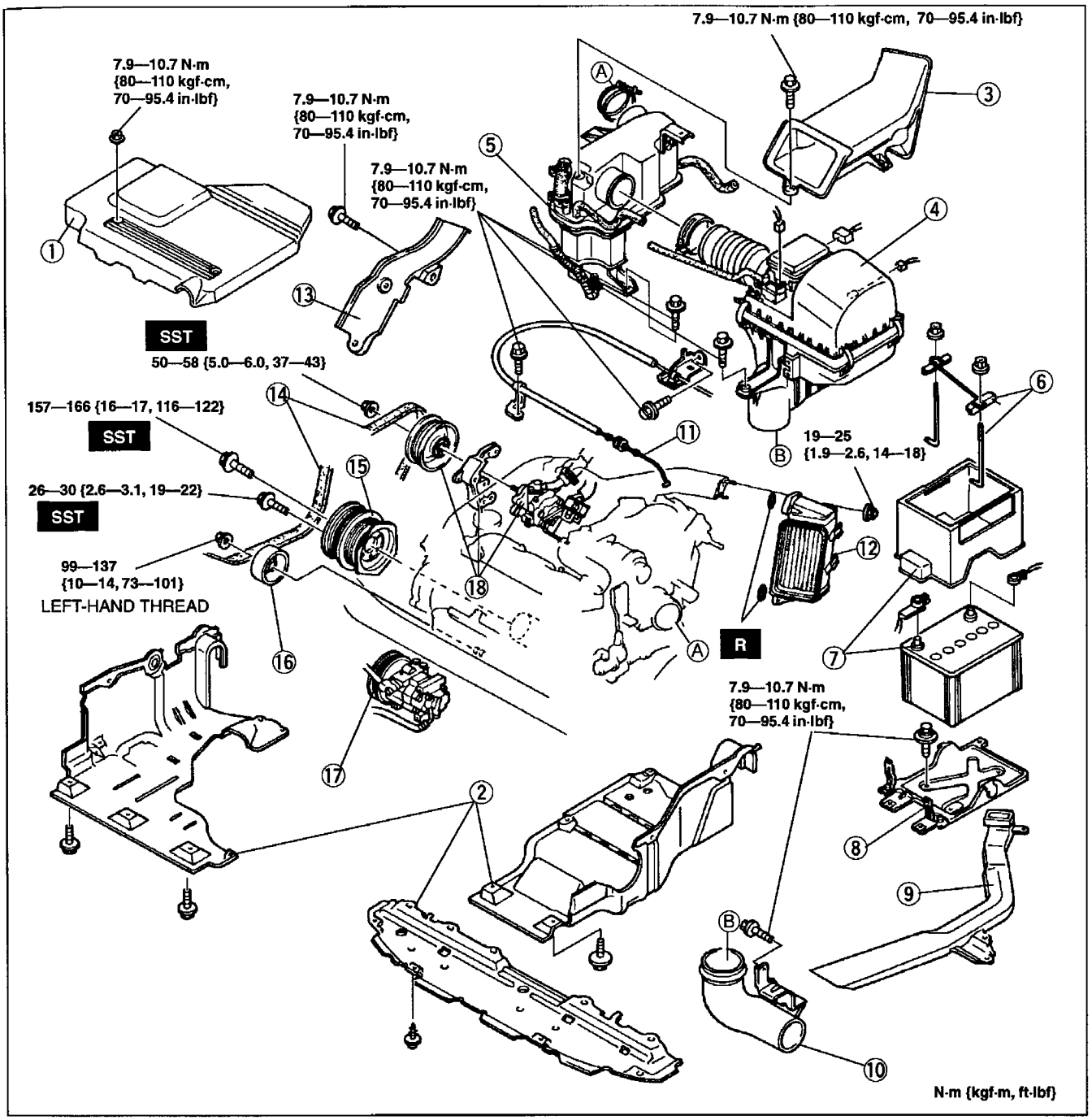
Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on section F2.**
- **Fuel vapor is hazardous. It can very easily ignite, causing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

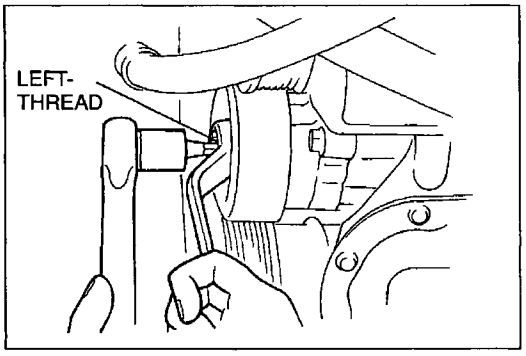
Note
- Plug the disconnected fuel hoses to prevent fuel leakage.

1. Disconnect the negative battery cable.
2. Drain engine coolant (Refer to section E.) and ATF. (Refer to section K2.)
3. Remove the hood and front wheels.
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.**

Step 1



1. Dynamic chamber cover
   Removal Note ..... section F2
2. Splash shield
3. Charge air cooler air duct
4. Air cleaner assembly
5. Resonator
6. Battery clamp
7. Battery and battery cover
8. Battery carrier
9. Battery air duct
10. Air duct
11. Accelerator cable
    Removal / Installation ..... section F2
12. Charge air cooler
13. Dust cover
14. Drive belt
    Replacement ..... page B2– 3
15. Crankshaft pulley
    Removal Note ..... page B2–10
    Installation Note ..... page B2–13
16. Vacuum pump pulley
    Removal Note ..... page B2–28
17. A/C compressor
    Removal Note ..... page B2–28
18. P/S oil pump
    Removal Note ..... page B2–28

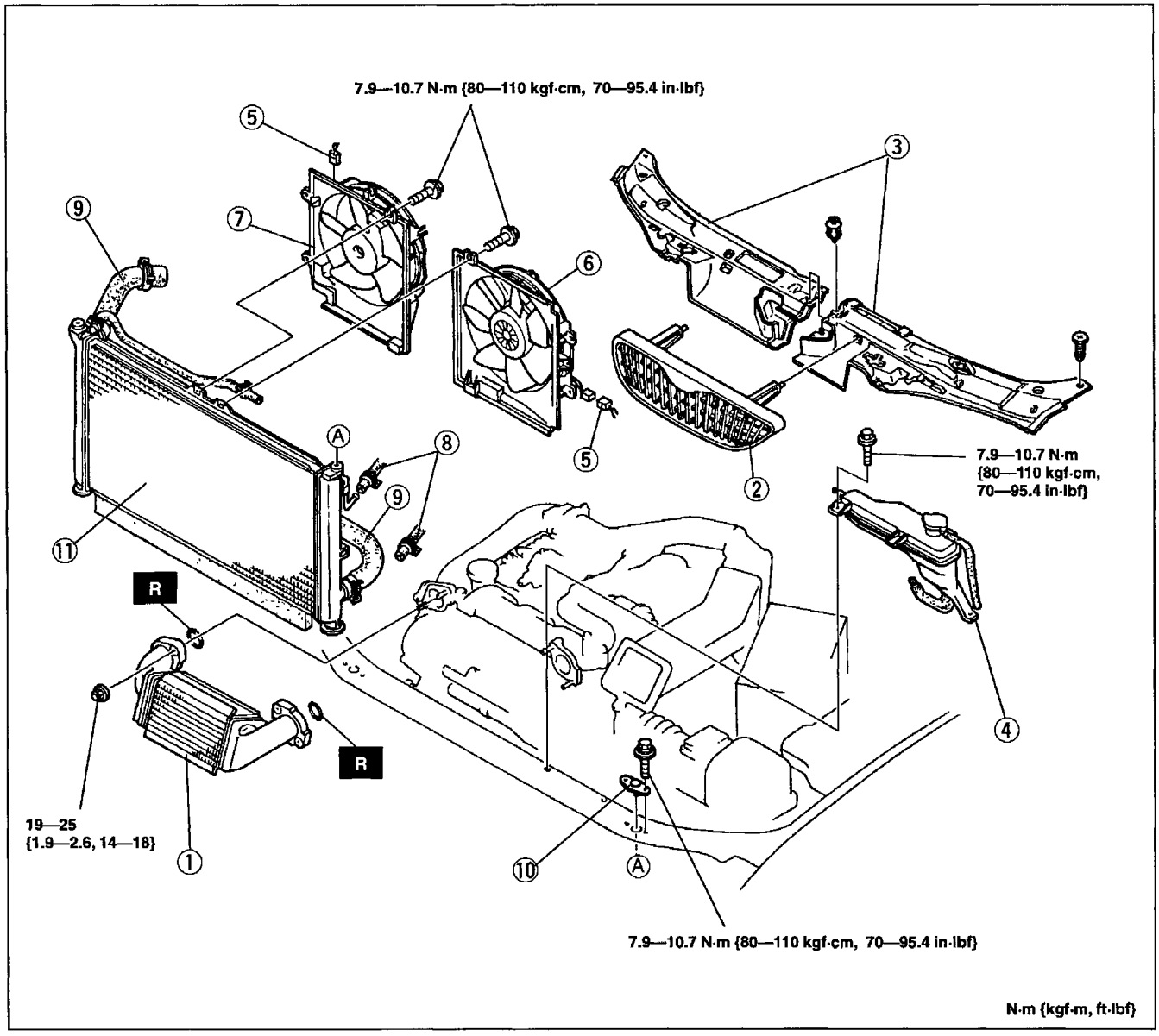


Removal Note
Vacuum pump pulley
1. Use a hexagon wrench to hold the vacuum pump pulley.
2. Remove the pulley locknut (left-threaded).

A/C compressor
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.

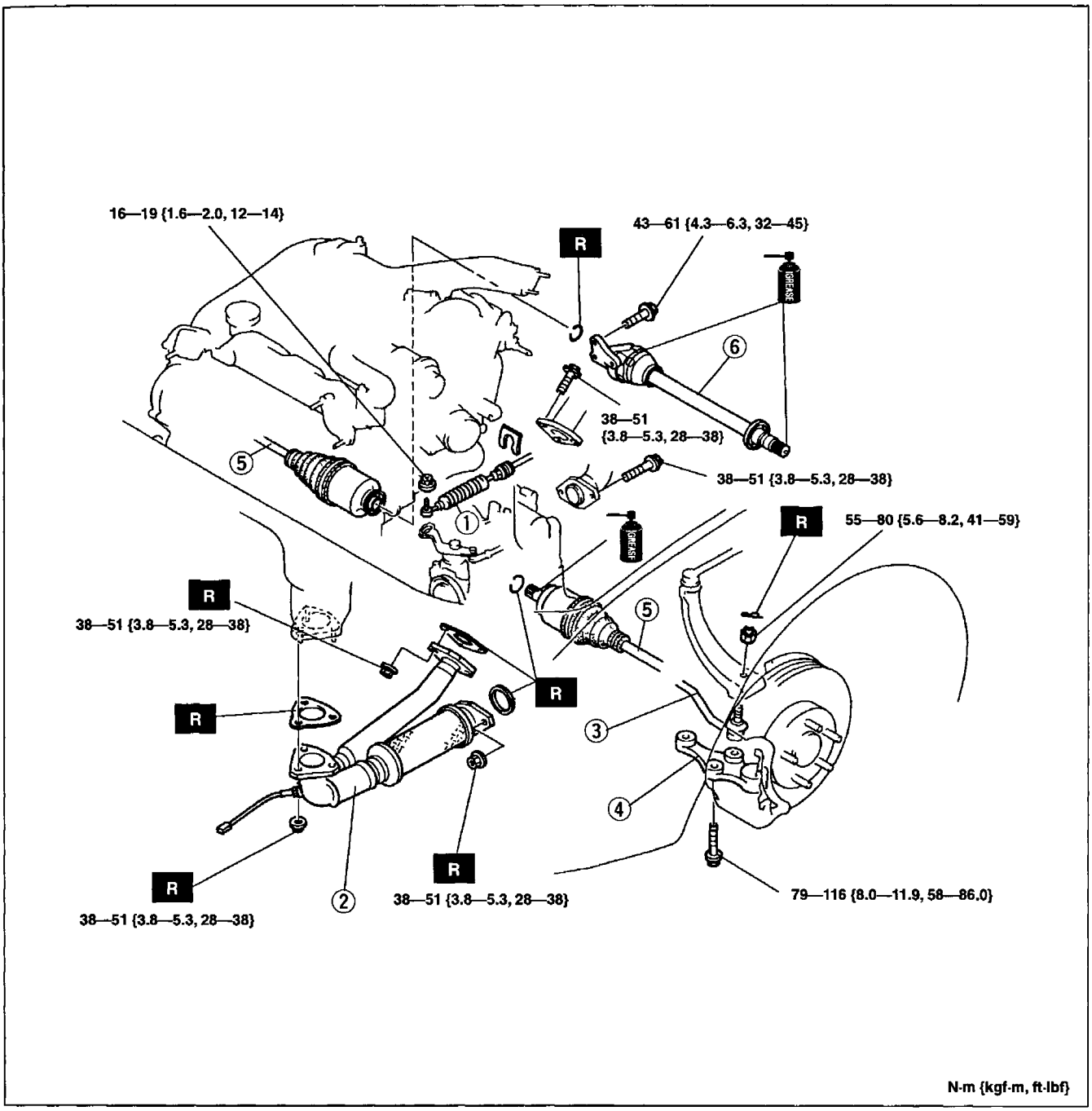
P/S oil pump
1. Remove the P/S oil pump with the hoses still connected. (Refer to section N.)
2. Position the pump away from the engine and affix it with wire.

Step 2



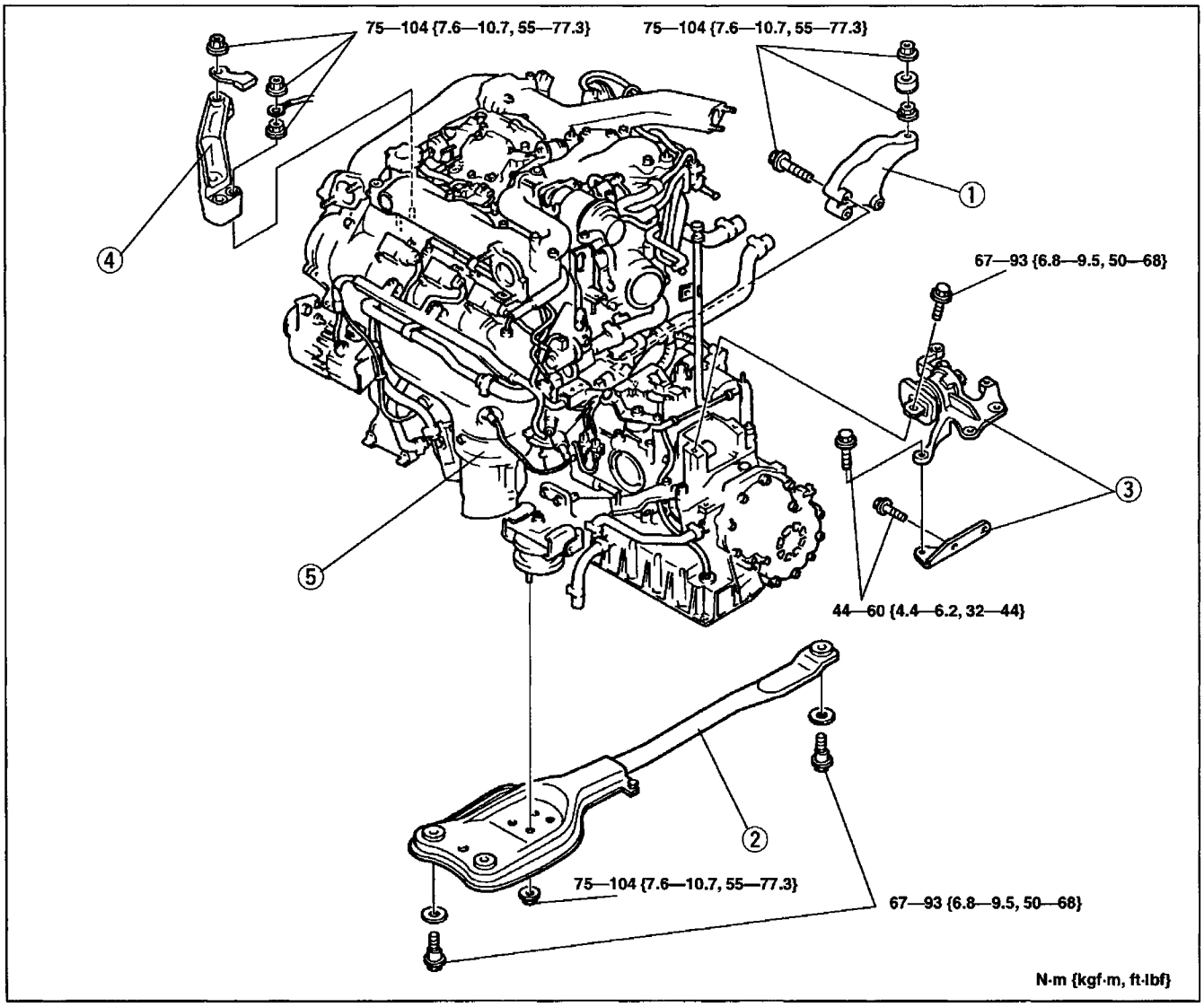
1. Charge air cooler
2. Radiator grille
3. Upper seal board
4. Radiator reservoir
5. Fan motor connector
6. Cooling fan assembly
7. Condenser fan assembly
8. Oil cooler hose
9. Radiator hose
10. Radiator bracket
11. Radiator

Step 3

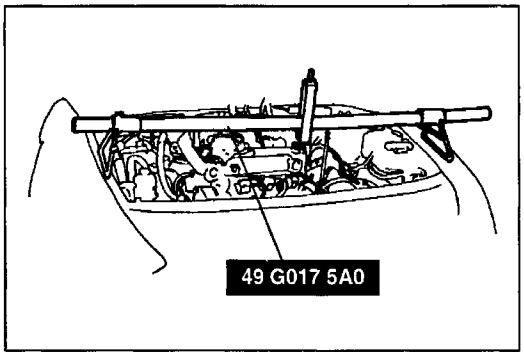


1. Selector cable
2. Front pipe
3. Upper lateral link ball joint
   Removal / Installation ..... section R
4. Lower ball joint
   Removal / Installation ..... section R
5. Drive shaft
   Removal / Installation ..... section M
6. Joint shaft
   Removal / Installation ..... section M

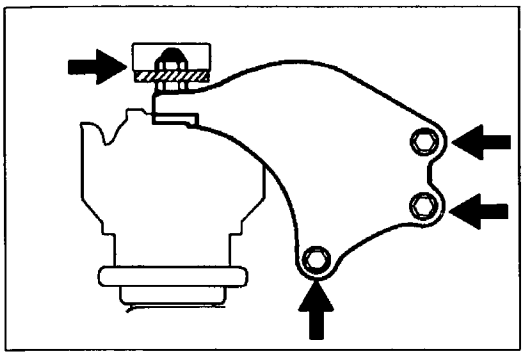
Step 4



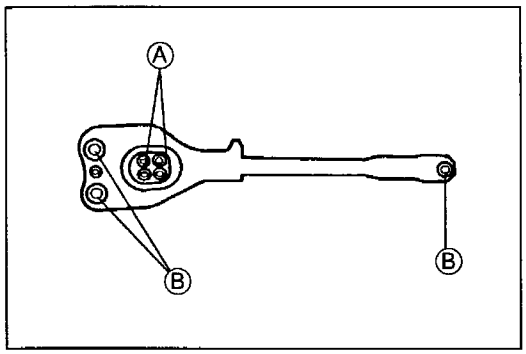
1. No.1 engine mount bracket
   - Removal Note ..... below
   - Installation Note ..... page B2–33
2. Engine mounting member
   - Removal Note ..... page B2–31
   - Installation Note ..... page B2–33
3. No.4 engine mount bracket
   - Removal Note ..... page B2–31
   - Installation Note ..... page B2–32
4. No.3 engine mount sub bracket
   - Removal Note ..... page B2–31
   - Installation Note ..... page B2–32
5. Engine and transaxle assembly
   - Removal Note ..... page B2–32
   - Installation Note ..... page B2–32



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

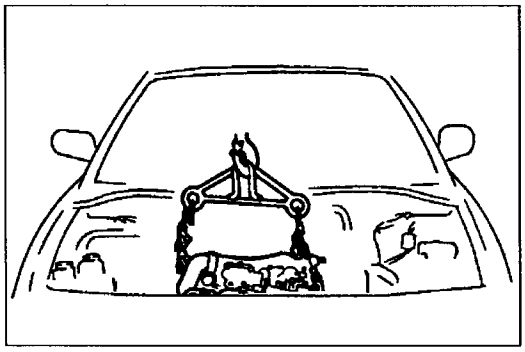


2. Remove the No.1 engine mount bracket.



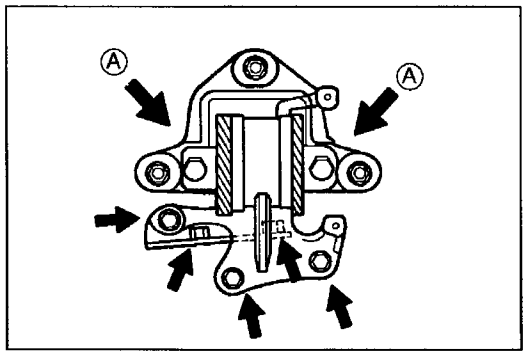
Engine mounting member

1. Remove No.2 engine mount nuts Ⓐ.
2. Remove engine mounting member bolts Ⓑ.
3. Remove the engine mounting member.



No.4 engine mount bracket

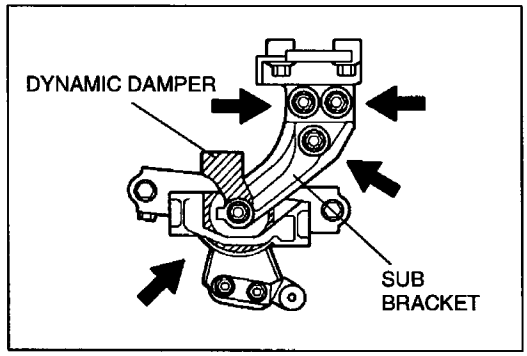
1. Remove the engine and transaxle assembly from the **SST** (support, engine) and securely support it with the chain block.
2. Slightly lift up the engine and transaxle assembly until No.3 and No.4 engine mounts are free from the engine weight.



Caution

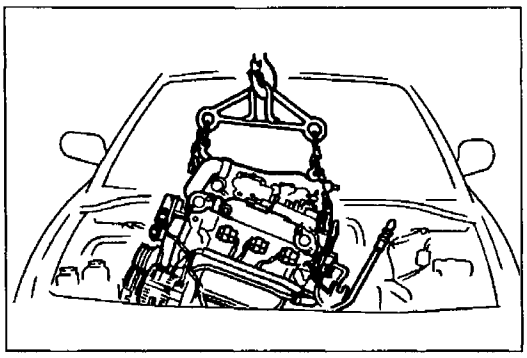
- **Engine load can damage the No.4 engine mount bolt Ⓐ holes when removing the bolts.**

3. Remove the No.4 engine mount bracket.



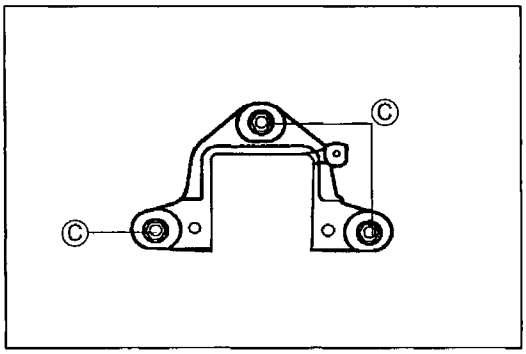
No.3 engine mount sub bracket

1. Remove the No.3 engine mount sub bracket nuts.
2. Remove the No.3 engine mount sub bracket.



Engine and transaxle assembly

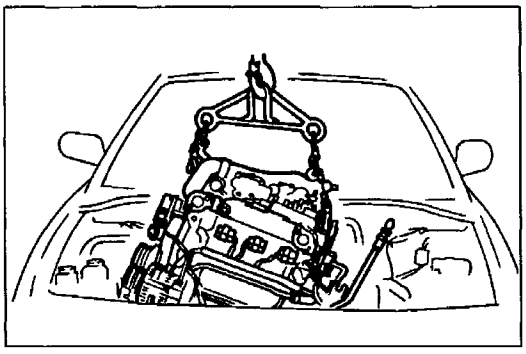
Slowly lift up the engine and transaxle assembly as a unit. Keep the engine from swinging or bumping into components it the engine compartment.



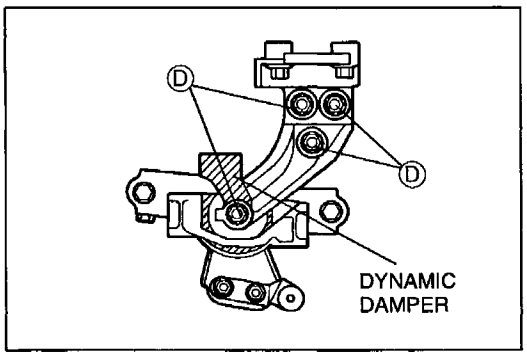
Installation Note

Engine and transaxle assembly

1. Loosen No.4 engine mount bracket nuts Ⓒ.
2. Hand tighten No.4 engine mount bracket nuts Ⓒ.

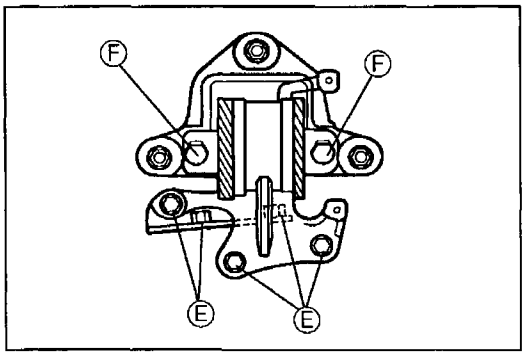


3. Slowly lower the engine and transaxle assembly as a unit. Keep the engine from swinging or bumping into components it the engine compartment.



No.3 engine mount sub bracket

1. Install the No.3 engine mount sub bracket.
2. Hand tighten No.3 engine mount sub bracket nuts Ⓓ.



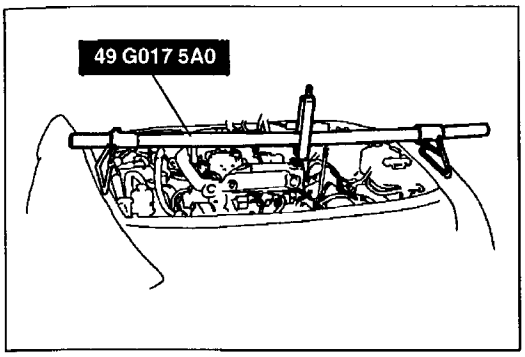
No.4 engine mount bracket

1. Install the No.4 engine mount bracket.

Tightening torque

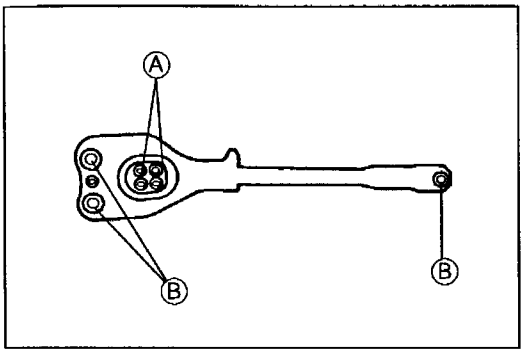
Ⓔ: 44—60 N·m {4.4—6.2 kgf·m, 32—44 ft·lbf}

2. Hand tighten No.4 engine mount bracket bolts Ⓕ.



Engine mounting member

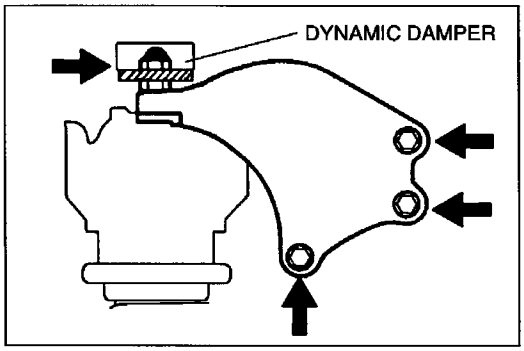
1. Remove the engine and transaxle assembly from the chain block and securely support it with the **SST** (Support, engine).



2. Install engine mounting member bolts Ⓑ.

   Tightening torque
   Ⓑ: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

3. Hand tighten No.2 engine mount nuts Ⓐ.

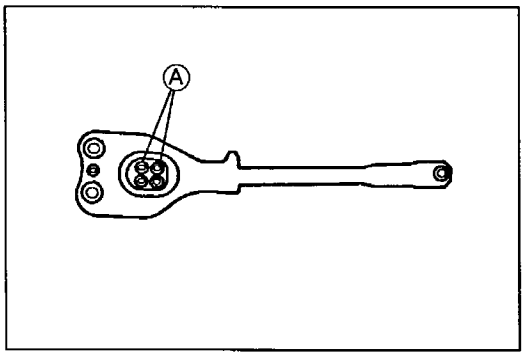


No.1 engine mount bracket

1. Install the No.1 engine mount bracket.

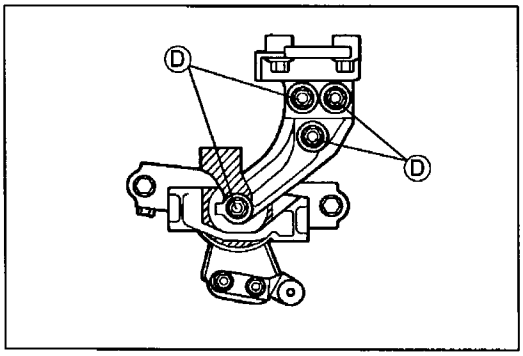
   Tightening torque:
   75—104 N·m {7.6—10.7 kgf·m, 55—77.3 ft·lbf}

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



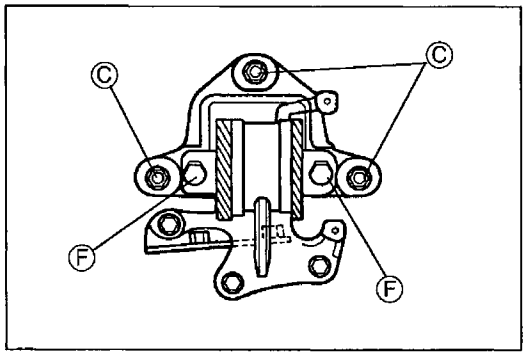
3. Tighten No.2 engine mount nuts Ⓐ.

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



4. Tighten No.3 engine mount sub bracket nuts Ⓓ.

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



5. Tighten No.4 engine mount nuts Ⓒ and bolts Ⓕ.

Tightening torque
Ⓒ, Ⓕ: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

Steps After Installation
1. Fill the engine with the specified amount and type of engine oil. (Refer to section D.)
2. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to section E.)
3. Fill the automatic transaxle with the specified amount and type of ATF. (Refer to section K2.)
4. Install the hood and front wheels.
5. Start the engine and
   (1) check the engine oil, ATF, and engine coolant leakage.
   (2) check the ignition timing and idle speed. (Refer to section F2.)
   (3) check the operation of emission control system. (Refer to section F2.)
6. Turn off the engine and check the drive belt. (Refer to page B2–2.)
7. Perform a road test.
8. Recheck the engine oil, ATF, and engine coolant levels.

Before beginning any service procedure, refer to section T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

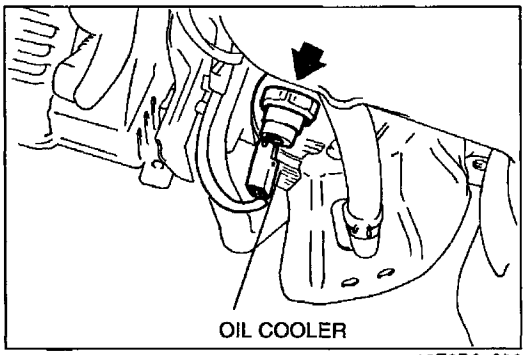
LUBRICATION SYSTEM

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 COOLER D–5
PREPARATION D–5
REMOVAL / INSTALLATION D–5
OIL PAN D–6
REMOVAL / INSTALLATION D–6

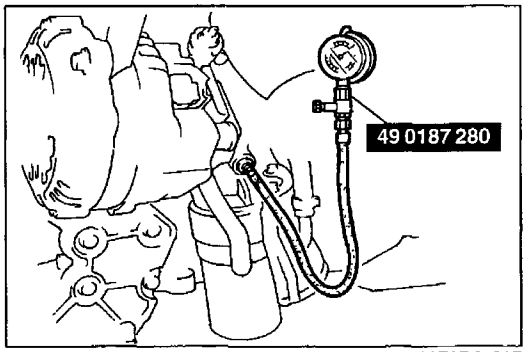
OIL PRESSURE

PREPARATION
SST

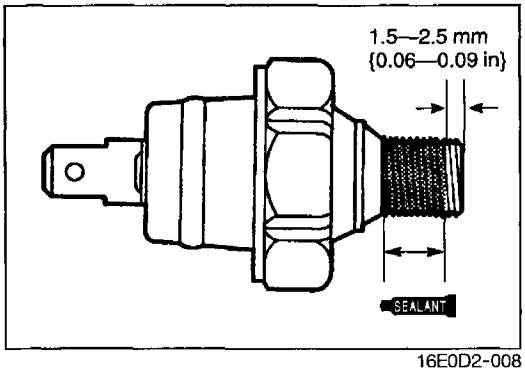
49 0187 280 Gauge, oil pressure		For inspection of oil pressure



16E0D2-006



16E0D2-007



16E0D2-008

INSPECTION

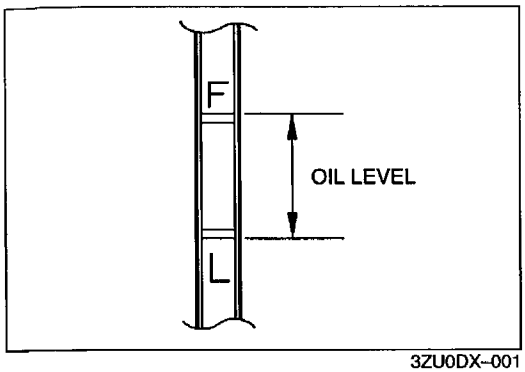
1. Remove the oil pressure switch.
2. Screw the **SST** into the oil pressure switch installation hole.
3. Warm up the engine to normal operating temperature.
4. Run the engine at the specified speed, and note the gauge readings.

Oil pressure
KL: 340—490 kPa
{3.4—5.0 kgf/cm^2, 49—71 psi}—3000rpm
KJ: 310—460 kPa
{3.1—4.7 kgf/cm^2, 44—66 psi}—3000rpm

5. If the pressure is not as specified, check for the cause and repair 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.



3ZU0DX–001

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

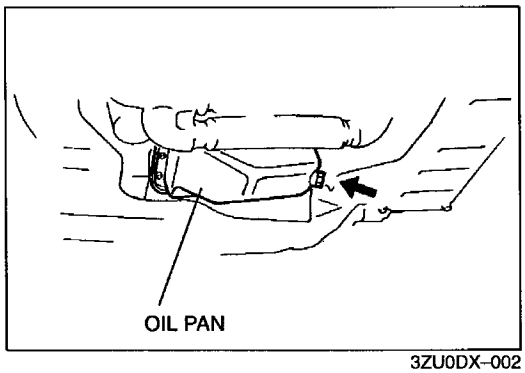
- The distance between the L and F marks on the dipstick represents 1.0 L {1.1 US qt, 0.9 Imp qt} (KL), 0.9L {1.0 US qt, 0.8 Imp qt} (KJ).

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.**

3ZE0DX–004



3ZU0DX–002

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.

Oil capacity L {US qt, Imp qt}

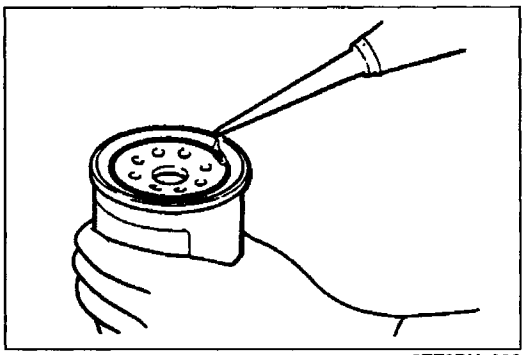
	KL	KJ
Total (dry engine)	4.9 {5.2, 4.3}	
Oil replacement	3.7 {3.9, 3.3}	3.8 {4.0, 3.3}
Oil and oil filter replacement	4.0 {4.2, 3.5}	4.1 {4.3, 3.6}

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.

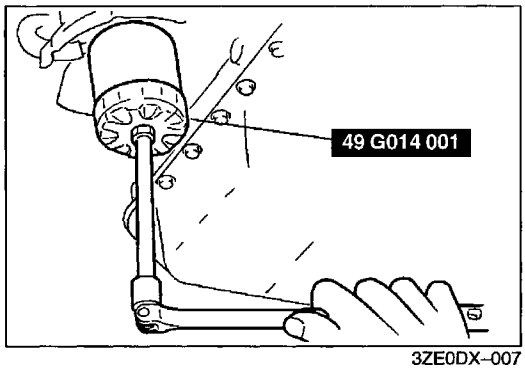
OIL FILTER

PREPARATION
SST

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



3ZE0DX-006



3ZE0DX-007

REPLACEMENT

1. Remove the oil filter with the **SST**.
2. Use a clean rag to wipe off the mounting surface on the oil cooler.
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 oil cooler.
5. Tighten the oil filter 1 and 1/6 turns with the **SST**.

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

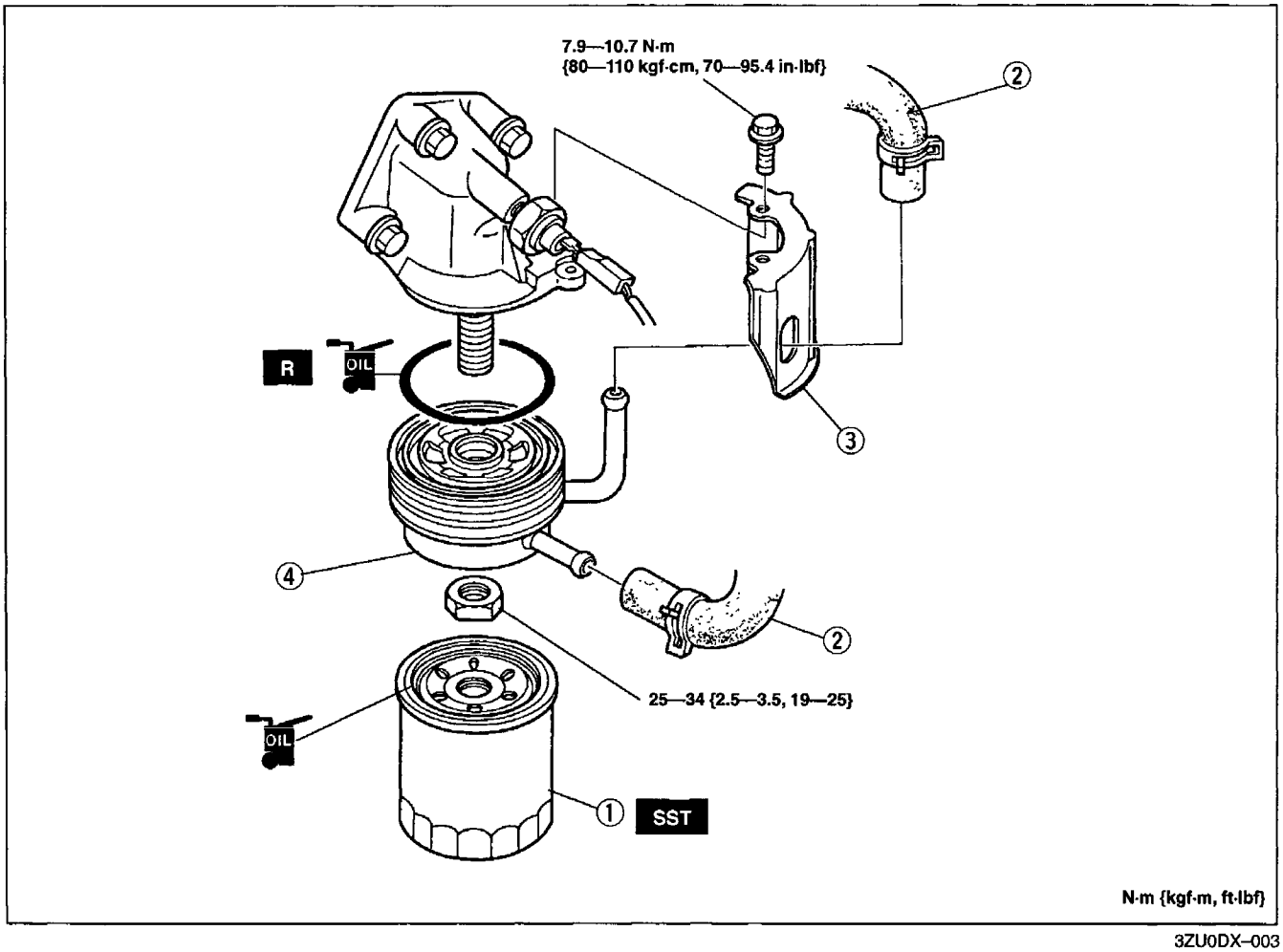
6. Start the engine and check for oil leaks.
7. Check the oil level and add oil if necessary.

OIL COOLER

PREPARATION
SST

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

REMOVAL / INSTALLATION
1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to section E.)
3. Remove the splash shield (RH).
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal.



3ZU0DX-003

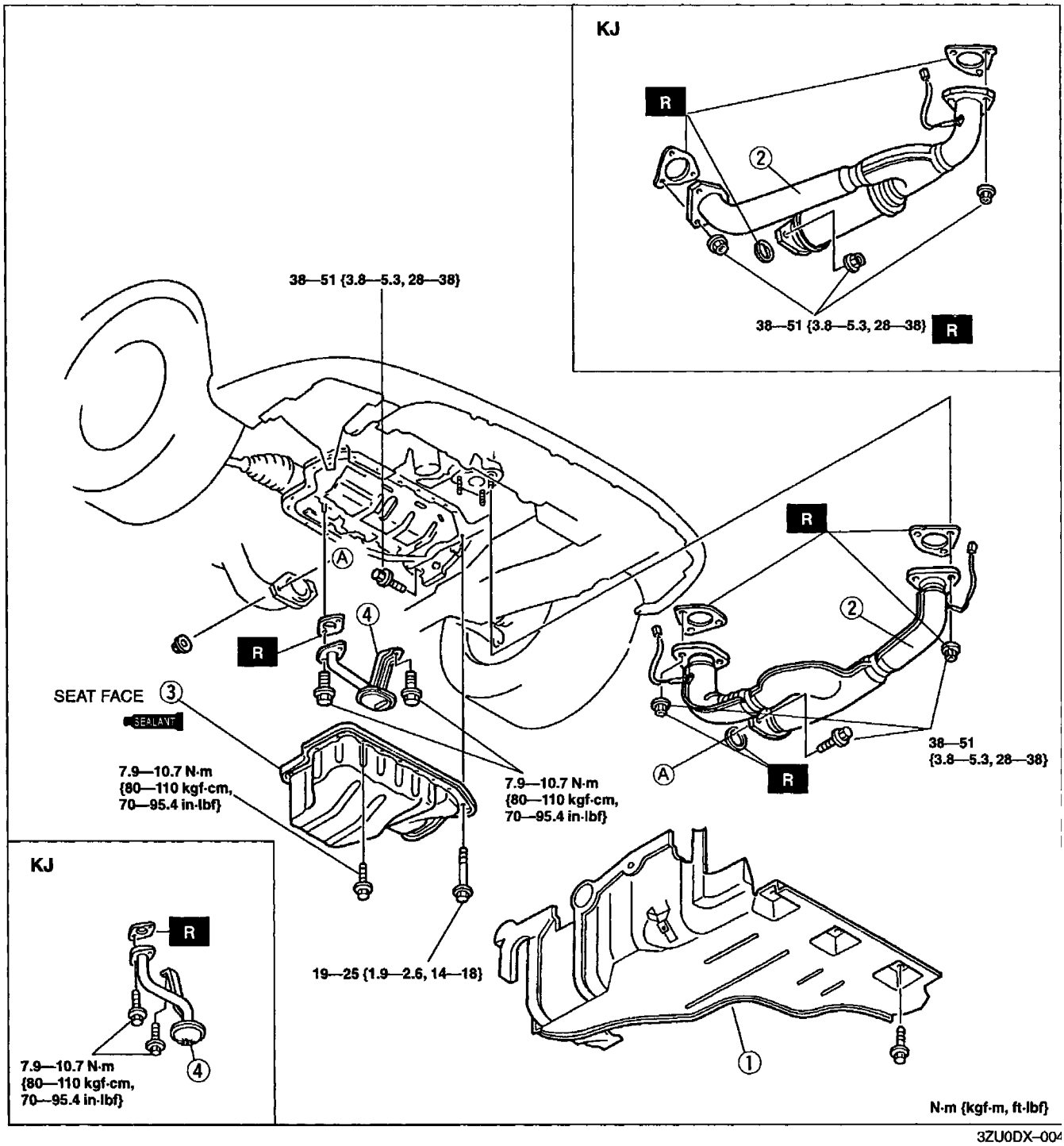
1. Oil filter
   Replacement ..... page D–4
2. Oil cooler hose
3. Insulator
4. Oil cooler

Steps After Installation
1. Install the splash shield (RH).
2. Fill with the specified amount and type of engine coolant. (Refer to section E.)
3. Start the engine and check for oil and coolant leaks.

OIL PAN

REMOVAL / INSTALLATION

1. Disconnect the negative battery cable.
2. Drain the engine oil. (Refer to page D–3.)
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**.



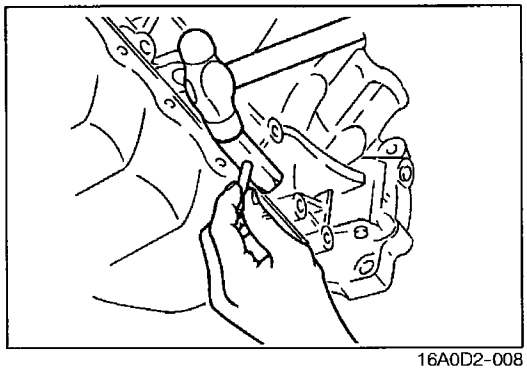
3ZU0DX-004

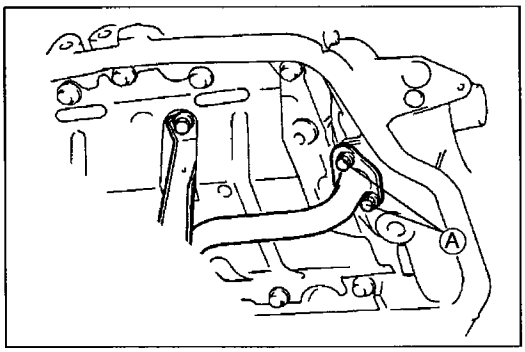
1. Splash shield (RH)
2. Front pipe
3. Oil pan
   - Removal Note ..... page D–7
   - Installation Note ..... page D–7
4. Oil strainer
   - Installation Note ..... page D–7

Removal Note
Oil pan
1. Remove the oil pan mounting bolts.

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

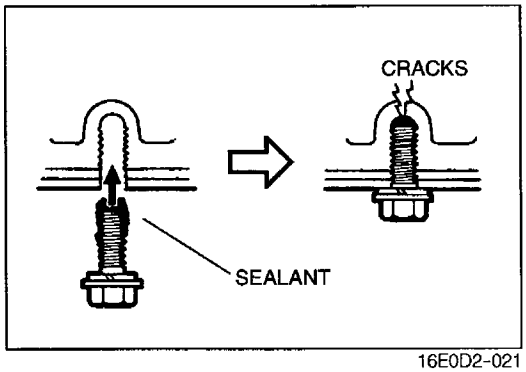
2. Insert a screwdriver or a seal cutter between the cylinder block and the oil pan to separate them.
3. Remove the oil pan.


16A0D2-008



Installation Note
Oil strainer
1. Install a new gasket and the oil strainer onto the oil pump body.
2. Tighten bolts Ⓐ first.

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



16E0D2-021

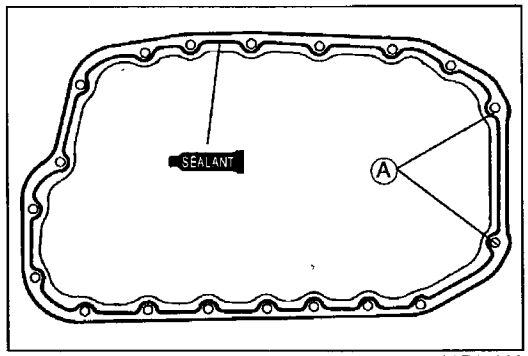
Oil pan

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 oil pan flange as shown.
2. Install the oil pan within five minutes of applying the sealant.

Thickness: ϕ2.0—3.0 mm {0.079—0.118 in}

Tightening torque
Ⓐ: 19—25 N·m {1.9—2.6 kgf·m, 14—18 ft·lbf}
7.9—10.7 N·m {80—110 kgf·cm, 70—95.4 in·lbf}



16A0D2-009

Steps After Installation
1. Fill with the specified amount and type of engine oil. (Refer to page D–3.)
2. Start the engine and check for oil leaks.
3. Check the oil level and add oil if necessary.

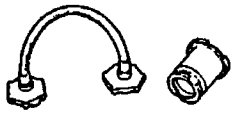
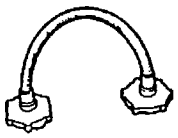
Before beginning any service procedure, refer to section T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

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– 8
REMOVAL / INSPECTION / INSTALLATION .... E– 8
INSPECTION ..... E– 9
WATER PUMP E–11
REMOVAL / INSTALLATION E–11
COOLING FAN MOTOR E–12
INSPECTION E–12
REPLACEMENT E–13

ENGINE COOLANT

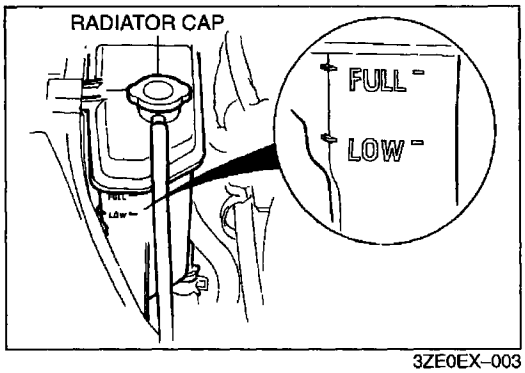
PREPARATION
SST

49 9200 145 Adapter set, radiator cap tester 	For inspection of cooling system	49 9200 146 Adapter A (Part of 49 9200 145) 	For inspection of cooling system
49 9200 147 Adapter B (Part of 49 9200 145) 	For inspection of cooling system	—	—

INSPECTION

Warning

- **Removing the radiator cap or the coolant filler cap 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 can 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.**



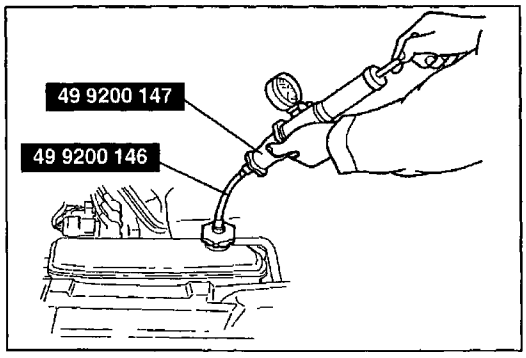
3ZE0EX-003

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 0.4 L {0.4 US qt, 0.4 Imp qt}.



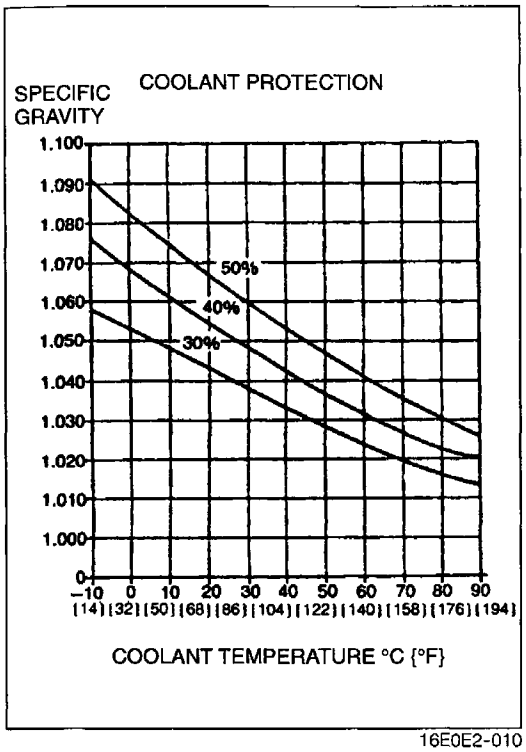
Coolant Leakage

1. Remove the radiator cap.
2. Connect a radiator tester and the **SST** to the radiator reservoir filler neck.
3. Apply **123 kPa {1.25 kgf/cm^2, 17.8 psi}** pressure to the system.

Caution

- **Applying more than 123 kPa {1.25 kgf/cm^2, 17.8 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.



16E0E2-010

Coolant Protection

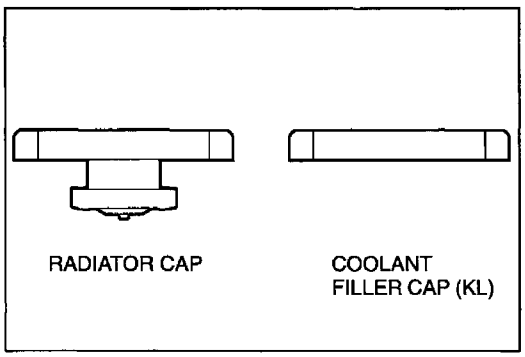
Caution

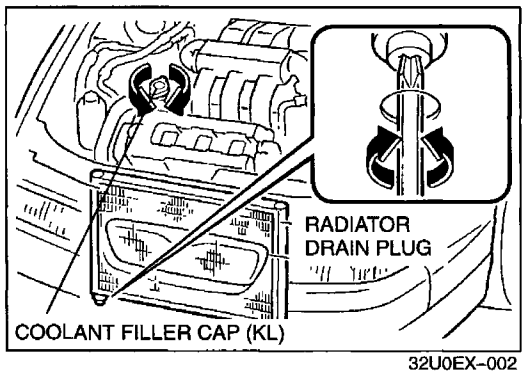
- **The engine has aluminum parts that can be damaged by alcohol or methanol antifreeze. Do not use alcohol or methanol in the cooling system. Use only ethylene-glycol-based coolant.**
- **Use only soft (demineralized) water in the coolant mixture. Water that contains minerals will cut down on the coolant's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





32U0EX-002

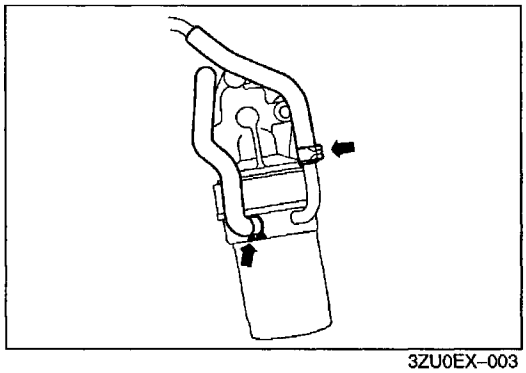
REPLACEMENT

Draining

Warning

- **Removing the radiator cap or the coolant filler cap 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 can 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 coolant filler cap (KL) and radiator cap and loosen the radiator drain plug.
2. Drain the coolant into a container.


3ZU0EX-003

3. Disconnect the oil cooler hoses.
4. Drain the coolant into a container.
5. Flush the cooling system with water until all traces of color are gone.
6. Let the system drain completely.
7. Connect the oil cooler hoses.
8. Tighten the radiator drain plug.

Tightening torque:
0.7—1.1 N·m {7—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. (KL)

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 coolant filler cap (KL) and 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 1–3.
6. Run the engine at 2200—2800 rpm for five minutes; repeat several times.
7. Stop the engine and allow it to cool.

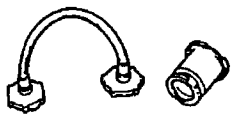
Warning

- **Removing the radiator cap or the coolant filler cap 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 can 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. Remove the coolant filler cap (KL) and check the coolant level. If the coolant level has dropped, repeat the procedure from step 1.

RADIATOR CAP

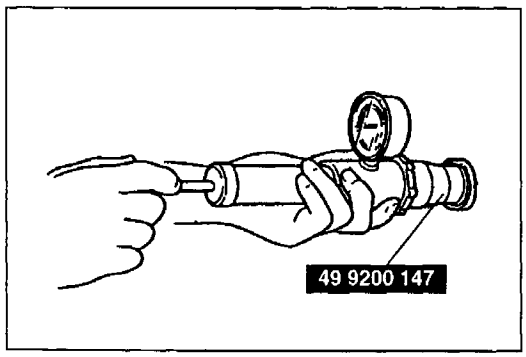
PREPARATION
SST

49 9200 145 Adapter set, radiator cap tester 	For inspection of radiator cap valve	49 9200 147 Adapter B (Part of 49 9200 145) 	For inspection of radiator cap valve

E

Warning

- **Removing the radiator cap or the coolant filler cap 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 can 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

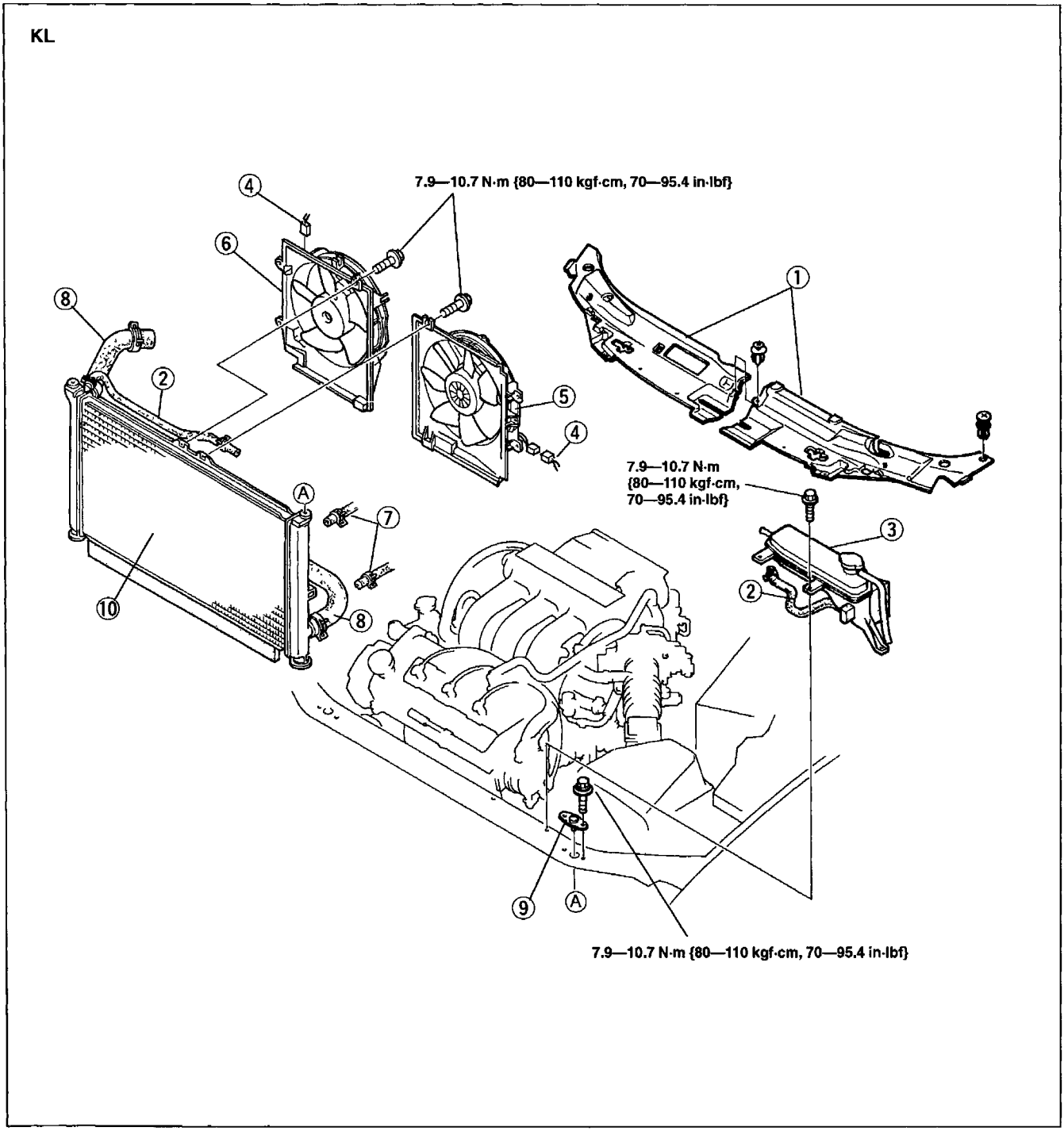
1. Remove the radiator cap.
2. Attach the radiator cap to a radiator cap tester with the **SST**. Apply pressure gradually to **93.2—122 kPa {0.95–1.25 kgf/cm^2, 13.5—17.7 psi}**.
3. Verify that the pressure is held for at least **10 seconds**.

RADIATOR

REMOVAL / INSTALLATION

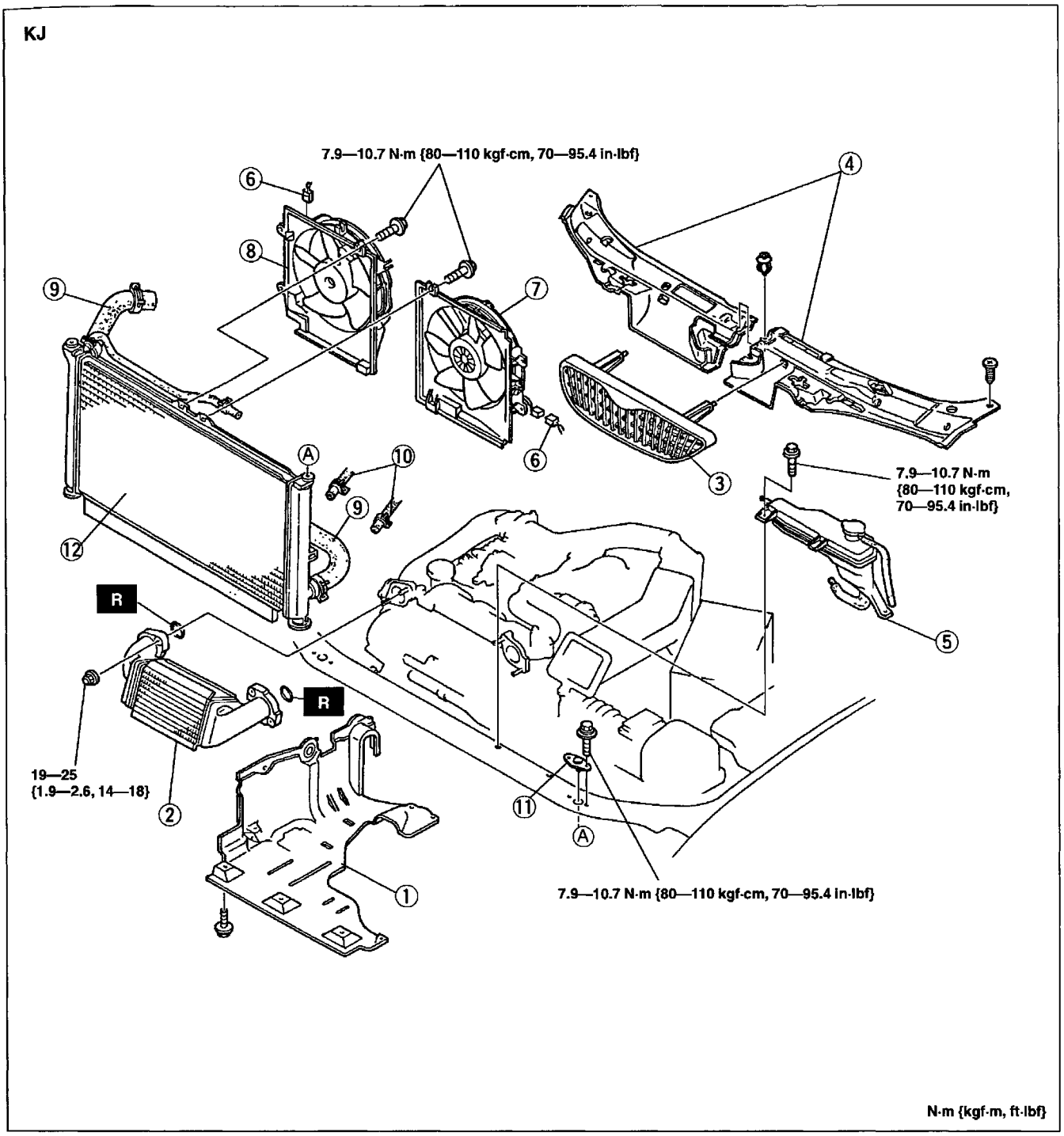
1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to page E–3.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.

KL



3ZU0EX–004

1. Upper seal board
2. Radiator reservoir hose
3. Radiator reservoir
4. Fan motor connecter
5. Cooling fan assembly
6. Condenser fan assembly
7. Oil cooler hose
8. Radiator hose
9. Radiator bracket
10. Radiator



3ZU0EX–005

1. Splash shield (RH)
2. Charge air cooler
3. Radiator grille
4. Upper seal board
5. Radiator reservoir
6. Fan motor connector
7. Cooling fan assembly
8. Condenser fan assembly
9. Radiator hose
10. Oil cooler hose
11. Radiator bracket
12. Radiator

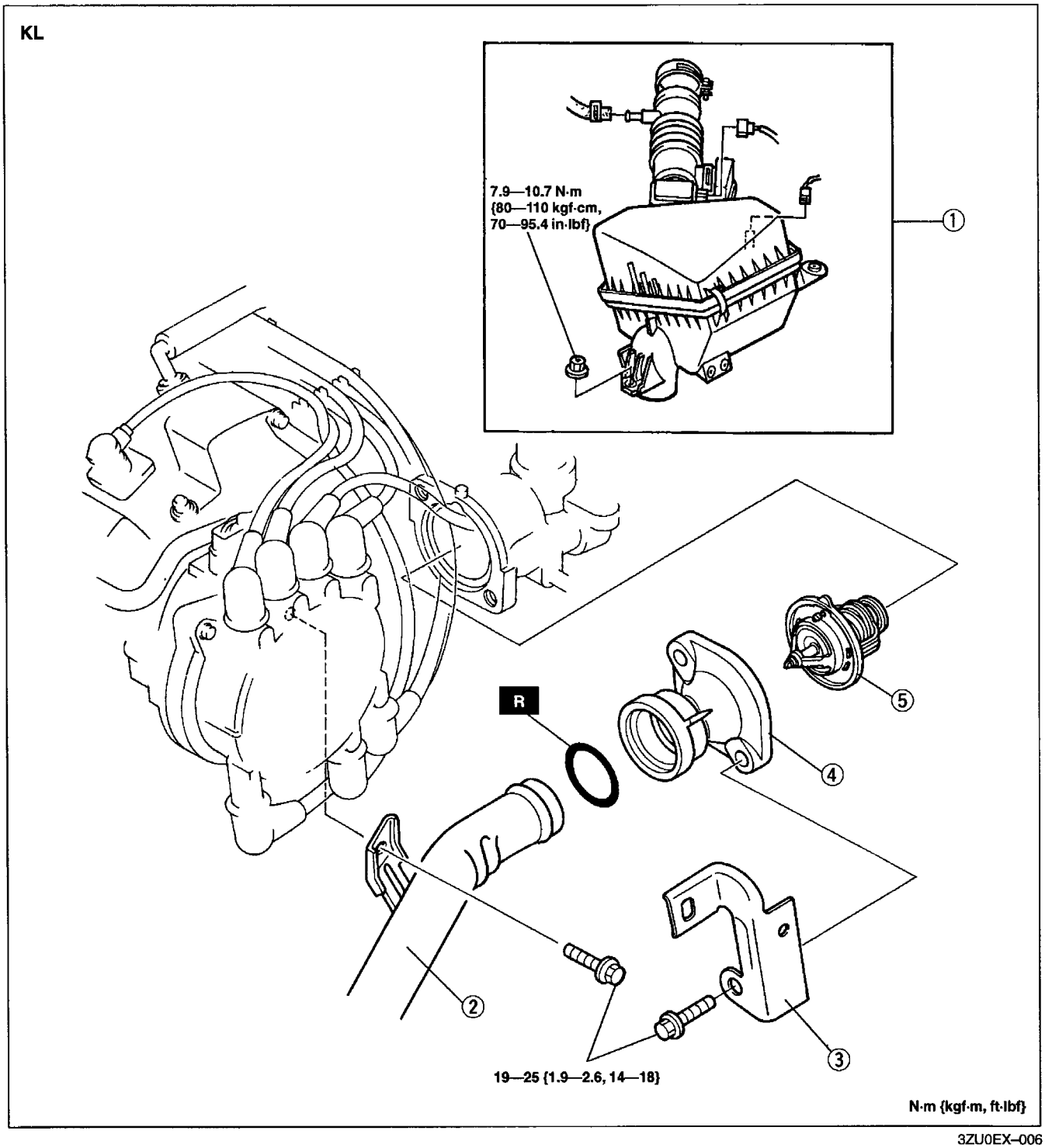
Steps After Installation

1. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to page E–4.)
2. Check the ATF level and add ATF if necessary. (Refer to sections K1, K2.)
3. Check the ATF and coolant leaks.

THERMOSTAT

REMOVAL / INSPECTION / INSTALLATION

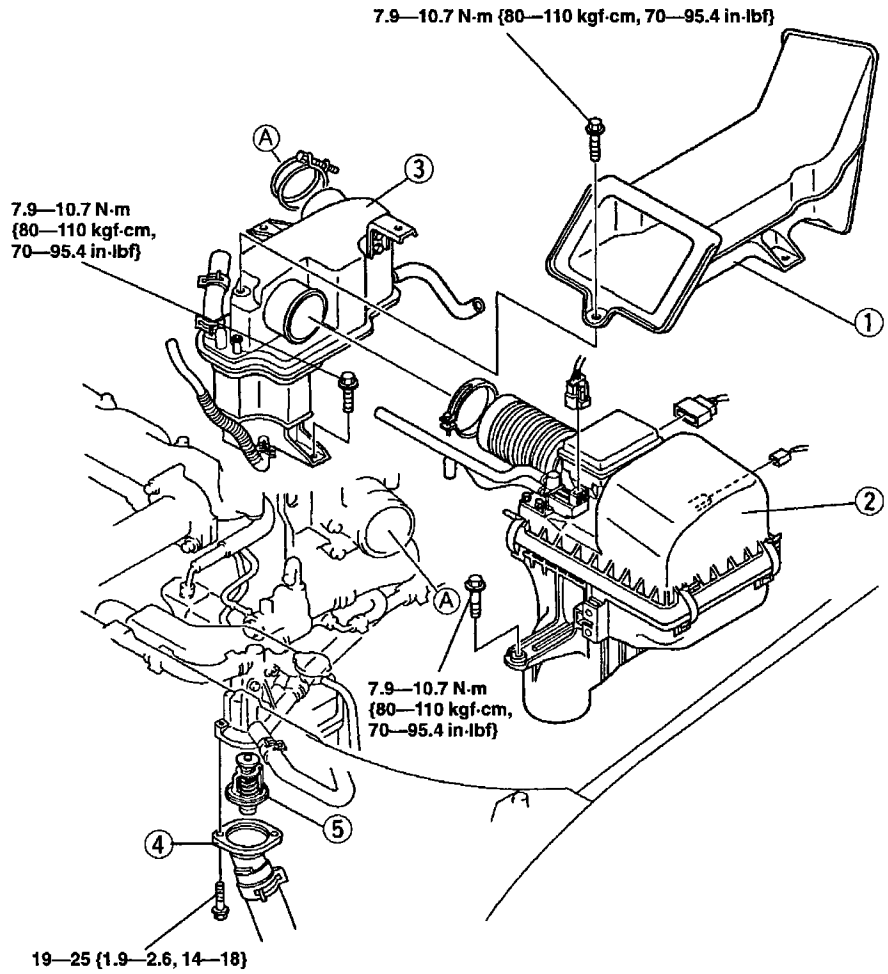
1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to page E–3.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal, referring to **Installation Note**.



3ZU0EX–006

1. Air cleaner assembly
   Removal / Installation ..... section F1
2. Water inlet pipe
3. Engine harness bracket
4. Thermostat cover
5. Thermostat
   Inspection ..... page E– 9
   Installation Note ..... page E–10

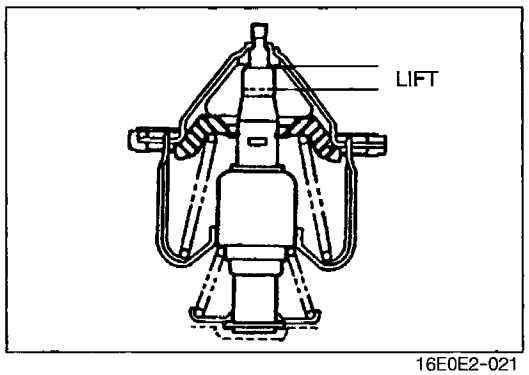
KJ



N·m {kgf·m, ft·lbf}

3ZU0EX–007

1. Charge air cooler air duct
2. Air cleaner assembly
   Removal / Installation ..... section F2
3. Resonator
4. Thermostat cover
5. Thermostat
   Inspection ..... page E– 9
   Installation Note ..... page E–10

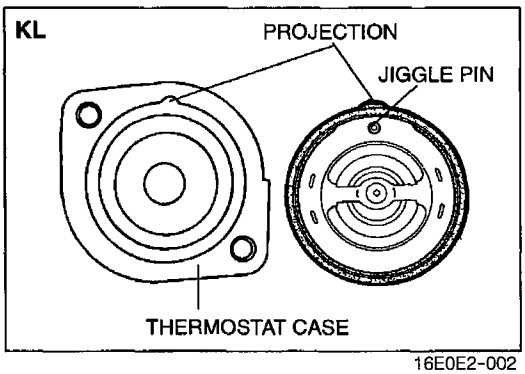


16E0E2-021

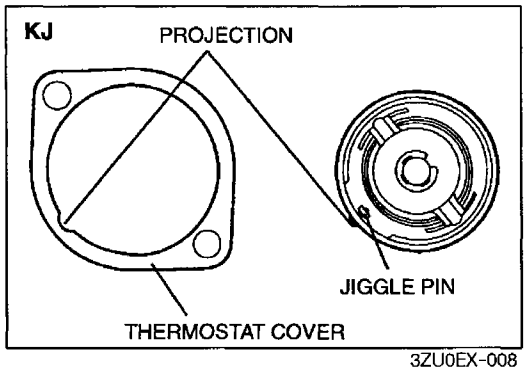
INSPECTION

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

Initial-opening temperature: 80—84°C {176—183°F}
Full-open temperature: 95°C {203°F}
Full-open lift: 8.5 mm {0.33 in} min.



16E0E2-002



3ZU0EX-008

Installation Note

Thermostat (KL)

Install the thermostat into the thermostat case with the jiggle pin and projection at the top.

Thermostat (KJ)

Install the thermostat into the thermostat cover with the jiggle pin and projection aligned.

Steps After Installation

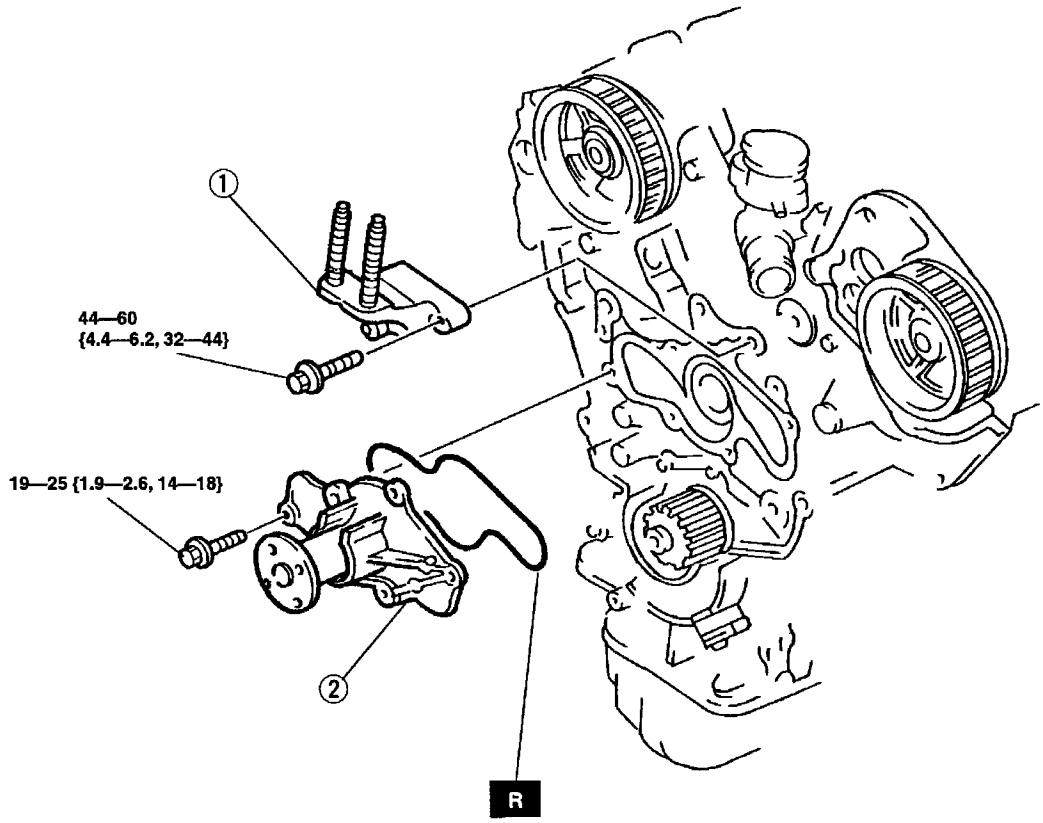
1. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to page E–4.)
2. Start the engine and check for coolant leaks.

WATER PUMP

REMOVAL / INSTALLATION

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to page E–3.)
3. Remove the timing belt. (KL: Refer to section B1.)
4. Remove in the order shown in the figure. (KL)
5. Remove the water pump together with the timing belt. (KJ: Refer to section B2.)
6. Install in the reverse order of removal.

KL



• Do not allow oil on the water pump rubber seal.

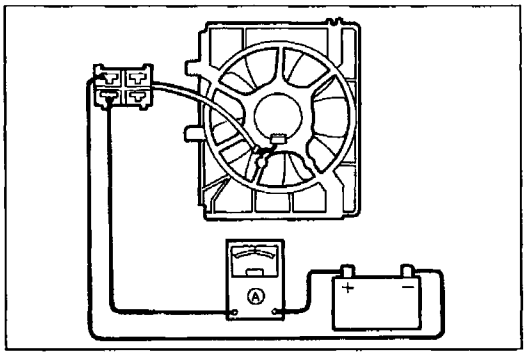
N·m {kgf·m, ft·lbf}

3ZU0EX–009

1. No.3 engine mount bracket
2. Water pump
   If the water pump is damaged, replace it. Do not repair it.

Steps After Installation

1. Install the timing belt. (Refer to sections B1, B2.)
2. Fill the radiator and radiator reservoir with the specified amount and type of engine coolant. (Refer to page E–4.)
3. Start the engine and check for coolant leaks.



COOLING FAN MOTOR

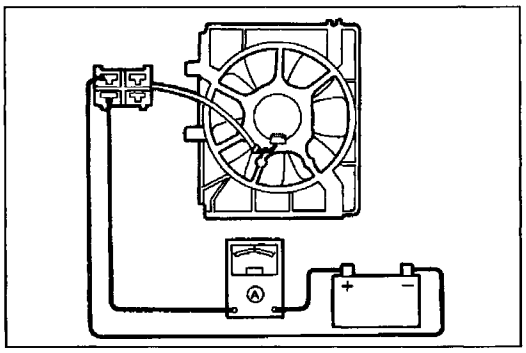
INSPECTION

Single-Speed Type (KL)

1. Verify that the battery is fully charged. (Refer to section G.)
2. Disconnect the cooling fan motor connecter.
3. Connect battery 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: 8.5—14.5A

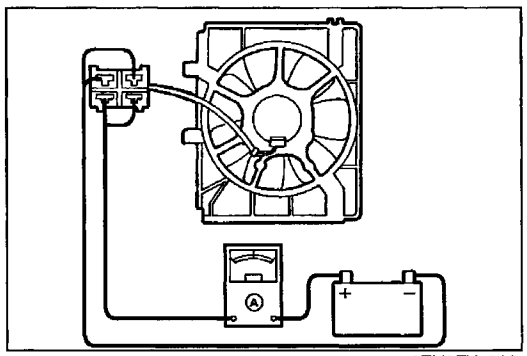
5. If not as specified, replace the cooling fan motor.



Two-Speed Type (KJ)

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 motar connector for low-speed inspection.
4. Verify that the cooling fan motor operates smoothly at the standard current draw.

   Current: 9—15A



3ZU0EX-010

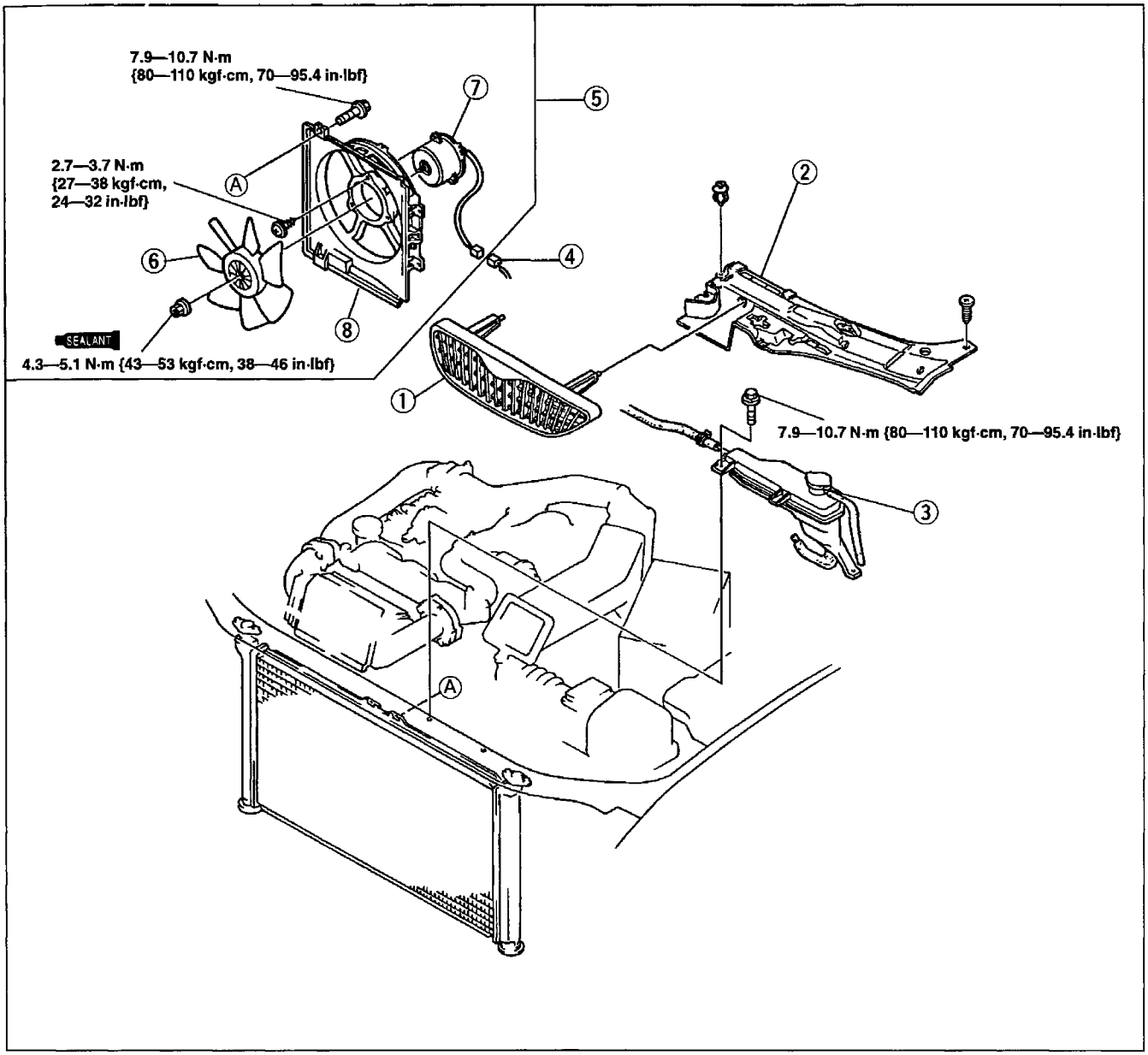
5. Connect battery positive voltage and an ammeter to the cooling fan motor connector for high-speed inspection.
6. Verify that the cooling fan motor operates smoothly at the standard current draw.

   Current: 12.3—18.3A

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

REPLACEMENT

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.



3ZU0EX-011

1. Radiator grille (KJ)
2. Upper seal board (LH)
3. Radiator reservoir
   Removal Note ..... below
4. Cooling fan motor connecter
5. Cooling fan assembly
6. Cooling fan blade
7. Cooling fan motor
8. Radiator cowling

Removal Note

Radiator reservoir

1. Remove the radiator reservoir with the hoses still connected.
2. Position the radiator reservoir away from the radiator.

Steps After Installation

1. Warm up the engine to notmal operating temperature.
2. Verify that the cooling fan motor operates smoothly.

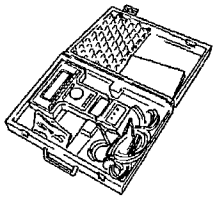
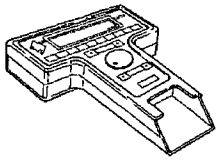
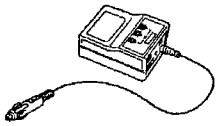
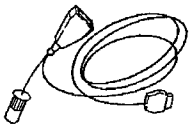
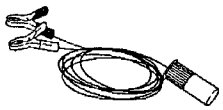
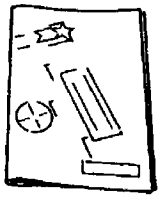
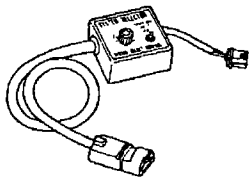
Before beginning any service procedure, refer to section T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

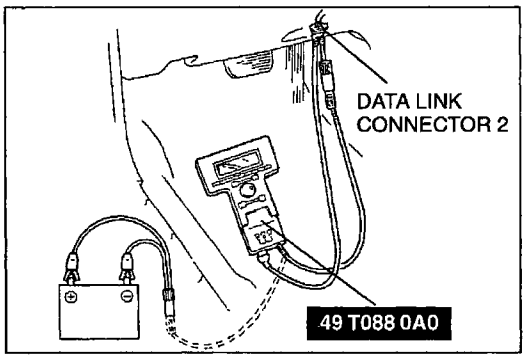
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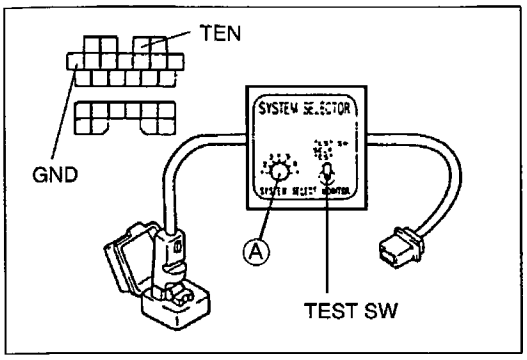
ENGINE TUNE-UP

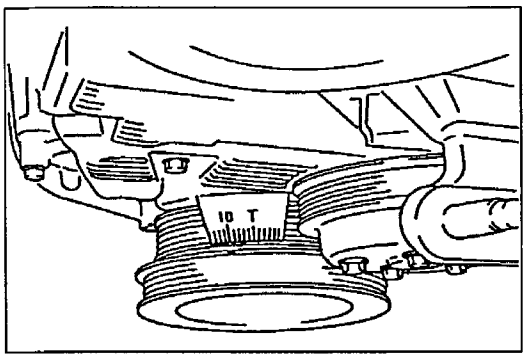
PREPARATION
SST

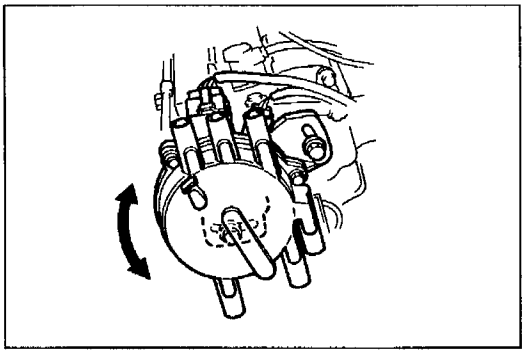
49 T088 0A0 NGS set 	For inspection of ignition timing and idle speed	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of ignition timing and idle speed
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of ignition timing and idle speed	49 T088 004 NGS OBDII Adapter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

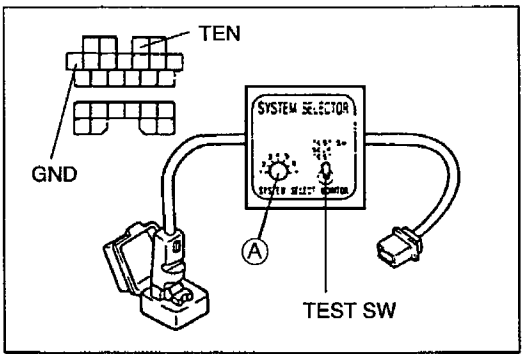


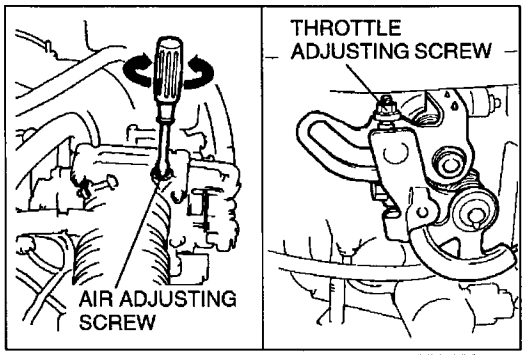
ADJUSTMENT
Preparation
1. Warm up the engine to normal operating temperature.
2. Shift the selector lever to park/neutral position.
3. Turn off all electrical loads.
   - Headlight
   - Blower motor
   - Rear window defroster
   - A/C
   - Power steering
4. Wait until the cooling fan stops.
5. Connect the **SSTs** (NGS) to the data link connector 2 and select the PID/DATA MONITOR AND RECORD function.
6. Select the "RPM" on the NGS display.











3ZE0FX–016

Ignition Timing

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

   Specification: 600—700 (650 ± 50) rpm

3. If not as specified, adjust the idle speed. (Refer to below.)
4. Connect the **SST** (system selector) to the data link connector.
5. Set switch Ⓐ to position 1.
6. Set the test switch to SELF TEST.
7. Verify that the idle speed is within the specification.

   Specification: 550—750 rpm

8. If not as specified, adjust the idle speed. (Refer to below.)
9. Connect a timing light to the high-tension lead of No.1 cylinder.
10. Verify that the ignition timing is within the specification.

    Specification: BTDC 9—11° (10 ± 1°)

11. If not as specified, loosen the distributor lock bolts and turn the distributor to make the adjustment.
12. 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}

13. Disconnect the **SST**.
14. Verify that the ignition timing is within the specification.

    Specification: BTDC 1—16°

Idle Speed

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

   Specification: 600—700 (650 ± 50) rpm

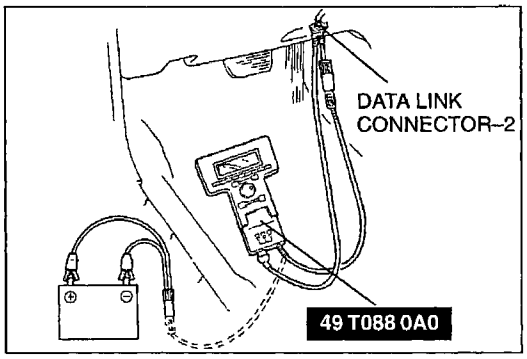
3. If not as specified, connect the **SST** (system selector) to the data link connector.
4. Set switch Ⓐ to position 1.
5. Set the test switch to SELF TEST.

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

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

   Specification: 600—700 (650 ± 50) rpm

7. Disconnect the **SST**.



Idle-up Speed

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

   Specification: 600—700 (650 ± 50) rpm

3. If not as specified, adjust the idle speed. (Refer to page F1–3.)
4. Verify that the idle speed is within the specification with the load condition.

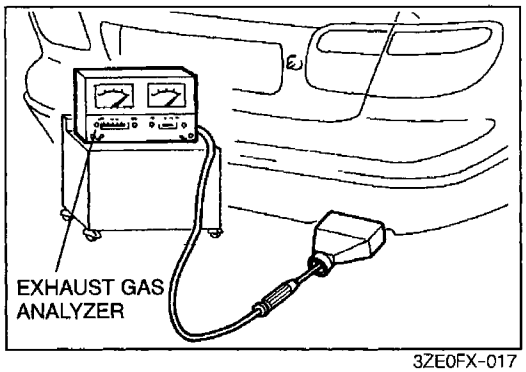
Specification

Load condition	Idle speed (rpm)*1
No load	600—700
E/L ON*2	650—750
A/C ON	775—875
P/S ON	600—700

*1: Excludes temporary idle speed drop just after the electrical loads are turned on.

*2:
- Blower motor operating at high speed
- Headlight switch turned on
- Rear window defroster switch turned on

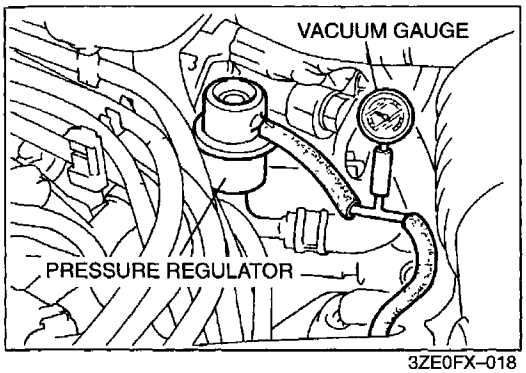
5. If not as specified with all load conditions, inspect the idle air control valve.
   If not as specified with any one of load conditions, check related input switches, harness and connectors.



3ZE0FX-017

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 F1–75.)
   - Heated oxygen sensor (Refer to page F1–45.)
   - Intake-air system (Refer to page F1–5.)
   - Fuel system (Refer to page F1–8.)
   - ESA control system (Refer to page F1–63.)
6. If the systems are normal, replace the three way catalytic converter and/or the warm up three way catalytic converter.



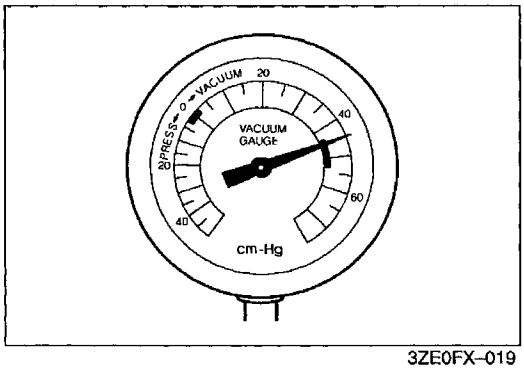
3ZE0FX–018

INTAKE-AIR SYSTEM

SYSTEM INSPECTION

1. Verify that the intake-air hoses are installed properly.
2. Disconnect the vacuum hose from the pressure regulator and connect to vacuum gauge as shown in the figure.
3. Start the engine and let it idle.
4. Measure the intake manifold vacuum by using a vacuum gauge.

Specification:
More than 60 kPa {450 mmHg, 18 inHg} (Vacuum)



3ZE0FX–019

5. If not as specified, inspect following.

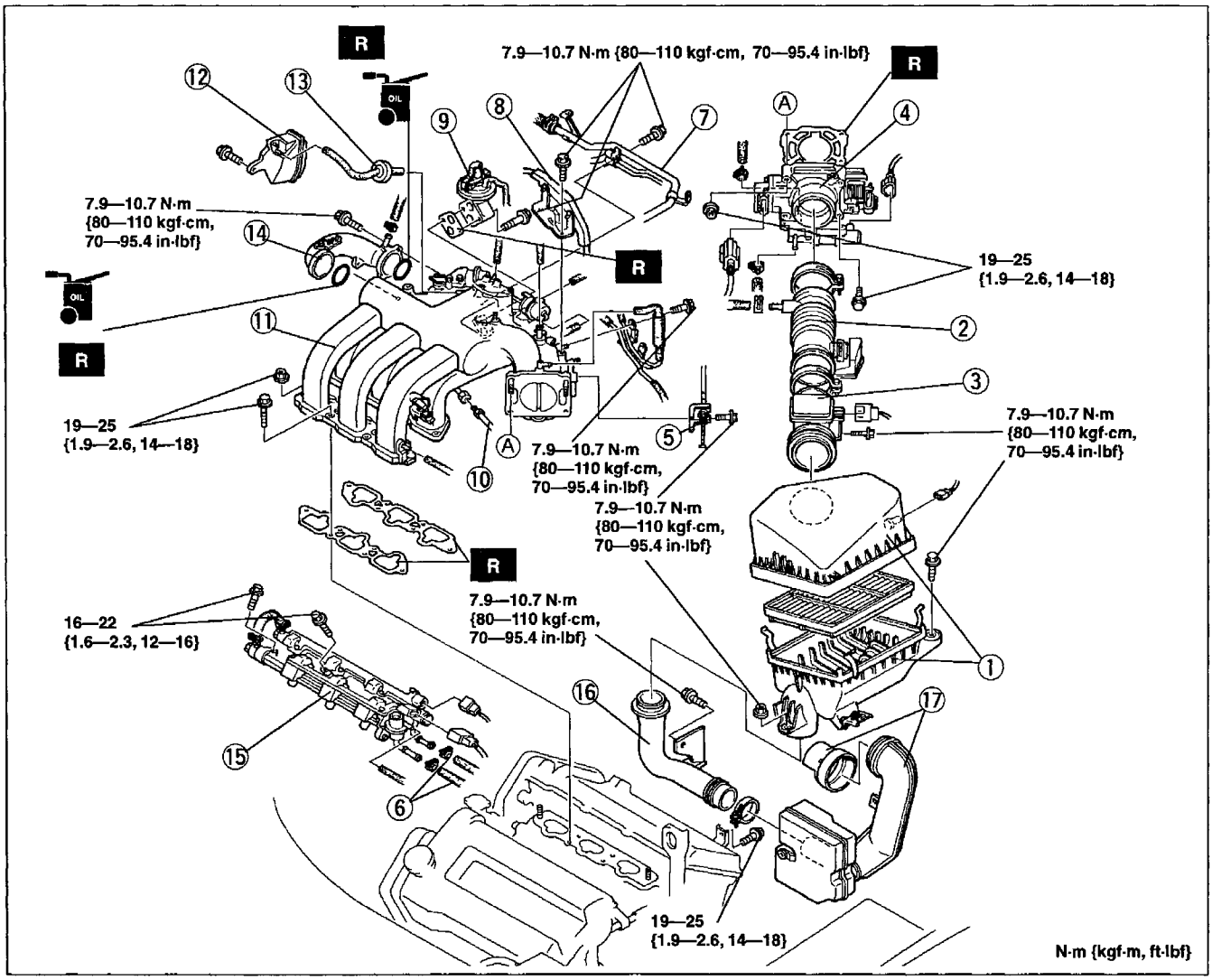
Air suction
- Throttle body
- Intake manifold
- PCV valve
- Fuel injector insulator

Accelerator cable free play (Refer to page F1–7.)
Engine compression (Refer to section B1.)

COMPONENT PARTS
Removal / Inspection / Installation

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 F1–8.**

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure, referring to **Removal note**.
3. Visually check each part for damage. Replace if necessary.
4. Install in the reverse order of removal.



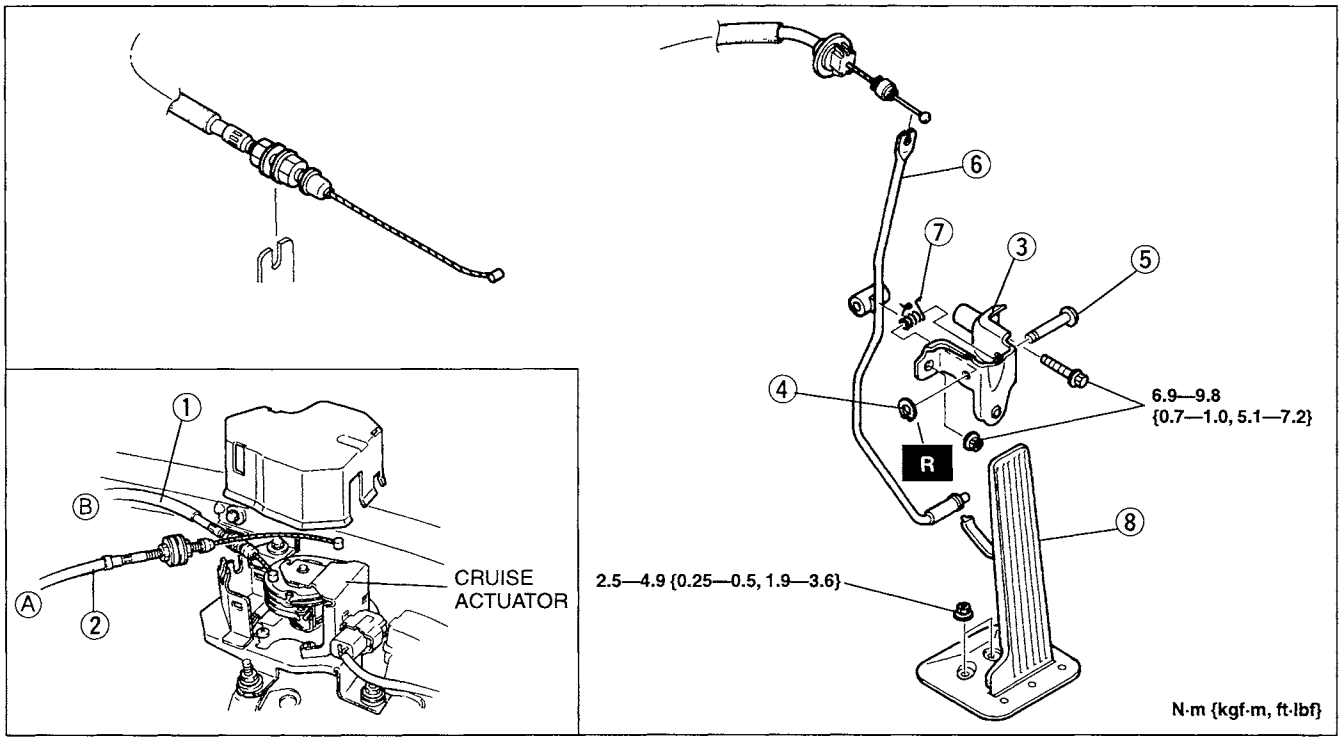
3ZE0FX–020

1. Air cleaner
2. Air intake hose
3. Mass air flow sensor
   System Inspection ..... page F1–39
4. Throttle body assembly
5. Accelerator cable
   Inspection / Adjustment ..... page F1– 7
6. Fuel pipes
7. Pipe
8. Harness
9. EGR control valve
   System inspection ..... page F1–66
10. EGR pipe
11. Intake manifold
12. Vacuum chamber
13. Check valve
    Inspection ..... page F1–56
14. Air intake pipe
15. Fuel distributor assembly
16. Air duct
17. Fresh-air duct

Removal note
Water hose
Before disconnecting the water hoses, drain the coolant from radiator. (Refer to section E.)

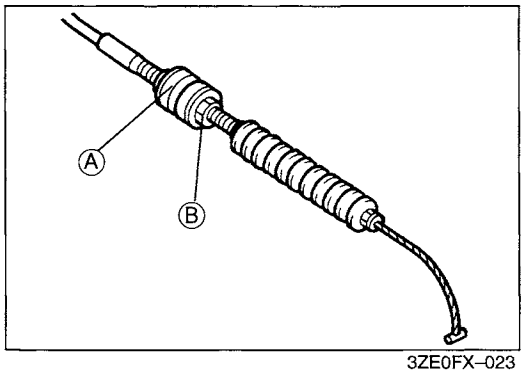
Fuel hose
Before disconnecting the fuel hoses, perform "Fuel Line Safety Procedures". (Refer to page F1–8.)

ACCELERATOR PEDAL
Removal / Inspection / Installation
1. Remove in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Install in the reverse order of removal.



3ZE0FX–022

1. Accelerator cable (throttle body)
   Inspection / Adjustment ..... below
2. Accelerator cable (accelerator pedal)
   Inspection / Adjustment ..... section T
3. Retainer
4. Clip
5. Shaft
6. Rod
7. Return spring
8. Accelerator pedal



3ZE0FX–023

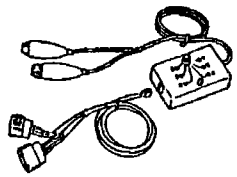
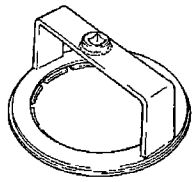
ACCELERATOR CABLE
Inspection / Adjustment
1. Verify that the throttle valve is closed throttle position.
2. Measure the free play of the accelerator cable.

   Free play: 1—3 mm {0.04—0.11 in}

3. If not as specified, adjust by turning locknut A.
4. Depress the accelerator pedal fully. Verify that the throttle valve is wide open throttle.
5. Adjust with bolt B if necessary.

FUEL SYSTEM

PREPARATION
SST

49 E018 9A0 Injector checker		For inspection of fuel injector	49 T042 001 Wrench, union		For removal and installation of fuel pump

PRECAUTION
Fuel Pressure Release and Servicing Fuel System

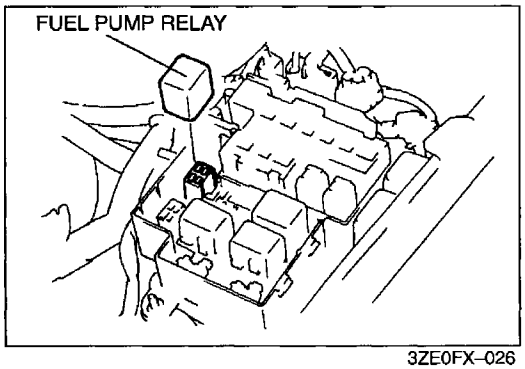
Warning

- **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

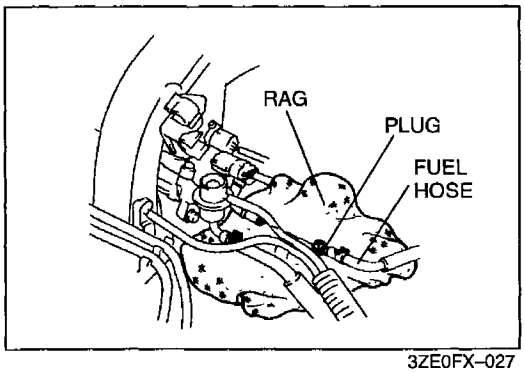
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the following "Fuel Line Safety Procedures".**



3ZE0FX–026

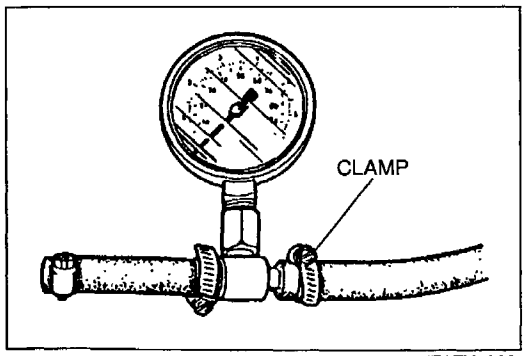
Fuel Line Safety Procedures

A. Release the fuel pressure before disconnecting a fuel line.
1. Start the engine.
2. Remove the fuel pump relay.
3. After the engine stalls, crank the engine several times.
4. Turn off the ignition switch.
5. Install the fuel pump relay.



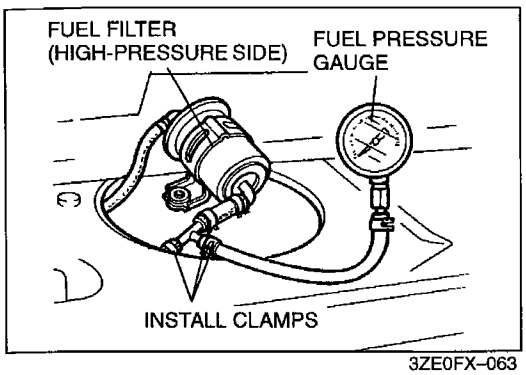
3ZE0FX–027

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.

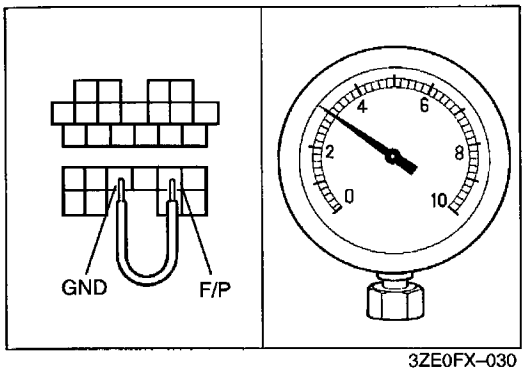


3ZE0FX–028

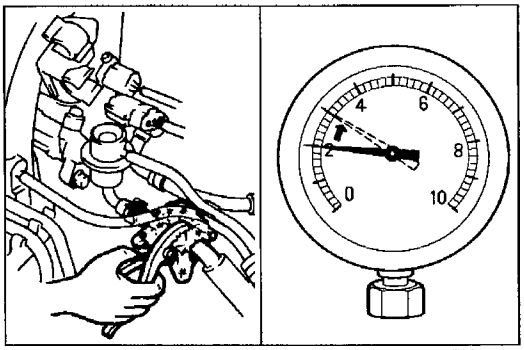
C. Install hose clamps to secure the fuel pressure gauge to fuel filter and the main hose.



3ZE0FX-063



3ZE0FX-030



3ZE0FX-031

SYSTEM INSPECTION
Fuel Line Pressure Inspection

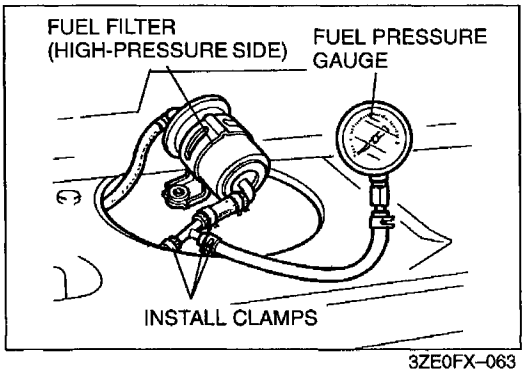
Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F1–8.**

F1

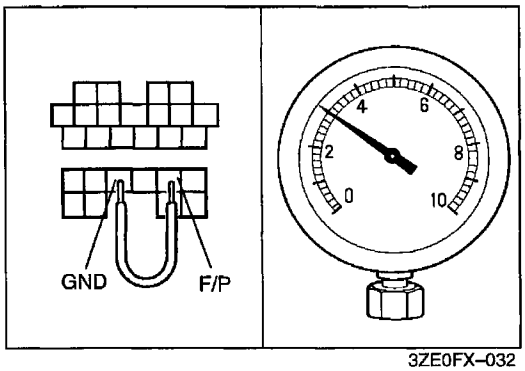
1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge between the fuel filter (high-pressure side) and fuel distributor.
3. Connect the negative battery cable.
4. Connect the data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON and measure the fuel line pressure.

   Specification:
   270—310 kPa {2.7—3.2 kgf/cm^2, 39—45 psi}

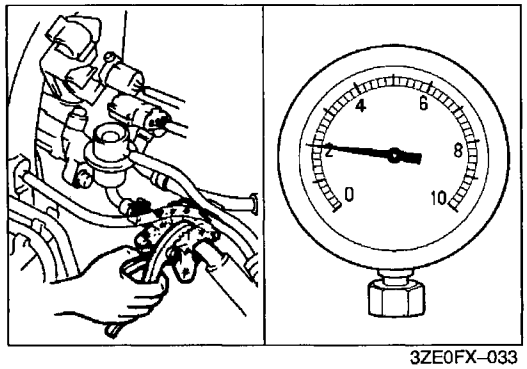
6. Turn off the ignition switch and disconnect the jumper wire.
7. If the pressure is higher than specified, check the fuel pump maximum pressure. (Refer to page F1–14.)
   If normal, check the pressure regulator or fuel return hose for clogs.
8. If the pressure is lower than specified, measure the fuel line pressure with pinching the return hose.
   - If the fuel line pressure quickly increases, check the pressure regulator. (Refer to page F1–22.)
   - If the fuel line pressure gradually increases, check the fuel pump maximum pressure. (Refer to page F1–14.)
     If the pressure is normal, check the clogging between fuel pump and pressure regulator.



3ZE0FX-063



3ZE0FX-032



3ZE0FX-033

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 F1–8.**

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 the 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 a 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 F1–18.)
   - If the fuel line pressure dose not hold, check the fuel pump hold pressure. (Refer to page F1–15.)

   If the fuel pump hold pressure is normal, check the fuel leaks from fuel line and fuel injector.

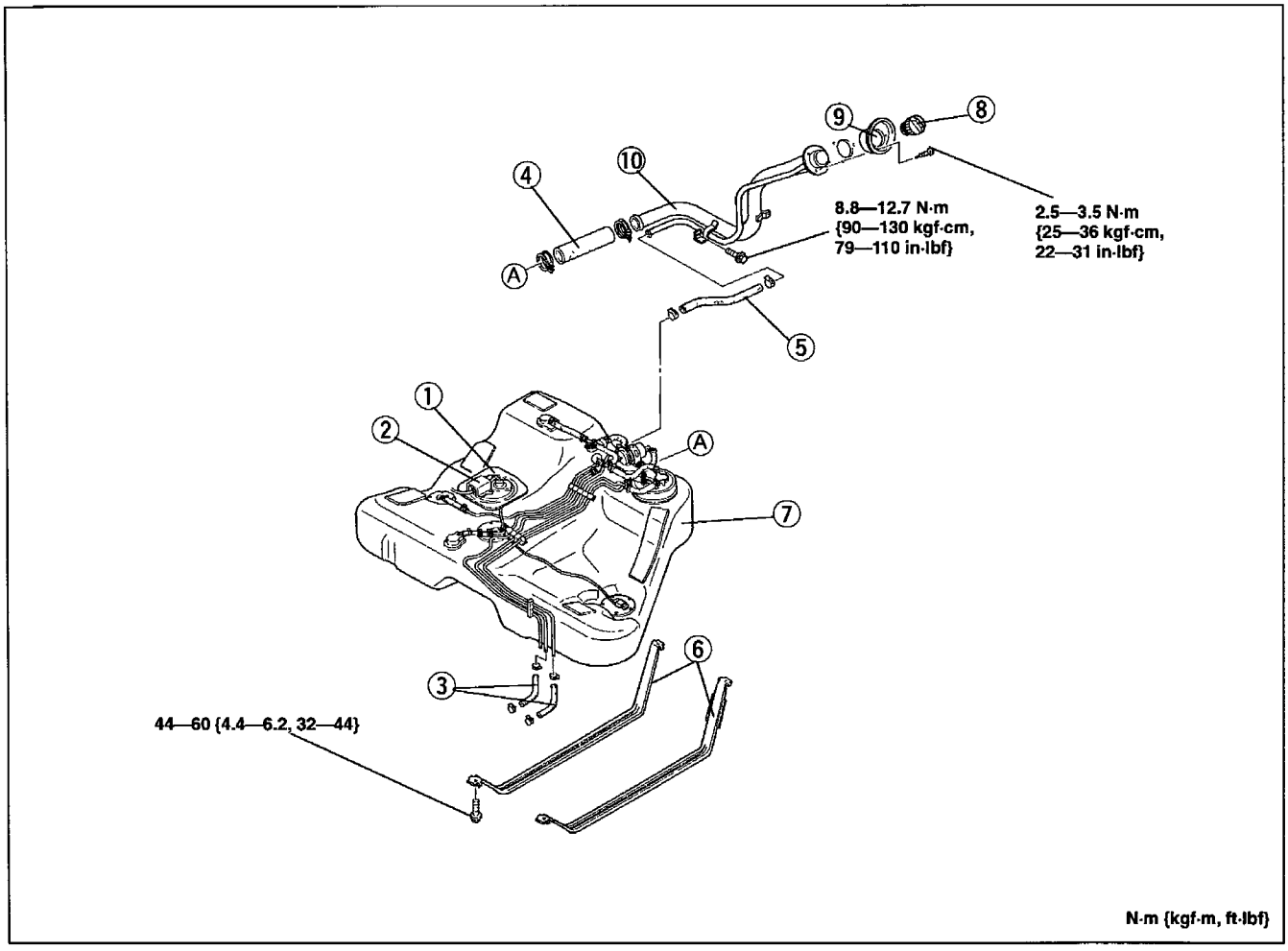
FUEL TANK ASSEMBLY

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 F1–8.**
- **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.**

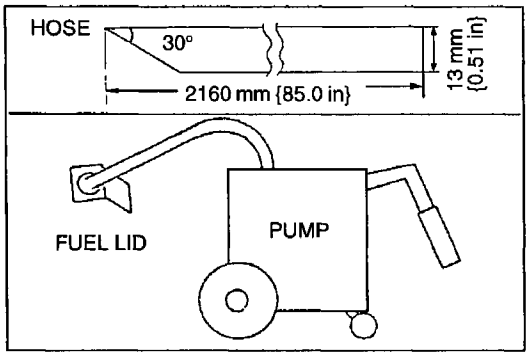
Removal / Inspection / Installation

1. Disconnect the negative battery cable.
2. Remove the rear seat cushion. (Refer to section S.)
3. Disconnect the fuel pump connector.
4. Suck up the fuel from the fuel tank, referring to **Removal note**.
5. Remove in the order shown in the figure.
6. Inspect all parts and repair or replace as necessary.
7. Install in the reverse order of removal.



3ZE0FX–034

1. Fuel pump cover
2. Fuel pump connector
3. Fuel hose
4. Fuel filler hose
5. Breather hose
6. Fuel tank strap
7. Fuel tank
   Removal note ..... page F1–12
8. Fuel filler cap
9. Reinforcement
10. Fuel filler pipe



Removal note
Fuel

1. Remove the filler cap and insert a hose into the fuel tank through the filler pipe.
2. Start the pump and suck up the fuel into a container.

Note

- For easier work, prepare a hose of following size.

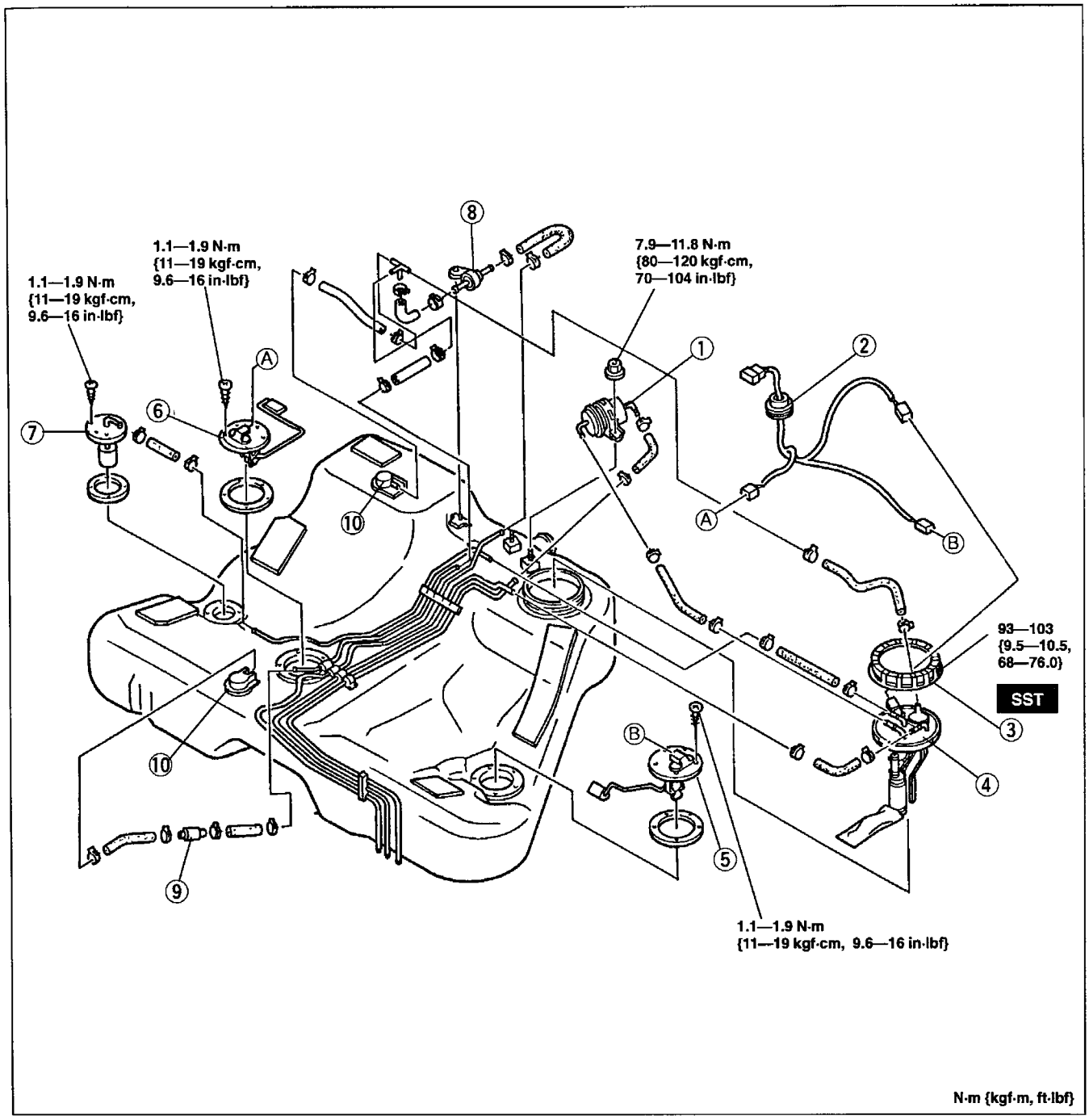
Outer diameter: 13 mm {0.51 in}
Length: 2,160 mm {85.0 in}

Fuel tank

The fuel tank is divided into the right and left banks, makes it difficult to suck up the fuel completely. Some fuel may be left in either side of the tank. Avoid tilting the fuel tank during removal.

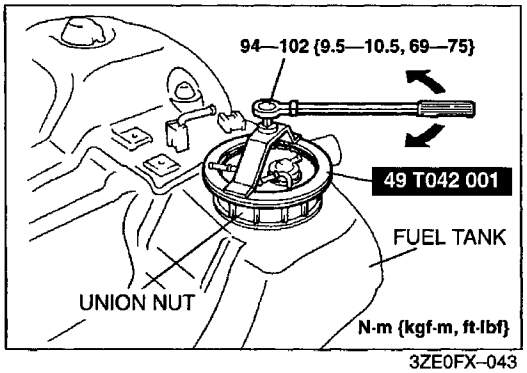
Disassembly / Assembly

1. Remove the fuel tank. (Refer to page F1–11.)
2. Disassemble in the order shown in the figure, referring to **Disassembly / Assembly note**.
3. Assemble in the reverse order of disassembly, referring to **Disassembly / Assembly note**.



3ZE0FX–035

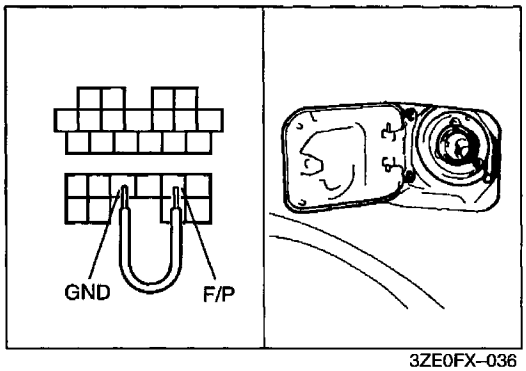
1. Fuel filter (high-pressure side)
2. Harness
3. Union nut
4. Fuel pump assembly
   - Disassembly / Assembly note . page F1–14
   - System Inspection ..... page F1–14
   - Inspection ..... page F1–14
   - Disassembly / Assembly ..... page F1–16
5. Fuel gauge sender unit No.1
6. Fuel gauge sender unit No.2
7. Fuel filter (transfer)
8. Check valve (two-way)
   - Inspection ..... page F1–25
9. Check valve (one-way)
   - Inspection ..... page F1–25
10. Fuel vapor valve
    - Inspection ..... page F1–25



3ZE0FX–043

Disassembly / Assembly note
Fuel pump assembly
Disassemble / assemble the fuel pump assembly by using the **SST**.

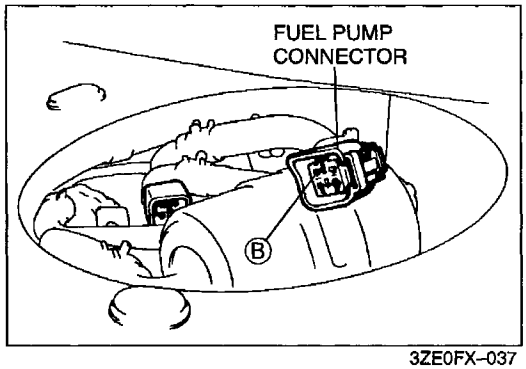
Tightening torque:
94—102 N·m {9.5—10.5 kgf·m, 69—75 ft·lbf}



3ZE0FX–036

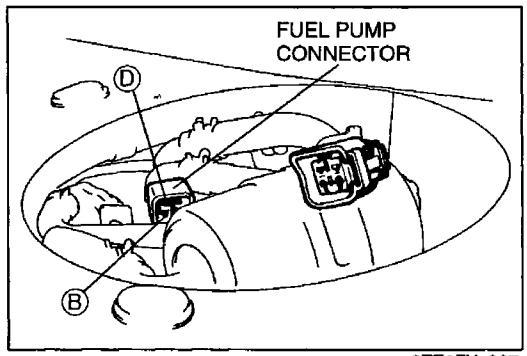
FUEL PUMP ASSEMBLY
System Inspection
1. Connect the data link connector terminals F/P and GND by using a jumper wire.
2. Remove the filler cap.
3. Turn the ignition switch to ON. Listen for fuel pump operation sound at the filler inlet.
4. If no sound was heard, measure the voltage at fuel pump connector terminal B by using a voltmeter.

   Specification: Battery positive voltage (Ignition switch ON)
5. Disconnect a jumper wire.
6. If not as specified, inspect the fuel pump relay.
7. If the fuel pump relay is normal, check continuity between the following.
   - Ignition switch and main relay
   - Main relay and fuel pump relay
   - Fuel pump relay and fuel pump
   - Fuel pump



3ZE0FX–037

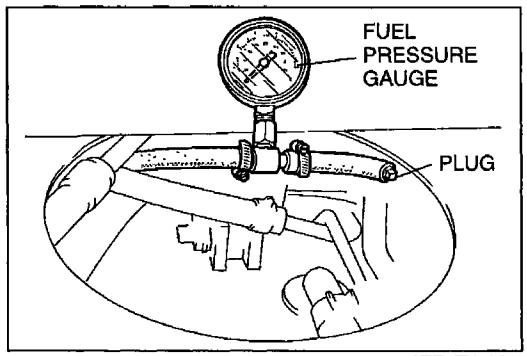
Inspection
Fuel pump continuity
1. Remove the hole cover. (Refer to page F1–17.)
2. Disconnect the fuel pump connector.
3. Check for continuity between fuel pump connector terminals B and D by using an ohmmeter.
4. If there is no continuity, replace the fuel pump. (Refer to page F1–13.)



3ZE0FX–037

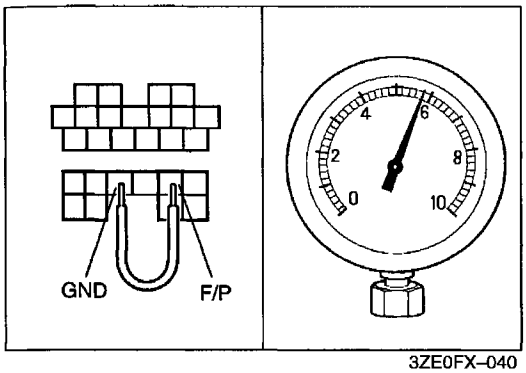
Fuel pump maximum pressure

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, complete the "Fuel Line Safety Procedures" on page F1–8.**

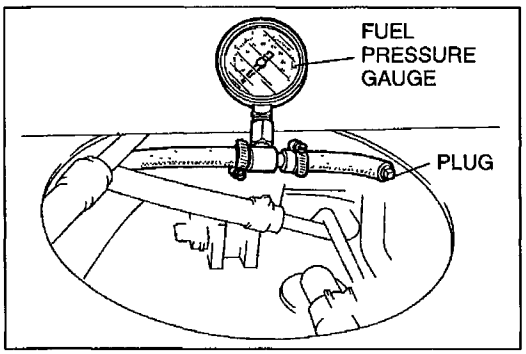


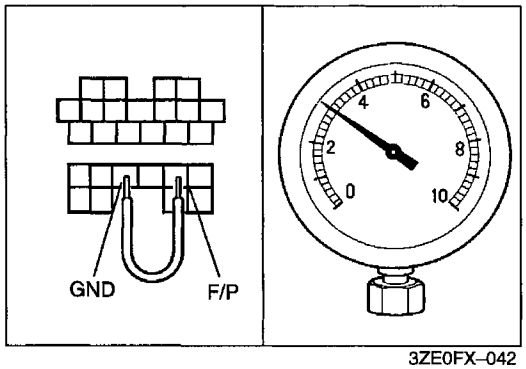
3ZE0FX–039

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 in the figure.
3. Connect the negative battery cable.



3ZE0FX-040





3ZE0FX-042

4. Connect the data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON, and measure the fuel pump pressure.

Specification:
500—630 kPa {5.0—6.5 kgf/cm^2, 72—93 psi}

6. Turn off the ignition switch and disconnect the jumper wire.
7. If not as specified, replace the fuel pump. (Refer to page F1–13.)

Fuel pump 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 F1–8.**

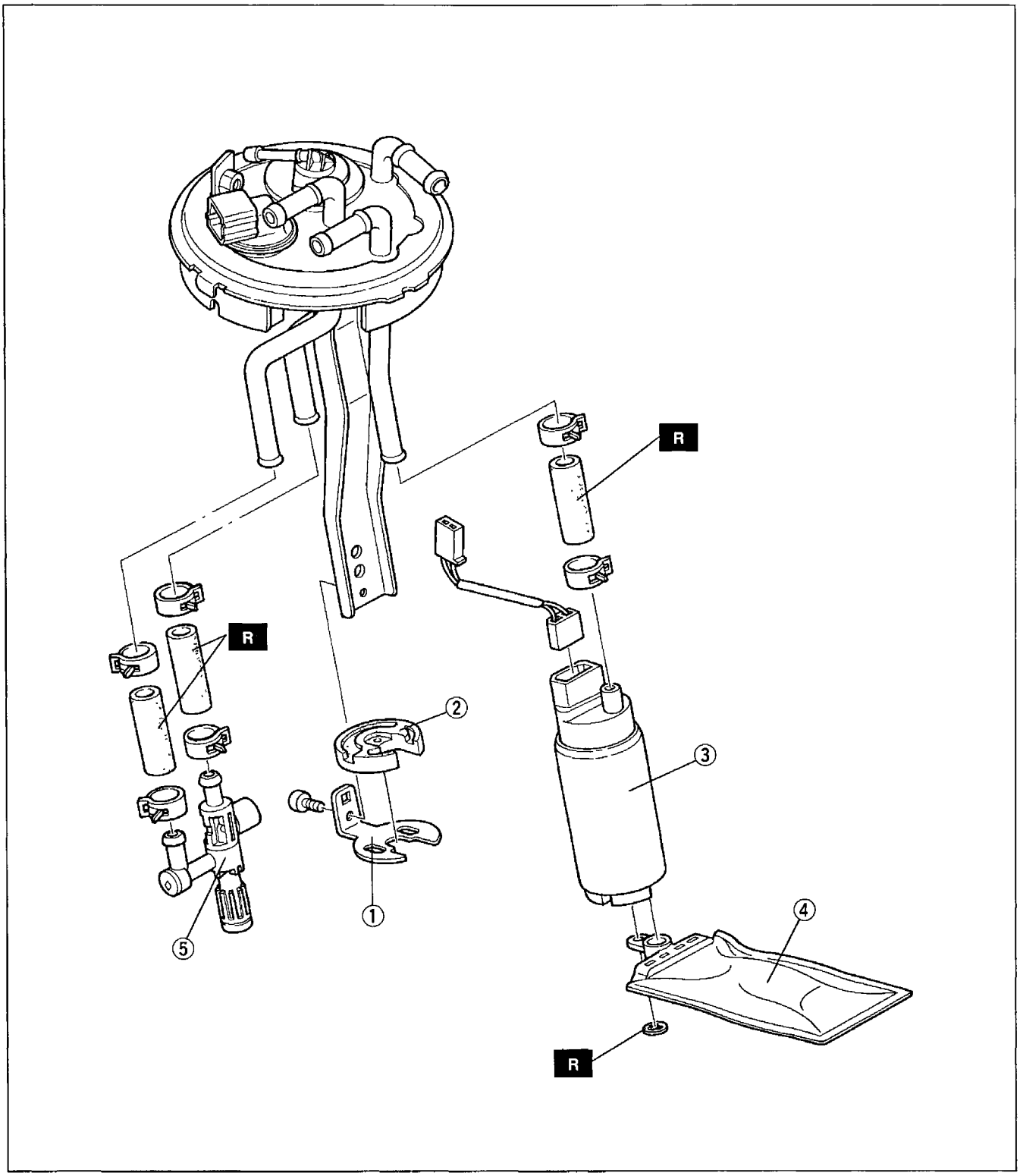
1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge to the fuel pump and plug the outlet of the gauge as shown in the figure.
3. Connect the negative battery cable.
4. Connect the data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON 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 not as specified, replace the fuel pump. (Refer to page F1–13.)

Disassembly / Assembly

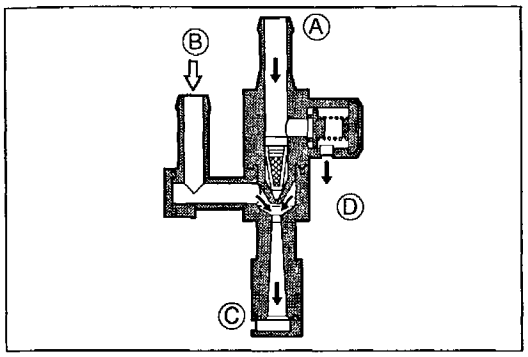
1. Remove the fuel tank assembly. (Refer to page F1–11.)
2. Remove the fuel pump assembly. (Refer to page F1–13.)
3. Disassemble in the order shown in the figure.
4. Assemble in the reverse order of disassembly.



3ZE0FX–046

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

Inspection ..... page F1–17



FUEL PUMP (TRANSFER)
Inspection

1. Remove the fuel pump (transfer). (Refer to page F1–16.)
2. Verify that air flows through the fuel pump from ports A and B to C.
3. Clean any clogs with compressed air.
4. Block ports B and C, and apply pressure of over 167 kPa {1.70 kgf/cm^2, 24.2 psi} to port A and verify that air comes out from port D.
5. If not as specified, replace the fuel pump (transfer). (Refer to page F1–16.)

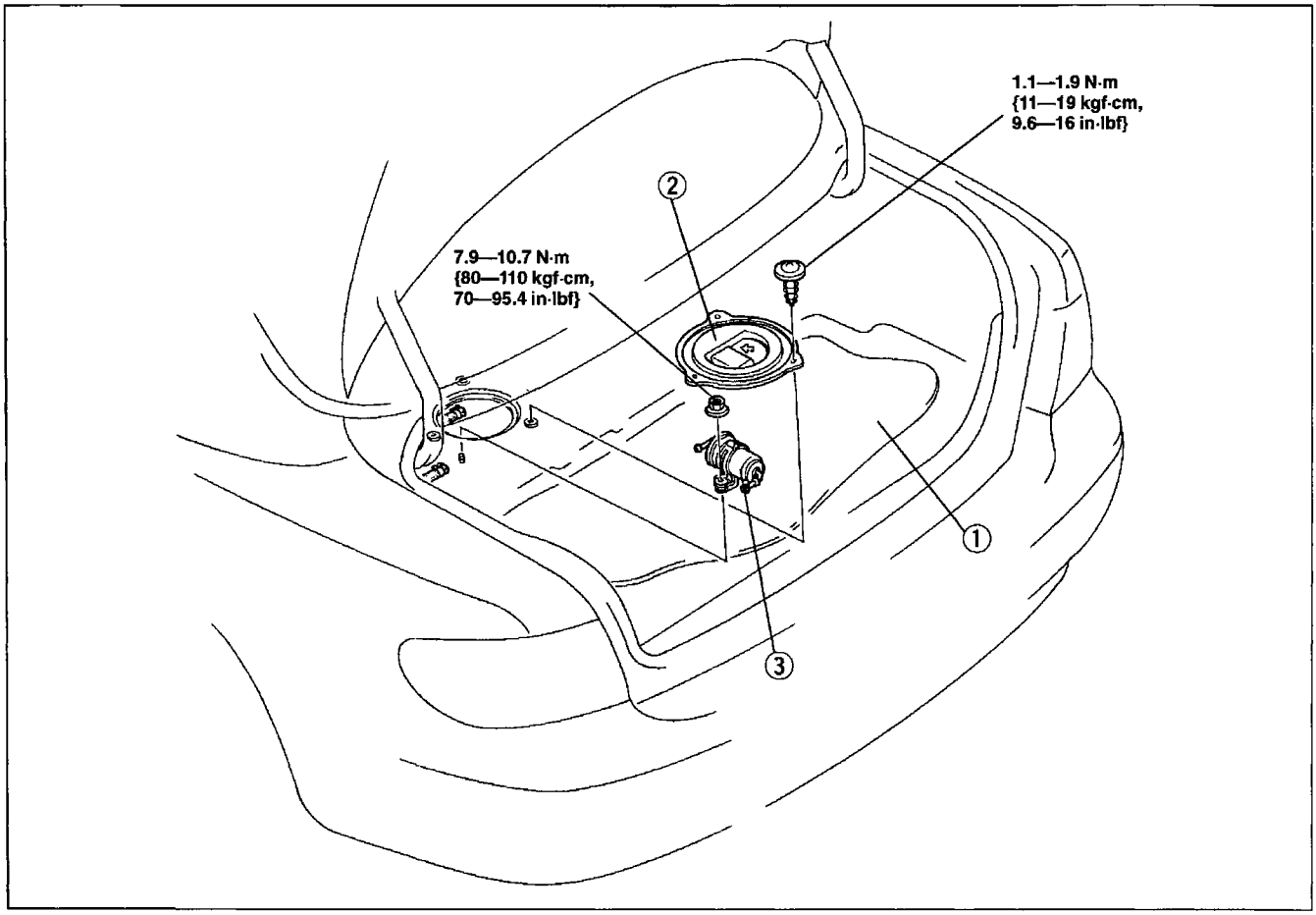
FUEL FILTER (HIGH-PRESSURE SIDE)
Removal / Installation

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 F1–8.**

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

1. Disconnect the negative battery cable.
2. Disconnect the fuel hoses from the fuel filter.
3. Remove the fuel filter and bracket.
4. Install in the reverse order of removal.
5. Verify that the fuel hoses are pushed fully onto the fuel filter nozzles.

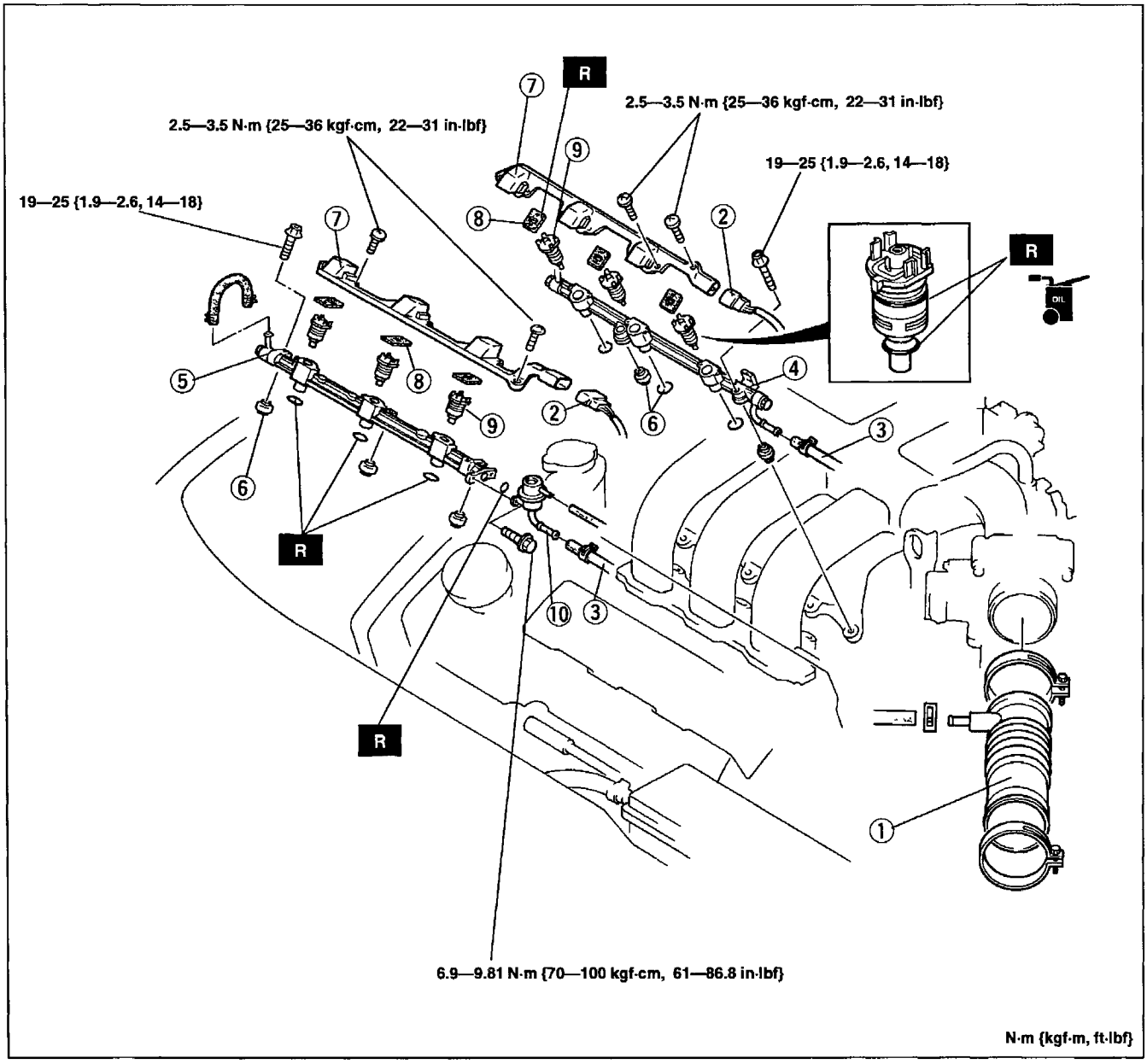


1. Trunk mat
2. Hole cover
3. Fuel filter (high-pressure side)

FUEL INJECTOR
Removal / Installation

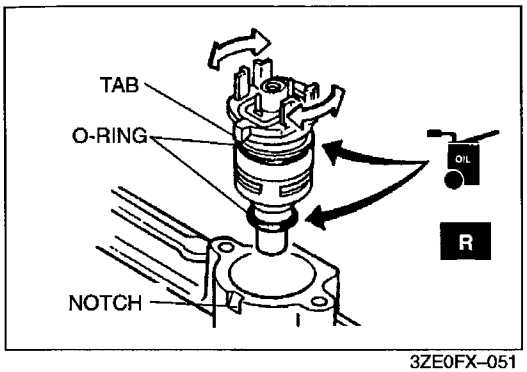
Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this , always complete the "Fuel Line Safety Procedures" on page F1–8.**

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**.



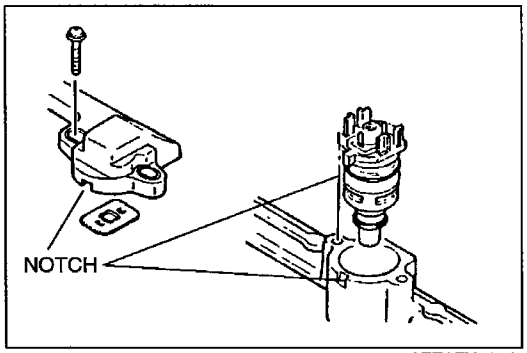
3ZE0FX–050

1. Air intake hose
2. Fuel injector connector
3. Fuel hose and fuel pipe
4. Fuel distributor (RH)
5. Fuel distributor (LH)
6. Insulator
7. Accumulated connector
8. Spacer
9. Fuel injector
   Inspection ..... page F1–20
10. Pressure regulator
    System Inspection ..... page F1–22



3ZE0FX-051

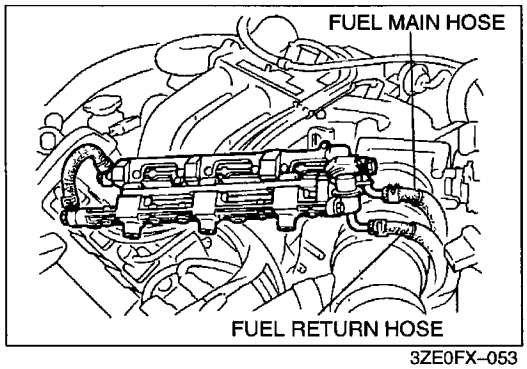
Installation note
Fuel injector
1. Apply a small amount of clean engine oil to the new O-rings, and install them.
2. Verify that the fuel injector holder is clean.
3. Clean the holder with gasoline, if necessary.
4. Install the fuel injector squarely into the distribution pipe while turning it back and forth.



3ZE0FX-052

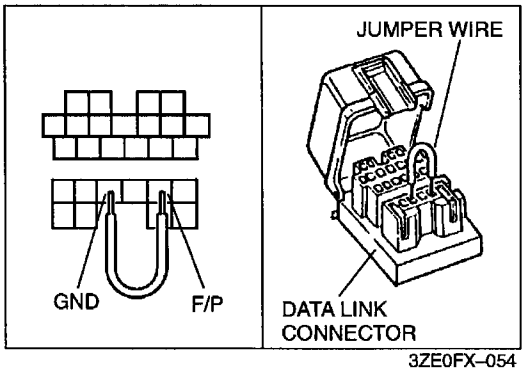
5. Fit the fuel injector tab into the notch in the distribution pipe.
6. When installing accumulated harness, install the fuel injector as shown in the figure.

Tightning torque:
2.5—3.5 N·m {25—36 kgf·cm, 22—31 in·lbf}



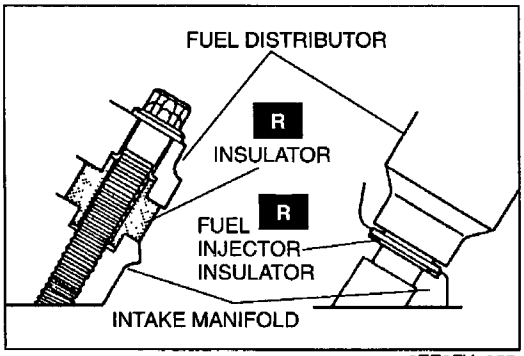
3ZE0FX-053

Fuel injector fitting (Fuel leakage test)
1. After installation of the fuel injector, connect fuel hoses as shown in the figure.



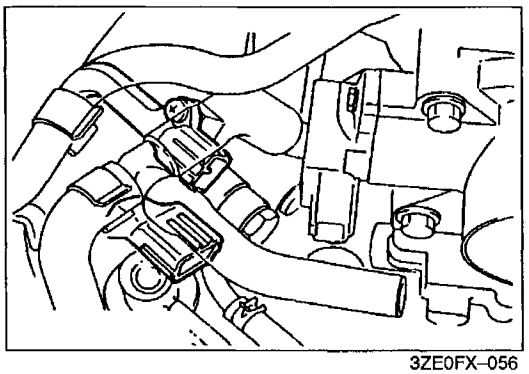
3ZE0FX-054

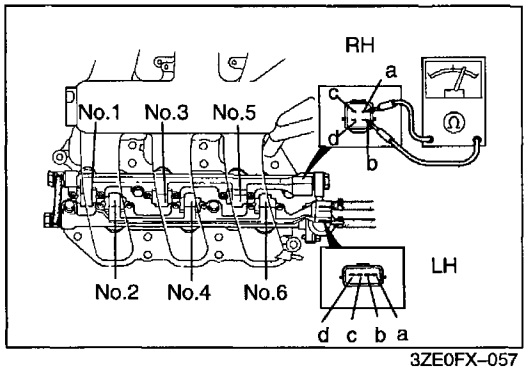
2. Connect the data link connector terminals F/P and GND with a jumper wire.
3. Turn the ignition switch to ON and check for fuel leaks from the fuel distributor assembly.
4. If leaks are found, reinstall the fuel injector.



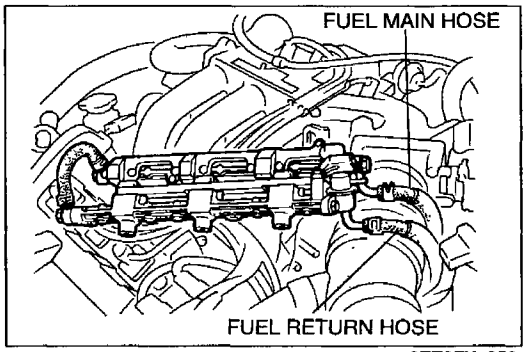
3ZE0FX-055

Fuel distributor assembly
1. Install new fuel injector insulators.
2. Install the insulators, making sure that each insulator is pressed in fully, and that it is not twisted or bent. Incorrectly installed insulators can cause rough idle.

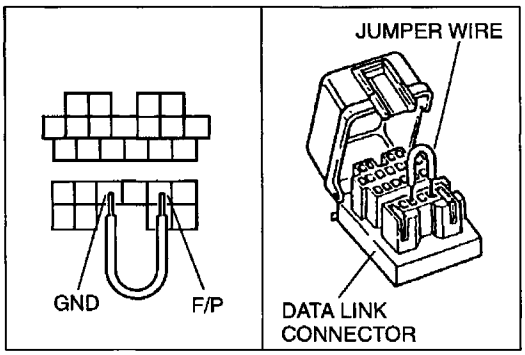

3ZE0FX-056

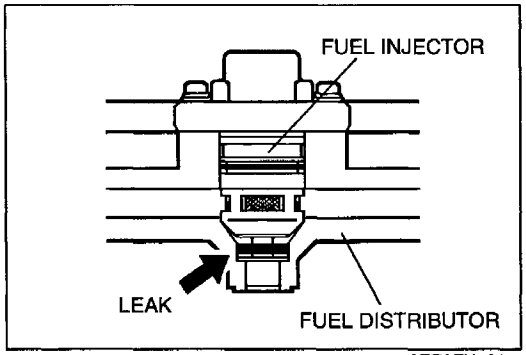


3ZE0FX-057



3ZE0FX-058





3ZE0FX-060

Inspection

Note
- It is not necessary to remove the fuel injectors to perform the following procedures.

Resistance
1. Disconnect the fuel injector connectors.
2. Measure resistance of the fuel injectors by using an ohmmeter.

Harness	Terminal	Fuel injector No.
RH	a—b	1
	a—c	5
	a—d	3
LH	d—c	2
	d—b	4
	d—a	6

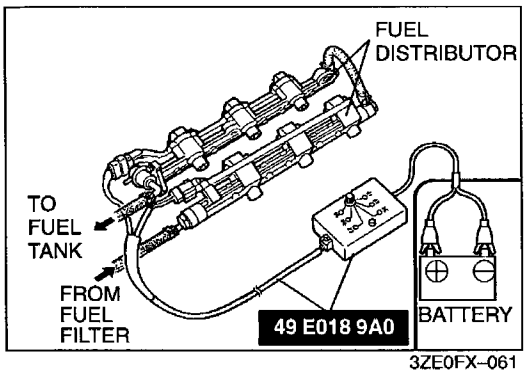
Resistance: Approx. 13.8 Ω [20°C {68°F}]

3. If not as specified, check continuity of the harness, and check for poor connection. If the harness is OK, replace the fuel injector. (Refer to page F1–18.)

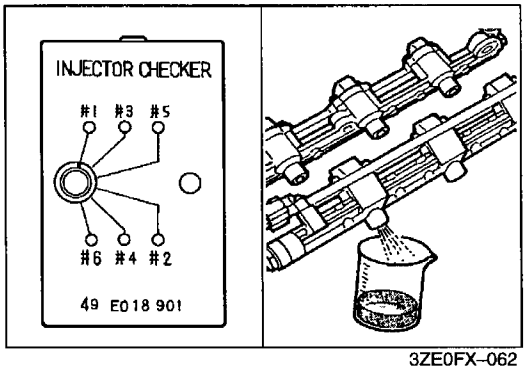
Fuel leakage test
1. Remove the fuel distributor assembly from the intake manifold. (Refer to page F1–18.)
2. Connect the fuel hoses as shown.
3. Connect data link connector terminals F/P and GND by using a jumper wire.
4. Turn the ignition switch to ON and check for fuel leaks from the fuel injectors.

Fuel leakage: Less than 1 drop/2 minutes

5. Turn off the ignition switch and disconnect the jumper wire.
6. If not as specified, remove the leaking fuel injector and check the fuel injector fitting.
7. Install the fuel injector.
8. Recheck the fuel injector for fuel leakage.
9. If leakage still occures, replace the fuel injector. (Refer to page F1–18.)



3ZE0FX-061



3ZE0FX-062

Volume test

1. Remove the fuel injectors and fuel distributor assembly from the intake manifold.
2. Connect the **SST** as shown.

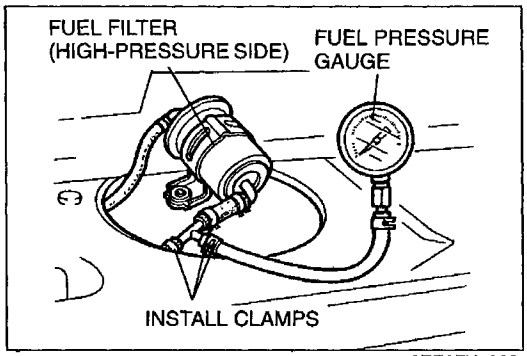
Warning

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

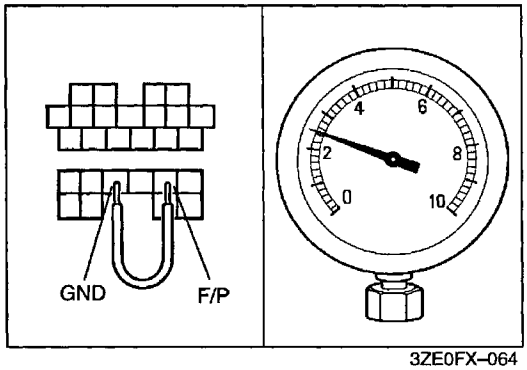
3. Connect data link connector terminals F/P and GND with a jumper wire.
4. Turn the ignition switch to ON.
5. Turn selector switch on the **SST** to select fuel injector number.
6. Press and hold the switch for 15 sec. and measure the injection volume of each fuel injector by using a graduated container.

Specification:
48—56 cm^3 {48—56 cc, 1.6—1.8 fl oz}/15 sec.

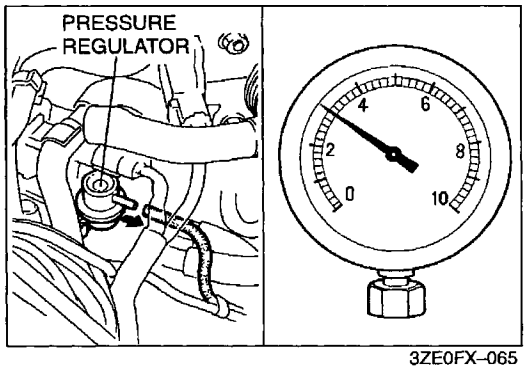
7. Turn off the ignition switch and disconnect the jumper wire.
8. If not as specified, replace the fuel injector. (Refer to page F1–18.)



3ZE0FX–063



3ZE0FX–064



3ZE0FX–065

PRESSURE REGULATOR
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" on page F1–8.**

1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge between the fuel filter (high-pressure side) and the fuel distributor. Install clamps as shown in the figure.
3. Connect the negative battery cable.
4. Start the engine and let it idle.
5. Carry out the intake-air system inspection. (Refer to page F1–5.)
6. Measure the fuel line pressure.

Specification:
210—260 kPa {2.1—2.7 kgf/cm^2, 30—38 psi}

7. If not as specified, carry out the fuel system inspection. (Refer to page F1–9.)
8. Disconnect the vacuum hose from the pressure regulator.
9. Measure the fuel line pressure.

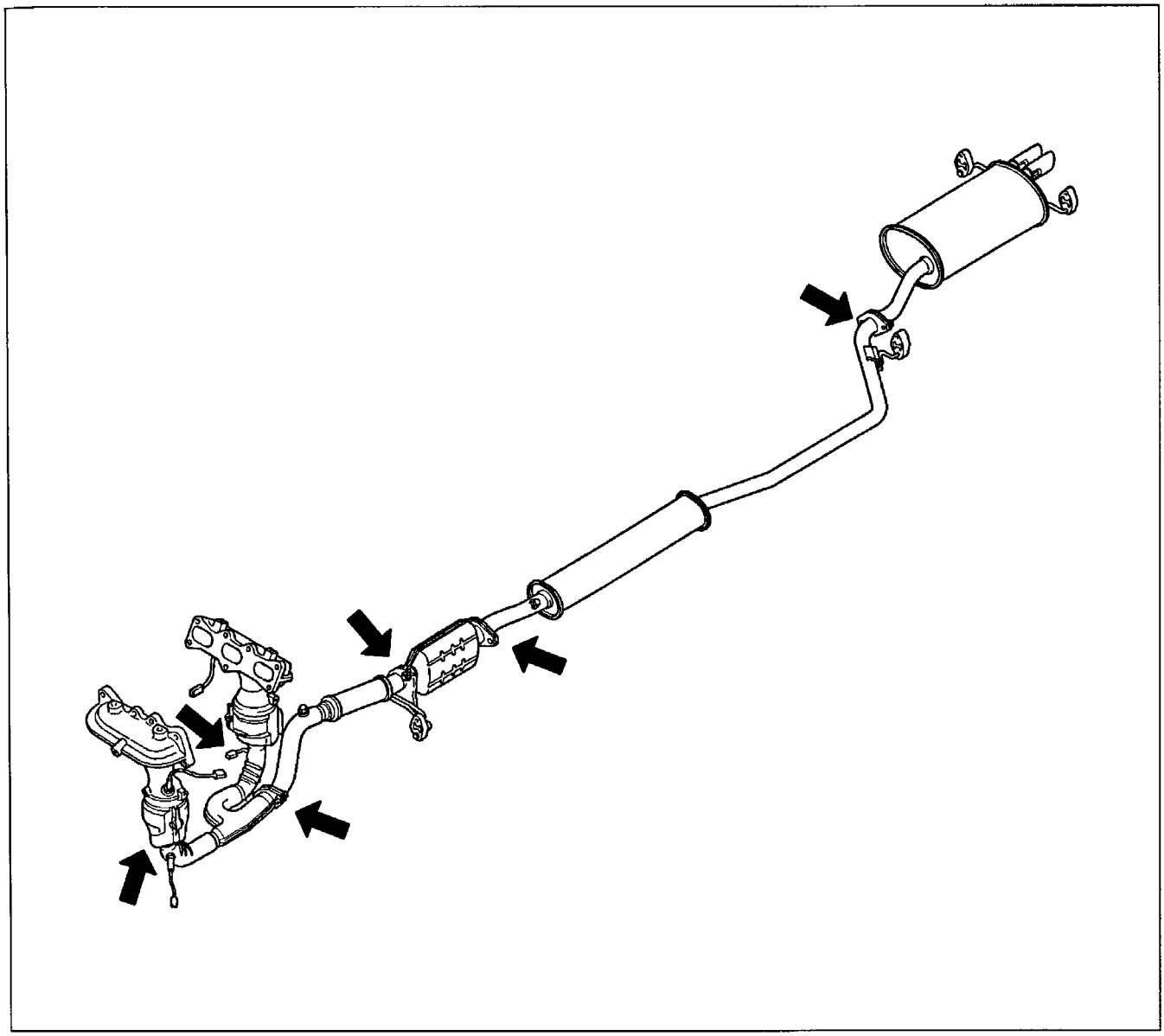
Specification:
270—310 kPa {2.7—3.2 kgf/cm^2, 39—45 psi}

10. If not as specified, replace the pressure regulator. (Refer to page F1–18.)

EXHAUST SYSTEM

SYSTEM INSPECTION

1. Verify that the exhaust pipes are installed propary.
2. Visually check the exhaust pipes for corrosion, damage, and cracks.
3. Repair or replace as necessary.
4. Start the engine and let it idle.
5. Visually check the exhaust gas leaks from exhaust pipes.
6. Repair or replace if necessary.

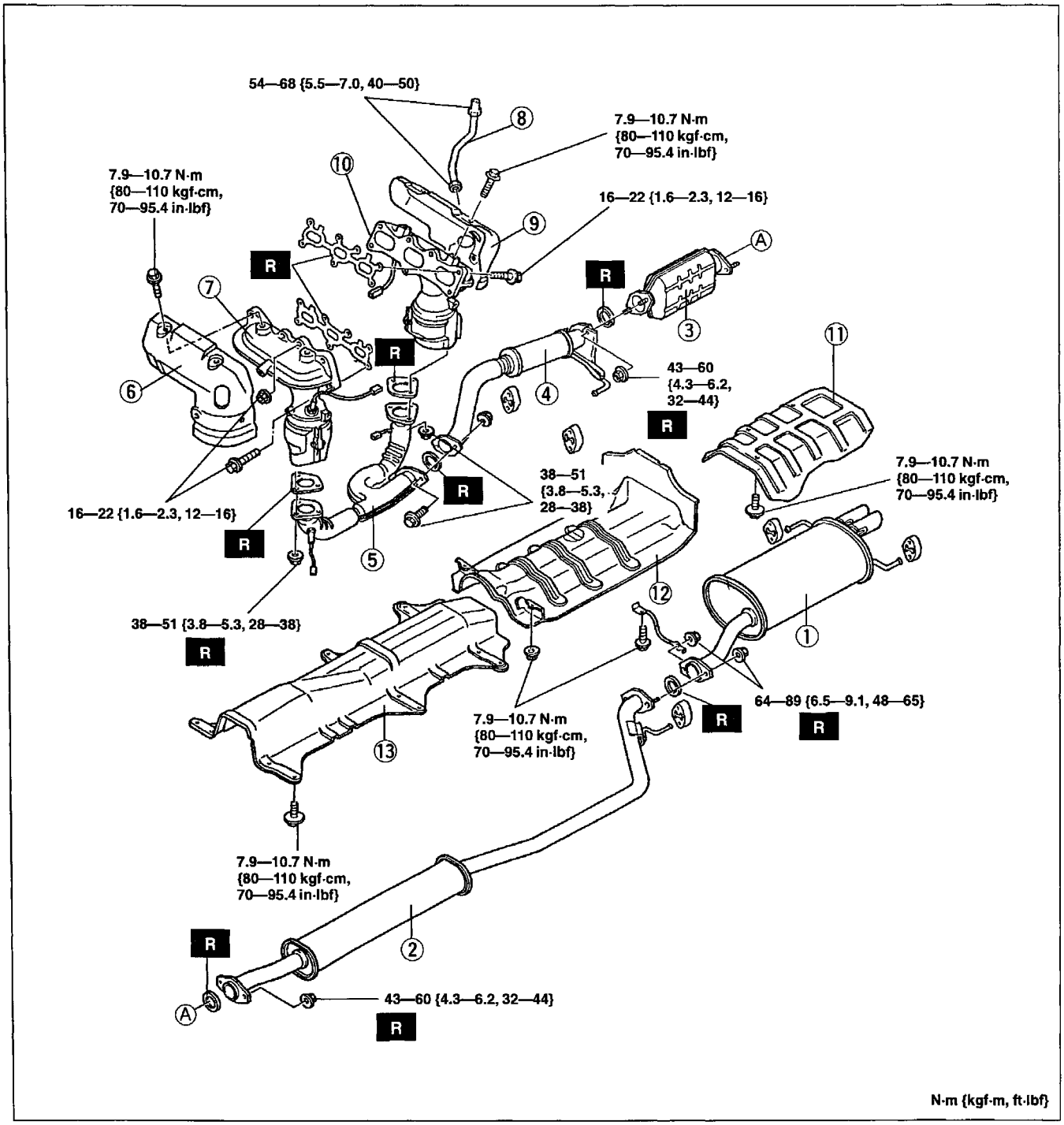


3ZE0FX–067

COMPONENT PARTS

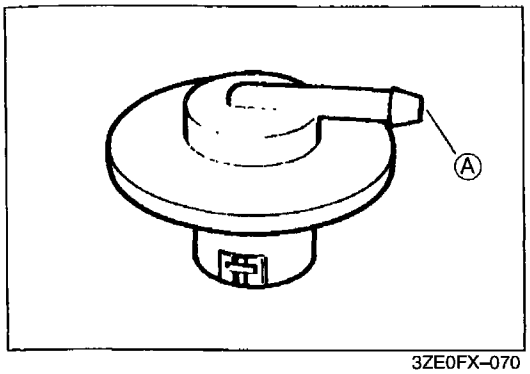
Removal / Inspection / Installation

1. Remove in the order shown in the figure.
2. Visually check each part for damage. Replace if necessary.
3. Install in the reverse order of removal.



3ZE0FX-069

1. Main silencer
2. Presilencer
3. Three way catalytic converter
4. Flexible pipe
5. Front pipe
6. Insulator
7. Warm up three way catalytic converter (LH)
8. EGR pipe
9. Insulator
10. Warm up three way catalytic converter (RH)
11. Insulator
12. Insulator
13. Insulator



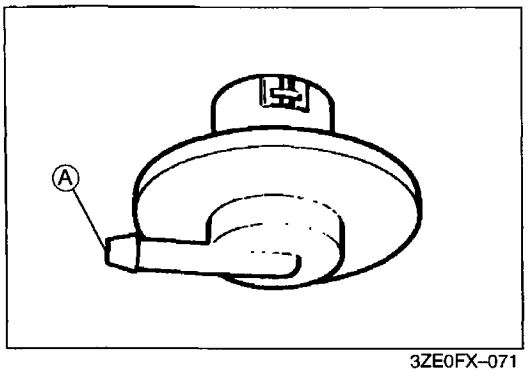
3ZE0FX–070

EVAPORATIVE EMISSION SYSTEM

FUEL VAPOR VALVE

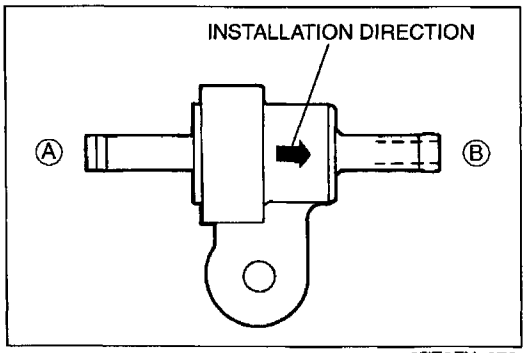
Inspection

1. Remove the fuel vapor valve. (Refer to page F1–13.)
2. Verify that air flows through the valve from port A when the valve is held as shown in the figure.



3ZE0FX–071

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



3ZE0FX–072

CHECK VALVE (TWO-WAY)

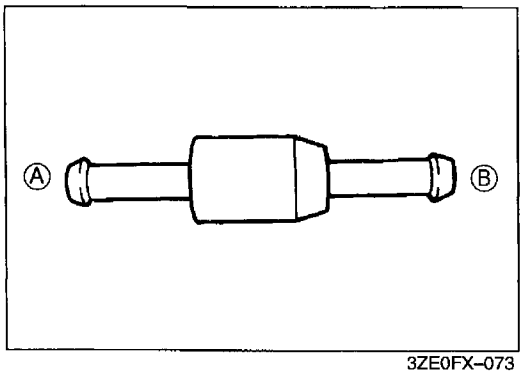
Inspection

1. Remove the check valve (two-way). (Refer to page F1–13.)
2. Apply pressure or vacuum to port A of the valve by using a vacuum pump, and check for the airflow.

Specification

Condition	kPa {mmHg, inHg}	Air flow
Pressure	Below 2.9 {22, 0.90}	No
	Above 5.9 {44, 1.7}	Yes
Vacuum	Below 0.97 {7.3, 0.29}	Yes

3. If not as specified, replace the check valve (two-way).

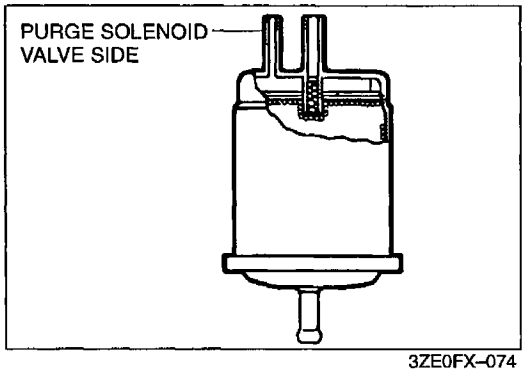


3ZE0FX–073

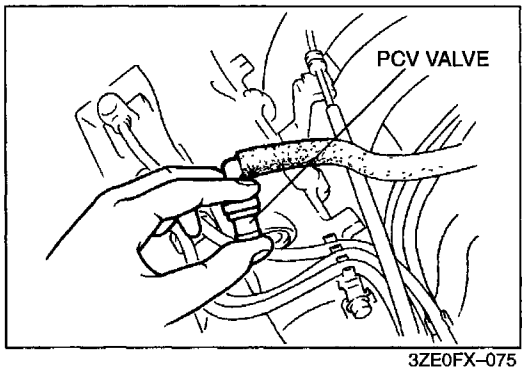
CHECK VALVE (ONE-WAY)

Inspection

1. Remove the check valve (one-way). (Refer to page F1–13.)
2. Blow through the check valve from port A, and verify that the air flows from port B.
3. Blow through the check valve from port B, and verify that there is no air flow.
4. If not as specified, replace the check valve (one-way).



3ZE0FX–074



3ZE0FX–075

CHARCOAL CANISTER

Inspection

1. Plug the charcoal canister vent side port and purge solenoid valve side port.
2. Blow air into the charcoal canister and verify that no air leaks.
3. If air leaks, replace the charcoal canister.

PCV VALVE

System inspection

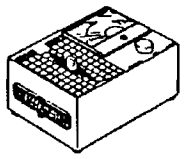
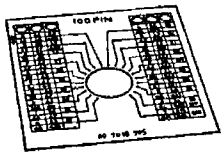
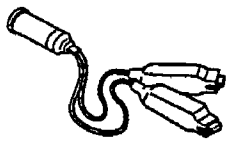
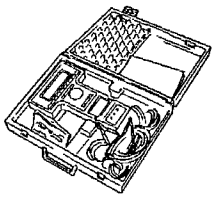
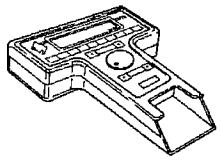
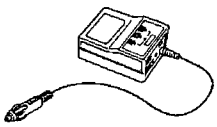
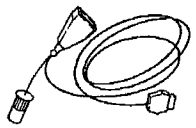
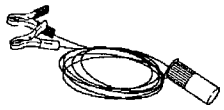
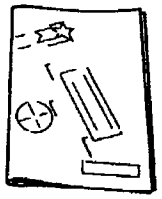
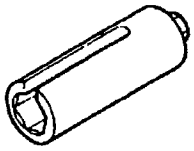
Caution

- **Disconnecting the valve while the engine coolant is warm (over 20°C {68°F}) can let the engine to inhale air through the valve, causes difficult starting.**

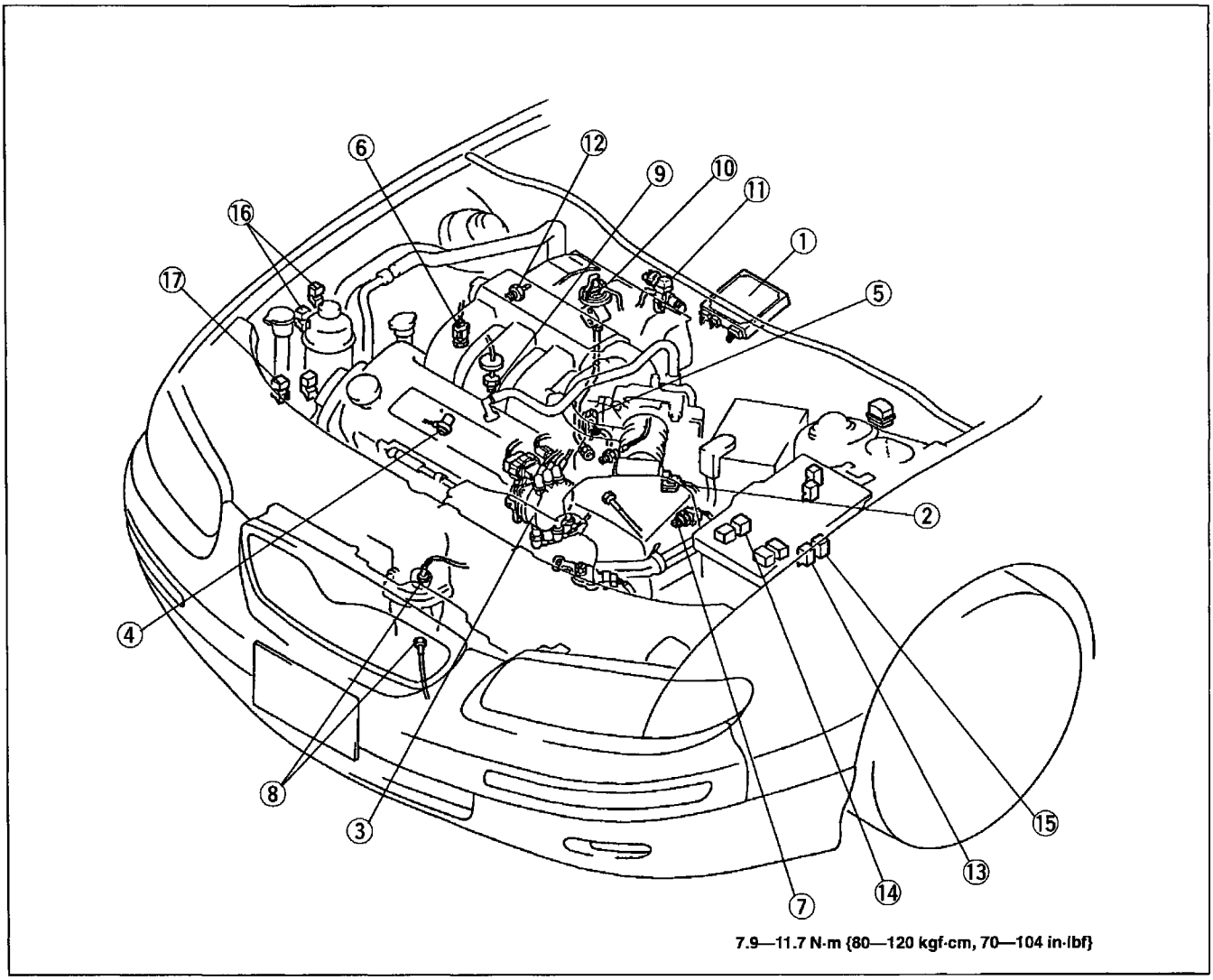
1. Verify that the engine coolant temperature is below 20°C {68°F}.
2. Start the engine and let it idle.
3. Disconnect the PCV valve from the cylinder head cover.
4. Block the valve opening by hand and verify that vacuum is felt.
5. If not, check the PCV valve for cloggine and damage. If the hose is OK, replace the PCV valve.

CONTROL SYSTEM

PREPARATION
SST

49 9200 162A Monitor, Engine Signal 	For inspection of PCM terminal voltage	49 T018 906 Adapter harness 	For inspection of PCM terminal voltage
49 T018 905 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 terminal voltage and input/output devices	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of PCM terminal voltage and input/output devices
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of PCM terminal voltage and input/output devices	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of PCM terminal voltage and input/output devices
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of PCM terminal voltage and input/output devices	49 T088 008A Instruction Manual 	For inspection of PCM terminal voltage and input/output devices
49 T088 010B Program Card 	For inspection of PCM terminal voltage and input/output devices	49 H018 001 Knock sensor wrench 	For replacement of knock sensor

COMPONENT PARTS



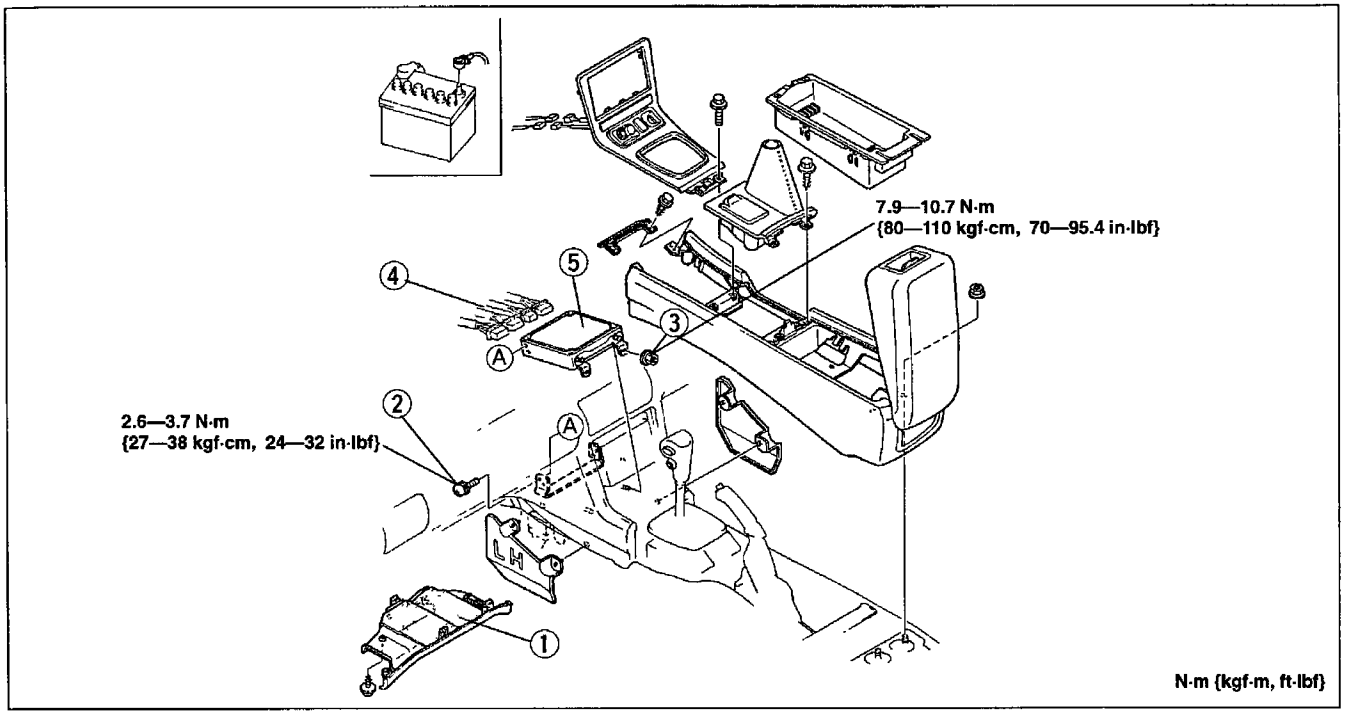
3ZE0FX-081

1. Powertrain control module (PCM)
   - Removal / Installation ..... page F1–29
   - Inspection ..... page F1–30
2. Mass air flow sensor
   - Inspection ..... page F1–38
3. Camshaft position sensor
   - Inspection ..... page F1–39
4. Crankshaft position sensor
   - Inspection ..... page F1–40
   - Replacement ..... page F1–40
5. Throttle position sensor
   - Inspection ..... page F1–41
   - Adjustment ..... page F1–42
   - Replacement ..... page F1–43
6. Engine coolant temperature sensor
   - Inspection ..... page F1–44
7. Intake air temperature sensor
   - Inspection ..... page F1–44
8. Heated oxygen sensor (front, rear)
   - Inspection ..... page F1–45
9. Knock sensor
   - Inspection ..... page F1–46
   - Replacement ..... page F1–47
10. EGR valve position sensor
    - System Inspection ..... page F1–48
    - Inspection ..... page F1–48
11. EGR boost sensor
    - Inspection ..... page F1–49
12. Power steering pressure switch
    - Inspection ..... page F1–50
13. Main relay
    - System Inspection ..... page F1–50
    - Inspection ..... page F1–50
14. Fuel pump relay
    - Inspection ..... page F1–59
15. Cooling fan relay
    - Inspection ..... page F1–70
16. Condenser fan relay
    - Inspection ..... page F1–70
17. A/C relay
    - Inspection ..... page F1–72

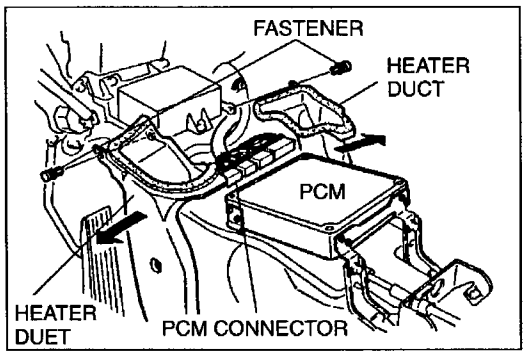
POWERTRAIN CONTROL MODULE (PCM)

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the rear console box, center panel and under cover. (Refer to section S.)
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. Cover
2. PCM bracket screw
3. PCM bracket nut
4. Connector
   - Removal note ..... below
   - Installation note ..... below
5. PCM
   - Inspection ..... page F1–30



Removal note

Connector

1. Remove the rear heater duct fasteners.
2. Separate the rear heater duct to both sides.

Note

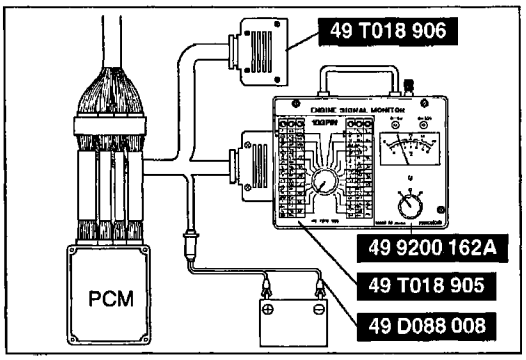
- Separating the duct may cause deformation to it. However, this will not affect the performance of the duct.

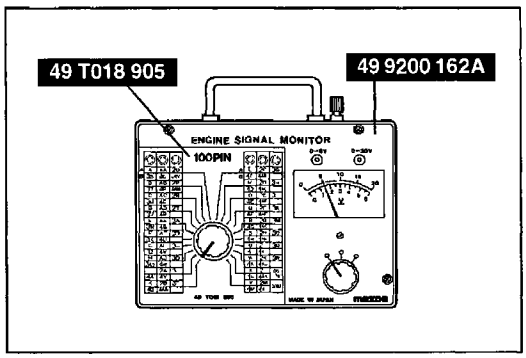
3. Disconnect the PCM connector.

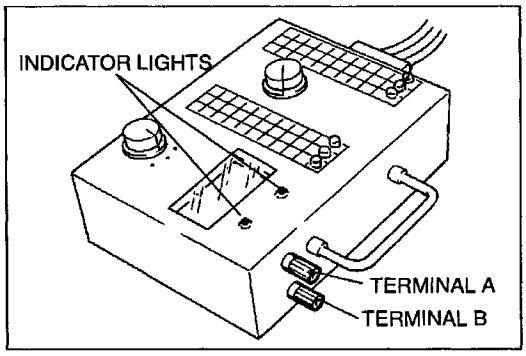
Installation note

Connector

1. Connect the PCM connector.
2. Assemble the rear heater duct.
3. Verify that the rear heater duct is correctly joined, and install the rear heater duct fasteners.







Inspection

Caution

- **The PCM terminal voltages vary with change 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.**

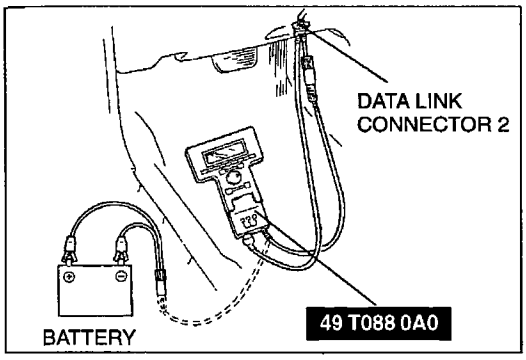
1. Disconnect the negative battery cable.
2. Disconnect the PCM connector. (Refer to page F1–29.)
3. Connect the **SST** (Adapter harness) to the PCM connector.
4. Connect the **SSTs** (Monitor, Engine Signal and Harness adapter, power) to the **SST** (Adapter harness). Use connector A of the adapter harness for PCM terminals 1A through 1AJ, 2A through 2T, and 3A through 3R. Use connector B for PCM terminals 3S through 3AB and 4A through 4AN.
5. Place the **SST** (Sheet) on the **SST** (Monitor, Engine Signal).
6. Measure the voltage at each PCM terminal by switching the selector switch and the monitor switch.
7. If any incorrect voltage is detected, check related systems, wiring harnesses and connectors referring to the possible malfunction in the terminal voltage list.

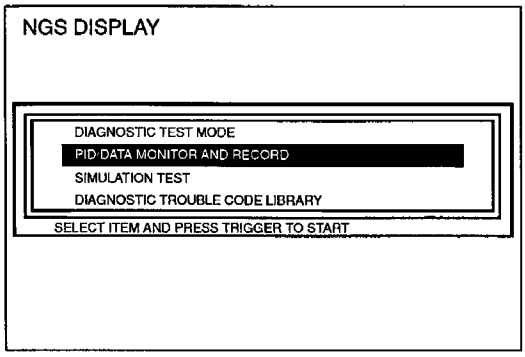
Caution

- **Disconnecting the connectors of the PCM and the SST (Adapter harness) while the battery is connected can damage the PCM and the SST (Monitor, Engine Signal). 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 (Monitor, Engine Signal) can damage the SST (Monitor, Engine Signal).**

Note

- The indicator lights of the **SST** (Monitor, Engine Signal), 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** (Monitor, Engine Signal) 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)

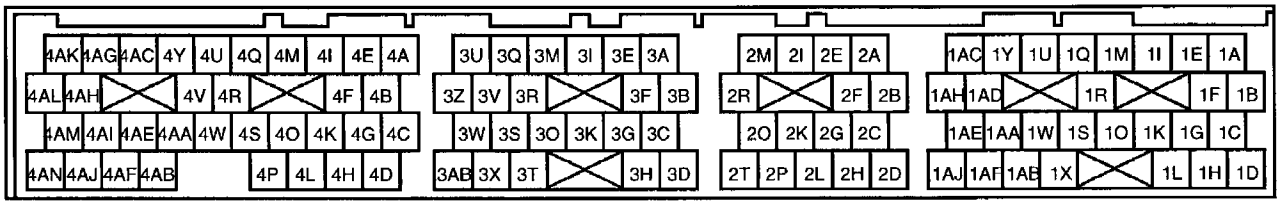
1. Connect the **SSTs** to the data link connector 2 as shown in the figure.
2. Referring to the NGS operational manual, select the PID/DATA MONITOR AND RECORD function.
3. Referring to the 1996 Service Highlights, inspect each PCM input/output signal.

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 (sensors and solenoids).
- When normal output signal cannot be detected while all input signals are normal, replace the PCM.

Terminal voltage (Reference)

B+: Battery positive voltage



Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
1A	Condenser fan control	Condenser fan relay No.1	Ignition switch ON	Condenser fan operating	Below 1.0	• Condenser fan relay No.1
				Condenser fan stop	B+	
1B	Pressure regulator control	PRC solenoid valve	Idle (Hot start)		Below 1.0	• PRC solenoid valve
			Other		B+	
1C	Vehicle speed	Vehicle speed sensor	Ignition switch ON		0 or 5.0	• Vehicle speed sensor
			Driving		Approx. 2.5	
1D	—	—	—		—	—
1E	Cooling fan and condenser fan control	Cooling fan relay No.1 Condenser fan relay No.2	Ignition switch ON	Cooling fan operating	Below 1.0	• Cooling fan relay • Condenser fan relay No.2
				Cooling fan stop	B+	
1F	Load/No load distinction	Transaxle range switch	Ignition switch ON	Other than park/neutral position	B+	• Transaxle range switch
				Park/neutral position	Below 1.0	
1G	DRL (CANADA)	DRL control module	Daytime running light OFF		Above 11.0	• DRL control module
			Daytime running light ON		Below 1.0	
1H	Start	Ignition switch (START)	While cranking		Approx. 10	• PCM terminal 1H — Ignition switch harness
			Ignition switch ON		Below 1.0	
1I	—	—	—		—	—
1J	—	—	—		—	—
1K	Blower	Fan switch	Ignition switch ON	Fan switch OFF	B+	• Fan switch
				Fan switch 3rd or higher	Below 1.0	
1L	Headlight	Headlight switch	Headlight switch OFF		Below 1.0	• Headlight switch
			Headlight switch ON		B+	
1M	A/C control	A/C relay	Idle	A/C operating	Below 1.0	• A/C relay
				A/C stop	B+	
1N	—	—	—		—	—
1O	Brake	Brake switch	Brake pedal released		Below 1.0	• Brake switch
			Brake pedal depressed		B+	
1P	—	—	—		—	—
1Q	Torque reduction request	ABS/TCS control unit	Ignition switch ON		Approx. 5.0	• ABS/TCS control unit
1R	—	—	—		—	—
1S	Torque reduction inhibit	ABS/TCS control unit	Ignition switch ON		Below 1.0	• ABS/TCS control unit
1T	—	—	—		—	—
1U	—	—	—		—	—
1V	—	—	—		—	—

B+: Battery positive voltage

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
1W	—	—	—		—	—
1X	Rear window defroster	Rear window defroster relay	Ignition switch ON	Rear window defroster switch OFF	B+	• Rear window defroster switch
				Rear window defroster switch ON	Below 1.0	
1Y	Diagnostic trouble code input	Data link connector 2 (Terminal KLN)	Carry out inspection according to diagnostic trouble codes Diagnostic trouble code output is a part of serial communication Judgement by terminal voltage is not possible		—	• On-board diagnostic system
1Z	—	—	—		—	—
1AA	VRIS No.1 control	VRIS solenoid valve No.1	Ignition switch ON		B+	• VRIS solenoid valve No.1
1AB	—	—	—		—	—
1AC	—	—	—		—	—
1AD	—	—	—		—	—
1AE	VRIS No.2 control	VRIS solenoid valve No.2	Ignition switch ON		B+	• VRIS solenoid valve No.2
1AF	Fuel pump control	Fuel pump relay	Ignition switch ON		B+	• Fuel pump relay
			Cranking		Below 1.0	
			Idle			
1AG	—	—	—		—	—
1AH	MIL	Malfunction indicator lamp	Malfunction indicator lamp OFF		B+	• PCM terminal 1AH — MIL harness
			Malfunction indicator lamp ON		Below 1.0—B+	
1AI	—	—	—		—	—
1AJ	Engine speed	Tachometer ABS/TCS control unit	Ignition switch ON		Below 1.0 or Approx. 11	• PCM terminal 4AH voltage
			Idle		Approx. 6	
2A	Shift solenoid A	Shift solenoid A	Solenoid valve ON		B+	• Shift solenoid A • Wiring and/or connector from terminal 2A to shift solenoid A
			Solenoid valve OFF		Below 1.0	
2B	Shift solenoid B	Shift solenoid B	Solenoid valve ON		B+	• Shift solenoid B • Wiring and/or connector from terminal 2B to shift solenoid B
			Solenoid valve OFF		Below 1.0	
2C	TCC* control solenoid valve	TCC control solenoid valve	TCC operation		B+	• TCC control solenoid valve • Wiring and/or connector from terminal 2C to TCC control solenoid valve
			TCC non operation		Below 1.0	
2D	TCC* solenoid valve	TCC solenoid valve	TCC slip operation→TCC operation		B+→ Below 1.0	• TCC solenoid valve • Wiring and/or connector from terminal 2D to TCC solenoid valve
			TCC non operation		Below 1.0	
2E	HOLD indicator light	HOLD indicator light	HOLD mode		Below 1.0	• HOLD indicator light • Wiring and/or connector from terminal 2E to HOLD indicator light
			Except HOLD mode		B+	

*: TCC = Torque converter clutch

B+: Battery positive voltage

Terminal	Signal	Connected to	Test condition	Voltage (V)	Possible malfunction
2F	Shift solenoid C	Shift solenoid C	Solenoid valve ON	B+	• Shift solenoid C • Wiring and/or connector from terminal 2F to shift solenoid C
			Solenoid valve OFF	Below 1.0	
2G	3–2 timing solenoid valve	3–2 timing solenoid valve	Solenoid valve ON	B+	• 3–2 timing solenoid valve • Wiring and/or connector from terminal 2G to 3–2 timing solenoid valve
			Solenoid valve OFF	Below 1.0	
2H	Pressure control solenoid	Pressure control solenoid	Throttle valve closed throttle position	8.0	• Pressure control solenoid • Wiring and/or connector from terminal 2H to pressure control solenoid
			Throttle valve wide open throttle	1.6	
2I	Transaxle range switch (D range)	Transaxle range switch	D range	B+	• Transaxle range switch • Wiring and/or connector from terminal 2I to transaxle range switch
			Other ranges All positions	Below 1.0	
2J	—	—	—	—	—
2K	Transaxle range switch (R position)	Transaxle range switch	R position	B+	• Transaxle range switch • Wiring and/or connector from terminal 2K to transaxle range switch
			All ranges Other positions	Below 1.0	
2L	HOLD switch	HOLD switch	HOLD switch released	B+	• HOLD switch • Wiring and/or connector from terminal 2L to HOLD switch
			HOLD switch depressed	Below 1.0	
2M	Transaxle range switch (S range)	Transaxle range switch	S range	B+	• Transaxle range switch • Wiring and/or connector from terminal 2M to transaxle range switch
			Other ranges All positions	Below 1.0	
2N	—	—	—	—	—
2O	Transaxle fluid temperature sensor	Transaxle fluid temperature sensor	Verify that voltage decreases according to ATF temperature rise For reference, if the ATF is 20°C {68°F} the voltage should be 3.5 V If the ATF is 130°C {260°F} the voltage should be 0.6 V	Approx. 0.6—4.8	• Transaxle fluid temperature sensor • Wiring and/or connector from terminal 2O to transaxle fluid temperature sensor
2P	Input/turbine speed sensor	Input/turbine speed sensor	Ignition switch ON	Below 1.0	• Input/turbine speed sensor • Wiring and/or connector from terminal 2P to input/turbine speed sensor
			Engine running (P position)	0.1—1.0	
2Q	—	—	—	—	—
2R	Transaxle range switch (L range)	Transaxle range switch	L range	B+	• Transaxle range switch • Wiring and/or connector from terminal 2R to transaxle range switch
			Other ranges All positions	Below 1.0	

B+: Battery positive voltage

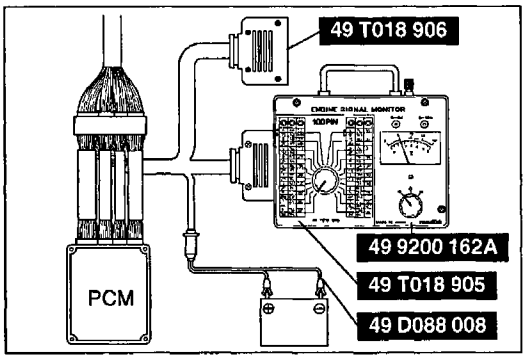
Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
2S	—	—	—		—	—
2T	Ground (Input/ turbine speed sensor)	Input/turbine speed sensor	Constant		Below 1.0	—
3A	Constant voltage (Vref)	Throttle position sensor EGR valve position sensor EGR boost sensor	Ignition switch ON		Approx. 5.0	• PCM terminal 4A voltage
3B	Throttle position sensor	Throttle position sensor	Ignition switch ON	Accelerator pedal released	0.1—1.1	• Throttle position sensor • PCM terminal 3A voltage
				Accelerator pedal depressed	2.8—4.5	
3C	—	—	—		—	—
3D	Heated oxygen sensor (rear RH)	Heated oxygen sensor (rear RH)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (rear RH)
			Idle	Engine cold	Approx. 0	
				After warm up	0.1—0.9	
3E	Mass air flow sensor	Mass air flow sensor	Ignition switch ON		1.0—1.5	• Mass air flow sensor
			Idle		1.5—2.5	
3F	Barometric pressure	EGR boost sensor	Ignition switch ON		Approx. 4	• EGR boost sensor
3G	—	—	—		—	—
3H	Heated oxygen sensor (rear LH)	Heated oxygen sensor (rear LH)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (rear RH)
			Idle	Engine cold	Approx. 0	
				After warms up	0.1—0.9	
3I	Heated oxygen sensor (front RH)	Heated oxygen sensor (front RH)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (front RH)
			Idle	Engine cold	Below 0.5	
				After warms up	0.1—0.9	
			Acceleration (After warms up)		0.5—1.0	
			Deceleration (After warms up)		0—0.5	
3J	—	—	—		—	—
3K	EGR boost	EGR boost sensor	Ignition switch ON		Approx. 4	• EGR boost sensor
3L	—	—	—		—	—
3M	Heated oxygen sensor (front LH)	Heated oxygen sensor (front LH)	Idnition switch ON		Below 1.0	• Heated oxygen sensor (front LH)
			Idle	Engine cold	Below 0.5	
				After warms up	0.1—0.9	
			Acceleration (After warms up)		0.5—1.0	
			Deceleration (After warms up)		0—0.5	
3N	—	—	—		—	—
3O	—	—	—		—	—
3P	—	—	—		—	—
3Q	Engine coolant temperature	Engine coolant temperature sensor	Ignition switch ON	Engine coolant temp. 20°C {68°F}	Approx. 3	• Engine coolant temperature sensor
				After warms up	Approx. 0.8	

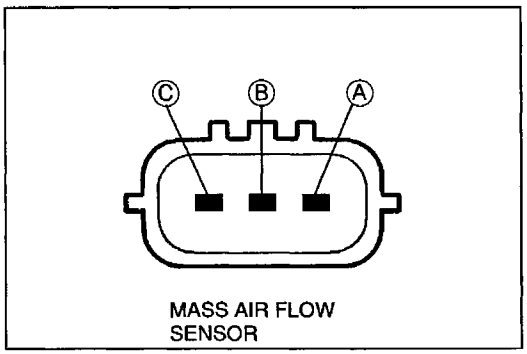
B+: Battery positive voltage

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
3R	EGR valve position	EGR valve position sensor	Ignition switch ON		Approx. 0.8	• EGR valve position sensor
			Driving		Approx. 2.2—2.7	
3S	Knock	Knock sensor	Ignition switch ON		Approx. 0.7	• Knock sensor
3T	Power steering pressure	Power steering pressure switch	Ignition switch ON		B+	• Power steering pressure switch
			Idle	P/S not operating		
				P/S operating	Below 1.0	
3U	—	—	—		—	—
3V	Intake-air temperature	Intake air temperature sensor	Ignition switch ON	Intake-air temperature 20°C {68°F}	Approx. 3	• Intake air temperature sensor
3W	—	—	—		—	—
3X	Closed throttle position	Closed throttle position switch (In throttle position sensor)	Ignition switch ON	Accelerator pedal released	Below 1.0	• Throttle position sensor
				Accelerator pedal depressed	B+	
3Y	—	—	—		—	—
3Z	—	—	—		—	—
3AA	—	—	—		—	—
3AB	Analogue sensor ground	Ground	Constant		Below 1.0	• PCM terminal 3AB harness (Open)
4A	Power supply	Main relay (FUEL INJ relay)	Ignition switch OFF		Below 1.0	• Main relay
			Ignition switch ON		B+	
4B	Back-up power supply	Battery	Constant		B+	• PCM terminal 4B — Battery harness and connector
4C	Power supply (ATX)	Main relay (FUEL INJ relay)	Ignition switch OFF		Below 1.0	• Main relay
			Ignition switch ON		B+	
4D	Output device ground	Ground	Constant		Below 1.0	• PCM terminal 4D harness (Open)
4E	Heated oxygen sensor (front RH) heater control	Heated oxygen sensor (front RH)	Idle		Below 1.0	• Heated oxygen sensor
4F	SGC	Camshaft position sensor (In distributor)	Ignition switch ON		0 or Approx. 5.0	• Camshaft position sensor
			Idle		Approx. 2.5	
4G	EGR vent control	EGR solenoid valve (vent)	Ignition switch ON		B+	• EGR solenoid valve (vent)
			Idle			
4H	—	—	—		—	—
4I	Heated oxygen sensor (front LH) heater control	Heated oxygen sensor (front LH)	Idle		Below 1.0	• Heated oxygen sensor
4J	—	—	—		—	—
4K	EGR vacuum control	EGR solenoid valve (vacuum)	Ignition switch ON		B+	• EGR solenoid valve (vacuum)
			Idle			

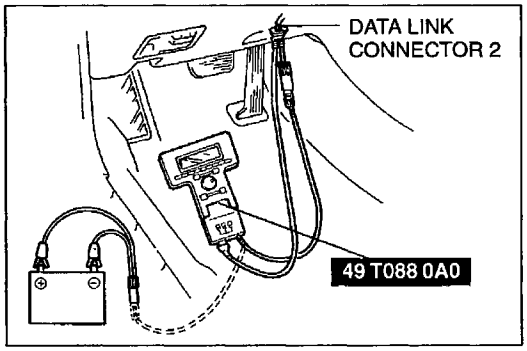
B+: Battery positive voltage

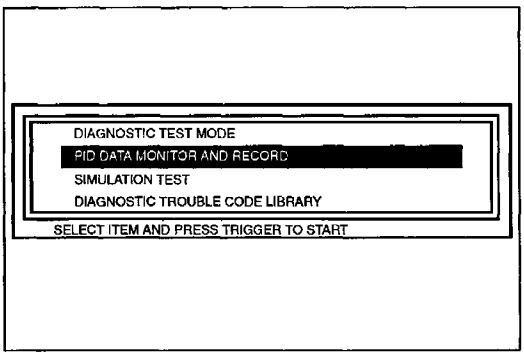
Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
4L	—	—	—		—	—
4M	Idle air control	Idle air control valve	Ignition switch ON		Approx. 6	• Idle air control valve
			Idle (After warms up)		Approx. 10	
4N	—	—	—		—	—
4O	Purge control	Purge solenoid valve	Ignition switch ON		B+	• Purge solenoid valve
			Idle			
4P	—	—	—		—	—
4Q	Fuel injector control No.1	Fuel injector (No.1 cylinder)	Ignition switch ON/Idle		B+	• Fuel injector
4R	—	—	—		—	—
4S	IGT control	Ignition control module (Distributor)	Ignition switch ON		Approx. 0	• Ignition control module
			Idle		Approx. 0.6	
4T	—	—	—		—	—
4U	Fuel injector control No.2	Fuel injector (No.2 cylinder)	Ignition switch ON/Idle		B+	• Fuel injector
4V	Diagnostic test mode	Data link connector (Terminal TEN)	Ignition switch ON	Open terminal TEN	B+	• PCM terminal 1I — Data link connector terminal TEN harness
				Terminal TEN ground	Below 1.0	
4W	—	—	—		—	—
4X	—	—	—		—	—
4Y	Fuel injector control No.3	Fuel injector (No.3 cylinder)	Ignition switch ON/Idle		B+	• Fuel injector
4Z	—	—	—		—	—
4AA	—	—	—		—	—
4AB	Fuel injector ground	Ground	Constant		Below 1.0	• PCM terminal 4AB harness (Open)
4AC	Fuel injector control No.4	Fuel injector (No.4 cylinder)	Ignition switch ON/Idle		B+	• Fuel injector
4AD	—	—	—		—	—
4AE	—	—	—		—	—
4AF	PCM ground	Ground	Constant		Below 1.0	• PCM terminal 4AF harness (Open)
4AG	Fuel injector control No.5	Fuel injector (No.5 cylinder)	Ignition switch ON/Idle		B+	• Fuel injector
4AH	NE⊕	Crankshaft position sensor	Ignition switch ON		0	• Crankshaft position sensor
			Idle		Approx. 0	
4AI	—	—	—		—	—
4AJ	PCM ground	Ground	Constant		Below 1.0	• PCM terminal 4AJ harness (Open)
4AK	Fuel injector control No.6	Fuel injector (No.6 cylinder)	Ignition switch ON/Idle		B+	• Fuel injector
4AL	NE⊖	Crankshaft position sensor	Constant		0	• Crankshaft position sensor
4AM	—	—	—		—	—
4AN	PCM ground	Ground	Constant		Below 1.0	• PCM terminal 4AN harness (Open)





MASS AIR FLOW SENSOR





MASS AIR FLOW SENSOR

Inspection

Using SSTs (Monitor, engine signal)

1. Check the mass air flow sensor for damage and cracks.
2. Remove the PCM. (Refer to page F1–29.)
3. Connect the **SSTs** to the PCM.
4. Measure the voltage at the PCM terminals as shown in the table.

Specification B+: Battery positive voltage

Terminal	Ignition switch ON	Idle
3E	1.0—1.5 V	1.5—2.5 V

5. If not as specified, inspect following.
   Harness continuity
   - Between PCM terminal 3E and mass air flow sensor terminal B
   - Between PCM terminal 4D and mass air flow sensor terminal A
   - Between PCM terminal 4A and mass air flow sensor terminal C
6. If there is incorrect terminal voltage or harness continuity, replace the mass air flow sensor.
   (Refer to page F1–6.)

Using SSTs (NGS)

1. Check the mass air flow sensor for damage and cracks.
2. Warm up the engine to nomal operating temperature.
3. Shift the selector lever to P.
4. Turn off all electric loods.
   - Headlight
   - Blower motor
   - Rear window defroster
   - Power steering
5. Wait until the cooling fan stops.
6. Connect the **SSTs** to the data link connector 2.
7. Select the PID/DATA MONITOR AND RECORD function of the NGS.
8. Select "MAF V" on the NGS display. NGS measures and shows the voltage.

Specification

	Ignition switch ON	Idle
Voltage (V)	1.0—1.5	1.5—2.5

9. If not as specified, perform following inspection.
   Harness continuity.
   - Between PCM terminal 3E and mass air flow sensor terminal B
   - Between PCM terminal 4D and mass air flow sensor terminal A
   - Between PCM terminal 4A and mass air flow sensor terminal C
10. If there is incorrect terminal voltage or harness continuity, replace the mass air flow sensor.
    (Refer to page F1–6.)

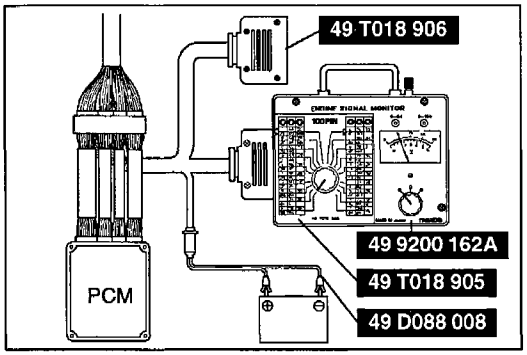
Note

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

Specification

Engine speed (rpm)	Intake mass air flow (g/s)	Load (%)
600—700 (Idle)	2.8—3.9	19.0—24.0
Approx. 2,500*	10.1—11.2	16.3—19.4

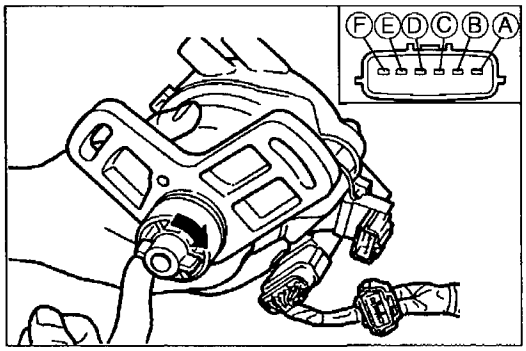
* No load, in neutral or park



CAMSHAFT POSITION SENSOR (IN DISTRIBUTOR)

Inspection

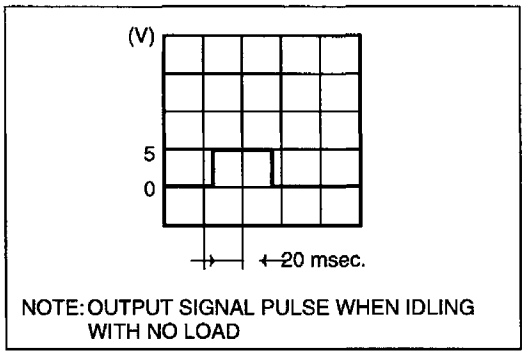
1. Remove the distributor. (Refer to section G.)



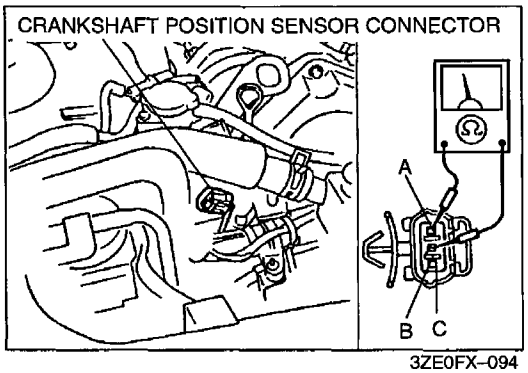
2. Remove the PCM. (Refer to page F1–29.)
3. Connect the **SSTs** to the PCM.
4. Turn the ignition switch to ON.
5. Rotate the distributor drive by hand and check the output signal.

Specification

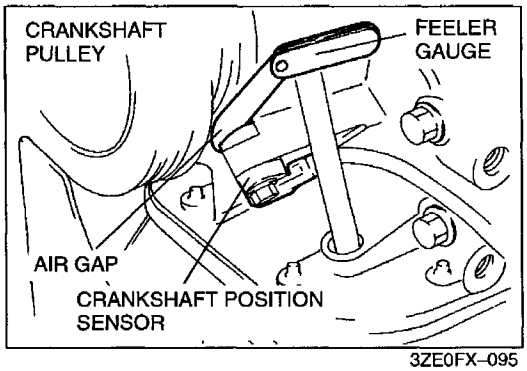
Signal	Terminal	Voltage
SGC	4F	Approx. 5 V (1 pulse/rev)



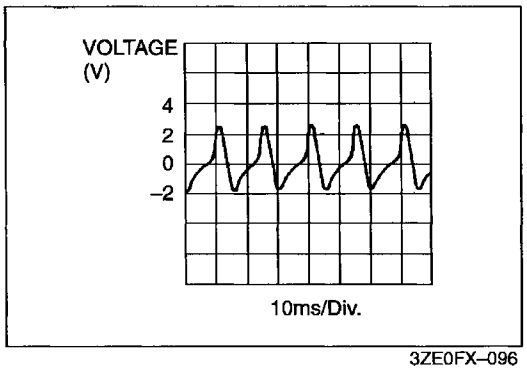
6. If not as specified, inspect following.
   Harness continuity
   - Between PCM terminal 4F and distributor (6-pin) terminal D
   - Between PCM terminal 4D and distributor (6-pin) terminal A
   - Between PCM terminal 4A and distributor (6-pin) B terminal
7. If there is incorrect terminal voltage or harness continuity, replace the distributor. (Refer to section G.)



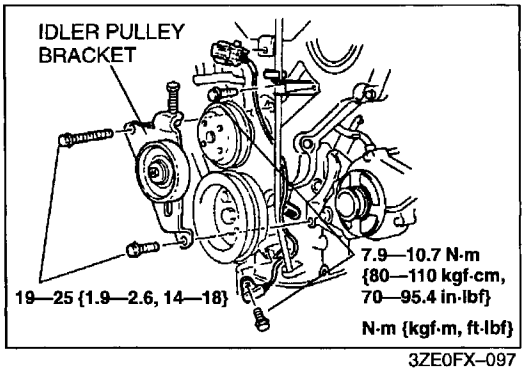
3ZE0FX–094



3ZE0FX–095



3ZE0FX–096



3ZE0FX–097

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: 520—580 Ω [20°C {68°F}]

3. If not as specified, replace the crankshaft position sensor.

Air gap

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

   Specification: 1.0—2.0 mm {0.040—0.080 in}

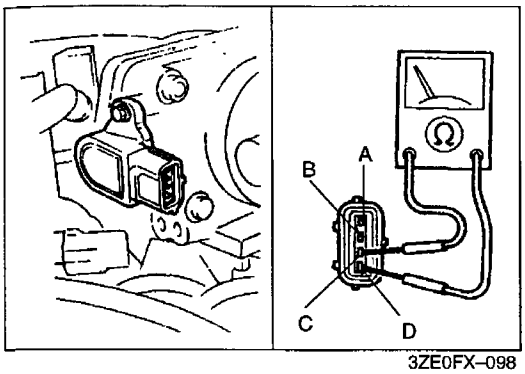
2. If not as specified, replace the crankshaft pulley or the crankshaft position sensor. (Refer to below.)

NE signal illustration

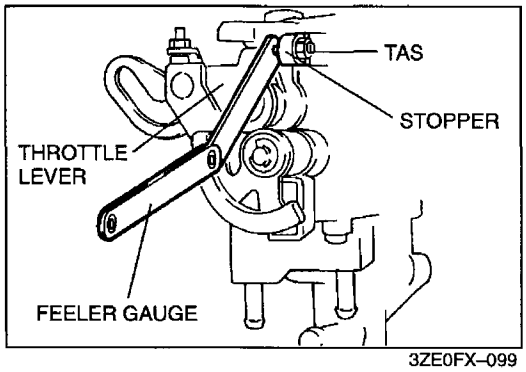
- After warm-up idle with no load condition.

Replacement

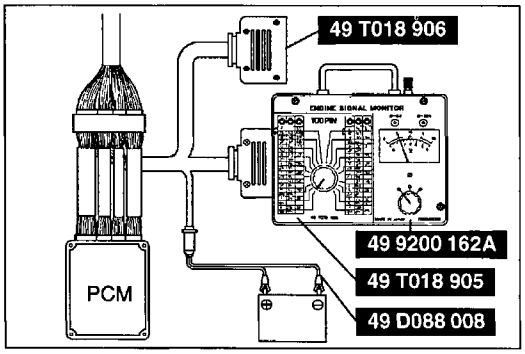
1. Disconnect the negative battery cable.
2. Remove the idler pulley bracket.
3. Remove the dipstick pipe.
4. Remove the crankshaft position sensor.
5. Install in the reverse order of removal.
6. Adjust the drive belt deflections. (Refer to section B1.)

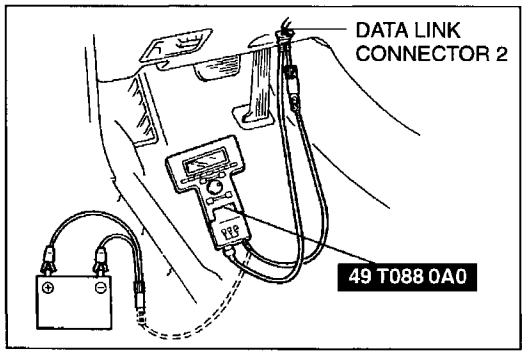


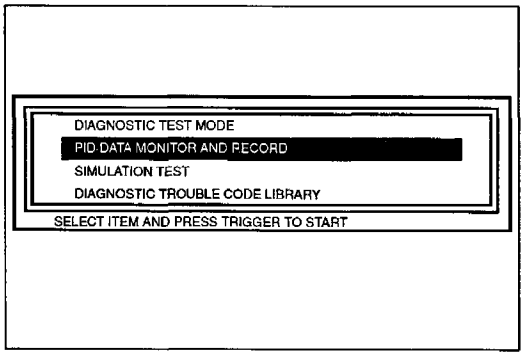
3ZE0FX–098



3ZE0FX–099







THROTTLE POSITION SENSOR

Inspection

Closed throttle position switch

1. Verify that the throttle valve is closed throttle position.
2. Disconnect the throttle position sensor connector.
3. Check for continuity between throttle position sensor connector terminals C and D by using an ohmmeter.
4. If no continuity, adjust the throttle position sensor.
5. Insert a 0.50 mm {0.020 in} feeler gauge between the throttle adjusting screw (TAS) and the throttle lever. Verify that there is no continuity.
6. If there is continuity, adjust the throttle position sensor. (Refer to page F1–42.)

Throttle position sensor

Using SSTs (Monitor, engine signal)

1. Remove the PCM. (Refer to page F1–29.)
2. Connect the **SSTs** to the PCM.
3. Verify that the throttle valve is at the closed throttle position.
4. Turn the ignition switch to ON.
5. Measure the PCM terminal 3B voltage by using a voltmeter.

Specification
Closed throttle position: 0.1—1.1 V
Wide open throttle: 2.8—4.5 V
(Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)

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

Using SSTs (NGS)

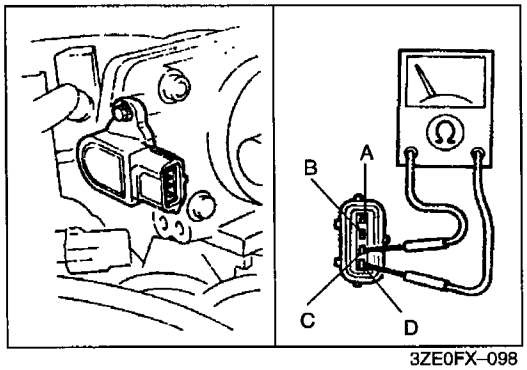
1. Connect the **SSTs** to the data link connector 2.
2. Verify that the throttle valve is at the closed throttle position.
3. Turn the ignition switch to ON.
4. Select the PID/DATA MONITOR AND RECORD function of the NGS.
5. Select "TP V" on the NGS display. NGS measures and shows the voltage.

Specification
Closed throttle position: 0.1—1.1 V
Wide open throttle: 2.8—4.5 V
(Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)

6. If not as specified, adjust the throttle position sensor. (Refer to page F1–42.)

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.**



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Closed throttle position switch
1. Verify that the throttle valve is closed throttle position.
2. Disconnect the throttle position sensor connector.
3. Loosen the attaching screws.
4. Insert a feeler gauge between the throttle adjusting screw (TAS) and the throttle lever. Adjust the continuity between the closed throttle position switch terminals C and D by using an ohmmeter.

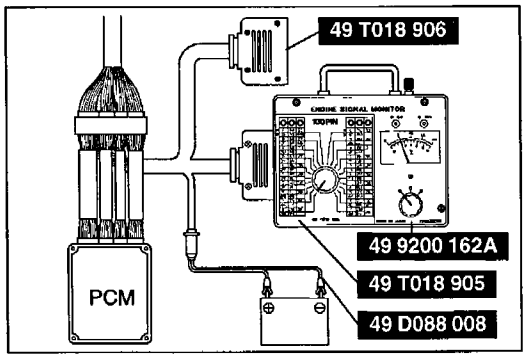
Specification

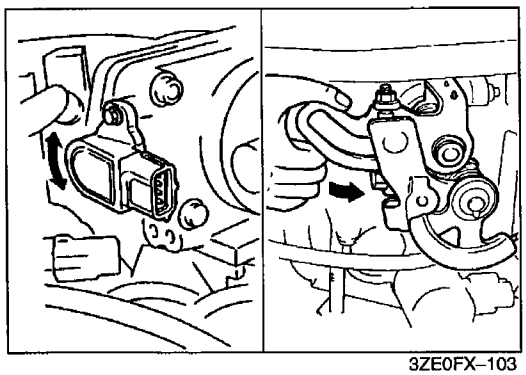
Clearance	Continuity
0.15 mm {0.006 in}	Yes
0.50 mm {0.020 in}	No

5. Tighten the attaching screws.

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

6. If not adjusted, replace the throttle position sensor. (Refer to page F1–43.)




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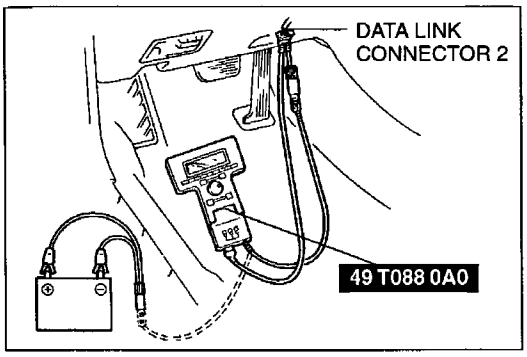
Throttle position sensor
Using SSTs (Monitor, engine signal)
1. Remove the PCM. (Refer to page F1–29.)
2. Connect the **SSTs** to the PCM.
3. Verify that the throttle valve is at the closed throttle position.
4. Loosen the attaching screws.
5. Turn the ignition switch to ON.
6. Adjust the throttle position sensor so that the PCM terminal 3B voltage is as specified, by using a voltmeter.

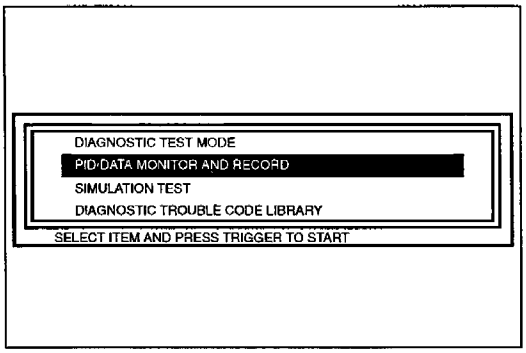
   Specification
   Closed throttle position: 0.1—1.1 V
   Wide open throttle: 2.8—4.5 V
   (Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)

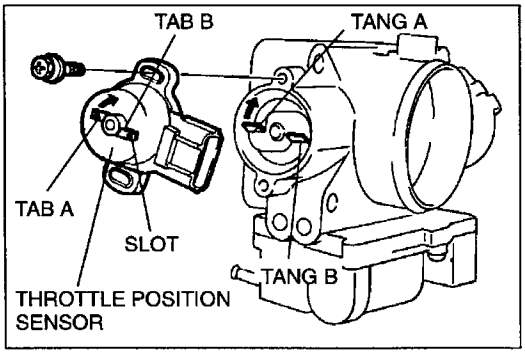
7. Tighten the attaching screws.

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

8. If not adjusted, inspect the throttle position sensor harness.
9. If harness is OK, replace the throttle position sensor.







Using SSTs (NGS)

1. Connect the **SSTs** to the data link connector 2.
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. Select the PID/DATA MONITOR AND RECORD function of the NGS.
6. Select "TP V" on the NGS display. NGS measures and shows the voltage.

   Specification
   Closed throttle position: 0.1—1.1 V
   Wide open throttle: 2.8—4.5 V
   (Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)

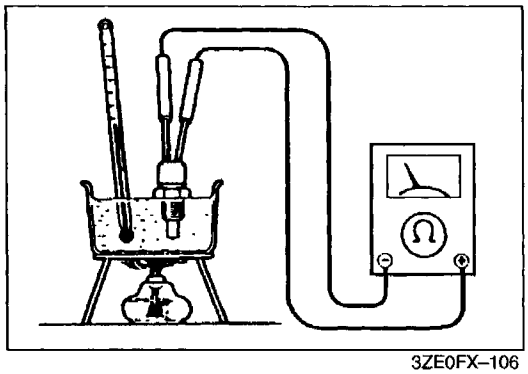
7. Tighten the attaching screws.

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

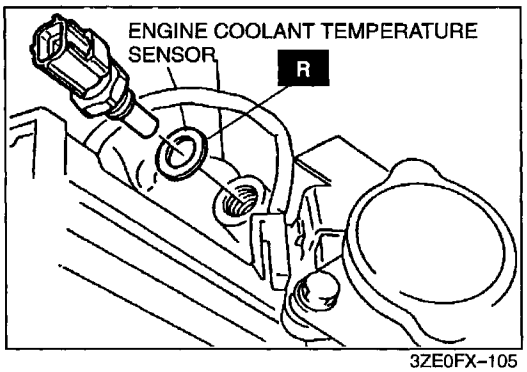
8. If not adjusted, replace the throttle position sensor.

Replacement

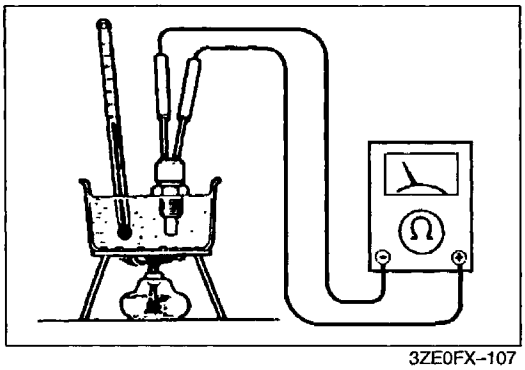
1. Disconnect the throttle position sensor connector.
2. Remove the attaching screws.
3. Remove the throttle position sensor.
4. Verify that the throttle valve is at the closed throttle position.
5. Open the throttle valve slightly and catch the tang of the throttle body on the throttle position sensor plastic tabs. Align tang A on the 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 and closed throttle position switch. (Refer to page F1–42.)



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3ZE0FX-107

ENGINE COOLANT TEMPERATURE SENSOR

Inspection

1. Remove the engine coolant temperature sensor.
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

Temperature (°C {°F})	Resistance (kΩ)
20 {68}	2.2—2.7
80 {176}	0.29—0.35

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

Tighting torque:
16—23 N·m {1.6—2.4 kgf·m, 12—17 ft·lbf}

INTAKE AIR TEMPERATURE SENSOR

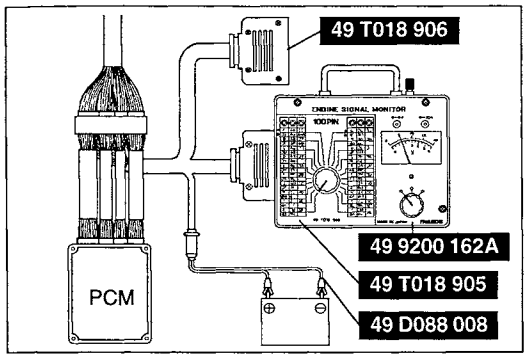
Inspection

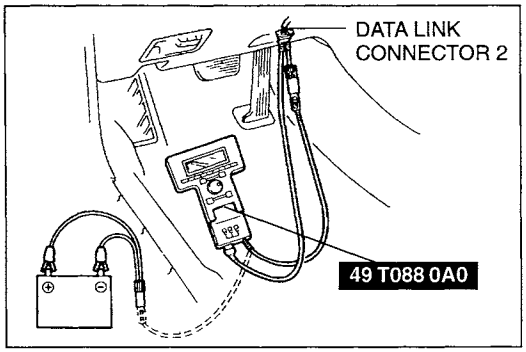
1. Remove the intake air temperature sensor.
2. Measure the resistance of the sensor by using an ohmmeter.

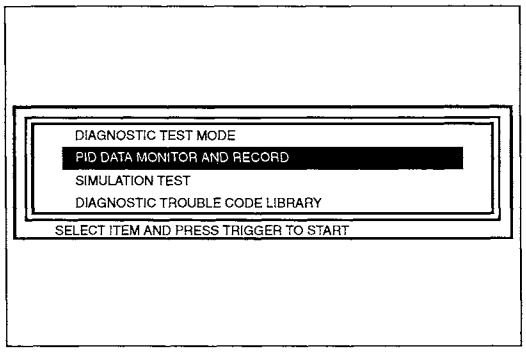
Specification

Temperature (C°{F°})	Resistance (kΩ)
20 {68}	2.2—2.7
80 {176}	0.29—0.35

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







HEATED OXYGEN SENSOR (FRONT, REAR)

Inspection

Using SSTs (Monitor, engine signal)

1. Remove the PCM. (Refer to page F1–29.)
2. Connect the **SSTs** to the PCM.
3. Warm up the engine to normal operating temperature.
4. Measure the voltage at PCM terminal 2K, 2L 3C and 3D.

Specification

Engine condition	PCM terminal voltage (V)			
	3I	3M	3D	3H
	Heated oxygen sensor (front RH)	Heated oxygen sensor (rear RH)	Heated oxygen sensor (front LH)	Heated oxygen sensor (rear LH)
IG-ON	Below 1.0			
Idle*	0.1—0.9			
Deceleration	0—0.5	0—1.0	0—0.5	0—1.0
Acceleration	0.5—1.0	0—1.0	0.5—1.0	0—1.0

* After warms up

5. If not as specified, inspect following.
   - Intake-air system
   - Fuel system
   - On-board diagnostic system

   If these systems are OK, replace the heated oxygen sensor.

Tightening torque:
30—49 N·m {3.0—5.0 kgf·m, 22—36 ft·lbf}

Using SSTs (NGS)

1. Connect the **SSTs** to the data link connector 2.
2. Select the PID/DATA MONITOR AND RECORD function of NGS.
3. Select "FHO2S R", "RHO2S R", "FHO2S L" and "RHO2S L" on the NGS display. NGS measures and shows the voltage.

Specification

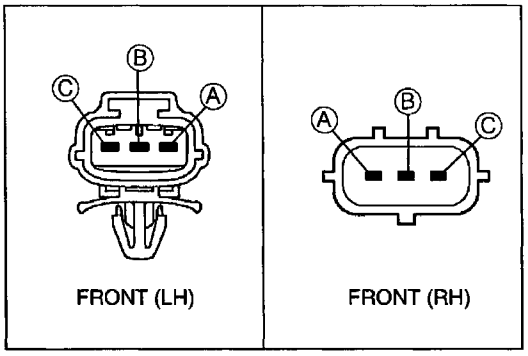
Engine condition	Voltage (V)			
	FHO2S R	RHO2S R	FHO2S L	RHO2S L
IG-ON	Below 1.0			
Idle*	0.1—0.9			
Deceleration	0—0.5	0—1.0	0—0.5	0—1.0
Acceleration	0.5—1.0	0—1.0	0.5—1.0	0—1.0

* After warms up

4. If not as specified, inspect following.
   - Intake-air system
   - Fuel system
   - On-Board diagnosis system

   If these systems are OK, replace the heated oxygen sensor.

Tightening torque:
30—49 N·m {3.0—5.0 kgf·m, 22—36 ft·lbf}



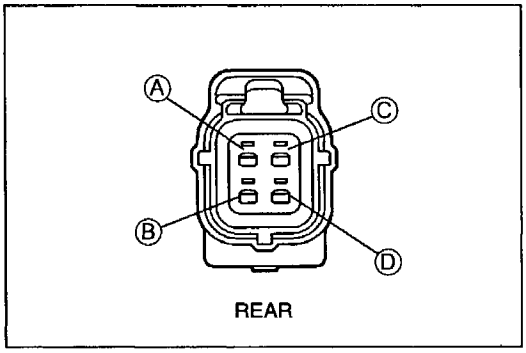
Heater

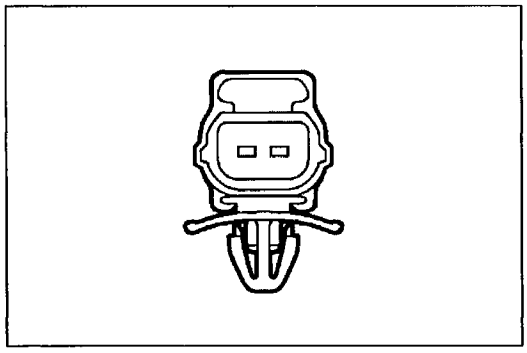
1. Disconnect the heated oxygen sensor connector.
2. Measure the resistance between heated oxygen sensor terminals B and C by using an ohmmeter.

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

3. If not as specified, replace the heated oxygen sensor.

   Tightening torque:
   30—49 N·m {3.0—5.0 kgf·m, 22—36 ft·lbf}





KNOCK SENSOR

Inspection

1. Verify that the ignition switch is OFF.
2. Disconnect the knock sensor connector.
3. Measure the resistance between knock sensor terminal A and the knock sensor body by using an ohmmeter.

   Specification: Approx. 560 kΩ [20°C {68°F}]

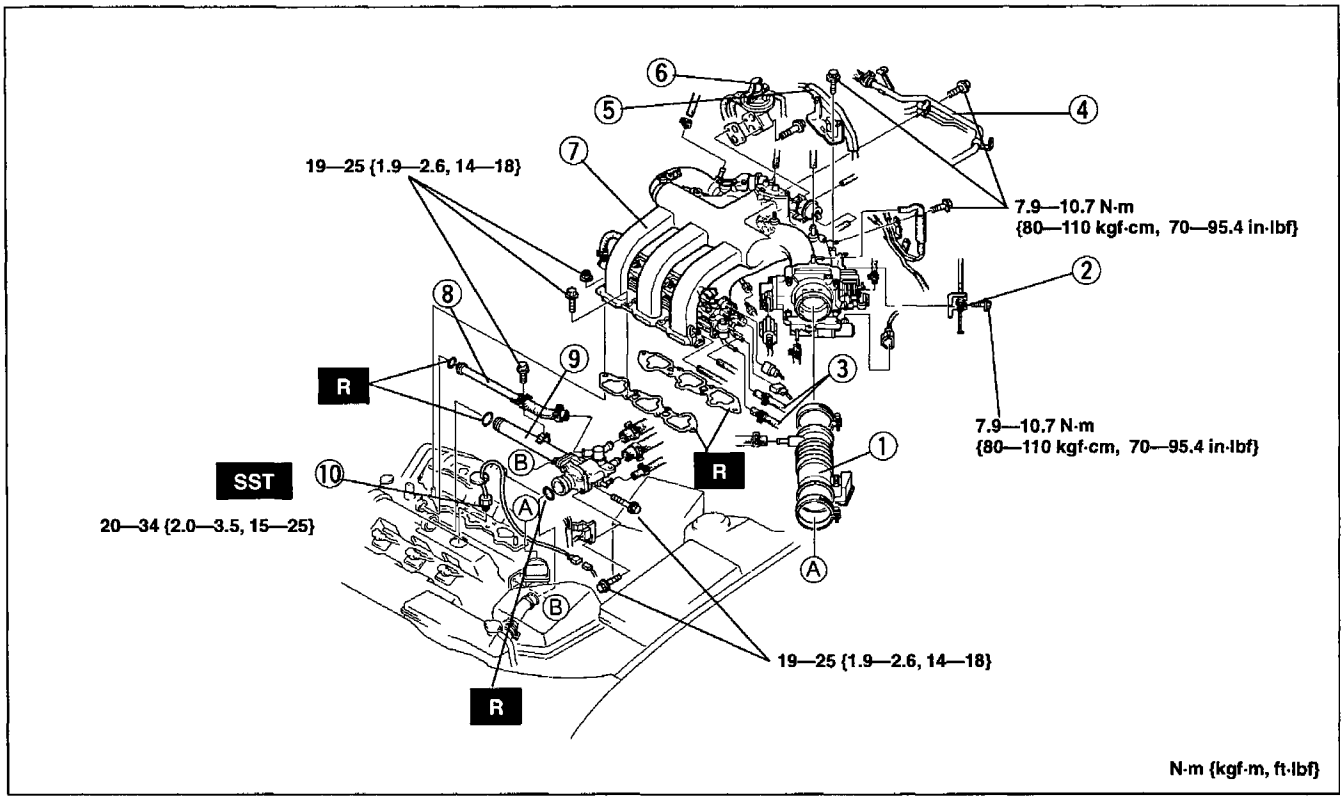
4. If not as specified, replace the knock sensor. (Refer to page F1–47.)

Replacement

Warning

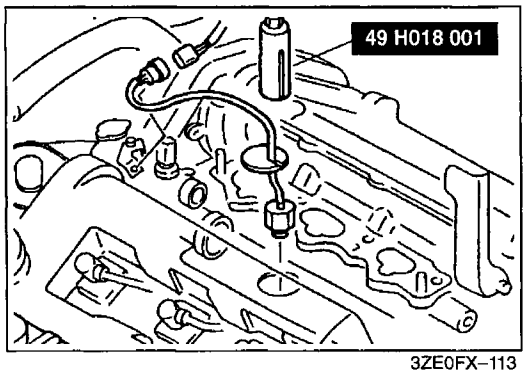
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F1–8.**

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.



3ZE0FX–112

1. Air intake hose
2. Accelerator cable
3. Fuel pipes
4. Pipe
5. Harness
6. EGR valve
7. Intake manifold
8. Bypass pipe
9. Water pipe
10. Knock sensor
    Removal / Installation note ..... below

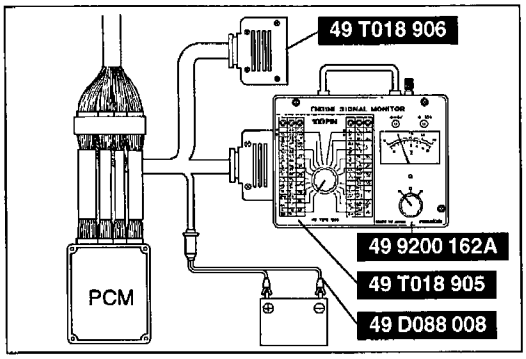


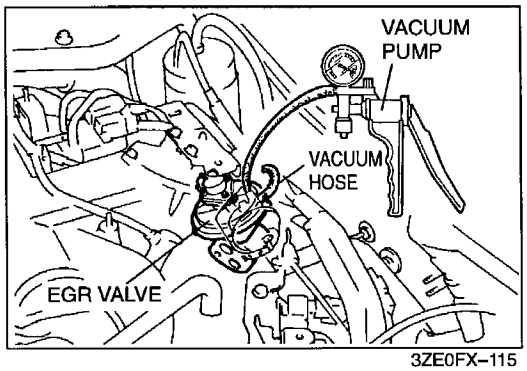
3ZE0FX–113

Removal / Installation note

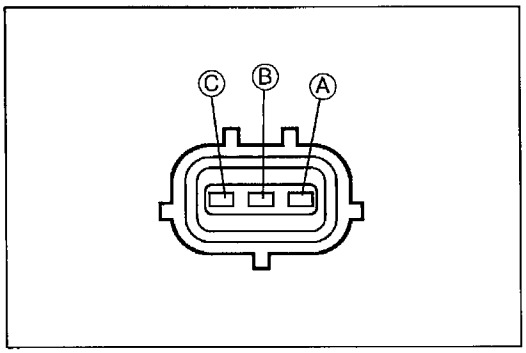
Knock sensor

Use the **SST** to remove and install the knock sensor.





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EGR VALVE POSITION SENSOR

System Inspection

1. Remove the PCM. (Refer to page F1–29.)
2. Connect the **SSTs** to the PCM.
3. Disconnect the vacuum hose from the EGR valve and connect the vacuum pump to the EGR valve.
4. Turn the ignition switch to ON.
5. Measure the voltage at the terminals as shown in the table.

Specification

Terminal	PCM	Vacuum	
		0 kPa {0 mmHg, 0 inHg}	20.0 kPa {150 mmHg, 5.90 inHg}
A	3AB	Approx. 0 V	
B	3A	4.5—5.5 V	
C	3R	Approx. 0.8 V	Approx. 4 V

6. If not as specified, inspect the harness between EGR valve position sensor and PCM.
7. If the harnesses are OK, replace the EGR valve position sensor.

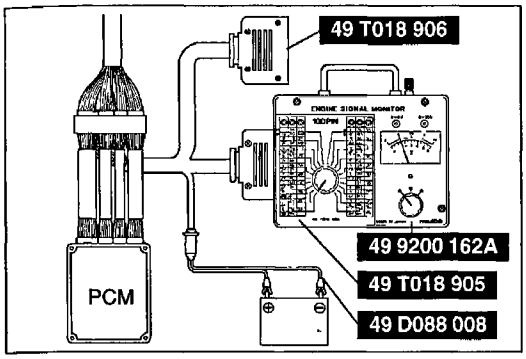
Inspection

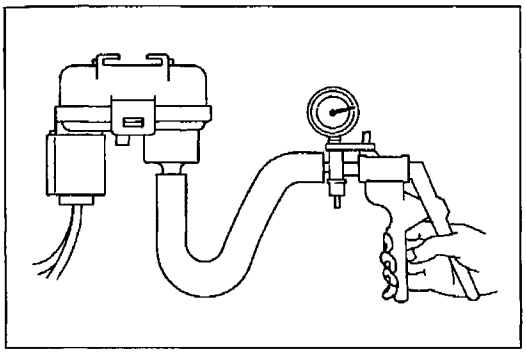
1. Disconnect the EGR valve position sensor connector.
2. Disconnect the vacuum hose from the EGR valve and connect the vacuum pump to the EGR valve.
3. Use an ohmmeter to measure the resistance between the terminals as shown in the table.

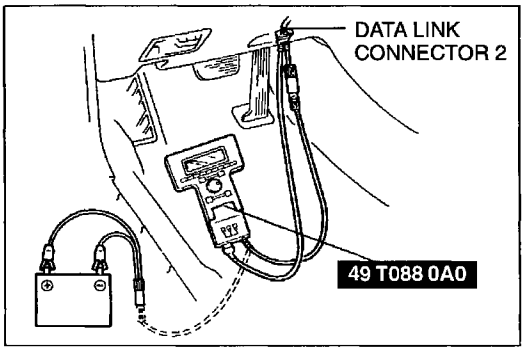
Specification

Terminal	Vacuum	
	0 kPa {0 mmHg, 0 inHg}	20.0 kPa {150 mmHg, 5.90 inHg}
A—B	Approx. 2.7 kΩ	
A—C	Approx. 0.5 kΩ	Approx. 2.7 kΩ
B—C	Approx. 2.4 kΩ	Approx. 0.1 kΩ

4. If not as specified, replace the EGR valve. (Refer to page F1–66.)







EGR BOOST SENSOR

Inspection

Using SSTs (Monitor, engine signal)

1. Remove the PCM. (Refer to page F1–29.)
2. Connect the **SSTs** to the PCM and connect a vacuum pump to the EGR boost sensor.
3. Turn the ignition switch to ON.
4. Measure the voltage at the terminals as shown in the specification.

Specification

Vacuum or Pressure	PCM terminal	
	3F	3K
0 kPa {0 mmHg, 0 inHg}	Approx. 4 V	Approx. 4 V

5. If not as specified, replace the EGR boost sensor.

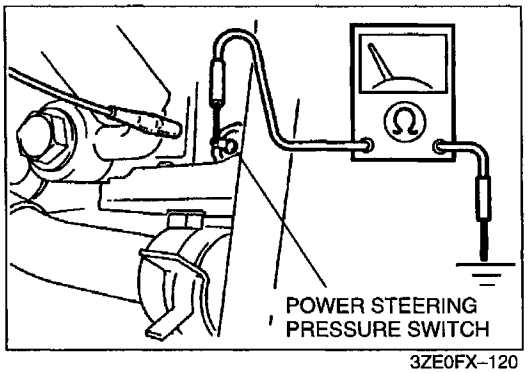
Using SSTs (NGS)

1. Connect the **SSTs** to the data link connector 2.
2. Select the PID/DATA MONITOR AND RECORD function of NGS and connect a vacuum pump.
3. Select the "BARO V" and "EGRB V" on the NGS display. NGS measures and shows the voltage.

Specification

Vacuum or Pressure	Barometric pressure signal voltage	EGR boost signal voltage
0 kPa {0 mmHg, 0 inHg}	Approx. 4 V	Approx. 4 V

4. If not as specified, replace the EGR boost sensor.



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POWER STEERING PRESSURE SWITCH

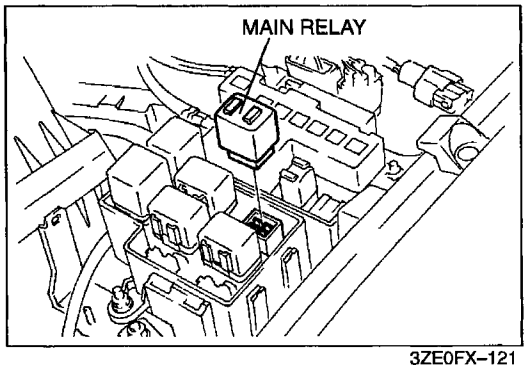
Inspection

1. Disconnect the power steering pressure switch connector.
2. Start the engine.
3. Check continuity of the switch by using a ohmmeter.

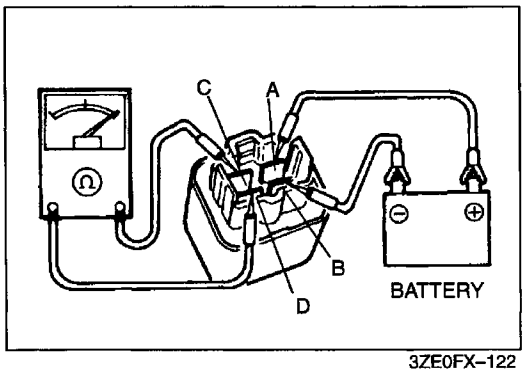
Specification

Steering wheel condition	Continuity
Turned	Yes
Straight ahead	No

4. If not as specified, replace the power steering pressure switch. (Refer to section N.)



3ZE0FX-121



3ZE0FX-122

MAIN RELAY

System Inspection

1. Listen for main relay operation sound while turning ignition switch to ON and OFF.
2. If no sound was heard, inspect following.
   - Main relay
   - Harness and connector between ignition switch and main relay

Inspection

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

Specification

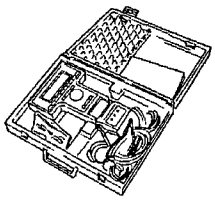
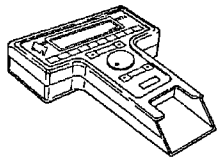
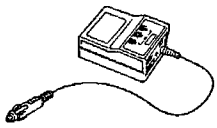
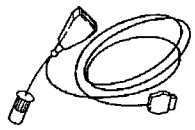
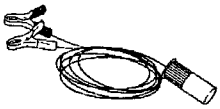
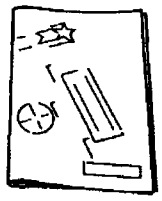
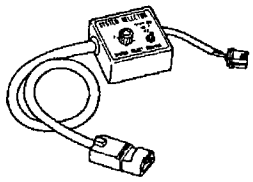
B+: Battery positive voltage

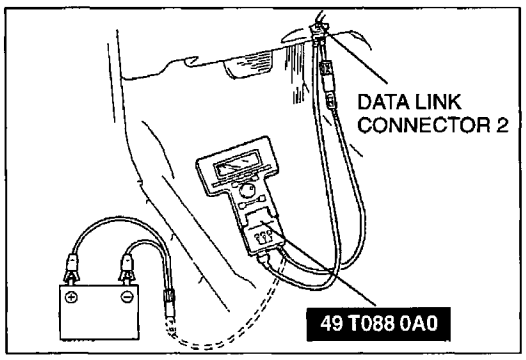
Terminal A—B	Terminal C—D
B+ applied	Yes
B+ not applied	No

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

IDLE AIR CONTROL (IAC) SYSTEM

PREPARATION
SST

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



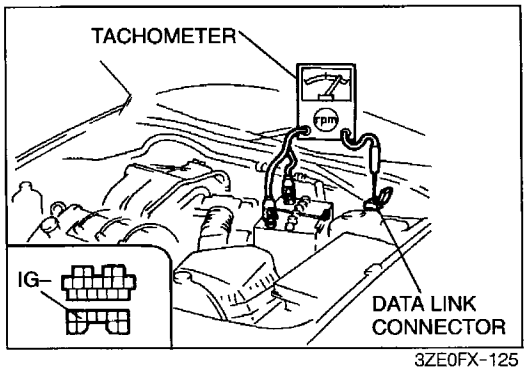
SYSTEM INSPECTION

1. Start the engine and run it at idle.
2. Disconnect the IAC valve connector and verify that the engine rotation becomes rough or the engine stalls.
3. If the engine condition will not change, do as follows.
   (1) Connect the **SSTs** (NGS).
   (2) Verify 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 verify that the idle speed increases.
      I. If the idle speed increases, replace the PCM. (Refer to page F1–29.)
      II. If the idle speed does not change, replace the BAC valve. (Refer to page F1–6.)
4. Warm up the engine to normal operating temperature and run it at idle.
5. Turn the electrical loads on and verify that the engine speed is within the specification.

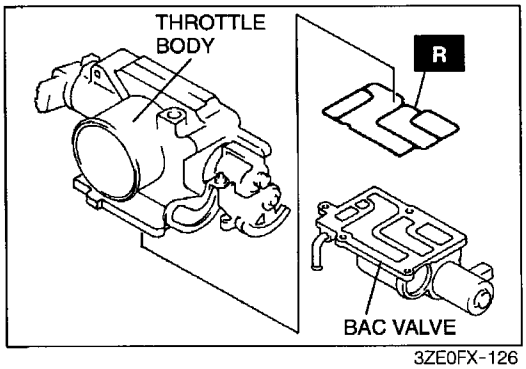
Engine speed (rpm)

No load	600—700
E/L operated	600—700
A/C operated	775—875
P/S operated	600—700

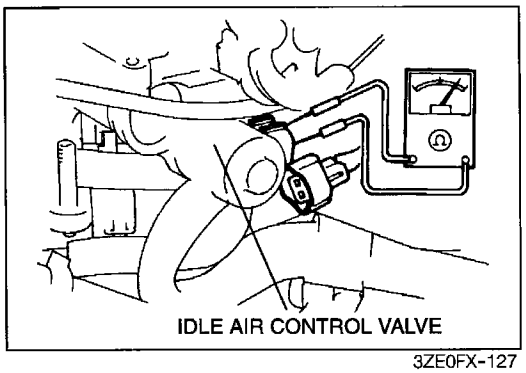
6. If not as specified, check the related switches and wiring harnesses.



3ZE0FX-125



3ZE0FX-126



3ZE0FX-127

BAC VALVE

System Inspection

1. Connect the data link connector terminals TEN and GND by using the **SST** (System selector).
2. Connect a tachometer to the data link connector terminal IG–.
3. Start the engine at engine cold condition.
4. Verify that the idle speed decreases gradually as the engine warms up.
5. If not, check the water hose of the BAC valve. (Refer to section E.)
6. If water hose is OK, replace the BAC valve.

Replacement

1. Remove the throttle body assembly. (Refer to page F1–6.)
2. Remove the BAC valve.
3. With a new gasket, install in the reverse order of removal.

Tightening torque:
2.8—4.0 N·m {29—41 kgf·cm, 25—35 in·lbf}

IDLE AIR CONTROL VALVE

Inspection

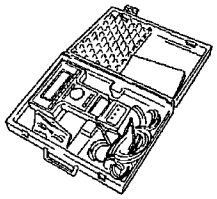
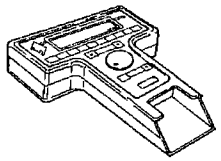
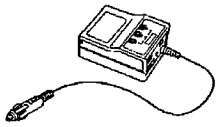
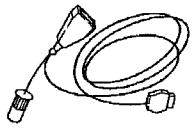
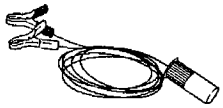
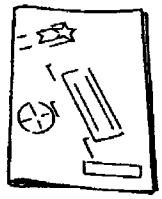
1. Verify that the ignition switch is OFF.
2. Disconnect the idle air control valve connector.
3. Measure the resistance of the idle air control valve by using an ohmmeter.

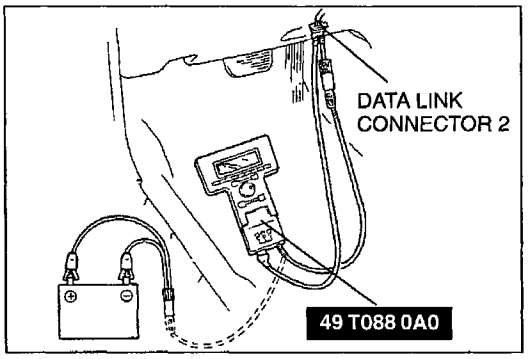
Specification: 10.7—12.3 Ω [20°C {68°F}]

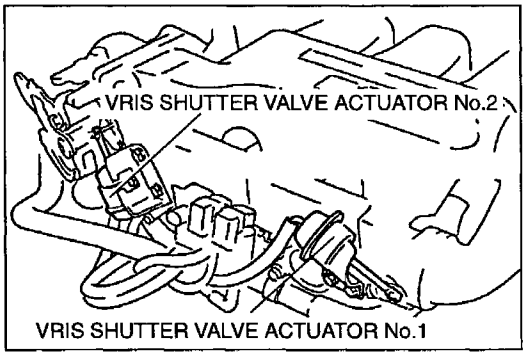
4. If not as specifed, replace the BAC valve. (Refer to above.)

VARIABLE RESONANCE INDUCTION SYSTEM (VRIS)

PREPARATION
SST

49 T088 0A0 NGS set 	For inspection of VRIS	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of VRIS
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of VRIS	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of VRIS
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of VRIS	49 T088 008A Instruction Manual 	For inspection of VRIS
49 T088 010B Program Card 	For inspection of VRIS	—	—





SYSTEM INSPECTION

1. Start the engine.
2. Verify that the rods of the shutter valve actuator 1 and 2 are not pulled.
3. If the rods are pulled, do as follows.
   (1) Stop the engine.
   (2) Connect the **SSTs** (NGS).
   (3) Verify that diagnostic trouble code No. P1521 or P1522 is not displayed. If code No. P1521 or P1522 is shown, carry out troubleshooting of the code No. P1521, P1522. (Refer to page F1–75.)
   (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 VRIS solenoid valve from OFF to ON by using the "VRISV1" or "VRISV2" and check if operation sound of the valve is heard.
      IV. If the operation sound is heard, check the following.
      • VRIS shutter valve actuators (Refer to page F1–56.)
      V. If the operation sound is not heard, check the following.
      • VRIS solenoid valve (Refer to page F1–56.)
4. Check the rod operation under the following conditions.

Rod operation

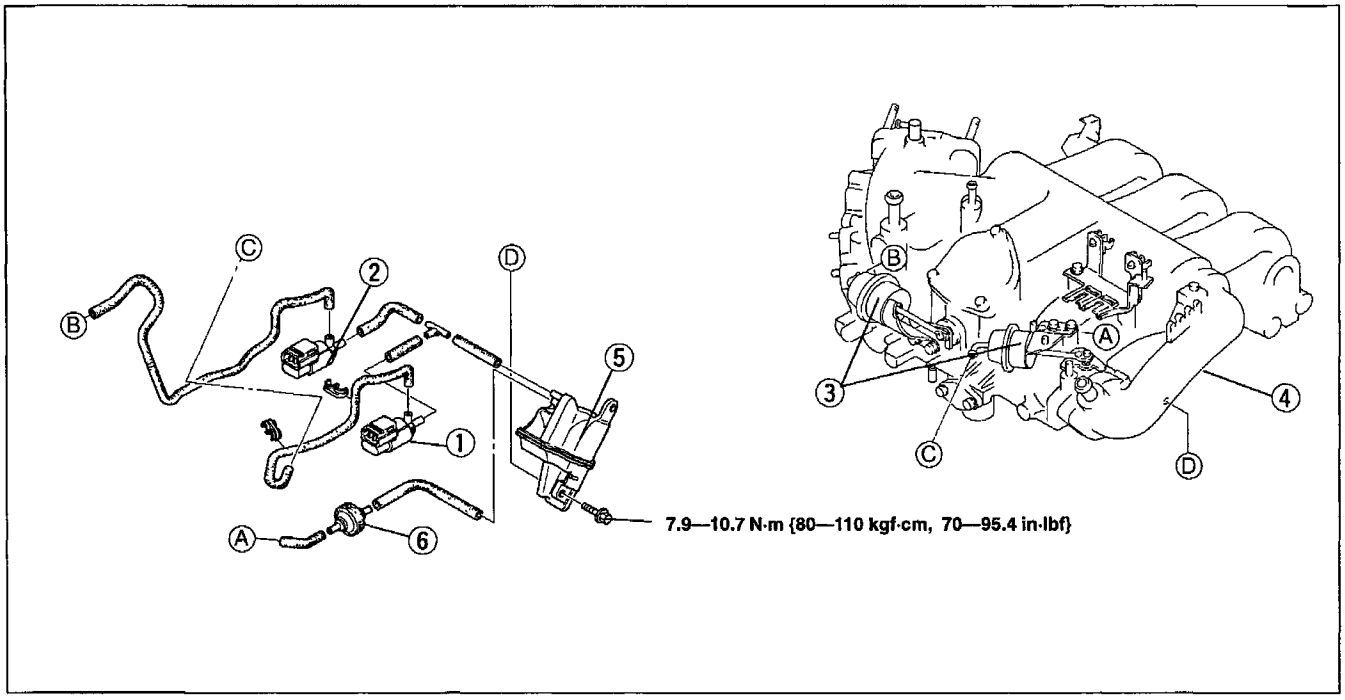
Engine speed (rpm)	0	3750	4250	6250	7500
VRIS shutter valve actuator 1	Not operate	Operate			Not operate
VRIS shutter valve actuator 2	Not operate		Operate		Not operate

5. If rod operation is not as specified, do as follows.
   (1) Stop the engine.
   (2) Connect the **SSTs** (NGS).
   (3) Verify that diagnostic trouble code No. P1521 or P1522 is not displayed. If code No. P1521 or P1522 is shown, carry out troubleshooting of the code No. P1521, P1522. (Refer to page F1–75.)
   (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 VRIS solenoid valve from OFF to ON by using "VRISV1" or "VRISV2" and check if operation sound of the valve is heard.
      IV. If the operation sound is heard, check the following.
      • Loose or damaged vacuum hose
      • VRIS shutter valve actuators (Refer to page F1–56.)
      • Throttle position sensor (Refer to page F1–42.)
      V. If the operation sound is not heard, check the following.
      • VRIS solenoid valve (Refer to page F1–56.)

COMPONENT PARTS

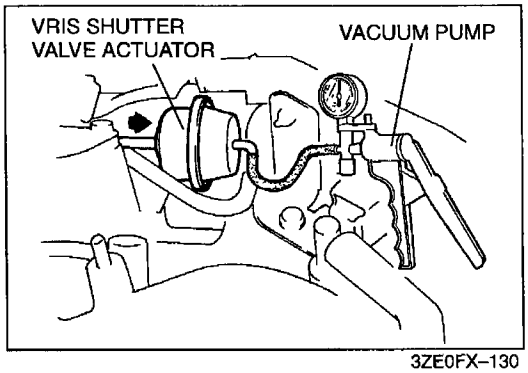
Removal / Inspection / Installation

1. Remove in the order shown in the figure.
2. Visually check each part for damage. Replace if necessary.
3. Install in the reverse order of removal.



3ZE0FX-129

1. VRIS solenoid valve No.1
   Inspection ..... page F1–56
2. VRIS solenoid valve No.2
   Inspection ..... page F1–56
3. VRIS shutter valve actuator
   Inspection ..... page F1–56
4. Intake manifold
5. Vacuum chamber
6. Check valve
   Inspection ..... page F1–56

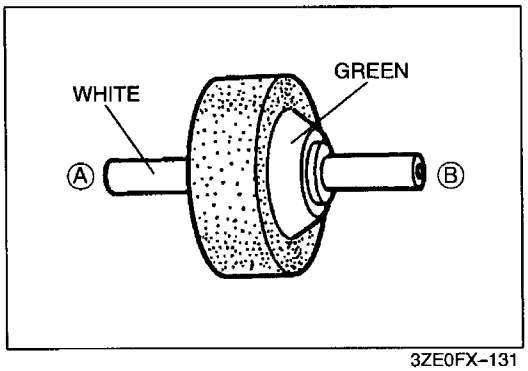


3ZE0FX–130

VRIS SHUTTER VALVE ACTUATOR

Inspection

1. Disconnect the vacuum hose from the VRIS shutter valve actuator.
2. Connect the vacuum pump to the actuator.
3. Apply **25 kPa {190 mmHg, 7.5 inHg}** vacuum and verify that the rod is pulled into the actuator.
4. If not as specified, carry out the intake-air system inspection. (Refer to page F1–5.)

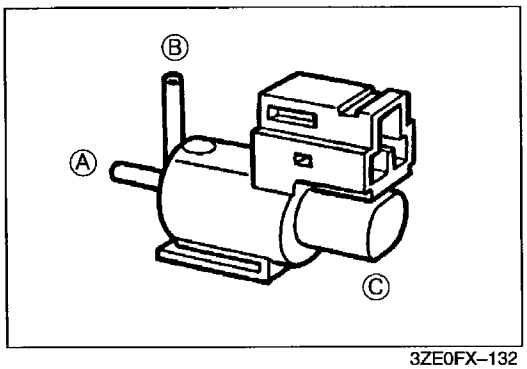


3ZE0FX–131

CHECK VALVE

Inspection

1. Remove the check valve.(Refer to page F1–55.)
2. Blow through A and verify that air flows from B.
3. Blow through B and verify that air does not flow from A.
4. Replace the check valve if necessary. (Refer to page F1–55.)



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VRIS SOLENOID VALVE

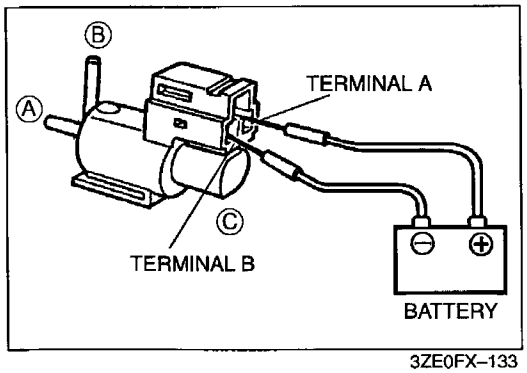
Inspection

1. Remove the solenoid valve.
2. Verify that air flows as shown below.

Specification

Port	Air flow
A—B	No
A—C	No
B—C	Yes

3. If not as specified, replace the VRIS solenoid valve. (Refer to page F1–55.)



3ZE0FX–133

4. Apply battery positive voltage to terminal A and ground terminal B of the solenoid valve. Verify that air flows as shown below.

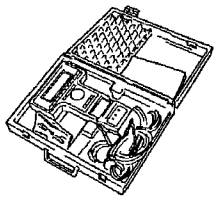
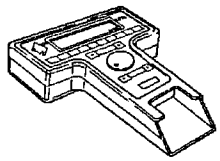
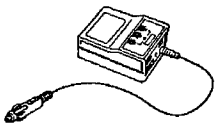
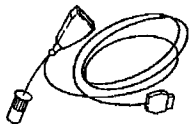
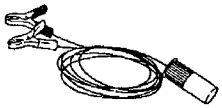
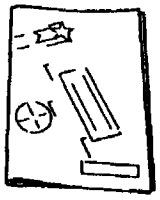
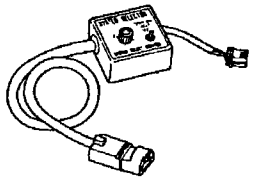
Specification

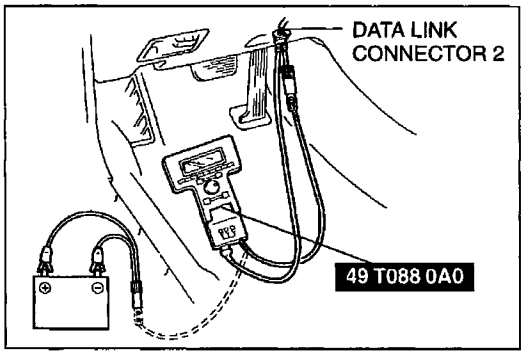
Port	Air flow
A—B	Yes
A—C	No
B—C	No

5. If not as specified, replace the VRIS solenoid valve. (Refer to page F1–55.)

FUEL INJECTION CONTROL

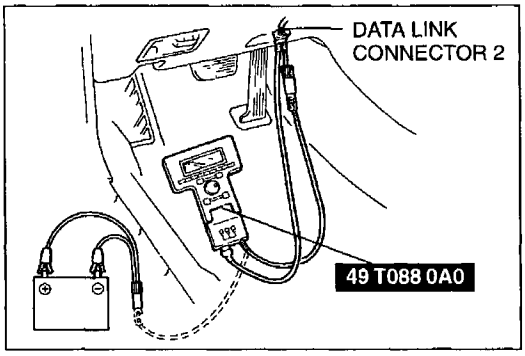
PREPARATION
SST

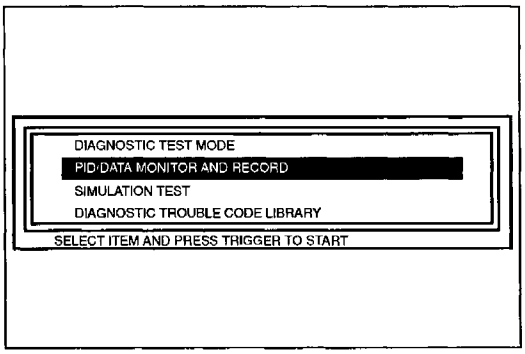
49 T088 0A0 NGS set 	For inspection of fuel injection control	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of fuel injection control
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of fuel injection control	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0)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



SYSTEM INSPECTION

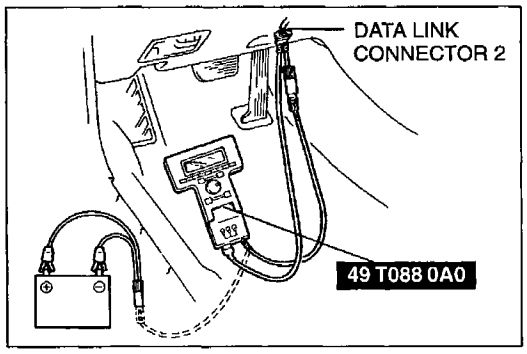
1. Connect the **SSTs** (NGS) to the data link connector 2.
2. Warm up the engine to normal operating temperature and let it idle.
3. Select the PID/DATA MONITOR AND RECORD function of the NGS.
4. With no electrical load operating, select "INJ RH" and "INJ LH" on the NGS display. NGS measures and shows the fuel injector pulse widths.
5. Increase the engine speed and verify that the pulse width changes.
6. If signal cannot be detected, or shows no change, check voltage at following terminals. (Refer to page F1–30.)
   - PCM terminal 3E (Mass air flow sensor)
   - PCM terminal 4AH 4AL (Crankshaft position sensor).





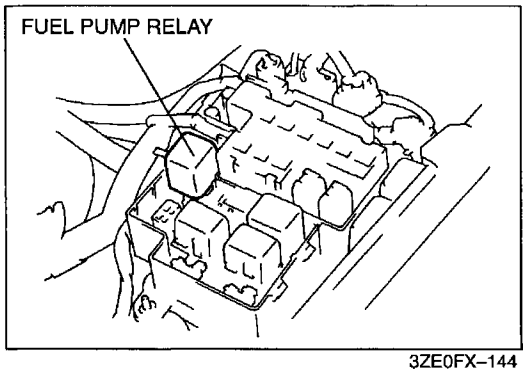
Fuel Cut Control

1. Connect the **SSTs** (NGS) to the data link connector 2.
2. Warm up the engine to normal operating temperature and let it idle.
3. Turn off the A/C switch.
4. Select the PID/DATA MONITOR AND RECORD function of the NGS.
5. Select "INJ RH" and "INJ LH" on the NGS display. NGS measures and shows the fuel injector pulth width.
6. Open the throttle valve and increase the engine speed to 4,000 rpm.
7. Close the throttle valve quickly. Verify that the fuel injector pulth width becomes 0ms until the engine speed drops to approx. 1,200 rpm, then recovers after that.
8. If not as specified, check voltage at following terminal (Refer to page F1–30.)
   - PCM terminal 3Q (Engine coolant temperature sensor)
   - PCM terminal 3X (Closed throttle position switch)
   - PCM terminal 4AH, 4AL (Crankshaft position sensor)

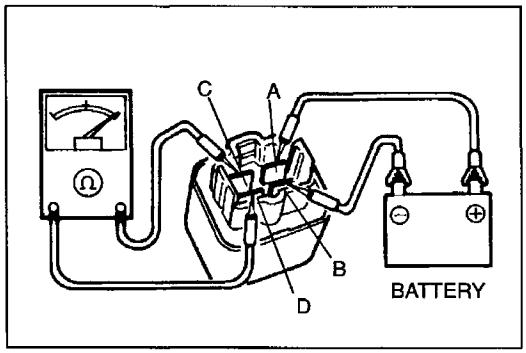


Dechoke Control

1. Connect the **SSTs** (NGS) to the data link connector 2.
2. Select the PID/DATA MONITOR AND RECORD function of the NGS.
3. Select "INJ RH" and "INJ LH" on the NGS display. NGS measures and shows the fuel injector pulth width.
4. Turn the ignition switch to START and verify that the engine start.
5. Depress the accelerator pedal to wide open throttle and turn the ignition switch to START. Verify that the fuel injector pulth width becomes 0 ms and engine does not start while cranking.
6. If not as specified, check the PCM terminal 3B voltage. (Throttle position sensor)



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FUEL PUMP CONTROL SYSTEM

SYSTEM INSPECTION

1. Turn the ignition switch to START and check for fuel pump relay operating sound.
2. If no sound was heard, check the fuel pump relay.
3. If the fuel pump relay is normal, check voltage at following terminals.
   - PCM terminal 1H (Ignition switch START signal)
   - PCM terminal 1AF (Fuel pump relay)

FUEL PUMP RELAY

Inspection

1. Remove the fuel pump relay. (Refer to above)
2. Apply battery positive voltage and check continuity between terminals of the relay by using an ohmmeter.

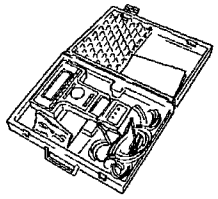
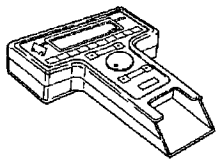
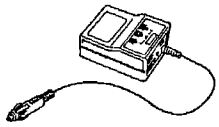
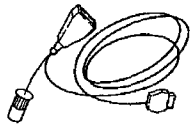
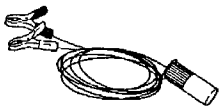
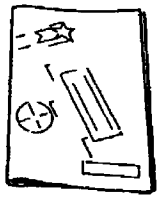
Specification B+: Battery positive voltage

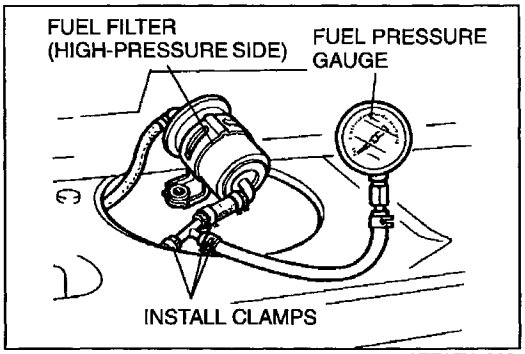
Terminal A—B	Terminal C—D
B+ applied	Continuity
B+ not applied	No continuity

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

PRESSURE REGULATOR CONTROL (PRC) SYSTEM

PREPARATION
SST

49 T088 0A0 NGS set 	For inspection of pressure regulator control (PRC) system	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of pressure regulator control (PRC) system
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of pressure regulator control (PRC) system	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of pressure regulator control (PRC) system
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of pressure regulator control (PRC) system	49 T088 008A Instruction Manual 	For inspection of pressure regulator control (PRC) system
49 T088 010B Program Card 	For inspection of pressure regulator control (PRC) system	—	—



3ZE0FX-063

SYSTEM INSPECTION

Warning

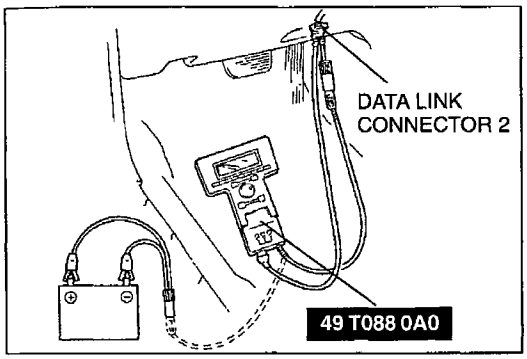
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F1–8.**

1. Connect the fuel pressure gauge.
2. Measure the fuel pressure under the following conditions.

Specifications

	Fuel pressure (kPa { kgf/cm², psi})		
Idling	210—260 { 2.1—2.7, 30—38}	210—260 {2.1—2.7, 30—38}	270—310 {2.7—3.2, 39—45}
During 120 sec. of hot start	270—310 { 2.7—3.2, 39—45}		
After 120 sec. of hot start	210—260 { 2.1—2.7, 30—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 as required.



Inspection 1

1. Stop the engine.
2. Connect the **SSTs** (NGS).
3. Start the engine and run it at idle.
4. Select the SIMULATION TEST function on the NGS display.
5. 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 F1–30.)
   - Engine coolant temperature signal
   - Intake air temperature signal
   - Closed throttle position signal

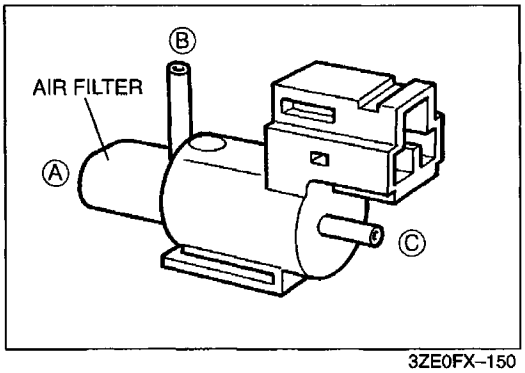
   (2) If the pressure does not change, do as follows.
   I. Stop the engine.
   II. Turn the ignition switch to ON.
   III. Turn the PRC solenoid valve from OFF to ON by using the simulation function and check if the operation sound of the valve is heard.
   a. If the operation sound is heard, check the following.
   - Pressure regulator (Refer to page F1–22.)

   b. If the operation sound is not heard, check the following.
   - PRC solenoid valve (Refer to page F1–62.)
   - Wiring between PRC solenoid valve and PCM terminal 1B

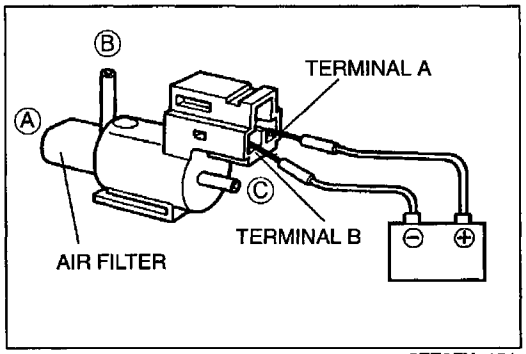
Inspection 2

1. Stop the engine.
2. Connect the **SSTs** (NGS).
3. By using the PID/DATA MONITOR AND RECORD function, verify that the PRC solenoid valve is OFF.
4. If the PRC solenoid valve is ON, check the following.
   - PCM terminal voltage (Refer to page F1–30.)
   - Engine coolant temperature signal
   - Intake air temperature signal
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 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 F1–62.)
   - Wiring between PRC solenoid valve and PCM terminal 1B



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3ZE0FX–151

PRC SOLENOID VALVE

Inspection

1. Remove the solenoid valve.
2. Verify that air flows as shown below.

Specification

Port	Air flow
A—B	No
A—C	No
B—C	Yes

3. If not as specified, replace the solenoid valve.
4. Apply battery positive voltage to terminal A and ground terminal B of the solenoid valve. Verify that air flows as shown below.

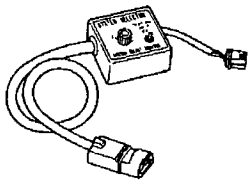
Specification

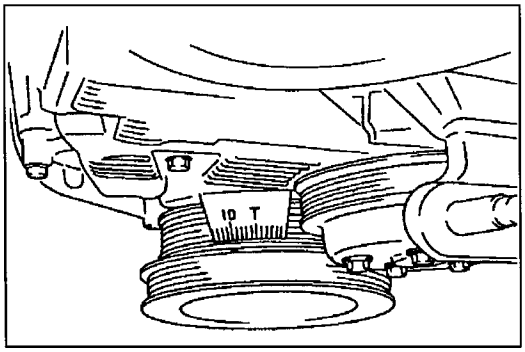
Port	Air flow
A—B	Yes
A—C	No
B—C	No

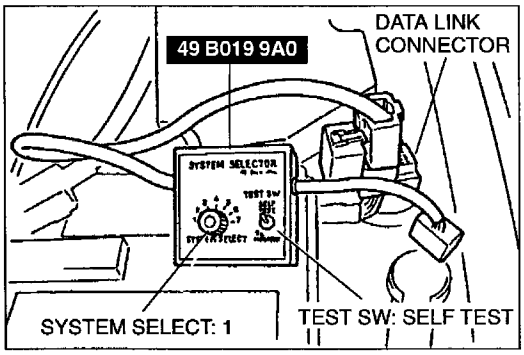
5. If not as specified, replace the solenoid valve.

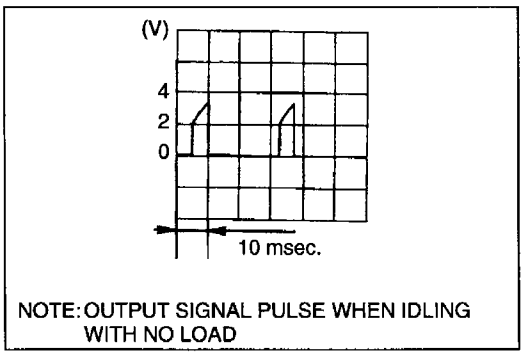
ELECTRONIC SPARK ADVANCE (ESA) CONTROL SYSTEM

PREPARATION
SST

49 B019 9A0 System Selector		For inspection of ESA control system







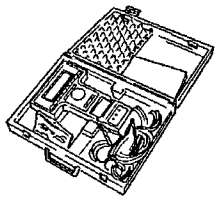
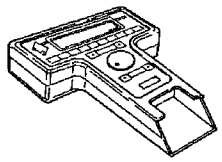
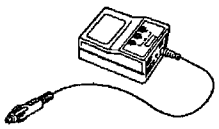
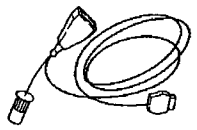
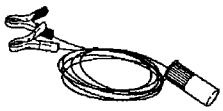
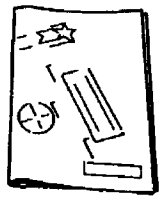
NOTE: OUTPUT SIGNAL PULSE WHEN IDLING WITH NO LOAD

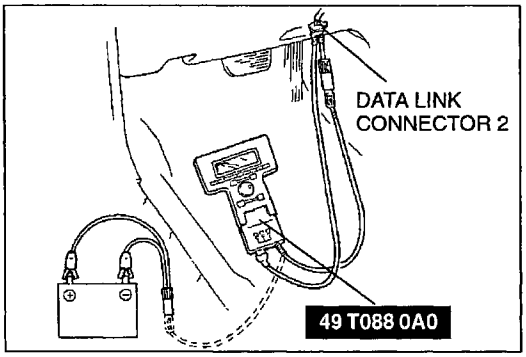
SYSTEM INSPECTION

1. Turn off following electrical loads.
   - Power steering
   - A/C
2. Connect a timing light to the high-temsion lead of No.1 cylinder.
3. Connect data link connector terminals TEN and GND with the **SST** (System selector).
4. Start the engine and verify that the ignition timing retards as the engine warms up.
5. If not as specified, check the PCM terminal 3Q (Engine coolant temperature sensor) voltage.
   (Refer to page F1–30.)
6. Disconnect the **SST**.
7. Verify that the engine is completely warmed up.
8. Increase the engine speed and verify that the ignition advances accordingly.
9. If not as specified, check voltage at following terminals.
   - PCM terminal 3E (Mass air flow sensor)
   - PCM terminal 4AH 4AL (Crankshaft position sensor)

EXHAUST GAS RECIRCULATION (EGR) CONTROL SYSTEM

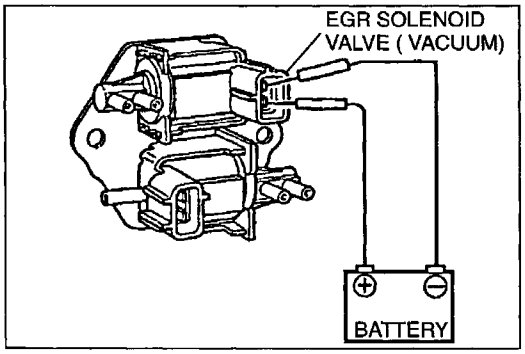
PREPARATION
SST

49 T088 0A0 NGS set 	For inspection of EGR control system	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of EGR control system
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of EGR control system	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of EGR control system
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of EGR control system	49 T088 008A Instruction Manual 	For inspection of EGR control system
49 T088 010B Program Card 	For inspection of EGR control system	—	—



SYSTEM INSPECTION

1. Connect the **SSTs** (NGS).
2. Start the engine and let it idle.
3. Select the SIMULATION TEST function on the NGS display.
4. Increase the duty value of the 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) Increase the duty value of the EGR solenoid valve (vacuum) from 0% to 100% by using the "EGRVAC". Operate the EGR solenoid valve (vacuum) and check if operation sound of the solenoid valve is heard.
      I. If the operation sound is heard, check the following.
         • Loose or damaged vacuum hose
         • EGR valve (Refer to page F1–66.)
         • EGR solenoid valve (vent) (Refer to page F1–66.)
      II. If the operation sound is not heard, check the following.
         • EGR solenoid valve (vacuum) (Refer to below.)
         • Wiring between EGR solenoid valve (vacuum) and PCM terminal 4K.



EGR SOLENOID VALVE

Inspection

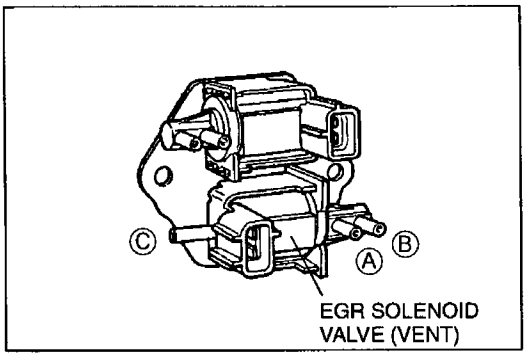
EGR solenoid valve (vacuum)

1. Remove the EGR solenoid valve (vacuum).
2. Apply battery positive voltage to terminal A and ground terminal B of the EGR solenoid valve (vacuum). Verify that air flows as shown below.

Specification B+: Battery positive voltage

Terminal A–B	Air flow
B+ applied	Yes
B+ not applied	No

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

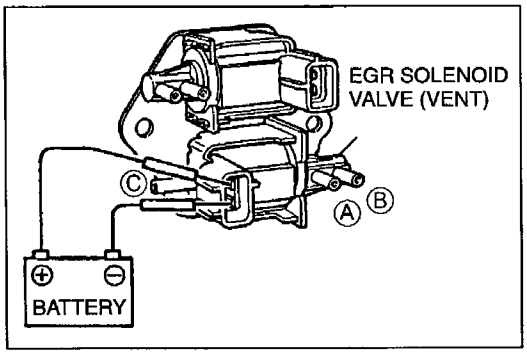


EGR solenoid valve (vent)

1. Remove the EGR solenoid valve (vent).
2. Verify that air flows as shown below.

Specification

Port	Air flow
A–B	Yes
A–C	Yes
B–C	Yes

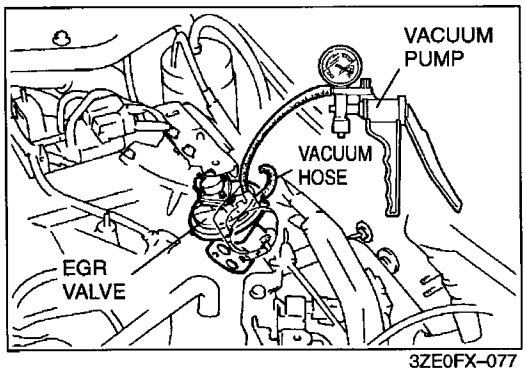


3. If not as specified, replace the EGR solenoid valve (vent).
4. Apply battery positive voltage to terminal A and ground terminal B of the EGR solenoid valve (vent). Verify that air flows as shown below.

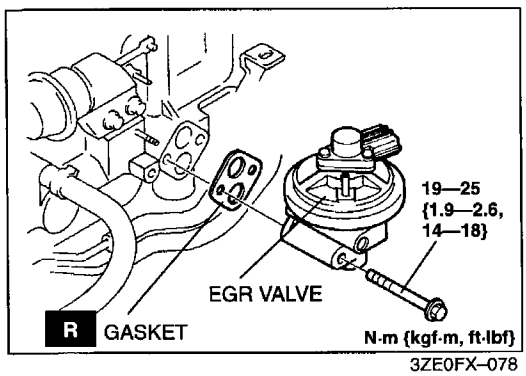
Specification

Port	Air flow
A–B	Yes
A–C	No
B–C	No

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



3ZE0FX–077



3ZE0FX–078

EGR VALVE

Inspection

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

Specification:
3.4—9.9 kPa {25—75 mmHg, 1.0—2.9 inHg}

4. If not as specified, replace the EGR valve.

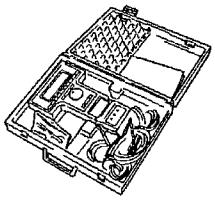
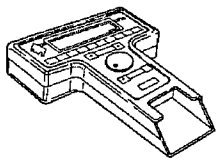
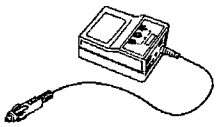
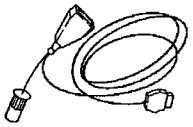
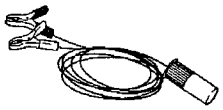
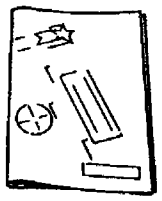
Replacement

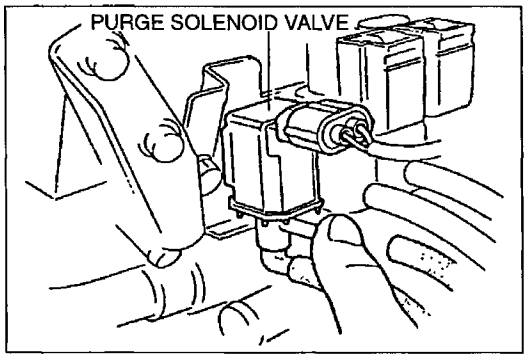
1. Disconnect the vacuum hose.
2. Disconnect the EGR valve position sensor connector.
3. Remove the EGR valve.
4. Remove the gasket.
5. Install in the reverse order of removal.

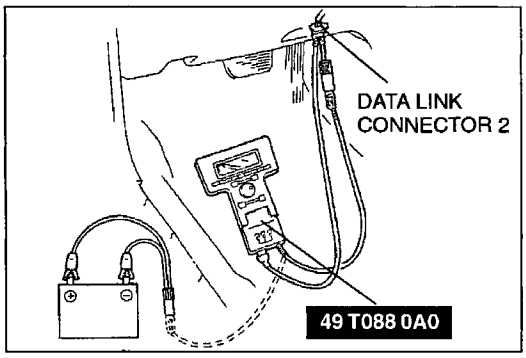
Tightening torque:
19—25 N·m {1.9—2.6 kgf·m, 14—18 ft·lbf}

PURGE CONTROL SYSTEM

PREPARATION
SST

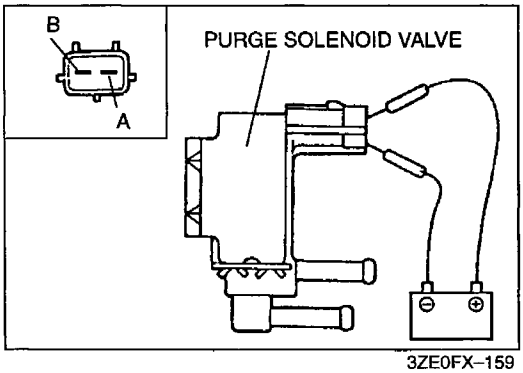
49 T088 0A0 NGS set 	For inspection of purge control system	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of purge control system
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of purge control system	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of purge control system
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of purge control system	49 T088 008A Instruction Manual 	For inspection of purge control system
49 T088 010B Program Card 	For inspection of purge control system	—	—





SYSTEM INSPECTION

1. Start and warm up the engine to the 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).
   (2) Verify that diagnostic trouble code No. P0443 is not displayed. If code No. P0443 is shown, carry out troubleshooting of code No. P0443.
   (Refer to page F1–75.)
   (3) If diagnostic trouble codes are not shown, check the following.
   • Purge solenoid valve (Refer to below.)
6. Reconnect the vacuum hose.
7. Connect the **SSTs** (NGS).
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. It code No. P0443 is shown, carry out troubleshooting of 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 below.)



PURGE SOLENOID VALVE

Inspection

1. Remove the purge solenoid valve.
2. Apply battery positive voltage to terminal A and ground terminal B of the solenoid valve. Verify that air flows as shown below.

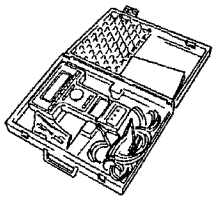
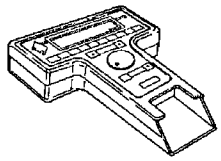
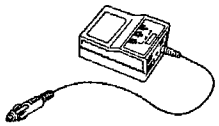
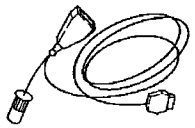
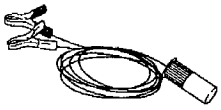
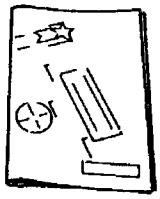
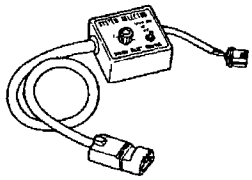
Specification B+: Battery positive voltage

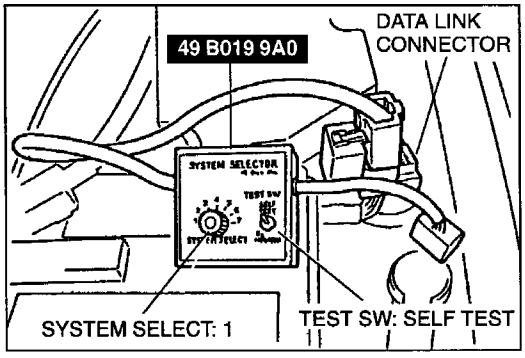
Terminal A—B	Air flow
B+ applied	Yes
B+ not applied	No

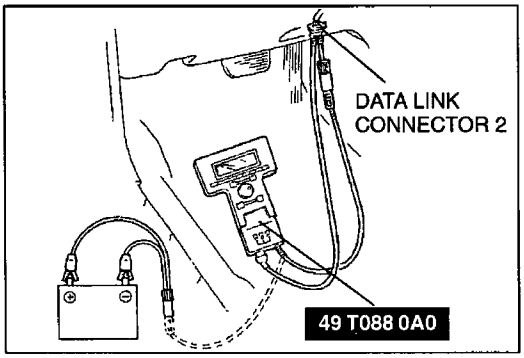
3. If not as specified, replace the purge solenoid valve.

ELECTRICAL FAN CONTROL SYSTEM

PREPARATION
SST

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

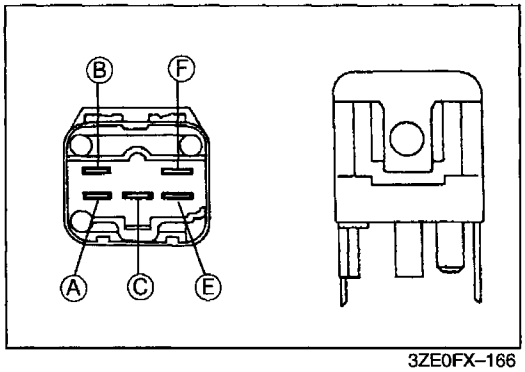




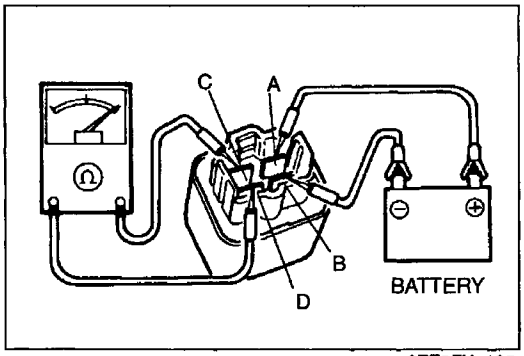
SYSTEM INSPECTION

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).
   (2) Select the PID/DATA MONITOR AND RECORD function on the NGS display.
   (3) By using the "FANCN", 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 F1–30.)
         • Engine coolant temperature signal
      II. If the cooling fan control signal is OFF, check the following.
         • Fan relay
         • Short circuit in wiring harnesses and connectors (Main relay — Fan relay — PCM)
5. Connect the **SST** (System selector) and set system select switch to 1 and test switch to SELF TEST.
6. Depress the accelerator pedal and verify that the cooling fan operates.

7. If the cooling fan does not operate, do as follows.
   (1) Connect the **SSTs** (NGS).
   (2) Select the SIMULATION TEST function on the NGS display.
   (3) Turn the fan relay from OFF to ON by using the "FANCN" and check for the cooling fan operation.
      I. If the cooling fan operates, check the following.
         • PCM terminal voltage (Refer to page F1–30.)
         • Diagnostic test mode signal
         • Closed throttle position signal
      II. If the cooling fan does not operate, do as follows.
         a. Turn the fan relay from OFF to ON by using the simulation function. Operate the fan relay and check if the operation sound of the relay is heard.
         b. If the operation sound is heard, check the following.
            • Wiring harnesses and connectors (Fan relay — Fan motor)
            • Fan motor (Refer to section E.)
         c. If the operation sound is not heard, check the following.
            • Fan relay
            • Open circuit in wiring harnesses and connectors (Main relay — Fan relay — PCM)



3ZE0FX–166



3ZE0FX–165

COOLING FAN RELAY

Inspection

1. Remove the cooling fan relay. (Refer to page F1–28.)
2. Apply battery positive voltage and check continuity between terminals of the relay by using an ohmmeter.

Specification B+: Battery positive voltage

Terminal A–B	Terminal C–E	Terminal C–F
B+ applied	No continuity	Continuity
B+ not applied	Continuity	No continuity

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

CONDENSER FAN RELAY

Inspection

1. Remove the condenser fan relay. (Refer to page F1–28.)
2. Apply battery positive voltage and check continuity between terminals of the relay by using an ohmmeter.

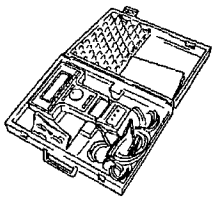
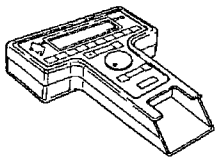
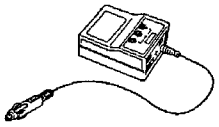
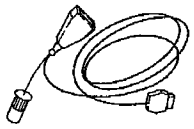
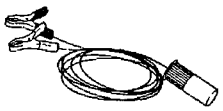
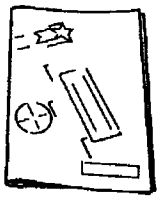
Specification B+: Battery positive voltage

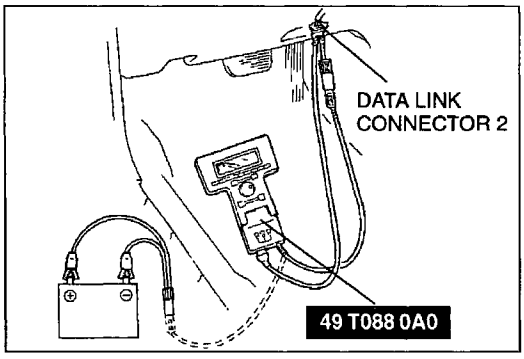
Terminal A–B	Terminal C–D
B+ applied	Continuity
B+ not applied	No continuity

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

A/C CUT-OFF CONTROL SYSTEM

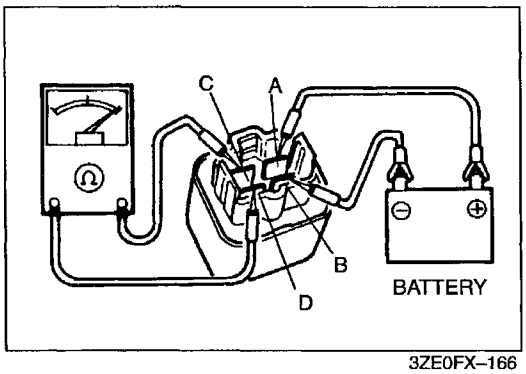
PREPARATION
SST

49 T088 0A0 NGS set 	For inspection of A/C cut off control system	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of A/C cut off control system
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of A/C cut off control system	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of A/C cut off control system
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of A/C cut off control system	49 T088 008A Instruction Manual 	For inspection of A/C cut off control system
49 T088 010B Program Card 	For inspection of A/C cut off control system	—	—



SYSTEM INSPECTION

1. Position the vehicle on a chassis roller and start the engine.
2. Shift the selector lever into other than P and N.
3. Turn the A/C switch and the fan switch on.
4. Fully open the throttle valve. Then, 3—6 seconds after, check if the operation sound of the A/C compressor electromagnetic clutch is heard.
5. If the operation sound is not heard, do as follows.
   (1) Connect the **SSTs** (NGS).
   (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" 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 F1–30.)
         • Load/no load distinction signal
         • Closed throttle position signal
      II. If the operation sound is not heard, check the following.
         • A/C relay
         • Open circuit in wiring harnesses and connector (Main relay — A/C relay — PCM)



3ZE0FX-166

A/C RELAY

Inspection

1. Remove the A/C relay. (Refer to page F1–28.)
2. Apply battery positive voltage and check continuity between terminals of the relay by using an ohmmeter.

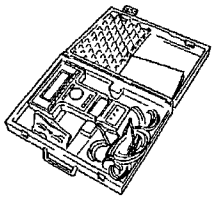
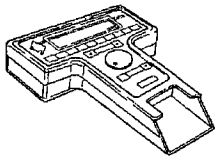
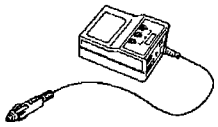
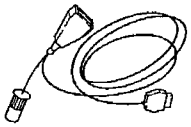
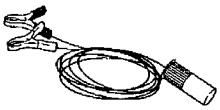
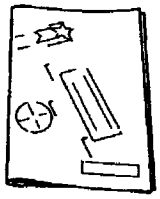
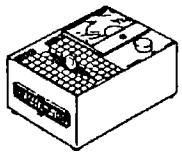
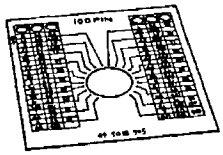
Specification B+: Battery positive voltage

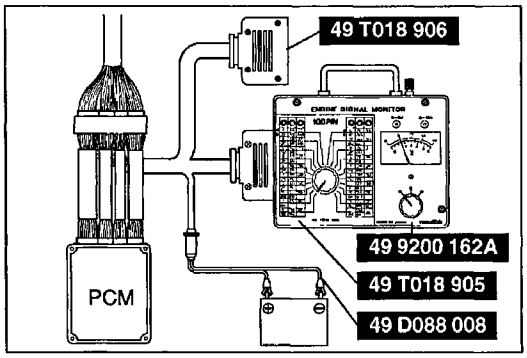
Terminal A—B	Terminal C—D
B+ applied	Continuity
B+ not applied	No continuity

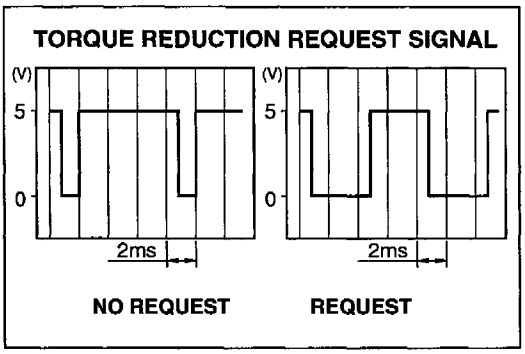
3. If not as specified, replace the A/C relay.

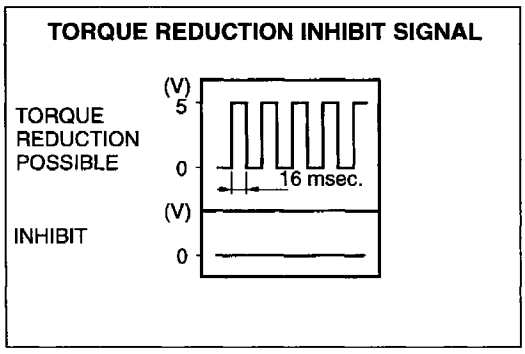
TRACTION CONTROL

PREPARATION
SST

49 T088 0A0 NGS set 	For inspection of traction control	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of traction control
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of traction control	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of traction control
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of traction control	49 T088 008A Instruction Manual 	For inspection of traction control
49 T088 010B Program Card 	For inspection of traction control	49 9200 162A Monitor, Engine Signal 	For inspection of traction control
49 T018 906 Harness adapter 	For inspection of traction control	49 T018 905 Sheet 	For inspection of traction control





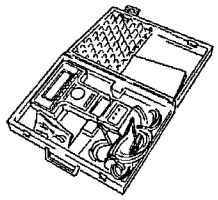
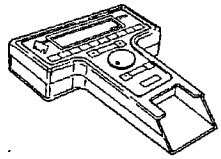
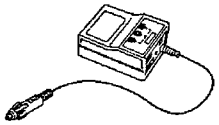
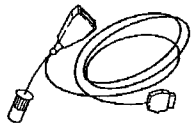
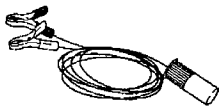
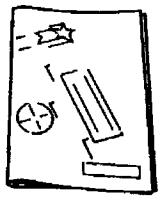


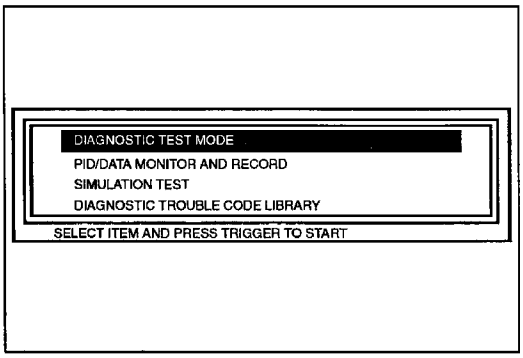
SYSTEM INSPECTION

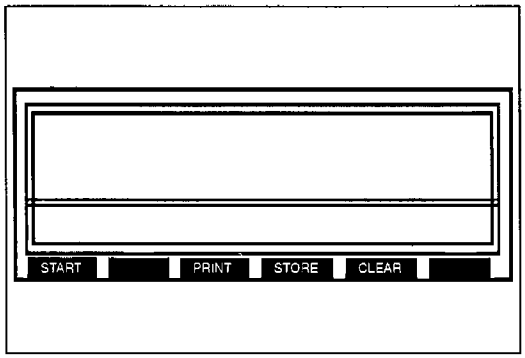
1. Remove the PCM. (Refer to page F1–29.)
2. Connect the **SSTs** to the PCM.
3. Warm up the engine to normal operating temperature and let it idle.
4. With no electrical load operating, check the torque reduction inhibit signal at the PCM terminal 1S by using an oscilloscope.
5. If the torque reduction inhibit signal can not be detected, do as follows.
   (1) Connect the **SSTs** (NGS).
   (2) Verify that diagnostic trouble code No.P0100, 0110, 0115, 0120, 0130, 0134, 0140, 0150, 0154, 0160, 0335 are not displayed. If any code is displayed, carry out troubleshooting. (Refer to page F1–75.)
6. Lift up the vehicle.
7. Shift the selector lever to D.
8. Depress the accelerator pedal, and verify that the engine speed does not exceed 1,500 rpm.
9. If the engine speed smoothly increases over 1,500 rpm, check the torque reduction request signal at the PCM terminal 1Q by using an oscilloscope.
10. Depress the accelerator pedal, and verify that the signal changes as shown in the figure.
11. If there is no change, check the ABS/TCS control unit. (Refer to section P.)
12. Let the engine idle.
13. Check the torque reduction inhibit signal of the PCM terminal 1S by using an oscilloscope.
14. Disconnect the engine coolant temperature sensor connector, and verify that the signal voltage is 0V.
15. If not as specified, check the PCM terminal 3Q (Engine coolant temperature sensor) voltage.

ON-BOARD DIAGNOSTIC SYSTEM

PREPARATION
SST

49 T088 0A0 NGS set 	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 002 Vehicle Interface Module (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 006 Battery Hookup 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 010B Program Card 	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 F1–59.)
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 F1–76.)
6. When "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 NGS memory.
3. Perform diagnostic trouble code inspection again and verify that no diagnostic trouble codes are displayed.

Diagnostic Trouble Code Numbers

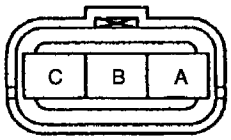
Code No.	Display on the NGS	Condition	Page
P0100	MAF/VAF-CIRCUIT MALFUNCTION	Mass or Volume air flow circuit malfunction	F1–79
P0105	MAP/BP-CIRCUIT MALFUNCTION	Manifold absolute pressure/Barometric pressure circuit malfunction	F1–80
P0110	IAT-CIRCUIT MALFUNCTION	Intake air temperature circuit malfunction	F1–81
P0115	ECT-CIRCUIT MALFUNCTION	Engine coolant temperature circuit malfunction	F1–82
P0120	TP-CIRCUIT MALFUNCTION	Throttle position circuit malfunction	F1–83
P0125	EXCESSIVE TIME TO ENTER CLOSED LOOP	Excessive time to enter closed loop fuel control	F1–84
P0130	O2S 11-CIRCUIT MALFUNCTION	O_2 sensor circuit malfunction	F1–84
P0134	O2S 11-CIRCUIT NO ACTIVITY DETECTED	O_2 sensor circuit no activity detected	F1–85
P0135	O2S 11-HEATER CIRCUIT MALFUCTION	O_2 sensor heater circuit malfunction	F1–86
P0140	O2S 12-CIRCUIT NO ACTIVITY DETECTED	O_2 sensor circuit no activity detected	F1–87
P0150	O2S 21-CIRCUIT MALFUNCTION	O_2 sensor circuit malfunction	F1–87
P0154	O2S 21-CIRCUIT NO ACTIVITY DETECTED	O_2 sensor circuit no activity detected	F1–88
P0155	O2S 21-HEATER CIRCUIT MALFUNCTION	O_2 sensor heater circuit malfunction	F1–89
P0160	O2S 22-CIRCUIT NO ACTIVITY DETECTED	O_2 sensor circuit no activity detected	F1–90
P0170	BANK 1-FUEL TRIM MALFUNCTION	Fuel trim malfunction	F1–91
P0173	BANK 2-FUEL TRIM MALFUNCTION	Fuel trim malfunction	F1–92

Code No.	Display on the NGS	Condition	Page
P0300	RANDOM MISFIRE DETECTED	Random misfire detected	F1–93
P0301	CYLINDER 1 MISFIRE DETECTED	Cylinder 1 misfire detected	F1–94
P0302	CYLINDER 2 MISFIRE DETECTED	Cylinder 2 misfire detected	F1–95
P0303	CYLINDER 3 MISFIRE DETECTED	Cylinder 3 misfire detected	F1–96
P0304	CYLINDER 4 MISFIRE DETECTED	Cylinder 4 misfire detected	F1–97
P0305	CYLINDER 5 MISFIRE DETECTED	Cylinder 5 misfire detected	F1–98
P0306	CYLINDER 6 MISFIRE DETECTED	Cylinder 6 misfire detected	F1–99
P0325	KNOCK SENSOR 1-CIRCUIT MALFUNCTION	Knock sensor 1 circuit malfunction	F1–100
P0335	CRANKSHAFT POS SENSOR-CKT MALFUNCTION	Crankshaft position sensor circuit malfunction	F1–100
P0400	EGR-FLOW MALFUNCTION	Exhaust gas recirculation flow malfunction	F1–101
P0420	BANK1 CAT EFFICIENCY BELOW LIMIT	Catalyst system efficiency below threshold	F1–101
P0430	BANK2 CAT EFFICIENCY BELOW LIMIT	Catalyst system efficiency below threshold	F1–101
P0440	EVAP SYSTEM-MALFUNCTION	Evaporative emission control system malfunction	F1–102
P0443	EVAP SYSTEM-PURGE CTRL VALVE CKT MALF	Evaporative emission control system purge control valve circuit malfunction	F1–103
P0505	IDLE CONTROL SYSTEM-MALFUNCTION	Idle control system malfunction	F1–104
P0510	CLOSED THROTTLE POS SWITCH-MALFUNCTION	Closed throttle position switch malfunction	F1–105

Code No.	Display on the NGS	Condition	Page
P0703	TORQUE CONV/BRAKE SW-MALFUNCTION	Brake switch input malfunction	F1–106
P1000	MORE DRIVING NEEDED TO COMPLETE TEST	Check of all OBD-II systems is not complete since last memory clear	F1–106
P1170	HO2S 11-INVERSION	Heated oxygen sensor (Front RH) (Inversion)	F1–107
P1173	HO2S 21-INVERSION	Heated oxygen sensor (Front LH) (Inversion)	F1–108
P1195	EGRBS-OPEN OR SHORT	EGR boost sensor	F1–109
P1196	STA SW-OPEN OR SHORT	Ignition switch (Start)	F1–109
P1345	SGC SIGNAL-NO SGC SIGNAL	SGC signal	F1–110
P1402	EGRS-OPEN OR SHORT	EGR valve position sensor	F1–111
P1521	VRIS1-OPEN OR SHORT	VRIS solenoid valve No.1 open or short	F1–112
P1522	VRIS2-OPEN OR SHORT	VRIS solenoid valve No.2 open or short	F1–113
P1609	PCME (CPU)-MALFUNCTION	PCM's knock control integrated circuit is damaged	F1–113
P1627	ECM/TCS LINE-COMMUNICATION ERROR	PCM—ABS/TCS control unit line communication error	F1–114
P1720	VSS2-NO VSS2 SIGNAL	Speedometer sensor	F1–114
P1794	BAT-BAT OR CIRCUIT FAIL	Battery	F1–115
P1797	PNS-OPEN OR SHORT	No P or N range signal or neutral/clutch signal	F1–115

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 PCM terminal 3E to mass air flow sensor terminal B • Open or short circuit in wiring from PCM terminal 4A to mass air flow sensor terminal C • Open circuit in wiring from PCM terminal 4D to mass air flow sensor terminal A

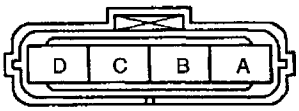
STEP	INSPECTION		ACTION
1	Does mass air flow sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3E voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect mass air flow sensor connector. Turn ignition switch to ON. Is there battery positive voltage at connector terminal C?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (PCM terminal 4A — Mass air flow sensor terminal C)
4	Is there continuity between connector terminal A and PCM terminal 4D?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between connector terminal B and PCM terminal 3E?	Yes	Go to next step
		No	Repair or replace wiring harness
6	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

Diagnostic trouble code No. P0105	MAP/BP-CIRCUIT MALFUNCTION
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 3K to EGR boost sensor terminal A • Open or short circuit in wiring from PCM terminal 3A to EGR boost sensor terminal B • Open circuit in wiring from PCM terminal 3AB to EGR boost sensor terminal C

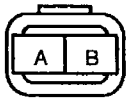
STEP	INSPECTION		ACTION
1	Does EGR boost sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3K voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect EGR boost sensor connector. Turn ignition switch to ON. Is there 5 V at connector terminal B?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (PCM terminal 3A — EGR boost sensor terminal B)
4	Is there continuity between connector terminal C and PCM terminal 3AB?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is EGR boost sensor OK?	Yes	Go to next step
		No	Replace EGR boost sensor
6	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

Diagnostic trouble code No. P0110	IAT-CIRCUIT MALFUNCTION
Symptom	Input from intake air temperature sensor is below 0.1 V or above 4.9 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 3V • Open or short circuit in wiring from intake air temperature sensor terminal B to PCM terminal 3AB

STEP	INSPECTION		ACTION
1	Does volume air flow sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3V voltage OK?	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 connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3V — Intake air temperature sensor terminal A)
4	Is there continuity between connector terminal B and PCM terminal 3AB?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is intake air temperature sensor OK?	Yes	Go to next step
		No	Replace intake air temperature sensor
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM
		No	Intermittent poor connection or harness of connector (Repair connector and/or harness)



HARNESS SIDE 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 3Q • Open or short circuit in wiring from engine coolant temperature sensor terminal B to PCM terminal 3AB

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 3Q voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect engine coolant temperature sensor connector. Turn ignition switch to ON. Is there 5 V at connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3Q — Engine coolant temperature sensor terminal A)
4	Is there continuity between connector terminal B and PCM terminal 3AB?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is engine coolant temperature sensor OK?	Yes	Go to next step
		No	Replace engine coolant temperature sensor
6	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

Diagnostic trouble code No. P0120	TP-CIRCUIT MALFUNCTION
Symptom	Input voltage from throttle position sensor is below 0.1 V or above 4.8 V when ignition switch is turned on
Possible cause	• Throttle position sensor malfunction • Open or short circuit in wiring from throttle position sensor terminal B to PCM terminal 3B • Open or short circuit in wiring from throttle position sensor terminal A to PCM terminal 3A • Open or short circuit in wiring from throttle position sensor terminal D to PCM terminal 3AB

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 3B voltage OK?	Yes	Go to next step
		No	Go to step 4
3	Is voltage increase linear according to the throttle valve opening angle?	Yes	Go to step 7
		No	Replace throttle position sensor
4	Disconnect throttle position sensor connector. Turn ignition switch to ON. Is there 5 V at connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3A — Throttle position sensor terminal A)
5	Is there continuity between connector terminal D and PCM terminal 3AB?	Yes	Go to next step
		No	Repair or replace wiring harness
6	Is there continuity between connector terminal B and PCM terminal 3B?	Yes	Replace throttle position sensor
		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

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 and leakage • Engine coolant level and protection

STEP	INSPECTION		ACTION
1	Is engine cooling fan system OK?	Yes	Go to next step
		No	Repair or replace engine cooling fan system
2	Is engine coolant temperature sensor OK?	Yes	Go to next step
		No	Replace engine coolant temperature sensor
3	Is cooling system OK?	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
		No	Temporary system malfunction

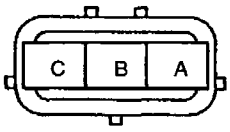
* During normal driving

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

STEP	INSPECTION		ACTION
1	Is heated oxygen sensor (Front RH) OK?	Yes	Replace PCM
		No	Repair or replace heated oxygen sensor (Front RH)

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

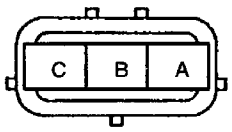
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front RH) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3I voltage OK?	Yes	Go to step 5
		No	Go to next step
3	Disconnect heated oxygen sensor (Front RH) connector. Is there continuity between connector terminal A and PCM terminal 3I?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Are following units OK? • Fuel injector • Pressure regulator • Mass air flow sensor • Engine coolant temperature sensor • Spark plug • Air suction (Air/Fuel ratio rich or lean)	Yes	Replace heated oxygen sensor (Front RH)
		No	Repair or replace
5	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor. 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

Diagnostic trouble code No. P0135	**O2S 11-HEATER CIRCUIT MALFUNCTION**
Symptom	Open or short circuit is observed in heated oxygen sensor heater (Front RH) system when ignition switch is turned on
Possible cause	• Heated oxygen sensor heater (Front RH) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front RH) terminal C to main relay • Open or short circuit in wiring from heated oxygen sensor (Front RH) terminal B to PCM terminal 4E

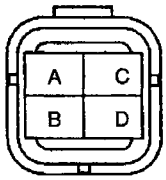
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front RH) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4E voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect heated oxygen sensor (Front RH) connector and turn ignition switch to ON. Is there battery positive voltage at connector terminal C?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — Heated oxygen sensor (Front RH) terminal C)
4	Is there continuity between connector terminal B and PCM terminal 4E?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between connector terminals B and C?	Yes	Go to next step
		No	Replace heated oxygen sensor (Front RH)
6	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor. 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

Diagnostic trouble code No. P0140	O2S 12-CIRCUIT NO ACTIVITY DETECTED
Symptom	When heated oxygen sensor (Rear RH) 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 RH) malfunction • Open or short circuit in wiring from heated oxygen sensor (Rear RH) terminal A to PCM terminal 3D • Open circuit in wiring from heated oxygen sensor (Rear RH) terminal B to PCM terminal 3AB • Intake-air system, fuel system or ignition system malfunction

STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Rear RH) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3D voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect heated oxygen sensor (Rear RH) connector. Is there continuity between connector terminal B and PCM terminal 3AB?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between 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 • Pressure regulator • Mass air flow sensor • Engine coolant temperature sensor • Spark plug • Air suction (Air/Fuel ratio rich)	Yes	Replace heated oxygen sensor (Rear RH)
		No	Repair or replace
6	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor. Is same code No. present after rechecking?	Yes	Replace PCM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



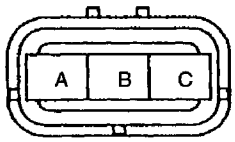
HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P0150	O2S 21-CIRCUIT MALFUNCTION
Symptom	• Heated oxygen sensor (Front LH) deterioration • Leakage in exhaust system

STEP	INSPECTION		ACTION
1	Is heated oxygen sensor (Front LH) OK?	Yes	Replace PCM
		No	Repair or replace heated oxygen sensor (Front LH)

Diagnostic trouble code No. P0154	O2S 21-CIRCUIT NO ACTIVITY DETECTED
Symptom	When heated oxygen sensor (Front LH) signal does not exceed 0.5 V after the engine is started, or stays below 0.5 V for two minutes after the engine has reached normal operating temperature and running at 1,500 rpm or over
Possible cause	• Heated oxygen sensor (Front LH) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front LH) terminal A to PCM terminal 3M • Intake-air system, fuel system or ignition system malfunction

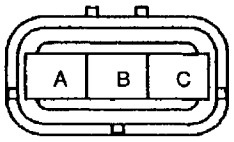
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front LH) connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3M voltage OK?	Yes	Go to step 5
		No	Go to next step
3	Disconnect heated oxygen sensor (front LH) connector. Is there continuity between connector terminal A and PCM terminal 3M?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Are following units OK? • Fuel injector • Pressure regulator • Mass air flow sensor • Engine coolant temperature sensor • Spark plug • Air suction (Air/Fuel ratio rich or lean)	Yes	Replace heated oxygen sensor (Front LH)
		No	Repair or replace
5	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor. 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

Diagnostic trouble code No. P0155	O2S 21-HEATER CIRCUIT MALFUNCTION
Symptom	Open or short circuit is observed in heated oxygen sensor heater (Front LH) system when ignition switch is turned on
Possible cause	• Heated oxygen sensor (Front LH) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front LH) terminal C to main relay • Open or short circuit in wiring from heated oxygen sensor (Front LH) terminal B to PCM terminal 4I

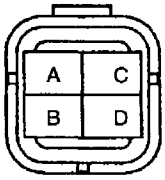
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front LH) connector and PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 4I voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect heated oxygen sensor (Front LH) connector and turn ignition switch to ON. Is there battery positive voltage at connector terminal C?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — Heated oxygen sensor (Front LH) terminal C)
4	Is there continuity between connector terminal B and PCM terminal 4I?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between connector terminals B and C?	Yes	Go to next step
		No	Replace heated oxygen sensor (Front LH)
6	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor. 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

Diagnostic trouble code No. P0160	O2S 22-CIRCUIT NO ACTIVITY DETECTED
Symptom	When heated oxygen sensor (Rear LH) signal does not exceed 0.5 V after the engine is started, or stays below 0.5 V for two minutes after the engine has reached normal operating temperature and running at 1,500 rpm or over
Possible cause	• Heated oxygen sensor (Rear LH) malfunction • Open or short circuit in wiring from heated oxygen sensor (Rear LH) terminal A to PCM terminal 3H • Open circuit in wiring from heated oxygen sensor (Rear LH) terminal B to PCM terminal 3AB • Intake-air system, fuel system, ignition system malfunction

STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Rear LH) connector and PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 3H voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect heated oxygen sensor (Rear LH) connector. Is there continuity between connector terminal B and PCM terminal 3AB?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between connector terminal A and PCM terminal 3H?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Are following units OK? • Fuel injector • Pressure regulator • Mass air flow sensor • Engine temperature sensor • Spark plug • Air suction (Air/Fuel ratio rich)	Yes	Replace heated oxygen sensor (Rear LH)
		No	Repair or replace
6	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor. 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

Diagnostic trouble code No. P0170	BANK 1-FUEL TRIM MALFUNCTION
Symptom	Right hand 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 4Q, 4Y, 4AG 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?	Yes	Repair or replace intake air device system
		No	Go to next step
2	Is fuel line pressure OK?	Yes	Go to step 5
		No	Go to next step
3	Is fuel pump maximum pressure OK?	Yes	Go to next step
		No	Repair or replace fuel pump
4	Is pressure regulator OK?	Yes	Go to next step
		No	Repair or replace pressure regulator
5	Is fuel injector OK?	Yes	Go to next step
		No	Replace fuel injector
6	Is engine coolant temperature sensor OK?	Yes	Go to next step
		No	Replace engine coolant temperature sensor
7	Is mass air flow sensor OK?	Yes	Go to next step
		No	Replace mass air flow sensor
8	Is throttle position sensor OK?	Yes	Go to next step
		No	Adjust throttle position sensor
9	Is closed throttle position switch OK?	Yes	Go to next step
		No	Adjust throttle position sensor
10	Is intake air temperature sensor OK?	Yes	Go to next step
		No	Replace intake air temperature sensor
11	Is EGR boost sensor OK?	Yes	Go to next step
		No	Replace EGR boost sensor
12	Is purge solenoid valve OK?	Yes	Go to next step
		No	Replace purge solenoid valve
13	Is PCV valve OK?	Yes	Go to next step
		No	Replace PCV valve
14	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM
		No	Temporary system malfunction

* During idling

Diagnostic trouble code No. P0173	BANK 2-FUEL TRIM MALFUNCTION
Symptom	Left hand 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, 4AC, 4AK 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?	Yes	Repair or replace intake air device system
		No	Go to next step
2	Is fuel line pressure OK?	Yes	Go to step 5
		No	Go to next step
3	Is fuel pump maximum pressure OK?	Yes	Go to next step
		No	Repair or replace fuel pump
4	Is pressure regulator OK?	Yes	Go to next step
		No	Repair or replace pressure regulator
5	Is fuel injector OK?	Yes	Go to next step
		No	Replace fuel injector
6	Is engine coolant temperature sensor OK?	Yes	Go to next step
		No	Replace engine coolant temperature sensor
7	Is mass air flow sensor OK?	Yes	Go to next step
		No	Replace mass air flow sensor
8	Is throttle position sensor OK?	Yes	Go to next step
		No	Adjust throttle position sensor
9	Is closed throttle position switch OK?	Yes	Go to next step
		No	Adjust throttle position sensor
10	Is intake air temperature sensor OK?	Yes	Go to next step
		No	Replace intake air temperature sensor
11	Is EGR boost sensor OK?	Yes	Go to next step
		No	Replace EGR boost sensor
12	Is purge solenoid valve OK?	Yes	Go to next step
		No	Replace purge solenoid valve
13	Is PCV valve OK?	Yes	Go to next step
		No	Replace PCV valve
14	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM
		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 voltage • Fuel system (RH or LH) malfunction • Insufficient compression • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system OK?	Yes	Go to next step
		No	Repair or replace as necessary
2	Is ignition timing within specification?	Yes	Go to next step
		No	Adjust ignition timing
3	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Repair or replace crankshaft position sensor
4	Is fuel system (RH and LH) OK?	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation system OK?	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compression at all cylinders normal?	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
		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 voltage • Fuel system (RH or LH) 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?	Yes	Go to next step
		No	Repair or replace as necessary
2	Is ignition timing within specification?	Yes	Go to next step
		No	Adjust ignition timing
3	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Repair or replace crankshaft position sensor
4	Is fuel injector at cylinder No.1 OK?	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.1
5	Is fuel system (RH and LH) OK?	Yes	Go to next step
		No	Repair or replace as necessary
6	Is exhaust gas recirculation system OK?	Yes	Go to next step
		No	Repair or replace as necessary
7	Is compression at cylinder No.1 normal?	Yes	Go to next step
		No	Repair or replace as necessary
8	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM
		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 voltage • Fuel system (RH or LH) 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?	Yes	Go to next step
		No	Repair or replace as necessary
2	Is ignition timing within specification?	Yes	Go to next step
		No	Adjust ignition timing
3	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Repair or replace crankshaft position sensor
4	Is fuel injector at cylinder No.2 OK?	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.2
5	Is fuel system (RH or LH) OK?	Yes	Go to next step
		No	Repair or replace as necessary
6	Is exhaust gas recirculation system OK?	Yes	Go to next step
		No	Repair or replace as necessary
7	Is compression at cylinder No.2 normal?	Yes	Go to next step
		No	Repair or replace as necessary
8	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM
		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 voltage • Fuel system (RH or LH) 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?	Yes	Go to next step
		No	Repair or replace as necessary
2	Is ignition timing within specification?	Yes	Go to next step
		No	Adjust ignition timing
3	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Repair or replace crankshaft position sensor
4	Is fuel injector at cylinder No.3 OK?	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.3
5	Is fuel system (RH and LH) OK?	Yes	Go to next step
		No	Repair or replace as necessary
6	Is exhaust gas recirculation system OK?	Yes	Go to next step
		No	Repair or replace as necessary
7	Is compression at cylinder No.3 normal?	Yes	Go to next step
		No	Repair or replace as necessary
8	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM
		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 voltage • Fuel system (RH or LH) 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?	Yes	Go to next step
		No	Repair or replace as necessary
2	Is ignition timing within specification?	Yes	Go to next step
		No	Adjust ignition timing
3	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Repair or replace crankshaft position sensor
4	Is fuel injector at cylinder No.4 OK?	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.4
5	Is fuel system (RH and LH) OK?	Yes	Go to next step
		No	Repair or replace as necessary
6	Is exhaust gas recirculation system OK?	Yes	Go to next step
		No	Repair or replace as necessary
7	Is compression at cylinder No.4 normal?	Yes	Go to next step
		No	Repair or replace as necessary
8	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0305	CYLINDER 5 MISFIRE DETECTED
Symptom	PCM input signal from crankshaft position sensor signal for cylinder No.5 is irregular
Possible cause	• Ignition system of cylinder No.5 malfunction • Low fuel • Low battery voltage • Fuel system (RH or LH) malfunction • Insufficient compression in cylinder No.5 • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system of cylinder No.5 OK?	Yes	Go to next step
		No	Repair or replace as necessary
2	Is ignition timing within specification?	Yes	Go to next step
		No	Adjust ignition timing
3	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Repair or replace crankshaft position sensor
4	Is fuel injector at cylinder No.5 OK?	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.5
5	Is fuel system (RH and LH) OK?	Yes	Go to next step
		No	Repair or replace as necessary
6	Is exhaust gas recirculation system OK?	Yes	Go to next step
		No	Repair or replace as necessary
7	Is compression at cylinder No.5 normal?	Yes	Go to next step
		No	Repair or replace as necessary
8	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM
		No	Temporary system malfunction

* During normal driving

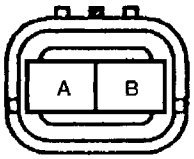
Diagnostic trouble code No. P0306	CYLINDER 6 MISFIRE DETECTED
Symptom	PCM input signal from crankshaft position sensor signal for cylinder No.6 is irregular
Possible cause	• Ignition system of cylinder No.6 malfunction • Low fuel • Low battery voltage • Fuel system (RH or LH) malfunction • Insufficient compression in cylinder No.6 • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system of cylinder No.6 OK?	Yes	Go to next step
		No	Repair or replace as necessary
2	Is ignition timing within specification?	Yes	Go to next step
		No	Adjust ignition timing
3	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Repair or replace crankshaft position sensor
4	Is fuel injector at cylinder No.6 OK?	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.6
5	Is fuel system (RH and LH) OK?	Yes	Go to next step
		No	Repair or replace as necessary
6	Is exhaust gas recirculation system OK?	Yes	Go to next step
		No	Repair or replace as necessary
7	Is compression at cylinder No.6 normal?	Yes	Go to next step
		No	Repair or replace as necessary
8	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace PCM
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0325	KNOCK SENSOR 1-CIRCUIT MALFUNCTION
Symptom	Input voltage from knock sensor is malfunction level preset in PCM when ignition switch is turned on
Possible cause	• Knock sensor malfunction • Knock sensor installation incorrect • Open or short circuit in wiring from PCM terminal 3S to knock sensor terminal A

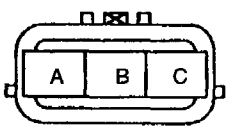
STEP	INSPECTION		ACTION
1	Does knock sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Disconnect knock sensor connector. Is there continuity between connector terminal A and PCM terminal 3S?	Yes	Go to next step
		No	Repair or replace wiring harness
3	Is resistance of knock sensor OK?	Yes	Go to next step
		No	Repair or replace knock sensor
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

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 4AH to crankshaft position sensor terminal A • Open or short circuit in wiring from PCM terminal 4AL to crankshaft position sensor terminal B

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 the crankshaft position sensor connector. Is there continuity between connector terminal B and PCM terminal 4AL? Is there continuity between connector terminal A and PCM terminal 4AH?	Yes	Go to next step
		No	Repair or replace wiring harness
3	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Replace crankshaft position sensor or crankshaft pulley
4	Is crankshaft position sensor OK?	Yes	Go to next step
		No	Replace crankshaft position sensor
5	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

Diagnostic trouble code No. P0400	EGR-FLOW MALFUNCTION
Symptom	Exhaust gas recirculation 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 • Warm up three way catalytic converter and EGR valve

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code for EGR solenoid valve (vaccum, vent), EGR boost sensor and EGR boost sensor solenoid valve shown?	Yes	Carry out inspection as required according to diagnostic trouble code
		No	Go to next step
2	Is EGR valve position sensor OK?	Yes	Go to next step
		No	Repair or replace EGR valve
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	Is EGR boost sensor OK?	Yes	Go to next step
		No	Replace EGR boost sensor
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
		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 (RH) deterioration • Leakage in exhaust system

STEP	INSPECTION		ACTION
1	Is heated oxygen sensor (Rear RH) OK?	Yes	Replace warm up three way catalytic converter (RH)
		No	Replace heated oxygen sensor (Rear RH)

Diagnostic trouble code No. P0430	BANK 2 CAT EFFICIENCY BELOW LIMIT
Symptom	• Warm up three way catalytic converter (LH) deterioration • Leakage in exhaust system

STEP	INSPECTION		ACTION
1	Is heated oxygen sensor (Rear LH) OK?	Yes	Replace warm up three way catalytic converter (LH)
		No	Replace heated oxygen sensor (Rear LH)

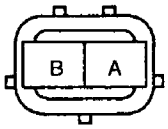
Diagnostic trouble code No. P0440	EVAP SYSTEM-MALFUNCTION
Symptom	Evaporative emission control system does not function normally because of mechanical trouble
Possible cause	• Purge solenoid valve malfunction • Charcoal canister malfunction • Check valve malfunction • Fuel vapor valve malfunction • Clogs 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 4O voltage OK?	Yes	Go to next step
		No	Inspect purge solenoid valve
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?	Yes	Go to next step
		No	Repair or replace as necessary
4	Is check valve OK?	Yes	Go to next step
		No	Repair or replace as necessary
5	Is fuel vapor valve OK?	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
		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 4O

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 4O voltage OK?	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 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 connector terminal B and PCM terminal 4O?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between purge solenoid valve 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
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR

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 4M

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 4M voltage OK?	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 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 connector terminal B and PCM terminal 4M?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between idle air control valve terminals A and B?	Yes	Go to next step
		No	Replace idle air control valve
6	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

Diagnostic trouble code No. P0510	CLOSED THROTTLE POS SWITCH-MALFUNCTION
Symptom	Input voltage from closed throttle position switch (in throttle position sensor) stays 0 V or above 12 V for more than 33.2 seconds after ignition switch is turned on
Possible cause	• Closed throttle position switch (in throttle position sensor) malfunction • Throttle position sensor malfunction • Open or short circuit in wiring from throttle position sensor terminal C to PCM terminal 3X • Open or short circuit in wiring from throttle position sensor terminal D to PCM terminal 3AB

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 3X voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Is there continuity between connector terminal D and PCM terminal 3AB?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between connector terminal C and PCM terminal 3X?	Yes	Replace throttle position sensor
		No	Repair or replace wiring harness
5	Is closed throttle position switch (in throttle position sensor) OK?	Yes	Go to next step
		No	Repair or replace throttle position sensor
6	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

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 1O 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 1O voltage OK?	Yes	Go to step 4
		No	Go to next step
3	Is there continuity between brake switch and PCM terminal 1O?	Yes	Check for open or short circuit in wiring harness. (Battery — Brake switch) Check brake switch.
		No	Repair or replace wiring harness
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)

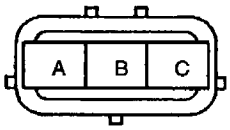
Diagnostic trouble code No. P1000	MORE DRIVING NEEDED TO COMPLETE TEST
Possible cause	Following diagnostic trouble code detection conditions not satisfied

Diagnosed circuit	Code No.
Excessive time to enter closed loop fuel control	P0125
O_2 sensor circuit malfunction	P0130 P0150
O_2 sensor heater circuit malfunction	P0135 P0155
Fuel trim malfunction	P0170
Misfire detected	P0300, P0301 P0302, P0303 P0304, P0305 P0306
Exhaust gas recirculation flow malfunction	P0400
Catalyst system efficiency below threshold	P0420 P0430
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 RH) signal remains unchanged for more than 20 seconds after engine control has entered feedback zone
Possible cause	• Heated oxygen sensor (Front RH) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front RH) terminal A to PCM terminal 3I • Intake-air system, fuel system, ignition system malfunction

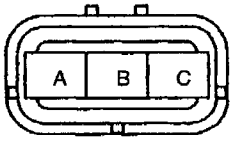
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front RH) connector or PCM connector have poor connection?	Yes	Repair or replace
		No	Go to next step
2	Is PCM terminal 3I voltage OK?	Yes	Go to step 5
		No	Go to next step
3	Disconnect heated oxygen sensor (Front RH) connector. Is there continuity between connector terminal A and PCM terminal 3I?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Are following units OK? • Fuel injector • Pressure regulator • Mass air flow sensor • Engine coolant temperature sensor • Spark plug • Air suction (Air/Fuel ratio rich or lean)	Yes	Replace heated oxygen sensor (Front RH)
		No	Repair or replace
5	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor. 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

Diagnostic trouble code No. P1173	HO2S 21-INVERSION
Symptom	Heated oxygen sensor (Front LH) signal remains unchanged for more than 20 seconds after engine control has entered feedback zone
Possible cause	• Heated oxygen sensor (Front LH) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front LH) terminal A to PCM terminal 3M • Intake-air system, fuel system, ignition system malfunction

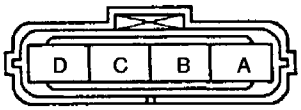
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front LH) connector or PCM connector have poor connection?	Yes	Repair or replace
		No	Go to next step
2	Is PCM terminal 3M voltage OK?	Yes	Go to step 5
		No	Go to next step
3	Disconnect heated oxygen sensor (Front LH) connector. Is there continuity between connector terminal A and PCM terminal 3M?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Are following units OK? • Fuel injector • Pressure regulator • Mass air flow sensor • Engine coolant temperature sensor • Spark plug • Air suction (Air/Fuel ratio rich or lean)	Yes	Replace heated oxygen sensor (Front LH)
		No	Repair or replace
5	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor. 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

Diagnostic trouble code No. P1195	EGRBS-OPEN OR SHORT
Symptom	Input voltage from EGR boost sensor is malfunction level preset in PCM when ignition switch is turned on
Possible cause	• EGR boost sensor malfunction • Open or short circuit in wiring from PCM terminal 3F to EGR boost sensor terminal D • Open or short circuit in wiring from PCM terminal 3A to EGR boost sensor terminal B • Open circuit in wiring from PCM terminal 3AB to EGR boost sensor terminal C

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 3F voltage OK?	Yes	Go to step 5
		No	Go to next step
3	Disconnect EGR boost sensor connector. Turn ignition switch to ON. Is there 5 V at connector terminal B?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3A — EGR boost sensor terminal B)
4	Is there continuity between connector terminal C and PCM terminal 3AB?	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
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



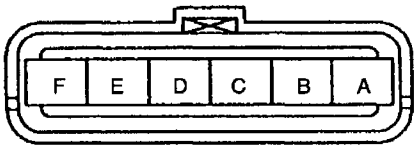
HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P1196	STA SW-OPEN OR SHORT
Symptom	Input signal from starter to PCM continues for more than 33 seconds
Possible cause	• Starter malfunction • Open or short circuit in wiring from starter terminal S to PCM terminal 1H

STEP	INSPECTION		ACTION
1	Does starter connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 1H voltage OK?	Yes	Go to step 4
		No	Go to next step
3	Disconnect starter connector. Is there continuity between connector terminal S and PCM terminal 1H?	Yes	Replace starter
		No	Repair or replace
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)

Diagnostic trouble code No. P1345	**SGC SIGNAL-NO SGC SIGNAL**
Symptom	No SGC signal input from camshaft position sensor while engine rotates two cycles
Possible cause	• Camshaft position sensor malfunction • Open or short circuit in wiring from distributor 6-pin connector terminal B to main relay terminal D • Open or short circuit in wiring from PCM terminal 4F to distributor 6-pin connector terminal D

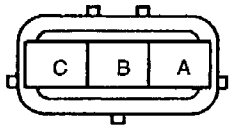
STEP	INSPECTION		ACTION
1	Does distributor 6-pin connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Disconnect distributor 6-pin connector. Turn ignition switch to ON. Is there battery positive voltage at connector terminal B?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — Distributor 6-pin connector terminal B)
3	Is there continuity between connector terminal D and PCM terminal 4F?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is PCM terminal 4F voltage OK?	Yes	Go to step 6
		No	Go to next step
5	Is camshaft position sensor OK?	Yes	Go to next step
		No	Replace distributor
6	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

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 C to PCM terminal 3R • Open or short circuit in wiring from EGR valve position sensor terminal B to PCM terminal 3A • Open or short circuit in wiring from EGR valve position sensor terminal A to PCM terminal 3AB

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 3R voltage OK?	Yes	Go to step 7
		No	Go to next step
3	Disconnect EGR valve position sensor connector. Turn ignition switch to ON. Is there 5 V at connector terminal B?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (PCM terminal 3A — EGR valve position sensor terminal B)
4	Is there continuity between connector terminal A and PCM terminal 3AB?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between connector terminal C and PCM terminal 3R?	Yes	Go to next step
		No	Repair or replace wiring harness
6	Is resistance of EGR valve position sensor OK?	Yes	Go to next step
		No	Replace EGR valve
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

Diagnostic trouble code No. P1521	**VRIS1-OPEN OR SHORT**
Symptom	Open or short circuit is observed in VRIS solenoid valve No.1 system when ignition switch is turned on
Possible cause	• VRIS solenoid valve No.1 malfunction • Open or short circuit in wiring from VRIS solenoid valve No.1 terminal B to PCM terminal 1AA • Open or short circuit in wiring from VRIS solenoid valve No.1 terminal A to main relay terminal D

STEP	INSPECTION		ACTION
1	Does VRIS solenoid valve No.1 connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 1AA voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect VRIS solenoid valve No.1 connector. Turn ignition switch to ON. Is there battery positive voltage at connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — VRIS solenoid valve No.1 terminal A)
4	Is there continuity between connector terminal B and PCM terminal 1AA?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between VRIS solenoid valve No.1 terminals A and B?	Yes	Go to next step
		No	Replace VRIS solenoid valve No.1
6	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

Diagnostic trouble code No. P1522	VRIS2-OPEN OR SHORT
Symptom	Open or short circuit is observed in VRIS solenoid valve No.2 system when ignition switch is turned on
Possible cause	• VRIS solenoid valve No.2 malfunction • Open or short circuit in wiring from VRIS solenoid valve No.2 terminal B to PCM terminal 1AE • Open or short circuit in wiring from VRIS solenoid valve No.2 terminal A to main relay terminal D

STEP	INSPECTION		ACTION
1	Does VRIS solenoid valve No.2 connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 1AE voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect VRIS solenoid valve No.2 connector. Turn ignition switch to ON. Is there battery positive voltage at connector terminal A?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — VRIS solenoid valve No.2 terminal A)
4	Is there continuity between connector terminal B and PCM terminal 1AE?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between VRIS solenoid valve No.2 terminals A and B?	Yes	Go to next step
		No	Replace VRIS solenoid valve No.2
6	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

Diagnostic trouble code No. P1609	PCME (CPU)-MALFUNCTION
Symptom	PCM's knock control integrated circuit is damaged
Possible cause	PCM's knock control integrated circuit is damaged

STEP	INSPECTION		ACTION
1	Erase diagnostic trouble code from memory. Is same code No. present after recheking?	Yes	Replace PCM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

Diagnostic trouble code No. P1627	ECM/TCS LINE-COMMUNICATION ERROR
Symptom	Open or short circuit is observed between PCM terminal 1Q and ABS/TCS control unit terminal 2S when ignition switch is turned on
Possible cause	• ABS/TCS control unit malfunction • Open or short circuit in wiring from ABS/TCS control unit terminal 2S to PCM terminal 1Q

STEP	INSPECTION		ACTION
1	Does ABS/TCS control unit connector or PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is there continuity between ABS/TCS control unit terminal 2S and PCM terminal 1Q?	Yes	Go to next step
		No	Repair or replace wiring harness
3	Is ABS/TCS control unit OK?	Yes	Go to next step
		No	Repair or replace transaxle range switch
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)

Diagnostic trouble code No. P1720	VSS2-NO VSS2 SIGNAL
Symptom	No vehicle speed sensor signal input from vehicle speed sensor while driving
Possible cause	• Speedometer sensor malfucntion • 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 1C

STEP	INSPECTION		ACTION
1	Does vehicle speed sensor connector and PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 1C voltage OK?	Yes	Go to step 5
		No	Go to next step
3	Is there continuity between vehicle speed sensor terminal and PCM terminal 1C?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between vehicle speed sensor and speedometer sensor terminals?	Yes	Go to next step
		No	Repair or replace speedometer sensor and wiring harness
5	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)

Diagnostic trouble code No. P1794	BAT-BAT OR CIRCUIT FAIL
Symptom	Battery positive voltage is not constantly applied to PCM terminal 4B
Possible cause	• Battery malfunction • Open or short circuit in wiring from PCM terminal 4B to batterry positive cable • Burnt fuse

STEP	INSPECTION		ACTION
1	Is battery fully charged?	Yes	Go to next step
		No	Charge the battery
2	Does battery positive voltage present at PCM terminal 4B?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (PCM terminal 4B — Battery)
3	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)

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
Possible cause	• Transaxle range switch malfunction • Open or short circuit in wiring from transaxle range switch terminal H to PCM terminal 1F

STEP	INSPECTION		ACTION
1	Does PCM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is PCM terminal 1F voltage OK?	Yes	Go to step 5
		No	Go to next step
3	Is there continuity between transaxle range switch terminal H and PCM terminal 1F?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is transaxle range switch OK?	Yes	Go to next step
		No	Repair or replace transaxle range switch
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace PCM
		No	Intermitent poor connection of harness or connector (Repair connector and/or harness)

TROUBLESHOOTING GUIDE

QUICK DIAGNOSIS CHART

This Quick Diagnosis Chart shows the relationship between troubleshooting items and inspection points.

Item		Possible parts and reference page	Intake air system		Fuel system							Evaporative emission system			Control System										
			F1–5	Section B1	F1–62	F1–14	F1–14	F1–17	F1–18	F1–18	F1–18	F1–22	F1–26	F1–26	F1–38	F1–41	F1–41	F1–44	F1–44	F1–45	F1–45	F1–46	F1–50	F1–50	
			Air leakage	Compression pressure	PRC solenoid valve	Fuel pump: Continuity	Fuel pump: Maximum pressure	Fuel pump (transfer)	Fuel injector: Resistance	Fuel injector: Leakage	Fuel injector: Volume	Pressure regulater	Charcoal canister	PCV valve	Mass air flow sensor	Throttle position sensor	Closed throttle position switch	Engine coolant temperature sensor	Intake air temperature sensor	Heated oxygen sensor (front RH, LH)	Heated oxygen sensor (rear RH, LH)	Knock sensor	Power steering pressure switch	Main relay	
1	Melts main or other fuse					○														○	○			○	
2	Will not crank or cranks slowly																								
3	Cranks normally but will not start	No combustion																						○	
4		Partial combustion — when engine cold				○	○		○																
5		Partial combustion — after warm-up																							
7	Cranks normally but hard to start	Any engine temp.		○				○			○														
8		When engine cold																							
9		After warm-up			○					○		○													
10	Engine stalls	Idle at any engine temp.	○	○		○	○		○	○	○				○			○							
11		During fast idle																							
12		Idle after warm-up												○			○								
13		Idle with A/C, P/S, and/or E/L ON															○						○		
14		Idle when shifted from N or P to other ranges															○								
15		Driveaway													○			○							
16		On acceleration					○								○										
17		While cruising				○									○										
18		On deceleration				○									○		○								
19	Engine rough	Idle at any engine temp.	○	○			○		○	○	○				○			○				○			
20		During fast idle																							
21		Idle after warm-up								○				○					○	○					
22		Idle with A/C, P/S, and/or E/L ON															○						○		
23		Idle when shifted from N or P to other ranges															○								
24		On deceleration															○								
25	Poor acceleration	Driveaway													○			○		○		○			
26		On acceleration		○			○		○		○				○	○		○		○		○			
27	High idle speed after warm-up																	○					○		

Control system															Section G							Possible parts and reference page		
F1–48	Section T	Section T	Section G	Section U	F1–30	F1–52	F1–52	F1–56	F1–59	F1–65	F1–66	F1–68	F1–73											
EGR valve position sensor	Brake switch	Headlight switch	Ignition switch (starter signal)	A/C amplifer	PCM	BAC valve	Idle air control valve	VRIS solenoid valve	Fuel pump relay	EGR solenoid valve (vacuum)	EGR valve	Purge solenoid valve	A/C relay	Battery	Ignition control module (in distributor)	Ignition coil (in distributor)	Distributor	High-tension lead	Spark plug	Starter		Item		
	○								○												Melts main or other fuse			1
			○											○						○	Will not crank or cranks slowly			2
					○													○	○		No combustion			3
						○			○												Partial combustion — when engine cold	Cranks normally but will not start		4
																					Partial combustion — after warm-up			5
			○		○				○			○									Any engine temp.	Cranks normally but hard to start		7
						○													○		When engine cold			8
																					After warm-up			9
					○		○		○	○	○	○			○	○	○	○	○		Idle at any engine temp.	Engine stalls		10
						○															During fast idle			11
							○														Idle after warm-up			12
		○		○	○		○						○								Idle with A/C, P/S, and/or E/L ON			13
					○		○														Idle when shifted from N or P to other ranges			14
					○					○	○										Driveaway			15
					○																On acceleration			16
					○				○												While cruising			17
					○				○												On deceleration			18
					○		○			○	○	○			○	○	○	○	○		Idle at any engine temp.	Engine rough		19
					○	○															During fast idle			20
					○		○														Idle after warm-up			21
		○		○	○		○						○								Idle with A/C, P/S, and/or E/L ON			22
					○		○														Idle when shifted from N or P to other ranges			23
					○																On deceleration			24
					○							○							○		Driveaway	Poor acceleration		25
					○			○				○				○	○	○	○		On acceleration			26
		○		○	○	○	○						○								High idle speed after warm-up			27

Item	Possible parts and reference page	Intake air system		Fuel system							Evaporative emission system			Control System									
		F1–5	Section B1	F1–63	F1–14	F1–14	F1–17	F1–18	F1–18	F1–18	F1–22	F1–26	F1–26	F1–38	F1–41	F1–41	F1–44	F1–44	F1–45	F1–45	F1–46	F1–50	F1–50
		Air leakage	Compression pressure	PRC solenoid valve	Fuel pump: Continuity	Fuel pump: Maximum pressure	Fuel pump (transfer)	Fuel injector: Resistance	Fuel injector: Leakage	Fuel injector: Volume	Pressure regulater	Charcoal canister	PCV valve	Mass air flow sensor	Throttle position sensor	Closed throttle position switch	Engine coolant temperature sensor	Intake air temperature sensor	Heated oxygen sensor (front RH, LH)	Heated oxygen sensor (rear RH, LH)	Knock sensor	Power steering pressure switch	Main relay
28	Idle fluctuates/Idle hunts									○													
29	Hesitates/Stumbles on acceleration					○		○	○	○				○	○		○		○				
30	Surges while cruising							○	○	○				○					○				
31	Lack of power	○	○			○		○	○	○	○			○			○		○		○		
32	Poor fuel economy	○	○								○			○			○		○				
33	A/C does not work																						
34	Knocking/Pinging																	○			○		
35	Fuel odor											○											
36	Exhaust sulfur smell																						
37	High oil consumption												○										
38	NGS displays "LINK COMMUNICATION ERROR"																						
39	NGS will not work																						

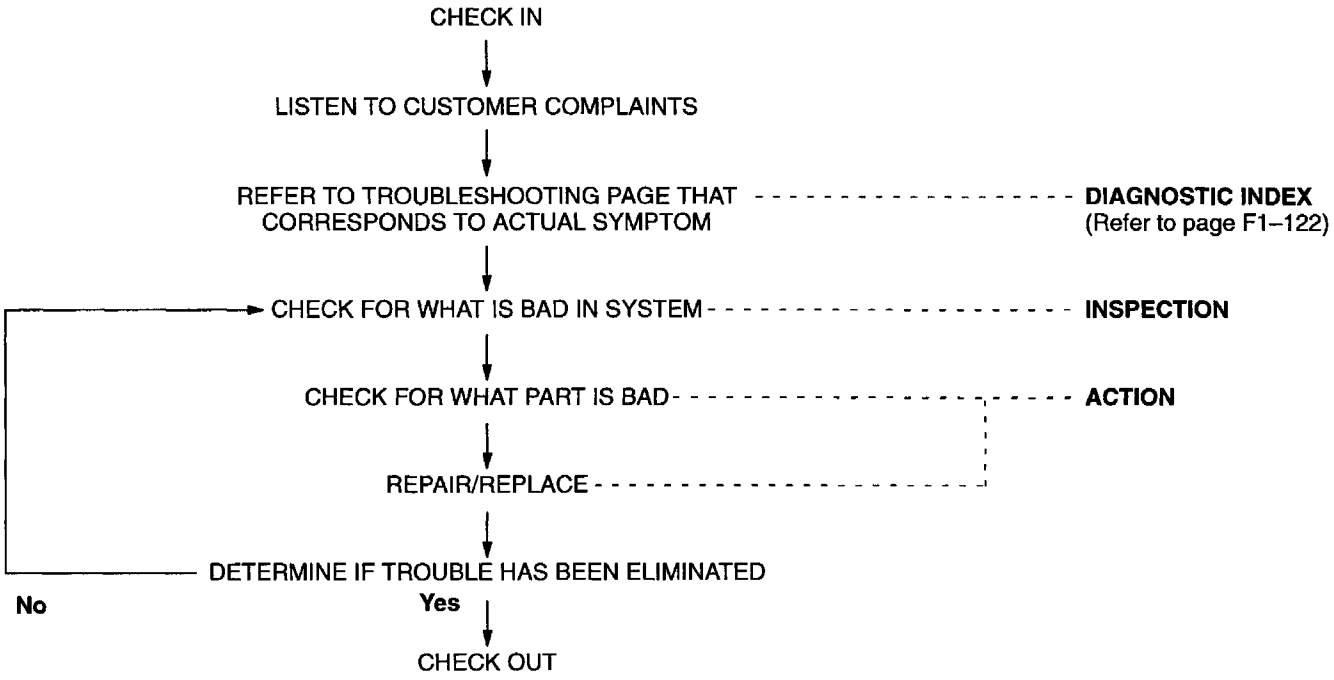
Control system															Section G							Possible parts and reference page	
F1–48	Section T	Section T	Section G	Section U	F1–30	F1–52	F1–52	F1–56	F1–59	F1–65	F1–66	F1–68	F1–73									Item	
EGR valve position sensor	Brake switch	Headlight switch	Ignition switch (starter signal)	A/C amplifer	PCM	BAC valve	Idle air control valve	VRIS solenoid valve	Fuel pump relay	EGR solenoid valve (vacuum)	EGR valve	Purge solenoid valve	A/C relay	Battery	Ignition control module (in distributor)	Ignition coil (in distributor)	Distributor	High-tension lead	Spark plug	Starter			
														○								Idle fluctuates/Idle hunts	28
○																						Hesitates/Stumbles on acceleration	29
																						Surges while cruising	30
																						Lack of power	31
																						Poor fuel economy	32
				○	○								○									A/C does not work	33
																						Knocking/Pinging	34
												○										Fuel odor	35
																						Exhaust sulfur smell	36
																						High oil consumption	37
																						NGS displays "LINK COMMUNICATION ERROR"	38
																						NGS will not work	39

USING THIS SECTION

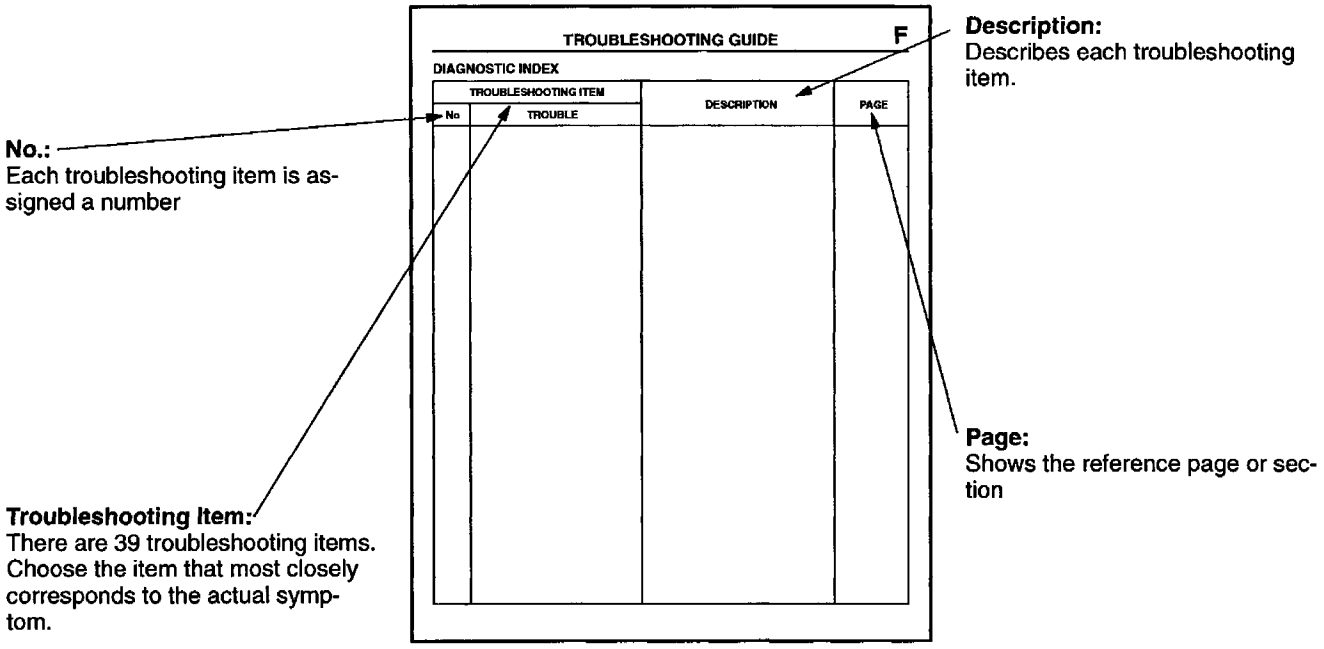
Introduction

Most of the fuel and emission control systems are electronically controlled, often making it difficult to diagnose problems, especially intermittent problems. Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer is often a good source of information on such problems, especially the intermittent ones. Through a talk with the customer, you will usually find out what the symptoms are and under what conditions they occur.

Work flow



Diagnostic index



Troubleshooting chart

13 14	**ENGINE STALLS**	• **IDLE WITH A/C, P/S, and/or E/L ON** • **IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGE**

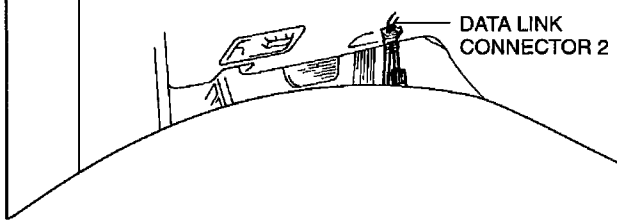
DESCRIPTION	• Engine stops unexpectedly when A/C, P/S, and/or E/L turned ON at idle • Engine stops unexpectedly when shifted from N or P to other ranges at idle • Idle condition is normal when A/C, P/S, and E/L are OFF and in park/neutral position

[TROUBLESHOOTING HINTS]

① Signal does not input to PCM
- A/C switch
- Headlight switch
- Rear window defroster switch
- Fan switch
- Power steering pressure switch

② Idle air control valve
- Stuck

③ Closed throttle position switch
- Throttle position sensor misadjustment

STEP	INSPECTION		ACTION
1	Is following terminal voltage at PCM correct? **☞ page F1–29** • 1D (A/C switch) • 1G (Daytime running light-Canada Fog light-except Canada) • 1K (Fan switch) • 1L (Headlight) • 1X (Rear window defroster switch) • 3T (Power steering pressure switch) • 3X (Closed throttle position switch) • Park/Neutral switch **☞ section K1**	Yes	Go to next step
		No	Check for cause
2	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? **☞ page F1–75**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check

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 action is described on the reference page specified by the "☞" mark.

DIAGNOSTIC INDEX

TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
No.	TROUBLE			
1	Melts main or other fuse		—	F1–126
2	Will not crank or cranks slowly		Starter does not work Starter cranks engine at slow speed	section G
3	Cranks normally but will not start	No combustion	Starter cranks engine at normal speed but engine shows no indication of firing	F1–127
4		Partial combustion — when engine cold	Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is cold or at initial starting Engine will not continue running when cold when ignition switch is returned from STA to IG position	F1–127
5		Partial combustion — after warm-up	Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is warm Engine will not continue running when warm when ignition switch is returned from STA to IG position	F1–129
6	Will start in other than park/neutral position		Engine starts in P, N and other ranges	section K1
7	Cranks normally but hard to start	Any engine temp.	Starter cranks engine at normal speed but engine requires excessive cranking time before starting at any engine temperature Engine starts after stalling a few times at any engine temperature	F1–130
8		When engine cold	Starter cranks engine at normal speed but engine requires excessive cranking time before starting when engine is cold Engine starts after stalling a few times when engine is cold	
9		After warm-up	Starter cranks engine at normal speed but engine requires excessive cranking time before starting after warm-up	
10	Engine stalls	Idle at any engine temp.	Engine stops unexpectedly at any engine temp.	F1–132
11		During fast idle	Engine stops unexpectedly during fast-idle operation	
12		Idle after warm-up	Engine stops unexpectedly at idle after warm-up	
13		Idle with A/C, P/S, and/or E/L ON	Engine stops unexpectedly when A/C, P/S, and/or E/L turned ON at idle	F1–135 section K1
*14		Idle when shifted from N or P to other ranges	Engine stops unexpectedly when shifted from N or P to other ranges at idle	
15		Driveaway	Engine stops unexpectedly upon driveaway	F1–136
16		On acceleration	Engine stops unexpectedly at beginning of acceleration or during acceleration	F1–138
17		While cruising	Engine stops unexpectedly while cruising	
*18		On deceleration	Engine stops unexpectedly at beginning of deceleration or recovery from deceleration Exhaust afterburn	F1–140 section K1

* Refer to section F1 before referring to section K1.

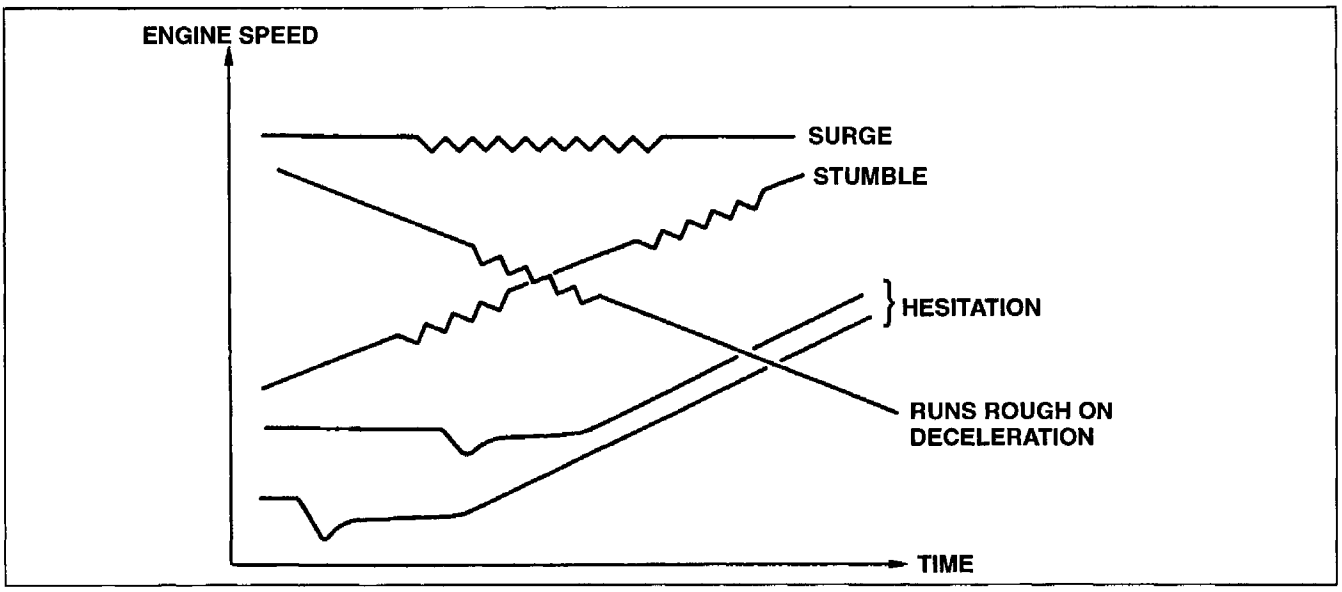
TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
No.	TROUBLE			
19	Engine runs rough	Idle at any engine temp.	Engine speed fluctuates between specified idle speed and lower speed, and excessive engine shake at any engine temp. Idle speed too slow and excessive engine shake at any engine temp.	F1–141
20		During fast idle	Fast idle speed too slow and excessive engine shake during fast idle, but returns to normal after warm-up	
21		Idle after warm-up	Engine speed fluctuates between specified idle speed and lower speed, and excessive engine shake at idle after warm-up	
22		Idle with A/C, P/S, and/or E/L ON	Engine speed fluctuates between specified idle speed and lower speed, and excessive engine shake at idle when A/C, P/S, and/or E/L ON	F1–144
23		Idle when shifted from N or P to other range	Engine speed fluctuates between specified idle speed and lower speed, and excessive engine shake at idle when shifted from P or N to other range	
*24		On deceleration	Engine shakes at beginning of deceleration, during deceleration, or recovery from deceleration Exhaust afterburn	F1–146 section K1
*25	Poor acceleration	Driveaway	Engine speed increases normally but vehicle speed slowly increases during driveaway	F1–147 section K1
*26		On acceleration	Engine speed increases normally but vehicle speed slowly increases during acceleration	
27	High idle speed after warm-up		Idle speed continues at fast idle after warm-up Engine returns slowly to idle after acceleration is released	F1–149
28	Idle fluctuates/Idle hunts		Engine speed changes back and forth between specified idle speed and higher speed	F1–150
29	Hesitates/Stumbles on acceleration		Momentary pause at beginning of acceleration or during acceleration	F1–152
*30	Surges while cruising		Momentary minor irregularity in engine output at steady vehicle speed	F1–154 section K1
*31	Lack of power		Performance poor under load (i.e., power down when climbing hills)	F1–155 section K1
*32	Poor fuel economy		Fuel economy unsatisfactory	F1–156 section K1
33	A/C does not work		A/C compressor magnetic clutch does not engage when A/C switch ON	F1–156
34	Knocking/Pinging		Sound produced when air/fuel mixture is ignited by something other than spark plug (i.e., hot spot in combustion chamber)	F1–156
35	Fuel odor		Gasoline fuel smell or visible leaks	F1–156
36	Exhaust sulfur smell		Rotten egg smell from exhaust	F1–156
37	High oil consumption		Oil consumption excessive	F1–156
38	NGS displays "LINK COMMUNICATION ERROR"		NGS displays "LINK COMMUNICATION ERROR"	F1–156
39	NGS will not work		NGS does not work	F1–156
40	Vehicle does not move in D, S, L and/or R ranges		No creep at all Vehicle does not move when accelerator pedal depressed after shifted to D, S, L and/or R range	section K1
41	Vehicle moves in N range		Vehicle creeps in N range Vehicle moves when accelerator pedal not depressed	section K1
42	Vehicle moves in P range		Vehicle rolls in P range, and drivetrain not locked up	section K1

* Refer to section F1 before referring to section K1.

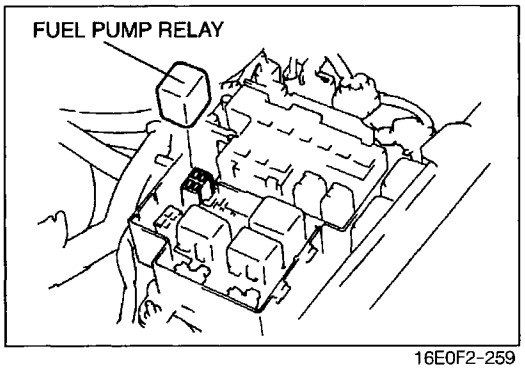
TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
No.	TROUBLE			
43	Excessive creep		Vehicle moves quickly in D, S, L and R range (accelerator pedal not depressed) **Note** • Excessive N to R range and N to D range shift shock felt	section K1
44	No shift		Single range shift (1st→2nd, 2nd→3rd or 3rd→O/D) only Sometimes shifts correctly **Note** • Gear position held in hold mode.	section K1
45	Abnormal shift		Shifts incorrectly (incorrect shift pattern) (ex) Vehicle shifts 1st→O/D directly when accelerating with accelerator pedal depressed slightly	section K1
46	Frequent shifting		Downshift occurs when accelerator depressed slightly in D, S and L ranges (except hold mode)	section K1
47	Shift point high or low		Shift points do not match shift diagram Shifts delayed when accelerating Shifts occur too fast when accelerating and engine speed does not increase	section K1
48	No lockup		No lockup when vehicle speed reaches lockup range	section K1
49	No kickdown		Does not downshift when accelerator pedal depressed more than 7/8 within kickdown range	section K1
50	Engine speed flares up	When accelerating	Engine speed flares up on acceleration	section K1
51		When upshifting and/or downshifting	Engine flares up when accelerator pedal depressed for upshifting Engine flares up suddenly when accelerator pedal depressed for downshifting	section K1
52	Excessive shift shock	P, N to R and/or N to D	Strong shift shock felt at idle when shifting from N to D or R range	section K1
53		When upshifting and/or downshifting	Excessive shift shock felt when accelerating at upshifting During cruising, excessive shift shock felt when accelerator pedal depressed at downshifting	section K1
54	No engine braking		Engine speed drops to idle but vehicle does not slow when accelerator pedal released during cruising at medium to high speed Engine speed drops to idle but vehicle does not slow when accelerator pedal released when in L range at low vehicle speed	section K1
55	No mode change		Mode does not change to/from normal mode in D range Hold mode not selected or not cancelled	section K1
56	Transaxle noise	All ranges	Transaxle noisy in all ranges when vehicle is idling	section K1
57		D, S, L, R ranges	Abnormal noise from transaxle in D, S, L, R	section K1
58	Transaxle overheats		ATF smells burnt and/or is discolored	section K1

Description of Driveability Problems

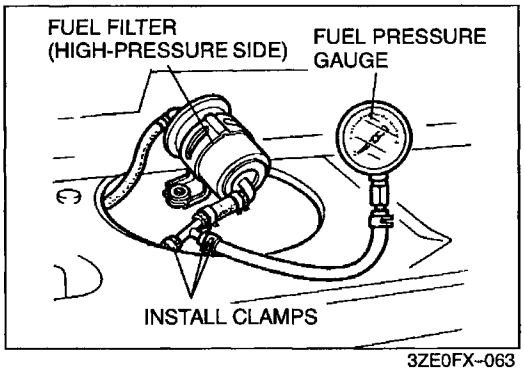
STUMBLE : Mild jerking during acceleration.
HESITATION : Flat spot occurring just after the accelerator pedal is depressed.
SURGE : Continuous soft jerking while cruising.



16E0F2-258



16E0F2-259



3ZE0FX-063

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. Start the engine.
   2. Remove the fuel pump relay.
   3. After the engine stalls, turn the ignition switch to OFF.
   4. Install the fuel pump relay.

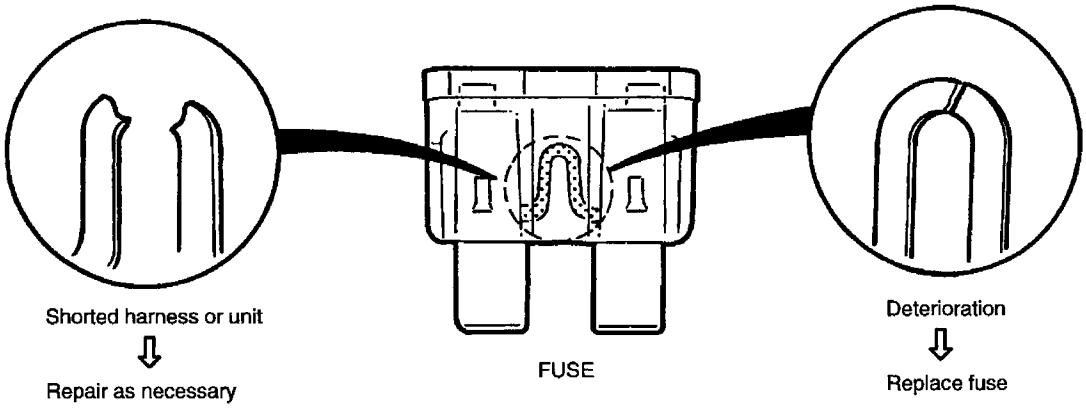
B. Avoid leakage.
   1. When disconnecting a fuel line hose, wrap a rag around it to protect against fuel leakage.
   2. Plug the hose after removal.

C. Install hose clamps to secure the fuel pressure gauge to the fuel filter and the main hose.

SYMPTOM TROUBLESHOOTING

1	MELTS MAIN OR OTHER FUSE

[TROUBLESHOOTING HINTS]
Check the condition of the fuse



Damaged Fuse	Related Wiring Harness
MAIN (120 A)	Main fuse — Generator terminal B
BTN (60 A)	BTN fuse — ROOM fuse
ROOM (15 A)	ROOM fuse — PCM terminal 4B ROOM fuse — Data link connector terminal +B
EGI INJ (40 A)	Main relay — Fuel pump relay Main relay — Data link connector terminal F/P Main relay — PCM terminal 1AF Fuel pump relay — Fuel pump Main relay — Fuel injectors Main relay — PCM terminal 4A Main relay — Distributor Main relay — Heated oxygen sensor Main relay — Mass air flow sensor Main relay — PRC solenoid valve Main relay — VRIS solenoid valve No.1 Main relay — VRIS solenoid valve No.2 Main relay — EGR solenoid valve (vacuum) Main relay — EGR solenoid valve (vent) Main relay — EGR boost sensor solenoid valve Main relay — Idle air control valve Main relay — PRG solenoid valve
ENGINE (10 A)	ENGINE fuse — Main relay

3	CRANKS NORMALLY BUT WILL NOT START	• NO COMBUSTION
DESCRIPTION	• Starter cranks engine at normal speed but engine shows no indication of firing	

[TROUBLESHOOTING HINTS]

① Diagnostic trouble codes
- P0335 (Crankshaft position sensor circuit malfunction)
- P1345 (SGC signal) ☞ page F1–75

② Main relay/Fuel pump relay
- Poor connection of connector
- Malfunction of relay ☞ page F1–59

③ PCM
- No IGT signal output from PCM terminal 4S to ignition control module (in distributor) ☞ page F1–30

④ Fuel pump
- Poor connection of connector
- Malfunction of fuel pump

⑤ Ignition system
- Referring to ignition system inspection ☞ section G

⑥ Fuel injectors
- Open or short circuit ☞ page F1–18

⑦ Throttle position sensor
- Misadjustment ☞ page F1–42

4	CRANKS NORMALLY BUT WILL NOT START	• PARTIAL COMBUSTION — WHEN ENGINE COLD
DESCRIPTION	• Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is cold at initial starting • Engine will not continue running when cold when ignition switch is returned from STA to IG position • Refer to "ENGINE STALLS" if this symptom appears after engine stall • Fuel in tank • Battery in normal condition	

[TROUBLESHOOTING HINTS]

① BAC valve
- Malfunction of air valve
- Idle air control valve

② Fuel injector
- Poor connection

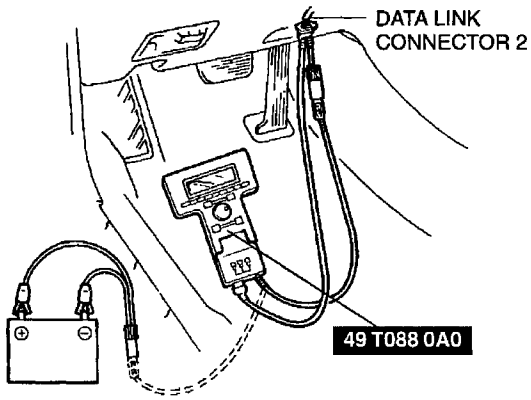
③ Fuel pump relay
- Poor connection

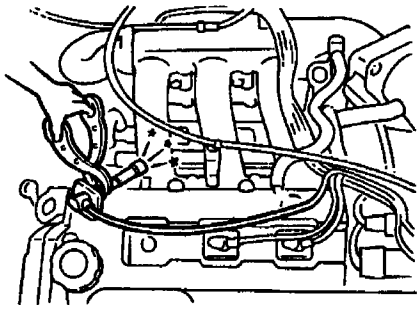
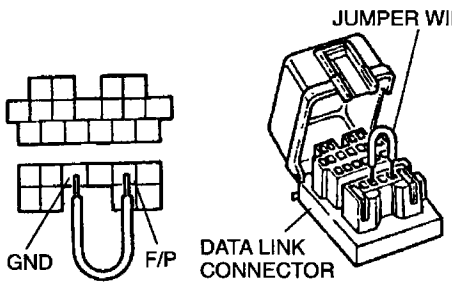
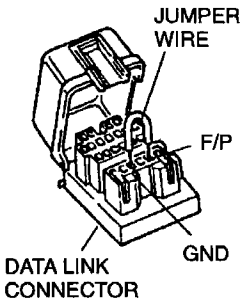
④ Fuel pump
- Poor connection of connector

⑤ Ignition coil
- Poor connection of connector

⑥ Pressure regulator
- Malfunction (low pressure)

⑦ Throttle body
- Stuck

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ page F1–75  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ page F1–75
2	Does engine start when throttle valve held quarter open?	Yes	Check BAC valve operation ☞ page F1–52
		No	Go to next step

STEP	INSPECTION		ACTION
3	Is a strong blue spark visible at each disconnected high-tension lead while cranking engine? 	Yes	Go to next step
		No	Refer to ignition system inspection ☞ **section G**
4	Connect jumper wire between F/P and GND terminals of data link connector; will engine start? 	Yes	Check follows: • Terminal 1AF voltage at PCM ☞ **page F1–30** • Continuity between 1AF terminal and fuel pump relay connector terminal • Condition of PCM and fuel pump relay connector female terminals
		No	Check if fuel pump operating sound is heard • If yes, go to next step • If no, check fuel pump and wiring harness ☞ **page F1–59**
5	Do Engine Signal Monitor lamps flash for specified terminals while cranking engine? ☞ **page F1–30** **Terminal: 4Q, 4U, 4Y, 4AC, 4AG, 4AK**	Yes	Go to next step
		No	Check follows according to results: Does not flash and 0V indicated for individual terminals • Continuity of fuel injector(s) • Continuity between PCM and fuel injector(s) • Condition of injector connector and PCM connector female terminals Repair or replace parts and/or wiring harness as necessary
6	Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON? ☞ **page F1–9** **Fuel line pressure:** **270—310 kPa {2.7—3.2 kgf/cm², 39—45 psi}** 	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator ☞ **page F1–9** • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞ **page F1–9**
7	Is following terminal voltage at PCM correct? • 1H (Starter signal) • 3E (Mass air flow sensor) • 3B (Throttle position sensor) • 3Q (Engine coolant temperature sensor)	Yes	Go to next step
		No	Check for cause

STEP	INSPECTION		ACTION
8	Are fuel injectors OK? • No fuel leakage ☞ page F1–20 • Fuel injectors not clogged ☞ page F1–20	Yes	Go to next step
		No	Replace fuel injector(s) ☞ page F1–18
9	Try known good PCM; does condition improve? ☞ page F1–30		

5	CRANKS NORMALLY BUT WILL NOT START	• PARTIAL COMBUSTION — AFTER WARM UP
DESCRIPTION	• Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is warm • Engine will not continue running when ignition switch is returned from STA to IG position	
[TROUBLESHOOTING HINTS] Pressure regulator • Fuel hold pressure low ☞ page F1–22		

7 8 9	**CRANKS NORMALLY BUT HARD TO START**	• **ANY ENGINE TEMP** • **WHEN ENGINE COLD** • **AFTER WARM-UP**

DESCRIPTION
- Starter cranks engine at normal speed but engine requires excessive cranking time before starting
- Engine starts after stalling a few times
- Battery in normal condition
- Engine runs normally at idle (if idle condition not OK, refer to "Engine runs rough" [Nos. 19, 20, 21, 22 or 23])

[TROUBLESHOOTING HINTS]

① Fuel injector
- Fuel leakage from fuel injector(s)

② Fuel pump
- Malfunction of pump

③ Pressure regulator
- Pressure regulator stuck

④ Spark plug
- Dirty or worn spark plug(s)

⑤ PRC solenoid valve
- Solenoid valve stuck

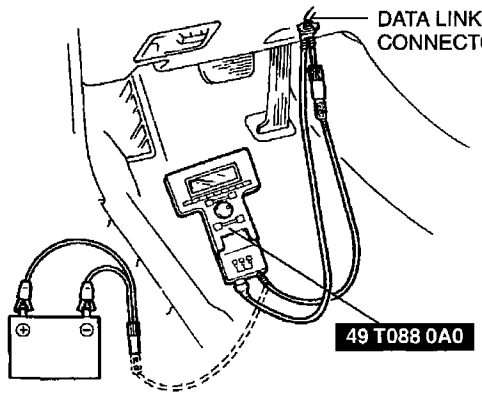
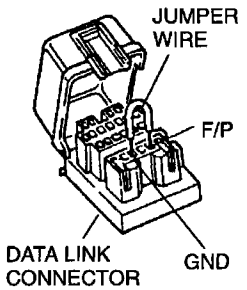
⑥ Throttle body
- Carbon on throttle plate

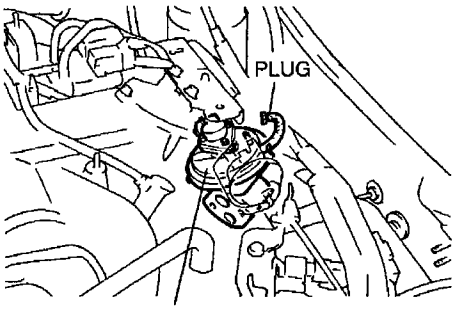
⑦ EGR solenoid valve (vacuum or vent)
- Solenoid valve stuck

⑧ EGR control valve
- EGR control valve stuck

⑨ BAC valve
- Air valve stuck
- Idle air control valve stuck

⑩ Mass air flow sensor
- Malfunction

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F1–75** 	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** • If symptom occurs after warm-up, go to step 11 • If symptom occurs except after warm-up, go to next step
		No	**Trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F1–75**
2	Is following terminal voltage at PCM correct? • 1H (Starter signal) • 3Q (Engine coolant temperature sensor) • 4Q, 4U, 4Y, 4AC, 4AG, 4AK (Fuel injectors)	Yes	Go to next step
		No	Check for cause
3	Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON? ☞ **page F1–9** **Fuel line pressure:** **270—310 kPa {2.7—3.2 kgf/cm², 39—45 psi}** 	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator ☞ **page F1–9** • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞ **page F1–9**

STEP	INSPECTION		ACTION
4	Is fuel line pressure held after ignition switch turned OFF? ☞ **page F1–10** **Fuel line pressure:** **More than 150 kPa {1.5 kgf/cm², 21 psi} for 5 min.**	Yes	Go to next step
		No	Plug outlet of pressure regulator, Is fuel line pressure held after ignition switch turned OFF? ☞ **page F1–10** • If yes, replace pressure regulator ☞ **page F1–18** • If no, check fuel pump hold pressure ☞ **page F1–15** If fuel pump OK, check fuel injectors for fuel leakage ☞ **page F1–20**
5	Is throttle body clean internally?	Yes	Go to next step
		No	Clean throttle body
6	Disconnect vacuum hose from EGR valve and plug it; does condition improve?  EGR VALVE	Yes	Check follows: • EGR solenoid valve (vacuum) for sticking • EGR solenoid valve (vent) for sticking • Condition of solenoid valve connector female terminal(s)
		No	Check if EGR valve moves smoothly ☞ **page F1–66** • If yes, go to next step • If no, replace EGR valve ☞ **page F1–66**
7	Is IAC system correct? ☞ **page F1–51**	Yes	Go to next step
		No	Check for cause
8	Is purge control system correct? ☞ **page F1–68**	Yes	Go to next step
		No	Check for cause
9	Is engine compression correct? ☞ **section B1** **Engine compression (Minimum):** **981 kPa {10.0 kgf/cm², 142 psi}/250 rpm**	Yes	Go to next step
		No	Check for cause ☞ **section B1**
10	Are fuel injectors OK? • No fuel leakage ☞ **page F1–20** • Fuel injectors not clogged ☞ **page F1–20** • Injection amount ☞ **page F1–21** • Resistance ☞ **page F1–20**	Yes	Go to next step
		No	Replace fuel injector(s) ☞ **page F1–18**
11	Is pressure regulator control system correct? ☞ **page F1–60**	Yes	Go to next step
		No	Repair or replace
12	Change fuel to another brand Does symptom improve?	Yes	Charge fuel to another brand
		No	Go to next step
13	Try known good PCM; does condition improve? ☞ **page F1–30**		

10 11 12	**ENGINE STALLS**	• **IDLE AT ANY ENGINE TEMPERATURE** • **DURING FAST IDLE** • **IDLE AFTER WARM-UP**

DESCRIPTION • Engine stops unexpectedly at idle and/or during fast idle operation

[TROUBLESHOOTING HINTS]

① Fuel injector
- Fuel leakage from fuel injector(s)
- Fuel injector(s) clogged

② Fuel pump
- Maximum pressure low

③ Fuel pump relay
- Poor connection of connector

④ Mass air flow sensor
- Malfunction

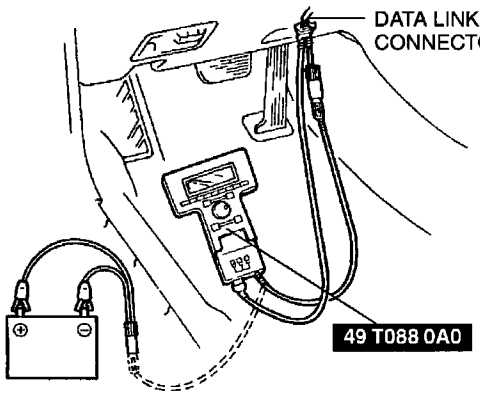
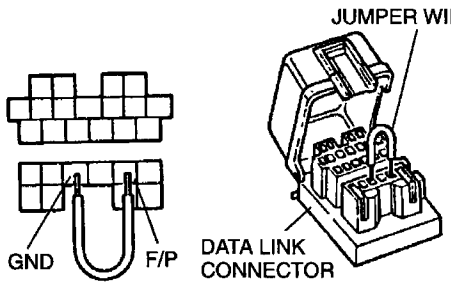
⑤ Distributor coil
- Cap and/or rotor damaged
- Poor connection of connector

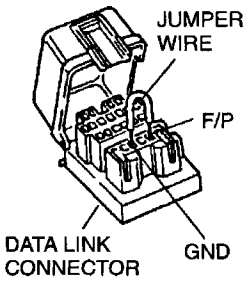
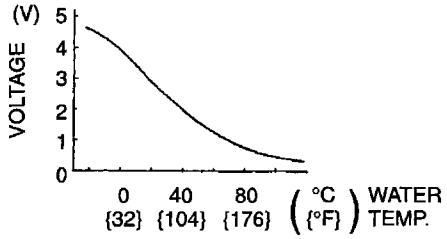
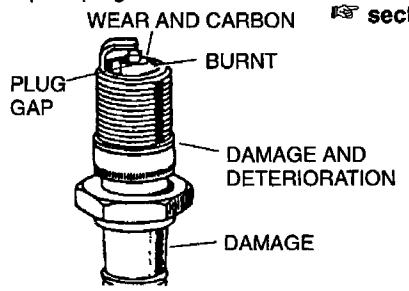
⑥ Engine coolant temperature sensor
- Poor connection of connector

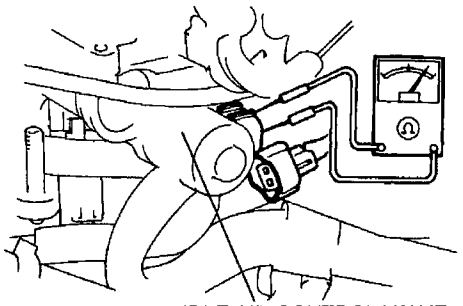
⑦ EGR valve
- EGR valve stuck

⑧ BAC valve
- Air valve stuck

⑨ Air leakage in intake-air system

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F1–75** 	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** • If symptom occurs at idle at any engine temp., go to next step • If symptom occurs during fast idle operation, go to step 10 • If symptom occurs at idle after warm-up, go to step 11
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F1–75**
2	Is air leakage felt or heard at intake-air system components while racing engine to higher speed?	Yes	Repair or replace
		No	Go to next step
3	Is strong blue spark visible at each disconnected ignition coil while cranking engine?	Yes	Go to next step
		No	Referring to ignition system inspection ☞ **section G**
4	Connect jumper wire between terminals F/P and GND of data link connector; will engine run? 	Yes	Check follows: • Terminal 1AF voltage at PCM ☞ **page F1–30** • Continuity between terminal 1AF and fuel pump relay connector terminal • Condition of PCM and fuel pump relay connector female terminals
		No	Check if fuel pump operating sound is heard • If yes, go to next step • If no, check fuel pump circuit
5	Do Engine Signal Monitor lamps flash for specified terminals while cranking engine? **Terminal: 4Q, 4U, 4Y, 4AC, 4AG, 4AK**	Yes	Go to next step
		No	Check follows according to results: Does not flash and 0V indicated for individual terminal(s) • Continuity of fuel injector(s) • Continuity between PCM and fuel injector(s) • Condition of fuel injector connector and PCM connector Repair or replace parts and/or wiring harness as necessary

STEP	INSPECTION		ACTION
6	Is following voltage at PCM correct? • 3E (Mass air flow sensor)	Yes	Go to next step
		No	Check for cause
7	Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON? ☞ **page F1–9** **Fuel line pressure:** **270—310 kPa {2.7—3.2 kgf/cm², 39—45 psi}**  	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator ☞ **page F1–9** • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞ **page F1–9**
8	Is purge control system correct? ☞ **page F1–67**	Yes	Go to next step
		No	Check for cause
9	Is engine compression correct? ☞ **section B1** **Engine compression (Minimum):** **981 kPa (10.0 kgf/cm², 142 psi)/250 rpm**	Yes	Go to next step
		No	Check for cause ☞ **section B1**
10	Does engine start with throttle valve held quarter open?	Yes	Check as follows: • Operation of EGR solenoid valve ☞ **page F1–66** • Operation of EGR valve ☞ **page F1–66**
		No	Go to next step
11	Does following terminal voltage at PCM decrease smoothly? ☞ **page F1–30** **(Terminal 3Q: Engine coolant temperature sensor)**  	Yes	Go to next step
		No	Check follows: • Ground of engine coolant temperature sensor • Continuity between engine coolant temperature sensor and PCM connector • Condition of engine coolant temperature sensor and PCM connector female terminals
12	Are spark plugs OK? ☞ **section G**  	Yes	• If symptom occurs at any engine temp., go to step 15 • If symptom occurs during fast idle operation, go to step 14 • If symptom occurs at idle after warm-up, go to next step
		No	Clean or replace ☞ **section G**

STEP	INSPECTION		ACTION
13	Is resistance of idle air control valve correct? **Resistance: 10.7—12.3 Ω [at 20°C {68°F}]**  IDLE AIR CONTROL VALVE	Yes	Go to next step
		No	Replace BAC valve ☞ **page F1–52**
14	Is BAC valve OK? ☞ **page F1–52**	Yes	Replace BAC valve ☞ **page F1–52**
		No	Go to next step
15	Are fuel injectors OK? • No fuel leakage ☞ **page F1–20** • Fuel injectors not clogged ☞ **page F1–20** • Injection amount ☞ **page F1–21** • Resistance ☞ **page F1–20**	Yes	Go to next step
		No	Replace fuel injector(s) ☞ **page F1–18**
16	Try known good PCM; does condition improve? ☞ **page F1–30**		

13 14	ENGINE STALLS	• IDLE WITH A/C, P/S, and/or E/L ON • IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGE

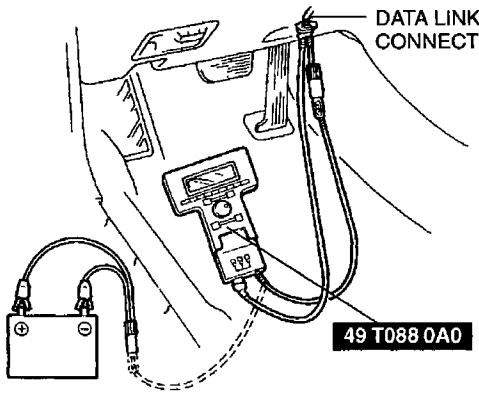
DESCRIPTION
- Engine stops unexpectedly when A/C, P/S, and/or E/L turned ON at idle
- Engine stops unexpectedly when shifted from N or P to other ranges at idle
- Idle condition is normal when A/C, P/S, and E/L are OFF and in park/neutral position

[TROUBLESHOOTING HINTS]

① Signal does not input to PCM
- A/C switch
- Headlight switch
- Rear window defroster switch
- Fan switch
- Power steering pressure switch

② Idle air control valve
- Stuck

③ Closed throttle position switch
- Throttle position sensor misadjustment

STEP	INSPECTION		ACTION
1	Is following terminal voltage at PCM correct? ☞ **page F1–30** • 1D (A/C switch) • 1G (Daytime running light-Canada Fog light-except Canada) • 1K (Fan switch) • 1L (Headlight) • 1X (Rear window defroster switch) • 3T (Power steering pressure switch) • 3X (Closed throttle position switch) • 1F (Transaxle range switch) ☞ **section K1**	Yes	Go to next step
		No	Check for cause
2	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F1–75**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F1–75**
3	Is idle air control system correct? ☞ **page F1–51**	Yes	Go to next step
		No	Repair or replace
4	Is terminal voltage at PCM correct at idle? ☞ **page F1–30** **Terminal 4Q: Approx. 1.6 V (at idle)**	Yes	Check BAC valve and replace if necessary ☞ **page F1–52** If OK, go to "ENGINE STALLS — IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGES" in section K of this manual
		No	Try known good PCM and check if condition improves ☞ **page F1–30**

15	ENGINE STALLS	• DRIVEAWAY
DESCRIPTION	• Engine stops unexpectedly upon driveaway • Idle condition normal	

[TROUBLESHOOTING HINTS]

① Fuel injector
- Fuel leakage from fuel injector(s)
- Injector(s) clogged

② Pressure regulator
- Diaphragm damaged

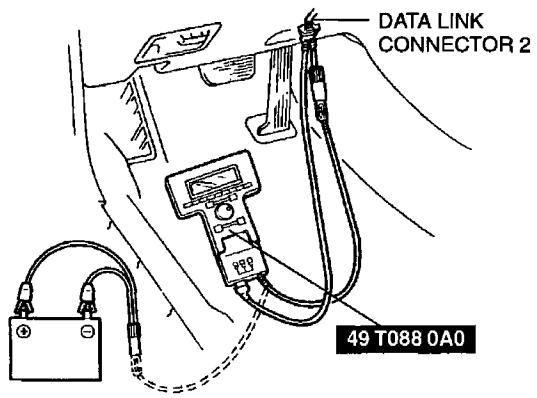
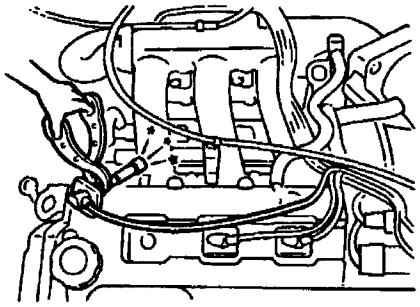
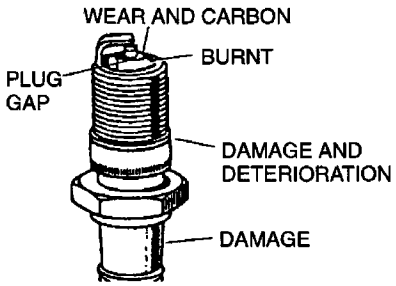
③ Fuel filter
- Fuel filter clogged

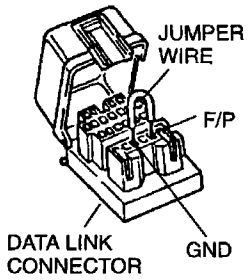
④ Distributor
- Poor connection of connector
- Cap and/or rotor damaged

⑤ Engine coolant temperature sensor
- Poor connection of connector

⑥ Fuel pump
- Poor connection of connector

⑦ Fuel pump relay
- Poor connection of connector

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ page F1–75  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ page F1–75
2	Is a strong blue spark visible at each disconnected high-tension lead while cranking engine? 	Yes	Go to next step
		No	Refer to ignition system inspection ☞ section G
3	Are spark plugs OK? ☞ section G  	Yes	Go to next step
		No	Clean or replace ☞ section G

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>4</td><td>Using Engine Signal Monitor, do voltage reading and lamp operation change as follows upon driveaway?
<table><tr><th>Terminal</th><th>Condition</th></tr><tr><td>3E</td><td>Voltage gradually increases</td></tr><tr><td>3Q, 4AH, 4AL</td><td>Voltage does not suddenly change</td></tr><tr><td>4Q, 4U, 4Y, 4AC, 4AG, 4AK</td><td>Flashing of green and red lamps becomes quicker</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Check for cause</td></tr>
<tr><td>5</td><td>Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON?
☞ page F1–9
Fuel line pressure:
270—310 kPa {2.7—3.2 kgf/cm², 38—45 psi}
 
</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Low pressure
Check fuel line pressure while pinching fuel return hose
• If pressure quickly increases, check pressure regulator
☞ page F1–22
• If pressure gradually increases, check for clogging between fuel pump and pressure regulator
If hose not clogged, check fuel pump maximum pressure
☞ page F1–14</td></tr>
<tr><td>6</td><td>Is purge control system OK?
☞ page F1–68</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Repair or replace</td></tr>
<tr><td>7</td><td>Is EGR control system OK?
☞ page F1–65</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Repair or replace</td></tr>
<tr><td>8</td><td>Are fuel injectors OK?
• No fuel leakage ☞ page F1–20
• Fuel injectors not clogged ☞ page F1–20
• Injection amount ☞ page F1–21
• Resistance ☞ page F1–20</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace fuel injector(s)
☞ page F1–18</td></tr>
<tr><td>9</td><td colspan="3">Try known good PCM; does condition improve?
☞ page F1–30</td></tr>
</table>

16 17	ENGINE STALLS	• ON ACCELERATION/WHILE CRUISING

DESCRIPTION
- Engine stops unexpectedly at beginning of acceleration or during acceleration
- Engine stops unexpectedly while cruising

[TROUBLESHOOTING HINTS]

① Fuel pump
- Poor connection

② Pressure regulator
- Diaphragm damaged

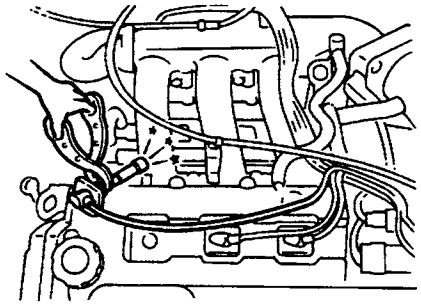
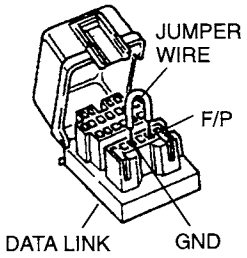
③ Distributor
- Poor connection of connector
- Cap and/or rotor damaged

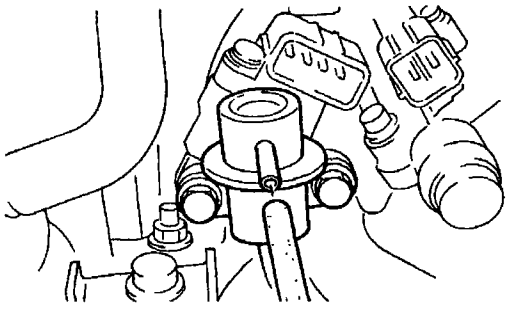
④ Mass air flow sensor
- Poor connection of connector

⑤ Main relay
- Poor connection of connector

⑥ Fuel pump
- Poor connection of connector

⑦ Fuel pump relay
- Poor connection of connector

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F1–75**	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F1–75**
2	Is a strong blue spark visible at each disconnected high-tension lead while cranking engine? 	Yes	Check spark plugs ☞ **section G** ➪ If OK, go to next step ➪ If not OK, clean or replace spark plug
		No	Referring to ignition system inspection ☞ **section G**
3	Are mass air flow sensor and PCM connector terminals good?	Yes	Go to next step
		No	Repair connector terminal
4	Ground terminal F/P of data link connector with ignition switch ON; is operation sound of fuel pump heard? 	Yes	Go to next step
		No	Check follows: • Poor connection of fuel pump relay • Poor connection of fuel pump connector • Melted EGI INJ fuse (40A) ☞ **page F1–126** Refer to "No.1 — MELTS MAIN OR OTHER FUSE" • Poor connection of main relay • Operation of main relay ☞ **page F1–50**
5	Is following terminal voltage at PCM correct? • 3E (Mass air flow sensor) • 3B (Throttle position sensor) • 4Q, 4U, 4Y, 4AC, 4AG, 4AK (Fuel injectors)	Yes	Go to next step
		No	Check for cause

STEP	INSPECTION		ACTION
6	If fuel line pressure correct at idle? ☞ page F1–9 **Fuel line pressure:** **210—260 kPa {2.1—2.7 kgf/cm², 30—38 psi}** **Pressure regulator vacuum hose disconnected:** **270—310 kPa {2.7—3.2 kgf/cm², 39—45 psi}** 	Yes	Go to next step
		No	Check pressure regulator ☞ page F1–22
7	Are fuel injectors OK? • No fuel leakage ☞ page F1–20 • Fuel injectors not clogged ☞ page F1–20 • Injection amount ☞ page F1–21 • Resistance ☞ page F1–20	Yes	Go to next step
		No	Replace fuel injector(s) ☞ page F1–18
8	Try known good PCM; does condition improve? ☞ page F1–30		

18	ENGINE STALLS	• ON DECELERATION
DESCRIPTION	• Engine stops unexpectedly at beginning of deceleration or recovery from deceleration • Exhaust afterburn	

[TROUBLESHOOTING HINTS]

① Fuel pump
- Poor connection of connector

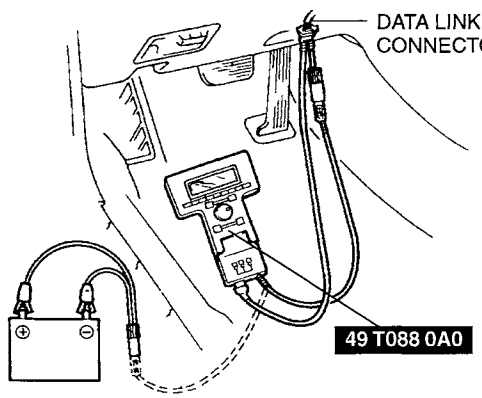
② Idle speed
- Idle speed too low

③ Distributor
- Poor connection of connector

④ Mass air flow sensor
- Poor connection of connector

⑤ Idle air control valve
- Stuck

⑥ Closed throttle position switch
- Misadjustment

STEP	INSPECTION		ACTION
1	Connect the TEN and GND terminals of data link connector with **SST** (System Selector) Is idle speed correct after warm-up? **Idle speed: 650 ± 50 rpm**	Yes	Go to next step
		No	Adjust ☞ **page F1–3**
2	Are following terminals and connections good? • Mass air flow sensor • Distributor connector • Fuel pump connector • Main relay • PCM connector	Yes	Go to next step
		No	Repair connector terminal
3	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F1–75**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F1–75**
4	Is idle air control system correct? ☞ **page F1–51**	Yes	Go to next step
		No	Repair or replace
5	Is following terminal voltage at PCM correct? ☞ **page F1–30** • 1F (Inhibitor signal) • 3E (Mass air flow sensor) • 3X (Closed throttle position switch) • 4Q, 4U, 4Y, 4AC, 4AG, 4AK (Fuel injectors)	Yes	Go to next step
		No	Check for caused
6	Are fuel injectors OK? • No fuel leakage ☞ **page F1–20** • Fuel injectors not clogged ☞ **page F1–20** • Injection amount ☞ **page F1–21** • Resistance ☞ **page F1–20**	Yes	Go to "ENGINE STALLS — ON DECELERATION" in section K1 of this manual
		No	Replace fuel injector(s) ☞ **page F1–18**

19 20 21	ENGINE RUNS ROUGH	• IDLE AT ANY ENGINE TEMP/DURING FAST IDLE/ IDLE AFTER WARM-UP

DESCRIPTION

- Engine speed fluctuates between specified idle speed and lower speed, and excessive engine shake at any engine temperature
- Idle speed too slow and excessive engine shake at any engine temperature
- Fast idle speed too slow and excessive engine shake during fast idle, but returns to normal after warm-up
- Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle after warm-up

[TROUBLESHOOTING HINTS]

① Fuel injector
- Fuel leakage from fuel injector(s)
- Fuel injector(s) clogged

② Fuel pump
- Maximum pressure low

③ Fuel pump relay
- Poor connection of connector

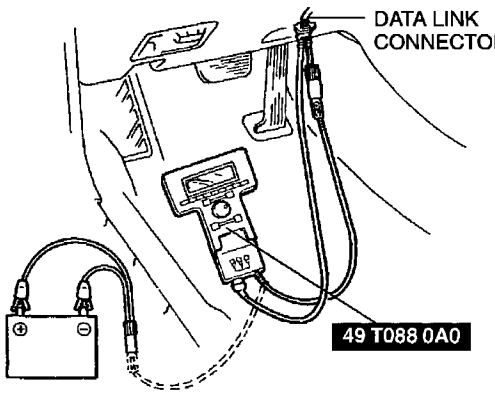
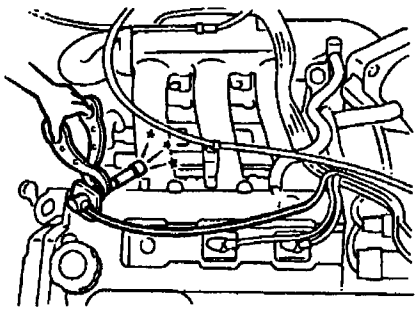
④ Air leakage
- Leakage in intake-air system

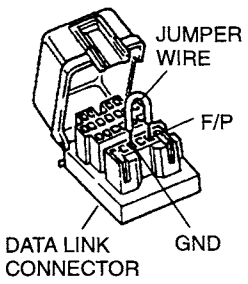
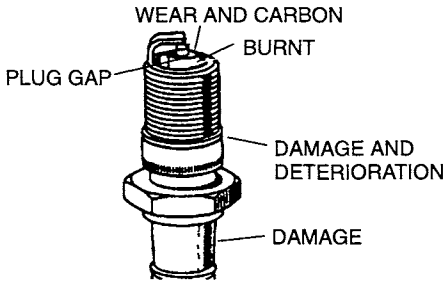
⑤ Distributor
- Cap and/or rotor damaged
- Poor connection of connector

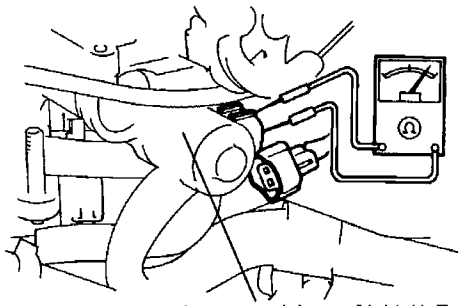
⑥ Engine coolant temperature sensor
- Poor connection of connector

⑦ Idle air control valve
- Idle air control valve stuck

⑧ BAC valve
- Air valve stuck

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F1–75**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** • If symptom occurs at idle at any engine temperature, go to next step • If symptom occurs during fast idle operation, go to step 10 • If symptom occurs at idle after warm-up, go to step 9
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F1–75**
2	Is there air leakage at intake-air system components while racing engine to higher speed?	Yes	Repair or replace
		No	Go to next step
3	Is a strong blue spark visible at each disconnected high-tension lead while cranking engine? 	Yes	Go to next step
		No	Refer to ignition system inspection ☞ **section G**
4	Do Engine Signal Monitor lamps flash for specified terminals while cranking engine? **Terminal: 4U, 4V, 4W, 4X, 4Y, 4Z**	Yes	Go to next step
		No	Check follows according to results: Does not flash and 0V indicated for individual terminal(s) • Continuity of fuel injector(s) ☞ **page F1–20** • Continuity between PCM and fuel injector(s) • Condition of injector connector and PCM connector Repair or replace parts and/or wiring harness as necessary

STEP	INSPECTION		ACTION
5	Is idle air control system correct? ☞ **page F1–51**	Yes	Go to next step
		No	Repair or replace
6	Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON? ☞ **page F1–9** **Fuel line pressure:** **270—310 kPa {2.7—3.2 kgf/cm², 39—45 psi}**  	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator ☞ **page F1–9** • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞ **page F1–9**
7	Is following terminal voltage at PCM correct? ☞ • 3B (Mass air flow sensor) • 3Q (Engine coolant temperature sensor)	Yes	Go to next step
		No	Check for cause
8	Is engine compression correct? ☞ **section B1** **Engine compression (minimum):** **981 kPa {10.0 kgf/cm², 142 psi}/250 rpm**	Yes	Go to next step
		No	Check for cause ☞ **section B1**
9	Is purge control system correct? ☞ **page F1–68**	Yes	Go to next step
		No	Repair or replace
10	Are spark plug OK? ☞ **section G**  	Yes	• If symptom occurs at any engine temperature, go to step 13 • If symptom occurs during fast idle operation, go to step 12 • If symptom occurs at idle after warm-up, go to next step
		No	Clean or replace

STEP	INSPECTION		ACTION
11	Is resistance of idle air control valve correct? **Resistance: 10.7—12.3 Ω [at 20°C {68°F}]**  IDLE AIR CONTROL VALVE	Yes	Go to next step
		No	Replace BAC valve ☞ **page F1–52**
12	Is BAC valve OK? ☞ **page F1–52**	Yes	Go to next step
		No	Replace BAC valve ☞ **page F1–52**
13	Are fuel injectors OK? • No fuel leakage ☞ **page F1–20** • Fuel injectors not clogged ☞ **page F1–20** • Injection amount ☞ **page F1–21** • Resistance ☞ **page F1–20**	Yes	Go to next step
		No	Replace fuel injector(s) ☞ **page F1–18**
14	Try known good PCM; does condition improve? ☞ **page F1–30**		

22 23	ENGINE ROUGH	• IDLE WITH A/C, P/S AND/OR E/L ON • IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGES

DESCRIPTION	• Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle when A/C, P/S and/or E/L ON • Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle when shifted from P or N to other range

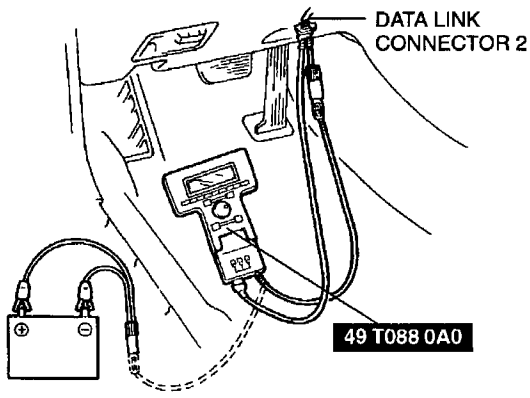
[TROUBLESHOOTING HINTS]

① Idle speed
- Idle speed too low

② Signal does not input to PCM
- A/C switch
- Headlight switch
- Rear window defroster switch
- Fan switch
- Power steering pressure switch

③ Idle air control valve
- Stuck

④ Closed throttle position switch
- Throttle position misadjustment

STEP	INSPECTION		ACTION
1	Connect terminals TEN and GND of data link connector with **SST** (System selector) Is idle speed correct after warm-up? **Idle speed: 650 ± 50 rpm**	Yes	Go to next step
		No	Adjust ☞ **page F1–3**
2	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F1–75**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F1–75**
3	Is following terminal voltage at PCM correct? ☞ **page F1–30** • 1D (A/C switch) • 1G (Daytime running light-Canada Fog light-except Canada) • 1K (Fan switch) • 1L (Headlight) • 1X (Rear window defroster switch) • 3T (Power steering pressure switch) • 3X (Closed throttle position switch) • 1F (Transaxle range switch) ☞ **section K1**	Yes	Go to next step
		No	Check for caused
4	Is idle air control system correct?	Yes	• If symptom occurs except when shifted from N or P to other range, go to next step • If symptom occurs at idle when shifted from N or P to other range, go to "ENGINE RUNS ROUGH — IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGE" in section K1 of the manual
		No	Repair or replace ☞ **page F1–52**

STEP	INSPECTION		ACTION
5	Does air conditioner operate continuously with ignition switch ON and A/C switch and fan switch OFF?	Yes	Check follows: • Malfunction of A/C relay ☞ **section U** • Wiring harness between A/C relay and PCM terminal 1M for short circuit ☞ **page F1–71**
		No	Go to next step
6	Try known good PCM; does condition improve? ☞ **page F1–30**		

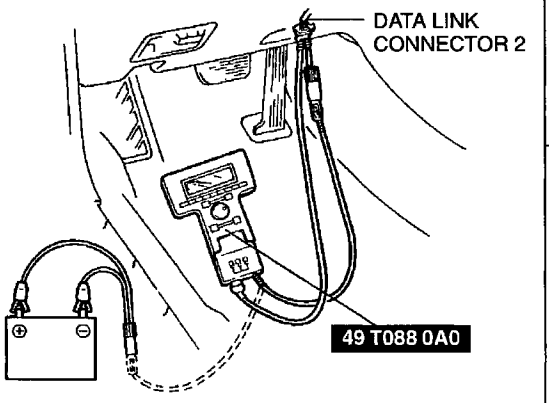
24	ENGINE RUNS ROUGH	• ON DECELERATION
DESCRIPTION	• Engine shakes at beginning of deceleration, during deceleration, or recover from deceleration • Exhaust afterburn	

[TROUBLESHOOTING HINTS]

① Fuel injector
- Fuel leakage from fuel injector(s)

② Idle speed
- Idle speed too low

③ Idle air control valve
- Stuck

STEP	INSPECTION		ACTION
1	Connect terminals TEN and GND of data link connector with **SST (System selector)** Is idle speed correct after warm-up? **Idle speed: 650 ± 50 rpm**	Yes	Go to step 3
		No	Adjust ☞ **page F1–75**
2	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F1–75**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F1–75**
3	Is idle air control system correct? ☞ **page F1–52**	Yes	Go to next step
		No	Repair or replace
4	Is following terminal voltage at PCM correct? ☞ **page F1–30** • 1F (Transaxle range switch) • 3X (Closed throttle position switch)	Yes	Go to next step
		No	Check for caused
5	Are fuel injectors OK? • No fuel leakage ☞ **page F1–21** • Fuel injection volume ☞ **page F1–20**	Yes	Go to next step
		No	Replace fuel injector(s)
6	Try known good PCM; does condition improve? ☞ **page F1–30**	Yes	Replace PCM
		No	Go to "ENGINE RUNS ROUGH — ON DECELERATION" in section K1 of this manual

25 26	POOR ACCELERATION	• DRIVEAWAY • ON ACCELERATION

DESCRIPTION • Engine speed increases normally but vehicle speed slowly increases during driveaway or acceleration

[TROUBLESHOOTING HINTS]

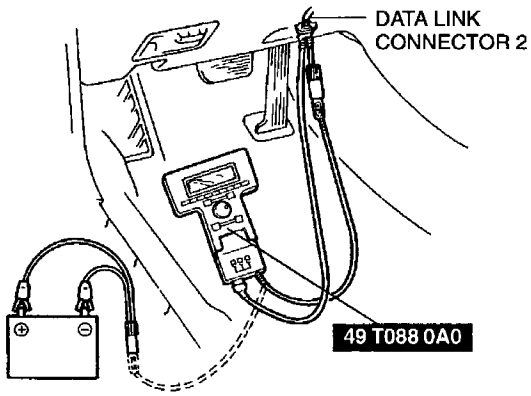
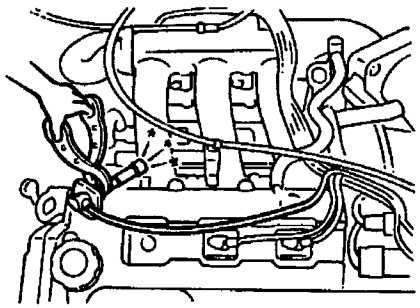
① Fuel injector
- Poor injection amount

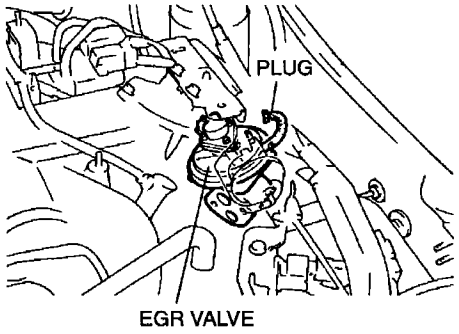
② Pressure regulator
- Pressure regulator malfunction

③ Fuel filter
- Clogged filter

④ Throttle position sensor
- Incorrect adjustment

⑤ Knock sensor
- Malfunction

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F1–75**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F1–75**
2	When poor acceleration occur, does engine overheat?	Yes	Check if cooling fan control system is OK ☞ **page F1–69**
		No	Go to next step
3	Is a strong blue spark visible at each disconnected high-tension lead while cranking engine? 	Yes	Check spark plugs ⇨ If OK, go to next step ⇨ If not OK, clean or replace spark plug
		No	Refer to ignition system inspection ☞ **section G**
4	Is intake manifold vacuum correct at idle? **Vacuum:** **More than 60.0 kPa {450 mmHg, 17.7 inHg}**	Yes	Go to next step
		No	Check follows: • Intake-air system components and installation • Vacuum hoses for disconnection and damage • Accelerator cable free play
5	If fuel line pressure correct at idle? ☞ **page F1–22** **Fuel line pressure:** **210—260 kPa {2.1—2.7 kgf/cm^2, 30—38 psi}**	Yes	Go to next step
		No	**Low pressure** Check follows: • Fuel filter for clogging • Operation of pressure regulator ☞ **page F1–22** • Fuel leakage from fuel injector(s) ☞ **page F1–20**

STEP	INSPECTION		ACTION
6	Is following terminal voltage at PCM correct? ☞ **page F1–30** • 3E (Mass air flow sensor) • 3B (Throttle position sensor) • 3Q (Engine coolant temperature sensor) • 3S (Knock sensor)	Yes	Go to next step
		No	Check for cause
7	Is engine compression correct? ☞ **section B1** **Engine compression (Minimum): 981 kPa {10.0 kgf/cm², 142 psi}/250 rpm**	Yes	Go to next step
		No	Check for cause ☞ **section B1**
8	Is EGR control system correct? ☞ **page F1–65**  	Yes	Go to next step
		No	Repair or replace
9	Is VRIS system correct? ☞ **page F1–54**	Yes	Go to next step
		No	Repair or replace
10	Is traction control system correct? ☞ **page F1–74**	Yes	Go to next step
		No	Repair or replace
11	Are fuel injectors OK? • No fuel leakage ☞ **page F1–20** • Fuel injectors not clogged ☞ **page F1–20** • Injection amount ☞ **page F1–21** • Resistance ☞ **page F1–20**	Yes	Go to next step
		No	Replace fuel injector(s) ☞ **page F1–18**
12	Try known good PCM; does condition improve? ☞ **page F1–30**	Yes	Replace PCM
		No	Go to "POOR ACCELERATION — DRIVEAWAY/ON ACCELERATION" in section K1 of this manual

27	HIGH IDLE SPEED AFTER WARM-UP
DESCRIPTION	• Idle speed continues at fast idle after warm-up • Engine returns slowly to idle after accelerator is released

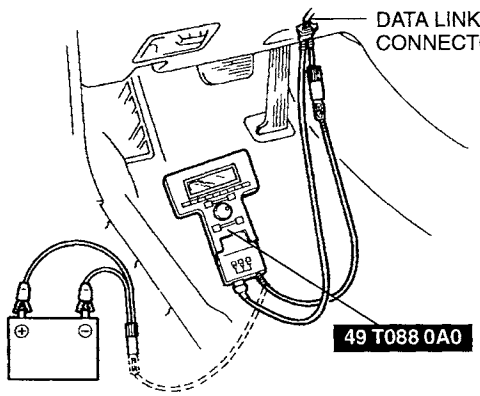
[TROUBLESHOOTING HINTS]

① Engine coolant temperature sensor
- Poor connection connector

② Throttle position sensor
- Poor connection connector
- Incorrect adjustment

③ BAC valve
- Idle air control valve or air valve stuck

④ Air adjusting screw
- Mis adjustment

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F1–75** 	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F1–75**
2	Connect terminals TEN and GND of data link connector with **SST (System selector)**: Does idle speed decrease?	Yes	Go to step 5
		No	Check idle air control system ➪ If OK, go to next step ☞ **page F1–51**
3	Is BAC valve OK? ☞ **page F1–52**	Yes	Go to next step
		No	Repair BAC valve
4	Does throttle valve fully close?	Yes	Go to next step
		No	Check accelerator cable free play ➪ If OK, repair or replace throttle body ☞ **page F1–6** ➪ If not OK, adjust accelerator cable ☞ **page F1–7**
5	Is following terminal voltage at PCM correct? ☞ **page F1–30** • 1L (Headlight) • 1X (Rear window defroster switch) • 1G (Daytime running light-Canada Fog light-except Canada) • 1D (A/C switch) • 1K (Fan switch) • 3Q (Engine coolant temperature sensor) • 3X (Closed throttle position switch) • 3T (Power steering pressure switch)	Yes	Go to next step
		No	Check for cause
6	Try known good PCM; does condition improve? ☞ **page F1–30**		

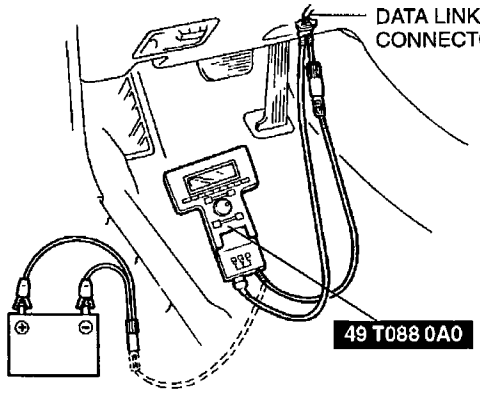
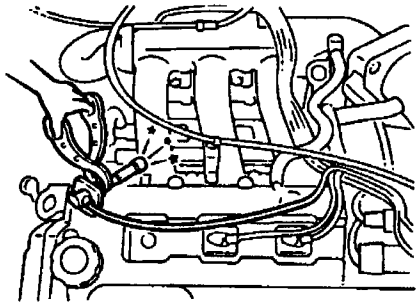
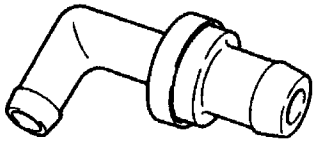
28	• IDLE FLUCTUATES • IDLE HUNTS
DESCRIPTION	• Engine speed changes back and forth between specified idle speed and higher speed

[TROUBLESHOOTING HINTS]
① PCV valve
- PCV valve stuck

② Spark plug
- Spark plug(s) damaged

③ Throttle position sensor
- Incorrect adjustment

④ Idle air control valve
- Stuck

STEP	INSPECTION		ACTION
1	Is "NO CODE RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ page F1–75 	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ page F1–75
2	If a strong blue spark visible at each disconnected high-tension lead while cranking engine? 	Yes	Check spark plug(s) ➪ If OK, go to next stop ➪ If not OK, replace spark plug(s)
		No	Referring to ignition system inspection ☞ section G
3	Is PCV valve stuck? ☞ page F1–26 	Yes	Replace PCV valve
		No	Go to next step
4	Is idle air control system correct? ☞ page F1–51	Yes	Go to next step
		No	Repair or replace
5	Is following terminal voltage at PCM correct? • 3E (Mass air flow sensor) • 3X (Closed throttle position switch)	Yes	Go to next step
		No	Check for cause

STEP	INSPECTION		ACTION
6	Are fuel injectors OK? • No fuel leakage ☞ **page F1–20** • Fuel injectors not clogged ☞ **page F1–20** • Injection amount ☞ **page F1–21** • Resistance ☞ **page F1–20**	Yes	Go to next step
		No	Replace fuel injector(s) ☞ **page F1–18**
7	Try known good PCM; does condition improve? ☞ **page F1–30**		

29	• HESITATES • STUMBLES ON ACCELERATION
DESCRIPTION	• Momentary pause at beginning of acceleration or during acceleration

[TROUBLESHOOTING HINTS]

① Fuel injector
- Fuel leakage from fuel injector(s)

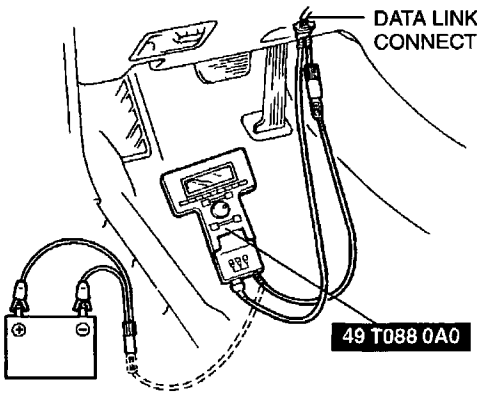
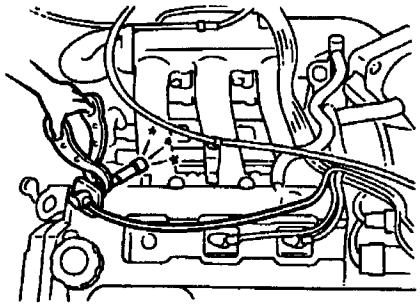
② Pressure regulator
- Pressure regulator stuck

③ EGR control valve
- EGR control valve stuck

④ EGR solenoid valve (vacuum)
- Solenoid valve stuck

⑤ High-tension lead(s)
- Lead(s) damaged

⑥ Throttle position sensor
- Incorrect adjustment

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F1–75** 	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F1–75**
2	Is strong blue spark visible at each disconnected high-tension lead? 	Yes	Go to next step
		No	Referring to ignition system inspection ☞ **section G**
3	Is fuel line pressure correct at idle? ☞ **page F1–22** **Fuel line pressure:** **210—260 kPa {2.1—2.7 kgf/cm², 30—38 psi}**	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator ☞ **page F1–9** • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞ **page F1–9**
4	Does fuel pressure increase when pressing the accelerator pedal?	Yes	Go to next step
		No	Check pressure regulator ☞ **page F1–22**

STEP	INSPECTION		ACTION
5	Are following terminal voltages at PCM correct? ☞ **page F1–30** • 1F (Transaxle range switch) • 3E (Mass air flow sensor) • 3B (Throttle position sensor) • 3Q (Engine coolant temperature sensor) • 3R (EGR valve position sensor) • 3S (Knock sensor) • 3I, 3M (Heated oxygen sensor(s))	Yes	Go to next step
		No	Check for cause
6	Is EGR control system correct? ☞ **page F1–65**	Yes	Check follows: • EGR solenoid valve (vacuum) for sticking • EGR solenoid valve (vent) for sticking • Condition of solenoid valve connectors female terminals
		No	Go to next step
7	Is VRIS correct? ☞ **page F1–54**	Yes	Go to next step
		No	Repair or replace
8	Is traction control system correct? ☞ **page F1–74**	Yes	Go to next step
		No	Repair or replace
9	Are fuel injectors OK? • No fuel leakage ☞ **page F1–20** • Fuel injectors not clogged ☞ **page F1–20** • Injection amount ☞ **page F1–21** • Resistance ☞ **page F1–20**	Yes	Go to next step
		No	Replace fuel injector(s) ☞ **page F1–18**
10	Try known good PCM; does condition improve? ☞ **page F1–30**	Yes	Replace PCM
		No	Go to "POOR ACCELERATION-DRIVE AWAY/ON ACCELERATION" in section K1 of this manual

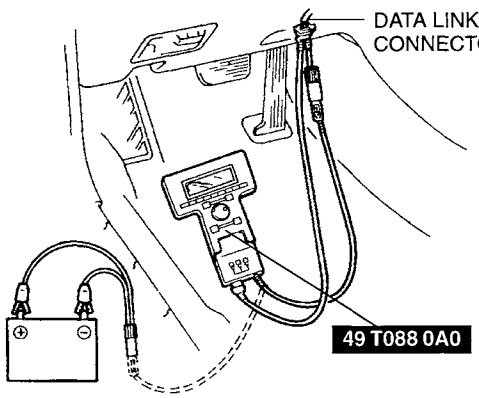
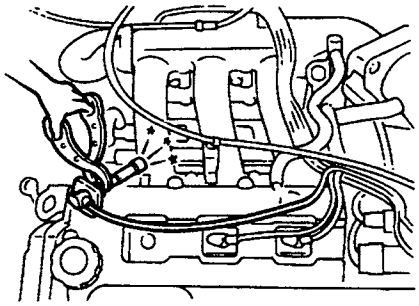
30	SURGES WHILE CRUISING
DESCRIPTION	• Momentary minor irregularity in engine output at steady vehicle speed

[TROUBLESHOOTING HINTS]

① Spark plug
- Spark plug(s) damaged

② Knock sensor
- Malfunction

③ EGR valve position sensor
- Malfunction

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F1–75** 	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F1–75**
2	If a strong blue spark visible at each disconnected high-tension lead while cranking engine? 	Yes	Check spark plug(s) ➪ If OK, go to next stop ➪ If not OK, replace spark plug(s)
		No	Refer to ignition system inspection ☞ **section G**
3	Is following terminal voltage at PCM correct? ☞ **page F1–30** • 3E (Mass air flow sensor) • 3B (Throttle position sensor) • 3R (EGR valve position sensor) • 3S (Knock sensor) • 3I, 3M (Heated oxygen sensor(s))	Yes	Go to next step
		No	Check for cause
4	Are fuel injectors OK? • No fuel leakage ☞ **page F1–20** • Fuel injectors not clogged ☞ **page F1–20** • Injection amount ☞ **page F1–21** • Resistance ☞ **page F1–20**	Yes	Go to next step
		No	Replace fuel injector(s) ☞ **page F1–18**
5	Try known good PCM; does condition improve? ☞ **page F1–30**	Yes	Replace PCM
		No	Go to "SURGES WHILE CRUISING" in section K1 of this manual

31	LACK OF POWER
DESCRIPTION	• Performance poor under load (i.e., power down when climbing hills)

[TROUBLESHOOTING HINTS]

① Engine
- Compression down — ☞ section B1
- Valve timing malfunction — ☞ section B1

② Intake air system
- Clogged air cleaner element — ☞ page F1–6
- Air leakage — ☞ page F1–6

③ Exhaust system
- Clogged three way catalytic converter — ☞ page F1–24

④ Fuel system
- Clogged fuel filter (high/low pressure side) — ☞ page F1–16
- Fuel pump malfunction (Too low pressure) — ☞ page F1–15
- Pressure regulator malfunction (Too low pressure) — ☞ page F1–22
- Fuel injector malfunction (injection amount) — ☞ page F1–18

⑤ Ignition system
- Ignition timing misadjustment — ☞ page F1–3
- Distibutor malfunction (poor connection) — ☞ section G
- High-tension lead(s) malfunction (poor connection, damaged) — ☞ section G

⑥ Control system malfunction
- VRIS control — ☞ page F1–54
- EGR control — ☞ page F1–65
- Traction control (TCS) — ☞ page F1–74

⑦ Input signal malfunction
- Mass air flow sensor — ☞ page F1–39
- Throttle position sensor — ☞ page F1–42
- Engine coolant temperature sensor — ☞ page F1–45
- Knock sensor — ☞ page F1–47
- Heated oxygen sensor(s) — ☞ page F1–46

⑧ Others
- Non premium gasoline used

32	POOR FUEL ECONOMY
DESCRIPTION	• Fuel economy unsatisfactory

[TROUBLESHOOTING HINTS]

① Engine
- Compression down — ☞ section B1

② Intake-air system
- Air leakage — ☞ page F1–6

③ Fuel system
- Pressure regulator malfunction (Too high pressure) — ☞ page F1–22
- Fuel injector leakage — ☞ page F1–20

④ Control system malfunction
- Pressure regulator control — ☞ page F1–60

⑤ Input signal malfunction
- Mass air flow sensor — ☞ page F1–39
- Engine coolant temperature sensor — ☞ page F1–45
- Intake air temperature sensor — ☞ page F1–45
- Heated oxygen sensor(s) — ☞ page F1–46
- Knock sensor — ☞ page F1–47

33	A/C DOES NOT WORK
DESCRIPTION	• A/C compressor magnetic clutch does not engage when A/C switch ON

[TROUBLESHOOTING HINTS]

① A/C relay
- Poor connection of connector — ☞ page F1–72
- Relay malfunction — ☞ section U

② A/C control system malfunction — ☞ page F1–71

34	• KNOCKING • PINGING
DESCRIPTION	• Sound produced when air/fuel mixture is ignited by something other than spark plug (i.e., hot spot in combustion chamber)

[TROUBLESHOOTING HINTS]
① Knock sensor
- Open or short in harness (Code No.P0325 output) ☞ page F1–75

② Intake air temperature sensor
- Open or short circuit in wiring (code No.P0110 output) ☞ page F1–75

③ Cooling fan control system malfunction ☞ page F1–63

35	FUEL ODOR
DESCRIPTION	• Gasoline fuel smell or visible leaks

[TROUBLESHOOTING HINTS]
① Purge control system malfunction ☞ page F1–68

② Charcoal canister
- Canister full of fuel and leaking
- Damaged ☞ page F1–26

36	EXHAUST SULFUR SMELL
DESCRIPTION	• Rotten egg smell (sulfur) from exhaust

[TROUBLESHOOTING HINTS]
High sulfur content fuel used

37	HIGH OIL CONSUMPTION
DESCRIPTION	• Oil consumption excessive

[TROUBLESHOOTING HINTS]
PCV valve
- PCV valve stuck open ☞ page F1–26

38	NGS DISPLAYS "LINK COMMUNICATION ERROR"
DESCRIPTION	• NGS displays "LINK COMMUNICATION ERROR" when connect NGS to data link connector

[TROUBLESHOOTING HINTS]
① Open or short circuit in wiring between DLC2 KLN terminal and PCM terminal 1Y

② PCM
- Vref terminal voltage malfunction
- Open or short circuit in wiring between main relay and PCM terminal 4A
- Open circuit in ground terminals of PCM

39	NGS WILL NOT WORK
DESCRIPTION	• NGS does not work

[TROUBLESHOOTING HINTS]
① Adapter harness between NGS and battery
- Open or short in harness

② NGS
- Malfunction

SERVICE POINTS

OUTLINE
Main Relay (Battery Power)
- If the circuit is open, the engine will not start.
- If the circuit is shorted, the EGI INJ fuse (40 A) will burn out.

Room Fuse (PCM Memory Power)
- If the circuit is open, the PCM memory function will not operate, and diagnostic trouble codes for intermittent malfunctions will not be indicated. Also, the learning control will be canceled, but will not produce any particular symptom.
- If the circuit is shorted, the ROOM fuse (15 A) will burn out.

Ground (Output Devices, Fuel Injector)
- If an output device or a fuel injector has an open ground circuit, no particular symptom will be produced. If a related output device and injectors both have open ground circuits, the engine will not start.

Ground (System, Analogue)
- An open circuit will not produce any symptom.

Terminal TEN (Data Link Connector)
- If the circuit is shorted, the opening amount of the idle air control valve will not change, causing hard starting and rough idle. The ignition timing will be fixed, causing lack of power and poor acceleration.
- If the circuit is shorted, the coolant fan operates whenever the throttle valve is opened (Ignition switch ON).

Terminal KLN (Data Link Connector 2)
- If circuit is open or short, the NGS indicates "LINK COMMUNICATION ERROR".

[Input Device]
Mass Air Flow Sensor
- If the Vs terminal of the mass air flow sensor has a short circuit, diagnostic trouble code No.P0100 will be output, and the throttle position sensor and closed throttle position switch signal will be used to adjust the basic injection amount as to the following three modes.
  1) Closed throttle position switch ON
  2) Small throttle angle
  3) Large throttle angle

Throttle Position Sensor
- If the Vref terminal has an open circuit or the TVO terminal has an open or short circuit, diagnostic trouble code No.P0120 is output.
- If the Vref terminal has a short circuit, the engine will not start.
- If the ground terminal has an open circuit, diagnostic trouble code No.P0120 is output.
- In the above conditions, the PCM uses a throttle valve fully-open program.
- If the throttle position sensor is not properly adjusted or the throttle position sensor system fails, poor acceleration or shift shock will result.

Intake Air Temperature Sensor
- If the temperature sensor or circuit has an open or short, diagnostic trouble code No.P0110 is output, and the PCM uses a preprogrammed intake-air temperature of 20°C { 68°F}.
- If the intake air temperature sensor system fails, no particular symptom will be noticed.

Closed Throttle Position Switch (In Throttle Position Sensor)
- If the position switch or circuit has on open or short, diagnostic trouble code No.P0510 is output.
- If the circuit is open, rough idle or engine stalling may appear because of inoperative IAC control.
- If the circuit is shorted, fuel will be cut when the accelerator pedal is pressed, causing hunting.

Heated Oxygen Sensor
- If sensor signal "lean" for approximately 2 minutes in feedback zone, diagnostic trouble code No. P0154, P0160 (left bank sensor) and/or P0134, P0140 (right bank sensor) is output.
- If the heated oxygen sensor signal remain unchanged for approximately 40 seconds in feedback zone, diagnostic trouble codes No.P0150 (left bank sensor) and/or P0130 (right bank sensor) is output.
- In the above conditions, no feedback control will be present and no symptom will be noticed.

Crankshaft Position Sensor (NE Signal), Camshaft Position Sensor (SGC Signal)
- If the NE signal circuit has an open or short, diagnostic trouble code No.P0335 is output.
- If the SGC signal circuit has an open or short, diagnostic trouble code No.P1345 is output.

Input		Diagnostic trouble code	Fail-safe function	Symptom
NE signal	SGC signal			
○	×	P1345	No injection/ignition	Engine does not start
×	○	P0335		
×	×	P0335, P1345		

○: Normal ×: Malfunction

Starter Signal
- A lack of starter signal input will cause hard starting.

Power Steering Pressure Switch
- An open circuit can cause a momentary drop in engine speed when steering at idle or low-speed driving.

A/C Signal (A/C Amplifier)
- If the circuit is open, the air conditioner will not operate.
- If the circuit is shorted, the air conditioner will constantly operate when the blower is ON.

Engine Coolant Temperature Sensor
- If the temperature sensor or circuit has an open or short, diagnostic trouble code No.P0115 is output, and the PCM uses a preprogrammed temperature value of 40°C {104°F}.
- A malfunction in the engine coolant temperature sensor system may cause rough idle, engine stalling, or hard starting.

Blower Signal (A/C Amplifier)
- If the circuit has an open, the idle speed may drop when in the high position.

Stoplight Signal
- An open or short circuit will produce no symptom.

Inhibitor Signal
- If the circuit is open, the idle speed will be slightly low in park/neutral position.
- If the circuit is shorted, the idle speed will be slightly high in R, D, S, and L ranges.

Torque Reduction Request Signal (ABS/TCS Control Unit)
- If the circuit is open or short, diagnostic trouble code No.P1627 is output.
- If a malfunction occurs in the torque reduction request signal, the traction control (TCS) is inhibited and TCS does not operate.

Knock Sensor
- If the knock sensor or circuit has an open or short, diagnostic trouble code No.P0325 is output.
- In the above conditions, ignition timing is retarded.

EGR Valve Position Sensor
- If the EGR valve position sensor or circuit has an open or short, diagnostic trouble code No.P1402 is output.
- In the above conditions, the EGR valve will be fully closed.

EGR Boost Sensor
- If the EGR boost sensor or circuit has an open or short, diagnostic trouble code No.P0105 or P1195 is output.
- An open or short circuit will produce no symptom.

Vehicle Speed Sensor
- If the vehicle speed sensor or circuit has an open or short, diagnostic trouble code No.P0500 is output.
- An open or short circuit will produce no symptom.

Headlight Switch
- An open or short circuit can cause a low idle speed when the switch is ON.
- A short circuit can cause a slightly high idle speed.

[Output Device]
Fuel Injector
- If the circuit is open, the fuel injector will not operate, causing rough idle and misfiring.
- If the circuit is shorted, the fuel injector will inject fuel constantly, will not start or hard start.

IGT Signal (Ignition Control Module)
- If no IGT signals are input to the ignition control module because of an open or short circuit, the engine will not start.

Idle Air Control Valve (BAC Valve)
- If the solenoid valve or circuit has an open or short, diagnostic trouble code No.P0505 is output.
- If the circuit is open, the idle air control valve will be fully closed, causing rough idle, engine stalling, and acceleration hesitation when cold.
- If the circuit is shorted, the idle air control valve will be fully opened and the idle speed will be increased, causing hunting.

Fuel Pump Relay
- If the circuit is open, the engine will not start.
- If the circuit is shorted, the fuel pump will operate whenever the ignition switch is ON.

Purge Solenoid Valve
- If the solenoid valve or circuit has an open or short, diagnostic trouble code No.P0443 is output.
- If the circuit is open, no symptom will be noticed.
- If the circuit is shorted, the engine stalls at low speed.
- A short circuit may cause an improper air/fuel ratio, causing rough idle and hard starting.

VRIS Solenoid Valve No.1
- If the solenoid valve or circuit has an open or short, diagnostic trouble code No.P1521 is output.
- If the circuit is open, the solenoid valve will stay OFF and the shutter valves will stay closed, causing a poor acceleration or lack of power.
- If the circuit is shorted, the solenoid valve will stay ON and the shutter valves will stay open, causing a poor acceleration or lack of power.

VRIS Solenoid Valve No.2
- If the solenoid valve or circuit has an open or short, Diagnostic trouble code No.P1522 is output.
- If the circuit is open, the solenoid valve will stay OFF and the shutter valves will stay closed, causing a poor acceleration or lack of power.
- If the circuit is shorted, the solenoid valve will stay ON and the shutter valves will stay open, causing a poor acceleration or lack of power.

A/C Signal (A/C Relay)
- If the circuit is open, the air conditioner will not operate.
- If the circuit is shorted, the air conditioner will constantly operate when the ignition switch is ON.

Torque Reduction Inhibit Signal (ABS/TCS Control Unit)
- If the circuit open or short, Diagnostic trouble code No.P1627 is output.
- If the circuit is open or shorted, the traction control will not operate.

EGR Solenoid Valve (Vent)
- If the circuit is open or shorted, no symptom will be noticed.

EGR Solenoid Valve (Vacuum)
- If the circuit is shorted, causing rough idle, engine stall.

PRC Solenoid Valve
- If the circuit is shorted, no symptom will be noticed.
- If the circuit is open, the engine will be hard to start when hot.

Condenser Fan Relay No.1
- If the circuit is shorted, the condenser fan and cooling fan will always operate while the ignition switch is ON.
- If the circuit is open, the condenser fan will not operate.

Condenser Fan Relay No.2 and Cooling Fan Relay
- If the circuit is shorted, the cooling fan will always operate while the ignition switch is ON.
- If the circuit is open, the cooling fan will not operate.

ELECTRICAL DIAGNOSIS SUPPORT

Main Relay (Battery Power)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (4A) — Main relay	Engine will not start	EGI INJ fuse (40 A) burns out when ignition switch ON	NA

Room Fuse (Memory Power)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (4B) — Room fuse	No symptom	Room fuse (15 A) burns out	NA

Ground (Output Device, Fuel Injector, System, Analogue)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (4AF) — Ground (Output device)	(One side open circuit) No symptom (Both sides open circuit) Engine will not start	NA	Engine may not start Hard starting
PCM (4AB) — Ground (Fuel injector)			
PCM (4D) — Ground (System)	No symptom		
PCM (3AB) — Ground (Analogue)			

Data Link Connector (Terminal TEN)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (4V) — Data link connector	Hard to adjust the idle speed and ignition timing (Not fixed)	Hard starting Rough idle Poor acceleration	NA

Data Link Connector 2 (K LINE)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1Y) — Data link connector 2	NGS displays "LINK COMMUNICATION ERROR" (Both lines)		NA

[Input Device]
Mass Air Flow Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Ignition switch — Mass air flow sensor	Lack of power Poor acceleration	Code No.0100 output Lack of power Poor acceleration	NA
PCM (3E) — Mass air flow sensor	Code No.P0100 output Lack of power Poor acceleration	Code No.0100 output Engine stalls and will not restart	
PCM (4D) — Mass air flow sensor	Code No.P0100 output Poor acceleration	NA	Poor acceleration

NA: Not applicable

Crankshaft Position Sensor (NE Signal), Camshaft Position Sensor (SGC Signal)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (4AL) — Crankshaft position sensor	Code No.P0335 output Engine does not start	Code No.P0335 output Engine does not start	NA
PCM (4AH) — Crankshaft position sensor	Code No.P0335 output Engine does not start	Code No.P0335 output Engine does not start	
PCM (4F) — Camshaft position sensor	Code No.P1345 output Engine does not start	Code No.P1345 output Engine does not start	
Main relay — Camshaft position sensor	Code No.P1345 output Engine does not start	Code No.P1345 output EGI INJ fuse (40 A) burns out when ignition switch ON	
Camshaft position sensor — Ground	Code No.P1345 output Engine will not start	NA	Engine may not start

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Engine Coolant Temperature Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (3Q) — Engine coolant temperature sensor	Code No.P0115 output Rough idle, hard starting Cooling fan and condenser fan operate continuously	Code No.P0115 output Rough idle, hard starting Cooling fan and condenser fan operate continuously	NA
Engine coolant temperature sensor — Ground	Code No.P0115 output Rough idle, hard starting Cooling fan and condenser fan operate continuously	NA	Rough idle Hard starting Cooling fan and condenser fan operate continuously

Intake Air Temperature Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (3V) — Intake air temperature sensor	Code No.P0110 output No symptom	Code No.P0110 output No Symptom	NA
Ground — Intake air temperature sensor	Code No.P0110 output No Symptom	NA	Poor acceleration

Throttle Position Sensor (Closed Throttle Position Switch Included)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (3A) — Throttle position sensor	Code No.P0120 output Poor acceleration Strong shift shock	Code No.P0120 output Engine will not start	NA
PCM (3B) — Throttle position sensor	Code No.P0120 output Poor acceleration Strong shift shock	Code No.P0120 output Poor acceleration Strong shift shock	
PCM (3X) — Throttle position sensor (Closed throttle position switch)	Code No.P0510 output Rough idle	Code No.P0510 output Fuel cut when accelerator pedal is pressed, causing hunting	
Throttle position sensor — Ground	Code No.P0120, 0510 output Poor acceleration Strong shift shock	NA	Poor acceleration Strong shift shock

NA: Not applicable

Heated Oxygen Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (3I) — Heated oxygen sensor (RF)	Code No.P0130 output Poor fuel economy	Code No.P0130 output Poor fuel economy	NA
PCM (4E) — Heated oxygen sensor heater (RF)	Code No.P0135 output No symptom	Code No.P0135 output No symptom	NA
PCM (3M) — Heated oxygen sensor (LF)	Code No.P0150 output Poor fuel economy	Code No.P0150 output Poor fuel economy	NA
PCM (4I) — Heated oxygen sensor heater (LF)	Code No.P0155 output No symptom	Code No.P0155 output No symptom	NA
PCM (3D) — Heated oxygen sensor (RR)	Code No.P0134 output Poor fuel economy	Code No.P0134 output Poor fuel economy	NA
Heated oxygen sensor heater (RR) — Ground	No symptom	NA	No symptom
PCM (3H) — Heated oxygen sensor (LR)	Code No.P0160 output Poor fuel economy	Code No.P0160 output Poor fuel economy	NA
Heated oxygen sensor heater (LR) — Ground	No symptom	NA	No symptom

Power Steering Pressure Switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (3T) — Power steering pressure switch	Engine speed may drop when steering at idle or low-speed driving	Engine speed slightly high at idle	Engine speed may momentarily drop when steering at idle or low-speed driving

A/C Signal (A/C Amplifier)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1D) — A/C amplifier	Air conditioner will not operate	Air conditioner will constantly operate with blower ON	NA

Blower Signal (A/C Amplifier)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1K) — A/C amplifier	Idle speed may be low in high position	Idle speed may be high at idle	NA

Stoplight Signal (Brake Switch)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1O) — Brake switch	No symptom	No symptom	NA

NA: Not applicable

Inhibitor Signal

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1F) — Transaxle range switch	Idle speed slightly lower in P and N ranges	Idle speed slightly higher in R, D, S, and L ranges	NA

Knock Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (3S) — Knock sensor	Code No.P0325 output Lack of power Knocking	Code No.P0325 output Lack of power Knocking	NA

EGR Valve Position Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (3R) — EGR valve position sensor	Code No.P1402 output No symptom	Code No.P1402 output No symptom	NA

EGR Boost Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (3F) — EGR boost sensor PCM (3K) — EGR boost sensor	Code No.P0105 output Code No.P1195 output No symptom	Code No.P0105 output Code No.P1195 output No symptom	NA

Vehicle Speed Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1C) — Vehicle speed sensor	Code No.P0500 output No symptom	Code No.P0500 output No symptom	NA

Torque Reduction Request Signal (ABS/TCS Control Unit)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1Q) — ABS/TCS CU	Code No.P1627 output Torque reduction control (TCS) will not operate	Code No.P1627 output Torque reduction control (TCS) will not operate	NA

Rear Window Defroster Switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1X) — Rear window defroster switch	Idle speed may be low when switch ON	Idle speed may be high at idle	NA

NA: Not applicable

Headlight Switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1L) — Headlight switch	Idle speed may be low when switch ON	Idle speed may be high at idle	NA

[Output Device]
Fuel Injector

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (4Q, 4U, 4Y, 4AC, 4AG, 4AK) — Fuel injector	Rough idle Poor acceleration	Will not start or hard start Engine runs rough or stalls	NA

IGT Signal (Ignition Control Module)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (4S) — ignition control module	Engine stalls and will not start	Engine stalls and will not start	NA
Ignition control module — Ground		NA	Engine will not start or laugh idle

Idle Air Control Valve [IN BAC Valve]

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (4M) — Idle air control valve	Code No.P0505 output Rough idle Engine stalls Hard start	Code No.P0505 output Hunts Idle speed stays or fluctuates at approx. 1,500 rpm	NA
Idle air control valve — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

Fuel Pump Relay

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1AF) — Fuel pump lelay	Engine stalls and will not restart	Fuel pump will operate whenever ignition switch ON	NA

Purge Solenoid Valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (4O) — Purge solenoid valve	Code No.P0443 output No symptom	Code No.P0443 output Hard starting Engine stalls at low speed	NA
PRG solenoid valve — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

NA: Not applicable

VRIS Solenoid Valve No.1

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1AA) — VRIS solenoid valve No.1	Code No.P1521 output Lack of power Poor acceleration	Code No.P1521 output Lack of power Poor acceleration	NA
VRIS solenoid valve No.1 — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

VRIS Solenoid Valve No.2

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1AE) — VRIS solenoid valve No.2	Code No.P1522 output Lack of power Poor acceleration	Code No.P1522 output Lack of power Poor acceleration	NA
VRIS solenoid valve No.2 — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

A/C Signal (A/C Relay)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1M) — A/C relay	Air conditioner will not operate	Air conditioner will operate whenever ignition switch ON	NA

EGR Solenoid Valve (Vacuum)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (4K) — EGR solenoid valve (vacuum)	No symptom	Engine stalls Hard start (must depress accelerator pedal)	NA
EGR solenoid valve (vacuum) — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

EGR Solenoid Valve (Vent)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (4G) — EGR solenoid valve (vent)	No symptom	No symptom	NA
EGR solenoid valve (vent) — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

NA: Not applicable

PRC Solenoid Valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1B) — PRC solenoid valve	Hard start after heat soak	No symptom	NA
PRC solenoid valve — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

Condenser Fan Relay No.1

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1A) — Condenser fan relay No.1	Condenser fan does not operate	Condenser fan and coolant fan will always operate while the ignition switch is ON	NA
Condenser fan relay No.1 — Ignition switch		EGI INJ fuse (40 A) burns out when ignition switch ON	

Cooling Fan Relay and Condenser Fan Relay No.2

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1E) — Cooling fan relay and condenser fan relay No.2	Cooling fan will not operate	Cooling fan will always operate while the ignition switch is ON	NA
Cooling fan relay and condenser fan relay No.2 — Ignition switch		EGI INJ fuse (40 A) burns out when ignition switch ON	

Torque Reduction Inhibit Signal (ABS/TCS Control Unit)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
PCM (1S) — ABS/TCS CU	Code No.P1627 output Traction control (TCS) will not operate when need the torque reduction condition		NA

NA: Not applicable

Before beginning any service procedure, refer to section T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

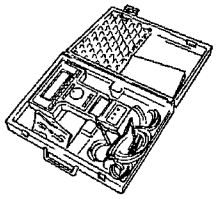
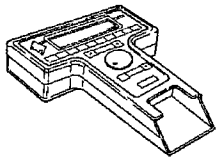
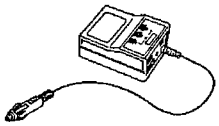
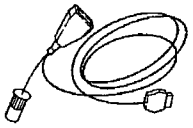
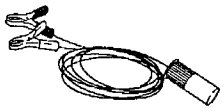
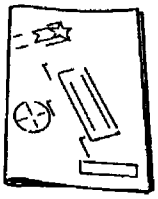
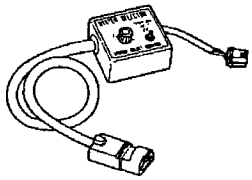
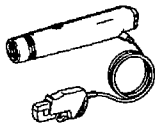
FUEL AND EMISSION CONTROL SYSTEMS (KJ)

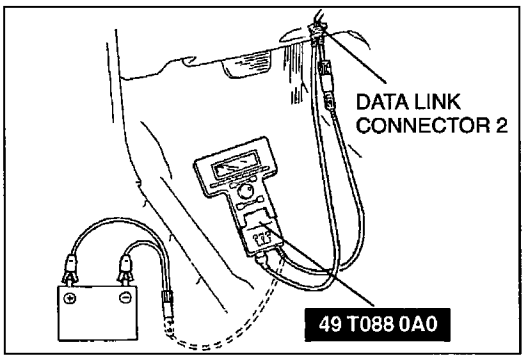
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ENGINE TUNE-UP

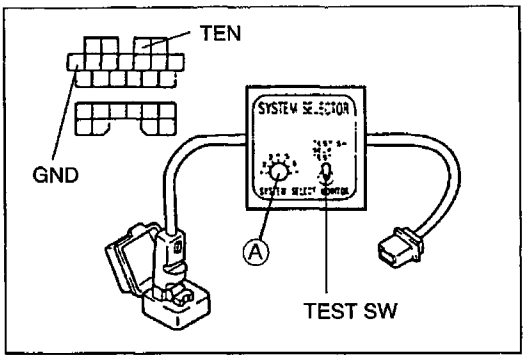
PREPARATION
SST

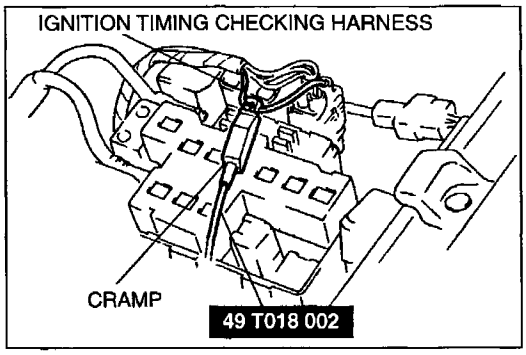
49 T088 0A0 NGS set 	For inspection of ignition timing and idle speed	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of ignition timing and idle speed
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of ignition timing and idle speed	49 T088 004 NGS OBDII Adapter (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
49 T088 010B Program Card 	For inspection of ignition timing and idle speed	49 B019 9A0 System Selector 	For inspection of ignition timing and idle speed
49 T018 002 Timing light 	For inspection of ignition timing	—	—

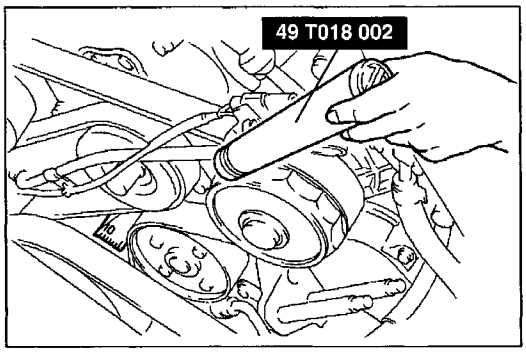


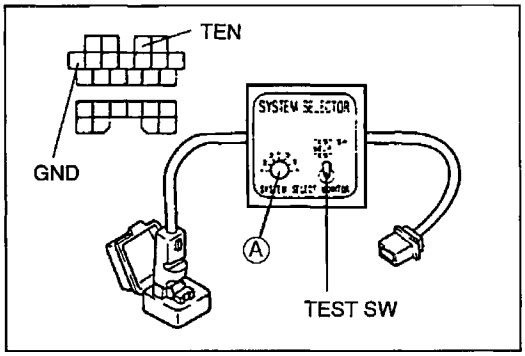
ADJUSTMENT
Preparation

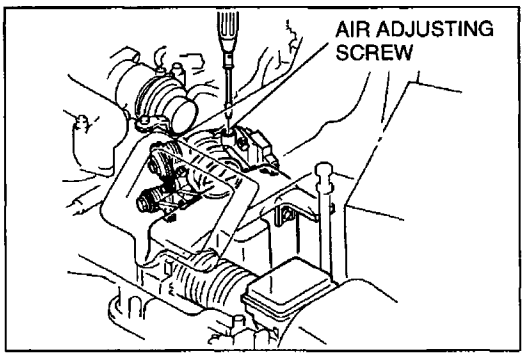
1. Warm up the engine to normal operating temperature.
2. Shift the selector lever to park/neutral position.
3. Turn off all electrical loads.
   - Headlight
   - Blower motor
   - Rear window defroster
   - A/C
   - Power steering
4. Wait until the cooling fan stops.
5. Connect the **SSTs** (NGS) to the data link connector 2 and select the PID/DATA MONITOR AND RECORD function.
6. Select the "RPM" on the NGS display.











Ignition Timing

1. Perform "Preparation". (Refer to page F2–3.)
2. Verify that the idle speed is within the specification.

   Specification: 600—700 (650 ± 50) rpm

3. If not as specified, adjust the idle speed. (Refer to below.)
4. Connect the **SST** (system selector) to the data link connector.
5. Set switch Ⓐ to position 1.
6. Set the test switch to SELF TEST.
7. Verify that the idle speed is within the specification.

   Specification: 550—750 rpm

8. If not as specified, adjust the idle speed. (Refer to below.)
9. Connect the **SST** to the ignition timing checking harness with the arrow on its cramp facing the connector.
10. Verify that the ignition timing is within the specification.

    Specification: BTDC 6—8° (7 ± 1°)

11. If not as specified, inspect following.
    - On-board diagnostic system (Refer to page F2–182.)
    - Camshaft position sensor (Refer to page F2–137.)
    - Crankshaft position sensor (Refer to page F2–139.)
12. Disconnect the jumper wire.
13. Verify that the ignition timing is within the specification.

    Specification: BTDC –5—17°

Idle Speed

1. Perform "Preparation". (Refer to page F2–3.)
2. Verify that the idle speed is within the specification.

   Specification: 600—700 (650 ± 50) rpm

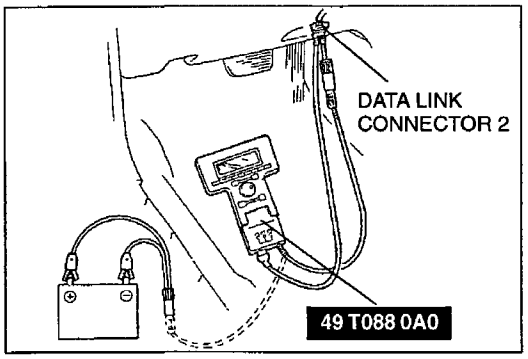
3. If not as specified, connect the **SST** (system selector) to the data link connector.
4. Set switch Ⓐ to position 1.
5. Set the test switch to SELF TEST.

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

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

   Specification: 600—700 (650 ± 50) rpm

7. Disconnect the **SST**.



Idle-up Speed

1. Perform "Preparation". (Refer to page F2–3.)
2. Verify that the idle speed is within the specification.

   Specification: 600—700 (650 ± 50) rpm

3. If not as specified, adjust the idle speed. (Refer to page F2–4.)
4. Verify that the idle speed is within the specification with the following load condition.

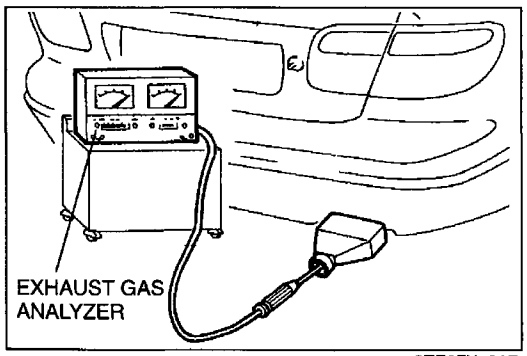
Specification

Load condition	Idle speed (rpm)*1
No load	600—700
E/L ON*2	650—750
A/C ON	730—830
P/S ON	650—750

*1: Excludes temporary idle speed drop just after the electrical loads are turned on.

*2:
- Blower motor operating at high speed
- Headlight switch turned on
- Rear window defroster switch turned on

5. If not as specified with all load conditions, inspect the idle air control valve.
   If not as specified with any one of load conditions, check related input switches, harnesses and connectors.



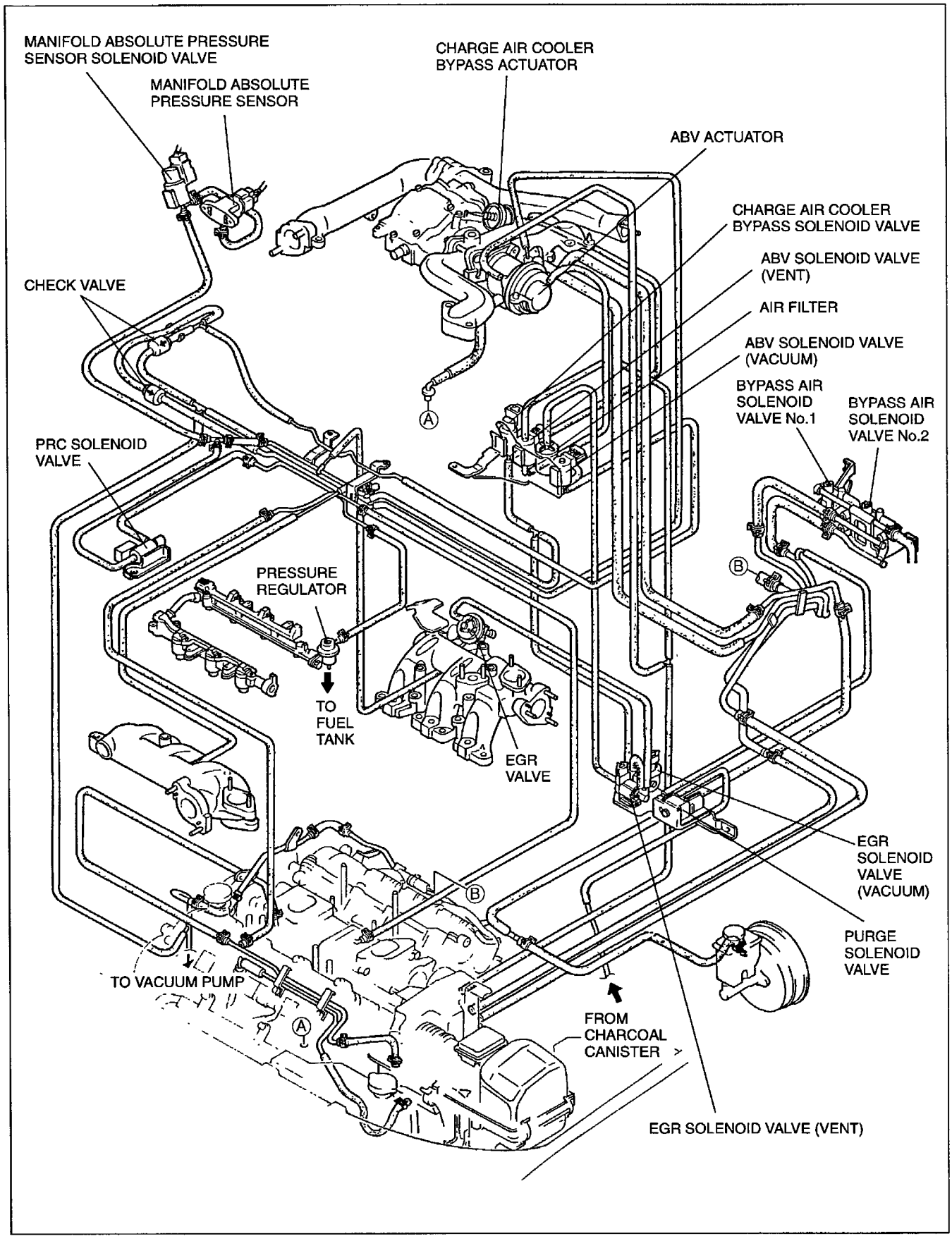
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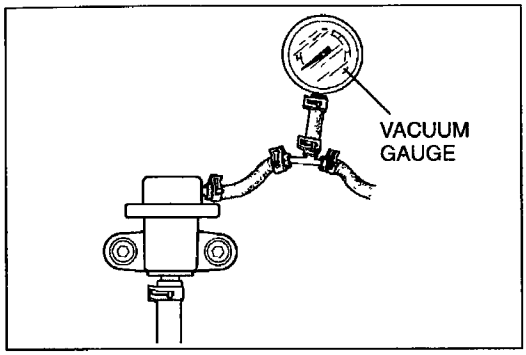
Idle Mixture

1. Perform "Preparation". (Refer to page F2–3.)
2. Verify that the idle speed and ignition timing are within the specification. (Refer to page F2–4.)
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 F2–99.)
   - Heated oxygen sensor (Refer to page F2–58.)
   - Intake-air system (Refer to page F2–6.)
   - Fuel system (Refer to page F2–15.)
   - ESA system (Refer to page F2–73.)
6. If the systems are normal, replace the three way catalytic converter and/or warm up three way catalytic converter.

INTAKE-AIR SYSTEM

VACUUM HOSE ROUTING DIAGRAM





SYSTEM INSPECTION

1. Verify that the intake-air hoses are installed properly.
2. Disconnect the vacuum hose from the pressure regulator and connect to vacuum gauge as shown in the figure.
3. Start the engine and let it idle.
4. Measure the intake manifold vacuum by using the vacuum gauge.

   Specification:
   60.0—73.3 kPa {450—550 mmHg, 18—21 inHg} (Vacuum)

5. If not as specified, inspect the following.

   Air suction
   - Throttle body
   - Intake manifold
   - PCV valve
   - Fuel injector insulator

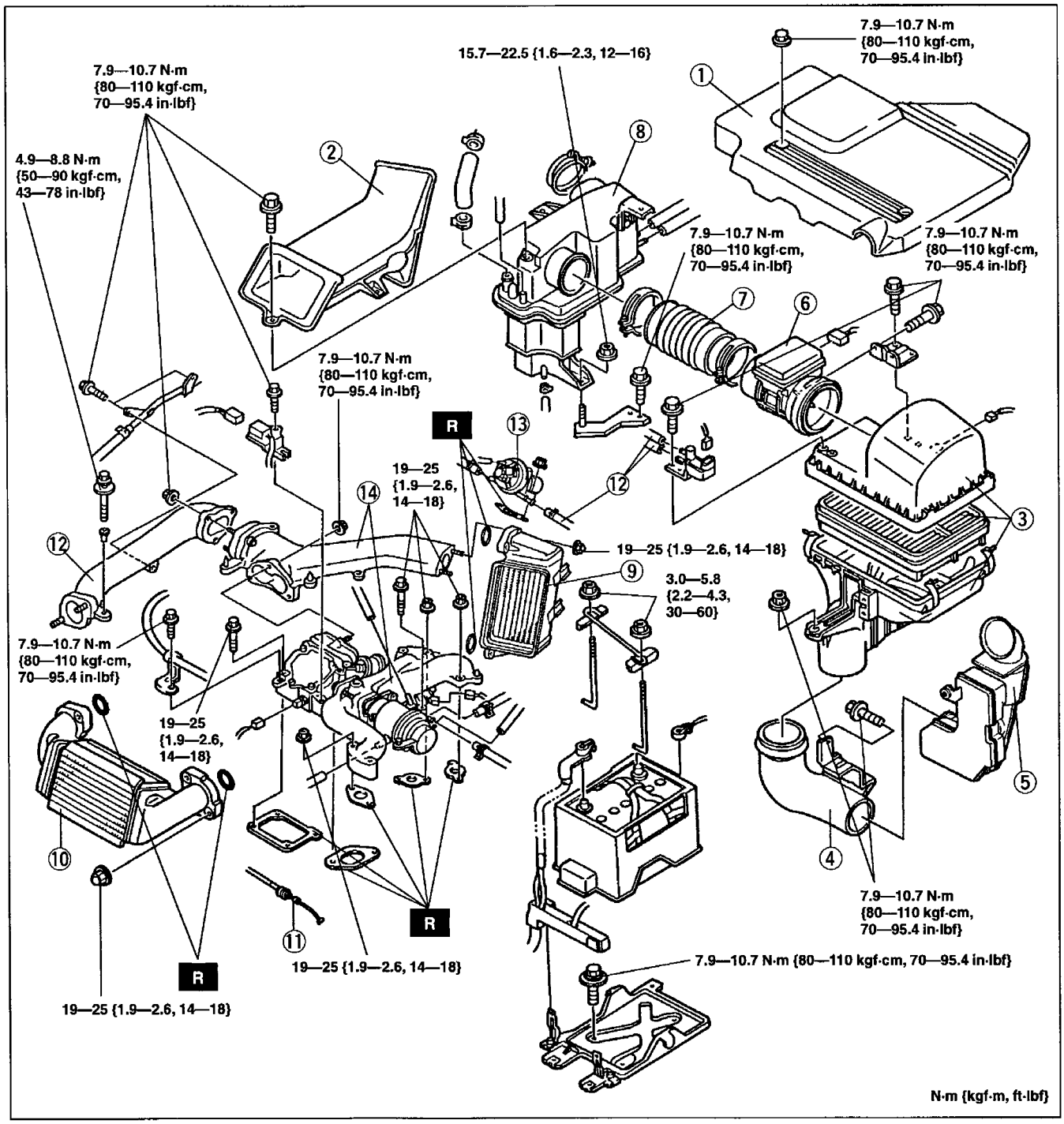
   Acceletor cable free play (Refer to page F2–14.)
   Engine compression (Refer to section B2.)
   Lysholm compressor (Refer to page F2–78.)

COMPONENT PARTS
Removal / Inspection / Installation

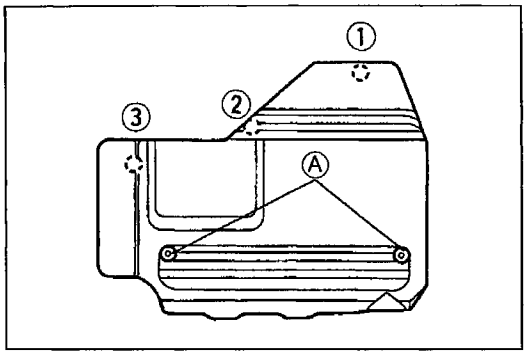
Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures" on page F2–15.**

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure, referring to **Removal note.**
3. Visually check each part for damage. Replace if necessary.
4. Install in the reverse order of removal, referring to **Installation note.**

STEP 1



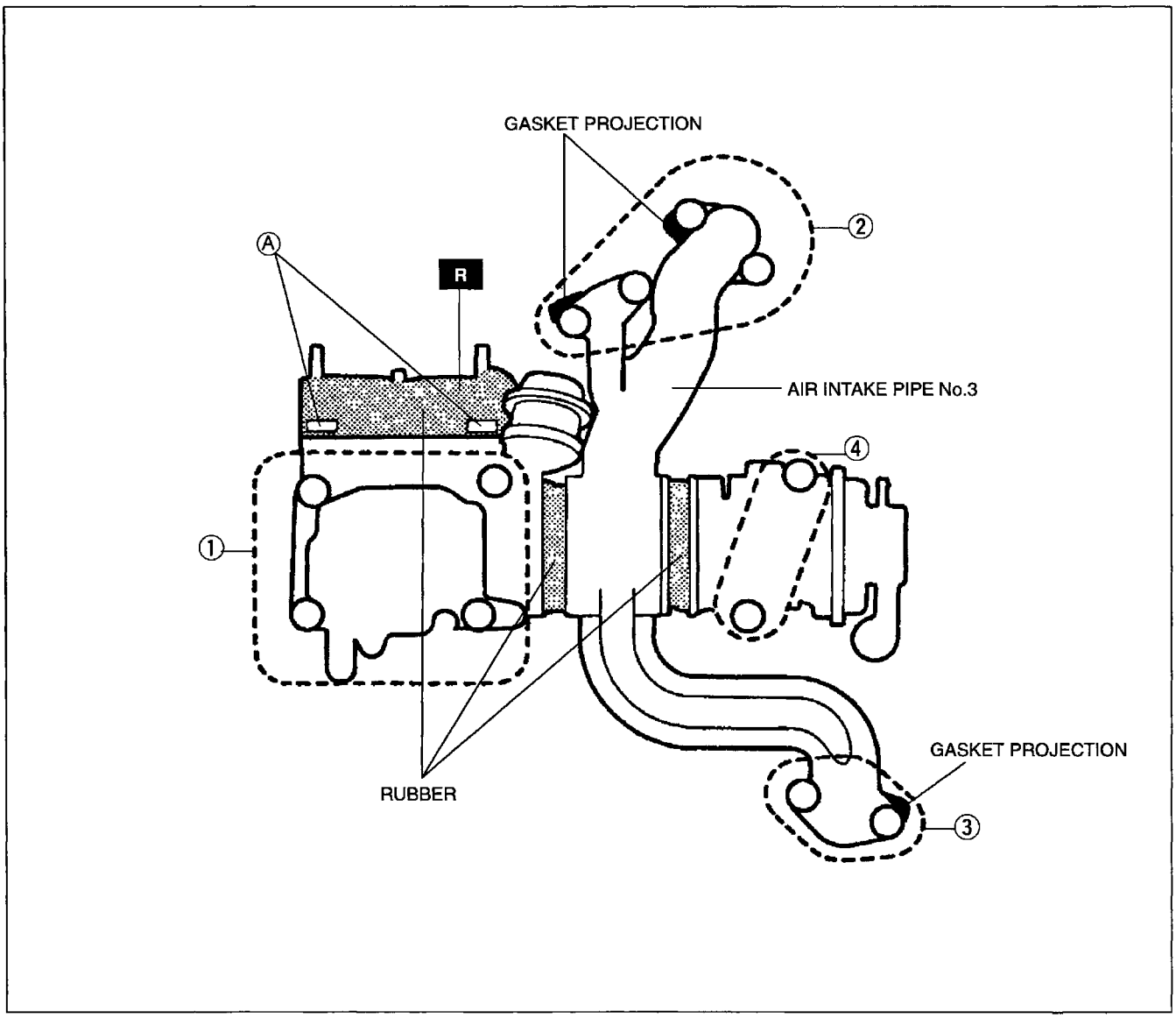
1. Dynamic chamber cover
   Removal note ..... page F2–10
2. Charge air cooler air duct
3. Air cleaner assembly
4. Air duct
5. Fresh-air duct
6. Mass air flow sensor
7. Air intake hose
8. Resonator
9. Charge air cooler (RH)
   Installation note ..... page F2–10
10. Charge air cooler (LH)
    Installation note ..... page F2–10
11. Accelerator cable
12. Vacuum hose assembly
13. EGR valve
    Inspection ..... page F2–85
14. Air intake pipe assembly
    Installation note ..... page F2–10



Removal note
Dynamic chamber cover
1. Remove nuts Ⓐ.
2. Remove the dynamic chamber cover in the order shown.

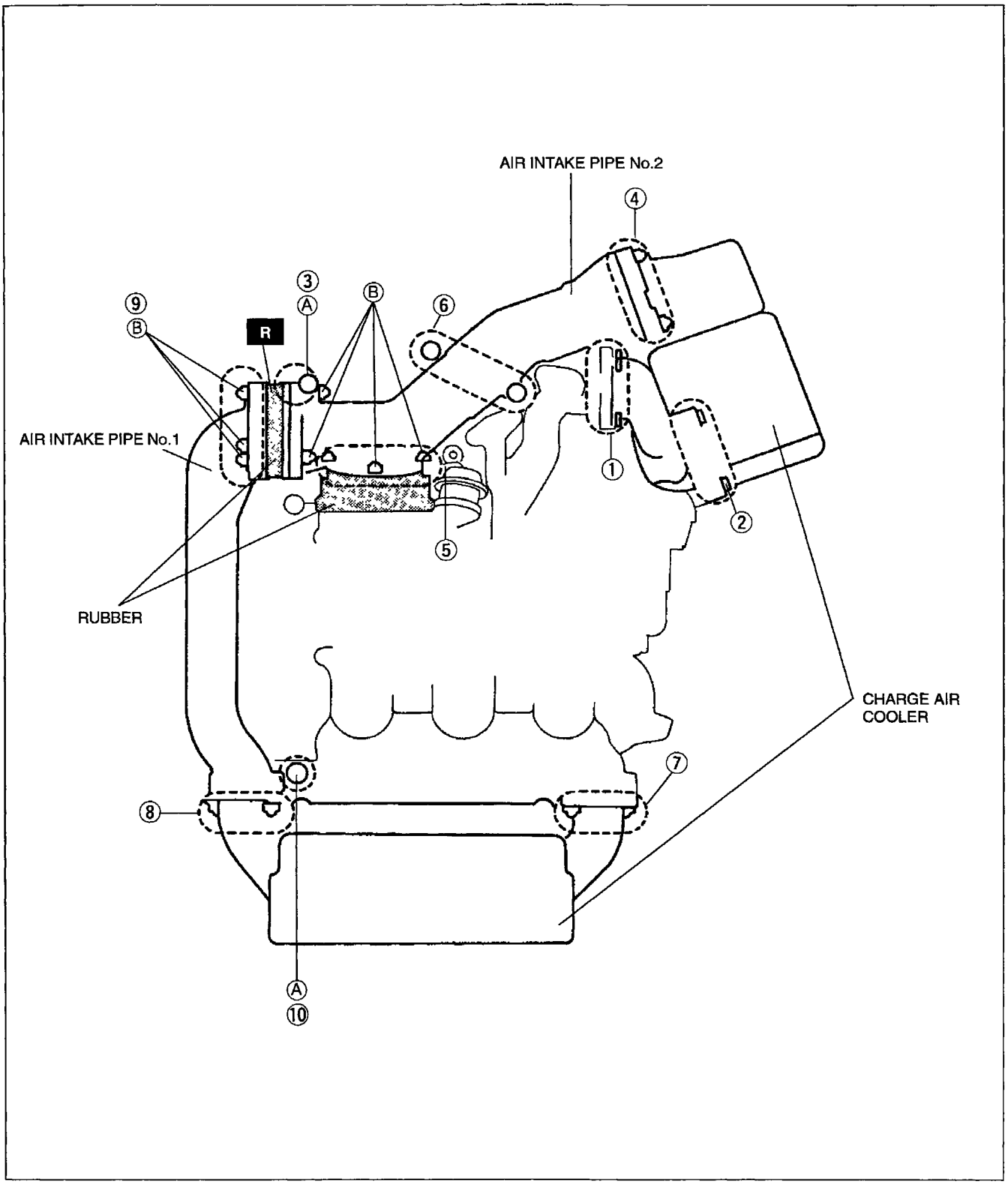
Installation note
Charge air cooler, air intake pipe assembly
1. Hand tighten the nuts and bolts in the order shown until the air intake pipe No.3 contacts the intake manifold.
2. Verify that the rubbers are not twisted or distorted.
3. Tighten the nuts and bolts to the specified torque in the order shown.

Tightening torque
A: 7.9—10.7 N·m {80—110 kgf·cm, 70—95.4 in·lbf}
Others: 19—25 N·m {1.9—2.6 kgf·m, 14—18 ft·lbf}

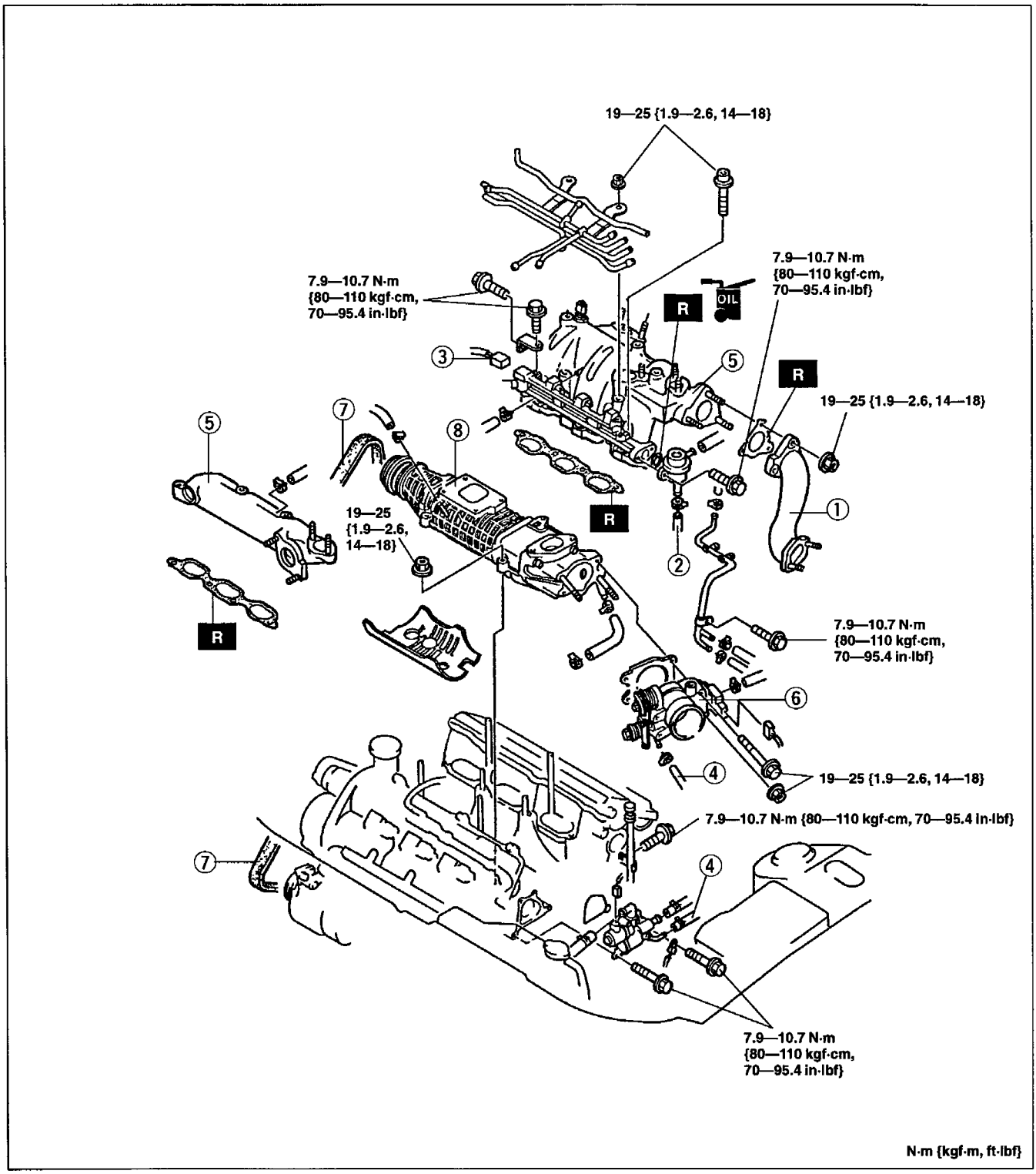


4. Hand tighten the nuts and bolts in the order shown until the charge air coolers and the air intake pipes No.1 and No.2 contact the intake manifold.
5. Verify that the rubbers are not twisted or distorted.
6. Tighten the nuts and bolts to the specified torque in the order shown.

Tightening torque
A: 5.0—8.8 N·m {50—90 kgf·cm, 44—78 in·lbf}
B: 7.9—10.7 N·m {80—110 kgf·cm, 70—95.4 in·lbf}
Others: 19—25 N·m {1.9—2.6 kgf·m, 14—18 ft·lbf}



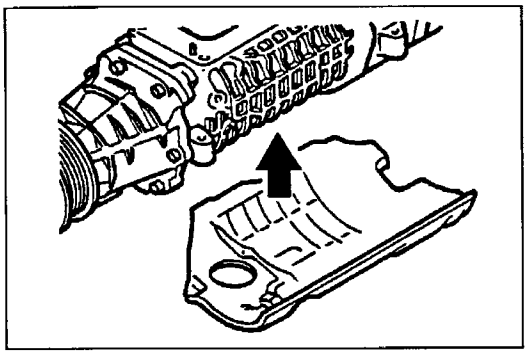
STEP 2



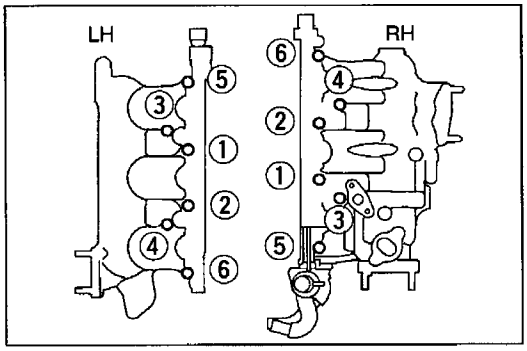
1. Charge air cooler pipe
2. Fuel hose
   Removal note ..... page F2–13
3. Fuel distributor connector
4. Coolant hose
   Removal note ..... page F2–13
5. Intake manifold assembly
   Installation note ..... page F2–13
6. Throttle body assembly
7. Drive belt ..... section B2
8. Lysholm compressor
   Installation note ..... page F2–13
   Inspection ..... page F2–78
   Disassembly / Assembly ..... page F2–78

Removal note
Fuel hose
Before disconnecting the fuel hoses, follow the "Fuel Line Safety Procedures". (Refer to page F2–15.)

Coolant hose
Before disconnecting the coolant hoses, drain the coolant from radiator. (Refer to section E.)



Installation note
Lysholm compressor
Before installation, temporarily fix the rubber onto the Lysholm compressor with two-side adhesive tape.



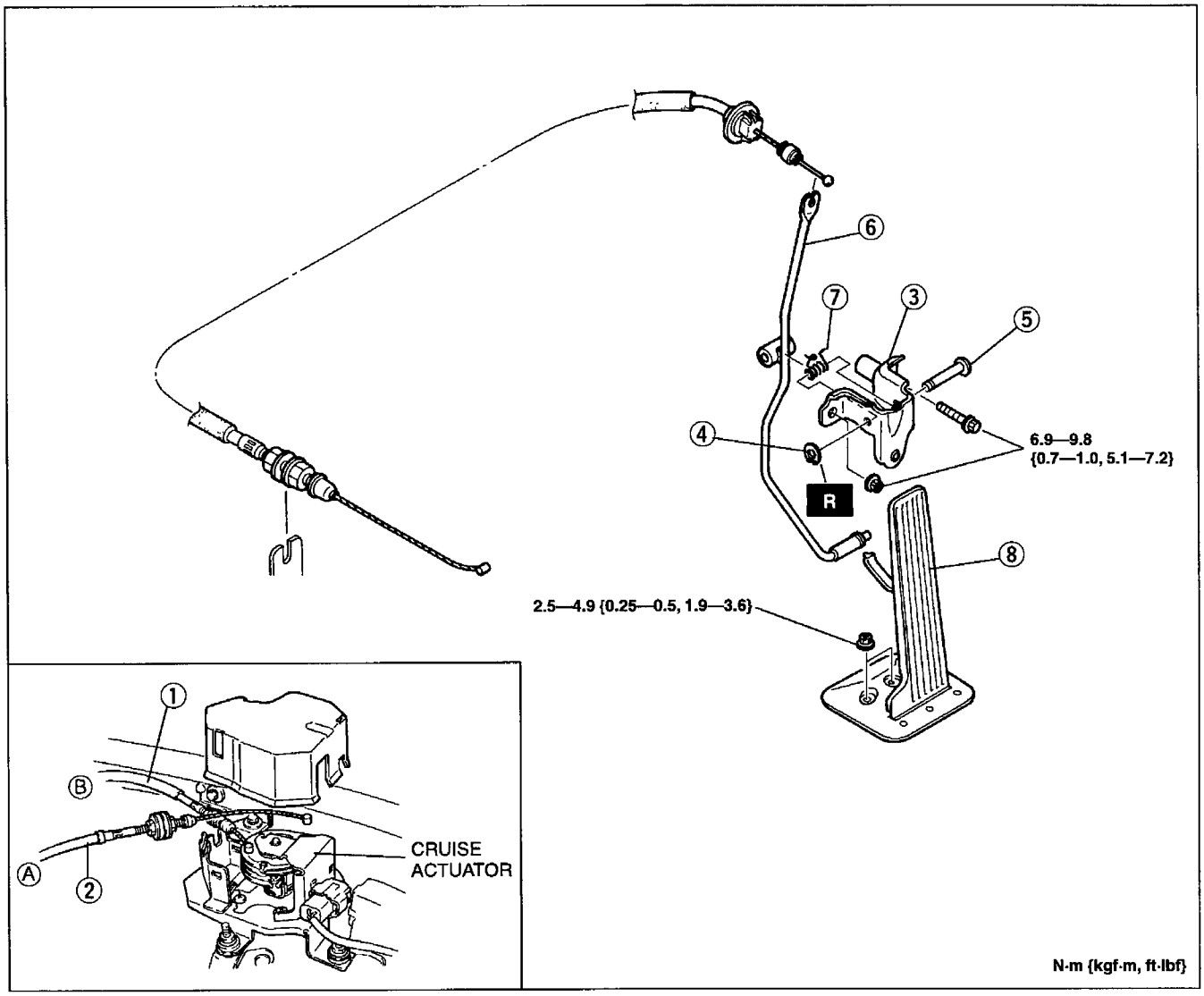
Intake manifold assembly
1. Install the intake manifold assembly with the new gaskets.
2. Tighten the bolts and nuts in the order shown.

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

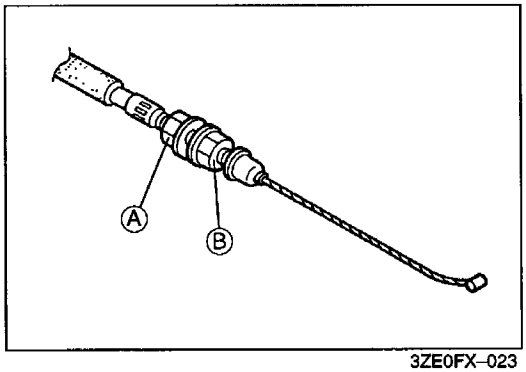
ACCELERATOR PEDAL

Removal / Inspection / Installation

1. Remove in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Install in the reverse order of removal.



1. Accelerator cable (throttle body)
   Inspection / Adjustment ..... below
2. Accelerator cable (accelerator pedal)
   Inspection / Adjustment ..... section T
3. Retainer
4. Clip
5. Shaft
6. Rod
7. Return spring
8. Accelerator pedal



3ZE0FX–023

ACCELERATOR CABLE

Inspection / Adjustment

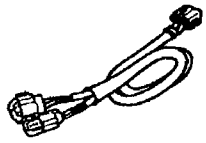
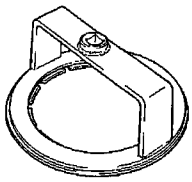
1. Verify that the throttle valve is at the closed throttle position.
2. Measure the free play of the accelerator cable.

   Free play: 1—3 mm {0.04—0.08 in}

3. If not as specified, adjust by turning locknut A.
4. Depress the accelerator pedal fully. Verify that the throttle valve is wide open throttle.
5. Adjust with bolt B if necessary.

FUEL SYSTEM

PREPARATION
SST

49 E018 901 Body (Part of 49 E018 9A0) 	For inspection of fuel injector	49 T018 901 Harness, adapter 	For inspection of fuel injector
49 T042 001 Wrench, union 	For removal and installation of fuel pump	—	—

PRECAUTION
Fuel Pressure Release and Servicing Fuel System

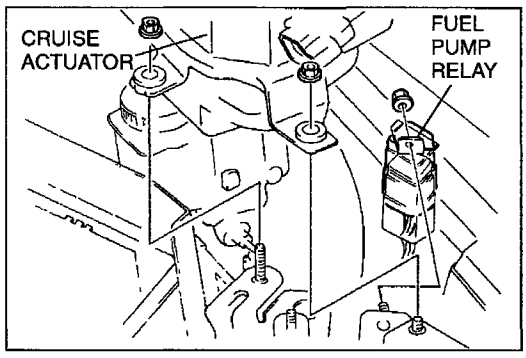
Warning

- **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 following "Fuel Line Safety Procedures".**

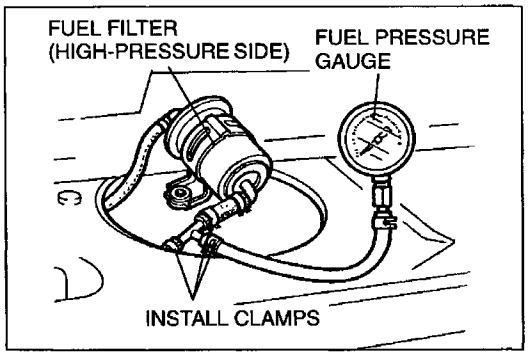


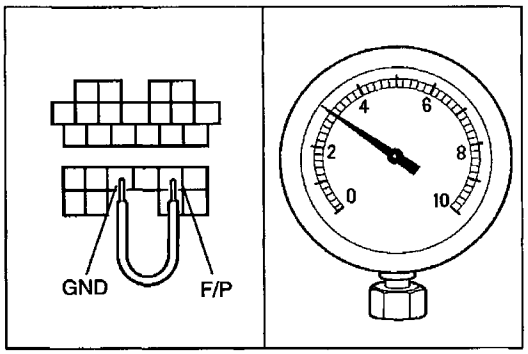
Fuel Line Safety Procedures

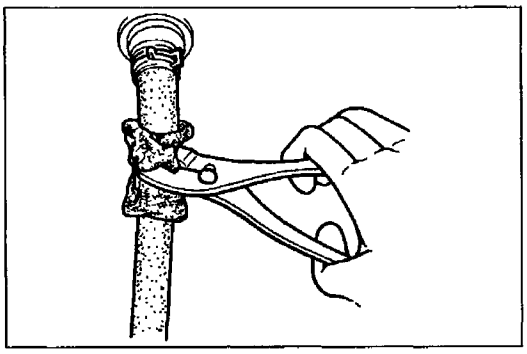
A. Release the fuel pressure before disconnecting a fuel line.
   1. Remove the cruise actuator. (Refer to section T.)
   2. Start the engine.
   3. Remove the fuel pump relay.
   4. After the engine stalls, crank the engine several times.
   5. Turn off the ignition switch.
   6. Install the fuel pump relay.

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 to fuel filter and the main hose.







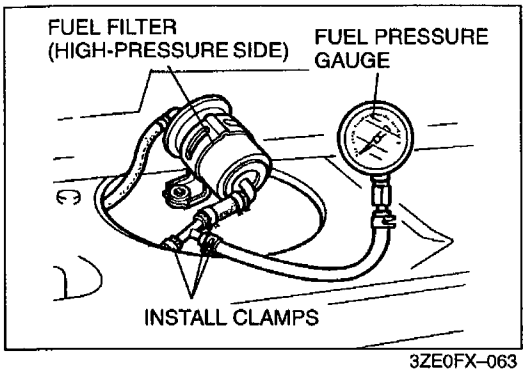
SYSTEM INSPECTION
Fuel Line Pressure Inspection

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 F2–15.**

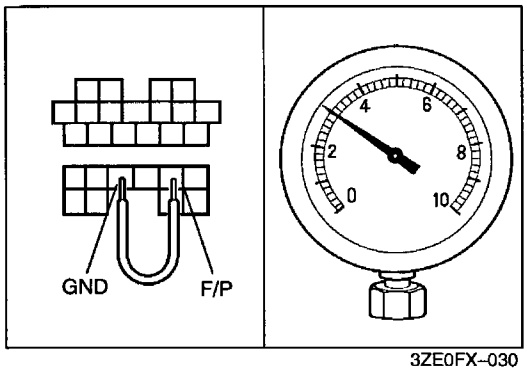
1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge between the fuel filter (high-pressure side) and fuel distributor.
3. Connect the negative battery cable.
4. Connect the data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON and measure the fuel line pressure.

   Specification:
   270—330 kPa {2.7—3.4 kgf/cm^2, 39—48 psi}

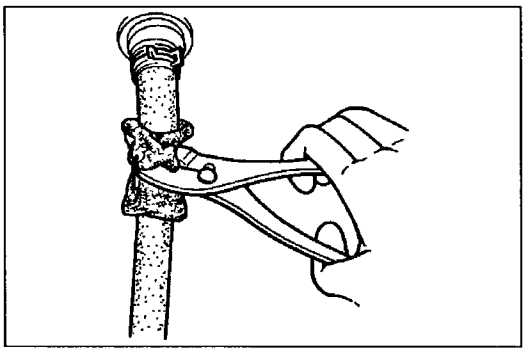
6. Turn off the ignition switch and disconnect the jumper wire.
7. If the pressure is higher than specified, check the fuel pump maximum pressure. (Refer to page F2–21.)
   If normal, check the pressure regulator or fuel return hose is clogged.
8. If the pressure is lower than specified, measure the fuel line pressure with pinching the return hose.
   - If the fuel line pressure quickly increases, check the pressure regulator. (Refer to page F2–29.)
   - If the fuel line pressure gradually increases, check the fuel pump maximum pressure. (Refer to page F2–21.)
     If the pressure is normal, check the clogging between fuel pump and pressure regulator.



3ZE0FX-063



3ZE0FX-030



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 F2–15.**

1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge between the fuel filter (high-pressure side) and the fuel distributor.
3. Connect the negative battery cable.
4. Connect the 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}

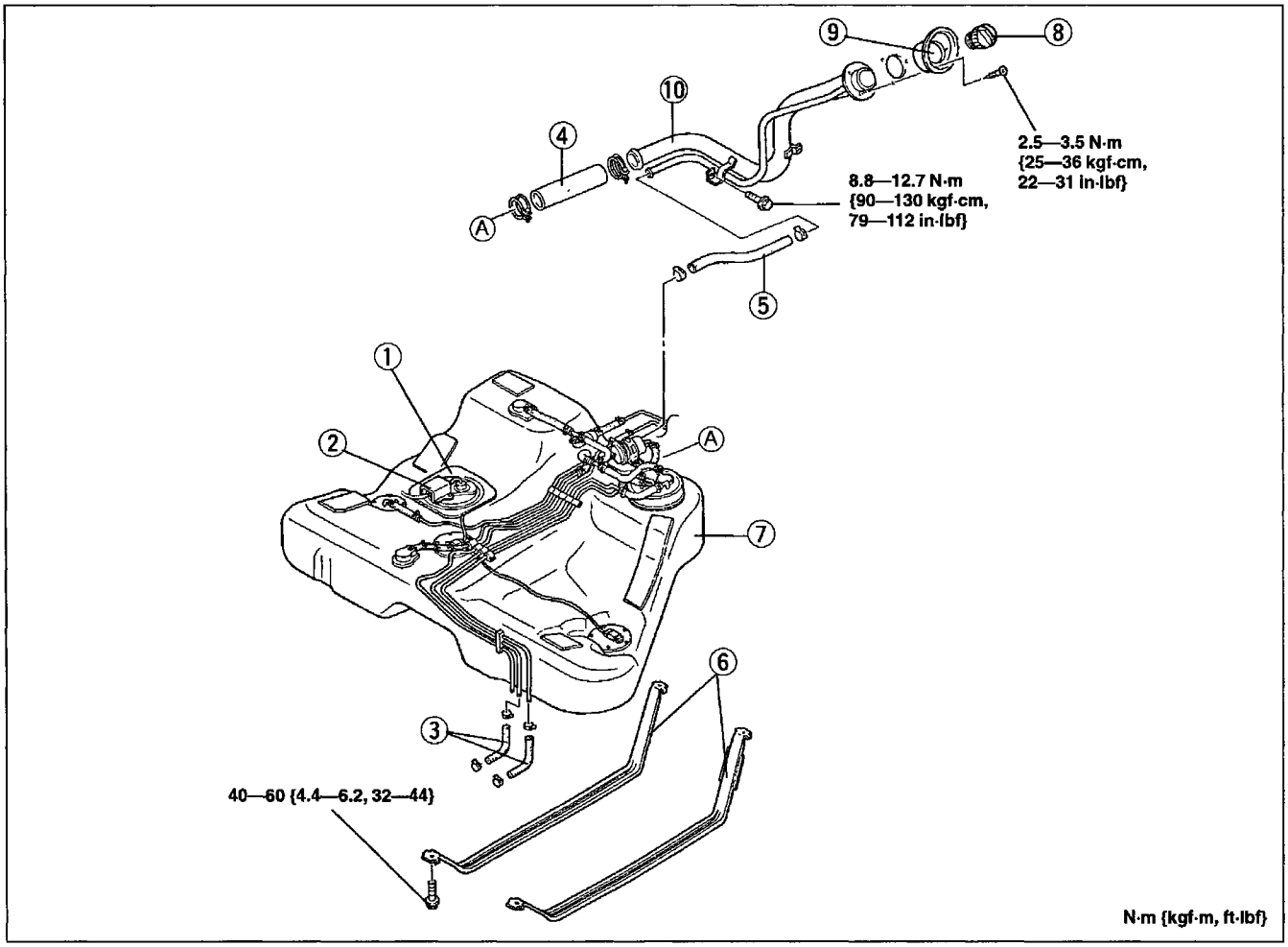
7. Disconnect a jumper wire.
8. If the pressure is lower than specified, measure the fuel line pressure with pinching the return hose.
   - If the fuel line pressure holds, replace the pressure regulator. (Refer to page F2–25.)
   - If the fuel line pressure dose not hold, check the fuel pump hold pressure. (Refer to page F2–22.)

   If the fuel pump hold pressure is normal, check the fuel leaks from fuel line and fuel injector.

FUEL TANK ASSEMBLY
Removal / Inspection / Installation

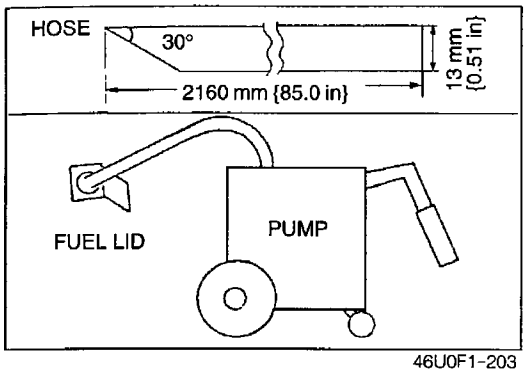
Warning
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "fuel Line Safety Procedures" on page F2–15.**
- **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 rear seat cushion. (Refer to section S.)
3. Disconnect the fuel pump connector.
4. Suck up the fuel from the fuel tank, referring to **Removal note**.
5. Remove in the order shown in the figure.
6. Inspect all parts and repair or replace as necessary.
7. Install in the reverse order of removal.



3ZE0FX–034

1. Fuel pump cover
2. Fuel pump connector
3. Fuel hose
4. Fuel filler hose
5. Breather hose
6. Fuel tank strap
7. Fuel tank
   Removal note ..... page F2–19
8. Filler cap
9. Reinforcement
10. Fuel filler pipe



46U0F1-203

Removal note
Fuel

1. Remove the filler cap and insert a hose into the fuel tank through the filler pipe.
2. Start the pump and suck up the fuel into a container.

Note
- For easier work, prepare a hose of following size.

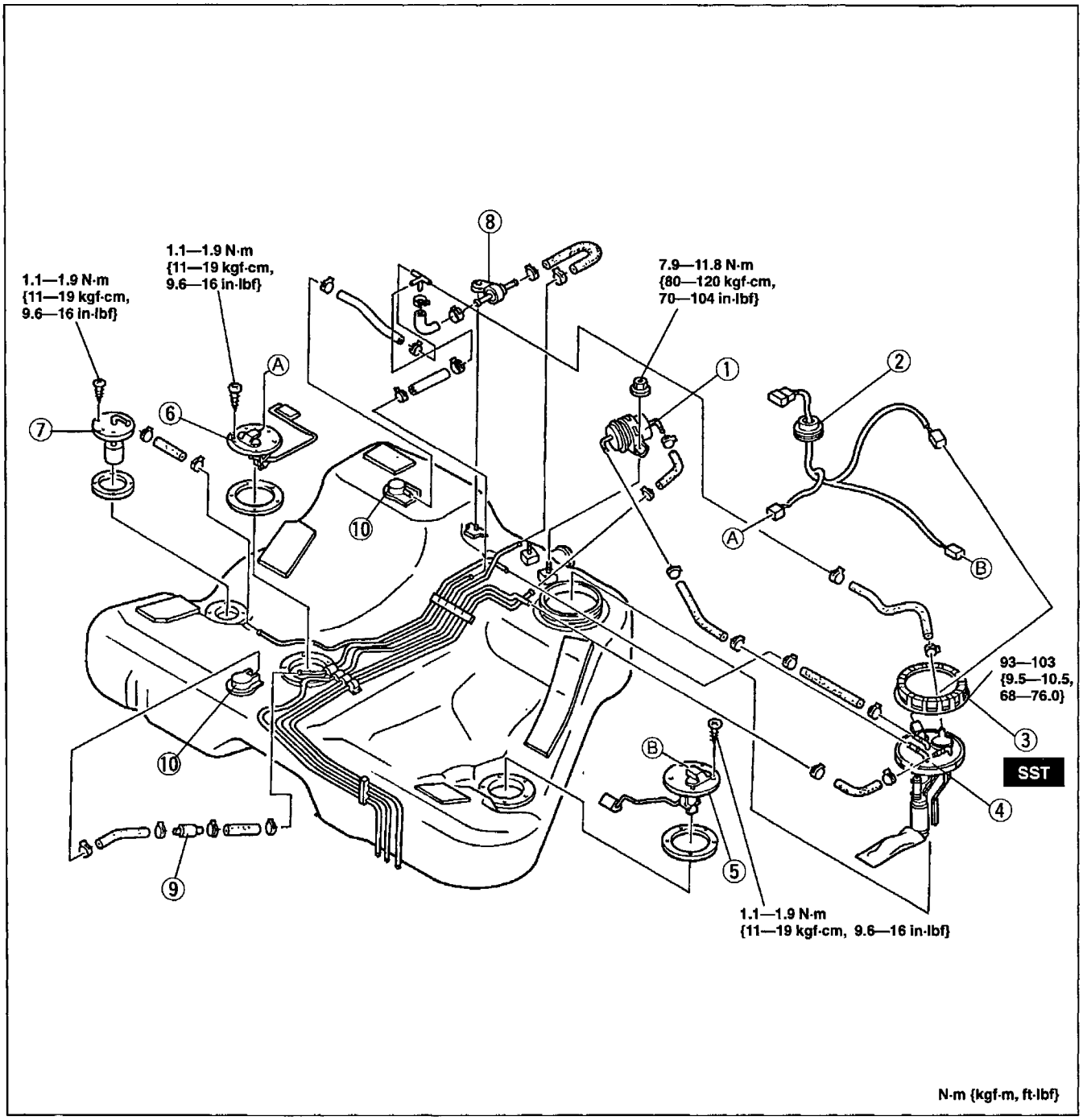
Outer diameter: 13 mm {0.51 in}
Length: 2,160 mm {85.0 in}

Fuel tank

The fuel tank is divided into the right and left banks, makes it difficult to suck up the fuel completely. Some fuel may be left in either side of the tank. Avoid tilting the fuel tank during removal.

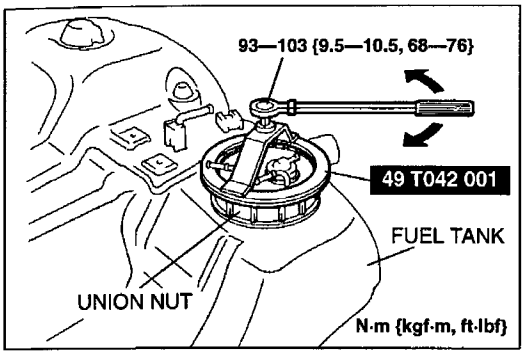
Disassembly / Assembly

1. Remove the fuel tank. (Refer to page F2–18.)
2. Disassemble in the order shown in the figure, referring to **Disassembly / Assembly note**.
3. Assemble in the reverse order of disassembly, referring to **Disassembly / Assembly note**.



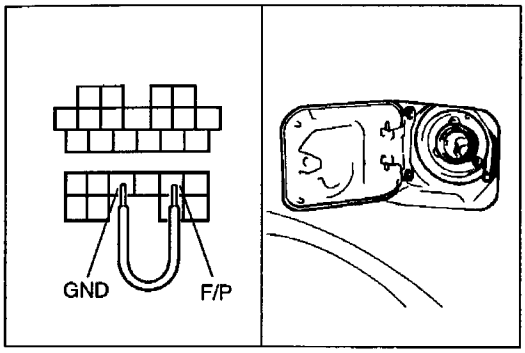
3ZE0FX-035

1. Fuel filter (high-pressure side)
2. Harness
3. Union nut
4. Fuel pump assembly
   - Disassembly / assembly note . page F2–21
   - System Inspection ..... page F2–21
   - Inspection ..... page F2–21
   - Disassembly / Assembly ..... page F2–23
5. Fuel gauge sender unit No.1
6. Fuel gauge sender unit No.2
7. Fuel filter (transfer)
8. Check valve (two-way)
   - Inspection ..... page F2–33
9. Check valve (one-way)
   - Inspection ..... page F2–33
10. Fuel vapor valve
    - Inspection ..... page F2–33



Disassembly / Assembly note
Fuel pump assembly
Disassemble / assemble the fuel pump assembly by using the **SST**.

Tightening torque:
93—103 N·m {9.5—10.5 kgf·m, 68—76.0 ft·lbf}



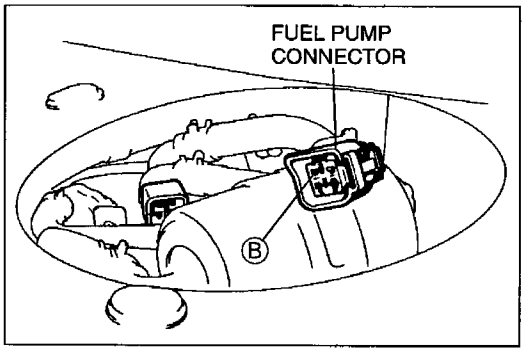
FUEL PUMP ASSEMBLY

System Inspection

1. Connect the data link connector terminals F/P and GND by using a jumper wire.
2. Remove the filler cap.
3. Turn the ignition switch to ON. Listen for fuel pump operation sound at the filler inlet.
4. If no sound was heard, measure the voltage fuel pump connector terminal B and a ground by using a voltmeter.

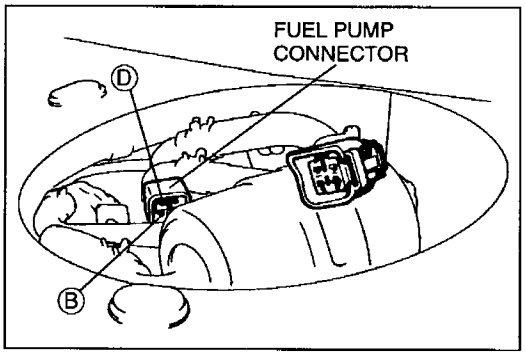
Specification: Battery positive voltage (Ignition switch ON)

5. Disconnect a jumper wire.
6. If not as specified, inspect the fuel pump relay and fuel pump resistor and relay (speed).
7. If the fuel pump relay and fuel pump resistor and relay (speed) is normal, check for continuity between the following.
   - Ignition switch and main relay
   - Main relay and fuel pump relay
   - Fuel pump relay and fuel pump resistor and relay (speed)
   - Fuel pump resistor and relay (speed)
   - Fuel pump



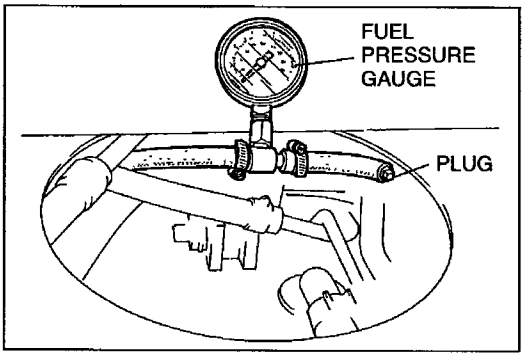
Inspection
Fuel pump continuity

1. Remove the hole cover. (Refer to page F2–24.)
2. Disconnect the fuel pump connector.
3. Check for continuity between fuel pump connector terminals B and D by using an ohmmeter.
4. If there is no continuity, replace the fuel pump. (Refer to page F2–22.)

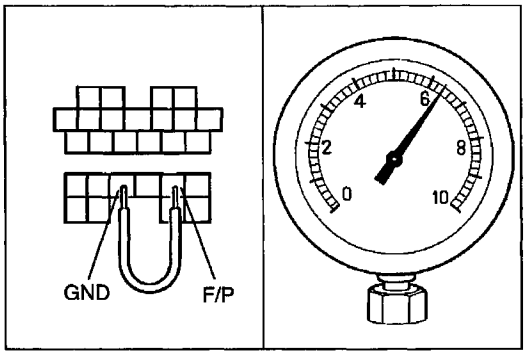


Fuel pump maximum pressure

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, complete the "Fuel Line Safety Procedures" on page F2–15.**



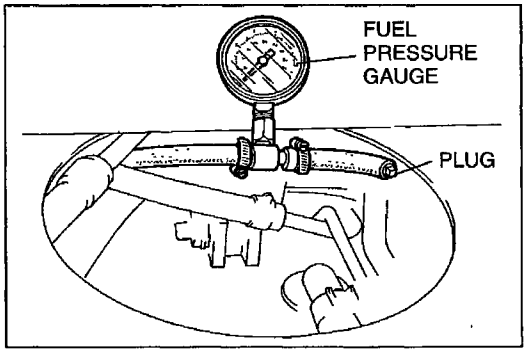
1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge to the fuel pump and plug the outlet of the gauge as shown in the figure.
3. Connect the negative battery cable.



4. Connect the data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON, and measure the fuel pump pressure.

Specification:
630—800 kPa {6.4—8.2 kgf/cm^2, 92—116 psi}

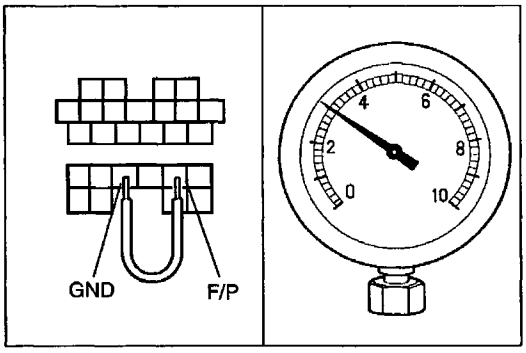
6. Turn off the ignition switch and disconnect a jumper wire.
7. If not as specified, replace the fuel pump. (Refer to page F2–18.)



Fuel pump fuel pressure hold inspection

Warning
- **Fuel 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 F2–15.**

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 in the figure.



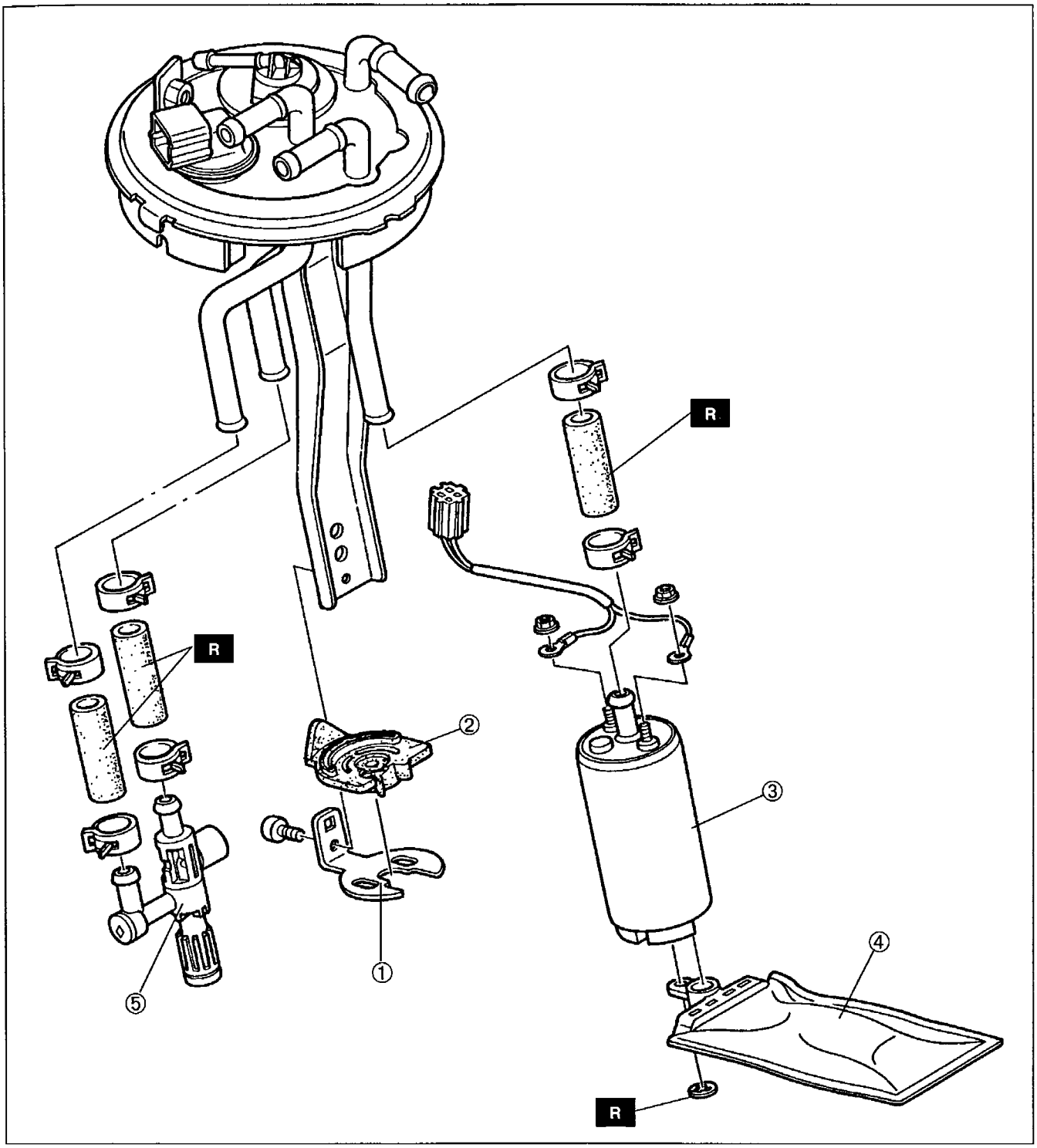
3. Connect the negative battery cable.
4. Connect the data link connector terminals F/P and GND by using a jumper wire.
5. Turn the ignition switch to ON for approx. 10 sec.to operate the fuel pump.
6. Turn off the ignition switch. Wait for 5 min., and measure the fuel pressure.

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

7. Disconnect a jumper wire.
8. If not as specified, replace the fuel pump. (Refer to page F2–18.)

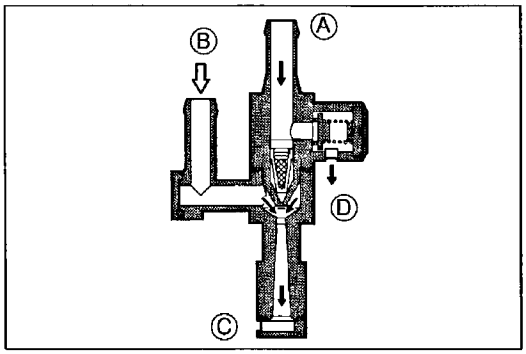
Disassembly / Assembly

1. Remove the fuel tank assembly. (Refer to page F2–18.)
2. Remove the fuel pump assembly. (Refer to page F2–20.)
3. Disassemble in the order shown in the figure.
4. Assemble in the reverse order of disassembly.



3ZE0FX–046

1. Bracket
2. Rubber mount
3. Fuel pump
   System Inspection ..... page F2–21
   Inspection ..... page F2–21
4. Fuel filter (Low-pressure side)
5. Fuel pump (transfer)
   Inspection ..... page F2–24



FUEL PUMP (TRANSFER)
Inspection

1. Remove the fuel pump (transfer). (Refer to page F2–23.)
2. Verify that air flows through the fuel pump from ports A and B to C.
3. Clean any clogs with compressed air.
4. Block port B and C, and apply pressure of over 167 kPa {1.70 kgf/cm^2, 24.2 psi} to port A and verify that air comes out from port D.
5. If not as specified, replace the fuel pump (transfer). (Refer to page F2–23.)

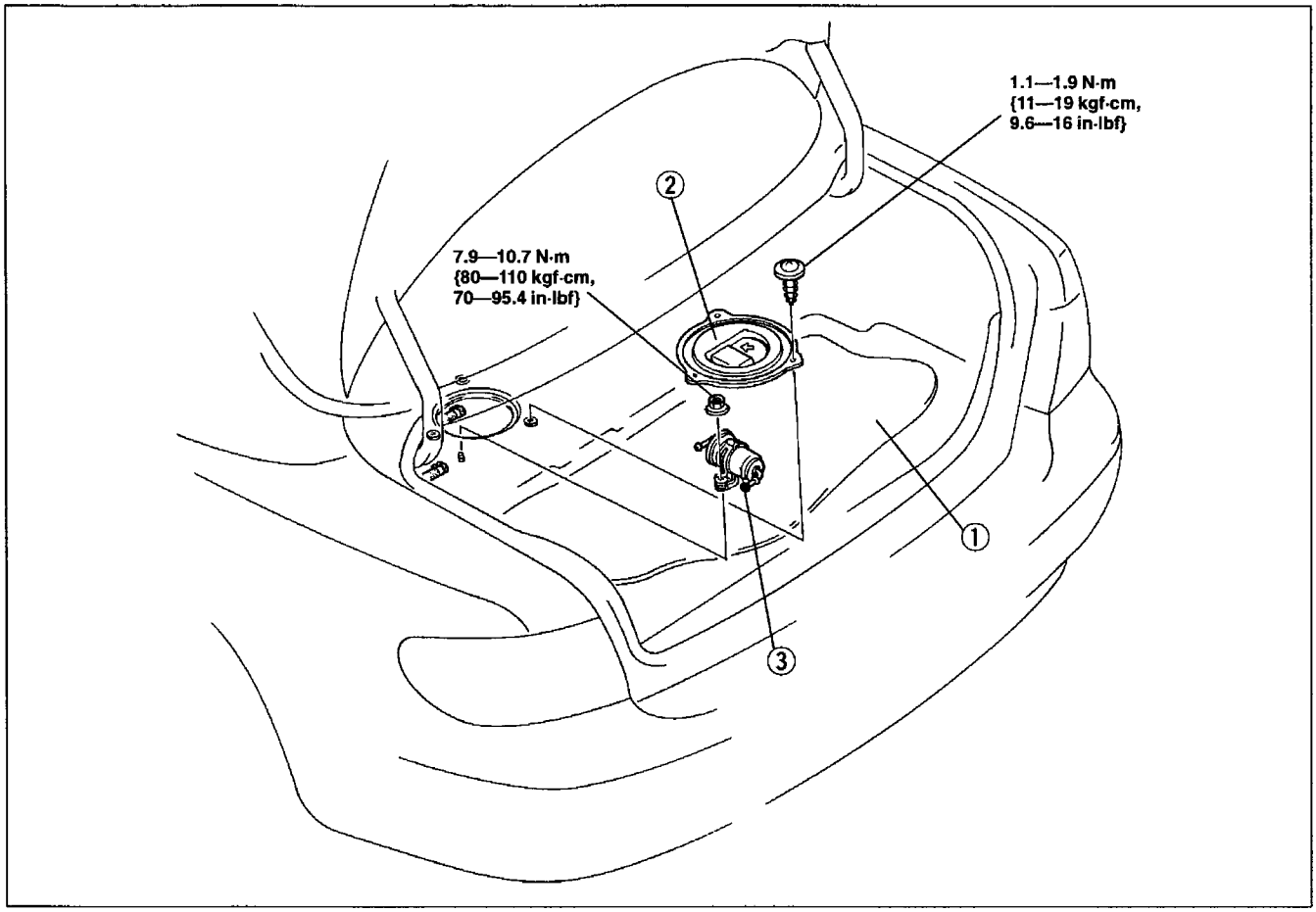
FUEL FILTER (HIGH-PRESSURE SIDE)
Removal / Installation

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 F2–15.**

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

1. Disconnect the negative battery cable.
2. Disconnect the fuel hoses from the fuel filter.
3. Remove the fuel filter and bracket.
4. Install in the reverse order of removal.
5. Verify that the fuel hoses are pushed fully onto the fuel filter nozzles.

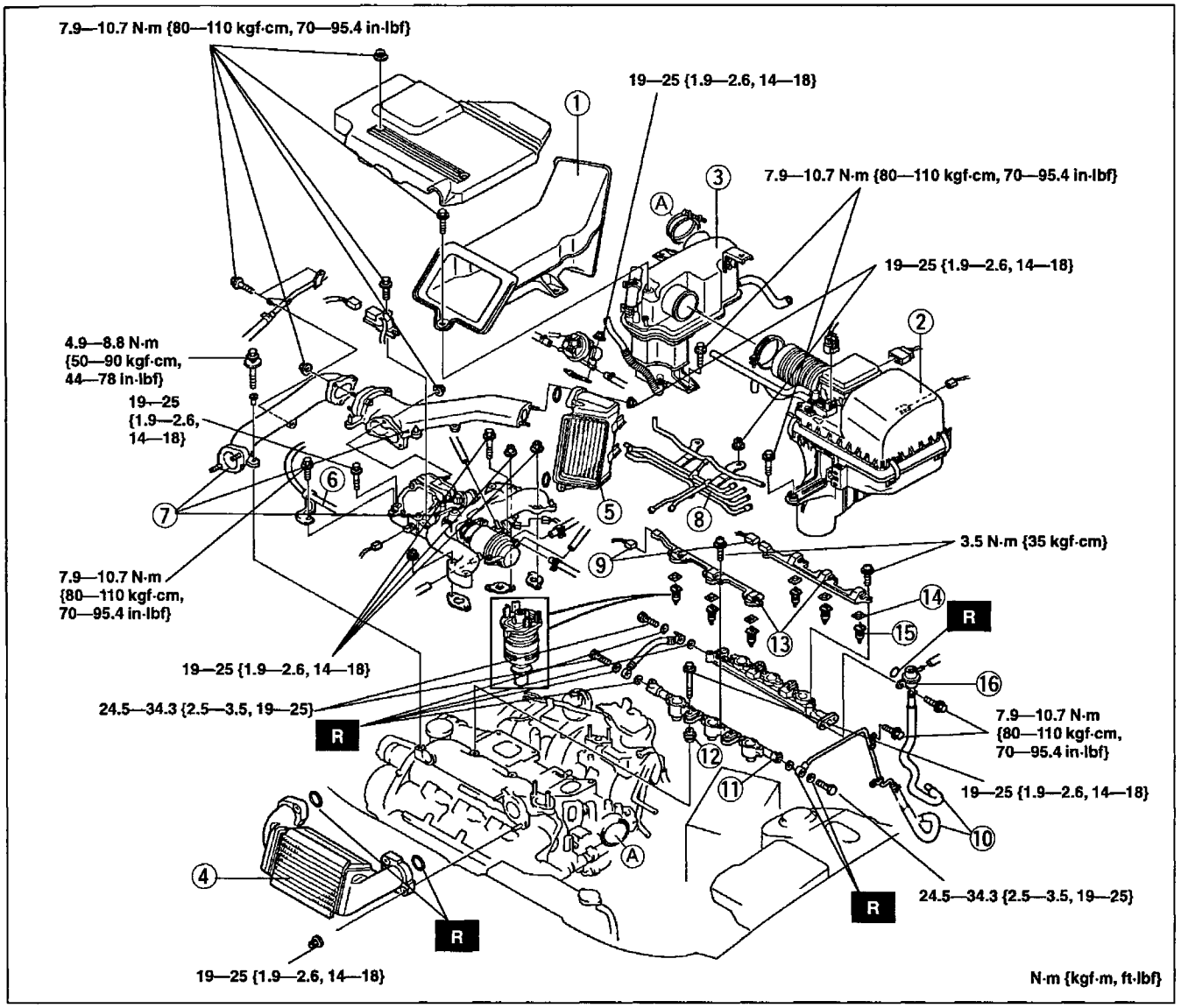


1. Trunk mat
2. Service hole cover
3. Fuel filter (high-pressure side)

FUEL INJECTOR
Removal / Installation

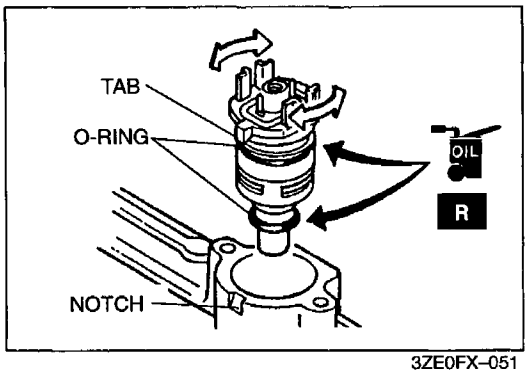
Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this , always complete the "Fuel Line Safety Procedures" on page F2–15.**

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**.



3ZE0FX–050

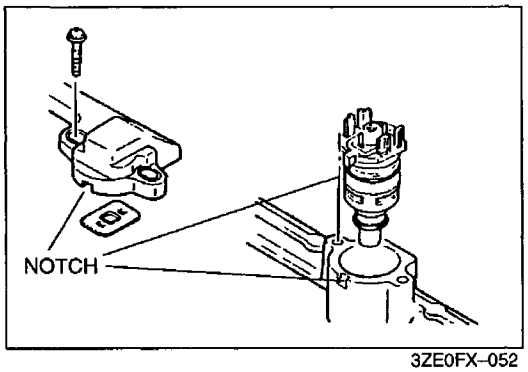
1. Charge air cooler air duct
2. Air cleaner
3. Resonator
4. Charge air cooler (LH)
5. Charge air cooler (RH)
6. Accelerator cable
7. Air intake pipe assembly
8. Vacuum hose assembly
9. Fuel injector connector
10. Fuel hose
11. Fuel distributor assembly
    Installation note ..... page F2–26
12. Insulator
13. Accumulated connector
14. Spacer
15. Fuel injector
    Installation note ..... page F2–26
    Inspection ..... page F2–27
16. Pressure regulator
    System inspection ..... page F2–29



3ZE0FX–051

Installation note
Fuel injector

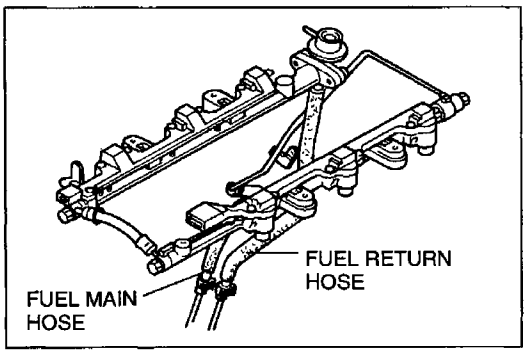
1. Apply a small amount of clean engine oil to the new O-rings, and install them.
2. Verify that the fuel injector holder is clean.
3. Clean the holder with gasoline, if necessary.
4. Install the fuel injector squarely into the distribution pipe while turning it back and forth.



3ZE0FX–052

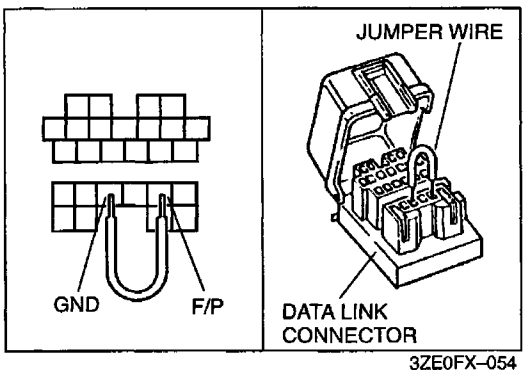
5. Fit the fuel injector tab into the notch in the distribution pipe.
6. When installing accumlated harness, install the fuel injector as shown in the figure.

Tightening torque: 3.4 N·m {35 kgf·cm, 30 in·lbf}



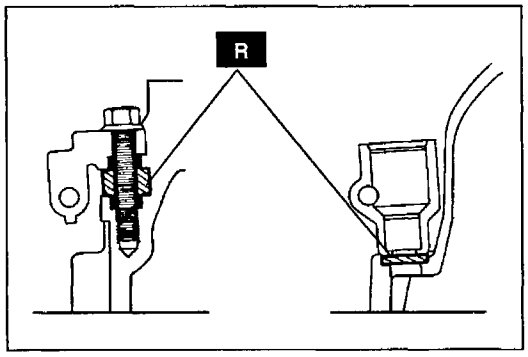
Fuel injector fitting (Fuel leakage test)

1. After installation of the fuel injector, connect fuel hoses as shown in the figure.



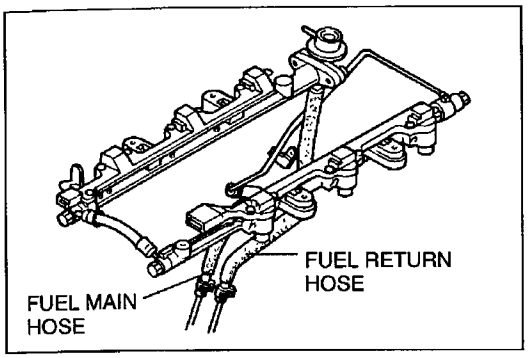
3ZE0FX–054

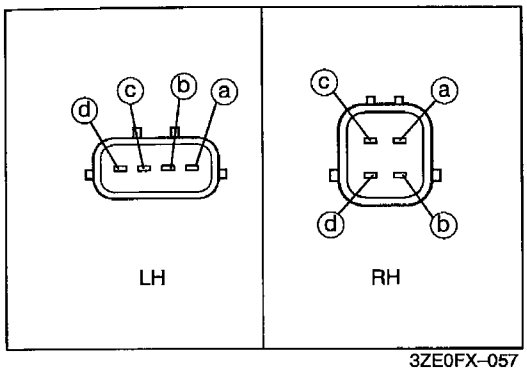
2. Connect the data link connector terminals F/P and GND with a jumper wire.
3. Turn the ignition switch to ON and check for fuel leaks from the fuel distributor assembly.
4. If leaks are found, reinstall the fuel injector.



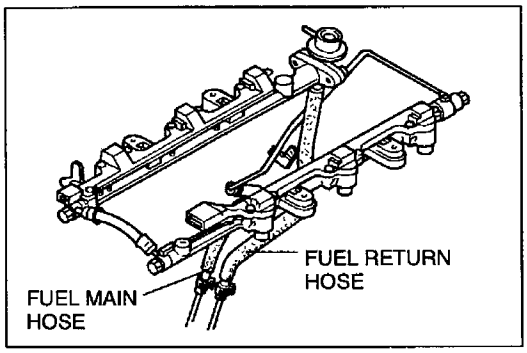
Fuel distributor assembly

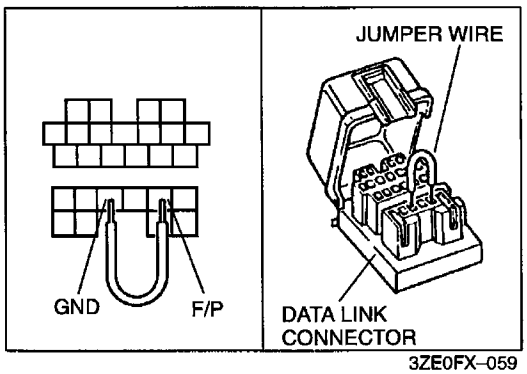
1. Install new fuel injector insulators.
2. Install the insulators, making sure that each insulator is pressed in fully, and that it is not twisted or bent. Incorrectly installed insulators can cause rough idle.



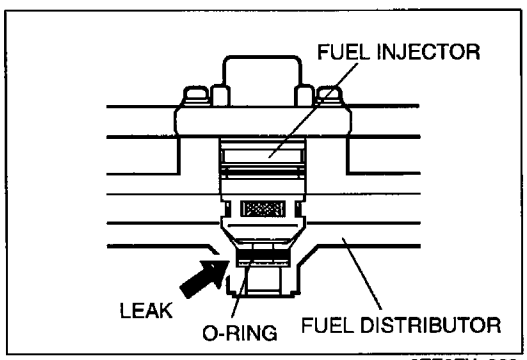


3ZE0FX-057





3ZE0FX-059



3ZE0FX-060

Inspection

Note
- It is not necessary to remove the fuel injectors to perform the following procedures.

Resistance

1. Disconnect the fuel injector connectors.
2. Measure resistance of the fuel injectors by using an ohmmeter.

Harness	Terminal	Fuel injector No.
Right bank	a—b	1
	a—c	5
	a—d	3
Left bank	d—c	2
	d—b	4
	d—a	6

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

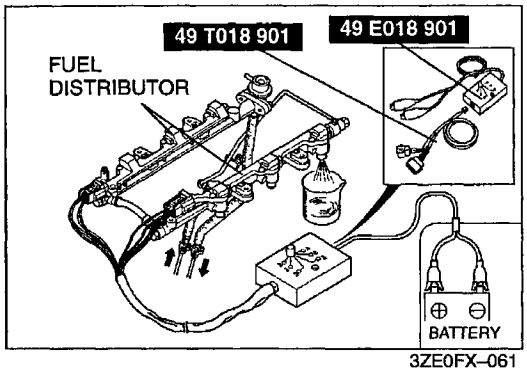
3. If not as specified, check continuity of the harness and check for poor connection. If the harness is OK, replace the fuel injector. (Refer to page F2–25.)

Fuel leakage test

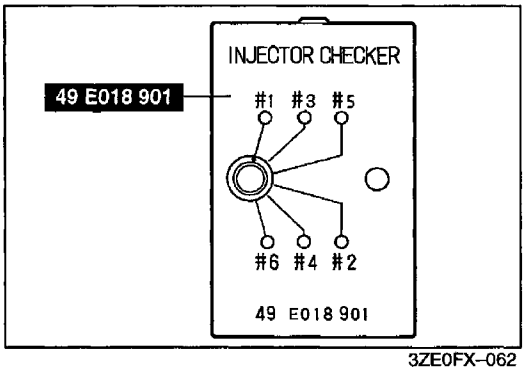
1. Remove the fuel distributor assembly from the intake manifold. (Refer to page F2–25.)
2. Connect the fuel hoses as shown.
3. Connect the data link connector terminals F/P and GND by using a jumper wire.
4. Turn the ignition switch to ON and check for fuel leaks from the fuel injectors.

Fuel leakage: Less than 1 drop/2 minutes

5. Turn off the ignition switch and disconnect the jumper wire.
6. If not as specified, remove the leaking fuel injector and check the fuel injector fitting.
7. Install the fuel injector.
8. Recheck the fuel injector for fuel leakage.
9. If leakage still occures, replace the fuel injector. (Refer to page F2–25.)



3ZE0FX–061



3ZE0FX–062

Volume test

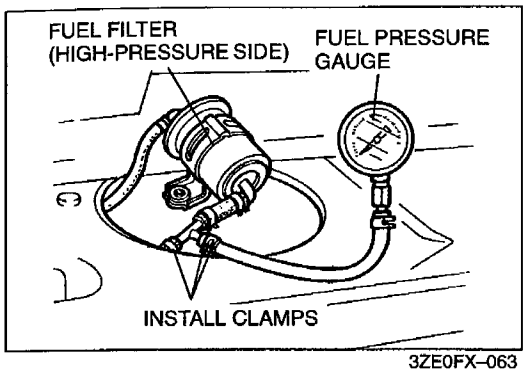
1. Remove the fuel injectors and fuel distributor assembly from the intake manifold.
2. Connect the **SSTs** as shown.

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

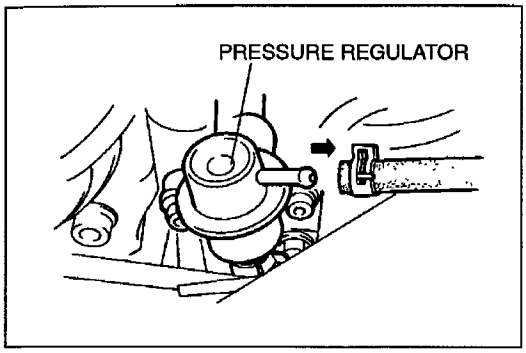
3. Connect data link connector terminals F/P and GND with a jumper wire.
4. Turn the ignition switch to ON.
5. Turn selector switch on the **SST** to select fuel injector number.
6. Press and hold the switch for 15 sec. and measure the injection volume of each fuel injector by using a graduated container.

   Specification:
   61—77 cm^3 {61—77 cc, 2.0—2.6 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 F2–25.)



3ZE0FX-063



PRESSURE REGULATOR
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" on page F2–25.**

1. Disconnect the negative battery cable.
2. Connect a fuel pressure gauge between the fuel filter (high-pressure side) and the main fuel hose. Install clamps as shown in the figure.
3. Connect the negative battery cable.
4. Start the engine and let it idle.
5. Carry out the intake-air system inspection. (Refer to page F2–7.)
6. Measure the fuel line pressure.

   Specification:
   210—330 kPa {2.1—3.4 kgf/cm^2, 30—48 psi}

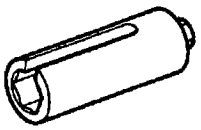
7. If not as specified, carry out the fuel system inspection. (Refer to page F2–16.)
8. Disconnect the vacuum hose from the pressure regulator.
9. Measure the fuel line pressure.

   Specification:
   280—330 kPa {2.8—3.4 kgf/cm^2, 41—48 psi}

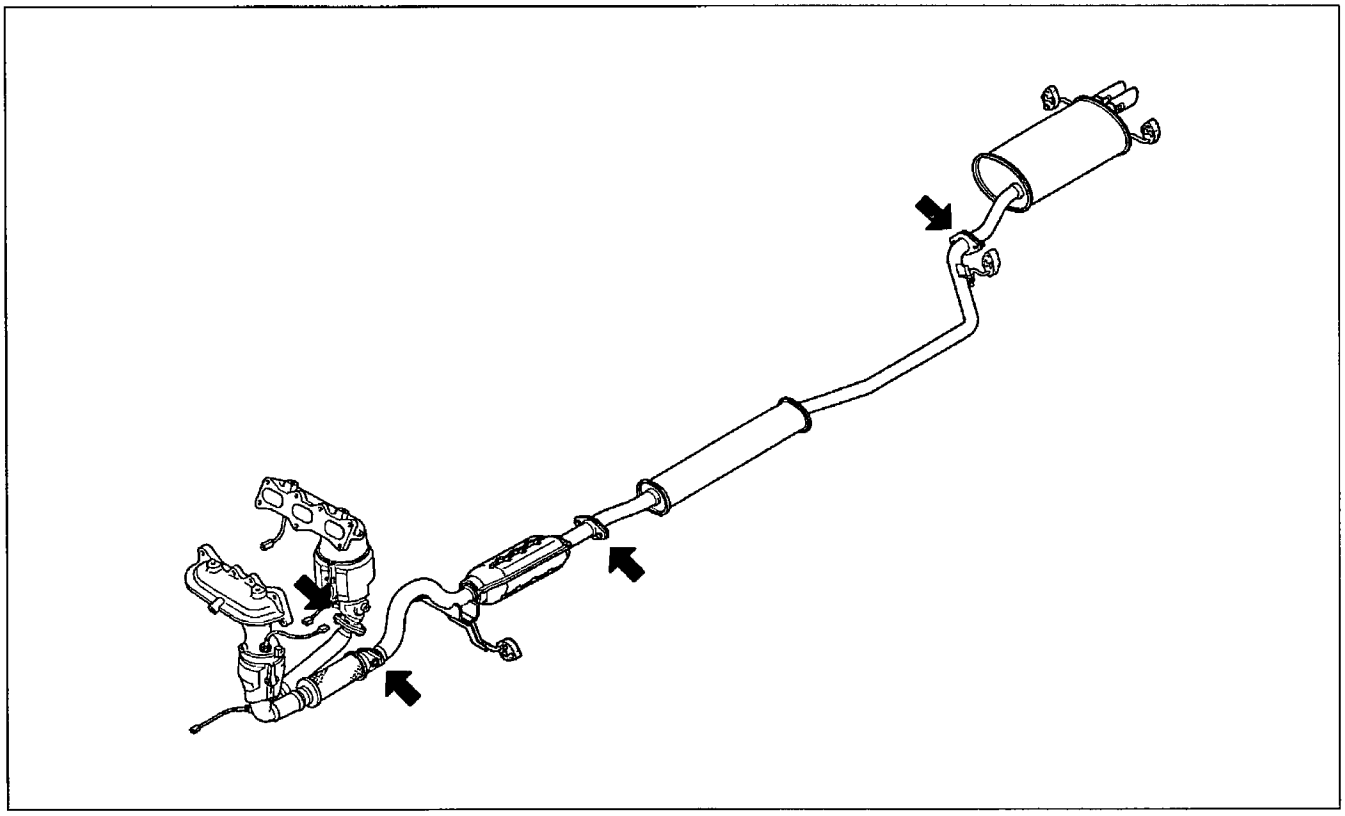
10. If not as specified, replace the pressure regulator. (Refer to page F2–25.)

EXHAUST SYSTEM

PREPARATION
SST

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

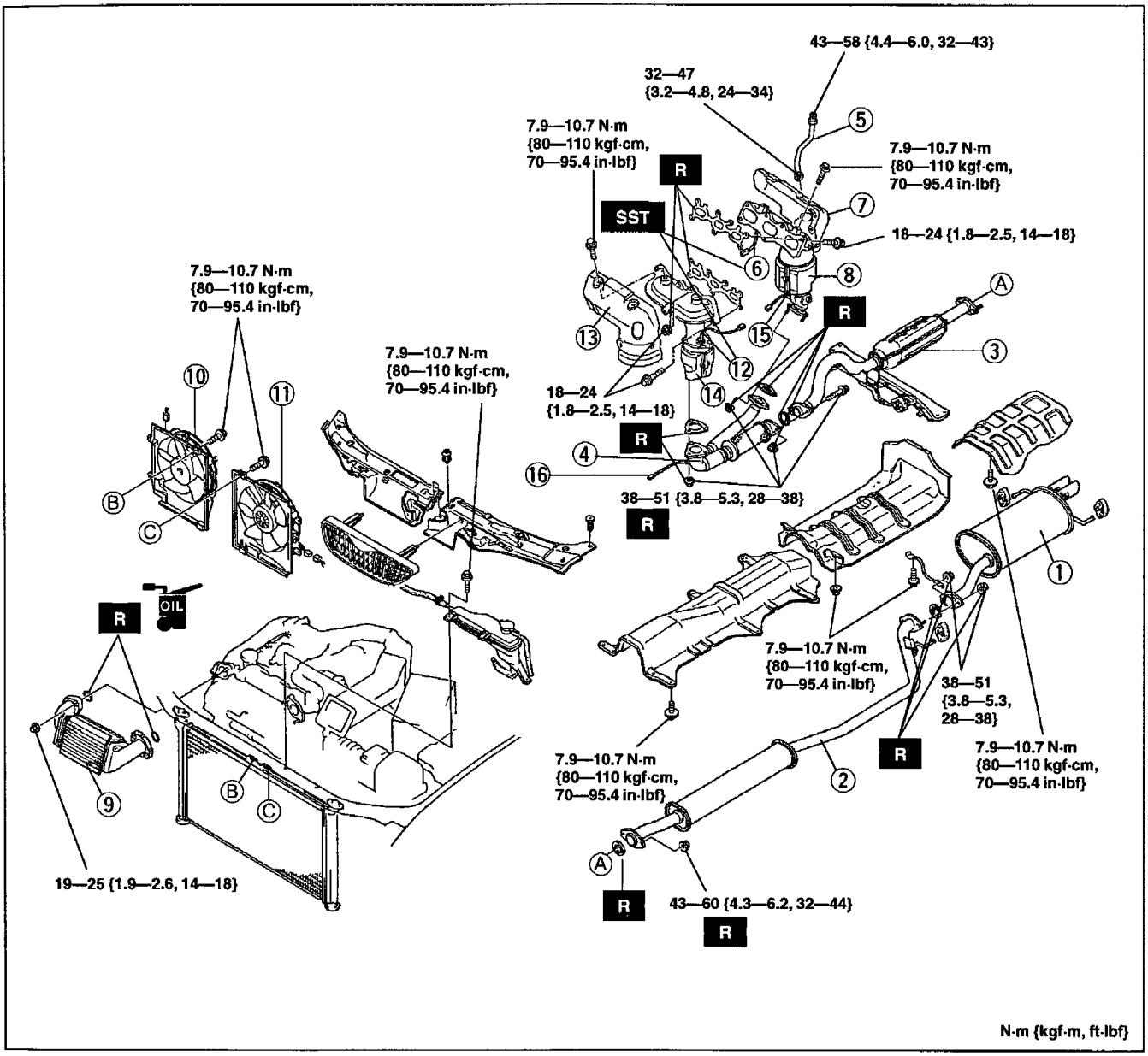
SYSTEM INSPECTION
1. Verify that the exhaust pipes are installed proparly.
2. Visually check the exhaust pipes for corrosion, damage, and cracks.
3. Repair or replace as necessary.
4. Start the engine and let it idle.
5. Visually check the exhaust gas leaks from exhaust pipes.
6. Repair or replace if necessary.



COMPONENT PARTS

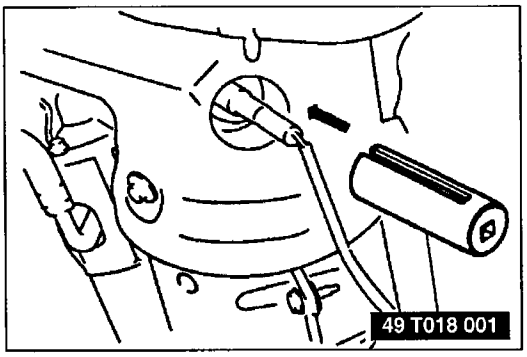
Removal / Inspection / Installation

1. Remove in the order shown in the figure, referring to **Removal / Installation note**.
2. Visually check each part for damage. Replace if necessary.
3. Install in the reverse order of removal, referring to **Removal / Installation note**.



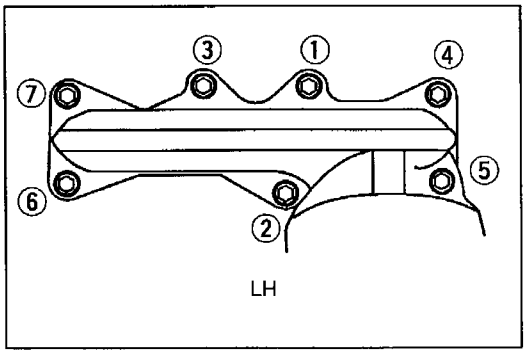
3ZE0FX–069

1. Main silencer
2. Presilencer
3. Three way catalytic converter
4. Front pipe
5. EGR pipe
6. Heated oxygen sensor (front RH)
   Removal / Installation note ... page F2–32
7. Insulator (RH)
8. Warm up three way catalytic converter (RH)
   Installation note ..... page F2–32
9. Charge air cooler (LH)
10. Cooling fan ..... section E
11. Condenser fan
12. Heated oxygen sensor (front LH)
    Removal / Installation note ... page F2–32
13. Insulator (LH)
14. Warm up three way catalytic converter (LH)
    Installation note ..... page F2–32
15. Heated oxygen sensor (rear RH)
16. Heated oxygen sensor (rear LH)



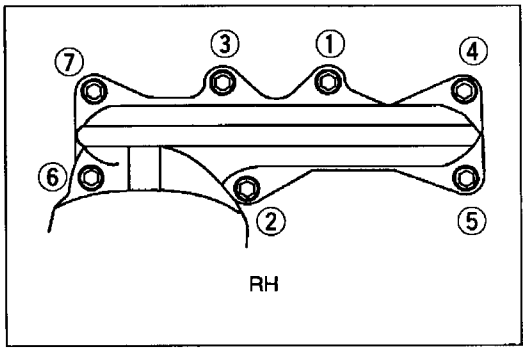
Removal / installation note
Heated oxygen sensor (front)
Use the **SST** to remove / install the heated oxygen sensor.

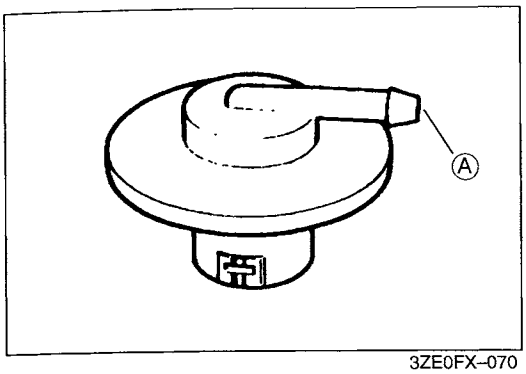
Tightening torque:
30—49 N·m {3.0—5.0 kgf·m, 22—36 ft·lbf}



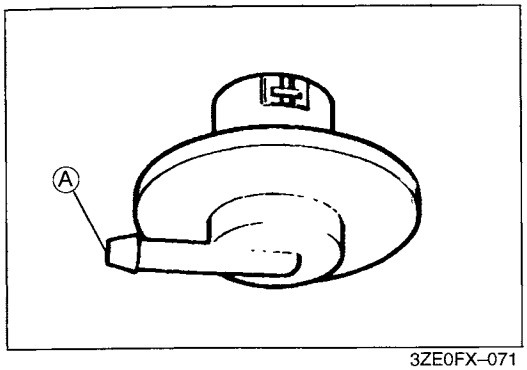
Installation note
Warm up three way catalytic converter
Tighten the bolts and nuts in the order shown.

Tightening torque:
16—22 N·m {1.6—2.3 kgf·m, 12—16 in·lbf}

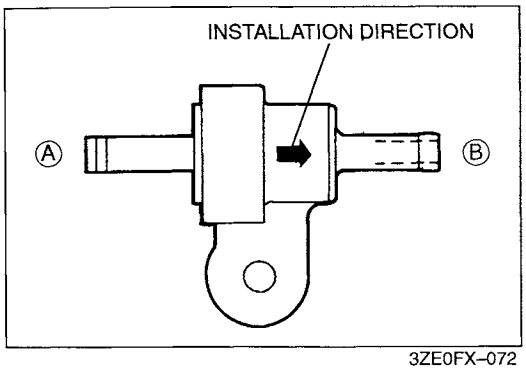




3ZE0FX–070



3ZE0FX–071



3ZE0FX–072

EVAPORATIVE EMISSION SYSTEM

FUEL VAPOR VALVE

Inspection

1. Remove the fuel vapor valve. (Refer to page F2–20.)
2. Verify that air flow through the valve from port A when the valve is held as shown in the figure.
3. Verify that no air flows through the valve from port A when the valve is held as shown.
4. If not as specified, replace the fuel vapor valve.

CHECK VALVE (TWO-WAY)

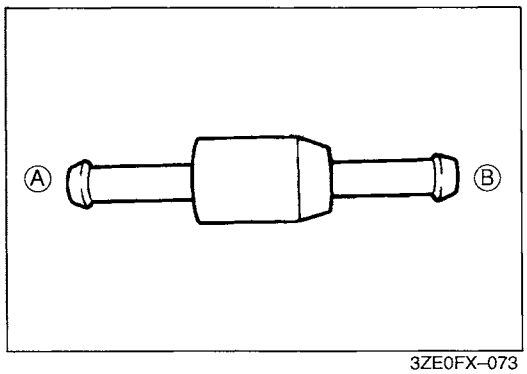
Inspection

1. Remove the check valve (two-way). (Refer to page F2–20.)
2. Apply pressure or vacuum to port A of the valve by using a vacuum pump, and check for the air flow.

Specification

Condition	kPa {mmHg, inHg}	Air flow
Pressure	Below 2.9 {22, 0.90}	No
	Above 5.9 {44, 1.7}	Yes
Vacuum	Above 0.97 {7.3, 0.29}	Yes

3. If not as specified, replace the check valve (two-way).

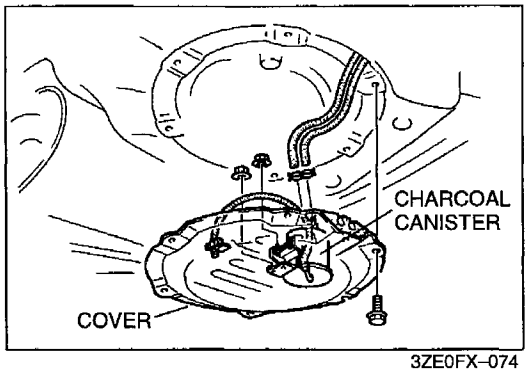


3ZE0FX–073

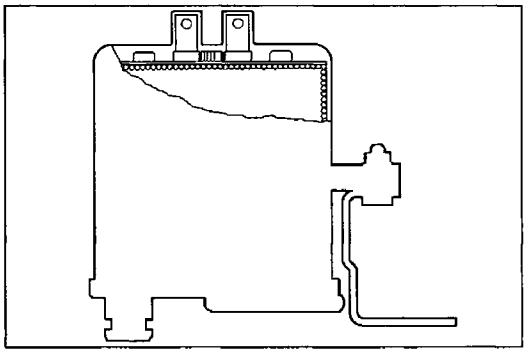
CHECK VALVE (ONE-WAY)

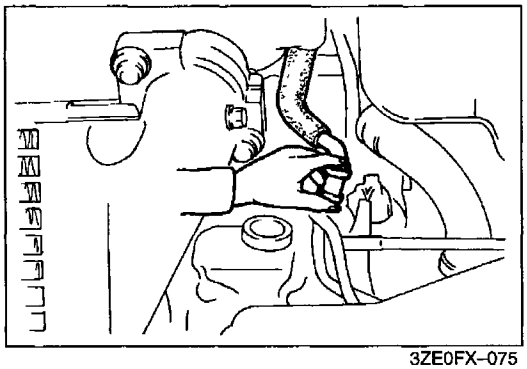
Inspection

1. Remove the check valve (one-way). (Refer to page F2–20.)
2. Blow through the check valve from port A, and verify that the air flow from port B.
3. Blow through the check valve from port B, and verify that there is not air flow.
4. If not as specified, replace the check valve (one-way).



3ZE0FX–074




3ZE0FX–075

CHARCOAL CANISTER

Removal / Installation

1. Remove the cover.
2. Remove the charcoal canister.
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}

Installation note

Cover

Install the cover with F mark facing front of the vehicle.

Inspection

1. Plug the charcoal canister vent side port and purge solenoid valve side port.
2. Blow air into the charcoal canister from the fuel tank side port and verify that no air leaks.
3. If air leaks, replace the charcoal canister.

PCV VALVE

System inspection

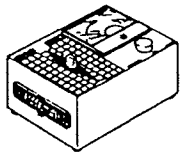
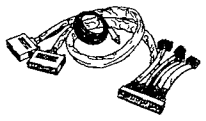
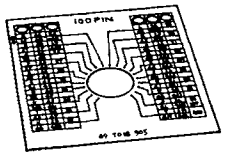
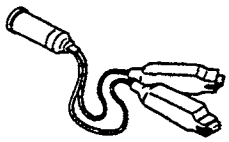
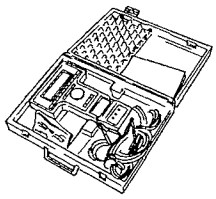
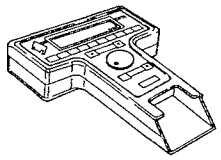
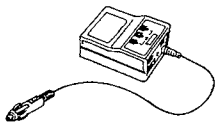
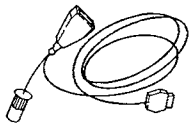
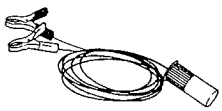
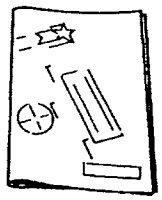
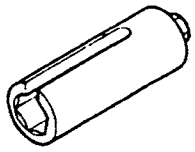
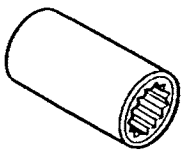
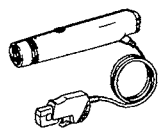
Caution

- **Disconnecting the valve while the engine coolant is warm (over 20° C {68° F}) can let the engine to inhale air through the valve, causes difficult starting.**

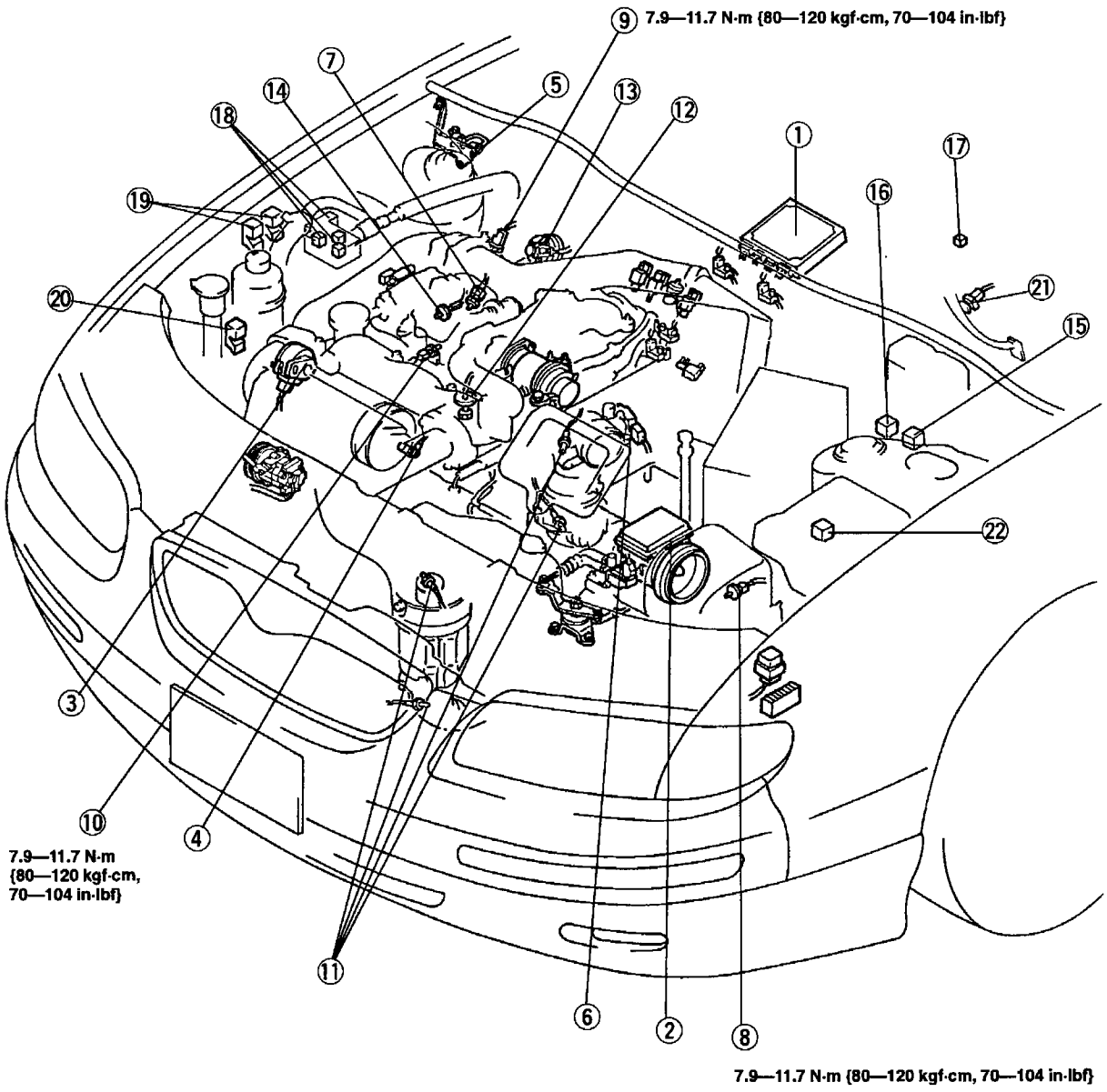
1. Verify that the engine coolant temperature is below 20° C {68° F}.
2. Start the engine and let it idle.
3. Disconnect the PCV valve from the cylinder head cover.
4. Block the valve opening by hand and verify that vacuum is felt.
5. If not, check the PCV valve for clogging and damage. If the hose is OK, replace the PCV valve.

CONTROL SYSTEM

PREPARATION
SST

49 9200 162A Monitor, Engine Signal 	For inspection of ECM terminal voltage	49 T018 906 Adapter harness 	For inspection of ECM terminal voltage
49 T018 905 Sheet 	For inspection of ECM terminal voltage	49 D088 008 Harness adapter, Power 	For inspection of ECM terminal voltage
49 T088 0A0 NGS set 	For inspection of ECM terminal voltage and input/output devices	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of ECM terminal voltage and input/output devices
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of ECM terminal voltage and input/output devices	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of ECM terminal voltage and input/output devices
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of ECM terminal voltage and input/output devices	49 T088 008A Instruction Manual 	For inspection of ECM terminal voltage and input/output devices
49 T088 010B Program Card 	For inspection of ECM terminal voltage and input/output devices	49 H018 001 Knock sensor wrench 	For replacement of knock sensor
49 D015 001 Box wrench 	For replacement of engine coolant temperature sensor	49 T018 002 Timing light 	For inspection of ignition timing

COMPONENT PARTS

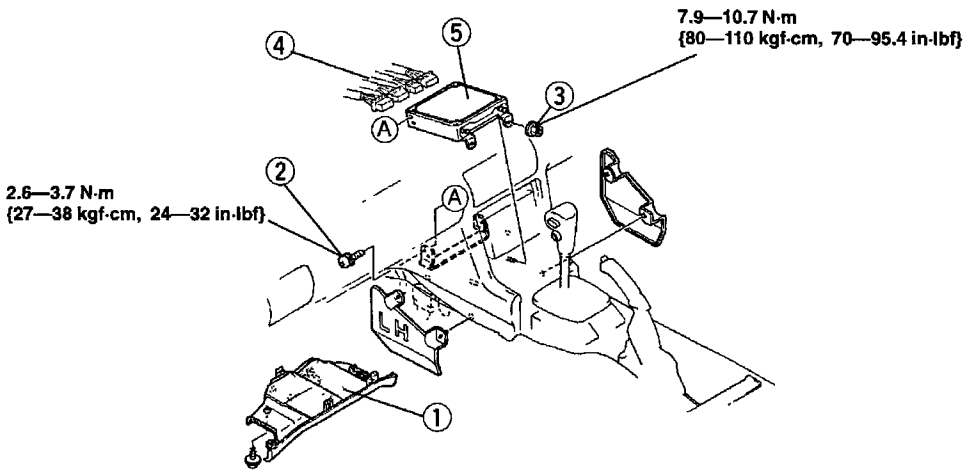


1. Engine control module (ECM)
Removal / Installation ..... page F2–38
Inspection ..... page F2–39
2. Mass air flow sensor
Inspection ..... page F2–48
3. Camshaft position sensor
Inspection ..... page F2–49
Removal / Installation ..... page F2–50
4. Crankshaft position sensor
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Replacement ..... page F2–51
5. Manifold absolute pressure sensor
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6. Throttle position sensor
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7. Engine coolant temperature sensor
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8. Intake air temperature sensor (Air cleaner)
Inspection ..... page F2–56
9. Intake air temperature sensor (Dynamic chamber)
Inspection ..... page F2–57
10. Intake air temperature sensor (L/C)
Inspection ..... page F2–57
11. Heated oxygen sensor (front, rear)
Inspection ..... page F2–58
Inspection ..... page F2–58
12. Knock sensor
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Replacement ..... page F2–59
13. EGR valve position sensor
System inspection ..... page F2–61
Inspection ..... page F2–61
14. Power steering pressure switch
Inspection ..... page F2–62
15. Main relay
System inspection ..... page F2–62
Inspection ..... page F2–62
16. Fuel pump relay
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17. Vehicle speed sensor
Inspection ..... section T
18. Cooling fan relay
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19. Condenser fan relay
Inspection ..... page F2–90
20. A/C relay
Inspection ..... page F2–92
21. Brake switch
Inspection ..... section T
22. Heated oxygen sensor heater relay
Inspection ..... page F2–95

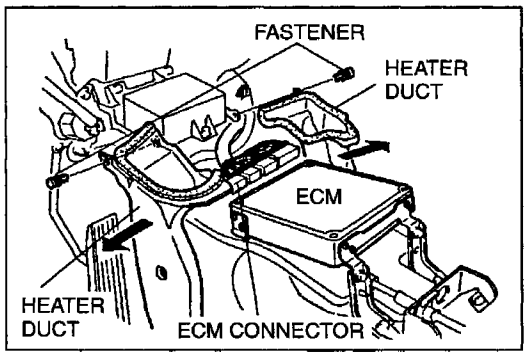
ENGINE CONTROL MODULE (ECM)

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the rear console box, center panel and undercover. (Refer to section S.)
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. Cover
2. ECM bracket screw
3. ECM bracket nut
4. Connector
   - Removal note ..... below
   - Installation note ..... below
5. ECM
   - Inspection ..... page F2–39



Removal note

Connector

1. Remove the rear heater duct fasteners.
2. Separate the rear heater duct to both sides.

Note

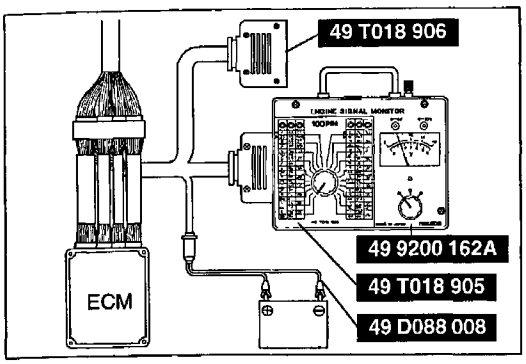
- Separating the duct may cause deformation to it. However, this will not affect the performance of the duct.

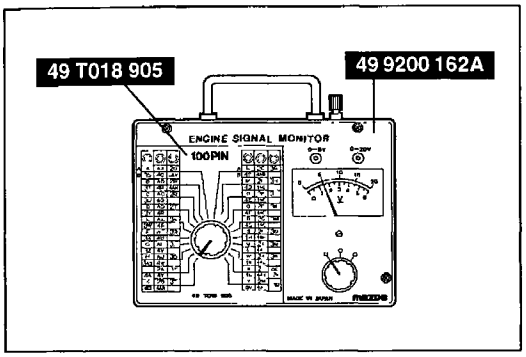
3. Disconnect the ECM connector.

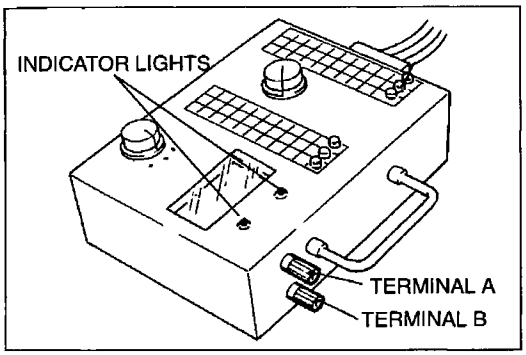
Installation note

Connector

1. Connect the ECM connector.
2. Assemble the rear heater duct.
3. Verify that the rear heater duct is correctly joined, and install the rear heater duct fasteners.







Inspection

Caution

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

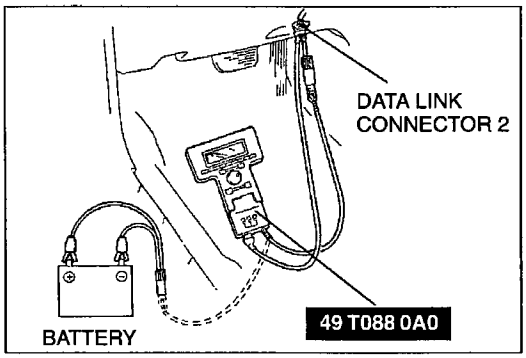
1. Disconnect the negative battery cable.
2. Disconnect the ECM connector. (Refer to page F2–38.)
3. Connect the **SST** (Adapter harness) to the ECM connector.
4. Connect the **SSTs** (Monitor, Engine Signal and Harness adapter, power) to the **SST** (Adapter harness). Use connector A of the adapter harness for ECM terminals 1A through 1AJ, 2A through 2T, and 3A through 3R. Use connector B for ECM terminals 3S through 3AB and 4A through 4AN.
5. Place the **SST** (Sheet) on the **SST** (Monitor, Engine Signal).
6. Measure the voltage at each ECM terminal by switching the selector switch and the monitor switch.
7. If any incorrect voltage is detected, check related systems, wiring harnesses and connectors referring to the possible malfunction in the terminal voltage list.

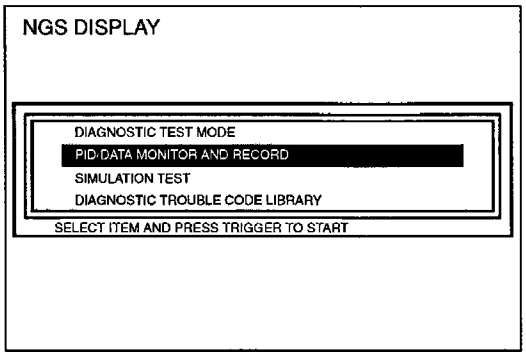
Caution

- **Disconnecting the connectors of the ECM and the SST (Adapter harness) while the battery is connected can damage the ECM and the SST (Monitor, Engine Signal). 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 (Monitor, Engine Signal) can damage the SST (Monitor, Engine Signal).**

Note

- The indicator lights of the **SST** (Monitor, Engine Signal), 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** (Monitor, Engine Signal) 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 ECM terminal voltages are made possible.





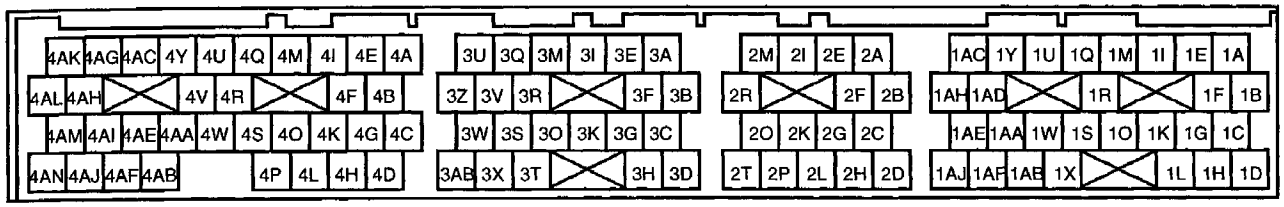
Using SST (NGS)

1. Connect the **SSTs** 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 ECM input/output signal.

Note

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

B+ : Battery positive voltage
– : Empty terminal
* : Dummy terminal



Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
1A	Cooling fan control, condenser fan control (high, middle speed)	Cooling fan relay No.1 Condenser fan relay No.2	Idle	Cooling fan operating (High or middle speed) and condenser fan operating (High speed) (more than 108°C { 227°F })	Below 1.0	• Cooling fan relay No.1 (Refer to page F2–90) • Condenser fan relay No.2 (Refer to page F2–90)
				Cooling fan operating (Low speed), or stopped	B+	
1B	ECM/TCM communication	TCM	Carry out inspection according to diagnostic trouble code. ECM/TCM communication is a part of serial communication. Judgement by terminal voltage is not possible (Refer to page F2–110)		—	• TCM (Refer to section K2)
1C	Vehicle speed	Vehicle speed sensor	Ignition switch ON		0 or Approx. 5.0	• Vehicle speed sensor (Refer to section T)
			Driving		Approx. 2.5	
1D	A/C	A/C amplifier	Idle	A/C switch ON and fan switch ON	Approx. 4.2	• A/C amplifier (Refer to section T)
				A/C switch OFF	Approx. 5.0	
1E	Condenser fan control (low speed)	Condenser fan relay No.1	Idle	Condenser fan operating (Low speed and higher)	Below 1.0	• Condenser fan relay No.1 (Refer to page F2–90)
				Condenser fan stopped	B+	
1F	ECM/TCM communication	TCM	Carry out inspection according to diagnostic trouble code. ECM/TCM communication is a part of serial communication. Judgement by terminal voltage is not possible (Refer to page F2–110)		—	• TCM (Refer to section K2)
1G	Front fog light	Front fog light switch	Headlight switch ON	Front fog light switch ON	Approx. 11.0	• Front fog light switch
				Front fog light switch OFF	Below 1.0	
	DRL (CANADA)	DRL control module	DRL ON		Approx. 11.0	• DRL control module
			DRL OFF		Below 1.0	
1H	Start	Ignition switch (Start)	While cranking		Approx. 10.0	• ECM terminal 1H — Ignition switch harness
			Ignition switch ON		0	
1I	Cooling fan control (high, low speed)	Cooling fan relay No.2, No.3	Idle	Cooling fan operating (Low or high speed)	Below 1.0	• Cooling fan relay No.2, No.3 (Refer to page F2–90)
				Cooling fan operating (Middle speed), or stopped	B+	
1J	*	*	*	*	*	*

B+ : Battery positive voltage
– : Empty terminal
* : Dummy terminal

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
1K	Blower	A/C amplifier	Ignition switch ON	Fan switch OFF, or ON at 1st or 2nd	B+	• A/C amplifier (Refer to section U)
				Fan switch ON at 3rd or 4th	Below 1.0	
1L	Headlight	Headlight switch	Headlight switch OFF		Below 1.0	• Headlight relay (Refer to section T)
			Headlight switch ON		B+	
1M	A/C control	A/C relay	Ignition switch ON		B+	• A/C relay (Refer to page F2–92)
			Idle	A/C operating	Below 1.0	
				A/C stopped	B+	
1N	*	*	*		*	*
1O	Brake	Brake switch	Brake pedal released		Below 1.0	• Brake switch (Refer to section T)
			Brake pedal depressed		B+	
1P	*	*	*		*	*
1Q	Torque reduction request	ABS/TCS control unit	Torque reduction request signal input		1.0—5.0	• ABS/TCS control unit (Refer to section P)
			Others		Approx. 5.0	
1R	Ground for ECM/TCM communication	Ground	Constant		Below 1.0	• Terminal 1R related harness (Open)
1S	—	—	—		—	—
1T	*	*	*		*	*
1U	Torque reduction inhibit	ABS/TCS control unit	Torque reduction inhibited		Approx. 5.0	• ABS/TCS control unit (Refer to section P)
			Others		Approx. 2.5	
1V	*	*	*		*	*
1W	—	—	—		—	—
1X	Rear window defroster	Rear window defroster relay	Ignition switch ON	Rear window defroster switch OFF	B+	• Rear window defroster relay (Refer to section T)
				Rear window defroster switch ON	Below 1.0	
1Y	Diagnostic trouble code output	Data link connector 2 (Terminal KLN)	Carry out inspection according to diagnostic trouble codes Diagnostic trouble code output is a part of serial communication Judgement by terminal voltage is not possible (Refer to page F2–110)		—	• On-board diagnostic system (Refer to page F2–99)
1Z	*	*	*		*	*
1AA	Bypass air control	Bypass air solenoid valve No.1	Idle	Engine coolant temperature below –5°C {23°F}	Below 1.0	• Bypass air solenoid valve No.1 (Refer to page F2–66)
				Engine coolant temperature above –5°C {23°F}	B+	
1AB	—	—	—		—	—
1AC	—	—	—		—	—
1AD	—	—	—		—	—

B+ : Battery positive voltage
– : Empty terminal
* : Dummy terminal

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
1AE	Bypass air control	Bypass air solenoid valve No.2	Idle	Engine coolant temperature below 10°C {50°F}	Below 1.0	• Bypass air solenoid vale No.2 (Refer to page F2–66)
				Engine coolant temperature below 10°C {50°F}	B+	
1AF	Fuel pump control	Fuel pump relay	Ignition switch ON		B+	• Fuel pump relay
			Cranking		Below 1.0	
			Idle			
1AG	*	*	*		*	*
1AH	MIL	Malfunction indicator lamp	Malfunction indicator lamp OFF		B+	• ECM terminal 1AH — MIL harness
			Malfunction indicator lamp ON		Below 1.0—B+	
1AI	*	*	*		*	*
1AJ	Fuel pump control No.2	Fuel pump resistor and relay	Ignition switch ON		B+	• Fuel pump resistor and relay (Refer to page F2–69)
			Cranking			
			Idle		Below 1.0	
2A	ABV control (Vent)	ABV solenoid valve (Vent)	Ignition switch ON		B+	• ABV solenoid valve (Vent) (Refer to page F2–79)
			Idle		Below 1.0	
2B	—	—	—		—	—
2C	Intake air temperature (dynamic chamber)	Intake air temperature sensor (dynamic chamber)	Ignition switch ON	Intake air temperature 20°C {68°F}	Approx. 3	• Intake air temperature sensor (dynamic chamber) (Refer to page F2–57)
2D	—	—	—		—	—
2E	Charge air cooler bypass control	Charge air cooler bypass solenoid valve	Ignition switch ON		Below 1.0	• Charge air cooler bypass solenoid valve (Refer to page F2–75)
			Engine running	Engine speed above 4,000 rpm	B+	
				Others	Below 1.0	
2F	—	—	—		—	—
2G	—	—	—		—	—
2H	—	—	—		—	—
2I	—	—	—		—	—
2J	*	*	*		*	*
2K	Intake air temperature (L/C)	Intake air temperature sensor (L/C)	Ignition switch ON	Intake air temperature 20°C {68°F}	Approx. 3	• Intake air temperature sensor (L/C) (Refer to page F2–57)
2L	High air charging pressure zone	ABS/TCS control unit	Ignition switch ON		B+	• ABS/TCS control unit (Refer to section P)
			Manifold absolute pressure above 900 mmHg		Below 1.0	
2M	ABV control (Vacuum)	ABV solenoid valve (Vacuum)	Ignition switch ON		B+	• ABV solenoid valve (Vacuum) (Refer to page F2–79)
			Idle		Below 1.0	
2N	*	*	*		*	*

B+ : Battery positive voltage
– : Empty terminal
* : Dummy terminal

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
2O	Engine speed	Data link connector (terminal IG–) Tachometer, TCM and ABS/TCS control unit	Ignition switch ON		Approx. 11.0	• ECM terminal 4AH voltage
			Idle		Approx. 5.5	
2P	—	—	—		—	—
2Q	*	*	*		*	*
2R	Pressure regulator control	PRC solenoid valve	Idle (Hot start)		Below 1.0	• PRC solenoid valve (Refer to page F2–72)
			Other		B+	
2S	*	*	*		*	*
2T	—	—	—		—	—
3A	Constant voltage power	Throttle position sensor, Manifold absolute pressure sensor, EGR valve position sensor, TCM and ABS/TCS control unit	Ignition switch ON		Approx. 5.0	• ECM terminal 4A voltage
3B	Throttle position sensor	Throttle position sensor	Ignition switch ON	Throttle valve closed throttle position	0.1—1.1	• Throttle position sensor (Refer to page F2–52) • ECM terminal 3A voltage
				Throttle valve wide open throttle	2.8—4.5	
3C	Heated oxygen sensor (rear) heater control	Heated oxygen sensor heater relay	Idle		Below 1.0	• Heated oxygen sensor heater relay
3D	Heated oxygen sensor (rear RH)	Heated oxygen sensor (rear RH)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (rear RH) (Refer to page F2–58)
			Idle	Engine cold	Approx. 0	
				After warm up	0.1—0.9	
3E	Mass air flow sensor	Mass air flow sensor	Idle		1.5—2.5	• Mass air flow sensor (Refer to page F2–48)
3F	—	—	—		—	—
3G	—	—	—		—	—
3H	Heated oxygen sensor (rear LH)	Heated oxygen sensor (rear LH)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (rear RH) (Refer to page F2–58)
			Idle	Engine cold	Approx. 0	
				After warm up	0.1—0.9	
3I	Heated oxygen sensor (front RH)	Heated oxygen sensor (front RH)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (front RH) (Refer to page F2–58)
			Idle	Engine cold	Approx. 0	
				After warm up	0.1—0.9	
			Acceleration (After warm up)		0.5—1.0	
			Deceleration (After warm up)		0—0.5	
3J	*	*	*		*	*
3K	—	—	—		—	—
3L	*	*	*		*	*

B+ : Battery positive voltage
– : Empty terminal
* : Dummy terminal

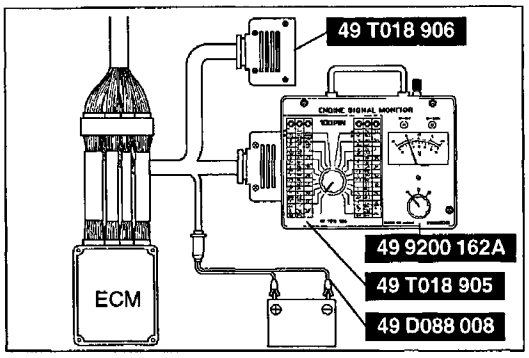
Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
3M	Heated oxygen sensor (front LH)	Heated oxygen sensor (front LH)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (front LH) (Refer to page F2–58)
			Idle	Engine cold	Approx. 0	
				After warm up	0.1—0.9	
			Acceleration (After warm up)		0.5—1.0	
			Deceleration (After warm up)		0—0.5	
3N	*	*	*		*	*
3O	—	—	—		—	—
3P	*	*	*		*	*
3Q	Engine coolant temperature	Engine coolant temperature sensor	Ignition switch ON	Engine coolant temperature 20 °C { 68 °F }	Approx. 3	• Engine coolant temperature sensor (Refer to page F2–56)
				After warm up	Approx. 0.8	
3R	EGR valve position	EGR valve position sensor	Ignition switch ON		Approx. 0.8	• EGR valve position sensor (Refer to page F2–61)
			Idle			
3S	Knock	Knock sensor	Ignition switch ON (Use digital voltmeter)		Approx. 2.4	• Knock sensor (Refer to page F2–59)
3T	Power steering pressure	Power steering pressure switch	Ignition switch ON		B+	• Power steering pressure switch (Refer to page F2–62)
			Idle	P/S not operation		
				P/S operation	Below 1.0	
3U	Manifold absolute pressure	Manifold absolute pressure sensor	Ignition switch ON		2.5—2.8	• Manifold absolute pressure sensor (Refer to page F2–52)
			Idle			
			Engine speed 2,000 rpm and no load		1.5—1.8	
3V	Intake air temperature	Intake air temperature sensor (Air cleaner)	Ignition switch ON	Intake air temperature 20 °C { 68 °F }	Approx. 3	• Intake air temperature sensor (air cleaner) (Refer to page F2–56)
3W	Manifold absolute pressure control	ABS/TCS control unit	Ignition switch ON		3.0—5.0	• ABS/TCS control unit (Refer to section P)
3X	Closed throttle position	Closed throttle position switch	Ignition switch ON	Accelerator pedal released	Below 1.0	• Throttle position sensor (Refer to page F2–52)
				Accelerator pedal depressed	B+	
3Y	*	*	*		*	*
3Z	—	—	—		—	—
3AA	*	*	*		*	*
3AB	Input device ground	Ground	Constant		Below 1.0	• ECM terminal 3AB harness
4A	Power supply	Main relay	Ignition switch OFF		Below 1.0	• Main relay (Refer to page F2–62)
			Ignition switch ON		B+	
4B	Back-up power supply	Battery	Constant		B+	• ECM terminal 4B — Baterry harness
4C	—	—	—		—	—
4D	CPU ground	Ground	Constant		Below 1.0	• ECM terminal 3AB harness
4E	Heated oxygen sensor (front RH) heater control	Heated oxygen sensor (front RH)	Idle		Below 1.0	• Heated oxygen sensor (front RH) (Refer to page F2–58)
			Engine speed above 2,200 rpm		B+	

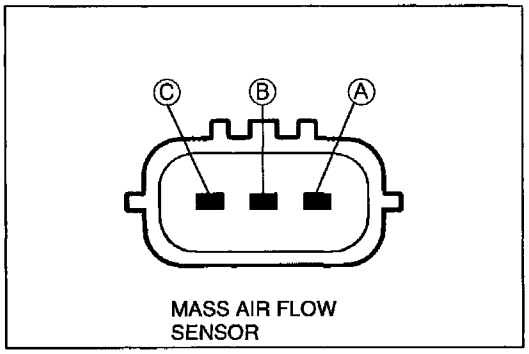
B+ : Battery positive voltage
– : Empty terminal
* : Dummy terminal

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
4F	SGC	Camshaft position sensor	Ignition switch ON		0 or Approx. 5.0	• Camshaft position sensor (Refer to page F2–49)
			Idle		Approx. 2.5	
4G	EGR control (Vent)	EGR solenoid valve (Vent)	Ignition switch ON		B+	• EGR solenoid valve (vent) (Refer to page F2–86)
			Idle			
4H	—	—	—		—	—
4I	Heated oxygen sensor (front LH) heater control	Heated oxygen sensor (front LH)	Idle		Below 1.0	• Heated oxygen sensor (front LH) (Refer to page F2–58)
			Engine speed above 2,200 rpm		B+	
4J	*	*	*		*	*
4K	EGR control (Vacuum)	EGR solenoid valve (Vacuum)	Ignition switch ON		B+	• EGR solenoid vale (Vacuum) (Refer to page F2–86)
			Idle			
4L	—	—	—		—	—
4M	Idle air control	Idle air control valve	Ignition switch ON		Approx. 1.0	• Idle air control valve (Refer to page F2–65)
			Idle (After warm up with no electrical load)		Approx. 11.0	
4N	*	*	*		*	*
4O	Purge control	Purge solenoid valve	Ignition switch ON		B+	• Purge solenoid valve (Refer to page F2–88)
			Idle			
4P	MAP sensor switching control	MAP sensor solenoid valve	Ignition switch ON		Below 1.0	• MAP sensor solenoid valve (Refer to page F2–82)
			Idle		B+	
4Q	Fuel injector control 1	Fuel injector (No.1 cylinder)	Ignition switch ON		B+	• Fuel injector (Refer to page F2–25)
			Idle			
4R	—	—	—		—	—
4S	IGT 1	Ignition control module (In ignition coil No.1)	Ignition switch ON		0	• Ignition control module (In ignition coil) (Refer to section G)
			Idle		Approx. 0.05	
4T	*	*	*		*	*
4U	Fuel injector control 2	Fuel injector (No.2 cylinder)	Ignition switch ON		B+	• Fuel injector (Refer to page F2–25)
			Idle			
4V	Diagnostic test mode	Data link connector (terminal TEN)	Ignition switch ON	Open terminal TEN (Data link connector)	B+	• ECM terminal 4V — Terminal TEN (Data link connector) harness
				Short terminal TEN (Data link connector)	Below 1.0	
4W	IGT 2	Ignition control module (In ignition coil No.2)	Ignition switch ON		0	• Ignition control module (In ignition coil) (Refer to section G)
			Idle		Approx. 0.05	
4X	*	*	*		*	*
4Y	Fuel injector control 3	Fuel injector (No.3 cylinder)	Ignition switch ON		B+	• Fuel injector (Refer to page F2–25)
			Idle			
4Z	*	*	*		*	*
4AA	IGT 3	Ignition control module (In ignition coil No.3)	Ignition switch ON		0	• Ignition control module (In ignition coil) (Refer to section G)
			Idle		Approx. 0.05	

B+ : Battery positive voltage
– : Empty terminal
* : Dummy terminal

Terminal	Signal	Connected to	Test condition	Voltage (V)	Possible malfunction
4AB	Fuel injector ground	Ground	Constant	Below 1.0	• ECM 4AB terminal harness (Open)
4AC	Fuel injector control 4	Fuel injector (No.4 cylinder)	Ignition switch ON	B+	• Fuel injecter (Refer to page F2–25)
			Idle		
4AD	*	*	*	*	*
4AE	IGT 4	Ignition control module (In ignition coil No.4)	Ignition switch ON	0	• Ignition control module (In ignition coil) (Refer to section G)
			Idle	Approx. 0.05	
4AF	Output device ground	Ground	Constant	Below 1.0	• ECM 4AF terminal harness (Open)
4AG	Fuel injector control 5	Fuel injector (No.5 cylinder)	Ignition switch ON	B+	• Fuel injecter (Refer to page F2–25)
			Idle		
4AH	NE +	Crankshaft position sensor	Ignition switch ON	0	• Crankshaft position sensor (Refer to page F2–51)
			Idle	Below 1.0	
4AI	IGT 5	Ignition control module (In ignition coil No.5)	Ignition switch ON	0	• Ignition control module (In ignition coil) (Refer to section G)
			Idle	Approx. 0.05	
4AJ	Ground	Ground	Constant	Below 1.0	• ECM terminal 4AJ harness (Open)
4AK	Fuel injector control 6	Fuel injector (No.6 cylinder)	Ignition switch ON	B+	• Fuel injector (Refer to page F2–25)
			Idle		
4AL	NE –	Crankshaft position sensor	Ignition switch ON	0	• Crankshaft position sensor (Refer to page F2–51)
			Idle	Below 1.0	
4AM	IGT 6	Ignition control module (In ignition coil No.6)	Ignition switch ON	0	• Ignition control module (In ignition coil) (Refer to section G)
			Idle	Approx. 0.05	
4AN	Ground	Ground	Constant	Below 1.0	• ECM terminal 4AN harness (Open)





MASS AIR FLOW SENSOR

Inspection

Using SSTs (Monitor, engine signal)

1. Check the mass air flow sensor for damage and cracks.
2. Remove the ECM. (Refer to page F2–38.)
3. Connect the **SSTs** to the ECM.
4. Measure the voltage at the ECM terminals 3E. (Refer to page F2–39.)

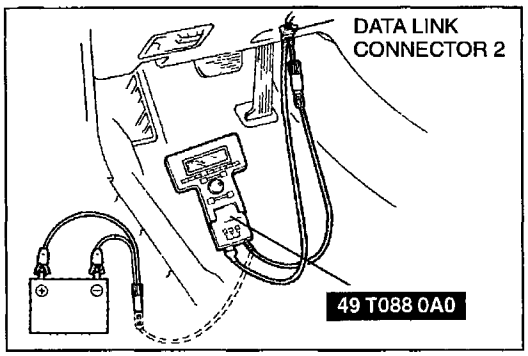
Specification

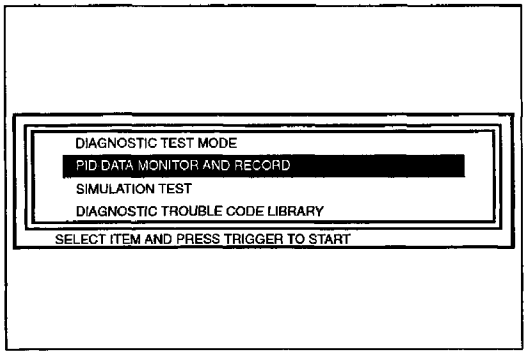
Terminal	Ignition switch ON (V)	Idle (V)
3E	1.0—1.5	1.5—2.5

5. If not as specified, inspect following.
   Harness continuity
   - Between ECM terminal 3E and mass air flow sensor terminal B
   - Between ECM terminal 4D and mass air flow sensor terminal A
   - Between ECM terminal 4A and mass air flow sensor terminal C
6. If there is incorrect terminal voltage or harness continuity, replace the mass air flow sensor. (Refer to page F2–8.)

Using SSTs (NGS)

1. Check the mass air flow sensor for damage and cracks.
2. Warm up the engine to normal operating temperature.
3. Shift the selector lever to P.
4. Turn off all electric loads.
   - Headlight
   - Blower motor
   - Rear window defroster
   - Power steering
5. Wait until the cooling fan stops.
6. Connect the **SSTs** (NGS) to the data link connector 2.
7. Select the PID/DATA MONITOR AND RECORD function of the NGS.
8. Select "MAF V" on the NGS display. NGS measures and shows the voltage.





Specification

	Ignition switch ON	Idle
Voltage (V)	1.0—1.5	1.5—2.5

9. If not as specified, perform following inspection.
   Harness continuity.
   - Between ECM terminal 3E and mass air flow sensor terminal B
   - Between ECM terminal 4D and mass air flow sensor terminal A
   - Between ECM terminal 4A and mass air flow sensor terminal C

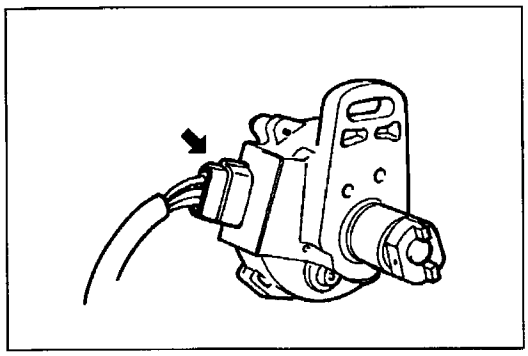
10. If there is incorrect terminal voltage or harness continuity, replace the mass air flow sensor.
(Refer to page F2–8.)

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

Specification

Engine speed (rpm)	Intake mass air flow (g/s)	Load (%)
600—700 (Idle)	2.3—3.2	17.0—21.0
Approx. 2500*	10.4—11.4	18.8—20.0

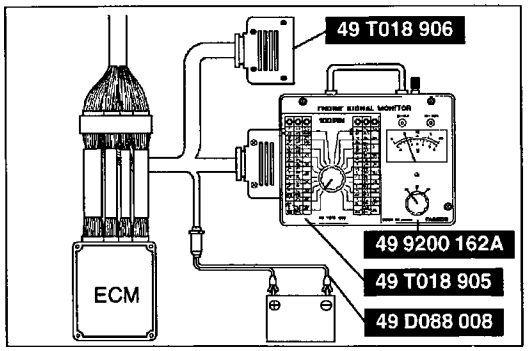
* No load, in neutral or park



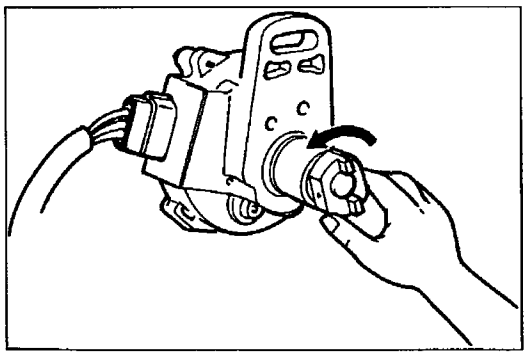
CAMSHAFT POSITION SENSOR

Inspection

1. Remove the camshaft position sensor.
(Refer to page page F2–50.)
2. Disconnect the camshaft position sensor connector.



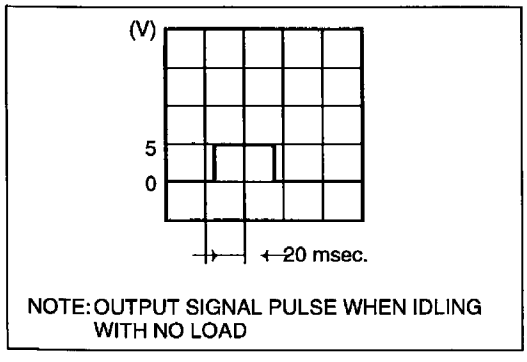
3. Remove the ECM. (Refer to page F2–38.)
4. Connect the **SSTs** to the ECM.



5. Turn the ignition switch to ON.
6. Measure the ECM terminal 4F voltage by using a voltmeter.
7. Rotate the camshaft position sensor shaft by hand and check the output signal.

Specification

Signal	Terminal	Voltage
SGC	4F	Approx. 5 V (1 pulse/rev)

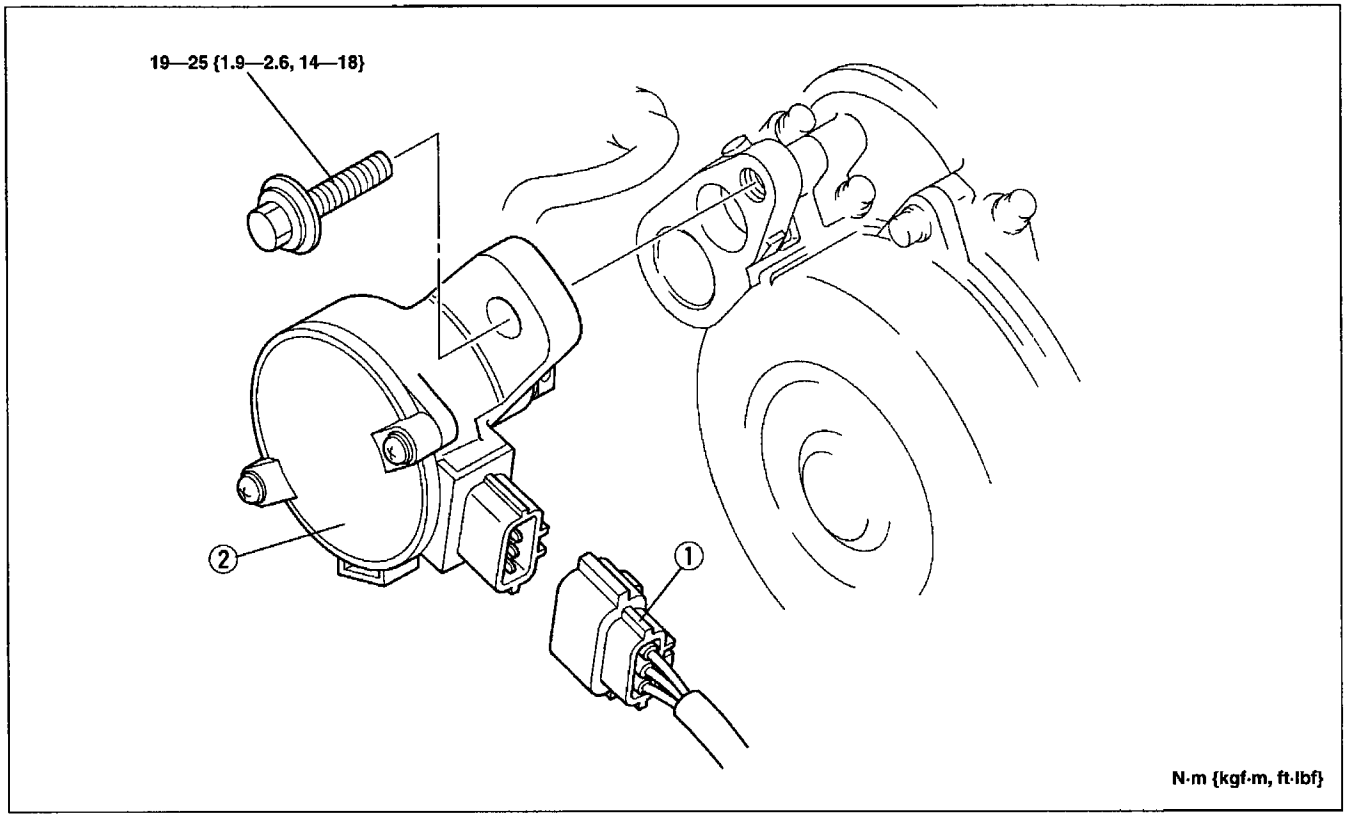


NOTE: OUTPUT SIGNAL PULSE WHEN IDLING WITH NO LOAD

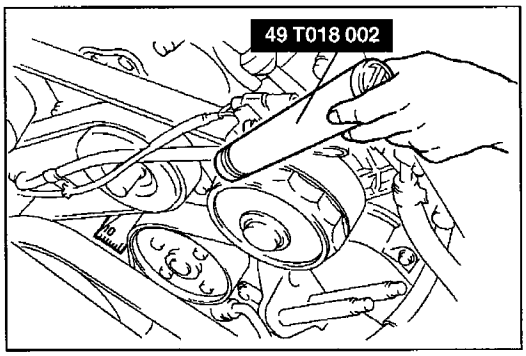
8. If not as specified, inspect harness and connector between camshaft position sensor and ECM terminal.
9. If harness and connector are OK, replace the camshaft position sensor.

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**.

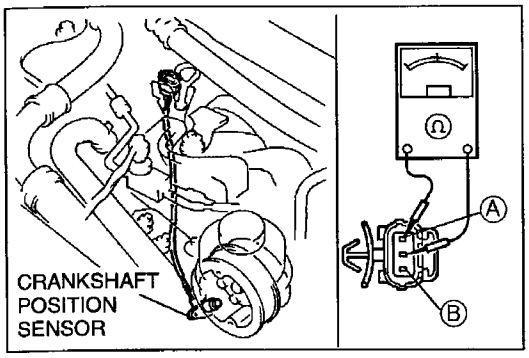


1. Connector
2. Camshaft position sensor
   Installation note ..... below



Installation note

Check ignition timing after the camshaft position sensor is installed. (Refer to page F2–4.)



CRANKSHAFT POSITION SENSOR

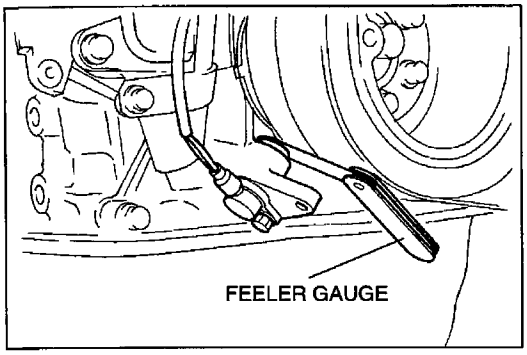
Inspection

Resistance

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

   Specification: 950—1,250 (1,100 ± 150) Ω

3. If not as specified, replace the crankshaft position sensor.

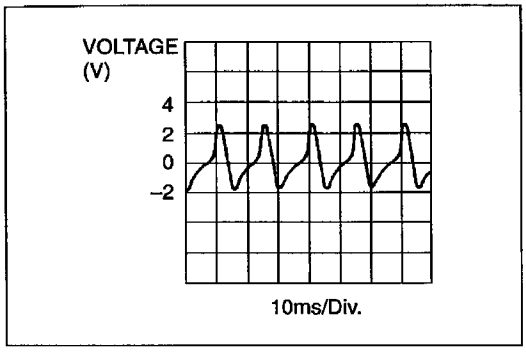


Air gap

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

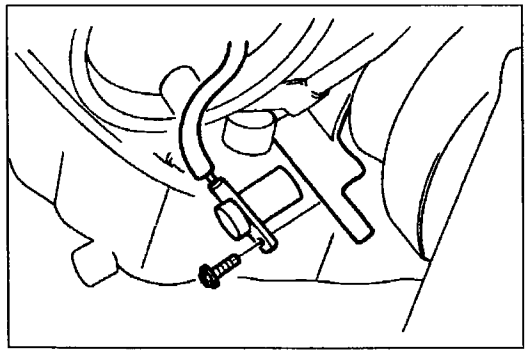
   Specification:
   0.5—1.5 (1.0 ± 0.5) mm {0.040—0.080 in}

2. If not as specified, replace the crankshaft pulley or the crankshaft position sensor.
   (Refer to section B2 or below.)



NE signal illustration

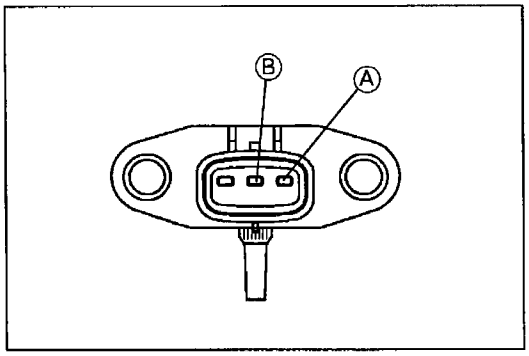
- After warm-up idle with no load condition.



Replacement

1. Disconnect the negative battery cable.
2. Remove the crankshaft position sensor connector.
3. Remove the crankshaft position sensor.
4. Install in the reverse order of removal.

   Tightening torque:
   7.9—10.7 N·m {80—110 kgf·cm, 69.4—95.5 in·lbf}

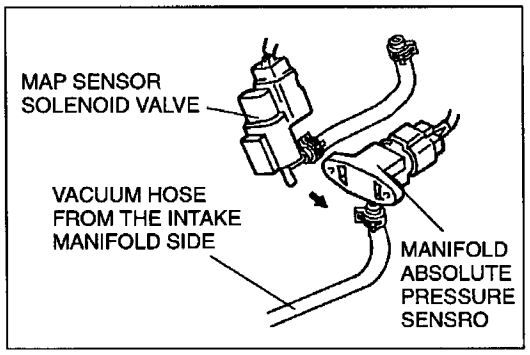


MANIFOLD ABSOLUTE PRESSURE SENSOR

Inspection

1. Warm up the engine to normal operating temperature and let it idle.
2. Carry out the intake-air system inspection. (Refer to page F2–7.)
3. Measure the voltage between terminals A and B by using a voltmeter, from the rear side of the connector.

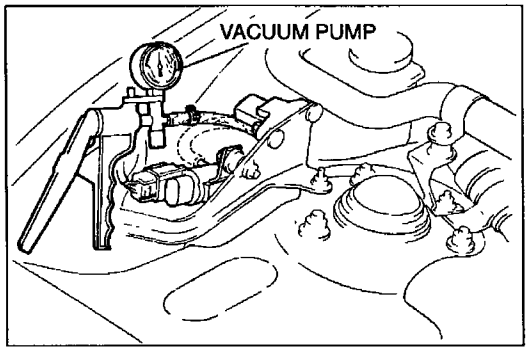
Specification: 2.5—2.8 V

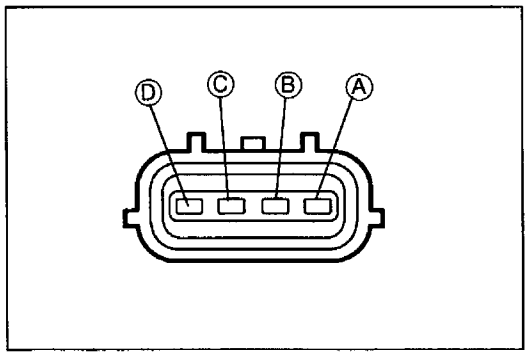


4. Disconnect the vacuum hose from the manifold absolute pressure sensor.
5. Disconnect the vacuum hose from the intake manifold side of the MAP sensor solenoid valve and connect the vacuum hose to the manifold absolute pressure sensor.
6. Measure the voltage between terminals A and B by using a voltmeter, from the rear side of the connector.

Specification: 1.2—1.6 V

7. Turn off the ignition switch.
8. If not as specified, replace the manifold absolute pressure sensor.



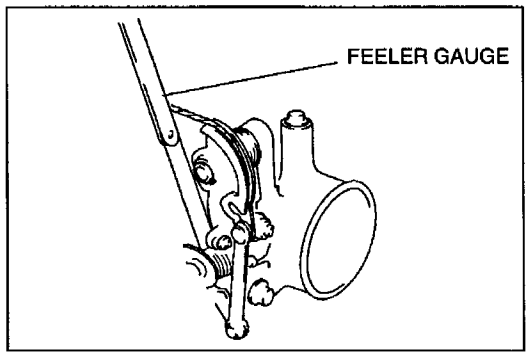


THROTTLE POSITION SENSOR

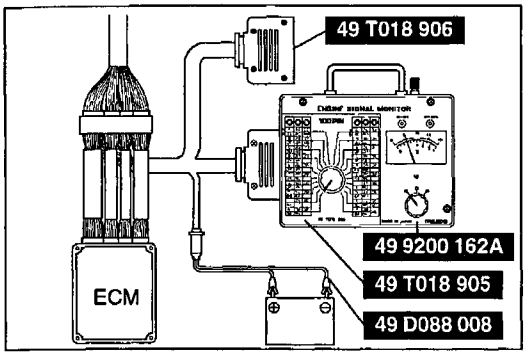
Inspection

Closed throttle position switch

1. Verify that the throttle valve is at the closed throttle position.
2. Disconnect the throttle position sensor connector.
3. Check for continuity between throttle position sensor connector terminals C and D by using an ohmmeter.
4. If no continuity, adjust the throttle position sensor.



5. Insert a 0.37 mm {0.015 in} feeler gauge between the throttle adjusting screw (TAS) and the throttle lever. Verify that there is no continuity between terminals C and D.
6. If there is continuity, adjust the throttle position sensor. (Refer to page F2–54.)

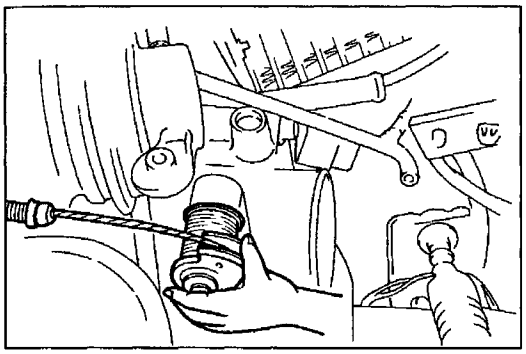


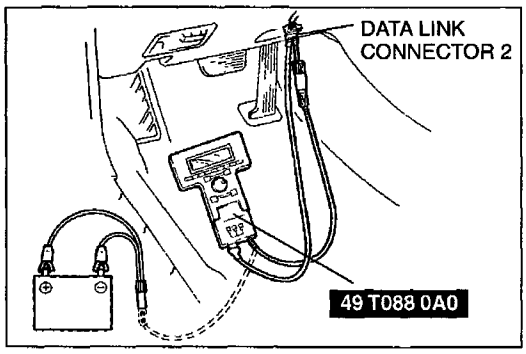
Throttle position sensor
Using SSTs (Engine signal monitor)

1. Remove the ECM. (Refer to page F2–38.)
2. Connect the **SSTs** to the ECM.
3. Verify that the throttle valve is at the closed throttle position.
4. Turn the ignition switch to ON.
5. Measure the ECM terminal 3B voltage by using a voltmeter. (Refer to page F2–39.)

   Specification
   Closed throttle position: 0.1—1.1 V
   Wide open throttle: 2.8—4.5 V
   (Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)

6. If not as specified, adjust the throttle position sensor. (Refer to page F2–54.)



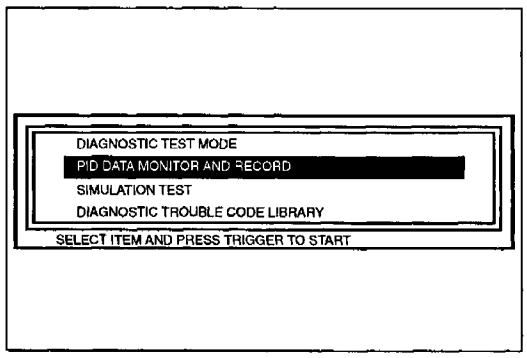


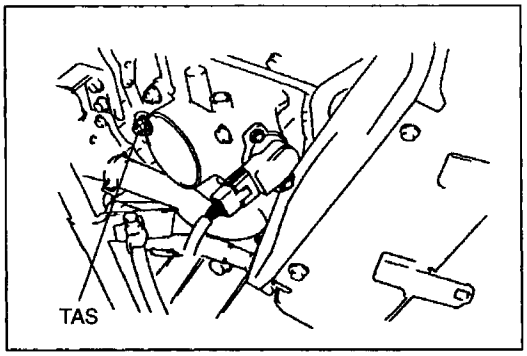
Using SST (NGS)

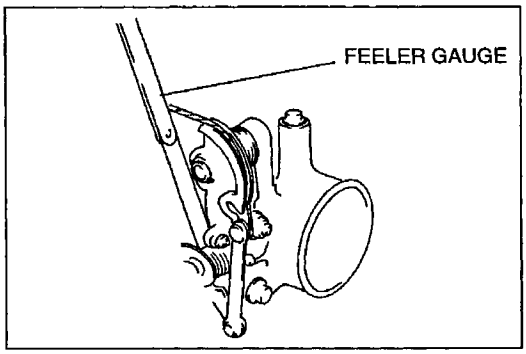
1. Connect the **SSTs** (NGS) to the data link connector 2.
2. Verify that the throttle valve is at the closed throttle position.
3. Turn the ignition switch to ON.
4. Select the PID/DATA MONITOR AND RECORD function of the NGS.
5. Select "TP V" on the NGS display. NGS measures and shows the voltage.

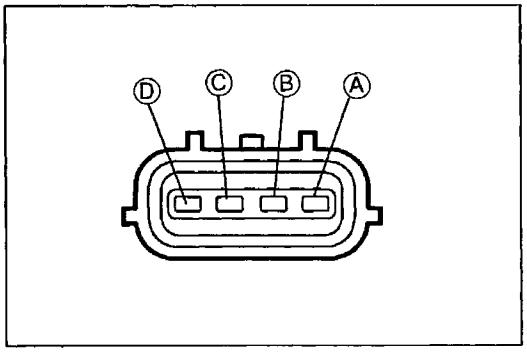
   Specification
   Closed throttle position: 0.1—1.1 V
   Wide open throttle: 2.8—4.5 V
   (Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)

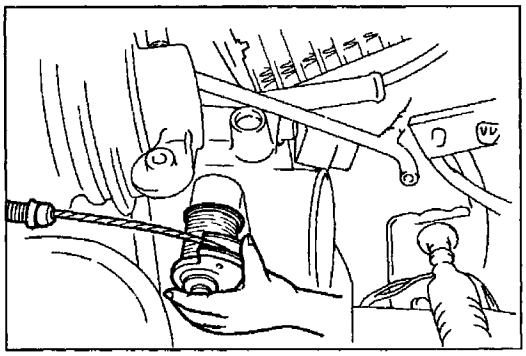
6. If not as specified, adjust the throttle position sensor. (Refer to page F2–54.)

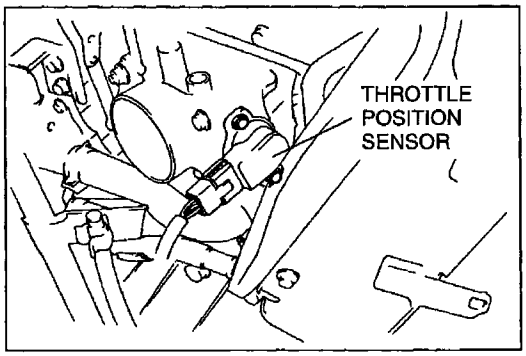












Adjustment

Caution
- **The throttle position sensor is adjusted at the fac tory before shipment. Unnecessaly adjustmen will negatively effect the engine performance.**
- **Adjusting the throttle position sensor by usinç the throttle adjusting screw (TAS) will negativel effect the engine performance.**

Closed throttle position switch
1. Verify that the throttle valve is at the closed throttle posi tion.
2. Disconnect the throttle position sensor connector.
3. Loosen the attaching screws.
4. Insert a feeler gauge between the throttle adjustinç screw (TAS) and the throttle lever. Adjust the continuit between the closed throttle position switch terminals C and D by using an ohmmeter.

Specification

Clearance	Continuity
0.19 mm {0.008 in}	Yes
0.37 mm {0.015 in}	No

5. Connect the throttle position sensor connector.
6. Tighten the attaching screws.

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

7. If not adjusted, replace the throttle position sensor. (Refer to page F2–55.)

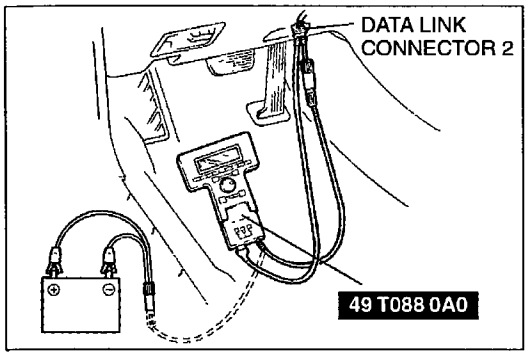
Throttle position sensor
Using SSTs (Monitor, engine signal)
1. Remove the ECM. (Refer to page F2–38.)
2. Connect the **SSTs** to the ECM.
3. Verify that the throttle valve is at the closed throttle posi tion.
4. Loosen the attaching screws.
5. Turn the ignition switch to ON.
6. Adjust the throttle position sensor so that the ECM termi nal 3B voltage is as specified, by using a voltmeter.

   Specification
   Closed throttle position: 0.1—1.1 V
   Wide open throttle: 2.8—4.5 V
   (Verify that the voltage increase is directly pro portioned to the throttle valve opening angle.)

7. Tighten the attaching screws.

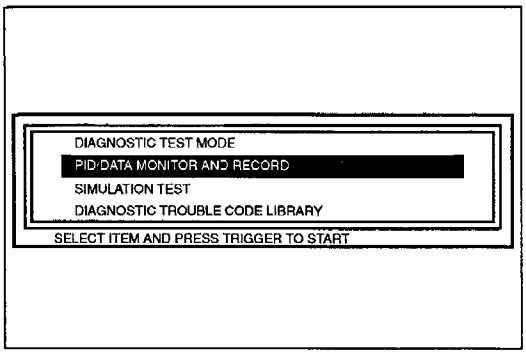
   Tighten torque:
   1.6—2.3 N·m {16—24 kgf·cm, 14—20 in·lbf}

8. If not adjusted, inspect the throttle position sensor har ness.
9. If harness is OK, replace the throttle position sensor.



Using SSTs (NGS)

1. Connect the **SSTs** to the data link connector 2.
2. Verify that the throttle valve is at the closed throttle position.
3. Loosen the attaching screws.
4. Turn the ignition switch to ON.



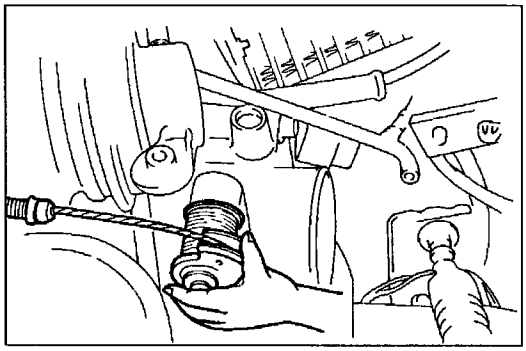
5. Select the PID/DATA MONITOR AND RECORD function of the NGS.
6. Select "TP V" on the NGS display. NGS measures and shows the voltage.

Specification
Fully closed: 0.1—1.1 V
Fully open: 2.8—4.5 V
(Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)

7. Tighten the attaching screws.

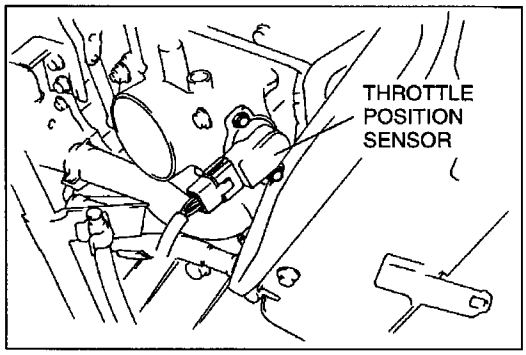
Tightening torque:
1.6—2.3 N·m {16—24 kgf·cm, 14—20 in·lbf}

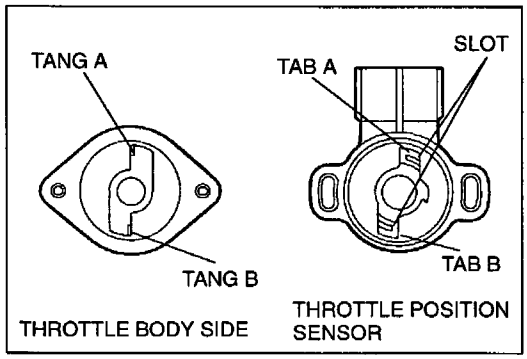
8. If not adjusted, replace the throttle position sensor.

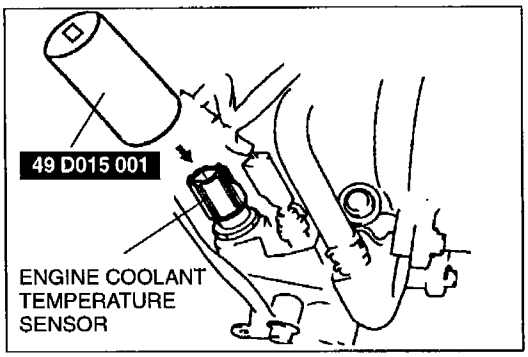


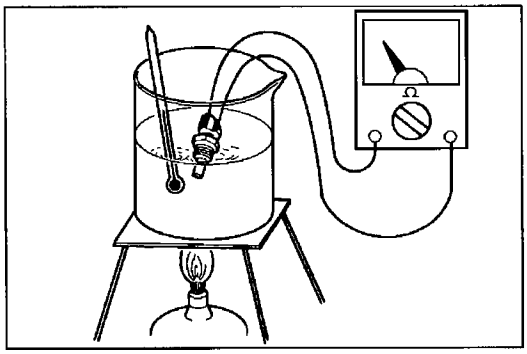
Replacement

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 at the closed throttle position.
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 the 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 and closed throttle position switch. (Refer to page F2–39.)









ENGINE COOLANT TEMPERATURE SENSOR
Removal / Installation

Note
- When the engine coolant temperature sensor is difficult to remove, remove the cylinder head cover (RH). (Refer to section B2.)

1. Remove the engine coolant temperature sensor by using the **SST**.
2. Install in the reverse order of removal.

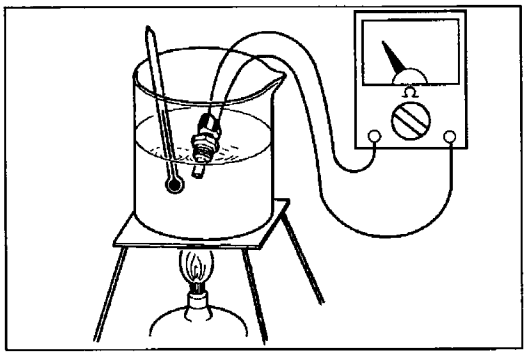
Tightening torque:
16—23 N·m {1.6—2.4 kgf·m, 12—17 ft·lbf}

Inspection
1. Remove the engine coolant temperature sensor.
2. Place the sensor in the water with a thermometer and heat the water gradually.
3. Measure the resistance of the sensor by using an ohmmeter.

Specification

Temperature (°C {°F})	Resistance (kΩ)
20 {68}	2.2—2.7
80 {176}	0.29—0.35

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

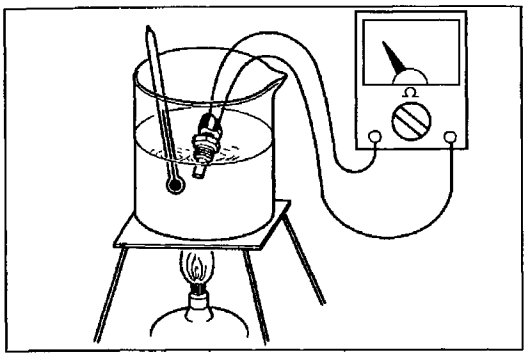


INTAKE AIR TEMPERATURE SENSOR (AIR CLEANER)
Inspection
1. Remove the intake air temperature sensor (Air cleaner).
2. Place the sensor and a thermometer in the water. Gradually heat the water and measure the resistance of the sensor by usign an ohmmeter.

Specification

Temperature (°C {°F})	Resistance (kΩ)
20 {68}	2.2—2.7
80 {176}	0.29—0.35

3. If not as specified, replace the intake air temperature sensor (Air cleaner).



INTAKE AIR TEMPERATURE SENSOR (DYNAMIC CHAMBER)

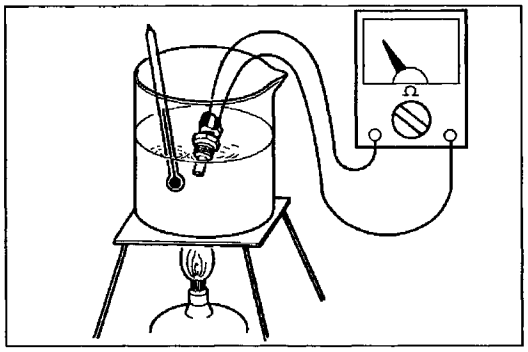
Inspection

1. Remove the intake air temperature sensor (dynamic chamber).
2. Place the sensor and a thermometer in the water. Gradually heat the water and measure the resistance of the sensor by using an ohmmeter.

Specification

Temperature (°C {°F})	Resistance (kΩ)
25 {77}	29.7—36.3
85 {185}	3.33—3.67

3. If not as specified, replace the intake air temperature sensor (dynamic chamber).



INTAKE AIR TEMPERATURE SENSOR (L/C)

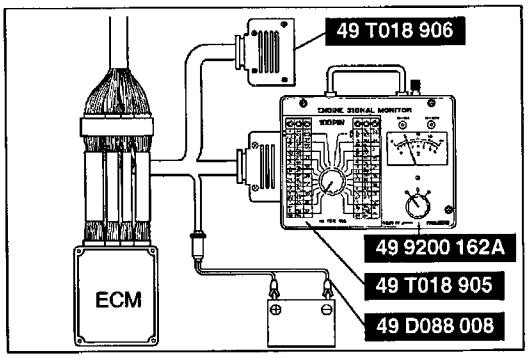
Inspection

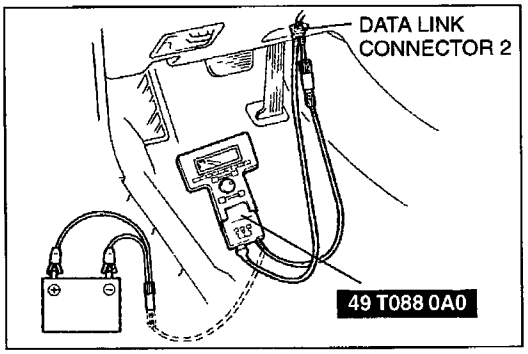
1. Remove the intake air temperature sensor (L/C).
2. Place the sensor and a thermometer in the water. Gradually heat the water and measure the resistance of the sensor by using an ohmmeter.

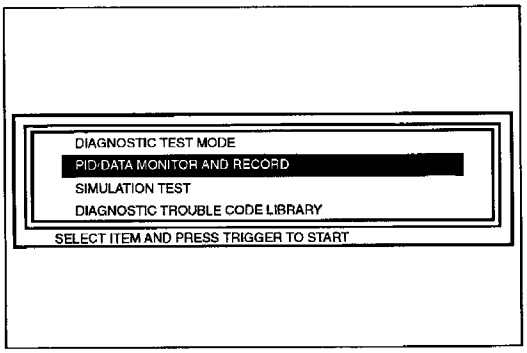
Specification

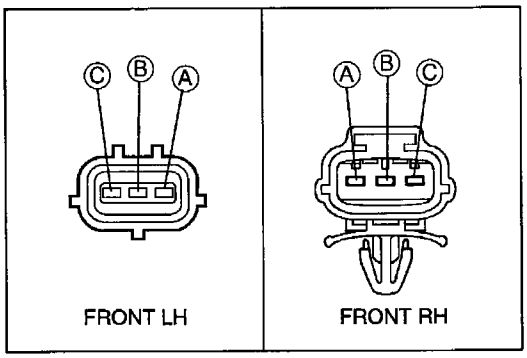
Temperature (C° {F°})	Resistance (kΩ)
100 {212}	5.6—6.9

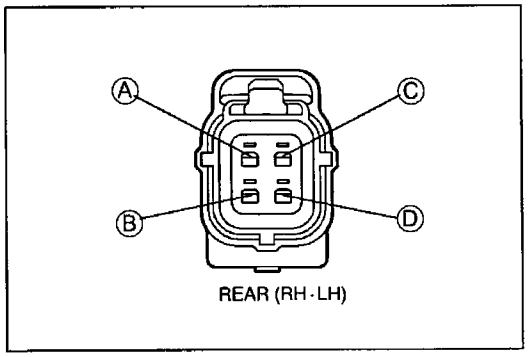
3. If not as specified, replace the intake air temperature sensor (L/C).











HEATED OXYGEN SENSOR (FRONT, REAR)

Inspection

Using SSTs (Monitor, engine signal)

1. Remove the ECM. (Refer to page F2–38.)
2. Connect the **SSTs** to the ECM.
3. Warm up the engine to normal operating temperature.
4. Measure the voltage at the ECM terminal 3D, 3H, 3I and 3M.

Specification

Engine condition	ECM terminal voltage (V)			
	3I	3D	3M	3H
	Heated oxygen sensor (front RH)	Heated oxygen sensor (rear RH)	Heated oxygen sensor (front LH)	Heated oxygen sensor (rear LH)
IG-ON	Below 1.0			
Idle	Below 1.0			
Deceleration	0—0.5	0—1.0	0—0.5	0—1.0
Acceleration	0.5—1.0	0—1.0	0.5—1.0	0—1.0

5. If not as specified, inspect following.
   - Intake-air system
   - Fuel system
   - On-board diagnosis system

   If there systems are OK, replace the heated oxygen sensor.

Tightening torque:
30—49 N·m {3.0—5.0 kgf·m, 22—36 ft·lbf}

Using SSTs (NGS)

1. Connect the **SSTs** to the data link connector–2.
2. Select the PID/DATA MONITOR AND RECORD function of NGS.
3. Select "FHO2S R", "RHO2S R", "FHO2S L" and "RHO2S L" on the NGS display. NGS measures and shows the voltage.

Specification

Engine condition	Voltage (V)			
	FHO2S R	RHO2S R	FHO2S L	RHO2S L
IG-ON	Below 1.0			
Idle	Below 1.0			
Deceleration	0—0.5	0—1.0	0—0.5	0—1.0
Acceleration	0.5—1.0	0—1.0	0.5—1.0	0—1.0

4. If not as specified, inspect following.
   - Intake-air system
   - Fuel system
   - On-Board diagnosis system

   If these systems are OK, replace the heated oxygen sensor.

Tightening torque:
30—49 N·m {3.0—5.0 kgf·m, 22—36 ft·lbf}

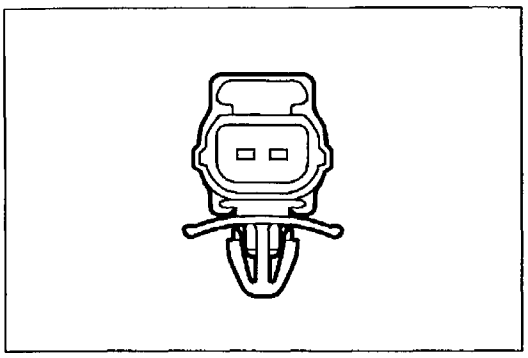
Heater

1. Disconnect the heated oxygen sensor connector.
2. Measure the resistance between heated oxygen sensor terminals B and C by using an ohmmeter.

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

3. If not as specified, replace the heated oxygen sensor.

Tightening torque:
30—49 N·m {3.0—5.0 kgf·m, 22—36 ft·lbf}



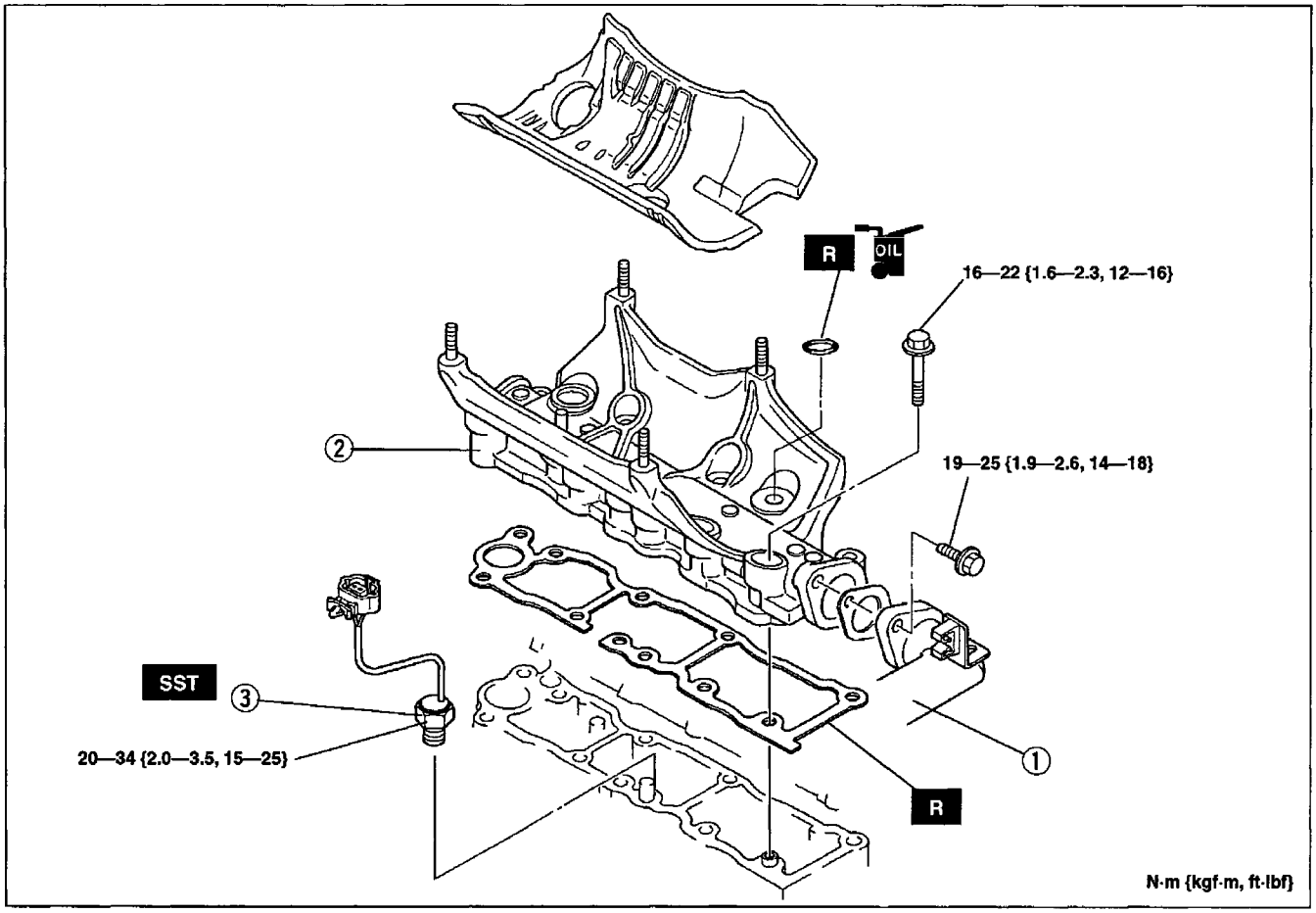
KNOCK SENSOR
Inspection
1. Verify that the ignition switch is OFF.
2. Disconnect the knock sensor connector.
3. Measure the resistance between knock sensor terminal A and the knock sensor body by using an ohmmeter.

   Specification: Approx. 560 kΩ [20° C {68° F}]

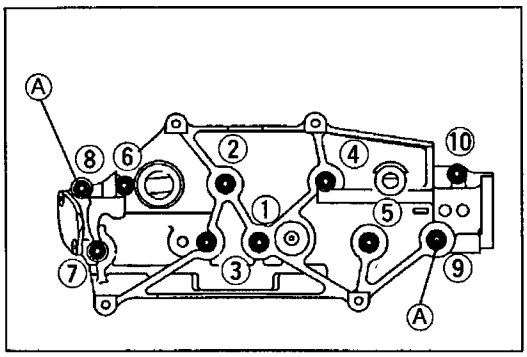
4. If not as specified, replace the knock sensor. (Refer to below.)

Replacement
- **Fuel vapor is hazardous. It can very easily ignite, cauing 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 Safely Procedure" on page F2–15.**

1. Disconnect the negative battery cable.
2. Drain the coolant from the radiator. (Refer to section E.)
3. Remove the intake air system. (Refer to page F2–8.)
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal, referring to **Installation note**.
6. Refill the radiator with the specified engine coolant.

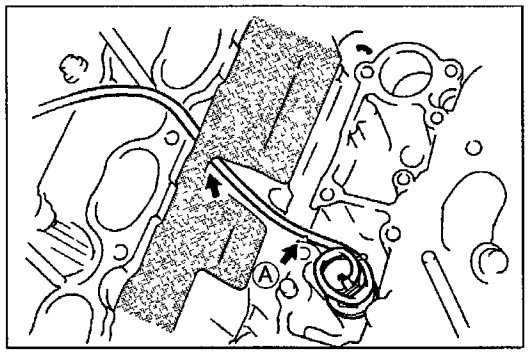


1. Water inlet pipe
2. Lysholm compressor bracket
   Installation note ..... page F2–60
3. Knock sensor
   Installation note ..... page F2–60

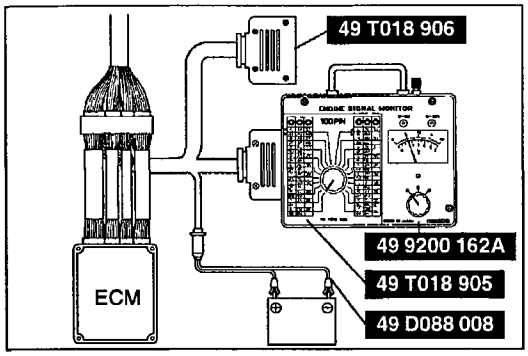


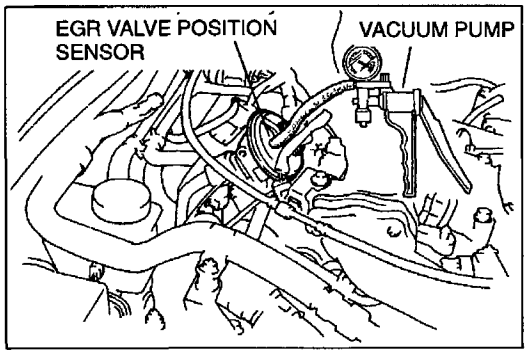
Installation note
Lysholm compressor bracket
1. Hand tighten bolts A first.
2. Tighten all the bolts in the order shown in the figure.

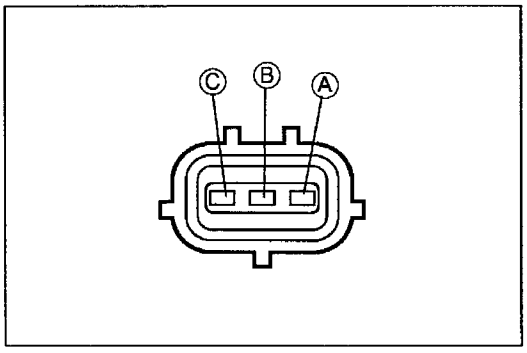
Tighten torque:
16—22 N·m {1.6—2.3 kgf·cm, 12—16 ft·lbf}

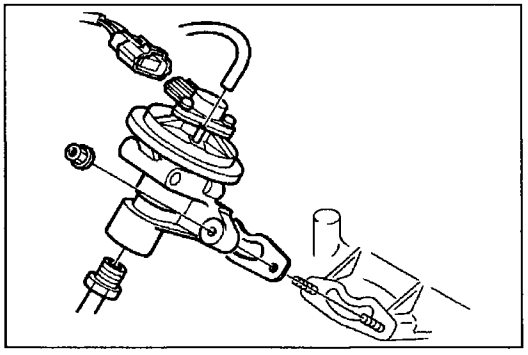


Knock sensor
1. Fit the knock sensor harness into the drill hole Ⓐ on the cylinder block.
2. Pass the harness under the rubber insulator on the LH cylinder head.









EGR VALVE POSITION SENSOR

System Inspection

1. Remove the ECM. (Refer to page F2–38.)
2. Connect the **SSTs** to the ECM.
3. Disconnect the vacuum hose from the EGR valve and connect the vacuum pump to the EGR valve.
4. Turn the ignition switch to ON.
5. Measure the voltage at the terminals as shown in the table.

Specification

Terminal		Vacuum/Voltage	
EGR VALVE POSITION SENSOR	**ECM**	**0 kPa {0 mmHg, 0 inHg}**	**20.0 kPa {150 mm Hg, 5.90 inHg}**
A	3AB	Approx. 0 V	
B	3A	4.5—5.5 V	
C	3R	Approx. 0.8 V	Approx. 4.8 V

6. If not as specified, inspect the harness between EGR valve position sensor and ECM.
7. If the harnesses are OK, replace the EGR valve position sensor.

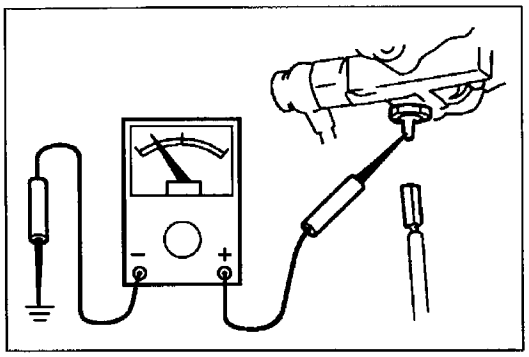
Inspection

1. Disconnect the EGR valve position sensor connector.
2. Disconnect the vacuum hose from the EGR valve and connect the vacuum pump to the EGR valve.
3. Use an ohmmeter to measure the resistance between the terminals as shown in the table.

Specification

Terminal	Vacuum/Resistance	
	0 kPa {0 mmHg, 0 inHg}	**20.0 kPa {150 mm Hg, 5.90 inHg}**
A—B	Approx. 2.7 kΩ	
A—C	Approx. 0.5 kΩ	Approx. 2.7 kΩ
B—C	Approx. 2.4 kΩ	Approx. 0.1 kΩ

4. If not as specified, replace the EGR valve. (Refer to page F2–85.)



POWER STEERING PRESSURE SWITCH

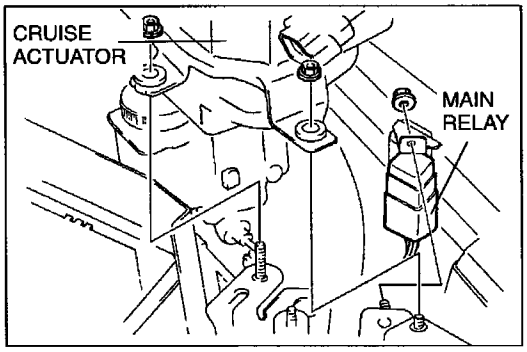
Inspection

1. Disconnect the power steering pressure switch connector.
2. Start the engine.
3. Check continuity of the switch by using an ohmmeter.

Specification

Steering wheel condition	Continuity
Turned	Yes
Straight ahead	No

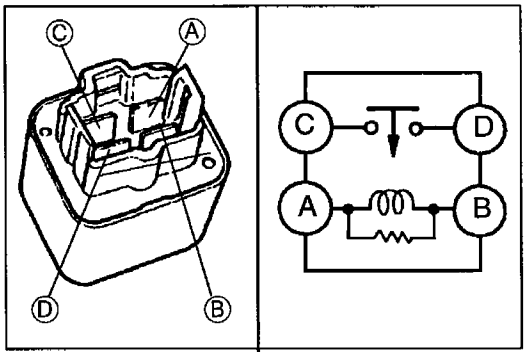
4. If not as specified, replace the power steering pressure switch.
   (Refer to section N.)



MAIN RELAY

System inspection

1. Listen for main relay operation sound while turning the ignition switch to ON and OFF.
2. If no sound was heard, inspect following.
   - Main relay
   - Harness and connector between ignition switch and main relay



Inspection

1. Remove the cruise actuator. (Refer to section T.)
2. Remove the main relay.
3. Apply battery positive voltage and check continuity between terminals of the main relay by using ohmmeter.

Specification

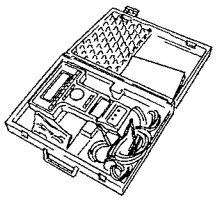
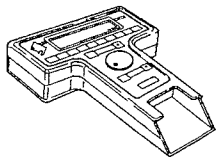
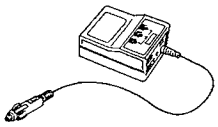
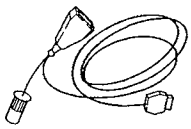
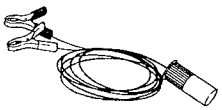
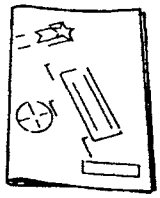
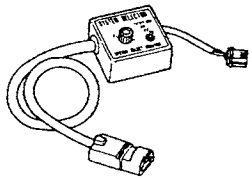
B+: Battery postive voltage

Terminal A—B	Terminal C—D
B+ applied	Continuity
B+ not applied	No continuity

4. If not as specifed, replace the main relay.

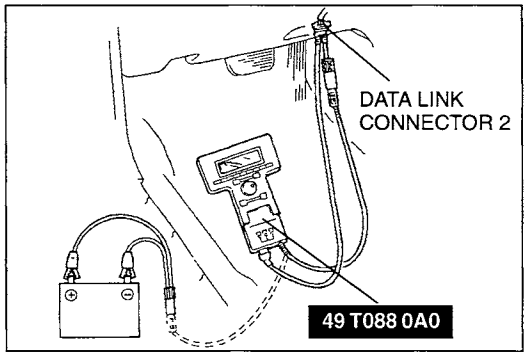
IDLE AIR CONTROL (IAC) SYSTEM

PREPARATION
SST

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

SYSTEM INSPECTION

1. Start the engine and run it at idle.
2. Disconnect the IAC valve connector and verify that the engine rotation becomes rough or the engine stalls.
3. If the engine condition will not change, do as follows.
   (1) Connect the **SSTs** (NGS).
   (2) Verify 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 verify that the idle speed increases.
      I. If the idle speed increases, replace the PCM.
      II. If the idle speed does not change, replace the BAC valve.

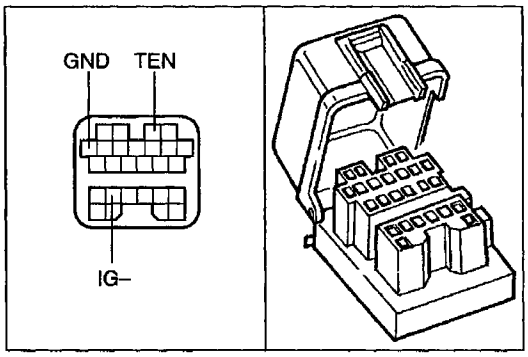


4. Warm up the engine to normal operating temperature and run it at idle.
5. Turn the electrical loads on and verify that the engine speed is within the specification.

Engine speed (rpm)

No load	600—700
E/L operated	650—750
A/C operated	730—830
P/S operated	650—750

6. If not as specified, check the related switches and wiring harnesses.



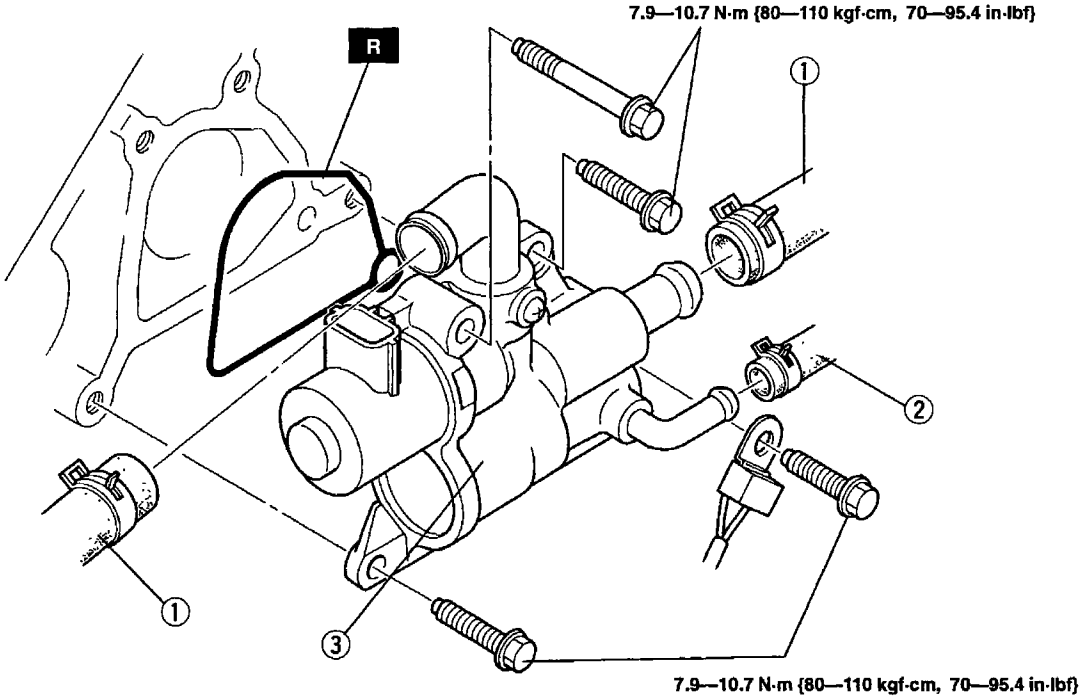
BAC VALVE

System Inspection

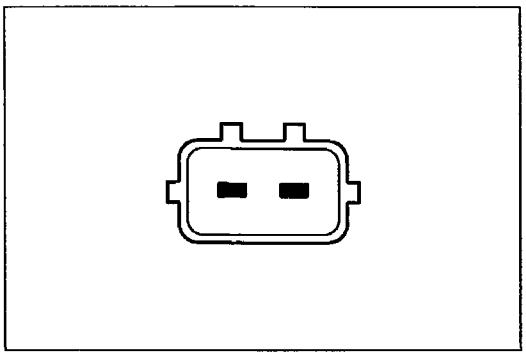
1. Connect the data link connector terminals TEN and GND by using the **SST** (System selector).
2. Connect a tachometer to the data link connector terminal IG–.
3. Start the engine at engine cold condition.
4. Verify that the idle speed decreases gradually as the engine warms up.
5. If not, check the water hose of the BAC valve. (Refer to section E.)
6. If water hose is OK, replace the BAC valve.

Removal / Installation

1. Disconnect the negative battery cable.
2. Drain the coolant from the radiator. (Refer to section E.)
3. Remove the air charge cooler air duct.
4. Remove the resonance chamber.
5. Remove in the order shown in the figure.
6. Install in the reverse order of removal.
7. Refill the radiator with the specified engine coolant. (Refer to section E.)



1. Air hose
2. Water hose
3. BAC valve

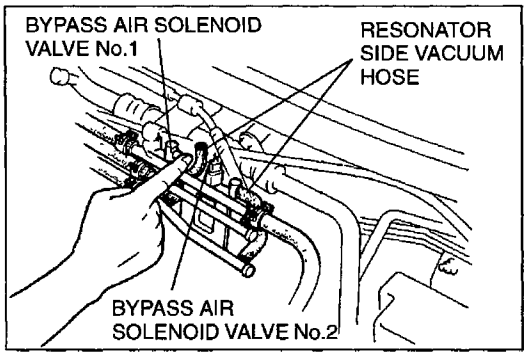


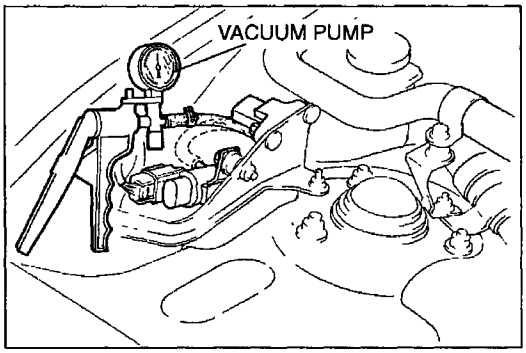
IDLE AIR CONTROL VALVE
Inspection

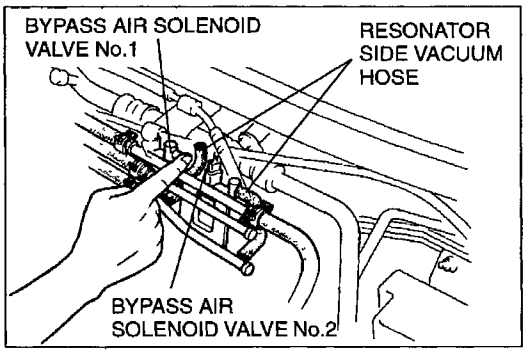
1. Verify that the ignition switch is OFF.
2. Disconnect the idle air control valve connector.
3. Measure the resistance of the idle air control valve by using an ohmmeter.

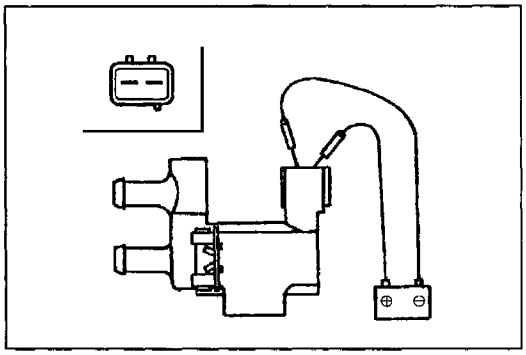
   Specification: 10.7—12.3 Ω [20°C {68°F}]

4. If not as specified, replace the BAC valve.
   (Refer to page F2–64.)









BYPASS AIR CONTROL SYSTEM

SYSTEM INSPECTION

1. Turn off the A/C switch.
2. Warm up the engine to normal operating temperature and let it idle.
3. Disconnect the vacuum hose from the resonator side of the bypass air solenoid valve No.1 and No.2.
4. Place a finger at the bypass air solenoid valve No.1 and No.2 as shown and verify that there is no vacuum.
5. Connect a vacuum pump to the manifold absolute pressure sensor and apply **26.7 kPa {200 mmHg, 7.9 inHg}** vacuum.
6. Place a finger at the bypass air solenoid valve No.1 and No.2 as shown and verify that vacuum is felt.
7. If not as specified, inspect following.
   - Manifold absolute pressure sensor (Refer to page F2–52.)
   - Bypass air solenoid vale (Refer to below)
   - Vacuum hose for damage or looseness
8. Disconnect the vacuum pump from the manifold absolute pressure sensor, and reconnect the vacuum hose.
9. Position the vehicle on a chassis roller. Shift the selector lever to D and turn the A/C switch to ON.
10. Place a finger at the bypass air solenoid valve No.1 as shown and verify that vacuum is felt.
11. If there is no vacuum, inspect following.
    - ECM terminal 1D (A/C amplifier)
    - ECM terminal 1B, 1F (Inhibitor signal)
    - Bypass air solenoid valve (Refer to below)

BYPASS AIR SOLENOID VALVE

Inspection

1. Remove the bypass air solenoid valve.
2. Verify that air flows as shown below.

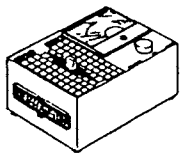
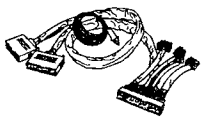
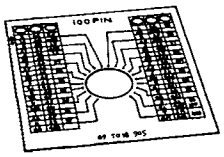
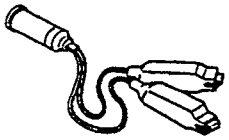
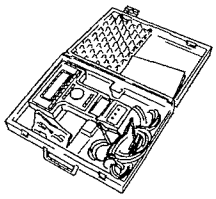
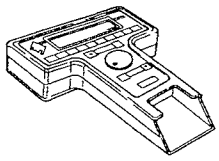
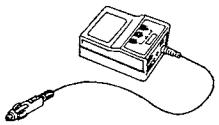
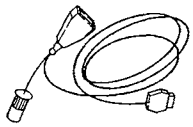
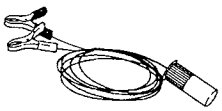
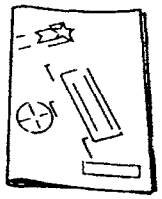
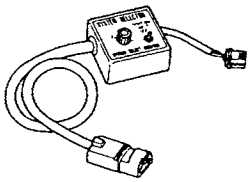
Specification B+: Battery positive voltage

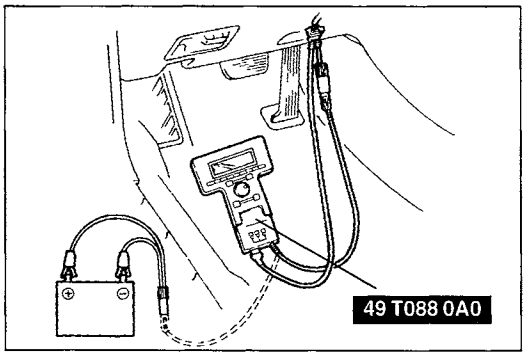
Terminal A—B	Air flow
B+ applied	Yes
B+ not applied	No

3. If not as specified, replace the bypass air solenoid valve.

FUEL INJECTION CONTROL

PREPARATION
SST

49 9200 162A Monitor, Engine signal 	For inspection of fuel injection control	49 T018 906 Adapter harness 	For inspection of fuel injection control
49 T018 905 Sheet 	For inspection of fuel injection control	49 D088 008 Harness adapter, Power 	For inspection of fuel injection control
49 T088 0A0 NGS set 	For inspection of fuel injection control	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of fuel injection control
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of fuel injection control	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of fuel injection control
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of fuel injection control	49 T088 008A Instruction Manual 	For inspection of fuel injection control
49 T088 010B Program Card 	For inspection of fuel injection control	49 B019 9A0 System Selector 	For inspection of fuel injection control



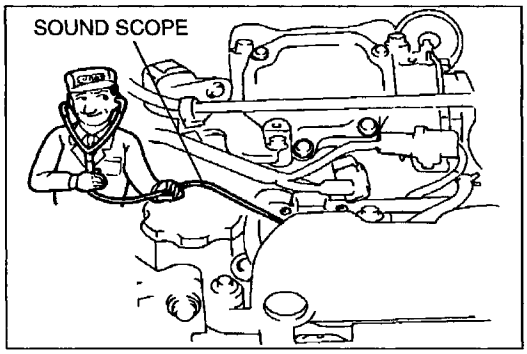
SYSTEM INSPECTION

1. Connect the **SSTs** (NGS) to the data link connector 2.
2. Warm up the engine to normal operating temperature and let it idle.
3. Select the PID/DATA MONITOR AND RECORD function of the NGS.
4. With no electrical load operating, select "INJ RH" and "INJ LH" on the NGS display. NGS measures and shows the fuel injector pulse widths.
5. Increase the engine speed and verify that the pulse width changes.

6. If signal cannot be detected, or shows no change, check voltage at following terminals (Refer to page F2–39.)
   - ECM terminal 3E (Mass air flow sensor)
   - ECM terminal 4AH 4AL (Crankshaft position sensor)

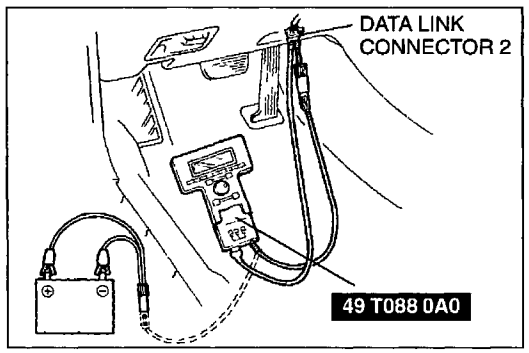
Fuel Cut
Inspection
Without using SST (NGS)

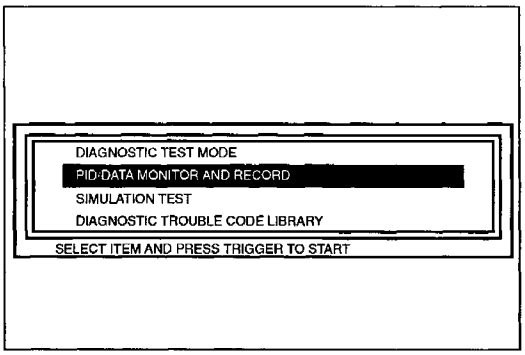
1. Warm up the engine to normal operating temperature and let it idle.
2. Turn off the A/C switch.
3. Connect a tachometer to the data link connector terminal IG–.
4. Open the throttle valve and increase the engine speed to 4,000 rpm. Check each fuel injector operation by using a sound scope or a screwdriver.
5. Close the throttle valve quickly. Verify that no fuel injector operating sound is heard while decreasing engine speed to approx. 1,200 rpm.
6. If not as specified, check voltage at following terminals. (Refer to page F2–39.)
   - ECM terminal 3Q (Engine coolant temperature sensor)
   - ECM terminal 3X (Closed throttle position switch)



Using SST (NGS)

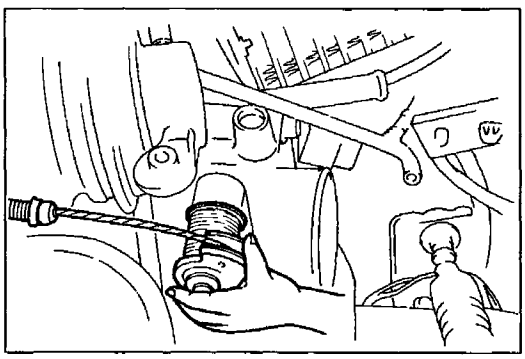
1. Connect the **SST** to the data link connector.
2. Warm up the engine to normal operating temperature and let it idle.
3. Turn off the A/C switch.
4. Select the PID/DATA MONITOR AND RECORD function of the NGS.
5. Select "INJ RH" and "INJ LH" on the NGS display. NGS measures and shows the fuel injector pulse width.
6. Open the throttle valve and increase the engine speed to 4,000 rpm.
7. Close the throttle valve quickly. Verify that the fuel injector pulse width becomes 0ms until the engine speed drops to approx. 1,200 rpm, then recovers after that.
8. If not as specified, check voltage at following terminals. (Refer to page F2–39.)
   - ECM terminal 3Q (Engine coolant temperature sensor)
   - ECM terminal 3X (Closed throttle position switch)
   - ECM terminal 4AH, 4AL (Crankshaft position sensor)

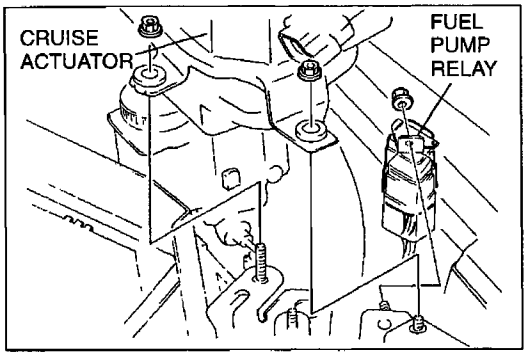




Dechoke

1. Turn the ignition switch to START and verify that the engine start or ignition occur while cranking.
2. Depress the accelerator pedal to the wide open throttle and turn the ignition switch to START. Verify that no injector operating sound is heard while cranking by using a sound scope or screwdriver.
3. If not as specified, check the ECM terminal 3B voltage. (Throttle position sensor) (Refer to page F2–39.)

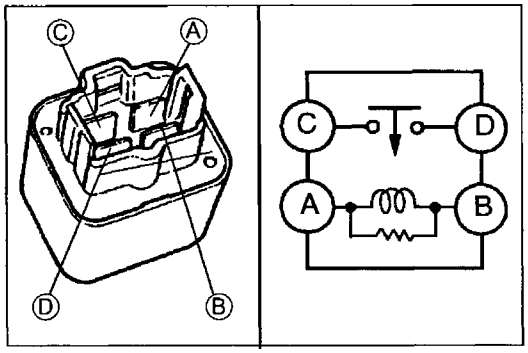




FUEL PUMP CONTROL SYSTEM

SYSTEM INSPECTION

1. Turn the ignition switch to START and check operation of fuel pump relay and fuel pump resistor and relay by listening their operating sound.
2. If no sound was heard, check the fuel pump relay and fuel pump resistor and relay (speed).
3. If the fuel pump relay and fuel pump resistor and relay (speed) are normal, check voltage at following terminals. (Refer to page F2–39.)
   - ECM terminal 1H (Ignition switch START signal)
   - ECM terminal 1AF (Fuel pump relay)
   - ECM terminal 1AJ (Fuel pump resistor and relay (speed))



FUEL PUMP RELAY

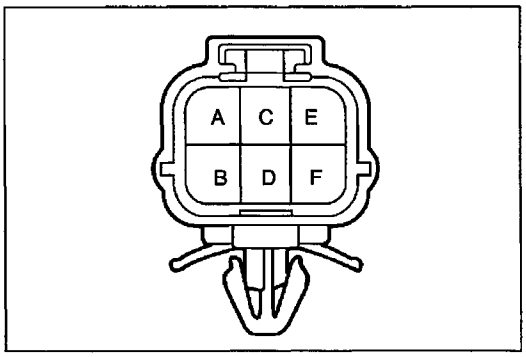
Inspection

1. Remove the cruise actuator. (Refer to section T.)
2. Remove the fuel pump relay.
3. Apply battery positive voltage and check continuity between terminals of the relay by using an ohmmeter.

Specification B+: Battery positive voltage

Terminal A—B	Terminal C—D
B+ applied	Continuity
B+ not applied	No continuity

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



FUEL PUMP RESISTOR AND RELAY (SPEED)

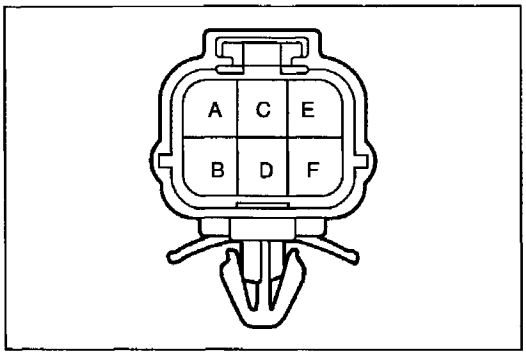
Inspection

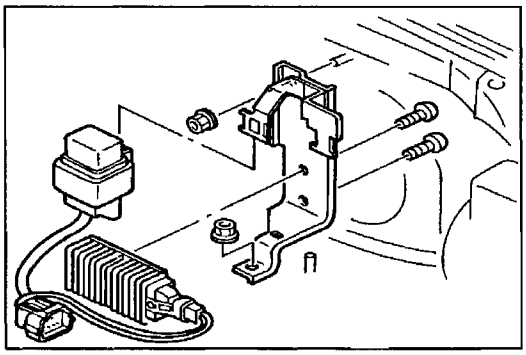
Resistor

1. Disconnect the fuel pump resistor and relay connector. Measure the resistance between terminals A and B by using an ohmmeter.

   Specification: 0.38—0.42 Ω

2. If not as specified, replace the fuel pump resistor and relay (speed).





Relay

1. Disconnect the fuel pump resistor and relay connector.
2. Apply battery positive voltage and check continuity between terminals of the relay by using an ohmmeter.

Specification **B+: Battery positive voltage**

Terminal C—D	Terminal E—F
B+ applied	Continuity
B+ not applied	No continuity

3. If not as specified, replace the fuel pump resistor and relay (speed).

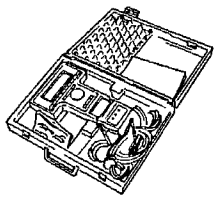
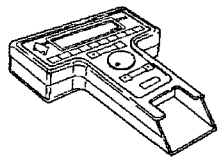
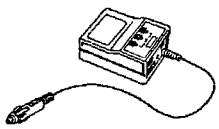
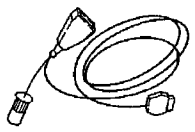
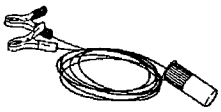
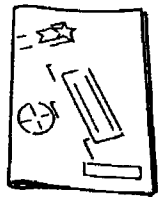
Replacement

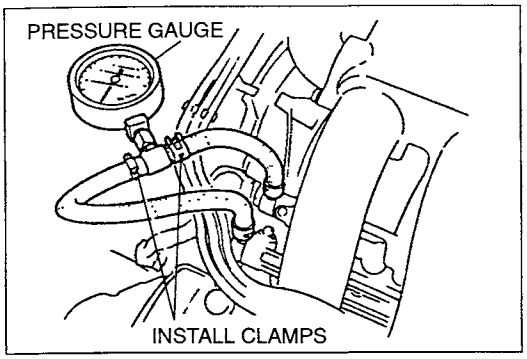
1. Disconnect the fuel pump resistor and relay (speed) connector.
2. Remove the fuel pump resistor and relay with the bracket from body.
3. Remove the fuel pump resistor and relay from the bracket.
4. Install in the reverse order of removal.

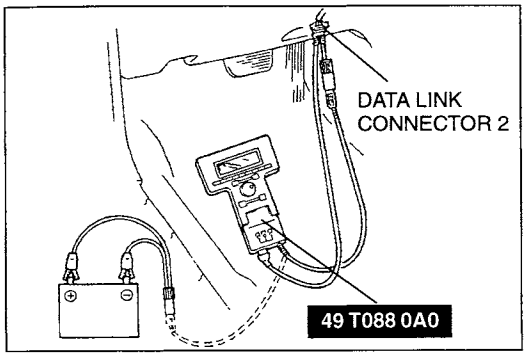
Tightening torque:
7.8—10.7 N·m {80—110 kgf·cm, 70—95 in·lbf}

PRESSURE REGULATOR CONTROL (PRC) SYSTEM

PREPARATION
SST

49 T088 0A0 NGS set 	For inspection of pressure regulator control system	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of pressure regulator control system
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of pressure regulator control system	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of pressure regulator control system
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of pressure regulator control system	49 T088 008A Instruction Manual 	For inspection of pressure regulator control system
49 T088 010B Program Card 	For inspection of pressure regulator control system	—	—





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" on page F2–15.**

1. Install the fuel pressure gauge.
2. Measure the fuel pressure under the following conditions.

Specifications

	Fuel pressure (kPa {kgf/cm², psi})		
Idling	210—330 {2.1—3.4, 30—48}	210—330 {2.1—3.4, 30—48}	280—330 {2.8—3.4, 40—48}
During 120 sec. of hot start	280—330 {2.8—3.4, 40—48}		
After 120 sec. of hot start	210—330 {2.1—3.4, 30—48}		
Judgement	Normal	Not normal (Perform Inspection 1)	Not normal (Perform Inspection 2)

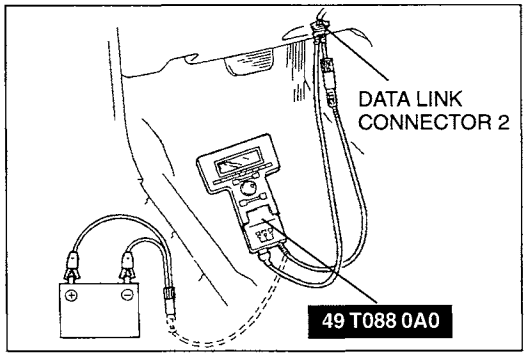
3. If the fuel pressure is not within the specification, carry out either Inspection 1 or Inspection 2 as required.

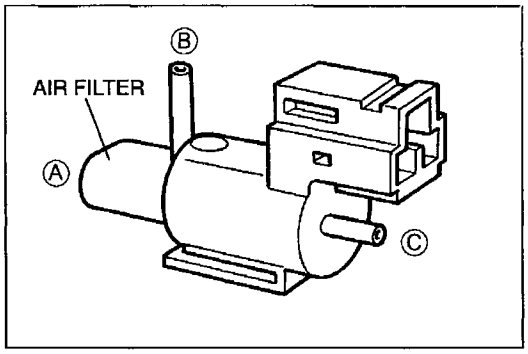
Inspection 1

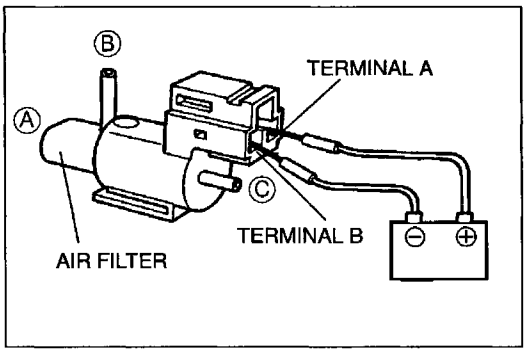
1. Stop the engine.
2. Connect the **SSTs** (NGS).
3. Start the engine and run it at idle.
4. Select the SIMULATION TEST function on the NGS display.
5. Turn the PRC solenoid valve from OFF to ON by using the "PRCV" and check if the fuel pressure changes.
   (1) If the pressure changes, check the following.
   - ECM terminal voltage (Refer to page F2–39.)
   - Engine coolant temperature signal
   - Intake air temperature signal
   - Closed 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 simulation function 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 F2–29.)

   b. If the operation sound is not heard, check the following.
   - PRC solenoid valve (Refer to below.)
   - Wiring between PRC solenoid valve and ECM terminal 2R







Inspection 2

1. Stop the engine.
2. Connect the **SSTs** (NGS).
3. By using the PID/DATA MONITOR AND RECORD function, verify that the PRC solenoid valve is OFF.
4. If the PRC solenoid valve is ON, check the following.
   - ECM terminal voltage (Refer to page F2–39.)
     - Engine coolant temperature signal
     - Intake air temperature signal
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 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 below.)
   - Wiring between PRC solenoid valve and ECM terminal 2R

PRC SOLENOID VALVE

Inspection

1. Remove the PRC solenoid valve.
2. Check for air flow between ports of the solenoid valve.

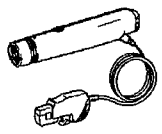
O—O: Continuity O═O: Air flow B+: Battery positive voltage

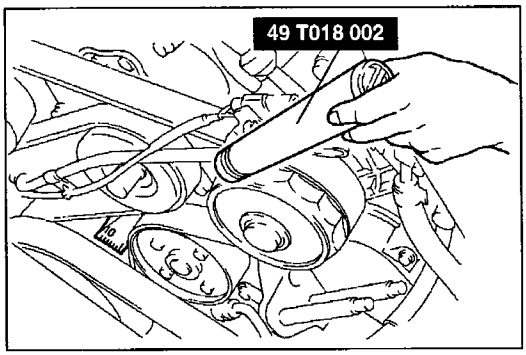
Step	Terminal		Port		
	A	B	A	B	C
1	O—O			O═O	
2	B+	Ground	O═O		

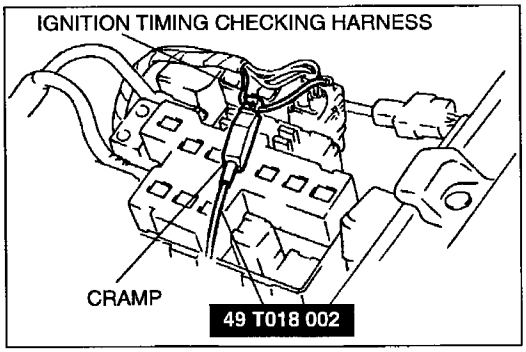
3. If not as specified, replace the PRC solenoid valve.

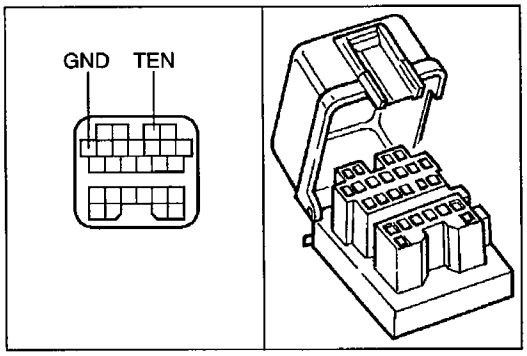
ELECTRONIC SPARK ADVANCE (ESA) CONTROL SYSTEM

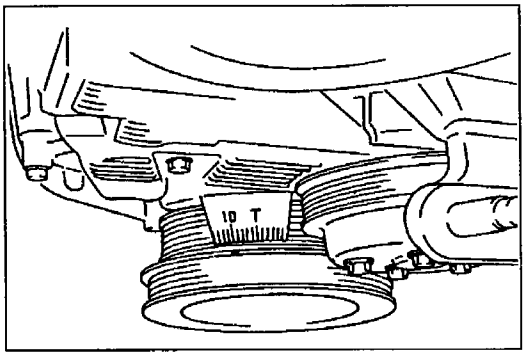
PREPARATION
SST

49 T018 002 Timing light		For inspection of ignition timing







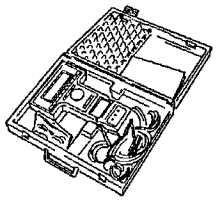
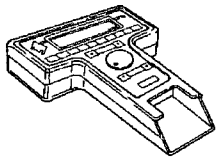
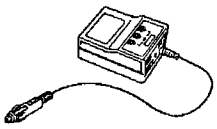
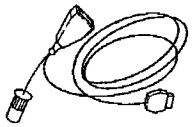
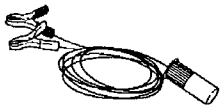
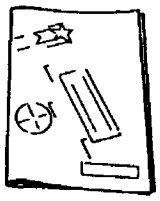
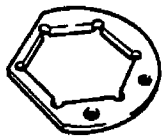


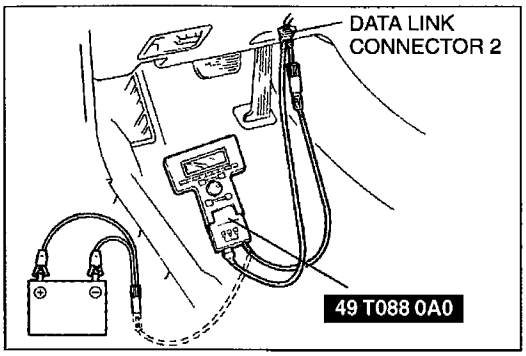
SYSTEM INSPECTION

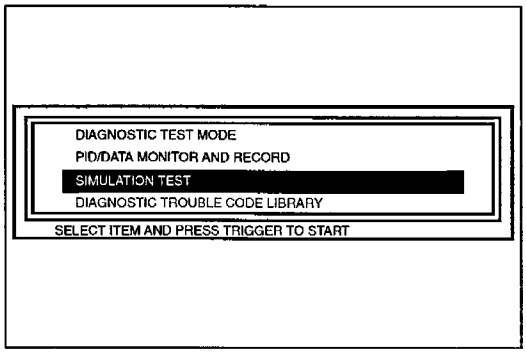
1. Turn off following electrical loads.
   - Power steering
   - A/C
2. Connect the **SST** to the ignition timing checking harness with the arrow on its cramp facing the connector.
3. Connect the data link connector terminals TEN and GND with a jumper wire.
4. Start the engine and verify that the ignition timing retards as the engine warms up.
5. If not as specified, check the ECM terminal 3Q (Engine coolant temperature sensor) voltage.
   (Refer to page F2–39.)
6. Disconnect a jumper wire.
7. Verify that the engine is completely warmed up.
8. Increase the engine speed and verify that the ignition advances accordingly.
9. If not as specified, check voltage at following terminals.
   - ECM terminal 3E (Mass air flow sensor)
   - ECM terminal 4AH 4AL (Crankshaft position sensor)

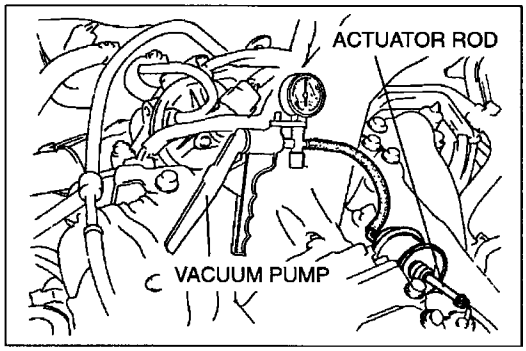
AIR CHARGING PRESSURE CONTROL

PREPARATION
SST

49 T088 0A0 NGS set 	For inspection of air charging pressure control	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of air charging pressure control
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of air charging pressure control	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of air charging pressure control
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of air charging pressure control	49 T088 008A Instruction Manual 	For inspection of air charging pressure control
49 T088 010B Program Card 	For inspection of air charging pressure control	49 T013 001 Holder 	For Disassembly / Assembly of Lysholm compressor







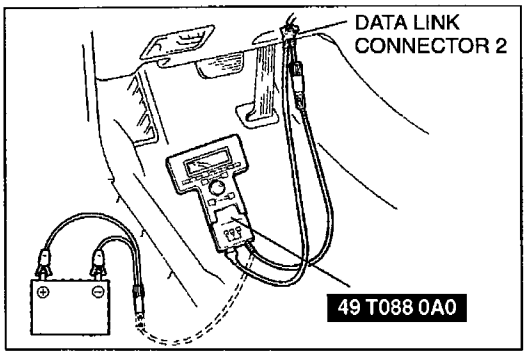
CHARGE AIR COOLER BYPASS ACTUATOR

System Inspection

1. Connect the **SST** (NGS) to the data link connector 2.
2. Start the engine and verify that the actuator rod is pulled into the charge air cooler bypass solenoid valve actuator.
3. Select the SIMULATION TEST function of the NGS.
4. Select "CACBYP" on the NGS display.
5. Use the SIMULATION TEST function, turn OFF the "CACBYP" and verify that the actuator rod returns.
6. If not as specified, stop the engine.
7. Turn the ignition switch to ON.
8. Use the SIMULATION TEST function, check operation sound of the charge air cooler bypass solenoid valve.
9. If the operation sound is heard, inspect following.
   - Vacuum hose for damage or looseness
   - Vacuum pump
   - Damaged diaphragm
   - Shutter valve for sticking
10. If the operation sound is not heard, inspect the charge air cooler bypass solenoid valve. (Refer to page F2–79.)

Inspection

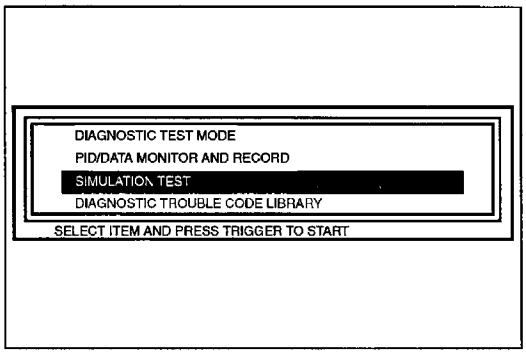
1. Disconnect the vacuum hose from the charge air cooler bypass actuator.
2. Install the vacuum pump to the charge air cooler bypass actuator. Apply vacuum of approx. 25.4 kPa {190 mmHg, 7.48 inHg} and verify that the actuator rod operates.
3. If not as specified, replace the charge air cooler bypass actuator. (Refer to page F2–79.)



ABV ACTUATOR

System Inspection

1. Connect the **SST** (NGS) to the data link connector 2.
2. Connect a vacuum gauge to the pressure regulator vacuum hose.
3. Start the engine and completely warm up the engine.
4. Increase the engine speed and note the vacuum gauge reading.

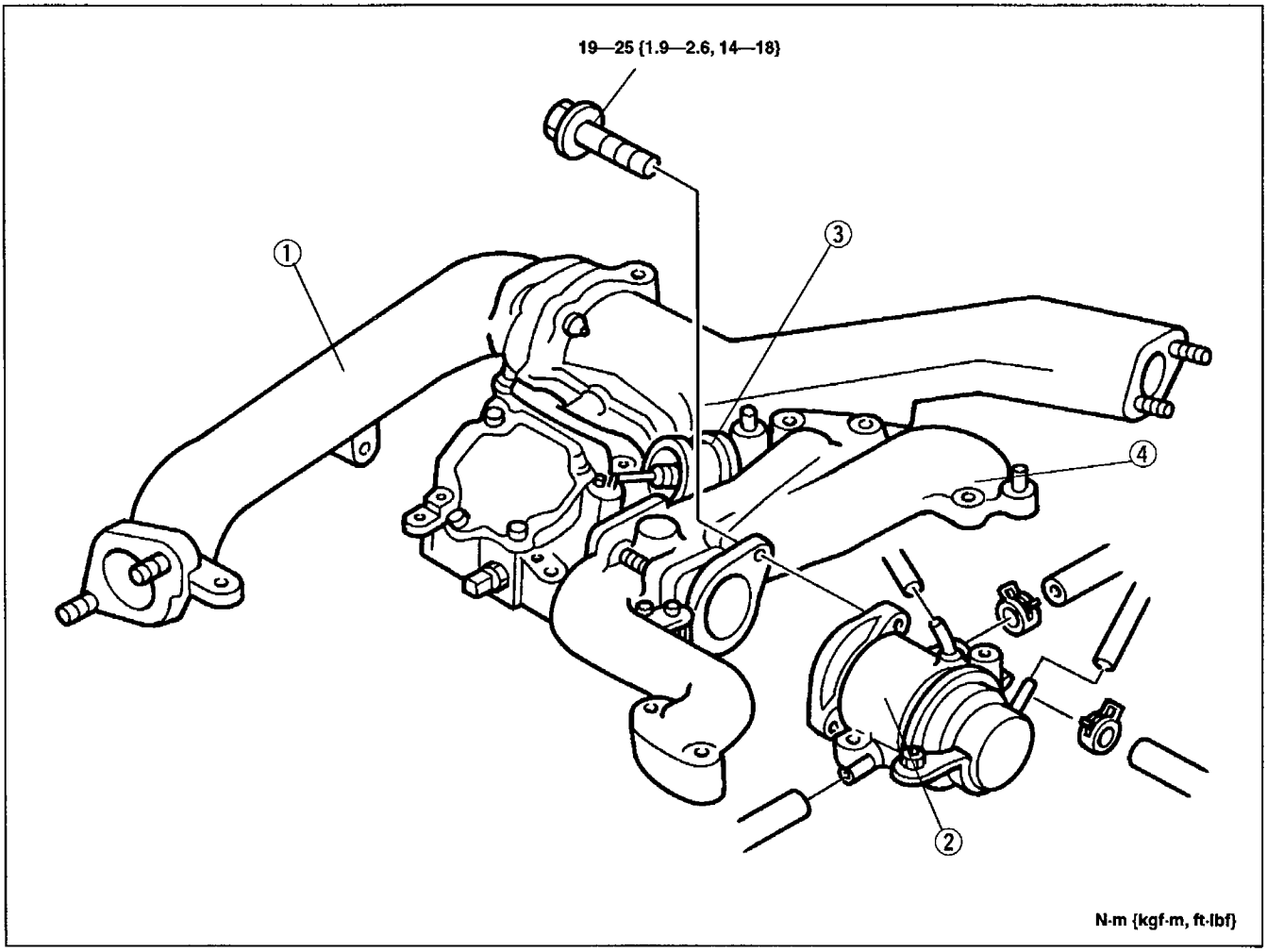


5. Select the SIMULATION TEST function of the NGS.
6. Select the "ABVVAC" on the NGS display.
7. Use the SIMULATION TEST function, set the "ABVVAC" duty value at 100%. Increase the engine speed and note the vacuum gauge reading. Verify that the value is lower than the one measured in Step 4.
8. If not as specified, stop the engine.
9. Turn the ignition switch to ON.
10. Use the SIMULATION TEST function, check operation sound of the ABV bypass solenoid valve (vacuum).
11. If the operation sound is heard, inspect following.
    - Vacuum hose for damage of looseness
    - Vacuum pump (Refer to page F2–80.)
    - Damaged diaphragm
    - Shutter valve for sticking
    - ECM terminal voltage.
      2A (ABV solenoid valve: vent)
      2M (ABV solenoid valve: vacuum)
12. If the operation sound is not heard, inspect the ABV solenoid valve (vacuum). (Refer to page F2– 79.)

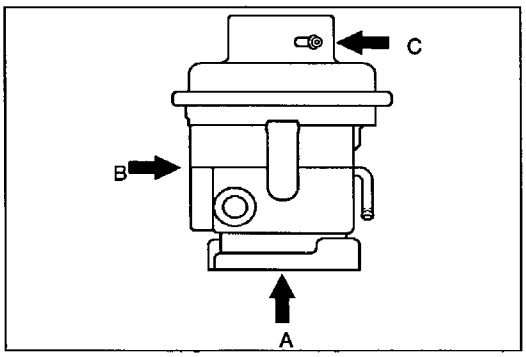
Removal / Installation

Note
- Do not remove the ABV actuator and the charge air cooler bypass actuator when not necessary.

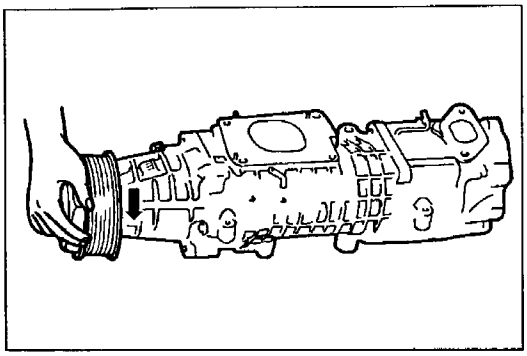
1. Disconnect the negative battery cable.
2. Drain the coolant from the radiator. (Refer to section E.)
3. Remove the air intake pipe assembly.
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal.
6. Refill the radiator with the specified engine coolant. (Refer to section E.)



1. Air intake pipe No.1
2. ABV actuator
3. Charge air cooler actuator
4. Air intake pipe No.2



Inspection
1. Remove the ABV actuator.
2. Verify that the air does not flow through ports A and B.
3. Install the vacuum pump to port C.
4. Using the vacuum pump, apply vacuum over 33.3 kPa {250 mmHg, 9.84 inHg} and verify that air flows through ports A and B.
5. Increase vacuum and verify that the air flow volume increases accordingly.
6. If not as specified, replace the ABV actuator.



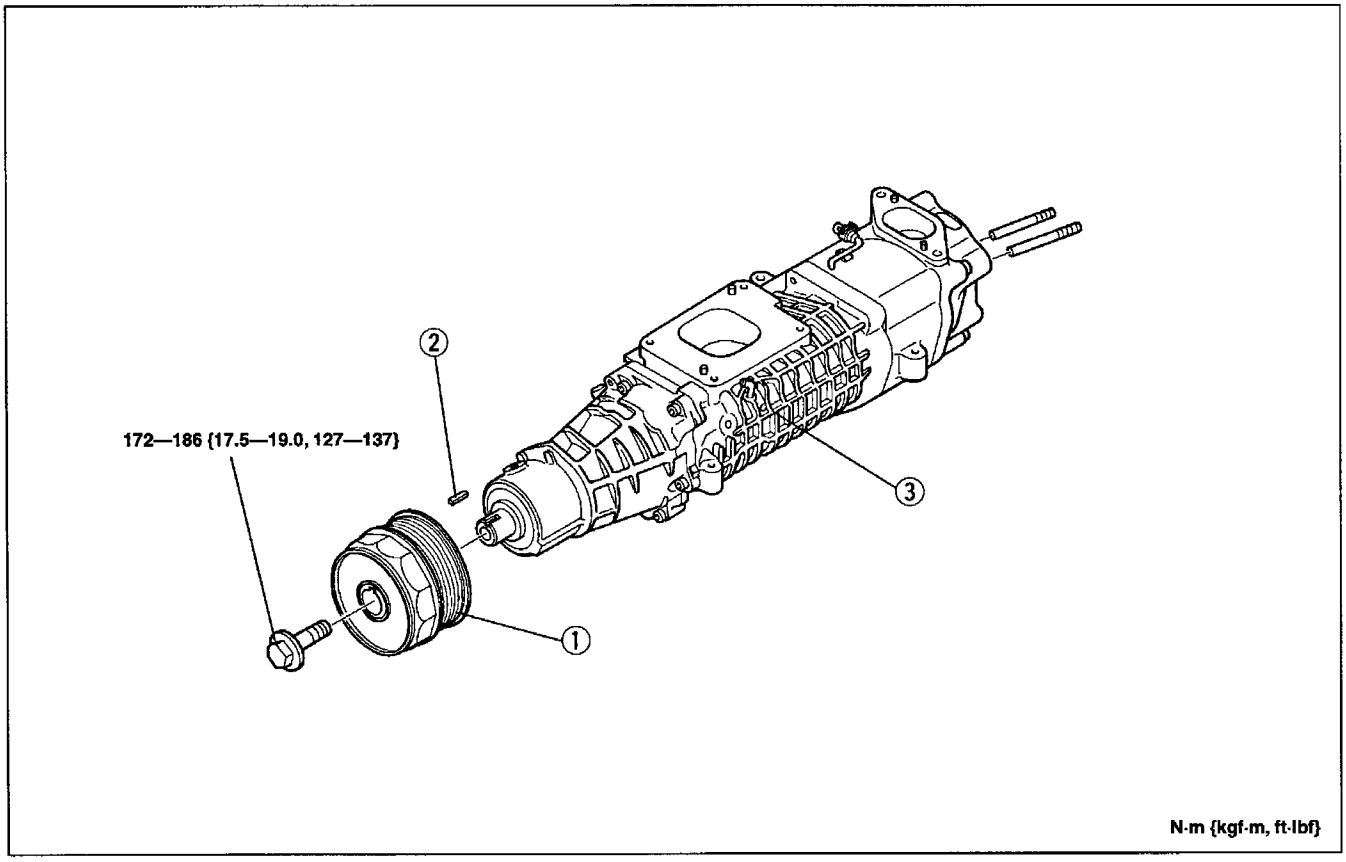
LYSHOLM COMPRESSOR

Inspection

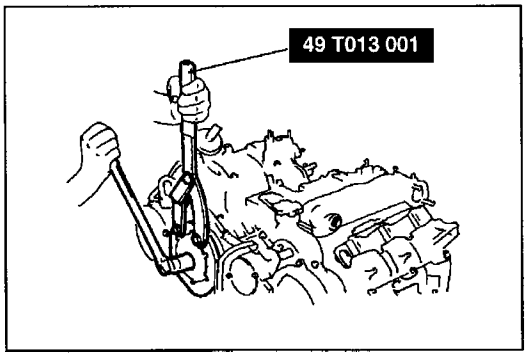
1. Turn the lysholm compressor by hand and verify that it rotates smoothly. If not, replace the lysholm compressor.
2. Check the lysholm compressor for cracks and damage. Replace the lysholm compressor if necessary. (Refer to below.)

Disassemble / Assemble

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Visually inspect each part and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



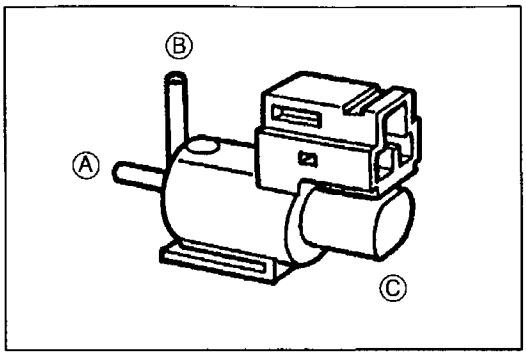
1. Lysholm compressor pulley
2. Key
3. Lysholm compressor

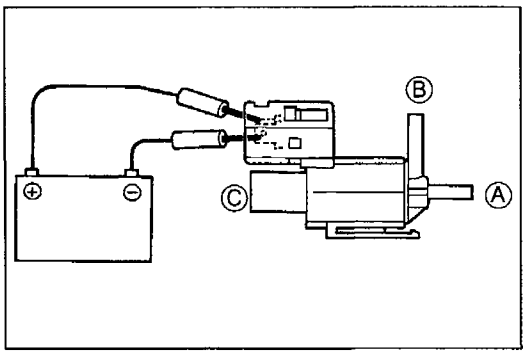


Disassembly / Assembly note

Lysholm compressor pulley

Install the **SST** to hold the pulley when turning the pulley bolt.





CHARGE AIR COOLER BYPASS SOLENOID VALVE

Inspection

1. Remove the charge air cooler bypass solenoid valve. (Refer to page F2–6.)
2. Blow air into each port and verify that air flows as specified below.

Ports	Air flow
A–B	No
A–C	No
B–C	Yes

3. If not as specified, replace the charge air cooler bypass solenoid valve.
4. Apply battery positive voltage between the terminals of the charge air cooler bypass solenoid valve.
5. Blow air into each port and verify that air flows as specified below.

Ports	Air flow
A–B	Yes
A–C	No
B–C	No

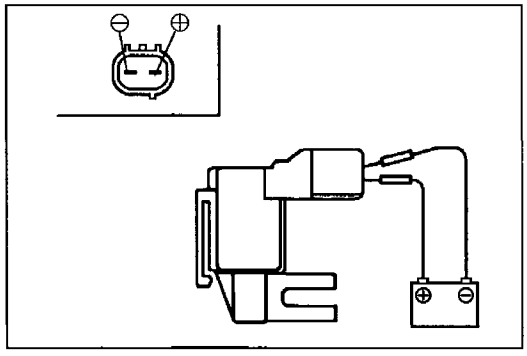
6. If not as specified, replace the charge air cooler bypass solenoid valve.

ABV SOLENOID VALVE

Inspection

ABV solenoid valve (vacuum)

1. Remove the ABV solenoid valve (vacuum). (Refer to page F2–6.)
2. Under the following conditions, check for airflow between ports A and B of the ABV solenoid valve (vacuum).

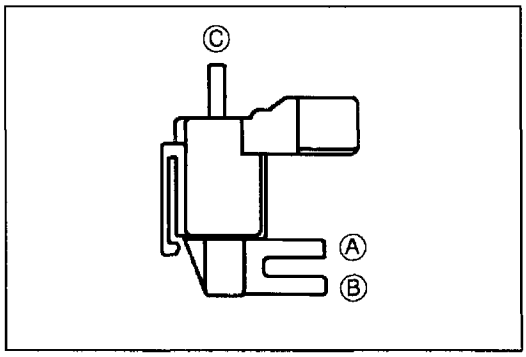


B+: Battery positive voltage

Terminals A–B	Air flow
B+ applied	Yes
B+ not applied	No

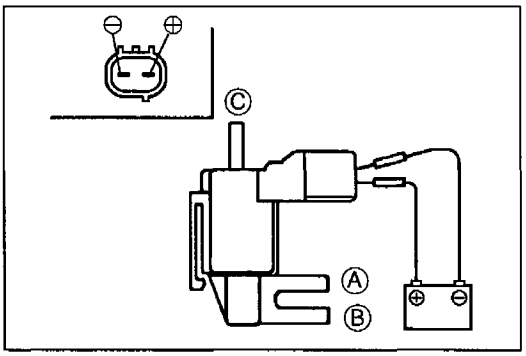
3. If not as specified, replace the ABV solenoid valve (vacuum).

ABV solenoid valve (vent)



1. Remove the ABV solenoid valve (vent). (Refer to page F2–6.)
2. Blow air into each port and verify that air flows as specified below.

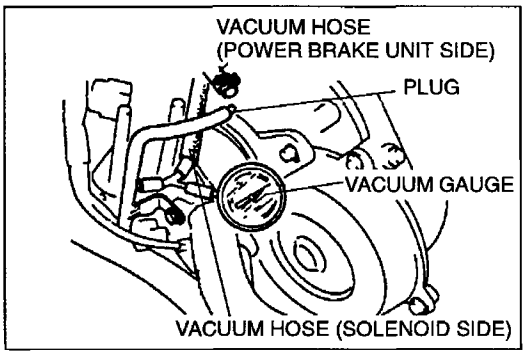
Ports	Air flow
A–B	Yes
A–C	No
B–C	No



3. If not as specified, replace the ABV solenoid valve (vent).
4. Apply battery positive voltage between the terminals of the ABV solenoid valve (vent).
5. Blow air into each port and verify that air flows as specified below.

Ports	Air flow
A–B	Yes
A–C	Yes
B–C	Yes

6. If not as specified, replace the ABV solenoid valve (vent).



VACUUM PUMP

System Inspection

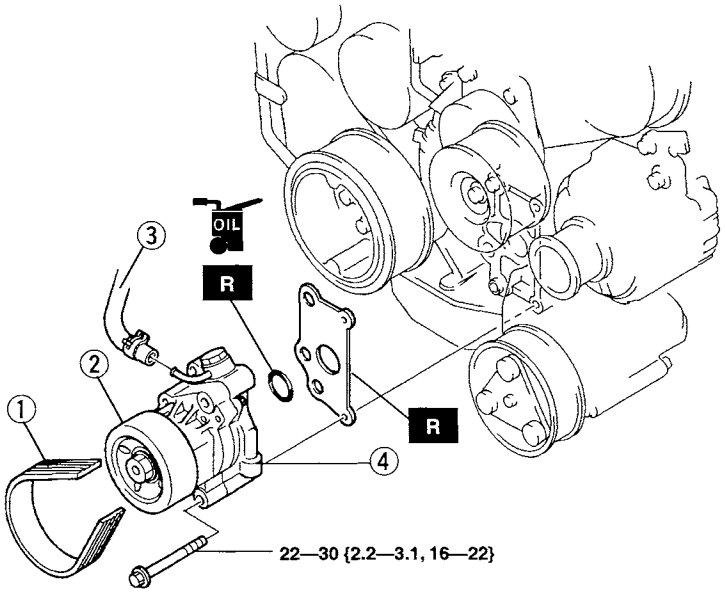
1. Disconnect the vacuum hose from the power brake unit side of the vacuum pump and plug them.
2. Disconnect the vacuum hose from the solenoid valve side of the vacuum pump and connect a vacuum gauge as shown in the figure.
3. Under the following conditions, measure the vacuum using a vacuum gauge.

Condition	Vacuum (kPa {mmHg, inHg})
After running engine at 900 rpm for 20 sec.	Above 58.7 {440, 17.4}
After running engine at 1,800 rpm for 20 sec.	Above 77.3 {580, 22.9}

4. If not as specified, replace the vacuum pump.

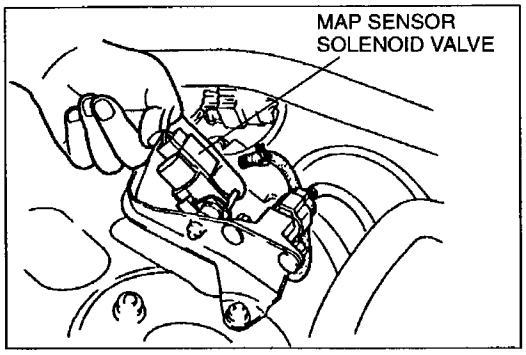
Removal / Installation

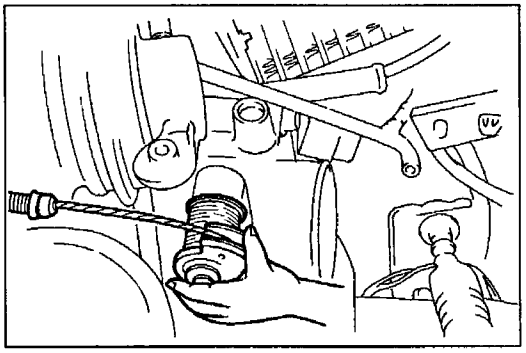
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.

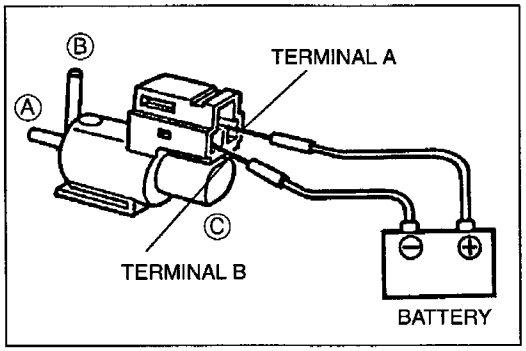


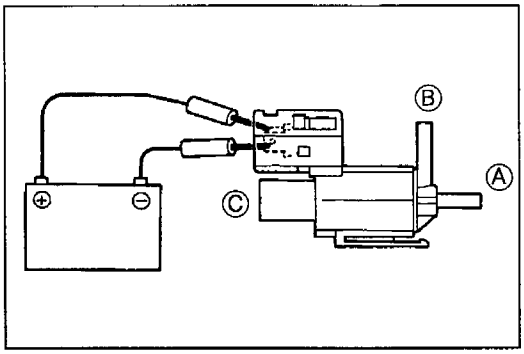
N·m {kgf·m, ft·lbf}

1. Drive belt (Generator) ..... section B2
2. Pulley
3. Vacuum hose
4. Vacuum pump









MANIFOLD ABSOLUTE PRESSURE SENSOR SWITCHING CONTROL

SYSTEM INSPECTION

1. Warm up the engine to normal operating temperature and let it idle.
2. Disconnect the vacuum hose from the MAP sensor solenoid valve side of the manifold absolute pressure sensor.
3. Put a finger on the port of the MAP sensor solenoid valve and verify that no vaccum is felt.
4. Open the throttle valve. Increase the engine speed to 4,000 rpm and hold it.
5. Put a finger on the port of the manifold absolue pressure sensor solenoid valve and verify that vacuum is felt.
6. If not as speicfied, check following.
   - Manifold absolute pressure sensor soleonid valve
   - Vacuum hose for damage or looseness
   - ECM terminal voltages
     3E (Mass air flow sensor)
     4P (MAP sensor solenoid valve)
     4AH, 4AL (Crankshaft position sensor)
     3X (Closed throttle position switch)

MAP SENSOR SOLENOID VALVE

Inspection

1. Remove the MAP sensor soleonid valve. (Refer to page F2–6.)
2. Blow air into each port and verify that air flows as specified below.

Ports	Air flow
A–B	No
A–C	No
B–C	Yes

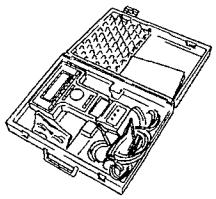
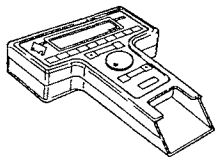
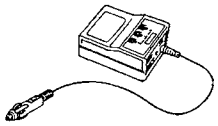
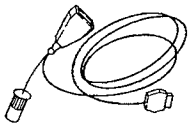
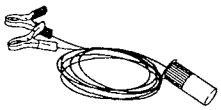
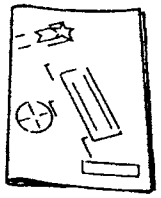
3. If not as specified, replace the MAP sensor solenoid valve.
4. Apply battery positive voltage between the terminals of the MAP sensor solenoid valve.
5. Blow air into each port and verify that air flows as specified below.

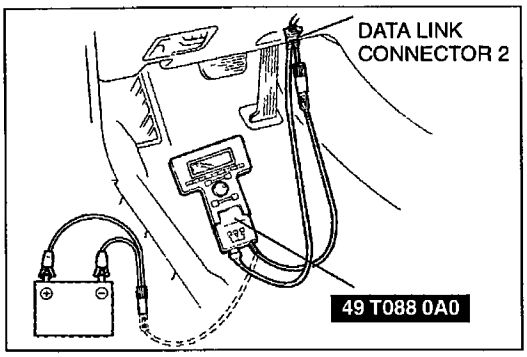
Ports	Air flow
A–B	Yes
A–C	No
B–C	No

6. If not as specified, replace the MAP sensor solenoid valve.

EXHAUST GAS RECIRCULATION (EGR) CONTROL SYSTEM

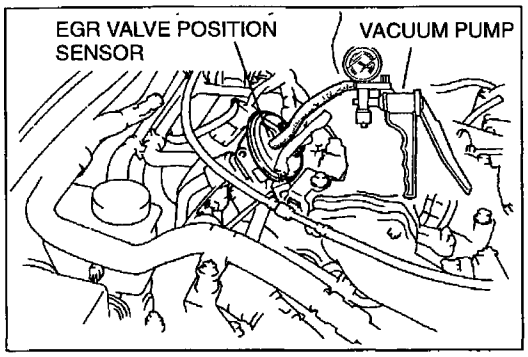
PREPARATION
SST

49 T088 0A0 NGS set 	For inspection of EGR control system	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of EGR control system
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of EGR control system	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of EGR control system
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of EGR control system	49 T088 008A Instruction Manual 	For inspection of EGR control system
49 T088 010B Program Card 	For inspection of EGR control system	—	—



SYSTEM INSPECTION

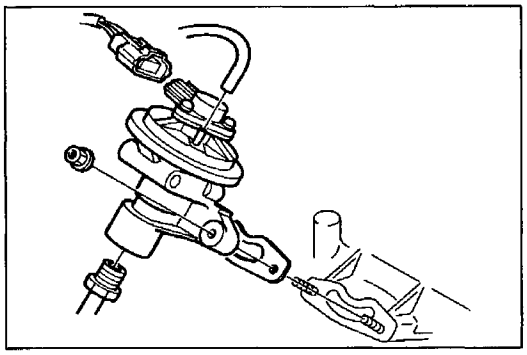
1. Connect the **SSTs** (NGS).
2. Start the engine and let it idle.
3. Select the SIMULATION TEST function on the NGS display.
4. Increase the duty value of the EGR solenoid valve (vacuum) from 0% to 100% by using the "EGRVAC". Operate the EGR solenoid valve (vacuum) and check if the engine speed becomes 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) Increase the duty value of the EGR solenoid valve (vacuum) from 0% to 100% by using the "EGRVAC". Operate the EGR solenoid valve (vacuum) and check if operation sound of the solenoid valve is heard.
      I. If the operation sound is heard, check the following.
         • Loose or damaged vacuum hose
         • EGR valve (Refer to page F2–85.)
         • EGR solenoid valve (vent) (Refer to page F2–86.)
      II. If the operation sound is not heard, check the following.
         • EGR solenoid valve (vacuum) (Refer to below.)
         • Wiring between EGR solenoid valve (vacuum) and ECM terminal 4K.



EGR VALVE

Inspection

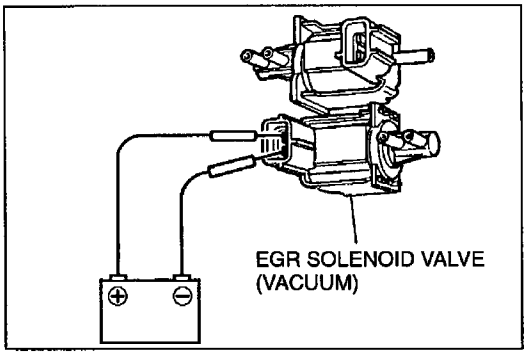
1. Start the engine and let it idle.
2. Connect a vacuum pump as shown in the figure and apply vacuum.
3. Verify that the engine runs roughly or stalls.
4. If not as specified, replace the EGR valve.



Replacement

1. Disconnect the EGR hose.
2. Disconnect the vacuum hose.
3. Disconnect the EGR valve position sensor connector.
4. Remove the EGR valve.
5. Remove the gasket.
6. Install in the reverse order of removal.

Tightening torque:
19—25 N·m {1.9—2.6 kgf·cm, 1.7—2.2 in·lbf}



EGR SOLENOID VALVE

Inspection

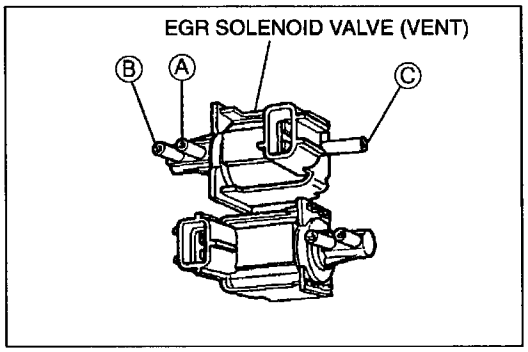
EGR solenoid valve (vacuum)

1. Remove the EGR solenoid valve (vacuum). (Refer to page F2–6.)
2. Apply battery positive voltage to terminal A and ground terminal B of the EGR solenoid valve (vacuum). Verify that air flows as shown below.

Specification B+: Battery positive voltage

Terminal A–B	Air flow
B+ applied	Yes
B+ not applied	No

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

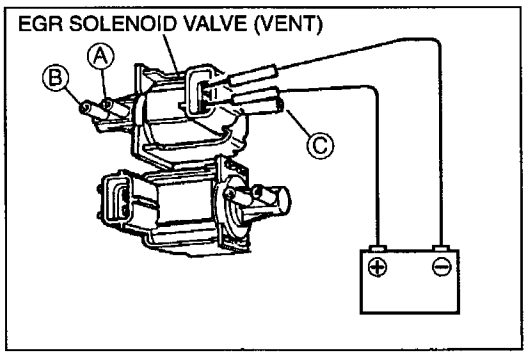


EGR solenoid valve (vent)

1. Remove the EGR solenoid valve (vent). (Refer to page F2–6.)
2. Verify that air flows as shown below.

Specification

Port	Air flow
A–B	Yes
A–C	No
B–C	No



3. If not as specified, replace the EGR solenoid valve (vent).
4. Apply battery positive voltage to terminal A and ground terminal B of the EGR solenoid valve (vent). Verify that air flows as shown below.

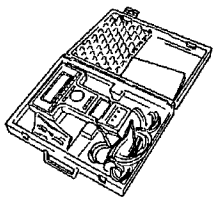
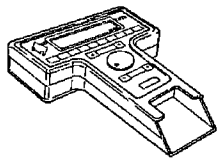
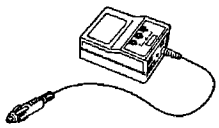
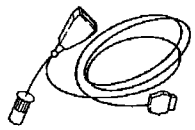
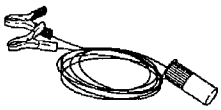
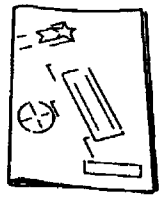
Specification

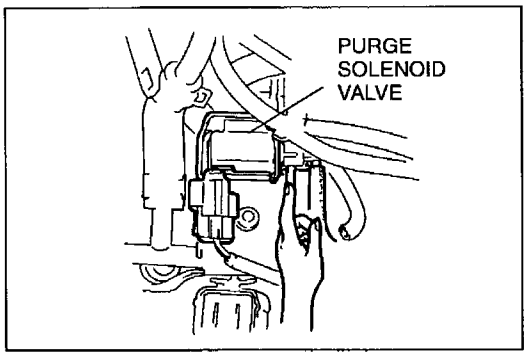
Port	Air flow
A–B	Yes
A–C	Yes
B–C	Yes

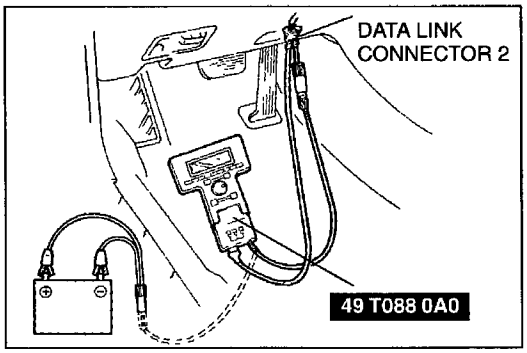
5. If not as specified, replace the EGR solenoid valve (vent).

PURGE CONTROL SYSTEM

PREPARATION
SST

49 T088 0A0 NGS set 	For inspection of purge control system	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of purge control system
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of purge control system	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of purge control system
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of purge control system	49 T088 008A Instruction Manual 	For inspection of purge control system
49 T088 010B Program Card 	For inspection of purge control system	—	—





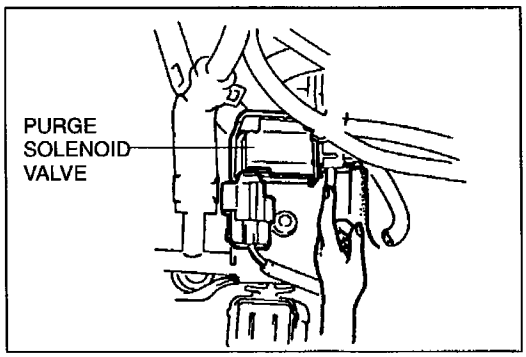
SYSTEM INSPECTION

1. Start and warm up the engine to the 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).
   (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 F2–99.)
   (3) If diagnostic trouble codes are not shown, check the following.
   • Purge solenoid valve (Refer to below.)
6. Reconnect the vacuum hose.
7. Connect the **SSTs** (NGS).
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. It code No. P0443 is shown, carry out troubleshooting of the code No. P0443.
    (Refer to page F2–99.)
    (3) 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 below.)

PURGE SOLENOID VALVE

Inspection

1. Remove the purge solenoid valve.
2. Apply battery positive voltage to terminal A and ground terminal B of the solenoid valve. Verity that air flows as shown below.



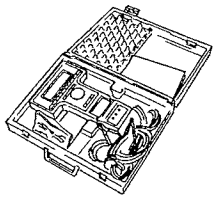
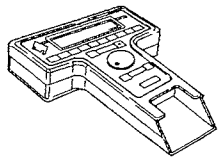
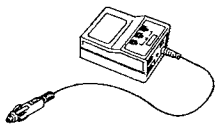
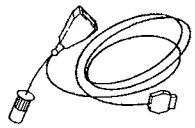
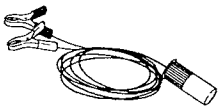
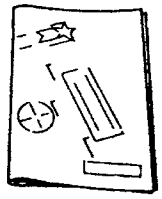
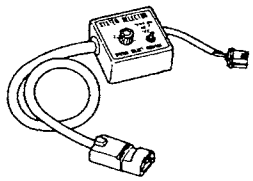
Specification B+: Battery positive voltage

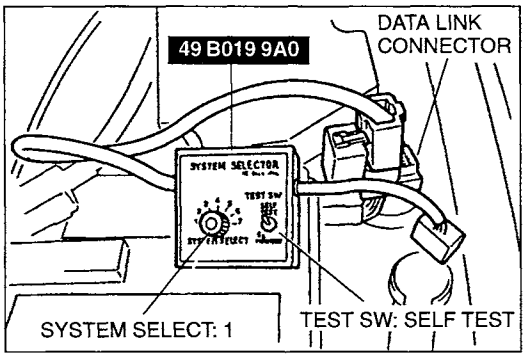
Terminal A–B	Air flow
B+ applied	Yes
B+ not applied	No

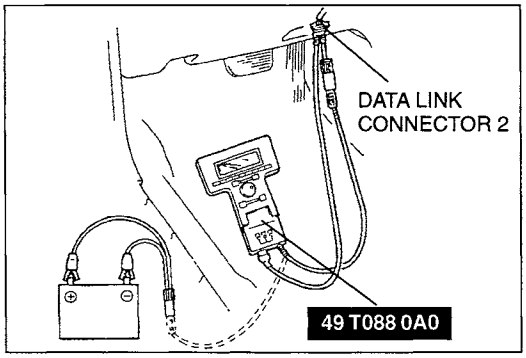
3. If not as specified, replace the purge solenoid valve.

ELECTRICAL FAN CONTROL SYSTEM

PREPARATION
SST

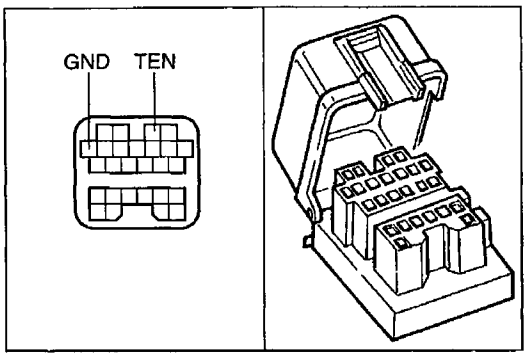
49 T088 0A0 NGS set		For inspection of electrical fan control system	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of electrical fan control system
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 		For inspection of electrical fan control system	49 T088 004 NGS OBDII Adapter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

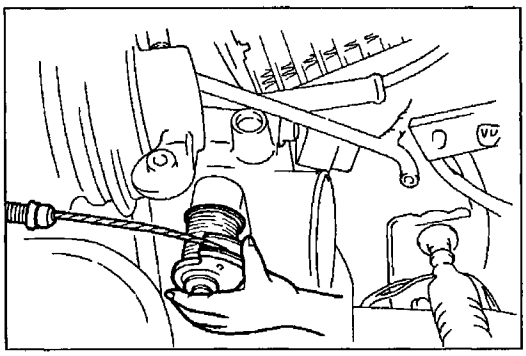


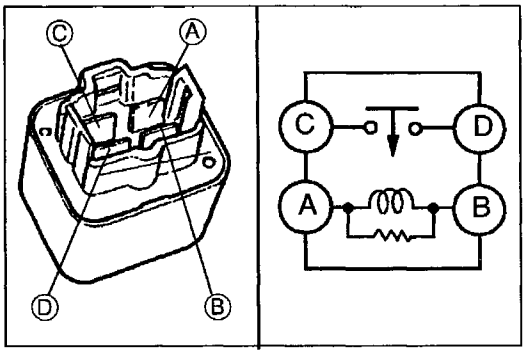


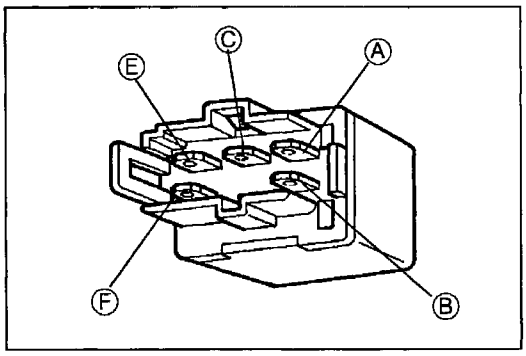
SYSTEM INSPECTION

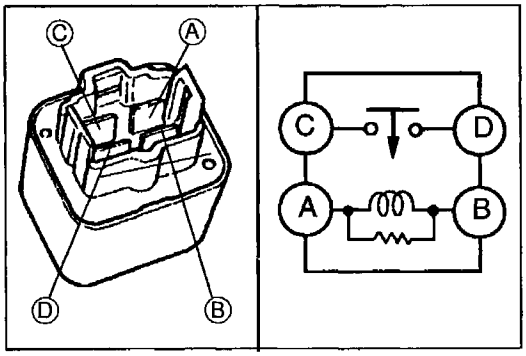
1. Verify that the engine is cold.
2. Turn the ignition switch to ON.
3. Verify that the cooling fan is not operating.
4. If the cooling fan is operating, do as follows.
   (1) Connect the **SSTs** (NGS).
   (2) Select the PID/DATA MONITOR AND RECORD function on the NGS display.
   (3) By using the "FANCLNL", verify that the cooling fan control signal is OFF.
      I. If the cooling fan control signal is ON, check the following.
         • ECM terminal voltage (Refer to page F2–39.)
         • Engine coolant temperature signal
      II. If the cooling fan control signal is OFF, check the following.
         • Fan relay
         • Short circuit in wiring harnesses and connectors (Main relay — Fan relay — ECM)
5. Connect the **SST** (System selector) and set system select switch to 1 and test switch to SELF TEST.
6. Depress the accelerator pedal and verify that the cooling fan operates.
7. If the cooling fan does not operate, do as follows.
   (1) Connect the **SSTs** (NGS).
   (2) Select the SIMULATION TEST function on the NGS display.











(3) Turn the fan relay from OFF to ON by using the "FANCLNL" and check for the cooling fan operation.
I. If the cooling fan operates, check the following.
- PCM terminal voltage (Refer to page F1–39.)
- Diagnostic test mode signal
- Closed throttle position signal

II. If the cooling fan does not operate, do as follows.
a. Turn the fan relay from OFF to ON by using the "FAN". Operate the fan relay and check if the operation sound of the relay is heard.
b. If the operation sound is heard, check the following.
- Wiring harnesses and connectors (Fan relay — Fan motor)
- Fan motor (Refer to section E.)

c. If the operation sound is not heard, check the following.
- Fan relay
- Open circuit in wiring harnesses and connectors (Main relay — Fan relay — ECM)

COOLING FAN RELAY

Inspection

Four (4) terminal type

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

Specification B+: Battery positive voltage

Terminal A–B	Terminal C–D
B+ applied	Continuity
B+ not applied	No continuity

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

Six (6) terminal type

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

Specification B+: Battery positive voltage

Terminal A–B	Terminal C–E	Terminal C–F
B+ applied	No continuity	Continuity
B+ not applied	Continuity	No continuity

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

CONDENSER FAN RELAY

Inspection

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

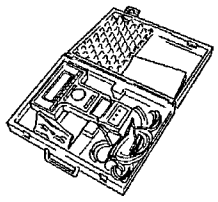
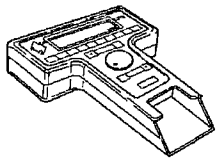
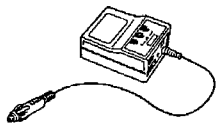
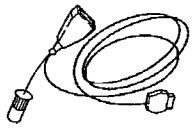
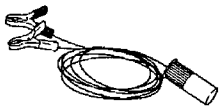
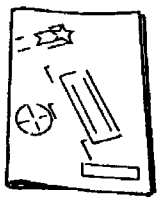
Specification B+: Battery positive voltage

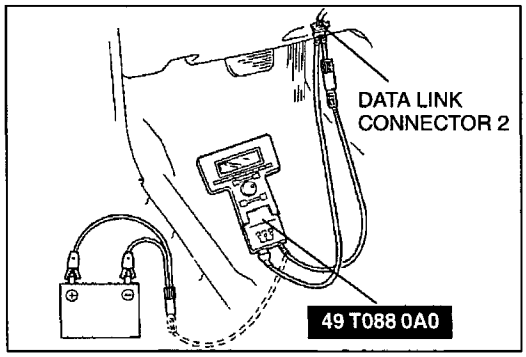
Terminal A–B	Terminal C–D
B+ applied	Continuity
B+ not applied	No continuity

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

A/C CUT-OFF CONTROL SYSTEM

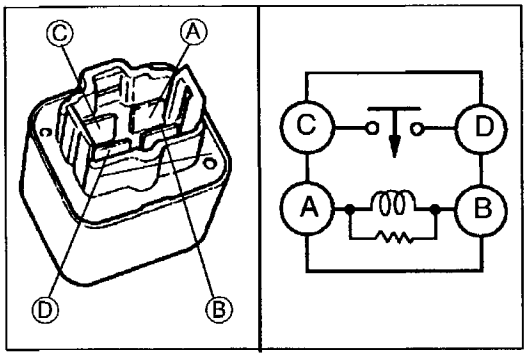
PREPARATION
SST

49 T088 0A0 NGS set 	For inspection of A/C cut off control system	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of A/C cut off control system
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of A/C cut off control system	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of A/C cut off control system
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of A/C cut off control system	49 T088 008A Instruction Manual 	For inspection of A/C cut off control system
49 T088 010B Program Card 	For inspection of A/C cut off control system	—	—



SYSTEM INSPECTION

1. Position the vehicle on a chassis roller and start the engine.
2. Shift the selector lever into other than P and N.
3. Turn the A/C switch and the fan switch on.
4. Fully open the throttle valve. Then, 3—6 seconds after, check if the operation sound of the A/C compressor electromagnetic clutch is heard.
5. If the operation sound is not heard, do as follows.
   (1) Connect the **SSTs** (NGS).
   (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" and check for the operation sound of the relay.
      I. If the operation sound is heard, check the following.
         • ECM terminal voltage (Refer to page F1–39.)
         • Load/no load distinction signal
         • Closed throttle position signal
      II. If the operation sound is not heard, check the following.
         • A/C relay
         • Open circuit in wiring harnesses and connector (Main relay — A/C relay — ECM)



A/C RELAY

Inspection

1. Remove the A/C relay.
2. Apply battery positive voltage and check continuity between terminals of the relay by using an ohmmeter.

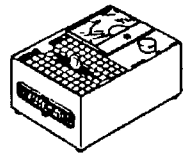
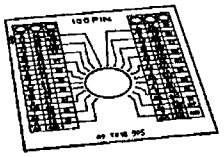
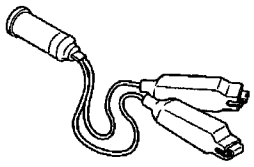
Specification B+: Battery positive voltage

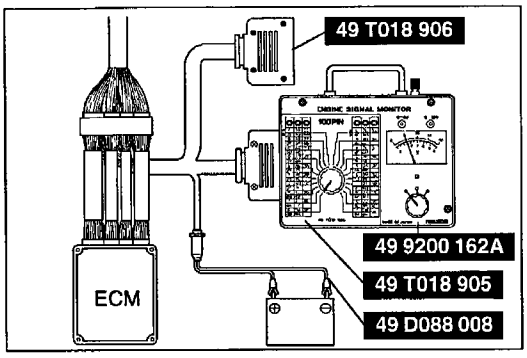
Terminal A–B	Terminal C–D
B+ applied	Continuity
B+ not applied	No continuity

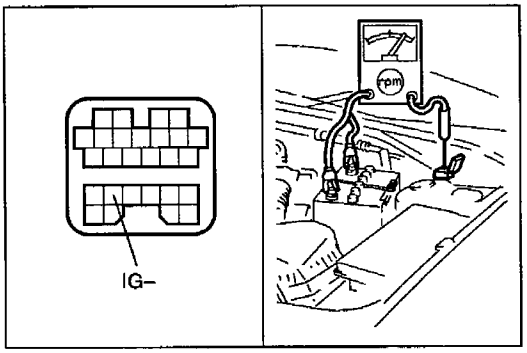
3. If not as specified replace the A/C relay.

HEATED OXYGEN SENSOR HEATER CONTROL SYSTEM

PREPARATION
SST

49 9200 162A Monitor, engine signal 	For inspection of heated oxygen sensor heater control	49 T018 905 Sheet 	For inspection of heated oxygen sensor heater control
49 T018 906 Adapter harness 	For inspection of heated oxygen sensor heater control	49 D088 008 Harness adapter, Power 	For inspection of heated oxygen sensor heater control





SYSTEM INSPECTION
Heated Oxygen Sensor Heater (Front)
Using SSTs (Engine signal monitor).

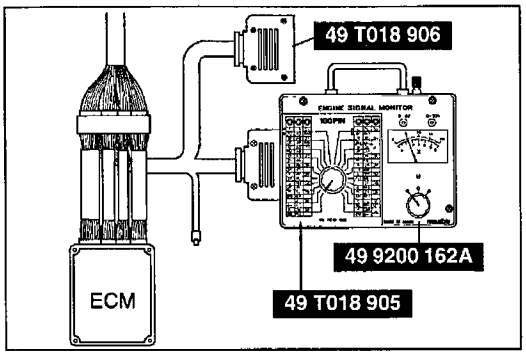
1. Remove the ECM. (Refer to page F2–39.)
2. Connect the **SSTs** to the ECM.
3. Turn the ignition switch to ON.
4. Measure the voltage at ECM terminal 4E and 4I by using a voltmeter.

   Specification: Below 1.0 V

5. Position the vehicle on a chassis roller and shift the selector lever to D.
6. Increase the engine speed over 4,000 rpm and measure the voltage at ECM terminals 4E and 4I by using a voltmeter.

   Specification: Battery positive voltage

7. If not as specified, inspect following.
   - ECM terminal 3E voltage (Mass air flow sensor)
   - ECM terminal 4AL, 4AH voltage (Crankshaft position sensor)
   - Heated oxygen sensor (Refer to page F2–58.)



Heated Oxygen Sensor Heater (Rear)

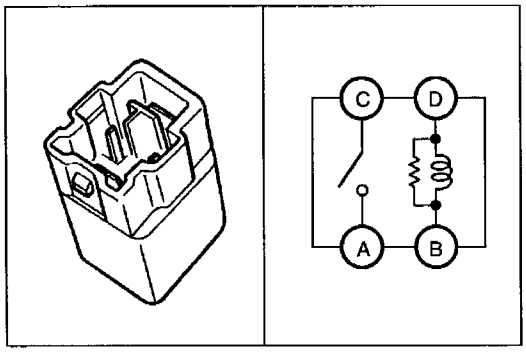
1. Remove the ECM. (Refer to page F2–39.)
2. Connect the **SSTs** to the ECM.
3. Start the engine.
4. Measure the ECM terminal 2F voltage by using a voltmeter.

   Specification: Below 1.0 V

5. Position the vehicle on a chassis roller and shift the selector lever to D.
6. Increase the vehicle speed over 80 km/h {50 mile/h} and measure the voltage at ECM terminal 2F.

   Specification: Battery positive voltage

7. If not as specified, inspect following.
   - ECM terminal 1C voltage (Vehicle speed sensor)
   - Heated oxygen sensor heater relay



HEATED OXYGEN SENSOR HEATER RELAY

Inspection

1. Remove the heated oxygen sensor heater relay.
2. Apply battery positive voltage and check continuity between terminals of the relay by using ohmmeter.

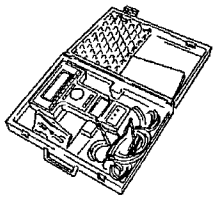
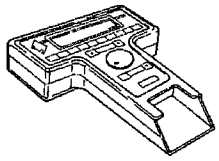
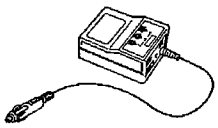
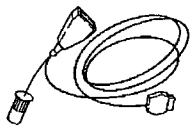
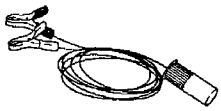
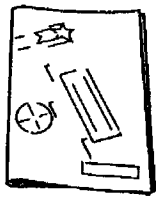
Specification B+: Battery positive voltage

Terminal A–B	Terminal C–D
B+ applied	Continuity
B+ not applied	No continuity

3. If not as specified, replace the heated oxygen sensor heater relay.

TORQUE REDUCTION CONTROL

PREPARATION
SST

49 T088 0A0 NGS set 	For inspection of torque reduction control	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of torque reduction control
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of torque reduction control	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of torque reduction control
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of torque reduction control	49 T088 008A Instruction Manual 	For inspection of torque reduction control
49 T088 010B Program Card 	For inspection of torque reduction control	—	—

SYSTEM INSPECTION

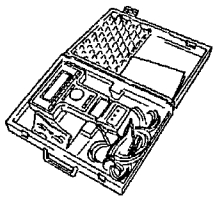
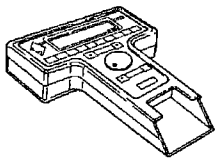
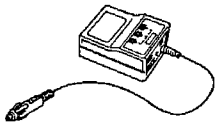
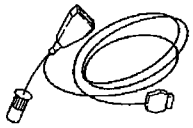
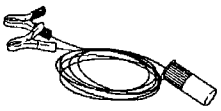
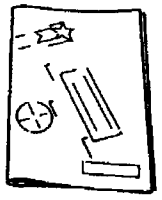
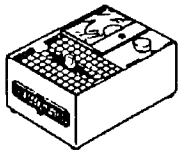
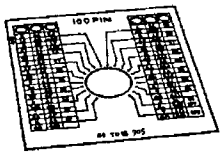
1. Verify that the following diagnostic trouble code is not displayed. (Refer to page F2–99.)
   - P1601
2. If the above code is displayed, carry out inspection following Symptom Troubleshooting.

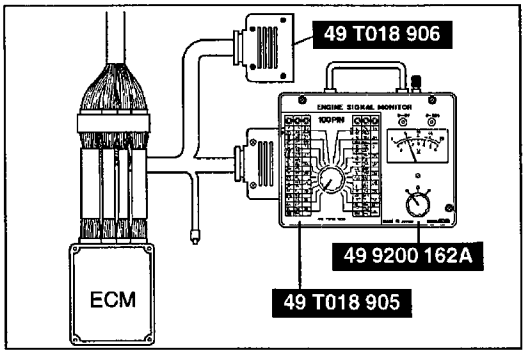
Note

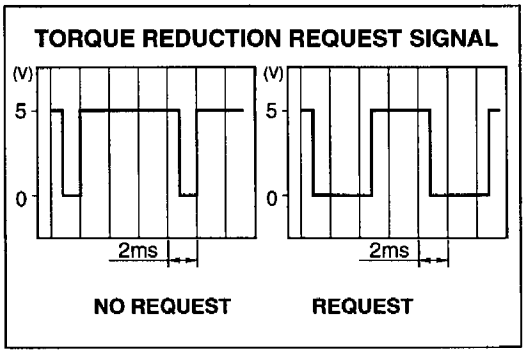
- The torque reduction control signal is transmitted between the ECM and TCM via serial communication along with other control signals.

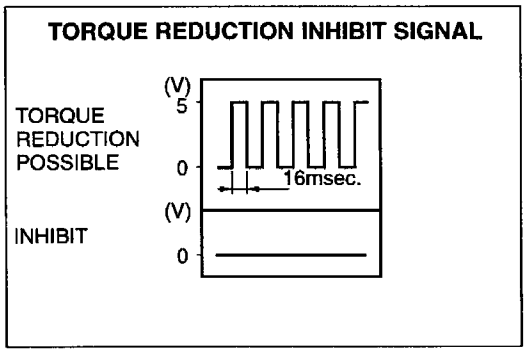
TRACTION CONTROL

PREPARATION
SST

49 T088 0A0 NGS set 	For inspection of traction control	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For inspection of traction control
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For inspection of traction control	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For inspection of traction control
49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For inspection of traction control	49 T088 008A Instruction Manual 	For inspection of traction control
49 T088 010B Program Card 	For inspection of traction control	49 9200 162A Monitor, Engine Signal 	For inspection of traction control
49 T018 906 Harness adapter 	For inspection of traction control	49 T018 905 Sheet 	For inspection of traction control





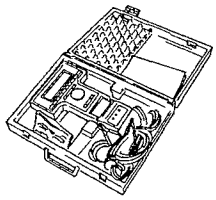
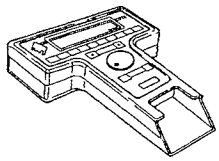
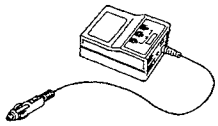
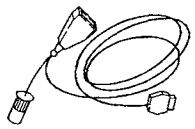
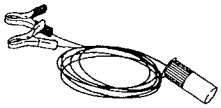
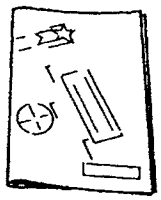


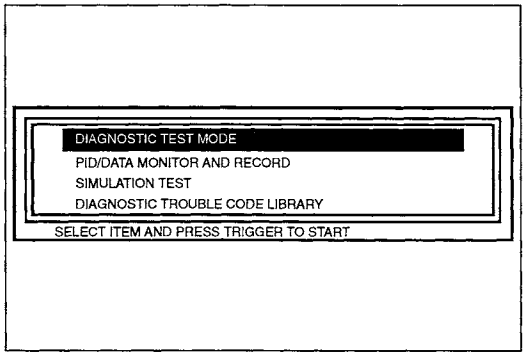
SYSTEM INSPECTION

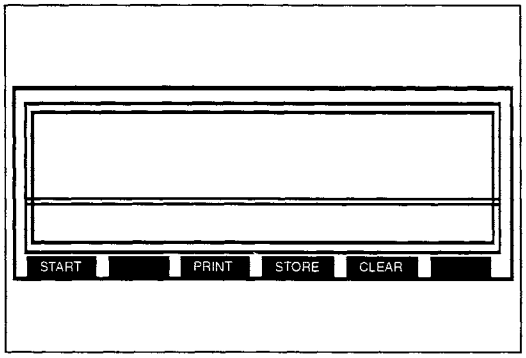
1. Remove the ECM. (Refer to page F2–39.)
2. Connect the **SSTs** to the ECM.
3. Warm up the engine to normal operating temperature and let it idle.
4. With no electrical load operating, check the torque reduction inhibit signal at the ECM terminal 1U by using an oscilloscope.
5. If the torque reduction inhibit signal can not be detected, carry out inspection following Symptom Troubleshooting. (Refer to page F2–99.)
   - P0100 (Mass air flow circuit malfunction)
   - P0105 (Manifold absolute pressure/Barometric pressure circuit malfunction)
   - P0110 (Intake air temperature circuit malfunction)
   - P0115 (Engine coolant temperature circuit malfunction)
   - P0120 (Throttle position circuit malfunction)
   - P0130, P0134, P0140, P0150, P0154, P0160 (O_2 sensor circuit malfunction no activity derected)
   - P0335 (Crankshaft position sensor circuit malfunction)
   - P1110 (Intake air temperature sensor (Dynamic chamber))
6. Lift up the vehicle.
7. Shift the selector lever to D.
8. Depress the accelerator pedal, and verify that the engine speed does not exceed 1,500 rpm.
9. If the engine speed smoothly increase over 1,500 rpm, check the torque reduction request signal at the ECM terminal 1Q by using an oscilloscope.
10. Depress the accelerator pedal, and verify that the signal changes as shown in the figure.
11. If there is no change, check the ABS/TCS control unit. (Refer to section P.)
12. Let the engine idle.
13. Check the torque reduction inhibit signal of the ECM terminal 1U by using an oscilloscope.
14. Disconnect the engine coolant temperature sensor connector, and verify that the signal voltage is 0V.
15. If not as specified, check the ECM terminal 3Q (Engine coolant temperature sensor) voltage.

ON-BOARD DIAGNOSTIC SYSTEM

PREPARATION
SST

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





DIAGNOSTIC TROUBLE CODE NUMBER
Inspection

1. Connect the **SSTs** (NGS) to the data link connector 2. (Refer to page F2–40.)
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 F2–99.)
6. When "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 NGS memory.
3. Perform diagnostic trouble code inspection again and verify that no diagnostic trouble codes are displayed.

Diagnostic Trouble Code Numbers

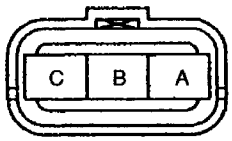
Code No.	Display on the NGS	Condition	Page
P0100	MAF/VAF—CIRCUIT MALFUNCTION	Mass or Volume air flow circuit malfunction	F2–103
P0105	MAP/BP—CIRCUIT MALFUNCTION	Manifold absolute pressure/Barometric pressure circuit malfunction	F2–104
P0110	IAT—CIRCUIT MALFUNCTION	Intake air temperature circuit malfunction	F2–105
P0115	ECT—CIRCUIT MALFUNCTION	Engine coolant temperature circuit malfunction	F2–106
P0120	TP—CIRCUIT MALFUNCTION	Throttle position circuit malfunction	F2–107
P0125	EXCESSIVE TIME TO ENTER CLOSED LOOP	Excessive time to enter closed loop fuel control	F2–108
P0130	O2S 11—CIRCUIT MALFUNCTION	O_2 sensor circuit malfunction	F2–109
P0134	O2S 11—CIRCUIT NO ACTIVITY DETECTED	O_2 sensor circuit no activity detected	F2–110
P0135	O2S 11—HEATER CIRCUIT MALFUCTION	O_2 sensor heater circuit malfunction	F2–111
P0140	O2S 12—CIRCUIT NO ACTIVITY DETECTED	O_2 sensor circuit no activity detected	F2–112
P0150	O2S 21—CIRCUIT MALFUNCTION	O_2 sensor circuit malfunction	F2–113
P0154	O2S 21—CIRCUIT NO ACTIVITY DETECTED	O_2 sensor circuit no activity detected	F2–114
P0155	O2S 21—HEATER CIRCUIT MALFUNCTION	O_2 sensor heater circuit malfunction	F2–115
P0160	O2S 22—CIRCUIT NO ACTIVITY DETECTED	O_2 sensor circuit no activity detected	F2–116
P0170	BANK 1—FUEL TRIM MALFUNCTION	Fuel trim malfunction	F2–117
P0173	BANK 2—FUEL TRIM MALFUNCTION	Fuel trim malfunction	F2–118
P0300	RANDOM MISFIRE DETECTED	Random misfire detected	F2–119
P0301	CYLINDER 1 MISFIRE DETECTED	Cylinder 1 misfire detected	F2–120

Code No.	Display on the NGS	Condition	Page
P0302	CYLINDER 2 MISFIRE DETECTED	Cylinder 2 misfire detected	F2–121
P0303	CYLINDER 3 MISFIRE DETECTED	Cylinder 3 misfire detected	F2–122
P0304	CYLINDER 4 MISFIRE DETECTED	Cylinder 4 misfire detected	F2–123
P0305	CYLINDER 5 MISFIRE DETECTED	Cylinder 5 misfire detected	F2–124
P0306	CYLINDER 6 MISFIRE DETECTED	Cylinder 6 misfire detected	F2–125
P0325	KNOCK SENSOR 1—CIRCUIT MALFUNCTION	Knock sensor 1 circuit malfunction	F2–126
P0335	CRANKSHAFT POS SENSOR-CKT MALFUNCTION	Crankshaft position sensor circuit malfunction	F2–127
P0400	EGR—FLOW MALFUNCTION	Exhaust gas recirculation flow malfunction	F2–128
P0420	BANK1 CAT EFFICIENCY BELOW LIMIT	Catalyst system efficiency below threshold	F2–129
P0430	BANK2 CAT EFFICIENCY BELOW LIMIT	Catalyst system efficiency below threshold	F2–129
P0440	EVAP SYSTEM—MALFUNCTION	Evaporative emission control system malfunction	F2–130
P0443	EVAP SYSTEM—PURGE CTRL VALVE CKT MALF	Evaporative emission control system purge control valve circuit malfunction	F2–131
P0505	IDLE CONTROL SYSTEM—MALFUNCTION	Idle control system malfunction	F2–132
P0510	CLOSED THROTTLE POS SWITCH—MALFUNCTION	Closed throttle position switch malfunction	F2–133
P0703	TORQUE CONV/BRAKE SW—MALFUNCTION	Brake switch input malfunction	F2–134
P1000	MORE DRIVING NEEDED TO COMPLETE TEST	Check of all OBDII systems is not complete since last memory clear	F2–135
P1110	IATS (D/C)—OPEN OR SHORT	Intake air temperature sensor (Dynamic chamber)	F2–136
P1113	IATS (L/C)—OPEN OR SHORT	Intake air temperature sensor (Lysholm compressor)	F2–137

Code No.	Display on the NGS	Condition	Page
P1170	HO2S 11—INVERSION	Heated oxygen sensor (Front RH) (Inversion)	F2–138
P1173	HO2S 21—INVERSION	Heated oxygen sensor (Front LH) (Inversion)	F2–139
P1195	EGRBS—OPEN OR SHORT	Manifold absolute pressure sensor	F2–140
P1196	STA SW—OPEN OR SHORT	Ignition switch (Start)	F2–141
P1345	SGC SIGNAL—NO SGC SIGNAL	SGC signal	F2–141
P1402	EGRS—OPEN OR SHORT	EGR valve position sensor	F2–142
P1508	BYPAIR1—OPEN OR SHORT	Bypass air solenoid valve No.1	F2–143
P1509	BYPAIR2—OPEN OR SHORT	Bypass air solenoid valve No.2	F2–144
P1525	ABV (VACUUM)—OPEN OR SHORT	ABV solenoid valve (vacuum)	F2–145
P1526	ABV (VENT)—OPEN OR SHORT	ABV solenoid valve (vent)	F2–146
P1540	ABV—OPEN OR SHORT	ABV control	F2–147
P1601	COMM LINE (AT)—COMM ERROR	Communication line (ECM—TCM)	F2–147
P1609	ECME (CPU)—MALFUNCTION	ECM's knock control integrated circuit is damaged	F2–148
P1627	ECM/TCS LINE COMMUNICATION ERROR	ECM—ABS/TCS control unit line communication error	F2–148
P1628	ECM/TCS LINE (ABV)—COMMUNICATION ERROR	ECM—ABS/TCS control unit line (ABV) communication error	F2–148
P1794	BAT—BAT OR CIRCUIT FAIL	Battery	F2–149
P1797	PNS—OPEN OR SHORT	No P or N range signal	F2–149

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 ECM terminal 4A to mass air flow sensor terminal C • Open or short circuit in wiring from ECM terminal 3E to mass air flow sensor terminal B • Open circuit in wiring from ECM terminal 4D to mass air flow sensor terminal A

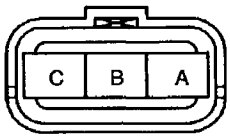
STEP	INSPECTION		ACTION
1	Does mass air flow sensor connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 3E voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect mass air flow sensor connector. Turn ignition switch to ON. Is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



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P0105	MAP/BP—CIRCUIT MALFUNCTION
Symptom	Input voltage from manifold absolute pressure sensor is below 0.2 V or above 4.9 V when ignition switch is turned on
Possible cause	• Manifold absolute pressure sensor malfunction • Open or short circuit in wiring from ECM terminal 3U to manifold absolute pressure sensor terminal B • Open or short circuit in wiring from ECM terminal 3A to manifold absolute pressure sensor terminal C • Open circuit in wiring from ECM terminal 3AB to manifold absolute pressure sensor terminal A

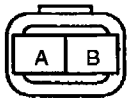
STEP	INSPECTION		ACTION
1	Does manifold absolute pressure sensor connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 3U voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect manifold absolute pressure sensor connector. Turn ignition switch to ON. Is there 5 V at connector terminal C?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (ECM terminal 3A — Manifold absolute pressure sensor terminal C)
4	Is there continuity between connector terminal A and ECM terminal 3AB?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is manifold absolute pressure sensor OK?	Yes	Go to next step
		No	Replace manifold absolute pressure sensor
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE 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 (Air cleaner) terminal A to ECM terminal 3V • Open or short circuit in wiring from intake air temperature sensor (Air cleaner) terminal B to ECM terminal 3AB

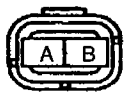
STEP	INSPECTION		ACTION
1	Does intake air temperature sensor connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 3V voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect intake air temperature sensor connector. Turn ignition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



HARNESS SIDE 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 ECM terminal 3Q • Open or short circuit in wiring from engine coolant temperature sensor terminal B to ECM terminal 3AB

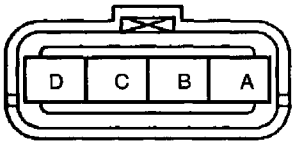
STEP	INSPECTION		ACTION
1	Does engine coolant temperature sensor or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 3Q voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect engine coolant temperature sensor connector. Turn ignition switch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



HARNESS SIDE 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 ECM terminal 3A • Open or short circuit in wiring from throttle position sensor terminal B to ECM terminal 3B • Open or short circuit in wiring from throttle position sensor terminal D to ECM terminal 3AB

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



HARNESS SIDE 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 and leakage • Engine coolant, level and protection

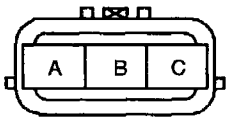
STEP	INSPECTION		ACTION
1	Is electrical fan control system OK?	Yes	Go to next step
		No	Repair or replace engine cooling fan system
2	Is engine coolant temperature sensor resistance OK?	Yes	Go to next step
		No	Replace engine coolant temperature sensor
3	Is cooling system OK?	Yes	Go to next step
		No	Repair or replace
4	Erase diagnostic trouble code from memory. Is some code No. present after *rechecking?	Yes	Replace ECM
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0130	O2S 11—CIRCUIT MALFUNCTION		
Symptom	• Heated oxygen sensor (Front RH) deterioration • Leakage in exhaust system		
STEP	**INSPECTION**		**ACTION**
1	Is heated oxygen sensor (Front RH) OK?	Yes	Replace ECM
		No	Repair or replace heated oxygen sensor (Front RH)

Diagnostic trouble code No. P0134	**OS2 11—CIRCUIT NO ACTIVITY DETECTED**
Symptom	When heated oxygen sensor (Front RH) signal does not exceed 0.5 V after the engine is started, or stays below 0.5 V for two minutes after the engine has reached normal operating temperature and runing at 1,500 rpm or over
Possible cause	• Heated oxygen sensor (Front RH) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front RH) terminal A to ECM terminal 3I • Intake-air system, fuel system, ignition system malfunction

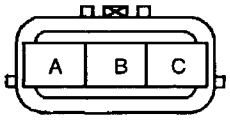
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front RH) connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 3I voltage OK?	Yes	Go to step 5
		No	Go to next step
3	Disconnect heated oxygen sensor (Front RH) connector. Is there continuity between connector terminal A and ECM terminal 3I?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Are following units OK? Fuel injector Pressure regulator Mass air flow sensor Engine coolant temperature sensor Spark plug Air suction (Air/Fuel ratio rich or lean)	Yes	Replace heated oxygen sensor (Front RH)
		No	Repair or replace
5	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P0135	O2S 11—HEATER CIRCUIT MALFUNCTION
Symptom	Open or short circuit is observed in heated oxygen sensor heater (Front RH) system when ignition switch is turned on
Possible cause	• Heated oxygen sensor heater (Front RH) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front RH) terminal C to ignition switch • Open or short circuit in wiring from heated oxygen sensor (Front RH) terminal B to ECM terminal 4E

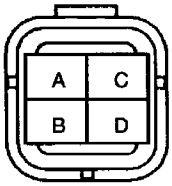
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front RH) connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 4E voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect heated oxygen sensor (Front RH) connector and turn ignition switch to ON. Is there battery positive voltage at connector terminal C?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Ignition switch — Heated oxygen sensor (Front RH) terminal C.)
4	Is there continuity between connector terminal B and ECM terminal 4E?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between connector terminals B and C?	Yes	Go to next step
		No	Replace heated oxygen sensor (Front RH)
6	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor. Is same code No. pressent after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR

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

STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Rear RH) connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 3D voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect heated oxygen sensor (Rear RH) connector. Is there continuity between connector terminal B and ECM terminal 3AB?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between connector terminal A and ECM terminal 3D?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Are following units OK? Fuel injector Pressure regulator Mass air flow sensor Engine coolant temperature sensor Spark plug Air suction (Air/Fuel ratio rich)	Yes	Replace heated oxygen sensor (Rear RH)
		No	Repair or replace
6	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

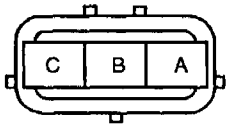


HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P0150	O2S 21—CIRCUIT MALFUNCTION		
Symptom	• Heated oxygen sensor (Front LH) deterioration • Leakage in exhaust system		
STEP	**INSPECTION**		**ACTION**
1	Is heated oxygen sensor (Front LH) OK?	Yes	Replace ECM
		No	Repair or replace heated oxygen sensor (Front LH)

Diagnostic trouble code No. P0154	**O2S 21—CIRCUIT NO ACTIVITY DETECTED**
Symptom	When heated oxygen sensor (Front LH) signal does not exceed 0.5 V after the engine is started, or stays below 0.5 V for two minutes after the engine has reached normal operating temperature and running at 1,500 rpm or over
Possible cause	• Heated oxygen sensor (Front LH) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front LH) terminal A to ECM terminal 3M • Intake-air system, fuel system, ignition system malfunction

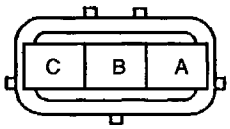
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front LH) connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 3M voltage OK?	Yes	Go to step 5
		No	Go to next step
3	Disconnect heated oxygen sensor (Front LH) connector. Is there continuity between connector terminal A and ECM terminal 3M?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Are following units OK? Fuel injector Pressure regulator Mass air flow sensor Engine coolant temperature sensor Spark plug Air suction (Air/Fuel ratio rich or lean)	Yes	Replace heated oxygen sensor (Front LH)
		No	Repair or replace
5	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P0155	O2S 21—HEATER CIRCUIT MALFUNCTION
Symptom	Open or short circuit is observed in heated oxygen sensor heater (Front LH) system when ignition switch is turned on
Possible cause	• Heated oxygen sensor heater (Front LH) malfunction • Open or short circuit in wiring from heated oxygen sensor (Front LH) terminal C to ignition switch • Open or short circuit in wiring from heated oxygen sensor (Front LH) terminal B to ECM terminal 4I

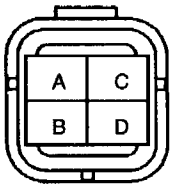
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front LH) connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 4I voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect heated oxygen sensor (Front LH) connector and turn ignition switch to ON. Is there battery positive voltage at connector terminal C?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (Ignition switch — Heated oxygen sensor (Front LH) terminal C)
4	Is there continuity between connector terminal B and ECM terminal 4I?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between connector terminals B and C?	Yes	Go to next step
		No	Replace heated oxygen sensor (Front LH)
6	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P0160	**O2S 22—CIRCUIT NO ACTIVITY DETECTED**
Symptom	When heated oxygen sensor (Rear LH) signal does not exceed 0.5 V after the engine is started, or stays below 0.5 V for two minutes after the engine has reached normal operating temperature and running at 1,500 rpm or over
Possible cause	• Heated oxygen sensor (Rear LH) malfunction • Open or short circuit in wiring from heated oxygen sensor (Rear LH) terminal A to ECM terminal 3H • Open circuit in wiring from heated oxygen sensor (Rear LH) terminal B to ECM terminal 3AB • Intake-air system, fuel system or ignition system malfunction

STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Rear LH) connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 3H voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect heated oxygen sensor (Rear LH) connector. Is there continuity between connector terminal B and ECM terminal 3AB?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between connector terminal A and ECM terminal 3H?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Are following units OK? Fuel injector Pressure regulator Mass air flow sensor Engine temperature sensor Spark plug Air suction (Air/Fuel ratio rich)	Yes	Replace heated oxygen sensor (Rear LH)
		No	Repair or replace
6	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P0170	BANK 1—FUEL TRIM MALFUNCTION
Symptom	Right hand 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 device system • ECM malfunction • Open or short circuit in wiring between ECM terminals 4Q, 4Y, 4AG to fuel injector • Intake air temperature sensor (Air cleaner) malfunction • Manifold absolute pressure sensor malfunction • PCV valve malfunction

STEP	INSPECTION		ACTION
1	Is there air leakage in intake-air system components?	Yes	Repair or replace intake-air system
		No	Go to next step
2	Is fuel line pressure OK?	Yes	Go to step 5
		No	Go to next step
3	Is fuel pump maximum pressure OK?	Yes	Go to next step
		No	Repair or replace fuel pump
4	Is pressure regulator OK?	Yes	Go to next step
		No	Replace pressure regulator
5	Is fuel injector OK?	Yes	Go to next step
		No	Replace fuel injector
6	Is engine coolant temperature sensor OK?	Yes	Go to next step
		No	Replace engine coolant temperature sensor
7	Is mass air flow sensor OK?	Yes	Go to next step
		No	Replace mass air flow sensor
8	Is throttle position sensor OK?	Yes	Go to next step
		No	Adjust throttle position sensor
9	Is closed throttle position switch OK?	Yes	Go to next step
		No	Adjust throttle position sensor
10	Is intake air temperature sensor (Air cleaner) OK?	Yes	Go to next step
		No	Replace intake air temperatur sensor (Air cleaher)
11	Is manifold absolute pressure sensor OK?	Yes	Go to next step
		No	Replace manifold absolute pressure sensor
12	Is purge solenoid valve OK?	Yes	Go to next step
		No	Replace PRG solenoid valve
13	Is PCV valve OK?	Yes	Go to next step
		No	Replace PCV valve
14	Erase diagnostic trouble code from memory. Is same code No. present after *rechecking?	Yes	Replace ECM
		No	Temporary system malfunction

* During Idling

Diagnostic trouble code No. P0173	BANK 2—FUEL TRIM MALFUNCTION
Symptom	Left hand 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 • ECM malfunction • Open or short circuit in wiring between ECM terminals 4U, 4AC, 4AK to fuel injector • Intake air temperature sensor (Air cleaner) malfunction • Manifold absolute pressure sensor malfunction • PCV valve malfunction

STEP	INSPECTION		ACTION
1	Is there air leakage in intake-air system components?	Yes	Repair or replace intake-air system
		No	Go to next step
2	Is fuel line pressure OK?	Yes	Go to step 5
		No	Go to next step
3	Is fuel pump maximum pressure OK?	Yes	Go to next step
		No	Repair or replace fuel pump
4	Is pressure regulator OK?	Yes	Go to next step
		No	Replace pressure regulator
5	Is fuel injector OK?	Yes	Go to next step
		No	Repair fuel injector
6	Is engine coolant temperature sensor OK?	Yes	Go to next step
		No	Replace engine coolant temperature sensor
7	Is mass air flow sensor OK?	Yes	Go to next step
		No	Replace mass air flow sensor
8	Is throttle position sensor OK?	Yes	Go to next step
		No	Adjust throttle position sensor
9	Is closed throttle position switch OK?	Yes	Go to next step
		No	Adjust throttle position sensor
10	Is intake air temperature sensor (Air cleaner) OK?	Yes	Go to next step
		No	Replace intake air temperatur sensor (Air cleaner)
11	Is manifold absolute pressure sensor OK?	Yes	Go to next step
		No	Replace manifold absolute pressure sensor
12	Is purge solenoid valve OK?	Yes	Go to next step
		No	Replace PRG solenoid valve
13	Is PCV valve OK?	Yes	Go to next step
		No	Replace PCV valve
14	Erase diagnostic trouble code from memory. Is same code No. present after* rechecking?	Yes	Replace ECM
		No	Temporary system malfunction

* During Idling

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

STEP	INSPECTION		ACTION
1	Is ignition system OK?	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap correct?	Yes	Go to next step
		No	Repair or replace crankshaft position sensor
3	Is fuel system (RH and LH) OK?	Yes	Go to next step
		No	Repair or replace as necessary
4	Is exhaust gas recirculation system OK?	Yes	Go to next step
		No	Repair or replace as necessary
5	Is compression at all cylinders normal?	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 ECM
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0301	CYLINDER 1 MISFIRE DETECTED
Symptom	ECM 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 voltage • Fuel system (RH or LH) 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?	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Repair or replace crankshaft position sensor
3	Is fuel injector at cylinder No.1 OK?	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.1
4	Is fuel system (RH and LH) OK?	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation system OK?	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compression at cylinder No.1 normal?	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 ECM
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0302	CYLINDER 2 MISFIRE DETECTED
Symptom	ECM 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 voltage • Fuel system (RH or LH) 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?	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Repair or replace crankshaft position sensor
3	Is fuel injector at cylinder No.2 OK?	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.2
4	Is fuel system (RH and LH) OK?	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation system OK?	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compression at cylinder No.2 normal?	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 ECM
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0303	CYLINDER 3 MISFIRE DETECTED
Symptom	ECM 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 voltage • Fuel system (RH or LH) 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?	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Repair or replace crankshaft position sensor
3	Is fuel injector at cylinder No.3 OK?	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.3
4	Is fuel system (RH and LH) OK?	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation system OK?	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compression at cylinder No.3 normal?	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 ECM
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0304	CYLINDER 4 MISFIRE DETECTED
Symptom	ECM 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 voltage • Fuel system (RH or LH) 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?	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Repair or replace crankshaft position sensor
3	Is fuel injector at cylinder No.4 OK?	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.4
4	Is fuel system (RH and LH) OK?	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation system OK?	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compression at cylinder No.4 normal?	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 ECM
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0305	CYLINDER 5 MISFIRE DETECTED
Symptom	ECM input signal from crankshaft position sensor signal for cylinder No.5 is irregular
Possible cause	• Ignition system of cylinder No.5 malfunction • Low fuel • Low battery voltage • Fuel system (RH or LH) malfunction • Insufficient compression in cylinder No.5 • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system of cylinder No.5 OK?	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Repair or replace crankshaft position sensor
3	Is fuel injector at cylinder No.5 OK?	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.5
4	Is fuel system (RH and LH) OK?	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation system OK?	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compression at cylinder No.5 normal?	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 ECM
		No	Temporary system malfunction

* During normal driving

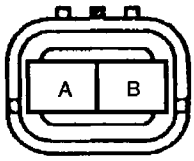
Diagnostic trouble code No. P0306	CYLINDER 6 MISFIRE DETECTED
Symptom	ECM input signal from crankshaft position sensor signal for cylinder No.6 is irregular
Possible cause	• Ignition system of cylinder No.6 malfunction • Low fuel • Low battery voltage • Fuel system (RH or LH) malfunction • Insufficient compression in cylinder No.6 • Crankshaft position sensor air gap incorrect • Exhaust gas recirculation system malfunction

STEP	INSPECTION		ACTION
1	Is ignition system of cylinder No.6 OK?	Yes	Go to next step
		No	Repair or replace as necessary
2	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Repair or replace crankshaft position sensor
3	Is fuel injector at cylinder No.6 OK?	Yes	Go to next step
		No	Repair or replace fuel injector at cylinder No.6
4	Is fuel system (RH and LH) OK?	Yes	Go to next step
		No	Repair or replace as necessary
5	Is exhaust gas recirculation system OK?	Yes	Go to next step
		No	Repair or replace as necessary
6	Is compression at cylinder No.6 normal?	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 ECM
		No	Temporary system malfunction

* During normal driving

Diagnostic trouble code No. P0325	KNOCK SENSOR 1—CIRCUIT MALFUNCTION
Symptom	Input voltage from knock sensor is malfunction level preset in ECM when ignition switch is turned on
Possible cause	• Knock sensor malfunction • Knock sensor installation incorrect • Open or short circuit in wiring from ECM terminal 3S to knock sensor terminal A

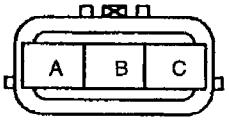
STEP	INSPECTION		ACTION
1	Does knock sensor connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Disconnect knock sensor connector. Is there continuity between connector A and ECM terminal 3S?	Yes	Go to next step
		No	Repair or replace wiring harness
3	Is knock sensor OK?	Yes	Go to next step
		No	Replace knock sensor
4	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR

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 ECM terminal 4AL to crankshaft position sensor terminal B • Open or short circuit in wiring from ECM terminal 4AH to crankshaft position sensor terminal A

STEP	INSPECTION		ACTION
1	Does crankshaft position sensor connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Disconnect the crankshaft position sensor connector. Is there continuity between connector terminal B and ECM terminal 4AL? Is there continuity between connector terminal A and ECM terminal 4AH?	Yes	Go to next step
		No	Repair or replace wiring harness
3	Is crankshaft position sensor air gap OK?	Yes	Go to next step
		No	Replace crankshaft position sensor or crankshaft pulley
4	Is crankshaft position sensor OK? ☞ page F2–58	Yes	Go to next step
		No	Replace crankshaft position sensor
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE 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 control valve malfunction • Manifold absolute pressure sensor malfunction • Manifold absolute pressure sensor solenoid valve malfunction • EGR valve position sensor malfunction • EGR solenoid valve (vacuum, vent) malfunction • Clogs or leakage in piping connecting following units • Manifold absolute pressure sensor, manifold absolute pressure sensor solenoid valve and intake manifold • Air cleaner housing, EGR solenoid valve (vent) and EGR control valve • Intake manifold, EGR solenoid valve (vaccum) and EGR control valve • Warm up three way catalytic converter

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code for EGR solenoid valve (vaccum, vent), manifold absolute pressure sensor solenoid valve and manifold absolute pressure sensor?	Yes	Carry out inspection as required according to diagnostic trouble code
		No	Go to next step
2	Is EGR valve position sensor OK?	Yes	Go to next step
		No	Repair or replace EGR control valve
3	Check each hose for damage • 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 necessary
4	Is manifold absolute pressure sensor OK?	Yes	Go to next step
		No	Replace manifold absolute pressure sensor
5	Check each hose for damage • EGR passage—Manifold absolute pressure sensor solenoid valve • Manifold absolute pressure sensor—Manifold absolute pressure 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 ECM
		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	BANK1 CAT EFFICIENCY BELOW LIMIT		
Symptom	• Warm up three way catalytic converter (RH) deterioration • Leakage in exhaust system		
STEP	INSPECTION		ACTION
1	Is heated oxygen sensor (Rear RH) OK?	Yes	Replace warm up three way catalytic converter (RH)
		No	Replace heated oxygen sensor (Rear RH)

Diagnostic trouble code No. P0430	BANK2 CAT EFFICIENCY BELOW LIMIT		
Symptom	• Warm up three way catalytic converter (LH) deterioration • Leakage in exhaust system		
STEP	INSPECTION		ACTION
1	Is heated oxygen sensor (Rear LH) OK?	Yes	Replace warm up three way catalytic converter (LH)
		No	Replace heated oxygen sensor (Rear LH)

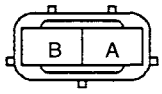
Diagnostic trouble code No. P0440	EVAP SYSTEM—MALFUNCTION
Symptom	Evaporative emission control system does not function normally because of mechanical trouble
Possible cause	• PRG solenoid valve malfunction • Charcoal canister malfunction • Check valve malfunction • Fuel vapor valve malfunction • Clogs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

STEP	INSPECTION		ACTION
1	Is ECM terminal 4O voltage OK?	Yes	Go to next step
		No	Inspect PRG solenoid valve
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?	Yes	Go to next step
		No	Repair or replace as necessary
4	Is check valve OK?	Yes	Go to next step
		No	Repair or replace as necessary
5	Is fuel vapor valve OK?	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 ECM
		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 ECM terminal 4O

STEP	INSPECTION		ACTION
1	Does purge solenoid valve connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 4O voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect purge solenoid valve connector. Turn ignition purge switch to ON. Is there battery positive voltage at 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 connector terminal B and ECM terminal 4O?	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 ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P0505	IDLE CONTROL SYSTEM—MALFUNCTION
Symptom	• Mechanical trouble is observed in idle speed control system • Open or short circuit is observed in idle speed 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 ECM terminal 4M

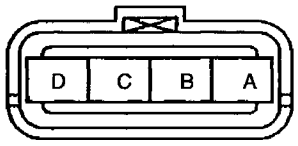
STEP	INSPECTION		ACTION
1	Does idle air control valve connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 4M voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect idle air control valve connector. Turn ignition switch to ON. Is there battery positive voltage at 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 connector terminal B and ECM terminal 4M?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is there continuity between idle air control valve connector terminal A and B?	Yes	Go to next step
		No	Replace BAC valve
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P0510	CLOSED THROTTLE POS SWITCH—MALFUNCTION
Symptom	Input voltage from closed throttle position switch (in throttle position sensor) stays 0 V or above 1.2 V for more than 33.2 seconds after ignition switch is turned on
Possible cause	• Closed throttle position switch (in throttle position sensor) malfunction • Throttle position sensor malfunction • Open or short circuit in wiring from throttle position sensor terminal C to ECM terminal 3X • Open or short circuit in wiring from throttle position sensor terminal D to ECM terminal 3AB

STEP	INSPECTION		ACTION
1	Does throttle position sensor connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 3X voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Is there continuity between connector terminal C and ECM terminal 3X?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between connector terminal D and ECM terminal 3AB?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is closed throttle position switch (in throttle position sensor) OK?	Yes	Go to next step
		No	Repair or replace throttle position sensor
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P0703	TORQUE CONV/BRAKE SW—MALFUNCTION
Symptom	No signal input from brake switch to ECM 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 ECM terminal 1O 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 ECM connector have poor connection?	Yes	Repair or replace
		No	Go to next step
2	Is ECM terminal 1O voltage OK?	Yes	Go to step 4
		No	Go to next step
3	Is there continuity between brake switch terminal and ECM terminal 1O?	Yes	Check for open or short circuit i wiring harness. (Battery — Brake switch) Check brake switch.
		No	Repair or replace wiring harness
4	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

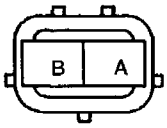
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<tr><td>Diagnostic trouble code No. P1000</td><td>MODE DRIVING NEEDED TO COMLETE TEST</td></tr>
<tr><td>Possible cause</td><td>Following diagnostic trouble code detection conditions not satisfied
<table>
<tr><td>Diagnosed circuit</td><td>Code No.</td></tr>
<tr><td>Excessive time to enter closed loop fuel control</td><td>P0125</td></tr>
<tr><td>O_2 sensor circuit malfunction</td><td>P0130
P0150</td></tr>
<tr><td>O_2 sensor heater circuit malfunction</td><td>P0135
P0155</td></tr>
<tr><td>Fuel trim malfunction</td><td>P0170
P0173</td></tr>
<tr><td>Random misfire detected
Cylinder 1 misfire detected
Cylinder 2 misfire detected
Cylinder 3 misfire detected
Cylinder 4 misfire detected
Cylinder 5 misfire detected
Cylinder 6 misfire detected</td><td>P0300, P0301
P0302, P0303
P0304, P0305
P0306</td></tr>
<tr><td>Exhaust gas recirculation flow malfunction</td><td>P0400</td></tr>
<tr><td>Catalyst system efficiency threshold</td><td>P0420
P0430</td></tr>
<tr><td>Evaporative emission control system malfunction</td><td>P0440</td></tr>
</table>
Note
• DTC No.P1000 will be deleted while the MIL is illuminated.</td></tr>
</table>

Diagnostic trouble code No. P1110	**IATS (D/C)—OPEN OR SHORT**
Symptom	Input voltage from intake air temperature sensor (dynamic chamber) 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 (dynamic chamber) terminal A to ECM terminal 2C • Open or short circuit in wiring from intake air temperature sensor (dynamic chamber) terminal B to ECM terminal 3AB

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

Diagnostic trouble code No. P1113	IATS (L/C)—OPEN OR SHORT
Symptom	Input voltage from intake air temperature snsor (Lysholm compresser) is below 0.2 V or above 4.9 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 (Lysholm compresser) terminal A to ECM terminal 2K • Open or short circuit wiring from intake air temperature sensor (Lysholm compresser) terminal B to ECM terminal 3AB

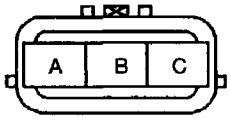
STEP	INSPECTION		ACTION
1	Does intake air temperature sensor (Lysholm compresser) connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 2K voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect intake air temperature sensor (Lysholm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



HARNESS SIDE CONNECTOR

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

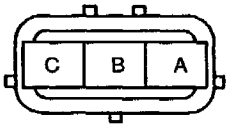
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front RH) connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 3I voltage OK?	Yes	Go to step 5
		No	Go to next step
3	Disconnect heated oxygen sensor (Front RH) connector. Is there continuity between connector terminal A and ECM terminal 3I?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Are following units OK? Fuel injector Pressure regulator Mass air flow sensor Engine coolant temperature sensor Spark plug Air suction (Air/Fuel ratio rich or lean)	Yes	Replace heated oxygen sensor (Front RH)
		No	Repair or replace
5	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P1173	HO2S 21—INVERSION
Symptom	Heated oxygen sensor (Front LH) signal remains unchanged for more than 20 seconds after engine is in feedback zone
Possible cause	• Heated oxygen sensor (Front LH) malfunction • Open or short circuit wiring from heated oxygen sensor (Front LH) terminal A to ECM terminal 3M • Intake-air system, fuel system, ignition system malfunction

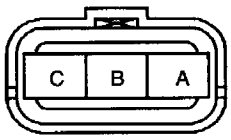
STEP	INSPECTION		ACTION
1	Does heated oxygen sensor (Front LH) connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 3M voltage OK?	Yes	Go to step 5
		No	Go to next step
3	Disconnect heated oxygen sensor (Front LH) connector. Is there continuity between connector terminal A and ECM terminal 3M?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Are following units OK? Fuel injector Pressure regulator Mass air flow sensor Engine coolant temperature sensor Spark plug Air suction (Air/Fuel ratio rich or lean)	Yes	Replace heated oxygen sensor (Front LH)
		No	Repair or replace
5	Erase diagnostic trouble code from memory. Run the engine at 1,500—2,000 rpm for more than 3 minutes to activate heated oxygen sensor. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P1195	**EGRBS—OPEN OR SHORT**
Symptom	Input voltage from manifold absolute pressure sensor is below 0.2 V or above 4.9 V when ignition switch is turned on
Possible cause	• Manifold absolute pressure sensor malfunction • Open or short circuit in wiring from ECM terminal 3U to manifold absolute pressure sensor terminal B • Open or short circuit in wiring from ECM terminal 3A to manifold absolute pressure sensor terminal C • Open circuit in wiring from ECM terminal 3AB to manifold absolute pressure sensor terminal A

STEP	INSPECTION		ACTION
1	Does manifold absolute pressure sensor connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 3U voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect manifold absolute pressure sensor connector. Turn ignition switch to ON. Is there 5 V at connector terminal C?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness. (ECM terminal 3A — Manifold absolute pressure sensor terminal C)
4	Is there continuity between connector terminal A and ECM terminal 3AB?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Is manifold absolute pressure sensor OK?	Yes	Go to next step
		No	Replace manifold absolute pressure sensor
6	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)



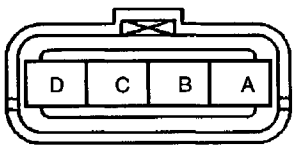
HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P1196	STA SW—OPEN OR SHORT
Symptom	Input signal from starter to ECM continues for more than 33 seconds
Possible cause	• Starter malfunction • Open or short circuit wiring from starter terminal S and ECM terminal 1H

STEP	INSPECTION		ACTION
1	Does starter connector or ECM connector have poor connection?	Yes	Repair or replace
		No	Go to next step
2	Is ECM terminal 1H voltage OK?	Yes	Go to step 4
		No	Go to next step
3	Disconnect starter connector. Is there continuity between connector terminal S and ECM terminal 1H?	Yes	Replace starter
		No	Repair or replace
4	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

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 camshaft position sensor terminal B to main relay terminal D • Open or short circuit in wiring from ECM terminal 4F to camshaft position sensor terminal C • Open circuit in wiring from ECM terminal 4D to camshaft position sensor terminal A

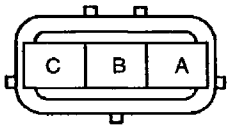
STEP	INSPECTION		ACTION
1	Does camshaft position sensor connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Disconnect camshaft position sensor connector. Turn ignition switch to ON. Is there battery positive voltage at connector terminal B?	Yes	Go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



HARNESS SIDE 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 ECM terminal 3A • Open or short circuit in wiring from EGR valve position sensor terminal C to ECM terminal 3R • Open or short circuit in wiring from EGR valve position sensor terminal A to ECM terminal 3AB

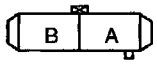
STEP	INSPECTION		ACTION
1	Does EGR valve position sensor connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 3R voltage OK?	Yes	Go to step 7
		No	Go to next step
3	Disconnect EGR valve position sensor connector. Turn ignition switch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



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P1508	BYPAIR1—OPEN OR SHORT
Symptom	Open or short circuit is observed in bypass air solenoid valve No.2 system when ignition switch is turned on
Possible cause	• Bypass air solenoid No.1 malfunction • Open or short circuit in wiring from bypass air solenoid valve No.1 terminal A to main relay terminal D • Open or short circuit in wiring from bypass air solenoid valve No.1 terminal B to ECM terminal 1AA

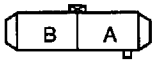
STEP	INSPECTION		ACTION
1	Does bypass air solenoid valve No.1 connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 1AA voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect bypass air solenoid valve No.1 connector. Turn ignition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



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P1509	BYPAIR2—OPEN OR SHORT
Symptom	Open or short circuit is observed in solenoid valve No.2 system when ignition switch is turned on
Possible cause	• Bypass air solenoid valve No.2 malfunction • Open or short circuit in wiring from bypass air solenoid valve No.2 terminal A to main relay terminal D • Open or short circuit in wiring from bypass air solenoid valve No.2 terminal B to ECM terminal 1AE

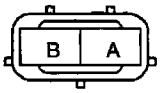
STEP	INSPECTION		ACTION
1	Does bypass air solenoid valve No.2 connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 1AE voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect bypass air solenoid valve No.2 connector. Turn ignition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



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P1525	**ABV (VACUUM)—OPEN OR SHORT**
Symptom	Open or short circuit is observed in ABV solenoid valve (vacuum) system when ignition switch is turned on
Possible cause	• ABV solenoid valve (vacuum) malfunction • Open or short circuit in wiring from ABV solenoid valve (vacuum) terminal A to main relay terminal D • Open or short circuit in wiring from ABV solenoid valve (vacuum) terminal B to ECM terminal 2M

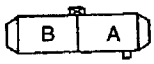
STEP	INSPECTION		ACTION
1	Does ABV solenoid valve (vacuum) connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 2M voltage OK?	Yes	Go to step 6
		No	Go to next step
3	Disconnect ABV solenoid valve (vacuum) connector. Turn ignition switch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



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P1526	ABV (VENT)—OPEN OR SHORT
Symptom	Open or short circuit is observed in ABV solenoid valve (vent) system when ignition switch is turned on
Possible cause	• ABV solenoid valve (vent) malfunction • Open or short circuit in wiring from ABV solenoid valve (vent) terminal A to main relay terminal D • Open or short circuit in wiring from ABV solenoid valve (vent) terminal B to ECM terminal 2A

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



HARNESS SIDE CONNECTOR

Diagnostic trouble code No. P1540	ABV—OPEN OR SHORT		
Symptom	Malfunction is observed in ABV control system when ignition switch is turned on		
Possible cause	• ABV solenoid valve malfunction • Input signal system malfunction • ABV actuator malfunction • Vacuum system leakage or choked		
STEP	INSPECTION		ACTION
1	Are other code No. also displayed?	Yes	Perform troubleshooting of the code No.
		No	Go to next step
2	Is ABV solenoid valve normal?	Yes	Go to next step
		No	Replace ABV solenoid valve
3	Are there clogs or leaks in related vacuum hose?	Yes	Repair or replace vacuum hose
		No	Go to next step
4	Is ABV actuator normal?	Yes	Go to next step
		No	Repair or replace ABV actuator
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

Diagnostic trouble code No.1601	COMM LINE (AT)—COMM ERROR		
Symptom	Open or short circuit in ECM—TCM serial communication line when ignition switch is turned on		
Possible cause	• Open or short circuit in wiring from ECM terminal 1B to TCM terminal 2K • Open or short circuit in wiring from ECM terminal 1F to TCM terminal 2N • Open or short circuit in wiring from ECM terminal 1R to TCM terminal 1J		
STEP	INSPECTION		ACTION
1	Does TCM connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is there continuity between ECM terminal 1B and TCM terminal 2K?	Yes	Go to next step
		No	Repair or replace wiring harness
3	Is there continuity between ECM terminal 1F and TCM terminal 2N?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between ECM terminal 1R and TCM terminal 1J?	Yes	Go to next step
		No	Repair or replace wiring harness
5	Erase diagnostic trouble code from memory. Is same code No. present after recheking?	Yes	Replace ECM
		No	Replace TCM

Diagnostic trouble code No.1609	ECME (CPU)—MALFUNCTION		
Symptom	ECM's knock control integrated circuit is damaged		
Possible cause	ECM's knock control integrated circuit is damaged		
STEP	INSPECTION		ACTION
1	Erase diagnostic trouble code from memory. Is same code No. present after recheking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

Diagnostic trouble code No.1627	ECM/TCS LINE COMMUNICATION ERROR		
Symptom	Open or short circuit is observed between ECM terminal 1Q and ABS/TCS control unit terminal 2S when ignition switch is turned on		
Possible cause	• Open or short circuit in wiring from ECM terminal 1Q to ABS/TCS control unit terminal 2S		
STEP	INSPECTION		ACTION
1	Does ABS/TCS control unit connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is there continuity between ECM terminal 1Q and ABS/TCS control unit terminal 2S?	Yes	Go to next step
		No	Repair or replace connector
3	Erase diagnostic trouble code from memory. Is same code No. present after recheking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

Diagnostic trouble code No.1628	ECM/TCS LINE (ABV)—COMMUNICATION ERROR		
Symptom	Open or short circuit is observed between ECM terminal 3W and ABS/TCS control unit terminal 1P when ignition switch is turned on		
Possible cause	• Open or short circuit in wiring from ECM terminal 3W to ABS/TCS control unit terminal 1P		
STEP	INSPECTION		ACTION
1	Does ABS/TCS control unit connector or ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is there continuity between ECM terminal 3W and ABS/TCS control unit terminal 1P?	Yes	Go to next step
		No	Repair or replace connector
3	Erase diagnostic trouble code from memory. Is same code No. present after recheking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

Diagnostic trouble code No. P1794	BAT—BAT OR CIRCUIT FAIL
Symptom	Battery positive voltage is not constantly applied to ECM terminal 4B
Possible cause	• Battery malfunction • Open or short circuit in wiring from ECM terminal 4B to batterry positive cable • Burnt fuse

STEP	INSPECTION		ACTION
1	Is battery fully charged?	Yes	Go to next step
		No	Charge the battery
2	Does battery positive voltage present at ECM terminal 4B?	Yes	Go to next step
		No	Check for open or short circuit in wiring harness (ECM terminal 4B — Battery)
3	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness)

Diagnostic trouble code No. P1797	PNS—OPEN OR SHORT
Symptom	• ECM judges N position for more than 33 seconds when shift lever is in D range
Possible cause	• Transaxle range switch malfunction • Open or short circuit in wiring from transaxle range switch terminal H to TCM terminal 2D

STEP	INSPECTION		ACTION
1	Does ECM connector have poor connection?	Yes	Repair or replace connector
		No	Go to next step
2	Is ECM terminal 2D voltage OK?	Yes	Go to step 5
		No	Go to next step
3	Is there continuity between transaxle range switch terminal H and ECM terminal 2D or neutral/clutch switch terminal and ECM terminal 2D?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is transaxle range switch OK?	Yes	Go to next step
		No	Repair or replace transaxle range switch
5	Erase diagnostic trouble code from memory. Is same code No. present after rechecking?	Yes	Replace ECM
		No	Intermitent poor connection of harness or connector (Repair connector and/or harness)

TROUBLESHOOTING GUIDE

QUICK DIAGNOSIS CHART

This Quick Diagnosis Chart shows the relationship between troubleshooting items and inspection points.

Item		Possible parts and reference page	Intake air system				Fuel system								Evaporative Emission system		Control System										
			F2–7	F2–14	Section B2	F2–78	F2–72	F2–21	F2–21	F2–24	F2–27	F2–27	F2–28	F2–29	F2–34	F2–34	F2–48	F2–52	F2–52	F2–52	F2–56	F2–56	F2–57	F2–57	F2–58	F2–58
			Air leakage	Accelator cable free play	Compression pressure	Lysholm compresser	PRC solenoid valve	Fuel pump: Continuity	Fuel pump: Maximum pressure	Fuel pump (transfer)	Fuel injector: Resistance	Fuel injector: Leakage	Fuel injector: Volume	Pressure regulator	Charcoal canister	PCV valve	Mass air flow sensor	Manifold absolute pressure sensor	Throttle position sensor	Closed throttle position switch	Engine coolant temperature sensor	Intake air temperature sensor (air cleaner)	Intake air temperature sensor (dynamic chamber)	Intake air temperature sensor (L/C)	Heated oxygen sensor (front RH, LH)	Heated oxygen sensor (rear RH, LH)
1	Melts main or other fuse							○																	○	○
2	Will not crank or cranks slowly																									
3	Cranks normally but will not start	No combustion																								
4		Partial combustion — when engine cold						○	○		○															
5		Partial combustion — after warm-up																								
7	Cranks normally but hard to start	Any engine temp.			○					○		○	○				○									
8		When engine cold											○								○					
9		After warm-up					○					○	○	○							○					
10	Engine stalls	Idle at any engine temp.	○		○				○			○	○				○									
11		During fast idle											○								○					
12		Idle after warm-up											○			○				○	○					
13		Idle with A/C, P/S, and/or E/L ON																		○						
14		Idle when shifted from N or P to other ranges																		○						
15		Driveaway															○				○					
16		On acceleration							○								○									
17		While cruising															○									
18		On deceleration															○				○					
19	Engine rough	Idle at any engine temp.	○		○				○		○	○	○				○				○					
20		During fast idle											○								○					
21		Idle after warm-up											○													
22		Idle with A/C, P/S, and/or E/L ON																		○						
23		Idle when shifted from N or P to other ranges																		○						
24		On deceleration										○														
25	Poor acceleration	Driveaway		○													○								○	
26		On acceleration									○		○				○	○	○		○		○	○	○	
27	High idle speed after warm-up			○												○				○	○					

Control system																				Section G				Possible parts and reference page		
F2–59	F2–62	F2–62	F2–61	F2–64	F2–65	F2–66	F2–69	F2–69	F2–75	F2–75	F2–79	F2–79	F2–86	F2–85	F2–88	F2–92	F2–94	F2–82					Item		
Knock sensor	Power steering pressure switch	Main relay	EGR valve position sensor	BAC valve	Idle air control valve	Bypass air solenoid valve	Fuel pump relay	Fuel pump resistor and relay (speed)	Charge air cooler bypass actuator	ABV actuator	Charge air cooler bypass solenoid valve	ABV solenoid valve	EGR solenoid valve (vacuum)	EGR valve	Purge solenoid valve	A/C relay	Heated oxygen sensor heater control	MAP sensor solenoid valve	Battery	Ignition coil	Spark plug	Starter			
		○					○																Melts main or other fuse		1
																			○			○	Will not crank or cranks slowly		2
		○																					No combustion	Cranks normally but will not start	3
				○			○														○		Partial combustion — when engine cold		4
															○								Partial combustion — after warm-up		5
							○			○								○					Any engine temp.	Cranks normally but hard to start	7
				○		○															○		When engine cold		8
															○								After warm-up		9
													○	○						○	○		Idle at any engine temp.	Engine stalls	10
				○		○																	During fast idle		11
					○										○								Idle after warm-up		12
	○				○											○							Idle with A/C, P/S, and/or E/L ON		13
					○																		Idle when shifted from N or P to other ranges		14
													○	○									Driveaway		15
																							On acceleration		16
																							While cruising		17
																							On deceleration		18
							○						○	○						○	○		Idle at any engine temp.	Engine rough	19
				○		○																	During fast idle		20
					○																		Idle after warm-up		21
	○				○																		Idle with A/C, P/S, and/or E/L ON		22
					○																		Idle when shifted from N or P to other ranges		23
																							On deceleration		24
									○	○	○	○	○	○	○			○		○	○		Driveaway	Poor acceleration	25
○									○	○	○	○	○	○	○	○		○		○	○		On acceleration		26
				○	○																		High idle speed after warm-up		27

Item \ Possible parts and reference page	Intake air system				Fuel system								Evaporative Emission system		Control System								
	F2–7	F2–14	Section B2	F2–78	F2–72	F2–21	F2–21	F2–24	F2–27	F2–27	F2–28	F2–29	F2–34	F2–34	F2–48	F2–52	F2–52	F2–56	F2–56	F2–56	F2–57	F2–57	F2–58	F2–58
	Air leakage	Accelator cable free play	Compression pressure	Lysholm compresser	PRC solenoid valve	Fuel pump: Continuity	Fuel pump: Maximum pressure	Fuel pump (transfer)	Fuel injector: Resistance	Fuel injector: Leakage	Fuel injector: Volume	Pressure regulator	Charcoal canister	PCV valve	Mass air flow sensor	Manifold absolute pressure sensor	Throttle position sensor	Closed throttle position switch	Engine coolant temperature sensor	Intake air temperature sensor (air cleaner)	Intake air temperature sensor (dynamic chamber)	Intake air temperature sensor (L/C)	Heated oxygen sensor (front RH, LH)	Heated oxygen sensor (rear RH, LH)
28 Idle fluctuates/Idle hunts											○													
29 Hesitates/Stumbles on acceleration							○								○		○						○	
30 Surges while cruising											○				○									
31 Lack of power	○		○	○			○	○			○				○	○					○	○		
32 Poor fuel economy			○	○								○				○					○	○	○	
33 A/C does not work																								
34 Knocking/Pinging																			○	○				
35 Fuel odor													○											
36 Exhaust sulfur smell																								
37 High oil consumption														○										
38 NGS displays "LINK COMMUNICATION ERROR"																								
39 NGS will not work																								

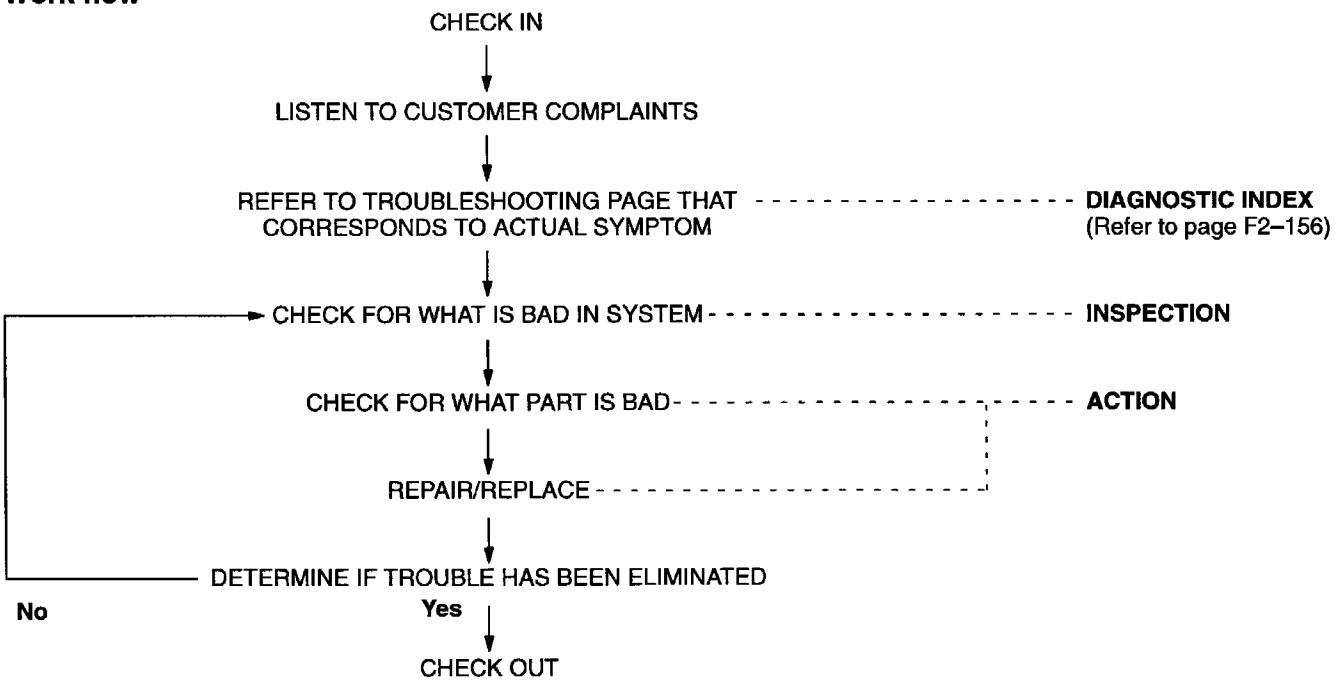
Control system																					Section G				Possible parts and reference page / Item	
F2–59	F2–62	F2–62	F2–61	F2–64	F2–65	F2–66	F2–69	F2–69	F2–75	F2–76	F2–79	F2–79	F2–86	F2–85	F2–88	F2–92	F2–94	F2–82							
Knock sensor	Power steering pressure switch	Main relay	EGR valve position sensor	BAC valve	Idle air control valve	Bypass air solenoid valve	Fuel pump relay	Fuel pump resistor and relay (speed)	Charge air cooler bypass actuator	ABV actuator	Charge air cooler bypass solenoid valve	ABV solenoid valve	EGR solenoid valve (vacuum)	EGR valve	Purge solenoid valve	A/C relay	Heated oxygen sensor heater control	MAP sensor solenoid valve	Battery	Ignition coil	Spark plug	Starter		
																			○				Idle fluctuates/Idle hunts	28
															○					○	○		Hesitates/Stumbles on acceleration	29
															○								Surges while cruising	30
○			○						○	○	○	○	○	○				○		○	○		Lack of power	31
									○	○	○	○					○	○					Poor fuel economy	32
																○							A/C does not work	33
○			○																				Knocking/Pinging	34
															○								Fuel odor	35
																							Exhaust sulfur smell	36
																							High oil consumption	37
																							NGS displays "LINK COMMUNICATION ERROR"	38
																							NGS will not work	39

USING THIS SECTION

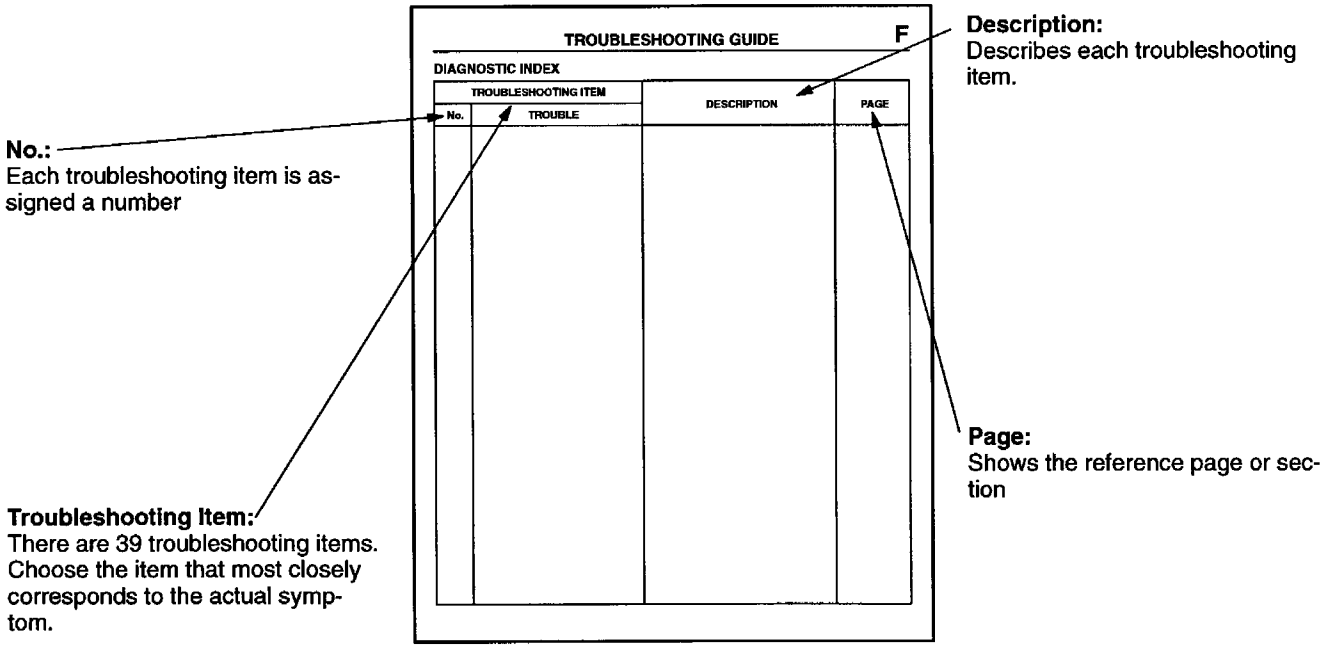
Introduction

Most of the fuel and emission control systems are electronically controlled, often making it difficult to diagnose problems, especially intermittent problems. Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer is often a good source of information on such problems, especially the intermittent ones. Through a talk with the customer, you will usually find out what the symptoms are and under what conditions they occur.

Work flow



Diagnostic index



Troubleshooting chart

13 14	ENGINE STALLS	• IDLE WITH A/C, P/S, and/or E/L ON • IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGES

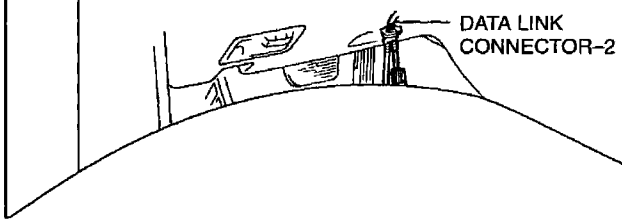
DESCRIPTION	• Engine stops unexpectedly when A/C, P/S, and/or E/L turned ON at idle • Engine stops unexpectedly when shifted from N or P to other ranges at idle • Idle condition is normal when A/C, P/S, and E/L are OFF and in park/neutral position

[TROUBLESHOOTING HINTS]

① Signal does not input to ECM
- A/C switch
- Headlight switch
- Rear window defroster switch
- Blower switch
- P/S pressure switch

② Idle air control valve
- Stuck

③ Closed throttle position switch
- Throttle position sensor misadjustment

STEP	INSPECTION		ACTION
1	Is following terminal voltage at PCM correct? ☞ **page F2–39** • 1D (A/C switch) • 1G (Daytime running light-Canada Fog light-except Canada) • 1K (Blower switch) • 1L (Headlight) • 1X (Rear window defroster switch) • 3T (P/S pressure switch) • 3X (Closed throttle position switch) • Park/Neutral switch ☞ **section K1**	Yes	Go to next step
		No	Check for cause
2	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F2–99**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check s

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 action is described on the reference page specified by the "☞" mark.

DIAGNOSTIC INDEX

TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
No.	TROUBLE			
1	Melts main or other fuse		—	F2–160
2	Will not crank or cranks slowly		Starter does not work Starter cranks engine at slow speed	section G
3	Cranks normally but will not start	No combustion	Starter cranks engine at normal speed but engine shows no indication of firing	F2–161
4		Partial combustion — when engine cold	Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is cold or at initial starting Engine will not continue running when cold when ignition switch is returned from STA to IG position	F2–161
5		Partial combustion — after warm up	Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is warm Engine will not continue running when warm when ignition switch is returned from STA to IG position	F2–163
6	Will start in other than park/neutral position		Engine starts in P, N and other ranges	section K2
7	Cranks normally but hard to start	Any engine temp.	Starter cranks engine at normal speed but engine requires excessive cranking time before starting at any engine temperature Engine starts after stalling a few times at any engine temperature	F2–164
8		When engine cold	Starter cranks engine at normal speed but engine requires excessive cranking time before starting when engine is cold Engine starts after stalling a few times when engine is cold	
9		After warm-up	Starter cranks engine at normal speed but engine requires excessive cranking time before starting after warm-up	
10	Engine stalls	Idle at any engine temp.	Engine stops unexpectedly at any engine temp.	F2–166
11		During fast idle	Engine stops unexpectedly during fast-idle operation	
12		Idle after warm-up	Engine stops unexpectedly at idle after warm-up	
13		Idle with A/C, P/S, and/or E/L ON	Engine stops unexpectedly when A/C, P/S, and/or E/L turned ON at idle	F2–169 section K2
*14		Idle when shifted from N or P to other ranges	Engine stops unexpectedly when shifted from N or P to other ranges at idle	
15		Driveaway	Engine stops unexpectedly upon driveaway	F2–170
16		On acceleration	Engine stops unexpectedly at beginning of acceleration or during acceleration	F2–172
17		While cruising	Engine stops unexpectedly while cruising	
*18		On deceleration	Engine stops unexpectedly at beginning of deceleration or recovery from deceleration Exhaust afterburn	F2–174 section K2

* Refer to section F2 before referring to section K2.

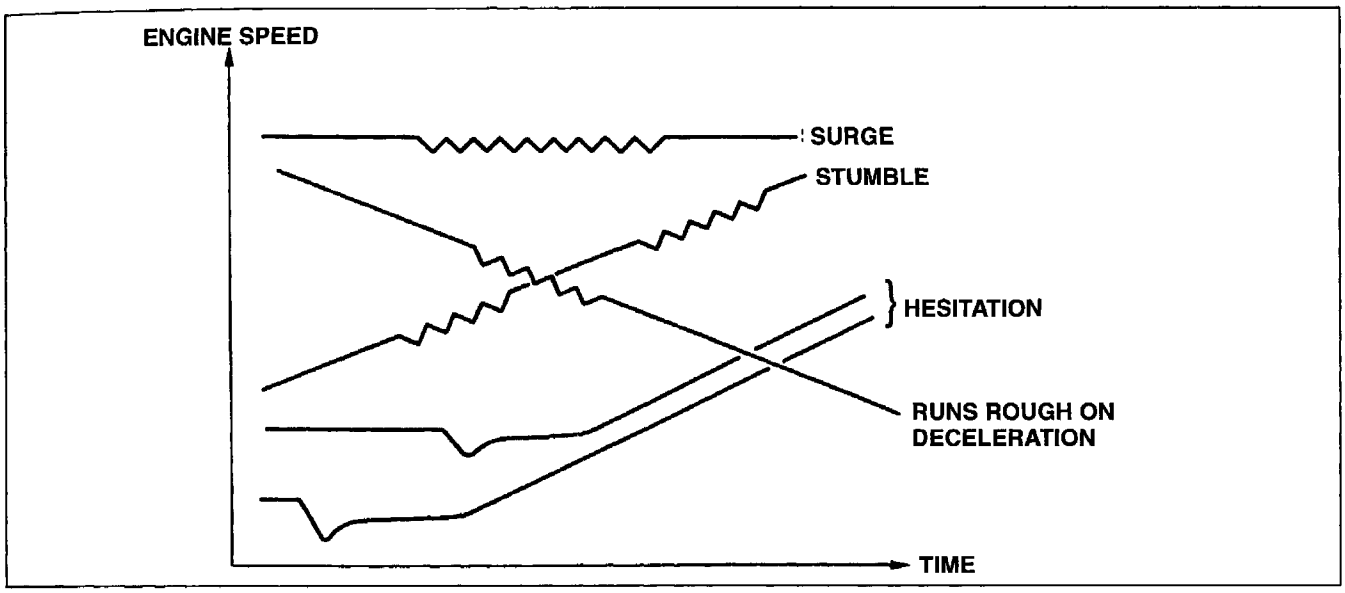
TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
No.	TROUBLE			
19	Engine runs rough	Idle at any engine temp.	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at any engine temp. Idle speed too slow and excessive engine shake at any engine temp.	F2–176
20		During fast idle	Fast idle speed too slow and excessive engine shake during fast idle, but returns to normal after warm-up	
21		Idle after warm-up	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle after warm-up	
22		Idle with A/C, P/S, and/or E/L ON	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle when A/C, P/S, and/or E/L ON	F2–179
23		Idle when shifted from N or P to other ranges	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle when shifted from P or N to other range	
*24		On deceleration	Engine shakes at beginning of deceleration, during deceleration, or recovery from deceleration Exhaust afterburn	F2–181 section K2
*25	Poor acceleration	Driveaway	Engine speed increases normally but vehicle speed slowly increases during driveaway	F2–182 section K2
*26		On acceleration	Engine speed increases normally but vehicle speed slowly increases during acceleration	
27	High idle speed after warm-up		Idle speed continues at fast idle after warm-up Engine returns slowly to idle after accelerator is released	F2–184
28	Idle fluctuates/Idle hunts		Engine speed changes back and forth between specified idle speed and higher speed	F2–185
29	Hesitates/Stumbles on acceleration		Momentary pause at beginning of acceleration or during acceleration	F2–186
*30	Surges while cruising		Momentary minor irregularity in engine output at steady vehicle speed	F2–188 section K2
*31	Lack of power		Performance poor under load (i.e., power down when climbing hills)	F2–189 section K2
*32	Poor fuel economy		Fuel economy unsatisfactory	F2–189 section K2
33	A/C does not work		A/C compressor magnetic clutch does not engage when A/C switch ON	F2–190
34	Knocking/Pinging		Sound produced when air/fuel mixture is ignited by something other than spark plug (i.e., hot spot in combustion chamber)	F2–190
35	Fuel odor		Gasoline fuel smell or visible leaks	F2–190
36	Exhaust sulfur smell		Rotten egg smell from exhaust	F2–190
37	High oil consumption		Oil consumption excessive	F2–190
38	NGS displays "LINK COMMUNICATION ERROR"		NGS displays "LINK COMMUNICATION ERROR"	F2–191
39	NGS will not work		NGS does not work	F2–191
40	Vehicle does not move in D, S, L and/or R ranges		No creep at all Vehicle does not move when accelerator pedal depressed after shifted to D, S, L and/or R range	section K2
41	Vehicle moves in N range		Vehicle creeps in N range Vehicle moves when accelerator pedal not depressed	section K2
42	Vehicle moves in P range		Vehicle rolls in P range, and drivetrain not locked up	section K2

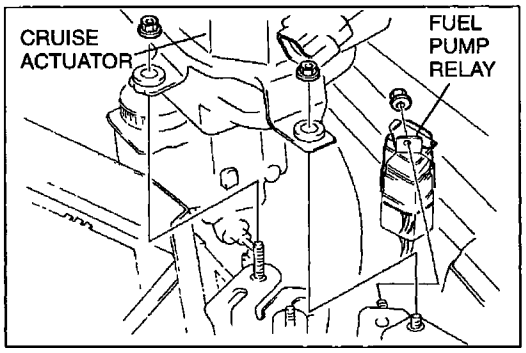
* Refer to section F2 before referring to section K2.

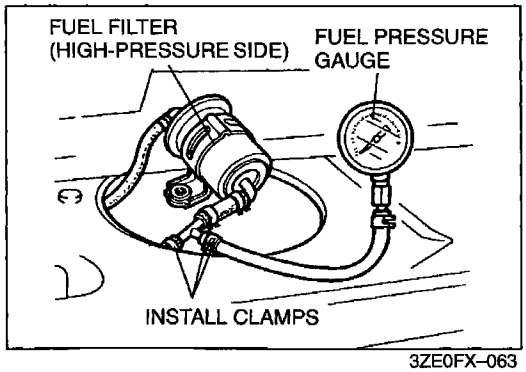
TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
No.	TROUBLE			
43	Excessive creep		Vehicle moves quickly in D, S, L and R range (accelerator pedal not depressed) **Note** • Excessive N to R range and N to D range shift shock felt	section K2
44	No shift		Single range shift (1st→2nd, 2nd→3rd or 3rd→O/D) only Sometimes shifts correctly **Note** • Gear position held in hold mode.	section K2
45	Abnormal shift		Shifts incorrectly (incorrect shift pattern) (ex) Vehicle shifts 1st→O/D directly when accelerating with accelerator pedal depressed slightly	section K2
46	Frequent shifting		Downshift occurs when accelerator depressed slightly in D, S and L ranges (except hold mode)	section K2
47	Shift point high or low		Shift points do not match shift diagram Shifts delayed when accelerating Shifts occur too fast when accelerating and engine speed does not increase	section K2
48	No lockup		No lockup when vehicle speed reaches lockup range	section K2
49	No kickdown		Does not downshift when accelerator pedal depressed more than 7/8 within kickdown range	section K2
50	Engine speed flares up	When accelerating	Engine speed flares up on acceleration	section K2
51		When upshifting and/or downshifting	Engine flares up when accelerator pedal depressed for upshifting Engine flares up suddenly when accelerator pedal depressed for downshifting	section K2
52	Excessive shift shock	P, N to R and/or N to D	Strong shift shock felt at idle when shifting from N to D or R range	section K2
53		When upshifting and/or downshifting	Excessive shift shock felt when accelerating at upshifting During cruising, excessive shift shock felt when accelerator pedal depressed at downshifting	section K2
54	No engine braking		Engine speed drops to idle but vehicle does not slow when accelerator pedal released during cruising at medium to high speed Engine speed drops to idle but vehicle does not slow when accelerator pedal released when in L range at low vehicle speed	section K2
55	No mode change		Mode does not change to/from normal mode in D range Hold mode not selected or not cancelled	section K2
56	Transaxle noise	All ranges	Transaxle noisy in all ranges when vehicle is idling	section K2
57		D, S, L, R ranges	Abnormal noise from transaxle in D, S, L, R	section K2
58	Transaxle overheats		ATF smells burnt and/or is discolored	section K2

Description of Driveability Problems

STUMBLE : Mild jerking during acceleration.
HESITATION : Flat spot occurring just after the accelerator pedal is depressed.
SURGE : Continuous soft jerking while cruising.







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. Start the engine.
   2. Remove the cruise actuator. (Refer to section T.)
   3. Remove the fuel pump relay.
   4. After the engine stalls, turn the ignition switch to OFF.
   5. Install the fuel pump relay.

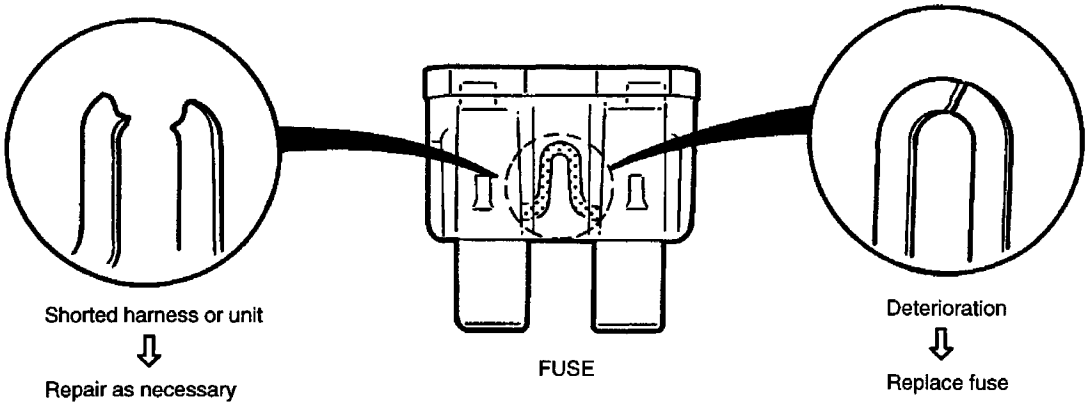
B. Avoid leakage.
   1. When disconnecting a fuel line hose, wrap a rag around it to protect against fuel leakage.
   2. Plug the hose after removal.

C. Install hose clamps to secure the fuel pressure gauge to the fuel filter and the main hose.

SYMPTOM TROUBLESHOOTING

1	MELTS MAIN OR OTHER FUSE

[TROUBLESHOOTING HINTS]
Check the condition of the fuse



Damaged Fuse	Related Wiring Harness
MAIN (120 A)	Main fuse — Alternator terminal B
BTN (60 A)	BTN fuse — ROOM fuse
ROOM (15 A)	ROOM fuse — ECM terminal 4B ROOM fuse — Data link connector terminal +B
EGI INJ (40 A)	Main relay — Fuel pump relay Main relay — Data link connector terminal F/P Main relay — ECM terminal 1AF Fuel pump relay — Fuel pump Main relay — Fuel injectors Main relay — ECM terminal 4B Main relay — Heated oxygen sensor Main relay — Mass air flow sensor Main relay — PRC solenoid valve Main relay — ABV solenoid valves Main relay — Bypass air solenoid valves Main relay — EGR solenoid valve (vacuum) Main relay — EGR solenoid valve (vent) Main relay — Idle air control valve Main relay — Purge solenoid valve Main relay — Charge air cooler bypass solenoid valve Main relay — MAP sensor solenoid valve
ENGINE (10 A)	ENGINE fuse — Main relay

3	CRANKS NORMALLY BUT WILL NOT START	• NO COMBUSTION
DESCRIPTION	• Starter cranks engine at normal speed but engine shows no indication of firing	

[TROUBLESHOOTING HINTS]

① Diagnostic trouble codes
- P0335 (Crankshaft position sensor circuit malfunction)
- P1345 (SGC signal)

② Main relay/Fuel pump relay
- Poor connection of connector
- Malfunction of relay

③ Fuel pump
- Poor connection of connector
- Malfunction of fuel pump ☞ page F2–21

④ Ignition system
- Referring to ignition system inspection ☞ section G

⑤ Fuel injectors
- Open or short circuit ☞ page F2–25

⑥ Throttle position sensor
- Misadjustment ☞ page F2–52

4	CRANKS NORMALLY BUT WILL NOT START	• PARTIAL COMBUSTION — WHEN ENGINE COLD
DESCRIPTION	• Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is cold at initial starting • Engine will not continue running when cold when ignition switch is returned from STA to IG position • Refer to "ENGINE STALLS" if this symptom appears after engine stall • Fuel in tank • Battery in terminal condition	

[TROUBLESHOOTING HINTS]

① BAC valve
- Malfunction of air valve
- Idle air control valve

② Fuel injector
- Poor connection

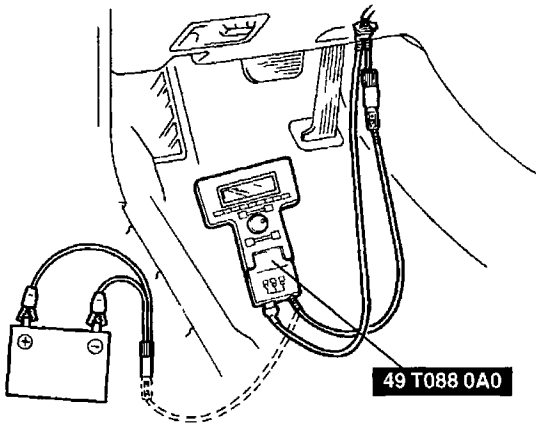
③ Fuel pump relay
- Poor connection

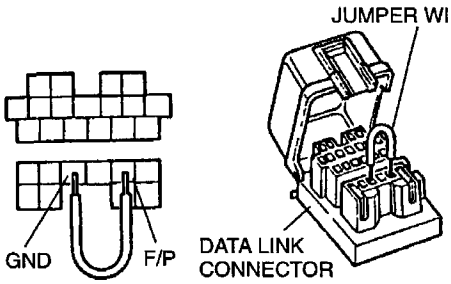
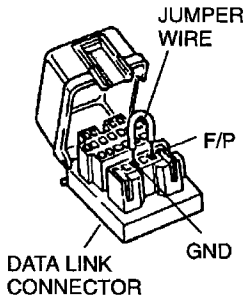
④ Fuel pump
- Poor connection of connector

⑤ Ignition coil(s)
- Poor connection of connector

⑥ Pressure regulator
- Malfunction (low pressure)

⑦ Throttle body
- Stuffed

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ page F2–99  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ page F2–99
2	Does engine start when throttle valve held quarter open?	Yes	Check BAC valve operation ☞ page F2–64
		No	Go to next step

STEP	INSPECTION		ACTION
3	Connect jumper wire between F/P and GND terminals of data link connector; will engine start? 	Yes	Check as follows: • Terminal 1AF voltage at ECM ☞ **page F2–39** • Continuity between 1AF terminal and fuel pump relay connector terminal • Condition of ECM and fuel pump relay connector female terminals
		No	Check if fuel pump operating sound is heard • If yes, go to next step • If no, check fuel pump, fuel pump resistor and relay (speed) and wiring harness ☞ **page F2–21** ☞ **page F2–69**
4	Do Engine Signal Monitor lamps flash for specified terminals while cranking engine? **Terminal: 4Q, 4U, 4Y, 4AC, 4AG, 4AK**	Yes	Go to next step
		No	Check as follows according to results: Does not flash and 0V indicated for individual terminals • Continuity of fuel injector • Continuity between ECM and fuel injector(s) • Condition of injector connector and ECM connector female terminals Repair or replace parts and/or wiring harness as necessary
5	Is following terminal voltage at ECM correct? • 1H (Starter signal) • 3B (Throttle position sensor) • 3E (Mass air flow sensor) • 3Q (Engine coolant temperature sensor)	Yes	Go to next step
		No	Check for cause
6	Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON? ☞ **page F2–16** **Fuel line pressure:** **270—330 kPa {2.7—3.3 kgf/cm², 39—47 psi}** 	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator ☞ **page F2–29** • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞ **page F2–21**
7	Is a strong blue spark visible at each disconnected ignition coil while cranking engine?	Yes	Go to next step
		No	Referring ignition system inspection ☞ **section G**
8	Are fuel injectors OK? • No fuel leakage ☞ **page F2–27** • Fuel injectors not clogged ☞ **page F2–28**	Yes	Go to next step
		No	Replace fuel injector(s) ☞ **page F2–25**
9	Try known good ECM; does condition improve? ☞ **page F2–39**		

5	CRANKS NORMALLY BUT WILL NOT START	• PARTIAL COMBUSTION — AFTER WARM UP
DESCRIPTION	• Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is warm • Engine will not continue running when ignition switch is returned from STA to IG position	
[TROUBLESHOOTING HINTS] ① Pressure regulator • Hold fuel pressure low ② Throttle body • Carbon on throttle valve ③ PRC solenoid valve • Solenoid valve stuck • Control system malfunction		☞ page F2–17 ☞ page F2–8 ☞ page F2–72 ☞ page F2–71

7 8 9	**CRANKS NORMALLY BUT HARD TO START**	• **ANY ENGINE TEMP** • **WHEN ENGINE COLD** • **AFTER WARM-UP**

DESCRIPTION	• Starter cranks engine at normal speed but engine requires excessive cranking time before starting • Engine starts after stalling a few times • Battery in normal condition • Engine runs normally at idle (if idle condition not OK, refer to "Engine runs rough" [Nos. 19, 20, 21, 22 or 23])

[TROUBLESHOOTING HINTS]

① Fuel injector
- Fuel leakage from fuel injector(s)

② Fuel pump
- Malfunction of pump

③ Pressure regulator
- Pressure regulator stuck

④ Spark plug
- Dirty or worn spark plug(s)

⑤ PRC solenoid valve
- Solenoid valve stuck

⑥ Throttle body
- Carbon on throttle plate

⑦ EGR solenoid valve (vacuum or vent)
- Solenoid valve stuck

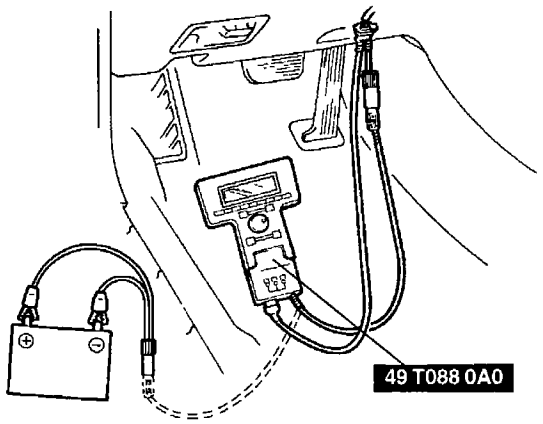
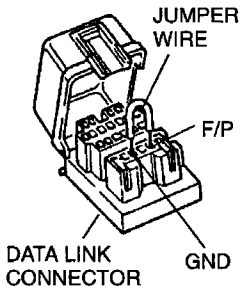
⑧ EGR control valve
- EGR valve stuck

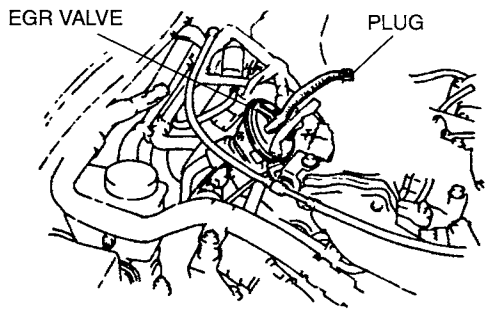
⑨ Manifold absolute pressure sensor
- Malfunction

⑩ MAP sensor solenoid valve
- Solenoid valve stuck

⑪ BAC valve
- Air valve stuck

⑫ Mass air flow sensor
- Malfunction

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F2–99**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F2–99**
2	Is following terminal voltage at ECM correct? • 1H (Starter signal) • 3Q (Engine coolant temperature sensor) • 4Q, 4U, 4Y, 4AC, 4AG, 4AK (Fuel injectors)	Yes	Go to next step
		No	Check for cause
3	Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON? ☞ **page F2–16** **Fuel line pressure:** **270—330 kPa {2.7—3.3 kgf/cm², 39—47 psi}**  	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator ☞ **page F2–29** • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞ **page F2–21**

STEP	INSPECTION		ACTION
4	Is fuel line pressure held after ignition switch turned OFF? ☞ **page F2–17** **Fuel line pressure:** **More than 150 kPa {1.5 kgf/cm², 21 psi} for 5 min.**	Yes	Go to next step
		No	Plug outlet of pressure regulator, Is fuel line pressure held after ignition switch turned OFF? • If yes, replace pressure regulator ☞ **page F2–25** • If no, check fuel pump hold pressure ☞ **page F2–22** If fuel pump OK, check fuel injectors for fuel leakage ☞ **page F2–27**
5	Is throttle body clean internally?	Yes	Go to next step
		No	Clean the throttle body
6	Is engine compression correct? ☞ **section B2** **Engine compression (Minimum):** **834 kPa {8.5 kgf/cm², 121 psi}/250 rpm**	Yes	Go to next step
		No	Check for cause ☞ **section B2**
7	Is IAC system correct? ☞ **page F2–63**	Yes	Go to next step
		No	Check for cause
8	Disconnect vacuum hose from EGR valve and plug it; does condition improve?  	Yes	Check if EGR control system correct ☞ **page F2–84**
		No	Check if EGR valve moves smoothly ☞ **page F2–85** • If yes, go to next step • If no, replace EGR valve ☞ **page F2–85**
9	Are fuel injectors OK? • No fuel leakage ☞ **page F2–27** • Fuel injectors not clogged ☞ **page F2–27** • Injection amount ☞ **page F2–28** • Resistance ☞ **page F2–27**	Yes	Go to next step
		No	Replace fuel injector(s) ☞ **page F2–25**
10	Try known good ECM; does condition improve? ☞ **page F2–39**		

10 11 12	**ENGINE STALLS**	• **IDLE AT ANY ENGINE TEMPERATURE** • **DURING FAST IDLE** • **IDLE AFTER WARM-UP**

DESCRIPTION • Engine stops unexpectedly at idle and/or during fast idle operation

[TROUBLESHOOTING HINTS]

① Fuel injector
- Fuel leakage from fuel injector(s)
- Fuel injector(s) clogged

② Fuel pump
- Maximum pressure low

③ Fuel pump relay
- Poor connection of connector

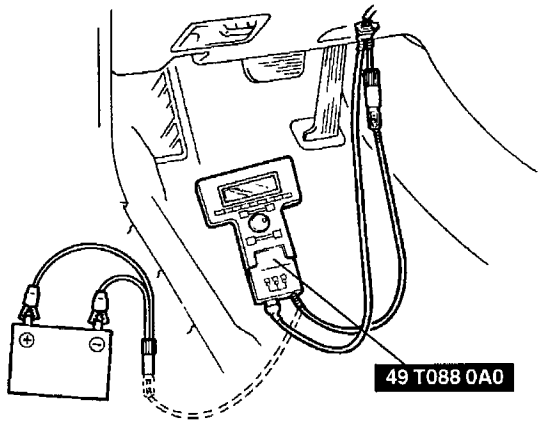
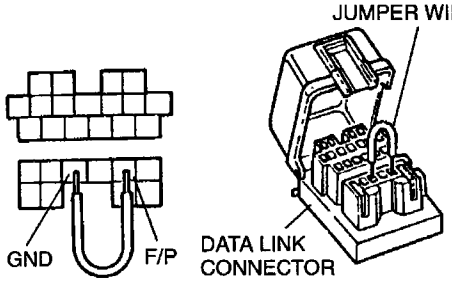
④ Mass air flow sensor
- Malfunction

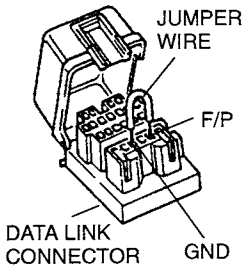
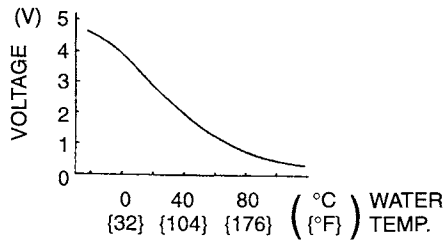
⑤ Ignition coil(s)
- Poor connection of connector

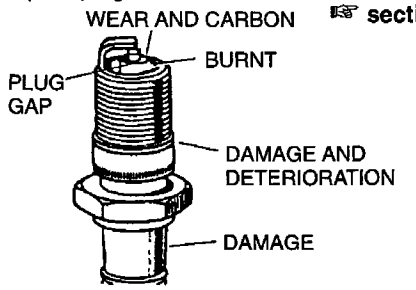
⑥ Engine coolant temperature sensor
- Poor connection of connector

⑦ EGR valve
- EGR valve stuck

⑧ BAC valve
- Air valve stuck

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on with ignition switch ON? ☞ **page F2–99**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** • If symptom occurs at idle at any engine temp., go to next step • If symptom occurs during fast idle operation, go to Step 10 • If ymptom occurs at idle after warm-up, go to Step 12
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F2–99**
2	Is strong blue spark visible at each disconnected ignition coil while cranking engine?	Yes	Go to next step
		No	Referring to ignition system inspection ☞ **section G**
3	Do Engine Signal Monitor lamps flash for specified terminals while cranking engine? **Terminal: 4Q, 4U, 4Y, 4AC, 4AG, 4AK**	Yes	Go to next step
		No	Check as follows according to results: Does not flash and 0 V indicated for individual terminal(s) • Continuity of fuel injector(s) • Continuity between ECM and fuel injector(s) • Condition of fuel injector connector and ECM connector Repair or replace parts and/or wiring harness as necessary
4	Is following voltage at ECM correct? ☞ **page F2–39** • 3E (Mass air flow sensor) • 3X (Closed throttle position switch)	Yes	Go to next step
		No	Check for cause
5	Connect jumper wire between terminals F/P and GND of data link connector; will engine run?  	Yes	Check as follows: • Terminal 1AF voltage at ECM ☞ **page F2–39** • Continuity between terminal 1AF and fuel pump relay connector terminal • Condition of ECM and fuel pump relay connector female terminals
		No	Check if fuel pump operating sound is heard? • If yes, go to next step • If no, check fuel pump, fuel pump resistor and relay (speed)

STEP	INSPECTION		ACTION
6	Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON? ☞ **page F2–16** **Fuel line pressure:** **270—330 kPa {2.7—3.3 kgf/cm², 39—47 psi}**  	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator ☞ **page F2–29** • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞ **page F2–21**
7	Is air leakage felt or heard at intake air system components while racing engine to higher speed?	Yes	Repair or replace
		No	Go to next step
8	Is purge control system correct? ☞ **page F2–88**	Yes	Go to next step
		No	Check for cause
9	Is engine compression correct? ☞ **section B2** **Engine compression (Minimum):** **834 kPa (8.5 kgf/cm², 121 psi)/250 rpm**	Yes	Go to Step 11
		No	Check for cause ☞ **section B2**
10	Does engine start with throttle valve held quarter open?	Yes	Check as follows: • Operation of BAC valve ☞ **page F2–64** • Operation of EGR valve ☞ **page F2–85**
		No	Go to next step
11	Is bypass air control system correct? ☞ **page F2–66**	Yes	Go to next step
		No	Check for cause
12	Does following terminal voltage at ECM decrease smoothly? ☞ **page F2–39** **(Terminal 3Q: Engine coolant temperature sensor)**  	Yes	Go to next step
		No	Check as follows: • Ground of mass air flow sensor • Continuity between mass air flow sensor and ECM connector • Condition of mass air flow sensor and ECM connector female terminals

STEP	INSPECTION		ACTION
13	Are spark plugs OK? ☞ **section G**  	Yes	• If symptom occurs at any engine temp., go to step 15 • If symptom occurs during fast idle operation, go to step 14 • If symptom occurs at idle after warm-up, go to next step
		No	Clean or replace ☞ **section G**
14	Is resistance of idle air control valve correct? **Resistance: 10.7—12.3 Ω [at 20° C {68° F}]**	Yes	Go to next step
		No	Replace BAC valve ☞ **page F2–64**
15	Try known good BAC valve; does condition improve	Yes	Replace BAC valve ☞ **page F2–64**
		No	Reinstall BAC valve and go to next step
16	Are fuel injectors OK? • No fuel leakage ☞ **page F2–27** • Fuel injectors not clogged ☞ **page F2–27** • Injection amount ☞ **page F2–28** • Resistance ☞ **page F2–27**	Yes	Go to next step
		No	Replace fuel injector(s) ☞ **page F2–25**
17	Try known good ECM; does condition improve? ☞ **page F2–39**		

13 14	ENGINE STALLS	• IDLE WITH A/C, P/S, and/or E/L ON • IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGES

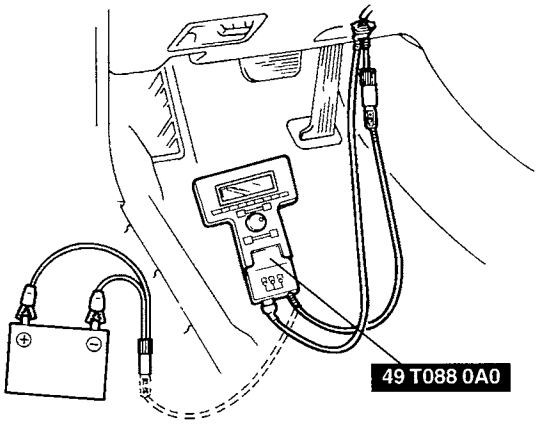
DESCRIPTION
- Engine stops unexpectedly when A/C, P/S, and/or E/L turned ON at idle
- Engine stops unexpectedly when shifted from N or P to other ranges at idle
- Idle condition is normal when A/C, P/S, and E/L are OFF and in park/neutral position

[TROUBLESHOOTING HINTS]

① Signal does not input to ECM
- A/C switch
- Headlight switch
- Rear window defroster switch
- Blower switch
- P/S pressure switch

② Idle air control valve
- Stuck

③ Closed throttle position switch
- Throttle position sensor misadjustment

STEP	INSPECTION		ACTION
1	Is following terminal voltage at ECM correct? ☞ page F2–39 • 1D (A/C switch) • 1G (Daytime running light-Canada Fog light-except Canada) • 1K (Blower switch) • 1L (Headlight) • 1X (Rear window defroster switch) • 3T (P/S pressure switch) • 3X (Closed throttle position switch) ☞ section K2	Yes	Go to next step
		No	Check for cause ☞ page F2–39
2	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ page F2–99  49 T088 0A0	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ page F2–99
3	Is IAC system correct? ☞ page F2–63	Yes	Go to next step
		No	Check for cause
4	Is terminal voltage at ECM correct at idle? **Terminal 4M: Approx. 1.6 V (at idle)**	Yes	Check BAC valve and replace if necessary ☞ page F2–64 If OK, go to "ENGINE STALLS — IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGES" in section K of this manual
		No	Try known good ECM and check if condition improves ☞ page F2–39

15	ENGINE STALLS	• DRIVEAWAY
DESCRIPTION	• Engine stops unexpectedly upon driveaway • Idle condition normal	

[TROUBLESHOOTING HINTS]

① Fuel injector
- Fuel leakage from fuel injector(s)
- Injector(s) clogged

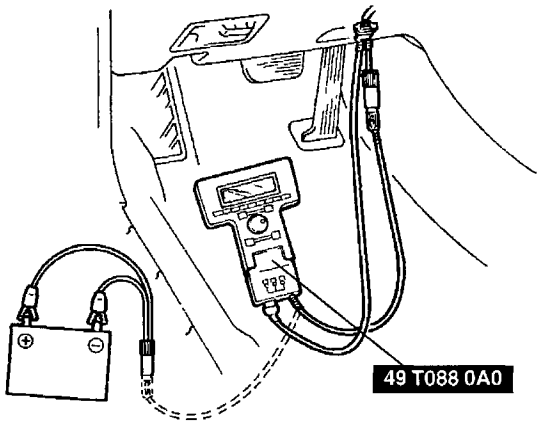
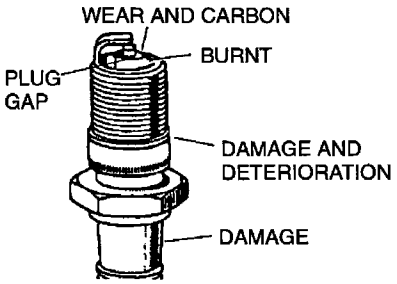
② Pressure regulator
- Diaphragm damaged

③ Fuel filter
- Fuel filter clogged

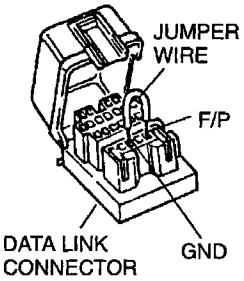
④ Engine coolant temperature sensor
- Poor connection of connector

⑤ Fuel pump
- Poor connection of connector

⑥ Fuel pump relay/Fuel pump resistor and relay
- Poor connection of connector

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ page F2–99 	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ page F2–99
2	Is a strong blue spark visible at each disconnected ignition coil while cranking engine?	Yes	Go to next step
		No	Referring to ignition system inspection ☞ section G
3	Are spark plug OK? ☞ section G 	Yes	Go to next step
		No	Clean or replace
4	Using Engine Signal Monitor, do voltage reading and lamp operation change as follows upon driveaway?	Yes	Go to next step
		No	Check for cause

Terminal	Condition
3B, 3E, 4G, 4K, 4O	Voltage gradually increases
3Q	Does not suddenly change voltage
4Q, 4U, 4Y, 4AC, 4AG, 4AK	Flashing of green and red lamps becomes quicker

STEP	INSPECTION		ACTION
5	Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON? ☞ page F2–16 **Fuel line pressure:** **270—330 kPa {2.7—3.3 kgf/cm², 39—47 psi}**  	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator ☞ page F2–29 • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞ page F2–21
6	Are fuel injectors OK? • No fuel leakage ☞ page F2–27 • Fuel injectors not clogged ☞ page F2–28 • Injection amount ☞ page F2–27 • Resistance ☞ page F2–27	Yes	Go to next step
		No	Replace fuel injector ☞ page F2–25
7	Try known good ECM; does condition improve? ☞ page F2–39		

16 17	ENGINE STALLS	• ON ACCELERATION/WHILE CRUISING

DESCRIPTION
- Engine stops unexpectedly at beginning of acceleration or during acceleration
- Engine stops unexpectedly while cruising

[TROUBLESHOOTING HINTS]

① Fuel pump
- Poor connection

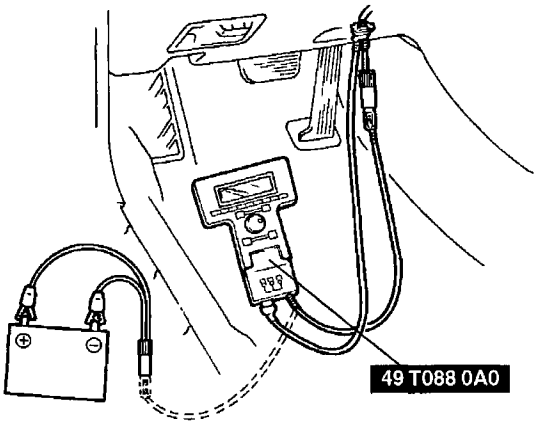
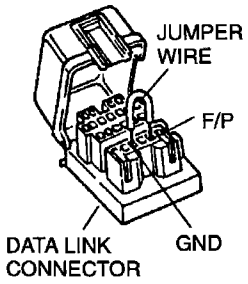
② Pressure regulator
- Diaphragm damaged

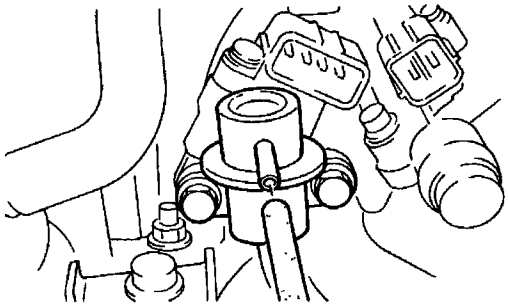
③ Mass air flow sensor
- Poor connection of connector

④ Main relay
- Poor connection of connector

⑤ Fuel pump
- Poor connection of connector

⑥ Fuel pump relay/Fuel pump resistor and relay
- Poor connection of connector

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F2–99**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F2–99**
2	Is a strong blue spark visible at each disconnected ignition coil while cranking engine?	Yes	Check spark plugs ☞ **section G** ⇨ If OK, go to next step ⇨ If not OK, clean or replace spark plug
		No	Referring to ignition system inspection ☞ **section G**
3	Are mass air flow sensor connector terminals good?	Yes	Go to next step
		No	Repair connector terminal(s)
4	Ground terminal F/P of data link connector while ignition switch ON; is operation sound of fuel pump heard?  	Yes	Go to next step
		No	Check as follows: • Poor connection of fuel pump relay and fuel pump resistor and relay • Poor connection of fuel pump connector • Melted EGI INJ fuse (40 A) ☞ **page F2–160** Refer to "No.1 — MELTS MAIN OR OTHER FUSE" • Poor connection of main relay • Operation of main relay
5	Is following terminal voltage at ECM correct? • 3B (Throttle position sensor) • 4Q, 4U, 4Y, 4AC, 4AG, 4AK (Fuel injectors)	Yes	Go to next step
		No	Check for cause

STEP	INSPECTION		ACTION
6	If fuel line pressure correct at idle? ☞ **page F2–20** **Fuel line pressure:** **210—330 kPa {2.1—3.4 kgf/cm², 30—48 psi}** **Pressure regulator vacuum hose disconnected:** **280—330 kPa {2.8—3.4 kgf/cm², 40—48 psi}** 	Yes	Go to next step
		No	Check pressure regulator ☞ **page F2–29**
7	Are fuel injectors OK? • No fuel leakage ☞ **page F2–27** • Fuel injectors not clogged ☞ **page F2–27** • Injection amount ☞ **page F2–28** • Resistance ☞ **page F2–27**	Yes	Go to next step
		No	Replace fuel injector ☞ **page F2–25**
8	Try known good ECM; does condition improve? ☞ **page F2–39**		

18	ENGINE STALLS	• ON DECELERATION
DESCRIPTION	• Engine stops unexpectedly at beginning of deceleration or recovery from deceleration • Exhaust afterburn	

[TROUBLESHOOTING HINTS]

① Fuel pump
- Poor connection of connector

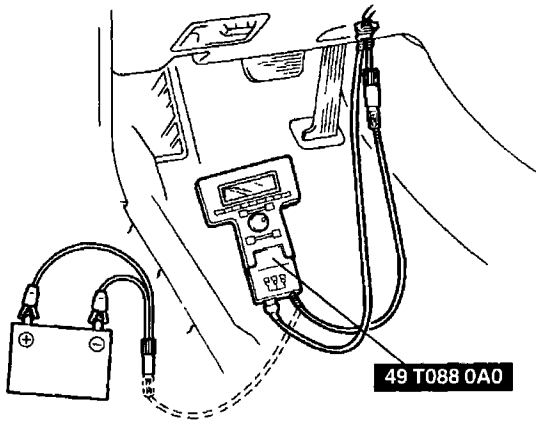
② Idle speed
- Idle speed to low

③ Ignition coil(s)
- Poor connection of connector

④ Mass air flow sensor
- Poor connection of connector

⑤ Idle air control valve
- Stuck

⑥ Closed throttle position switch
- Misadjustment

STEP	INSPECTION		ACTION
1	Connect the TEN and GND terminals of data link connector with jumper wire: is idle speed correct after warm-up? **Idle speed: 650 ± 50 rpm**	Yes	Go to next step
		No	Adjust the idle speed ☞ **page F2–4**
2	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F2–99**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F2–99**
3	Is IAC system correct? ☞ **page F2–63**	Yes	Go to next step
		No	Check for cause
4	Are mass air flow sensor connector terminals good?	Yes	Go to next step
		No	Repair connector terminal
5	Is following terminal voltage at ECM correct? ☞ **page F2–39** • 1B, 1F, 1R (Serial lines) • 1X (Closed throttle position switch) • 3B (Throttle position sensor) • 3E (Mass air flow sensor) • 4Q, 4U, 4Y, 4AC, 4AG, 4AK (Fuel injectors)	Yes	Go to next step
		No	Check for caused
6	Are fuel injectors OK? • No fuel leakage ☞ **page F2–27** • Fuel injectors not clogged ☞ **page F2–27** • Injection amount ☞ **page F2–28** • Resistance ☞ **page F2–27**	Yes	Go to next step
		No	Replace fuel injector ☞ **page F2–25**
7	Are following terminals and connections good? • Camshaft position sensor • Fuel pump connector • Main relay • Fuel pump relay • Fuel pump resistor and relay • ECM connector	Yes	Go to "ENGINE STALLS — ON DECELERATION" in section K of this manual
		No	Repair connector terminal

19 20 21	ENGINE RUNS ROUGH	• IDLE AT ANY ENGINE TEMP/DURING FAST IDLE/ IDLE AFTER WARM-UP

DESCRIPTION

- Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at any engine temperature
- Idle speed too slow and excessive engine shake at any engine temperature
- Fast idle speed too slow and excessive engine shake during fast idle, but returns to normal after warm-up
- Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle after warm-up

[TROUBLESHOOTING HINTS]

① Fuel injector
- Fuel leakage from fuel injector(s)
- Fuel injector(s) clogged

② Fuel pump
- Maximum pressure low

③ Fuel pump relay/Fuel pump resistor and relay
- Poor connection of connector

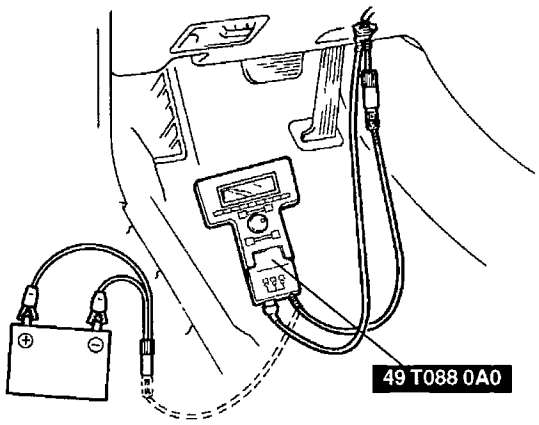
④ Air leakage
- Leakage in intake air system

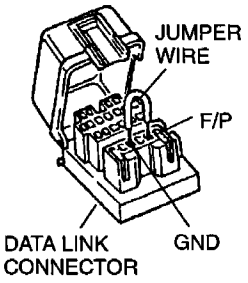
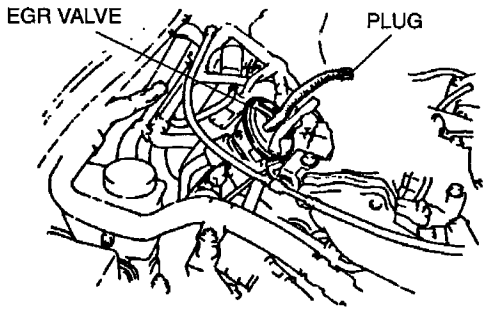
⑤ Ignition coil(s)
- Poor connection of connector

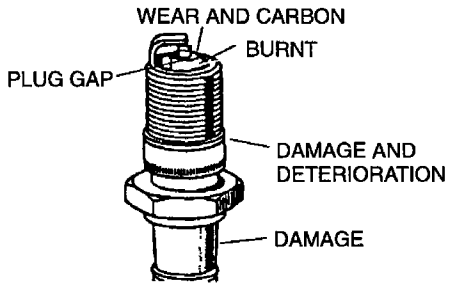
⑥ Engine coolant temperature sensor
- Poor connection of connector

⑦ EGR valve
- EGR valve stuck

⑧ BAC valve
- Air valve stuck

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F2–99**  49 T088 0A0	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** • If symptom occurs at idle at any engine temperature, go to next step • If symptom occurs during fast idle operation, go to Step 10 • If symptom occurs at idle after warm-up, go to Step 11
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F2–99**
2	Do Engine Signal Monitor lamps flash for specified terminals while cranking engine? **Terminal: 4Q, 4U, 4Y, 4AC, 4AG, 4AK**	Yes	Go to next step
		No	Check as follows according to results: Does not flash and 0 V indicated for individual terminal(s) • Continuity of fuel injector(s) ☞ **page F2–27** • Continuity between ECM and fuel injector(s) • Condition of injector connector and ECM connector Repair or replace parts and/or wiring harness as necessary
3	Is a strong blue spark visible at each disconnected ignition coil while cranking engine?	Yes	Go to next step
		No	Referring to ignition system inspection ☞ **section G**

STEP	INSPECTION		ACTION
4	Connect data link connector terminals F/P and GND with a jumper wire; is fuel line pressure correct with ignition switch ON? ☞ **page F2–16** **Fuel line pressure:** **270—330 kPa {2.7—3.3 kgf/cm², 39—47 psi}**  	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator ☞ **page F2–29** • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞ **page F2–21**
5	Is there air leakage at intake air system components while racing engine to higher speed?	Yes	Repair or replace
	Is there air leakage at intake air system components while racing engine to higher speed?	No	Go to next step
6	Disconnect vacuum hose from EGR valve and plug it; does condition improve?  	Yes	Check if EGR control system correct ☞ **page F2–85**
		No	Check if EGR valve moves smoothly ☞ **page F2–85** • If yes, go to next step • If no, replace EGR valve ☞ **page F2–85**
7	Is following terminal voltage at ECM correct? • 3B (Throttle position sensor) • 3E (Mass air flow sensor) • 3X (Closed throttle position switch)	Yes	Go to next step
		No	Check for cause
8	Is engine compression correct? ☞ **section B2** **Engine compression (minimum):** **834 kPa {8.5 kgf/cm², 121 psi}/250 rpm**	Yes	Go to next step
		No	Check for cause ☞ **section B2**
9	Is purge control system correct? ☞ **page F2–88**	Yes	Go to next step
		No	Check for cause
10	Is bypass air control system correct? ☞ **page F2–66**	Yes	Go to next step
		No	Check for cause

STEP	INSPECTION		ACTION
11	Are spark plug OK? ☞ **section G**  	Yes	• If symptom occurs at any engine temperature, go to step 14 • If symptom occurs during fast idle operation, go to step 13 • If symptom occurs at idle after warm-up, go to next step
		No	Clean or replace
12	Is resistance of idle air control valve correct? **Resistance: 10.7—12.3 Ω (at 20° C {68° F})**	Yes	Go to next step
		No	Replace BAC valve ☞ **page F2–64**
13	Try known good BAC valve; does condition improve?	Yes	Replace BAC valve ☞ **page F2–64**
		No	Reinstall BAC valve Go to next step
14	Are fuel injectors OK? • No fuel leakage ☞ **page F2–27** • Fuel injectors not clogged ☞ **page F2–27** • Injection amount ☞ **page F2–28** • Resistance ☞ **page F2–27**	Yes	Go to next step
		No	Replace fuel injector(s) ☞ **page F2–25**
15	Try known good ECM; does condition improve? ☞ **page F2–39**		

22 23	ENGINE RUNS ROUGH	• IDLE WITH A/C, P/S AND/OR E/L ON • IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGES

DESCRIPTION

- Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle when A/C, P/S and/or E/L ON
- Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle when shifted from P or N to other range

[TROUBLESHOOTING HINTS]

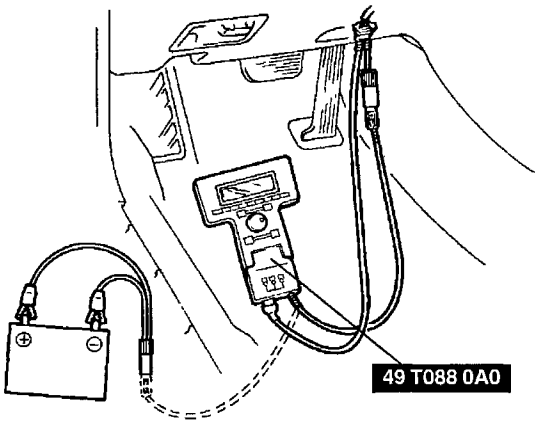
① Idle speed
- Idle speed to low

② Signal does not input to ECM
- A/C switch
- Headlight switch
- Rear window defroster switch
- Blower switch
- P/S pressure switch

③ Idle air control valve
- Stuck

④ Closed throttle position switch
- Throttle position sensor misadjustment

⑤ Fuel injector
- Injection volume

STEP	INSPECTION		ACTION
1	Connect the TEN and GND terminal of data link connector with jumper wire: is idle speed correct after warm-up? **Idle speed: 650 ± 50 rpm**	Yes	Go to next step
		No	Adjust idle speed and go to next step ☞ **page F2–4**
2	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F2–99**  49 T088 0A0	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F2–99**
3	Is following terminal voltage at ECM correct? ☞ **page F2–39** • 1D (A/C switch) • 1G (Daytime running light-Canada/ Fog light-except Canada) • 1K (Blower switch) • 1L (Headlight) • 1X (Rear window defroster switch) • 3T (P/S pressure switch) • 3X (Closed throttle position switch) • Transmission range switch ☞ **section K2**	Yes	Go to next step
		No	Check for caused
4	Is IAC system correct? ☞ **page F2–63**	Yes	• If symptom occurs except when shifted from N or P to other range, go to next step • If symptom occurs at idle when shifted from N or P to other range, go to "ENGINE RUNS ROUGH — IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGE" in section K2 of the manual
		No	Check for cause

STEP	INSPECTION		ACTION
5	Does air conditioner operate continuously with ignition switch ON and A/C switch and blower switch OFF?	Yes	Check follows: • Malfunction A/C relay ☞ **section U** • Wiring harness between A/C relay and ECM terminal 1M for short circuit
		No	Go to next step
6	Are fuel injectors OK? • No fuel leakage ☞ **page F2–27** • Fuel injectors not clogged ☞ **page F2–27** • Injection amount ☞ **page F2–28** • Resistance ☞ **page F2–27**	Yes	Go to next step
		No	Replace ☞ **page F2–25**
7	Try known good ECM; does condition improve? ☞ **page F2–39**		

24	ENGINE RUNS ROUGH	• ON DECELERATION
DESCRIPTION	• Engine shakes at beginning of deceleration, during deceleration, or recover from deceleration • Exhaust afterburn	

[TROUBLESHOOTING HINTS]

① Fuel pump
- Poor connection of connector

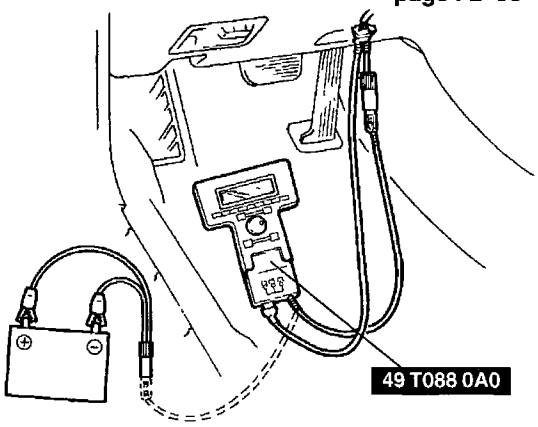
② Fuel injector
- Fuel leakage from fuel injector(s)

③ Idle speed
- Idle speed too low

④ Ignition coil(s)
- Poor connection of connector

⑤ Mass air flow sensor
- Poor connection of connector

⑥ Idle air control valve
- Stuck

STEP	INSPECTION		ACTION
1	Connect the TEN and GND terminals of data link connector with jumper wire: is idle speed correct after warm-up? **Idle speed: 650 ± 50 rpm**	Yes	Go to next step
		No	Adjust the idle speed
2	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F2–99**  49 T088 0A0	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F2–99**
3	Is IAC system correct? ☞ **page F2–63**	Yes	Go to next step
		No	Check for cause
4	Is following terminal voltage at ECM correct? ☞ **page F2–39** • 1B, 1F, 1R (Serial lines) • 1X (Closed throttle position switch)	Yes	Go to next step
		No	Check for caused
5	Are mass air flow sensor connector terminal and connection good?	Yes	Go to next step
		No	Repair connector terminal
6	Are following connection good? • Ignition coil connector • Fuel pump connector • Main relay • Fuel pump relay • Fuel pump resistor and relay • ECM connector	Yes	Go to next step
		No	Repair connector terminal
7	Are fuel injectors OK? • Injection volume • No fuel leakage ☞ **page F2–27**	Yes	Go to next step
		No	Replace ☞ **page F2–25**
8	Try known good ECM; does condition improve? ☞ **page F2–39**	Yes	Replace ECM
		No	Go to "ENGINE RUNS ROUGH — ON DECELERATION" in section K2 of this manual

25 26	POOR ACCELERATION	• DRIVEAWAY • ON ACCELERATION

DESCRIPTION • Engine speed increases normally but vehicle speed slowly increases during driveaway or acceleration

[TROUBLESHOOTING HINTS]

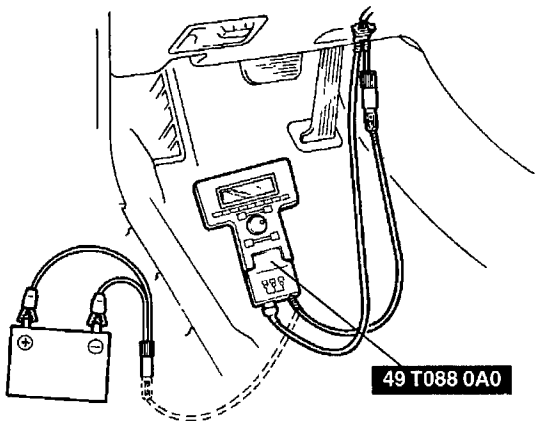
① Fuel injector
- Fuel leakage from fuel injector(s)

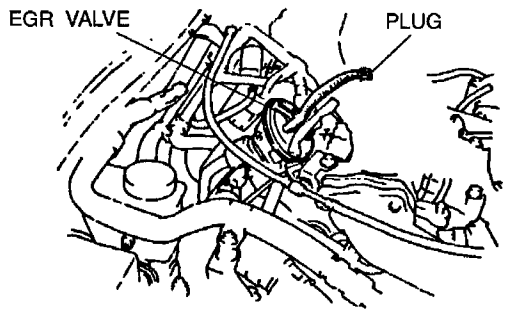
② Pressure regulator
- Pressure regulator malfunction

③ Fuel filter
- Clogged filter

④ Ignition coil(s)
- Poor connection of connector

④ Mass air flow sensor
- Poor connection of connector

STEP	INSPECTION		ACTION
1	Is "NO CODE RECEIVED/SYSTEM PASSED" displayed on with ignition switch ON? ☞ **page F2–99**  	Yes	**"NO CODE RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F2–99**
2	Is a strong blue spark visible at each disconnected ignition coil while cranking engine?	Yes	Check spark plugs ⇨ If OK, go to next step ⇨ If not OK, clean or replace spark plug
		No	Referring to ignition system inspection ☞ **section G**
3	Is intake manifold vacuum correct at idle? **Vacuum:** **More than 60.0 kPa {450 mmHg, 17.7 inHg}**	Yes	Go to next step
		No	Check as follows: • Intake air system components and installation • Vacuum hoses for disconnection and damage • Accelerator cable free play
4	If fuel line pressure correct at idle? ☞ **page F2–29** **Fuel line pressure:** **210—330 kPa {2.1—3.4 kgf/cm^2, 30—48 psi}**	Yes	Go to next step
		No	**Low pressure** Check as follows: • Fuel filter for clogging • Operation of pressure regulator ☞ **page F2–29** • Fuel leakage from fuel injector(s) ☞ **page F2–27**
5	Is following terminal voltage at ECM correct? ☞ **page F2–39** • 1B, 1F, 1R (Serial lines) • 1AJ (Fuel pump resistor and relay (speed)) • 3B (Throttle position sensor) • 3E (Mass air flow sensor) • 3R (EGR valve position sensor) • 3Q (Engine coolant termperature sensor) • 3S (Knock sensor) • 3U (Manifold absolute pressure sensor) • 3X (Closed throttle position switch) • 4P (MAP sensor solenoid valve)	Yes	Go to next step
		No	Check for cause

STEP	INSPECTION		ACTION
6	Is engine compression correct? ☞ **section B2** **Engine compression (Minimum): 834 kPa {8.5 kgf/cm², 121 psi}/250 rpm**	Yes	Go to next step
		No	Check for cause ☞ **section B2**
7	Disconnect vacuum hose from EGR valve and plug it: does condition improve?  	Yes	Check if EGR system correct
		No	Check if EGR valve moves smoothly ☞ **page F2–85** • If yes, go to next step • If no, replace EGR valve ☞ **page F2–85**
8	Is ABV control system correct? ☞ **page F2–76**	Yes	Go to next step
		No	Check for cause
9	Is traction control system correct? ☞ **page F2–98**	Yes	Go to next step
		No	Check for cause
10	Is torque reduction control system correct? ☞ **page F2–96**	Yes	Go to next step
		No	Check for cause
11	Does lysholm compressor move smoothly? ☞ **page F2–78**	Yes	Go to next step
		No	Replace
12	Are fuel injectors OK? • No fuel leakage ☞ **page F2–27** • Fuel injectors not clogged ☞ **page F2–27** • Injection amount ☞ **page F2–28** • Resistance ☞ **page F2–27**	Yes	Go to next step
		No	Replace fuel injector(s) ☞ **page F2–25**
13	Try known good ECM; does condition improve? ☞ **page F2–39**	Yes	Replace ECM
		No	Go to "POOR ACCELERATION — DRIVEAWAY/ON ACCELERATION" in section K2 of this manual

27	HIGH IDLE SPEED AFTER WARM-UP
DESCRIPTION	• Idle speed continues at fast idle after warm-up • Engine returns slowly to idle after accelerator is released

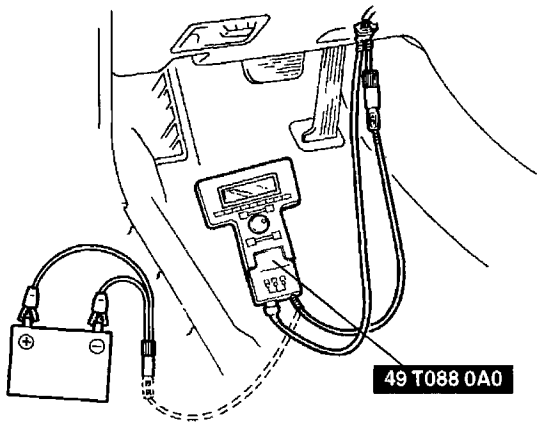
[TROUBLESHOOTING HINTS]

① Engine coolant temperature sensor
- Poor connection connector

② Throttle position sensor
- Poor connection connector
- Incorrect adjustment

③ BAC valve
- Idle air control valve or air valve stuck

④ Air adjusting screw
- Misadjustment

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F2–99**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F2–99**
2	Connect the TEN and GND terminals of data link connector with jumper wire: Does idle speed decrease? **Idle speed: 650 ± 50 rpm**	Yes	Go to step 4
		No	Check if IAC system correct ☞ **page F2–63** ➪ If OK, go to next step
3	Does throttle valve fully close?	Yes	Go to next step
		No	Check if accelerator cable free play ➪ If OK, repair or replace throttle body ☞ **page F2–8** ➪ If not OK, adjust the accelerator cable ☞ **page F2–14**
4	Is following terminal voltage at ECM correct? ☞ **page F2–39** • 1D (A/C switch) • 1G (Daytime running light-Canada/ Fog light-except Canada) • 1K (Blower switch) • 1L (Headlight) • 1X (Rear window defroster switch) • 3T (P/S pressure switch) • 3Q (Engine coolant temperature sensor) • 3X (Closed throttle position switch)	Yes	Go to next step
		No	Check for cause
5	Try known good ECM; does condition improve? ☞ **page F2–39**		

28	• IDLE FLUCTUATES • IDLE HUNTS
DESCRIPTION	• Engine speed changes back and forth between specified idle speed and higher speed

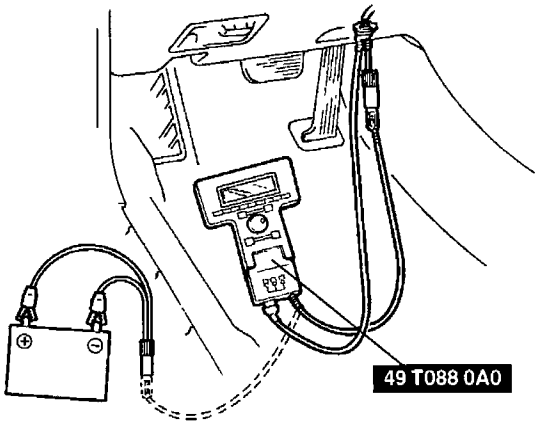
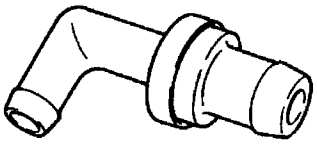
[TROUBLESHOOTING HINTS]

① PCV valve
- PCV valve stuck

② Spark plug
- Spark plug(s) damaged

③ Throttle position sensor
- Incorrect adjustment

④ Idle air control valve
- Stuck

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ page F2–99  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ page F2–99
2	Is a strong blue spark visible at each disconnected ignition coil while cranking engine?	Yes	Check spark plug(s) ⇨ If OK, go to next stop ⇨ If not OK, replace spark plug(s)
		No	Refer to troubleshooting "Misfire" ☞ section G
3	Is PCV valve stuck? ☞ page F2–34 	Yes	Replace PCV valve
		No	Go to next step
4	Connect the TEN and GND terminals of data link connector with jumper wire: Does idle hunt stop?	Yes	Check as follows: • Idle air control valve for sticking • Poor sealing between throttle body and BAC valve
		No	Go to next step
5	Is following terminal voltage at ECM correct? • 3B (Throttle position sensor) • 3E (Mass air flow sensor) • 3X (Closed throttle position switch)	Yes	Go to next step
		No	Check for cause
6	Are fuel injectors OK? • No fuel leakage ☞ page F2–27 • Fuel injectors not clogged ☞ page F2–27 • Injection amount ☞ page F2–28 • Resistance ☞ page F2–27	Yes	Go to next step
		No	Replace fuel injector(s) ☞ page F2–25
7	Try known good ECM; does condition improve? ☞ page F2–39		

29	• **HESITATES** • **STUMBLES ON ACCELERATION**
DESCRIPTION	• Momentary pause at beginning of acceleration or during acceleration

[TROUBLESHOOTING HINTS]

① Fuel injector
- Fuel leakage from fuel injector(s)

② Fuel pump
- Poor connection of connector

③ Pressure regulator
- Pressure regulator stuck

④ EGR valve
- EGR valve stuck

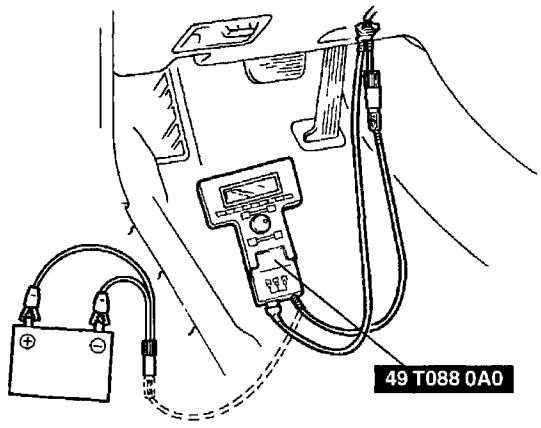
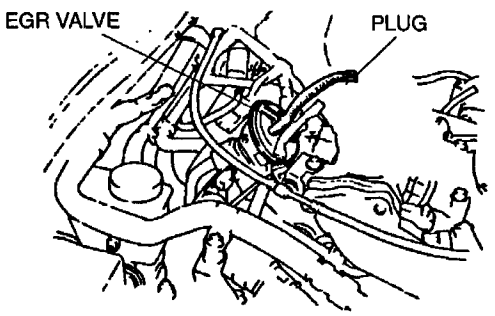
⑤ EGR solenoid valve (vacuum)
- Solenoid valve stuck

⑥ Ignition coil(s)
- Poor connection of connector

⑦ High-tension lead(s)
- Lead(s) damaged

⑧ Mass air flow sensor
- Poor connection of connector

⑨ Throttle position sensor
- Poor connection of connector

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F2–99**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F2–99**
2	Is strong blue spark visible at each disconnected high-tension lead?	Yes	Go to next step
		No	Referring to ignition system inspection ☞ **section G**
3	Is fuel line pressure correct at idle? ☞ **page F2–29** **Fuel line pressure:** **210—330 kPa {2.1—3.4 kgf/cm², 30—48 psi}**	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose • If pressure **quickly** increases, check pressure regulator ☞ **page F2–29** • If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose not clogged, check fuel pump maximum pressure ☞ **page F2–21**
4	Does fuel pressure increase when racing the accelerator pedal?	Yes	Go to next step
		No	Check pressure regulator ☞ **page F2–29**
5	Disconnect vacuum hose from EGR valve and plug it: does condition improve?  	Yes	Check if EGR control system correct? ☞ **page F2–84**
		No	Go to next step

STEP	INSPECTION		ACTION
6	Is following terminal voltage at ECM correct? ☞ page F2–39 • 1B, 1F, 1R (Serial lines) • 1AJ (Fuel pump resistor and relay (speed)) • 3B (Throttle position sensor) • 3E (Mass air flow sensor) • 3R (EGR valve position sensor) • 3Q (Engine coolant temperature sensor) • 3S (Knock sensor) • 3U (Manifold absolute pressure sensor) • 4P (MAP sensor solenoid valve)	Yes	Go to next step
		No	Check for cause
7	Is charge air cooler bypass control system correct? ☞ page F2–75	Yes	Go to next step
		No	Check for cause
8	Is ABV control system correct? ☞ page F2–76	Yes	Go to next step
		No	Check for cause
9	Is traction control system correct? ☞ page F2–98	Yes	Go to next step
		No	Check for cause
10	Are fuel injectors OK? • No fuel leakage ☞ page F2–27 • Fuel injectors not clogged ☞ page F2–27 • Injection amount ☞ page F2–28 • Resistance ☞ page F2–27	Yes	Go to next step
		No	Replace fuel injector(s) ☞ page F2–25
11	Try known good ECM; does condition improve? ☞ page F2–39		

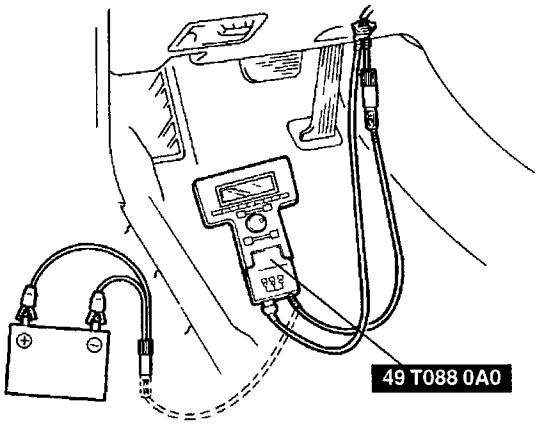
30	SURGES WHILE CRUISING
DESCRIPTION	• Momentary minor irregularity in engine output at steady vehicle speed

[TROUBLESHOOTING HINTS]

① Fuel injector
- Poor connection of connector

② Spark plug
- Spark plug(s) damaged

③ Mass air flow sensor
- Poor connection of connector

STEP	INSPECTION		ACTION
1	Is "NO CODES RECEIVED/SYSTEM PASSED" displayed on NGS with ignition switch ON? ☞ **page F2–99**  	Yes	**"NO CODES RECEIVED/SYSTEM PASSED" displayed** Go to next step
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F2–99**
2	If a strong blue spark visible at each disconnected ignition coil while cranking engine?	Yes	Check spark plug(s) ⇨ If OK, go to next stop ⇨ If not OK, replace spark plug(s)
		No	Referring to ignition system inspection ☞ **section G**
3	Is following terminal voltage at ECM correct? ☞ **page F2–39** • 3B (Throttle position sensor) • 3E (Mass air flow sensor) • 3R (EGR valve position sensor) • 3S (Knock sensor) • 3U (Manifold absolute pressure sensor) • 4P (MAP sensor solenoid valve)	Yes	Go to next step
		No	Check for cause
4	Is ABV control system correct? ☞ **page F2–76**	Yes	Go to next step
		No	Check for cause
5	Is charge air cooler bypass control system correct?	Yes	Go to next step
		No	Check for cause
6	Is traction control system correct? ☞ **page F2–98**	Yes	Go to next step
		No	Check for cause
7	Are fuel injectors OK? • No fuel leakage ☞ **page F2–27** • Fuel injectors not clogged ☞ **page F2–27** • Injection amount ☞ **page F2–28** • Resistance ☞ **page F2–27**	Yes	Go to next step
		No	Replace fuel injector(s) ☞ **page F2–25**
8	Try known good ECM; does condition improve? ☞ **page F2–39**	Yes	Replace ECM
		No	Go to "SURGE WHILE CRUISING" in section K2 of this manual

31	LACK OF POWER
DESCRIPTION	• Performance poor under load (i.e., power down when climbing hills)

[TROUBLESHOOTING HINTS]

① Engine	
• Compression down	☞ section B2
• Valve timing malfunction	☞ section B2
② Intake air system	
• Clogged air cleaner element	☞ page F2–8
• Air leakage	☞ page F2–7
• Lysholm compressor malfunction	☞ page F2–78
③ Exhaust system	
• Clogged three-way catalyst	☞ page F2–31
④ Fuel system	
• Clogged fuel filter (high/low pressure side)	
• Fuel pump malfunction (low pressure)	☞ page F2–21
• Pressure regulator malfunction (low pressure)	☞ page F2–29
• Fuel injector malfunction (injection amount)	☞ page F2–28
⑤ Ignition system	
• Ignition coil(s) malfunction (poor connection)	
⑥ Control system malfunction	
• ABV control	☞ page F2–76
• EGR control	☞ page F2–84
• F/P control	☞ page F2–69
• Traction control (TCS)	☞ page F2–98
• Torque reduction control	☞ page F2–96
⑦ Input signal malfunction	
• Mass air flow sensor	☞ page F2–48
• Manifold absolute pressure sensor	☞ page F2–52
• Throttle position sensor	☞ page F2–52
• Engine coolant temperature sensor	☞ page F2–56
• Knock sensor	☞ page F2–59
⑧ Others	
• Non premium gasoline used	

32	POOR FUEL ECONOMY
DESCRIPTION	• Fuel economy unsatisfactory

[TROUBLESHOOTING HINTS]

① Engine	
• Compression down	☞ section B2
② Intake air system	
• Air leakage	☞ page F2–7
• Lysholm compressor malfunction	☞ page F2–78
③ Fuel system	
• Pressure regulator malfunction (Too high pressure)	☞ page F2–29
• Fuel injector leakage	☞ page F2–27
④ Control system malfunction	
• ABV control	☞ page F2–76
• PRC control	☞ page F2–71
• EGR control	☞ page F2–84
⑤ Input signal malfunction	
• Mass air flow sensor	☞ page F2–48
• Manifold absolute pressure sensor	☞ page F2–52
• Engine coolant temperature sensor	☞ page F2–56
• Intake air temperature sensor (AC, D/C, L/C)	☞ page F2–56
• Heated oxygen sensor(s)	☞ page F2–58
• Knock sensor	☞ page F2–59

33	A/C DOES NOT WORK
DESCRIPTION	• A/C compressor magnetic clutch does not engage when A/C switch ON

[TROUBLESHOOTING HINTS]

① A/C relay
- Poor connection of connector
- Relay malfunction — ☞ section U

② A/C switch or A/C amplifier
- Does not send signal to ECM terminal 1D — ☞ page F2–39

③ ECM
- Does not send signal to A/C relay when A/C switch ON — ☞ page F2–59

34	• KNOCKING • PINGING
DESCRIPTION	• Sound produced when air/fuel mixture is ignited by something other than spark plug (i.e., hot spot in combustion chamber)

[TROUBLESHOOTING HINTS]

① Knock sensor
- Open or short in harness (Code No.P0325 output) — ☞ page F2–99

② Throttle position sensor
- Misadjustment — ☞ page F2–54

③ Intake air temperature sensor (AC)
- Open or short circuit in wiring (code No.P0110 output) — ☞ page F2–99

35	FUEL ODOR
DESCRIPTION	• Gasoline fuel smell or visible leaks

[TROUBLESHOOTING HINTS]

① Purge solenoid valve
- Purge control system malfunction — ☞ page F2–88

② Charcoal canister
- Canister full of fuel and leaking
- Damaged — ☞ page F2–34

36	EXHAUST SULFUR SMELL
DESCRIPTION	• Rotten egg smell (sulfur) from exhaust

[TROUBLESHOOTING HINTS]

High sulfur content fuel used

37	HIGH OIL CONSUMPTION
DESCRIPTION	• Oil consumption excessive

[TROUBLESHOOTING HINTS]

PCV valve
- PCV valve stuck open — ☞ page F2–34

38	NGS DISPLAYS "LINK COMMUNICATION ERROR"
DESCRIPTION	• NGS displays "LINK COMMUNICATION ERROR"

[TROUBLESHOOTING HINTS]
① Open or circuit in wiring between data link connector terminal KLN and ECM terminal 1Y
② ECM
- ECM terminal 3A open or short
- Open or short circuit wiring between main relay and ECM terminal 4A
- Open circuit ground terminals of ECM

☞ page F2–39

39	NGS WILL NOT WORK
DESCRIPTION	• NGS does not work

[TROUBLESHOOTING HINTS]
① Adapter harness between NGS and battery
- Open or short in harness

② NGS
- Malfunction

SERVICE POINTS

OUTLINE

Main Relay (Battery Power)
- If the circuit is open, the engine will not start.
- If the circuit is shorted, the EGI INJ fuse (40 A) will burn out.

Room Fuse (ECM Memory Power)
- If the circuit is open, the ECM memory function will not operate, and diagnostic trouble codes for intermittent malfunctions will not be indicated. Also, the learning control will be canceled, but will not produce any particular symptom.
- If the circuit is shorted, the ROOM fuse (15 A) will burn out.

Ground (Output Devices, Fuel Injector)
- If an output device or a fuel injector has an open ground circuit, no particular symptom will be produced.
- If a related output device and injectors both have open ground circuits, the engine will not start.

Ground (System, Analogue)
- An open circuit will not produce any symptom.

Terminal TEN (Data Link Connector)
- If the circuit is shorted, the opening amount of the idle air control valve will not change, causing hard starting and rough idle. The ignition timing will be fixed, causing lack of power and poor acceleration.
- If the circuit is shorted, the coolant fan operates whenever the throttle valve is opened (Ignition switch ON).

Terminal KLN (Data Link Connector 2)
- If both circuits are open or short, the NGS indicates "LINK COMMUNICATION ERROR".

Serial Line
- If each or both lines have an open or short, Diagnostic trouble Code No.P1601 is output.

[Input Device]
Mass Air Flow Sensor
- If the Vs terminal of the mass air flow sensor has a short circuit, Diagnostic Trouble Code No.0100 will be output, and the throttle position sensor and closed throttle position switch signal will be used to adjust the basic injection amount as to the following three modes.
  1) Closed throttle position switch ON
  2) Small throttle angle
  3) Large throttle angle

Throttle Position Sensor
- If the Verf terminal has an open circuit or the TVO terminal has an open or short circuit, Diagnostic Trouble Code No.P0120 is output.
- If the Vref terminal has an short circuit, the engine will not start or laugh idle.
- If the ground terminal has an open circuit, Diagnostic Trouble Code No.P0120 is output.
- In the above conditions, the ECM uses a throttle valve fully-open program.
- If the throttle position sensor is not properly adjusted or the throttle position sensor system fails, poor acceleration or shift shock will result.

Intake Air Temperature Sensor (A/C)
- If the thermosensor or circuit has an open or short, Diagnostic Trouble Code No.P0110 is output, and the ECM uses a preprogrammed intake air temperature of –10° C { 14° F}.
- If the intake air temperature sensor system fails, no particular symptom will be noticed.

Closed Throttle Position Switch (In Throttle Position Sensor)
- If the circuit is open, rough idle or engine stalling may appear because of inoperative idle air control.
- If the circuit is shorted, fuel will be cut when the accelerator pedal is pressed, causing hunting.

Heated Oxygen Sensor
- If sensor signal "lean" for approximately 2 minutes in feedback zone, Diagnostic Trouble Code No.P0154, P0160 (left bank sensor) and/or P0134, P0140 (right bank sensor) is output.
- If the heated oxygen sensor signal remain unchanged for approximately 40 seconds in feedback zone, Diagnostic Trouble Codes No.P0150 (left bank sensor) and/or P0130 (right bank sensor) is output.
- In the above conditions, no feedback control will be present and no symptom will be noticed.

Crankshaft Position Sensor (NE Signal), Camshaft Position Sensor (SGC Signal)
- If the NE signal circuit has an open or short, Diagnostic Trouble Code No.P0335 is output.
- If the SGC signal circuit has an open or short, Diagnostic Trouble Code No.P1345 is output.

Input		Diagnostic trouble code	Fail-safe function	Symptom
NE signal	SGC signal			
○	×	P1345	No injection/ignition	Engine does not start
×	○	P0335		
×	×	P0335, P1345		

○: Normal ×: Malfunction

Starter Signal
- A lack of starter signal input will cause hard starting.

P/S Pressure Switch
- An open circuit can cause a momentary drop in engine speed when steering at idle or low-speed driving.

A/C Signal (A/C Amplifier)
- If the circuit is open, the air conditioner will not operate.
- If the circuit is shorted, the air conditioner will constantly operate when the blower is ON.

Engine Coolant Temperature Sensor
- If the thermosensor or circuit has an open or short, Diagnostic Trouble Code No.P0115 output, and the ECM uses a preprogrammed temperature value of 52° C {125.6° F} and coolant fan and condenser fan operate continuously.
- A malfunction in the engine coolant temperature sensor system may cause rough idle, engine stalling, or hard starting.

Blower Signal (A/C Amplifier)
- If the circuit has an open, the idle speed may drop when in the high position.

Brake Signal
- An open or short circuit will produce no symptom.

High Air Charging Pressure Control Signal
- If the circuit is open, torque reduction control will not operate.
- If the circuit is shorted, always operates torque reduction control, causing poor acceleration or lack of power.

Vehicle Speed Sensor
- If the sensor or circuit has an open or short, diagnostic trouble code No.P0500 is output.
- If the circuit is open or shorted, no symptom will be noticed.

Manifold Absolute Pressure Sensor
- If the sensor or circuit has an open or short circuit, diagnostic trouble code No.P0105 is output, and the ECM uses a preprogrammed manifold pressure of 101 kPa {760 mmHg}.
- A malfunction in the MAP system may cause poor acceleration or lack of power.

Intake Air temperature Sensor (D/C)
- If the sensor or circuit has an open or short, diagnostic trouble code No.P1110 is output and the ECM uses a preprogrammed intake air temperature of 60° C {140° F}
- A malfunction in the intake air temperature sensor (D/C), no symptom will be noticed.

Intake Air Temperature Sensor (L/C)
- If the sensor or circuit has an open or short, diagnostic trouble code No.P1113 is output, and the ECM uses a preprogrammed intake air temperature of 60° C {140° F}.
- A malfunction in the intake air temperature sensor (L/C), no symptom will be noticed.

Torque Reduction Request Signal (ABS/TCS Control Unit)
- If a malfunction occurs in the torque reduction request signal, the traction control (TCS) is inhibited and TCS does not operate.

Knock Sensor
- If the knock sensor or circuit has an open or short, Diagnostic Trouble Code No.P0325 is output.
- In the above conditions, ignition timing is retarded, causing poor acceleration or lack of power.

EGR Valve Position Sensor
- If the EGR valve position sensor or circuit has an open or short, Diagnostic Trouble Code No.P1402 is output.
- In the above conditions, the EGR valve will be fully closed.

Rear Window Defroster Signal (A/C Amplifier)
- An open circuit can cause a low idle speed.
- An short circuit can cause a slightly high idle speed.

Headlight Switch
- An open circuit can cause a low idle speed.
- An short circuit can cause a slightly high idle speed.

[Output Device]
Fuel Injector
- If the circuit is open, the fuel injector will not operate, causing rough idle and misfiring.
- If the circuit is shorted, the fuel injector will inject fuel constantly, will not start or hard start.

IGT Signal (Ignition coil)
- If no IGT signal(s) are input to the ignition coil because of an open or short circuit, the cylinder(s) will not start.

Idle Air Control Valve (IAC Valve)
- If the solenoid valve or circuit has an open or short, Diagnostic Trouble Code No.P0505 is output.
- If the circuit is open, the solenoid valve will be fully closed, causing rough idle, engine stalling, and acceleration hesitation when cold.
- If the circuit is shorted, the idle air control valve will be fully opened and the idle speed will be increased, causing hunting.

Fuel Pump Relay
- If the circuit is open, the engine will not start.
- If the circuit is shorted, the fuel pump will operate whenever the ignition switch is ON.

Purge Solenoid Valve
- If the solenoid valve or circuit has an open or short, Diagnostic Trouble Code No.P0443 is output.
- If the circuit is open, no symptom will be noticed.
- If the circuit is shorted, the engine stall or laugh at low speed.
- A short circuit may cause an improper air/fuel ratio, causing rough idle and hard starting.

A/C Signal (A/C Relay)
- If the circuit is open, the air conditioner will not operate.
- If the circuit is shorted, the air conditioner will constantly operate when ignition switch ON.

Torque Reduction Inhibit Signal (ABS/TCS Control Unit)
- If the circuit is open or shorted, the traction control will not operate.

EGR Solenoid Valve (Vent)
- If the solenoid valve or circuit has an open or short, Diagnostic Trouble Code No.P1486 is output.
- If the circuit is open or shorted, no symptom will be noticed.

EGR Solenoid Valve (Vacuum)
- If the solenoid valve or circuit has an open or short, Diagnostic Trouble Code No.P1485 is output.
- If the circuit is shorted, the EGR valve will remain open, causing engine stalling and hard starting.
- If the circuit is open, no symptom will be noticed.

PRC Solenoid Valve
- If the solenoid valve or circuit has an open or short, Diagnostic Trouble Code No.P1250 is output.
- If the circuit is shorted, no symptom will be noticed.
- If the circuit is open, the engine will be hard to start when hot.

Condenser Fan Relay No.1
- If the circuit is shorted, the condenser fan and coolant fan will always operate while the ignition switch is ON.
- If the circuit is open, the condenser fan will not operate.

Cooling Fan Relay No.1 and Condenser Fan Relay No.2
- If the circuit is shorted, the cooling fan and condenser fan will always operate while the ignition switch is ON.
- If the circuit is open, the cooling fan will remain OFF when the engine temperature exceeds 108° C {226° F}.

ABV Solenoid Valve (Vacuum)
- If the solenoid valve or circuit has an open or short, diagnostic trouble code No.P1525 is output.
- If the circuit is open, no symptom will be noticed.
- If the circuit is shorted, the ABV actuator is not controlled causing poor acceleration or lack of power.

ABV Solenoid Valve (Vent)
- If the solenoid valve or circuit has an open or short, diagnostic trouble code No.P1526 is output.
- If the circuit is open, no symptom will be noticed.
- If the circuit is shorted, the ABV actuator is not controlled causing poor acceleration or lack of power.

Charge Air Cooler Bypass Solenoid Valve
- If the solenoid valve or circuit has an open or short, diagnostic trouble code No.P1524 is output.
- If the circuit is open, no symptom will be noticed.
- If the circuit is shorted, the charge air cooler bypass valve always closed, the air charging pressure control is not controled, causing poor acceleration, lack of power or knocking.

MAP Sensor Solenoid Valve
- If the solenoid valve or circuit has an open or short, diagnostic trouble code No.P1487 is output.
- If the circuit is open, ECM can not detect the manifold pressure, causing poor acceleration or lack of power.
- If the circuit is shorted, no symptom will be noticed.

Bypass Air Solenoid Valve No.1
- If the solenoid valve or circuit has an open or short, diagnostic trouble code No.P1508 is output.
- If the circuit is open, lack of air amount for starting when engine is very cold, causing hard to start.
- If the circuit is shorted, high idle speed after warm-up.

Bypass Air Solenoid Valve No.2
- If the solenoid valve or circuit has an open or short, diagnostic trouble code No.P1509 is output.
- If the circuit is open, lack of air amount for starting when engine is vary cold, causing hard to start.
- If the circuit is shorted, high idle speed after warm-up.

Fuel Pump Resistor and Relay (Speed)
- If the circuit is shorted, the fuel pump does not operate at high speed causing poor acceleration or lack of power when heavy duty driving.
- If the circuit is open, fuel pump does not operate, causing engine will not start.

Cooling Fan Relay No.2 and No.3
- If the circuit is shorted, the cooling fan will always operate while the ignition switch ON.
- If the circuit is open, the cooling fan will remain OFF when water temperature exceeds 108°C {226°F}.

High Air Charging Pressure Zone Signal
- If the circuit is open, torque reduction control will not operate.
- If the circuit is shorted, always operates torque reduction control, causing poor acceleration or lack of power.

ELECTRICAL DIAGNOSIS SUPPORT

Main Relay (Battery Power)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (4A) — Main relay	Engine will not start	EGI INJ fuse (40 A) burns out when ignition switch ON	NA

Room Fuse (Memory Power)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (4B) — Room fuse	No symptom	Room fuse (15 A) burns out	NA

Ground (Output Device, Injector, System, Analogue)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (4AF) — Ground (Output device)	(One side open circuit) No symptom (Both sides open circuit) Engine will not start	NA	Engine may not start Hard starting
ECM (4AB) — Ground (Fuel injector)			
ECM (4D) — Ground (System)	No symptom		
ECM (3AB) — Ground (Analogue)			

Data Link Connector (Terminal TEN)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (4V) — Data link connector	Hard to adjust the idle speed (Not fixed)	Hard starting Rough idle Poor acceleration	NA

Data Link Connector (Terminal KLN)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1Y) — Data link connector–2	NGS displays "LINK COMMUNICATION ERROR" (both lines)		NA

Serial Line

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1B) — TCM (2K) ECM (1F) — TCM (2N)	Code No.P1601 is output (Both lines)		NA

NA: Not applicable

[Input Device]
Mass Air Flow Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (4A) — Mass air flow sensor	Lack of power Poor acceleration	Code No.P0100 output Lack of power Poor acceleration	NA
ECM (3E) — Mass air flow sensor	Code No.P0100 output Lack of power Poor acceleration	Code No.P0100 output Engine stalls and will not restart	
Mass air flow sensor — Ground	Code No.P0100 output Poor acceleration	NA	Poor acceleration

Crankshaft Position Sensor (NE Signal), Camshaft Position Sensor (SGC Signal)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (4AH) — Crankshaft position sensor	Code No.P0335 output Engine does not start	Code No.P0335 output Engine does not start	NA
ECM (4AL) — Crankshaft position sensor	Code No.P0335 output Engine does not start	Code No.P0335 output Engine does not start	
ECM (4F) — Camshaft position sensor	Code No.P1345 output Engine does not start	Code No.P1345 output Engine does not start	
Main relay — Camshaft position sensor	Code No.P1345 output Engine will not start	Code No.P1345 output EGI INJ fuse (40 A) burns out when ignition switch ON	
Camshaft position sensor — Ground	Code No.P1345 output Engine will not start	NA	Engine may not start

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Engine Coolant Temperature Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (3Q) — Engine coolant temperature sensor	Code No.P0115 output Rough idle, hard starting Cooling fan and condenser fan operate continuously	Code No.P0115 output Rough idle, hard starting Cooling fan and condenser fan operate continuously	NA
Engine coolant temperature sensor — Ground	Code No.P0115 output Rough idle, hard starting Cooling fan and condenser fan operate continuously	NA	Rough idle Hard starting Coolant fan and condenser fan operate continuously

Intake Air Temperature Sensor (AC)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (3V) — Intake air temperature sensor (AC)	Code No.P0110 output No symptom	Code No.P0110 output No symptom	NA
Intake air temperature sensor (AC) — Ground	Code No.P0110 output No symptom	NA	Poor acceleration

NA: Not applicable

Throttle Position Sensor (Closed Throttle Position Switch Included)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (3A) — Throttle position sensor	Code No.P0120 output Poor acceleration Strong shift shock	Code No.P0120 output Engine may not start Rough idle	NA
ECM (3B) — Throttle position sensor	Code No.P0120 output Poor acceleration Strong shift shock	Code No.P0120 output Poor acceleration Strong shift shock	
ECM (3X) — Throttle position sensor (Closed throttle position switch)	Rough idle	Fuel cut when accelerator pedal is pressed, causing hunting	
Throttle position sensor — Ground	Code No.P0120 output Poor acceleration Strong shift shock	NA	Poor acceleration Strong shift shock

Heated Oxygen Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (3I) — Heated oxygen sensor (RF)	Code No.P0130 output Poor fuel economy	Code No.P0130 output Poor fuel economy	NA
ECM (4E) — Heated oxygen sensor heater (RF)	Code No.P0135 output No symptom	Code No.P0135 output No symptom	NA
ECM (3M) — Heated oxygen sensor (LF)	Code No.P0150 output Poor fuel economy	Code No.P0150 output Poor fuel economy	NA
ECM (4I) — Heated oxygen sensor heater (LF)	Code No.P0155 output No symptom	Code No.P0155 output No symptom	NA
ECM (3D) — Heated oxygen sensor (RR)	Code No.P0134 output Poor fuel economy	Code No.P0134 output Poor fuel economy	NA
Heated oxygen sensor heater (RR) — Ground	No symptom	NA	No symptom
ECM (3H) — Heated oxygen sensor (LR)	Code No.P0160 output Poor fuel economy	Code No.P0160 output Poor fuel economy	NA
Heated oxygen sensor heater (LR) — Ground	No symptom	NA	No symptom

Power Steering Pressure Switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (3T) — Power steering pressure switch	Engine speed may drop when steering at idle or low-speed driving	Engine speed slightly high at idle	Engine speed may momentarily drop when steering at idle or low-speed driving

A/C Signal (A/C Amplifier)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1D) — A/C amplifier	Air conditioner will not operate	Air conditioner will constantly operate with blower ON	NA

NA: Not applicable

Blower Signal (A/C Amplifier)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1K) — A/C amplifier	Idle speed may be low in high position	Idle speed may be high at idle	NA

Brake Signal (Brake Switch)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1O) — Brake switch	No symptom	No symptom	NA

Knock Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (3S) — Knock sensor	Code No.P0325 output Lack of power Knocking	Code No.P0325 output Lack of power Knocking	NA

EGR Valve Position Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (3R) — EGR valve position sensor	Code No.P1402 output No symptom	Code No.P1402 output No symptom	NA

High Air Charging Pressure Zone Signal

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (3W) — ABS/TCS CU	Torque reduction control (TCS) will not operate	Poor acceleration Lack of power	NA

Vehicle Speed Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1M) — Vehicle speed sensor	Code No.P0500 output No symptom	Code No.P0500 output No symptom	NA

NA: Not applicable

Manifold Absolute Pressure Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (3A) — Manifold absolute pressure sensor	Code No.P0105 output Lack of power Poor acceleration	Code No.P0105 output Lack of power Poor acceleration	NA
ECM (3U) — Manifold absolute pressure sensor	Code No.P0105 output Lack of power Poor acceleration	Code No.P0105 output Lack of power Poor acceleration	
Manifold absolute pressure sensor — Ground	Code No.P0105 output Poor acceleration	NA	Poor acceleration

Intake Air Temperature Sensor (D/C)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (2C) — Intake air temperature sensor (D/C)	Code No.P1110 output No symptom	Code No.P1110 output No Symptom	NA
Intake air temperature sensor (D/C) — Ground	Code No.P1110 output No Symptom	NA	Poor acceleration

Intake Air Temperature Sensor (L/C)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (2K) — Intake air temperature sensor	Code No.P1113 output No symptom	Code No.P1113 output No Symptom	NA
Intake air temperature sensor (L/C) — Ground	Code No.P1113 output No Symptom	NA	Poor acceleration

Torque Reduction Request Signal (ABS/TCS Control Unit)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1Q) — ABS/TCS CU	Torque reduction control (TCS) will not operate	Torque reduction control (TCS) will not operate	NA

Rear Window Defroster Switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1X) — Rear window defroster switch	Idle speed may be low when switch ON	Idle speed may be high at idle	NA

Headlight Switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1L) — Headlight switch	Idle speed may be low when switch ON	Idle speed may be high at idle	NA

NA: Not applicable

[Output Device]
Fuel Injector

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (4Q, 4U, 4Y, 4AC, 4AG, 4AK) — Fuel injector	Rough idle Poor acceleration	Will not start or hard start Engine runs rough or stalls	NA

IGT Signal (Ignition coil)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (4S, 4W, 4AA, 4AE, 4AI, 4AM) — Ignition coil	Engine will not start or Rough idle	Engine will not start or laugh idle	NA
Ignition coil — Ground		NA	Engine will not start or laugh idle

Idle Air Control Valve [IN BAC Valve]

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (4M) — Idle air control valve	Code No.P0505 output Rough idle Engine stalls Hard start	Code No.P0505 output Hunts Idle speed stays or fluctuates at approx. 1,500 rpm	NA
Idle air control valve — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

Fuel Pump Relay

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1AF) — Fuel pump relay	Engine stalls and will not restart	Fuel pump will operate whenever ignition switch ON	NA

Purge Solenoid Valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (4O) — Purge solenoid valve	Code No.P0443 output No symptom	Code No.P0443 output Hard starting Engine stalls at low speed	NA
Purge solenoid valve — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

A/C Signal (A/C Relay)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1M) — A/C relay	Air conditioner will not operate	Air conditioner will operate whenever ignition switch ON	NA

NA: Not applicable

EGR Solenoid Valve (Vacuum)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (4K) — EGR solenoid valve (vacuum)	No symptom	Engine stalls Hard start (must depress accelerator pedal)	NA
EGR solenoid valve (vacuum) — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

EGR Solenoid Valve (Vent)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (4G) — EGR solenoid valve (vent)	No symptom	No symptom	NA
EGR solenoid valve (vent) — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

PRC Solenoid Valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (2R) — PRC solenoid valve	Hard start after heat soak	No symptom	NA
PRC solenoid valve — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

Condenser Fan Relay No.1

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1E) — Condenser fan relay No.1	Condenser fan does not operate	Condenser fan and cooling fan will always operate while the ignition switch is ON	NA
Condenser fan relay No.1 — Ignition switch		EGI INJ fuse (40 A) burns out when ignition switch ON	

Cooling Fan Relay No.1 and Condenser Fan Relay No.2

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1I) — Cooling fan relay No.1 and condenser fan relay No.2	Cooling fan will not operate when water temperature exceeds 108°C {226°F}	Cooling fan and condenser fan will always operate while the ignition switch is ON	NA
Cooling fan relay No.1 and condenser fan relay No.2 — Ignition switch		EGI INJ fuse (40 A) burns out when ignition switch ON	

NA: Not applicable

Torque Reduction inhibit Signal (ABS/TCS Control Unit)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1U) — ABS/TCS CU	Traction control will not operate when need the torque reduction condition		NA

ABV Solenoid Valve (Vacuum)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (2M) — ABV solenoid valve (Vacuum)	Code No.P1525 output No Symptom	Code No.P1525 output Poor acceleration Lack of power	NA
ABV solenoid valve (Vacuum) — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

ABV Solenoid Valve (Vent)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (2A) — ABV solenoid valve (vent)	Code No.P1526 output No Symptom	Code No.P1526 output Poor acceleration Lack of power	NA
ABV solenoid valve (vent) — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

Charge Air Cooler Bypass Solenoid Valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (2E) — Charge air cooler bypass solenoid valve	No Symptom	Poor acceleration Lack of power Knocking	NA
Charge air cooler bypass solenoid valve — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

MAP Sensor Solenoid Valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (4F) — MAP sensor solenoid valve	Poor acceleration Lack of power	No Symptom	NA
MAP sensor solenoid valve — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

NA: Not applicable

Bypass Air Solenoid Valve No.1

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1AA) — Bypass air solenoid valve No.1	Code No.P1508 output Hard to start when engine is very cold	Code No.P1508 output Engine speed is high at idle	NA
Bypass air solenoid valve No.1 — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

Bypass Air Solenoid Valve No.2

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1AE) — Bypass air solenoid valve No.2	Code No.P1509 output Hard to start when engine is very cold	Code No.P1509 output Engine speed is high at idle	NA
Bypass air solenoid valve No.2 — Main relay		EGI INJ fuse (40 A) burns out when ignition switch ON	

Fuel Pump Resistor and Relay (Speed)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1AJ) — Fuel pump resistor and relay	No symptom	Poor acceleration Lack of power when heavy duty driving	NA
Fuel pump resistor and relay (speed) — Main relay	Engine will not start	EGI INJ fuel (40 A) burns out when ignition switch ON	

Cooling Fan Relay No.2 and No.3

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (1A) — Cooling fan control No.2 and No.3	Cooling fan will not operate high speed when water temperature exceeds 108°C {226°F}	Cooling fan will always operates while the ignition switch is ON	NA
		EGI INJ fuse (40 A) burns out when ignition switch ON	

NA: Not applicable

High Air Charging Pressure Zone Signal

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ECM (2L) — ABS/TCS CU	Traction control (TCS) will not operate		NA

NA: Not applicable

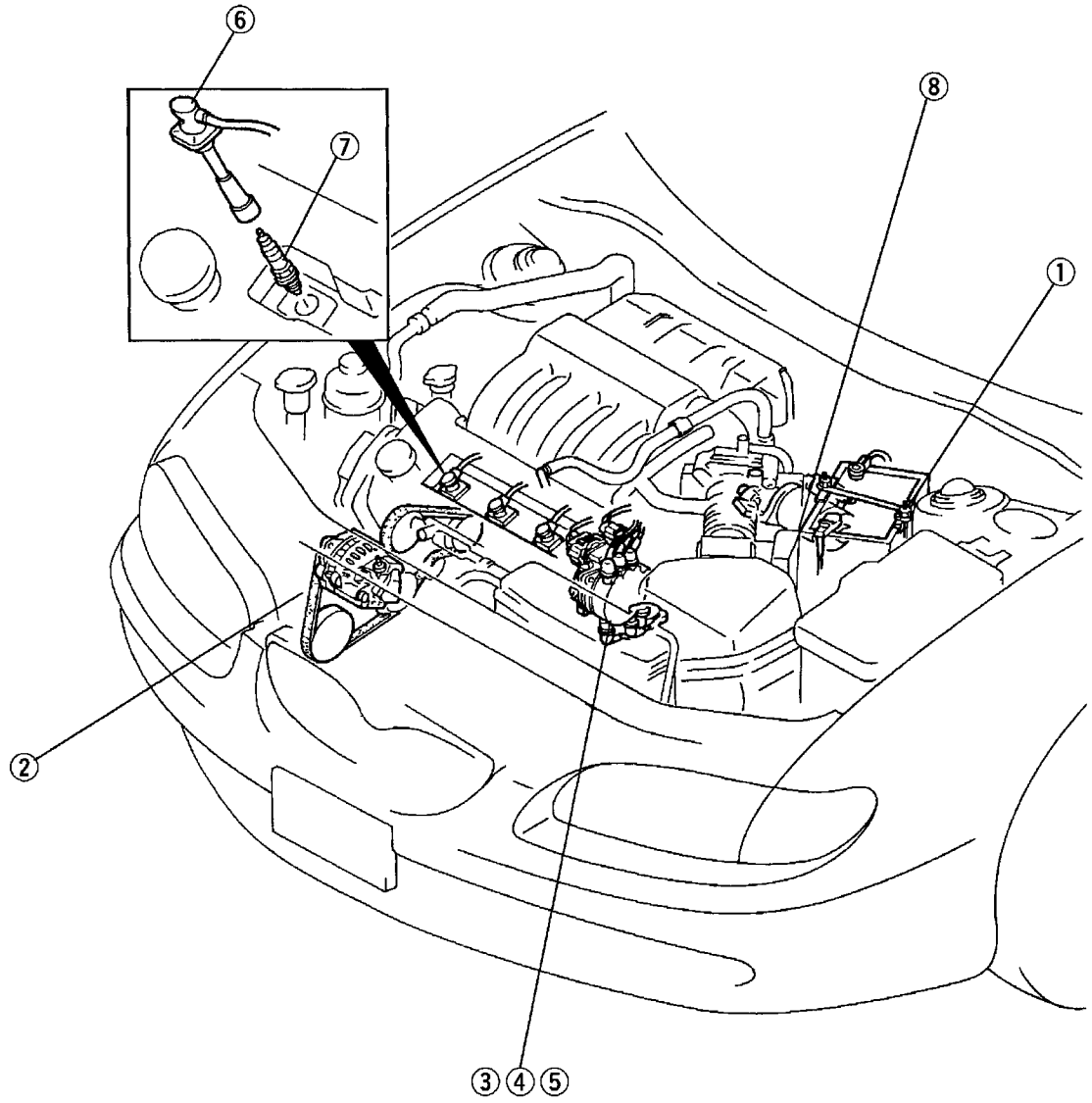
Before beginning any service procedure, refer to section T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

ENGINE ELECTRICAL SYSTEM

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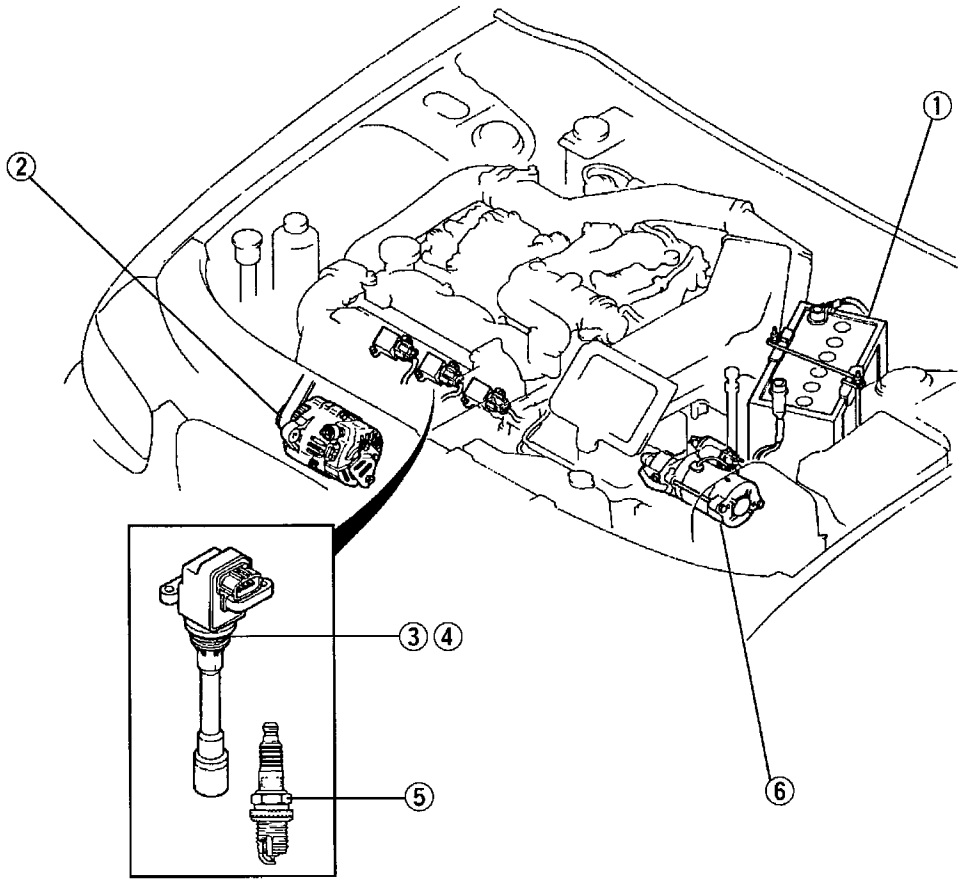
KL



3ZU0GX–002

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2. Generator
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7. Spark plug
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KJ



1. Battery
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4. Ignition coil
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Inspection ..... page G–21

OUTLINE

SPECIFICATIONS

Item \ Engine/Transaxle				KL	KJ
				ATX	
Battery	Electrolyte gravity			1.27—1.29 [20°C {68°F}]	
	Dark current*1		mA	MAX. 20	
Generator	Rotor resistance (Between slip rings)		Ω	2.9 [20°C {68°F}]	
	Brush length	Standard	mm {in}	10.5 {0.41}	
		Minimum	mm {in}	1.5 {0.06}	
	Brush spring force	Standard	N {kgf, lbf}	2.95—3.53 {0.30—0.36, 0.66—0.79}	
Ignition coil	Resistance	Primary coil	Ω	0.49—0.73 [20°C {68°F}]	—
		Secondary coil	kΩ	20—31 [20°C {68°F}]	—
Distributor	Gap		mm {in}	1.2 {0.05}	—
	Firing order			1—2—3—4—5—6	—
High-tension lead	Resistance		kΩ/m	16 [20°C {68°F}]	—
Spark plug	Plug gap		mm {in}	1.0—1.1 {0.039—0.042}	0.7—0.8 {0.028—0.031}
	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}	29.4 {1.16}	32.0 {1.26}
		Minimum	mm {in}	28.8 {1.14}	31.4 {1.24}
	Brush length	Standard	mm {in}	12.5 {0.49} 17.5 {0.69}*2	18.0 {0.71}
		Minimum	mm {in}	7.0 {0.28} 12.0 {0.48}*2	11.0 {0.44}
	Brush spring force	Standard	N {kgf, lbf}	18 {1.8, 4.0} 19 {2.0, 3.3}*2	34 {3.5, 7.7}
		Minimum	N {kgf, lbf}	5.9 {0.6, 1.3} 9.4 {0.95, 2.1}*2	20 {2.0, 4.4}
	Pinion gap		mm {in}	0 {0}	

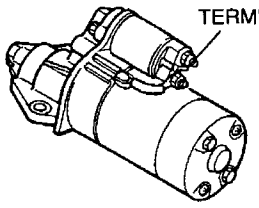
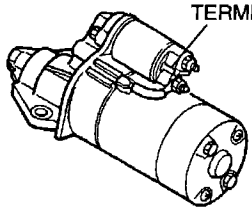
*1 Dark current is the constant flow of current present when the ignition switch is OFF (i.e., audio unit, clock, etc.).
*2 Cold area

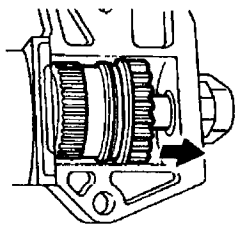
TROUBLESHOOTING GUIDE

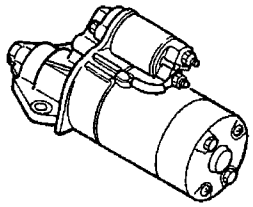
DIAGNOSTIC INDEX

No.	Troubleshooting items	Page
1	Will not crank — starter motor does not operate	below
2	Will not crank — starter motor spins	below
3	Cranks slowly	G–6

SYMPTOM TROUBLESHOOTING

1	Will not crank — starter motor does not operate		
STEP	INSPECTION		ACTION
1	Does engine crank normally with fully charged battery?	Yes	Check charging system ☞ page G–7
		No	Go to next step
2	Is battery positive voltage present at terminal B?  	Yes	Go to next step
		No	Check wiring harness
3	Is battery positive voltage present at terminal S with ignition switch in START position?  	Yes	• Check magnetic switch • Check yoke • Check armature
		No	• Check transmission range sensor ☞ sections K1, K2 • Check ignition switch ☞ section T • Check wiring harness

2	Will not crank — starter motor spins		
STEP	INSPECTION		ACTION
1	Is drive pinion pushed out while cranking? (Is click heard?) 	Yes	Remove starter and check ring gear teeth and starter drive pinion teeth
		No	Check magnetic switch

3	Cranks slowly		
STEP	INSPECTION		ACTION
1	Does engine crank normally with fully charged battery?	Yes	Check charging system ☞ page G–7
		No	Go to next step
2	Are starter cable connections loose or corroded? 	Yes	Repair connection
		No	Check starter for binding (brush, armature, etc.)

CHARGING SYSTEM

PREPARATION
SST

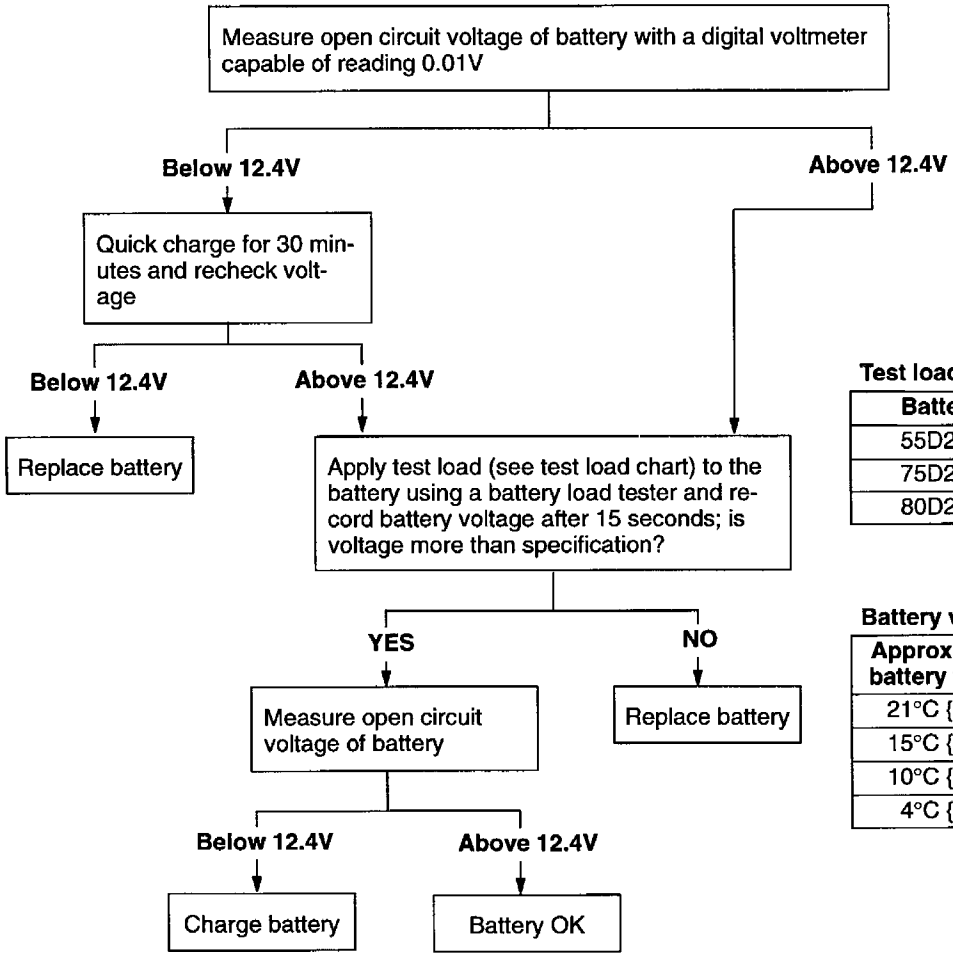
49 T018 0A0 Wrench, adapter set 	For removal of generator pulley

BATTERY

Inspection

Battery discharge test

Check the battery in the following procedure.

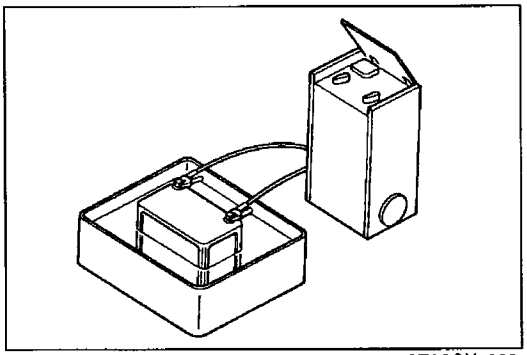


Test load chart

Battery	Load (A)
55D23L	180
75D23L	195
80D26L	

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



3ZA0GX-003

Recharging

Caution

- **To avoid damaging the battery, do not quick charge for over 30 minutes.**

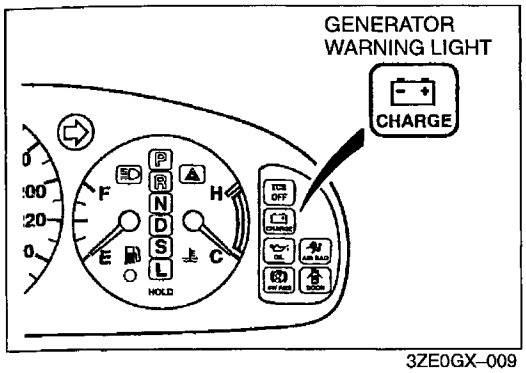
1. Remove the battery from vehicle and place it in a pan of water.
2. Connect a battery charger to the battery.
3. Adjust the charging current as follows.

Battery type (5 hour rate)	Slow charge (A)	Quick charge (A)
55D23L (48)	4.5—5.5	30
75D26L (52)	5—6	35
80D26L (55)	5.5—6.5	35

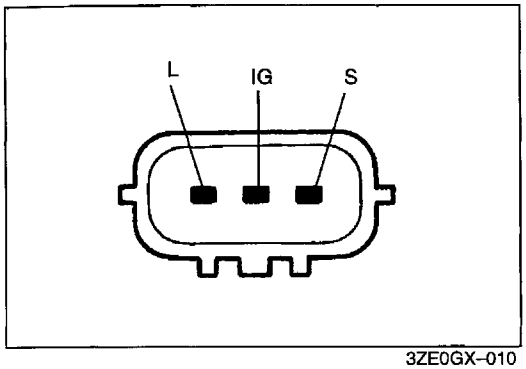
4. After the battery has been recharged, measure the battery positive voltage and verify that the battery keeps specified voltage for more than 1 hour.

   Specification: Above 12.4V

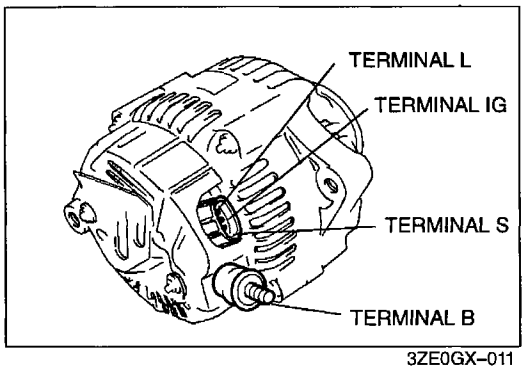
5. If not as specified, replace the battery.



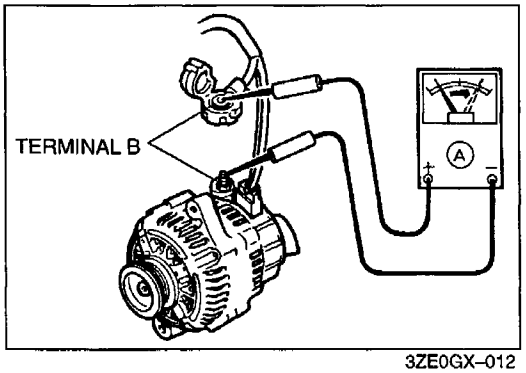
3ZE0GX-009



3ZE0GX-010



3ZE0GX-011



3ZE0GX-012

GENERATOR

System 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. If not, check the generator warning light (refer to section T) and wiring harness between battery and generator warning light and generator.
4. Turn the ignition switch to START and verify that the generator warning light goes out after engine starts.
5. If the light stays on, turn off all electrical loads.
6. Measure the voltage at terminal L by using a voltmeter.

Specification: Approx. 1V (Ignition switch ON)
13.0—14.0V (Idle)

7. If not as specified, replace the generator.
   If normal, check short circuit in the wiring harness between terminal L and generator warning light.

Inspection (On-Vehicle)

1. Verify that the drive belt tension is within the specification. (Refer to sections B1, B2.)
2. Turn the ignition switch to START and verify that the generator turns smoothly without any noise while the engine is running.
3. Measure the voltage at the terminals as shown in the table by using a voltmeter.

Standard voltage B+: Battery positive voltage

Terminal	Ignition switch ON	Idle
B	B+	B+
L	Approx. 1 V	Approx. 1 V less than B+
S	B+	B+
IG	B+	B+

4. Measure the current at terminal B as shown in the table by using an ammeter.

Standard current (Reference)

Electrical load	Idle		2,000 rpm	
	KL	KJ	KL	KJ
OFF	Approx. 11A	Approx. 14A	Approx. 12A	Approx. 15A
ON	Approx. 67A	Approx. 70A	Approx. 78A	Approx. 81A

Note

- The values are measured with the battery fully charged.
- As the battery discharges, the current becomes greater.
- When the measuring condition is "electrical load ON", turn all the following electrical systems on.
  - Headlight (high beam)
  - A/C (Max.)
  - Brake light
  - Cooling fan
  - Condenser fan

5. If not as specified, replace the generator.

Removal / Installation

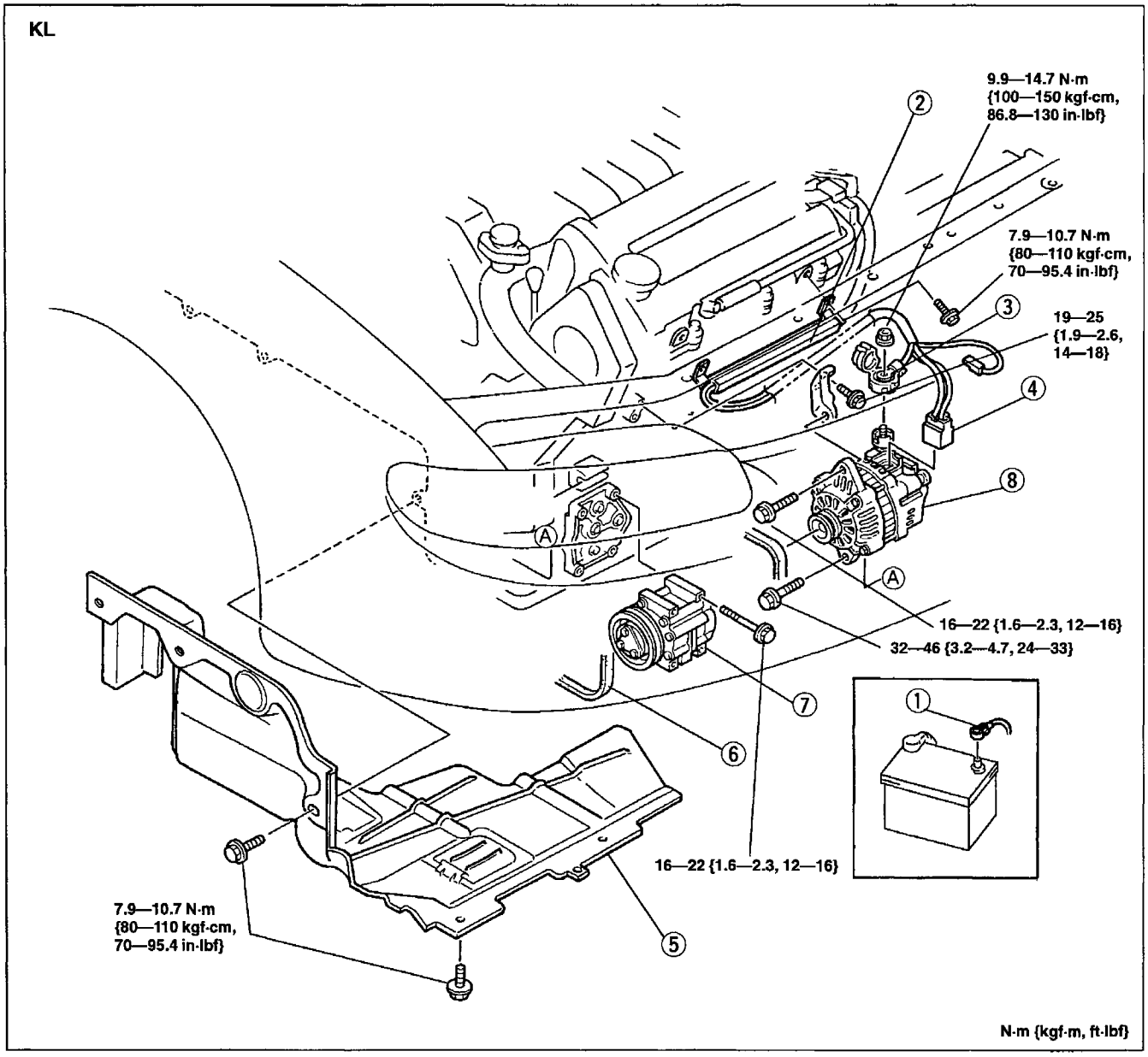
1. Remove in the order shown in the figure, referring to **Removal Note.**
2. Install in the reverse order of removal.

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.**
- **Disconnecting generator terminal B before disconnecting the negative battery cable can damage the generator harness and connector.**

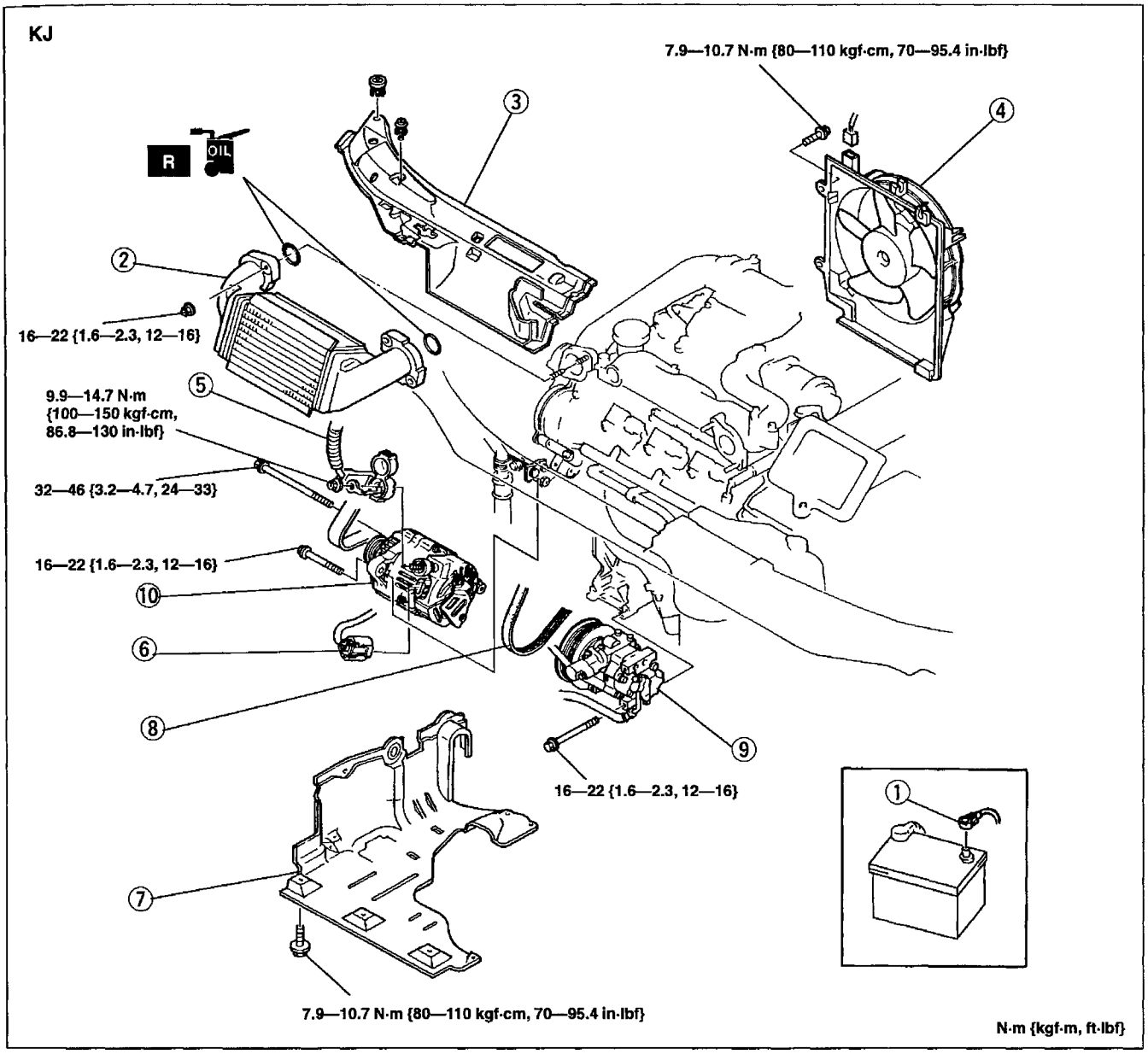
Note

- Battery positive voltage is always present at generator terminal B while the battery cable connected.



3ZA0GX-004

1. Negative battery cable
2. Harness
3. Terminal B wire
4. Connector
5. Splash shield
6. Drive belt (Refer to section B1)
7. A/C compressor
   Removal Note ..... page G–11
8. Generator
   Removal Note ..... page G–11



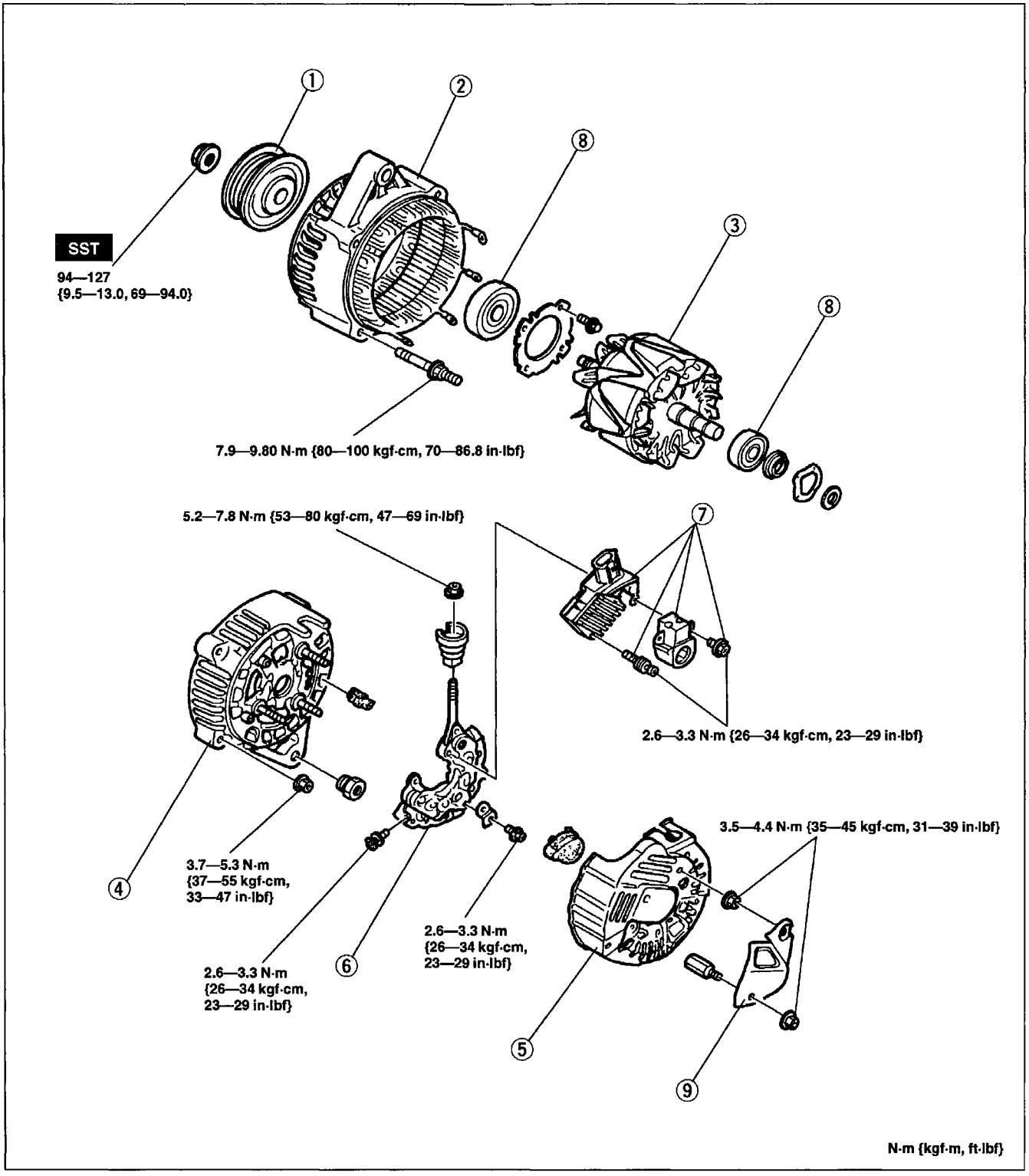
1. Negative battery cable
2. Charge air cooler (LH)
3. Upper seal board (RH)
4. Condenser fan assembly
5. Generator terminal B
6. Connector
7. Splash shield
8. Drive belt (Refer to section B2)
9. A/C compressor
   Removal Note ..... Below
10. Generator
    Removal Note ..... Below

Removal note
A/C compressor and generator

- Remove the generator from under the vehicle.
- With the pipe still connected, position the A/C compressor away from the generator for easy access to the generator.

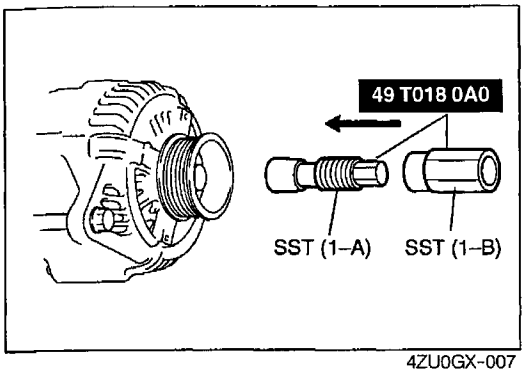
Disassembly / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly / Assembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Disassembly / Assembly Note**.



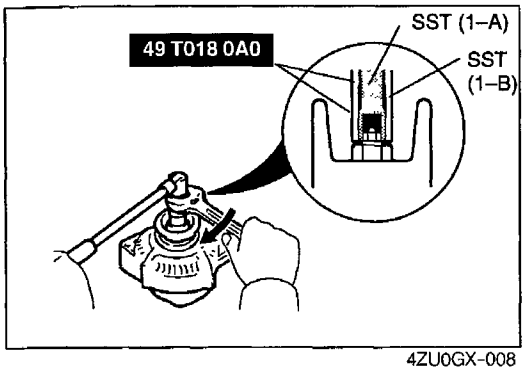
4ZU0GX–006

1. Pulley
   Disassembly / Assembly Note . page G–13
2. Front cover
3. Rotor
4. Rear cover assembly
5. Rear cover
6. Rectifier
7. Brush holder assembly
8. Bearing
9. Cover set



4ZU0GX-007

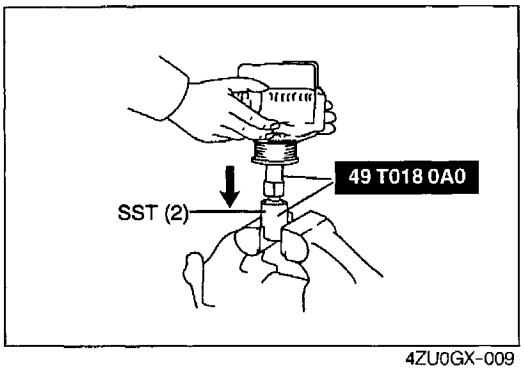
Disassembly / Assembly Note
Removal of pulley
1. Fit **SST** (1–A) onto the pulley shaft.
2. Secure **SST** (1–A) and screw **SST** (1–B) onto it.



4ZU0GX-008

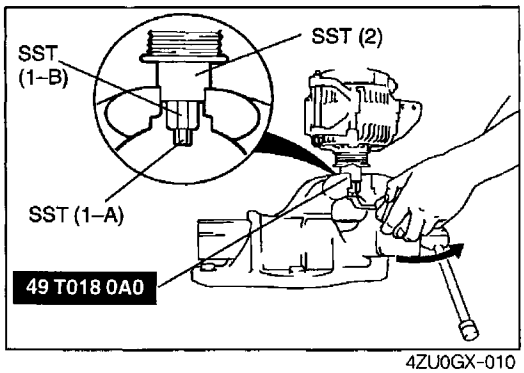
3. Tighten **SST** (1–B) to secure **SST** (1–A) onto the pulley shaft.

   Tightening torque (reaction torque of SST 1–A):
   53.9 N·m {5.50 kgf·m, 39.8 ft·lbf}



4ZU0GX-009

4. Secure **SST** (2) in a vise by its straight edges.
5. With **SST** (1–A and B) installed, fit the pulley locknut of the generator into the **SST** (2).



4ZU0GX-010

6. Turn **SST** (1–A) in the generator rotation direction to loosen the pulley locknut.
7. Remove the generator from **SST** (2).
8. Secure **SST** (1–A) and loosen **SST** (1–B). Remove **SST** (1–A and B).
9. Remove the pulley locknut and pulley.

Installation of pulley
Install in the order of removal.

IGNITION SYSTEM

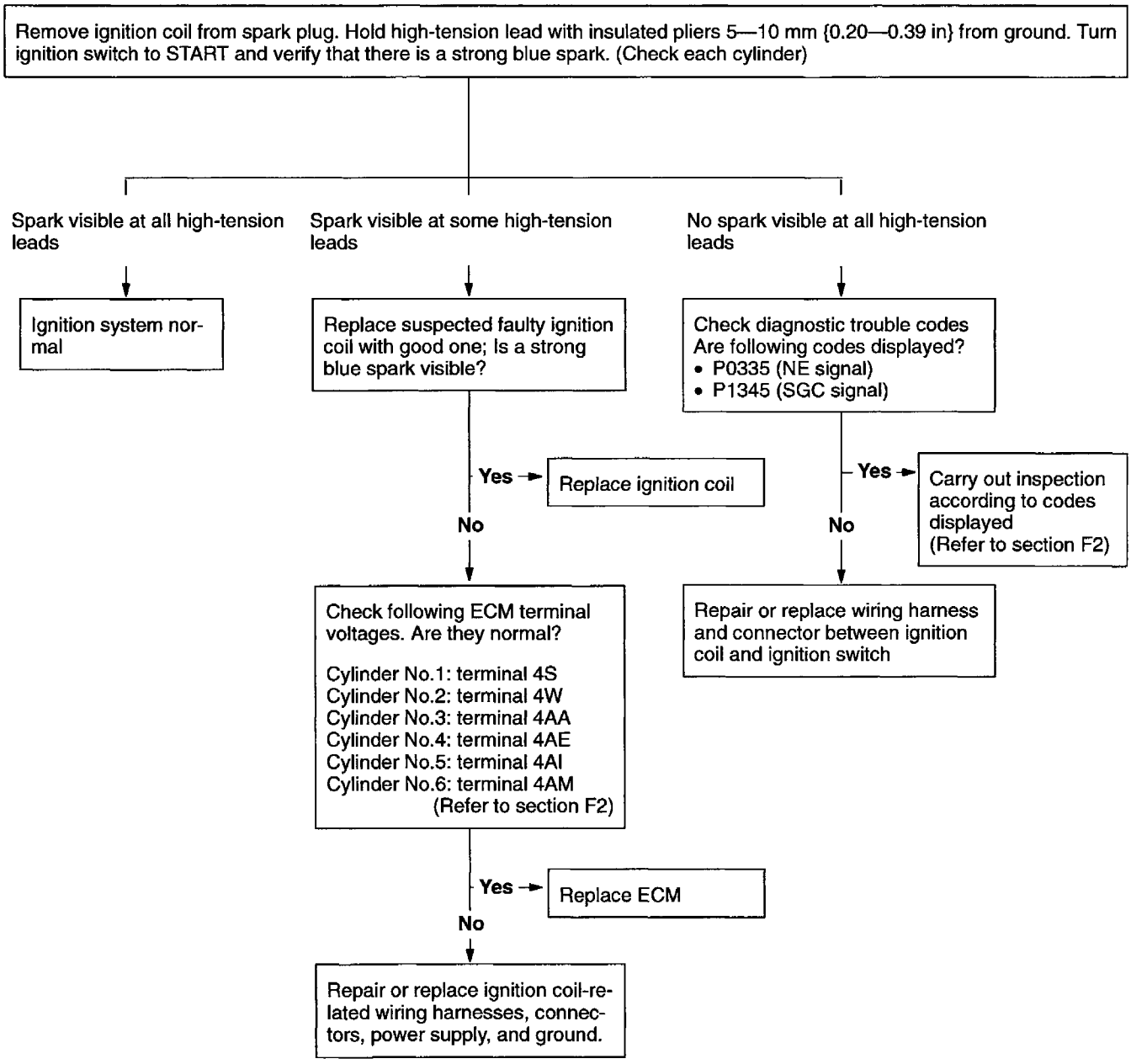
SYSTEM INSPECTION

1. Remove the fuel pump relay from main fuse block.
2. Check condition of connector and ignition coil (KJ). Check condition of connector, and high-tension leads (KL).
3. Inspect the ignition system as following procedure.

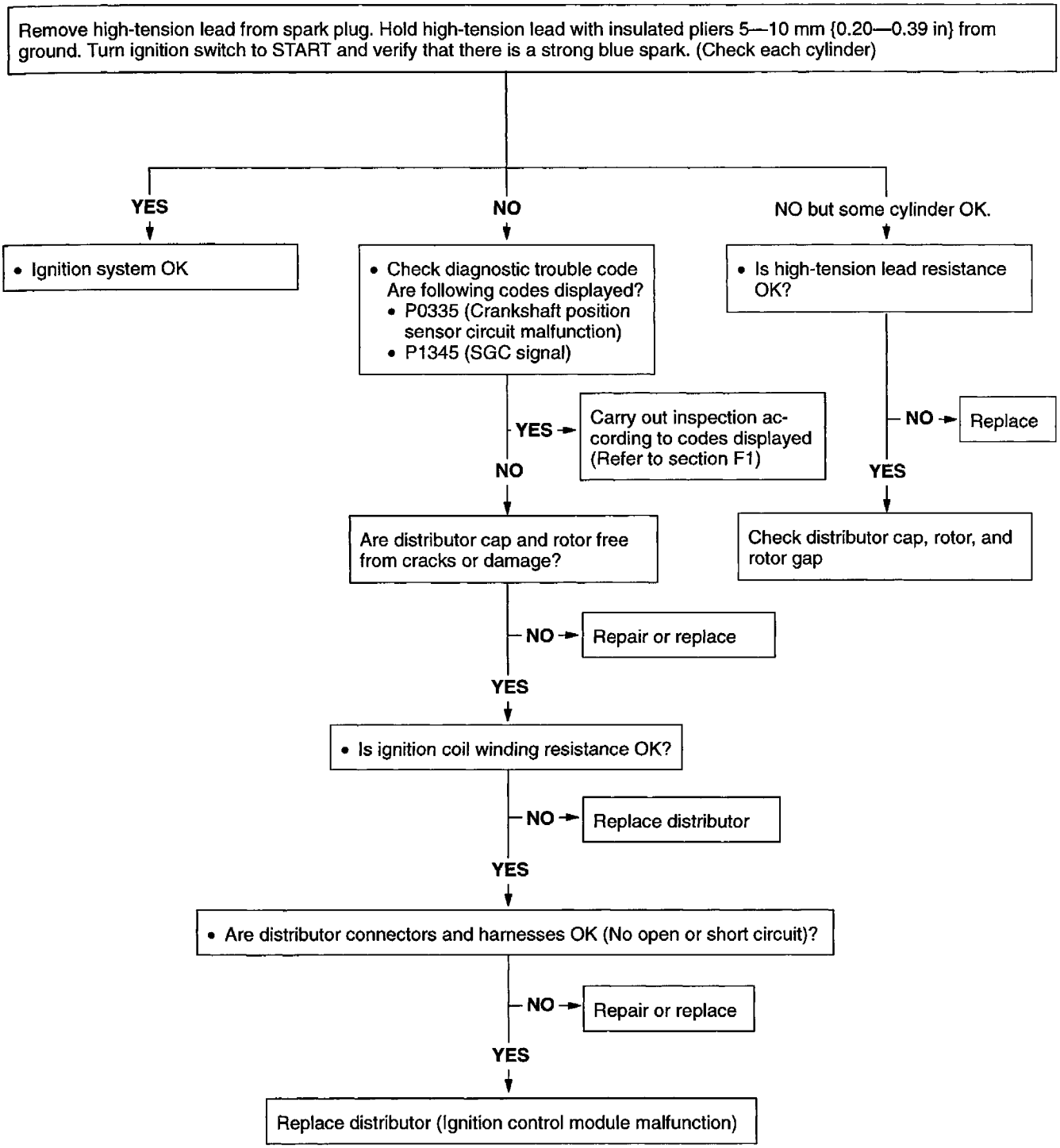
Warning

- **High voltage in the ignition system can cause strong electrical shock. Avoid direct contact to the vehicle body during the following spark test.**

KJ



KL


Remove high-tension lead from spark plug. Hold high-tension lead with insulated pliers 5—10 mm {0.20—0.39 in} from ground. Turn ignition switch to START and verify that there is a strong blue spark. (Check each cylinder)
YES
NO
NO but some cylinder OK.
• Ignition system OK
• Check diagnostic trouble code Are following codes displayed?
• P0335 (Crankshaft position sensor circuit malfunction)
• P1345 (SGC signal)
• Is high-tension lead resistance OK?
YES
Carry out inspection according to codes displayed (Refer to section F1)
NO
Replace
NO
YES
Are distributor cap and rotor free from cracks or damage?
Check distributor cap, rotor, and rotor gap
NO
Repair or replace
YES
• Is ignition coil winding resistance OK?
NO
Replace distributor
YES
• Are distributor connectors and harnesses OK (No open or short circuit)?
NO
Repair or replace
YES
Replace distributor (Ignition control module malfunction)

IGNITION CONTROL MODULE

Inspection

(KJ)

Carry out the ignition system inspection.
(Refer to page G–14.)

Note

- Inspection of the ignition control module itself is difficult because the ignition control module contains many IC parts.

(KL)

Carry out the ignition system inspection.
(Refer to page G–15.)

Note

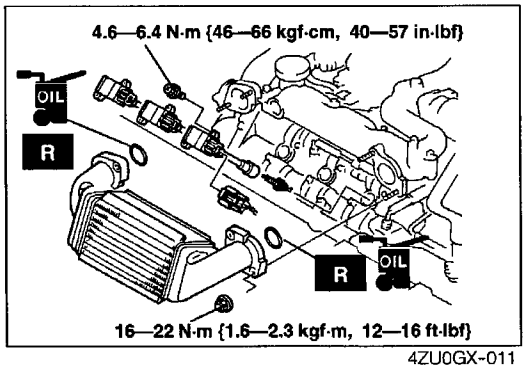
- Inspection of the ignition control module itself is difficult because the ignition control module contains many IC parts.

IGNITION COIL

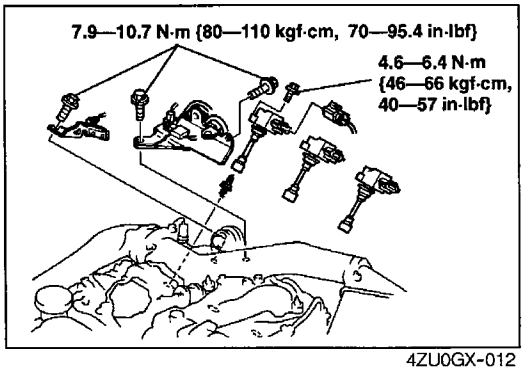
Removal / Installation

(KJ)

1. Disconnect the negative battery cable.
2. LH: Remove the charge air cooler.
   RH: Remove the solenoid bracket assembly.
3. Disconnect the ignition coil 4-pin connector.
4. Remove the ignition coil.
5. Install in the reverse order of removal.



4ZU0GX-011



4ZU0GX-012

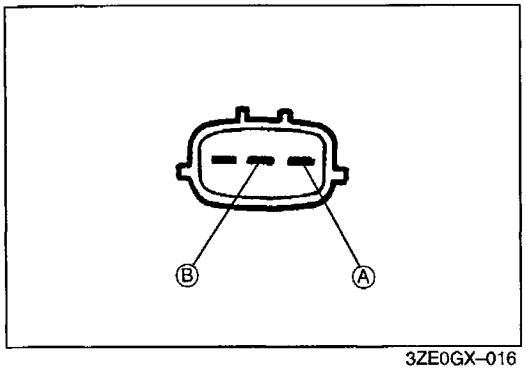
Inspection

(KJ)

Carry out the ignition system inspection.
(Refer to page G–14.)

Note

- Inspection of ignition coil itself is difficult because the ignition coil is integrated in the ignition control module.



3ZE0GX–016

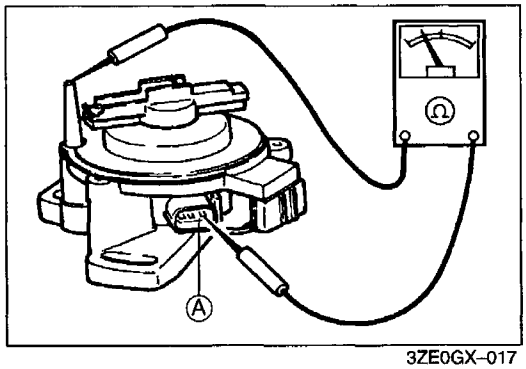
(KL)

Primary coil winding

1. Disconnect the distributor 3-pin 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.



3ZE0GX–017

Secondary coil winding

1. Disconnect the distributor 3-pin connector.
2. Remove the distributor cap.
3. Measure the resistance as shown in the figure by using an ohmmeter.

   Specification: 20—31 kΩ [20°C {68°F}]

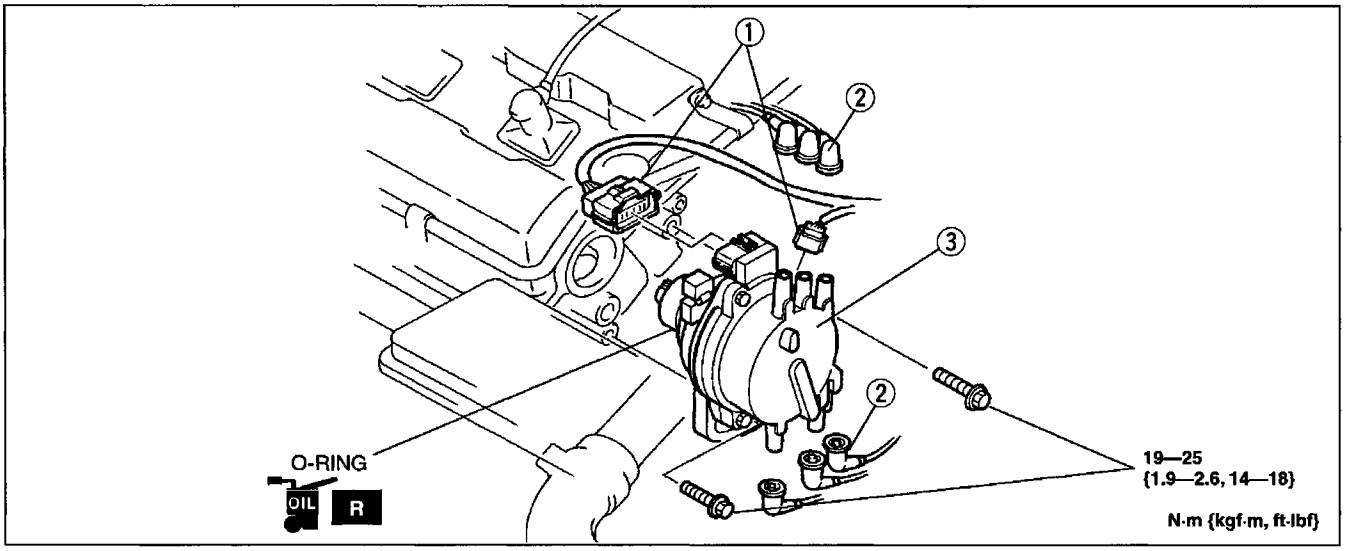
4. If not as specified, replace the distributor.

DISTRIBUTOR

Removal / Installation

(KL)

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



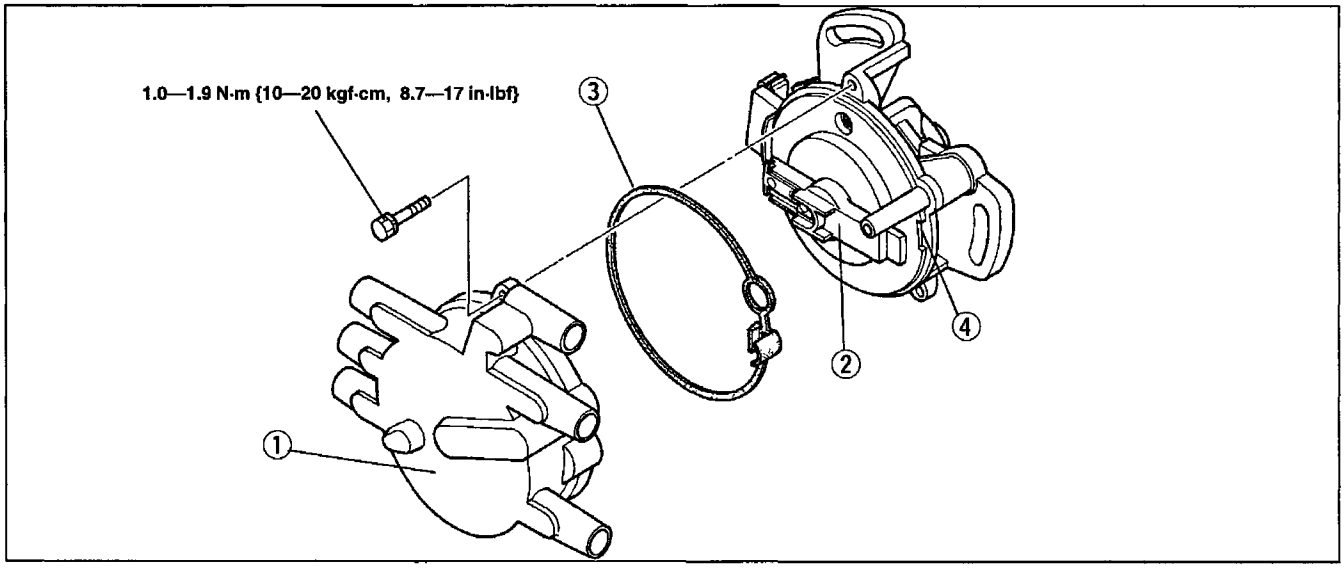
3ZE0GX-018

1. Connector
2. High-tension lead
3. Distributor
   Disassembly / Assembly ..... below

Disassembly / Assembly

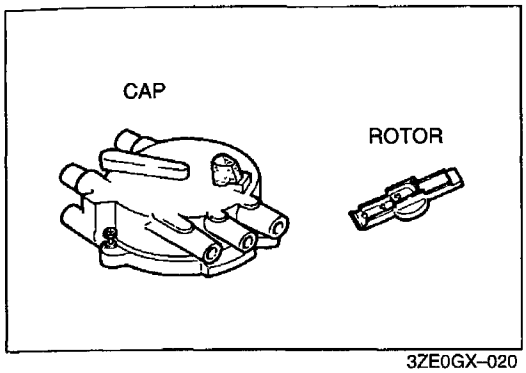
(KL)

1. Disassemble in the order shown in the figure.
2. Inspect all parts and repair or replace if necessary.
3. Assemble in the reverse order of disassembly.



3ZE0GX-019

1. Distributor cap
   Inspection ..... page G–19
2. Rotor
   Inspection ..... page G–19
3. Packing
4. Ignition control module, ignition coil and camshaft position sensor
   Inspection
   (Ignition control module) ..... page G–16
   Inspection (Ignition coil) ..... page G–17
   System inspection
   (Camshaft position sensor) .. section F1

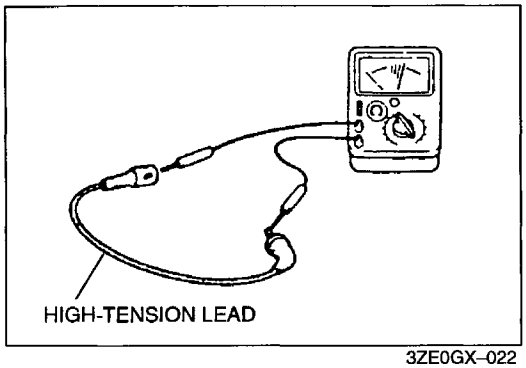


3ZE0GX-020

Inspection
Distributor cap and rotor
1. Check for corrosion, damage, and cracks.
2. Replace if necessary.

HIGH-TENSION LEAD
Removal / Installation
(KL)

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.**



3ZE0GX-022

Inspection
1. Measure the resistance of the high-tension leads.

   Specification: 16 kΩ per 1.00 m {3.28 ft}

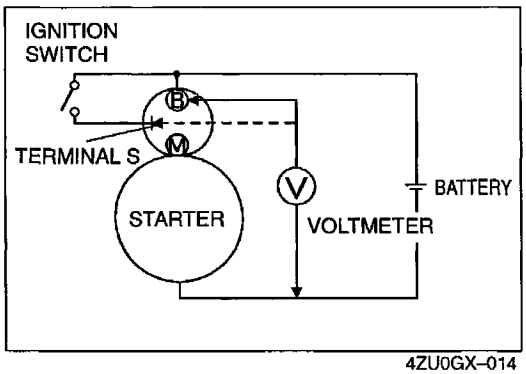
2. If not as specified, replace the high-tension lead.

SPARK PLUG
Removal / Installation
(KJ)
1. Disconnect the negative battery cable.
2. Remove the ignition coil. (Refer to page G–16.)
3. Remove the spark plug.
4. Install in the reverse order of removal.

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

Inspection

Caution
- **To protect the platinum electrode:**
  (1) Do not use a wire brush to clean the electrode.
  (2) Use a plug cleaner for a maximum of 20 seconds and air pressure below 589 kPa {6.00 kgf/cm^2, 85.0 psi}.
  (3) Do not adjust the plug gap to protect a platinum electrode.



4ZU0GX-014

STARTING SYSTEM

STARTER

System Inspection

1. Verify that the battery is fully charged.
2. Turn the ignition switch to START and verify that the starter turns smoothly with normal operating sound while cranking.
3. If the starter does not turn, measure the voltage between terminals S and B by using a voltmeter.

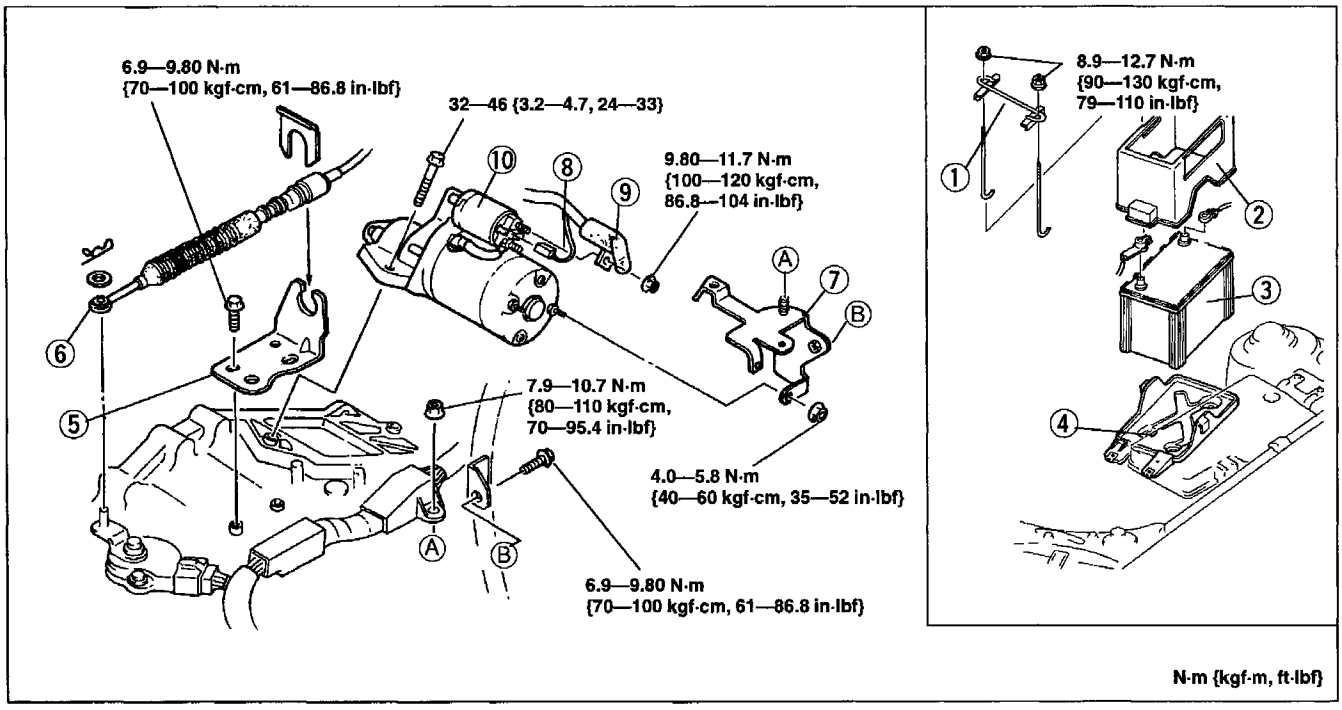
   Specification: More than 8V

4. If the voltage is as specified, remove the starter and inspect the magnetic switch and starter harness. If not, check the wiring harness, ignition switch, and transmission range sensor.

Removal / Installation

(KL)

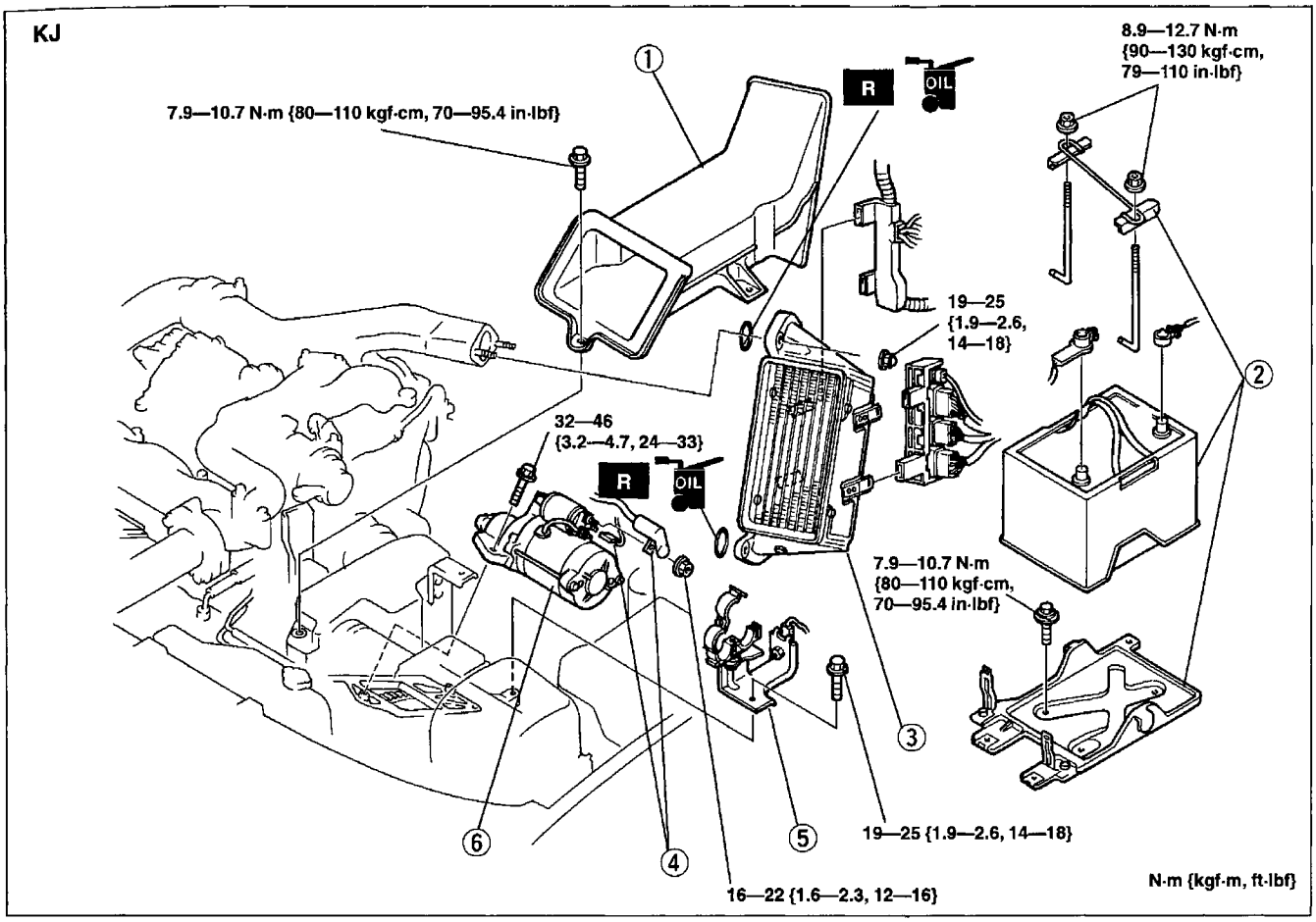
1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



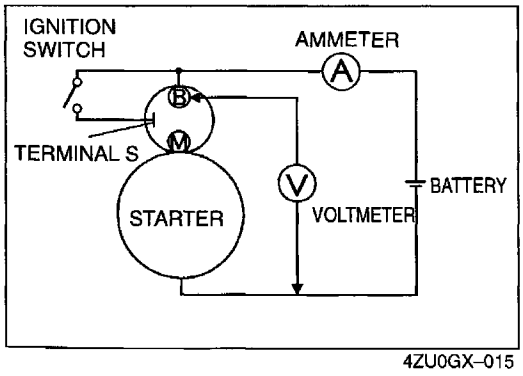
3ZG0GX-006

1. Battery clamp
2. Battery box
3. Battery
4. Battery tray
5. Cable bracket
6. Selector cable
7. Starter bracket
8. Terminal S connector
9. Terminal B wire
10. Starter

Inspection ..... page G–21



1. Charge air cooler duct (RH)
2. Battery assembly
3. Charge air cooler (RH)
4. Terminals B, S
5. Pipe bracket
6. Starter
   Inspection ..... below



4ZU0GX–015

Inspection

No load test

1. Connect the starter, battery, voltmeter and ammeter as shown in the figure.
2. Measure the voltage, current, and speed as shown below.

Engine		KL	KJ
Voltage	(V)	11	
Current	(A)	90	
Speed	(rpm)	2,800 or higher 1,450 or higher*1	2,200 or higher

*1 Cold area

3. If not as specified, repair or replace inner parts as necessary.

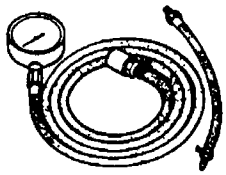
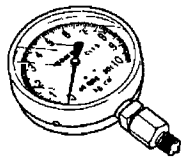
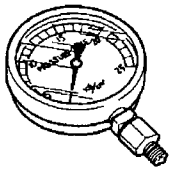
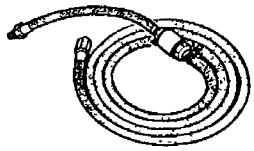
Before beginning any service procedure, refer to section T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

AUTOMATIC TRANSAXLE (Electronically Controlled)

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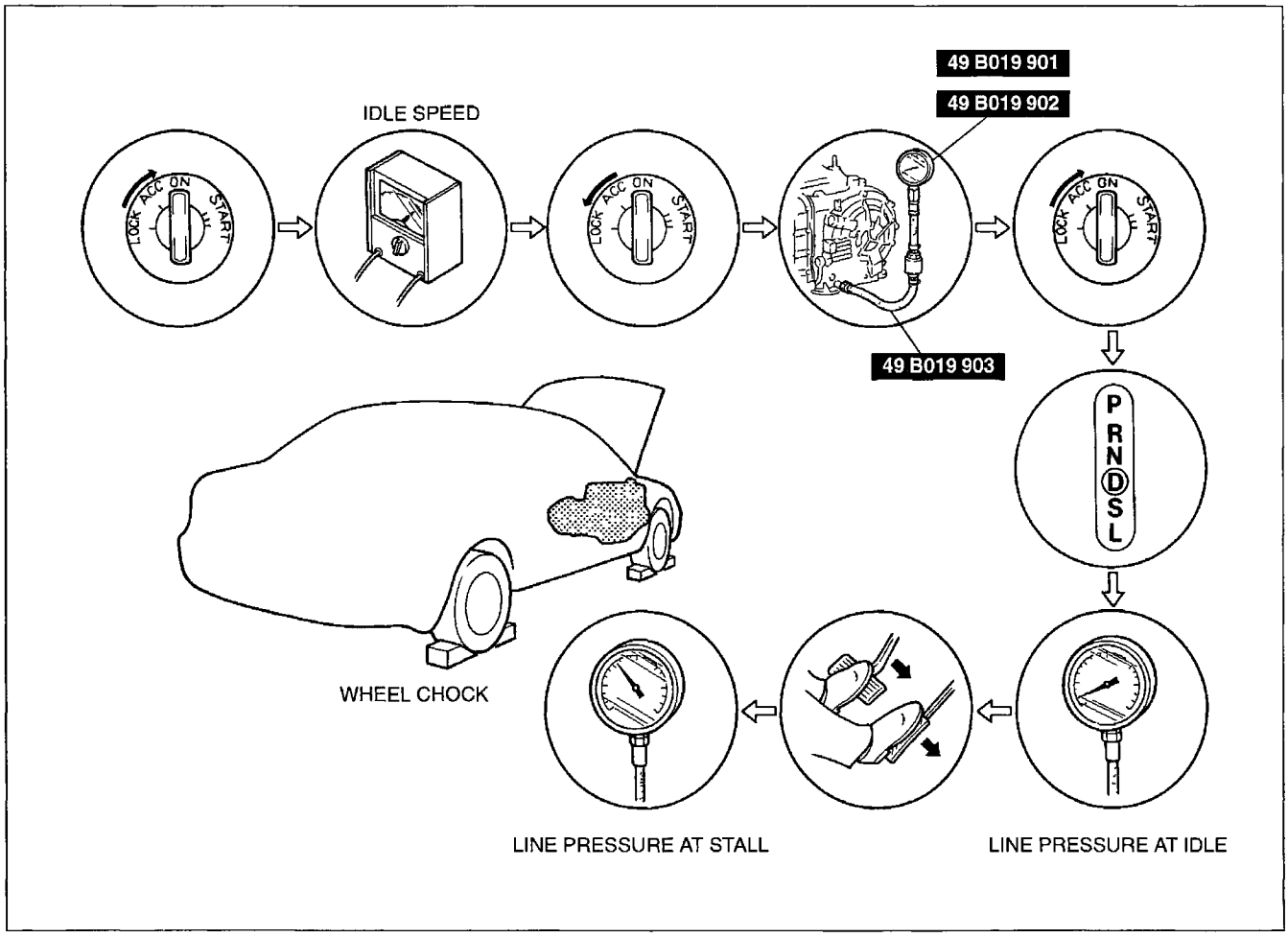
MECHANICAL SYSTEM TEST

PREPARATION
SST

49 0378 400B Gauge set, oil pressure 	For oil pressure test	49 B019 901 Oil pressure gauge 	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

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 level. (Refer to page K1–10.)
5. Check the idle speed and ignition timing in P position. (Refer to section F1.)

LINE PRESSURE TEST
Procedure



Warning
- **Draining the ATF when it is hot is dangerous. Hot ATF can shoot out when the square-head is removed, causing burns and serious injury. Wait until the transaxle and ATF are cool before draining the ATF.**

1. Connect the **SST (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 pressed, the transaxle could be damaged. Therefore, do steps 5 and 6 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 engine speed and release the accelerator.
6. Shift the selector to neutral and let the engine at idle for 1 minute or more to cool the ATF.
7. Read the line pressure at idle and at the engine stall speed for each range in the same manner.

Specified line pressure:

Range, Position	Line pressure kPa {kgf/cm^2, psi}	
	Idle	Stall
D, S, L	420—530 {4.2—5.5, 60—78}	1,100—1,170 {11.2—12.0, 160—170}
R	730—1,010 {7.4—10.3, 110—146}	1,910—2,020 {19.4—20.7, 276—294}

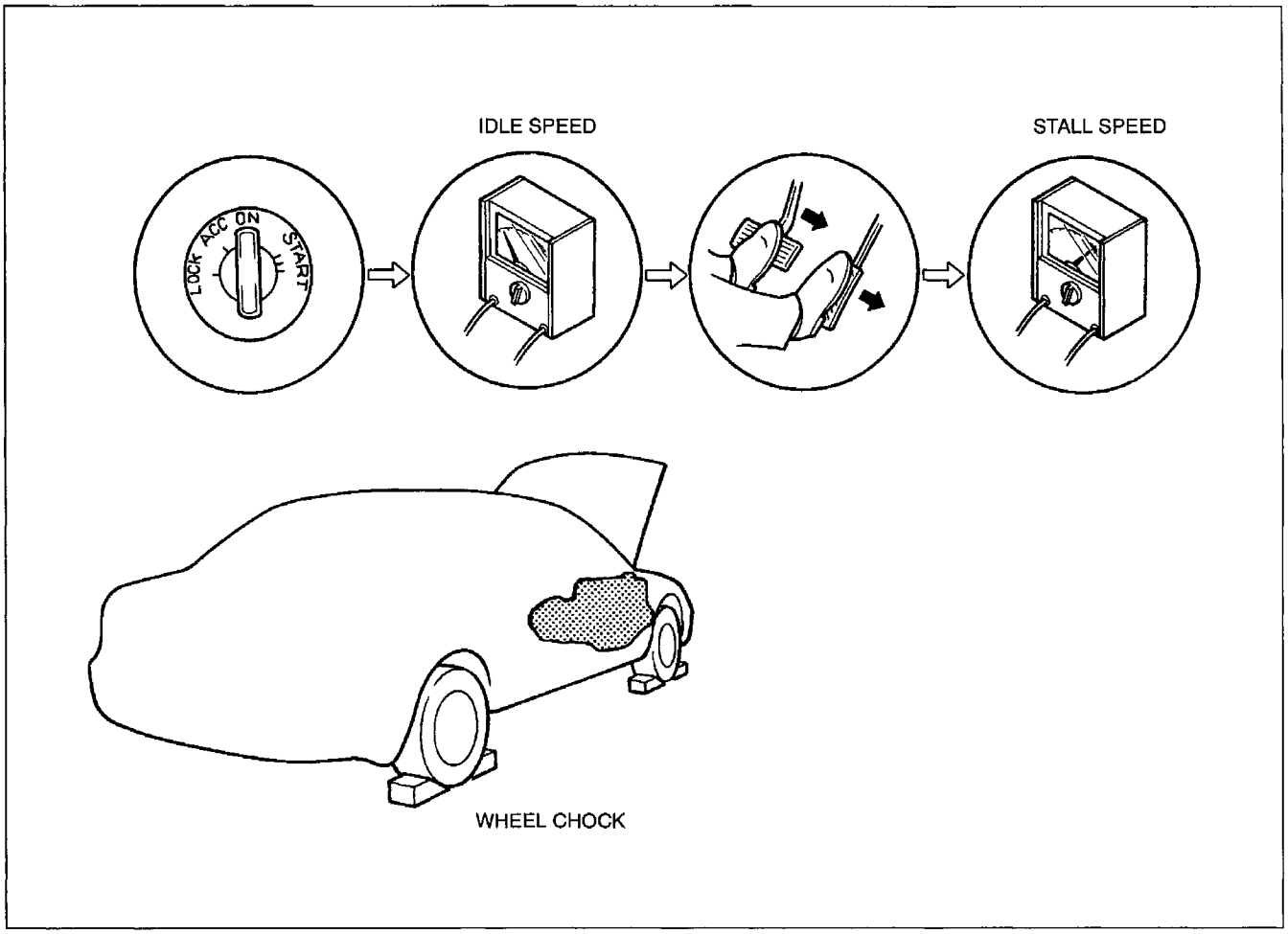
8. Install a new square head plug in the inspection port.

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
Low pressure in every position	Worn oil pump Oil leaking from oil pump, control valve body, and/or transaxle case Pressure regulator valve sticking Pressure control solenoid malfunction Pressure modulator valve sticking
Low pressure in D and S only	Oil leaking from hydraulic circuit of forward clutch
Low pressure in L and R only	Oil leaking from hydraulic circuit of low and reverse brake
Low pressure in R only	Oil leaking from hydraulic circuit of reverse clutch
Higher than specification	Pressure control solenoid malfunction Pressure regulator valve sticking Pressure modulator valve sticking

STALL TEST
Procedure



1. Shift the selector lever to D range.

Caution
- **If the accelerator pedal is pressed for longer than 5 seconds while the brake pedal is pressed, the transaxle could be damaged. Therefore, do steps 4 and 5 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 neutral and let the engine idle for 1 minute or more to cool the ATF.
5. Perform stall tests for the remaining ranges in the same manner.
   (1) S range (non-HOLD), S range (HOLD)
   (2) L range (non-HOLD), L range (HOLD)
   (3) R position

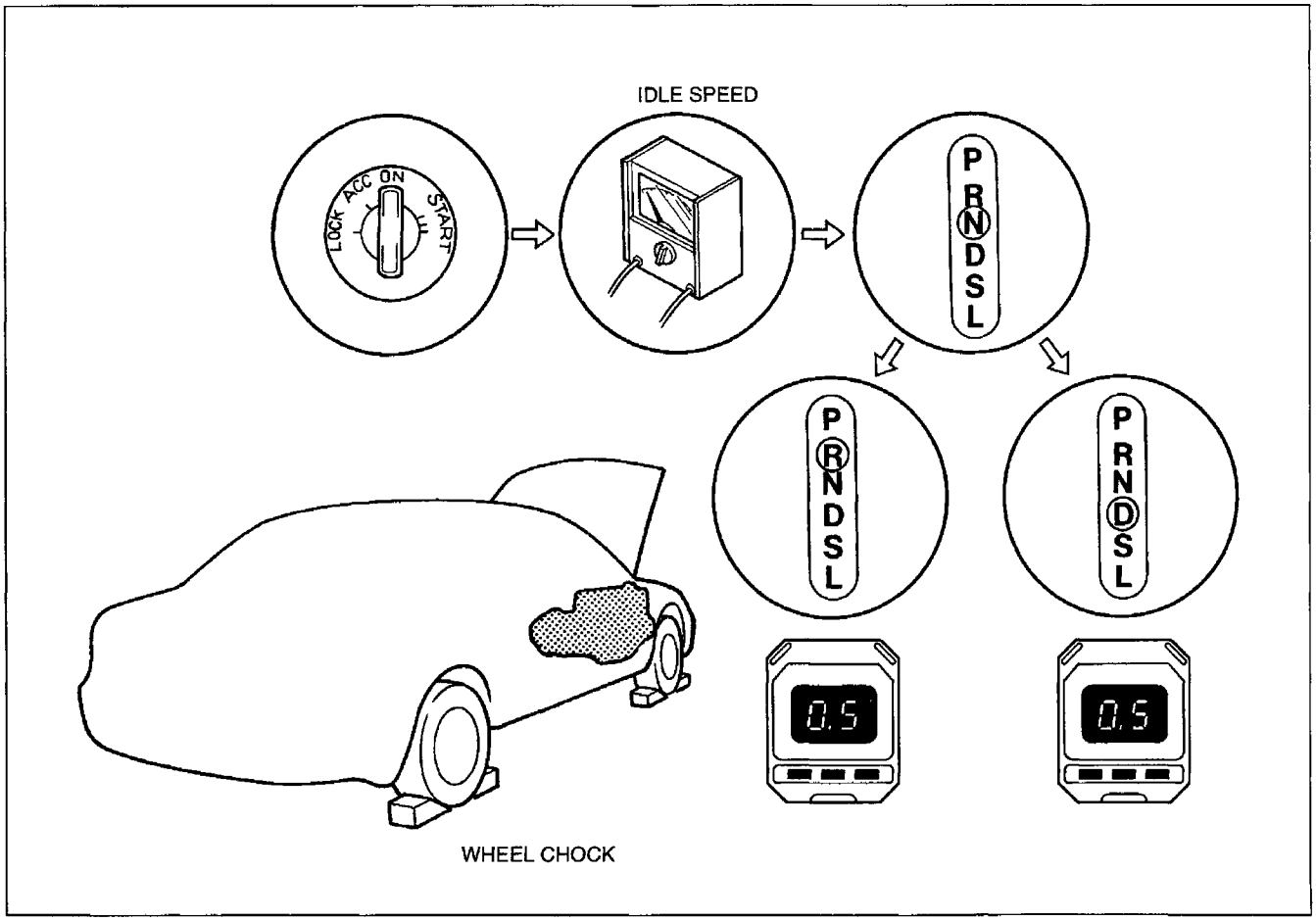
Engine stall speed:
D, S, L range : 2,270—2,500 rpm
R position : 2,270—2,500 rpm

Evaluation of Stall Test

Condition		Possible cause	
Above specification	In all ranges	Insufficient line pressure	Worn oil pump
			Oil leaking from oil pump, control valve, and/or transaxle case
			Pressure regulator valve sticking
			Pressure control solenoid malfunction
			Pressure modulator valve sticking
	In forward ranges	Forward clutch slipping One-way clutch 1 slipping	
	In D range	One-way clutch 2 slipping	
	In D (HOLD) and S (HOLD) ranges	2–4 brake band slipping	
	In L range and R position	Low and reverse brake 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 L range (HOLD) ...Reverse clutch b) Engine braking not felt in L range (HOLD) ...Low and reverse brake	
Below specification		Engine out of tune	
		One-way clutch slipping within torque converter	

K1

TIME LAG TEST
Procedure



1. Shift from neutral position to D range.
2. Use a stopwatch to measure the time it takes from shifting until shock is felt.
3. Shift the selector to neutral position and run the engine at idle speed for at least one (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. Perform the test for the following shifts in the same manner.
   (1) Neutral→D range
   (2) Neutral→D range (HOLD mode)
   (3) Neutral→R position

Time lag: Neutral→D range ..... approx. 0.9 second
Neutral→R position .... approx. 1.1 second

Evaluation of Time Lag Test

Condition		Possible Cause
Neutral→D shift	More than specification	Insufficient line pressure Forward clutch slipping One-way clutch 1 slipping One-way clutch 2 slipping
	Less than specification	N-D accumulator not operating properly Excessive line pressure
Neutral→D (HOLD) shift	More than specification	Insufficient line pressure Forward clutch slipping 2-4 brake band slipping One-way clutch 1 slipping
	Less than specification	1–2 accumulator not operating properly Excessive line pressure
Neutral→R shift	More than specification	Insufficient line pressure Low and reverse brake slipping Reverse clutch slipping
	Less than specification	N-R accumulator not operating properly Excessive line pressure

ROAD TEST

PREPARATION

1. Check and correct as necessary, the engine coolant, engine oil, and ATF levels before testing.
2. Warm 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 park position. (Refer to section F1.)

D RANGE TEST

D range (NORMAL, POWER)

Note
- The POWER mode and the NORMAL mode are automatically selected by the powertrain control module.

1. Shift the selector lever to D range.

Note
- There is no fourth gear in any of the following conditions.
  1. The ATF temperature is below 10°C {50°F}.
  2. The cruise control is operating, and there is an 8 km/h {5 mph} difference between the preset cruise speed and the vehicle speed.
  3. The RESUME/ACCEL switch in ON.

2. Accelerate the vehicle to half- and full-throttle opening.
3. Verify that 1–2, 2–3, and 3–4 upshifts and downshifts are obtained. The shift points must be as shown in the D range shift diagram.
4. Drive the vehicle in fourth, third, and second gears and verify that kickdown occurs for 4→3, 4→2, 4→1, 3→2, 3→1, 2→1, and that the shift points are as shown in the D range shift diagram.
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 60°C {140°F}.
  2. The closed throttle position switch is ON.
  3. The brake switch is ON.
- There is torque converter clutch non-slip operation in the following conditions.
  1. The engine coolant temperature is below 60°C {140°F}.
  2. The ATF temperature is below 20°C {68°F}.
  3. The accelerator pedal is depressed rapidly.

6. Drive the vehicle and verify that torque converter clutch operation is obtained.

D range (HOLD)

1. Select HOLD mode.
2. Accelerate the vehicle to half- and full-throttle opening, and verify that 2–3 upshift and downshift are obtained. The shift points must be as shown in the D range (HOLD mode) shift diagram.
3. Drive the vehicle in third and second gears and verify that kickdown does not occur.
4. Decelerate the vehicle and verify that engine braking effect is felt in third gear.

Note
- There is torque converter clutch non-operation in the following conditions.
  1. The engine coolant temperature is below 60°C {140°F}.
  2. The closed throttle position switch is ON.
  3. The brake switch is ON.

5. Drive the vehicle and verify that torque converter clutch operation is obtained.

Vehicle Speed at Shiftpoint Table

Range Mode		Throttle condition	Shift	Vehicle speed km/h {mph}	Turbine speed rpm
POWER	D	Wide open throttle	$D_1 \rightarrow D_2$	61—67 {38—41}	6100—6700
			$D_2 \rightarrow D_3$	106—113 {66—70}	5850—6200
			$D_3 \rightarrow D_4$	172—182 {107—112}	6150—6500
		Half throttle	$D_1 \rightarrow D_2$	42—51 {26—31}	4200—5100
			$D_2 \rightarrow D_3$	72—91 {45—56}	4000—5000
			$D_3 \rightarrow D_4$	119—145 {74—89}	4250—5150
		Closed throttle position	$D_4 \rightarrow D_3$	11—17 {7—10}	300—400
			$D_3 \rightarrow D_1$	29—35 {18—21}	1050—1250
		Kickdown (wide open throttle)	$D_4 \rightarrow D_3$	143—153 {89—94}	3600—3800
			$D_3 \rightarrow D_2$	91—99 {56—61}	3250—3500
			$D_2 \rightarrow D_1$	37—43 {23—26}	2050—2350
NORMAL		Wide open throttle	$D_1 \rightarrow D_2$	61—67 {38—41}	6100—6700
			$D_2 \rightarrow D_3$	106—113 {66—70}	5850—6200
			$D_3 \rightarrow D_4$	172—182 {107—112}	6150—6500
			TCC ON (D_4)	147—157 {91—97}	3700—3900
		Half throttle	$D_1 \rightarrow D_2$	33—42 {20—26}	3300—4200
			$D_2 \rightarrow D_3$	59—76 {37—47}	3250—4150
			$D_3 \rightarrow D_4$	96—124 {60—76}	3450—4400
			TCC ON (D_4)	127—150 {79—93}	3200—3750
		Closed throttle position	$D_4 \rightarrow D_3$	11—17 {7—10}	300—400
			$D_3 \rightarrow D_1$	29—35 {18—21}	1050—1250
		Kickdown (wide open throttle)	$D_4 \rightarrow D_3$	143—153 {89—94}	3600—3800
			$D_3 \rightarrow D_2$	91—99 {56—61}	3250—3500
			$D_2 \rightarrow D_1$	37—43 {23—26}	2050—2350
HOLD		—	$D_2 \rightarrow D_3$	15—25 {9—16}	850—1350
			TCC ON (D3)	105—115 {65—71}	3750—4100
			$D_4 \rightarrow D_3$	172—178 {100—104}	4300—4450
			$D_3 \rightarrow D_2$	7—13 {4—8}	250—450

S RANGE TEST

S range (non-HOLD)

1. Shift the selector lever to S range.
2. Accelerate the vehicle to half- and full throttle opening.
3. Verify that 1–2 and 2–3 upshifts and downshifts are obtained. The shift points must be as shown in the S range shift diagram.
4. 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 S range shift diagram.
5. Decelerate the vehicle and verify that engine braking effect is felt in third gear.

Note

- There is torque converter clutch non-operation in the following conditions.
  1. The engine coolant temperature is below 60°C {140°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.

S range (HOLD)
1. Select HOLD mode.
2. Accelerate the vehicle to half- and full throttle opening, and verify that second gear is held.
3. Decelerate the vehicle and verify that engine braking effect is felt.

Note
- There is torque converter clutch non-operation in the following conditions.
  1. The engine coolant temperature is below 60°C {140°F}.
  2. The closed throttle position switch is ON.
  3. The brake switch is ON.

4. Drive the vehicle and verify that torque converter clutch operation is obtained.

Vehicle Speed at Shiftpoint Table

Range Mode		Throttle condition	Shift	Vehicle speed km/h {mph}	Turbine speed rpm
Non-HOLD	S	Wide open throttle	$S_1 \rightarrow S_2$	61—67 {38—41}	6100—6700
			$S_2 \rightarrow S_3$	105—113 {65—70}	5800—6200
			TCC ON (S_3)	108—116 {67—72}	3900—4100
		Half throttle	$S_1 \rightarrow S_2$	42—52 {26—32}	4200—5200
			$S_2 \rightarrow S_3$	72—91 {45—56}	4000—5000
			TCC ON (S_3)	104—116 {64—72}	3750—4100
		Closed throttle position	O/D→S_3	172—178 {107—110}	4300—4450
			$S_3 \rightarrow S_1$	29—35 {18—21}	1050—1250
		Kickdown (wide open throttle)	$S_3 \rightarrow S_2$	91—99 {56—61}	3250—3500
			$S_2 \rightarrow S_1$	37—43 {23—26}	2050—2350
HOLD		—	TCC ON (S_3)	105—115 {65—71}	3750—4100
			O/D→S_3	172—178 {107—110}	4300—4450
			$S_3 \rightarrow S_2$	104—110 {64—68}	3750—3900

L RANGE TEST

L range (non-HOLD)
1. Shift the selector lever to L range.
2. Accelerate the vehicle with half- and full-throttle opening.
3. Verify that 1–2 upshift and downshift are obtained. The shift points must be as shown in the L range shift diagram.
4. Drive the vehicle in second gear and verify that kickdown occurs for 2→1, and that the shift point is as shown in the L range shift diagram.
5. Decelerate the vehicle and verify that engine braking effect is felt in second gear.

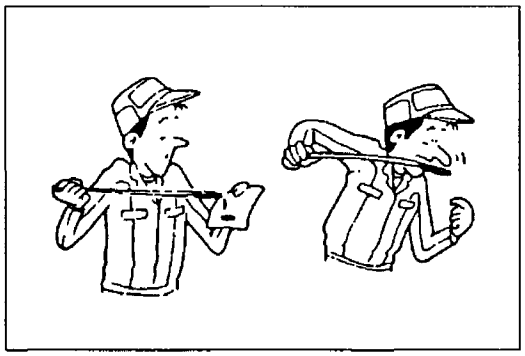
L range (HOLD)
1. Select HOLD mode.
2. Accelerate the vehicle with half- and full-throttle opening, and verify that first gear is held.
3. Decelerate the vehicle and verify that engine braking effect is felt.

Vehicle Speed at Shiftpoint Table

Range Mode		Throttle condition	Shift	Vehicle speed km/h {mph}	Turbine speed rpm
Non-HOLD	L	Wide open throttle	$L_1 \rightarrow L_2$	61—67 {38—41}	6100—6700
		Half throttle	$L_1 \rightarrow L_2$	42—52 {26—32}	4200—5200
		Closed throttle position	$L_2 \rightarrow L_1$	37—43 {23—26}	2050—2350
		Kickdown	$L_2 \rightarrow L_1$	37—43 {23—26}	2050—2350
HOLD		—	$L_2 \rightarrow L_1$	43—49 {27—30}	2400—2650

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

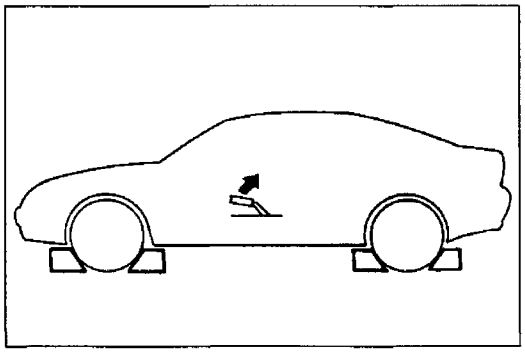
One way of determining whether the transaxle should be disassembled is by noting:

1. If the ATF is muddy or varnished.
2. If the ATF smells strange or unusual.

ATF condition

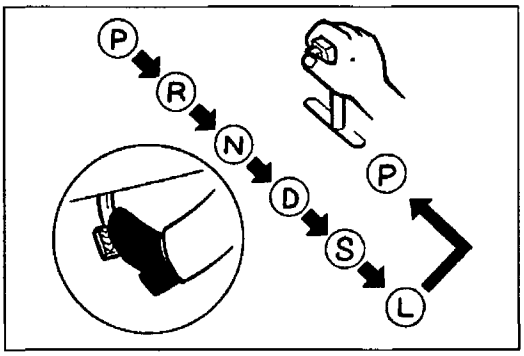
Color	Condition
Clear red	Normal
Dark	Powertrain components damaged
Light pink	Water in the ATF
Reddish-brown	Deterioration of the ATF

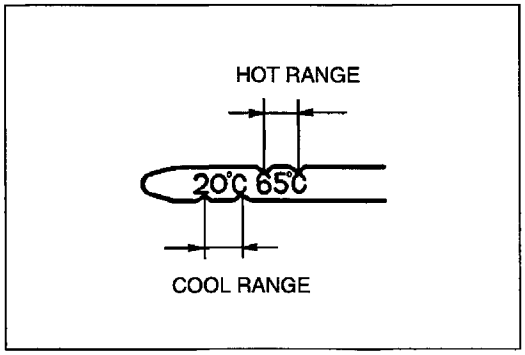
3. If ATF condition is not OK, repair as follows
   - Dark color condition
     Overhaul transaxle and repair or replace parts as necessary.
   - Light pink and/or reddish-brown condition replace ATF



Level

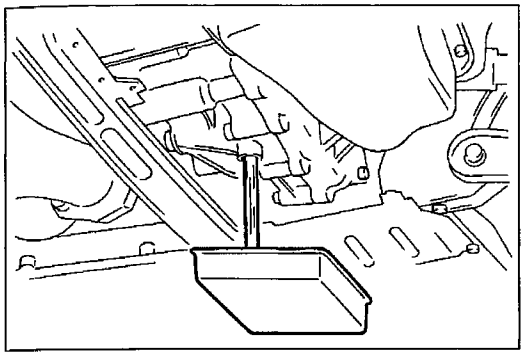
1. Park the vehicle on level ground.
2. Apply the parking brake and position wheel chocks securely to prevent the vehicle from rolling.
3. If necessary, inspect the ATF before warming up the engine. In this case, use the cool range (**15—25°C {59—77°F}**).
4. Warm up the engine until the ATF reaches **60—70°C {140—158°F}**.
5. While depressing the brake pedal, shift the selector lever to each range (park—L), pausing momentarily in each range.
6. Shift back to park.





7. While the engine is idling, ensure that the ATF level is in the HOT **65°C {149°F}** range. Add ATF to the specification, if necessary.

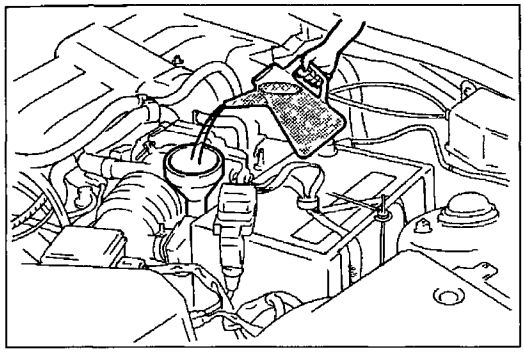
   ATF type: M-III or Dexron®II



Replacement

1. Remove the oil level gauge.
2. Remove the drain plug and washer.
3. Drain the ATF into a 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}



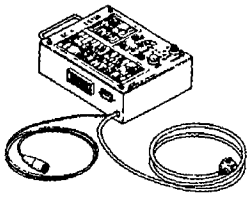
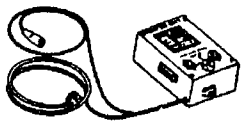
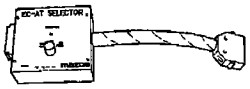
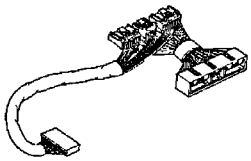
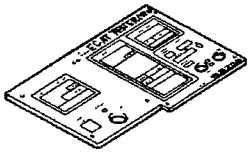
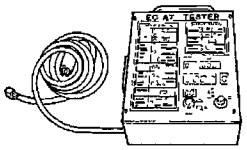
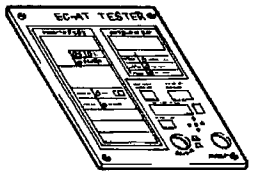
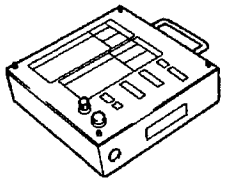
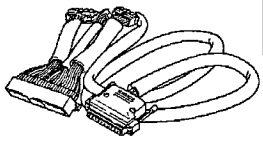
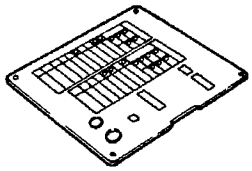
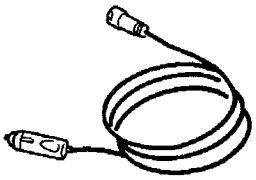
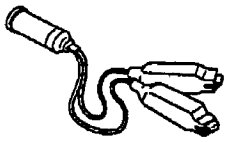
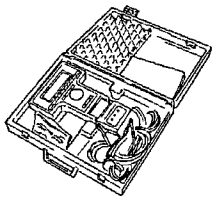
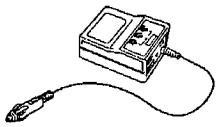
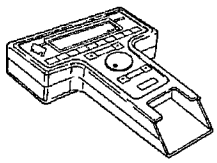
5. Remove the oil level gauge and add the specified amount and type of ATF through the oil filler tube.

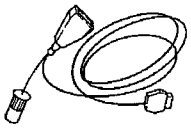
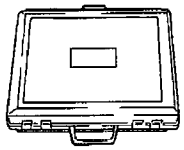
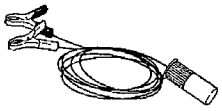
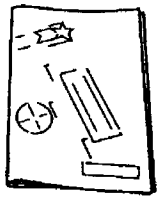
ATF type: M-III or Dexron®II
Capacity: 8.0 L { 8.5 US qt, 7.0 Imp qt}

6. Install the oil level gauge.
7. Ensure that the ATF level is in the HOT **65°C {149°F}** range.
8. Add ATF to the specified level if necessary.

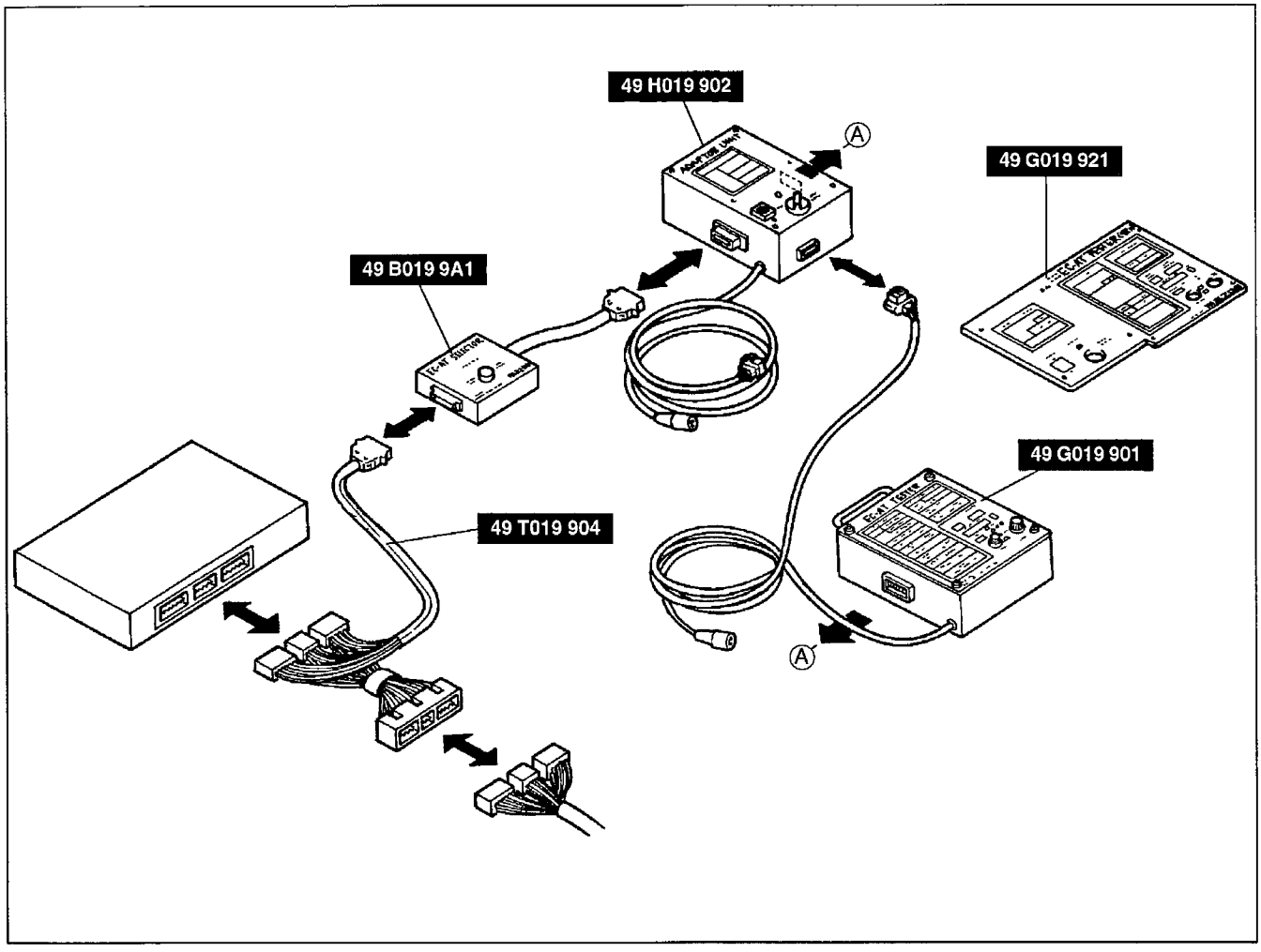
ELECTRICAL SIGNAL INSPECTION

PREPARATION
SST

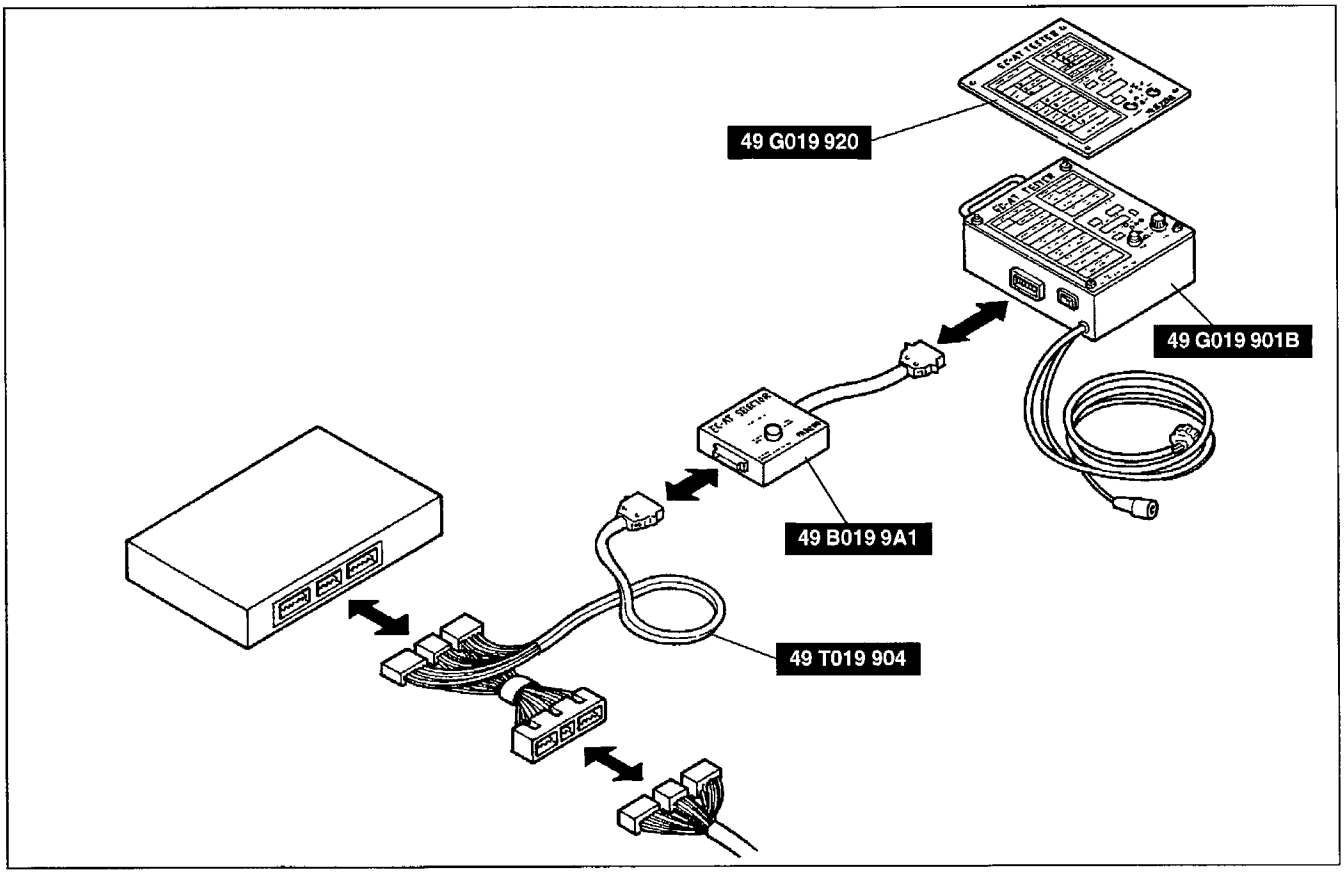
49 G019 901 EC-AT Tester 	For inspection of electrical signal	49 H019 902 Adapter 	For inspection of electrical signal
49 B019 9A1 Adapter 	For inspection of electrical signal	49 T019 904 Adapter Harness 	For inspection of electrical signal
49 G019 921 Panel 	For inspection of electrical signal	49 G019 901B EC-AT Tester 	For inspection of electrical signal
49 G019 920 Panel 	For inspection of electrical signal	49 G019 901C EC-AT Tester 	For inspection of electrical signal
49 T019 905 Adapter Harness 	For inspection of electrical signal	49 T019 906 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 Hook up Adapter (Part of 49 T088 0A0) 	For inspection of electrical signal	49 T088 008 Instruction Manual 	For inspection of electrical signal

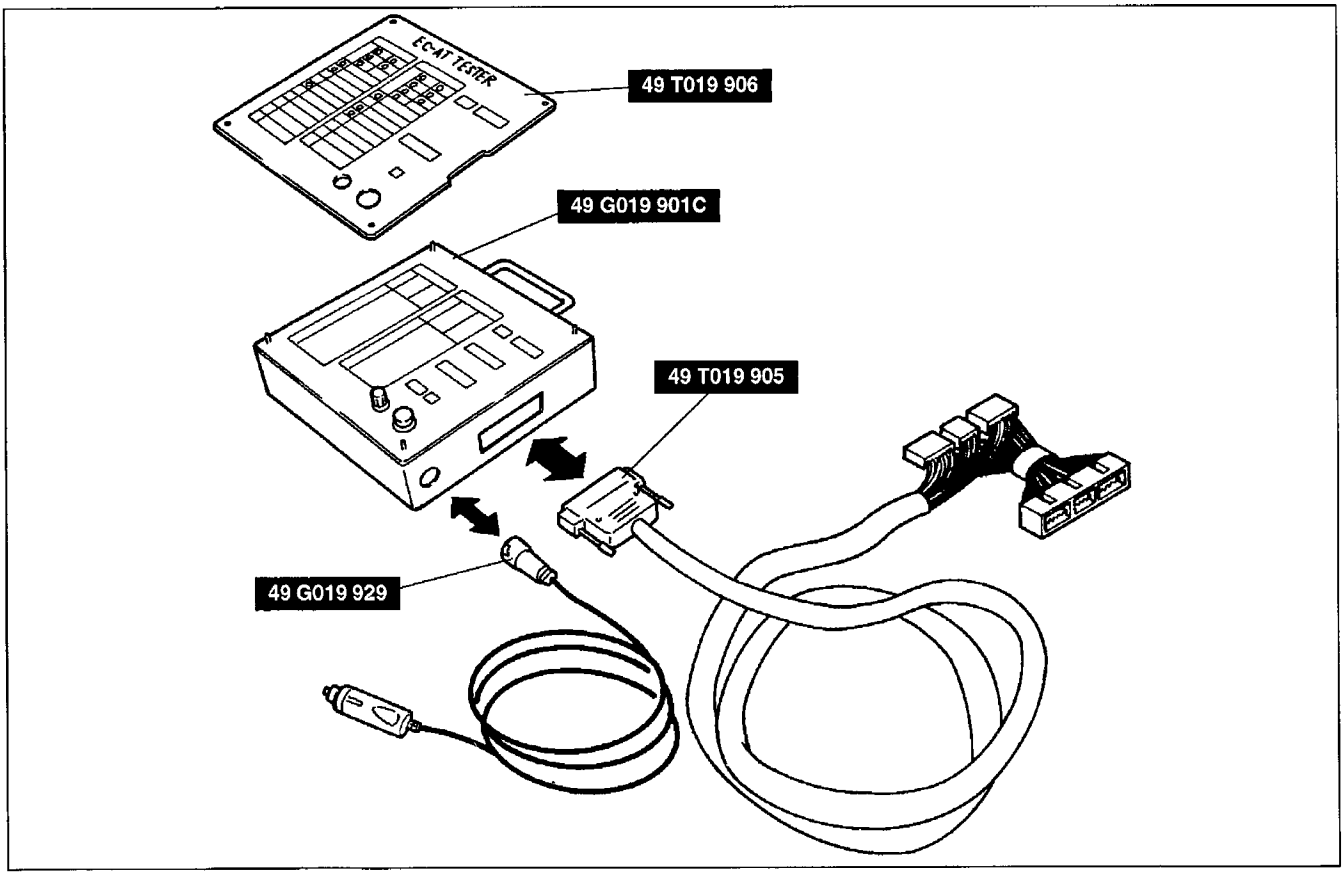
ELECTRICAL SIGNAL INSPECTION
Assembly of SST
EC-AT tester (49 G019 901), adapter (49 H019 902) and adapter (49 B019 9A1)



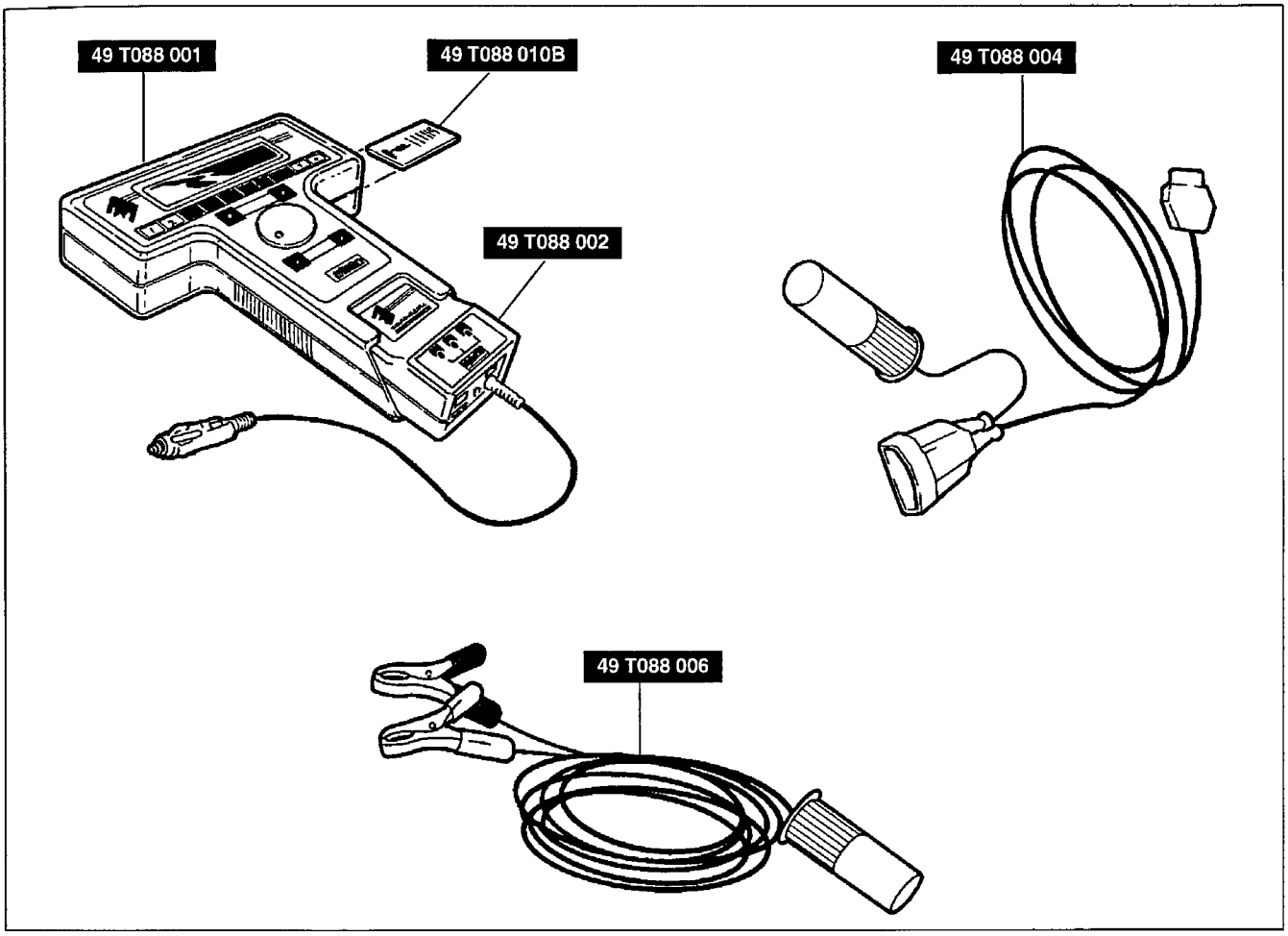
EC-AT tester (49 G019 901B) and adapter (49 B019 9A1)

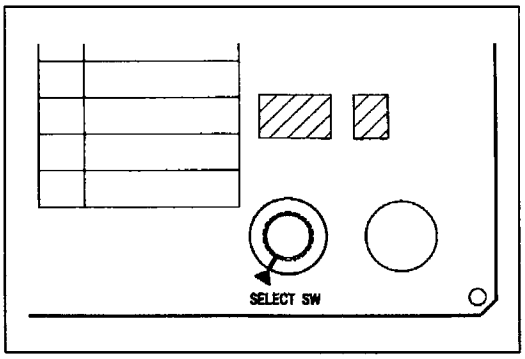


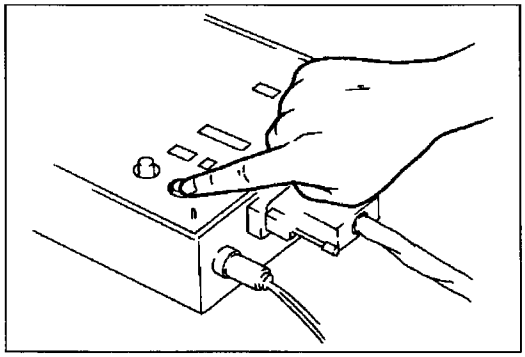
EC-AT tester (49 G019 901C)



NGS

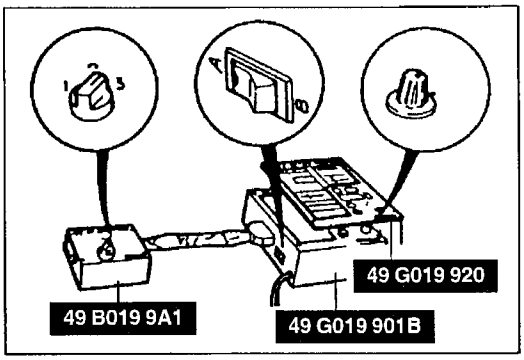


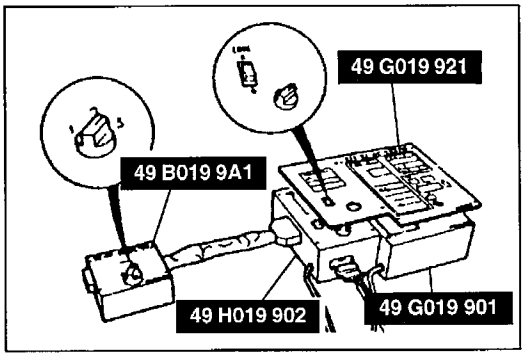




Inspection Procedure
When using the EC-AT tester (49 G019 901C)

1. Assemble the **SST**. (Refer to page K1–14.)
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 page K1–17.





When using the EC-AT tester (49 G019 901B)

1. Assemble the **SST**. (Refer to page K1–14.)
2. Set the EC-AT selector switch to position 3.
3. Set the EC-AT tester vehicle switch to 626/MX-6 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 K1–13.)
2. Set the EC-AT selector switch to position 3.
3. Set the adapter unit vehicle switch to 626/MX-6 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 K1–15.)
2. Select the PID/DATA MONITOR AND RECORD function. (Refer to section F1.)

Indication Table
Indication table of light and digital display
EC-AT tester (49 G019 901)

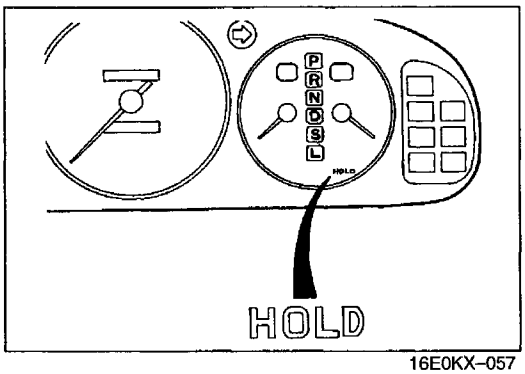
Item		Indication	Condition	Possible cause
Input (Light)				
Transaxle range switch (INHIBITOR SW)	P, N	ON	P or N position	Transaxle range switch or wiring
		OFF	R position, all ranges	
	D	ON	D range	
		OFF	Other ranges, all positions	
	S	ON	S range	
		OFF	Other ranges, all positions	
	L	ON	L range	
		OFF	Other ranges, all positions	
HOLD switch (HOLD switch)		ON	HOLD switch depressed	HOLD switch or wiring
		OFF	HOLD switch released	
Closed throttle position switch (IDLE SW)		ON	Closed throttle position	Closed throttle position switch or wiring
		OFF	Other positions	
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 control (LOCKUP CONTROL)	ON	TCC operation	Powertrain control module, TCC control solenoid valve, or wiring
		OFF	TCC non-operation	
	3–2 TIMING	ON	1→2, 2→3, 3 →4, 3 →2, 3→1, 2→1 shift	Powertrain control module, 3–2 timing solenoid valve, or wiring
		OFF	Other than above	
HOLD indicator light (HOLD INDICATOR)		ON	HOLD mode	Powrtrain control module, HOLD indicator light, or wiring
		OFF	Non-HOLD mode	
Output (Digital Display)				
GEAR		1	First gear	—
		2	Second gear	
		3	Third gear	
		4	Fourth gear	

EC-AT tester (49 G019 901B)

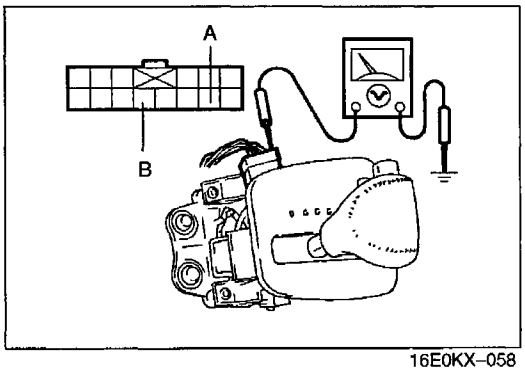
Item		Indication	Condition	Possible cause
Input (Light)				
Transaxle range switch (INHIBITOR SW)	P, N	ON	P or N position	Transaxle range switch or wiring
		OFF	R position, all ranges	
	D	ON	D range	
		OFF	Other ranges, all positions	
	S	ON	S range	
		OFF	Other ranges, all positions	
	L	ON	L range	
		OFF	Other ranges, all positions	
HOLD switch (HOLD switch)		ON	HOLD switch depressed	HOLD switch or wiring
		OFF	HOLD switch released	
Closed throttle position switch (IDLE SW)		ON	Closed throttle position	Closed throttle position switch or wiring
		OFF	Other positions	
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		Vehicle speed	Vehicle moving	Vehicle speed sensor, vehicle speedometer sensor, or wiring
Turbine speed		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 control (LOCKUP CONTROL)	ON	TCC operation	Powertrain control module, TCC control solenoid valve, or wiring
		OFF	TCC non-operation	
	3–2 TIMING	ON	1→2, 2→3, 3→4, 3→2, 3→1, 2→1 shift	Powertrain control module, 3–2 timing solenoid valve, or wiring
		OFF	Other than above	
HOLD indicator light (HOLD INDICATOR)		ON	HOLD mode	Powertrain control module, HOLD indicator light, or wiring
		OFF	Non-HOLD mode	
Output (Digital Display)				
GEAR		1	First gear	—
		2	Second gear	
		3	Third gear	
		4	Fourth gear	

EC-AT tester (49 G019 901C)

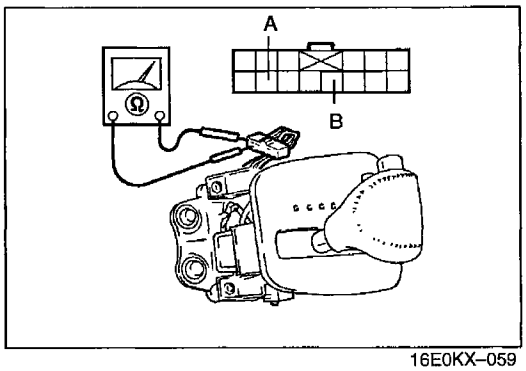
Item		Indication	Condition	Possible cause
Input (Light)				
Transaxle range switch	P/N	ON	P or N position	Transaxle range switch or wiring
		OFF	R position, all ranges	
	R	ON	R position	
		OFF	Other positions, all ranges	
	D	ON	D range	
		OFF	Other ranges, all positions	
	S	ON	S range	
		OFF	Other ranges, all positions	
	L	ON	L range	
		OFF	Other ranges, all positions	
HOLD/O/D OFF switch		Bright	HOLD switch depressed	HOLD switch or wiring
		Dim	HOLD 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 OFF and vehicle speed kept at preset speed	ASC control module or wiring
		OFF	RESUME/ACCEL switch ON or vehicle speed 8km/h {5 mph} lower than preset speed	
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	Transaxle fluid temperature sensor or wiring
Output (Light)				
SOLENOID VALVE	Shift solenoid A	ON	2GR, 3GR, or 4GR	Powertrain control module, shift solenoid A, or wiring
		OFF	1GR	
	Shift solenoid B	ON	1GR or 2GR	Powertrain control module, shift solenoid B, or wiring
		OFF	3GR or 4GR	
	Shift solenoid C	ON	1GR, 2GR, or 4GR	Powertrain control module, shift solenoid C, or wiring
		OFF	3GR	
	TCC control	ON	TCC operation	Powertrain control module, TCC control solenoid valve, or wiring
		OFF	TCC non-operation	
	3–2 timing	ON	1→2, 2→3, 3→4, 3→2, 3→1, 2→1 shift	Powertrain control module, 3–2 timing solenoid valve, or wiring
		OFF	Other than above	
	TCC	Bright	IG SW ON	Powertrain control module, TCC solenoid valve, or wiring
		Dim	TCC slip operation	
	Pressure control	ON (Bright↔Dim)	While driving (Accelerator pedal released↔depressed)	Powertrain control module or pressure control solenoid wiring
HOLD/O/D OFF INDICATOR LIGHT		ON	HOLD mode	Powertrain control module, HOLD indicator light, or wiring
		OFF	Non-HOLD mode	
Output (Digital Display)				
Gear Position		1	First gear	—
		2	Second gear	
		3	Third gear	
		4	Fourth gear	



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16E0KX-059

ELECTRICAL SYSTEM COMPONENTS

HOLD SWITCH

Inspection

Inspection of operation

1. Turn the ignition switch from OFF to ON.
2. Verify that the HOLD indicator light is not illuminated. Depress the HOLD switch and verify that the HOLD indicator light illuminates.
3. If not as specified, check the terminal voltage of the HOLD switch.

Inspection of voltage

1. Remove the rear console, brake boot panel, and center panel.
2. Turn the ignition switch ON.
3. Measure the voltage at the HOLD switch connector.

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 HOLD switch.

Inspection of continuity

1. Disconnect the negative battery cable.
2. Disconnect the HOLD switch connector.
3. Check for continuity at the HOLD switch.

Position	Connector terminal	
	A	B
Normal		
Depressed	O———	———O

O——O: Continuity

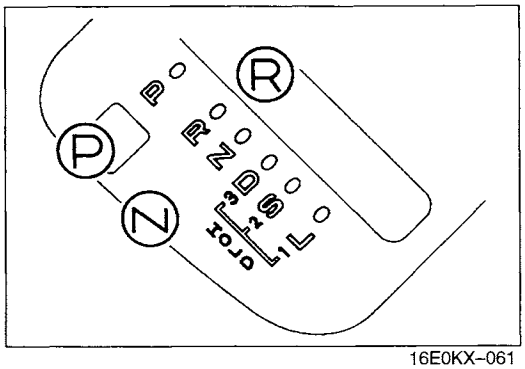
4. If not as specified, replace the selector lever knob assembly. (Refer to page K1–49.)
5. If the switch is OK, check the wiring harness. (HOLD switch—Powertrain control module, HOLD switch—Body ground.)
6. Install the center panel, brake boot panel, and rear console.
7. Connect the negative battery cable.

Replacement

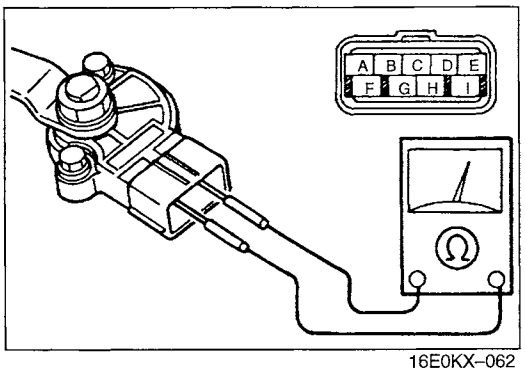
1. Disconnect the negative battery cable.
2. Remove the rear console, brake boot panel, and center panel.
3. Remove the indicator panel installation screws.
4. Disconnect the connector and remove the HOLD switch terminals.
5. Remove the selector lever knob assembly.
6. Install a new selector lever knob assembly.

Tightening torque:
2.0—2.9 N·m {20—30 kgf·cm, 18—26 in·lbf}

7. Install the HOLD switch terminals and connect the connector.
8. Install the indicator panel installation screws. (Refer to page K1–46.)
9. Install the center panel, brake boot panel, and rear console.
10. Connect the negative battery cable.



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16E0KX–062

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 park/neutral position.
2. Verify that the back-up lights illuminate when shifted to R position with the ignition switch in the ON position.
3. Check the transaxle range switch, if not as specified.

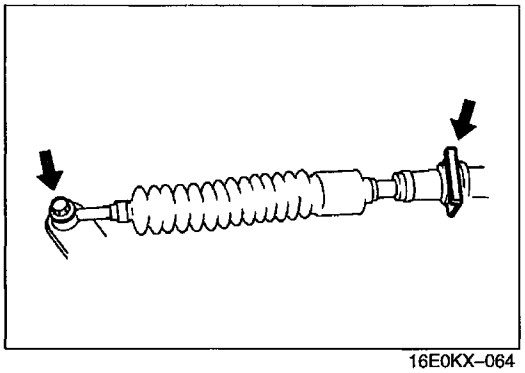
Inspection of continuity

1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly.
3. Disconnect the transaxle range switch connector.
4. Check for continuity at the transaxle range switch.

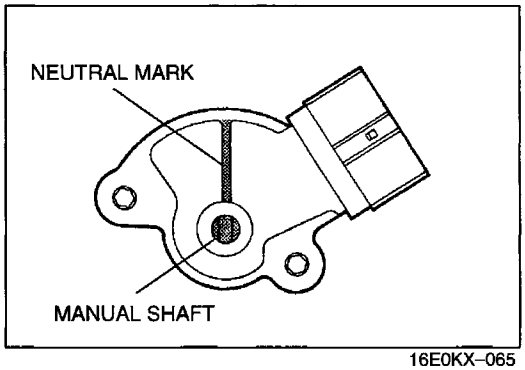
Position	Connector terminal								
	A	B	C	D	E	F	G	H	I
P	○				○				
						○			○
R	○			○					
N	○							○	
						○			○
D	○	○							
S	○						○		
L	○		○						

○—○: Continuity

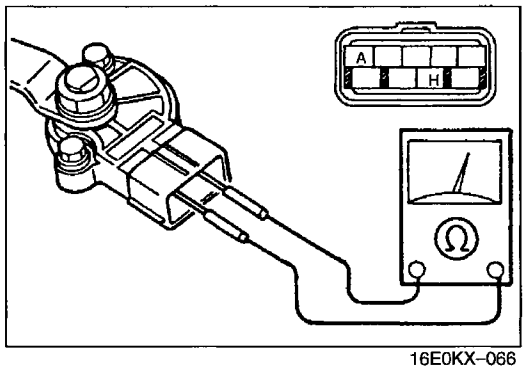
5. If not as specified, replace or adjust the transaxle range switch.
6. Connect the transaxle range switch connector.
7. Install the air cleaner assembly.
8. Connect the negative battery cable.



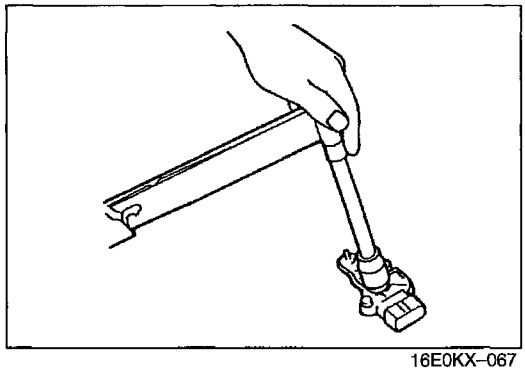
16E0KX-064



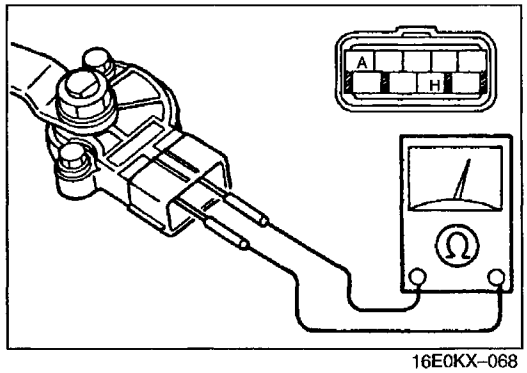
16E0KX-065



16E0KX-066



16E0KX-067



16E0KX-068

Replacement

1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly.
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 lock-washer and lever.
7. Remove the transaxle range switch.
8. Rotate the manual shaft to the neutral 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, 69.5—95.4 in·lbf}

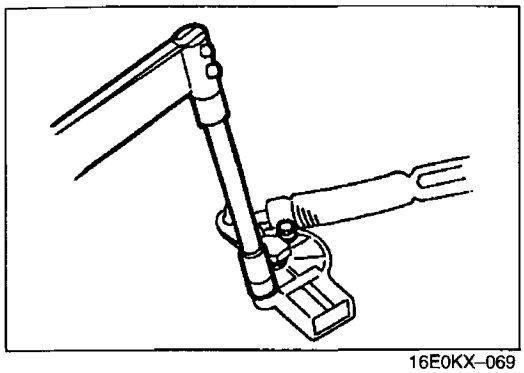
13. Install the lever and spring washer.
14. Tighten the manual shaft nut by using a torque wrench.

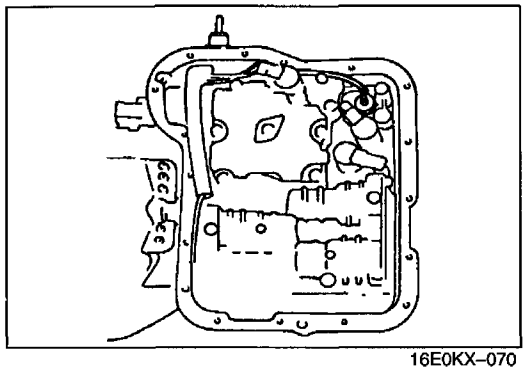
Tightening torque:
32—46 N·m {3.2—4.7 kgf·m, 24—33 ft·lbf}

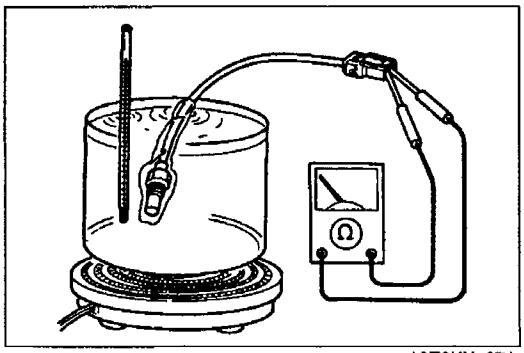
15. Verify that the selector lever range position and transaxle range switch are aligned, then connect the selector cable and install a new spring pin and clip.
16. Check for continuity at the transaxle range switch. (Refer to page K1–21.)
17. Connect the transaxle range switch connector.
18. Install the air cleaner assembly.
19. Connect the negative battery cable.
20. Check operation of the transaxle range switch. (Refer to page K1–21.)

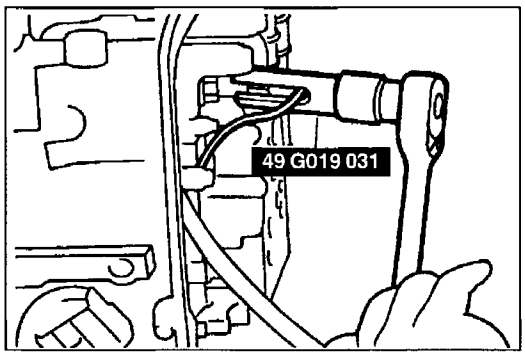
Adjustment

1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly.
3. Remove the nut and clip, and disconnect the selector cable.
4. Rotate the manual shaft to the neutral position.
5. Disconnect the transaxle range switch connector.
6. Loosen the transaxle range switch mounting bolts.
7. Connect an ohmeter between terminals A and H.
8. Adjust the switch to the point where there is continuity between the terminals.


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9. Tighten the transaxle range switch mounting bolts.

Tightening torque:
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 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 clip.
13. Install the air cleaner assembly.

TRANSAXLE FLUID TEMPERATURE SENSOR

Inspection

1. Refer to "Replacement" below for removal of the transaxle fluid temperature sensor.
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 the terminals of the transaxle fluid temperature sensor.

ATF temperature °C {°F}	Resistance (KΩ)
–20 {–4}	15.55—17.56
0 {32}	5.825—6.450
20 {68}	2.496—2.717
40 {104}	1.192—1.278
60 {140}	0.6218—0.6584
80 {176}	0.3493—0.3656
100 {212}	0.2087—0.2162
120 {248}	0.1314—0.1349
130 {266}	0.1091—0.1084

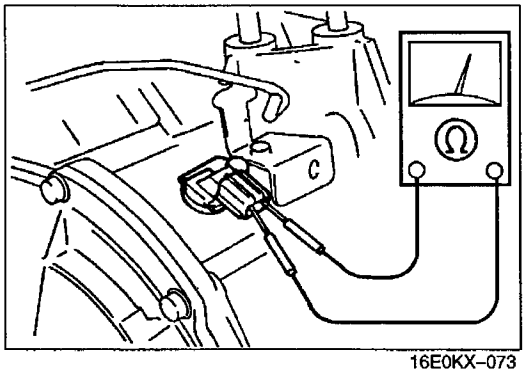
4. If not correct, replace the transaxle fluid temperature sensor.
5. Refer to "Replacement" for installation of the transaxle fluid temperature sensor.

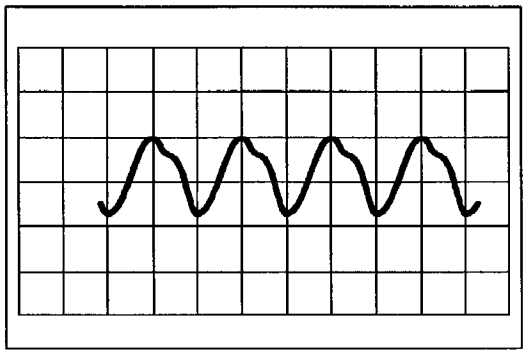
Replacement

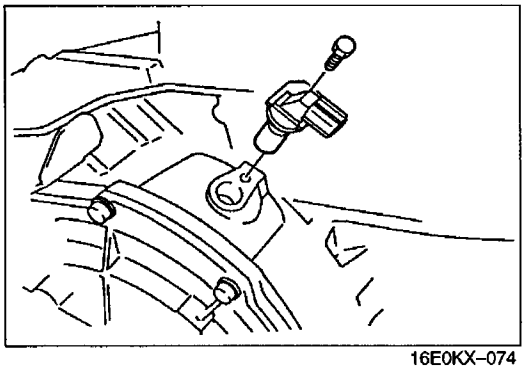
1. Remove the control valve body cover.
(Refer to page K1–36.)
2. Disconnect the transaxle fluid temperature sensor connector.
3. Remove the transaxle fluid temperature sensor by using the **SST**.
4. Install a new transaxle fluid temperature sensor by using the **SST**.

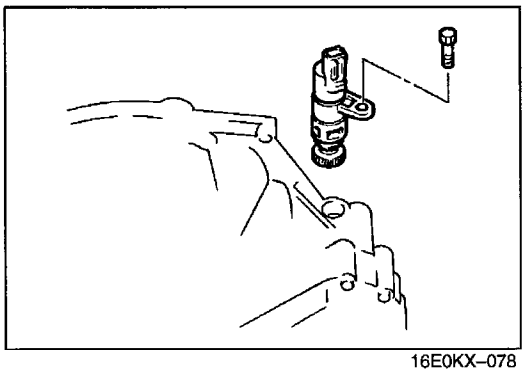
Tightening torque:
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}

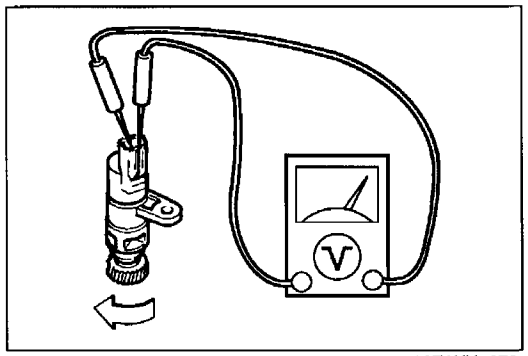
5. Connect the transaxle fluid temperature sensor connector.
6. Install the control valve body cover.
(Refer to page K1–36.)


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16E0KX-078


16E0KX-079

INPUT/TURBINE SPEED SENSOR
Inspection
Inspection of resistance
1. Refer to "Replacement" below to disconnect the input/turbine speed sensor connector.
2. Measure the resistance between the terminals of the input/turbine speed sensor.

   Resistance: 253—604 Ω
   (ATF temperature: –40—160°C {–40—320°F})

3. If not correct, replace the input/turbine speed sensor.
4. Refer to "Replacement" to connect the input/turbine speed sensor connector.

Inspection of wave form
1. Connect the oscilloscope to the powertrain control module at terminals 2P and 2T.
2. Inspect the wave form as shown in the figure.

Replacement
1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly, battery, 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:
   5.4—7.8 N·m {55—80 kgf·cm, 47—69 in·lbf}

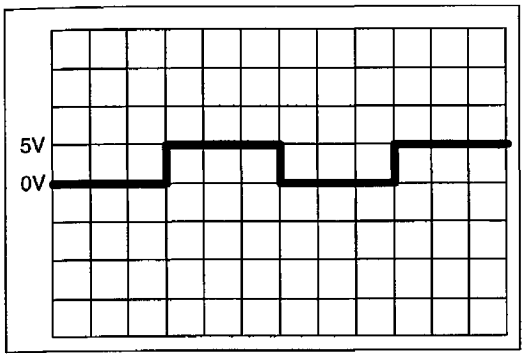
7. Connect the input/turbine speed sensor connector.
8. Install the battery, battery carrier, and air cleaner assembly.
9. Connect the negative battery cable.

SPEEDOMETER SENSOR
Inspection
Inspection of voltage
1. Remove the speedometer sensor.

2. Measure the voltage between the terminals of the speedometer sensor while rotating the driven gear.

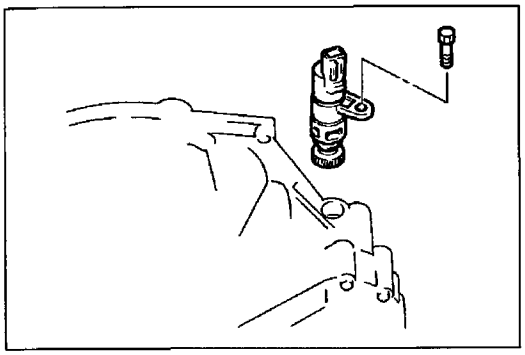
Meter needle	Action
Moves slightly under 5V	Repair wiring harness (Instrument cluster—Speedometer sensor)
Does not move	Replace speedometer sensor

3. Install the speedometer sensor.



Inspection of wave form

1. Connect the oscilloscope to the powertrain control module at terminal 1C.
2. Inspect the wave form as shown in the figure.

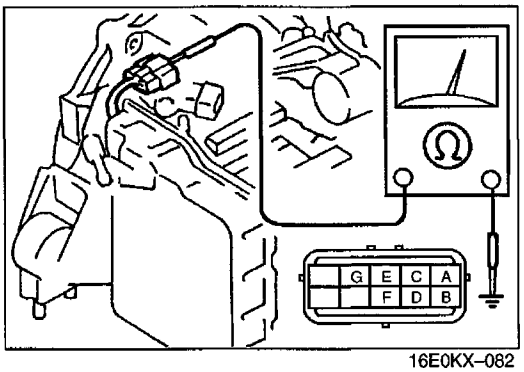


Replacement

1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly, battery, and battery carrier.
3. Disconnect the speedometer sensor connector.
4. Remove the speedometer sensor.
5. Apply ATF to a new O-ring and install it on a new speedometer sensor.
6. Install the speedometer sensor.

Tightening torque:
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}

7. Connect the speedometer sensor connector.
8. Install the battery, battery carrier, and air cleaner assembly.
9. Connect the negative battery cable.



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SOLENOID VALVES

Inspection

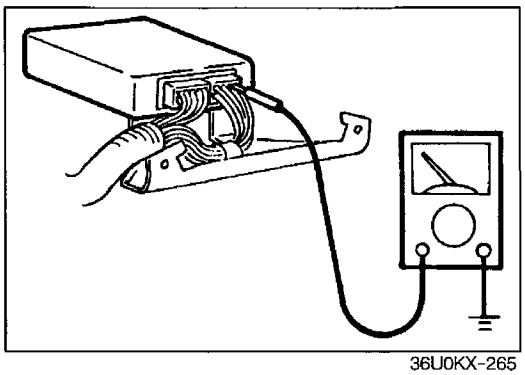
Inspection of resistance

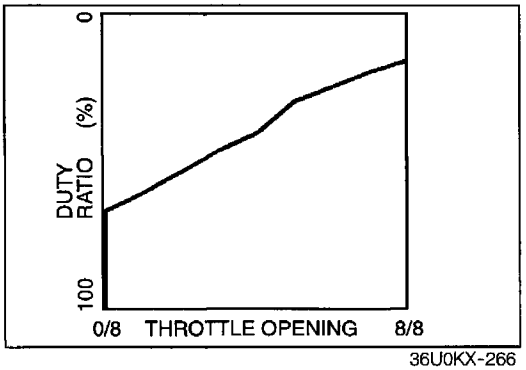
1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly.
3. Disconnect the solenoid valve connector.
4. Measure the resistance between terminals A through G and a ground.

ATF temperature: –40—160°C {–40—320°F}

Terminal	Solenoid valve	Resistance (Ω)
A	Shift solenoid A	11—27
B	Shift solenoid B	11—27
C	Shift solenoid C	11—27
D	TCC control	11—27
E	3–2 timing	11—27
F	TCC	9—18
G	Pressure control solenoid	9—18

5. If not correct, check the wiring harness or replace the solenoid valve(s), if necessary.
6. Connect the solenoid valve connector.
7. Install the air cleaner assembly.
8. Connect the negative battery cable.


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Inspection of output duty
Pressure control solenoid

1. Connect the (+) terminal of a dwell meter to terminal 2H at the powertrain control module and the (–) terminal to a ground.
   Set the dwell meter selector to the 4 cylinder position.
2. Engage the parking brake and use wheel chocks at the front and rear of the wheels.
3. Start the engine.
4. Depress the brake pedal firmly.
5. Shift the selector lever to D range.

Note
- The dwell meter indicates the OFF duty ratio.

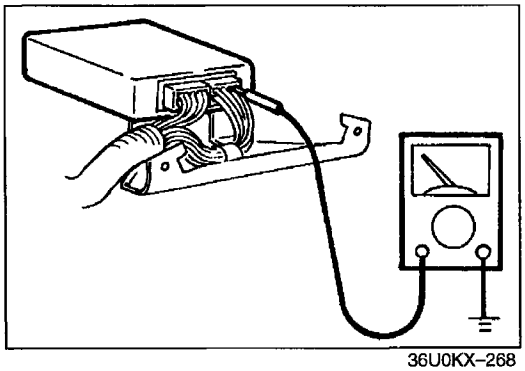
6. Verify the duty ratio by depressing and releasing the accelerator pedal.

Throttle opening	Duty ratio (ON %)
Closed throttle position (0/8)	Approx. 67
Wide open throttle (8/8)	Approx. 23

Note
- The relationship between the dwell angle (°) and duty ratio (%) is as follows:

Dwell angle (°)	0	18	36	54	72	90
Duty ratio (%)	0	20	40	60	80	100

7. Depress the accelerator pedal slowly and verify that the duty ratio changes as shown in the graph.
8. If not as specified, check the powertrain control module (Refer to section F1.) and pressure control solenoid (Refer to below.).


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TCC solenoid

1. Connect the (+) terminal of a dwell meter to terminal 2C of the powertrain control module and the (–) terminal to a ground.
2. Drive the vehicle.

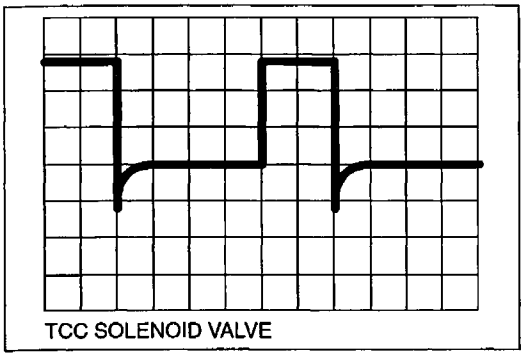
Note
- The dwell meter indicates the OFF duty ratio.

3. Verify the duty ratio in the TCC operation.

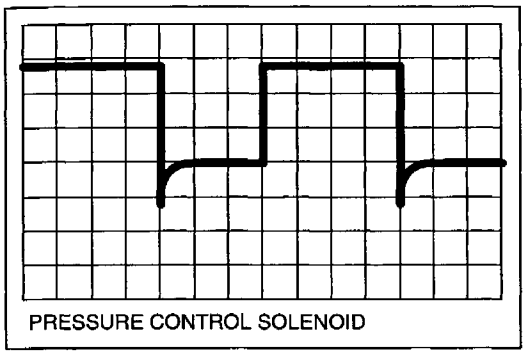
Condition	Duty ratio (ON %)
TCC slip operation	Approx. 65
Except TCC slip operation	0
TCC operation↔TCC slip operation ↔Complete TCC operation	Approx. 0↔65↔0

Note
- See the above note for the dwell and duty relationship.

4. If not as specified, check the powertrain control module (Refer to section F1.), and TCC solenoid valve (Refer to page K1–27.).


TCC SOLENOID VALVE

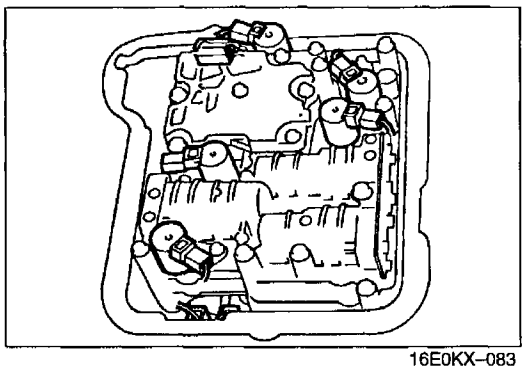
Inspection of wave form
1. Connect the oscilloscope to the powertrain control module at terminals 2C and 2H.
2. Inspect the wave form as shown in the figure.

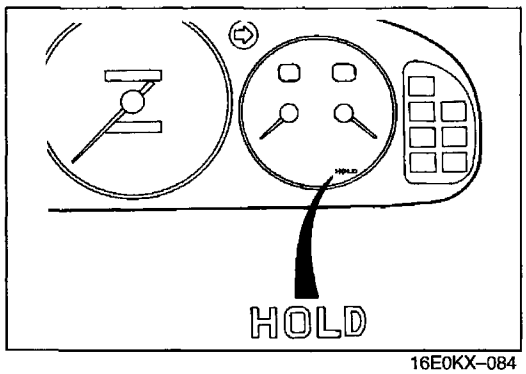

PRESSURE CONTROL SOLENOID

Replacement
1. Remove the control valve body. (Refer to page K1–36.)
2. Remove the solenoid valve(s).
3. Apply ATF to a new O-ring and install it on the solenoid valve.
4. Install the solenoid valve in the control valve body.

   Tightening torque:
   6.5—7.8 N·m {66—80 kgf·cm, 58—69 in·lbf}

5. Install the control valve body. (Refer to page K1–36.)
6. Pour in ATF and, with the engine idling, check the ATF level and check for leaks. (Refer to page K1–10.)
7. Drive the vehicle and check the shift points, shift schedule, and shift shock.
   (Refer to ROAD TEST, page K1–7.)


16E0KX–083



16E0KX–084

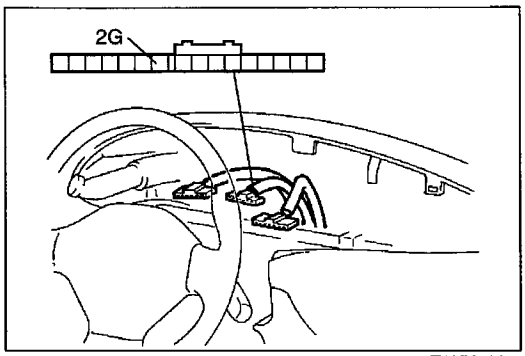
HOLD INDICATOR LIGHT
Inspection
Inspection of operation
1. Turn the ignition switch from OFF to ON.

   Note
   - The HOLD indicator light will flash if a malfunction exists in any of the EC-AT system components.

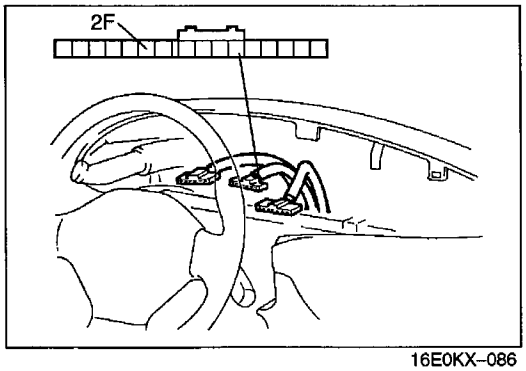
2. Verify that the HOLD indicator light is not illuminated.
3. Depress the switch and verify that the HOLD indicator light illuminates.

   Note
   - If a malfunction occurs in any of the EC-AT system components, the HOLD indicator light flashes.

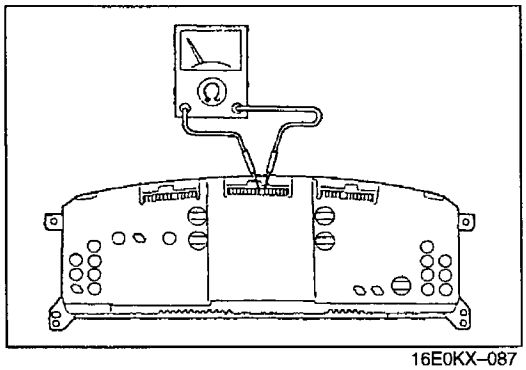
4. If the HOLD switch function is not as specified, check the HOLD switch (page K1–20), and then check the terminal voltage of the HOLD indicator light.



16E0KX-085



16E0KX-086


16E0KX-087

Inspection of voltage

1. Remove the instrument cluster. (Refer to section T.)
2. Turn the ignition switch to ON.
3. Measure the voltage between terminal 2G and a 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 2F and powertrain control module terminal 2E.

Hold switch	Continuity
HOLD mode	Yes
NORMAL mode	No

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 2G and 2F.

Terminals	Continuity
2G—2F	Yes

7. If not correct, replace the instrument cluster or bulb.
8. Install the instrument cluster. (Refer to section T.)
9. Connect the negative battery cable.

POWERTRAIN CONTROL MODULE

Note

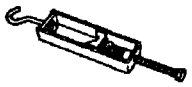
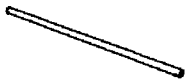
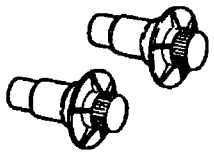
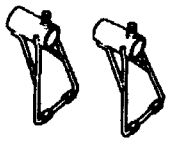
- Inspect the transaxle control module (integrated with engine control module) terminal voltage. (Refer to section F1.)

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	—	—

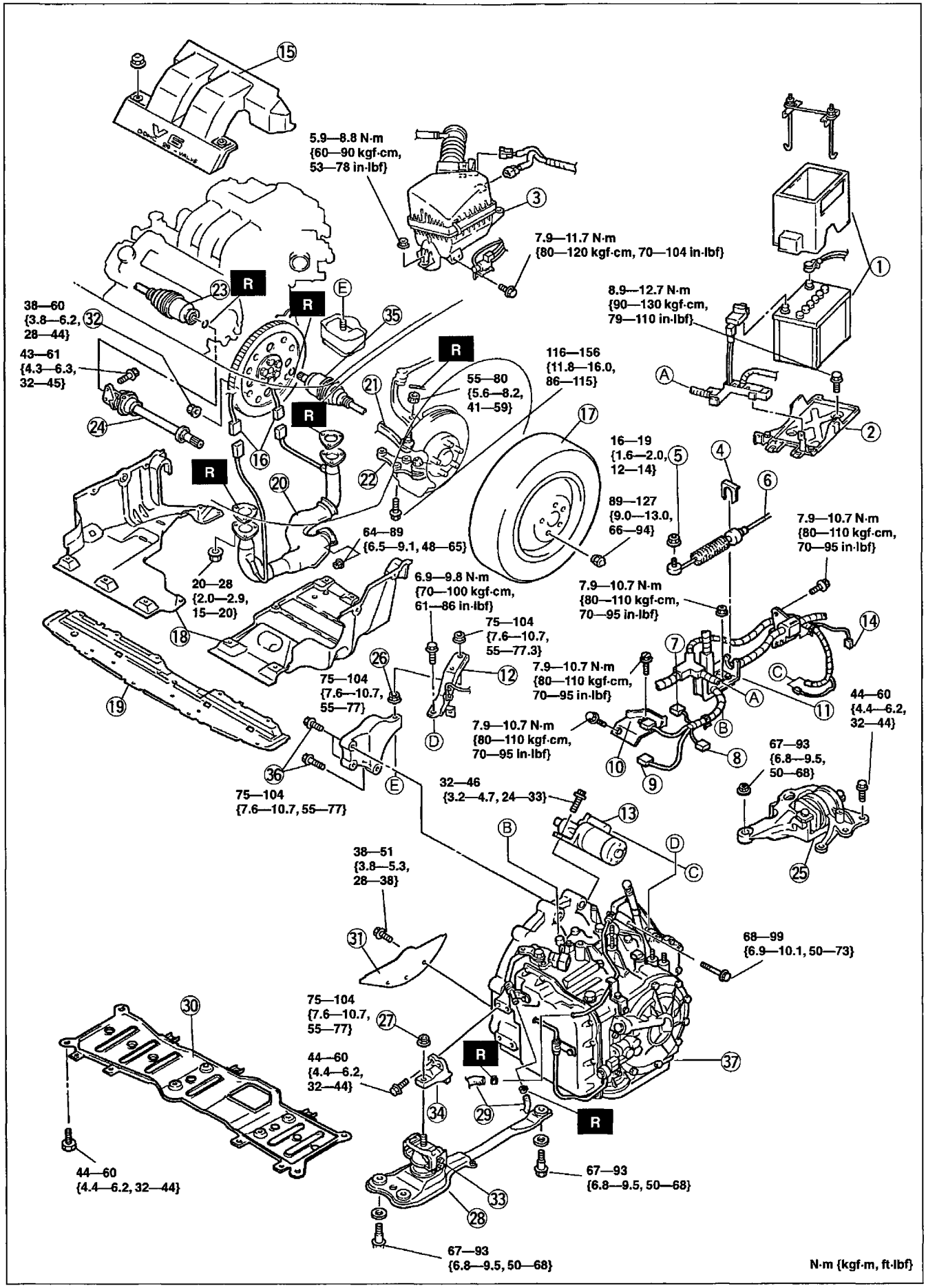
Removal / Installation

1. Disconnect the negative battery cable.
2. Drain the ATF into a container.
3. Remove in the order shown in the figure, referring to **Removal Note**.
4. Install the reverse order of removal, referring to **Installation Note**.
5. Fill the transaxle with the specified ATF after installation.
6. Check for leakage of ATF from all connection points. (Refer to page K1–10.)
7. Connect the negative battery cable.
8. Check the operation of the transaxle range switch. (Refer to page K1–21.)
9. Check the operation of the selector lever. (Refer to page K1–45.)
10. Carry out the mechanical system test. (Refer to page K1–2.)

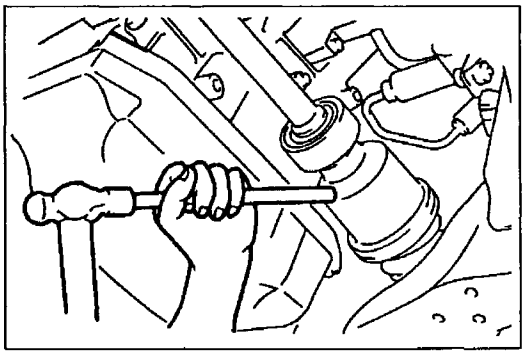
Service item \ Test item	Line pressure test	Stall test	Time lag test
Automatic transaxle replacement	○		
Automatic transalxe overhaul	○	○	○
Torque converter replacement	○	○	
Oil pump replacement	○		
Clutch system replacement	○		
Differential replacement	○		

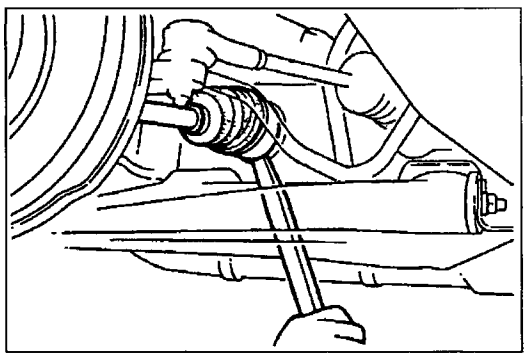
○: Test to be performed after work

11. Carry out the road test. (Refer to page K1–7.)


5.9—8.8 N·m {60—90 kgf·cm, 53—78 in·lbf}
7.9—11.7 N·m {80—120 kgf·cm, 70—104 in·lbf}
8.9—12.7 N·m {90—130 kgf·cm, 79—110 in·lbf}
38—60 {3.8—6.2, 28—44}
43—61 {4.3—6.3, 32—45}
116—156 {11.8—16.0, 86—115}
55—80 {5.6—8.2, 41—59}
16—19 {1.6—2.0, 12—14}
89—127 {9.0—13.0, 66—94}
64—89 {6.5—9.1, 48—65}
20—28 {2.0—2.9, 15—20}
6.9—9.8 N·m {70—100 kgf·cm, 61—86 in·lbf}
7.9—10.7 N·m {80—110 kgf·cm, 70—95 in·lbf}
75—104 {7.6—10.7, 55—77.3}
75—104 {7.6—10.7, 55—77}
44—60 {4.4—6.2, 32—44}
67—93 {6.8—9.5, 50—68}
32—46 {3.2—4.7, 24—33}
38—51 {3.8—5.3, 28—38}
68—99 {6.9—10.1, 50—73}
44—60 {4.4—6.2, 32—44}
67—93 {6.8—9.5, 50—68}
N·m {kgf·m, ft·lbf}

1. Battery and battery cover
2. Battery carrier
3. Air cleaner assembly
4. Clip
5. Nut
6. Selector cable
   Adjustment ..... page K1–46
7. Transaxle range switch connector
8. Input/turbine speed sensor connector
9. Solenoid valve connector
10. Harness bracket
11. Selector cable bracket
12. No.1 engine mount bracket stay
13. Starter
14. Speedometer sensor connector
15. Intake manifold cover
16. O_2 sensor connector
17. Wheels and tires
18. Splash shields
19. Undercover
20. Front exhaust pipe
21. Upper lateral link (left side)
    Service ..... section R
22. Lower ball joint
23. Drive shaft (right)
    Removal Note ..... below
    Installation Note ..... page K1–34
24. Joint shaft
25. No.4 engine mount
    Removal Note ..... page K1–32
26. No.1 engine mount nut
27. No.2 engine mount nut
28. Engine mounting member
    Installation Note ..... page K1–33
29. Oil hose
    Installation Note ..... page K1–39
30. Undercover
31. Undercover
32. Torque converter nuts
    Removal Note ..... page K1–32
33. No.2 engine mount
34. No.2 engine mount bracket
35. Drive shaft (left)
    Removal Note ..... below
    Installation Note ..... page K1–34
36. No.1 engine mount bolts
    Installation Note ..... page K1–33
37. Transaxle
    Removal Note ..... page K1–32
    Installation Note ..... page K1–33





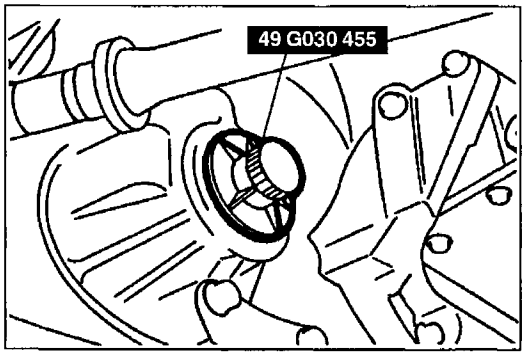
Removal Note
Drive shaft

1. Remove the upper link (left side). (Refer to section M.)
2. Separate the right side drive shaft from the joint shaft by using a brass bar and a hummer.

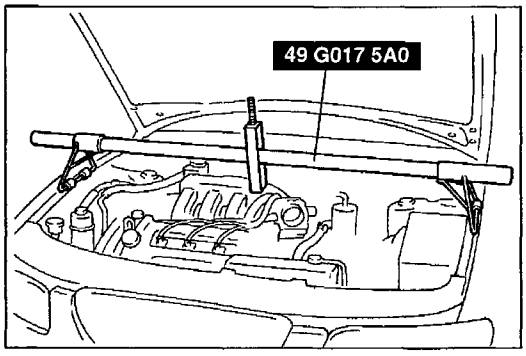
Caution

- **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.

3. 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.
4. Suspend the drive shaft by using a rope.

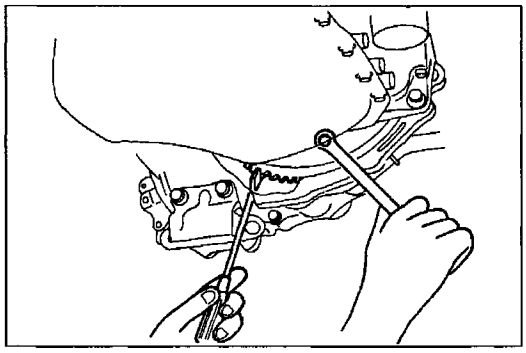


5. Install the **SST** into the transaxle to hold the side gear.



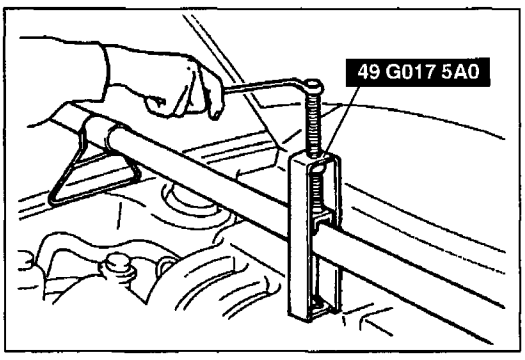
No.4 engine mount

1. Support the engine by using the **SST** before removing the No.4 engine mount.
2. Remove the No.4 engine mount.



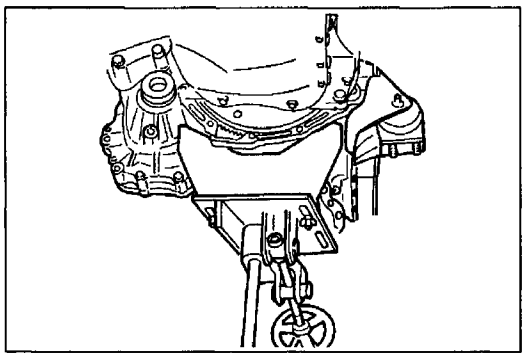
Torque converter nuts

Hold the drive plate and remove the torque converter nuts.

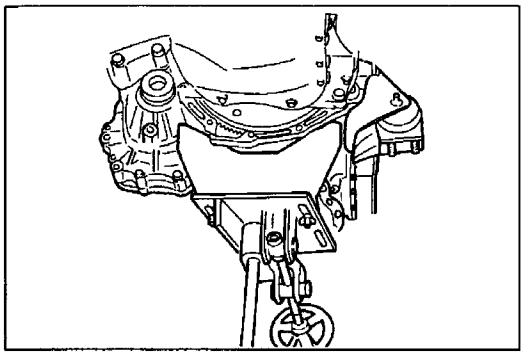


Transaxle

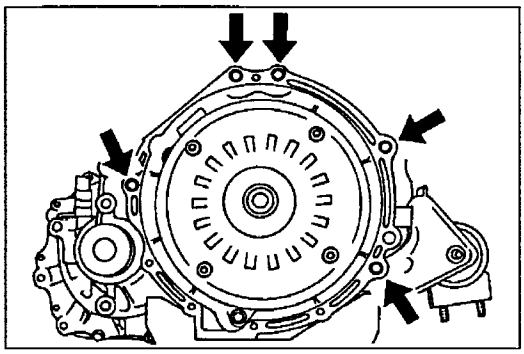
1. Loosen the **SST (engine support)** and lean the engine toward the transaxle.



2. Support the transaxle on a jack.
3. Remove the transaxle mounting bolts.
4. Remove the transaxle.



Installation Note
Transaxle
1. Set the transaxle on a jack and lift it into place.



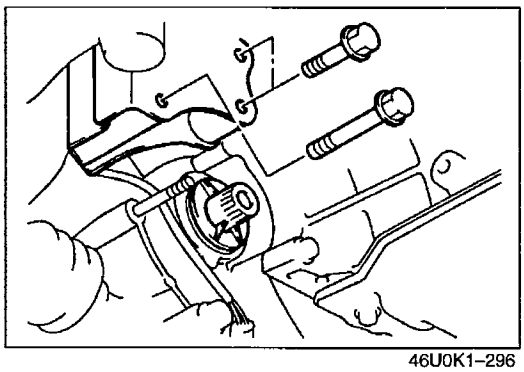
2. Install the transaxle mounting bolts.

   Tightening torque:
   68—99 N·m {6.9—10.1 kgf·m, 50—73 ft·lbf}

3. Install the torque converter nuts.

   Tightening torque:
   38—60 N·m {3.8—6.2 kgf·m, 28—44 ft·lbf}

4. Hand-tighten the No.4 engine mount nuts.



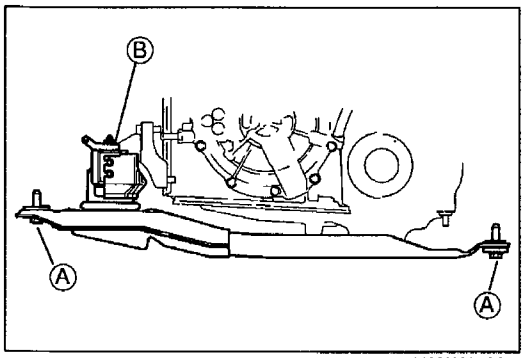
46U0K1-296

No.1 engine mount bolts

Caution
- **Align the transaxle bolt holes and the engine mount exactly. Any misalignment can result in the bolt and bold holes becoming damaged or stripped during installation.**

1. Use the **SST (engine support)** to make sure the transaxle bolt holes and No.1 engine mount are aligned.
2. Tighten the bolts to the specified torque.

   Tightening torque:
   75—104 N·m {7.6—10.7 kgf·m, 55—77 ft·lbf}



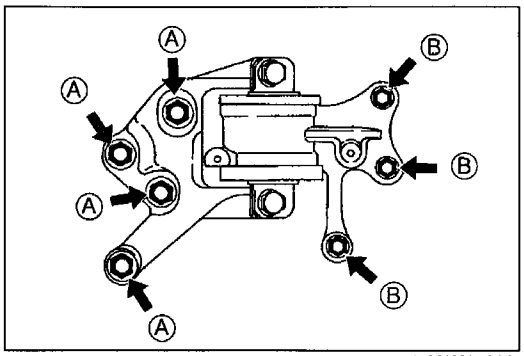
46U0K1-297

Engine mounting member
1. Install the engine mounting member and No.2 engine mount, making sure that the No.2 engine mount stud bolt passes through the No.2 engine mount bracket installation hole.
2. Install bolts Ⓐ as shown.

   Tightening torque:
   A: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

3. Tighten nut Ⓑ as shown.

   Tightening torque:
   B: 75—104 N·m {7.6—10.7 kgf·m, 55—77 ft·lbf}

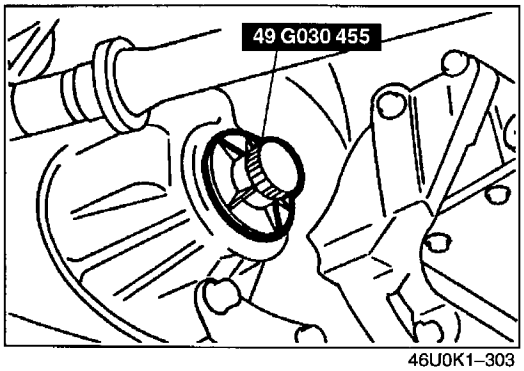


46U0K1-299

4. Tighten the No.4 engine mount nuts.

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

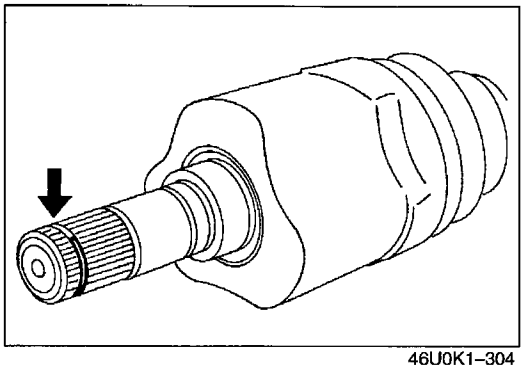
5. Remove the **SST (engine support)**.



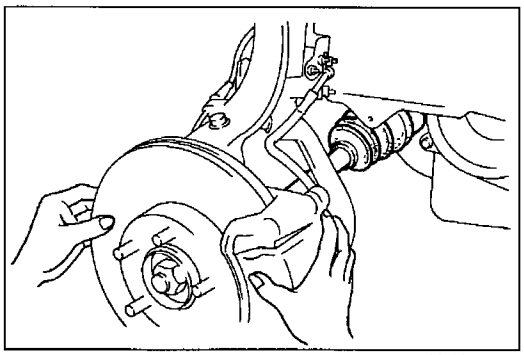
46U0K1-303

Driveshaft
1. Remove the **SST** from the transaxle case.
2. Verify that there is no damage to the oil seal.

Caution
- **The sharp edges of the driveshaft snap ring can slice or puncture the oil seal. Be careful when installing the driveshaft to the transaxle.**

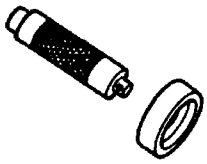
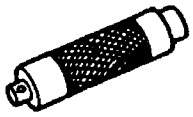

46U0K1-304

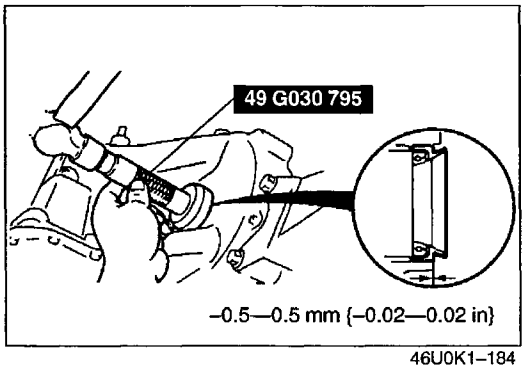
3. Install the clip with the gap upward.
(Refer to section M.)


46U0K1-305

4. Apply ATF to the oil seal lip, and install the drive shaft.
5. Verify that the drive shaft is correctly seated by pulling on the shaft. It must not slide out.

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	—	—



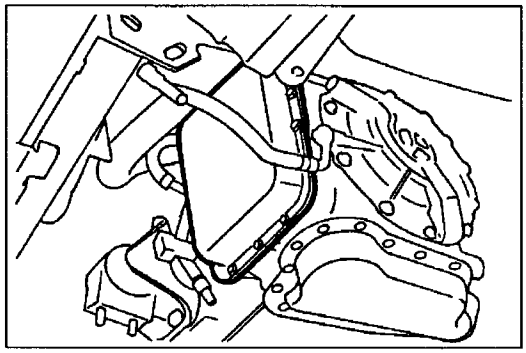
46U0K1–184

On-vehicle Replacement
1. Remove the driveshaft and joint shaft. (Refer to page K1–31.)
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 transaxle oil.
5. Install the driveshaft and joint shaft. (Refer to page K1–34.)

CONTROL VALVE BODY (ON-VEHICLE REMOVAL / INSTALLATION)

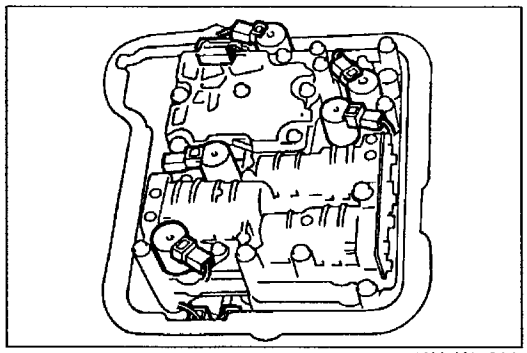
On-vehicle Removal

1. Disconnect the negative battery cable.
2. Clean the transaxle exterior thoroughly with a steam cleaner or cleaning solvents.
3. Drain the ATF and engine coolant into separate suitable containers.
4. Remove the splash shield.
5. Remove the oil cooler hose and radiator hose.



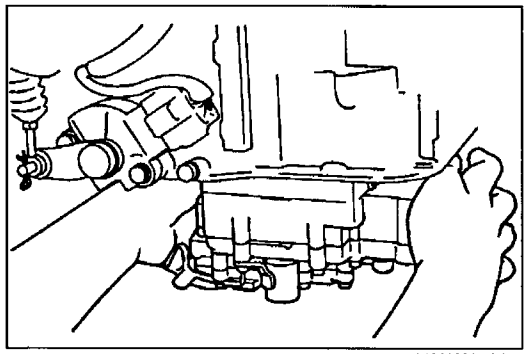
46U0K1-213

6. Remove the control valve body cover and gasket.



46U0K1-214

7. Disconnect the solenoid connectors and transaxle fluid temperature sensor.

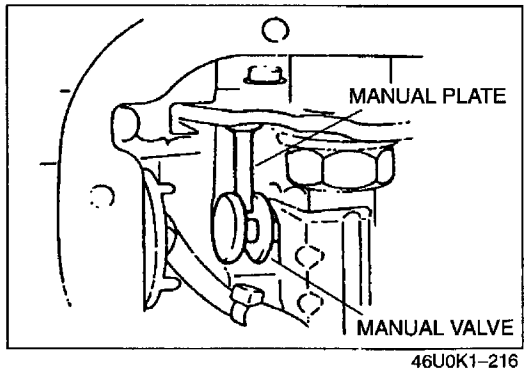


46U0K1-215

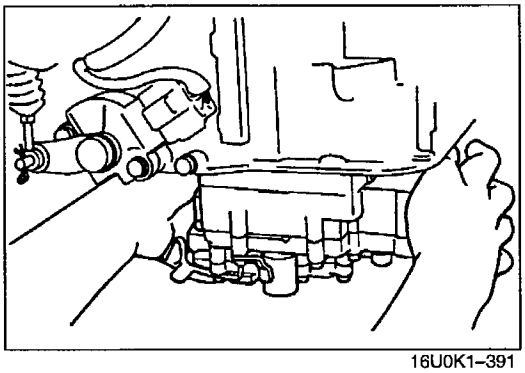
8. Remove the control valve body assembly.

On-vehicle Installation

1. Align the manual plate and the manual valve.



46U0K1-216

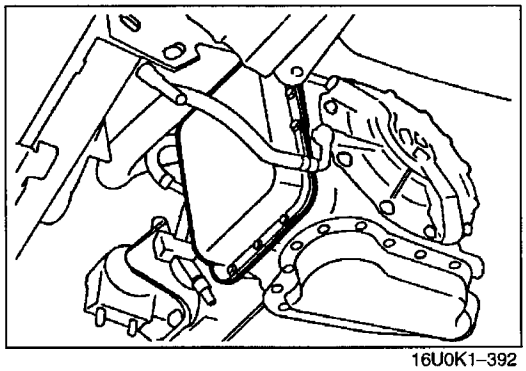


16U0K1-391

2. Install the control valve body assembly.

   Tightening torque:
   10.8—14.7 N·m {110—150 kgf·cm, 96—130 in·lbf}

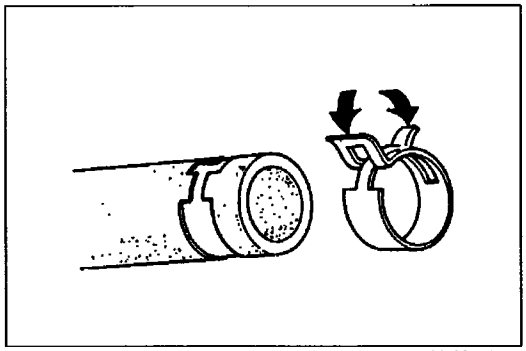
3. Match the harness colors, and connect the solenoid connectors and transmission fluid temperature sensor connector.



16U0K1-392

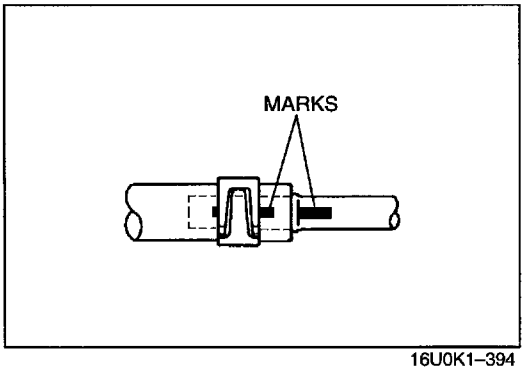
4. Install a new gasket and the control valve body cover.

   Tightening torque:
   8.4—10.7 N·m {85—110 kgf·cm, 74—95 in·lbf}



16U0K1-393

5. Align the marks, and slide the oil cooler hose onto the oil cooler pipe unit it is fully seated as shown.
6. 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.
7. Verify that the hose clamp does not interfere with any other parts.
8. Slide the radiator hose onto the radiator pipe until it is fully seated.
9. Install the hose clamp on the hose.
10. Squeeze it lightly with large pliers to ensure a good fit.
11. Install the splash shield.
12. Fill the radiator and reservoir with the specified amount and type of engine coolant. (Refer to section E.)
13. Connect the negative battery cable.
14. Pour in ATF and with the engine idling, check the ATF level and check for ATF and engine coolant leakage. (Refer to page K1–10.)
15. Drive the vehicle and check the shift points, shift schedule, and shift shock. (Refer to ROAD TEST, page K1–7.)



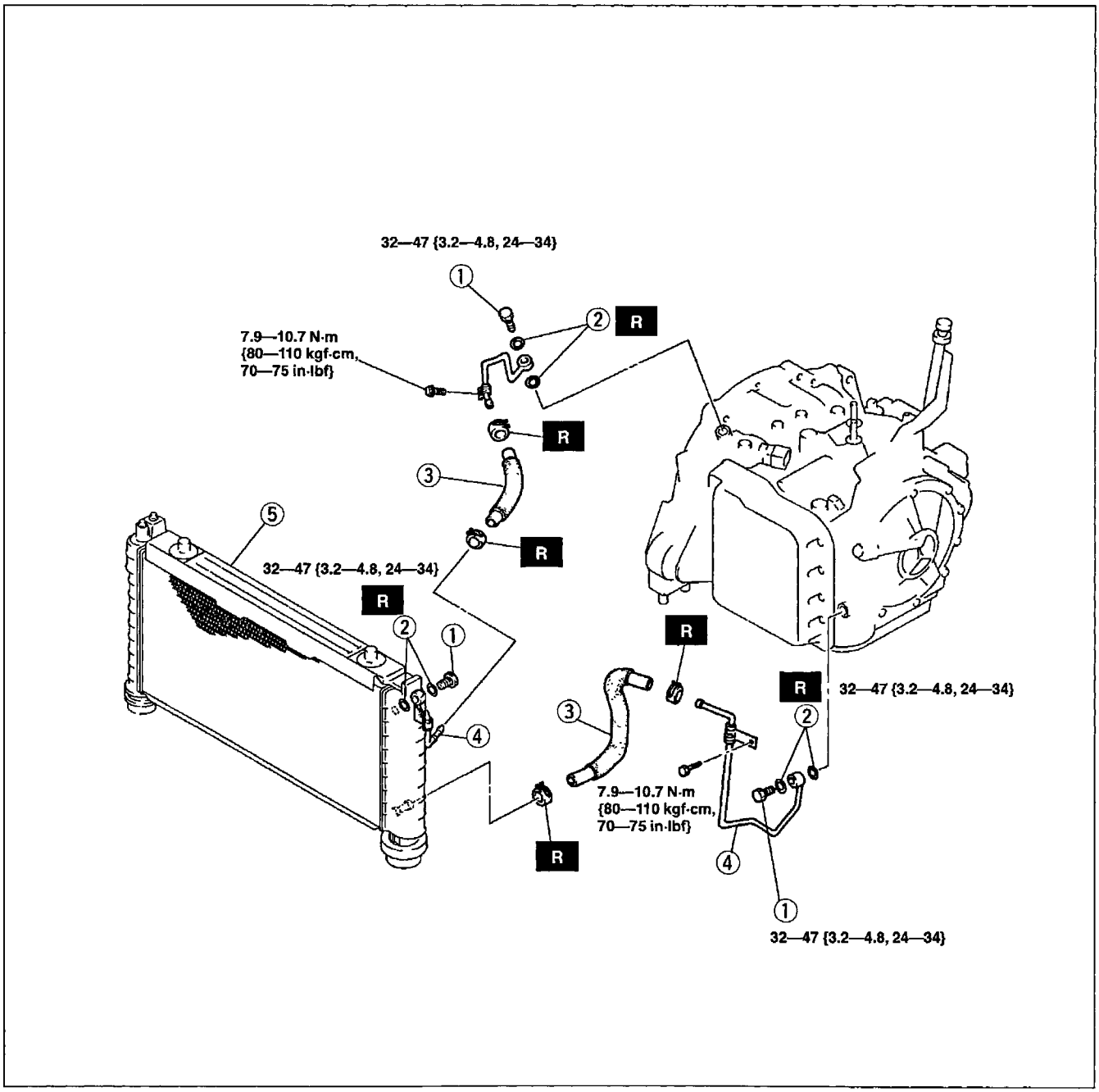
16U0K1-394

OIL COOLER

OIL COOLER

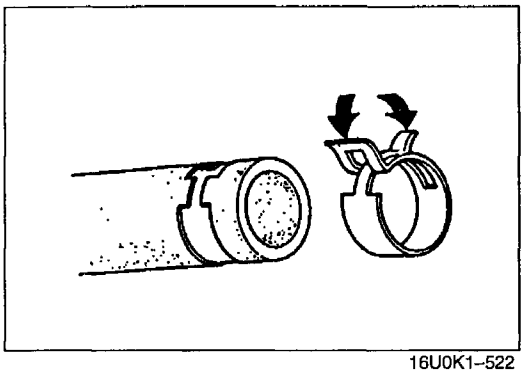
Removal / Installation

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 K1–10.)

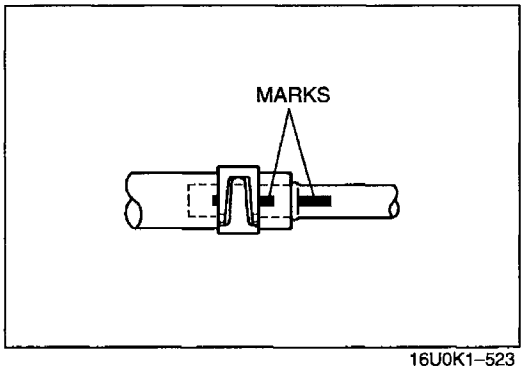


16U0K1-519

1. Connector bolts
2. Washers
3. Oil hose
   Installation Note ..... page K–39
4. Oil pipe
5. Radiator
   Service ..... section E



16U0K1-522



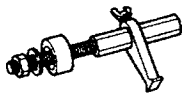
16U0K1-523

Installation Note
Oil hose

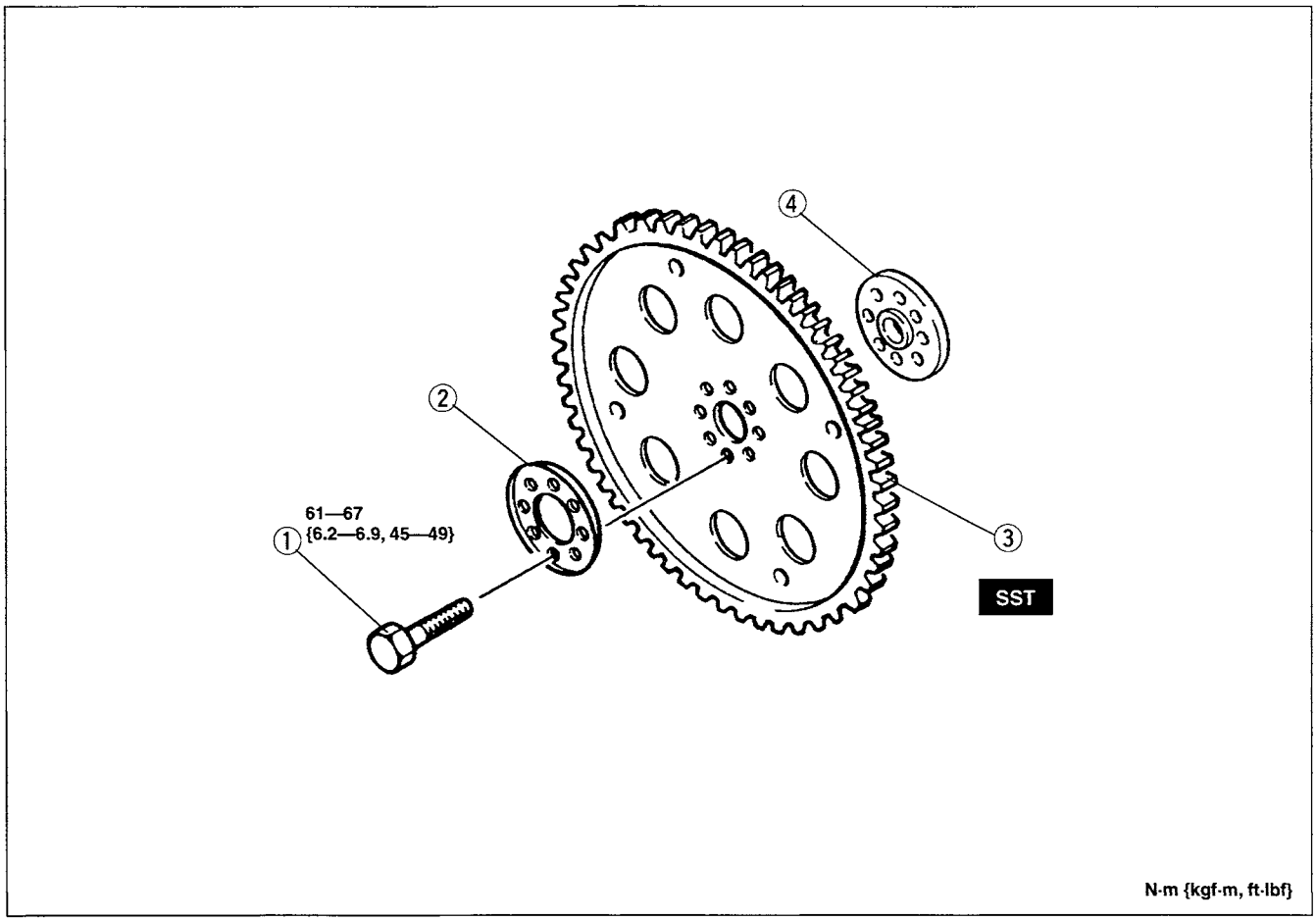
1. Align the marks, and slide the oil cooler hose onto the oil cooler pipe until it is fully seated as shown.
2. Install the hose clamp onto the hose. If reusing the hose, install the new hose clamp exactly into the mark left by the previous hose clamp.
3. Verify that the hose clamp does not interfere with any other parts.

DRIVE PLATE

PREPARATION
SST

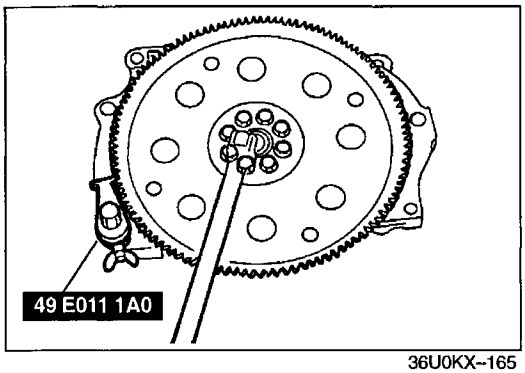
49 E011 1A0 Brake set, ring gear 	For holding drive plate	49 E011 103 Shaft (Part of 49 E011 1A0) 	For holding drive plate
49 E011 104 Collar (Part of 49 E011 1A0) 	For holding drive plate	49 E011 105 Stopper (Part of 49 E011 1A0) 	For holding drive plate

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**.



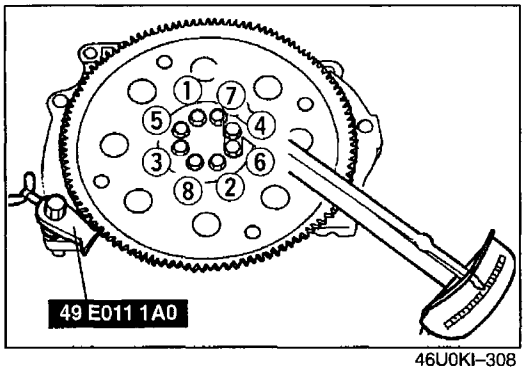
46U0KI–307

1. Drive plate mounting bolts
   Removal Note ..... page K1–41
   Installation Note ..... page K1–41
2. Backing plate
3. Drive plate
4. Adapter



36U0KX-165

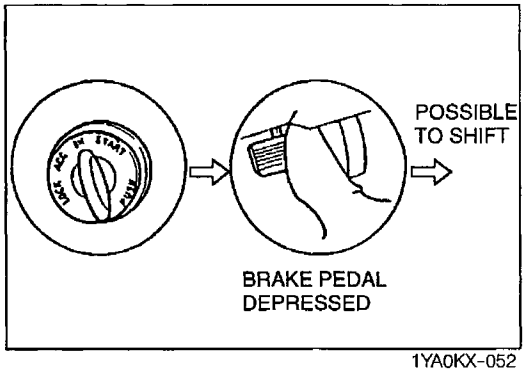
Removal Note
Drive plate mounting bolts
1. Set the **SST** against the drive plate.
2. Remove the bolts and the drive plate.



46U0KI-308

Installation Note
Drive plate mounting bolts
1. Set the **SST** against the drive plate.
2. Tighten the drive plate mounting bolts gradually in the order shown.

Tightening torque:
61—67 N·m {6.2—6.9 kgf·m, 45—49 ft·lbf}



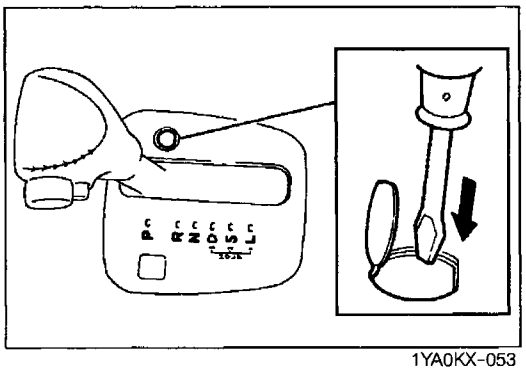
1YA0KX-052

SHIFT MECHANISM

SHIFT-LOCK

Inspection

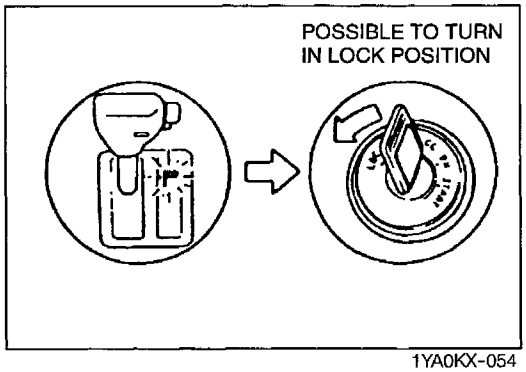
1. Turn the ignition switch to ON (engine off).
2. Verify that the selector lever is in park position.
3. Without the brake pedal depressed, verify that the selector lever cannot be shifted from park position.
4. Depress the brake pedal and verify that the selector lever can be shifted from park position.
5. If not as specified, check the park position switch continuity and/or shift-lock actuator terminal voltage and continuity. (Refer to pages K1–43, 44.)


1YA0KX-053

EMERGENCY OVERRIDE BUTTON

Inspection

1. Turn the ignition switch off.
2. Verify that the selector lever is in park position.
3. Without the brake pedal depressed, verify that the selector lever cannot be shifted from park position.
4. Remove the indicator panel cover by using a screwdriver as shown.
5. Insert the screwdriver into the emergency override hole and push down. Verify that the selector lever can be shifted from park position.
6. If not as specified, inspect and repair as necessary.

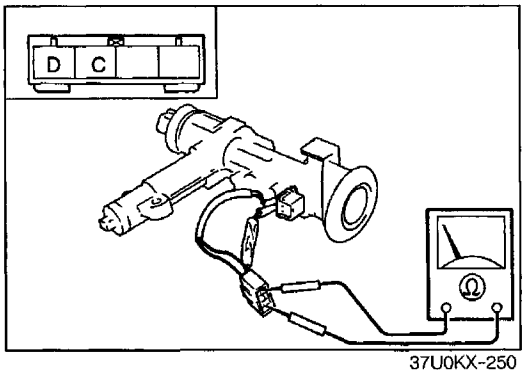


1YA0KX-054

KEY INTERLOCK

Inspection

1. Turn the ignition switch to ON (engine off).
2. Shift the selector lever to R range.
3. Verify that the ignition key cannot be turned to LOCK position.
4. Shift the selector lever to park position.
5. Verify that the ignition key can be turned to LOCK position.
6. If not as specified, inspect and repair as necessary.



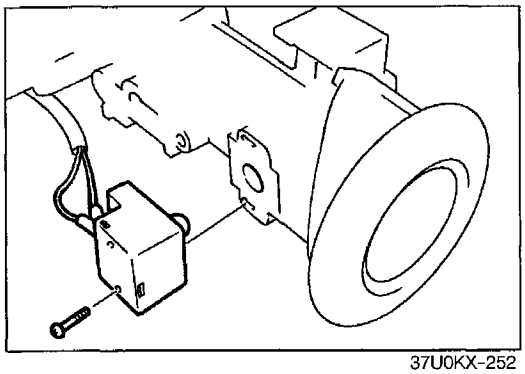
37U0KX-250

KEY INTERLOCK SOLENOID

Inspection

Continuity

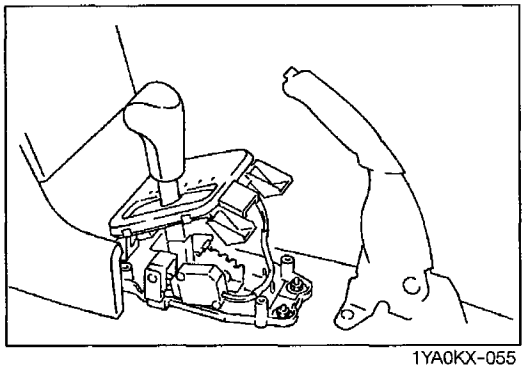
1. Disconnect the negative battery cable.
2. Remove the instrument cluster. (Refer to section T.)
3. Disconnect the key interlock solenoid connector.
4. Check for continuity between terminals C and D.
5. If not correct, replace the key interlock solenoid.
6. Connect the key interlock solenoid connector.
7. Install the instrument cluster. (Refer to section T.)
8. Connect the negative battery cable.

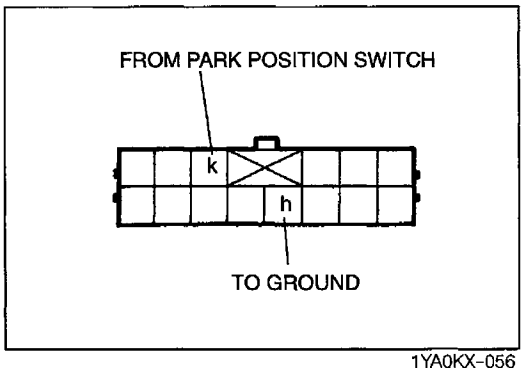

37U0KX-252

Replacement
1. Disconnect the negative battery cable.
2. Remove the instrument cluster. (Refer to section T.)
3. Disconnect the key interlock solenoid connector.
4. Remove the screws and the key interlock solenoid.
5. Install the new key interlock solenoid and tighten the screws.

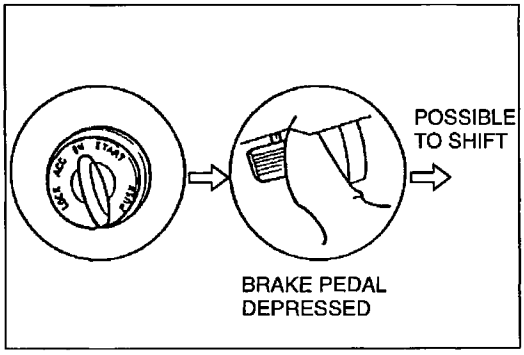
   Tightening torque:
   6.9—12.7 N·m {70—130 kgf·cm, 61—112 in·lbf}

6. Connect the key interlock solenoid connector.
7. Install the instrument cluster. (Refer to section T.)
8. Connect the negative battery cable.


1YA0KX-055



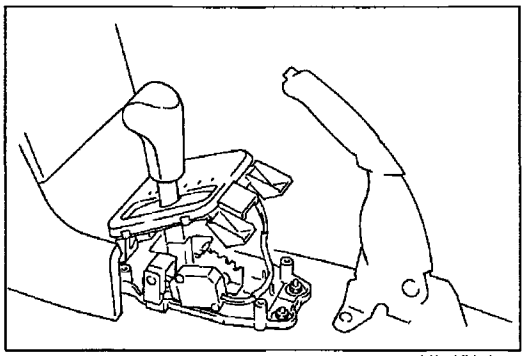
1YA0KX-056



PARK POSITION SWITCH
Inspection
1. Disconnect the negative battery cable.
2. Remove the rear console box and center panel. (Refer to page K1–47.)
3. Remove the indicator screws and lift up the indicator panel.
4. Disconnect the connector.
5. Check for continuity between the terminals h and k.

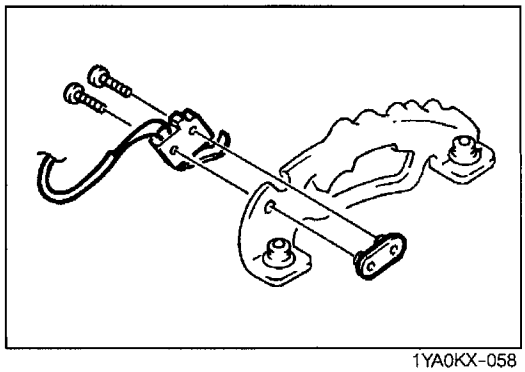
Range	Selector lever release button	Continuity
P	Released	Yes
	Depressed	No
Except P	—	No

6. If not as specified, replace the park position switch.
7. Connect the connector.
8. Install and adjust the indicator panel. (Refer to page K1–46.)
9. Install the center panel and rear console box. (Refer to page K1–47.)
10. Connect the negative battery cable.
11. Check for correct operation of the shift-lock system. (Refer to page K1–42.)

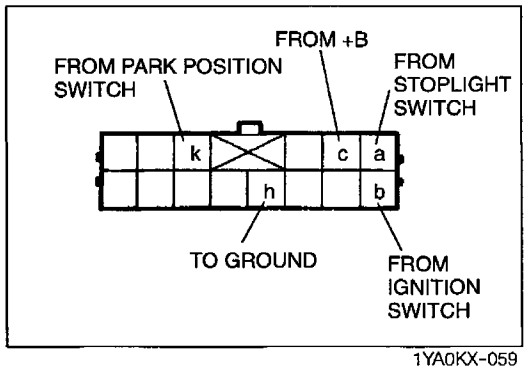

1YA0KX-057

Replacement

1. Disconnect the negative battery cable.
2. Remove the rear console box and center panel. (Refer to page K1–47.)
3. Remove the indicator screws and lift up the indicator panel.
4. Disconnect the connector.
5. Remove the park position switch.


1YA0KX-058

6. Install the new park position switch.
7. Connect the connector.
8. Install and adjust the indicator panel. (Refer to page K1–46.)
9. Install the center panel and rear console box. (Refer to page K1–47.)
10. Connect the negative battery cable.
11. Check for correct operation of the shift-lock system. (Refer to page K1–42.)



1YA0KX-059

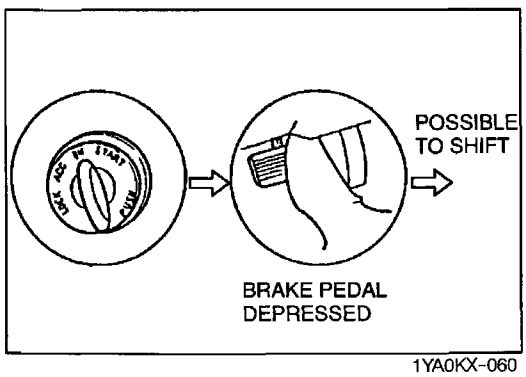
SHIFT-LOCK ACTUATOR

Inspection

1. Remove the rear console box and center panel. (Refer to page K1–47.)
2. Shift the selector lever to park position.
3. Turn the ignition switch to ON (engine off), and check for terminal voltage and continuity, referring to the chart below. When checking for continuity between terminal h (harness side) and ground, disconnect the connector.

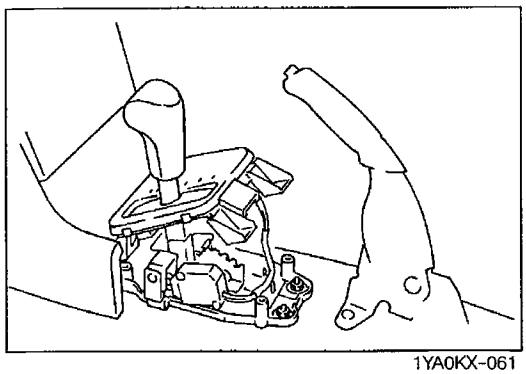
B+: Battery povitive voltage

Terminal	⊖ probe connected to	Condition	Measurement value
a	h	Brake pedal released → depressed	0V → B+
b	h	Ignition switch ON	B+
c	h	Ignition switch OFF	B+
h (harness side)	Body	Constant	0Ω
k	h	Park position, selector lever release button not depressed	0Ω

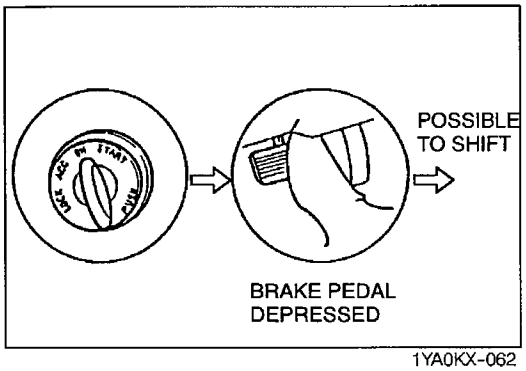


1YA0KX-060

4. If not as specified, repair the wire harness and/or replace the shift-lock actuator.
5. Install the center panel and rear console box. (Refer to page K1–47.)
6. Verify correct operation of the shift-lock system. (Refer to page K1–42.)

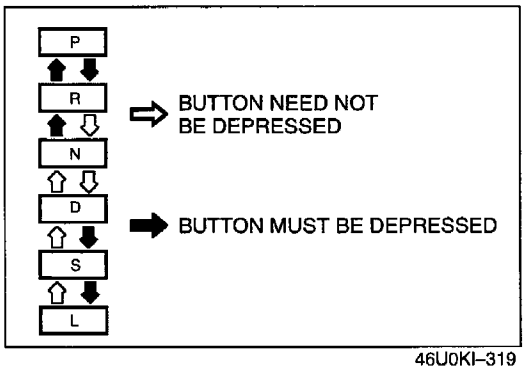

1YA0KX-061

Replacement
1. Disconnect the negative battery cable.
2. Remove the rear console box and center panel. (Refer to page K1–47.)
3. Remove the indicator screws and lift up the indicator panel.
4. Disconnect the shift-lock actuator connector.
5. Disconnect the park position switch connector.
6. Remove the shift-lock actuator.



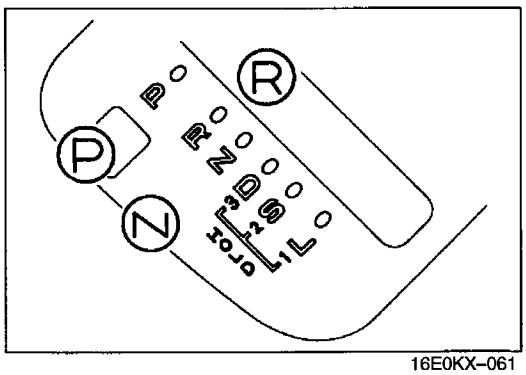
1YA0KX-062

7. Install the new shift lock actuator.
8. Connect the park position switch connector.
9. Connect the shift-lock actuator connector.
10. Install and adjust the indicator panel. (Refer to page K1–46.)
11. Install the center panel and rear console box. (Refer to page K1–47.)
12. Connect the negative battery cable.
13. Verify correct operation of the shift-lock system. (Refer to page K1–42.)



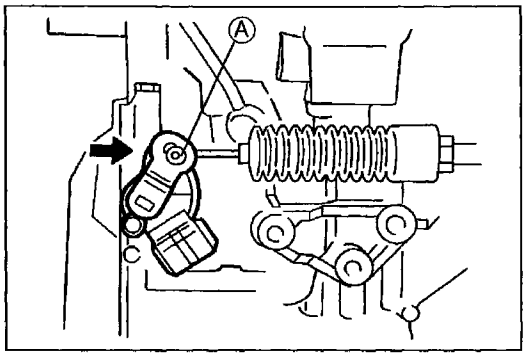
46U0KI-319

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 position when shifted from park→L range.
5. Verify that the positions of the selector lever and the indicator are aligned.
6. If not as specified, adjust the indicator panel. (Refer to page K1–46.)



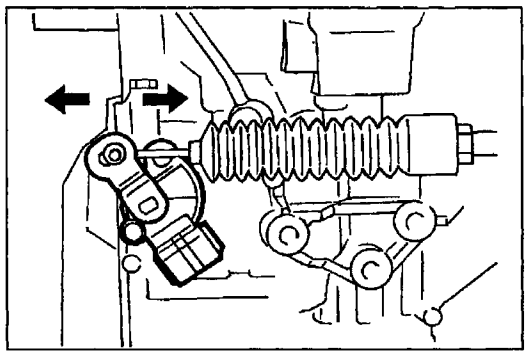
16E0KX-061

7. Verify that the vehicle operates in each selected range.
8. If not as specified, adjust the transaxle range switch. (Refer to page K1–21.)



Adjustment
Selector cable

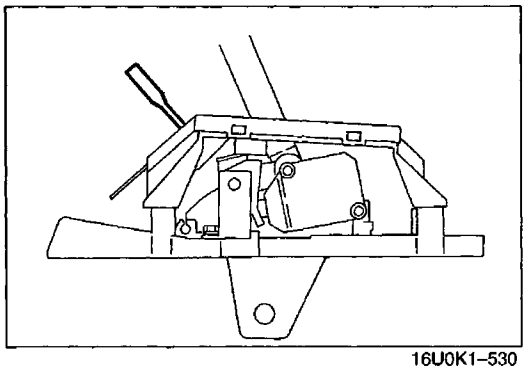
1. Remove the air cleaner assembly.
2. Shift the selector lever to the park position.
3. Loosen nut Ⓐ shown in the figure.
4. Push the selector cable in the direction of the arrow until it doesn't move any further.



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}

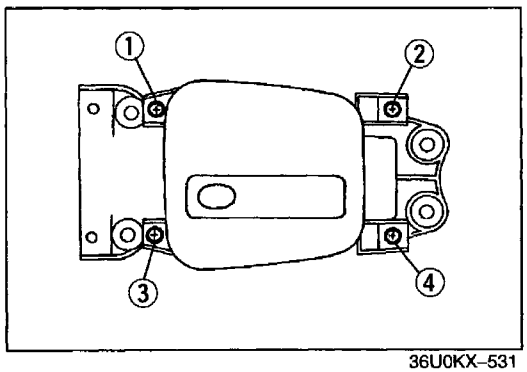
6. Install the air cleaner assembly.
7. Shift the selector lever from park position to L range, and make sure that there is no interference from other components in that area.



16U0K1-530

Indicator panel

1. Shift the selector lever to park position.
2. Loosen the indicator panel screws.
3. Align the alignment screw in the slider with the holes in the indicator panel. Install suitable heavy-gauge wire to hold the slider.



36U0KX-531

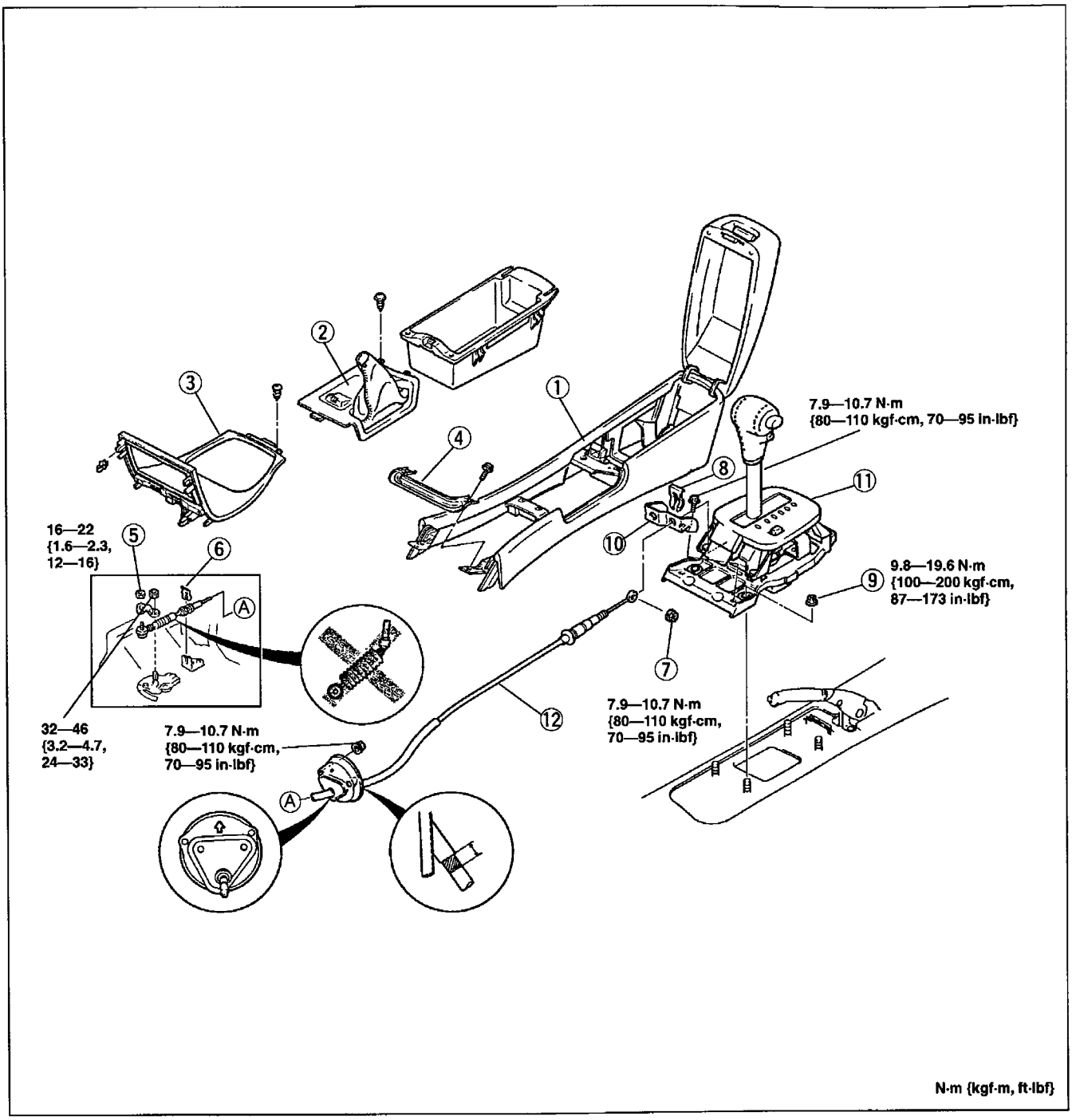
4. Tighten the indicator panel screws in the order shown in the figure.

   Tightening torque:
   2.0—2.9 N·m {20—30 kgf·cm, 18—26 in·lbf}

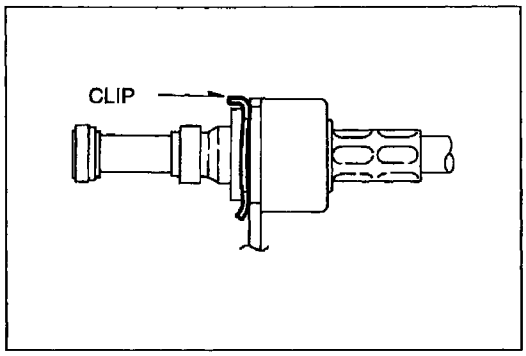
5. Remove the wire.
6. Verify that the selector lever properly aligns with the indicator in each range.

Removal / Inspection / Installation

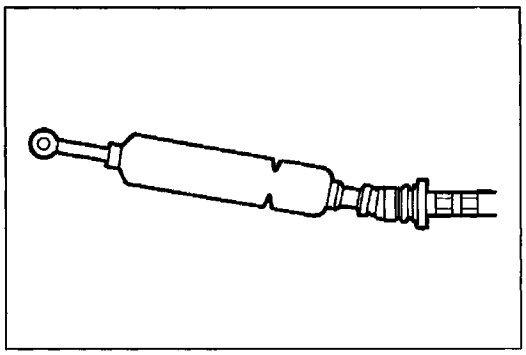
1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure.
3. Install the reverse order of removal, referring to **Installation Note**.



1. Rear console
2. Brake boot panel
3. Center panel
4. Bracket
5. Nut
   Installation Note ..... page K1–48
6. Clip
   Installation Note ..... page K1–48
7. Nut
8. Clip
9. Nut
10. Bracket
11. Selector lever
    Inspection ..... page K1–45
    Adjustment ..... page K1–46
    Disassembly / Inspection / Assembly ..... page K1–49
12. Selector cable

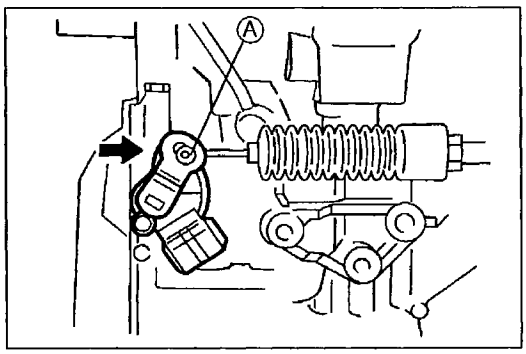


Installation Note
Clip
Install the clip flush to the selector cable bracket.

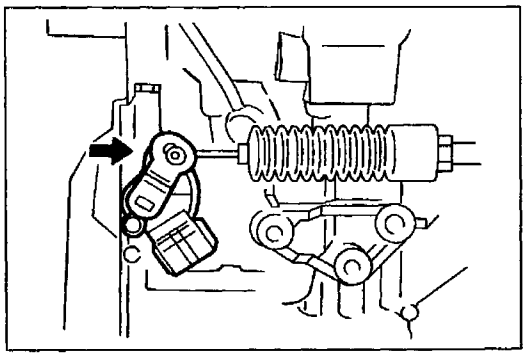


Nut
1. Shift the selector lever and manual shaft to park position.

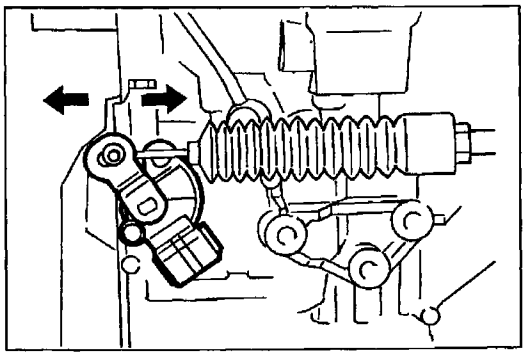
Caution
- **Bending the selector cable as shown in the figure will damage the cable and cause it to become loose during shifting. When handling and installing the selector cable, hold it straight.**



2. After verifying that the selector cable boot is not twisted, install the selector cable to the selector lever, and tighten nut Ⓐ.



3. Push the selector cable in the direction of the arrow until it doesn't move any further.



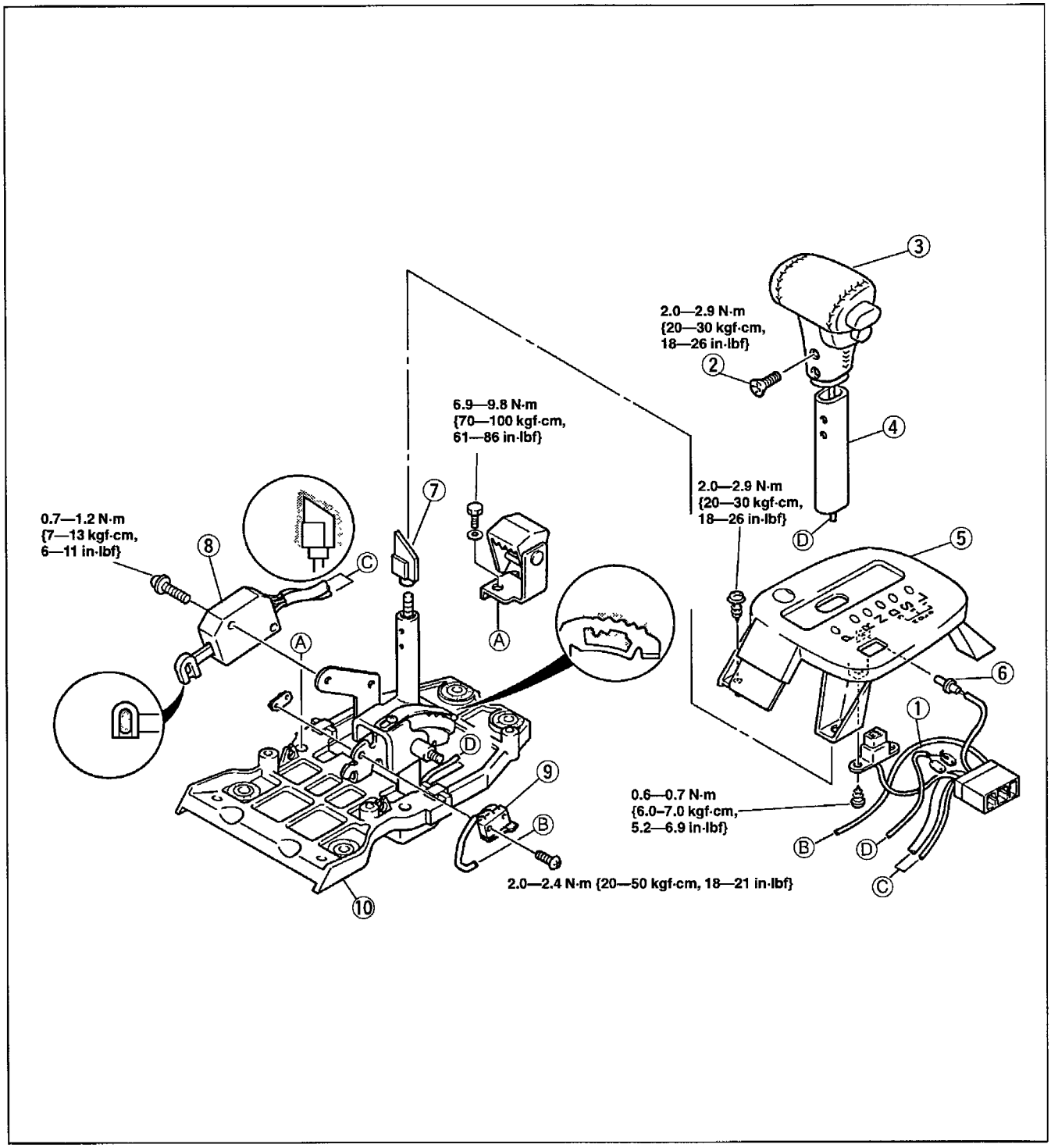
4. Position the selector cable so that there is no load in the direction of the arrows, and tighten the nut.

Tightening torque:
16—22 N·m {1.6—2.3 kgf·m, 12—16 ft·lbf}

5. Shift the selector lever from park position to L range, and make sure that there is no interference from other components in that area.

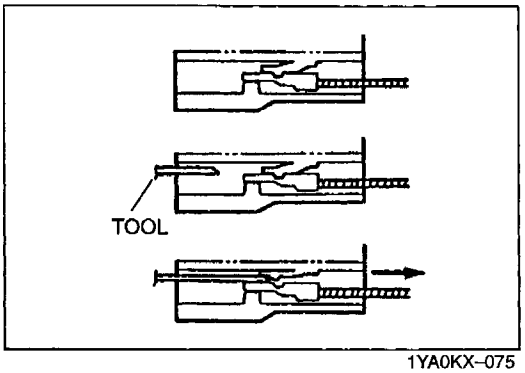
Disassembly / Inspection / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly Note.**
2. Assemble in the reverse order shown in the figure, referring to **Assembly Note.**



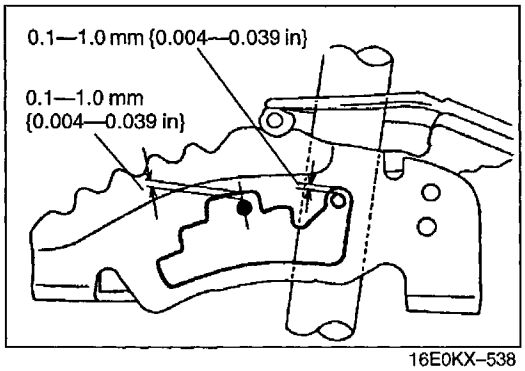
16U0K1–534

1. Connector
   Disassembly note ..... page K1–50
2. Screws
3. Selector lever knob
4. Cover
5. Indicator panel
   Assembly note ..... page K1–50
6. Position indicator light
7. Cam
   Assembly note ..... page K1–50
8. Shift-lock actuator
   Inspection ..... page K1–44
9. Park position switch
   Inspection ..... page K1–43
10. Selector lever



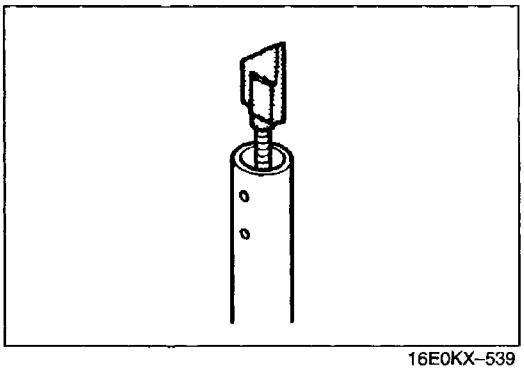
1YA0KX–075

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.

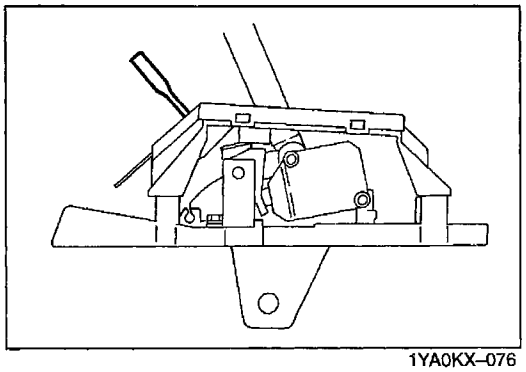


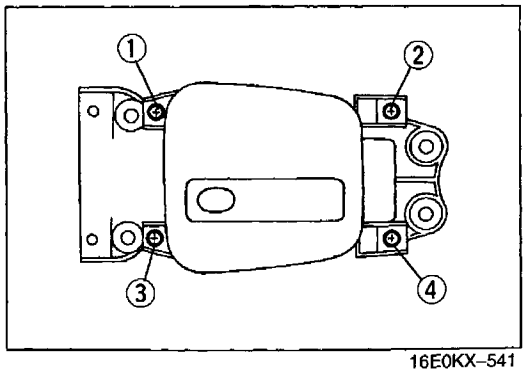
16E0KX–538

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 not, repeat from step 2.
6. Remove the selector lever knob.
7. Apply grease to the cam as shown.


16E0KX–539

Indicator panel
1. Shift the selector lever to park 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. Temporarily install the indicator panel to the selector lever bracket.


1YA0KX–076



16E0KX–541

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 each range.

ON-BOARD DIAGNOSTIC SYSTEM

DESCRIPTION

The on-board diagnostic system integrated within the powertrain control module on-board diagnostic malfunctions of the main sensor (input) and solenoid valves (output) as well as the transmission control module itself.

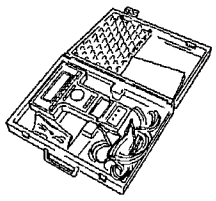
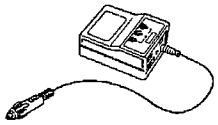
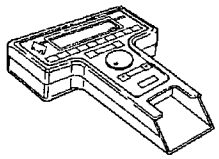
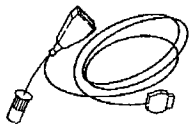
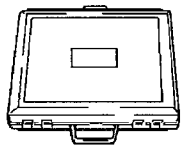
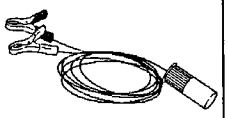
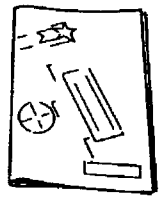
Malfunctions or intermittent malfunctions are memorized in the powertrain control module to later be output as diagnostic trouble codes.

The NGS can be used to retrieve these diagnostic trouble codes.

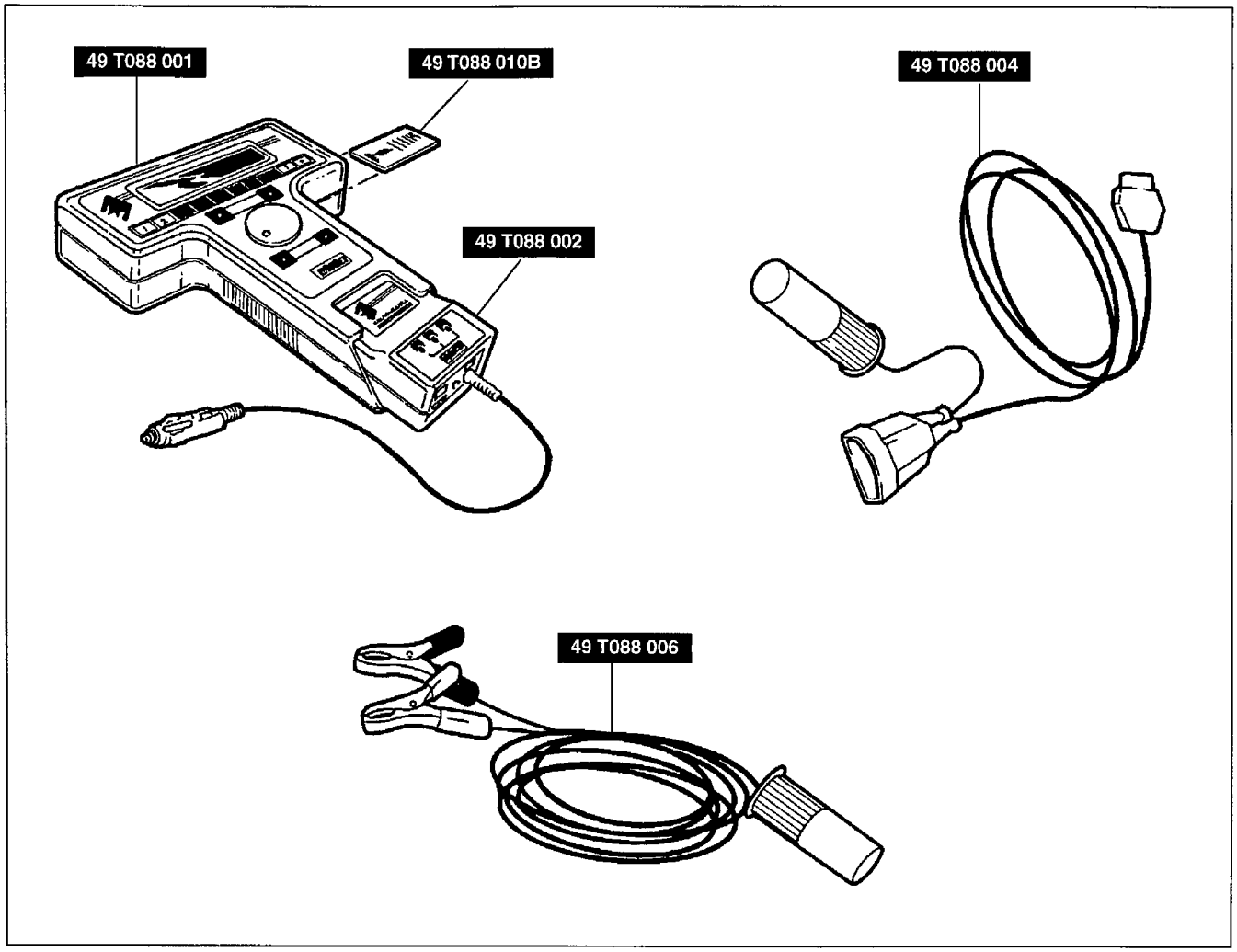
The NGS indicates a malfunction by displaying a diagnostic trouble code.

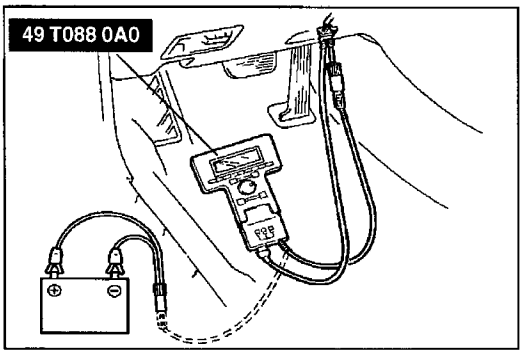
PREPARATION

SST

49 T088 0A0 NGS set 	For diagnosis	49 T088 010B Program Card 	For diagnosis
49 T088 002 Vehicle Interface Module 	For diagnosi	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For diagnosis
49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For diagnosis	49 T088 009 Case (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

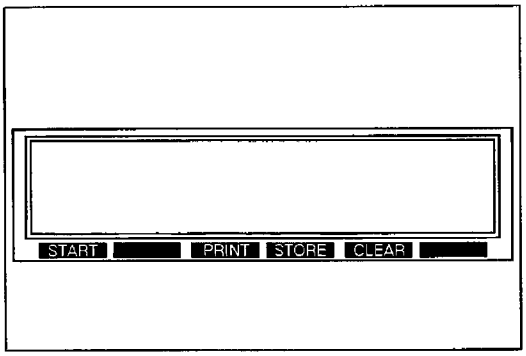
Assembly of SST





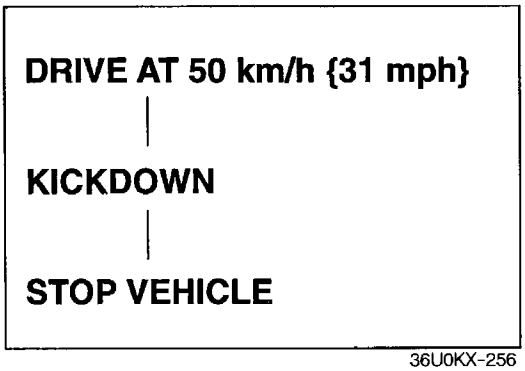
DIAGNOSTIC TROUBLE CODE
Inspection Procedure

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), referring to the **SST (NGS)** instruction manual.
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. After repairs is made, do the After-Repair procedure to verify that there are no remaining codes.



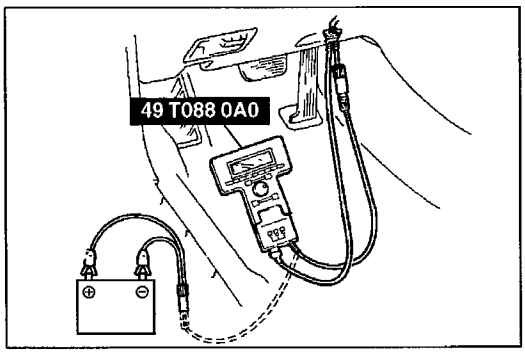
After-Repair Procedure

1. Cancel the diagnostic trouble code memory by using the **SST (NGS)**. (Refer to the Instruction Manual)
2. Remove the **SST (NGS)** from the data link connector 2.



36U0KX-256

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.

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 Sensor	K1–55
P0710	TRANS FLUID TEMP SENS — CKT MALFUNCTION	Transaxle Fluid Temperature Sensor	K1–56
P0715	INPUT/TSS CIRCUIT MALFUNCTION	Input/Turbine Speed Sensor	K1–57
P0731	GEAR 1 INCORRECT RATIO	Gear 1 Incorrect Ratio	K1–58
P0732	GEAR 2 INCORRECT RATIO	Gear 2 Incorrect Ratio	K1–59
P0733	GEAR 3 INCORRECT RATIO	Gear 3 Incorrect Ratio	K1–60
P0734	GEAR 4 INCORRECT RATIO	Gear 4 Incorrect Ratio	K1–61
P0740	TORQUE CONV CLUTCH SYS — MALFUNCTION	Torque Converter Clutch System	K1–62
P0745	PRESSURE CTRL SOLENOID — MALFUNCTION	Pressure Control Solenoid	K1–63
P0750	SHIFT SOLENOID A — MALFUNCTION	Shift Solenoid A	K1–64
P0755	SHIFT SOLENOID B — MALFUNCTION	Shift Solenoid B	K1–65
P0760	SHIFT SOLENOID C — MALFUNCTION	Shift Solenoid C	K1–66
P1743	SOLENOID TCC — Open or short	Torque Converter Clutch Control Solenoid Valve	K1–67
P1744	SOLENOID TCC — Open or short	Torque Converter Clutch Solenoid Valve	K1–68
P1765	3–2 TIMING SOL. V — Open or short	3–2 Timing Solenoid Valve	K1–69

DIAGNOSTIC TROUBLE CODE P0705	TRANS RANGE SENSOR—CKT MALFUNCTION (Transaxle Range Sensor)
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 and transaxle range switch connections at the connector 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 K1–12**	**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 the transaxle range switch ☞ **page K1–22** 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, re-check if diagnostic trouble code is shown ☞ **page K1–53**	**Yes**	Replace the powertrain control module ☞ **section F1**
		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
R	ON	R position
	OFF	Other positions, all ranges
D	ON	D range
	OFF	Other ranges, all positions
S	ON	S range
	OFF	Other ranges, all positions
L	ON	L 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 and transaxle fluid temperature sensor connections at the connector and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector 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. 3.5 V** **40°C {104°F}: Approx. 2.7 V** **80°C {176°F}: Approx. 1.3 V** ☞ **page K1–12**	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 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}: 2.495—2.717 kΩ** **40°C {104°F}: 1.191—1.278 kΩ** **80°C {176°F}: 0.3492—0.3655 kΩ** ☞ **page K1–23**	Yes	Go to next step
		No	Replace transaxle fluid temperature sensor ☞ **page K1–23**
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ **page K1–53**	Yes	Replace the powertrain control module ☞ **section F1**
		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 and input/turbine speed sensor connection at the connector and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector 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 K1–12	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: 253—604 Ω** ☞ page K1–24	Yes	Go to next step
		No	Replace the input/turbine speed sensor ☞ page K1–24
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ page K1–53	Yes	Replace the powertrain control module ☞ section F1
		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 outputs 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 K1–54	Yes	Refer to flowchart for diagnostic trouble code P0750, P0755, or P0760 and perform troubleshooting ☞ page K1–64, 65, 66
		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 K1–10	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 3 • 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 (non-HOLD) **Turbine speed: Approx. 2,100 rpm** ☞ page K1–12	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 (non-HOLD) • Is line pressure OK? **Line pressure when in D range (non-HOLD)** **Idling: 420—530 kPa {4.2—5.5 kgf/cm², 60—78 psi}** **Stalled: 1,100—1,170 kPa {11.2—12.0 kgf/cm², 160—170 psi}** ☞ page K1–2	Yes	Go to next step
		No	Repair or replace any defective parts • Line pressure is low only when in D or S range: ATF leakage in forward clutch circuit
5	Check stall speed in D range (non-HOLD) • Is stall speed OK? **Stall speed when in D range (non-HOLD): 2,270—2,500 rpm** ☞ page K1–4	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 K1–25	Yes	Go to next step
		No	Replace shift solenoid A, B, or C ☞ page K1–27 Go to step 3 • 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
8	After diagnostic trouble code has been cleared, re-check if diagnostic trouble code is shown ☞ page K1–53	Yes	Replace powertrain control module ☞ section F1
		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 K1–54	Yes	Refer to flowchart for diagnostic trouble code P0750, P0755, or P0760 and perform troubleshooting ☞ page K1–64, 65, 66
		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 K1–10	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 S range **Turbine speed: Approx. 1,100 rpm** ☞ page K1–12	Yes	Go to step 8
		No	Above specification: Go to next step Below specification: Go to step 6
4	Check line pressure in D, S range • Is line pressure OK? **Line pressure when in D, S range** **Idling: 420—530 kPa {4.2—5.5 kgf/cm², 60—78 psi}** **Stalled: 1,100—1,170 kPa {11.2—12.0 kgf/cm², 160—170 psi}** ☞ page K1–2	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
5	Check stall speed in D, S range • Is stall speed OK? **Stall speed when in D, S range: 2,270—2,500 rpm** ☞ page K1–4	Yes	Go to next step
		No	Repair or replace any defective parts • 2–4 brake band slipping • Forward clutch slipping
6	Inspect operation of shift solenoid A, B, C • Disconnect negative battery cable • Disconnect solenoid connector • Is it operating OK? ☞ page K1–25	Yes	Go to next step
		No	Replace shift solenoid A, B, or C ☞ page K1–27 Go to step 3 • 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
8	After diagnostic trouble code has been cleared, re-check if diagnostic trouble code is shown ☞ page K1–53	Yes	Replace the powertrain control module ☞ section F1
		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 K1–54	Yes	Refer to flowchart for diagnostic trouble code P0750, P0755, or P0760 and perform troubleshooting ☞ page K1–64, 65, 66
		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 K1–10	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: Approx. 800 rpm** ☞ page K1–12	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** **Stalled: 844—902 kPa {8.6—9.2 kgf/cm², 123—130 psi}** ☞ page K1–2	Yes	Go to next step
		No	Repair or replace any defective parts • ATF leakage in 3–4 clutch
5	Check stall speed when solenoid connector is disconnected • Solenoid connector disconnected • Is stall speed OK? **Stall speed when third gear in D range:** **2,270—2,500 rpm** ☞ page K1–4	Yes	Go to next step
		No	Repair or replace any defective parts • 3–4 clutch slipping
6	Inspect operation of shift solenoid A, B, C • Disconnect negative battery cable • Disconnect solenoid connector • Is it operating OK? ☞ page K1–25	Yes	Go to next step
		No	Replace shift solenoid A, B, or C ☞ page K1–27 Go to step 3 • 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
8	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ page K1–53	Yes	Replace powertrain control module ☞ section F1
		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 output 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 K1–54	Yes	Refer to flowchart for diagnostic trouble code P0750, P0755, or P0760 and perform troubleshooting ☞ page K1–64, 65, 66
		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 K1–10	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 K1–54	Yes	Refer to flowchart for diagnostic trouble code P0732 (Gear 2 incorrect ratio), and perform troubleshooting ☞ page K1–59
		No	Go to next step
4	Is diagnostic trouble code P0733 (Gear 3 incorrect ratio) indicated? ☞ page K1–54	Yes	Refer to flowchart for diagnostic trouble code P0733 (Gear 3 incorrect ratio), and perform troubleshooting ☞ page K1–60
		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 K1–25	Yes	Go to next step
		No	Replace shift solenoid A, B, or C ☞ page K1–27 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
7	After diagnostic trouble code has been cleared, re-check if diagnostic trouble code is shown ☞ page K1–53	Yes	Replace powertrain control module ☞ section F1
		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)
DETAILS	Powertrain control module outputs torque converter clutch signal, 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 • Torque converter clutch control solenoid valve malfunction

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 K1–10	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 (non-HOLD) • Is line pressure OK? **Line pressure when in D range (non-HOLD)** **Idling: 420—530 kPa {4.2—5.5 kgf/cm², 60—78 psi}** **Stalled: 1,100—1,170 kPa {11.2—12.0 kgf/cm², 160—170 psi}** ☞ page K1–2	Yes	Go to next step
		No	Repair or replace any defective parts • ATF leakage in transaxle case, oil pump, or control valve
3	Inspect operation of solenoid valve • Disconnect negative battery cable • Disconnect solenoid connector • Is it operating OK? ☞ page K1–25	Yes	Go to next step
		No	Replace torque converter clutch solenoid valve or torque converter clutch control solenoid valve ☞ page K1–27
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
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 K1–12	Yes	Replace torque converter
		No	Go to next step
6	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ page K1–53	Yes	Replace powertrain control module ☞ section F1
		No	Problem is a temporary slip of clutch and should be investigated further

DIAGNOSTIC TROUBLE CODE P0745	PRESSURE CTRL SOLENOID—MALFUNCTION (Pressure Control Solenoid)
DETAILS	• Damaged wiring or connectors between pressure control solenoid and powertrain control module • Short or open circuit in pressure control solenoid • Short or open circuit in powertrain control module internal transistors
POSSIBLE CAUSE	• Damaged wiring or connectors between pressure control solenoid and powertrain control module • Short or open circuit in pressure control solenoid • Short or open circuit in powertrain control module internal transistors

STEP	INSPECTION		ACTION
1	Are powertrain control module and pressure control solenoid connections at connector 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 • Does indication on EC-AT tester display change according to throttle opening angle? **Indication** **Pressure control solenoid: Light (Wide open throttle)—Dark (Closed throttle position)** ☞ **page K1–12**	Yes	Go to step 5
		No	Go to next step
3	Check for continuity between terminals of pressure control solenoid and powertrain control module • Disconnect negative battery cable • Disconnect solenoid connector 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 pressure control solenoid terminals • Disconnect negative battery cable • Disconnect solenoid connector • Is resistance between terminals correct? **Resistance: 9—18 Ω** ☞ **page K1–25**	Yes	Go to next step
		No	Replace pressure control solenoid ☞ **page K1–27**
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ **page K1–53**	Yes	Replace the powertrain control module ☞ **section F1**
		No	Problem is a temporary poor connection of wiring or connectors 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 and shift solenoid A connections at connector 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 K1–12	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: 11—27 Ω** ☞ page K1–25	Yes	Go to next step
		No	Replace shift solenoid A ☞ page K1–27
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ page K1–53	Yes	Replace powertrain control module ☞ section F1
		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 and shift solenoid B connections at connector 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 K1–12	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: 11—27 Ω** ☞ page K1–25	Yes	Go to next step
		No	Replace shift solenoid B ☞ page K1–27
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ page K1–53	Yes	Replace powertrain control module ☞ section F1
		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 and shift solenoid C connections at connector 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 K1–12	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: 11—27 Ω** ☞ page K1–25	Yes	Go to next step
		No	Replace shift solenoid C ☞ page K1–27
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ page K1–53	Yes	Replace powertrain control module ☞ section F1
		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 control solenoid valve)
DETAILS	• Damaged wiring or connectors between torque converter clutch control solenoid valve and powertrain control module • Short or open circuit in torque converter clutch control solenoid valve • Short or open circuit in powertrain control module internal transistors
POSSIBLE CAUSE	• Damaged wiring or connectors between torque converter clutch control solenoid valve and powertrain control module • Short or open circuit in torque converter clutch control solenoid valve • Short or open circuit in powertrain control module internal transistor

STEP	INSPECTION		ACTION
1	Are powertrain control module and torque converter clutch control solenoid valve connections at connector 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 control solenoid valve normally off and illuminated when valve is on? ☞ page K1–12	Yes	Go to step 5
		No	Go to next step
3	Check for continuity between terminals of torque converter clutch control 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 control solenoid valve terminal • Disconnect nagative battery cable • Disconnect solenoid connector • Is resistance correct? **Resistance: 11—27 Ω** ☞ page K1–25	Yes	Go to next step
		No	Replace torque converter clutch control solenoid valve ☞ page K1–27
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ page K1–53	Yes	Replace powertrain control module ☞ section F1
		No	Problem is a temporary poor connection of wiring or connectors and should be investigated further

DIAGNOSTIC TROUBLE CODE P1744	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 transistor
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 powertrain control module and torque converter clutch solenoid valve connections at connector 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 • Does indication on EC-AT tester display change when torque converter clutch slip operation occur? **Indication** **Light (torque converter clutch slip operation)—Dark (torque converter clutch operation)** **☞ page K1–12**	Yes	Go to step 5
		No	Go to next step
3	Check for continuity between terminal 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 negative battery cable • Disconnect solenoid connector • Is resistance correct? **Resistance: 9—18 Ω** **☞ page K1–25**	Yes	Go to next step
		No	Replace torque converter clutch solenoid valve **☞ page K1–27**
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown **☞ page K1–53**	Yes	Replace powertrain control module **☞ section F1**
		No	Problem is a temporary poor connection of wiring or connectors and should be investigated further

DIAGNOSTIC TROUBLE CODE P1765	3–2 TIMING SOL. V—OPEN OR SHORT (3–2 timing solenoid valve)
DETAILS	• Damaged wiring or connectors between 3–2 timing solenoid valve and powertrain control module • Short or open circuit in 3–2 timing solenoid valve • Short or open circuit in powertrain control module internal transistors
POSSIBLE CAUSE	• Damaged wiring or connectors between 3–2 timing solenoid valve and powertrain control module • Short or open circuit in 3–2 timing solenoid valve • Short or open circuit in powertrain control module internal transistors

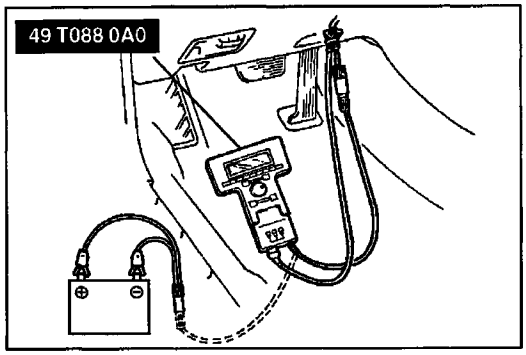
STEP	INSPECTION		ACTION
1	Are powertrain control module and 3–2 timing solenoid valve connections at connector and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector(s) Inspection step 5 • Yes: Go to next step • No: End of flowchart
2	Check EC-AT tester display • Connect EC-AT tester to powertrain control module • Is light for 3–2 timing solenoid valve normally off and illuminated when valve is on? ☞ page K1–12	Yes	Go to step 5
		No	Go to next step
3	Check for continuity between terminals of 3–2 timing 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 3–2 timing solenoid valve terminal • Disconnect negative battery cable • Disconnect solenoid connector • Is resistance correct? **Resistance: 11—27 Ω** ☞ page K1–25	Yes	Go to next step
		No	Replace 3–2 timing solenoid valve ☞ page K1–27
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ page K1–53	Yes	Replace powertrain control module ☞ section F1
		No	Problem is a temporary poor connection of wiring or connectors and should be investigated further

MEMO

TROUBLESHOOTING GUIDE

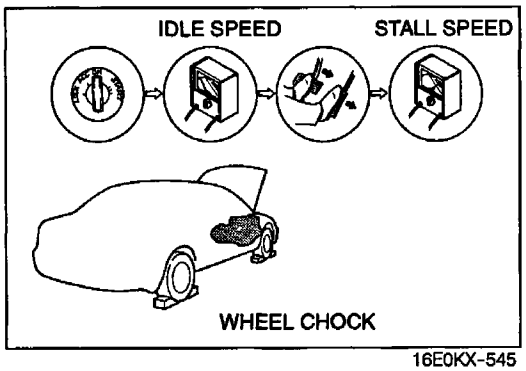
GENERAL NOTES

A problem with the EC-AT may be caused by the engine, the EC-AT powertrain, the hydraulic control system, or the electronic control system. When troubleshooting, begin with those points which can be inspected quickly and easily. The recommended troubleshooting sequence is described below.



Step 1: On-Board Diagnostic System Inspection

Check for diagnostic trouble code(s) memorized in powertrain control module with the **NGS**.
(Refer to page K1–51.)



16E0KX-545

Step 2: Mechanical System Test

Check the engine stall speed, time lag and line pressure, and solenoid reducing pressure. (Refer to page K1–2.)

Step 3: Road Test

Check the shift point and shift shock.
(Refer to page K1–7.)

QUICK DIAGNOSIS CHART

OUTLINE

The Quick Diagnosis Chart shows various problems and the various components that might be the cause of the problem.

1. Components indicated in the "On-board diagnostic" row of the QUICK DIAGNOSIS CHART (I) are diagnosed by the powertrain control module on-board diagnostic system. The **NGS** can be used for easy retrieval of the diagnostic trouble codes.
2. Components indicated in the "Adjustment" row of the QUICK DIAGNOSIS CHART (I) indicate that there is a possibility that the problem may be the result of an incorrect adjustment.
   Check the adjustment of each component, and readjust if necessary.
3. Components indicated in the "Stall Test" row of the QUICK DIAGNOSIS CHART (I) can be checked for malfunction by observing the results of the stall test.
4. Components indicated in the "Time Lag Test" row of the QUICK DIAGNOSIS CHART (I) can be checked for malfunction by observing the results of the time lag test.
5. Components indicated in the "Line Pressure Test" row of the QUICK DIAGNOSIS CHART (I) can be checked for malfunction by observing the results of the line pressure test.
6. Components indicated in the "Road Test" row of the QUICK DIAGNOSIS CHART (I) can be checked for malfunction by observing the results of the road test.
7. QUICK DIAGNOSIS CHART (II) shows the relationship between the troubleshooting item and inspection point.

QUICK DIAGNOSIS CHART (I)

Possible parts and reference page / Item	Preliminary							Emission control system															Electronic system							
	K1–10	K1–45	section F1	K1–4	K1–5	K1–2	K1–7	section F1	section F1	section F1	section F1	section F1	section F1	section F1	section F1	section F1	section F1	section G	section F1	section F1	section F1	section F1	K1–20	K1–21	section F1	section F1	K1–24	K1–24	section P	K1–23
	ATF level and condition	Selector lever	Idle speed and ignition timing	Stall test	Time lag test	Line pressure test	Road test	Air leakage	Mass air flow sensor	Engine coolant temperature sensor	Heated oxygen sensor (right side, left side)	Idle air control valve	Injector	Ignition control module (in distributor)	Ignition coil (in distributor)	Spark plug	Fuel pump	Main relay	Generator	Pressure regulator	Fuel filter	Air cleaner element	Camshaft	HOLD switch	Transaxle range switch	Throttle position sensor	Closed throttle position switch	Input/turbine speed sensor	Speedometer sensor	Brake switch	Transaxle fluid temperature sensor
On-board diagnostic																									○		○	○		○
Adjustment	○	○	○																					○	○					
Stall test																														
Time lag test																														
Line pressure test																														
Road test																														

QUICK DIAGNOSIS CHART (I)

Electronic system															Hydraulic control system						Powertrain										Possible parts and reference page / Item
Fourth gear inhibit signal (cruise control unit)	Engine speed input signal	EGR boost sensor	Shift solenoid A	Shift solenoid B	Shift solenoid C	TCC control solenoid valve	3–2 timing solenoid valve	TCC solenoid valve	Pressure control solenoid	Inhibitor signal	Powertrain control module	Oil pump	Control valve body	1–2 accumulator	2–3 accumulator	N–D accumulator	N–R accumulator	Torque converter	Forward clutch	Coasting clutch	Reverse clutch	3–4 clutch	2–4 brake band	Low and reverse brake	One-way clutch 1 (Sprag type)	One-way clutch 2 (Roller type)	Planetary gear	Parking mechanism	Differential	
section F1	section F1	section F1	K1–25	K1–25	K1–25	K1–25	K1–25	K1–25	K1–25	section F1	section F1	*						*												
	○	○	○	○	○	○	○	○	○																					On-board diagnostic
																														Adjustment
									○			○	○					○	○		○			○	○	○				Stall test
														○		○	○		○		○		○	○	○	○				Time lag test
									○			○	○						○					○						Line pressure test
													○						○	○		○	○	○	○			○		Road test

* Refer to Automatic transaxle workshop manual GF4A-EL

QUICK DIAGNOSIS CHART (II)

Item			Preliminary							Emission control system														Electronic system							
Possible parts and reference page			K1–10	K1–45	section F1	K1–4	K1–5	K1–2	K1–7	section F1	section F1	section F1	section F1	section F1	section F1	section F1	section F1	section F1	section G	section F1	section F1	section F1	section F1	K1–20	K1–21	section F1	section F1	K1–24	K1–24	section P	K1–23
			ATF level and condition	Selector lever	Idle speed and ignition timing	Stall test	Time lag test	Line pressure test	Road test	Air leakage	Mass air flow sensor	Engine coolant temperature sensor	Heated oxygen sensor (right side, left side)	Idle air control valve	Injector	Ignition control module (in distributor)	Ignition coil (in distributor)	Spark plug	Fuel pump	Main relay	Generator	Pressure regulator	Fuel filter	Air cleaner element	Camshaft	HOLD switch	Transaxle range switch	Throttle position sensor	Closed throttle position switch	Input/turbine speed sensor	Speedometer sensor	Brake switch	Transaxle fluid temperature sensor
6	Will start other than park/neutral position				○																					○					
14	Engine stalls	When shifted from park/neutral position to other ranges while idling												○												○						
18		On deceleration	○		○						○		○	○			○		○	○												
24	Engine rough	On deceleration	○																													
25	Poor acceleration	Driveaway									○				○								○			○						
26		On acceleration													○							○	○			○						
30	Surges while cruising										○				○			○									○		○			
31	Lack of power										○				○							○	○	○								
32	Poor fuel economy									○			○									○										
39	Vehicle does not move in D, S, L and/or R ranges		○	○				○																							
40	Vehicle moves in neutral position			○																											
41	Vehicle moves in park position			○																											
42	Excessive creep							○																				○			
43	No shift		○					○																○		○		○	○		
44	Abnormal shift		○																						○	○		○			
45	Frequent shifting																									○			○		
46	Shift point high or low		○					○																	○	○		○	○		○
47	TCC non-operation		○					○								○								○	○	○		○	○	○	○
48	No kickdown							○																○	○	○					
49	Engine speed flares up	When accelerating	○	○				○																		○					○
50		When upshifting and/or downshifting	○	○				○																		○		○			○
51	Excessive shift shock	Park, neutral to R and/or neutral to D						○																	○	○		○			○
52		When upshifting and/or downshifting	○																							○		○			○
53	No engine braking		○					○								○									○	○	○	○	○		○
54	No mode changes																									○					
55	Transaxle noise	All ranges	○																												
56		D, S, L, R ranges	○																												
57	Transaxle overheats		○																							○		○	○		○

QUICK DIAGNOSIS CHART (II)

Electronic system												Hydraulic control system						Powertrain											Possible parts and reference page		
Fourth gear inhibit signal (cruise control unit)	Engine speed input signal	EGR boost sensor	Shift solenoid A	Shift solenoid B	Shift solenoid C	TCC control solenoid valve	3–2 timing solenoid valve	TCC solenoid valve	Pressure control solenoid	Inhibitor signal	Powertrain control module	Oil pump	Control valve body	1–2 accumulator	2–3 accumulator	N–D accumulator	N–R accumulator	Torque converter	Forward clutch	Coasting clutch	Reverse clutch	3–4 clutch	2–4 brake band	Low and reverse brake	One-way clutch 1 (Sprag type)	One-way clutch 2 (Roller type)	Planetary gear	Parking mechanism	Differential	Item		
section F1	section F1	section F1	K1–25	K1–25	K1–25	K1–25	K1–25	K1–25	K1–25	section F1	section F1	*						*													
																													Will start in other than park/neutral position		6
			○				○				○	○	○																When shifted from park/neutral position to other ranges while idling	Engine stalls	14
											○		○																On deceleration		18
																													On deceleration	Engine rough	24
											○		○																Driveaway	Poor acceleration	25
						○					○		○																On acceleration		26
	○										○		○																Surges while cruising		30
																		○			○								Lack of power		31
						○		○																					Poor fuel economy		32
			○						○		○	○	○					○	○	○		○	○		○	○	○	○		Vehicle does not move in D, S, L and/or R ranges		39
																		○	○										Vehicle moves in neutral position		40
																												○	Vehicle moves in park position		41
											○	○																	Excessive creep		42
			○	○	○				○		○	○	○						○	○		○	○		○		○		○	No shift		43
			○	○	○						○		○																Abnormal shift		44
													○										○						Frequent shifting		45
									○		○	○							○	○		○	○		○		○		Shift point high or low		46
	○		○	○	○	○	○	○	○		○		○						○										TCC non-operation		47
									○		○		○																No kickdown		48
									○		○	○	○						○			○	○		○	○	○		When accelerating	Engine speed falres up	49
							○		○		○	○	○						○	○		○	○		○	○	○		When upshifting and/or downshifting		50
			○	○	○				○	○	○	○	○			○	○	○			○	○		○	○	○	○		Park, neutral to R and/or neutral to D	Excessive shift shock	51
		○	○	○	○		○		○		○	○	○						○										When upshifting and/or downshifting		52
	○		○	○	○	○	○	○	○		○	○	○					○	○	○		○	○	○	○		○		No engine braking		53
											○																		No mode changes		54
																						○						○	All ranges	Transaxle noise	55
																		○											D, S, L, R ranges		56
	○		○	○	○	○	○	○	○		○	○	○						○		○		○	○	○				Transaxle overheats		57

* Refer to Automatic transaxle workshop manual GF4A-EL

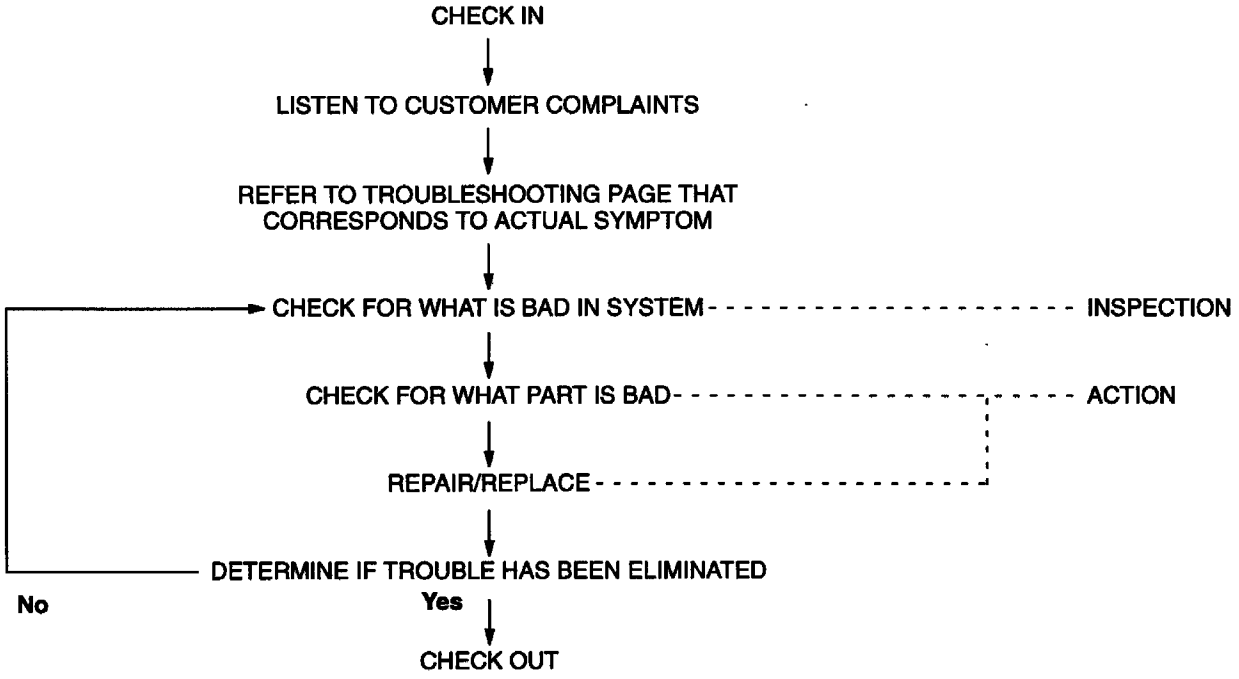
SYMPTOM TROUBLESHOOTING

USING THIS SECTION

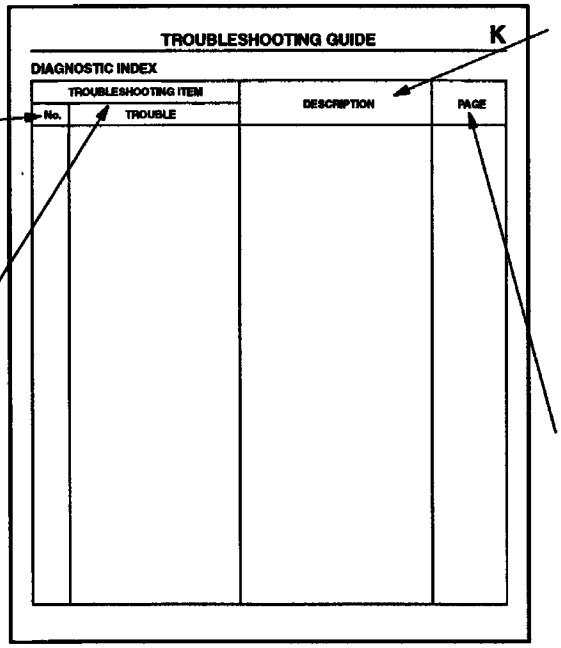
Introduction

Most of the automatic transaxle control system is electronicaly controlled, often making it difficult to diagnose problems in the system, especially intermittent problems. Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a drivability complaint. The customer is often a good source of information on such problems, especially intermittent ones. Through talks with the customer, one can find out what the symptoms are and under what conditions they occur.

Work Flow



Diagnosis Index



Description:
Describes each troubleshooting item.

No.:
Each troubleshooting item is assigned a number

Troubleshooting Item:
There are 58 troubleshooting items. Choose the item that most closely corresponds to the actual symptom.

Page:
Shows the reference page or section

Troubleshooting chart

14	ENGINE STALLS	• WHEN SHIFTED FROM NEUTRAL OR PARK TO OTHER RANGES WHILE IDLING

DESCRIPTION • Engine stops unexpectedly when shifted from neutral or park position to other ranges at idle

[TROUBLESHOOTING HINTS]
① Engine idle speed low
② Control valve stuck
③ Idle air control valve malfunction
④ Powertrain control module malfunction
⑤ Torque converter clutch control solenoid valves worn
⑥ Inhibitor signal malfunction
⑦ Transaxle range switch worn or misadjusted
⑧ Oil pump worn
⑨ ATF level low

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Are ATF level and condition OK? ☞ page K1–10 Do transaxle seals, sealant, and gaskets prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Conditions ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
3	Is line pressure OK? ☞ K1–2 S	Yes	Go to next step

DESCRIPTION:
Further describes the symptom. 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 shown by the "☞" mark.

ACTION:
This recommends the appropriate action to take as a result (Yes/No) of the INSPECTION. How to perform the action is described on the reference page shown by the "☞" mark.

DIAGNOSTIC INDEX

TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
No.	TROUBLE			
1	Melts main or other fuse			section F1
2	Will not crank or cranks slowly		Starter does not work Starter cranks engine at slow speed	section F1
3	Cranks normally but will not start	No combustion	Starter cranks engine at normal speed, but engine shows no indication of firing	section F1
4		Partial combustion —when engine cold	Starter cranks engine at normal speed and engine shows indication of firing, but will not run when engine is cold or at initial starting Engine will not continue running when cold when ignition switch is returned from STA to IG position	section F1
5		Partial combustion —when warmed up	Starter cranks engine at normal speed and engine shows indication of firing, but will not run when engine is warm Engine will not continue running when warm when IGN switch is returned from STA to IG position	section F1
6	Will start in other than park/neutral position		Engine starts in park, neutral, and other ranges	K1–81
7	Cranks normally but hard to start	Any engine temp.	Starter cranks engine at normal speed, but engine requires excessive cranking time before starting at any engine temperature Engine starts after stalling a few times at any engine temperature	section F1
8		When engine cold	Starter cranks engine at normal speed, but engine requires excessive cranking time before starting when engine is cold Engine starts after stalling a few times when engine is cold	section F1
9		After warm-up	Starter cranks engine at normal speed, but engine requires excessive cranking time before starting after warm-up	section F1
10	Engine stalls	While idling at any engine temp.	Engine stops unexpectedly at any engine temp.	section F1
11		During fast idle	Engine stops unexpectedly during fast-idle operation	section F1
12		While idling after warm-up	Engine stops unexpectedly at idle after warm-up	
13		While idling with A/C, P/S, and/or E/L ON	Engine stops unexpectedly when A/C, P/S, and/or E/L turned ON at idle	section F1
*14		When shifted from neutral or park to other ranges while idling	Engine stops unexpectedly when shifted from neutral or park to other ranges at idle	section F1 K1–82
15		Driveaway	Engine stops unexpectedly upon driveaway	section F1
16		On acceleration	Engine stops unexpectedly at beginning of acceleration or during acceleration	section F1
17		While cruising	Engine stops unexpectedly while cruising	section F1
*18		On deceleration	Engine stops unexpectedly at beginning of deceleration or recovery from deceleration exhaust afterburn	section F1 K1–84
19	Engine rough	While idling at any engine temp.	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at any engine temp. Idle speed too slow and excessive engine shake at any engine temp.	section F1
20		During fast idle	Fast idle speed too slow and excessive engine shake during fast idle, but returns to normal after warm-up	section F1
21		While idling warm-up	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle after warm-up	section F1

* Refer to section F1 before referring to K1 sections.

TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
No.	TROUBLE			
22	Engine runs rough	While idling with A/C, P/S, and/or E/L ON	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle when A/C, P/S, and/or E/L ON	section F1
23		When shifted from neutral or park to other range while idling	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle when shifted from park or neutral to other range	section F1
*24		On deceleration	Engine shakes at beginning of deceleration, during deceleration, or recovery from deceleration Exhaust afterburn	section F1 K1–86
*25	Poor acceleration	Driveaway	Engine speed increases normally, but vehicle speed slowly increases during driveaway	section F1 K1–87, 88
*26		On acceleration	Engine speed increases normally, but vehicle speed slowly increases during acceleration	
27	High idle speed after warm-up		Idle speed continues at fast idle after warm-up Engine returns slowly to idle after acceleration is released	section F1
28	Idle fluctuates hunts		Engine speed changes back and forth between specified idle speed and higher speed	section F1
29	Hesitates/stumbles on acceleration		Momentary pause at beginning of acceleration or during acceleration	section F1
*30	Surges while cruising		Momentary minor irregularity in engine output at steady vehicle speed	section F1 K1–89
*31	Lack of power		Performance poor under load (i.e., power down when climbing hills)	section F1 K1–89
*32	Poor fuel economy		Fuel economy unsatisfactory	section F1 K1–90
33	A/C does not work		A/C compressor magnetic clutch does not engage when A/C switch ON	section F1
34	Knocking/pinging		Sound produced when air/fuel mixture is ignited by something other than spark plug (i.e., hot spot in combustion chamber)	section F1
35	Fuel odor		Gasoline fuel smell or visible leaks	section F1
36	Exhaust sulfur smell		"Rotten egg" smell from exhaust	section F1
37	High oil consumption		Oil consumption excessive	section F1
38	NGS indicates "LINK COMMUNICATION ERROR"		NGS indicates "LINK COMMUNICATION ERROR"	section F1
39	Vehicle does not move in D, S, L and/or R ranges		No creep at all Vehicle does not move when accelerator pedal depressed after shifted to D, S, L and/or R range	K1–91
40	Vehicle moves in neutral position		Vehicle creeps in neutral position Vehicle moves when accelerator pedal not depressed	K1–92
41	Vehicle moves in park position		Vehicle rolls in park position, and drivetrain doesn't torque converter clutch operation	K1–93
42	Excessive creep		Vehicle moves quickly in D, S, L and R range (accelerator pedal not depressed) Excessive neutral to R range and neutral to D range shift shock felt	K1–94
43	No shift		Single range shift (1st→2nd, 2nd→3GR, or 3GR→4GR) only Sometimes shifts correctly With gear position in HOLD mode: Single range shift (1st→2nd, 2nd→3GR or 3GR→4GR) only Shifts incorrectly at times	K1–95

* Refer to section F1 before referring to K1 sections.

TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
No.	TROUBLE			
44	Abnormal shift		Shifts incorrectly (incorrect shift pattern) (ex) Vehicle shifts 1st→4GR directly when accelerating with accelerator pedal depressed slightly	K1–97
45	Frequent shifting		Downshift occurs when accelerator depressed slightly in D, S, and L ranges (non-HOLD mode)	K1–99
46	Shift point high or low		Shift points do not match shift diagram Shifts delayed when accelerating Shifts occur too fast when accelerating and engine speed does not increase	K1–100
47	Torque converter clutch non operation		Torque converter clutch non operation when vehicle speed reaches torque converter clutch operation range	K1–102
48	No kickdown		Does not downshift when accelerator pedal depressed more than 7/8 within kickdown range	K1–103
49	Engine speed flares up	When accelerating	Engine speed flares up on acceleration	K1–104
50		When upshifting and/or downshifting	Engine flares up when accelerator pedal depressed for upshifting Engine flares up suddenly when accelerator pedal depressed for downshifting	K1–105
51	Excessive shift shock	Park, neutral to R and/or neutral to D	Strong shift shock felt at idle when shifting from neutral to D or R range	K1–106
52		When upshifting and/or downshifting	Excessive shift shock felt when accelerating at upshifting During cruising, excessive shift shock felt when accelerator pedal depressed at downshifting	K1–107
53	No engine braking		Engine speed drops to idle, but vehicle does not slow when accelerator pedal released during cruising at medium to high speed Engine speed drops to idle, but vehicle does not slow when accelerator pedal released when in L range at low vehicle speed	K1–108
54	No mode change		Mode does not change to/from NORMAL mode in D range HOLD mode not selected or not cancelled	K1–109
55	Transaxle noise	All ranges	Transaxle noisy in all ranges when vehicle is idling	K1–109
56		D, S, L, R ranges	Abnormal noise from transaxle in D, S, L, R	K1–109
57	Transaxle overheats		ATF smells burnt and/or is discolored	K1–110

SYMPTOM TROUBLESHOOTING CHART

6	WILL START OTHER THAN P AND N RANGES		
DESCRIPTION	• Engine starts in P, N, and other ranges		
[TROUBLESHOOTING HINTS] ① Selector lever installation or adjustment incorrect ② Transaxle range switch worn or misadjusted			
STEP	INSPECTION		ACTION
1	Is selector lever operation OK? ☞ page K1–45	Yes	Go to next step
		No	Adjust selector lever ☞ page K1–46
2	Operate selector lever Are selector lever and selector indicator light positions aligned?	Yes	Go to next step
		No	Adjust transaxle range switch ☞ page K1–21
3	Are measurements at powertrain control module terminals OK? ☞ section F1 TERMINAL: 1F, 2K, 2I, 2M, 2R — FUNCTION: Transaxle range switch	Yes	Go to next step
		No	Check transaxle range switch and wiring ☞ page K1–21
4	Is continuity of transaxle range switch OK? ☞ page K1–21	Yes	Check parking mechanism ☞ Automatic transaxle workshop manual GF4A–EL
		No	Adjust and/or replace transaxle range switch ☞ page K1–22

14	ENGINE STALLS	• WHEN SHIFTED FROM NEUTRAL OR PARK TO OTHER RANGES WHILE IDLING

DESCRIPTION • Engine stops unexpectedly when shifted from neutral or park position to other ranges at idle

[TROUBLESHOOTING HINTS]
① Engine idle speed low
② Control valve stuck
③ Idle air control valve malfunction
④ Powertrain control module malfunction
⑤ Torque converter clutch control solenoid valves worn
⑥ Inhibitor signal malfunction
⑦ Transaxle range switch worn or misadjusted
⑧ Oil pump worn
⑨ ATF level low

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Are ATF level and condition OK? ☞ page K1–10 Do transaxle seals, sealant, and gaskets prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Conditions ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
3	Is line pressure OK? ☞ page K1–2 **Specified pressure** **Line pressure** **kPa {kgf/cm², psi}** Range / Idle / Stall D, S, L: 420—530 {4.2—5.5, 60—78} / 1,100—1,170 {11.2—12.0, 160—170} R: 730—1,010 {7.4—10.3, 110—146} / 1,910—2,020 {19.4—20.7, 276—294}	Yes	Go to next step
		No	Replace control valve body assembly ☞ page K1–36
4	Are measurements at powertrain control module terminals OK? TERMINAL: 1F, 2K, 2I, 2M, 2R — FUNCTION: Transaxle range switch	Yes	Go to next step
		No	Check transaxle range switch and wiring ☞ page K1–21
5	Is continuity of transaxle range switch OK? ☞ page K1–21	Yes	Go to next step
		No	Adjust and/or replace transaxle range switch ☞ page K1–22
6	Does idle air control valve operate correctly? ☞ section F1	Yes	Go to next step
		No	Replace idle air control valve ☞ section F1

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Are resistance and output voltage of torque converter clutch control solenoid valve at powertrain control module terminal OK?
☞ page K1–25 section F1
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>2C</td><td>TCC control solenoid valve</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td>No</td><td>If resistance is not OK, check for malfunctioning parts and wiring
• Torque converter clutch control solenoid valve
☞ page K1–27

If resistance is OK but voltage is not, replace powertrain control module
☞ section F1</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">Is output voltage of inhibitor signal at powertrain control module terminal OK?
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>1F</td><td>Transaxle range switch</td></tr></table></td><td>Yes</td><td>Check wiring and connector (1F terminal of powertrain control module—transaxle range switch)</td></tr>
<tr><td>No</td><td>Go to next step</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">Is engine stall speed OK?
☞ page K1–4

Stall speed:
D, S, L range : 2,270—2,500 rpm
R range : 2,270—2,500 rpm</td><td>Yes</td><td>Replace powertrain control module
☞ section F1</td></tr>
<tr><td>No</td><td>Overhaul transaxle and repair or replace parts as necessary
☞ Automatic transaxle workshop manual GF4A–EL</td></tr>
</table>

18	ENGINE STALLS	• ON DECELERATION
DESCRIPTION	• Engine stalls when brake pedal depressed while driving at low speed or stopping	

[TROUBLESHOOTING HINTS]
① ATF level low or high
② Transaxle range switch worn or misadjusted
③ Powertrain control module malfunction
④ Torque converter clutch control solenoid valve malfunction
⑤ Inhibitor signal malfunction
⑥ Oil pump worn
⑦ Control valve stuck

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Are ATF level and condition OK? ☞ page K1–10 Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Conditions ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
3	Is line pressure OK? ☞ page K1–2 **Specified pressure** **Line pressure** **kPa {kgf/cm², psi}** Range / Idle / Stall D, S, L: 420—530 {4.2—5.5, 60—78} / 1,100—1,170 {11.2—12.0, 160—170} R: 730—1,010 {7.4—10.3, 110—146} / 1,910—2,020 {19.4—20.7, 276—294}	Yes	Go to next step
		No	Replace control valve body assembly ☞ page K1–36
4	Are measurements at powertrain control module terminals OK? ☞ section F1 TERMINAL: 1F, 2K, 2I, 2M, 2R — FUNCTION: Transaxle range switch	Yes	Go to next step
		No	Check transaxle range switch and wiring ☞ page K1–21
5	Is continuity of transaxle range switch OK? ☞ page K1–21	Yes	Go to next step
		No	Adjust and/or replace transaxle range switch ☞ page K1–22
6	Are resistance and output voltage of torque converter clutch control solenoid valve at powertrain control module terminal OK? ☞ page K1–25 section F1 TERMINAL: 2C — FUNCTION: TCC control solenoid valve	Yes	Go to next step
		No	If resistance is not OK, check for malfunctioning parts and wiring • Torque converter clutch control solenoid valve ☞ page K1–27 If resistance is OK but voltage is not, replace powertrain control module ☞ section F1

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Is output voltage of inhibitor signal at powertrain control module terminal OK?
☞ section F1

<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>1F</td><td>Transaxle range switch</td></tr></table></td><td>Yes</td><td>Check wiring and connector (1F terminal of powertrain control module—transaxle range switch)</td></tr>
<tr><td>No</td><td>Go to next step</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">Is engine stall speed OK?
☞ page K1–4

Stall speed:
D, S, L range : 2,270—2,500 rpm
R range : 2,270—2,500 rpm</td><td>Yes</td><td>Replace powertrain control module
☞ section F1</td></tr>
<tr><td>No</td><td>Overhaul transaxle and repair or replace parts as necessary
☞ Automatic transaxle workshop manual GF4A-EL</td></tr>
</table>

24	ENGINE ROUGH	• ON DECELERATION
DESCRIPTION	• Engine shakes at beginning of deceleration, during deceleration, or recovery from deceleration • Exhaust afterburn	
[TROUBLESHOOTING HINTS] ① ATF level low		② Line pressure low

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K1–10 Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Conditions ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
2	Is line pressure OK? ☞ page K1–2 **Specified pressure** **Line pressure** **kPa {kgf/cm², psi}**	Yes	Go to next step
		No	Replace control valve body assembly ☞ page K1–36

Range	Idle	Stall
D, S, L	420—530 {4.2—5.5, 60—78}	1,100—1,170 {11.2—12.0, 160—170}
R	730—1,010 {7.4—10.3, 110—146}	1,910—2,020 {19.4—20.7, 276—294}

25	POOR ACCELERATION	• AT DRIVEAWAY
DESCRIPTION	• Engine speed increases normally, but vehicle speed slowly increases during acceleration	

[TROUBLESHOOTING HINTS]
① ATF level low
② HOLD switch malfunction
③ Transaxle range switch worn or misadjusted
④ Throttle position sensor malfunction or misadjusted
⑤ Line pressure incorrect
⑥ Engine stall speed incorrect

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Are ATF level and condition OK? ☞ page K1–10 Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Conditions ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
3	Drive vehicle in D, S, and L ranges (non-HOLD mode) Does vehicle start from stop in first gear? Amount of engine rpm when throttle opening angle is at 4/8 and vehicle speed is 20 km/h {12 mph} **RPM: Approx. 2,000**	Yes	Go to next step
		No	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A-EL
4	Are measurements at powertrain control module terminals OK? ☞ section F1 TERMINAL / FUNCTION 2L — HOLD switch 1F, 2K, 2I, 2M, 2R — Transaxle range switch 3B — Throttle position sensor	Yes	Go to next step
		No	Check for malfunction parts and wiring • HOLD switch ☞ page K1–20 • Transaxle range switch ☞ page K1–21 • Throttle position sensor ☞ section F1
5	Is line pressure OK? ☞ page K1–2 **Specified pressure** **Line pressure** kPa {kgf/cm², psi} Range / Idle / Stall D, S, L — 420—530 {4.2—5.5, 60—78} / 1,100—1,170 {11.2—12.0, 160—170} R — 730—1,010 {7.4—10.3, 110—146} / 1,910—2,020 {19.4—20.7, 276—294}	Yes	Go to next step
		No	Replace control valve body assembly ☞ page K1–36
6	Is engine stall speed OK? ☞ page K1–4 **Stall speed:** **D, S, L range : 2,270—2,500 rpm** **R range : 2,270—2,500 rpm**	Yes	Replace powertrain control module ☞ section F1
		No	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A-EL

26	POOR ACCELERATION	• ON ACCELERATION
DESCRIPTION	• Engine speed increases normally, but vehicle speed slowly increases during acceleration	

[TROUBLESHOOTING HINTS]
① ATF level low
② Line pressure low
③ Engine stall speed incorrect
④ HOLD switch malfunction
⑤ Transaxle range switch worn or misadjusted
⑥ Throttle position sensor malfunction or misadjusted

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Are ATF level and condition OK? ☞ page K1–10 Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Conditions ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
3	Is line pressure OK? ☞ page K1–2 **Specified pressure** **Line pressure** **kPa {kgf/cm², psi}** Range / Idle / Stall D, S, L: 420—530 {4.2—5.5, 60—78} / 1,100—1,170 {11.2—12.0, 160—170} R: 730—1,010 {7.4—10.3, 110—146} / 1,910—2,020 {19.4—20.7, 276—294}	Yes	Go to next step
		No	Replace control valve body assembly ☞ page K1–36
4	Is engine stall speed OK? ☞ page K1–4 **Stall speed:** **D, S, L range : 2,270—2,500 rpm** **R range : 2,270—2,500 rpm**	Yes	Replace powertrain control module ☞ section F1
		No	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A-EL
5	Drive vehicle in D, S, and L ranges (non-HOLD mode) Does vehicle start from stop in first gear? Amount of engine rpm when throttle opening angle is at 4/8 and vehicle speed is 20 km/h {12 mph} **RPM: Approx. 2,000 rpm**	Yes	Go to next step
		No	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A-EL
6	Are measurements at powertrain control module terminals OK? ☞ section F1 TERMINAL / FUNCTION 2L: HOLD switch 1F, 2K, 2I, 2M, 2R: Transaxle range switch 3B: Throttle position sensor	Yes	Replace powertrain control module ☞ section F1
		No	Check for malfunction parts and wiring • HOLD switch ☞ page K1–20 • Transaxle range switch ☞ page K1–21 • Throttle position sensor ☞ section F1

30	SURGES WHILE CRUISING
DESCRIPTION	• Momentary minor irregularity in engine output at steady vehicle speed

[TROUBLESHOOTING HINTS]
① Throttle position sensor malfunction or misadjusted
② Torque converter clutch control solenoid valve malfunction
③ Powertrain control module malfunction
④ Control valve stuck

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Is input voltage of throttle position sensor at powertrain control module terminal OK? ☞ section F1 TERMINAL: 3B — FUNCTION: Throttle position sensor	Yes	Go to next step
		No	Check throttle position sensor and wiring ☞ section F1
3	Are resistance and output voltage of torque converter clutch control solenoid valve at powertrain control module terminal OK? ☞ page K1–25 section F1 TERMINAL: 2C — FUNCTION: TCC control solenoid valve	Yes	Replace control valve body assembly ☞ page K1–36
		No	If resistance is not OK, check for malfunctioning parts and wiring • Torque converter clutch control solenoid valve ☞ page K1–27 If resistance is OK but voltage is not, replace powertrain control module ☞ section F1

31	LACK OF POWER
DESCRIPTION	• Performance poor under load (i.e., power down when climbing hills)
Go to No.26 "POOR ACCELERATION" ☞ page K1–88	

32	POOR FUEL ECONOMY
DESCRIPTION	• Fuel economy unsatisfactory

[TROUBLESHOOTING HINTS]
① ATF level low
② Throttle position sensor malfunction or misadjusted
③ Torque converter clutch control solenoid valve worn

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ **page K1–51** If problem remains, go to next step
2	Are ATF level and condition OK? ☞ **page K1–10** Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Condition ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
3	Is input voltage of throttle position sensor at powertrain control module terminal OK? TERMINAL: 3B — FUNCTION: Throttle position sensor	Yes	Go to next step
		No	Check throttle position sensor and wiring ☞ **section K1**
4	Are resistance and output voltage of torque converter clutch control solenoid valve at powertrain control module terminal OK? ☞ **page K1–25 section F1** TERMINAL: 2C — FUNCTION: TCC control solenoid valve	Yes	Overhaul transaxle and repair or replace parts as necessary ☞ **Automatic transaxle workshop manual GF4A-EL**
		No	If resistance is not OK, check for malfunctioning parts and wiring • Torque converter clutch control solenoid valve ☞ **page K1–27** If resistance is OK but voltage is not, replace powertrain control module ☞ **section F1**

39	VEHICLE DOES NOT MOVE IN D, S, L, AND/OR R RANGES
DESCRIPTION	• No creep at all • Vehicle does not move when accelerator pedal depressed after shifted to D, S, L, and/or R range

[TROUBLESHOOTING HINTS]
① ATF level low
② Selector lever installation or adjustment incorrect
③ Line pressure low
④ Powertrain slippage
⑤ Parking mechanism worn
⑥ Control valve stuck
⑦ Torque converter worn

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K1–10	Yes	Go to next step
	Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Condition ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
2	Is selector lever operation OK? ☞ page K1–45	Yes	Go to next step
		No	Adjust selector lever ☞ page K1–46
3	Operate selector lever Are selector lever and selector indicator light positions aligned?	Yes	Go to next step
		No	Adjust transaxle range switch ☞ page K1–21
4	Operate selector lever Does transaxle operates normally and are selector lever and transaxle position aligned?	Yes	Go to next step
		No	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A–EL
5	Is line pressure OK? ☞ page K1–2 **Specified pressure** **Line pressure** **kPa {kgf/cm², psi}** Range / Idle / Stall D, S, L: 420—530 {4.2—5.5, 60—78} / 1,100—1,170 {11.2—12.0, 160—170} R: 730—1,010 {7.4—10.3, 110—146} / 1,910—2,020 {19.4—20.7, 276—294}	Yes	Go to next step
		No	Replace control valve body assembly ☞ page K1–36
6	Is engine stall speed OK? ☞ page K1–4 **Stall speed:** **D, S, L range : 2,270—2,500 rpm** **R range : 2,270—2,500 rpm**	Yes	Go to next step
		No	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A–EL
7	Stop vehicle on flat, paved surface with engine OFF Does vehicle move when pushed? (Except park position, parking brake released)	Yes	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A–EL
		No	Parking mechanism malfunction Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A–EL

40	VEHICLE MOVES IN NEUTRAL POSITION
DESCRIPTION	• Vehicle creeps in neutral position • Vehicle moves when accelerator pedal not depressed

[TROUBLESHOOTING HINTS]
① Selector lever installation or adjustment incorrect
② ATF level low or high
③ Powertrain damaged
④ Torque converter worn

STEP	INSPECTION		ACTION
1	Is selector lever operation OK? ☞ page K1–45	Yes	Go to next step
		No	Adjust selector lever ☞ page K1–46
2	Operate selector lever Are selector lever light position aligned?	Yes	Go to next step
		No	Adjust transaxle range switch ☞ page K1–21
3	Operate selector lever Does transaxle operates normally and are selector lever and transaxle position aligned?	Yes	Go to next step ☞ page K1–31
		No	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A–EL
4	Are ATF level and condition OK? ☞ page K1–10 Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Condition ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
5	Is line pressure OK? ☞ page K1–2 **Specified pressure** **Line pressure** **kPa {kgf/cm², psi}** Range / Idle / Stall D, S, L: 420—530 {4.2—5.5, 60—78} / 1,100—1,170 {11.2—12.0, 160—170} R: 730—1,010 {7.4—10.3, 110—146} / 1,910—2,020 {19.4—20.7, 276—294}	Yes	Go to next step
		No	Replace control valve body assembly ☞ page K1–36
6	Is engine stall speed OK? ☞ page K1–4 **Stall speed:** **D, S, L range : 2,270—2,500 rpm** **R range : 2,270—2,500 rpm**	Yes	Go to next step
		No	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A–EL
7	Stop vehicle on flat, paved surface with engine OFF Does vehicle move when pushed? (Except park position, parking brake released)	Yes	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A–EL
		No	Parking mechanism malfunction Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A–EL

41	VEHICLE MOVES IN PARK POSITION		
DESCRIPTION	• Vehicle rolls in park position		
[TROUBLESHOOTING HINTS] ① Selector lever installation or adjustment incorrect ② Line pressure incorrect ③ Parking mechanism worn ④ Powertrain damaged ⑤ Torque converter worn			
1	Is selector lever operation OK? ☞ page K1–45	Yes	Go to next step
		No	Adjust selector lever ☞ page K1–46
2	Operate selector lever Are selector lever and selector indicator light positions aligned?	Yes	Go to next step
		No	Adjust transaxle range switch ☞ page K1–21
3	Operate selector lever Does transaxle operates normally and are selector lever and transaxle position aligned?	Yes	Go to next step ☞ page K1–107
		No	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A–EL
4	Is line pressure OK? ☞ page K1–2 **Specified pressure** **Line pressure** kPa {kgf/cm², psi}	Yes	Go to next step
		No	Replace control valve body assembly ☞ page K1–36
5	Is engine stall speed OK? ☞ page K1–4 **Stall speed:** **D, S, L range : 2,270—2,500 rpm** **R range : 2,270—2,500 rpm**	Yes	Go to next step
		No	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A–EL
6	Stop vehicle on flat, paved surface with engine OFF Does vehicle move when pushed? (Except park position, parking brake released)	Yes	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A–EL
		No	Parking mechanism malfunction Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A–EL

Range	Idle	Stall
D, S, L	420—530 {4.2—5.5, 60—78}	1,100—1,170 {11.2—12.0, 160—170}
R	730—1,010 {7.4—10.3, 110—146}	1,910—2,020 {19.4—20.7, 276—294}

42	EXCESSIVE CREEP
DESCRIPTION	• Vehicle moves quickly in D, S, L, and R ranges (accelerator pedal depressed) • Excessive neutral to R range and neutral to D range shift shock felt
[TROUBLESHOOTING HINTS] Selector lever installation or adjustment incorrect	☞ page K1–46

43	NO SHIFT
DESCRIPTION	With gear position in HOLD mode: • Single range shift (1st→2nd, 2nd→3GR, or 3GR→4GR) only • Sometimes shifts correctly

[TROUBLESHOOTING HINTS]

① ATF level low
② Selector lever installation or adjustment incorrect
③ Input/turbine speed sensor malfunction
④ Speedometer sensor malfunction
⑤ Throttle position sensor malfunction or misadjusted
⑥ Transaxle range switch worn or misadjusted
⑦ Line pressure low
⑧ HOLD switch malfunction
⑨ Shift solenoid A, B, C malfunction
⑩ Powertrain control module malfunction
⑪ Control valve stuck
⑫ Powertrain damaged

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ **page K1–51** If problem remains, go to next step
2	Are ATF level and condition OK? ☞ **page K1–10** Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Condition ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
3	Is selector lever operation OK? ☞ **page K1–45**	Yes	Go to next step
		No	Adjust selector lever ☞ **page K1–46**
4	Operate selector lever Is selector lever position aligned?	Yes	Go to next step
		No	Adjust transaxle range switch ☞ **page K–21**
5	Operate selector lever Does transaxle operates normally and are selector lever and transaxle position aligned?	Yes	Go to next step
		No	Overhaul transaxle and repair or replace parts as necessary ☞ **Automatic transaxle workshop manual GF4A–EL**
6	Disconnect solenoid 6-pin connector Is vehicle driven as follows?	Yes	Go to next step
		No	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary ☞ **Automatic transaxle workshop manual GF4A–EL**
7	Drive vehicle in D, S, and L ranges (non-HOLD mode) Does vehicle start from stop in 1st gear? Amount of engine rpm when throttle opening angle is at 4/8 and vehicle speed is 20 km/h {12 mph} **RPM: Approx. 2,000 rpm**	Yes	Go to next step
		No	Overhaul transaxle and repair or replace parts as necessary ☞ **Automatic transaxle workshop manual GF4A–EL**

Range	Gear position
D range	3GR (fixed)
S range	3GR (fixed)
L range	First (fixed)
R range	Reverse (fixed)

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>8</td><td>Are reistance and output voltage shift solenoid A, B, C at powertrain control module terminals OK?
☞ page K1–25 section F1
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>2A</td><td>Shift solenoid A</td></tr><tr><td>2B</td><td>Shift solenoid B</td></tr><tr><td>2F</td><td>Shift solenoid C</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>If resistance is not OK, check for malfunctioning parts and wiring
• Shift solenoid A ☞ page K1–27
• Shift solenoid B ☞ page K1–27
• Shift solenoid C ☞ page K1–27

If resistance is OK but voltage is not, replace powertrain control module</td></tr>
<tr><td>9</td><td>Are measurements at powertrain control module terminals OK?
☞ section F1
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>3B</td><td>Throttle position sensor</td></tr><tr><td>2P</td><td>Input/turbine speed sensor</td></tr><tr><td>2T</td><td>Ground (input)</td></tr><tr><td>1C</td><td>Speedometer sensor</td></tr><tr><td>2L</td><td>HOLD switch</td></tr><tr><td>1F, 2K, 2I, 2M, 2R</td><td>Transaxle range switch</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Check for malfunction parts and wiring
• Throttle position sensor ☞ section F1
• Input/turbine speed sensor ☞ page K1–24
• Speedometer sensor ☞ page K1–24
• HOLD switch ☞ page K1–20
• Transaxle range switch ☞ page K1–21</td></tr>
<tr><td>10</td><td>Is continuity of transaxle range switch OK?
☞ page K1–21</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace transaxle range switch
☞ page K1–22</td></tr>
<tr><td>11</td><td>Is line pressure OK?
☞ page K1–2

Specified pressure
Line pressure kPa {kgf/cm², psi}
<table><tr><th>Range</th><th>Idle</th><th>Stall</th></tr><tr><td>D, S, L</td><td>420—530
{4.2—5.5, 60—78}</td><td>1,100—1,170
{11.2—12.0, 160—170}</td></tr><tr><td>R</td><td>730—1,010
{7.4—10.3, 110—146}</td><td>1,910—2,020
{19.4—20.7, 276—294}</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace control valve body assembly
☞ page K1–36</td></tr>
<tr><td>12</td><td>Is engine stall speed OK?
☞ page K1–4

Stall speed:
D, S, L range : 2,270—2,500 rpm
R range : 2,270—2,500 rpm</td><td>Yes</td><td>Replace powertrain control module
☞ section F1</td></tr>
<tr><td></td><td></td><td>No</td><td>Overhaul transaxle and repair or replace parts as necessary
☞ Automatic transaxle workshop manual GF4A–EL</td></tr>
</table>

44	ABNORMAL SHIFT
DESCRIPTION	• Shifts incorrectly (incorrect shift pattern) (Ex) Vehicle shifts 1st→4GR directly when accelerating with accelerator pedal depressed slightly

[TROUBLESHOOTING HINTS]

① ATF level low or high
② Throttle position sensor malfunction or misadjusted
③ Input/turbine speed sensor malfunction
④ Transaxle fluid temperature sensor malfunction
⑤ Selector lever installation or adjustment incorrect
⑥ Shift solenoid A, B, C valve worn
⑦ Powertrain control module malfunction
⑧ Control valve stuck
⑨ Transaxle range switch malfunction or misadjusted

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Are ATF level and condition OK? ☞ page K1–10 Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Condition ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
3	Are measurements at powertrain control module terminals OK? ☞ section F1 TERMINAL: 3B — FUNCTION: Throttle position sensor TERMINAL: 2P — FUNCTION: Input/turbine speed sensor TERMINAL: 2T — FUNCTION: Ground (Input)	Yes	Go to next step
		No	Check for malfunction parts and wiring • Throttle position sensor ☞ section F1 • Input/turbine speed sensor ☞ page K1–24
4	Is input voltage of transaxle fluid temperature sensor at powertrain control module terminal OK? ☞ section F1 TERMINAL: 2O — FUNCTION: Transaxle fluid temperature sensor TERMINAL: 3AB — FUNCTION: Ground (Input)	Yes	Go to next step
		No	Check transaxle fluid temperature sensor and wiring ☞ page K1–23
5	Is selector lever operation OK? ☞ page K1–45	Yes	Go to next step
		No	Adjust selector lever ☞ page K1–46
6	Operate selector lever Are selector lever and selector indicator light positions aligned?	Yes	Go to next step
		No	Adjust transaxle range switch ☞ page K1–21
7	Operate selector lever Does transaxle operates normally and are selector lever and transaxle position aligned?	Yes	Go to next step
		No	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A–EL

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>8</td><td>Are measurements at powertrain control module terminals OK?
☞ section F1
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>1F, 2K, 2I, 2M, 2R</td><td>Transaxle range switch</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Check transaxle range switch and wiring
☞ page K1–21</td></tr>
<tr><td>9</td><td>Is continuity of transaxle range switch OK?
☞ page K1–21</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Adjust and/or replace transaxle range switch
☞ page K1–21</td></tr>
<tr><td>10</td><td>Are resistance and output voltage of shift solenoid A, B, C at powertrain control module terminal OK?
☞ page K1–25
section F1
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>2A</td><td>Shift solenoid A</td></tr><tr><td>2B</td><td>Shift solenoid B</td></tr><tr><td>2F</td><td>Shift solenoid C</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>If resistance is not OK, check for malfunctioning parts and wiring
• Shift solenoid A ☞ page K1–27
• Shift solenoid B ☞ page K1–27
• Shift solenoid C ☞ page K1–27
If resistance is OK but voltage is not, replace powertrain control module
☞ section F1</td></tr>
<tr><td>11</td><td>Is line pressure OK?
☞ page K1–2
Specified pressure
Line pressure kPa {kgf/cm², psi}
<table><tr><th>Range</th><th>Idle</th><th>Stall</th></tr><tr><td>D, S, L</td><td>420—530 {4.2—5.5, 60—78}</td><td>1,100—1,170 {11.2—12.0, 160—170}</td></tr><tr><td>R</td><td>730—1,010 {7.4—10.3, 110—146}</td><td>1,910—2,020 {19.4—20.7, 276—294}</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace control valve body assembly
☞ page K1–36</td></tr>
<tr><td>12</td><td>Is engine stall speed OK?
☞ page K1–4
Stall speed:
D, S, L range : 2,270—2,500 rpm
R range : 2,270—2,500 rpm</td><td>Yes</td><td>Replace powertrain control module
☞ section F1</td></tr>
<tr><td></td><td></td><td>No</td><td>Overhaul transaxle and repair or replace parts as necessary
☞ Automatic transaxle workshop manual GF4A-EL</td></tr>
</table>

45	FREQUENT SHIFTING
DESCRIPTION	• Downshift occurs when accelerator depressed slightly in D, S, and L ranges (non-HOLD mode)

[TROUBLESHOOTING HINTS]
① Transaxle fluid temperature sensor malfunction
② Throttle position sensor malfunction or misadjusted
③ Input/turbine speed sensor malfunction
④ Powertrain control module malfunction
⑤ Control valve stuck

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Is voltage between 2O terminals of powertrain control module and transaxle case OK?	Yes	Go to next step
		No	Repair wiring or replace connector
3	Are measurements at powertrain control module terminals OK? ☞ section F1 TERMINAL / FUNCTION: 2O — Transaxle fluid temperature sensor 3AB — Ground (Input) 3B — Throttle position sensor 2P — Input/turbine speed sensor 2T — Ground (Input)	Yes	Go to next step
		No	Check for malfunction parts and wiring • Transaxle fluid temperature sensor ☞ page K1–23 • Throttle position sensor ☞ section F1 • Input/turbine speed sensor ☞ page K1–24
4	Replace with known good powertrain control module Is problem corrected?	Yes	Replace powertrain control module ☞ section F1
		No	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary ☞ page K1–36

46	SHIFT POINT HIGH OR LOW
DESCRIPTION	• Shift points do not match shift diagram • Shits delayed when accelerating • Shifts occur too fast when accelerating and engine speed does not increase

[TROUBLESHOOTING HINTS]

① ATF level low or high
② Throttle position sensor malfunction or misadjusted
③ Input/turbine speed sensor malfunction
④ Transaxle fluid temperature sensor malfunction
⑤ Selector lever installation or adjustment incorrect
⑥ Shift solenoid A, B, C worn
⑦ Powertrain control module malfunction
⑧ Control valve stuck
⑨ Transaxle range switch malfunction or misadjusted

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Are ATF level and condition OK? ☞ page K1–10 Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Condition ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
3	Are measurements at powertrain control module terminals OK? ☞ section F1 TERMINAL: 3B — FUNCTION: Throttle position sensor TERMINAL: 2P — FUNCTION: Input/turbine speed sensor TERMINAL: 2T — FUNCTION: Ground (Input)	Yes	Go to next step
		No	Check for malfunction parts and wiring • Throttle position sensor ☞ section F1 • Input/turbine speed sensor ☞ page K1–24
4	Is input voltage of transaxle fluid temperature sensor at powertrain control module terminal OK? ☞ page K1– TERMINAL: 2O — FUNCTION: Transaxle fluid temperature sensor TERMINAL: 3AB — FUNCTION: Ground (Input)	Yes	Go to next step
		No	Check transaxle fluid temperature sensor and wiring ☞ page K1–23
5	Is selector lever operation OK? ☞ page K1–45	Yes	Go to next step
		No	Adjust selector lever ☞ page K1–46
6	Operate selector lever Are selector lever and selector indicator light positions aligned?	Yes	Go to next step
		No	Adjust transaxle range switch ☞ page K1–21

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>7</td><td>Operate selector lever
Does transaxle operates normally and are selector lever and transaxle position aligned?</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Overhaul transaxle and repair or replace parts as necessary
☞ Automatic transaxle workshop manual GF4A-EL</td></tr>
<tr><td>8</td><td>Are measurements at powertrain control module terminals OK?
☞ section F1
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>1F, 2K, 2I, 2M, 2R</td><td>Transaxle range switch</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Check transaxle range switch and wiring
☞ page K1-21</td></tr>
<tr><td>9</td><td>Is continuity of transaxle range switch OK?
☞ page K1-21</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Adjust and/or replace transaxle range switch
☞ page K1-21</td></tr>
<tr><td>10</td><td>Are resistance and output voltage of shift solenoid A, B, C at powertrain control module terminal OK?
☞ page K1-25
section F1
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>2A</td><td>Shift solenoid A</td></tr><tr><td>2B</td><td>Shift solenoid B</td></tr><tr><td>2F</td><td>Shift solenoid C</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>If resistance is not OK, check for malfunctioning parts and wiring
• Shift solenoid A ☞ page K1-27
• Shift solenoid B ☞ page K1-27
• Shift solenoid C ☞ page K1-27
If resistance is OK but voltage is not, replace powertrain control module
☞ section F1</td></tr>
<tr><td>11</td><td>Is line pressure OK?
☞ page K1-2
Specified pressure
Line pressure kPa {kgf/cm², psi}
<table><tr><th>Range</th><th>Idle</th><th>Stall</th></tr><tr><td>D, S, L</td><td>420—530 {4.2—5.5, 60—78}</td><td>1,100—1,170 {11.2—12.0, 160—170}</td></tr><tr><td>R</td><td>730—1,010 {7.4—10.3, 110—146}</td><td>1,910—2,020 {19.4—20.7, 276—294}</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace control valve body assembly
☞ page K1-36</td></tr>
<tr><td>12</td><td>Is engine stall speed OK?
☞ page K1-4
Stall speed:
D, S, L range : 2,270—2,500 rpm
R range : 2,270—2,500 rpm</td><td>Yes</td><td>Replace powertrain control module
☞ section F1</td></tr>
<tr><td></td><td></td><td>No</td><td>Overhaul transaxle and repair or replace parts as necessary
☞ Automatic transaxle workshop manual GF4A-EL</td></tr>
</table>

47	TORQUE CONVERTER CLUTCH NON OPERATION
DESCRIPTION	• Torque converter clutch non operation when vehicle speed reaches torque converter clutch operation range

[TROUBLESHOOTING HINTS]

① ATF level low
② Solenoid valve malfunction
③ HOLD switch worn
④ Transaxle range switch worn or misadjusted
⑤ Brake switch malfunction
⑥ Control valve stuck
⑦ Transaxle fluid temperature sensor malfunction
⑧ Throttle position sensor malfunction or misadjusted
⑨ Engine speed input signal malfunction
⑩ Input/turbine speed sensor malfunction
⑪ Speedometer sensor malfunction
⑫ Powertrain control module malfunction
⑬ Torque converter worn

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Is input voltage of engine coolant temperature sensor at powertrain control module terminal OK? ☞ section F1 TERMINAL: 3Q — FUNCTION: Engine coolant temperature sensor	Yes	Go to next step
		No	Check engine coolant temperature sensor and wiring ☞ section F1
3	Are resistance and output voltage of torque converter clutch control solenoid valve at powertrain control module terminal OK? ☞ page K1–25 section F1 TERMINAL: 2C — FUNCTION: TCC control solenoid valve	Yes	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary ☞ page K1–36
		No	If resistance is not OK, check for malfunctioning parts and wiring • Torque converter clutch control solenoid valve ☞ page K1–27 If resistance is OK but voltage is not, replace powertrain control module ☞ section F1

48	NO KICKDOWN
DESCRIPTION	• Does not downshift when accelerator pedal depressed more than 7/8 while within kickdown range

[TROUBLESHOOTING HINTS]
① Throttle position sensor malfunction or misadjusted
② Accelerator cable malfunction or misadjusted
③ HOLD switch worn
④ Transaxle range switch worn or misadjusted
⑤ Powertrain control module malfunction
⑥ Control valve stuck
⑦ Pressure control solenoid worn

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Is input voltage of throttle position sensor at powertrain control module OK? TERMINAL: 3B — FUNCTION: Throttle position sensor	Yes	Replace powertrain control module ☞ section F1
		No	Check throttle position sensor and wiring ☞ section F1
3	Is accelerator cable installed correctly and does it operate smoothly? ☞ section F1	Yes	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary ☞ page K1–36
		No	Adjust or replace accelerator cable ☞ section F1

49	ENGINE SPEED FLARES UP	• WHEN ACCELERATING
DESCRIPTION	• Engine speed flares up on acceleration	

[TROUBLESHOOTING HINTS]

① ATF level low
② Line pressure low
③ Control valve stuck
④ Selector lever installation or adjustment incorrect
⑤ Throttle position sensor malfunction or misadjusted
⑥ Pressure control solenoid worn
⑦ Powertrain slippage
⑧ Torque converter worn
⑨ Transaxle fluid temperature sensor malfunction
⑩ Input/turbine speed sensor malfunction
⑪ Powertrain control module malfunction

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ **page K1–10**	Yes	Go to next step
	Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Condition ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
2	Is line pressure OK? **Specified pressure** **Line pressure** **kPa {kgf/cm², psi}**	Yes	Go to next step
		No	Replace control valve body assembly ☞ **page K1–36**
3	Is engine stall speed OK? ☞ **page K1–4** **Stall speed:** **D, S, L range : 2,270—2,500 rpm** **R range : 2,270—2,500 rpm**	Yes	Replace control valve body assembly ☞ **page K1–36**
		No	Overhaul transaxle and repair or replace parts as necessary ☞ **Automatic transaxle workshop manual GF4A-EL**

Range	Idle	Stall
D, S, L	420—530 {4.2—5.5, 60—78}	1,100—1,170 {11.2—12.0, 160—170}
R	730—1,010 {7.4—10.3, 110—146}	1,910—2,020 {19.4—20.7, 276—294}

50	ENGINE SPEED FLARES UP	• WHEN UPSHIFTING AND/OR DOWNSHIFTING
DESCRIPTION	• Engine flares up when accelerator pedal depressed for upshifting • Engine flares up suddenly when accelerator pedal depressed or downshifting	

[TROUBLESHOOTING HINTS]

① ATF level low
② Line pressure low
③ Transmission fluid temperature sensor malfunction
④ Throttle position sensor malfunction or misadjusted
⑤ Input/turbine speed sensor malfunction
⑥ Powertrain control module malfunction
⑦ Servo piston malfunction
⑧ Orifice valve malfunction
⑨ 1-2, 2-3 accumulator malfunction
⑩ Control valve stuck
⑪ Powertrain slippage

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Are ATF level and condition OK? ☞ page K1–10 Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Condition ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
3	Is line pressure OK? ☞ page K1–2 **Specified pressure** **Line pressure** **kPa {kgf/cm², psi}** Range / Idle / Stall D, S, L: 420—530 {4.2—5.5, 60—78} / 1,100—1,170 {11.2—12.0, 160—170} R: 730—1,010 {7.4—10.3, 110—146} / 1,910—2,020 {19.4—20.7, 276—294}	Yes	Go to next step
		No	Replace control valve body assembly ☞ page K1–36
4	Are measurement at powertrain control module terminals OK? TERMINAL / FUNCTION 2O: Transaxle fluid temperature sensor 3AB: Ground (Input) 3B: Throttle position sensor 2P: Input/turbine speed sensor 2T: Ground (Input)	Yes	Go to next step
		No	Check for malfunction parts and wiring • Transaxle fluid temperature sensor ☞ page K1–23 • Throttle position sensor ☞ section F1 • Input/turbine speed sensor ☞ page K1–24
5	Is engine stall speed OK? ☞ page K1–4 **Stall speed:** **D, S, L range : 2,270—2,500 rpm** **R range : 2,270—2,500 rpm**	Yes	Replace powertrain control module ☞ section F1
		No	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A-EL

51	EXCESSIVE SHIFT SHOCK	• PARK/NEUTRAL TO R AND/OR NEUTRAL TO D
DESCRIPTION	• Strong shift shock felt at idle when shifting from park or neutral to D or R range	

[TROUBLESHOOTING HINTS]
① ATF level low
② Idle speed high
③ Line pressure high
④ Powertrain control module malfunction
⑤ N–D, N–R accumulator malfunction
⑥ Powertrain damaged

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ **page K1–51** If problem remains, go to next step
2	Are ATF level and condition OK? ☞ **page K1–10** Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Condition ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
3	Is line pressure OK? ☞ **page K1–2** **Specified pressure** **Line pressure** **kPa {kgf/cm², psi}** D, S, L: Idle 420—530 {4.2—5.5, 60—78}; Stall 1,100—1,170 {11.2—12.0, 160—170} R: Idle 730—1,010 {7.4—10.3, 110—146}; Stall 1,910—2,020 {19.4—20.7, 276—294}	Yes	Go to next step
		No	Replace control valve body assembly ☞ **page K1–36**
4	Is engine stall speed OK? ☞ **page K1–4** **Stall speed:** **D, S, L range : 2,270—2,500 rpm** **R range : 2,270—2,500 rpm**	Yes	Go to next step
		No	Overhaul transaxle and repair or replace parts as necessary ☞ **Automatic transaxle workshop manual GF4A-EL**
5	Is input voltage of inhibitor signal at powertrain control module terminal OK? ☞ **section F1** 1F: Transaxle range switch	Yes	Check transaxle range switch and wiring.
		No	Replace powertrain control module ☞ **section F1**

52	EXCESSIVE SHIFT SHOCK	• WHEN UPSHIFTING AND/OR DOWNSHIFTING
DESCRIPTION	• Excessive shift shock felt when accelerating at upshifting • During cruising, excessive shift shock felt when accelerator pedal depressed at downshifting	

[TROUBLESHOOTING HINTS]

① ATF level low
② Line pressure high
③ Throttle position sensor malfunction or misadjsuted
④ Input/turbine speed sensor malfunction
⑤ Transaxle fluid temperature sensor malfunction
⑥ Powertrain control module malfunction
⑦ 1–2, 2–3 accumulator malfunction
⑧ Orifice valve malfunction
⑨ Control valve stuck
⑩ Powertrain damaged

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Are ATF level and condition OK? ☞ page K1–10 Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Condition ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
3	Is line pressure OK? ☞ page K1–2 **Specified pressure** **Line pressure** **kPa {kgf/cm², psi}** Range / Idle / Stall: D, S, L: 420—530 {4.2—5.5, 60—78} / 1,100—1,170 {11.2—12.0, 160—170} R: 730—1,010 {7.4—10.3, 110—146} / 1,910—2,020 {19.4—20.7, 276—294}	Yes	Go to next step
		No	Replace control valve body assembly ☞ page K1–36
4	Is engine stall speed OK? ☞ page K1–4 **Stall speed:** **D, S, L range : 2,270—2,500 rpm** **R range : 2,270—2,500 rpm**	Yes	Go to next step
		No	Overhaul transaxle and repair or replace parts as necessary ☞ Automatic transaxle workshop manual GF4A–EL
5	Are measurements at powertrain control module terminals OK? ☞ section F1 TERMINAL / FUNCTION: 3B: Throttle position sensor 2P: Input/turbine speed sensor 2T: Ground (Input) 2O: Transaxle fluid temperature sensor 3AB: Ground (Input) 3Q: Engine coolant temperature sensor	Yes	Replace powertrain control module ☞ section F1
		No	Check for malfunction parts and wiring • Throttle position sensor ☞ section F1 • Input/turbine speed sensor ☞ page K1–24 • Transaxle fluid temperature sensor ☞ page K1–23 • Engine coolant temperature sensor ☞ section F1

53	NO ENGINE BRAKING
DESCRIPTION	• Engine speed drops to idle, but vehicle does not slow when accelerator pedal released while cruising at medium to high speed • Engine speed drops to idle, but vehicle does not slow when accelerator pedal released when in L range at low vehicle speed

[TROUBLESHOOTING HINTS]
① Shift solenoid A, B, C
② Transaxle range sensor worn or misadjusted
③ Powertrain control module malfunction
④ Control valve stuck
⑤ Powertrain slippage

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Are resistance and output voltage of shift solenoid A, B, C at powertrain control module terminals OK? ☞ page K1–25 section F1 TERMINAL / FUNCTION: 2A Shift solenoid A; 2B Shift solenoid B; 2F Shift solenoid C	Yes	Go to next step
		No	If resistance is not OK, check for malfunctioning parts and wiring • Shift solenoid A ☞ page K1–27 • Shift solenoid B ☞ page K1–27 • Shift solenoid C ☞ page K1–27 If resistance is OK but voltage is not, replace powertrain control module ☞ section F1
3	Are measurements at powertrain control module terminals OK? ☞ section F1 TERMINAL / FUNCTION: 1F, 2K, 2I, 2M, 2R — Transaxle range switch	Yes	Replace powertrain control module ☞ section F1
		No	Check transaxle range switch and wiring ☞ page K1–21

54	NO MODE CHANGE
DESCRIPTION	• HOLD mode not selected or not canceled
[TROUBLESHOOTING HINTS] Inspect parts and wiring, and repair or replace malfunctioning parts as necessary ① HOLD switch malfunction ② Powertrain control module	

55	TRANSAXLE NOISE
DESCRIPTION	• Transaxle noisy in all ranges when vehicle idling
[TROUBLESHOOTING HINTS] Inspect parts and repair, adjust, or replace malfunctioning parts as necessary ① ATF level low ② Differential worn or damaged	

56	TRANSAXLE NOISE	• D,S, L, AND R RANGES
DESCRIPTION	• Abnormal noise from transaxle in D,S, L, R	
[TROUBLESHOOTING HINTS] Inspect parts and repair, adjust, or replace malfunctioning parts as necessary ① ATF level low ② Torque converter worn or damaged		

57	TRANSAXLE OVERHEATS
DESCRIPTION	• ATF smells burnt and/or discolored

[TROUBLESHOOTING HINTS]
① ATF level low
② Transaxle fluid temperature sensor malfunction
③ Line pressure low
④ Powertrain control module malfunction
⑤ Torque converter clutch solenoid valve malfunction
⑥ Engine coolant temperature sensor malfunction
⑦ Torque converter clutch burnt
⑧ Powertrain damaged

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE)" with ignition switch at ON?	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of diagnostic trouble code(s) ☞ page K1–51 If problem remains, go to next step
2	Are ATF level and condition OK? ☞ page K1–10 Do transaxle seals, sealant, and gasket prevent leakage? ATF condition ① Clear red: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (oxidation): Overheated or old fluid	Yes	Go to next step
		No	If ATF level is not OK, adjust it If ATF condition is not OK, repair as follows: • Condition ② Overhaul transaxle and repair or replace parts as necessary, then go to next step • Condition ③ and/or ④ Replace ATF, then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle, then go to next step
3	Is input voltage of transaxle fluid temperature sensor at powertrain control module terminal OK? ☞ section F1 TERMINAL: 2O — FUNCTION: Transaxle fluid temperature sensor TERMINAL: 3AB — FUNCTION: Ground (Input)	Yes	Go to next step
		No	Check transaxle fluid temperature sensor and wiring ☞ page K1–23
4	Is line pressure OK? ☞ page K1–2 **Specified pressure** **Line pressure** kPa {kgf/cm², psi} Range D, S, L — Idle: 420—530 {4.2—5.5, 60—78} — Stall: 1,100—1,170 {11.2—12.0, 160—170} Range R — Idle: 730—1,010 {7.4—10.3, 110—146} — Stall: 1,910—2,020 {19.4—20.7, 276—294}	Yes	Go to next step
		No	Replace control valve body assembly ☞ page K1–36
5	Are resistance and output voltage of torque converter clutch control solenoid valve at powertrain control module terminals OK? ☞ page K1–25 section F1 TERMINAL: 2C — FUNCTION: TCC control solenoid valve	Yes	Go to next step
		No	If resistance is not OK, check for malfunctioning parts and wiring • Torque converter clutch control solenoid valve ☞ page K1–27 If resistance is OK but voltage is not, replace powertrain control module ☞ section F1

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Is input voltage of engine coolant temperature signal at powertrain control module
☞ section F1
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>3Q</td><td>Engine coolant temperature sensor</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td>No</td><td>Check engine coolant temperature sensor and wiring
☞ section F1</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Is engine stall speed OK?
☞ page K1–4

Stall speed:
D, S, L range : 2,270—2,500 rpm
R range : 2,270—2,500 rpm</td><td>Yes</td><td>Replace powertrain control module
☞ section F1</td></tr>
<tr><td>No</td><td>Overhaul transaxle and repair or replace parts as necessary
☞ Automatic transaxle workshop manual GF4A–EL</td></tr>
</table>

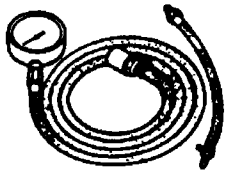
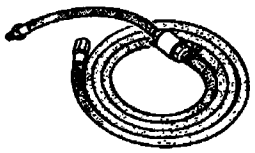
Before beginning any service procedure, refer to section T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

AUTOMATIC TRANSAXLE (Electronically Controlled)

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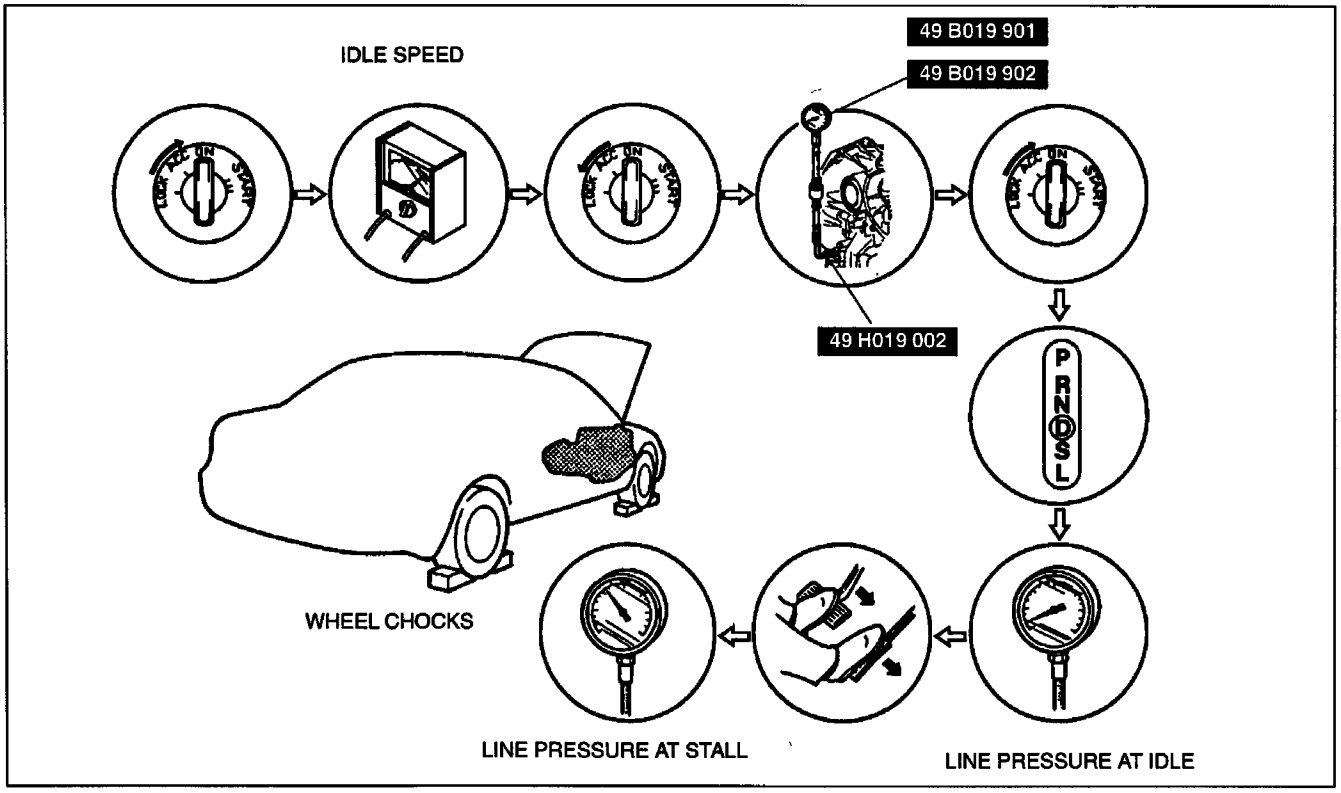
MECHANICAL SYSTEM TEST

PREPARATION
SST

49 0378 400A Gauge set, oil pressure 	For oil pressure test	49 B019 901 Oil pressure gauge 	For oil pressure test
49 B019 902 Oil pressure gauge (Part of 49 0378 400A) 	For oil pressure test	49 B019 903 Hose (Part of 49 0378 400A) 	For oil pressure test
49 H019 002 Adapter 	For oil pressure test	—	—

MECHANICAL SYSTEM TEST PREPARATION
1. Check and correct as necessary, the engine coolant, engine oil, and ATF levels before testing.
2. Warm the engine thoroughly to raise the ATF temperature to operating level (60—70°C {140—158°F}).
3. Engage the parking brake and use wheel chocks at the front and rear of the wheels.
4. Connect a tachometer to the engine.

LINE PRESSURE TEST
Procedure



Warning
- **Draining the ATF when it is hot is dangerous. Hot ATF can shoot out when the square-head is removed, causing burns and serious injury. Wait until the transaxle and ATF are cool before draining the ATF.**

1. Connect the **SST (49 B019 901, 49 B019 903, and 49 H019 002)** 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 pressed, the transaxle could be damaged. Therefore, do steps 5 and 6 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 engine speed 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 each range in the same manner.

Specified line pressure:

Range/Position	Line pressure kPa {kgf/cm², psi}	
	Idle	Stall
D, S, L	450—510 {4.5—5.3, 64—69}	1,210—1,280 {12.3—13.1, 175—186}
R	550—620 {5.6—6.4, 80—91}	1,610—1,680 {16.4—17.2, 234—244}

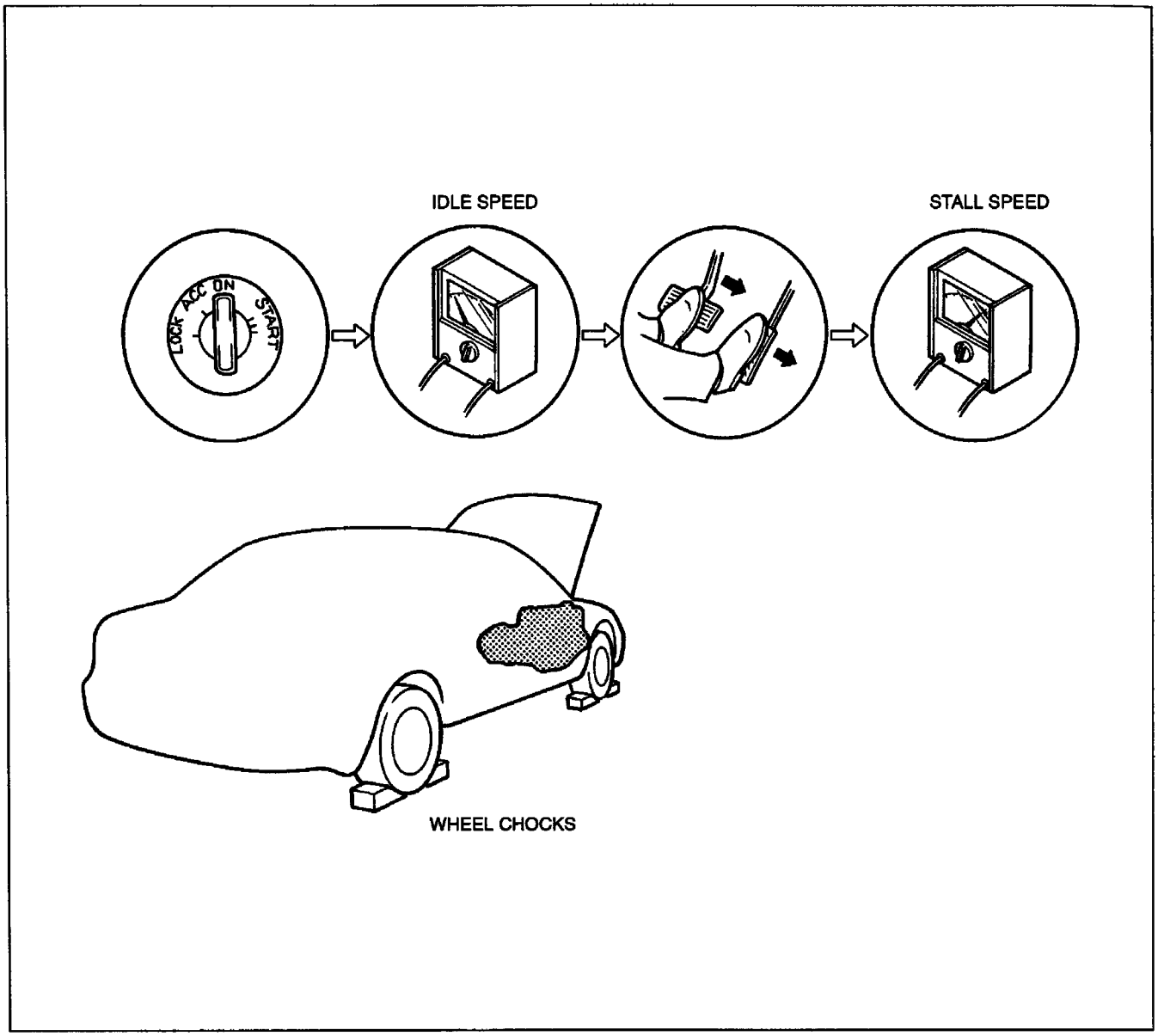
8. Install a new square head plug in the inspection port.

Tightening torque: 5.0—9.8 N·m {50—100 kgf·cm, 44—86 in·lbf}

Evaluation of line pressure test

Condition		Possible cause
At idle	Low pressure in every range	Worn oil pump Damaged control piston (in oil pump) Pressure regulator valve or plug sticking Damaged pressure regulator valve spring Fluid leaking between oil strainer and pressure regulator valve
	Low pressure in forward ranges	Fluid leaking from hydraulic circuit of forward clutch
	Low pressure in D and S ranges (HOLD mode only)	Fluid leaking from hydraulic circuit of band servo 2GR apply side
	Low pressure in R position only	Fluid leaking from hydraulic circuit of reverse clutch
	Low pressure in R position and L ranges only	Fluid leaking from hydraulic circuit of low and reverse brake
	Higher than specification	Throttle position sensor out of adjustment Damaged transaxle fluid temperature sensor Pressure control solenoid sticking Short circuit of pressure control solenoid circuit Pressure modulator valve sticking Pressure regulator valve or plug sticking
At stall speed	Low pressure	Throttle position sensor misadjusted Pressure control solenoid sticking Short circuit of pressure control solenoid circuit Pressure regulator valve or plug sticking Pressure modifier valve sticking Pilot valve sticking Damaged control piston (in oil pump)

STALL TEST
Procedure



1. Shift the selector lever to D range.

Caution
- **If the accelerator pedal is pressed for longer than 5 seconds while the brake pedal is pressed, the transaxle could be damaged. Therefore, do steps 4 and 5 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 in the same manner.
   (1) S range
   (2) L range
   (3) R position

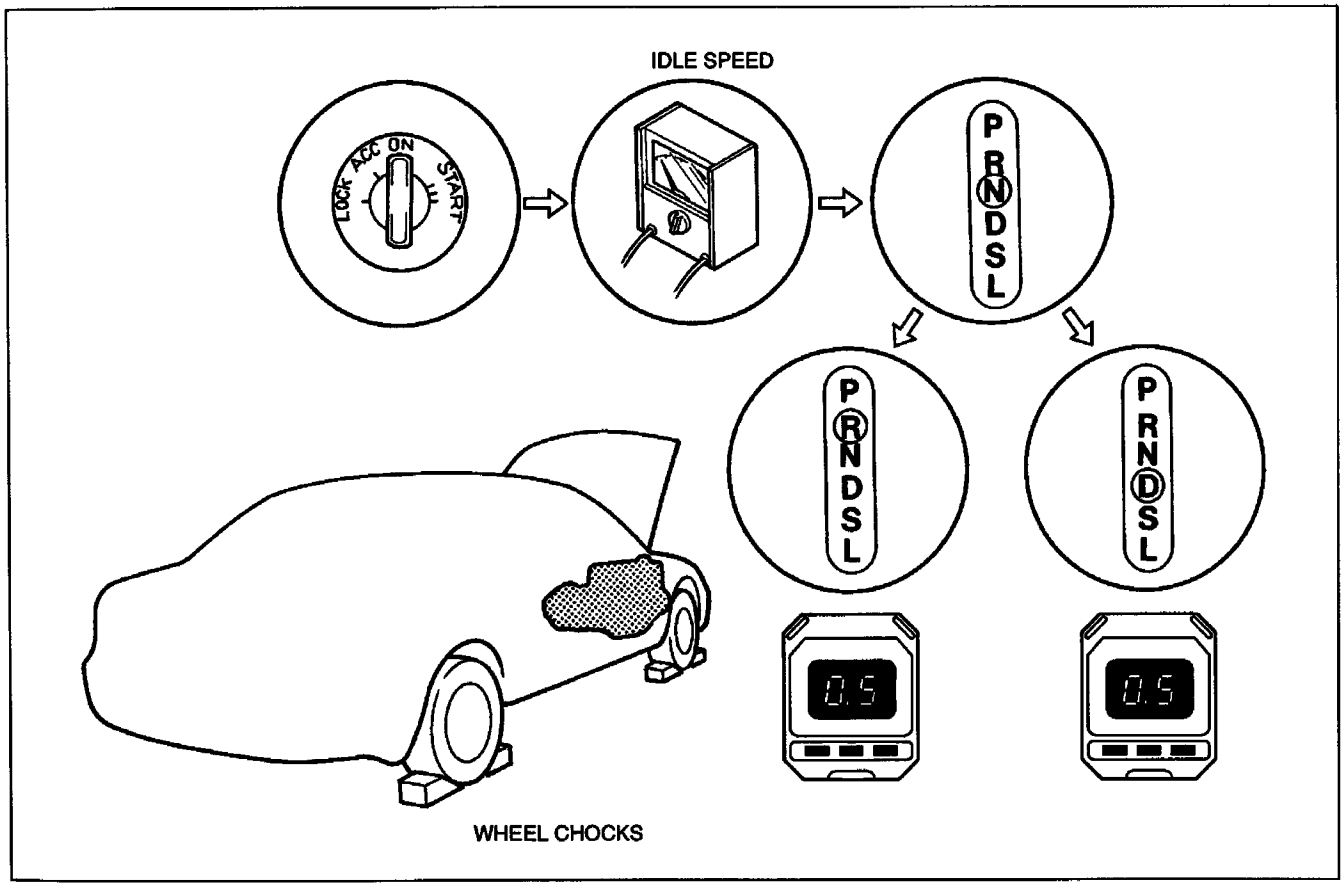
Engine stall speed:
D, S, L range : 2,150—2,450 rpm
R position : 1,950—2,250 rpm

Evaluation of stall test

Condition		Possible cause	
Above specification	In all ranges	Insufficient line pressure	Worn oil pump
			Oil leaking from oil pump, control valve, and/or transaxle case
			Pressure regulator valve sticking
	In D (except HOLD) and S (except HOLD) ranges	Forward clutch slipping Forward one-way clutch slipping Low one-way clutch slipping	
	In R position	Reverse clutch slipping Low and reverse brake slipping Perform road test to determine whether problem is low and reverse brake or reverse clutch a) Engine braking felt in L range (HOLD) ...Reverse clutch b) Engine braking not felt in L range (HOLD) ...Low and reverse brake	
Below specification		Engine out of tune	
		One-way clutch slipping within torque converter	

K2

TIME LAG TEST
Procedure



1. Shift 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 to N position and run the engine at idle speed for at least one (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. Perform the test for the following shifts in the same manner.
   (1) N position→D range (Except HOLD mode)
   (2) N position→D range (HOLD mode)
   (3) N position→R position

Time lag: N position→D range...approx. 0.9 second
N position→R position...approx. 1.1 second

Evaluation of time lag test

Condition		Possible Cause
Above specification	N position→D range and N position→D range (HOLD) shift	Insufficient line pressure Forward clutch slipping Forward one-way clutch slipping
	N position→D range shift	Insufficient line pressure Low one-way clutch slipping N-D accumulator not operating properly
	N position→D range (HOLD) shift	Insufficient line pressure 1–2 accumulator not operating properly
	N position→R position shift	Insufficient line pressure Reverse clutch slipping Low and reverse brake slipping N-R accumulator not operating properly

ROAD TEST

ROAD TEST PREPARATION

1. Before testing, check and correct the engine coolant, engine oil, and ATF levels as necessary.
2. Warm 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 F2.)

D RANGE TEST

Note

- There is TCC non-operation in the following conditions.
  1. The engine coolant temperature is below 60°C {140°F}.
  2. The closed throttle position switch is ON.
  3. The brake switch is ON.

D range (except HOLD)

1. Shift the selector lever to D range.

Note

- There is no shift to fourth gear in any of the following conditions.
  1. The ATF temperature is below 10°C {50°F}.
  2. The cruise control is operating, and there is an 8 km/h {5 mph} difference between the preset cruise speed and the vehicle speed.

2. Accelerate the vehicle to half- and full-throttle opening.
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 concerning vehicle speed at shift point.
4. Drive the vehicle in fourth, third, and second gear and verify that kickdown occurs for 4→3, 3→2, 4→1, 3→2, 3→1, 2→1, and that the shift points are as shown in the table concerning vehicle speed at shift point.
5. Drive the vehicle and verify that TCC operation is obtained.

D range (HOLD)

1. Select HOLD mode.
2. Accelerate the vehicle to half- and full-throttle opening, and verify that 2–3 upshift and downshift are obtained. The shift points must be as shown in the table concerning vehicle speed at shift point.
3. Drive the vehicle in third and second gear and verify that kickdown does not occur.
4. Decelerate the vehicle and verify that engine braking effect is felt in second and third gear.
5. Drive the vehicle and verify that TCC operation is obtained.

Vehicle speed at shiftpoint

Range/Mode		Throttle condition (throttle position sensor voltage)	Shift	Vehicle speed km/h {mph}
D	Except HOLD	Wide open throttle	$D_1 \rightarrow D_2$	50—56 {31—34}
			$D_2 \rightarrow D_3$	92—100 {58—62}
			$D_3 \rightarrow D_4$	166—176 {103—109}
		Half throttle	$D_1 \rightarrow D_2$	42—48 {27—29}
			$D_2 \rightarrow D_3$	84—96 {52—59}
			$D_3 \rightarrow D_4$	146—164 {91—101}
			TCC operation (D_3)	114—126 {71—78}
			TCC operation (D_4)	146—164 {91—101}
		Closed throttle position	$D_4 \rightarrow D_3$	32—38 {20—23}
			$D_3 \rightarrow D_2$	5—11 {4—6}
			$D_2 \rightarrow D_1$	5—11 {4—6}
		Kickdown	$D_4 \rightarrow D_3$	147—157 {92—97}
			$D_3 \rightarrow D_2$	83—91 {52—56}
			$D_2 \rightarrow D_1$	30—37 {19—22}
	HOLD	—	$D_2 \rightarrow D_3$	15—25 {10—15}
			$D_4 \rightarrow D_3$	166—176 {103—109}
			$D_3 \rightarrow D_2$	7—13 {5—8}
			TCC operation (D_3)	114—126 {71—78}

S RANGE TEST

Note
- There is TCC non-operation in the following conditions.
  1. The engine coolant temperature is below 60°C {140°F}.
  2. The closed throttle position switch is ON.
  3. The brake switch is ON.

S range (Except HOLD)
1. Shift the selector lever to S range.
2. Accelerate the vehicle to half- and full throttle opening.
3. Verify that 1–2 and 2–3 upshifts and downshifts are obtained. The shift points must be as shown in the vehicle speed at shiftpoint table.
4. Drive the vehicle in third and second gear and verify that kickdown occurs for 3→2, 3→1, 2→1, and that the shift points are as shown in the table concerning vehicle speed at shiftpoint.
5. Decelerate the vehicle and verify that engine braking effect is felt in first, second, and third gear.
6. Drive the vehicle and verify that TCC operation is obtained.

S range (HOLD)
1. Select HOLD mode.
2. Accelerate the vehicle to half- and full throttle opening, and verify that second gear is held.
3. Decelerate the vehicle and verify that engine braking effect is felt.
4. Drive the vehicle and verify that TCC operation is obtained.

Vehicle speed at shiftpoint

Range/Mode		Throttle condition (throttle position sensor voltage)	Shift	Vehicle speed km/h {mph}
S	Except HOLD	Wide open throttle	$S_1 \rightarrow S_2$	50—56 {31—34}
			$S_2 \rightarrow S_3$	92—100 {58—61}
		Half throttle	$S_1 \rightarrow S_2$	42—48 {26—29}
			$S_2 \rightarrow S_3$	84—96 {52—59}
			TCC operation (S_3)	114—126 {71—78}
		Closed throttle position	$S_3 \rightarrow S_2$	5—11 {4—6}
			$S_2 \rightarrow S_1$	5—11 {4—6}
		Kickdown	$S_3 \rightarrow S_2$	83—91 {52—56}
			$S_2 \rightarrow S_1$	30—37 {19—22}
	HOLD	—	$S_3 \rightarrow S_2$	93—99 {58—61}

L RANGE TEST

L range (Except HOLD)

1. Shift the selector lever to L range.
2. Accelerate the vehicle with half- and full-throttle opening.
3. Verify that 1–2 upshift and downshift are obtained. The shift points must be as shown in the L range shift diagram.
4. Drive the vehicle in second gear and verify that kickdown occurs for 2→1, and that the shift point is as shown in the L range shift diagram.
5. Decelerate the vehicle and verify that engine braking effect is felt in second gear.

L range (HOLD)

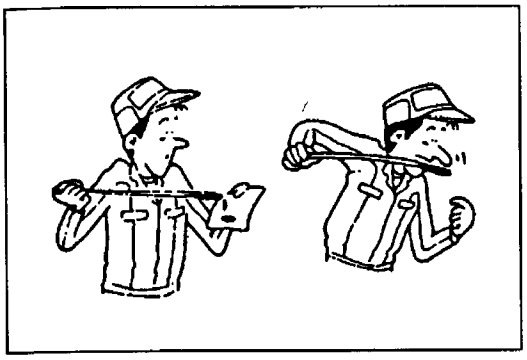
1. Select HOLD mode.
2. Accelerate the vehicle with half- and full-throttle opening, and verify that first gear is held.

Vehicle speed at shiftpoint

Range/Mode		Throttle condition (throttle position sensor voltage)	Shift	Vehicle speed km/h {mph}
L	Except HOLD	Wide open throttle	$L_1 \rightarrow L_2$	50—56 {31—34}
		Half throttle	$L_1 \rightarrow L_2$	41—47 {26—29}
		Closed throttle position	$L_2 \rightarrow L_1$	5—11 {4—6}
		Kickdown	$L_2 \rightarrow L_1$	30—37 {19—22}
	HOLD	—	$L_2 \rightarrow L_1$	45—51 {28—31}

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

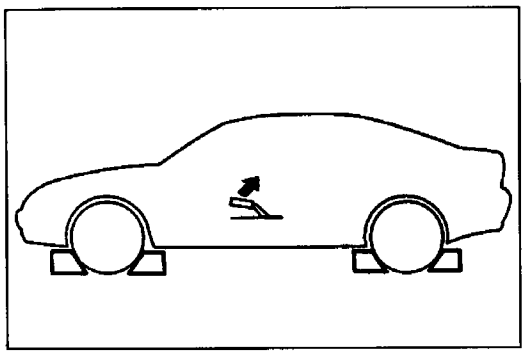
One way of determining whether the transaxle should be disassembled is by noting:

1. If the ATF is muddy or varnished.
2. If the ATF smells strange or unusual.

ATF condition

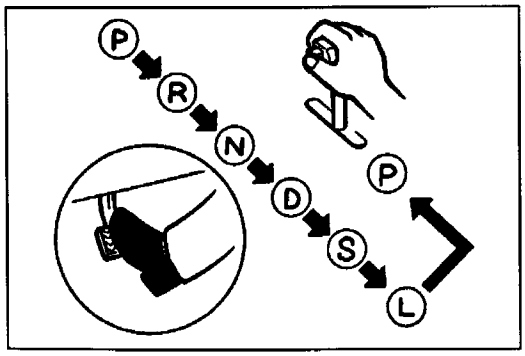
Color	Condition
Clear red	Normal
Dark	Powertrain components damaged
Light pink	Water in the ATF
Reddish-brown	Deterioration of the ATF

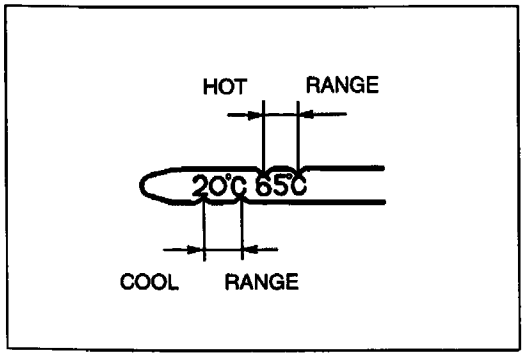
3. If the ATF condition is not OK, repair as follows.
   - Dark color condition
     Overhaul transaxle and repair or replace parts as necessary.
   - Light pink and/or reddish-brown condition
     Replace ATF.



Level

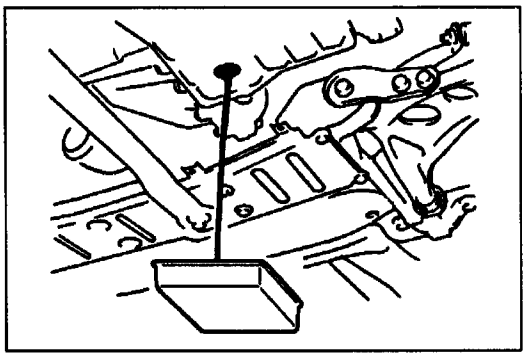
1. Park the vehicle on level ground.
2. Apply the parking brake and position wheel chocks securely to prevent the vehicle from rolling.
3. If necessary, inspect the ATF before warming up the engine. In this case, use the cool range (15—25°C {59—77°F}).
4. Warm up the engine until the ATF reaches **60—70°C {140—158°F}**.
5. While depressing the brake pedal, shift the selector lever to each range (P—L), pausing momentarily in each range.
6. Shift back to P position.





7. While the engine is idling, ensure that the ATF level is in the HOT **65°C {149°F}** range. Add ATF to the specification if necessary.

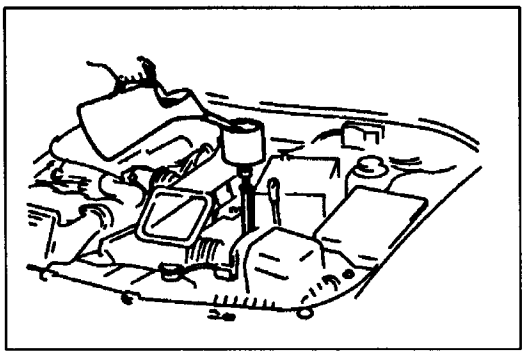
   ATF type: M-III or Dexron®II



Replacement

1. Remove the oil level gauge.
2. Remove the drain plug and washer.
3. Drain the ATF into a 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}



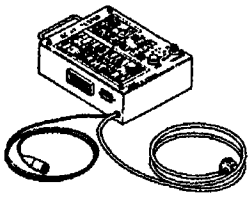
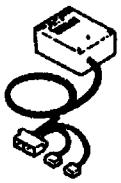
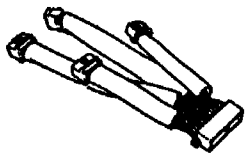
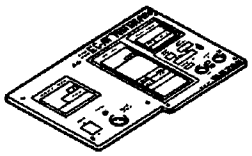
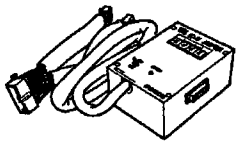
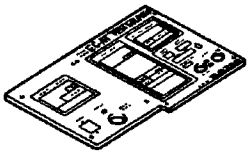
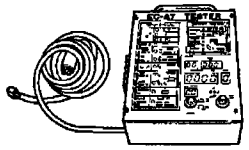
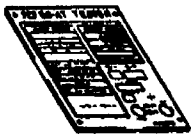
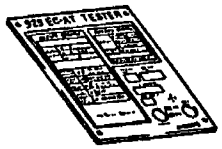
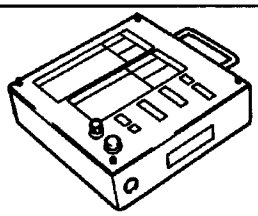
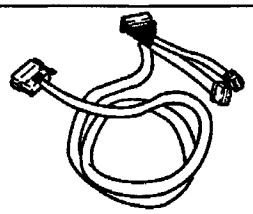
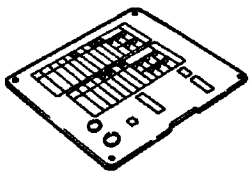
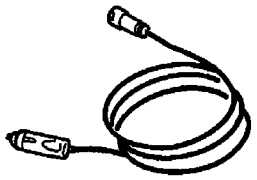
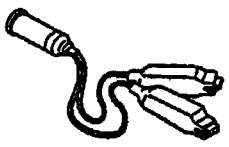
5. Remove the oil level gauge and add the specified amount and type of ATF through the oil filler tube.

ATF type: M-III or Dexron®II
Capacity: 7.4 L { 7.8 US qt, 6.5 Imp qt}

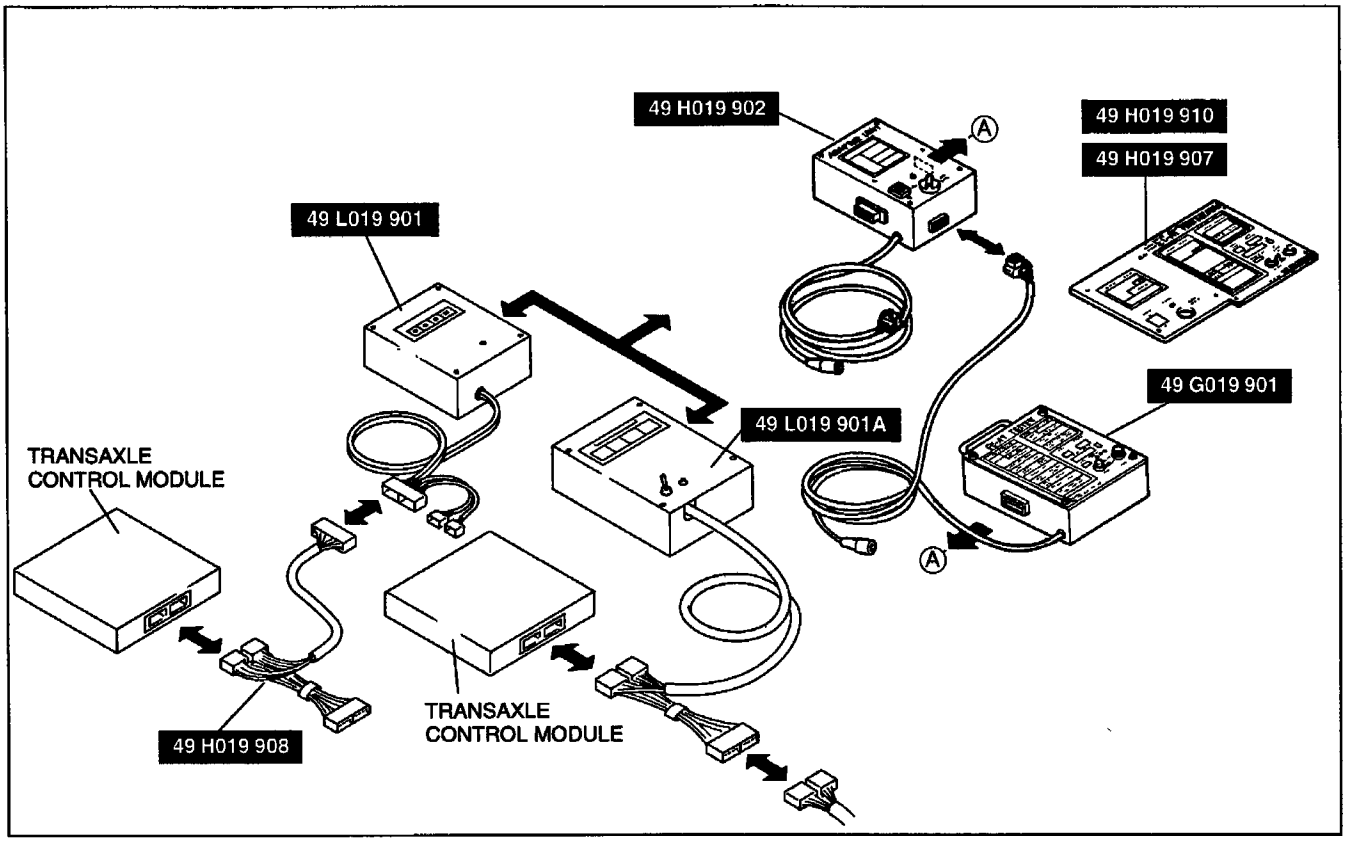
6. Install the oil level gauge.
7. Ensure that the ATF level is in the HOT **65°C {149°F}** range.
8. Add ATF to the specified level if necessary.

ELECTRICAL SIGNAL INSPECTION

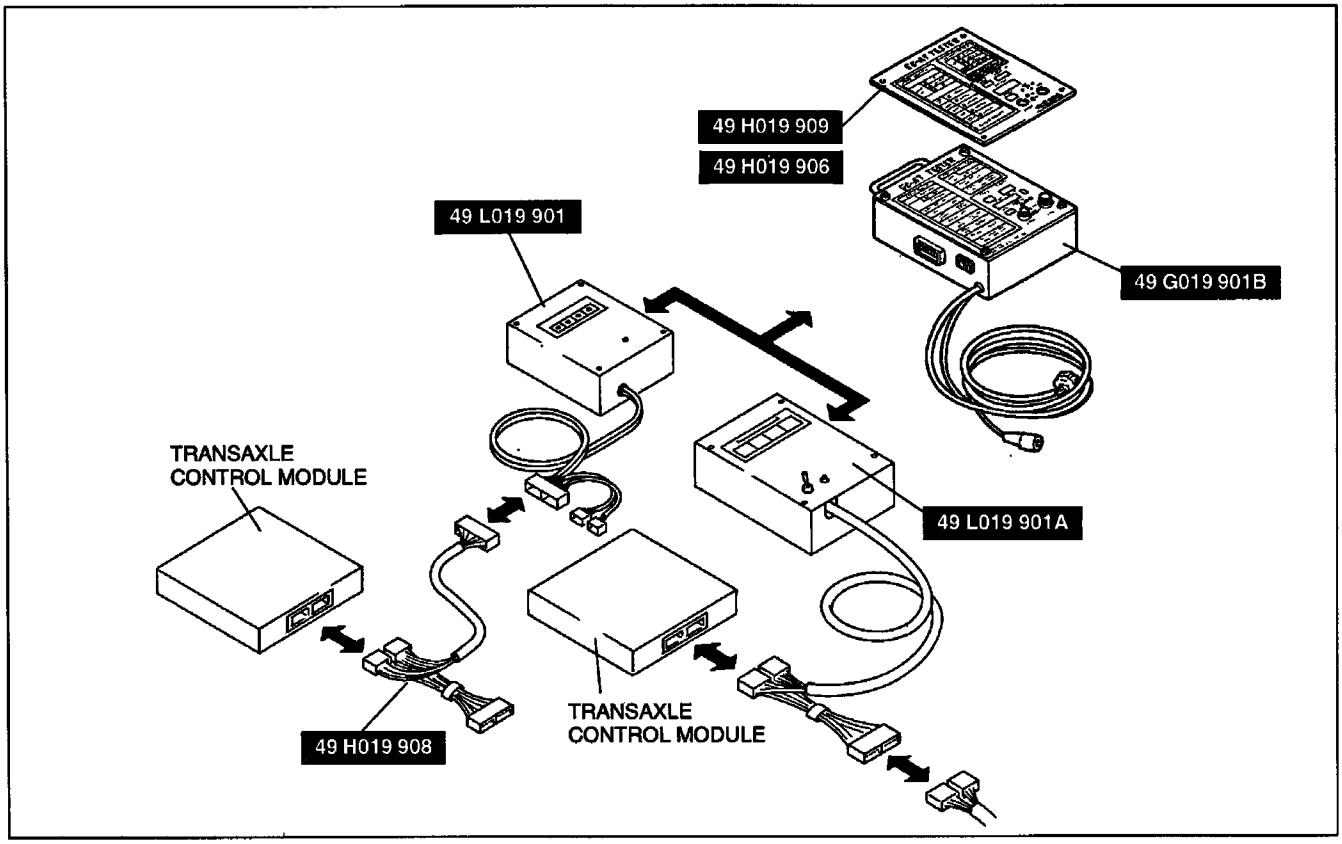
PREPARATION
SST

49 G019 901 EC-AT Tester 	For inspection of electrical signal	49 H019 902 Adapter 	For inspection of electrical signal
49 L019 901 Adapter 	For inspection of electrical signal	49 H019 908 Adapter Harness 	For inspection of electrical signal
49 H019 910 Panel 	For inspection of electrical signal	49 L019 901A Adapter 	For inspection of electrical signal
49 H019 907 Panel 	For inspection of electrical signal	49 G019 901B EC-AT Tester 	For inspection of electrical signal
49 H019 909 Panel 	For inspection of electrical signal	49 H019 906 Panel 	For inspection of electrical signal
49 G019 901C EC-AT Tester 	For inspection of electrical signal	49 T019 903 Adapter Harness 	For inspection of electrical signal
49 T019 902A 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	—	—

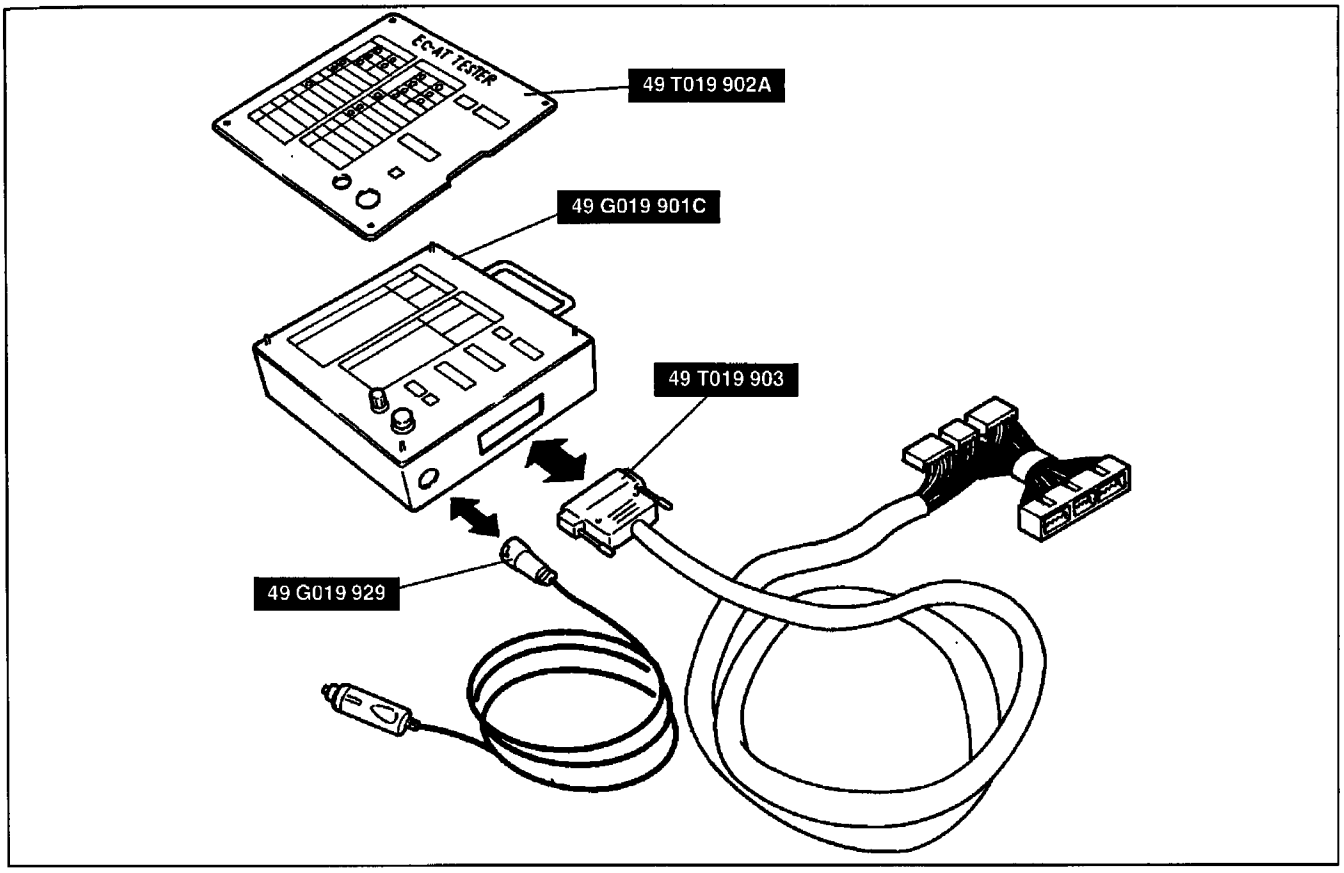
ELECTRICAL SIGNAL INSPECTION
Assembly of SST
EC-AT tester (49 G019 901)

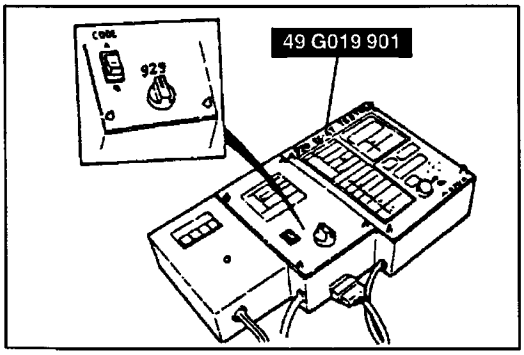


EC-AT tester (49 G019 901B)



EC-AT tester (49 G019 901C)



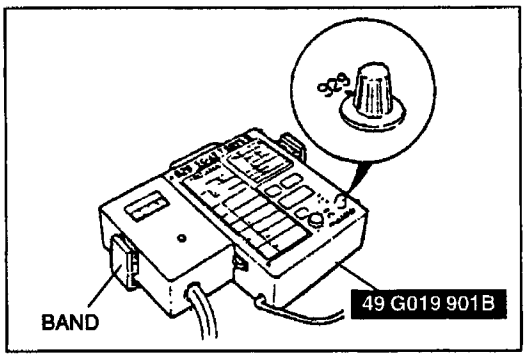


Inspection Procedure

Caution
- **Do not connect the NGS to the data link connector 2 when the EC-AT tester is connected to the transaxle control module.**
  Doing so can cause incorrect test results.

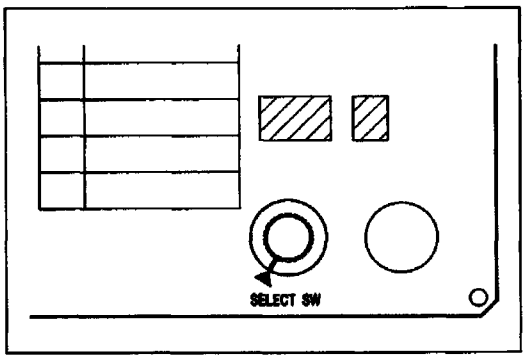
When using the EC-AT tester (49 G019 901) and adapter unit (49 H019 902), and adapter unit (49 L019 901) or adapter unit (49 L019 901A)

1. Assemble the **SST**. (Refer to page K2–14.)
2. Set the **SST** (49 H019 902 and 49 L019 901A) vehicle switch to 929 position.
3. Turn the ignition switch and 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) and adapter unit (49 L019 901) or adapter unit (49 L019 901A)

1. Assemble the **SST**. (Refer to page K2–14.)
2. Set the **SST** (49 G019 901B and 49 L019 901A) vehicle switch to 929 position.
3. Turn the ignitionn 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 901C)

1. Assemble the **SST**. (Refer to page K2–15.)
2. Turn the **SST** select switch to the ▲ mark on the panel.
3. Turn the ignition switch and the **SST** 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.

Indication Table of Light and Digital Display
EC-AT tester (49 G019 901) and panel (49 H019 910) or EC-AT tester (49 G019 901B) and panel (49 H019 909)

Item		Indication	Condition	Possible cause
Input (Light)				
Transaxle range switch (INHIBITOR SW)	D	ON	D range	Transaxle range switch or wiring
		OFF	Other ranges, all positions	
	S	ON	S range	
		OFF	Other ranges, all positions	
	L	ON	L range	
		OFF	Other ranges, all positions	
	R	ON	R range	
		OFF	Other positions, all ranges	
	P, N	Not used		
HOLD SW		ON	HOLD switch depressed	HOLD switch or wiring
		OFF	HOLD switch released	
Transaxle fluid temperature sensor (ATF THERMOSENSOR)		ON	ATF temperature above 40°C {104°F}	Transaxle fluid temperature sensor or wiring
		OFF	ATF temperature below 40°C {104°F}	
Closed throttle position switch (IDLE SW)		ON	Throttle valve closed throttle position	Closed throttle position switch or wiring
		OFF	Throttle valve open	
Barometric pressure sensor (ATMOSPHERIC PRESSURE SENSOR)		Not used		
4GR inhibit signal (CRUISE CONTROL SW)		Not used		
Input (Digital Display)				
Throttle position sensor V. (THROTTLE SENSOR V.)		Transaxle control module terminal voltage	Constant	Throttle position sensor or wiring
VEHICLE SPEED km/h		Vehicle speed	Vehicle moving	Vehicle speedometer sensor, vehicle speed sensor, or wiring
ENGINE RPM rpm		Engine rpm	Constant	Engine control module or wiring
Output (Light)				
Solenoid valve (SOLENOID)	Shift solenoid A (SHIFT A)	ON	1GR and 4GR position	Transaxle control module, shift solenoid A, or wiring
		OFF	2GR and 3GR position	
	Shift solenoid B (SHIFT B)	ON	1GR and 2GR position	Transaxle control module, shift solenoid B, or wiring
		OFF	3GR and 4GR position	
	OVERRUNNING	ON	Other condition	Transaxle control module, overrunning clutch solenoid valve, or wiring
		OFF	When engine braking and 3–2 timing control	
	TCC (LOCKUP)	Bright	TCC operation	Transaxle control module, TCC solenoid valve, or wiring
		Dim	TCC non-operation	
	Pressure control (LINE PRESSURE)	ON (Bright↔Dim)	While driving (Accelerator release↔depressed)	Transaxle control module, pressure control solenoid, or wiring
	TCC control (LOCKUP CONTROL)	Not used		
HOLD INDICATOR	HOLD MODE	Not used		
GEAR POSITION	1GR (1st)	ON	First gear position	—
		OFF	Other gear position	
	2GR (2nd)	ON	Second gear position	
		OFF	Other gear position	
	3GR (3rd)	ON	Third gear position	
		OFF	Other gear position	
	4GR (O/D)	ON	Fourth gear position	
		OFF	Other gear position	

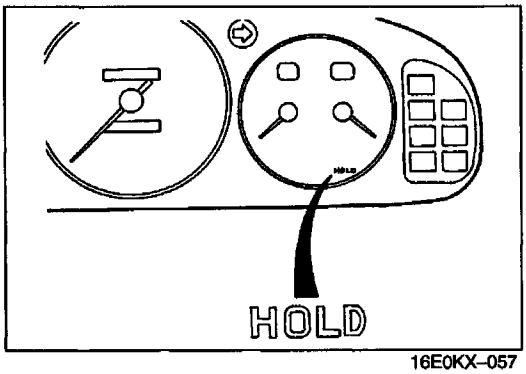
EC-AT tester (49 G019 901) and panel (49 H019 907) or EC-AT tester (49 G019 901B) and panel (49 H019 906)

Item		Indication	Condition	Possible cause
Input (Light)				
Transaxle range switch (INHIBITOR SW)	D	ON	D range	Transaxle range switch or wiring
		OFF	Other ranges, all positions	
	S	ON	S range	
		OFF	Other ranges, all positions	
	L	ON	L range	
		OFF	Other ranges, all positions	
	R	ON	R range	
		OFF	Other positions, all ranges	
Barometric pressure sensor (ATMOSPHERIC PRESSURE SENSOR)		Not used		
HOLD SW		ON	HOLD switch depressed	HOLD switch or wiring
		OFF	HOLD switch released	
Transaxle fluid temperature sensor (ATF THERMOSENSOR)		ON	ATF temperature above 40°C {104°F}	Transaxle fluid temperature sensor or wiring
		OFF	ATF temperature below 40°C {104°F}	
Closed throttle position switch (IDLE SW)		ON	Throttle valve closed throttle position	Closed throttle position switch or wiring
		OFF	Throttle valve open	
VEHICLE SPEED PULS		Not used		
Input (Digital Display)				
Throttle position sensor voltage (THROTTLE SENSOR V.)		Transaxle control module terminal voltage	Constant	Throttle position sensor or wiring
VEHICLE SPEED km/h		Vehicle speed	Vehicle moving	Vehicle speedometer sensor, vehicle speed sensor, or wiring
ENGINE RPM		Engine rpm	Constant	Engine control module or wiring
Output (Light)				
Solenoid valve (SOLENOID)	Shift solenoid A (SHIFT A)	ON	1GR and 4GR position	Powertrain control module, shift solenoid A, or wiring
		OFF	2GR and 3GR position	
	Shift solenoid B (SHIFT B)	ON	1GR and 2GR position	Powertrain control module, shift solenoid B, or wiring
		OFF	3GR and 4GR position	
	OVERRUNNING	ON	Other condition	Powertrain control module, overrunning clutch solenoid valve, or wiring
		OFF	When engine braking and 3–2 timing control	
	TCC (LOCKUP)	Bright	TCC operation	Powertrain control module, TCC solenoid valve, or wiring
		Dim	TCC non-operation	
	Pressure control (LINE PRESSURE)	ON (Bright↔Dim)	While driving (Accelerator release↔ depressed)	Powertrain control module, pressure control solenoid, or wiring
	TCC control (LOCKUP CONTROL)	Not used		
HOLD INDICATOR	HOLD MODE	Not used		
GEAR POSITION	1GR (1st)	ON	First gear position	—
		OFF	Other gear position	
	2GR (2nd)	ON	Second gear position	
		OFF	Other gear position	
	3GR (3rd)	ON	Third gear position	
		OFF	Other gear position	
	4GR (O/D)	ON	Fourth gear position	
		OFF	Other gear position	

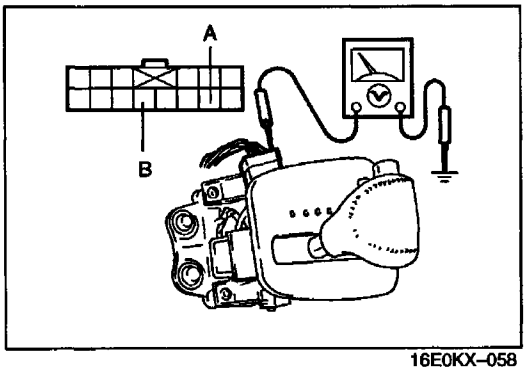
EC-AT tester (49 G019 901C)

Item		Indication	Condition	Possible cause
Input (Light)				
Transaxle range switch (PARK/NEUTRAL SW)	P/N	ON	P or N position	Transaxle range switch or wiring
		OFF	R position, all ranges	
	R	ON	R position	
		OFF	Other positions, all ranges	
	D	ON	D range	
		OFF	Other ranges, all positions	
	S	ON	S range	
		OFF	Other ranges, all positions	
	L	ON	L range	
		OFF	Other ranges, all positions	
HOLD Switch		Bright	HOLD switch depressed	HOLD switch or wiring
		Dim	HOLD switch released	
Closed throttle position switch		ON	Closed throttle position	Closed throttle position switch (in throttle position sensor) or wiring
		OFF	Other positions	
Kickdown switch*		ON	Not used	
Cruise control switch		Bright	RESUME/ACCEL switch OFF and vehicle speed kept at preset speed	Cruise control module or wiring
		Dim	RESUME/ACCEL switch ON or vehicle speed 8km/h {5 mph} lower than preset speed	
Input (Digital Display)				
Throttle position sensor		TCM terminal voltage	Constant	Throttle position sensor or wiring
Vehicle speed		Vehicle speed	Vehicle moving	Vehicle speedometer sensor, Vehicle speed sensor, or wiring
Engine rpm		Engine rpm	Constant	ECM or wiring
ATF temp		TCM terminal voltage	ATF temperature: 10°C {50°F}: 1.8 V ATF temperature: 40°C {104°F}: 1.1 V	Transaxle fluid temperature sensor or wiring
Output (Light)				
Solenoid valve	Shift solenoid A (SHIFT A)	ON	1GR and 4GR position	Transaxle control module, shift solenoid A, or wiring
		OFF	2GR and 3GR position	
	Shift solenoid B (SHIFT B)	ON	1GR and 2GR position	Transaxle control module, shift solenoid B, or wiring
		OFF	3GR and 4GR position	
	TCC (LOCKUP)	Bright	TCC operation	Transaxle control module, TCC solenoid valve, or wiring
		Dim	TCC non-operation	
	Pressure control (LINE PRESSURE)	ON (Bright↔Dim)	While driving (Accelerator release↔depressed)	Transaxle control module, Pressure control solenoid, or wiring
	Overrunning clutch	ON	Other conditions	Transaxle control module, Overrunning clutch solenoid valve, or wiring
		OFF	When engine braking and 3–2 timing control	
HOLD indicator light		ON	HOLD mode	Transaxle control module or wiring
		OFF	Except HOLD mode	
Output (Digital Display)				
Gear Position		1	First gear	—
		2	Second gear	
		3	Third gear	
		4	Fourth gear	

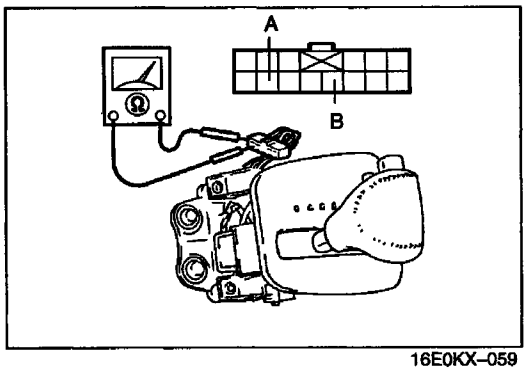
* When the IG switch is ON, the light usually flashes.



16E0KX-057



16E0KX-058



16E0KX-059

ELECTRICAL SYSTEM COMPONENTS

HOLD SWITCH

Inspection

Inspection of operation

1. Turn the ignition switch from OFF to ON.
2. Verify that the HOLD indicator light is not illuminated. Depress the HOLD switch and verify that the HOLD indicator light illuminates.
3. If not as specified, check the terminal voltage of the HOLD switch.

Inspection of voltage

1. Remove the rear console, brake boot panel, and center panel.
2. Turn the ignition switch to ON.
3. Measure the voltage at the HOLD switch connector.

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 HOLD switch.

Inspection of continuity

1. Disconnect the negative battery cable.
2. Disconnect the HOLD switch connector.
3. Check for continuity at the HOLD switch.

Position	Connector terminal	
	A	B
Normal		
Depressed	O———	———O

O——O: Continuity

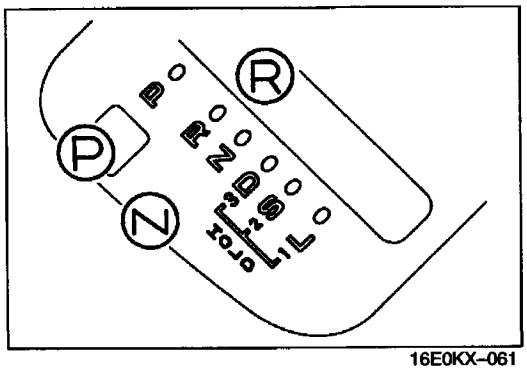
4. If not as specified, replace the selector lever knob assembly. (Refer to section K1.)
5. If the switch is OK, check the wiring harness. (HOLD switch—Transaxle control module, HOLD switch—Body ground.)
6. Install the center panel, brake boot panel, and rear console.
7. Connect the negative battery cable.

Replacement

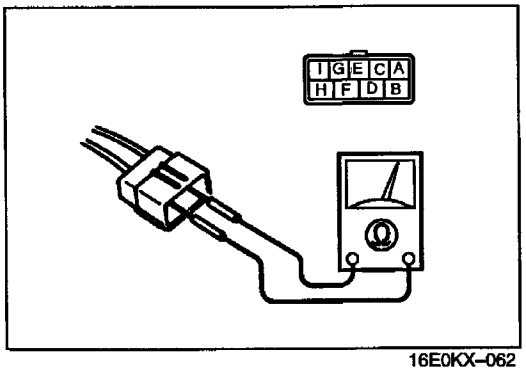
1. Disconnect the negative battery cable.
2. Remove the rear console, brake boot panel, and center panel.
3. Remove the indicator panel installation screws.
4. Disconnect the connector and remove the HOLD switch terminals.
5. Remove the selector lever knob assembly.
6. Install a new selector lever knob assembly.

Tightening torque:
2.0—2.9 N·m {20—30 kgf·cm, 18—26 in·lbf}

7. Install the HOLD switch terminals and connect the connector.
8. Install the indicator panel installation screws. (Refer to section K1.)
9. Install the center panel, brake boot panel, and rear console.
10. Connect the negative battery cable.



16E0KX-061



16E0KX-062

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 position.
2. Verify that the back-up lights illuminate when shifted to R position with the ignition switch in the ON position.
3. Check the transaxle range switch, if not as specified.

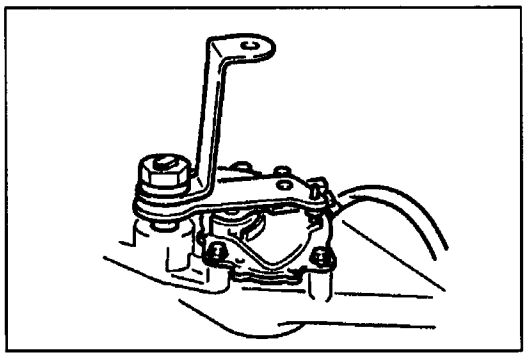
Inspection of continuity

1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly.
3. Disconnect the transaxle range switch connector.
4. Check for continuity at the transaxle range switch.

Range/ Position	Connector terminal								
	E	G	D	C	F	A	I	B	H
P	O						O	O—O	
R		O					O	O—O	
N			O				O		
D				O			O		
S					O		O		
L						O	O		

O—O: Continuity

5. If not as specified, replace or adjust the transaxle range switch.
6. Connect the transaxle range switch connector.
7. Install the air cleaner assembly.
8. Connect the negative battery cable.

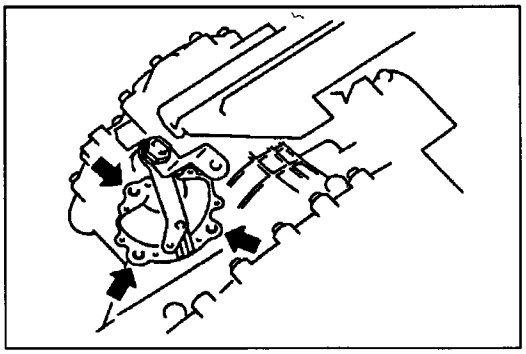


Replacement

Refer to "Adjustment" below for replacement of the transaxle range switch.

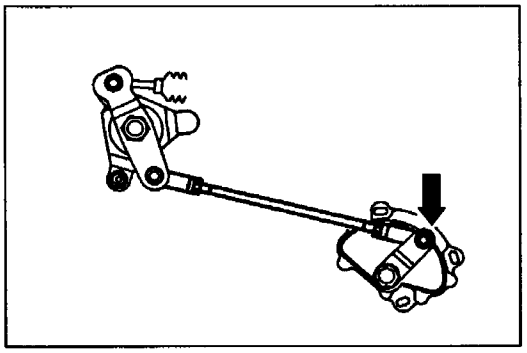
Adjustment

1. Remove the selector rod from the manual shaft lever.
2. Move the manual shaft to the N position.
3. Loosen the transaxle range switch mounting bolts.
4. Align the holes of the transaxle range switch and the manual shaft lever by inserting a pin with an outer diameter of **approx. 4.0 mm {0.157 in}**.

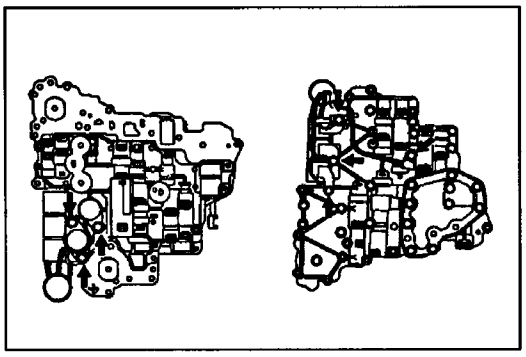


5. Tighten the transaxle range switch mounting bolts and remove the pin.

Tightening torque:
2.5—3.9 N·m {25—40 kgf·cm, 22—34 in·lbf}



6. Recheck the continuity of the transaxle range switch.
7. If not correct, replace the transaxle range switch.
8. Install the selector rod to the manual shaft lever.



TRANSAXLE FLUID TEMPERATURE SENSOR

Inspection

1. Remove the control valve body. (Refer to page K2–41.)
2. Remove the transaxle fluid temperature sensor and solenoid valve(s).
3. Place the transaxle fluid temperature sensor in water with a thermometer as shown and heat the water gradually.
4. Measure resistance between the terminals of the transaxle fluid temperature sensor.

Water temperature	Resistance (KΩ)
10°C {50°F}	3.8
40°C {104°F}	1.2
80°C {176°F}	0.3

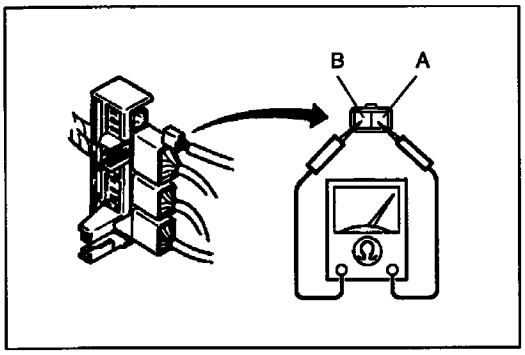
5. If not correct, replace the transaxle fluid temperature sensor.
6. Install the transaxle fluid temperature sensor and solenoid valve(s).

Tightening torque:
6.9—8.8 N·m {70—90 kgf·cm, 61—78 in·lbf}

7. Install the control valve body. (Refer to page K2–41.)
8. Carry out the line pressure test. (Refer to page K2–2.)

Replacement

Refer to "Inspection" on page K2–22 for replacement of the transaxle fluid temperature sensor.



OUTPUT SPEED SENSOR

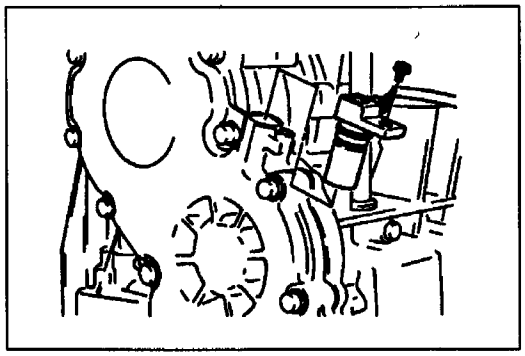
Inspection

1. Disconnect the negative battery cable.
2. Remove the battery.
3. Disconnect the output speed sensor connector.
4. Measure the resistance between the terminals of the output speed sensor.

ATF temperature: 20—80°C {68—176°F}

Terminal	Resistance (Ω)
A—B	500—1,000

5. If not correct, replace the output speed sensor.
6. Connect the output speed sensor connector.
7. Install the battery.
8. Connect the negative battery cable.

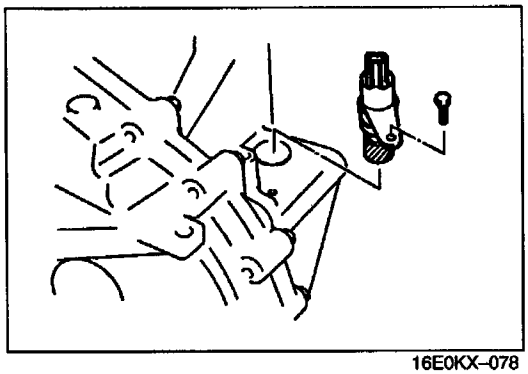


Replacement

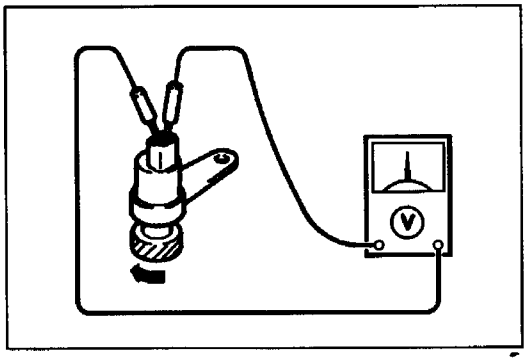
1. Disconnect the negative battery cable.
2. Remove the battery.
3. Disconnect the output speed sensor connector.
4. Remove the splash shield.
5. Remove the output speed sensor.
6. Apply ATF to a new O-ring and install it on the output speed sensor.
7. Install the new output speed sensor.

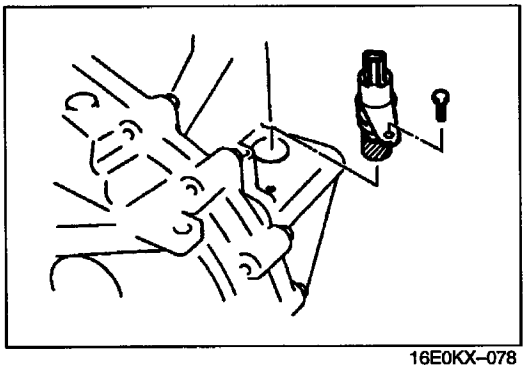
Tightening torque:
5.0—6.8 N·m {50—70 kgf·cm, 44—60 in·lbf}

8. Install the splash shield.
9. Connect the output speed sensor connector.
10. Install the battery.
11. Connect the negative battery cable.

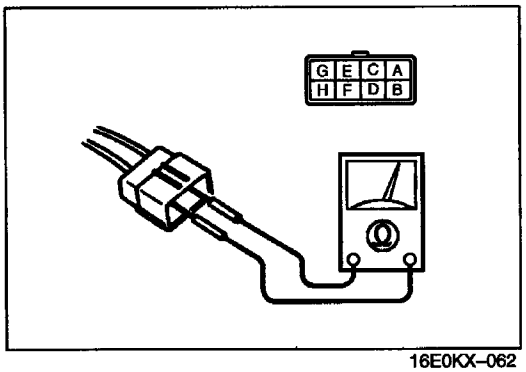


16E0KX-078





16E0KX-078



16E0KX-062

VEHICLE SPEEDOMETER SENSOR

Inspection

1. Disconnect the negative battery cable.
2. Remove the battery, rear intercooler air duct, and air cleaner assembly.
3. Remove the starter.
4. Disconnect vehicle speedometer sensor connector.
5. Remove the vehicle speedometer sensor.

Note

- Vehicle speedometer sensor is a kind of generator of alternating current. Therefore, a general circuit tester of direct current cannot follow if the vehicle speed is fast. (If using a circuit tester of alternating current, voltage will increase as the vehicle speed is increasing.)

6. Measure the voltage between the terminals of the vehicle speedometer sensor while rotating the driven gear.

Meter needle	Action
Moves slightly under 5V	Repair wiring harness (Instrument cluster—Vehicle speedometer sensor)
Does not move	Replace vehicle speedometer sensor

7. Install the vehicle speedometer sensor.

Tigtening torque:
7.9—10.7 N·m {80—110 kgf·cm, 70—95 in·lbf}

8. Connect the vehicle speedometer sensor connector.
9. Install the air cleaner assembly, rear intercooler air duct, and battery.
10. Connect the negative battery cable.

SOLENOID VALVES

Inspection

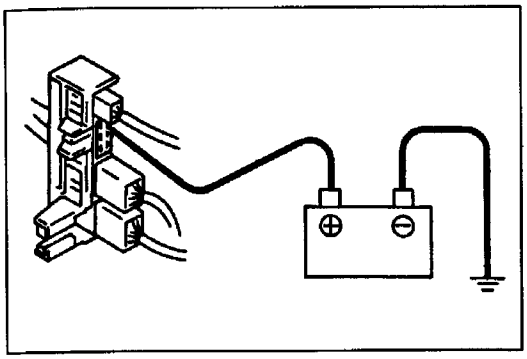
Inspection of resistance

1. Disconnect the negative battery cable.
2. Remove the battery.
3. Disconnect the solenoid valve connector.
4. Measure the resistance between terminals A—H and a ground.

ATF temperature: 20—80°C {68—176°F}

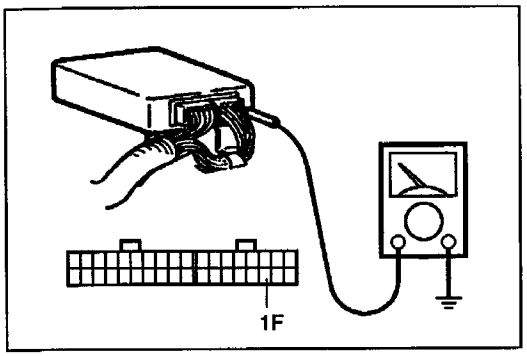
Terminal	Solenoid valve	Resistance (Ω)
A	Pressure control solenoid	2—6
C	Overrunning clutch solenoid valve	20—40
E	Shift solenoid A	20—40
G	Shift solenoid B	20—40
H	TCC solenoid valve	20—40

5. If not correct, replace the solenoid valves.
6. Connect the solenoid valve connector.
7. Install the battery.
8. Connect the negative battery cable.



Inspection of operation

1. Disconnect the negative battery cable.
2. Disconnect the solenoid valve connector.
3. Apply battery voltage to each terminal of A—H.
4. Verify that each control valve operates with a "click".
5. If the "click" is not heard, replace the solenoid valve.



PRESSURE CONTROL SOLENOID OUTPUT DUTY

Inspection

1. Connect the (+) terminal of a dwell meter to terminal 1F of the transaxle control module and the (–) terminal to a ground. Set the dwell meter selector to the 4 cylinder position.
2. Turn the ignition switch to ON.

Note

- The dwell meter indicates the OFF duty ratio.

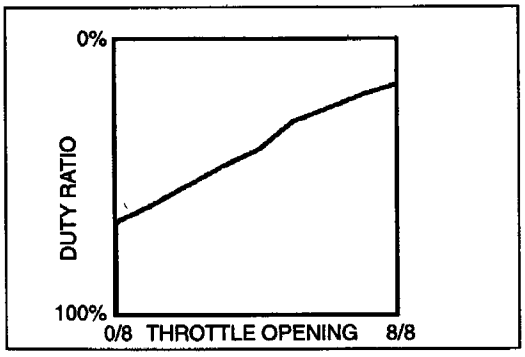
3. Verify the duty ratio by depressing and releasing the accelerator pedal.

Throttle opening	Duty ratio (ON %)
Closed throttle position (0/8)	Approx. 100
Wide open throttle (8/8)	Approx. 5

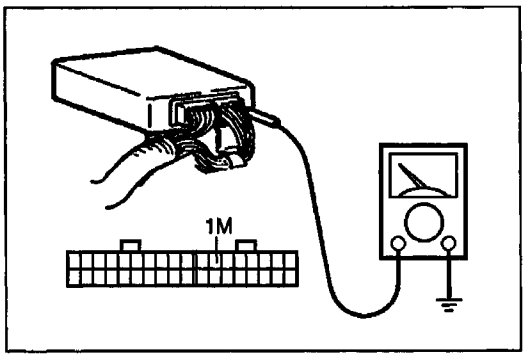
Note

- The relationship between the dwell angle (°) and duty ratio (%) is as follows:

Dwell angle (°)	0	18	36	54	72	90
Duty ratio (%)	0	20	40	60	80	100



4. Depress the accelerator pedal slowly and verify that the duty ratio charges as shown in the graph.
5. If not as specified, check the transaxle control module (Refer to page K2–29.), dropping resistor, and pressure control solenoid.



TORQUE CONVERTER CLUTCH SOLENOID VALVE OUTPUT DUTY

Inspection

1. Connect the (+) terminal of a dwell meter to terminal 1M of the transaxle control module and the (–) terminal to a ground.
2. Drive the vehicle.

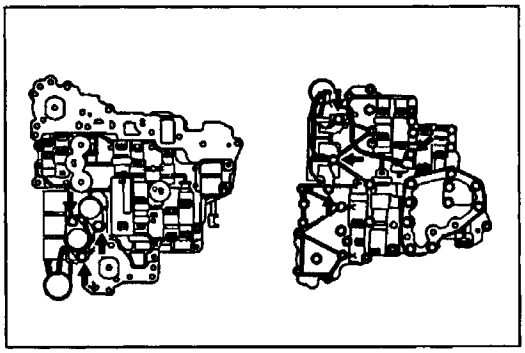
Condition	Duty ratio (ON %)
Others	Approx. 5
TCC operation	Approx. 95

Note
- The dwell meter indicates the OFF duty ratio.

3. Verify the duty ratio in the TCC condition.

Note
- See the above note for the dwell and duty relationship.

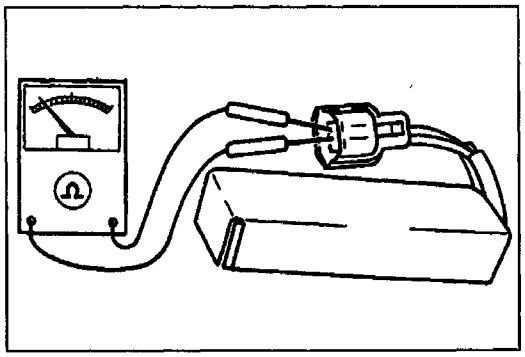
4. If not as specified, check the Transaxle control module (Refer to page K2–29.) and TCC solenoid valve.



Replacement

Note
- If the solenoid valves (shift A, shift B, overrunning clutch TCC, and pressure control) are not correct, replace the solenoid valves and transaxle fluid temperature sensor as an assembly.

1. Remove the control valve body. (Refer to page K2–41.)
2. Remove the solenoid valves and transaxle fluid temperature sensor. (Refer to pages K2–23.)
3. Apply ATF to a new O-ring and install it on the solenoid valves.
4. Install the new solenoid valves and transaxle fluid temperature sensor to the control valve body. (Refer to pages K2–23.)
5. Install the control valve body. (Refer to page K2–41.)
6. Carry out the time lag test and line pressure test. (Refer to page K2–2.)
7. Carry out the road test. (Refer to page K2–7.)



DROPPING RESISTOR

Inspection

1. Disconnect the negative battery cable.
2. Disconnect the dropping resistor connector.
3. Measure the resistance between the terminals of the resistor.

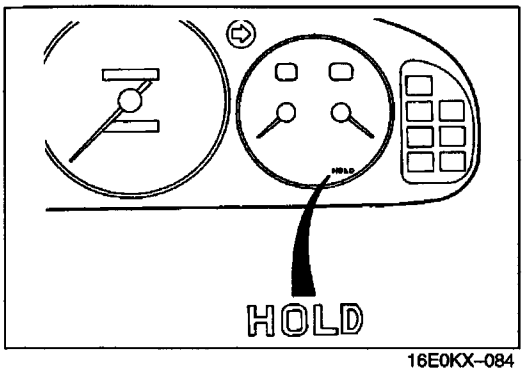
Resistance 11.4—12.6 Ω

4. If not correct, replace the dropping resistor.
5. Connect the dropping resistor connector.
6. Connect the negative battery cable.

Replacement
1. Disconnect the negative battery cable.
2. Disconnect the dropping resistor connector.
3. Remove the dropping resistor.
4. Install the new dropping resistor.

Tightening torque:
7.9—11.7 N·m {80—120 kgf·m, 70—104 in·lbf}

5. Connect the dropping resistor connector.
6. Connect the negative battery cable.

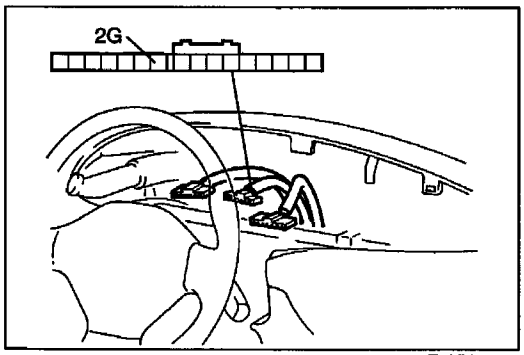


16E0KX-084

HOLD INDICATOR LIGHT
Inspection
Inspection of operation
1. Turn the ignition switch from OFF to ON.

Note
- The HOLD indicator light will flash if a malfunction exists in any of the EC-AT system components.

2. Verify that the HOLD indicator light is not illuminated.
3. Depress the switch and verify that the HOLD indicator light illuminates.
4. If the HOLD switch function is not as specified, check the HOLD switch (page K2–20), and then check the terminal voltage of the HOLD indicator light.

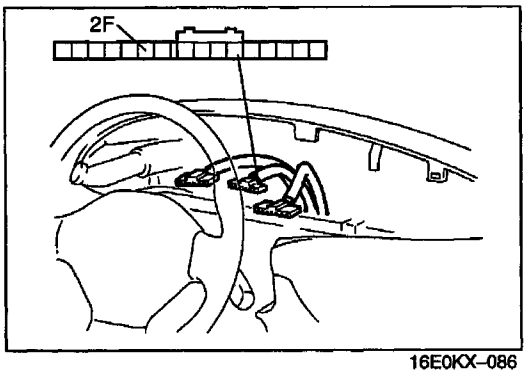


16E0KX-085

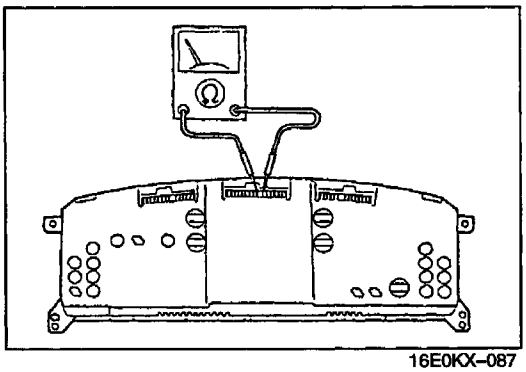
Inspection of voltage
1. Remove the instrument cluster. (Refer to section T.)
2. Turn the ignition switch to ON.
3. Measure the voltage between terminal 2G and a ground.

B+: Battery positive voltage

Voltage	Action
B+	Go to next step
Other	• Replace METER fuse • Repair wiring harness (METER fuse—Instrument cluster)



16E0KX-086


16E0KX-087

Inspection of continuity

1. Disconnect the negative battery cable.
2. Disconnect the instrument cluster connector.
3. Check for continuity between terminal 2F and the transaxle control module terminal 1K.

HOLD switch	Continuity
HOLD mode	Yes
Except HOLD mode	No

4. If not correct, check the wiring harness (instrument cluster—transaxle control module).
5. If correct, go to the next step.
6. Check for continuity between terminals 2G and 2F.

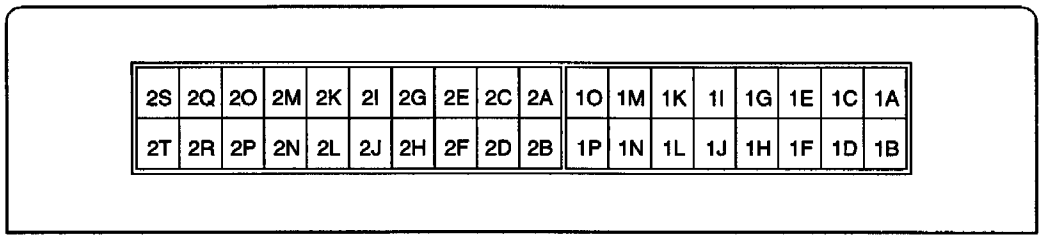
Terminals	Continuity
2G—2F	Yes

7. If not correct, replace the instrument cluster or bulb.
8. Install the instrument cluster. (Refer to section T.)
9. Connect the negative battery cable.

TRANSAXLE CONTROL MODULE
Inspection
Terminal voltage chart (Reference data)

Note
- Use the ground of terminal 1J of the transaxle control module when measuring terminal voltage, as an error may occur when connecting the negative (–) circuit tester to ground.

B+: Battery positive voltage



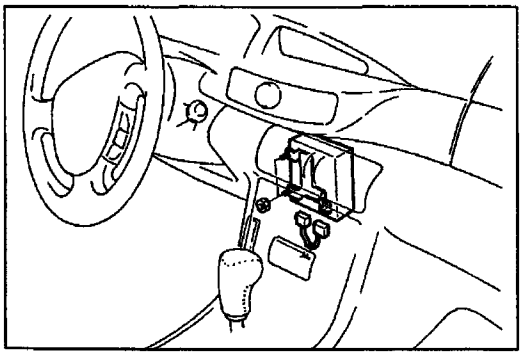
Terminal	Component	Connected to	Condition	Correct voltage	Possible cause
1A	Battery (Back-up)	Battery	Constant	B+	• Wiring and/or connector from 1A terminal to battery
1B	Shift solenoid B	Shift solenoid B	P, N and R positions or 1GR and 2GR	B+	• Shift solenoid B and/or wiring
			3GR and 4GR	Below 1.0 V	
1C	—	—	—	—	—
1D	Shift solenoid A	Shift solenoid A	P, N, and R positions or 1GR and 4GR	B+	• Shift solenoid A and/or wiring
			2GR and 3GR	Below 1.0 V	
1E	Transaxle range switch (R position)	Transaxle range switch	R position	B+	• Transaxle range switch and/or wiring
			Other positions, all ranges	0 V	
1F	Pressure control solenoid	Pressure control solenoid	Closed throttle position (after ATF warm, engine stopped)	Above 2.0 V	• Pressure control solenoid and/or dropping resistor
			Wide open throttle (after ATF warm, engine stopped)	Below 1.0 V	
1G	Engine speed input signal	Engine control module	Engine running at idle	5.0—6.0 V	• Engine control module and/or wiring
			Engine stopped	0 V or B+	
1H	Dropping resistor	Dropping resistor	Closed throttle position	B+	• Dropping resistor and/or pressure control solenoid
			Other conditions	Below 1.0 V	
1I	Vehicle speedometer sensor	Speedometer	Vehicle moving	2.0—3.0 V	• Vehicle speedometer sensor and/or speed sensor
			Vehicle stopped	0 V or 4.5—5.5 V	
1J	Ground	—	Constant	0 V	• Wiring from 1J terminal to ground

B+: Battery positive voltage

Terminal	Component	Connected to	Condition	Correct voltage	Possible cause
1K	HOLD indicator light	Combination meter (HOLD indicator light)	HOLD mode	Below 1.0 V	• Combination meter
			Except HOLD mode	B+	
1L	—	—	—	—	—
1M	TCC solenoid valve	TCC solenoid valve	TCC operation	B+	• TCC solenoid valve and/or wiring
			TCC non-operation	Below 1.0 V	
1N	Battery (Main)	Ignition switch	Ignition switch ON	B+	• Ignition switch • Wiring and/or connector from 1N terminal to ignition switch
			Ignition switch OFF	0 V	
1O	Overrunning clutch solenoid valve	Overrunning clutch solenoid valve	Driving	B+	• Overrunning clutch solenoid valve and/or wiring
			Not driving	0 V	
1P	Battery	Ignition switch	Ignition switch ON	B+	• Ignition switch • Wiring and/or connector from 1P terminal to ignition switch
			Ignition switch OFF	0 V	
2A	Throttle position sensor (Vref)	Throttle position sensor	Ignition switch ON	4.5—5.5 V	• Engine control module • Wiring and/or connector from 2A terminal to engine control module
			Ignition switch OFF	0 V	
2B	Transaxle range switch (D range)	Transaxle range switch	D range	B+	• Transaxle range switch and/or wiring
			Other ranges, all positions	0 V	
2C	—	—	—	—	—
2D	Transaxle range switch (P and N position)	Transaxle range switch	P and N position	0 V	• Transaxle range switch and/or wiring
			Other positions, all ranges	B+	
2E	—	—	—	—	—
2F	—	—	—	—	—
2G	4GR inhibit signal (auto speed control signal)	Cruise control module	Ignition switch ON	B+	• Wiring and/or connector from 2G terminal to cruise control module
			When 4GR inhibit signal is not input	6.0 V	
			When 4GR inhibit signal is input	Below 1.0 V	
2H	Battery	Ignition switch	Ignition switch ON	B+	• Ignition switch • Wiring and/or connector from terminal 2H to ignition switch
			Ignition switch OFF	0 V	
2I	HOLD switch	HOLD switch	Switch depressed	0 V	• HOLD switch and/or wiring
			Switch released	B+	
2J	Output speed sensor	Output speed sensor	Vehicle speed above 25km/h {16mph}	Above 1.0 V	• Output speed sensor and/or wiring
			Vehicle stopped	0 V	
2K	ECM/TCM communication signal	Engine control module	Serial communication (Refer to section F2)	5.0 V	• Wiring and/or connector from 2K terminal to engine control module
2L	Ground (Input signals)	—	Constant	0 V	• Wiring from 2L terminal to ground
2M	Closed throttle position switch	Throttle position sensor	Throttle valve open	B+	• Wiring from 2M terminal to throttle position sensor
			Throttle valve closed throttle position	0 V	

B+: Battery positive voltage

Terminal	Component	Connected to	Condition	Correct voltage	Possible cause
2N	ECM/TCM communication signal	Engine control module	Serial communication (Refer to section F2)	5.0 V	• Wiring and/or connector from 2N terminal to engine control module
2O	—	—	—	—	—
2P	—	—	—	—	—
2Q	Transaxle range switch (L range)	Transaxle range switch	L range	B+	• Transaxle range switch and/or wiring
			Other ranges, all positions	0 V	
2R	Transaxle fluid temperature sensor	Transaxle fluid temperature sensor	While warming up ATF Note • 1.8V: ATF temperature 10°C {50°F} • 1.1V: ATF temperature 40°C {104°F}	0.1—2.4 V	• Transaxle fluid temperature sensor and/or wiring
2S	Transaxle range switch (S range)	Transaxle range switch	S range	B+	• Transaxle range switch and/or wiring
			Other ranges, all positions	0 V	
2T	Throttle position sensor (TVO)	Throttle position sensor	Closed throttle position	0.1—1.2 V	• Throttle position sensor • Wiring and/or connector from 2T terminal to throttle position sensor
			Wide open throttle	3.5—4.0 V	



Replacement

1. Disconnect the negative battery cable.
2. Remove the ABS control module. (Refer to section P.)
3. Disconnect the transaxle control module connector.
4. Remove the nuts shown in the figure, and remove the transaxle control module.
5. Install the new transaxle control module.

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

6. Connect the transaxle control module connector.
7. Install the ABS control module. (Refer to section P.)
8. Connect the negative battery cable.

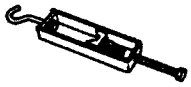
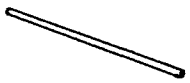
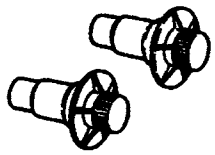
MEMO

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	—	—

Removal / Installation

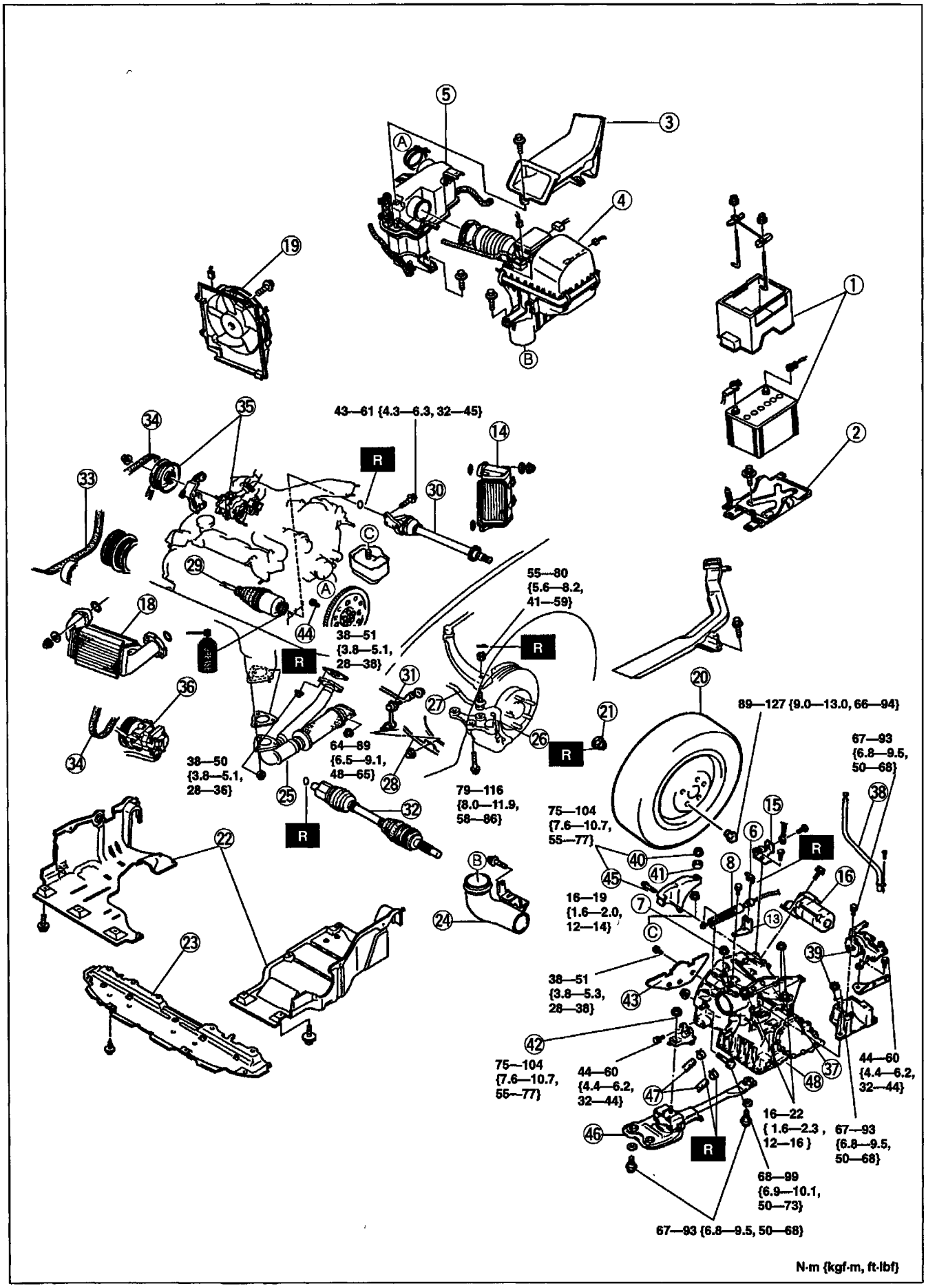
The oil pan could contain small chips, shavings, and other particles helpful in checking the condition of the transaxle and diagnosing certain problems.
To ensure that all foreign particles stay in the oil pan, make sure that the transaxle is never tipped completely over while the oil pan is still installed.

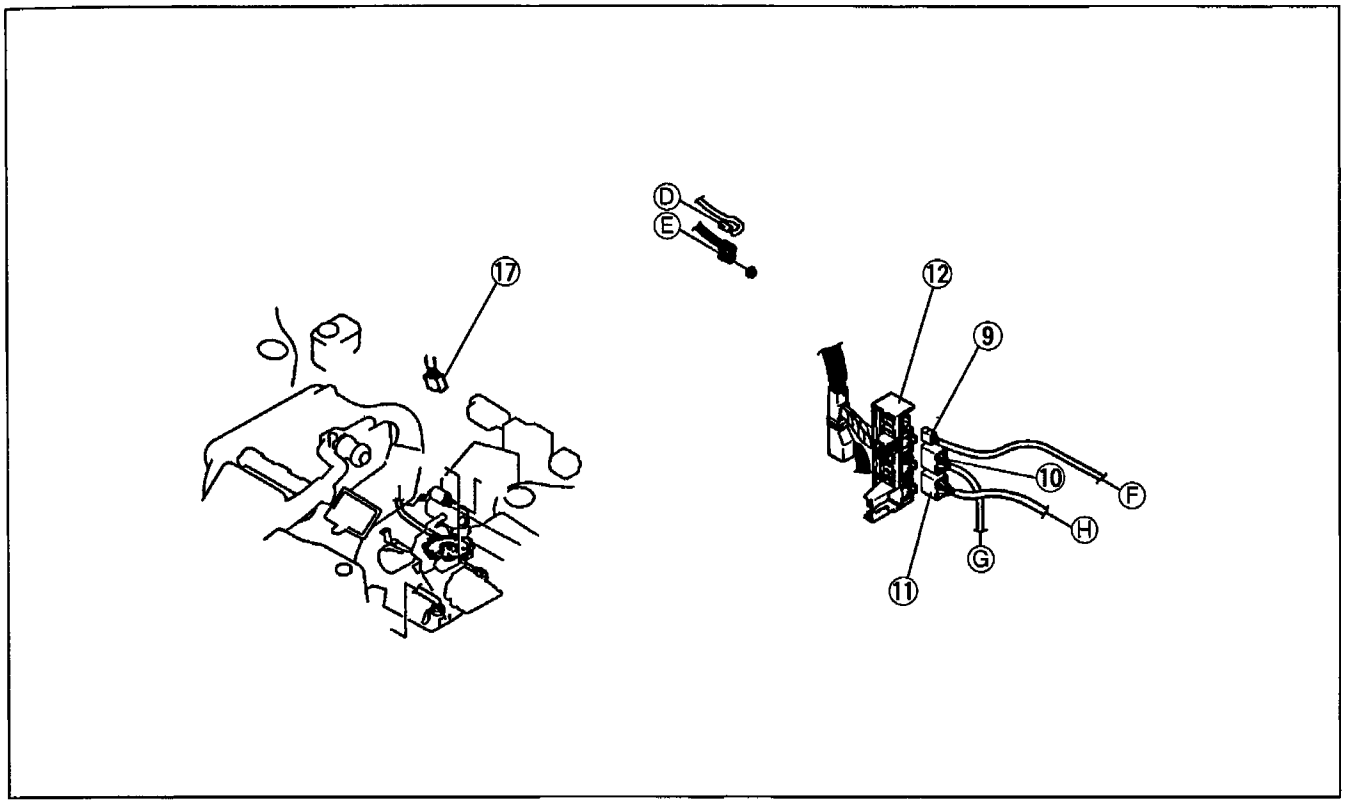
1. Disconnect the negative battery cable.
2. Raise the vehicle on a vehicle hoist.
3. Drain the ATF into a container.
4. Remove in the order shown in the figure, referring to **Removal Note**.
5. After removal, remove the oil pan to check the condition of the transaxle.
6. Install in the reverse order of removal, referring to **Installation Note**.
7. Fill the transaxle with the specified ATF after installation.
8. Check for leakage of ATF from all connecting points.
9. Connect the negative battery cable.
10. Check the operation of the transaxle range switch. (Refer to page K2–21.)
11. Check the operation of the selector lever. (Refer to section K1.)
12. Carry out the mechanical system test. (Refer to page K2–2.)

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	○		

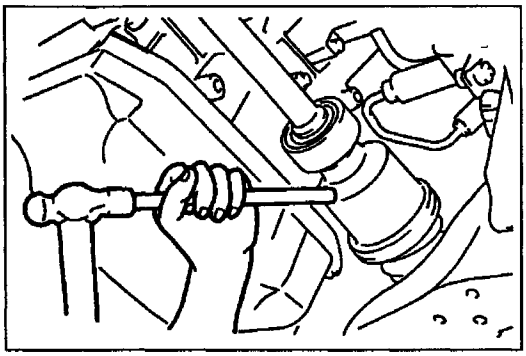
○: Test to be performed after work

13. Carry out the road test. (Refer to page K2–7.)

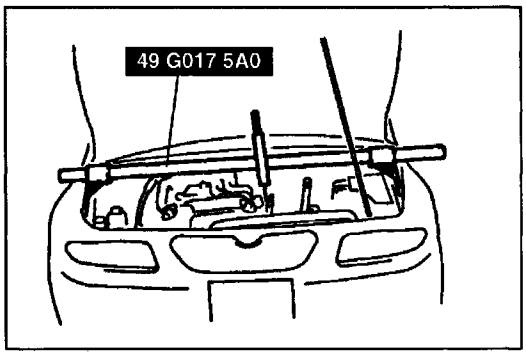

43—61 {4.3—6.3, 32—45}
55—80 {5.6—8.2, 41—59}
38—51 {3.8—5.1, 28—38}
64—89 {6.5—9.1, 48—65}
38—50 {3.8—5.1, 28—36}
79—116 {8.0—11.9, 58—86}
89—127 {9.0—13.0, 66—94}
67—93 {6.8—9.5, 50—68}
75—104 {7.6—10.7, 55—77}
16—19 {1.6—2.0, 12—14}
38—51 {3.8—5.3, 28—38}
75—104 {7.6—10.7, 55—77}
44—60 {4.4—6.2, 32—44}
16—22 {1.6—2.3, 12—16}
67—93 {6.8—9.5, 50—68}
68—99 {6.9—10.1, 50—73}
67—93 {6.8—9.5, 50—68}
R
N·m {kgf·m, ft·lbf}



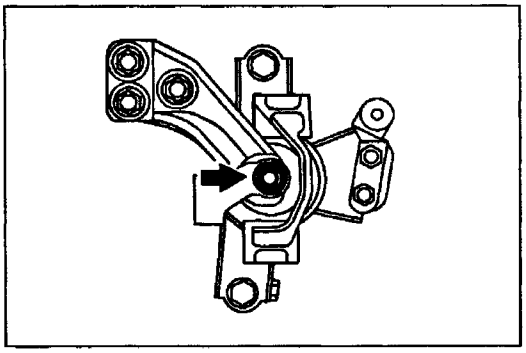
1. Battery and battery cover
2. Battery carrier
3. Rear intercooler air duct
4. Air cleaner assembly
5. Resonance chamber
6. Clip
7. Nut
8. Selector cable
   Adjustment ..... section K1
9. Output speed sensor connector
10. Transaxle range switch connector
11. Solenoid valve connector
12. Harness bracket
13. Selector cable bracket
14. Rear intercooler
15. Bracket
16. Starter
17. Vehicle speedometer sensor connector
18. Front intercooler
19. Electric coolant fan assembly
    Service ..... section E
20. Wheel and tires
21. Locknut
22. Splash shield
23. Under cover
24. Fresh air duct
25. Exhaust pipe
26. Lower ball joint
    Service ..... section K1
27. Upper lateral link (left side)
    Service ..... section K1
28. Lower arm
29. Drive shaft (right side)
    Removal note ..... page K2–36
    Installation note ..... page K2–39
30. Joint shaft
31. Stabilizer control link
32. Drive shaft (left side)
    Service ..... section M
33. Timing belt
    Service ..... section B2
34. P/S, A/C Drive belt
35. P/S oil pump
36. A/C compressor
    Service ..... section U
37. Selector rod
    Installation note ..... page K2–39
38. ATF filler tube
39. No.4 engine mount
    Removal note ..... page K2–36
    Installation note ..... page K2–38
40. No.1 engine mount nut
41. No.1 engine mount damper
42. No.2 engine mount nut
43. Under cover
44. Torque converter bolts
    Removal note ..... page K2–36
45. No.1 engine mount bolt
    Installation note ..... page K2–38
46. Engine mount member
    Installation note ..... page K2–37
47. Oil hose
48. Transaxle
    Removal note ..... page K2–36
    Installation note ..... page K2–37



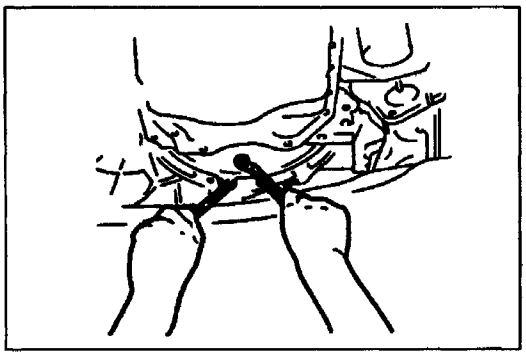
Removal note
Drive shaft (right side)
1. Remove the upper link (right side). (Refer to section M.)
2. Separate the right side drive shaft from the joint shaft by using a brass bar and a hammer.



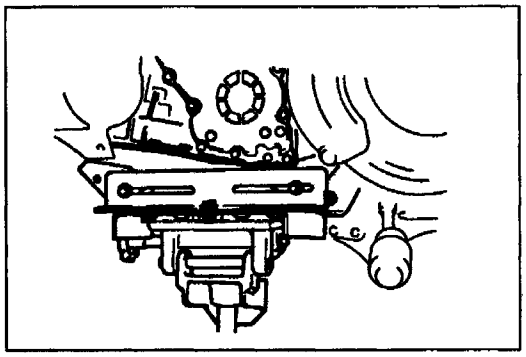
No.4 engine mount
1. Support the engine by using the **SST** before removing the No.4 engine mount.



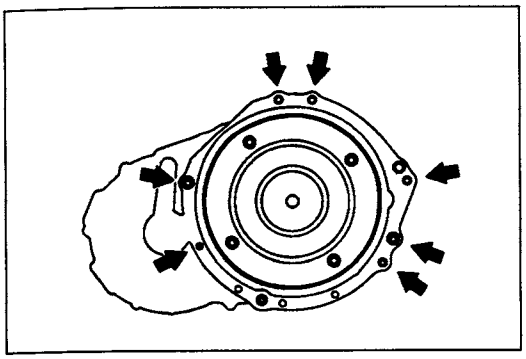
2. Loosen the No.3 engine mount bolt as shown.
3. Remove the No.4 engine mount.



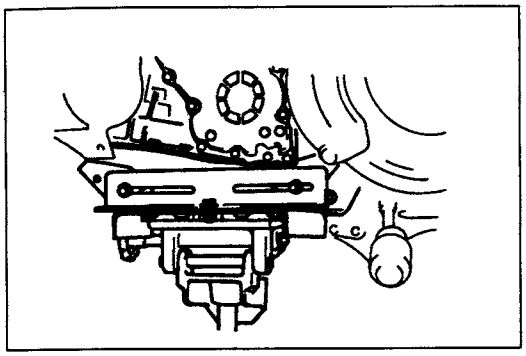
Torque converter bolts
Hold the drive plate and remove the torque converter bolts.



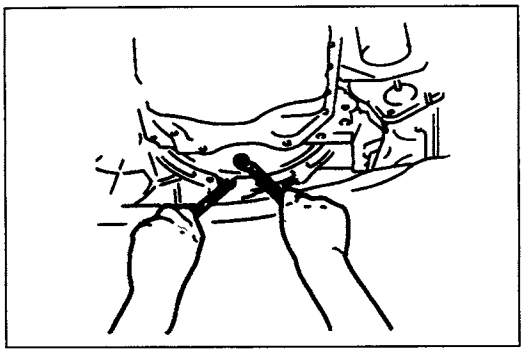
Transaxle
1. Loosen the **SST (engine support)** and lean the engine toward the transaxle.
2. Support the transaxle on a jack.



3. Remove the transaxle mounting bolts.
4. Remove the transaxle.



Installation note
Transaxle
1. Set the transaxle on a jack and lift it into place.

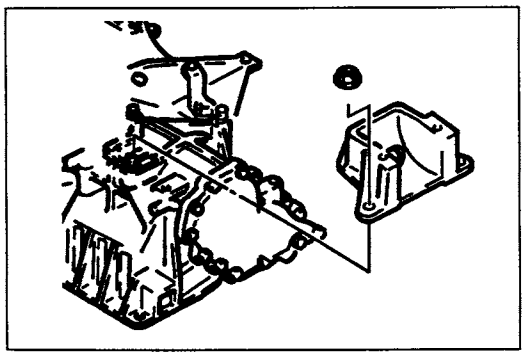


2. Install the transaxle mounting bolts.

   Tightening torque:
   68—99 N·m {6.9—10.1 kgf·m, 50—73 ft·lbf}

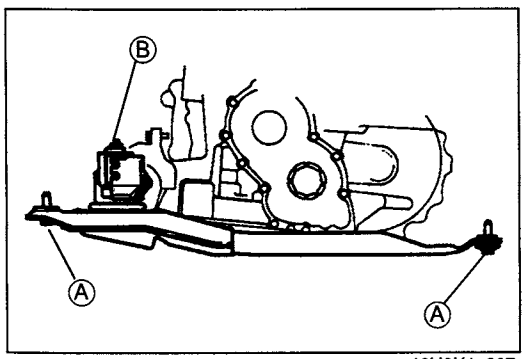
3. Install the torque converter nuts.

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



4. Install the No.4 engine mount bracket.

   Tightening torque:
   67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}



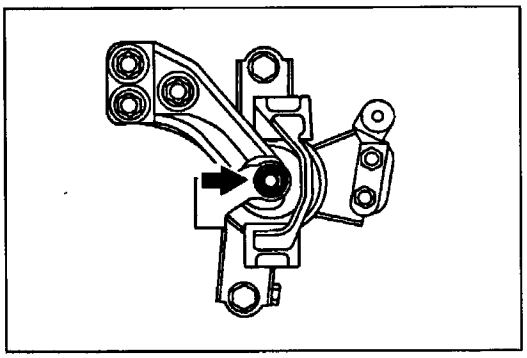
46U0K1-297

Engine mounting member
1. Install the engine mounting member and No.2 engine mount, making sure that the No.2 engine mount stud bolt passes through the No.2 engine mount bracket installation hole.
2. Install bolts Ⓐ as shown.

   Tightening torque:
   A: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

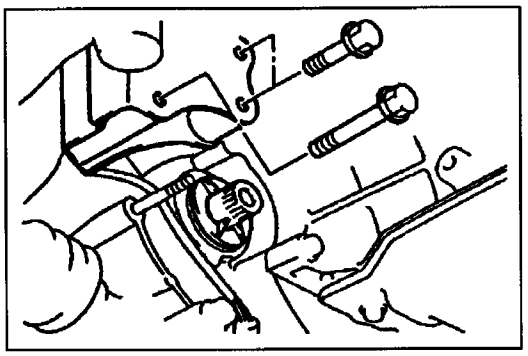
3. Tighten nut Ⓑ.

   Tightening torque:
   B: 75—104 N·m {7.6—10.7 kgf·m, 55—77 ft·lbf}



4. Tighten the No.3 engine mount bolt.

Tightening torque:
75—104 N·m {7.6—10.7 kgf·m, 55—77 ft·lbf}

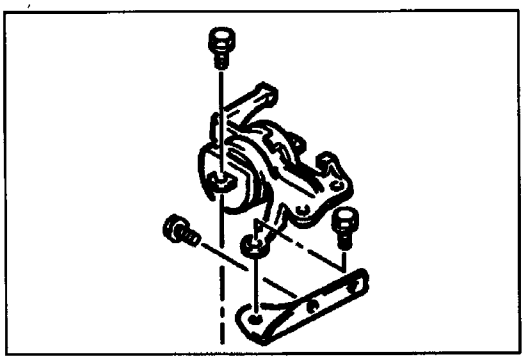


No.1 engine mount bolts

Caution
- **Align the transaxle bolt holes and the engine mount exactly. Any misalignment can result in the bolt and bold holes becoming damaged or stripped during installation.**

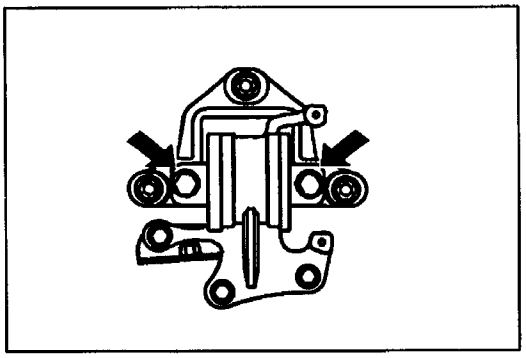
1. Use the **SST (engine support)** to make sure the transaxle bolt holes and No.1 engine mount are aligned.
2. Tighten the bolts to the specified torque.

Tightening torque:
75—104 N·m {7.6—10.7 kgf·m, 55—77 ft·lbf}



No.4 engine mount
1. Install the No.4 engine mount onto the vehicle.

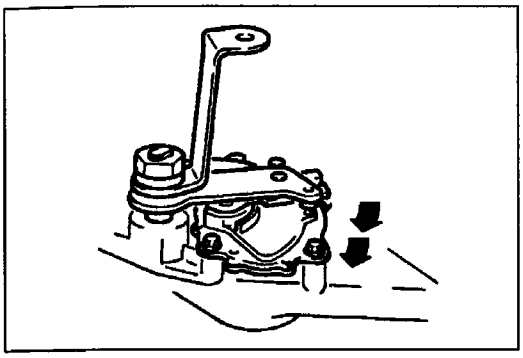
Tightening torque:
44—60 N·m {4.4—6.2 kgf·m, 32—44 ft·lbf}



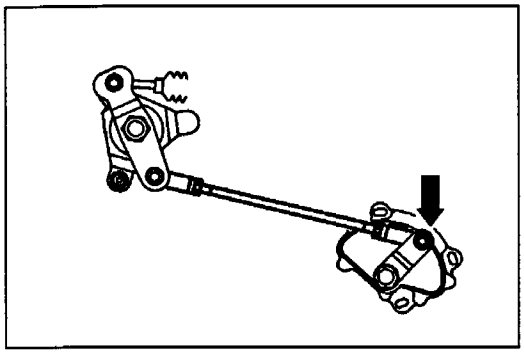
2. Use the jack to make sure the No.4 engine mount bolt holes and No.4 engine mount bracket are aligned.
3. Tighten the bolts to the specified torque.

Tightening torque:
67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

4. Remove the **SST (engine support)**.

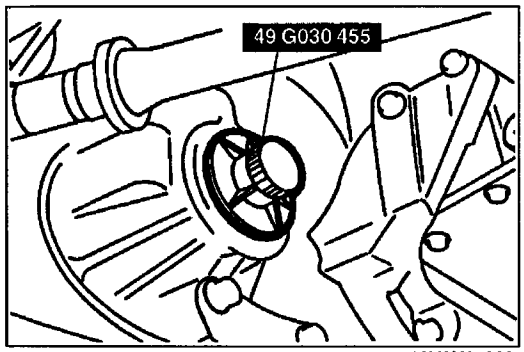


Selector rod
1. Shift the selector lever to the P position.
2. Move the manual shaft to the P position.



3. Install the selector rod and tighten the nut as shown.

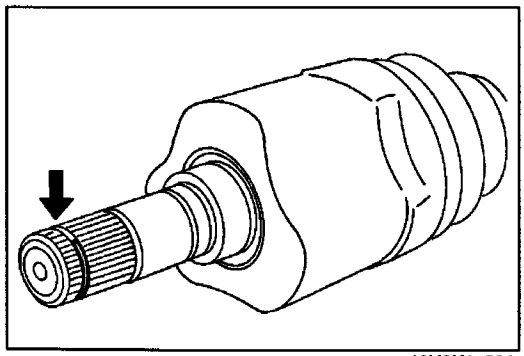
Tightening torque:
16—22 N·m {1.6—2.3 kgf·m, 12—16 ft·lbf}



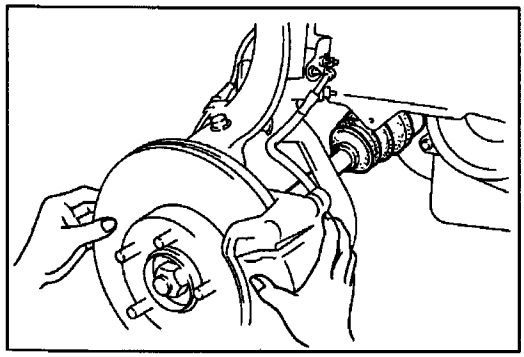
46U0K1-303

Drive shaft
1. Remove the **SST** from the transaxle case.
2. Verify that there is no damage to the oil seal.

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.**


46U0K1-304

3. Install the clip with the gap facing upward. (Refer to section M.)

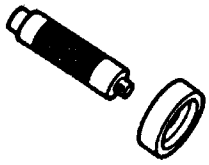
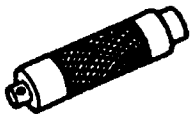

46U0K1-305

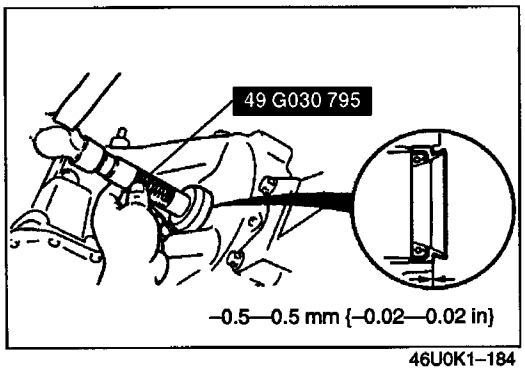
4. Apply ATF to the oil seal lip, and install the drive shaft.
5. Verify that the drive shaft is correctly seated by pulling on the shaft. It must not slide out.

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	—	—



46U0K1–184

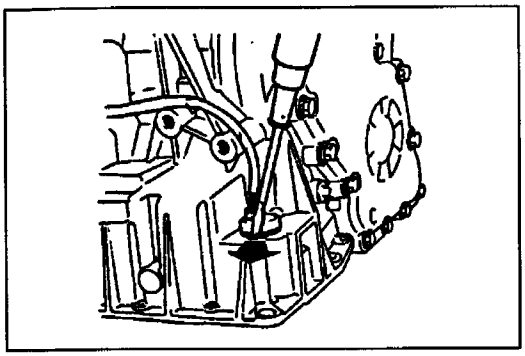
On-vehicle Replacement

1. Remove the drive shaft and joint shaft. (Refer to page K2–33.)
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 transaxle oil.
5. Install the drive shaft and joint shaft. (Refer to page K2–33.)

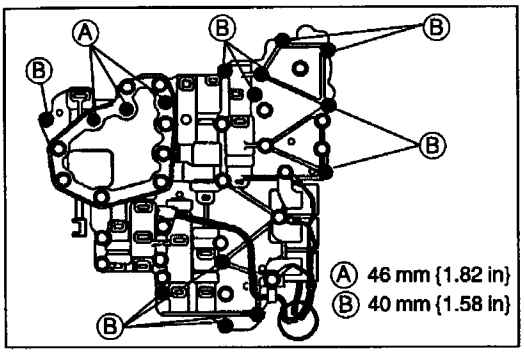
CONTROL VALVE BODY (ON-VEHICLE REMOVAL / INSTALLATION)

On-vehicle Removal

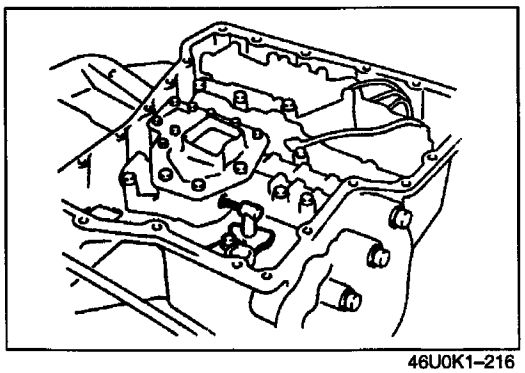
1. Disconnect the negative battery cable.
2. Clean the transaxle exterior thoroughly by using a steam cleaner or cleaning solvents.
3. Drain the ATF and engine coolant into separate containers.
4. Remove the splash shield.



5. Remove the clip as shown.



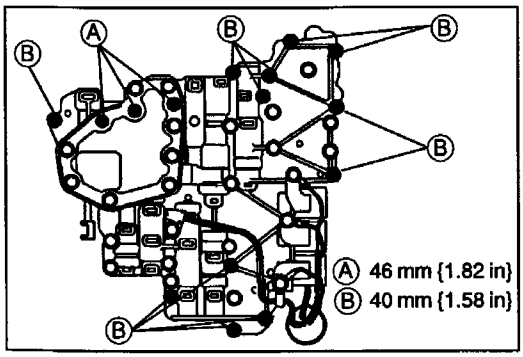
6. Remove the oil pan.
7. Remove the bolts shown.
8. Remove the control valve body assembly.



46U0K1-216

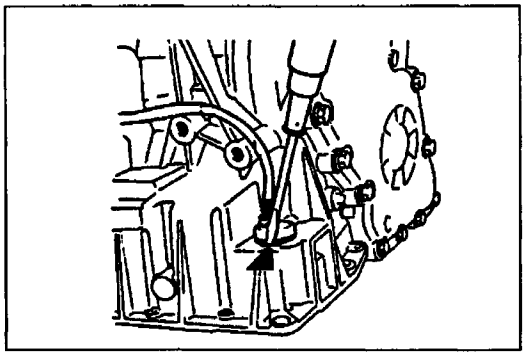
On-vehicle Installation

1. Align the manual plate and the manual valve.

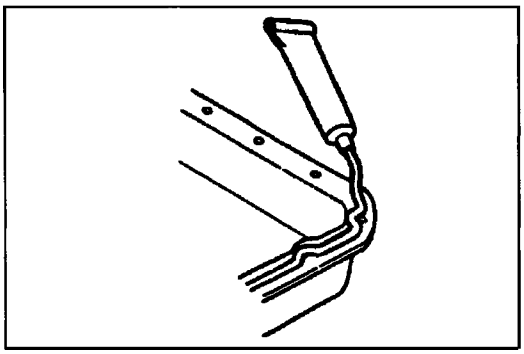


2. Install the control valve body assembly.

Tightening torque:
6.9—8.8 N·m {70—90 kgf·cm, 61—78 in·lbf}

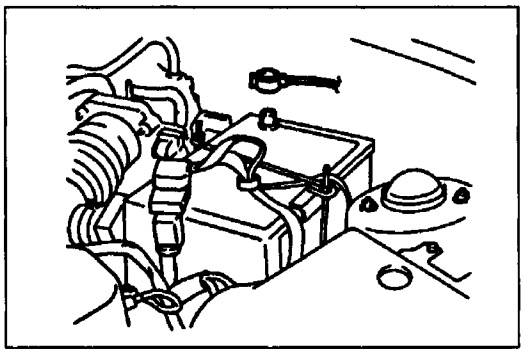


3. Install the clip as shown.



4. Clean the oil pan, bolt holes, and magnet.
5. Set the magnet into the oil pan.
6. Remove the any oil locking compound from the bolt holes.
7. Apply sealant to the oil pan.
8. Install the oil pan and tighten the new bolts evenly and quickly.

Tightening torque:
6.9—8.8 N·m {70—90 kgf·cm, 61—78 in·lbf}



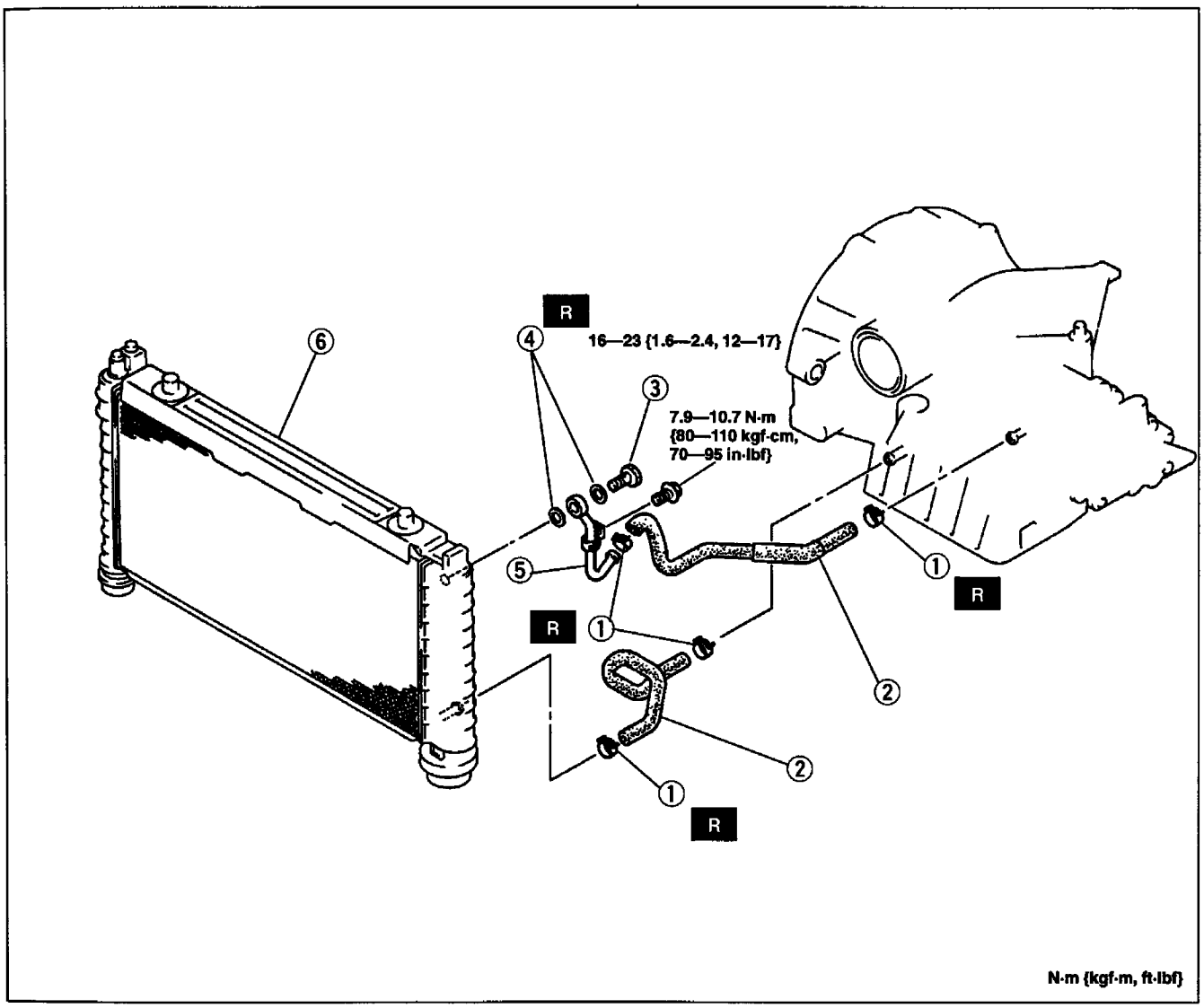
9. Install the splash shield.
10. Pour in ATF and with the engine idling, check the ATF level and check for ATF leakage. (Refer to page K2–11.)
11. Carry out the mechanical system test. (Refer to page K2–2.)
12. Carry out the road test. (Refer to page K2–7.)

OIL COOLER

OIL COOLER

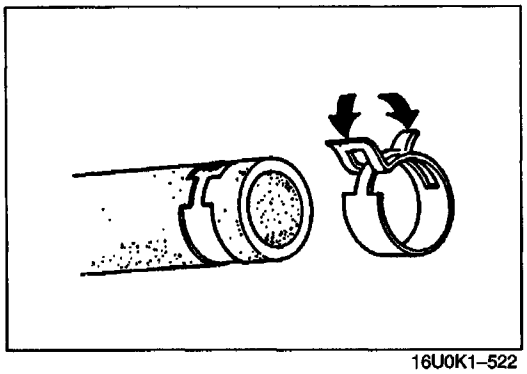
Removal / Inspection / Installation

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure.
3. Inspect all parts and repair or replace as necessary.
4. Install in the reverse order of removal, referring to **Installation Note**.
5. Add ATF to the specified level.
6. Connect the negative battery cable.
7. Inspect for oil leakage from the oil pipes and oil hoses.
8. Inspect the ATF level and condition. (Refer to page K2–11.)
9. Carry out the line pressure test. (Refer to page K2–2.)
10. Carry out the road test. (Refer to page K2–7.)

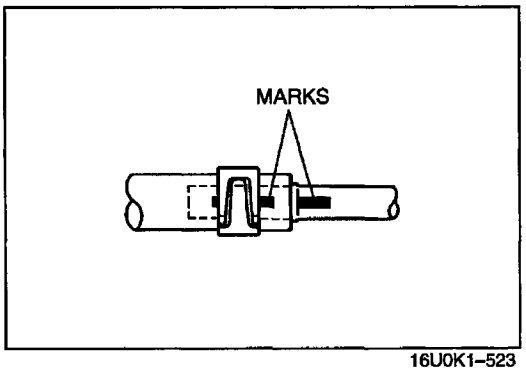


16U0K1-519

1. Hose clamp
2. Oil hose
   Installation Note ..... page K2–44
3. Connector bolts
4. Washers
5. Oil pipe
6. Radiator
   Service ..... section E



16U0K1-522



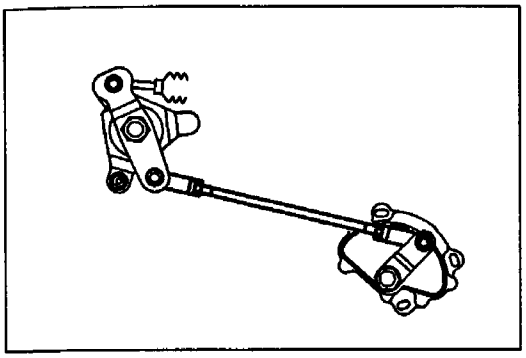
16U0K1-523

Installation note
Oil hose

1. Align the marks, and slide the oil cooler hose onto the oil cooler 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

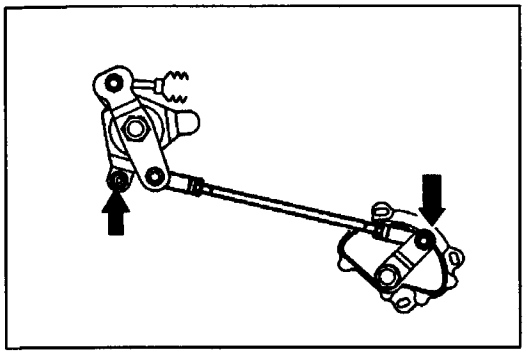
Refer to section K1.



SHIFT MECHANISM

SELECTOR ROD AND BRAKET

1. Disconnect the negative battery cable.
2. Remove the battery.
3. Remove the battery carrier.
4. Remove the selector cable nut.

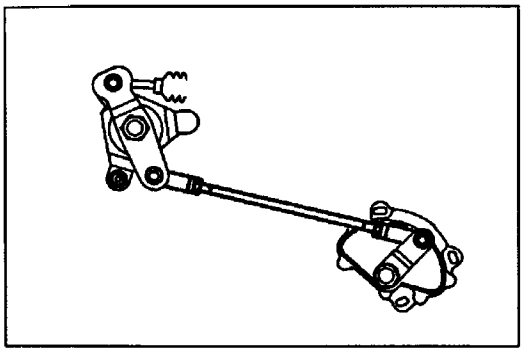


5. Remove the selector rod from the manual shaft lever.
6. Remove the bracket from the transaxle.
7. Install the new braket to the transaxle.

   Tightening torque:
   6.9—10.7 N·m {70—100 kgf·cm, 61—87 in·lbf}

8. Install the selector rod to the manual shaft lever.

   Tightening torque:
   16—22 N·m {1.6—2.3 kgf·m, 12—16 ft·lbf}



9. Install the selector cable nut.

   Tightening torque:
   16—22 N·m {1.6—2.3 kgf·m, 12—16 ft·lbf}

10. Install the battery carrier.
11. Install the battery.
12. Connect the negative battery cable.

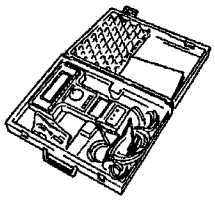
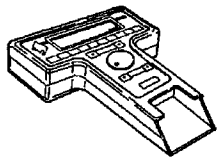
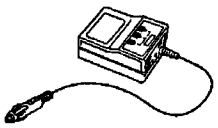
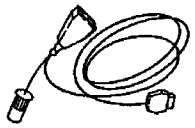
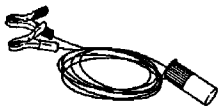
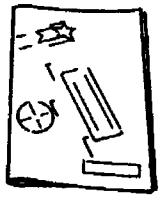
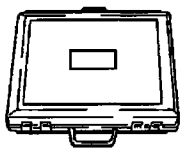
ON-BOARD DIAGNOSTIC SYSTEM

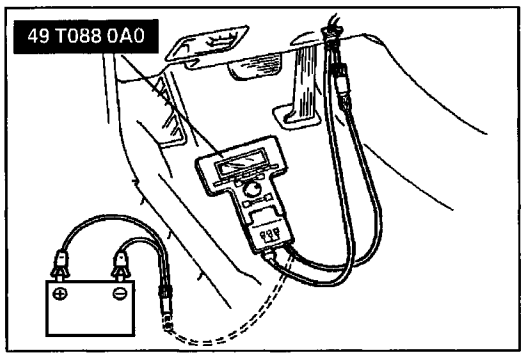
DESCRIPTION

The on-board diagnostic system integrated within the transaxle control module diagnoses malfunctions of the main sensor (input) and solenoid valves (output) as well as the transaxle control module itself. Malfunctions or intermittent malfunctions are memorized in the transaxle control module to later be output as diagnostic trouble codes.
The NGS can be used to retrieve these diagnostic trouble codes.
The NGS indicates a malfunction by displaying a diagnostic trouble code.

PREPARATION

SST

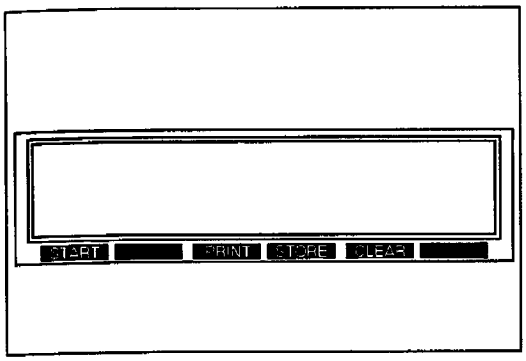
49 T088 0A0 NGS set 	For diagnosis of EC-AT	49 T088 001 Control Unit (Part of 49 T088 0A0) 	For diagnosis of EC-AT
49 T088 002 Vehicle Interface module (Part of 49 T088 0A0) 	For diagnosis of EC-AT	49 T088 004 NGS OBDII Adapter (Part of 49 T088 0A0) 	For diagnosis of EC-AT
49 T088 006 Battery Hook up adapter (Part of 49 T088 0A0) 	For diagnosis of EC-AT	49 T088 008 Instruction Manual 	For diagnosis of EC-AT
49 T088 009 Case (Part of 49 T088 0A0) 	For diagnosis of EC-AT	49 T088 010B Program card 	For diagnosis of EC-AT



DIAGNOSTIC TROUBLE CODE

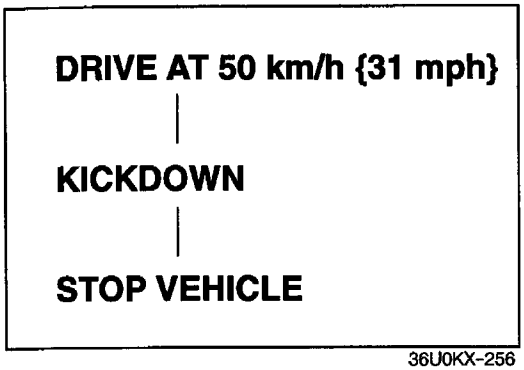
Inspection Procedure

1. Connect the **SST** (NGS) to the data link connector 2 and battery. (Refer to section F2.)
2. Turn the ignition switch ON.
3. Check the diagnostic trouble code(s), referring to the **SST** (NGS) operation manual.
4. If a diagnostic trouble code(s) is displayed, check for the cause by using the table of the diagnostic trouble code number. (Repair as necessary)
5. After repairs have made, do the After-Repair procedure to verify that there are no remaining codes.



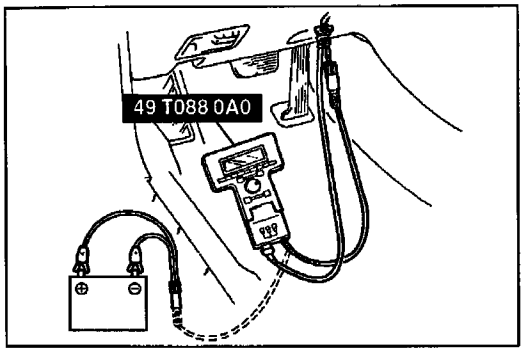
After-Repair Procedure

1. Cancel the diagnostic trouble code memory by using the **SST** (NGS). (Refer to the Instruction Manual.)
2. Remove the **SST** (NGS) from the data link connector 2.



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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.

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	K2–49
P0710	TRANS FLUID TEMP SENS — CKT MALFUNCTION	Transaxle fluid temperature sensor	K2–50
P0720	OUTPUT SPEED SENSOR — CKT MALFUNCTION	Output speed sensor	K2–51
P0725	ENGINE SPEED INPUT — CKT MALFUCNTION	Engine speed input signal	K2–52
P0731	GEAR 1 INCORRECT RATIO	Gear 1 Incorrect Ratio	K2–53
P0732	GEAR 2 INCORRECT RATIO	Gear 2 Incorrect Ratio	K2–54
P0733	GEAR 3 INCORRECT RATIO	Gear 3 Incorrect Ratio	K2–55
P0734	GEAR 4 INCORRECT RATIO	Gear 4 Incorrect Ratio	K2–56
P0740	TORQUE CONV CLUTCH SYS — MALFUNCTION	Torque Converter Clutch System Malfunction	K2–57
P0745	PRESSURE CTRL SOLENOID — MALFUNCTION	Pressure Control Solenoid	K2–58
P0750	SHIFT SOLENOID A — MALFUNCTION	Shift Solenoid A	K2–59
P0755	SHIFT SOLENOID B — MALFUNCTION	Shift Solenoid B	K2–60
P1720	VSS2 — NO VSS2 SIGNAL	Vehicle speedometer sensor	K2–61
P1743	SOLENOID TCC — OPEN OR SHORT	Torque converter clutch solenoid valve	K2–62
P1770	OVRC SOL. — OPEN OR SHORT	Overrunning clutch solenoid valve	K2–63
P1790	TPS — OPEN OR SHORT	Throttle position sensor	K2–64

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 transaxle control module • Transaxle control module malfunction

STEP	INSPECTION		ACTION
1	Are transaxle control module and transaxle range switch connections at the connector and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector(s) Go to step 6 • When **Yes**, go to next step • Wnen **No**, end of flowchart
2	Check EC-AT tester display • Connect the EC-AT tester to transaxle control module • Are transaxle range switch range and EC-AT tester display correct? ☞ **page K2–13**	Yes	Go to step 6
		No	Go to next step
3	Check for continuity between terminals of transaxle range switch and transaxle control module • Disconnect negative battery cable • Disconnect transaxle range switch and transaxle 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 the transaxle range switch ☞ **page K2–21** Go to step 2 • When **Yes**, go to step 6 • When **No**, go to next step
5	Check for continuity between terminal 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, re-check if diagnostic trouble code is shown ☞ **page K2–46**	Yes	Replace the transaxle control module ☞ **page K2–31**
		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
R	ON	R position
	OFF	Other positions, all ranges
D	ON	D range
	OFF	Other ranges, all positions
S	ON	S range
	OFF	Other ranges, all positions
L	ON	L range
	OFF	Other ranges, all positions

DIAGNOSTIC TROUBLE CODE P0710	TRANS FLUID TEMP SENS—CKT MALFUNCTION (Transaxle Fluid Temperature Sensor)
DETAILS	Transaxle 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 transaxle control module • Transaxle control module malfunction

STEP	INSPECTION		ACTION
1	Are transaxle control module and transaxle fluid temperature sensor connections at the connector and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector Go to step 6 • When **Yes**, go to next step • When **No**, end of flowchart
2	Check EC-AT tester display • Connect EC-AT tester to transaxle control module • Is transaxle fluid temperature sensor voltage correct? **Voltage** **ATF temp. 10°C {50°F}: Approx. 1.8 V** **40°C {104°F}: Approx. 1.1 V** **80°C {176°F}: Approx. 0.4 V** **☞ page K2–13**	Yes	Go to step 5
		No	Go to next step
3	Check for continuity between terminals of transaxle fluid temperature sensor and transaxle control module • Disconnect negative battery cable • Disconnect transaxle fluid temperature sensor and transaxle 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 transaxle fluid temperature sensor terminals • Disconnect negative battery cable • Disconnect transaxle fluid temperature sensor connector • Is resistance between terminals correct? **Resistance** **ATF temp. 10°C {50°F}: 3.8 kΩ** **40°C {104°F}: 1.2 kΩ** **80°C {176°F}: 0.3 kΩ** **☞ page K2–22**	Yes	Go to next step
		No	Replace transaxle fluid temperature sensor **☞ page K2–22**
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown **☞ page K2–46**	Yes	Replace the transaxle control module **☞ page K2–31**
		No	Problem is a temporary poor connection of wiring or connectors, and should be investigated further

DIAGNOSTIC TROUBLE CODE P0720	OUTPUT SPEED SENSOR — CKT MALFUNCTION (Output Speed Sensor)
DETAILS	Signal from output speed sensor is not input to transaxle control module when vehicle is moving
POSSIBLE CAUSE	• Output speed sensor malfunction • Damaged harness or connectors between output speed sensor and transaxle control module • Transaxle control module malfunction

STEP	INSPECTION		ACTION
1	Are transaxle control module and output speed sensor connection at the connector and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector Go to step 5 • When **Yes**, go to next step • When **No**, end of flowchart
2	Measure the terminal voltage at terminal 2J and 2L of the transaxle control module as follows • Start the engine • Connect a circuit tester • Is terminal voltage as specified? **Standard voltage** **Vehicle speed above 25 km/h {16 mph}:** **Above approx. 1.0 V** **Vehicle stopped: 0V** ☞ **page K2–29**	Yes	Go to step 5
		No	Go to next step
3	Check for continuity between terminals of output speed sensor and transaxle control module • Disconnect negative battery cable • Disconnect output speed sensor and transaxle 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 output speed sensor terminals • Disconnect negative battery cable • Disconnect output speed sensor connector • Is resistance between terminals correct? **Resistance: 500—1,000 Ω** ☞ **page K2–23**	Yes	Go to next step
		No	Replace the output speed sensor ☞ **page K2–23**
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ **page K2–46**	Yes	Replace the transaxle control module ☞ **page K2–31**
		No	Problem is a temporary poor connection of wiring or connectors, and should be investigated further

DIAGNOSTIC TROUBLE CODE P0725	ENGINE SPEED INPUT—CKT MALFUNCTION (Engine Speed Input Signal)
DETAILS	Engine speed input signal is not input to the transaxle control module
POSSIBLE CAUSE	• Crank angle sensor–2 malfucntion • Damaged wiring or connector between engine control module and transaxle control module • Engine control module • Transaxle control module

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code P0335 indicated? ☞ section F2	Yes	Refer to flowchart for diagnostic trouble code P0335, and perform troubleshooting ☞ section F2
		No	Go to next step
2	Are transaxle control module and engine speed input signal connection at the connector and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector Go to step 7 • When **Yes**, go to next step • When **No**, end of flowchart
3	Check EC-AT tester display • Connect EC-AT tester to transaxle control module • Is speed indicated on EC-AT tester after engine is started and vehicle is idling? ☞ page K2–13	Yes	Go to step 7
		No	Go to next step
4	Check for continuity between terminals of transaxle control module and engine control module • Disconnect negative battery cable • Disconnect the transaxle control module and engine 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 7 • When **No**, go to next step
5	Measure voltage at terminal 2O of engine control module • Connect a circuit tester to terminal 2O of engine control module • Is voltage at terminal correct? **Voltage** **Idling: Approx. 5.5 V** **Ignition switch ON: Approx. 11.0 V** ☞ section F2	Yes	Go to next step
		No	Check for engine control module or crankshaft position sensor ☞ section F2 Go to step 2 • When **Yes**, go to step 7 • When **No**, go to next step
6	Measure resistance between terminals 1N and 2P of transaxle control module • Disconnect negative battery cable • Disconnect transaxle control module connector • Is resistance correct? **Resistance: 7.2—8.0 Ω**	Yes	Go to next step
		No	Replace transaxle control module ☞ page K2–31 Go to step 2 • When **Yes**, go to step 7 • When **No**, go to next step
7	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ page K2–46	Yes	Replace transaxle control module ☞ page K2–31
		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	Transaxle control module outputs 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 • Transaxle control module malfunction

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code P0750 or P0755 indicated? ☞ page K2–46	Yes	Refer to flowchart for diagnostic trouble code P0750 or P0755 perform troubleshooting ☞ page K2–59, 60
		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 K2–11	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 3 • If ATF color is ③ or ④, replace ATF
3	Check line pressure in D range (except HOLD mode) • Is line pressure OK? **Line pressure when in D range (except HOLD mode)** **Idling: 450—510 kPa {4.5—5.3 kgf/cm², 64—69 psi}** **Stalled: 1,210—1,280 kPa {12.3—13.1 kgf/cm², 175—186 psi}** ☞ page K2–2	Yes	Go to next step
		No	Repair or replace any defective parts • Line pressure is low only when in D or S range: ATF leakage in forward clutch circuit
4	Check stall speed in D range (except HOLD mode) • Is stall speed OK? **Stall speed when in D range (except HOLD mode): 2,150—2,450 rpm** ☞ page K2–4	Yes	Go to next step
		No	Repair or replace any defective parts • High in D range: Shifting of forward clutch, forward one-way clutch, or low one-way clutch
5	Inspect operation of shift solenoid A, B • Disconnect negative battery cable • Disconnect solenoid connector • Is it operating OK? ☞ page K2–24	Yes	Go to next step
		No	Replace shift solenoid A, B ☞ page K2–24 Go to step 7 • When **Yes**, go to next step • When **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
7	After diagnostic trouble code has been cleared, re-check if diagnostic trouble code is shown ☞ page K2–46	Yes	Replace transaxle control module ☞ page K2–31
		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	Transaxle control module output solenoid pattern of second gear when gear ratio is other than second gear
POSSIBLE CAUSE	• ATF level low • Forward clutch slippage • Band servo • Solenoid valve malfunction • Line pressure low • Forward one-way clutch slippage • Control valve stuck • Transaxle control module malfunction

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code P0750, P0755 indicated? ☞ page K2–46	Yes	Refer to flowchart for diagnostic trouble code P0750 or P0755 and perform troubleshooting ☞ page K2–59, 60
		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 K2–11	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 3 • If ATF color is ③ or ④, replace ATF
3	Check line pressure in D, S range • Is line pressure OK? **Line pressure when in D, S range** **Idling: 450—510 kPa {4.5—5.3 kgf/cm², 64—69 psi}** **Stalled: 1,210—1,280 kPa {12.3—13.1 kgf/cm², 175—186 psi}** ☞ page K2–2	Yes	Go to next step
		No	Repair or replace any defective parts • ATF leakage in band servo circuit • ATF leakage in forward clutch circuit
4	Check stall speed in D, S range • Is stall speed OK? **Stall speed when in D, S range: 2,150—2,450 rpm** ☞ page K2–4	Yes	Go to next step
		No	Repair or replace any defective parts • Band servo slipping • Forward clutch slipping • Forward one-way clutch • Low one-way clutch
5	Inspect operation of shift solenoid A, B • Disconnect negative battery cable • Disconnect solenoid connector • Is it operating OK? ☞ page K2–24	Yes	Go to next step
		No	Replace shift solenoid A, B ☞ page K2–24 Go to step 7 • When **Yes**, go to next step • When **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
7	After diagnostic trouble code has been cleared, re-check if diagnostic trouble code is shown ☞ page K2–46	Yes	Replace the transaxle control module ☞ page K2–31
		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	Transaxle control module output solenoid pattern of third gear when gear ratio is other than third gear
POSSIBLE CAUSE	• ATF level low • Forward clutch slippage • High clutch slippage • Solenoid valve malfunction • Line pressure low • Forward one-way clutch 1 slippage • Control valve stuck • Transaxle control module malfunction

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code P0750 or P0755 indicated? ☞ page K2–46	Yes	Refer to flowchart for diagnostic trouble code P0750 or P0755 and perform troubleshooting ☞ page K2–59, 60
		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 K2–11	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 3 • If ATF color is ③ or ④, replace ATF
3	Inspect operation of shift solenoid A, B • Disconnect negative battery cable • Disconnect solenoid connector • Is it operating OK? ☞ page K2–24	Yes	Go to next step
		No	Replace shift solenoid A, B ☞ page K2–24 Go to step 5 • When **Yes**, go to next step • When **No**, end of flowchart
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
5	After diagnostic trouble code has been cleared, re-check if diagnostic trouble code is shown ☞ page K2–46	Yes	Replace transaxle control module ☞ page K2–31
		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	Transaxle control module output solenoid pattern of fourth gear when gear ratio is other than fourth gear
POSSIBLE CAUSE	• ATF level low • Band servo slippage • Control valve stuck • Transaxle control module malfunction • Line pressure low • High clutch slippage • Solenoid valve malfunction

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code P0750 or P0755 indicated? ☞ page K2–46	Yes	Refer to flowchart for diagnostic trouble code P0750 or P0755 and perform troubleshooting ☞ page K2–59, 60
		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 K2–11	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 K2–46	Yes	Refer to flowchart for diagnostic trouble code P0732 (Gear 2 incorrect ratio), and perform troubleshooting ☞ page K2–54
		No	Go to next step
4	Is diagnostic trouble code P0733 (Gear 3 incorrect ratio) indicated? ☞ page K2–46	Yes	Refer to flowchart for diagnostic trouble code P0733 (Gear 3 incorrect ratio), and perform troubleshooting ☞ page K2–55
		No	Go to next step
5	Inspect operation of shift solenoid A, B • Disconnect negative battery cable • Disconnect solenoid connector • Is it operating OK? ☞ page K2–24	Yes	Go to next step
		No	Replace shift solenoid A, B ☞ page K2–24 Go to step 7 • When **Yes**, go to next step • When **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
7	After diagnostic trouble code has been cleared, re-check if diagnostic trouble code is shown ☞ page K2–46	Yes	Replace transaxle control module ☞ page K2–31
		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	Transaxle control module outputs torque converter clutch signal, but no torque converter clutch obtained
POSSIBLE CAUSE	• ATF level low • Torque converter clutch slippage • Torque converter clutch solenoid valve malfunction • Transaxle 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 K2–11	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 HOLD mode) • Is line pressure OK? **Line pressure when in D range (except HOLD mode)** **Idling: 450—510 kPa {4.5—5.3 kgf/cm², 64—69 psi}** **Stalled: 1,210—1,280 kPa {12.3—13.1 kgf/cm², 175—186 psi}** ☞ page K2–2	Yes	Go to next step
		No	Repair or replace any defective parts • ATF leakage in transaxle case, oil pump, control valve
3	Inspect operation of solenoid valve • Disconnect negative battery cable • Disconnect solenoid connector • Is it operating OK? ☞ page K2–24	Yes	Go to next step
		No	Replace torque converter clutch solenoid valve ☞ page K2–24
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
5	After diagnostic trouble code has been cleared, re-check if diagnostic trouble code is shown ☞ page K2–46	Yes	Replace transaxle control module ☞ page K2–31
		No	Replace torque converter

DIAGNOSTIC TROUBLE CODE P0745	PRESSURE CTRL SOLENOID—MALFUNCTION (Pressure Control Solenoid)
DETAILS	• Damaged wiring or connectors between pressure control solenoid and transaxle control module • Short or open circuit in pressure control solenoid • Short or open circuit in transaxle control module internal transistors • Short or open circuit in dropping resistor
POSSIBLE CAUSE	• Damaged wiring or connectors between pressure control solenoid and transaxle control module • Short or open circuit in pressure control solenoid • Short or open circuit in transaxle control module internal transistors • Short or open circuit in dropping resistor

STEP	INSPECTION		ACTION
1	Are transaxle control module and pressure control solenoid connections at connector and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector(s) Go to step 8 • When **Yes**, go to next step • When **No**, end of flowchart
2	Check EC-AT tester display • Connect EC-AT tester to transaxle control module • Does indication on EC-AT tester display change according to throttle opening angle? **Indication** **Pressure control solenoid: Light (Wide open throttle)—Dark (Closed throttle position)** ☞ **page K2–13**	Yes	Go to step 8
		No	Go to next step
3	Check for continuity between terminals of pressure control solenoid and transaxle control module • Disconnect negative battery cable • Disconnect solenoid connector and transaxle 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 8 • When **No**, go to next step
4	Measure resistance between pressure control solenoid terminals • Disconnect negative battery cable • Disconnect solenoid connector • Is resistance between terminals correct? **Resistance: 2—6 Ω** ☞ **page K2–24**	Yes	Go to next step
		No	Replace pressure control solenoid ☞ **page K2–24** Go to step 2 • When **Yes**, go to step 8 • When **No**, go to next step
5	Check for continuity between terminals of dropping resistor and transaxle control module • Disconnect negative battery cable • Disconnect dropping resistor and transaxle 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 8 • When **No**, go to next step
6	Measure resistance between dropping resistor terminals • Disconnect negative battery cable • Disconnect dropping resistor connector • Is resistance between terminals correct? **Resistance: 11.4—12.6 Ω** ☞ **page K2–26**	Yes	Go to next step
		No	Replace dropping resistor ☞ **page K2–26** Go to step 2 • When **Yes**, go to step 8 • When **No**, go to next step
7	Check for continuity between terminals of dropping resistor and pressure control solenoid • Disconnect negative battery cable • Disconnect dropping resistor and pressure control solenoid • Is there continuity between terminals?	Yes	Go to next step
		No	Repair or replace connectors and wiring
8	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ **page K2–46**	Yes	Replace the transaxle control module ☞ **page K2–31**
		No	Problem is a temporary poor connection of wiring or connectors 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 transaxle control module • Short or open circuit in shift solenoid A • Short or open circuit in transaxle control module internal transistor
POSSIBLE CAUSE	• Damaged wiring or connectors between shift solenoid A and transaxle control module • Short or open circuit in shift solenoid A • Short or open circuit in transaxle control module internal transistor

STEP	INSPECTION		ACTION
1	Are transaxle control module and shift solenoid A connections at connector and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector(s) Go to step 5 • When **Yes**, go to next step • When **No**, end of flowchart
2	Check EC-AT tester display • Connect EC-AT tester to transaxle control module • Is light for shift solenoid A normally off and illuminated when valve is on? ☞ **page K2–13**	Yes	Go to step 5
		No	Go to next step
3	Check for continuity between terminals of shift solenoid A and transaxle control module • Disconnect negative battery cable • Disconnect solenoid connector and transaxle 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: 20—40 Ω** ☞ **page K2–24**	Yes	Go to next step
		No	Replace shift solenoid A ☞ **page K2–24**
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ **page K2–46**	Yes	Replace transaxle control module ☞ **page K2–31**
		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 transaxle control module • Short or open circuit in shift solenoid B • Short or open circuit in transaxle control module internal transistors
POSSIBLE CAUSE	• Damaged wiring or connectors between shift solenoid B and transaxle control module • Short or open circuit in shift solenoid B • Short or open circuit in transaxle control module internal transistors

STEP	INSPECTION		ACTION
1	Are transaxle control module and shift solenoid B connections at connector and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector(s) Go to step 5 • When **Yes**, go to next step • When **No**, end of flowchart
2	Check EC-AT tester display • Connect EC-AT tester to transaxle control module • Is light for shift solenoid B normally off and illuminated when valve is on? ☞ **page K2–13**	Yes	Go to step 5
		No	Go to next step
3	Check for continuity between terminals of shift solenoid B and transaxle control module • Disconnect negative battery cable • Disconnect solenoid connector and transaxle 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: 20—40 Ω** ☞ **page K2–24**	Yes	Go to next step
		No	Replace shift solenoid B ☞ **page K2–24**
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ **page K2–46**	Yes	Replace transaxle control module ☞ **page K2–31**
		No	Problem is a temporary poor connection of wiring or connectors and should be investigated further

DIAGNOSTIC TROUBLE CODE P1720	VSS2—NO VSS2 SIGNAL (Vehicle Speedometer Sensor)
DETAILS	Signal from vehicle speedometer sensor is not input to transaxle control module when vehicle is moving
POSSIBLE CAUSE	• Vehicle speed sensor malfunction • Vehicle speedometer sensor malfunction • Damaged wiring or connectors between vehicle speedometer sensor, vehicle speed sensor, and transaxle control module • Transaxle control module malfunction

STEP	INSPECTION		ACTION
1	Are transaxle control module, vehicle speed sensor, and vehicle speedometer sensor connections at connector and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector(s) Go to step 7 • When **Yes**, go to next step • When **No**, end of flowchart
2	Check EC-AT tester display • Connect EC-AT tester to transaxle control module • Is vehicle speed indicated on EC-AT tester when vehicle is being driven? ☞ **page K2–13**	Yes	Go to step 7
		No	Go to next step
3	Check for continuity between terminal of vehicle speed sensor and transaxle control module • Disconnect negative battery cable • Remove dashboard • Is there continuity between terminal 2K fo dashboard and terminal 1I of transaxle control module?	Yes	Go to next step
		No	Repair or replace connectors wiring Go to step 2 • When **Yes**, go to step 7 • When **No**, go to next step
4	Check for movement of circuit tester needle when circuit tester is connected to terminals of dashboard • Disconnect negative battery cable • Remove dashboard • Connect circuit tester to terminal 2D and 2H of dashboard • Does the circuit tester needle move when the front wheel is rotated slowly?	Yes	Replace vehicle speed sensor Go to step 2 • When **Yes**, go to step 7 • When **No**, go to next step
		No	Go to next step
5	Check for continuity in harness between vehicle speedometer sensor and vehicle speed sensor • Disconnect negative battery cable • Disconnect vehicle speedometer sensor and vehicle speed sensor connectors • Is there continuity in the harness?	Yes	Go to next step
		No	Repair or replace connectors and wiring Go to step 2 • When **Yes**, go to step 7 • When **No**, go to next step
6	Check for movement of circuit tester needle when circuit tester is connected to terminals of vehicle speedometer sensor • Disconnect negative battery cable • Disconnect vehicle speedometer sensor • Connect circuit tester to vehicle speedometer sensor connector • Does the circuit tester or needle move when the driven gear is rotated slowly? ☞ **page K2–24**	Yes	Go to next step
		No	Replace vehicle speedometer sensor ☞ **page K2–24**
7	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ **page K2–46**	Yes	Replace transaxle control module ☞ **page K2–31**
		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 transaxle control module • Short or open circuit in torque converter clutch solenoid valve • Short or open circuit in transaxle control module internal transistor
POSSIBLE CAUSE	• Damaged wiring or connectors between torque converter clutch solenoid valve and transaxle control module • Short or open circuit in torque converter clutch solenoid valve • Short or open circuit in transaxle control module internal transistor

STEP	INSPECTION		ACTION
1	Are transaxle control module and torque converter clutch solenoid valve connections at connector and connector pins OK?	**Yes**	Go to next step
		No	Repair or replace connector(s) Go to step 5 • When **Yes**, go to next step • When **No**, end of flowchart
2	Check EC-AT tester display • Connect EC-AT tester to transaxle control module • Does indication on EC-AT tester display change when torque converter clutch slip operation occure? **Indication** **Light (torque converter clutch non-operation)—Dark (torque converter clutch operation)** ☞ **page K2–13**	**Yes**	Go to step 5
		No	Go to next step
3	Check for continuity between terminal of torque converter clutch solenoid valve and transaxle control module • Disconnect negative battery cable • Disconnect solenoid connector and transaxle 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 negative battery cable • Disconnect solenoid connector • Is resistance correct? **Resistance: 20—40 Ω** ☞ **page K2–24**	**Yes**	Go to next step
		No	Replace torque converter clutch solenoid valve ☞ **page K2–24**
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ **page K2–46**	**Yes**	Replace transaxle control module ☞ **page K2–31**
		No	Problem is a temporary poor connection of wiring or connectors and should be investigated further

DIAGNOSTIC TROUBLE CODE P1770	OVRC SOL.—OPEN OR SHORT (Overrunning Clutch Solenoid Valve)
DETAILS	• Damaged wiring or connectors between overrunning clutch solenoid valve and transaxle control module • Short or open circuit in overrunning clutch solenoid valve • Short or open circuit in transaxle control module internal transistors
POSSIBLE CAUSE	• Damaged wiring or connectors between overrunning clutch solenoid valve and transaxle control module • Short or open circuit in overrunning clutch solenoid valve • Short or open circuit in transaxle control module internal transistors

STEP	INSPECTION		ACTION
1	Are transaxle control module and overrunning clutch solenoid valve connections at connector and connector pins OK?	Yes	Go to next step
		No	Repair or replace connector(s) Go to step 5 • When **Yes**, go to next step • When **No**, end of flowchart
2	Check EC-AT tester display • Connect EC-AT tester to transaxle control module • Is light for overrunning clutch solenoid valve normally off and illuminated when valve is on? ☞ **page K2–13**	Yes	Go to step 5
		No	Go to next step
3	Check for continuity between terminals of overrunning clutch solenoid valve and transaxle control module • Disconnect negative battery cable • Disconnect solenoid connector and transaxle 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 overrunning clutch solenoid valve terminal • Disconnect negative battery cable • Disconnect solenoid connector • Is resistance correct? **Resistance: 20—40 Ω** ☞ **page K2–24**	Yes	Go to next step
		No	Replace overrunning clutch solenoid valve ☞ **page K2–24**
5	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ **page K2–46**	Yes	Replace transaxle control module ☞ **page K2–31**
		No	Problem is a temporary poor connection of wiring or connectors and should be investigated further

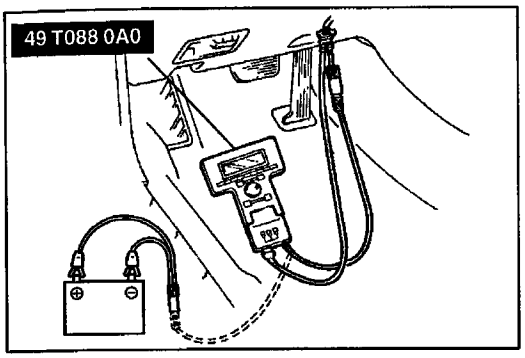
DIAGNOSTIC TROUBLE CODE P1790	TPS—OPEN OR SHORT (Throttle Position Sensor)
DETAILS	Throttle position sensor voltage is less than 0.09 V or greater than 4.95 V
POSSIBLE CAUSE	• Throttle position sensor malfunction • Damaged wiring or connectors between throttle position sensor and engine control module • Damaged wiring or connectors between throttle position sensor and transaxle control module • Engine control module or transaxle control module malfunction

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code P0725 indicated? ☞ **section F2**	**Yes**	Refer to flowchart for diagnostic trouble code P0725, and perform troubleshooting ☞ **section F2**
		No	Go to next step
2	Are transaxle control module and throttle position sensor connections at connector and connector pins OK?	**Yes**	Go to next step
		No	Repair or replace connector(s) Go to step 6 • When **Yes**, go to next step • When **No**, end of flowchart
3	Measure throttle position sensor output voltage • Connect EC-AT tester to transaxle control module • Is throttle position sensor voltage OK? **Voltage** **Wide open throttle: 0.1—1.1 V** **Closed throttle position: 3.1—4.4 V** ☞ **page K2–13**	**Yes**	Go to step 6
		No	Go to next step
4	Measure voltage at terminal 2A of transaxle control module • Is voltage at the terminal OK? **Voltage** **Ignition switch at ON: 4.5—5.5 V** **Ignition switch at OFF: 0 V** ☞ **page K2–29**	**Yes**	Go to next step
		No	Repair or replace connector or wiring Go to step 3 • When **Yes**, go to step 6 • When **No**, go to next step
5	Check for continuity between terminals of transaxle control module and throttle position sensor • Disconnect negative battery cable • Disconnect transalxe control module and throttle position sensor connectors • Is there continuity between the terminals?	**Yes**	Go to next step
		No	Repair or replace connector or wiring Go to step 3 • When **Yes**, go to step 6 • When **No**, go to next step
6	After diagnostic trouble code has been cleared, recheck if diagnostic trouble code is shown ☞ **page K2–46**	**Yes**	Replace transaxle control module ☞ **page K2–31**
		No	Problem is a temporary poor connection of wiring or connectors and should be investigated further

TROUBLESHOOTING GUIDE

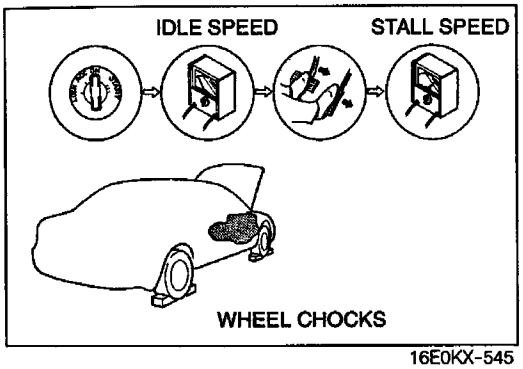
GENERAL NOTES

A problem with the EC-AT may be caused by the engine, the EC-AT powertrain, the hydraulic control system, or the electronic control system. When troubleshooting, begin with those points which can be inspected quickly and easily. The recommended troubleshooting sequence is described below.



Step 1: On-Board Diagnostic System Inspection

Check for diagnostic trouble code(s) memorized in the transaxle control module with the **NGS**.
(Refer to page K2–46.)



16E0KX-545

Step 2: Mechanical System Test

Check the engine stall speed, time lag, and line pressure. (Refer to page K2–2.)

Step 3: Road Test

Check the shift point and shift shock.
(Refer to page K2–7.)

QUICK DIAGNOSIS CHART

OUTLINE

The Quick Diagnosis Chart shows various problems and the various components that might be the cause of the problem.

1. Components indicated in the "On-board diagnostic" row of the QUICK DIAGNOSIS CHART (I) are diagnosed by the transaxle control module on-board diagnostic system. The **NGS** can be used for easy retrieval of the diagnostic trouble codes.
2. Components indicated in the "Adjustment" row of the QUICK DIAGNOSIS CHART (I) indicate that there is a possibility that the problem may be the result of an incorrect adjustment.
   Check the adjustment of each component, and readjust if necessary.
3. Components indicated in the "Stall Test" row of the QUICK DIAGNOSIS CHART (I) can be checked for malfunction by observing the results of the stall test.
4. Components indicated in the "Time Lag Test" row of the QUICK DIAGNOSIS CHART (I) can be checked for malfunction by observing the results of the time lag test.
5. Components indicated in the "Line Pressure Test" row of the QUICK DIAGNOSIS CHART (I) can be checked for malfunction by observing the results of the line pressure test.
6. Components indicated in the "Road Test" row of the QUICK DIAGNOSIS CHART (I) can be checked for malfunction by observing the results of the road test.
7. QUICK DIAGNOSIS CHART (II) shows the relationship between the troubleshooting item and inspection point.

QUICK DIAGNOSIS CHART (I)

Possible parts and reference page / Troubleshooting item	Preliminary								Electronic system											
	K2–11	section K1	section F2	section G	K2–4	K2–5	K2–2	K2–7	K2–21	section F2	K2–23	K2–24	section G	K2–22	K2–24	K2–24	K2–24	K2–26	K2–24	K2–24	section F2
	ATF level and condition	Selector lever and control linkage	Idle speed and ignition timing	Ignition system and starter	Stall test	Time lag test	Line pressure test	Road test	Transaxle range switch	Throttle position sensor	Output speed sensor	Vehicle speedometer sensor	Engine speed input signal	Transaxle fluid temperature sensor	Shift solenoid A	Shift solenoid B	Pressure control solenoid	Dropping resistor	TCC solenoid valve	Overrunning clutch solenoid valve	Closed throttle position sensor
On-board diagnostic									○	○	○	○	○	○	○	○	○	○	○	○	
Adjustment	○	○	○						○	○											
Stall test																					
Time lag test																					
Line pressure test																					
Road test																					

QUICK DIAGNOSIS CHART (I)

Electronic system			Hydraulic control system					Powertrain												Possible parts and reference page
K2–29	K2–20	K2–29	*					*												
4GR inhibit signal (ASC signal)	HOLD switch	Ground	Control valve body	N-D accumulator	1-2 accumulator	2-3 accumulator	N-R accumulator	Band servo	Oil pump	Hydraulic circuit	Torque converter	Reverse clutch	High clutch	Forward clutch	Forward one-way clutch	Overrunning clutch	Low one-way clutch	Low and reverse brake	Brake band (and servo)	Parking mechanism	Troubleshooting item
																				On-board diagnostic
																				Adjustment
			○						○		○	○	○	○	○		○	○	○	Stall test
				○	○		○					○		○			○	○	○	Time lag test
			○						○	○		○		○				○		Line pressure test
			○	○	○	○	○							○	○	○	○	○	○	Road test

* Refer to Automatic transaxle workshop manual LJ4A-EL

QUICK DIAGNOSIS CHART (II–1)

Troubleshooting item \ Possible parts and reference page			Preliminary								Electronic system												
			K2–11	section K1	section F2	section G	K2–4	K2–5	K2–2	K2–7	K2–21	section F2	K2–23	K2–24	section G	K2–22	K2–24	K2–24	K2–24	K2–26	K2–24	K2–24	section F2
			ATF level and condition	Selector lever and control linkage	Idle speed and ignition timing	Ignition system and starter	Stall test	Time lag test	Line pressure test	Road test	Transaxle range sensor	Throttle position sensor	Output speed sensor	Vehicle speedometer sensor	Engine speed input signal	Transaxle fluid temperature sensor	Shift solenoid A	Shift solenoid B	Pressure control solenoid	Dropping resistor	TCC solenoid valve	Overrunning clutch solenoid valve	Closed throttle position sensor
Accelerating	1	Vehicle does not move in D, S, L range and R position	1	4					2	3		7							5	6			
		① Vehicle does not move in D, and S ranges		1																			
		② Vehicle does not move in R position		1					2										3	4			
		③ Vehicle does not move in D, S, and L ranges	1						2										3	4			
	2	Vehicle moves in N position	1	3					2			6							4	5			
	3	Vehicle moves in P position, or parking gear does not disengage when P disengaged		1						2													
	4	Excessive creep			1		3		2		7	6							4	5			
	5	No creep at all	1	3					2			6							4	5			
	6	Low maximum speed and poor acceleration	1				3		2	7	10	6	12				8	9	4	5			
Shifting	7	No shift								1			5				2	3					
		① Does not shift from 1GR to 2GR											3				1	2					
		② Does not shift from 2GR to 3GR											2					1					
		③ Does not shift from 4GR to 3GR															1						
	8	Does not shift to 4GR									5		6			1	2	3				4	
		① Does not shift from 4GR to 2GR or from 3GR to 2GR	1						7			3					4	5					
		② Does not shift from 3GR to 1GR or from 2GR to 1GR	1						7			3					4	5					
	9	Abnormal shift	1									2	3										
		① Shifts directly from 1GR to 3GR	1																				
		② Does not kickdown when accelerator is depressed in 4GR within kickdown range										2	3				4	5					
		③ Excessive engine speed when accelerated in 4GR due to delayed kickdown										3	2				4	5					
	10	Frequent shifting										1											2
	11	Shift point high or low										1	4	3									2
		① TCC operation point high or low										1	3								4		7
	12	TCC non-operation									5	3	6		4	2					1		
	13	No kickdown										2	6				3	4					
Slipping	14	Engine flares up or slips when accelerating vehicle	1	3					2			6							4	5			
		① Slips when shifting from 1GR to 2GR	1	2			9		3			6	7						4	5			
		② Slips when shifting from 2GR to 3GR	1	2			9		3			6	7						4	5			

*The numbers indicate the inspection sequence.

QUICK DIAGNOSIS CHART (II–1)

Electronic system			Hydraulic control system					Powertrain												Possible parts and reference page		
K2–29	K2–20	K2–29	*					*														
4GR inhibit signal (ASC signal)	HOLD switch	Ground	Control valve body	N-D accumulator	1-2 accumulator	2-3 accumulator	N-R accumulator	Band servo	Oil pump	Hydraulic circuit	Torque converter	Reverse clutch	High clutch	Forward clutch	Forward one-way clutch	Overrunning clutch	Low one-way clutch	Low and reverse brake	Brake band (and servo)	Parking mechanism	Troubleshooting item		
			8					9	10	18	14	17	11	16				13	12	15	Vehicle does not move in D, S, L ranges and R position	1	Accelerating
										3							2				Vehicle does not move in D and S ranges ①		
			5							11		6	7	8		9		10			Vehicle does not move in R position ②		
			5	6						12		7	8	9	10		11				Vehicle does not move in D, S, and L ranges ③		
			7							11		10		8		9					Vehicle moves in N position	2	
																				3	Vehicle moves in P position, or parking gear does not disengage when P disengaged	3	
			8																		Excessive creep	4	
			7						9	10	11			8							No creep at all	5	
	11		13					14	19	21	20	15	16					18	17		Low maximum speed and poor acceleration	6	
	4	6	7					8		11			10						9		No shift	7	Shifting
			4					5		8			7						6		Does not shift from 1GR to 2GR ①		
			3					4		7			6						5		Does not shift from 2GR to 3GR ②		
			2					3		7						5		6	4		Does not shift from 4GR to 3GR ③		
7	8		9					10		12									11		Does not shift to 4GR	8	
	6		8					10		12			9						11		Does not shift from 4GR to 2GR or from 3GR to 2GR ①		
	6		8					11		13			9				10		12		Does not shift from 3GR to 1GR or from 2GR to 1GR ②		
			4					5		7									6		Abnormal shift	9	
					2			3		5									4		Shifts directly from 1GR to 3GR ①		
																					Does not kickdown when accelerator is depressed in 4GR within kickdown range ②		
																					Excessive engine speed when accelerated in 4GR due to delayed kickdown ③		
			2							3											Frequent shifting	10	
5			6																		Shift point high or low	11	
			5																		TCC operation point high or low ①		
			8							10	9										TCC non-operation	12	
	5		7																		No kickdown	13	
			7						13	15	14	11		8	9		10	12			Engine flares up or slips when accelerating vehicle	14	Slipping
			10		11					12									13		Slips when shifting from 1GR to 2GR ①		
			10			11				14			13						12		Slips when shifting from 2GR to 3GR ②		

* Refer to Automatic transaxle workshop manual LJ4A-EL

QUICK DIAGNOSIS CHART (II–2)

Troubleshooting item \ Possible parts and reference page				Preliminary								Electronic system											
				K2–11	section K1	section F2	section G	K2–4	K2–5	K2–2	K2–7	K2–21	section F2	K2–23	K2–24	section G	K2–22	K2–24	K2–24	K2–24	K2–26	K2–24	K2–24	section F2
				ATF level and condition	Selector lever and control linkage	Idle speed and ignition timing	Ignition system and starter	Stall test	Time lag test	Line pressure test	Road test	Transaxle range sensor	Throttle position sensor	Output speed senosr	Vehicle speedometer sensor	Engine speed input signal	Transaxle fluid temperature sensor	Shift solenoid A	Shift solenoid B	Pressure control solenoid	Dropping resistor	TCC solenoid valve	Overrunning clutch solenoid valve	Closed throttle position sensor
Slipping	14	③	Slips when shifting from 3GR to 4GR	1	2			8		3			6	7						4	5			
		④	Engine flares up or slips when shifting from 4GR to 3GR	1	2			7		3			6							4	5			
		⑤	Engine flares up or slips when shifting from 4GR to 2GR	1	2			8		3			6					7		4	5			
		⑥	Engine flares up or slips when shifting from 3GR to 2GR	1	2			7		3			6							4	5			
		⑦	Engine flares up or slips when shifting from 4GR or 3GR to 1GR	1	2			7		3			6							4	5			
	15		Engine flares up or slips when upshifting or downshifting	1	3					2			6	7						4	5			
	16		Shudders upon TCC operation	2		1				4			7	10		9				5	6	3		8
Shift shock	17		Excessive N to D or N to R position shift shock	1		2		4		3		8	7							5	6			
	18		Excessive shift shock when upshifting and downshifting	1				3		2			6	9			8			4	5			7
		①	Excessive 1GR to 2GR shift shock					7		1			4	6			5			2	3			
		②	Excessive 2GR to 3GR shift shock					7		1			4	6			5			2	3			
		③	Excessive 3GR to 4GR shift shock					7		1			4	6			5			2	3			
		④	Excessive 2GR to 1GR shift shock in L range					7		1			4	6			5			2	3			
		⑤	Shift shock when accelerator released and deceleration occurs							2			5	7			6			3	4		1	8
	19		Excessive TCC operation shift shock	1									3	6		5						2		4
Noise	20		Noise at idle when vehicle stopped in all ranges	1									4	5		6				2	3			
	21		Noise at idle when vehicles stopped in R position, D, S, and L ranges	1																				
Others	22		No engine braking	1								4	3										2	
	23		No mode changes from/to HOLD mode																					
	24		Transaxle overheats	1				3		2			6							4	5	7		
	25		Engine does not start in N or P position, or starts in other ranges		3		2					1												
	26		Engine stalls when shifted to R position, D, S, and L ranges			1						2		3										
		①	Rough idle when R position, D, S, and L ranges selected from N and P position									2												1
	27		Engine stalls when driving at low speed or stopping	1		2						4		5										

QUICK DIAGNOSIS CHART (II–2)

Electronic system			Hydraulic control system					Powertrain													Possible parts and reference page		
K2–29	K2–20	K2–29	*					*															
4GR inhibit signal (ASC signal)	HOLD switch	Ground	Control valve body	N-D accumulator	1-2 accumulator	2-3 accumulator	N-R accumulator	Band servo	Oil pump	Hydraulic circuit	Torque converter	Reverse clutch	High clutch	Forward clutch	Forward one-way clutch	Overrunning clutch	Low one-way clutch	Low and reverse brake	Brake band (and servo)	Parking mechanism	Troubleshooting item		
			9				11			14			13						12		Slips when shifting from 3GR to 4GR	③	14
			8							11			10						9		Engine flares up or slips when shifting from 4GR to 3GR	④	
			9							11									10		Engine flares up or slips when shifting from 4GR to 2GR	⑤	
			8			9				12			11						10		Engine flares up or slips when shifting from 3GR to 2GR	⑥	
			8							12				9	10		11				Engine flares up or slips when shifting from 4GR or 3GR to 1GR	⑦	
			8		9	10	11			17			13	14	15		16		12		Engine flares up or slips when upshifting or downshifting		15
			11							13	12										Shudders upon TCC operation		16
			9	10			11			15		13		12				14			Excessive N to D or N to R position shift shock		17
			10		11	12	13			17			16			15			14		Excessive shift shock when upshifting and downshifting		18
			8		9					11									10		Excessive 1GR to 2GR shift shock	①	
			8			9				12			11						10		Excessive 2GR to 3GR shift shock	②	
			8				9			12						11			10		Excessive 3GR to 4GR shift shock	③	
			8							10								9			Excessive 2GR to 1GR shift shock in L range	④	
			9																		Shift shock when accelerator released and deceleration occurs	⑤	
			7							9	8										Excessive TCC operation shift shock		19
									7		8										Noise at idle when vehicle stopped in all ranges		20
											2										Noise at idle when vehicles stopped in R position, D, S, and L ranges		21
			5							8						6		7			No engine braking		22
	1																				No mode changes from/to HOLD mode		23
			8						9	17	16	10	11	13		14		15	12		Transaxle overheats		24
																					Engine does not start in N or P position, or starts in other ranges		25
				4						6	5										Engine stalls when shifted to R position, D, S, and L ranges		26
																					Rough idle when R position, D, S, and L ranges selected from N and P position	①	
				6						8	7										Engine stalls when driving at low speed or stopping		27

Slipping	14–17
Shift shock	18–19
Noise	20–21
Others	22–27

* Refer to Automatic transaxle workshop manual LJ4A-EL

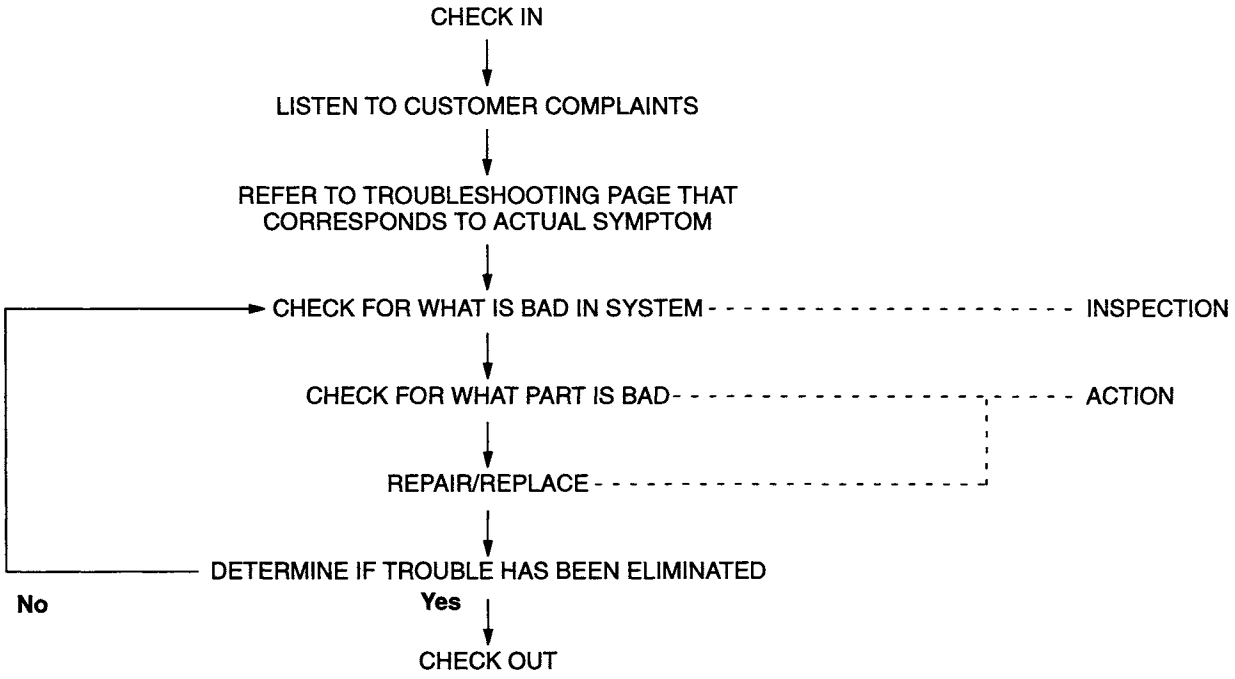
SYMPTOM TROUBLESHOOTING

USING THIS SECTION

Introduction

Most of the automatic transaxle control system is electronically controlled, often making it difficult to diagnose problems in the system, especially intermittent problems. Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a drivability complaint. The customer is often a good source of information on such problems, especially intermittent ones. Through talks with the customer, one can find out what the symptoms are and under what conditions they occur.

Work Flow



Diagnosis Index

DIAGNOSTIC INDEX

TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
ITEM	No.	TROUBLE		
Accelerating	1	Vehicle does not move in D, S, L ranges, and R position		K2-76
	2	Vehicle moves in N position		K2-77
	3	Vehicle moves in P position, or parking gear does not disengage when P disengaged		K2-78
	4	Excessive creep	Creep should occur in D, S, L ranges, and R position	K2-78
	5	No creep at all	Creep should occur in D, S, L range, and R position	K2-79
	6	Low maximum speed and poor acceleration		K2-80
Shifting	7	No shift	Shift schedule: D range • Except HOLD mode : 1GR ↔ 2GR ↔ 3GR ↔ 4GR • HOLD mode : 2GR ↔ 3GR ← 4GR S range • Except HOLD mode : 1GR ↔ 2GR ↔ 3GR • HOLD mode : 2GR ← 3GR L range • Except HOLD mode : 1GR	K2-82
	8	Does not shift to 4GR		K2-83
	9	A...		K2-84
				K2-

No.:
Each troubleshooting item is assigned a number

Page:
Shows the reference page or section

Description:
Describes each troubleshooting item.

Troubleshooting Item:
There are 27 troubleshooting items. Choose the item that most closely corresponds to the actual symptom.

Troubleshooting chart

1	VEHICLE DOES NOT MOVE IN D, S, L, RANGES AND R POSITION		
DESCRIPTION	• Vehicle does not move when accelerator depressed		
[TROUBLESHOOTING HINTS] ① ATF level low ② Selector lever installation or adjustment incorrect ③ Throttle position sensor malfunction or misadjusted ④ Line pressure low ⑤ Powertrain slippage (high clutch, brake band, forward clutch, or reverse clutch) ⑥ Control valve stuck (manual valve, pressure regulator valve, pressure modifier valve, or pilot valve) ⑦ Pressure control solenoid worn ⑧ Dropping resistor malfunction ⑨ Parking mechanism worn			
STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step, and check for cause When the problem is found, overhaul the transaxle and repair or replace parts as necessary
2	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46 If problem remains, overhaul transaxle and repair or replace parts as necessary
3	Is line pressure OK? ☞ page K2–2 **Specified pressure** **kPa {kgf/cm², psi}** Range / Idle / Stall D, S, L / 450—510 {4.5— / 1,210—1,280 175—186} R	Yes	Go to next step
		No	Go to step 5
			...blem with transaxle ...nsaxle and repair

DESCRIPTION:
Further describes the symptom. Confirm that the chart addresses the actual symptom before beginning troubleshooting.

TROUBLESHOOTING HINTS:
Describes the possible point of malfunction.

STEP:
Shows the order of troubleshooting. Proceed with troubleshooting as indicated.

INSPECTION:
Describes an inspection method to quickly determine the malfunction of parts. If a detailed procedure is necessary to perform the INSPECTION, refer to the page shown by the "☞" mark.

ACTION:
This recommends the appropriate action to take as a result (Yes/No) of the INSPECTION. How to perform the action is described on the reference page shown by the "☞" mark.

DIAGNOSTIC INDEX

TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
ITEM	No.	TROUBLE		
Accelerating	1	Vehicle does not move in D, S, L ranges, and R position		K2–76
	2	Vehicle moves in N position		K2–77
	3	Vehicle moves in P position, or parking gear does not disengage when P disengaged		K2–78
	4	Excessive creep	Creep should occur in D, S, L ranges, and R position	K2–78
	5	No creep at all	Creep should occur in D, S, L range, and R position	K2–79
	6	Low maximum speed and poor acceleration		K2–80
Shifting	7	No shift	Shift schedule: D range • Except HOLD mode : 1GR ↔ 2GR ↔ 3GR ↔ 4GR • HOLD mode : 2GR ↔ 3GR ← 4GR S range • Except HOLD mode : 1GR ↔ 2GR ↔ 3GR • HOLD mode : 2GR ← 3GR L range • Except HOLD mode : 1GR ↔ 2GR • HOLD mode : 1GR ← 2GR	K2–82
	8	Does not shift to 4GR		K2–83
	9	Abnormal shift		K2–84
	10	Frequent shifting		K2–85
	11	Shift point high or low		K2–86
	12	TCC non-operation		K2–87
	13	No kickdown		K2–88
Slipping	14	Engine flares up or slips when accelerating vehicle		K2–89
	15	Engine flares up or slips when upshifting or downshifting		K2–90
	16	Shudders upon TCC		K2–91
Shift shock	17	Excessive N position to D range or N position to R position shift shock		K2–93
	18	Excessive shift shock when upshifting and downshifting		K2–94
	19	Excessive TCC shift shock		K2–96
Noise	20	Noise at idle when vehicle stopped in all ranges		K2–97
	21	Noise at idle when vehicle stopped in R position, D, S, and L ranges		K2–98

TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
ITEM	No.	TROUBLE		
Others	22	No engine braking	Engine braking is available as follows: D range 4GR : Constant • HOLD mode 2GR, 3GR: Throttle opening less than 1/8 and vehicle speed above 10 km/h {6 mph} S range • Except HOLD mode 2GR, 3GR: Throttle opening less than 1/8 • HOLD mode 2GR : Throttle opening less than 1/8 L range • Except HOLD mode 1GR, 2GR: Constant • HOLD mode 1GR : Constant	K2–99
	23	No mode changes from/to HOLD mode		K2–100
	24	Transaxle overheats		K2–101
	25	Engine does not start in N or P position, or starts in other ranges		K2–103
	26	Engine stalls when shifted to R position, D, S, and L ranges		K2–103
	27	Engine stalls when driving at slow speed or stopping		K2–104

SYMPTOM TROUBLESHOOTING CHART

1 VEHICLE DOES NOT MOVE IN D, S, L, RANGES AND R POSITION

DESCRIPTION • Vehicle does not move when accelerator depressed

[TROUBLESHOOTING HINTS]
① ATF level low
② Selector lever installation or adjustment incorrect
③ Throttle position sensor malfunction or misadjusted
④ Line pressure low
⑤ Powertrain slippage (high clutch, brake band, forward clutch, or reverse clutch)
⑥ Control valve stuck (manual valve, pressure regulator valve, pressure modifier valve, or pilot valve)
⑦ Pressure control solenoid worn
⑧ Dropping resistor malfunction
⑨ Parking mechanism worn

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step, and check for cause When the problem is found, overhaul the transaxle and repair or replace parts as necessary
2	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46 If problem remains, overhaul transaxle and repair or replace parts as necessary
3	Is line pressure OK? ☞ page K2–2 **Specified pressure** **kPa {kgf/cm², psi}** Range/position: D, S, L — Idle: 450—510 {4.5—5.3, 64—68} — Stall: 1,210—1,280 {12.3—13.1, 175—186} Range/position: R — Idle: 550—620 {5.6—6.4, 80—91} — Stall: 1,610—1,680 {16.4—17.2, 234—244}	Yes	Go to next step
		No	Go to step 5
4	Stop vehicle on flat paved surface with engine OFF. Does vehicle move when pushed? (Except P position, brake released)	Yes	Problem with transaxle Overhaul transaxle and repair or replace parts as necessary
		No	Parking mechanism malfunction Overhaul transaxle and repair or replace parts as necessary
5	Does selector lever operate OK? ☞ section K1	Yes	Go to next step
		No	Adjust selector lever ☞ section K1
6	Are measurements at transaxle control module terminals OK? ☞ page K2–29 TERMINAL: 1F — FUNCTION: Pressure control solenoid TERMINAL: 1H — FUNCTION: Dropping resistor	Yes	Overhaul transaxle and replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • Pressure control solenoid ☞ page K2–24 • Dropping resistor ☞ page K2–26 If resistance OK but duty not, go to next step
7	Is input voltage of throttle position sensor at transaxle control module OK? ☞ page K2–29 TERMINAL: 2T — FUNCTION: Throttle position sensor	Yes	Replace transaxle control module ☞ page K2–29
		No	Check throttle position sensor and wiring ☞ section F2 If the problem is within the transaxle, overhaul transaxle and repair or replace as necessary

2 VEHICLE MOVES IN N POSITION

DESCRIPTION
- Vehicle creeps in N position
- Vehicle moves quickly in N position

[TROUBLESHOOTING HINTS]
① Selector lever installation or adjustment incorrect
② Powertrain burnt (forward clutch, or overrunning clutch)
③ Throttle position sensor malfunction or misadjusted
④ Control valve stuck (manual valve)
⑤ Pressure control solenoid worn
⑥ Dropping resistor malfunction

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step, and check for the main cause When the problem is found, overhaul the transaxle and repair or replace parts as necessary
2	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46 If problem remains, overhaul transaxle and repair or replace parts as necessary
3	Is line pressure OK? ☞ page K2–2 **Specified pressure** **kPa {kgf/cm², psi}**	Yes	Overhaul transaxle and repair or replace parts as necessary
		No	Go to next step
4	Does selector lever operate OK? ☞ section K1	Yes	Go to next step
		No	Adjust selector lever ☞ section K1
5	Are measurements at transalxe control module terminals OK? ☞ page K2–29	Yes	Overhaul transaxle and repair or replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • Pressure control solenoid ☞ page K2–24 • Dropping resistor ☞ page K2–26 If resistance OK but duty not, go to next step
6	Is input voltage of throttle position sensor at transaxle control module OK? ☞ page K2–29	Yes	Replace transaxle control module ☞ page K2–29
		No	Check throttle position sensor and wiring ☞ section F2 If the problem is within the transaxle, overhaul transaxle and repair or replace parts as necessary

Range/ position	Idle	Stall
D, S, L	450—510 {4.5—5.3, 64—68}	1,210—1,280 {12.3—13.1, 175—186}
R	550—620 {5.6—6.4, 80—91}	1,610—1,680 {16.4—17.2, 234—244}

TERMINAL	FUNCTION
1F	Pressure control solenoid
1H	Dropping resistor

TERMINAL	FUNCTION
2T	Throttle position sensor

3	VEHICLE MOVES IN P POSITION, OR PARKING GEAR DOES NOT DISENGAGE WHEN P DISENGAGED
DESCRIPTION	• Vehicle rolls although in P position, and tires do TCC non-operation • Vehicle will not move in D, S, L ranges and R position and engine remains in stall condition (Vehicle in stall condition)

[TROUBLESHOOTING HINTS]
① Selector lever installation or adjustment incorrect
② Parking mechanism worn

STEP	INSPECTION		ACTION
1	Does selector lever operate OK? ☞ section K1	Yes	Parking mechanism malfunction Overhaul transaxle and repair or replace parts as necessary
		No	Adjust selector lever ☞ section K1 If problem remains, overhaul transaxle and repair or replace parts as necessary

4	EXCESSIVE CREEP
DESCRIPTION	• Vehicle moves quickly in D, S, L ranges and R position without depressing accelerator • Excessive N position to R position and N position to D range shift shock felt

[TROUBLESHOOTING HINTS]
① Engine idle speed misadjusted
② Line pressure at idle high

STEP	INSPECTION		ACTION
1	Is ignition timing at idle OK? ☞ section F2	Yes	Go to next step
		No	Adjust ignition timing ☞ section F2
2	Is idle speed OK? ☞ section F2	Yes	Go to next step
		No	Adjust idle speed ☞ section F2
3	Is shift shock at N position to R position or N position to D range shift OK?	Yes	Idle speed in D range and R position high Check continuous fuel injection system
		No	Line pressure malfunction Go to No. 17 "Excessive N position to D range or N position to R position shift shock"

5	NO CREEP AT ALL
DESCRIPTION	• Vehicle does not move in D, S, L ranges and R position when idling • Road condition: flat, paved road **Note** • D, S ranges HOLD mode creep is reduced because transaxle is in 2GR position

[TROUBLESHOOTING HINTS]

① ATF level low
② Selector lever installation or adjustment incorrect
③ Throttle position sensor malfunction or misadjusted
④ Line pressure low
⑤ Powertrain slippage (forward clutch)
⑥ Control valve stuck (manual valve, pressure regulator valve, or pilot valve)
⑦ Pressure control solenoid worn
⑧ Dropping resistor malfunction

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step and check for the main cause When the problem is found, overhaul the transaxle and repair or replace parts as necessary
2	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE) with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46 If problem remains, overhaul transaxle and repair or replace parts as necessary
3	Is line pressure OK? ☞ page K2–2 **Specified pressure** **kPa {kgf/cm², psi}** Range/position: D, S, L — Idle: 450—510 {4.5—5.3, 64—68} — Stall: 1,210—1,280 {12.3—13.1, 175—186} Range/position: R — Idle: 550—620 {5.6—6.4, 80—91} — Stall: 1,610—1,680 {16.4—17.2, 234—244}	Yes	Overhaul transaxle and repair or replace parts as necessary
		No	Go to next step
4	Does selector lever operate OK? ☞ section K1	Yes	Go to next step
		No	Adjust selector lever ☞ section K1
5	Are measurements at transaxle control module terminals OK? ☞ page K2–29 TERMINAL: 1F — FUNCTION: Pressure control solenoid TERMINAL: 1H — FUNCTION: Dropping resistor	Yes	Overhaul transaxle and repair or replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • Pressure control solenoid ☞ page K2–24 • Dropping resistor ☞ page K2–26 If resistance OK but duty not, go to next step
6	Is input voltage of throttle position sensor at transaxle control module OK? ☞ page K2–29 TERMINAL: 2T — FUNCTION: Throttle position sensor	Yes	Replace transaxle control module ☞ page K2–29
		No	Check throttle position sensor and wiring ☞ section F2 If the problem is within the transaxle, overhaul transaxle and repair or replace parts as necessary

6	LOW MAXIMUM SPEED AND POOR ACCELERATION
DESCRIPTION	• Poor acceleration at start • Delayed acceleration when accelerator depressed while driving

[TROUBLESHOOTING HINTS]

① ATF level low
② Selector lever installation or adjustment incorrect
③ Throttle position sensor malfunction or misadjusted
④ Line pressure low
⑤ Powertrain slippage
⑥ Control valve stuck (pressure regulator valve, pressure modifier valve, shift valve A, or shift valve B)
⑦ Pressure control solenoid worn
⑧ Dropping resistor malfunction
⑨ Shift solenoid A and/or B worn
⑩ Transaxle range switch worn or misadjusted
⑪ HOLD switch circuit malfunction
⑫ Output speed sensor malfunction
⑬ Torque converter worn
⑭ Engine power low

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step and check for the main cause When the problem is found, overhaul the transaxle and repair or replace parts as necessary
2	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE) with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46
3	Is line pressure OK? ☞ page K2–2 **Specified pressure** **kPa {kgf/cm², psi}** Range/position / Idle / Stall D, S, L: 450—510 {4.5—5.3, 64—68} / 1,210—1,280 {12.3—13.1, 175—186} R: 550—620 {5.6—6.4, 80—91} / 1,610—1,680 {16.4—17.2, 234—244}	Yes	Go to next step
		No	Check selector lever operation If OK, go to next step If not OK, adjust, repair, or replace selector lever ☞ section K1
4	Is engine stall speed OK? ☞ page K2–4 **Engine stall speed:** **D, S, L range: 2,150—2,450 rpm** **R position: 1,950—2,250 rpm**	Yes	Go to step 7
		No	Overhaul transaxle and repair or replace parts as necessary
5	Are measurements at transaxle control module terminals OK? ☞ page K2–29 TERMINAL / FUNCTION 1F: Pressure control solenoid 1H: Dropping resistor	Yes	Overhaul transaxle and repair or replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • Pressure control solenoid ☞ page K2–24 • Dropping resistor ☞ page K2–26 If resistance OK but duty not, go to next step
6	Is input voltage of throttle position sensor at transaxle control module OK? ☞ page K2–29 TERMINAL / FUNCTION 2T: Throttle position sensor	Yes	Replace transaxle control module ☞ page K2–29 If problem remains, overhaul transaxle and repair or replace parts as necessary
		No	Check throttle position sensor and wiring ☞ section F2 If problem remains, overhaul transaxle and repair or replace parts as necessary

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>7</td><td>Disconnect solenoid connector; is vehicle drive as follows?

<table><tr><th>Range/position</th><th>Gear position</th></tr><tr><td>D</td><td>3GR (fixed)</td></tr><tr><td>S</td><td>3GR (fixed)</td></tr><tr><td>L</td><td>3GR (fixed)</td></tr><tr><td>R</td><td>Reverse (fixed)</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace control valve body assembly
If problem remains, overhaul transaxle and repair or replace parts as necessary</td></tr>
<tr><td>8</td><td>Drive vehicle in D, S, and L ranges (except HOLD mode); does vehicle start from stop in 1GR?

Are engine rpm at 20 km/h {12 mph} and throttle opening OK?

RPM: Approx. 2,000
Throttle opening: 4/8</td><td>Yes</td><td>Overhaul transaxle and repair or replace parts as necessary</td></tr>
<tr><td></td><td></td><td>No</td><td>Go to next step</td></tr>
<tr><td>9</td><td>Are measurements at transaxle control module terminals OK?
☞ page K2–29

<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>1D</td><td>Shift solenoid A</td></tr><tr><td>1B</td><td>Shift solenoid B</td></tr></table></td><td>Yes</td><td>Replace control valve body assembly
If problem remains, overhaul transaxle and repair or replace parts as necessary</td></tr>
<tr><td></td><td></td><td>No</td><td>If resistance not OK, check for malfunctioning parts and wiring
• Shift solenoid A ☞ page K2–24
• Shift solenoid B ☞ page K2–24

If resistance OK but voltage not, go to next step</td></tr>
<tr><td>10</td><td>Are measurements at transaxle control module terminals OK?
☞ page K2–29

<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>2D, 1E, 2B, 2S, 2Q</td><td>Transaxle range switch</td></tr><tr><td>2I</td><td>HOLD switch</td></tr><tr><td>2J</td><td>Output speed sensor</td></tr><tr><td>2L</td><td>Ground (Input)</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Check for malfunctioning parts and wiring
• Transaxle range switch ☞ page K2–21
• HOLD switch ☞ page K2–20
• Output speed sensor ☞ page K2–23

If problem remains, return to step 7</td></tr>
<tr><td>11</td><td>Replace with known good transaxle control module; is problem corrected?</td><td>Yes</td><td>Replace transaxle control module
☞ page K2–29</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace torque converter</td></tr>
</table>

7	NO SHIFT
DESCRIPTION	• Single range shift (1→2, 2→3, or 3→4) only • Sometimes shifts correctly **Note** • Gear position is usually held in HOLD mode

[TROUBLESHOOTING HINTS]
① Shift solenoid A and B worn
② Control valve stuck
③ HOLD switch malfunction
④ Output speed sensor malfunction
⑤ Poor ground
⑥ Transaxle control module malfunction

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE) with ignition switch at ON? ☞ **page K2–46**	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ **page K2–46**
2	Disconnect solenoid connector; is vehicle driven as follows? **Range/position** / **Gear position** D — 3GR (fixed) S — 3GR (fixed) L — 3GR (fixed) R — Reverse (fixed)	Yes	Go to next step
		No	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary
3	Drive vehicle in D, S, and L ranges (except HOLD mode); does vehicle start from stop in 1GR? Are engine rpm at 20 km/h {12 mph} and throttle opening OK? **RPM: Approx.: 2,000** **Throttle opening: 4/8**	Yes	Go to step 5
		No	Go to next step
4	Are measurements at transaixe control module terminals OK? ☞ **page K2–29** **TERMINAL** / **FUNCTION** 1D — Shift solenoid A 1B — Shift solenoid B	Yes	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • Shift solenoid A ☞ **page K2–24** • Shift solenoid B ☞ **page K2–24** If resistance OK but voltage not, go to next step
5	Are measurements at transaxle control module terminals OK? ☞ **page K2–29** **TERMINAL** / **FUNCTION** 2I — HOLD switch 2J — Output speed sensor 2L — Ground (Input)	Yes	Go to next step
		No	Check for malfunctioning parts and wiring • HOLD switch ☞ **page K2–20** • Output speed sensor ☞ **page K2–23** If problem remains, return to step 3
6	Replace with known good transaxle control module; is problem corrected?	Yes	Replace transaxle control module ☞ **page K2–29**
		No	Overhaul transaxle and repair or replace parts as necessary

8	DOES NOT SHIFT TO FOURTH GEAR
DESCRIPTION	• Vehicle does not upshift from 3GR to 4GR within 4GR range • Vehicle does not shift to 4GR when accelerator pedal released in D range at 60 km/h {37 mph}

[TROUBLESHOOTING HINTS]

① Transaxle fluid temperature sensor malfunction
② Shift solenoid A and/or B worn
③ Overrunning clutch solenoid valve worn
④ Control valve stuck (manual valve, shift valve A, shift valve B, or pilot valve)
⑤ Transaxle range switch worn
⑥ Output speed sensor malfunction
⑦ 4GR inhibit signal (ASC signal) malfunction
⑧ HOLD switch malfunction
⑨ Poor ground
⑩ Transaxle control module malfunction

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (NO DTCs AVAILABLE) with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46
2	Is input voltage of transaxle fluid temperature sensor at transaxle control module OK? ☞ page K2–29 TERMINAL: 2R↔2L; FUNCTION: Transaxle fluid temperature sensor	Yes	Go to next step
		No	Check transaxle fluid temperature sensor and wiring ☞ page K2–22
3	Are measurements at transaxle control module terminals OK? ☞ page K2–29 TERMINAL: 1D; FUNCTION: Shift solenoid A TERMINAL: 1B; FUNCTION: Shift solenoid B	Yes	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • Shift solenoid A ☞ page K2–24 • Shift solenoid B ☞ page K2–24 If resistance OK but voltage not, go to next step
4	Are output voltages and resistance of overrunning clutch solenoid valve at transaxle control module OK? ☞ page K2–29 TERMINAL: 1O; FUNCTION: Overrunning clutch solenoid valve	Yes	Go to next step
		No	If resistance not OK, check overrunning clutch solenoid valve and wiring ☞ page K2–24 If resistance OK but voltage not, go to next step
5	Are measurements at transaxle control module terminals OK? ☞ page K2–29 TERMINAL: 2D, 1E, 2B, 2S, 2Q; FUNCTION: Transaxle range switch TERMINAL: 2J; FUNCTION: Output speed sensor TERMINAL: 2G; FUNCTION: 4GR inhibit signal (ASC signal) TERMINAL: 2I; FUNCTION: HOLD switch TERMINAL: 2L; FUNCTION: Ground (Input)	Yes	Replace transaxle control module ☞ page K2–29
		No	Check for malfunctioning parts and wiring • Transaxle range switch ☞ page K2–21 • Output speed sensor ☞ page K2–23 • 4GR inhibit signal (ASC signal) ☞ page K2–29 If problem remains, return to step 3

9	ABNORMAL SHIFT
DESCRIPTION	• Shifts incorrectly (incorrect shift pattern) Ex) Vehicle shifts 1GR→4GR directly when accelerating with accelerator pedal depressed slightly

[TROUBLESHOOTING HINTS]

① ATF level low
② Poor ground
③ Throttle position sensor malfunction or misadjusted
④ Output speed sensor malfunction
⑤ Transaxle control module malfunction
⑥ Stuck control valve (shift valve A, shift valve B, or pilot valve)

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step and check for the main cause. When the problem is found, overhaul the transaxle and repair or replace parts as necessary.
2	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46
3	Are measurements at transaxle control module terminals OK? ☞ page K2–29	Yes	Go to next step
		No	Check for malfunctioning parts and wiring • Throttle position sensor ☞ section F2 • Output speed sensor ☞ page K2–23
4	Replace with known good transaxle control module; is problem corrected?	Yes	Replace transaxle control module ☞ page K2–29
		No	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary

TERMINAL	FUNCTION
2T	Throttle position sensor
2J	Output speed sensor
2L	Ground (Input)

10	FREQUENT SHIFTING
DESCRIPTION	• Downshift occurs when accelerator depressed slightly in D, S, and L ranges (except HOLD mode)

[TROUBLESHOOTING HINTS]
① Poor ground
② Throttle position sensor malfunction or misadjusted
③ Transaxle control module malfunction

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46
2	Is input voltage of throttle position sensor at transalxe control module OK? ☞ page K2–29 TERMINAL: 2T — FUNCTION: Throttle position sensor	Yes	Go to next step
		No	Check for throttle position sensor and wiring ☞ section F2
3	Replace with known good transaxle control module; is problem corrected?	Yes	Replace transaxle control module ☞ page K2–29
		No	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary

11	SHIFT POINT HIGH OR LOW
DESCRIPTION	• Shift points do not match shift diagram • Shift delayed when accelerating • Shifts occur fast when accelerating and engine speed does not increase

[TROUBLESHOOTING HINTS]
① Throttle position sensor malfunction or misadjusted
② Engine speed input signal malfunction
③ Output speed sensor malfunction

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46
2	Is input voltage of throttle position sensor at transaxle control module OK? ☞ page K2–29 TERMINAL: 2T — FUNCTION: Throttle position sensor	Yes	Go to next step
		No	Check throttle position sensor and wiring ☞ section F2
3	Are measurements at transaxle control module terminals OK? ☞ page K2–29 1G — Engine speed input signal 2J — Output speed sensor 2L — Ground (Input)	Yes	Replace transaxle control module ☞ page K2–29 If problem remains, overhaul transaxle and repair or replace parts as necessary
		No	Check for malfunctioning parts and wiring • Engine speed input signal ☞ section G • Output speed sensor ☞ page K2–23

12	TORQUE CONVERTER CLUTCH NON-OPERATION
DESCRIPTION	• TCC non-operation when vehicle speed reaches TCC operation range

[TROUBLESHOOTING HINTS]
① TCC solenoid valve worn
② Control valve stuck (lockup control valve, lockup modifier valve, pilot valve, or shuttle shift valve D)
③ Transaxle fluid temperature sensor malfunction
④ Throttle position sensor malfunction or misadjusted
⑤ Closed throttle position sensor malfunction
⑥ Engine speed input signal malfunction
⑦ Output speed sensor
⑧ Transaxle range switch worn or misadjusted

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46
2	Are measurements at transaxle control module terminals OK? ☞ page K2–29 TERMINAL: 1M — FUNCTION: TCC solenoid valve	Yes	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • TCC solenoid valve ☞ page K2–24 If resistance OK but duty and/or voltage not, go to next step
3	Are measurements at transaxle control module terminals OK? ☞ page K2–29 2R — Transaxle fluid temperature sensor 2T — Throttle position sensor 2M — Closed throttle position sensor 1G — Engine speed input signal 2D, 1E, 2B, 2S, 2Q — Transaxle range switch 2L — Ground (Input)	Yes	Replace transaxle control module
		No	Check for malfunctioning parts and wiring • Transaxle fluid temperature sensor ☞ page K2–22 • Throttle position sensor ☞ section F2 • Closed throttle position sensor ☞ section F2 • Engine speed input signal ☞ section G • Transaxle range switch ☞ page K2–21 • Output speed sensor ☞ page K2–23

13	NO KICKDOWN
DESCRIPTION	• Does not downshift when accelerator depressed more than 7/8 when within kickdown range

[TROUBLESHOOTING HINTS]
① Throttle position sensor malfunction or misadjusted
② Shift solenoid A and/or B worn
③ Control valve stuck (shift valve A, shift valve B, or pilot valve)
④ HOLD switch malfunction
⑤ Output speed sensor malfunction

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46
2	Is input voltage of throttle position sensor at transaxle control module OK? ☞ page K2–29 TERMINAL: 2T — FUNCTION: Throttle position sensor	Yes	Replace transaxle control module ☞ page K2–29
		No	Check throttle position sensor and wiring ☞ section F2
3	Are measurements at transaxle control module terminals OK? ☞ page K2–29 1D — Shift solenoid A 1B — Shift solenoid B	Yes	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • Shift solenoid A ☞ page K2–24 • Shift solenoid B ☞ page K2–24 If resistance OK but voltage not, go to next step
4	Are measurements at transaxle control module terminals OK? ☞ page K2–29 2I — HOLD switch 2J — Output speed sensor 2L — Ground (Input)	Yes	Replace transaxle control module ☞page K2–29
		No	Check for malfunctioning parts and wiring • HOLD switch ☞ page K2–20 • Output speed sensor ☞ page K2–23

14	ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE
DESCRIPTION	• When accelerator pedal depressed for driveaway, engine speed increases but vehicle speed increases slowly • When accelerator depressed while driving, engine speed increases but vehicle speed does not

[TROUBLESHOOTING HINTS]

① ATF level low
② Selector lever installation or adjustment incorrect
③ Throttle position sensor malfunction or misadjusted
④ Line pressure low
⑤ Powertrain slippage (forward clutch, forward one-way clutch, low one-way clutch, reverse clutch, or low and reverse brake)
⑥ Control valve stuck (pressure regulator valve, pressure modifier valve, or pilot valve)
⑦ Pressure control solenoid worn
⑧ Dropping resistor malfunction

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step and check for the main cause. When the problem is found, overhaul the transaxle and repair or replace parts as necessary.
2	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE) with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed ☞ page K2–46 • Check for cause of code(s) If problem remains, overhaul transaxle and repair or replace parts as necessary
3	Is line pressure OK? ☞ page K2–2 **Specified pressure** **kPa {kgf/cm², psi}** Range/position: D, S, L — Idle: 450—510 {4.5—5.3, 64—68} — Stall: 1,210—1,280 {12.3—13.1, 175—186} Range/position: R — Idle: 550—620 {5.6—6.4, 80—91} — Stall: 1,610—1,680 {16.4—17.2, 234—244}	Yes	Overhaul transaxle repair or replace parts as necessary
		No	Check selector lever operation If OK, go to next step If not OK, adjust, repair, or replace selector lever ☞ section K1
4	Are measurements at transaxle control module terminals OK? ☞ page K2–29 TERMINAL 1F: Pressure control solenoid TERMINAL 1H: Dropping resistor	Yes	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • Pressure control solenoid ☞ page K2–24 • Dropping resistor ☞ page K2–26 If resistance OK but duty not, go to next step
5	Is input voltage of throttle position sensor at transaxle control module OK? ☞ page K2–29 TERMINAL 2T: Throttle position sensor	Yes	Replace transaxle control module ☞ page K2–29
		No	Check throttle position sensor and wiring ☞ section F2

15 ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING

DESCRIPTION
- Engine flares up when accelerator pedal depressed for upshifting
- Engine flares up suddenly when accelerator pedal depressed for downshifting

[TROUBLESHOOTING HINTS]
① ATF level low
② Selector lever installation or adjustment incorrect
③ Throttle position sensor malfunction or misadjusted
④ Line pressure low
⑤ Powertrain slippage (brake band, high clutch forward clutch, forward one-way clutch, or low one-way clutch)
⑥ Control valve stuck (pressure regulator valve, pressure modifier valve, pilot valve, shift valve A, or shift valve B)
⑦ Pressure control solenoid worn
⑧ Dropping resistor malfunction
⑨ Output speed sensor malfunction

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step and check for the main cause. When problem is found, overhaul the transaxle and repair or replace parts as necessary.
2	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46
3	Is line pressure OK? ☞ page K2–2 **Specified pressure** **kPa {kgf/cm², psi}** Range/position: D, S, L — Idle: 450—510 {4.5—5.3, 64—68} — Stall: 1,210—1,280 {12.3—13.1, 175—186} Range/position: R — Idle: 550—620 {5.6—6.4, 80—91} — Stall: 1,610—1,680 {16.4—17.2, 234—244}	Yes	Overhaul transaxle and repair or replace parts as necessary
		No	Check selector lever operation If OK, go to next step If not OK, adjust, repair, or replace selector lever ☞ section K1
4	Are measurements at transaxle control module terminals OK? ☞ page K2–29 TERMINAL 1F: Pressure control solenoid TERMINAL 1H: Dropping resistor	Yes	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • Pressure control solenoid ☞ page K2–24 • Dropping resistor ☞ page K2–26 If resistance OK but duty not, go to next step
5	Is input voltage of throttle position sensor at transaxle control module OK? ☞ page K2–29 TERMINAL 2T: Throttle position sensor	Yes	Go to next step
		No	Check throttle position sensor and wiring ☞ section F2
6	Are measurements at transaxle control module terminals OK? Term. 2J→2L — Unit: Ω — Spec.: 500—1,000 — Condition: Constant (Ign:OFF) Unit: Ω → Resistance	Yes	Replace transaxle control module ☞ page K2–29
		No	Check for malfunctioning parts and wiring • Output speed sensor ☞ page K2–23

16	SHUDDERS UPON TCC
DESCRIPTION	• Vehicle jolted when TCC engaged

[TROUBLESHOOTING HINTS]

① Ignition timing misadjusted
② ATF level low
③ TCC solenoid valve worn
④ Control valve stuck (lockup control valve, lockup modifier valve, shuttle shift vale D, or pilot valve)
⑤ Throttle position sensor malfunction or misadjusted
⑥ Line pressure low
⑦ Pressure control solenoid worn
⑧ Dropping resistor malfunction
⑨ Closed throttle position sensor malfunction
⑩ Engine speed input signal malfunction
⑪ Output speed sensor malfunction

STEP	INSPECTION		ACTION
1	Is ignition timing OK? ☞ section F2	Yes	Go to next step
		No	Adjust ignition timing ☞ section F2
2	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step and check for the main cause. When problem is found, overhaul the transaxle and repair or replace parts as necessary.
3	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46
4	Are measurements at transaxle control module terminals OK? ☞ page K2–29 TERMINAL: 1M — FUNCTION: TCC solenoid valve	Yes	Go to next step
		No	If resistance not OK, check for malfunctioning parts and wiring • TCC solenoid valve ☞ page K2–24 If resistance OK but duty and/or voltage not, go to step 8
5	Is line pressure OK? ☞ page K2–2 **Specified line pressure** **kPa {kgf/cm², psi}** D, S, L: Idle 450—510 {4.5—5.3, 64—68}; Stall 1,210—1,280 {12.3—13.1, 175—186} R: Idle 550—620 {5.6—6.4, 80—91}; Stall 1,610—1,680 {16.4—17.2, 234—244}	Yes	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary
		No	Go to next step
6	Are measurements at transaxle control module terminals OK? ☞ page K2–29 1F — Pressure control solenoid 1H — Dropping resistor	Yes	Overhaul transaxle repair or replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • Pressure control solenoid ☞ page K2–24 • Dropping resistor ☞ page K2–26 If resistance OK and duty not, go to next step
7	Is input voltage of throttle position sensor at transaxle control module OK? ☞ page K2–29 2T — Throttle position sensor	Yes	Replace transaxle control module ☞page K2–29
		No	Check throttle position sensor and wiring ☞ section F2

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td rowspan="2">8</td><td rowspan="2">Are measurements at transaxle control module terminals OK?
☞ page K2–29
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>2T</td><td>Throttle position sensor</td></tr><tr><td>2M</td><td>Closed throttle position sensor</td></tr><tr><td>1G</td><td>Engine speed input signal</td></tr><tr><td>2J</td><td>Output speed sensor</td></tr><tr><td>2L</td><td>Ground (Input)</td></tr></table></td><td>Yes</td><td>Replace transaxle control module
☞ page K2–29</td></tr>
<tr><td>No</td><td>Check for malfunctioning parts and wiring
• Throttle position sensor ☞ section F2
• Closed throttle position switch ☞ section F2
• Engine speed input signal ☞ section G
• Output speed sensor ☞ page K2–23</td></tr>
</table>

17	EXCESSIVE N POSITION TO D RANGE OR N POSITION TO R POSITION SHIFT SHOCK
DESCRIPTION	• Strong shift shock felt when selecting from N position to D range or R position at idling

[TROUBLESHOOTING HINTS]

① ATF level low
② Idle speed high
③ Throttle position sensor malfunction or misadjusted
④ Line pressure high
⑤ Control valve stuck (pressure regulator valve, pressure modifier valve, or pilot valve)
⑥ Powertrain slippage
⑦ Pressure control solenoid worn
⑧ Dropping resistor malfunction
⑨ N–D, or 3–4/N–R accumulator worn
⑩ Transaxle range switch worn or misadjusted

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step, and check for the main cause. When the problem is found, overhaul the transaxle and repair or replace parts as necessary
2	Are ignition timing and idle speed OK? ☞ section F2	Yes	Go to next step
		No	Adjust ignition timing and/or idle speed ☞ section F2
3	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46
4	Is line pressure OK? ☞ page K2–2 **Specified pressure** **kPa {kgf/cm², psi}** Range/position: D, S, L — Idle: 450—510 {4.5—5.3, 64—68} — Stall: 1,210—1,280 {12.3—13.1, 175—186} Range/position: R — Idle: 550—620 {5.6—6.4, 80—91} — Stall: 1,610—1,680 {16.4—17.2, 234—244}	Yes	Go to next step
		No	Go to step 6
5	Is engine stall speed OK? ☞ page K2–4 **Engine stall speed:** **D,S,L range: 2,150—2,450 rpm** **R position: 1,950—2,250 rpm**	Yes	Go to step 8
		No	Overhaul transaxle and repair or replace parts as necessary
6	Are measurements at transaxle control module terminals OK? ☞ page K2–29 1F — Pressure control solenoid 1H — Dropping resistor	Yes	Overhaul transaxle and repair or replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • Pressure control solenoid ☞ page K2–24 • Dropping resistor ☞ page K2–26 If resistance OK but duty not, go to next step
7	Is input voltage of throttle position sensor at transaxle control module OK? ☞ page K2–29 2T — Throttle position sensor	Yes	Replace transaxle control module ☞ page K2–29
		No	Check throttle position sensor and wiring ☞ section F2
8	Are measurements at transaxle control module terminals OK? ☞ page K2–29 2D, 1E, 2B, 2S, 2Q — Transaxle range switch 2L — Ground (Input)	Yes	Overhaul transaxle and repair or replace parts as necessary
		No	Check for malfunctioning parts and wiring • Transaxle range switch ☞ page K2–21

18 EXCESSIVE SHIFT SHOCK WHEN UPSHIFTING AND DOWNSHIFTING

DESCRIPTION
- Excessive shift shock felt when accelerating at upshifting
- During cruising, excessive shift shock felt when accelerator pedal depressed at downshifting

[TROUBLESHOOTING HINTS]
① ATF level low
② Throttle position sensor malfunction or misadjusted
③ Line pressure high
④ Powertrain slippage
⑤ Control valve stuck (pressure regulator valve, pressure modifier valve, pilot valve, servo charger valve, or accumulator control valve)
⑥ Pressure control solenoid worn
⑦ Dropping resistor malfunction
⑧ Closed throttle position switch malfunction
⑨ Transaxle fluid temperature sensor malfunction
⑩ Output speed sensor

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step and check for the main cause When the problem is found, overhaul the transaxle and repair or replace parts as necessary.
2	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46
3	Is line pressure OK? ☞ page K2–2 **Specified pressure** **kPa {kgf/cm², psi}** Range/position: D, S, L — Idle: 450—510 {4.5—5.3, 64—68} — Stall: 1,210—1,280 {12.3—13.1, 175—182} Range/position: R — Idle: 550—620 {5.6—6.4, 80—91} — Stall: 1,610—1,680 {16.4—17.2, 234—244}	Yes	Go to next step
		No	Go to step 5
4	Is engine stall speed OK? ☞ page K2–4 **Engine stall speed:** **D, S, L range: 2,150—2,450 rpm** **R position: 1,950—2,250 rpm**	Yes	Go to step 8
		No	Overhaul transaxle and repair or replace parts as necessary
5	Are measurements at transaxle control module terminal OK? ☞ page K2–29 TERMINAL 1F — FUNCTION: Pressure control solenoid TERMINAL 1H — FUNCTION: Dropping resistor	Yes	Overhaul transaxle and repair or replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • Pressure control solenoid ☞ page K2–24 • Dropping resistor ☞ page K2–26 If resistance OK and duty not, go to next step
6	Is input voltage of throttle position sensor at transaxle control module OK? ☞ page K2–29 TERMINAL 2T — FUNCTION: Throttle position sensor	Yes	Go to next step
		No	Check throttle position sensor and wiring ☞ section F2
7	Is input voltage of closed throttle position switch at transaxle control module OK? ☞ page K2–29 TERMINAL 2M — FUNCTION: Closed throttle position switch	Yes	Replace transaxle control module ☞ page K2–29
		No	Check closed throttle position switch and idling ☞ section F2

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td rowspan="2">8</td><td>Are measurements at transaxle control module terminals OK?
☞ page K2–29
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>2R</td><td>Transaxle fluid temperature sensor</td></tr><tr><td>2L</td><td>Ground (Input)</td></tr></table></td><td>Yes</td><td>Overhaul transaxle and repair or replace parts as necessary</td></tr>
<tr><td></td><td>No</td><td>Check for malfunctioning parts and wiring
• Transaxle fluid temperature sensor ☞ page K2–22
• Output speed sensor ☞ page K2–23</td></tr>
</table>

19	EXCESSIVE TCC SHIFT SHOCK
DESCRIPTION	• Strong shift shock felt when TCC engaged

[TROUBLESHOOTING HINTS]
① ATF level low
② TCC solenoid worn
③ Throttle position sensor malfunction or misadjusted
④ Closed throttle position switch malfunction
⑤ Engine speed input signal malfunction
⑥ Output speed sensor malfunction
⑦ Control valve stuck (lockup control valve, lockup modifier valve, or pilot valve)

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step and check for the main cause. When the problem is found, overhaul the transaxle and repair or replace parts necessary.
2	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed Check for cause of code(s) ☞ page K2–46
3	Are resistance and output duty of TCC solenoid at transaxle control module OK? Is TCC engagement shock felt at same time as duty switching? ☞ page K2–29 TERMINAL: 1M — FUNCTION: TCC solenoid valve	Yes	If duty switching occurs at same time as TCC engagement shock, go to next step If it does not go to No. 18 "Excessive shift shock when upshifting and downshifting"
		No	If resistance not OK, check TCC solenoid and wiring ☞ page K2–24 If resistance OK but duty not, go to next step
4	Are measurements at transaxle control module terminals OK? ☞ page K2–29 2T — Throttle position sensor 2M — Closed throttle position sensor 1G — Engine speed input signal 2J — Output speed sensor 2L — Ground (Input)	Yes	Go to next step
		No	Check for malfunctioning parts and wiring • Throttle position sensor ☞ section F2 • Closed throttle position switch ☞ section F2 • Engine speed input signal ☞ section G • Output speed sensor ☞ page K2–23
5	Replace with known good transaxle control module; is problem corrected?	Yes	Replace transaxle control module ☞ page K2–29
		No	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary

20	NOISE AT IDLE WHEN VEHICLE STOPPED IN ALL RANGES
DESCRIPTION	• Transaxle noisy in all ranges when vehicle is idling

[TROUBLESHOOTING HINTS]
① ATF level low
② Throttle position sensor malfunction or misadjusted
③ Output speed sensor malfunction
④ Engine speed input signal malfunction

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ **page K2–11**	Yes	Go to next step
		No	Problem within transaxle Go to next step and check for the main cause. When the problem is found, overhaul the transaxle and repair or replace parts as necessary.
2	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ **page K2–46**	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ **page K2–46**
3	Does noise stop when 8-pin connector of solenoid valve disconnected?	Yes	Go to next step
		No	Overhaul transaxle and repair or replace parts as necessary
4	Are measurements at transaxle control module terminals OK? ☞ **page K2–29** **TERMINAL** / **FUNCTION** 1F — Pressure control solenoid 1H — Dropping resistor	Yes	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • Pressure control solenoid ☞ **page K2–24** • Dropping resistor ☞ **page K2–26** If resistor OK and duty not, go to next step
5	Are specifications at transaxle control module terminal OK? ☞ **page K2–29** **TERMINAL** / **FUNCTION** 2T — Throttle position sensor 2J — Output speed sensor 1G — Engine speed input signal 2L — Ground (Input)	Yes	Replace transaxle control module ☞ **page K2–29**
		No	Check for malfunctioning parts and wiring • Throttle position sensor ☞ **section F2** • Output speed sensor ☞ **page K2–23** • Engine speed input signal ☞ **section G**

21	NOISE AT IDLE WHEN VEHICLE STOPPED IN R POSITION, D, S, AND L RANGES		
DESCRIPTION	• Noise from transaxle in driving ranges at idle		
[TROUBLESHOOTING HINTS] ① ATF level low ② Torque converter malfunction			
STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step, and check for the main cause. When problem is found overhaul transaxle and repair or replace parts as necessary.
2	Jack up vehicle Is noise from vicinity of torque converter?	Yes	Replace torque converter If problem remains, overhaul transaxle and repair or replace parts as necessary
		No	If noise from vicinity of oil pan, go to No. 20 "Noise at idle when vehicle stopped in all ranges"

22	NO ENGINE BRAKING
DESCRIPTION	• Engine speed drops to idle but vehicle does not slow when accelerator pedal released during cruising at medium to high speed • Engine speed drops to idle but vehicle does not slow when accelerator pedal released when in L range at low vehicle speed

[TROUBLESHOOTING HINTS]

① ATF level low
② Powertrain slippage
③ Control valve stuck (overrunning clutch control valve, overrunning clutch reducing valve, or pilot valve)
④ Overrunning clutch solenoid valve worn
⑤ Throttle position sensor malfunction or misadjusted
⑥ Transaxle range switch worn or misadjusted

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step and check for the main cause. When problem is found, overhaul transaxle and repair or replace parts as necessary.
2	Dose NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46
3	Is there slippage when accelerating or shifting?	Yes	Go to No.14 "Engine flares up or slips when accelerating vehicle" or No. 15 "Engine flares up or slips when upshifting or downshifting"
		No	Go to next step
4	Is engine braking felt in L range? ☞ page K2–10	Yes	Go to next step
		No	Replace control valve body assembly If problem remains, overhaul transaxle and repair or replace parts as necessary
5	Are resistance and output voltage of overrunning clutch solenoid valve at transaxle control module terminal OK? ☞ page K2–29 TERMINAL: 1O — FUNCTION: Overrunning clutch solenoid valve	Yes	Go to next step
		No	If resistance not OK, check for overrunning clutch solenoid valve and wiring ☞ page K2–24 If resistance OK and voltage not, go to next step
6	Are measurements at transaxle control module terminals OK? ☞ page K2–29 TERMINAL: 2T — FUNCTION: Throttle position sensor TERMINAL: 2D, 1E, 2B, 2S, 2Q — FUNCTION: Transaxle range switch	Yes	Replace transaxle control module
		No	Check for malfunctioning parts and wiring • Throttle position sensor ☞ section F2 • Transaxle range switch ☞ page K2–21

23	NO MODE CHANGES FROM/TO HOLD MODE
DESCRIPTION	• HOLD mode operated when HOLD switch not depressed • HOLD mode not operated when HOLD switch depressed

[TROUBLESHOOTING HINTS]
• HOLD switch malfunction

STEP	INSPECTION		ACTION
1	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46
2	Is input voltage of HOLD switch at transaxle control module OK? ☞ page K2–29 TERMINAL: 21 — FUNCTION: HOLD switch	Yes	Replace transaxle control module ☞ page K2–29
		No	Check HOLD switch and wiring ☞ page K2–20

24 TRANSAXLE OVERHEATS

DESCRIPTION
- Burnt smell from transaxle
- Smoke from transaxle

[TROUBLESHOOTING HINTS]
① ATF level low
② Line pressure low
③ Powertrain burnt
④ Torque converter clutch burned
⑤ Pressure control solenoid
⑥ Dropping resistor malfunction
⑦ Throttle position sensor malfunction or misadjusted
⑧ TCC solenoid valve worn
⑨ Oil cooler circuit malfunction

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞ page K2–11	Yes	Go to next step
		No	Problem within transaxle Go to next step and check for the main cause. When problem is found, overhaul transaxle and repair or replace parts as necessary.
2	Does NGS display "SYSTEM PASSED (No DTCs AVAILABLE)" with ignition switch at ON? ☞ page K2–46	Yes	Go to next step
		No	Diagnostic trouble code(s) displayed • Check for cause of code(s) ☞ page K2–46 If problem remains, overhaul transaxle and repair or replace parts as necessary
3	Is line pressure OK? ☞ page K2–2 **Specified pressure** **kPa {kgf/cm², psi}** Range/position: D, S, L — Idle: 450—510 {4.5—5.3, 64—68} — Stall: 1,210—1,280 {12.3—13.1, 175—186} Range/position: R — Idle: 550—620 {5.6—6.4, 80—91} — Stall: 1,610—1,680 {16.4—17.2, 234—244}	Yes	Go to next step
		No	Go to step 5
4	Is engine stall speed OK? ☞ page K2–4 **Engine stall speed:** **D,S,L range: 2,150—2,450 rpm** **R position: 1,950—2,250 rpm**	Yes	Go to step 7
		No	Overhaul transaxle and repair or replace part as necessary
5	Are measurements at transaxle control module terminals OK? ☞ page K2–29 TERMINAL 1F — FUNCTION: Pressure control solenoid TERMINAL 1H — FUNCTION: Dropping resistor	Yes	Overhaul transaxle and repair or replace parts as necessary
		No	If resistance not OK, check for malfunctioning parts and wiring • Pressure control solenoid ☞ page K2–24 • Dropping resistor ☞ page K2–26 If resistance OK and duty not, go to next step
6	Is input voltage of throttle position sensor at transaxle control module OK? ☞ page K2–29 TERMINAL 2T — FUNCTION: Throttle position sensor	Yes	Replace transaxle control module ☞ page K2–29 If problem remains, return to step 5
		No	Check throttle position sensor and wiring ☞ section F2

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Are measurements at transaxle control module terminal OK?
☞ page K2–29
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>1M</td><td>TCC solenoid valve</td></tr></table></td><td>Yes</td><td>Replace control valve body assembly
If problem remains, overhaul transaxle and repair or replace parts as necessary</td></tr>
<tr><td>No</td><td>I resistance not OK, check for malfunctioning parts and wiring
• TCC solenoid valve ☞ page K2–24
If resistance OK but duty and/or voltage not, go to next step</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">Is oil cooler circuit OK?
☞ page K2–43</td><td>Yes</td><td>Overhaul transaxle and repair or replace parts as necessary</td></tr>
<tr><td>No</td><td>Overhaul oil cooler circuit and repair or replace parts as necessary</td></tr>
</table>

25 ENGINE DOES NOT START IN N POSITION OR P POSITION, OR STARTS IN OTHER RANGES

DESCRIPTION
- Engine does not start in N position or R position
- Engine will start in ranges other than N position or P position

[TROUBLESHOOTING HINTS]
① Transaxle range switch worn or misadjusted
② Ignition system malfunction
③ Selector lever installation or adjustment incorrect

STEP	INSPECTION		ACTION
1	Disconnect transaxle range switch connector Is continuity between terminal B and terminal H OK?	Yes	Check ignition system
		No	Go to next step
2	Does selector lever operate OK? ☞ section K1	Yes	Adjust or replace transaxle range switch ☞ page K2–21
		No	Adjust, repair, or replace selector lever ☞ section K1

Terminal	Continuity	Condition
B↔H	Yes	P and N position
	No	Other position, all range

26 ENGINE STALLS WHEN SHIFTED TO R POSITION, D, S, AND L RANGES

DESCRIPTION
- Engine stalls when shifting from N or P position to D, S, L range or R position at idle

[TROUBLESHOOTING HINTS]
① Engine idle speed low
② Control valve stuck (lockup control valve, shuttle shift valve D, TCC modifier valve, or pilot valve)
③ Transaxle range switch worn or misadjusted
④ Output speed sensor malfunction

STEP	INSPECTION		ACTION
1	Are ignition timing and idle speed OK? ☞ section F2	Yes	Go to next step
		No	Adjust ignition timing and/or idle speed ☞ section F2
2	Is problem corrected when 20-pin and 16-pin connectors of transaxle control module are disconnected?	Yes	Go to next step
		No	Overhaul control valve body and repair or replace parts as necessary If large amounts of material are found, overhaul transaxle and repair or replace parts as necessary
3	Is output voltage of P/N signal at transaxle control module terminal OK? Does NGS display "1601" with ignition switch ON?	Yes	Check wiring and connector from terminal 2K and 2N of transaxle control module to terminal 1B and 1F of engine control module
		No	Go to next step
4	Are measurements at transaxle control module terminals OK? ☞ page K2–29	Yes	Replace transaxle control module ☞ page K2–29
		No	Check for malfunctioning parts and wiring • Transaxle range switch ☞ page K2–21 • Output speed sensor ☞ page K2–23

TERMINAL	FUNCTION
2D, 1E, 2B, 2S, 2Q	Transaxle range switch
2J	Output speed sensor
2L	Ground (Input)

27	ENGINE STALLS WHEN DRIVING AT LOW SPEED OR STOPPING		
DESCRIPTION	• Engine stalls when brake pedal depressed while driving at low speed or stopping		
[TROUBLESHOOTING HINTS] ① ATF level low			
STEP	INSPECTION		ACTION
1	Is ATF level OK? ☞ page K2–11 **Level: Between notches on dipstick**	Yes	Go to No. 26 "Engine stalls when shifted to R position, D, S, and L ranges"
		No	Adjust ATF level ☞ page K2–11

Before beginning any service procedure, refer to section T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

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– 3**
REAR AXLE ..... **M– 8**
PREPARATION ..... **M– 8**
WHEEL HUB, HUB SPINDLE ..... **M– 8**
DRIVE SHAFT **M–11**
PREPARATION **M–11**
JOINT SHAFT **M–12**
DRIVE SHAFT **M–16**

OUTLINE

SPECIFICATIONS

Item \ Engine			KL	KJ
Front axle	Wheel bearing type		Angular ball bearing	
	Max. wheel bearing end play mm {in}		0.05 {0.002}	
Rear axle	Wheel bearing type		Unitized angular ball bearing	
	Max. wheel bearing end play mm {in}		0.05 {0.002}	
Drive shaft	Joint type	Wheel side	Bell joint	
		Differential side	Tripod joint (with free ring)	
	Length of joint (between center of joint) mm {in}	Right side	390.0 {15.35}	387.0 {15.24}
		Left side	406.5 {16.00}	387.0 {15.24}
	Shaft diameter mm {in}		26.0 {1.02}	27.0 {1.06}
Joint shaft	Shaft length mm {in}		380.0 {14.96}	398.6 {15.69}
	Shaft diameter mm {in}		26.0 {1.02}	33.5 {1.32}

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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.

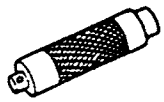
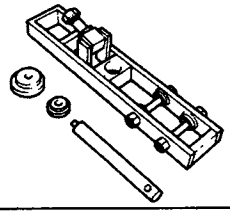
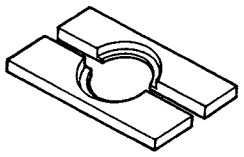
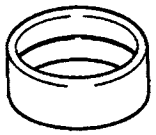
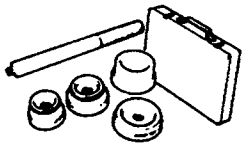
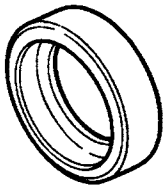
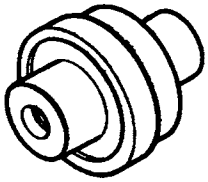
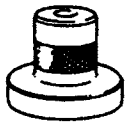
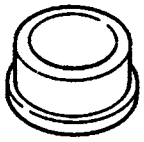
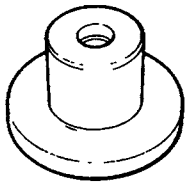
Wheels and tires

- 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}**.

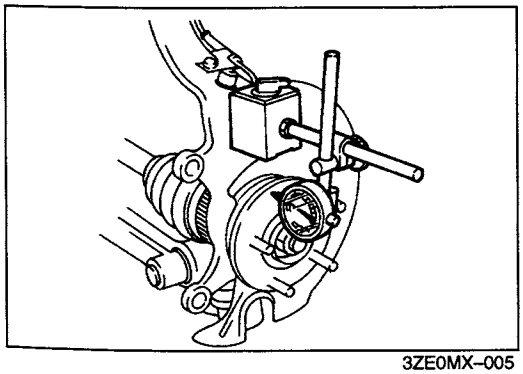
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FRONT AXLE

PREPARATION
SST

49 G030 795 Installer, oil seal 	For removal of wheel bearing	49 G030 797 Handle (Part of 49 G030 795) 	For removal of wheel bearing
49 G033 1A1 Puller, wheel hub 	For installation of wheel bearing	49 W017 101 Remover, clutch 	For removal of wheel hub assembly
49 G033 105 Attachment (Part of 49 G033 1A1) 	For installation of wheel hub assembly	49 E033 101 Installer, dust cover 	For removal of wheel bearing
49 F027 0A1 Installer set, bearing 	For installation of wheel hub assembly and wheel bearing	49 G033 107 Installer, dust cover 	For installation of dust cover
49 G026 102 Replacer, bearing 	For removal of wheel bearing	49 V001 795 Installer, oil seal 	For installation of oil seal
49 F027 009 Attachment 68 & 77 (Part of 49 F027 0A1) 	For installation of dust cover, wheel hub assembly and wheel bearing	49 F026 102 Installer, bearing 	For removal of wheel hub assembly and installation of wheel bearing

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3ZE0MX–005

WHEEL HUB, STEERING KNUCKLE
Preinspection
Wheel bearing play

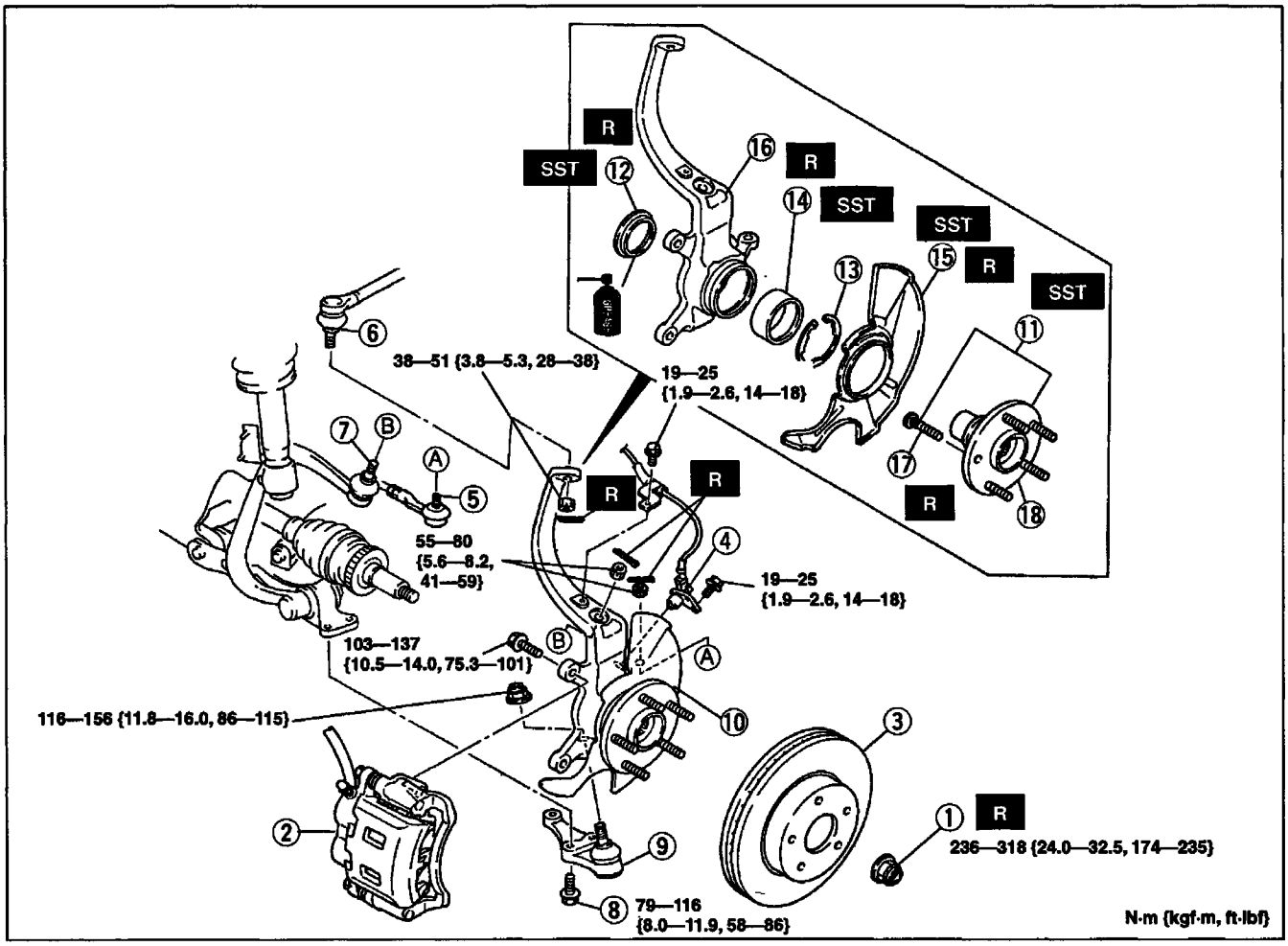
1. Remove the brake caliper assembly and disc plate.
2. Position a dial indicator against the wheel hub. Push and pull the wheel hub by hand in the axial direction and measure the wheel bearing play.
3. If the bearing play exceeds the specification, check and adjust the locknut torque or replace the wheel bearing if necessary. (Refer to page M–4.)

Max. wheel bearing end play: 0.05 mm {0.002 in}

Removal / Inspection / Installation

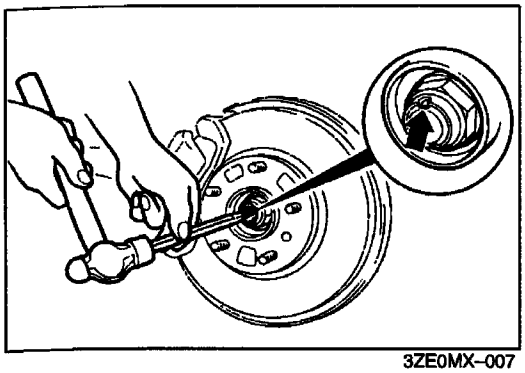
Caution

- **Leave the nuts on the ball joint studs until removing the axle assembly. This will keep the axle weight distributed evenly and prevent damage to the link bushings.**

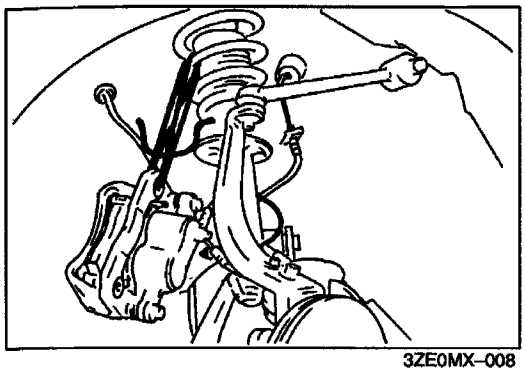


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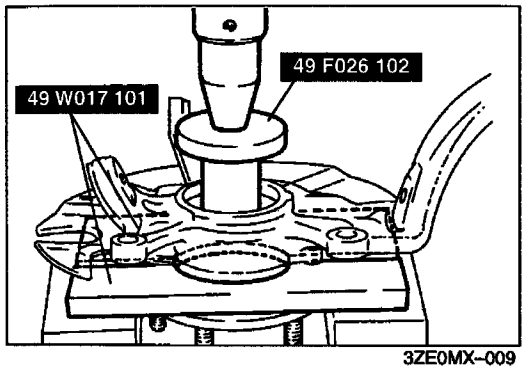
1. Locknut
   - Removal Note ..... page M–5
   - Installation Note ..... page M–7
2. Brake caliper assembly
   - Removal Note ..... page M–5
   - Service ..... section P
3. Disc plate
   - Service ..... section P
4. ABS wheel-speed sensor
   - Service ..... section P
5. Tie-rod end ball joint
   - Service ..... section N
6. Upper leading link ball joint
   - Service ..... section R
7. Upper lateral link ball joint
   - Service ..... section R
8. Lower arm ball joint bolt
9. Lower arm ball joint
   - Service ..... section R
10. Front wheel hub, steering knuckle
    - Inspect wheel hub for damage and rough rotation
11. Wheel hub assembly
    - Removal Note ..... page M–5
    - Installation Note ..... page M–7
12. Oil seal
    - Installation Note ..... page M–7
13. Snap ring
14. Wheel bearing
    - Removal Note ..... page M–5
    - Installation Note ..... page M–7
15. Dust cover
    - Removal Note ..... page M–6
    - Installation Note ..... page M–6
16. Steering knuckle
    - Inspect for cracks and damage
17. Hub bolt
    - Removal Note ..... page M–6
    - Installation Note ..... page M–6
18. Wheel hub


3ZE0MX-007

Removal Note
Locknut
1. Knock the crimped portion of the locknut outward by using a small chisel and a hammer.
2. Lock the hub by applying the brakes.
3. Remove the locknut.

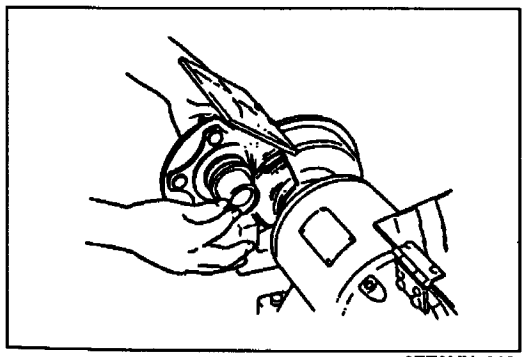

3ZE0MX-008

Brake caliper assembly
Suspend the brake caliper assembly as shown in the figure.

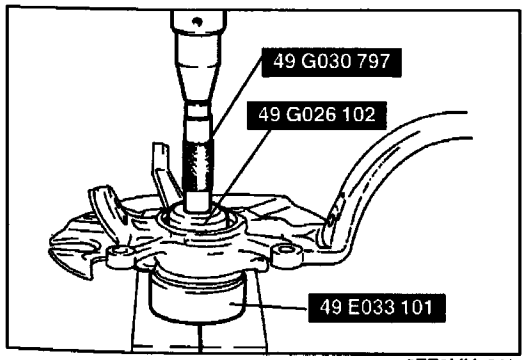


3ZE0MX-009

Wheel hub assembly
1. Press out the front wheel hub assembly by using the **SST**.

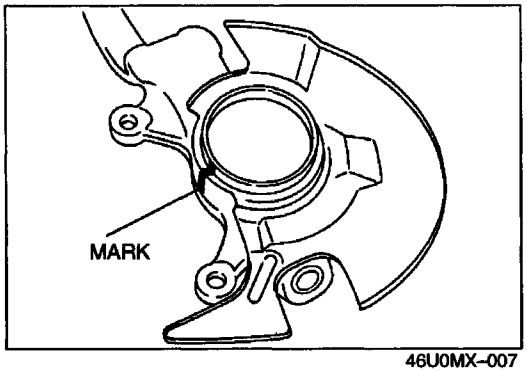

3ZE0MX-010

2. Grind a section of the bearing inner race until approximately **0.5 mm {0.020 in}** remains. Then remove it with a chisel.



3ZE0MX-011

Wheel bearing
Press out the wheel bearing by using the **SST**.

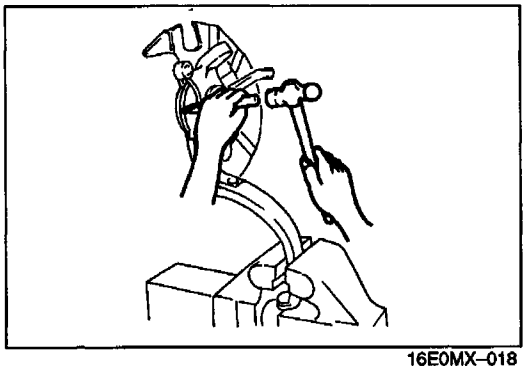


46U0MX-007

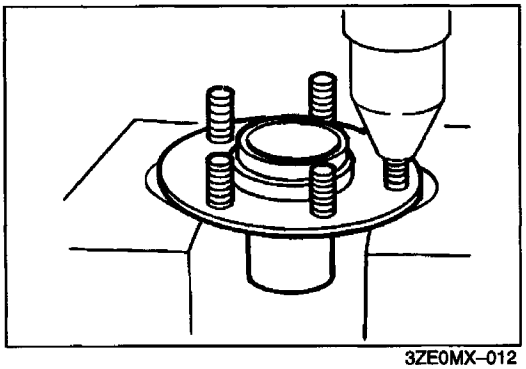
Dust cover

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.


16E0MX-018

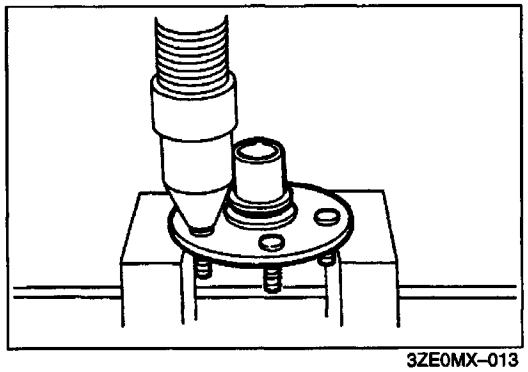
2. Remove the dust cover by using a chisel.


3ZE0MX-012

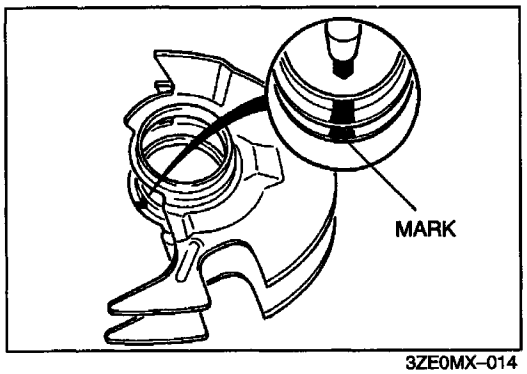
Hub bolt

Note
- The hub bolts do not need to be removed unless you are replacing them.

Press out the hub bolts.

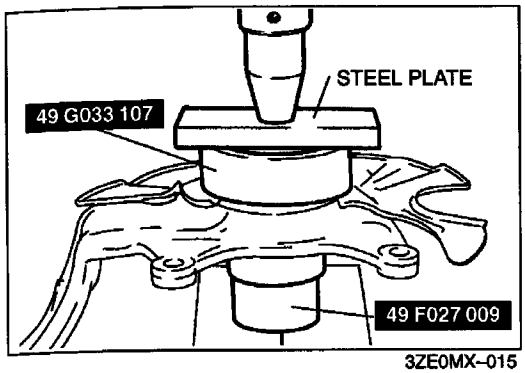

3ZE0MX-013

Installation Note
Hub bolt
Press in new hub bolts.



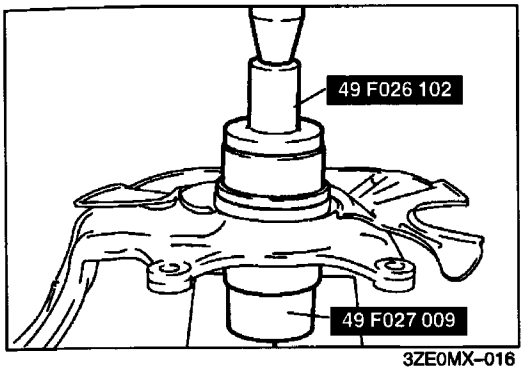
3ZE0MX-014

Dust cover
1. Mark the new dust cover in the same manner as the one removed.



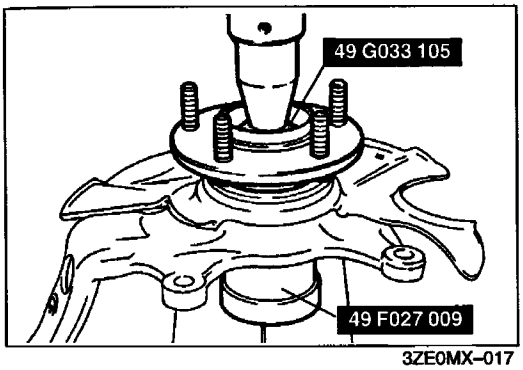
3ZE0MX-015

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 **SST**.



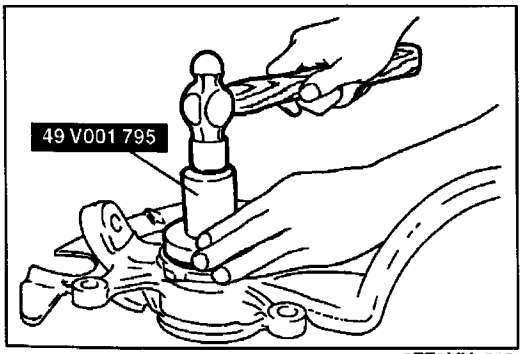
3ZE0MX-016

Wheel bearing
Press in the new wheel bearing by using the **SST**.



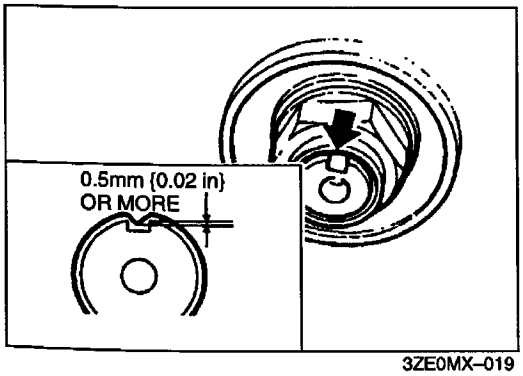
3ZE0MX-017

Wheel hub assembly
Press in the front wheel hub assembly by using the **SST**.



3ZE0MX-018

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.



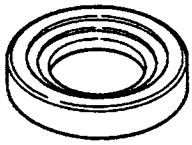
3ZE0MX-019

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

3ZE0MX–020

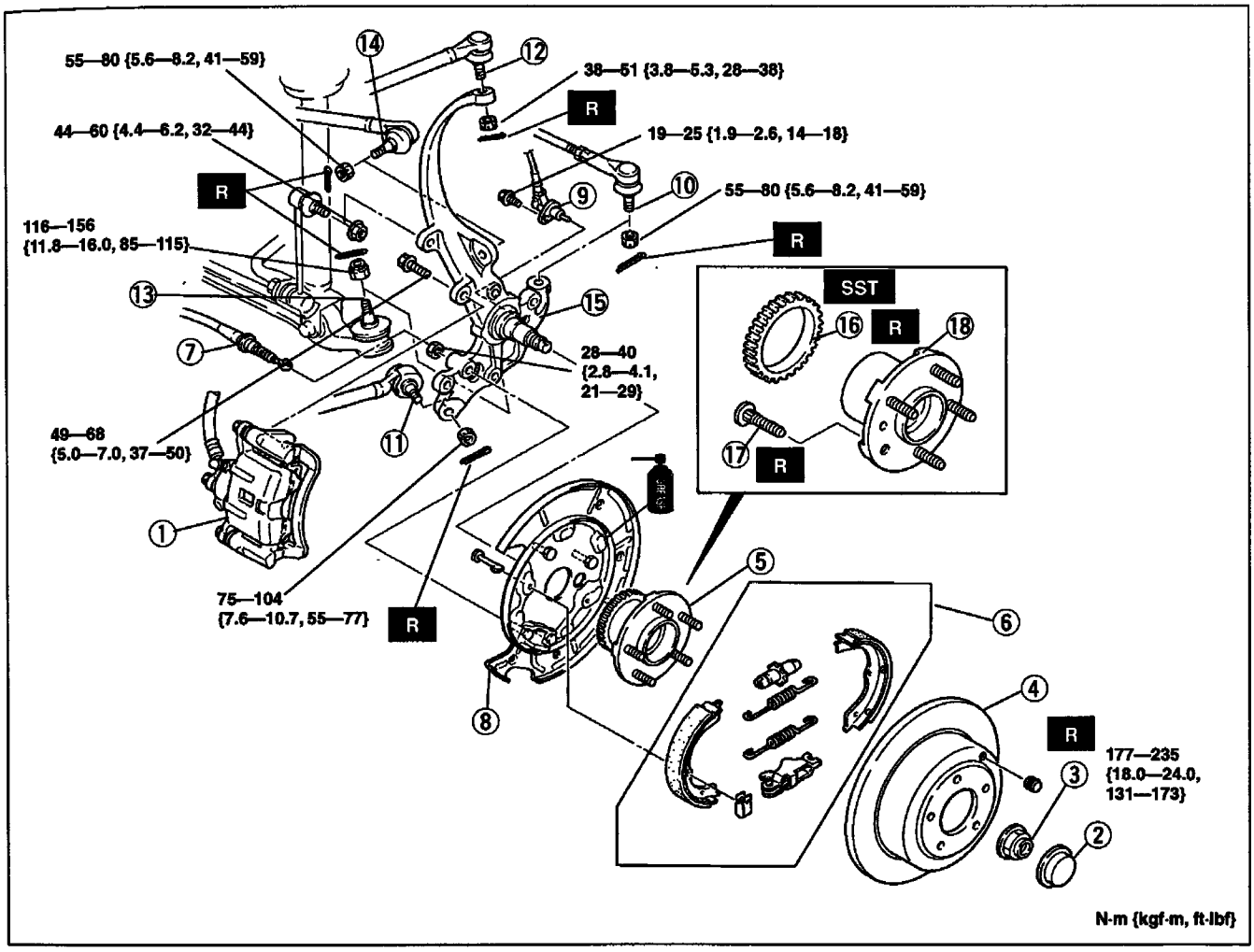
WHEEL HUB, HUB SPINDLE
Preinspection
Wheel bearing play
Refer to page M–3.

3ZE0MX–021

Removal / Inspection / Installation

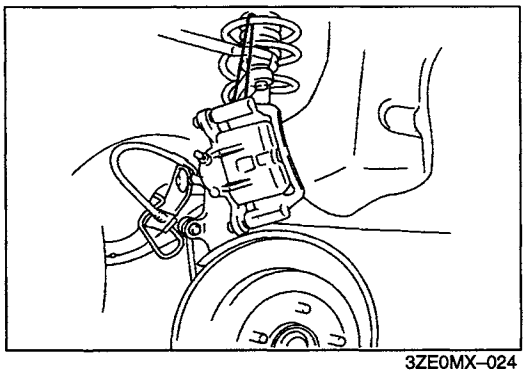
Caution

- **Leave the nuts on the ball joint studs until removing the axle assembly. This will keep the axle weight distributed evenly and prevent damage to the link bushings.**

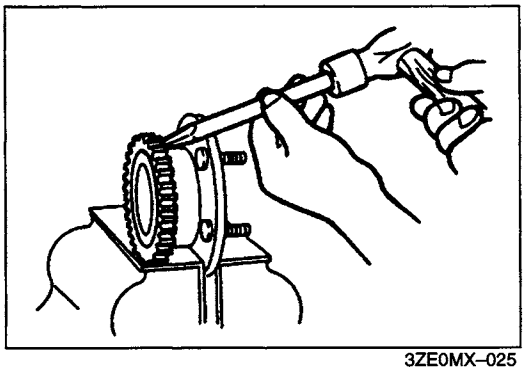


3ZG0MX-002

1. Brake caliper assembly
   - Removal Note ..... page M–10
   - Service ..... section P
2. Hub cap
3. Locknut
   - Installation Note ..... page M– 7
4. Disc plate
   - Service ..... section P
5. Wheel hub assembly
   - Inspect for damage
   - Inspect bearing for damage and rough rotation
6. Parking brake shoe assembly
   - Service ..... section P
7. Parking brake cable
   - Service ..... section P
8. Back plate
   - Inspect for damage
9. ABS wheel-speed sensor
   - Service ..... section P
10. Rear lower lateral link ball joint
    - Service ..... section R
11. Lower trailing link ball joint
    - Service ..... section R
12. Upper trailing link ball joint
    - Service ..... section R
13. Lower lateral link ball joint
    - Service ..... section R
14. Upper lateral link ball joint
    - Service ..... section R
15. Hub spindle
    - Inspect for damage and cracks
16. ABS sensor rotor
    - Removal Note ..... page M–10
    - Installation Note ..... page M–10
17. Hub bolt
    - Removal Note ..... page M– 6
    - Installation Note ..... page M– 6
18. Wheel hub


3ZE0MX–024

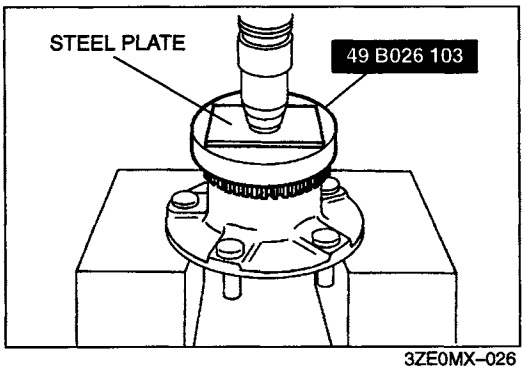
Removal Note
Brake caliper assembly
Suspend the brake caliper assembly as shown in the figure.


3ZE0MX–025

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.



3ZE0MX–026

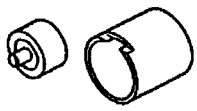
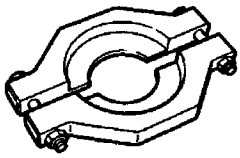
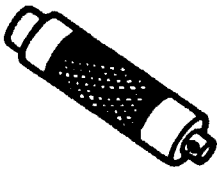
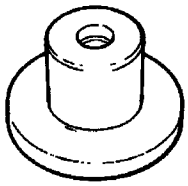
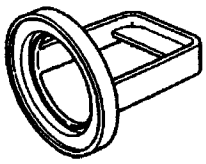
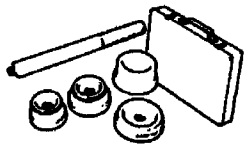
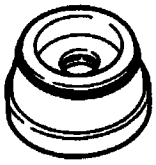
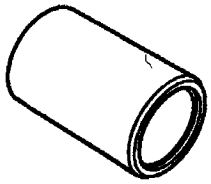
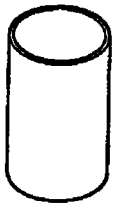
Installation Note
ABS sensor rotor
1. Install a new rear ABS sensor rotor onto the wheel hub.

Note
- The ABS sensor rotor can be installed in either direction.

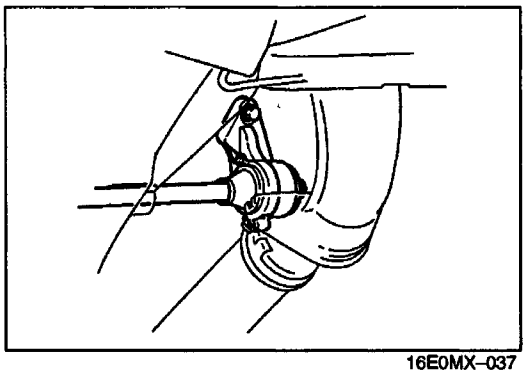
2. Using a steel plate and the **SST**, press the rotor on until it is flush with the wheel hub.

DRIVE SHAFT

PREPARATION
SST

49 H034 2A0 Lower arm bushing puller & installer 	For support of bracket	49 H034 201 Support block (Part of 49 H034 2A0) 	For support of bracket
49 H027 002 Remover, bearing 	For removal of differential side dust cover	49 G030 795 Installer, oil seal 	For installation of drive shaft side dust seal
49 G030 797 Handle (Part of 49 G030 795) 	For installation of bearing	49 F026 102 Installer, bearing 	For removal of differential side dust seal and bearing
49 G025 001 Installer, sensor rotor 	For installation of sensor rotor	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 S120 785 Installer, dust boot 	For installation of differential side dust seal
49 B025 005 Installer, dust cover 	For installation of differential side dust cover	—	—

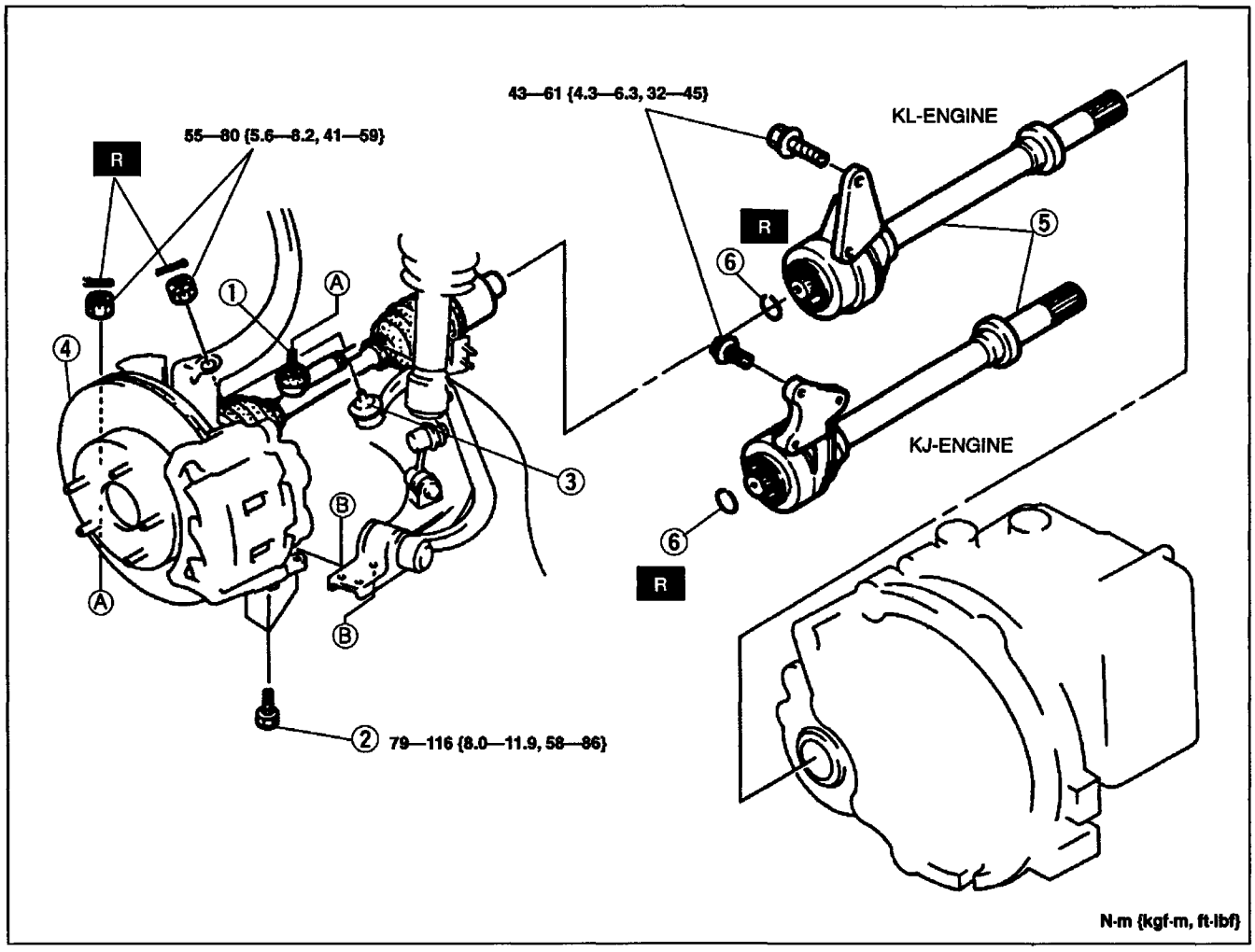
3ZE0MX-027



16E0MX-037

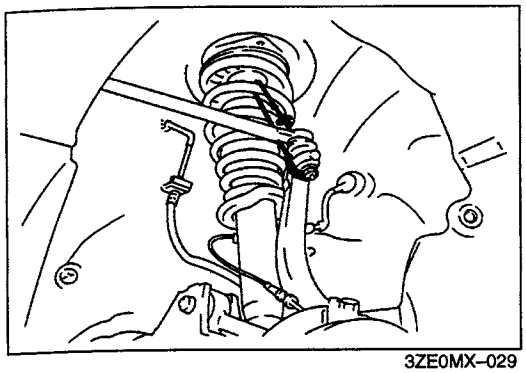
JOINT SHAFT
Preinspection
Joint shaft
1. Verify that the joint shaft is not twisted or cracked. Replace it if necessary.
2. Turn the joint shaft by hand and verify that the bearing rotates smoothly and freely. Replace it if necessary.

Removal / Installation
- Drain the transaxle oil.
- After installation, fill the transaxle with the specified amount and type of ATF, and inspect for oil leakage. (Refer to sections K1, K2.)

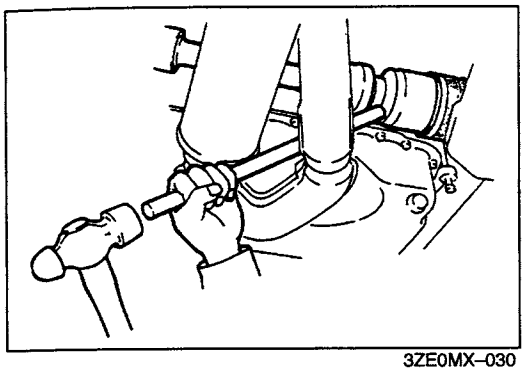


3ZG0MX-003

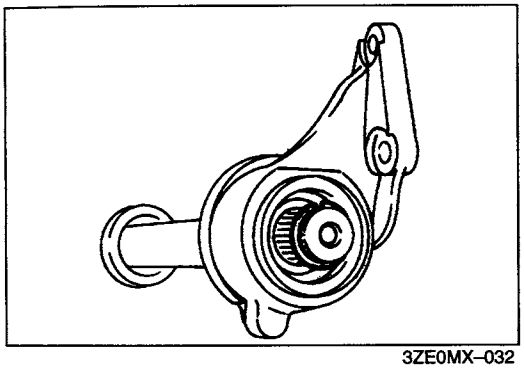
1. Tie-rod end ball joint
   Service ..... section N
2. Lower arm ball joint bolt
3. Upper lateral link ball joint
   Removal Note ..... page M–13
   Service ..... section R
4. Drive shaft and axle assembly
   Removal Note ..... page M–13
   Installation Note ..... page M–13
5. Joint shaft
   Installation Note ..... page M–13
   Disassembly / Inspection / Assembly ..... page M–14
6. Clip
   Installation Note ..... page M–13


3ZE0MX-029

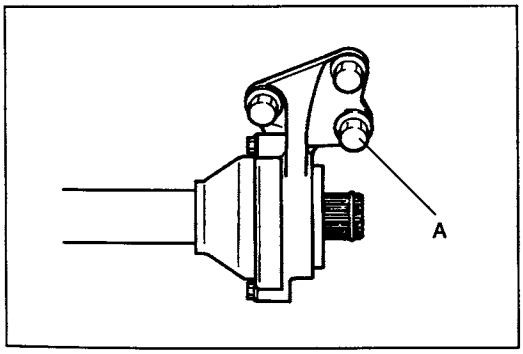
Removal Note
Upper lateral link ball joint
1. Disconnect the upper lateral link ball joint referring to section R.
2. Suspend the axle assembly as shown in the figure to prevent damage to the link bushing.


3ZE0MX-030

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.

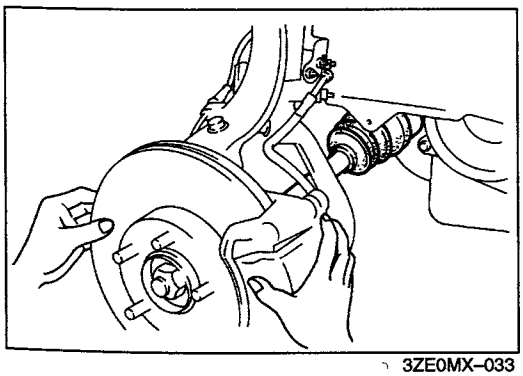

3ZE0MX-032

Installation Note
Clip
Install a new clip so that the opening is facing upward.



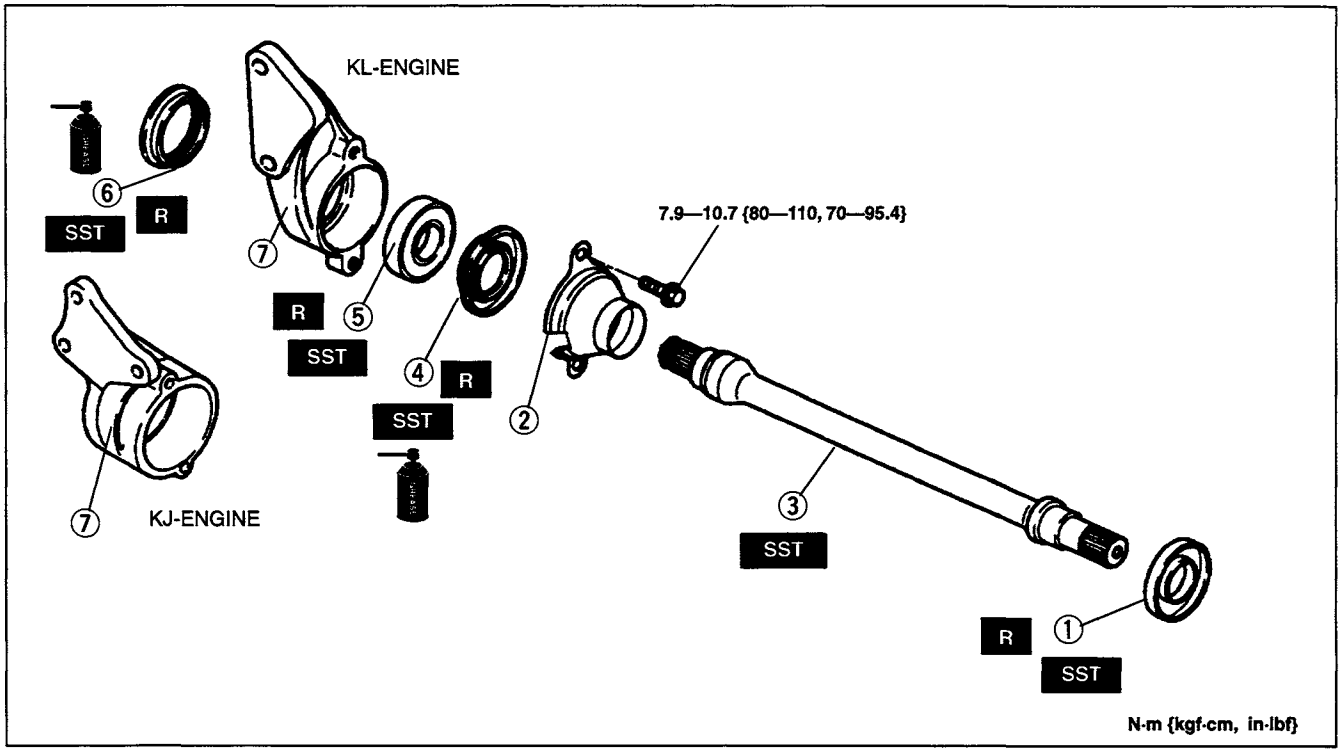
Joint shaft
1. Install the joint shaft.
2. Tighten bolt A last. (KJ-ENGINE)

Tightening torque:
43—61 N·m {4.3—6.3 kgf·m, 32—45 ft·lbf}


3ZE0MX-033

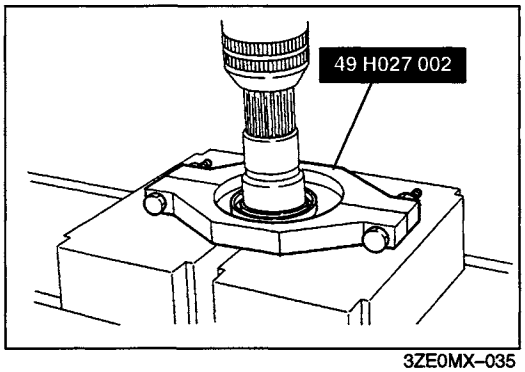
Drive shaft and axle assembly
1. Push the drive shaft onto the joint shaft.
2. After installation, pull the front hub outward to verify that the drive shaft is securely held by the clip.

Disassembly / Inspection / Assembly



3ZE0MX–034

1. Dust cover (differential side)
   Disassembly Note ..... below
   Assembly Note ..... page M–16
2. Dust cover (bracket side)
3. Joint shaft
   Inspect splines for damage and wear
   Disassembly Note ..... below
   Assembly Note ..... page M–16
4. Dust seal (differential side)
   Disassembly Note ..... page M–15
   Assembly Note ..... page M–15
5. Bearing
   Disassembly Note ..... page M–15
   Assembly Note ..... page M–15
6. Dust seal (drive shaft side)
   Assembly Note ..... page M–15
7. Bracket

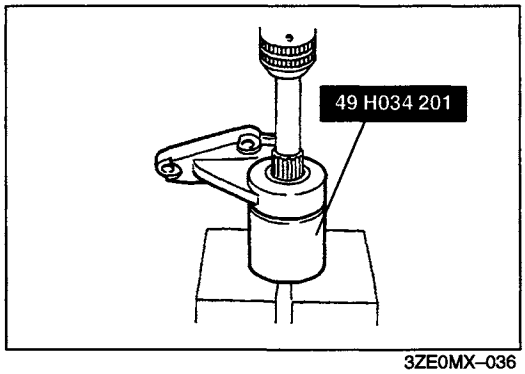


3ZE0MX–035

Disassembly Note

Dust cover (differential side)

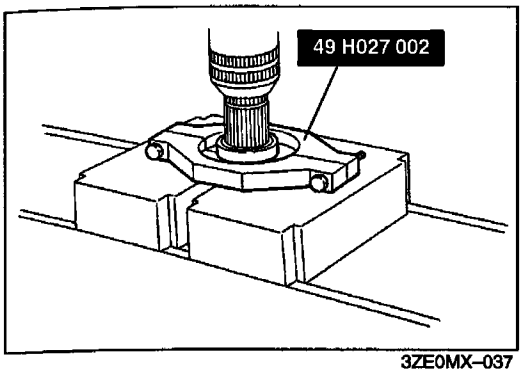
While holding the joint shaft, press out the dust cover by using the **SST**.



3ZE0MX–036

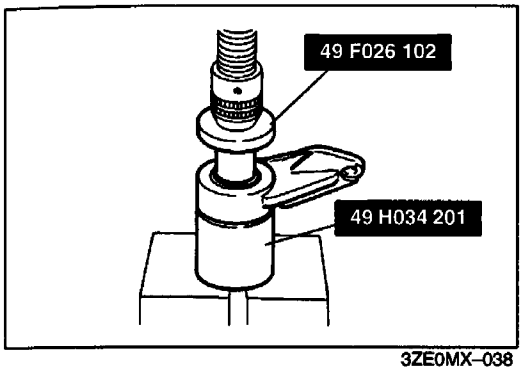
Joint shaft

1. While holding the joint shaft, press it out by using the **SST**.



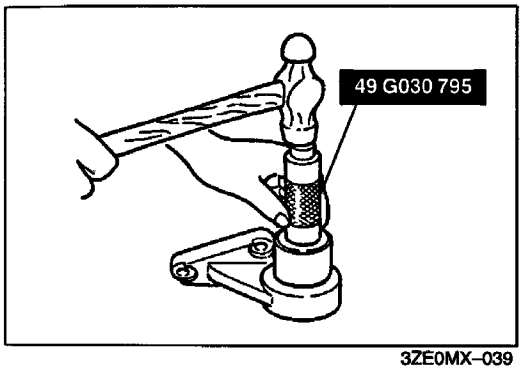
3ZE0MX-037

2. While holding the shaft, press out the bearing inner race by using the **SST**.



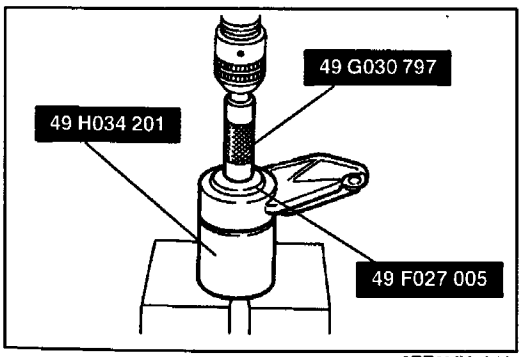
3ZE0MX-038

Dust seal (differential side)/Bearing
Press out the differential side dust seal and bearing by using the **SST**.



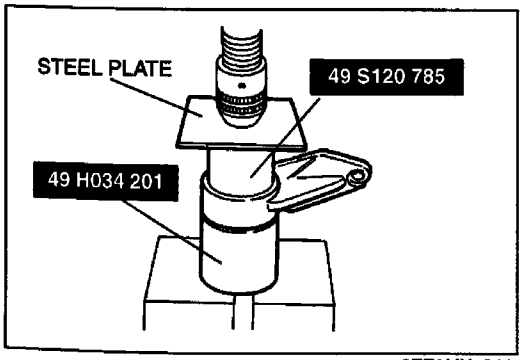
3ZE0MX-039

Assembly Note
Dust seal (drive shaft side)
Tap in the new drive shaft side dust seal by using the **SST**.



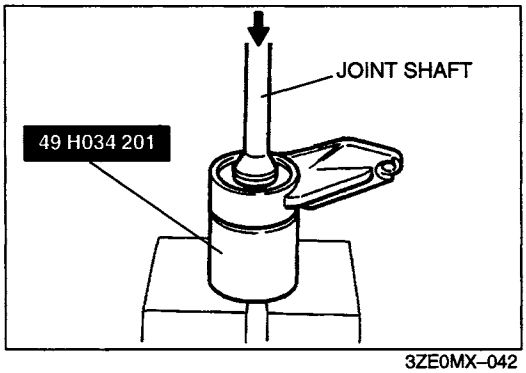
3ZE0MX-040

Bearing
Press in the new bearing by using the **SST**.



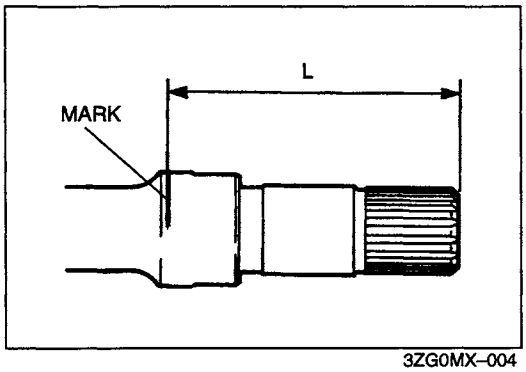
3ZE0MX-041

Dust seal (differential side)
Press in the new differential side dust seal by using a steel plate and the **SST**.



3ZE0MX-042

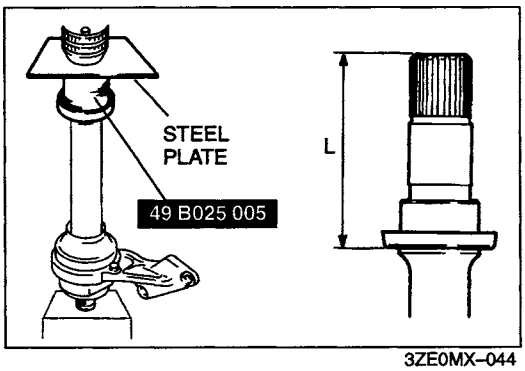
Joint shaft
Press in the joint shaft by using the **SST**.



3ZG0MX-004

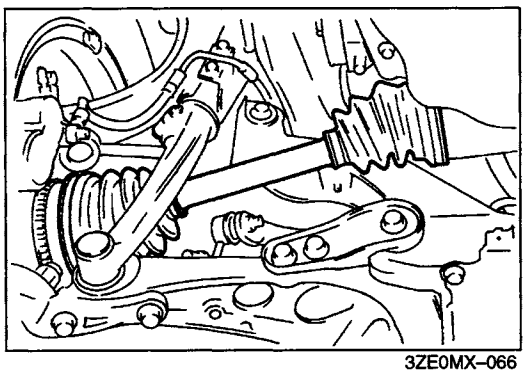
Dust cover (differential side)
1. Mark the shaft as shown in the figure.

Length L
KL-ENGINE: 89.0 ± 0.5 mm {3.50 ± 0.02 in}
KJ-ENGINE: 93.5 ± 0.5 mm {3.68 ± 0.02 in}



3ZE0MX-044

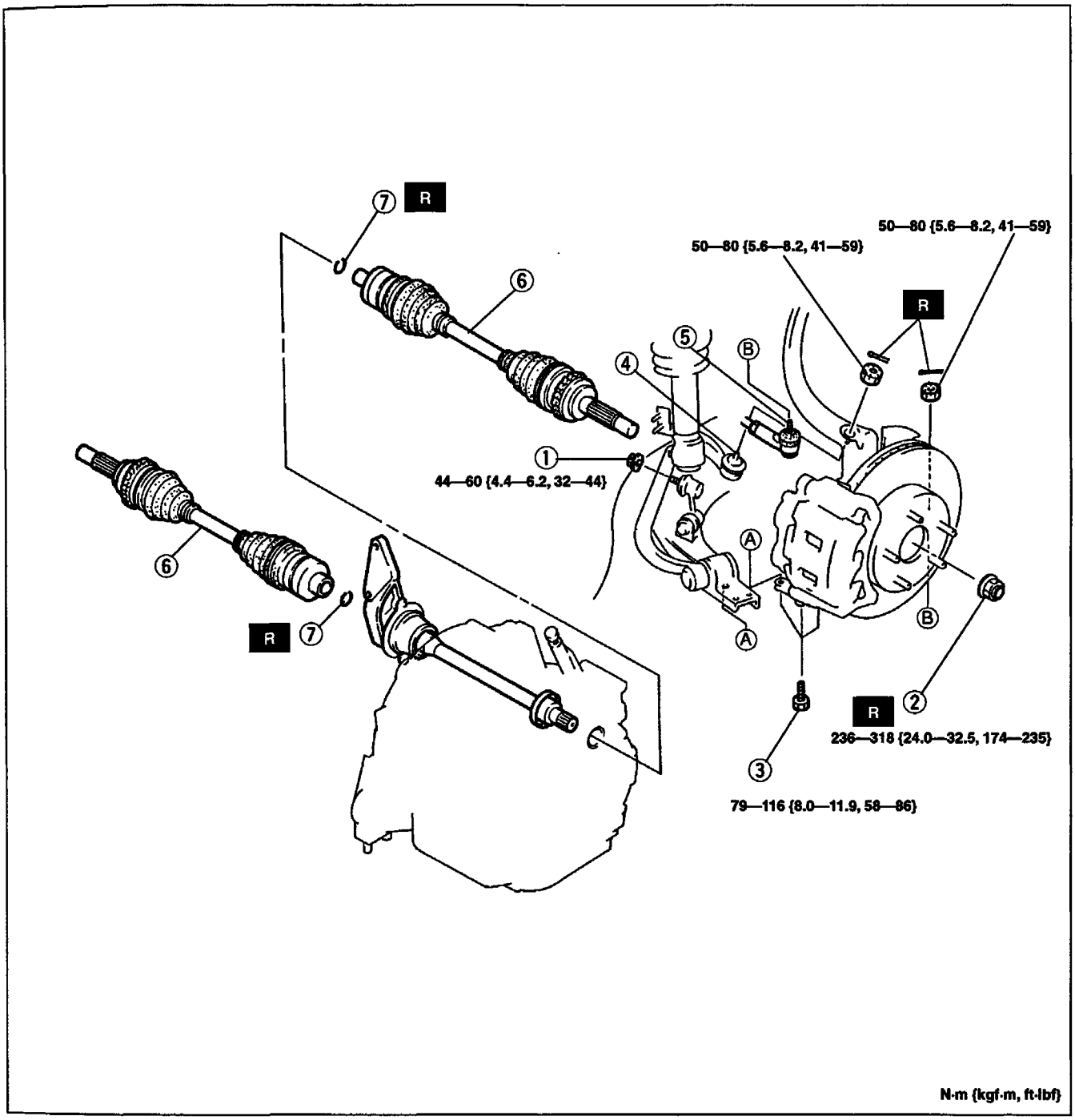
2. Press in the dust cover to the marked position by using a steel plate and the **SST**.
3. Verify that length L is within the specification.


3ZE0MX-066

DRIVE SHAFT
Preinspection
Drive shaft
1. Check the drive shaft dust boot for cracks, damage, grease leakage, 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.

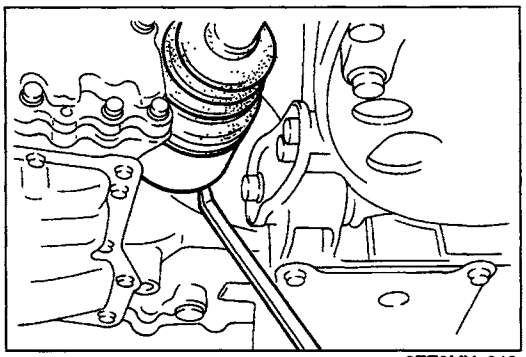
Removal / Installation

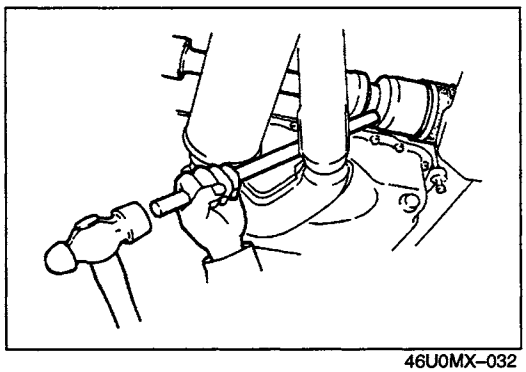
- Drain the transaxle oil.
- After installation, fill the transaxle with the specified amount and type of ATF, and inspect for oil leakage. (Refer to sections K1, K2.)

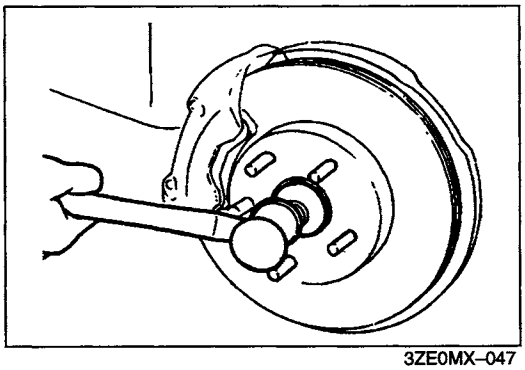


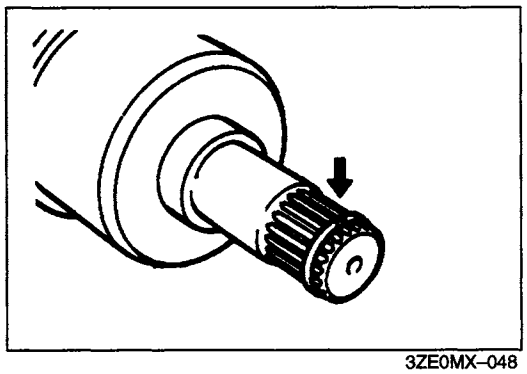
3ZG0MX-005

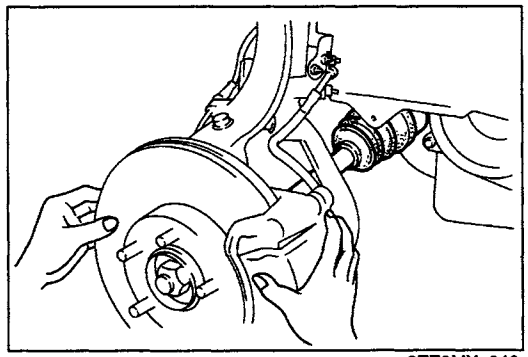
1. Stabilizer control link upper nut
2. Locknut
   - Removal Note ..... page M- 5
   - Installation Note ..... page M- 7
3. Lower arm ball joint bolt
4. Upper lateral link ball joint
   - Removal Note ..... page M-13
   - Service ..... section R
5. Tie-rod end ball joint
   - Service ..... section N
6. Drive shaft
   - Removal Note ..... page M-18
   - Installation Note ..... page M-18
   - Disassembly / Inspection / Assembly ..... page M-19
7. Clip
   - Installation Note ..... page M-13


3ZE0MX-046


46U0MX-032


3ZE0MX-047


3ZE0MX-048


3ZE0MX-049

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.

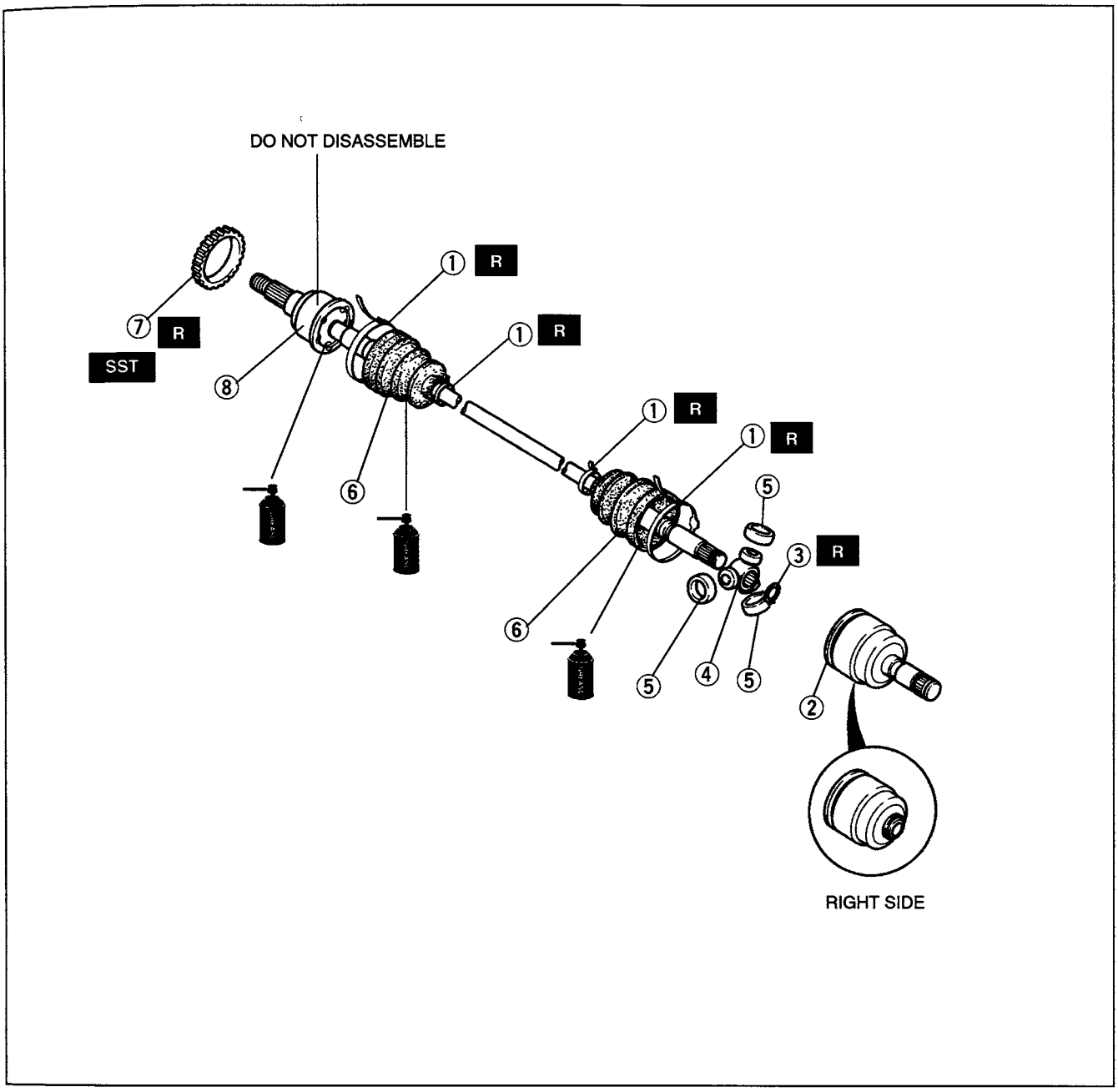
Note
- If the drive shaft will not come out of the front wheel hub easily, install an already discarded nut onto the drive shaft so that the nut is flush with the end of the drive shaft. Tap the nut with a copper hammer to loosen the drive shaft from the front wheel hub.

Installation Note
Drive shaft
1. Turn the clip so that the opening is facing upward. (left side)
2. Apply grease to the ends of the drive shafts.

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.**

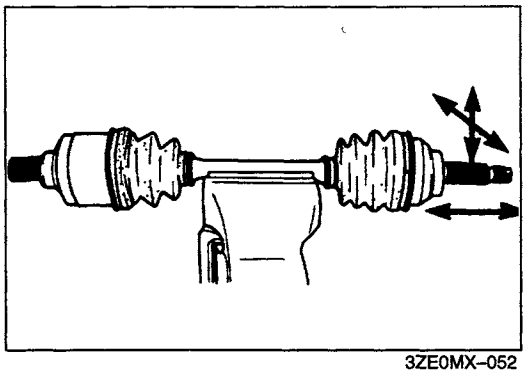
3. Push the drive shaft into the transaxle (left side) or joint shaft (right side).
4. After installation, pull the front hub outward to confirm that the drive shaft is securely held by the clip.

Disassembly / Inspection / Assembly



3ZE0MX–051

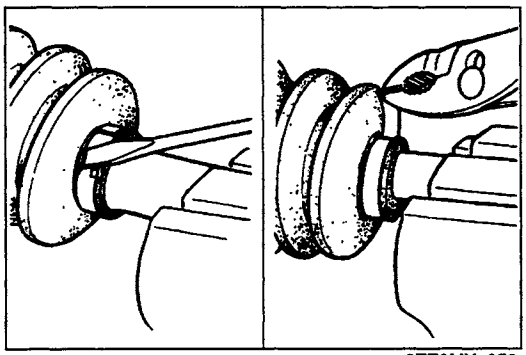
1. Boot band
   - Disassembly Note ..... page M–20
   - Assembly Note ..... page M–22
2. Outer ring
   - Disassembly Note ..... page M–20
   - Inspect inside bore for wear, corrosion, and scoring
   - Assembly Note ..... page M–21
3. Snap ring
   - Disassembly Note ..... page M–20
   - Assembly Note ..... page M–21
4. Tripod joint
   - Disassembly Note ..... page M–20
   - Inspect for damage and wear
   - Assembly Note ..... page M–21
5. Free ring
6. Boot
   - Disassembly Note ..... page M–20
   - Inspect for damage
   - Assembly Note ..... page M–21
7. ABS sensor rotor
   - Disassembly Note ..... page M–21
   - Assembly Note ..... page M–21
8. Shaft and bell joint assembly
   - Inspect splines for damage and wear
   - Inspect wheel-side joint for excessive play and rough rotation



3ZE0MX-052

Preinspection
Drive shaft assembly

1. Move the joint in 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.

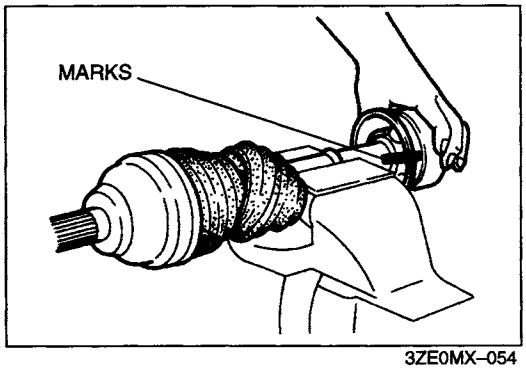


3ZE0MX-053

Disassembly Note
Boot band

Note
- The boot band does not need to be removed unless you are replacing it.

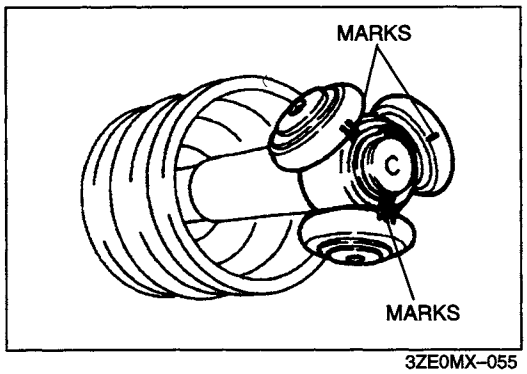
1. Pry up the locking clips of the boot band.
2. Remove the boot band with pliers.



3ZE0MX-054

Outer ring

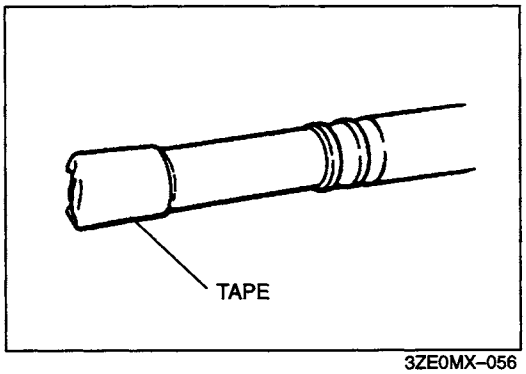
1. Mark the outer ring and the shaft for proper reassembly.
2. Remove the outer ring, being careful to keep the free rings from dropping.



3ZE0MX-055

Snap ring/Tripod joint

1. Mark the shaft, tripod joint and free rings for proper reassembly.
2. Remove the snap ring with snap ring pliers.
3. Remove the tripod joint from the shaft by using a bar and a hammer.

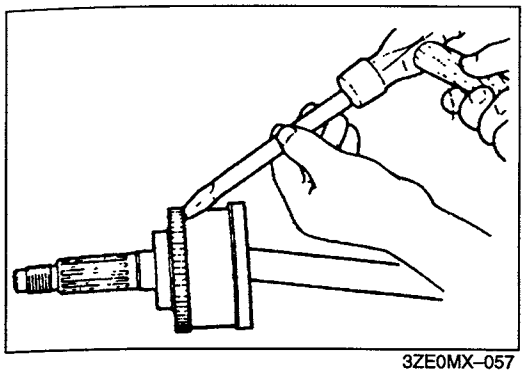


3ZE0MX-056

Boot

Note
- The wheel-side boot does not need to be removed unless you are replacing it.

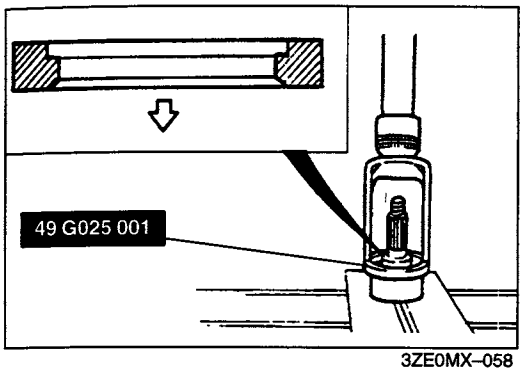
Wrap the splines of the shaft with tape to prevent damaging the boot.


3ZE0MX–057

ABS sensor rotor

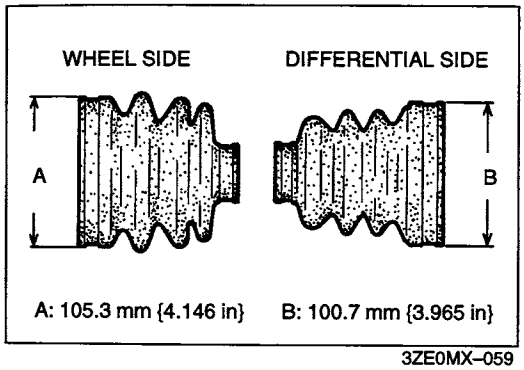
Note
- The sensor rotor does not need to be removed unless you are replacing it.

Tap the ABS sensor rotor off the bell joint outer race by using a chisel.



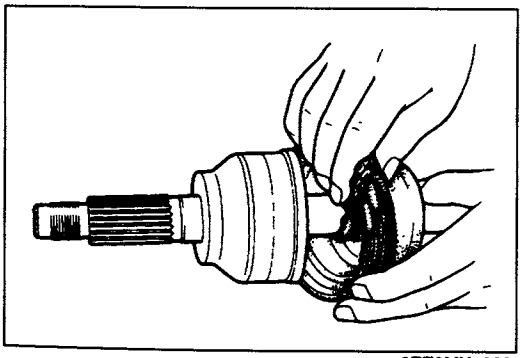
3ZE0MX–058

Assembly Note
ABS sensor rotor
Set a new ABS sensor rotor onto the bell joint outer race in the direction shown, and press it onto the shaft assembly by using the **SST**.



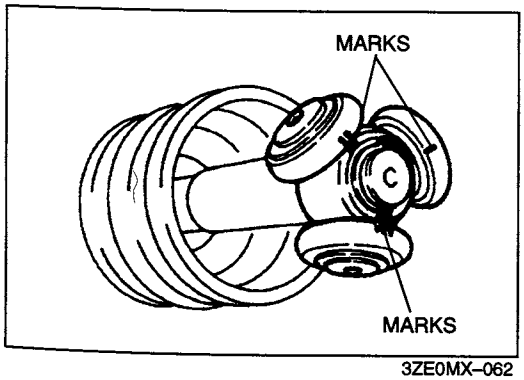
3ZE0MX–059

Boot
1. Wrap the splines of the differential side shaft, and install the wheel–side and differential side boots, noting the shape and size of each one in the figure.


3ZE0MX–060

2. Fill the wheel side boot with the grease supplied in the boot kit.

Grease amount: 130—150 g {4.59—5.29 oz}

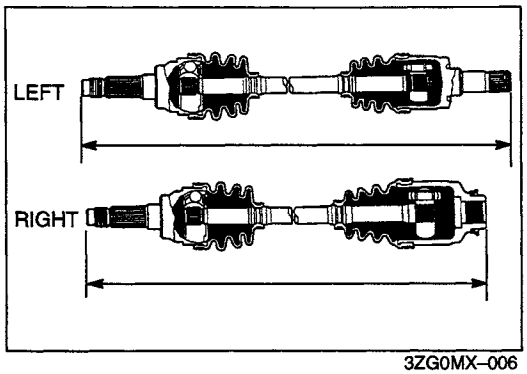


3ZE0MX–062

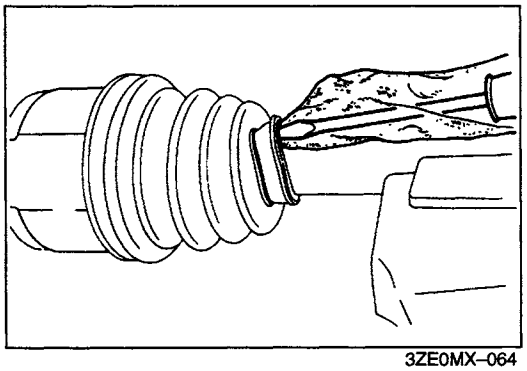
Tripod joint/outer ring
1. Fill the outer ring and differential–side boot with the grease supplied in the boot kit.

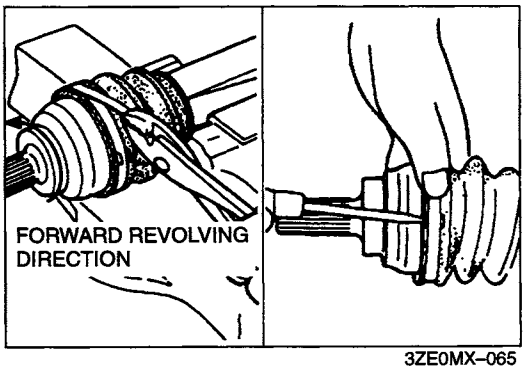
Grease amount: 195—215 g {6.88—7.58 oz}

2. Align the marks and install the tripod joint and free rings.
3. Install a new snap ring with snap ring pliers.
4. While supporting the free rings, install the outer ring.



3ZG0MX–006


3ZE0MX–064



3ZE0MX–065

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}

Engine	KL	KJ
Left side	672.5—682.5 {26.48—26.87}	657.2—667.2 {25.87—26.26}
Right side	605.5—615.5 {23.84—24.23}	602.5—612.5 {23.72—24.11}

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 T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

STEERING SYSTEM

GENERAL PROCEDURES ..... **N– 2**
OUTLINE ..... **N– 2**
SPECIFICATIONS ..... **N– 2**
ENGINE SPEED SENSING POWER STEERING .. **N– 3**
PREPARATION ..... **N– 3**
AIR BLEEDING ..... **N– 5**
POWER STEERING FLUID ..... **N– 5**
STEERING WHEEL AND COLUMN ..... **N– 8**
STEERING GEAR AND LINKAGE **N–14**
POWER STEERING OIL PUMP **N–25**
AUTO-TILT STEERING COLUMN **N–30**
STRUCTURAL VIEW **N–30**
SYSTEM OPERATION **N–31**
UNIT INSPECTION **N–32**
TILT MOTOR **N–34**
TILT SWITCH **N–34**
TILT SENSOR **N–37**
TILT RELAY **N–39**

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.

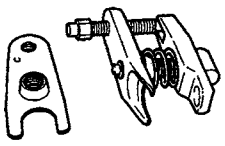
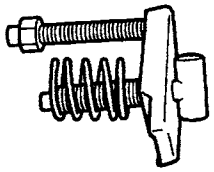
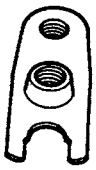
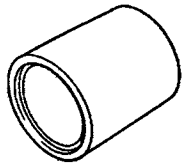
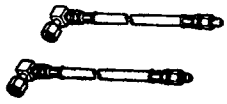
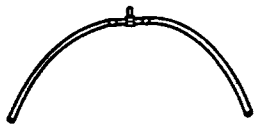
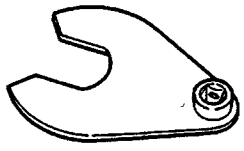
OUTLINE

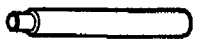
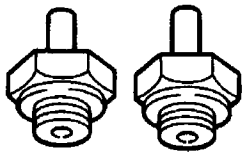
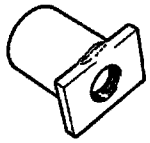
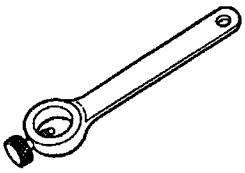
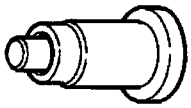
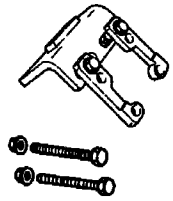
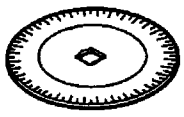
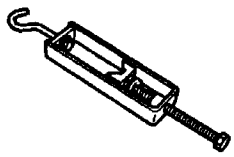
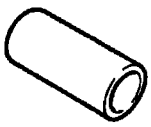
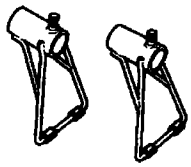
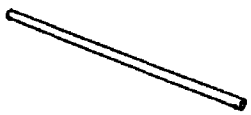
SPECIFICATIONS

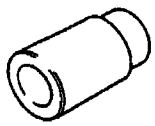
Item		Specification
Steering wheel	Outer diameter mm {in}	390 {15.35}
	Lock-to-lock turns	2.9
Steering gear	Type	Rack-and-pinion
	Total gear ratio	17.5
	Rack stroke mm {in}	141 {5.55}
Steering column and shaft	Shaft type	Collapsible (with auto-tilt steering column)
Power assist system		Engine speed sensing
Power steering fluid	Type	Dexron®II or M-III
	Fluid capacity L {US qt, Imp qt}	1.25 {1.32, 1.10}

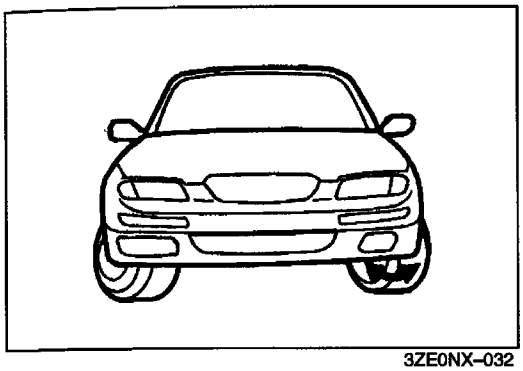
ENGINE SPEED SENSING POWER STEERING

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 T028 302 Installer, 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 set 	For inspection of power steering fluid pressure	49 F032 303 Handle 	For installation of oil seal and backup washer
49 H032 301 Wrench 	For removal of tie rod	49 G032 317 Hose 	For hermetic inspection of cylinder
49 T032 303 Wrench 	For removal and installation of adjusting cover	49 H032 328 Former, seal ring 	For formation of seal ring
49 H032 331 Wrench 	For removal and installation of adjusting cover lock nut	49 H032 334 Collar 	For installation of bearing

49 H032 323 Remover oil seal 	For removal of oil seal and backup washer	49 G033 102 Handle 	For removal of oil seal and bearing
49 H032 326 Body 	For installation of oil seal and backup washer	49 H032 332 Adapter 	For hermetic inspection of cylinder
49 H032 325 Protector 	For installation of rack bushing	49 T032 301 Support block 	For installation of upper bearing and oil seal
49 0180 510B Attachment, preload 	For measurement of pinion preload	49 H032 327 Installer, oil seal and bearing 	For installation of oil seal and bearing
49 F032 301 Hanger, power steering pump 	For disassembly / assembly of power steering oil pump	49 G017 5A0 Support, engine 	For support of engine
49 D032 316 Protractor 	For installation of adjusting cover	49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine
49 T032 302 Installer, bearing 	For installation of ball bearing	49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine
49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine	49 G032 354 Adjust, wrench 	For removal and installation of power steering oil pump pulley

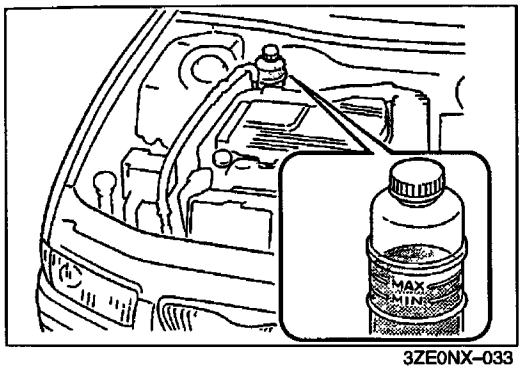
49 F032 3A2 Installer set 	For assembly of power steering oil pump	49 F032 320 Installer A 	For assembly of power steering oil pump


3ZE0NX-032

AIR BLEEDING

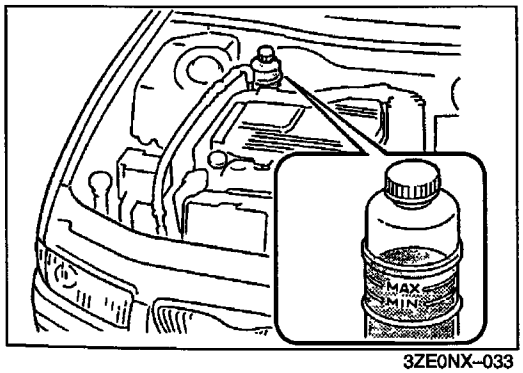
1. Check the fluid level.
2. Turn the steering wheel fully left and right several times with the engine not running.
3. Recheck the fluid level. If it has dropped, add fluid.
4. Repeat steps 2 and 3 until the fluid level stabilizes.
5. Start the engine and let it idle.
6. Turn the steering wheel fully left and right several times.

N



3ZE0NX-033

7. Verify that the fluid is not foamy and that the fluid level has not dropped.
8. Add fluid if necessary and repeat steps 6 and 7.



3ZE0NX-033

POWER STEERING FLUID

Inspection

Fluid level

Check the power steering fluid level. Add the specified power steering fluid if necessary.

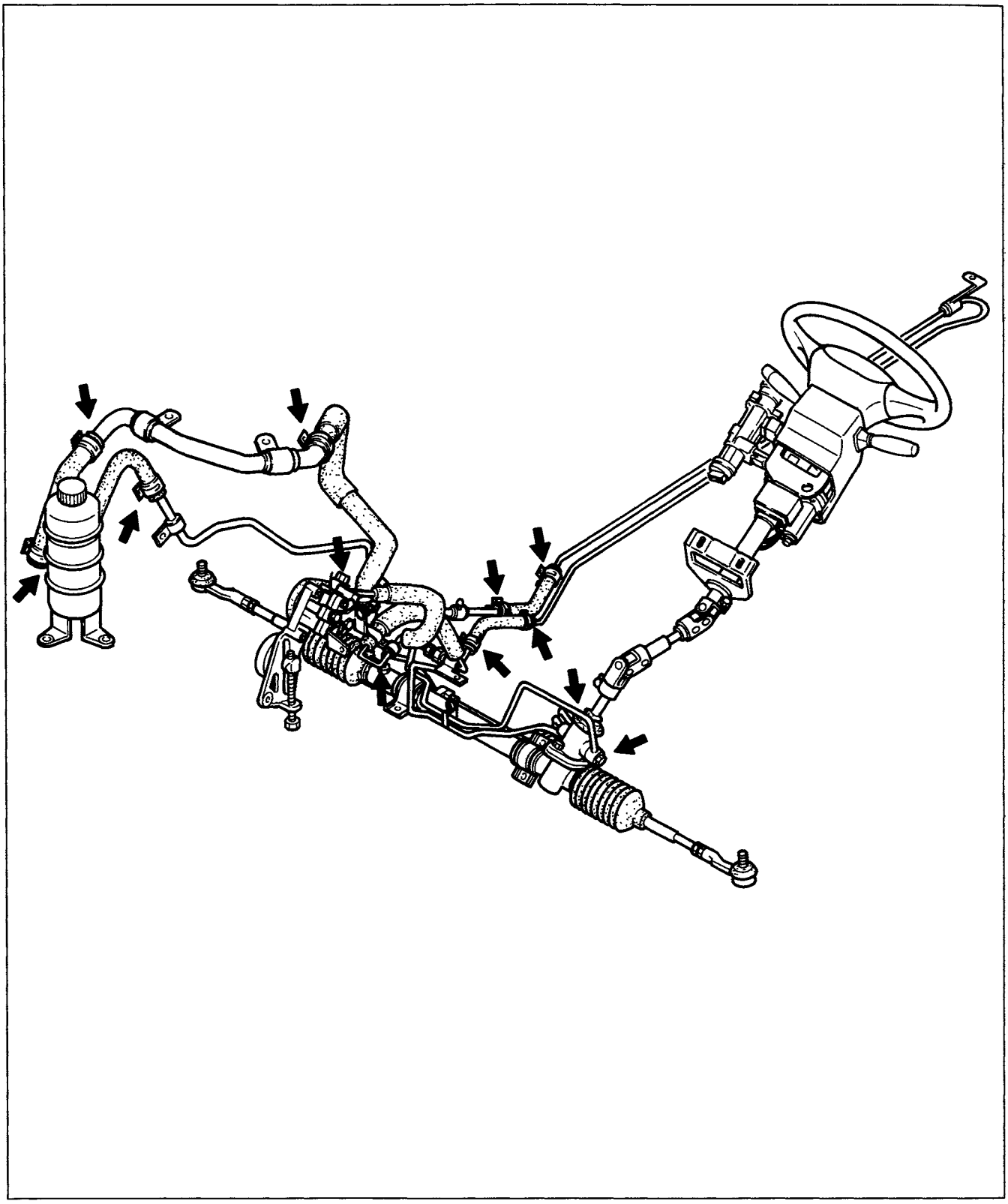
Fluid specification: ATF Dexron®II or M-III

Fluid leakage

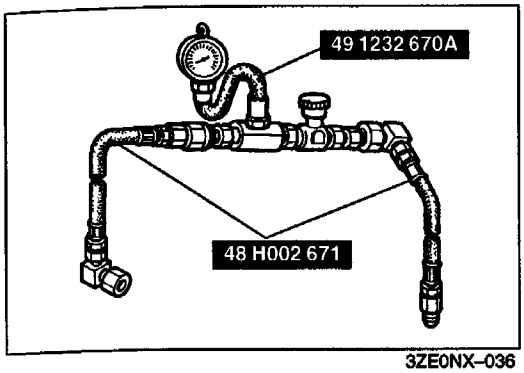
Caution

- **Never hold the steering wheel to the extreme left or right for more than five seconds with the engine running. This could damage 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.



3ZE0NX-035

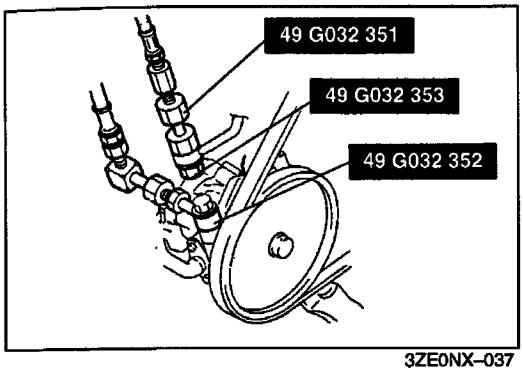


3ZE0NX-036

Fluid pressure

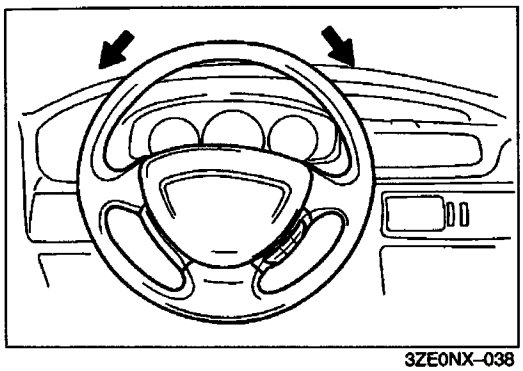
1. Assemble the **SST** as shown in the figure.

   Tightening torque:
   30—39 N·m {3.0—4.0 kgf·m, 22—28 ft·lbf}

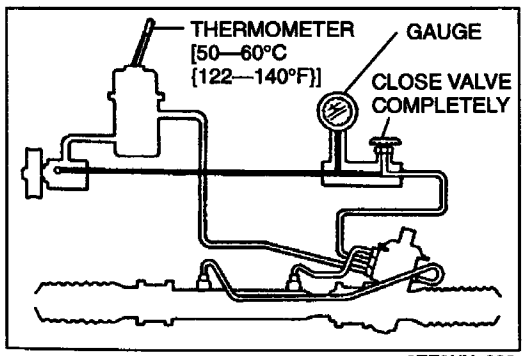


3ZE0NX-037

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 **SST (adapters)**.
4. Connect the **SST (gauge set)** to the **SST (adapters)**.
5. Bleed the air from the system. (Refer to page N–5.)


3ZE0NX-038

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}**.



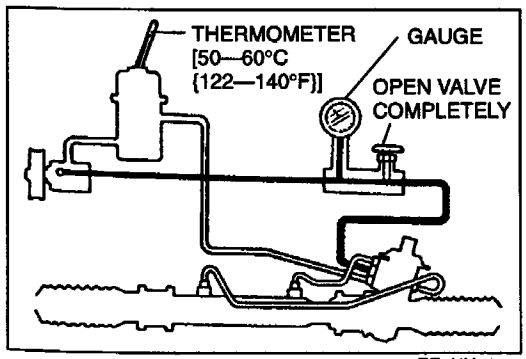
3ZE0NX-039

Caution

- **Do not let the valve stay closed for more than 5 seconds. The increase in fluid temperature will damage the oil pump.**

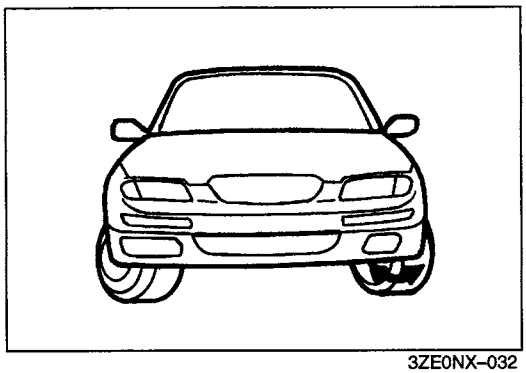
7. Close the gauge valve completely. Increase the engine speed to **1,000—1,500 rpm** and measure the fluid pressure generated by the oil pump. If the pressure is not within the specification, replace the oil pump assembly. (Refer to page N–25.)

   Oil pump fluid pressure: 8,340—8,820 kPa {85.0—90.0 kgf/cm^2, 1,210—1,280 psi}



3ZE0NX-040

8. Open the gauge valve fully and increase the engine speed to **1,000—1,500 rpm**.


3ZE0NX–032

Caution
- **Do not let the valve stay closed for more than 5 seconds. The increase in fluid temperature will damage the oil pump.**

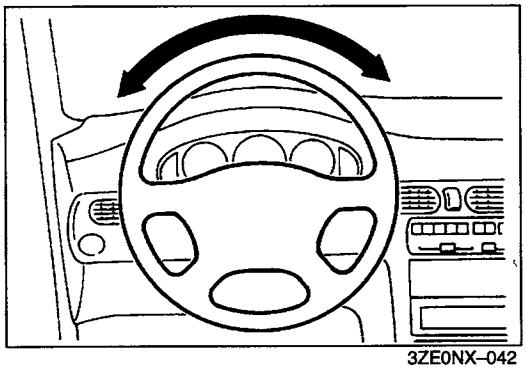
9. Turn the steering wheel fully left. Measure the fluid pressure generated within the gear housing. Turn the steering wheel fully right. Measure the fluid pressure generated within the gear housing. If the pressure is not within the specification, repair or replace the steering gear assembly.

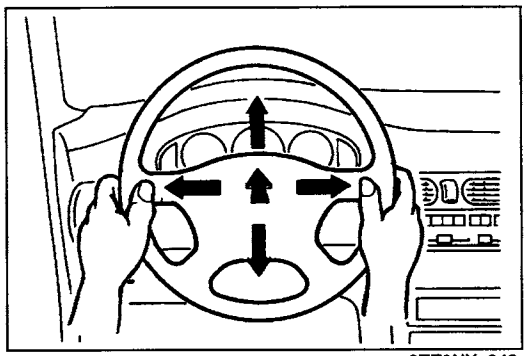
   Gear housing fluid pressure: 8,340—8,820 kPa {85.0—90.0 kgf/cm^2, 1,210—1,280 psi}

10. Remove the gauge set. Install and tighten the pressure hose to the specified torque.

    Tightening torque:
    30—39 N·m {3.0—4.0 kgf·m, 22—28 ft·lbf}

11. Bleed the air from the system. (Refer to page N–5.)


3ZE0NX–042


3ZE0NX–043

STEERING WHEEL AND COLUMN

On-vehicle Inspection

Steering wheel play

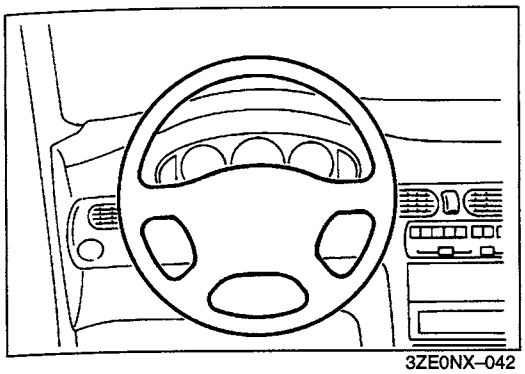
With the wheels in the straight-ahead position, gently turn the steering wheel left and right and verify that the play is within the specification.

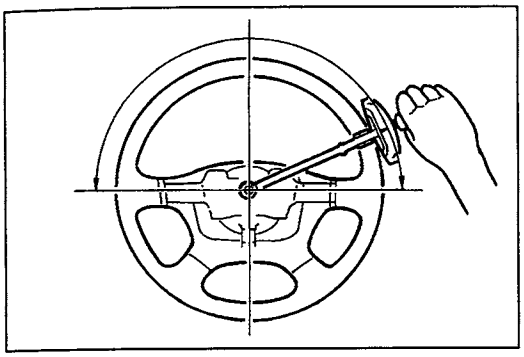
Play: 0—30 mm {0—1.18 in}

If the play exceeds the 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.


3ZE0NX-042



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 T for removal and installation of the air bag module.**

4. Remove the air bag module.
5. Measure the steering wheel effort by using a torque wrench.

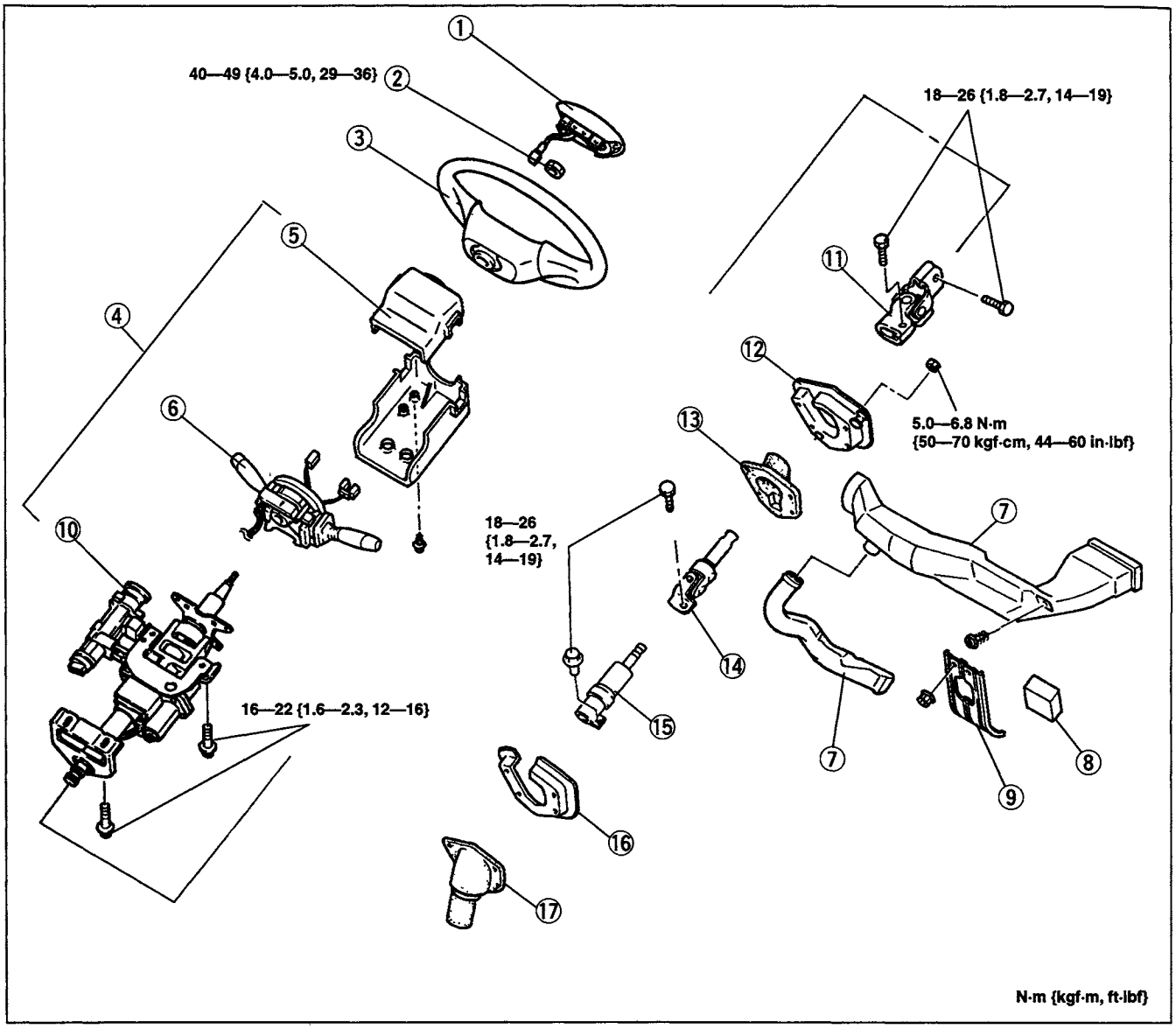
Steering wheel effort:
7.8 N·m {80 kgf·cm, 69 in·lbf} max.

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.

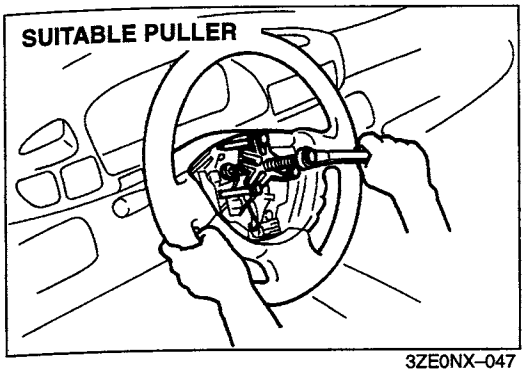
6. If not within the specification, note the following:
   (1) Air in system
   (2) Fluid leakage at hose or connections
   (3) Function of oil pump and steering gear

Removal / Installation



3ZE0NX-046

1. Air bag module
   Removal / Installation ..... section T
2. Locknut
3. Steering wheel
   Removal Note ..... page N–11
   Installation Note ..... page N–11
4. Dashboard, console, and steering shaft assembly
   Removal / Installation ..... section S
5. Column cover
6. Combination switch
   Removal / Installation ..... section T
7. Air duct
8. Flasher unit
9. Bracket
10. Steering shaft assembly
    Installation Note ..... page N–11
    Disassembly / Inspection / Assembly ..... page N–12
11. Universal joint (intermediate shaft)
12. Cover
13. Shaft seal
    Inspect for damage and cracks
14. Intermediate shaft
    Installation Note ..... page N–11
    Inspect for damage
    Inspect universal joint for looseness, abnormal noise, and sticking
15. Collapsible shaft
    Installation Note ..... page N–11
    Inspect for looseness, abnormal noise, and sticking
16. Set plate
17. Dust cover

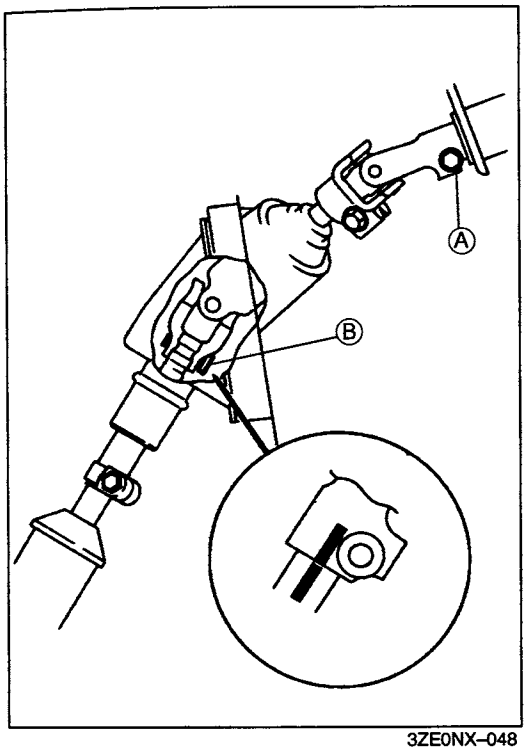


3ZE0NX-047

Removal note
Steering wheel

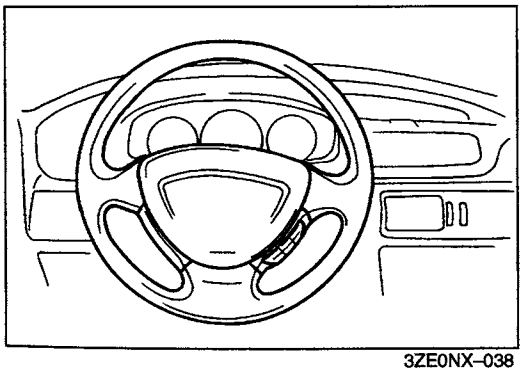
Caution
- **Do not try to remove the steering wheel by hitting the shaft with a hammer. The column will collapse.**

Remove the steering wheel by using a suitable puller.



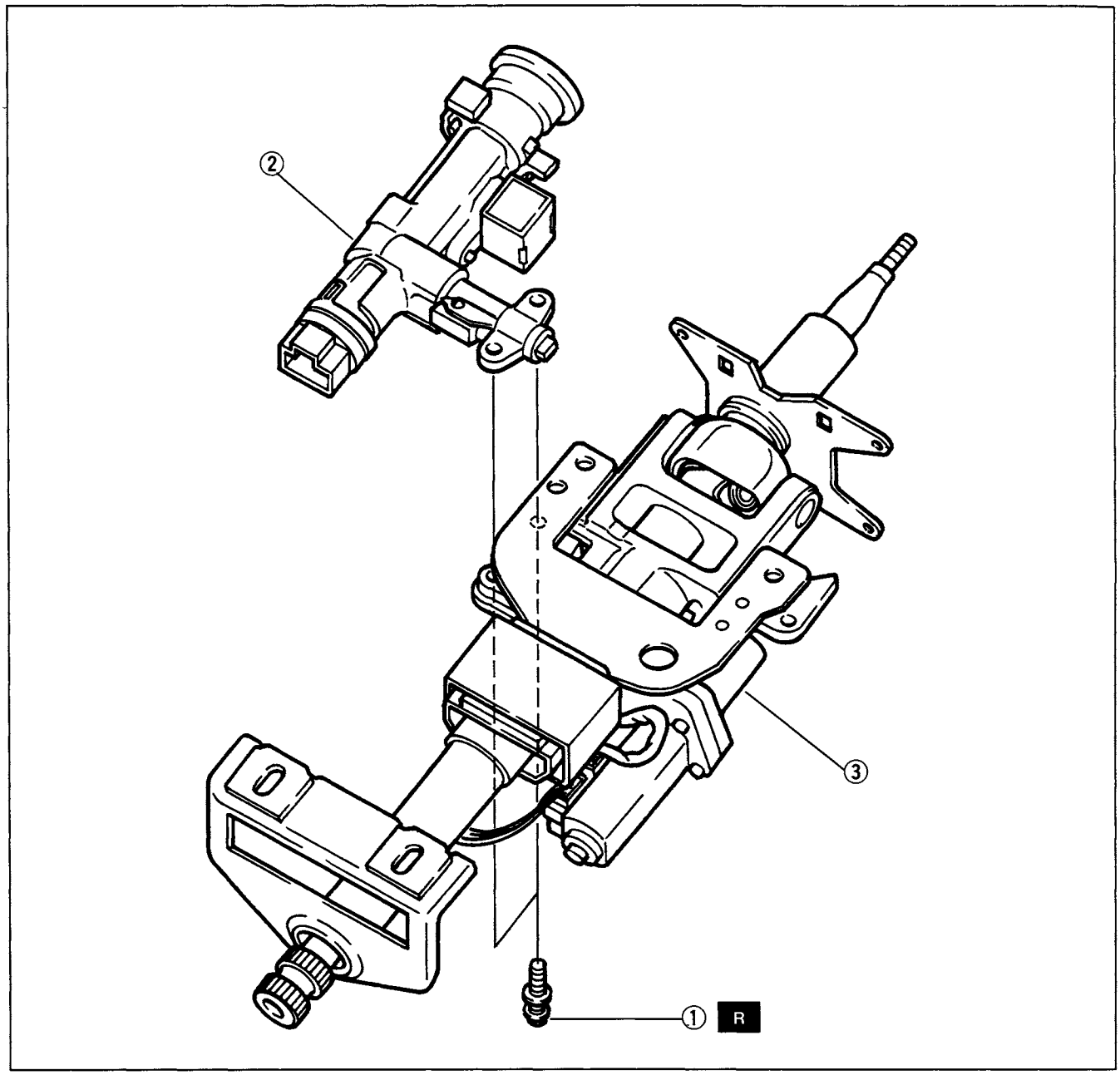
3ZE0NX-048

Installation note
Intermediate shaft and collapsible shaft
1. Align the marks of the intermediate shaft and the collapsible shaft.
2. Tighten bolt A or B last.


3ZE0NX-038

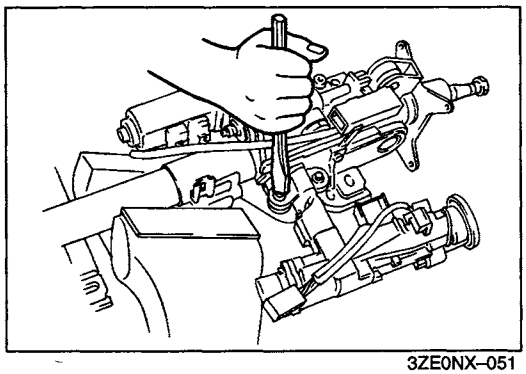
Steering wheel
Set the wheels in the straight-ahead position, and install the steering wheel.

Disassembly / Inspection / Assembly



3ZE0NX–050

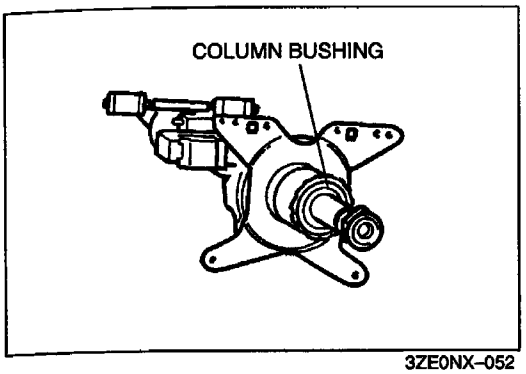
1. Steering lock mounting bolts
   Disassembly Note ..... below
   Assembly Note ..... page N–13
2. Steering lock assembly
3. Steering shaft assembly
   Inspection ..... page N–13



3ZE0NX–051

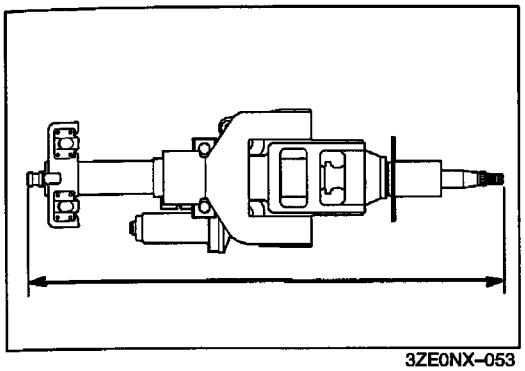
Disassembly note
Steering lock mounting bolts

1. Use a chisel and a hammer to make a groove in the heads of the steering lock mounting bolts.
2. Remove the bolts.
3. Remove the steering lock assembly.



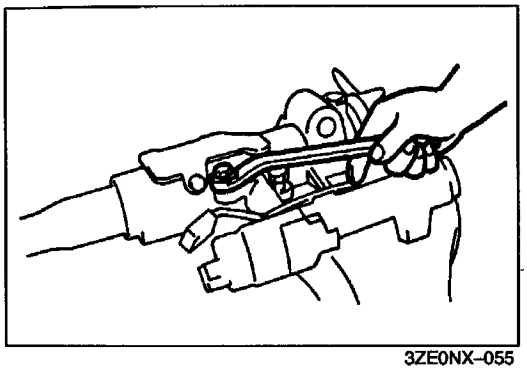
3ZE0NX-052

Inspection
Steering shaft assembly
Note the following and replace the steering shaft assembly if necessary.
1. Column bushing damage
2. Column bearing damage


3ZE0NX-053

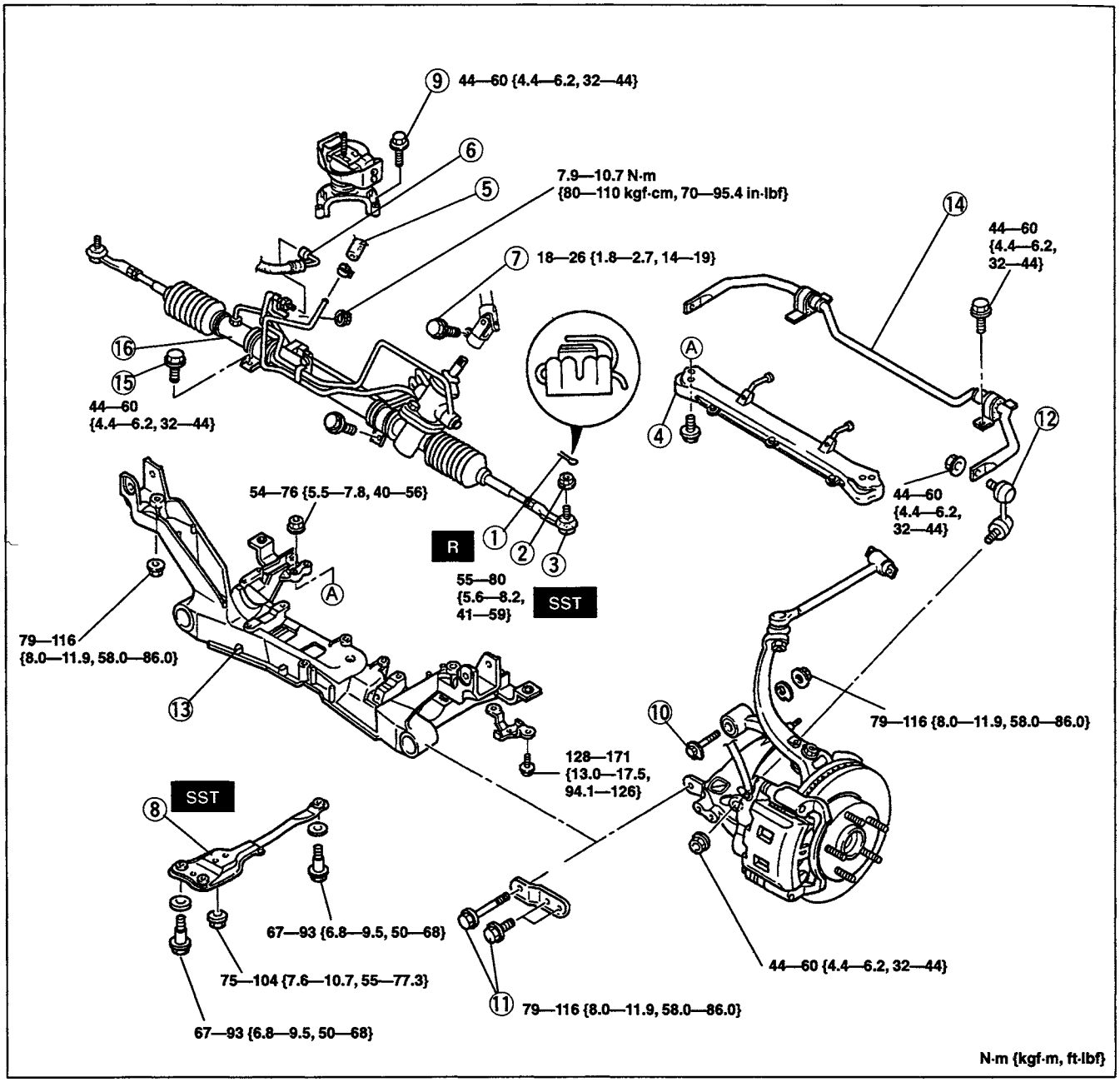
3. Steering shaft length

   Length: 557.5 mm {21.95 in}


3ZE0NX-055

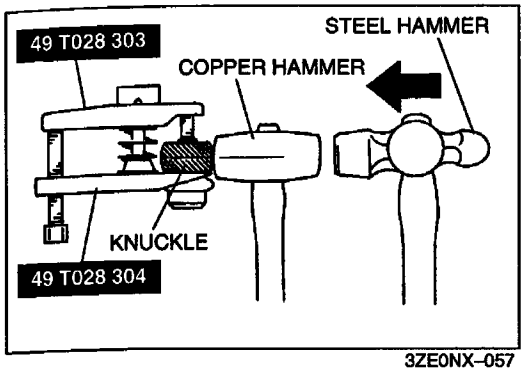
Assembly note
Steering lock mounting bolts and bracket
1. Install the steering lock assembly on the jacket.
2. Verify that the lock operates correctly.
3. Install new steering lock mounting bolts.
4. Tighten the bolts until the heads break off.

STEERING GEAR AND LINKAGE
Removal / Installation



3ZE0NX–056

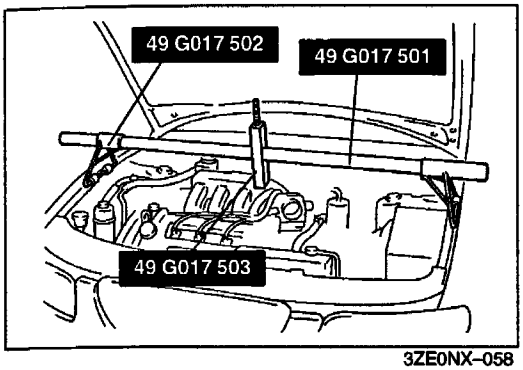
1. Cotter pin
2. Nut
3. Tie rod end ball joint
   Removal Note ..... page N–15
4. Transverse member
   Service ..... section R
5. Return hose
6. Pressure pipe
7. Bolt (intermediate shaft)
   Installation Note ..... page N–15
8. Engine mount member
   Removal Note ..... page N–15
9. Bolts (engine mount No.1)
10. Bolt and nut (upper lateral link)
    Service ..... section R
11. Lower arm bolt (crossmember side)
12. Stabilizer control link
    Service ..... section R
13. Crossmember
    Removal Note ..... page N–15
14. Stabilizer
    Service ..... section R
15. Mounting bracket bolts
    Installation Note ..... page N–15
16. Steering gear and linkage
    Disassembly / Inspection ..... page N–16
    Assembly ..... page N–20



3ZE0NX-057

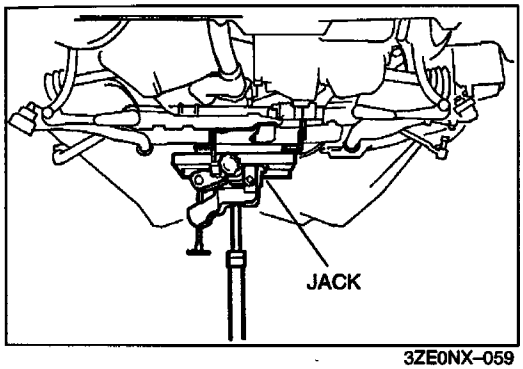
Removal note
Tie-rod end ball joint
1. Install the **SST** to the ball joint.
2. Tighten the bolt of the **SST** to **3.4—3.6 N·m {34—35 kgf·m, 25—26 ft·lbf}**.
3. Tap the knuckle as shown.

Caution
- **Do not tap the ball joint and the stud bolt.**
- **Be careful not to make an edge on the knuckle.**



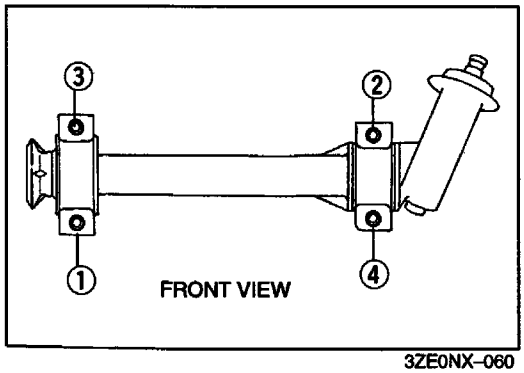
3ZE0NX-058

Engine mount member
1. Use the **SST** as shown.
2. Remove the engine mount.



3ZE0NX-059

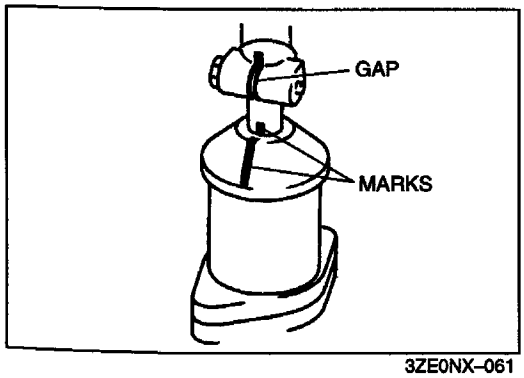
Crossmember
1. Support the crossmember by using a jack, and remove the bolts and nuts.
2. Lower the crossmember slowly and remove the stabilizer bar from the crossmember.
3. Remove the steering gear and linkage.



3ZE0NX-060

Installation note
Mounting bracket bolts
1. Loosely tighten the ④ bolt.
2. Tighten the mounting bracket bolts to the specified torque in the order shown.

Tightening torque:
44—60 N·m {4.4—6.2 kgf·m, 32—44 ft·lbf}



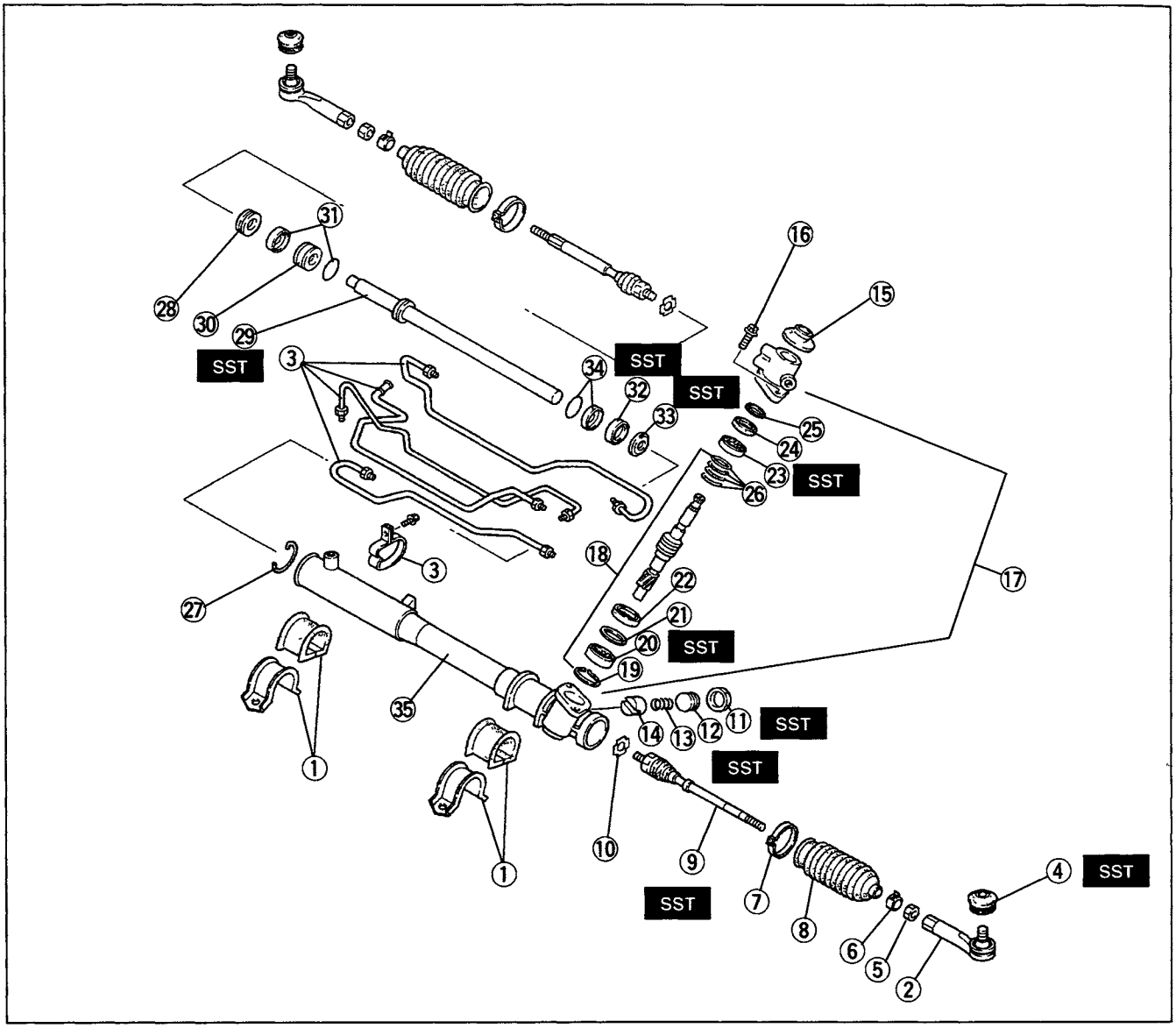
3ZE0NX-061

Bolt (intermediate shaft)
1. Align the marks as shown.
2. Install the intermediate shaft so that the universal joint gap is aligned with the marks.
3. Tighten the bolt.

Tightening torque:
18—26 N·m {1.8—2.7 kgf·m, 14—19 ft·lbf}

Disassembly / Inspection

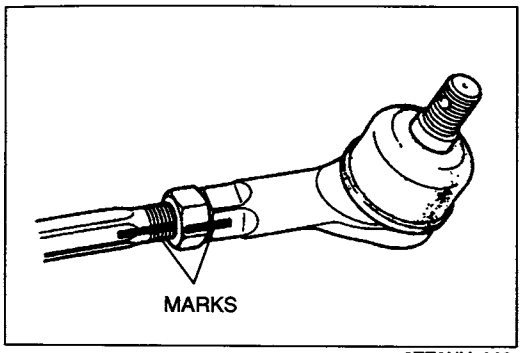
- Plug all pipe fittings, and thoroughly clean the steering gear and linkage.
- Do disassembly and assembly in a clean area to prevent dirt or other foreign particles from entering the mechanisms.
- Inspect all parts and repair or replace as necessary.



3ZE0NX–062

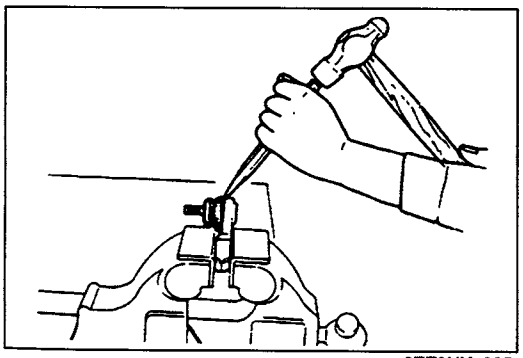
1. Mounting bracket and mount
2. Tie-rod end
   Disassembly Note ..... page N–17
   Inspection ..... page N–20
3. Oil pipe and bracket
   Inspect for clogging and damage
4. Tie-rod end boot
   Disassembly Note ..... page N–17
5. Nut (tie-rod end)
6. Boot clamp (outer)
7. Boot clamp (inner)
8. Boot
   Inspect for cracking and tearing
9. Tie rod
   Disassembly Note ..... page N–17
   Inspection ..... page N–19
10. Washer (tie rod)
11. Locknut (adjusting cover)
    Disassembly Note ..... page N–18
12. Adjusting cover
    Disassembly Note ..... page N–18
13. Yoke spring
    Inspect for damage
14. Support yoke
    Inspect for damage
15. Dust cover
16. Bolt
17. Valve housing assembly

18. Pinion shaft assembly
    Inspect teeth for wear and damage
    Inspect valve for clogging, damage, and wear
    Disassembly Note ..... page N–18
19. Snap ring
20. Ball bearing
    Disassembly Note ..... page N–18
21. Backup washer
22. Oil seal
23. Upper bearing
    Inspect for wear and damage
    Disassembly Note ..... page N–18
24. Oil seal
    Disassembly Note ..... page N–18
25. O-ring
26. Seal ring
27. Clip
    Disassembly Note ..... page N–18
28. Rack stop
    Disassembly Note ..... page N–18
29. Rack
    Disassembly Note ..... page N–19
    Inspection ..... page N–19
30. Rack bushing
    Inspect for wear and damage
31. Oil seal and O-ring
32. Oil seal
    Disassembly Note ..... page N–19
33. Backup washer
    Disassembly Note ..... page N–19
34. Seal ring and O-ring
    Disassembly Note ..... page N–19
35. Gear housing
    Inspect for damage and cracks

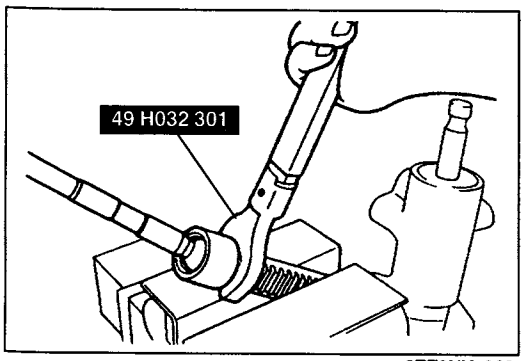


3ZE0NX–063

Disassembly note
Tie-rod end
Mark the tie-rod end before loosening, for reference during installation.

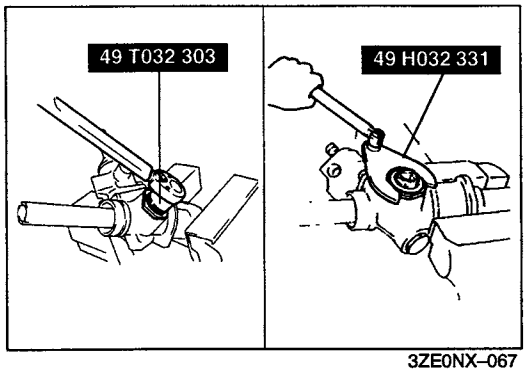

3ZE0NX–065

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.



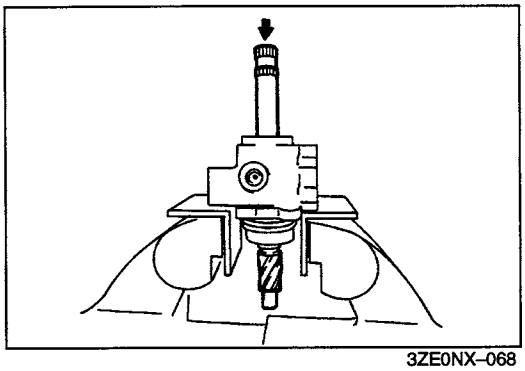
3ZE0NX–066

Tie rod
1. Unbend the washer.
2. Remove the tie rod by using the **SST**.

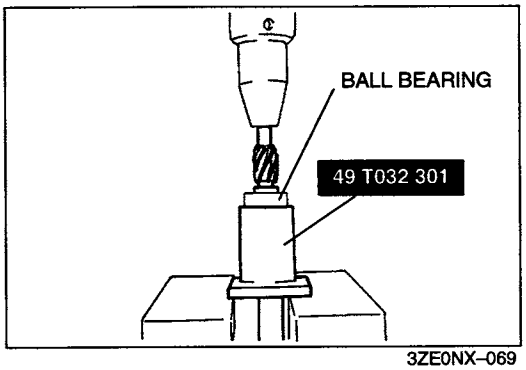


3ZE0NX–067

Locknut and adjusting cover
1. Remove the locknut by using the **SST.**
2. Remove the adjusting cover by using the **SST.**

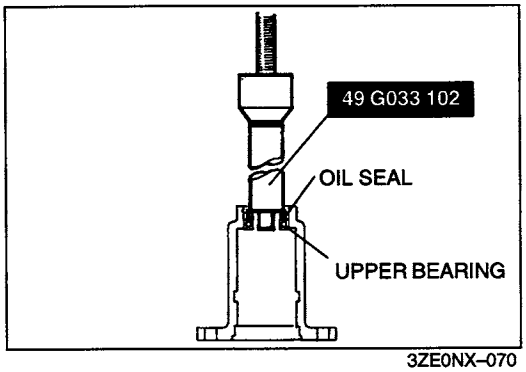

3ZE0NX–068

Pinion shaft assembly
Tap the head of the pinion shaft with a plastic hammer.



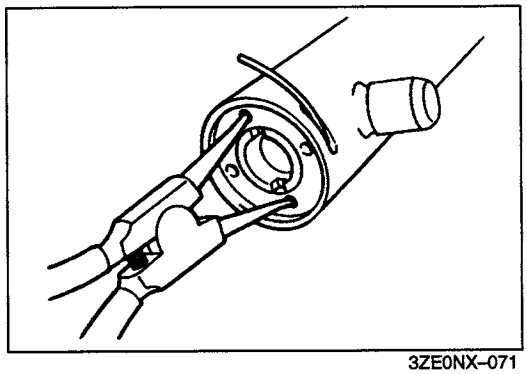
3ZE0NX–069

Ball bearing
Press out the ball bearing and the oil seal by using the **SST.**

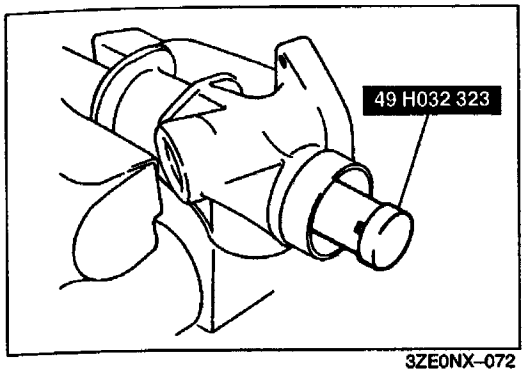


3ZE0NX–070

Upper bearing and oil seal
Press out the upper bearing and the oil seal by using the **SST.**

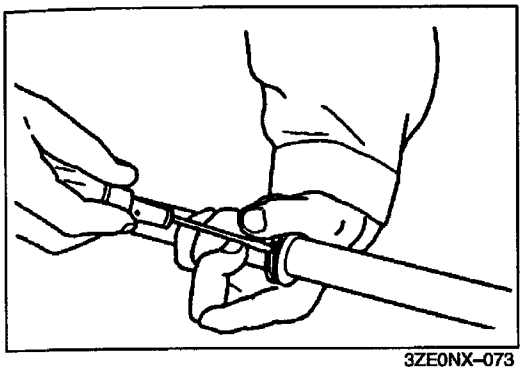

3ZE0NX–071

Clip and rack stop
1. Turn the rack stop counterclockwise with snap–ring pliers until the end of the clip comes out.
2. Turn the rack stop in the opposite direction to remove the clip, and remove the rack stop.

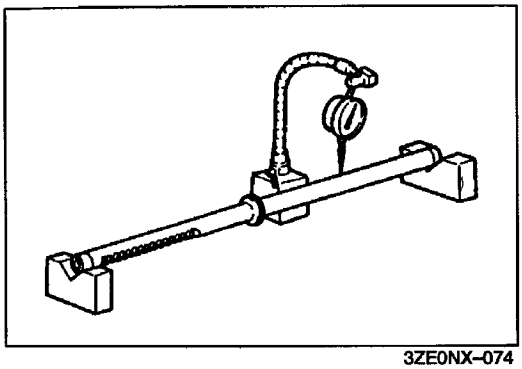


3ZE0NX-072

Rack, oil seal and backup washer
1. Install the **SST** over the rack end.
2. Pull out the rack with the rack bushing, oil seal, and the backup washer from the housing side.


3ZE0NX-073

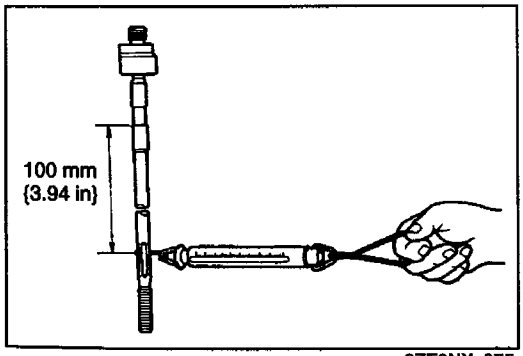
Seal ring and O-ring
1. Remove the seal rings by using a small, tape-wrapped screwdriver.
2. Remove the O-ring.


3ZE0NX-074

Inspection
Rack
1. Inspect for cracking, damage, and tooth wear. Replace if necessary.
2. Measure the runout of the rack.

   Runout: 0.4 mm {0.016 In} max.

3. If not within the specification, replace the rack.

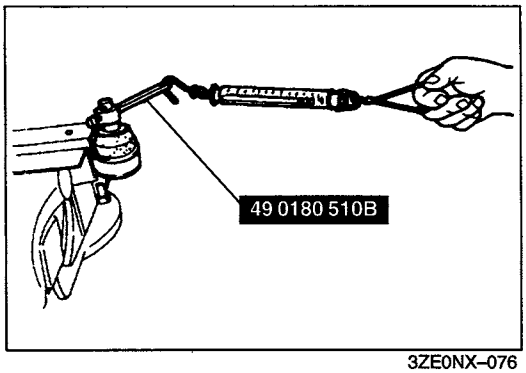


3ZE0NX-075

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 the specification, replace the tie rod.



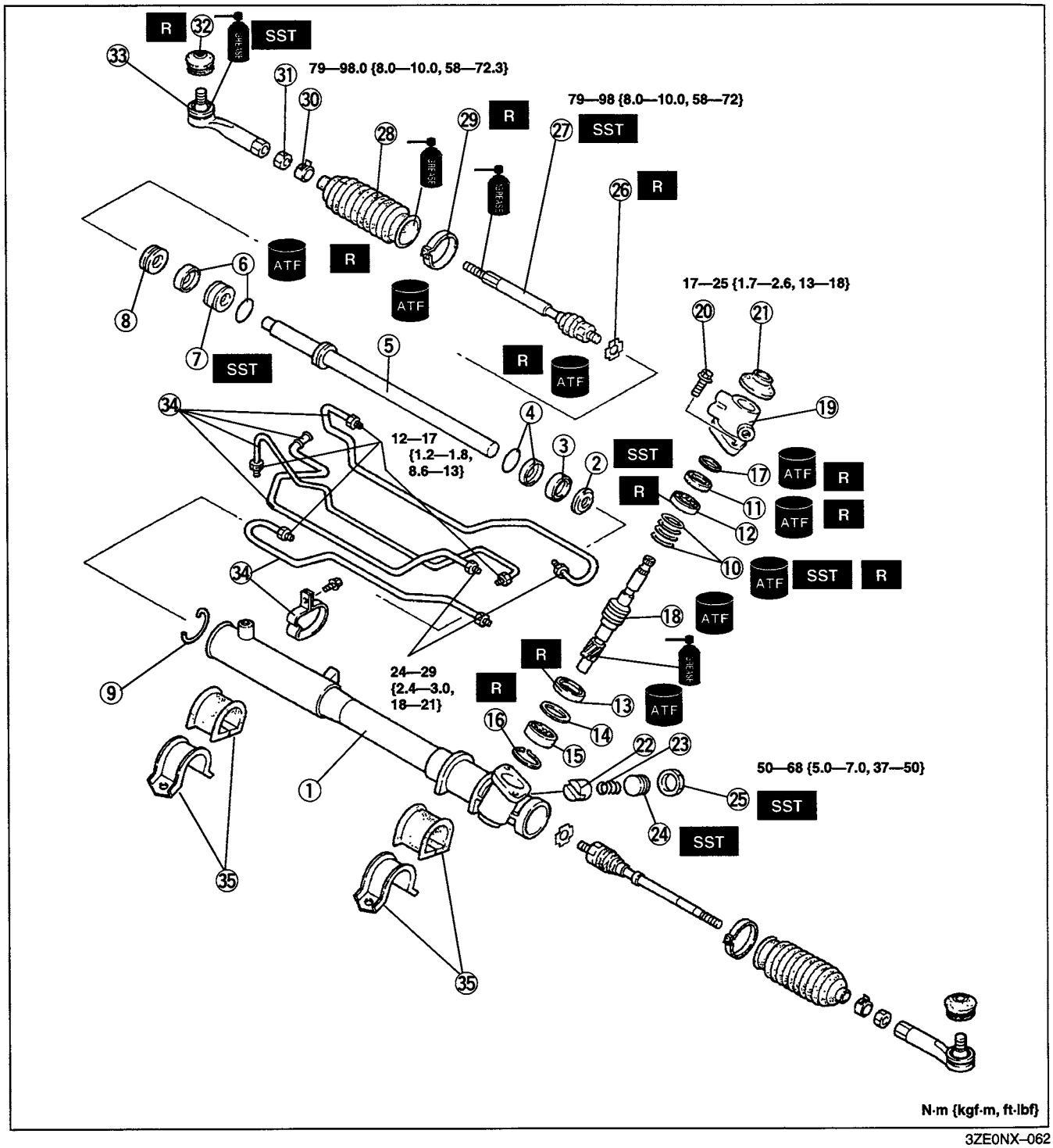
3ZE0NX-076

Tie-rod end

1. Inspect the ball joint for looseness. Replace the tie-rod end if necessary.
2. Rotate the ball joint five times.
3. Measure the rotation torque of the ball joint by using the **SST** and a pull scale.

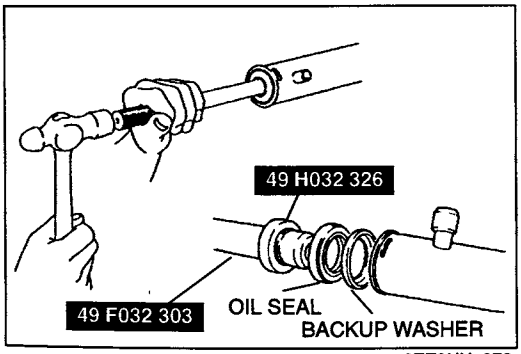
   Rotation torque:
   0.3—2.9 N·m {3—30 kgf·cm, 2.6—26 in·lbf}
   Pull scale reading:
   3—29 N {0.3—3 kgf, 0.7—6.6 lbf}
4. If not within specification, replace the tie-rod end.

Assembly

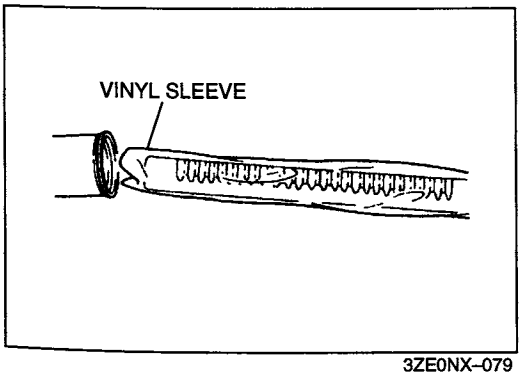


3ZE0NX-062

1. Gear housing
2. Backup washer
   Assembly Note ..... below
3. Oil seal (Gear housing)
   Assembly Note ..... below
4. O-ring and seal ring
5. Steering rack
   Assembly Note ..... below
6. Oil seal and O-ring
   Assembly Note ..... page N–22
7. Rack bushing
   Assembly Note ..... page N–22
8. Rack stop
   Assembly Note ..... page N–22
9. Clip
   Assembly Note ..... page N–22
10. Seal ring
    Assembly Note ..... page N–23
11. Oil seal
    Assembly Note ..... page N–23
12. Upper bearing
    Assembly Note ..... page N–23
13. Oil seal
14. Backup washer
15. Ball bearing
    Assembly Note ..... page N–23
16. Snap ring
17. O-ring
18. Pinion shaft assembly
19. Valve housing assembly
20. Bolt
21. Dust cover
22. Support yoke
23. Yoke spring
24. Adjusting cover
    Assembly Note ..... page N–23
25. Locknut
    Assembly Note ..... page N–23
26. Washer
27. Tie rod
    Assembly Note ..... page N–24
28. Boot
    Assembly Note ..... page N–24
29. Boot clamp (inner)
    Assembly Note ..... page N–24
30. Boot clamp (outer)
    Assembly Note ..... page N–24
31. Lock nut
32. Tie-rod end boot
    Assembly Note ..... page N–24
33. Tie-rod end
    Assembly Note ..... page N–24
34. Oil pipe
35. Mounting bracket and mount



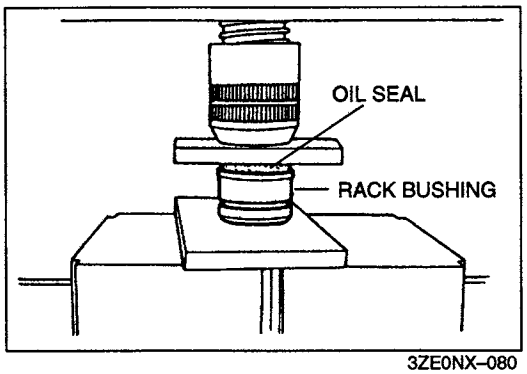
3ZE0NX–078



3ZE0NX–079

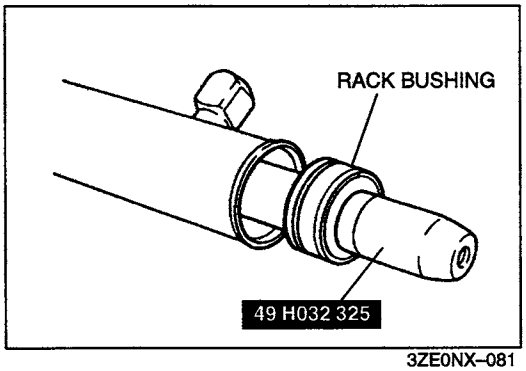
Assembly note
Backup washer and oil seal (Gear housing)
1. Apply ATF to the new oil seal.
2. Install the backup washer and oil seal by using the **SST**s.
3. After installing, shake the gear housing and verify that the backup washer does not rattle.
4. If it rattles, remove the oil seal and backup washer, and reinstall them.

Steering rack
1. Apply ATF to a new O-ring and seal ring.
2. Install the O-ring and seal ring in the piston groove.
3. Apply grease to the friction surface and teeth of the rack.
4. Slide the vinyl sleeve (supplied in the seal kit) over the rack, and slide the rack in from the tube side.
5. Remove the vinyl sleeve.



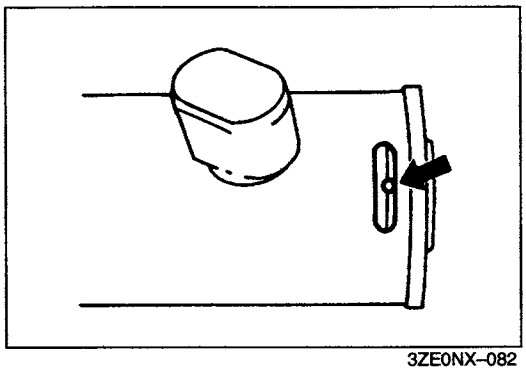
3ZE0NX-080

Oil seal and O-ring
1. Apply ATF to a new oil seal.
2. Set a plate on the oil seal and press it into the rack bushing until the plate contacts the edge of the rack bushing.
3. Apply ATF to the new O-ring.
4. Install the O-ring onto the groove of the rack bushing.

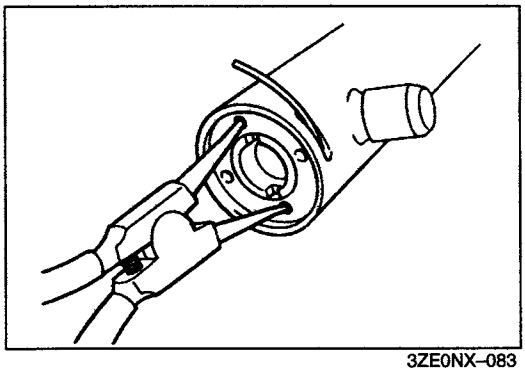


3ZE0NX-081

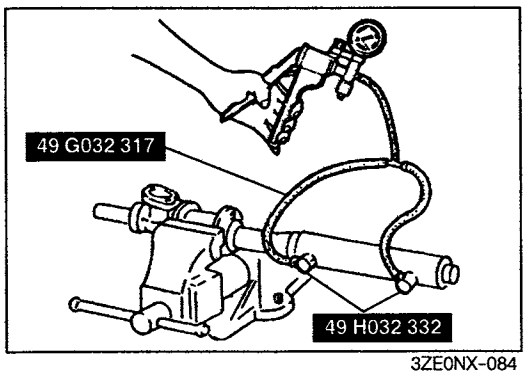
Rack bushing
1. Apply ATF to the friction surface of the rack bushing.
2. Slide the **SST** over the end of the rack and install the rack bushing.


3ZE0NX-082

Rack stop and clip
1. Using snap ring pliers, turn the rack stop into the rack housing until the holes of the rack housing and the rack bushing are aligned.

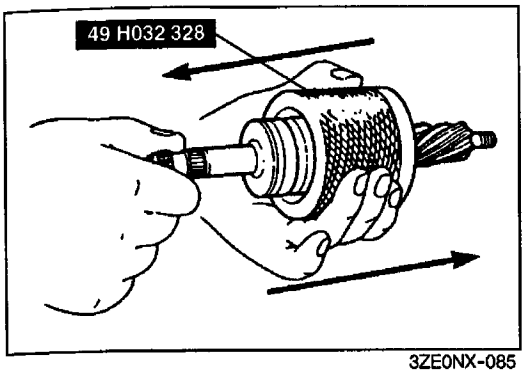

3ZE0NX-083

2. Insert the clip through the holes and turn the rack stop to install it.



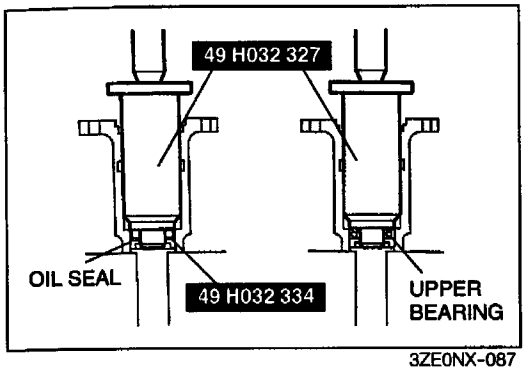
3ZE0NX-084

(Hermetic inspection of cylinder)
1. Connect the **SST (adapters)** to the cylinder housing.
2. Connect the vacuum pump to the **SST (hose)** and apply **400mmHg {15.7 inHg}** vacuum.
3. Verify that vacuum pressure is maintained for at least **30 seconds**. If not, replace the oil seal.



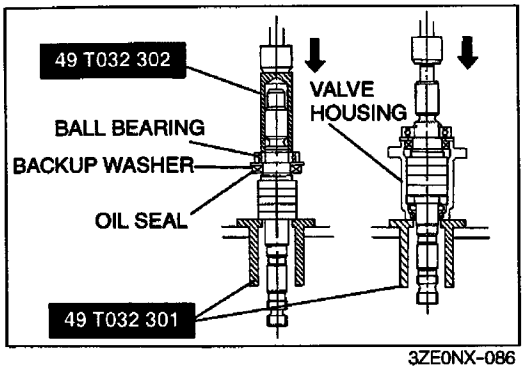
3ZE0NX-085

Seal ring
1. Apply ATF to new seal rings.
2. Install the seal rings onto the pinion shaft assembly.
3. Pass the pinion shaft assembly back and forth through the **SST** until the seal rings are set.
4. Install the oil seal on the gear side of the pinion shaft.



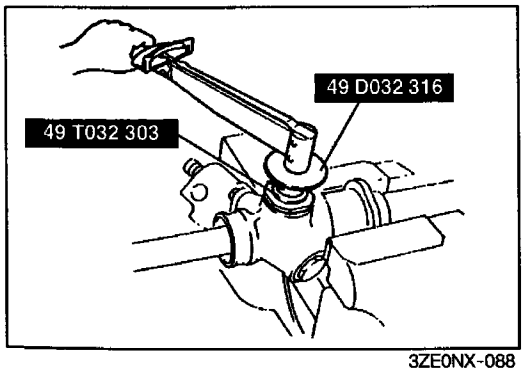
3ZE0NX-087

Oil seal and upper bearing
1. Apply grease to the lip of a new oil seal.
2. Press the oil seal into the valve housing by using the **SST**.
3. Press the upper bearing in the valve housing by using the **SST**.



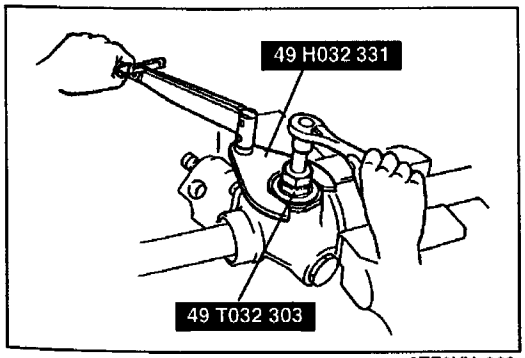
3ZE0NX-086

Ball bearing
Press the ball bearing into the pinion shaft by using the **SST**.



3ZE0NX-088

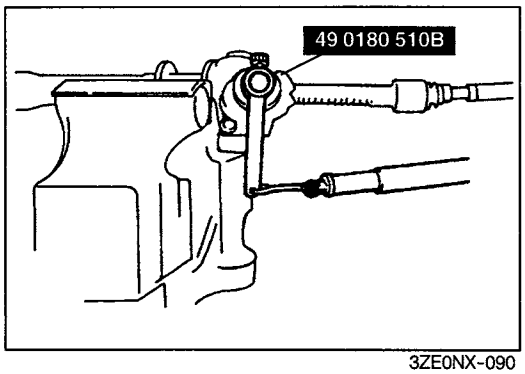
Adjusting cover and locknut
1. Apply sealant to the threads of the adjusting cover.
2. Tighten the adjusting cover to **20—29 N·m {2.0—3.0 kgf·m, 14—22 ft·lbf}** by using the **SST**, and return it **25°—30°**.



3ZE0NX-089

3. While keeping the adjusting cover from turning, tighten the locknut by using the **SST**.

Tightening torque:
50—68 N·m {5.0—7.0 kgf·m, 37—50 ft·lbf}

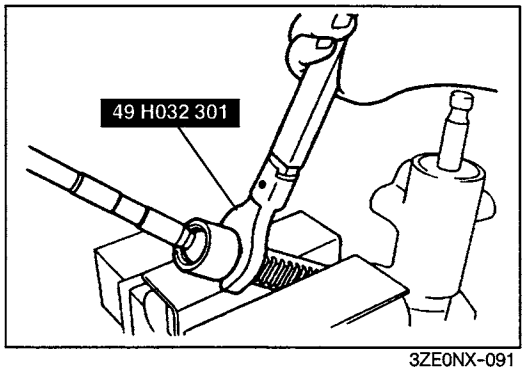


3ZE0NX-090

(Measurement of pinion preload)
1. Attach the **SST** and a pull scale to the pinion shaft.
2. Measure the pinion preload. (Center of rack ± 90°)

Pinion preload:
0.8—1.4 N·m {8—15 kgf·cm, 7—13 in·lbf}max.
Pull scale reading: 0.8—1.5 kg {1.8—3.3 lb}

3. If not within the specification, adjust the adjusting cover.

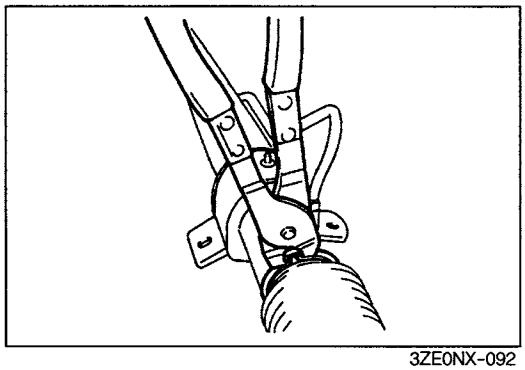


3ZE0NX-091

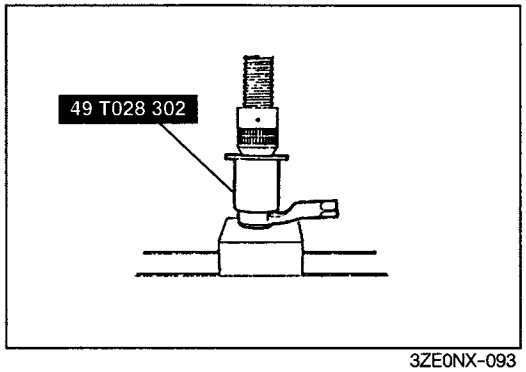
Tie rod
1. Install the tie rod by using the **SST**.

Tightening torque:
79—98 N·m {8.0—10.0 kgf·m, 58—72 ft·lbf}

2. Bend the new washer at the two points by using a punch.

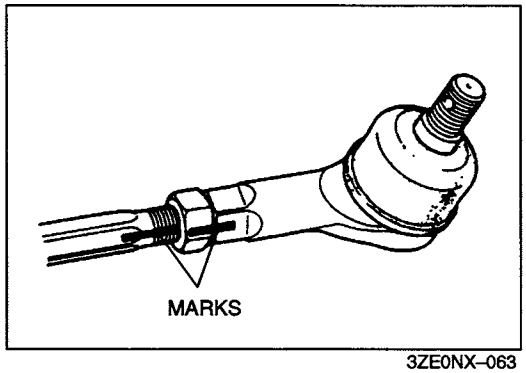

3ZE0NX-092

Boot and boot clamps
1. Apply grease to the inner surface of the small end of the boot.
2. Install the boot and the new boot clamp as shown in the figure.
3. Install the new small boot clamp.
4. Slide the rack fully in and out to verify that the boot is not twisted.



3ZE0NX-093

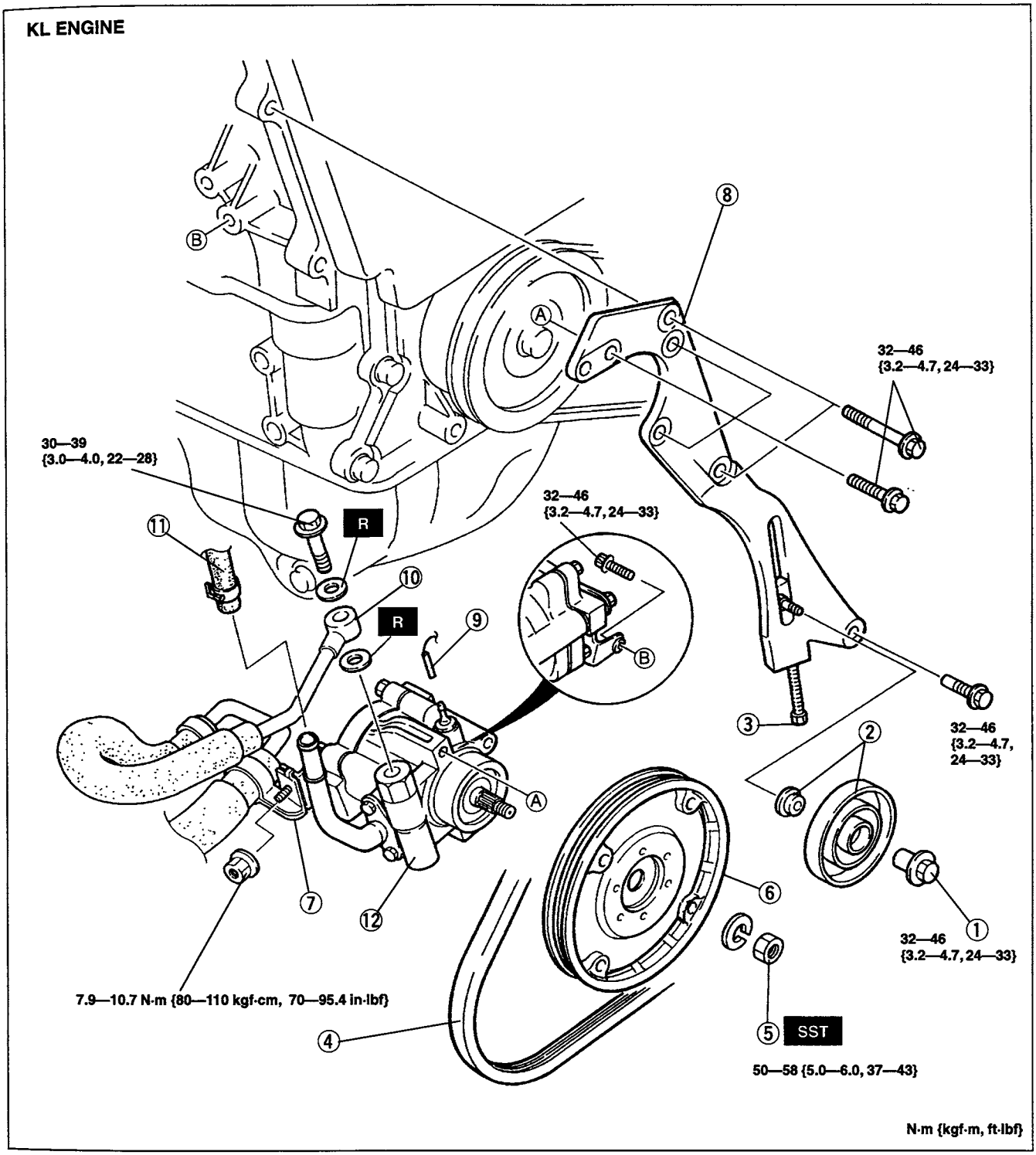
Tie-rod end boot
1. Wipe away the grease on the ball joint.
2. Put a small amount of grease (lithium-based) into the new boot and set it onto the tie-rod end.
3. Press the boot onto the tie-rod end by using the **SST** and a press.
4. Wipe away any grease expelled from the dust boot.



3ZE0NX-063

Tie-rod end
Install the tie-rod end so that it is aligned with the reference marks.

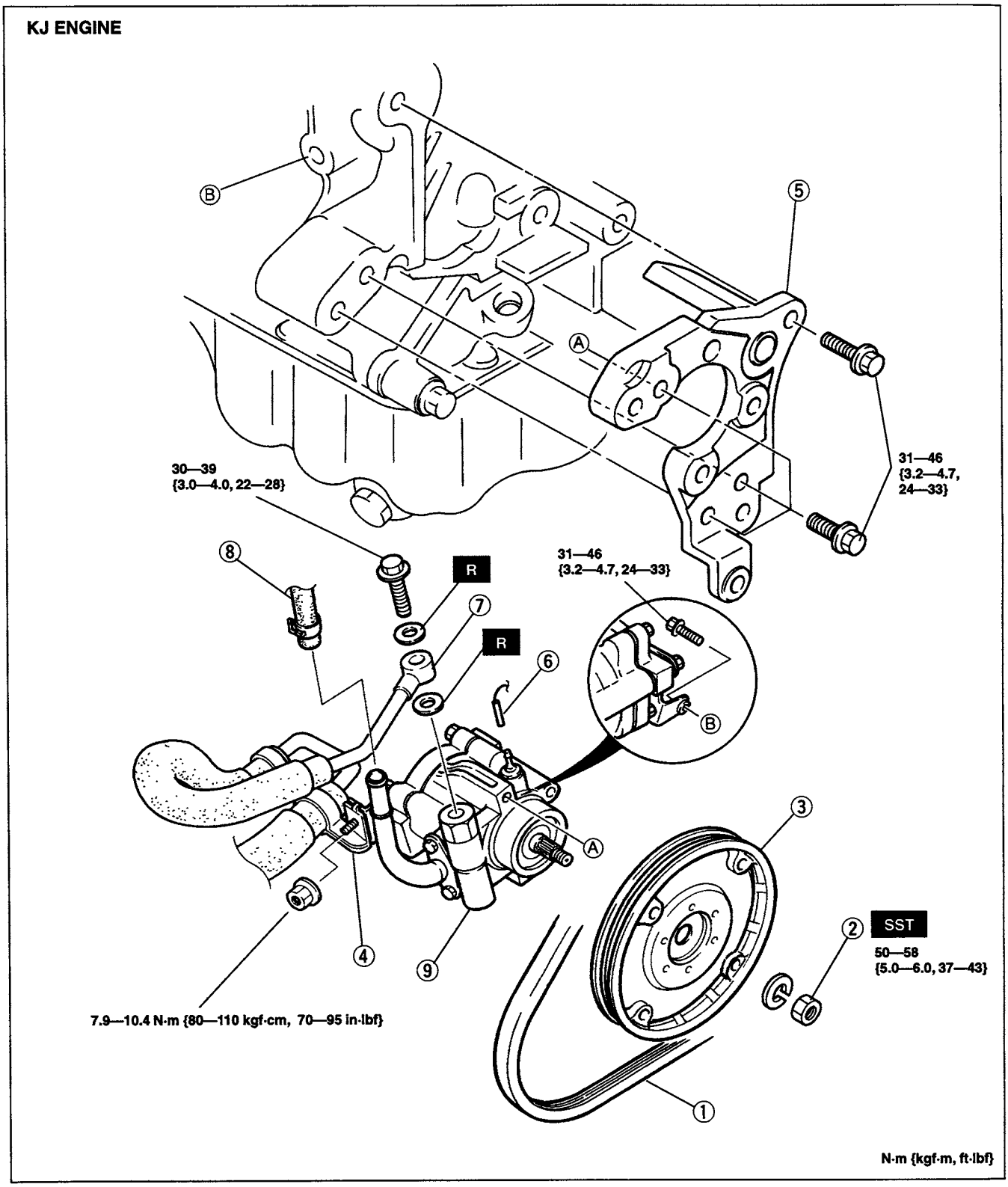
POWER STEERING OIL PUMP
Removal / Installation



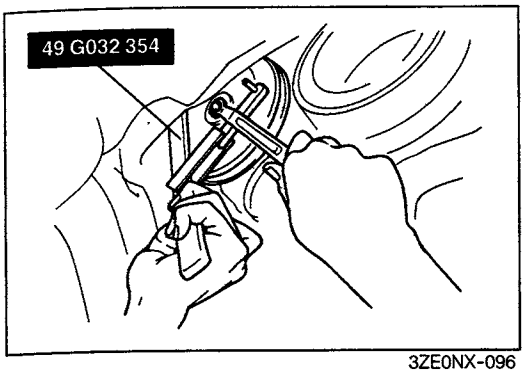
3ZE0NX-095

1. Locknut
2. Idler pulley and bearing
3. Adjusting bolt
4. Drive belt
   Service ..... section B1
5. Nut
   Removal / Installation Note .... page N–27
6. Pulley
7. Hose bracket
8. Pump bracket
9. Power steering pressure switch connector
10. Pressure pipe
11. Return hose
12. Power steering oil pump
    Disassembly / Inspection / Assembly ..... page N–28

KJ ENGINE



1. Drive belt
   Service ..... section B2
2. Nut
   Removal / Installation Note .... page N–27
3. Pulley
4. Hose bracket
5. Pump bracket
6. Power steering pressure switch connector
7. Pressure pipe
8. Return hose
9. Power steering oil pump
   Disassembly / Inspection / Assembly ..... page N–28



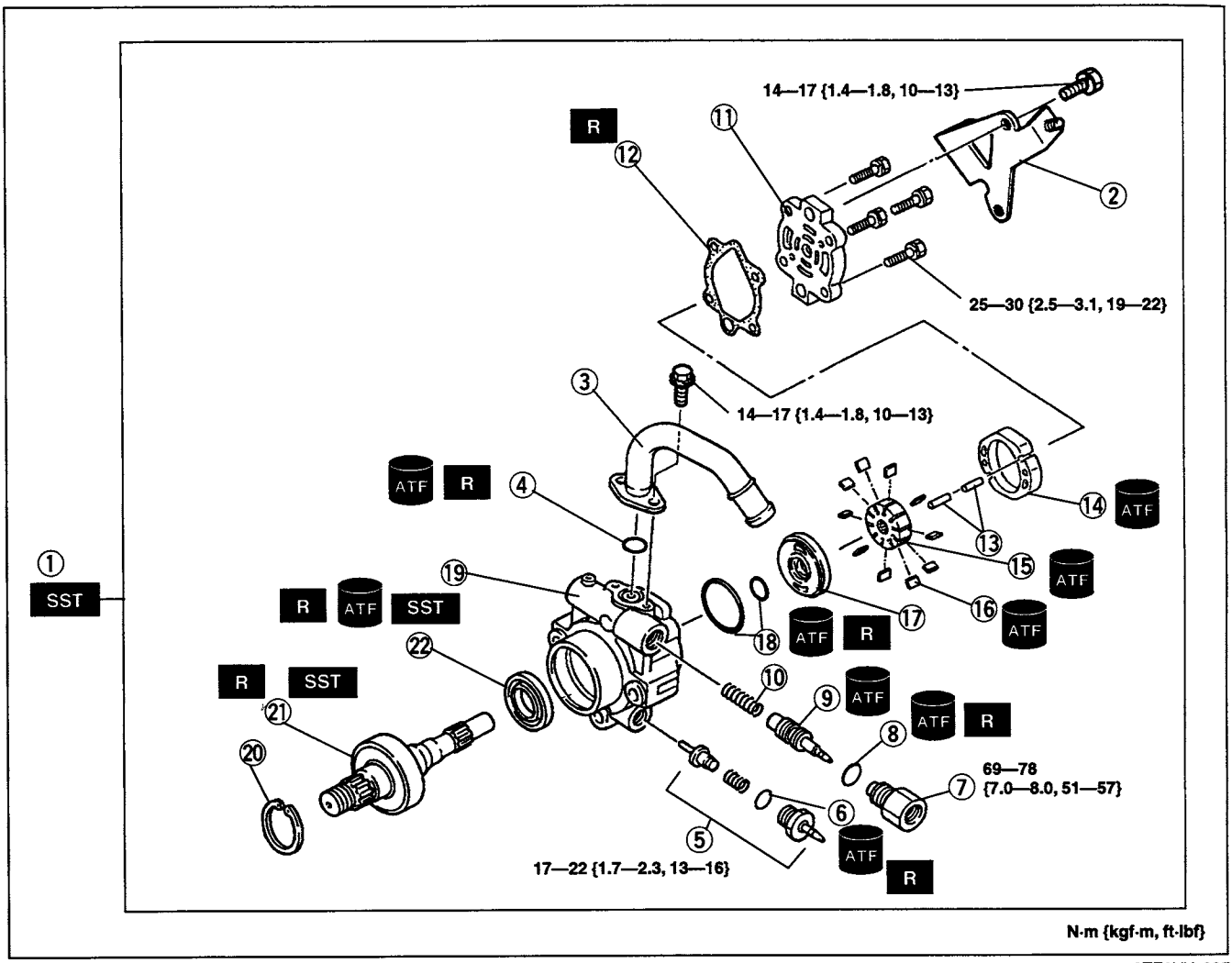
3ZE0NX-096

Removal / Installation note
Nut

Insert the **SST** into the hole of the pulley. While holding the pulley, loosen/tighten the nut.

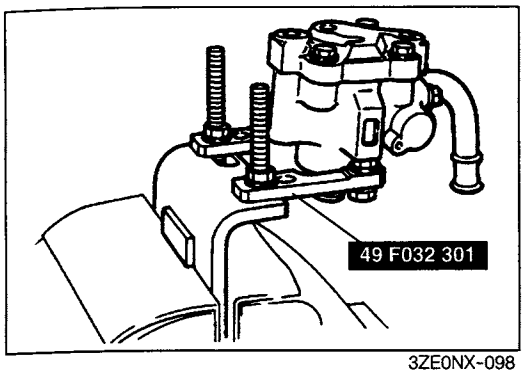
Disassembly / Inspection / Assembly

- The following procedure is for replacement of the O-rings, the shaft, and the pump body (front) only. Replace the oil pump assembly if other repairs are necessary.



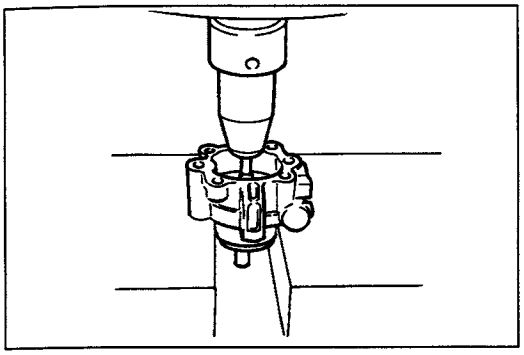
3ZE0NX-097

1. Oil pump
   Disassembly Note ..... page N–29
2. Bracket
3. Suction pipe
4. O-ring
5. Steering pressure sensor 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–30
    Inspect for cracks, wear, and damage
12. Gasket
13. Pin
14. Cam ring
    Assembly Note ..... page N–29
    Inspect for wear and damage
15. Rotor
    Inspect for wear and damage
16. Blade
    Assembly Note ..... page N–30
    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
20. Snap ring
21. Shaft and bearing
    Disassembly Note ..... page N–29
    Assembly Note ..... page N–29
22. Oil seal
    Assembly Note ..... page N–29

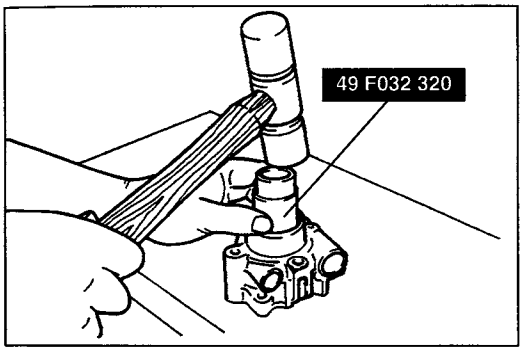


3ZE0NX-098

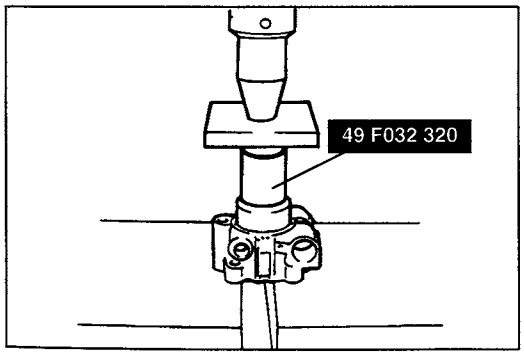
Disassembly note
Oil pump
Install the pump to the **SST** and hold the pump and **SST** in a vise.



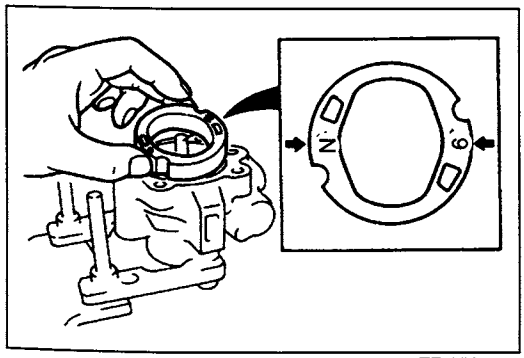
Shaft and bearing
Remove the shaft and bearing by using a press.



Assembly note
Oil seal
Tap the oil seal into the pump body (front) by using the **SST**.

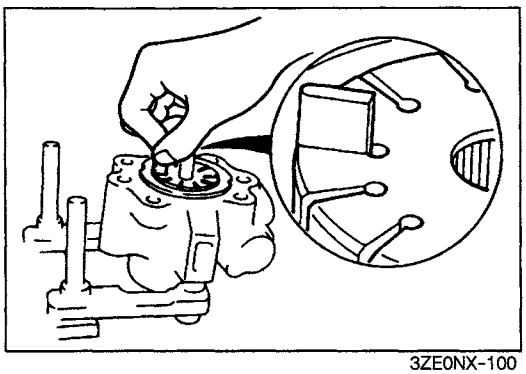


Shaft and bearing
Press the shaft and bearing into the pump body (front) by using the **SST**.



3ZE0NX-099

Cam ring
Install the cam ring in the pump body (front) with the mark facing upward.

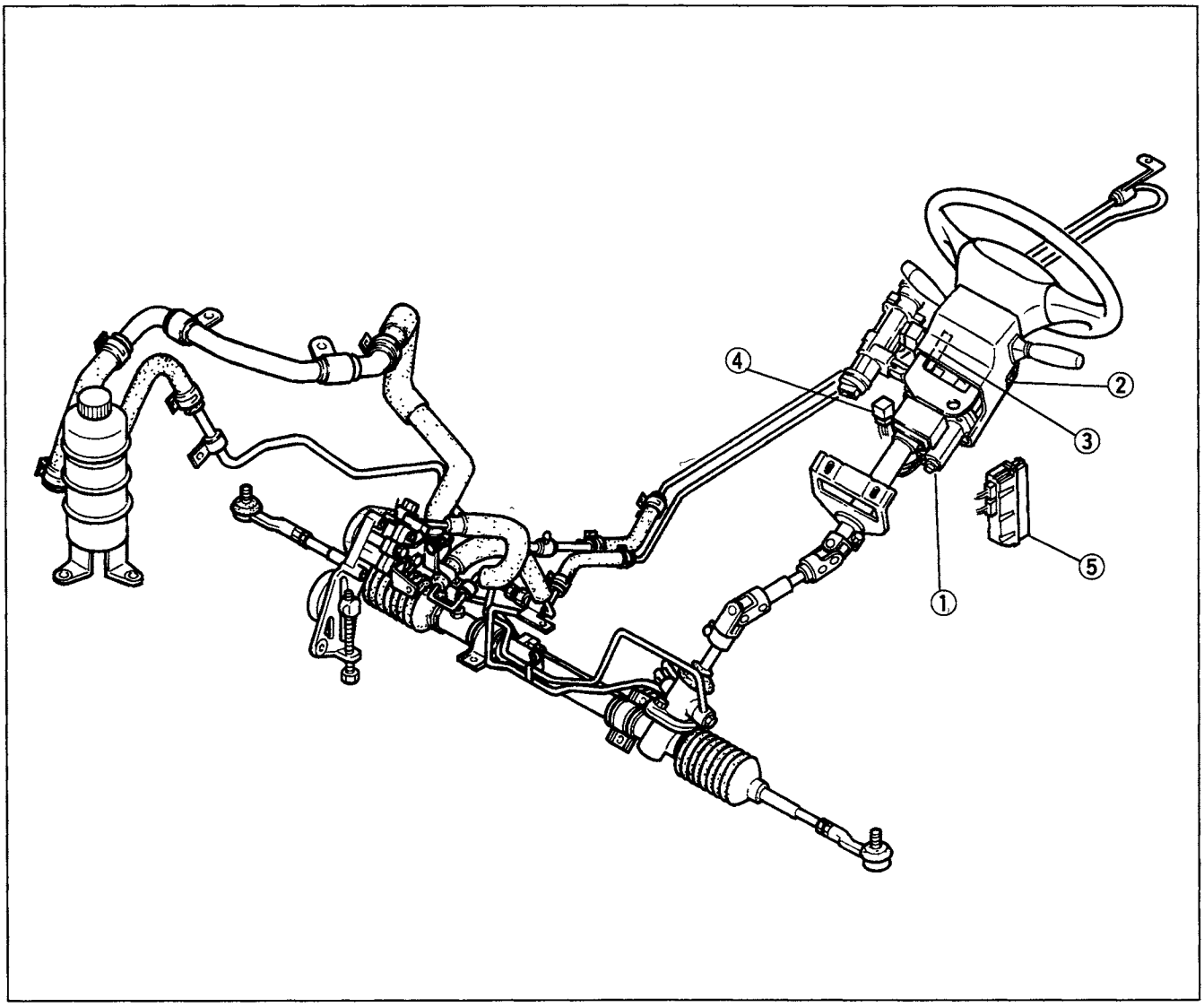

3ZE0NX-100

Blade
Place the blades in the rotor with the rounded edges contacting the cam.

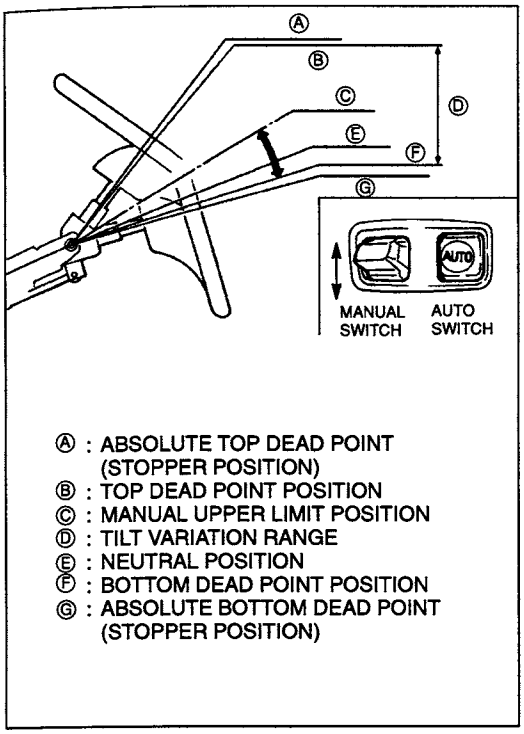
Pump body (Rear)
After installing the pump body (rear), manually turn the shaft to verify that it rotates smoothly.

AUTO-TILT STEERING COLUMN

STRUCTURAL VIEW



1. Tilt motor
   Inspection ..... page N–34
2. Tilt switch
   Inspection ..... page N–34
3. Tilt sensor
   Inspection ..... page N–35
4. Tilt relay
   Removal / Installation ..... page N–37
   Inspection ..... page N–37
5. Central processing unit (CPU)
   Service ..... section T



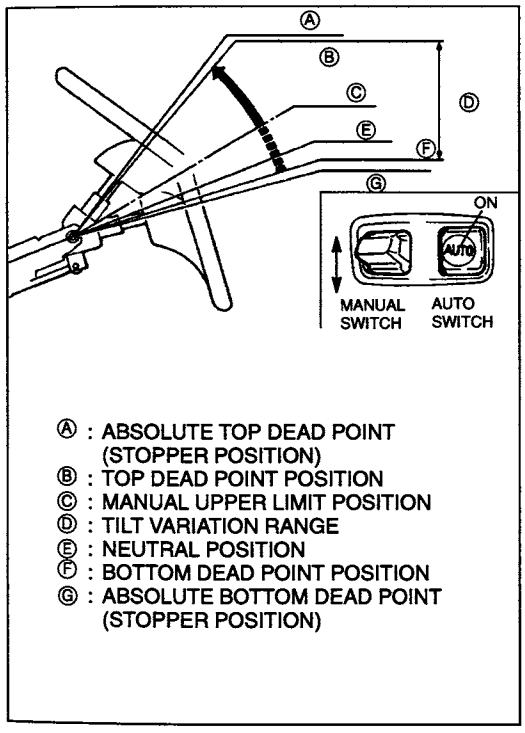
Ⓐ : ABSOLUTE TOP DEAD POINT (STOPPER POSITION)
Ⓑ : TOP DEAD POINT POSITION
Ⓒ : MANUAL UPPER LIMIT POSITION
Ⓓ : TILT VARIATION RANGE
Ⓔ : NEUTRAL POSITION
Ⓕ : BOTTOM DEAD POINT POSITION
Ⓖ : ABSOLUTE BOTTOM DEAD POINT (STOPPER POSITION)

SYSTEM OPERATION

Manual Control

Turn the ignition ON. Move the manual switch up/down and check that the steering wheel tilts up/down.
Faulty operation → Refer to page N–32.

This control stops operation when the following occur.
- Ignition switch is turned OFF.
- Manual switch is OFF.
- Sensor senses bottom dead point.
- Sensor senses manual operation upper limit position.
- Electric current flows to the motor for more than 10 seconds.
- Position sensor movement speed is below the set value (1°56'04"/sec.).

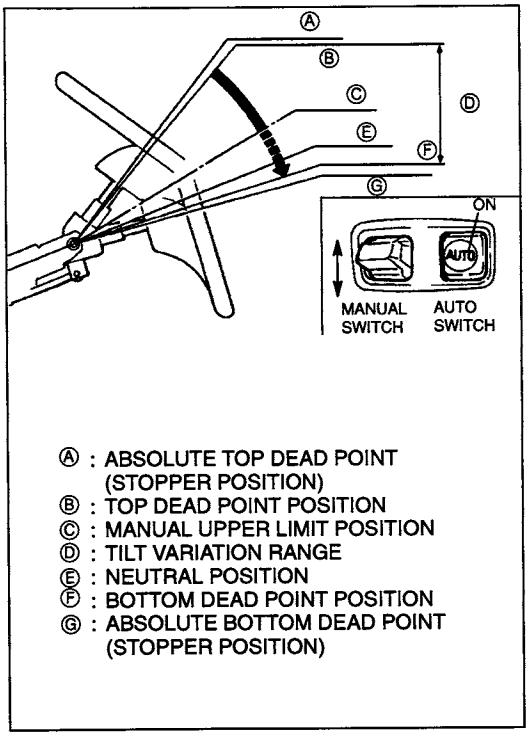


Ⓐ : ABSOLUTE TOP DEAD POINT (STOPPER POSITION)
Ⓑ : TOP DEAD POINT POSITION
Ⓒ : MANUAL UPPER LIMIT POSITION
Ⓓ : TILT VARIATION RANGE
Ⓔ : NEUTRAL POSITION
Ⓕ : BOTTOM DEAD POINT POSITION
Ⓖ : ABSOLUTE BOTTOM DEAD POINT (STOPPER POSITION)

Auto Control (Away Control)

With the auto switch turned ON, check that when the ignition key is pulled out, the steering wheel moves up until the sensor senses the top dead point.
Faulty operation → Refer to page N–32.

This control stops operation when the following occur.
- Auto switch is turned OFF.
- Manual switch is turned ON.
- Sensor senses top dead point.
- Electric current flows to the motor for more than 10 seconds.
- Position sensor movement speed is below the set value (1°56'04"/sec.).
- Ignition key is inserted again, and ignition is turned ON or ACC.



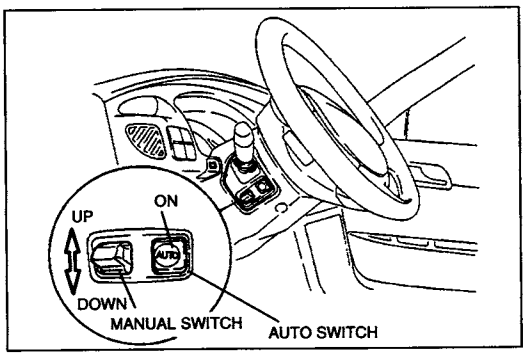
Ⓐ : ABSOLUTE TOP DEAD POINT (STOPPER POSITION)
Ⓑ : TOP DEAD POINT POSITION
Ⓒ : MANUAL UPPER LIMIT POSITION
Ⓓ : TILT VARIATION RANGE
Ⓔ : NEUTRAL POSITION
Ⓕ : BOTTOM DEAD POINT POSITION
Ⓖ : ABSOLUTE BOTTOM DEAD POINT (STOPPER POSITION)

Auto Control (Return Control)

With the auto switch turned ON, check that when the ignition key is inserted again, the steering wheel moves back to the position memorized by the computer (located inside the CPU) during manual control (i.e. the position before the ignition key was pulled out).
Faulty operation → Refer to page N–32.

This control stops operation when the following occur.
- Auto switch is turned OFF.
- Manual switch is turned ON.
- Memorized position is reached.
- Electric current flows to the motor for more than 10 seconds.
- Position sensor movement speed is below the set value (1°56'04"/sec.).

Note
- In the initial state (when the battery is connected, or when the CPU is reset and there is no memorized position), the steering wheel returns to the neutral position.
- The memorized position is updated every time adjustment is performed using manual control.

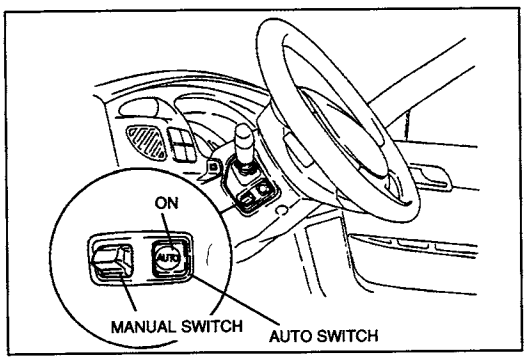


UNIT INSPECTION

Tilt Motor

Run the motor in manual or auto (away/return) control, and check that its operation is normal.

If operation is faulty, inspect the following.
- CPU (Refer to section T.)
- Key reminder switch (Refer to section T.)
- Tilt motor (Refer to page N–34.)

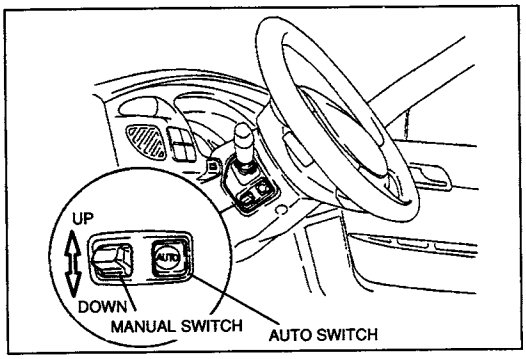


Tilt Switch

Auto switch

Check that with the auto switch ON, both away and return auto control operate normally.

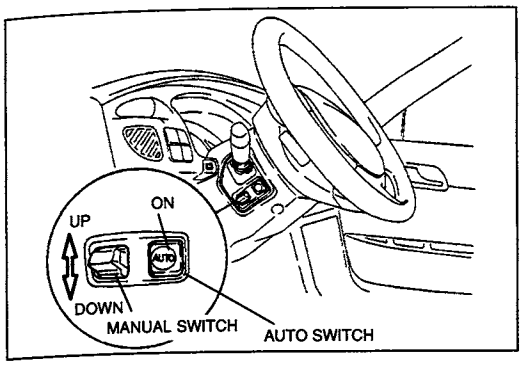
If operation is faulty, inspect the following.
- CPU (Refer to section T.)
- Key reminder switch (Refer to section T.)
- Tilt switch (Refer to page N–34.)



Manual switch

Push the manual switch up or down, and check that its operation is normal.

If operation is faulty, inspect the following.
- CPU (Refer to section T.)
- Tilt switch (Refer to page N–34.)

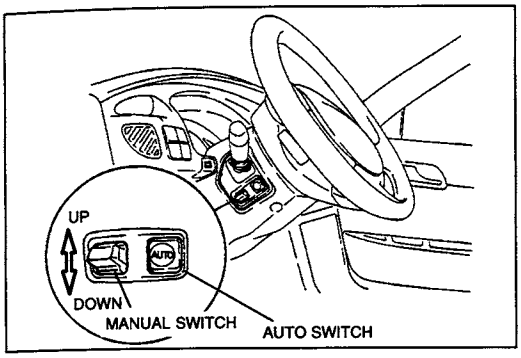


Tilt Sensor

1. Check that away auto control operates normally.
2. Check that return auto control returns the steering wheel to the position adjusted using the manual switch.

If operation is faulty, inspect the following.

- CPU (Refer to section T.)
- Key reminder switch (Refer to section T.)
- Tilt switch (Refer to page N–35.)

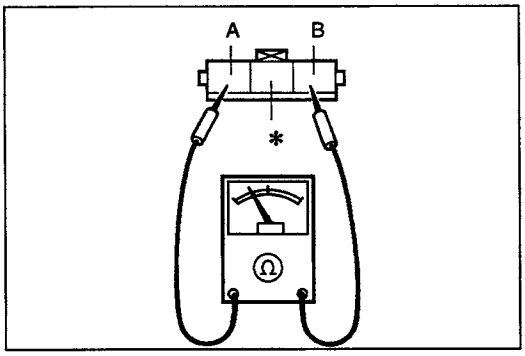


Tilt Relay

Check that tilt-up and tilt-down operate normally in manual control.

If operation is faulty, inspect the following.

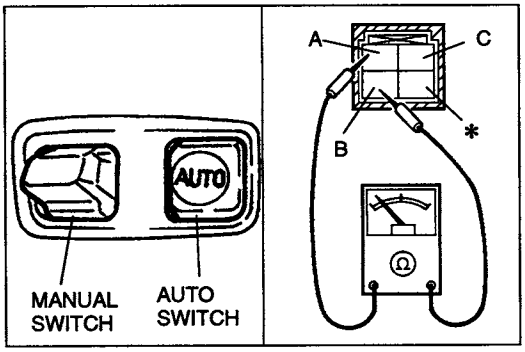
- CPU (Refer to section T.)
- Tilt switch (Refer to page N–37.)

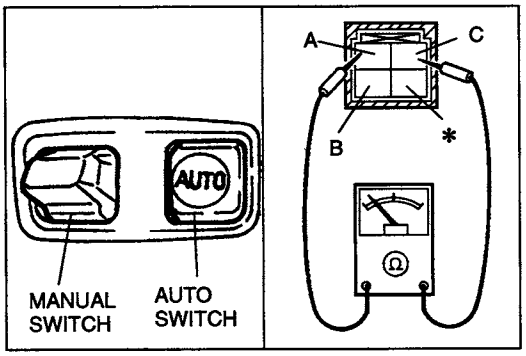


TILT MOTOR
Inspection
Continuity inspection
1. Disconnect the connectors between the tilt motor and the tilt relay.
2. Check for continuity between terminal Ⓐ and terminal Ⓑ of the motor side connector.

Terminal	Continuity
Ⓐ——Ⓑ	Yes

3. If not as specified, replace the steering shaft assembly. (Refer to page N–10.)





TILT SWITCH
Inspection
Continuity inspection
Auto switch
1. Turn ON the auto switch.
2. Disconnect the connectors between the tilt switch and the CPU.
3. Check for continuity between terminal Ⓐ and terminal Ⓑ of the tilt switch side connector.

Terminal	Continuity
Ⓐ——Ⓑ	Yes

4. If not as specified, replace the combination switch assembly. (Refer to section T.)

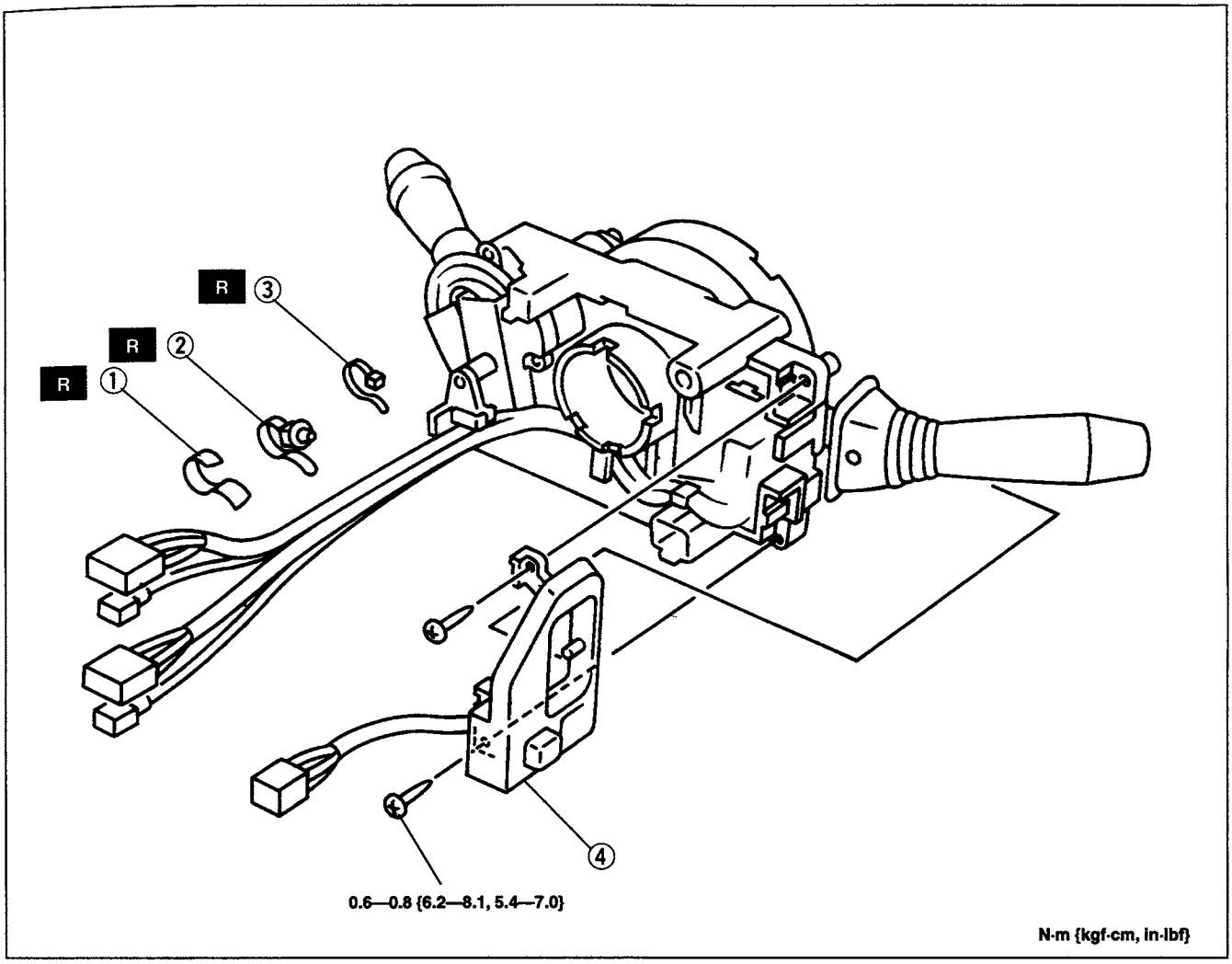
Manual switch
1. Disconnect the connectors between the tilt switch and CPU.
2. Move the manual switch upward or downward.
3. Check for continuity between terminal Ⓐ and terminal Ⓒ of the tilt switch side connector.

	Terminal	Continuity
Upward	Ⓐ——Ⓒ	Yes
Downward	Ⓐ——Ⓒ	Yes (1 kΩ)

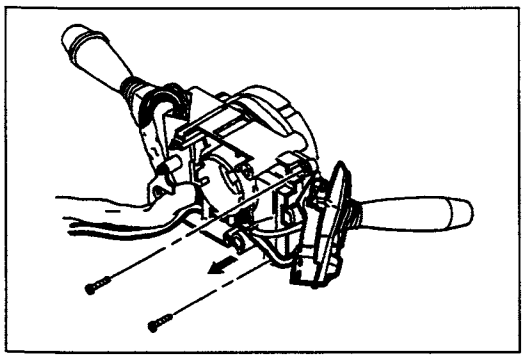
4. If not as specified, replace the combination switch assembly. (Refer to section T.)

Removal / Installation

- Remove the combination switch. (Refer to section T.)

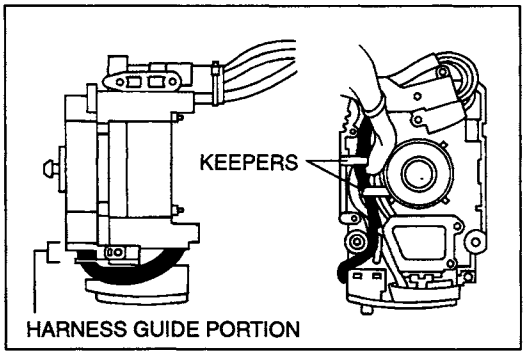


1. Vinyl tape
   Installation Note ..... page N–36
2. Band clip
   Installation Note ..... page N–36
3. Band
   Installation Note ..... page N–36
4. Tilt switch
   Removal Note ..... below
   Installation Note ..... page N–36

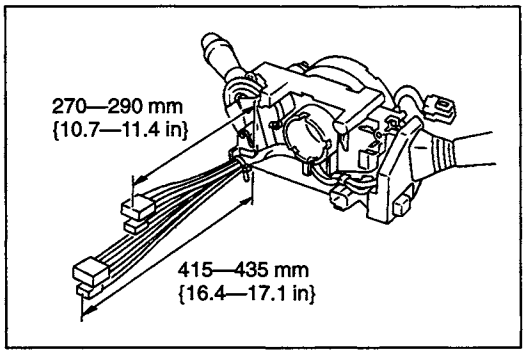


Remova note
Tilt switch

1. Remove the screws.
2. Release the tabs of the tilt switch from the turn lever boot.
3. Slide the tilt switch in the direction indicated by the arrow, then remove it along the turn lever.

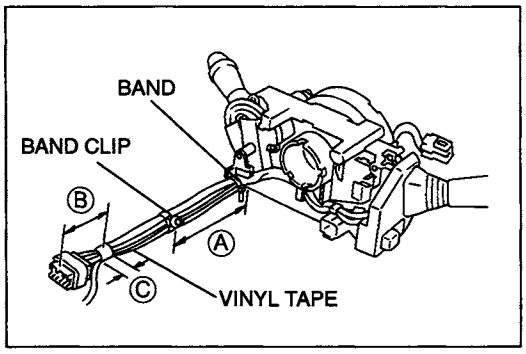


Installation note
Tilt switch
After installing the tilt switch, route the harnesses of the combination switch as shown.



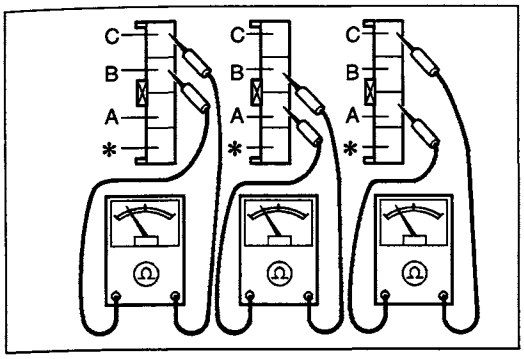
Band, band clip, vinyl tape
1. Set the harness length from the shaft contact portion as follows.

   4-pin connector, 1 pin connector, 2 pin connector:
   415—435 mm {16.4—17.1 in}
   4-pin connector (tilt switch), 21-pin connector:
   270—290 mm {10.7—11.4 in}



2. Install the band, band clip, and vinyl tape as shown.

   A: 125—130 mm {4.92—5.11 in}
   B: 70—75 mm {2.76—2.95 in}
   C: 20—25 mm {0.79—0.98 in}

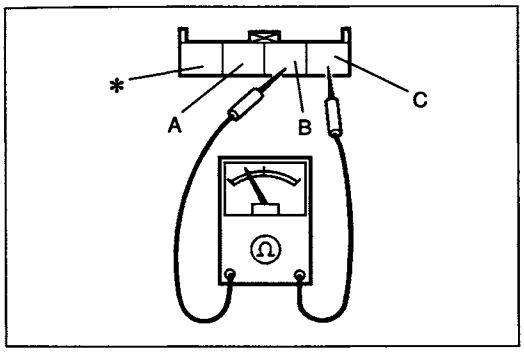


TILT SENSOR
Inspection
Continuity inspection

1. Disconnect the connectors between the tilt sensor and the CPU.
2. Check for continuity between each pair (Ⓐ—Ⓑ, Ⓑ—Ⓒ, Ⓐ—Ⓒ) of the three terminals (Ⓐ, Ⓑ, Ⓒ) of the tilt sensor side connector.

Terminal	Continuity
Ⓐ——Ⓑ	Yes
Ⓑ——Ⓒ	Yes
Ⓐ——Ⓒ	Yes

3. If not as specified, replace the steering shaft assembly. (Refer to page N–10.)



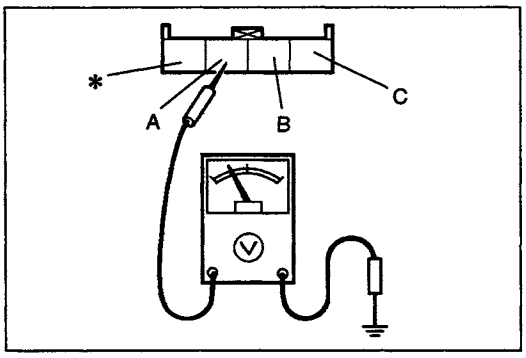
Resistance inspection

Caution
- **When using the ohmmeter, always make sure that no voltage is applied. If voltage is applied, the ohmmeter may be damaged.**

1. Disconnect the connectors between the tilt sensor to the CPU.
2. Measure the resistance between terminal Ⓑ and terminal Ⓒ of the tilt sensor side connector.

   Resistance: Approx. 1 kΩ

3. If not as specified, replace the steering shaft assembly. (Refer to page N–10.)



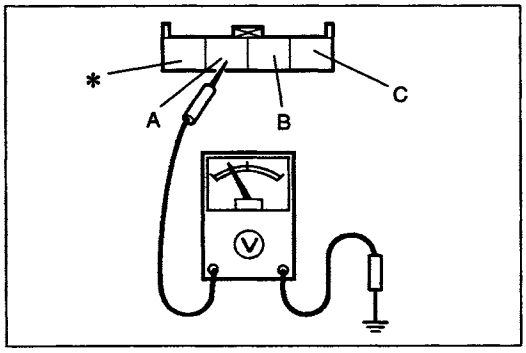
Voltage inspection

At top dead point position in away auto control

1. Insert the ignition key into the key cylinder (LOCK position).
2. Turn ON the auto switch.
3. Remove the ignition key from the key cylinder to make the steering wheel rise to the top dead point position.
4. Leave the connectors connected. Connect the (+) terminal of the voltmeter to the tilt sensor side connector's variable resistance pole side terminal, Ⓐ, (at the back of the connector), and connect the voltmeter's (–) terminal to the body ground side of the connector.

   Voltage: Approx. 4.6V

5. If not as specified, replace the steering shaft assembly. (Refer to page N–10.)



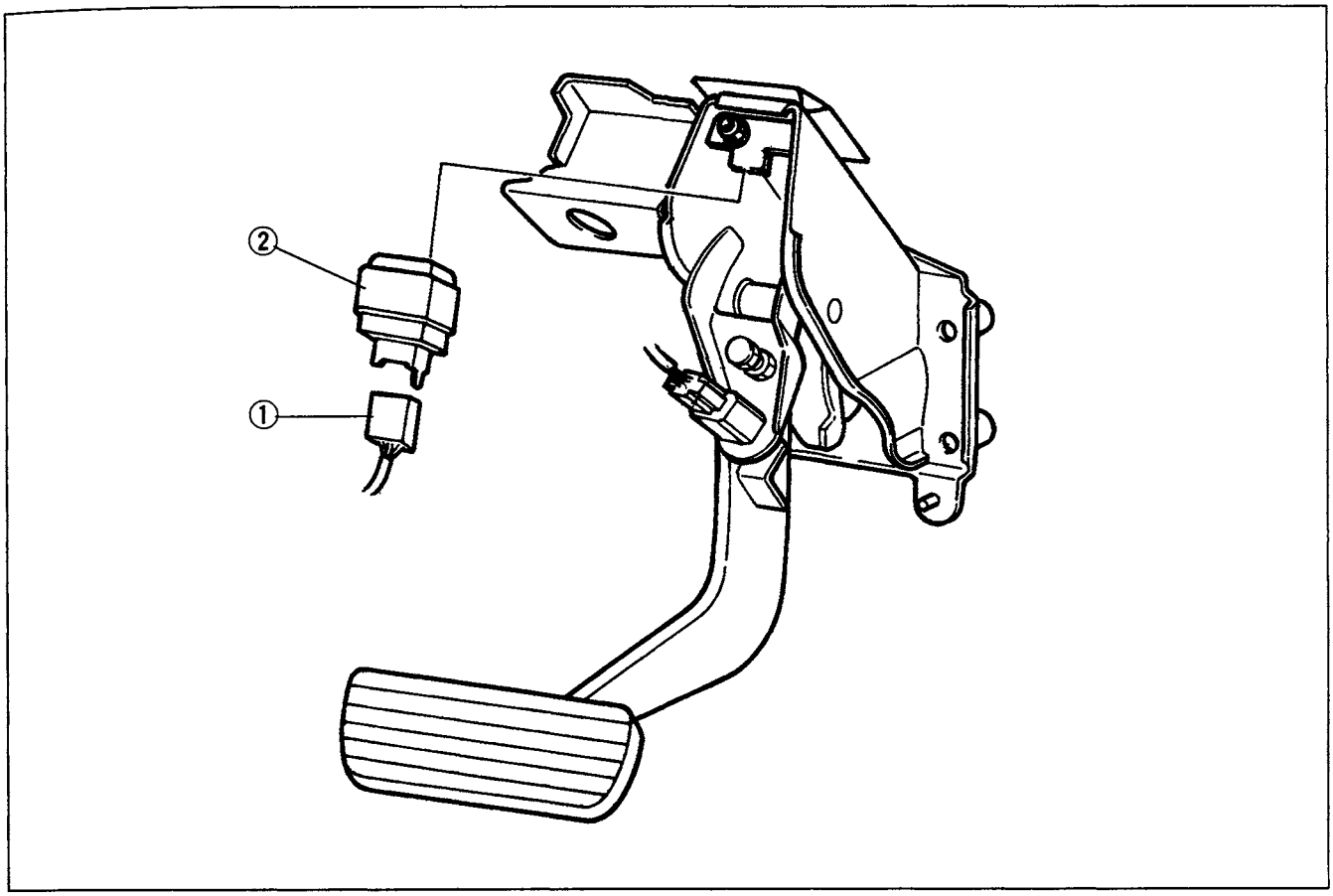
At bottom dead point position in manual control

1. Insert the ignition key into the ignition cylinder (ignition ON position).
2. Move the manual switch downward to lower the steering wheel to the bottom dead point position.
3. Leave the connectors connected. Connect the (+) terminal of the voltmeter to the tilt sensor side connector's variable resistance pole side terminal, Ⓐ, (at the back of the connector), and connect the voltmeter's (–) terminal to the body ground side of the connector.

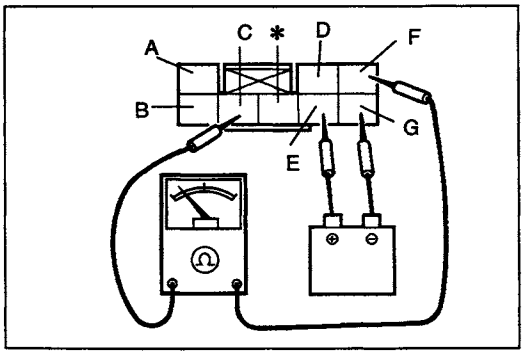
   Voltage: Approx. 1.4V

4. If not as specified, replace the steering shaft assembly. (Refer to page N–10.)

TILT RELAY
Removal / Installation



1. Connector
2. Tilt relay
   Inspection ..... below

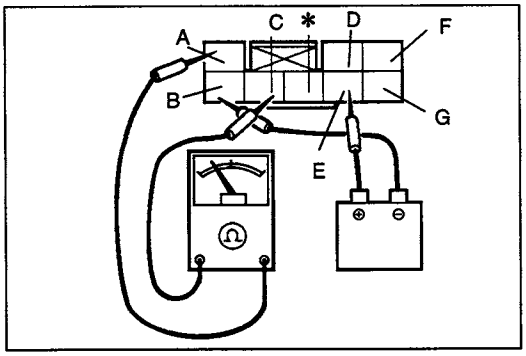


Inspection
Continuity inspection
Disconnect and inspect the connectors between the tilt relay to the circuit breaker, CPU, tilt motor, and ground.

Auto-tilt steering column tilt-up condition
1. While connecting battery positive terminal to terminal Ⓔ, and battery negative terminal to terminal Ⓖ, check for continuity between terminal Ⓒ and terminal Ⓕ of the tilt relay side connector.

Terminal	Continuity
Ⓒ—Ⓕ	Yes

2. If not as specified, replace the tilt relay.

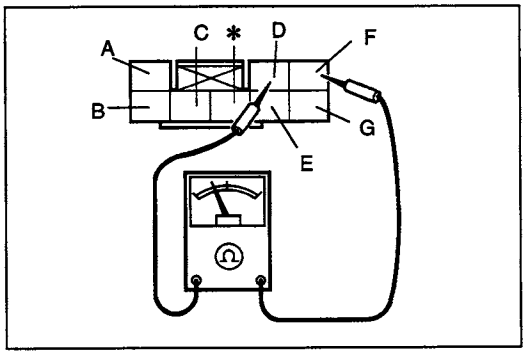


Auto-tilt steering column tilt-down condition

1. While connecting battery positive terminal to terminal Ⓔ, and battery negative terminal to terminal Ⓑ, check for continuity between terminal Ⓒ and terminal Ⓐ of the tilt relay side connector.

Terminal	Continuity
Ⓒ——Ⓐ	Yes

2. If not as specified, replace the tilt relay.

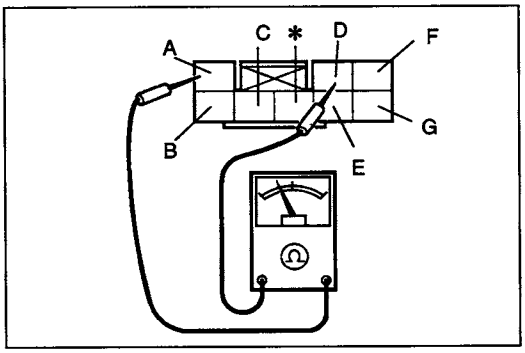


Tilt relay OFF condition, UP side

1. Check for continuity between terminal Ⓕ and terminal Ⓓ of the tilt relay side connector.

Terminal	Continuity
Ⓕ——Ⓓ	Yes

2. If not as specified, replace the tilt relay.



Tilt relay OFF condition, DOWN side

1. Check for continuity between terminal Ⓐ and terminal Ⓓ of the tilt relay side connector.

Terminal	Continuity
Ⓐ——Ⓓ	Yes

2. If not as specified, replace the tilt relay.

Before beginning any service procedure, refer to section T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

BRAKING SYSTEM AND TRACTION CONTROL SYSTEM

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OUTLINE

SPECIFICATIONS

Item		Specifications
Brake pedal	Type	Suspended
	Pedal lever ratio	3.9
	Max. stroke mm {in}	125 {4.88}
Master cylinder	Type	Tandem (with level sensor)
		Plunger-type
	Cylinder inner diameter mm {in}	25.4 {1.00}
Power brake unit	Type	Vacuum multiplier, tandem diaphragm
	Diameter mm {in}	213.4 {8.402} + 240.2 {9.457}
Front disc brake	Type	Ventilated disc, floating caliper (two pistons)
	Cylinder bore mm {in}	42.86 {1.687} × 2
	Pad dimensions (area × thickness) mm^2 {in^2} × mm {in}	5,530 {8.571} × 10.0 {0.39}
	Disc plate dimensions mm {in} (outer diameter × thickness)	274 {10.8} × 28.0 {1.10}
Rear disc brake	Type	Solid disc, floating caliper
	Cylinder bore mm {in}	34.93 {1.375}
	Pad dimensions (area × thickness) mm^2 {in^2} × mm {in}	3,300 {5.115} × 10 {0.39}
	Disc plate dimensions mm {in} (outer diameter × thickness)	286 {11.3} × 9.5 {0.37}
Rear wheel hydraulic control system	Type	Dual proportioning valve
	Switching point kPa {kgf/cm^2, psi}	2,900 {30, 430}
Parking drum brake	Type	Mechanical, two-rear-wheel control
	Operation system	Center lever
	Drum brake type	Duo servo
	Lining dimensions (width × thickness) mm {in}	30 {1.18} × 3.5 {0.14}
	Drum inner diameter mm {in}	190 {7.48}
Brake fluid		FMVSS 116 DOT3

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.**

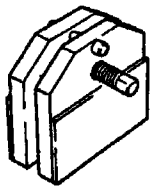
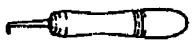
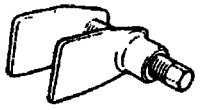
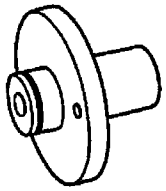
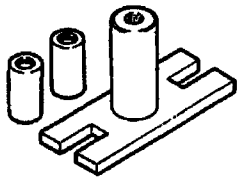
- Tighten the brake pipe flare nut by using the **SST** (49 0259 770B). Be sure to modify the brake pipe flare nut tightening torque to allow for use of a torque wrench-**SST** combination. (Refer to section GI "Torque Formulas".)
- If a brake line(s) has been disconnected anytime during the procedure, add brake fluid, bleed the brakes, and inspect for leakage after the procedure has been completed.

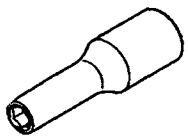
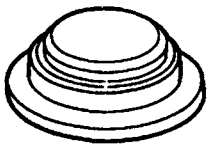
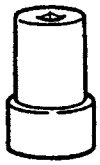
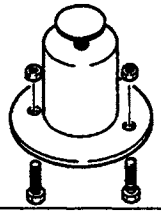
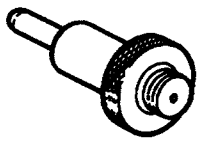
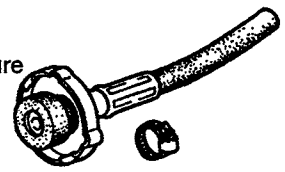
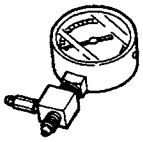
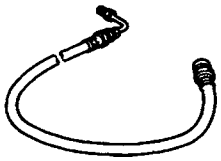
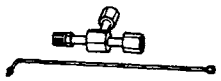
Connectors
- Disconnect the negative battery cable before doing any work that requires handling of connectors. Reconnect the negative battery cable only after the work is completed.

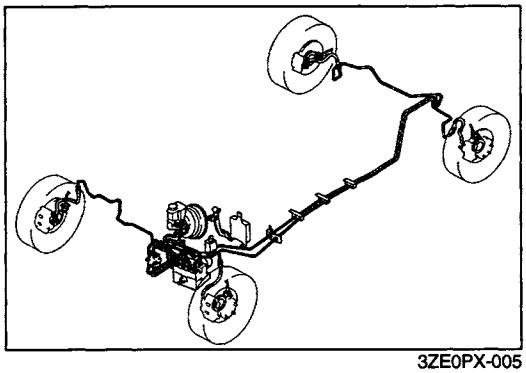
ABS components
- Make sure that there are no diagnostic trouble codes in the ABS memory after working on ABS components. If there are any codes in the memory, erase them.

CONVENTIONAL BRAKE SYSTEM

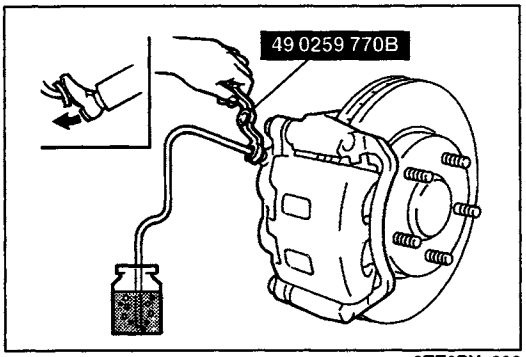
PREPARATION
SST

49 0259 770B Wrench, flare nut 	For removal of brake pipe	49 T033 001A Stopper, disc brake piston 	For removal of brake piston (Front)
49 0208 701A Air-out tool, boot 	For removal of piston seal	49 0221 600C Expand tool, disc brake 	For installatin of brake pads
49 E043 001A Adjust gauge 	For adjustment of push rod clearance	49 E043 003 Lock tool, turning 	For adjustment of push rod clearance

49 B043 004 Socket wrench 	For adjustment of push rod clearance	49 E043 002A Installer, retainer 	For installation of retainer
49 Z043 001 Wrench, cap nut 	For removal and installation of master cylinder cap	49 Z043 0A0 Piston adjuster set 	For inspection of master cylinder
49 Z043 002 Adapter 	For inspection of master cylinder	49 R015 002 Hose, pressure 	For inspection of master cylinder
49 U043 004 Gauge, oil pressure (Part of 49 U043 0A0) 	For inspection of brake fluid pressure	49 U043 0A0 Gauge set, oil pressure 	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



3ZE0PX-005



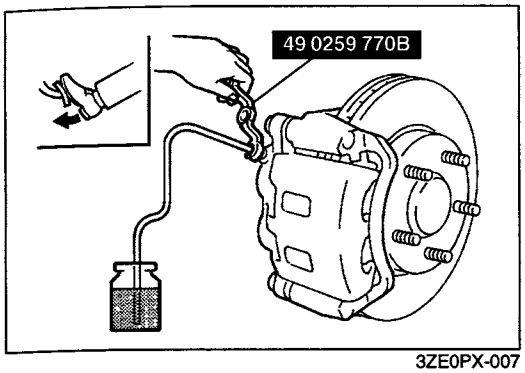
3ZE0PX-006

AIR BLEEDING

Note

- The brakes should be bled whenever a brake line is disconnected. If a hydraulic line is disconnected at the mater cylinder, start at the slave cylinder farthest from the brake master cylinder, and move to the next fathest slave cylinder until all four cylinders have been bled. If the disconnection point is anywhere except the master cylinder, start at the slave cylinder 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. Working with another person, 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**.

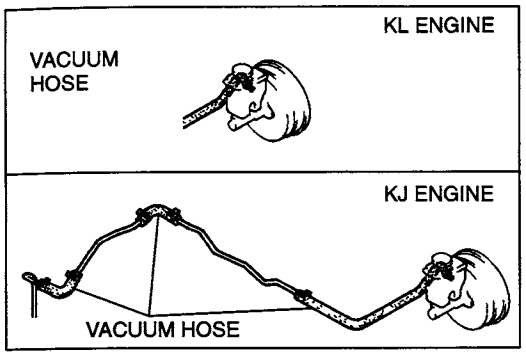


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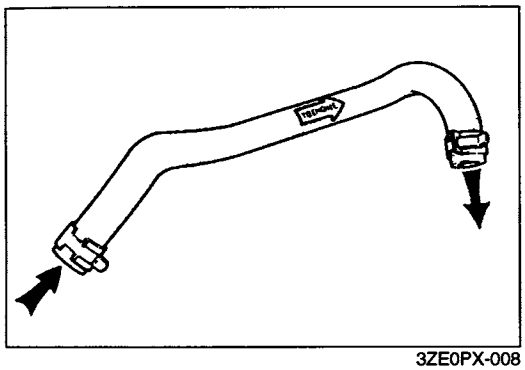
6. Repeat steps 4 and 5 until no air bubbles are seen. The reservoir should be kept about 3/4 full during bleeding to prevent air from reentering the lines.

Tightening torque:
5.9—8.8 N·m {60—90 kgf·cm, 53—78 in·lbf}

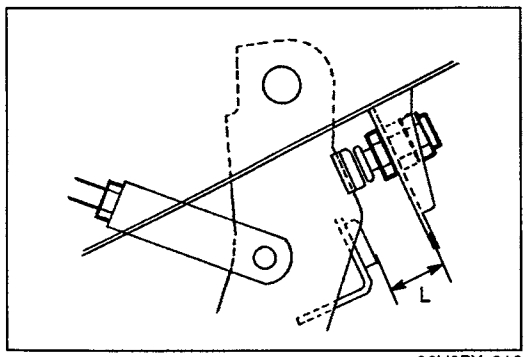
7. Check for correct brake operation.
8. Verify that there is no fluid leakage. Wipe off any spilled fluid immediately.
9. After bleeding the brakes, add brake fluid to MAX.



VACUUM LINE
Inspection
1. Remove the clamps and the hose.


3ZE0PX-008

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.

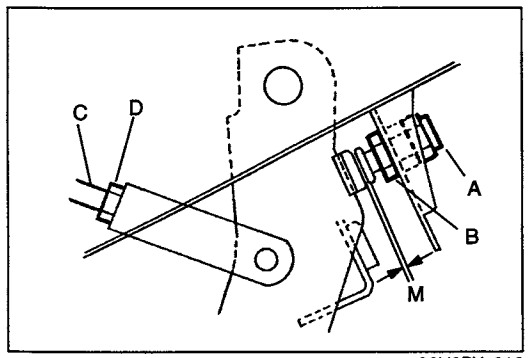


36U0PX-016

BRAKE PEDAL
Inspection (On-vehicle)
Brake pedal height
Inspection
1. Remove the brake switch
2. Measure length L.

Length L: 20.0—23.0 mm {0.79—0.90 in}

3. If length L is within the specification, reinstall the switch.

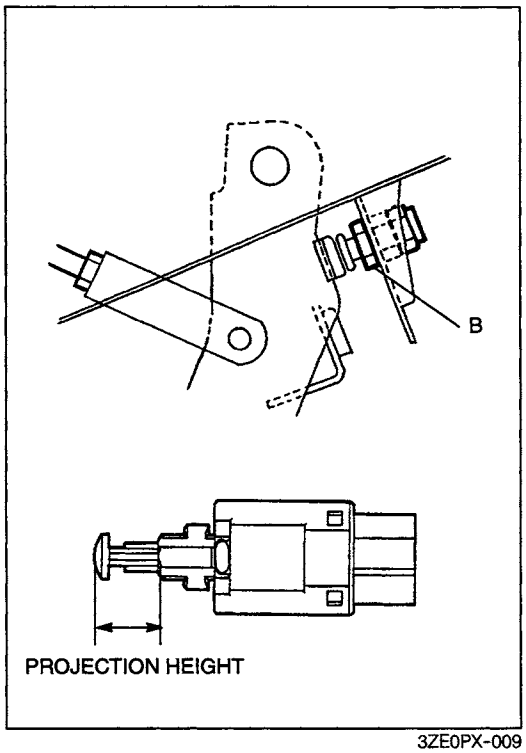


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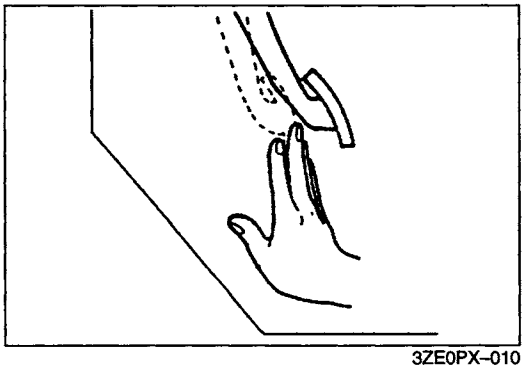
Adjustment
1. Loosen locknut B and turn self-locknut A until it does not contact the pedal.
2. Loosen locknut D and turn rod C to adjust the height.
3. Tighten locknut D.

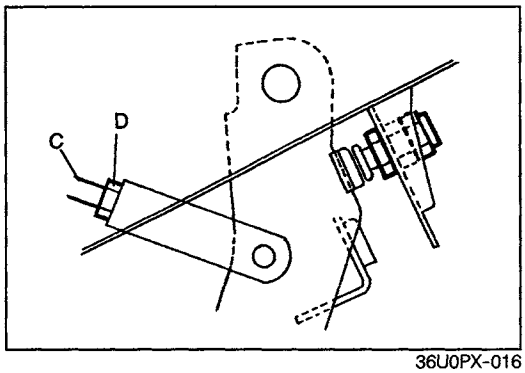
Tightening torque:
24—34 N·m {2.4—3.5 kgf·m, 18—25 ft·lbf}

4. Turn self-locknut A so that the clearance M is **0.1—1.0 mm {0.04—0.039 in}**.

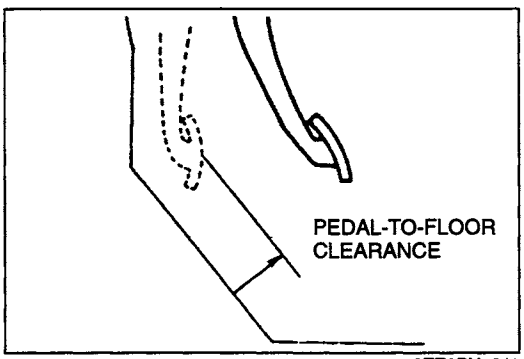


3ZE0PX-009


3ZE0PX-010



36U0PX-016



3ZE0PX-011

5. Tighten locknut B.

Tightening torque:
9.81—14.7 N·m {100—150 kgf·cm, 86.8—130 in·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 (until resistance is felt) and check the free play.

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. Check the pedal height and the brake light operation.

Tightening torque:
24—34 N·m {2.4—3.5 kgf·m, 17—25 ft·lbf}

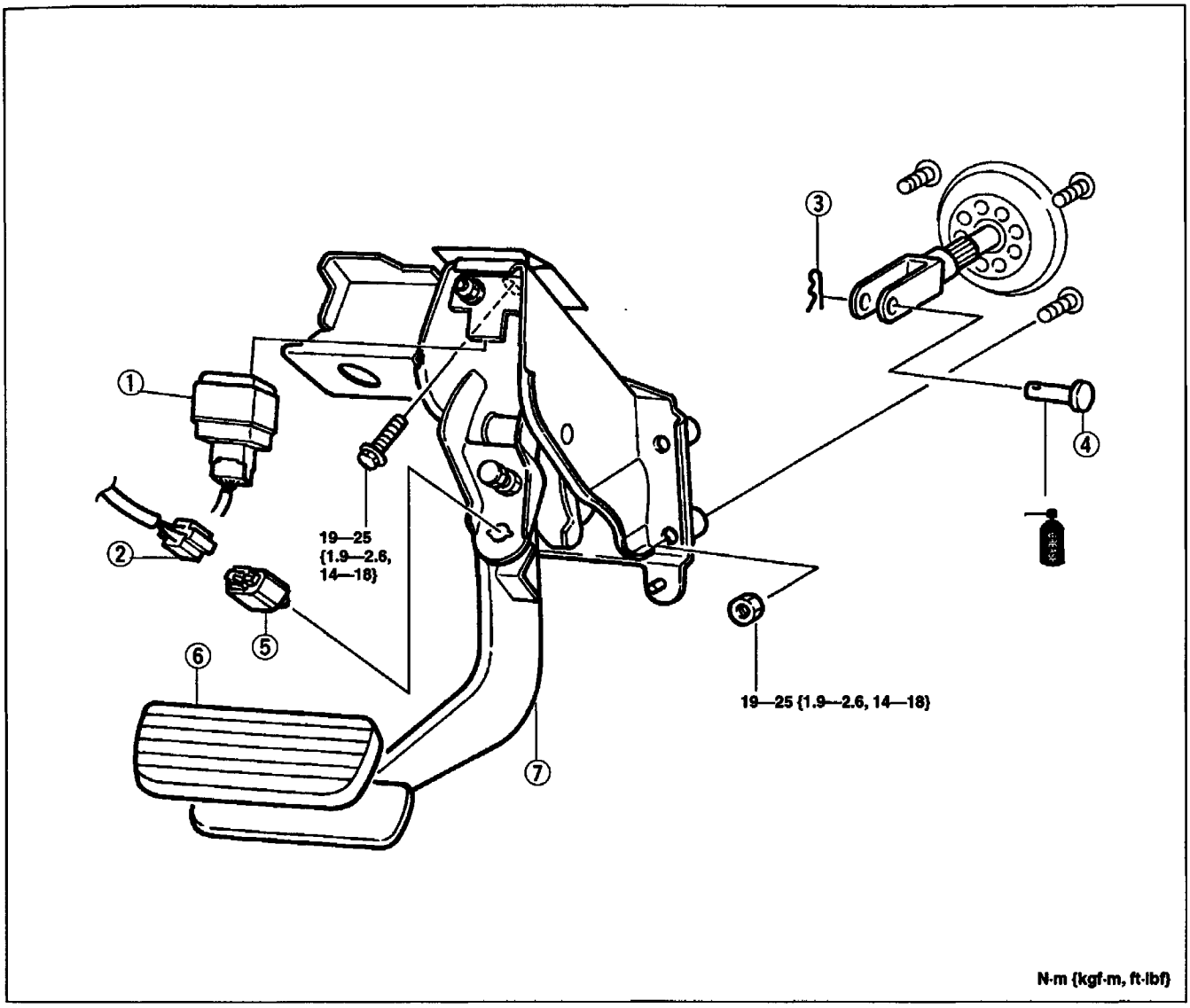
Pedal-to-floor clearance
Inspection
Verify that the distance from the floor panel to the pedal pad center is as specified when the pedal is depressed with a force of **589 N {60 kgf, 132 lbf}**.

Pedal-to-floor clearance: 95 mm {3.8 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

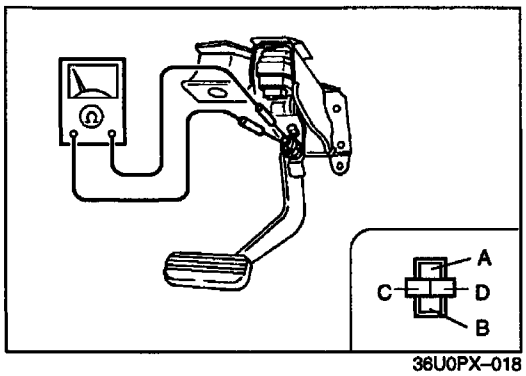
Removal / Inspection / Installation

- Remove the instrument panel and steering shaft. (Refer to sections S and N.)
- After installation, check and adjust the pedal height and free play. (Refer to page P–6.)



3ZE0PX–012

1. Tilt relay
2. Brake switch connector
3. Snap pin
4. Clevis pin
5. Brake switch
   Inspection ..... below
6. Pedal pad
   Inspect for wear and damage
7. Brake pedal assembly
   Inspect for bending and damage



38U0PX–018

Inspection

Brake switch

1. Disconnect the brake switch connector.
2. Check continuity between the terminals.

Brake pedal \ Terminals	A	B	C	D
Pressed	O—O			
Released			O—O	

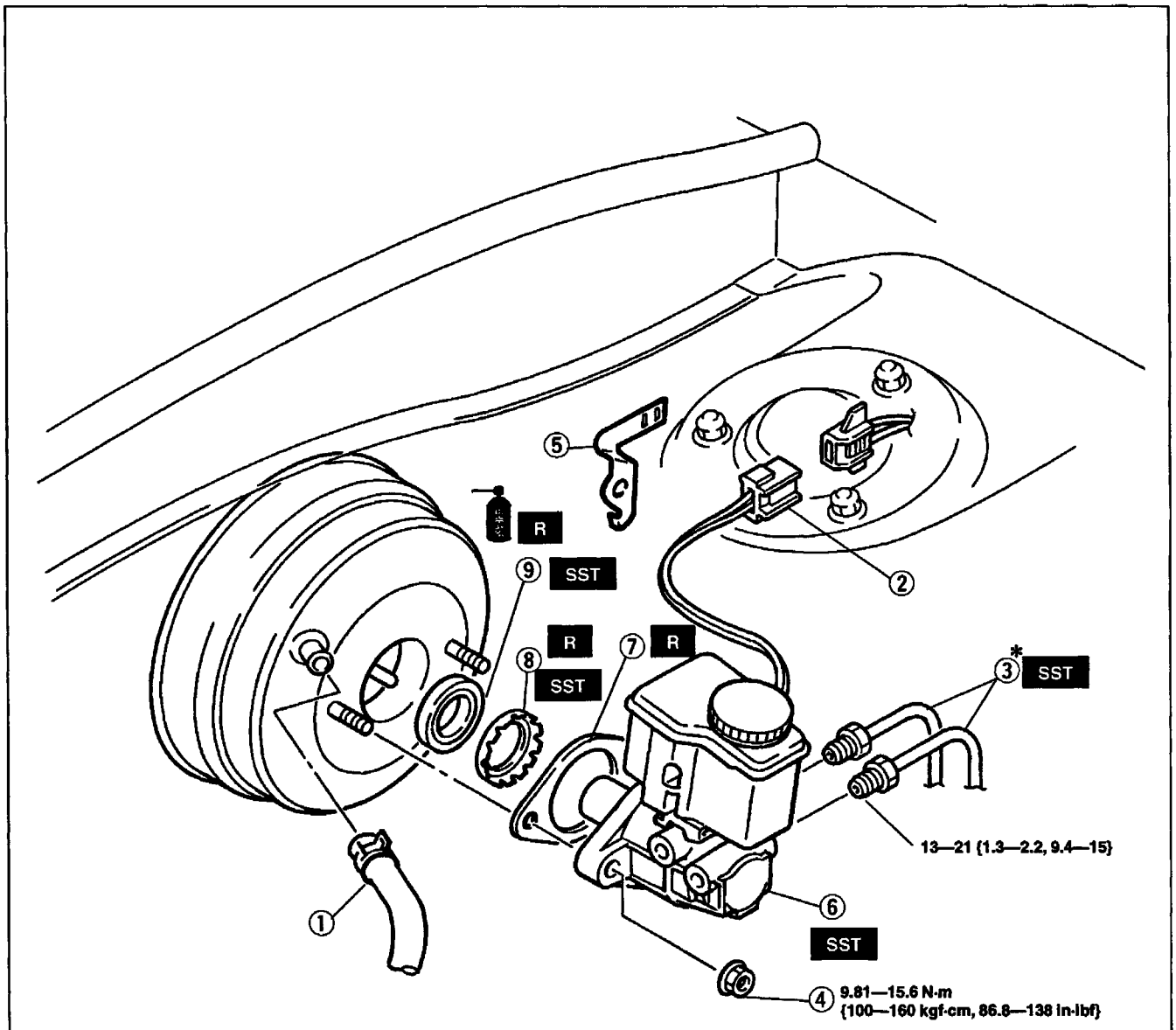
O—O: Indicates continuity

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

MASTER CYLINDER

Removal / Installation

- Before removing the master cylinder, be sure to disconnect the vacuum hose (with check valve) from the power brake unit. Removing the master cylinder with vacuum remaining in the power brake unit will cause the master cylinder piston to pop out and drain the brake fluid.

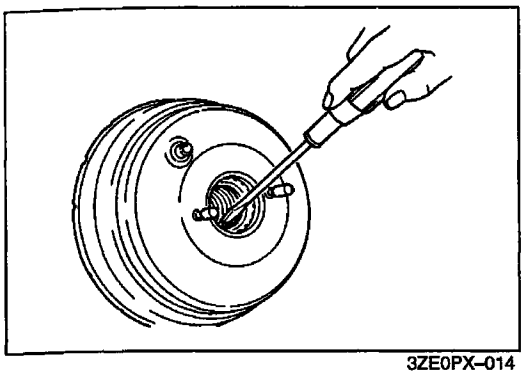


* 49 0259 770B (Wrench, flare nut)

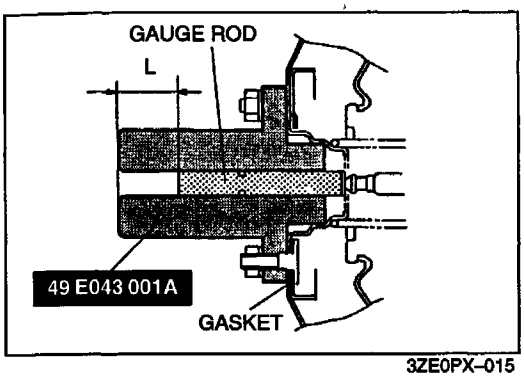
N·m {kgf·m, ft·lbf}

3ZE0PX-013

1. Vacuum hose
2. Fluid level sensor connector
   Inspection ..... page P-10
3. Brake pipe
4. Nut
5. Bracket
6. Master cylinder
   Installation Note ..... page P- 9
   Disassembly / Inspection / Assembly ..... page P-10
7. Gasket
8. Retainer
   Removal Note ..... page P- 9
   Installation Note ..... page P- 9
9. Seal and plate assembly
   Removal Note ..... page P- 9
   Installtion Note ..... page P- 9


3ZE0PX-014

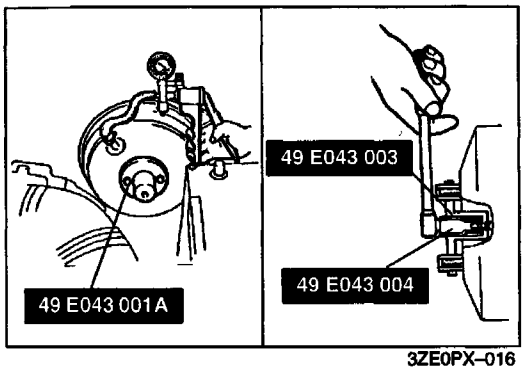
Remove note
Retainer, seal and plate assembly
1. Remove the retainer as shown in the figure.
2. Remove the seal and plate assembly.



3ZE0PX-015

Installation note
Master cylinder, retainer, seal and plate assembly
1. Remove the seal and plate assembly, and install the power brake unit gasket.
2. Adjust the push rod clearance as follows.
   (1) Attach the **SST** to the power brake unit as shown in the figure, and tighten the locknuts to the specified torque.

   Tightening torque:
   9.81—15.6 N·m {100—160 kgf·cm, 86.8—138 in·lbf}

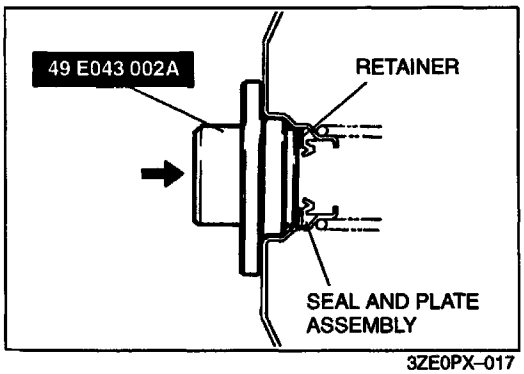


3ZE0PX-016

   (2) Apply **500 mmHg {19.7 inHg}** vacuum by using a vacuum pump.
   (3) Measure depth L of the gauge rod.

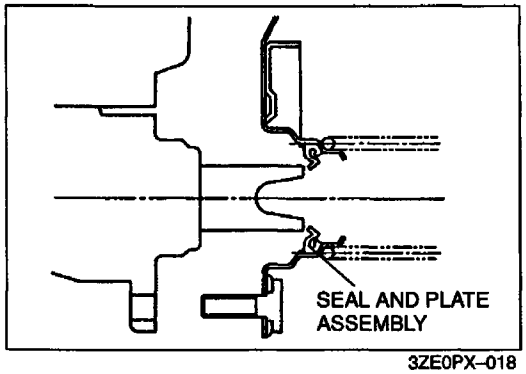
   Depth L: 35.1 mm {1.381 in}

   (4) If not as specified, use the **SST** to adjsut the push rod to the proper length.
   (5) Verify depth L of the gauge rod.



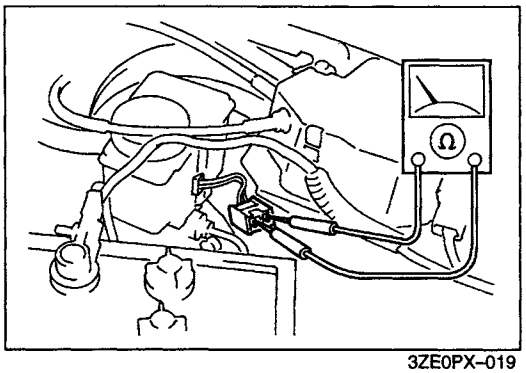
3ZE0PX-017

3. Install the retainer and the seal and plate assembly by using the **SST**.
4. Apply the specified grease (supplied in the repair kit) to the seal and plate assembly.



3ZE0PX-018

5. When installing the master cylinder into the power brake unit, be sure to align it correctly, fitting the master cylinder squarely into the power brake unit seal.Do not roll the lip of the power brake unit seal.



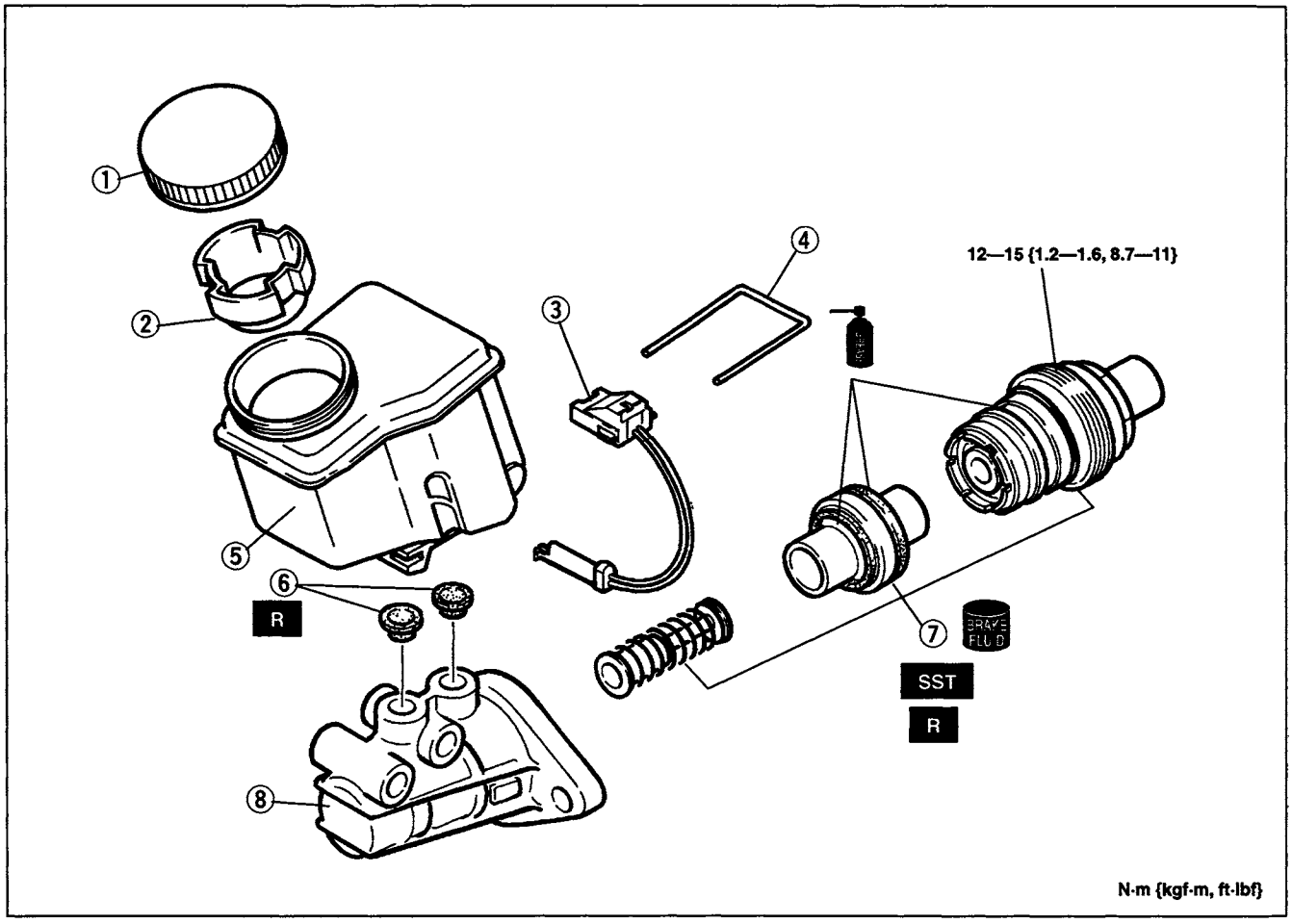
3ZE0PX-019

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

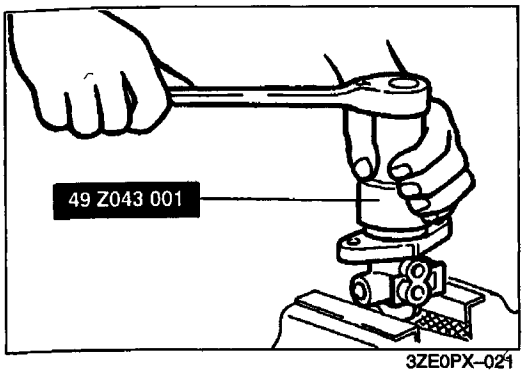
Caution
- **The brake master cylinder is made of aluminum, and can be easily damaged by tightening in a vise. When securing the master cylider in a vise, tighten only the front ports of the cylinder body.**

- If the master cylinder body is damaged, replace the unit as an assembly.



3ZE0PX-020

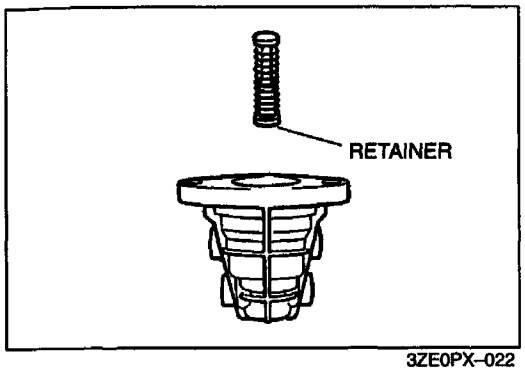
1. Cap
2. Tank filter
3. Fluid level sensor
4. Tank retainer
   Assembly Note ..... page P–12
5. Reserve tank
   Inspect for damage and deformation
6. Grommet
7. Piston assembly
   Disassembly Note ..... page P–11
   Assembly Note ..... page P–11
8. Master cylinder body
   Inspect for abnormal wear, rust and damage



3ZE0PX-021

Disassembly note
Piston assembly

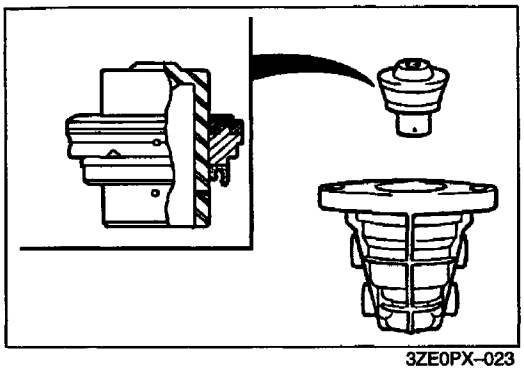
Loosen the cap by using the **SST**, and remove the primary piston assembly from the cylinder.



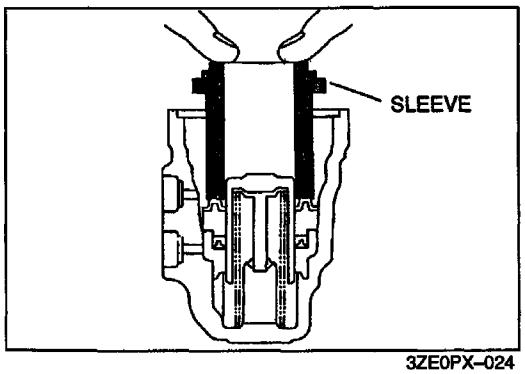
3ZE0PX-022

Assembly note
Piston assembly

1. Before assembly, clean the cylinder body inner surface and a new piston assembly by using brake fluid.
2. Install the secondary spring assembly into the cylinder body with the retainer facing the cylinder body.

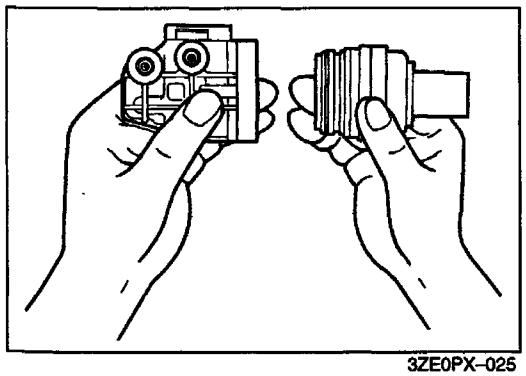

3ZE0PX-023

3. Apply the specified grease (supplied in the repair kit) to the cup of the secondary piston assembly.
4. Install the secondary piston assembly into the cylinder body with the hole in the piston assembly facing the cylinder body.



3ZE0PX-024

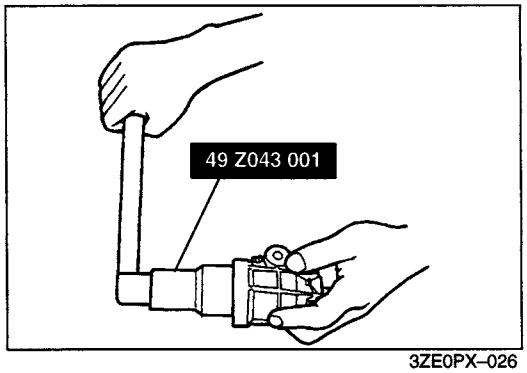
5. Using the old sleeve of the primary piston assembly, push the secondary piston assembly into the cylinder body.


3ZE0PX-025

Caution

- **Holding only the piston or the sleeve of the primary piston assembly could allow the components to fall out and become damaged. When handling the primary piston assembly, hold the cap and keep the assembly level.**

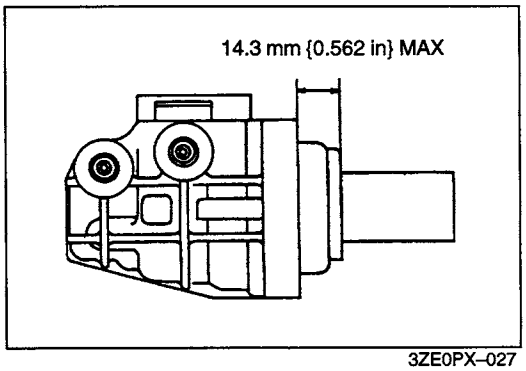
6. Apply the specified grease (supplied in the repair kit) to the cup of the primary piston assembly.
7. Install the primary piston assembly into the cylinder body while keeping the piston assembly and the cylinder body horizontal.



3ZE0PX–026

8. Tighten the cap by using the **SST**.

Tightening torque:
12—15 N·m {1.2—1.6 kgf·m, 8.7—11 ft·lb}

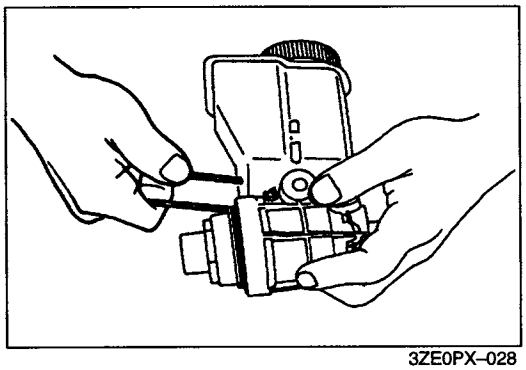


3ZE0PX–027

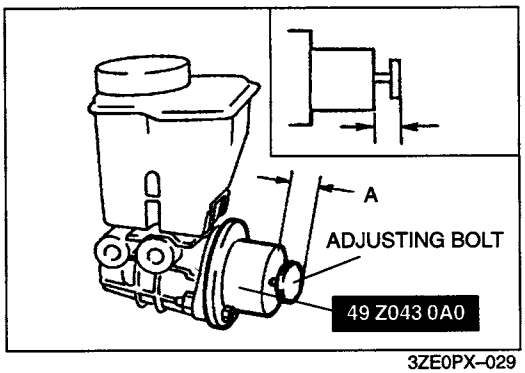
9. Measure clearance between the cylinder body flange and the cap.

Clearance: 14.3 mm {0.562 in} max.

10. If the clearance is greater than specified, disassemble and reassemble in the master cylinder.


3ZE0PX–028

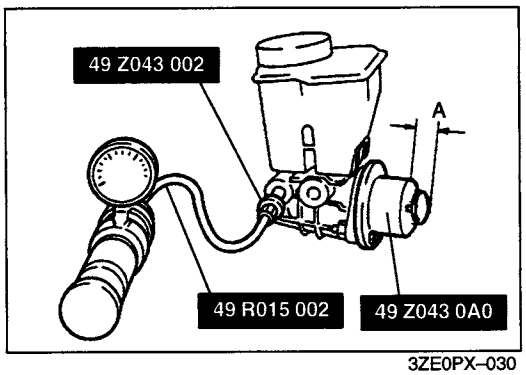
Tank retainer
Install the tank retainer while pushing the reserve tank to the cylinder body.



3ZE0PX–029

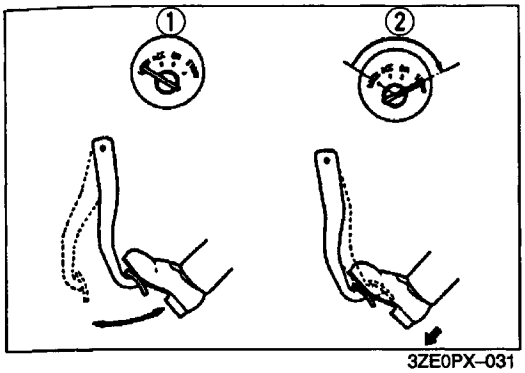
Inspection
Master cylinder assembly
1. Set the **SST** as shown in the figure, and tighten the nut to the specified torque.

Tightening torque:
9.81—15.6 N·m {100—160 kgf·cm, 86.8—138 in·lbf}



3ZE0PX–030

2. Turn the adjusting bolt until gap A is **21 mm {0.83 in}**.
3. Install a radiator cap tester and the **SST** to the front port on the master cylinder. Apply air into the master cylinder and verify that the air pressure does not build up.
4. Tighten the adjustment bolt on the **SST** until gap A becomes **11 mm {0.43 in}**. Raise the air pressure to **49 kPa {0.5 kgf/cm^2, 7.1 psi}** and verify that the pressure is held for more than 5 seconds.
5. Check the rear port on the master cylinder by using the same procedure.



3ZE0PX-031

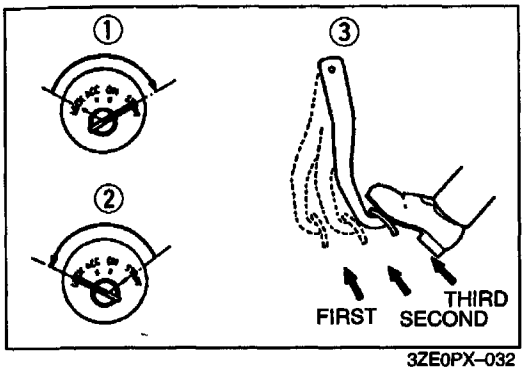
POWER BRAKE UNIT

Quick Inspection (On-vehicle)

Power brake unit function check (Simple method)

Step 1

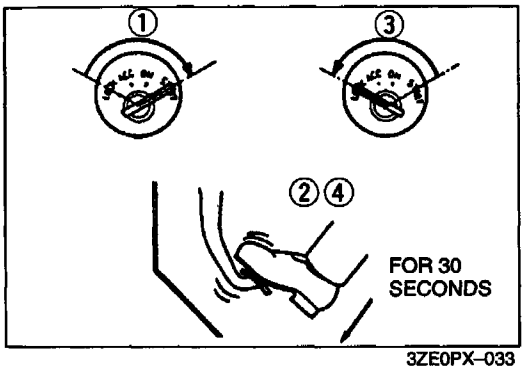
1. With the engine stopped, depress the pedal a few times.
2. With the pedal depressed, start the engine.
3. If the pedal moves down slightly immediately after the engine is started, the unit is operating.



3ZE0PX-032

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.

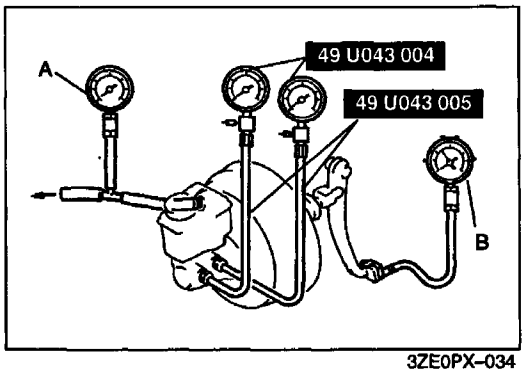


3ZE0PX-033

Step 3

1. Start the engine.
2. Depress the pedal with the usual force.
3. Stop the engien 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, check the check valve and vacuum hose for damage, and check the connection. Repair if necessary and check again.

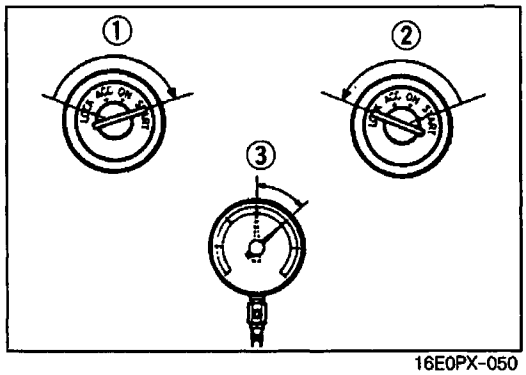
If the nature of the problem is still not clear after the 3 steps above, follow the more detailed check described in "Inspection using gauges" below.



3ZE0PX-034

(Inspection using gauges)

Connect the **SST** or equivalent, vacuum gauge (A), and pedal depression force gauge (B) as shown. Bleed the air from the **SST** gauges before performing the following tests.

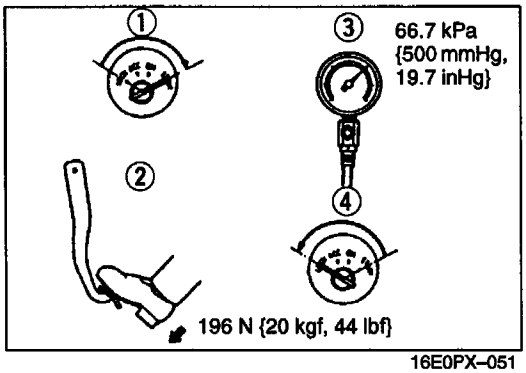


16E0PX-050

a) Checking for vacuum loss

Unloaded condition

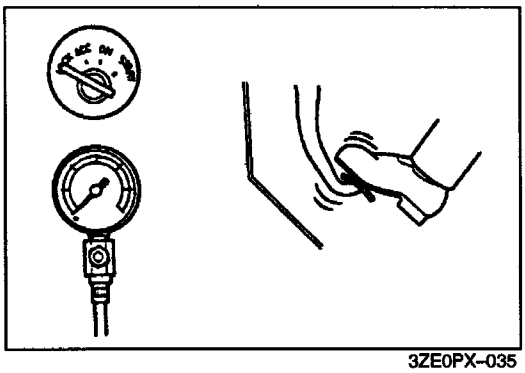
1. Start the engine.
2. Stop the engine when the vacuum gauge reading reaches **66.7 kPa {500 mmHg, 19.7 inHg}**.
3. Observe the vacuum gauge for **15 seconds**. If the gauge shows **63.3—66.7 kPa {475—500 mmHg, 18.7—19.7 inHg}**, the unit is operating.



16E0PX-051

Loaded condition

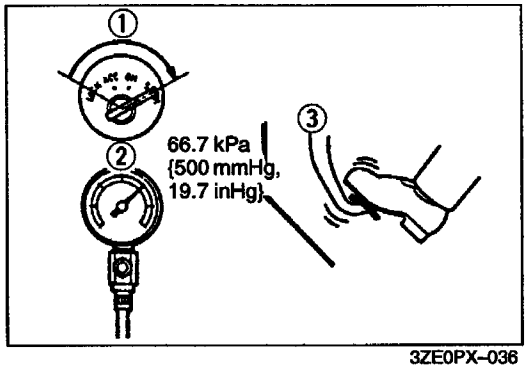
1. Start the engine.
2. Depress the brake pedal with a force of **196 N {20 kgf, 44 lbf}**.
3. With the brake pedal depressed, stop the engine when the vacuum gauge reading reaches **66.7 kPa {500 mmHg, 19.7 inHg}**.
4. Observe the vacuum gauge for **15 seconds**. If the gauge shows **63.3—66.7 kPa {475—500 mmHg, 18.7—19.7 inHg}**, the unit is operating.


3ZE0PX-035

b) Checking for hydraulic pressure

1. If the fluid pressure is within the specification when the engine is stopped (vacuum **0 kPa {0 mmHg, 0 inHg}**), the unit is operating.

Pedal force N {kgf, lbf}	Fluid presure kPa {kgf/cm^2, psi}
96 {20, 44}	880 {9, 130} min.



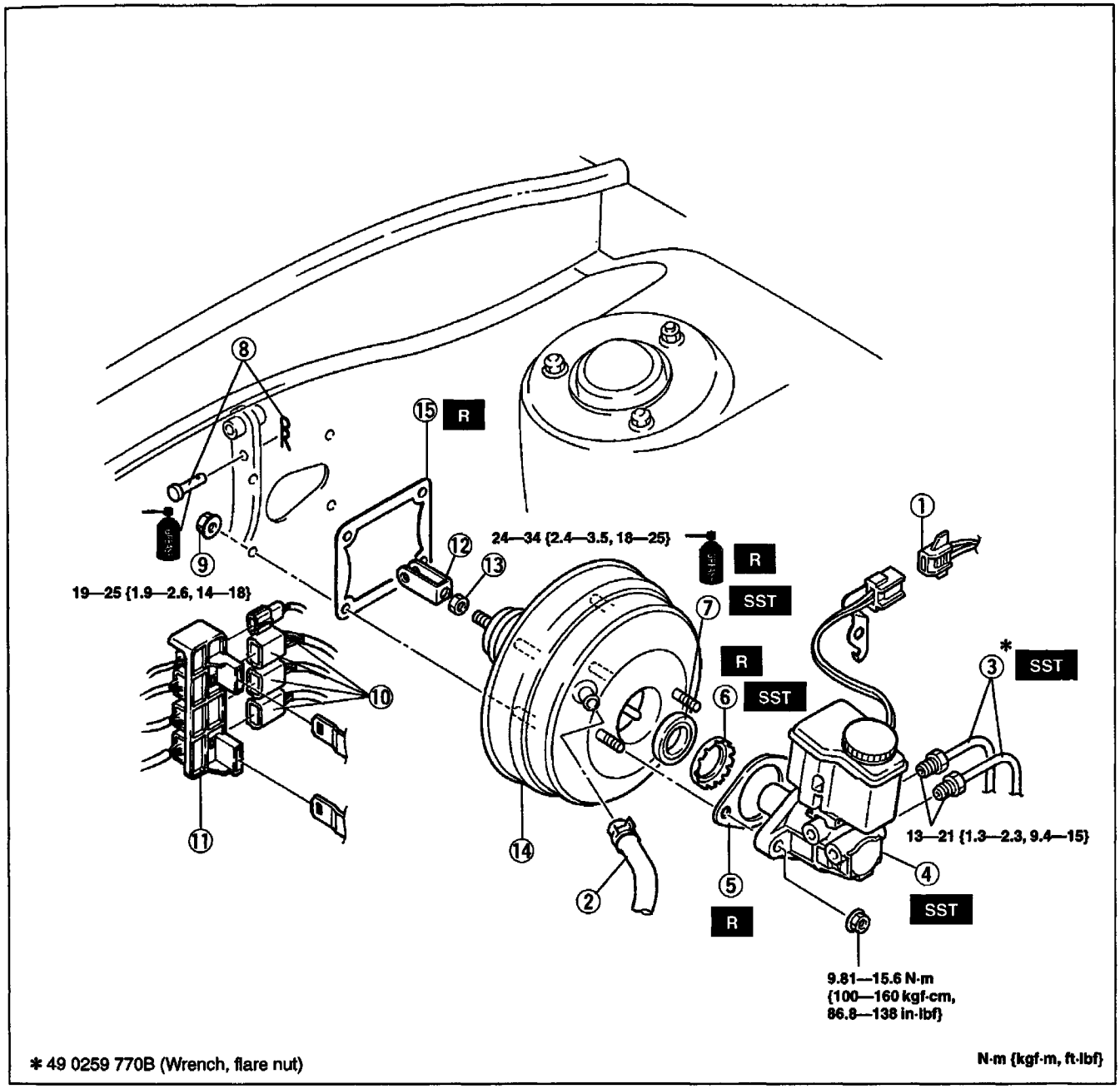
3ZE0PX-036

2. Start the engine. Depress the brake pedal when the vacuum reaches **66.7 kPa {500 mmHg, 19.7 inHg}**. If the fluid pressure is within the specification, the unit is operating.

Pedal force N {kgf, lbf}	Fluid presure kPa {kgf/cm^2, psi}
196 {20, 44}	8,300 {85, 1,200} min.

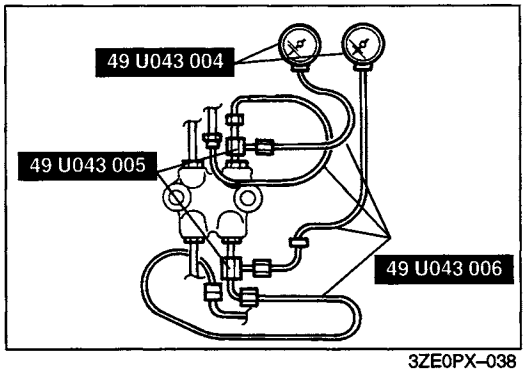
Removal / Installation

- 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.)

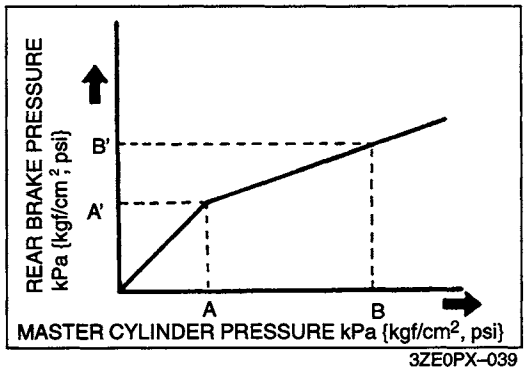


3ZE0PX–037

1. Fluid level sensor connector
2. Vacuum hose
3. Brake pipe
4. Master cylinder assembly
   Installation Note ..... page P–9
5. Gasket
6. Retainer
   Removal Note ..... page P–9
   Installation Note ..... page P–9
7. Seal and plate assembly
   Removal Note ..... page P–9
   Installation Note ..... page P–9
8. Snap pin and clevis pin
9. Nut
10. Connectors (KJ engine)
11. Holder (KJ engine)
12. Fork
13. Nut
14. Power brake unit
15. Gasket



3ZE0PX–038



3ZE0PX–039

DUAL PROPORTIONING VALVE

Inspection

1. Remove the battery.
2. Connect the **SST** or equivalent 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, 9.4—15 ft·lbf}

3. Bleed the air from the brake system. (Refer to page P-5.)
4. Depress the brake pedal until the master cylinder pressure equals A; then record rear brake pressure A'.
5. Depress the brake pedal again, and apply additional pressure until the pressure equals B. Then record pressure B'.

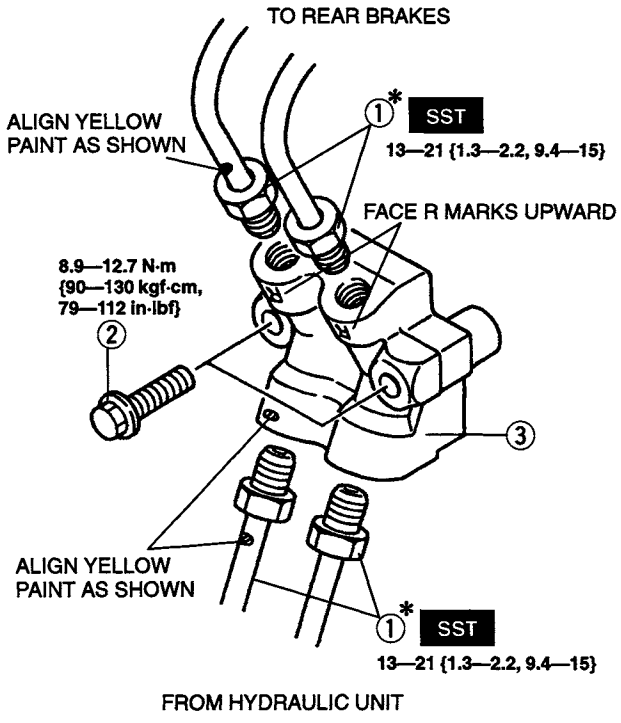
Fluid pressure kPa {kgf/cm², psi}

A	A'	B	B'
2,900 {30, 430}	2,900 {30, 430} ± 200 {2, 30}	5,900 {60, 850}	3,800 {39, 560} ± 290 {3, 40}

6. If not within the specification, replace the dual proportioning valve.

Replacement

- Remove the battery.

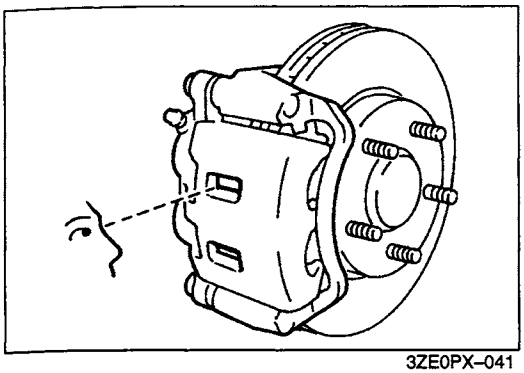


* 49 0259 770B (Wrench, flare nut)

N·m {kgf·m, ft·lbf}

3ZE0PX–040

1. Brake pipe
2. Bolt
3. Dual proportioning valve


3ZE0PX–041

FRONT BRAKE (DISC)

Inspection (on-vehicle)

Disc pad

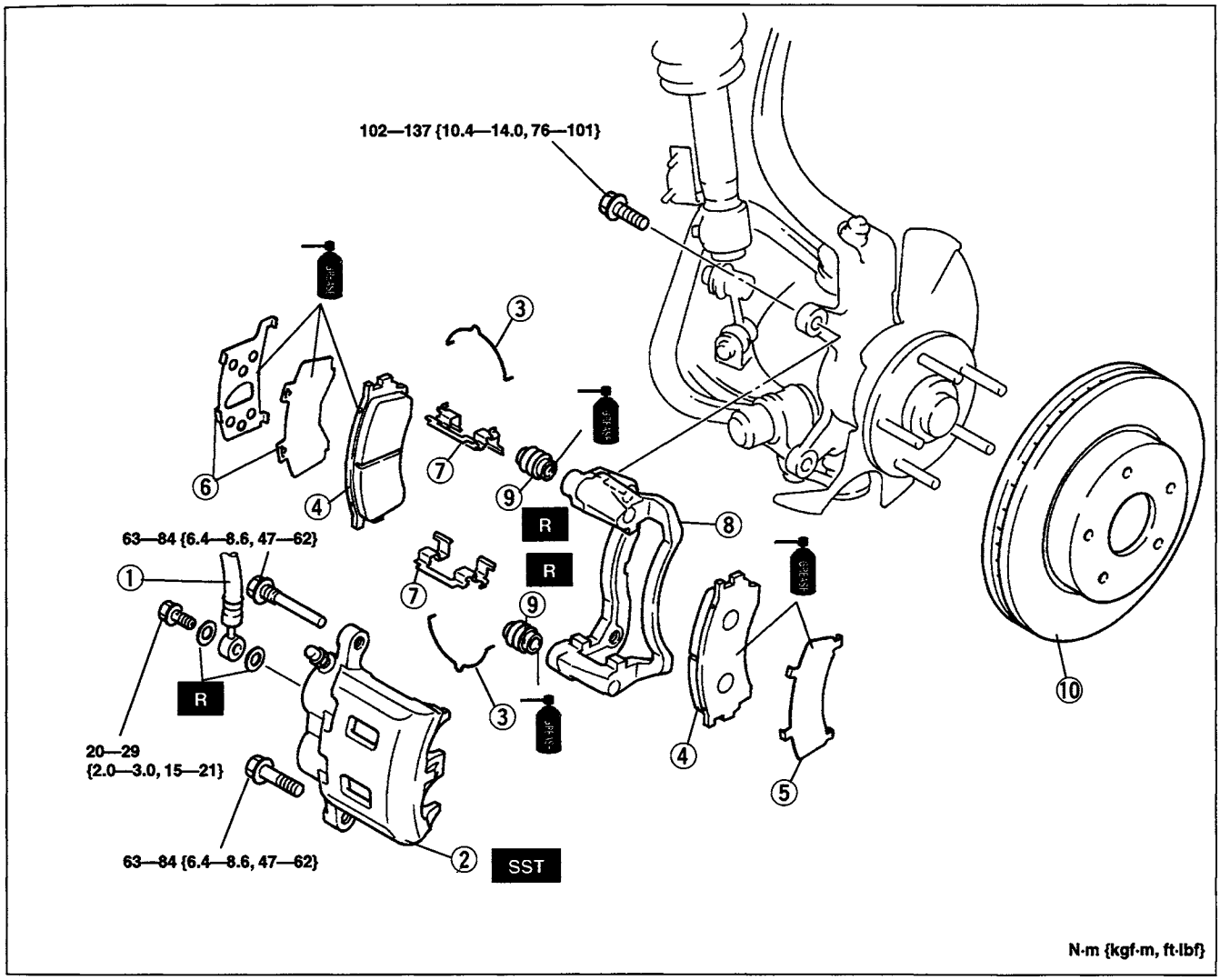
1. Look through the caliper inspection hole and inspect the remaining thickness of the pads.

   Thickness: 2.0 mm {0.08 in} min.

2. Replace the pads as a set (right and left wheels) if either is at or less than the minimum thickness.

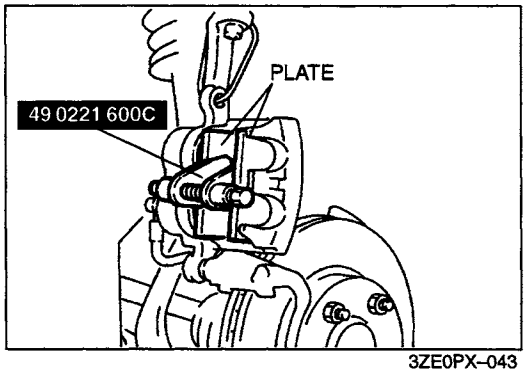
Removal / Inspection / Installation

- After installation, depress the pedal a few times. Then rotate the wheel by hand, and verify that the brakes do not drag.



3ZE0PX–042

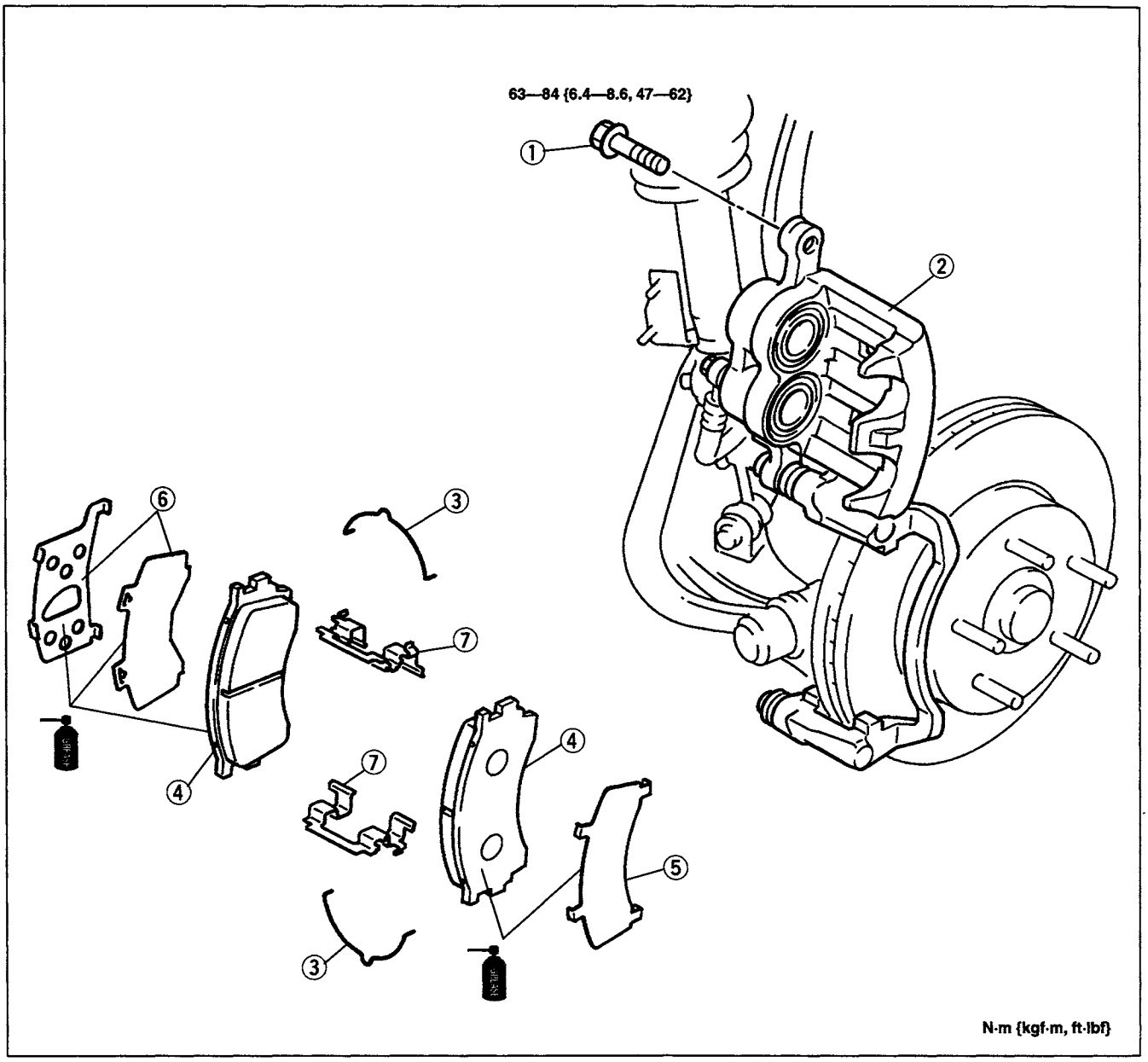
1. Flexible hose
2. Caliper
   - Installation Note ..... page P–18
   - Disassembly / Inspection / Assembly ..... page P–20
3. V-spring
4. Disc pad
   - Inspection ..... above
5. Outer shim
6. Inner shim
7. Guide plate
8. Mounting support
9. Boot
10. Disc plate
    - Inspection ..... page P–19



3ZE0PX-043

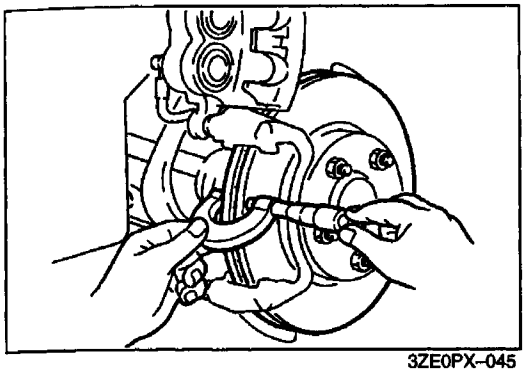
Installation note
Caliper
1. Push the piston fully inward by using the **SST.**
2. Install the caliper.

DISC PAD
Replacement



3ZE0PX-044

1. Bolt
2. Caliper
   Installation Note ..... above
3. V-spring
4. Disc pad
5. Outer shim
6. Inner shim
7. Guide plate

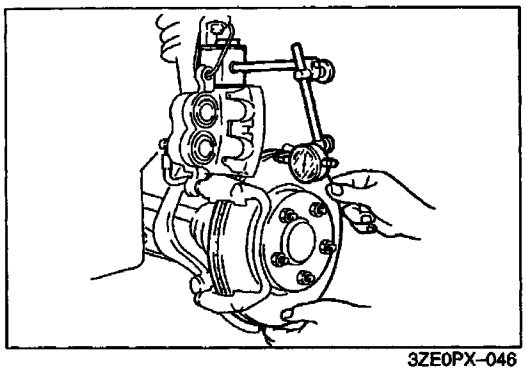

3ZE0PX-045

DISC PLATE
Inspection
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: 28 mm {1.10 in}
Minimum: 26 mm {1.02 in}
Minimun thickness after machining by using a brake lathe on-vehicle: 26.8 mm {1.05 in}

2. If the thickness is not within the specification, replace the disc plate.

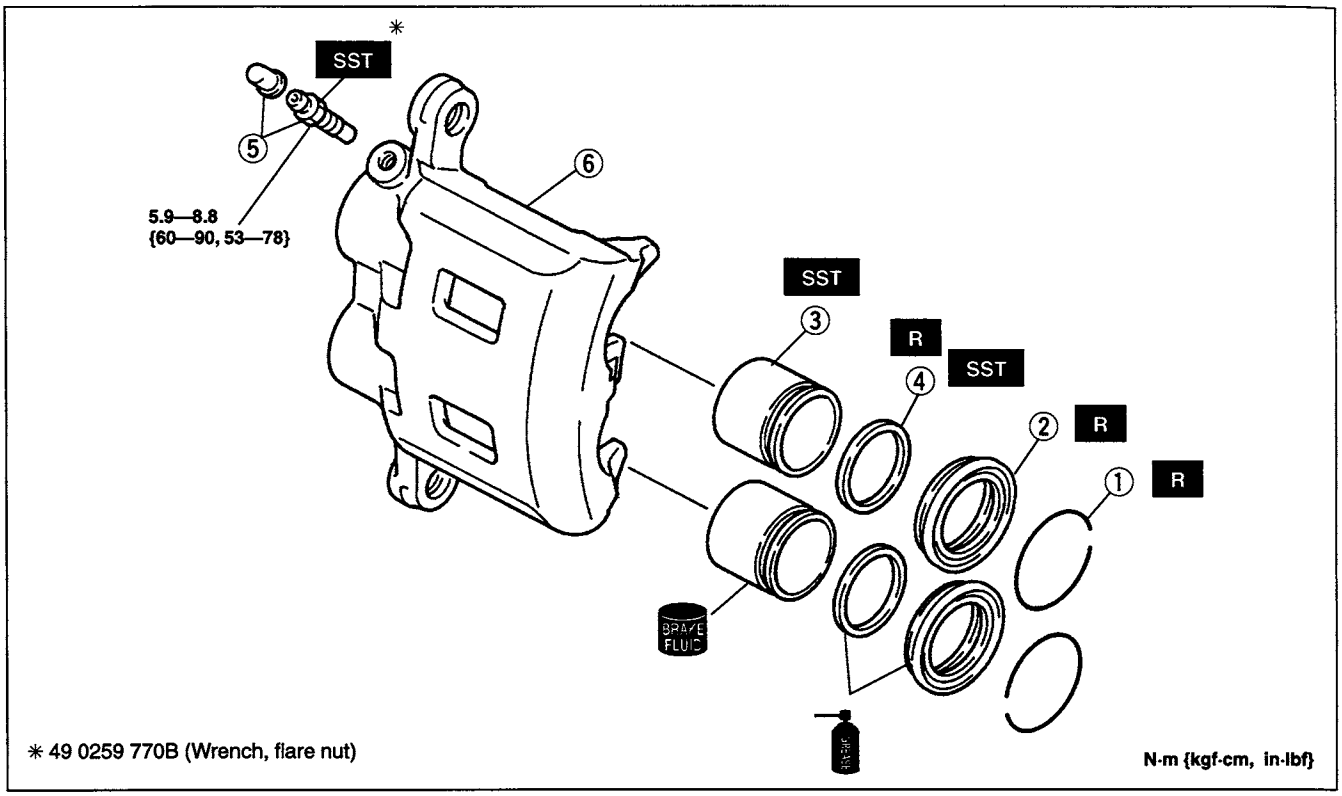

3ZE0PX-046

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.

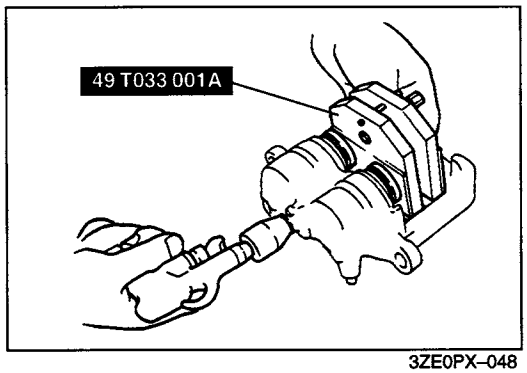
3. If the runout is not within the specification, repair or replace the disc plate.

CALIPER
Disassembly / Inspection / Assembly



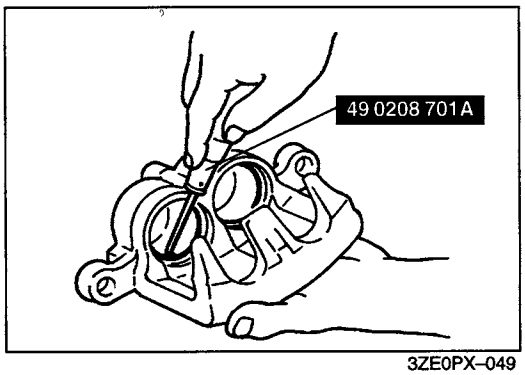
3ZE0PX–047

1. Snap ring
2. Dust seal
   Inspect for damage and poor sealing
3. Piston
   Disassembly Note ..... below
   Inspect for wear and rust
4. Piston seal
   Disassembly Note ..... below
5. Bleeder cap, bleeder screw
6. Caliper body
   Inspect for damage, wear and rust



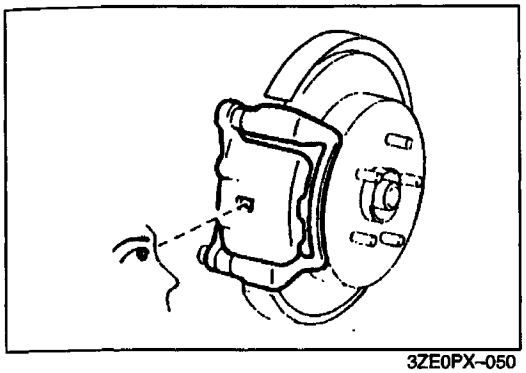
3ZE0PX–048

Disassembly note
Piston
1. Place the **SST** in the caliper.
2. Gently blow compressed air through the pipe hole to force the piston out of the caliper.



3ZE0PX–049

Piston seal
Remove the piston seal from the caliper by using the **SST**.


3ZE0PX-050

REAR BRAKE (DISC)
Inspection (on-vehicle)
Disc pad

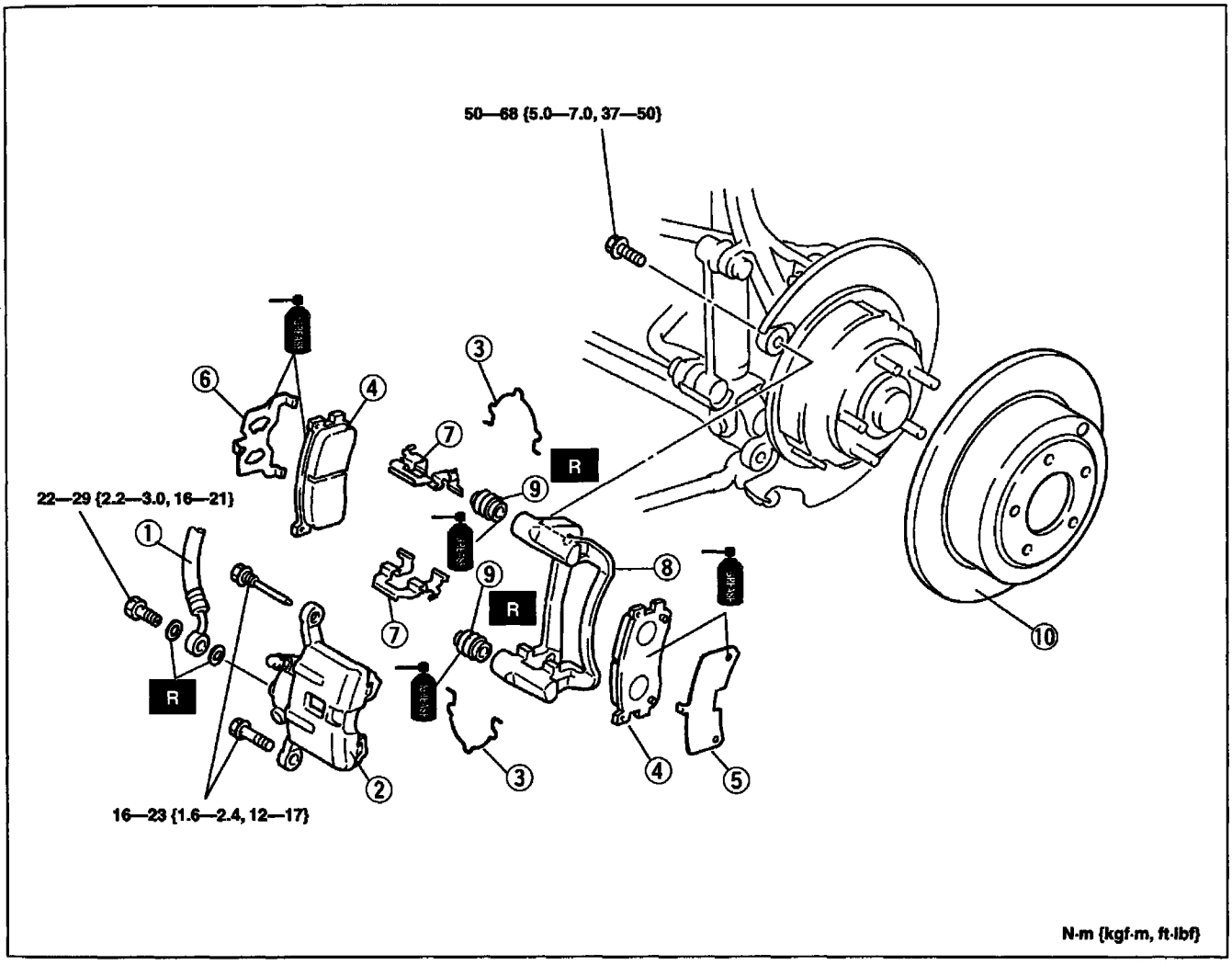
1. Look through the caliper inspection hole and inspect the remaining thickness of the pads.

   Thickness: 2 mm {0.08 in} min.

2. Replace the pads as a set (right and left wheels) if either is at or less than the minimum thickness.

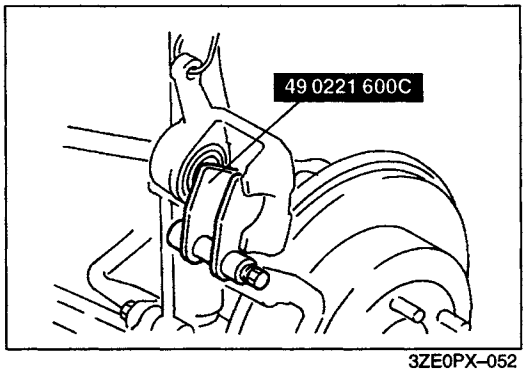
Removal / Inspection / Installation

- After installation, depress the pedal a few times. Then rotate the wheel by hand and verify that the brakes do not drag.
- If the disc plate has been replaced, settle the parking brake shoes. (Refer to page P–27.)



3ZE0PX-051

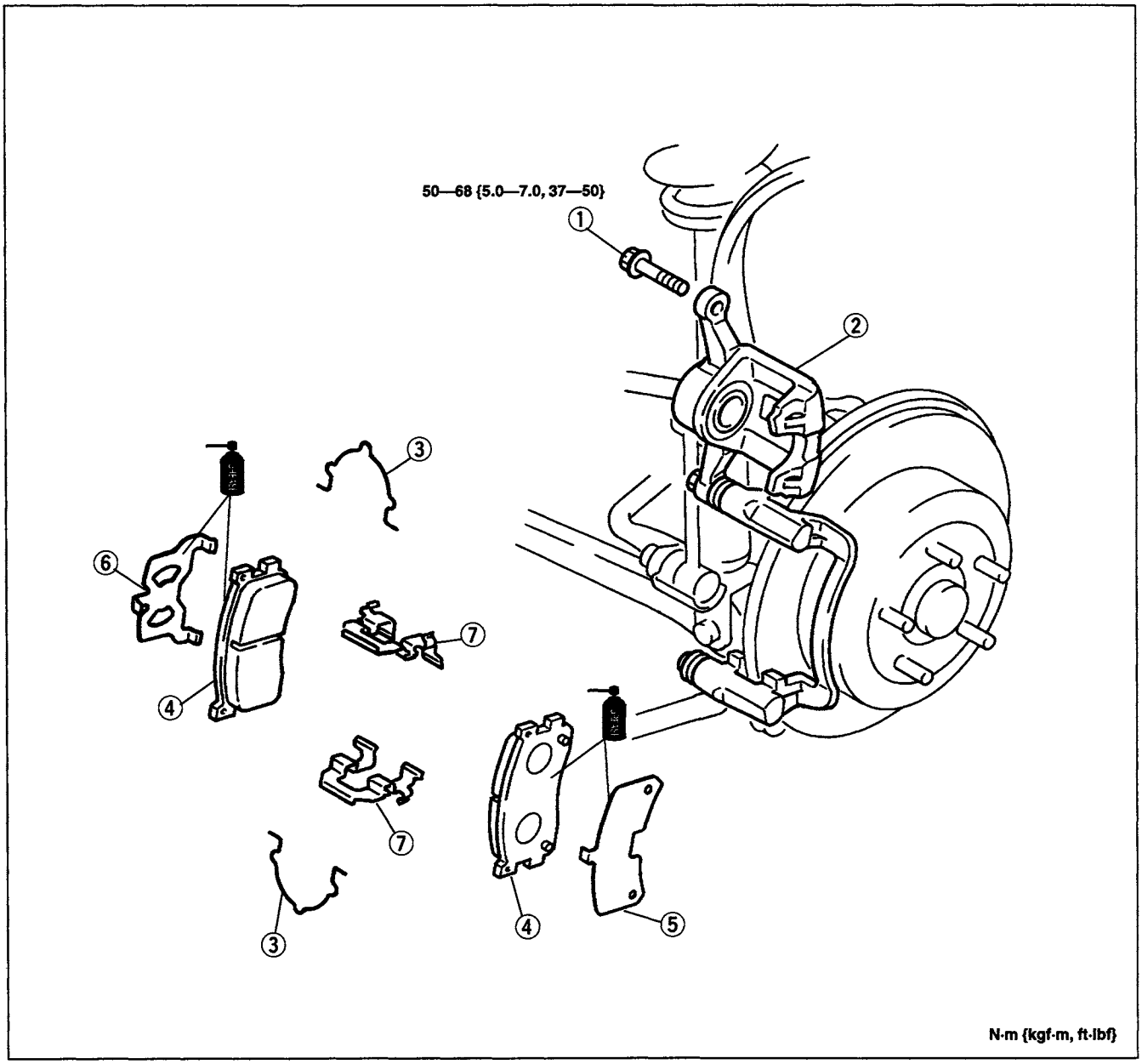
1. Flexible hose
2. Caliper
   Installation Note ..... page P–22
   Disassembly / Inspection / Assembly ..... page P–24
3. V-spring
4. Disc pad
   Inspection ..... above
5. Outer shim
6. Inner shim
7. Guide plate
8. Mounting support
9. Boot
10. Disc plate
    Inspection ..... page P–23



3ZE0PX–052

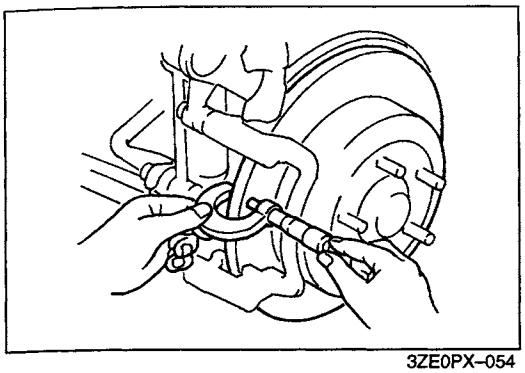
Installation note
Caliper
1. Push the piston fully inward by using the **SST**.
2. Install the caliper.

DISC PAD
Replacement



3ZE0PX–053

1. Bolt
2. Caliper
   Installation Note ..... above
3. V-spring
4. Disc pad
5. Outer shim
6. Inner shim
7. Guide plate

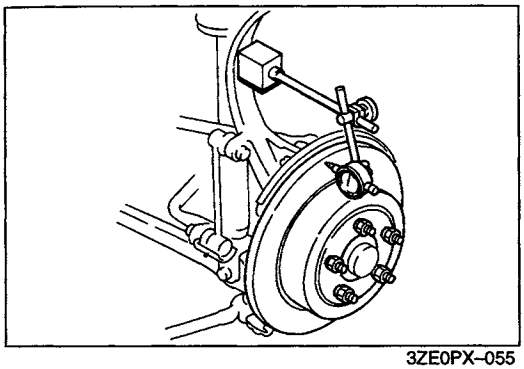

3ZE0PX-054

DISC PLATE
Inspection
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: 9.5 mm {0.37 in}
Minimum: 7.5 mm {0.29 in}
Minimun thickness after machining by using a brake lathe on-vehicle: 8.3 mm {0.33 in}

2. If the thickness is not within the specification, replace the disc plate.

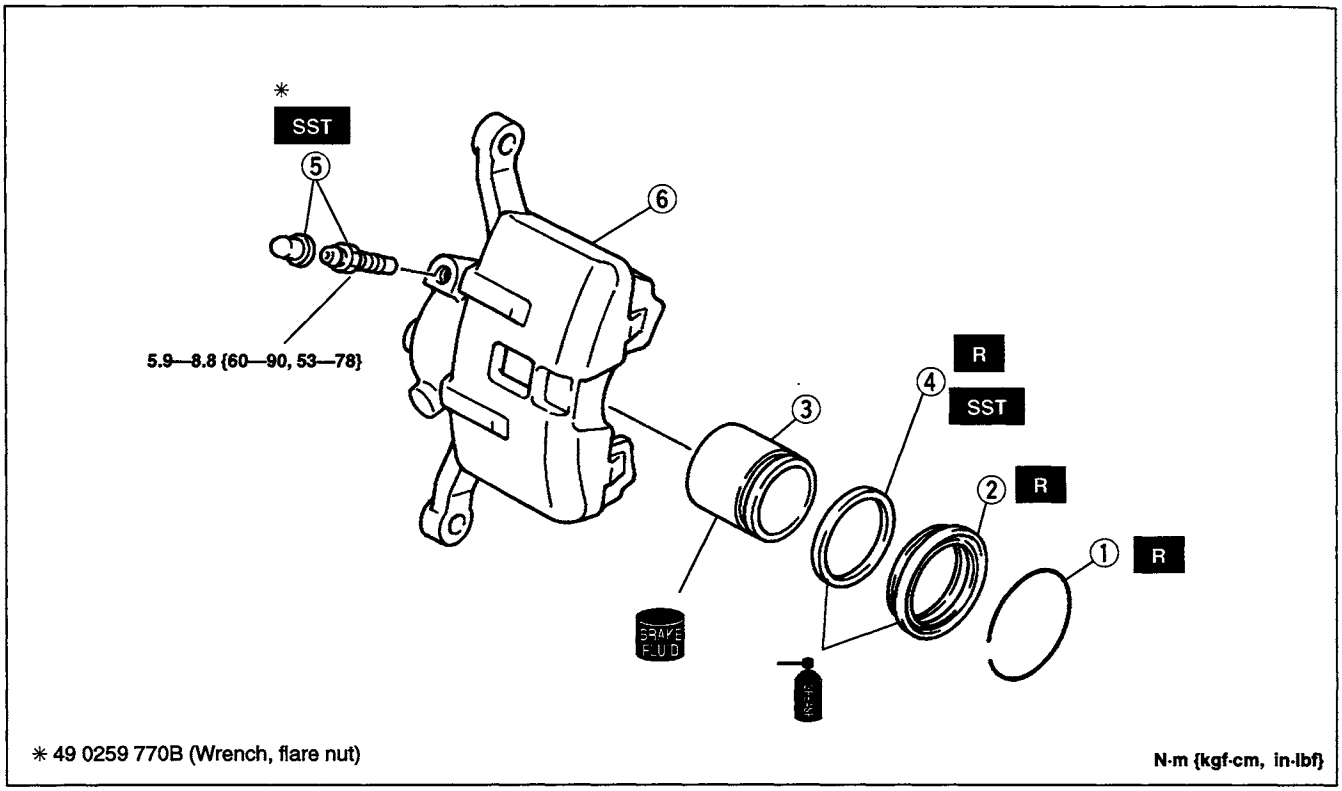

3ZE0PX-055

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: 0.05 mm {0.002 in} max.

3. If the runout is not within the specification, repair or replace the disc plate.

CALIPER
Disassembly / Inspection / Assembly

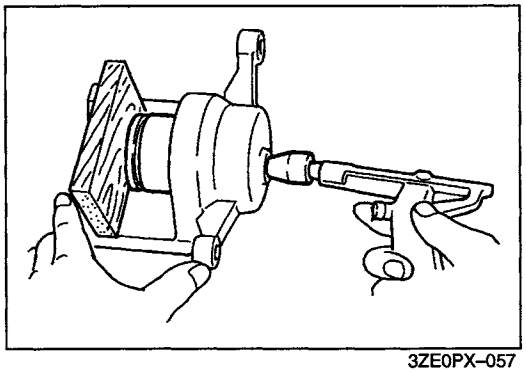


* 49 0259 770B (Wrench, flare nut)

N·m {kgf-cm, in-lbf}

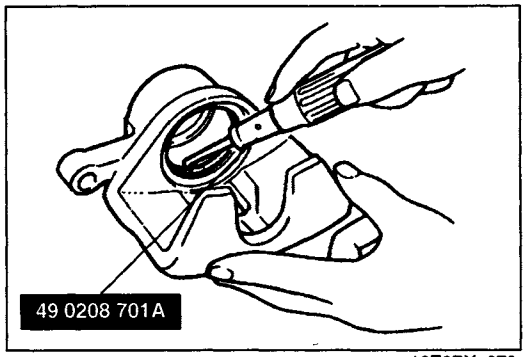
3ZE0PX–056

1. Snap ring
2. Dust seal
   Inspect for damage and poor sealing
3. Piston
   Disassembly Note ..... below
   Inspect for wear and rust
4. Piston seal
   Disassembly Note ..... below
5. Bleeder cap, bleeder screw
6. Caliper body
   Inspect for damage, wear and rust



3ZE0PX–057

Disassembly note
Piston
1. Place a piece of wood in the caliper.
2. Gently blow compressed air throuth the pipe hole to force the piston out of the caliper.



16E0PX–070

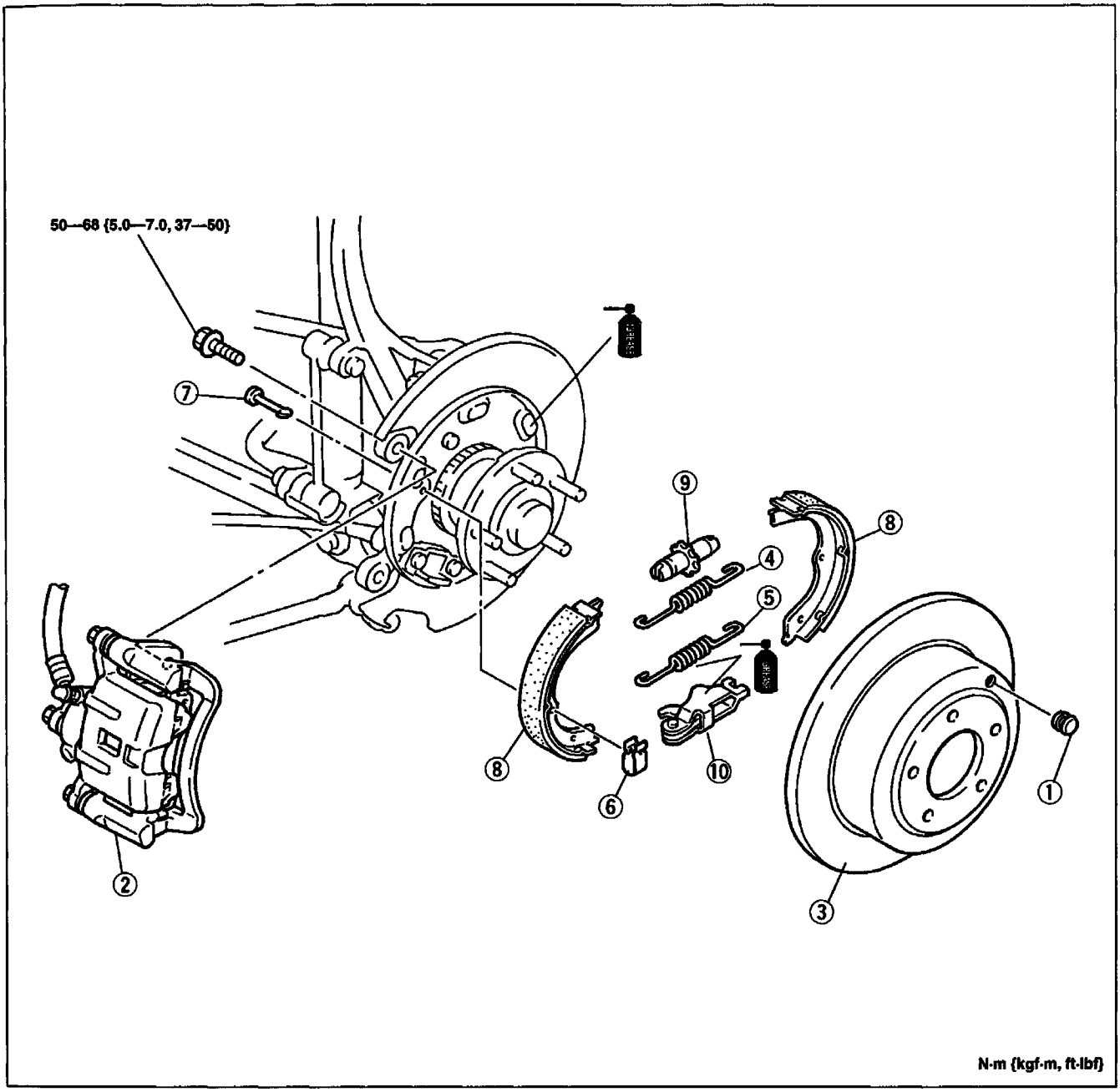
Piston seal
Remove the piston seal from the caliper by using the **SST**.

PARKING BRAKE SYSTEM

PARKING BRAKE SHOE

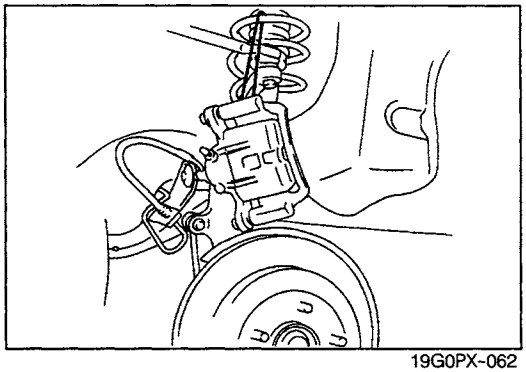
Removal / Inspection / Installation

- After installation, check the parking brake lever stroke. (Refer to page P–28.)
- If the parking brake shoes have been replaced, settle the parking brake shoes. (Refer to page P–27.)

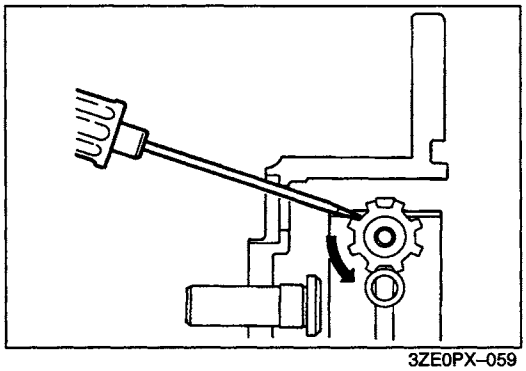


3ZE0PX–058

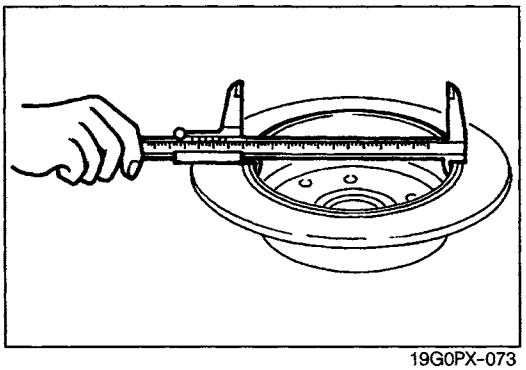
1. Service plug
2. Caliper
   - Removal Note ..... page P–26
   - Installation Note ..... page P–22
3. Disc plate
   - Removal Note ..... page P–26
   - Inspection ..... page P–26
   - Installation Note ..... page P–27
4. Upper return spring
5. Lower return spring
6. Hold spring
7. Hold pin
8. Parking brake shoe
   - Inspection ..... page P–26
   - Installation Note ..... page P–26
9. Adjuster
   - Installation Note ..... page P–27
10. Operating lever
    - Installation Note ..... page P–27


19G0PX-062

Removal note
Caliper
Support the caliper as shown in the figure.


3ZE0PX-059

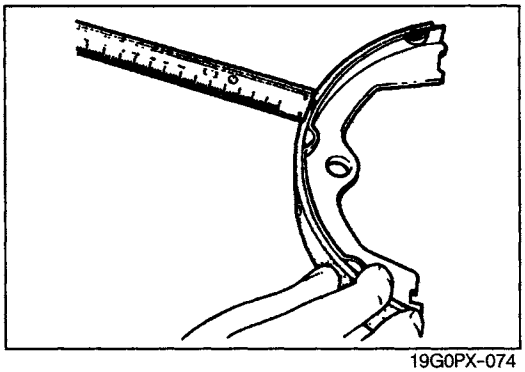
Disc plate
If the disc plate is difficult to remove, loosen the parking brake shoes as described below.
1. Remove the service plug from the disc plate.
2. Insert a screwdriver into the hole and turn the adjuster in the opposite direction of the arrow marked on the disc plate.


19G0PX-073

Inspection
Disc plate
1. Inspect the inside of disc plate for scratches and uneven or abnormal wear.
2. Measure the disc plate inner diameter.

   Inner diameter: 191.0 mm {7.52 in} max.

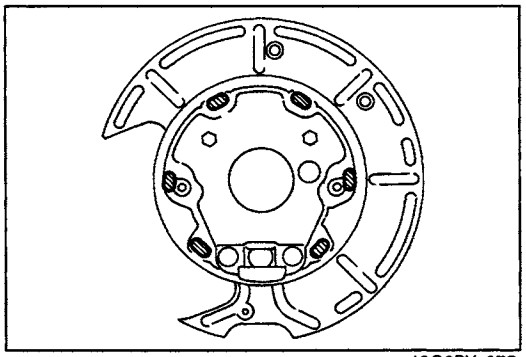
3. If the diameter is not within the specification, replace the disc plate.


19G0PX-074

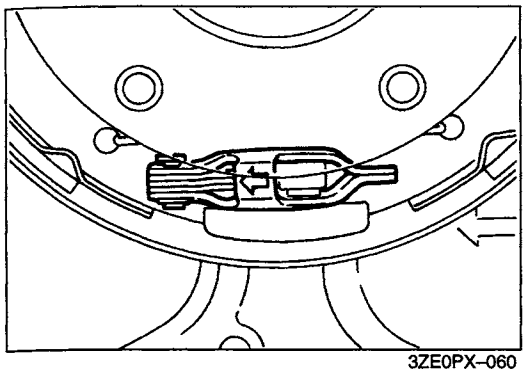
Parking brake shoe
1. Inspect the lining for peeling, cracking, and uneven wear.
2. Measure the lining thickness.

   Thickness: 1.0 mm {0.04 in} min.

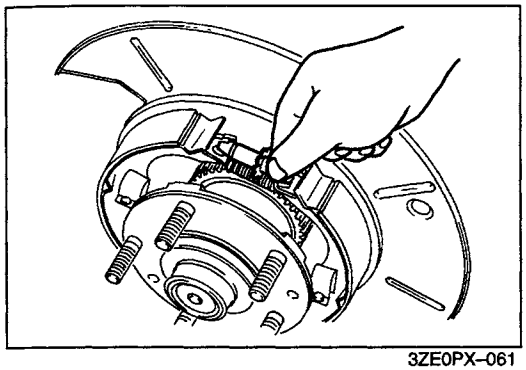
3. If the thickness is not within the specification, replace the parking brake shoes on the right and left wheels.


19G0PX-075

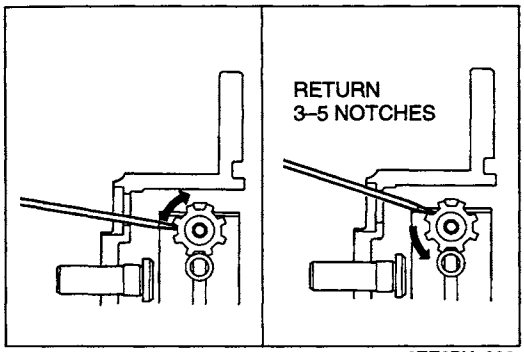
Installation note
Parking brake shoe
Before installing the parking brake shoes, apply grease to the shaded areas of the back plate, as shown in the figure.


3ZE0PX-060

Operating lever
1. Install the operating lever with the mark (⇦) facing the front.
2. Connect the operating lever to the parking brake cable.


3ZE0PX-061

Adjuster
1. Screw the threaded part of the adjuster in completely.
2. Install the adjuster between the brake shoes with the threaded part facing the front on the left wheel and the rear on the right wheel.

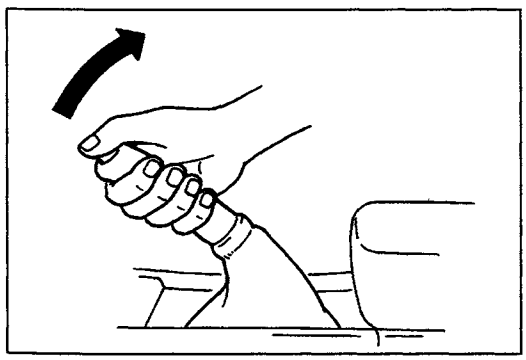


3ZE0PX-062

Disc plate
After installating the disc plate, adjust the parking brake shoe clearance as described below.
1. Remove the service plug from the disc plate.
2. Insert a screwdriver into the hole and turn the adjuster in the direction of the arrow marked on the disc plate until the disc plate locks.
3. Set the shoe clearance to about **0.34 mm {0.013 in}** by turning the adjuster **3–5 notches** in the opposite direction of the arrow marked on the disc plate.
4. Rotate the disc plate by hand, and verify that the brakes do not drag.
5. Install the disc plate service plug.

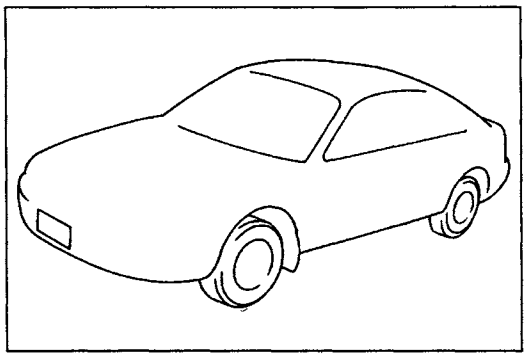
Settling the parking brake shoes

Warning
- **Settling the brake shoes in a crowded area can cause traffic accidents, which can lead to death or serious injury. Do this procedure only in a wide open area, or in an area with good overall visiblity, and be extremely careful of people, vehicles, and other obstacle in the area.**

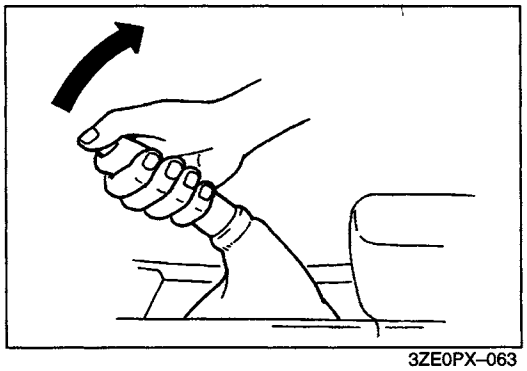


Caution
- **Doing this procedure more than 3 times during the life of the brake shoes will cause the lining to wear.**

1. Inspect the parking brake stroke, and adjust to specification if necessary. (Refer to page P–28.)
2. Pull up the parking brake lever with a force of **147 N {15 kgf, 33 lbf}**.



3. With the lever pulled up, drive the vehicle for **150 m {45.7 ft}** at about **30 km/h {19 MPH}**.
4. Stop the vehicle in a safe place, release the parking brake, and wait 5 minutes to cool the brakes.
5. Repeat steps 2 through 4 two more times.
6. After the procedure is completed, inspect the parking brake stroke, and adjust to specification if necessary.



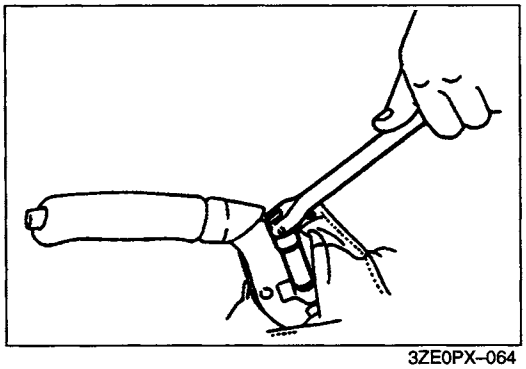
3ZE0PX-063

PARKING BRAKE (LEVER TYPE)

Inspection

Verify that the stroke is within the specification when the parking brake lever is pulled up with a force of **98 N {10 kgf, 22 lbf}**.

Stroke: 3—5 notches



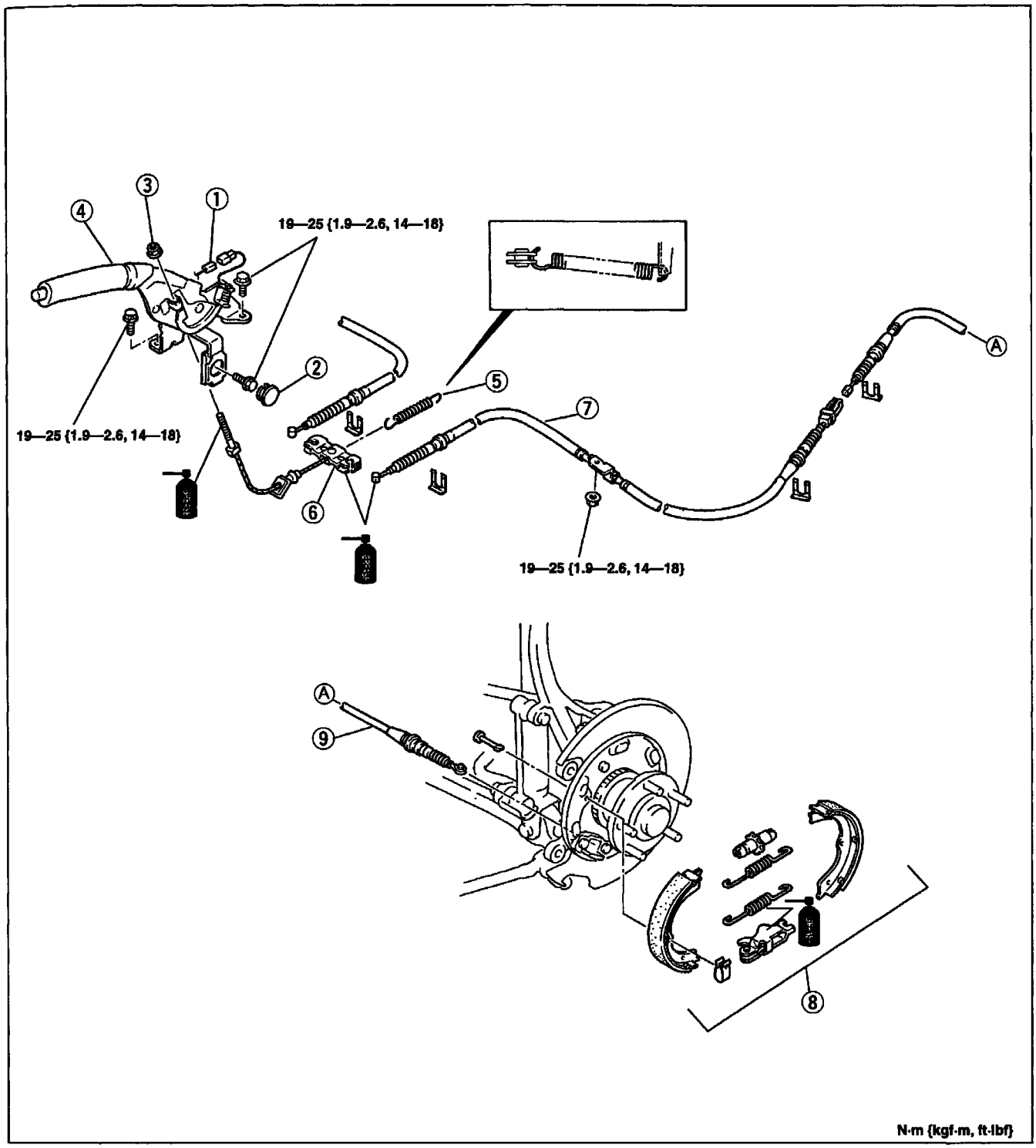
3ZE0PX-064

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 to 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 S.)
- After installation, adjust the parking brake lever stroke. (Refer to page P–28.)

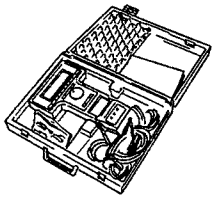
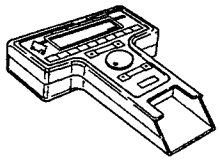
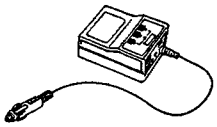
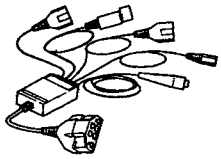
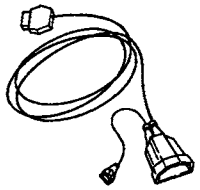
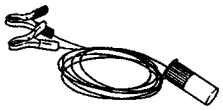
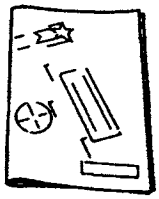


3ZE0PX–065

1. Connector
2. Cap
3. Adjusting nut
4. Parking brake lever assembly
5. Return spring
6. Equalizer
7. Front parking cable
   Inspect for damage
8. Parking brake shoe assembly
   Removal / Inspection / Installation ..... page P–25
9. Rear parking cable
   Inspect for 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 (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	—	—

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 diagnosis 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 diagnosis indication mode.

The on-board diagnosis system must be used when diagnosing malfunction 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 (60 seconds while TCS is operating) or more.
   - When there is insufficint battery positive 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 Index

No.	Troubleshooting Items	Remarks	Page
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–32
3	ABS warning light flashes	—	P–32

Symptom Troubleshooting

1	ABS WARNING LIGHT NOT ILLUMINATED WHEN IGNITION SWITCH TURNED ON		
DELAILED DESCRIPTION	—		
Possible cause: • If other warning indicators do not illuminate, METER 15A fuse may be burnt. • Failed warning light or open in related wiring harness.			
STEP	**INSPECTION**		**ACTION**
1	Is METER 15A fuse OK?	Yes	Go to next step
		No	Replace METER 15A 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
DELAILED DESCRIPTION	**ABS warning light remains ON and ABS does not operate**

Possible cause:
- 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 CM

STEP	INSPECTION		ACTION
1	Using the **SST**, check for diagnostic trouble codes Are there any? ☞ **page P–33**	Yes	Read diagnostic trouble code and follow diagnosis chart ☞ **page P–35**
		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 [2B] 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 [2Z] terminal of ABS CM connector indicates battery positive voltage [ ]: for ABS/TCS	Yes	Go to next step
		No	• Inspect ABS relay (fail-safe relay) ☞ **page P–45** • Inspect harness between ABS relay (fail-safe relay) and ABS CM, battery • Inspect harness between ABS relay (fail-safe relay) and HU Correct as necessary
6	Is voltage at terminals 1E [2V], 1F [1B] and 1H [1A] of ABS CM connector and terminal 2B [1F] and 2L [2C] of ABS CM connector as specified? ☞ **page P–43** [☞ **page P–63**] [ ]: for ABS/TCS	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
DELAILED DESCRIPTION	—

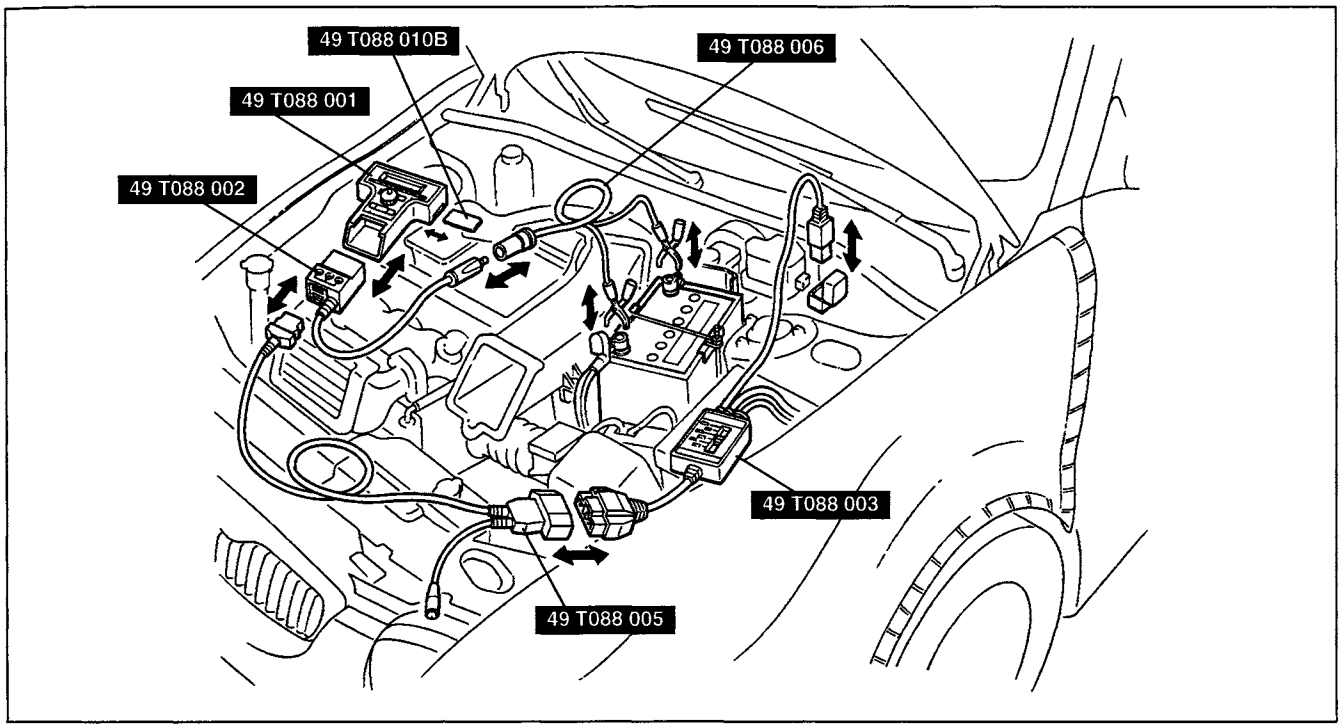
Possible cause:
- Data link connector terminal TBS ground

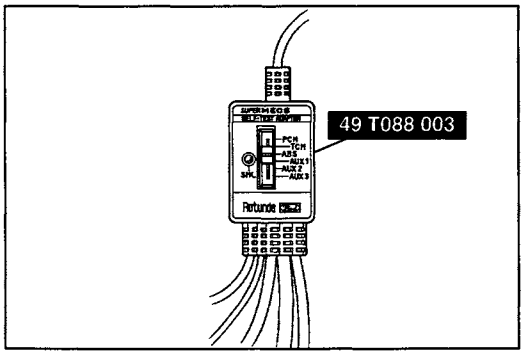
STEP	INSPECTION		ACTION
1	Verify that there is no continuity between terminals TBS and GND at data link connector	Yes	Inspect ABS CM
		No	Repair short between TBS and GND

On-Board Diagnosis System
Inspection by diagnostic test mode
Outline

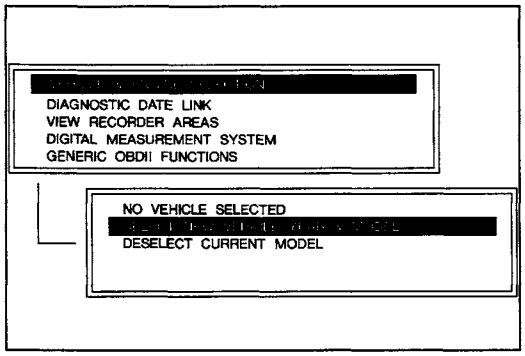
- The ABS control module contains on-board diagnosis and memory functions to detect and indicate present and past failures.
  Read and note the diagnostic indications by using the **SST**, and take action according to the Diagnostic trouble code table. (Refer to page P–35.)
- The ABS CM has a nonvolatile 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–34.)

Inspection using NGS

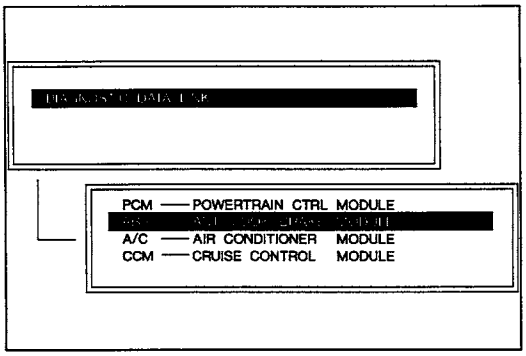




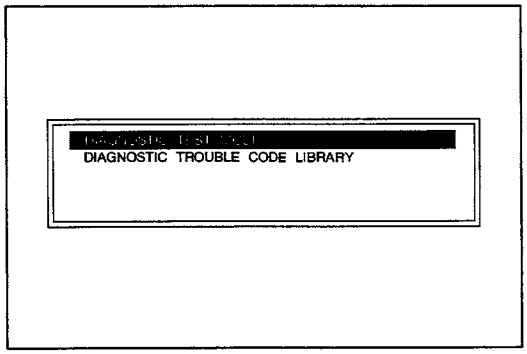
1. Connect the **SST** (NGS) to the data link connector and battery.
2. Set the **SST** (Super MECS Adapter) to ABS.



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 diagnostic trouble code is displayed, refer to the Diagnostic trouble code table (Refer to page P–35.) 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 ared.

Memory cancel

Diagnostic trouble codes memorized in the ABS control module are canceled by performing the following steps.

1. Connect TBS and GND terminals of the data link connector.
2. Turn the ignition switch to 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:
   - Intervals of depressing the brake pedal exceeded one second (1 sec.).
   - Brake switch has failed.

   While performing the memory cancel operation, the ABS warning light will not illuminate.
   When the memory cancel operation is completed, the ABS warning light comes on for 2—3 seconds, then goes out.
   After the memory is canceled, the ABS control module performs self-diagnosis.
5. For vehicles with Traction Control System (TCS), turn off the ignition switch to reset the control module.

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–36
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–36
22	SOLV (RH-FRONT) — OPEN OR SHORT	Right front solenoid valve	P–37
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–37
53	MOTOR, MOTOR RELAY — OPEN OR SHORT, DEFECT	Motor Motor relay	P–38
61	ABS CONTROL UNIT — DEFECT	ABS control module	P–38

* If the ignition switch is turned OFF and then 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 wheel-speed sensor, sensor rotor, or ABS hydraulic unit • Malfunction of related wiring harness

STEP	INSPECTION		ACTION
1	Is control module connector connected properly?	Yes	Go to next step
		No	Correct as necessary
2	Is wiring harness between control module and wheel-speed sensor OK?	Yes	Go to next step
		No	Correct as necessary
3	Is ABS wheel-speed sensor OK? ☞ page P–48	Yes	Go to next step
		No	Replace ABS wheel-speed sensor ☞ pages P–48, 49
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–39	Yes	Go to next step
		No	Replace ABS hydraulic unit ☞ page P–41
7	Erase diagnostic trouble code, and re-check for diagnostic trouble codes after driving over **10 km/h {6.2 MPH}** Is diagnostic trouble code 11—14 obtained?	Yes	Repace ABS control module ☞ page P–42
		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 wheel-speed sensor • Malfunction of related wiring harness

STEP	INSPECTION		ACTION
1	Erase diagnostic trouble code, and re-check 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: Go to next step
		No	There was a temporarily poor contact is wiring harness or connector
2	Is there open circuit in harnesses between ABS/TCS CM and each of the four wheel-speed sensors? Is each of the four wheel-speed sensor OK? (Refer to page P–49)	Yes	Replace ABS control module ☞ page P–42
		No	Repair or replace as necessary

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 control unit connector connected properly?	Yes	Go to next step
		No	Correct as necessary
2	Inspect solenoid valve including harness Is it OK? ☞ page P–40	Yes	Go to step 4
		No	Go to next step
3	Is solenoid valve OK? ☞ page P–41	Yes	Go to next step
		No	Replace ABS hydraulic unit ☞ page P–41
4	Erase diagnostic trouble code, and recheck for diagnostic trouble codes Is diagnostic trouble code 22–28 obtained?	Yes	Replace ABS control module ☞ page P–42
		No	There was a temporary 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

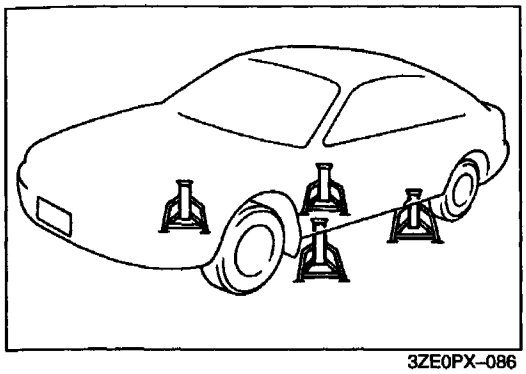
STEP	INSPECTION		ACTION
1	Is engine fuse (10A) OK?	Yes	Go to next step
		No	Replace fuse
2	Inspect fail-safe relay including harness Is it OK? ☞ page P–45	Yes	Go to step 4
		No	Go to next step
3	Is fail-safe relay OK? ☞ page P–46	Yes	Go to next step
		No	Replace ABS relay ☞ page P–45
4	Erase diagnostic trouble code, and recheck for diagnostic trouble codes Is diagnostic trouble code 51 obtained?	Yes	Replace ABS control module ☞ page P–42
		No	There was a temporary poor contact in wiring harness or connector

Diagnostic trouble code No.53	Motor, motor relay
Possible cause	• Malfunction of motor or motor relay • Malfunction of related wiring harness

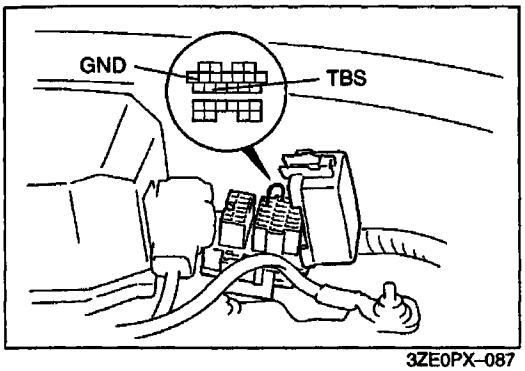
STEP	INSPECTION		ACTION
1	With ignition switch OFF, is motor operating?	Yes	Replace ABS relay ☞ page P–45
		No	Go to next step
2	Is ABS fuse (60A) OK?	Yes	Go to next step
		No	Replace fuse
3	Inspect motor relay including harness Is it OK? ☞ page P–46	Yes	Go to step 7
		No	Go to next step
4	Is motor relay OK? ☞ page P–47	Yes	Go to next step
		No	Replace ABS relay ☞ page P–45
5	Inspect ABS motor, including harness Is it OK? ☞ page P–40	Yes	Go to step 7
		No	Go to next step
6	Is ABS motor OK? ☞ page P–40	Yes	Correct harness as necessary
		No	Replace ABS hydraulic unit ☞ page P–41
7	Erase diagnostic trouble code, and recheck for diagnostic trouble codes Is diagnostic trouble code 53 obtained?	Yes	Replace ABS control module ☞ page P–42
		No	There was a temporary poor contact in wiring harness or connector

Diagnostic trouble code No.61	ABS control module
Possible cause	• Malfunction of control module

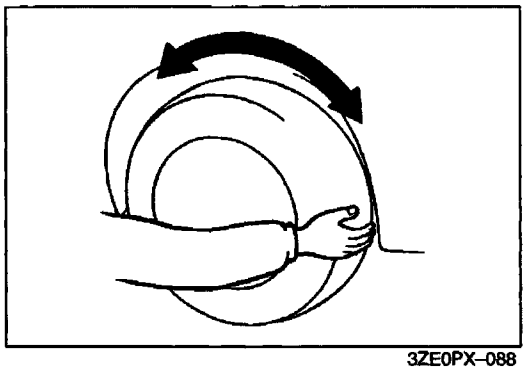
STEP	INSPECTION		ACTION
1	Is diagnostic trouble code 15 obtained together with 61?	Yes	Go to next step
		No	Replace ABS control module ☞ page P–42
2	Is there open circuit in harnesses between ABS CM and each of the four wheel speed sensors? Is each of the four wheel-speed sensor OK? (Refer to page P–49)	Yes	Go to next step
		No	Repair or replace as necessary, and go to next step
3	Erase diagnostic trouble code, and recheck for diagnostic trouble code Is diagnostic trouble code 61 obtained?	Yes	Replace ABS control module ☞ page P–42
		No	There was a temporary poor contact in wiring harness or connector



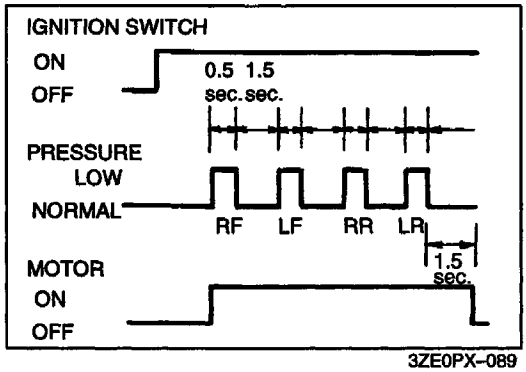
3ZE0PX-086



3ZE0PX-087



3ZE0PX-088

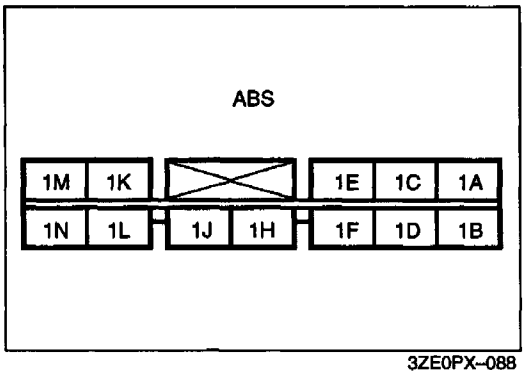


3ZE0PX-089

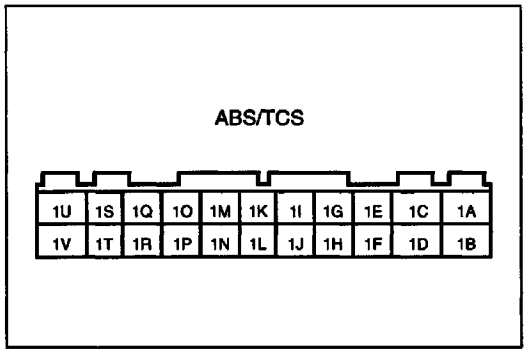
ABS HYDRAULIC UNIT
Inspection (on-vehicle)
System inspection

1. Verify that the battery is fully charged.
   Verify that the ABS warning light goes out after the engine is started.
2. If the light stays on after the engine has started, the ABS control module detects a failure and will not activate the hydraulic unit. Follow the troubleshooting procedures.
3. Turn off the engine.
4. On level ground, jack up the vehicle and support it evenly on safety stands. Shift the transaxle to neutral position.
5. Release the parking brake.
6. Rotate the wheels by hand, and inspect for brake drag.
7. Using a jumper wire, connect 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 to 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.



3ZE0PX-088

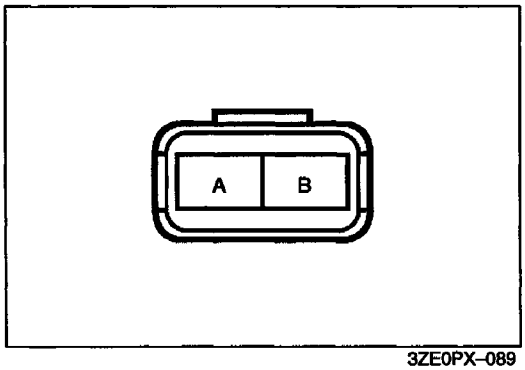


ABS motor (including harness to ABS control module)

1. Turn the ignition switch to OFF, and disconnect the ABS control module connector.
2. Measure the resistance between terminal 1L [1C for ABS/TCS] of the control module connector and a ground.

   Resistance: 1 Ω max.

3. If not as specified, check the wiring harness between the motor and the control module and check the ABS motor. (Refer to below.)



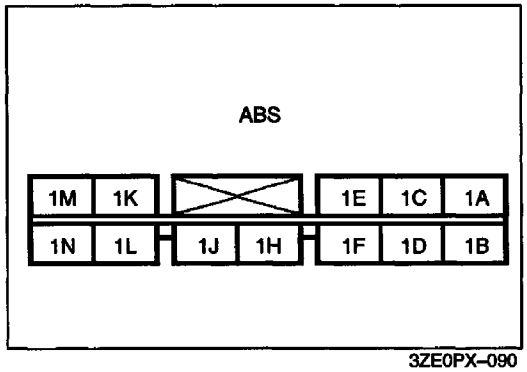
3ZE0PX-089

ABS motor

1. Turn the ignition switch to 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 connector (2 pin).
5. If not as specified, repair harness or replace the ABS hydraulic unit if necessary.



3ZE0PX-090

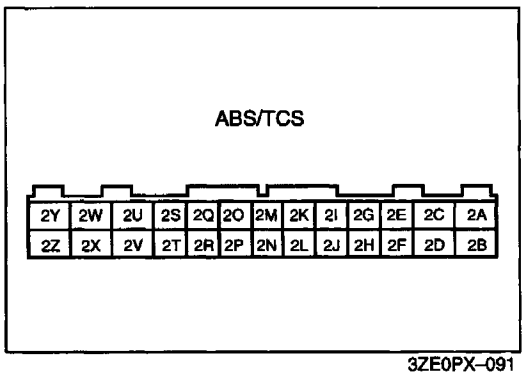
Solenoid valve
(including harness to ABS control unit)

1. Turn the ignition switch to OFF.
2. Measure the resistance between a ground and the following terminals at the ABS control module connector.

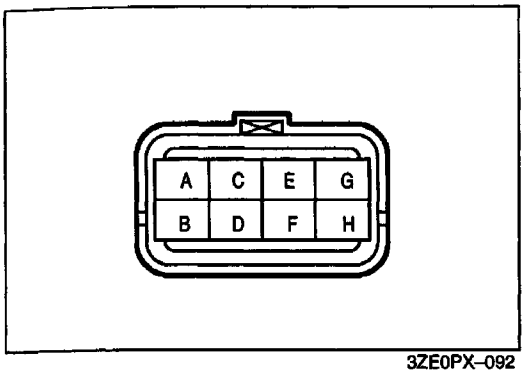
   Terminal: 1A [2V]: Right rear
   1B [2W]: Left front
   1C [2Y]: Right front
   1D [2Z]: Left rear [ ]: for ABS/TCS

   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 page P–41.)



3ZE0PX-091



3ZE0PX-092

Solenoid valve

1. Disconnect the ABS hydraulic unit connector (8 pin).
2. Measure the resistance between the following terminals.

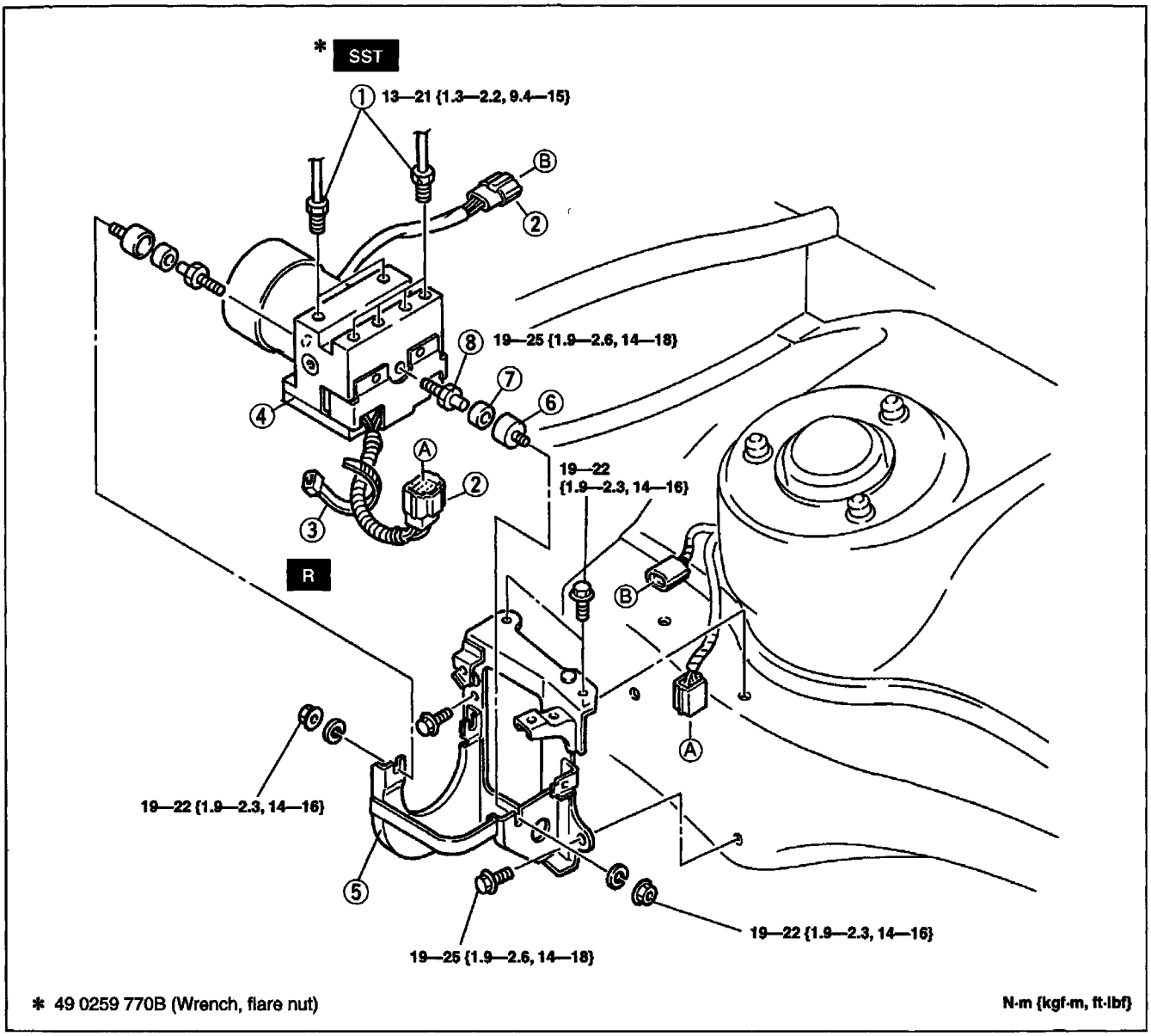
   A–E, B–F, C–G, D–H

   Resistance: Approx. 3 Ω

3. If not as specified, repair the hydraulic module harness or replace the ABS hydraulic unit if necessary.

Removal / Installation

- Remove the battery.

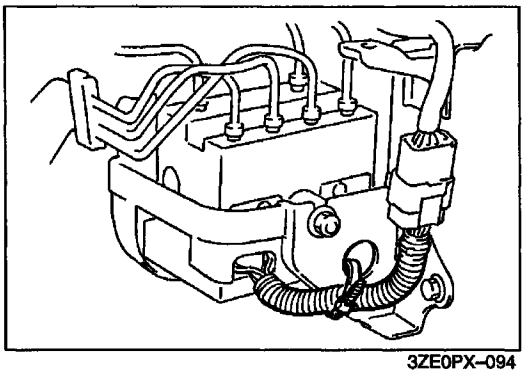


* 49 0259 770B (Wrench, flare nut)

N·m {kgf·m, ft·lbf}

3ZE0PX-093

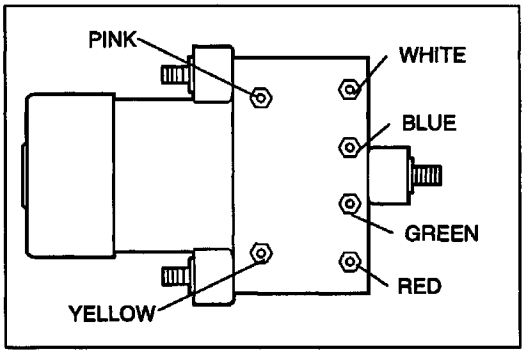
1. Brake pipe
   Installation Note ..... page P–42
2. Connector
3. Band
   Installation Note ..... page P–42
4. ABS hydraulic unit assembly
5. Bracket
6. Casing
7. Mount
8. Hex stud



3ZE0PX-094

Installation note
Band

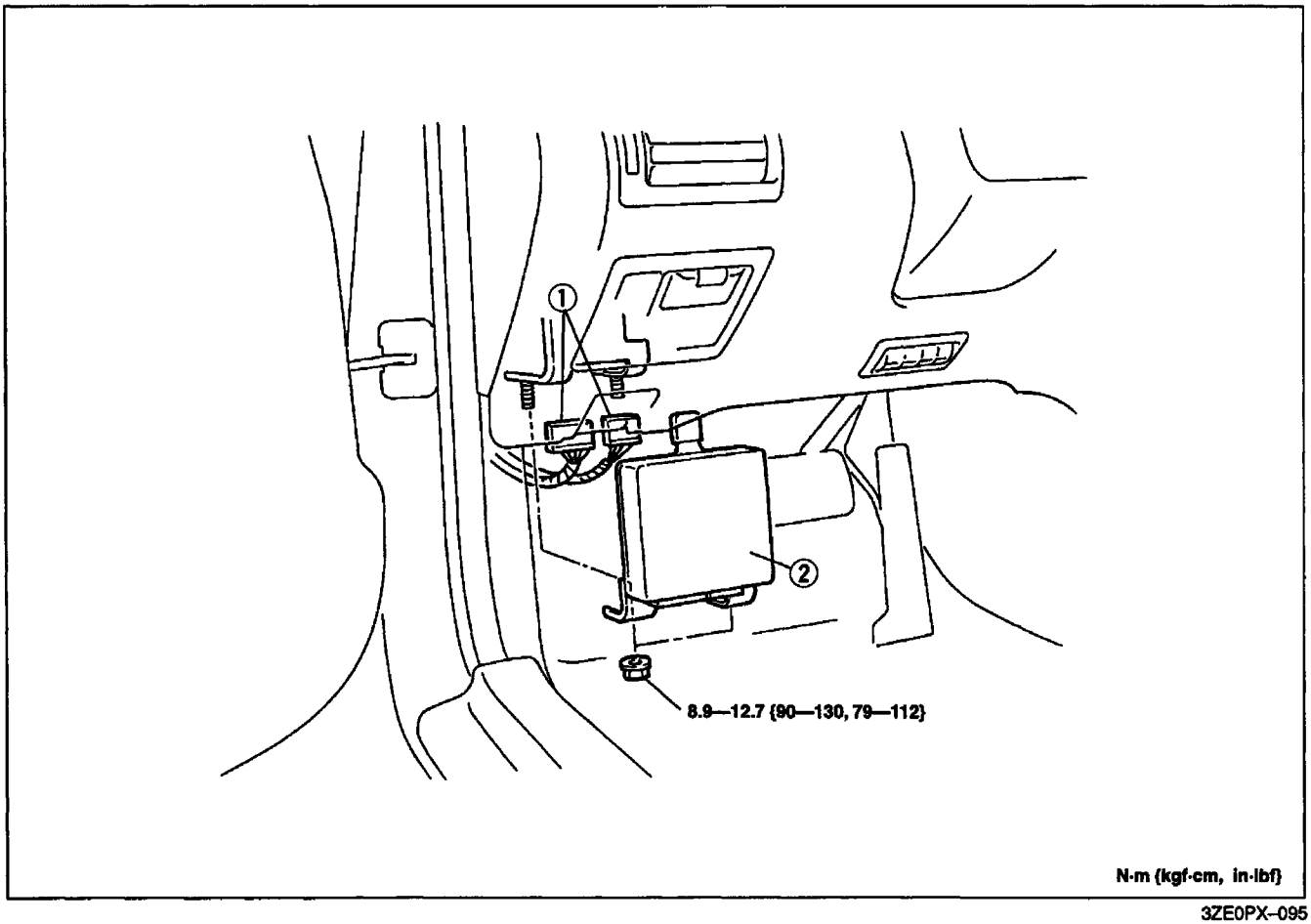
1. Install the band around the bracket and the harness, and tighten the band until it contacts the bracket.
2. Cut off the rest of the band end.



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



3ZE0PX-095

1. Connector
2. ABS control module
   Inspection ..... page P–43

Inspection

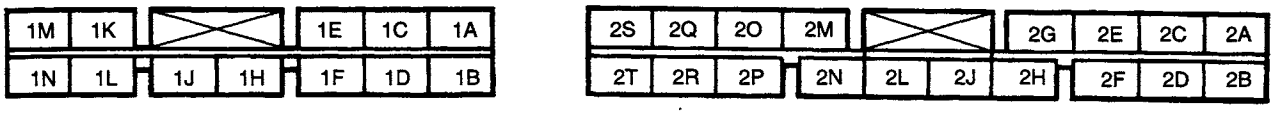
Terminal voltage chart (reference value)

(Ignition switch is ON, and connector is connected unless indicated otherwise)

- Refer to page P–64 for vehicles with TCS.

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	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 "Hydraulic unit system inspection". (Refer to page P–39.)

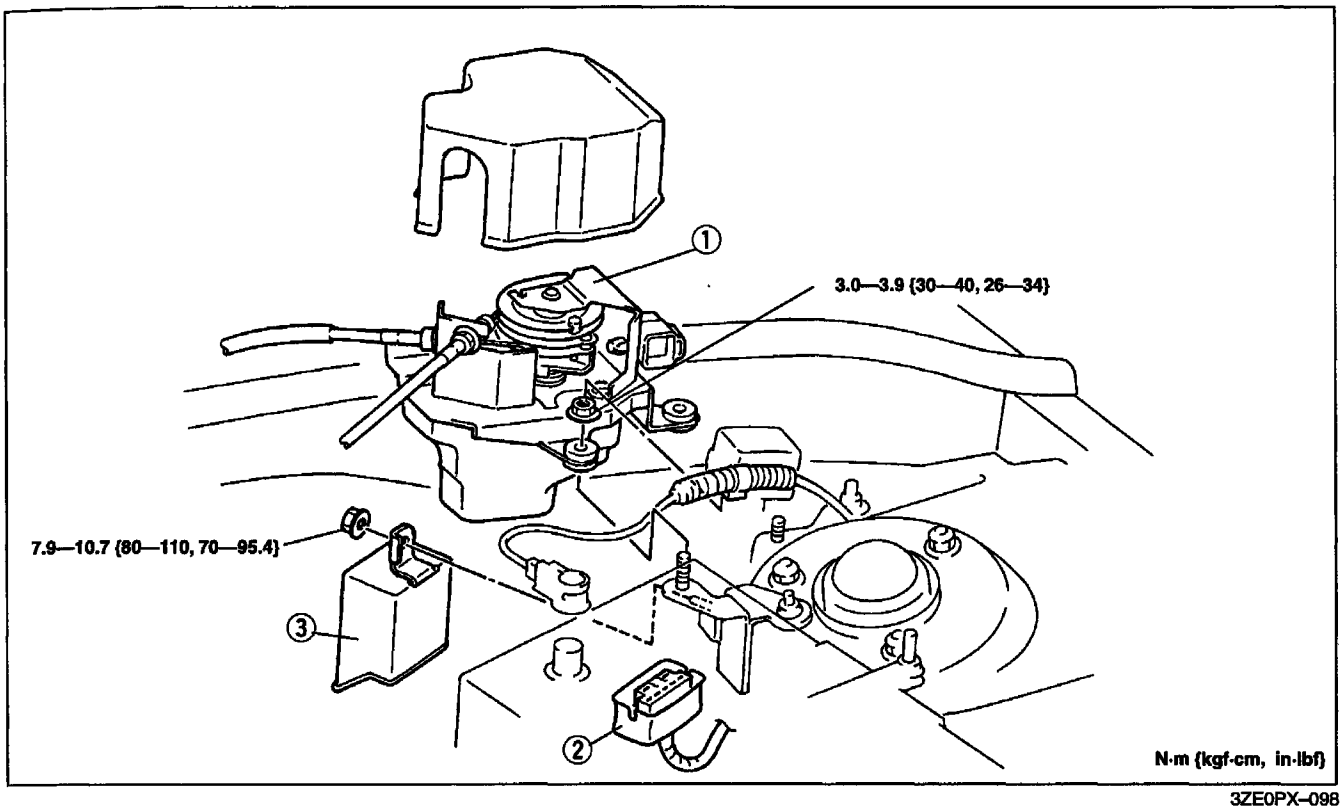
B+: Battery positive voltage

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)

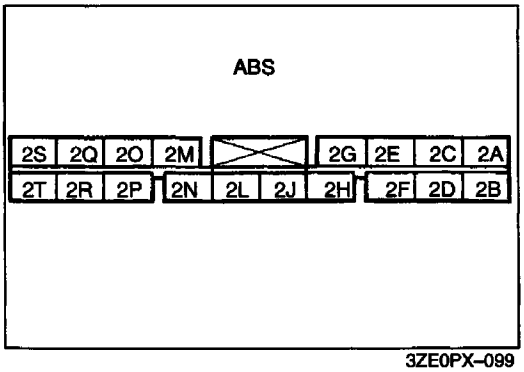
ABS RELAY
Removal / Inspection / Installation

Note
- The ABS relay contains the fail-safe relay and the motor relay.

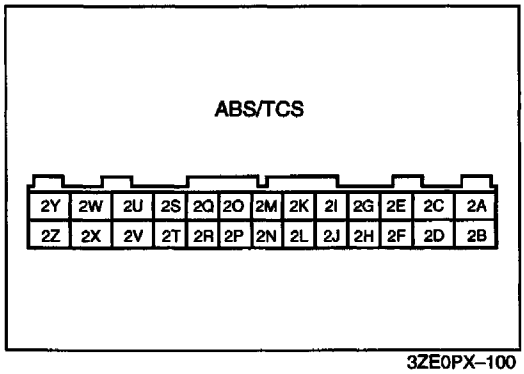


3ZE0PX–098

1. Cruise control actuator
   Service ..... section T
2. Connector
3. ABS relay
   Insection ..... below



3ZE0PX–099



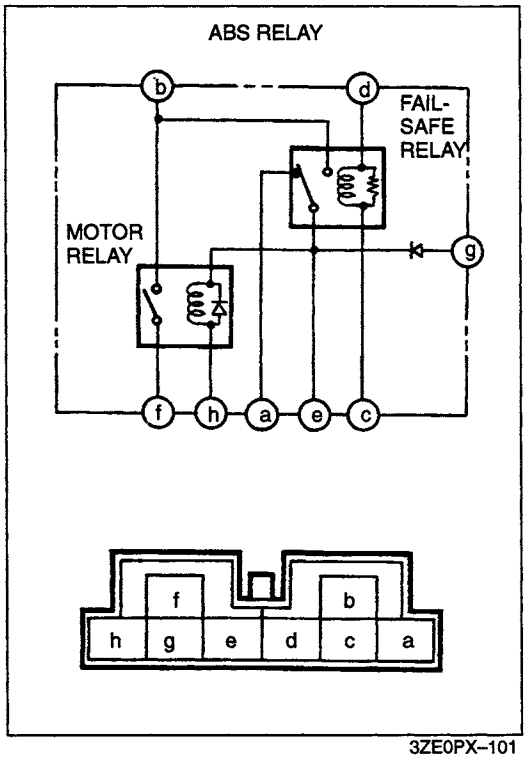
3ZE0PX–100

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 [2B for ABS/TCS] of the control module connector to a ground.
4. Check the following points.

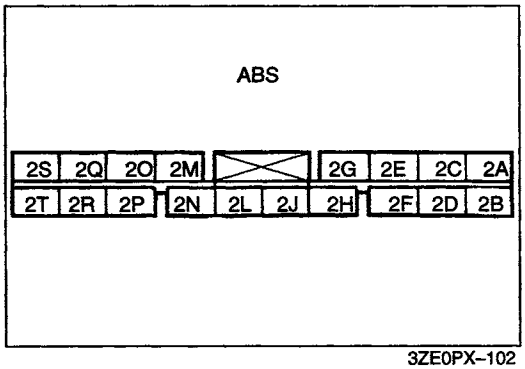
Condition	Action
Fail-safe relay in ABS relay does not click when 2J [2B] terminal grounded	• Check fail-safe relay • Check harness between fail-safe relay and ABS control module
Warning light illuminates after grounding 2J [2B] terminal	• Check fail-safe relay
1D [2Z] terminal of ABS control module connector does not indicate 12V	• Check fail-safe relay • Check harness between fail-safe relay and ABS hyraulic unit

[ ]: for ABS/TCS

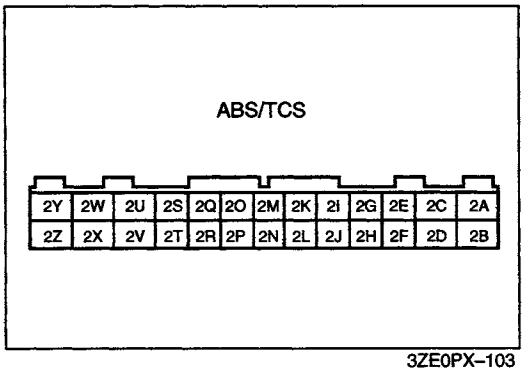
5. If not as specified, inspect the wiring harness and the fail-safe relay. (Refer to page P–46.)



3ZE0PX-101



3ZE0PX-102



3ZE0PX-103

Fail-safe relay

1. Measure resistance between terminals c and d of ABS relay connector.

   Resistance: 60—100 Ω

2. Check for continuity between terminals a and e, and between b and e.

Terminal	Conitinuity
a—e	Yes
b—e	No

3. Apply 12 V between terminals d and c. Check for continuity between terminals b and e and between a and e.

Terminal	Conitinuity
b—e	Yes
a—e	No

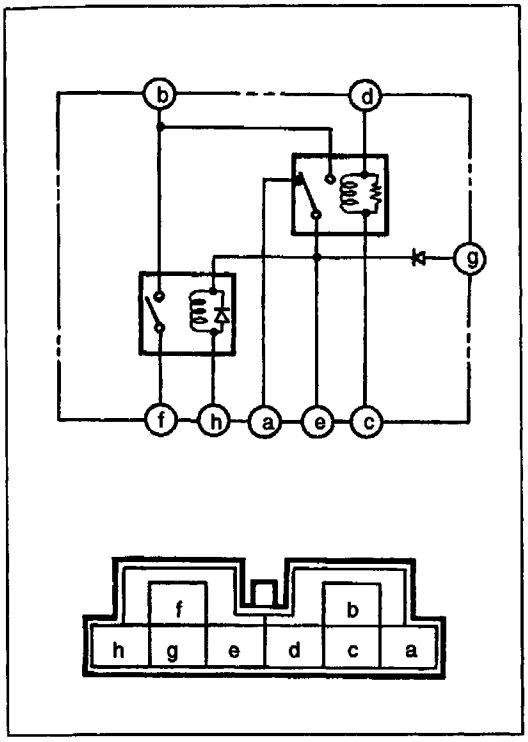
4. If not as specified, replace the ABS relay.

Motor relay (including harness to ABS CM)

1. Inspect the fail-safe relay.
2. Turn the ignition switch to OFF and disconnect the ABS control module connector.
3. Turn the ignition switch to ON.
4. Connect terminal 2J [2B for ABS/TCS] to a ground.
5. Connect terminal 2H [2A for ABS/TCS] 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–47.)



3ZE0PX-104

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 terminals b and f.

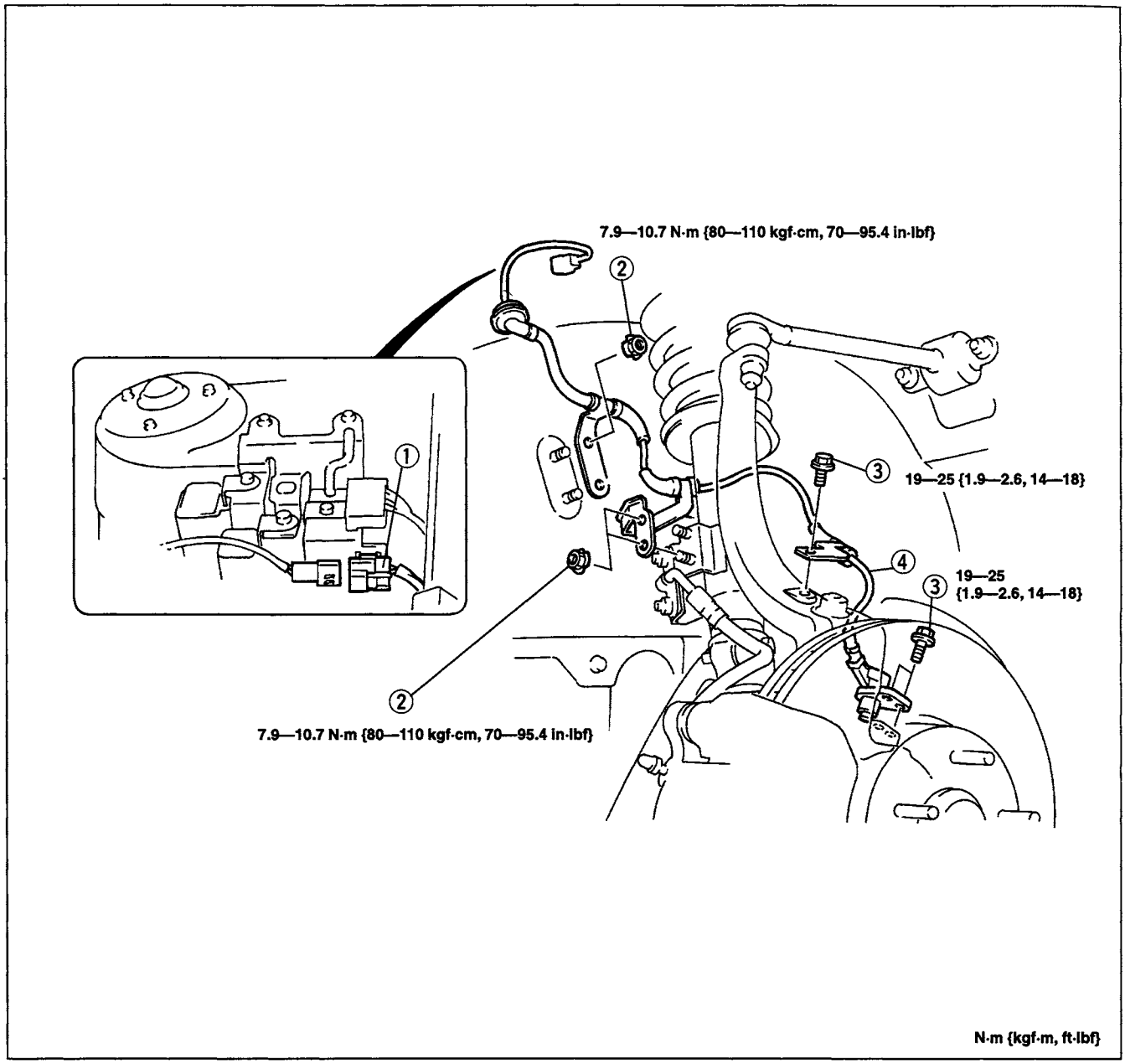
Terminal	Conitinuity
b—f	No

3. Apply 12 V to terminals g (+) and h (–). Check for continuity between terminals b and f.

Terminal	Conitinuity
b—f	Yes

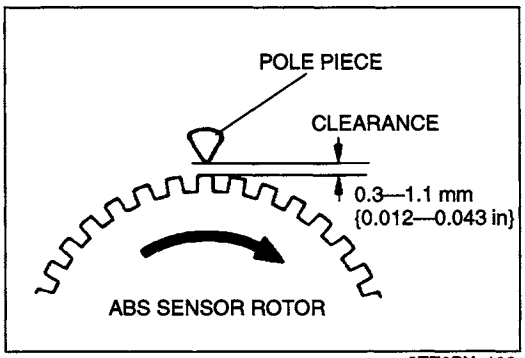
4. If not as specified, replace the ABS relay.

ABS WHEEL-SPEED SENSOR (FRONT)
Removal / Inspection / Installation



3ZE0PX–105

1. Connector
2. Nut
3. Bolt
4. ABS wheel-speed sensor
   Inspection ..... below



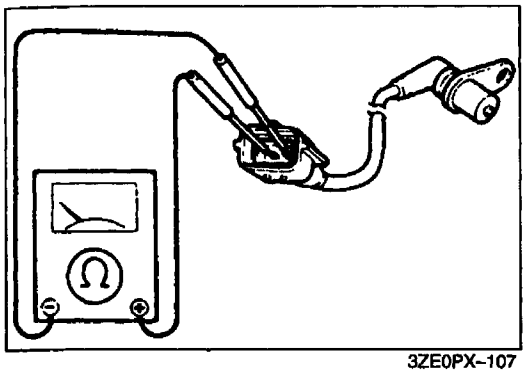
3ZE0PX–106

ABS wheel-speed sensor
Inspection (On-vehicle)

1. Check the clearance between the wheel-speed sensor and the sensor rotor.

   Clearance: 0.3—1.1 mm {0.012—0.043 in}

2. If not as specified, replace the ABS wheel-speed sensor or sensor rotor as necessary.


3ZE0PX-107

Resistance of ABS wheel-speed sensor
1. Disconnect the ABS wheel-speed sensor connector.
2. Check resistance at the ABS wheel-speed sensor.

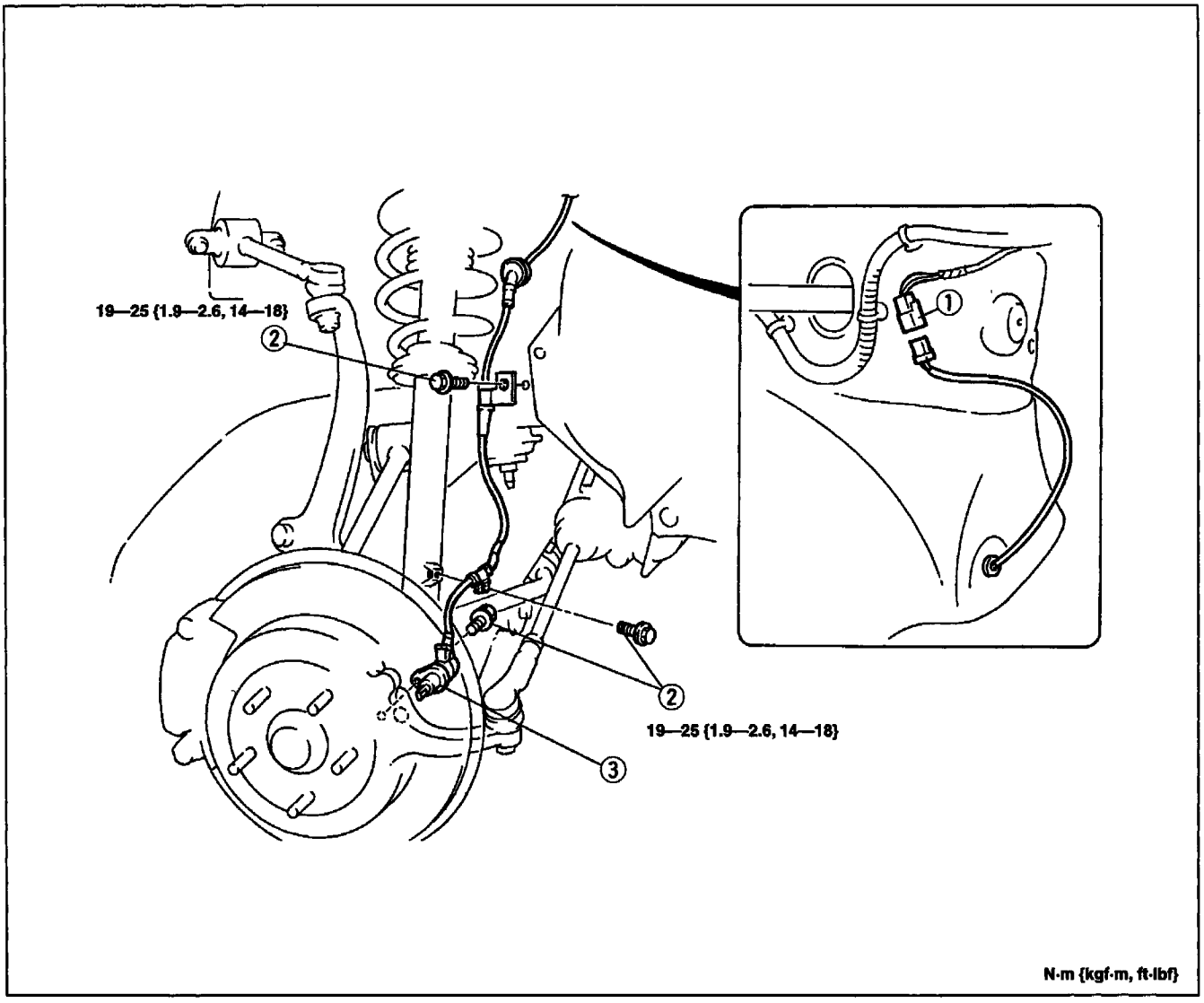
   Resistance: 1.6—2.0 kΩ

Voltage of ABS wheel-speed sensor
1. On level ground, jack up the vehicle and support it evenly on safety stands.
2. Disconnect the 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 / Inspection / Installation

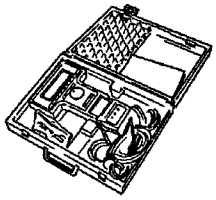
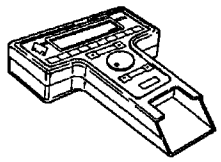
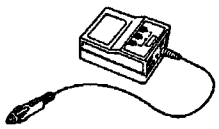
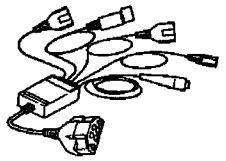
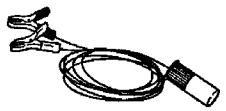
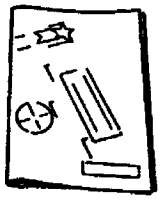


3ZE0PX-108

1. Connector
2. Bolt
3. ABS wheel-speed sensor
   Inspection ..... page P–48

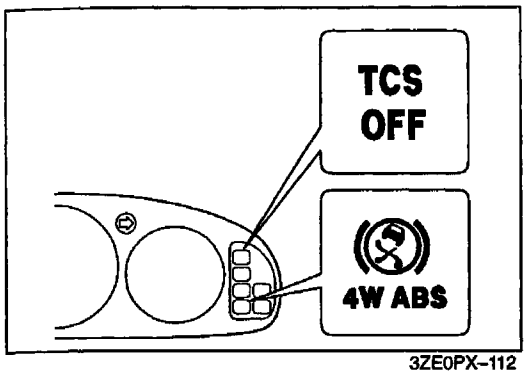
TRACTION CONTROL SYSTEM (TCS)

PREPARATION
SST

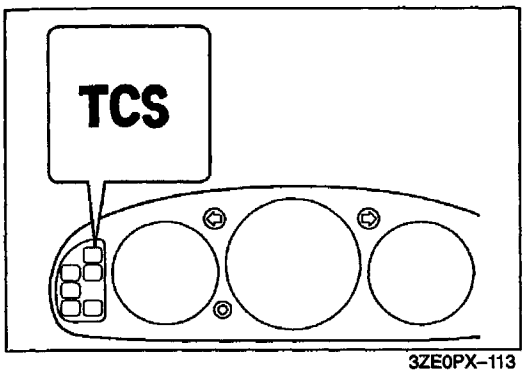
49 T088 0A0 NGS set		For diagnosis	49 T088 001 Control Unit (Part of 49 T088 0A0)		For diagnosis
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0)		For diagnosis	49 T088 003 Super MECS Adapter (Part of 49 T088 0A0)		For diagnosis
49 T088 005 STAR/DCL Adapter (Part of 49 T088 0A0)		For diagnosis	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

TROUBLESHOOTING
Troubleshooting notes
Some of the electrical components of the TCS are shared with the ABS and engine control. Malfunction of the TCS electrical components is judged by the on-board diagnosis function within the engine control module and/or ABS/TCS control module. Malfunctions are indicated by the warning light in the instrument panel. The technician can locate the malfunctions by using the **SST** (NGS set).

Conditions that are not malfunctions
The TCS warning light may illuminate under any of the following conditions:
- When TCS OFF is selected by the TCS OFF switch.
  The warning light will be off and the TCS will be ready for operation when the TCS OFF switch is pressed again.
- When (while the vehicle is jacked up or stuck) the front wheels only are spun for 60 seconds or more.
  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.
- When there is insufficient battery voltage.
  The warning light will be off and the TCS will be ready for operation when the battery voltage rises. There will also be no diagnostic trouble code entry made to the control module.
- When the engine coolant temperature is extremely low.
  The warning light will be off and the TCS will be ready for operation when the engine coolant temperature rises. There will also be no diagnostic trouble code entry made to the control module memory.



3ZE0PX-112



3ZE0PX-113

System Operation Check

1. Place the front wheels on a chassis roller or jack up the front of the vehicle on level ground and support it on safety stands.
2. Start the engine, and verify that the TCS OFF light is out.

   Note
   - In order to protect the engine, if engine coolant temperature is extremely low, TCS control is temporarily interrupted until the engine coolant temperature rises. In such cases, the TCS OFF light illuminates.

3. If the light stays on after the engine is started, the TCS/ABS control module detects a failure. In that case, turn off the engine and follow the troubleshooting procedures.
4. Select D position.
5. Depress the accelerater pedal for 5 seconds, and verify that the engine speed is held low and that the TCS indicator light flashes.

   Note
   - If the front wheels rotate for 60 seconds or more, the ABS and TCS OFF lights illuminate, and the engine speed increases.
     In that case, the warning light will not illuminate a second time when the ignition is switched OFF then back ON, and there will be no diagnostic trouble code entry made to the control module memory.

6. If not as described, follow the troubleshooting procedures.

Diagnosis Index

No.	Troubleshooting Items	Remarkes	Page
1	TCS OFF light and TCS indicator light illuminate during driving	—	P-52
2	TCS OFF light, TCS indicator light and ABS warning light illuminate during driving	—	P-52
3	TCS OFF light, TCS indicator light and malfunction indicator lamp illuminate during driving	—	P-52
4	TCS OFF light illuminates during driving	—	P-53
5	TCS indicator light flashes during driving	—	P-53
6	TCS OFF light or TCS indicator light has illuminated in the past	Not illuminated at present	P-54
7	TCS does not fully operate	—	P-54

Symptom Troubleshooting

1	TCS OFF LIGHT AND TCS INDICATOR LIGHT ILLUMINATE DURING DRIVING		
DETAILED DESCRIPTION	—		
Possible cause: • ABS/TCS control module detects a failure • ECM (PCM) detects a failure			
STEP	**INSPECTION**		**ACTION**
1	Using the **SST**, check for DTCs. ☞ **page P–55** Are there any DTCs?	Yes	Read DTC and follow diagnosis chart ☞ **page P–57**
		No	Go to next step
2	Check for engine control system DTCs. ☞ **section F1 or F2** Are there any DTCs?	Yes	Follow troubleshooting for engine control
		No	Go to next step
3	Are the following harnesses normal? • ABS/TCS CM — TCS OFF light • ABS/TCS CM — TCS indicator light	Yes	Replace ABS/TCS CM
		No	Repair or replace wiring harness

2	TCS OFF LIGHT, TCS INDICATOR LIGHT, AND ABS WARNING LIGHT ILLUMINATE DURING DRIVING		
DETAILED DESCRIPTION	—		
Possible cause: • ABS/TCS CM detects a failure • Low battery voltage			
STEP	**INSPECTION**		**ACTION**
1	Using the **SST**, check for DTCs. ☞ **page P–55** Are there any DTCs?	Yes	Read DTC and follow diagnosis chart ☞ **page P–57**
		No	Go to STEP 2 in ABS symptom troubleshooting

3	TCS OFF LIGHT, TCS INDICATOR LIGHT, AND MALFUNCTION INDICATOR LAMP ILLUMINATE DURING DRIVING		
DETAILED DESCRIPTION	—		
Possible cause: • ECM (PCM) detects a failure			
STEP	**INSPECTION**		**ACTION**
1	Check for engine control system DTCs. ☞ **section F1 or F2** Are there any DTCs?	Yes	Follow troubleshooting for engine control
		No	Replace ECM (PCM)

4	TCS OFF LIGHT ILLUMINATES DURING DRIVING
DETAILED DESCRIPTION	—

Possible cause:
- Malfunction of TCS OFF switch
- ABS/TCS CM detects a failure
- ECM (TCM) detects a failure
- Malfunction of related wiring harness

STEP	INSPECTION		ACTION
1	Warn up the engine for 15 minutes. Does TCS OFF light go out within 15 minutes?	Yes	System is normal
		No	Go to next step
2	Are TCS OFF switch and related wiring harness normal? ☞ **page P–64**	Yes	Go to next step
		No	Repair or replace as necessary
3	Using the **SST**, check for DTCs. ☞ **page P–55** Are there any DTCs?	Yes	Read DTC and follow diagnosis chart ☞ **page P–57**
		No	Go to next step
4	Check for engine control system DTCs. ☞ **section F1 or F2** Are there any DTCs?	Yes	Follow troubleshooting for engine control
		No	Go to next step
5	Is the harness between ABS/TCS CM and TCS OFF light normal? • Check for short to ground	Yes	Replace ABS/TCS CM
		No	Repair or replace wiring harness

Note
- In order to protect the engine, if the engine coolant temperature is 0°C {32°F} or less, the TCS control is temporarily interrupted until the engine coolant temperature rises. In such cases, the TCS OFF light illuminates.

5	TCS INDICATOR LIGHT FLASHES DURING DRIVING
DETAILED DESCRIPTION	—

Possible cause:
- "Spare use only" tire is used at front
- Incorrect tire size/pressure
- Short to ground of TCS indicator light harness

STEP	INSPECTION		ACTION
1	Are tire size and pressure as specified? ☞ **section Q**	Yes	Go to next step
		No	Correct as specified
2	Is the harness between the ABS/TCS CM and the TCS indicator light normal? • Check for short to ground	Yes	Inspect ABS wheel-speed sensor/rotor Repair or replace as necessary ☞ **page P–48**
		No	Repair or replace wiring harness

Note
- When wheel spinning occurs, flashing of the TCS indicator light indicates that the system is operating and the TCS is normal.
- When different size tires are used or tire pressure is insufficient, the TCS may go into operation. If the TCS is operating, the TCS OFF cannot be selected until the TCS operation has been completed.

6	TCS OFF LIGHT OR TCS INDICATOR LIGHT HAS ILLUMINATED IN THE PAST		
DETAILED DESCRIPTION	—		
Possible cause: • ABS/TCS CM detected a failure in the past • ECM (PCM) detected a failure in the past • Malfunction of harness related to TCS OFF light, TCS indicator light, and/or TCS OFF switch			
STEP	**INSPECTION**		**ACTION**
1	Using the **SST**, check for DTCs. ☞ **page P–55** Are there any DTCs?	Yes	Read DTC and follow diagnosis chart ☞ **page P–57**
		No	Go to next step
2	Check for engine control system DTCs. ☞ **section F1 or F2** Are there any DTCs?	Yes	Follow troubleshooting for engine control
		No	Go to next step
3	Are the following harness normal? • ABS/TCS CM — TCS OFF light • ABS/TCS CM — TCS indicator light Are TCS OFF SW and related harness normal?	Yes	System is normal Recheck customer's complaint
		No	Repair or replace as necessary

7	TCS DOES NOT FULLY OPERATE		
DETAILED DESCRIPTION	—		
Possible cause: • Incorrect tire size/pressure • Malfunction of engine control system			
STEP	**INSPECTION**		**ACTION**
1	Are tire size and pressure as specified? ☞ **section Q**	Yes	Go to next step
		No	Correct as specified
2	Check for engine control system DTCs. ☞ **section F1 or F2** Are there any DTCs?	Yes	Follow troubleshooting for engine control
		No	Perform system operation check ☞ **page P–51**

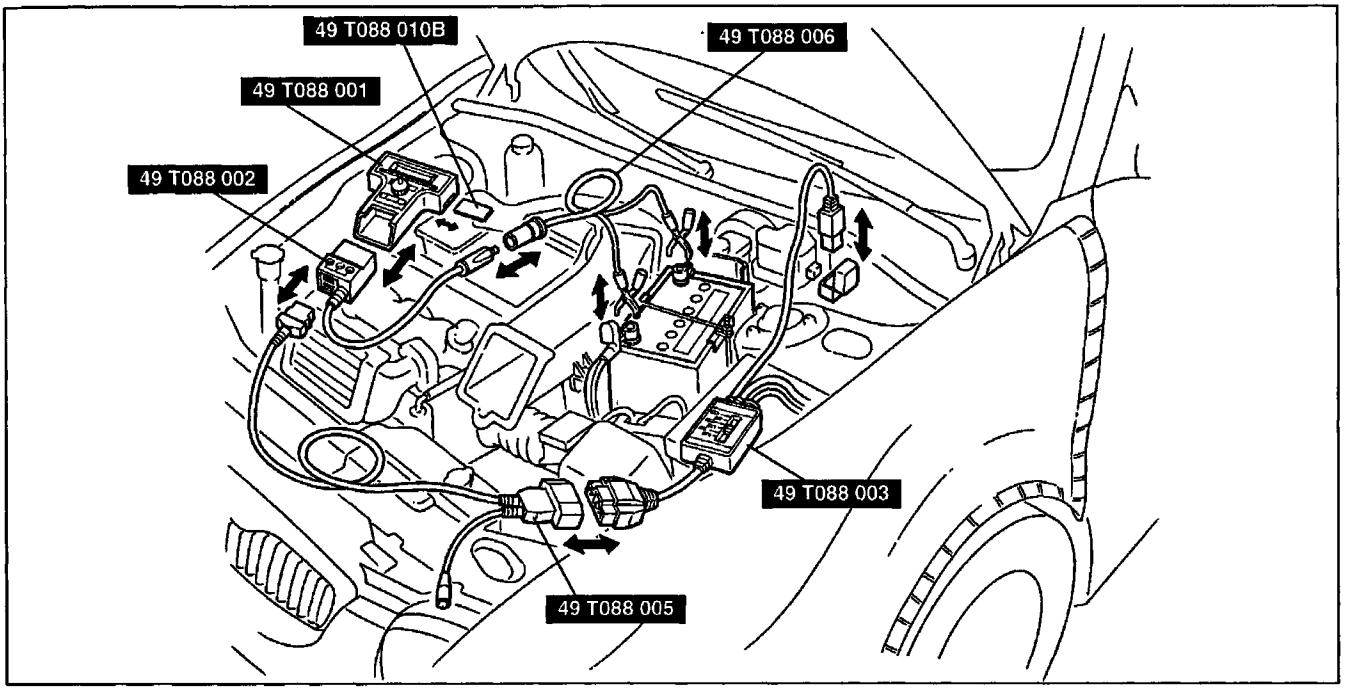
Note

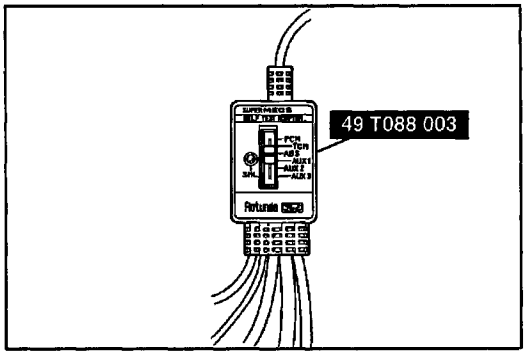
- When there is a possibility of the engine stalling, the TCS may allow spining, and restrain the torque reduction amount in order to prevent the engine from stalling.

On-Board Diagnosis System
Inspection by diagnostic test mode
Outline

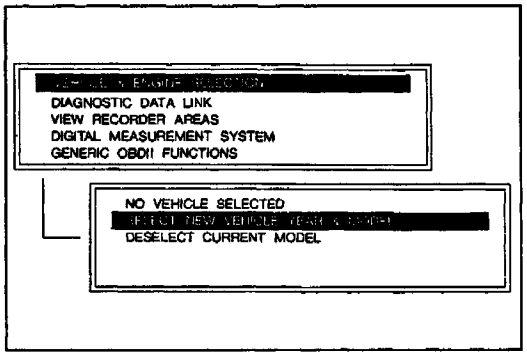
- The ABS/TCS control module contains self-diagnostic and memory functions to detect and indicate present and past failures.
  Read and note the diagnostic indications by using the **SST**, and take action according to the Diagnostic trouble code table. (Refer to page P–57.)
- The ABS/TCS CM has a nonvolatile 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–34.)

Inspection using NGS

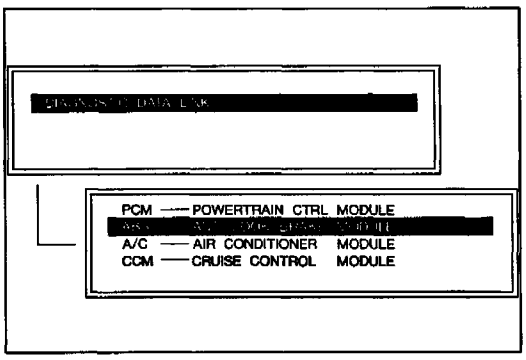




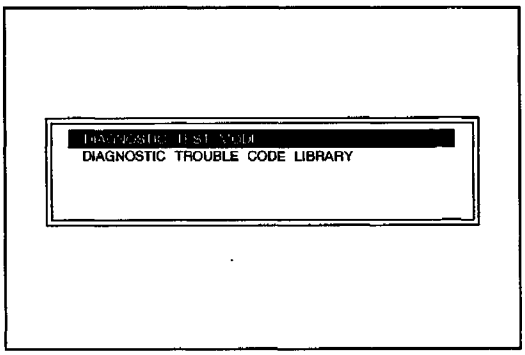
1. Connect the **SST** (NGS) to the data link connector and battery.
2. Set the **SST** (Super MECS Adapter) to the ABS.



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 diagnostic trouble code is displayed, refer to the Diagnostic trouble code table (Refer to page P–57.) 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.

Diagnostic trouble code table

Code No.	Display on the NGS	Possible cause	page
10*1	MAP — OPEN OR SHORT	Manifold absolute pressure sensor	P–58
11	WSS, SR (RH-FRONT) — OPEN OR SHORT, FECT	Right front wheel-speed sensor Right front sensor rotor	P–36
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*2	WSS — OPEN OR SHORT	Wheel-speed sensor	P–36
17*3	CRANKSHAFT POS SENSOR — OPEN OR SHORT	Engine control system Engine speed input signal	P–58
22	SOLV (RH-FRONT) — OPEN OR SHORT	Right front solenoid valve	P–37
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 AFE RELAY — OPEN OR SHORT, DEFECT	Fail-safe relay	P–37
53	MOTOR, MOTOR RELAY — OPEN OR SHORT, DEFECT	Motor Motor relay	P–38
61	ABS CONTROL UNIT	ABS/TCS control module	P–38
82	TQR REQUEST SIGNAL LINE — OPEN OR SHORT	Engine control system Torque reduction request signal line	P–60
83	TQR INHIBIT SIGNAL LINE — OPEN OR SHORT	Torque reduction inhibit signal line	P–62
84	HACPZS LINE — OPEN OR SHORT	High air charging pressure zone signal line	P–63

*1 KJ engine only
*2 If the ignition switch is turned OFF and then 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.
*3 Engine speed malfunction detection does not operate and codes are not displayed until the vehicle runs at higher than 10 km/h {6.2 MPH} for a certain period of time.

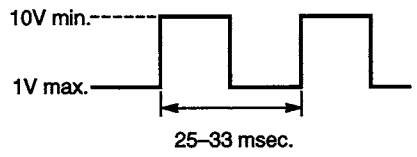
Diagnosis Chart

Diagnostic trouble code No.10 (KJ engine)	Manifold absolute pressure sensor
Possible cause	• Malfunction of engine control system • Malfunction of related wiring harness

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code for engine control obtained? (Refer to section F2)	Yes	Follow troubleshooting for engine control
		No	Go to next step
2	With ABS/TCS CM connector disconnected, and engine idling, is voltage between 1I and 1B of harness connector less than 4 V?	Yes	Turn IG SW OFF and go to next step
		No	Go to step 5
3	Is there continuity between 1I of ABS/TCS CM connector and 3A of ECM?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is resistance between 1I of ABS/TCS CM connector and ground 10 Ω or less?	Yes	Repair or replace wiring harness
		No	Replace ECM
5	With ABS/TCS CM connector disconnected and engine idling, is voltage between 1K and 1B of harness connector more than 4 V?	Yes	Turn IG SW OFF and go to next step
		No	Go to step 7
6	Is there continuity between 1K of ABS/TCS CM connector and 3U of ECM?	Yes	Replace ECM
		No	Repair or replace wiring harness
7	With ABS/TCS CM connector disconnected and IG ON, is voltage between 1S and 1B of harness connector as follows? When accelerator pedal ON: approx. 12 V When accelerator pedal OFF: 1 V or less	Yes	Replace ABS/TCS CM
		No	Inspect throttle position sensor and repair or replace the sensor and wiring harness (Refer to section F2)

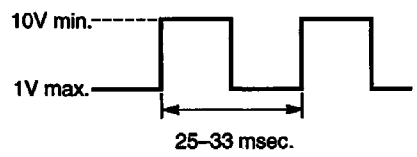
Note
- Code 10 may be memorized if large amount of high air charging has been done with the closed throttle position switch failed.

Diagnostic trouble code No.17 (KL engine)	Engine speed input signal
Possible cause	• Malfunction of engine control system • Malfunction of related wiring harness

STEP	INSPECTION		ACTION
1	Is diagnostic trouble code for engine control obtained? (Refer to section F1)	Yes	Follow troubleshooting for engine control
		No	Go to next step
2	With engine idling, check voltage pattern between 1D of ABS/TCS CM and ground by using an oscilloscope (engine speed input signal)  Is voltage as specified?	Yes	Replace ABS/TCS CM
		No	Turn IG SW OFF and go to next step
3	With IG OFF, ABS/TCS connector disconnected, check resistance between 1D and 1B of ABS/TCS CM Is resistance 7.2–9.3 kΩ?	Yes	Go to next step
		No	Replace ABS/TCS CM
4	Check resistance between 1D and 1A of ABS/TCS CM Is resistance ∞ ?	Yes	Go to next step
		No	Replace ABS/TCS CM

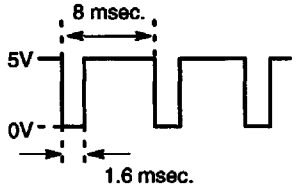
STEP	INSPECTION		ACTION
5	Is there continuity between 1D of ABS/TCS CU and 1AJ of PCM?	Yes	Go to next step
		No	Repair or replace wiring harness
6	With IG OFF, PCM connector is disconnected, check resistance between 1AJ and 3AB of PCM harness connector Is resistance 1.8kΩ or less?	Yes	Inspect for malfunction of engine speed input circuit in the tachometer Check engine speed input harnesses of the above system for open and short circuit Repair or replace as necessary (Refer to section T)
		No	Go to next step
7	Check resistance between 1AJ and power supply of PCM Is resistance ∞ ?	Yes	Replace PCM
		No	Inspect for malfunction of engine speed input circuit in the tachometer Check engine speed input harnesses of the above system for open and short circuit Repair or replace as necessary (Refer to section T)

Note
- When attaching the tester lead to the PCM, the **SST** must be used. Refer to section F1.
- Code 17 may be memorized if the engine is stalled or the ignition switch is turned OFF while the vehicle is driving at 10 km/h {6.2 MPH} or more.

Diagnostic trouble code No.17 (KJ engine)	**Engine speed input signal**	
Possible cause	• Malfunction of engine control system • Malfunction of related wiring harness	
STEP	**INSPECTION**	**ACTION**
1	Is diagnostic trouble code for engine control obtained? (Refer to section F2)	Yes: Follow troubleshooting for engine control No: Go to next step
2	With engine idling, check voltage pattern between 1D of ABS/TCS CM and ground by using an oscilloscope (engine speed input signal)  Is voltage as specified?	Yes: Replace ABS/TCS CM No: Turn IG SW OFF and go to next step
3	With IG OFF, ABS/TCS connector disconnected, check resistance between 1D and 1B of ABS/TCS CM Is resistance 7.2–9.3 kΩ?	Yes: Go to next step No: Replace ABS/TCS CM
4	Check resistance between 1D and 1A of ABS/TCS CM Is resistance ∞ ?	Yes: Go to next step No: Replace ABS/TCS CM
5	Is there continuity between 1D of ABS/TCS CM and 2O of ECM?	Yes: Go to next step No: Repair or replace wiring harness
6	With IG OFF, ECM connector is disconnected, check resistance between 2O and 4D of ECM harness connector Is resistance 1.8kΩ or less?	Yes: Inspect for malfunction of engine speed input circuit in the TCM and tachometer Check engine speed input harnesses of the above systems for open and short circuit Repair or replace as necessary (Refer to sections K2, T) No: Go to next step

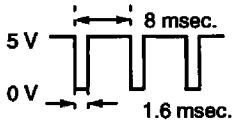
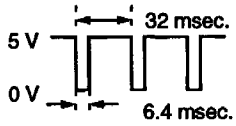
STEP	INSPECTION		ACTION
7	Check resistance between 2O and 4A of ECM Is resistance ∞ ?	Yes	Replace ECM
		No	Inspect for malfunction of engine speed input circuit in the TCM and tachometer Check engine speed input harnesses of the above systems for open and short circuit Repair or replace as necessary (Refer to sections K2, T)

Note
- When attaching the tester lead to the ECM, the **SST** must be used. Refer to section F2.
- Code 17 may be memorized if the engine is stalled or the ignition switch is turned OFF while the vehicle is driving at 10 km/h {6.2 MPH} or more.

Diagnostic trouble code No.82 (KL engine)	**Engine control system Torque reduction request signal line**		
Possible cause	• Malfunction of engine control system • Malfunction of related wiring harness		
STEP	**INSPECTION**		**ACTION**
1	Is diagnostic trouble code for engine control obtained? (Refer to section F1)	Yes	Follow troubleshooting for engine control
		No	Turn IG SW OFF and go to next step
2	With ABS/TCS connector disconnected and IG ON, is voltage between 2S and 2V of ABS/TCS harness connector approx. 5V?	Yes	Turn IG SW OFF and go to step 5
		No	Turn IG SW OFF and go to next step
3	Is resistance between 2S of ABS/TCS connector and 1Q of PCM (torque reduction request signal harness) 500 Ω or less?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between 2S of ABS/TCS connector and ground?	Yes	Repair or replace wiring harness
		No	Replace PCM
5	Connect PCM connector and turn IG SW ON Check voltage pattern between 2S of ABS/TCS CU by using an oscilloscope  Is voltage as specified?	Yes	System in normal Erase DTC and recheck for DTC If DTC 82 is still obtained and results of inspection step 1 through 4 are normal, replace PCM
		No	Replace ABS/TCS CM Erase DTC and recheck for DTC If DTC 82 is still obtained and results of inspection step 1 trough 4 are normal, replace ABS/TCS CM

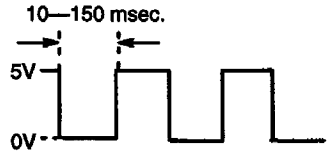
Note
- If malfunction of the torque reduction request line occures, DTC 1627 is memorized is PCM.

Diagnostic trouble code No.82 (KJ engine)	Engine control system Torque reduction request signal line
Possible cause	• Malfunction of engine control system • Malfunction of related wiring harness

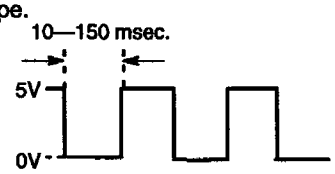
STEP	INSPECTION		ACTION
1	Is diagnostic trouble code for engine control obtained? (Refer to section F2)	Yes	Follow troubleshooting for engine control
		No	Turn IG SW OFF and go to next step
2	With ABS/TCS connector disconnected and IG ON, is voltage between 2S and 2V of ABS/TCS harness connector approx. 5 V?	Yes	Turn IG SW OFF and go to step 5
		No	Turn IG SW OFF and go to next step
3	Is resistance between 2S of ABS/TCS harness connector and 1Q of ECM (torque reduction request signal harness) 500 Ω or less?	Yes	Go to next step
		No	Repair or replace wiring harness
4	Is there continuity between 2S of ABS/TCS connector and ground?	Yes	Repair or replace wiring harness
		No	Replace ECM
5	With ABS/TCS CM connector disconnected and IG ON, is voltage between 1P and 2V of ABS/TCS harness connector approx. 5 V?	Yes	Turn IG SW OFF, connect the connector and go to step 8
		No	Turn IG SW OFF and go to next step
6	Is there continuity between 1P of ABS/TCS CM connector and 3W of ECM (high air charging pressure control harness)?	Yes	Go to next step
		No	Repair or replace harness
7	Is resistance between 1P of ABS/TCS connector and ground 500 Ω or less?	Yes	Repair or replace harness
		No	Replace ECM
8	With IG ON, check voltage pattern at 2S of ABS/TCS CM (torque reduction request signal) by using an oscilloscope  Is voltage pattern as specified?	Yes	Go to next step
		No	Erase DTC and check for DTC If DTC 82 is still obtained and results of inspection step 1 through 4 are normal, replace ABS/TCS CM
9	With IG ON, check voltage pattern at 1P of ABS/TCS CU (high air charging pressure control signal) by using an oscilloscope  Is voltage pattern as specified?	Yes	System is normal Erase DTC and recheck for DTC If DTC 82 is still obtained and results of inspection step 1 through 4 are normal, replace ECM
		No	Erase DTC and recheck for DTC If DTC 82 is still obtained and results of inspection step 1 through 4 are normal, replace ABS/TCS CM

Note
- If malfunction of the torque reduction request signal line occures, DTC 1627 is memorized in ECM.

Diagnostic trouble code No.83 (KL engine)	Torque reduction inhibit signal line
Possible cause	• Open/short of torque reduction inhibit signal line harness

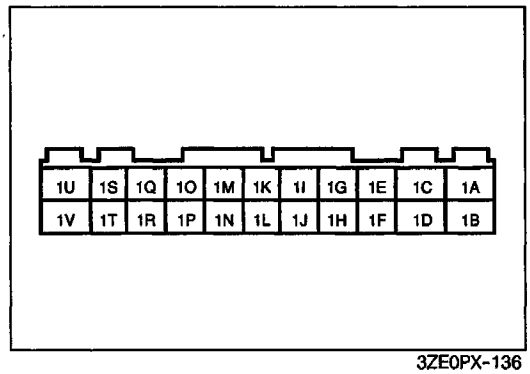
STEP	INSPECTION		ACTION
1	With PCM connector disconnected and IG ON, is voltage between 1S of PCM connector and ground approx. 5 V?	Yes	Turn IG SW OFF and go to step 4
		No	Turn IG SW OFF and go to next step
2	Is there continuity between 1S of PCM connector and 2T of ABS/TCS connector (torque reduction inhibit signal harness)?	Yes	Go to next step
		No	Repair or replace wiring harness
3	Is resistance between 1S of PCM connector and ground 500 Ω or less?	Yes	Repair or replace wiring harness
		No	Erase DTC and recheck for DTCs If DTC 83 is still obtained and results of inspection steps 1 and 2 are normal, replace ABS/TCS CM
4	With engine idling, check voltage pattern at 2T of ABS/TCS CM by using an oscilloscope.  Is voltage as specified?	Yes	System in normal Erase DTC and recheck for DTCs If DTC 83 is still obtained and results of inspection steps 1 and 2 are normal, replace ABS/TCS CM
		No	Erase DTC and recheck for DTCs If DTC 83 is still obtained and results of inspection steps 1 and 2 are normal, replace PCM

Diagnostic trouble code No.83 (KJ engine)	Torque reduction inhibit signal line
Possible cause	• Open/short of torque reduction inhibit signal line harness

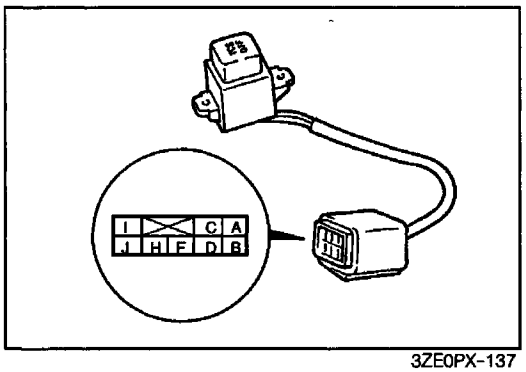
STEP	INSPECTION		ACTION
1	With ECM connector disconnected and IG ON, is voltage between 1U of PCM connector and ground approx. 5 V?	Yes	Turn IG SW OFF and go to step 4
		No	Turn IG SW OFF and go to next step
2	Is there continuity between 1U of ECM connector and 2T of ABS/TCS connector (torque reduction inhibit signal harness)?	Yes	Go to next step
		No	Repair or replace wiring harness
3	Is resistance between 1U of ECM connector and ground 500 Ω or less?	Yes	Repair or replace wiring harness
		No	Erase DTC and recheck for DTCs If DTC 83 is still obtained and results of inspection steps 1 and 2 are normal, replace ABS/TCS CM
4	With engine idling, check voltage pattern at 2R of ABS/TCS CM by using an oscilloscope.  Is voltage as specified?	Yes	System in normal Erase DTC and recheck for DTCs If DTC 83 is still obtained and results of inspection steps 1 and 2 are normal, replace ABS/TCS CM
		No	Erase DTC and recheck for DTCs If DTC 83 is still obtained and results of inspection steps 1 and 2 are normal, replace ECM

Diagnostic trouble code No.84 (KJ engine)	High air charging pressure zone signal line
Possible cause	• Open/short of high air charging pressure zone signal line harness

STEP	INSPECTION		ACTION
1	With ECM connector disconnected and IG ON, is voltage between 2L and 4D of ECM connector approx. 5 V?	Yes	Go to step 4
		No	Turn IG SW OFF and go to next step
2	Is there continuity between 2L of ECM connector and 2T of ABS/TCS CM (high air pressure zone signal harness)?	Yes	Go to next step
		No	Repair or replace wiring harness
3	Is resistance between 2L of ECM and ground 500 Ω or less?	Yes	Repair or replace wiring harness
		No	Erase DTC and recheck for DTCs If DTC 84 is still obtained and results of inspection steps 1 and 2 are normal, replace ABS/TCS CM
4	ABS/TCS CM connector disconnected and engine idling, is voltage between 1I and 1B of ABS/TCS CM connector less than 4 V?	Yes	Turn IG SW OFF and go to next step
		No	Go to step 7
5	Is there continuity between 1I of ABS/TCS CM connector and 3A of ECM?	Yes	Go to next step
		No	Repair or replace wiring harness
6	Is resistance between 1I of ABS/TCS CM connector and ground 10 Ω or less?	Yes	Repair or replace wiring harness
		No	Replace ECM
7	With ABS/TCS CM connector disconnected and engine idling, is voltage between 1K and 1B of ABS/TCS CM connector more than 4 V?	Yes	Turn IG SW OFF and go to next step
		No	System is normal Erase DTC and recheck for DTCs If DTC 84 is still obtained and results of inspection steps 1 through 6 are normal, replace ABS/TCS CM
8	Is there continuity between 1K of ABS/TCS CM connector and 3U of ECM?	Yes	Replace ECM
		No	Repair or replace wiring harness



3ZE0PX-136



3ZE0PX-137

TCS OFF SWITCH

Removal / Installation

The TCS OFF switch is installed on the rear console. (Refer to section S.)

Inspection

Switch and ABS/TCS CM harness

1. Check the wiring harness between the ABS/TCS control module and TCS OFF switch for short to ground.
2. Remove the ABS/TCS CM connector.
3. Measure the resistance between 1N and ground.

   When switch is pressed : 100 Ω or less
   When switch is released : ∞

4. If not within the specification, check the harness and the TCS OFF switch.

Switch operation

1. Remove the TCS OFF switch. (Refer to section S.)
2. Measure the resistance between I and J of the connector.

   When switch is pressed : 100 Ω or less
   When switch is released : ∞

ABS/TCS CONTROL MODULE

Removal / Installation

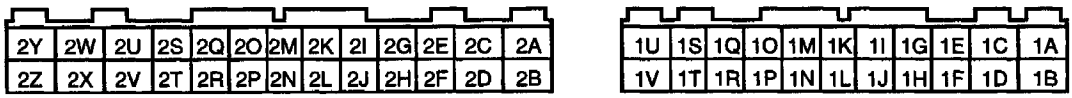
Refer to page P–42.

Inspection

Terminal voltage chart (reference value)

(Ignition switch is ON, and connector is connected unless indicated otherwise)

B+: Battery positive voltage



Terminal	Signal name	Connected to	Condition	Voltage	Inspection point
1A	Battery	Ignition switch	Ignition switch ON	B+	• Harness, fuse(battery—IG SW—ABS/TCS CM)
			Ignition switch OFF	0	
1B	Ground	Ground	—	0	• Harness condition, open circuit
1C	Motor monitor	Motor	Motor running	B+	• Harness (HU—ABS/TCS CM)
			Motor stopped	0	
1D	Engine speed	ECM (PCM)	Engine idling	8–12	• Harness (ABS/TCS CM—ECM or PCM)
1E	—	—	—	—	—
1F	On-board diagnosis	TBS check terminal	Normal mode	10–12	• Harness (battery—ABS/TCS CM—TBS terminal)
			Diagnostic test mode	0	
1G	—	—	—	—	—
1H	—	—	—	—	—
1I (KJ engine)	Constant voltage power	MAP sensor	—	approx. 5	• MAP sensor • Harness (sensor—ABS/TCS CM)
1J	—	—	—	—	—
1K (KJ engine)	Boost	MAP sensor	—	approx. 2.6	• MAP sensor • Harness (sensor—ABS/TCS CM)
1L	—	—	—	—	—
1M	—	—	—	—	—
1N	TCS OFF switch	TCS OFF switch	—	10–12	• Harness, fuse (battery—TCS indicator—ABS/TCS CM)
1O	—	—	—	—	—
1P (KJ engine)	High air charging pressure control	ECM	—	3—5	• ABS/TCS CM
1Q	—	—	—	—	—
1R	On-board diagnosis	FBS check terminal	—	10–12	• Harness, fuse (battery—ABS/TCS CM—FBS terminal)
1S	Idle	Closed throttle position switch	—	0–1.0	• Harness (closed throttle position switch —ABS/TCS CM)
1T	—	—	—	—	—
1U	Brake switch	Brake switch	Brake pedal depressed	B+	• Harness (battery—brake switch —ABS/TCS CM)
			Brake pedal released	0	

B+: Battery positive voltage

Terminal	Signal name	Connected to	Condition	Voltage	Inspection point
1V	TCS indicator	TCS indicator light	—	B+	• Harness, fuse (battery—TCS indicator—ABS/TCS CM)
2A	Motor relay (coil)	Motor relay	Motor relay ON	0–2	• Harness (ABS relay—ABS/TCS CM) • Motor relay
			Motor relay OFF	B+	
2B	Fail-safe relay (coil)	Fail-safe relay	Normal	0–2	• Harness (ABS relay—ABS/TCS CM) • Fail-safe relay
			If malfunction present	B+	
2C	ABS warning light	ABS warning light	Illuminated	0	• Harness, fuse (battery—warning light—ABS/TCS CM)
			Not illuminated	B+	
2D	ABS/TCS warning light	ABS/TCS warning light	Illuminated	0	• Harness, fuse (battery—warning light—ABS/TCS CM)
			Not illuminated	B+	
2E*1 2F*1	Left front wheel-speed	Left front wheel-speed sensor	Vehicle stopped	0	• Harness (wheel-speed sensor—ABS/TCS CM) • Wheel-speed sensor
			Wheel turned 1 revolution per second	0.25–3.0 (AC)	
2G*1 2H*1	Right front wheel-speed	Right front wheel-speed sensor	Vehicle stopped	0	
			Wheel turned 1 revolution per second	0.25–3.0 (AC)	
2I*1 2J*1	Left rear wheel-speed	Left rear wheel-speed sensor	Vehicle stopped	0	
			Wheel turned 1 revolution per second	0.25–3.0 (AC)	
2K*1 2L*1	Right rear wheel-speed	Right rear wheel-speed sensor	Vehicle stopped	0	
			Wheel turned 1 revolution per second	0.25–3.0 (AC)	
2M*	—	—	—	—	—
2N*	—	—	—	—	—
2O*	—	—	—	—	—
2P*	—	—	—	—	—
2Q*	—	—	—	—	—
2R	Torque reduction inhibit	ECM (PCM)	—	approx. 5	• Harness (ABS/TCS CM—ECM or PCM) • ECM (PCM)
2S	Torque reduction request	ECM (PCM)	—	3–5	• ABS/TCS CM
2T (KJ engine)	High air charging pressure zone	ECM	—	approx. 3	• ECM • Harness (ECM—ABS/TCS CM)
2U	Right rear wheel solenoid	Right rear wheel solenoid	Solenoid ON*2	0–2	• Harness (HU—ABS/TCS CM) • Solenoid valve
			Ignition switch ON	V_B	
2V	Ground	Ground	—	0	• Harness condition, open circuit
2W	Left front wheel solenoid	Left front wheel solenoid	Solenoid ON*2	0–2	• Harness (HU—ABS/TCS CM) • Solenoid valve
			Ignition switch ON	B+	
2X	—	—	—	—	—
2Y	Right front wheel solenoid	Right front wheel solenoid	Solenoid ON*2	0–2	• Harness (HU—ABS/TCS CM) • Solenoid valve
			Ignition switch ON	B+	
2Z	Left rear wheel solenoid	Left rear wheel solenoid	Solenoid ON*2	0–2	
			Ignition switch ON	B+	

*1 Check the following terminals in AC range:
2E–2F (left front), 2G–2H (right front), 2I–2J (left rear), 2K–2L (right rear)
In DC range, voltage will be approx. 1.0V (with ignition switch ON)

*2 Solenoid valve is ON only when ABS is functioning. Voltage when solenoid is ON can be measured by "Hydraulic system inspection". (Refer to page P–39.)

WHEELS AND TIRES

OUTLINE **Q–2**
SPECIFICATIONS **Q–2**

OUTLINE

SPECIFICATIONS

Standard Tire

Item \ Engine			KL	KJ	
Wheel	Size		15 × 6JJ		16 × 6 1/2JJ
	Offset	mm {in}	50 {1.97}		55 {2.17}
	Pitch circle diameter	mm {in}	114.3 {4.50}		
	Material		Aluminum Alloy		
Tire	Size		205/65R15 92H		215/55R16 91V
	Air pressure kPa {kgf/cm^2, psi}	Front	220 {2.2, 32}		
		Rear	200 {2.0, 29}		
	Remaining tread	Standard tire	1.6 mm {0.063 in}		
		Snow tire	50% of tread		
Wheel and tire	Lug nut tightening torque		88—127 N·m {9—13 kgf·m, 65—94 ft·lbf}		
	Wheel and tire runout	Radial direction	Max. 1.5 mm {0.06 in}		
		Lateral direction	Max. 2.0 mm {0.08 in}		
	Wheel imbalance		Max. 9 g {0.32 oz}		

- 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.

Temporary Spare Tire

Item			Specifications
Wheel	Size		15 × 4T
	Offset	mm {in}	45 {1.77}
	Pitch circle diameter	mm {in}	114.3 {4.50}
	Material		Aluminum Alloy
Tire	Size		T135/70D15, T135/70D16
	Air pressure	kPa {kgf/cm^2, psi}	415 {4.2, 60}

Before beginning any service procedure, refer to section T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

SUSPENSION

OUTLINE ..... **R– 2**
SPECIFICATIONS ..... **R– 2**
GENERAL PROCEDURES ..... **R– 3**
WHEEL ALIGNMENT ..... **R– 4**
PREINSPECTION ..... **R– 4**
FRONT WHEEL ALIGNMENT ..... **R– 4**
REAR WHEEL ALIGNMENT ..... **R– 6**
FRONT SUSPENSION (MULTI-LINK) ..... **R– 7**
PREPARATION ..... **R– 7**
FRONT SHOCK ABSORBER AND SPRING **R–10**
LOWER ARM **R–14**
UPPER LATERAL LINK **R–17**
UPPER LEADING LINK **R–20**
FRONT STABILIZER **R–22**
FRONT CROSSMEMBER **R–24**
REAR SUSPENSION (MULTI-LINK) **R–26**
PREPARATION **R–26**
REAR SHOCK ABSORBER AND SPRING **R–28**
LOWER LATERAL LINK, UPPER LATERAL LINK, REAR LOWER LATERAL LINK **R–33**
LOWER TRAILING LINK, UPPER TRAILING LINK **R–38**
REAR STABILIZER **R–41**
REAR CROSSMEMBER **R–42**

OUTLINE

SPECIFICATIONS

Front Suspension

Item \ Engine				KL	KJ
Suspension type				Multi-link	
Stabilizer	Type			Torsion bar	
	Diameter		mm {in}	25.4 {0.99}	
Shock absorber	Type			Cylindrical, double-acting, low-pressure gas-charged	
	Damping force N {kgf, lbf} at 0.3 m/s {0.09 ft/s}		Expansion	1,068 {109, 240}	
			Compression	245 {25, 55}	
Coil spring	Identification mark color			White	Pink
	Wire diameter		mm {in}	13.0 {0.51}	13.3 {0.52}
	Coil center diameter		mm {in}	116.0 {4.57}	116.3 {4.58}
	Free length		mm {in}	319.0 {12.56}	331.0 {13.03}
	Number of active coils			5.93	6.46
Front wheel alignment (Unladen*1)	Total toe-in		mm {in}	3 ± 4 {0.12 ± 0.16}	
	Maximum steering angle		Inner	36° ± 3°	
			Outer	30° ± 3°	
	Camber angle*2			–0° 11' ± 1°	
	Caster angle*2	Fuel gauge indication		—	
		Empty		2° 24' ± 1°	
		1/4		2° 26' ± 1°	
		1/2		2° 29' ± 1°	
		3/4		2° 32' ± 1°	
		Full		2° 35' ± 1°	
	Steering axis inclination			9° 06' ± 45'	

Rear Suspension

Item				Specifications
Suspension type				Multi-link
Stabilizer	Type			Torsion bar
	Diameter		mm {in}	17 {0.67}
Shock absorber	Type			Cylindrical, double-acting, low-pressure gas-charged
	Damping force N {kgf, lbf} at 0.3 m/s {0.09 ft/s}		Expansion	578 {59, 130}
			Compression	274 {28, 62}
Coil spring				Refer to page R—3
Rear wheel alignment (Unladen*1)	Total toe-in		mm {in}	3 ± 4 {0.12 ± 0.16}
	Camber angle*2	Fuel gauge indication		—
		Empty		–0° 10' ± 1°
		1/4		–0° 11' ± 1°
		1/2		–0° 14' ± 1°
		3/4		–0° 16' ± 1°
		Full		–0° 19' ± 1°
	Thrust angle			0° ± 0.8°

*1 Radiator coolant and engine oil at specified levels; spare tire, jack, and tools in designated positions. Adjust to the median when carrying out wheel alignment.
*2 Difference between left and right must not exceed 1.5°.

Rear coil spring applications

With: ○
Without: ×

Engine	Sunroof	Coil spring	
		Right	Left
KL	×	B	C
	○	C	A
KJ	○	C	A

Rear coil spring specifications

Item \ Type		A	B	C
Identification mark color		Purple	Green	White
Wire diameter	mm {in}	13.0 {0.51}	12.7 {0.50}	12.8 {0.50}
Coil center diameter	mm {in}	116.0 {4.57}	115.7 {4.56}	115.8 {4.56}
Free length	mm {in}	344.5 {13.56}	331.5 {13.05}	338.0 {13.31}
Number of active coils		6.45	5.96	6.12

GENERAL PROCEDURES

R

Removal / Installation
- The numbers in the structural view indicate the removal order. For installation, follow the reverse order.

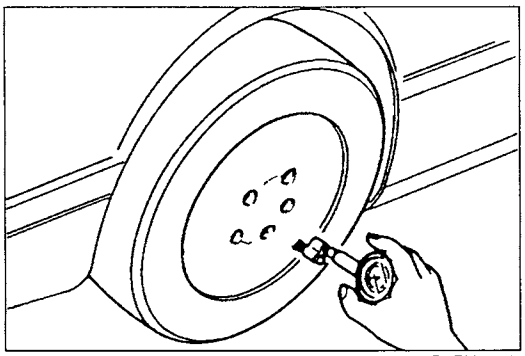
Wheels and tires
- The removal and installation procedures for the wheels and tires are not mentioned in this section. If you must remove a wheel, retighten it to **80—127 N·m {9.0—13.0 kgf·m, 66—94 ft·lbf}**.

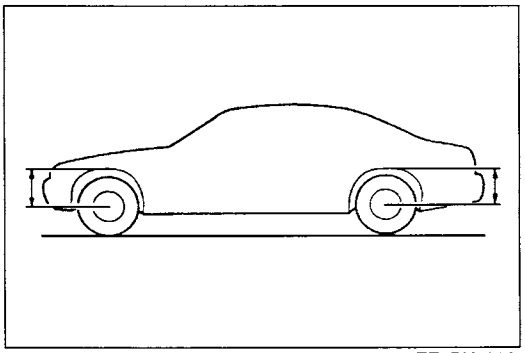
Suspension links
- Tighten any part of the suspension that uses rubber bushings only after the vehicle has been lowered and unloaded.

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".)

Brake lines
- 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.

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.


19G0RX-098


3ZE0RX-006

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.

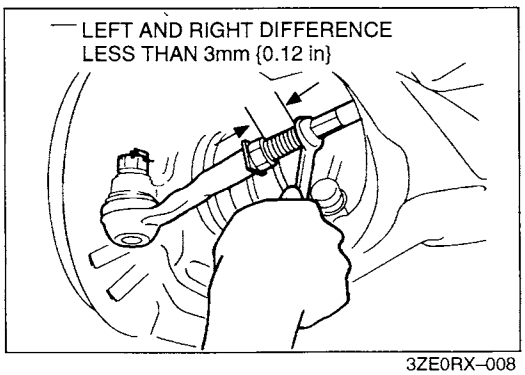
   Specification: 10 mm {0.39 in}

7. Shake the vehicle to settle the suspension.

FRONT WHEEL ALIGNMENT
Specifications (Unladen*1)

Item			Specifications
Total toe-in		mm {in}	3 ± 4 {0.12 ± 0.16}
Maximum steering angle		Inner	36° ± 3°
	degree	Outer	30° ± 3°
Camber angle*2		degree	–0° 11' ± 1°
Caster angle*2 degree	Fuel gauge indication		—
	Empty		2° 24' ± 1°
	1/4		2° 26' ± 1°
	1/2		2° 29' ± 1°
	3/4		2° 32' ± 1°
	Full		2° 35' ± 1°
Steering axis inclination		degree	9° 06' ± 45'

*1 Radiator coolant and engine oil at specified levels; spare tire, jack, and tools in designated positions. Adjust to the median when carrying out wheel alignment.
*2 Difference between left and right must not exceed 1.5°.

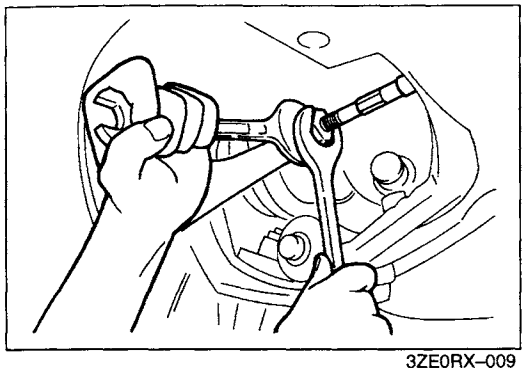


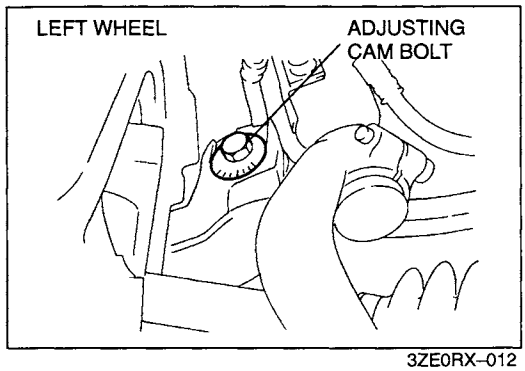
3ZE0RX-008

Maximum Steering Angle Adjustment

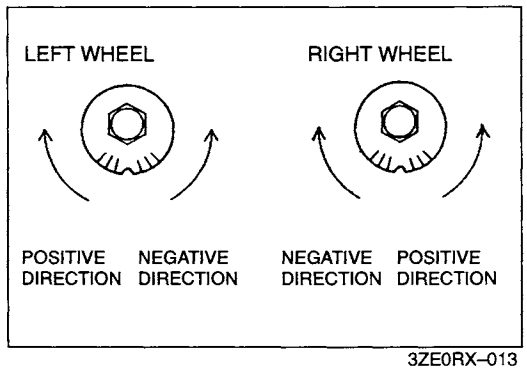
1. Remove the steering gear boot clamp.
2. Loosen the tie rod locknut.
3. Turn the tie rod to provide the correct maximum steering angle.

   Maximum left/right difference: 3 mm {0.12 in}

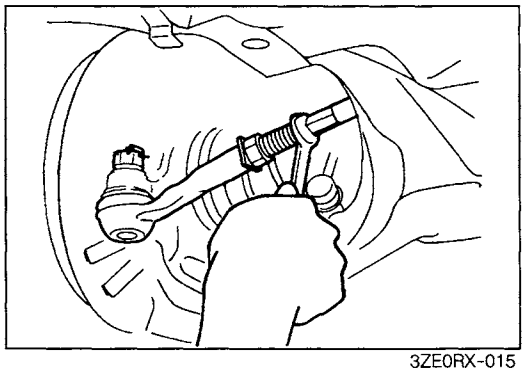

3ZE0RX-009

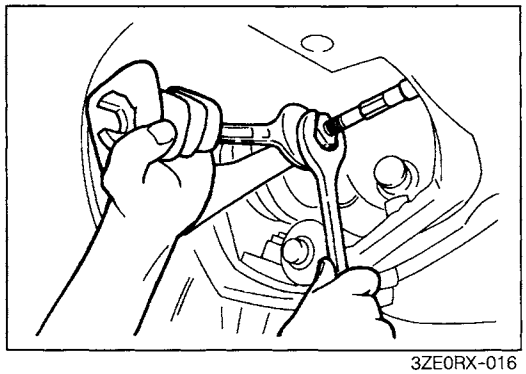


3ZE0RX-012



3ZE0RX-013


3ZE0RX-015


3ZE0RX-016

4. After adjustment, tighten the locknut to the specified torque.

Tightening torque:
69—98 N·m {7.0—10.0 kgf·m, 51—72 ft·lbf}

5. Adjust the toe-in. (Refer to below.)
6. Verify that the boot is not twisted, and install the boot clamp.

Caster / Camber
Adjustment (camber)

Note
- Caster is not adjustable.

1. Loosen the cam nut on the upper lateral link.
2. Turn the adjusting cam bolt to provide the correct camber angle as indicated.

	Left wheel	Right wheel
Positive direction	Clockwise	Counterclockwise
Negative direction	Counterclockwise	Clockwise

Note
- Turning the adjusting cam bolt one graduation changes the camber about **16 minutes**.

3. Tighten the cam nut.

Tightening torque:
79—116 N·m {8.0—11.9 kgf·m, 58—86 ft·lbf}

4. Adjust the toe-in as indicated.

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 **15.8 mm {0.62 in}**.

4. Tighten the tie rod locknuts to the specified torque.

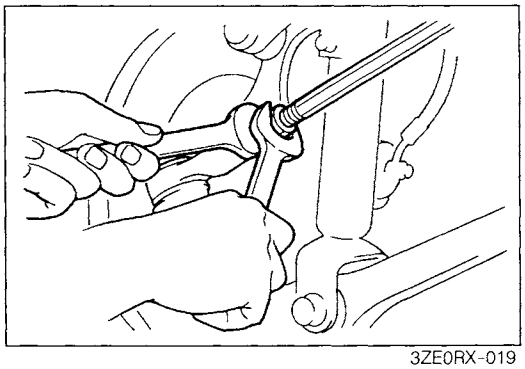
Tightening torque:
69—98 N·m {7.0—10.0 kgf·m, 51—72 ft·lbf}

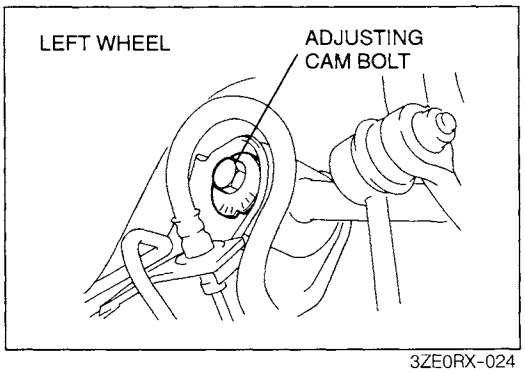
5. Verify that the boot is not twisted, and install the boot clamp.

REAR WHEEL ALIGNMENT
Specifications (Unladen*1)

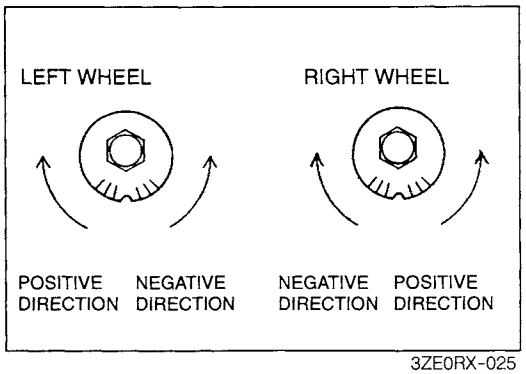
Item		Specifications
Total toe-in mm {in}		3 ± 4 {0.12 ± 0.16}
Camber angle*2 degree	Fuel gauge indication	—
	Empty	–0° 10' ± 1°
	1/4	–0° 11' ± 1°
	1/2	–0° 14' ± 1°
	3/4	–0° 16' ± 1°
	Full	–0° 19' ± 1°
Thrust angle degree		0° ± 0.8°

*1 Radiator coolant and engine oil at specified levels; spare tire, jack, and tools in designated positions. Adjust to the median when carrying out wheel alignment.
*2 Difference between left and right must not exceed 1.5°.


3ZE0RX-019



3ZE0RX-024



3ZE0RX-025

Toe-in
Adjustment
In order to maintain the specified thrust angle of **0° ± 0.8°**, the rear toe-in setting must be adjusted. If the thrust angle cannot be adjusted to that specification, check the body dimensions.

1. Loosen the left and right locknuts and turn the rear lower lateral link inner ball joints equally. Both inner ball joints are right threaded, so turning the right inner ball joint toward the front of the vehicle and the left toward the rear increases toe-in.

Note
- Turning both inner ball joints one complete turn changes toe-in by about **15.8 mm {0.62 in}**.

2. Tighten the locknuts to the specified torque.

Tightening torque:
69—98 N·m {7.0—10.0 kgf·m, 51—72 ft·lbf}

Camber
Adjustment
1. Loosen the cam nut on the upper lateral link.
2. Turn the adjusting cam bolt to provide the correct camber angle as indicated.

	Left wheel	Right wheel
Positive direction	Clockwise	Counterclockwise
Negative direction	Counterclockwise	Clockwise

Note
- Turning the adjusting cam bolt one graduation changes the camber about **14 minutes**.

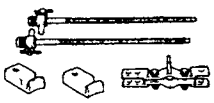
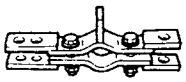
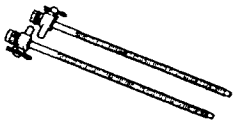
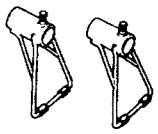
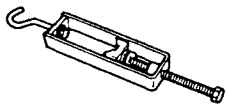
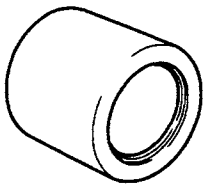
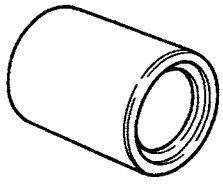
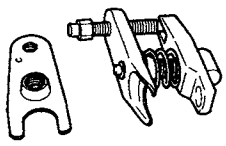
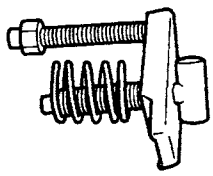
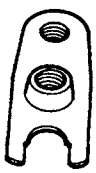
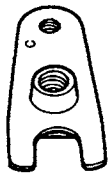
3. Tighten the cam nut.

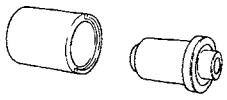
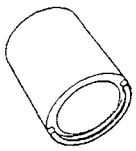
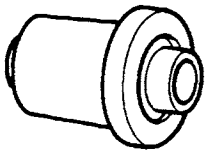
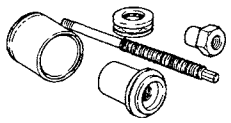
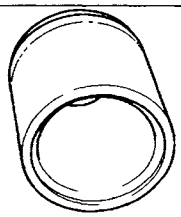
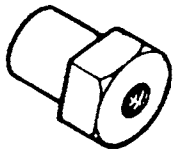
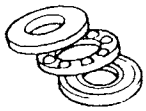
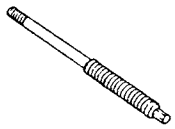
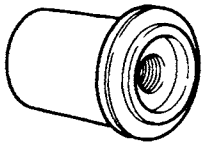
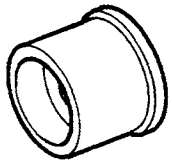
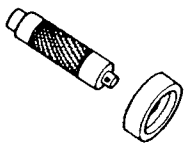
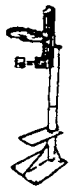
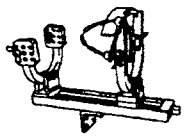
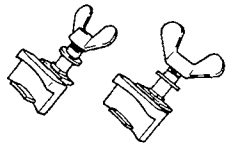
Tightening torque:
79—116 N·m {8.0—11.9 kgf·m, 58—86 ft·lbf}

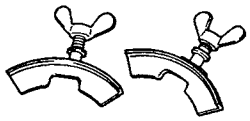
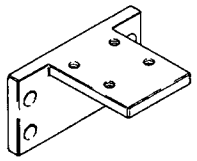
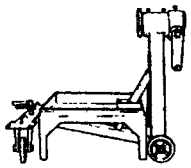
4. Adjust the toe-in. (Refer to above.)

FRONT SUSPENSION (MULTI-LINK)

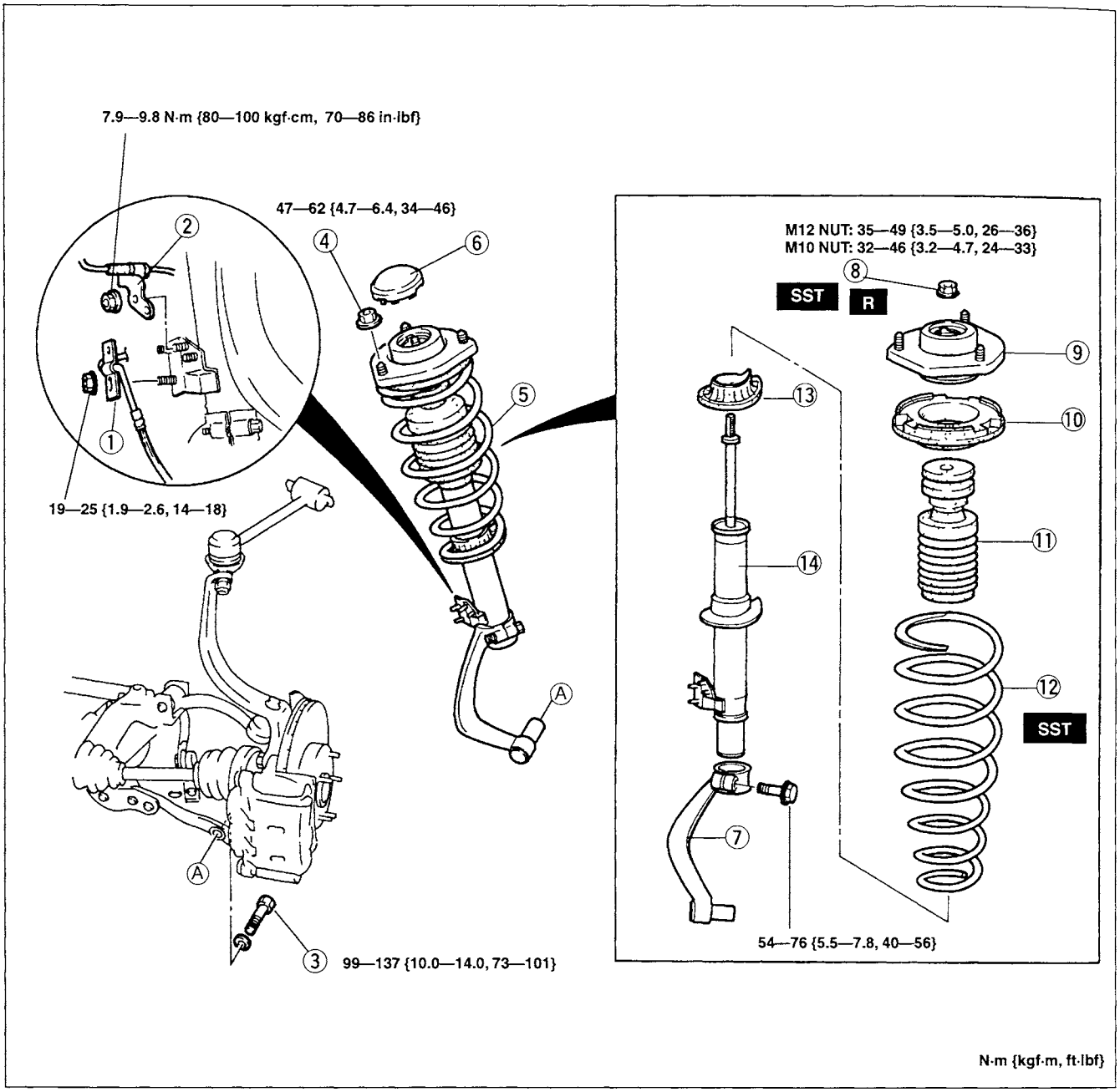
PREPARATION
SST

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 G017 5A0 Support, engine 	For support of engine	49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine
49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine	49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine
49 0180 510B Attachment, preload measuring 	For inspection of ball joint	49 T034 202 Guide, clip 	For installation of upper lateral link dust boot
49 T034 201 Installer, dust boot 	For installation of lower ball joint dust boot	49 T028 301 Installer, dust boot 	For installation of leading link dust boot
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 upper lateral link and leading link ball joint	49 T028 305 Attachment (Part of 49 T028 3A0) 	For removal of lower ball joint

49 T034 2A1 Replacer set, rubber bushing 	For removal and installation of lower arm bushing	49 W034 306 Support block (Part of 49 T034 2A1) 	For removal and installation of lower arm bushing
49 T034 204 Attachment (Part of 49 T034 2A1) 	For removal and installation of lower arm bushing	49 T034 0A0 Replacer set, rubber bushing 	For removal and installation of crossmember bushing
49 T034 001 Support block (Part of 49 T034 0A0) 	For removal and installation of crossmember bushing	49 W038 002 Nut (Part of 49 T034 0A0) 	For removal and installation of crossmember bushing
49 G034 205 Bearing (Part of 49 T034 0A0) 	For removal and installation of crossmember bushing	49 T034 002 Shaft (Part of 49 T034 0A0) 	For removal and installation of crossmember bushing
49 T034 003 Attachment (Part of 49 T034 0A0) 	For removal and installation of crossmember bushing	49 T034 203 Attachment 	For removal and installation of upper lateral link bushing
49 G030 795 Installer, oil seal 	For removal and installation of upper lateral link bushing	49 G030 797 Handle (Part of 49 G030 795) 	For removal and installation of upper lateral link bushing
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

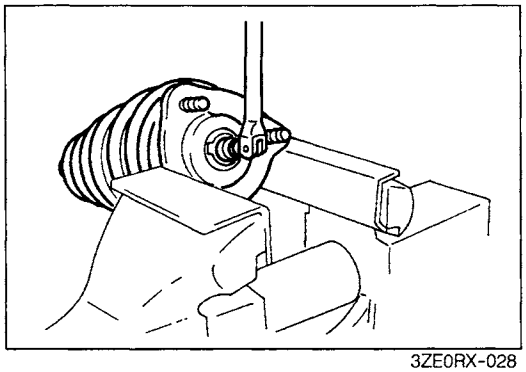
49 T034 104 Support (Part of 49 T034 1A0) 	For removal and installation of coil spring	49 T034 105 Attachment 	For removal and installation of coil spring
49 0107 680A Engine stand 	For removal and installation of coil spring	—	—

FRONT SHOCK ABSORBER AND SPRING
Removal / Inspection / Installation



3ZE0RX-027

1. Flexible hose
2. ABS wheel-speed sensor harness
3. Bolt (shock absorber and spring)
4. Nuts
5. Front shock absorber and spring
6. Cap
7. Damper fork
8. Nut
   Removal Note ..... page R–11
9. Mount
   Inspect for damage and deterioration
10. Upper spring seat
    Inspect for damage and cracks
11. Bound stopper
    Inspect for damage and cracks
12. Coil spring
    Inspect for damage and cracks
    Installation Note ..... page R–12
13. Lower spring seat
    Inspect for damage and cracks
14. Front shock absorber
    Inspection ..... page R–12

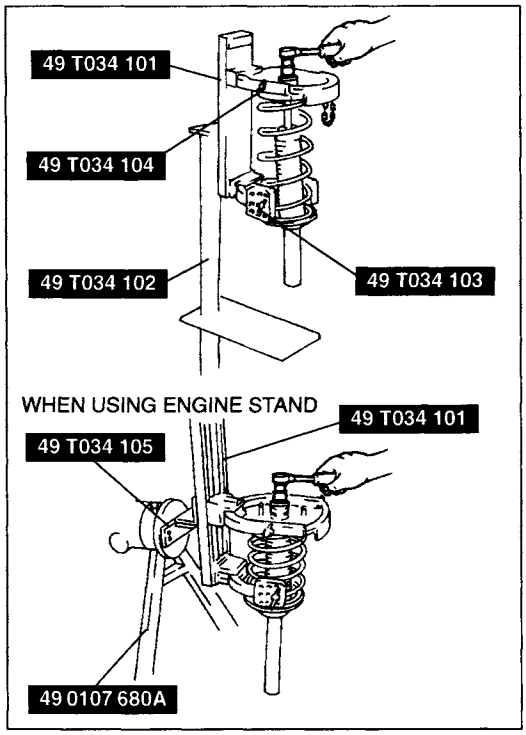

3ZE0RX-028

Removal note
Nut

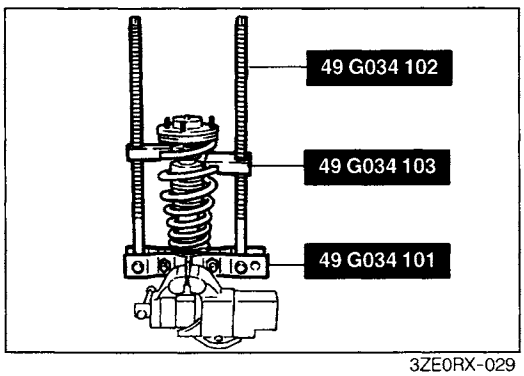
Warning
- **Removing the mounting rubber nut is dangerous. The shock absorber and spring could fly off under tremendous pressure and cause serious injury or death. Secure the shock absorber in the SST before removing the mounting rubber nut.**

Caution
- **To prevent damage to the mounting rubber, use protective plates in the vise jaws.**

1. Secure the mounting rubber in a vise.
2. Loosen the nut several turns, but do not remove it.

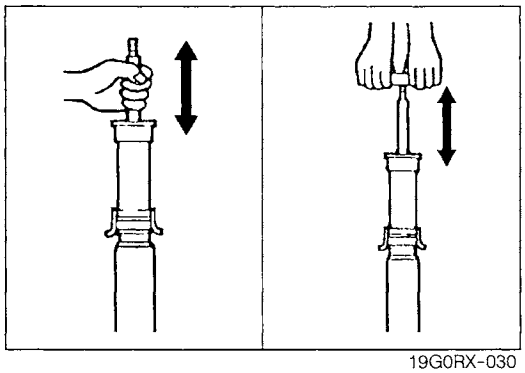


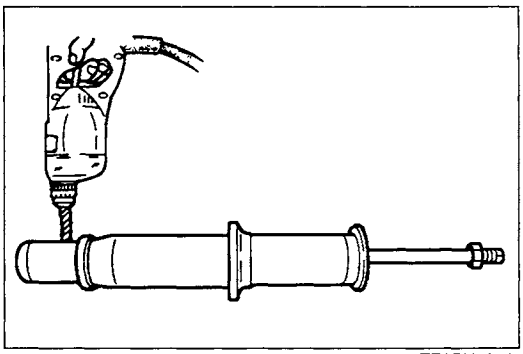
When using SST (49 T034 1A0)
3. Assemble the **SST**.
4. Secure the shock absorber in the **SST**.
5. Compress the coil spring by using the **SST** and remove the nut.



3ZE0RX-029

When using SST (49 G034 1A0)
3. Assemble the **SST**.
4. Compress the coil spring by using the **SST** and remove the nut.


19G0RX-030


3ZE0RX-030

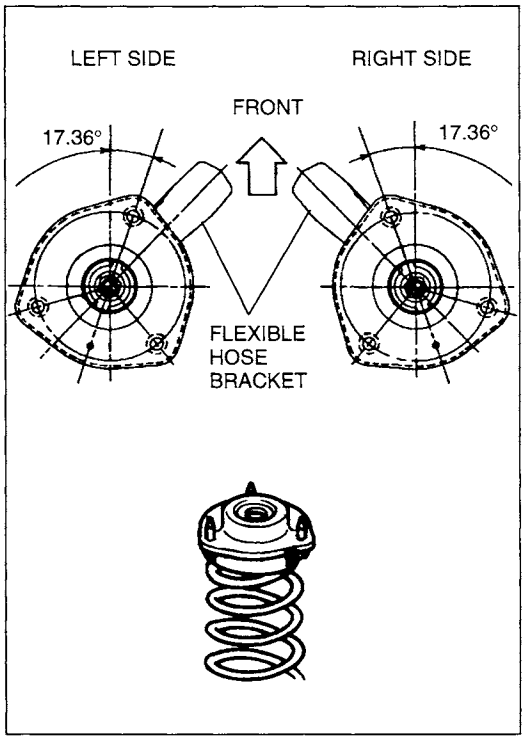
Inspection
Front shock absorber
Do the following and replace the shock absorber if necessary.
1. Inspect for damage and oil leakage.
2. Compress the shock absorber rod and release it, and verify that the rod extends fully at a normal speed.
3. Compress and extend the shock rod at least three (3) times. Verify that the operational force does not change and that there is no unusual noise.

Disposal of shock absorber

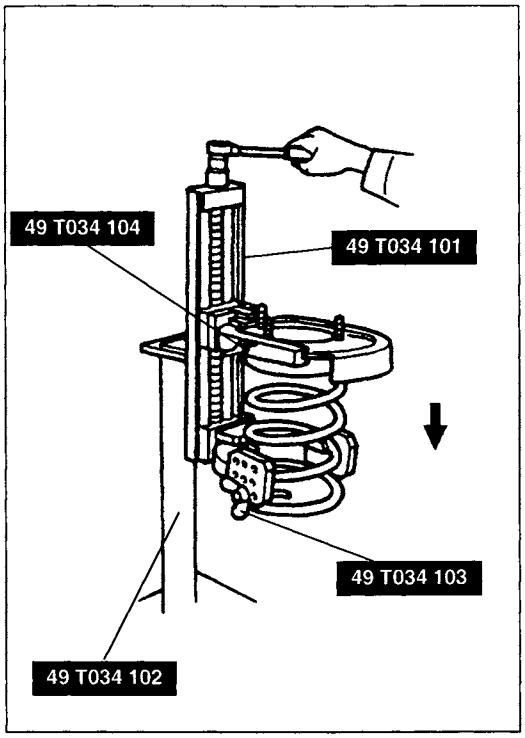
Warning
- **The gas in the shock absorber is pressurized, and could spray metal chips into the eyes and face when drilling. Whenever drilling into a shock absorber, wear protective eye wear.**

1. Clamp a shock absorber flat or with the piston downwards.
2. Drill the 2—3 mm {0.08—0.12 in} hole at a point of 20—30 mm { 0.08—0.12 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 waste oil according to the waste disposal law.

Note
- Shock absorber gas is nitrogen gas.
- Shock absorber oil is mineral oil.

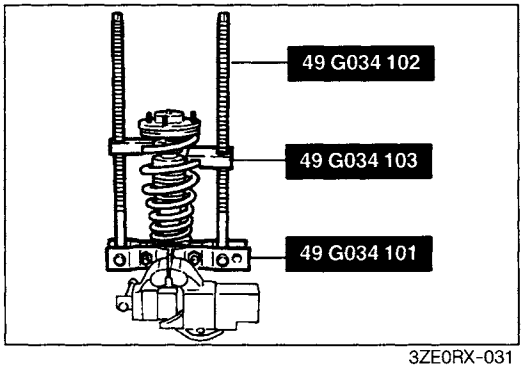


Installation note
Coil spring
When using SST (49 T034 1A0)
1. Temporarily assemble the mount, upper spring seat and coil spring to the shock absorber, as shown.
2. Mark the mount, upper spring seat and coil spring for proper reassembly.



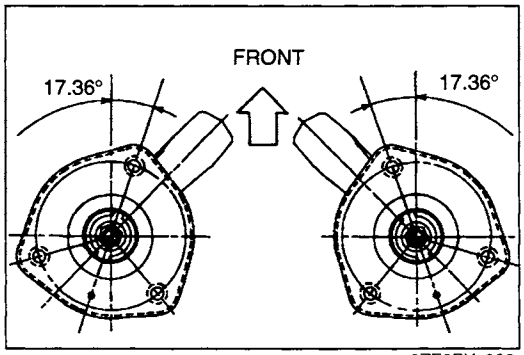
3. Align the marks of the mount, upper spring seat and coil spring. Protect the upper spring seat and the coil spring with a piece of cloth; then assemble the **SST**.
4. Use the **SST** to compress the spring.
5. Install the bound stopper.
6. Install the lower spring seat.
7. Install the shock absorber, fitting the end of the coil into the step of the lower seat.
8. Temporarily tighten the nut.
9. Remove the **SST**.
10. Verify that the lower coil of the spring is seated on the step of the lower seat.
11. Secure the mount in a vise.
12. Tighten the nut.

Tightening torque
M12 nut: 35—49 N·m {3.5—5.0 kgf·m, 26—36 ft·lbf}
M10 nut: 32—46 N·m {3.2—4.7 kgf·m, 24—33 ft·lbf}



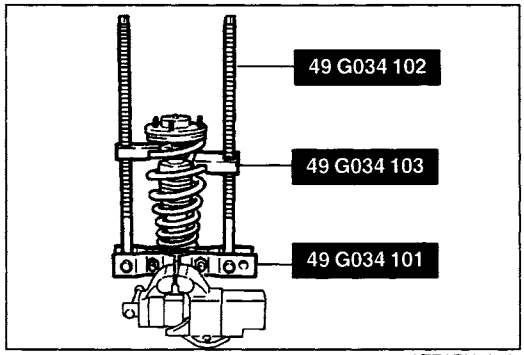
3ZE0RX-031

When using SST (49 G034 1A0)
1. Compress the coil spring by using the **SST**.
2. Install the spring so that the lower coil is seated on the step of the lower seat.



3ZE0RX-032

3. Install the mount so that the flexible hose bracket of the shock absorber faces the front of the vehicle as shown.



3ZE0RX-033

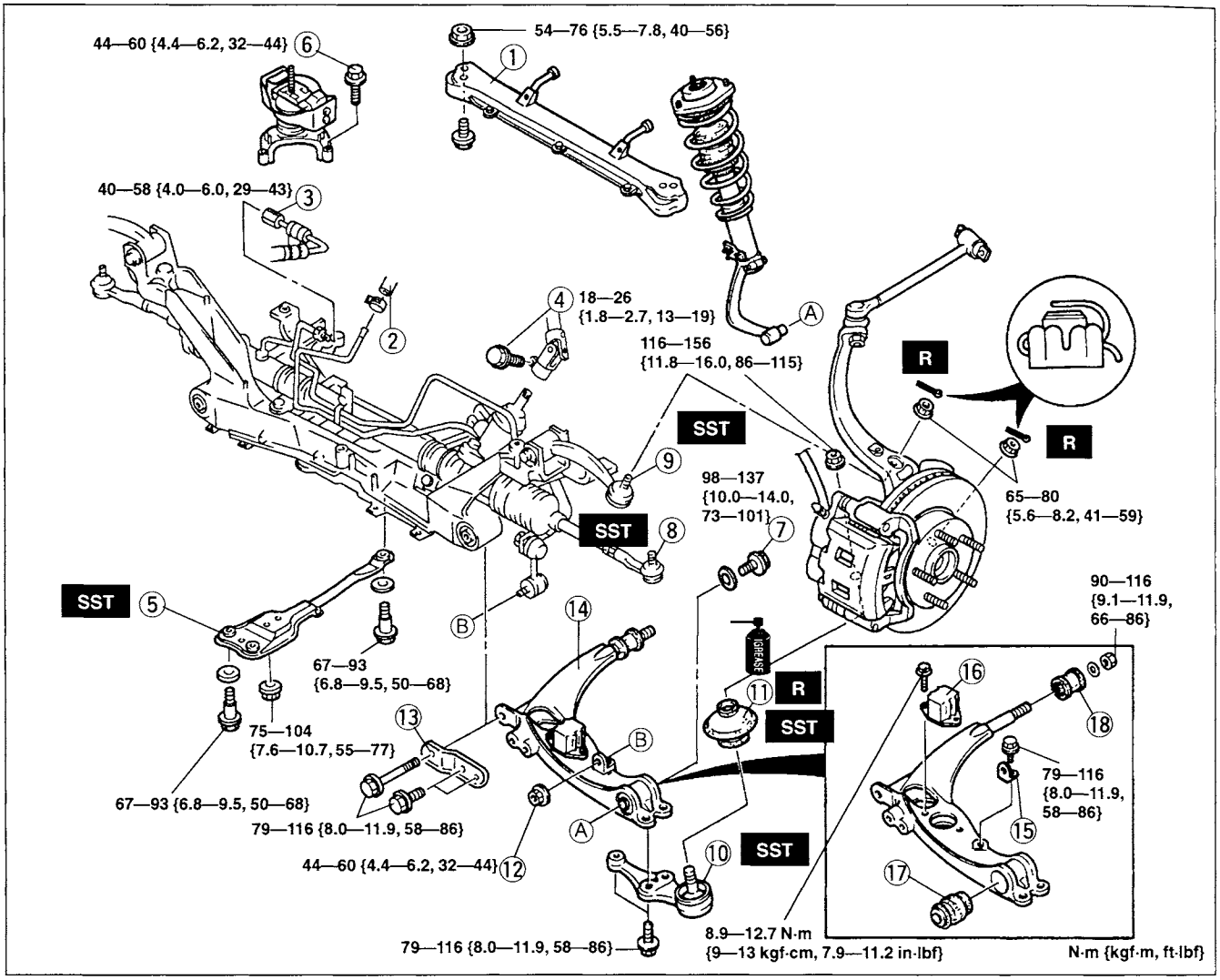
4. Temporarily tighten the nut.
5. Remove the **SST**.
6. Verify that the lower coil of the spring is seated on the step of the lower seat.
7. Secure the mount in a vise.
8. Tighten the nut.

Tightening torque
M12 nut: 35—49 N·m {3.5—5.0 kgf·m, 26—36 ft·lbf}
M10 nut: 32—46 N·m {3.2—4.7 kgf·m, 24—33 ft·lbf}

LOWER ARM

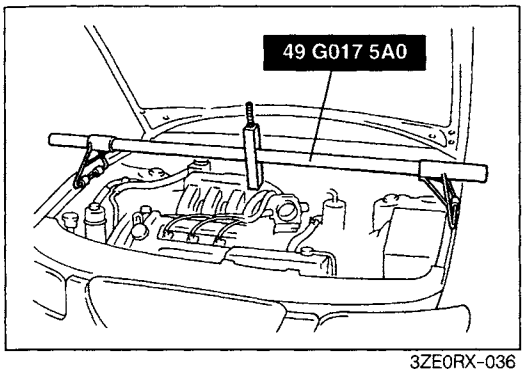
Removal / Inspection / Installation

- Remove the locknut and the splash shield(s). (Refer to section M.)
- Do the following steps after installation.
  (1) Adjust the front wheel alignment. (Refer to page R–4.)
  (2) Bleed the air from the power steering system. (Refer to section N.)



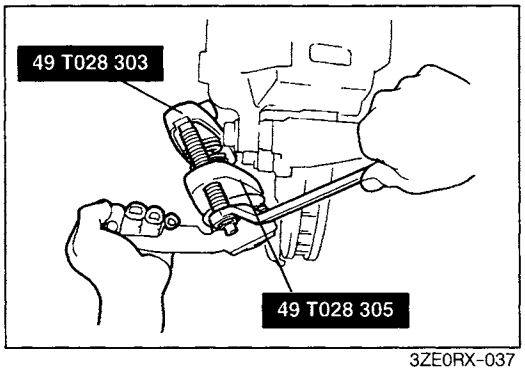
3ZE0RX-035

1. Transverse member
2. Return hose (power steering)
3. Pressure pipe (power steering)
4. Bolt (intermediate shaft)
   Service ..... section N
5. Engine mount member
   Removal Note ..... page R–15
6. Bolts (No.1 engine mount)
7. Bolts (shock absorber and spring)
8. Tie-rod end ball joint
   Service ..... section N
9. Upper lateral link ball joint
   Removal Note ..... page R–18
10. Lower ball joint
    Removal Note ..... page R–15
    Inspection ..... page R–16
    Installation Note ..... page R–16
11. Dust boot (lower ball joint)
    Removal Note ..... page R–15
    Installation Note ..... page R–16
12. Nut (stabilizer control link)
13. Gusset
14. Lower arm
    Removal Note ..... page R–15
15. Bracket (stabilizer)
16. Dynamic damper
17. Lower arm bushing (front)
    Removal Note ..... page R–15
    Installation Note ..... page R–16
18. Lower arm bushing (rear)
    Installation Note ..... page R–16



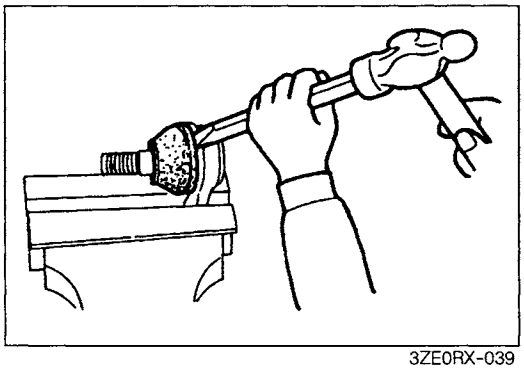
3ZE0RX-036

Removal note
Engine mount member
1. Support the engine by using the **SST**.
2. Remove the engine mount member nuts.

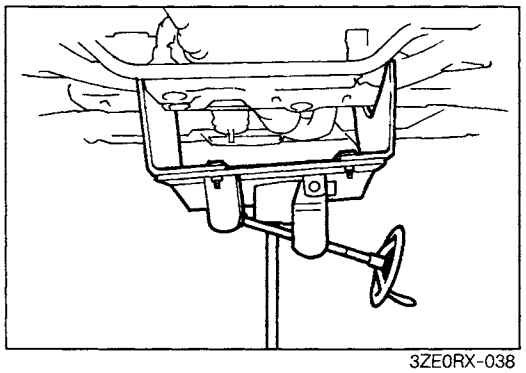


3ZE0RX-037

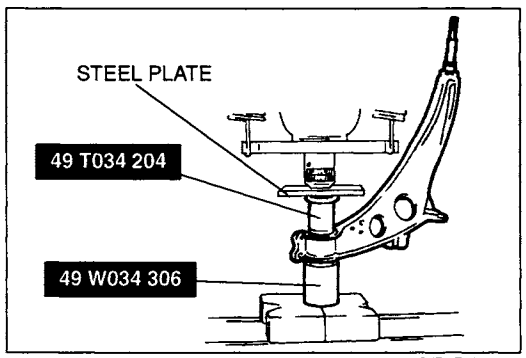
Lower ball joint
1. Suspend the axle assembly by using a rope.
2. Remove the drive shaft from the axle assembly, and suspend the drive shaft with a rope.
3. While supporting the ball joint with one hand, remove the ball joint by using the **SST**.


3ZE0RX-039

Dust boot (lower ball joint)
Carefully remove the dust boot with a chisel.

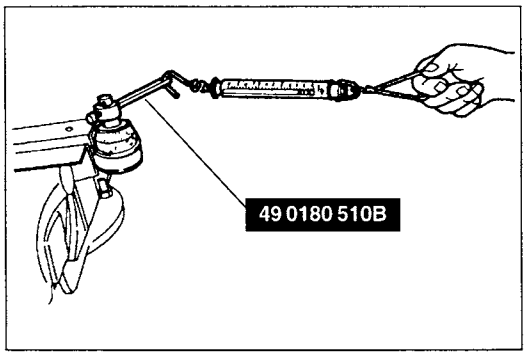

3ZE0RX-038

Lower arm
1. Support the crossmember by using a jack.
2. Remove the crossmember installation nuts.
3. Lower the crossmember to gain clearance.
4. Remove the lower arm assembly.

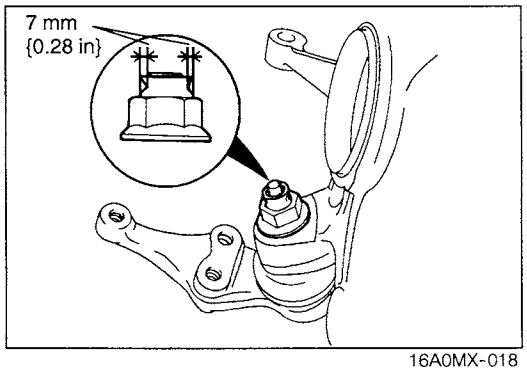


3ZE0RX-040

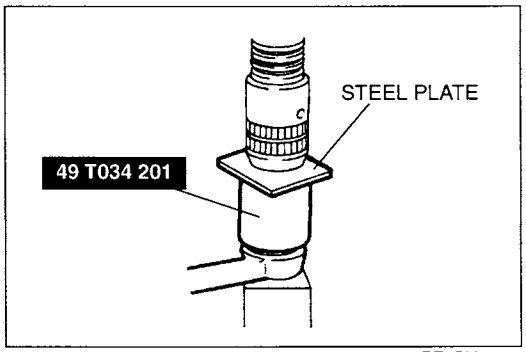
Lower arm bushing (front)
Press the lower arm bushing out by using the **SST**.



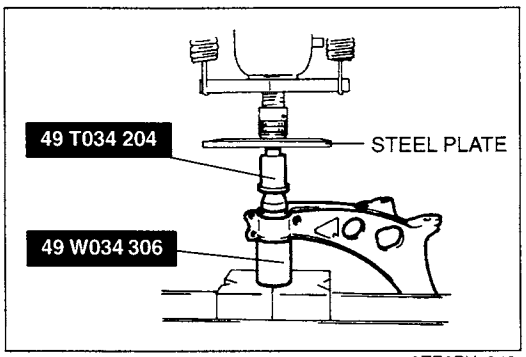
3ZE0RX-041



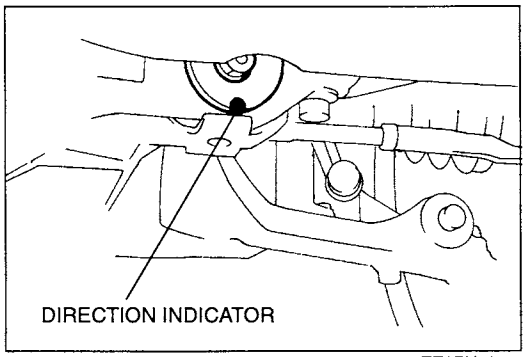
16A0MX-018



3ZE0RX-042



3ZE0RX-043



3ZE0RX-044

Inspection
Lower ball joint
Ball joint rotation torque
1. Inspect the link for damage and boot cracks. Replace it if necessary.
2. Inspect the ball joint for looseness. Replace the link if necessary.
3. Shake the ball joint stud at least five times.
4. Connect the **SST** to the stud and measure the rotation torque by using a pull scale.

   Rotation torque:
   0.3—3.4 N·m {3—35 kgf·cm, 2.6—30 in·lbf}
   Pull scale reading:
   3.0—34 N {0.3—3.5 kgf, 0.7—7.7 lbf}

5. If not within the specification, replace the lower ball joint.

Installation note
Lower ball joint
Install a new locknut and stake it, as shown.

Tightening torque:
116—156 N·m {11.8—16.0 kgf·m, 86—115 ft·lbf}

Dust boot (lower ball joint)
1. Wipe any 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 any excess grease.

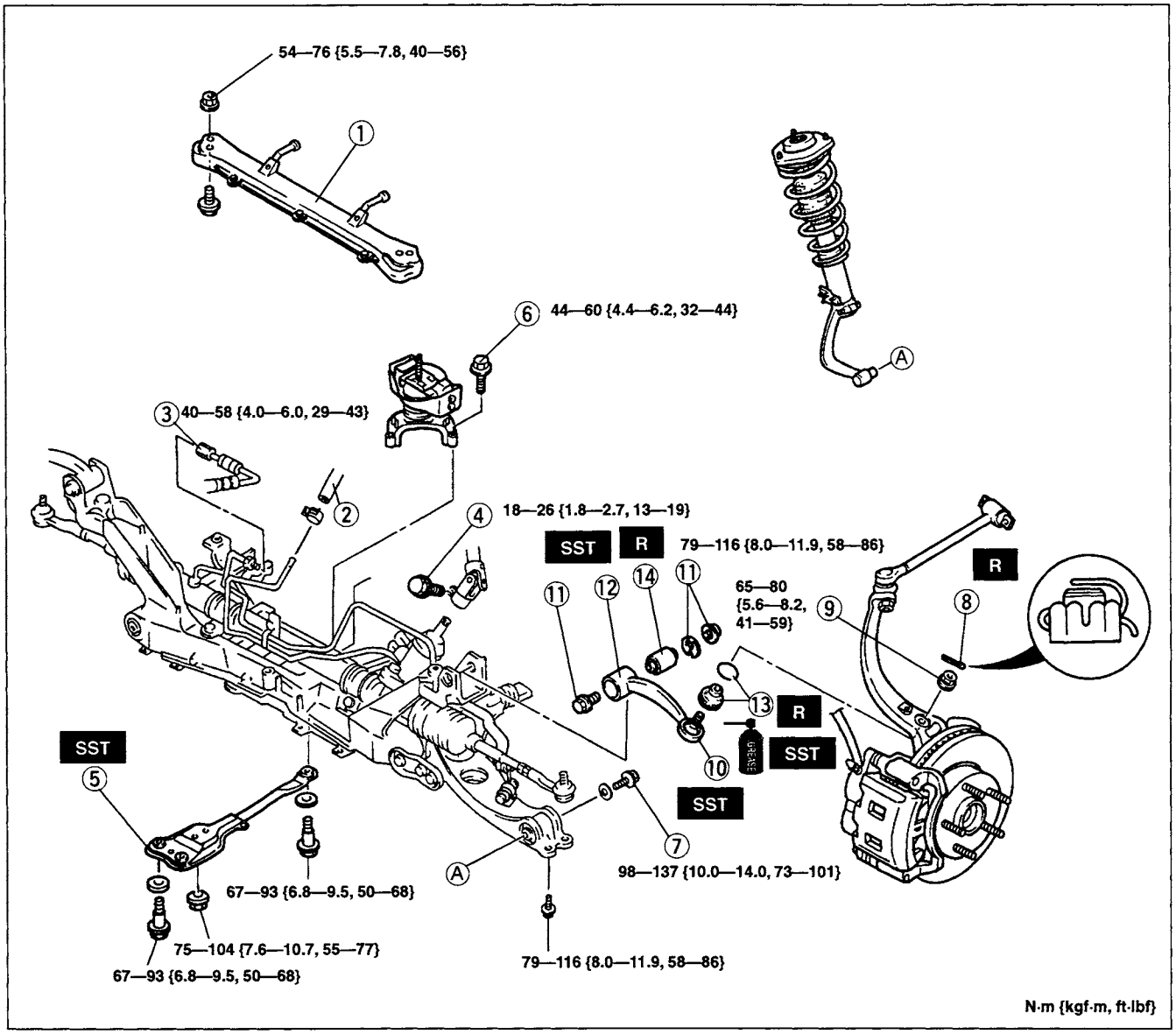
Lower arm bushing (front)
1. Apply soapy water to the new bushing.
2. In order to keep the lower arm stable, position the **SST** as shown.
3. Press the new bushing in by using the **SST**.

Lower arm bushing (rear)
Install the lower arm bushing so that the direction indicator is facing down.

UPPER LATERAL LINK

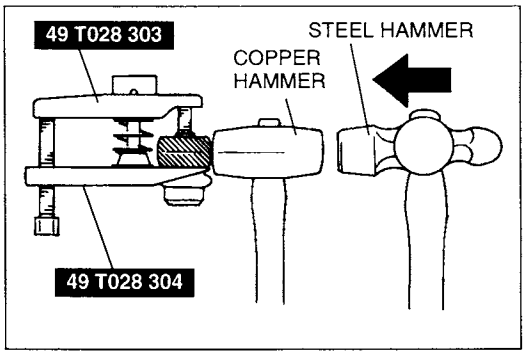
Removal / Inspection / Installation

- Remove the splash shield(s).
- Do the following steps after installation.
  (1) Adjust the front wheel alignment. (Refer to page R–4.)
  (2) Bleed the air from the power steering system. (Refer to section N.)

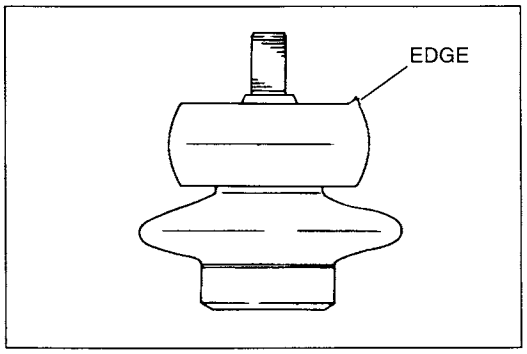


3ZE0RX-045

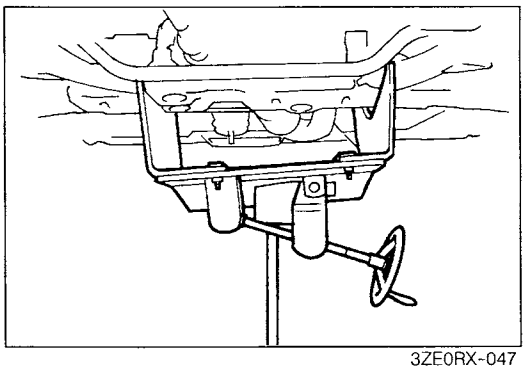
1. Transverse member
2. Return hose (power steering)
3. Pressure pipe (power steering)
4. Bolt (intermediate shaft)
   Service ..... section N
5. Engine mount member
   Removal Note ..... page R–15
6. Bolts (No.1 engine mount)
7. Bolt (shock absorber and spring)
8. Cotter pin
9. Nut
10. Upper lateral link ball joint
    Removal Note ..... page R–18
    Inspection ..... page R–19
11. Nut, cam plate, and adjusting cam bolt
    Removal Note ..... page R–18
    Installation Note ..... page R–19
12. Upper lateral link
    Inspect for damage and cracks
    Inspect bushing for damage and wear
13. Dust boot and clip
    Installation Note ..... page R–19
14. Upper lateral link bushing
    Removal Note ..... page R–18
    Installation Note ..... page R–19



Removal note
Upper lateral link ball joint
1. Suspend the axle assembly by using a rope.
2. Install the **SST** to the ball joint.
3. Tighten the bolt of the **SST** to **34—35 N·m {3.4—3.6 kgf·m, 25—26 ft·lbf}**.
4. Tap the knuckle as shown.

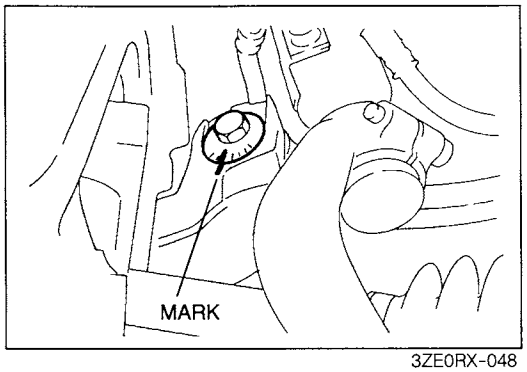


Caution
- **Do not tap the ball joint and the stud bolt.**
- **Be careful not to make an edge on the knuckle.**



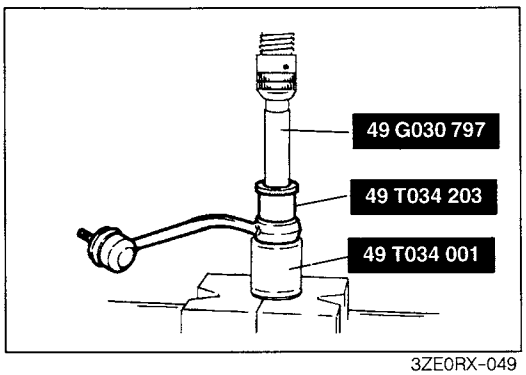
3ZE0RX-047

Nut, cam plate, and adjusting cam bolt
1. Support the crossmember by using a jack.
2. Remove the crossmember installation nuts.
3. Lower the crossmember to gain clearance.



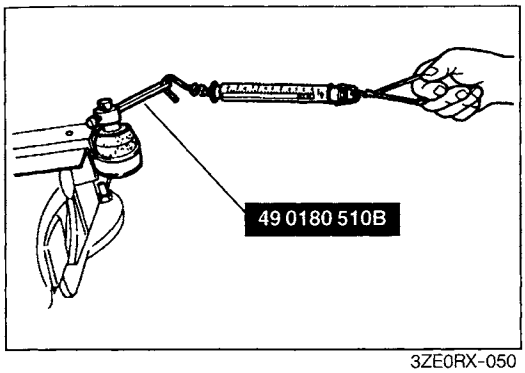
3ZE0RX-048

4. Before loosening the nut, make a mark on the cam plate and the crossmember for reference during installation.



3ZE0RX-049

Upper lateral link bushing
Remove the bushing by using the **SST**.

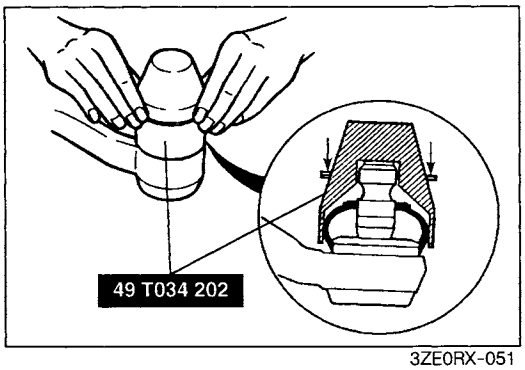


3ZE0RX-050

Inspection
Upper lateral link ball joint
Ball joint rotation torque
1. Inspect the link for damage and boot cracks. Replace it if necessary.
2. Inspect the ball joint for looseness. Replace the link if necessary.
3. Shake the ball joint stud at least five times.
4. Connect the **SST** to the stud and measure the rotation torque by using a pull scale.

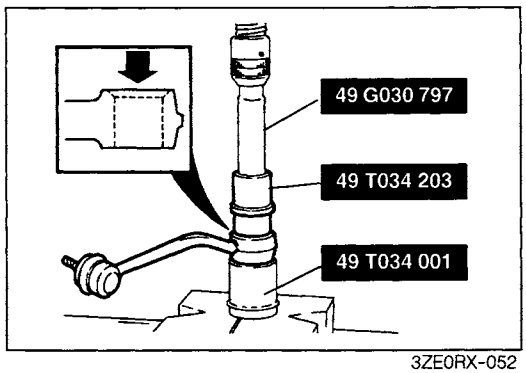
   Rotation torque:
   0.3—4.4 N·m {3—45 kgf·cm, 2.6—39 in·lbf}
   Pull scale reading:
   3.0—44 N {0.3—4.5 kgf, 0.7—9.9 lbf}

5. If not within the specification, replace the upper lateral link.



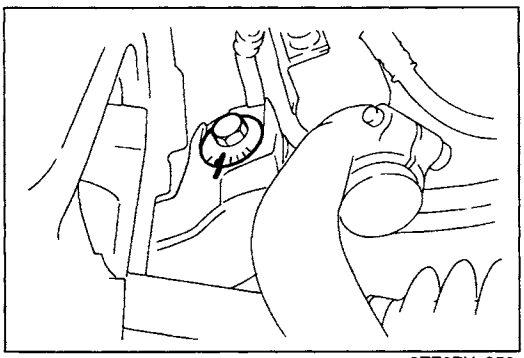
3ZE0RX-051

Installation note
Dust boot and clip
1. Wipe any grease off the ball stud.
2. Fill the inside of the new dust boot with grease.
3. Install the boot on the ball joint.
4. Install the new clip by using the **SST**.
5. Wipe away any excess grease.



3ZE0RX-052

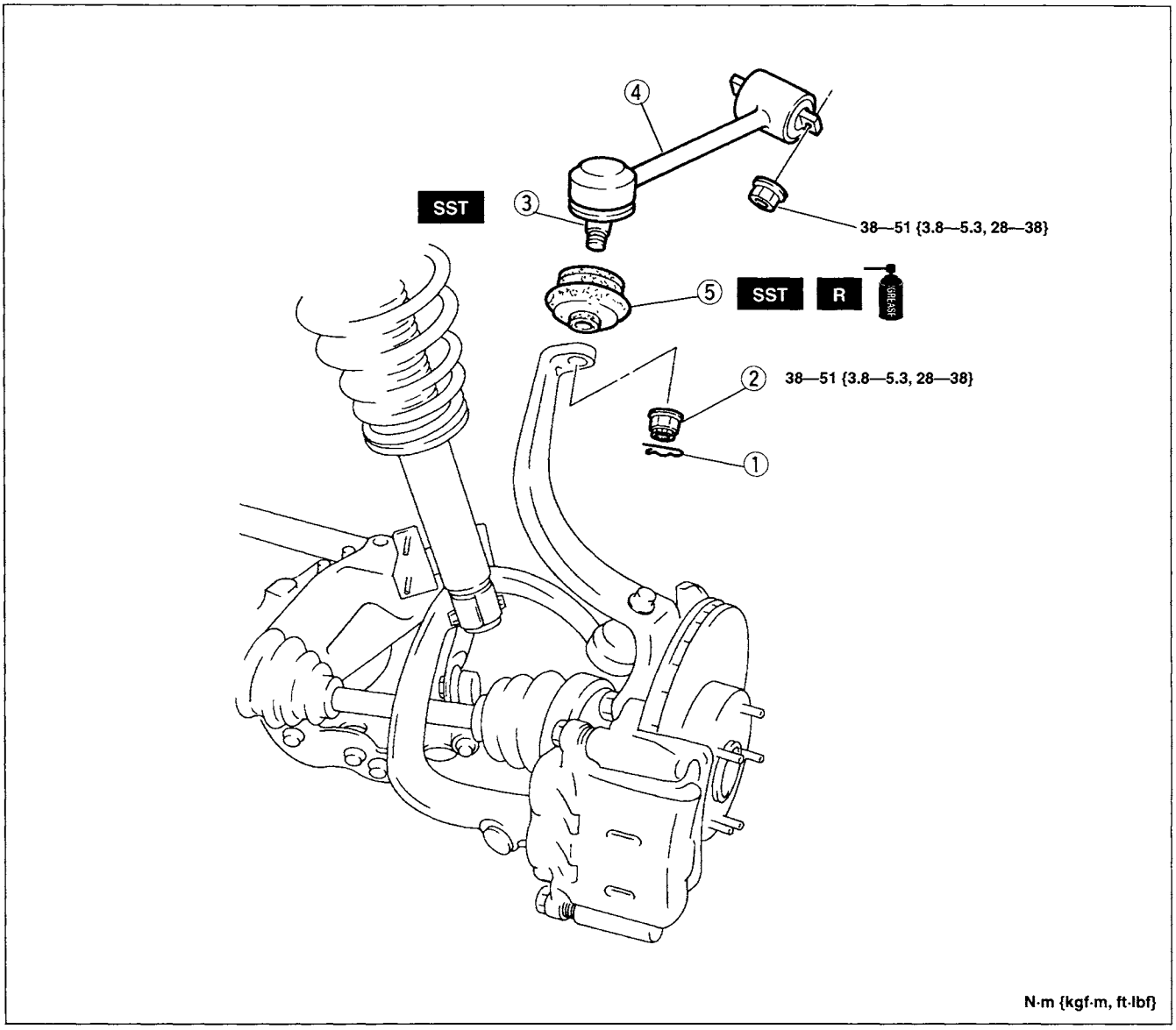
Upper lateral link bushing
1. Apply soapy water to the new bushing.
2. Insert the new bushing to the upper lateral link (chamfered side).
3. Position the **SST** on the upper lateral link as shown.
4. Press the bushing into the upper lateral link.


3ZE0RX-053

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 the marks that were made before removing the adjusting cam bolt, and tighten the nut.

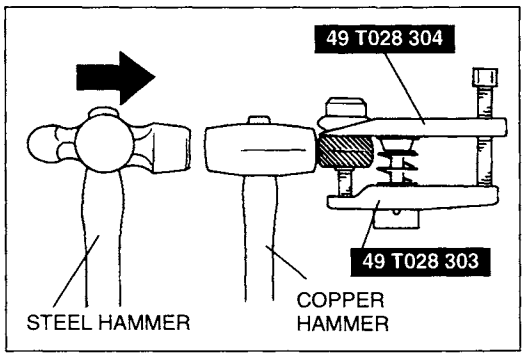
   Tightening torque:
   79—116 N·m {8.0—11.9 kgf·m, 58—86 ft·lbf}

UPPER LEADING LINK
Removal / Inspection / Installation

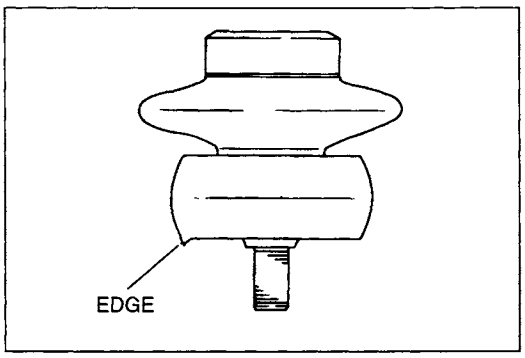


3ZE0RX-054

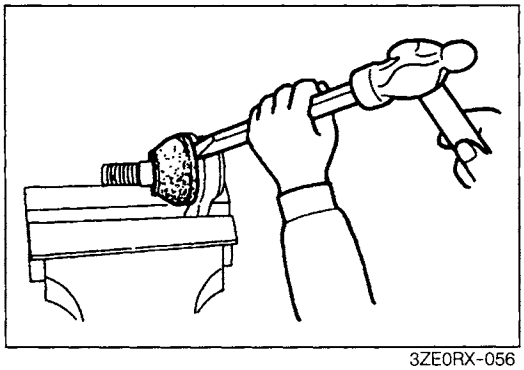
1. Snap pin
2. Nut
3. Upper leading link ball joint
   - Removal Note ..... page R–20
   - Inspection ..... page R–21
4. Upper leading link
   - Inspect for damage and cracks
   - Inspect bushing for damage and wear
5. Dust boot (upper leading link)
   - Removal Note ..... page R–21
   - Installation Note ..... page R–21



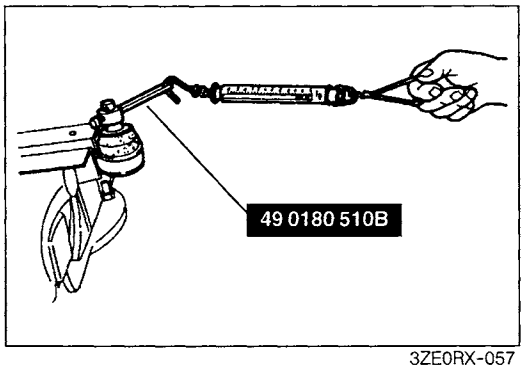
Removal note
Upper leading link ball joint
1. Install the **SST** to the ball joint.
2. Tighten the bolt of the **SST** to **14—15 N·m {140—160 kgf·cm, 122—138 in·lbf}**.
3. Tap the knuckle as shown.



Caution
- **Do not tap the ball joint and the stud bolt.**
- **Be careful not to make an edge on the knuckle.**


3ZE0RX-056

Dust boot (upper leading link)
Carefully remove the dust boot with a chisel.

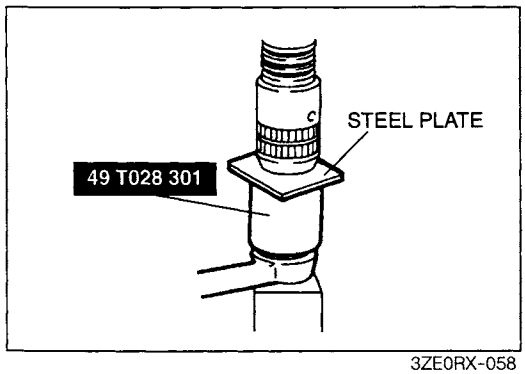


3ZE0RX-057

Inspection
Upper leading link ball joint
Ball joint rotation torque
1. Inspect the link for damage and boot cracks. Replace it if necessary.
2. Inspect the ball joint for looseness. Replace the link if necessary.
3. Shake the ball joint stud at least five times.
4. Connect the **SST** to the stud and measure the rotation torque by using a pull scale.

   Rotation torque:
   0.3—2.9 N·m {3—30 kgf·cm, 2.6—26 in·lbf}
   Pull scale reading:
   3.0—29 N {0.3—3.0 kgf, 0.7—6.6 lbf}

5. If not within the specification, replace the leading link.



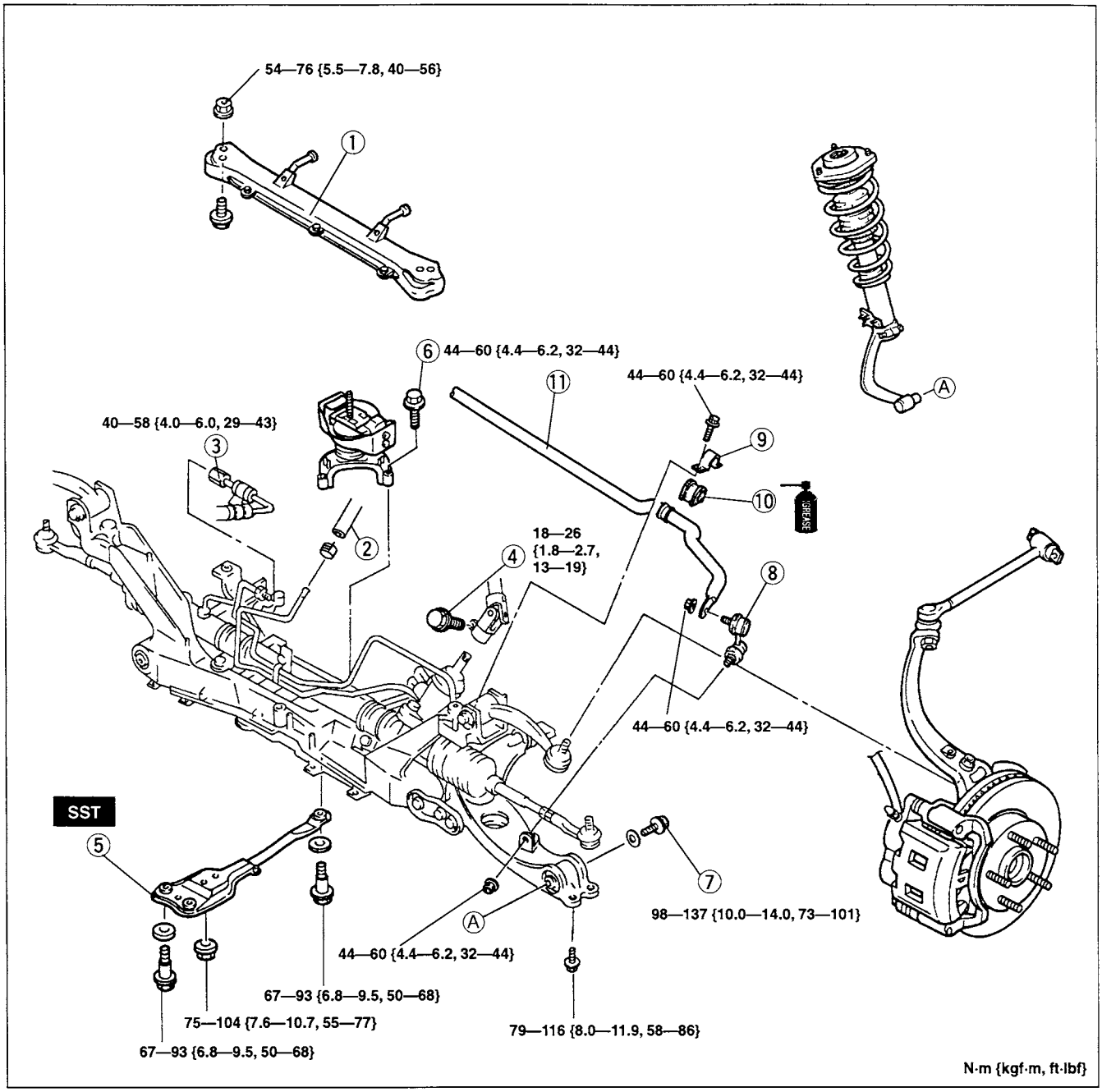
3ZE0RX-058

Installation note
Dust boot (upper leading link)
1. Wipe any 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 any excess grease.

FRONT STABILIZER

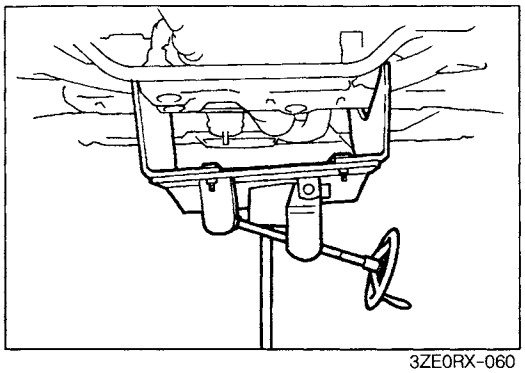
Removal / Inspection / Installation

- Remove the splash shield(s).
- Do the following steps after installation.
  (1) Adjust the front wheel alignment. (Refer to page R–4.)
  (2) Bleed the air from the power steering system. (Refer to section N.)

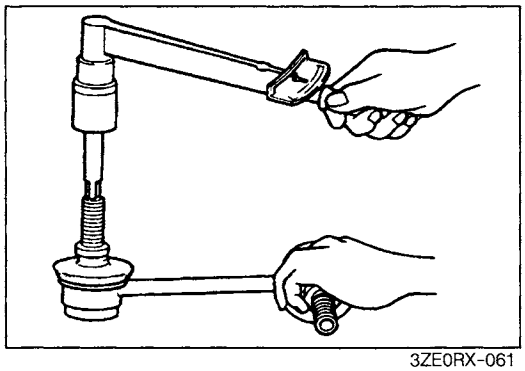


3ZE0RX-059

1. Transverse member
2. Return hose (power steering)
3. Pressure pipe (power steering)
4. Bolt (intermediate shaft)
   Service ..... section N
5. Engine mount member
   Removal Note ..... page R–15
6. Bolt (No.1 engine mount)
7. Bolt (shock absorber and spring)
8. Stabilizer control link
   Inspection ..... page R–23
9. Stabilizer bracket
   Removal Note ..... page R–23
10. Stabilizer bushing
    Installation Note ..... page R–23
    Inspect for wear and deterioration
11. Front stabilizer


3ZE0RX-060

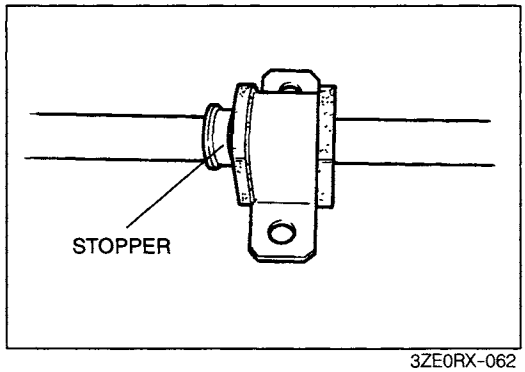
Removal note
Stabilizer bracket
1. Support the crossmember by using a jack.
2. Remove the crossmember installation bolts and nuts.
3. Lower the crossmember to gain clearance.
4. Remove the stabilizer bracket.


3ZE0RX-061

Inspection
Stabilizer control link
1. Inspect for bending and damage.
2. Measure the ball joint starting torque.
   (a) Shake the ball joint stud from side to side 10 times.
   (b) Rotate the ball joint stud 10 times.
   (c) Measure the starting torque by using an Allen socket and a torque wrench.

   Starting torque:
   0.1—1.9 N·m {1—20 kgf·cm, 0.9—17 in·lbf}

3. If not within the specification, replace the stabilizer control link.



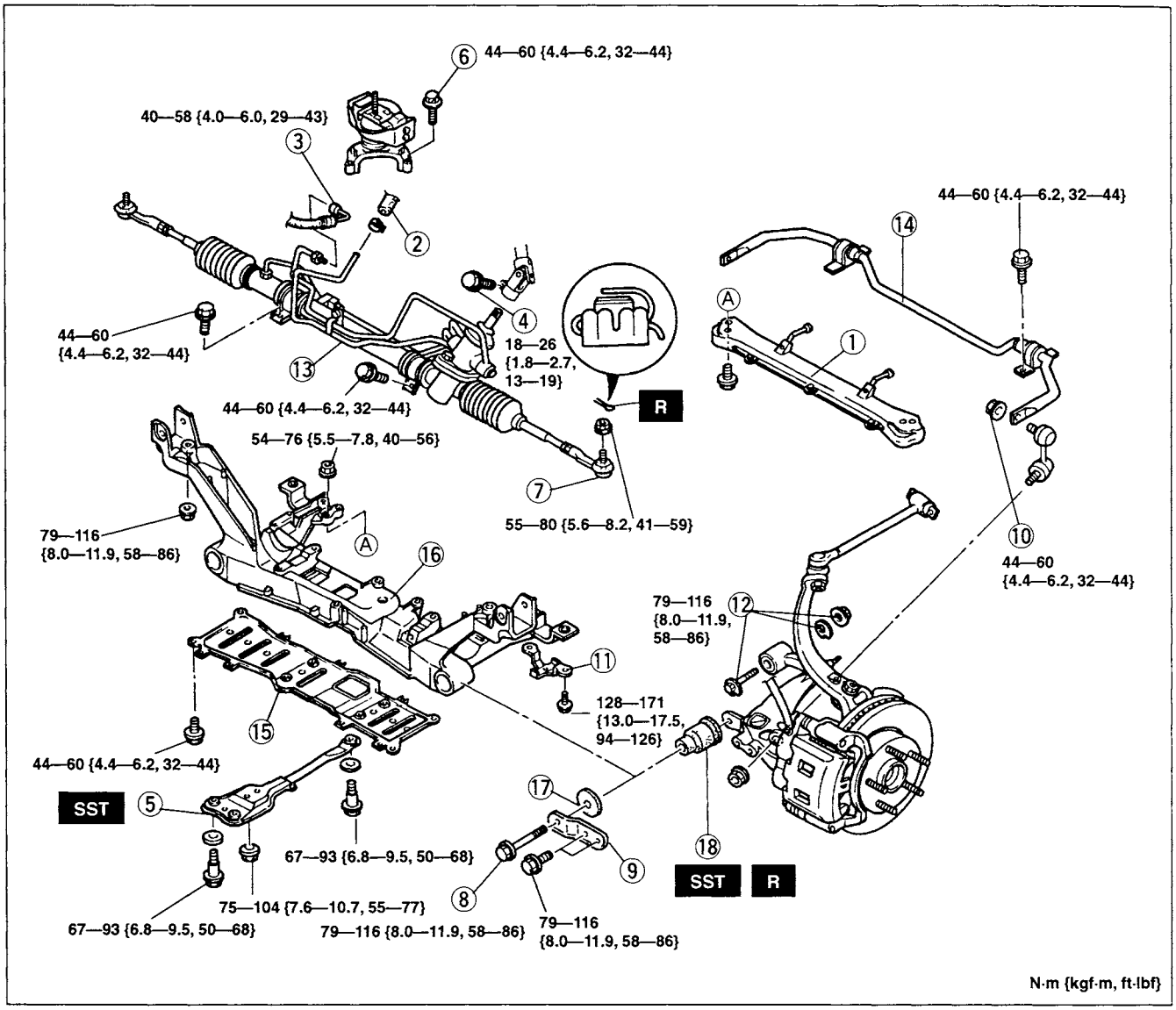
3ZE0RX-062

Installation note
Stabilizer bushing
1. Apply rubber grease to the inside surface of the stabilizer bushing.
2. Align the bushing with the stopper on the stabilizer.

FRONT CROSSMEMBER

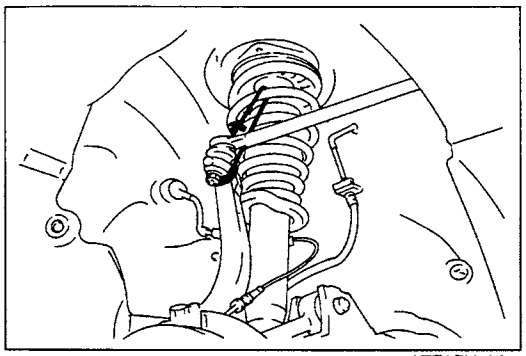
Removal / Installation

- Remove the splash shield(s).
- Do the following steps after installation.
  (1) Adjust the front wheel alignment. (Refer to page R–4.)
  (2) Bleed the air from the power steering system. (Refer to section N.)

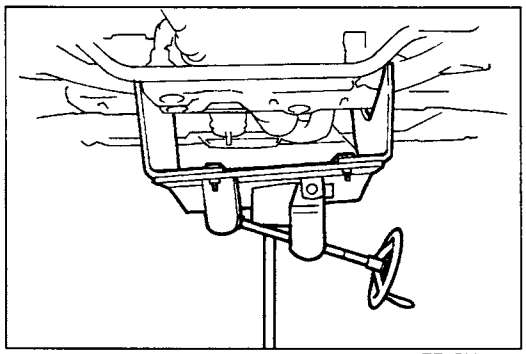


3ZE0RX-063

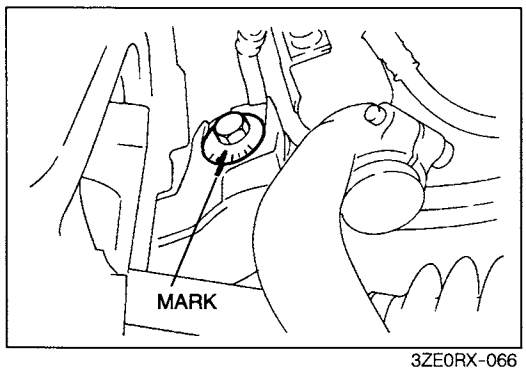
1. Transverse member
2. Return hose (power steering)
3. Pressure pipe (power steering)
4. Bolt (intermediate shaft)
   Service ..... section N
5. Engine mount member
   Removal Note ..... page R–15
6. Bolts (No.1 engine mount)
7. Tie rod end ball joint
   Service ..... section N
8. Bolt (lower arm)
   Removal Note ..... page R–25
9. Gusset
10. Nut (stabilizer control link)
11. Protect bracket
    Removal Note ..... page R–25
12. Nut, cam plate, and adjusting bolt
    Removal Note ..... page R–25
    Installation Note ..... page R–19
13. Steering gear and linkage
    Service ..... section N
14. Front stabilizer
15. Crossmember undercover
16. Front crossmember
    Inspect for damage and cracks
17. Stopper
18. Crossmember bushing
    Removal Note ..... page R–25
    Installation Note ..... page R–25


3ZE0RX-064

Removal note
Bolt (lower arm)
Suspend the axle assembly by using a rope.

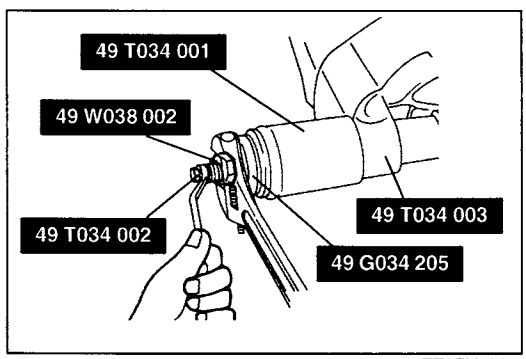

3ZE0RX-065

Protect bracket
1. Support the crossmember by using a jack.
2. Remove the bolts.
3. Remove the protect bracket.



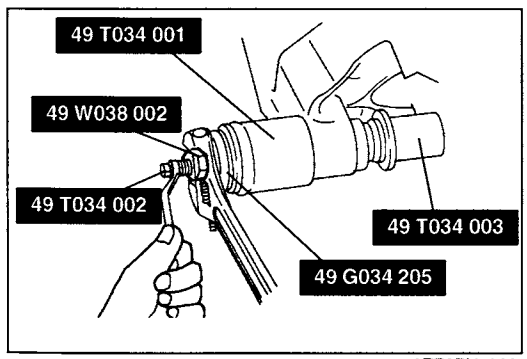
3ZE0RX-066

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.



3ZE0RX-067

Front crossmember bushing
Remove the bushing by using the **SST**.

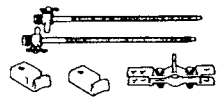
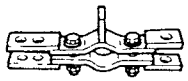
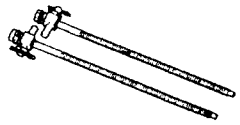
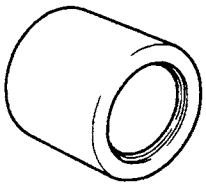
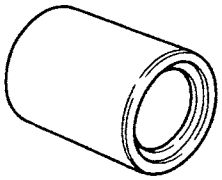
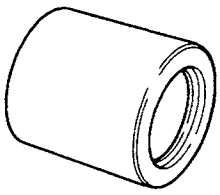
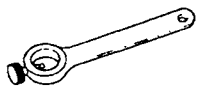
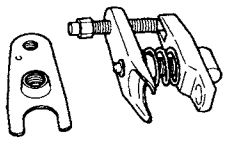
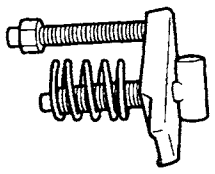
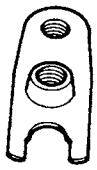
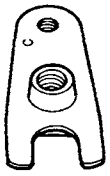
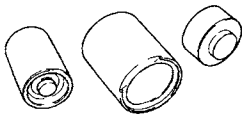
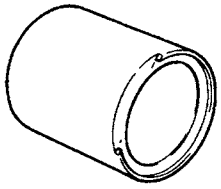
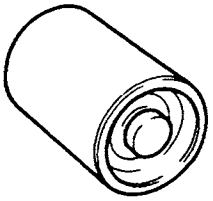
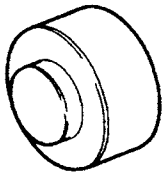


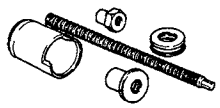
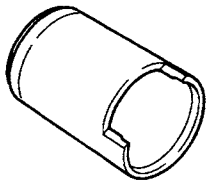
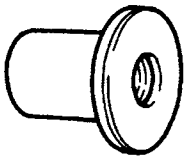
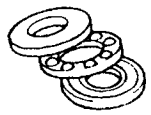
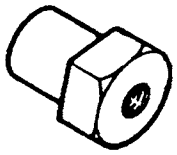
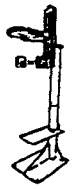
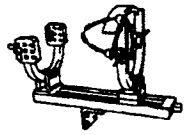
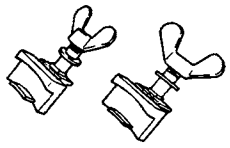
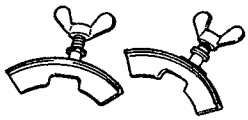
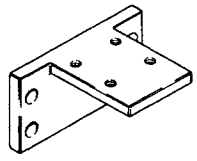
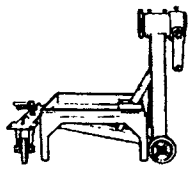
3ZE0RX-068

Installation note
Front crossmember bushing
1. Apply soapy water to the new bushing.
2. Install the front crossmember bushing.
3. Pull the bushing into the front crossmember by using the **SST**.

REAR SUSPENSION (MULTI-LINK)

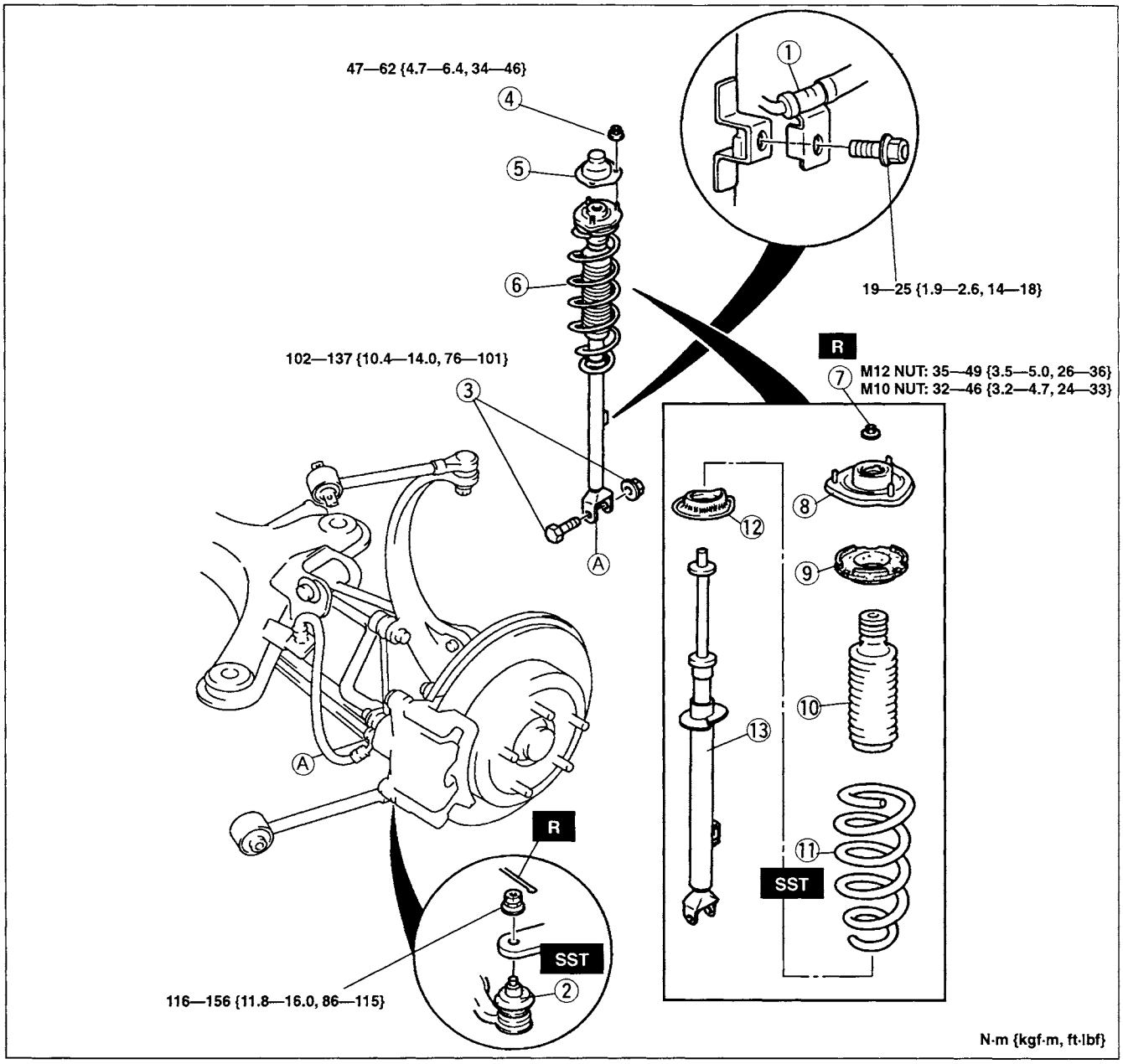
PREPARATION
SST

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 T034 201 Installer, dust boot 	For installation of lower lateral link dust boot	49 T028 301 Installer, dust boot 	For installation of upper trailing link dust boot
49 T028 302 Installer, dust boot 	For installation of lower trailing link, upper lateral link and rear lower lateral link ball joint dust boot	49 0180 510B Attachment, preload measuring 	For inspection of ball joint
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 upper trailing link, lower trailing link, upper lateral link and rear lower lateral link ball joint	49 T028 305 Attachment (Part of 49 T028 3A0) 	For removal of lower lateral link ball joint
49 T028 2A0 Replacer set, rubber bushing 	For removal and installation of lower lateral link bushing	49 T028 201 Support block (Part of 49 T028 2A0) 	For removal and installation of lower lateral link bushing
49 T028 202 Remover, rubber bushing (Part of 49 T028 2A0) 	For removal and installation of lower lateral link bushing	49 T028 203 Installer, rubber bushing (Part of 49 T028 2A0) 	For removal and installation of lower lateral link bushing

49 T028 2A1 Replacer set, rubber bushing 	For removal and installation of rear crossmember rubber mount	49 T028 204 Support block (Part of 49 T028 2A1) 	For removal and installation of rear crossmember rubber mount
49 T028 205 Attachment (Part of 49 T028 2A1) 	For removal and installation of rear crossmember rubber mount	49 G034 205 Bearing (Part of 49 T028 2A1) 	For removal and installation of rear crossmember rubber mount
49 W038 002 Nut (Part of 49 T028 2A1) 	For removal and installation of rear crossmember rubber mount	49 W038 001 Shaft (Part of 49 T028 2A1) 	For removal and installation of rear crossmember rubber mount
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 (Part of 49 T034 1A0) 	For removal and installation of coil spring	49 T034 105 Attachment 	For removal and installation of coil spring
49 0107 680A Engine stand 	For removal and installation of coil spring	—	—

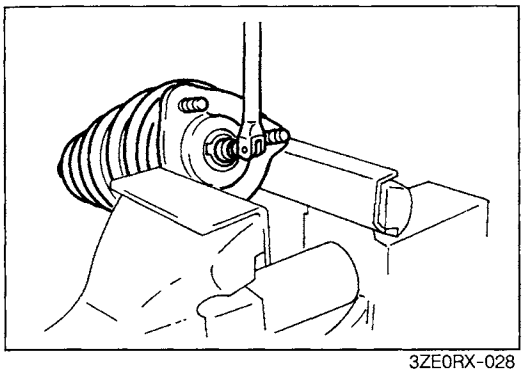
REAR SHOCK ABSORBER AND SPRING
Removal / Inspection / Installation

- Remove the rear package front trim. (Refer to section S.)



3ZE0RX-070

1. ABS wheel-speed sensor harness
2. Lower lateral link ball joint
   Removal Note ..... page R–34
3. Bolt and nut (shock absorber and spring)
4. Nuts
5. Cap
6. Rear shock absorber and spring
   Installation Note ..... page R–32
7. Nut
   Removal Note ..... page R–29
8. Mount
   Inspect for damage and deterioration
9. Upper spring seat
   Inspect for damage and cracks
10. Bound stopper
    Inspect for damage and cracks
11. Coil spring
    Inspect for damage and weakness
    Installation Note ..... page R–30
12. Lower spring seat
    Inspect for damage and cracks
13. Rear shock absorber
    Inspection ..... page R–30

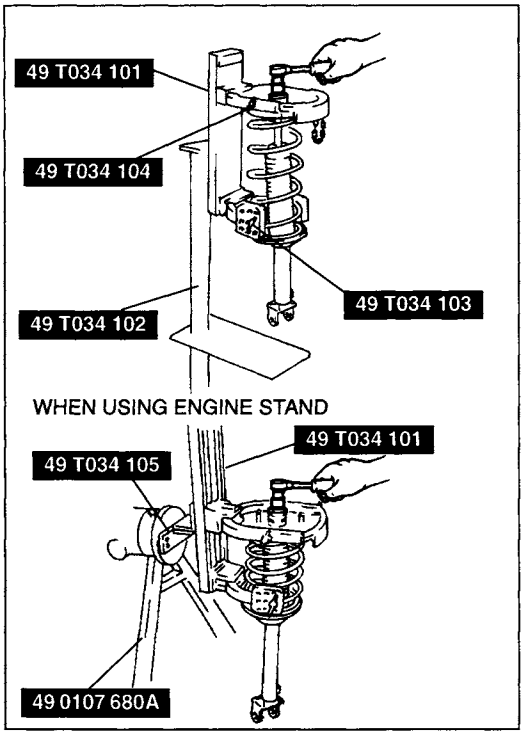

3ZE0RX-028

Removal note
Nut

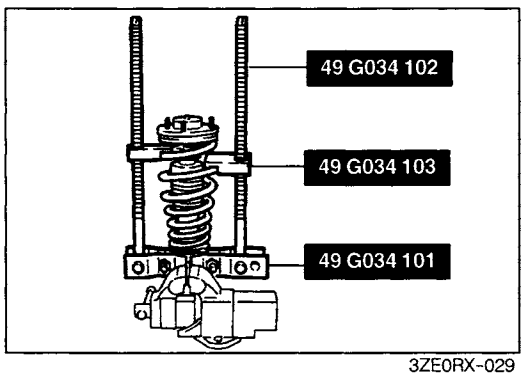
Warning
- **Removing the mounting rubber nut is dangerous. The shock absorber and spring could fly off under tremendous pressure and cause serious injury or death. Secure the shock absorber in the SST before removing the mounting rubber nut.**

Caution
- **To prevent damage to the mounting rubber, use protective plates in the vise jaws.**

1. Secure the mounting rubber in a vise.
2. Loosen the nut several turns, but do not remove it.

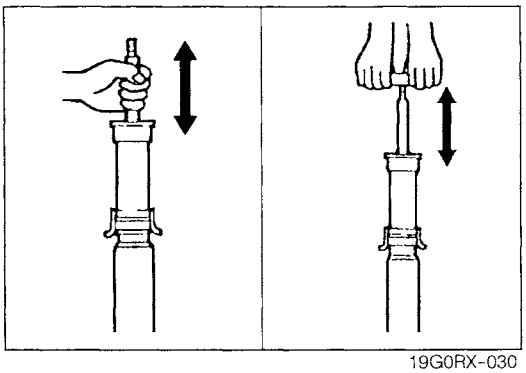


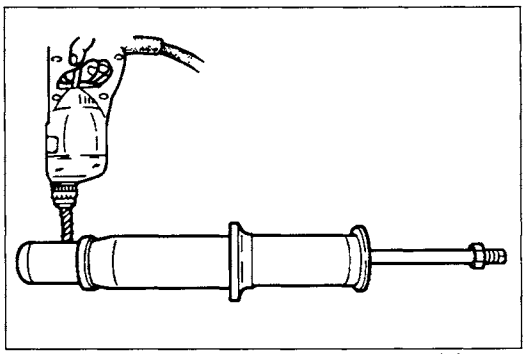
When using SST (49 T034 1A0)
3. Assemble the **SST**.
4. Secure the shock absorber in the **SST**.
5. Compress the coil spring by using the **SST** and remove the nut.



3ZE0RX-029

When using SST (49 G034 1A0)
3. Assemble the **SST**.
4. Compress the coil spring by using the **SST** and remove the nut.


19G0RX-030


3ZE0RX-030

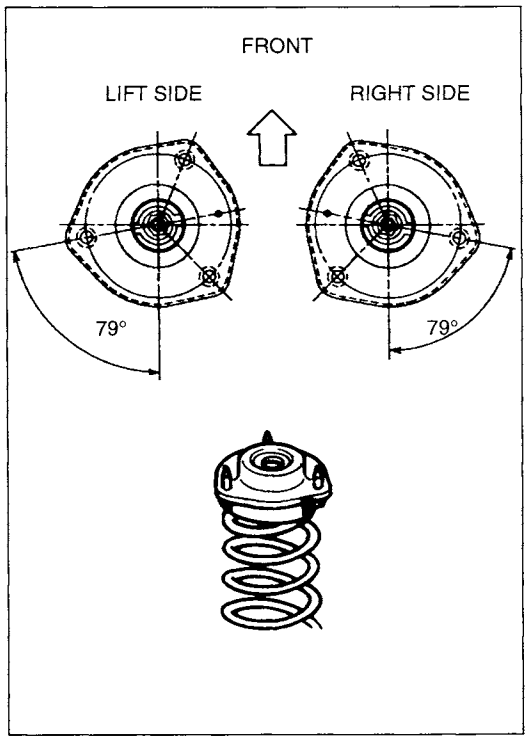
Inspection
Rear shock absorber
Do the following and replace the shock absorber if necessary.
1. Inspect for damage and oil leakage.
2. Compress the shock absorber rod and release it, and verify that the rod extends fully at a normal speed.
3. Compress and extend the shock rod at least three (3) times. Verify that the operational force does not change and that there is no unusual noise.

Disposal of shock absorber

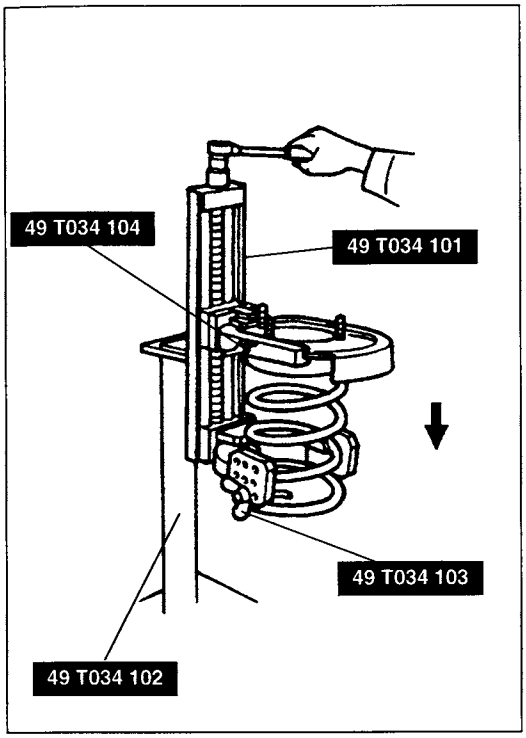
Warning
- **The gas in the shock absorber is pressurized, and could spray metal chips into the eyes and face when drilling. Whenever drilling into a shock absorber, wear protective eye wear.**

1. Clamp a shock absorber flat or with the piston downwards.
2. Drill the 2—3 mm {0.08—0.12 in} hole at a point of 20—30 mm { 0.08—0.12 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 waste oil according to the waste disposal law.

Note
- Shock absorber gas is nitrogen gas.
- Shock absorber oil is mineral oil.

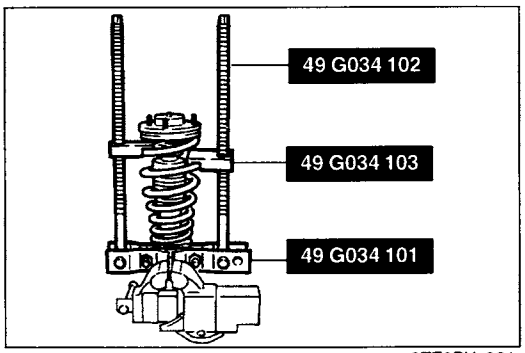


Installation note
Coil spring
When using SST (49 T034 1A0)
1. Temporarily assemble the mount, upper spring seat and coil spring to the shock absorber, as shown.
2. Mark the mount, upper spring seat and coil spring for proper reassembly.



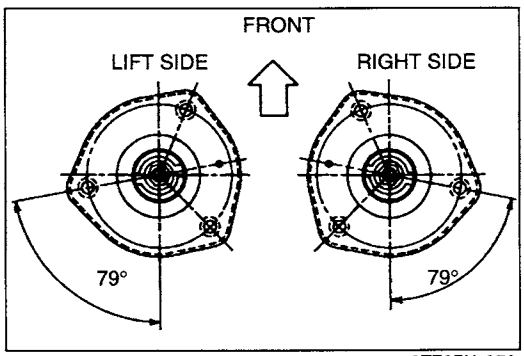
3. Align the marks of the mount, upper spring seat and coil spring. Protect the upper spring seat and the coil spring with a piece of cloth; then assemble the **SST**.
4. Use the **SST** to compress the spring.
5. Install the bound stopper.
6. Install the lower spring seat.
7. Install the shock absorber, fitting the end of the coil into the step of the lower seat.
8. Temporarily tighten the nut.
9. Remove the **SST**.
10. Verify that the lower coil of the spring is seated on the step of the lower seat.
11. Secure the mount in a vise.
12. Tighten the nut.

Tightening torque
M12 nut: 35—49 N·m {3.5—5.0 kgf·m, 26—36 ft·lbf}
M10 nut: 32—46 N·m {3.2—4.7 kgf·m, 24—33 ft·lbf}



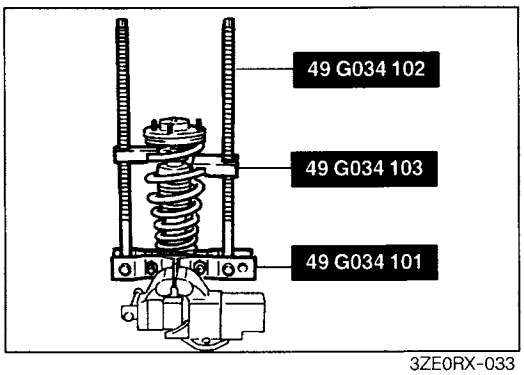
3ZE0RX-031

When using SST (49 G034 1A0)
1. Compress each coil spring by using the **SST**.
2. Install each spring so that the lower coil is seated on the step of the lower seat.



3ZE0RX-076

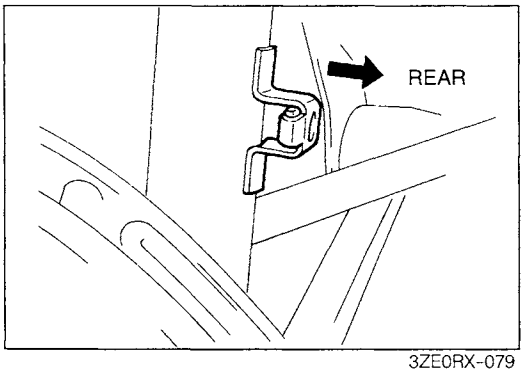
3. Install the mount so that the ABS wheel-speed sensor harness bracket of the shock absorber faces the rear of the vehicle as shown.



3ZE0RX-033

4. Temporarily tighten the nut.
5. Remove the **SST**.
6. Verify that the lower coil of the spring is seated on the step of the lower seat.
7. Secure the mount in a vise.
8. Tighten the nut.

Tightening torque
M12 nut: 35—49 N·m {3.5—5.0 kgf·m, 26—36 ft·lbf}
M10 nut: 32—46 N·m {3.2—4.7 kgf·m, 24—33 ft·lbf}



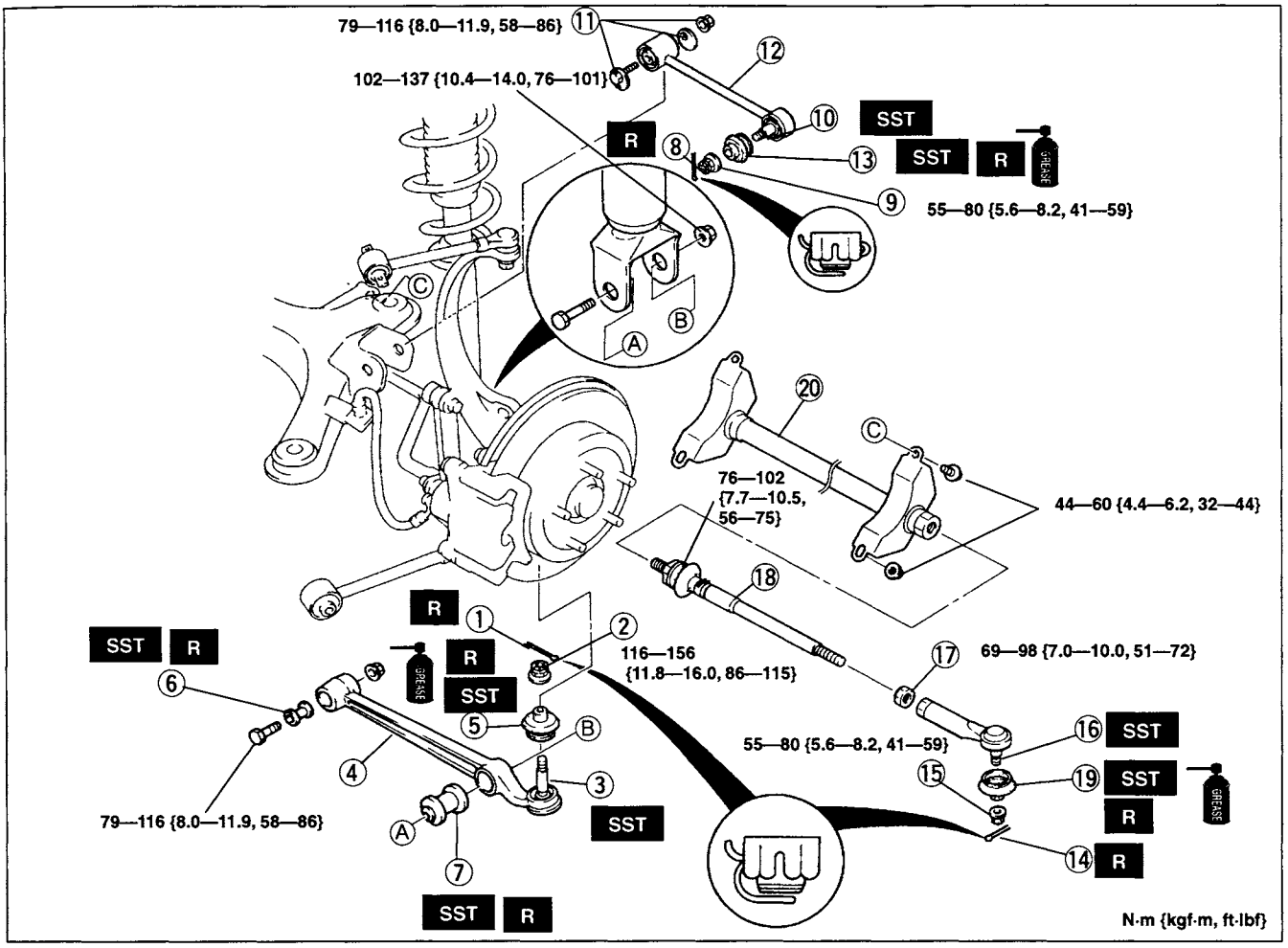
3ZE0RX-079

Rear shock absorber and spring

Install the shock absorber and spring so that the ABS wheel-speed sensor bracket faces the rear.

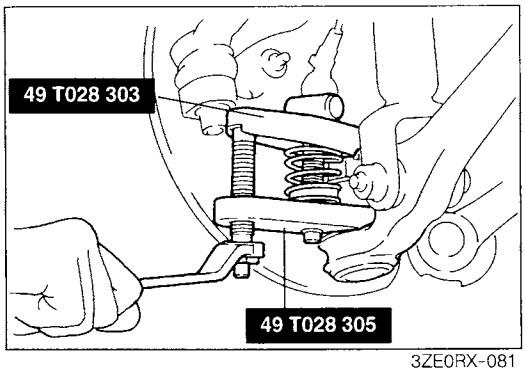
LOWER LATERAL LINK, UPPER LATERAL LINK, REAR LOWER LATERAL LINK
Removal / Inspection / Installation

- After installation, adjust the rear wheel alignment. (Refer to page R–6.)



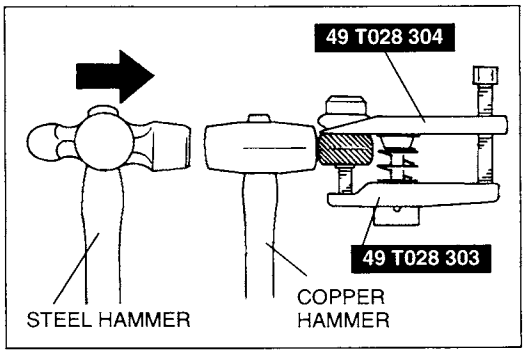
3ZE0RX-080

1. Cotter pin
2. Nut
3. Lower lateral link ball joint
   - Removal Note ..... page R–34
   - Inspection ..... page R–35
4. Lower lateral link
   - Inspect for bending and damage
   - Inspect bushing for wear and deterioration
5. Dust boot (lower lateral link)
   - Removal Note ..... page R–34
   - Installation Note ..... page R–35
6. Lower lateral link bushing
   - Removal Note ..... page R–34
   - Installation Note ..... page R–36
7. Damper bushing
   - Removal Note ..... page R–35
   - Installation Note ..... page R–37
8. Cotter pin
9. Nut
10. Upper lateral link ball joint
    - Removal Note ..... page R–34
    - Inspection ..... page R–35
11. Nut, cam plate, and adjusting cam bolt
    - Removal Note ..... page R–34
    - Installation Note ..... page R–37
12. Upper lateral link
    - Inspect for bending and damage
    - Inspect bushing for wear and deterioration
13. Dust boot (upper lateral link)
    - Removal Note ..... page R–34
    - Installation Note ..... page R–36
14. Cotter pin
15. Nut
16. Rear lower lateral link outer ball joint
    - Removal Note ..... page R–34
    - Inspection ..... page R–35
17. Locknut
18. Rear lower lateral link inner ball joint
    - Inspect for bending and damage
19. Dust boot (rear lower lateral link)
    - Removal Note ..... page R–34
    - Installation Note ..... page R–36
20. Rear lower lateral link



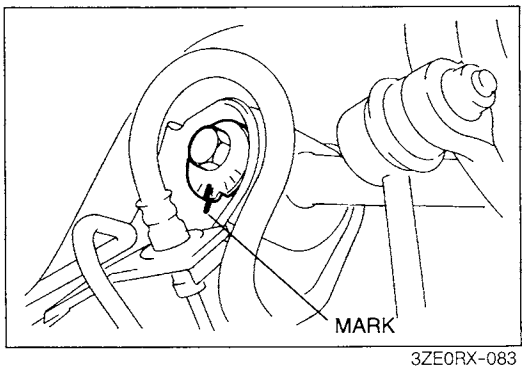
3ZE0RX-081

Removal note
Lower lateral link ball joint
Remove the ball joint by using the **SST**.



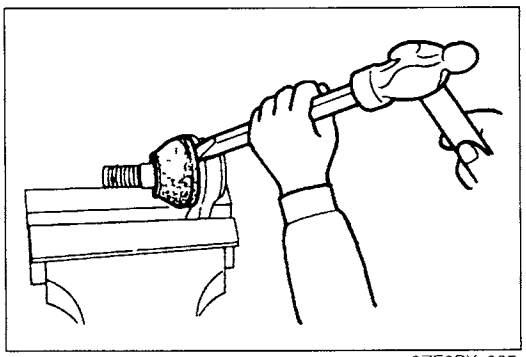
Upper lateral link ball joint and rear lower lateral link ball joint
1. Install the **SST** to the ball joint.
2. Tighten the bolt of the **SST** to **34—35 N·m {3.4—3.6 kgf·m, 25—26 ft·lbf}**.
3. Tap the knuckle as shown.

Caution
- **Do not tap the ball joint and the stud bolt.**
- **Be careful not to make an edge on the knuckle.**

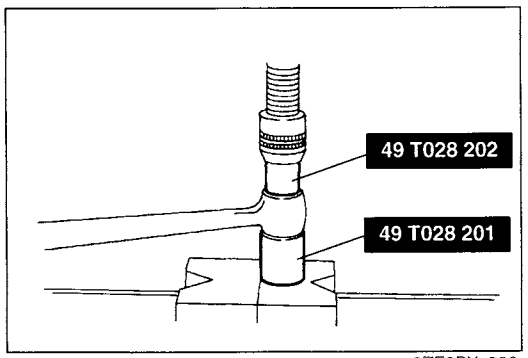


3ZE0RX-083

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.

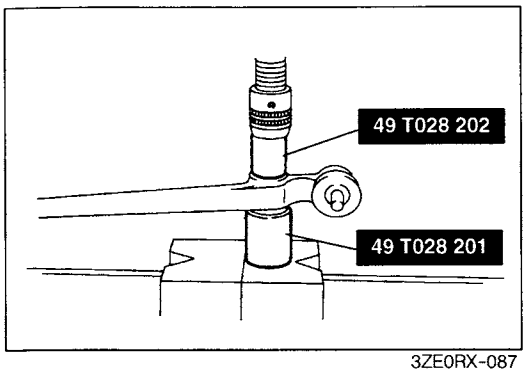

3ZE0RX-085

Dust boot (upper lateral link, lower lateral link, rear lower lateral link)
Carefully remove the dust boot with a chisel.

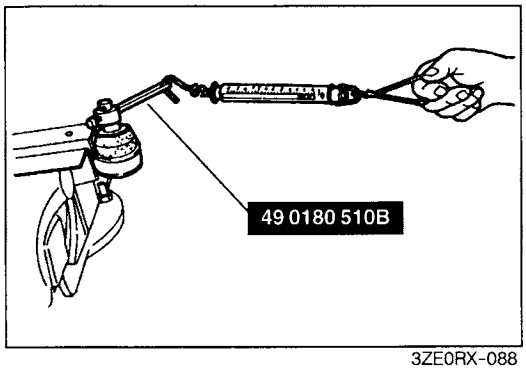


3ZE0RX-086

Lower lateral link bushing
1. Cut away the projecting rubber part of the lower lateral link bushing.
2. Remove the bushing by using the **SST**.



3ZE0RX-087



3ZE0RX-088

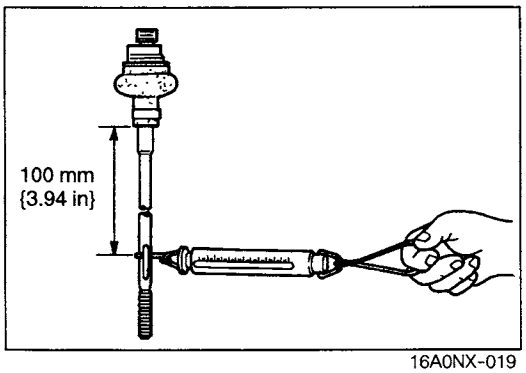
Damper bushing
1. Cut away the projecting rubber part of the lower lateral link bushing.
2. Remove the bushing by using the **SST**.

Inspection
Lower lateral link ball joint, upper lateral link ball joint, rear lower lateral link outer ball joint
Ball joint rotation torque
1. Inspect the link for damage and boot cracks. Replace it as necessary.
2. Inspect the ball joint for looseness. Replace the link if necessary.
3. Shake the ball joint stud at least five times.
4. Connect the **SST** to the stud and measure the rotation torque by using a pull scale.

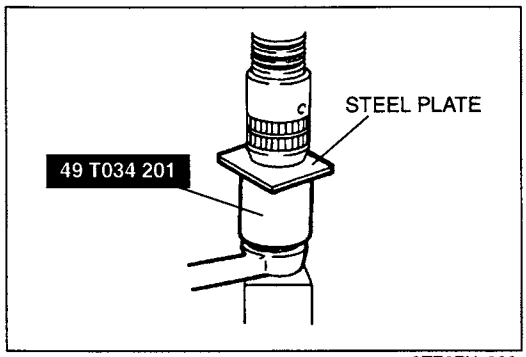
Lower lateral link ball joint
Rotation torque:
0.3—3.4 N·m {3—35 kgf·cm, 2.6—30 in·lbf}
Pull scale reading:
3.0—34 N {0.3—3.5 kgf, 0.7—7.7 lbf}

Upper lateral link ball joint, rear lower lateral link ball joint
Rotation torque:
0.3—4.4 N·m {3—45 kgf·cm, 2.6—39 in·lbf}
Pull scale reading:
3.0—44 N {0.3—4.5 kgf, 0.7—9.9 lbf}

5. If not within the specification, replace the link of the ball joint.



16A0NX-019



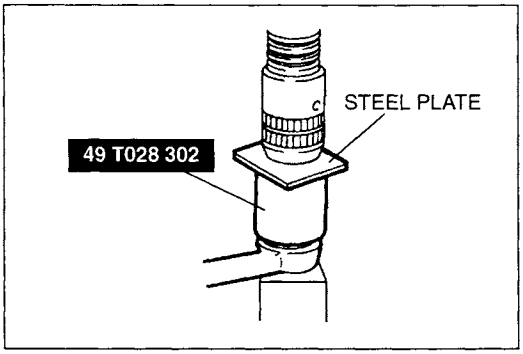
3ZE0RX-089

Rear lower lateral link inner ball joint
1. Inspect the link for bending and damage. Replace it if necessary.
2. Inspect the ball joint for looseness. Replace the link as necessary.
3. Swing the link five times.
4. Measure the swinging torque by using a pull scale.

Swingning 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}

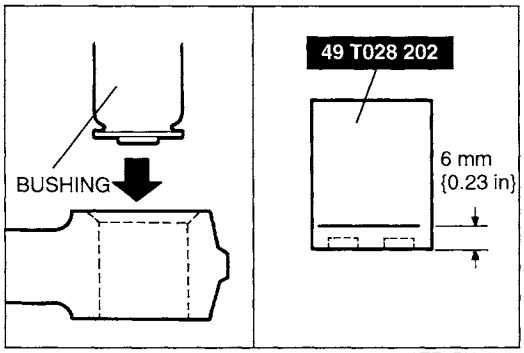
5. If not within the specification, replace the link.

Installation note
Dust boot (lower lateral link)
1. Wipe any 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 any excess grease.



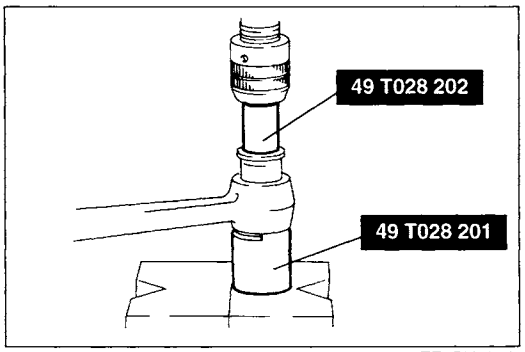
3ZE0RX-090

Dust boot (upper lateral link, rear lower lateral link)
1. Wipe any 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 any excess grease.



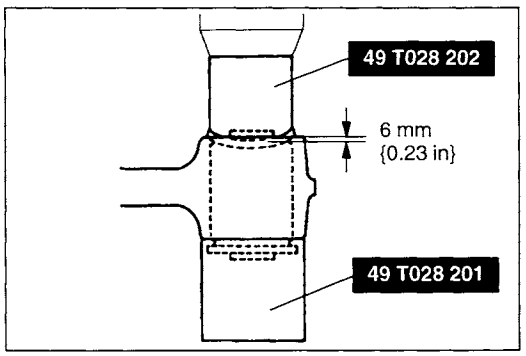
3ZE0RX-091

Lower lateral link bushing
1. Apply soapy water to the new bushing.
2. Insert the new bushing to the lower lateral link (chamfered side).
3. Draw a line 6 mm {0.23 in} from the bottom of the **SST**.

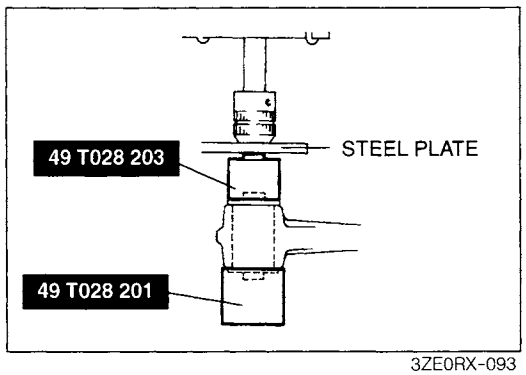


3ZE0RX-092

4. Position the **SST** on the lower lateral link as shown.

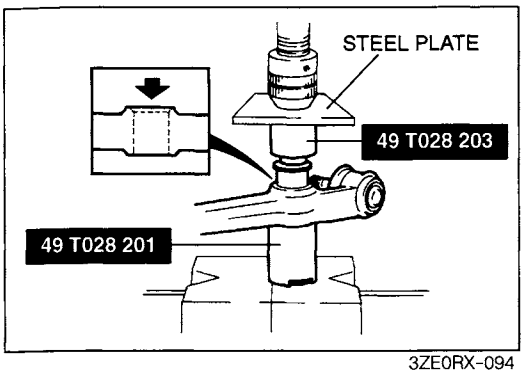


5. Press in the **SST** / bushing down to the line drawn on the **SST**.



3ZE0RX-093

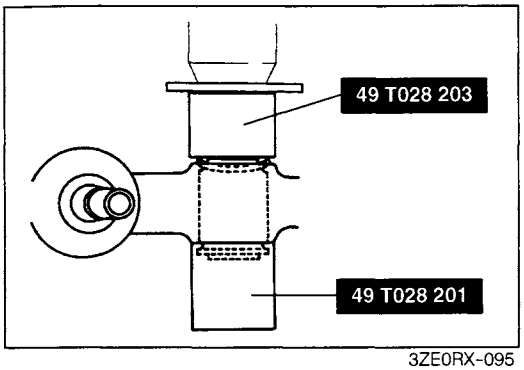
6. Turn the lower lateral link to the opposite side, and position the **SST** as shown.
7. By using the **SST**, press in the bushing until the pressure gauge starts to increase sharply.



3ZE0RX-094

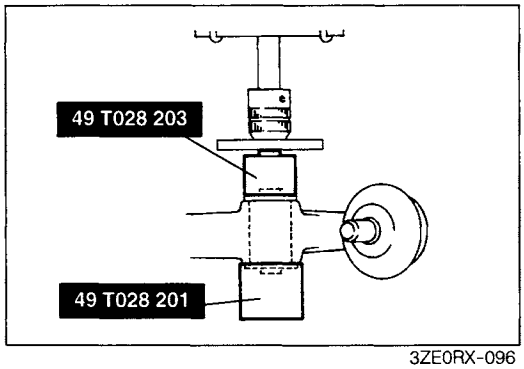
Damper bushing

1. Apply soapy water to the new bushing.
2. Insert the new bushing to the lower lateral link (chamfered side).
3. Position the **SST** on the lower lateral link as shown.



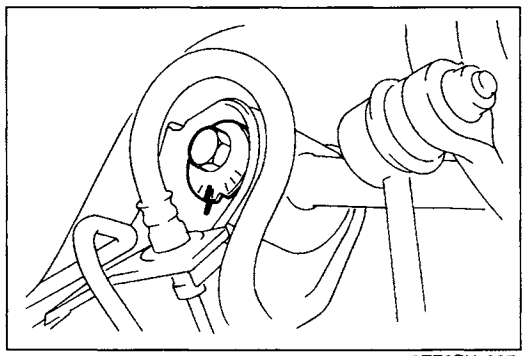
3ZE0RX-095

4. By using the **SST**, press in the bushing until the pressure gauge starts to increase sharply.



3ZE0RX-096

5. Turn the lower lateral link and **SST (49 T028 203)** to the opposite side, and position the **SST** as shown.
6. By using the **SST**, press in the bushing until the pressure gauge starts to increase sharply.

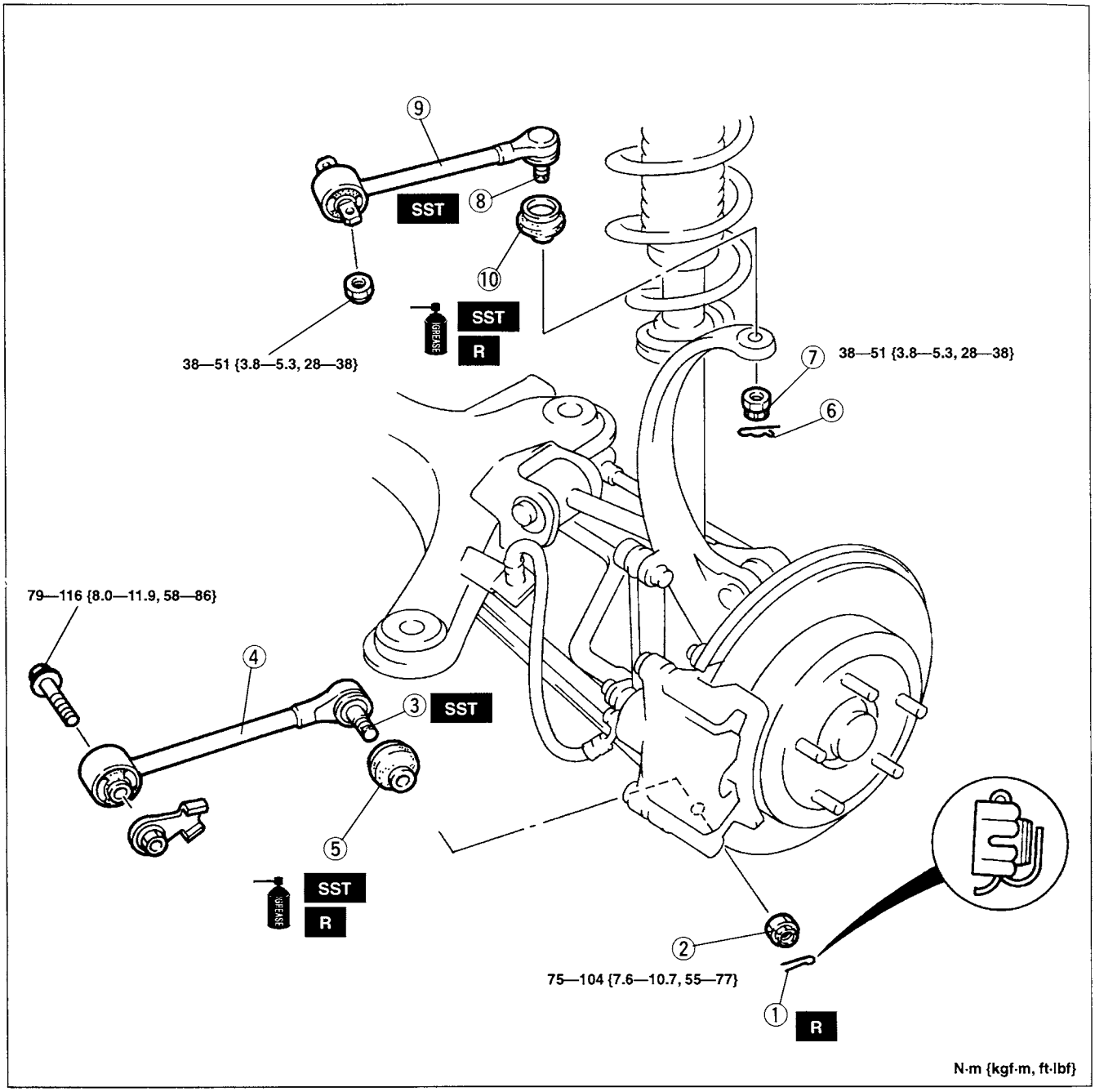

3ZE0RX-097

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 the marks that were made before removing the adjusting cam bolt, and tighten the nut.

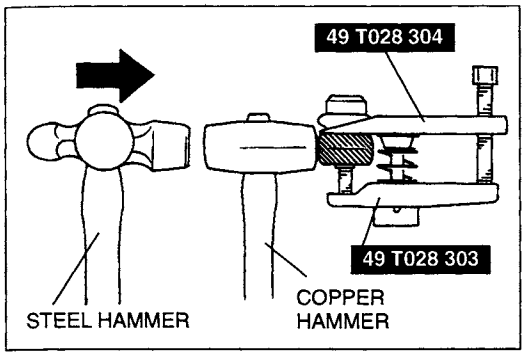
Tightening torque:
79—116 N·m {8.0—11.9 kgf·m, 58—86 ft·lbf}

LOWER TRAILING LINK, UPPER TRAILING LINK
Removal / Inspection / Installation



3ZE0RX-098

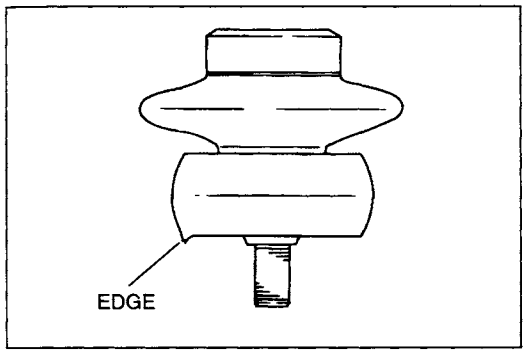
1. Cotter pin
2. Nut
3. Lower trailing link ball joint
   - Removal Note ..... page R–39
   - Inspection ..... page R–39
4. Lower trailing link
   - Inspect for bending and damage
   - Inspect bushing for wear and deterioration
5. Dust boot (lower trailing link)
   - Removal Note ..... page R–39
   - Installation Note ..... page R–40
6. Snap pin
7. Nut
8. Upper trailing link ball joint
   - Removal Note ..... page R–39
   - Inspection ..... page R–39
9. Upper trailing link
   - Inspect for bending and damage
   - Inspect bushing for wear and deterioration
10. Dust boot (upper trailing link)
    - Removal Note ..... page R–39
    - Installation Note ..... page R–40



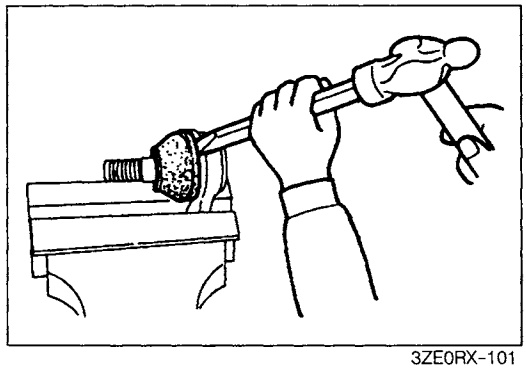
Removal note
Lower trailing link ball joint, upper trailing link ball joint
1. Install the **SST** to the ball joint.
2. Tighten the bolt of the **SST**.

Tightening torque
Lower trailing link:
34—35 N·m {3.4—3.6 kgf·m, 25—26 ft·lbf}
Upper trailing link:
14—15 N·m {140—160 kgf·cm, 122—138 in·lbf}

3. Tap the knuckle as shown.

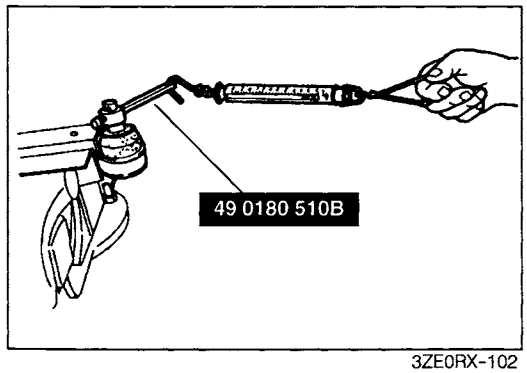


Caution
- **Do not tap the ball joint and the stud bolt.**
- **Be careful not to make an edge on the knuckle.**



3ZE0RX-101

Dust boot (lower trailing link, upper trailing link)
Carefully remove the dust boot with a chisel.



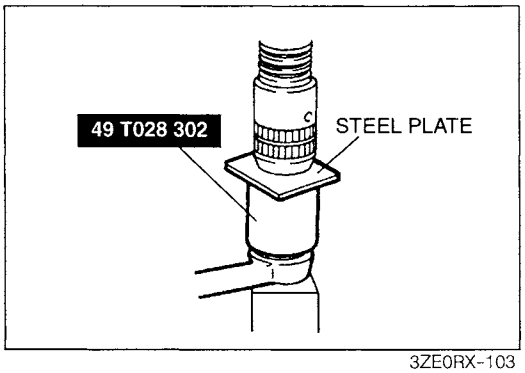
3ZE0RX-102

Inspection
Lower trailing link ball joint, upper trailing link ball joint
Ball joint rotation torque
1. Inspect the link for damage and boot cracks. Replace it as necessary.
2. Inspect the ball joint for looseness. Replace the link as necessary.
3. Shake the ball joint stud at least five times.
4. Connect the **SST** to the stud and measure the rotation torque by using a pull scale.

Lower trailing link ball joint
Rotation torque:
0.3—4.4 N·m {3—45 kgf·cm, 2.6—39 in·lbf}
Pull scale reading:
3.0—44 N {0.3—4.5 kgf, 0.7—9.9 lbf}

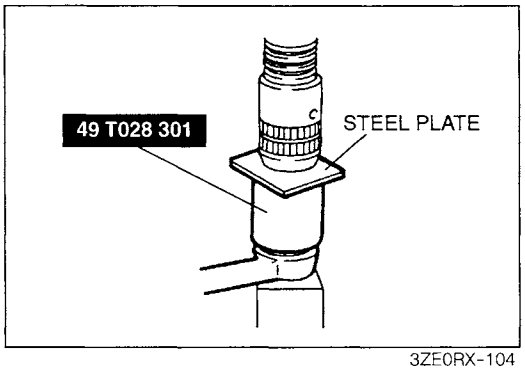
Upper trailing link ball joint
Rotation torque:
0.3—2.9 N·m {3—30 kgf·cm, 2.6—26 in·lbf}
Pull scale reading:
3.0—29 N {0.3—3.0 kgf, 0.7—6.6 lbf}

5. If not within the specification, replace the upper trailing link and lower trailing link.



3ZE0RX-103

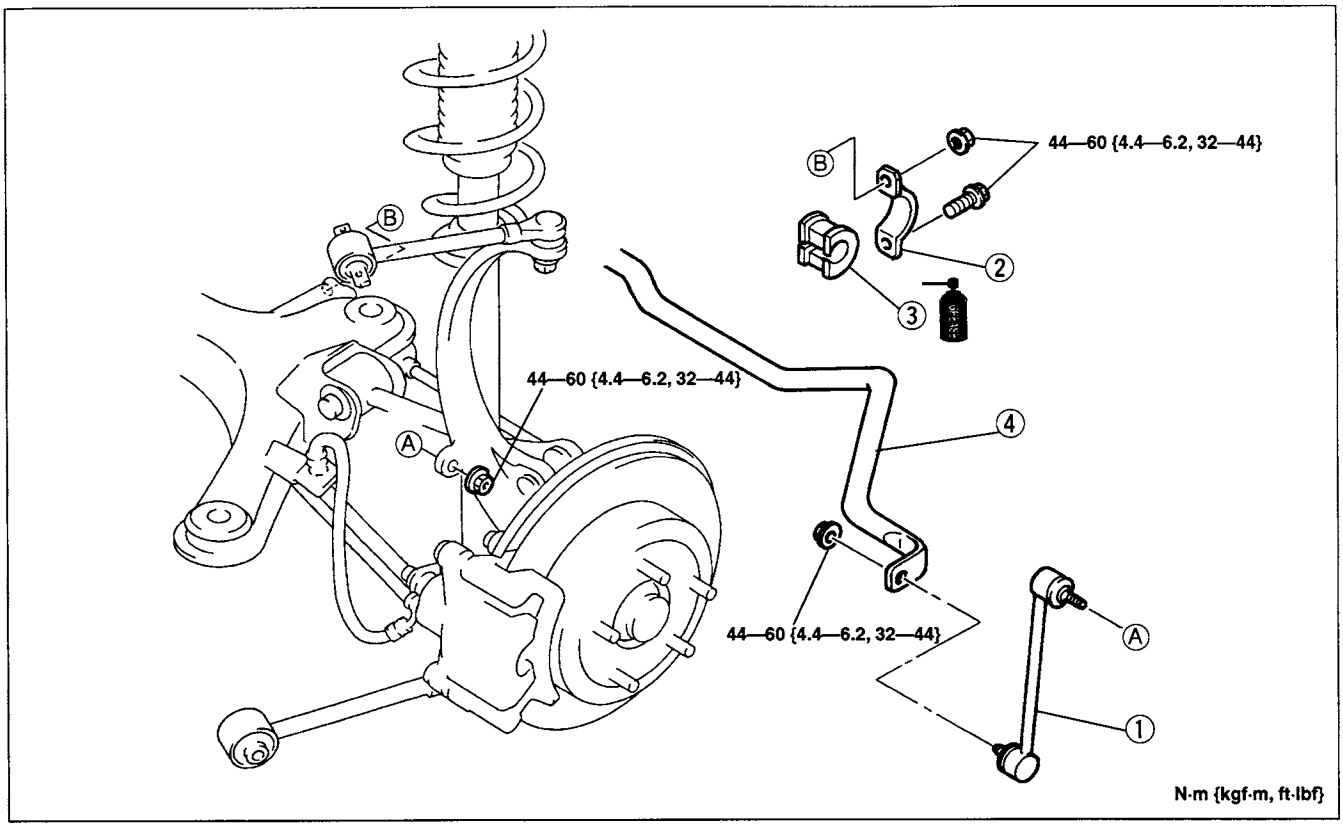
Installation note
Dust boot (lower trailing link)
1. Wipe any grease off the ball stud.
2. Fill the inside of the new dust boot with grease.
3. Press the boot onto the ball joint by using the **SST**.
4. Wipe away any excess grease.



3ZE0RX-104

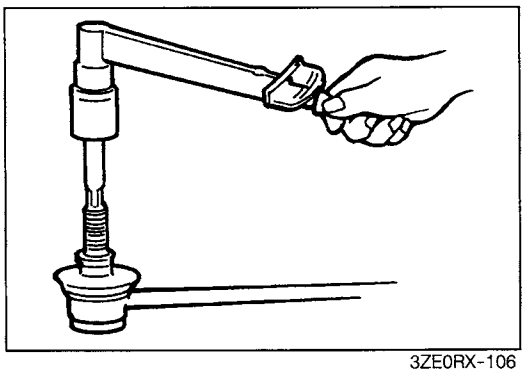
Dust boot (upper trailing link)
1. Wipe any grease off the ball stud.
2. Fill the inside of the new dust boot with grease.
3. Press the boot onto the ball joint by using the **SST**.
4. Wipe away any excess grease.

REAR STABILIZER
Removal / Inspection / Installation

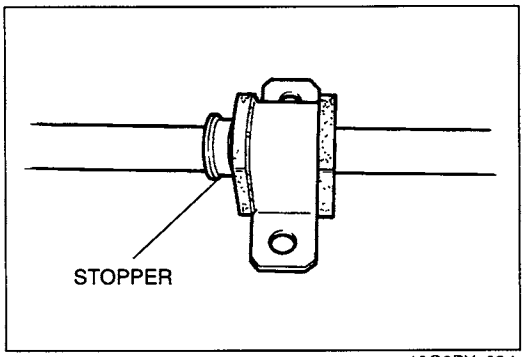


3ZE0RX-105

1. Stabilizer control link
   Inspection ..... below
2. Stabilizer bracket
3. Stabilizer bushing
   Installation Note ..... below
   Inspect for wear and damage
4. Rear stabilizer
   Inspect for bending and damage



3ZE0RX-106



19G0RX-094

Inspection
Stabilizer control link
1. Inspect for bending and damage.
2. Measure the ball joint starting torque.
   (a) Shake the ball joint stud from side to side 10 times.
   (b) Rotate the ball joint stud 10 times.
   (c) Measure the starting torque by using an Allen socket and a torque wrench.

   Starting torque:
   0.1—1.9 N·m {1—20 kgf·cm, 0.9—17 in·lbf}

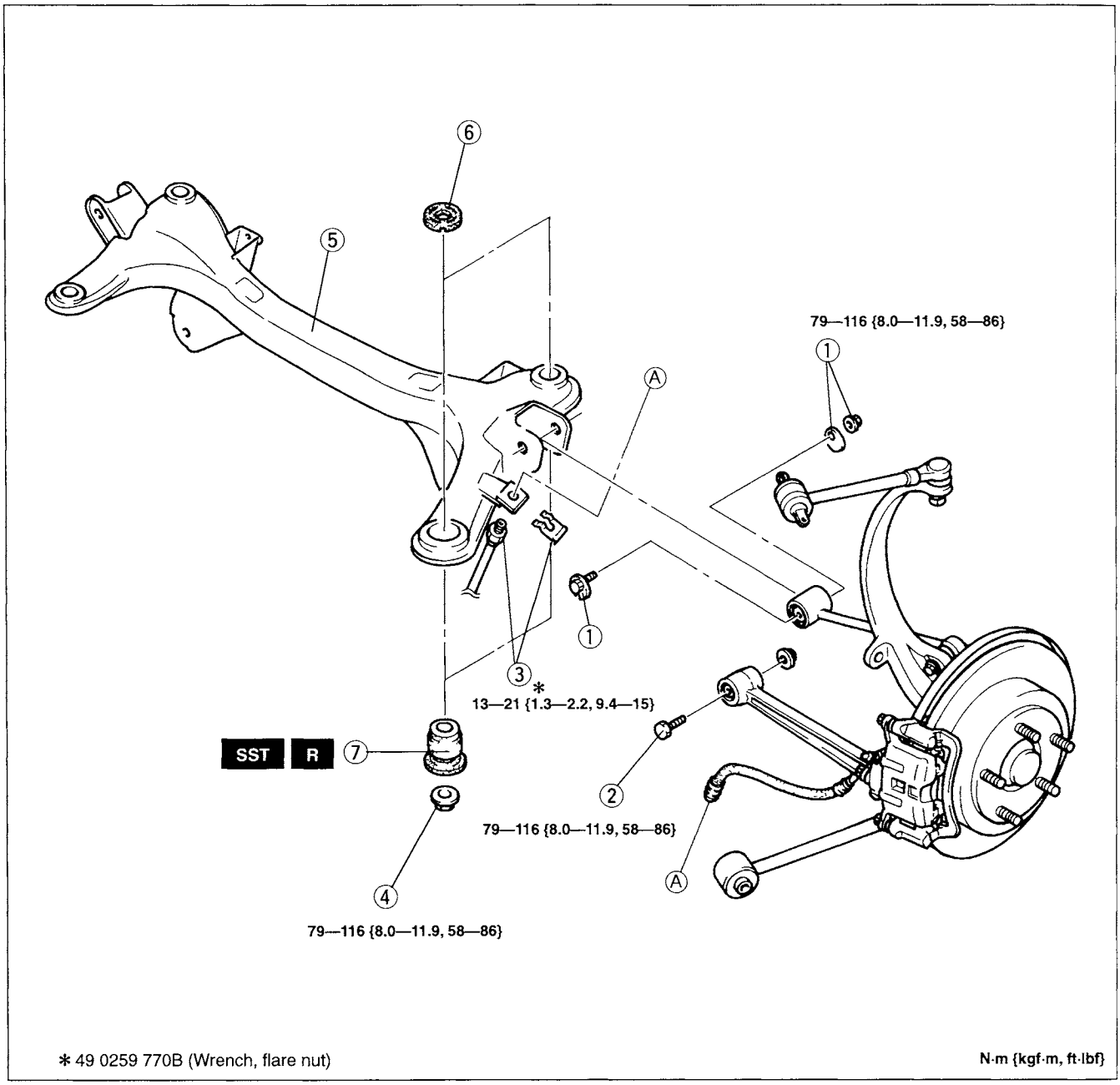
3. If not within the specification, replace the stabilizer control link.

Installation note
Stabilizer bushing
1. Apply rubber grease to the inside surface of the stabilizer bushing.
2. Align the bushing with the stopper on the stabilizer.

REAR CROSSMEMBER

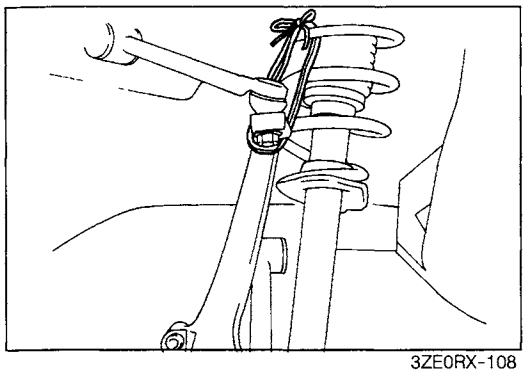
Removal / Installation

- Remove the following parts.
  (1) Rear stabilizer (Refer to page R–41.)
  (2) Rear lower lateral link (Refer to page R–33.)
- Do the following steps after installation.
  (1) Adjust the rear wheel alignment. (Refer to page R–6.)
  (2) Bleed the air from the brake system. (Refer to section P.)

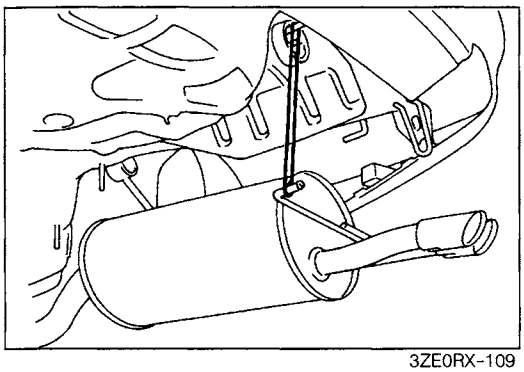


3ZE0RX-107

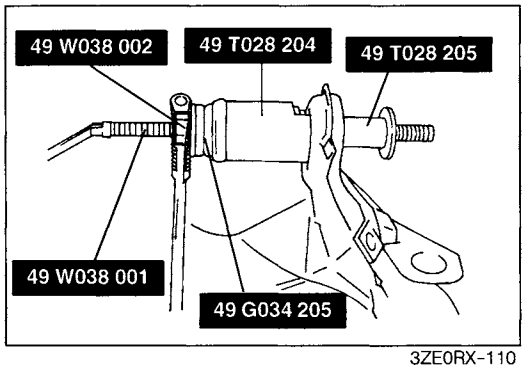
1. Nut, cam plate, and adjusting cam bolt
   Removal Note ..... page R–34
   Installation Note ..... page R–37
2. Bolt (lower lateral link)
   Removal Note ..... page R–43
3. Clamp and brake pipe
4. Nuts (crossmember)
   Removal Note ..... page R–43
5. Rear crossmember
6. Stopper
   Installation Note ..... page R–43
7. Rubber mount
   Removal Note ..... page R–43
   Installation Note ..... page R–43


3ZE0RX-108

Removal note
Bolts (lower lateral link)
Suspend the axle assembly by using a rope.

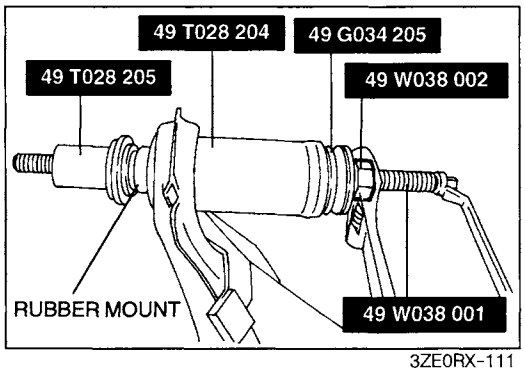

3ZE0RX-109

Nuts (crossmember)
Suspend the main silencer by using a rope.



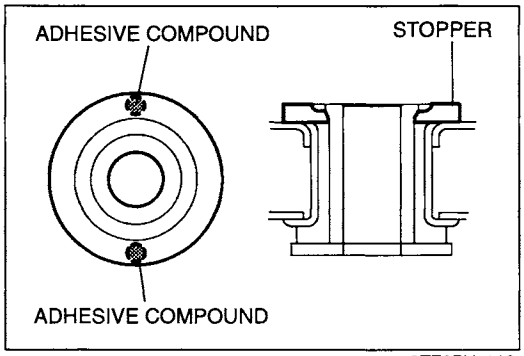
3ZE0RX-110

Rubber mount
Remove the rubber mount by using the **SST**.



3ZE0RX-111

Installation note
Rubber mount
1. Apply soapy water to the new bushing.
2. Install the rear crossmember bushing.
3. Pull the rubber mount into the rear crossmember by using the **SST**.



3ZE0RX-112

Stopper
1. Apply adhesive compound onto the stopper as shown in the figure.
2. Install the stopper onto the rear crossmember.

Before beginning any service procedure, refer to section T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

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SUNROOF RELAY S–86
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DASHBOARD AND CONSOLE S–88

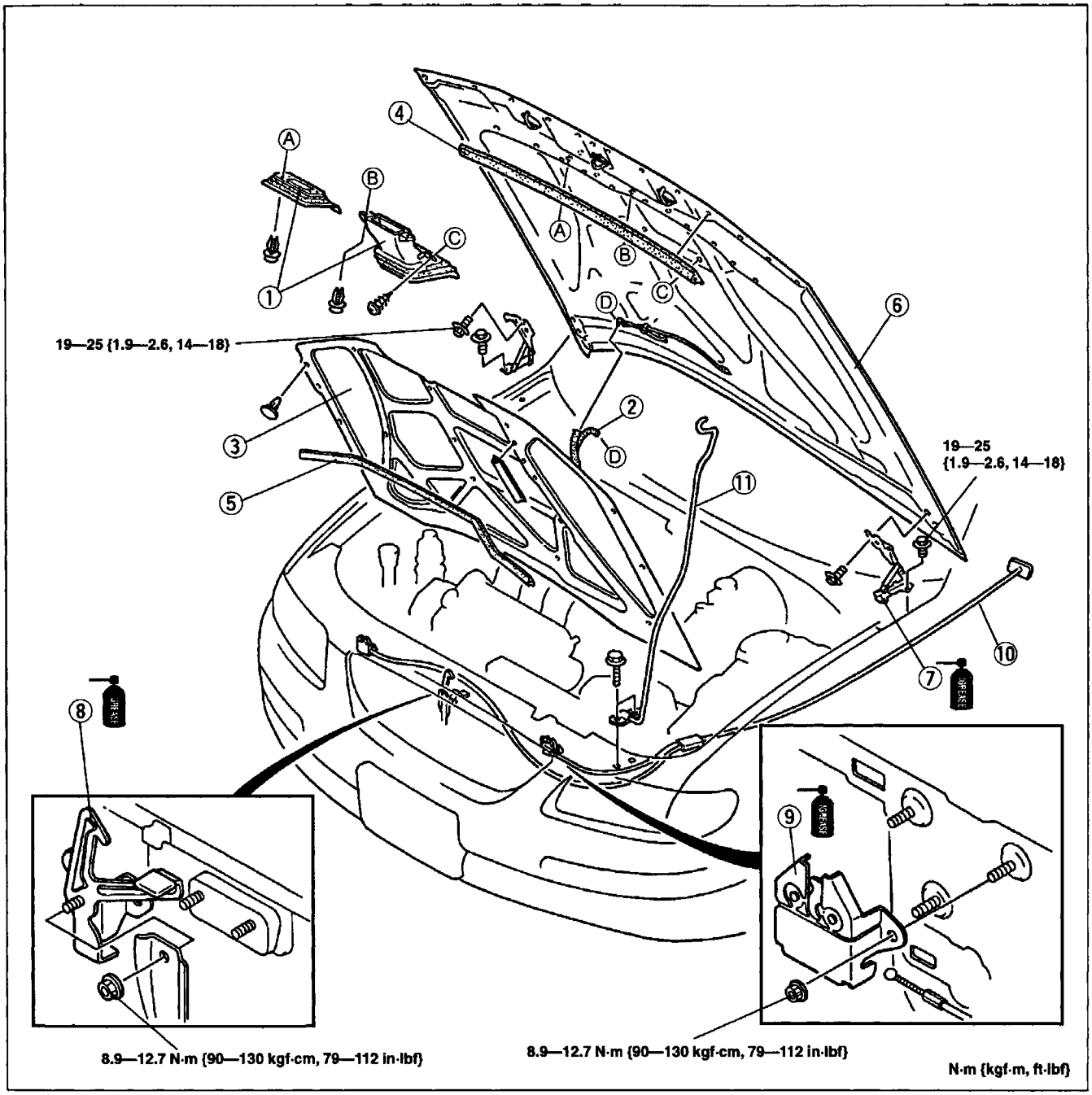
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HOOD

HOOD

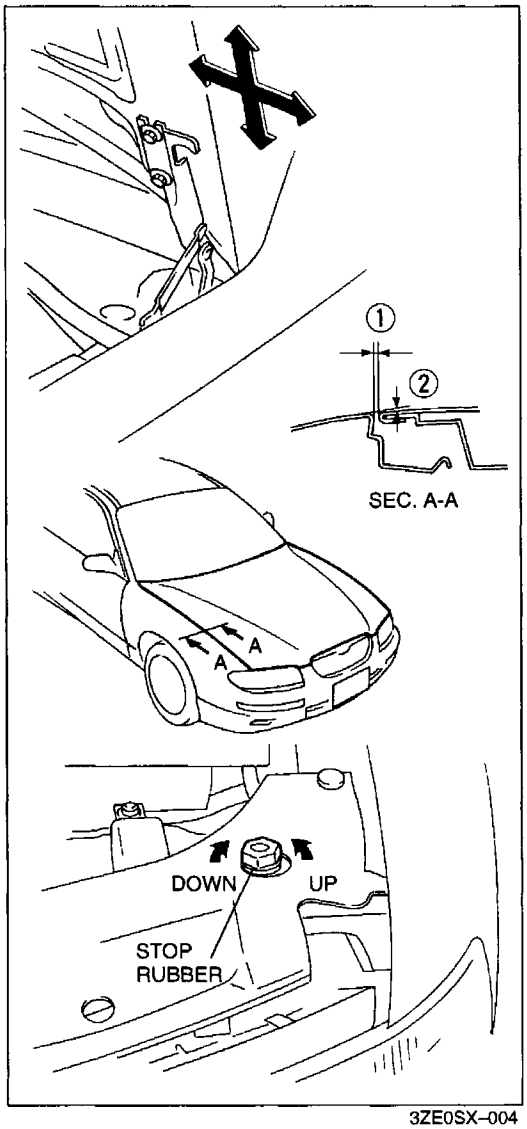
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure. To remove the hood hinge, remove the front fender panel. (Refer to page S–5.)
3. Install in the reverse order of removal.



3ZU0SX–005

1. Air duct (KJ)
2. Washer pipe
3. Hood insulator
4. Parting seal weatherstrip
5. Surround seal weatherstrip
6. Hood
   Adjustment ..... page S–4
7. Hood hinge
8. Safety hook
   Adjustment ..... page S–4
9. Hood lock
   Adjustment ..... page S–4
10. Release wire
11. Hood stay



3ZE0SX-004

Adjustment
Hood
Gap

1. Measure the gap between the hood and the front fender panel.

   Clearance ①: 3.5 ± 0.7 mm {0.14 ± 0.03 in}

2. If not as specified, loosen the hood-to-hinge installation bolts and reposition the hood.

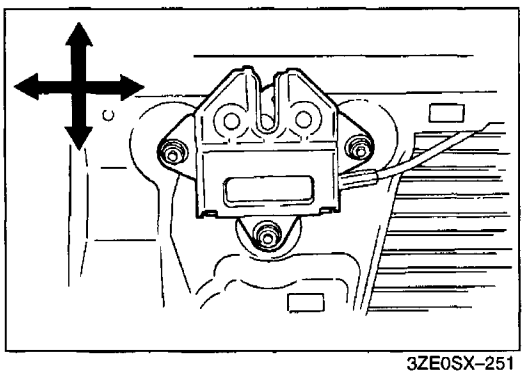
   Tightening torque:
   19—25 N·m {1.9—2.6 kgf·m, 14—18 ft·lbf}

Height

1. Measure the height between the hood and the front fender panel.

   Clearance ②: 0.5 ± 1.0 mm {0.03 ± 0.04 in}

2. If not as specified, turn the stop rubber to adjust the height of the hood.

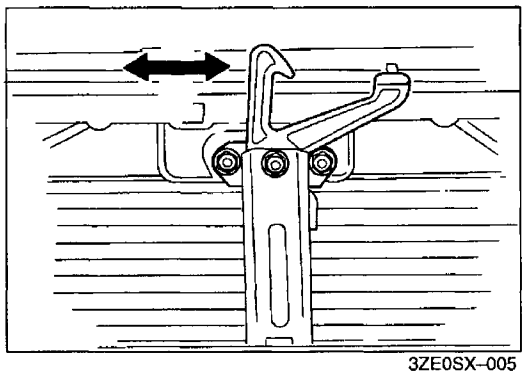


3ZE0SX-251

Hood lock, safety hook

1. Adjust the hood lock and safety hook after the hood has been aligned.
2. Loosen the hood lock and safety hook installation nut and align the lock with the striker on the hood.

   Tightening torque:
   8.9—12.7 N·m {90—130 kgf·cm, 79—112 in·lbf}



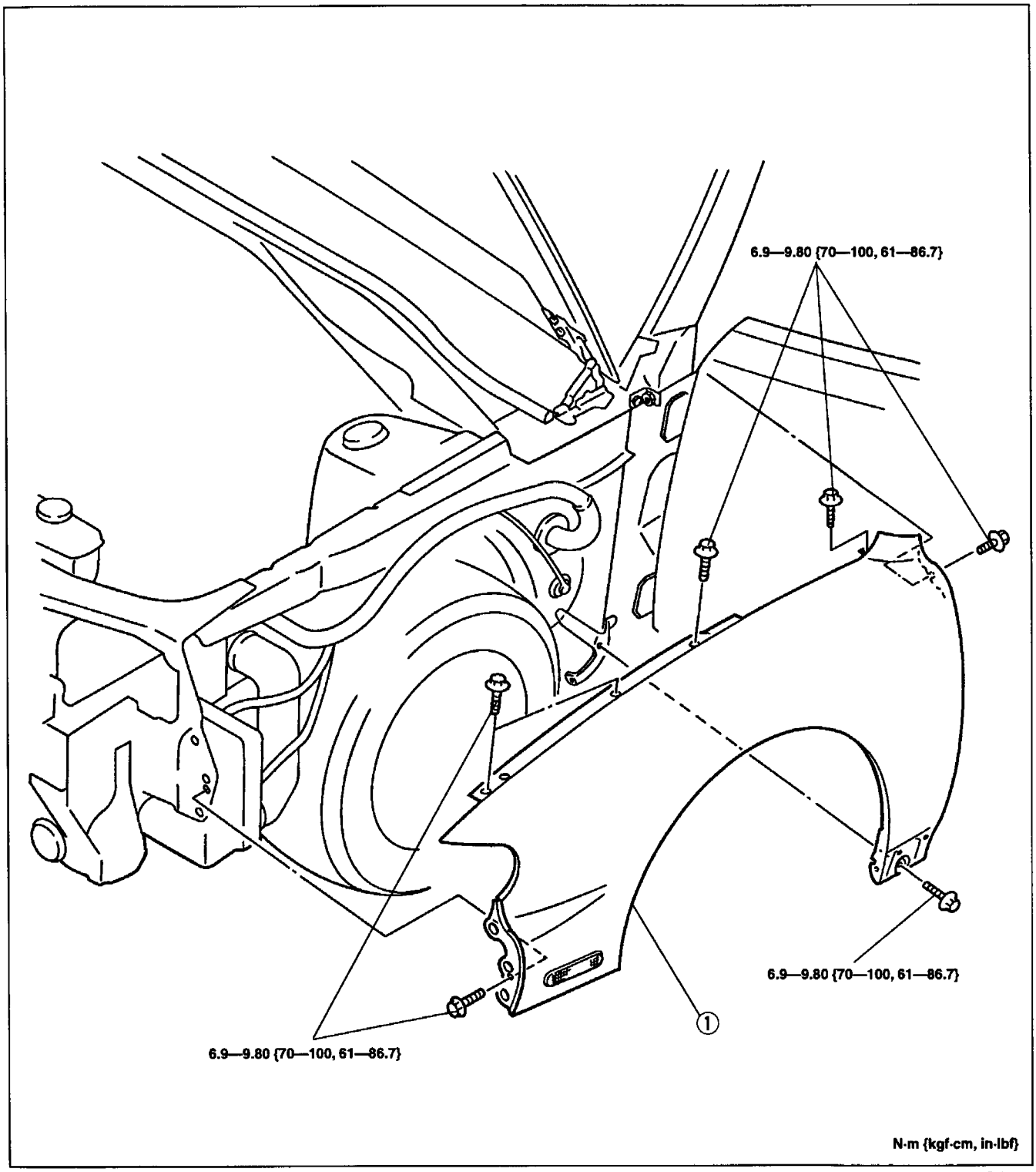
3ZE0SX-005

FRONT FENDER PANEL

FRONT FENDER PANEL

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the front bumper. (Refer to page S–39.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



3ZU0SX–006

1. Front fender panel

DOOR

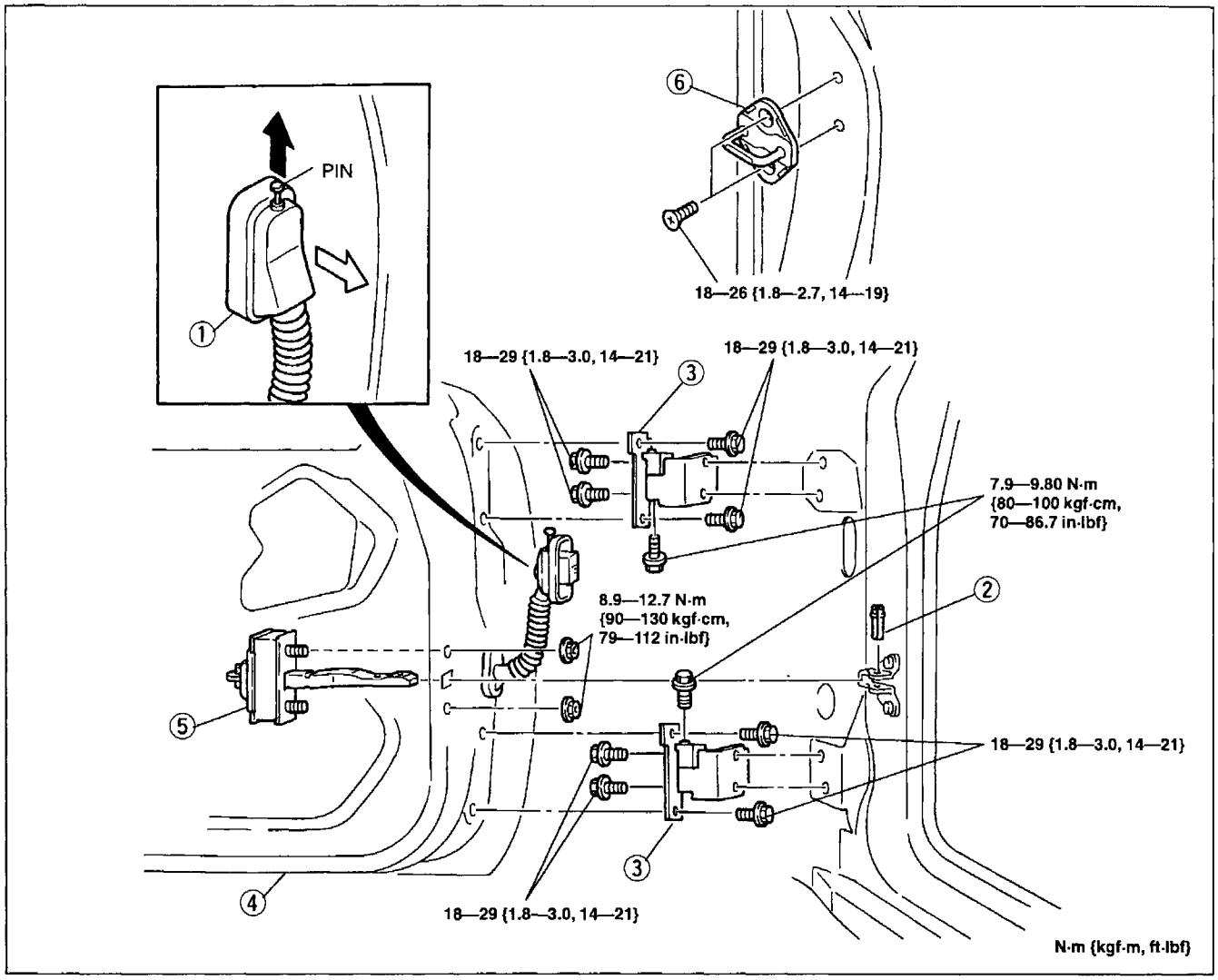
PREPARATION

TORX tool (T40)	For installation / removal of door lock striker

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 front door trim (Refer to page S–105.) and door screen. (Refer to page S–10.)
3. Install in the reverse order of removal.



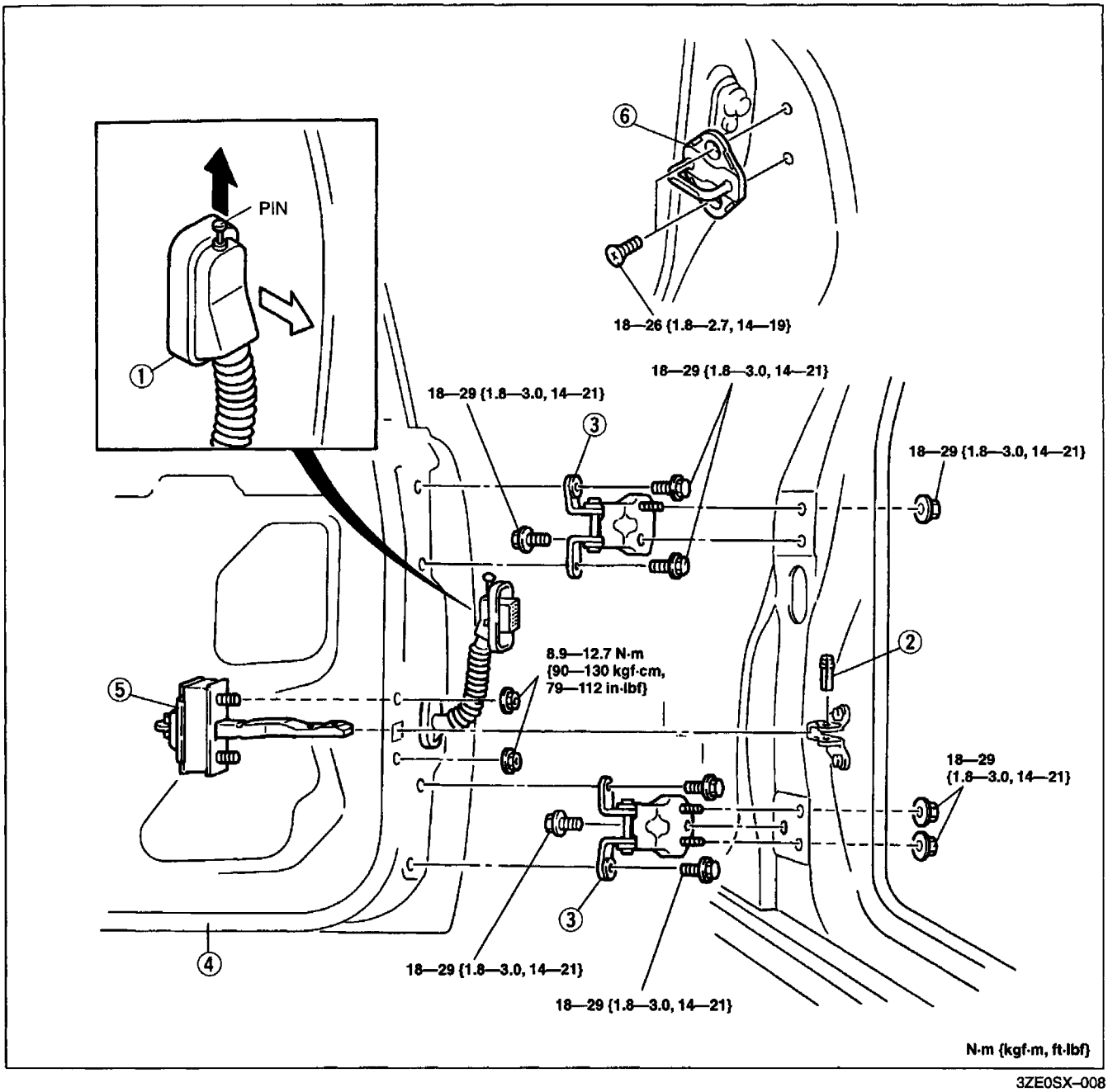
3ZG0SX–004

1. Harness connector
2. Checker pin
3. Door hinge
4. Front door
   Adjustment ..... page S–8
5. Checker
6. Door lock striker
   Adjustment ..... page S–8

REAR DOOR

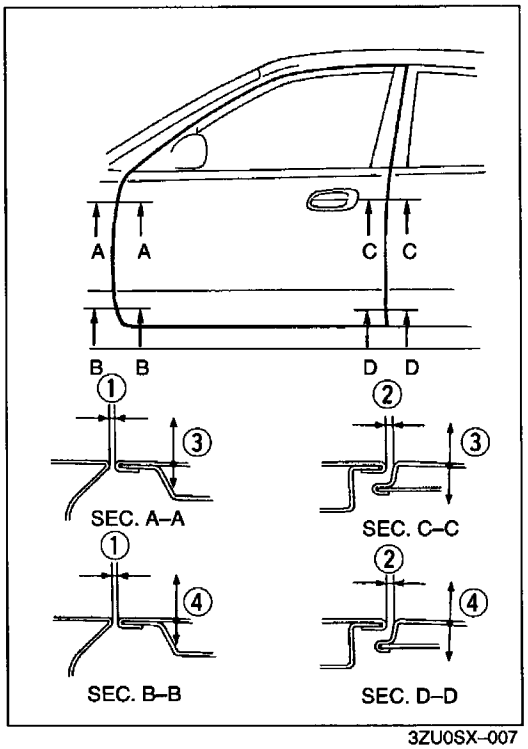
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure. To remove the checker, remove the rear door trim (Refer to page S–107.) and door screen. (Refer to page S–11.) To remove the door hinge, remove the front seat belt. (Refer to page S–113.)
3. Install in the reverse order of removal.



3ZE0SX–008

1. Harness connector
2. Checker pin
3. Door hinge
4. Rear door
   Adjustment ..... page S–8
5. Checker
6. Door lock striker
   Adjustment ..... page S–8



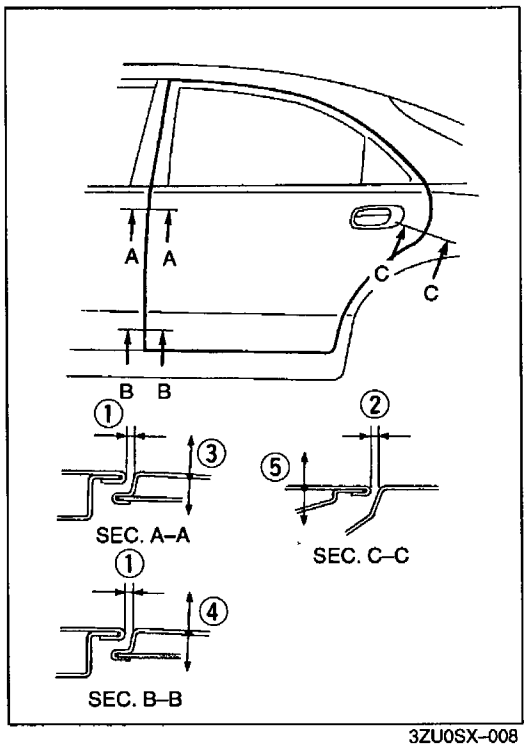
3ZU0SX–007

Adjustment
Front door
1. Verify that the front door can be closed easily and that there is no looseness or excessive clearance.

Clearance ①: 3.5 ± 0.7 mm {0.14 ± 0.03 in}
②: 4.0 ± 0.7 mm {0.16 ± 0.03 in}
③: 0 $^{+0.5}_{-1.0}$ mm {0 $^{+0.02}_{-0.04}$ in}
④: –0.5 $^{+0.5}_{-1.0}$ mm {–0.02 $^{+0.02}_{-0.04}$ 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}



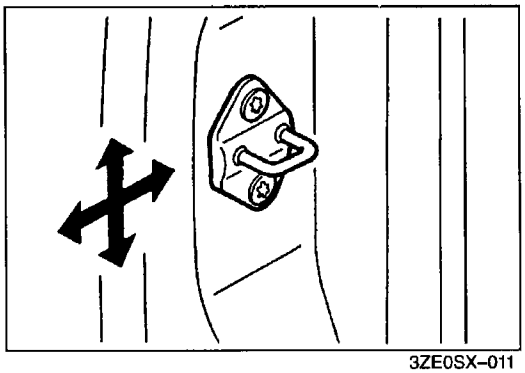
3ZU0SX–008

Rear door
1. Verify that the rear door can be closed easily and that there is no looseness or excessive clearance.

Clearance ①: 4.0 ± 0.7 mm {0.16 ± 0.03 in}
②: 3.5 ± 0.7 mm {0.14 ± 0.03 in}
③: 0 $^{+0.5}_{-1.0}$ mm {0 $^{+0.02}_{-0.04}$ in}
④: –0.5 $^{+0.5}_{-1.0}$ mm {–0.02 $^{+0.02}_{-0.04}$ in}
⑤: 0 $^{+1.0}_{-0.5}$ mm {0 $^{+0.04}_{-0.02}$ 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}

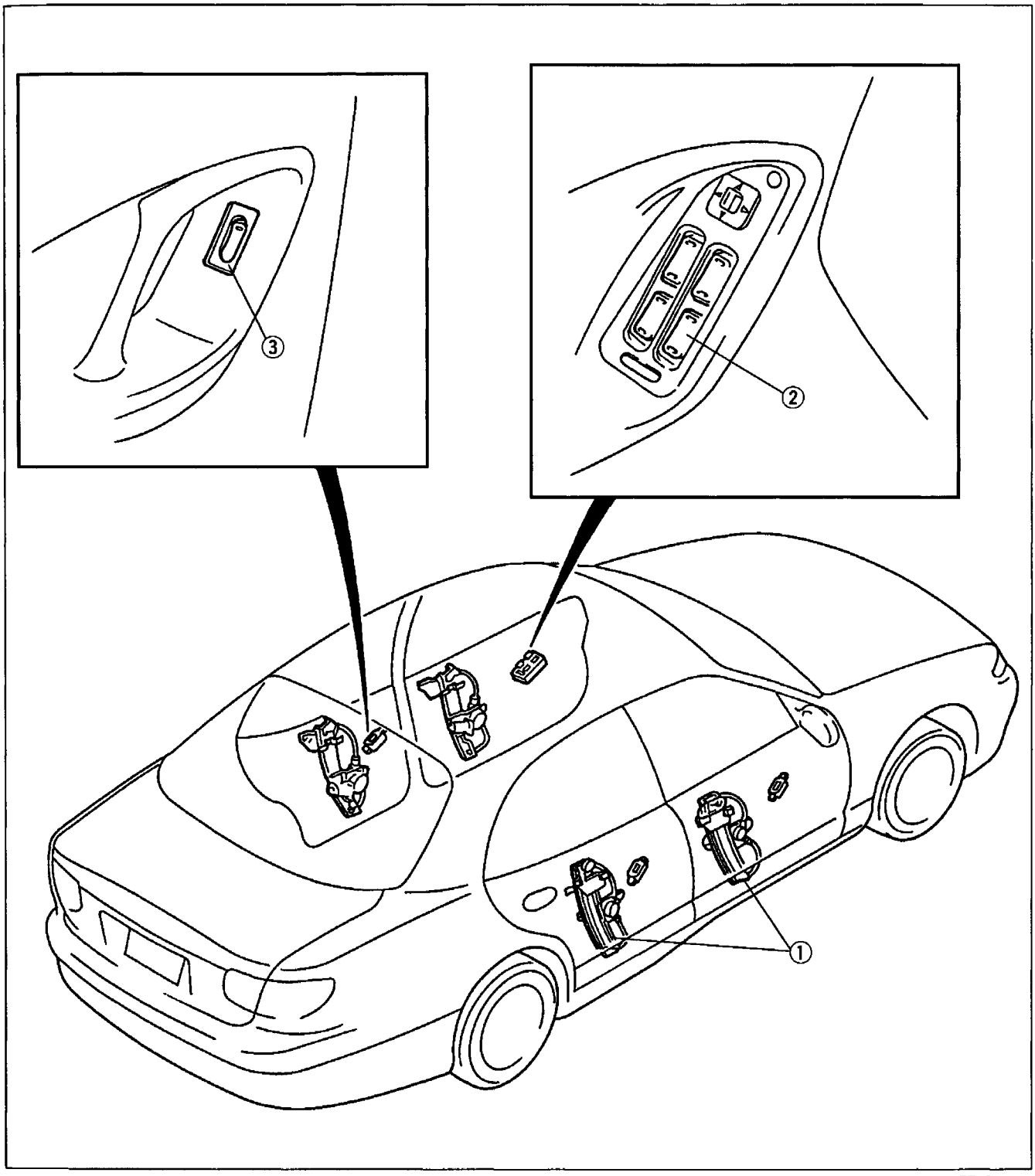

3ZE0SX–011

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



3ZE0SX-012

1. Power window regulator
   - Removal / Installation (front) ... page S–10
   - Removal / Installation (rear) ... page S–11
   - Inspection ..... page S–12
2. Power window main switch assembly
   - Removal / Installation ..... page S–13
   - Inspection ..... page S–13
3. Power window subswitch
   - Removal / Installation ..... page S–14
   - Inspection ..... page S–14

FRONT WINDOW REGULATOR AND GLASS

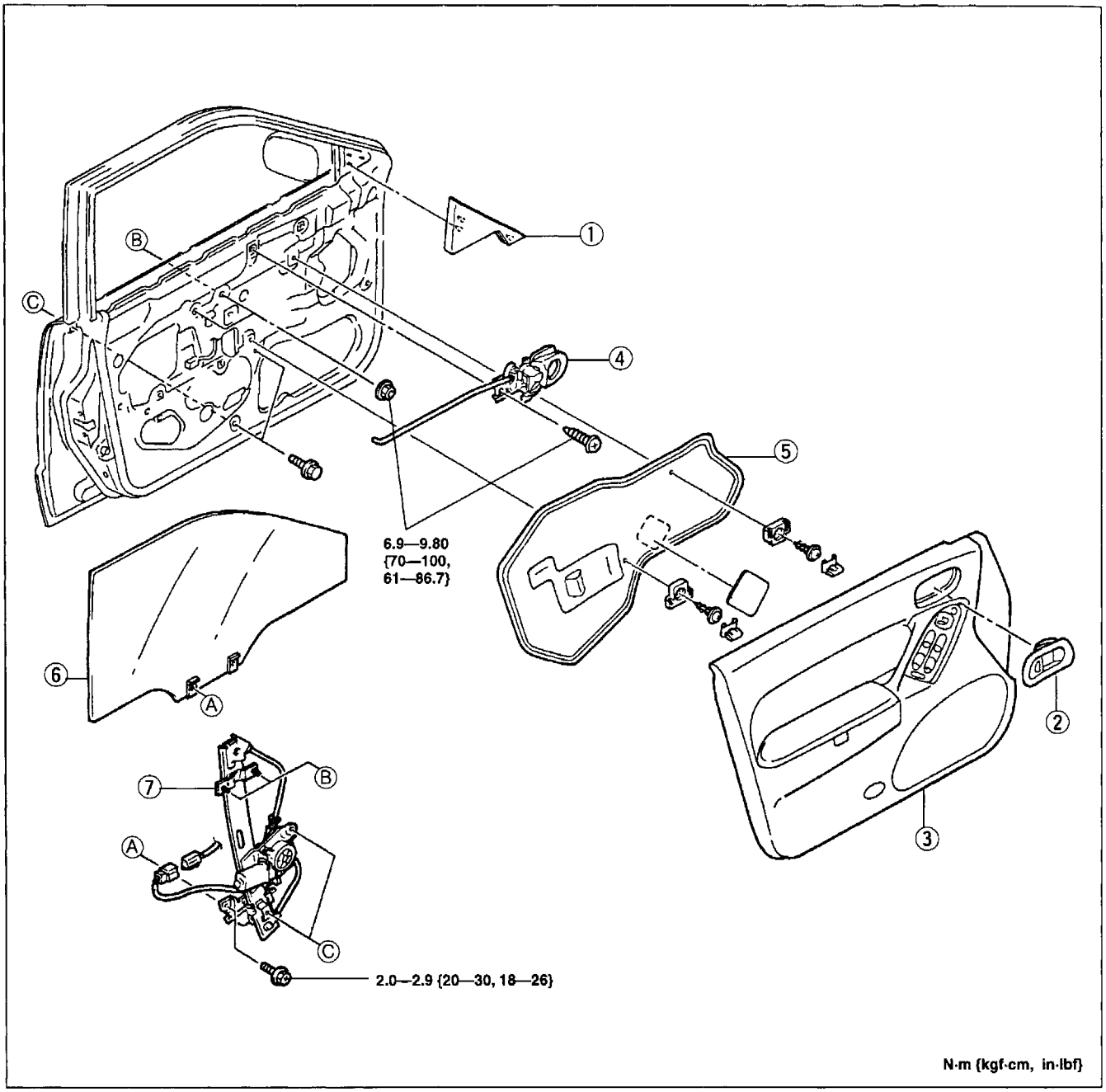
Removal / Installation

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.
4. Install in the reverse order of removal.



3ZE0SX-013

1. Inner garnish
2. Inner handle cover
3. Front door trim
   Removal / Installation ..... page S–105
4. Inner handle
   Installation note ..... page S– 17
5. Door screen
6. Front door glass
7. Power window regulator

REAR WINDOW REGULATOR, GLASS AND GUIDE

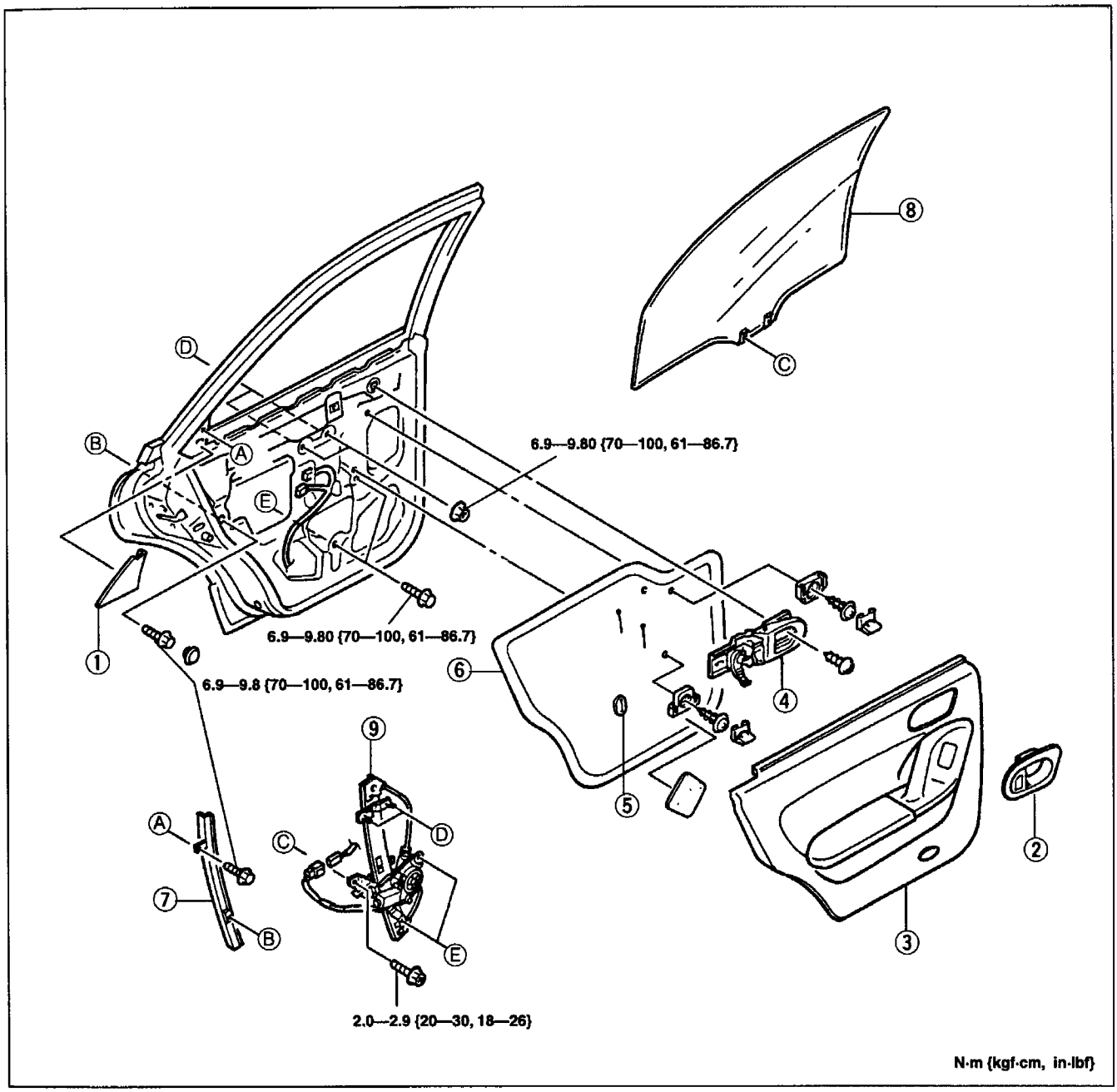
Removal / Installation

1. Raise the front edge of the rear door glass about **200 mm {7.9 in}** from the fully lowered position.
2. Disconnect the negative battery cable.

Note

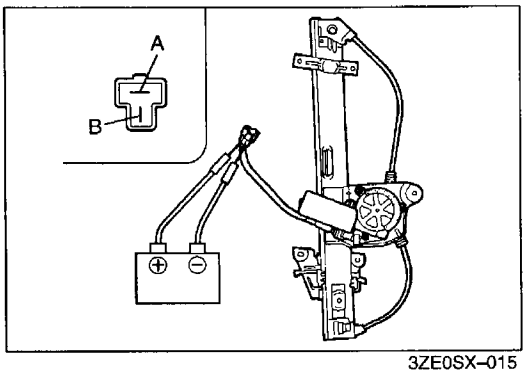
- Remove the door screen carefully so that it may be reused.

3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



3ZE0SX-014

1. Inner garnish
2. Inner handle cover
3. Rear door trim
   Removal / Installation ..... page S-105
4. Inner handle
   Installation note ..... page S- 19
5. Sealing pad
6. Door screen
7. Glass guide
8. Rear door glass
9. Power window regulator



3ZE0SX-015

POWER WINDOW REGULATOR

Inspection

1. Remove the power window regulator.
   (Refer to pages S–10, 11.)
2. Disconnect the power window regulator connector.
3. Apply battery voltage to the power window regulator connector terminals and check the operation of the regulator.

B+: Battery positive voltage

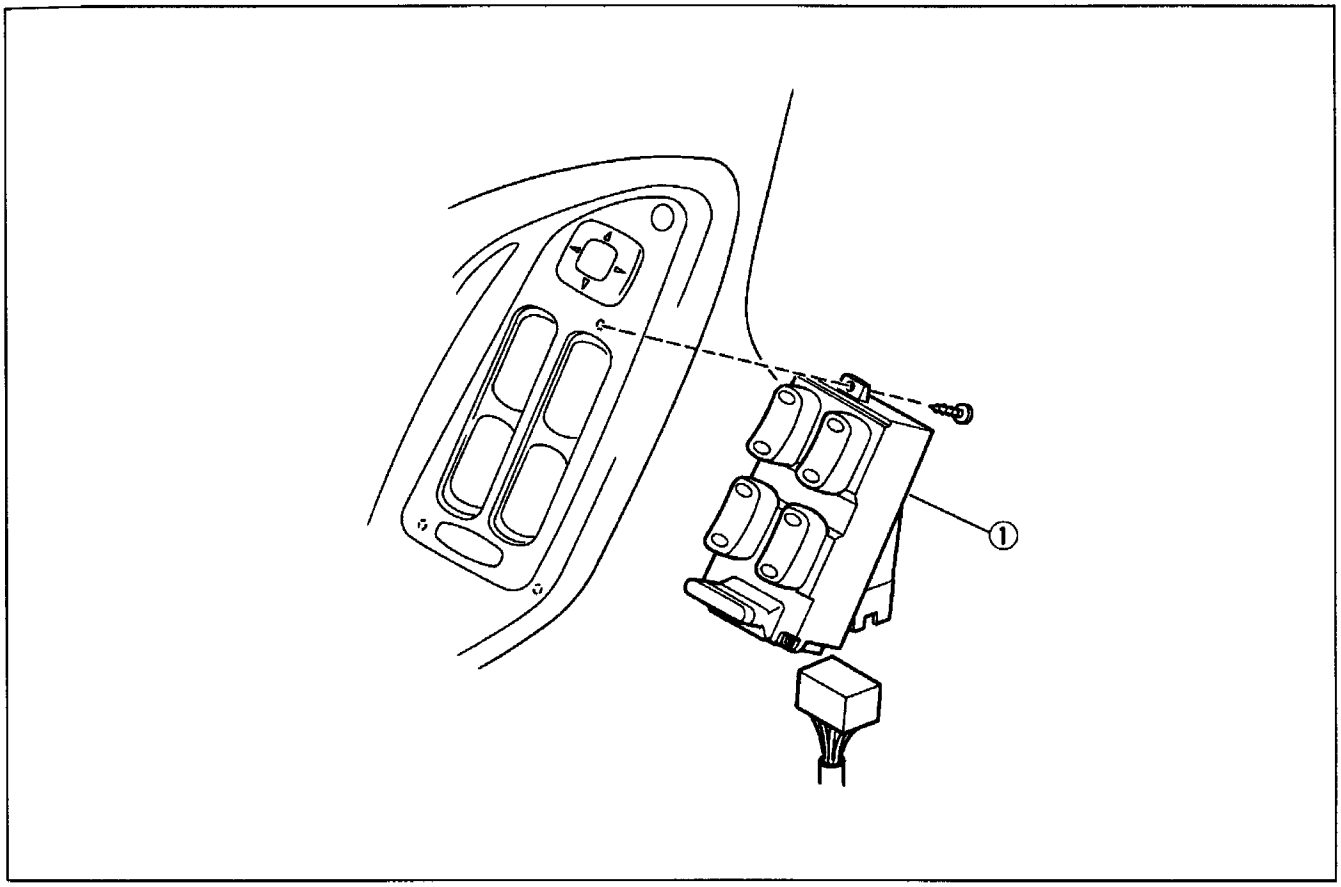
Connection		Regulator operation
B+	GND	
A	B	UP
B	A	DOWN

4. If not as specified, replace the power window regulator.

POWER WINDOW MAIN SWITCH ASSEMBLY

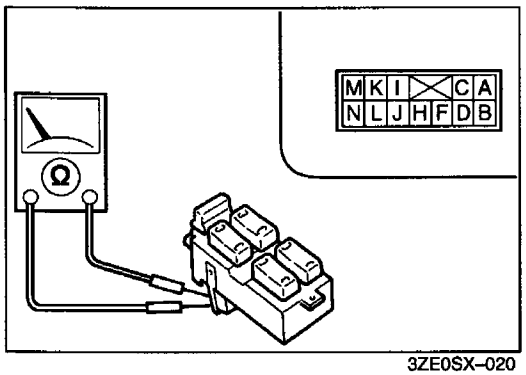
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the front door trim. (Refer to page S–105.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



3ZE0SX–019

1. Power window main switch assembly
   Inspection ..... below



3ZE0SX–020

Inspection

1. Remove the power window main switch assembly. (Refer above.)
2. Check for continuity between the terminals of the main switch assembly connector with the main switches in the following positions.

Switch / Terminals / Switch position	Driver				Passenger				Left rear				Right rear			
	H	F	A	C	H	F	M	K	H	F	D	B	H	F	L	N
UP	O		O		O		O		O		O		O		O	
		O		O		O		O		O		O		O		O
OFF (with power-cut switch at ON)		O	O	O		O	O	O		O	O	O		O	O	O
DOWN	O			O	O			O	O			O	O			O
		O	O			O	O			O	O			O	O	
AUTO DOWN	O			O												
		O	O													

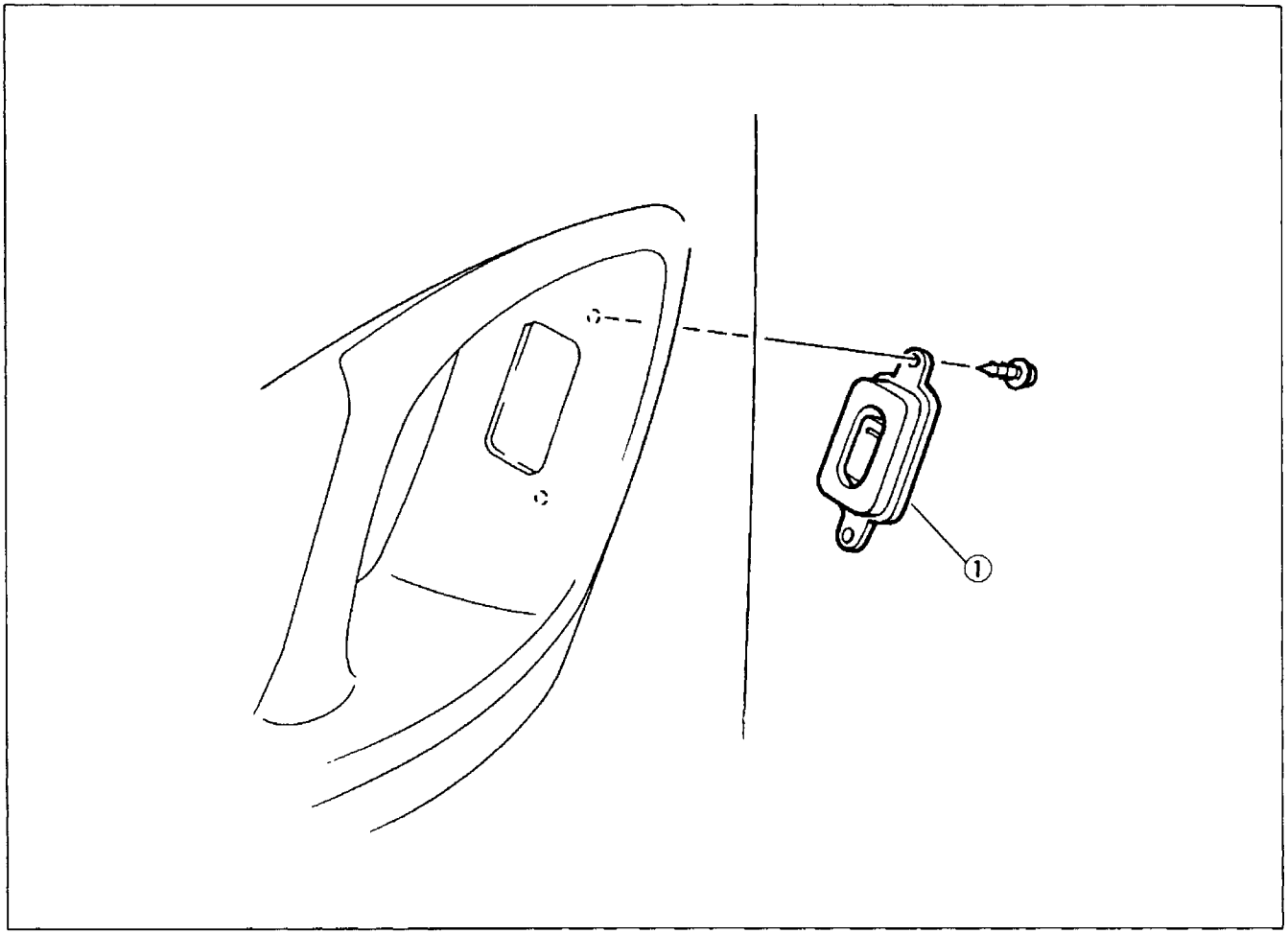
O—O: Continuity

3. If not as specified, replace the power window main switch assembly.

POWER WINDOW SUBSWITCH

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the front / rear door trim. (Refer to pages S–105, 107.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.

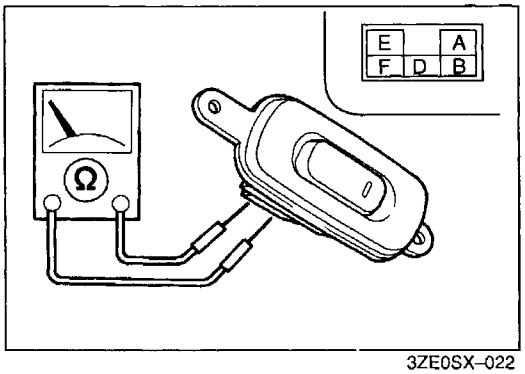


3ZE0SX–021

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.



3ZE0SX–022

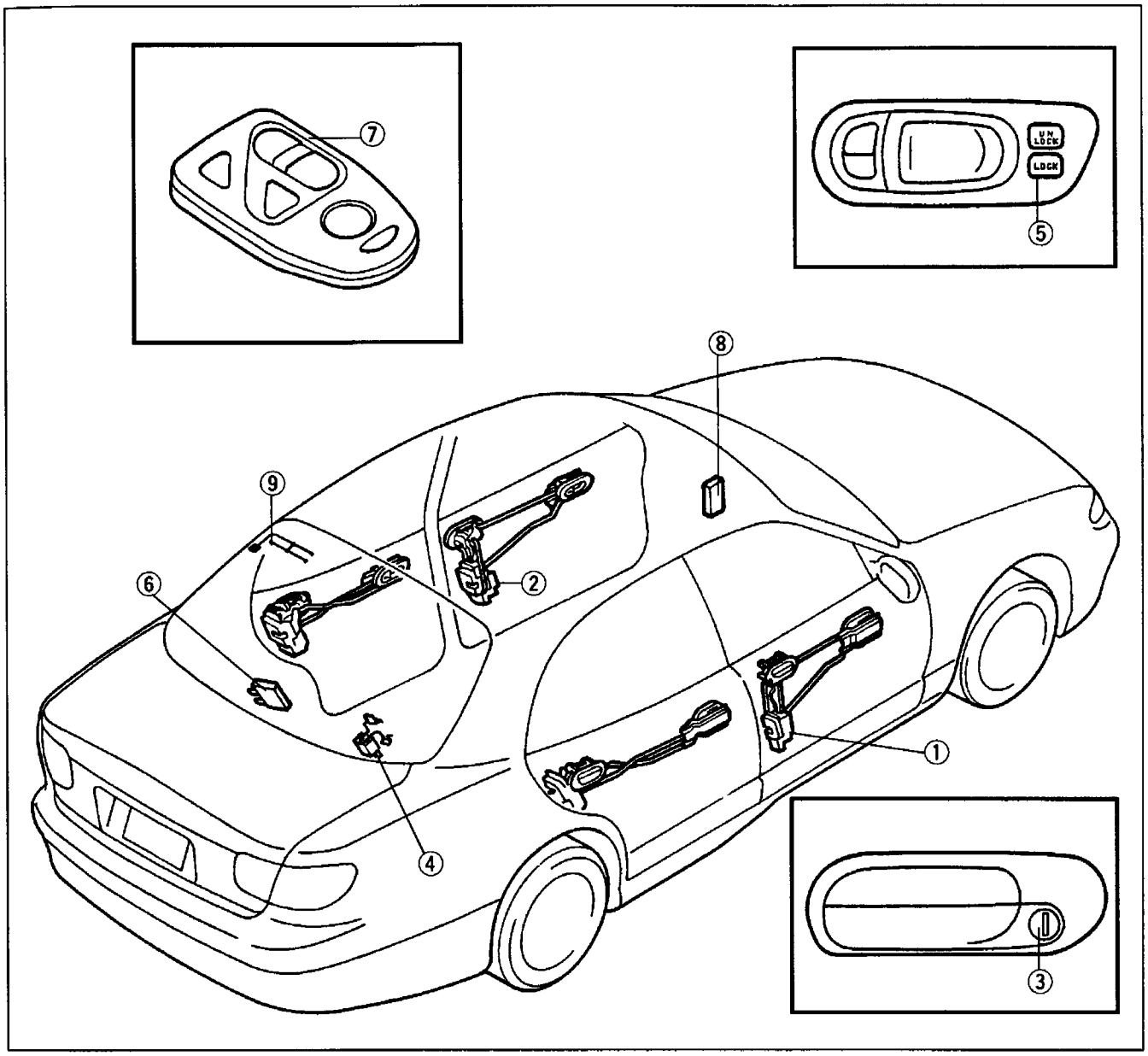
Switch position \ Terminal	A	B	D	E	F
UP	○	○	○	○	
OFF	○		○	○	○
DOWN		○	○	○	○

○—○: Continuity

3. If not as specified, replace the power window subswitch.

DOOR LOCK AND OPENER

STRUCTURAL VIEW



3ZE0SX-023

1. Door lock actuator (within door lock)
   - Removal / Installation (front) ... page S–16
   - Removal / Installation (rear) ... page S–18
   - Inspection ..... page S–19
2. Lock-link switch (within door lock actuator)
   - Inspection ..... page S–20
3. Door key cylinder switch (within key cylinder)
   - Removal / Installation ..... page S–16
   - Inspection ..... page S–21
4. Door lock timer unit
   - Removal / Installation ..... page S–21
   - Inspection ..... page S–22
5. Door lock switch
   - Removal / Installation ..... page S–23
   - Inspection ..... page S–23
6. Keyless unit
   - Removal / Installation ..... page S–24
   - Self-diagnosis function ..... page S–26
   - Changing the ID code ..... page S–29
7. Transmitter
   - Battery replacement ..... page S–27
   - Inspection ..... page S–28
8. CPU
   - Removal / Installation ..... section T
   - Inspection ..... section T
9. Keyless antenna
   - Inspection ..... page S–28

FRONT DOOR LOCK AND OPENER

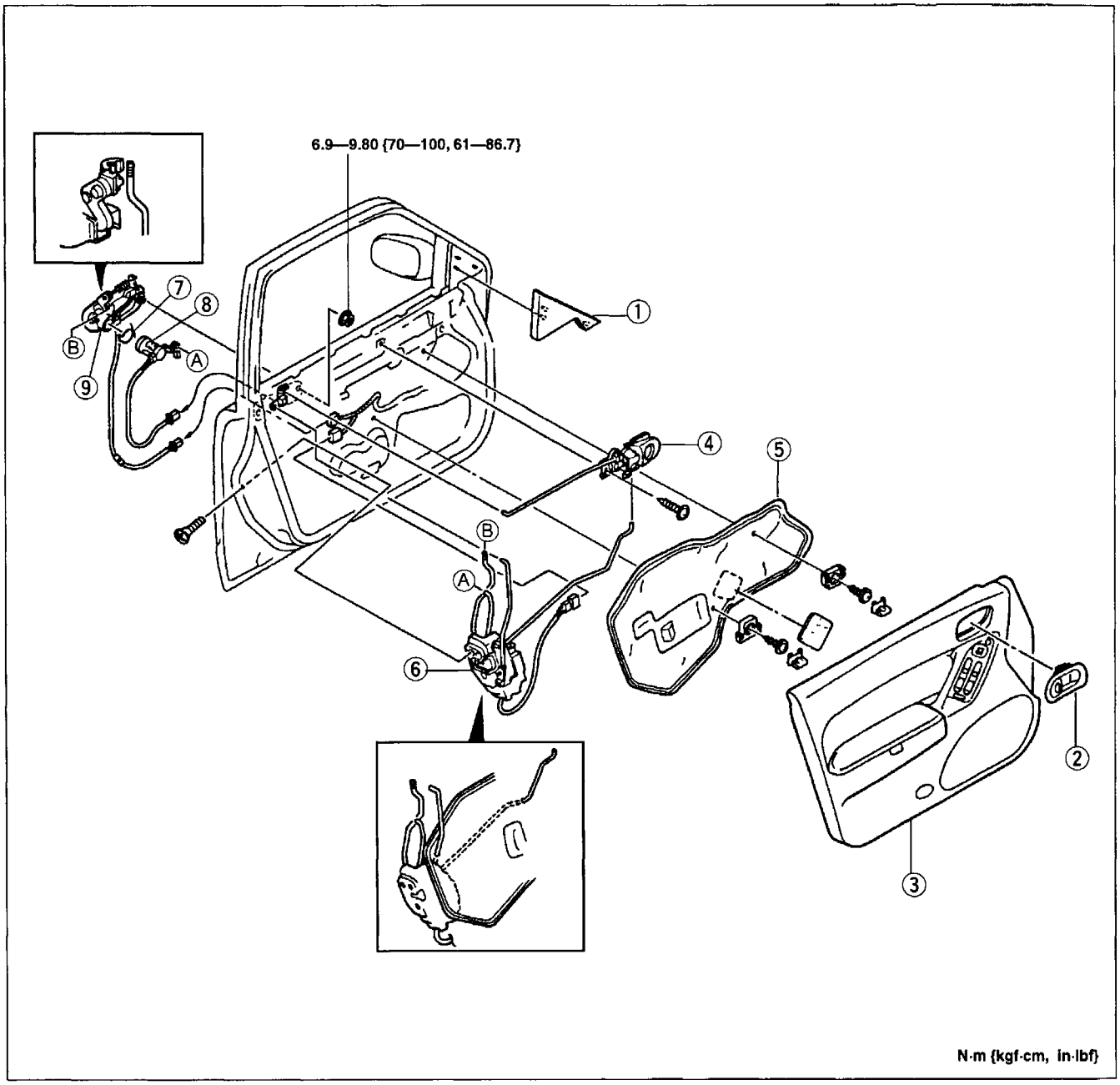
Removal / Installation

1. Raise the front door glass fully.
2. Disconnect the negative battery cable.

Note

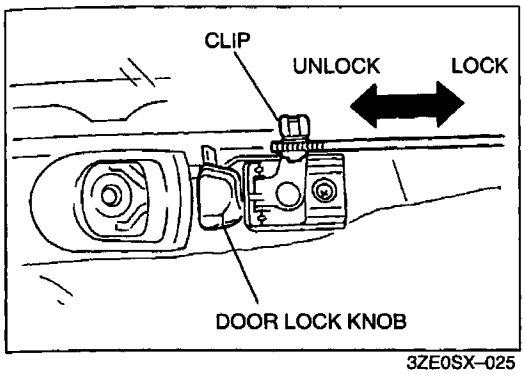
- Remove the door screen carefully so that it may be reused.

3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



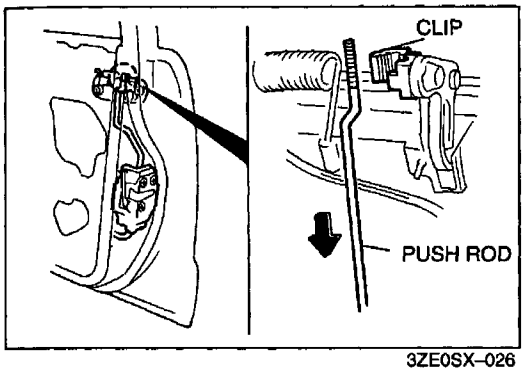
3ZE0SX-024

1. Inner garnish
2. Inner handle cover
3. Front door trim
   Removal / Installation ..... page S–105
4. Inner handle
   Installation note ..... page S– 17
5. Door screen
6. Door lock
7. Retainer
8. Key cylinder
9. Outer handle
   Installation note ..... page S– 17



3ZE0SX–025

Installation note
Inner handle
1. Set the door lock knob to LOCK.
2. Pull the lock rod fully in the lock direction.
3. Attach the clip to the rod.



3ZE0SX–026

Outer handle
1. Lower the push rod fully.
2. Install the push rod into the outer handle joint.
3. Attach the clip to the rod.

REAR DOOR LOCK AND OPENER

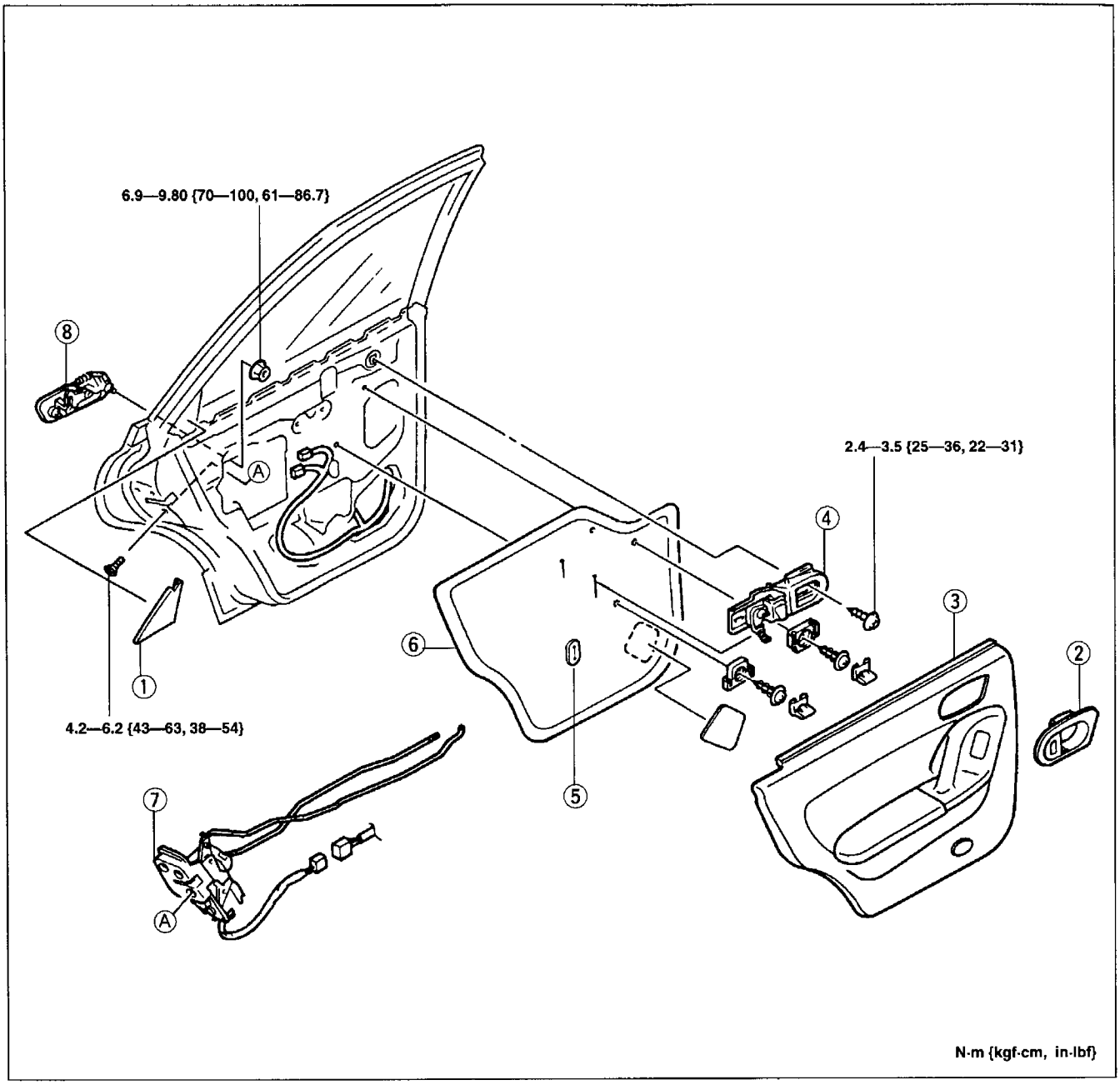
Removal / Installation

1. Raise the rear door glass fully.
2. Disconnect the negative battery cable.

Note

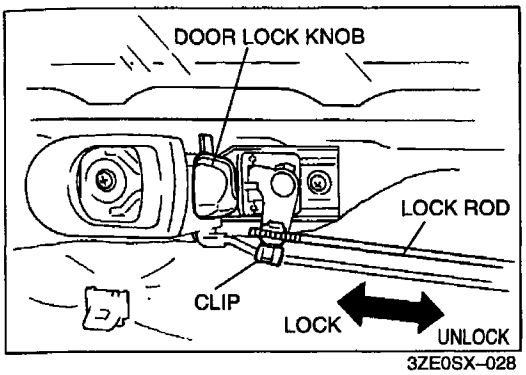
- Remove the door screen carefully so that it may be reused.

3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



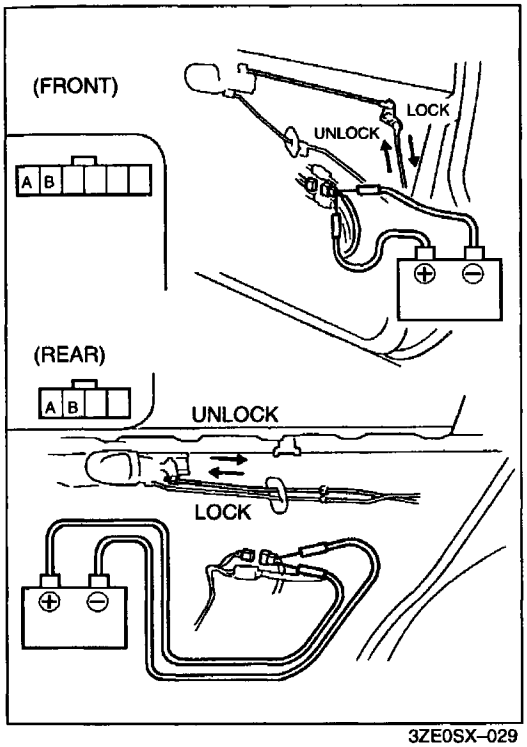
3ZE0SX–027

1. Inner garnish
2. Inner handle cover
3. Rear door trim
   Removal / Installation ..... page S–107
4. Inner handle
   Installation note ..... page S– 19
5. Sealing pad
6. Door screen
7. Door lock
8. Outer handle



3ZE0SX-028

Installation note
Inner handle
1. Set the door lock knob to LOCK.
2. Push the lock rod fully in the lock direction.
3. Attach the clip to the rod.



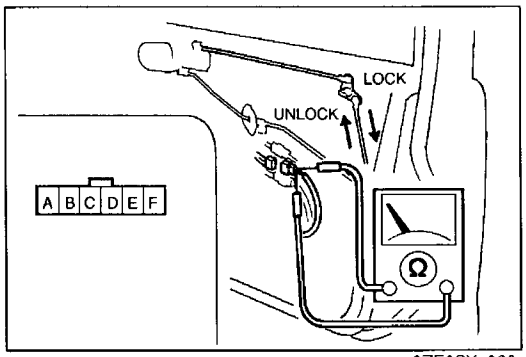
3ZE0SX-029

DOOR LOCK ACTUATOR (within door lock)
Inspection
1. Remove the door screen. (Refer to pages S-16, 18.)
2. Disconnect the door lock actuator connector.
3. Apply battery 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

4. If not as specified, replace the door lock.



3ZE0SX-030

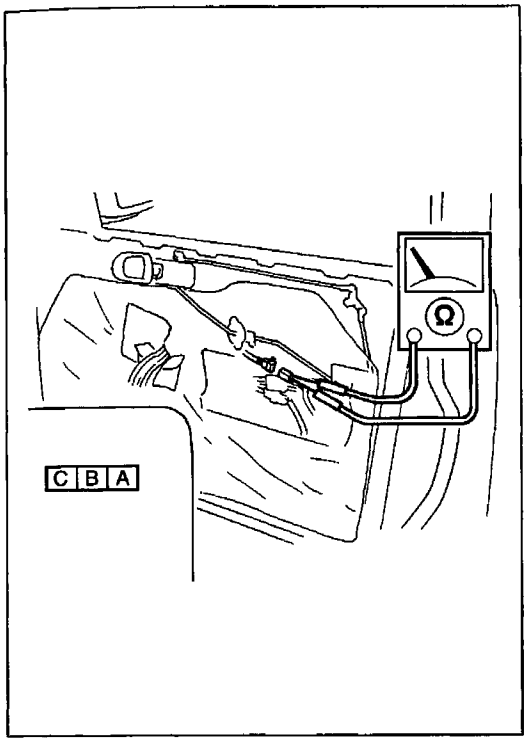
LOCK-LINK SWITCH (within door lock actuator)
Inspection

1. Check for continuity between the terminals of the door lock actuator connector with the lock rod in the following positions.

Rod position \ Terminal	A	B	C	D	E	F
Lock				O—O		
Unlock			O—O			

O—O: Continuity

2. If not as specified, replace the door lock.



3ZE0SX-033

DOOR KEY CYLINDER SWITCH (within key cylinder)
Inspection

1. Remove the door screen. (Refer to page S–16.)
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.

(driver's door)

Cylinder position \ Terminal	A	B	C
Lock			
Unlock	O—O		

O—O: Continuity

(passenger's door)

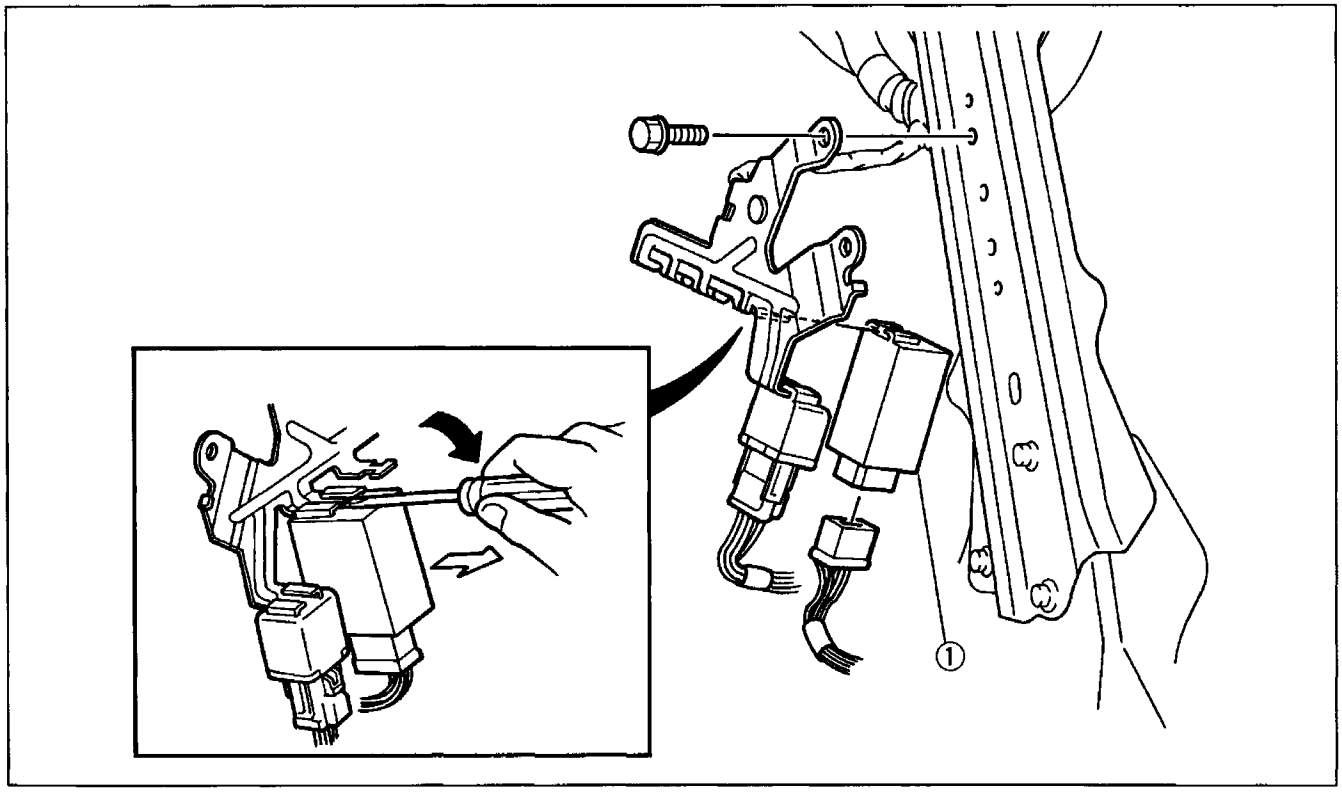
Cylinder position \ Terminal	A	B	C
Lock	O—∿∿—O 1 kΩ ± 5%		
Unlock	O—O		

O—O: Continuity

4. If not as specified, replace the door key cylinder.

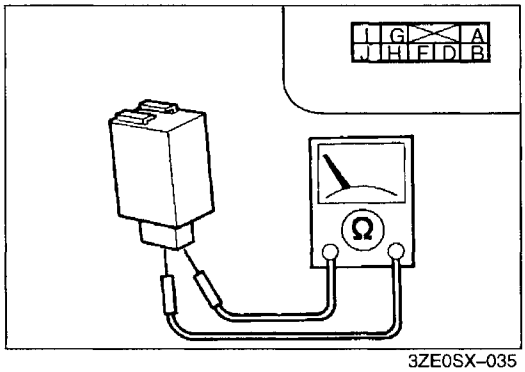
DOOR LOCK TIMER UNIT
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the rear seat back. (Refer to page S–125.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.

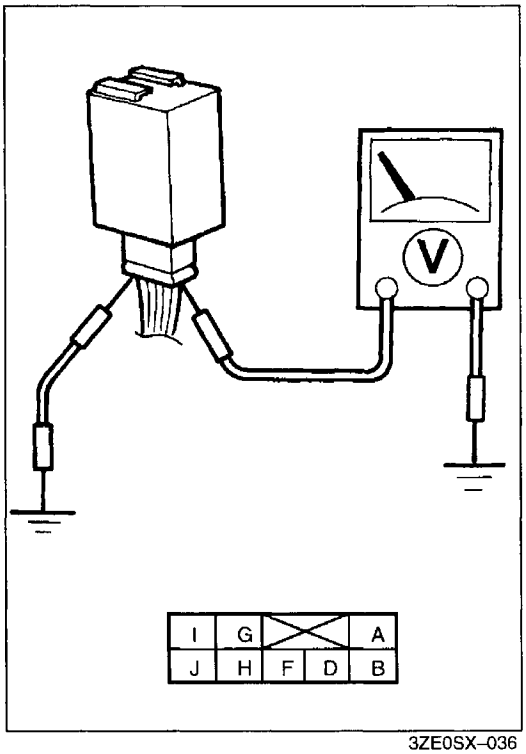


3ZE0SX-034

1. Door lock timer unit
   Inspection ..... page S–22



3ZE0SX-035



3ZE0SX-036

Inspection

1. Remove the door lock timer unit from its support bracket. (Refer to page S–21.)
2. Disconnect the door lock timer unit connector.
3. Check for continuity between the terminals of the door lock timer unit connector.

(Without keyless entry system)

A	B	F	J	G	H	I
○	○	○	○	○	○	○

○—○: Continuity

(With keyless entry system)

A	B	D	F	G	H	I	J
		○		○	○	○	
○	○		○				○

○—○: Continuity

4. Reconnect the door lock timer unit connector.
5. Measure the voltage at the terminals of the door lock timer unit connector with the following terminals connected to ground.

(Without keyless entry system) **B+: Battery positive voltage**

Grounded terminal	Test terminal	Voltage
H	A	B+
G	B	B+
	F	B+

(With keyless entry system) **B+: Battery positive voltage**

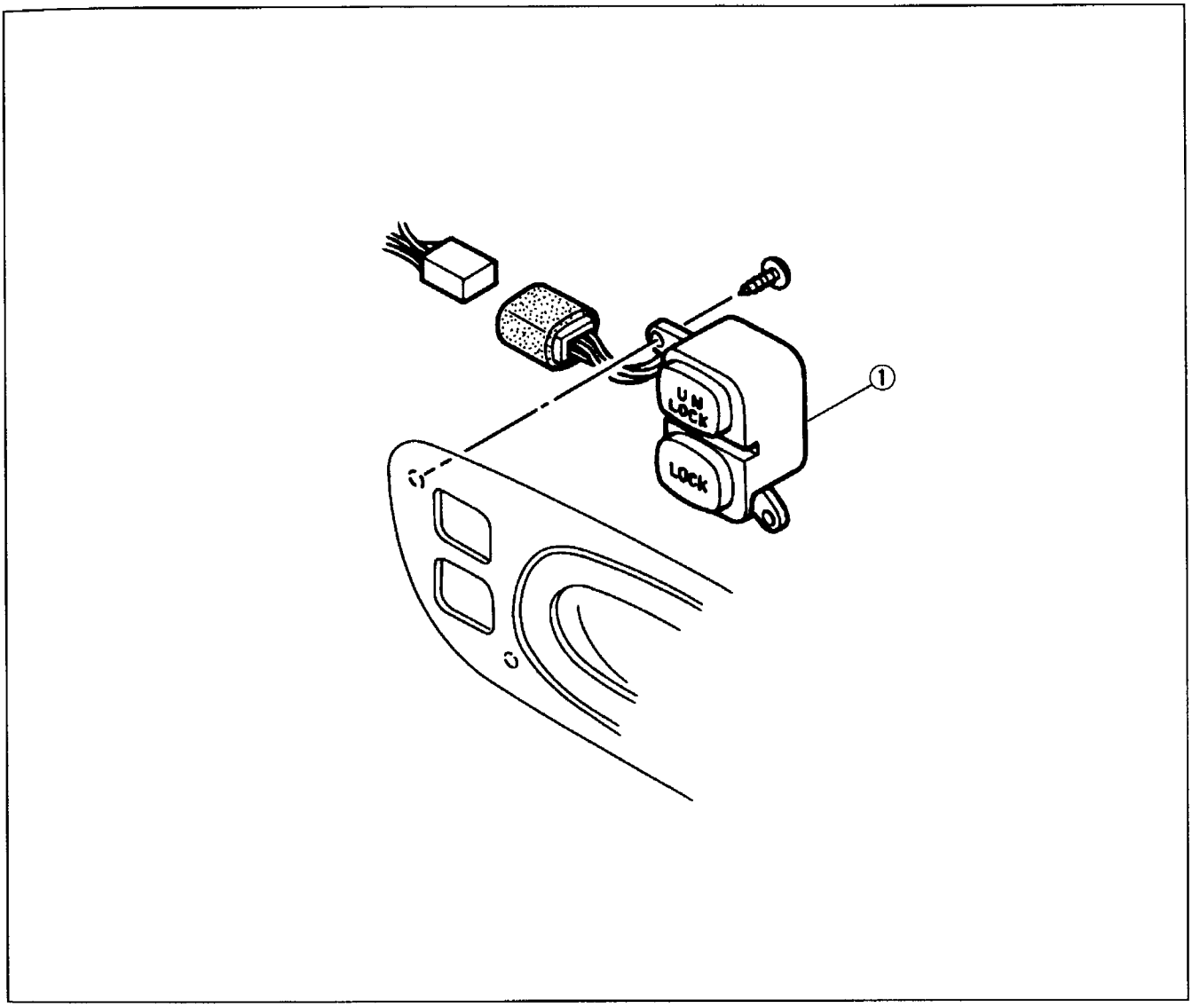
Grounded terminal	Test terminal	Voltage
H	A	B+
G	F	B+
D	B	B+

6. If not as specified, replace the door lock timer unit.

DOOR LOCK SWITCH

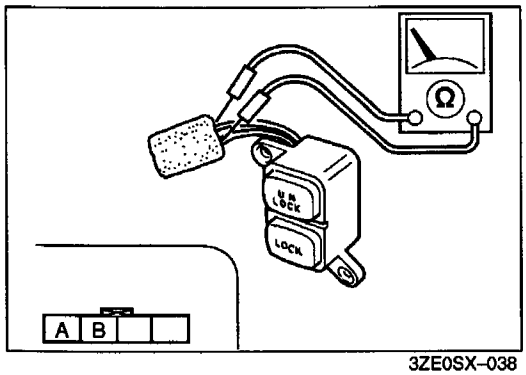
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the inner handle cover. (Refer to page S–10.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



3ZE0SX–037

1. Door lock switch
   Inspection ..... below



3ZE0SX–038

Inspection

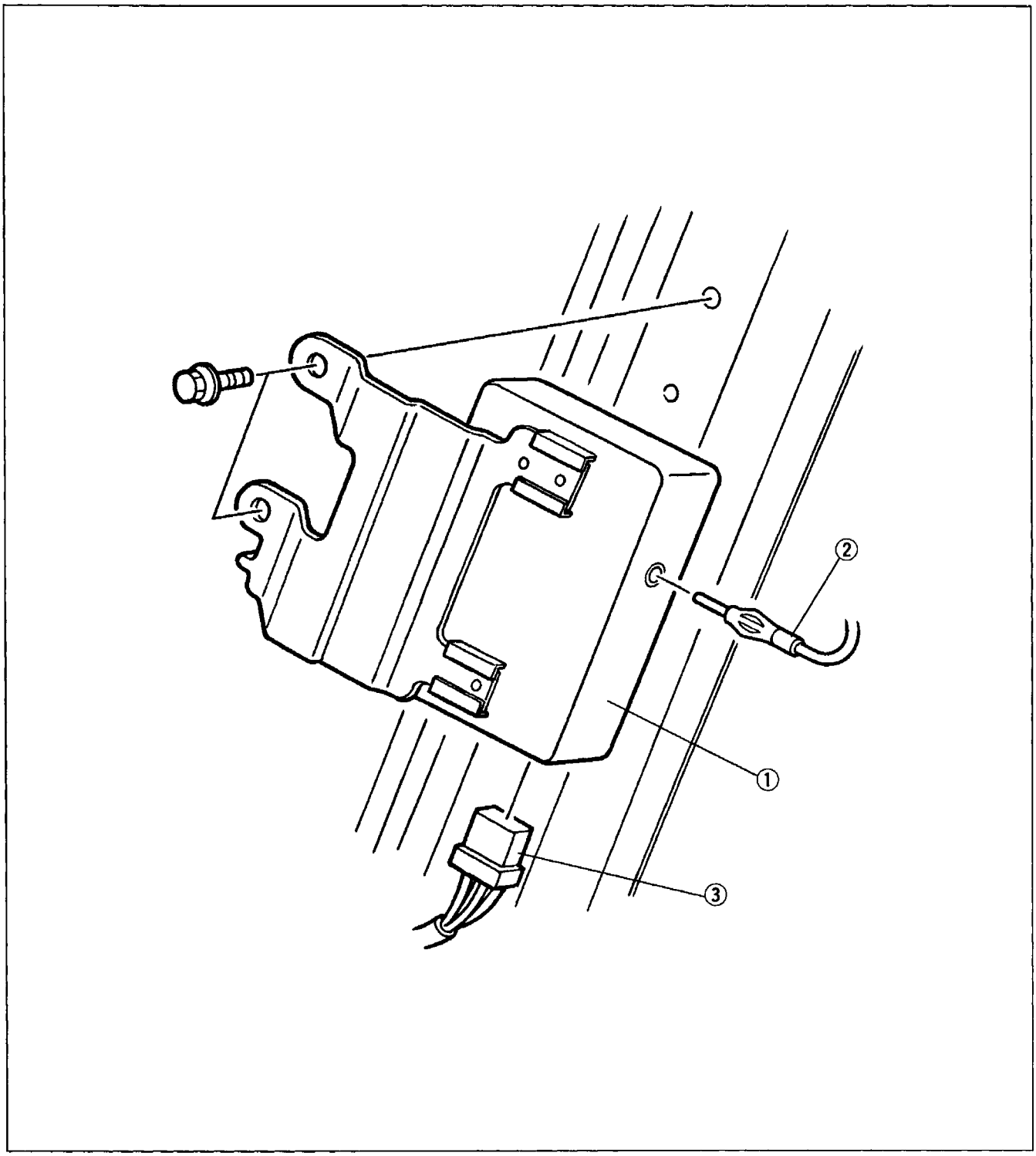
1. Remove the door lock switch. (Refer above.)
2. Check for continuity between the terminals of the door lock switch harness connector.

Switch position \ Terminal	A	B
Lock	O—∿∿—O 1kΩ ± 5%	
Unlock	O	O

O—O: Continuity

3. If there is no continuity, replace the door lock switch.

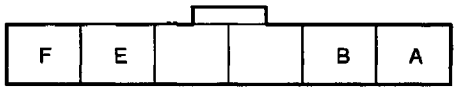
KEYLESS UNIT
Removal / Installation
1. Disconnect the negative battery cable.
2. Remove the rear seat back. (Refer to page S–125.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal. When installing a new keyless unit, change the ID code. (Refer to page S–27.)



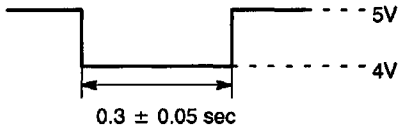
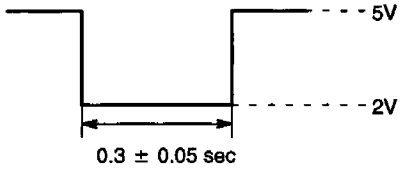
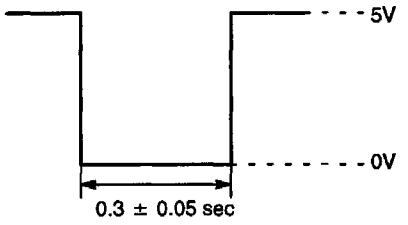
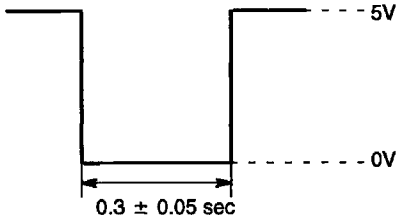
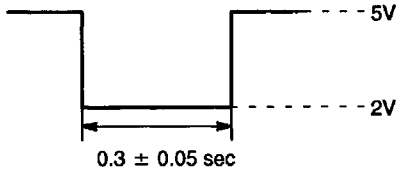
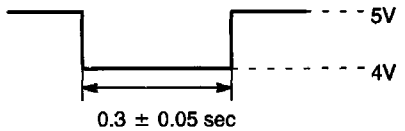
3ZU0SX–009

1. Keyless unit
   Self-diagnosis function . . . . . page S–26
   Changing the ID code . . . . . page S–29
2. Antenna feeder
3. Connector

Terminal voltage list



B+: Battery positive voltage

Terminal	Signal name	Connection	Test condition	Voltage
A	Battery	ROOM 15A fuse	Constant	B+
B	GND	Body ground	Constant	0V
E	Lock signal	CPU	Transmitter LOCK button pressed	
	Unlock signal	CPU	Transmitter UN-LOCK button pressed	
	Buzzer signal	CPU	When the buzzer sounds	
F	Driver's side Unlock signal	CPU	Transmitter UN-LOCK button pressed	
	Trunk signal	CPU	Transmitter TRUNK button pressed	
	Panic signal	CPU	Transmitter PANIC button pressed	

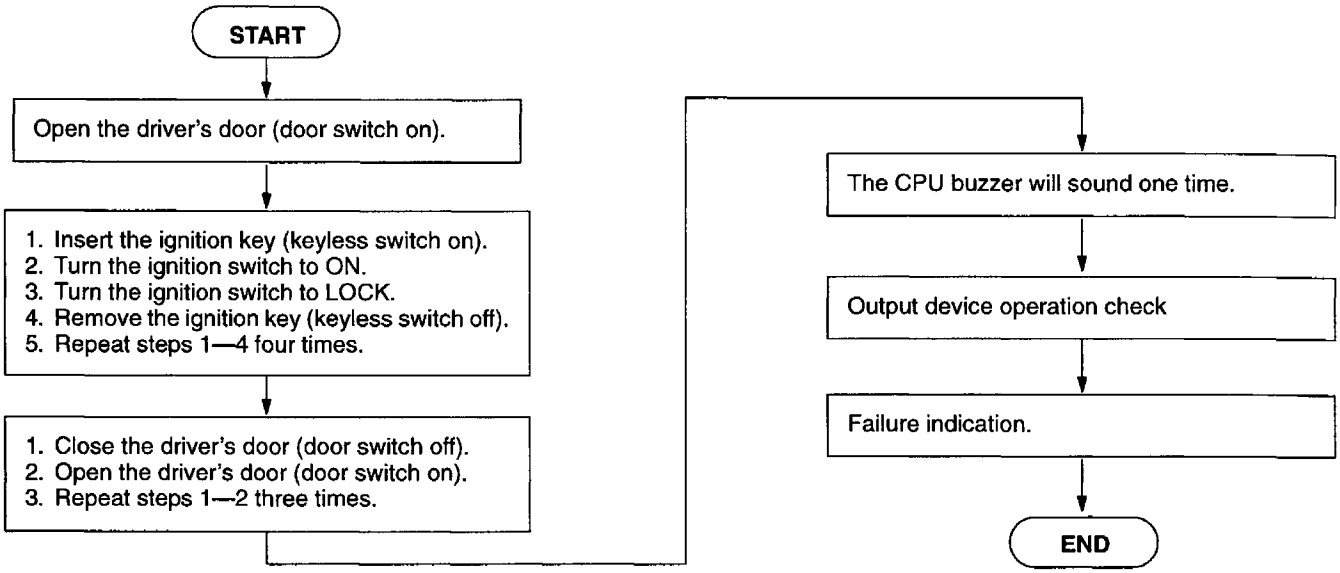
Self-Diagnosis Function

Outline

- A built-in self-diagnosis function locates problem areas based on signals between the CPU and the keyless unit.
- When the flow of self-diagnosis is completed, the self-diagnosis function activates the output device operation check. The problem area can be determined by observing the output device operation and listening for the number of times the buzzer sounds.

Flow of self-diagnosis

To start the self-diagnosis function, complete the procedure below within **180 seconds**.



Output device operation check

The keyless unit sends a signal to the CPU and the CPU activates the device every **3 seconds** in the following steps.

Step	Function	Driver's Door	Passenger's Door	Rear Door	Trunk Lid	Warning
1	LOCK	Unlock → Lock	Unlock → Lock	Unlock → Lock	—	—
2	UNLOCK (Driver's side)	Lock → Unlock	—	—	—	—
3	UNLOCK	Lock → Unlock	Lock → Unlock	Lock → Unlock	—	—
4	TRUNK	—	—	—	Lock → Unlock	—
5	INTERIOR LIGHT	—	—	—	—	Interior light turns on
6	PANIC	—	—	—	—	Horn sounds intermittently and headlights and hazard lights flash

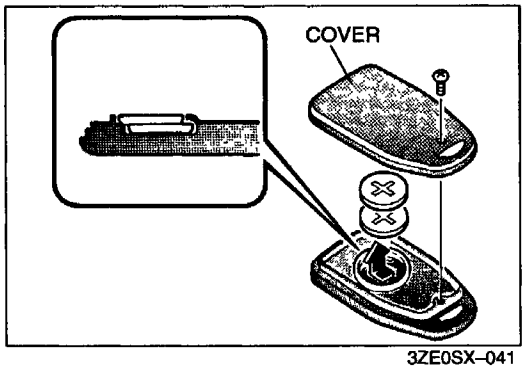
Failure indication

The number of times the CPU buzzer sounds indicates whether or not the keyless unit and CPU are communicating properly

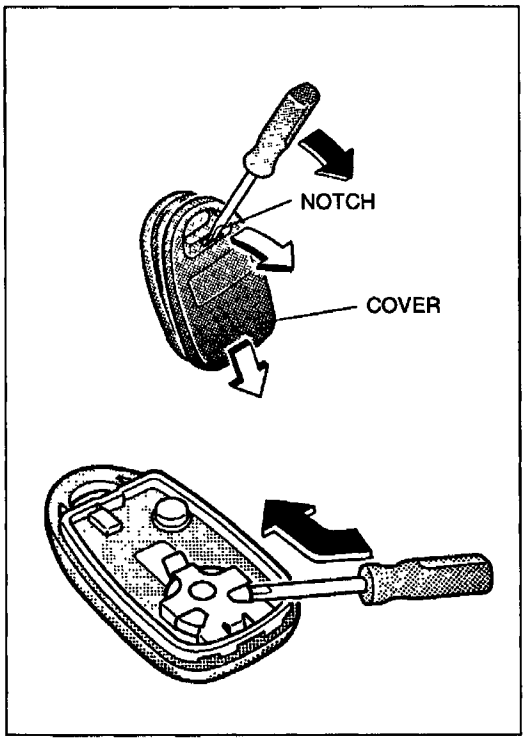
No. of CPU buzzer sounds	Condition
1	Check transmitter, keyless antenna, keyless unit
2	The CPU is not receiving the BUZZER, UNLOCK, and LOCK signals from the keyless unit properly. There may be an open or short circuit between terminal E of the keyless unit and terminal 1P of the CPU, or the keyless unit may be damaged.
3	The CPU is not receiving the driver's door UNLOCK, TRUNK, and PANIC signals from the keyless unit properly. There may be an open or short circuit between terminal F of the keyless unit and terminal 3B of the CPU, or the keyless unit may be damaged.
4	The CPU is not receiving the driver's door UNLOCK, BUZZER, UNLOCK, LOCK, TRUNK, and PANIC signals from the keyless unit properly. There may be an open or short circuit between terminals E and F of the keyless unit and terminals 1P and 3B of the CPU, or the keyless unit may be damaged.

Note

- If the buzzer sounds once, the keyless unit's digital circuit (keyless unit—CPU—lock actuator) is operating normally. If the transmitter still does not operate when the digital circuit is normal, the trouble is in the high-frequency circuit (transmitter—antenna—keyless unit).



3ZE0SX-041



TRANSMITTER

Battery Replacement

(Two-battery transmitter)

1. Remove the cover from the transmitter.
2. Remove the batteries from the battery case.
3. Install the new batteries with the ⊕ side facing up.

   Battery specification: Lithium CR 2016 × 2

4. Install the cover.

   Note
   - The batteries will last **about 2 years** when used **10 times** a day.

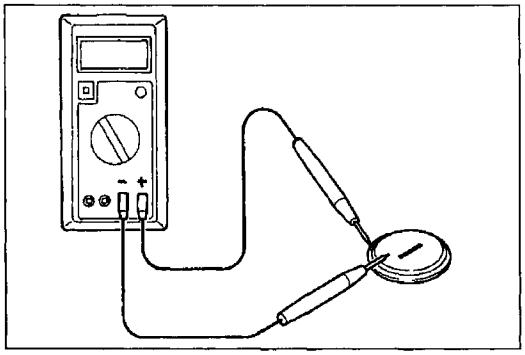
(One-battery transmitter)

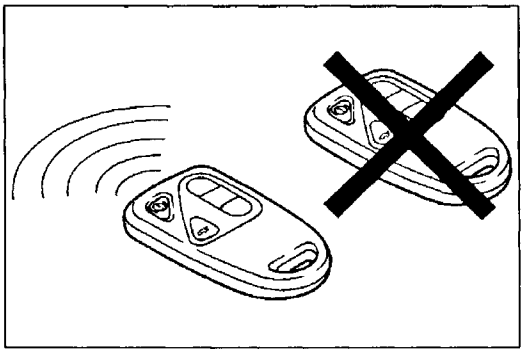
1. Insert a flathead screwdriver into the notch of the transmitter.
2. Remove the cover by using the screwdriver as shown.
3. Install the new batteries with the ⊕ side facing up.

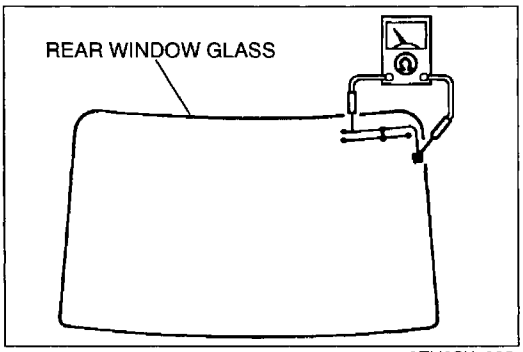
   Battery specification: Lithium CR 2025 × 1

4. Install the cover.

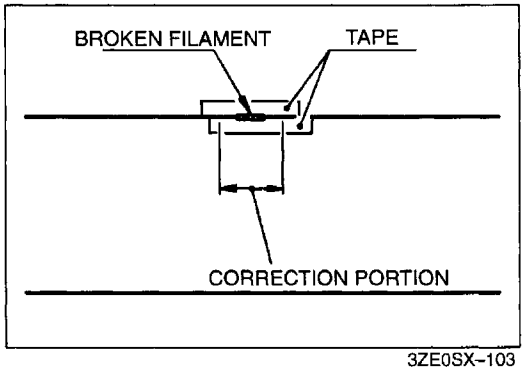
   Note
   - The batteries will last **about 2 years** when used **10 times** a day.







3ZU0SX-002



3ZE0SX-103

Inspection

1. Remove the batteries.
2. Leave the batteries on a table for **30 minutes** and allow them to warm to room temperature (**20—30°C {65—85°F}**).
3. Measure the voltage of each battery by using a digital circuit tester.

(USA)

Voltage	Action
2.9 V or more	Install batteries and go to step 4
Less than 2.9 V	Replace transmitter batteries

(Canada)

Voltage	Action
2.9 V or more	Check antenna feeder — keyless unit
Less than 2.9 V	Replace transmitter batteries

4. Verify that the keyless entry system is functioning properly by operating the system with the second transmitter.

Operates	Action
Yes	Replace the defective transmitter
No	Check antenna feeder — keyless unit

KEYLESS ANTENNA

Inspection

1. Check for continuity at the keyless antenna as shown in the figure.
2. If there is no continuity, repair the keyless antenna.

Repair

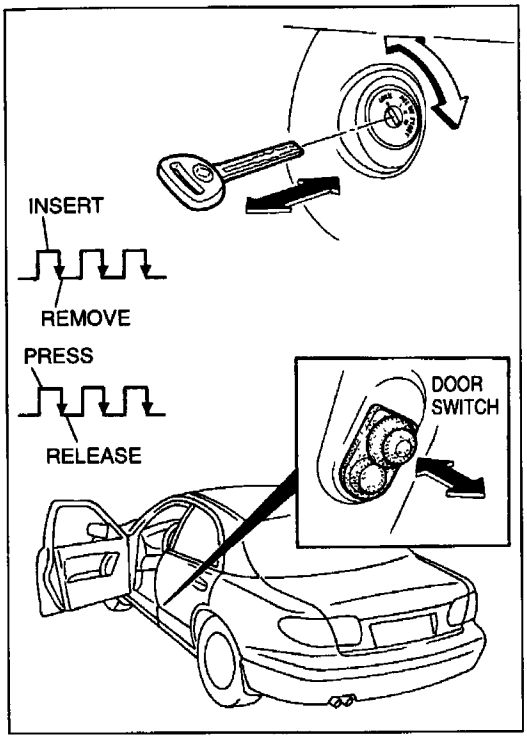
Caution

- **Use only paint thinner or ethyl alcohol for cleaning. Other solvents can damage the surrounding filament.**

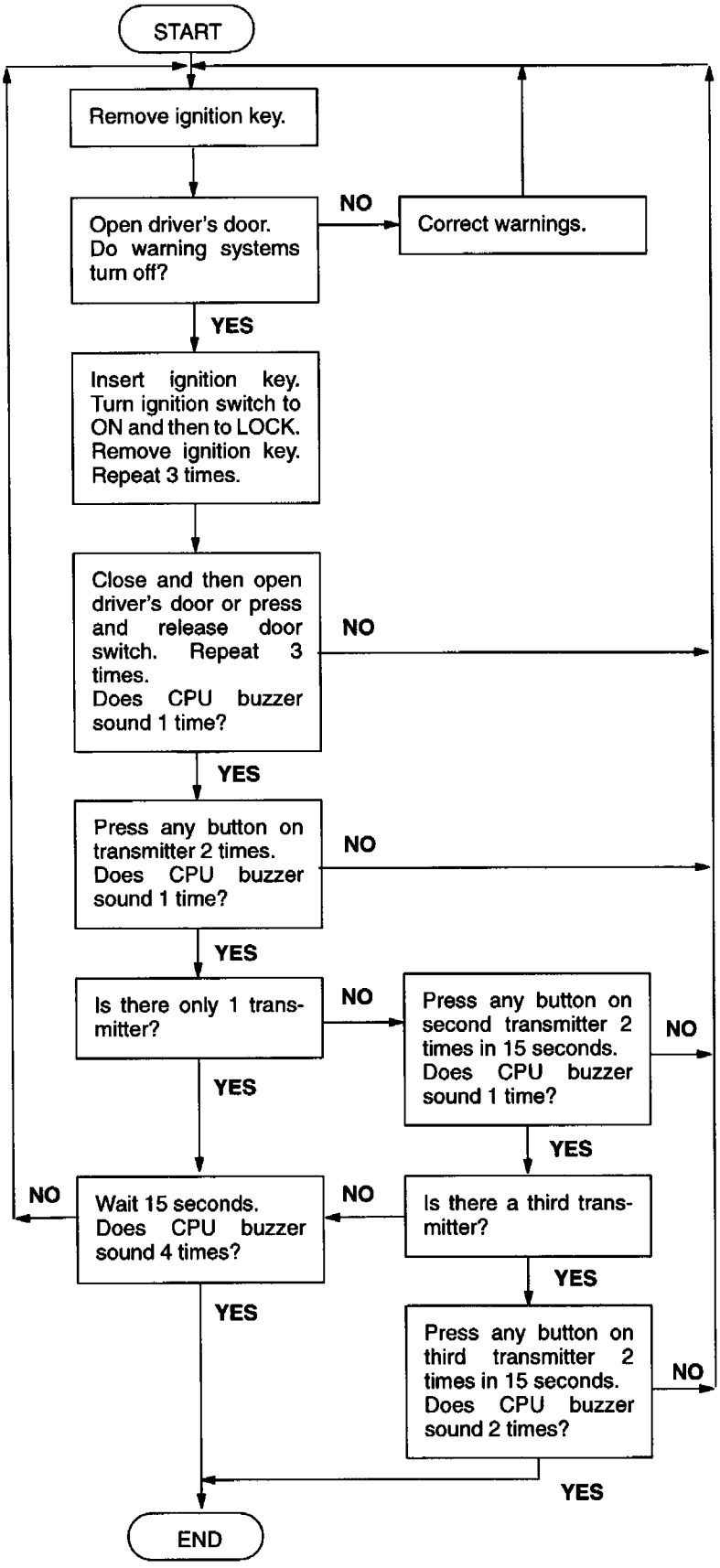
1. Use paint thinner or ethyl alcohol to clean around the damaged section of the filament.
2. Attach tape above and below the damaged section of the filament.
3. Using a small brush or marking pen, repair the filament with silver paint or equivalent.
4. Use a hot-air blower heated to **150°C {302°F}** for **30 minutes** or let the paint set for 24 hours at **25°C {77°F}** to allow it to dry completely.

Changing the ID Code

- Up to 3 transmitters can be used with the keyless entry system. If there are three, work with all of them when changing the ID code.
- If you must repeat a procedure in the flowchart more than once, troubleshoot the keyless entry system and then start again.



3ZE0SX-040

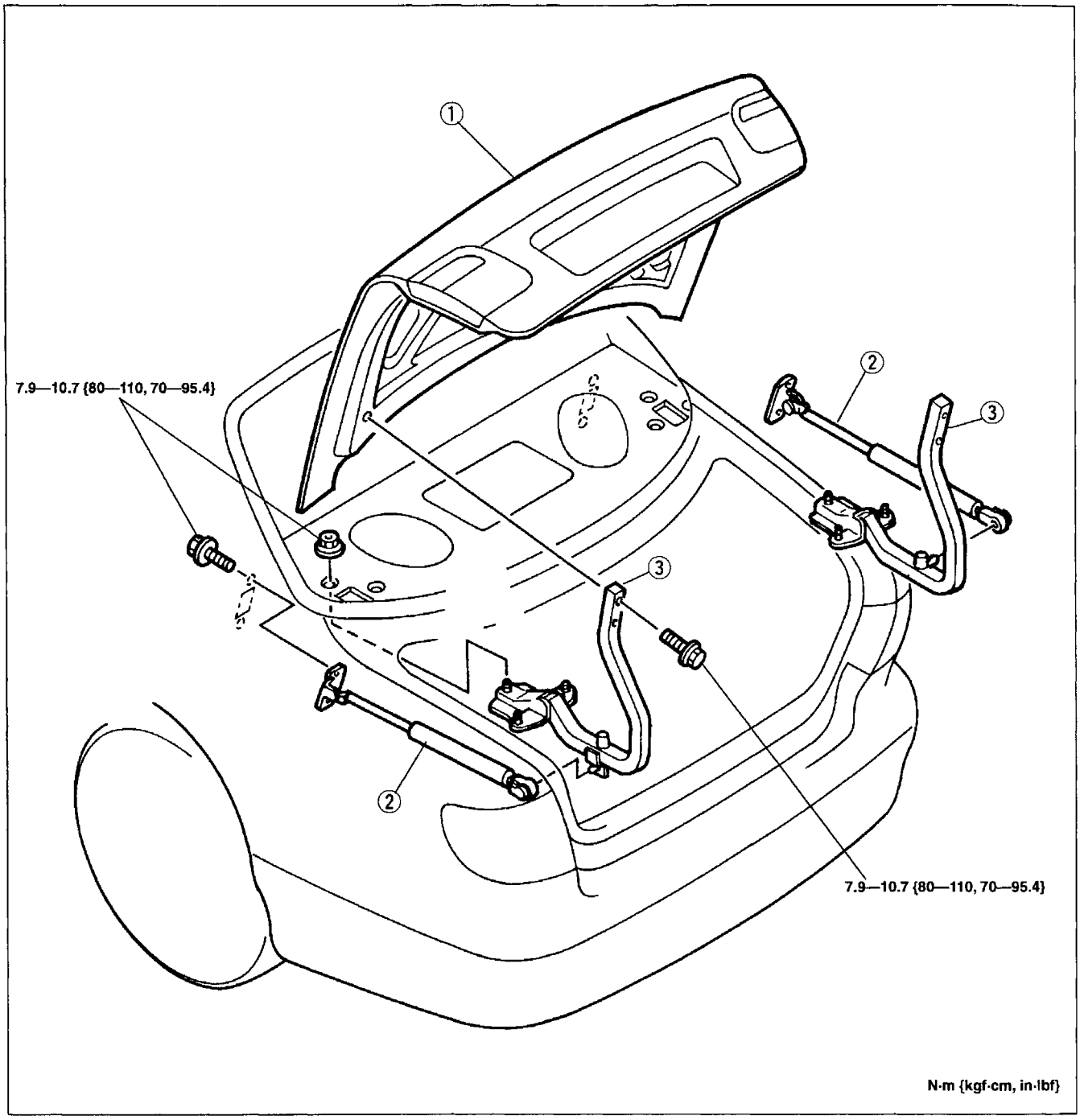


TRUNK LID

TRUNK LID

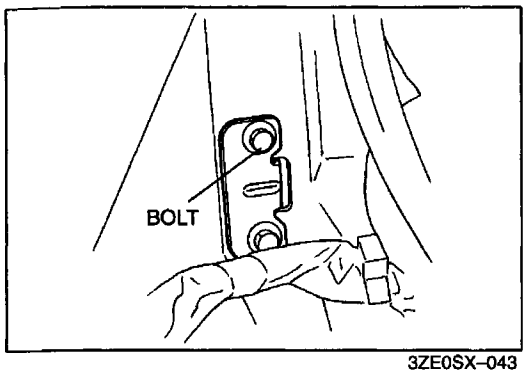
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure. To remove the trunk lid, remove the trunk lid trim. (Refer to page S–104.) To remove the trunk lid hinge arm, remove the rear package front trim. (Refer to page S–100.)
3. Install in the reverse order of removal.

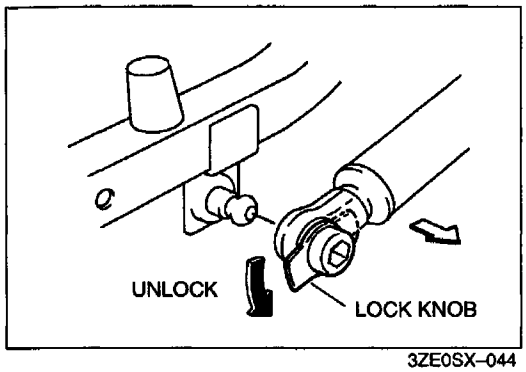


3ZE0SX–042

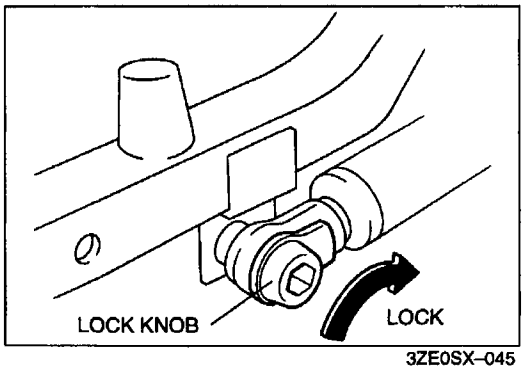
1. Trunk lid
   Adjustment ..... page S–32
2. Stay damper
   Removal note ..... page S–31
   Installation note ..... page S–31
   Disposal of stay damper ..... page S–32
3. Trunk lid hinge arm



3ZE0SX–043



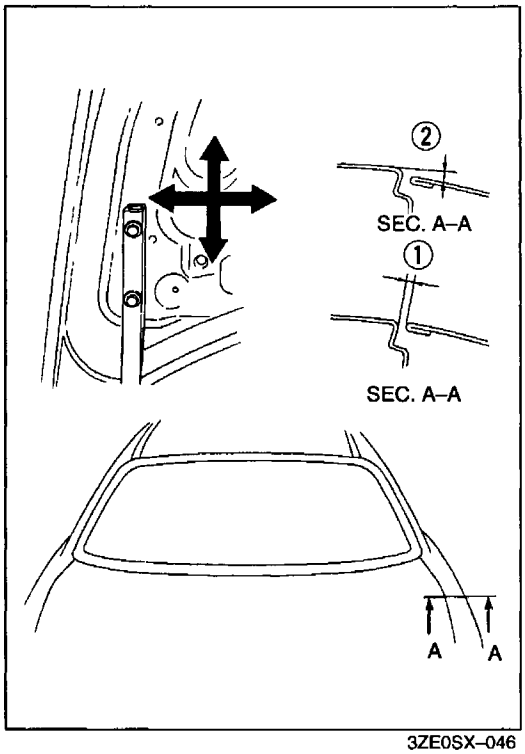
3ZE0SX–044



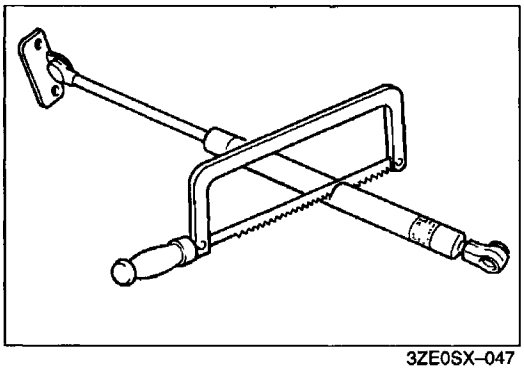
3ZE0SX–045

Removal note
Stay damper
1. Remove the rear seat back. (Refer to page S–125.)
2. Remove the installation bolts of the stay damper.
3. Turn the stay damper lock knob counterclockwise to unlock the stay damper from the trunk lid hinge arm.

Installation note
Stay damper
Turn the stay damper lock knob clockwise to lock the stay damper on the trunk lid hinge arm.



3ZE0SX–046



3ZE0SX–047

Adjustment
Trunk lid

1. Measure the clearance between the trunk lid and the rear fender panel.

   Clearance ①: 3.5 ± 0.7 mm {0.14 ± 0.03 in}
   ②: 0.5 ± 1.0 mm {0.02 ± 0.04 in}

2. If not as specified, loosen the trunk-lid-to-hinge mounting bolts and reposition the trunk lid.

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

Disposal of stay damper

Note
- The gas in the stay damper is colorless, odorless, and non-toxic.

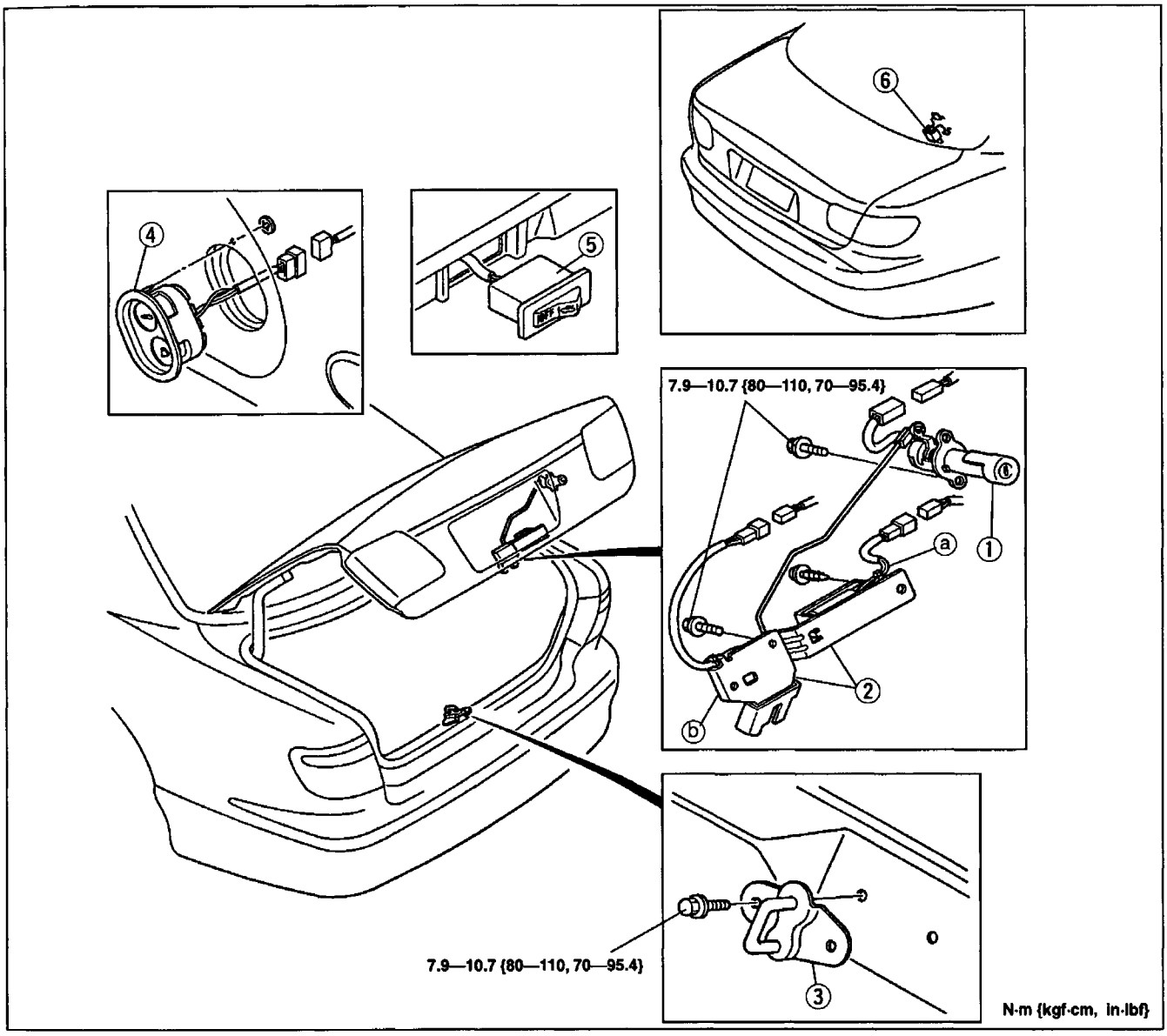
1. Lay the stay damper flat.
2. Saw through the stay damper body by using a hacksaw.
3. Allow the gas to escape from the stay damper.
4. Discard the stay damper.

TRUNK LID LOCK AND OPENER

TRUNK LID LOCK AND OPENER

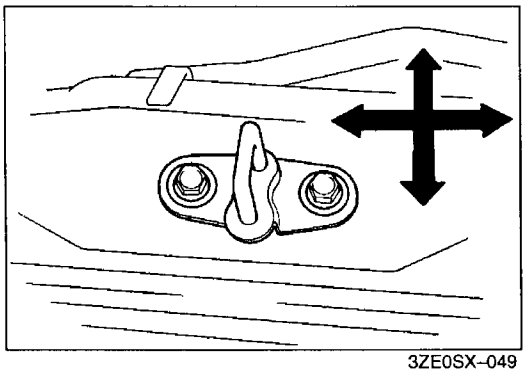
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure. To remove the trunk key cylinder or trunk lid lock assembly, remove the trunk lid trim. (Refer to page S–104.) To remove the trunk lid striker, remove the trunk end trim. (Refer to page S–102.) To remove the trunk lid opener switch, remove the front door trim. (Refer to page S–105.) To remove the trunk lid cancel switch, remove the glove compartment cover. (Refer to page S–88.) To remove the trunk lid opener relay, remove the rear seat back. (Refer to page S–125.)
3. Install in the reverse order of removal.



3ZA0SX–007

1. Trunk key cylinder switch (within key cylinder)
   Inspection ..... page S–34
2. Trunk lid lock assembly
   a. Trunk lid opener
      Inspection ..... page S–34
   b. Trunk lid lock
      Inspection ..... page S–35
3. Trunk lid striker
   Adjustment ..... page S–34
4. Trunk lid opener switch
   Inspection ..... page S–35
5. Trunk lid cancel switch
   Inspection ..... page S–35
6. Trunk lid opener relay
   Removal / Installation ..... page S–36
   Inspection ..... page S–36

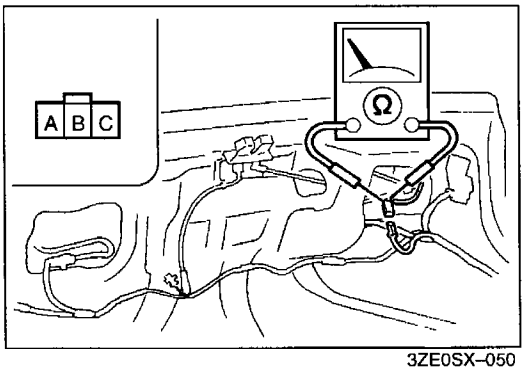


3ZE0SX-049

Adjustment
Trunk lid striker

1. Adjust the trunk lid striker after the trunk lid has been aligned.
2. Loosen the trunk lid striker mounting bolts and align the striker with the lock assembly.

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



3ZE0SX-050

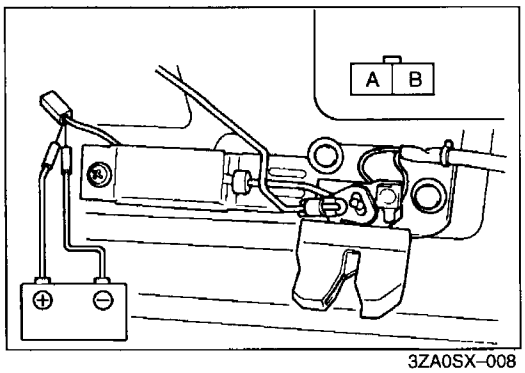
TRUNK KEY CYLINDER SWITCH (within key cylinder)
Inspection

1. Remove the trunk lid trim. (Refer to page S–104.)
2. Disconnect the trunk 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	C
Lock	O	O	
Unlock	O		O

O—O: Continuity

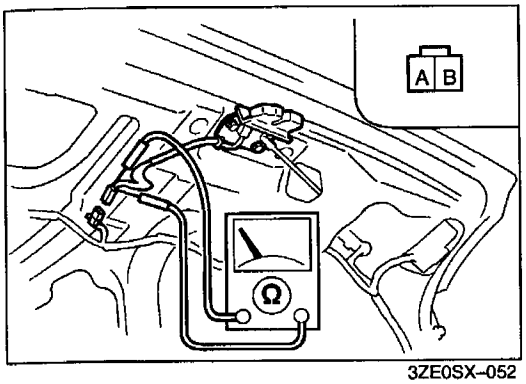
4. If not as specified, replace the key cylinder.



3ZA0SX-008

TRUNK LID OPENER
Inspection

1. Remove the trunk lid trim. (Refer to page S–104.)
2. Disconnect the trunk lid opener connector.
3. Connect battery voltage to terminal A and ground to terminal B of the trunk lid opener connector. Verify that the trunk lid opener operates.
4. If not as specified, replace the trunk lid lock assembly.



3ZE0SX-052

TRUNK LID LOCK

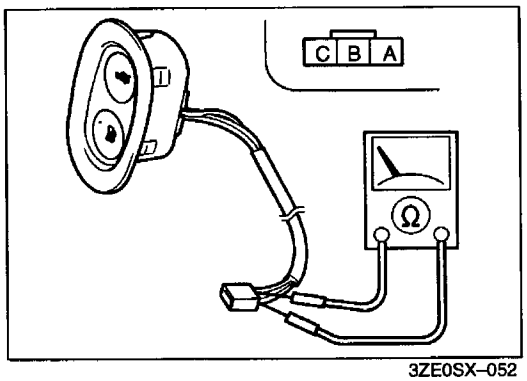
Inspection

1. Remove the trunk lid trim. (Refer to page S–104.)
2. Disconnect the trunk lid lock connector.
3. Check for continuity between the terminals of the connector with the key cylinder in the following positions.

Terminal / Cylinder position	A	B
Latch	O	O
Unlatch		

O—O: Continuity

4. If not as specified, replace the trunk lid lock.



3ZE0SX-052

TRUNK LID OPENER SWITCH

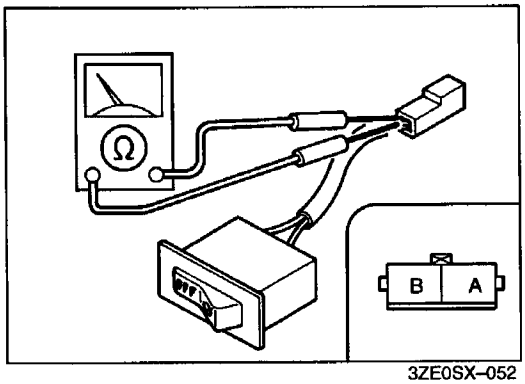
Inspection

1. Remove the trunk lid opener switch. (Refer to page S–33.)
2. Check for continuity between the terminals of the opener switch.

Terminal / Switch condition	A	B	C
Pressed	O	O	
Released			

O—O: Continuity

3. If not as specified, replace the trunk lid opener switch.



3ZE0SX-052

TRUNK LID CANCEL SWITCH

Inspection

1. Remove the trunk lid cancel switch. (Refer to page S–33.)
2. Check for continuity between the terminals of the cancel switch.

Terminal / Switch position	A	B
ON		
OFF	O	O

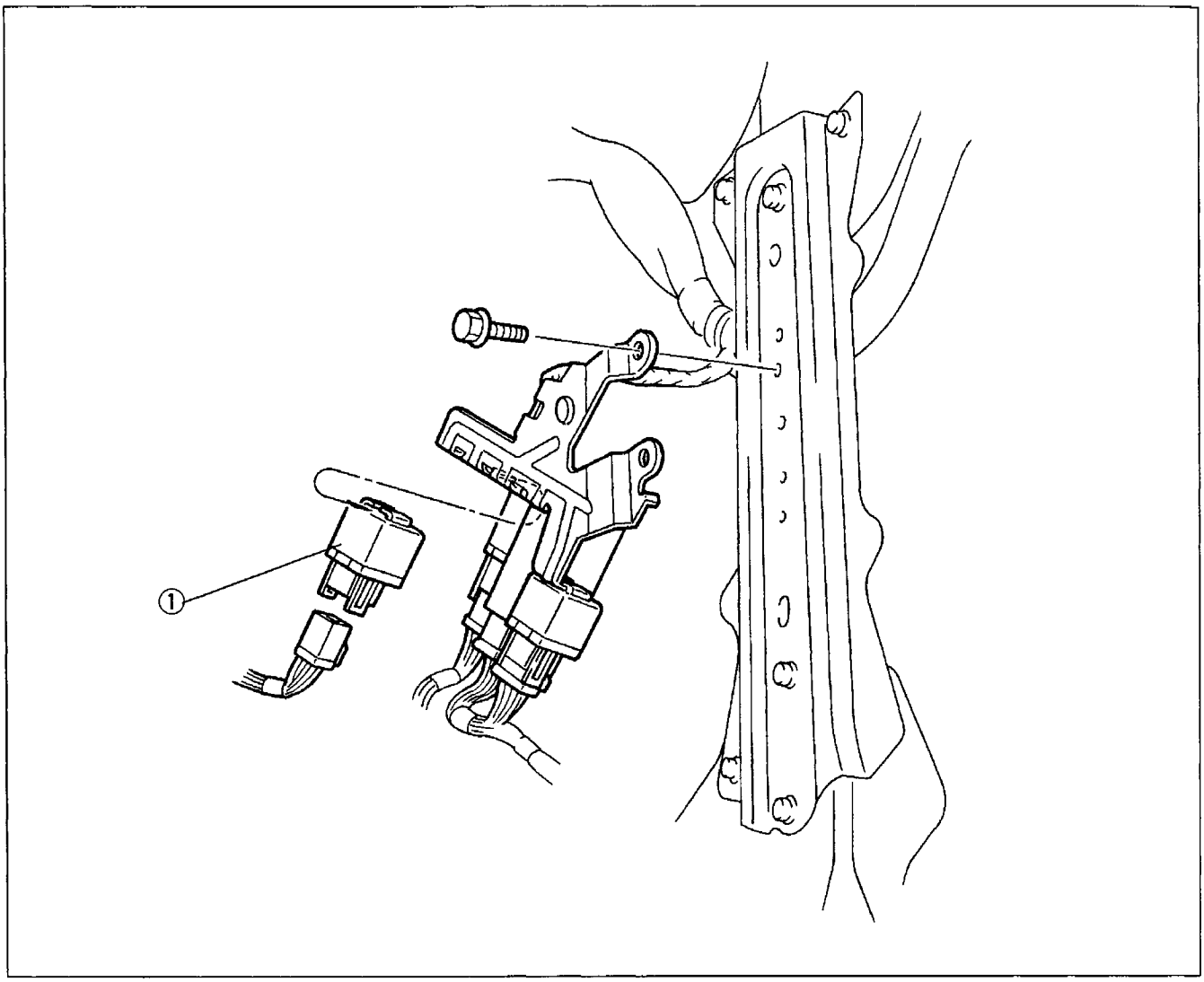
O—O: Continuity

3. If not as specified, replace the trunk lid cancel switch.

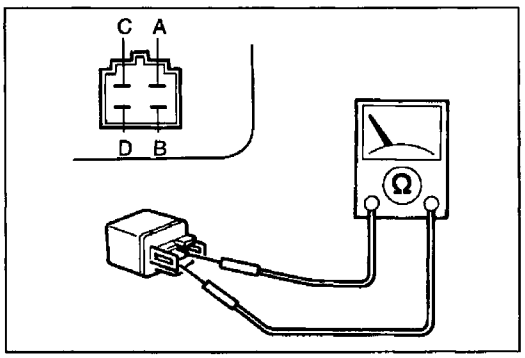
TRUNK LID OPENER RELAY

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the rear seat back. (Refer to page S–125.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



1. Trunk lid opener relay
   Inspection ..... below



Inspection

1. Remove the trunk lid opener relay. (Refer above.)
2. Apply battery voltage and check for continuity between the relay terminals.

B+: Battery positive voltage

Connection		A	B	C	D
B+	Ground				
—	—	O—O			
A	B			O—O	

O—O: Continuity

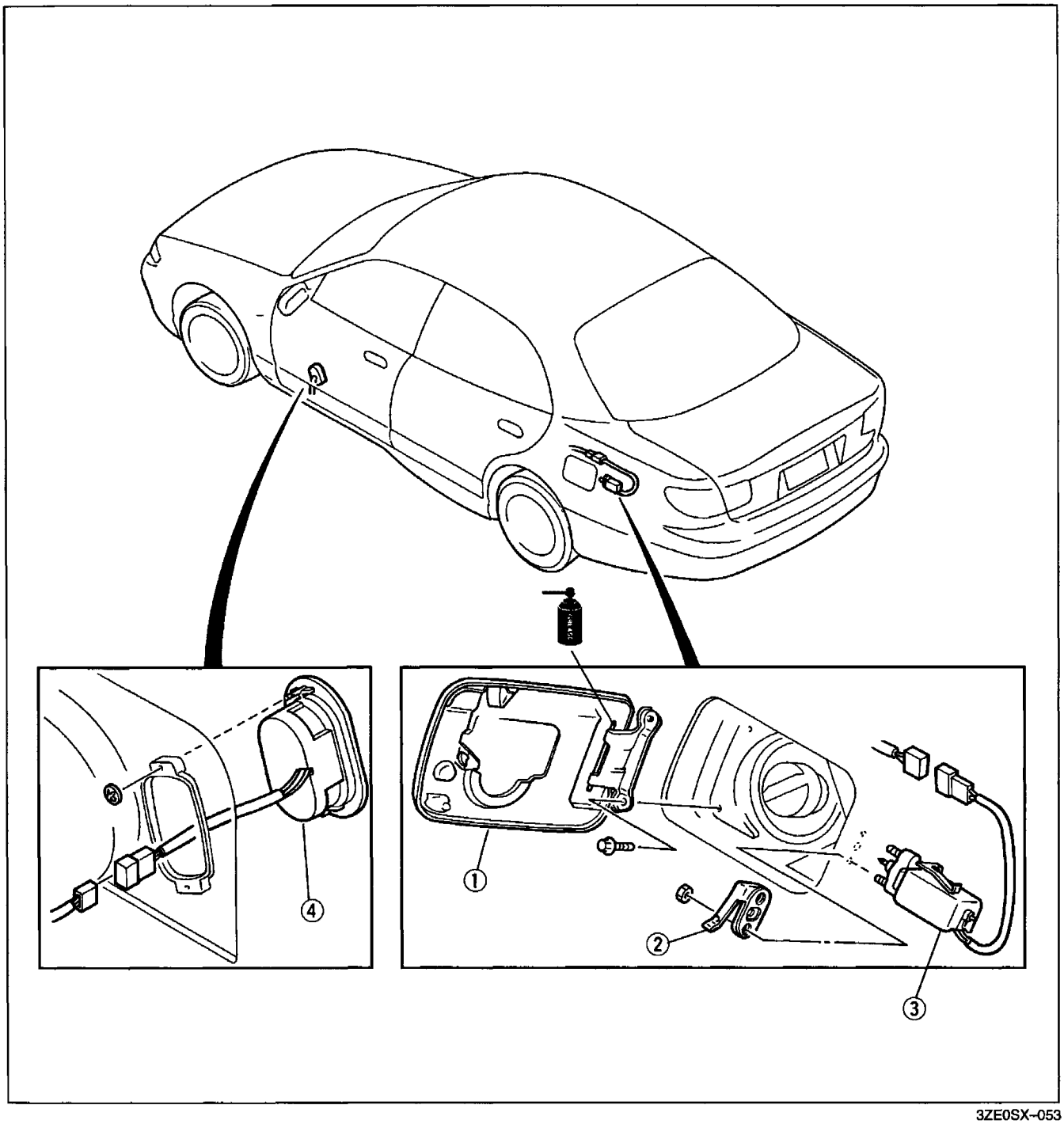
3. If not as specified, replace the trunk lid opener relay.

FUEL-FILLER LID AND OPENER

FUEL-FILLER LID AND OPENER

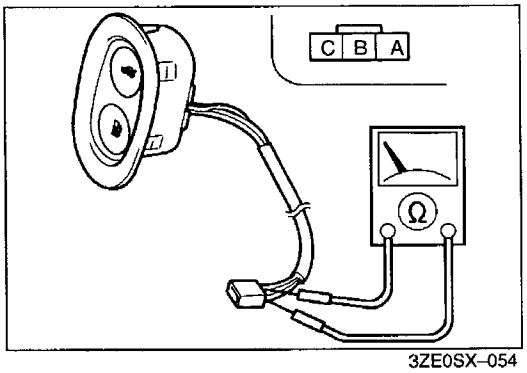
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure. To remove the fuel-filler lid opener, remove the trunk side trim. (Refer to page S–103.) To remove the fuel-filler lid opener switch, remove the front door trim. (Refer to page S–105.)
3. Install in the reverse order of removal.



3ZE0SX–053

1. Fuel-filler lid
2. Lift spring
3. Fuel-filler lid opener
   Inspection ..... page S–38
4. Fuel-filler lid opener switch
   Inspection ..... page S–38



3ZE0SX-054

FUEL-FILLER LID OPENER SWITCH

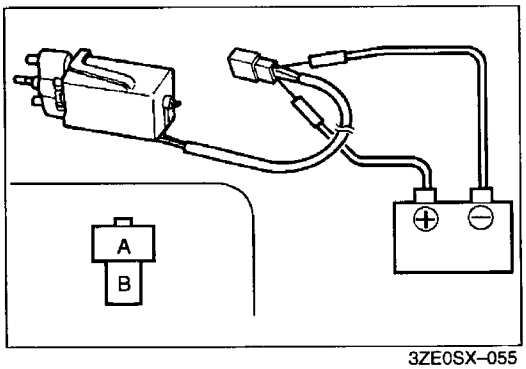
Inspection

1. Remove the fuel-filler lid opener switch. (Refer to page S–37.)
2. Check for continuity between the terminals of the fuel-filler lid opener switch.

Switch condition \ Terminal	A	B	C
Pressed	O		O
Released			

O—O: Continuity

3. If not as specified, replace the fuel-filler lid opener switch.



3ZE0SX-055

FUEL-FILLER LID OPENER

Inspection

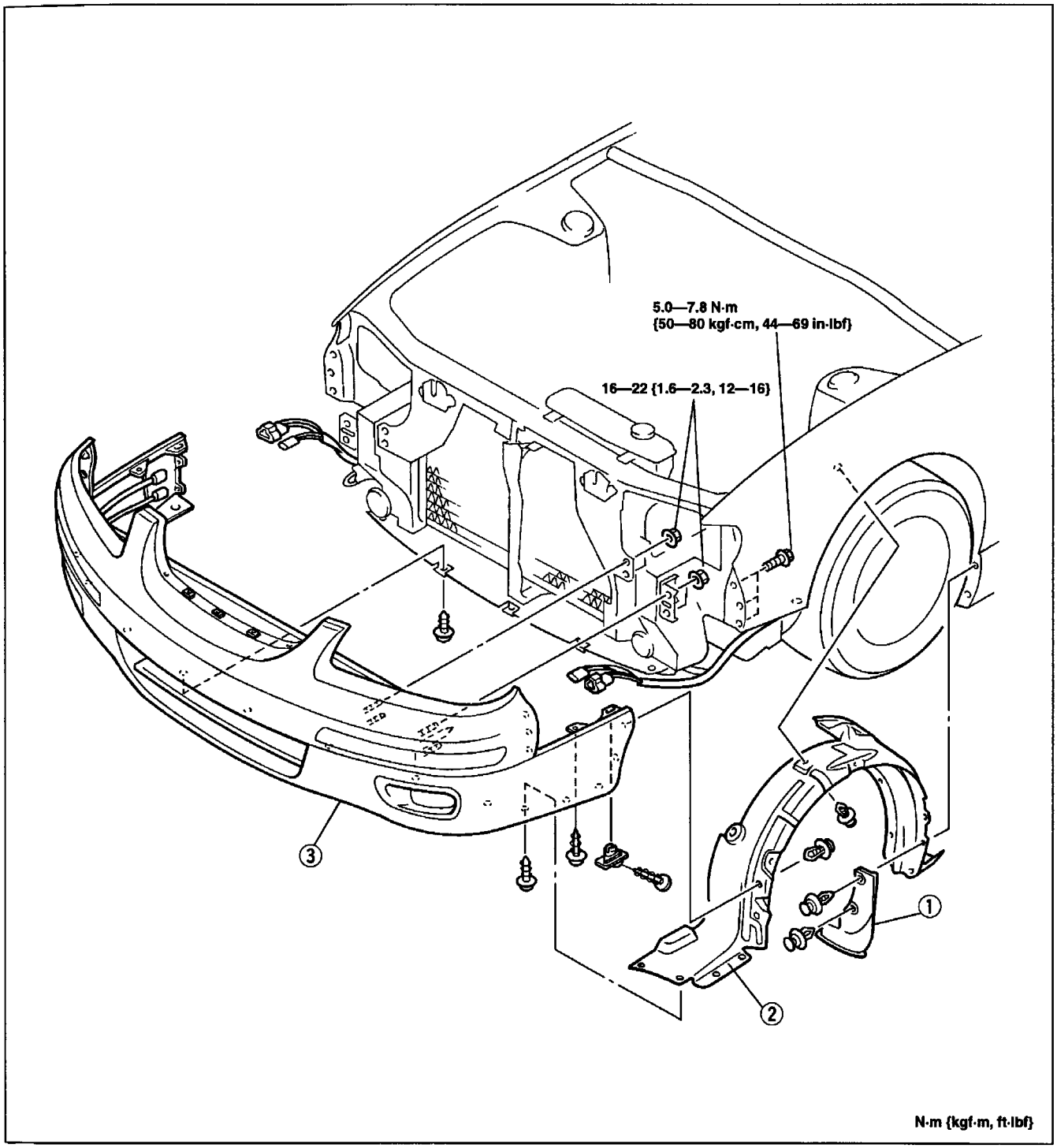
1. Remove the fuel-filler lid opener. (Refer to page S–37.)
2. Connect battery voltage to terminal A and ground to terminal B of the fuel-filler lid opener connector. Verify that the filler lid opener operates.
3. If not as specified, replace the fuel-filler lid opener.

BUMPER

FRONT BUMPER

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure. To remove the mud guard, remove the front side step molding. (Refer to page S–56.) To remove the front bumper, remove the fresh air duct (Refer to section F.), radiator grille (Refer to page S–43.), and headlight. (Refer to section T.)
3. Install in the reverse order of removal.

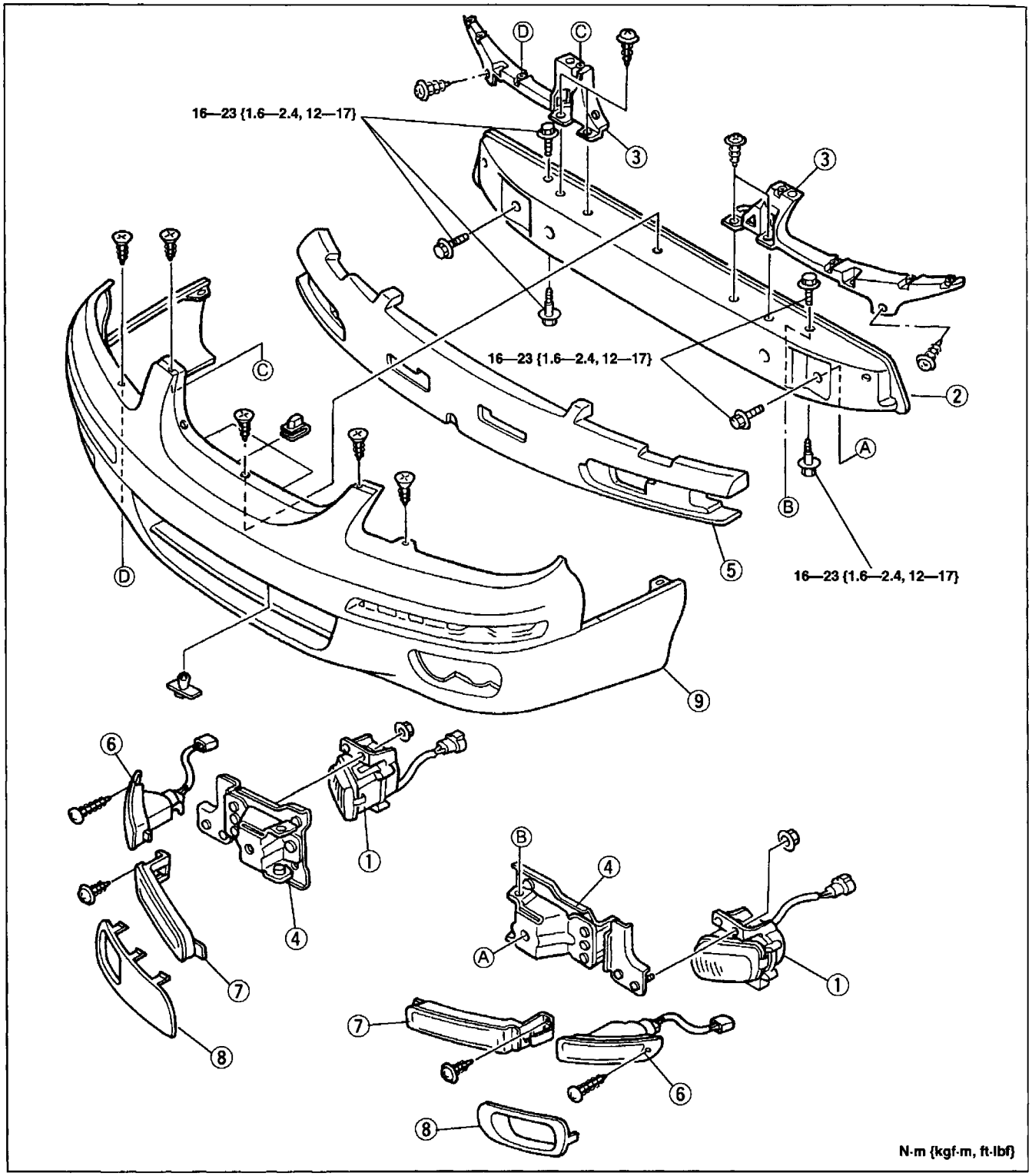


3ZE0SX–056

1. Front flap
2. Mud guard
3. Front bumper
   Disassembly / Assembly ..... page S–40

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



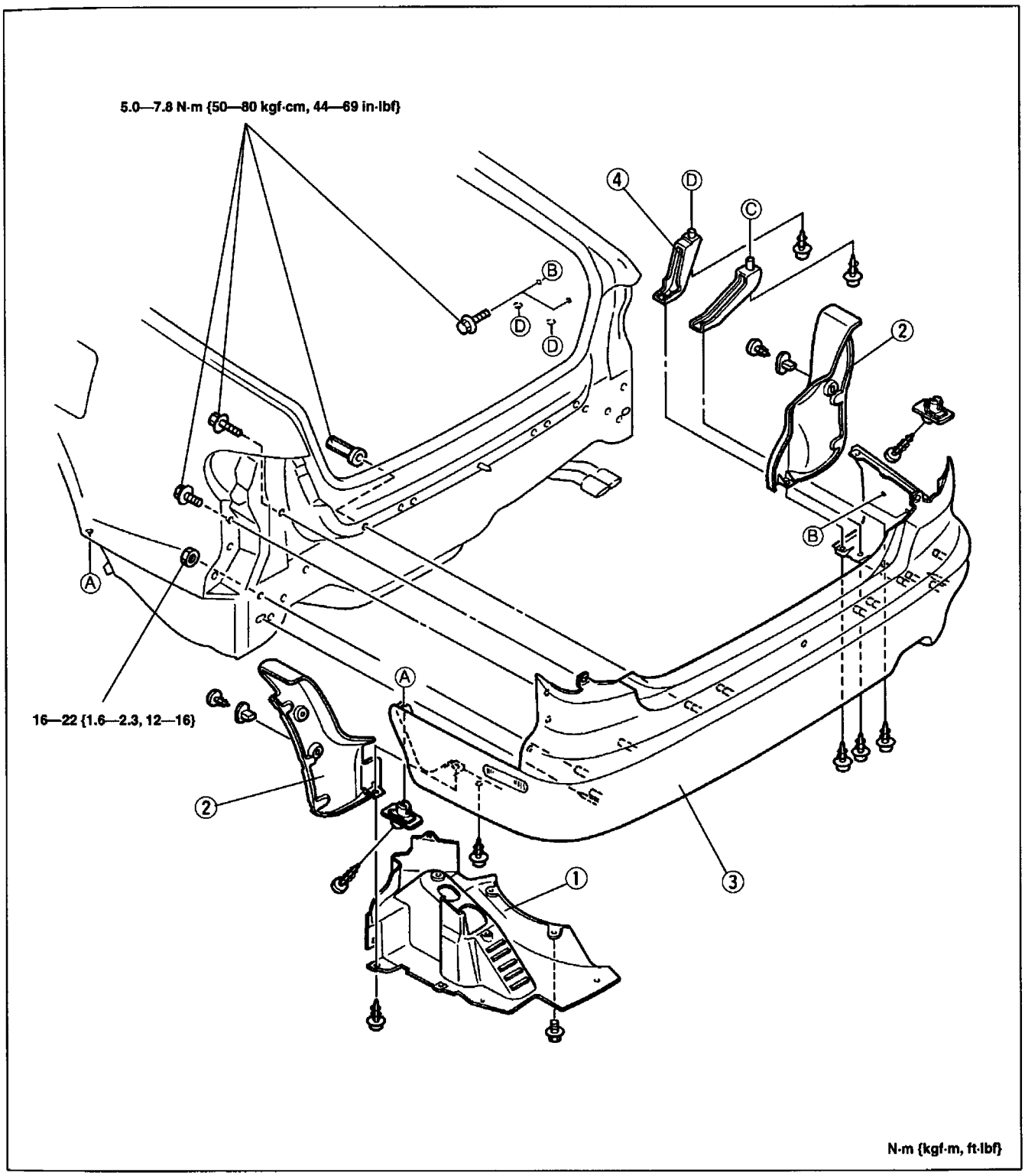
3ZE0SX-057

1. Front fog light
   Removal / Installation ..... section T
2. Front bumper reinforcement
3. Bracket
4. Front bumper stay
5. Energy-absorbing foam
6. Front turn light
   Removal / Installation ..... section T
7. Reflector
8. Cover
9. Front bumper fascia

REAR BUMPER

Removal / Installation

1. Remove in the order shown in the figure. To remove the rear bumper, remove the trunk side trim (Refer to page S–103.), and rear combination light (Refer to section T.), and solar ventilation fan. (Refer to section U.)
2. Install in the reverse order of removal.

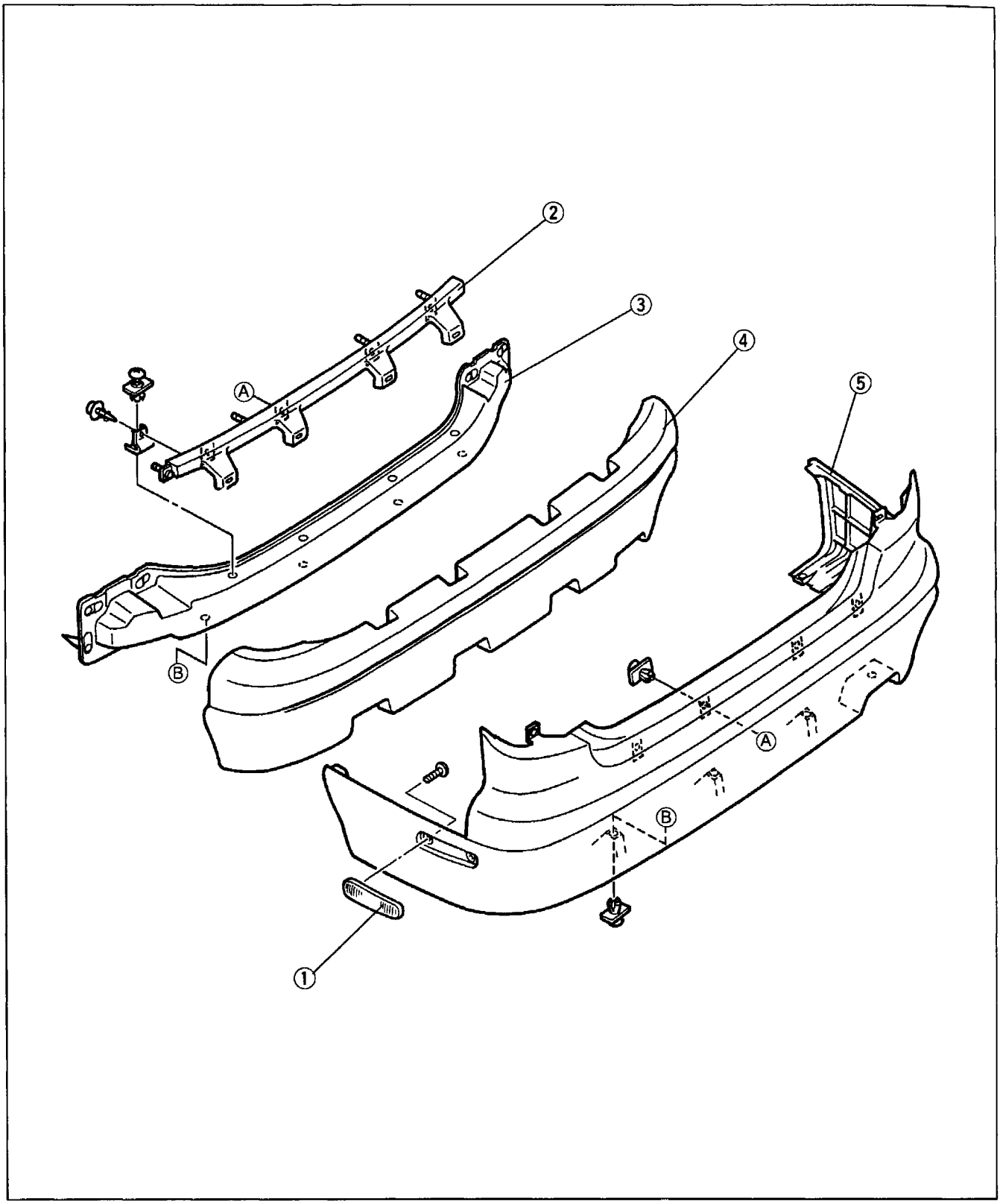


3ZU0SX–011

1. Under cover
2. Splash shield
3. Rear bumper
   Disassembly / Assembly ..... page S–42
4. Bracket

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



3ZU0SX-012

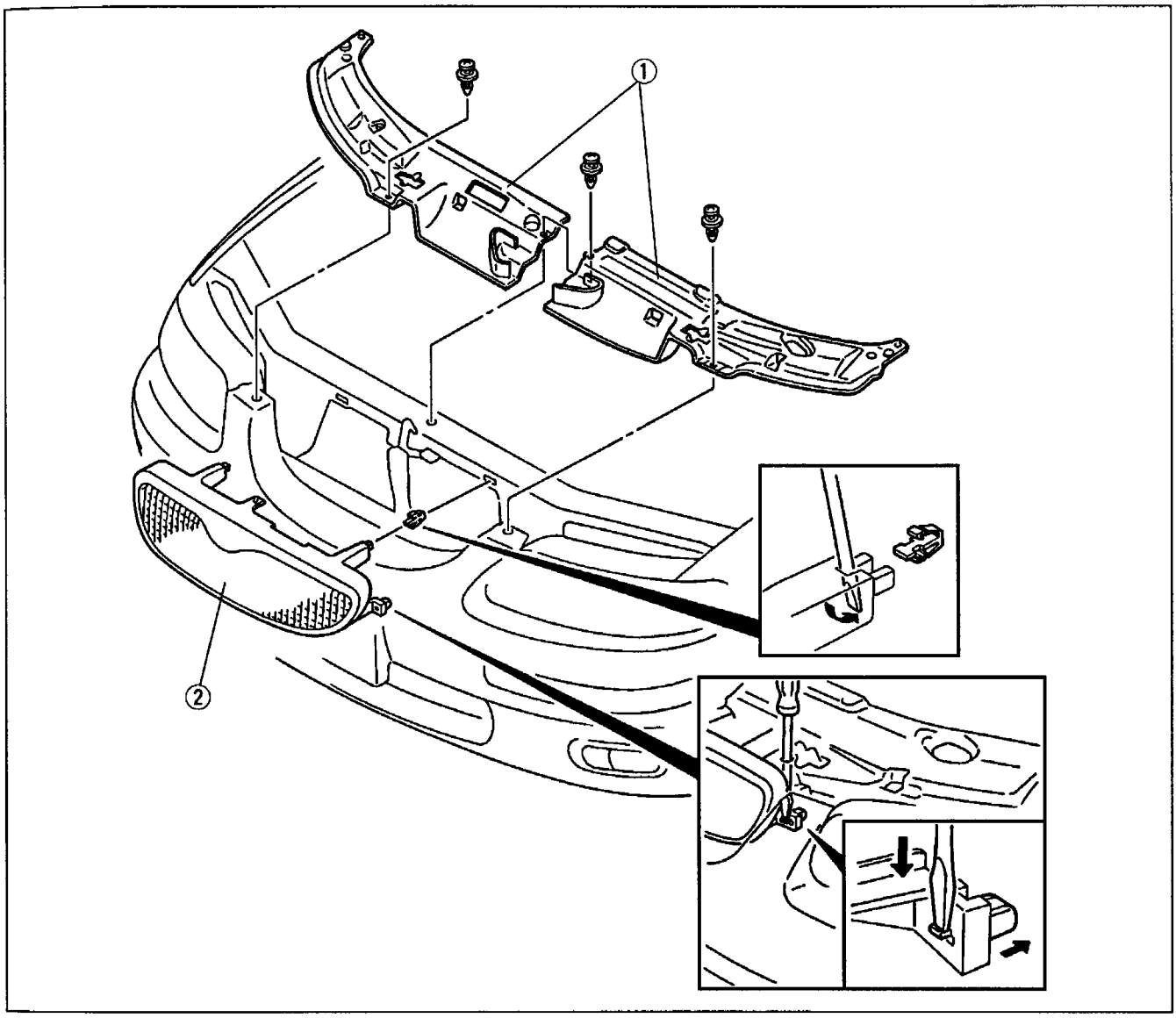
1. Reflector
2. Rear bumper retainer
3. Rear bumper reinforcement
4. Energy-absorbing foam
5. Rear bumper fascia

RADIATOR GRILLE

RADIATOR GRILLE

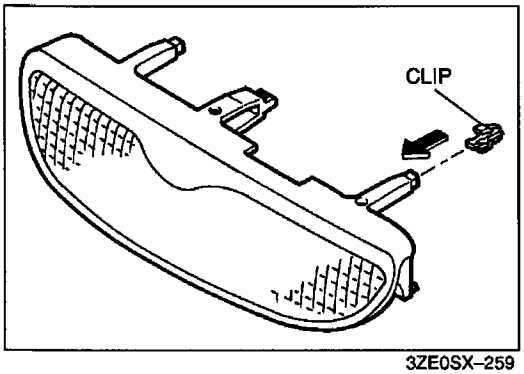
Removal / Installation

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



3ZU0SX–013

1. Upper seal board
2. Radiator grille
   Installation note ..... below



3ZE0SX–259

Installation note

Radiator grille

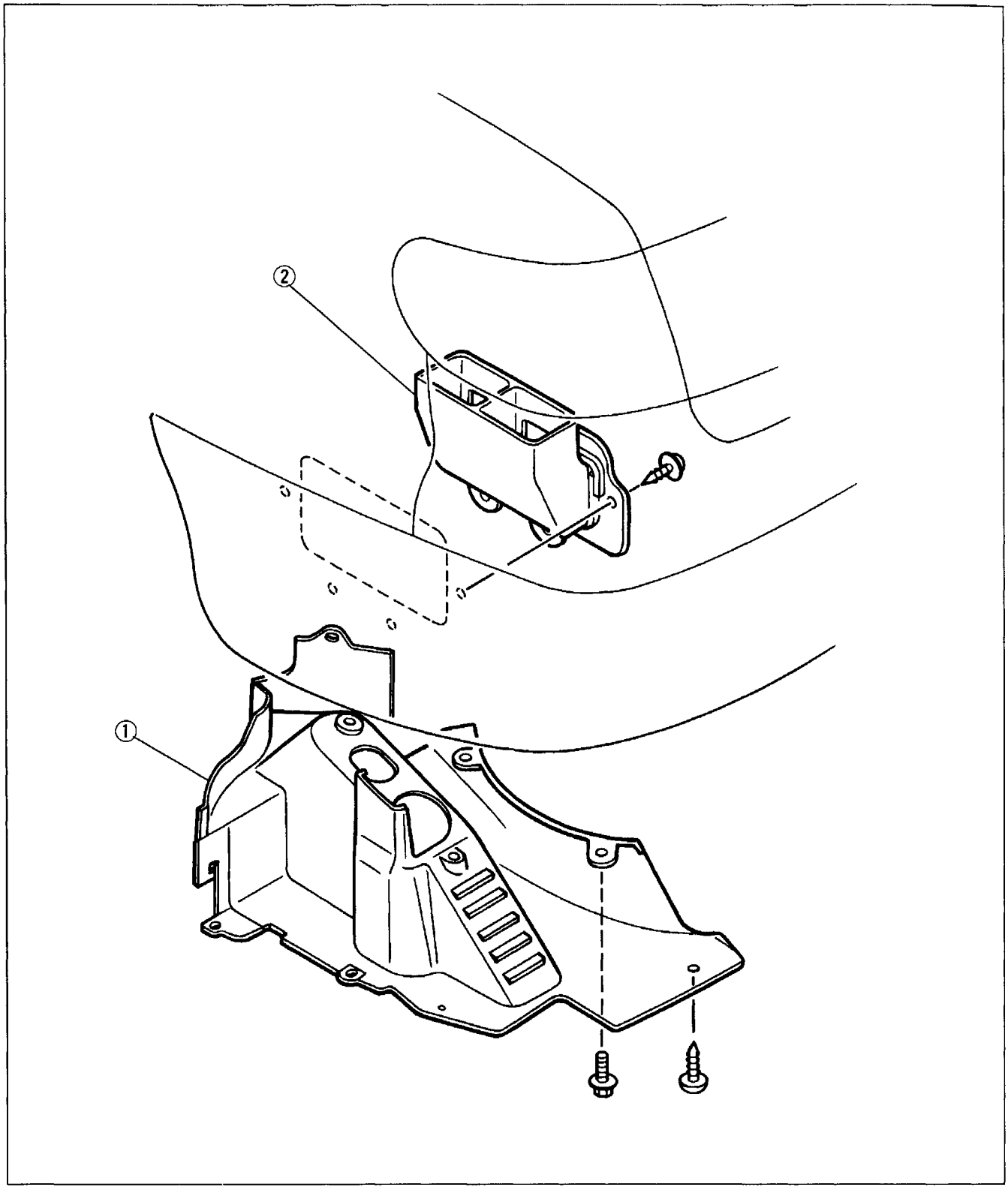
Install the clips to the radiator grille before installing the radiator grille to the body.

EXTRACTOR CHAMBER

EXTRACTOR CHAMBER

Removal / Installation

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



3ZE0SX–061

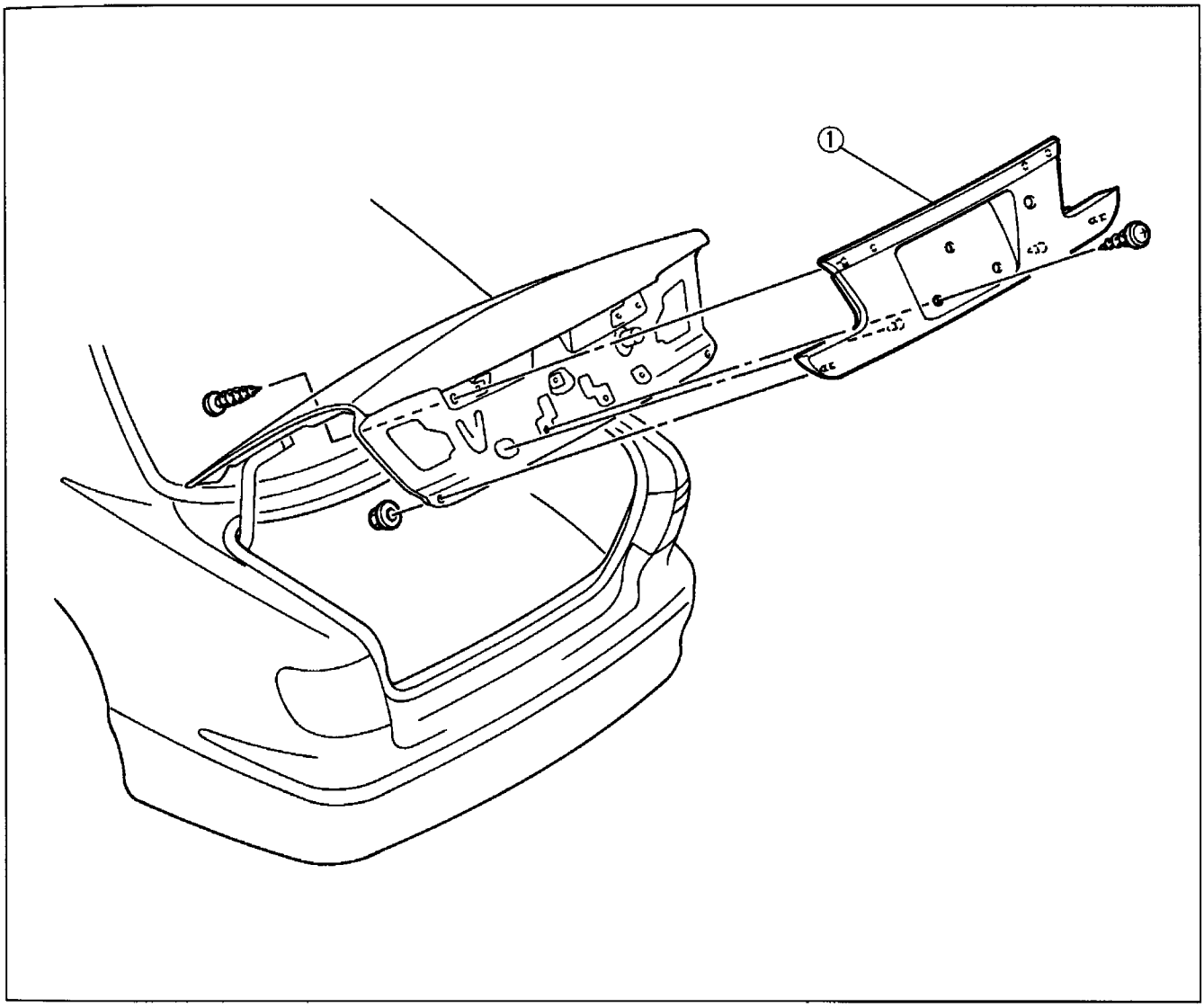
1. Undercover
2. Extractor chamber

REAR FINISHER

REAR FINISHER

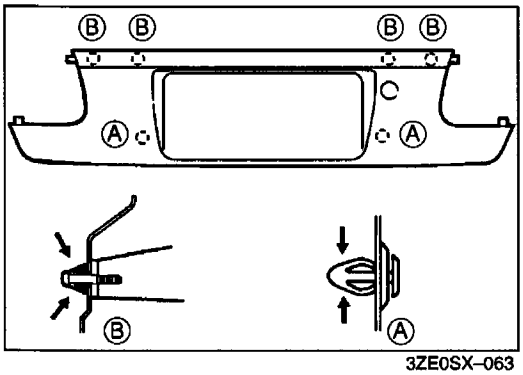
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the trunk lid trim (Refer to page S–104.) and trunk lid light (Refer to section T.).
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



3ZE0SX–062

1. Rear finisher
   Removal note ..... below



3ZE0SX–063

Removal note

Squeeze the end of the clips and push forward to disengage them.

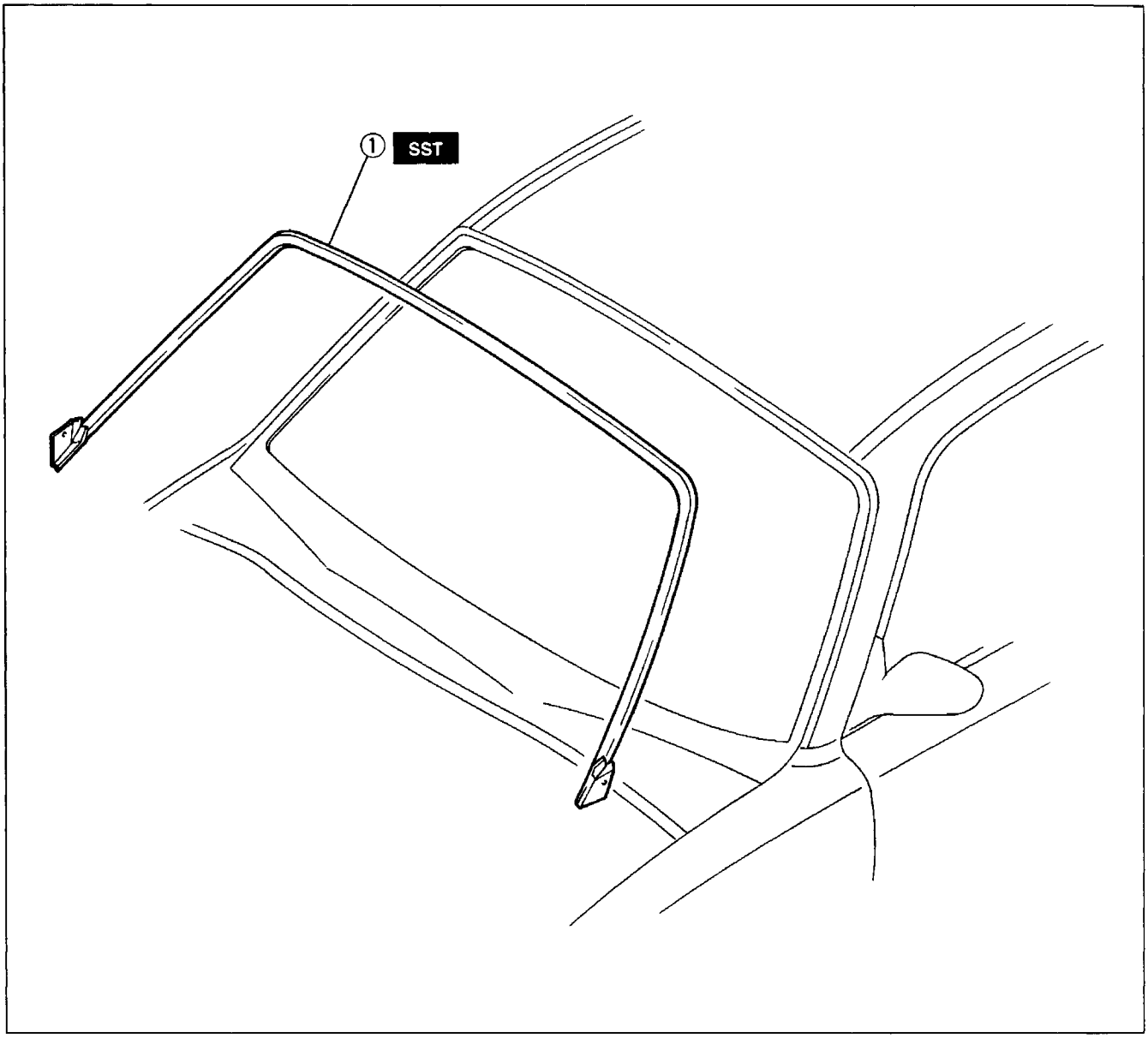
MOLDING

PREPARATION
SST

49 0305 870A Tool set, window		For installation of windshield molding

3ZE0SX-064

WINDSHIELD MOLDING
Removal / Installation
1. Remove as shown in the figure.
2. Install in the reverse order of removal.

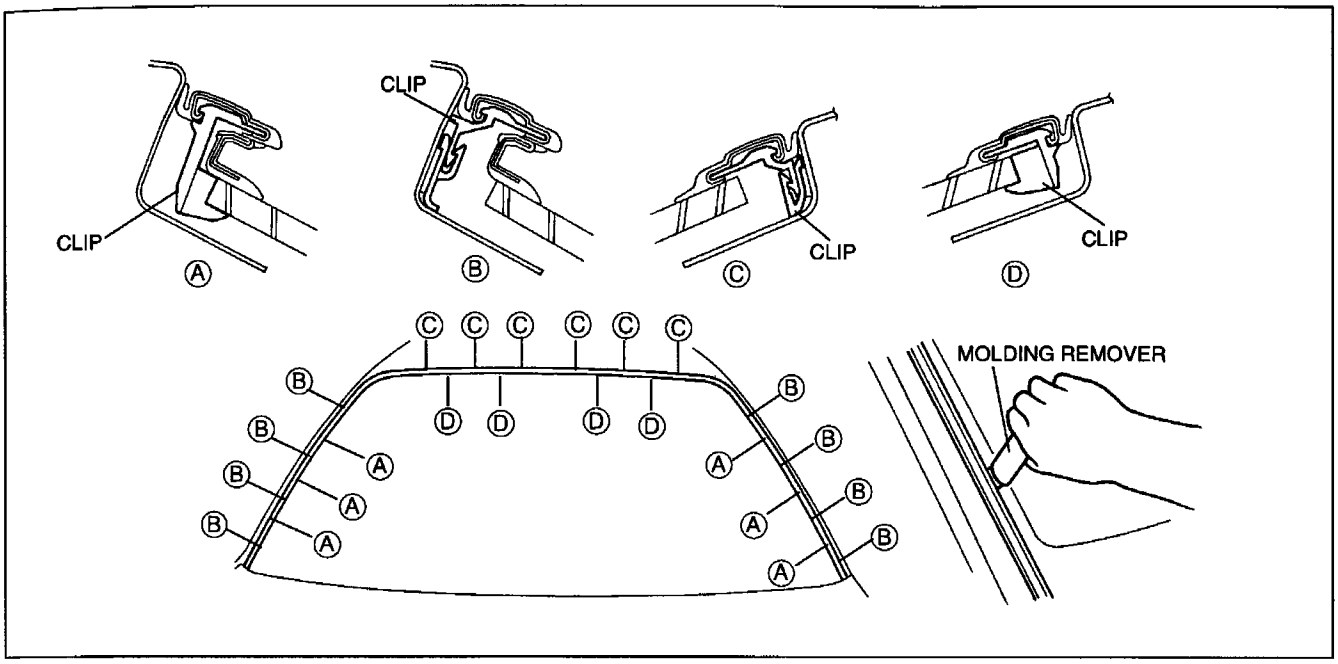


3ZE0SX-065

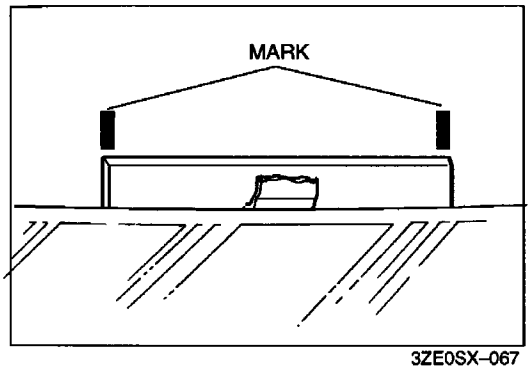
1. Windshield molding
   Removal note ..... page S–47
   Installation note ..... page S–47

Removal note

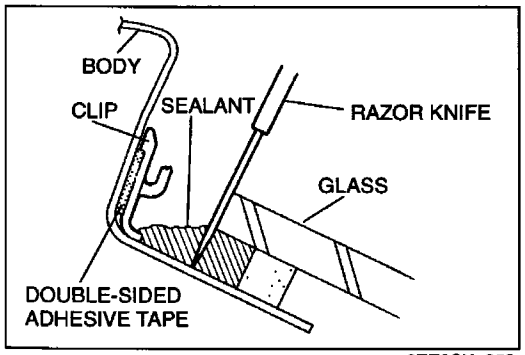
Use a molding remover to remove the windshield molding.



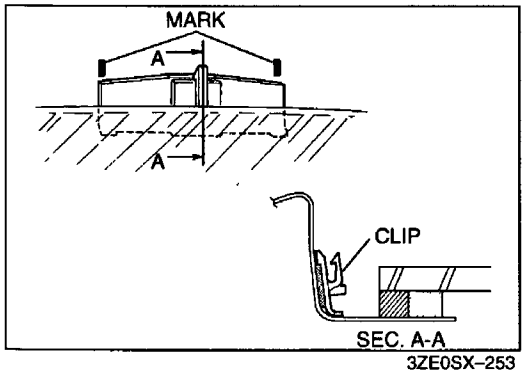
3ZE0SX–066



3ZE0SX–067



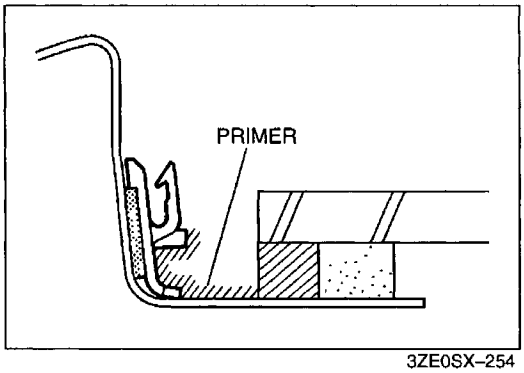
3ZE0SX–252



3ZE0SX–253

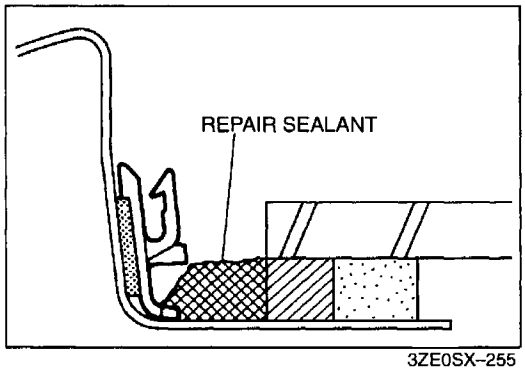
Installation note

1. Verify that the clips on the body and the molding are not damaged. If they are damaged, replace them as follows:
   (1) Mark the mounting points of the clips.
   (2) Remove the clips from the body. If necessary, cut the sealant with a razor knife to remove the clips. Do not cut the sealant between the glass and the body.
   (3) Remove the double-side adhesive tape while heating it with a hot-air blower.
   (4) Clean and degrease the adhesion surface of the body. Remove any remaining sealant that is not between the glass and the body.
   (5) Stick the clips at the marks on the body.



3ZE0SX-254

(6) Apply primer to the shaded area as shown in the figure and allow it to dry for approximately **30 minutes**. Keep the area free of dirt and grease, and do not touch the surface.

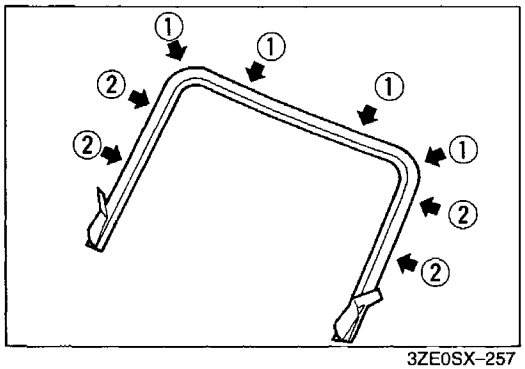


3ZE0SX-255

(7) Apply a bead of repair sealant as shown. If necessary, reshape the repair sealant with a spatula.

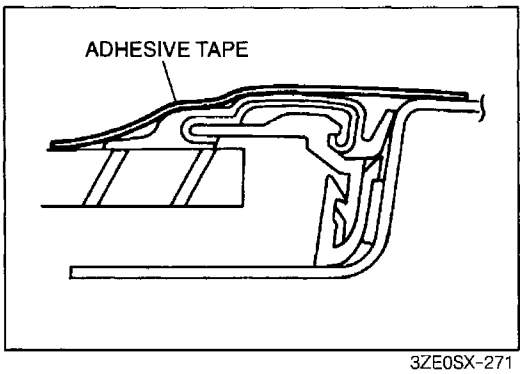
Hardening time of repair sealant

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



3ZE0SX-257

2. Align the upper corners of the molding and attach the upper clips ① to the body.
3. Working from top to bottom, attach the side clips ②.



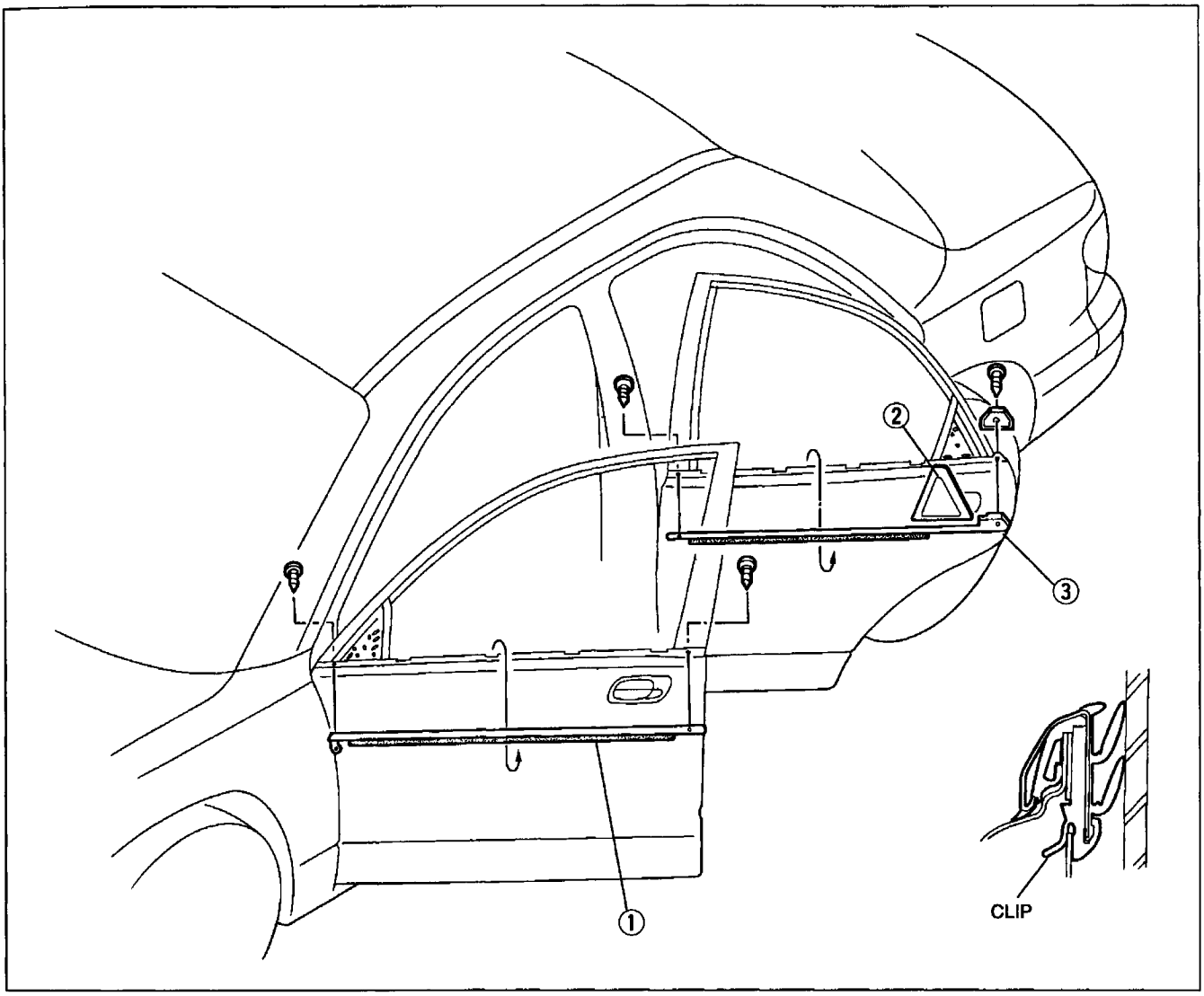
3ZE0SX-271

4. After installing the molding, check for gaps between the body and the molding and between the glass and the molding. If there is a gap, secure the molding with adhesive tape until the repair sealant hardens.

BELTLINE MOLDING

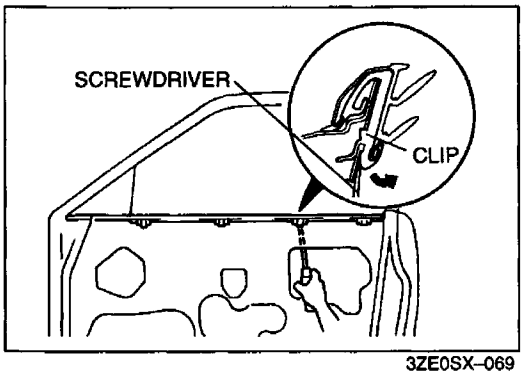
Removal / Installation

1. Open the door glass fully.
2. Remove in the order shown in the figure. To remove the front beltline molding, remove the power outside mirror (Refer to page S–59.) and door glass (Refer to page S–10.). To remove the rear beltline molding, remove the rear door glass. (Refer to page S–11.)
3. Install in the reverse order of removal.



3ZE0SX–068

1. Front beltline molding
   Removal note ..... below
2. Outer garnish
3. Rear beltline molding
   Removal note ..... below



3ZE0SX–069

Removal note

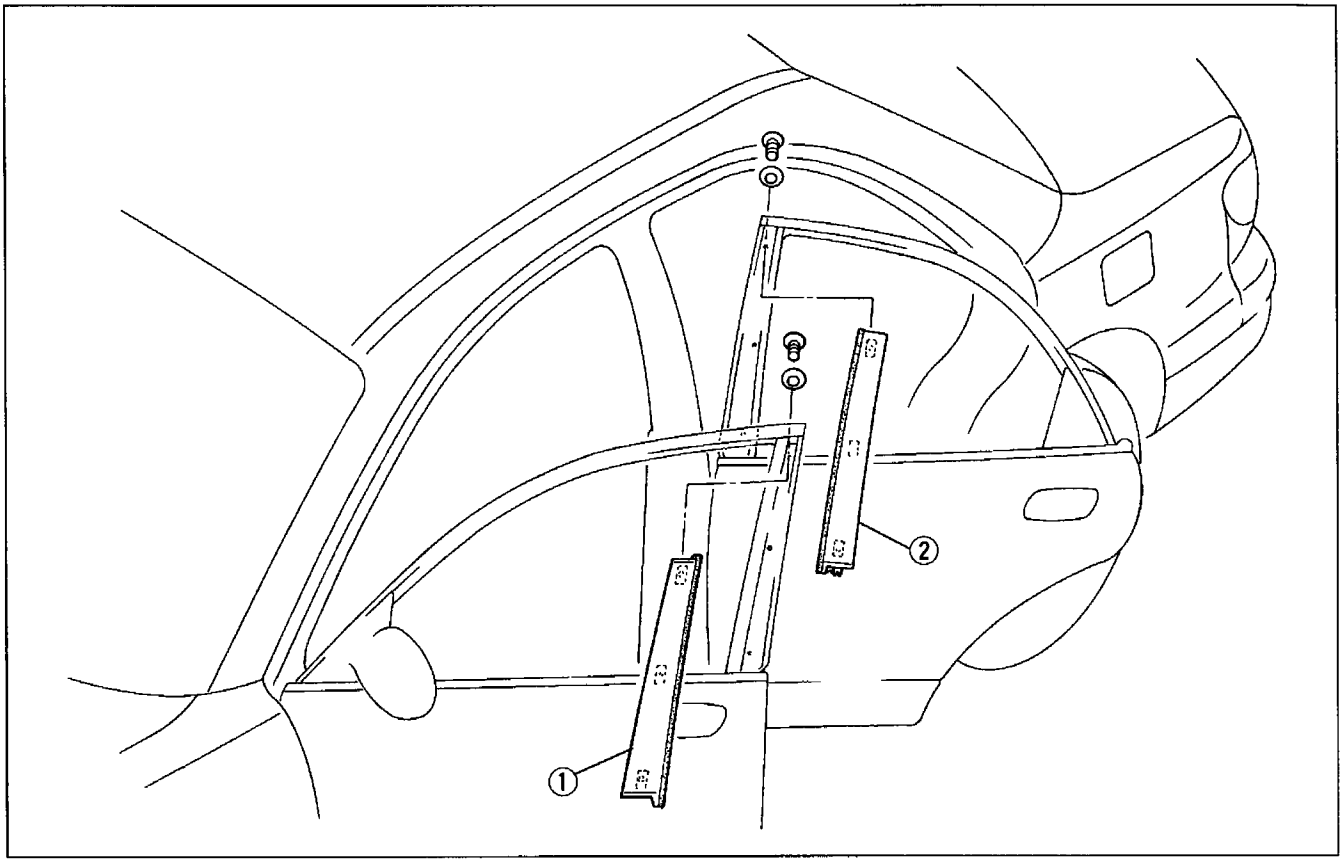
Front and rear beltline molding

1. Remove the installation screws.
2. Insert a screwdriver which has been wrapped in tape under the clip as shown. Lift the screwdriver and pull up on the molding to remove it.

PILLAR MOLDING

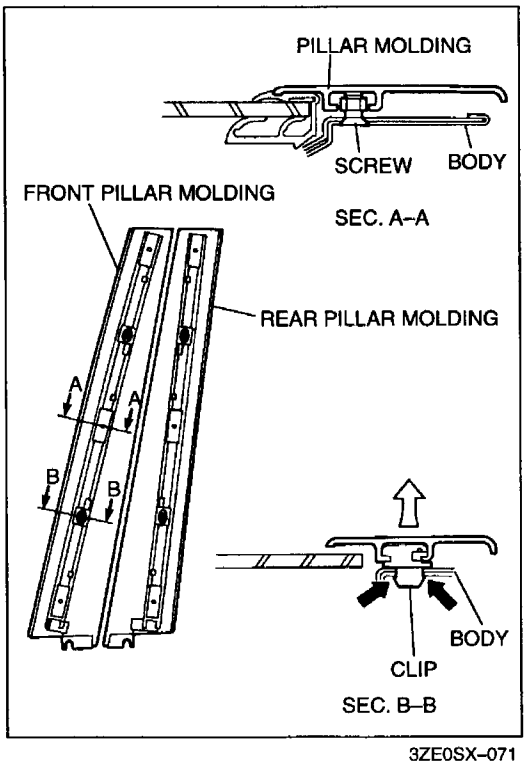
Removal / Installation

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



3ZE0SX–070

1. Front pillar molding
   Removal note ..... below
2. Rear pillar molding
   Removal note ..... below



3ZE0SX–071

Removal note

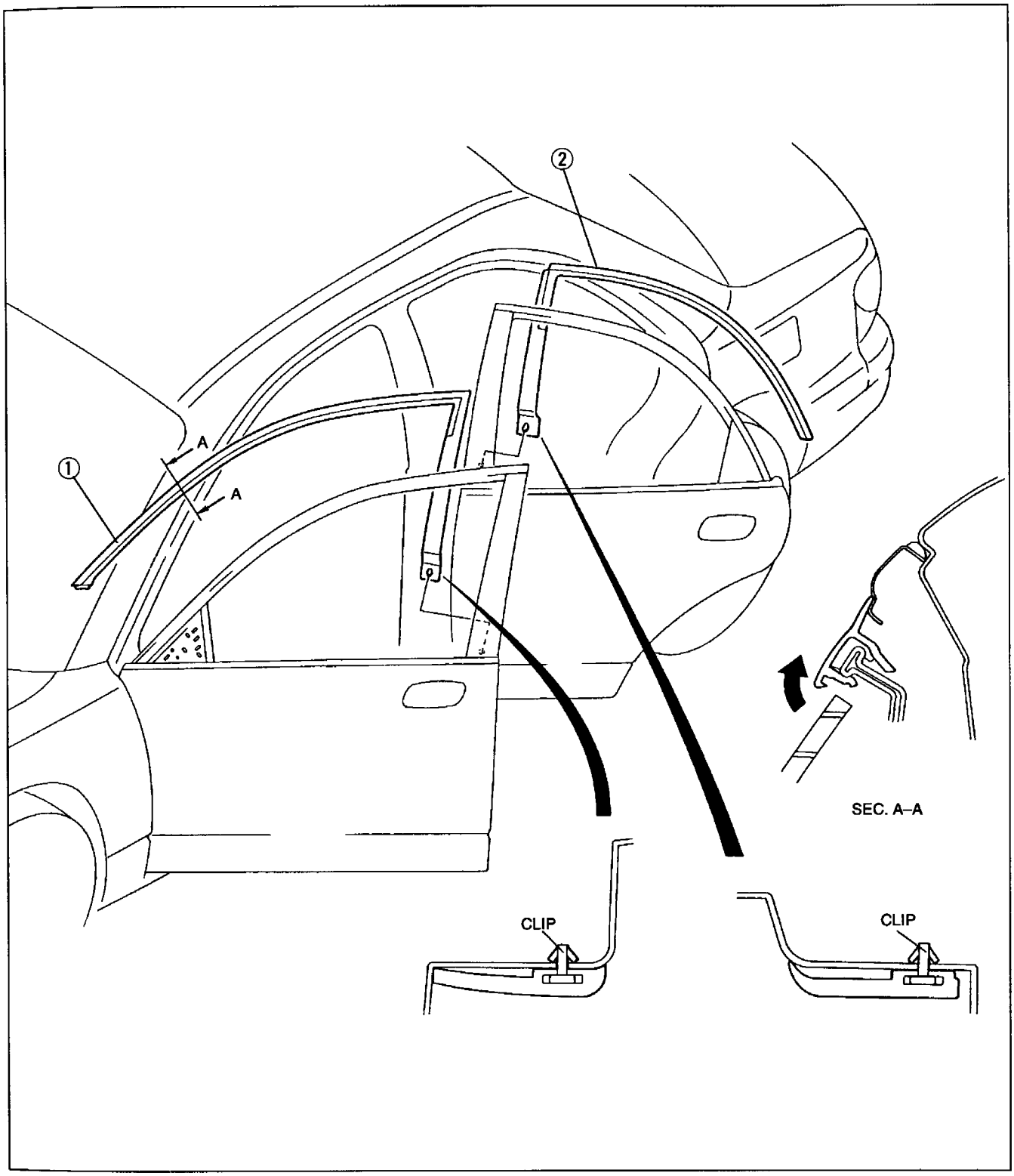
Front and rear pillar molding

1. Peel back the weatherstrip and remove the pillar molding installation screws.
2. Squeeze the top and bottom catches on the pillar molding clips, and push the pillar molding forward.

SASH MOLDING

Removal / Installation

1. Remove in the order shown in the figure. To remove the front sash molding, remove the front beltline molding (Refer to page S–49.), front pillar molding (Refer to page S–50.), and power outside mirror (Refer to page S–59.). To remove the rear sash molding, remove the rear beltline molding (Refer to page S–49.) and rear pillar molding (Refer to page S–50.).
2. Install in the reverse order of removal.



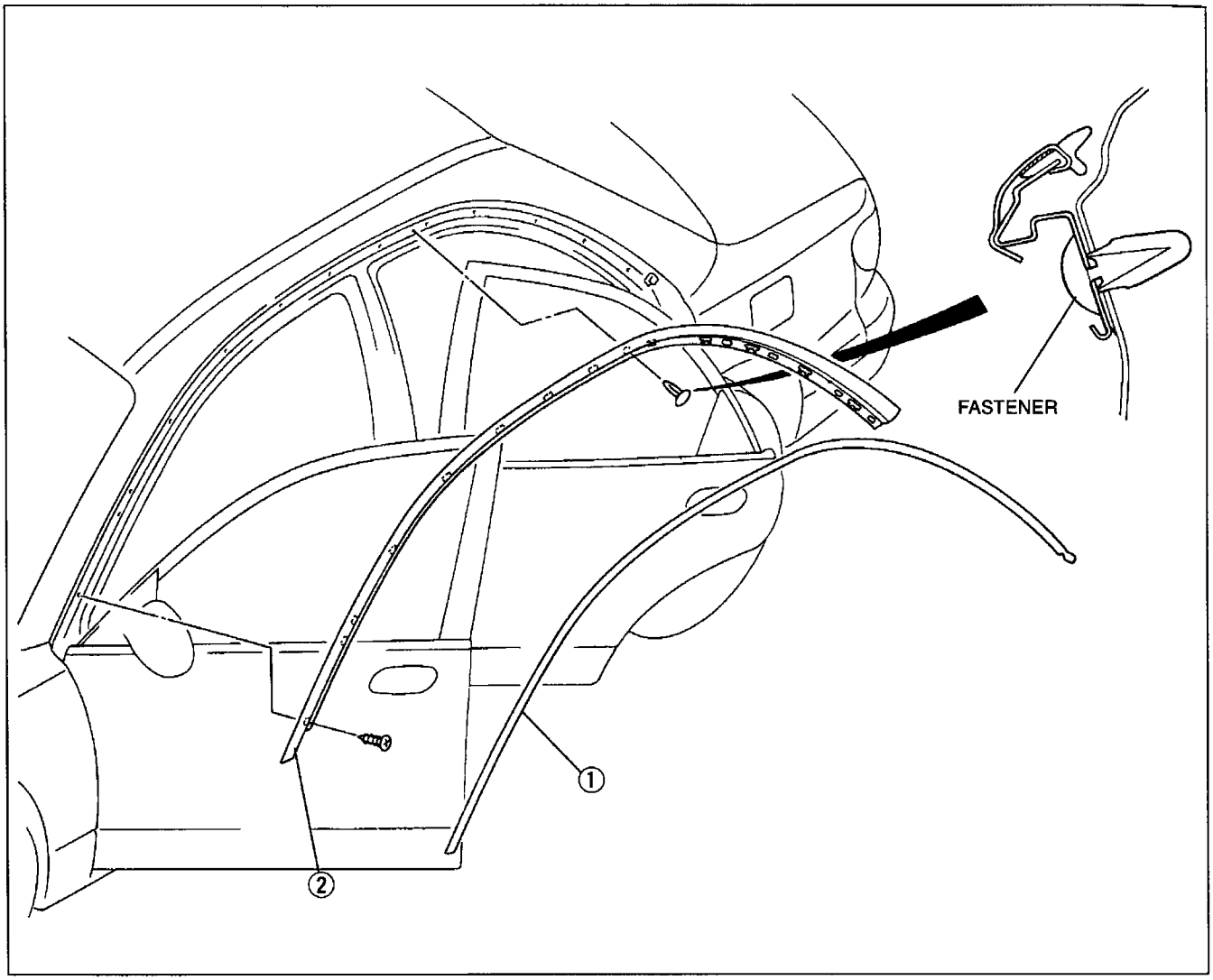
3ZE0SX–072

1. Front sash molding
2. Rear sash molding

DRIP MOLDING

Removal / Installation

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



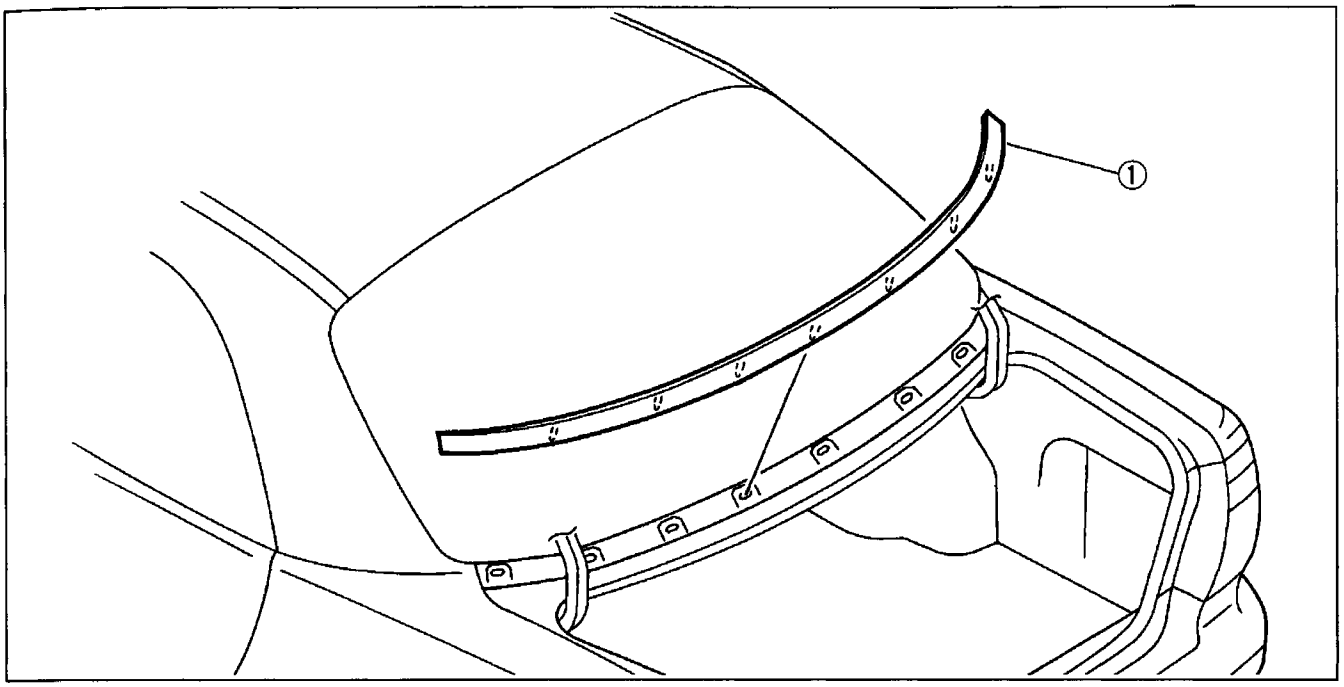
3ZE0SX–073

1. Protector
2. Drip molding

REAR WINDOW LOWER MOLDING

Removal / Installation

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



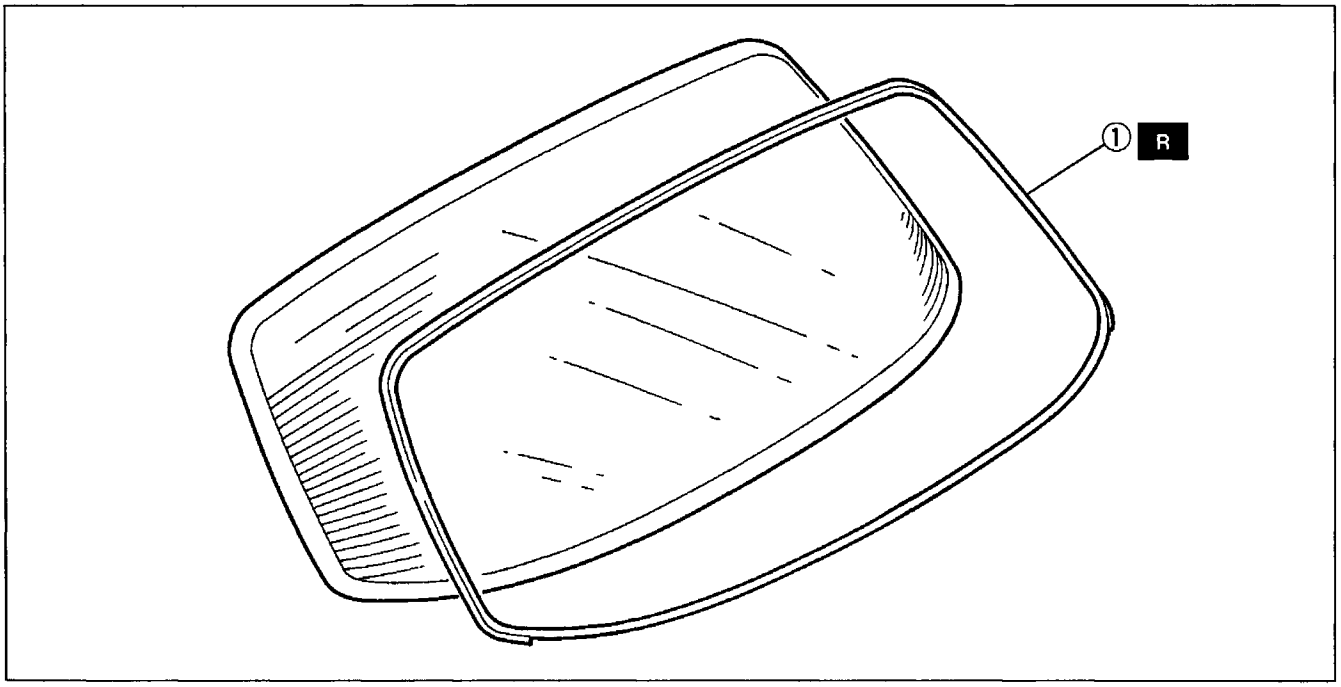
3ZE0SX-074

1. Rear window lower molding

REAR WINDOW MOLDING

Removal / Installation

1. Remove the rear window glass. (Refer to page S–73.)
2. Remove as shown in the figure.
3. Install in the reverse order of removal.



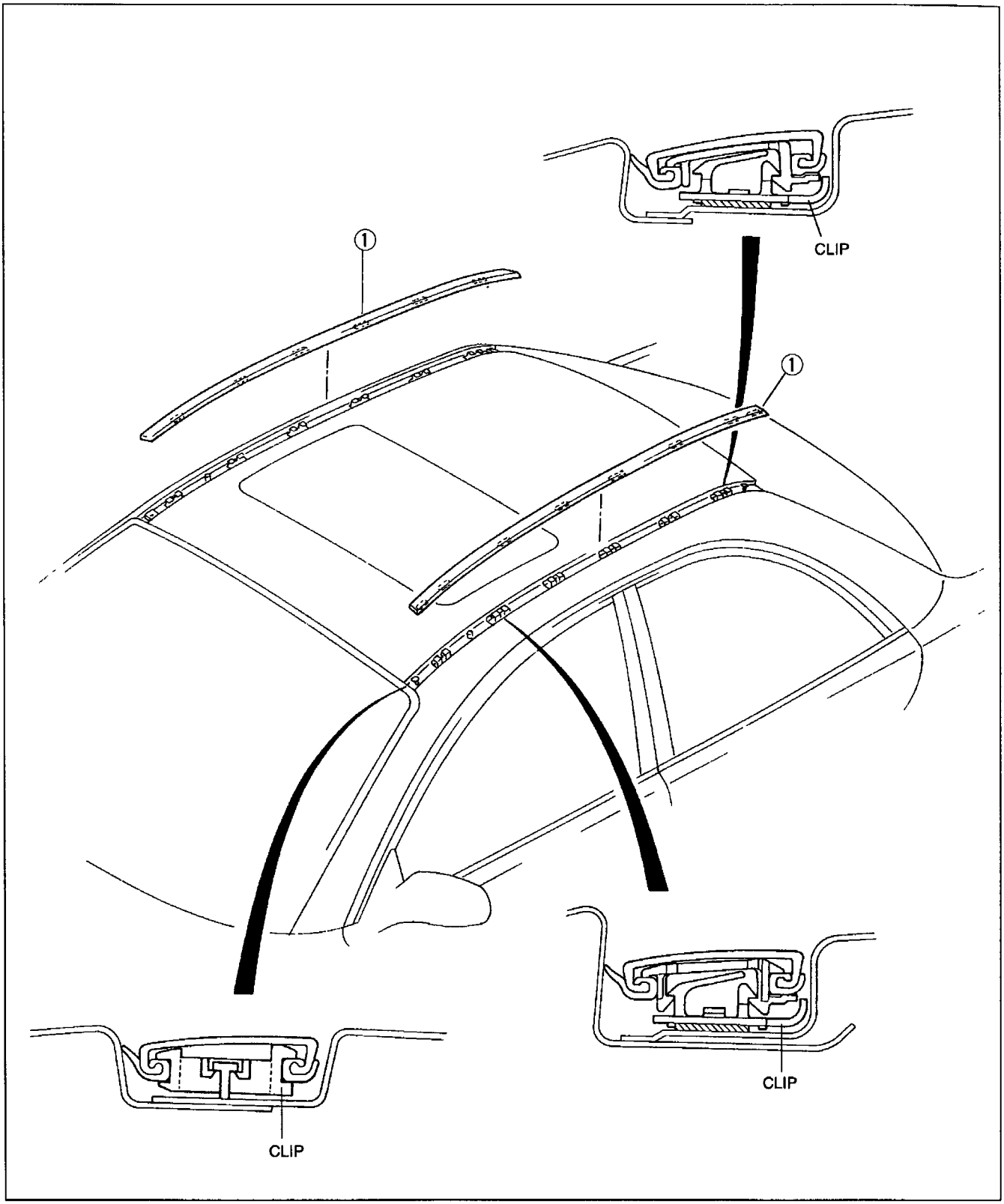
3ZE0SX-075

1. Rear window molding

ROOF MOLDING

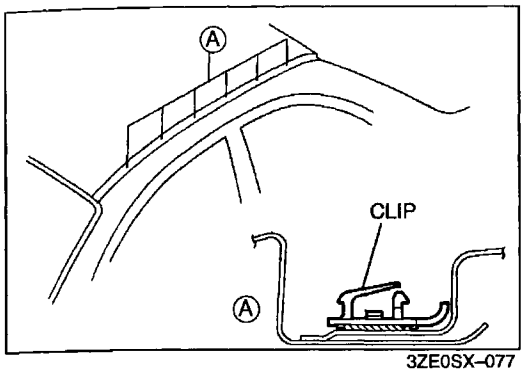
Removal / Installation

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



3ZE0SX-076

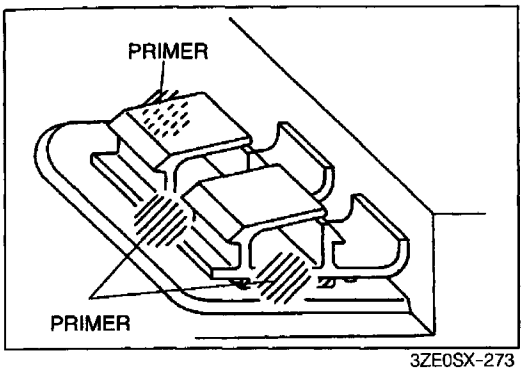
1. Roof molding
   Installation note ..... page S–55



3ZE0SX-077

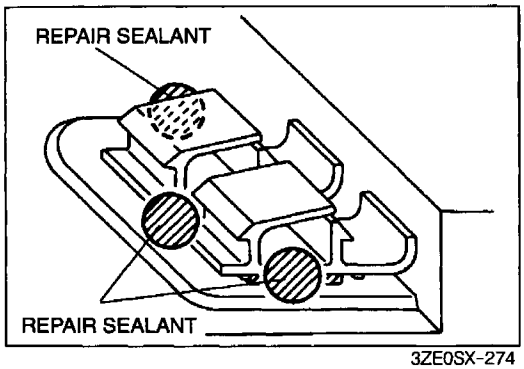
Installation note

1. If a clip is damaged, replace it as follows.
   (1) Mark the position of the clip and then remove it.
   (2) Remove any adhesive remaining on the body.
   (3) Peel off the double-sided tape protectors and align the new clip with the mark made in step 1.



3ZE0SX-273

(4) Apply primer to the shaded area as shown in the figure and allow it to dry for approximately **30 minutes**. Keep the area free of dirt and grease, and do not touch the surface.

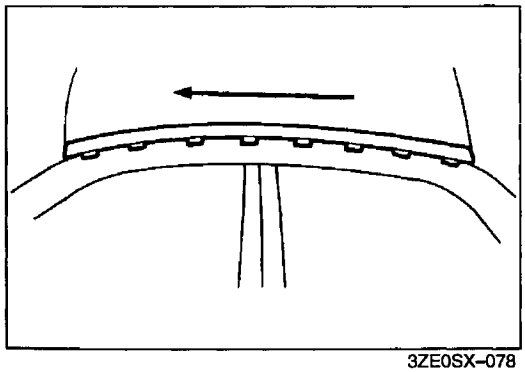


3ZE0SX-274

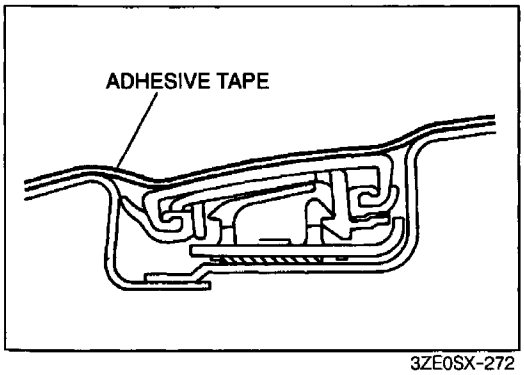
(5) Apply a bead of repair sealant as shown. If necessary, reshape the repair sealant with a spatula.

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


3ZE0SX-078

2. Align the rear end of the molding with the body and press down firmly on the molding.



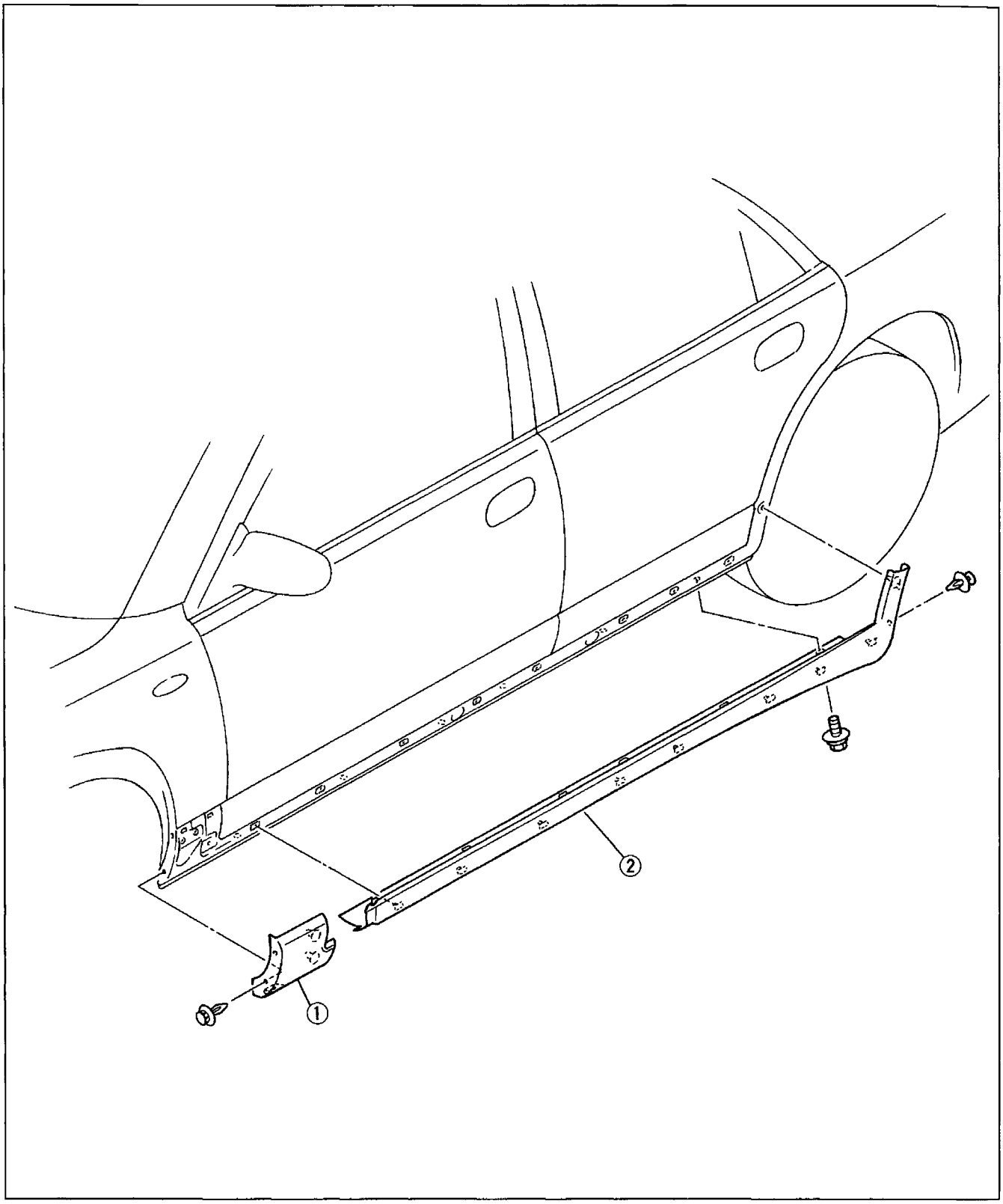
3ZE0SX-272

3. After installing the molding, check for gaps between the body and the molding and between the glass and the molding. If there is a gap, secure the molding with adhesive tape until the repair sealant hardens.

SIDE STEP MOLDING

Removal / Installation

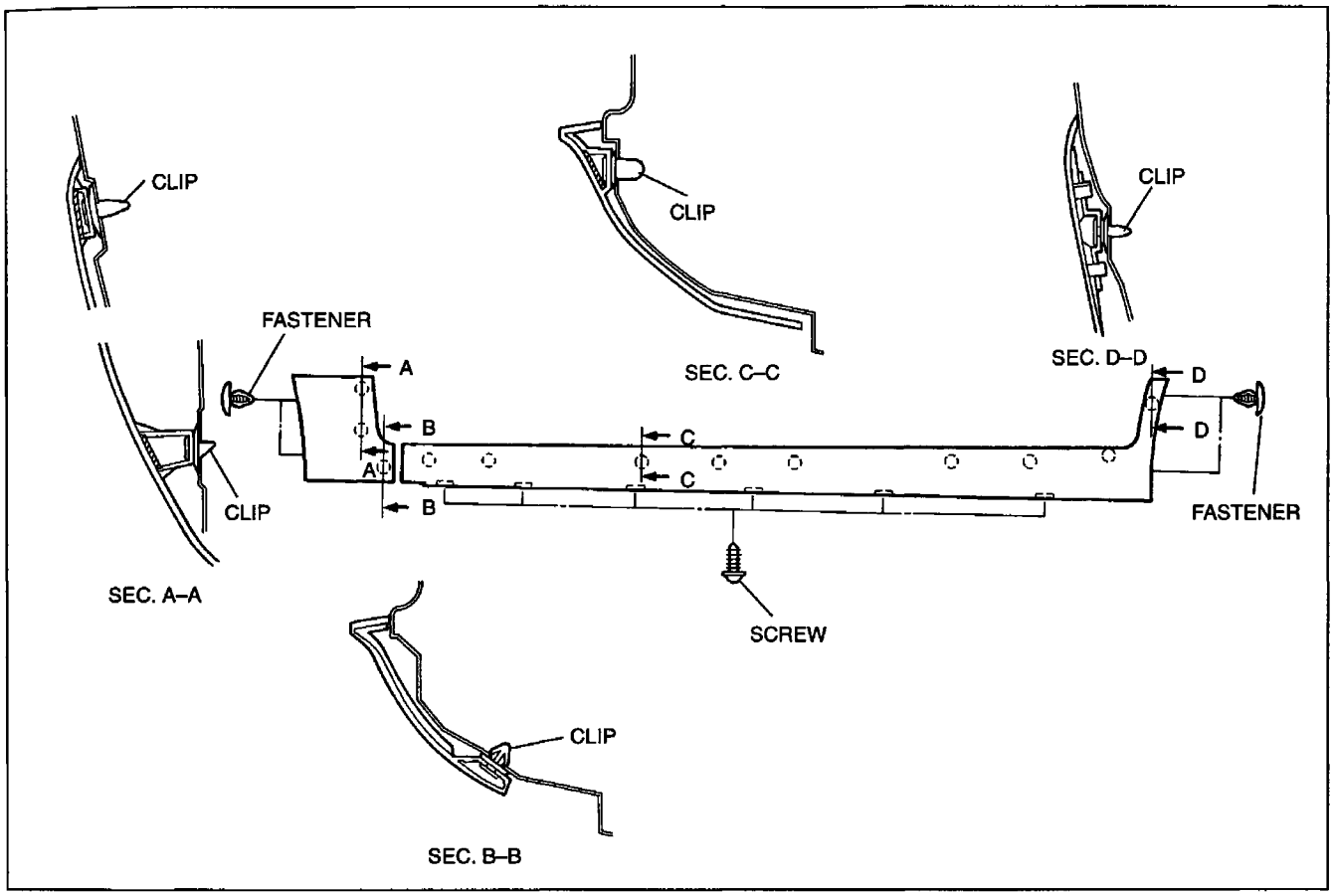
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



3ZE0SX-079

1. Front side step molding
   Removal note ..... page S–57
2. Rear side step molding
   Removal note ..... page S–57

Removal note
Front and rear side step molding
1. Remove the side step molding installation screws and fasteners.
2. Use a fastener remover to remove the side step molding.



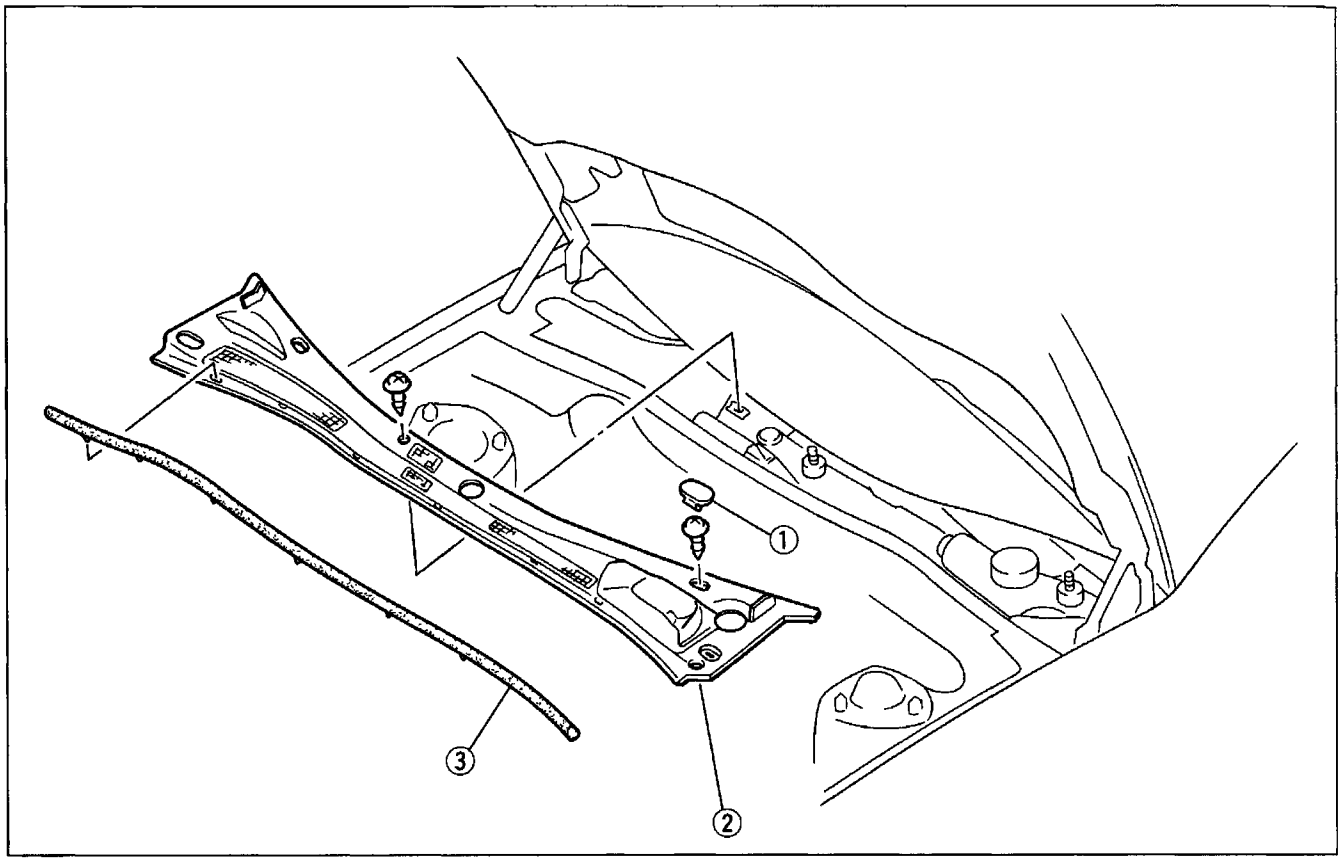
3ZE0SX–081

COWL GRILLE

COWL GRILLE

Removal / Installation

1. Remove the windshield wiper arm and blade. (Refer to section T.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



3ZE0SX-082

1. Cowl cap
2. Cowl grille
3. Cowl seal weatherstrip

POWER OUTSIDE MIRROR

POWER OUTSIDE MIRROR

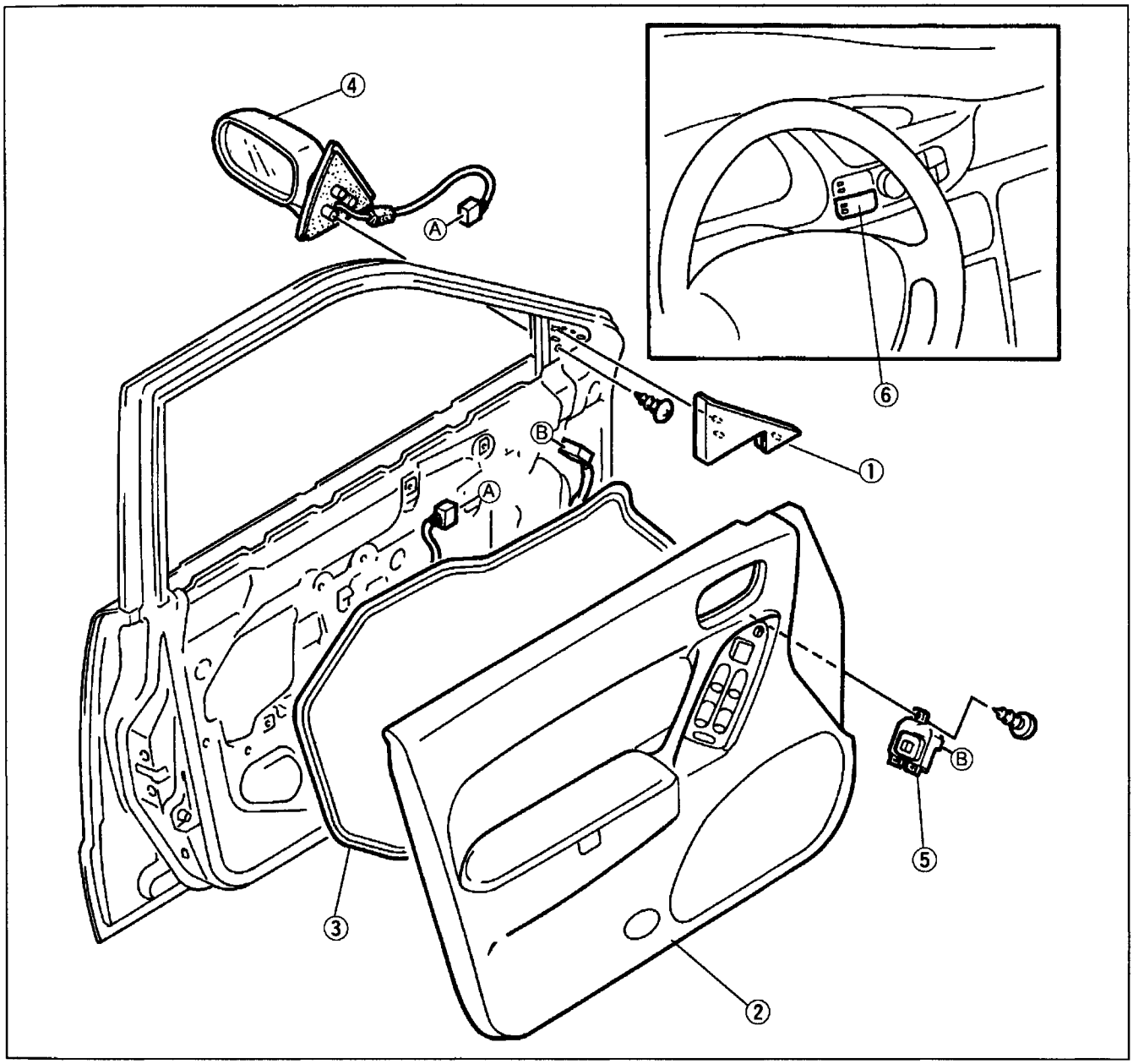
Removal / Installation

1. Disconnect the negative battery cable.

Note

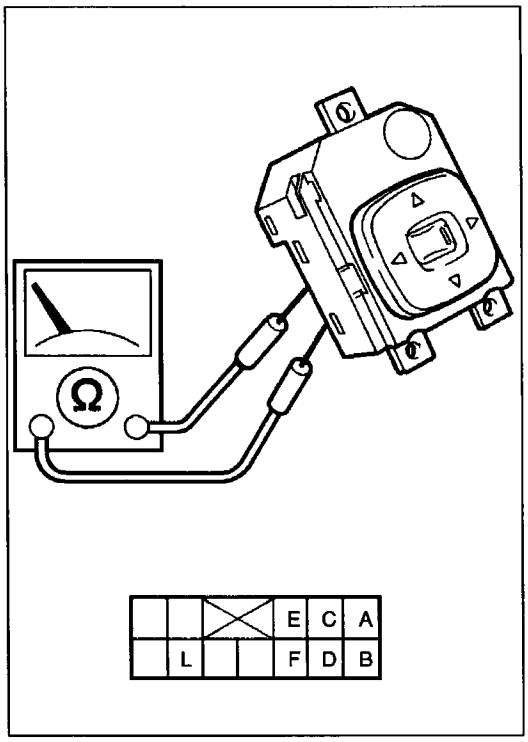
- Remove the door screen carefully so that it may be reused.

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



3ZE0SX-083

1. Inner garnish
2. Front door trim
   Removal / Installation ..... page S-105
3. Door screen
4. Outside mirror
   Inspection ..... page S- 60
   Replacement of mirror glass .. page S- 61
5. Power outside mirror switch
   Inspection ..... page S-60
6. Rear window defroster switch
   Removal / Installation ..... section U
   Inspection ..... section U



3ZE0SX–084

POWER OUTSIDE MIRROR SWITCH

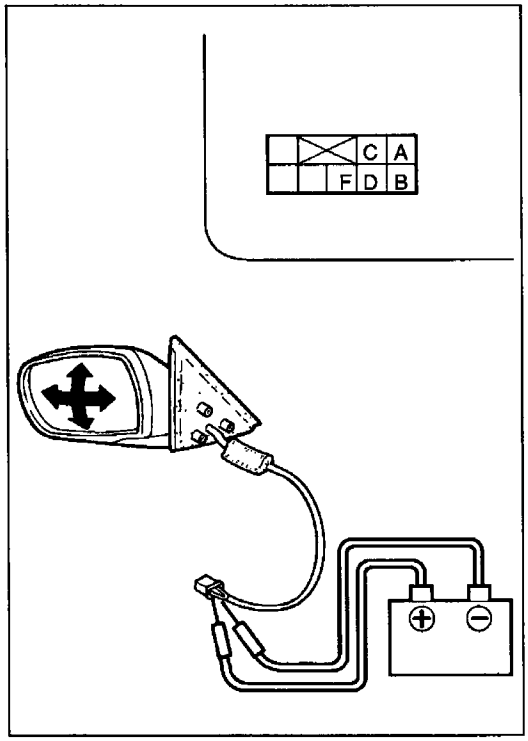
Inspection

1. Remove the power outside mirror switch. (Refer to page S–59.)
2. Check for continuity between the switch terminals.

Switch position \ Terminal		A	B	C	D	E	F	K	L
Left	UP		○			○	○		○
	DOWN		○			○	○		○
	LEFT				○	○	○		○
	RIGHT				○	○	○		○
Right	UP		○	○		○			○
	DOWN		○	○		○			○
	LEFT	○		○		○			○
	RIGHT	○		○		○			○

○—○: Continuity

3. If not as specified, replace the power outside mirror switch.



3ZE0SX–085

OUTSIDE MIRROR

Inspection

1. Remove the outside mirror. (Refer to page S–59.)
2. Apply battery voltage and check the operation of the outside mirror.

B+: Battery positive voltage

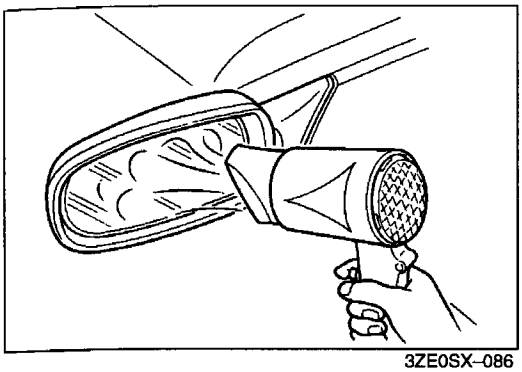
Connection		Mirror operation
B+	GND	
C	D	Up
D	C	Down
D	F	Left
F	D	Right

3. Check for continuity between the terminals of the outside mirror.

Function \ Terminal	A	B
Heater	○	○

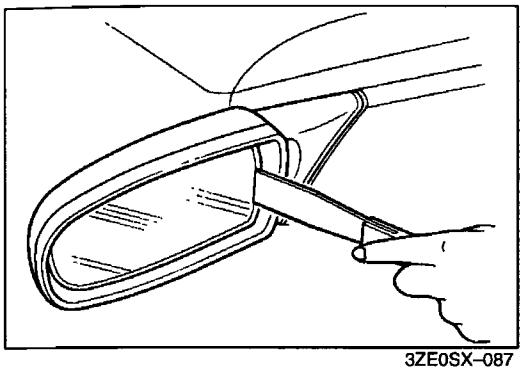
○—○: Continuity

4. If not as specified, replace the outside mirror.

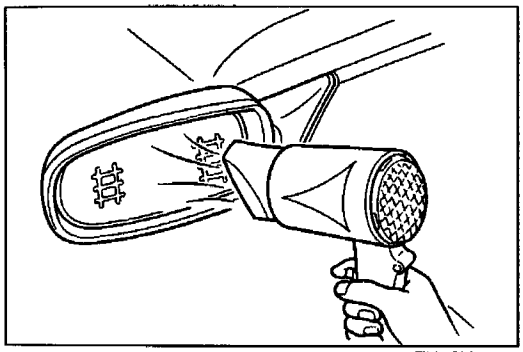

3ZE0SX-086

Replacement of Mirror Glass
(except heated outside mirror)
Removal

1. Warm the frame and the mirror glass by using a hot-air blower.

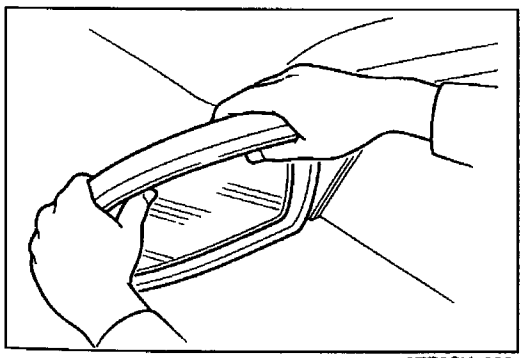

3ZE0SX-087

2. Insert a scraper between the mirror glass and the frame, and pry the glass loose.
3. Remove the remaining adhesive.

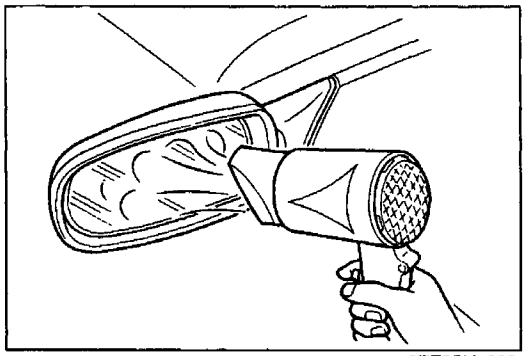

3ZU0SX-014

Installation

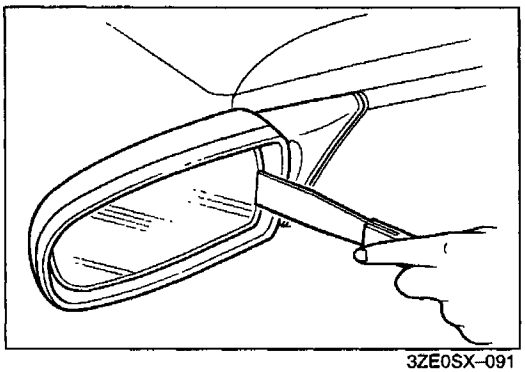
1. Warm the adhesive surface of the frame and the mirror by using a hot-air blower. If the frame is stained with oil, degrease it.
2. Peel off the wax paper from the double-sided adhesive tape on the rear side of the new mirror glass.


3ZE0SX-089

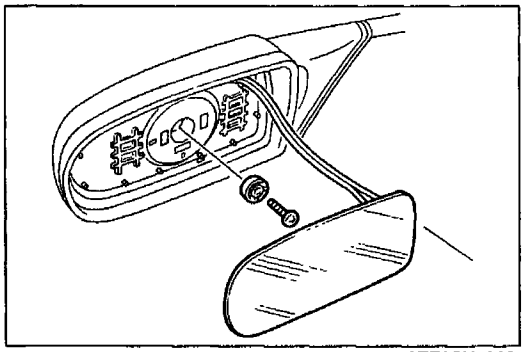
3. Install the glass in the mirror frame and gently press it in to secure it.


3ZE0SX-090

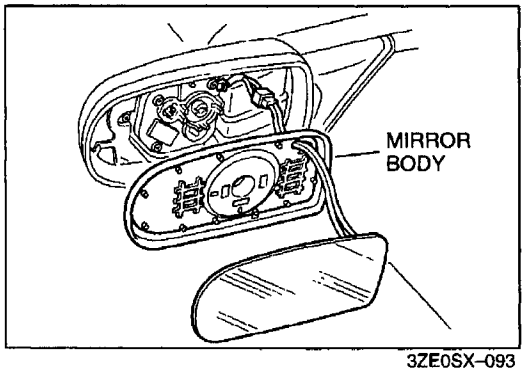
(with heated outside mirror)
Removal
1. Warm the mirror glass by using a hot-air blower.


3ZE0SX-091

2. Insert a scraper between the mirror glass and the mirror body, and pry the glass loose.
3. Remove the remaining adhesive from the mirror body.

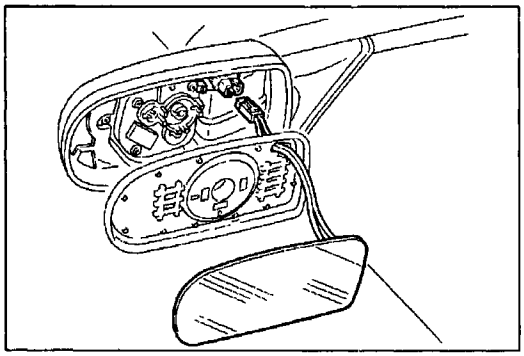

3ZE0SX-092

4. Remove the center screw and washer.

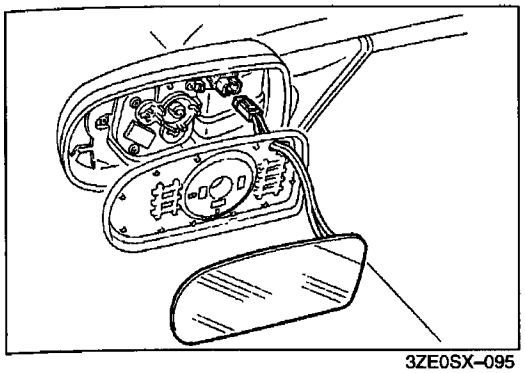


3ZE0SX-093

5. Pull the mirror body out as straight as possible. Do not pull the harness.

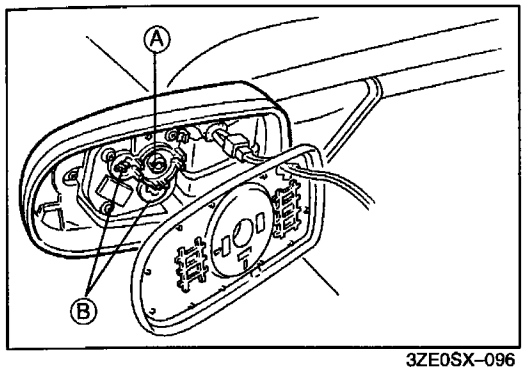

3ZE0SX-094

6. Pull out the heated outside mirror harness connector, and peel back the surrounding tape. Disconnect the connector.


3ZE0SX-095

Installation

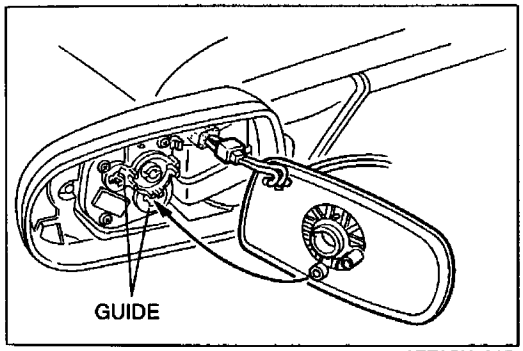
1. Reconnect the heated outside mirror harness connector, and wrap it in tape.
2. Secure the connector in back of the case. If the connector is not put in back of the case, the connector will prevent the mirror body from moving.



3ZE0SX-096

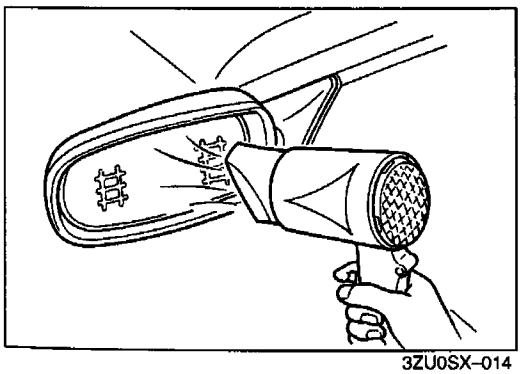
3. Verify that there is enough grease in parts Ⓐ and Ⓑ. If necessary, apply more grease. Use only the following specification.

   Grease specification: H385 76 189

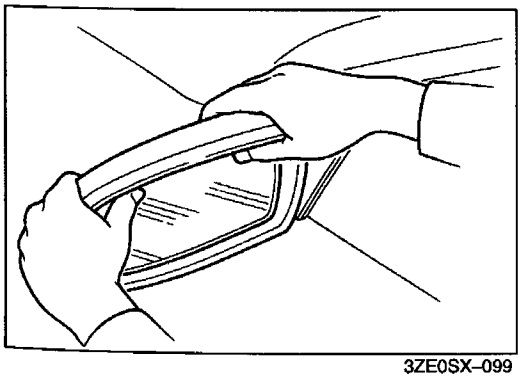


3ZE0SX-097

4. Align the mirror body with the power unit guide, and press in the mirror body.
5. Apply grease to the washer, and install the washer and the screw. Remove any grease that may be on the surface of the mirror body.


3ZU0SX-014

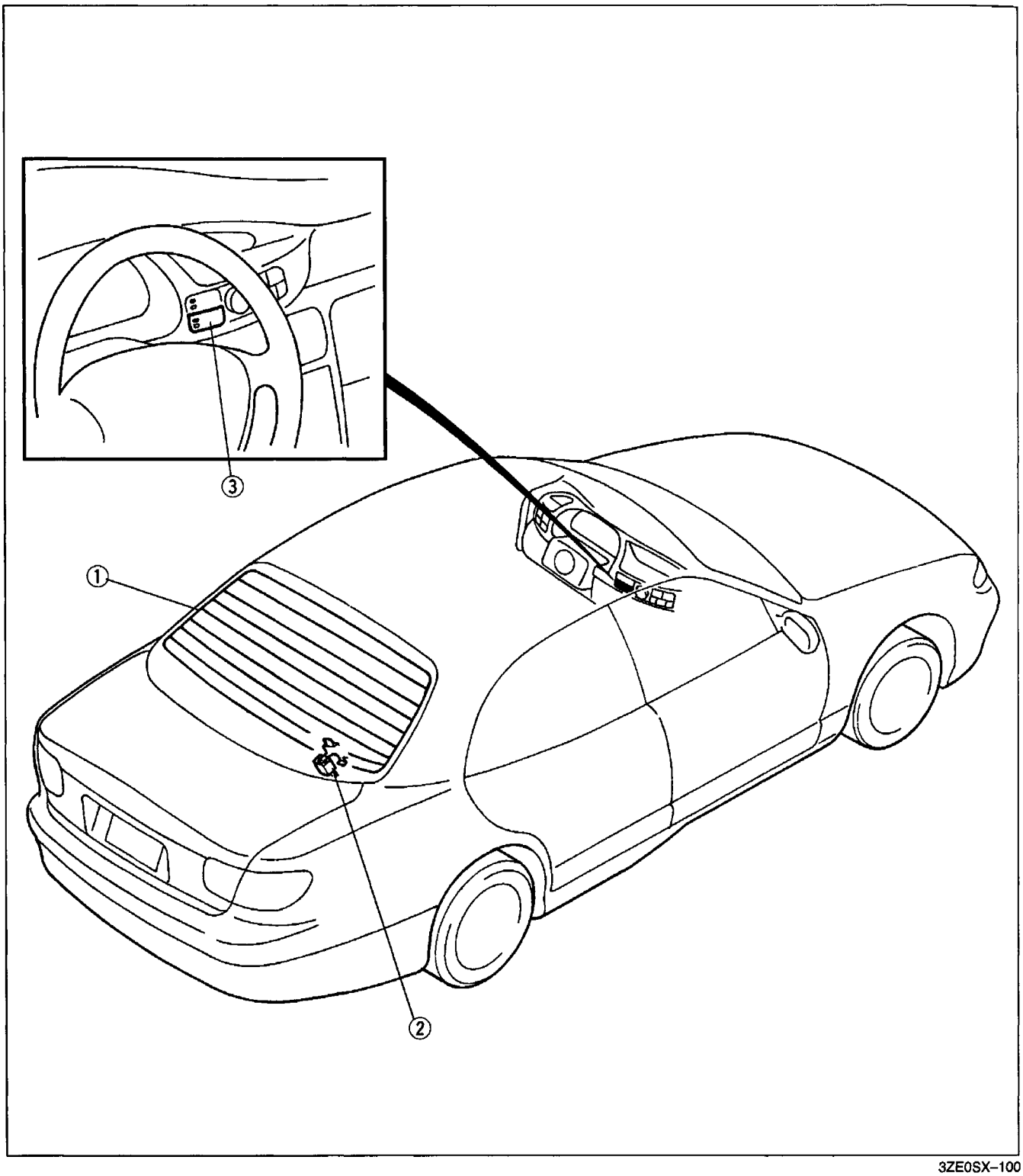
6. Remove the film from the adhesive tape on back of the new mirror glass.
7. Warm the adhesive surface of the mirror body and mirror glass by using a hot-air blower.


3ZE0SX-099

8. Install the glass to the mirror body and gently press in the glass to secure it.

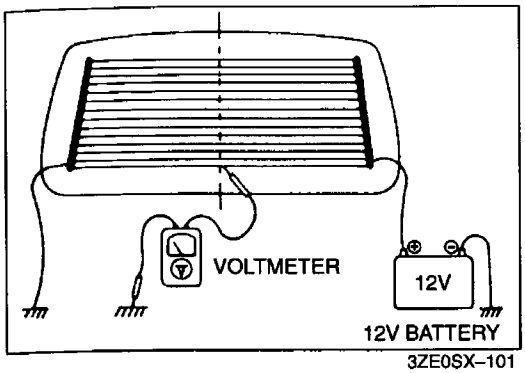
REAR WINDOW DEFROSTER

STRUCTURAL VIEW

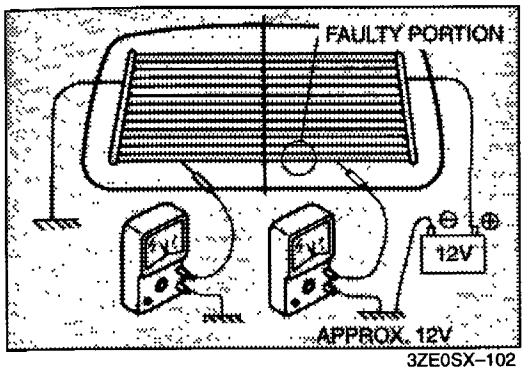


3ZE0SX-100

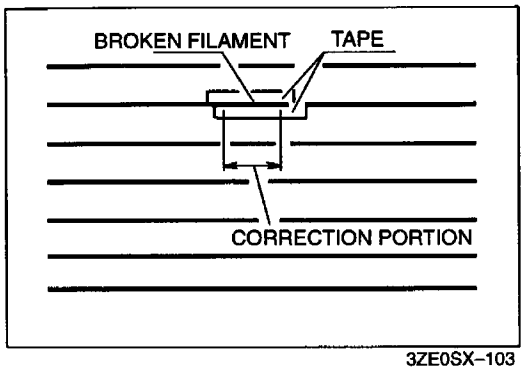
1. Filament
   - Inspection ..... page S–65
   - Repair ..... page S–65
2. Rear window defroster relay
   - Removal / Installation ..... page S–66
   - Inspection ..... page S–66
3. Rear window defroster switch (within heater control unit)
   - Removal / Installation ..... section U
   - Inspection ..... section U



3ZE0SX-101



3ZE0SX-102



3ZE0SX-103

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. The standard voltage at the center of each filament is approximately 6V. If the meter indication is high, there is an open circuit between the center and the ground side of the filament. If the indication is low, the malfunction is between the center and positive side.

Repair

Caution

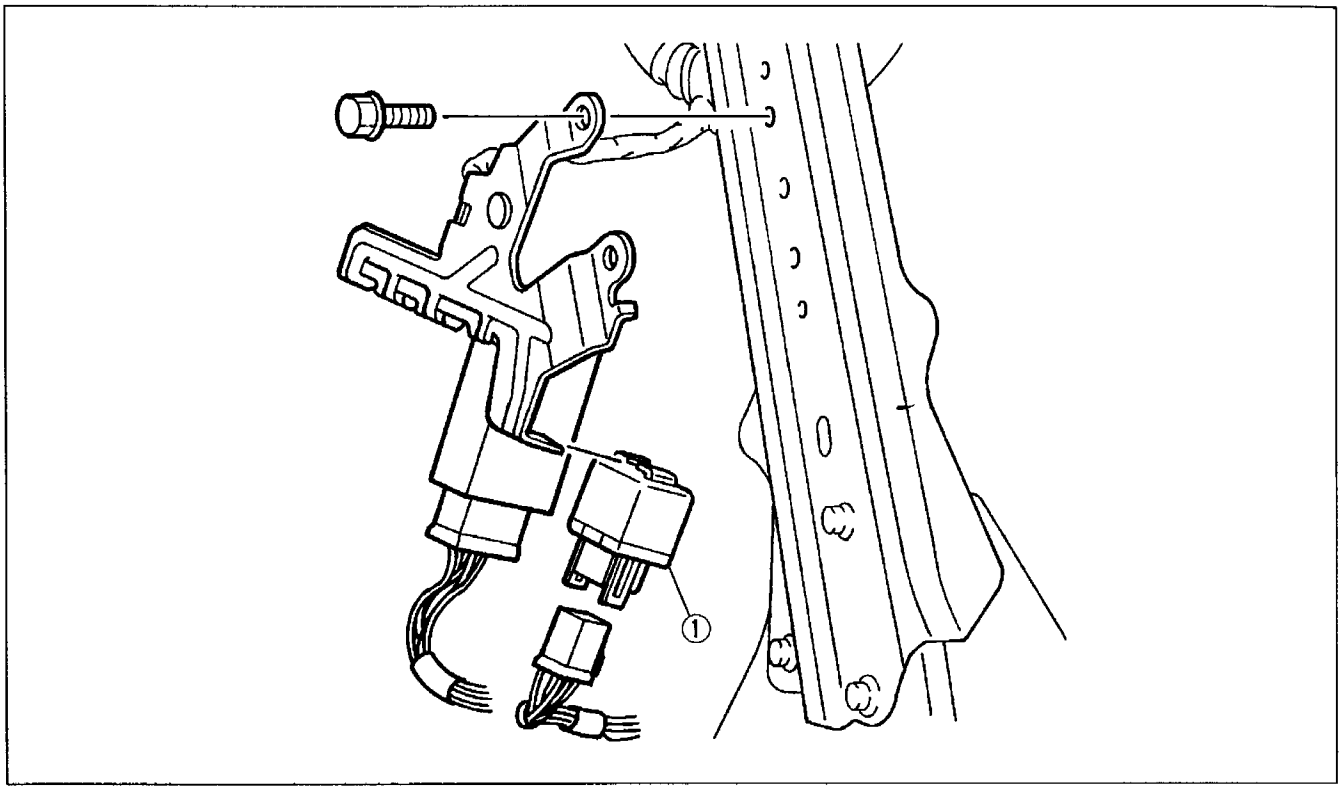
- **Use only paint thinner or ethyl alcohol for cleaning. Other solvents can damage the surrounding filament.**

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.

REAR WINDOW DEFROSTER RELAY

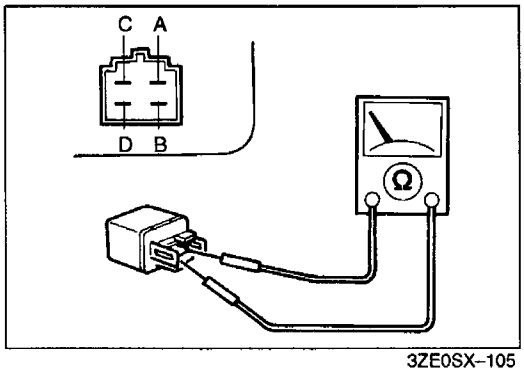
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the rear seat back. (Refer to page S–125.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



3ZE0SX–104

1. Rear window defroster relay
   Inspection ..... below



3ZE0SX–105

Inspection

1. Remove the rear window defroster relay. (Refer above.)
2. Apply battery voltage and check for continuity between the relay terminals.

B+: Battery positive voltage

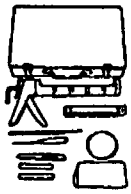
Connection		A	B	C	D
B+	GND				
—	—	○——○			
A	B			○——○	

○——○: Continuity

3. If not as specified, replace the rear window defroster relay.

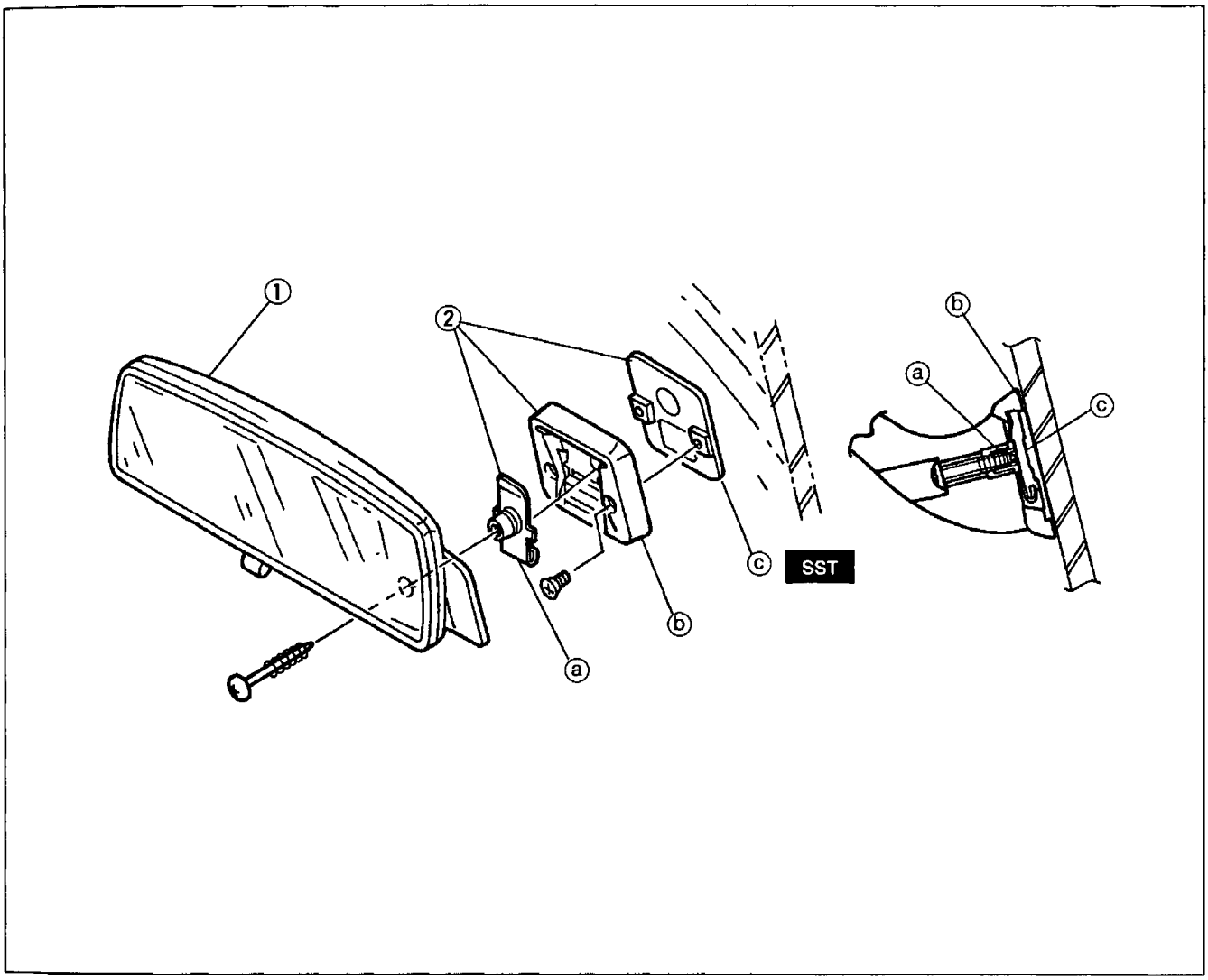
REARVIEW MIRROR

PREPARATION
SST

49 0305 870A Tool set, window		For removal / installation of base

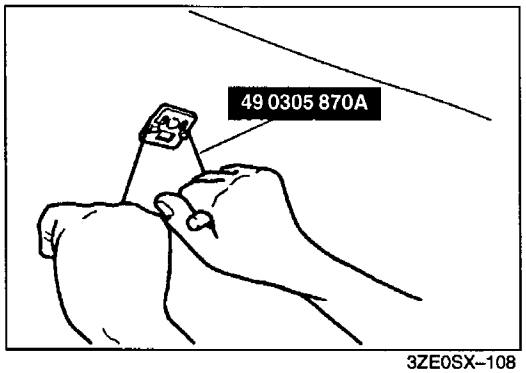
3ZE0SX-106

REARVIEW MIRROR
Removal / Installation
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



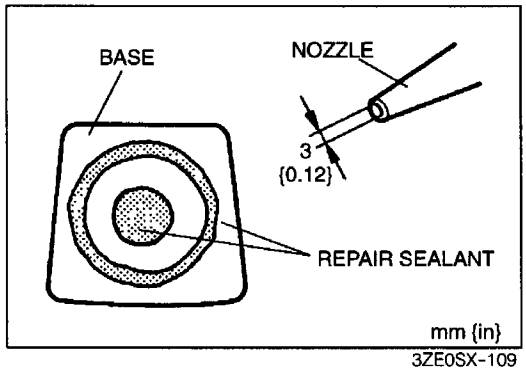
3ZE0SX-107

1. Rearview mirror
2. Mirror base assembly
   a. Holder
      Installation note ..... page S-68
   b. Cover
   c. Base
      Removal note ..... page S-68
      Installation note ..... page S-68



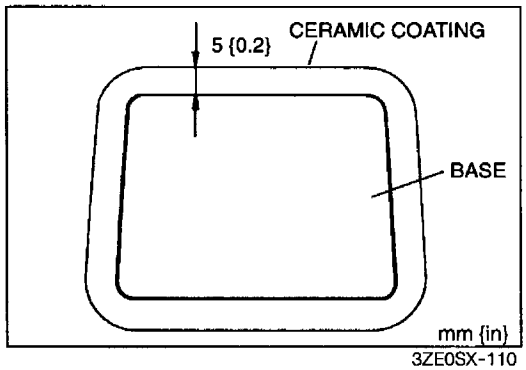
3ZE0SX-108

Removal note
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.



3ZE0SX-109

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.

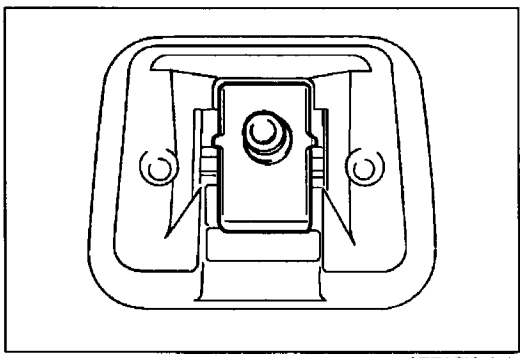


3ZE0SX-110

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

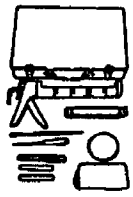
Temperature	Surface hardening time	Time required until car can be put into service
5°C {41°F}	Approx. 1.5 hr	12 hr
20°C {68°F}	Approx. 1 hr	4 hr
35°C {95°F}	Approx. 10 min	2 hr


3ZE0SX-111

Holder
Install the holder to the cover as shown in the figure.

WINDOW GLASS

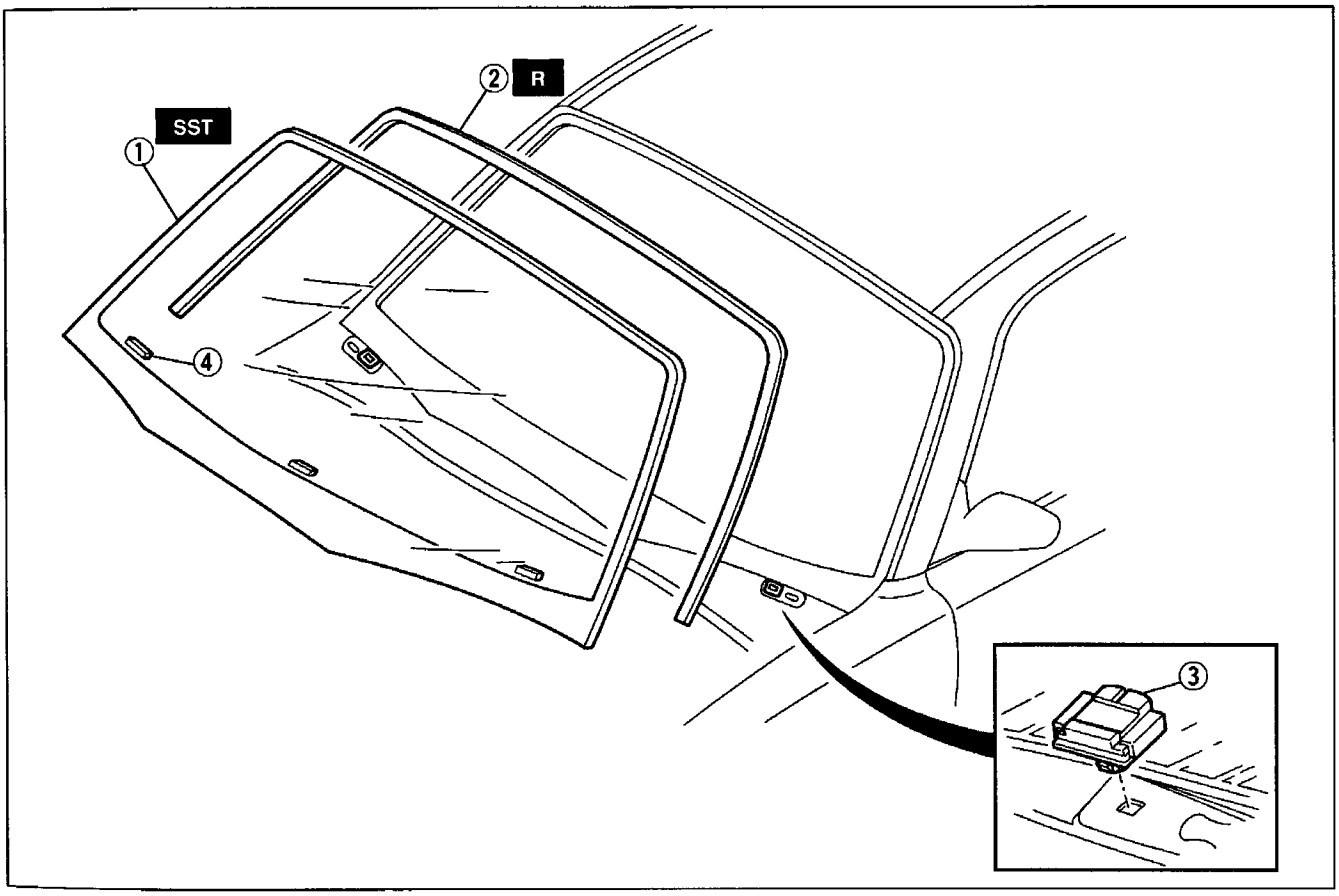
PREPARATION
SST

49 0305 870A Tool set, window		For installation of windshield and rear window molding clips

3ZE0SX–112

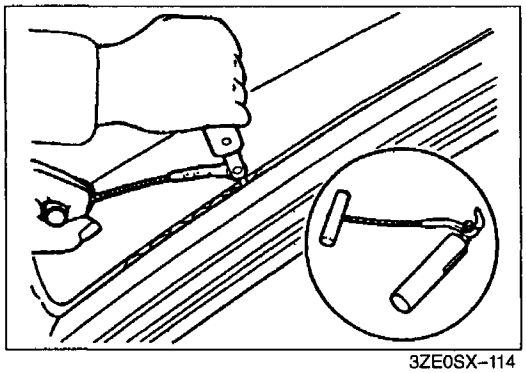
WINDSHIELD
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the following.
   a. Sunroof switch (Refer to page S–110.)
   b. Overhead console (Refer to page S–110.)
   c. Sunvisor and adapter (Refer to page S–110.)
   d. Rearview mirror (Refer to page S–67.)
   e. A-pillar trim (Refer to page S–92.)
   f. Windshield molding (Refer to page S–46.)
   g. Wiper arm and blade (Refer to section T.)
   h. Cowl grille (Refer to page S–58.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



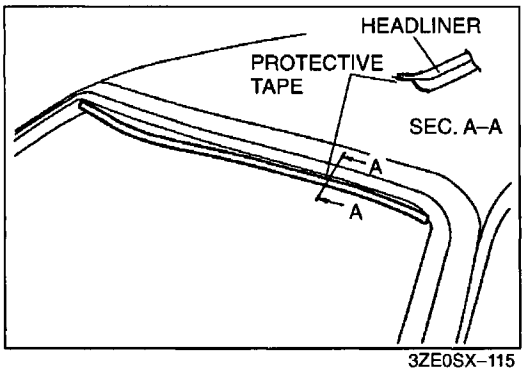
3ZE0SX–113

1. Windshield
   Removal note ..... page S–70
   Installation note ..... page S–70
2. Dam
3. Spacer A
4. Spacer B


3ZE0SX-114

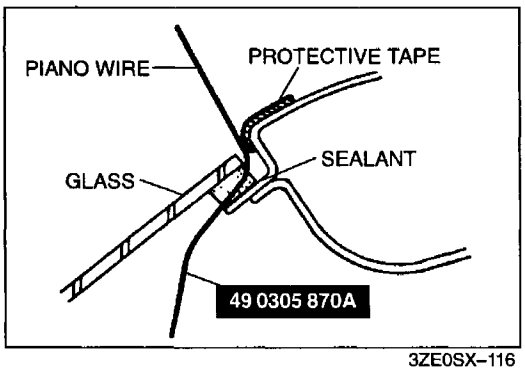
Removal note
Windshield

If the glass will not be reused
1. Use a tool like that shown in the figure and insert the blade into the sealant.
2. Pull it through the sealant around the edge of the glass.
3. If the protector is damaged, remove it.
4. Remove the glass.



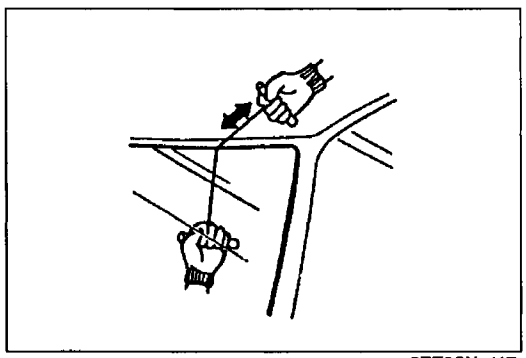
3ZE0SX-115

If the glass will be reused
1. Apply protective tape along the front edge of the headliner to protect it from damage.

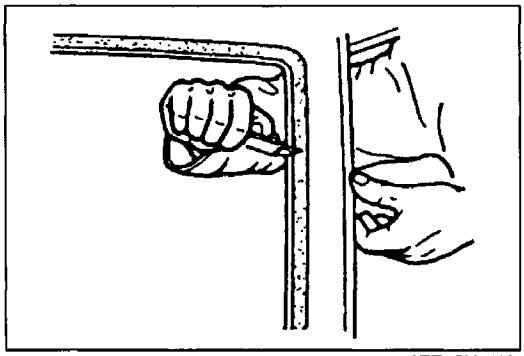


3ZE0SX-116

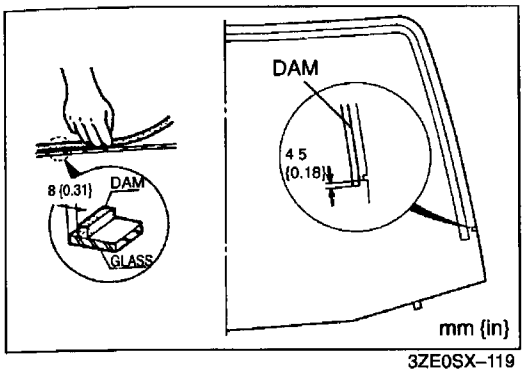
2. Apply protective tape along the edge of the body to protect it from damage.
3. Make a hole through the sealant from the inside of the vehicle by using an awl.
4. Pass piano wire through the hole.


3ZE0SX-117

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 or the dashboard.
7. Remove the glass.

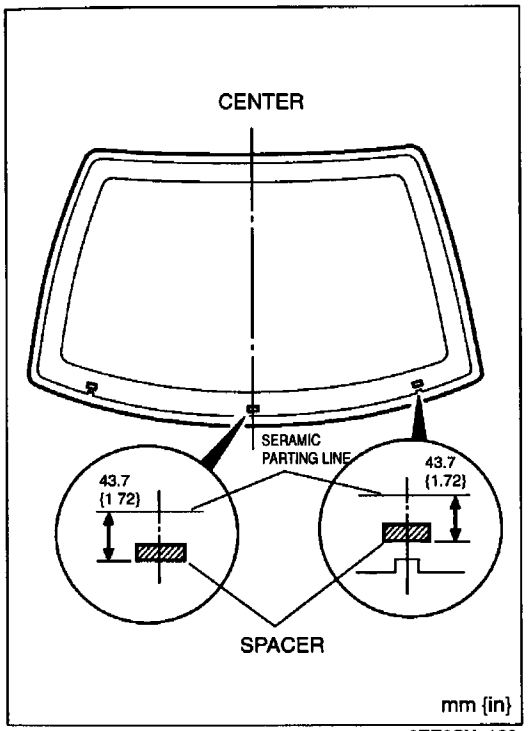

3ZE0SX-118

Installation note
Windshield
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 {1.97 in}** wide around the circumference of the glass and clean the bonding area on the body.



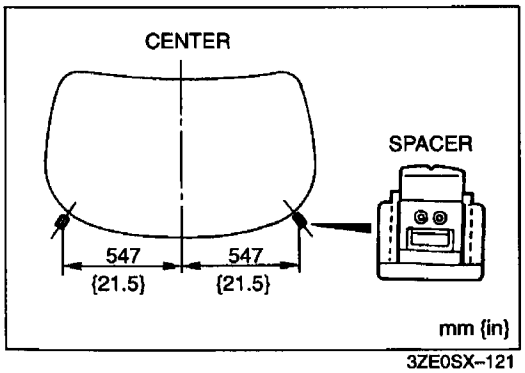
3ZE0SX–119

3. Securely bond a new dam along the top and sides **8 mm {0.31 in}** from the edge of the glass as shown. Allow it to dry completely.



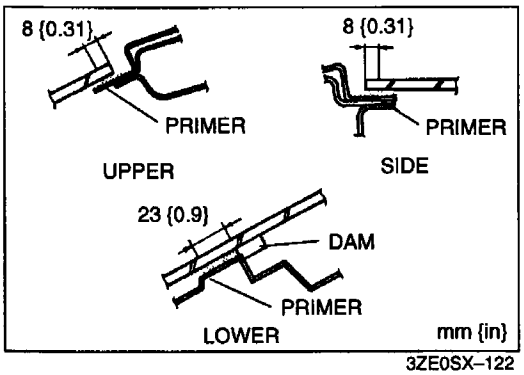
3ZE0SX–120

4. Install the spacers onto the glass as shown. If a spacer is damaged, replace it.



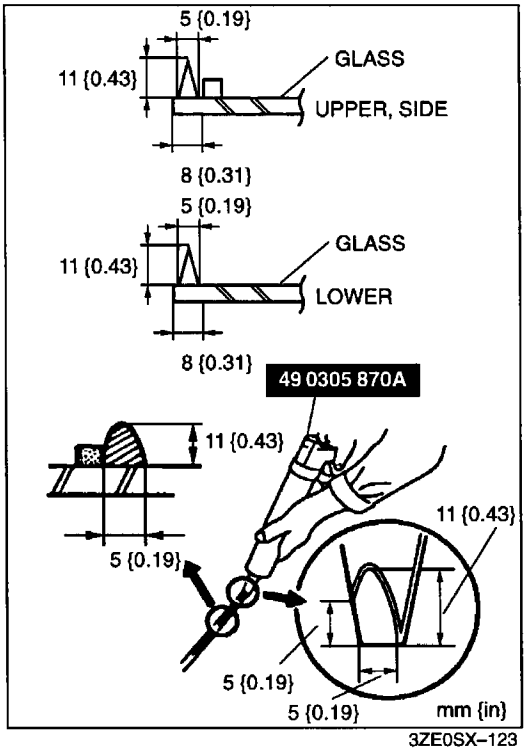
3ZE0SX–121

5. Install the spacers onto the body as shown. If a spacer is damaged, replace it.
6. Set the glass onto the body and adjust the clearance between the top of the glass and the body to **8 mm {0.31 in}** by moving the spacers up or down.
7. Remove the glass from the body.



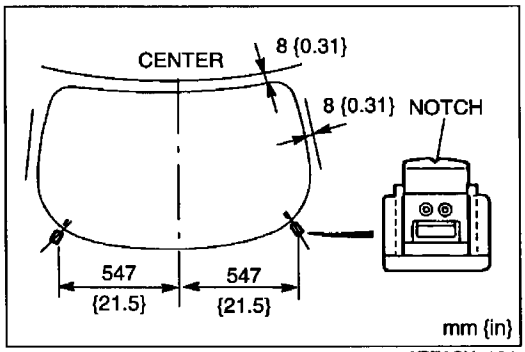
3ZE0SX–122

8. Apply primer to the bonding area of the glass and body by using a brush. Keep the area free of dirt and grease, and do not touch the surface. Allow it to dry for approximately **30 minutes**.



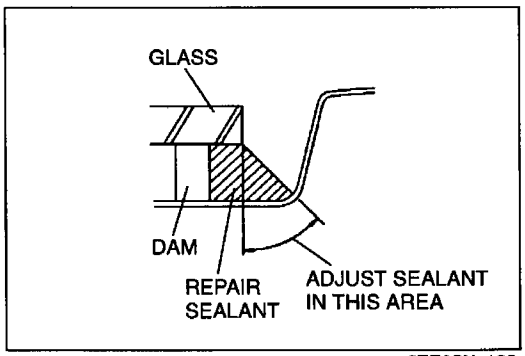
3ZE0SX-123

9. After the primer has dried, apply an **11 mm {0.43 in}** high bead of repair sealant around the entire 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.



3ZE0SX-124

10. Align the glass marks with the notches in the spacers and install the glass onto the body.
11. Press firmly on the glass to compress the sealant. Verify that the clearance between the top and sides of the glass and the body is **8 mm {0.31 in}**.



3ZE0SX-125

12. 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 sealants as shown, if necessary.

Hardening time of repair sealant

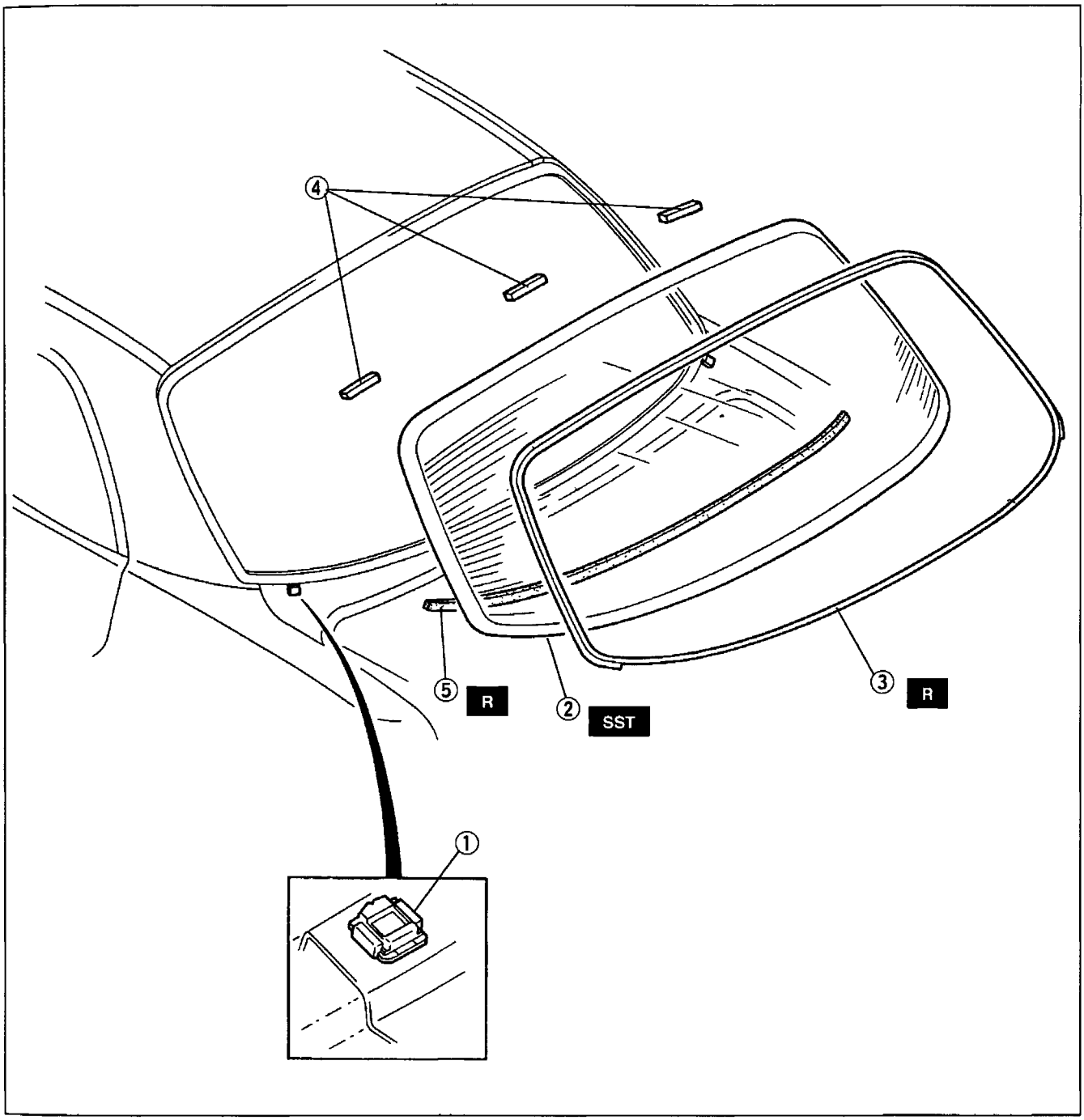
Temperature	Surface hardening time	Time required until car can be put into service
5°C {41°F}	Approx. 1.5 hr	12 hr
20°C {68°F}	Approx. 1 hr	4 hr
35°C {95°F}	Approx. 10 min	2 hr

13. Check for water leaks.
14. If a leak is found, wipe the water off well and remove the windshield. Then reinstall the windshield.

REAR WINDOW GLASS

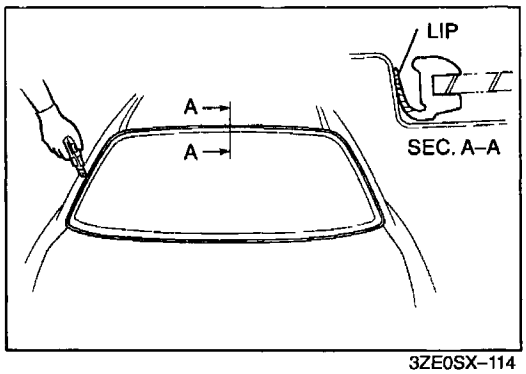
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the following.
   a. C-pillar trim (Refer to page S–99.)
   b. Rear package rear trim (Refer to page S–100.)
   c. Rear window lower molding (Refer to page S–53.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



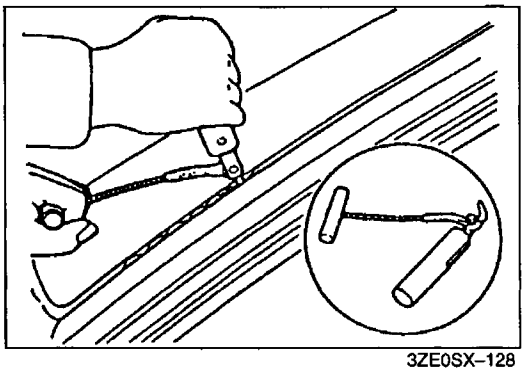
3ZE0SX–126

1. Spacer A
2. Rear window glass
   Removal note ..... page S–74
   Installation note ..... page S–75
3. Rear window molding
4. Spacer B
5. Dam

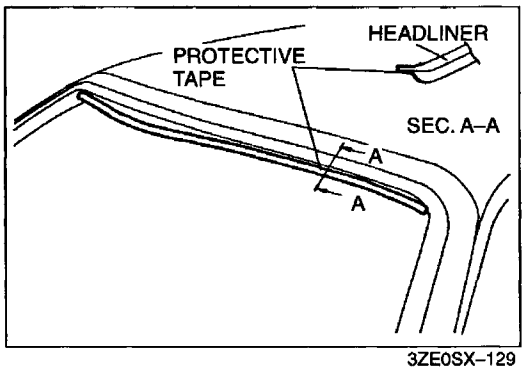


3ZE0SX–114

Removal note
Rear window glass
1. Cut the lip of the rear window glass by using a razor knife and remove the lip.

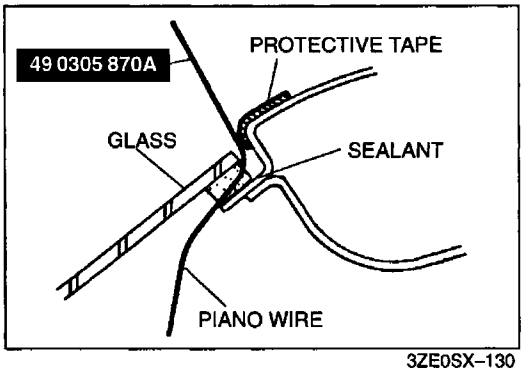

3ZE0SX–128

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. If a protector is damaged, remove it.
5. Remove the glass.



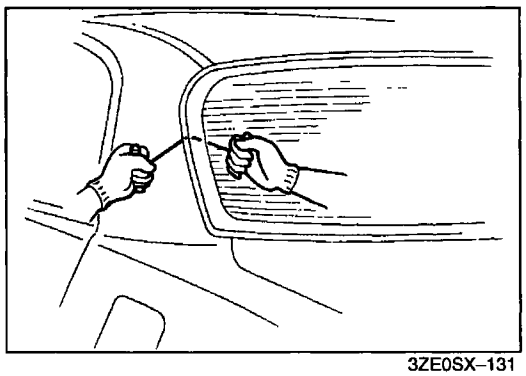
3ZE0SX–129

If the glass will be reused
2. Apply protective tape along the rear edge of the headliner to protect it from damage.

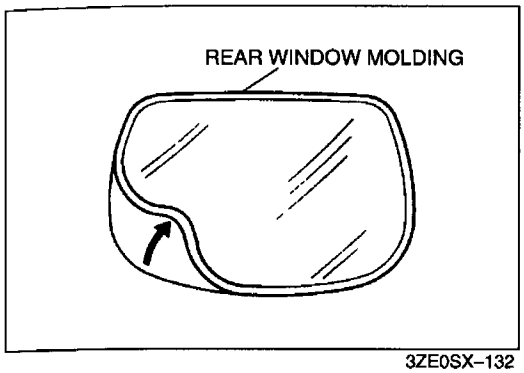


3ZE0SX–130

3. Apply protective tape along the edge of the body to protect it from damage.
4. Make a hole through the sealant from the inside of the vehicle by using an awl.
5. Pass piano wire through the hole.

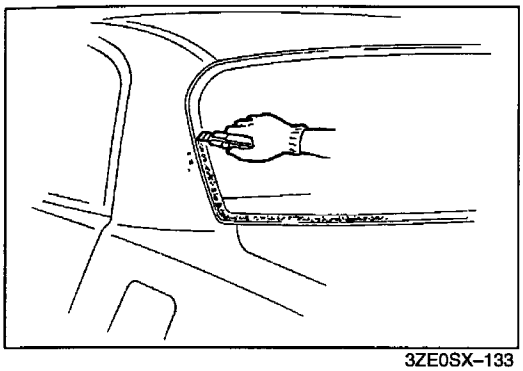

3ZE0SX–131

6. Wind each end of the wire around a bar.
7. 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.
8. Remove the glass.



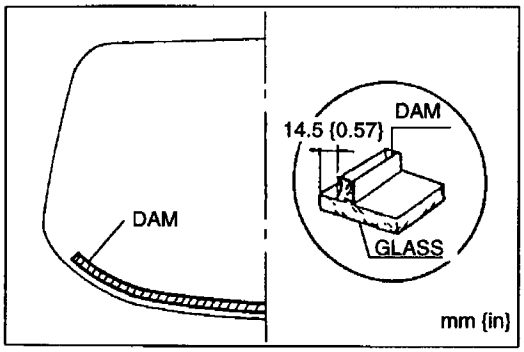
3ZE0SX-132

9. Remove the molding from the glass.


3ZE0SX-133

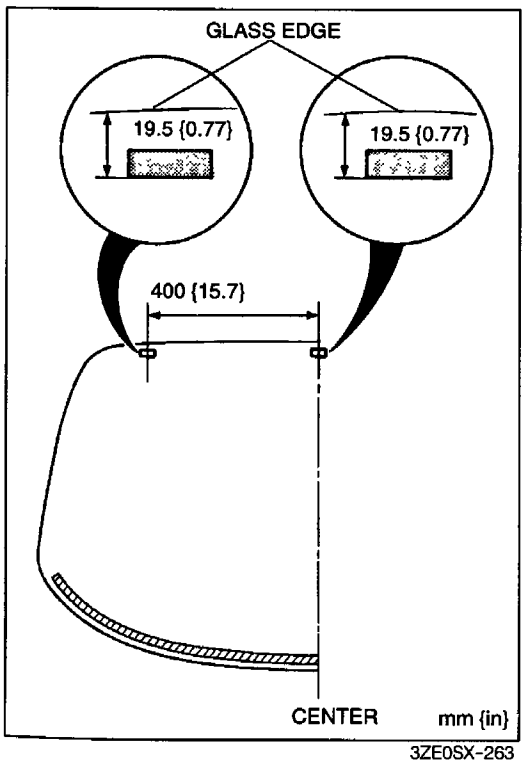
Installation note
Rear window glass

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 put on new sealant to create a **2 mm {0.08 in}** layer.
2. Carefully clean an area **50 mm {1.97 in}** wide around the circumference of the glass and clean the bonding area on the body.



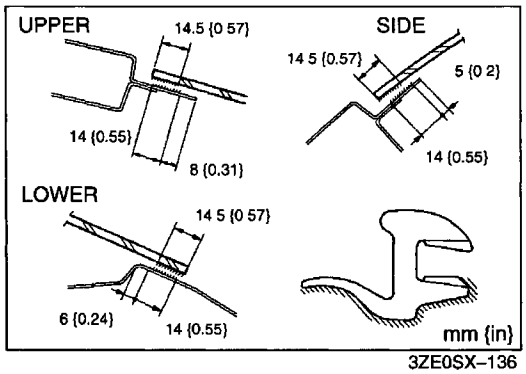
3ZE0SX-134

3. Securely bond a new dam along the circumference of the glass **14.5 mm {0.57 in}** from the edge. Allow it to dry completely.

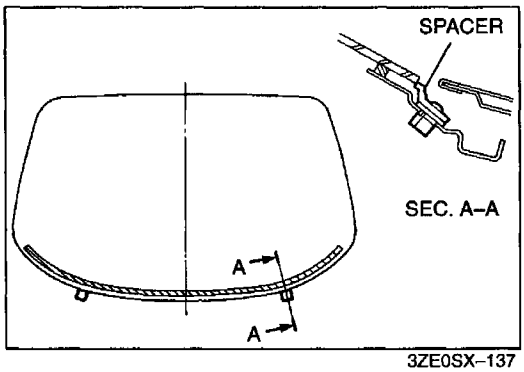


3ZE0SX-263

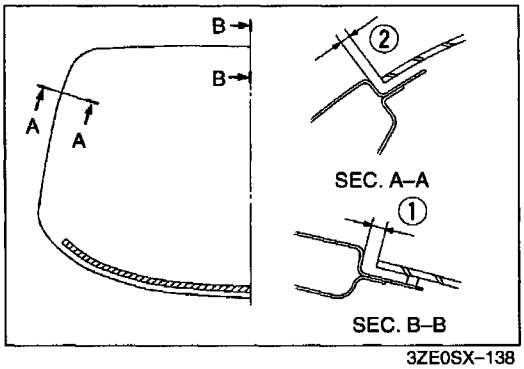
4. Install the spacers onto the glass as shown. If a spacer is damaged, replace it.



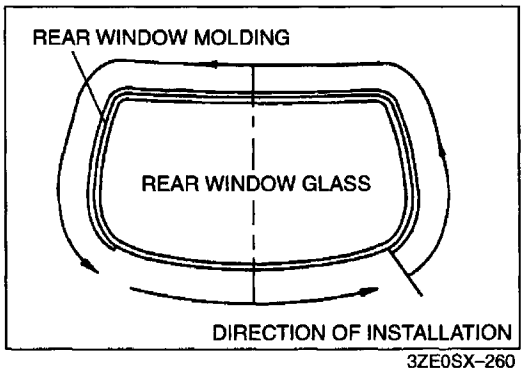
3ZE0SX-136



3ZE0SX-137



3ZE0SX-138



3ZE0SX-260

5. 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. Keep the area free of dirt and grease, and do not touch the surface. Allow it to dry for approximately **30 minutes**.

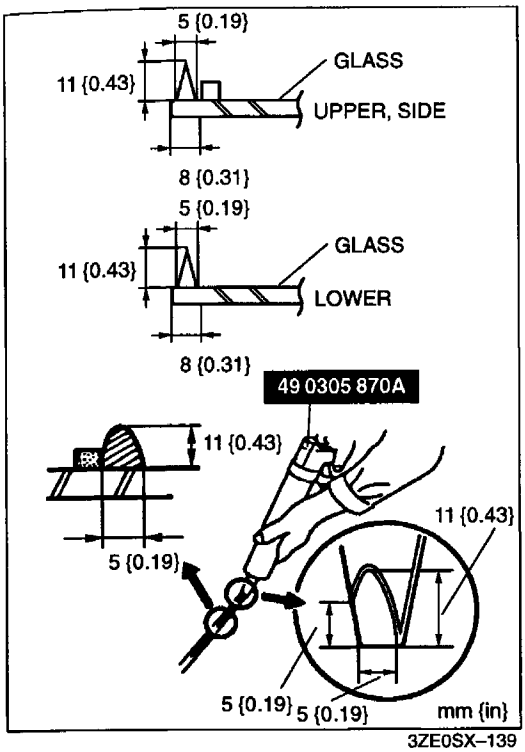
6. Install the spacers to the mounting holes in the body.

7. Temporarily install the glass onto the body and adjust the glass-to-body clearance as indicated.

   ① **Upper part: 7.5 mm {0.30 in}**
   ② **Side parts: 6.5 mm {0.26 in}**

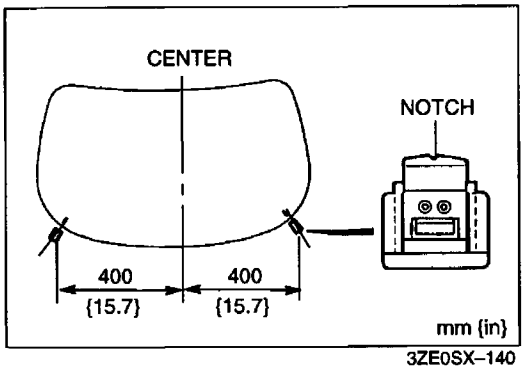
8. Mark the glass at the spacers.
9. Remove the glass.

10. After the primer has dried, install the rear window molding to the glass.



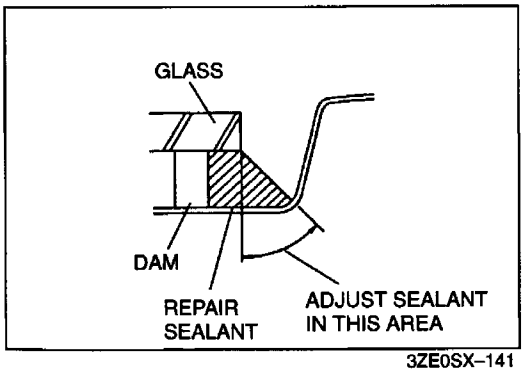
3ZE0SX–139

11. Apply an **11 mm {0.43 in}** high bead of repair sealant around the entire 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.



3ZE0SX–140

12. Align the glass marks with the V notches in the spacers and install the glass to the body.
13. Press firmly on the glass to compress the sealant.
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.



3ZE0SX–141

15. Use a scraper to smooth away any sealant that oozes out. Add more sealant to any points of poor contact.

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

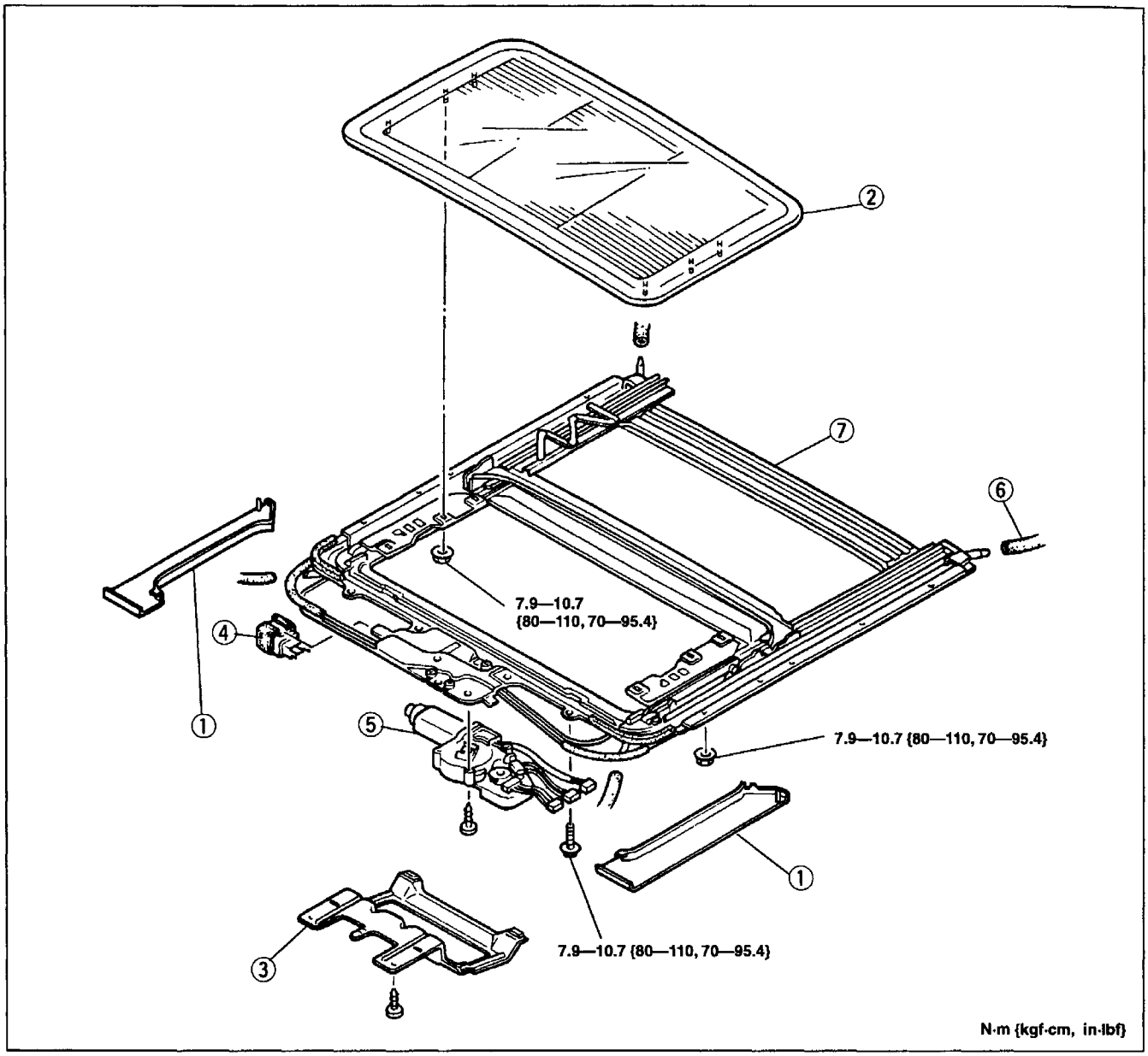
16. Check for water leaks.
17. If a leak is found, wipe the water off well and remove the rear window glass. Reinstall the rear window glass.

SLIDING SUNROOF

SLIDING SUNROOF

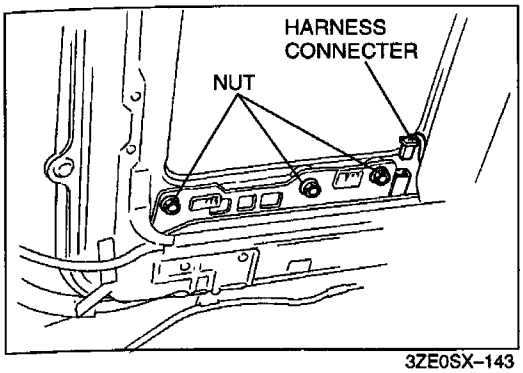
Removal / Installation

1. Close the glass panel fully.
2. Disconnect the negative battery cable.
3. Remove in the order shown in the figure. To remove the overhead console bracket, remove the headliner. (Refer to page S–110.)
4. Install in the reverse order of removal.



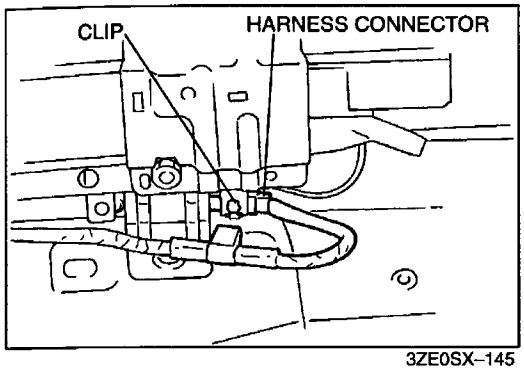
3ZE0SX–142

1. Lower panel cover
2. Glass panel
   - Removal note ..... page S–79
   - Adjustment ..... page S–85
3. Overhead console bracket
4. Sunroof relay
   - Inspection ..... page S–86
5. Sunroof motor assembly
   - Installation note ..... page S–79
   - Adjustment ..... page S–85
   - Inspection ..... page S–87
6. Drain hose
   - Installation note ..... page S–80
7. Sunroof drive unit
   - Removal note ..... page S–79
   - Disassembly / Assembly ..... page S–81



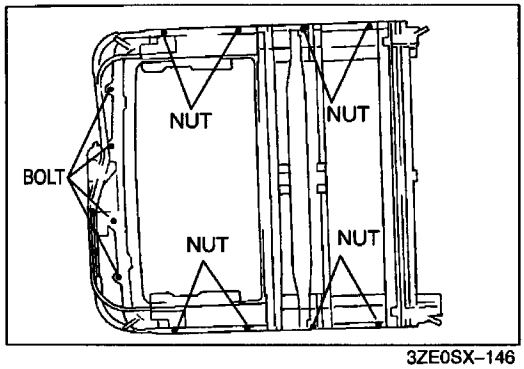
3ZE0SX-143

Removal note
Glass panel
1. If a solar ventilation system is installed, disconnect the harness connector.
2. Remove the glass panel installation nuts.
3. Push the glass panel up from the inside to remove it.



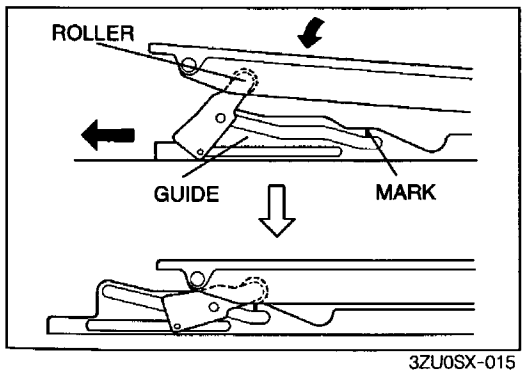
3ZE0SX-145

Sunroof drive unit
1. If a solar ventilation system is installed, disconnect the harness connector and remove the clip from the bracket.



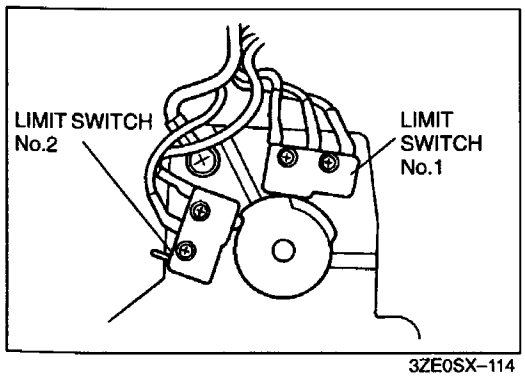
3ZE0SX-146

2. Remove the sunroof drive unit installation nuts and bolts.



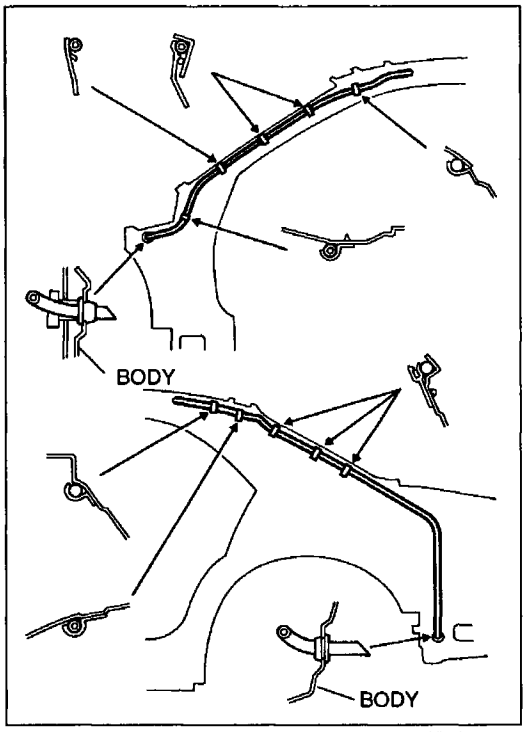
3ZU0SX-015

Installation note
Sunroof motor assembly
1. Move the guide backward and align the center of the roller with the mark written on the guide.



3ZE0SX-114

2. Set the sunroof motor by using an Allen wrench as shown.



3ZE0SX-135

Drain hose

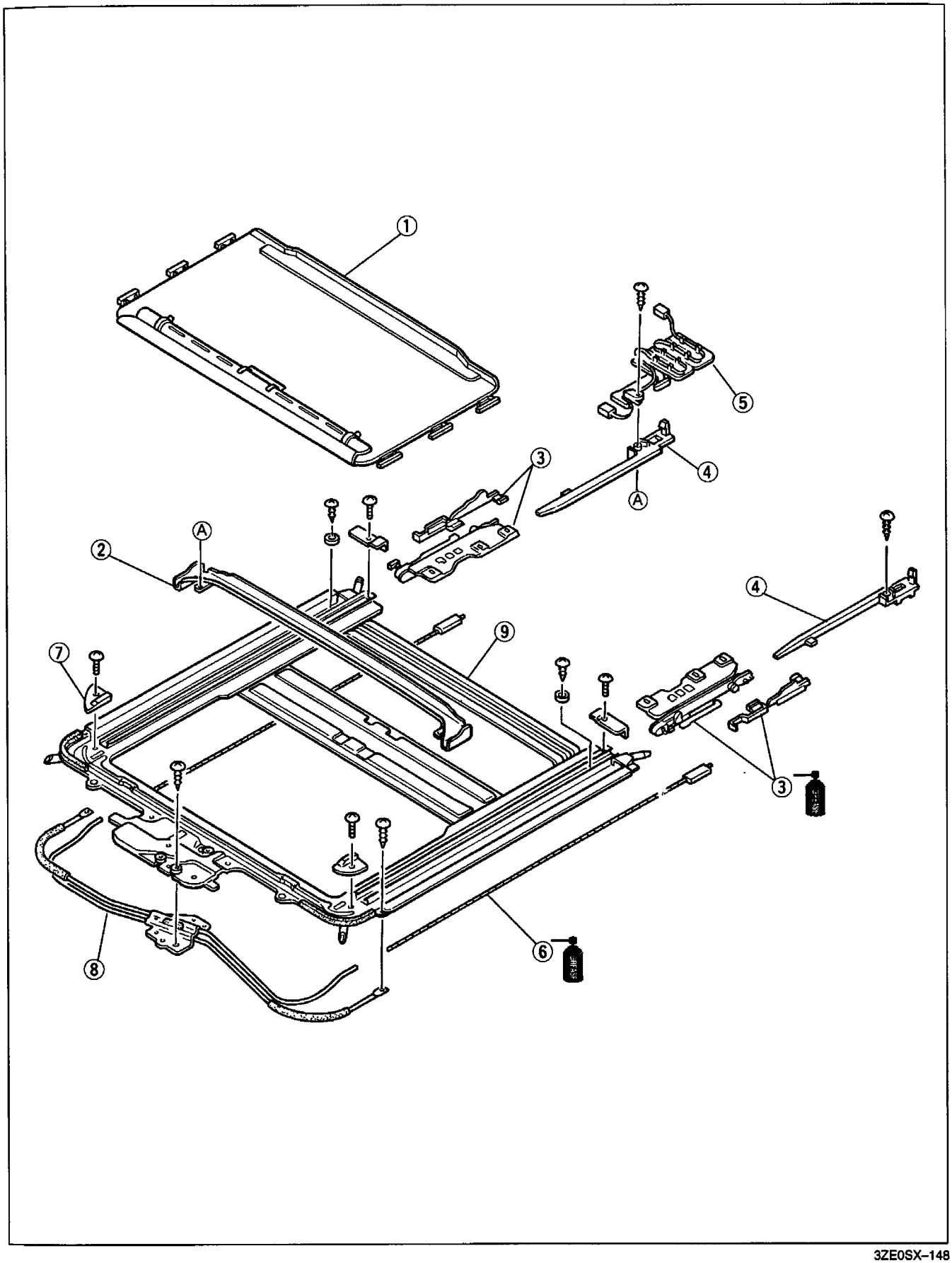
Note
- Apply soapy water to the drain hose and insert it fully into the sunroof frame.

(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 cowl side panel hole.

(rear)
Insert one end of the hose into the sunroof frame and insert the order end into the rear fender panel hole via the hole in the upper part of the C-pillar.

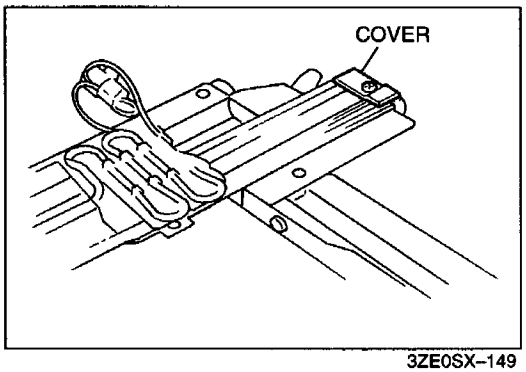
Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



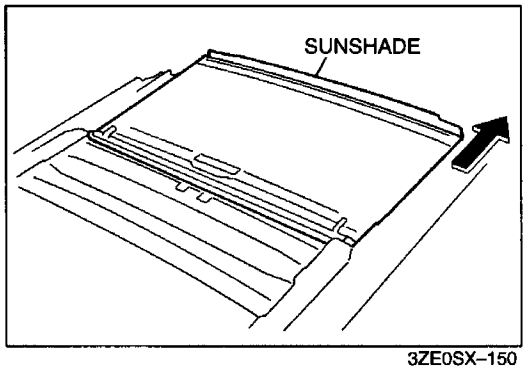
3ZE0SX-148

1. Sunshade
   Disassembly note ..... below
2. Drip rail
   Disassembly note ..... below
3. Guide
   Disassembly note ..... below
   Assembly note ..... page S–84
4. Decoration link
   Assembly note ..... page S–84
5. Harness (solar ventilation system)
6. Drive cable
7. Guide rail cover
   Disassembly note ..... page S–83
8. Guide unit
   Disassembly note ..... page S–83
9. Sunroof frame



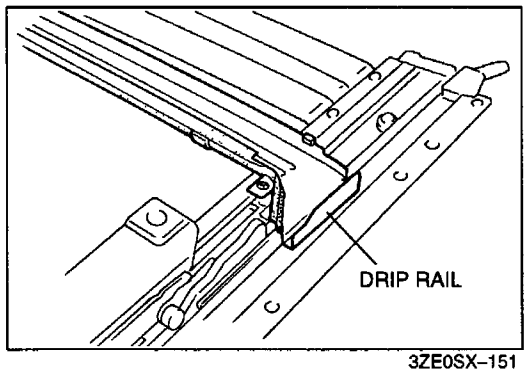
3ZE0SX–149

Disassembly note
Sunshade
1. Remove the cover.



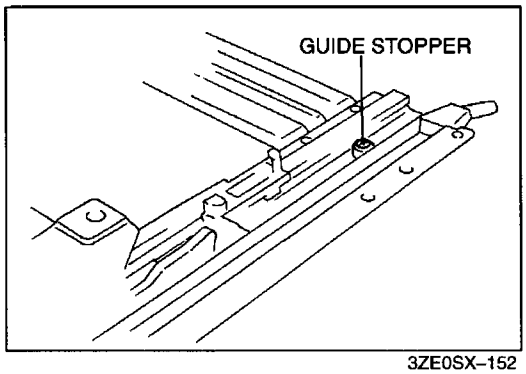
3ZE0SX–150

2. Slide the sunshade back to remove it.



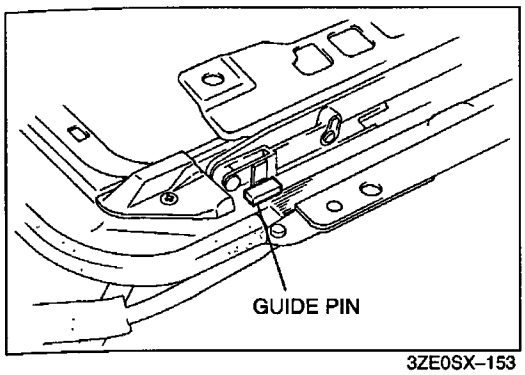
3ZE0SX–151

Drip rail
Remove the drip rail installation screws.



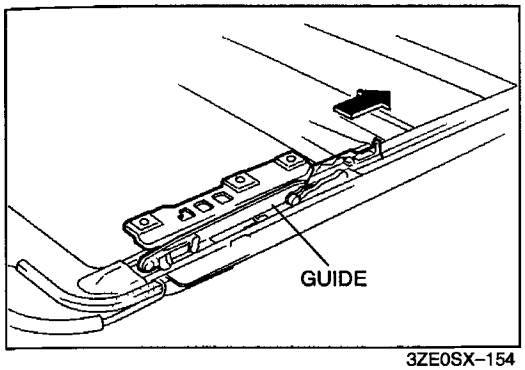
3ZE0SX–152

Guide
1. Remove the guide stopper.



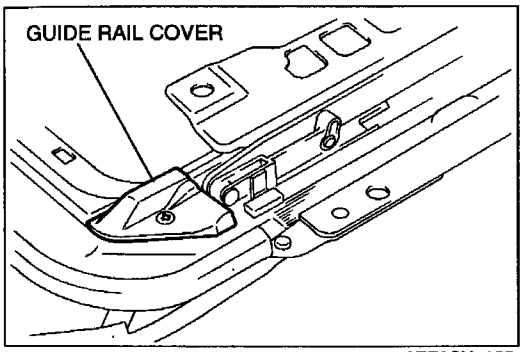
3ZE0SX-153

2. Remove the guide pin.



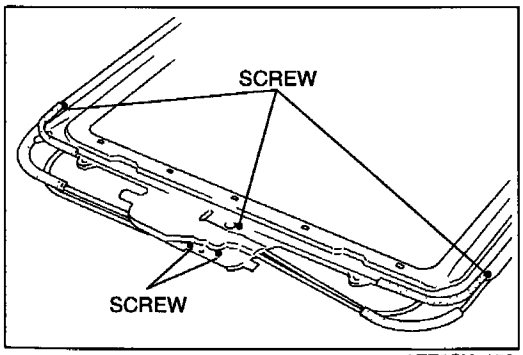
3ZE0SX-154

3. Slide the guide back to remove it.



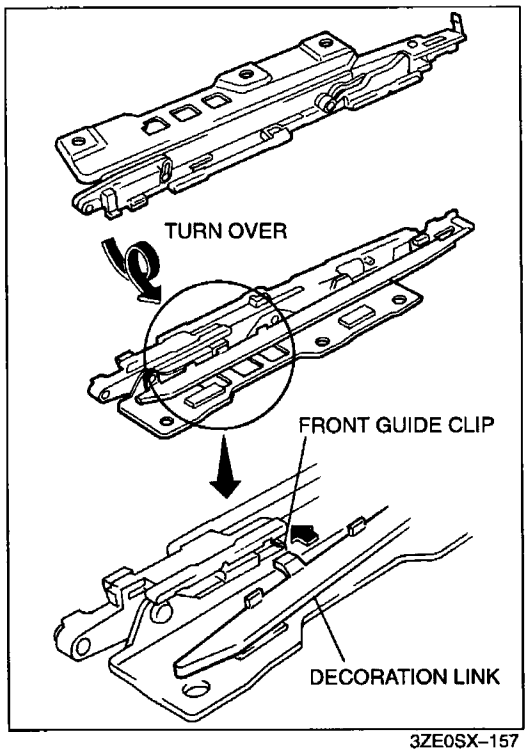
3ZE0SX-155

Guide rail cover
Remove the guide rail cover installation screw.



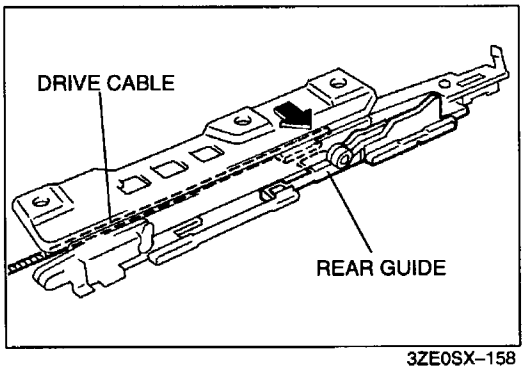
3ZE0SX-156

Guide unit
Remove the guide unit installation screws.



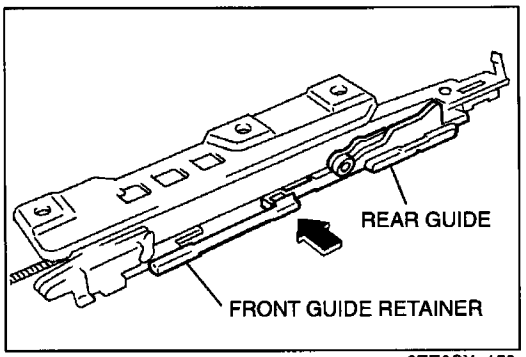
3ZE0SX-157

Assembly note
Decoration link, guide
1. Set the decoration link under the front guide clip.



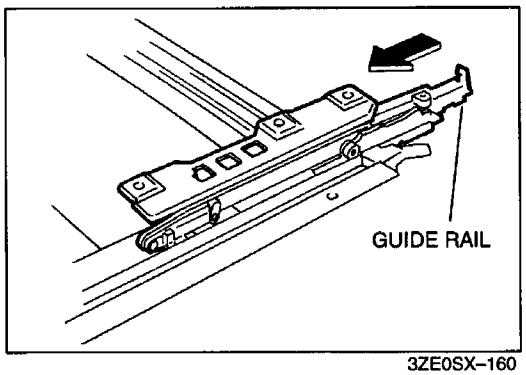
3ZE0SX-158

2. Set the drive cable to the rear guide.



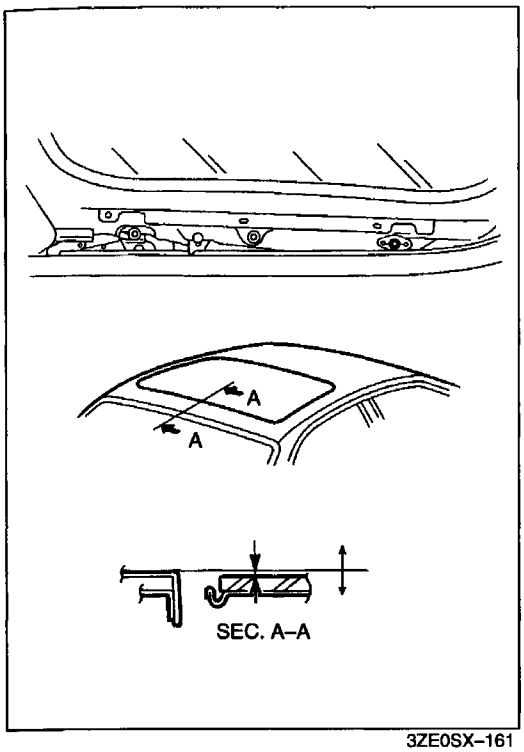
3ZE0SX-159

3. Set the front guide retainer to the rear guide.



3ZE0SX-160

4. Insert the guide into the guide rail.



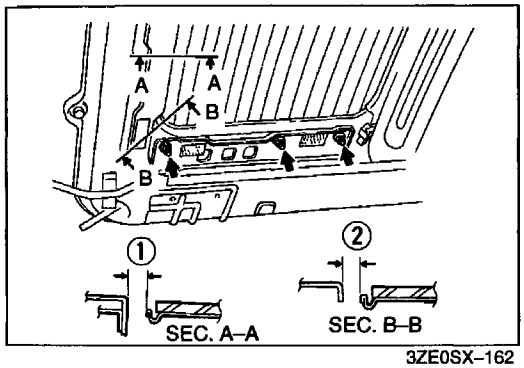
3ZE0SX–161

Adjustment
Glass panel
Height

1. Remove the lower panel cover. (Refer to page S–78.)
2. Pull up on the weatherstrip surrounding the section which is measured.
3. Measure the height between the glass panel and the roof.

Allowable height clearance: 0 $^{+0.5}_{-1.5}$ mm {0 $^{+0.02}_{-0.06}$ in}

4. If not as specified, loosen the lower panel installation nuts and adjust the height.



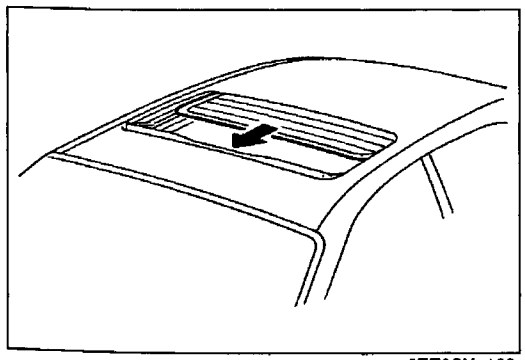
3ZE0SX–162

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 close the glass panel.
4. Remove the lower panel cover. (Refer to page S–78.)
5. Measure the gap between the glass panel and the roof.

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}

6. If not as specified, loosen the glass panel installation nuts and adjust the gap.
7. Open the glass panel and install the weatherstrip.

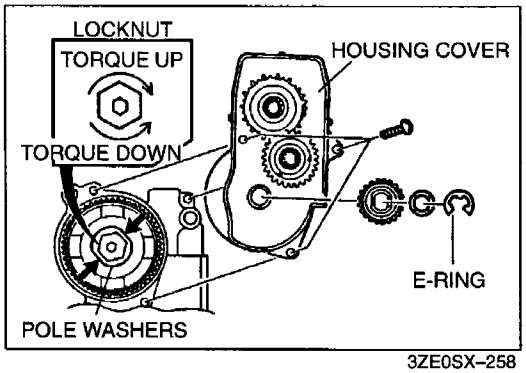


3ZE0SX–163

Sunroof motor assembly

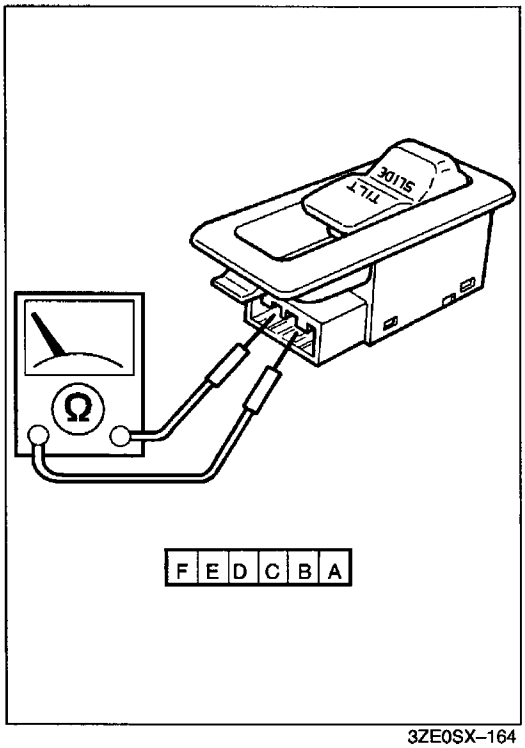
1. Measure the operating time of the glass panel from fully open to fully closed or vice versa.

Specified time: 4—7 sec



3ZE0SX-258

2. If not as specified, adjust the motor driving torque as follows.
   (1) Remove the housing cover screws and the E-ring. Remove the housing cover from the motor.
   (2) Unfold the pole washers indicated by arrows in the figure.
   (3) Loosen the locknut and adjust the torque by using an Allen wrench.
   (4) After adjustment, fold the pole washers to lock the locknut.



3ZE0SX-164

SUNROOF SWITCH

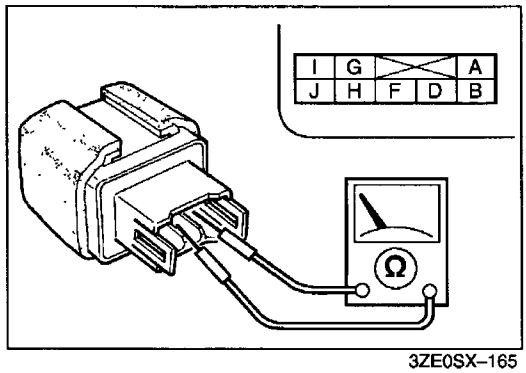
Inspection

1. Remove the sunroof switch. (Refer to page S–110.)
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	O		O			
Tilt down		O	O			
Slide open			O			O
Slide close			O		O	

O—O: Continuity

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



3ZE0SX-165

SUNROOF RELAY

Inspection

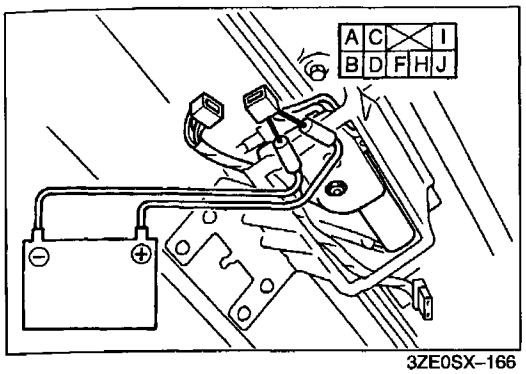
1. Remove the sunroof relay. (Refer to page S–78.)
2. Apply battery voltage and check for continuity between the relay terminals.

B+: Battery positive voltage

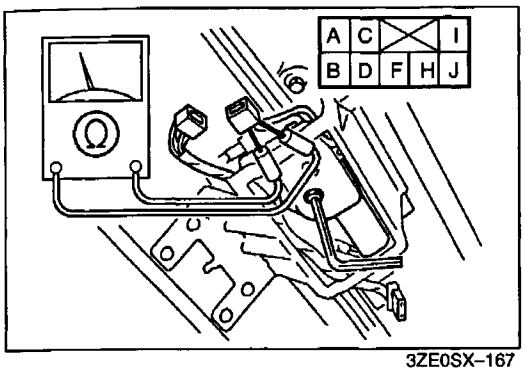
Connection		A	D	G	I
B+	Ground				
—	—	O	O		O
H	J	O	O	O	O
F	B	O	O	O	O

O—O: Continuity

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



3ZE0SX–166



3ZE0SX–167

SUNROOF MOTOR ASSEMBLY

Inspection

Motor

1. Remove the headliner. (Refer to page S–110.)
2. Disconnect the sunroof motor connector.
3. Apply battery voltage to terminal J and connect terminal I 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 specified, replace the sunroof motor assembly.

Limit switch

1. Remove the headliner. (Refer to page S–110.)
2. Disconnect the sunroof motor connector.
3. Operate the slide panel by using an Allen wrench (provided in vehicle). Check for continuity between the terminals of the sunroof motor connector.

Slide panel \ Terminals	A	B	C	D	F
Open			O—O		
Closed				O—O	
Tilted up	O—O			O—O	

O—O: Continuity

4. If not as specified, replace the sunroof motor assembly.

DASHBOARD AND CONSOLE

DASHBOARD AND CONSOLE

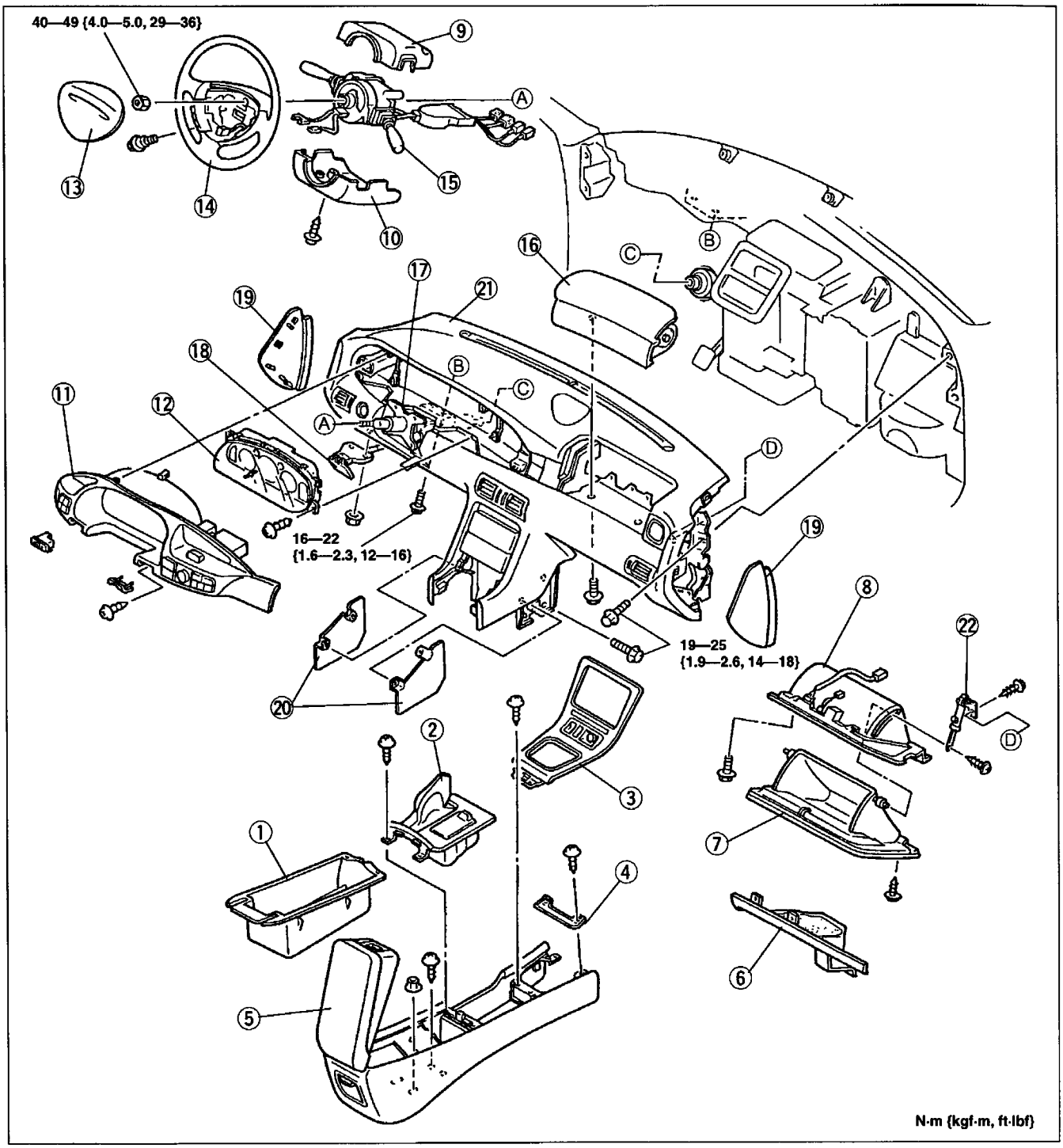
Removal / Installation

1. Disconnect the negative battery cable.

Warning

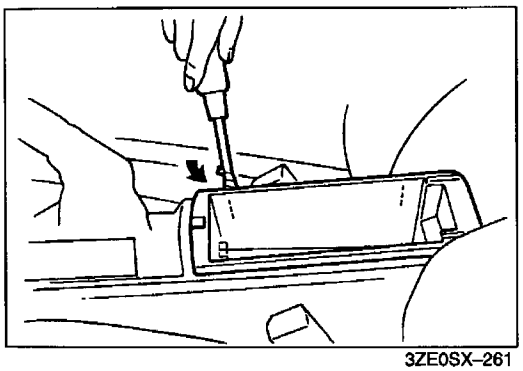
- **Handling the air bag module improperly can accidently deploy the air bag, which may seriously injure you. Read SERVICE WARNINGS, section T, before handling the air bag module.**

2. Remove in the order shown in the figure. To remove the dashboard, remove the A-pillar trim (Refer to page S–92.) and the selector lever. (Refer to section K.)
3. Install in the reverse order of removal.



3ZU0SX–016

1. Rear console box
   Removal note ..... below
2. Brake boot
   Removal note ..... below
3. Center panel
   Removal note ..... below
4. Bracket
5. Rear console
   Removal note ..... page S–90
6. Undercover
7. Glove compartment
   Removal note ..... page S–91
8. Glove compartment cover
9. Upper column cover
10. Lower column cover
11. Meter hood
    Removal note ..... page S–90
12. Instrument cluster
    Removal / Installation ..... section T
13. Driver-side air bag module
    Removal / Installation ..... section T
14. Steering wheel
    Removal / Installation ..... section N
15. Combination switch
    Removal / Installation ..... section T
16. Passenger-side air bag module
    Removal / Installation ..... section T
17. Steering shaft
    Removal note ..... page S–90
18. Hood release knob
19. Side panel
    Removal note ..... page S–90
20. Cover
21. Dashboard
    Removal note ..... page S–91
    Installation note ..... page S–91
22. Damper

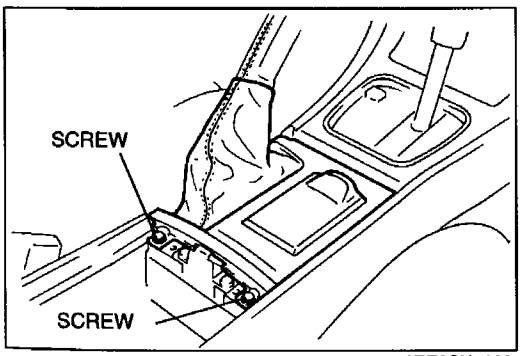


3ZE0SX–261

Removal note

Rear console box

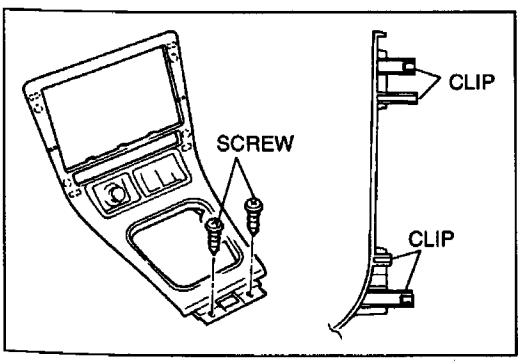
Remove the rear console box by using a screwdriver which has been wrapped in tape as shown in the figure.



3ZE0SX–169

Brake boot

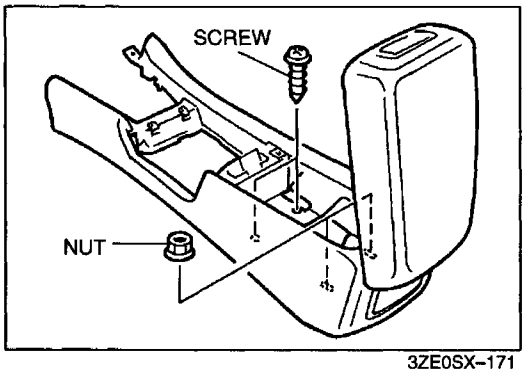
Remove the brake boot installation screws.



3ZE0SX–170

Center panel

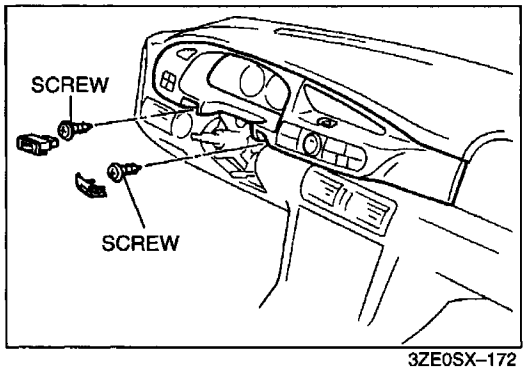
1. Remove the center panel installation screws.
2. Pull the center panel forward to disengage the clips.
3. Disconnect the harness connectors.



3ZE0SX-171

Rear console

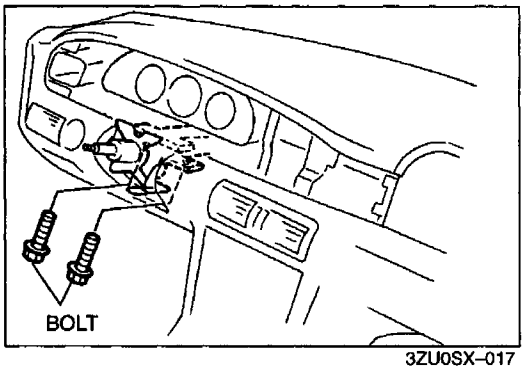
Remove the rear console installation screws and nuts.



3ZE0SX-172

Meter hood

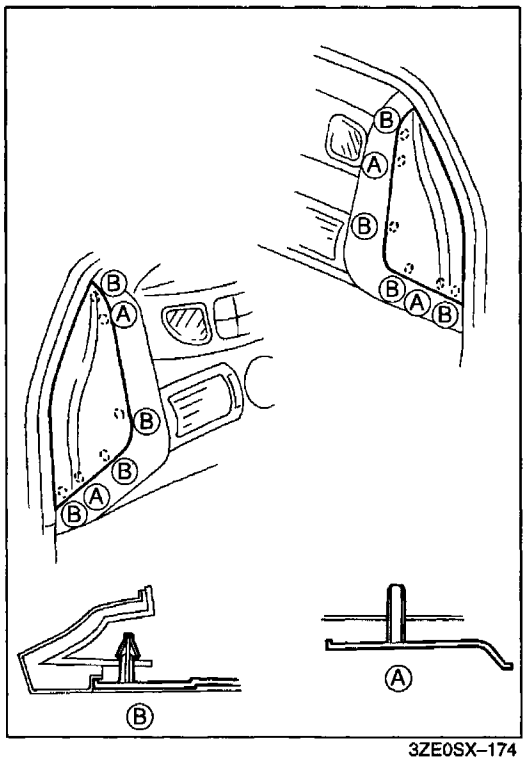
1. Tilt the steering shaft down.
2. Remove the cap and panel light control switch. (Refer to section T.)
3. Remove the meter hood installation screws.
4. Pull the meter hood forward to disengage the clips.



3ZU0SX-017

Steering shaft

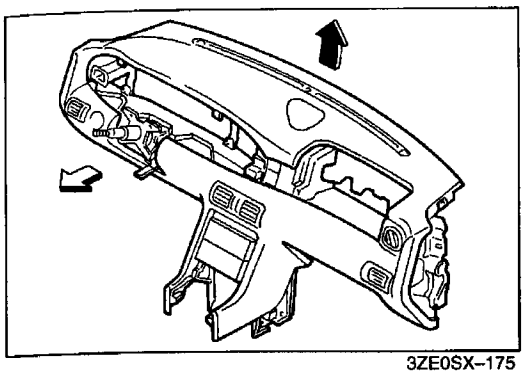
Remove the steering shaft installation bolts.



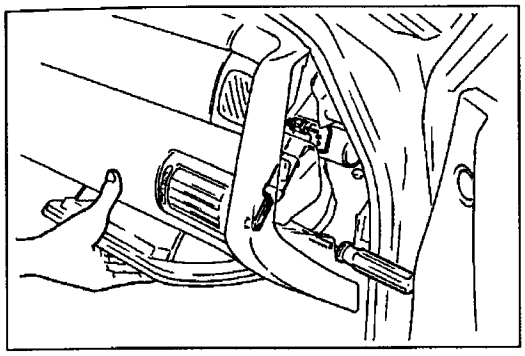
3ZE0SX-174

Side panel

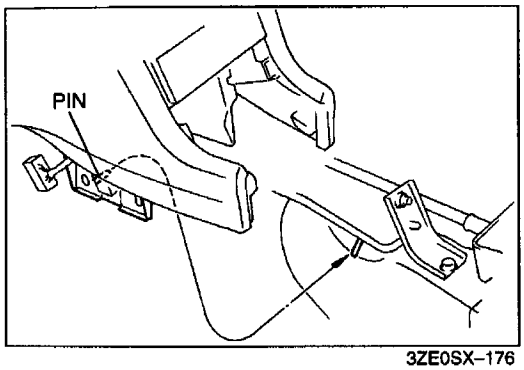
Pull the side panel forward to disengage the clips.


3ZE0SX-175

Dashboard
1. Pull the dashboard up and forward to remove it.
2. Disconnect the harness connectors.



Glove compartment
1. Remove the passenger side panel. (Refer to page S-89.)
2. Remove the glove compartment installation screw by using a long screwdriver as shown in the figure.



3ZE0SX-176

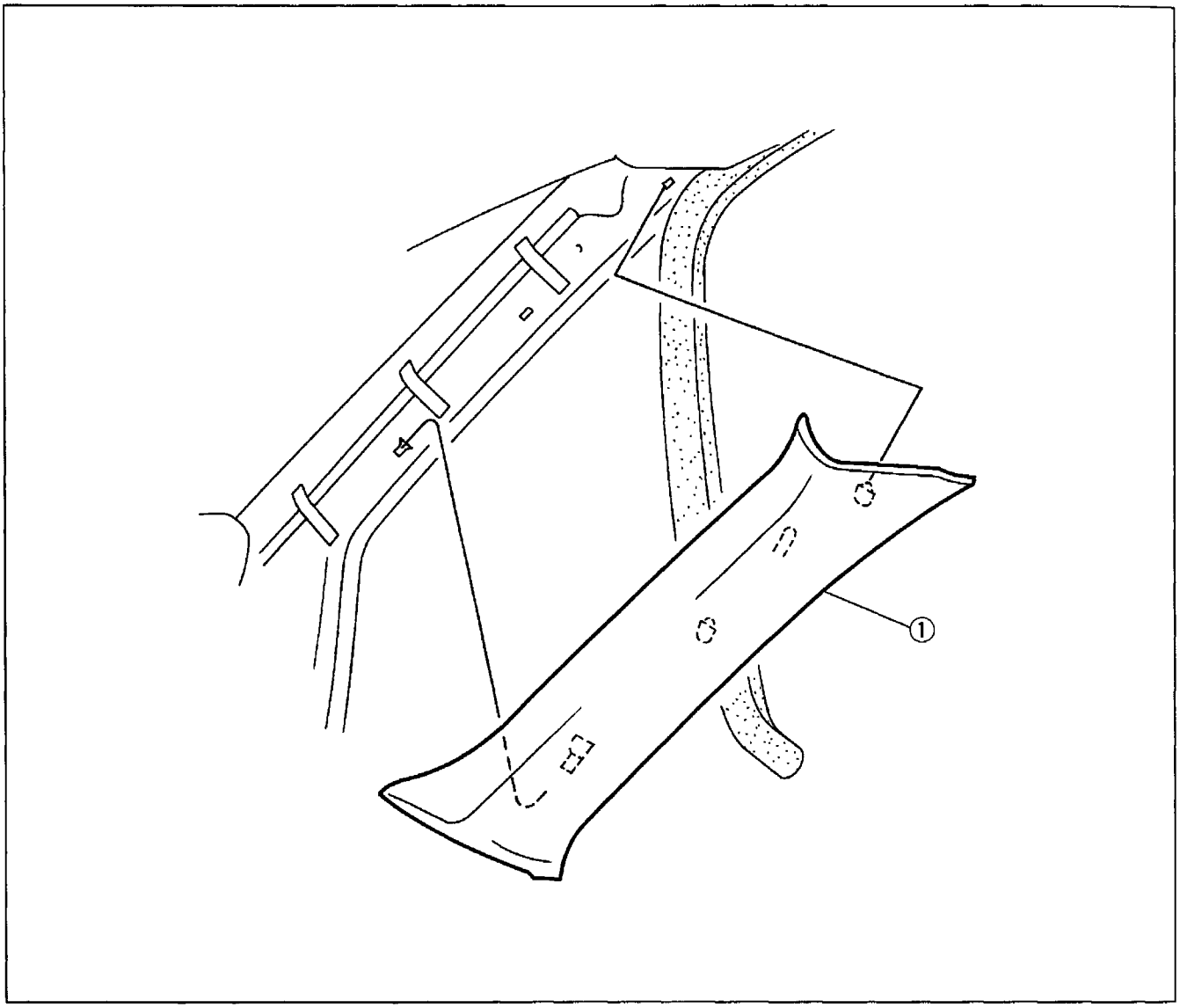
Installation note
Dashboard
Set the dashboard installation pin into its hole as shown.

TRIM

A-PILLAR TRIM

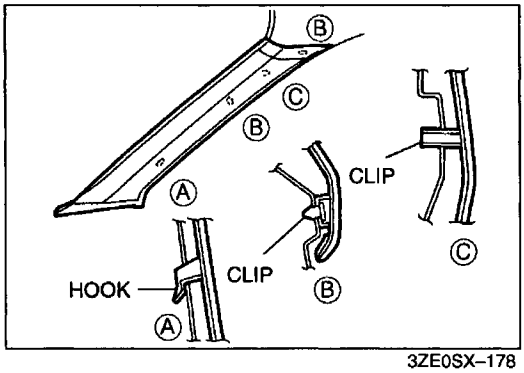
Removal / Installation

1. Remove as shown in the figure.
2. Install as shown in the figure.



3ZE0SX-177

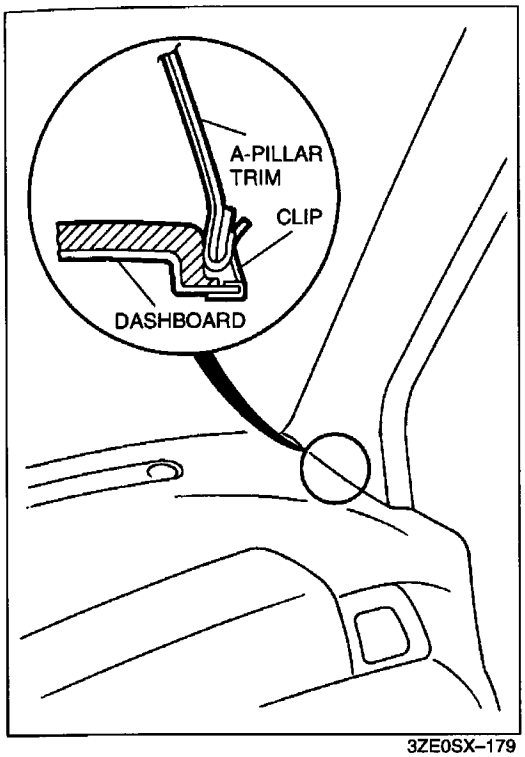
1. A-pillar trim
   Removal note ..... below
   Installation note ..... page S-93



3ZE0SX-178

Removal note

1. Remove the seaming welt along the A-pillar trim.
2. Pull the A-pillar trim forward to disengage the clips from the body.
3. Pull the A-pillar trim upward to disengage the hook from the body.



3ZE0SX-179

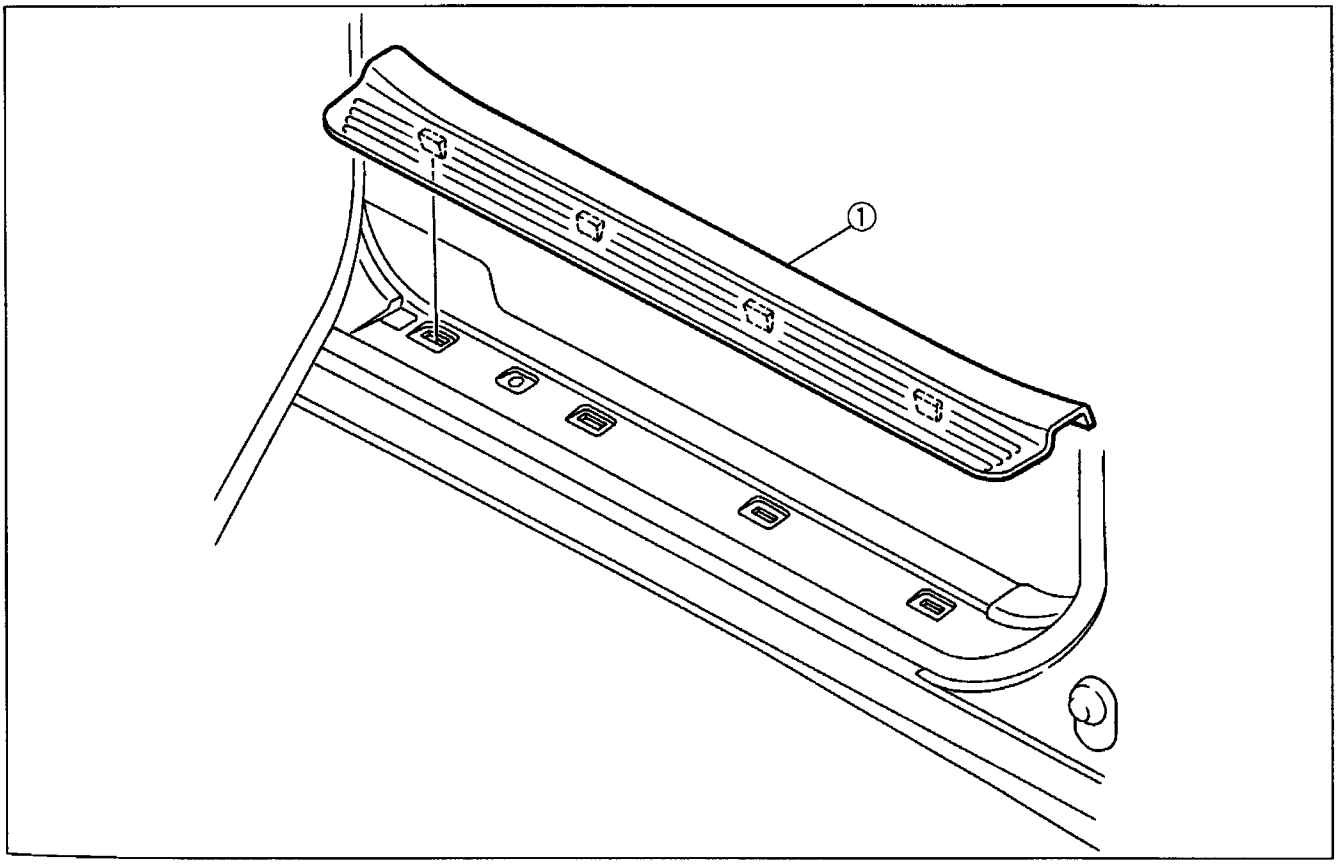
Installation note

Insert the A-pillar trim into the dashboard installation clip.

FRONT SCUFF PLATE

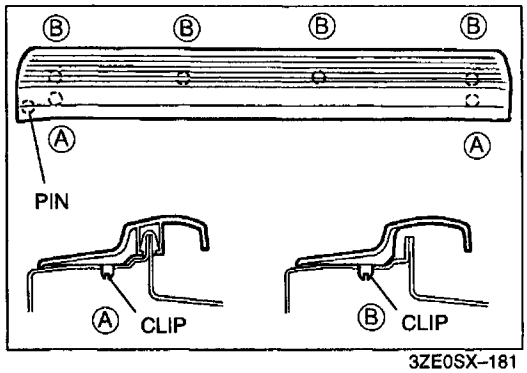
Removal / Installation

1. Remove as shown in the figure.
2. Install as shown in the figure.



3ZE0SX-180

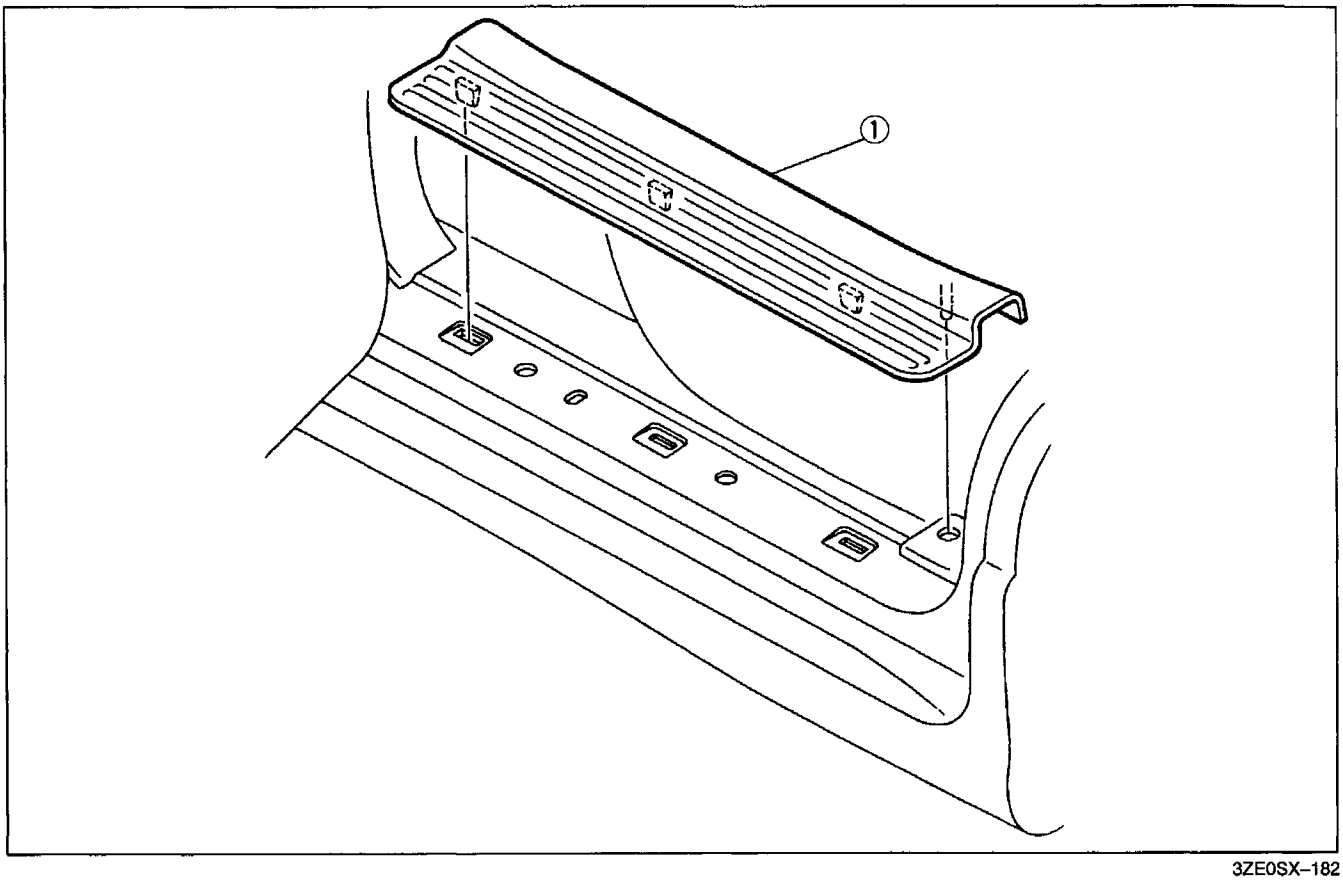
1. Front scuff plate
   Removal note ..... page S-94



3ZE0SX-181

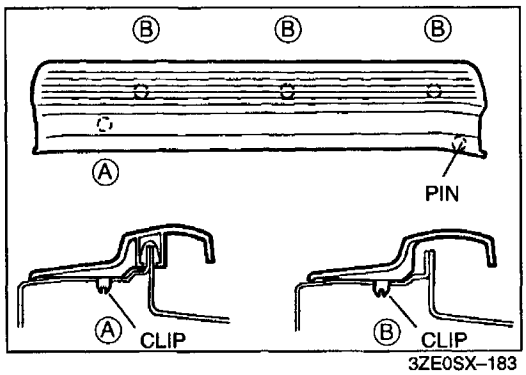
Removal note
Pull the front scuff plate upward to disengage the clips from the body.

REAR SCUFF PLATE
Removal / Installation
1. Remove as shown in the figure.
2. Install as shown in the figure.



3ZE0SX-182

1. Rear scuff plate
   Removal note ..... below



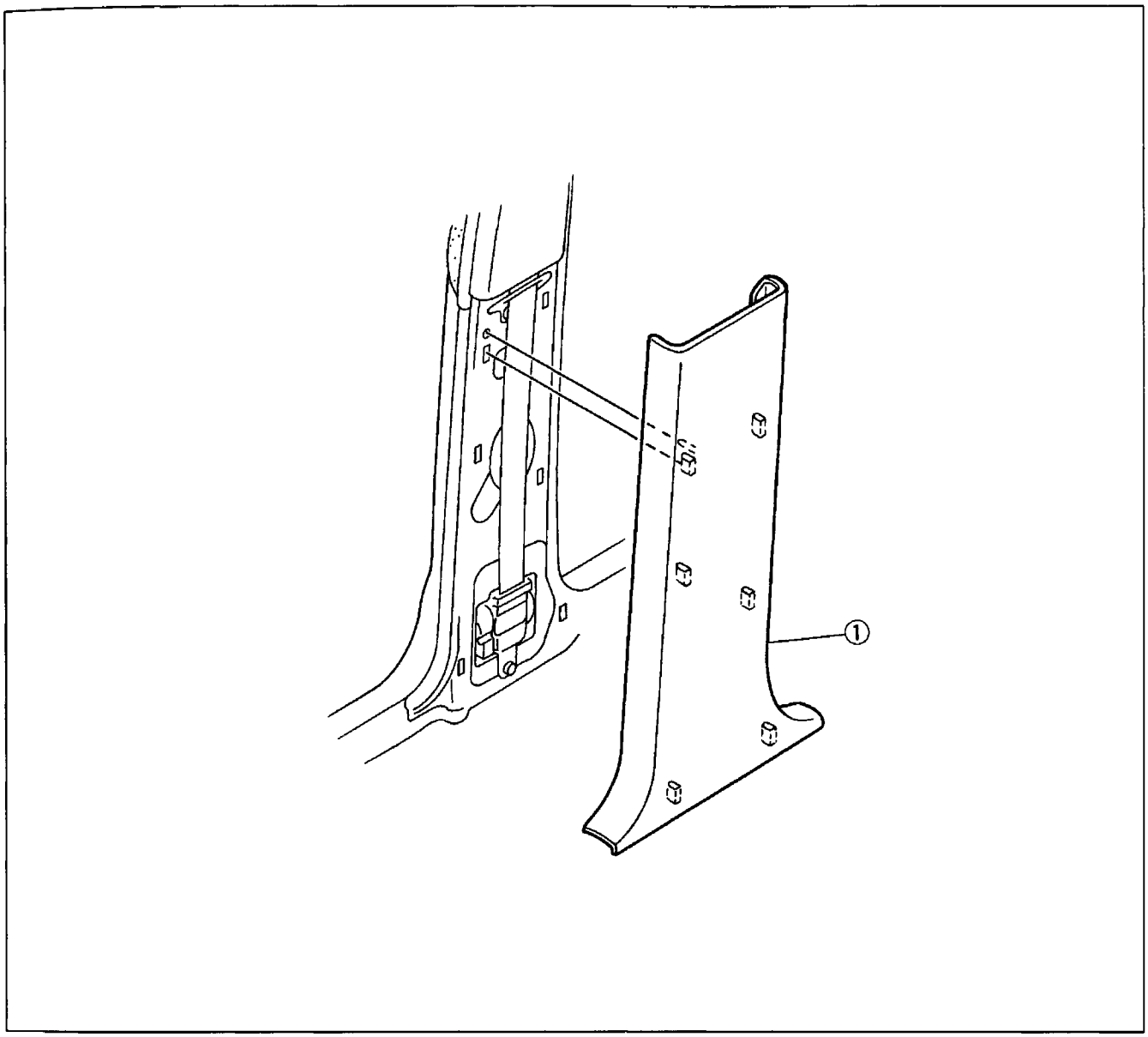
3ZE0SX-183

Removal note
Pull the rear scuff plate upward to disengage the clips from the body.

B-PILLAR LOWER TRIM

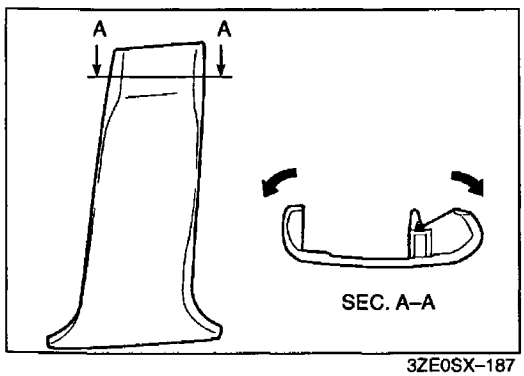
Removal / Installation

1. Remove the front scuff plate (Refer to page S–93.) and rear scuff plate. (Refer to page S–94.)
2. Remove as shown in the figure.
3. Install in the reverse order of removal.



3ZE0SX–186

1. B-pillar lower trim
   Removal note ..... below



3ZE0SX–187

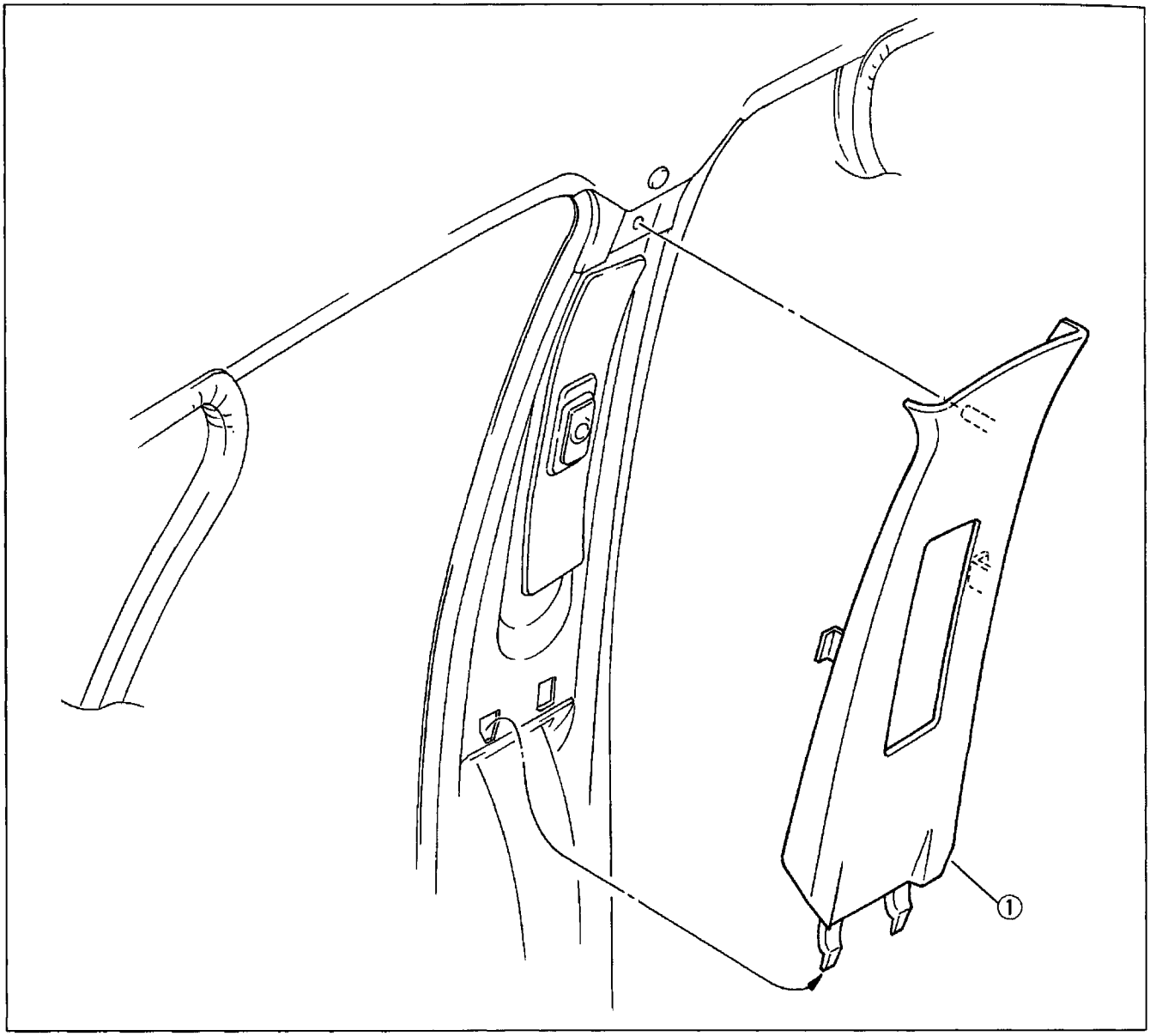
Removal note

1. Remove the seaming welt along the B-pillar lower trim.
2. Pull the rear of the B-pillar lower trim to disengage the clips from the body.

B-PILLAR UPPER TRIM

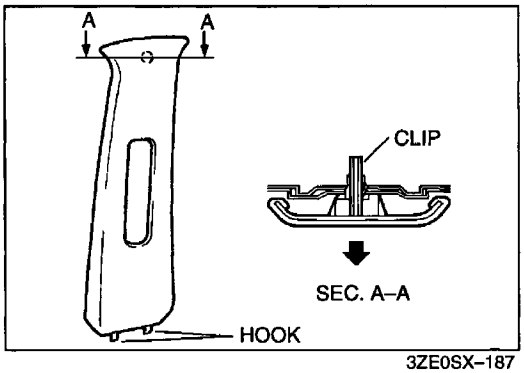
Removal / Installation

1. Remove the B-pillar lower trim. (Refer to page S–95.)
2. Remove as shown in the figure.
3. Install in the reverse order of removal.



3ZE0SX–188

1. B-pillar upper trim
   Removal note ..... below



3ZE0SX–187

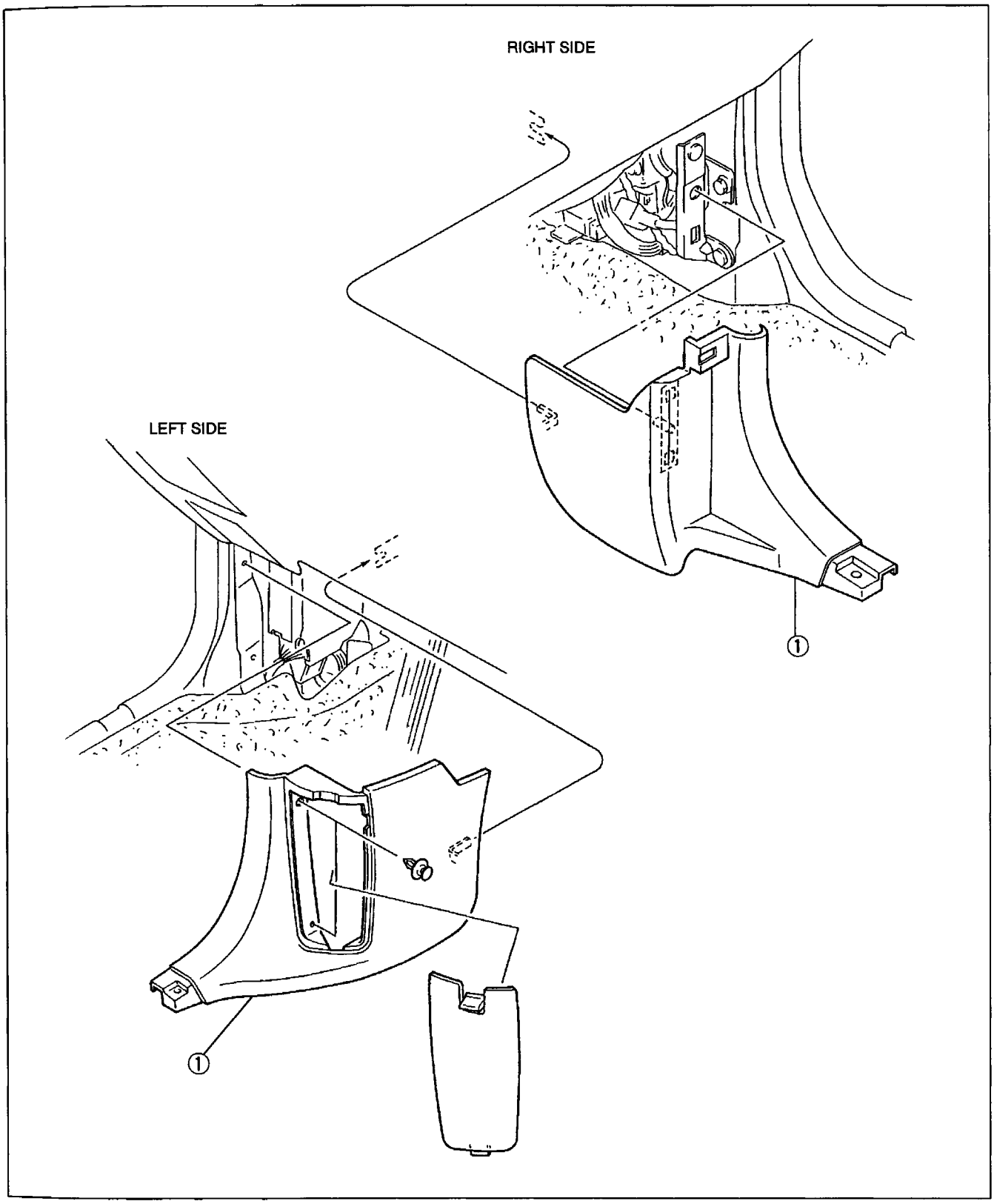
Removal note

1. Remove the front seat belt upper anchor. (Refer to page S–113.)
2. Remove the seaming welt along the B-pillar upper trim.
3. Pull the B-pillar upper trim to disengage the clips from the body.

FRONT SIDE TRIM

Removal / Installation

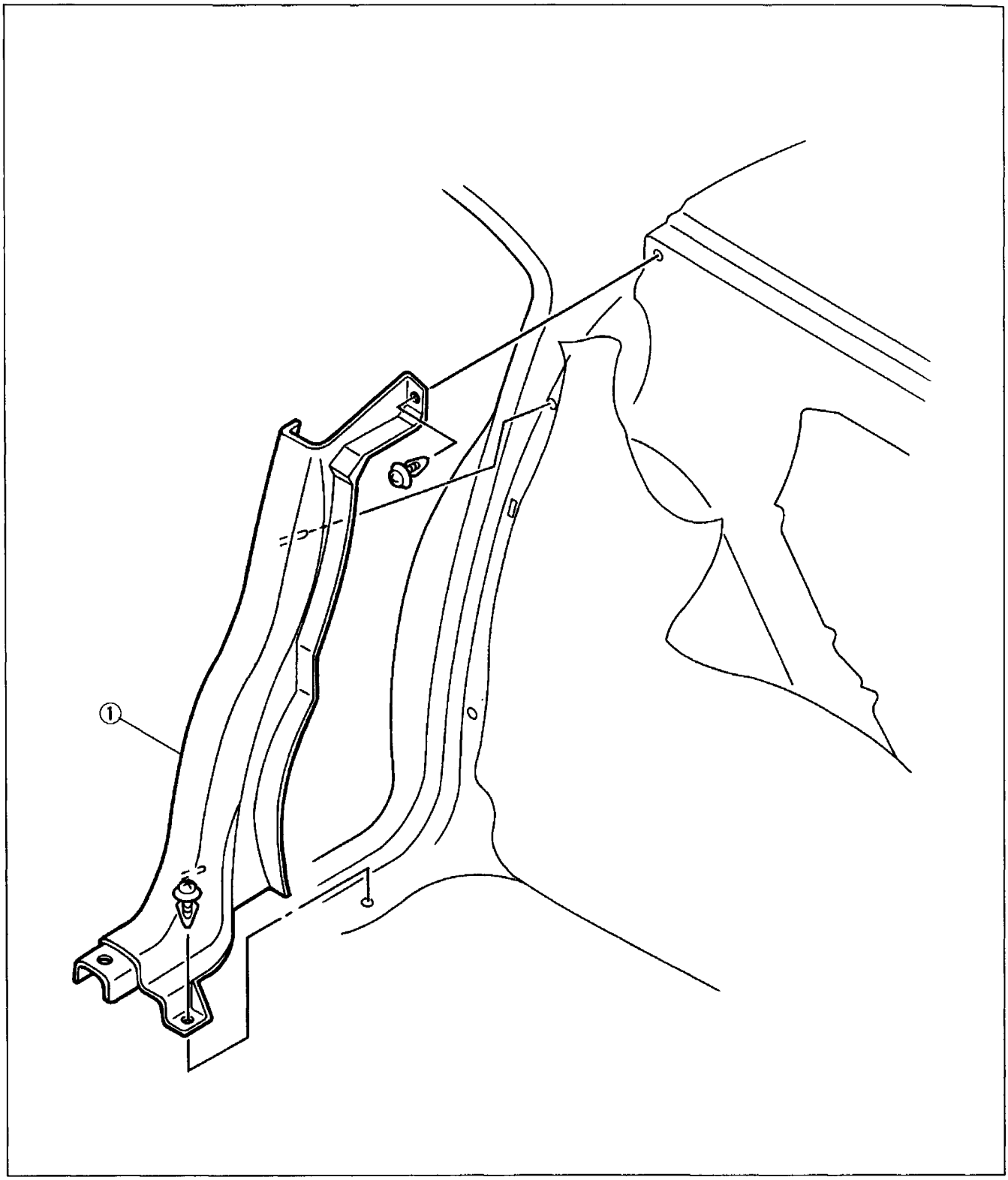
1. Remove the front scuff plate. (Refer to page S–93.)
2. Remove as shown in the figure.
3. Install in the reverse order of removal.



3ZE0SX–188

1. Front side trim

TIRE HOUSE TRIM
Removal / Installation
1. Remove the rear seat cushion and back (Refer to page S–125.) and the rear scuff plate. (Refer to page S–94.)
2. Remove as shown in the figure.
3. Install in the reverse order of removal.



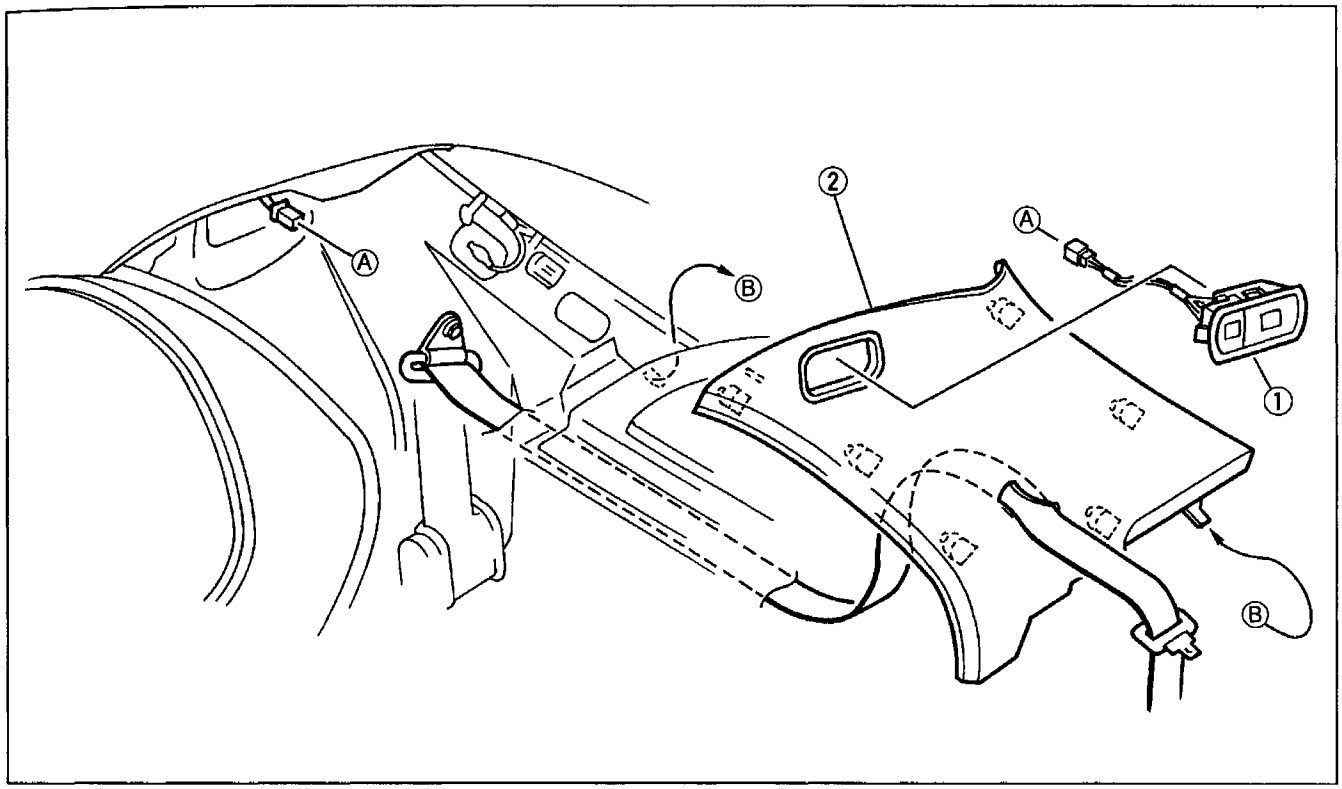
3ZE0SX–189

1. Tire house trim

C-PILLAR TRIM

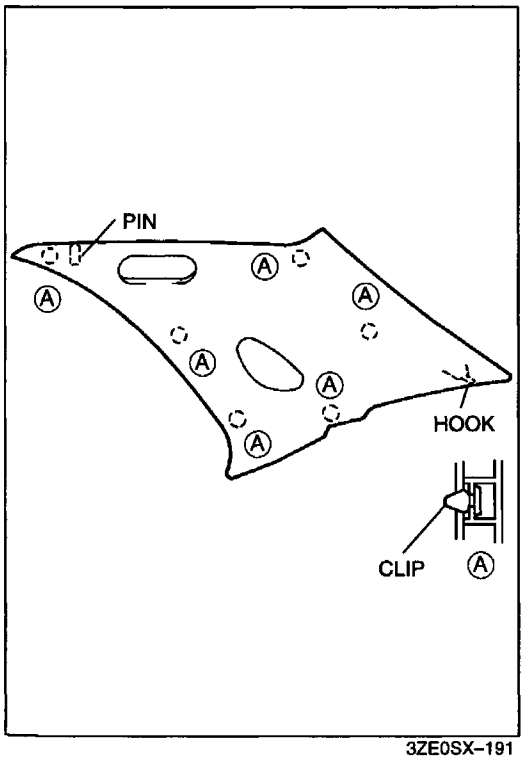
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the tire house trim. (Refer to page S–98.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



3ZE0SX–190

1. Rear personal light
   Removal / Installation ..... section T
2. C-pillar trim
   Removal note ..... below



3ZE0SX–191

Removal note

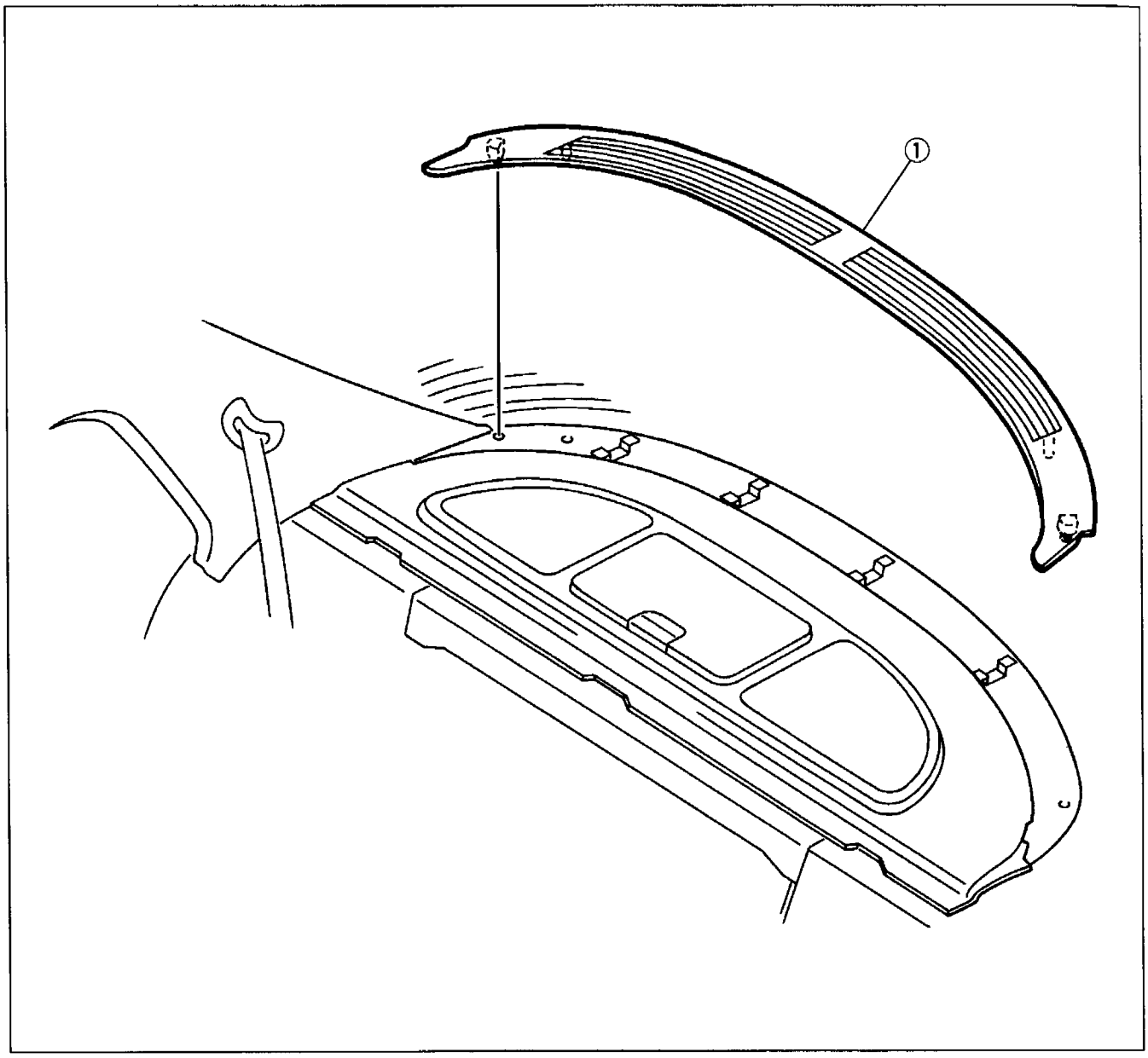
C-pillar trim

1. Remove the rear seat belt lower anchor. (Refer to page S–113.)
2. Remove the seaming welt along the C–pillar trim.
3. Pull the C-pillar trim forward to disengage the clips from the body.

REAR PACKAGE REAR TRIM

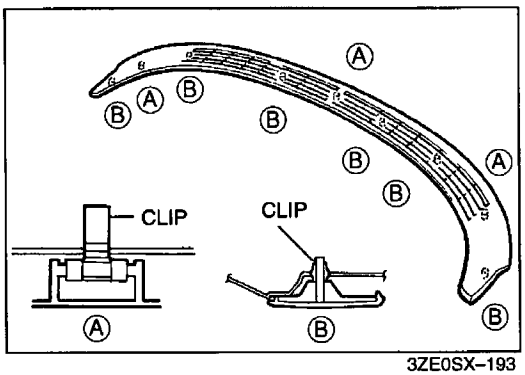
Removal / Installation

1. Remove as shown in the figure.
2. Install as shown in the figure.



3ZE0SX–192

1. Rear package rear trim
   Removal note ..... below



3ZE0SX–193

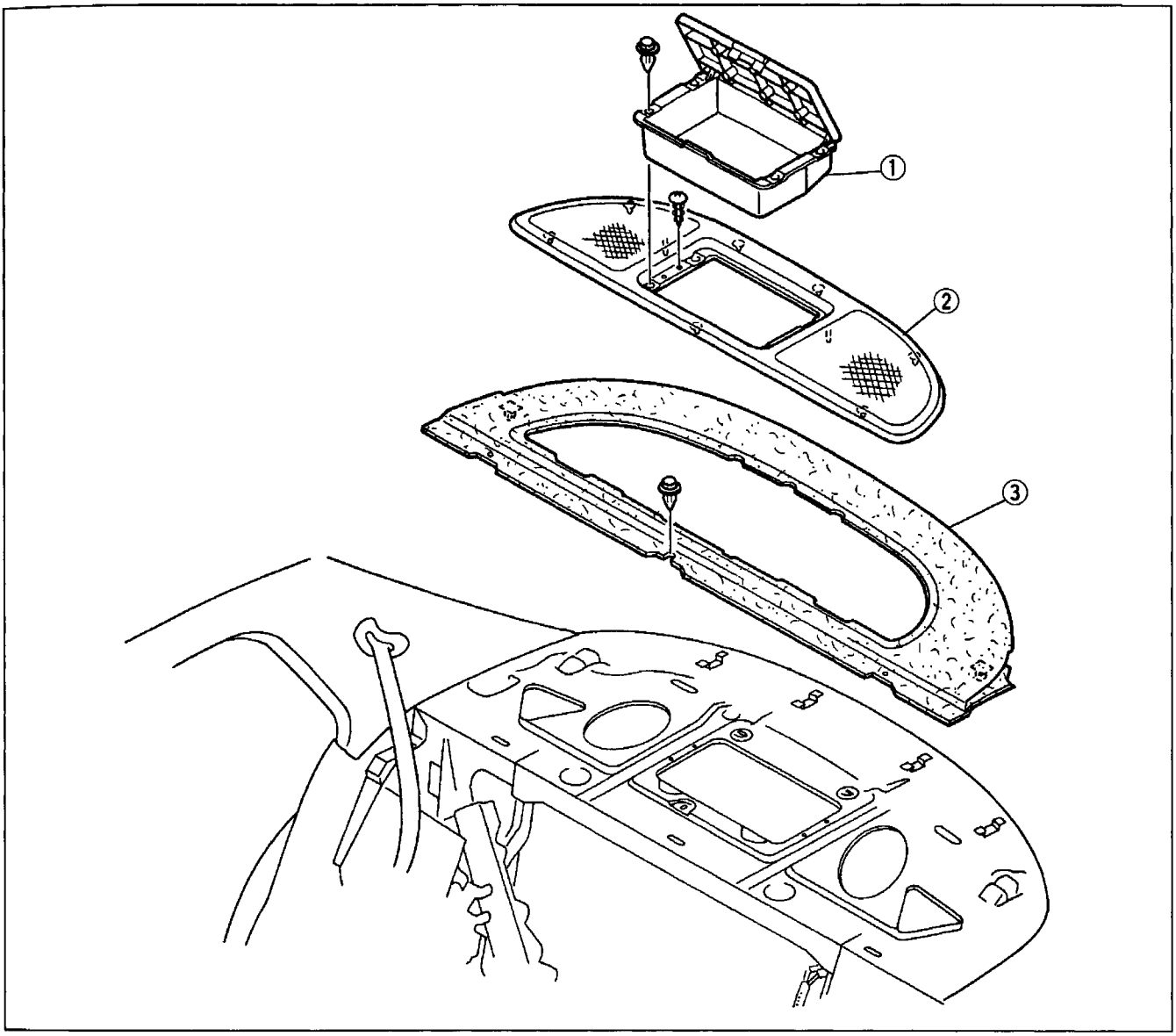
Removal note

Pull the rear package rear trim upward to disengage the clips.

REAR PACKAGE FRONT TRIM

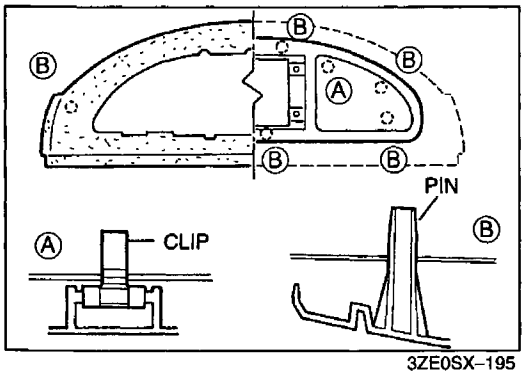
Removal / Installation

1. Remove in the order shown in the figure. To remove the rear package front trim, remove the rear package rear trim. (Refer to page S–100.)
2. Install in the reverse order of removal.



3ZE0SX–194

1. First-aid box
2. Speaker cover
   Removal note ..... below
3. Rear package front trim
   Removal note ..... below



3ZE0SX–195

Removal note

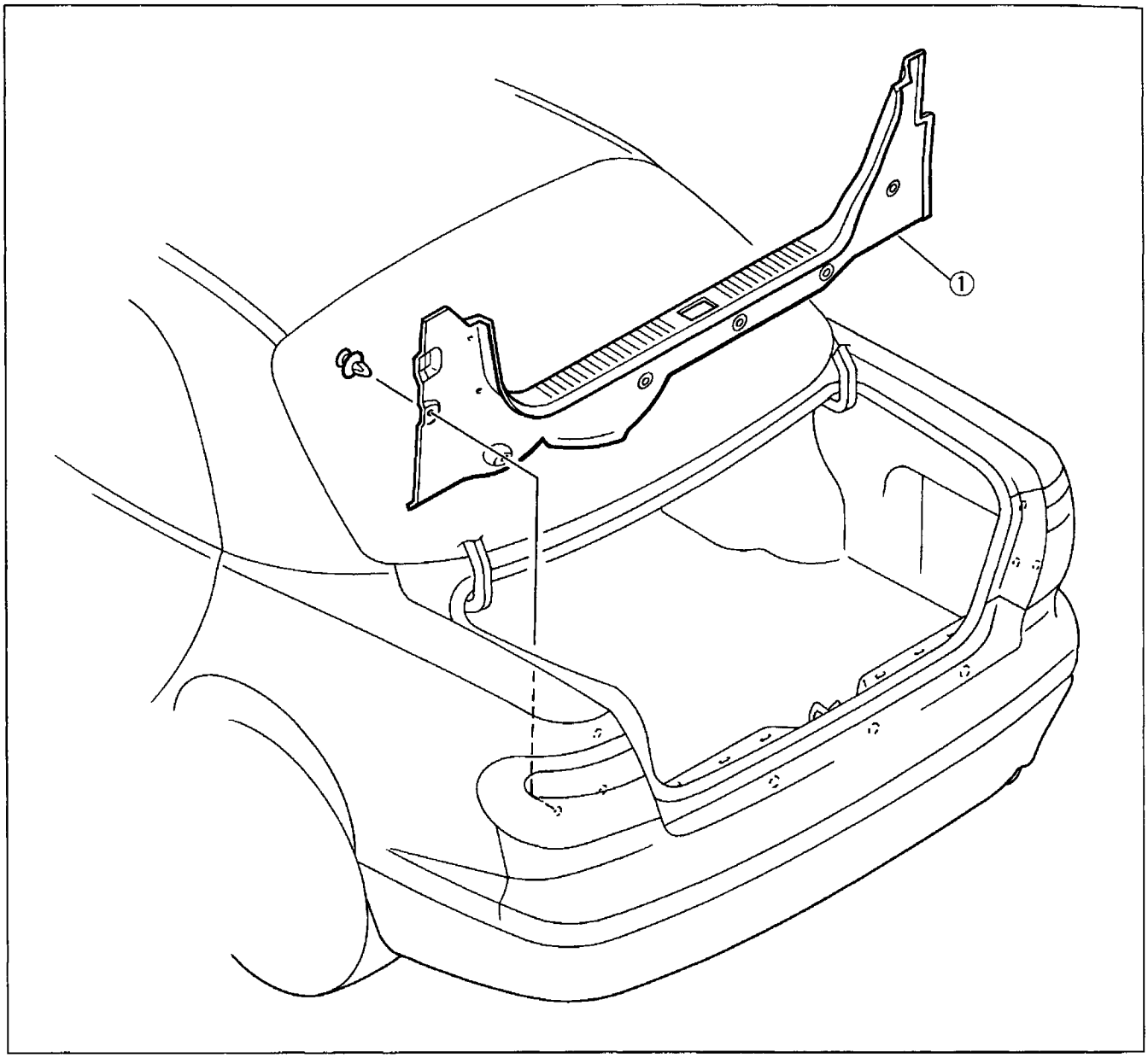
Speaker cover, rear package front trim

Pull the speaker cover and rear package front trim upward to disengage the clips.

TRUNK END TRIM

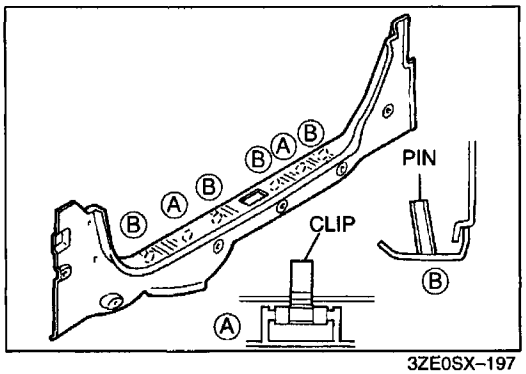
Removal / Installation

1. Remove as shown in the figure.
2. Install as shown in the figure.



3ZE0SX-196

1. Trunk end trim
   Removal note ..... below



3ZE0SX-197

Removal note

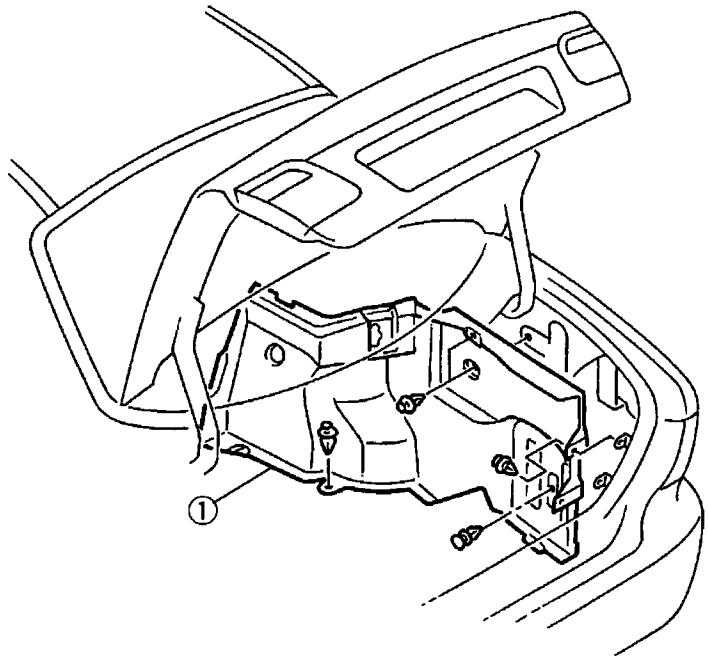
Pull the trunk end trim upward to disengage the clips.

TRUNK SIDE TRIM

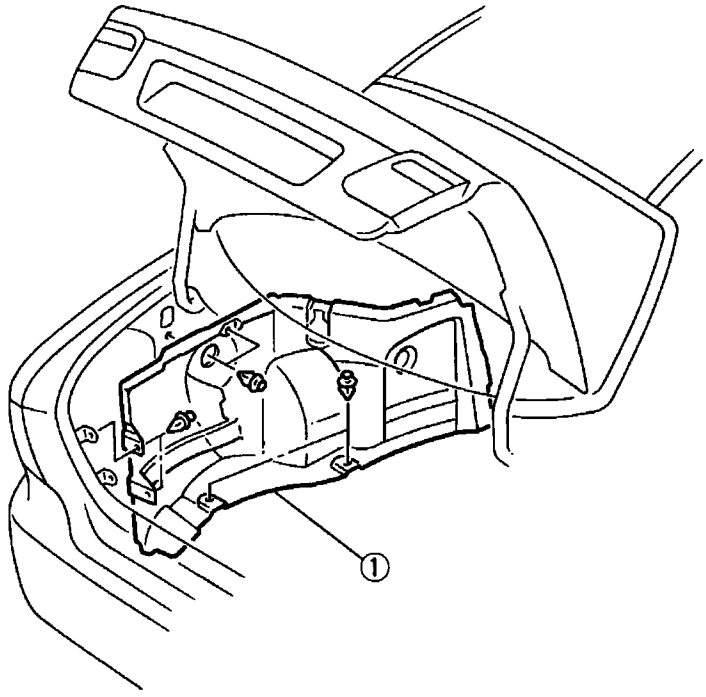
Removal / Installation

1. Remove as shown in the figure. To remove the trunk side trim, remove the trunk end trim. (Refer to page S–102.)
2. Install in the reverse order of removal.

RIGHT SIDE



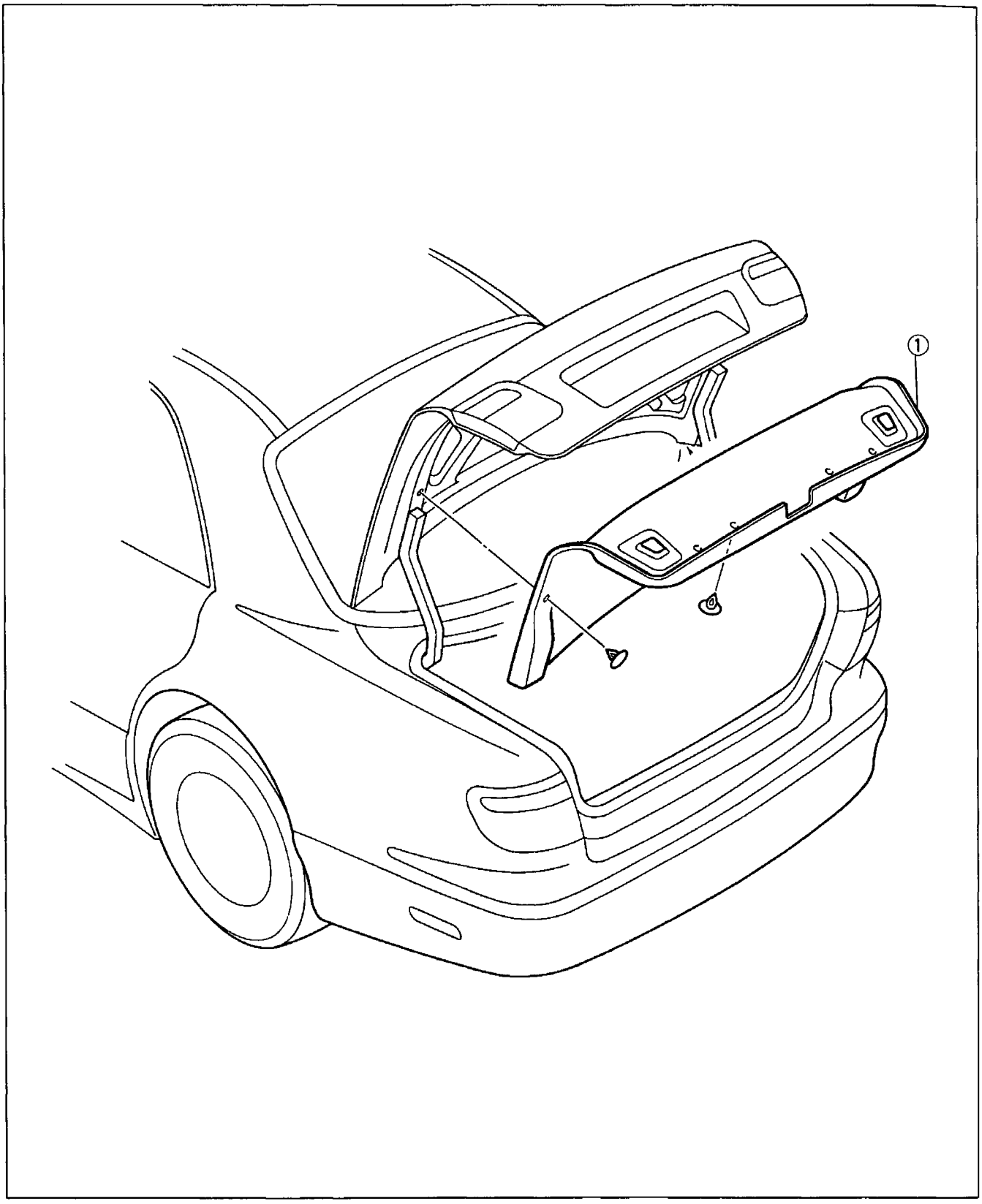
LEFT SIDE



3ZE0SX–198

1. Trunk side trim

TRUNK LID TRIM
Removal / Installation
1. Remove as shown in the figure.
2. Install as shown in the figure.



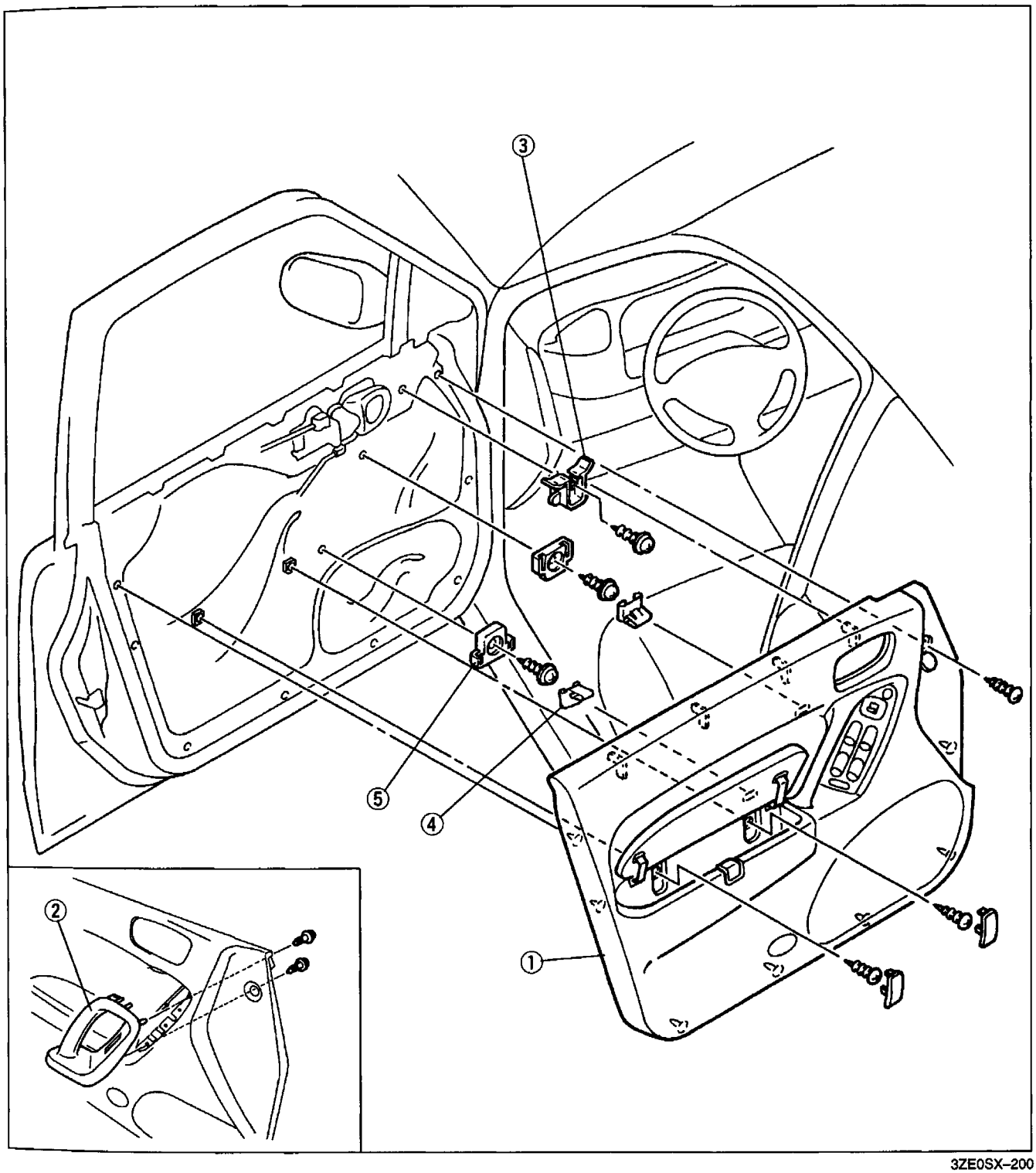
3ZE0SX–199

1. Trunk lid trim

FRONT DOOR TRIM

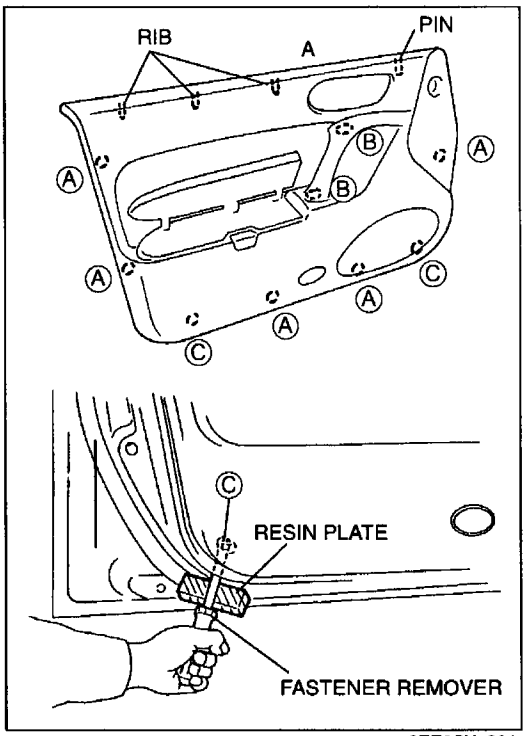
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the inner garnish and inner handle cover. (Refer to page S–10.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



3ZE0SX–200

1. Front door trim
   - Removal note ..... page S–106
   - Installation note ..... page S–106
2. Pull handle
3. Bracket
4. Clip
5. Screw grommet



3ZE0SX-201

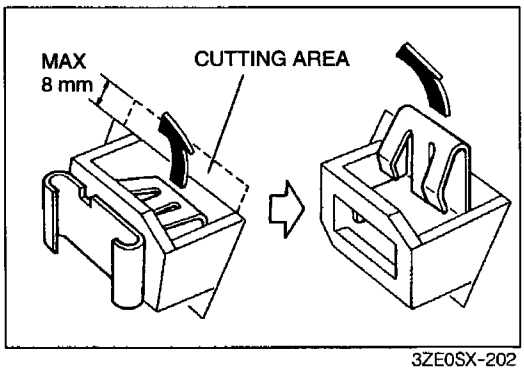
Removal note
Front door trim
1. Loosen the inner handle installation screw.
2. By inserting the fastener remover as shown, remove fasteners Ⓒ. Protect the body with a resin plate to prevent it from being dented or damaged.
3. Pull the door trim to remove fasteners Ⓐ from the body.

Note
- Fastener Ⓒ cannot be reused.

4. Lift the door trim up and remove the trim and clips Ⓑ together.

Caution
- **If the clips Ⓑ are pulled forward, the door trim will break.**

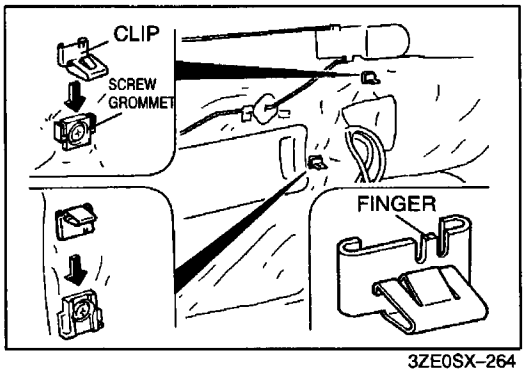
5. Disconnect the wiring harnesses.



3ZE0SX-202

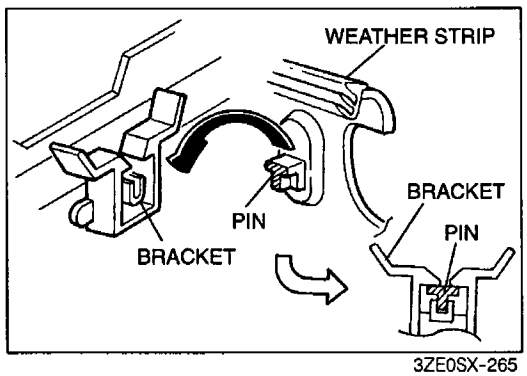
Clip
Remove the clips from the door trim as shown in the figure.

Note
- If the clips are difficult to remove, cut a part of the trim by using a razor knife.



3ZE0SX-264

Installation note
Screw grommet, clip
1. Install the grommets as shown in the figure.
2. Point the finger of the upper clip upward and the finger of the lower clip downward and slide the clips onto the grommets. If the clips are installed upside-down, the door trim cannot be installed properly and the clips will be impossible to remove from the trim without breakage.



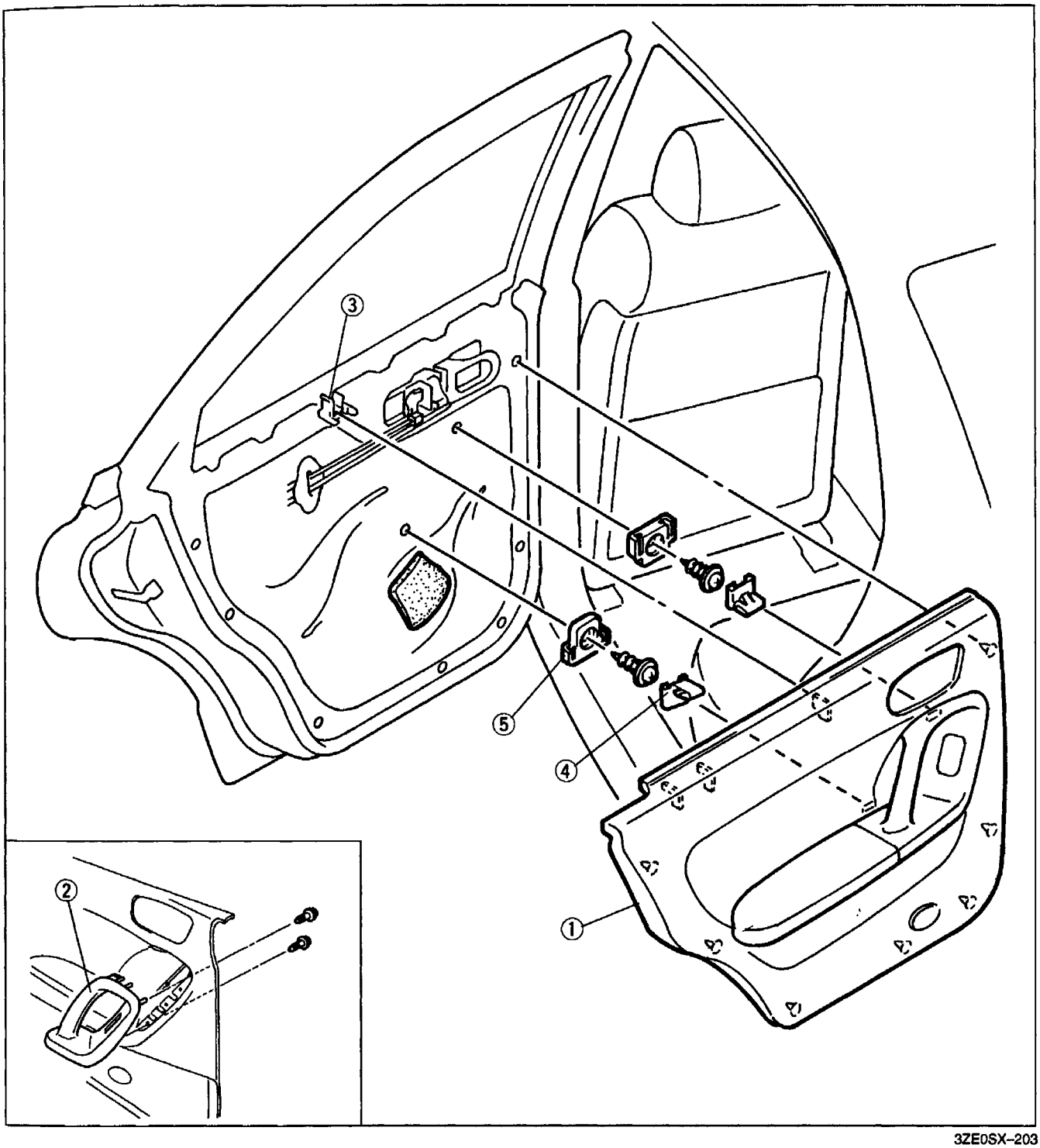
3ZE0SX-265

Front door trim
1. Hook the door trim weatherstrip over the body and lower the pin into its bracket.
2. Look through the inner handle opening and verify that the pin is properly installed and that the clips are properly aligned with the body holes.
3. Push the door trim to secure the clips and fasteners.
4. Install the inner handle installation screw.

REAR DOOR TRIM

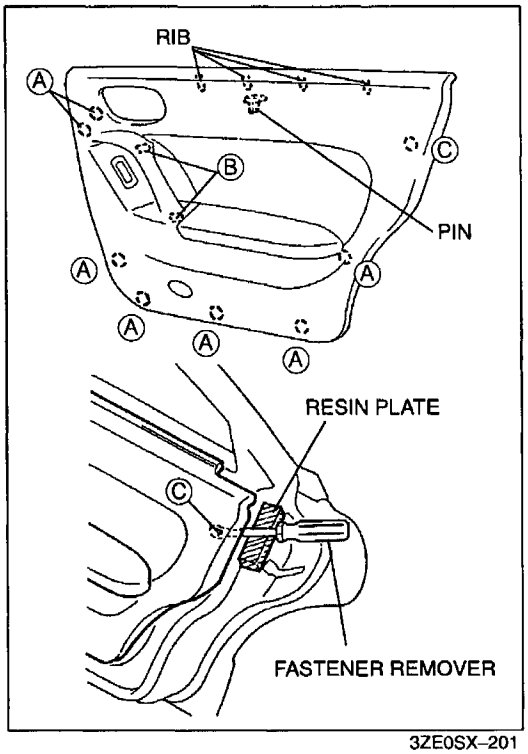
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the inner garnish and inner handle cover. (Refer to page S–11.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



3ZE0SX–203

1. Rear door trim
   - Removal note ..... page S–108
   - Installation note ..... page S–108
2. Pull handle
3. Bracket
4. Clip
5. Screw grommet



3ZE0SX-201

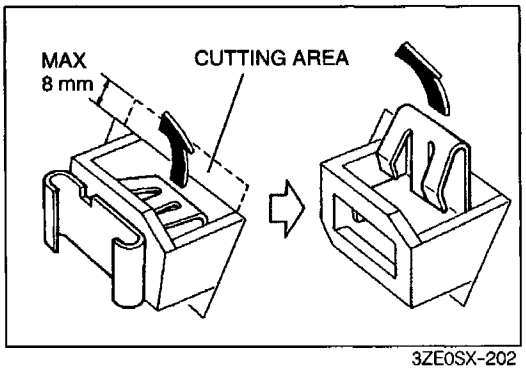
Removal note
Rear door trim
1. Loosen the inner handle installation screw.
2. Pull the door trim to remove fasteners Ⓐ from the body.
3. By inserting the fastener remover as shown, remove fastener Ⓒ. Protect the body with a resin plate to prevent it from being dented or damaged.

Note
- Fastener Ⓒ cannot be reused.

4. Lift the door trim up and remove the trim and clips Ⓑ together.

Caution
- **If the clips Ⓑ are pulled forward, the door trim will break.**

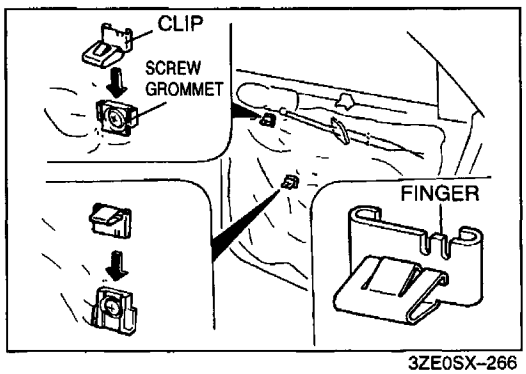
5. Disconnect the wiring harnesses.



3ZE0SX-202

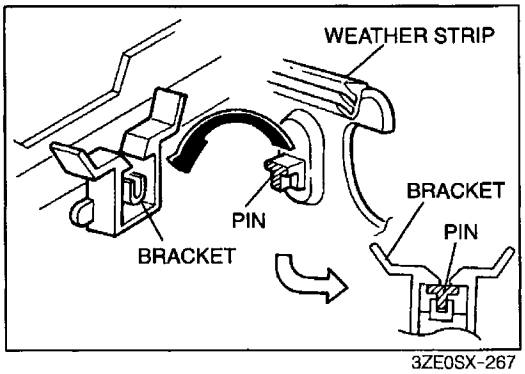
Clip
Remove the clips from the door trim as shown in the figure.

Note
- If the clips are difficult to remove, cut a part of the trim by using a razor knife.



3ZE0SX-266

Installation note
Screw grommet, clip
1. Install the grommets as shown in the figure.
2. Point the finger of the upper clip upward and the finger of the lower clip downward and slide the clips onto the grommets. If the clips are installed upside-down, the door trim cannot be installed properly and the clips will be impossible to remove from the trim without breakage.



3ZE0SX-267

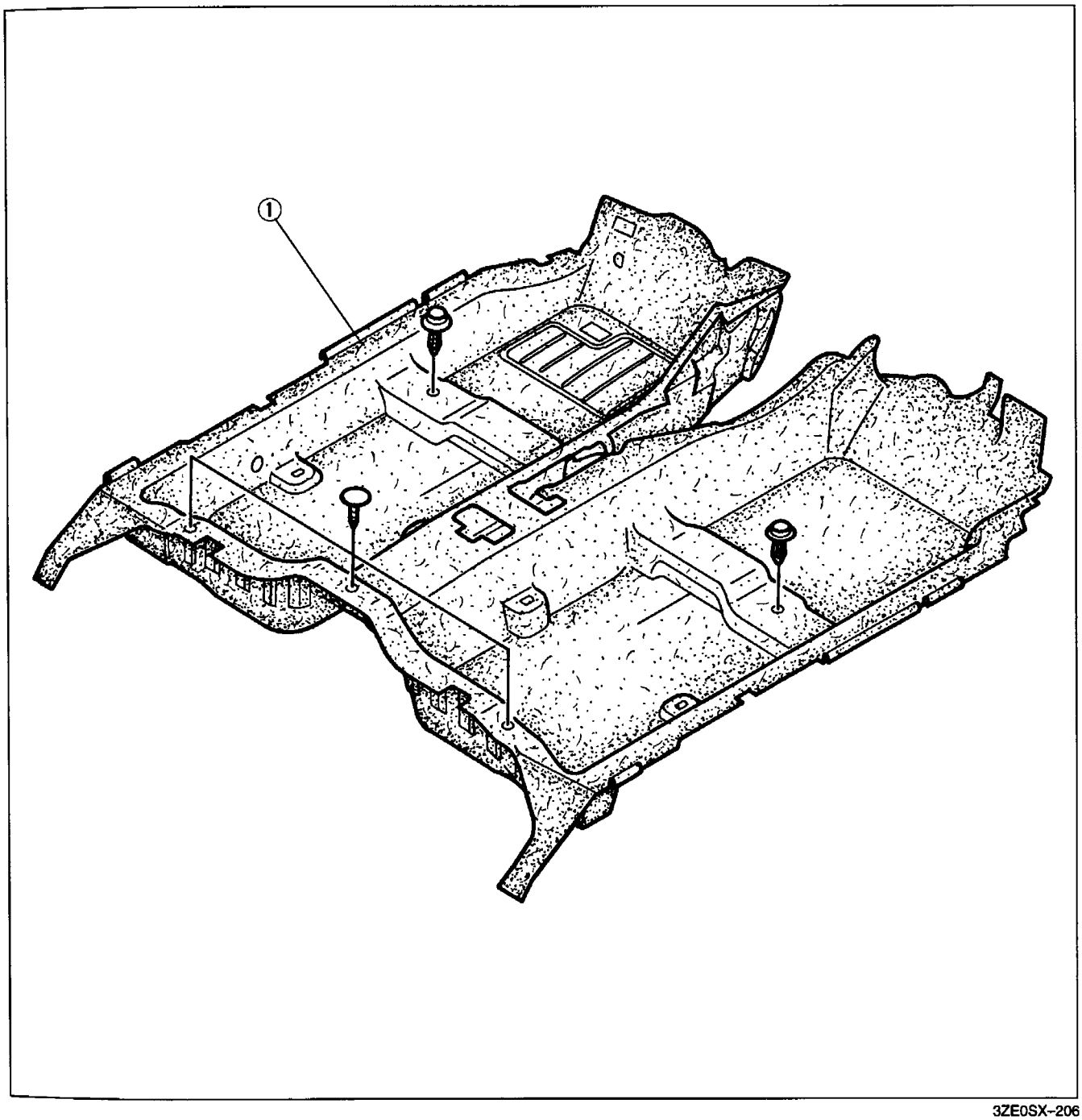
Rear door trim
1. Hook the door trim weatherstrip over the body and lower the pin into its bracket.
2. Look through the inner handle opening and verify that the clips are properly aligned with the body holes.
3. Push the door trim to secure the clips and fasteners.
4. Install the inner handle installation screw.

FLOOR COVERING

FLOOR COVERING

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the following.
   a. Front seats (Refer to page S–115.), and rear seat cushion (Refer to page S–125.)
   b. Dashboard and rear console (Refer to page S–88.)
   c. Front side trim (Refer to page S–97.), front scuff plate (Refer to page S–93.), rear scuff plate (Refer to page S–94.), B-pillar lower trim (Refer to page S–95.), and tire house trim (Refer to page S–98.)
   d. Front seat belt lower anchor (Refer to page S–113.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



3ZE0SX--206

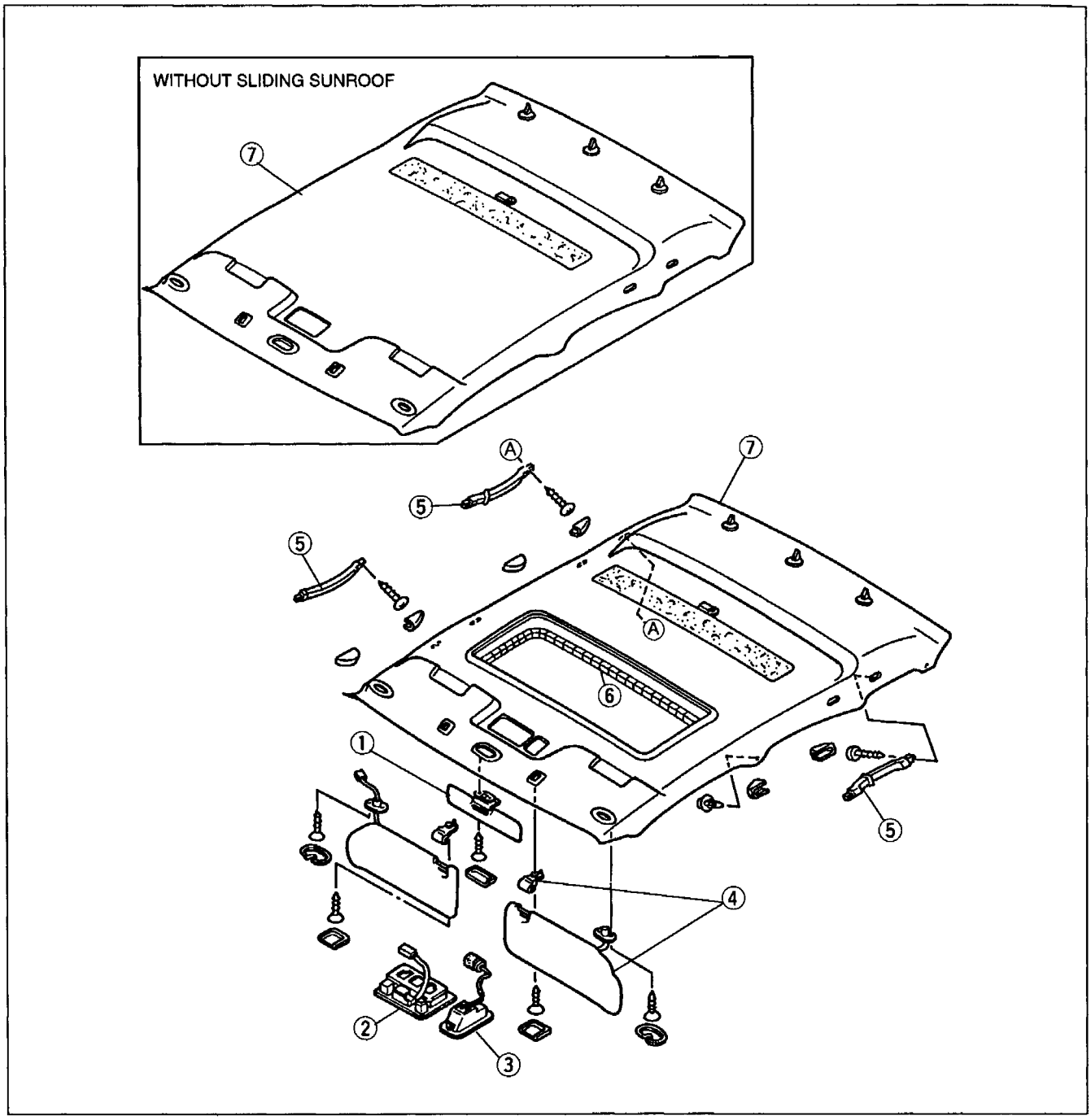
1. Cabin carpet

HEADLINER

HEADLINER

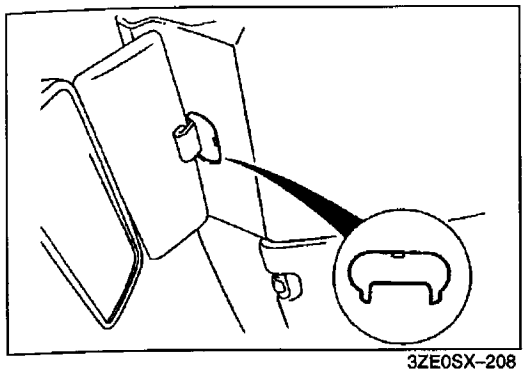
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the A–pillar trim (Rear to page S–92.), B–pillar upper trim (Rear to page S–96), and C–pillar trim. (Refer to page S–99.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



3ZU0SX–018

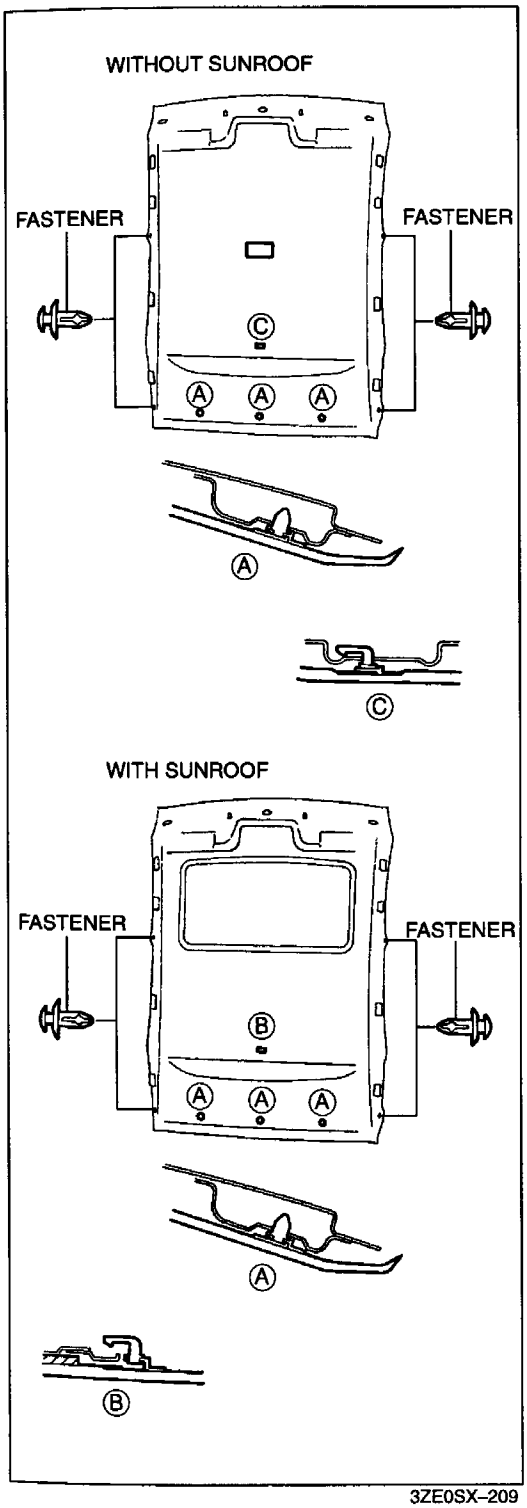
1. Center sunvisor
   Removal note ..... page S–111
2. Overhead console
3. Sunroof switch (sliding sunroof)
   Inspection ..... page S– 86
4. Sunvisor and adapter
5. Assist handle
6. Seaming welt (sliding sunroof)
7. Headliner
   Removal note ..... page S–111



3ZE0SX-208

Removal note
Center sunvisor

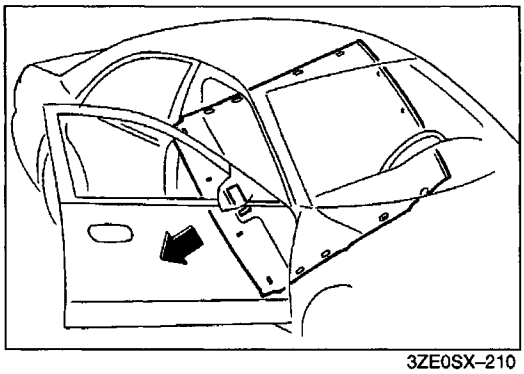
1. Insert a screwdriver which has been wrapped in tape into the notch of the cap and pry it out.
2. Remove the installation screws to remove the center sunvisor.



3ZE0SX-209

Headliner

1. Remove the headliner mounting fasteners.
2. Disconnect the clips at the rear of the headliner to remove the headliner.


3ZE0SX-210

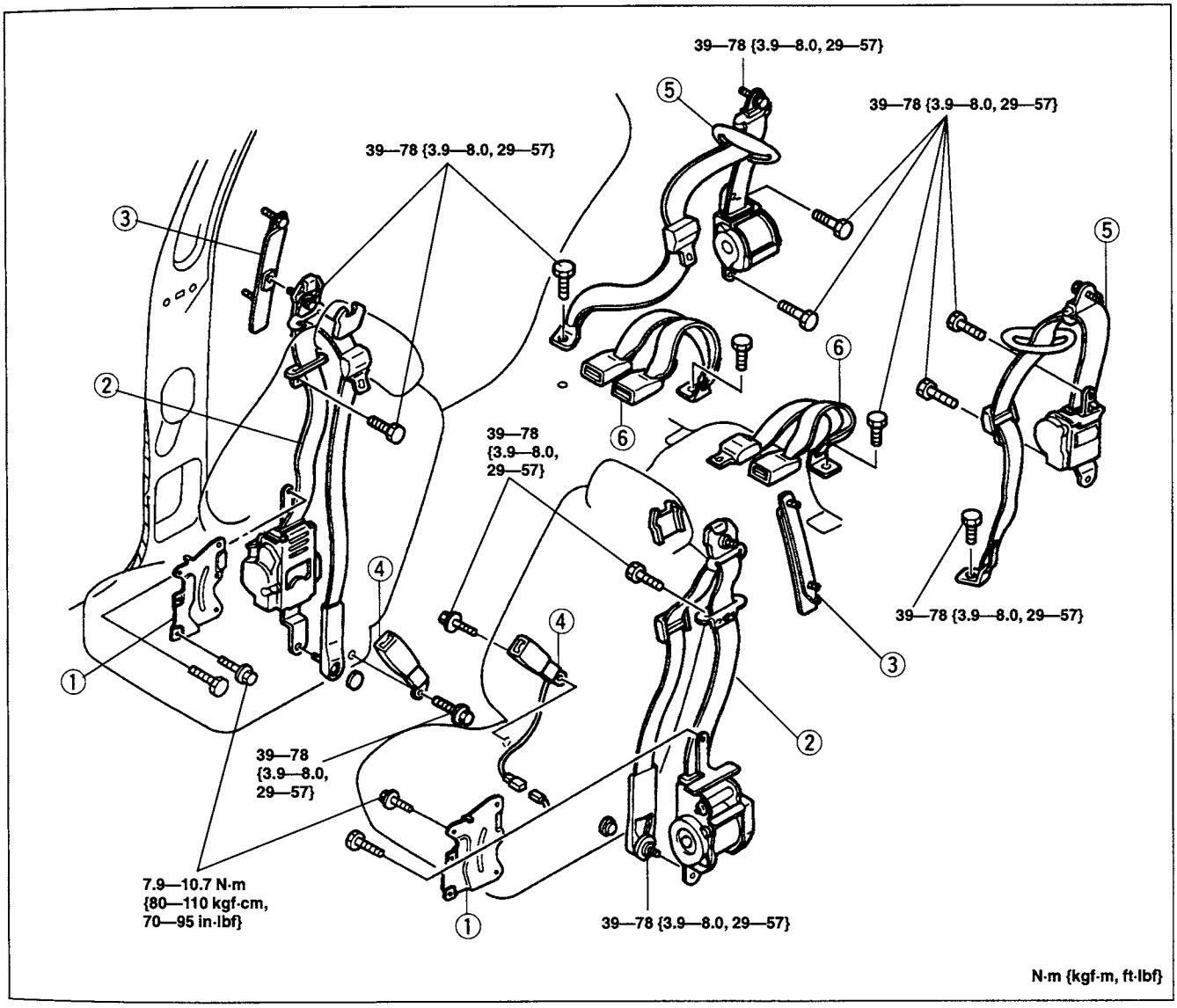
3. Slide back the front seat and fold the seat down.
4. Take out the headliner from the passenger's side.

SEAT BELT

SEAT BELT
Removal / Installation

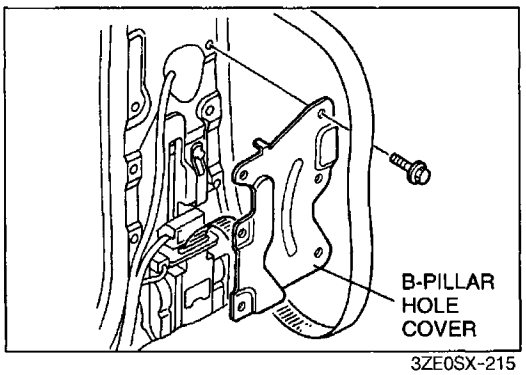
Caution
- **The ELR (emergency locking retractor) has a spring that will unwind if the retractor's cover is removed. The spring cannot be rewound by hand. If this occurs, the ELR will not work properly. Therefore, do not disassemble the retractor.**

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure. To remove the front seat belts, remove the B–pillar lower trim. (Refer to page S–95.) To remove the anchor adjuster, remove the B-pillar upper trim. (Refer to page S–96.) To remove the rear seat belts, remove the C-pillar trim (Refer to page S–99.) and rear seat cushion. (Refer to page S–125.)
3. Install in the reverse order of removal.



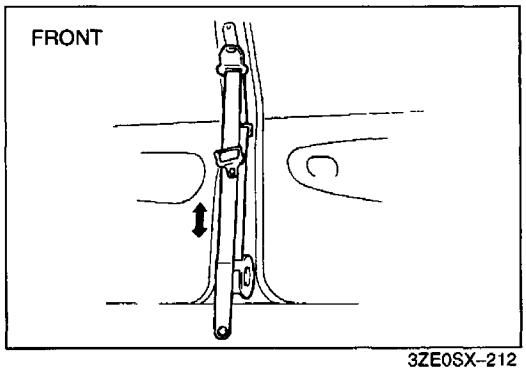
3ZE0SX–211

1. B-pillar hole cover
   Installation note ..... page S–114
2. Front seat belt
   Inspection ..... page S–114
3. Anchor adjuster
4. Front buckle
   Inspection ..... page S–114
5. Rear seat belt
   Inspection ..... page S–114
6. Rear buckle



3ZE0SX-215

Installation note
B-pillar hole cover
Install the B-pillar hole cover between the seat belt and B-pillar. If the seat belt is installed between the hole cover and B-pillar, the seat belt will be difficult or impossible to extend.

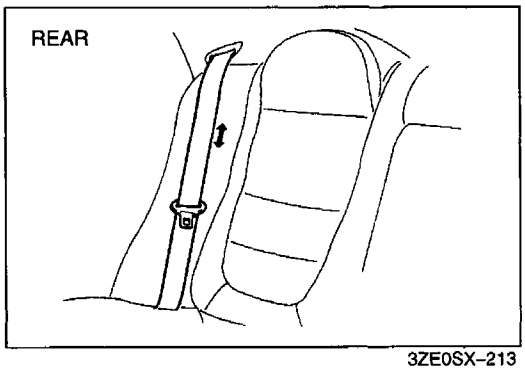


3ZE0SX-212

FRONT AND REAR SEAT BELTS

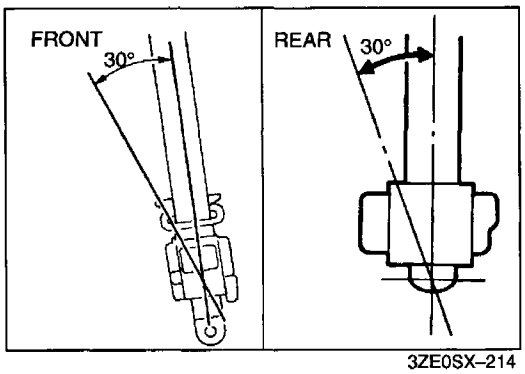
Inspection
Webbing and fittings
1. Inspect the webbing for scars, tears, and wear.
2. Inspect the fittings for deformation and damage.
3. If any problem is found, replace the seat belt assembly.

Emergency locking retractor (ELR)
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.



3ZE0SX-213

3. Remove the retractor.
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 seat belt assembly.



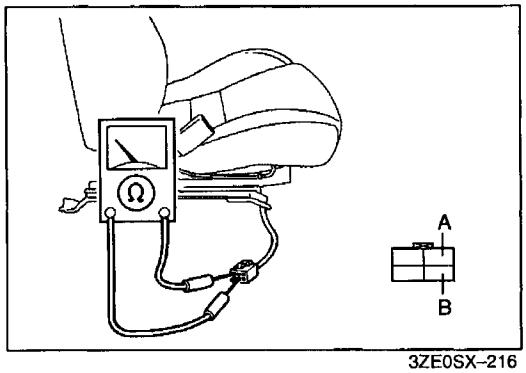
3ZE0SX-214

FRONT BUCKLE

Inspection
1. Disconnect the buckle switch connector and check for continuity between the connector terminals.

Terminal / Seat belt	Driver A	Driver B
Buckled		
Unbuckled	O——	——O

O——O: Continuity



3ZE0SX-216

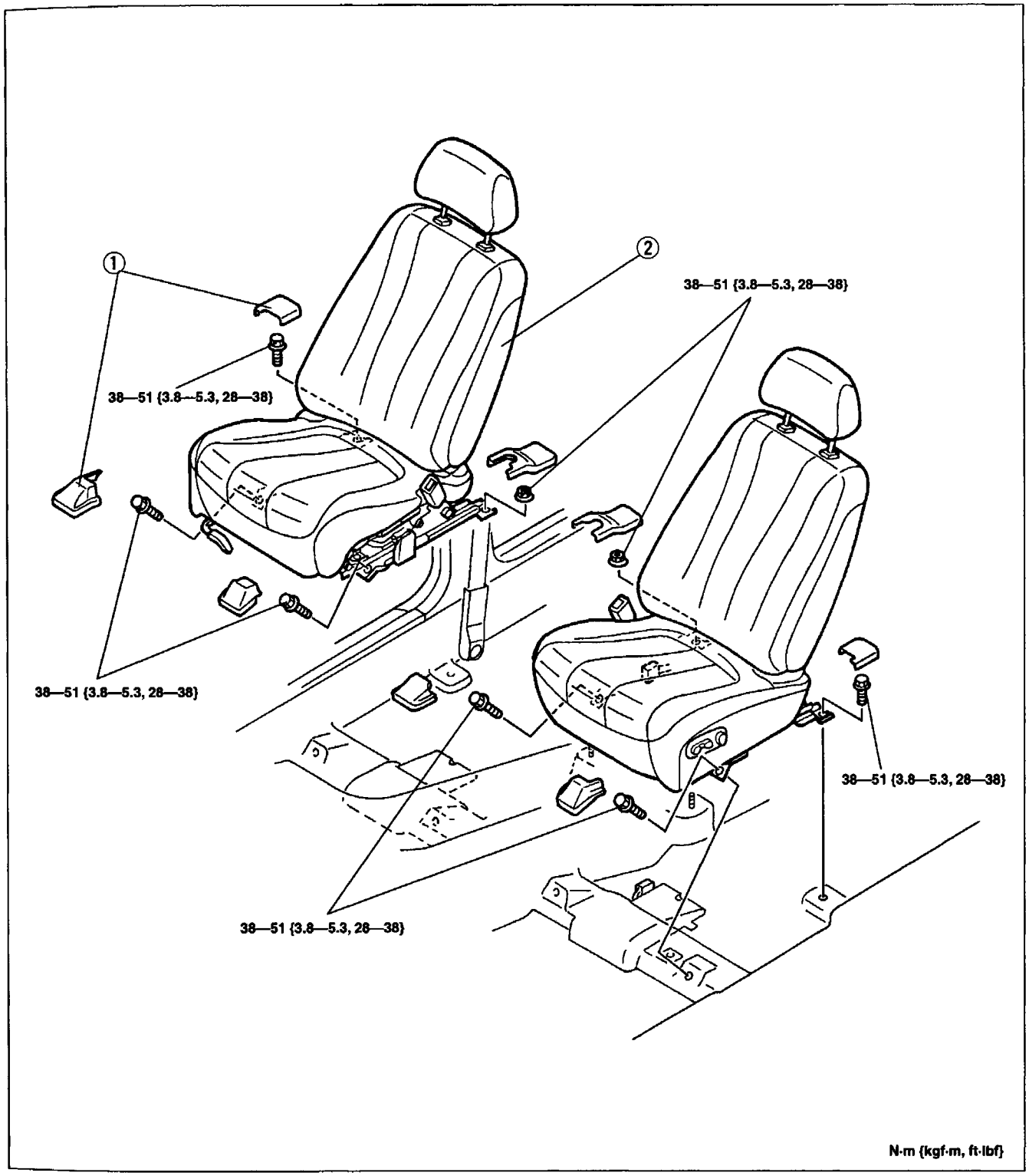
2. If not as specified, replace the buckle assembly.

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.

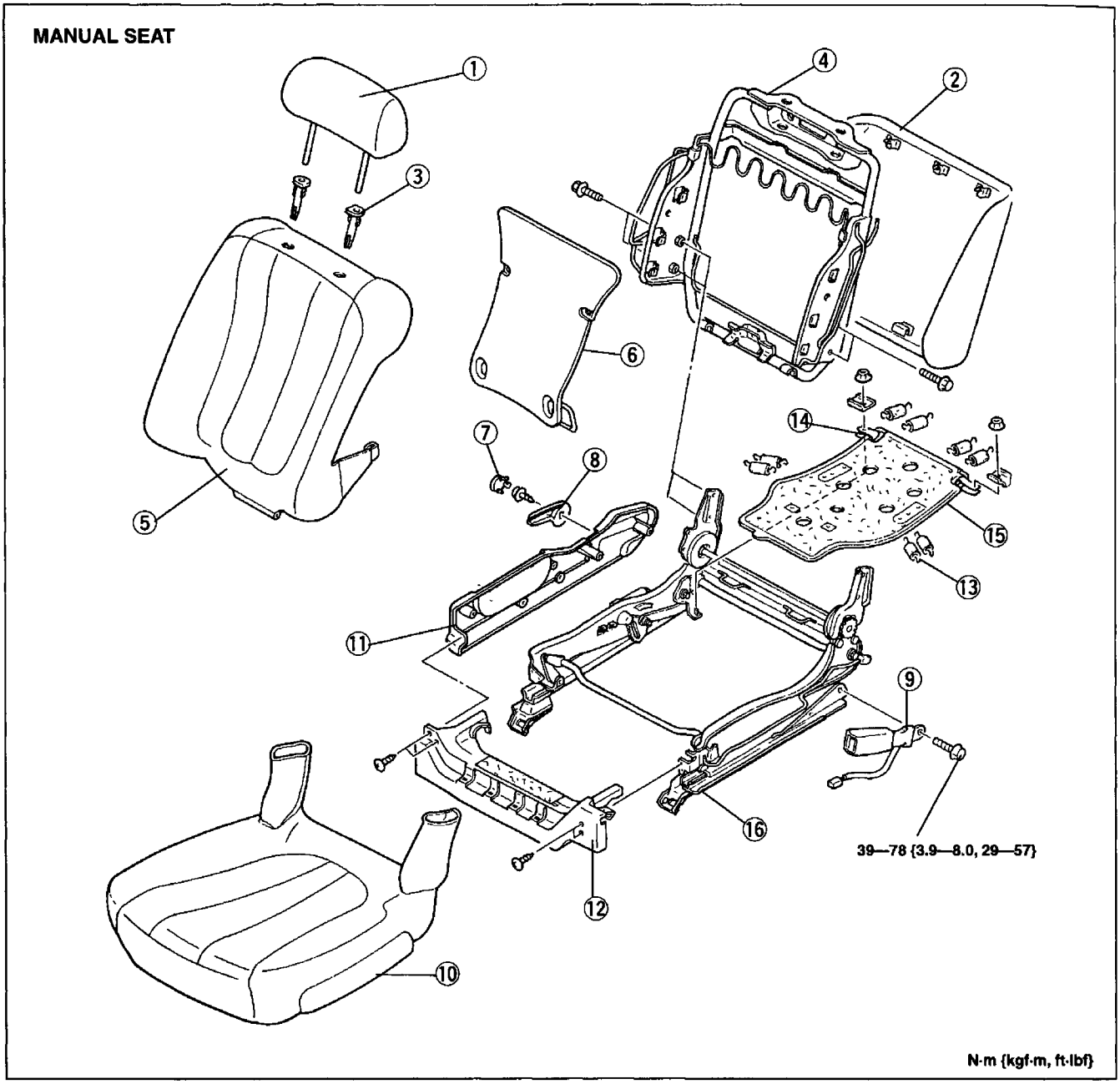


3ZU0SX-019

1. Adjuster cover
2. Front seat
   Disassembly / Assembly ..... page S–116

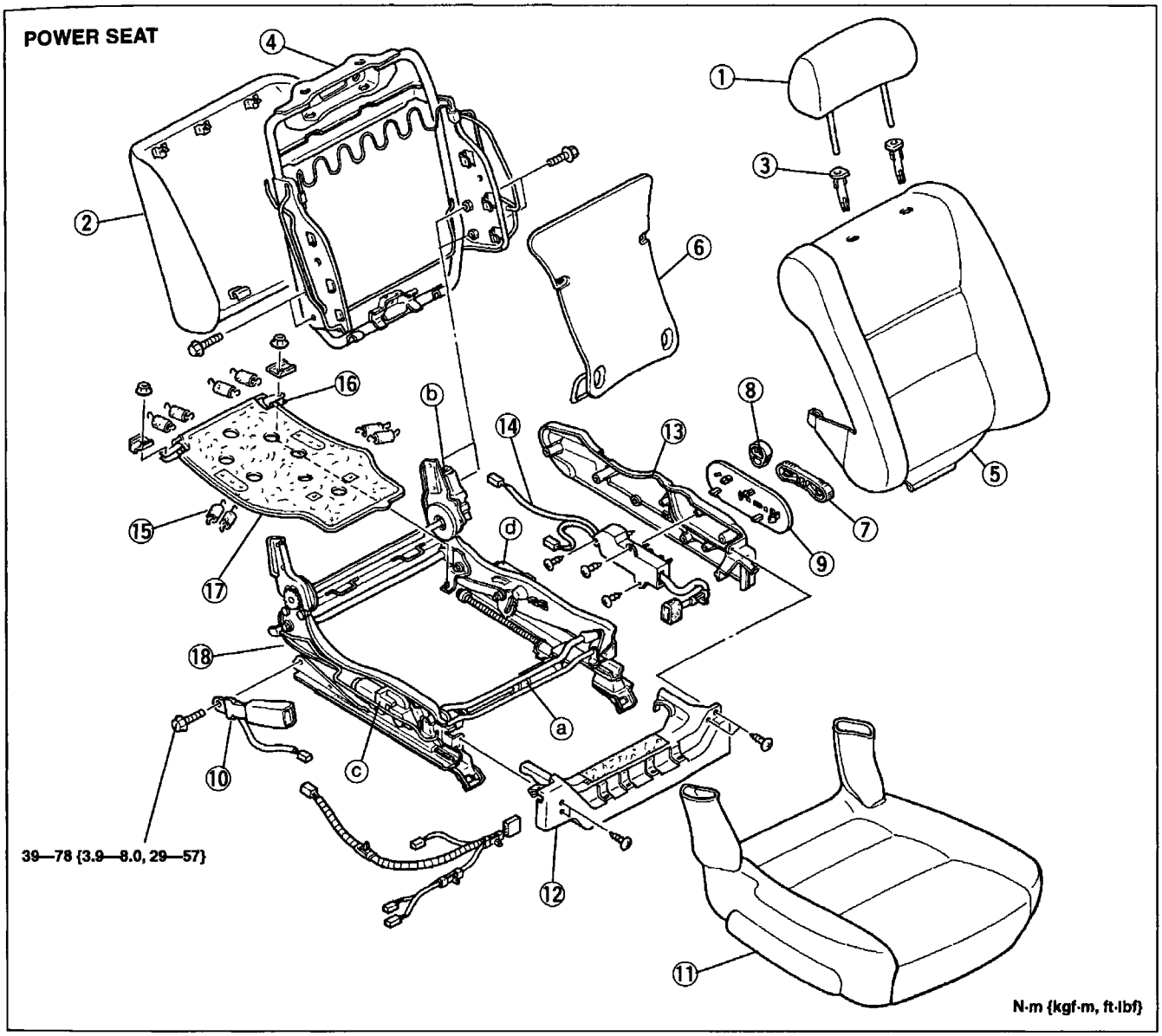
Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



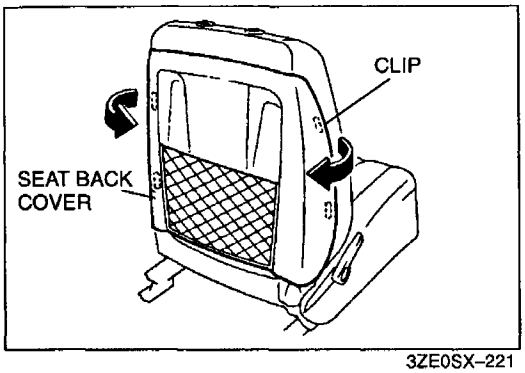
3ZE0SX-218

1. Headrest
2. Seat back cover
   Disassembly note ..... page S–118
3. Pole guide
   Disassembly note ..... page S–118
4. Seat back frame
   Disassembly note ..... page S–118
5. Seat back trim
   Disassembly note ..... page S–118
   Inspection
   (seat back warmer) ..... page S–129
6. Seat back hardboard
   Disassembly note ..... page S–119
7. Cap
8. Recliner lever
9. Buckle
10. Seat cushion trim
    Disassembly note ..... page S–119
    Inspection
    (seat cushion warmer) ..... page S–129
11. Side cover
12. Front cover
13. Spring
14. Band
15. Seat cushion hardboard
16. Slide adjuster



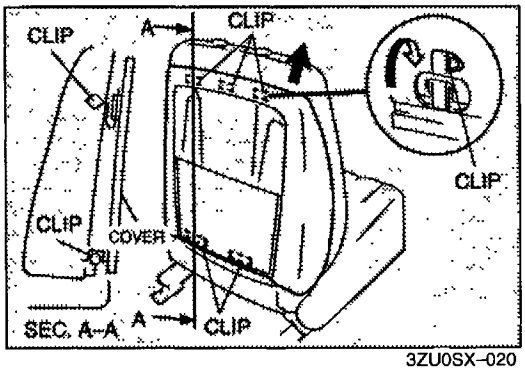
3ZE0SX-217

1. Headrest
2. Seat back cover
   Disassembly note ..... page S–118
3. Pole guide
   Disassembly note ..... page S–118
4. Seat back frame
   Disassembly note ..... page S–118
5. Seat back trim
   Disassembly note ..... page S–118
   Inspection
   (seat back warmer) ..... page S–129
6. Seat back hardboard
   Disassembly note ..... page S–119
7. Slide and lifter switch knob
8. Recliner switch knob
9. Switch bezel
   Disassembly note ..... page S–119
10. Buckle
11. Seat cushion trim
    Disassembly note ..... page S–119
    Inspection
    (seat cushion warmer) ..... page S–129
12. Front cover
13. Side cover
14. Power seat switch
    Inspection ..... page S–121
15. Spring
16. Band
17. Seat cushion hardboard
18. Power unit
    a. Slide motor
       Inspection ..... page S–123
    b. Recliner motor
       Inspection ..... page S–123
    c. Front-lift motor (driver's side)
       Inspection ..... page S–124
    d. Rear-lift motor (driver's side)
       Inspection ..... page S–124



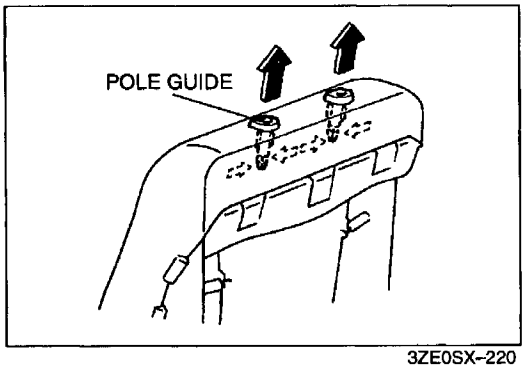
3ZE0SX-221

Disassembly note
Seat back cover
1. Pull the edges of the seat back cover to disengage the clips from the seat back frame.



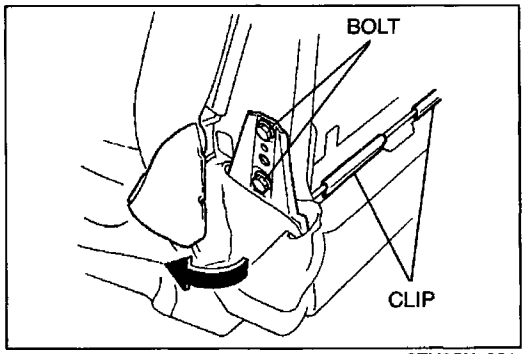
3ZU0SX-020

2. Lift up the seat back cover to remove it.
3. As shown in the figure, remove the installation clips from the seat frame, then install them onto the seat back cover.



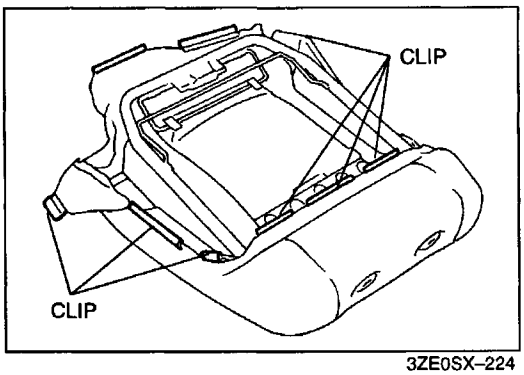
3ZE0SX-220

Pole guide
Squeeze the catches and push the pole guide upward.



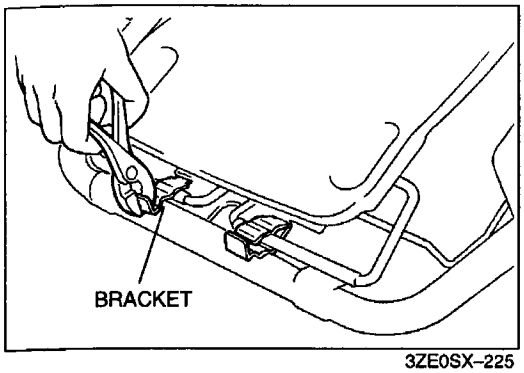
3ZU0SX-021

Seat back frame
1. Remove the seat back trim clips.
2. Remove the seat back frame installation bolts.
3. Remove the seat back trim installation clips from the seat back frame.



3ZE0SX-224

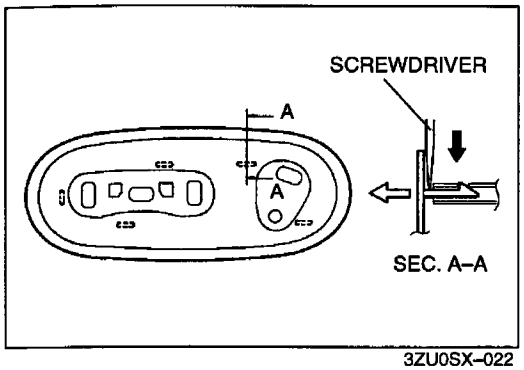
Seat back trim
Remove the seat back trim installation clips from the seat back frame.



3ZE0SX-225

Seat back hardboard

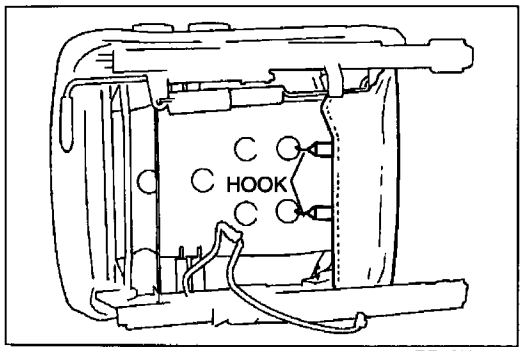
Bend the top of the seat back frame bracket up by using pliers.



3ZU0SX-022

Switch bezel

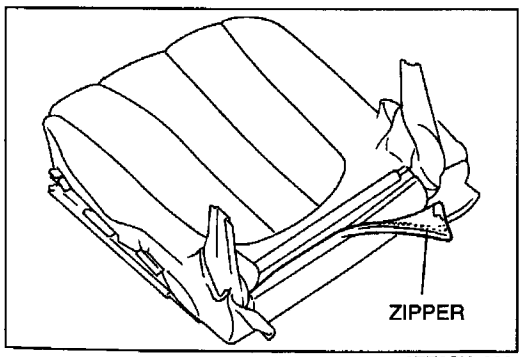
Insert a flathead screwdriver which has been wrapped in tape as shown in the figure and pull up to remove the clips.



3ZE0SX-227

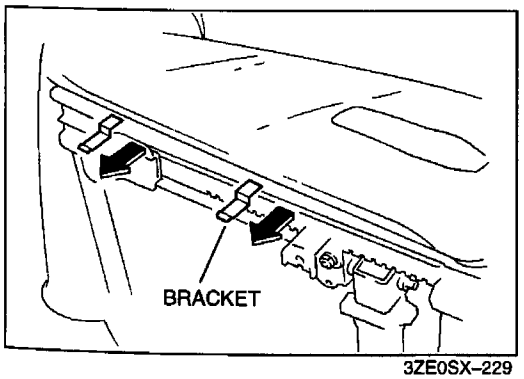
Seat cushion trim

1. Remove the hook from the seat cushion hardboard.



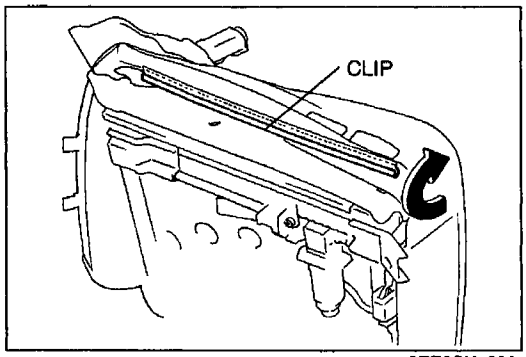
3ZE0SX-228

2. Unzip the zipper.



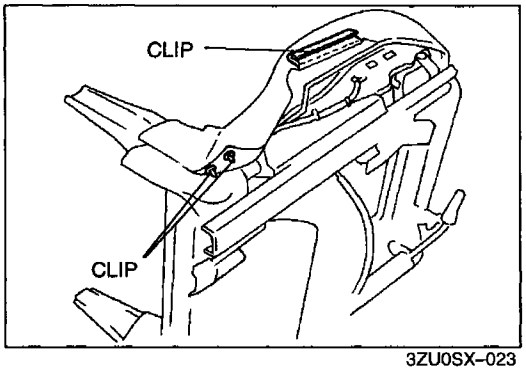
3ZE0SX-229

3. Remove the bracket.



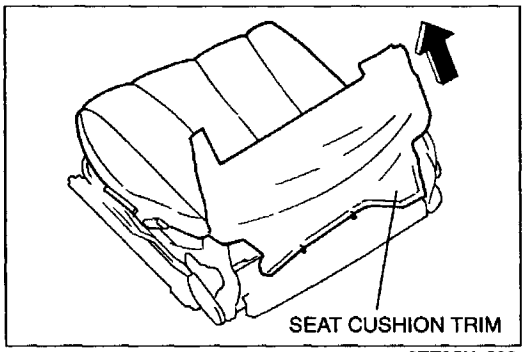
3ZE0SX-230

4. Remove the seat cushion trim installation clip from the side cover.



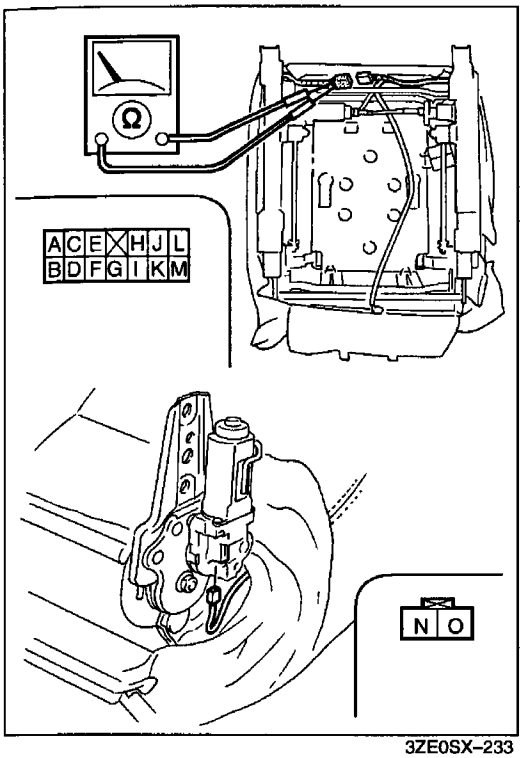
3ZU0SX-023

5. Remove the seat cushion trim installation clips from the seat cushion frame.



3ZE0SX-232

6. Pull the seat cushion trim upward to remove it.



3ZE0SX–233

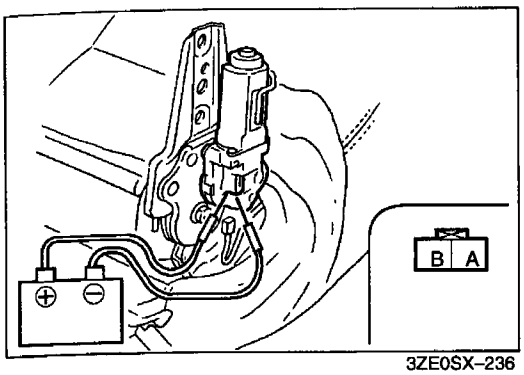
POWER SEAT SWITCH

Inspection

1. Remove the front seat. (Refer to page S–115.)
2. Remove the seat back trim. (Refer to page S–117.)
3. Disconnect the power seat switch connector and recliner motor connector.
4. Check for continuity between the terminals of the connector with the power seat switch in the positions indicated on the following pages.
5. If not as specified, replace the power seat switch.

Switch position		Terminal	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Recliner	Driver	FORWARD	○						○		○	○		○		○	○
		OFF							○		○	○		○		○	○
		BACKWARD	○						○		○	○		○		○	○
	Passenger	FORWARD	○						○		○	○		○		○	○
		OFF							○		○	○		○		○	○
		BACKWARD	○						○		○	○		○		○	○
Slide	Driver	FORWARD	○		○			○	○		○	○		○			
		OFF			○			○	○		○	○		○			
		BACKWARD	○		○			○	○		○	○		○			
	Passenger	FORWARD	○		○			○	○		○	○		○			
		OFF			○			○	○		○	○		○			
		BACKWARD	○		○			○	○		○	○		○			
Front lift		UP	○			○	○		○		○	○		○			
		OFF				○	○		○		○	○		○			
		DOWN	○			○	○		○		○	○		○			
Rear lift		UP	○						○	○	○	○	○	○			
		OFF							○	○	○	○	○	○			
		DOWN	○						○	○	○	○	○	○			

○—○: Continuity



3ZE0SX-236

RECLINER MOTOR

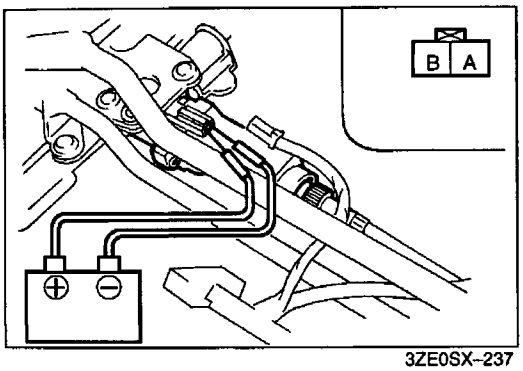
Inspection

1. Remove the front seat. (Refer to page S–115.)
2. Remove the seat back trim. (Refer to page S–117.)
3. Disconnect the recliner motor connector.
4. Apply battery voltage to the recliner motor terminals and check the operation of the motor.

B+: Battery positive voltage

Connection		Motor operation
B+	GND	
A	B	Forward
B	A	Backward

5. If not as specified, replace the power unit.



3ZE0SX-237

SLIDE MOTOR

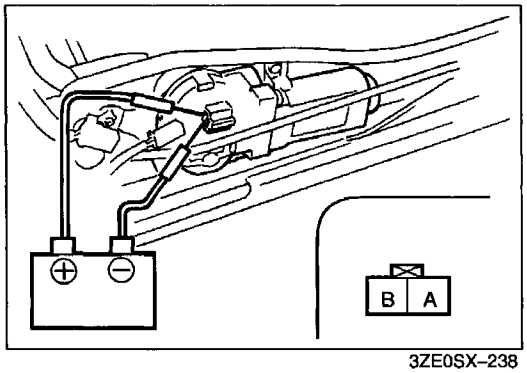
Inspection

1. Remove the front seat. (Refer to page S–115.)
2. Remove the seat cushion trim. (Refer to page S–117.)
3. Disconnect the slide motor connector.
4. Apply battey voltage to the slide motor terminals and check the operation of the motor.

B+: Battery positive voltage

Connection		Motor operation
B+	GND	
A	B	Forward
B	A	Backward

5. If not as specified, replace the power unit.



3ZE0SX-238

FRONT-LIFT MOTOR

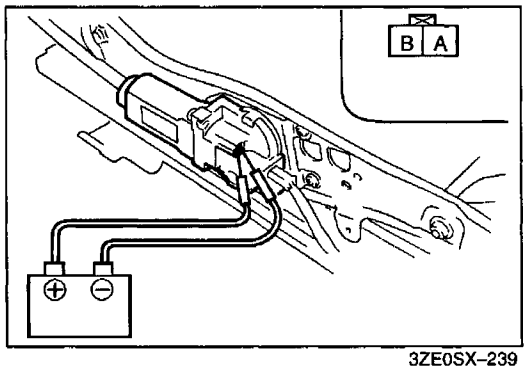
Inspection

1. Remove the front seat. (Refer to page S–115.)
2. Remove the seat cushion trim. (Refer to page S–117.)
3. Disconnect the front-lift motor connector.
4. Apply battery voltage to the front-lift motor terminals and check the operation of the motor.

B+: Battery positive voltage

Connection		Motor operation
B+	GND	
B	A	Forward
A	B	Backward

5. If not as specified, replace the power unit.



3ZE0SX-239

REAR-LIFT MOTOR

Inspection

1. Remove the front seat. (Refer to page S–115.)
2. Remove the seat cushion trim. (Refer to page S–117.)
3. Disconnect the rear-lift motor connector.
4. Apply battery voltage to the rear-lift motor terminals and check the operation of the motor.

B+: Battery positive voltage

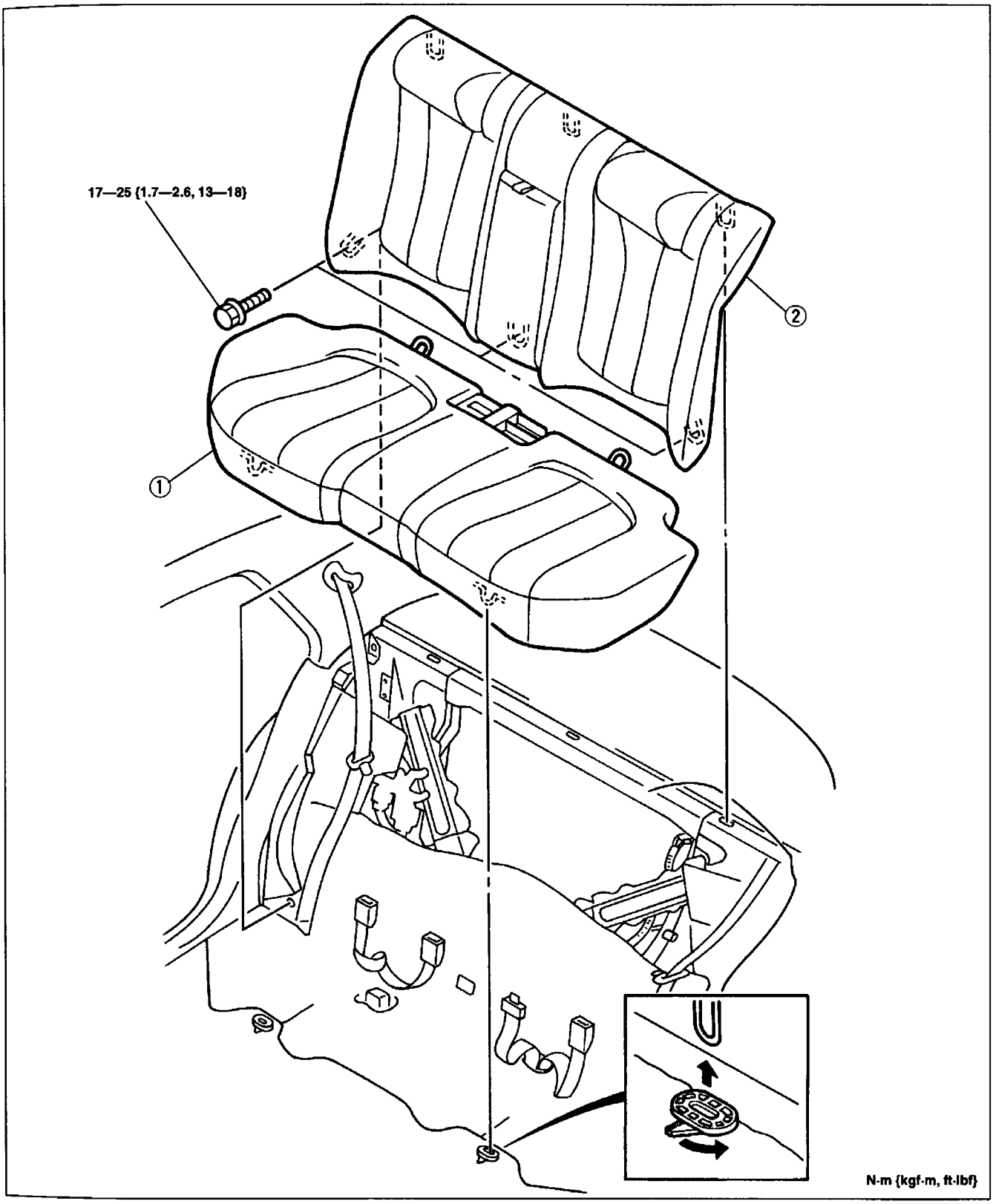
Connection		Motor operation
B+	GND	
A	B	Forward
B	A	Backward

5. If not as specified, replace the power unit.

REAR SEAT

Removal / Installation

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

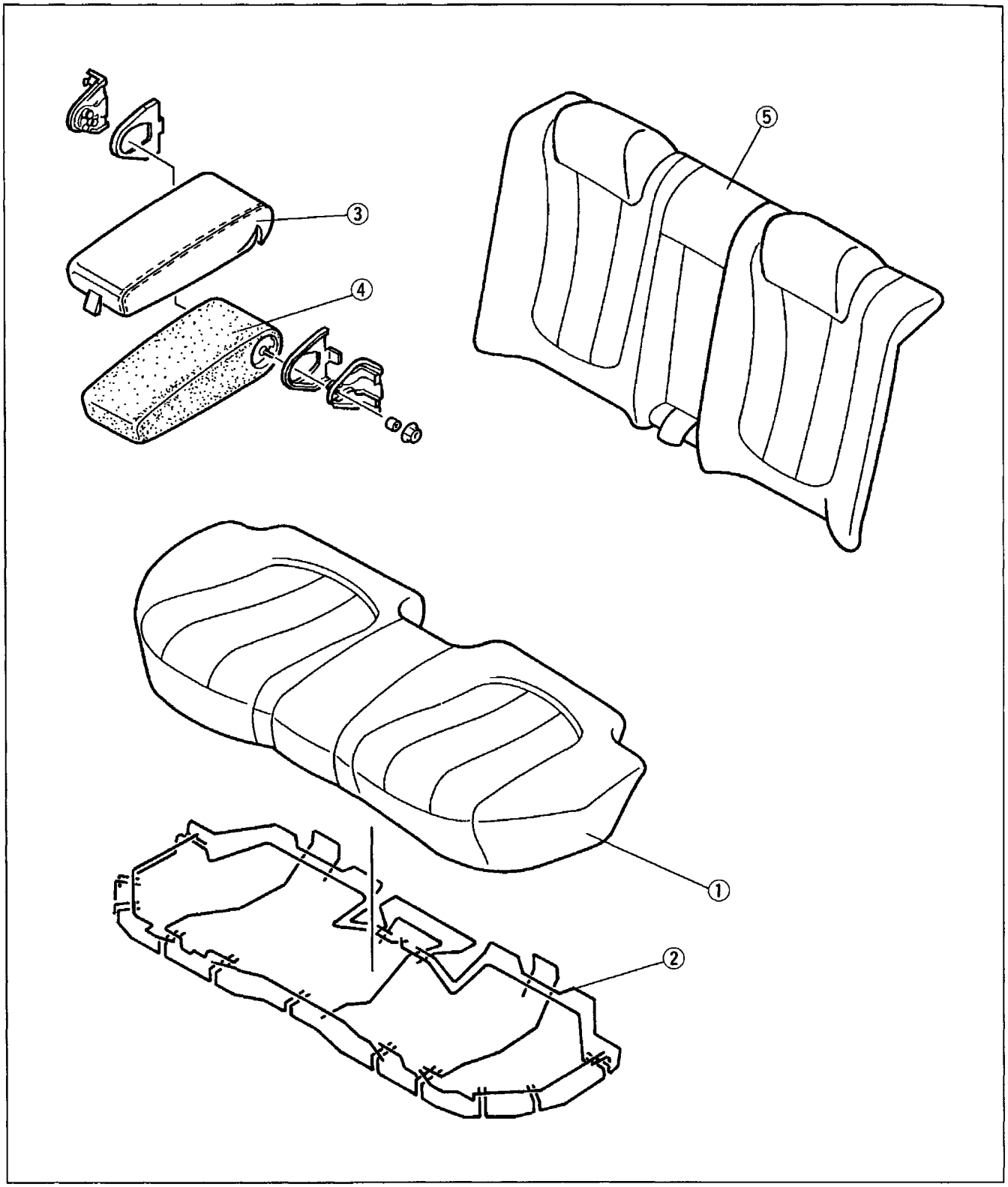


3ZE0SX-240

1. Rear seat cushion
   Disassembly / Assembly ..... page S–126
2. Rear seat back
   Disassembly / Assembly ..... page S–126

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



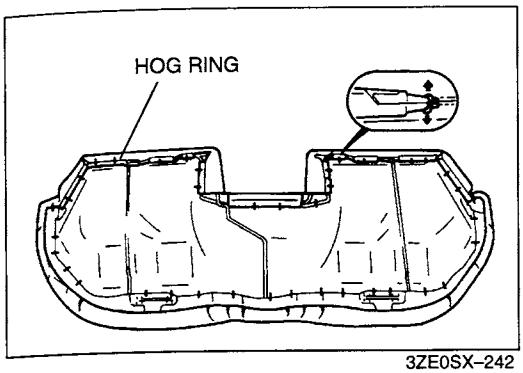
3ZU0SX–024

Rear seat cushion

1. Seat cushion trim
   Disassembly note ..... page S–127
2. Seat cushion frame

Rear seat back

3. Armrest trim
4. Armrest frame
5. Seat back trim

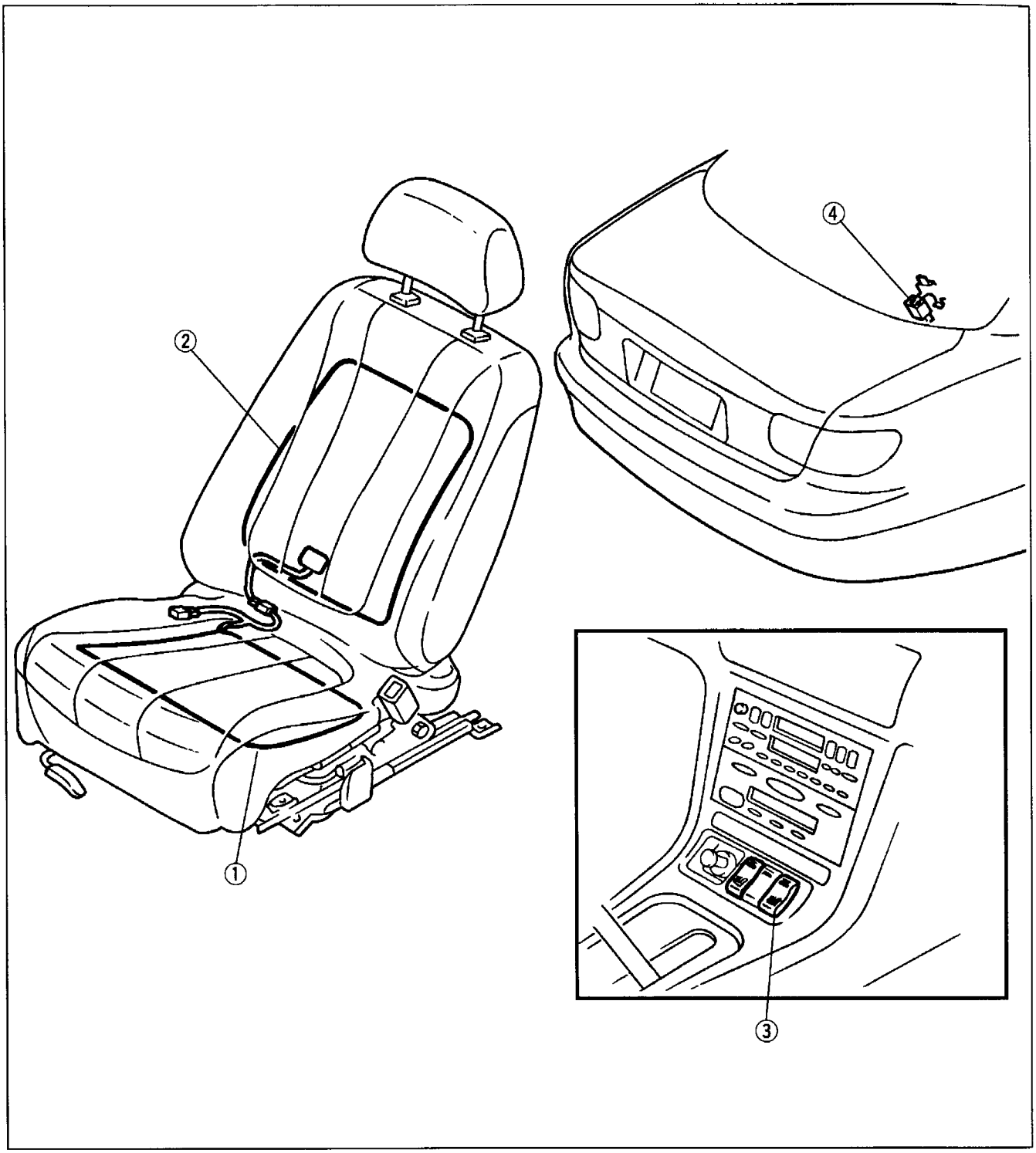


3ZE0SX–242

Disassembly note
Seat cushion trim
Remove the hog rings.

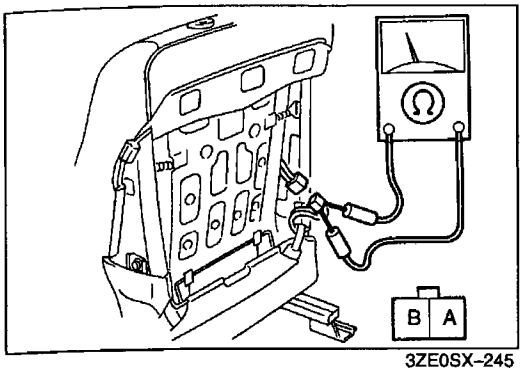
SEAT WARMER

STRUCTURAL VIEW



3ZE0SX–244

1. Seat cushion warmer (within seat cushion trim)
   Removal / Installation ..... page S–117
   Inspection ..... page S–129
2. Seat back warmer (within seat back trim)
   Removal / Installation ..... page S–117
   Inspection ..... page S–129
3. Seat warmer switch
   Removal / Installation ..... page S–130
   Inspection ..... page S–130
4. Seat warmer relay
   Removal / Installation ..... page S–131
   Inspection ..... page S–131

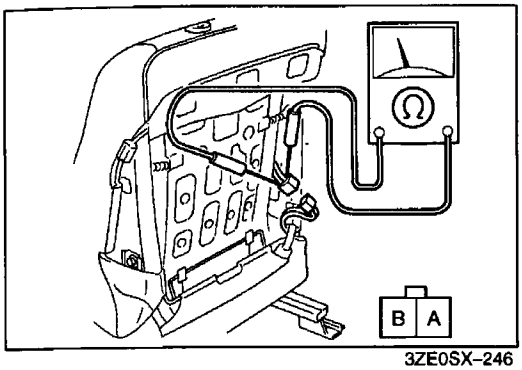


3ZE0SX-245

SEAT CUSHION WARMER

Inspection

1. Remove the seat back cover. (Refer to page S–117.)
2. Check for continuity between terminals A and B of the seat cushion warmer connector.
3. If not as specified, replace the seat cushion trim.



3ZE0SX-246

SEAT BACK WARMER

Inspection

1. Remove the seat back cover. (Refer to page S–117.)
2. Warm the thermoswitch with a hot-air blower and check for continuity between the terminals of the seat back warmer.

Thermoswitch temperature \ Terminal	A	B
Less than 34°C {93°F}	O———	———O
More than 35°C {95°F}		

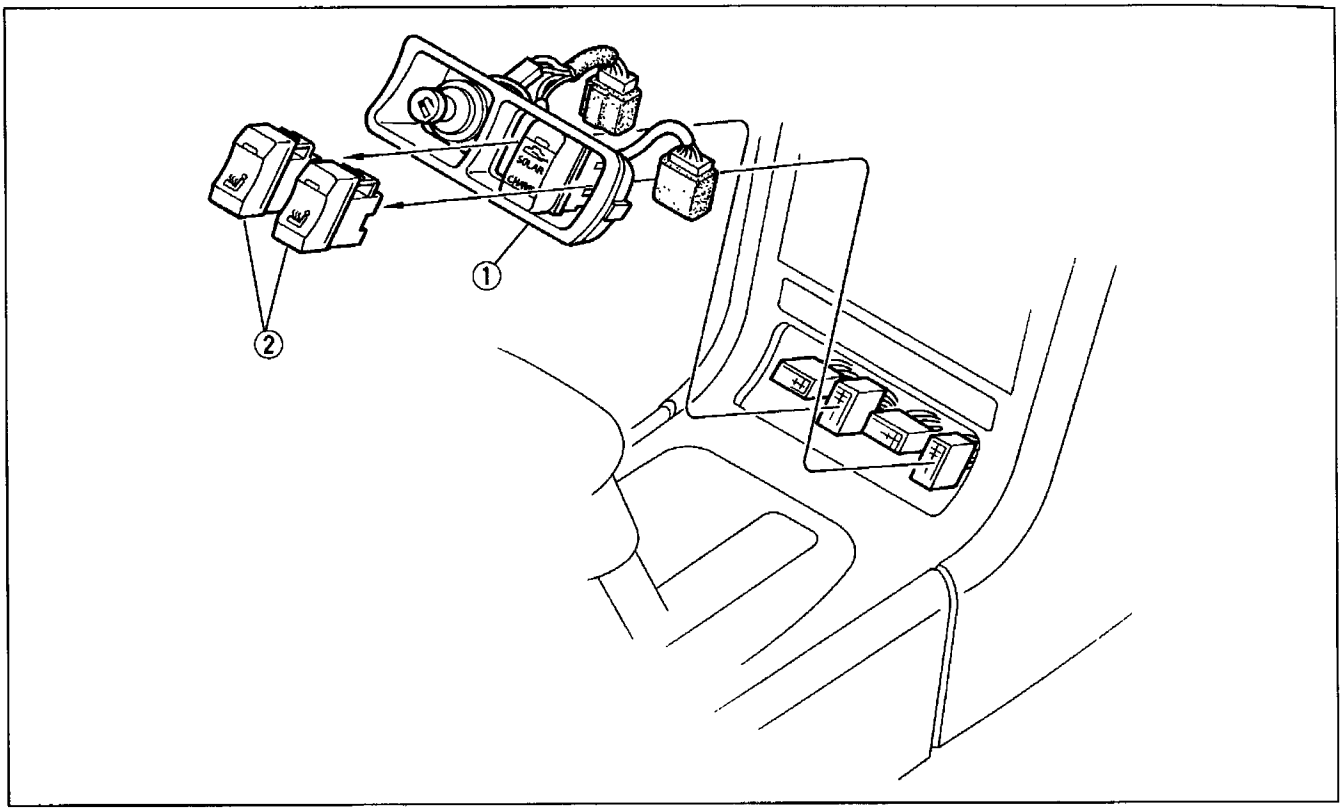
O——O: Continuity

3. If not as specified, replace the seat back trim.

SEAT WARMER SWITCH

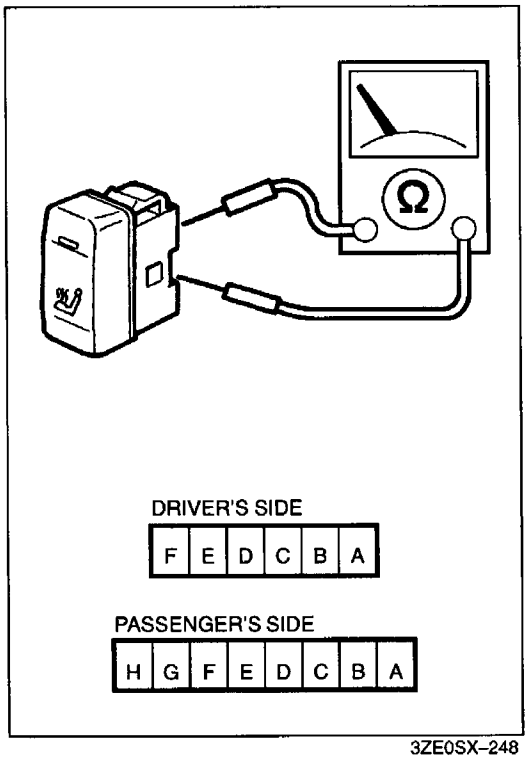
Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the center panel. (Refer to page S–88.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



3ZE0SX–247

1. Switch panel
2. Seat warmer switch
   Inspection ..... below



3ZE0SX–248

Inspection

1. Remove the seat warmer switch. (Refer above.)
2. Check for continuity between the seat warmer switch terminals.

(driver's seat)

Switch position \ Terminal	A	B	C	E	F
ON	O—O	O—O	O	O—O	O—O
OFF	O—O	O—O		O—O	O—O

O—O: Continuity

(passenger's seat)

Switch position \ Terminal	B	C	D	F	G
ON	O—O	O—O	O	O—O	O—O
OFF	O—O	O—O		O—O	O—O

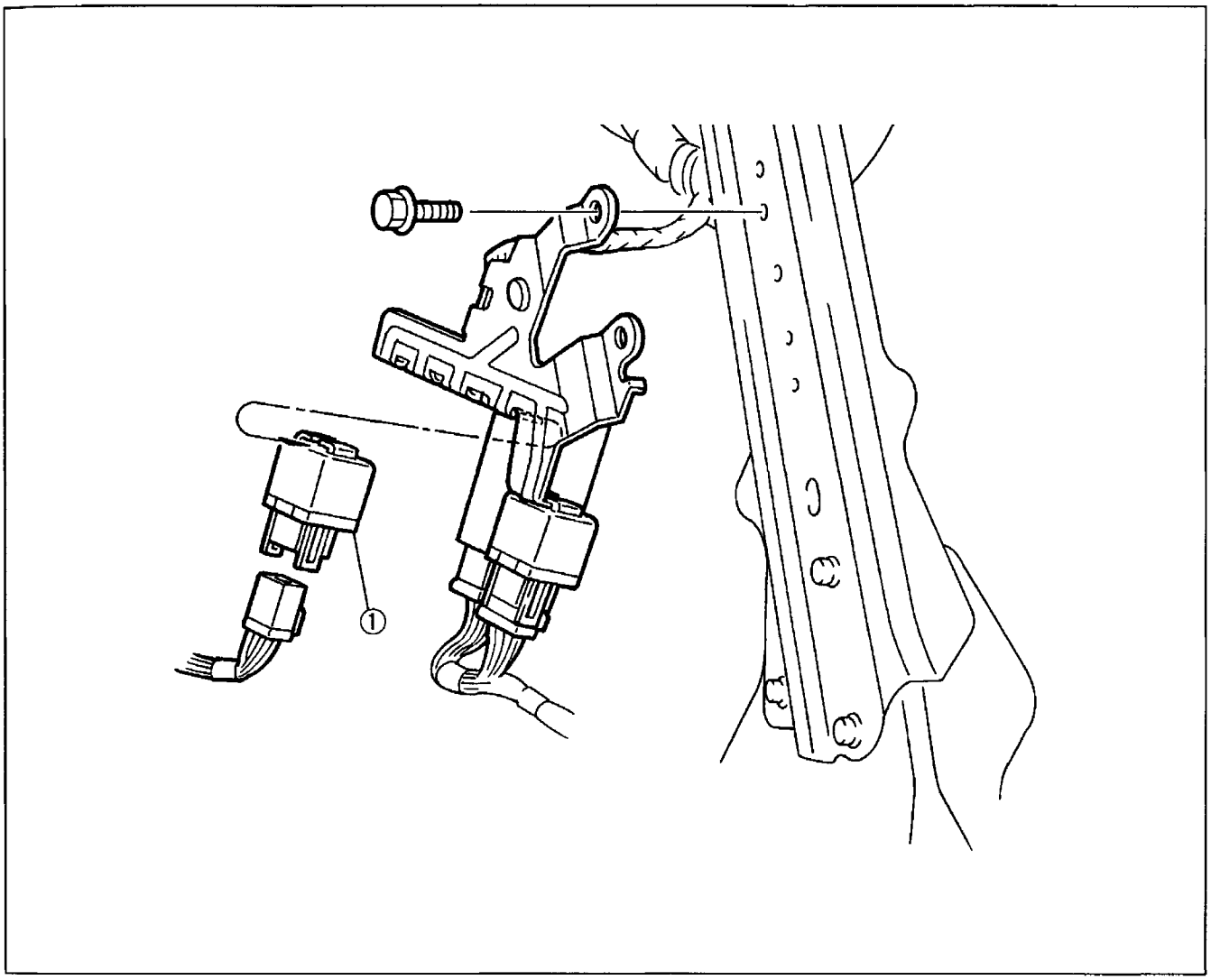
O—O: Continuity

3. If not as specified, replace the seat warmer switch.

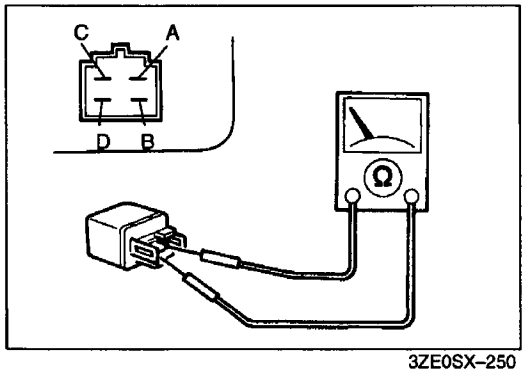
SEAT WARMER RELAY

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the seat back. (Refer to page S–125.)
3. Remove as shown in the figure.
4. Install in the reverse order of removal.



1. Seat warmer relay
   Inspection ..... below



3ZE0SX–250

Inspection

1. Remove the seat warmer relay. (Refer above.)
2. Apply battery voltage and check for continuity between the relay terminals.

B+: Battery positive voltage

Connection		A	B	C	D
B+	GND				
—	—	○	○		
A	B			○	○

○—○: Continuity

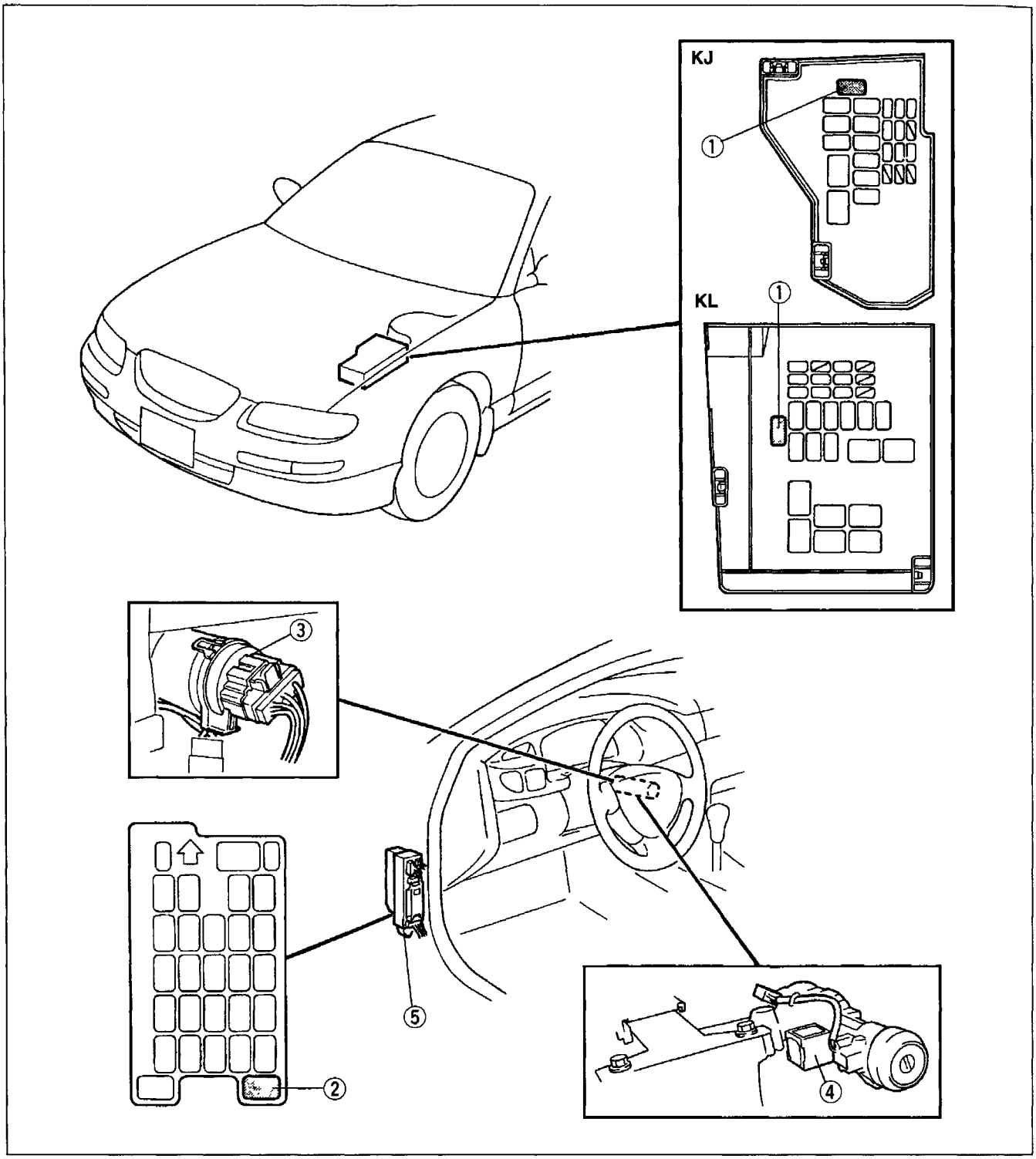
3. If not as specified, replace the seat warmer relay.

BODY ELECTRICAL SYSTEM

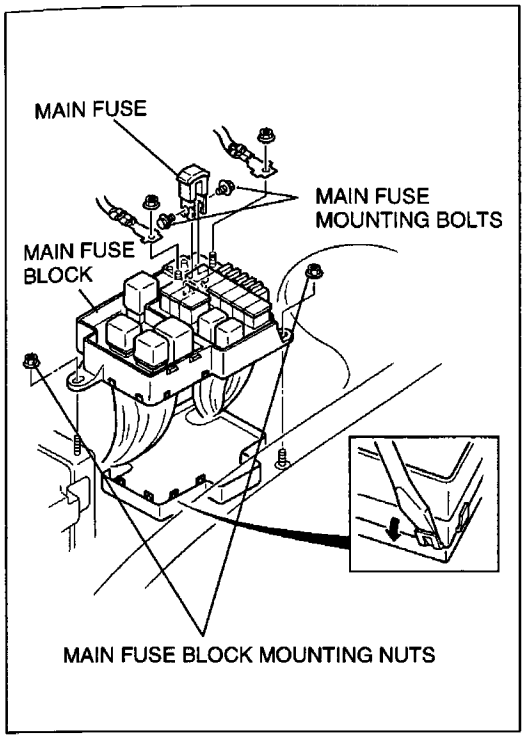
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STRUCTURAL VIEW ..... T- 2
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ROOM FUSE ..... T- 3
IGNITION SWITCH ..... T- 4
KEY REMINDER SWITCH ..... T- 4
JOINT BOX ..... T- 5
CPU (CENTRAL PROCESSING UNIT) .... T- 6
CPU ..... T- 6
EXTERIOR LIGHTING SYSTEM T-12
STRUCTURAL VIEW T-12
HEADLIGHT T-14
FRONT SIDE MARKER LIGHT T-16
FRONT TURN LIGHT T-17
FRONT FOG LIGHT T-18
REAR COMBINATION LIGHT T-20
INBOARD COMBINATION LIGHT T-21
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HIGH-MOUNT BRAKE LIGHT T-23
DRL RELAY T-24
HEADLIGHT RELAY T-24
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TNS RELAY T-24
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THEFT-DETERRENT SYSTEM ..... T- 60
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POWER SYSTEM

STRUCTURAL VIEW

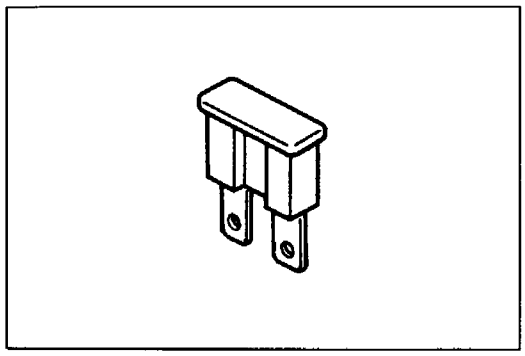


1. MAIN fuse
   Removal / Installation ..... page T–3
2. ROOM fuse
   Installation ..... page T–3
3. Ignition switch
   Removal / Installation ..... page T–4
   Inspection ..... page T–4
4. Key reminder switch
   Inspection ..... page T–4
5. Joint box
   Removal / Installation ..... page T–5



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.

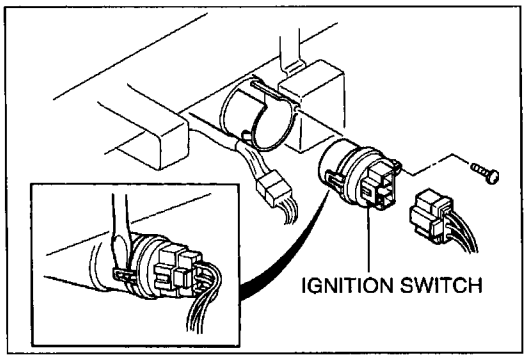


ROOM FUSE
Installation

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.

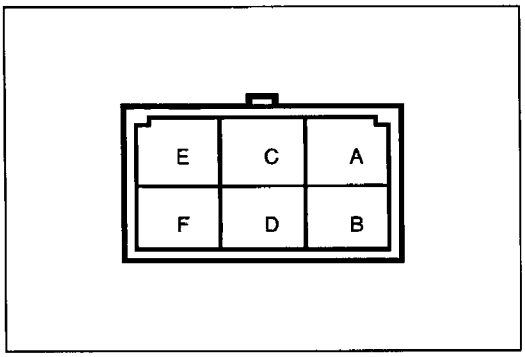
1. Turn the ignition switch to LOCK.
2. Install the ROOM fuse.



IGNITION SWITCH

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the screw and the ignition switch.
3. Disconnect the ignition switch connector.
4. Install in the reverse order of removal.



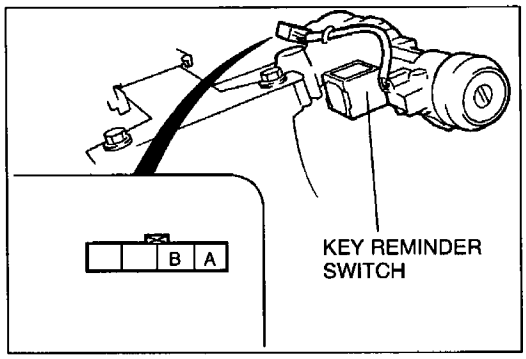
Inspection

1. Remove the ignition switch.
2. Check for continuity between the terminals of the ignition switch.

O—O : Continuity

Switch position \ Terminal	C	D	F	B	A	E
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 dashboard. (Refer to section S.)
2. Disconnect the key reminder switch connector.
3. Check for continuity between terminals A and B of the key reminder switch.

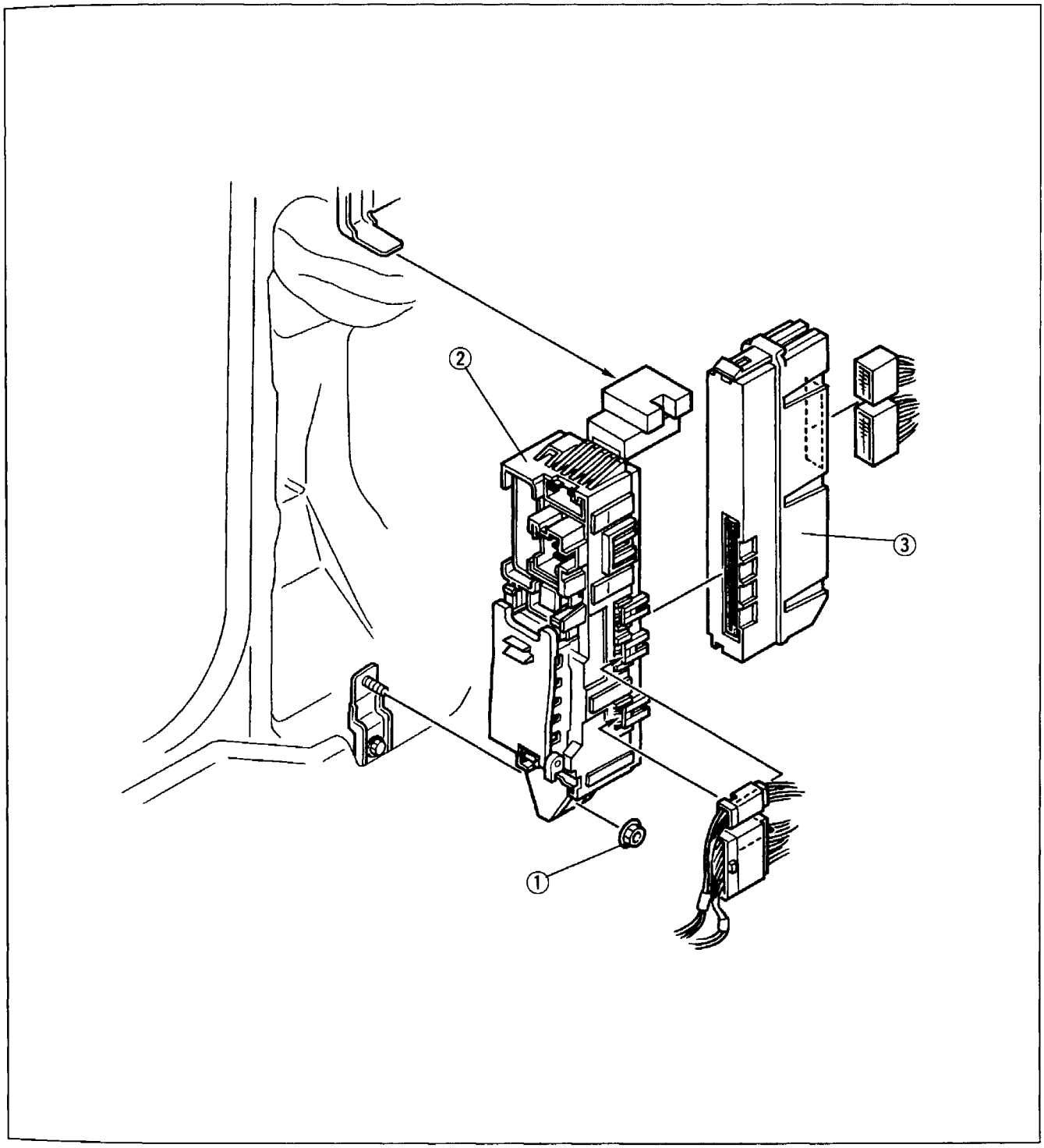
Switch condition	Continuity
Key inserted	Yes
Key removed	No

4. If not as specified, replace the steering lock. (Refer to section N.)

JOINT BOX

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the scuff plate and front side trim. (Refer to section S.)
3. Disconnect the joint box and CPU connectors.
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal.



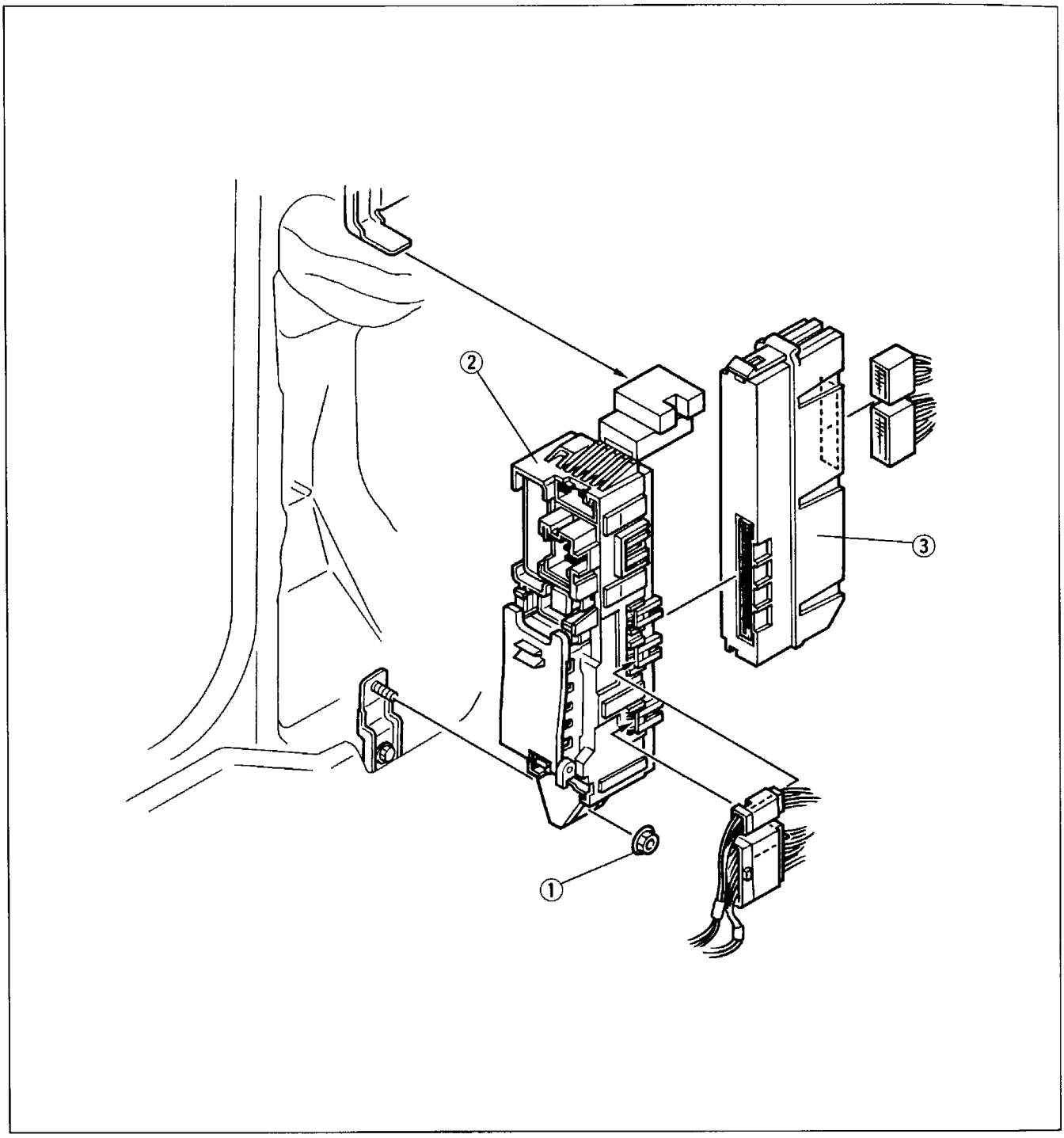
1. Nut
2. Joint box
3. CPU
   Removal / Installation ..... page T–6
   Inspection ..... page T–7

CPU (CENTRAL PROCESSING UNIT)

CPU

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the scuff plate and front side trim. (Refer to section S.)
3. Disconnect the joint box and CPU connectors.
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal.

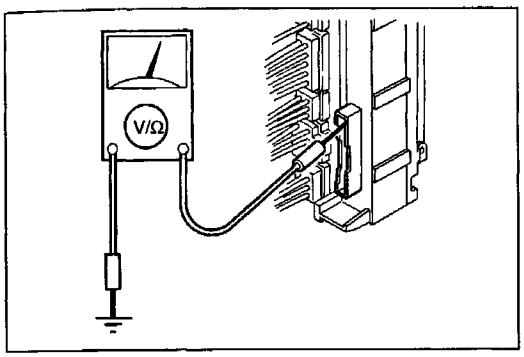


1. Nut
2. Joint box
3. CPU

Inspection ..... page T–7

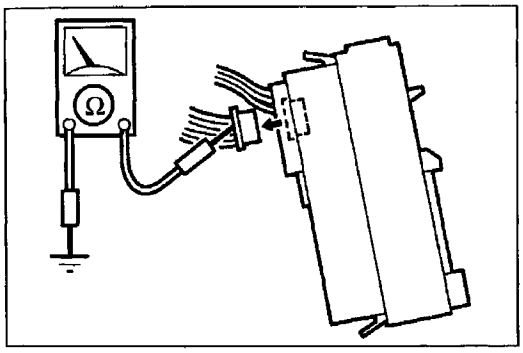
Inspection

1. Remove the scuff plate, front side trim, and hood release lever.
   (Refer to section S.)
2. Remove the joint box mounting nut.
3. Cut away the vinyl tape stuck to the floor harness.



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 T–8.

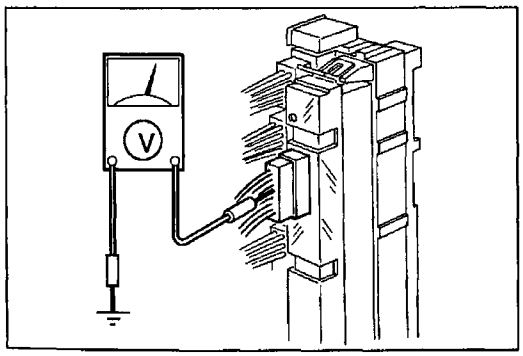


Connector B, C, and D

(1) Follow the appropriate procedure, referring to the terminal voltage list on page T–9, 10, and 11.

Terminals 1B, 1M, 1N, 2D, 2T, and 3A

① Disconnect the CPU connector.
② Check for continuity between the terminals of the CPU connector and ground.



Terminals except 1B, 1M, 1N, 2D, 2T, and 3A

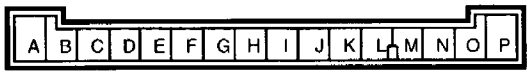
① Install the CPU onto the joint box.
② Measure the voltage at the CPU terminals.

4. If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnesses.
5. If the parts and wiring harnesses are OK but the system still does not work properly, replace the CPU.
   (Refer to page T–6.)

Terminal voltage list (Reference)

B+: Battery positive voltage

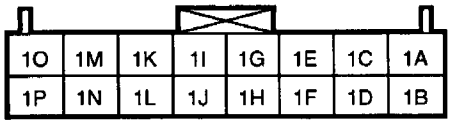
CONNECTOR A



Terminal	Signal	Connection	Test condition		Voltage/ Continuity	Inspection area
A	Hood open/closed	Hood switch	Hood open: check for continuity to ground		Yes	Hood switch
			Hood closed: check for continuity to ground		No	
B	Starter cut	Starter cut relay	Ignition switch at ON		B+	• Engine 10 A fuse • Starter cut relay
C	ACC	RADIO 10 A fuse	Ignition switch at ACC		B+	RADIO 10 A fuse
D	—	—	—		—	—
E	Door open/closed	Door switch (rear)	Any door open: check for continuity to ground		Yes	Door switch
			All doors closed: check for continuity to ground		No	
F	Horn output	Horn relay	Horn sounding		0 V	• HORN 10 A fuse • Horn relay
			Other		B+	
G	CPU ground	GND	Constant: check for continuity to ground		Yes	—
H	Key inserted	Key reminder switch	Key inserted into steering lock		B+	• ROOM 15 A fuse • Key reminder switch
			Other		0 V	
I	—	—	—		—	—
J	B+	ROOM 15 A fuse	Constant		B+	ROOM 15 A fuse
K	Interior light	Interior and spot light	Interior and spot light switch at DOOR		B+	• ROOM 15 A fuse • Interior and spot light
			Other		0 V	
L	TNS	TNS relay	Headlight switch on		B+	• TAIL 20 A fuse • TNS relay
			Other		0 V	
M	IG1	METER 15 A fuse	Ignition switch at ON		B+	METER 15 A fuse
N	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	
O	—	—	—		—	—
P	—	—	—		—	—

B+: Battery positive voltage

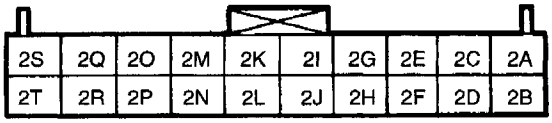
CONNECTOR B



Terminal	Signal	Connection	Test condition		Voltage/ Continuity	Inspection area
1A	—	—	—		—	—
1B	Trunk lid unlock input	Trunk key cylinder switch	Unlocked: check for continuity to ground		Yes	Trunk key cylinder switch
			Other: check for continuity to ground		No	
1C	Headlight output	Headlight relay	Headlight switch on		0 V	• HEAD 40 A fuse • Headlight relay
			Headlight switch off		B+	
1D	Trunk lid open/closed	• Trunk compartment light switch • Trunk compartment light	Trunk lid open		0 V	• ROOM 15 A fuse • Trunk compartment light switch • Trunk compartment light
			Trunk lid closed		B+	
1E	Hazard light output	• Flasher unit • Hazard warning switch	Hazard warning switch on		0 V	• HAZARD 15 A fuse • Flasher unit • Hazard warning switch
			Hazard warning switch off		B+	
1F	—	—	—		—	—
1G	Power door lock control	Door lock timer unit	For 0.4 seconds after door lock switch is locked		0 V	• DOOR LOCK 30 A fuse • Door lock timer unit
			Other		B+	
1H	—	—	—		—	—
1I	Power door lock control	Door lock timer unit	For 0.4 seconds after door lock switch is unlocked		0 V	• DOOR LOCK 30 A fuse • Door lock timer unit
			Other		B+	
1J	—	—	—		—	—
1K	—	—	—		—	—
1L	Fog light control	Front fog light relay	Headlight switch on	Front fog light switch on	0 V	• HEAD 40 A fuse • Headlight relay • Combination switch • Front fog light relay
				Front fog light switch off	B+	
1M	Fog light control	Front fog light switch	Front fog light pushed (ON): check for continuity to ground		Yes	Cluster switch
			Front fog light released: check for continuity to ground		No	
1N	Fog light control	Front fog light switch	Front fog light pushed (OFF): check for continuity to ground		Yes	Cluster switch
			Front fog light released: check for continuity to ground		No	
1O	—	—	—		—	—
1P	Keyless	Keyless unit	Keyless unit is not operating		5 V	Keyless unit

B+: Battery positive voltage

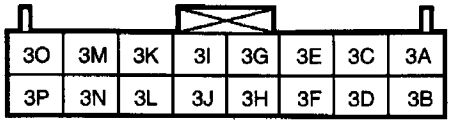
CONNECTOR C



Terminal	Signal	Connection	Test condition		Voltage/ Continuity	Inspection area
2A	Key interlock	Key interlock solenoid	Ignition switch at ON	Selector lever at P range	B+	• ROOM 15 A fuse • Key interlock solenoid
				Selector lever at R range	0 V	
2B	Key interlock	Key interlock solenoid	Ignition switch at ON	Selector lever at P range	B+	• ROOM 15 A fuse • Key interlock solenoid • Key interlock resistor
				Other	0 V	
2C	Key interlock	P range switch	Ignition switch at ON	Selector lever at P range	5 V	Shift-lock actuator
				Other	0 V	
2D	Door open/closed	Door switch (passenger)	Door open: check for continuity to ground		Yes	Door switch
			Door closed: check for continuity to ground		No	
2E	—	—	—		—	—
2F	—	—	—		—	—
2G	Trunk unlock output	Trunk lid opener relay	For 0.27 seconds after transmitter TRUNK button is pressed		0 V	• OPENER 15 A fuse • Trunk lid opener relay
			Other		B+	
2H	Door lock/unlock	Lock-link switch (driver)	Locked		5 V	Lock-link switch
			Unlocked		0 V	
2I	—	—	—		—	—
2J	—	—	—		—	—
2K	Courtesy light	Courtesy light	Any door open		0 V	• OPENER 15 A fuse • Courtesy light
			All doors closed		B+	
2L	Door lock/unlock	Door lock switch	At lock position		2.5 V	Door lock switch
			At unlock position		0 V	
			Other		5 V	
2M	Security light output	Security light	Security light illuminated		0 V	• ROOM 15 A fuse • Security light
			Other		B+	
2N	—	—	—		—	—
2O	—	—	—		—	—
2P	Door lock/unlock	Door key cylinder switch (passenger)	At lock position		2.5 V	Door key cylinder switch
			At unlock position		0 V	
			Other		5 V	
2Q	—	—	—		—	—
2R	Door lock/unlock	Door key cylinder switch (driver)	At unlock position		0 V	Door key cylinder switch
			Other		5 V	
2S	—	—	—		—	—
2T	Door open/closed	Door switch (driver)	Door open: check for continuity to ground		Yes	Door switch
			Door closed: check for continuity to ground		No	

B+: Battery positive voltage

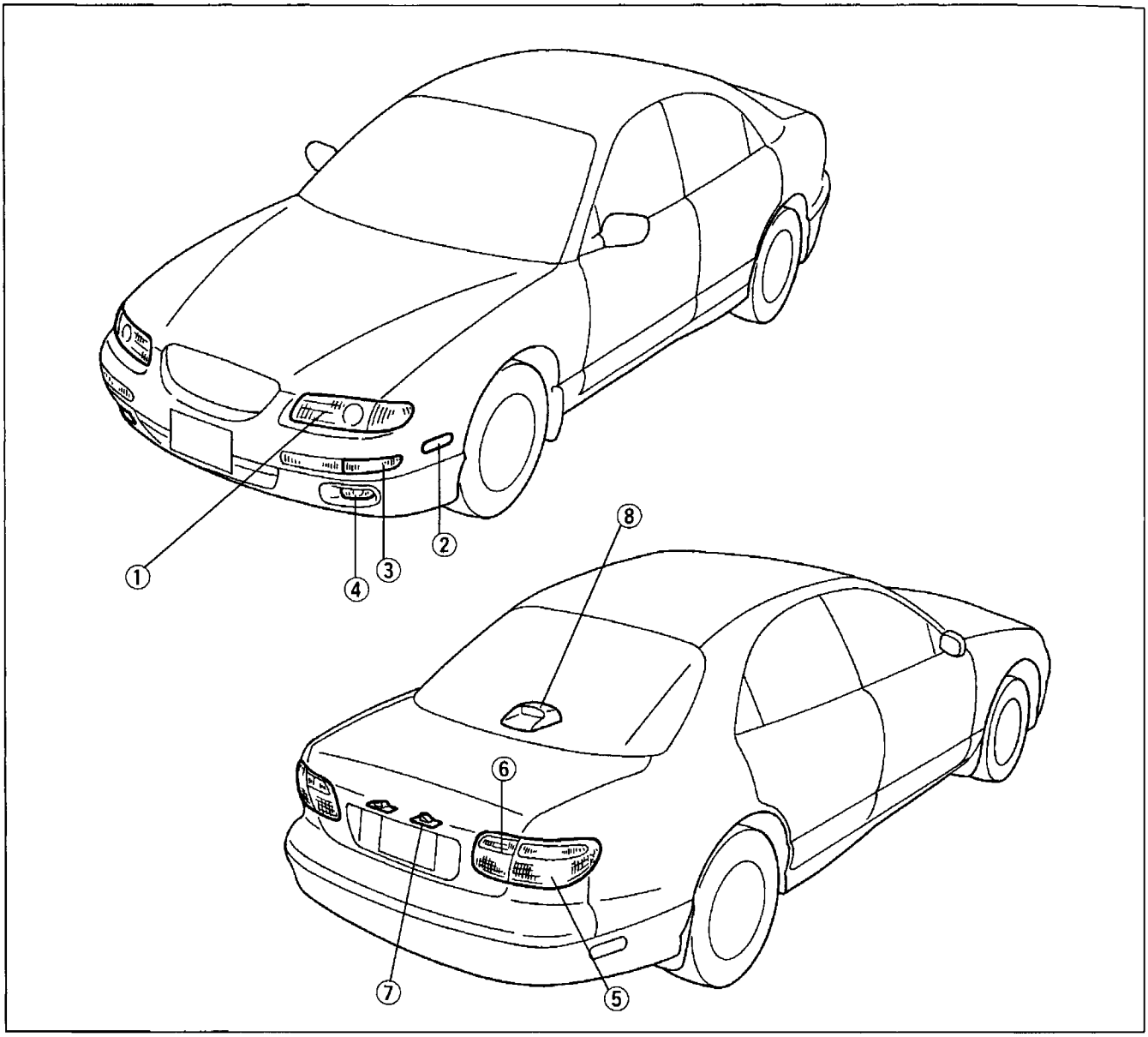
CONNECTOR D



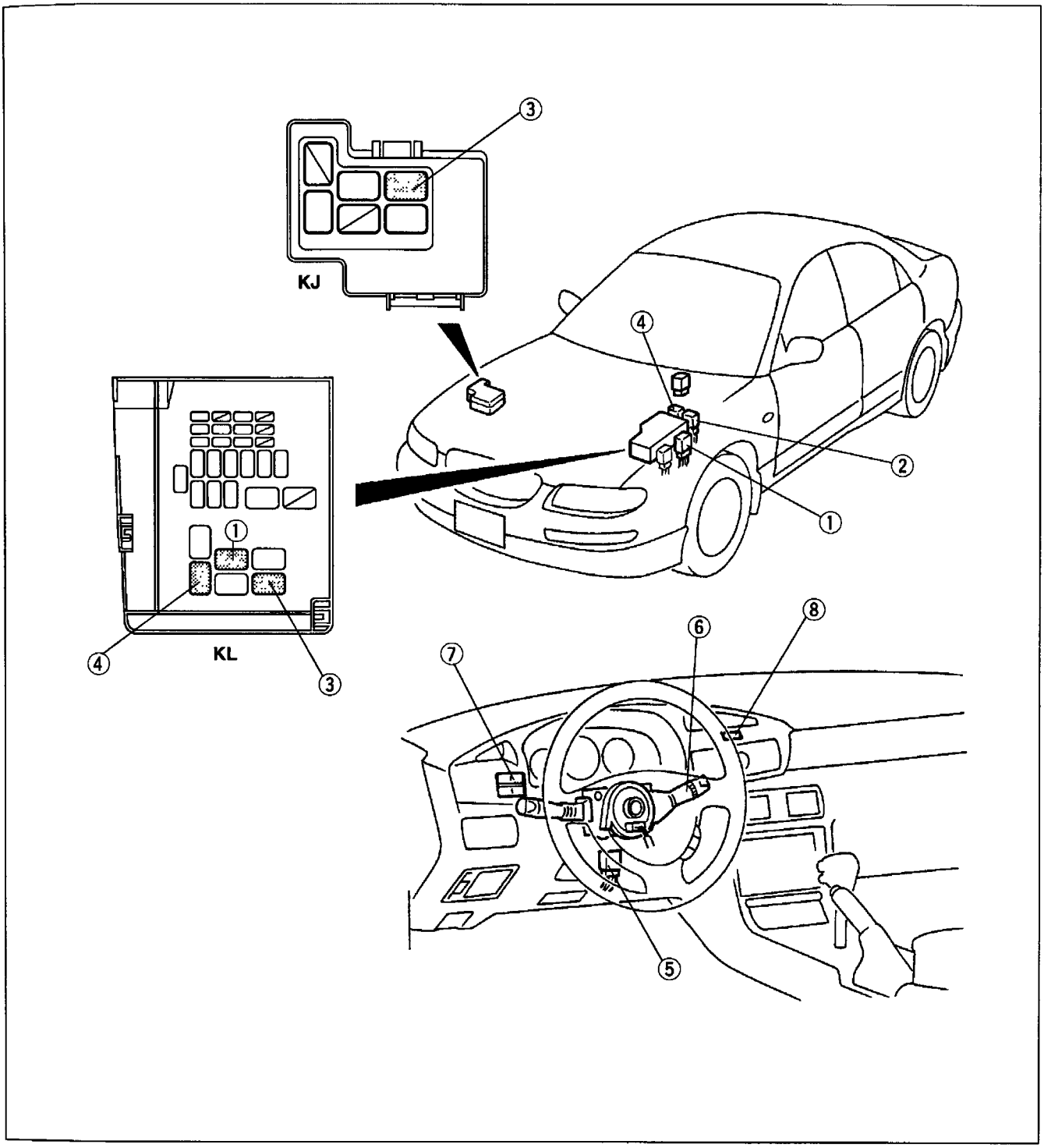
Terminal	Signal	Connection	Test condition		Voltage/ Continuity	Inspection area
3A	Brake warning	Parking brake switch	Parking brake operated: check for continuity to ground		Yes	Parking brake switch
			Parking brake released: check for continuity to ground		No	
3B	Keyless	Keyless unit	Keyless unit is not operating		5 V	Keyless unit
3C	Power door lock control	Door lock timer unit	For 0.4 seconds after transmitter UNLOCK (driver) button is pressed		0 V	Door lock timer unit
			Other		B+	
3D	—	—	—		—	—
3E	DRL	DRL relay	Ignition switch at ON	Parking brake operated	B+	• A/C 10 A fuse • DRL relay
				Parking brake released	0 V	
3F	Auto-tilt	Tilt switch	Ignition switch at ON	Auto switch on	0 V	Tilt switch
				Auto switch off	5 V	
3G	Auto-tilt	Tilt relay	Ignition switch at ON	Manual switch at up position	0 V	• DOOR LOCK 30 A fuse • Tilt relay
				Other	B+	
3H	Auto-tilt	Tilt switch	Ignition switch at ON	Manual switch at up position	0 V	Tilt switch
				Manual switch at down position	2.85 V	
				Other	5 V	
3I	Auto-tilt	Tilt relay	Ignition switch at ON	Manual switch at down position	0 V	• DOOR LOCK 30 A fuse • Tilt relay
				Other	B+	
3J	Auto-tilt	Tilt sensor	Constant		5 V	Tilt sensor
3K	Auto-tilt	Tilt sensor	Steering wheel position (top — bottom)		4.3—1.3 V	Tilt sensor
3L	Auto-tilt	Tilt sensor	Constant		0 V	Tilt sensor

EXTERIOR LIGHTING SYSTEM

STRUCTURAL VIEW



1. Headlight
   - Removal / Installation ..... page T–14
   - Aiming ..... page T–15
   - Bulb replacement ..... page T–16
2. Front side marker light
   - Removal / Installation ..... page T–16
3. Front turn light
   - Removal / Installation ..... page T–17
4. Front fog light
   - Removal / Installation ..... page T–18
   - Aiming ..... page T–19
   - Bulb replacement ..... page T–19
5. Rear combination light
   - Removal / Installation ..... page T–20
   - (1) Rear turn and hazard warning light
   - (2) Brake light and taillight
6. Inboard combination light
   - Removal / Installation ..... page T–21
   - Bulb replacement ..... page T–21
   - (1) Brake light and taillight
   - (2) Back-up light
7. Licence plate light
   - Removal / Installation ..... page T–22
   - Bulb replacement ..... page T–22
8. High-mount brake light
   - Removal / Installation ..... page T–23
   - Bulb replacement ..... page T–23



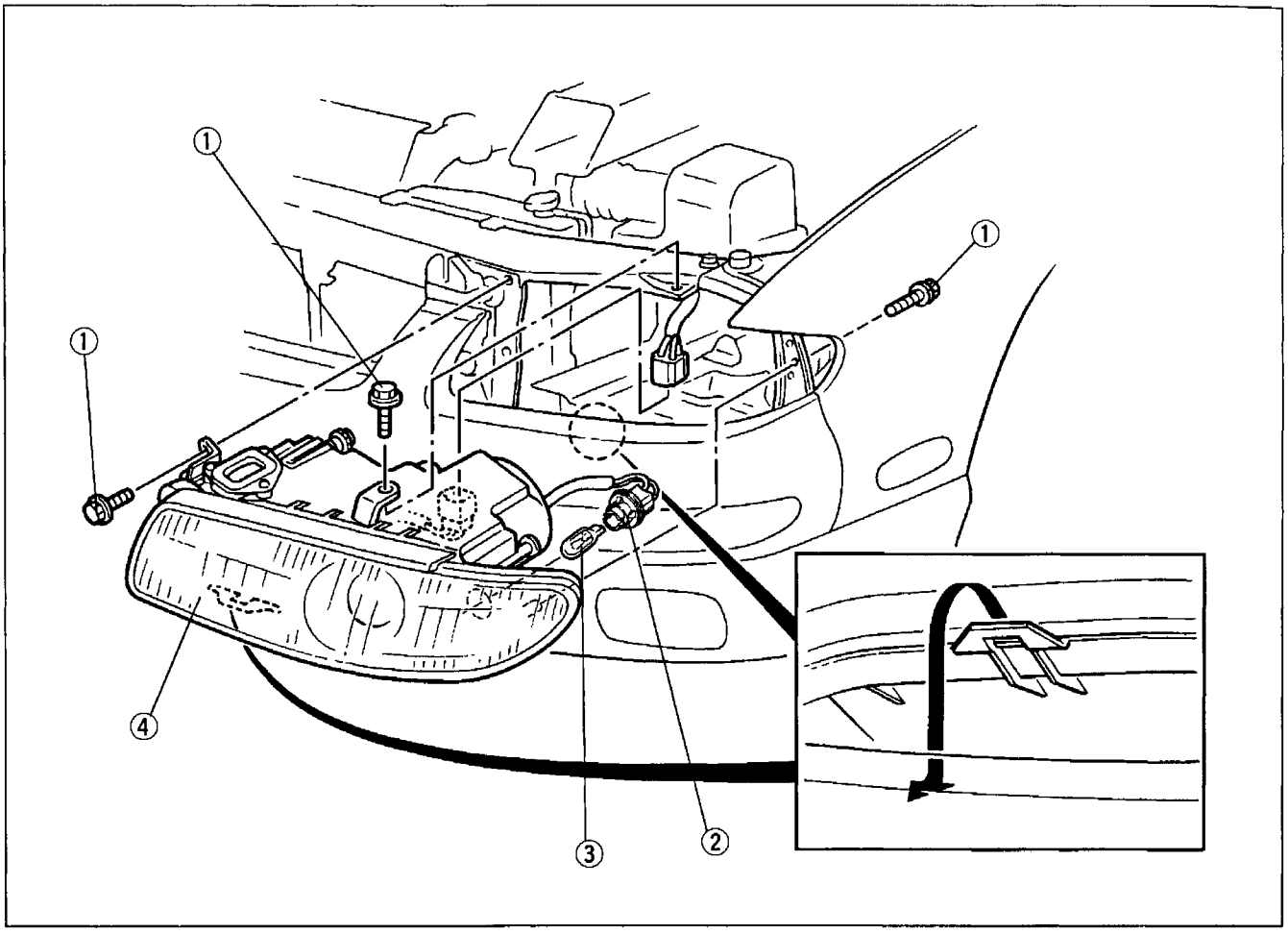
3ZU0TX–034

1. DRL relay
   Inspection ..... page T–24
2. Headlight relay
   Inspection ..... page T–24
3. Front fog light relay
   Inspection ..... page T–24
4. TNS relay
   Inspection ..... page T–24
5. Flasher unit
   Removal / Installation ..... page T–25
   Inspection ..... page T–25
6. Combination switch
   Removal / Installation ..... page T–26
   Inspection ..... page T–27
   Adjustment ..... page T–29
7. Cluster switch
   Removal / Installation ..... page T–30
   Inspection ..... page T–30
8. Hazard warning switch
   Removal / Installation ..... page T–31
   Inspection ..... page T–31

HEADLIGHT

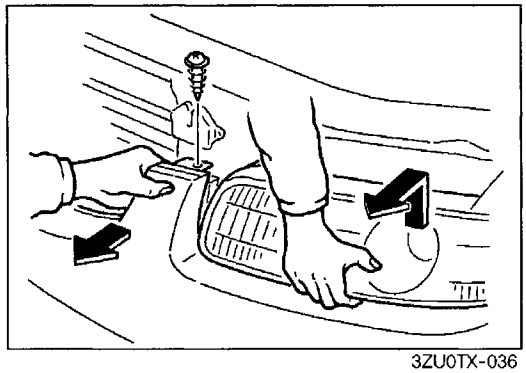
Removal / Installation

1. Remove the upper seal board.
   (Refer to section S.)
2. Disconnect the headlight connector.
3. Remove the mud guard.
   (Refer to section S.)
4. Remove in the order shown in the figure, referring to **Removal note**. To remove the driver's side headlight, remove the fresh-air duct.
   (Refer to sections F1, F2.)
5. Install in the reverse order of removal.



3ZU0TX-035

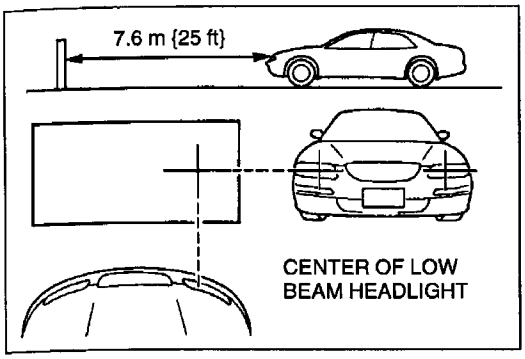
1. Bolt
2. Socket cover
3. Parking light bulb **(5 W)**
4. Headlight
   Aiming ..... page T–15
   Bulb replacement ..... page T–16



3ZU0TX-036

Removal note

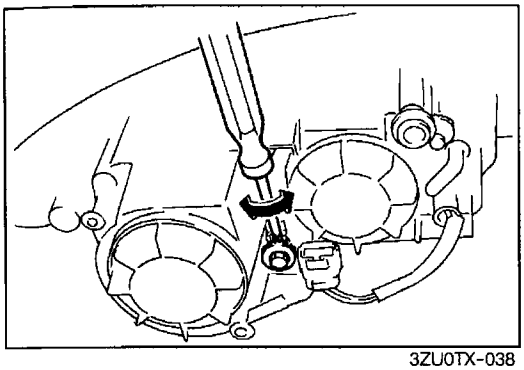
Pull the front bumper fascia forward to remove the headlight.



Aiming

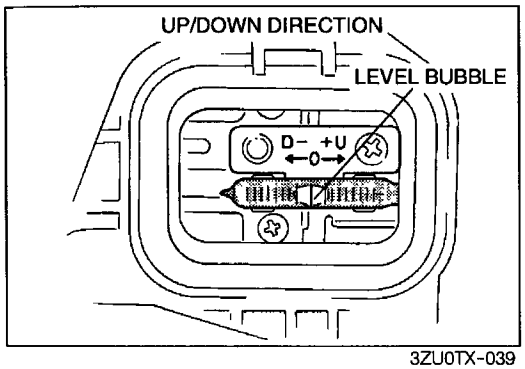
Vertical-horizonal aiming method

1. Adjust the air pressure of the tires 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.

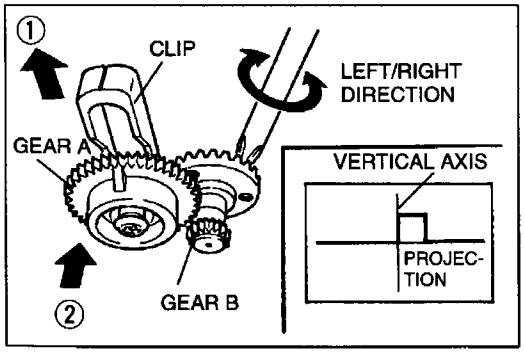


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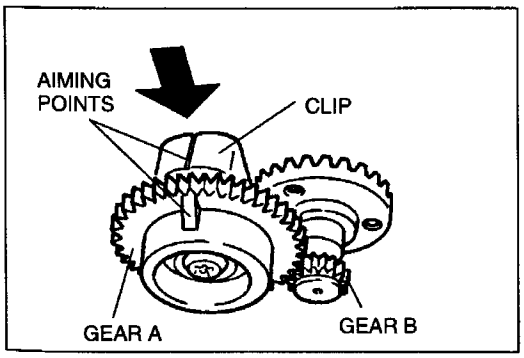
6. Adjust the up/down position of the headlight by using the vertical aiming gauge. Make sure the bubble in the gauge is within two lines on either side of the center "0".



3ZU0TX-039



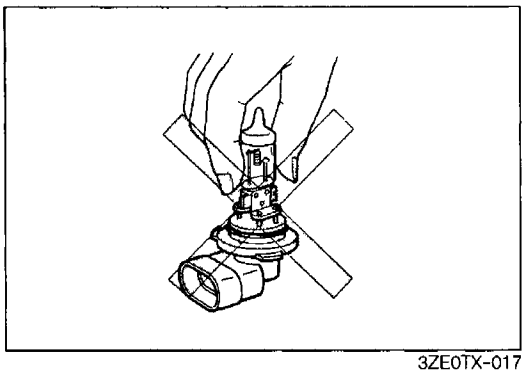
7. Pull up the clip.
8. Push gear A toward the front of the vehicle until gears A and B disengage.
9. Turn the headlight on at low beam.
10. By using a screwdriver, turn gear B to carry out horizontal aiming. The left edge of the figure projected on the tester screen must be aligned with the vertical axis as shown.



11. Turn gear A to align the aiming points.
12. Push the clip down until gears A and B engage.
13. Do this procedure for both RH and LH headlights.

Note

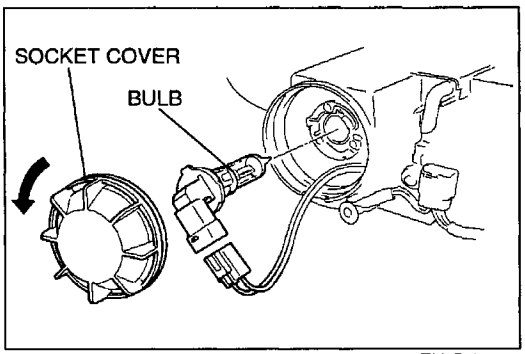
- When the headlights are correctly adjusted by following the above steps, simplified aiming by just turning gear B to align aiming points is possible.


3ZE0TX-017

Bulb Replacement

Caution

- **A halogen light generates extremely high heat when it is used. If the surface of the light is soiled, excessive heat will build up and the light's life will be shortened. When replacing the light, hold the metal flange, not the glass.**

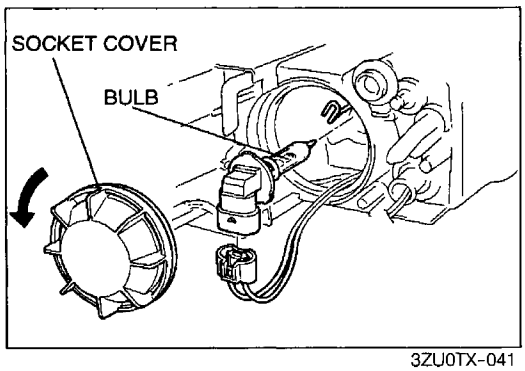


3ZU0TX-040

Low bulb

1. Remove the socket cover.
2. Disconnect the bulb connector.
3. Turn left and remove the headlight bulb.
4. Install in the reverse order of removal.

Headlight bulb: low 51 W

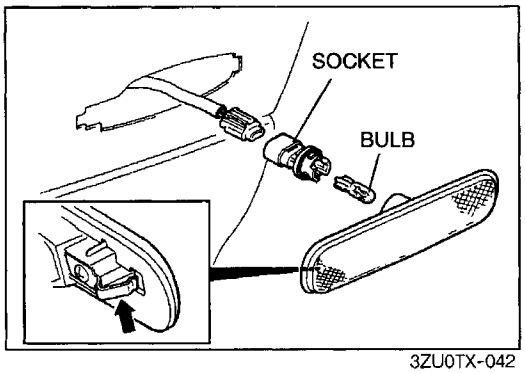


3ZU0TX-041

High bulb

1. Remove the socket cover.
2. Disconnect the bulb connector.
3. Unfasten the clasp and remove the headlight bulb.
4. Install in the reverse order of removal.

Headlight bulb: high 60 W



3ZU0TX-042

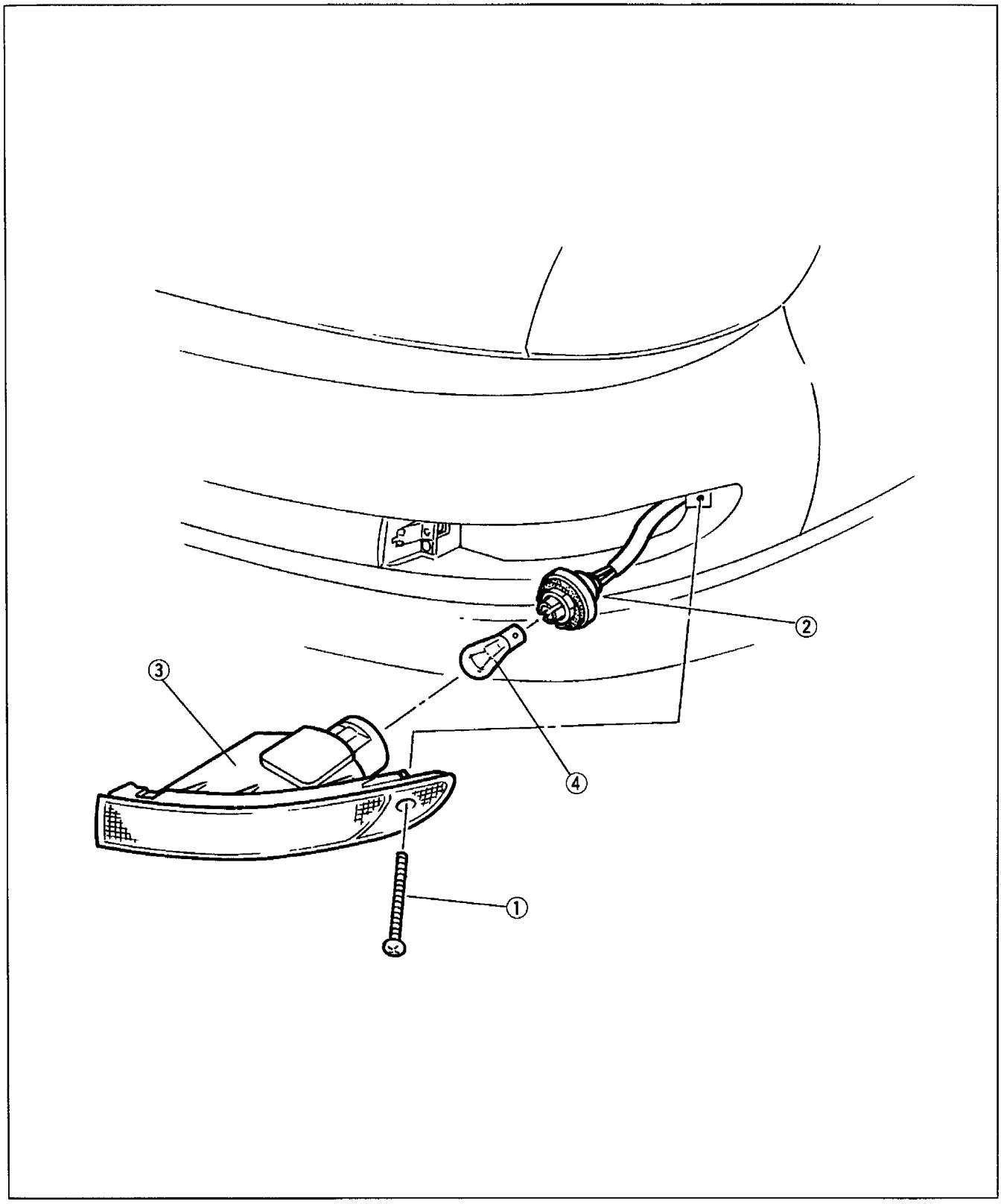
FRONT SIDE MARKER LIGHT

Removal / Installation

1. Remove the front side marker light.
2. Disconnect the front side marker light connector.
3. Remove the socket and front side marker light 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.

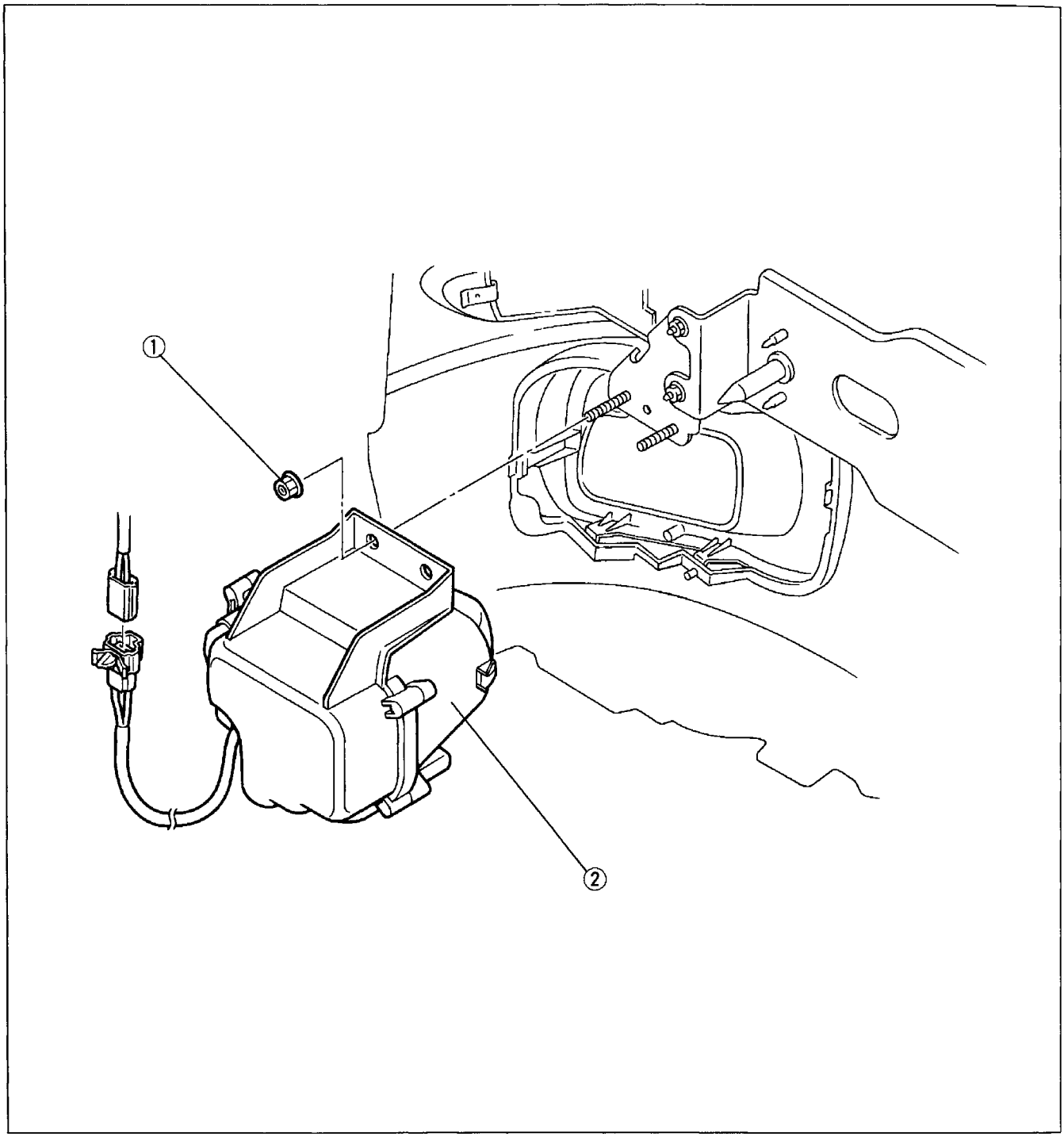


1. Screw
2. Socket cover
3. Housing
4. Front turn light bulb **(27 W)**

FRONT FOG LIGHT

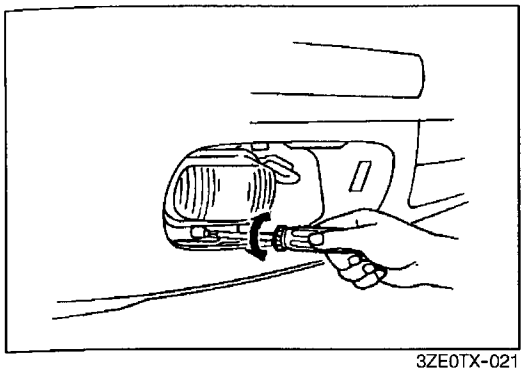
Removal / Installation

1. Remove the headlight.
   (Refer to page T–14.)
2. Remove the undercover.
   (Refer to section K1, K2.)
3. Disconnect the front fog light connector.
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal.



3ZE0TX–020

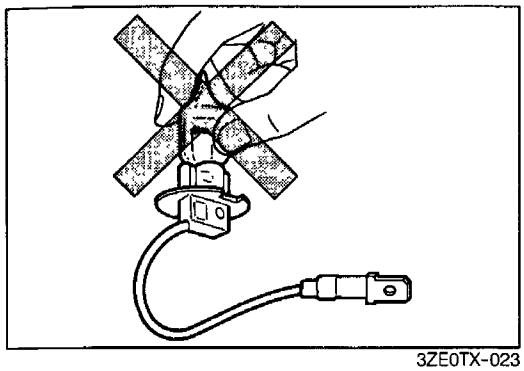
1. Nut
2. Front fog light
   Aiming ..... page T–19
   Bulb replacement ..... page T–19



3ZE0TX-021

Aiming

1. Remove the front fog light cover.
2. Adjust the front fog lights by turning the adjusting screw shown in the figure.



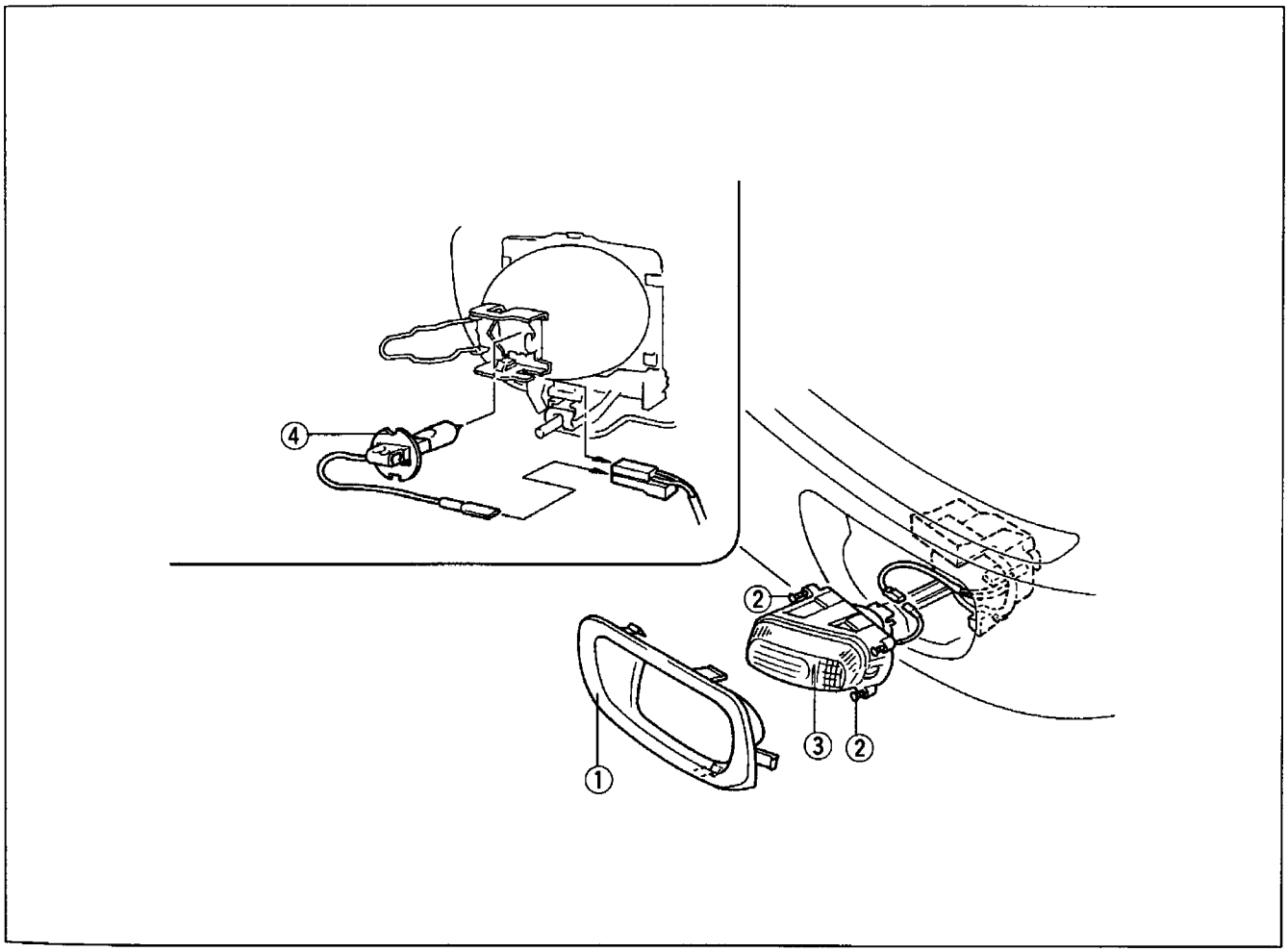
3ZE0TX-023

Bulb Replacement

Caution

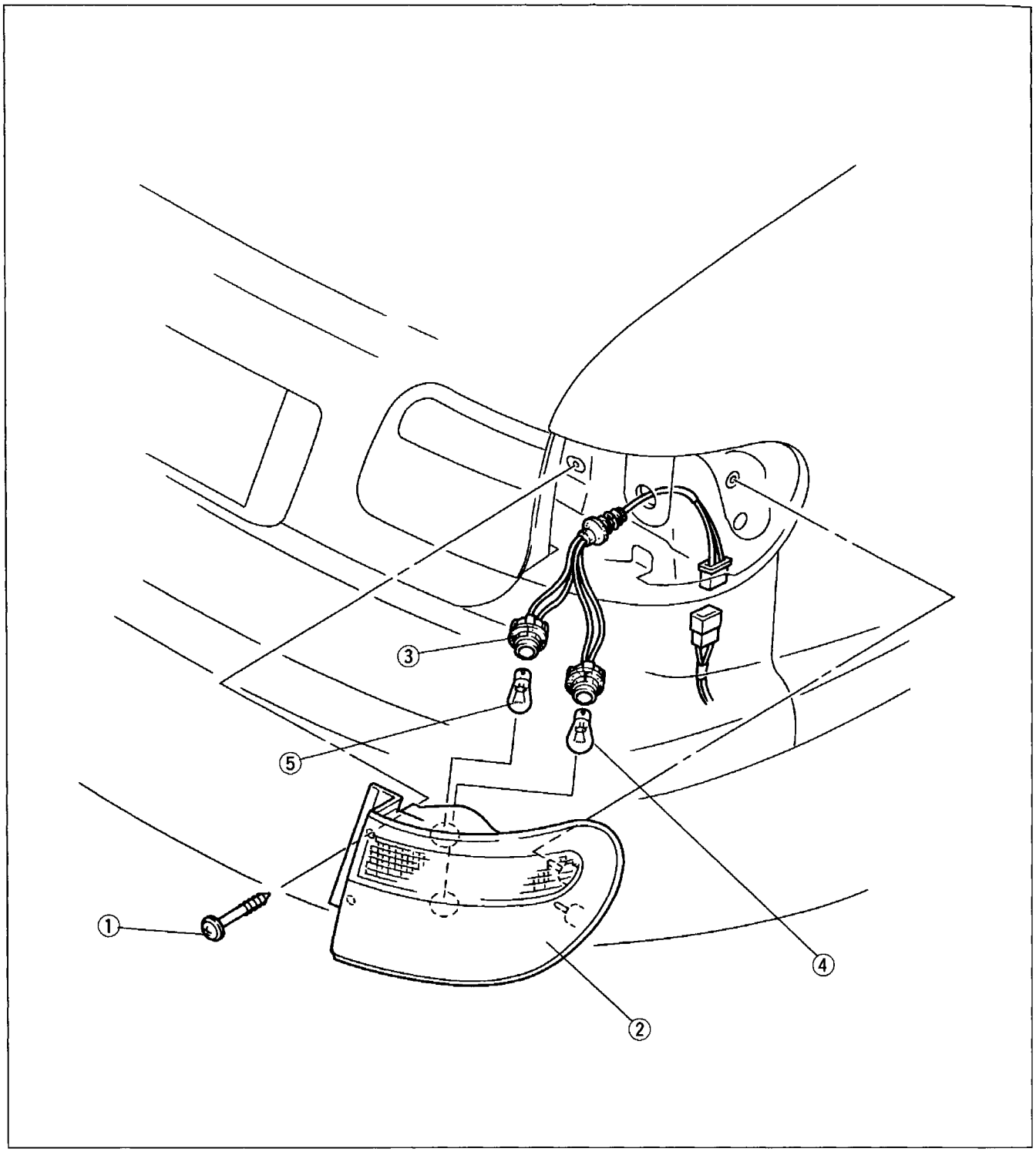
- **A halogen light generates extremely high heat when it is used. If the surface of the light is soiled, excessive heat will build up and the light's life will be shortened. When replacing the light, hold the metal flange, not the glass.**

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



1. Front fog light cover
2. Screw
3. Front fog light lens
4. Front fog light bulb **(55 W)**

REAR COMBINATION LIGHT
Removal / Installation
1. Remove the trunk side trim.
   (Refer to section S.)
2. Disconnect the rear combination light connector.
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.

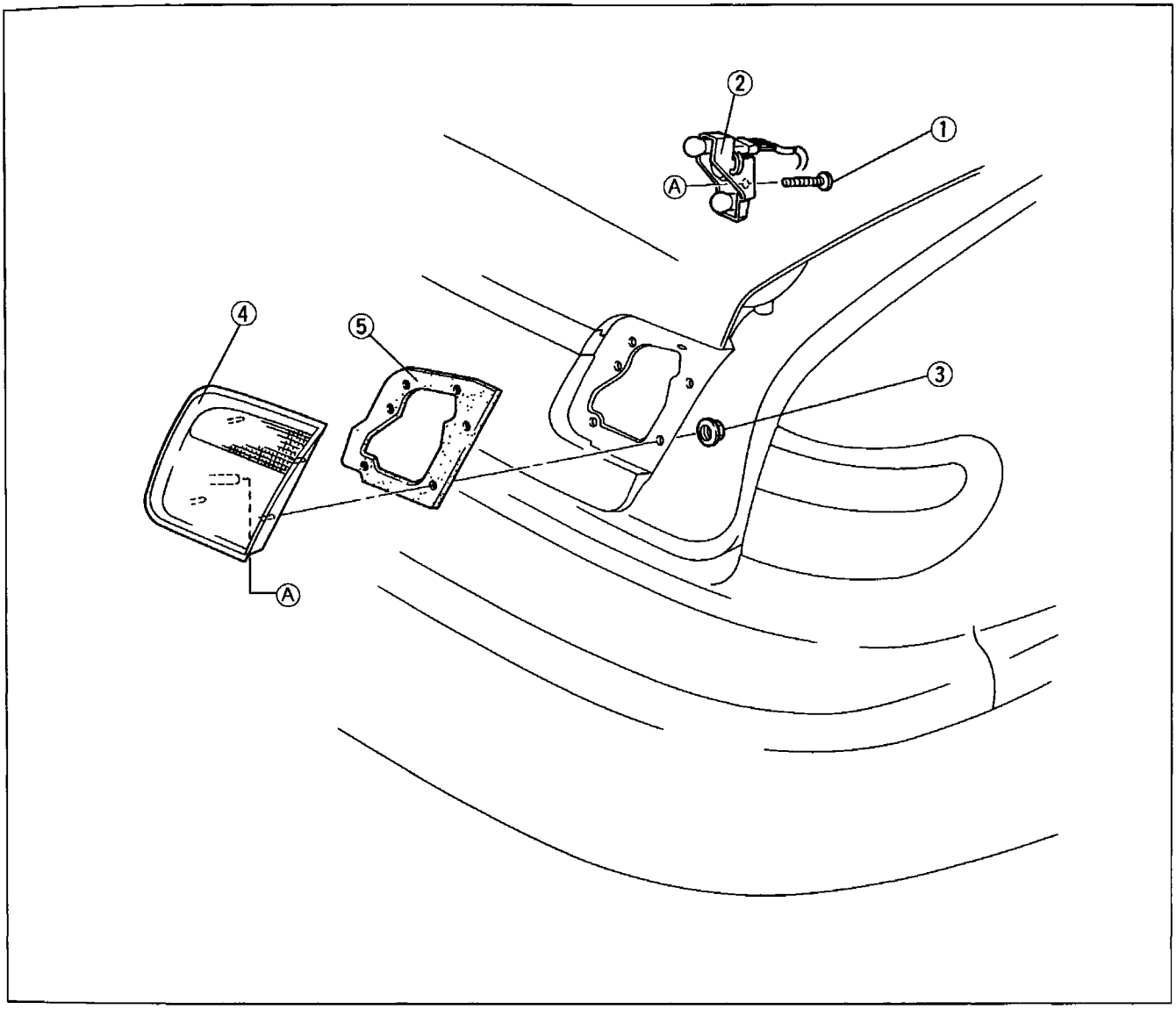


1. Screw
2. Rear combination light
3. Socket
4. Bulb (brake light and taillight) **(27/8 W)**
5. Bulb (rear turn light) **(27 W)**

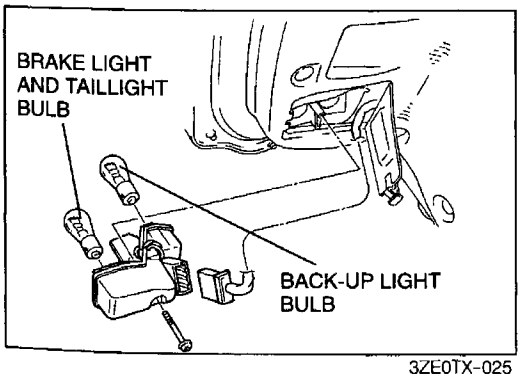
INBOARD COMBINATION LIGHT

Removal / Installation

1. Remove the trunk lid trim.
   (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



1. Screw
2. Socket
3. Nut
4. Inboard combination light
5. Gasket



3ZE0TX-025

Bulb Replacement

Inboard combination light

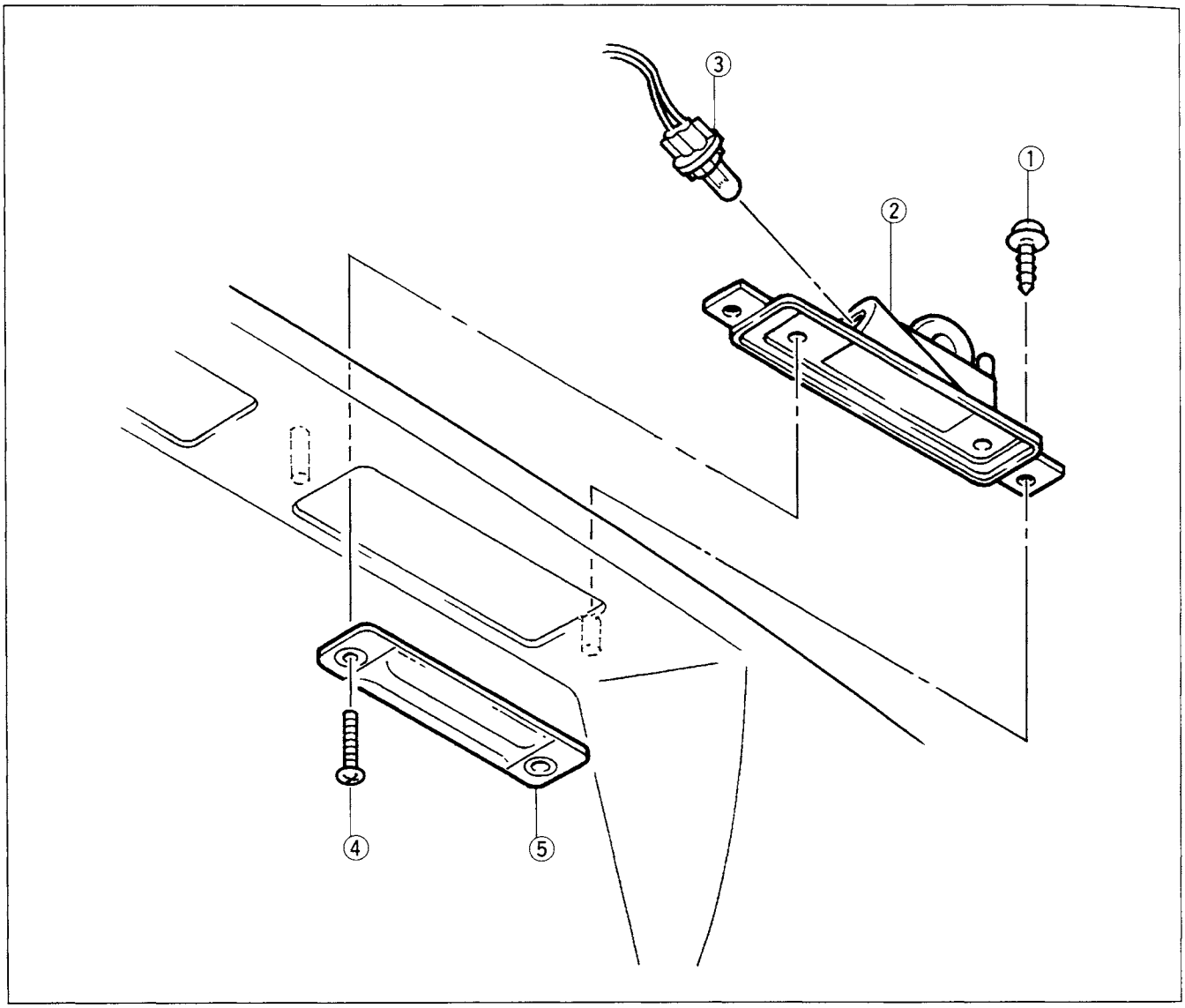
1. Turn over the trunk lid trim cover.
2. Disconnect the inboard combination light connector.
3. Remove the screw.
4. Remove the socket.
5. Remove the bulbs.
6. Install in the reverse order of removal.

Inboard combination light bulb:
Brake light and taillight: 27/8 W
Back-up light: 27 W

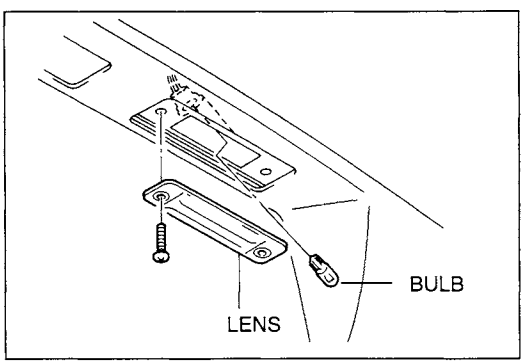
LICENCE PLATE LIGHT

Removal / Installation

1. Remove the rear finisher.
   (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



1. Screw
2. Housing
3. Socket
4. Screw
5. Lens



Bulb Replacement

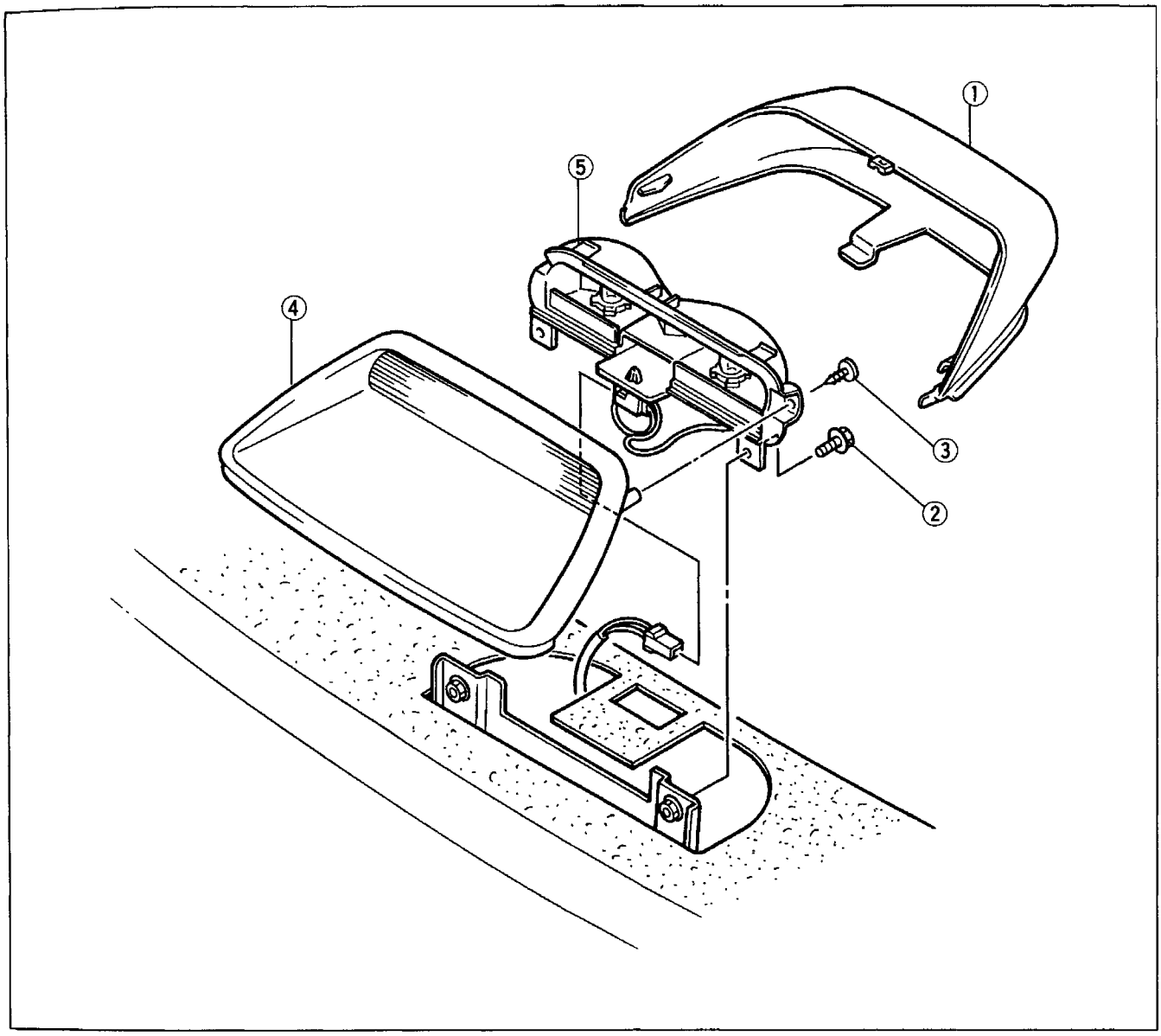
1. Remove the screws.
2. Remove the lens.
3. Remove the licence plate light bulb.
4. Install in the reverse order of removal.

Licence plate light bulb: 5 W

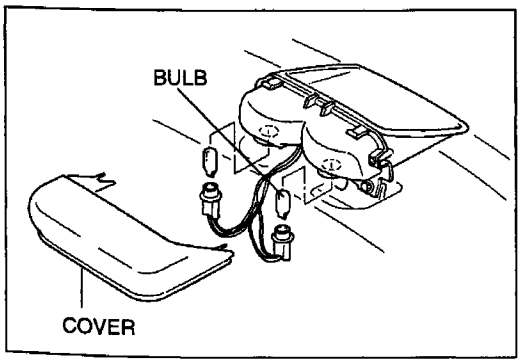
HIGH-MOUNT BRAKE LIGHT

Removal / Installation

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



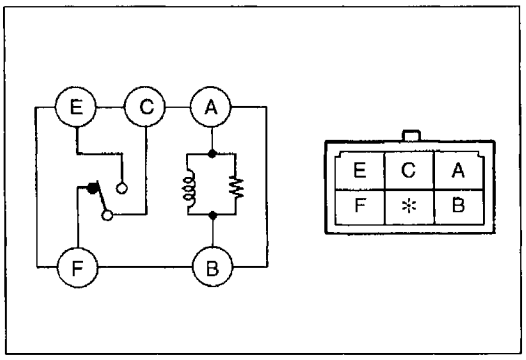
1. Cover
2. Bolt
3. Screw
4. Lens
5. Housing



Bulb Replacement

1. Remove the cover.
2. Remove the socket and high-mount brake light bulb.
3. Install in the reverse order of removal.

High-mount brake light bulb: 18.4 W



DRL RELAY

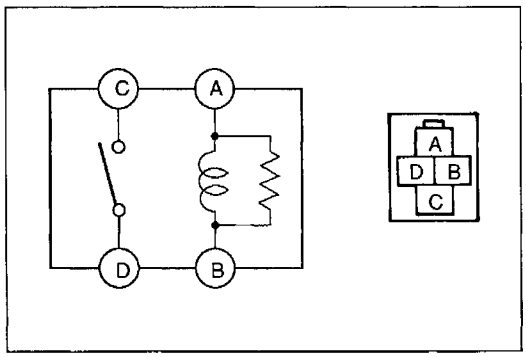
Inspection

1. Apply battery positive voltage and check for continuity between the relay terminals.

○—○: Continuity B+: Battery positive voltage

Step \ Terminal	A	B	E	C	F
1	○—○			○—○	
2	GND	B+	○—○		

2. If not as specied, replace the DRL relay.



HEADLIGHT RELAY

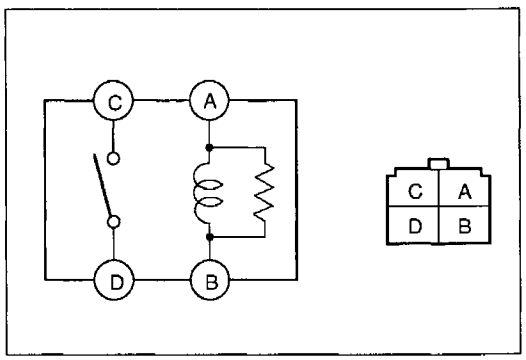
Inspection

1. Apply battery positive voltage and check for continuity between the relay terminals.

○—○: Continuity B+: Battery positive voltage

Step \ Terminal	A	B	C	D
1	○—○			
2	GND	B+	○—○	

2. If not as specified, replace the headlight relay.



FRONT FOG LIGHT RELAY

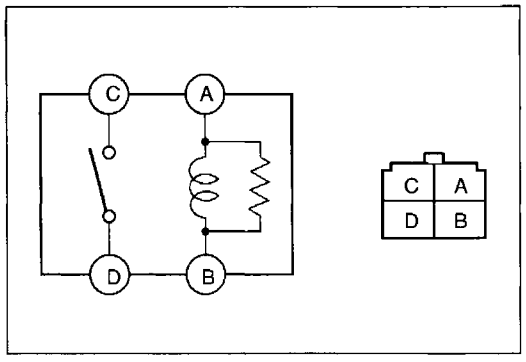
Inspection

1. Apply battery positive voltage and check for continuity between the relay terminals.

○—○: Continuity B+: Battery positive voltage

Step \ Terminal	A	B	C	D
1	○—○			
2	GND	B+	○—○	

2. If not as specified, replace the front fog light relay.



TNS RELAY

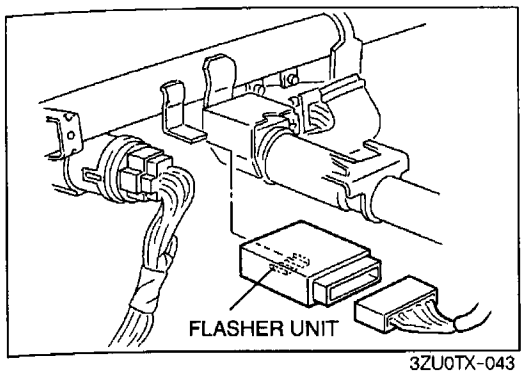
Inspection

1. Apply battery positive voltage and check for continuity between the relay terminals.

○—○: Continuity B+: Battery positive voltage

Step \ Terminal	A	B	C	D
1	○—○			
2	GND	B+	○—○	

2. If not as specified, replace the TNS relay.



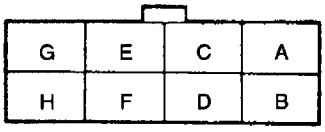
3ZU0TX-043

FLASHER UNIT
Removal / Installation
1. Remove the lap louver duct. (Refer to page T–4.)
2. Disconnect the flasher unit connector.
3. Remove the flasher unit.
4. Install in the reverse order of removal.

Inspection
1. Measure the voltage at the flasher unit terminals as indicated below.
2. If not as specified, inspect the parts listed under "Inspection area" and the related wiring harness.
3. If the parts and wiring harness are OK but the system still does not work properly, replace the flasher unit.

Terminal voltage list (Reference)

B+: Battery positive voltage



Terminal	Signal	Connection	Test condition	Voltage/ Continuity	Inspection area
A	Flasher unit ground	GND	Constant: check for continuity to ground	Yes	Wiring harness (Flasher unit—GND)
B	—	—	—	—	—
C	Hazard warning on	Hazard warning switch	Hazard warning switch: on	0 V	Hazard warning switch
			Hazard warning switch: off	B+	
D	Turn signal flasher (LH)	Turn signal light (LH)	Turn signal light (LH) flashes	Alternates 0 V and B+	Turn signal light (LH)
			Other	0 V	
E	Turn switch on/ off (RH)	Combination switch	Ignition switch and turn switch (RH): on	B+	Combination switch
			Other	0 V	
F	Turn switch on/ off (LH)	Combination switch	Ignition switch and turn switch (LH): on	B+	Combination switch
			Other	0 V	
G	Turn signal flasher (RH)	Turn signal light (RH)	Turn signal light (RH) flashes	Alternates 0 V and B+	Turn signal light (RH)
			Other	0 V	
H	B+	HAZARD 15 A fuse	Constant	B+	HAZARD 15 A fuse

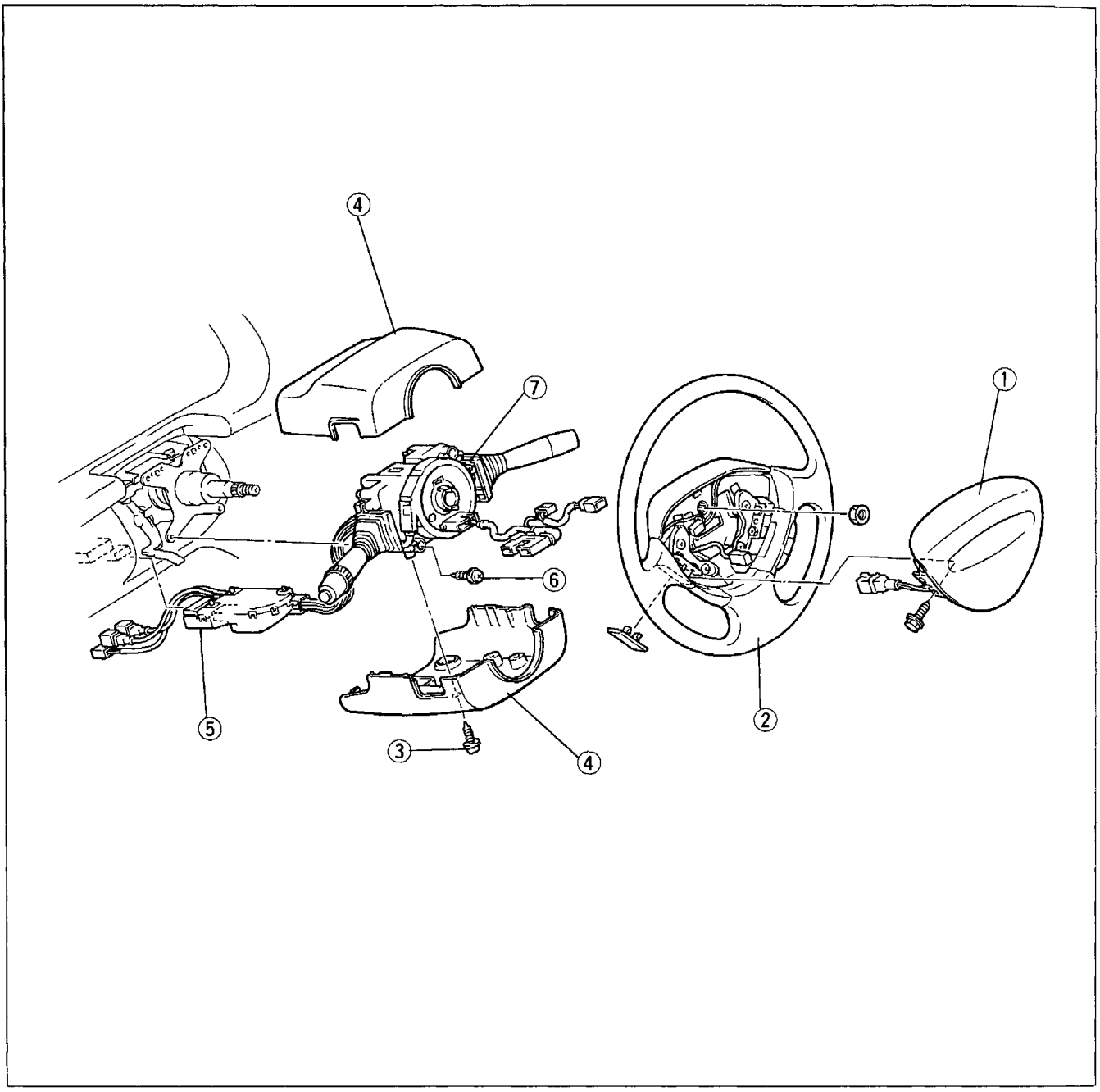
COMBINATION SWITCH

Warning

- **Handling the air bag module improperly can accidently deploy the air bag, which may seriously injure you. Read SERVICE WARNINGS, page T–92, before handling the air bag module.**

Removal / Installation

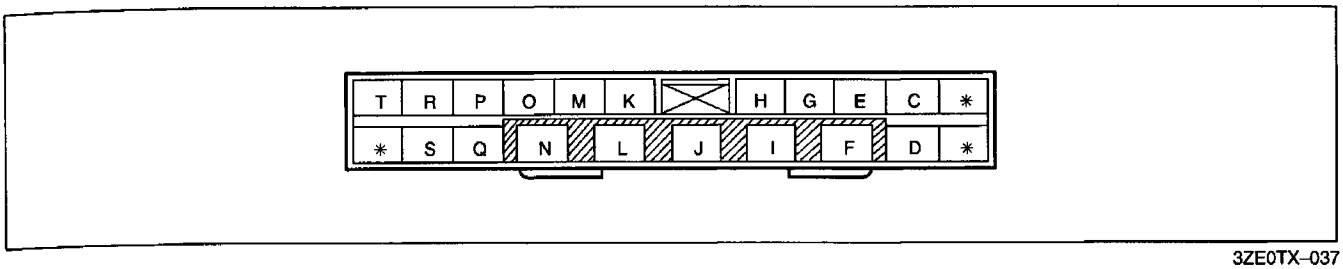
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



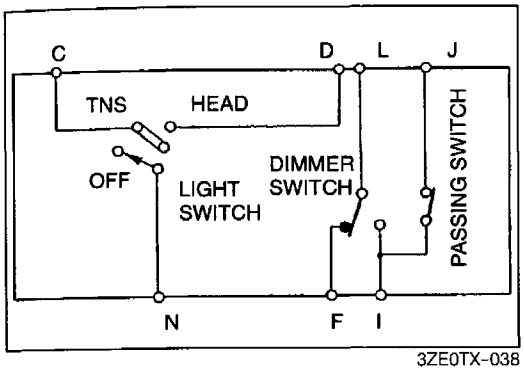
1. Driver-side air bag module
   Removal / Installation ..... page T–102
2. Steering wheel
   Removal / Installation ..... section N
3. Screw
4. Column cover
5. Combination switch connector
6. Screw
7. Combination switch
   Inspection ..... page T–27
   Adjustment ..... page T–29

Inspection

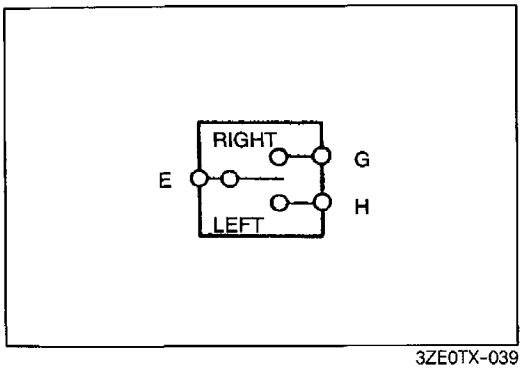
1. Check for continuity between the switch terminals as indicated below.
2. If not as specified, replace the combination switch.



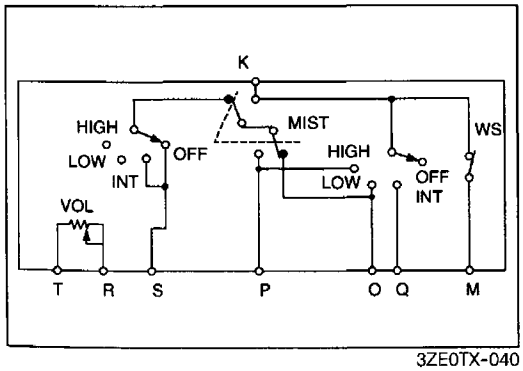
3ZE0TX-037



3ZE0TX-038



3ZE0TX-039



3ZE0TX-040

Headlight switch

○—○: Continuity

Light	Dimmer	Terminal / Flash-to-pass	N	C	D	L	F	I	J
OFF	—	OFF							
		ON						○—○	
Parking	—	OFF	○—○						
		ON	○—○					○—○	
Headlight	Low	OFF	○—○—○			○—○			
		ON	○—○—○			○—○		○—○	
	High	—	○—○—○			○————		○	

Turn switch

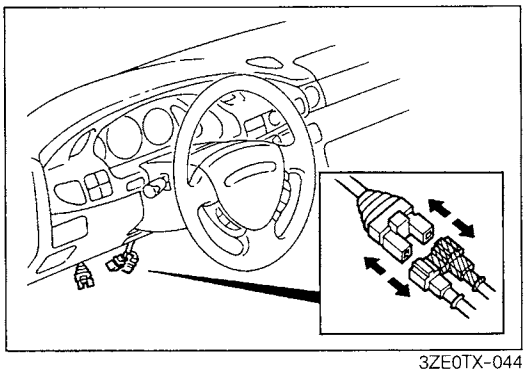
○—○: Continuity

Switch position / Terminal	E	H	G
Left	○———○		
Off			
Right	○		○

Windshield wiper and washer switch

○—○: Continuity ○WW○ : Resistance

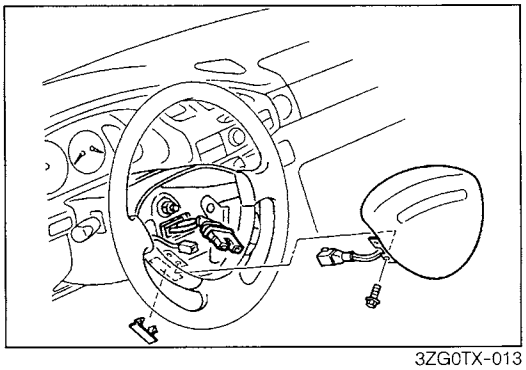
Switch position / Terminal			K	M	Q	O	P	S	R	T
Wiper switch	OFF	MIST OFF				○———○			○WW○	
		MIST ON	○————				○		○WW○	
	INT		○———○			○———○			○WW○	
	LO		○————			○			○WW○	
	HI		○————				○		○WW○	
Washer switch	ON		○—○						○WW○	



3ZE0TX-044

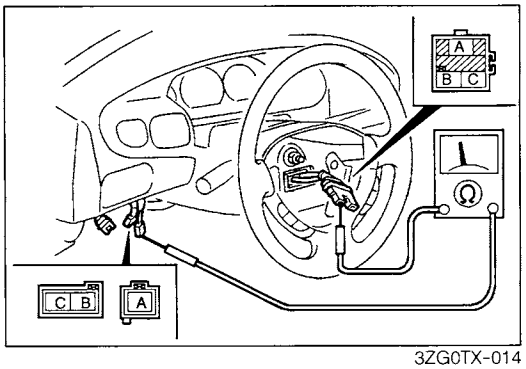
Clock spring

1. Deactivate the audio antitheft system, it installed.
2. Disconnect the negative battery cable.
3. Disconnect the orange and blue clock spring connectors.



3ZG0TX-013

4. Remove the driver-side air bag module. (Refer to page T–102.)

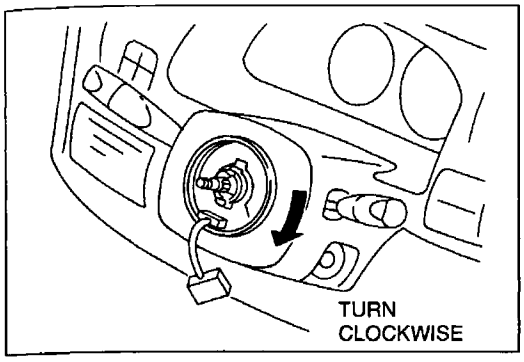


3ZG0TX-014

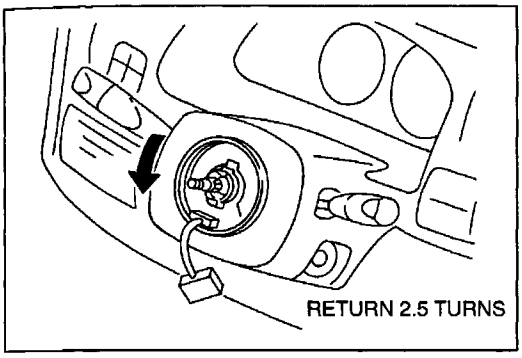
5. Check for continuity between the terminals of the clock spring connector as shown.

Terminal		Continuity
Air bag module side	Vehicle harness side	
A (Male)	A (Female)	Yes
B (Male)	B (Female)	Yes
C (Male)	C (Female)	Yes

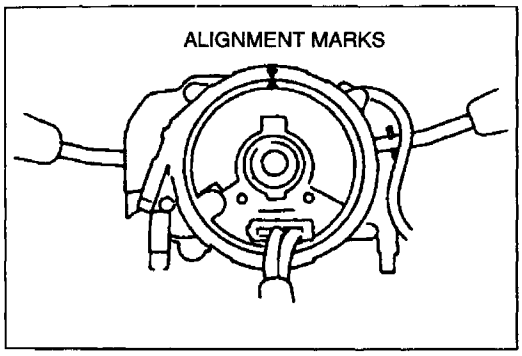
6. If not as specified, replace the combination switch. (Refer to page T–26.)



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 stops. Do not force it.



3. Turn the clock spring counter clockwise 2.5 turns.

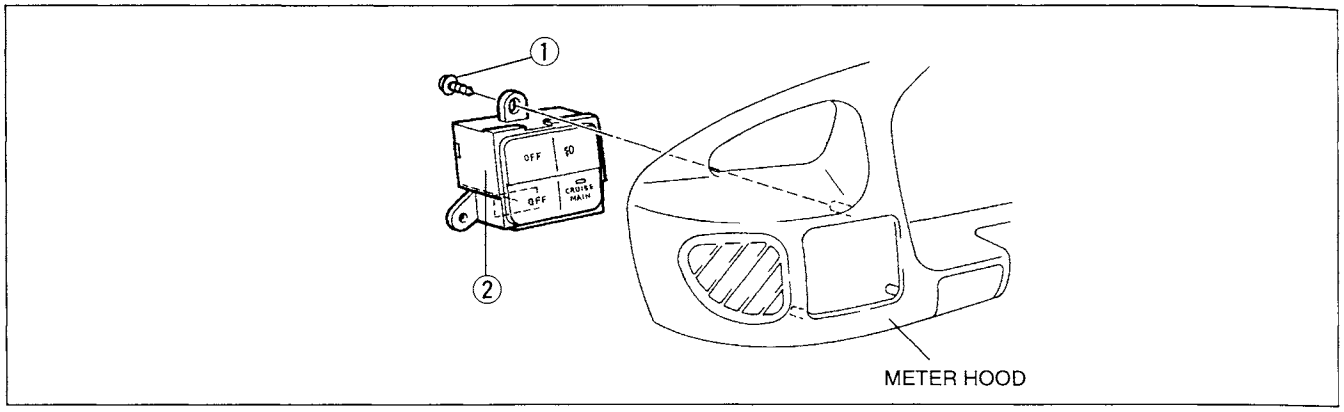


4. Align the mark on the clock spring connector with that on the outer housing.

CLUSTER SWITCH

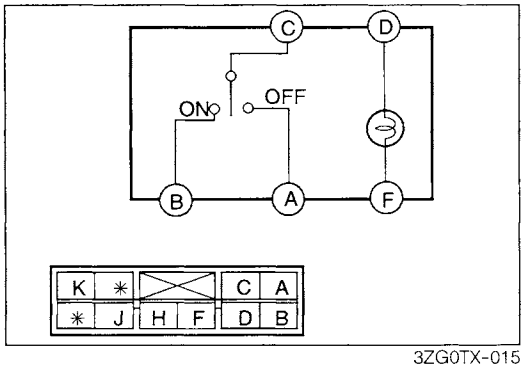
Removal / Installation

1. Remove the meter hood.
   (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



3ZE0TX-047

1. Screw
2. Cluster switch



3ZG0TX-015

Inspection

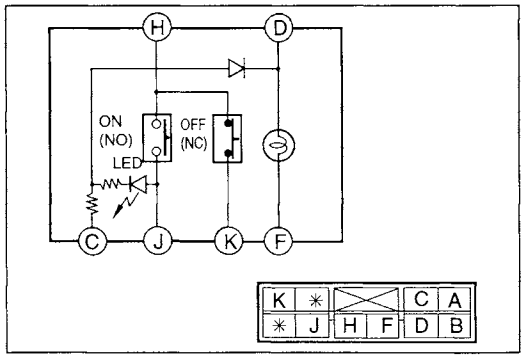
Front fog light switch

1. Remove the cluster switch.
2. Check for continuity between the switch terminals.

O—O: Continuity O—⓪—O: Bulb

Switch position		Terminal A	B	C	D	F
OFF	Pushed	O		O	O—⓪—O	
	Released				O—⓪—O	
ON	Pushed		O	O	O—⓪—O	
	Released				O—⓪—O	

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



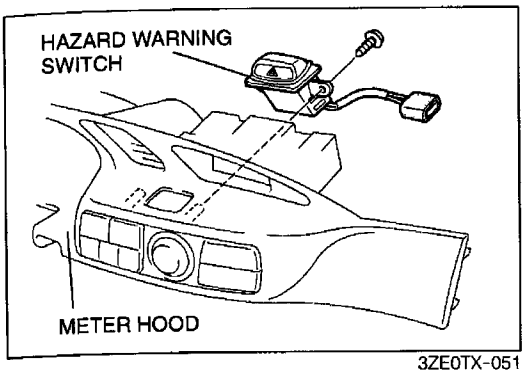
Cruise control main switch

1. Remove the cluster switch.
2. Check for continuity between the switch terminals.

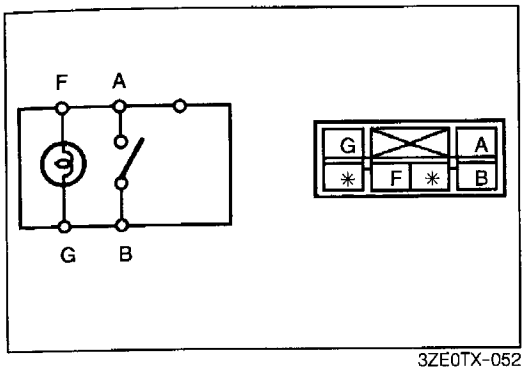
O—O: Continuity O—⓪—O: Bulb

Position		Terminal H	J	K	D	F
Cruise control main switch	ON	O	O	O	O—⓪—O	
	OFF				O—⓪—O	
Constant		O		O	O—⓪—O	

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



3ZE0TX-051



3ZE0TX-052

HAZARD WARNING SWITCH

Removal / Installation

1. Remove the meter hood. (Refer to section S.)
2. Remove the screws and the hazard warning switch.
3. Install in the reverse order of removal.

Inspection

1. Check for continuity between the terminals of the hazard warning switch.

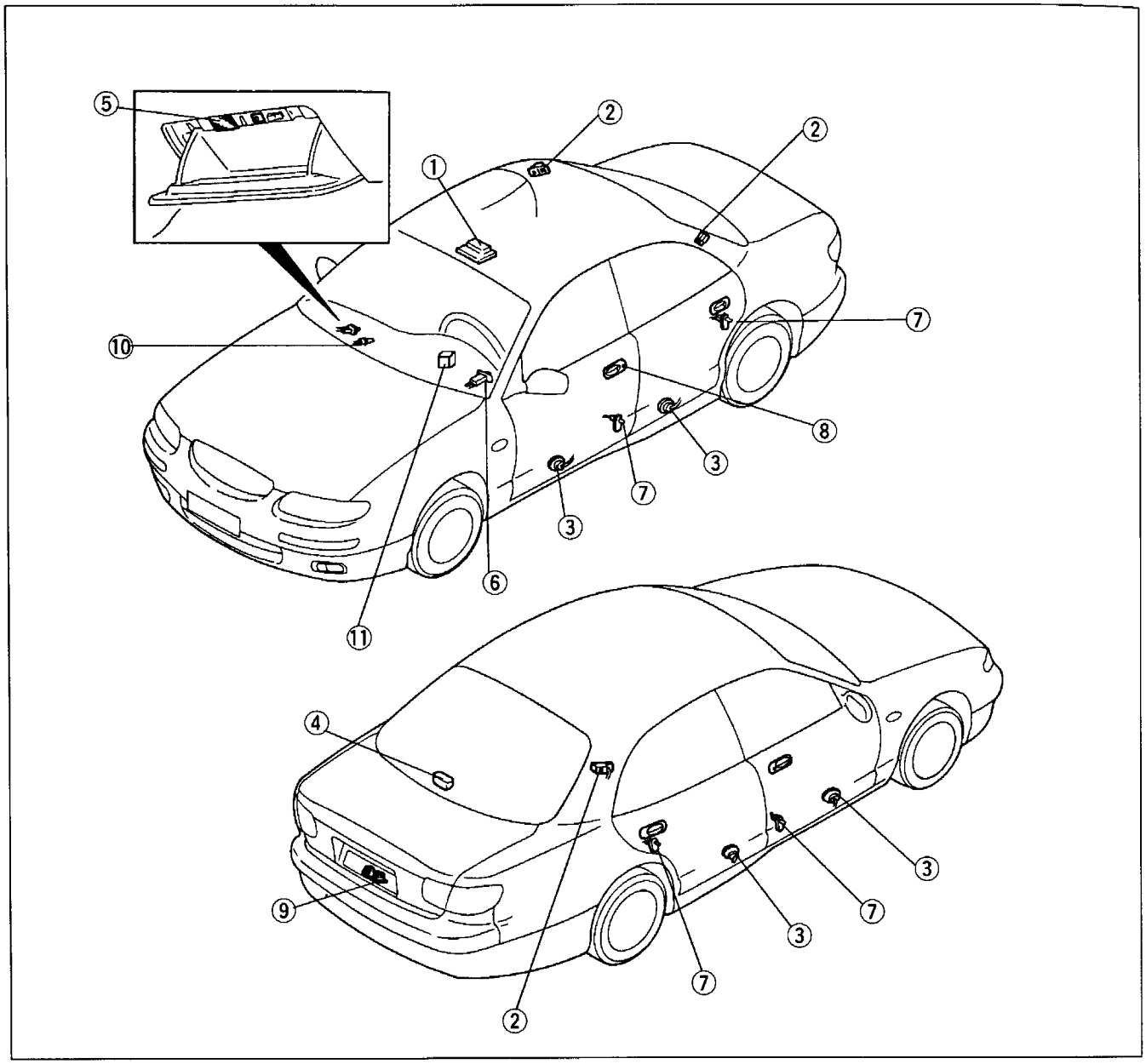
○—○: Continuity ○—⓪—○ : Bulb

Switch position \ Terminal	A	B	F	G
OFF			○—⓪—○	
ON	○—	—○	○—⓪—○	

2. If not as specified, replace the hazard warning switch.

INTERIOR LIGHTING SYSTEM

STRUCTURAL VIEW

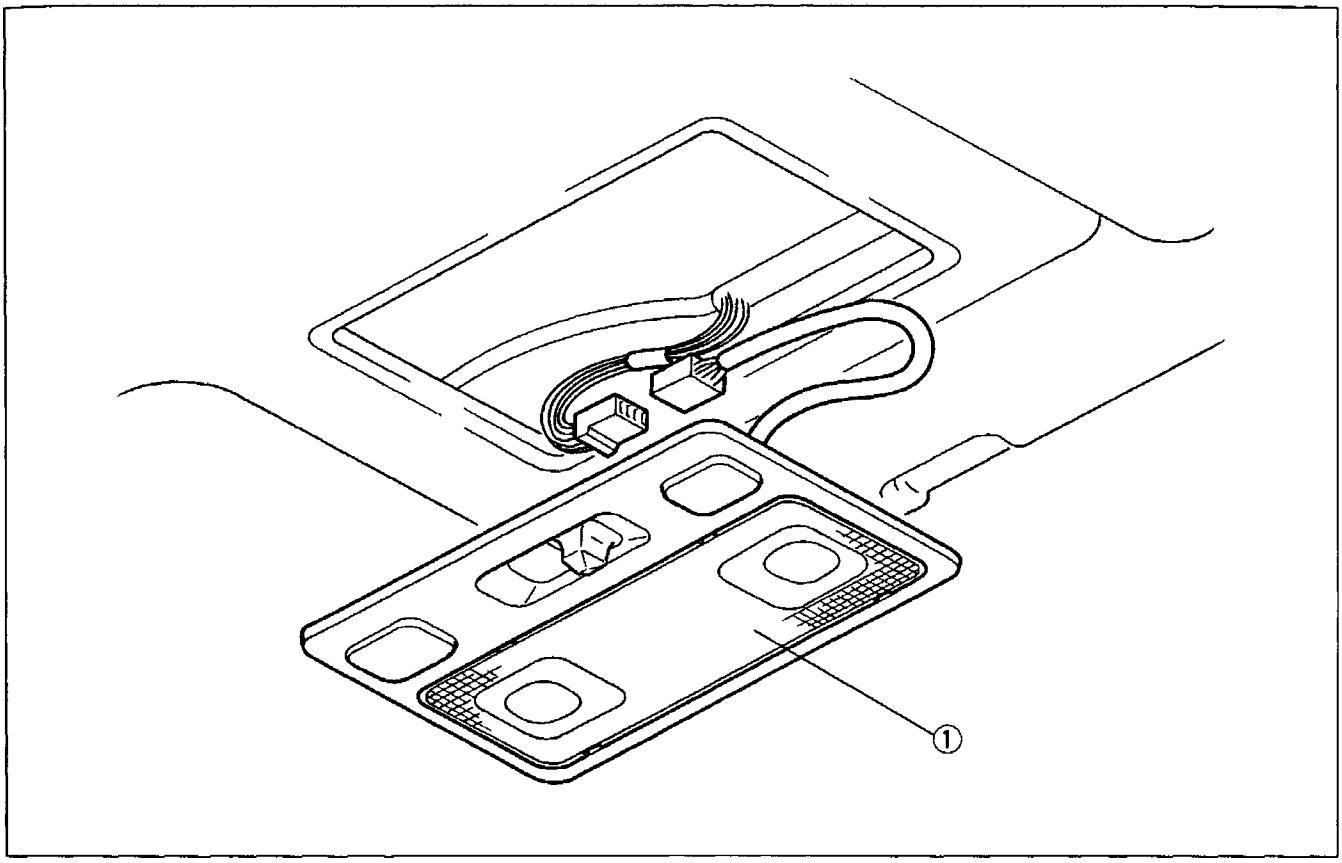


1. Interior and spotlight
   - Removal / Installation ..... page T–33
   - Bulb replacement ..... page T–33
2. Rear personal light
   - Removal / Installation ..... page T–34
3. Courtesy light
   - Removal / Installation ..... page T–34
   - Bulb replacement ..... page T–34
4. Trunk compartment light
   - Bulb replacement ..... page T–35
5. Glove compartment light
   - Bulb replacement ..... page T–35
6. Panel light control switch
   - Removal / Installation ..... page T–35
   - Inspection ..... page T–35
7. Door switch
   - Removal / Installation ..... page T–35
   - Inspection ..... page T–36
8. Outer door handle switch
   - Inspection ..... section S
9. Trunk compartment light switch
   - Inspection ..... page T–36
10. Glove compartment light switch
    - Removal / Installation ..... page T–36
    - Inspection ..... page T–36
11. Panel light control unit
    - Removal / Installation ..... page T–49

INTERIOR AND SPOT LIGHT

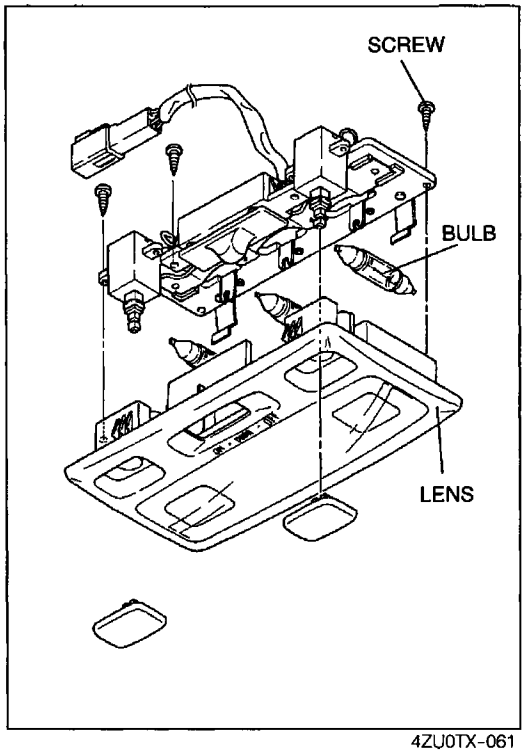
Removal / Installation

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



4ZU0TX-060

1. Interior and spot light

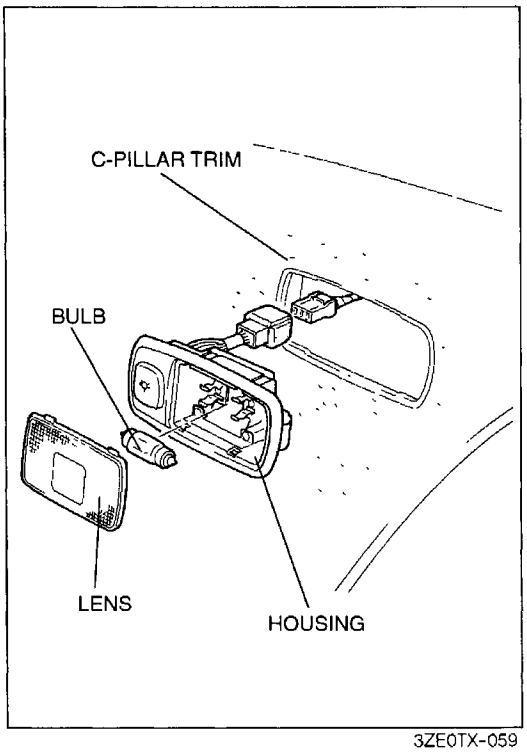


4ZU0TX-061

Bulb Replacement

1. Remove the interior and stop light.
2. Remove the screws and the lens.
3. Remove the bulb.
4. Install in the reverse order of removal.

Interior and stop light bulb: 8 W



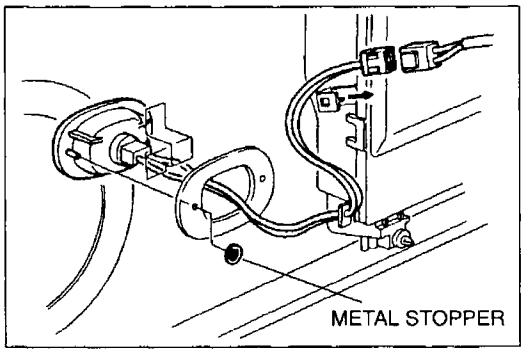
3ZE0TX-059

REAR PERSONAL LIGHT

Removal / Installation

1. Remove the rear personal light.
2. Remove the lens.
3. Remove the rear personal light bulb.
4. Install in the reverse order of removal.

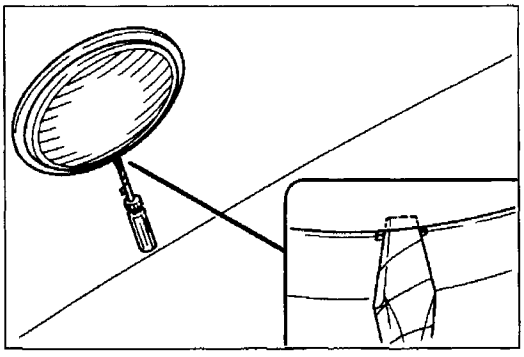
Rear personal light bulb: 5 W



COURTESY LIGHT

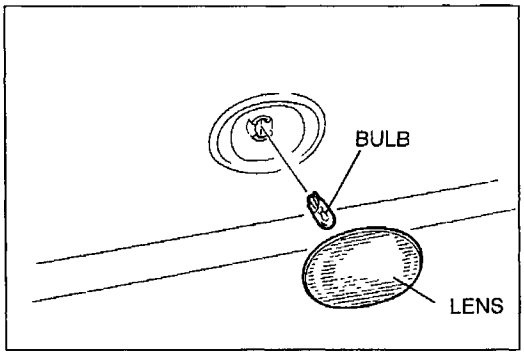
Removal / Installation

1. Remove the door trim.
   (Refer to section S.)
2. Remove the metal stopper securing the courtesy light onto the door and remove the courtesy light.
3. Install in the reverse order of removal.



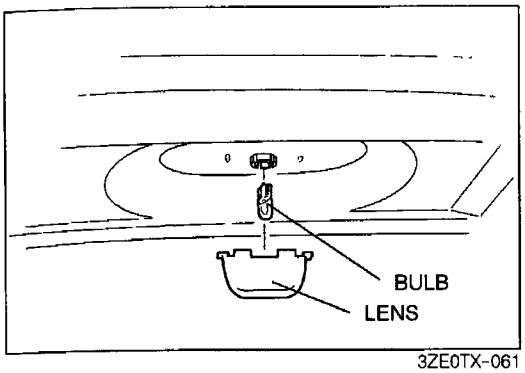
Bulb Replacement

1. Insert a screwdriver wrapped in tape into the service hole between the lens and the housing.



2. Twist the screwdriver to remove the lens.
3. Remove the courtesy light bulb.
4. Install in the reverse order of removal.

Courtesy light bulb: 3.4 W



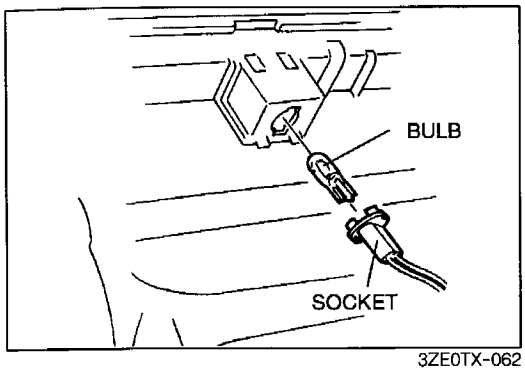
3ZE0TX-061

TRUNK COMPARTMENT LIGHT

Bulb Replacement

1. Remove the lens and the bulb.
2. Install in the reverse order of removal.

Trunk compartment light bulb: 10 W



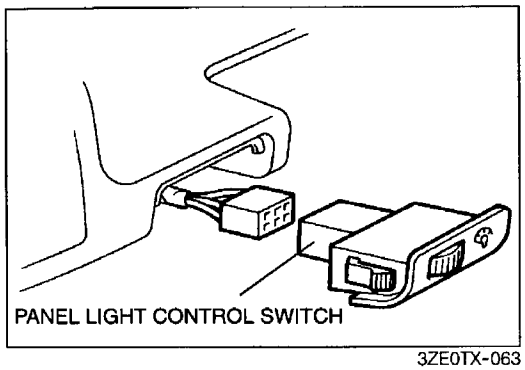
3ZE0TX-062

GLOVE COMPARTMENT LIGHT

Bulb Replacement

1. Remove the glove compartment cover. (Refer to section S.)
2. Remove the socket.
3. Remove the bulb.
4. Install in the reverse order of removal.

Glove compartment light bulb: 3.4 W

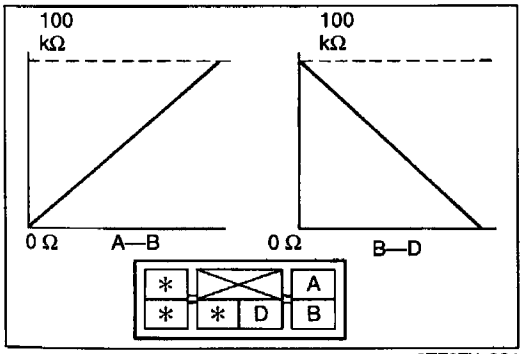


3ZE0TX-063

PANEL LIGHT CONTROL SWITCH

Removal / Installation

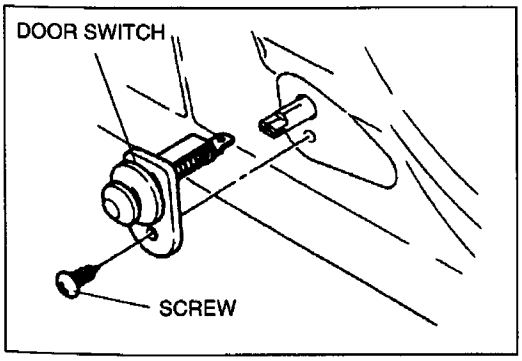
1. Remove the panel light control switch.
2. Disconnect the panel light control switch connector.
3. Install in the reverse order of removal.



3ZE0TX-064

Inspection

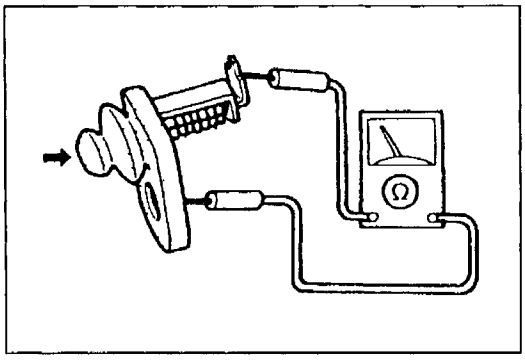
1. Measure the resistance at terminals A — B and B — D of the panel light control switch.
2. Verify that the resistance changes from 0 to 100 kΩ as shown in the figure when the panel light control switch is rotated from left to right.
3. If not as specified, replace the panel light control switch.



DOOR SWITCH

Removal / Installation

1. Remove the screw.
2. Disconnect the door switch connector to remove the door switch.
3. Install in the reverse order of removal.

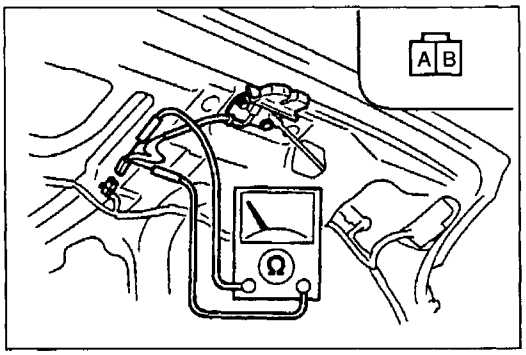


Inspection

1. Remove the door switch.
2. Check for continuity between the terminal of each switch 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.



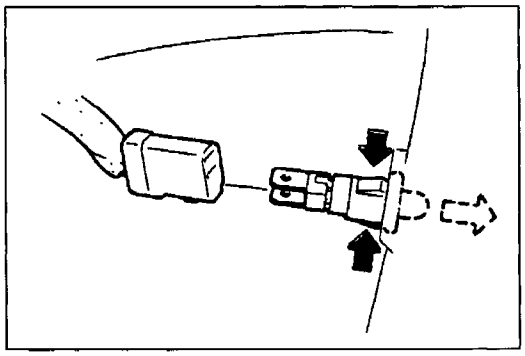
TRUNK COMPARTMENT LIGHT SWITCH

Inspection

1. Remove the trunk lid trim. (Refer to section S.)
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

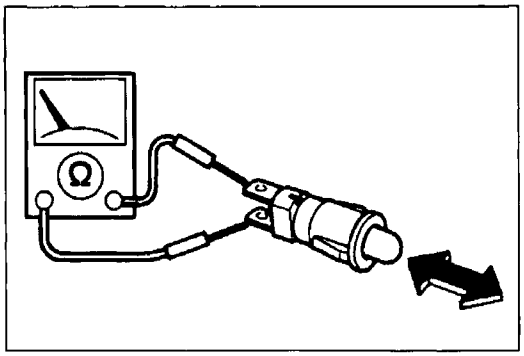
4. If not as specified, replace the trunk lid lock. (Refer to section S.)



GLOVE COMPARTMENT LIGHT SWITCH

Removal / Installation

1. Remove the glove compartment cover. (Refer to section S.)
2. Disconnect the glove compartment light switch connector.
3. Remove the glove compartment light switch.
4. Install in the reverse order of removal.



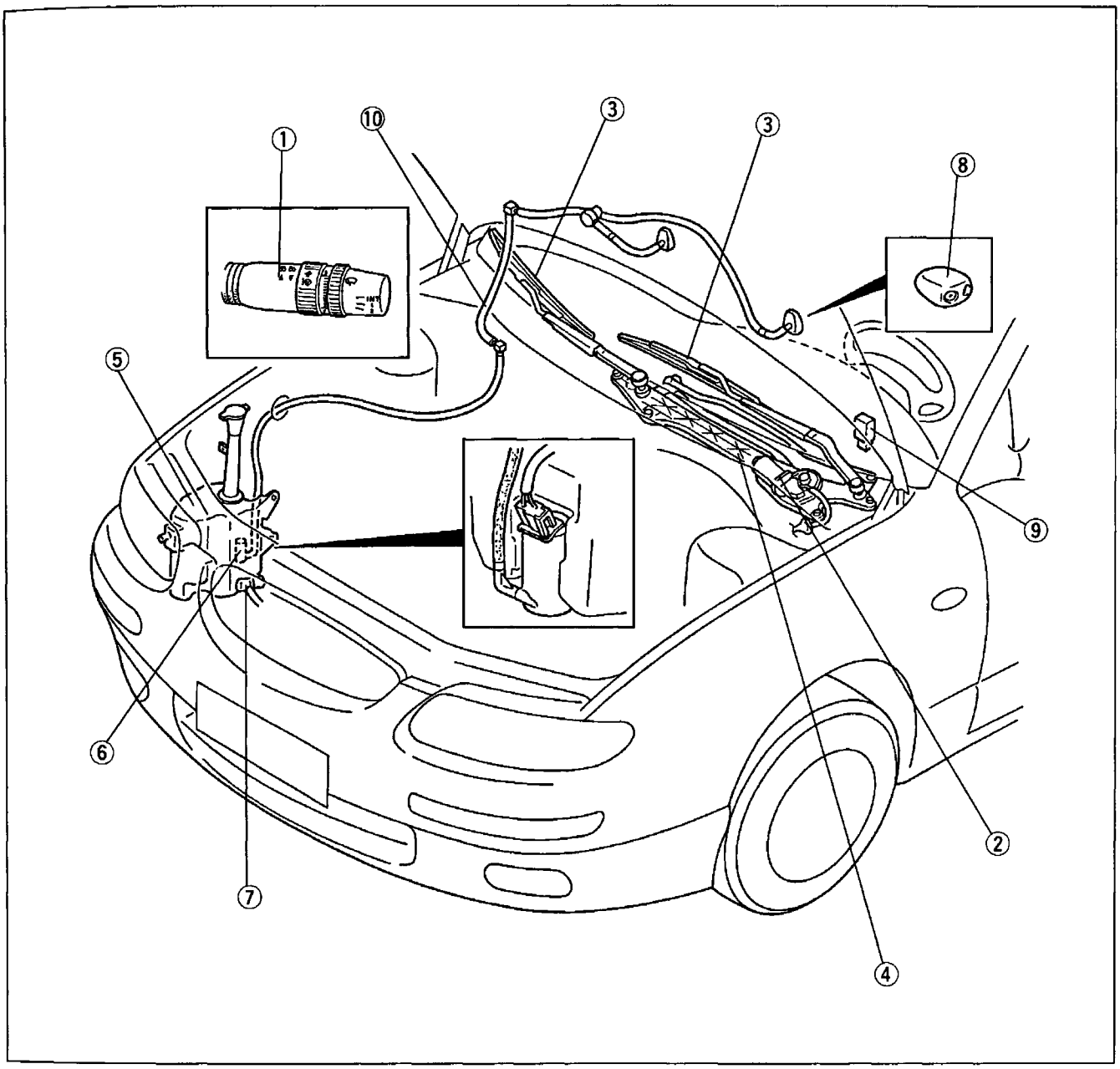
Inspection

1. Remove the glove compartment light switch.
2. Check for continuity between the terminals of the glove compartment light switch.

Switch condition	Continuity
Pressed	No
Released	Yes

WINDSHIELD WIPER AND WASHER

STRUCTURAL VIEW

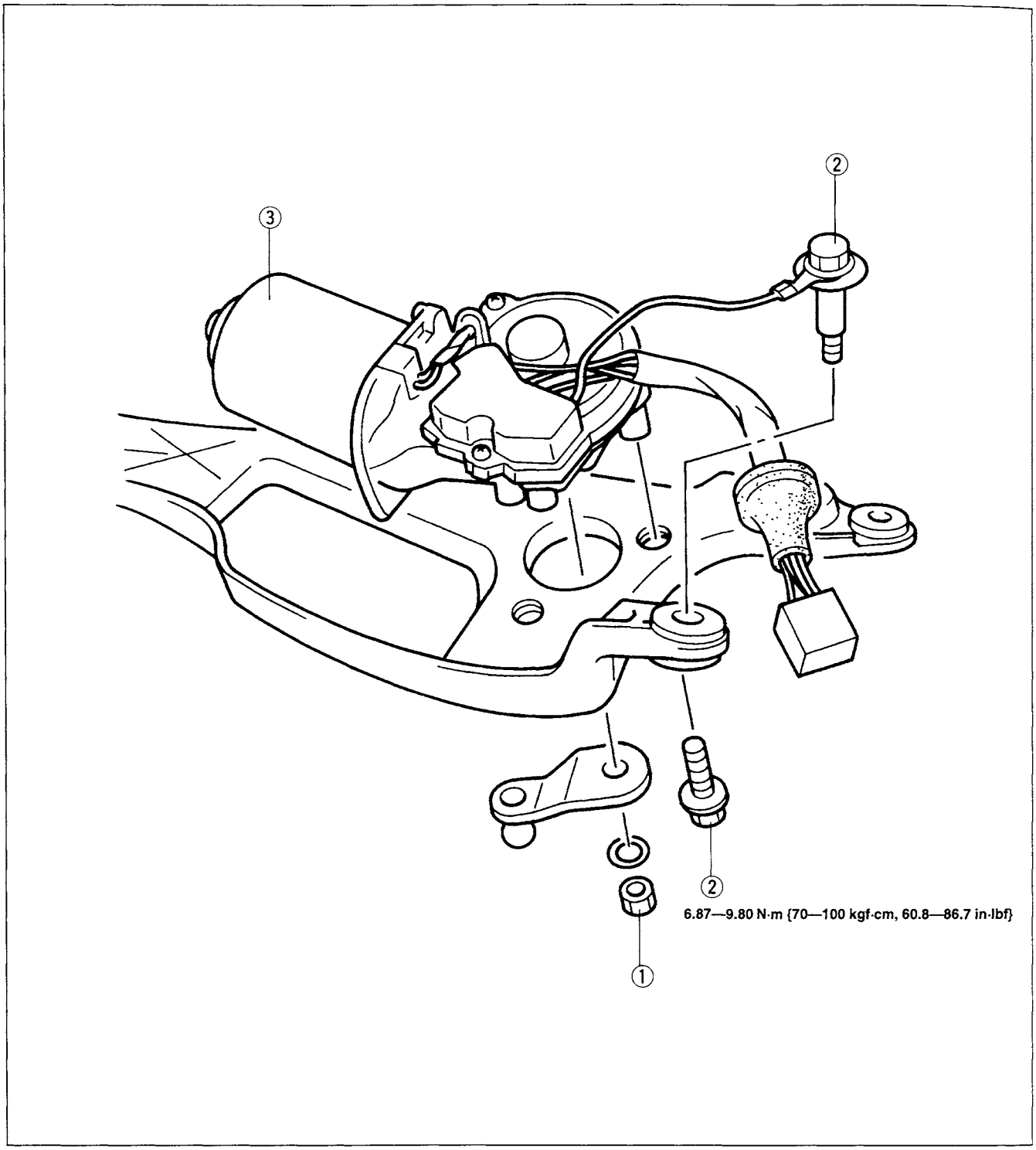


1. Windshield wiper and washer switch
   - Removal / Installation ..... page T–26
   - Inspection ..... page T–27
2. Windshield wiper motor
   - Removal / Installation ..... page T–38
   - Disassembly / Assembly ..... page T–39
   - Inspection ..... page T–39
3. Windshield wiper arm and blade
   - Removal / Installation ..... page T–40
   - Adjustment ..... page T–40
4. Windshield wiper frame and wiper link
   - Removal / Installation ..... page T–41
5. Windshield washer tank
   - Removal / Installation ..... page T–42
6. Windshield washer motor
   - Removal / Installation ..... page T–42
   - Inspection ..... page T–42
7. Washer fluid-level sensor
   - Removal / Installation ..... page T–43
   - Inspection ..... page T–43
8. Windshield washer nozzle
   - Removal / Installation ..... page T–43
   - Adjustment ..... page T–43
9. Intermittent wiper relay
   - Removal / Installation ..... page T–44
   - Inspection ..... page T–44
10. Windshield washer pipe
    - Removal / Installation ..... page T–45

WINDSHIELD WIPER MOTOR

Removal / Installation

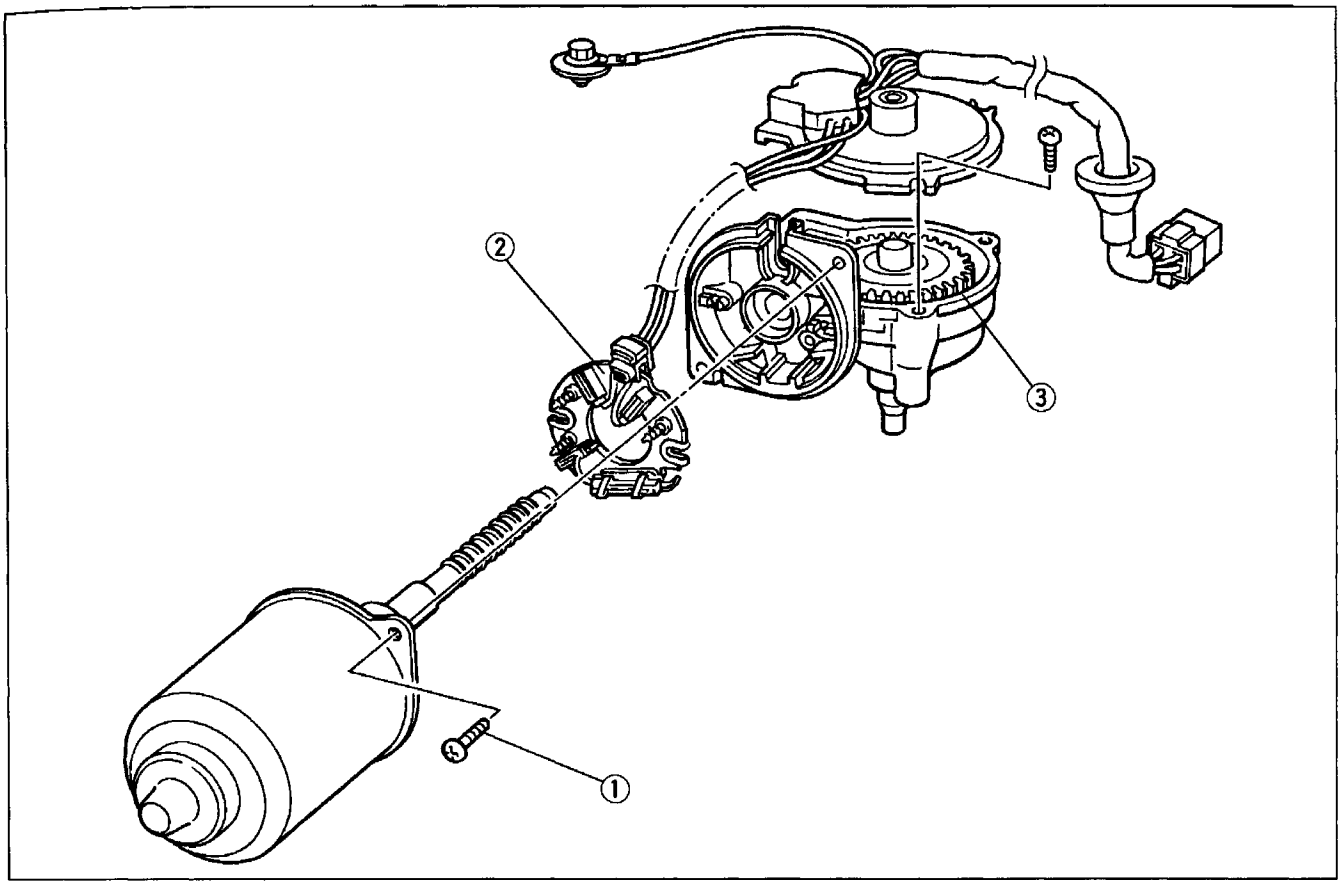
1. Remove the windshield wiper frame and wiper link.
   (Refer to page T–41.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal. Adjust the wiper arm and blade after installing it.
   (Refer to page T–40.)



1. Nut
2. Bolt
3. Windshield wiper motor
   Disassembly / Assembly ..... page T–39
   Inspection ..... page T–39

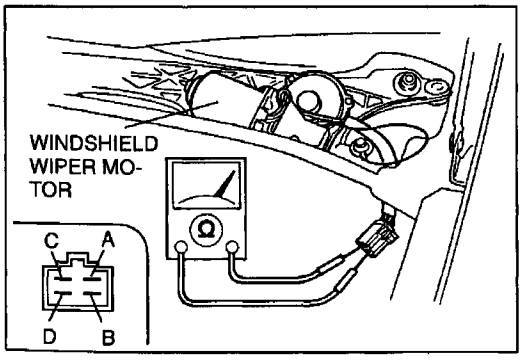
Disassembly / Assembly

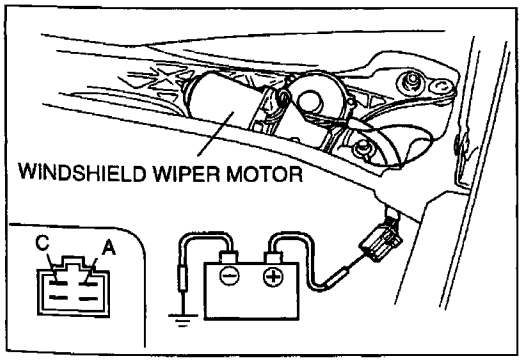
1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



3ZE0TX-100

1. Screw
2. Brush plate holder
3. Motor gear shaft





Inspection

1. Disconnect the windshield wiper motor connector.
2. Check for continuity between the terminals as indicated below.

O—O: Continuity

Terminal / Wiper position	A	B	C	D
Park	O	O	O	
Other	O		O	
		O		O

3. 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.

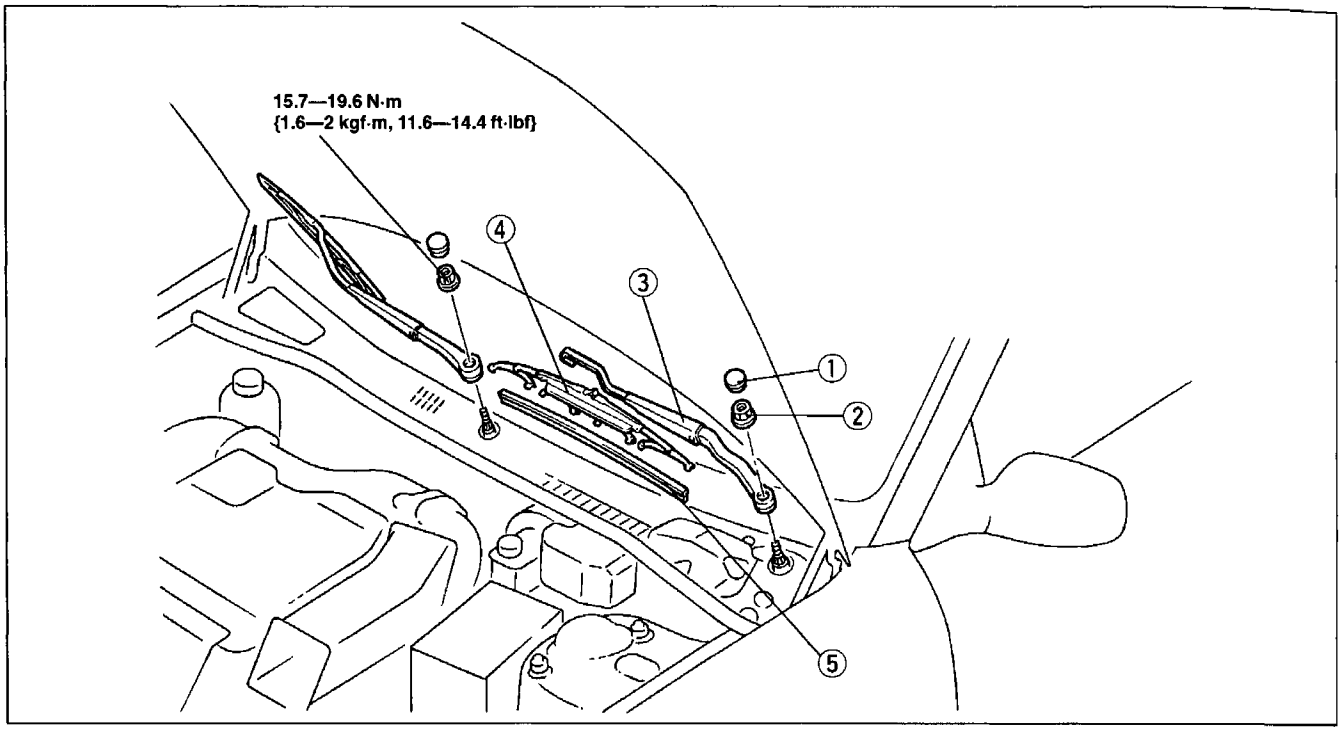
Terminal	Operation speed
C	Low
A	High

4. If not as specified, replace the windshield wiper motor.

WINDSHIELD WIPER ARM AND BLADE

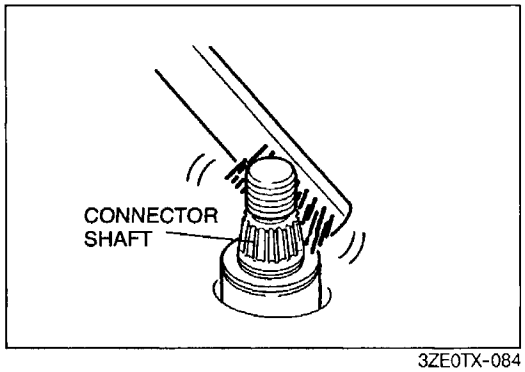
Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal, referring to **Installation note**.
3. Adjust the windshield wiper arm and blade.



3ZU0TX-045

1. Cap
2. Nut
3. Windshield wiper arm
   Installation note ..... below
   Adjustment ..... below
4. Windshield wiper blade
5. Windshield wiper brush

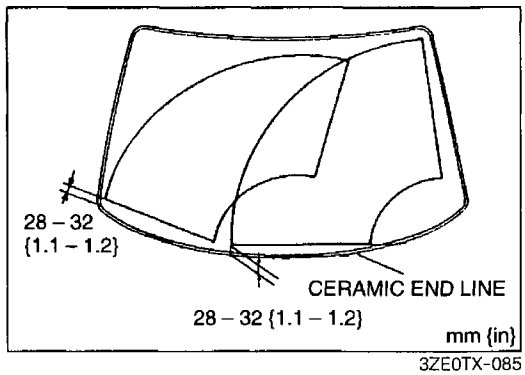


3ZE0TX-084

Installation note

Windshield wiper arm

Clean the windshield wiper arm connector shafts by using a wire brush before installing the windshield wiper arms.



3ZE0TX-085

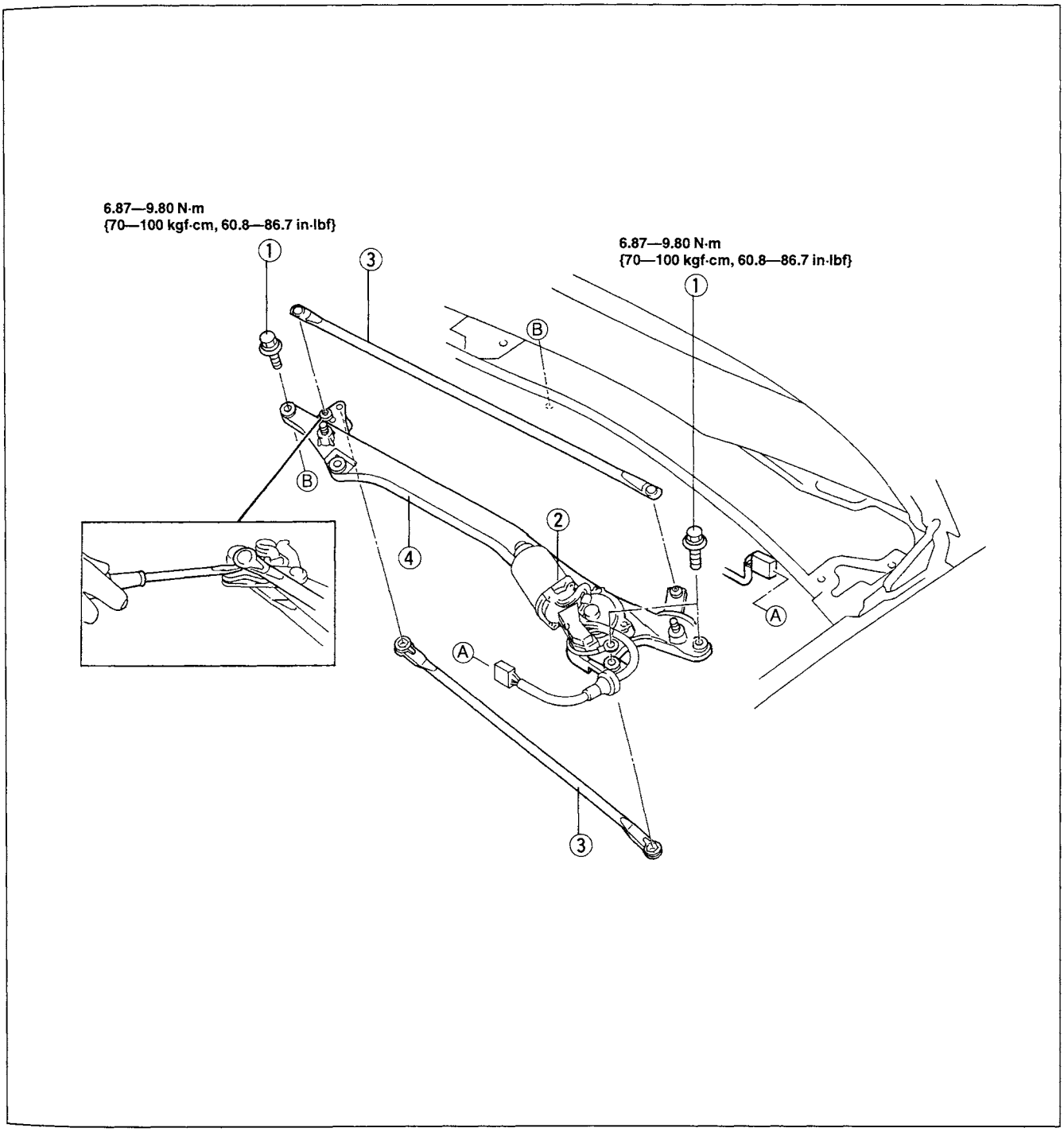
Adjustment

1. Turn the ignition switch to ON.
2. Turn the windshield wiper switch on and off to set the wipers in the park position.
3. Set the wiper height as shown.

WINDSHIELD WIPER FRAME AND WIPER LINK

Removal / Installation

1. Remove the cowl grille.
   (Refer to section S.)
2. Remove the windshield wiper arm and blade.
   (Refer to page T–40.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal, referring to **Installation note**.

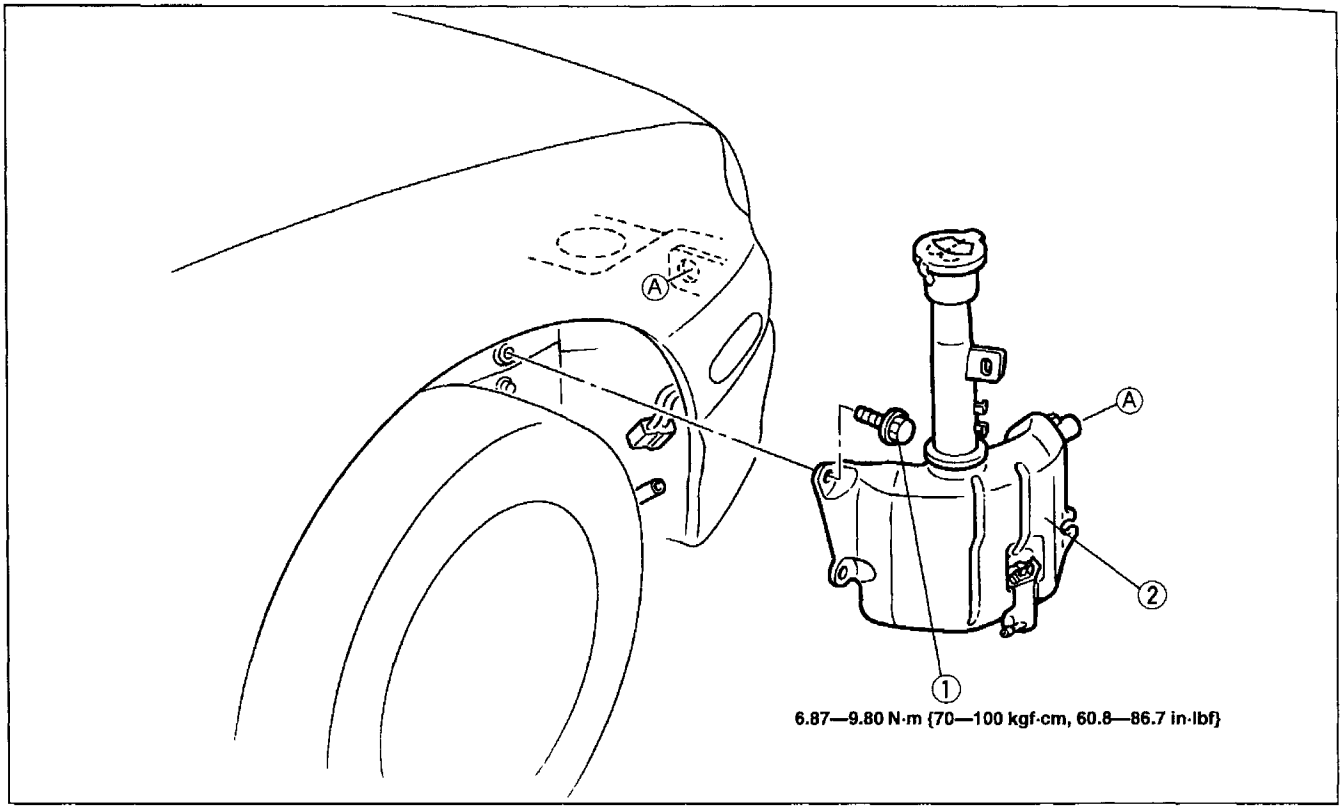


1. Bolt
2. Windshield wiper motor
   Removal / Installation ..... page T–38
   Disassembly / Assembly ..... page T–39
3. Windshield wiper link
4. Windshield wiper frame

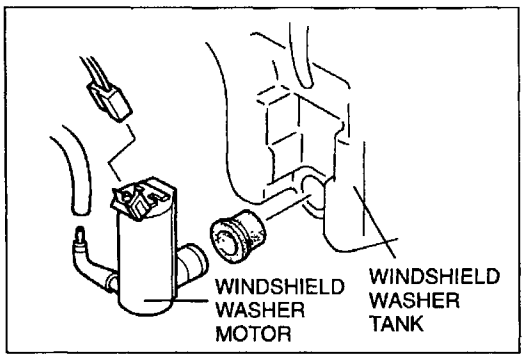
WINDSHIELD WASHER TANK

Removal / Installation

1. Remove the right mud guard.
   (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



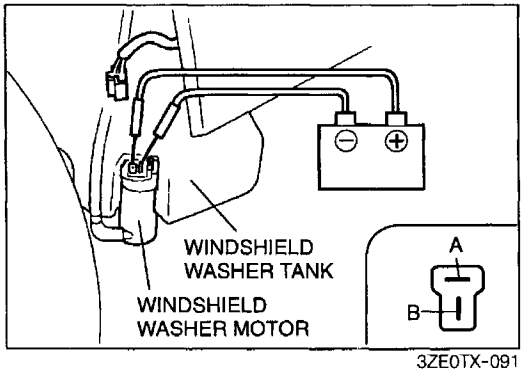
1. Bolt
2. Windshield washer tank



WINDSHIELD WASHER MOTOR

Removal / Installation

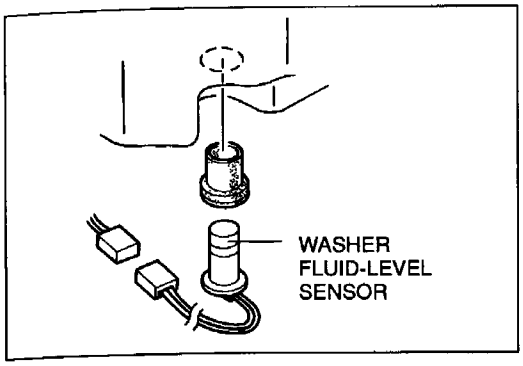
1. Remove the windshield washer tank.
2. Extract the washer fluid.
3. Remove the windshield washer motor as shown.
4. Install in the reverse order of removal.



3ZE0TX-091

Inspection

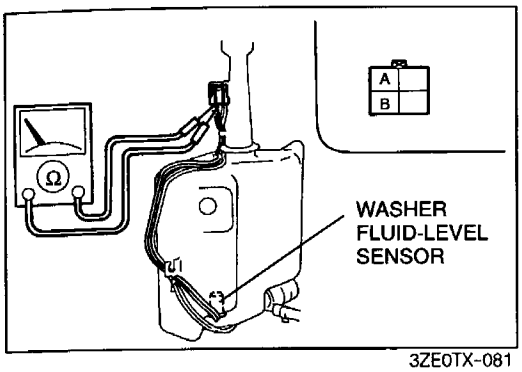
1. Remove the right mud guard.
   (Refer to section S.)
2. Disconnect the windshield washer motor connector and connect battery positive voltage to terminal B and ground to terminal A of the windshield washer motor.
3. Verify that the windshield washer motor operates.
4. If the windshield washer motor does not operate, replace it.



WASHER FLUID-LEVEL SENSOR

Removal / Installation

1. Remove the windshield washer tank.
   (Refer to page T–42.)
2. Remove the washer fluid-level sensor.
3. Install in the reverse order of removal.



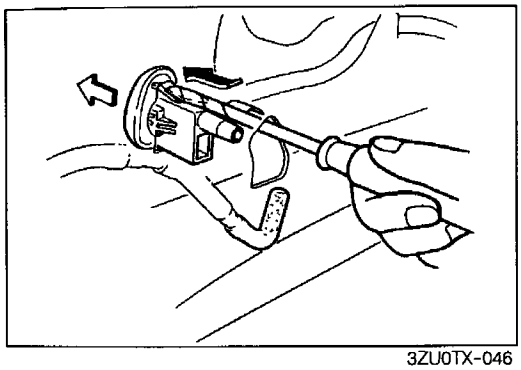
3ZE0TX-081

Inspection

1. Remove the right mud guard.
   (Refer to section S.)
2. Disconnect the washer fluid-level sensor connector.
3. Check for continuity between terminal A and B of the washer fluid-level sensor.

Washer level	Continuity
Below MIN	Yes
Above MIN	No

4. If not as specified, replace the washer fluid-level sensor.



3ZU0TX-046

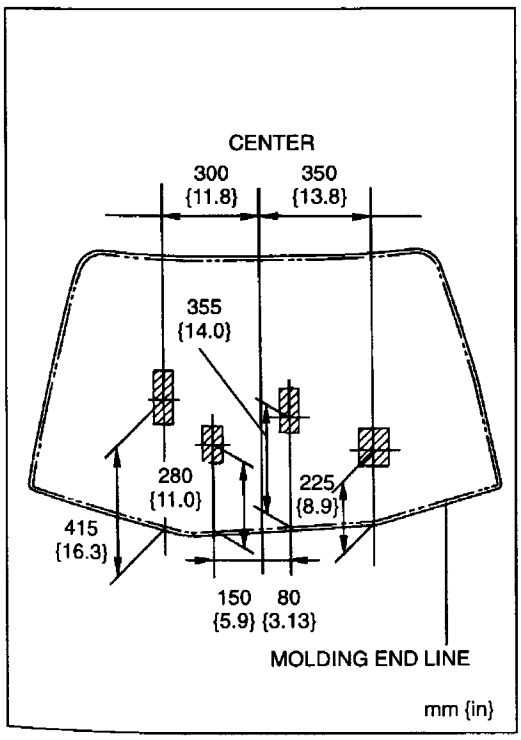
WINDSHIELD WASHER NOZZLE

Removal / Installation

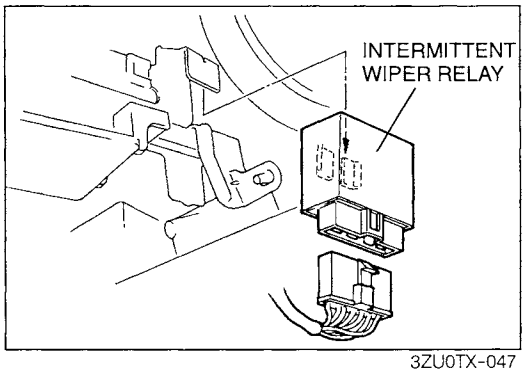
1. Remove the hood insulator.
   (Refer to section S.)
2. Disconnect the windshield washer pipe.
3. Remove the windshield washer nozzle as shown in the figure.
4. Install in the reverse order of removal.
5. Adjust the windshield washer nozzle.

Adjustment

Insert a needle or similar object into the nozzle hole and move the nozzle to adjust the spray direction.



3ZE0TX-099



3ZU0TX-047

INTERMITTENT WIPER RELAY

Removal / Installation

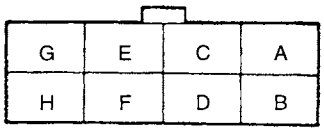
1. Remove the lap louver duct.
   (Refer to page T–4.)
2. Disconnect the intermittent wiper relay connector.
3. Remove the intermittent wiper relay.
4. Install in the reverse order of removal.

Inspection

1. Remove the lower panel.
   (Refer to section S.)
2. Measure the voltage at the intermittent wiper relay 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 intermittent wiper relay.

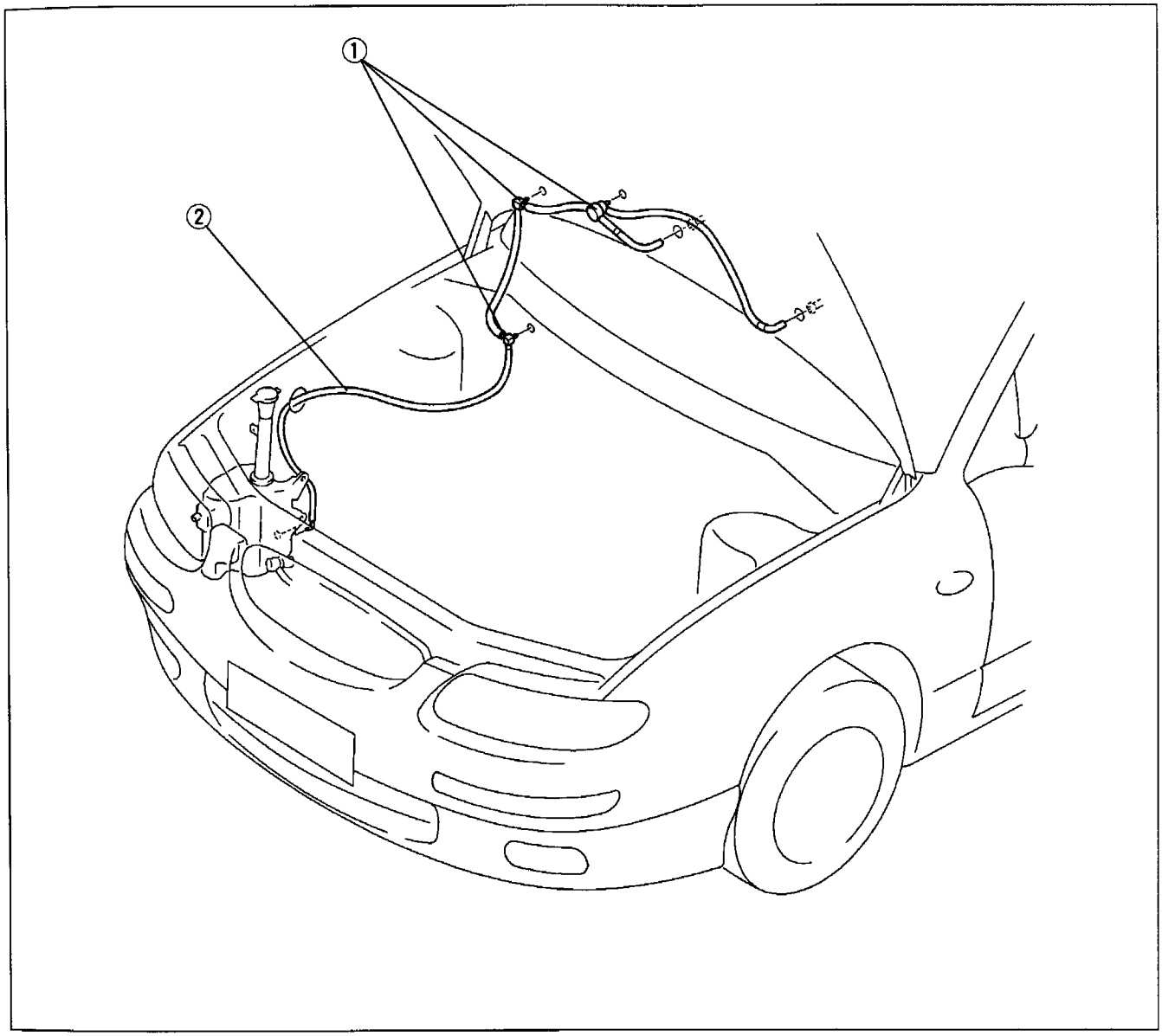
Terminal voltage list (reference)

B+: Battery positive voltage



Terminal	Signal	Connection	Test condition		Voltage/ Continuity/ Resistance		Inspection area
A	Auto stop switch	Windshield wiper motor	Windshield wipers operate		Alternates 0 V and B+		Windshield wiper motor
			Other		0 V		
B	Windshield washer switch	Windshield washer motor	Ignition switch: on	Windshield washer switch: on	B+		Windshield washer switch
				Windshield washer switch: off	0 V		
C	Intermittent wiper	Windshield wiper switch	Ignition switch: on	Windshield wiper switch: INT	B+		Windshield wiper switch
				Other	0 V		
D	B+	WIPER 20A fuse	Ignition switch: on	Constant	B+		WIPER 20A fuse
E	INT Volume	Windshield wiper and washer switch	Disconnect intermittent wiper relay connector	Measure the resistance between the H terminal at each speed setting of the INT volume	LO position	Approx 50 kΩ	Windshield wiper and washer switch
					MID position	Approx 35 kΩ	
					HI position	Approx 15 kΩ	
F	One touch switch	Windshield wiper switch	Ignition switch: on	Intermittent wiper operate	Alternates 0 V and B+		Windshield wiper switch
				Other	0 V		
G	Ground	GND	Constant: check for continuity to ground		Yes		GND
H	INT Volume	Windshield wiper and washer switch	Disconnect intermittent wiper relay connector	Measure the resistance between the E terminal at each speed setting of the INT volume	LO position	Approx 50 kΩ	Windshield wiper and washer switch
					MID position	Approx 35 kΩ	
					HI position	Approx 15 kΩ	

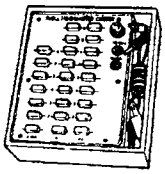
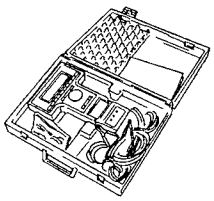
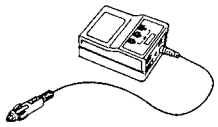
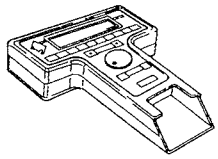
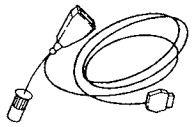
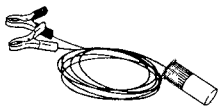
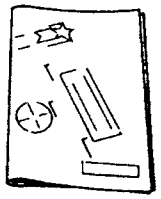
WINDSHIELD WASHER PIPE
Removal / Installation
1. Remove the hood insulator.
   (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



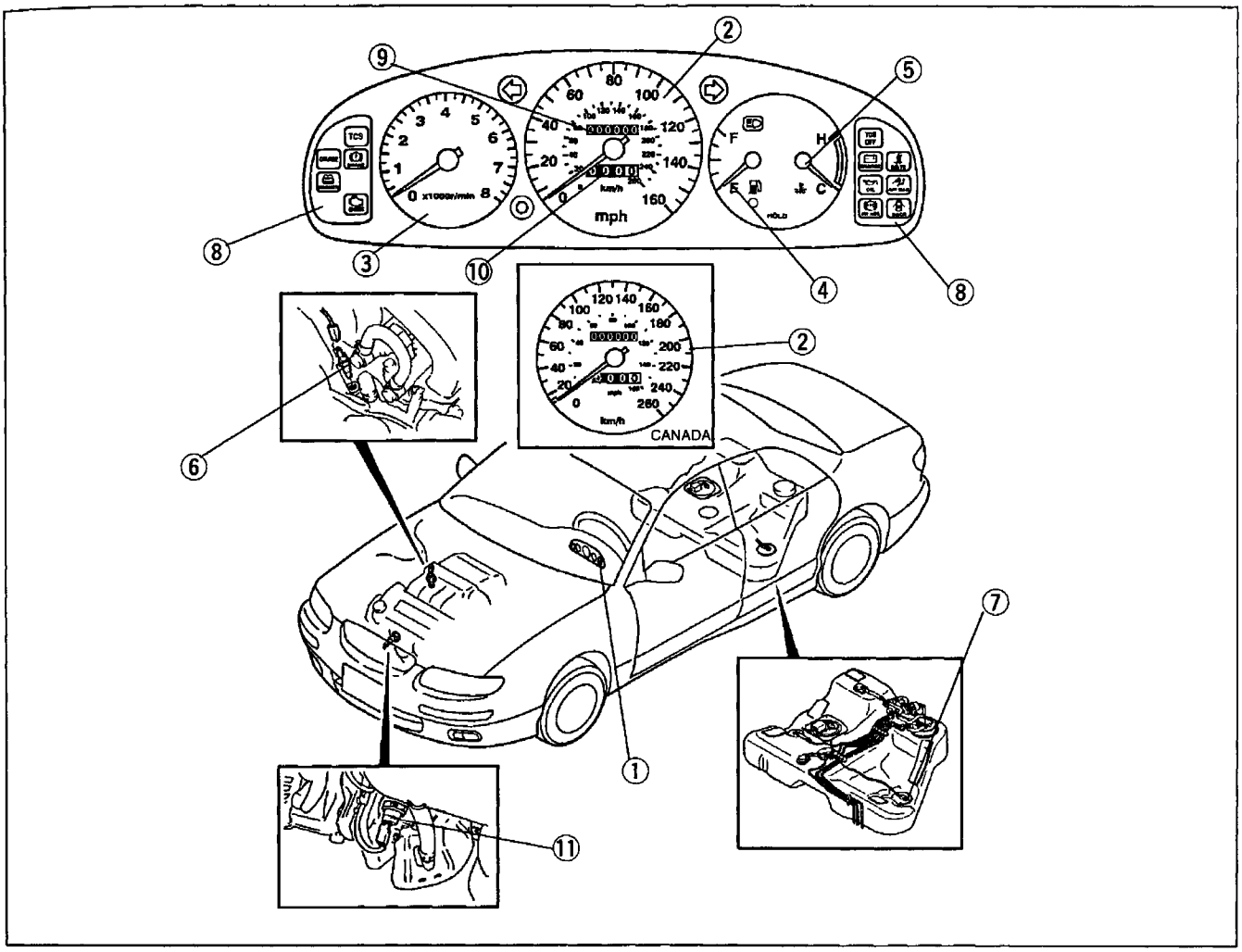
1. Clips
2. Windshield washer pipe

INSTRUMENT CLUSTER

PREPARATION
SST

49 0839 295 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 OBD II 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

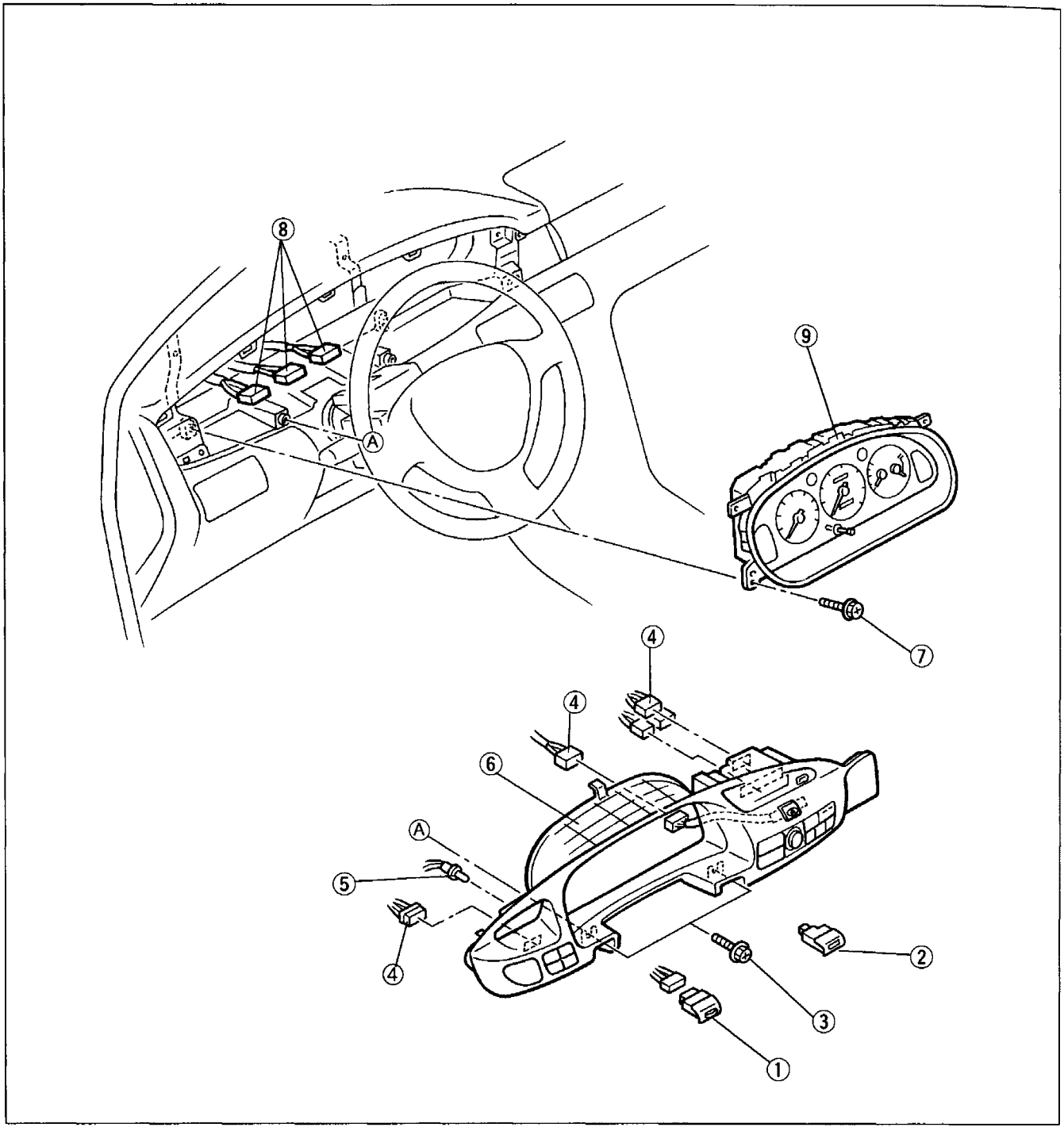


1. Instrument cluster
   - Removal / Installation ..... page T–48
   - Disassembly / Assembly ..... page T–49
2. Speedometer
   - Inspection ..... page T–50
3. Tachometer
   - Inspection ..... page T–50
4. Fuel gauge
   - Inspection ..... page T–51
5. Water temperature gauge
   - Inspection ..... page T–51
6. Water temperature sender unit
   - Removal / Installation ..... page T–52
   - Inspection ..... page T–52
7. Fuel gauge sender unit
   - Inspection ..... page T–52
8. Warning and indicator light
   - Structural view ..... page T–53
   - Bulb replacement ..... page T–53
9. Odometer
10. Tripmeter
11. Oil pressure switch
    - Inspection ..... page T–54

INSTRUMENT CLUSTER

Removal / Installation

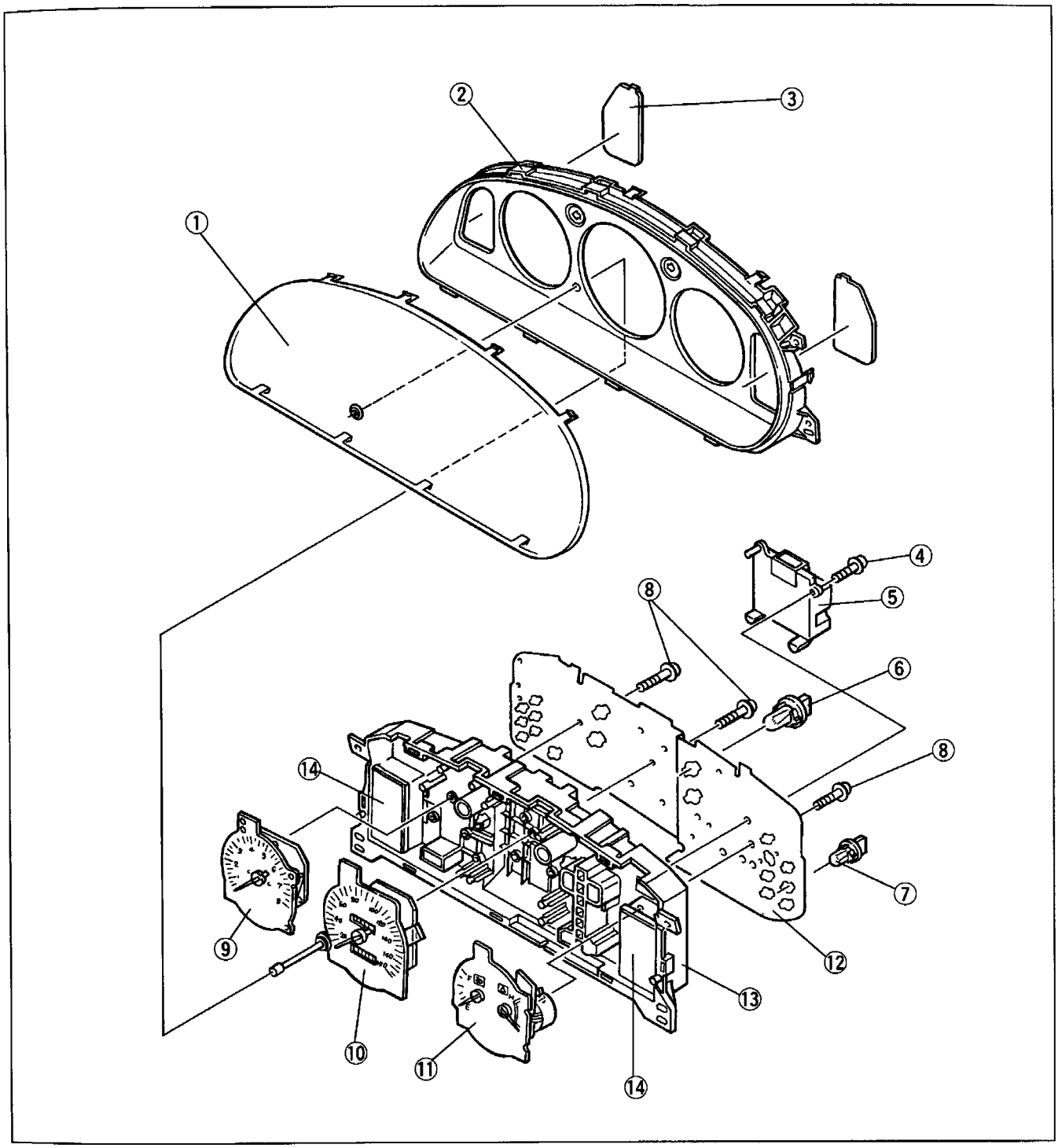
1. Remove the column cover.
   (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



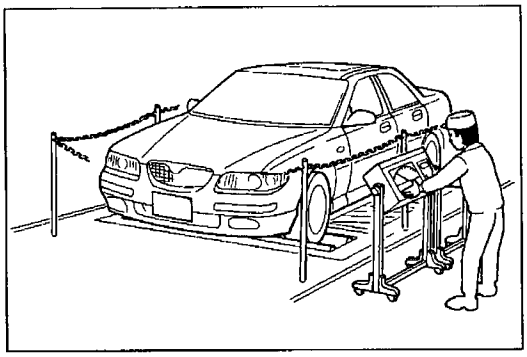
1. Panel light control switch
   Removal / Installation ..... page T–35
   Inspection ..... page T–35
2. Hole cover
3. Screw
4. Connector
5. Security light bulb and socket
6. Meter hood
7. Screw
8. Connectors
9. Instrument cluster

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



1. Front glass
2. Window plate
3. Warning lens
4. Screw
5. Panel light control unit
6. Socket
7. Bulb
8. Screws
9. Tachometer
10. Speedometer
11. Combination gauge (fuel and water temperature gauges)
12. Print plate
13. Case
14. Waring lens



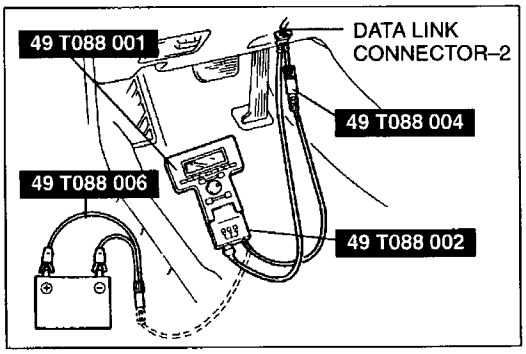
SPEEDOMETER

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, check the vehicle speedometer sensor and wiring harness.
4. If the vehicle speedometer sensor and wiring harness are normal, replace the speedometer. (Refer to pages T–48, 49.)

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



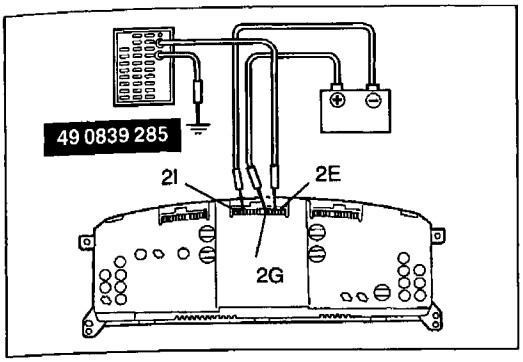
TACHOMETER

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 engnie speed.
4. Compare the values of the vehicle tachometer and the **SST** (NGS).

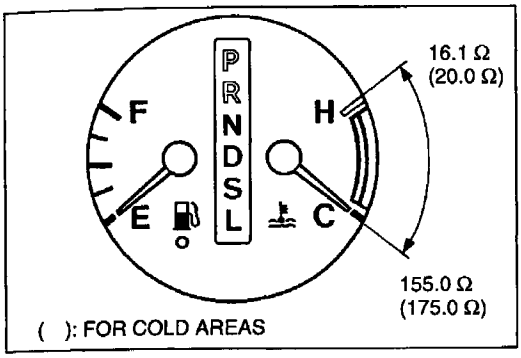
Engine speed (rpm)	Meter indication (rpm)
650	589— 711
1,000	945—1,079
2,000	1,963—2,129
3,000	2,980—3,180
4,000	3,998—4,231
5,000	5,016—5,282
6,000	6,034—6,332
7,000 (KL)	7,051—7,383

5. If not as specified, inspect the wiring harness (ECM (PCM) — instrument cluster).
6. If the wiring harness is normal, replace the tachometer. (Refer to pages T–48, 49.)

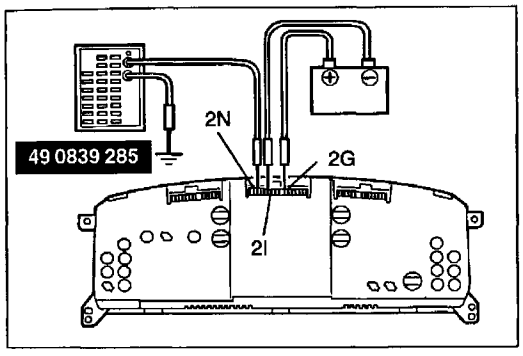


WATER TEMPERATURE GAUGE
Inspection

1. Remove the instrument cluster. (Refer to page T–48.)
2. Connect battery positive voltage to terminal 2G and ground to terminal 2I of the instrument cluster.
3. Connect the positive (+) lead of the **SST** to terminal 2E of the instrument cluster and ground to the negative (–) lead.

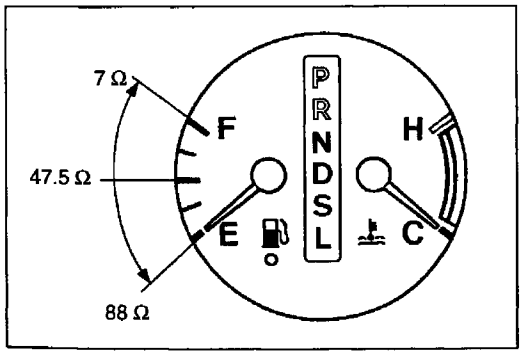


4. Verify that the gauge indicates the values shown in the figure.
5. If not as specified, replace the combination gauge. (Refer to page T–49.)

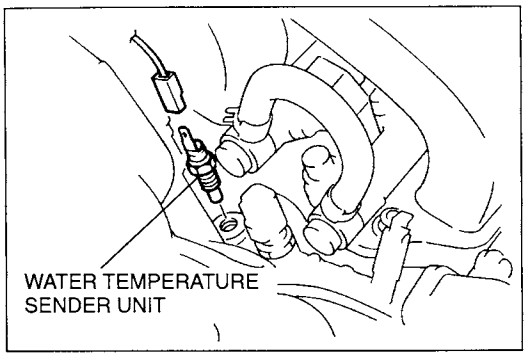


FUEL GAUGE
Inspection

1. Remove the instrument cluster. (Refer to page T–48.)
2. Connect battery positive voltage to terminal 2G and ground to terminal 2I of the instrument cluster.
3. Connect the positive (+) lead of the **SST** to terminal 2N of the instrument cluster and ground to the negative (–) lead.



4. Verify that the gauge indicates the values shown in the figure.
5. If not as specified, replace the combination gauge. (Refer to page T–49.)

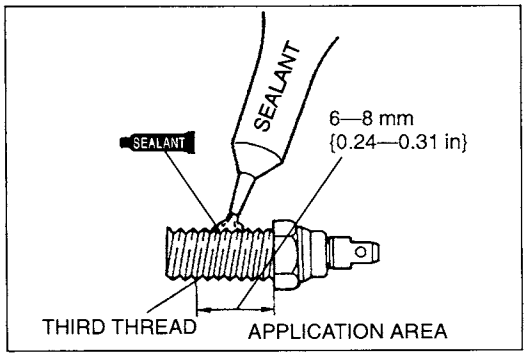


WATER TEMPERATURE SENDER UNIT

Removal / Installation

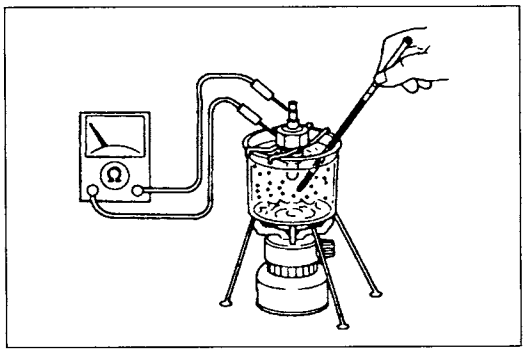
1. Disconnect the water temperature sender unit connector.
2. Remove the water temperature sender unit.
3. Before installing the unit, apply sealant from the third thread to the top thread.
4. Install in the reverse order of removal.

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.



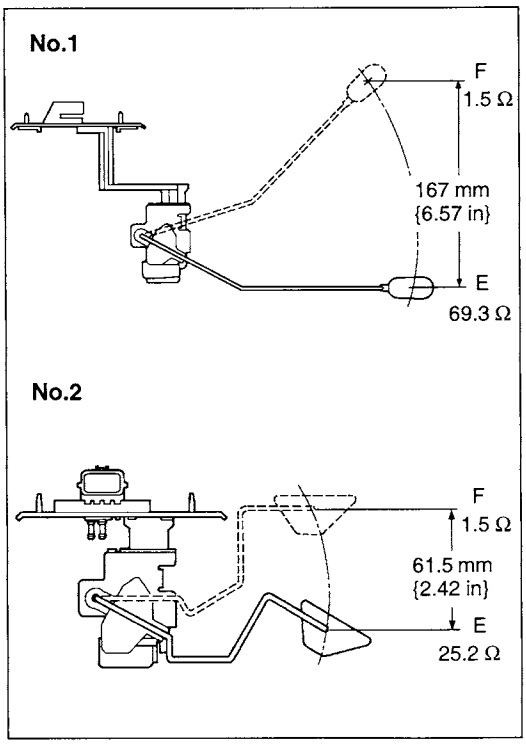
Temperature	°C {°F}	50 {122}
Resistance	Ω	192.4—259.6

4. If not as specified, replace the water temperature sender unit.

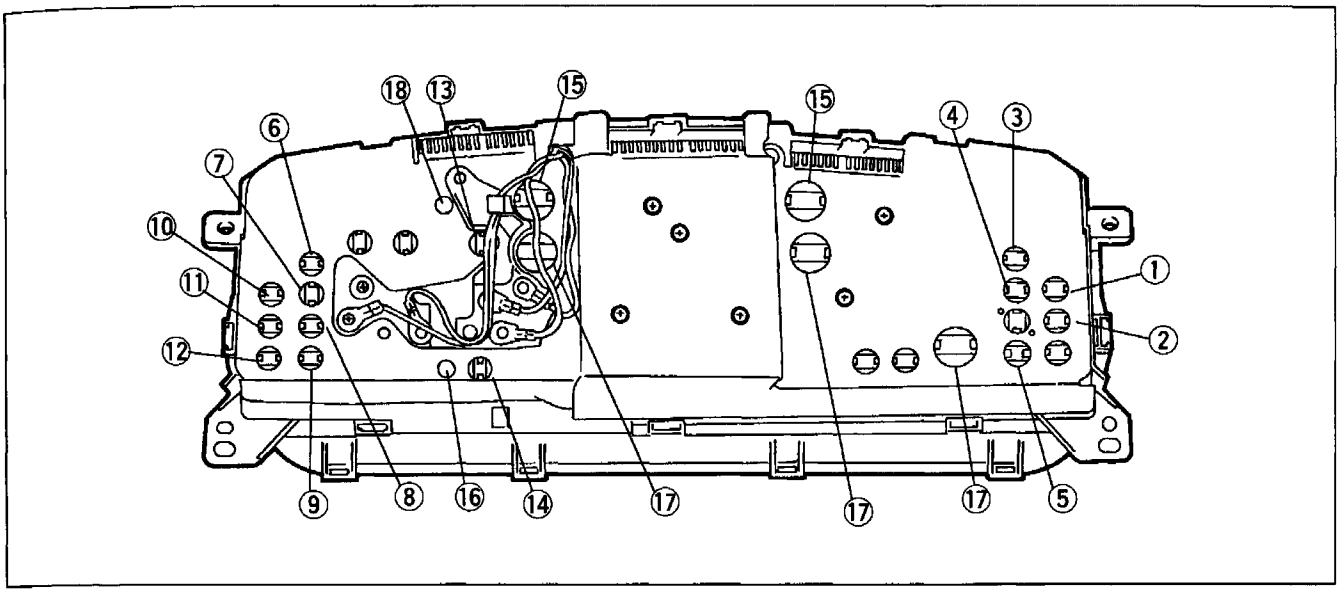
FUEL GAUGE SENDER UNIT

Inspection

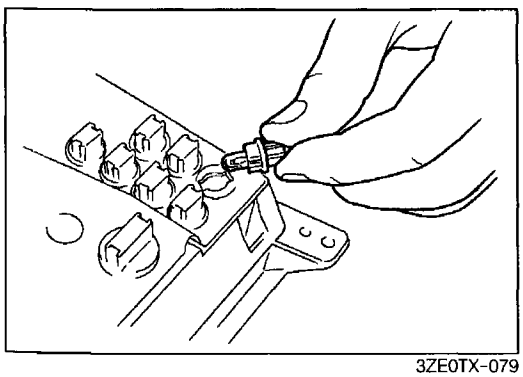
1. Remove the fuel gauge sender unit. (Refer to sections F1, F2.)
2. Connect an ohmmeter between the terminals of the sender unit.
3. Measure the resistance while slowly moving the unit arm from point E to point F.
4. If not as specified, replace the fuel gauge sender unit.



WARNING AND INDICATOR LIGHT
Structural View



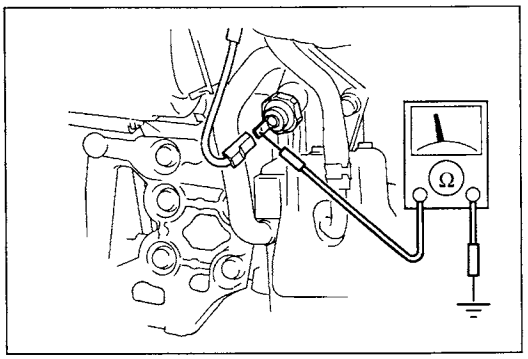
	Bulb	Specification (W)
1	Cruise set indicator light	1.4
2	Washer fluid-level warning light	1.4
3	TCS warning light	1.4
4	Brake system warning light	1.4
5	Malfunction indicator lamp	1.4
6	TCS OFF warning light	1.4
7	Generator warning light	3.0
8	Oil pressure warning light	1.4
9	ABS warning light	1.4
10	Seat belt warning light	1.4
11	Air bag system warning light	1.4
12	Door ajar warning light	1.4
13	High-beam indicator light	3.0
14	Fuel-level warning light	3.0
15	Turn indicator light	3.4×2
16	Hold indicator light	1.4
17	Instrument cluster illumination	3.4×3
18	Instrument cluster illumination	1.4



3ZE0TX-079

Bulb Replacement

1. Remove the instrument cluster. (Refer to page T–48.)
2. Replace the bulbs as shown in the figure. Use only the bulbs with the designated capacity.



OIL PRESSURE SWITCH

Inspection

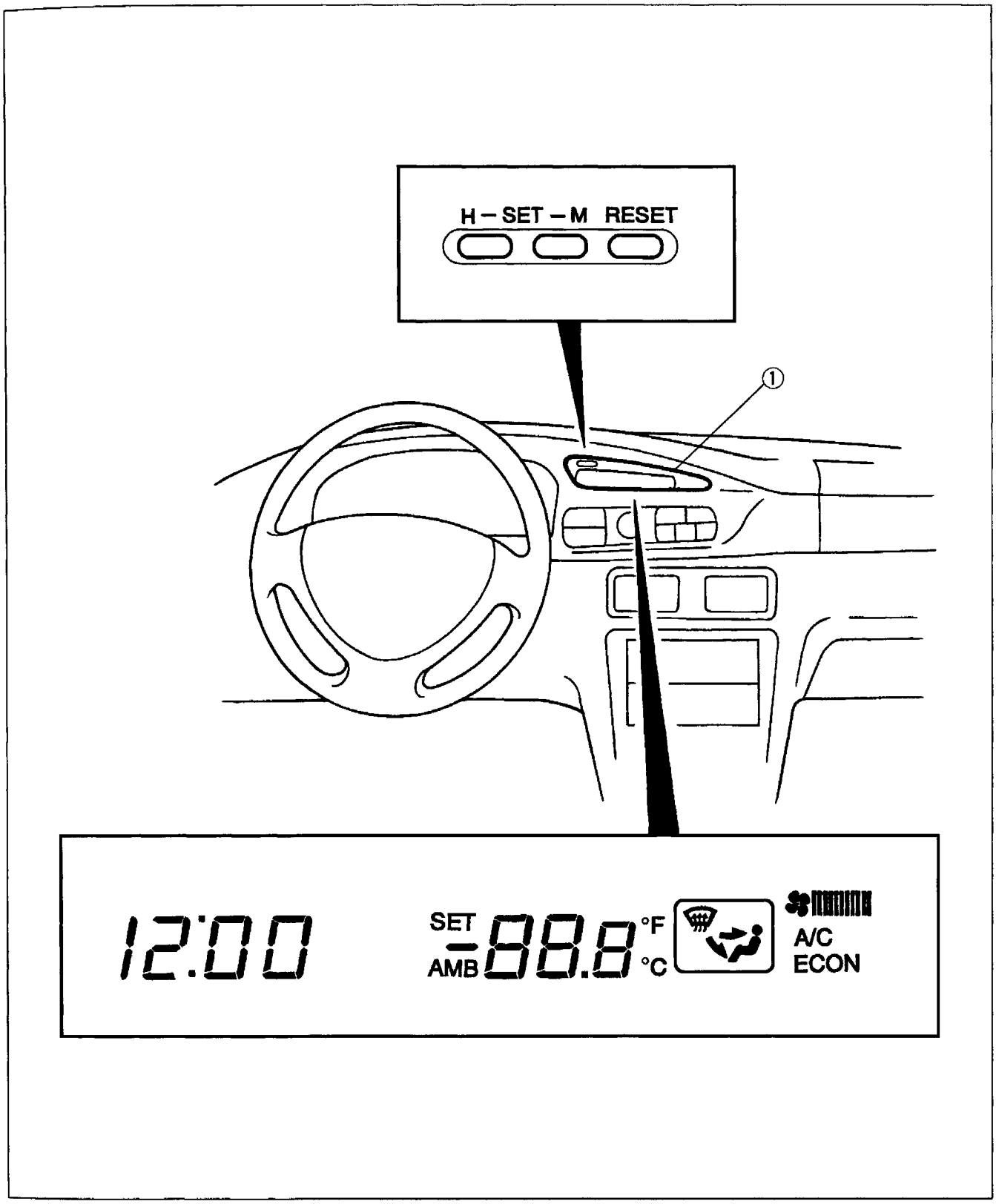
1. Disconnect the oil pressure switch connector.
2. Check for continuity between the oil pressure switch and ground.

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.)

INFORMATION DISPLAY

STRUCTURAL VIEW

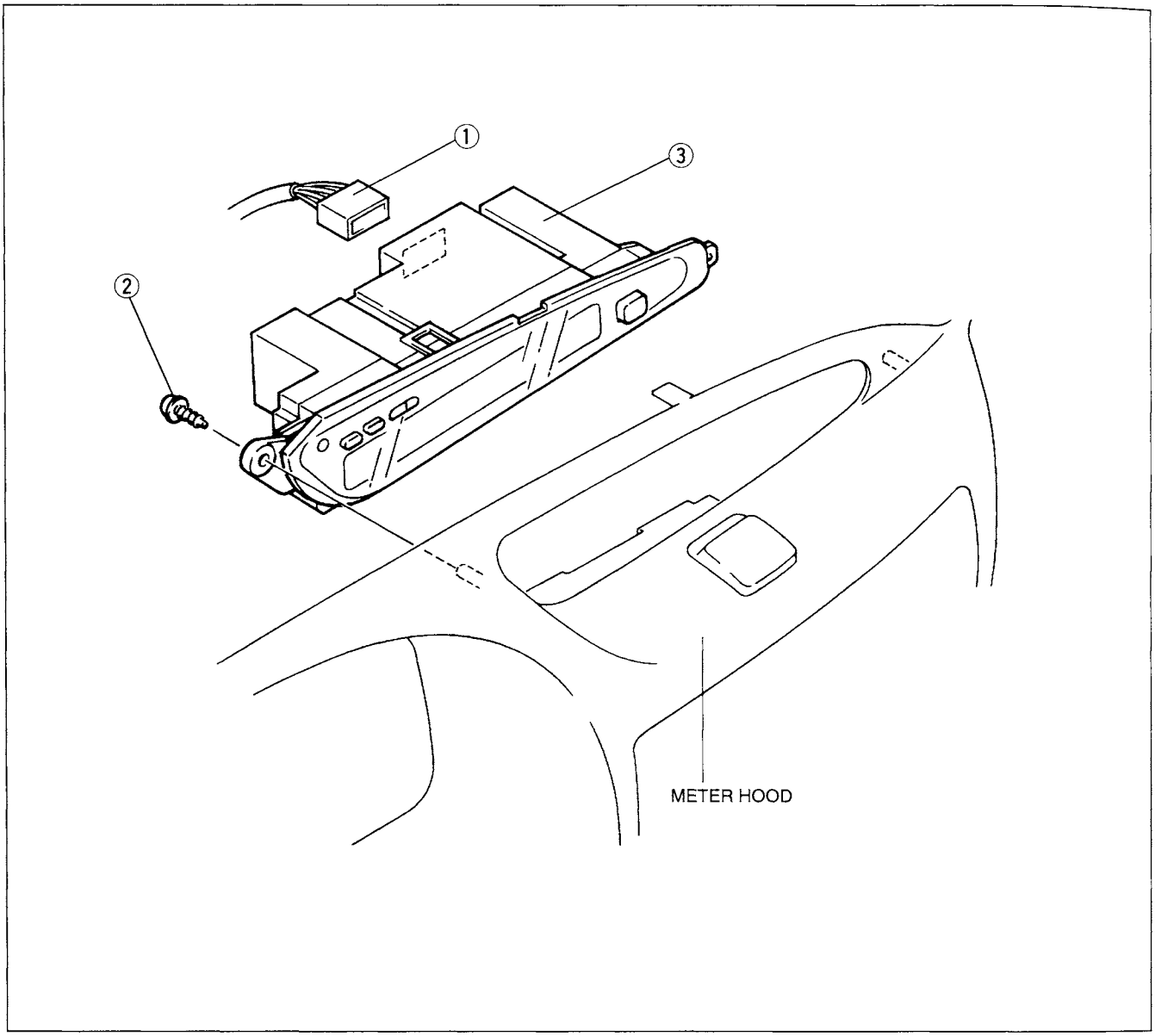


1. Information display
   Removal / Installation ..... page T–56
   Inspection ..... page T–57

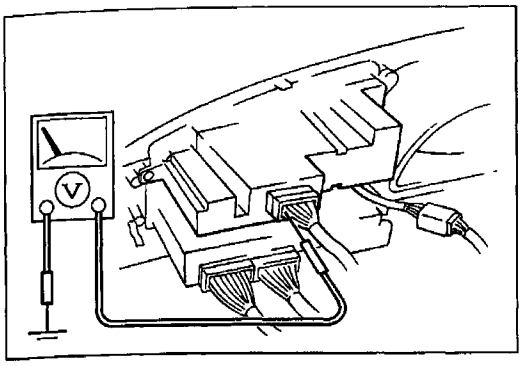
INFORMATION DISPLAY

Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the meter hood.
   (Refer to section S.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



1. Information display connector
2. Screw
3. Information display
   Inspection ..... page T–57



Inspection

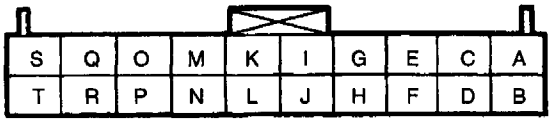
1. Remove the meter hood.
   (Refer to section S.)
2. Measure the voltage at the information display terminals as indicated below.

   Note
   - Voltage at terminals G, I, K, and M cannot be measured because they are used for serial communication. To inspect terminals G, I, K, and M, refer to the troubleshooting, section U.

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 information display.
   (Refer to page T–56.)

Terminal voltage list (Reference)

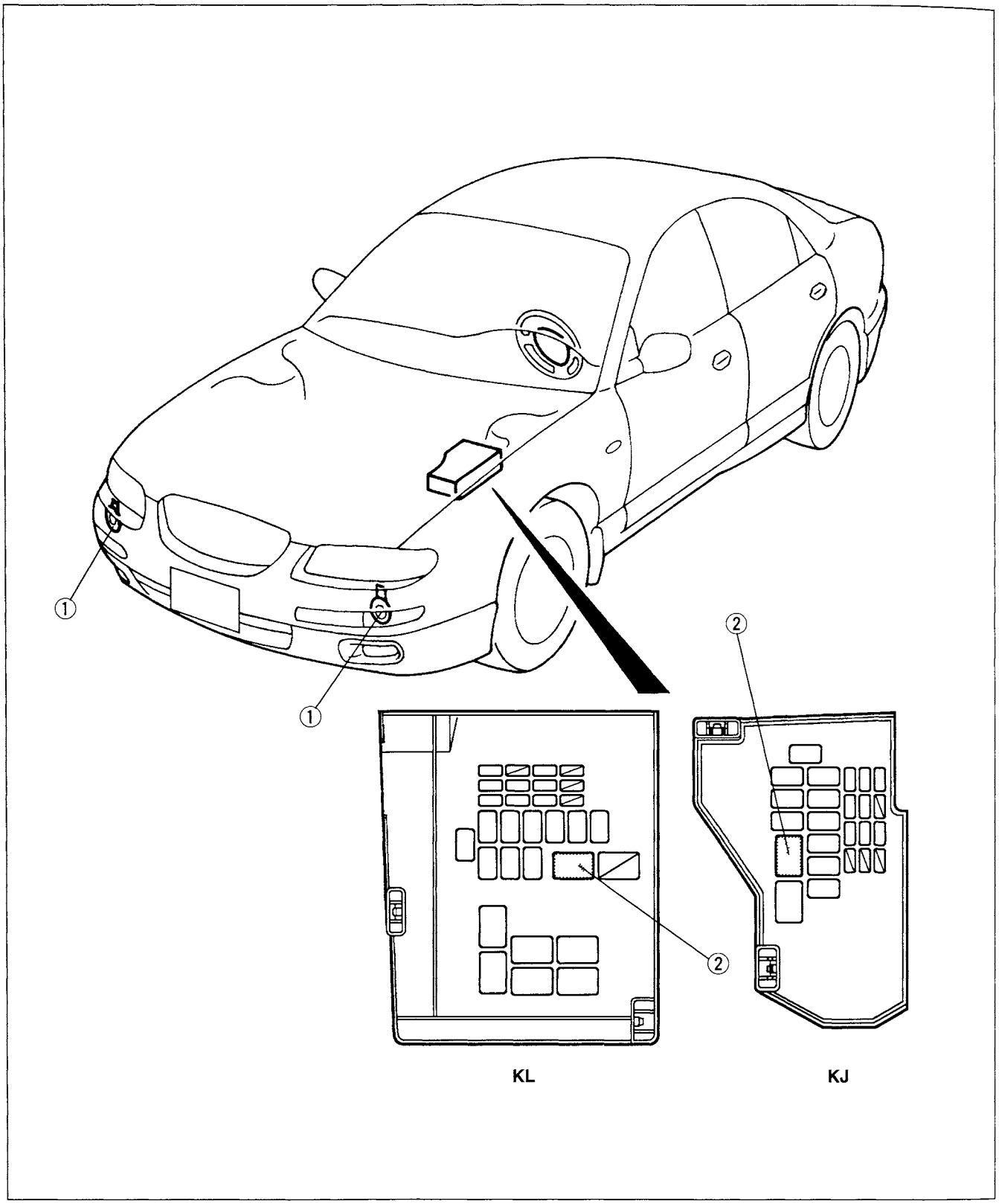
B+: Battery positive voltage



Terminal	Signal	Connection	Test condition	Voltage	Inspection area
A	+B	ROOM 15 A fuse	Constant	B+	ROOM 15 A fuse
B	—	—	—	—	—
C	TNS	ILLUMI 10 A fuse	Headlight switch on	B+	• TNS relay • ILLUMI 10 A fuse
			Headlight switch off	0 V	
D	ACC	RADIO 10 A fuse	Ignition switch at ACC	B+	RADIO 10 A fuse
E	—	—	—	—	—
F	—	—	—	—	—
G	Serial Communication	A/C amplifier	—	—	—
H	—	—	—	—	—
I	Serial Communication	A/C amplifier	—	—	—
J	—	—	—	—	—
K	Serial Communication	A/C amplifier	—	—	—
L	—	—	—	—	—
M	Serial Communication	A/C amplifier	—	—	—
N	—	—	—	—	—
O	—	—	—	—	—
P	—	—	—	—	—
Q	—	—	—	—	—
R	Ambient temperature	A/C amplifier	Ignition switch at ON	3.6 V	A/C amplifier
S	Panel light control	Panel light control unit	Headlight switch on	B+	• Panel light control unit • Panel light control switch
			Headlight switch off	0 V	
T	Information display ground	A/C amplifier	Constant	0 V	A/C amplifier

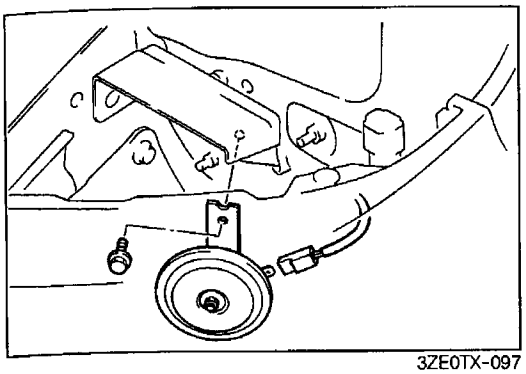
HORN

STRUCTURAL VIEW



3ZU0TX–048

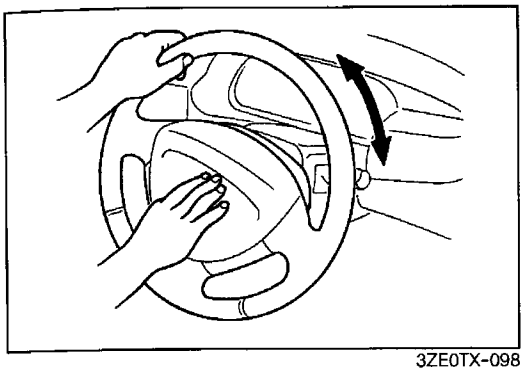
1. Horns
   - Removal / Installation ..... page T–59
   - On-vehicle Inspection ..... page T–59
2. Horn relay
   - Inspection ..... page T–59


3ZE0TX-097

HORN

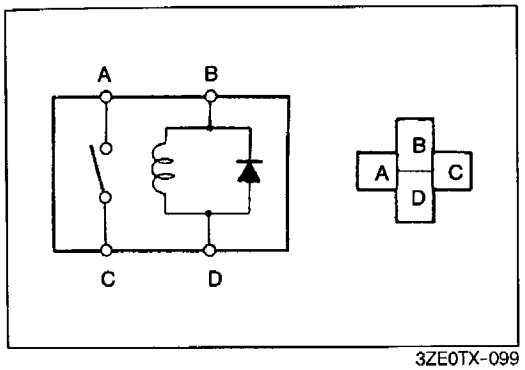
Removal / Installation

1. Remove the headlight.
   (Refer to page T–13.)
2. Disconnect the horn connector.
3. Remove the bolt and the horn.
4. Install in the reverse order of removal.


3ZE0TX-098

On-vehicle Inspection

While turning the steering wheel, verify that the horn sounds when the horn switch is pressed.



3ZE0TX-099

HORN RELAY

Inspection

1. Apply battery positive voltage and check for continuity between the relay terminals.

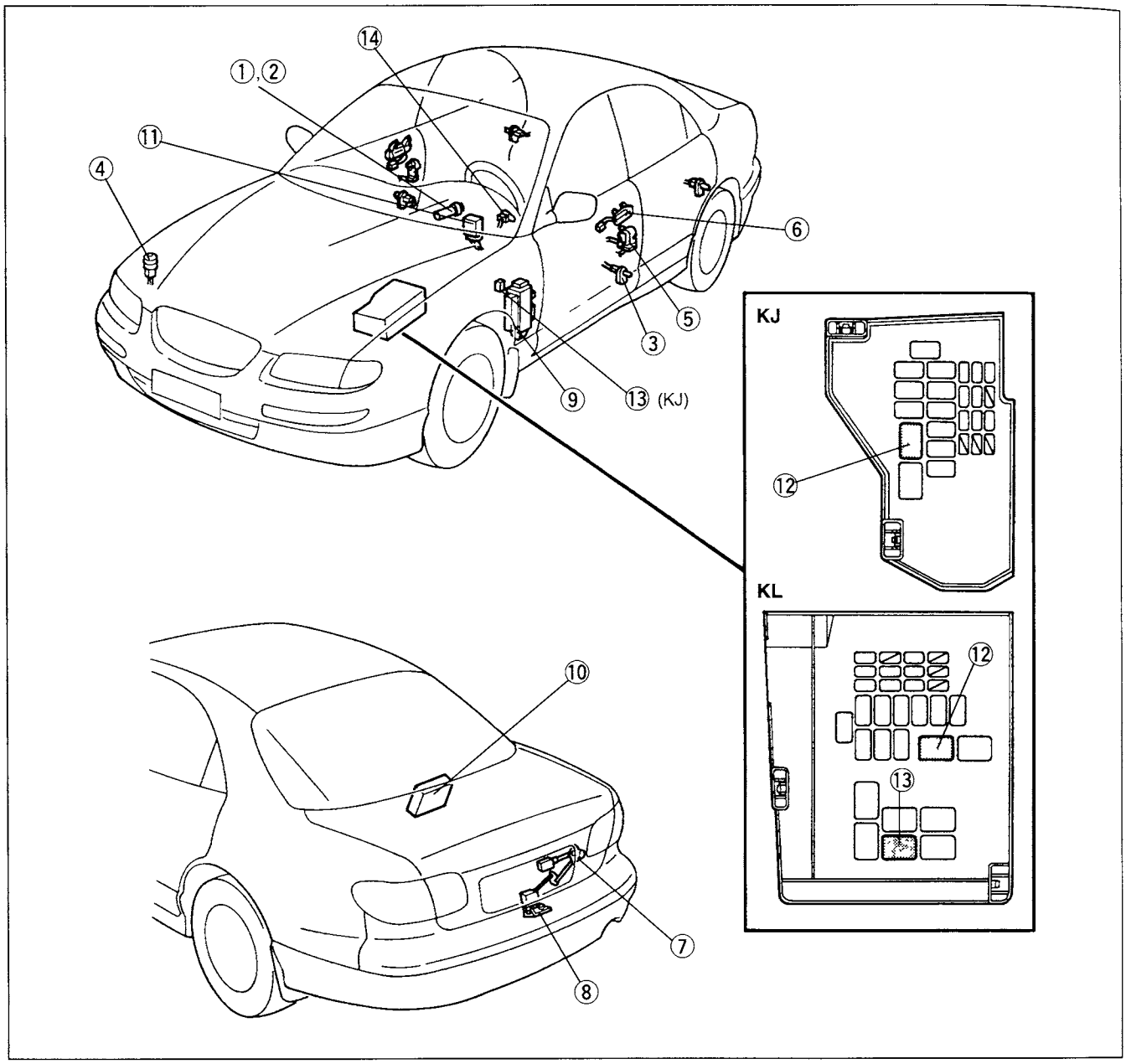
○—○: Continuity B+: Battery positive voltage

Step \ Terminal	D	B	A	C
1	○	○		
2	GND	B+	○	○

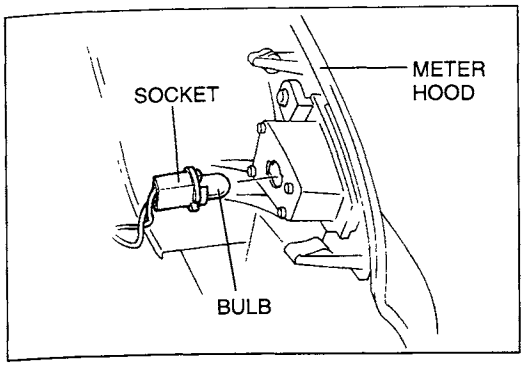
2. If not as specified, replace the horn relay.

THEFT-DETERRENT SYSTEM

STRUCTURAL VIEW



1. Ignition switch
   Inspection ..... page T– 4
2. Key reminder switch
   Inspection ..... page T– 4
3. Door switch
   Inspection ..... page T–36
4. Hood switch
   Inspection ..... page T–61
5. Door lock-link switch
   Inspection ..... section S
6. Door key cylinder switch
   Inspection ..... section S
7. Trunk key cylinder switch
   Inspection ..... section S
8. Trunk compartment light switch
   Inspection ..... page T–36
9. CPU
   Inspection ..... page T– 7
10. Keyless unit
    Removal / Installation ..... section S
11. Flasher unit
    Inspection ..... page T–25
12. Horn relay
    Inspection ..... page T–59
13. Starter cut relay
    Inspection ..... page T–61
14. Security light
    Bulb replacement ..... page T–61

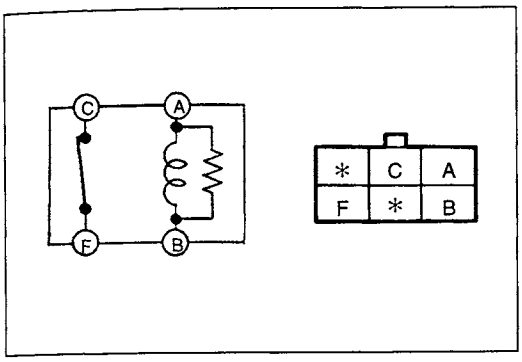


SECURITY LIGHT

Bulb Replacement

1. Disconnect the negative battery cable.
2. Remove the meter hood. (Refer to section S.)
3. Remove the socket.
4. Remove the bulb.
5. Install in the reverse order of removal.

Security light bulb: 1.7 W



STARTER CUT RELAY

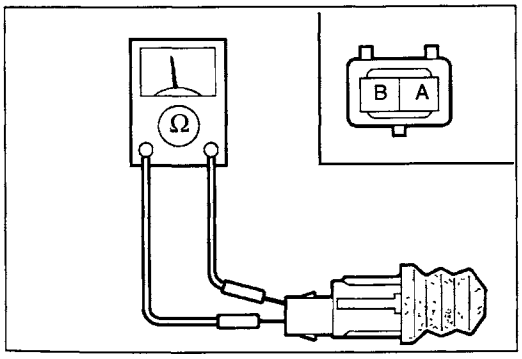
Inspection

1. Remove the starter cut relay.
2. Apply battery positive voltage and check for continuity between the terminals of the starter cut relay.

O—O: Continuity B+: Battery positive voltage

Step \ Terminal	A	B	C	F
1	O	O	O	O
2	B+	GND		

3. If not as specified, replace the starter cut relay.



HOOD SWITCH

Inspection

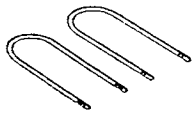
1. Remove the hood switch.
2. Check for continuity between the terminals of the hood switch.

Switch condition	Continuity
Pressed	No
Released	Yes

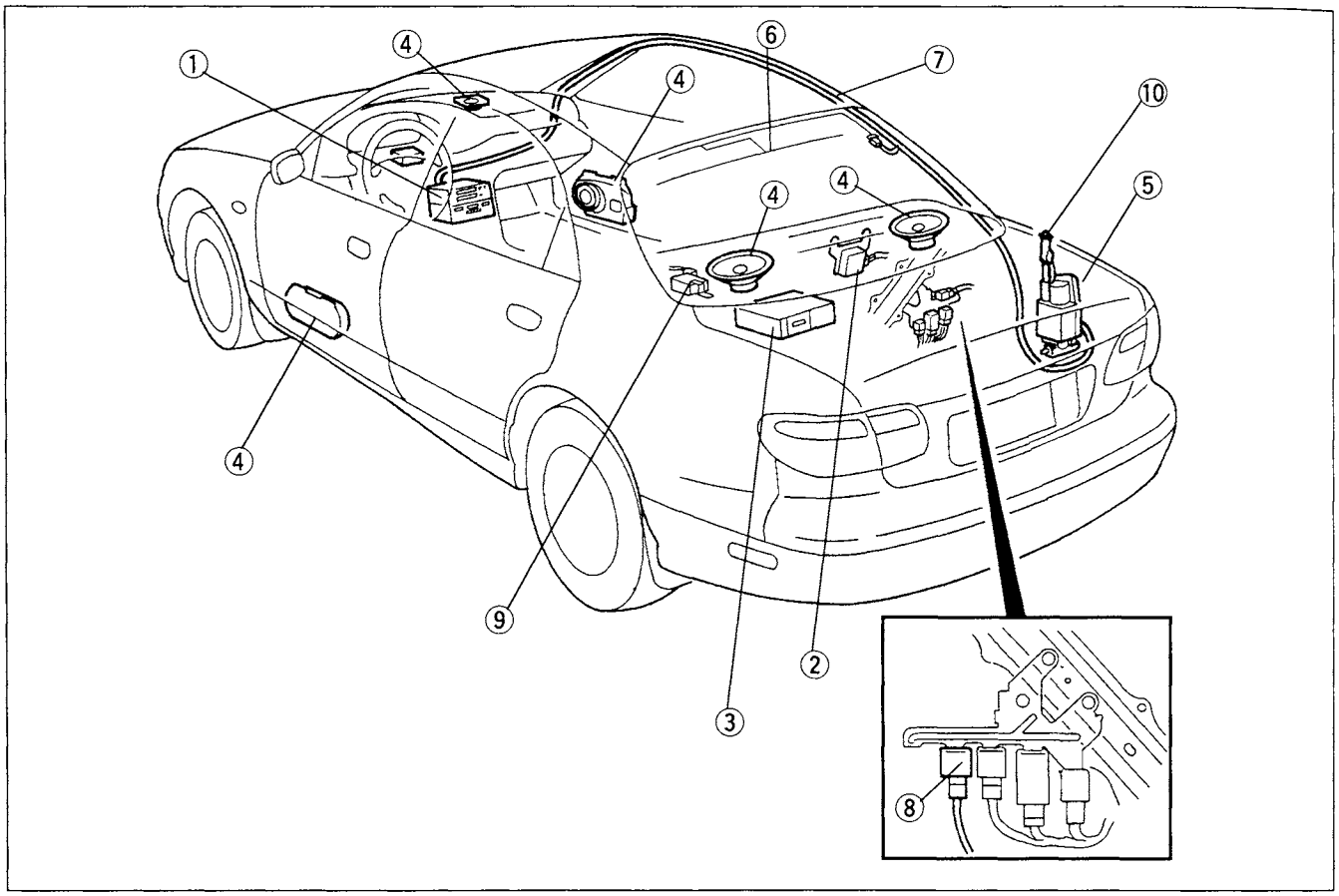
3. If not as specified, replace the hood switch.

AUDIO

PREPARATION
SST

49 UN01 050 Tool, removing		For removal of audio unit

STRUCTURAL VIEW



1. Audio unit
   - Removal ..... page T–67
   - Installation ..... page T–67
   - CD changer error detection function ..... page T–68
2. Amplifier
   - Removal / Installation ..... page T–69
3. CD changer
   - Removal / Installation ..... page T–69
4. Speaker
   - Removal / Installation ..... page T–70
   - Inspection ..... page T–71
5. Power antenna
   - Removal / Installation ..... page T–72
   - Disassembly / Assembly ..... page T–73
   - Inspection ..... page T–74
6. Glass antenna
   - Inspection ..... page T–74
7. Antenna feeder
   - Removal / Installation ..... page T–74
   - Inspection ..... page T–74
8. Audio relay
   - Removal / Installation ..... page T–75
   - Inspection ..... page T–75
9. Noise filter
   - Removal / Installation ..... page T–76
   - Inspection ..... page T–76
10. Antenna mast
    - Removal / Installation ..... page T–76

ANTITHEFT SYSTEM

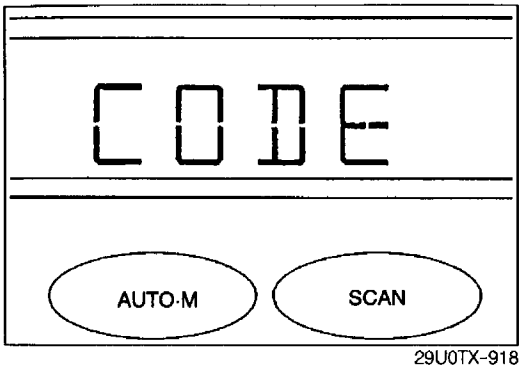
Alarm Conditions

If the antitheft system protection has been activated, any one of the following conditions will trigger the system:

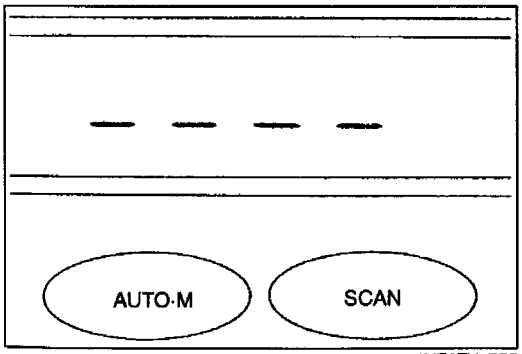
- Disconnected battery cable
- Discharged battery
- Disconnected audio unit connectors

If the system is triggered, the audio unit will then be inoperative when it is reconnected to a power source, and "code" will flash on the display until the preselected code number is input. Follow the procedures in "Canceling Antitheft Operation" (page T–66) to deactivate the unit.

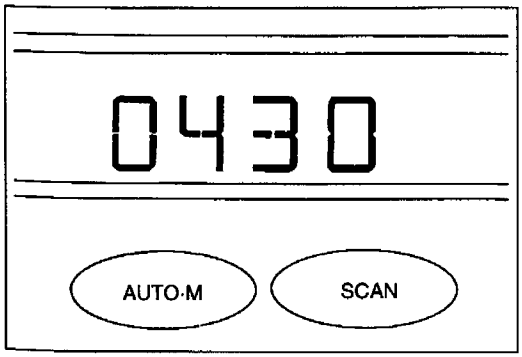
Operation	Reference page
Input code number to activate antitheft system	T–63 "Setting the Code Number"
Delete previous code number and set new number	T–65 "Canceling the Code Number"
Resume audio unit operation after antitheft system is triggered	T–66 "Canceling Antitheft Operation"



29U0TX-918



1YE0TX-575

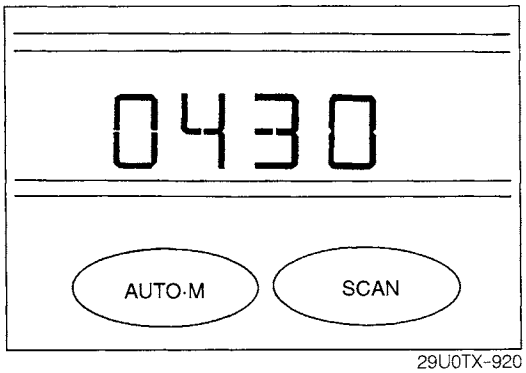


29U0TX-920

Setting Code Number

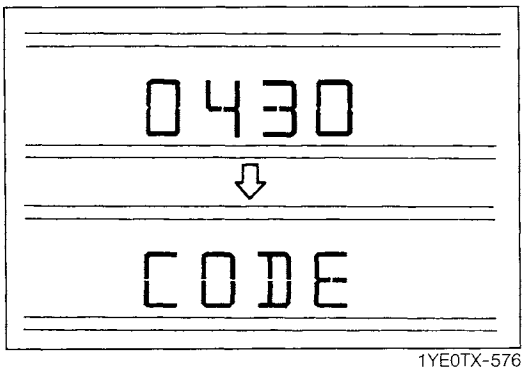
Complete steps 1—3 within 10 seconds or the setting procedure will be canceled.

1. Turn the ignition switch to ACC and then turn off the audio unit.
2. Press and hold the SCAN and AUTO-M buttons simultaneously for approximately 1.5 seconds until "code" appears on the display.
3. Press the SCAN and AUTO-M buttons again until bars appear on the display.
4. Select a personal code number and record it before inputting it. If the number is input and then forgotten, it cannot be canceled, and if the unit is disconnected again, the audio unit will be inoperative.



29U0TX-920

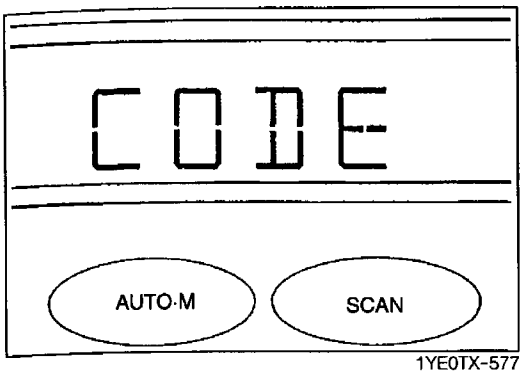
5. Use channel buttons 1—4 to input the selected code number. Press button 1 for the first digit, 2 for the second, 3 for the third, and 4 for the last digit. Input the number within 10 seconds. If the display is deleted, repeat the procedure from step 1.



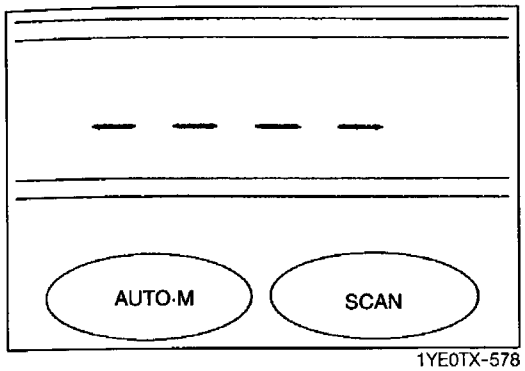
1YE0TX-576

6. With the code number displayed, press and hold the SCAN and AUTO-M buttons for approximately 1.5 seconds until a beep is heard. "Code" will be displayed for approximately 5 seconds. After it disappears, the code number is set.

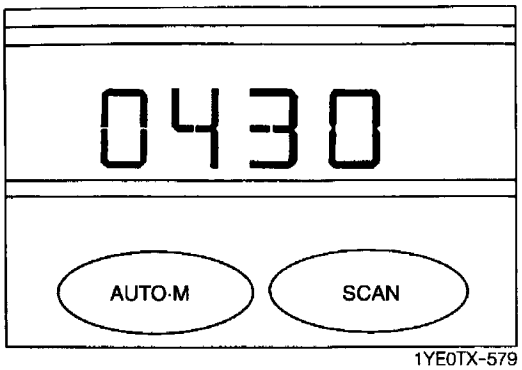
7. If "Err" (error) appears on the display, repeart the procedure from step 1. If input error is repeated three times, turn the ignition switch to OFF and repeat the procedure from step 1.



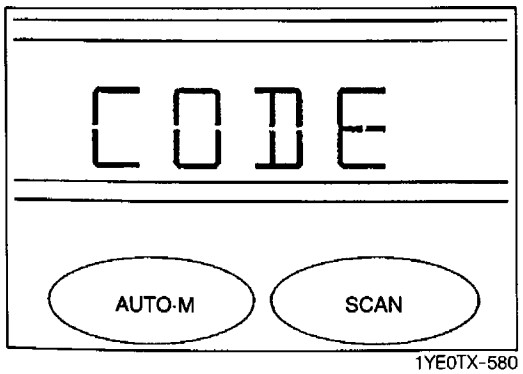
1YE0TX-577



1YE0TX-578



1YE0TX-579



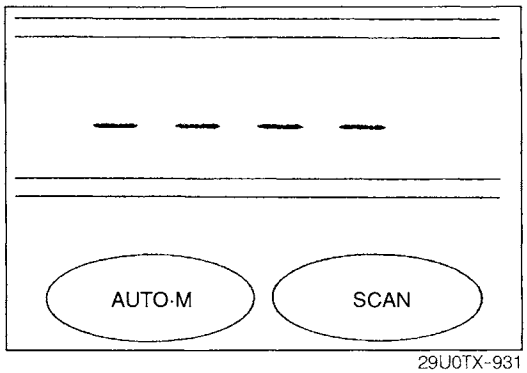
1YE0TX-580

Canceling the Code Number

Complete steps 1—3 within 10 seconds or the canceling procedure will be canceled.

1. Turn the ignition switch to ACC and then turn off the audio unit.
2. Press and hold the SCAN and AUTO-M buttons simultaneously for approximately 1.5 seconds until "code" appears on the display.
3. Press the SCAN and AUTO-M buttons again until bars appear on the display.
4. Use channel buttons 1—4 to input the current code number. Press button 1 for the first digit, 2 for the second, 3 for the third, and 4 for the last digit. Input the number within 10 seconds. If the display is deleted, repeat the procedure from step 1.
5. With the code number displayed, press and hold the SCAN and AUTO-M buttons for approximately 1.5 seconds until a beep is heard. "Code" will be displayed for approximately 5 seconds. After it disappears, the code number is canceled.

   Caution
   - **Three consecutive errors, including turning the ignition switch to OFF and disconnecting the audio unit, will activate the antitheft system and render the audio unit completely inoperative. If this occurs, cantact your distributor.**
6. If "code" appears on the display, the code number is not canceled. Repeat the procedure from step 3. If "Err" (error) appears on the display, repeat the procedure from step 1.

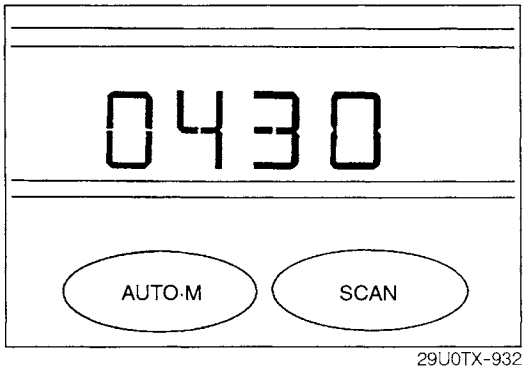


29U0TX-931

Canceling Antitheft Operation

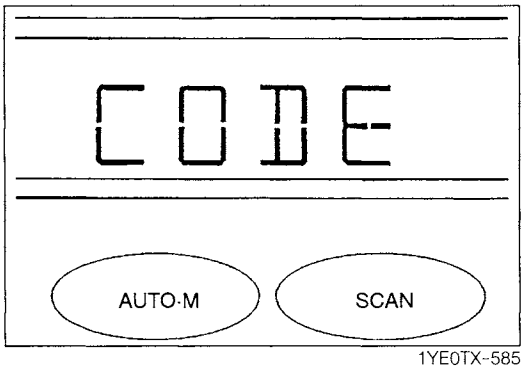
Properly input the selected code number to deactivate the antitheft system and resume normal audio operation.

1. Turn the ignition switch to ACC. ("Code" will flash on the display.)
2. Press the SCAN and AUTO-M buttons simultaneously for approximately 1.5 seconds until bars appear on the display.



29U0TX-932

3. Use channel buttons 1—4 to input the selected code number. Press button 1 for the first digit, 2 for the second, 3 for the third, and 4 for the last digit. Input the number within 10 seconds. If the display is deleted, repeat the procedure from step 1.



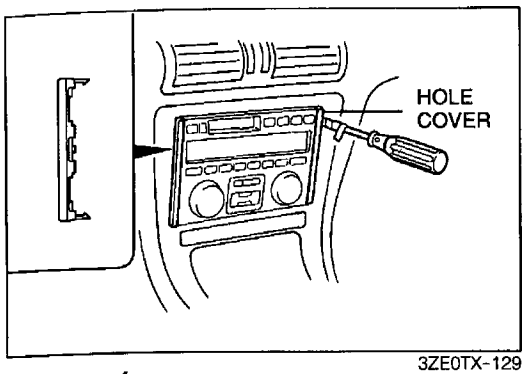
1YE0TX-585

4. With the code number displayed, press and hold the SCAN and AUTO-M buttons for approximately 1.5 seconds until a beep is heard. "Code" will flash for approximately 15 seconds. After it disappears, the new code number is set.

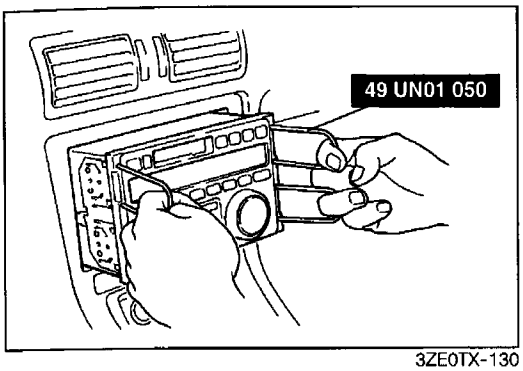
Caution

- **Three consecutive errors, including turning the ignition switch to OFF and disconnecting the audio unit, will activate the antitheft system and render the audio unit completely inoperative. If this occurs, contact your distributor.**

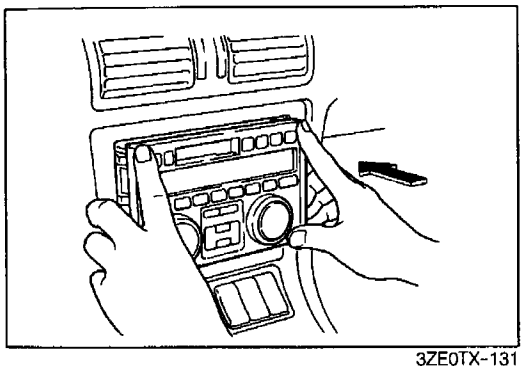
5. If "Err" (error) appears on the display, repeart the procedure from step 1.



3ZE0TX-129



3ZE0TX-130


3ZE0TX-131

AUDIO UNIT

Removal

1. Using a flathead screwdriver wrapped in tape, pry out the audio unit service hole covers of the audio unit and CD changer controller. Keep the hole covers for reinstallation.

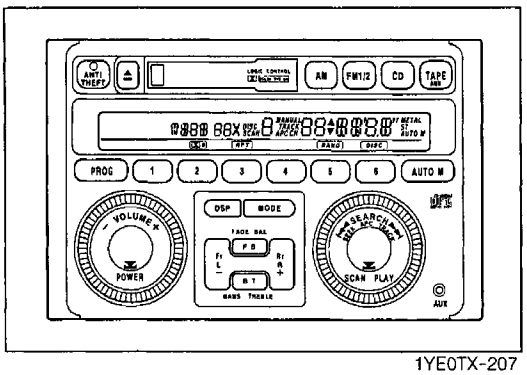
Note

- Two **SST** sets are required when removing an audio unit that includes the CD changer controller.

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 audio unit connectors and antenna jacks.

Installation

1. Install the audio unit service hole covers.
2. Connect the audio unit connectors and antenna jacks.
3. Insert the audio unit until each clip clicks. Make sure the wiring harness and antenna feeder do not become trapped.



1YE0TX-207

CD Changer Error Detection Function

All CD changers are equipped with an error detection function. The function detectes errors in the system and notifies the driver by flashing a diagnostic trouble code on the display of the CD changer controller. Determine the diagnostic trouble code and carry out troubleshooting by referring to the list below.

Note

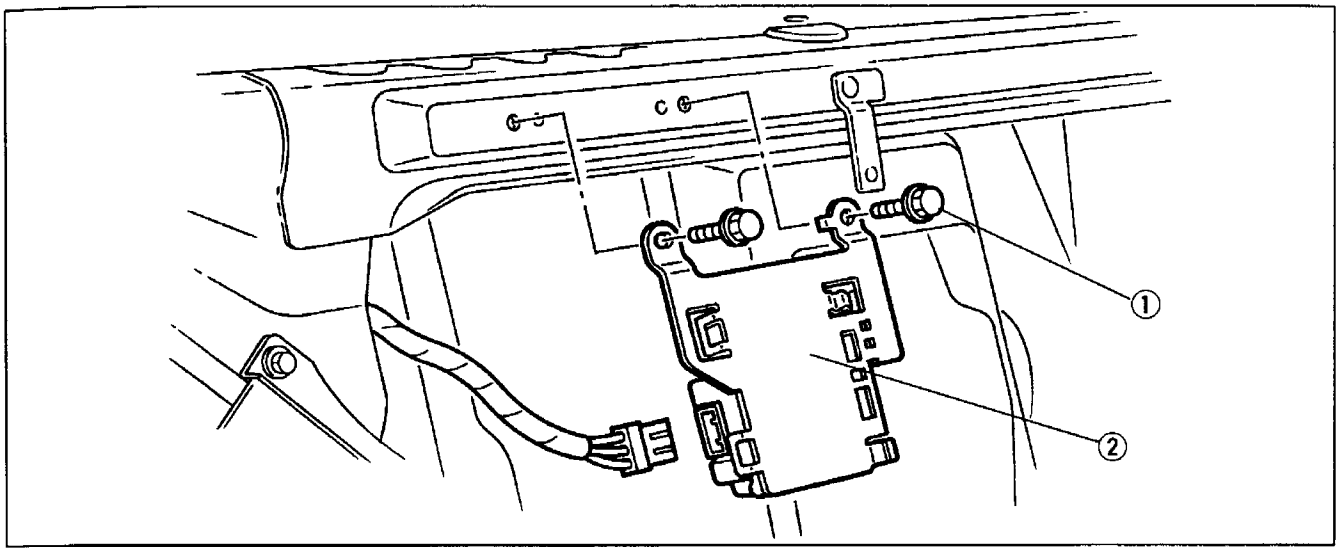
- The diagnostic trouble code can be displayed again by pressing the PLAY·STOP push button switch.

Diagnostic trouble code table

Diagnostic trouble code	Problem	Action
1 Error	• Playback not possible (disc caught between CD magazine and roller) • Disc cannot be unloaded (CD magazine loaded)	Press EJECT button on CD changer to unload CD magazine, and then reload magazine If problem occurs again, replace CD magazine or CD changer
2 Error	• Disc cannot be unloaded (CD magazine loaded) • Disc does not unload by three consecutive unloading operations	
3 Error	• Disc cannot be unloaded (CD magazine loaded) • Disc does not unload in three seconds	
4 Error	• Playback is not possible • Disc does not load in three seconds	
5 Error	• Playback is not possible • Disc cannot be unloaded (CD magazine loaded)	
6 Error	• CD change is not possible • CD changed does not finish within three seconds	
7 Error	CD magazine cannot be unloaded by EJECT button	• Repair wiring harness (CD changer — CD changer controller) • Replace CD magazine or CD changer
3 0Error	Playback is not possible (CD changer at 60 °C {140 °F} or higher)	Allow unit to cool down
L Error	Playback is not possible	Repair wiring harness (CD changer — CD changer controller)
nodisc	• Playback is not possible • CD magazine cannot be loaded • CDs improperly set	Set disc properly into CD magazine and reload

1YA0TX-208

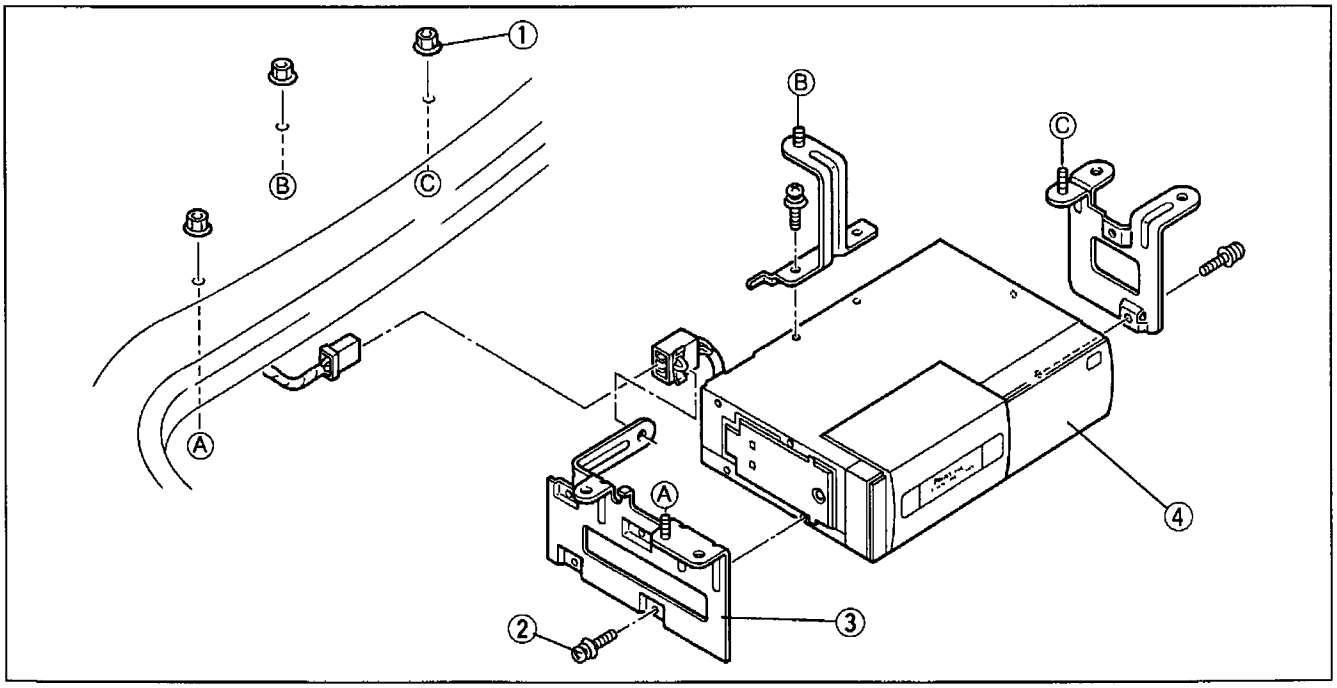
AMPLIFIER
Removal / Installation
Center speaker amplifier
1. Remove the rear seat.
   (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



3ZE0TX–132

1. Bolts
2. Center speaker amplifier

CD CHANGER
Removal / Installation
1. Remove the speaker cover and rear package trim.
   (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



3ZE0TX–133

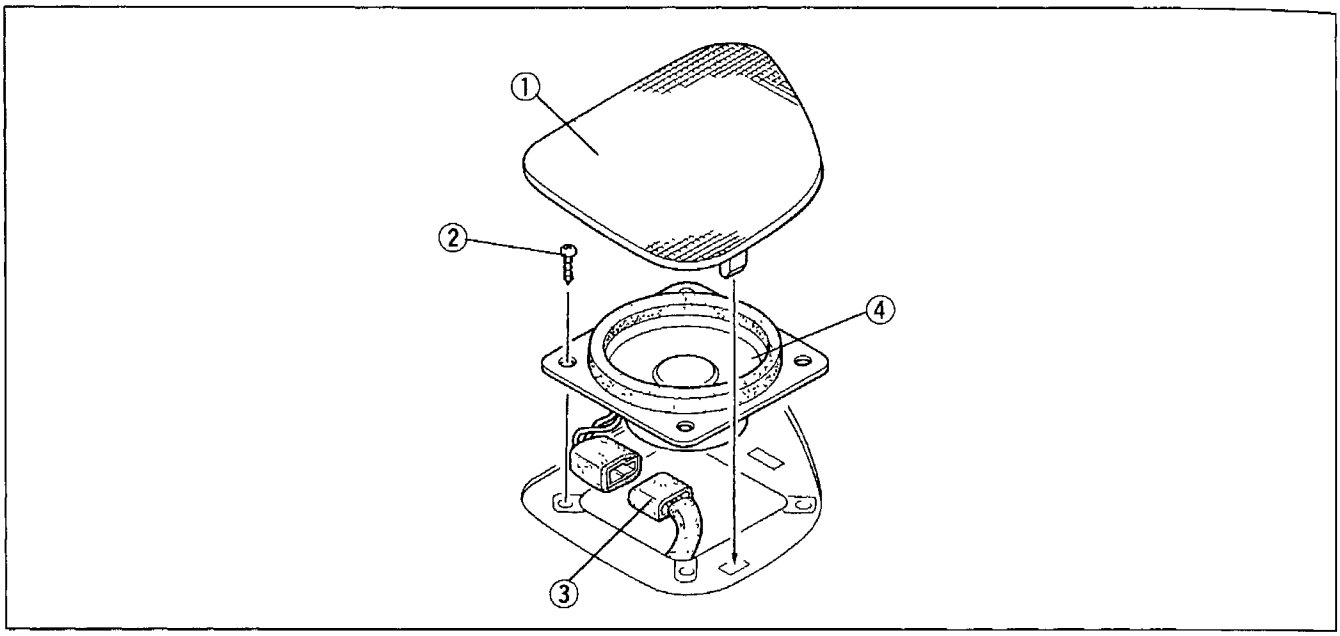
1. Nut
2. Screw
3. Bracket
4. CD changer

SPEAKER

Removal / Installation

Center speaker

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

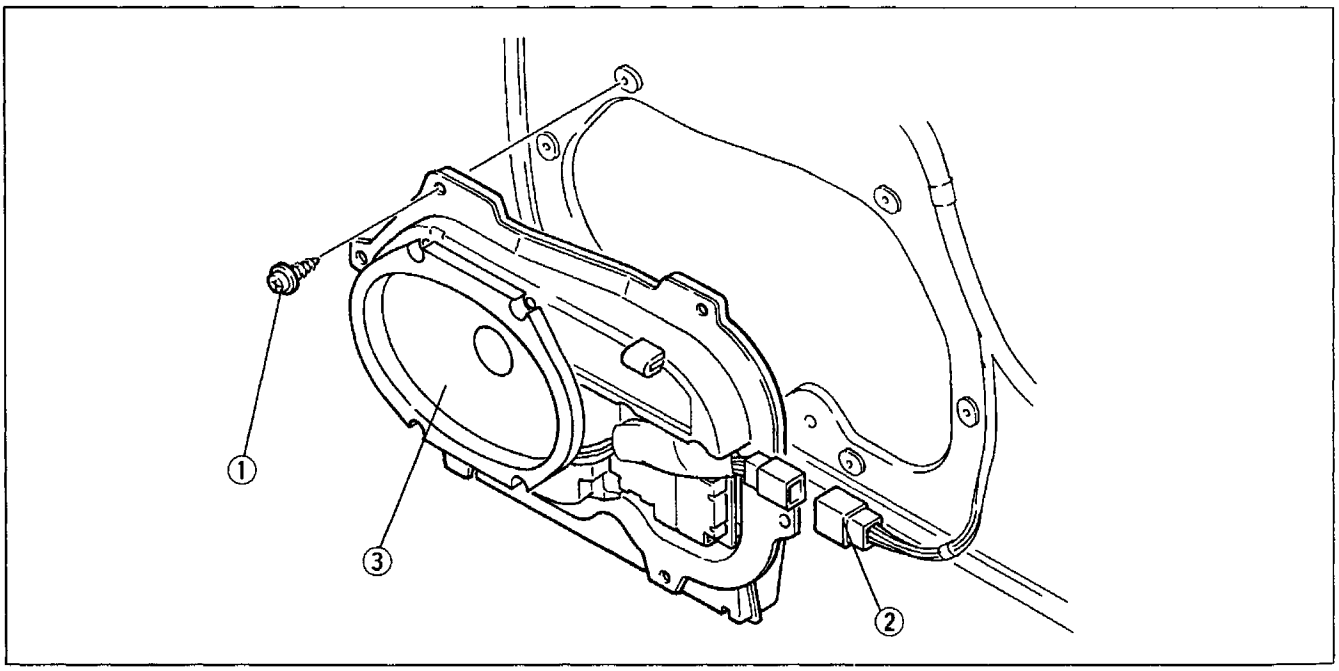


3ZE0TX–134

1. Center speaker cover
2. Screw
3. Center speaker connector
4. Center speaker

Door speaker

1. Remove the door trim.
   (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.

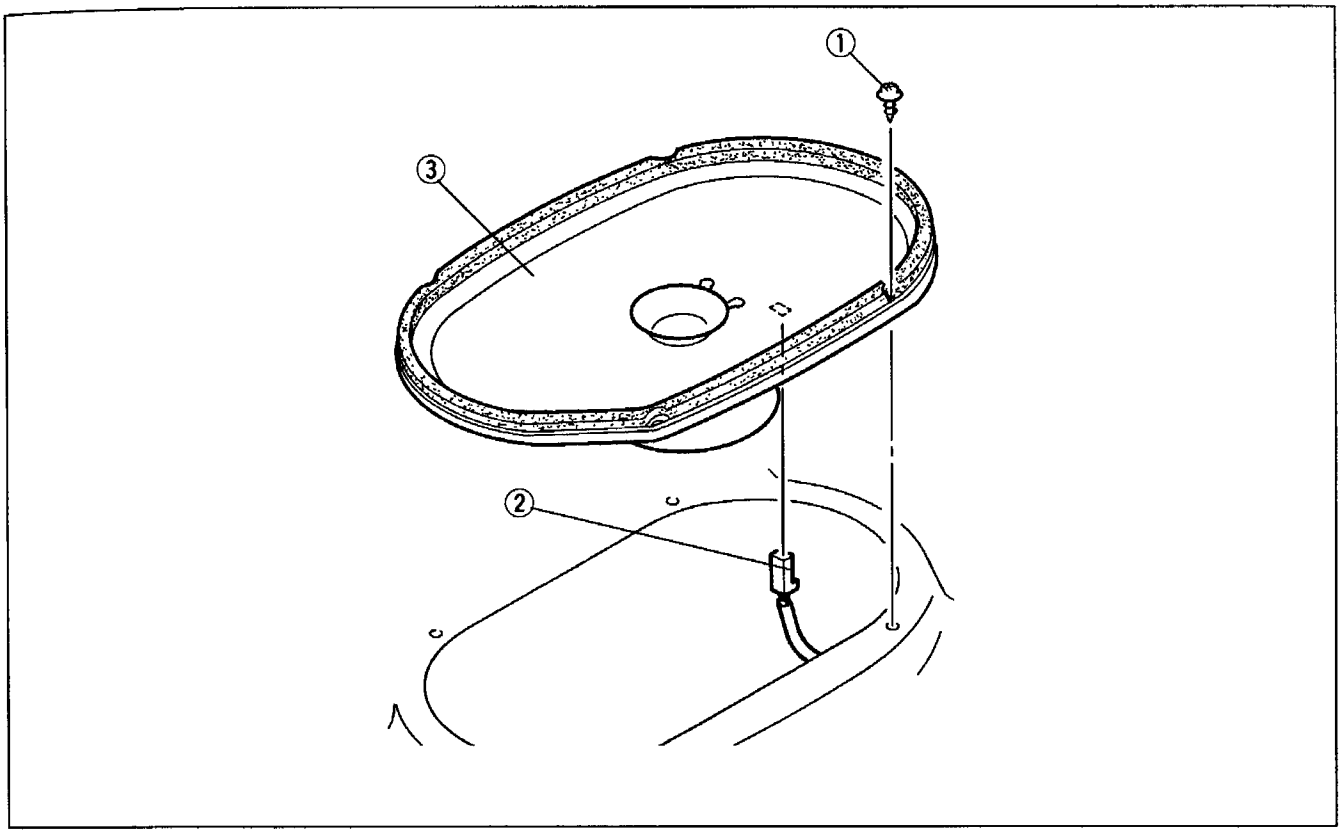


3ZE0TX–135

1. Screw
2. Door speaker connector
3. Door speaker

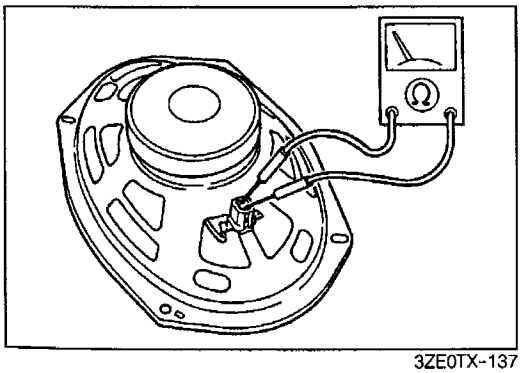
Rear speaker

1. Remove the speaker cover.
   (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



3ZE0TX-136

1. Screw
2. Rear speaker connector
3. Rear speaker



3ZE0TX-137

Inspection

Caution

- **The door speakers and rear speakers in high-grade systems contain amplifiers that can be easily damaged during inspection. Therefore, do not inspect these speakers.**

1. Measure the resistance between the terminals of the speaker.

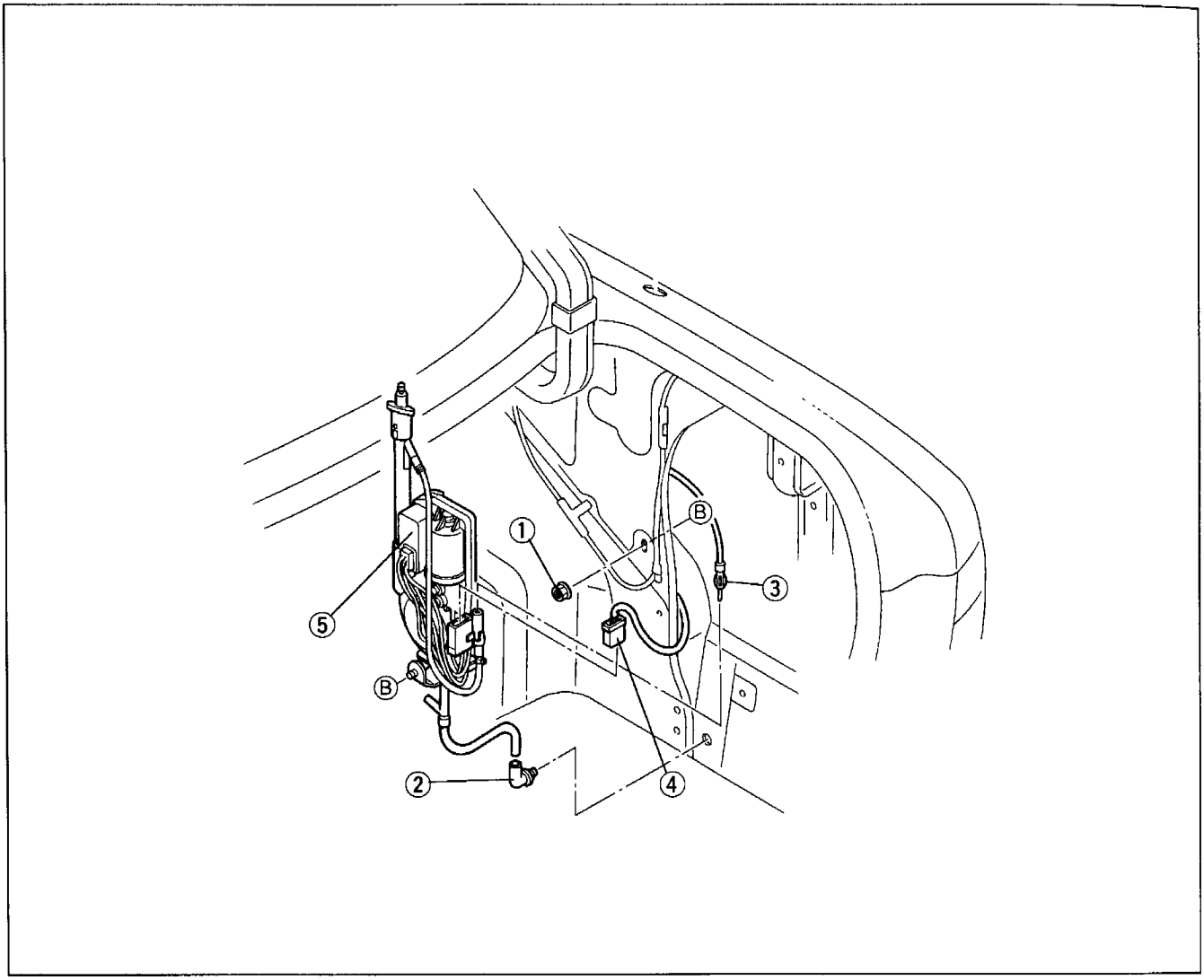
Speaker		Resistance (Ω)
Center speaker	High-grade system	8
Door speaker	Standard system	4
	High-grade system	—
Rear speaker	Standard system	4
	High-grade system	—

2. Touch the leads of an ohmmeter to the speaker terminals and verify that the speaker clicks.
3. If not as specified, replace the speaker.

POWER ANTENNA

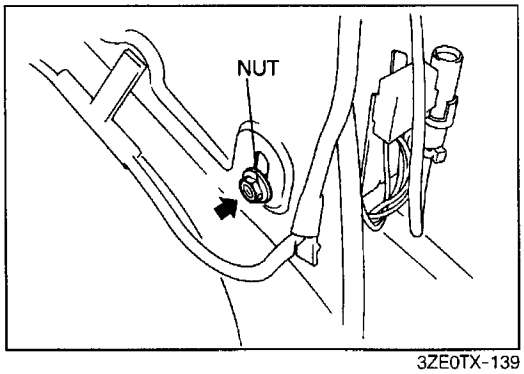
Removal / Installation

1. Remove the antenna mast.
   (Refer to page T–76.)
2. Remove the trunk side trim.
   (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**.



3ZE0TX–138

1. Nut
   Installation note ..... below
2. Drain tube
3. Antenna jack
4. Power antenna connector
5. Power antenna



3ZE0TX–139

Installation note

Nut

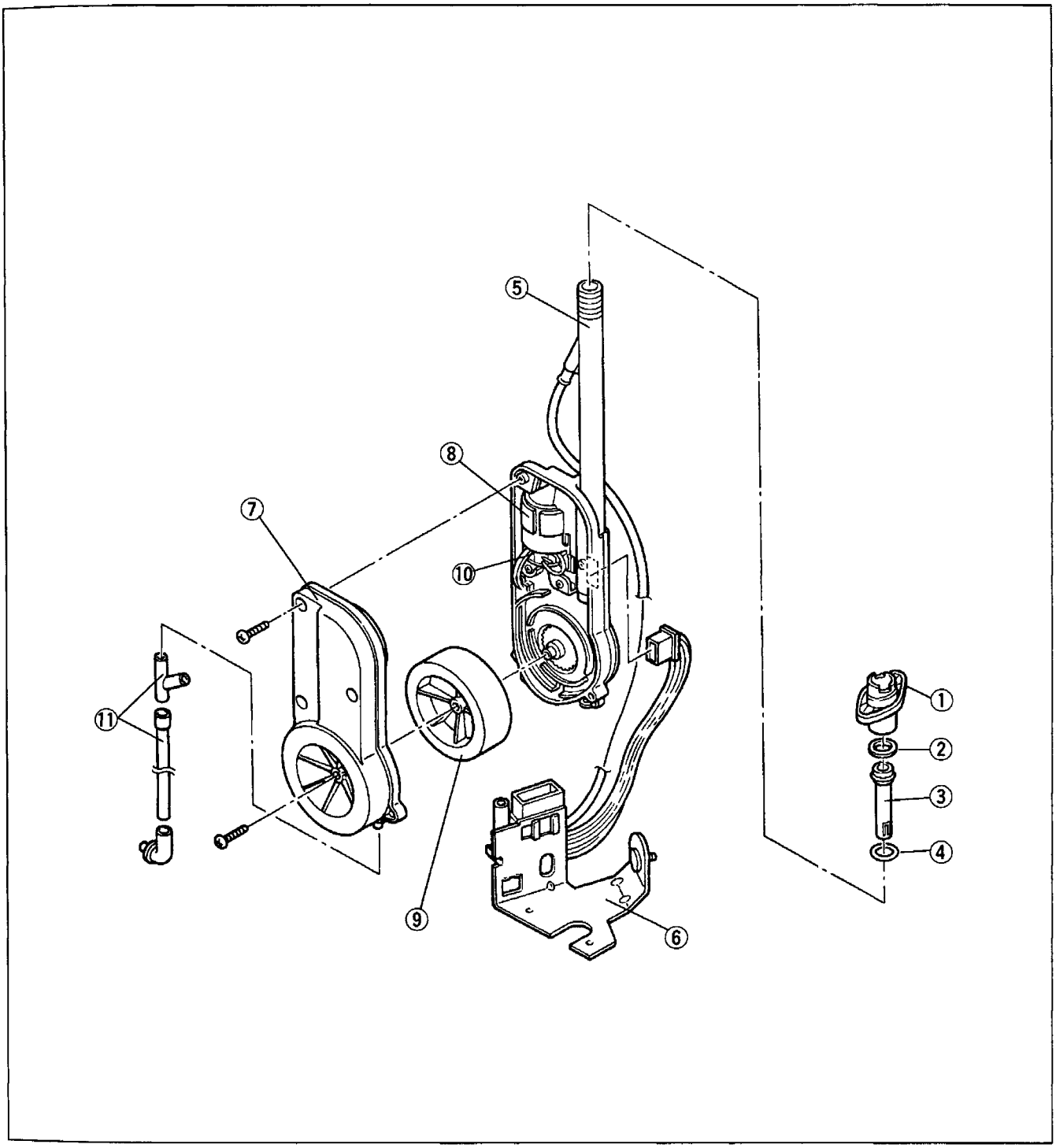
1. Tighten the nut temporary.
2. Tighten the mounting nut to the specified torque.

   Tightening torque:
   2.5—2.9 N·m {25—30 kgf·cm, 22—26 in·lbf}

3. Tighten the nut.

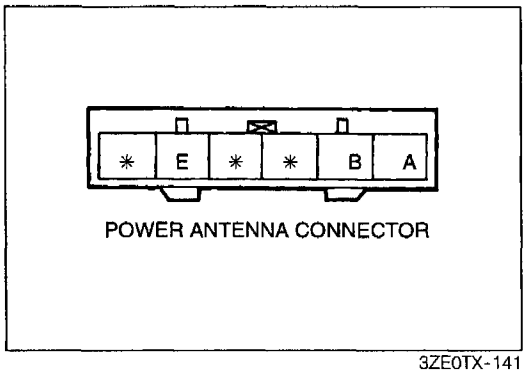
Disassembly / Assembly

1. Remove the power antenna.
   (Refer to page T–72.)
2. Disassemble in the order shown in the figure.
3. Assemble in the reverse order of disassembly.



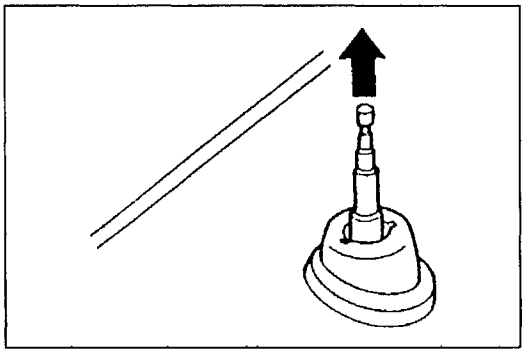
3ZE0TX–140

1. Ground plate
2. O-ring
3. Rod insulator
4. O-ring
5. Mast assembly
6. Bracket
7. Drive mechanism cover
8. Motor drive unit
9. Drive mechanism
10. Antenna circuit
11. Drain pipe



POWER ANTENNA CONNECTOR

3ZE0TX-141



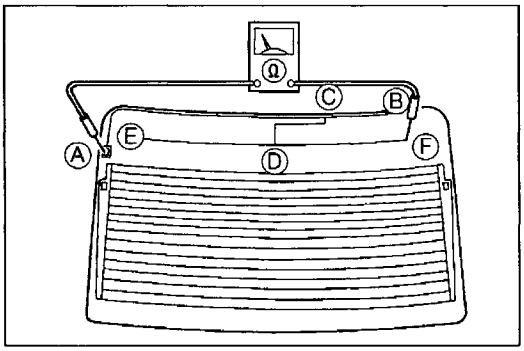
Inspection

1. Remove the trunk side trim. (Refer to section S.)
2. Disconnect the power antenna connector.
3. Connect terminal E of the power antenna to ground.
4. Apply battery positive voltage to the antenna and check the operation of the antenna.

B+: Battery positive voltage

Terminal		Antenna operation
A	B	
	B+	Down
B+	B+	Up

5. If not as specified, replace the necessary parts. (Refer to page T–73.)



GLASS ANTENNA

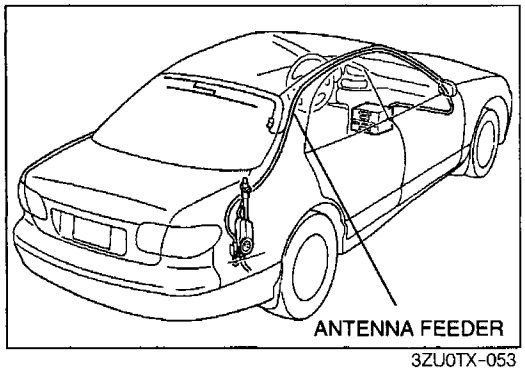
Inspection

1. Check for continuity between the following positions of the glass antenna.

O—O: Continuity

Step \ Position	A	B	C	D	E	F
1	O	O				
2			O	O		
3					O	O
4	O					O

2. If not as specified, repair the glass antenna filament. (Refer to section S, "Keyless antenna".)

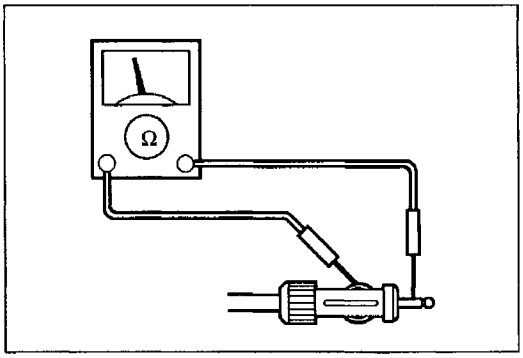


3ZU0TX-053

ANTENNA FEEDER

Removal / Installation

1. Remove the A-pillar trim, dashboard, headliner, C-pillar trim, and trunk side trim. (Refer to section S.)
2. Remove the antenna feeder.
3. Install in the reverse order of removal.



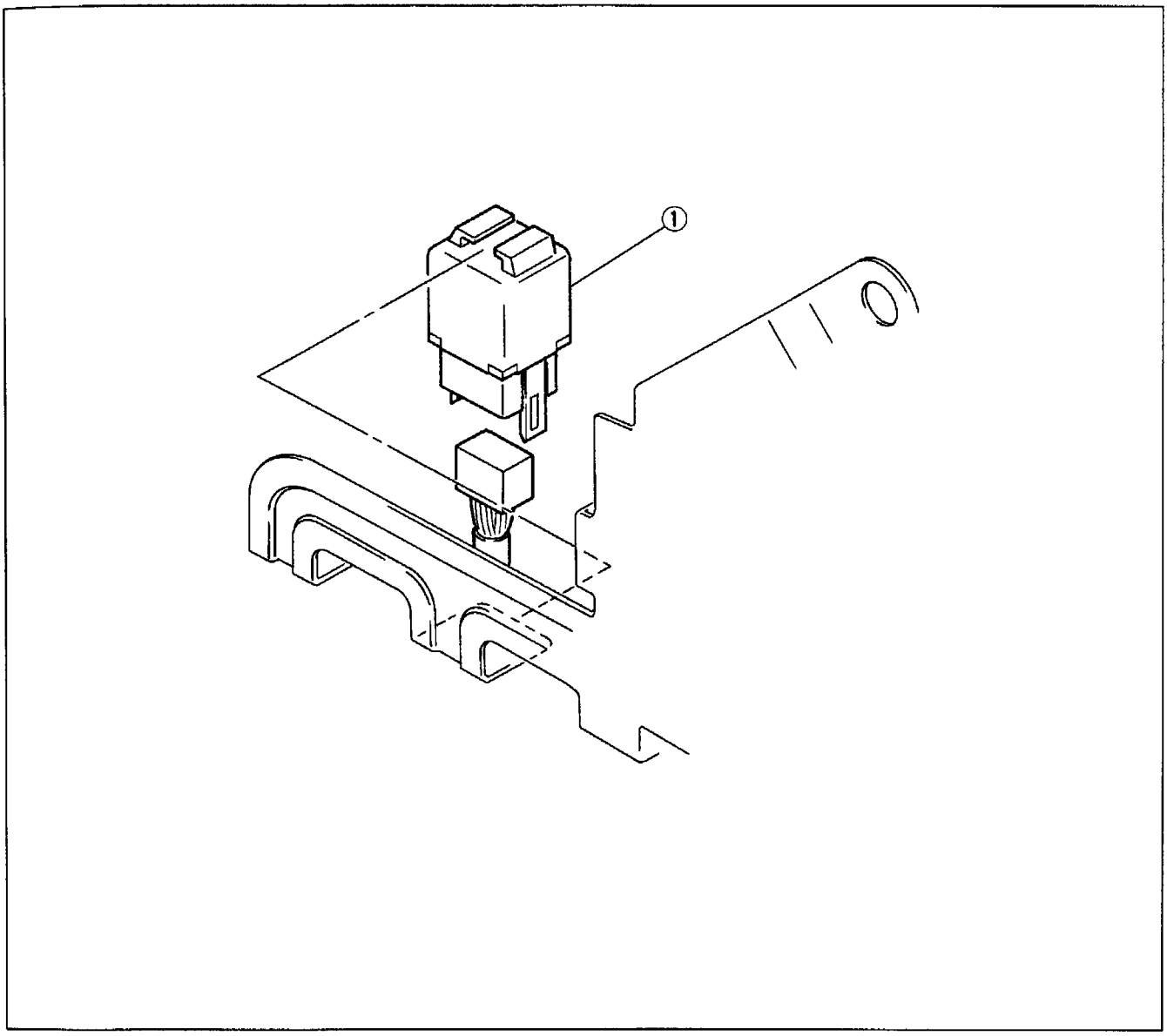
Inspection

1. Disconnect the antenna jack.
2. Check for continuity as shown in the figure.
3. If there is continuity, replace the antenna feeder.

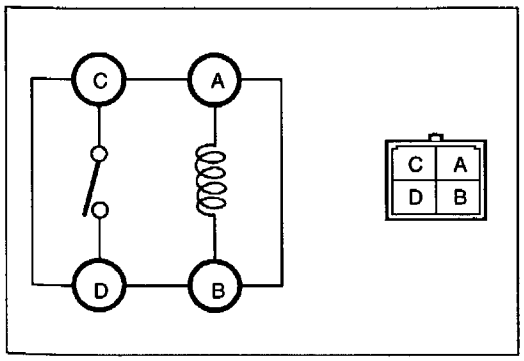
AUDIO RELAY

Removal / Installation

1. Remove the seat back.
   (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



1. Audio relay



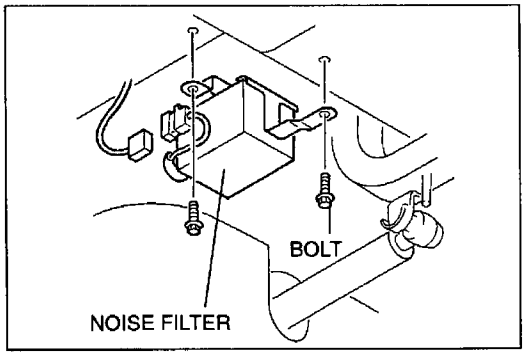
Inspection

1. Apply battery positive voltage and check for continuity between the audio relay terminals.

○—○: Continuity B+: Battery positive voltage

Step \ Terminal	A	B	C	D
1	○—○			
2	B+	GND	○—○	

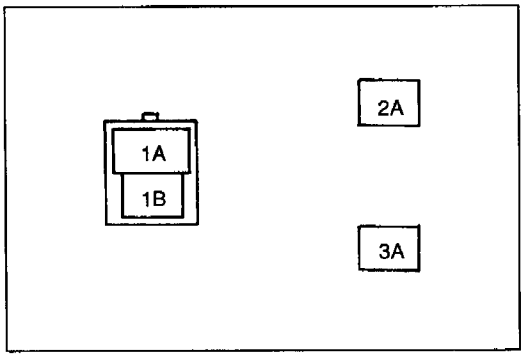
2. If not as specified, replace the audio relay.



NOISE FILTER

Removal / Installation

1. Remove the left side C-pillar trim. (Refer to section S.)
2. Remove the bolts.
3. Disconnect the connector to remove the noise filter.
4. Install in the reverse order of removal.



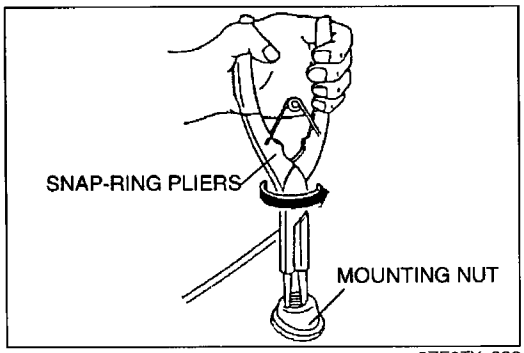
Inspection

1. Remove the noise filter.
2. Check for continuity between the terminals of the noise filter.

O—O: Continuity

Step \ Terminal	1A	1B	2A	3A
1	O		O	
2		O		O

3. If not as specified, replace the noise filter.

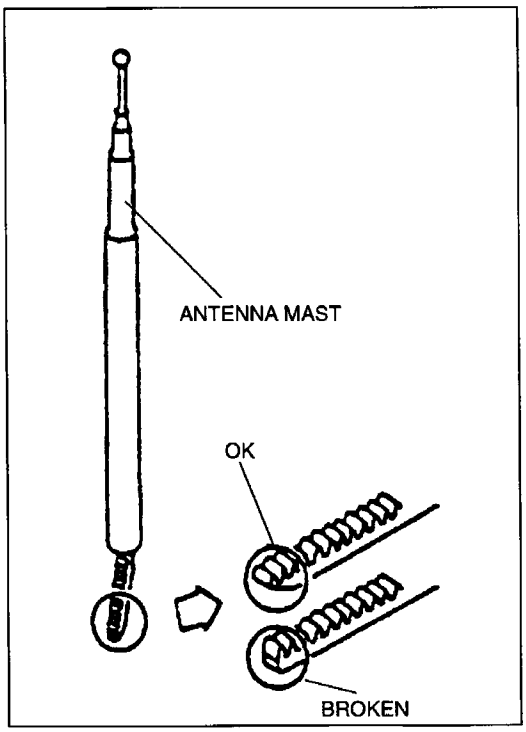


3ZE0TX-222

ANTENNA MAST

Removal / Inspection

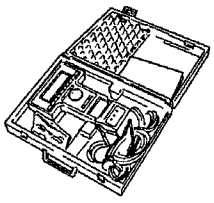
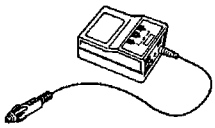
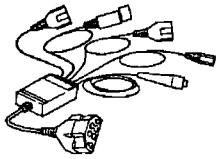
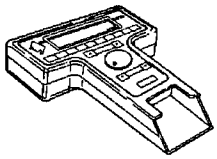
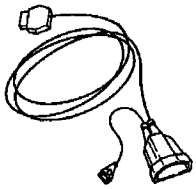
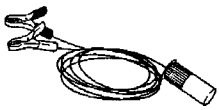
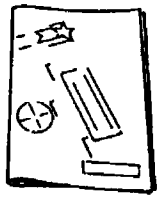
1. Remove the mounting nut by using snap-ring pliers as shown.



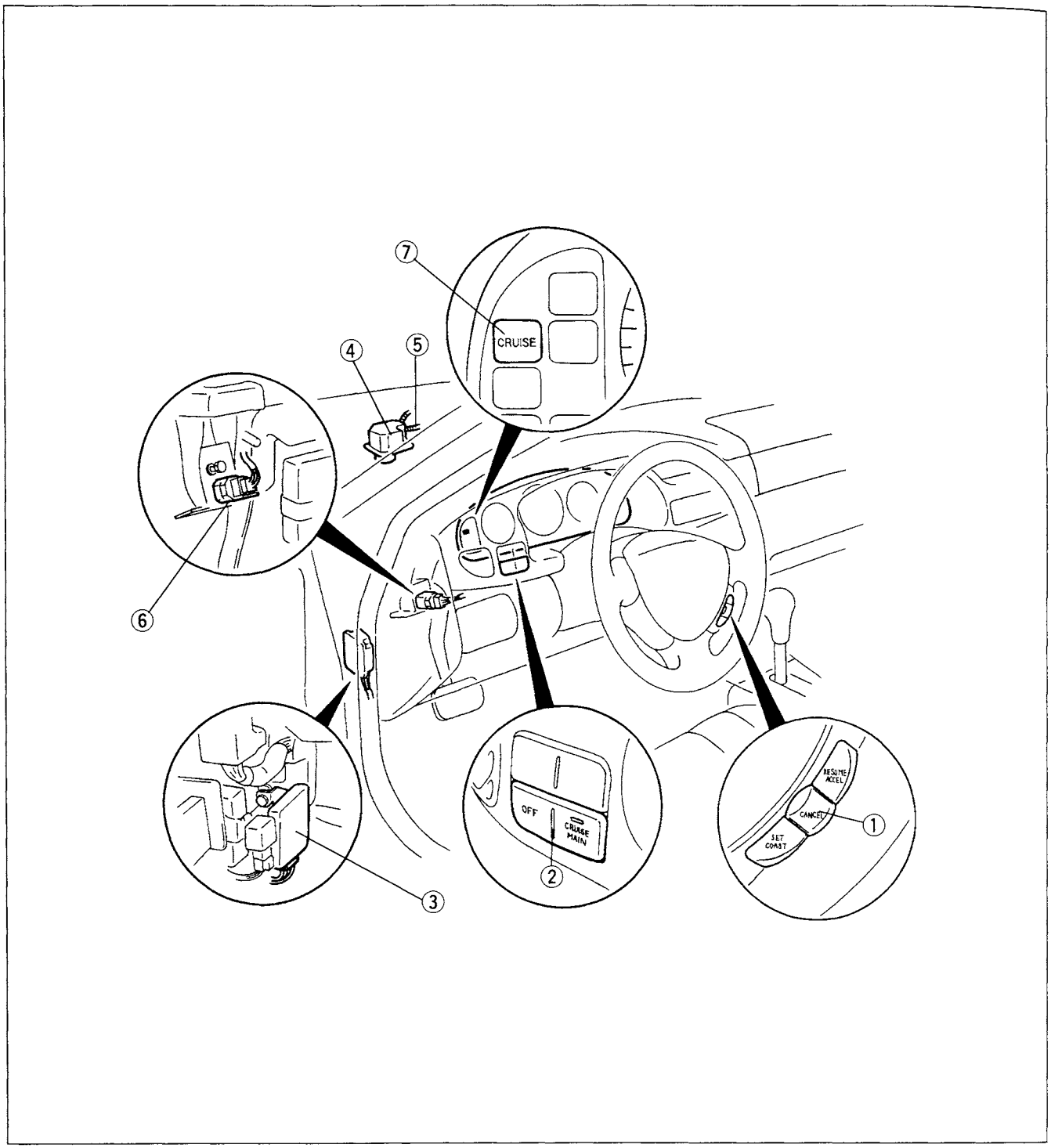
2. With the ignition switch at ACC or ON, turn the radio switch on and take out the antenna mast.
3. Check the end of the plastic rack for damage.
4. If the rack end is kinked or broken, replace the antenna mast.

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 START/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 T–89
   - Inspection ..... page T–90
2. Cruise control main switch
   - Removal / Installation ..... page T–30
   - Inspection ..... page T–30
3. Cruise control module
   - Removal / Installation ..... page T–85
   - Inspection ..... page T–86
4. Cruise actuator
   - Removal / Installation ..... page T–87
   - Inspection ..... page T–87
5. Actuator cable
   - Removal / Installation ..... page T–88
   - Adjustment ..... page T–88
6. Brake switch
   - Inspection ..... section P
7. Cruise set indicator light
   (in instrument cluster)

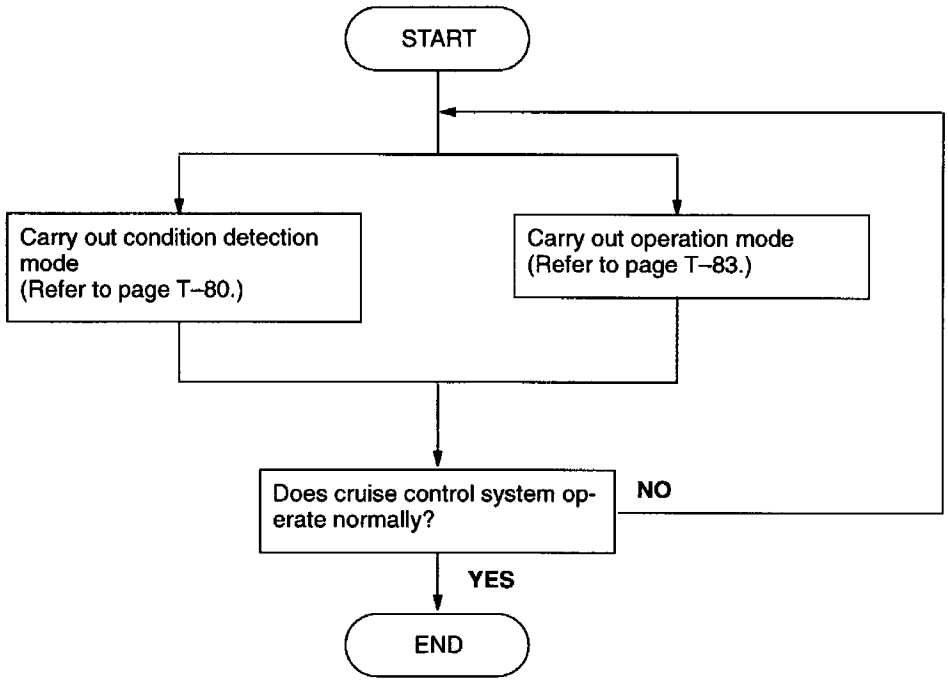
ON-BOARD DIAGNOSTIC

Outline

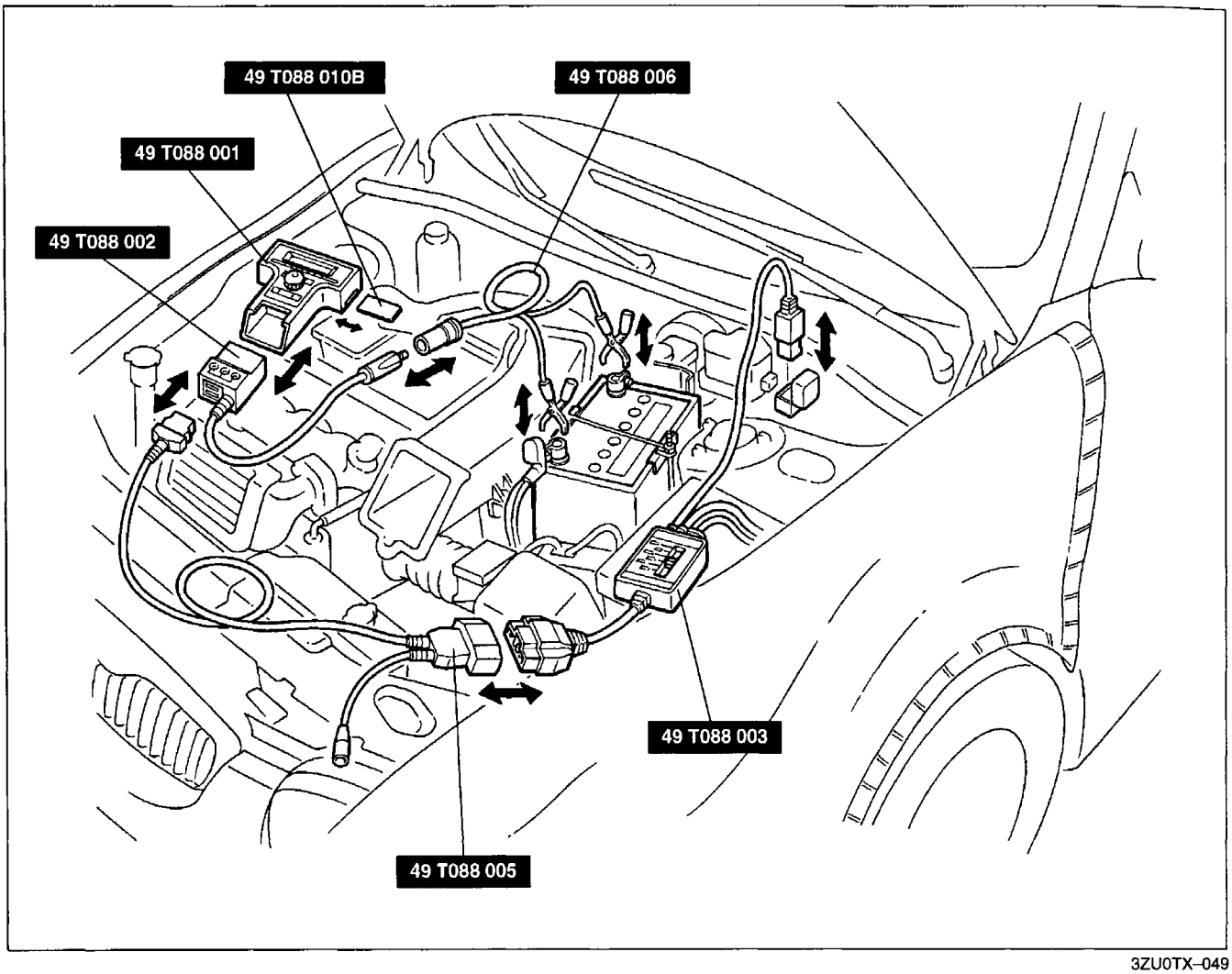
- There are two on-board diagnostic functions: Condition Detection Mode, which indicates troubles in the system; and Operation Mode, which checks for and indicates correct operation of the input signals to the control unit.
- The two functions can be done by using either of the following methods:
  1) 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

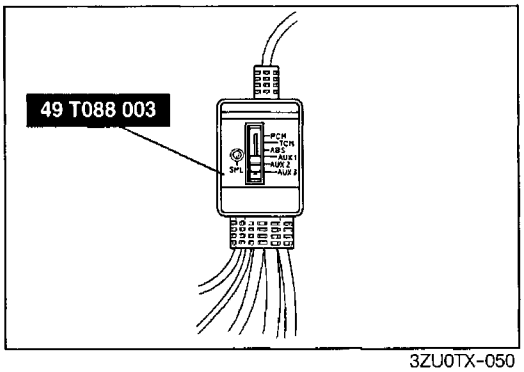
Use Condition Detection Mode or Operation Mode or both to inspect the cruise control system. Either diagnostic function can be done before the other. If one diagnostic function does not locate the trouble, carry out the other function.



Condition Detection Mode Using NGS

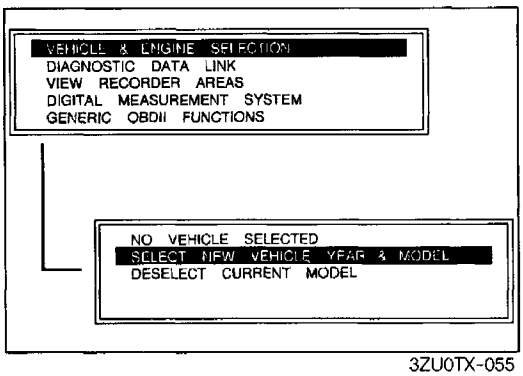


3ZU0TX-049



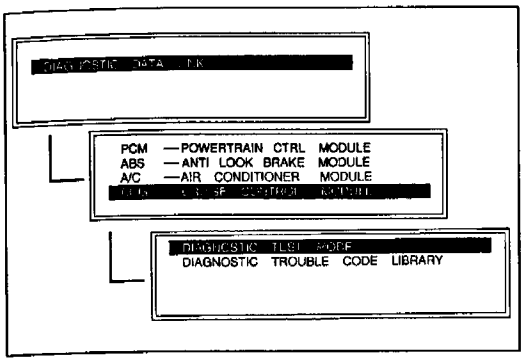
3ZU0TX-050

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.

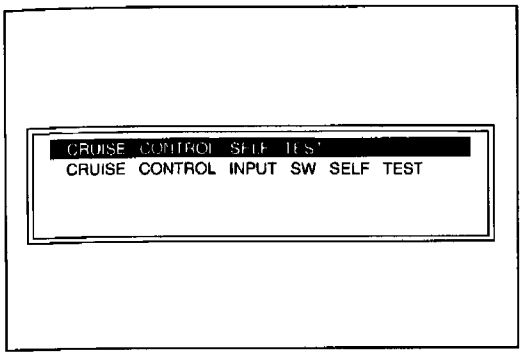


3ZU0TX-055

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}.

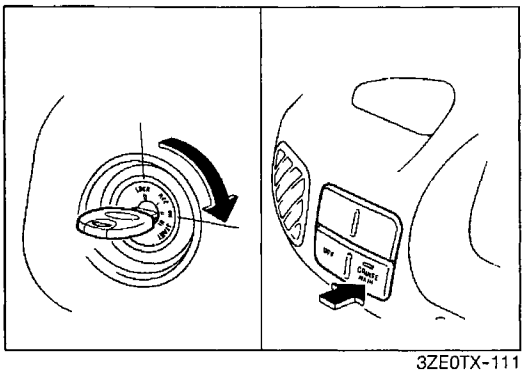


8. Select "CRUISE CONTROL SELF TEST" on the **SST** (Control Unit) display.
9. (1) If a diagnostic trouble code is displayed, refer to the diagnostic trouble code table (Refer to page T–82.) and inspect the appropriate system area.
   (2) If "NO CODES RECEIVED" is displayed, the system areas shown in 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.

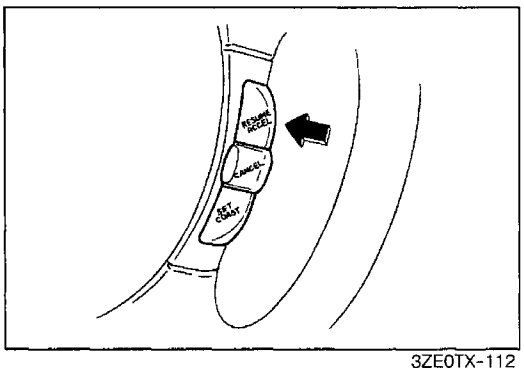
Canceling condition detection mode

To cancel condition detection mode, do any one of the following:

- Turn the cruise control main switch off.
- Turn the ignition switch to LOCK.



3ZE0TX-111



3ZE0TX-112

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 T–80.)

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 diagnosis system. 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.

Canceling condition detection mode

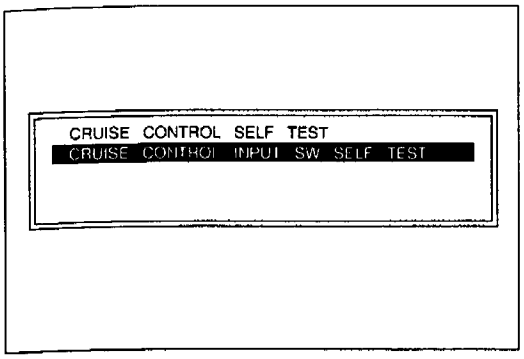
To cancel condition detection mode, do any one of the following:

- Turn off the cruise control main switch.
- Turn the ignition switch to LOCK.
- Drive the vehicle at over 16 km/h {10 MPH}.

Diagnostic trouble code table

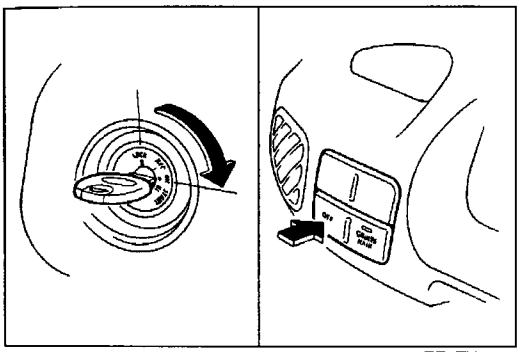
If there are two or more problems in the cruise control system, the problem with the highest priority will be indicated.

Priority	DTC	Display on the NGS	Possible cause	Action
1	1	ACTUATOR — CIRCUIT MALFUNCTION	Defective wiring (Actuator—Cruise control module) Defective cruise control module Defective actuator	Replace cruise control module Repair wiring harness Inspect actuator
2	5	STOP FUSE — CIRCUIT MALFUNCTION	Burnt STOP 20A fuse Defective brake switch Defective wiring (Fuse—Brake switch—Cruise control module)	Replace fuse Repair wiring harness Inspect brake switch
3	7	BRAKE SW — DEFECT	Defective brake switch	Inspect brake switch
4	11	SET/COAST SW — DEFECT (ALWAYS ON)	Defective cruise control switch (SET/COAST) (always on)	Inspect cruise control switch
5	12	RESUME/ACCEL SW — DEFECT (ALWAYS ON)	Defective cruise control switch. (RESUME/ACCEL) (always on)	Inspect cruise control switch
6	15	CRUISE CONTROL MODULE — DEFECT	Defective cruise control module	Replace cruise control module



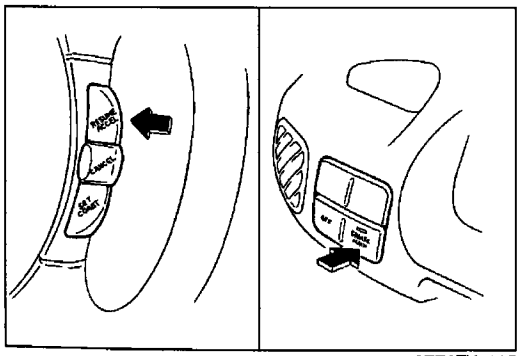
Operation Mode
Using NGS

1. Carry out steps 1—6 of the condition detection mode procedure. (Refer to page T–80.)
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 T–84. 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.


3ZE0TX-114

Using cruise set indicator light
Inspection

1. Turn the ignition switch to ON.
2. Verify that the cruise control main switch is off.
3. Shift the transaxle to D range.


3ZE0TX-115

4. Turn 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.

Canceling operation mode

To cancel operation mode, do any one of the following:

- Turn off the cruise control main switch.
- 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.

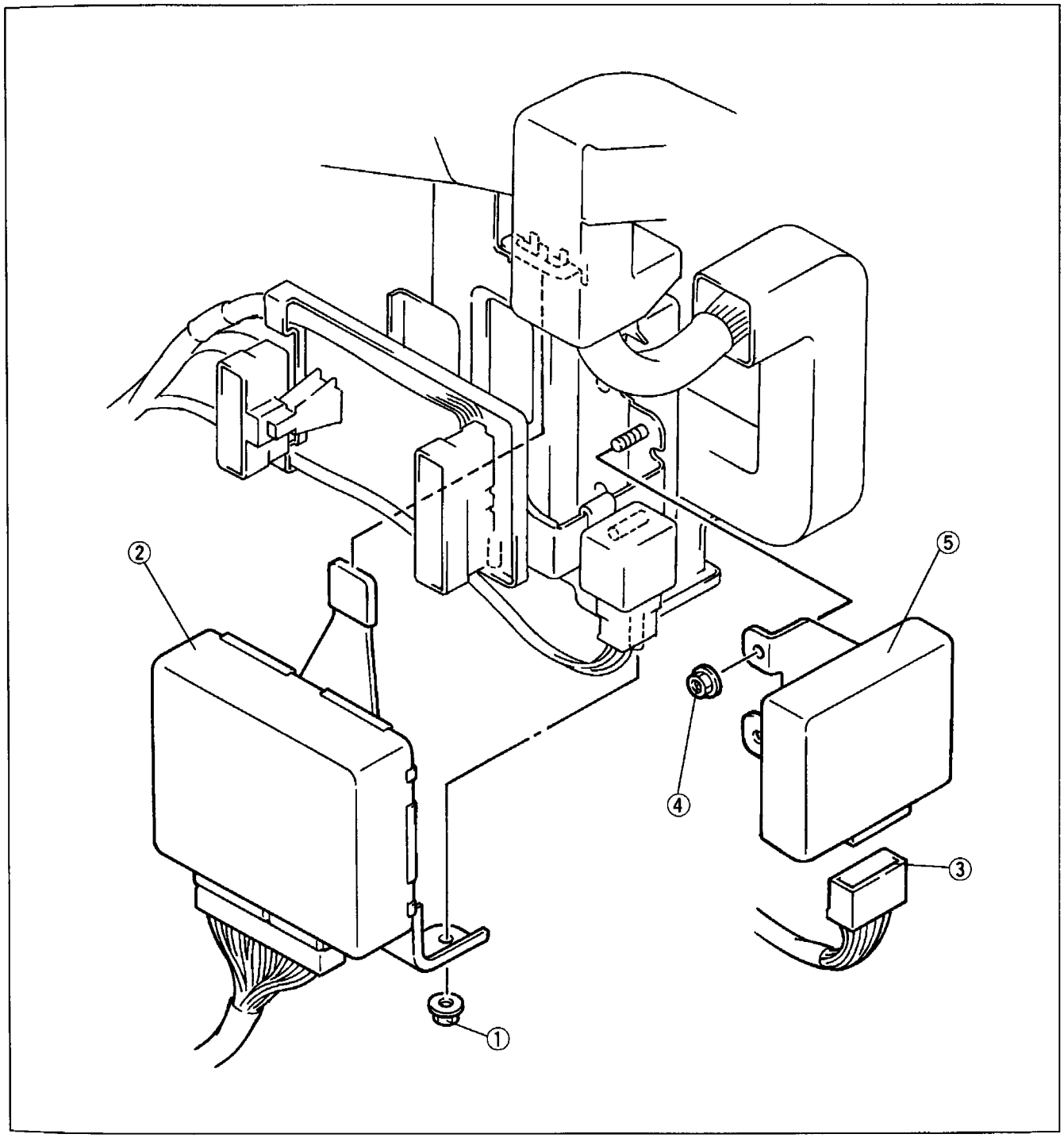
Procedure	Normal		Malfunction	
	DTC	Display on the NGS	Possible cause	Action
Press SET/ COAST switch	21	SET/COAST SW—PRESS	Defective cruise control switch Defective wiring (Cruise control module — SET/COAST switch — GND)	Inspect cruise control switch Repair wiring harness
Press RESUME/ ACCEL switch	22	RESUME/ACCEL SW—PRESS	Defective RESUME/ACCEL switch Defective wiring (Cruise control module — RESUME/ACCEL switch — GND)	Inspect cruise control switch Repair wiring harness
Press brake pedal	31	BRAKE PEDAL—DEPRESS	Defective brake switch Defective wiring (Cruise control module — Brake switch — GND)	Inspect brake switch Repair wiring harness
Shift transaxle to P or N range	35	P OR N RANGE—SHIFT	Defective transaxle range switch Defective wiring (Cruise control module — Transaxle range switch)	Inspect transaxle range switch Repair wiring harness
Drive vehicle above 40 km/h {25 MPH}	37	VEHICLE SPEED—ABOVE 40 km/h (25 MPH)	Defective vehicle speedometer sensor or speedometer Defective wiring (Cruise control module — Speedometer — Vehicle speedometer sensor)	Inspect vehicle speedometer sensor Inspect speedometer Repair wiring harness

3ZE0TX-116

CRUISE CONTROL MODULE

Removal / Installation

1. Remove the scuff plate and front side trim. (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.
4. Carry out on-board diagnosis inspection. (Refer to page T–79.)



3ZE0TX–117

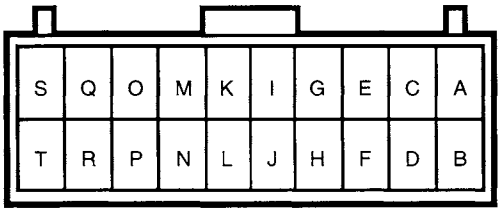
1. Nut
2. ABS/TCS control module
   Service ..... section P
3. Cruise control module connector
4. Nut
5. Cruise control module
   Inspection ..... page T–86

Inspection

Terminal voltage list (Reference)

1. Measure the voltage at the cruise control module terminals as indicated below.
2. If not as specified, replace the cruise control module.
   (Refer to page T–85.)

B+: Battery positive voltage

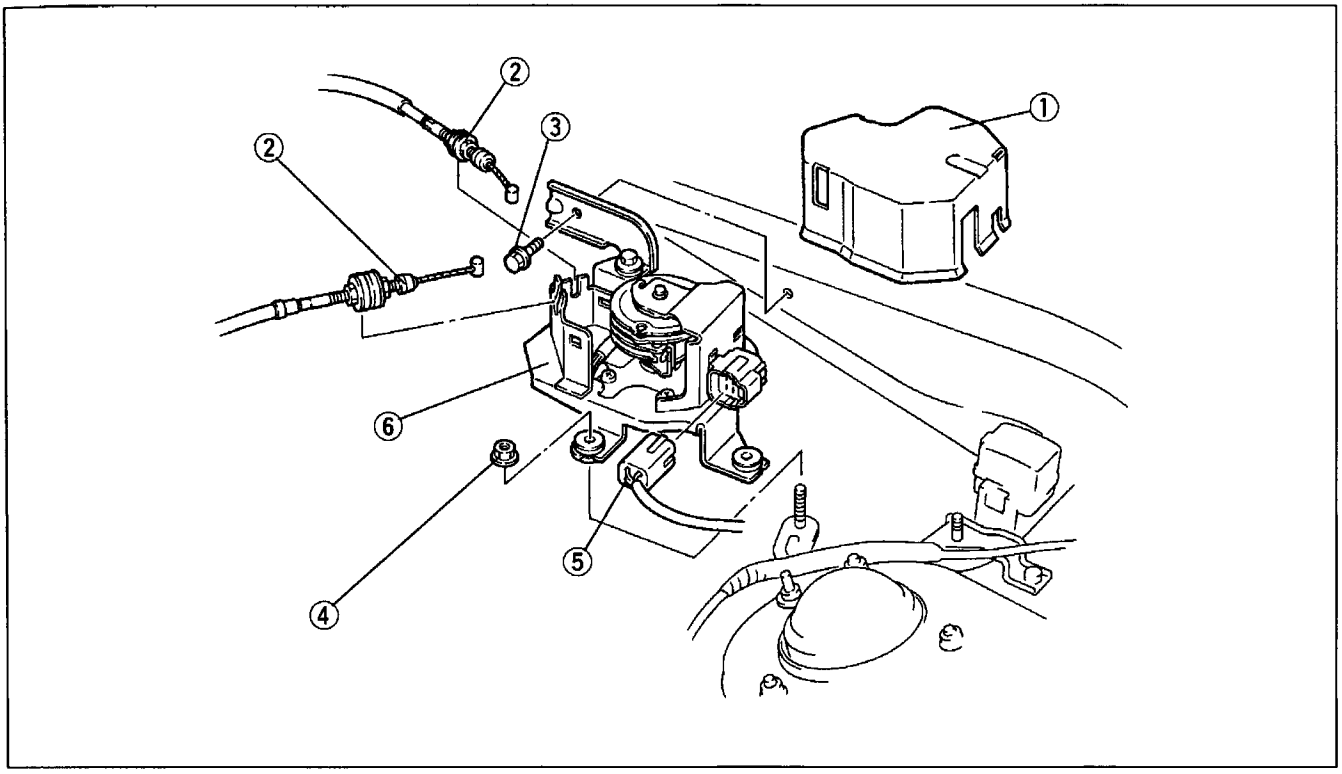


Terminal	Connection	Test condition		Voltage
A	Cruise actuator (motor)	Ignition switch: ON		0 V
		Ignition switch and cruise control main switch: ON		B+
B	Cruise actuator (motor)	Ignition switch: ON		0 V
		Ignition switch and cruise control main switch: ON		B+
C	Cruise actuator (clutch)	Ignition switch: ON		0 V
		Ignition switch and cruise control main switch: ON		B+
D	Instrument cluster (cruise set indicator light)	Ignition switch and cruise control main switch: ON		B+
		CRUISE set indicator light illuminated		0 V
E	Cruise control main switch (OFF side)	Ignition switch: ON	Cruise control main switch off side pushed	0 V
			Other	B+
F	Cruise control main switch (ON side)	Ignition switch: ON	Cruise control main switch: ON	B+
			Cruise control main switch: OFF	0 V
G	PCM (KL), TCM (KJ)	Ignition switch: ON		B+
H	Brake switch	Ignition switch at ON and cruise control main switch on	Release brake pedal	B+
			Depress brake pedal	B+
I	Data link connector	—		—
J	Transaxle range switch	Park/neutral position		0 V
		Other		B+
K	—	—		—
L	—	—		—
M	Brake switch	Brake pedal depressed		B+
		Other		0 V
N	Cruise control switch	Ignition switch and cruise control main switch: ON		5 V
		Ignition switch and cruise control main switch: ON	SET/COAST switch pushed	2 V
			RESUME/ACCEL switch pushed	3 V
			CANCEL switch pushed	0 V
O	Cruise actuator (clutch)	Ignition switch at ON and cruise control main switch on	Release brake pedal	B+
			Depress brake pedal	0 V
P	Instrument cluster (vehicle speedometer sensor)	Front tires rotating		0—5 V
Q	—	—		—
R	—	—		—
S	—	—		—
T	GND	Constant		0 V

CRUISE ACTUATOR

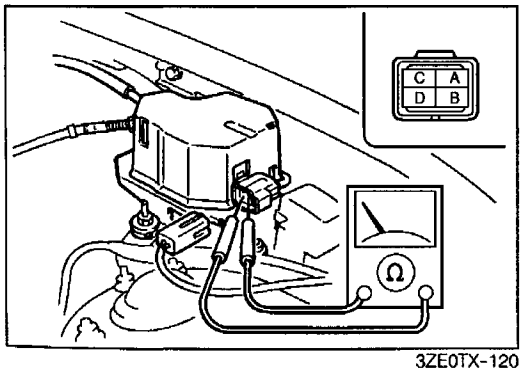
Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.
3. Adjust the actuator cable.
   (Refer to page T–88.)

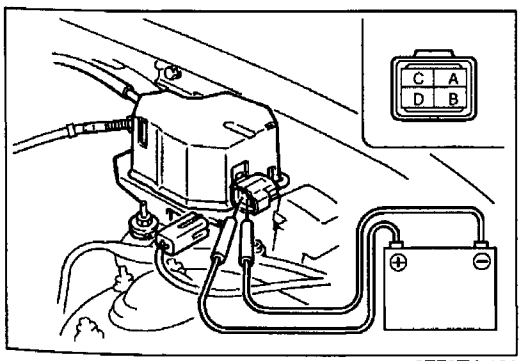


3ZE0TX–119

1. Actuator cover
2. Actuator cable
3. Bolt
4. Nut
5. Cruise actuator connector
6. Cruise actuator



3ZE0TX-120



3ZE0TX-121

Inspection

1. Disconnect the cruise actuator connector.
2. Measure the resistance between the actuator terminals.

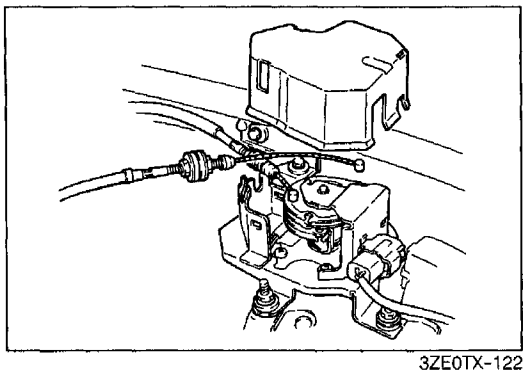
Terminal	Resistance
A—C	14.4 Ω
B—D	5—30 Ω

3. Connect battery positive voltage and verify the operation of the actuator cable as indicated below.

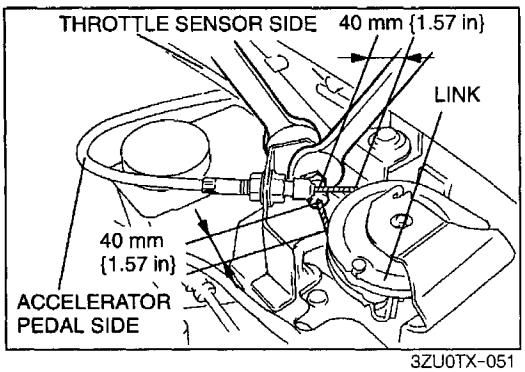
B+: Battery positive voltage

Step	Terminal connection				Actuator cable operation
	D	B	A	C	
1	GND	B+	GND	B+	Pull
2	GND	GND	GND	B+	Hold
3	B+	GND	GND	B+	Extend
4	—	—	—	—	Released

4. If not as specified, replace the cruise actuator.



3ZE0TX-122



3ZU0TX-051

ACTUATOR CABLE

Removal / Installation

1. Disconnect the actuator cable from the accelerator pedal.
2. Remove the clamp at the inside of the link.
3. Disconnect the actuator cable from the cruise actuator.
4. Remove the clamp and the actuator cable.
5. Install in the reverse order of removal.

Adjustment

1. Adjust the actuator cable as shown so that 40 mm {1.57 in} remains between the rubber bushing and the link on both the accelerator pedal side and throttle sensor side.
2. Adjust the nut so that actuator cable free play on the accelerator pedal side is 0.
3. Adjust the free play on the throttle sensor side. (Refer to sections F1 and F2.)

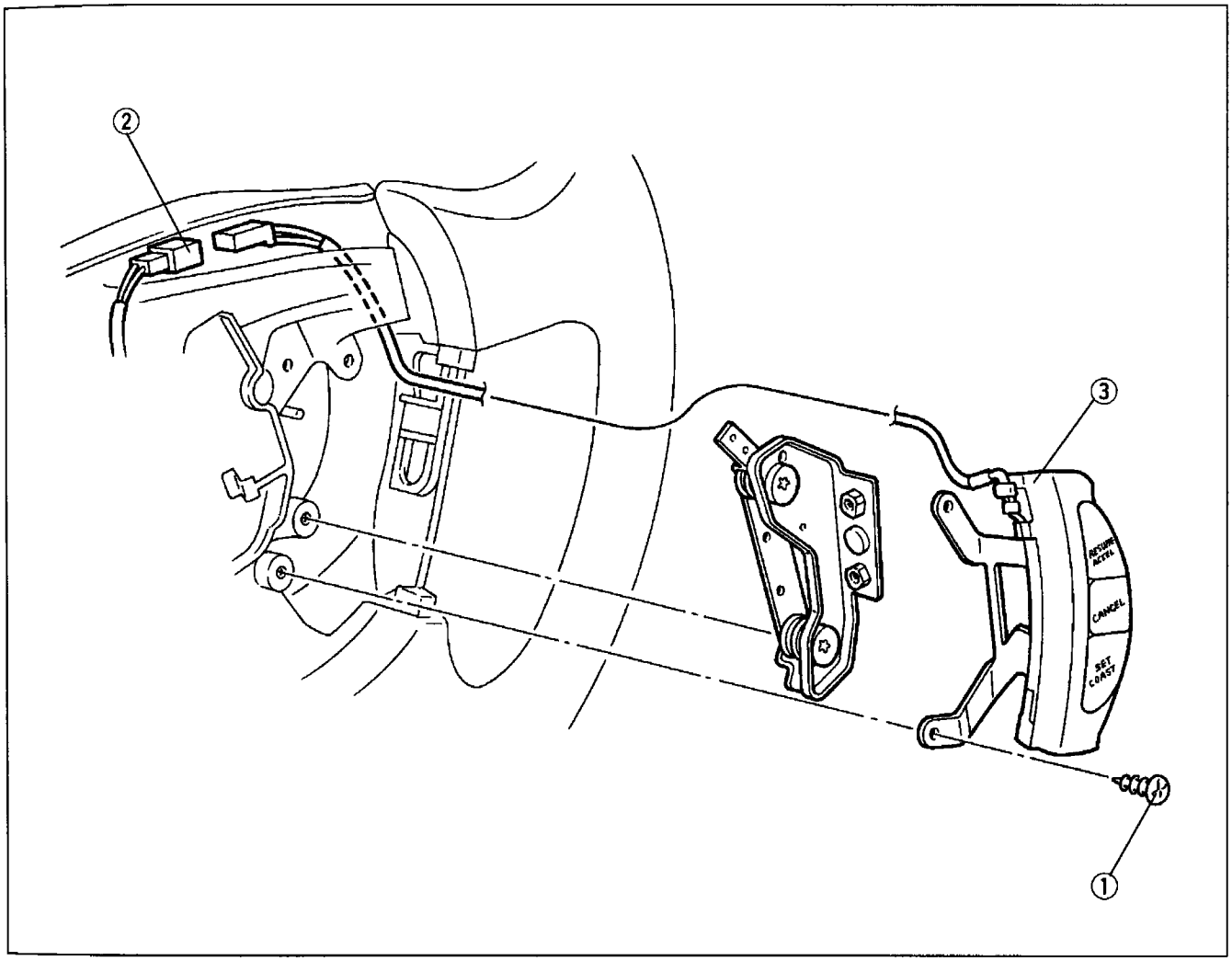
CRUISE CONTROL SWITCH

Warning

- **Handling the air bag module improperly can accidently deploy the air bag, which may seriously injure you. Read SERVICE WARNINGS, page T–92, before handling the air bag module.**

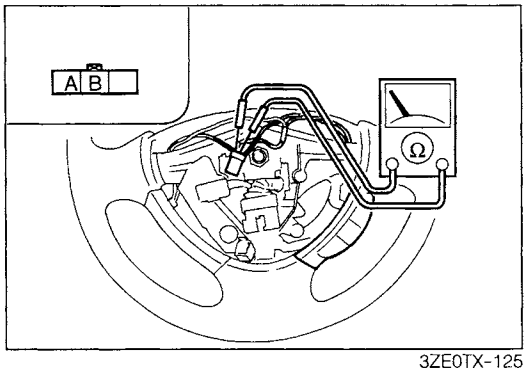
Removal / Installation

1. Remove the driver-side air bag module. (Refer to page T–102.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.

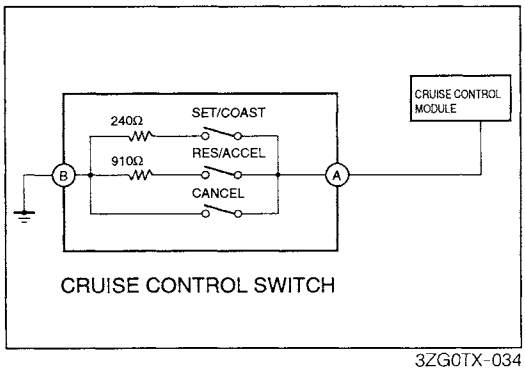


3ZU0TX–059

1. Screw
2. Cruise control switch connector
3. Cruise control switch
   Inspection ..... page T–90



3ZE0TX-125



3ZG0TX-034

Inspection

1. Check for continuity between the switch terminals.

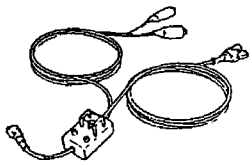
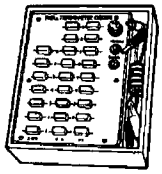
○—○: Continuity ○WW○: Resistance

Terminal / Switch position	A	B
SET/COAST	○—WW—	—○ 240 Ω
RES/ACCEL	○—WW—	—○ 910 Ω
CANCEL	○	○

2. If not as specified, replace the cruise control switch. (Refer to page T–89.)

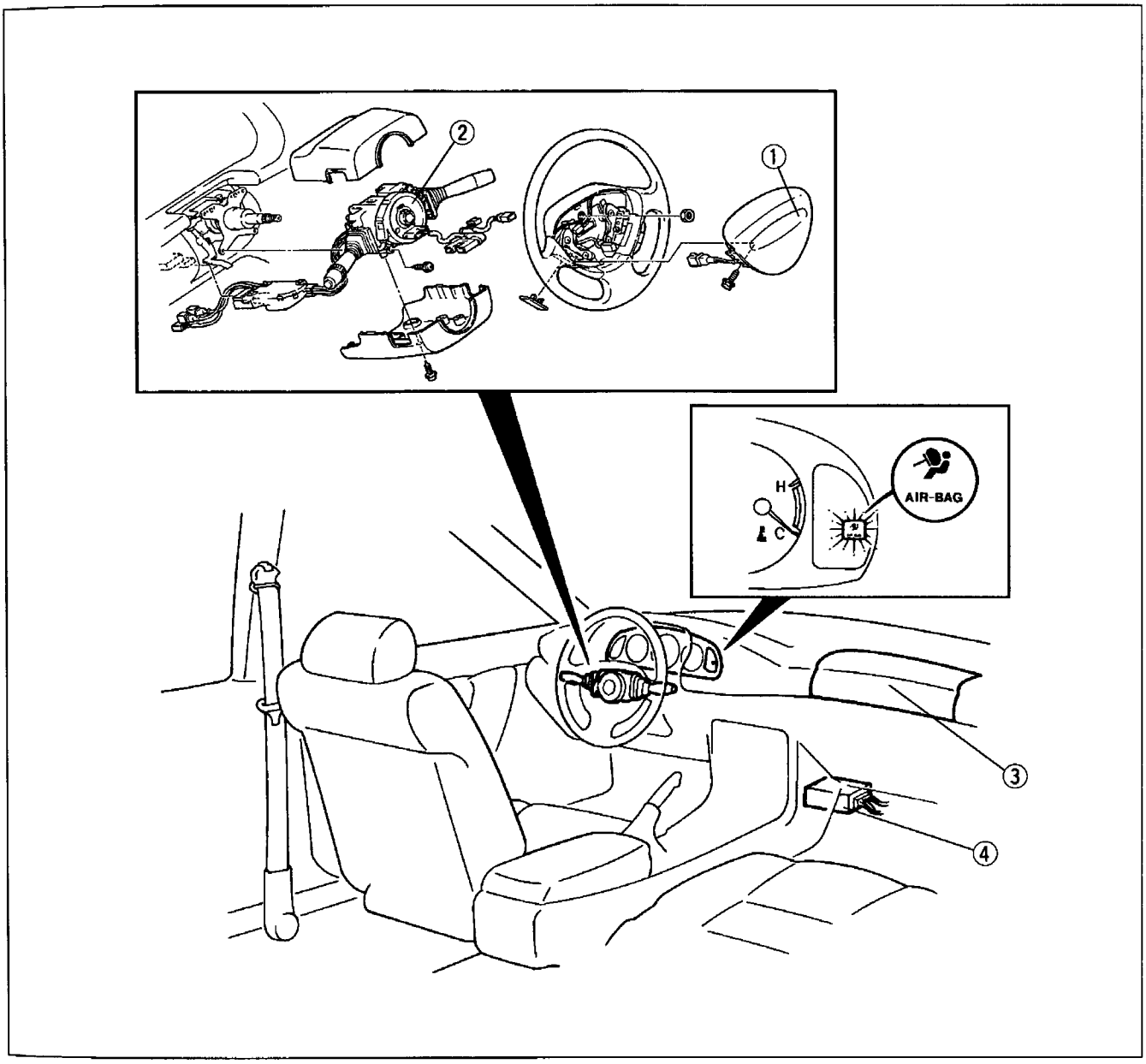
AIR BAG SYSTEM

PREPARATION
SST

49 H066 002 Deployment tool 	For disposal of air bag module	49 0839 285 Checker, fuel thermometer 	For inspection of air bag system

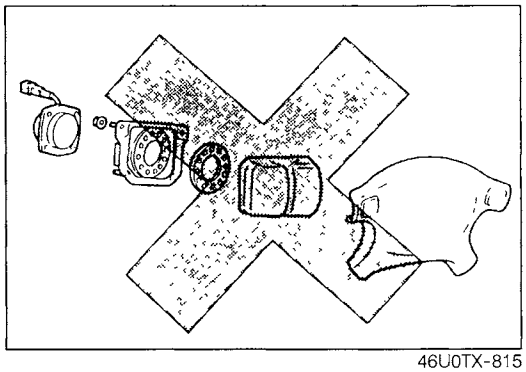
3ZE0TX–223

STRUCTURAL VIEW



3ZE0TX–143

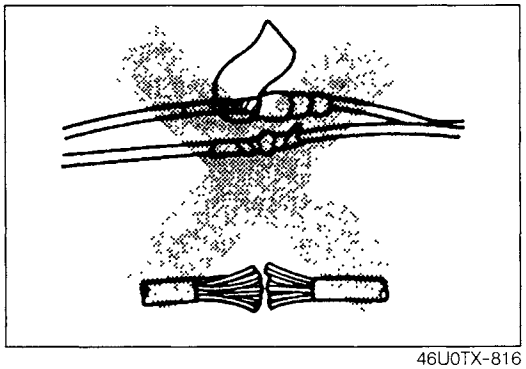
1. Driver-side air bag module
   - Removal / Installation ..... page T–102
   - Disposal procedure ..... page T–107
2. Clock spring
   - Inspection ..... page T– 28
3. Passenger-side air bag module
   - Removal / Installation ..... page T–104
   - Disposal procedure ..... page T–107
4. SAS unit
   - Removal / Installation ..... page T–105


46U0TX-815

SERVICE WARNINGS

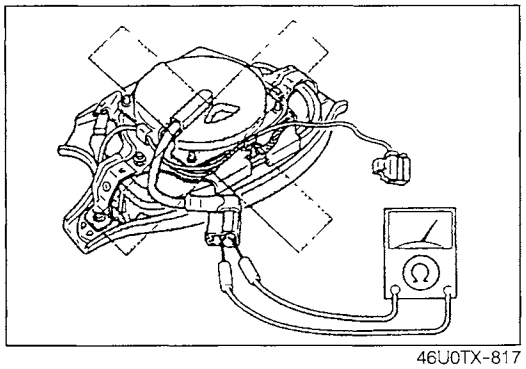
Component Disassembly

- **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.**


46U0TX-816

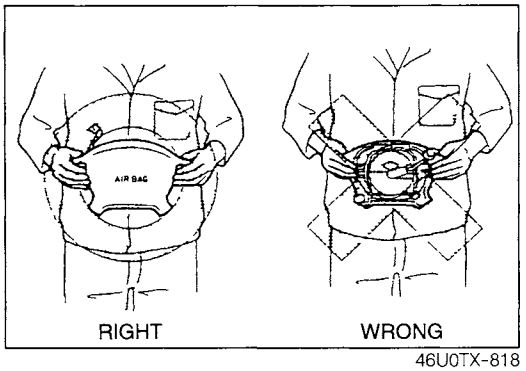
Wiring Harness Repair

- **Incorrectly repairing an air bag system wiring harness can accidently deploy the air bag, which can cause serious injury. If a problem is found in the system wiring, replace the wiring harness. Do not try to repair it.**


46U0TX-817

Air Bag Module Inspection

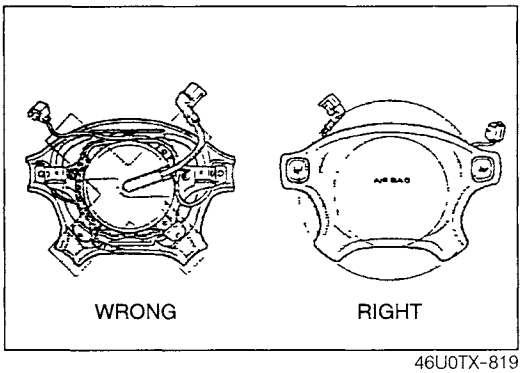
- **Inspecting the air bag module with an ohmmeter can deploy the air bag, which can cause serious injury. Do not use an ohmmeter to inspect the air bag module.**



46U0TX-818

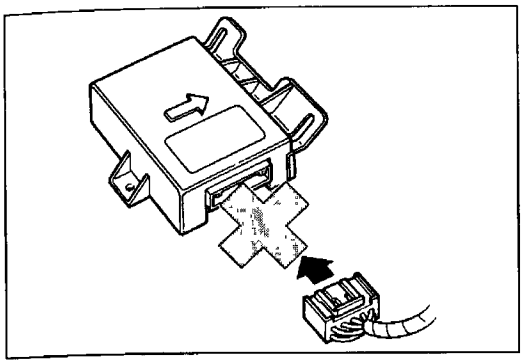
Air Bag Module Handling

- **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 lessen the chance of injury in case it deploys.**



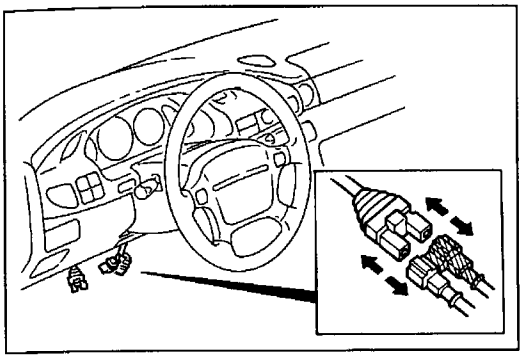
46U0TX-819

- **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

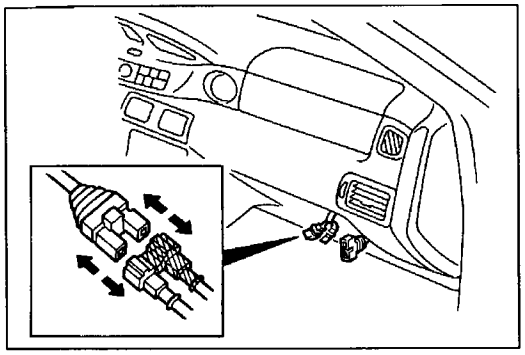
- **Installing a connected SAS unit is dangerous. Movement generated during installation can cause the crash sensor inside the unit to send an electrical signal to the air bag modules. This will deploy the air bags, which may result in serious injury. Therefore, before connecting the SAS unit, firmly mount the unit to the vehicle.**

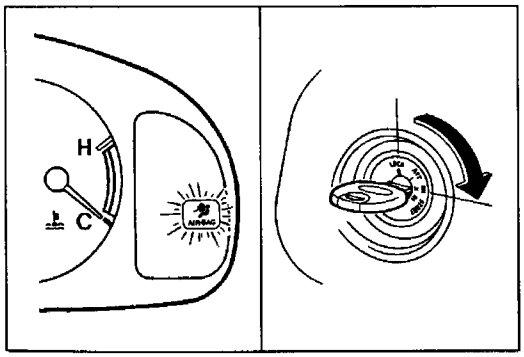


GENERAL PROCEDURES

Before Servicing

1. Deactivate the audio antitheft system, it installed. (Refer to page T–63.)
2. Turn the ignition switch to LOCK.
3. Disconnect the negative battery cable and wait for more than one minute to allow the backup power supply to deplete its stored power.
4. Remove the drive-side undercover and lower panel. (Refer to section S.)
5. Disconnect the orange and blue clock spring connectors.
6. Remove the glove compartment. (Refer to section S.)
7. Disconnect the orange and blue passenger-side air bag module connectors.





After Servicing

1. Connect the negative battery cable.
2. Turn the ignition switch to ON.
3. Verify that air bag system warning light illuminates for 4–8 seconds and then goes off.

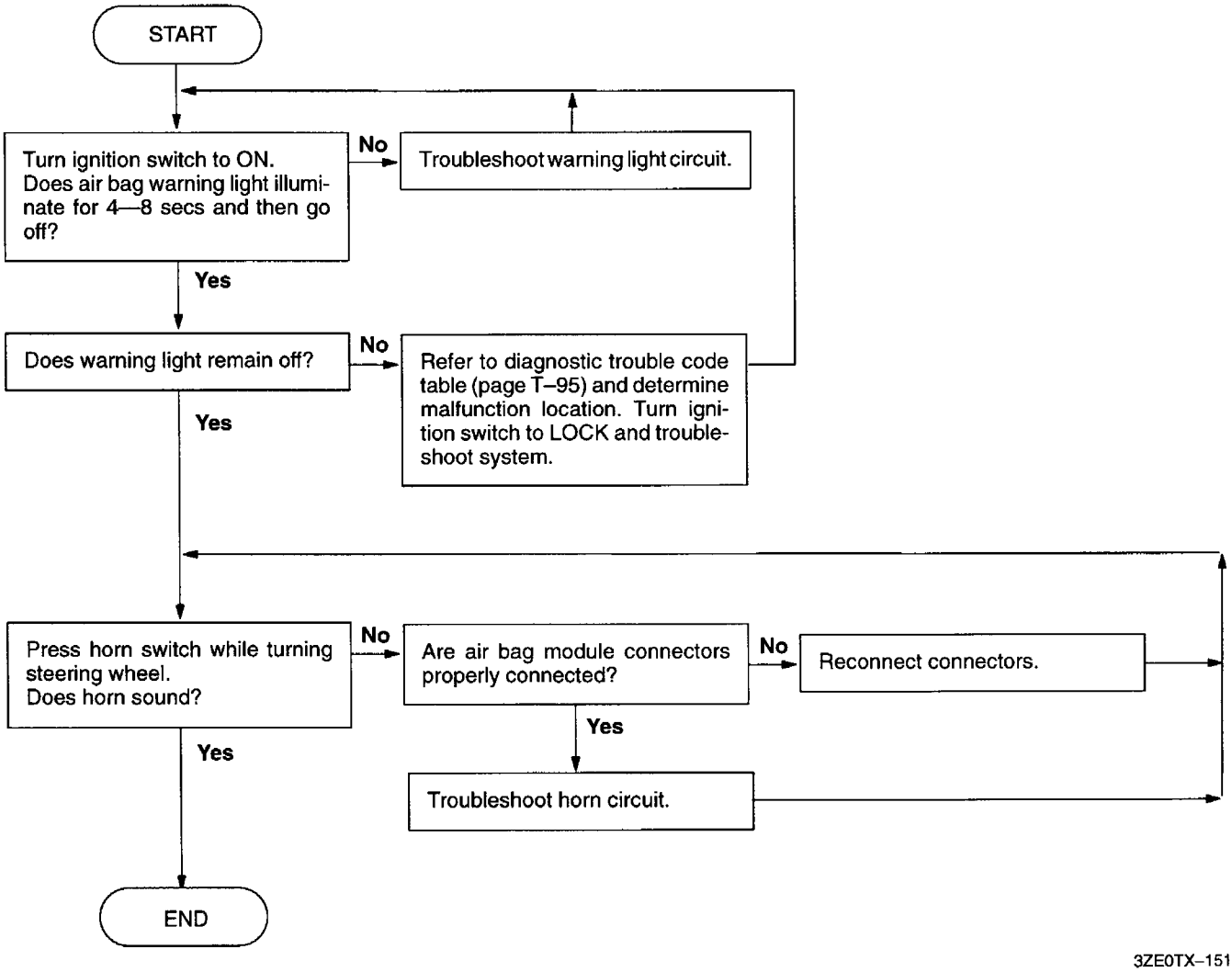
TROUBLESHOOTING

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.

3ZE0TX-150

Flowchart



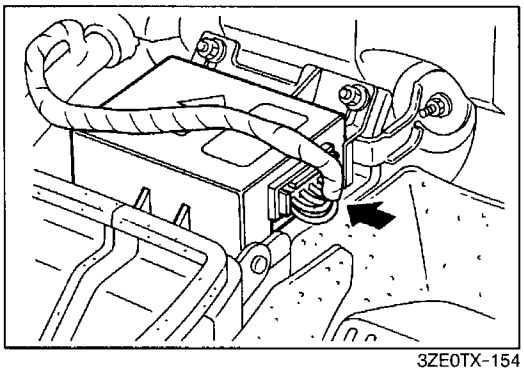
3ZE0TX-151

Diagnostic Trouble Code Table

Priority	Code No.	Warning light indication	Malfunction location	Inspection area	Refer to page
1	0	Remains on	SAS unit	• SAS unit connector	T–96
2	3		Battery	• Battery • Wiring harness (Battery—ENGINE 10 A fuse —SAS unit, Battery—METER 15 A fuse—SAS unit)	T–97
3	6		Driver-side air bag module	• Driver-side air bag module • Clock spring • Wiring harness (Clock spring—SAS unit)	T–98
4	7		Passenger-side air bag module	• Passenger-side air bag module • Wiring harness (Passenger-side air bag module—SAS unit)	T–100

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


3ZE0TX-154

Remedy

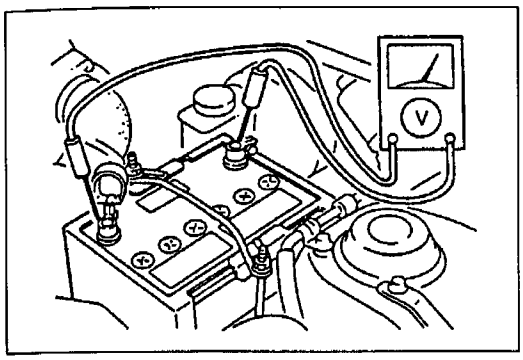
Warning
- **Handling the SAS unit improperly can accidently deploy the air bags, which may seriously injure you. Read SERVICE WARNINGS, page T–92, before handling the SAS unit.**

1. Carry out the "Before Servicing" procedure under GENERAL PROCEDURES, page T–93.
2. Check the SAS unit connection.

Connection	Action
OK	Replace SAS unit (Refer to page T–105)
Loose	Reconnect connector

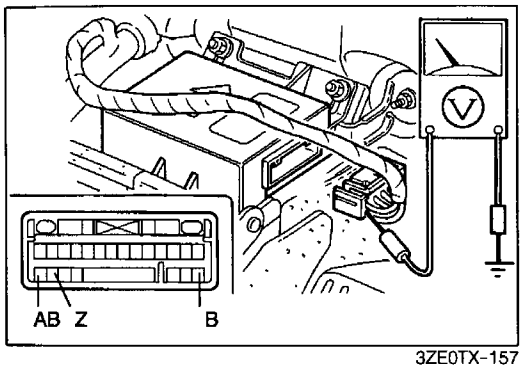
Flowchart No.2	Symptom	Diagnostic trouble code 3

Possible cause
- Weak battery
- Open or short circuit in wiring harness
- 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 weak Check charge/discharge system (Refer to section G)



3ZE0TX-157

Step 2

Warning
- **Handling the SAS unit improperly can accidently deploy the air bags, which may seriously injure you. Read SERVICE WARNINGS, page T–92, before handling the SAS unit.**

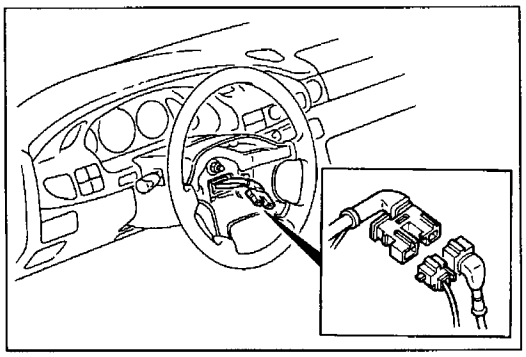
1. Carry out the "Before Servicing" procedure under GENERAL PROCEDURES, page T–93.
2. Disconnect the SAS unit connector.
3. Connect the negative battery cable.
4. Turn the ignition switch to ON.
5. Measure the voltage at the terminals of the SAS unit connector.

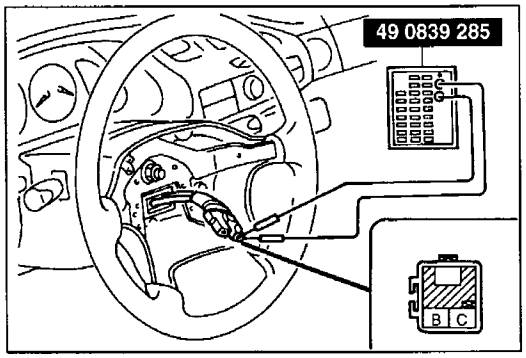
Terminal	Voltage	Action
B (B/W) Z (B/W)	More than 8 V	Measure voltage at terminal AB
	Less than 8 V	Repair wiring harness (Battery — ENGINE 10 A fuse — SAS unit)
AB (B/Y)	More than 8 V	Replace SAS unit (Refer to page T–105)
	Less than 8 V	Repair wiring harness (Battery — METER 15 A fuse — SAS unit)

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 T–92, before handling the air bag module and SAS unit.**



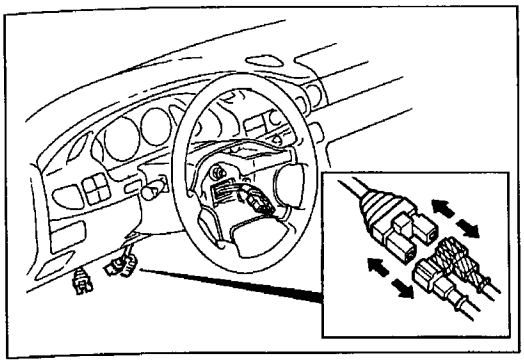


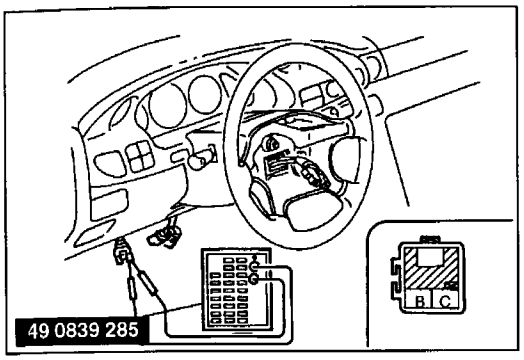
Step 1
1. Carry out the "Before Servicing" procedure under GENERAL PROCEDURES, page T–93.
2. Remove the driver-side air bag module. (Refer to page T–102.)
3. Check the pin of the driver-side air bag module connector.

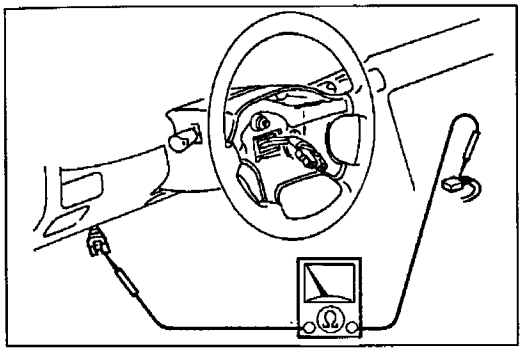
Pin	Action
OK	Go to Step 2
Broken	Replace combination switch (Refer to page T–26)

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 negative battery cable.
4. Connect the clock spring connectors.
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–102)







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. Check the pin of the clock spring connector.

Pin	Action
OK	Go to Step 4
Broken	Replace dash harness

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.

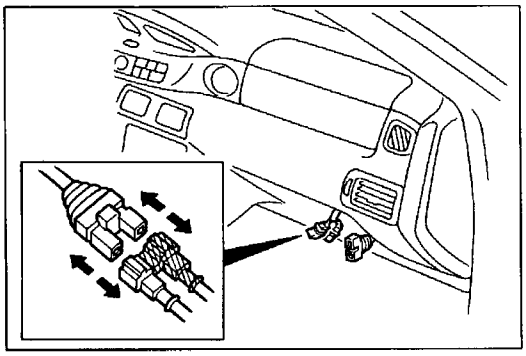
Diagnostic trouble code	Action
6	Go to Step 5
Other	Replace combination switch (Refer to page T–26)

Step 5
1. Turn the ignition switch to LOCK.
2. Disconnect the nagative battery cable and wait for more than one minute to allow the backup power supply to deplete its stored power.
3. Disconnect the SAS unit connector.
4. 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
5. If the wiring harness is normal, replace the SAS unit. (Refer to page T–105.)
6. If the wiring harness is faulty, repair it. (SAS unit — Clock spring)

Flowchart No.4	Symptom	Diagnostic trouble code 7

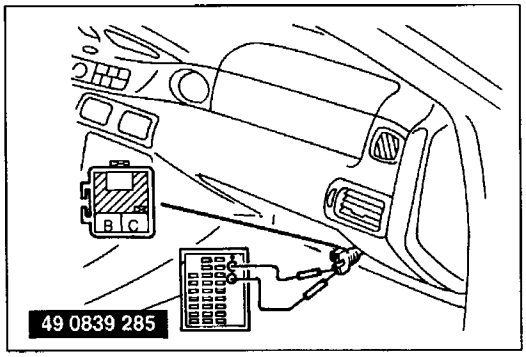
Possible cause
- Damaged passenger-side air bag module
- Damaged SAS unit
- Open or short circuit in wiring harness
- Poor connection of connector

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 T–92, before handling the air bag module and SAS unit.**



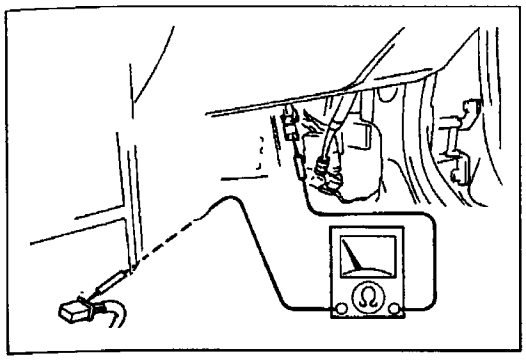
Step 1
1. Carry out the "Before Servicing" procedure under GENERAL PROCEDURES, page T–93.
2. Check the pin of the passenger-side air bag module connector.

Pin	Action
OK	Go to Step 2
Broken	Replace dash harness



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 orange and blue clock spring connectors.
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 T–104)



Step 3

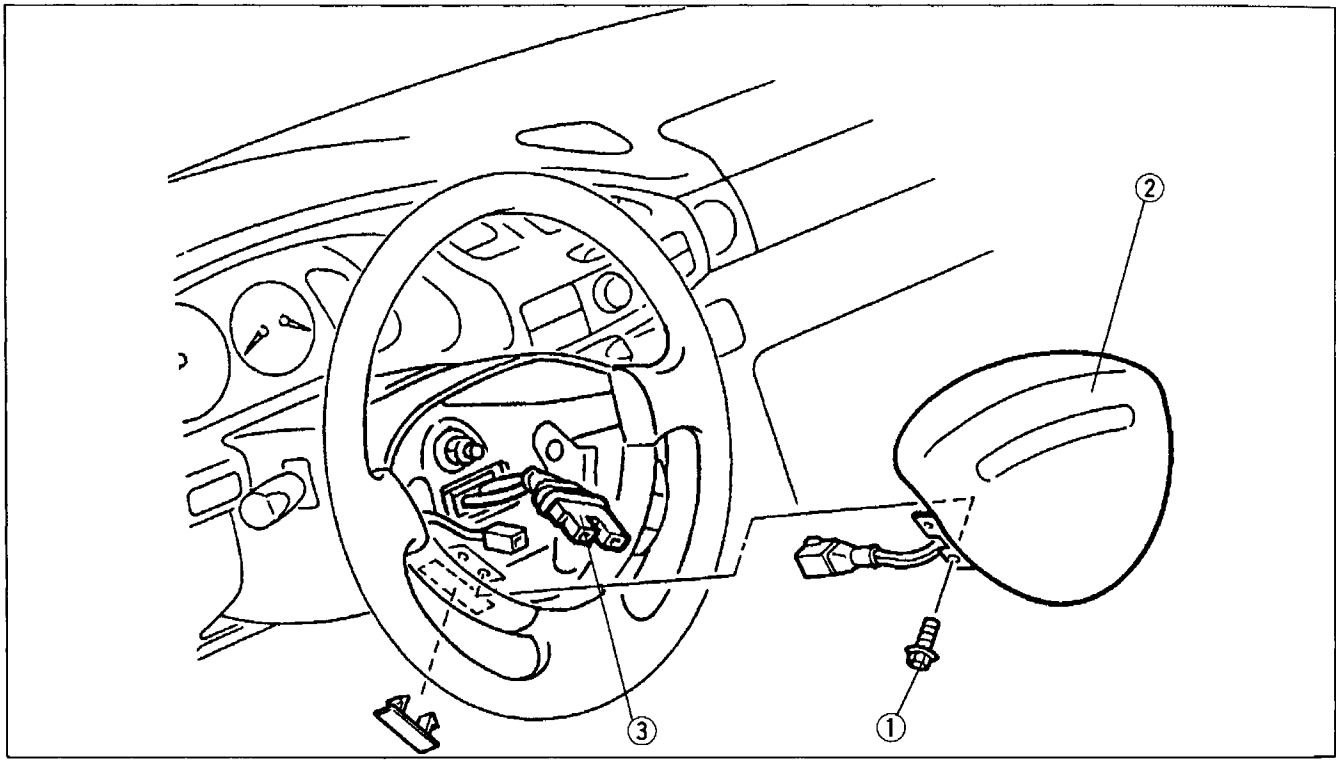
1. Turn the ignition switch to LOCK.
2. Disconnect the negative battery cable and wait for more than one minute to allow the backup power supply to deplete its stored power.
3. Disconnect the orange and blue clock spring connectors.
4. Disconnect the SAS unit connector.
5. Check the wiring harness between 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
6. If the wiring harness is normal, replace the SAS unit. (Refer to page T–105.)
7. If the wiring harness is faulty, repair it. (SAS unit — Passenger-side air bag module)

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 T–92, before handling the air bag module.**

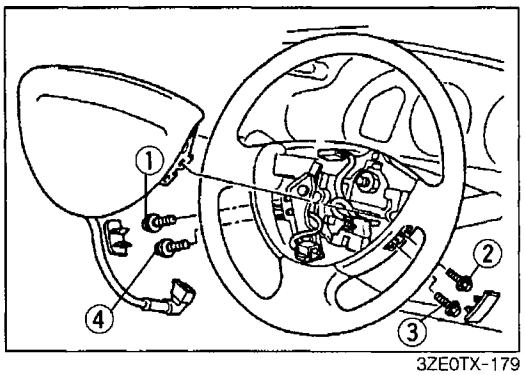
Warning
- **Installing the driver-side air bag module when a service code 6 is not indicated can accidently deploy, the air bag, which can cause serious injury. Carry out the proper troubleshooting procedures and verify that service code 6 is indicated before installing the driver-side air bag module.**

1. Carry out the "Before Servicing" procedure under GENERAL PROCEDURES, page T–93.
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 (Refer to page T–94) to verify that the air bag system is operating normally.



3ZE0TX–178

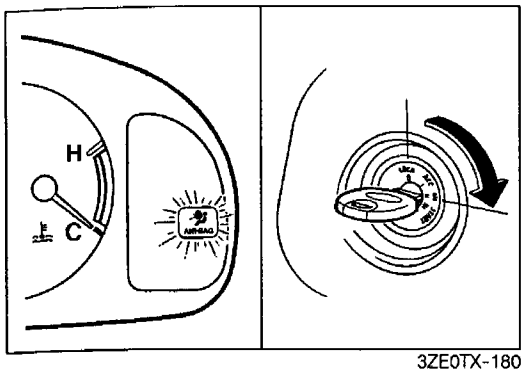
1. Bolt
   Installation note ..... below
2. Driver-side air bag module
   Installation note ..... page T–103
3. Connector



3ZE0TX–179

Installation note
Bolt
Tighten the bolts in the order shown in the figure.

Tightening torque:
8.9—12.7 N·m {90—130 kgf·cm, 79—112 in·lbf}



3ZE0TX-180

Driver-side air bag module

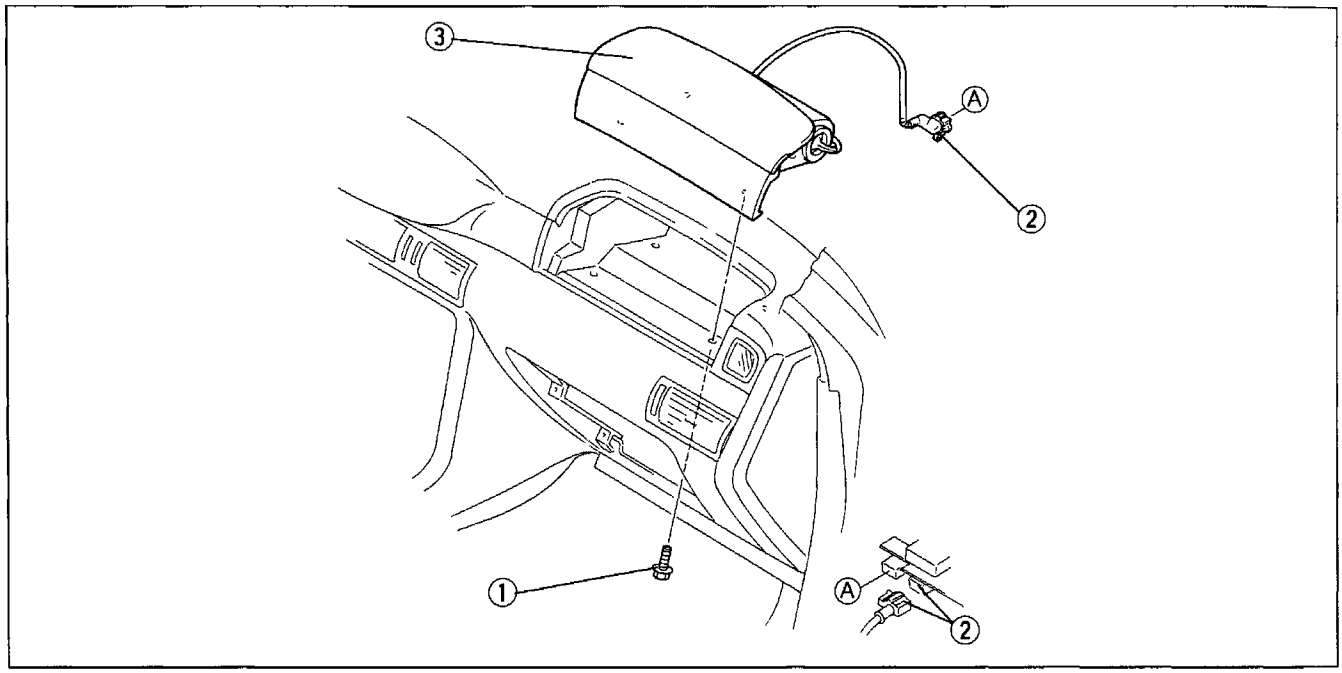
1. Connect the clock spring connector.
2. Connect the negative battery cable.
3. Turn the ignition switch to ON and verify that diagnostic trouble code 6 is set.
4. If another diagnostic trouble code is set, troubleshoot the system.
5. If diagnostic trouble code 6 is set, turn the ignition switch to LOCK and disconnect the negative battery cable.
6. Disconnect the clock spring connector.
7. Install the driver-side air bag module.

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 T–92, before handling the air bag module.**

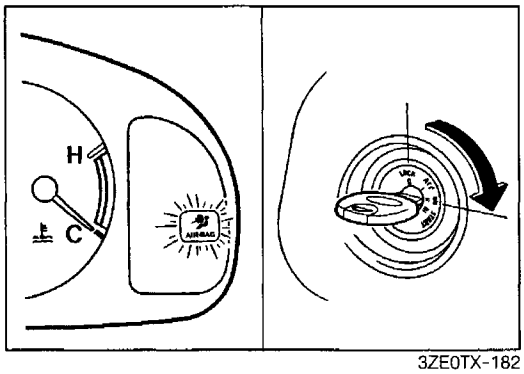
Warning
- **Installing the passenger-side air bag module when a service code 7 is not indicated can accidently deploy, the air bag, which can cause serious injury. Carry out the proper troubleshooting procedures and verify that service code 7 is indicated before installing the passenger-side air bag module.**

1. Carry out the "Before Servicing" procedure under GENERAL PROCEDURES, page T–93.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.
4. Follow the troubleshooting flowchart (Refer to page T–94.) to verify that the air bag system is operating normally.



3ZE0TX–181

1. Bolt
2. Connectors
3. Passenger-side air bag module
   Installation note ..... below



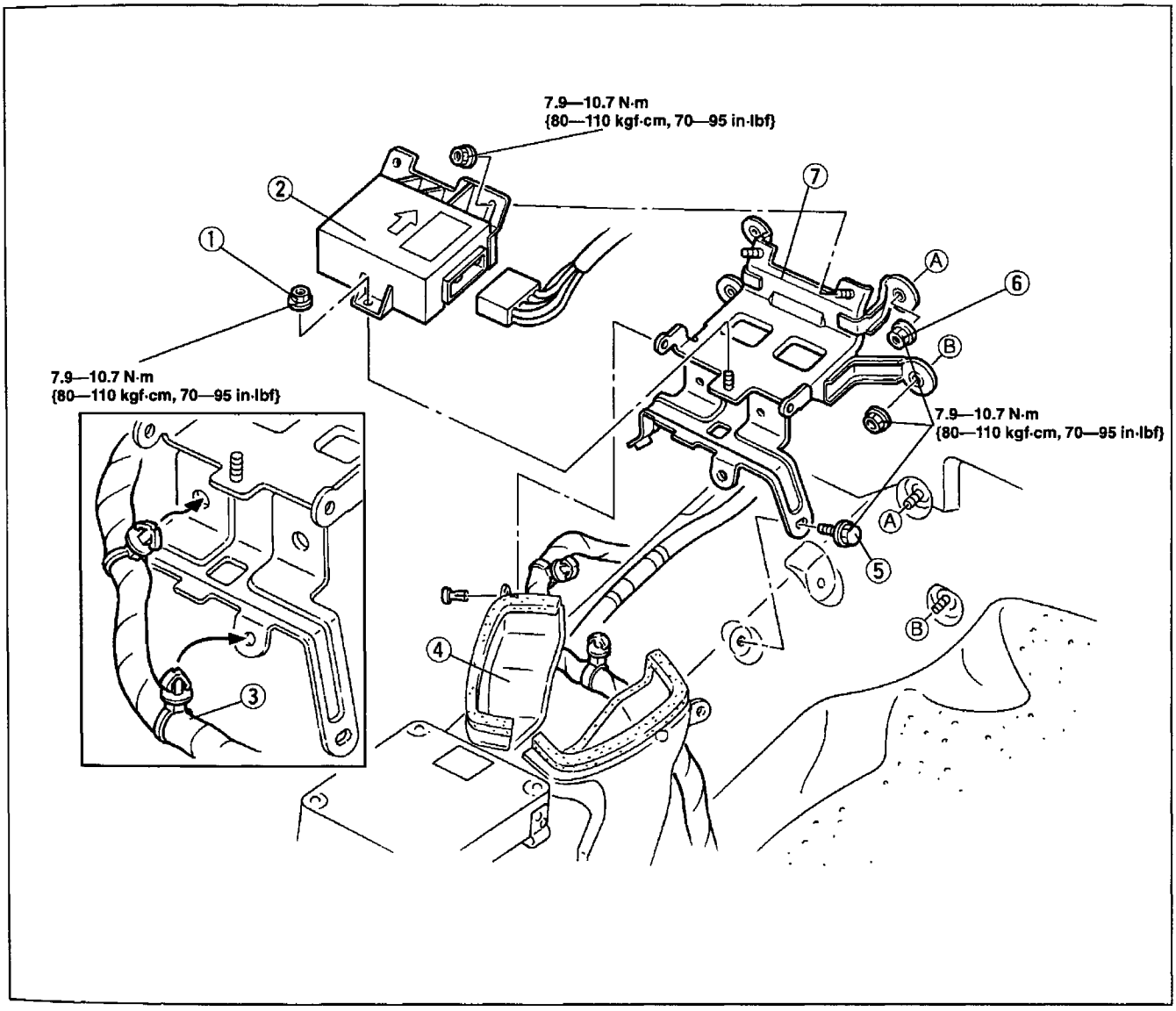
3ZE0TX-182

Installation note
Passenger-side air bag module
1. Connect the passenger-side air bag module connector.
2. Connect the negative battery cable.
3. Turn the ignition switch to ON and verify that diagnostic trouble code 7 is set.
4. If another diagnostic trouble code is set, troubleshoot the system.
5. If diagnostic trouble code 7 is set, turn the ignition switch to LOCK and disconnect the negative battery cable.
6. Disconnect the passenger-side air bag module connector.
7. Install the passenger-side air bag module.

SAS UNIT
Removal / Installation

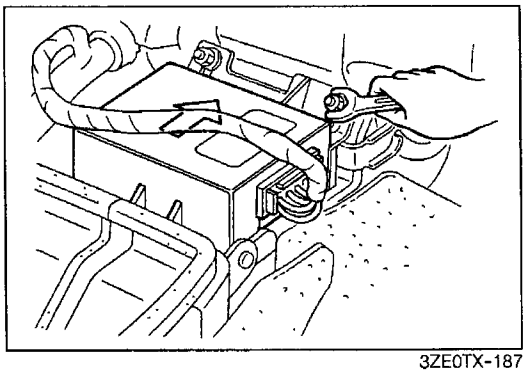
Warning
- **Handling the SAS unit improperly can accidently deploy the air bag, which may seriously injure you. Read SERVICE WARNINGS, page T–92, before handling the SAS unit.**

1. Carry out the "Before Servicing" procedure under GENERAL PROCEDURES, page T–93.
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.
5. Follow the troubleshooting flowchart (Refer to page T–94) to verify that the air bag system is operating normally.



3ZG0TX–055

1. Nut
2. SAS unit
   Installation note ..... page T–106
3. Wiring harness
4. Heater duct
5. Bolt
6. Nut
7. Bracket
   Installation note ..... page T–106



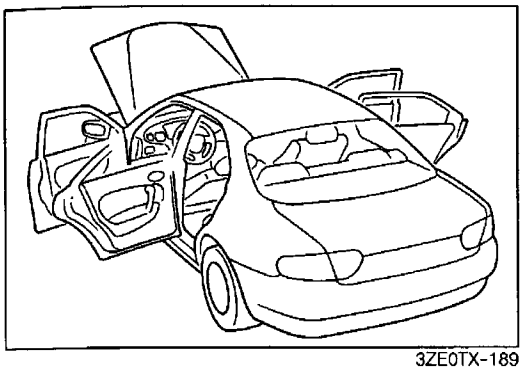
3ZE0TX-187

Installation note
SAS unit and bracket

1. If the bracket mounting area is damaged, repair the area to its original shape.
2. Position the SAS unit and bracket with the arrow on the SAS unit facing toward the front of vehicle. Install them and tighten the bolts and nuts to the specified torque.

AIR BAG MODULE DISPOSAL PROCEDURE

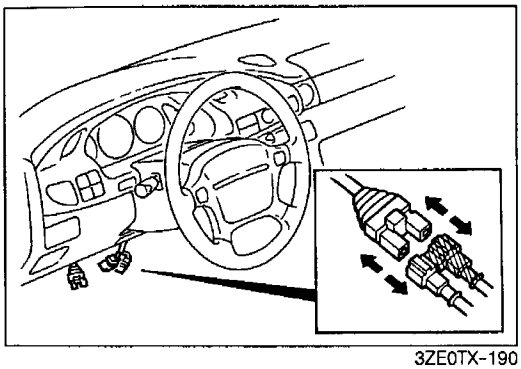
Before scrapping a vehicle with an undeployed air bag module, deploy the air bag. Never dispose of a live air bag module. If the **SST** (deployment tool) is not available, consult the nearest Mazda representative for assistance.



3ZE0TX-189

Air Bag Deployment

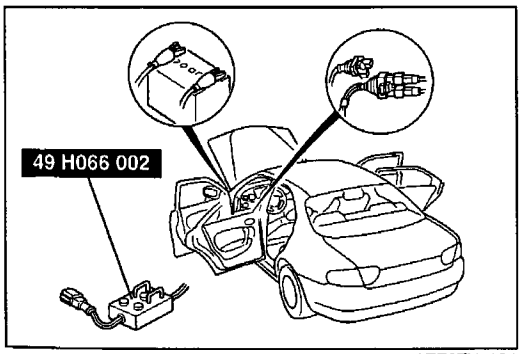
1. Move the vehicle to an open space, away from strong winds, and open all of the vehicle's doors.
2. Deactivate the audio antitheft system, if installed. (Refer to page T–63.)
3. Disconnect the negative battery cable and wait for more than one minute to allow the backup power supply to deplete its stored power.
4. Follow the appropriate procedure for the driver-side or passenger-side air bag module.



3ZE0TX-190

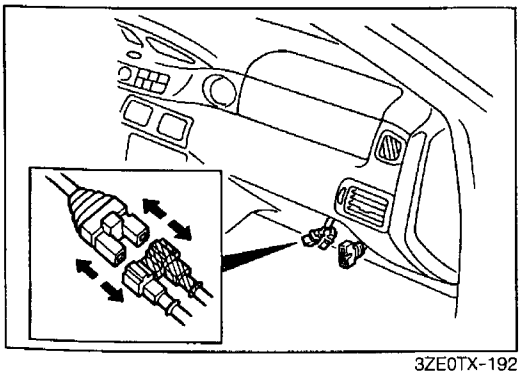
Driver-side air bag module

(1) Make sure the air bag module is firmly mounted to the steering wheel.
(2) Remove the drive-side undercover and lower panel. (Refer to section S.)
(3) Disconnect the orange and blue clock spring connectors.



3ZE0TX-191

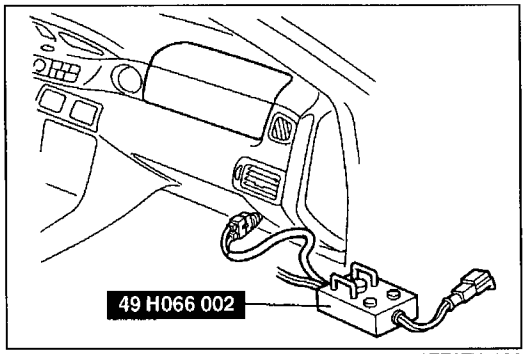
(4) Inspect the **SST**. (Refer to page T–109.)
(5) Connect the **SST** to the clock spring connector as shown in the figure.



3ZE0TX-192

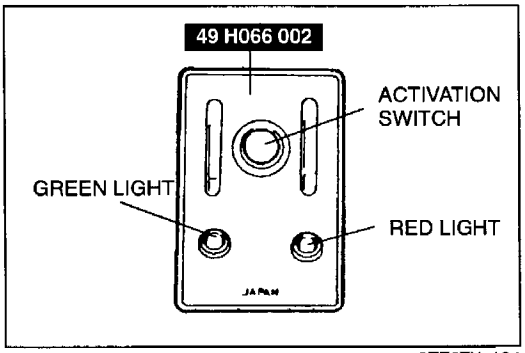
Passenger-side air bag module

(1) Remove the glove compartment. (Refer to section S.)
(2) Disconnect the orange and blue air bag module connectors.



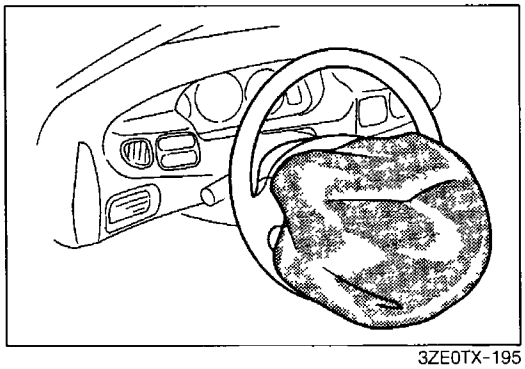
3ZE0TX-193

(3) Inspect the **SST**.
(Refer to page T–109.)
(4) Connect the **SST** to the air bag module.



3ZE0TX-194

5. Connect the red clip of the **SST** to the positive battery terminal and the black clip to the negative terminal.
6. Verify that the red light on the **SST** is illuminated.
7. Make sure all persons are standing at least **6 m {20 ft}** from the vehicle.
8. Press the activation switch on the **SST** to deploy the air bag.

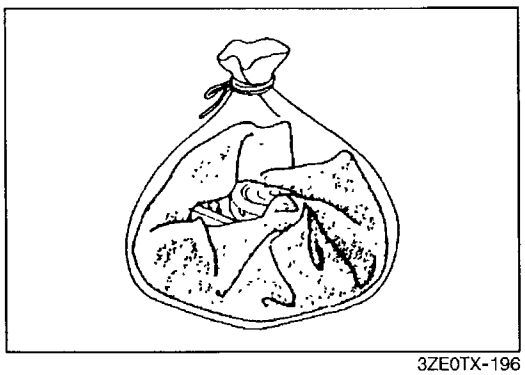

3ZE0TX-195

Air Bag Disposal

Warning
- **The air bag is very hot immediately after it deploys. You can 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.**

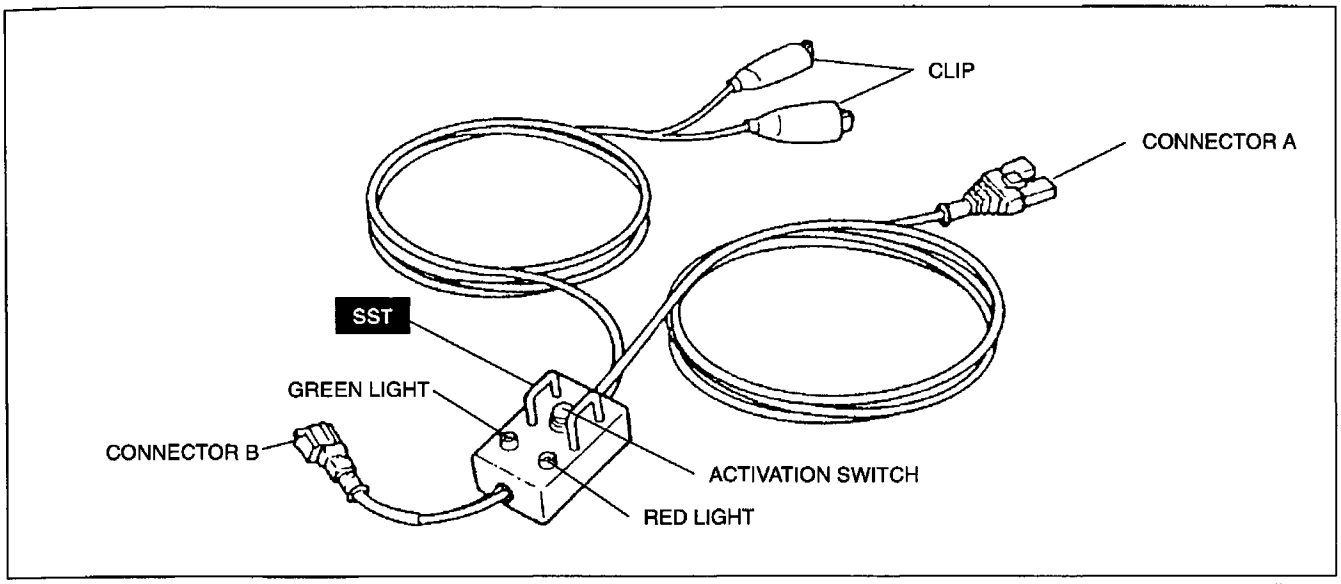
Warning
- **A deployed air bag module may contain deposits of sodium hydroxide, a caustic by-product of the gas-generated combustion. If this substance gets in your eyes or on your hands, it can cause irritation and itching. When handling a deployed air bag module, wear gloves and safety glasses.**


3ZE0TX-196

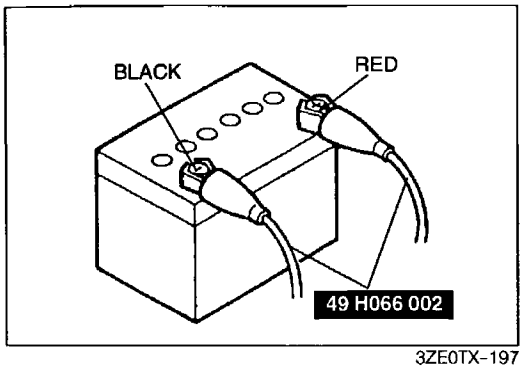
1. Put on gloves and safety glasses.
2. Place the deployed air bag module in a plastic bag, seal it, and then dispose of it.
3. Wash your hands after removing your gloves.

INSPECTION OF SST (DEPLOYMENT TOOL)

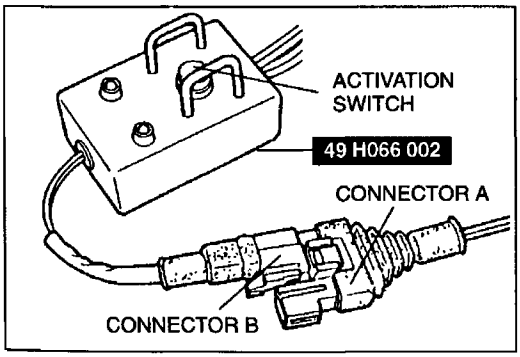
- Use the **SST** (deployment tool) to deploy a live air bag module before disposing of it.
- Before connecting the **SST** to the clock spring connector or air bag module connector, inspect the operation of the **SST**.

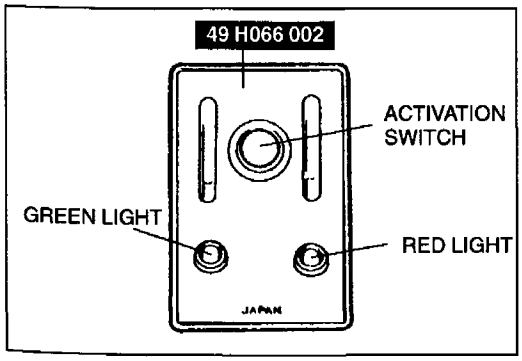


29U0TX-357



3ZE0TX-197





Inspection Procedure

1. Follow the steps below to verify that the **SST** is operating corectly.

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 module.

Before beginning any service procedure, refer to section T of this manual for air bag system service warnings and audio antitheft system alarm conditions.

HEATER AND AIR CONDITIONING 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 and cause abnormal A/C compressor vane noise. 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) (ATMOS GU10)	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 and cause abnormal A/C compressor vane noise. 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.

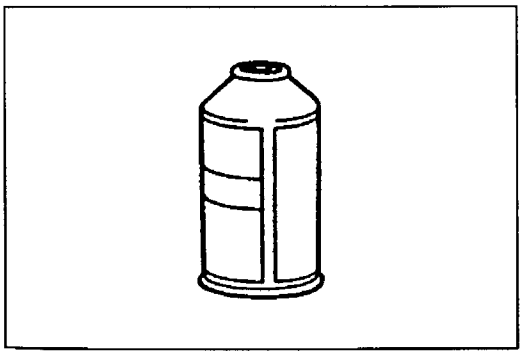
SERVICE WARNINGS

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.

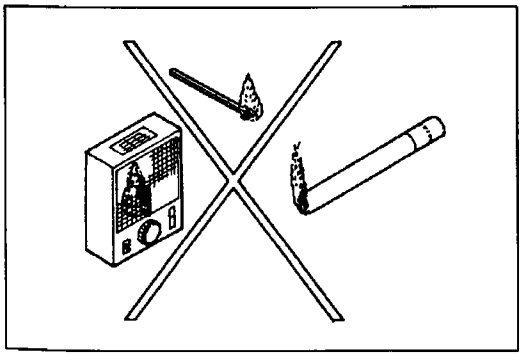
- **Checking for system leaks on a vehicle that has been serviced with flammable refrigerant, such as OZ-12, is dangerous. Conventional leak detectors use an electronically generated arc which can ignite the refrigerant, causing serious injury or death. If a flammable refrigerant has been used to service the system, or if you suspect a flammable refrigerant may have been used, contact the local fire marshall or EPA office for information on handling the refrigerant.**

U



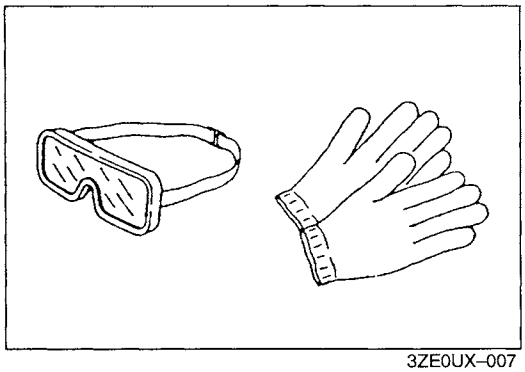
Storing Refrigerant

- **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}.**



Service Refrigerant System

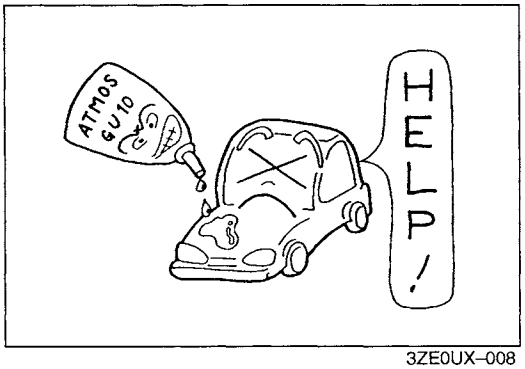
- **Do not allow the refrigerant to leak near fire or any kind of heat. A poisonous gas may be generated if the refrigerant gas contacts fire or heat such as from cigaretters and heaters.**
  When carrying out any operation that can cause refrigerant leakage, extinguish or remove the abovementioned heat sources and maintain adquate ventilation.



3ZE0UX-007

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.**

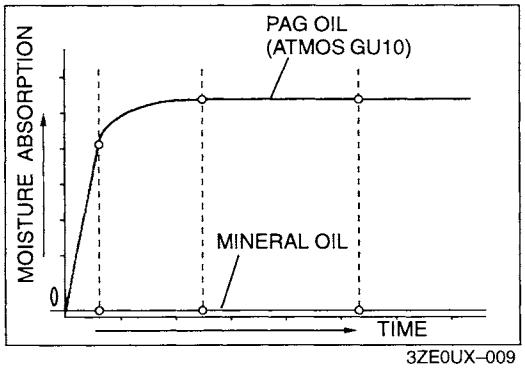


3ZE0UX-008

SERVICE CAUTIONS

Compressor Oil (ATMOS GU10)

- **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.**

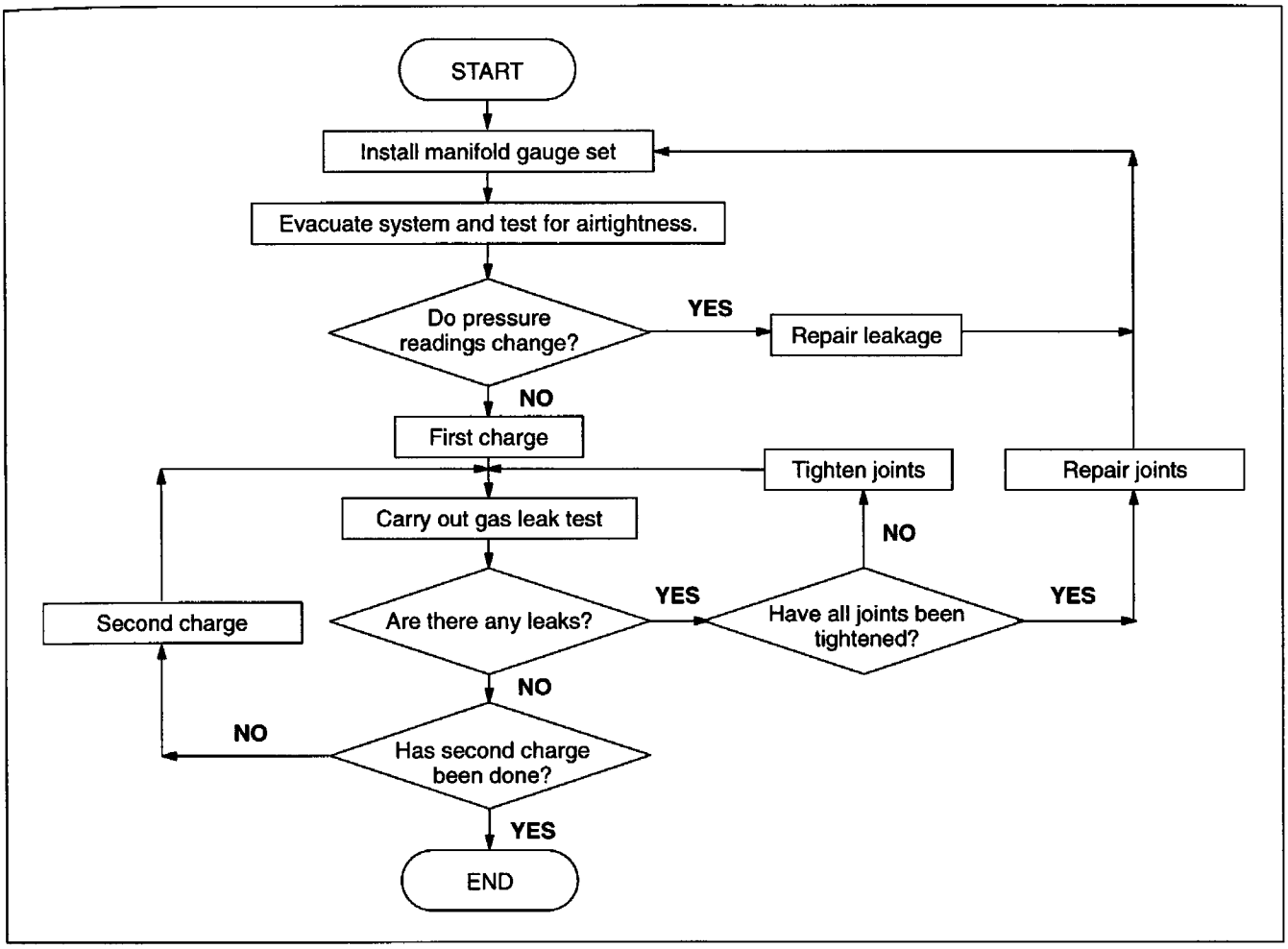


3ZE0UX-009

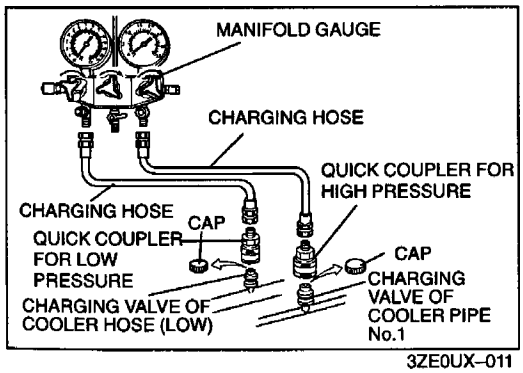
- **PAG compressor oil (ATMOS GU10) has a higher moisture absorption efficiency than the previously used mineral oil. If moisture mixes with the compressor oil, the refrigerant system could be damaged. Therefore, install caps immediately after using the compressor oil or removing refrigerant system parts to prevent moisture absorption.**

REFRIGERANT SYSTEM SERVICE PROCEDURES

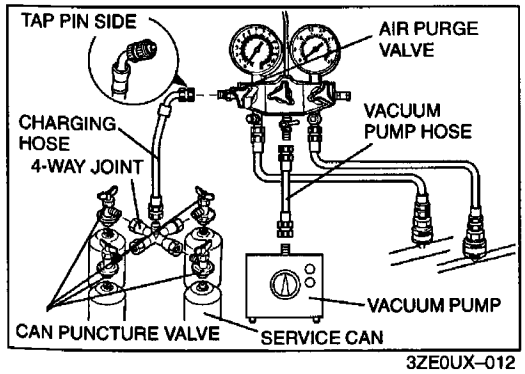
CHARGING PROCEDURE FLOW



3ZE0UX–011



3ZE0UX–011



3ZE0UX–012

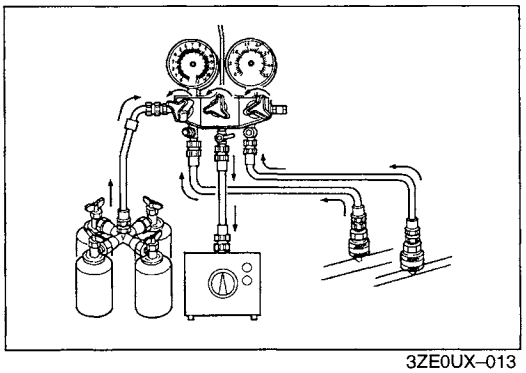
MANIFOLD GAUGE SET INSTALLATION

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 charging valves of cooler pipe No.1 and cooler hose (low).
5. Connect the quick couplers to the charging valves of cooler pipe No.1 and cooler hose (low).

CHARGING

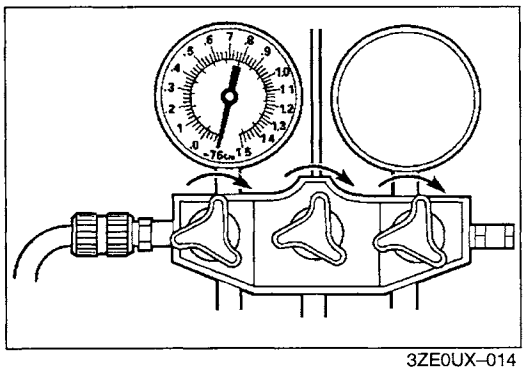
1. Install the manifold gauge set.
2. Connect the tap pin side of the charging hose to the air purge valve of the manifold gauge.
3. Connect the vacuum pump hose to the center joint of the manifold gauge.
4. Connect the vacuum pump hose to the vacuum pump.
5. Connect can puncture valves to a 4-way joint.
6. Fully open the can puncture valves and connect service cans to the valves.

Regular amount of refrigerant: 750 g {26.5 oz}



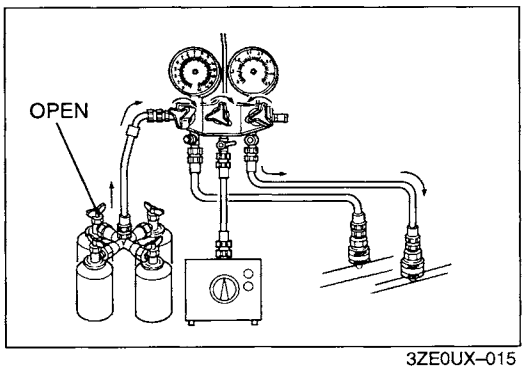
3ZE0UX–013

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**.



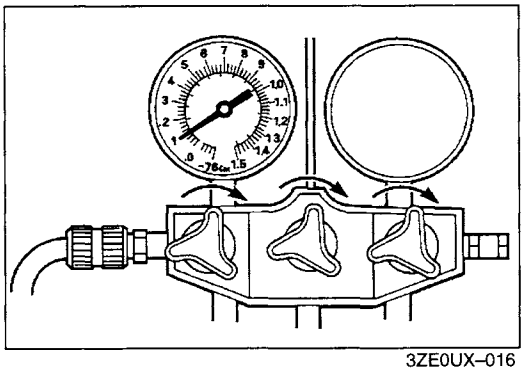
3ZE0UX–014

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 the reading has not changed, go to step 14.



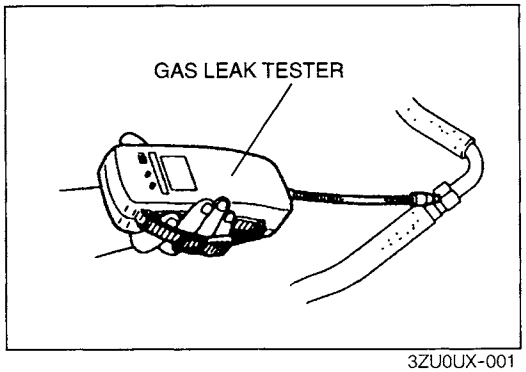
3ZE0UX–015

14. Open the service cans by using the can puncture valves.
15. Open the high-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}**.



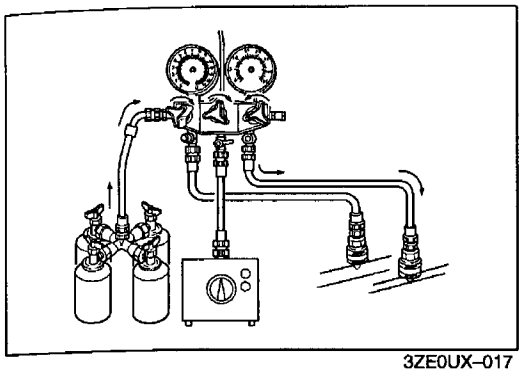
3ZE0UX–016

16. Close the high-pressure side valve of the manifold gauge.



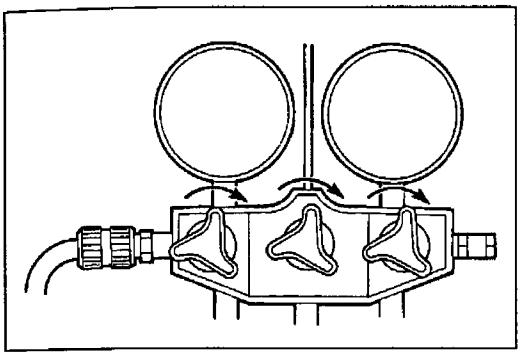
3ZU0UX-001

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.



3ZE0UX-017

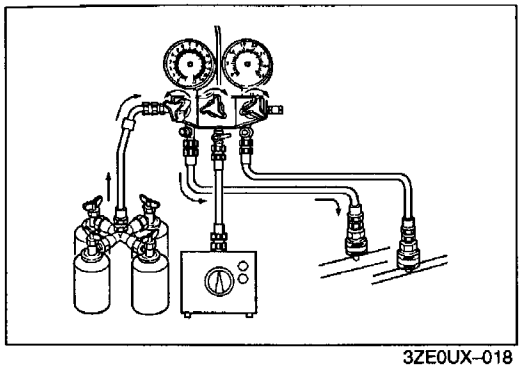
18. Open the high-pressure side valve of the manifold gauge and charge with half the regular amount of refrigerant.



19. Close the high-pressure side valve of the manifold gauge.

Warning

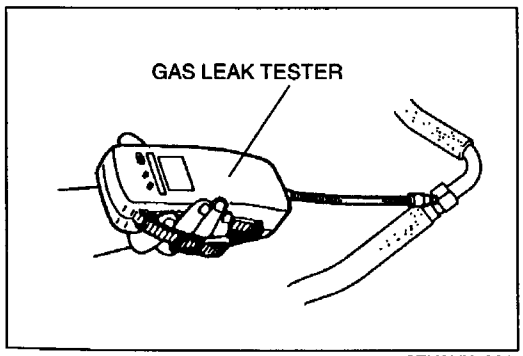
- **Running the engine with the high-pressure side valve open is dangerous. Pressure within the service cans will increase and the cans could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Therefore, do not open the high-pressure side valve while the engine is running.**



3ZE0UX-018

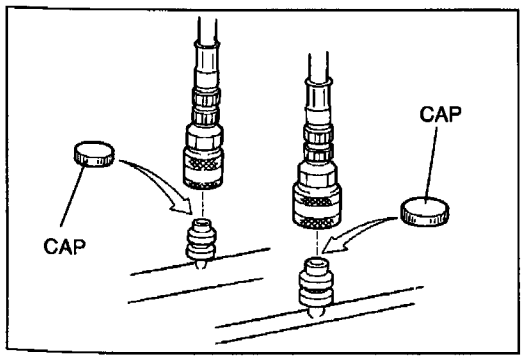
20. Start the engine and actuate the A/C compressor.
21. Open the low-pressure side valve of the manifold gauge and charge with the remaining refrigerant.
22. Close the low-pressure side valve of the manifold gauge.
23. Stop the engine and A/C compressor.

U



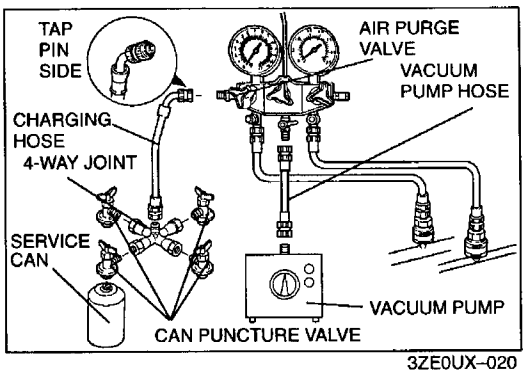
3ZU0UX-001

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.

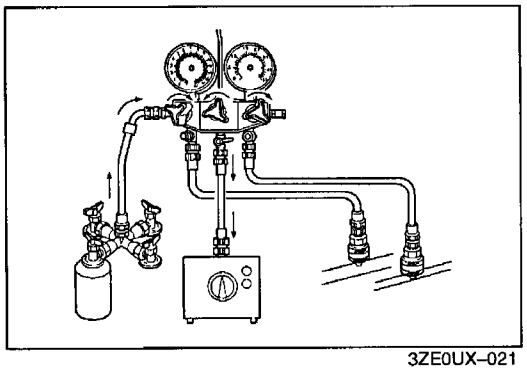


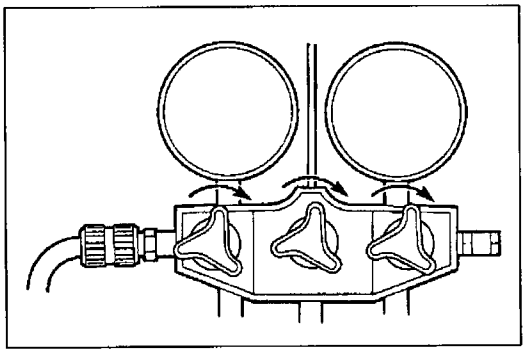
3ZE0UX-019

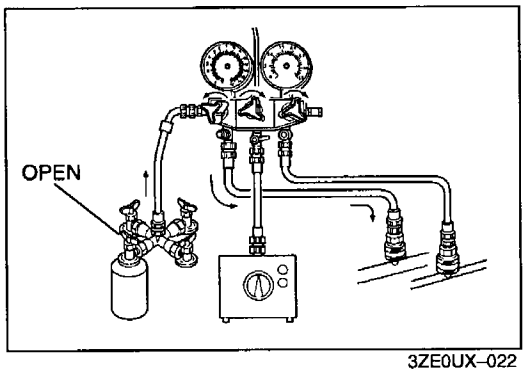
25. Disconnect the high- and low-pressure side quick couplers from the charging valves that are connected to cooler pipe No.1 and cooler hose (low) of the refrigerant system.
26. Install the caps to the charging valves of cooler pipe No.1 and cooler hose (low).



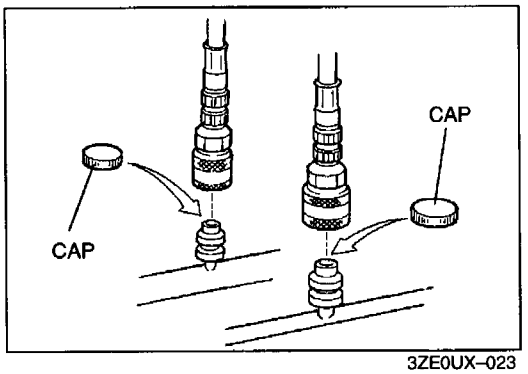
3ZE0UX-020


3ZE0UX-021





3ZE0UX-022



3ZE0UX-023

REFILLING

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 the puncture valves to a 4-way joint.
6. Fully open the can puncture valves and connect the service cans to the valves.
7. Fully close any can puncture valve that it is not connected to a service can.
8. Connect the 4-way joint to the charging hose that is connected to the manifold gauge air purge valve.
9. Open only the center valve of the manifold gauge.
10. Start the vacuum pump and let it run for **5 minutes.**
11. After 5 minutes, close the center valve of the manifold gauge.
12. Stop the vacuum pump.
13. Open the service can by using the can puncture valve.

Warning

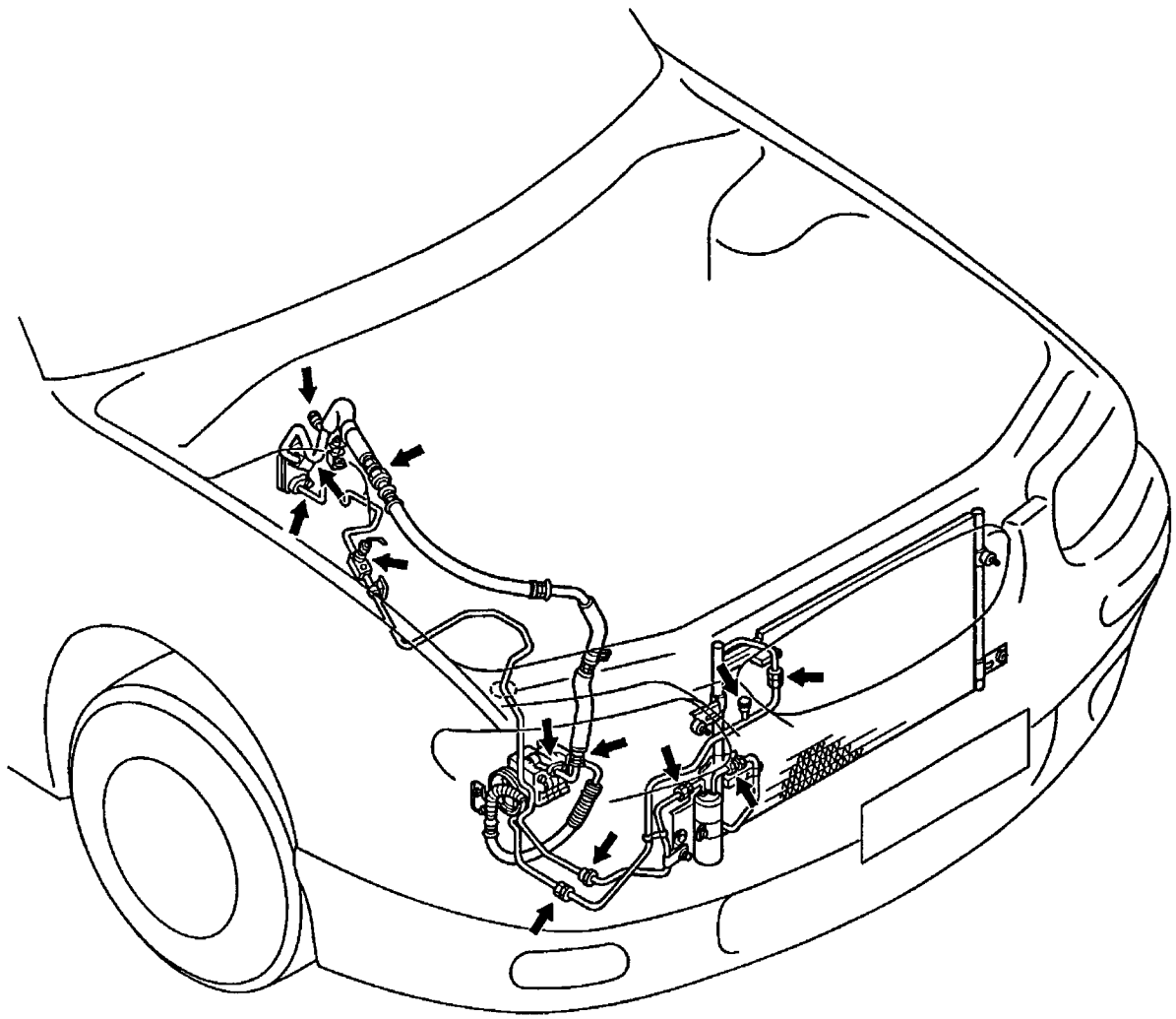
- **Running the engine with the high-pressure side valve open is dangerous. Pressure within the service cans will increase and the cans could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Therefore, do not open the high-pressure side valve while the engine is running.**

14. Start the engine and actuate the A/C compressor.
15. Open the low-pressure side valve and refill with refrigerant until the high- and low-pressure readings of the manifold gauge are within normal pressure limits. (Refer to page U–11.)
16. Close the low-pressure side valve of the manifold gauge.
17. Stop the engine and the A/C compressor.
18. Disconnect the high- and low-pressure side quick couplers from the charging valves that are connected to cooler pipe No.1 and cooler hose (low) of the refrigerant system.
19. Install the caps to the charging valves of cooler pipe No.1 and cooler hose (low).

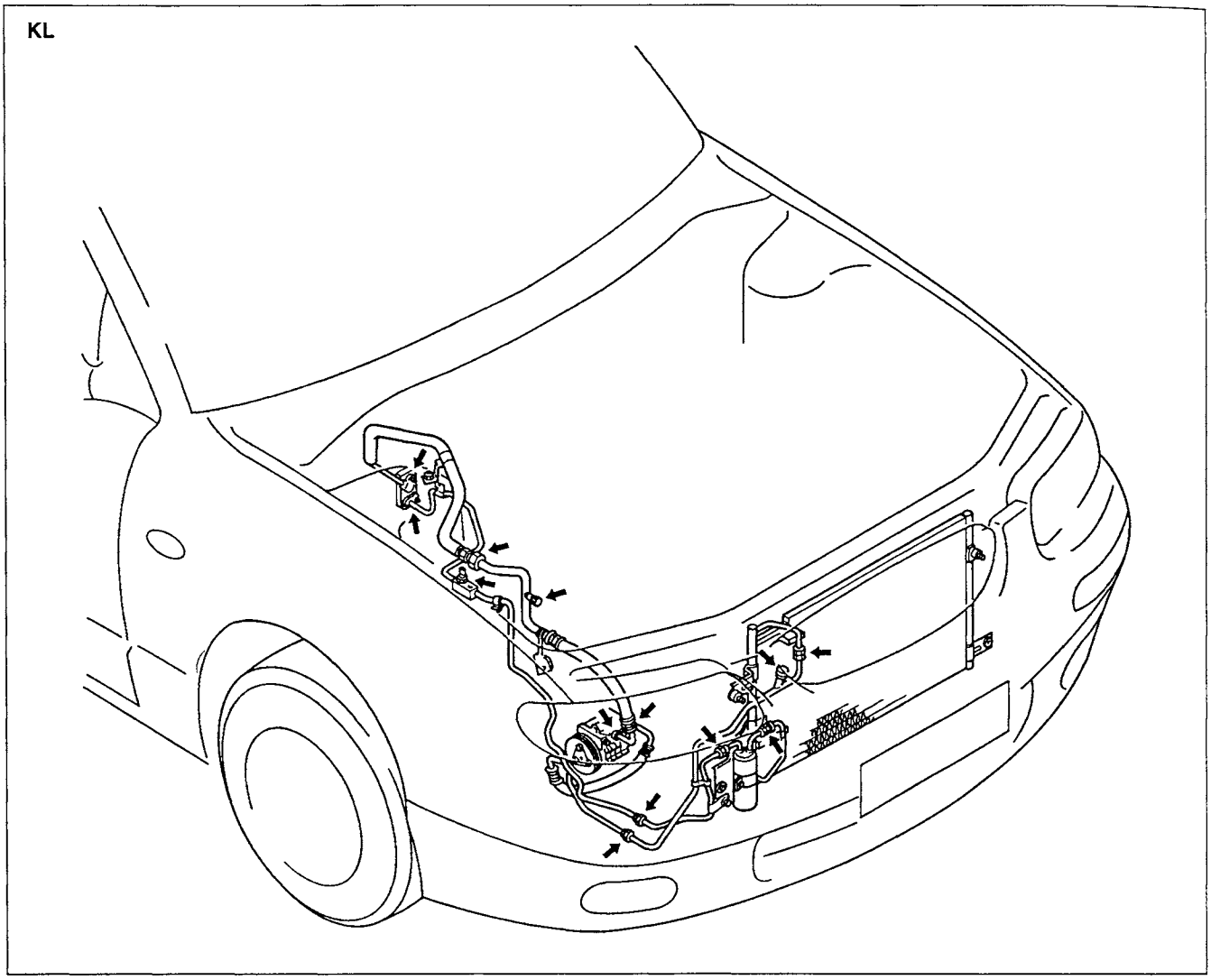
GAS LEAK TEST

1. Check for oil stains on the connections shown below.

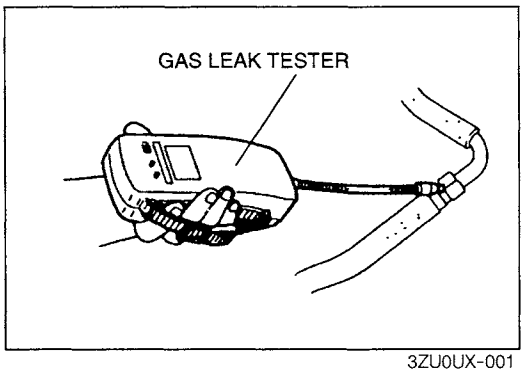
KJ



3ZU0UX-014



3ZU0UX–015

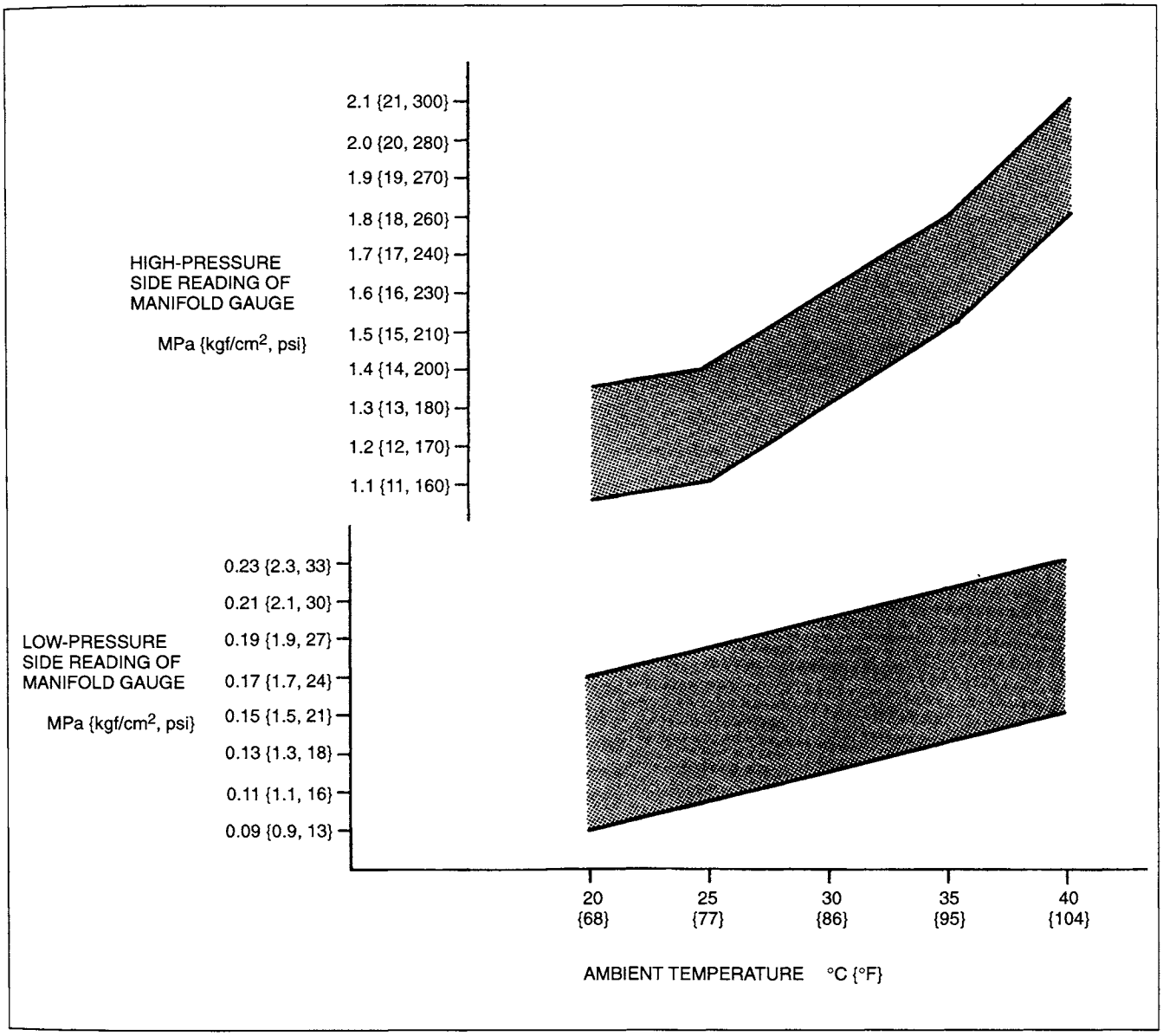


3ZU0UX-001

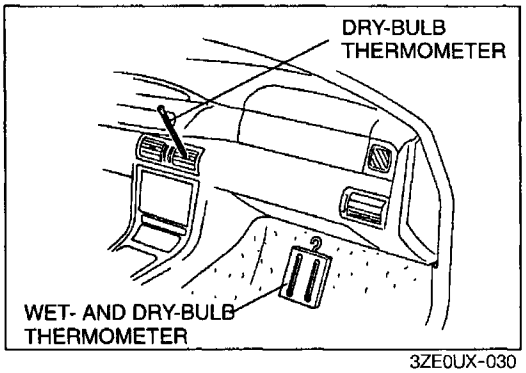
2. If there is no oil stain, go to step 4.
3. If there is an oil stain, check for a loose connection. If it's loose, tighten the connection to the specified torque and refill the oil and refrigerant. (Refer to page U–80.) If the connection is properly tightened, replace the O-ring and, if necessary, other parts. Refill the oil and refrigerant. (Refer to page U–8.)
4. Check for leaks at the connection by using a 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 refrigerant. (Refer to page U–80.) If the connection is properly tightened, replace the O-ring and, if necessary, other parts. Refill the refrigerant. (Refer to page U–8.)

REFRIGERANT PRESSURE CHECK

1. Install the manifold gauge set. (Refer to page U–5.)
2. Close all the doors and all the windows.
3. Warm up the engine and run it at a constant 1,500 rpm.
4. Turn the AUTO switch on.
5. Set the temperature setting dial to 18.0°C {65°F}.
6. Measure the ambient temperature and the high- and low-pressure side readings of the manifold gauge.
7. If the high- and low-pressure side readings are in the shaded zone shown in the figure, the refrigerant system is normal. If the pressures are abnormal, refer to flowchart No.27 and troubleshoot the system. (Refer to page U–55.)



3ZU0UX–012



3ZE0UX-030

PERFORMANCE TEST

After servicing the refrigerant system, test its performance.

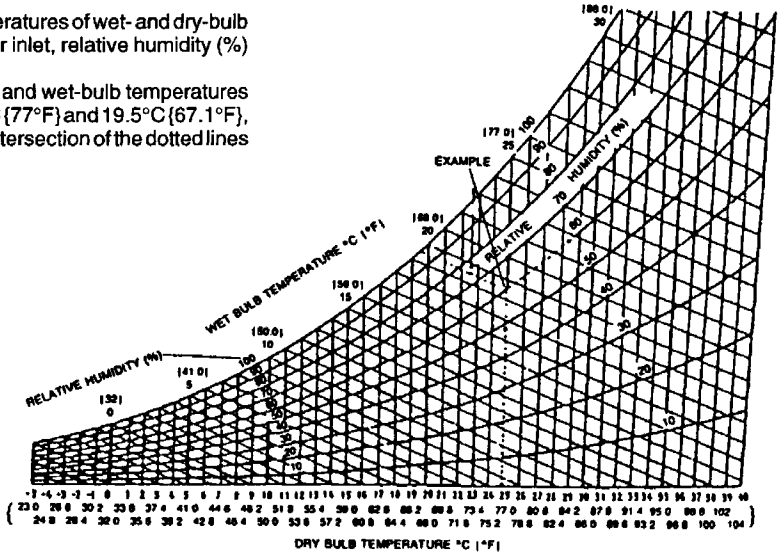
1. Install the manifold gauge set. (Refer to page U–5.)
2. Place a dry-bulb thermometer in the center ventilator outlet.
3. Place a wet- and dry-bulb thermometer at the blower inlet.
4. Open the front doors and the front windows.
5. Warm up the engine and run it at a constant 1,500 rpm.
6. Turn the AUTO switch on.
7. Set the temperature setting dial to 18.0 °C {65 °F}.
8. Wait until the air conditioner output temperature stabilizes.

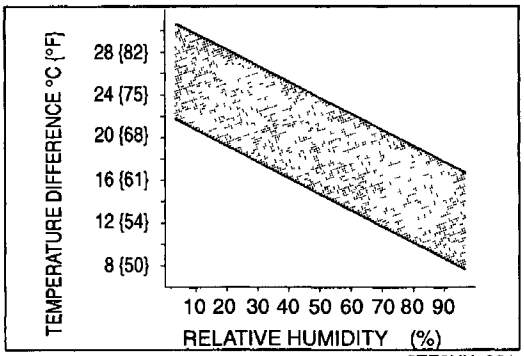
   Stabilized condition
   Blower inlet temperature: 25—35 °C {77—95 °F}
   High-pressure-side reading:
   1.1—1.7 MPa {11—18 kgf/cm², 160—250 psi}

9. 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%.





3ZE0UX-031

10. Read the dry-bulb thermometer at the air outlet, and calculate the temperature difference between the center ventilator outlet and the blower inlet.
11. Verify that the intersection of the temperature difference and the relative humidity is in the shaded zone.
12. If the performance is abnormal, troubleshoot the system. (Refer to page U–16.)

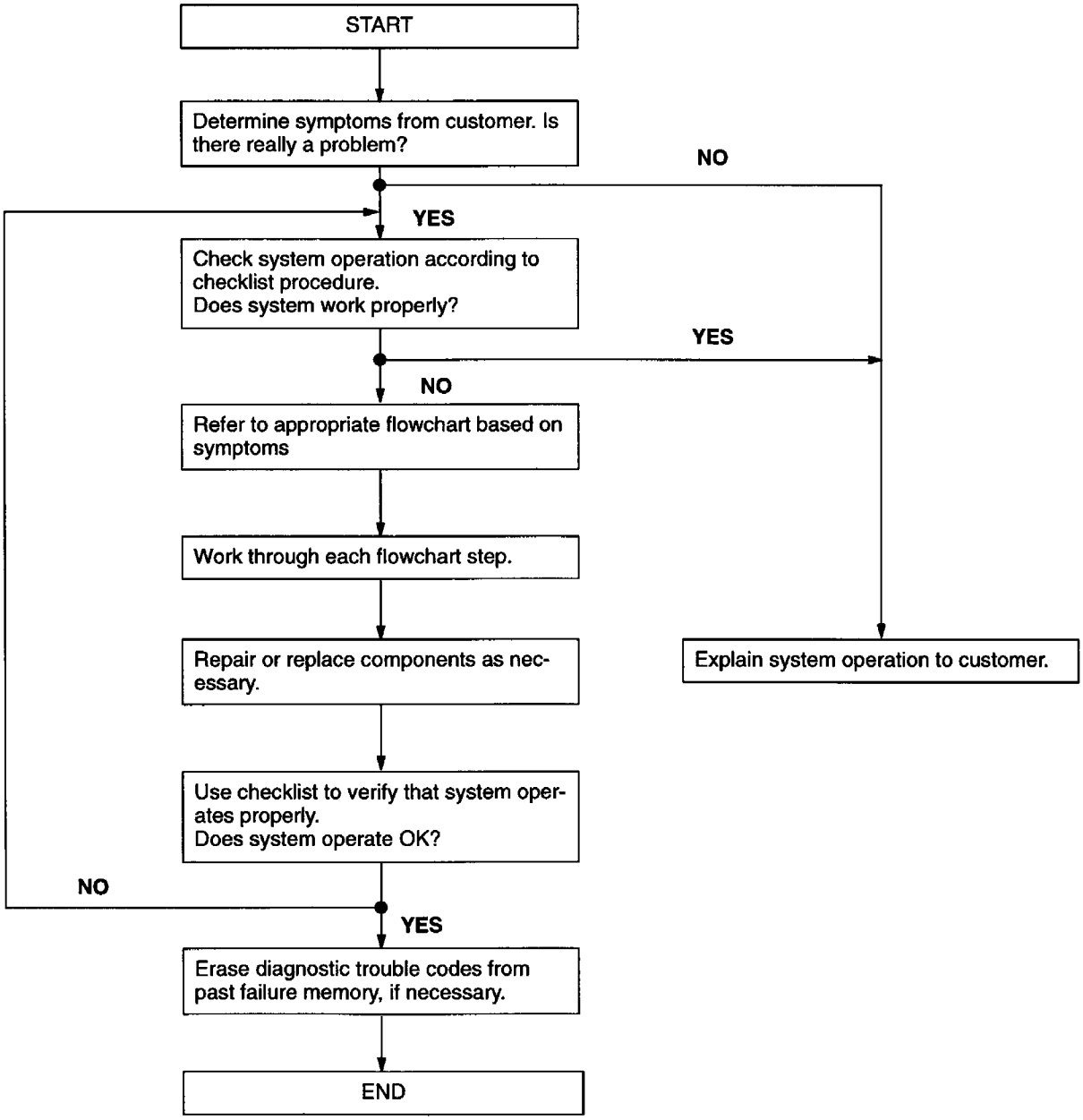
TROUBLESHOOTING GUIDE

TROUBLESHOOTING POINTS

- 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 of the system operation in a logical order is necessary for the accurate understanding of problems.
- The A/C amplifier is equipped with an on-board diagnostic function. As with the engine control system, the on-board diagnostic function detects malfunctions of the input/output devices by using the **SST** (NGS).

BASIC TROUBLESHOOTING PROCEDURES

When troubleshooting, follow the procedure shown in the table below.



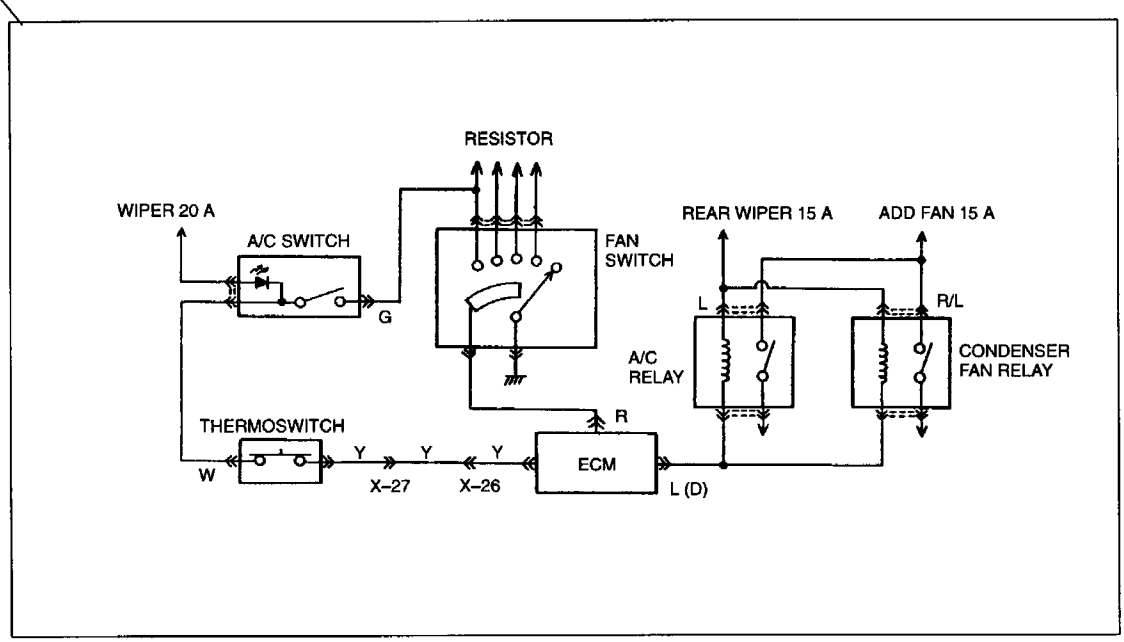
3ZE0UX-032

HOW TO USE THE FLOWCHARTS

Note the following points when using the flowcharts.

Flowchart No.		Symptom ..... Magnetic clutch and condenser fan do not operate
1	A/C signal system inspection	Related parts ... Thermoswitch, A/C switch, Fan switch, ECM, Wiring harness

①



②

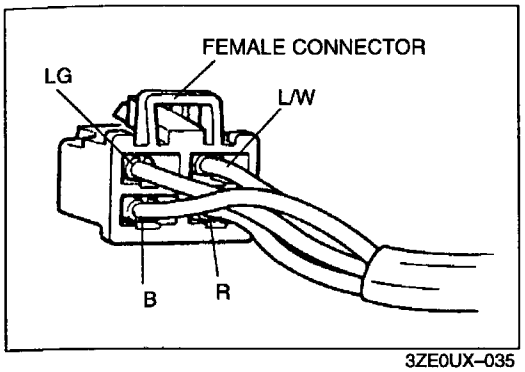
④

B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
1	1) Disconnect thermoswitch connector. 2) Is there continuity between terminals of thermoswitch connector (male). ③	Terminal A ⑥ Terminal B	YES	Connect thermoswitch connector and go to Step 2
			NO	Replace thermoswitch (Refer to page U-65)
2	1) Turn ignition switch to ON. 2) Measure voltage at terminals of ECM connector (female: 20-pin). ⑦	⑤ (R) wire	B+	Check (L) terminal wire
			Other	Replace ECM (Refer to section F)
		(L) wire (Terminal D) ⑧	B+	Go to Step 3
			Other	Go to Step 6
3	1) Turn ignition switch to OFF. 2) Disconnect midway connector (X-26) between ECM and thermoswitch. 3) Turn ignition switch to ON. 4) Measure voltage at terminal of midway connector (male: X-26). ⑨	Terminal E	B+	Connect midway connector (X-26) and go to Step 4
			Other	Repair (Y) wiring harness {ECM — Midway connector (X-26)}
4	1) Turn ignition switch to OFF. 2) Disconnect midway connector (X-27) between ECM and thermoswitch. 3) Turn ignition switch to ON. 4) Measure voltage at terminal of midway connector (female: X-27).	(Y) wire	B+	Connect midway connector (X-27) and go to Step 5
			Other	Repair (Y) wiring harness {ECM — Midway connector (X-27)}

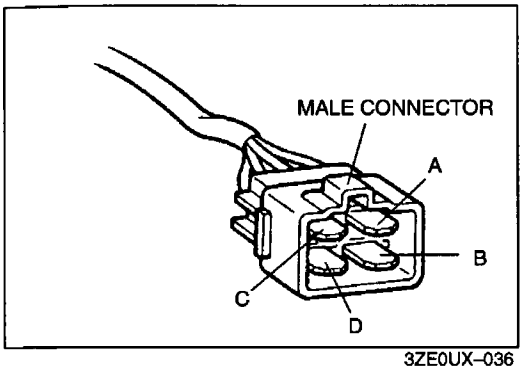
3ZE0UX-033

1. Only those parts, connectors, and harnesses that are directly related to the item being checked are indicated in the wiring diagram and they are arranged in order to make the checking of the contents and trouble symptoms understandable.
2. Follow the steps in order when troubleshooting the system.
3. Inspect connectors from either the male or female side stated after the connector name.
4. 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.



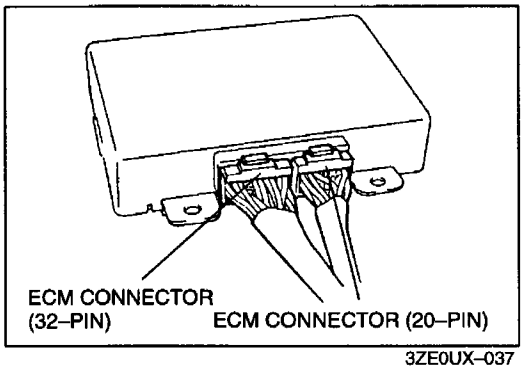
3ZE0UX-035

5. Inspect a terminal from the female connector side if the wire color is indicated.



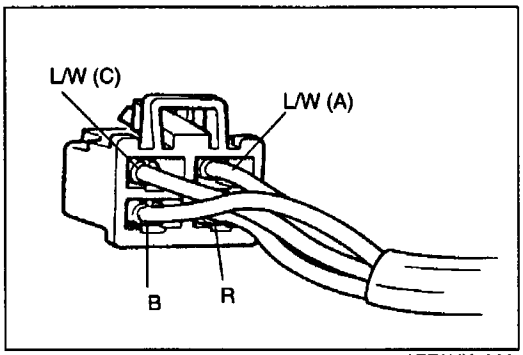
3ZE0UX-036

6. Inspect a terminal from the male connector side if an alphabet letter is indicated.



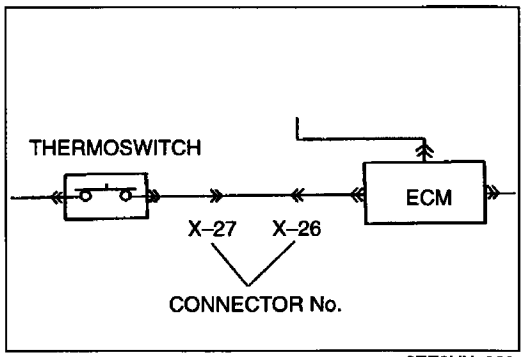
3ZE0UX-037

7. When more than one connector is attached to the same part, the pin number enclosed in ( ) after the connector name distinguishes the connectors.



3ZE0UX-038

8. When a connector has more than one terminal wire of the same color, the alphabet letter enclosed in ( ) after the wire color indication distinguishes the terminals.



3ZE0UX-039

9. When more than one harness connects two different parts, the connector No. of the wiring diagram enclosed in ( ) after the connector name distinguishes the connectors.

TROUBLESHOOTING

CHECKLISTS

How To Use The Checklists

Determine symptoms of the problem based on 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, noise, airflow, 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
When ignition switch is turned off and then on again, set temperature returns to 25.0 °C {77 °F} and AUTO indicator light turns on	ROOM 15 A
Blower motor does not operate	BLOWER 15 A, HEATER 40 A
On-board diagnostic function does not operate	RADIO 10 A, A/C 10 A
A/C compressor idle-up operates, but magnetic clutch and condenser fan do not operate	METER 15 A, AD. FAN 30 A

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.

General problem area	Procedure	Proper operation	Symptom	Flowchart No.
Entire control system	1. Start on-board diagnostic function and set to present failure and past failure modes. (Refer to page U–24.)	"NO CODES RECEIVED" is indicated	On-board diagnostic function does not start	1
	2. Turn off on-board diagnostic function and press AUTO switch.	System changes to automatic operation	System does not change to automatic operation	26
	3. Press OFF switch or turn temperature setting dial to any temperature other than 25.0°C {77°F} and set each switch to manual. 4. Turn ignition switch to LOCK and then to ON.	When ignition switch is turned on again, operational condition is memorized before ignition switch is turned off	Always starts with set temperature at 25.0°C {77°F} and in AUTO mode	13
Air outlet volume system	1. Start on-board diagnostic function and set to diagnostic test mode (present and past). (Refer to page U–24).	"NO CODES RECEIVED" is indicated	Diagnostic trouble code 2 (present failure) is indicated	15
			Diagnostic trouble code 6 (present failure) or 7 (past failure) is indicated	16
			Diagnostic trouble code 12 (present failure) or 13 (past failure) is indicated	14
			Diagnostic trouble code 14 (present failure) or 15 (past failure) is indicated	17
	2. Set to step 1 of output device operation check. (Refer to page U–25.)	Blower motor operates corresponding to operational table	Blower motor does not operate	2
			Blower motor does not operate properly with fan switch at 1st, 2nd, or 3rd	3
			Air outlet volume is below maximum with fan switch at 4th (MAX–HI relay does not operate)	4
	3. Set to step 4 of output device operation check. (Refer to page U–25.)	Air intake actuator (air intake mode) operates (changes) corresponding to operational table	Air intake actuator does not operate properly	5
	4. Turn off on-board diagnostic function and set fan switch in order at 1st, 2nd, 3rd, and 4th.	Blower motor operates corresponding to fan switch operation	Blower motor operation does not correspond to fan switch operation	26
	—	—	When FRESH and AUTO control (except MAX COLD and MAX HOT), air outlet volume changes in compliance with vehicle speed. ("Vehicle speed correction" does not operate)	25

General problem area	Procedure	Proper operation	Symptom	Flowchart No.
Air intake mode system	1. Start on-board diagnostic function and set to diagnostic test mode (present and past) (Refer to page U–24.)	"NO CODES RECEIVED" is indicated	Diagnostic trouble code 2 (present failure) is indicated	15
			Diagnostic trouble code 6 (present failure) or 7 (past failure) is indicated	16
			Diagnostic trouble code 12 (present failure) or 13 (past failure) is indicated	14
	2. Set to step 4 of output device operation check. (Refer to page U–25.)	Air intake actuator (air intake mode) operates (changes) corresponding to operational table	Air intake actuator does not operate properly	5
	3. Turn off on-board diagnostic function and set fan switch at 4th. 4. Set REC/FRESH switch in order at each air intake mode.	Air intake actuator (air intake mode) operates (changes) corresponding to REC/FRESH switch operation	Air intake actuator operation does not correspond to REC/FRESH switch operation	26
Airflow mode system	1. Start on-board diagnostic function and set to diagnostic test mode (present and past). (Refer to page U–24.)	"NO CODES RECEIVED" is indicated	Diagnostic trouble code 2 (present failure) is indicated	15
			Diagnostic trouble code 6 (present failure) or 7 (past failure) is indicated	16
			Diagnostic trouble code 10 (present failure) or 11 (past failure) is indicated	18
			Diagnostic trouble code 12 (present failure) or 13 (past failure) is indicated	14
			Diagnostic trouble code 14 (present failure) or 15 (past failure) is indicated	17
			Diagnostic trouble code 21 (present failure) or 22 (past failure) is indicated	6
	2. Set to step 3 of output device operation check. (Refer to page U–25.)	Airflow mode actuator (airflow mode) operates (changes) corresponding to operational table	Airflow mode actuator does not operate properly	6
	3. Turn off on-board diagnostic function and set the fan switch at 4th. 4. Set MODE switch and DEFROSTER switch at each airflow mode.	Airflow mode actuator (airflow mode) operates (changes) corresponding to each switch operation	Airflow mode actuator operation does not correspond to MODE switch and DEFROSTER switch operation	26

General problem area	Procedure	Proper operation	Symptom	Flowchart No.
Air outlet temperature system	1. Start on-board diagnostic function and set to diagnostic test mode (present and past). (Refer to page U–24.)	"NO CODES RECEIVED" is indicated	Diagnostic trouble code 2 (present failure) is indicated	15
			Diagnostic trouble code 6 (present failure) or 7 (past failure) is indicated	16
			Diagnostic trouble code 10 (present failure) or 11 (past failure) is indicated	18
			Diagnostic trouble code 12 (present failure) or 13 (past failure) is indicated	14
			Diagnostic trouble code 18 (present failure) or 19 (past failure) is indicated	8
	2. Set to step 2 of output device operation check. (Refer to page U–25.)	Air mix actuator (air outlet temperature) operates (changes) corresponding to operational table	Air mix actuator does not operate properly	8
	3. Set to step 4 of output device operation check.	Magnetic clutch, condenser fan, and A/C compressor idle-up operate corresponding to operational table Cool air discharged	Magnetic clutch, condenser fan, and A/C compressor idle-up do not operate	19
			A/C compressor idle-up operates, but magnetic clutch and condenser fan do not operate	20
			Only magnetic clutch does not operate	21
			Only condenser fan does not operate	22
			Condenser fan does not operate with condenser fan speed at Lo	23
			Condenser fan does not operate with condenser fan speed at Hi	24
			Magnetic clutch, condenser fan, and A/C compressor idle-up operate, but cool air does not discharge or air cooling ability is low	27
	4. Turn off on-board diagnostic function and set fan switch at 4th. 5. Change temperature setting dial from 18.0 °C {65 °F} to 32.0 °C {90 °F} gradually.	Air mix actuator (air outlet temperature) operates (changes) corresponding to temperature setting dial operation	Air mix actuator operation does not correspond to temperature setting dial operation	26
	6. Operate A/C switch.	Magnetic clutch operates corresponding to A/C siwtch operation	Magnetic clutch operation does not correspond to A/C switch operation	26

General problem area	Procedure	Proper operation	Symptom	Flowchart No.
Solar ventilation system	1. Start on-board diagnostic function and set to diagnostic test mode (present and failure). (Refer to page U–24.)	"NO CODES RECEIVED" is indicated	Diagnostic trouble code 12 (present failure) or 13 (past failure) is indicated	14
	2. Set to step 2 of output device operation check. (Refer to page U–25.)	Air mix actuator (air outlet temperature) operates (changes) corresponding to operational table	Air mix actuator does not operate properly	8
	3. Set to step 3 of output device operation check. (Refer to page U–25.)	Airflow mode actuator (airflow mode) operates (changes) corresponding to operational table	Airflow mode actuator does not operate properly	6
	4. Set to step 4 of output device operation check. (Refer to page U–25.)	Air intake actuator (air intake mode) operates (changes) corresponding to operational table	Air intake actuator does not operate properly	5
	5. Turn off on-board diagnostic function and press OFF switch or turn temperature setting dial to any temperature other than 25.0 °C {77 °F} in manual mode. 6. Turn ignition switch to LOCK and then to ON.	When ignition switch is turned on again, operational condition is memorized before ignition switch is turned off	Always starts with set temperature at 25.0 °C {77 °F} and in AUTO mode	13
Indication system	1. Start on-board diagnostic function and set to diagnostic test mode (present and past). (Refer to page U–24.)	"NO CODES RECEIVED" is indicated	Diagnostic trouble code 12 (present failure) or 13 (past failure) is indicated	14
	2. Set to output device operation check.	All indicator lights and information display indications illuminate when output device operation check is started	Indicator light of each switch does not illuminate properly	10
			Information display indications do not illuminate properly	11
	3. Turn off on-board diagnostic function and operate light switch and panel light control switch.	Illumination light turns on and indicator light of each switch and information display becomes dim, or change brightness.	Illumination light, indicator light of each switch and information display do not illuminate properly	9
	4. Turn AMB switch on.	Set temperature indication on information display changes to ambient temperature indication; ambient temperature indication shows correct ambient temperature	Set temperature indication does not change to ambient temperature indication	12
			Ambient temperature indication is always 0 °C {32 °F}	14
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 3rd and 4th	Electrical load idle-up does not operate with fan switch at 3rd or 4th	7
A/C compressor noise system	Turn AUTO switch on and set the temperature setting dial to 18.0 °C {65 °F}.	Vane noise does not occur when magnetic clutch ON	Vane noise occurs	28

ON-BOARD DIAGNOSTIC FUNCTION

Outline

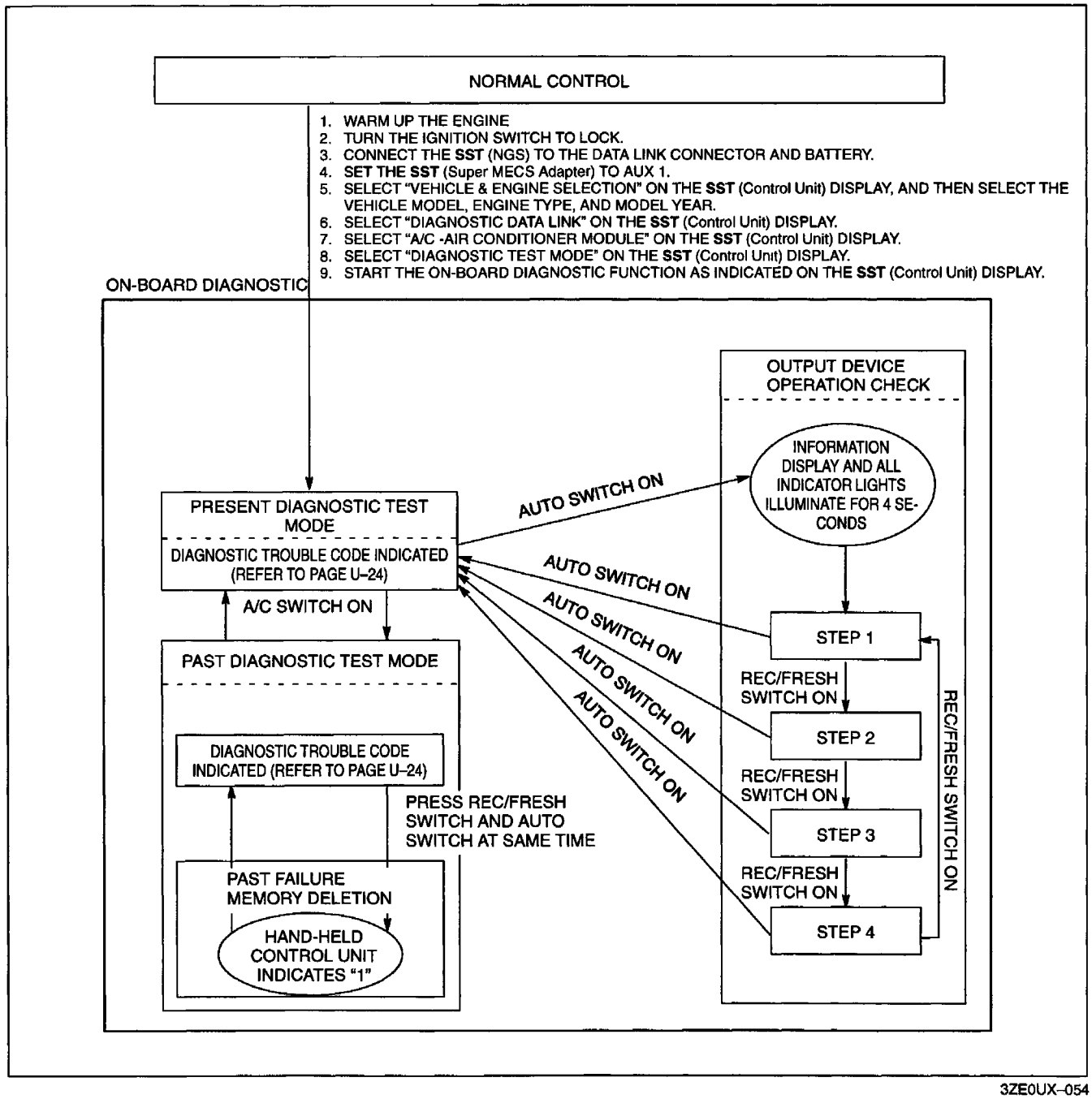
An on-board diagnostic function in the A/C amplifier that locates and indicates malfunctions in the control system.

The on-board diagnostic function has three steps:

Present diagnostic test mode	Electrical faults presently occuring in the control system are detected and indicated as diagnostic trouble codes.
Past diagnostic test mode	Electrical faults that previously occurred in the control system (intermittent problems) are detected and indicated as diagnostic trouble codes.
Output device operation check mode	All output devices are made to operate individually according to a designated pattern.

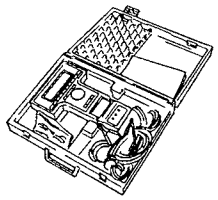
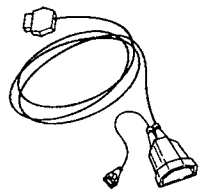
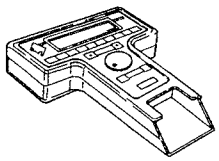
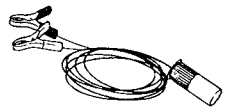
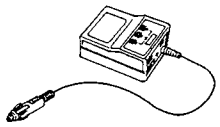
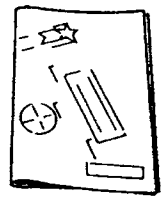
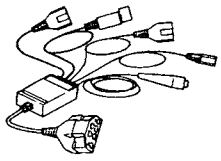
The on-board diagnostic function works as shown below. To turn off the on-board diagnostic function, turn off the ignition switch.

Operation flow

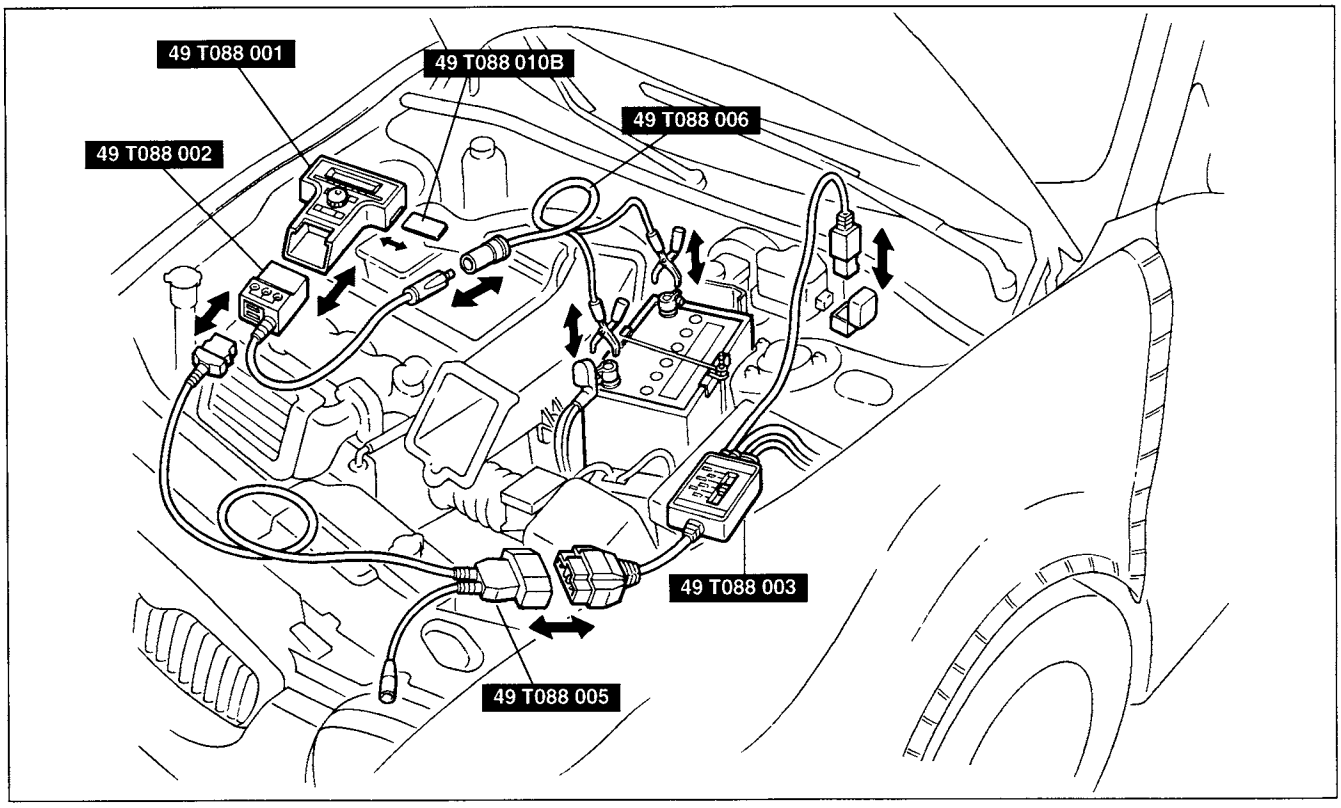


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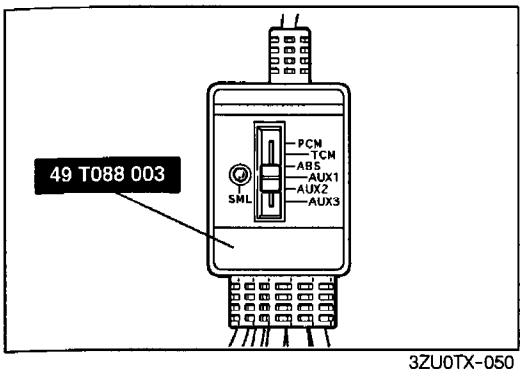
Preparation
SST

49 T088 0A0 NGS set 	For diagnosis of air conditioner	49 T088 005 STAR/DCL Adapter (5 pin) (Part of 49 T088 0A0) 	For diagnosis of air conditioner
49 T088 001 Control Unit (Part of 49 T088 0A0) 	For diagnosis of air conditioner	49 T088 006 Battery Hookup Adapter (Part of 49 T088 0A0) 	For diagnosis of air conditioner
49 T088 002 Vehicle Interface Module (Part of 49 T088 0A0) 	For diagnosis of air conditioner	49 T088 008A Instruction Manual 	For diagnosis of air conditioner
49 T088 003 Super MECS Adapter (Part of 49 T088 0A0) 	For diagnosis of air conditioner	49 T088 010B Program Card 	For diagnosis of air conditioner

Condition Detection Mode
Using NGS

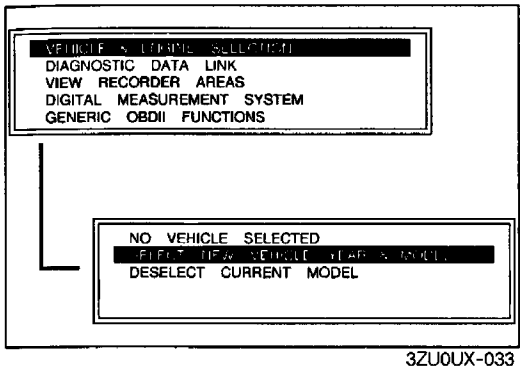


3ZU0UX–017



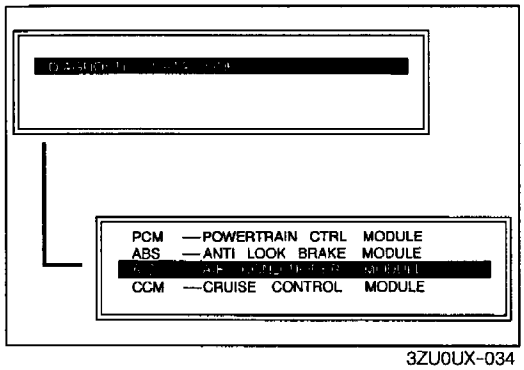
3ZU0TX-050

1. Warm up the engine.
2. Turn the ignition switch to LOCK.
3. Connect the **SST** (NGS) to the data link connector and battery.
4. Set the **SST** (Super MECS Adapter) to AUX 1.



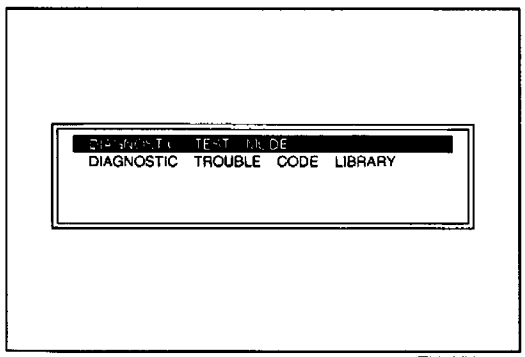
3ZU0UX-033

5. Select "VEHICLE & ENGINE SELECTION" on the **SST** (Control Unit) display, and then select the vehicle model, engine type, and model year.



3ZU0UX-034

6. Select "DIAGNOSTIC DATA LINK" on the **SST** (Control Unit) display.
7. Select "A/C -AIR CONDITIONER MODULE" on the **SST** (Control Unit) display.



3ZU0UX-035

8. Select "DIAGNOSTIC TEST MODE" on the **SST** (Control Unit) display.
9. Start the on-board diagnostic function as indicated on the **SST** (Control Unit) display.

   Note
   - If the solar radiation sensor is not lit, a failure will be indicated.

10. Start present diagnostic test mode, past diagnostic test mode, or output device operation check mode. (Refer to pages U–24, 25.)
11. If past failures are indicated, carry out "Erasing past failure memory" after correcting all failed systems. (Refer to page U–25.)

Present diagnostic test mode

Immediately after starting the on-board diagnostic function, present failures in the control circuit, such as disconnections or short circuits, are detected and indicated on the **SST** (Control Unit) as diagnostic trouble codes. If a diagnostic trouble code is indicated, refer to the following diagnostic trouble code table and inspect the appropriate system. {The **SST** (Control Unit) will not, however, detect a short circuit in the (W) solar radiation sensor signal wire.}

Past diagnostic test mode

When the A/C switch is pressed with the system in present diagnostic test mode, the A/C amplifier changes the on-board diagnostic function to past diagnostic test mode. In this mode, any past failures, such as disconnections or short circuits, detected and memorized by the A/C amplifier are indicated on the **SST** (Control Unit) as diagnostic trouble codes. If a diagnostic trouble code is indicated, refer to the following diagnostic trouble code table and inspect the appropriate system. (Disconnections and short circuits are memorized only if they occur in the same system 16 times or more.) If the A/C switch is pressed again while in past diagnostic test mode, the on-board diagnostic function will return to present diagnostic test mode.

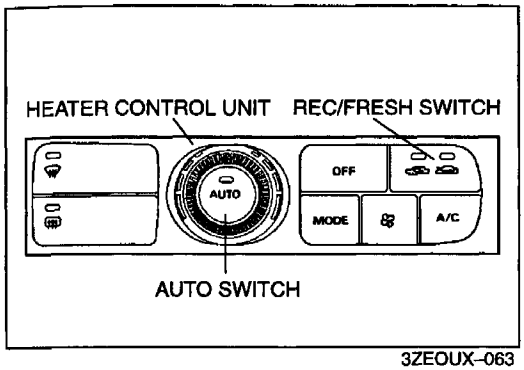
Note

- Only when "(Past)" appears on the display, the A/C amplifier is in the past diagnostic test mode, otherwise the A/C amplifier is in the present diagnostic test mode.

Diagnostic trouble code table

DTC	Display on the NGS	Inspection area	Flowchart No.
2	Solar radiation sensor—Open or short	• Solar radiation sensor • A/C amplifier • Wiring harness	15
6	PCTS—Open or short	• Passenger compartment temperature sensor • A/C amplifier • Wiring harness	16
7	PCTS—Open or short (past)	• Passenger compartment temperature sensor • A/C amplifier • Wiring harness	16
10	ETS—Open or short	• Evaporator temperature sensor • A/C amplifier • Wiring harness	18
11	ETS—Open or short (past)	• Evaporator temperature sensor • A/C amplifier • Wiring harness	18
12	ATS—Open or short	• Ambient temperature sensor • A/C amplifier • Wiring harness	14
13	ATS—Open or short (past)	• Ambient temperature sensor • A/C amplifier • Wiring harness	14
14	WTS—Open or short	• Water temperature sensor • A/C amplifier • Wiring harness	17
15	WTS—Open or short (past)	• Water temperature sensor • A/C amplifier • Wiring harness	17
18	Air mix actuator—Open or short	• Air mix actuator • A/C amplifier • Wiring harness	8
19	Air mix actuator—Open or short (past)	• Air mix actuator • A/C amplifier • Wiring harness	8

DTC	Display on the NGS	Inspection area	Flowchart No.
21	Airflow mode actuator—Open or short	• Airflow mode actuator • A/C amplifier • Wiring harness	6
22	Airflow mode actuator—Open or short (past)	• Airflow mode actuator • A/C amplifier • Wiring harness	6



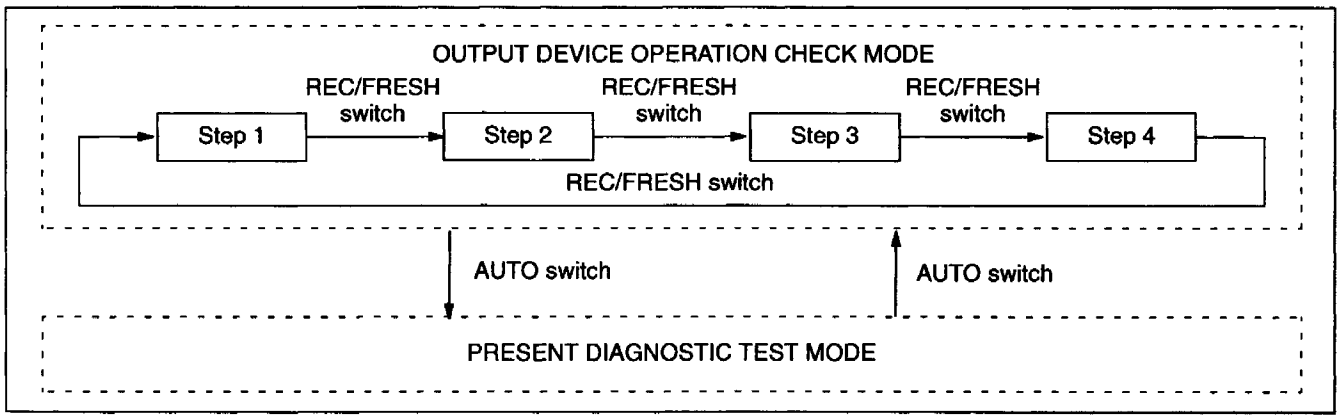
3ZEOUX-063

Erasing past failure memory

Past failures are memorized and remain in the memory even after the failed systems are corrected. The next time the system is serviced, the past failure diagnostic trouble codes will appear again on the **SST** (Control Unit), even though there is actually no failure. Therefore, erase past failure memory after correcting all failed systems. To erase past failure memory, press the AUTO and REC/FRESH switches on the heater control unit at the same time while in past diagnostic test mode. Past failure memory will be erased and "1" will be indicated on the **SST** (Control Unit).

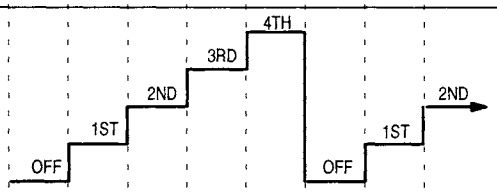
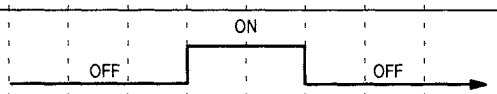
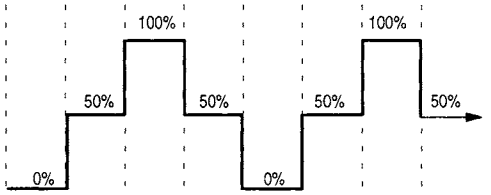
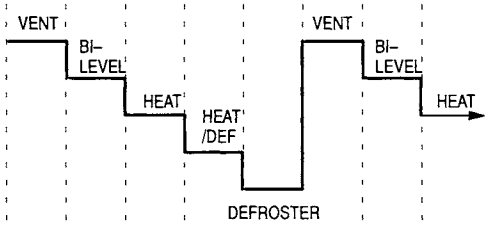
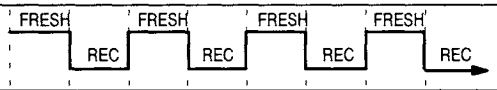
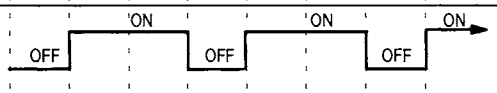
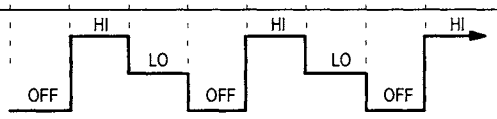
Output device operation check mode

When the AUTO switch is pressed with the system in present diagnostic test mode, the A/C amplifier changes to output device operation check mode. In this mode, all output devices, indicator lights, and the information display operate individually according to a designated pattern, as shown below. Each step is changed by pressing the REC/FRESH switch. If the AUTO switch is pressed again, the on-board diagnostic function will return to present diagnostic test mode.



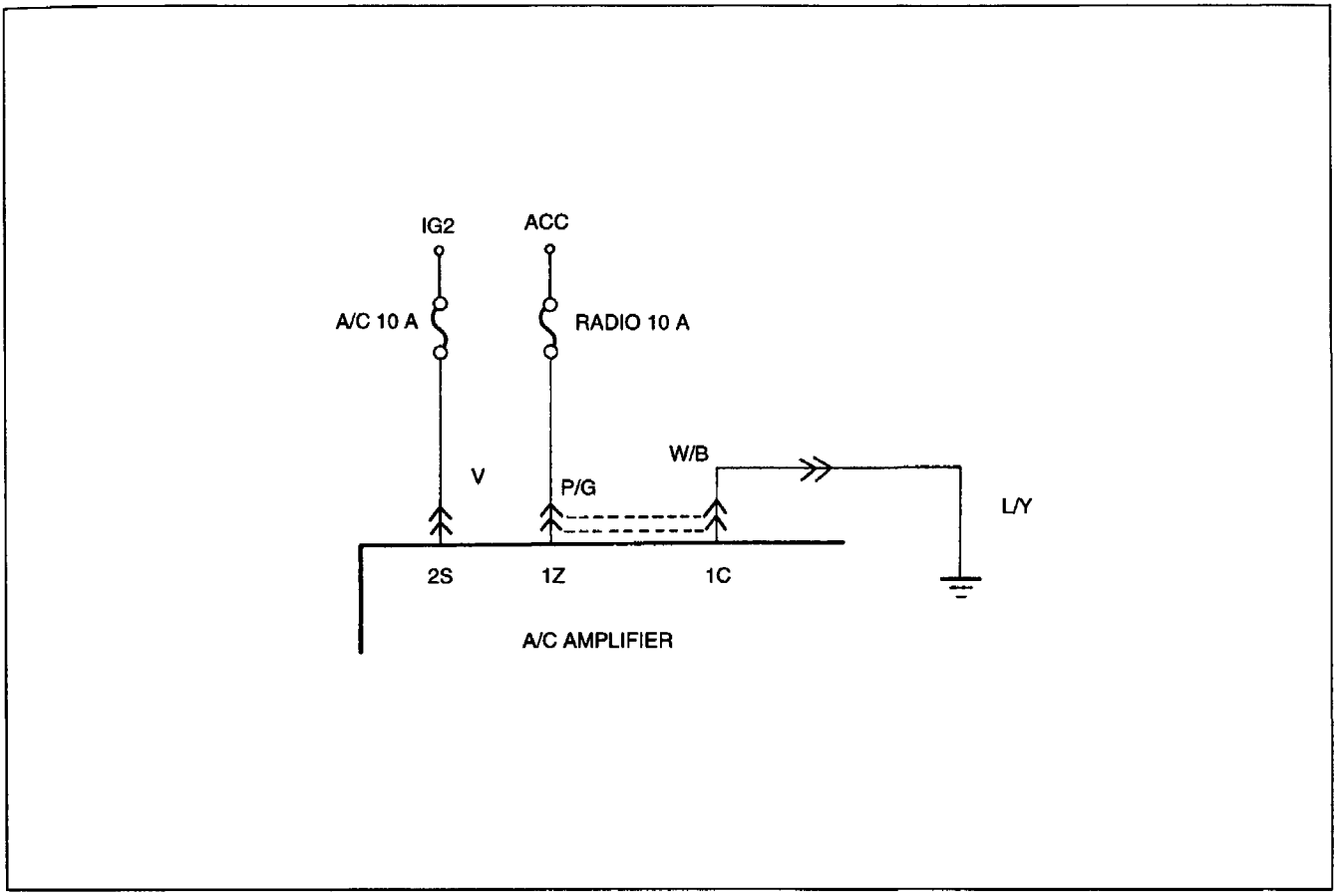
3ZE0UX-064

Output device operation check table

Step	Operating device	Operating conditions	Other device conditions	Flowchart no.
1	Blower motor speed		• Air mix actuator operation ...50% • Airflow mode actuator operation ...VENT • Air intake actuator operation...FRESH • A/C compressor operation ...ON • Condenser fan operation ... ON • A/C compressor idle-up operation ... ON	2 3 4 7
	Electrical load idle-up signal			
2	Air mix actuator operation (100%=MAX HOT, 0%=MAX COLD)		• Blower motor speed ... 2ND • Electrical load idle-up signal ...OFF • Airflow mode actuator operation ... VENT • Air intake actuator operation ...FRESH • A/C compressor operation ...ON • Condenser fan operation ... ON • A/C compressor idle-up operation ... ON	8
3	Airflow mode actuator operation		• Blower motor speed...2ND • Electrical load idle-up signal ...OFF • Air mix actuator operation ...50% • Air intake actuator operation...FRESH • A/C compressor operation ...ON • Condenser fan operation ... ON • A/C compressor idle-up operation ... ON	6
4	Air intake actuator operation		• Blower motor speed ... 2ND • Electrical load idle-up signal ...OFF • Air mix actuator operation ...0% • Airflow mode actuator operation ...VENT	5 19 20 21 22 23 24 28
	A/C compressor operation A/C compressor idle-up operation			
	Condenser fan operation			

FLOWCHART

Flowchart No.	A/C amplifier power source system inspection	Symptom ..... On-board diagnostic function does not start
1		Related parts ... A/C amplifier, wiring harness

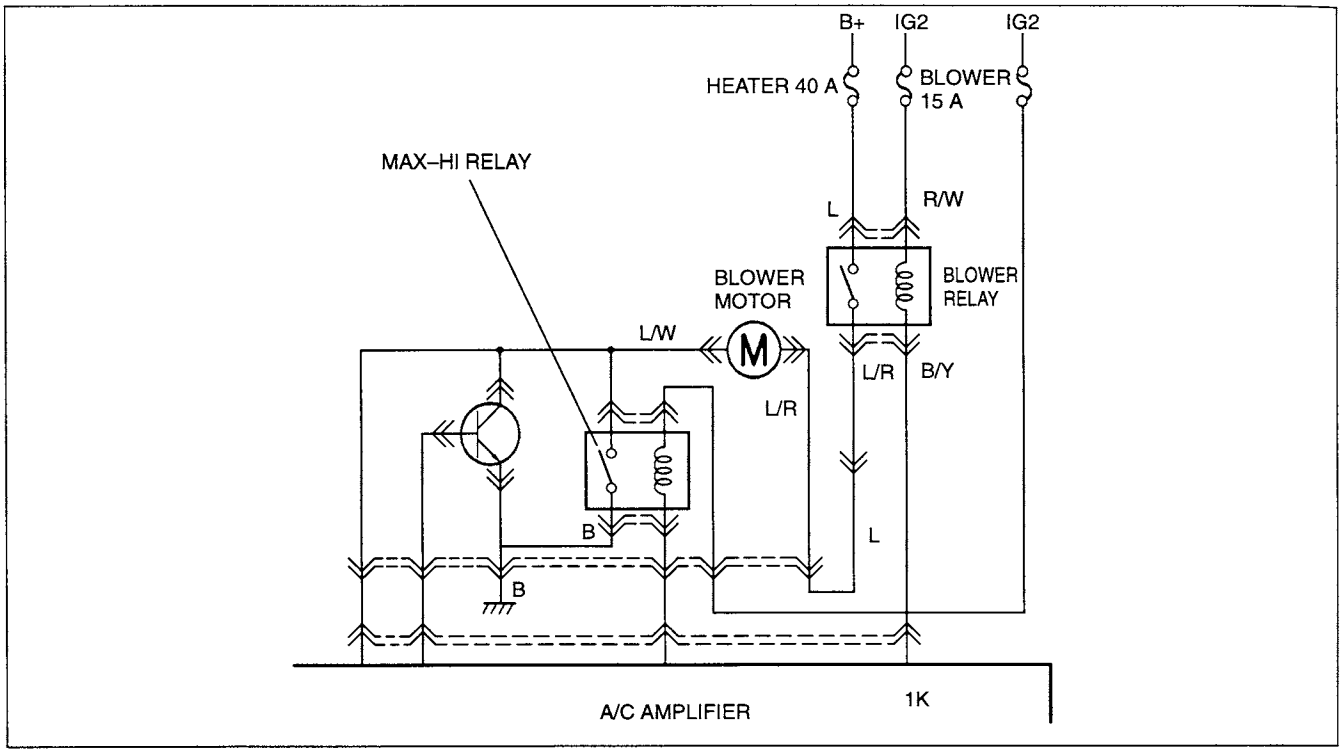


3ZE0UX–074

B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
1	1) Turn ignition switch to ON. 2) Measure voltage at terminals of A/C amplifier connector (female: 26-pin).	(W/B) wire	0 V	Check (P/G) terminal wire
			Other	Repair (W/B) — (L/Y) wiring harness (A/C amplifier — Ground)
		(P/G) wire	B+	Go to Step 2
			Other	Repair (P/G) wiring harness (RADIO 10 A fuse — A/C amplifier)
2	Measure voltage at terminal of A/C amplifier connector (female: 22-pin).	(V) wire	B+	Replace A/C amplifier (Refer to page U–96)
			Other	Repair (V) wiring harness (A/C 10 A fuse — A/C amplifier)

Flowchart No.	Blower motor system inspection	Symptom ..... Blower motor does not operate
2		Related parts ... Blower motor, blower relay, A/C amplifier, wiring harness



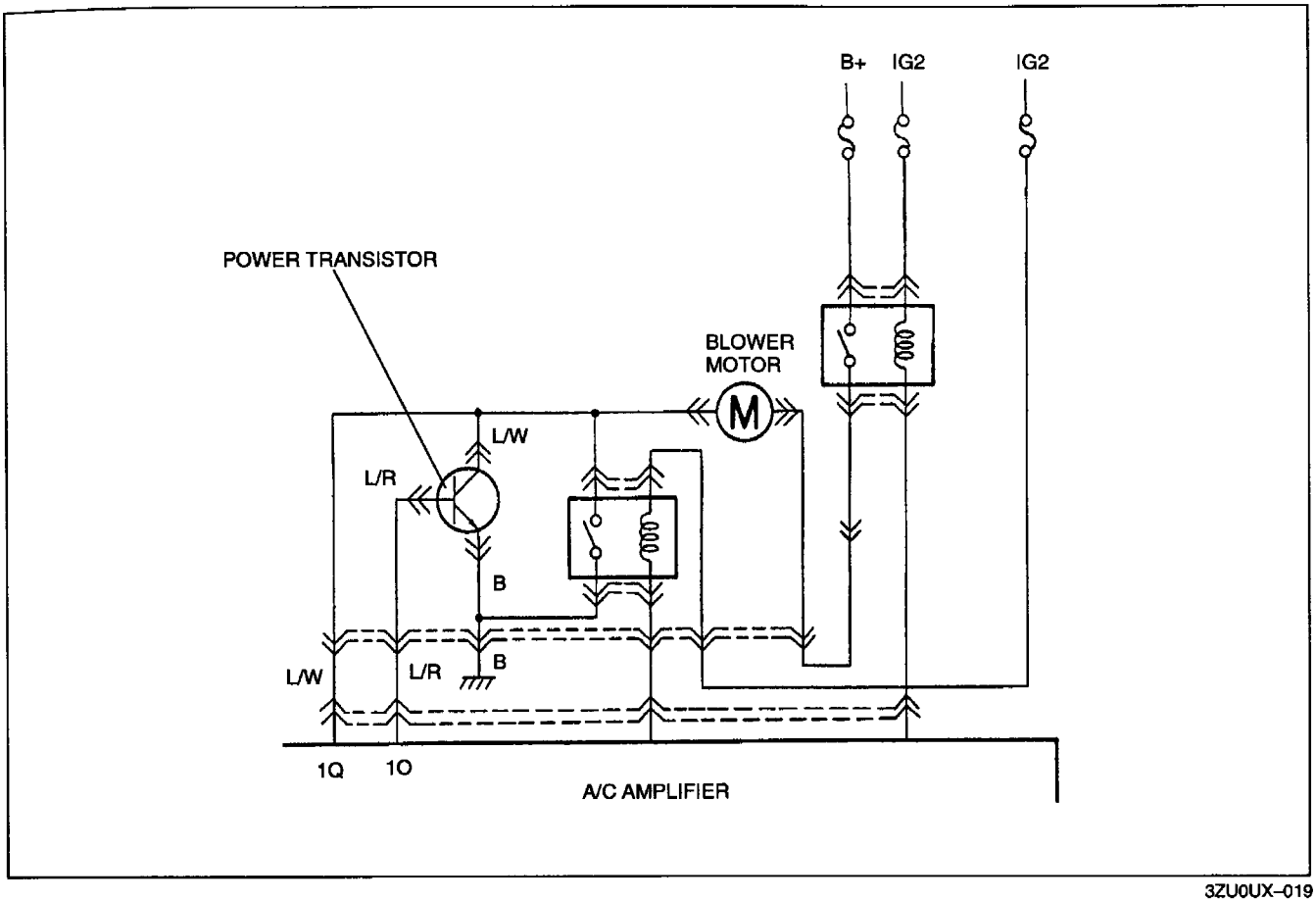
3ZU0UX–018

B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
1	1) Turn ignition switch to ON 2) Set fan switch at manual 4th speed. 3) Measure voltage at terminals of blower motor connector (female).	(L/R) wire	B+	Check (L/W) terminal wire
			Other	Go to Step 3
		(L/W) wire	0 V	Replace blower motor (Refer to page U–89)
			Other	Go to Step 2
2	Measure voltage at terminal of MAX–HI relay connector (female).	(B) wire	0 V	Repair (L/W) wiring harness (Blower motor — MAX–HI relay)
			Other	Repair (B) wiring harness (MAX–HI relay — Ground)
3	Measure voltage at terminals of blower relay connector (female).	(B/Y) wire	0 V	Check (B/W) terminal wire
			Other	Go to Step 4
		(R/W) wire	B+	Check (L) terminal wire
			Other	Repair (R/W) wiring harness (BLOWER 15 A fuse — Blower relay)
		(L) wire	B+	Check (L/R) terminal wire
			Other	Repair (L) wiring harness (HEATER 40 A fuse — Blower relay)
		(L/R) wire	B+	Repair (L/R) — (L) — (L/R) wiring harness (Blower relay — Blower motor)
			Other	Replace blower relay (Refer to page U–88)
4	Measure voltage at terminal of A/C amplifier connector (female: 26-pin).	(B/Y) wire	0 V	Repair (B/Y) wiring harness (Blower relay — A/C amplifier)
			Other	Replace A/C amplifier (Refer to page U–96)

3ZE0UX–076

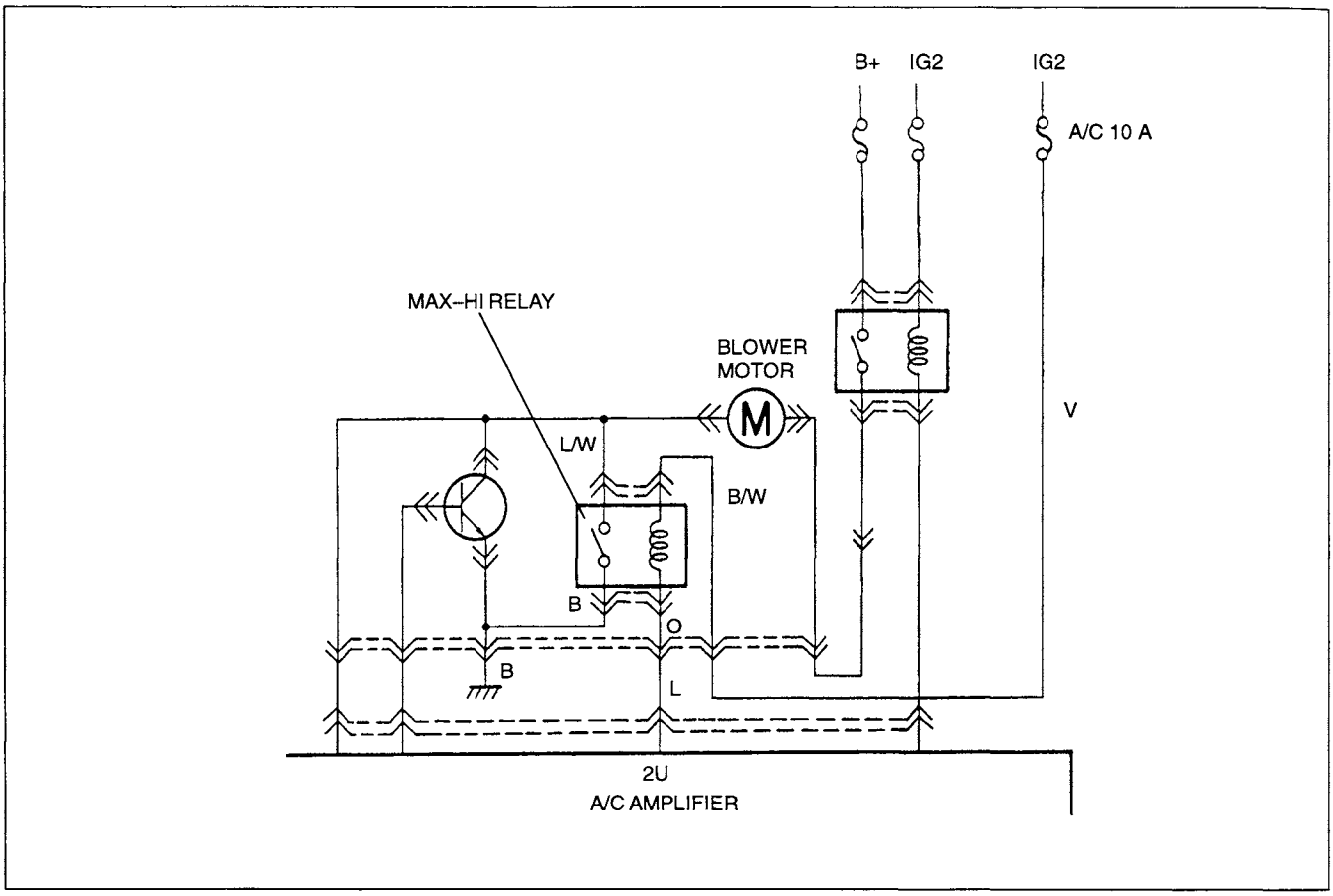
Flowchart No.	Power transistor system inspection	Symptom ..... Blower motor does not operate properly with fan switch at 1st, 2nd, or 3rd
3		Related parts ... Power transistor, A/C amplifier, wiring harness



3ZU0UX-019

Step	Inspection procedure	Terminal	Result	Action
1	1) Check power transistor. (Refer to page U–89.) 2) Are voltages same as in table or 5.5 V?	—	YES	Go to Step 2
			NO	Replace power transistor (Refer to page U–89)
2	1) Disconnect blower motor connector. 2) Is there continuity between terminal of power transistor connector (female) and terminal of blower motor connector (female)?	(L/W) wire	YES	Go to Step 3
			NO	Repair (L/W) wiring harness (Power transistor — Blower motor)
3	Is there continuity between terminal of power transistor connector (female) and ground?	(B) wire	YES	Go to Step 4
			NO	Repair (B) wiring harness (Power transistor — Ground)
4	1) Disconnect A/C amplifier connector (26-pin). 2) Is there continuity between terminals of power transistor connector (female) and terminals of A/C amplifier connector (female: 26-pin)?	(L/R) wire (Terminal 1O)	YES	Check (L/W) terminal wire
			NO	Repair (L/R) wiring harness (Power transistor — A/C amplifier)
		(L/W) wire	YES	Replace A/C amplifier (Refer to page U–96)
			NO	Repair (L/W) wiring harness (Power transistor — A/C amplifier)

Flowchart No.	MAX–HI relay system inspection	Symptom ..... Air outlet volume is below maximum with fan switch at 4th (MAX–HI relay does not operate)
4		Related parts ... MAX–HI relay, A/C amplifier, wiring harness

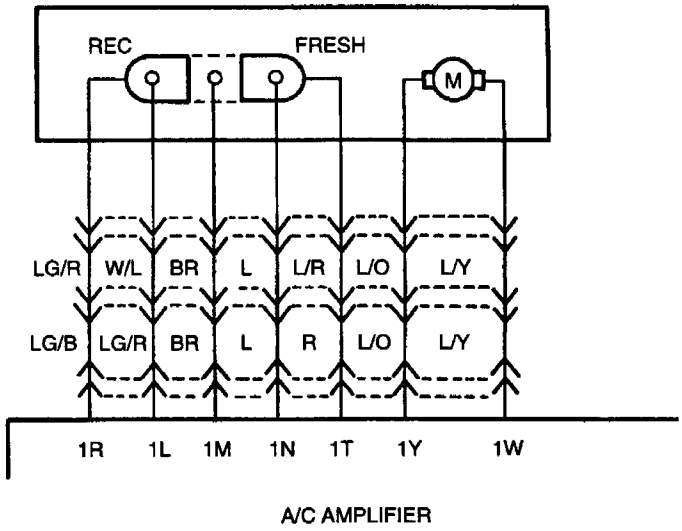


3ZU0UX–019

B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
1	1) Disconnect power transistor connector. 2) Turn ignition switch to ON. 3) Set fan switch at manual 4th speed. 4) Measure voltage at terminals of MAX–HI relay connector (female).	(B/W) wire	B+	Check (O) terminal wire
			Other	Repair (B/W) — (V) wiring harness (A/C 10 A fuse — MAX–HI relay)
		(O) wire	0 V	Check (L/W) terminal wire
			Other	Go to Step 2
		(L/W) wire	0 V	Repair (L/W) wiring harness (Blower motor — MAX–HI relay)
			Other	Check (B) terminal wire
		(B) wire	0 V	Replace MAX–HI relay (Refer to page U–87)
			Other	Repair (B) wiring harness (MAX–HI relay — Ground)
2	Measure voltage at terminal of A/C amplifier connector (female: 22-pin).	(L) wire (Terminal 2U)	0 V	Repair (O) — (L) wiring harness (MAX–HI relay — A/C amplifier)
			Other	Replace A/C amplifier (Refer to page U–96)

Flowchart No.		Symptom ..... Air intake actuator does not operate properly
5	Air intake actuator system inspection	Related parts ... Blower unit, air intake actuator, A/C amplifier, wiring harness

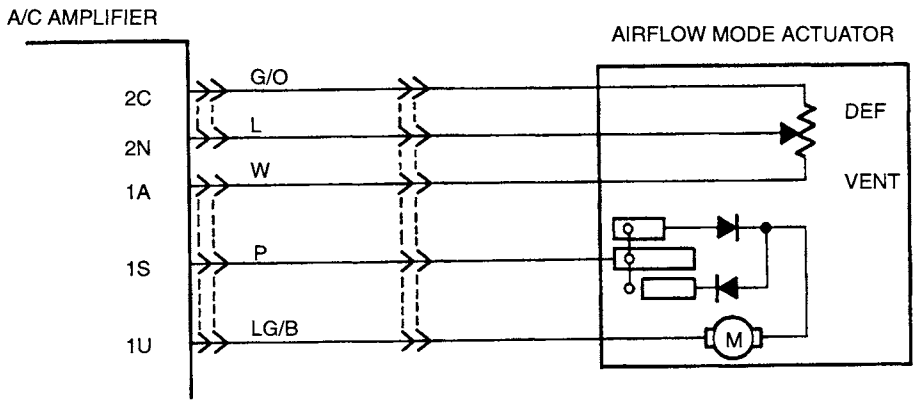


3ZA0UX-004

Step	Inspection procedure	Terminal	Result	Action
1	1) Remove air intake actuator. (Refer to page U–90.) 2) Turn ignition switch to ON. 3) Set fan switch at manual 4th speed. 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) Check air intake actuator. (Refer to page U–90.) 2) Does air intake actuator operate properly?	—	YES	Go to Step 3
			NO	Replace air intake actuator (Refer to page U–90)
3	1) Turn ignition switch to LOCK. 2) Disconnect A/C amplifier connector (26-pin). 3) Is there continuity between terminals of air intake actuator connector (female) and A/C amplifier connector (female: 26-pin)?	(LG/R)—(LG/B) (Terminal 1R), (W/L)—(LG/R), (L), (L/R)—(R), (L/O), (L/Y), (BR) wires	YES	Replace A/C amplifier (Refer to page U–96)
			NO	Repair wiring harness with no continuity (Air intake actuator — A/C amplifier)

3ZE0UX-081

Flowchart No.	Airflow mode actuator system inspection	Symptom ..... Airflow mode actuator does not operate properly Diagnostic trouble code 21 (present failure) or 22 (past failure) is indicated
6		Related parts ... Heater unit, airflow mode actuator, A/C amplifier, wiring harness

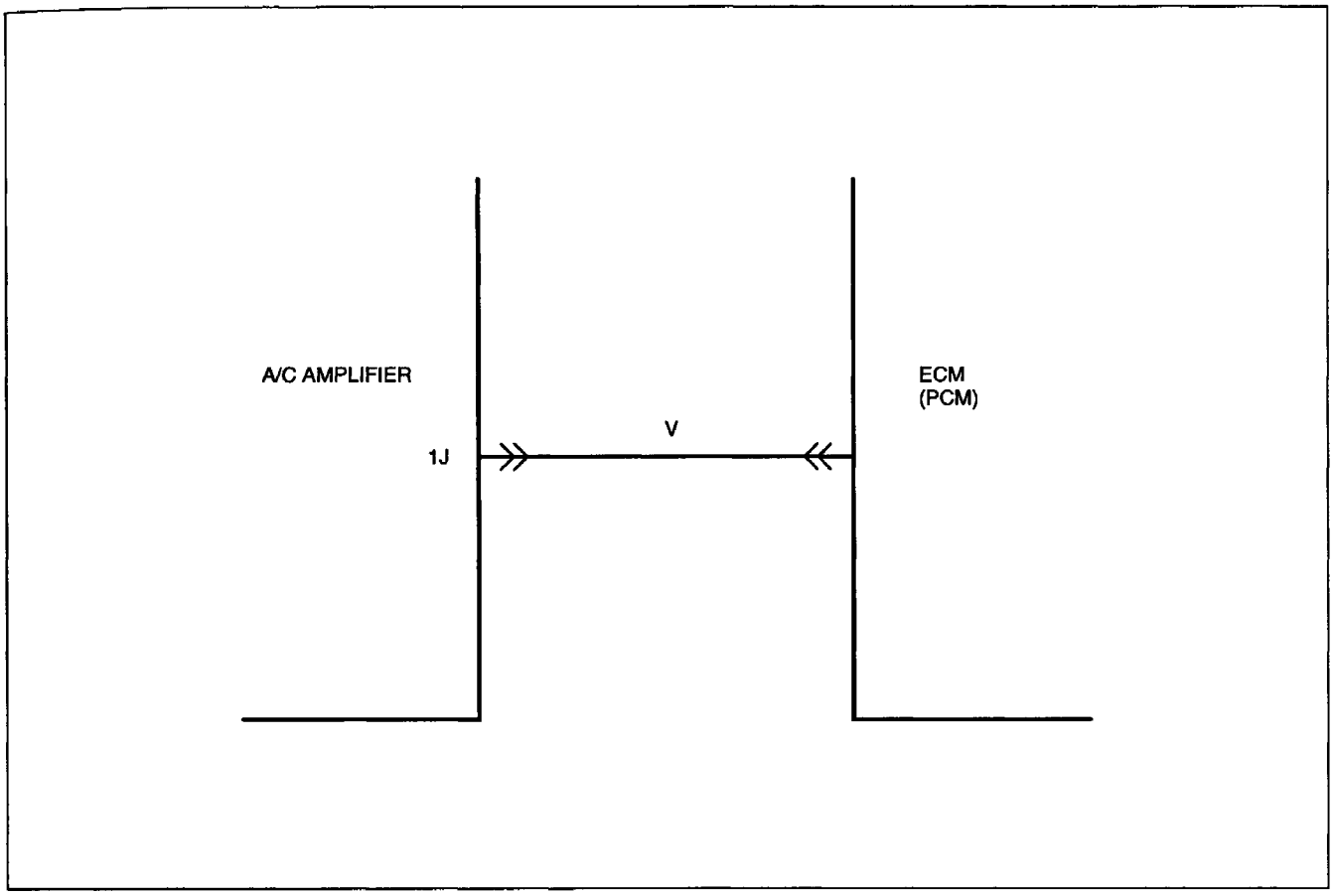


3ZE0UX–082

Step	Inspection procedure	Terminal	Result	Action
—	If diagnostic trouble code 21 (present failure) or 22 (past failure) is indicated, start from Step 2. Otherwise, start from Step 1.	—	—	—
1	1) Remove airflow mode actuator. (Refer to page U–92.) 2) Turn ignition switch to ON. 3) Set fan switch at manual 4th speed. 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–92.) 2) Does airflow mode actuator operate properly?	—	YES	Go to Step 3
			NO	Replace airflow mode actuator (Refer to page U–92)
3	1) Turn ignition switch to LOCK. 2) Disconnect A/C amplifier connector (26-pin) 3) Is there continuity between terminals of A/C amplifier connector (female: 26-pin) and terminals of airflow mode actuator connector (male)?	(W), (LG/B) (Terminal 1U), (P) wires	YES	Go to Step 4
			NO	Repair wiring harness with no continuity (A/C amplifier — Airflow mode actuator)
4	1) Disconnect A/C amplifier connector (22-pin). 2) Is there continuity between terminals of A/C amplifier connector (female: 22-pin) and terminals of airflow mode actuator connector (male)?	(L) (Terminal 2N), (G/O) wires	YES	Replace A/C amplifier (Refer to page U–96)
			NO	Repair wiring harness with no continuity (A/C amplifier — Airflow mode actuator)

3ZE0UX–083

Flowchart No.	Electrical load idle-up system inspection	Symptom ..... Electrical load idle-up does not operate with fan switch at 3rd or 4th
7		Related parts ... A/C amplifier, ECM (PCM), wiring harness

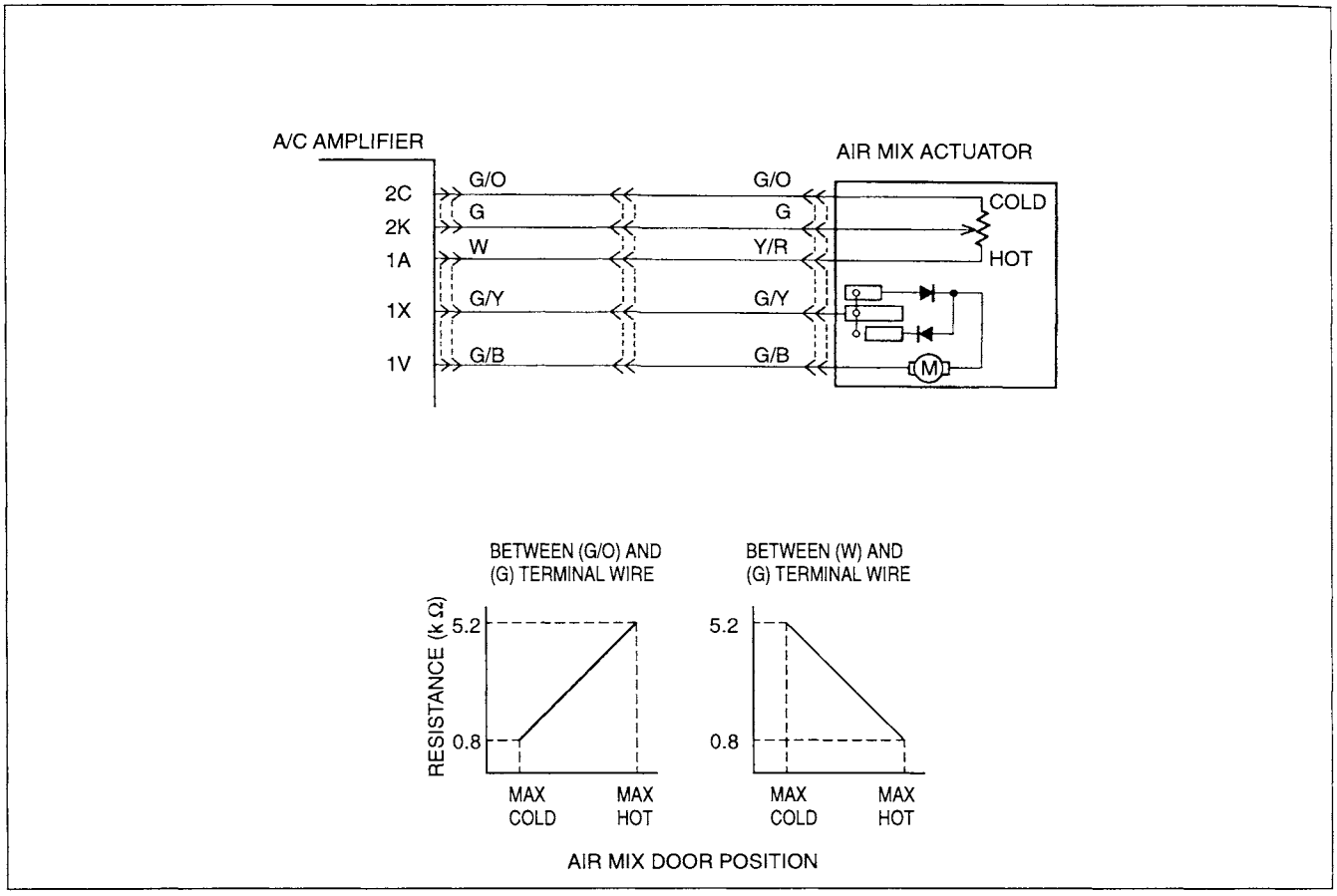


3ZE0UX-084

B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
1	1) Turn ignition switch to ON. 2) Measure voltage at terminal of A/C amplifier connector (female: 26-pin).	(V) wire	B+	Go to Step 2
			Other	Check for continuity between (V) wiring harness of ECM (PCM) and A/C amplifier, and check ECM (PCM) (Refer to sections F1, F2)
2	1) Set fan switch at manual 4th speed. 2) Measure voltage at terminal of A/C amplifier connector (female: 26-pin).	(V) wire	0 V	Check ECM (PCM) (Refer to sections F1, F2)
			Other	Replace A/C amplifier (Refer to page U-96)

Flowchart No.	Air mix actuator system inspection	Symptom ..... Air mix actuator does not operate properly Diagnostic trouble code 18 (present failure) or 19 (past failure) is indicated
8		Related parts ... Heater unit, air mix actuator, A/C amplifier, wiring harness

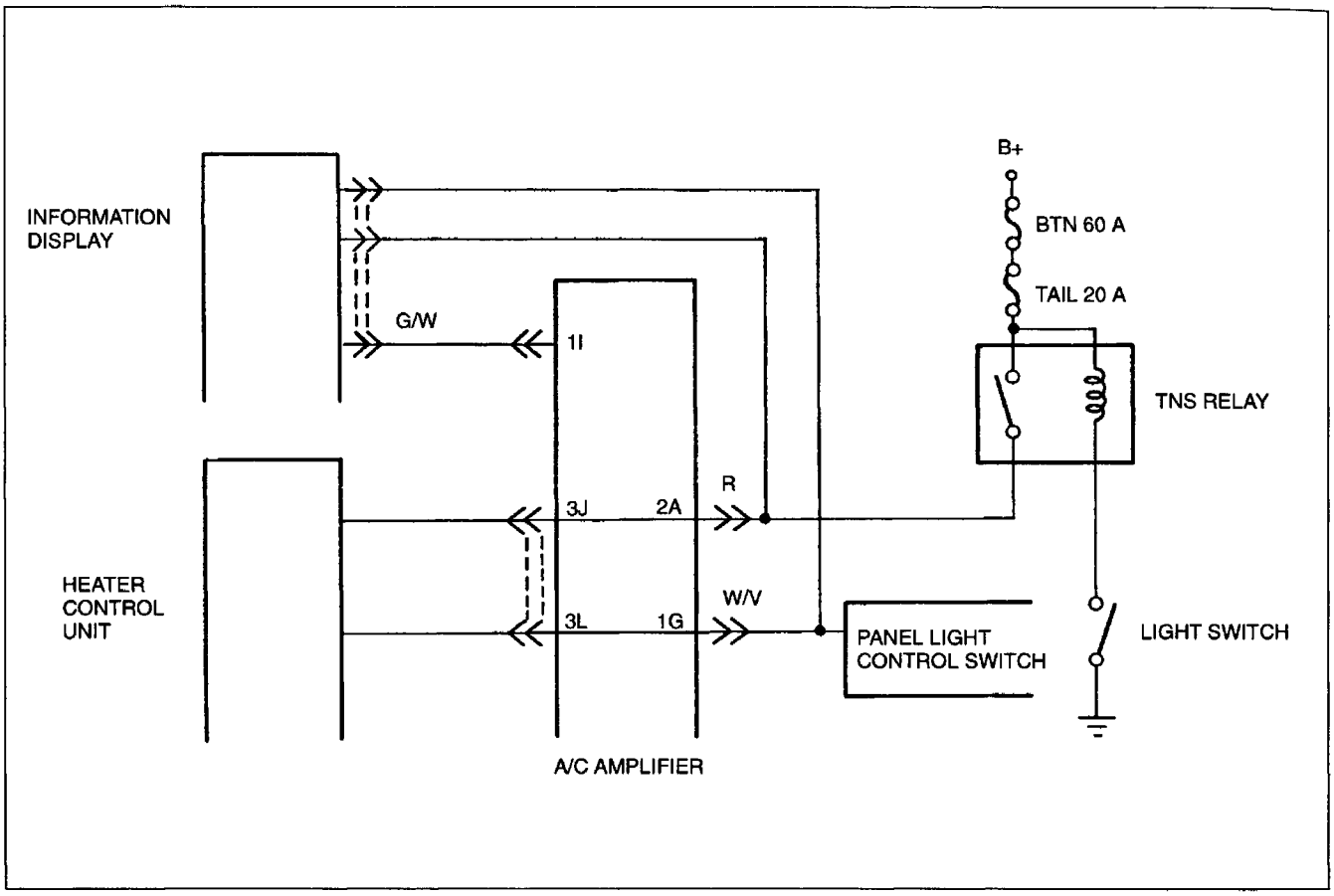


3ZE0UX–085

Step	Inspection procedure	Terminal	Result	Action
1	1) Start and warm up the engine. 2) Turn ignition switch to LOCK. 3) Disconnect A/C amplifier connectors (26-pin, 22-pin). 4) Disconnect blower motor connector. 5) Connect battery positive voltage to terminal A and ground to terminal B of the blower motor connector (male). 6) Connect battery positive voltage to terminal (G/B) or (G/Y) and ground to terminal (G/Y) or (G/B) of the A/C amplifier connector (female: 26-pin). 7) Verify that the airflow temperature changes. 8) Verify that resistance between (W) terminal wire of A/C amplifier connector (female: 26-pin) or (G/O) terminal wire of A/C amplifier connector (female: 22-pin) and (G) terminal wire (Terminal 2K) of A/C amplifier connector (female: 22-pin) are as shown in above figure. 9) Are outlet temperature and resistance specified?	—	YES	Replace A/C amplifier (Refer to page U–96)
			NO	In case trouble symptom were "Diagnostic trouble code 18 (present failure) or 19 (past failure) is indicated", remove all jumper wires and go to Step 3 In case trouble symptom were "Air mix actuator does not operate properly", remove all jumper wires and go to Step 2

Step	Inspection procedure	Terminal	Result	Action
2	1) Remove air mix actuator. (Refer to page U–91.) 2) Start and warm up the engine. 3) Set fan switch at manual 4th speed. 4) Operate air mix crank by hand. 5) Does discharge air temperature change smoothly?	—	YES	Go to Step 3
			NO	Check heater unit
3	1) Turn ignition switch to LOCK. 2) Disconnect A/C amplifier connector (26-pin). 3) Is there continuity between terminals of A/C amplifier connector (female: 26-pin) and air mix actuator connector (female)?	(W) — (Y/R), (G/Y), (G/B) wires	YES	Go to Step 4
			NO	Repair wiring harness with no continuity (A/C amplifier — Air mix actuator)
4	1) Disconnect A/C amplifier connector (22-pin). 2) Is there continuity between terminals of A/C amplifier connector (female: 22-pin) and air mix actuator connector (female)?	(G/O), (G) (Terminal 2K) wires	YES	Replace air mix actuator (Refer to page U–91)
			NO	Repair wiring harness with no continuity (A/C amplifier — Air mix actuator)

Flowchart No.	TNS system inspection	Symptom ..... Illumination light, indicator light of each switch and information display do not illuminate properly
9		Related parts ... A/C amplifier, heater control unit, information display, TNS relay, panel light control switch, wiring harness



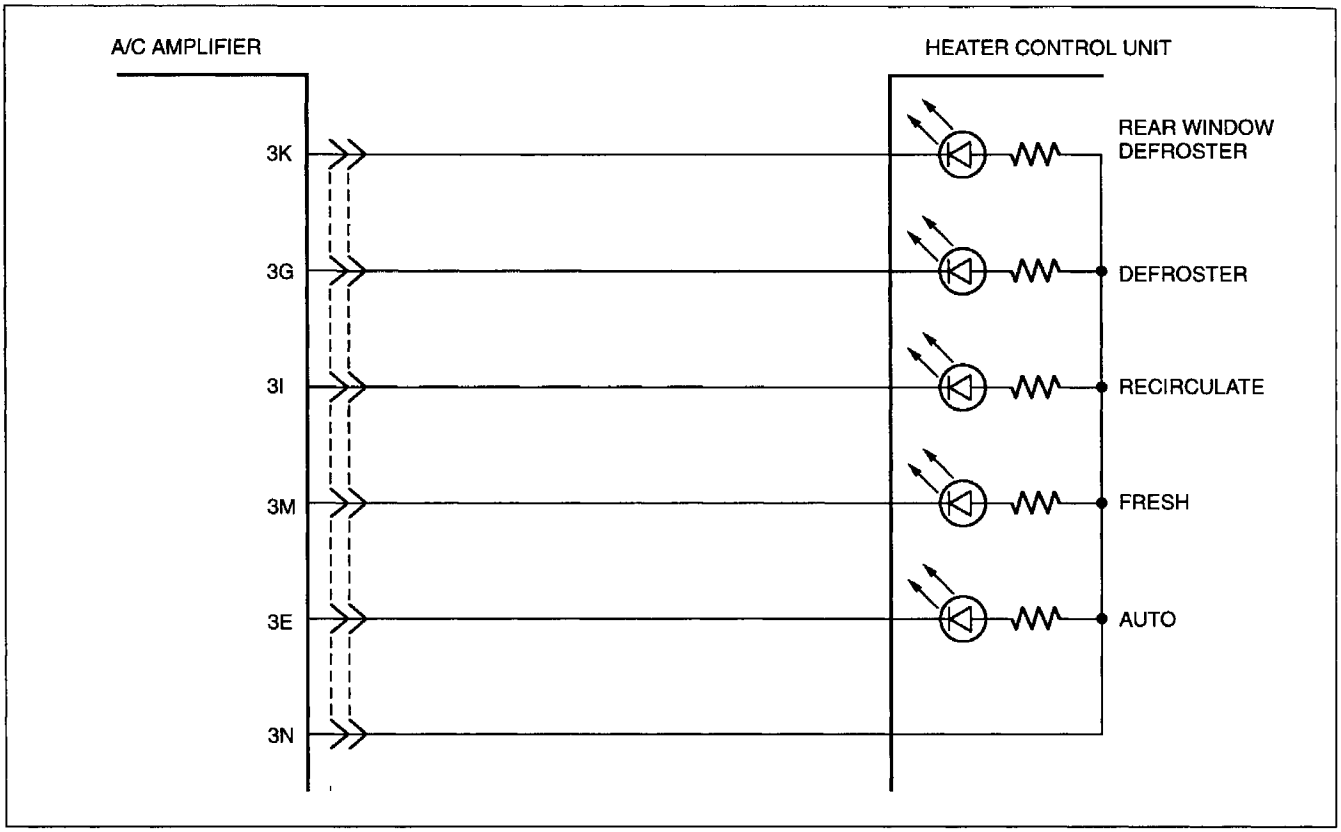
3ZE0UX-087

Step	Inspection procedure	Terminal	Result	Action
—	In case only each indicator light of heater control unit does not dim, start from Step 7. In case only information display does not dim or change brightness, start from Step 1. In case only illumination light of AMB switch does not turn on, start from Step 2. Otherwise, start from Step 4.	—	—	—
1	1) Disconnect A/C amplifier connector (26-pin) and information display connector. 2) Is there continuity between terminal of A/C amplifier connector (female: 26-pin) and information display connector (female)?	(G/W) wire	YES	Replace A/C amplifier or information display (Refer to page U–96, section T)
			NO	Repair (G/W) wiring harness (A/C amplifier — Information display)
2	1) Connect jumper wire between (W/V) terminal wire of information display connector (female) and ground. 2) Turn ignition switch to ON. 3) Turn light switch to ON. 4) Does illumination light of AMB switch turn on?	—	YES	Repair (W/V) wiring harness (Information dispaly — Panel light control switch)
			NO	Go to Step 3

B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
3	Measure voltage at terminal of information display connector (female).	(R) wire	B+	Replace information display (Refer to section T)
			Other	Repair (R) wiring harness (TNS relay — Information display)
4	1) Turn ignition switch to ON. 2) Turn light switch to ON. 3) Measure voltage at terminal of A/C amplifier connector (female: 22-pin).	(R) wire	B+	Go to Step 5
			Other	Check for continuity between (R) wiring harness of TNS relay and A/C amplifier, and check TNS relay system (Refer to section T)
5	1) Turn ignition switch to LOCK. 2) Turn light switch to OFF. 3) Disconnect A/C amplifier connector (20-pin). 4) Is there continuity between terminals of A/C amplifier connector (female: 20-pin)?	Terminal 3J — Terminal 3L	YES	Connect A/C amplifier connector and go to Step 6
			NO	Replace heater control unit (Refer to page U–96)
6	1) Connect jumper wire between (W/V) terminal wire of A/C amplifier connector (female: 26-pin) and ground. 2) Turn ignition switch to ON. 3) Turn light switch to ON. 4) Does illumination light of heater control unit turn on?	—	YES	Check for continuity between (W/V) wiring harness of A/C amplifier and panel light control switch, and check panel light control switch (Refer to section T)
			NO	Replace A/C amplifier (Refer to page U–96)
7	—	—	—	Replace A/C amplifier (Refer to page U–96)

Flowchart No.	Indicator light system inspection	Symptom ..... Indicator light of each switch does not illuminate properly
10		Related parts ... A/C amplifier, heater control unit

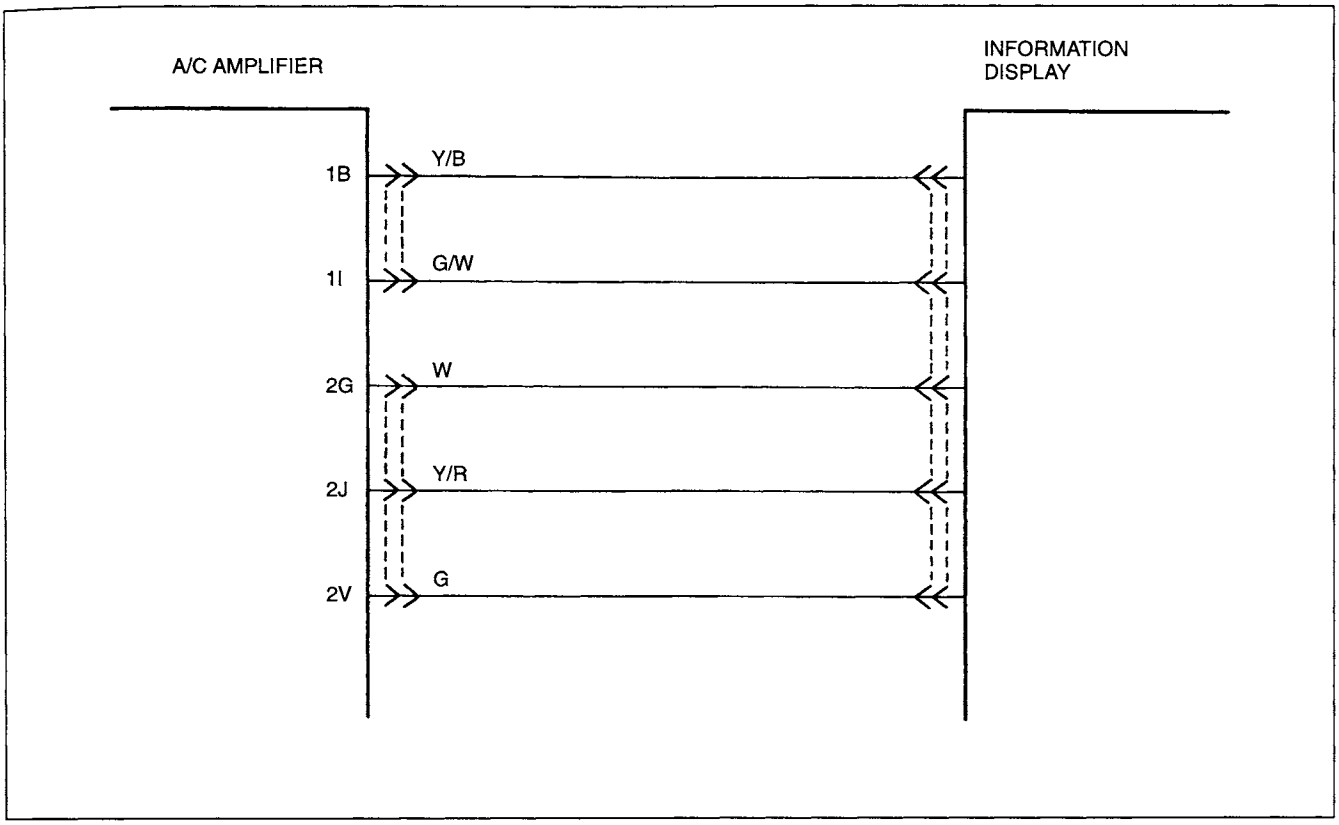


3ZE0UX–087

B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
1	1) Turn ignition switch to ON. 2) Turn on AUTO switch, DEFROSTER switch, REAR WINDOW DEFROSTER switch, and REC/FRESH switch. 3) Does each indicator light illuminate?	—	Partially	Go to Step 2
			Not at all	Go to Step 3
2	Measure voltage at terminals of A/C amplifier connector (female: 20-pin) that does not illuminate.	RECIRCULATE indicator light (3I), FRESH indicator light (3M), DEFROSTER indicator light (3G), AUTO indicator light (3E), REAR WINDOW DEFROSTER indicator light (3K)	0 V	Replace heater control unit (Refer to page U–96)
			Other	Replace A/C amplifier (Refer to page U–96)
3	Measure voltage at the terminals of A/C amplifier connector (female:20-pin).	Terminal 3N	B+	Check (3M) terminal wire
			Other	Replace A/C amplifier (Refer to page U–96)
		Terminal 3M	0 V	Replace heater control unit (Refer to page U–96)
			Other	Replace A/C amplifier (Refer to page U–96)

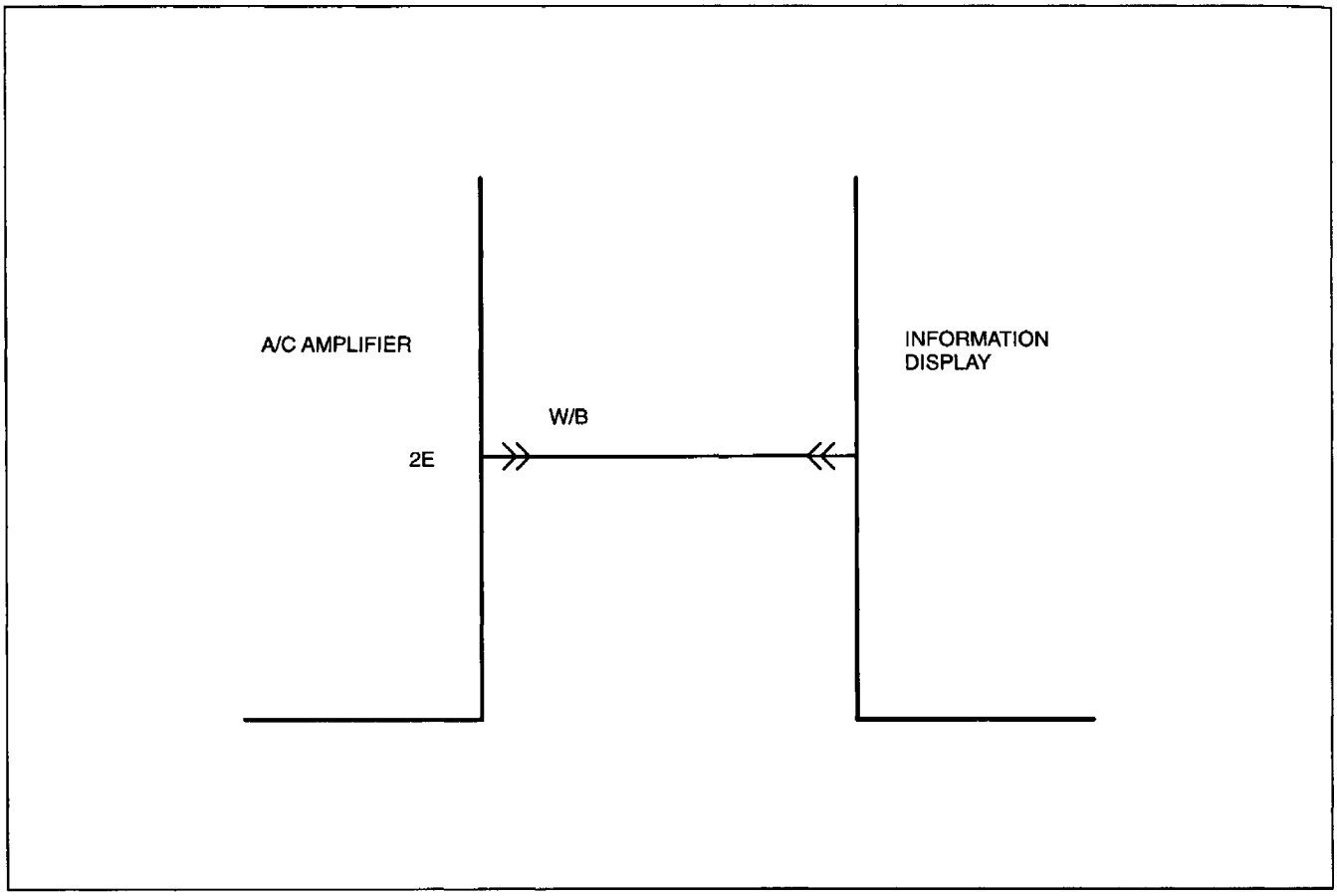
Flowchart No.	Serial communication system inspection	Symptom ..... Information display indications do not illuminate properly
11		Related parts ... A/C amplifier, information display, wiring harness



3ZE0UX-090

Step	Inspection procedure	Terminal	Result	Action
—	In case information display indications do not illuminate, start from Step 3. Otherwise, start from Step 1.	—	—	—
1	1) Disconnect A/C amplifier connector (26-pin) and information display connector. 2) Is there continuity between terminals of A/C amplifier connector (female: 26-pin) and information display connector (female)?	(G/W), (Y/B) wires	YES	Go to Step 2
			NO	Repair wiring harness with no continuity (A/C amplifier — Information display)
2	1) Disconnect A/C amplifier connector (22-pin). 2) Is there continuity between terminals of A/C amplifier connector (female: 22-pin) and information display connector (female)?	(W), (Y/R) wires	YES	Replace A/C amplifier or information display (Refer to page U–96, section T)
			NO	Repair wiring harness with no continuity (A/C amplifier — Information display)
3	Is there continuity between terminal of A/C amplifier connector (female: 22-pin) and ground?	(G) wire (Terminal 2V)	YES	Go to Step 4
			NO	Replace A/C amplifier (Refer to page U–96)
4	1) Disconnect A/C amplifier connector (22-pin) and information display connector. 2) Is there continuity between terminal of A/C amplifier connector (female: 22-pin) and information display connector (female)?	(G) wire (Terminal 2V)	YES	Check information display (Refer to section T)
			NO	Repair (G) wiring harness (A/C amplifier — Information display)

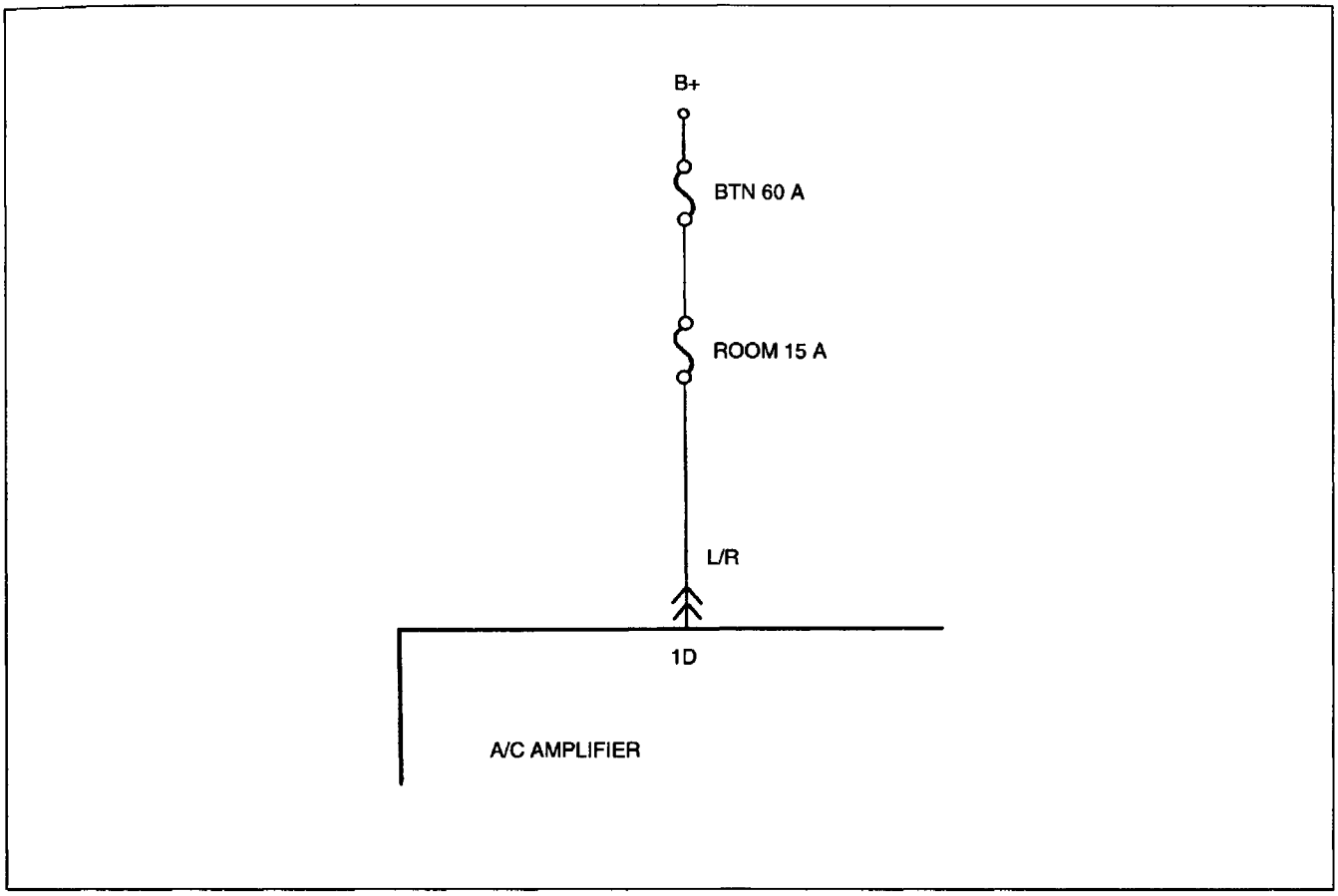
Flowchart No.	Ambient temperature indication system inspection	Symptom ..... Set temperature indication does not change to ambient temperature indication
12		Related parts ... A/C amplifier, information display, wiring harness



3ZE0UX-091

Step	Inspection procedure	Terminal	Result	Action
1	1) Turn ignition switch to ON. 2) Measure voltage at terminal of A/C amplifier connector (female: 22-pin).	(W/B) wire	3.6 V	Go to Step 2
			Other	Replace A/C amplifier (Refer to page U-96)
2	1) Hold AMB switch on. 2) Measure voltage at terminal of A/C amplifier connector (female: 22-pin).	(W/B) wire	0 V	Replace A/C amplifier (Refer to page U-96)
			Other	Go to Step 3
3	1) Turn AMB switch off. 2) Measure voltage at terminal of information display connector (female).	(W/B)wire	3.6 V	Replace information display (Refer to section T)
			Other	Repair (W/B) wiring harness (A/C amplifier — Information display)

Flowchart No.	A/C amplifier backup power source system inspection	Symptom ..... Always starts with set temperature at 25.0 °C {77 °F} and in AUTO mode
13		Related parts ... A/C amplifier, wiring harness

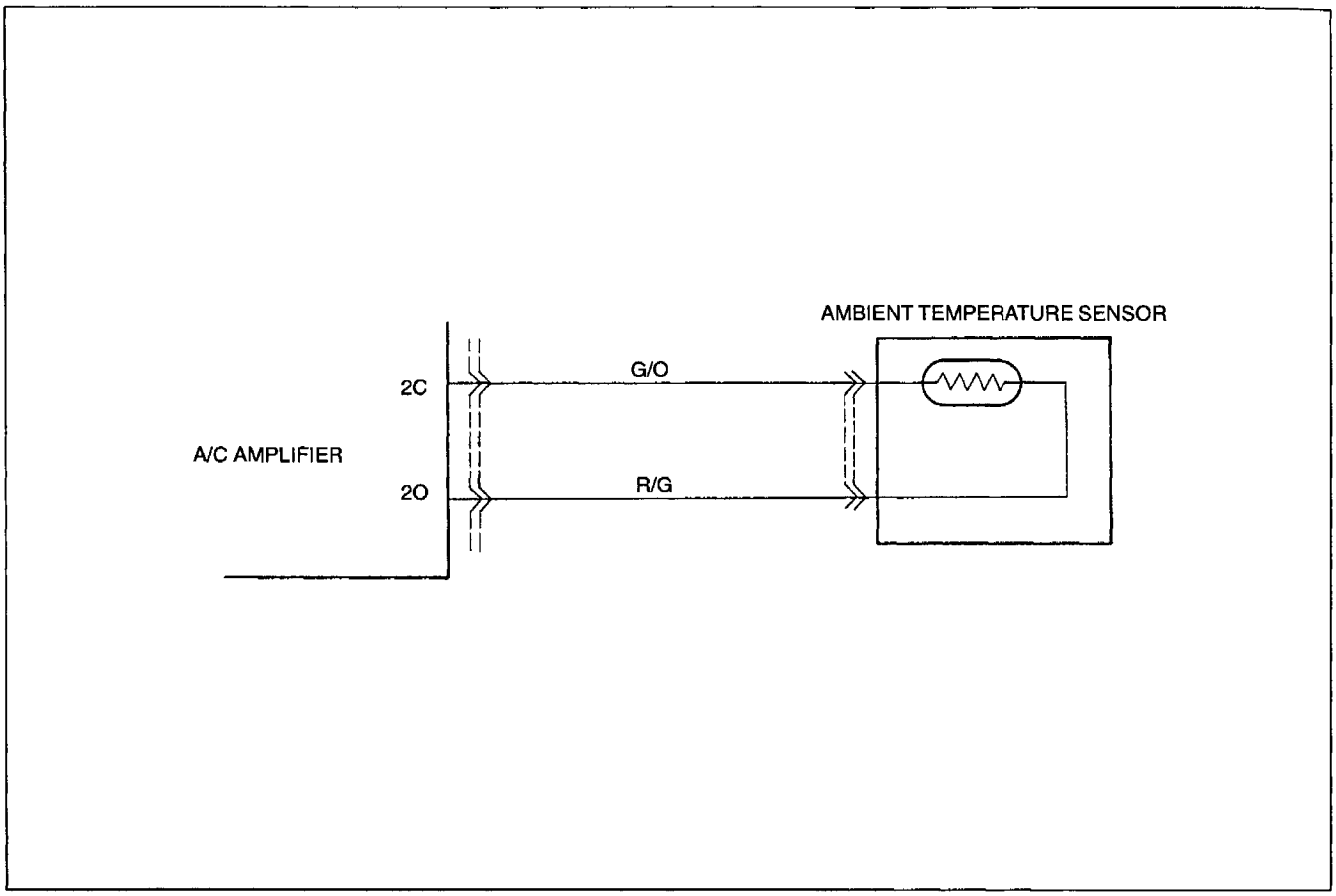


3ZE0UX–092

B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
—	Measure voltage at terminal of A/C amplifier connector (female: 26-pin).	(L/R) wire (Terminal 1D)	B+	Replace A/C amplifier (Refer to page U–96)
			Other	Repair (L/R) wiring harness (ROOM 15 A fuse — A/C amplifier)

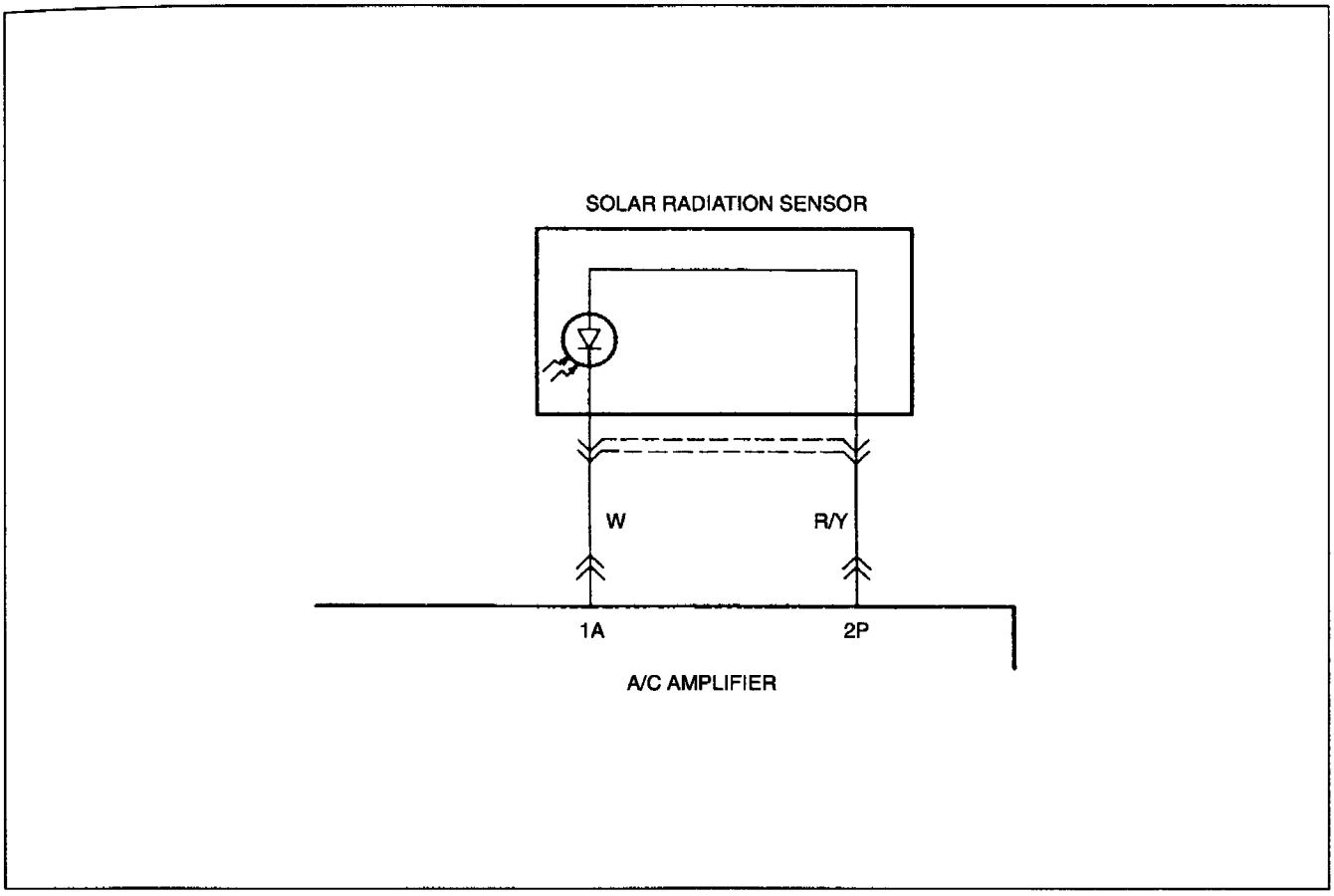
Flowchart No.	Ambient temperature sensor system inspection	Symptom ..... Ambient temperature indication is always 0 °C {32 °F} Diagnostic trouble code 12 (present failure) or 13 (past failure) is indicated
14		Related parts ... Ambient temperature sensor, A/C amplifier, wiring harness



3ZE0UX-093

Step	Inspection procedure	Terminal	Result	Action
1	1) Check ambient temperature sensor. (Refer to page U-94.) 2) Is resistance same as in graph?	—	YES	Go to Step 2
			NO	Replace ambient temperature sensor (Refer to page U-94)
2	1) Disconnect A/C amplifier connector (22-pin). 2) Is there continuity between terminals of A/C amplifier connector (female: 22-pin) and ambient temperature sensor connector (male)?	(R/G) wire	YES	Check (G/O) terminal wire
			NO	Repair (R/G) wiring harness (A/C amplifier — Ambient temperature sensor)
		(G/O) wire	YES	Replace A/C amplifier (Refer to page U-96)
			NO	Repair (G/O) wiring harness (A/C amplifier — Ambient temperature sensor)

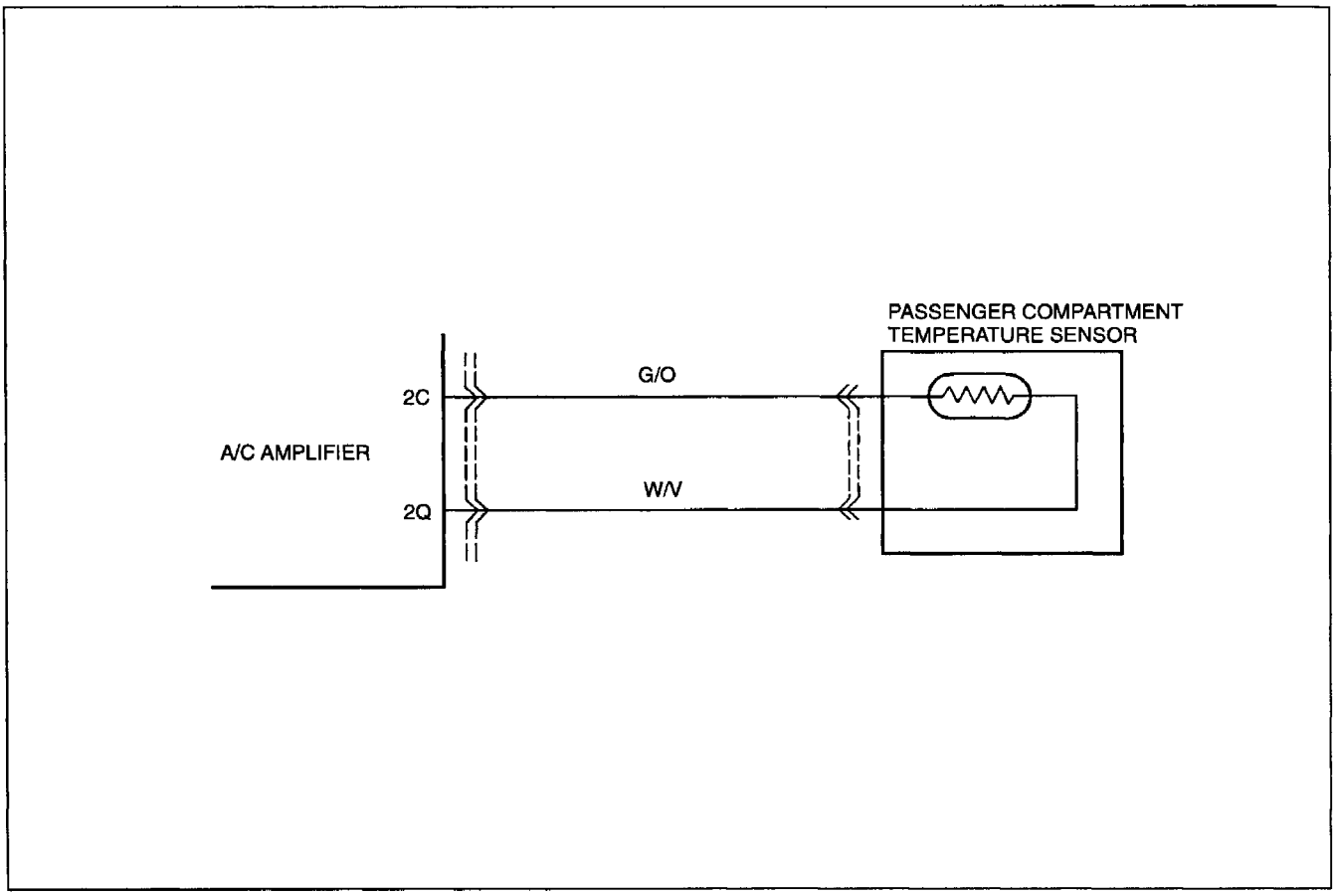
Flowchart No.	Solar radiation sensor system inspection	Symptom ..... Diagnostic trouble code 2 (present failure) is indicated
15		Related parts ... Solar radiation sensor, A/C amplifier, wiring harness



3ZE0UX-094

Step	Inspection procedure	Terminal	Result	Action
1	1) Check solar radiation sensor. (Refer to page U-93.) 2) Is output voltage above 0.45 V?	—	YES	Go to Step 2
			NO	Replace solar radiation sensor (Refer to page U-93)
2	1) Disconnect A/C amplifier connector (22-pin). 2) Is there continuity between terminals of A/C amplifier connector (female: 22-pin) and solar radiation sensor connector (female)?	(R/Y) wire	YES	Go to Step 3
			NO	Repair (R/Y) wiring harness (A/C amplifier — Solar radiation sensor)
3	1) Disconnect A/C amplifier connector (26-pin). 2) Is there continuity between terminals of A/C amplifier connector (female: 26-pin) and solar radiation sensor connector (female)?	(W) wire	YES	Replace A/C amplifier (Refer to page U-96)
			NO	Repair (W) wiring harness (A/C amplifier — Solar radiation sensor)

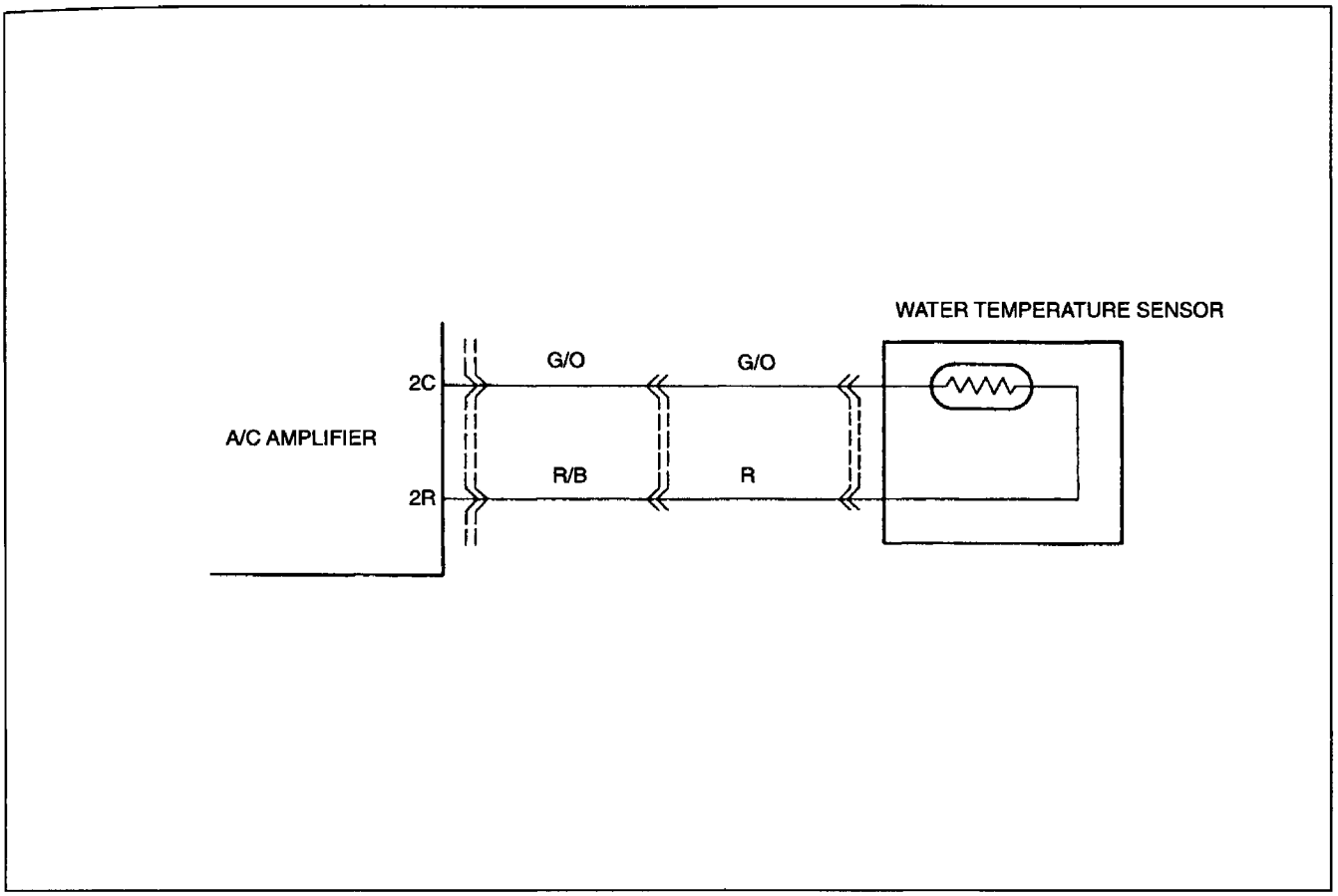
Flowchart No.	Passenger compartment temperature sensor system inspection	Symptom ..... Diagnostic trouble code 6 (present failure) or 7 (past failure) is indicated
16		Related parts ... Passenger compartment temperature sensor, A/C amplifier, wiring harness



3ZE0UX–095

Step	Inspection procedure	Terminal	Result	Action
1	1) Check passenger compartment temperature sensor. (Refer to page U–93.) 2) Is resistance same as in graph?	—	YES	Go to Step 2
			NO	Replace passenger compartment temperature sensor (Refer to page U–93)
2	1) Disconnect A/C amplifier connector (22-pin). 2) Is there continuity between terminals of A/C amplifier connector (female: 22-pin) and passenger compartment temperature sensor connector (female)?	(W/V) wire	YES	Check (G/O) terminal wire
			NO	Repair (W/V) wiring harness (A/C amplifier — Passenger compartment temperature sensor)
		(G/O) wire	YES	Replace A/C amplifier (Refer to page U–96)
			NO	Repair (G/O) wiring harness (A/C amplifier — Passenger compartment temperature sensor)

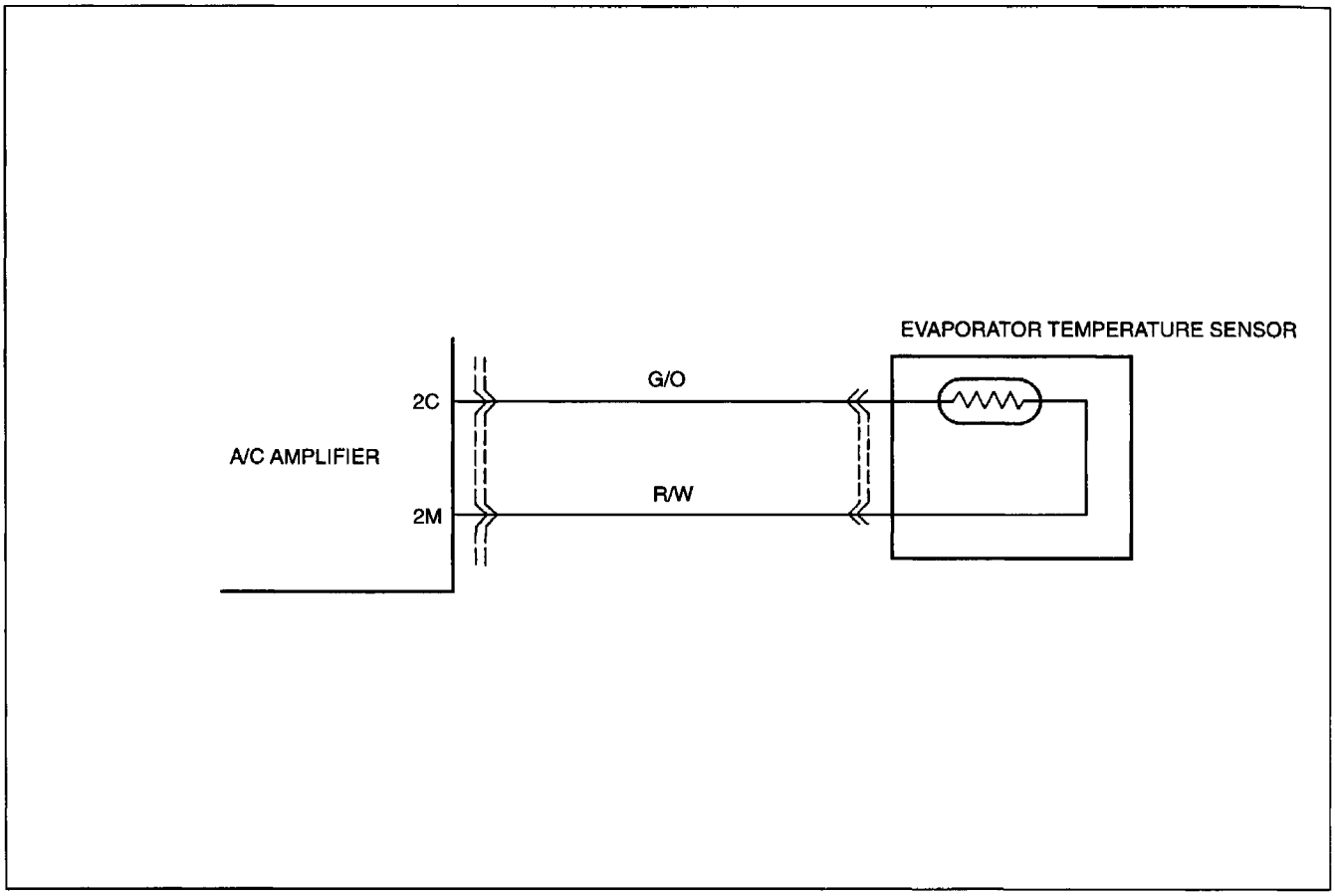
Flowchart No.	Water temperature sensor system inspection	Symptom ..... Diagnostic trouble code 14 (present failure) or 15 (past failure) is indicated
17		Related parts ... Water temperature sensor, A/C amplifier, wiring harness



3ZE0UX-096

Step	Inspection procedure	Terminal	Result	Action
1	1) Check water temperature sensor. (Refer to page U-95.) 2) Is resistance same as in graph?	—	YES	Go to Step 2
			NO	Replace water temperature sensor (Refer to page U-95)
2	1) Disconnect A/C amplifier connector (22-pin). 2) Is there continuity between terminals of A/C amplifier connector (female: 22-pin) and water temperature sensor connector (female)?	(R/B) — (R) wire	YES	Check (G/O) terminal wire
			NO	Repair (R/B) — (R) wiring harness (A/C amplifier — Water temperature sensor)
		(G/O) wire	YES	Replace A/C amplifier (Refer to page U-96)
			NO	Repair (G/O) wiring harness (A/C amplifier — Water temperature sensor)

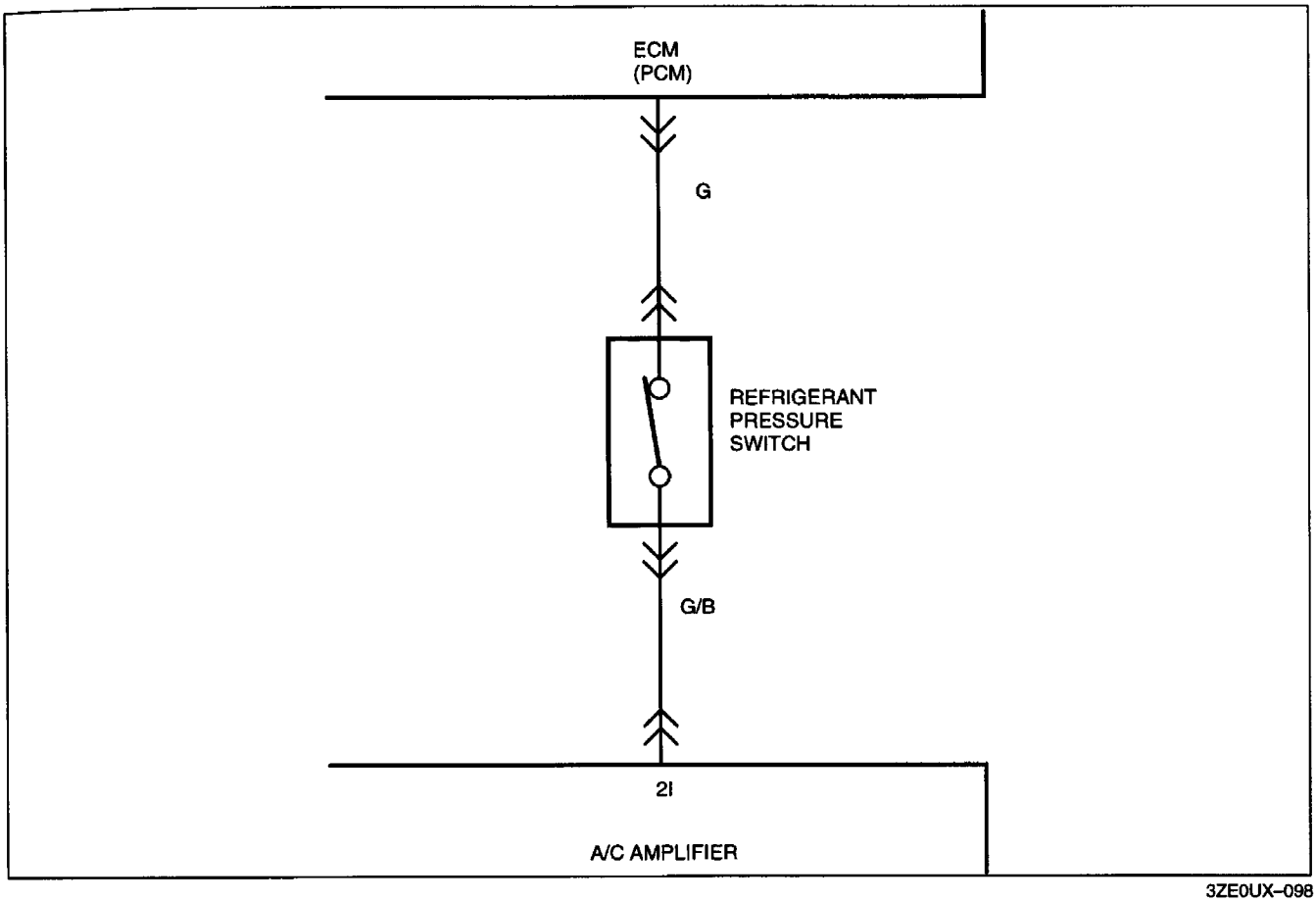
Flowchart No.	Evaporator temperature sensor system inspection	Symptom ..... Diagnostic trouble code 10 (present failure) or 11 (past failure) is indicated
18		Related parts ... Evaporator temperature sensor, A/C amplifier, wiring harness



3ZE0UX-097

Step	Inspection procedure	Terminal	Result	Action
1	1) Check evaporator temperature sensor. (Refer to page U-95.) 2) Is resistance same as in graph?	—	YES	Go to Step 2
			NO	Replace evaporator temperature sensor (Refer to page U-95)
2	1) Disconnect A/C amplifier connector (22-pin). 2) Is there continuity between terminals of A/C amplifier connector (female: 22-pin) and evaporator temperature sensor connector (female)?	(R/W) wire	YES	Check (G/O) terminal wire
			NO	Repair (R/W) wiring harness (A/C amplifier — Evaporator temperature sensor)
		(G/O) wire	YES	Replace A/C amplifier (Refer to page U-96)
			NO	Repair (G/O) wiring harness (A/C amplifier — Evaporator temperature sensor)

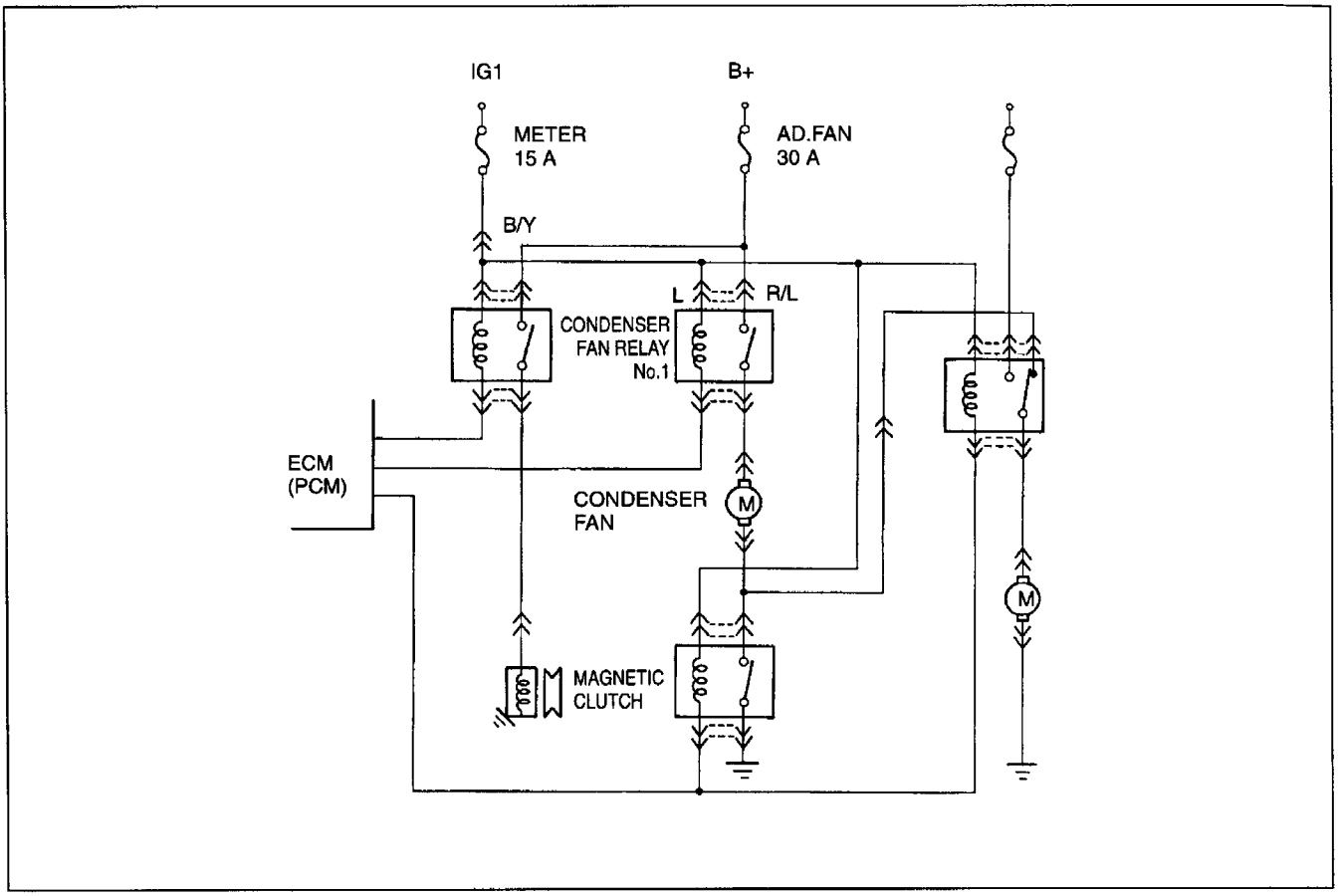
Flowchart No.	A/C signal system inspection	Symptom ..... Magnetic clutch, condenser fan, and A/C compressor idle-up do not operate
19		Related parts ... A/C amplifier, refrigerant pressure switch, ECM (PCM), wiring harness



3ZE0UX–098

Step	Inspection procedure	Terminal	Result	Action
1	1) Check refrigerant pressure switch. (Refer to page U–86.) 2) Is there continuity between terminals of refrigerant pressure switch connector (male)?	—	YES	Go to Step 2
			NO	Replace refrigerant pressure switch (Refer to page U–86)
2	1) Disconnect refrigerant pressure switch connector. 2) Turn ignition switch to ON. 3) Measure voltage at terminal of the refrigerant pressure switch connector (female).	(G) wire	5 V	Connect refrigerant pressure switch connector and go to Step 3
			Other	Check for continuity between (G) wiring harness of ECM (PCM) and refrigerant pressure switch, and check ECM (PCM) (Refer to sections F1, F2)
3	Measure voltage at terminal of A/C amplifier connector (female: 22-pin).	(G/B) wire	5 V	Go to Step 4
			Other	Repair (G/B) wiring harness (Refrigerant pressure switch — A/C amplifier)
4	1) Set fan switch at manual 4th speed. 2) Turn A/C switch on. 3) Measure voltage at terminal of A/C amplifier connector (female: 22-pin).	(G/B) wire	3.1—3.5 V or below 1.5 V	Check ECM (PCM) (Refer to sections F1, F2)
			Other	Replace A/C amplifier (Refer to page U–96)

Flowchart No.	A/C power source system inspection	Symptom ..... A/C compressor idle-up operates, but magnetic clutch and condenser fan do not operate
20		Related parts ... ECM (PCM), wiring harness

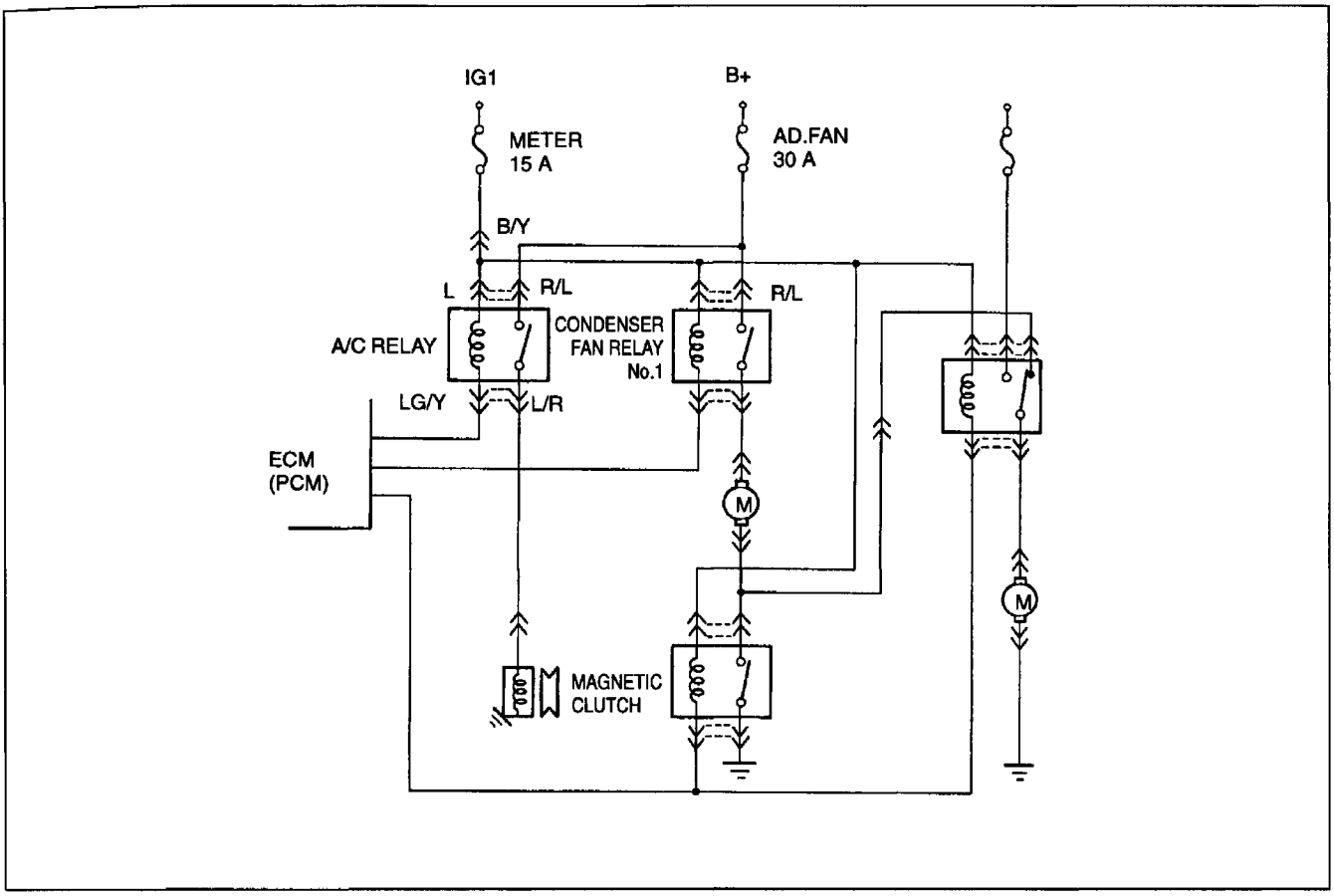


3ZU0UX-020

B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
—	Measure voltage at terminals of condenser fan relay No.1 connector (female).	(R/L) wire	B+	Check (L) terminal wire
			Other	Repair (R/L) wiring harness (AD. FAN 30 A fuse — Condenser fan relay No.1)
		(L) wire	B+	Check ECM (PCM) (Refer to sections F1, F2)
			Other	Repair (L) — (B/Y) wiring harness (METER 15 A fuse — Condenser fan relay No.1)

Flowchart No.	Magnetic clutch system inspection	Symptom ..... Only magnetic clutch does not operate
21		Related parts ... A/C relay, magnetic clutch, ECM (PCM), wiring harness

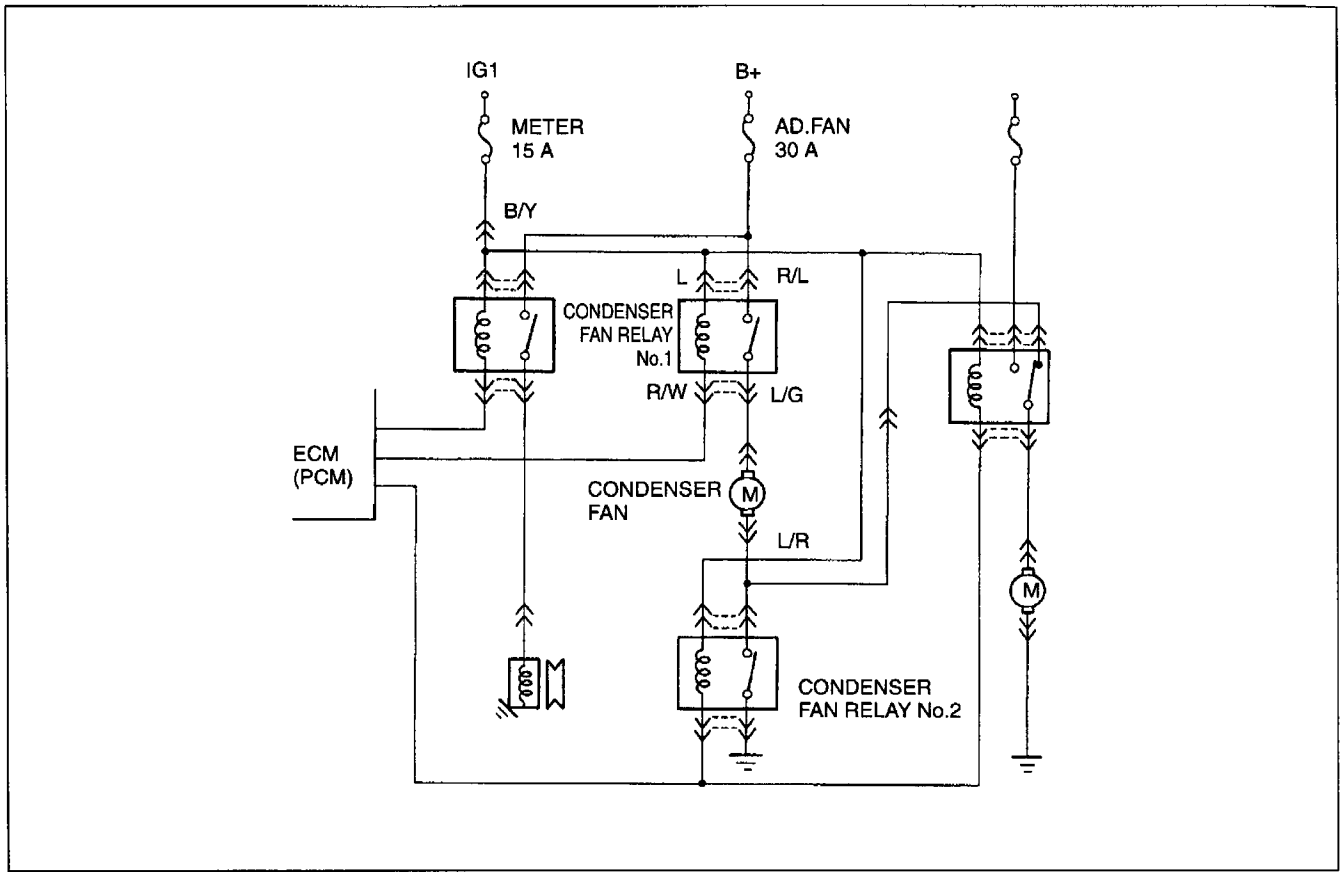


3ZU0UX–020

B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
1	1) Connect jumper wire between (LG/Y) of A/C relay connector (female) and ground. 2) Turn ignition switch to ON. 3) Does magnetic clutch operate?	—	YES	Check for continuity between (LG/Y) wiring harness of A/C relay and ECM (PCM), and check ECM (PCM) (Refer to sections F1, F2)
			NO	Go to Step 2
2	Measure voltage at terminals of A/C relay connecter (female).	(L/R) wire	B+	Go to Step 3
			Other	Check (R/L) terminal wire
		(R/L) wire	B+	Check (L) terminal wire
			Other	Repair (R/L) wiring harness (AD. FAN 30 A fuse — A/C relay)
		(L) wire	B+	Replace A/C relay (Refer to page U–87)
			Other	Repair (L) — (B/Y) wiring harness (METER 15 A fuse — A/C relay)
3	Measure voltage at terminal of magnetic clutch connector (female).	(L/R) wire	B+	Check magnetic clutch (Refer to page U–84)
			Other	Repair (L/R) wiring harness (A/C relay — Magnetic clutch)

Flowchart No.	Condenser fan system inspection	Symptom ..... Only condenser fan does not operate
22		Related parts ... Condenser fan relay No.1, condenser fan, ECM (PCM), wiring harness

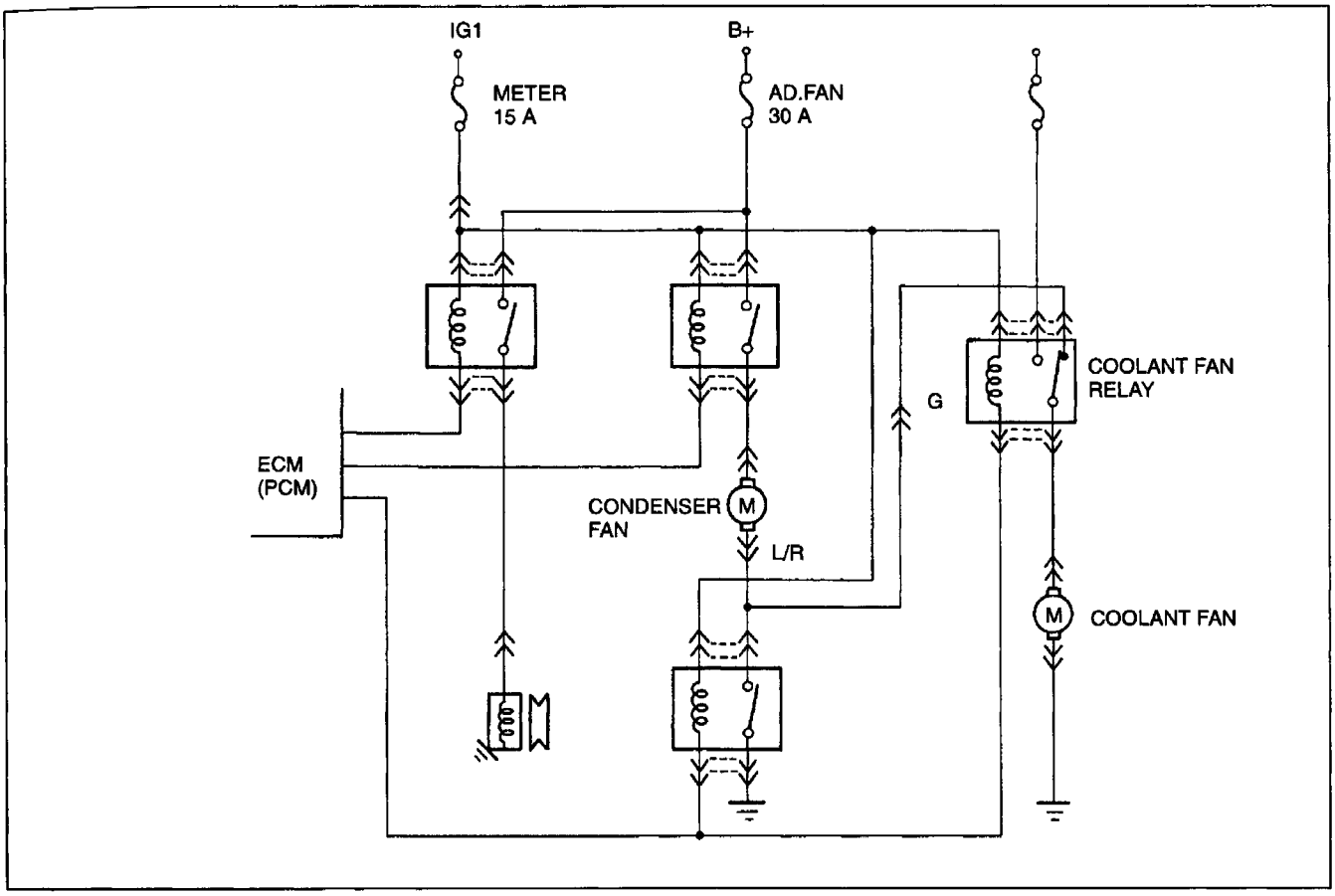


3ZU0UX–020

B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
1	1) Connect jumper wire between (R/W) terminal wire of condenser fan relay No. 1 connector (female) and ground. 2) Turn ignition switch to ON. 3) Does condenser fan operate?	—	YES	Check for continuity between (R/W) wiring harness of condenser fan relay No. 1 and ECM (PCM), and check ECM (PCM) (Refer to sections F1, F2)
			NO	Go to Step 2
2	Measure voltage at terminals of condenser fan relay No.1 connector (female).	(L/G) wire	B+	Go to Step 3
			Other	Check (R/L) terminal wire
		(R/L) wire	B+	Check (L) terminal wire
			Other	Repair (R/L) wiring harness (AD. FAN 30 A fuse — Condenser fan relay No.1)
		(L) wire	B+	Replace condenser fan relay No.1 (Refer to page U–87)
			Other	Repair (L) — (B/Y) wiring harness (METER 15 A fuse — Condenser fan relay No.1)
3	Measure voltage at terminals of condenser fan connector (female).	(L/G) wire	B+	Check (L/R) terminal wire
			Other	Repair (L/G) wiring harness (Condenser fan relay No.1 — Condenser fan)
		(L/R) wire	0 V	Check condenser fan (Refer to page U–85)
			Other	Repair (L/R) wiring harness (Condenser fan — Condenser fan relay No.2)

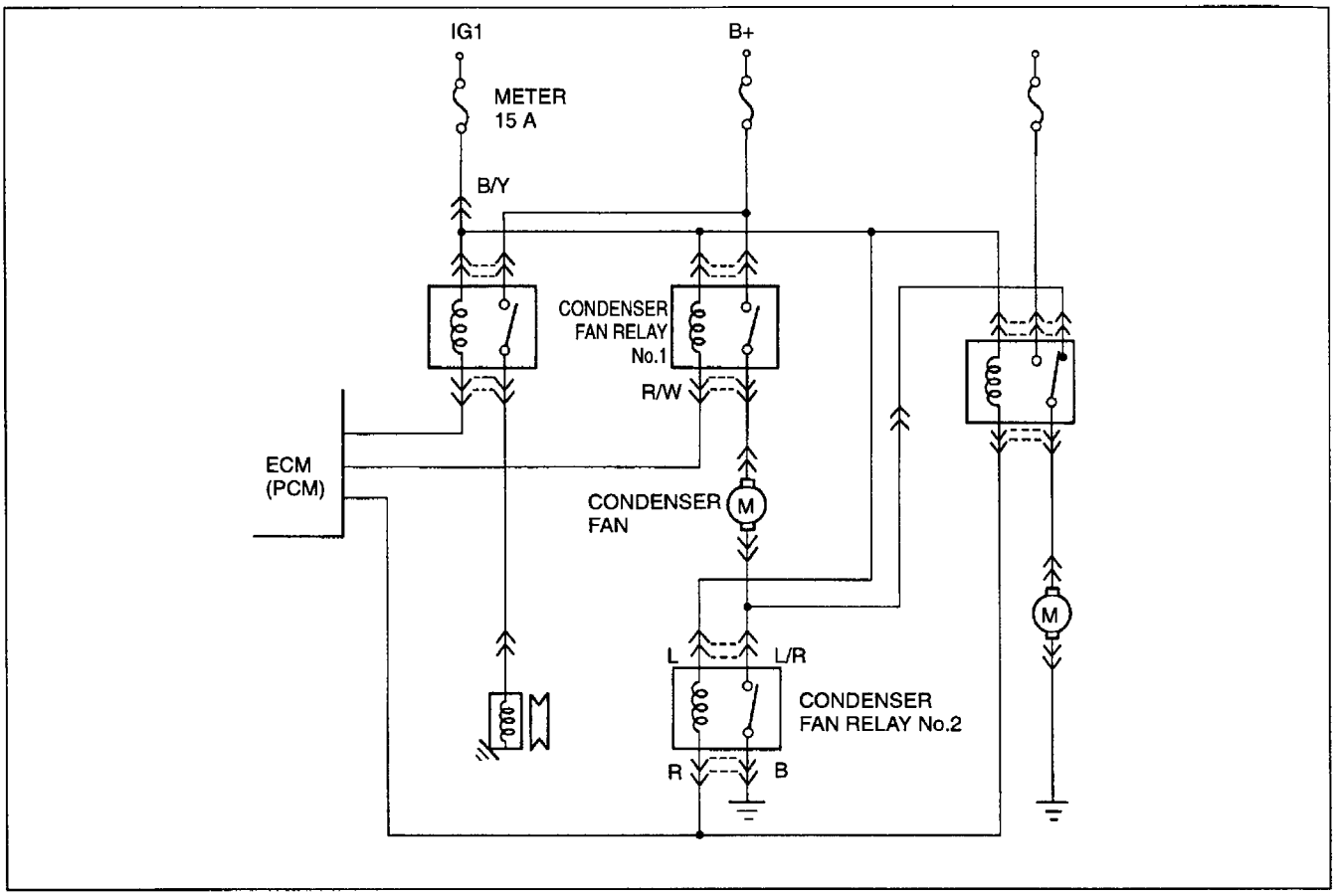
Flowchart No.	Coolant fan system inspection	Symptom ..... Condenser fan does not operate with condenser fan speed at Lo
23		Related parts ... Wiring harness, coolant fan relay, coolant fan



3ZE0UX–103

Step	Inspection procedure	Terminal	Result	Action
—	—	—	—	Check for continuity between (L/R) — (G) wiring harness of condenser fan and coolant fan relay, and check coolant fan system (Refer to sections F1, F2)

Flowchart No.	Condenser fan relay No.2 system inspection	Symptom ..... Condenser fan does not operate with condenser fan speed at Hi
24		Related parts ... Condenser fan relay No.2, ECM (PCM), wiring harness

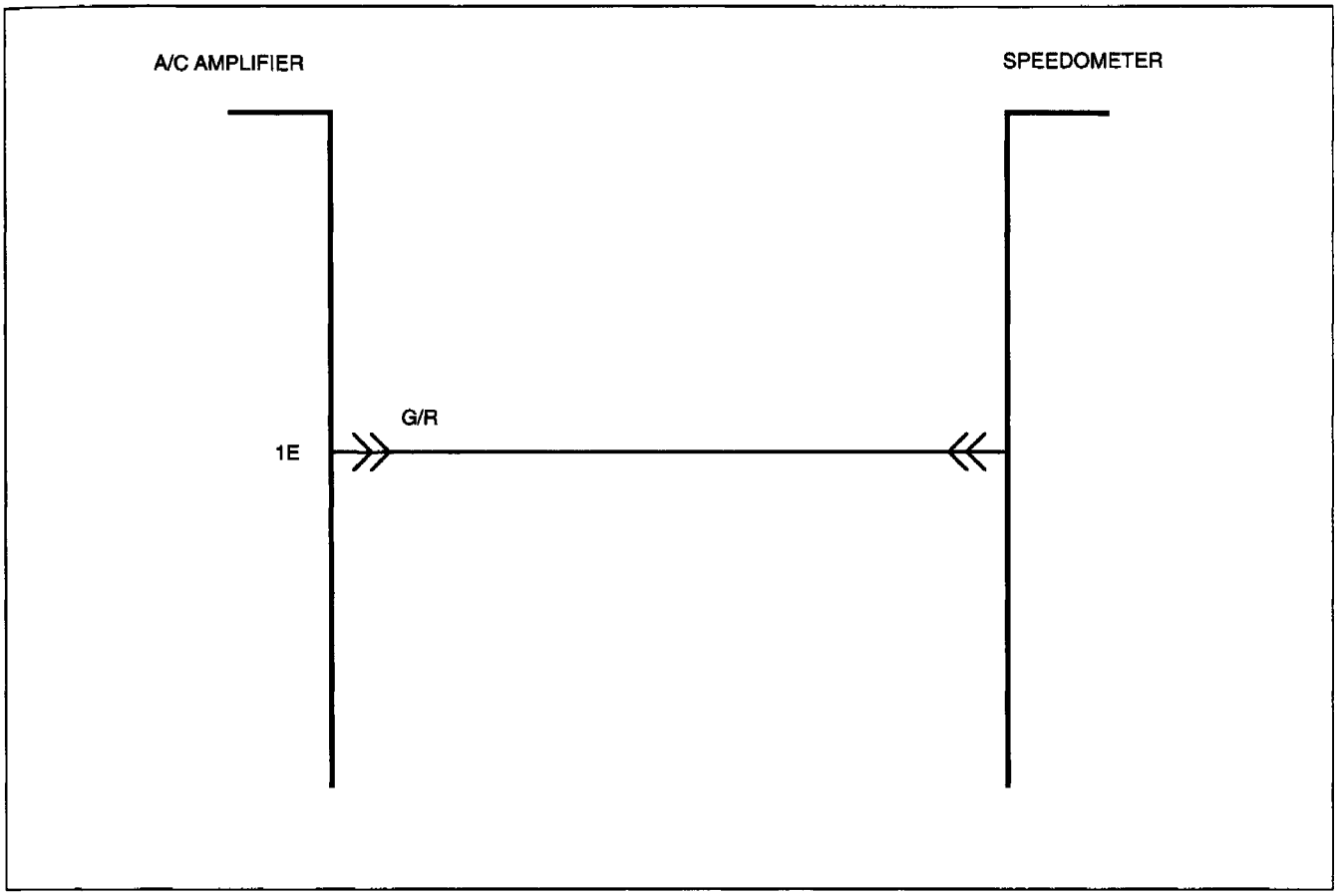


3ZE0UX-101

B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
1	1) Connect jumper wire between (R/W) terminal wire of condenser fan relay No.1 connector (female) and ground. 2) Connect jumper wire between (R) terminal wire of condenser fan relay No.2 connector (female) and ground. 3) Turn ignition switch to ON. 4) Does condenser fan operate?	—	YES	Check for continuity between (R) wiring harness of condenser fan relay No.2 and ECM (PCM), and check ECM (PCM) (Refer to sections F1, F2)
			NO	Go to Step 2
2	Measure voltage at terminals of condenser fan relay No.2 connector (female).	(L) wire	B+	Check (B) terminal wire
			Other	Repair (L) — (B/Y) wiring harness (METER 15 A fuse — Condenser fan relay No.2)
		(B) wire	0 V	Check (L/R) terminal wire
			Other	Repair (B) wiring harness (Condenser fan relay No.2 — Ground)
		(L/R) wire	0 V	Repair (L/R) wiring harness (Condenser fan — Condenser fan relay No.2)
			Other	Replace condenser fan relay No.2 (Refer to page U–87)

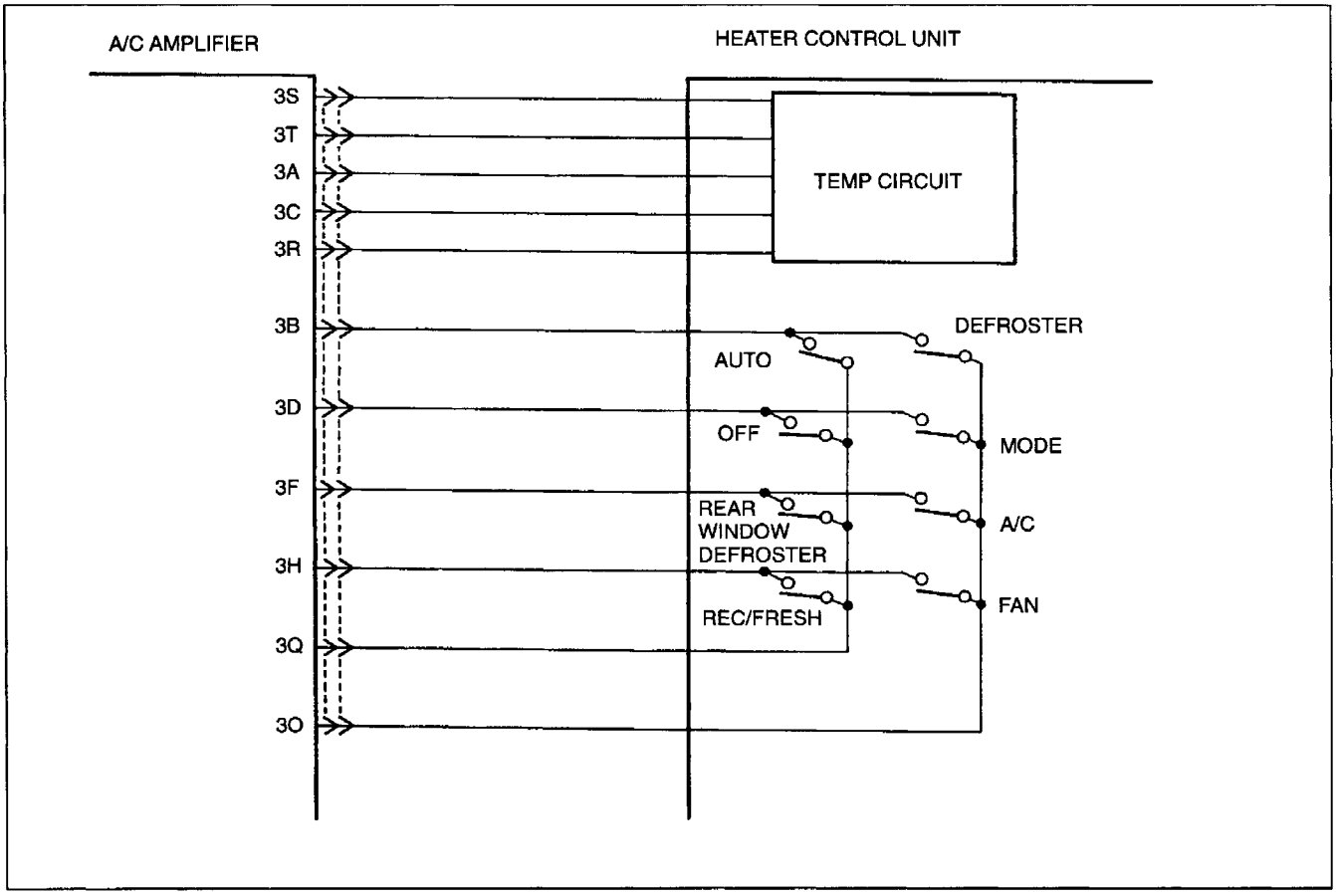
Flowchart No.	Vehicle speed correction control system inspection	Symptom ..... When FRESH and AUTO control (except MAX COLD and MAX HOT), air outlet volume changes in compliance with vehicle speed ("Vehicle speed correction" does not operate)
25		Related parts ... A/C amplifier, speedometer, wiring harness



3ZE0UX–105

Step	Inspection procedure	Terminal	Result	Action
1	1) Raise front of vehicle. 2) Selector lever into neutral (N range). 3) Rotate front wheels by hand at same time and measure voltage at terminal of A/C amplifier connector (female: 26-pin). 4) Does meter needle make a routine move between 0 V and 5 V?	(G/R) wire	YES	Replace A/C amplifier (Refer to page U–96)
			NO	Go to Step 2
2	1) Disconnect A/C amplifier connector (26-pin). 2) Disconnect instrument cluster connector (16-pin). (Refer to section T) 3) Is there continuity between A/C amplifier connector (female: 26-pin) and speedometer connector (female: 16-pin)?	(G/R) wire	YES	Check speedometer (Refer to section T)
			NO	Repair (G/R) wire harness (A/C amplifier — Speedometer)

Flowchart No.	Heater control unit system inspection	Symptom ..... Control system operation does not correspond to heater control unit operation
26		Related parts ... Heater control unit, A/C amplifier

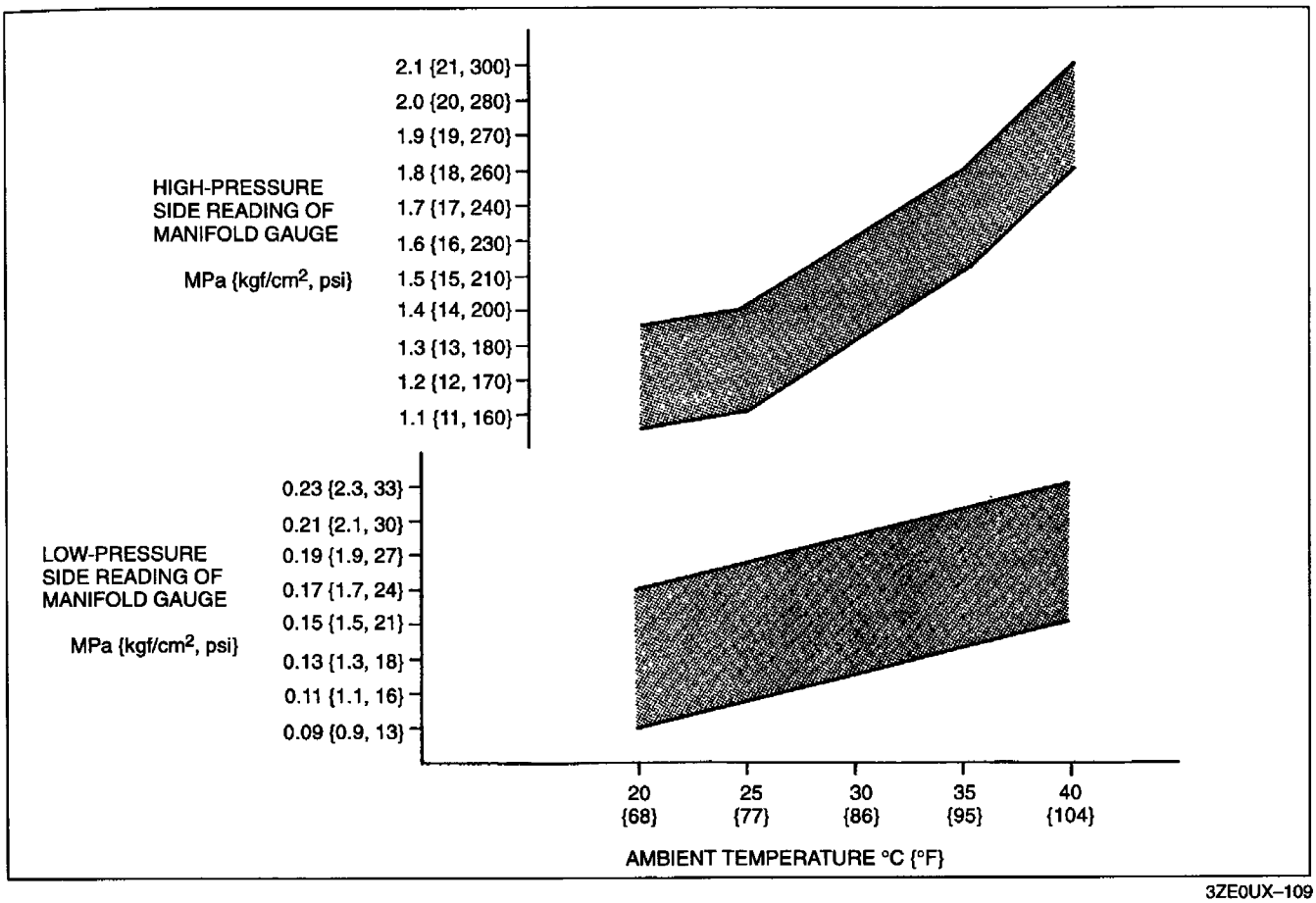


3ZE0UX-106

B+: Battery positive voltage

Step	Inspection procedure	Terminal	Result	Action
—	If system does not operate by operating temperature setting dial, start from Step 2. Otherwise start Step 1.	—	—	—
1	1) Check heater control unit. (Refer to page U–106.) 2) Is there continuity between switch terminals?	—	YES	Replace A/C amplifier (Refer to page U–96)
			NO	Replace heater control unit (Refer to page U–96)
2	1) Turn ignition switch to ON. 2) Measure voltage at terminals of A/C amplifier connector (female: 20-pin).	Terminal 3R	5 V	Check terminal 3S
			Other	Replace A/C amplifier (Refer to page U–96)
		Terminal 3S	B+	Go to Step 3
			Other	Replace A/C amplifier (Refer to page U–96)
3	1) Turn ignition switch to LOCK. 2) Is there continuity between terminal A/C amplifier connector (female: 20-pin) and ground?	Terminal 3T	YES	Replace A/C amplifier or heater control unit (Refer to page U–96)
			NO	Replace A/C amplifier (Refer to page U–96)

Flowchart No.	Refrigerant system inspection	Symptom ..... Magnetic clutch, condenser fan, and A/C compressor idle-up operate, but cool air does not discharge or air cooling ability is low
27		Related parts ... Refrigerant system



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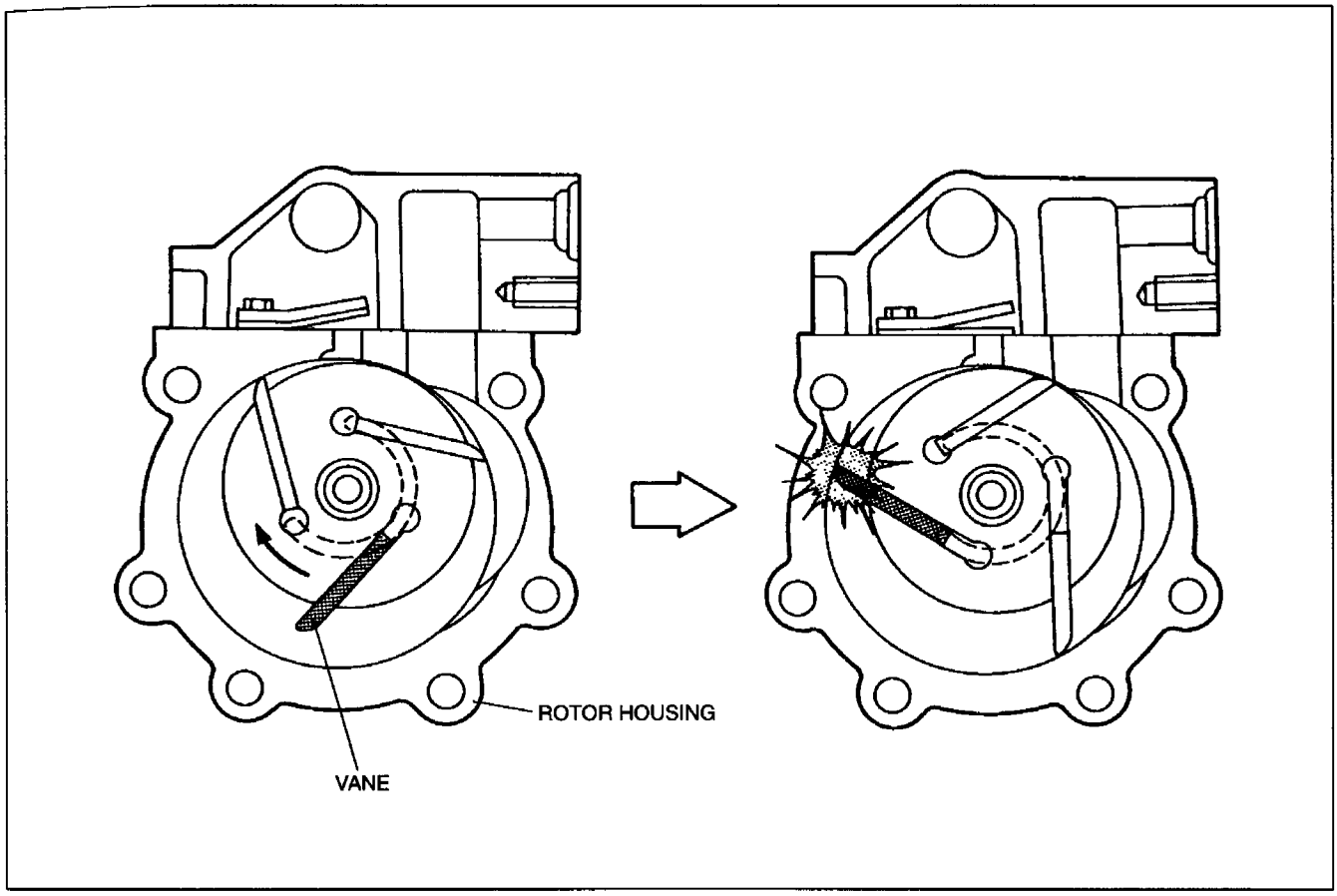
Step	Inspection procedure	Result	Action
1	1) Turn ignition switch to LOCK. 2) Conduct refrigerant pressure check. (Refer to page U–11.)	High- and low-pressure side readings are higher than normal	Go to Step 2
		High- and low-pressure side readings are lower than normal	Go to Step 3
		High-pressure side 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 (Refer to flowchart No. 28, page U–57)

Step	Inspection procedure	Result	Action
2	Are condenser fins clogged or damaged?	YES	Insufficient refrigeration in condenser Clean or repair condenser fins (Refer to page U–79)
		NO	Too much refrigerant Adjust refrigerant amount
3	1) Conduct gas leak test. (Refer to page U–9.) 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–9)
		NO	Insufficient refrigerant due to secular leakage Insufficient charging Regulate refrigerant amount (Refer to page U–8)
4	Is heat-sensing tube its proper position and securely connected to evaporator outlet pipe? (Refer to page U–71)	YES	Expansion valve opening too wide because of expansion valve malfunction Replace expansion valve (Refer to page U–69)
		NO	Expansion valve opening too wide because of improper heat-sensing tube installation Reinstall heat-sensing tube (Refer to page U–71)
5	1) Turn off fan switch and wait for about 10 minutes. 2) Set fan switch at 4th speed. 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–78)
		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–69)
		NO	Expansion valve closing too wide because of improper heat-sensing tube installation Reinstall heat-sensing tube (Refer to page U–71)

Flowchart No.	Vane noise inspection	Symptom ..... Vane noise occurs
28		Related parts ... A/C compressor, refrigerant system

Vane noise

Because a rotary vane type compressor is used, an irregular noise may be heard when filling gas from the low pressure charging port or when replacing parts without adjusting the amount of compressor oil. Noise is produced when the vanes are not pressed against the inner wall of the rotor housing. For troubleshooting, refer to the flowchart below.



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Step	Inspection procedure	Result	Action
1	Check for vane noise.	Vane noise occurs after refrigerant system parts are replaced	Go to Step 2
		Vane noise occurs during refrigerant charge	Go to Step 5 In case refrigerant charge after replacing the refrigerant parts, go to Step 2
		Vane noise occurs briefly after A/C compressor is started	Normal
		Vane noise occurs at excessive low idle	The vane noise is due to the idle speed that is low Adjust the idle speed (Refer to sections F1, F2)
		Other	Go to Step 3

<table>
<tr><th>Step</th><th>Inspection procedure</th><th>Result</th><th>Action</th></tr>
<tr><td rowspan="2">2</td><td rowspan="2">When replacing parts did you supply compressor oil?</td><td>YES</td><td>Go to Step 5</td></tr>
<tr><td>NO</td><td>Vane noise is due to insufficient compressor oil
When replacing parts, supply following amount of compressor oil
<table><tr><th>Replaced part</th><th>Oil supplement</th></tr><tr><td>Cooling unit</td><td>50 ml {50 cc, 1.7 fl oz}</td></tr><tr><td>Condenser</td><td>20 ml {20 cc, 0.7 fl oz}</td></tr><tr><td>Receiver drier</td><td>10 ml {10 cc, 0.3 fl oz}</td></tr><tr><td>Cooler pipe, Cooler hose</td><td>10 ml {10 cc, 0.3 fl oz}</td></tr></table></td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Check refrigerant charge.
(Refer to page U–11)</td><td>Refrigerant amount normal</td><td>Go to Step 4</td></tr>
<tr><td>Refrigerant amount almost normal or insufficient</td><td>Regulate refrigerant amount
(Refer to page U–8)</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">1) Turn ignition switch to LOCK.
2) Check for oil stains. (Refer to page U–9)
3) Are there any oil stains?</td><td>YES</td><td>Take necessary measures, depending on the result of "gas leak test"
(Refer to page U–9)</td></tr>
<tr><td>NO</td><td>Go to Step 5</td></tr>
<tr><td>5</td><td>—</td><td>—</td><td>Run the engine at a constant 3,000—4,000 rpm; then alternately switch the A/C compressor on and off (turn A/C switch on and off).
If the noise remains, turn off the ignition switch for 1—2 minutes
Again, start the engine, hold its speed at 3,000—4,000 rpm, and alternately switch the A/C compressor on and off (Turn A/C switch on and off)</td></tr>
</table>

AFTER SERVICE OPERATION CHECK

Verify that each control operates as described below after repairing the air conditioning system. Start and warm up the engine (so that the engine coolant temperature reaches 40—100 °C {104—212 °F}).

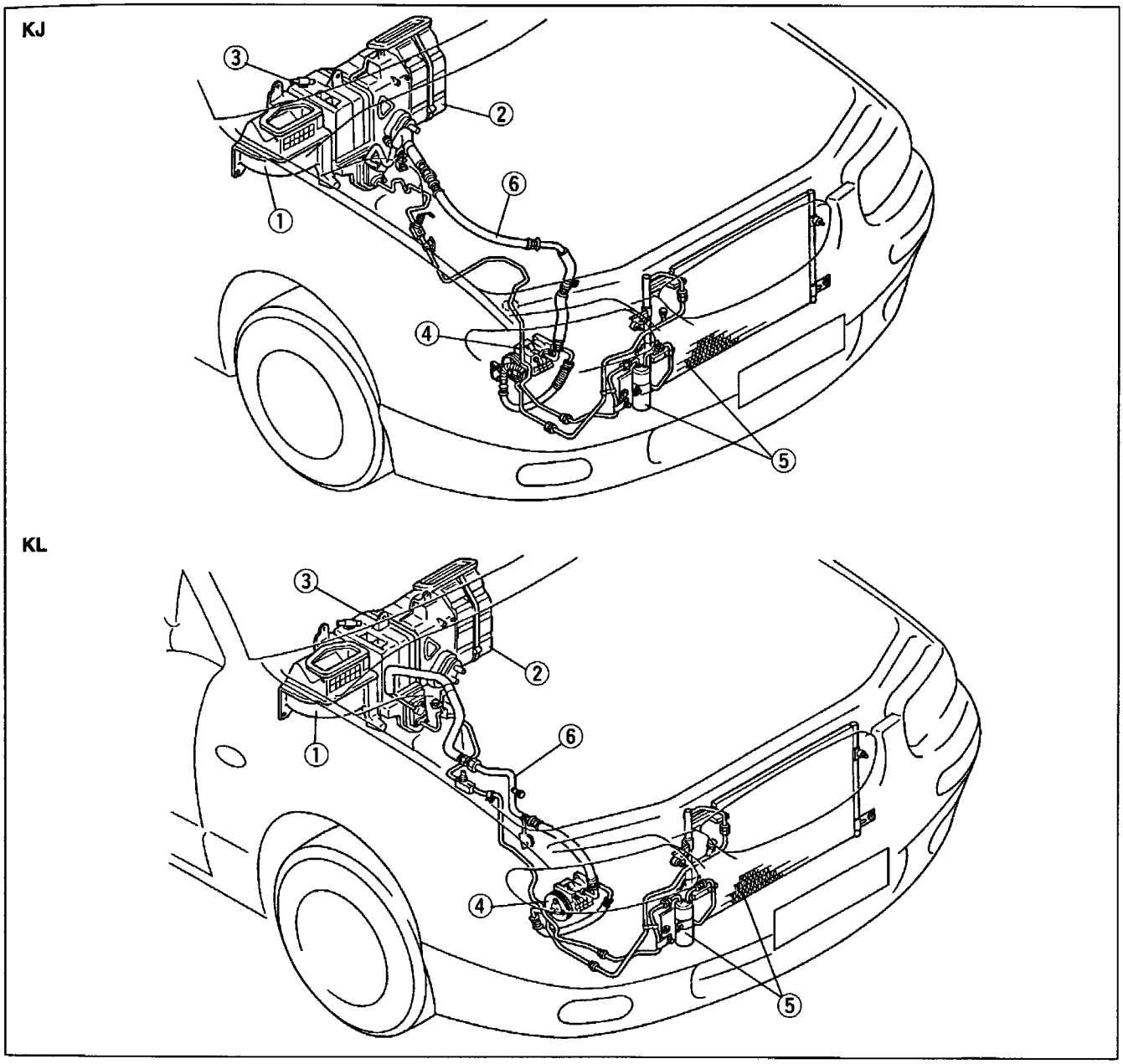
Checklist

Step	Item	Condition	Procedure	Proper operation
1	Air outlet volume	• AUTO switch on • Temperature setting dial at 18.0 °C {65 °F}	1) Turn OFF switch to ON.	No air outlet volume
				Indicator lights turn off except REC/FRESH switch
				Information display turn off except airflow mode
			2) Set fan switch in order at 1st, 2nd, 3rd, and 4th.	Air outlet volume and information display indication change with fan switch operation
				AUTO switch indicator light turns OFF
2	Air intake mode	• AUTO switch on • Temperature setting dial at 18.0 °C {65 °F}	Set REC/FRESH switch in order at each air intake mode.	Air intake mode and indicator light change cyclically with REC/FRESH switch operation
				AUTO switch indicator light turns off
3	Airflow mode	• AUTO switch on • Temperature setting dial at 18.0 °C {65 °F}	Set MODE switch in order at each airflow mode.	Airflow mode and information display indication change cyclically with MODE switch operation
				AUTO switch indicator light turns off
4	Air outlet temperature	• Fan switch at 4th • Airflow mode at VENT • A/C switch on	1) Set temperature setting dial at 18.0 °C {65 °F}.	Air outlet is cold
			2) Set temperature setting dial at 32.0 °C {90 °F}.	Air outlet is hot
5	Electrical load idle-up	No electrical load except blower motor	Set fan switch in order at 1st, 2nd, 3rd, and 4th.	Electrical load idle-up operates with fan switch at 3rd or 4th
6	Illumination light (information display, heater control unit)	—	Turn light switch ON and OFF.	Illumination light turns on and off with light switch operation
				Indicator lights and information display indication become dim with light switch operation
7	Refrigerant system	• AUTO switch on • Temperature setting dial at 18.0 °C {65 °F}	Set A/C switch in order at each A/C mode.	Information display indication changes ECON → (PUT OUT) → A/C with A/C switch operation.
				A/C compressor, condenser fan, and A/C compressor idle-up operate with A/C switch operation
				Air outlet is cold with A/C switch on
				AUTO switch indicator light turns off
8	Backup system	• Temperature setting dial at except 25.0 °C {77 °F} • Each switch to manual	Turn ignition switch to LOCK and ON.	Operational condition is memorized before ignition switch is turned off

Step	Item	Condition	Procedure	Proper operation
9	DEFROSTER mode	• OFF switch on (Temperature setting dial at 25.0 °C {77 °F} before OFF switch is pressed) • Air intake mode at RECIRCULATE • Airflow mode at any except DEFROSTER	1) Turn DEFROSTER switch to ON.	Airflow mode and information display indication change to DEFROSTER
				DEFROSTER switch indicator light turns on
				Blower motor operates
				Air intake mode changes to FRESH
				A/C mode change to A/C
				AUTO switch indicator light turns off
			2) Turn DEFROSTER switch to OFF.	Air outlet volume decreases slightly
				Other modes return to previous condition (Before DEFROSTER switch was first pressed)
10	Automatic function	• AUTO switch on	1) Set temperature setting dial at 18.0 °C {65 °F}.	Airflow mode and information display indication at VENT
				MAX-HI relay turns on, and air outlet volume and information display indication change to maximum level
				Air outlet temperature at MAX COLD
				Air intake mode and indicator light at RECIRCULATE
			2) Change temperature setting dial from 18.0 °C {65 °F} to 32.0 °C {90 °F} gradually.	Airflow mode and information display indication change VENT → BI-LEVEL → HEAT
				Air outlet volume and information display indication change High → Low → High
				Air outlet changes from MAX COLD to MAX HOT
				Air intake mode and indicator light changes from RECIRCULATE to FRESH
			3) Set temperature setting dial at 32.0 °C {90 °F}.	Airflow mode and information display indication change to HEAT
				Air outlet volume and information display indication change to AUTO-HI by power transistor
				Air outlet temperature at MAX HOT
				Air intake mode and indicator light change to FRESH

BASIC SYSTEM

STRUCTURAL VIEW



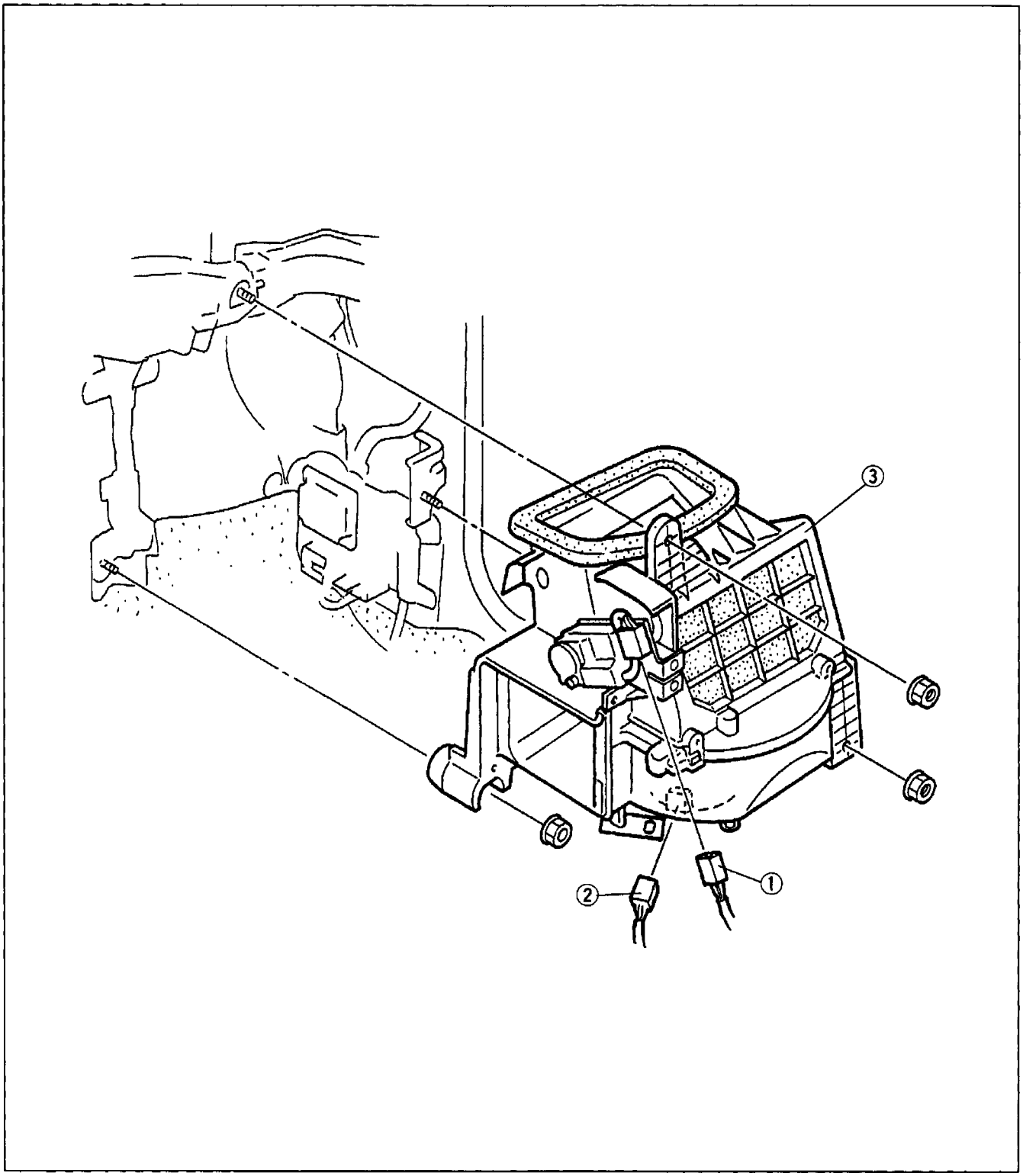
3ZU0UX-023

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BLOWER UNIT

Removal / Installation

1. Remove the dashboard. (Refer to section S.)
2. Remove the cooling unit. (Refer to page U–68.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.

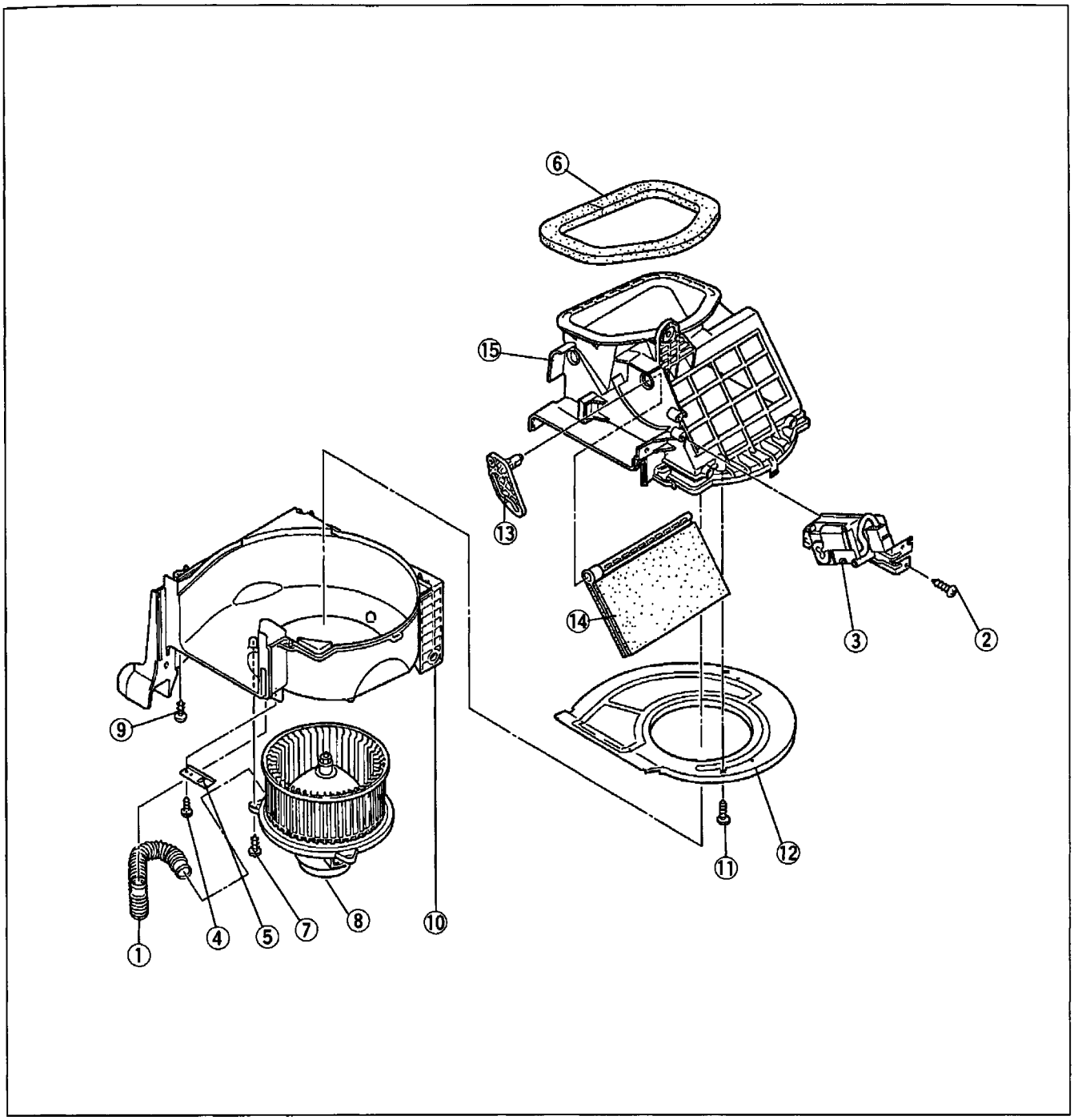


3ZE0UX–134

1. Air intake actuator connector
2. Blower motor connector
3. Blower unit
   Disassembly / Assembly ..... page U–63

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



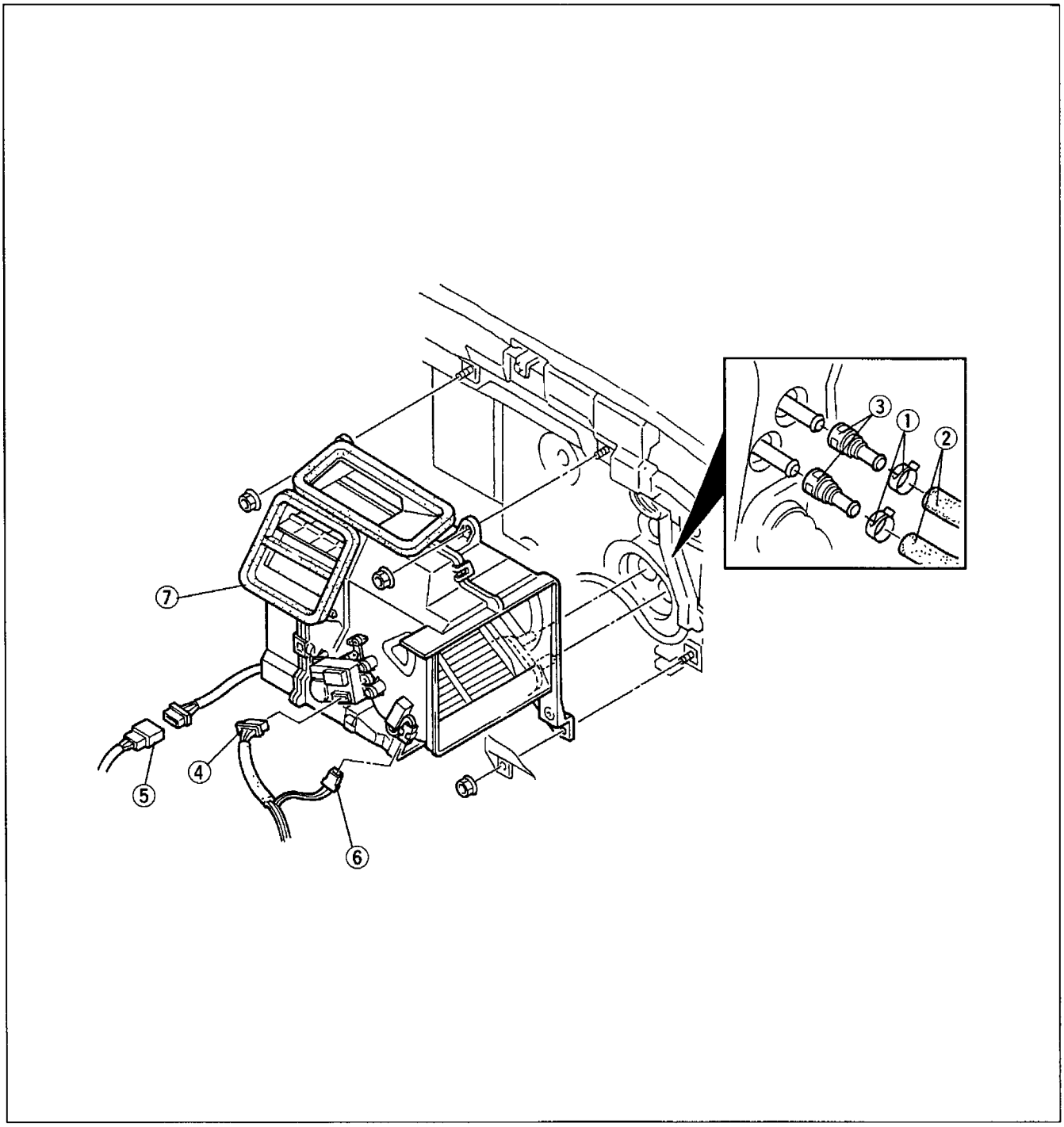
3ZE0UX-135

1. Air hose
2. Tapping screw
3. Air intake actuator
   Removal / Installation ..... page U-90
   Inspection ..... page U-90
4. Tapping screw
5. Bracket
6. Polyurethane protector
7. Hex tapping screw
8. Blower motor
   Removal / Installation ..... page U-89
   Inspection ..... page U-89
9. Tapping screw
10. Blower case (bottom)
11. Tapping screw
12. Air guider
13. Air intake crank
14. Air intake door
15. Blower case (top)

HEATER UNIT

Removal / Installation

1. Drain the engine coolant. (Refer to section E.)
2. Remove the dashboard. (Refer to section S.)
3. Remove the cooling unit. (Refer to page U–68.)
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal.

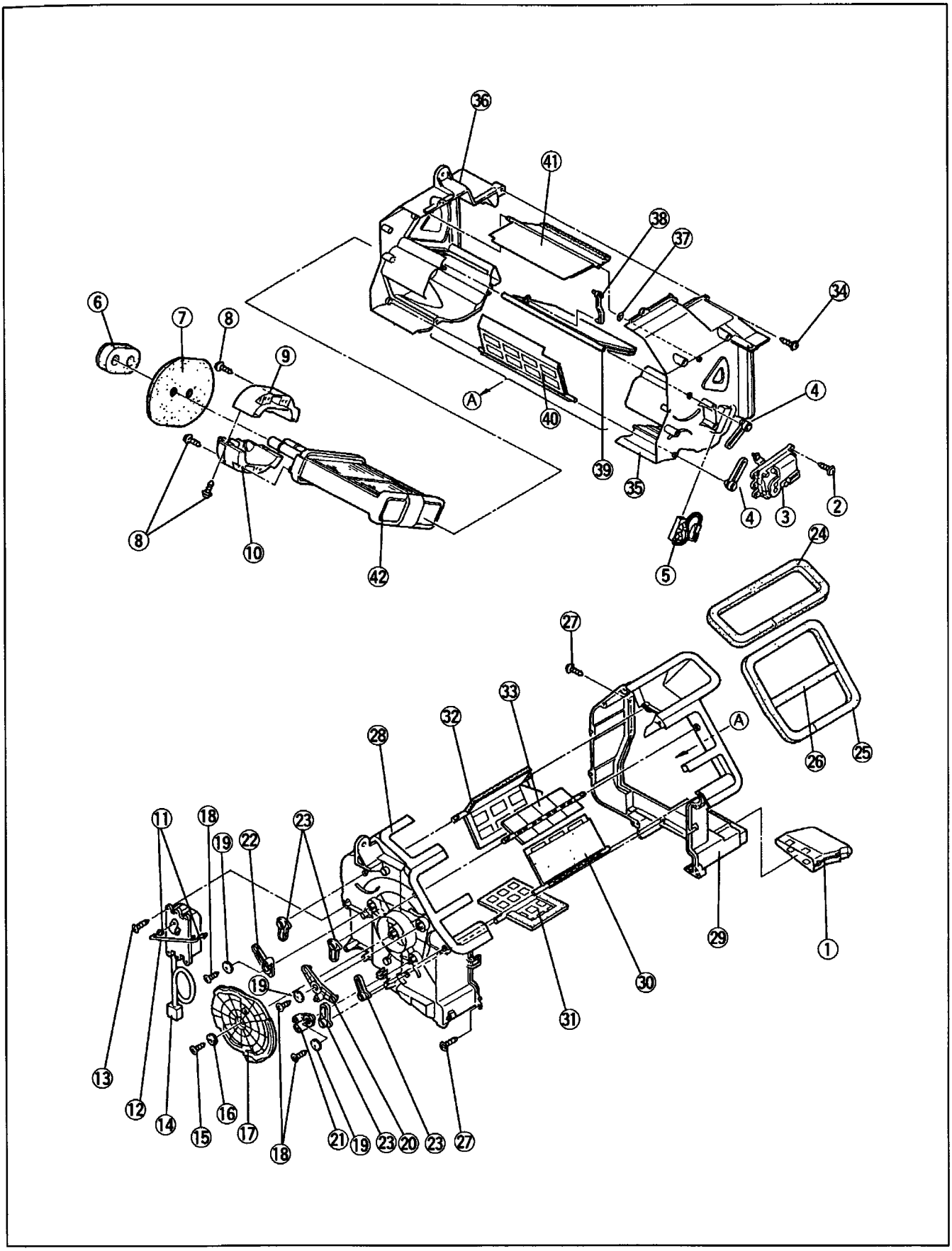


3ZE0UX–136

1. Clamp
2. Heater hose
3. Quick coupler
4. Air mix actuator connector
5. Airflow mode actuator connector
6. Water temperature sensor connector
7. Heater unit
   - Disassembly / Assembly ..... page U–65
   - Assembly note ..... page U–67
   - Inspection ..... page U–67

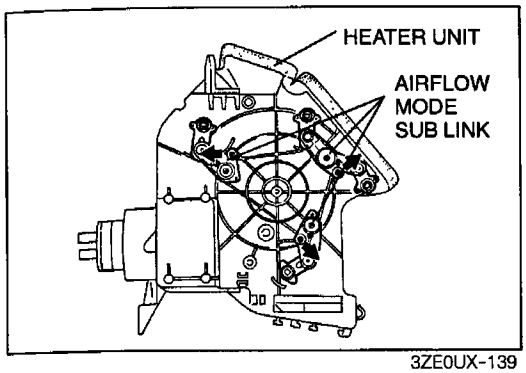
Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly. Do not apply extra grease to the links.



3ZE0UX-138

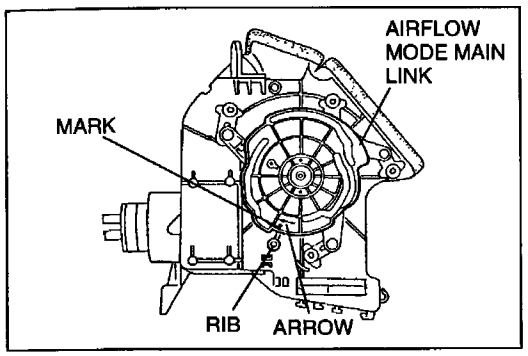
1. Heat duct
2. Tapping screw
3. Air mix actuator
   - Removal / Installation ..... page U–91
   - Inspection ..... page U–91
4. Air mix crank
5. Water temperature sensor
   - Removal / Installation ..... page U–95
   - Inspection ..... page U–95
6. Polyurethane foam (thick)
7. Polyurethane foam (thin)
8. Tapping screw
9. Heater core bracket (1)
10. Heater core bracket (2)
11. Rod stopper
12. Airflow mode rod
13. Tapping screw
14. Airflow mode actuator
    - Removal / Installation ..... page U–92
    - Inspection ..... page U–92
15. Tapping screw
16. Link collar
17. Airflow mode main link
    - Assembly note ..... page U–67
18. Tapping screw
19. Link collar
20. Airflow mode sub link (VENT)
21. Airflow mode sub link (HEAT)
22. Airflow mode sub link (DEFROSTER)
23. Airflow mode crank
24. Polyurethane protector (DEFROSTER)
25. Polyurethane protector (VENT)
26. Polyurethane protector (SIDE VENT)
27. Tapping screw
28. Heater case (4)
29. Heater case (3)
30. Vent door
31. Heat door
32. Defroster door
33. Side vent door
34. Tapping screw
35. Heater case (1)
36. Heater case (2)
37. Collar
38. Air mix rod
39. Air mix main door
40. Air mix sub door
41. Air mix guide door
42. Heater core
    - Inspection ..... page U–67



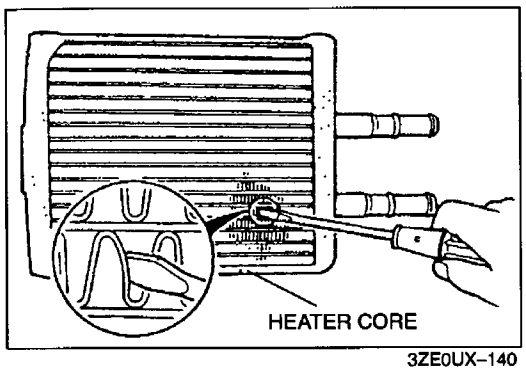
3ZE0UX-139

Assembly note
Airflow mode main link

1. Turn the projections of each airflow mode sub link outward.



2. Set the ▼ mark of the airflow mode main link to the rib of 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.



3ZE0UX-140

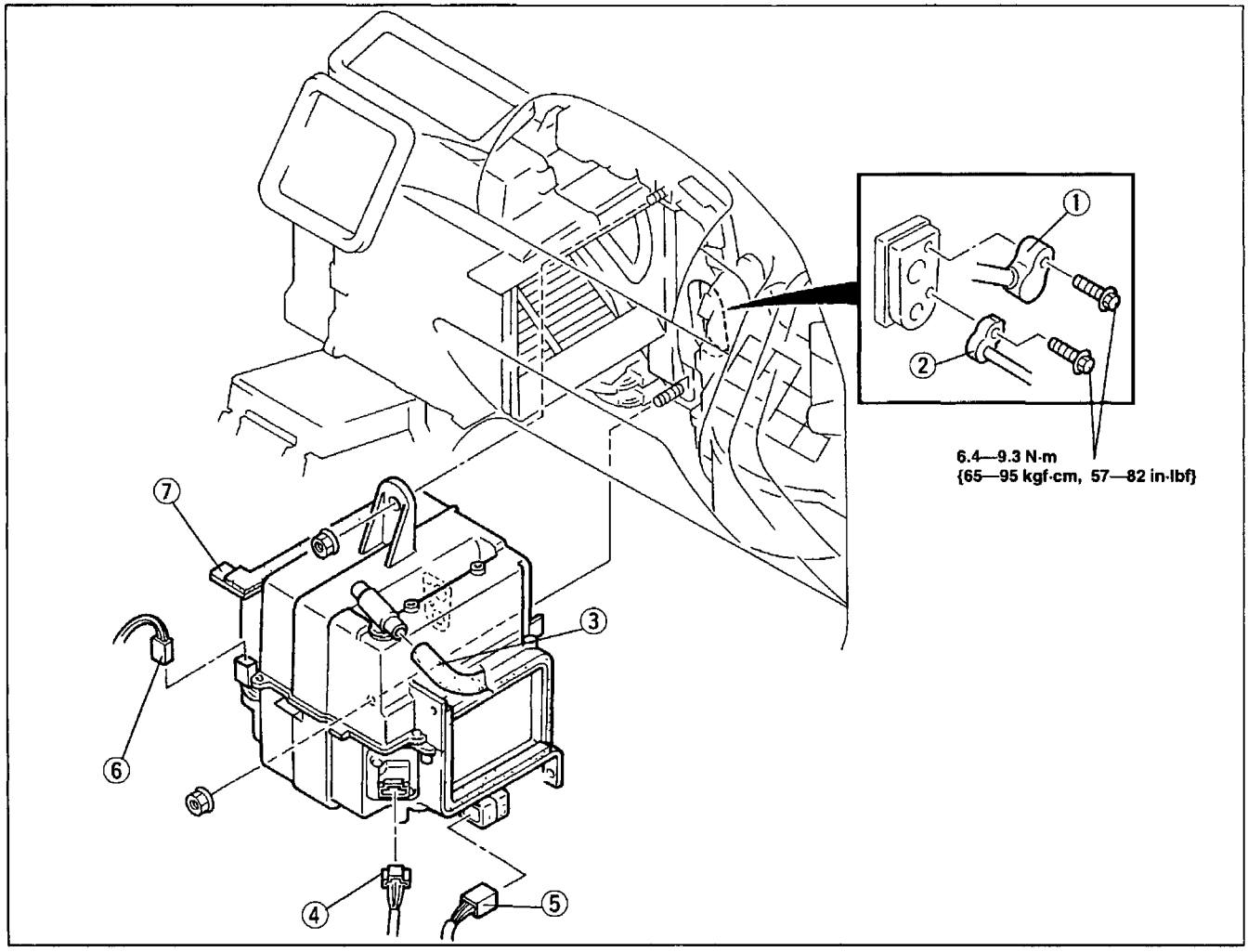
Inspection
Heater core

1. Disassemble the heater unit. (Refer to page U–65.)
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 flathead screwdriver to straighten them.
4. Verify that the heater core inlet and outlet are not distorted or damaged. Repair with pliers if necessary.

COOLING UNIT

Removal / Installation

1. Discharge the refrigerant from the system.
2. Remove the undercover, glove compartment, and glove compartment cover. (Refer to section S.)
3. Remove the stay.
4. Remove the passenger-side air bag module. (Refer to section T.)
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.
7. Charge the system and test its performance. (Refer to pages U–5, 12.)



3ZE0UX–141

1. Cooler pipe No.4
   Installation note ..... below
2. Cooler pipe No.3
   Installation note ..... below
3. Aspirator hose
4. Power transistor connector
5. MAX–HI relay connector
6. Evaporator temperature sensor connector
7. Cooling unit
   Installation note ..... below
   Disassembly / Assembly ..... page U–69
   Assembly note ..... page U–71
   Inspection ..... page U–71

Installation note

Cooling unit

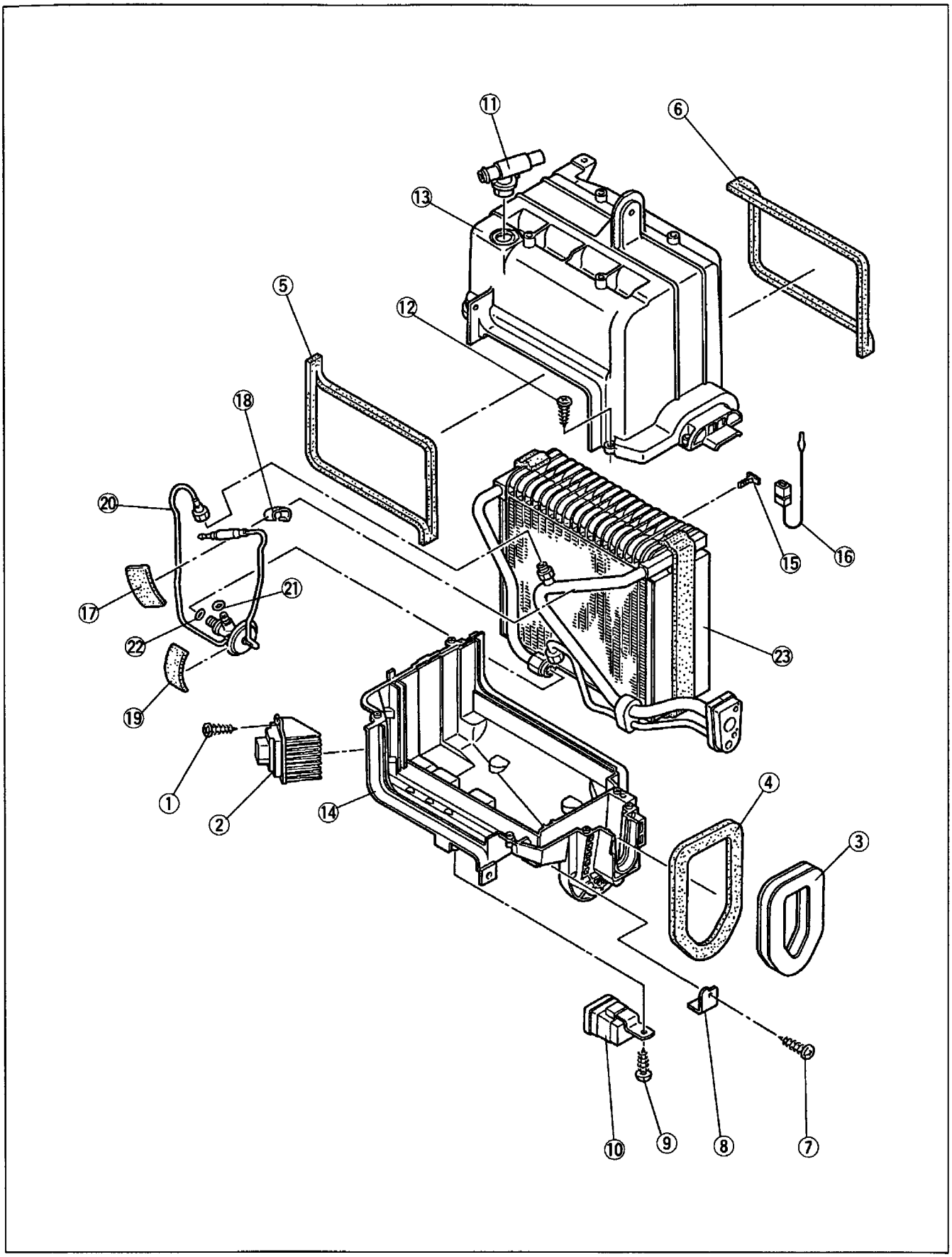
When installing a new cooling unit (evaporator), add 50 ml {50 cc, 1.7 fl oz} of compressor oil through the high-pressure side of the A/C compressor.

Cooling unit, Cooler pipe

Refer to the installation note for system piping when tightening the piping joints. (Refer to page U–81.)

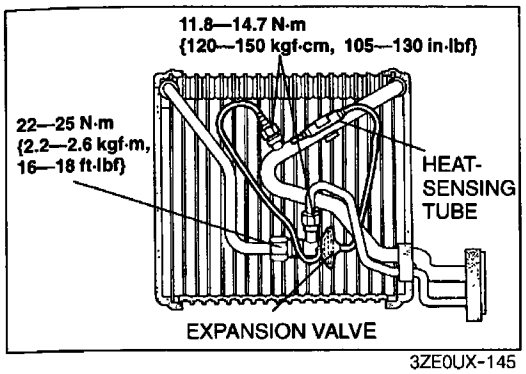
Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.

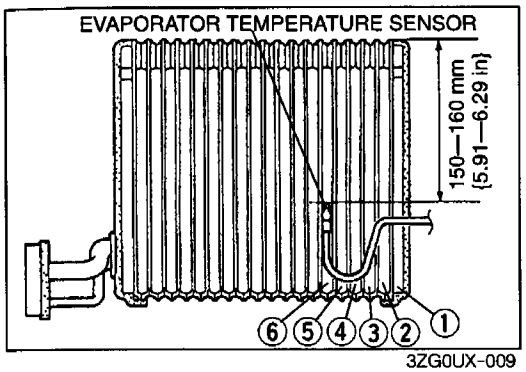


3ZE0UX-143

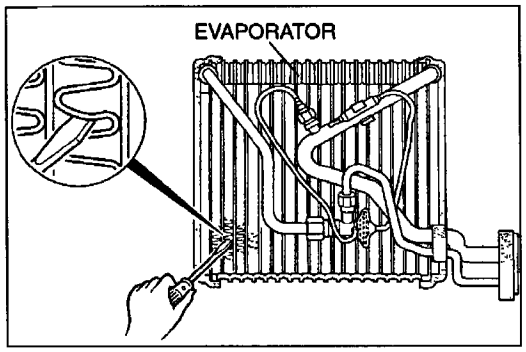
1. Tapping screw
2. Power transistor
   - Removal / Installation ..... page U–89
   - Inspection ..... page U–89
3. Polyurethane foam
4. Polyurethane protector (pipe)
5. Polyurethane protector (blower side)
6. Polyurethane protector (heater side)
7. Tapping screw
8. Bracket
9. Hex tapping screw
10. MAX–HI relay
    - Removal / Installation ..... page U–87
    - Inspection ..... page U–88
11. Aspirator
12. Tapping screw
13. Cooler case (top)
14. Cooler case (bottom)
15. Sensor clamp
16. Evaporator temperature sensor
    - Assembly note ..... page U–71
    - Inspection ..... page U–95
17. Adhesive sponge rubber
18. Clamp
19. Insulator
20. Expansion valve
    - Assembly note ..... page U–71
21. O-ring (high side)
22. O-ring (low side)
23. Evaporator
    - Inspection ..... page U–71



3ZE0UX-145



3ZG0UX-009



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–81.)
4. Assemble the heat-sensing tube as shown in the figure.

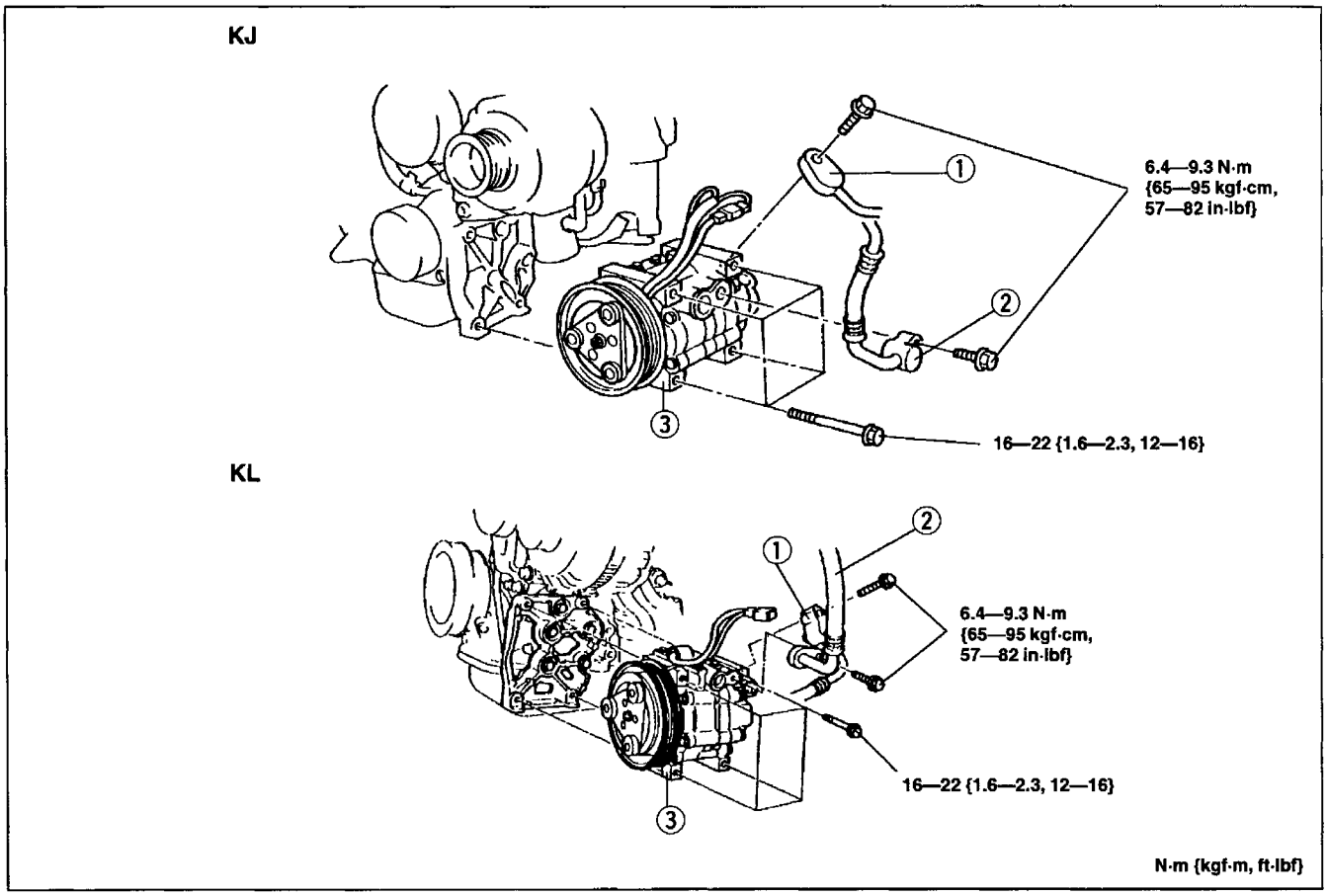
Evaporator temperature sensor
Assemble the evaporator temperature sensor as shown in the figure.

Inspection
Evaporator
1. Disassemble the cooling unit. (Refer to page U–68.)
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 flathead screwdriver to straighten them.

A/C COMPRESSOR

Removal / Installation

1. Discharge the refrigerant from the system.
2. Remove the splash shield. (Front RH). (Refer to section S.)
3. Remove the A/C drive belt. (Refer to sections B1, B2.)
4. Disconnect the magnetic clutch connector.
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.
7. Charge the system and test its performance. (Refer to pages U–5, 12.)



3ZE0UX-247

1. Cooler hose (high)
   Installation note ..... below
2. Cooler hose (low) No.2
   Installation note ..... below
3. A/C compressor
   Installation note ..... below
   Disassembly / Assembly ..... page U–73
   Disassembly note ..... page U–74
   Assembly note ..... page U–74

Installation note

Cooler hose

Refer to the installation note for system piping when tightening the piping joints. (Refer to page U–81.)

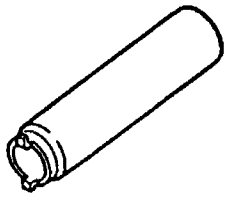
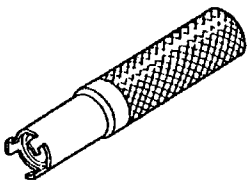
A/C compressor

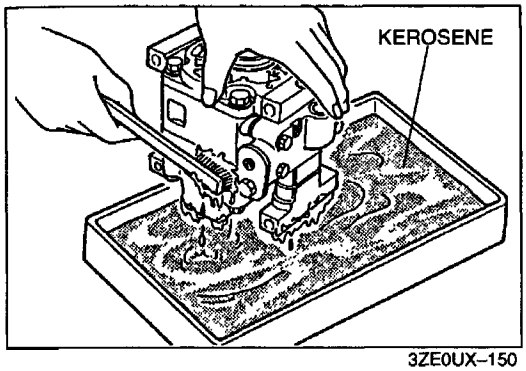
Follow the procedure below when replacing the A/C compressor with a new one:

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
= 175 ml {175 cc, 5.92 fl oz} – [compressor oil from old A/C compressor + 10—20 ml {10—20 cc, 0.4—0.6 fl oz}]

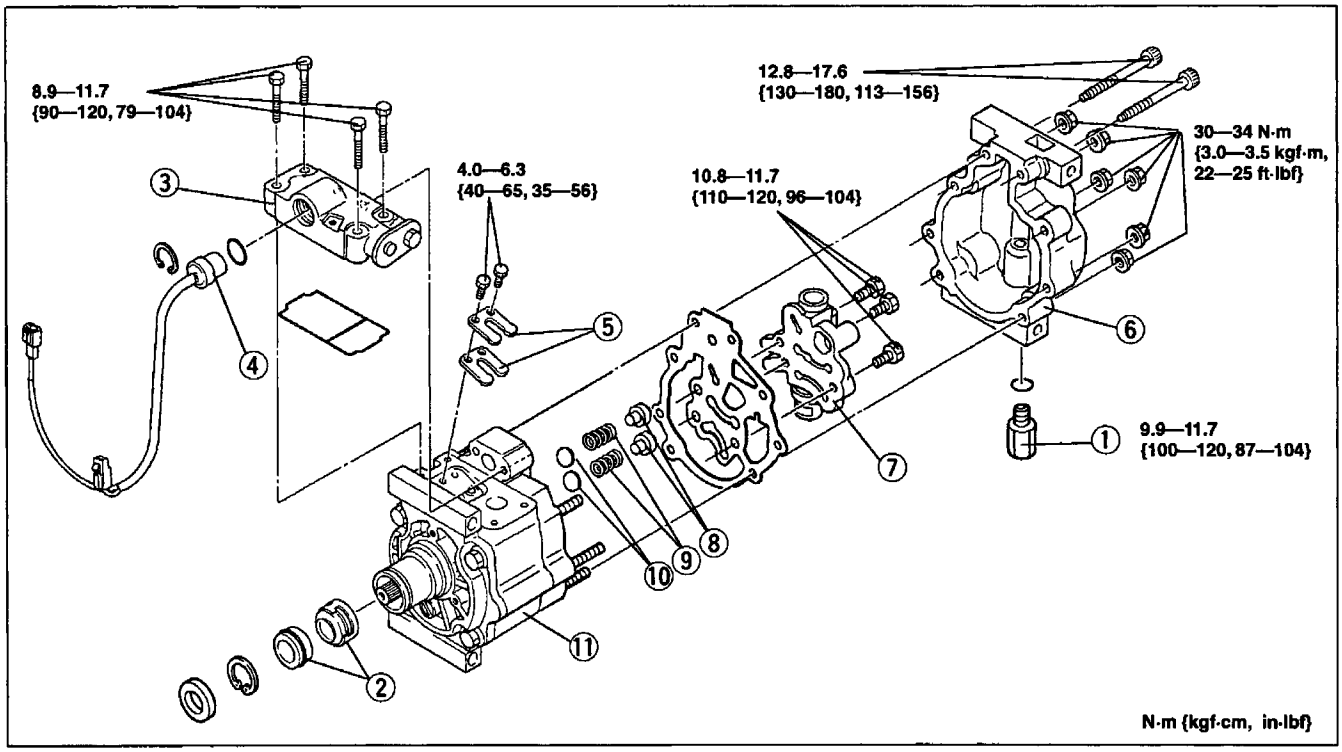
Disassembly / Assembly
Preparation
SST

49 B061 005 Replacer seal plate		For replacement of shaft seal plate	49 B061 006 Replacer shaft seal 	For replacement of shaft seal



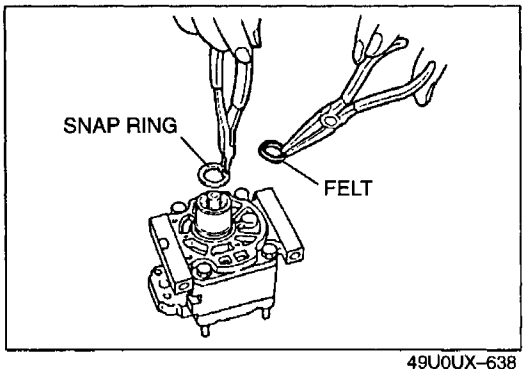
3ZE0UX-150

1. Remove the magnetic clutch. (Refer to page U–83.)
2. Before disassembling the A/C compressor, clean it with kerosene to remove foreign objects and dust. Allow it to dry completely.
3. Disassemble in the order shown in the figure below.
4. Clean the sealing surfaces of the rear case and A/C compressor body with an oil stone after disassembly.
5. Remove any oil from the bolt holes.
6. Assemble in the reverse order of disassembly.



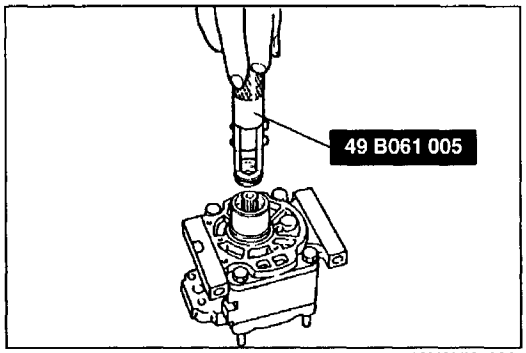
3ZE0UX-151

1. Pressure relief valve
   Assembly note ..... page U–77
2. Shaft seal and shaft seal plate
   Disassembly note ..... page U–74
   Assembly note ..... page U–76
3. Head cover
   Assembly note ..... page U–76
4. Thermal protector
   Disassembly note ..... page U–74
   Assembly note ..... page U–75
5. Discharge valve and discharge valve stopper
   Assembly note ..... page U–75
6. Rear case
   Assembly note ..... page U–75
7. Oil control valve
   Assembly note ..... page U–74
8. Spring stopper
9. Compression spring
10. Anti-valve
11. A/C compressor body



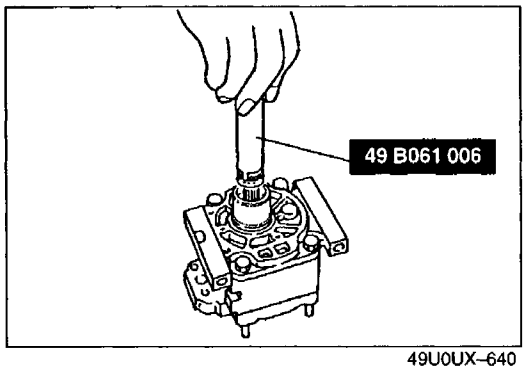
49U0UX-638

Disassembly note
Shaft seal and shaft seal plate
1. Remove the felt and snap ring. If there is oil on the felt, replace the felt.



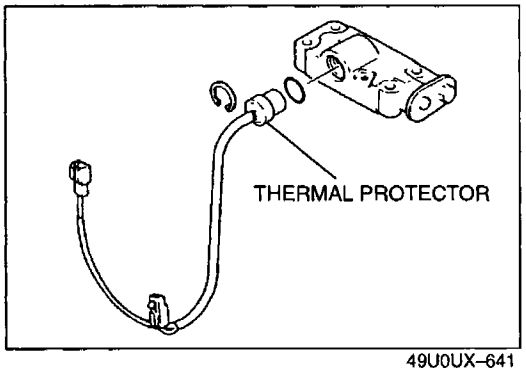
49U0UX-639

2. Use the **SST** to remove the shaft seal plate.



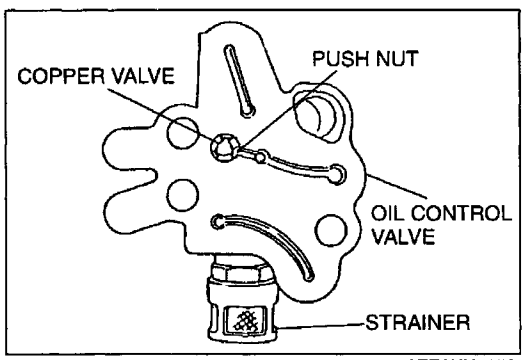
49U0UX-640

3. Use the **SST** to remove the shaft seal.



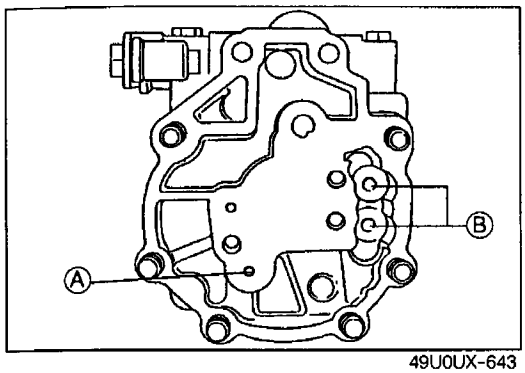
49U0UX-641

Thermal protector
Remove the snap ring and push the protector out from its back side to remove it. Do not pull on the wiring harness.



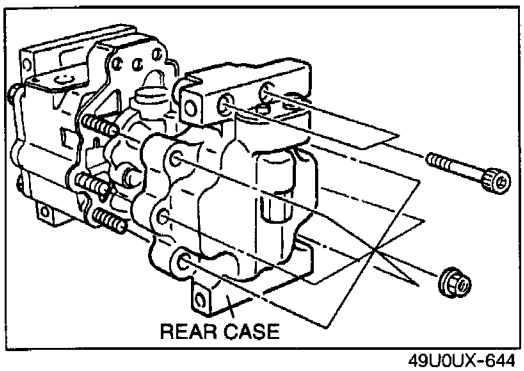
3ZE0UX-152

Assembly note
Oil control valve
1. Make sure there are no foreign objects or dust in the oil control valve strainer.
2. Verify that the copper valve and push nut are attached to the oil control valve. If they are not, replace them.



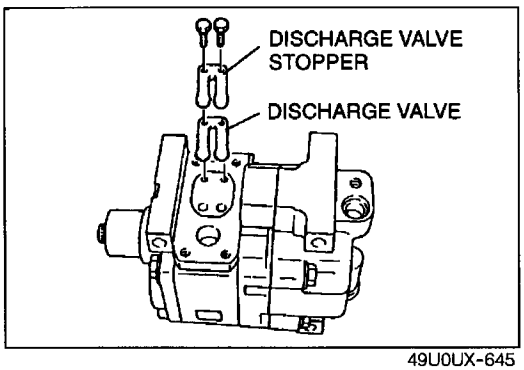
49U0UX-643

3. Inspect the operation of the vanes.
   (1) Rotate the rotor until one of the vanes can be seen through hole B.
   (2) Apply N_2 at 100 kPa {1 kgf/cm^2, 10 psi} through port A by using a charge hose.
   (3) Verify that the vane extends smoothly.
   (4) Repeat steps (1)—(3) for each of the other vanes.
4. Apply compressor oil to the rear cause gasket.
5. Install the oil control valve.



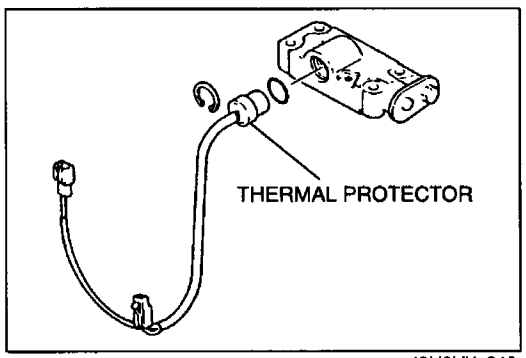
49U0UX-644

Rear case
1. Use a level block to ensure that the rear case fits evenly onto the A/C compressor body.
2. Gradually tighten the four nuts in a diagonal pattern.
3. Tighten the two bolts in two steps.



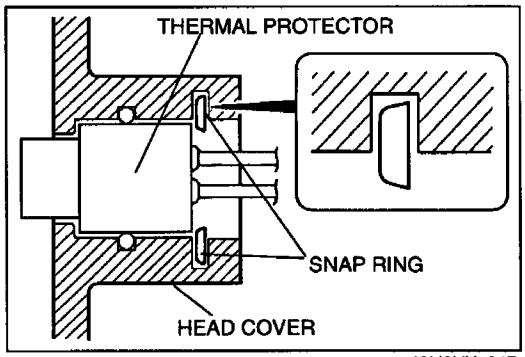
49U0UX-645

Discharge valve and discharge valve stopper
Make sure the A/C compressor body and surfaces of the discharge valve and discharge valve stopper are free from foreign material before installing them.



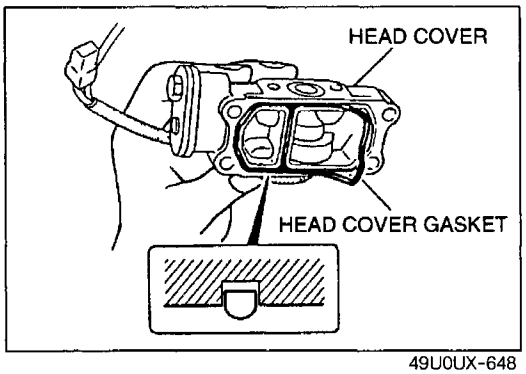
49U0UX-646

Thermal protector
1. Make sure the O-ring is free from foreign material. Apply compressor oil to the O-ring and fit it into the groove securely.
2. Check for continuity between the protector terminals.
3. Install the snap ring so that its chamfered edge faces the thermal protector. Make sure the snap ring is seated securely in its groove.



49U0UX-647

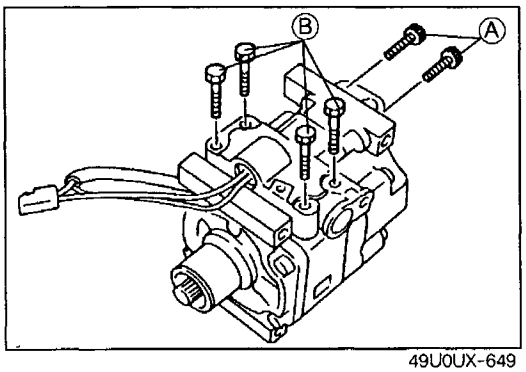
4. Install the thermal protector so that its two lead wire outlet sections are horizontal, as shown on the left.



49U0UX-648

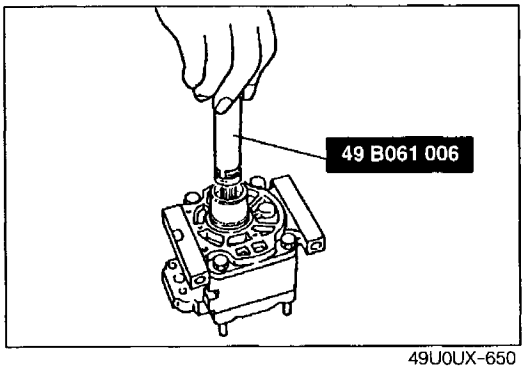
Head cover

1. Replace the O-ring and gasket with new ones. Apply compressor oil to the gasket and assemble them. Make sure the top side of the gasket faces upward.



49U0UX-649

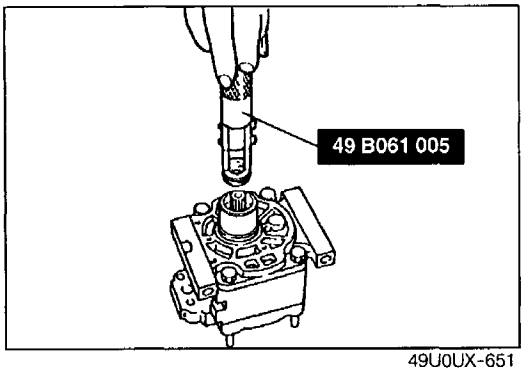
2. Carefully install the head cover on the A/C compressor. Tighten socket head bolts A, and then tighten bolts B in a diagonal manner.



49U0UX-650

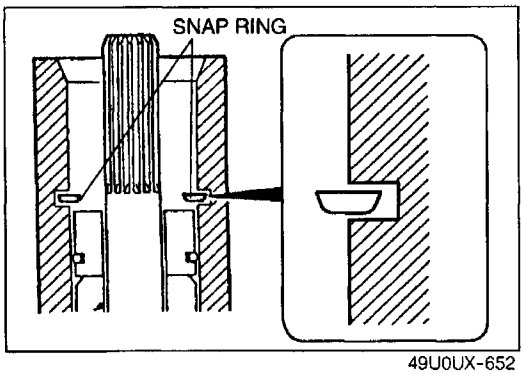
Shaft seal and shaft seal plate

1. Apply compressor oil to the O-ring and carbon surface of a new shaft seal. Do not reuse the old shaft seal.
2. Use the **SST** to install the shaft seal.



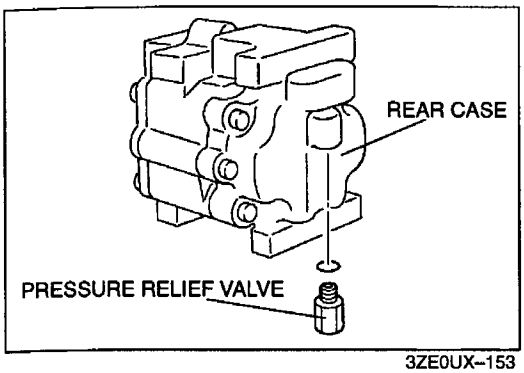
49U0UX-651

3. Apply compressor oil to the O-ring and carbon surface of a new shaft seal plate. Do not reuse the old seal plate.
4. Use the **SST** to install the shaft seal plate.



49U0UX-652

5. Install the snap ring as shown in the figure.
6. Install the felt.



3ZE0UX-153

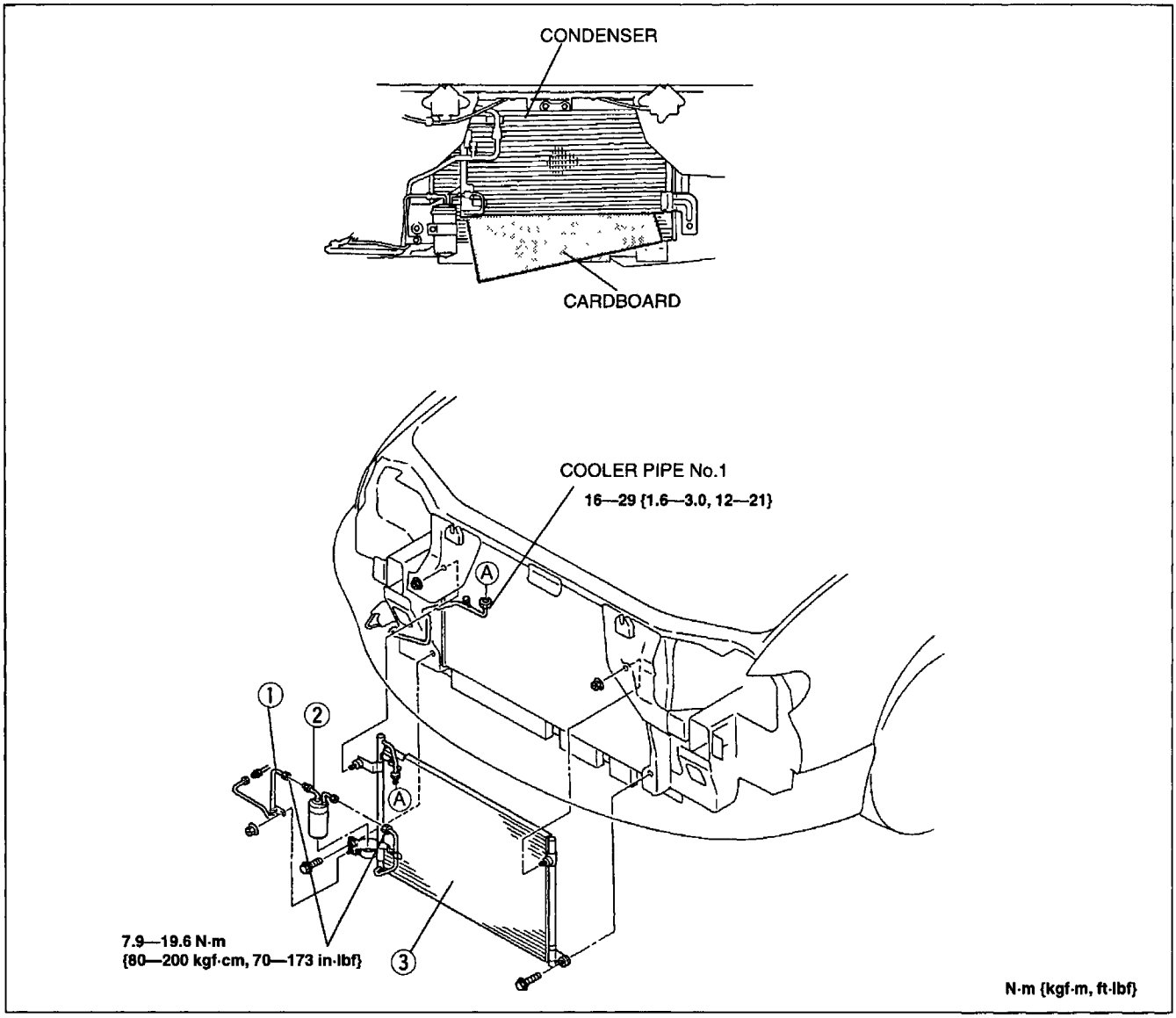
Pressure relief valve

1. Apply compressor oil to the O-ring.
2. Tighten the pressure relief valve by hand and then tighten it to the specified torque.

CONDENSER, RECEIVER/DRIER

Removal / Installation

1. Discharge the refrigerant from the system.
2. Raise the front of the vehicle.
3. Remove the ambient temperature sensor. (Refer to page U–94.)
4. Remove the radiator grille, mud guard (RH), splash shields (Front), and hood stay. (Refer to section S.)
5. Remove the radiator brackets and coolant reservoir. (Refer to section E.)
6. Insert a protector (such as cardboard) between the condenser and the radiator, and lean the radiator toward the engine.
7. Disconnect cooler pipe No.1.
8. Remove the assembled cooler pipe No.2, receiver/drier, and condenser, then disassemble them 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.
9. Install in the reverse order of removal.
10. Charge the system and test its performance. (Refer to pages U–5, 12.)



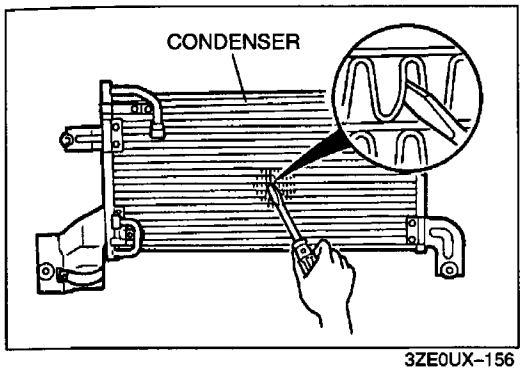
3ZE0UX–154

1. Cooler pipe No.2
   Installation note ..... page U–79
2. Receiver/drier
   Installation note ..... page U–79
3. Condenser
   Installation note ..... page U–79
   Inspection ..... page U–79

Installation note
Condenser, Receiver/drier
When installing new parts, add compressor oil through the high-pressure side of the A/C compressor.

Condenser: 20 ml {20 cc, 0.7 fl oz}
Receiver/drier: 10 ml {10 cc, 0.3 fl oz}

Condenser, Cooler pipe No.2, Receiver/drier
Refer to the installation note for system piping when tightening the piping joints. (Refer to page U–81.)



3ZE0UX–156

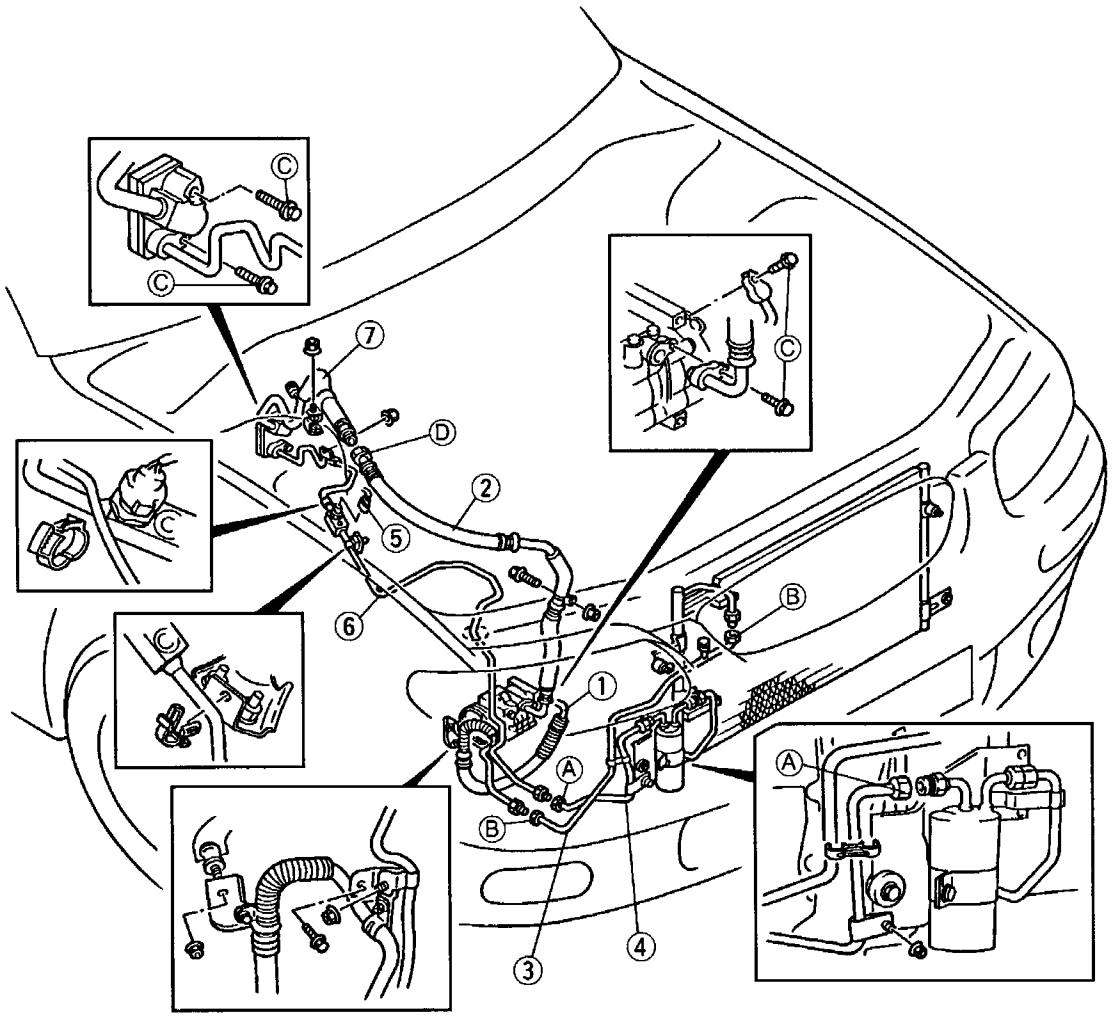
Inspection
Condenser
1. Remove the front bumper and hood stay. (Refer to section S.)
2. Check for cracks, damage, and oil leakage. Repair or replace the condenser if necessary.
3. Check for bent fins. If they are bent, use a flathead screwdriver to straighten them.

REFRIGERANT LINES
Removal / Installation
1. Discharge the refrigerant from the system.
2. Remove the following parts, depending on pipe and hose to be removed.

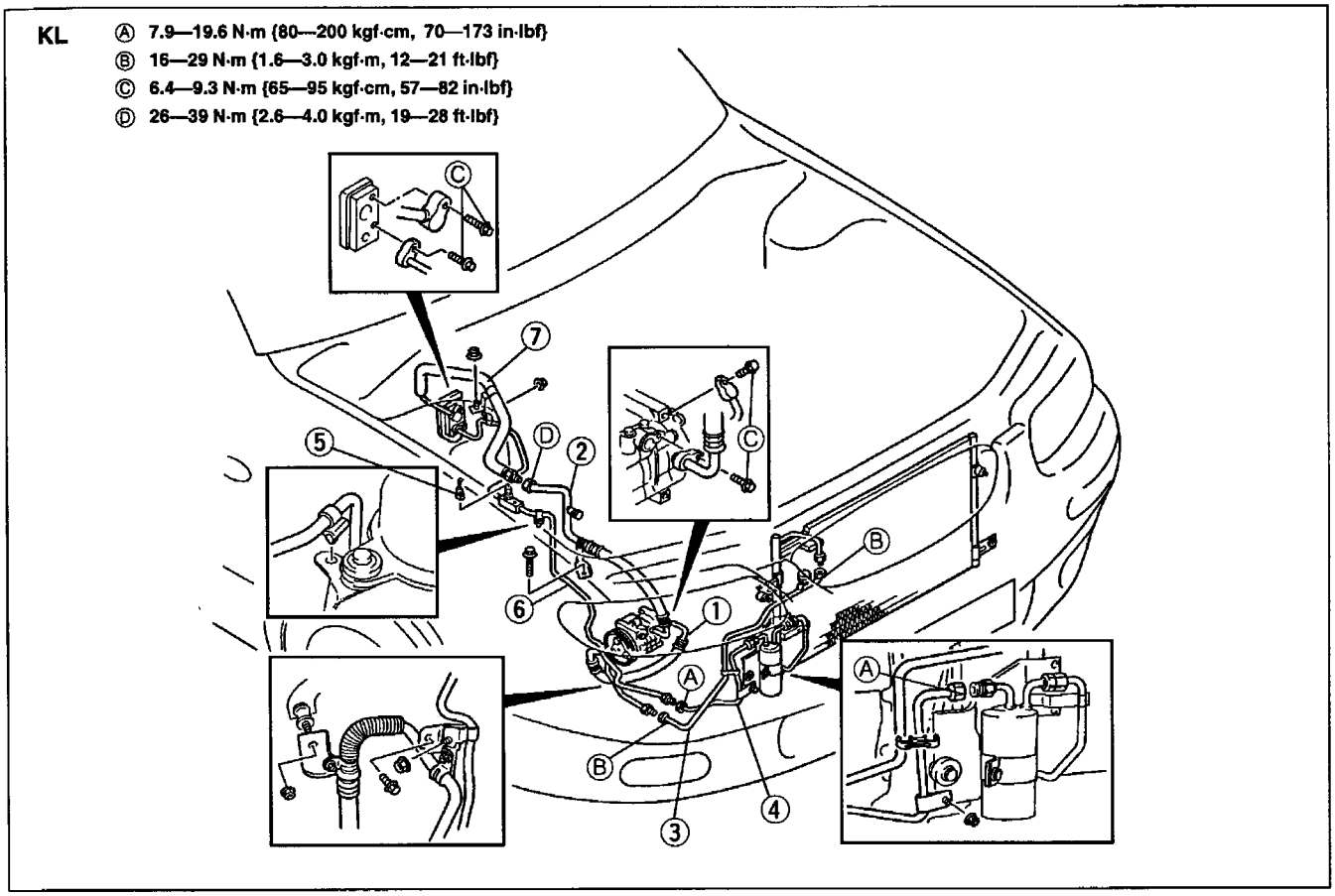
Removal cooler pipe and hose	Removal parts	Section
Cooler hose (low)	Splash shield (Front RH)	S
Cooler hose (high)	Splash shield (Front RH), mud guard (RH)	S
Cooler pipe No.4	—	—
Cooler pipe No.3	Splash shield (Front RH), mud guard (RH)	S
Cooler pipe No.2	Condenser, receiver/drier	U–78
Cooler pipe No.1	Splash shield (Front RH), mud guard (RH), radiator grille	S

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.
5. Charge the system and test its performance. (Refer to pages U–5, 12.)

KJ



3ZU0UX–024



3ZU0UX–025

1. Cooler hose (high)
   Installation note ..... below
2. Cooler hose (low)
   Installation note ..... below
3. Cooler pipe No.1
   Installation note ..... below
4. Cooler pipe No.2
   Installation note ..... below
5. Refrigerant pressure switch connector
6. Cooler pipe No.3
   Installation note ..... below
7. Cooler pipe No.4
   Installation note ..... below

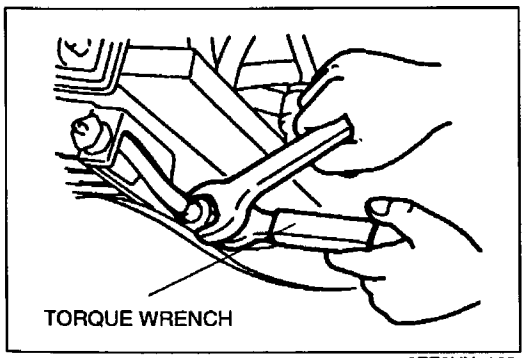
Installation note

Cooler pipe, Cooler hose

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 cooler hose, add compressor oil through the high-pressure side of the A/C compressor.

Oil supplement

Cooler pipe, cooler hose: 10 ml {10 cc, 0.3 fl oz}

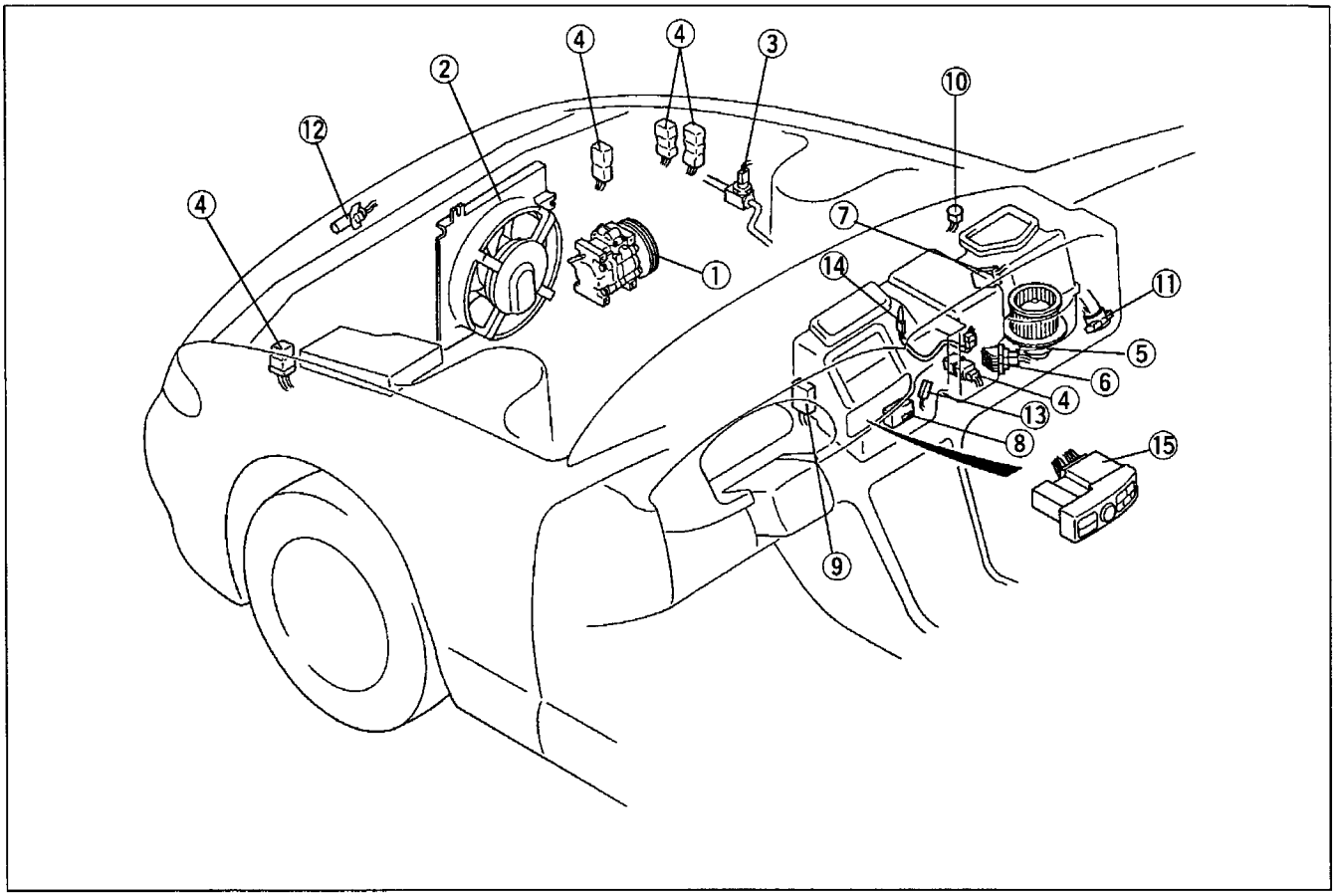


3ZE0UX–162

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. For nut joints, tighten in the procedure as the figure.

CONTROL SYSTEM

STRUCTURAL VIEW



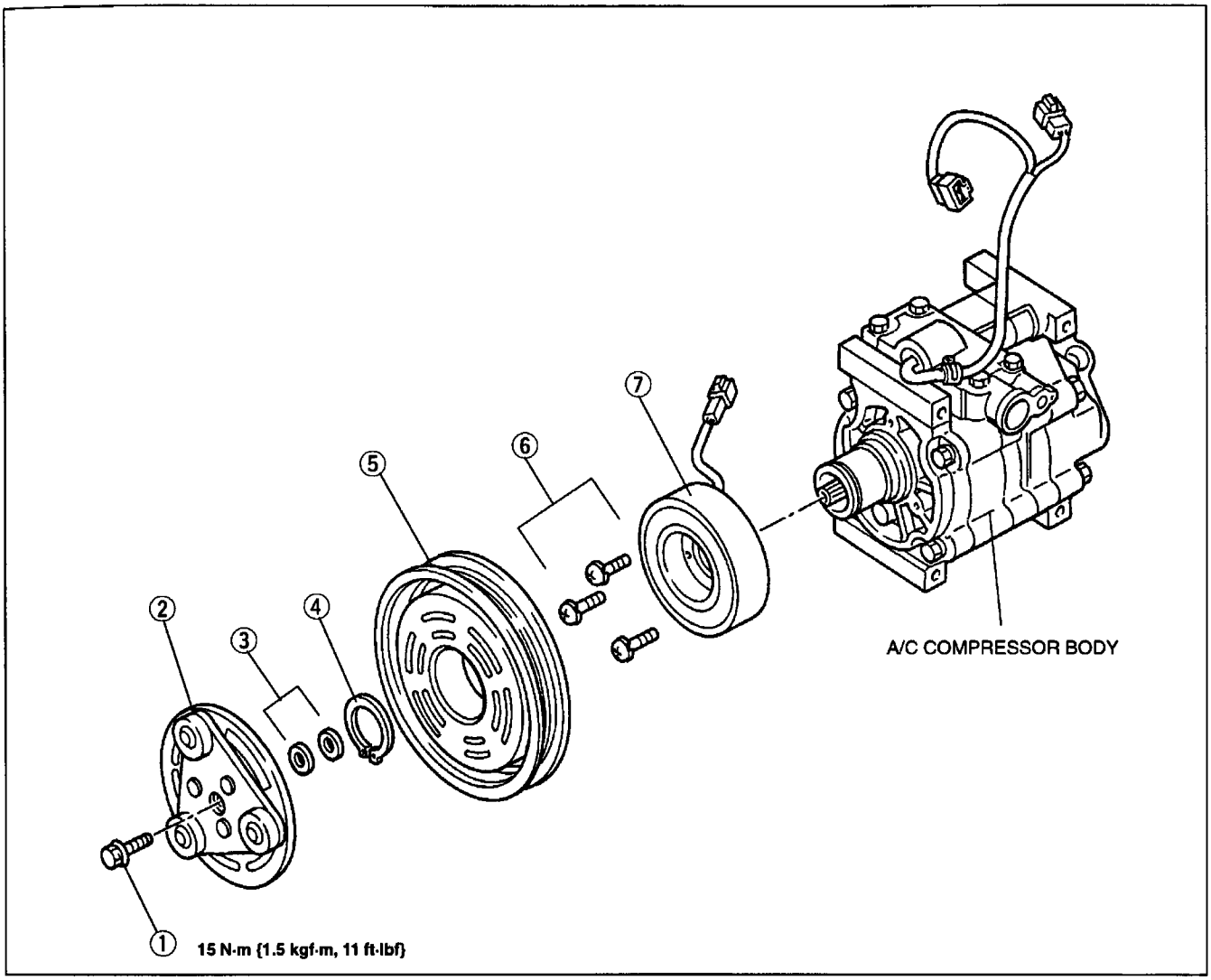
3ZE0UX-163

1. Magnetic clutch
   - Disassembly / Assembly ..... page U-83
   - Disassembly note ..... page U-83
   - Assembly note ..... page U-84
   - Inspection ..... page U-84
2. Condenser fan
   - Removal / Installation ..... page U-85
   - Inspection ..... page U-85
3. Refrigerant pressure switch
   - Removal / Installation ..... page U-86
   - Installation note ..... page U-86
   - Inspection ..... page U-86
4. Relay
   - Removal / Installation ..... page U-87
   - Inspection ..... page U-88
5. Blower motor
   - Removal / Installation ..... page U-89
   - Inspection ..... page U-89
6. Power transistor
   - Removal / Installation ..... page U-89
   - Inspection ..... page U-89
7. Air intake actuator
   - Removal / Installation ..... page U-90
   - Inspection ..... page U-90
8. Air mix actuator
   - Removal / Installation ..... page U-91
   - Inspection ..... page U-91
9. Airflow mode actuator
   - Removal / Installation ..... page U-92
   - Inspection ..... page U-92
10. Solar radiation sensor
    - Removal / Installation ..... page U-93
    - Inspection ..... page U-93
11. Passenger compartment temperature sensor
    - Removal / Installation ..... page U-93
    - Inspection ..... page U-93
12. Ambient temperature sensor
    - Removal / Installation ..... page U-94
    - Inspection ..... page U-94
13. Water temperature sensor
    - Removal / Installation ..... page U-95
    - Inspection ..... page U-95
14. Evaporator temperature sensor
    - Removal / Installation ..... page U-95
    - Inspection ..... page U-95
15. Heater control assembly
    - Removal / Installation ..... page U-96
    - Disassembly / Assembly ..... page U-96
    - Inspection ..... page U-97

MAGNETIC CLUTCH

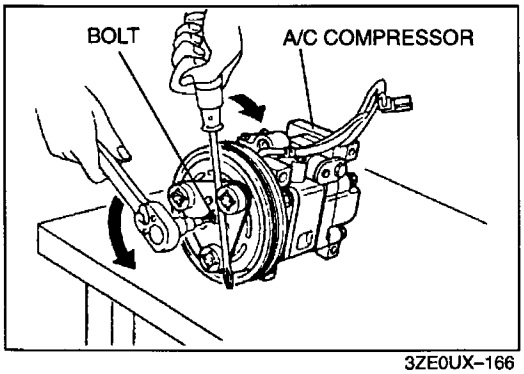
Disassembly / Assembly

1. Remove the A/C compressor. (Refer to page U–72.)
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**.



3ZE0UX–165

1. Bolt
   Disassembly note ..... below
2. Pressure plate
   Assembly note ..... page U–84
3. Shims
4. Snap ring
5. A/C compressor pulley
6. Screws
7. Stator
   Inspection ..... page U–84

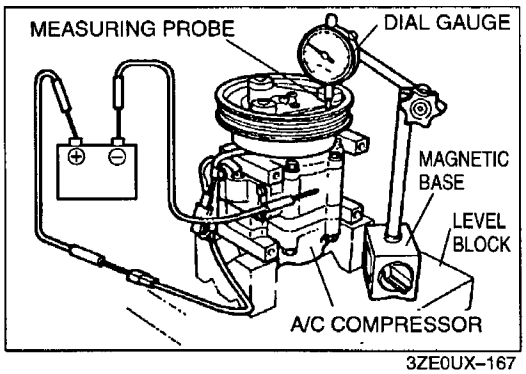


3ZE0UX–166

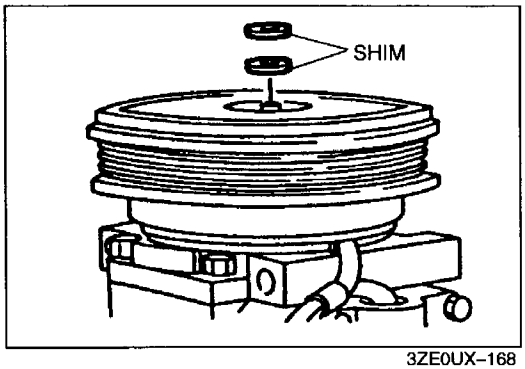
Disassembly note

Bolt

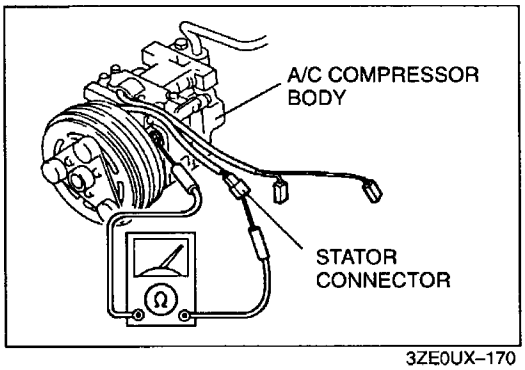
When removing the bolt, hold the pressure plate in place as shown in the figure.



3ZE0UX-167



3ZE0UX-168



3ZE0UX-170

Assembly note
Pressure plate

1. Adjust the clearance between the pressure plate and the A/C compressor pulley in the order shown below.
   (1) Set the A/C compressor on a level block.
   (2) Fix a dial gauge on a magnetic base and set the measuring probe on the pressure plate surface.
   (3) Alternately apply and remove battery positive voltage as shown in the figure. The clearance is the difference in the dial gauge readings.
   (4) Compare the measure clearance with the specified clearance below.

   Clearance: 0.4—0.6 mm {0.016—0.023 in}

2. If not as specified, install shims to adjust the clearance.

Shim part no.	Thickness: mm {in}
B455 61 L15	0.2 {0.008}
B456 61 L15	0.5 {0.020}

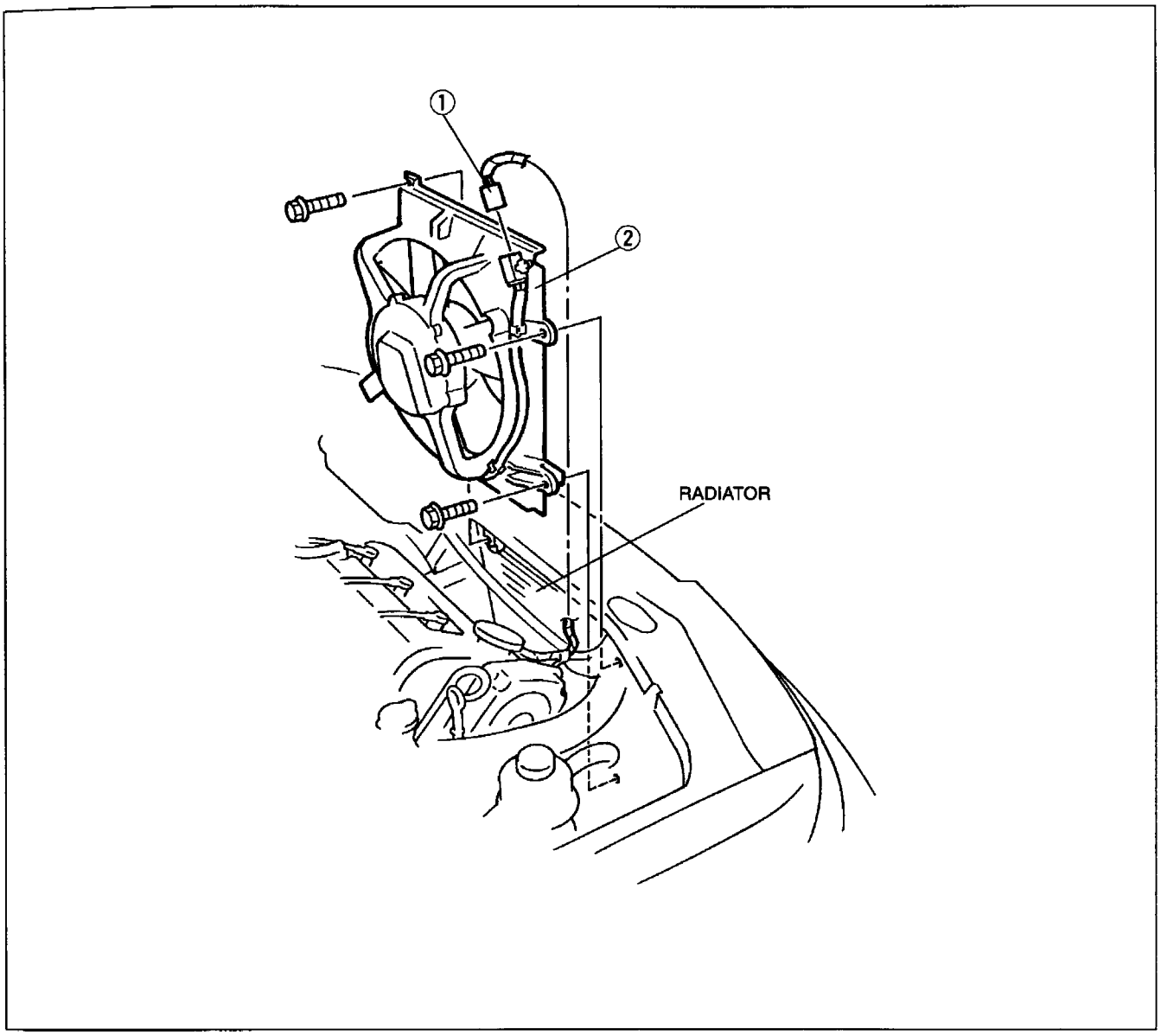
Inspection
Stator

1. Disconnect the stator connector.
2. Set the ohmmeter to the $\times 1000\ \Omega$ range.
3. Verify that there is continuity between the stator connector (male) and A/C compressor body.
4. If there is no continuity, replace the stator.

CONDENSER FAN

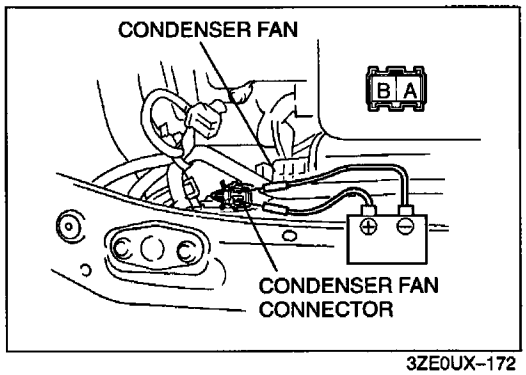
Removal / Installation

1. Remove the intercooler (KJ). (Refer to section F2.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



3ZE0UX-171

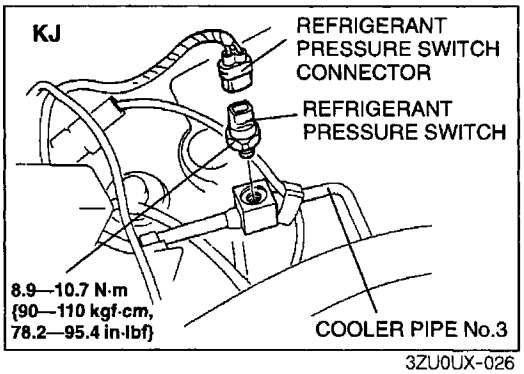
1. Condenser fan connector
2. Condenser fan
   Inspection ..... below



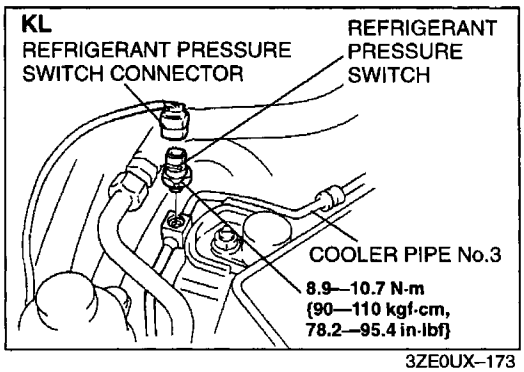
3ZE0UX-172

Inspection

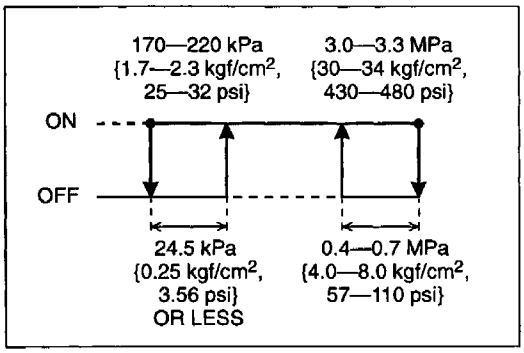
1. Disconnect the condenser fan connector.
2. Connect battery positive voltage to terminal A and ground to terminal B of the condenser fan connector (male) and verify its operation.
3. If not as specified, replace the condenser fan.

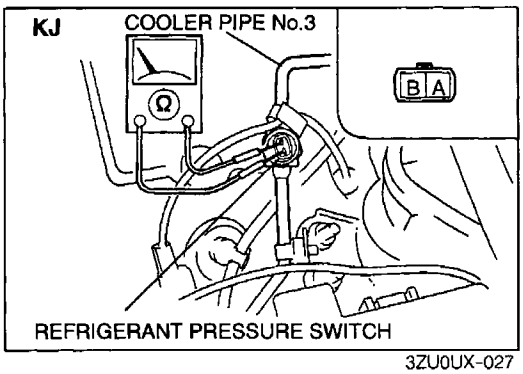


3ZU0UX-026

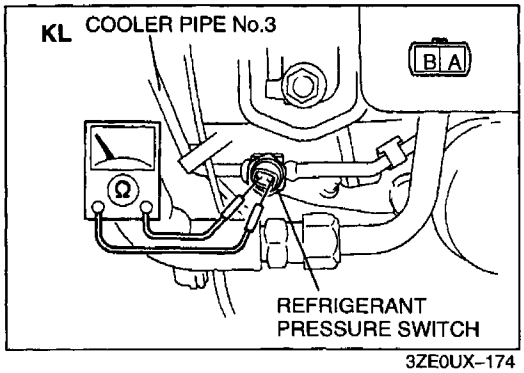


3ZE0UX-173





3ZU0UX-027



3ZE0UX-174

REFRIGERANT PRESSURE SWITCH

Removal / Installation

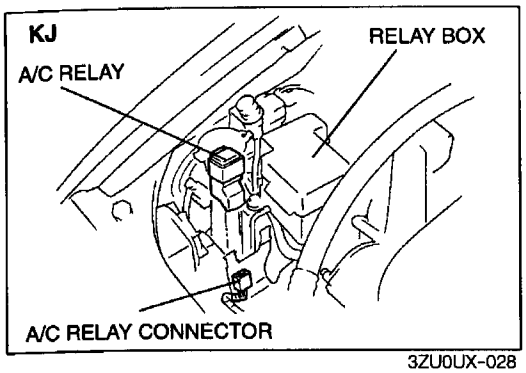
1. Discharge the refrigerant from the system.
2. Disconnect the refrigerant pressure switch connector.
3. Remove the refrigerant pressure switch from cooler pipe No.3.
   Immediately plug all open fittings to keep moisture out of the system.
4. Install in the reverse order of removal, referring to **Installation note.**
5. Charge the system and test its performance. (Refer to pages U–5, 12.)

Installation note

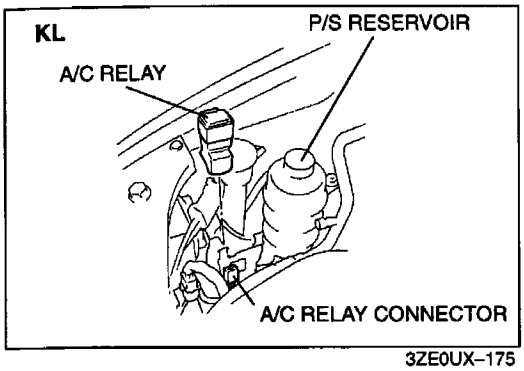
Apply compressor oil to the O-rings and connect the joint.

Inspection

1. Install the manifold gauge set. (Refer to page U–5.)
2. Make sure 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 connector (male).
5. If there is no continuity, replace the refrigerant pressure switch.



3ZU0UX-028



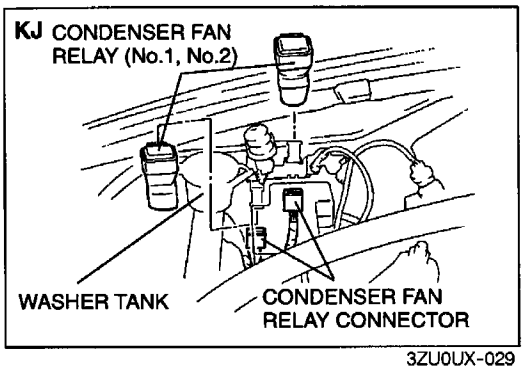
3ZE0UX-175

RELAY

Removal / Installation

A/C relay

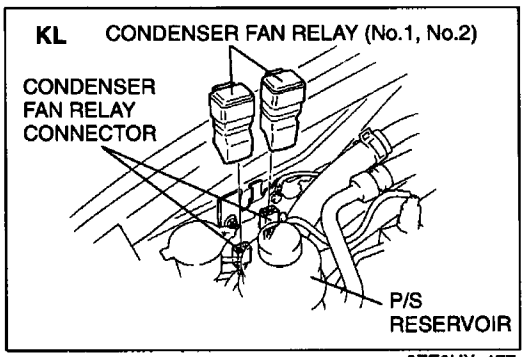
1. Remove the A/C relay.
2. Disconnect the A/C relay connector.
3. Install in the reverse order of removal.



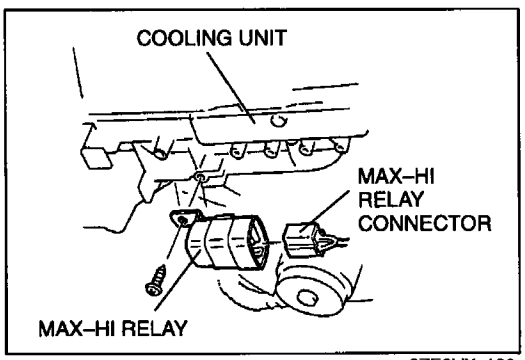
3ZU0UX-029

Condenser fan relay No.1 and No.2

1. Remove the relays.
2. Disconnect the relay connectors.
3. Install in the reverse order of removal.



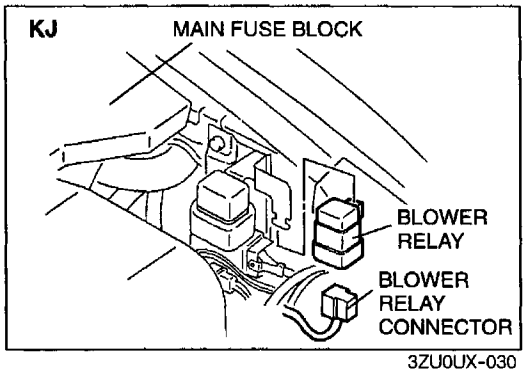
3ZE0UX-177



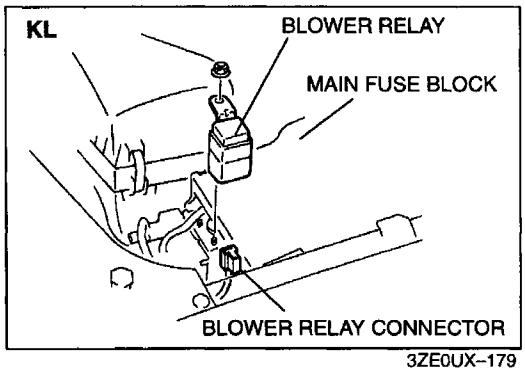
3ZE0UX-180

MAX-HI relay

1. Remove the undercover. (Refer to section S.)
2. Remove the MAX-HI relay.
3. Disconnect the MAX-HI relay connector.
4. Install in the reverse order of removal.

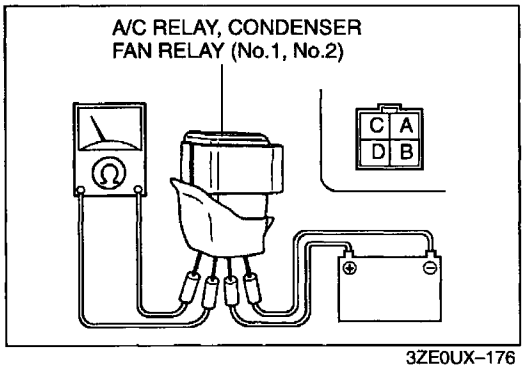


3ZU0UX-030



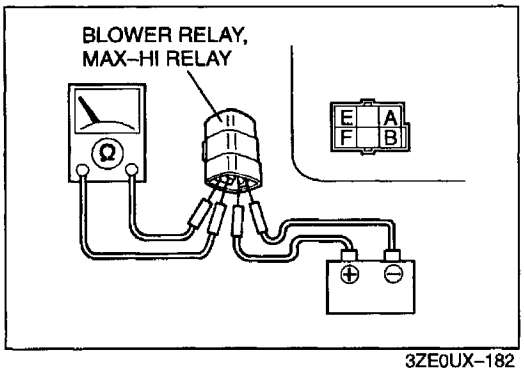
3ZE0UX-179

Blower relay
1. Remove the blower relay.
2. Disconnect the blower relay connector.
3. Install in the reverse order of removal.



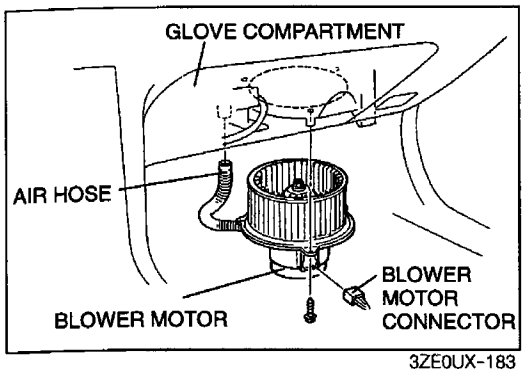
3ZE0UX-176

Inspection
A/C relay, condenser fan relay No.1 and No.2
1. Remove the relay. (Refer to page U–87.)
2. Check for no continuity between terminals C and D of the relay connector (male).
3. Connect battery positive voltage to terminal A and ground to terminal B of the relay connector (male).
4. Check for continuity between terminals C and D.
5. If not as specified, replace the relay.



3ZE0UX-182

MAX–HI relay, Blower relay
1. Remove the relay. (Refer to page U–87.)
2. Check for no continuity between terminals B and F of the relay connector (male).
3. Connect battery positive voltage to terminal A and ground to terminal E of the relay connector (male).
4. Check for continuity between terminals B and F.
5. If not as specified, replace the relay.

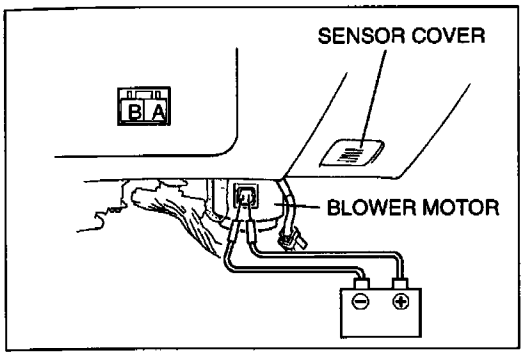


3ZE0UX-183

BLOWER MOTOR

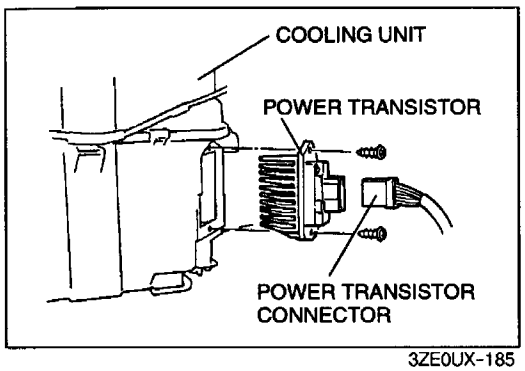
Removal / Installation

1. Remove the undercover. (Refer to section S.)
2. Disconnect the blower motor connector.
3. Remove the air hose.
4. Remove the three hex tapping screws and blower motor.
5. Install in the reverse order of removal.



Inspection

1. Disconnect the blower motor connector.
2. Connect battery positive voltage to terminal A and ground to terminal B of the blower motor connector (male). Verify that the blower motor operates.
3. If not as specified, replace the blower motor.

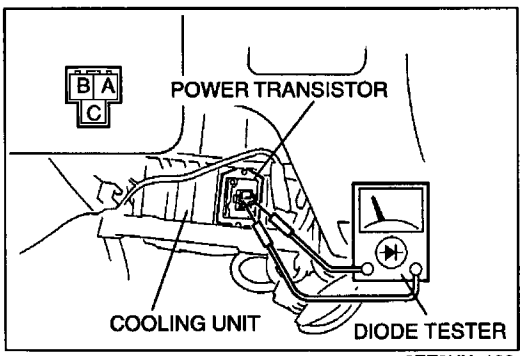


3ZE0UX-185

POWER TRANSISTOR

Removal / Installation

1. Remove the undercover, glove compartment, and glove compartment cover. (Refer to section S.)
2. Remove the stay.
3. Disconnect the power transistor connector.
4. Remove the power transistor.
5. Install in the reverse order of removal.



3ZE0UX-186

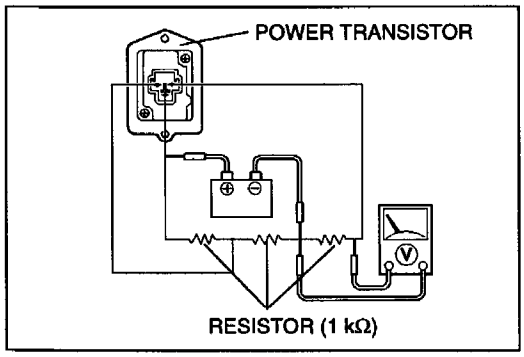
Inspection

When using a diode tester

1. Disconnect the power transistor connector.
2. Verify that the voltage between the terminals of the power transistor connector (mail) is as shown below.

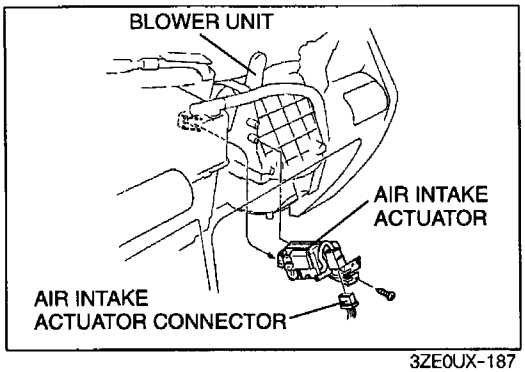
Tester		Voltage (V)	Tester		Voltage (V)
+	−		+	−	
A	B	0.9	B	C	0.5
A	C	0.4	C	A	—
B	A	0.5	C	B	—

3. If not as specified, replace the power transistor.

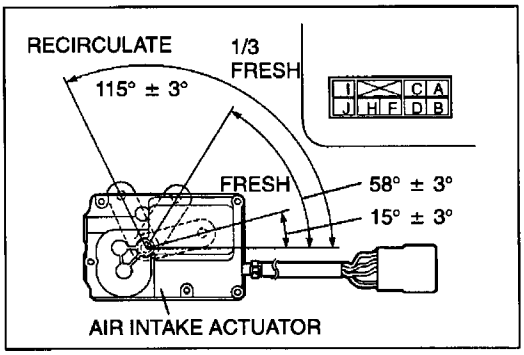


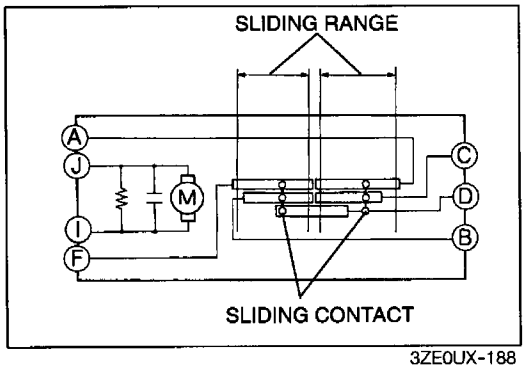
When using a resistor

1. Remove the power transistor.
2. Verify that the battery voltage is 12 V.
3. Set the circuit by using the resistor (1 kΩ, rated power: 0.25 W), the voltmeter, and battery as shown in the figure.
4. Verify that the voltage is 5.5 V.
5. If not as specified, replace the power transistor.



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AIR INTAKE ACTUATOR

Removal / Installation

1. Remove the undercover, glove compartment, and glove compartment cover. (Refer to section S.)
2. Disconnect the air intake actuator connector.
3. Remove the two tapping screws and air intake actuator.
4. Install in the reverse order of removal.

Inspection

1. Remove the air intake actuator.
2. Connect battery positive voltage to terminal J or I and ground to terminal I or J of the air intake actuator connector (male).
3. Verify that the air intake actuator operates as shown below.

B+: Battery positive voltage

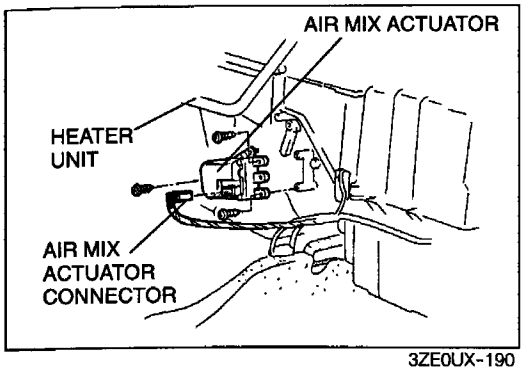
Connection		Movement
B+	GND	
J	I	FRESH → 1/3 FRESH → RECIRCULATE
I	J	RECIRCULATE → 1/3 FRESH → FRESH

4. Check for continuity between the terminals of the air intake actuator connector (male).

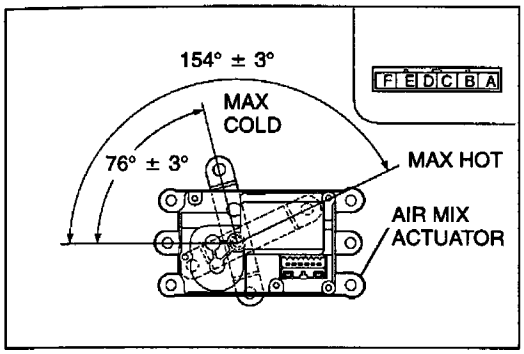
O—O: Continuity

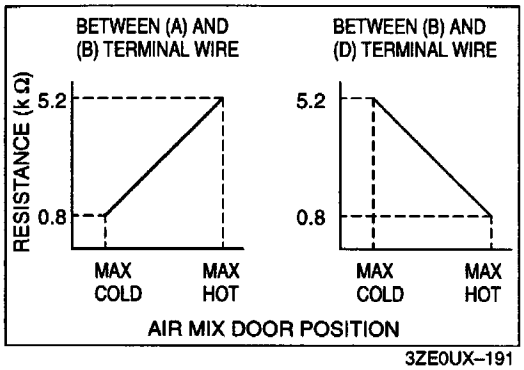
Mode	A	C	D	B	F
FRESH	O	O	O		
1/3 FRESH	O	O		O	O
RECIRCULATE			O	O	O

5. If not as specified, replace the air intake actuator.

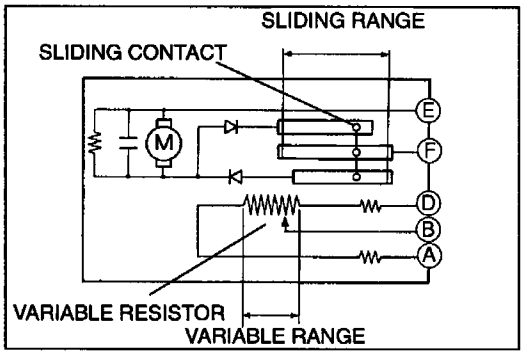


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AIR MIX ACTUATOR

Removal / Installation

1. Remove the dashboard. (Refer to section S.)
2. Disconnect the air mix actuator connector.
3. Remove the three tapping screws and the air mix actuator.
4. Install in the reverse order of removal.

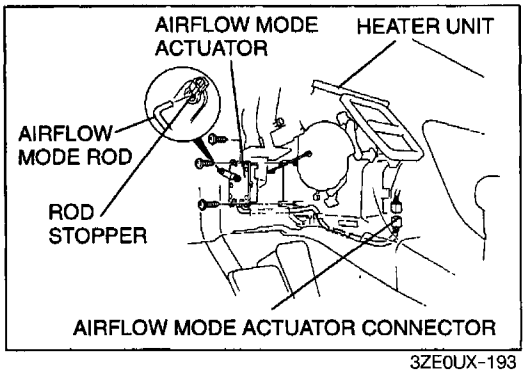
Inspection

1. Remove the air mix actuator.
2. Connect battery positive voltage to terminal F or E and ground to terminal E or F of the air mix actuator connector (male).
3. Verify that the air mix actuator operates as shown below.

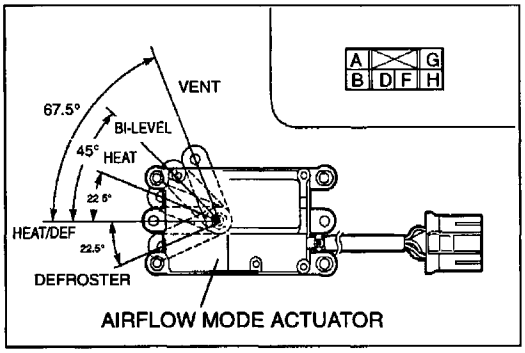
B+: Battery positive voltage

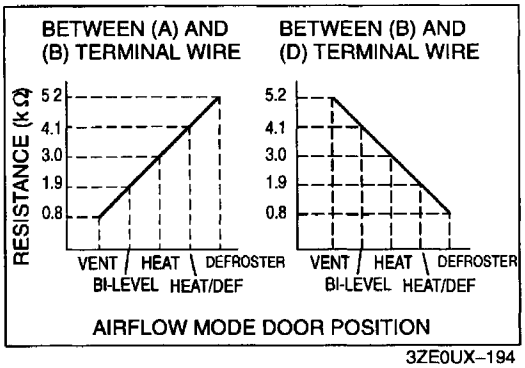
Connection		Movement
B+	GND	
F	E	HOT → COLD
E	F	COLD → HOT

4. Measure the resistance between the terminals of the air mix actuator connector (male) as shown in the figure.
5. If not as specified, replace the air mix actuator.

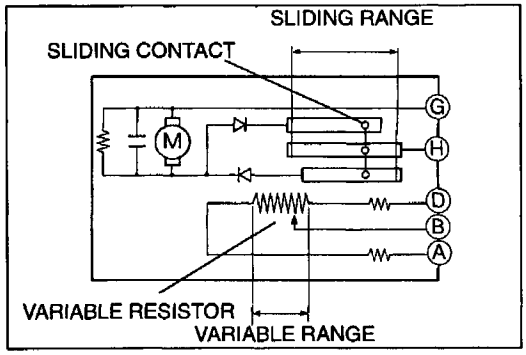


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AIRFLOW MODE ACTUATOR

Removal / Installation

1. Remove the rear console. (Refer to section S.)
2. Turn off the floor covering and remove the cover.
3. Disconnect the airflow mode actuator connector.
4. Disconnect the airflow mode rod from the rod stopper of the airflow mode actuator.
5. Remove the airflow mode actuator.
6. Install in the reverse order of removal.

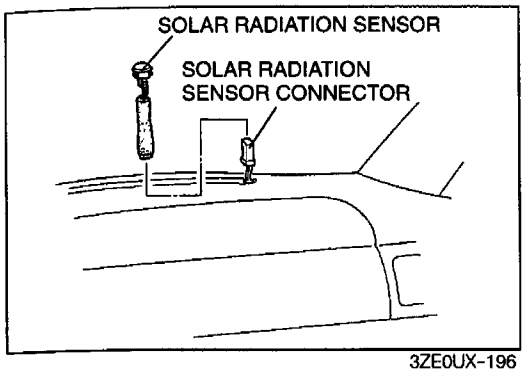
Inspection

1. Remove the airflow mode actuator.
2. Connect battery positive voltage to terminal G or H and ground to terminal H or G of the airflow mode actuator connector (female).
3. Verify that the airflow mode actuator operates as shown below.

B+: Battery positive voltage

Connection		Movement
B+	GND	
G	H	VENT → DEFROSTER
H	G	DEFROSTER → VENT

4. Measure the resistance between the terminals of the airflow mode actuator connector (female) as shown in the figure.
5. If not as specified, replace the airflow mode actuator.

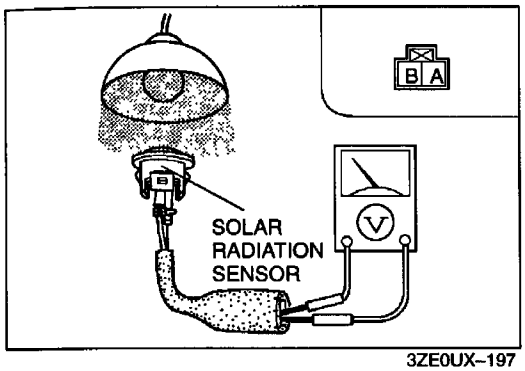


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SOLAR RADIATION SENSOR

Removal / Installation

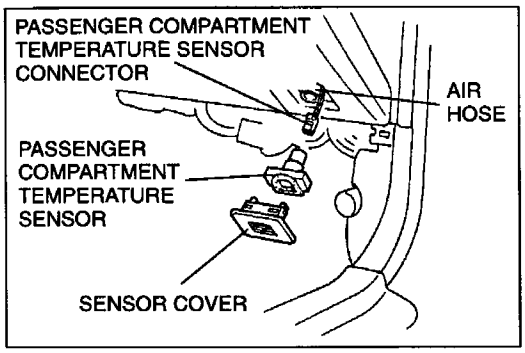
1. Remove the solar radiation sensor from the dashboard by using a flathead screwdriver which has been wrapped in tape.
2. Disconnect the solar radiation sensor connector.
3. Install in the reverse order of removal.



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Inspection

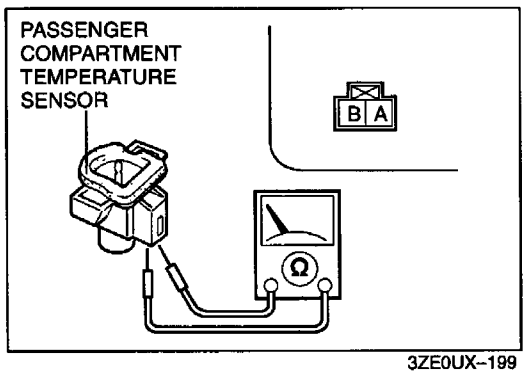
1. Remove the solar radiation sensor.
2. Shine an incandesent light (60 W) on the solar radiation sensor from a distance of approximately 10 cm {3.9 in}.
3. Connect positive (+) lead to terminal A and negative (–) lead to terminal B of the solar radiation sensor connector (male).
4. If the output voltage is not above 0.45 V, replace the solar radiation sensor.



PASSENGER COMPARTMENT TEMPERATURE SENSOR

Removal / Installation

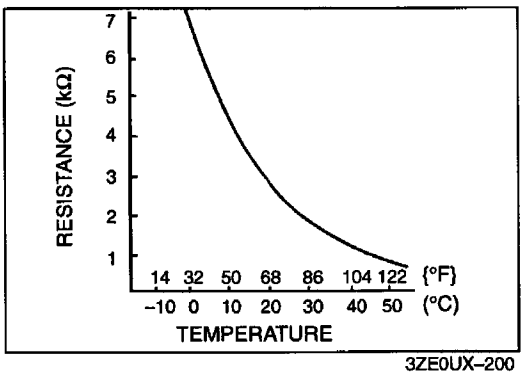
1. Remove the sensor cover.
2. Disconnect the air hose and passenger compartment temperature sensor connector.
3. Remove the passenger compartment temperature sensor.
4. Install in the reverse order of removal.



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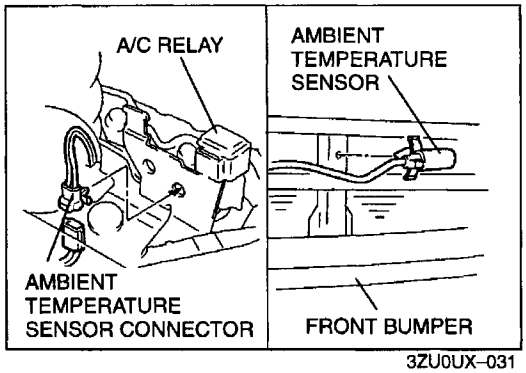
Inspection

1. Remove the passenger compartment temperature sensor.
2. Measure the temperature around the passenger compartment temperature sensor.
3. Measure the resistance between terminals A and B of the passenger compartment temperature sensor connector (male).



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4. If the resistance is not as shown in the graph, replace the passenger compartment temperature sensor.

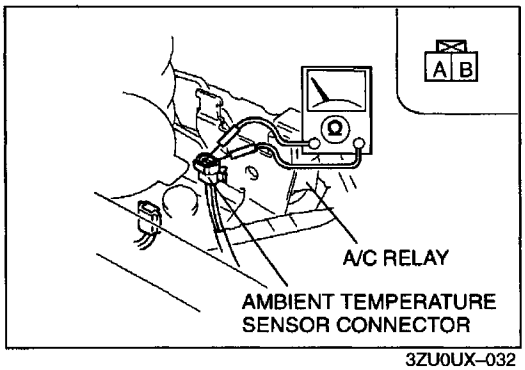


3ZU0UX-031

AMBIENT TEMPERATURE SENSOR

Removal / Installation

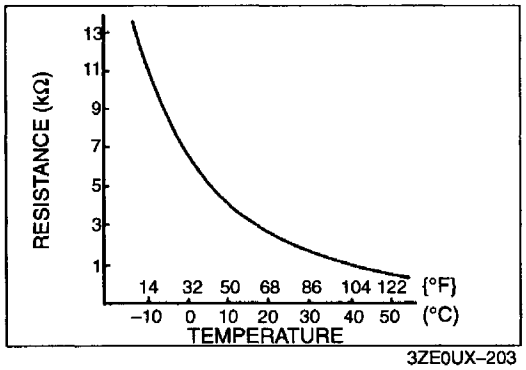
1. Remove the radiator grille. (Refer to section S.)
2. Disconnect the ambient temperature sensor connector.
3. Remove the ambient temperature sensor harness clamp.
4. Remove the ambient temperature sensor.
5. Install in the reverse order of removal.



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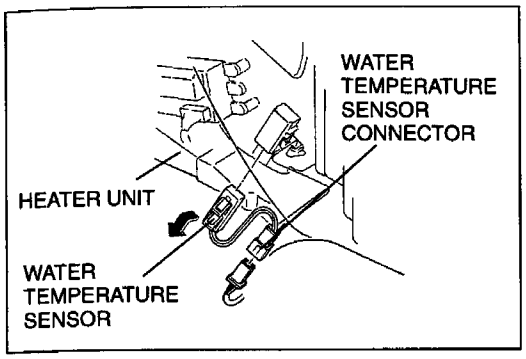
Inspection

1. Disconnect the ambient temperature sensor connector.
2. Measure the temperature around the ambient temperature sensor.
3. Measure the resistance between terminals A and B of the ambient temperature sensor connector (female).



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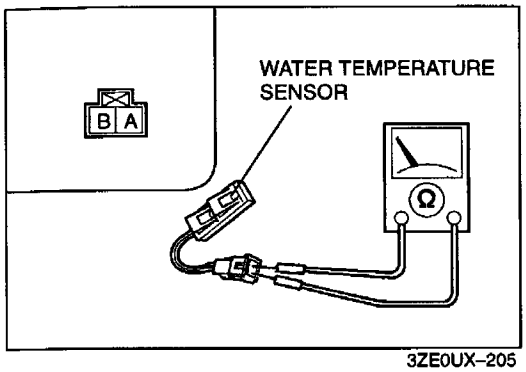
4. If the resistance is not as shown in the graph, replace the ambient temperature sensor.



WATER TEMPERATURE SENSOR

Removal / Installation

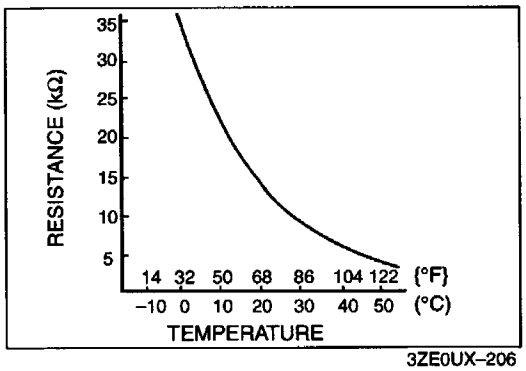
1. Remove the undercover, glove compartment, and glove compartment cover. (Refer to section S.)
2. Remove the stay.
3. Disconnect the water temperature sensor connector.
4. Remove the water temperature sensor.
5. Install in the reverse order of removal.



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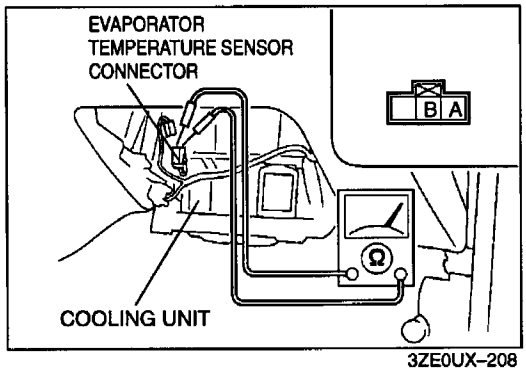
Inspection

1. Remove the water temperature sensor.
2. Measure the temperature around the water temperature sensor.
3. Measure the resistance between terminals A and B of the water temperature sensor connector (male).



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4. If the resistance is not as shown in the graph, replace the water temperature sensor.

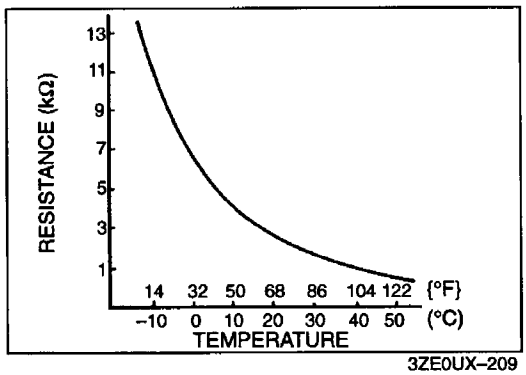


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EVAPORATOR TEMPERATURE SENSOR

Removal / Installation

1. Remove the cooling unit. (Refer to page U–68.)
2. Remove the evaporator temperature sensor from the cooling unit. (Refer to page U–69.)
3. Install in the reverse order of removal.



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Inspection

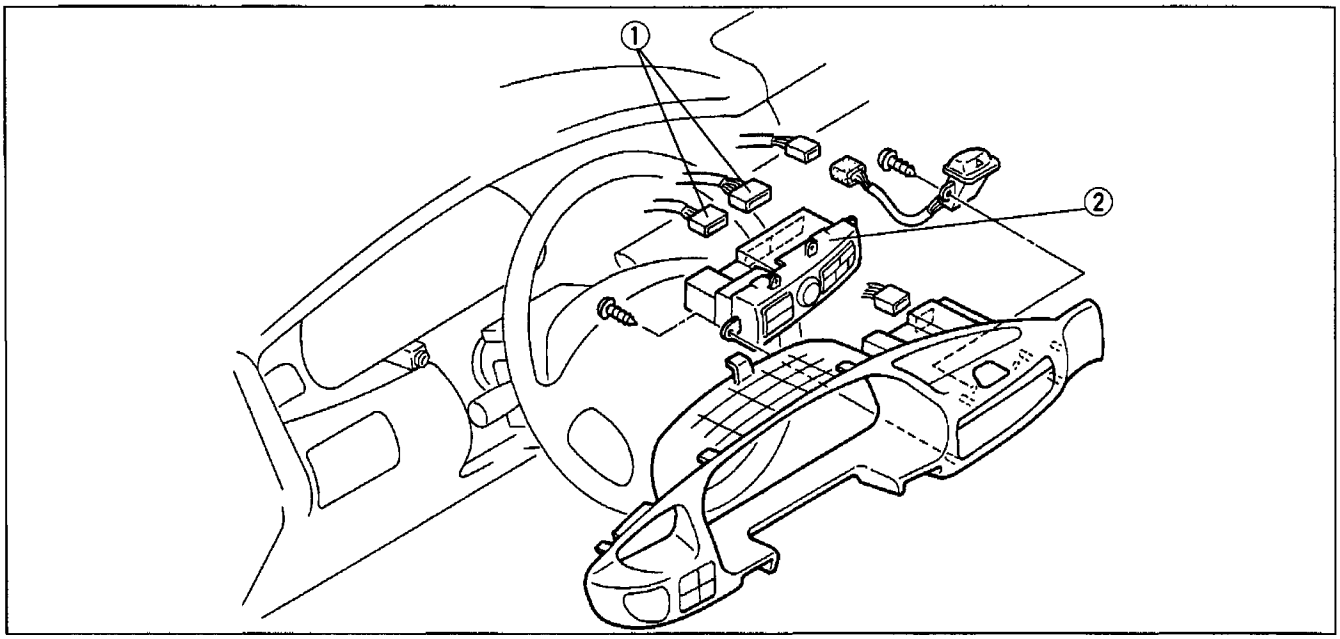
Be sure that A/C switch is off before inspection. Leave the evaporator until its surface temperature equals the surrounding temperature.

1. Remove the undercover, glove compartment, and glove compartment cover. (Refer to section S.)
2. Disconnect the evaporator temperature sensor connector.
3. Set the fan switch at manual 4th speed.
4. Set the REC/FRESH switch to RECIRCULATE.
5. Measure the temperature at the blower inlet.
6. Measure the resistance between terminals A and B of the evaporator temperature sensor connector (male).
7. If the resistance is not as shown in the graph, replace the evaporator temperature sensor.

HEATER CONTROL ASSEMBLY

Removal / Installation

1. Remove the column cover and meter hood. (Refer to section S.)
2. Remove the hazard warning switch. (Refer to section T.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.

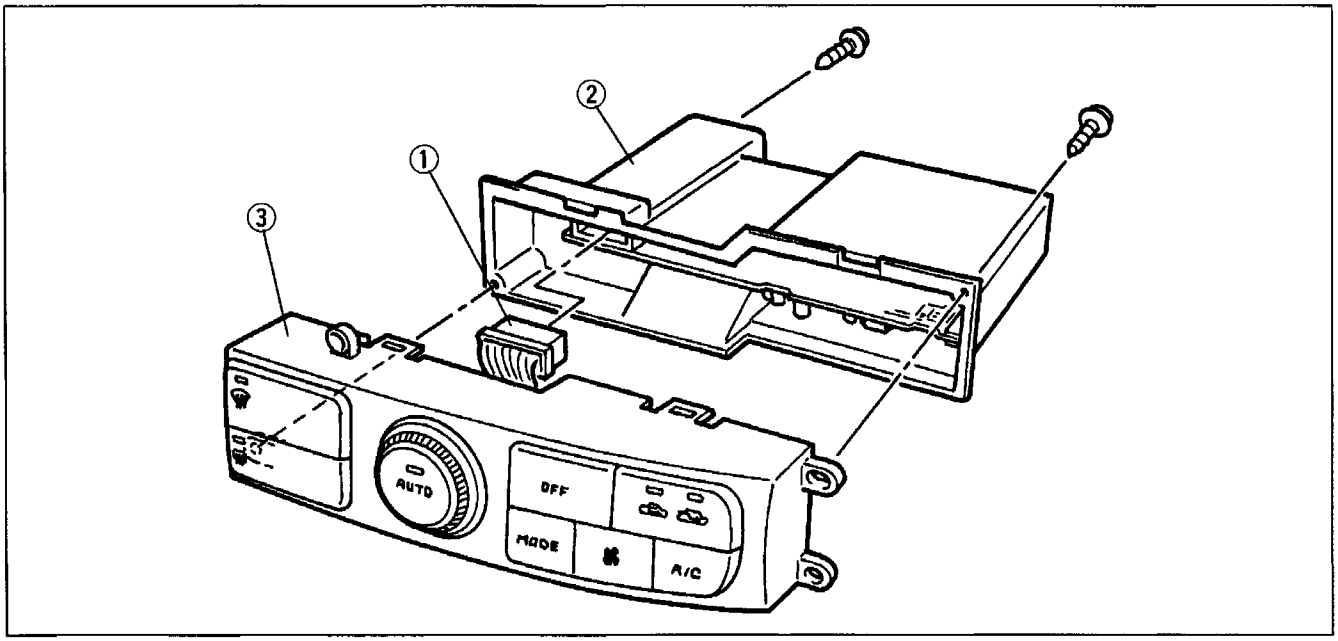


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1. A/C amplifier connector
2. Heater control assembly
   Disassembly / Assembly ..... below

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.

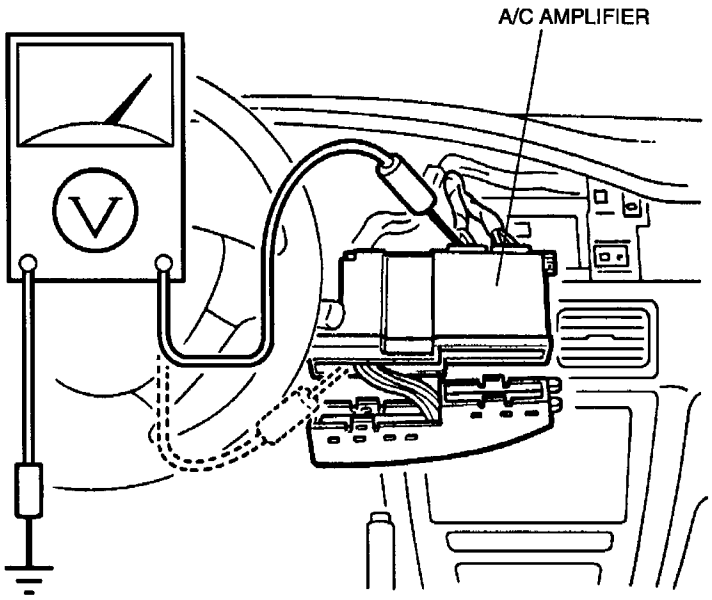


3ZE0UX-211

1. A/C amplifier connector
2. A/C amplifier
   Inspection ..... page U–97
3. Heater control unit
   Inspection ..... page U–106

Inspection
A/C amplifier

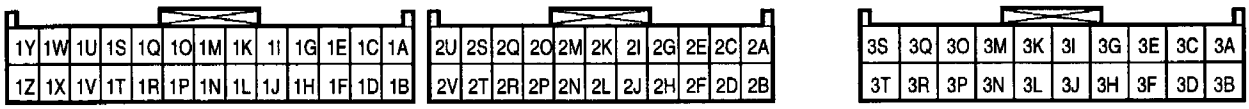
1. Disassemble the heater control assembly. (Refer to page U–96.)
2. Connect the A/C amplifier connectors (26-pin, 22-pin, 20-pin) and information display connector.
3. Start the engine.
4. Measure the voltage at the terminals of the A/C amplifier connector and refer to the terminal voltage chart on the following pages.
5. If not as specified, inspect the appropriate area.
6. If the appropriate area is correct, replace the A/C amplifier.



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Terminal voltage (Reference)

B+: Battery positive voltage



Terminal	Signal name	Connected	Test condition	Voltage (V)	Inspection area
1A	Potentiometer power source	• Air mix actuator • Airflow mode actuator • Solar radiation sensor	Ignition switch at ACC	5	• Short circuit (A/C amplifier — Air mix actuator: [W] — [Y/R] wire, A/C amplifier — Solar radiation sensor: [W] wire, A/C amplifier — Airflow mode actuator: [W] wire) • Air mix actuator (Refer to page U–91) • Airflow mode actuator (Refer to page U–92) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
			Ignition switch at LOCK	0	
1B	Serial communication	Information display	—	—	Refer to "Serial communication system inspection" in trouble-shooting guide (page U–39)
1C	Ground	Ground	Any	0	Continuity (A/C amplifier — Ground: [W/B] — [L/Y] wire)
1D	Battery	• ROOM 15 A fuse • Information display	Any	B+	• Short circuit (ROOM 15 A fuse — A/C amplifier, Information display: [L/R] wire) • Continuity (ROOM 15 A fuse — A/C amplifier: [L/R] wire) • ROOM 15 A fuse
1E	Vehicle speed signal	Speedometer	Raise front wheels and rotate front wheels by hand	Meter needle make a rotate move between 0 V and 5 V	• Continuity or short circuit (Speedometer — A/C amplifier; [G/R] wire) • Speedometer (Refer to section T)
1F	—	—	—	—	—
1G	TNS signal	• Panel light control switch • Information display	Light switch on and panel light control switch at max. illumination	0.4	• Short circuit (A/C amplifier — Panel light control switch, Information display: [W/V] wire) • Continuity (A/C amplifier — Panel light control switch: [W/V] wire) • Panel light control switch (Refer to section T) • Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (2A) • Terminal voltage of information display connector (3C)
			Light switch on and panel light control switch at min. illumination	11.5	
			Light switch off	0	
1H	—	—	—	—	—

B+: Battery positive voltage

Terminal	Signal name	Connected	Test condition	Voltage (V)	Inspection area
1I	Serial communication	Information display	—	—	Refer to "Serial communication system inspection in trouble-shooting guide (page U–39)
1J	Electrical load idle-up signal	ECM (PCM)	Fan speed 1st/2nd	B+	• Terminal voltage of A/C amplifier connector (3H, 3O) • Continuity or short circuit <ECM (PCM) — A/C amplifier: [V] wire> • ECM (PCM) (Refer to sections F1, F2)
			Fan speed 3rd/4th	0	
1K	Blower relay control signal	Blower relay	Fan switch on	0.2	• Continuity or short circuit (Blower relay — A/C amplifier: [B/Y] wire, BLOWER 15 A fuse — Blower relay: [R/W] wire) • Blower relay (Refer to page U–88) • Terminal voltage of A/C amplifier connector (3H) • BLOWER 15 A fuse
			Fan switch off	B+	
1L	Recirculate signal	Air intake actuator	RECIRCULATE or operating	0	Terminal voltage of A/C amplifier connector (1R)
			FRESH or 1/3 FRESH	5	
1M	1/3 Fresh signal	Air intake actuator	1/3 FRESH or operating	0	Terminal voltage of A/C amplifier connector (1R)
			FRESH or RECIRCULATE	5	
1N	Fresh signal	Air intake actuator	RECIRCULATE or 1/3 FRESH	5	Terminal voltage of A/C amplifier connector (1R)
			FRESH or operating	0	
1O	Fan speed control signal	Power transistor	Fan switch off	0	• Continuity (A/C amplifier — Power transistor: [L/R] wire, A/C amplifier — Power transistor, MAX–HI relay, Blower motor: [L/W] wire, Blower relay — Blower motor: [L/R] — [L] — [L/R] wire, HEATER 40 A fuse — Blower relay: [L] wire, Power transistor, MAX–HI relay — Ground: [B] wire) • Short circuit (A/C amplifier — Power transistor: [L/R] wire, A/C amplifier — Power transistor, MAX–HI relay, Blower motor: [L/W] wire, Blower relay — Blower motor: [L/R] — [L] — [L/R] wire, HEATER 40 A fuse — Blower relay: [L] wire) • Power transistor (Refer to page U–89) • Blower motor (Refer to page U–89) • HEATER 40 A fuse • Terminal voltage of A/C amplifier connector (1K, 2U)
			Fan switch at 1st position	1.3	
			Fan switch at 2nd position	1.4	
			Fan switch at 3rd position	1.6	
			Fan switch at 4th position	0.6	
1P	—	—	—	—	—
1Q	Blower motor feedback signal	• Power transistor • MAX–HI relay • Blower motor	Fan switch off	6.1	Terminal voltage of A/C amplifier connector (1O)
			Fan switch at 1st position	9.5	
			Fan switch at 2nd position	6.1	
			Fan switch at 3rd position	3.2	
			Fan switch at 4th position	0.2	

B+: Battery positive voltage

Terminal	Signal name	Connected	Test condition	Voltage (V)	Inspection area
1R	Common power source	Air intake actuator	Moving to RECIRCULATE	0	• Continuity or short circuit (A/C amplifier — air intake actuator: [L/O], [L/Y], [L/R] — [R], [L], [W/L] — [LG/R], [LG/R] — [LG/B], [BR] wire) • Air intake actuator (Refer to page U–90) • Terminal voltage of A/C amplifier connector (3H)
			Moving to FRESH & stopped	5	
1S	Motor drive signal	Airflow mode actuator	Moving to VENT	B+	Terminal voltage of A/C amplifier connector (2N)
			Moving to DEFROSTER	0.6	
			30 seconds after stopped	0	
1T	Common power source	Air intake actuator	Moving to FRESH	0	Terminal voltage of A/C amplifier connector (1R)
			Moving to RECIRCULATE & stopped	5	
1U	Motor drive signal	Airflow mode actuator	Moving to VENT	0.6	Terminal voltage of A/C amplifier connector (2N)
			Moving to DEFROSTER	B+	
			30 seconds after stopped	0	
1V	Motor drive signal	Air mix actuator	Moving to HOT	B+	Terminal voltage of A/C amplifier connector (2K)
			Moving to COLD	0.6	
			30 seconds after stopped	0	
1W	Motor drive signal	Air intake actuator	Stopped	0.6	Terminal voltage of A/C amplifier connector (1R)
			Moving to RECIRCULATE	B+	
			Moving to FRESH	0.8	
1X	Motor drive signal	Air mix actuator	Moving to HOT	0.6	Terminal voltage of A/C amplifier connector (2K)
			Moving to COLD	B+	
			30 seconds after stopped	0	
1Y	Motor drive signal	Air intake actuator	Stopped	0.6	Terminal voltage of A/C amplifier connector (1R)
			Moving to RECIRCULATE	0.8	
			Moving to FRESH	B+	
1Z	ACC	• Information display • RADIO 10 A fuse	Ignition switch at ACC	B+	• Continuity (RADIO 10 A fuse — A/C amplifier: [P/G] wire) • Short circuit (RADIO 10 A fuse — A/C amplifier, information display: [P/G] wire) • RADIO 10 A fuse
			Ignition switch at LOCK	0	
2A	TNS signal	TNS relay	Light switch on	B+	• Continuity or short circuit (TNS relay — A/C amplifier: [R] wire) • TNS relay (Refer to section T)
			Light switch off	0	
2B	—	—	—	—	—

Terminal	Signal name	Connected	Test condition	Voltage (V)	Inspection area
2C	Ground	• Airflow mode actuator • Air mix actuator • Ambient temperature sensor • Passenger compartment temperature sensor • Water temperature sensor • Solar radiation sensor • Evaporator temperature sensor	Any	0	Terminal voltage of A/C amplifier connector (1C)
2D	On-board diagnostic signal	Data link connector TAC terminal	Ignition switch at ACC	11.6	• Short circuit (A/C amplifier — Data link connector: [BR/W] — [BR/Y] wire) • Terminal voltage of A/C amplifier connector (1Z)
			Ignition switch at LOCK	0	
2E	Ambient temperature switch signal	Information display	AMB switch hold on	0	• Continuity (A/C amplifier — Information display: [W/B], [G] wires) • Short circuit (A/C amplifier — Information display: [W/B] wire) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S) • Information display (Refer to section T)
			AMB switch off	3.6	
2F	—	—	—	—	—
2G	Serial communication	Information display	—	—	Refer to "Serial communication system inspection" in troubleshooting guide (page U–39)
2H	On-board diagnostic signal	Data link connector FAC terminal	• Connect the **SST** (NGS) • Block the light to solar radiation sensor	(Refer to Figure 1, page U–105)	• Continuity or short circuit (A/C amplifier — Data link connector: [O/B] — [BR/W] wire) • **SST** (NGS) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
2I	A/C signal	Refrigerant pressure switch	Magnetic clutch on	3.1—3.7 or below 1.5	• Continuity or short circuit (A/C amplifier — Refrigerant pressure switch: [G/B] wire, Refrigerant pressure switch — ECM (PCM): [G] wire) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S) • Refrigerant pressure switch (Refer to page U–86) • ECM (PCM) (Refer to sections F1, F2)
			Magnetic clutch off	5	
2J	Serial communication	Information display	—	—	Refer to "Serial communication system inspection" in troubleshooting guide (page U–39)
2K	Potentiometer signal	Air mix actuator	Set temperature at 18.0 °C {65 °F}	0.7	• Continuity (Air mix actuator — A/C amplifier: [G/B], [G/Y], [G], [Y/R] — [W], [G/O] wires) • Short circuit (Air mix actuator — A/C amplifier: [G/B], [G/Y], [G] wires) • Terminal voltage of A/C amplifier connector (1A, 3R, 3S, 3T)
			Set temperature at 32.0 °C {90 °F}	4.3	

Terminal	Signal name	Connected	Test condition	Voltage (V)	Inspection area
2L	—	—	—	—	—
2M	Evaporator temperature sensor input signal	Evaporator temperature sensor	Depends on temperature surrounding sensor	(Refer to Figure 2, page U–105)	• Continuity (A/C amplifier — Evaporator temperature sensor: [R/W], [G/O] wire) • Short circuit (A/C amplifier — Evaporator temperature sensor: [R/W] wire) • Evaporator temperature sensor (Refer to page U–95) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
2N	Potentiometer signal	Airflow mode actuator	VENT	4.3	• Continuity (Airflow mode actuator — A/C amplifier: [L], [LG/B], [P], [W], [G/O] wires) • Short circuit (Airflow mode actuator — A/C amplifier: [L], [LG/B], [P] wires) • Terminal voltage of A/C amplifier connector (1A, 3B, 3D, 3O)
			DEFROSTER	0.7	
2O	Ambient temperature sensor input signal	Ambient temperature sensor	Depends on temperature surrounding sensor	(Refer to Figure 3, page U–105)	• Continuity (A/C amplifier — Ambient temperature sensor: [R/G], [G/O] wires) • Short circuit (A/C amplifier — Ambient temperature sensor: [R/G] wire) • Ambient temperature sensor (Refer to page U–94) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
2P	Solar radiation sensor input signal	Solar radiation sensor	Incandescent-light (60 W) shining on solar radiation sensor from distance of approx. 10 cm {3.9 in}	1.7	• Continuity or short circuit (A/C amplifier — Solar radiation sensor: [R/Y], [W] wires) • Terminal voltage of A/C amplifier connector (1A) • Solar radiation sensor (Refer to page U–93)
			Light to solar radiation sensor blocked	0.2	
2Q	Passenger compartment temperature sensor input signal	Passenger compartment temperature sensor	Depends on temperature surrounding sensor	(Refer to Figure 4, page U–105)	• Continuity (A/C amplifier — Passenger compartment temperature sensor: [W/V], [G/O] wires) • Short circuit (A/C amplifier — Passenger compartment temperature sensor: [W/V] wire) • Passenger compartment temperature sensor (Refer to page U–93) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
2R	Water temperature sensor input signal	Water temperature sensor	Depends on temperature surrounding sensor	(Refer to Figure 5, page U–105)	• Continuity (A/C amplifier — Water temperature sensor: [R/B] — [R], [G/O] wires) • Short circuit (A/C amplifier — Water temperature sensor; [R/B] — [R] wire) • Water temperature sensor (Refer to page U–95) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)

B+: Battery positive voltage

Terminal	Signal name	Connected	Test condition	Voltage (V)	Inspection area
2S	IG2	• A/C 10 A fuse • Information display	Ignition switch at ON	B+	• Short circuit (A/C 10 A fuse, — A/C amplifier: [V] wire, A/C 10A fuse — MAX-HI relay: [V] — [B/W] wire) • Continuity (A/C 10 A fuse — A/C amplifier: [V] wire) • A/C 10 A fuse
			Ignition switch at LOCK	0	
2T	REAR WINDOW DEFROSTER relay control signal	REAR WINDOW DEFROSTER relay	REAR WINDOW DEFROSTER switch on	0.2	• Continuity or short circuit (REAR WINDOW DEFROSTER relay — A/C amplifier: [P] wire) • REAR WINDOW DEFROSTER relay (Refer to section T) • Terminal voltage of A/C amplifier connector (3F)
			REAR WINDOW DEFROSTER switch off	B+	
2U	MAX–HI relay operation signal	MAX–HI relay	Fan switch at 4th position	0.2	• Continuity or short circuit (MAX–HI relay — A/C amplifier: [O] — [L] wire) • MAX–HI relay (Refer to page U–87) • Terminal voltage of A/C amplifier connector (3H)
			Fan switch at any position except 4th	B+	
2V	Ground	Information display	Any	0	Terminal voltage of A/C amplifier connector (1C)
3A	Serial communication	Heater control unit	—	—	Refer to "Serial communication system inspection" in troubleshooting guide (page U–54)
3B	DEFROSTER switch and AUTO switch signal	Heater control unit	DEFROSTER switch or AUTO switch hold on	2.3	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
			DEFROSTER switch and AUTO switch off	0	
3C	Serial communication	Heater control unit	—	—	Refer to "Serial communication system inspection" in troubleshooting guide (page U–54)
3D	MODE switch and OFF switch signal	Heater control unit	MODE switch or OFF switch hold on	2.3	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
			MODE switch and OFF switch off	0	
3E	AUTO indicator light illumination signal	Heater control unit	AUTO indicator light on	0.1	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
			AUTO indicator light off	11.6	
3F	REAR WINDOW DEFROSTER switch and A/C switch signal	Heater control unit	REAR WINDOW DEFROSTER switch or A/C switch hold on	2.3	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
			REAR WINDOW DEFROSTER switch and A/C switch off	0	
3G	DEFROSTER indicator light illumination signal	Heater control unit	DEFROSTER indicator light on	0.1	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
			DEFROSTER indicator light off	11.6	
3H	REC/FRESH switch and fan switch signal	Heater control unit	REC/FRESH switch or fan switch hold on	2.3	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
			REC/FRESH switch and fan switch off	0	

B+: Battery positive voltage

Terminal	Signal name	Connected	Test condition	Voltage (V)	Inspection area
3I	REC indicator light illumination signal	Heater control unit	REC indicator light on	0.1	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
			REC indicator light off	11.6	
3J	TNS signal	Heater control unit	Light switch on	B+	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (2A)
			Light switch off	0	
3K	REAR WINDOW DEFROSTER indicator light illumination signal	Heater control unit	REAR WINDOW DEFROSTER indicator light on	0.1	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
			REAR WINDOW DEFROSTER indicator light off	11.6	
3L	Panel light control switch signal	Heater control unit	Light switch on and panel light control switch at max. illumination	0.5	Terminal voltage of A/C amplifier connector (1G)
			Light switch on and panel light control switch at min. illumination	11.5	
			Light switch off	0	
3M	FRESH indicator light illumination signal	Heater control unit	FRESH indicator light on	0.1	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
			FRESH indicator light off	11.6	
3N	Indicator light power source	Heater control unit	Light switch off	B+	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
			Light switch on	1.9	
3O	Fan switch, MODE switch, A/C switch, and DEFROSTER switch signal	Heater control unit	Fan switch, MODE switch, A/C switch, or DEFROSTER switch hold on	2.3	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
			Fan switch, MODE switch, A/C switch, and DEFROSTER switch off	4.7	
3P	—	—	—	—	—
3Q	REC/FRESH switch, REAR WINDOW DEFROSTER switch, OFF switch, and AUTO switch signal	Heater control unit	REC/FRESH switch, REAR WINDOW DEFROSTER switch, OFF switch, or AUTO switch hold on	2.3	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
			REC/FRESH switch, REAR WINDOW DEFROSTER switch, OFF switch, and AUTO switch off	4.7	
3R	TEMP circuit	Heater control unit	Ignition switch at ACC	5	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (1C, 1Z, 2S)
			Ignition switch at LOCK	0	
3S	ACC	Heater control unit	Ignition switch at ACC	B+	• Heater control unit (Refer to page U–106) • Terminal voltage of A/C amplifier connector (1Z)
			Ignition switch at LOCK	0	
3T	Ground	Heater control unit	Any	0	Terminal voltage of A/C amplifier connector (1C)

Figure 1

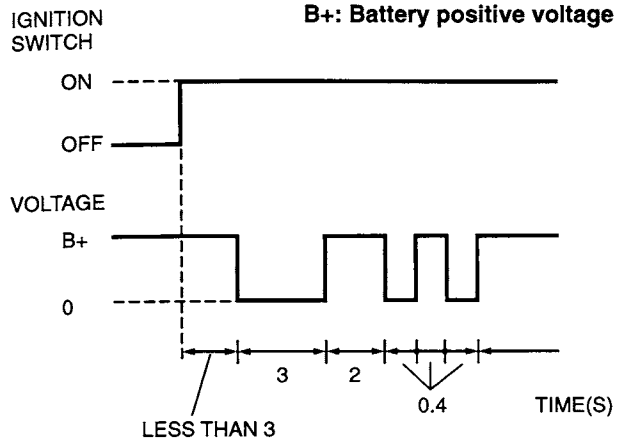


Figure 2

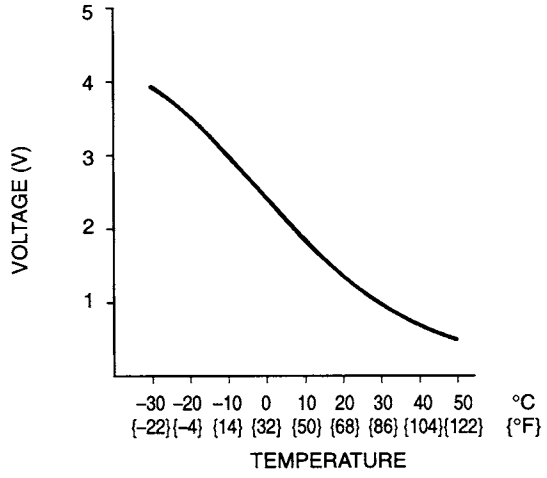


Figure 3

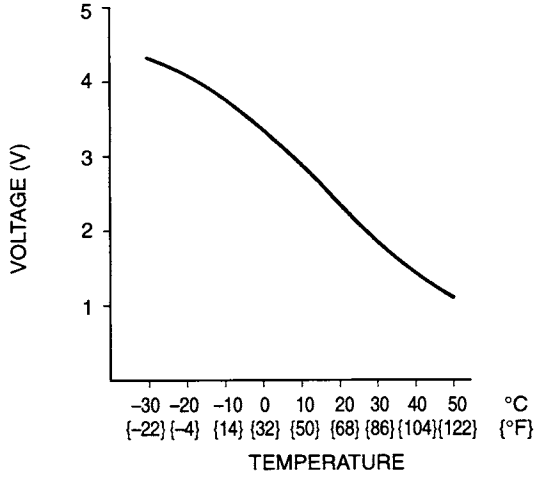


Figure 4

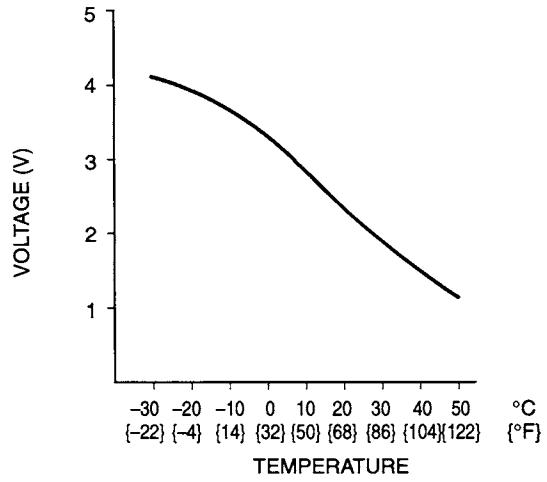
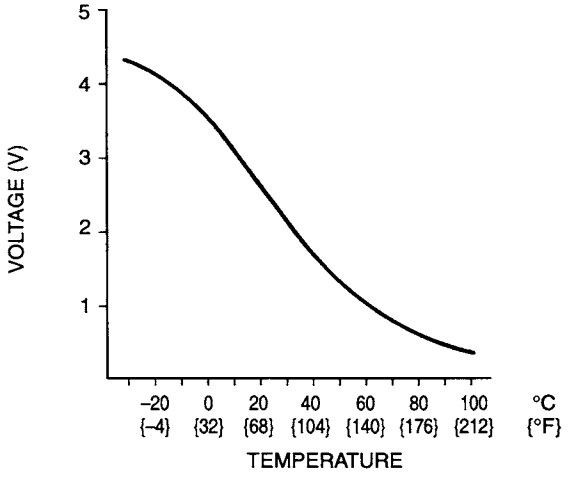
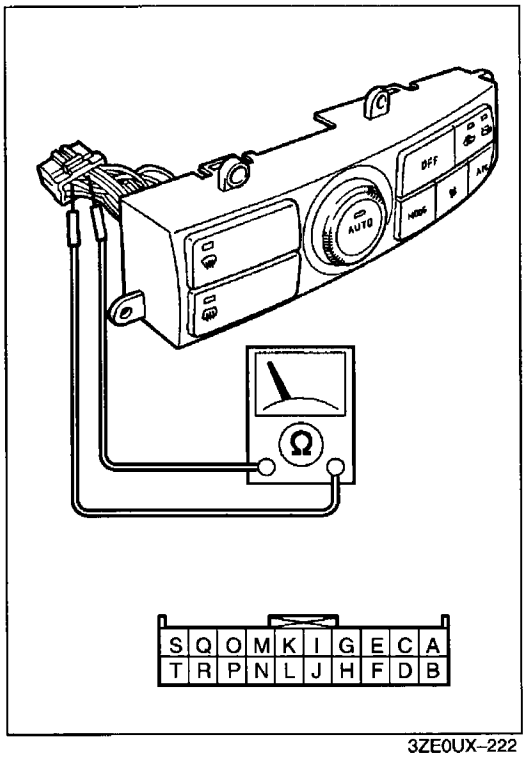
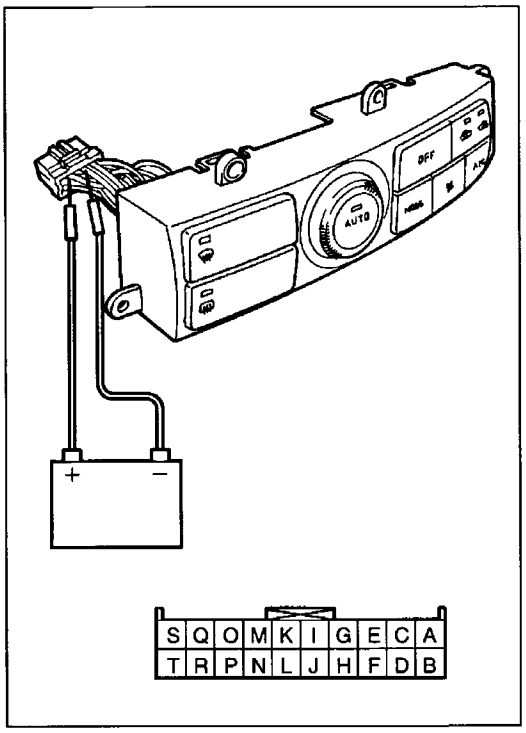


Figure 5





3ZE0UX-222



3ZU0UX-008

Heater control unit

1. Check for continuity between switch terminals.

O—O: Continuity

Condition	Terminal					
	O	Q	H	F	D	B
NONE						
Fan switch pressed	O		O			
A/C switch pressed	O			O		
MODE switch pressed	O				O	
DEFROSTER switch pressed	O					O
REC/FRESH switch pressed		O	O			
REAR WINDOW DEFROSTER switch pressed		O		O		
OFF switch pressed		O			O	
AUTO switch pressed		O				O

2. Verify that there is continuity between terminals J and L of the heater control unit connector.

3. Apply battery positive voltage to terminal N and ground to terminals E, M, I, G, K and verify that the following indicators turn on.

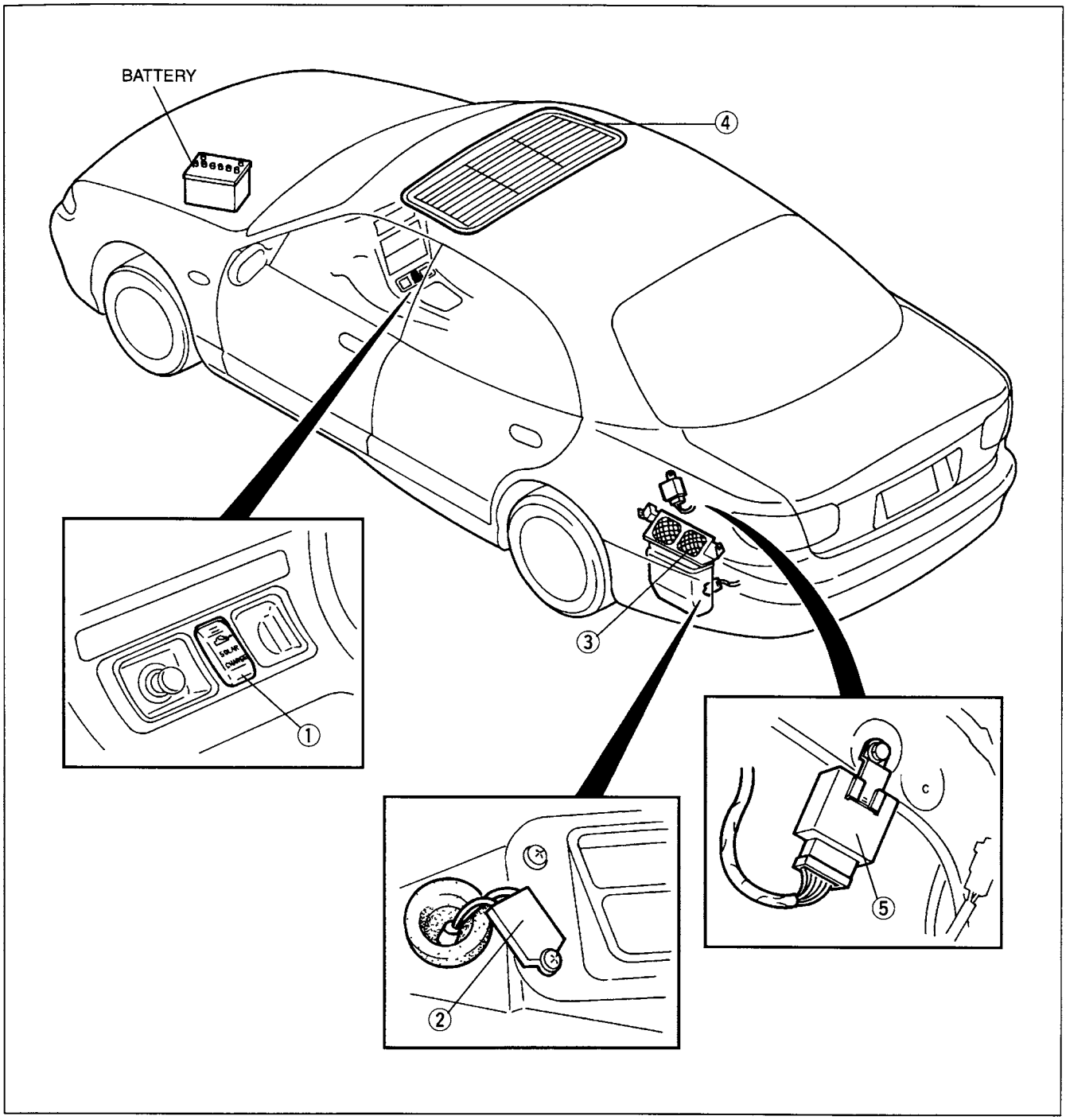
B+: Battery positive voltage

Connection		Indicator light
B+	GND	
N	E	AUTO
	G	DEFROSTER
	I	RECIRCULATE
	K	REAR WINDOW DEFROSTER
	M	FRESH

4. If not as specified, replace the heater control unit.

SOLAR VENTILATION SYSTEM

STRUCTURAL VIEW



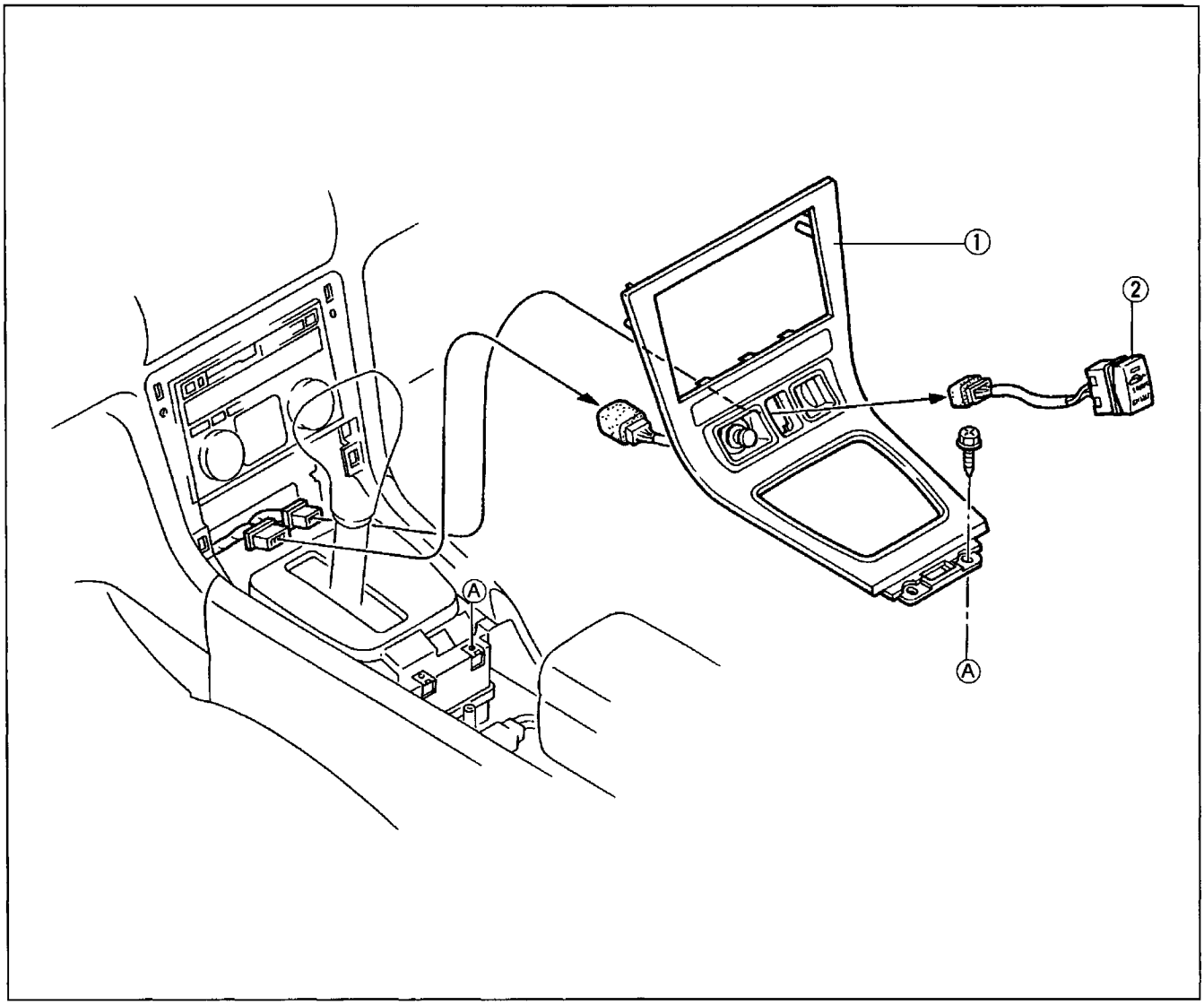
3ZU0UX–009

1. Solar ventilation switch
   - Removal / Installation ..... page U–108
   - Inspection ..... page U–108
2. Ambient temperature switch
   - Removal / Installation ..... page U–109
   - Inspection ..... page U–109
3. Ventilation fan
   - Removal / Installation ..... page U–110
   - Disassembly / Assembly ..... page U–111
   - Inspection ..... page U–111
4. Solar cell
   - Inspection ..... page U–112
5. Solar ventilation control module (SVCM)
   - Removal / Installation ..... page U–113
   - Inspection ..... page U–113

SOLAR VENTILATION SWITCH

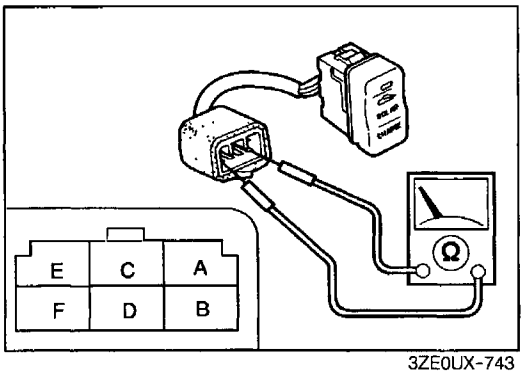
Removal / Installation

1. Remove the console box and brake boot panel. (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



3ZU0UX-010

1. Center panel
2. Solar ventilation switch



3ZE0UX-743

Inspection

1. Remove the solar ventilation switch.
2. Check for continuity between the terminals of the switch.

O—O: Continuity

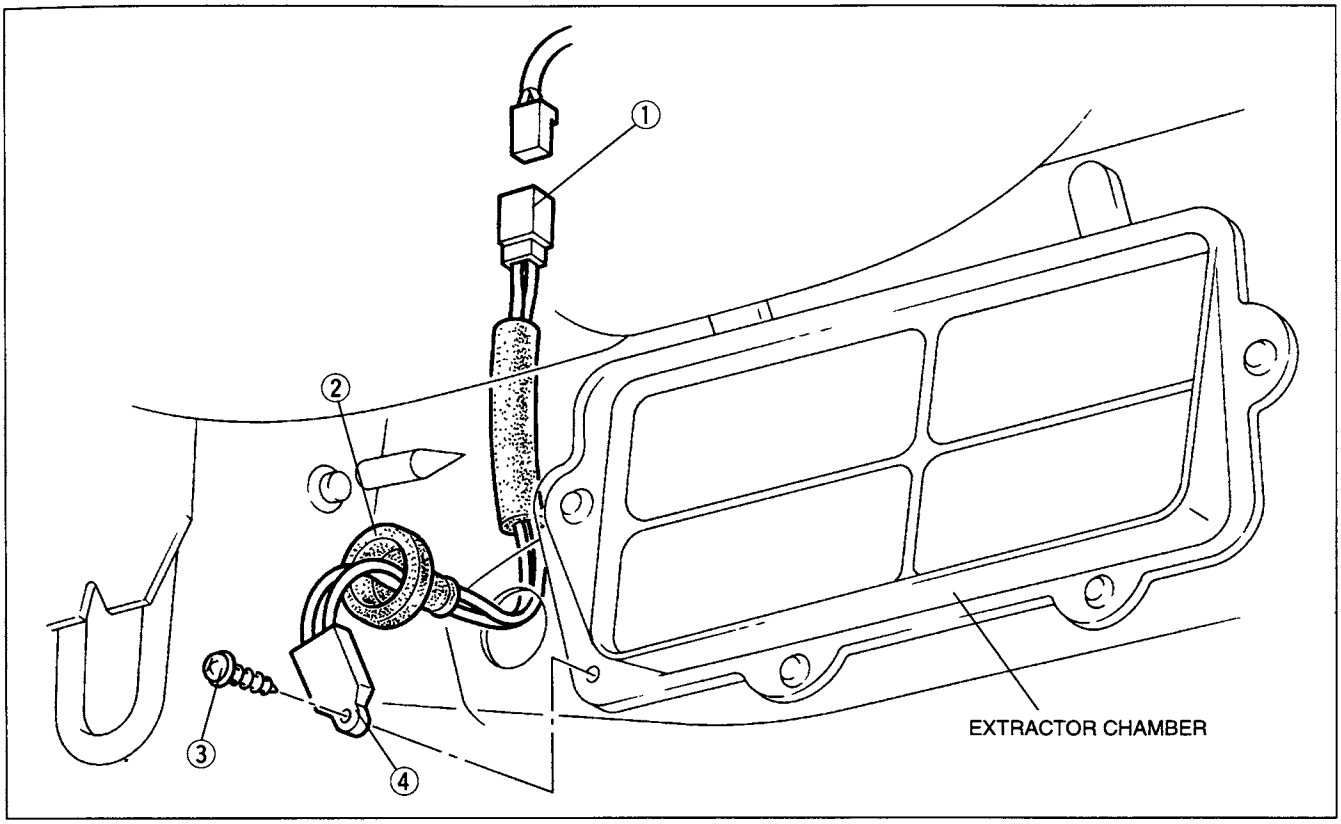
Terminal / SW position	A	B	C	D	E	F	
SOLAR	O		O	O	O	O	Auto return
OFF			O	O	O	O	
CHARGE		O	O	O	O	O	Lock

3. If not as specified, replace the solar ventilation switch.

AMBIENT TEMPERATURE SWITCH

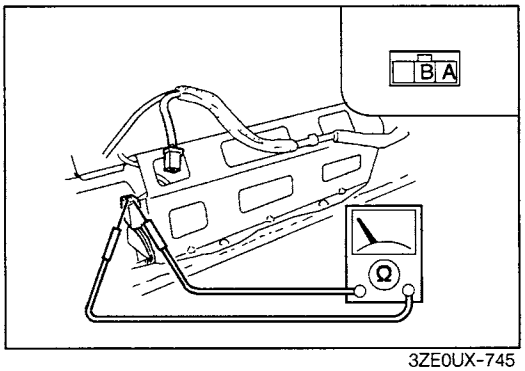
Removal / Installation

1. Remove the trunk end trim, trunk side trim (LH), and rear under cover. (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.

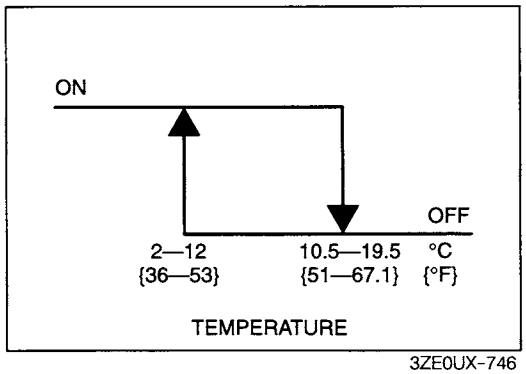


3ZE0UX-744

1. Ambient temperature switch connector
2. Grommet
3. Screw
4. Ambient temperature switch



3ZE0UX-745



3ZE0UX-746

Inspection

1. Remove the trunk end trim and trunk side trim (LH). (Refer to section S.)
2. Disconnect the ambient temperature switch connector.
3. Check for continuity between terminals A and B of the ambient temperature switch.

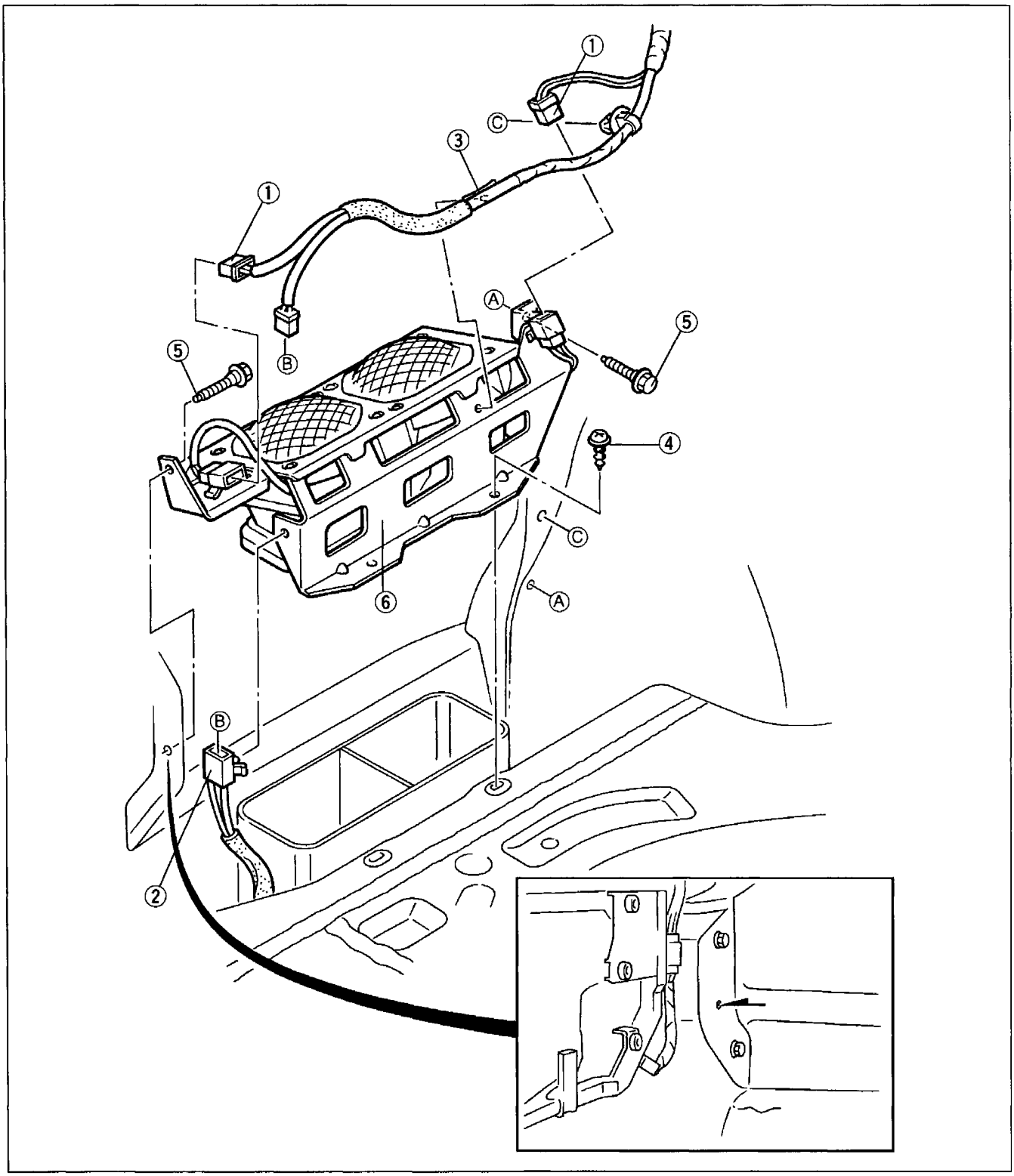
Condition	Continuity
Less than 2 °C {36 °F}	Yes
More than 19.5 °C {67.1 °F}	No

4. If not as specified, replace the ambient temperature switch.

Note

- The ambient temperature switch turns ON and OFF in relation to the ambient temperature, as shown in the figure.

VENTILATION FAN
Removal / Installation
1. Remove the trunk end trim and trunk side trim (LH). (Refer to section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal

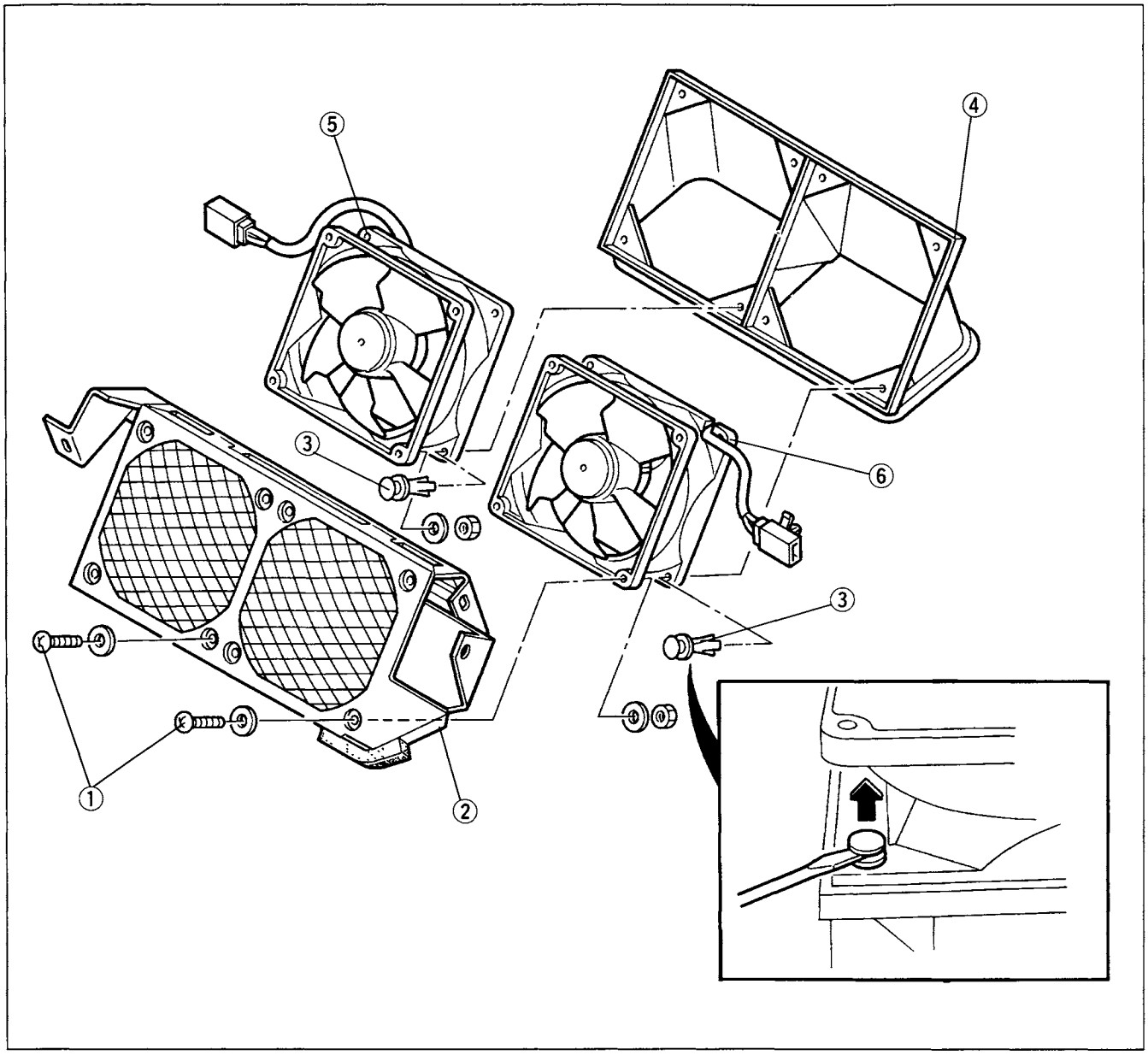


3ZU0UX-011

1. Ventilation fan connector
2. Ambient temperature switch connector
3. Harness clip
4. Screw
5. Bolt
6. Ventilation fan

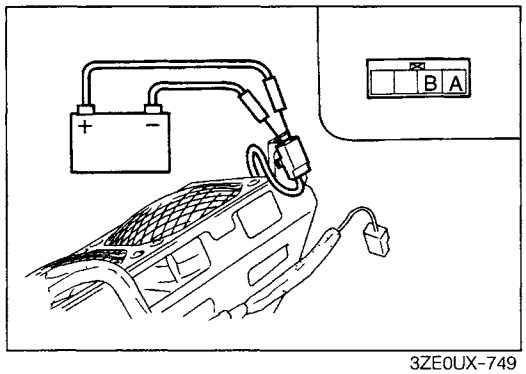
Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



3ZE0UX-748

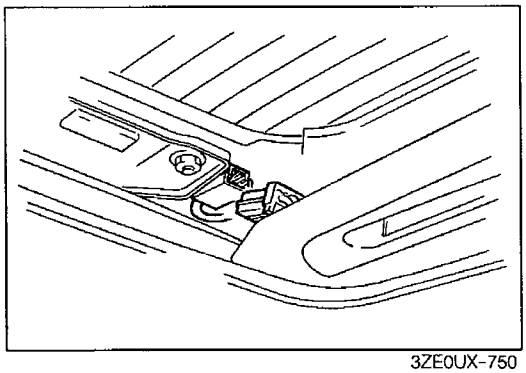
1. Screw
2. Fan bracket
3. Fastener
4. Fan duct
5. Ventilation fan No.1
6. Ventilation fan No.2



3ZE0UX-749

Inspection

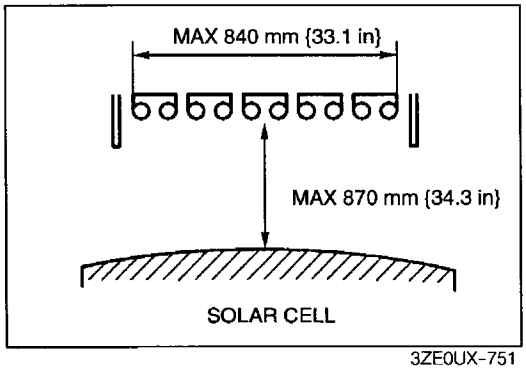
1. Remove the trunk end trim and trunk side trim (LH). (Refer to section S.)
2. Disconnect the ventilation fan connector.
3. Connect battery positive voltage to terminal A and ground terminal B. Verify that the fan operates.
4. If not as specified, replace the ventilation fan.


3ZE0UX-750

SOLAR CELL

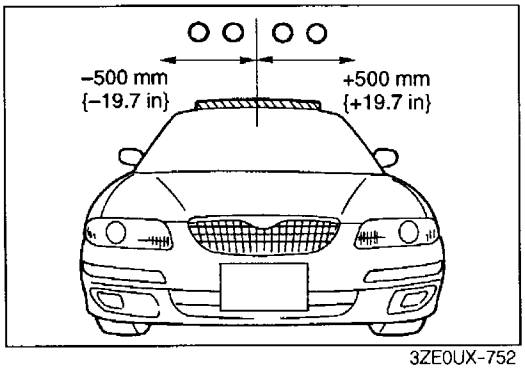
Inspection

1. Open the sunshade, and remove the lower panel cover. (Refer to section S.)
2. Disconnect the solar cell connector.



3ZE0UX-751

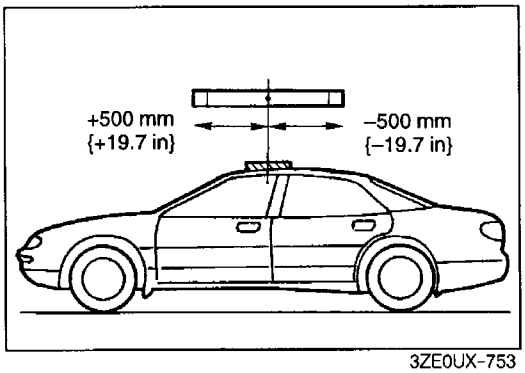
3. Set ten 110 W fluorescent lights as shown in the figure.
4. Set the reflector (white board) all over the fluorescent lights.
5. Light on the fluorescent lights.
6. Verify that the brightness on the solar cell is more than 8,000 lx.



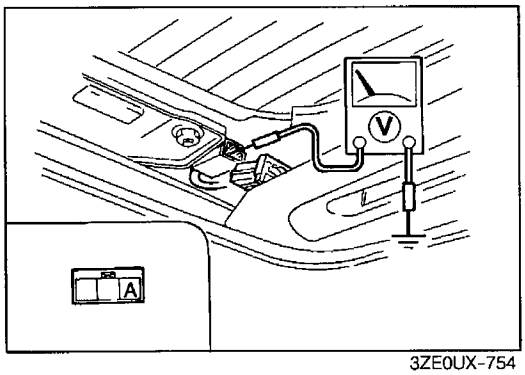
3ZE0UX-752

Note

- Set the difference between the center of the solar battery and that of the fluorescent lights below 500 mm {19.7 in}.



3ZE0UX-753

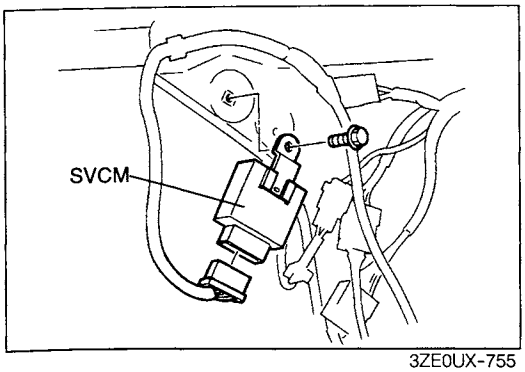


3ZE0UX-754

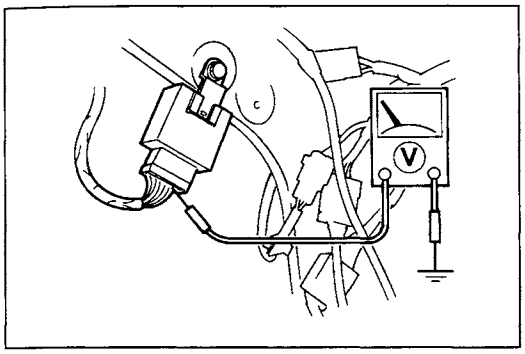
7. Measure the voltage at terminal A of the solar cell.

   Voltage: 6 V min.

8. If the voltage is less than 6 V, replace the glass panel. (Refer to section S.)



3ZE0UX-755



SOLAR VENTILATION CONTROL MODULE (SVCM)

Removal / Installation

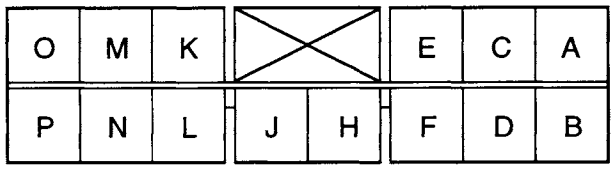
1. Remove the trunk end trim and trunk side trim (LH). (Refer to section S.)
2. Disconnect the SVCM connector.
3. Remove the bolt and SVCM.
4. Install in the reverse order of removal.

Inspection

1. Measure the voltage at the terminal wires of the SVCM connector.
2. If not as specified, inspect the appropriate area.

Terminal voltage (Reference)

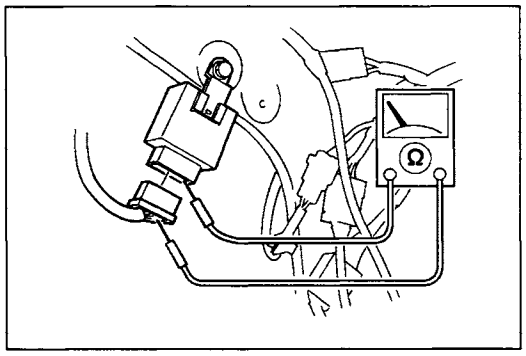
B+: Battery positive voltage



Terminal	Signal name	Connection	Test condition	Voltage (V)	Inspection area
A	CHARGE mode signal	Solar ventilation switch	—	—	—
B	Ventilation fan No.1 drive signal	Ventilation fan No.1	In manual exhaust mode	9—11	• Ventilation fan No.1 (Refer to page U–111) • Continuity or short circuit (Ventilation fan — SVCM: [BR] wire)
			Ventilation fan No.1 stopped	0	
C	Key reminder switch signal	Key reminder switch	Key removed (key reminder switch off)	0	• Key reminder switch (Refer to section T) • Continuity or short circuit (Key reminder switch — SVCM: [L/B] wire)
			Key inserted (key reminder switch on)	B+	
D	Solar ventilation indicator signal	Solar ventilation switch (indicator light)	Indicator light at on	9—11	• Continuity or short circuit (Solar ventilation switch — SVCM: [P/G] wire)
			Indicator light at off	0	
E	Ambient temperature switch signal	Ambient temperature switch	—	—	—

Vsc: Solar cell voltage B+: Battery positive voltage

Terminal	Signal name	Connection	Test condition	Voltage (V)	Inspection area
F	—	—	—	—	—
H	Ground	Body ground	Constant	0	• Continuity (SVCM — Ground: [B] — [B/W] wire)
J	Ventilation fan No.2 drive signal	Ventilation fan No.2	In manual exhaust mode	9—11	• Ventilation fan No.2 (Refer to page U–111) • Continuity or short circuit (Ventilation fan — SVCM: [W/L] wire)
			Ventilation fan No.2 stopped	0	
K	Manual exhaust mode signal	Solar ventilation switch	Solar ventilation switch pressed (manual exhaust side)	0	• Solar ventilation switch (Refer to page U–108) • Continuity or short circuit (Solar ventilation switch — SVCM: [W/R] wire)
			Other	5	
L	IG2	A/C 10 A fuse	Igniation switch at ON	B+	• Ignition switch (Refer to section T) • Continuity or short circuit (A/C 10 A fuse — SVCM: [G] wire)
			Ignition switch at LOCK	0	
M	Solar cell signal	Solar cell	—	Vsc	• Solar cell (Refer to page U–112) • Continuity or short circuit (Solar cell — SVCM: [BR/W] wire)
N	+B	ROOM 15 A fuse	Constant	B+	• Continuity or short circuit (ROOM 15 A fuse — SVCM: [L/R] wire)
O	—	—	—	—	—
P	—	—	—	—	—



3. Disconnect the SVCM connector and check for continuity between the SVCM and main harness.
4. If not as specified, inspect the appropriate area.
5. If the appropriate area is correct, replace the SVCM. (Refer to page U–113.)

Terminal	Test condition	Continuity	Inspection area
A	Constant	Yes	Continuity (Solar ventilation switch — SVCM : [W/G] wire)
E	Ambient temperature less than 2—12 °C {36—53 °F}	Yes	• Ambient temperature switch (Refer to page U–109) • Continuity or short circuit (Ambient temperature switch — SVCM: [BR/Y] wire)
	Ambient temperature more than 10.5—19.5 °C {51—67.1 °F}	No	