Important

WARNING/CAUTION/NOTE

Please read this manual and follow its instructions carefully. To emphasize special information, the words **WARNING**, **CAUTION** and **NOTE** have special meanings. Pay special attention to the messages highlighted by these signal words.

WARNING:

Indicates a potential hazard that could result in death or injury.

CAUTION:

Indicates a potential hazard that could result in vehicle damage.

NOTE:

Indicates special information to make maintenance easier or instructions clearer.

WARNING:

This service manual is intended for authorized SUZUKI dealers and qualified service mechanics only. Inexperienced mechanics or mechanics without the proper tools and equipment may not be able to properly perform the services described in this manual. Improper repair may result in injury to the mechanic and may render the vehicle unsafe for the driver and passengers.

WARNING:

For vehicles equipped with a Supplemental Restraint (Air Bag) System :

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer.**
  Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.
- **If the air bag system and another vehicle system both need repair, SUZUKI recommends that the air bag system be repaired first, to help avoid unintended air bag system activation.**
- **Do not modify the steering wheel, instrument panel or any other air bag system component (on or around air bag system components or wiring). Modifications can adversely affect air bag system performance and lead to injury.**
- **If the vehicle will be exposed to temperatures over 93°C (200°F) (for example, during a paint baking process), remove the air bag system components (air bag (inflator) module, sensing and diagnostic module (SDM), seat belt pretensioner (if equipped) beforehand to avoid component damage or unintended activation.**

The circle with a slash in this manual means "Don't do this" or "Don't let this happen".

Foreword

This manual (Volumes 1 and 2) contains procedures for diagnosis, maintenance, adjustments, minor service operations, replacement of components (Service) and for disassembly and assembly of major components (Unit Repair-Overhaul).

VOLUME 1 contains Chassis, Electrical and Body sections (all sections except engine).
VOLUME 2 contains Engine sections (Sections 6 – 6K).

Applicable model : GRAND VITARA (SQ416/SQ420/SQ625) vehicles on and after following vehicle identification numbers (VINs).

2S2GTA03C00600001	JS3TA03V⍰34100001
2S2GTA52C00600001	JS3TB03V⍰34100001
ⓧ JSAFTA03V00200001 ⓧ	JS3TB52V⍰34100001
ⓧ JSAFTA03V30200001 ⓧ	JS3TD62V⍰34100001
ⓧ JSAFTB03V00200001 ⓧ	JS3TL52V⍰34100001
ⓧ JSAFTB52V00200001 ⓧ	
ⓧ JSAFTD02V00200001 ⓧ	
ⓧ JSAFTD62V00200001 ⓧ	
ⓧ JSAFTD62V34200001 ⓧ	
ⓧ JSAFTL52V00200001 ⓧ	
ⓧ JSAFTL52V34200001 ⓧ	

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

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

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

NOTE:

Refer to the next page for RELATED MANUALS.

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RELATED MANUAL :

MANUAL NAME	MANUAL NO.	APPLICABILITY
GRAND VITARA/GRAND VITARA XL-7 (SQ416/SQ420/SQ625/JA627) Unit Repair Manual	99501-65D40-01E	Transmission, Transfer and Differentials (Front and Rear) of applicable model mentioned in “Foreword” of this manual.
GRAND VITARA/GRAND VITARA XL-7 (SQ416/SQ420/SQ625/JA627) Wiring Diagram Manual	99512-52D10-015	Applicable model mentioned in “Foreword” of this manual. Other than vehicle identification number of 2S2GTA03C00###### and 2S2GTA52C00######.
SQ416/SQ420/SQ625 Wiring Diagram Manual	99512-65D11-015	Applicable model mentioned in “Foreword” of this manual. Vehicle identification number of 2S2GTA03C00###### and 2S2GTA52C00######.

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NOTE:

The screen toned Sections 6 – 6K are included in Volume 2 and Section 8A is in Wiring Diagram Manual.

SECTION 0A

GENERAL INFORMATION

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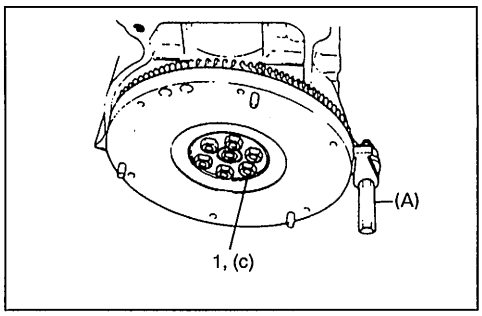
How to Use This Manual

1) There is a Table of Contents for The Whole Manual on the third page of this manual, whereby you can easily find the section that offers the information you need. Also, there is a Contents on the first page of Each Section, where the main items in that section are listed.
2) Each section of this manual has its own pagination. It is indicated at the top of each page along with the Section name.
3) The Special Tool usage and Torque Specification are given as shown in figure below.



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

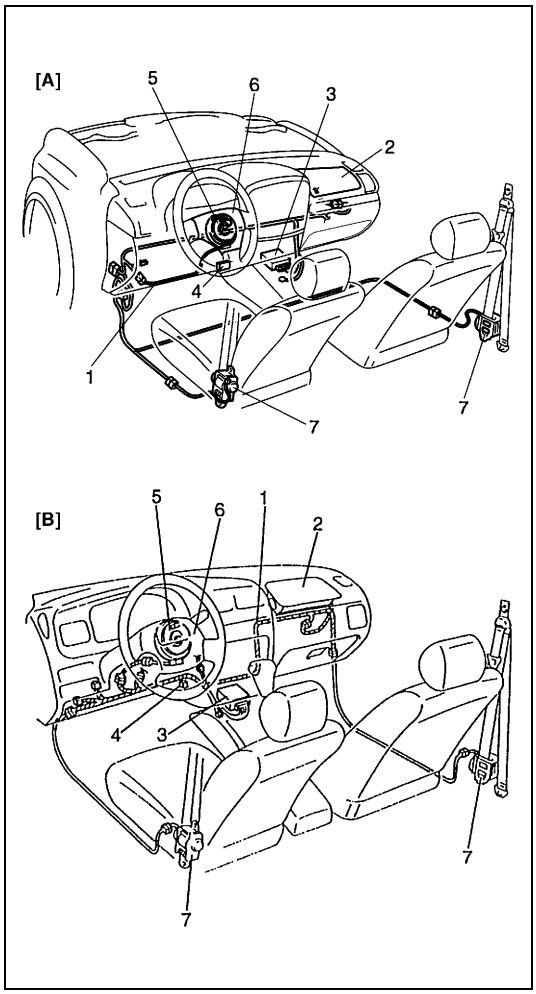
   Special Tool
   (A): 09924-17810
   Tightening Torque
   (c): 78 N·m (7.8 kg-m, 56.0 lb-ft)

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

4) A number of abbreviations are used in the text.
   For their full explanations, refer to **"Abbreviations May Be Used In This Manual"** of this section.
5) The SI, metric and foot-pound systems are used as units in this manual.
6) "Diagnosis" are included in each section as necessary.
7) At the end of each section, there are descriptions of "Special Tools", "Required Service Materials" and "Tightening Torque Specifications" that should be used for the servicing work described in that section.

Precautions

Precaution for Vehicles Equipped with a Supplemental Restraint (Air Bag) System



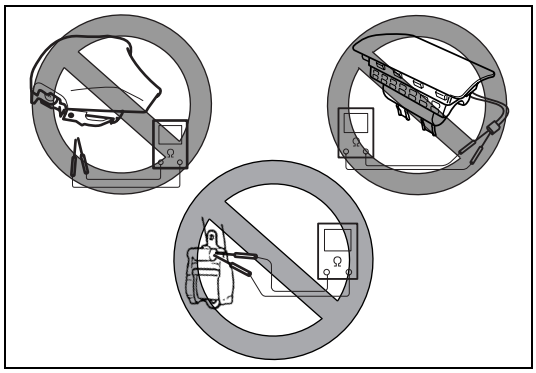
WARNING:

- **The configuration of air bag system parts are as shown in the figure. When it is necessary to service (remove, reinstall and inspect) these parts, be sure to follow procedures described in Section 10B. Failure to follow proper procedures could result in possible air bag system activation, personal injury, damage to parts or air bag system being unable to activate when necessary.**
- **If the air bag system and another vehicle system both need repair, SUZUKI recommends that the air bag system be repaired first, to help avoid unintended air bag system activation.**
- **Do not modify the steering wheel, dashboard, or any other air bag system components. Modifications can adversely affect air bag system performance and lead to injury.**
- **If the vehicle will be exposed to temperatures over 93°C (200°F) (for example, during a paint baking process), remove the air bag system components beforehand to avoid component damage or unintended air bag system activation.**

1. Air bag wire harness	6. Driver air bag (inflator) module
2. Passenger air bag (inflator) module	7. Seat belt pretensioner (if equipped)
3. SDM	[A] : Other than canvas top model
4. DLC	[B] : Canvas top model
5. Contact coil	

Diagnosis

- When troubleshooting air bag system, be sure to follow “Diagnosis” in Section 10B. Bypassing these procedures may result in extended diagnostic time, incorrect diagnosis, and incorrect parts replacement.
- Never use electrical test equipment other than that specified in this manual.

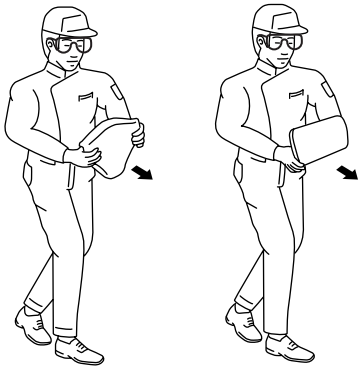


WARNING:

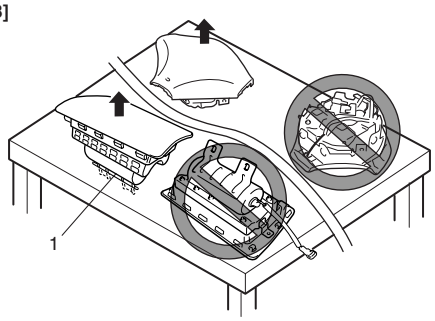
Never attempt to measure the resistance of the air bag (inflator) modules (driver and passenger) and seat belt pretentioners (driver and passenger). It is very dangerous as the electric current from the tester may deploy the air bag or activate the pretensioner.

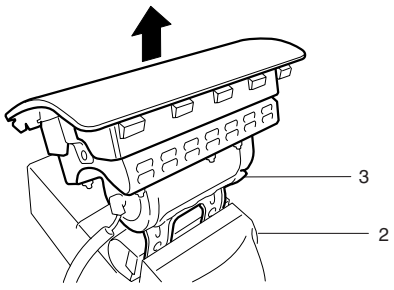
Servicing and Handling

[A]



[B]





WARNING:

Many of service procedures require disconnection of "Air Bag" fuse and all air bag (inflator) module(s) from initiator circuit to avoid an accidental deployment.

Driver and Passenger Air Bag (Inflator) Modules

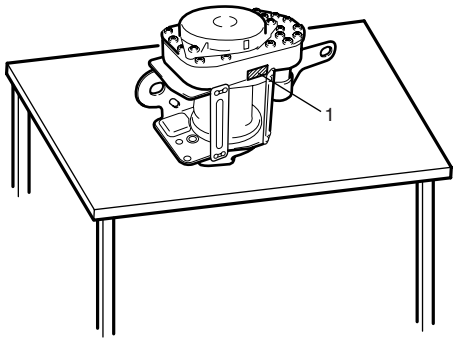
- **For handling and storage of a live air bag (inflator) module, select a place where the ambient temperature below 65°C (150°F), without high humidity and away from electric noise.**
- **When carrying a live air bag (inflator) module, make sure the bag opening is pointed away from you. In case of an accidental deployment, the bag will then deploy with minimal chance of injury. Never carry the air bag (inflator) module by the wires or connector on the underside of the module. When placing a live air bag (inflator) module on a bench or other surface, always face the bag up, away from the surface. As the live passenger air bag (inflator) module must be placed with its bag (trim cover) facing up, place it on the workbench with a slit or use the workbench vise to hold it securely at its lower mounting bracket. This is necessary so that a free space is provided to allow the air bag to expand in the unlikely event of accidental deployment. Otherwise, personal injury may result.**
- **Never dispose of live (undeployed) air bag (inflator) modules (driver and passenger). If disposal is necessary, be sure to deploy them according to deployment procedures described in Section 10B before disposal.**
- **The air bag (inflator) module immediately after deployment is very hot. Wait for at least half an hour to cool it off before proceeding the work.**
- **After an air bag (inflator) module has been deployed, the surface of the air bag may contain a powdery residue. This powder consists primarily of cornstarch (used to lubricate the bag as it inflates) and by-products of the chemical reaction. As with many service procedures, gloves and safety glasses should be worn.**

[A] :	ALWAYS CARRY AIR BAG (INFLATOR) MODULE WITH TRIM COVER (AIR BAG OPENING) AWAY FROM BODY.
[B] :	ALWAYS PLACE AIR BAG (INFLATOR) MODULE ON WORKBENCH WITH TRIM COVER (AIR BAG OPENING) UP, AWAY FROM LOOSE OBJECTS.
1.	Slit on workbench
2.	Workbench vise
3.	Lower mounting bracket

WARNING:

SDM

- **During service procedures, be very careful when handling a Sensing and Diagnostic Module (SDM). Never strike or jar the SDM.**
  Never power up the air bag system when the SDM is not rigidly attached to the vehicle. All SDM and mounting bracket fasteners must be carefully torqued and the arrow must be pointing toward the front of the vehicle to ensure proper operation of the air bag system.
  The SDM could be activated when powered while not rigidly attached to the vehicle which could cause deployment and result in personal injury.



WARNING:

Driver and Passenger Seat Belt Pretensioners

- **For handling and storage of a live seat belt pretensioner, select a place where the ambient temperature below 65°C (150°F), without high humidity and away from electric noise.**
- **Never carry seat belt pretensioner by wire or connector of pretensioner. When placing a live seat belt pretensioner on the workbench or some place like that, be sure not to lay it with its exhaust hole provided side facing down. It is also prohibited to put something on its face with an exhaust hole or to put a seat belt pretensioner on top of another. Otherwise, personal injury may result.**
- **Never dispose of live (inactivated) seat belt pretensioners (driver and passenger). If disposal is necessary, be sure to activate them according to activation procedures described in Section 10B before disposal.**
- **The seat belt pretensioner immediately after activation is very hot. Wait for at least half an hour to cool it off before proceeding the work.**
- **With many service procedures, gloves and safety glasses should be worn to prevent any possible irritation of the skin or eyes.**

1. Exhaust hole

CAUTION:

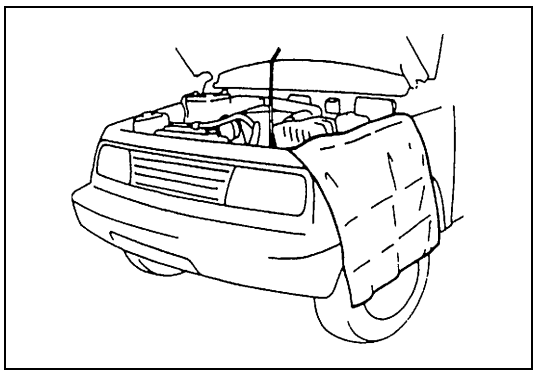
- **Even when the accident was light enough not to cause air bags to activate, be sure to inspect system parts and other related parts according to instructions under "Repair and Inspection Required after an Accident" in Section 10B.**
- **When servicing parts other than air bag system, if shocks may be applied to air bag system component parts, remove those parts beforehand.**
- **When handling the air bag (inflator) modules (driver and passenger), seat belt pretensioners (driver and passenger) or SDM, be careful not to drop it or apply an impact to it. If an excessive impact was applied (e.g., dropped from a height of 91.4 cm (3 feet) or more), never attempt disassembly or repair but replace it with a new one.**
- **When grease, cleaning agent, oil, water, etc. has got onto air bag (inflator) modules (driver and passenger) or seat belt pretensioners (drive and passenger), wipe off immediately with a dry cloth.**
- **Air bag wire harness can be identified easily as it is covered with a yellow protection tube and it has yellow connectors. Be very careful when handling it.**
- **When an open in air bag wire harness, damaged wire harness, connector or terminal is found, replace wire harness, connectors and terminals as an assembly.**
- **Do not apply power to the air bag system unless all components are connected or a diagnostic flow table requests it, as this will set a diagnostic trouble code.**
- **Never use air bag system component parts from another vehicle.**
- **When using electric welding, be sure to temporarily disable air bag system referring to "Disabling Air Bag System" described in "Service Precautions" under "On-Vehicle Service" in Section 10B.**
- **Never expose air bag system component parts directly to hot air (drying or baking the vehicle after painting) or flames.**
- **WARNING/CAUTION labels are attached on each part of air bag system components. Be sure to follow the instructions.**
- **After vehicle is completely repaired, perform "Air Bag Diagnostic System Check" described in "Diagnosis" in Section 10B.**

General Precautions

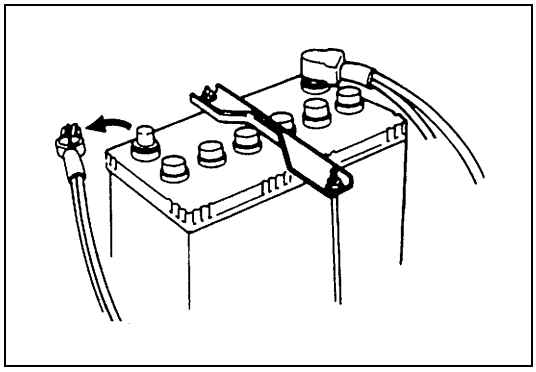
The WARNING and CAUTION below describe some general precautions that you should observe when servicing a vehicle. These general precautions apply to many of the service procedures described in this manual, and they will not necessarily be repeated with each procedure to which they apply.

WARNING:

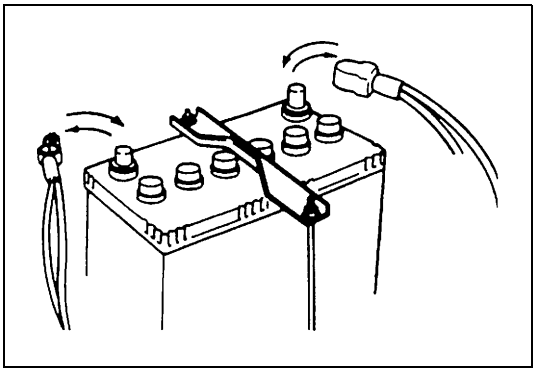
- **Whenever raising a vehicle for service, be sure to follow the instructions under "Vehicle Lifting Points" on Section 0A.**
- **When it is necessary to do service work with the engine running, make sure that the parking brake is set fully and the transmission is in Neutral (for manual transmission vehicles) or Park (for automatic transmission vehicles). Keep hands, hair, clothing, tools, etc. away from the fan and belts when the engine is running**
- **When it is necessary to run the engine indoors, make sure that the exhaust gas is forced outdoors.**
- **Do not perform service work in areas where combustible materials can come in contact with a hot exhaust system. When working with toxic or flammable materials (such as gasoline and refrigerant), make sure that the area you work in is well-ventilated.**
- **To avoid getting burned, keep away from hot metal parts such as the radiator, exhaust manifold, tailpipe, muffler, etc.**
- **New and used engine oil can be hazardous. Children and pets may be harmed by swallowing new or used oil. Keep new and used oil and used engine oil filters away from children and pets.**
  Continuous contact with used engine oil has been found to cause [skin] cancer in laboratory animals.
  Brief contact with used oil may irritate skin. To minimize your exposure to used engine oil, wear a long-sleeve shirt and moisture-proof gloves (such as dishwashing gloves) when changing engine oil.
  If engine oil contacts your skin, wash thoroughly with soap and water. Launder any clothing or rags if wet with oil, recycle or properly dispose of used oil and filters.
- **Make sure the bonnet is fully closed and latched before driving. If it is not, it can fly up unexpectedly during driving, obstructing your view and resulting in an accident.**



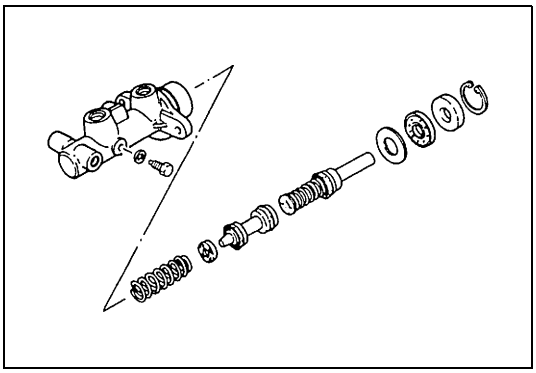
- **Before starting any service work, cover fenders, seats and any other parts that are likely to get scratched or stained during servicing. Also, be aware that what you wear (e.g, buttons) may cause damage to the vehicle's finish.**



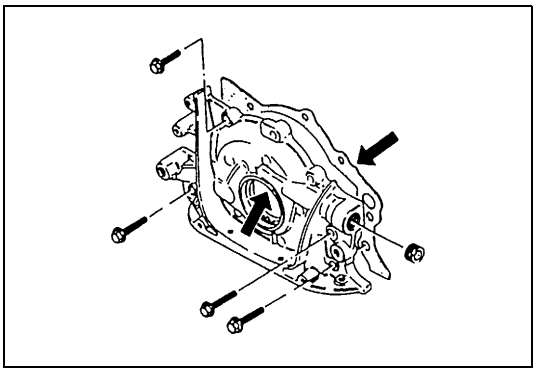
- **When performing service to electrical parts that does not require use of battery power, disconnect the negative cable of the battery.**



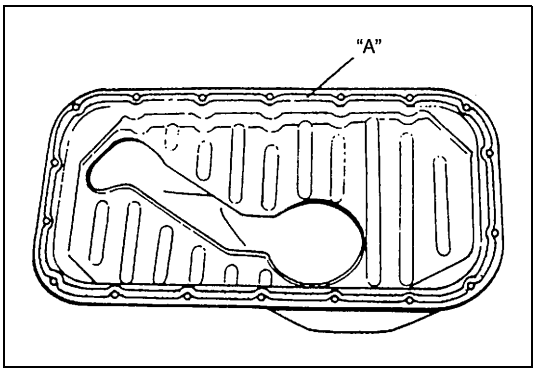
- When removing the battery, be sure to disconnect the negative cable first and then the positive cable. When reconnecting the battery, connect the positive cable first and then the negative cable, and replace the terminal cover.



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

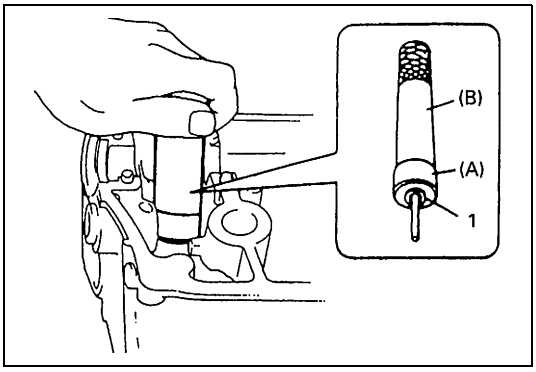


- Whenever you use oil seals, gaskets, packing, O-rings, locking washers, split pins, self-locking nuts, and certain other parts as specified, be sure to use new ones. Also, before installing new gaskets, packing, etc., be sure to remove any residual material from the mating surfaces.



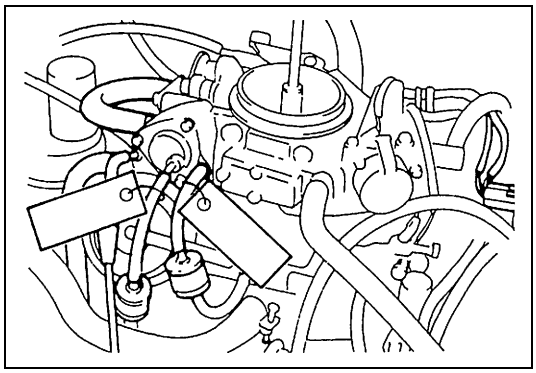
- Make sure that all parts used in reassembly are perfectly clean.
- When use of a certain type of lubricant, bond or sealant is specified, be sure to use the specified type.

"A" : Sealant 99000-31150

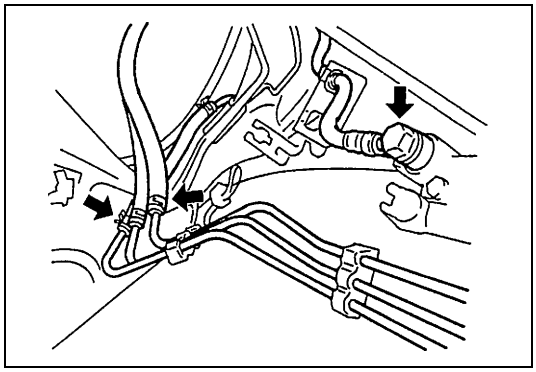


- Be sure to use special tools when instructed.

Special tool
(A) : 09917-98221
(B) : 09916-58210



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



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

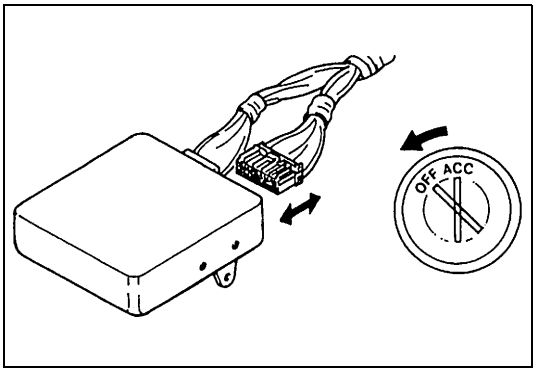
- **For vehicles equipped with fuel injection systems, never disconnect the fuel line between the fuel pump and injector without first releasing the fuel pressure, or fuel can be sprayed out under pressure.**

Precautions for Catalytic Converter

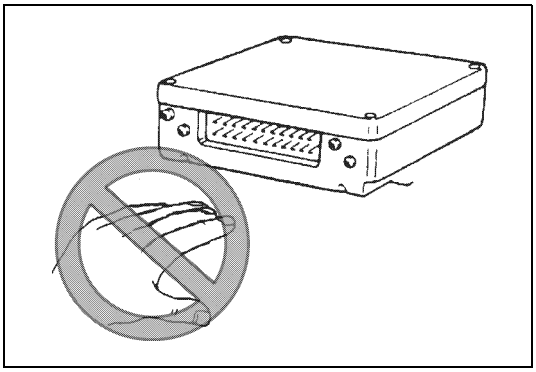
For vehicles equipped with a catalytic converter, use only unleaded gasoline and be careful not to let a large amount of unburned gasoline enter the converter or it can be damaged.

- **Conduct a spark jump test only when necessary, make it as short as possible, and do not open the throttle.**
- **Conduct engine compression checks within the shortest possible time.**
- **Avoid situations which can result in engine misfire (e.g. starting the engine when the fuel tank is nearly empty).**

Precautions for Electrical Circuit Service

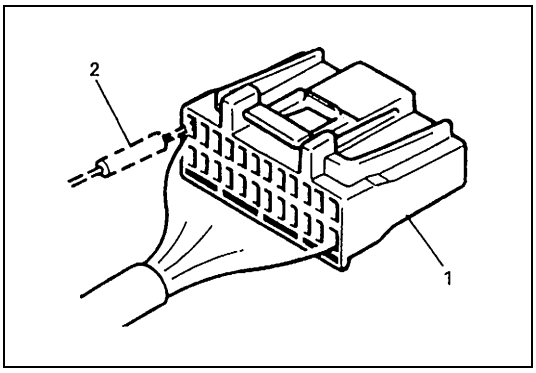


- **When disconnecting and connecting coupler, make sure to turn ignition switch OFF, or electronic parts may get damaged.**



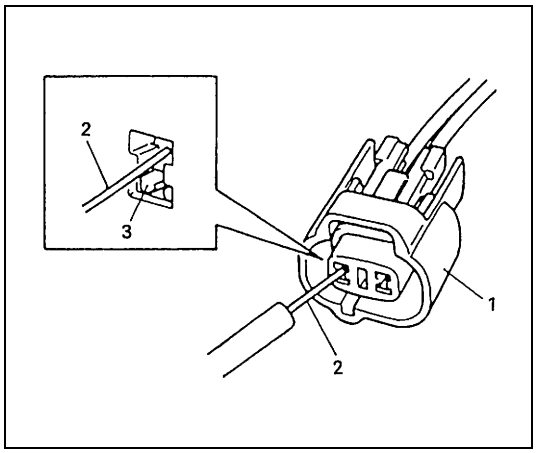
- **Be careful not to touch the electrical terminals of parts which use microcomputers (e.g. electronic control unit like as ECM, PCM, P/S controller, etc.). The static electricity from your body can damage these parts.**

- **Never connect any tester (voltmeter, ohmmeter, or whatever) to electronic control unit when its coupler is disconnected.**
  Attempt to do it may cause damage to it.
- **Never connect an ohmmeter to electronic control unit with its coupler connected to it. Attempt to do it may cause damage to electronic control unit and sensors.**
- **Be sure to use a specified voltmeter/ohmmeter. Otherwise, accurate measurements may not be obtained or personal injury may result.**



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

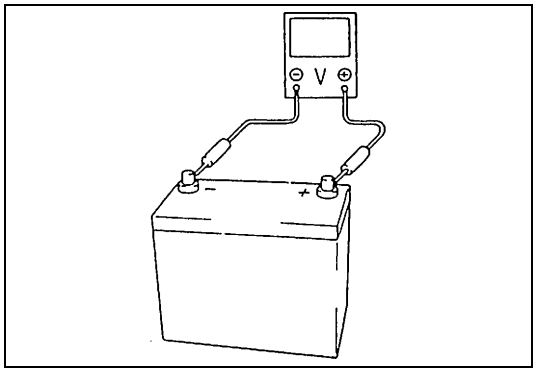
1. Coupler
2. Probe



- **When connecting meter probe from terminal side of coupler because it can't be connected from harness side, use extra care not to bend male terminal of coupler of force its female terminal open for connection.**
  In case of such coupler as shown connect probe as shown to avoid opening female terminal.
  Never connect probe where male terminal is supposed to fit.

1.	Coupler
2.	Probe
3.	Where male terminal fits

- **When checking connection of terminals, check its male half for bend and female half for excessive opening and both for locking (looseness), corrosion, dust, etc.**



- **Before measuring voltage at each terminal, check to make sure that battery voltage is 11 V or higher. Such terminal voltage check at low battery voltage will lead to erroneous diagnosis.**

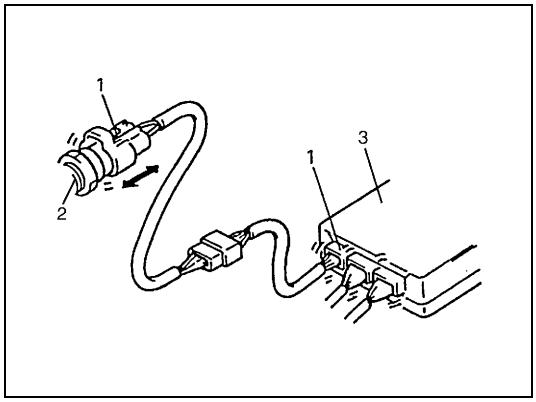
Electrical Circuit Inspection Procedure

While there are various electrical circuit inspection methods, described here is a general method to check its open and short circuit by using an ohmmeter and a voltmeter.

Open circuit check

Possible causes for the open circuit are as follows. As the cause is in the connector or terminal in many cases, they need to be checked particularly carefully.

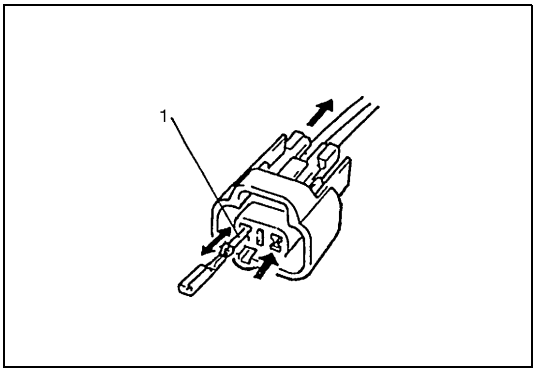
- Loose connection of connector
- Poor contact of terminal (due to dirt, corrosion or rust on it, poor contact tension, entry of foreign object etc.)
- Wire harness being open



When checking system circuits including an electronic control unit such as ECM, TCM, ABS control module, etc., it is important to perform careful check, starting with items which are easier to check.

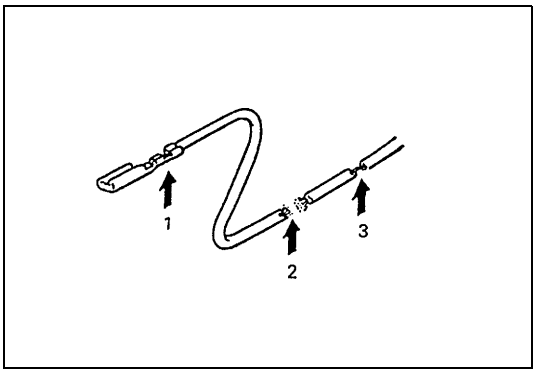
1) Disconnect negative cable from battery.
2) Check each connector at both ends of the circuit being checked for loose connection. Also check lock condition of connector if equipped with connector lock.

1.	Check for loose connection	3.	ECM
2.	Sensor		



3) Using a test male terminal, check both terminals of the circuit being checked for contact tension of its female terminal.
Check each terminal visually for poor contact (possibly caused by dirt, corrosion, rust entry of foreign object, etc.).
At the same time, check to make sure that each terminal is locked in the connector fully.

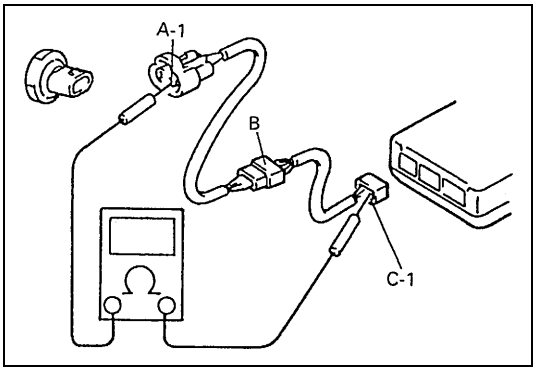
1. Check contact tension by Inserting and removing just for once



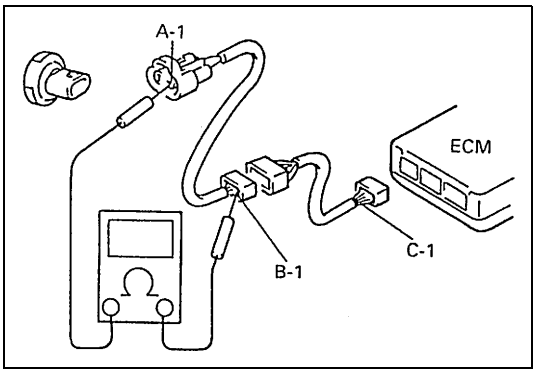
4) Using continuity check or voltage check procedure described in the following page, check the wire harness for open circuit and poor connection with its terminals. Locate abnormality, if any.

1. Looseness of crimping
2. Open
3. Thin wire (Single strand of wire)

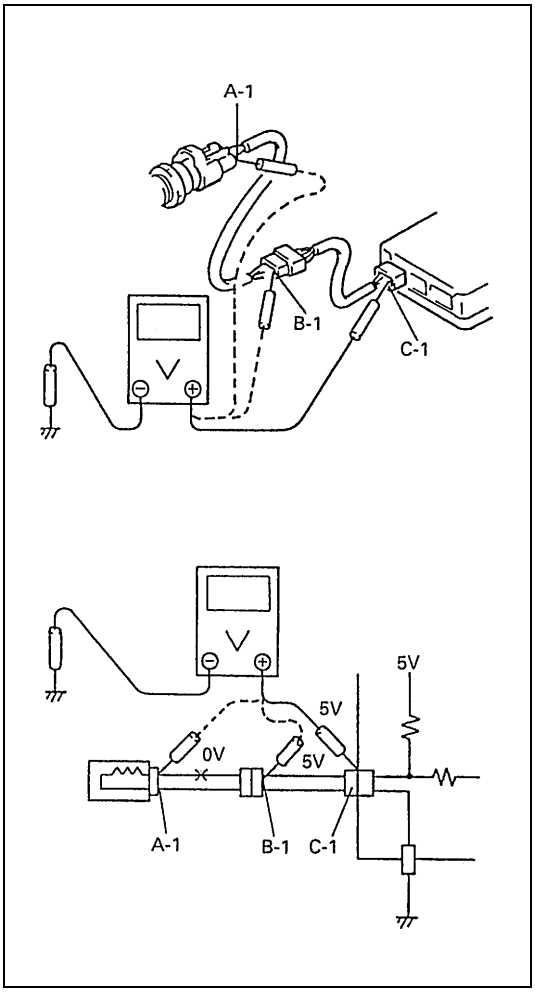
Continuity check



1) Measure resistance between connector terminals at both ends of the circuit being checked (between A-1 and C-1 in the figure).
If no continuity is indicated (infinity or over limit), that means that the circuit is open between terminals A-1 and C-1.



2) Disconnect the connector included in the circuit (connector-B in the figure) and measure resistance between terminals A-1 and B-1.
If no continuity is indicated, that means that the circuit is open between terminals A-1 and B-1. If continuity is indicated, there is an open circuit between terminals B-1 and C-1 or an abnormality in connector-B.



Voltage check

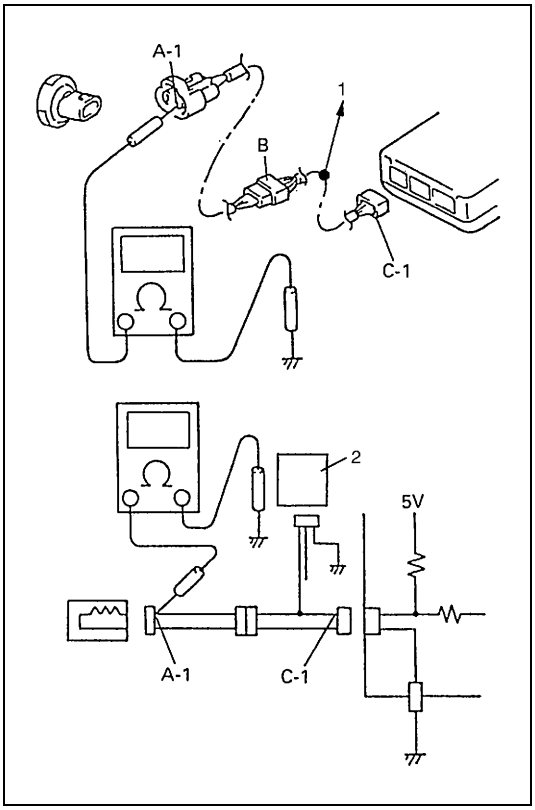
If voltage is supplied to the circuit being checked, voltage check can be used as circuit check.

1) With all connectors connected and voltage applied to the circuit being checked, measure voltage between each terminal and body ground.
   a) If measurements were taken as shown in the figure at the left and results were as listed below, it means that the circuit is open between terminals B-1 and A-1.

Voltage Between:
C-1 and body ground : Approx. 5V
B-1 and body ground : Approx. 5V
A-1 and body ground : 0V

   b) Also, if measured values were as listed below, it means that there is a resistance (abnormality) of such level that corresponds to the voltage drop in the circuit between terminals A-1 and B-1.

Voltage Between:
C-1 and body ground : Approx. 5V
B-1 and body ground : Approx. 5V
A-1 and body ground : Approx. 3V (2V voltage drop)



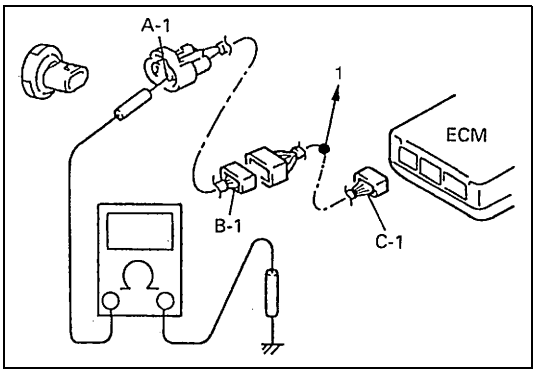
Short circuit check (wire harness to ground)

1) Disconnect negative cable from battery.
2) Disconnect connectors at both ends of the circuit to be checked.

NOTE:
If the circuit to be checked is connected to other parts, disconnect all connectors of those parts.
Otherwise, diagnosis will be misled.

3) Measure resistance between terminal at one end of circuit (A-1 terminal in figure) and body ground. If continuity is indicated, it means that there is a short to ground between terminals A-1 and C-1 of the circuit.

1.	To other parts
2.	Other parts

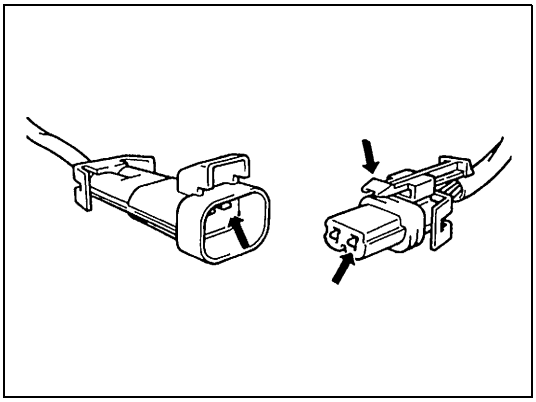


4) Disconnect the connector included in circuit (connector B) and measure resistance between A-1 and body ground.
If continuity is indicated, it means that the circuit is shorted to the ground between terminals A-1 and B-1.

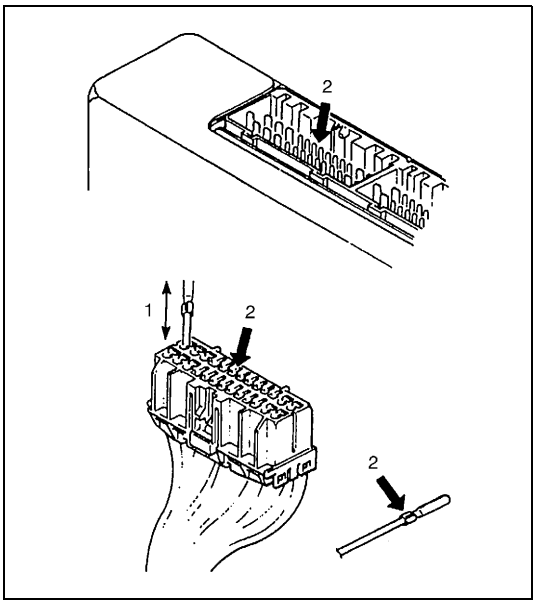
1. To other parts

Intermittent and Poor Connection

Most intermittent are caused by faulty electrical connections or wiring, although a sticking relay or solenoid can occasionally be at fault. When checking it for proper connection, perform careful check of suspect circuits for :

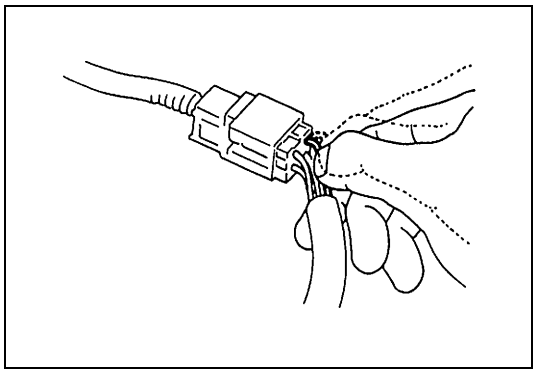


- Poor mating of connector halves, or terminals not fully seated in the connector body (backed out).
- Dirt or corrosion on the terminals. The terminals must be clean and free of any foreign material which could impede proper terminal contact.
  However, cleaning the terminal with a sand paper or the like is prohibited.
- Damaged connector body, exposing the terminals to moisture and dirt, as well as not maintaining proper terminal orientation with the component or mating connector.

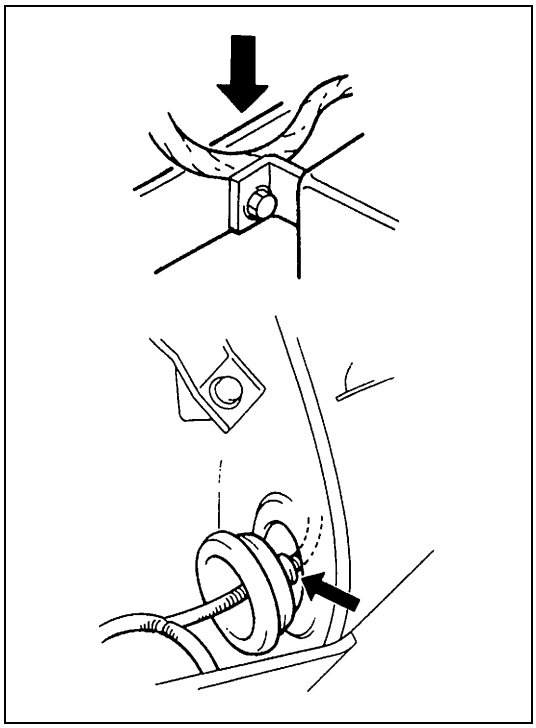


- Improperly formed or damaged terminals.
  Check each connector terminal in problem circuits carefully to ensure good contact tension by using the corresponding mating terminal.
  If contact tension is not enough, reform it to increase contact tension or replace.

1. Check contact tension by inserting and removing just once.
2. Check each terminal for bend and proper alignment.



- Poor terminal-to-wire connection.
  Check each wire harness in problem circuits for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.



- Wire insulation which is rubbed through, causing an intermittent short as the bare area touches other wiring or parts of the vehicle.
- Wiring broken inside the insulation. This condition could cause continuity check to show a good circuit, but if only 1 or 2 strands of a multi-strand-type wire are intact, resistance could be far too high.
  If any abnormality is found, repair or replace.

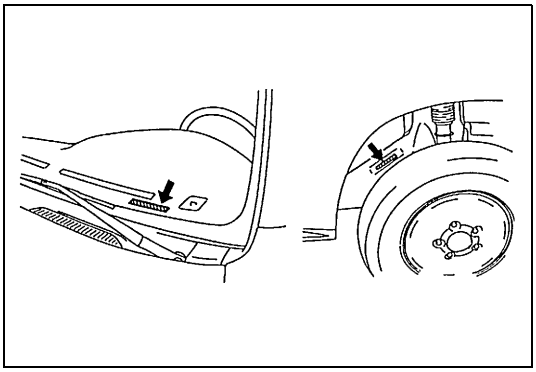
Precaution for Installing Mobile Communication Equipment

When installing mobile communication equipment such as CB (Citizens-Band)-radio or cellular-telephone, be sure to observe the following precautions.
Failure to follow cautions may adversely affect electronic control system.

- Keep the antenna as far away as possible from the vehicle's electronic control unit.
- Keep the antenna feeder more than 20 cm (7.9 in.) away from electronic control unit and its wire harnesses.
- Do not run the antenna feeder parallel with other wire harnesses.
- Confirm that the antenna and feeder are correctly adjusted.

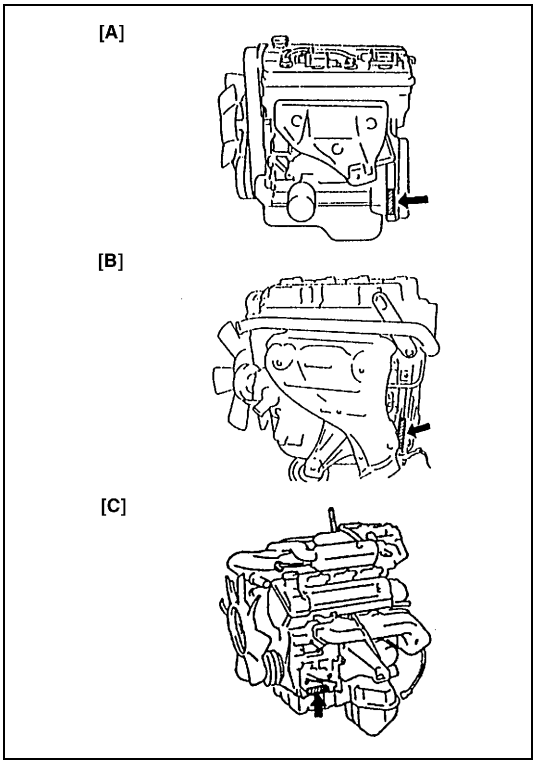
Identification Information

Vehicle Identification Number



The number is punched on the chassis inside the tire housing on the right front side and it is also on the left side of instrument panel depending on the vehicle specification.
It is possible to identify the country of origin (the production plant) of the vehicle by the first three digits of the number as shown below.
JSAxxx ..... Japan (Iwata) produced
2S2xxx ..... Canada (CAMI) produced

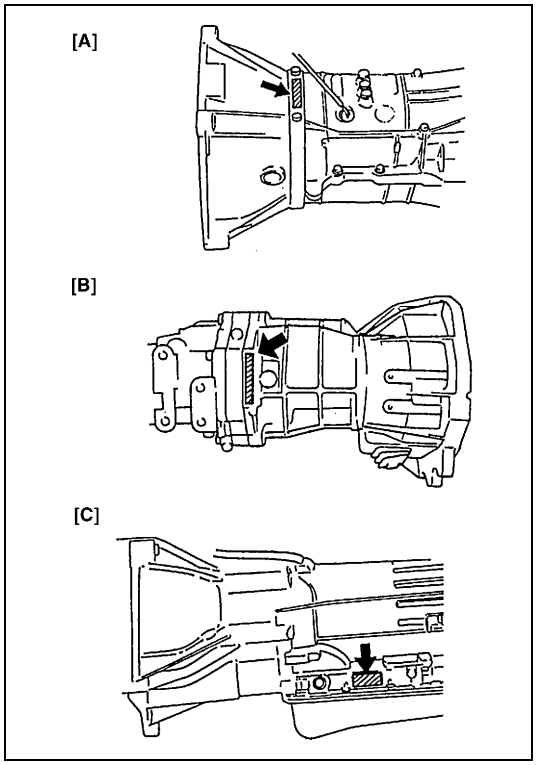
Engine Identification Number



The number is punched on the cylinder block.

[A] : G16 engine
[B] : J20 engine
[C] : H25 engine

Transmission Identification Number



The number is located on the transmission case.

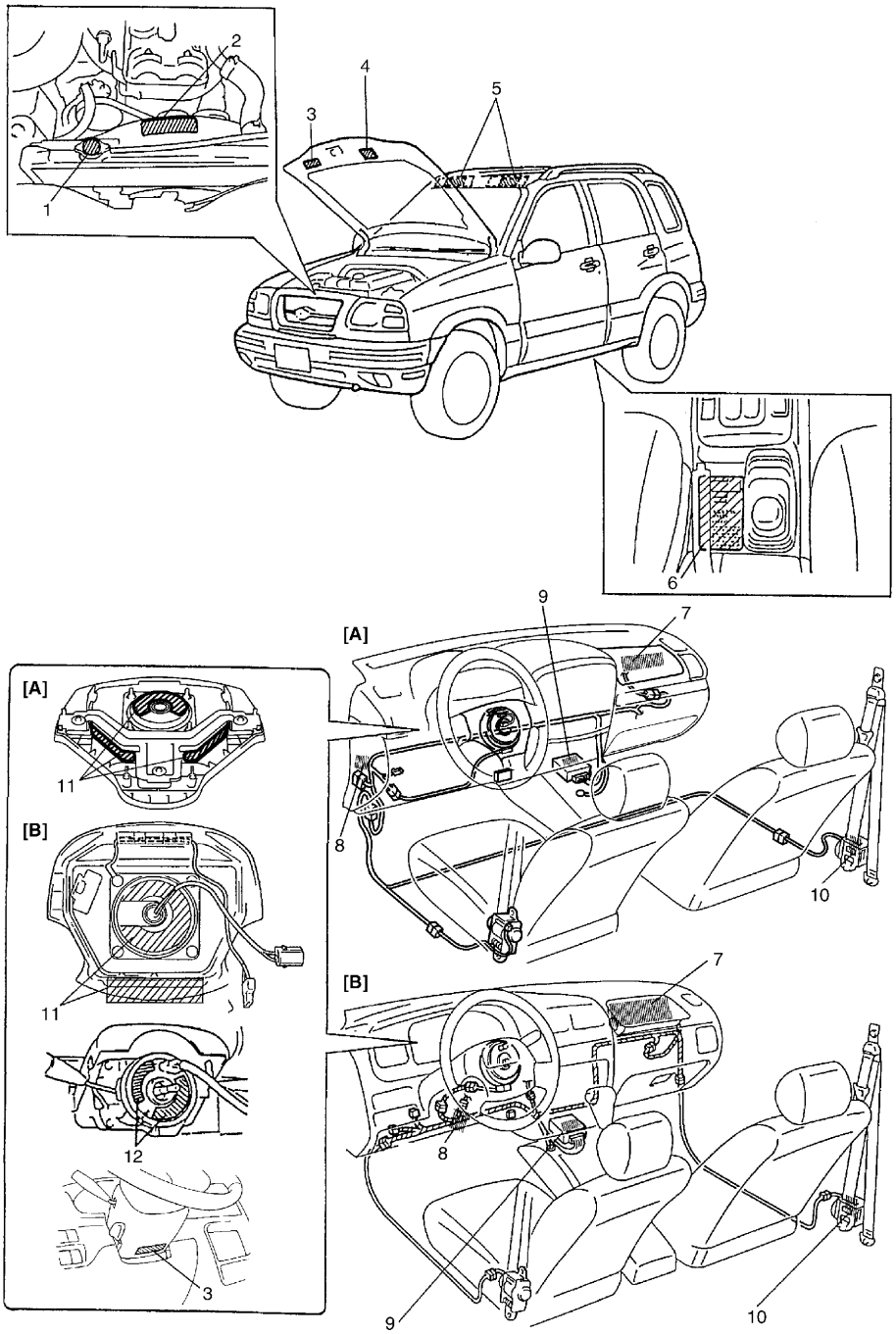
[A] :	M/T (Type1)
[B] :	M/T (Type2)
[C] :	4-speed A/T

Warning, Caution and Information Labels

The figure below shows main labels among others that are attached to vehicle component parts.
When servicing and handling parts, refer to WARNING/CAUTION instructions printed on labels.
If any WARNING/CAUTION label is found stained or damaged, clean or replace it as necessary.

NOTE:

Air bag CAUTION/WARNING labels are attached on the vehicle equipped with air bag system only.



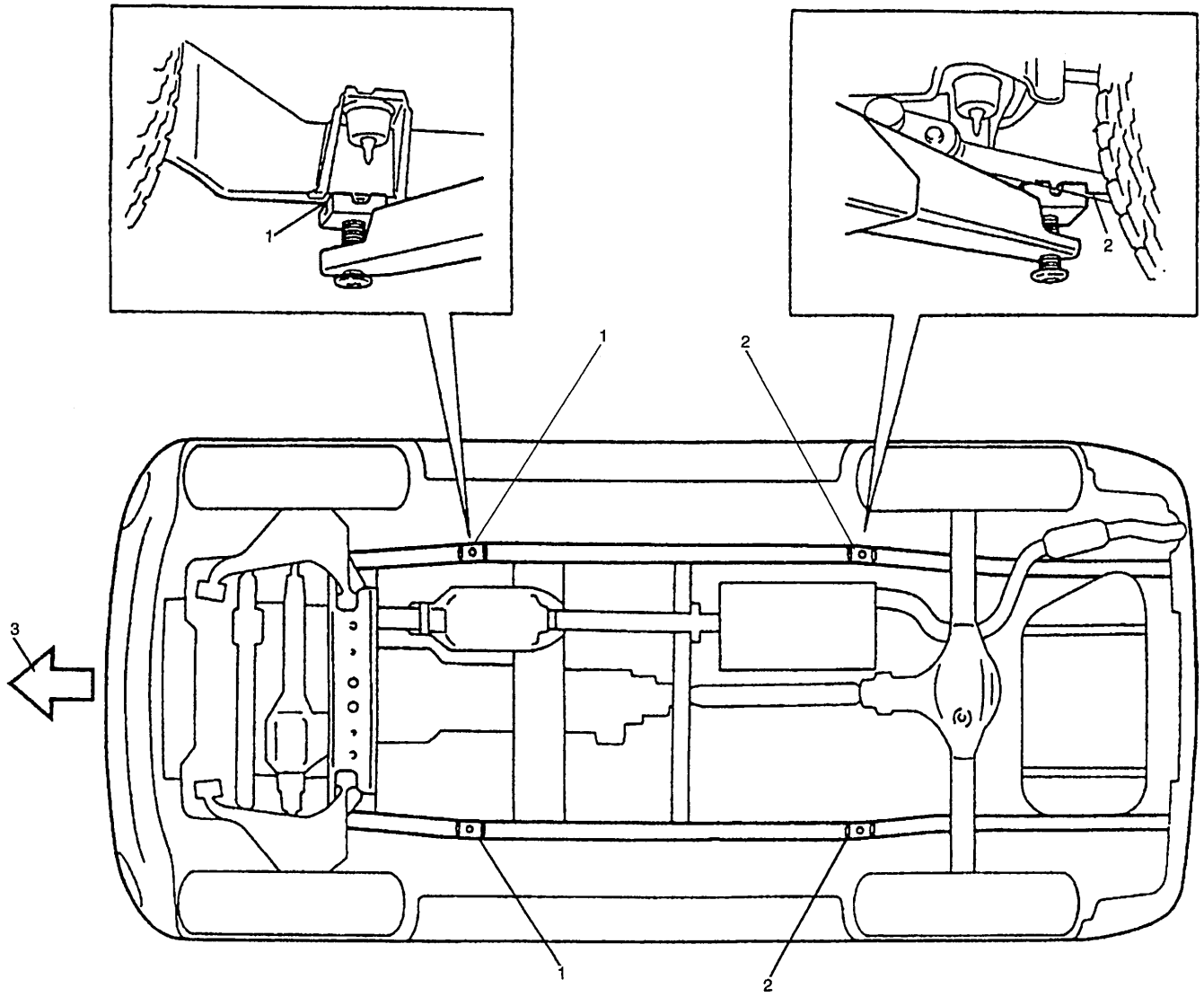
1. Radiator cap label	6. Transfer label	11. Air bag warning label on driver air bag (inflator) module
2. Engine cooling fan label	7. Air bag label on passenger air bag (inflator) module	12. Air bag warning label on combination switch and contact coil assembly
3. Air bag label	8. Air bag label on wire harness	13. Air bag warning label on steering column
4. Emission control label (Australia only)	9. Air bag label on SDM	[A] : Other than canvas top model
5. Air bag label on sun visor	10. Seat belt pretensioner label on retractor	[B] : Canvas top model

Vehicle Lifting Points

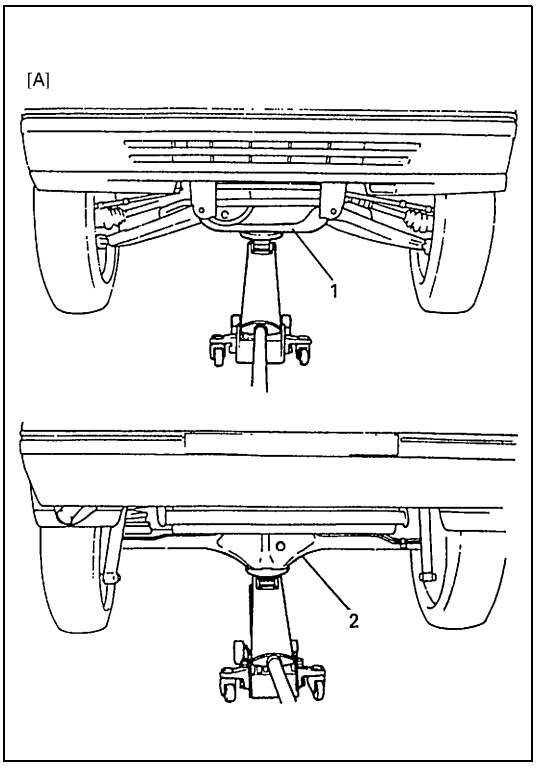
WARNING:

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

[A]



[A] : When using frame contact hoist	2. Rear lifting point
1. Front lifting point	3. Front

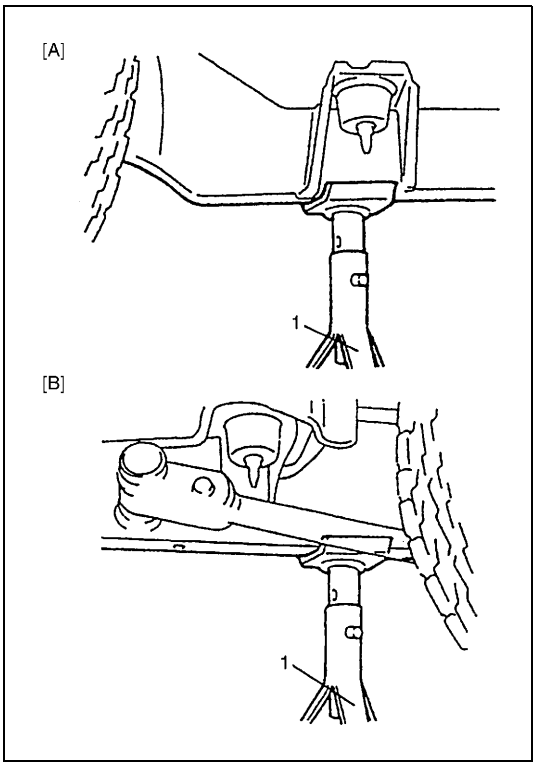


In raising front or rear vehicle end off the floor by jacking, be sure to put the jack against the center portion of the front suspension frame or rear axle housing.

WARNING:

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

[A] : When using floor jack
1. Front suspension frame
2. Rear axle housing



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

[A] : Front
[B] : Rear
1. Safety stands

Abbreviations May Be Used in This Manual

A	ABS	Anti-lock Brake System
	ABDC	After Bottom Dead Center
	AC	Alternating Current
	A/C	Air Conditioning
	A-ELR	Automatic-Emergency Locking Retractor
	A/F	Air Fuel Mixture Ratio
	ALR	Automatic Locking Retractor
	API	American Petroleum Institute
	A/T	Automatic Transmission
	ATDC	After Top Dead Center
	ATF	Automatic Transmission Fluid
B	B+	Battery Positive Voltage
	BBDC	Before Bottom Dead Center
	BCM	Body Electrrical Control Module
	BTDC	Before Top Dead Center
C	CKT	Circuit
	CMP Sensor	Camshaft Position Sensor (Crank Angle Sensor, CAS)
	CO	Carbon Monoxide
	CPP Switch	Clutch Pedal Position Switch (Clutch Switch, Clutch Start Switch)
	CPU	Central Processing Unit
	CRS	Child Restraint System
D	DC	Direct Current
	DLC	Data Link Connector (Assembly Line Diag. Link, ALDL, Serial Data Link, SDL)
	DOHC	Double Over Head Camshaft
	DOJ	Double Offset Joint
	DRL	Daytime Running Light
	DTC	Diagnostic Trouble Code (Diagnostic Code)
E	EBCM	Electronic Brake Control Module, ABS Control Module
	EBD	Electric Brake force Distribution
	ECM	Engine Control Module
	ECT Sensor	Engine Coolant Temperature Sensor (Water Temp. Sensor, WTS)
	EFE Heater	Early Fuel Evaporation Heater (Positive Temperature Coefficient, PTC Heater)
	EGR	Exhaust Gas Recirculation
	EGRT Sensor	EGR Temperature Sensor (Recirculated Exhaust Gas Temp. Sensor, REGTS)
	ELR	Emergency Locking Retractor
	EPS	Electronic Power Steering
E	EVAP	Evaporative Emission
	EVAP Canister	Evaporative Emission Canister (Charcoal Canister)
F	4WD	4 Wheel Drive
G	GEN	Generator
	GND	Ground
H	HC	Hydrocarbons
	HO2S	Heated Oxygen Sensor
	HVAC	Heating, Ventilating and Air Conditioning
I	IAC Valve	Idle Air Control Valve (Idle Speed Control Solenoid Valve, ISC Solenoid Valve)
	IAT Sensor	Intake Air Temperature Sensor (Air temperature Sensor, ATS)
	ICM	Immobilizer Control Module
	IG	Ignition
	ISC Actuator	Idle Speed Control Actuator (Motor)
L	LH	Left Hand
	LSPV	Load Sensing Proportioning Valve
M	MAF Sensor	Mass Air Flow Sensor (Air Flow Sensor, AFS, Air Flow Meter, AFM)
	MAP Sensor	Manifold Absolute Pressure Sensor (Pressure Sensor, PS)
	Max	Maximum
	MFI	Multiport Fuel Injection (Multipoint Fuel Injection)
	MIL	Malfunction Indicator Lamp (“CHECK ENGINE” Light)
	Min	Minimum
	M/T	Manual Transmission
N	NOx	Nitrogen Oxides
O	OBD	On-Board Diagnostic System (Self-Diagnosis Function)
	O/D	Overdrive
	OHC	Over Head Camshaft
P	PCM	Powertrain Control Module
	PCV	Positive Crankcase Ventilation
	PNP	Park/Neutral Position
	P/S	Power Steering
	PSP Switch	Power Steering Pressure Switch (P/S Pressure Switch)
R	RH	Right Hand

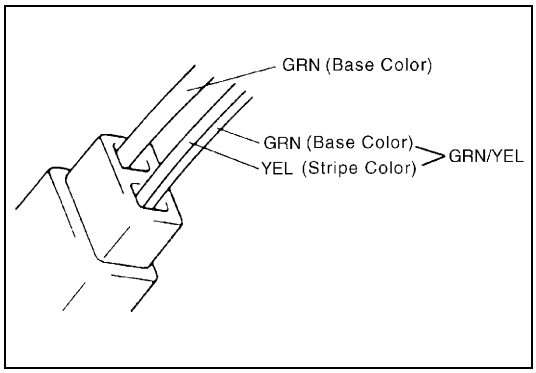
S	SAE	Society of Automotive Engineers
	SDM	Sensing and Diagnostic Module (Air bag controller, Air bag control module)
	SFI	Sequential Multiport Fuel Injection
	SOHC	Single Over Head Camshaft
T	TBI	Throttle Body Fuel Injection (Single-Point Fuel Injection, SPI)
	TCC	Torque Converter Clutch
	TCM	Transmission Control Module (A/T Controller, A/T Control Module)
	TP Sensor	Throttle Position Sensor
	TVV	Thermal Vacuum Valve (Thermal Vacuum Switching Valve, TVSV, Bimetal Vacuum Switching Valve, BVSV)
	TWC	Three Way Catalytic Converter (Three Way Catalyst)
	2WD	2 Wheel Drive
V	VIN	Vehicle Identification Number
	VSS	Vehicle Speed Sensor
W	WU-OC	Warm Up Oxidation Catalytic Converter
	WU-TWC	Warm Up Three Way Catalytic Converter

SYMBOLS

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Tightening torque	1216	Apply SUZUKI BOND NO. 1216 99000-31160
OIL	Apply oil (engine, transmission, transfer, differential)	Si	Apply SILICONE SEALANT 99000-31120
FLD	Apply fluid (brake, power steering or automatic transmission fluid)	366E	Apply SEALING COMPOUND 366E 99000-31090
A	Apply SUZUKI SUPER GREASE A 99000-25010		
C	Apply SUZUKI SUPER GREASE C 99000-25030	1322	Apply THREAD LOCK 1322 99000-32110
E	Apply SUZUKI SUPER GREASE E 99000-25050	1333B	Apply THREAD LOCK 1333B 99000-32020
H	Apply SUZUKI SUPER GREASE H 99000-25120	1342	Apply THREAD LOCK 1342 99000-32050
I	Apply SUZUKI SUPER GREASE I 99000-25210		
1215	Apply SUZUKI BOND NO. 1215 99000-31110		Do not reuse
1207F	Apply SUZUKI BOND NO. 1207F 99000-31250		Note on reassembly

WIRE COLOR SYMBOLS

Symbol		Wire Color	Symbol		Wire Color
B	BLK	Black	O, Or	ORN	Orange
Bl	BLU	Blue	R	RED	Red
Br	BRN	Brown	W	WHT	White
G	GRN	Green	Y	YEL	Yellow
Gr	GRY	Gray	P	PNK	Pink
Lbl	LT BLU	Light blue	V	PPL	Violet
Lg	LT GRN	Light green			



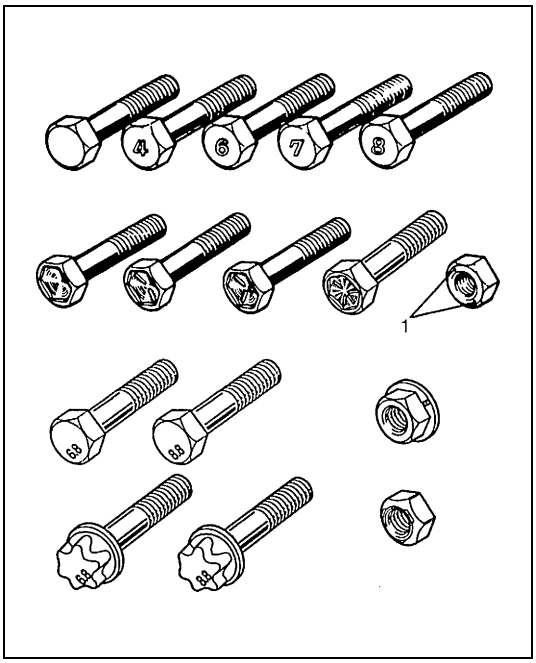
There are two kinds of colored wire used in this vehicle. One is single-colored wire and the other is dual-colored (striped) wire.
The single-colored wire uses only one color symbol (i.e. “GRN”).
The dual-colored wire uses two color symbols (i.e. “GRN/YEL”).
The first symbol represents the base color of the wire (“GRN” in the figure) and the second symbol represents the color of the stripe (“YEL” in the figure).

Metric Information

Metric Fasteners

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

Fastener Strength Identification



Most commonly used metric fastener strength property classes are 4T, 6.8, 7T, 8.8 and radial line with the class identification embossed on the head of each bolt. Some metric nuts will be marked with punch, 6 or 8 mark strength identification on the nut face. Figure shows the different strength markings.
When replacing metric fasteners, be careful to use bolts and nuts of the same strength or greater than the original fasteners (the same number marking or higher). It is likewise important to select replacement fasteners of the correct diameter and thread pitch.
Correct replacement bolts and nuts are available through the parts division.

Metric bolts : Identification class numbers or marks correspond to bolt strength (increasing numbers represent increasing strength)

1. Nut strength identification

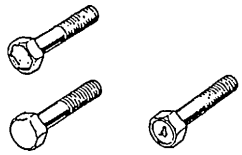
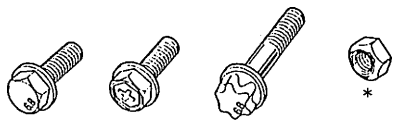
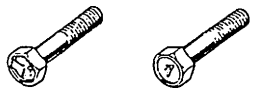
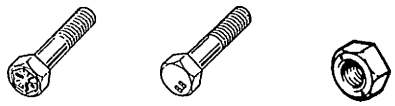
Standard Tightening Torque

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

NOTE:

- **For the flanged bolt, flanged nut and self-lock nut of 4T and 7T strength, add 10% to the tightening torque given in the chart below.**
- **The chart below is applicable only where the fastened parts are made of steel or light alloy.**

Tightening torque chart :

			Thread Diameter (Nominal Diameter) (mm)								
			4	5	6	8	10	12	14	16	18
Strength	A equivalent of 4T strength fastener 	N·m	1.5	3.0	5.5	13	29	45	65	105	160
		kg-m	0.15	0.30	0.55	1.3	2.9	4.5	6.5	10.5	16
		lb-ft	1.0	2.5	4.0	9.5	21.0	32.5	47.0	76.0	116.0
	A equivalent of 6.8 strength fastener without flange	N·m	2.4	4.7	8.4	20	42	80	125	193	280
		kg-m	0.24	0.47	0.84	2.0	4.2	8.0	12.5	19.3	28
		lb-ft	2.0	3.5	6.0	14.5	30.5	58.0	90.5	139.5	202.5
	A equivalent of 6.8 strength fastener with flange 	N·m	2.4	4.9	8.8	21	44	84	133	203	298
		kg-m	0.24	0.49	0.88	2.1	4.4	8.4	13.3	20.3	29.8
		lb-ft	2.0	3.5	6.5	15.5	32.0	61.0	96.5	147.0	215.5
	A equivalent of 7T strength fastener 	N·m	2.3	4.5	10	23	50	85	135	210	240
		kg-m	0.23	0.45	1.0	2.3	5.0	8.5	13.5	21	24
		lb-ft	2.0	3.5	7.5	17.0	36.5	61.5	98.0	152.0	174.0
	A equivalent of 8.8 strength fastener without flange 	N·m	3.1	6.3	11	27	56	105	168	258	373
		kg-m	0.31	0.63	1.1	2.7	5.6	10.5	16.8	25.8	37.3
		lb-ft	2.5	4.5	8.0	19.5	40.5	76.0	121.5	187.0	270.0
	A equivalent of 8.8 strength fastener with flange	N·m	3.2	6.5	12	29	59	113	175	270	395
		kg-m	0.32	0.65	1.2	2.9	5.9	11.3	17.5	27	39.5
		lb-ft	2.5	5.0	9.0	21.0	43.0	82.0	126.5	195.5	286.0

*: Self-lock nut

SECTION 0B

MAINTENANCE AND LUBRICATION

WARNING:

For vehicles equipped with a Supplemental Restraint (Air Bag) System :

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

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Maintenance Schedule

Maintenance Schedule Under Normal Driving Conditions

NOTE:

- **This interval should be judged by odometer reading or months, whichever comes first.**
- **This table includes services as scheduled up to 90,000 km (54,000 miles) mileage. Beyond 90,000 km (54,000 miles), carry out the same services at the same intervals respectively.**

Interval :		Km (x 1,000)		15	30	45	60	75	90
		Miles (x 1,000)		9	18	27	36	45	54
		Months		12	24	36	48	60	72
ENGINE									
Drive belt		V-belt		I	R	I	R	I	R
		V-rib belt (Flat type)		–	–	I	–	–	R
Camshaft timing belt (G16 engine only)				Replace every 100,000 km or 60,000 miles					
Valve lash (clearance)		G16 engine only		–	I	–	I	–	I
Engine oil and oil filter	J20/H25 engines G16 engine with HO2S (SG, SH, SJ, SL grade oil)			R	R	R	R	R	R
	G16 engine (SE, SF, grade oil)			Replace every 10,000 km (6,000 miles) or 8 months					
Engine coolant				–	–	R	–	–	R
Exhaust system				–	I	–	I	–	I
IGNITION SYSTEM									
✱Spark plugs	When unleaded fuel is used	Vehicle without HO2S	Nickel plug	–	R	–	R	–	R
			Iridium plug	–	–	–	R	–	–
		Vehicle with HO2S	Nickel plug	–	–	R	–	–	R
			Iridium plug	Replace every 105,000 km, 63,000 miles or 84 months					
	When leaded fuel is used, refer to “Maintenance Recommended under Severe Driving Condition” in this section.								
FUEL SYSTEM									
Air cleaner filter			Paved-road	I	I	R	I	I	R
			Dusty condition	Refer to “Maintenance Recommended under Severe Driving Condition” in this section.					
Fuel lines and connections				–	I	–	I	–	I
Fuel filter				Replace every 105,000 km or 63,000 miles					
Fuel tank				–	–	I	–	–	I
EMISSION CONTROL SYSTEM									
Crankcase ventilation hoses and connections (Vehicle without HO2S)				–	–	I	–	–	I
✱PCV valve		Vehicle without HO2S		–	–	I	–	–	I
		Vehicle with HO2S		–	–	–	–	–	I
✱Fuel evaporative emission control system		Vehicle without HO2S		–	I	–	I	–	I
		Vehicle with HO2S		–	–	–	–	–	I

NOTE:

- **"R" : Replace or change**
- **"I" : Inspect and correct, replace or lubricate if necessary**
- **For Camshaft timing belt : This belt may be replaced every 90,000 km (54,000 miles) according to customer's maintenance convenience.**
- **For Sweden, items with asterisk (∗) should be performed by odometer reading only.**
- **For Spark plugs, replace every 50,000 km if the local law requires.**
- **Nickel spark plug : BKR6E-11 or K20PR-U11**
- **Iridium spark plug : IFR6J11 or IFR6E11 for G16 engine, IFR5J11 or SK16PR11 for J20/H25 engines**

Interval :	Km (x 1,000)	15	30	45	60	75	90
	Miles (x 1,000)	9	18	27	36	45	54
	Months	12	24	36	48	60	72
CHASSIS AND BODY							
Clutch (pedal and fluid level)		–	I	–	I	–	I
Brake discs and pads (thickness, wear, damage)		I	I	I	I	I	I
Brake drums and shoes (wear, damage)		–	I	–	I	–	I
Brake hoses and pipes (leakage, damage, clamp)		–	I	–	I	–	I
Brake fluid		–	R	–	R	–	R
Brake lever and cable (damage, stroke, operation)		Inspect at first 15,000 km (9,000 miles) only					
Tires (wear, damage, rotation)		I	I	I	I	I	I
Wheel discs (damage)		I	I	I	I	I	I
Suspension system (tighteness, damage, rattle, breakage)		–	I	–	I	–	I
Propeller shafts and drive shafts		–	–	I	–	–	I
Manual transmission oil (leakage, level) (I : 1st 15,000 km only)		I	–	R	–	–	R
Automatic transmission	Fluid level	–	I	–	I	–	I
	Fluid change	Replace every 165,000 km (99,000 miles)					
	Fluid hose	–	–	–	I	–	–
Transfer oil (leakage, level)		I	–	I	–	I	–
Differential oil (leakage, level) (R : 1st 15,000 km only)		R or I	–	I	–	I	–
Steering system (tighteness, damage, breakage, rattle)		–	I	–	I	–	I
Power steering (if equipped)		I	I	I	I	I	I
All latches, hinges and locks		–	I	–	I	–	I
Air conditioning filter (if equipped)		–	I	R	–	I	R

NOTE:

"R" : Replace or change

"I" : Inspect and correct, replace or lubricate if necessary

Maintenance Recommended Under Severe Driving Conditions

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

Severe condition code :

A : Repeated short trips
B : Driving on rough and/or muddy roads
C : Driving on dusty roads
D : Driving in extremely cold weather and/or salted roads
E : Repeated short trips in extremely cold weather
F : Leaded fuel use
G : – – – – – – – –
H : Trailer towing (if admitted)

Severe Condition Code	Maintenance		Maintenance Operation	Maintenance Interval
– B C D – – – –	Drive belt (V-rib belt)		I	Every 15,000 km (9,000 miles) or 12 months
			R	Every 45,000 km (27,000 miles) or 36 months
A – C D E F – H	Engine oil and oil filter		R	Every 5,000 km (3,000 miles) or 4 months
– B – – – – – –	Exhaust pipe mountings		I	Every 15,000 km (9,000 miles) or 12 months
– – C – – – – –	Air cleaner filter*1		I	Every 2,500 km (1,500 miles)
			R	Every 30,000 km (18,000 miles) or 24 months
A B C – E F – H	Spark plugs	Nickel plug	R	Every 10,000 km (6,000 miles) or 8 months
		Iridium plug	R	Every 30,000 km (18,000 miles) or 24 months
– B – D E – – H	Propeller shafts and drive shafts		I	Every 15,000 km (9,000 miles) or 12 months
– B – – E – – H	Manual transmission, transfer and differential oil		R	First time only: 15,000 km (9,000 miles) or 12 months
				Second time and after: Every 30,000 km (18,000 miles) or 24 months reckoning from 0 km (0 miles) or 0 months
– B – – E – – H	Automatic transmission fluid		R	Every 30,000 km (18,000 miles) or 24 months
– B – – – – – –	Suspension bolts and nuts		T	Every 15,000 km (9,000 miles) or 12 months
– B C D – – – H	Wheel bearing		I	Every 15,000 km (9,000 miles) or 12 months
– – C D – – – –	Air conditioning filter*2 (if equipped)		I	Every 15,000 km (9,000 miles) or 12 months
			R	Every 45,000 km (27,000 miles) or 36 months

NOTE:

"I" : Inspect and correct, replace or lubricate if necessary
"R" : Replace or change
"T" : Tighten to the specified torque
***1 : Inspect or replace more frequently if necessary.**
***2 : Clean or replace more frequently if the air from the air conditioning decreases.**

Maintenance Service

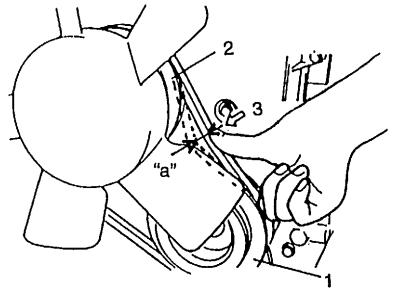
Engine

Drive belt

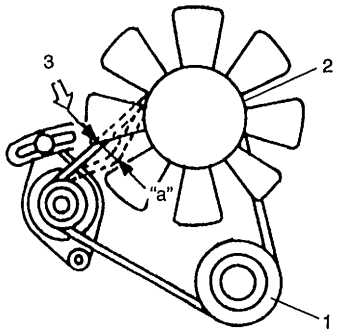
WARNING:
All inspection and replacement are to be performed with ENGINE NOT RUNNING.

WATER PUMP AND GENERATOR DRIVE BELT (G16 AND H25 ENGINES) INSPECTION

G16



H25



1) Disconnect negative cable at battery.
2) Inspect belt for cracks, cuts, deformation, wear and cleanliness.
   If any defect exists, replace.
   Check belt for tension.

Water pump and generator belt tension
"a" : 5 – 7 mm (0.20 – 0.28 in.) deflection for G16,
9 – 11 mm (0.35 – 0.43 in.) deflection for H25 under 100 N, 10 kg or 22 lb pressure

NOTE:
When replacing belt with a new one, adjust belt tension to 5 – 6 mm (0.20 – 0.24 in.) for G16, 7 – 9 mm (0.28 – 0.35 in.) for H25.

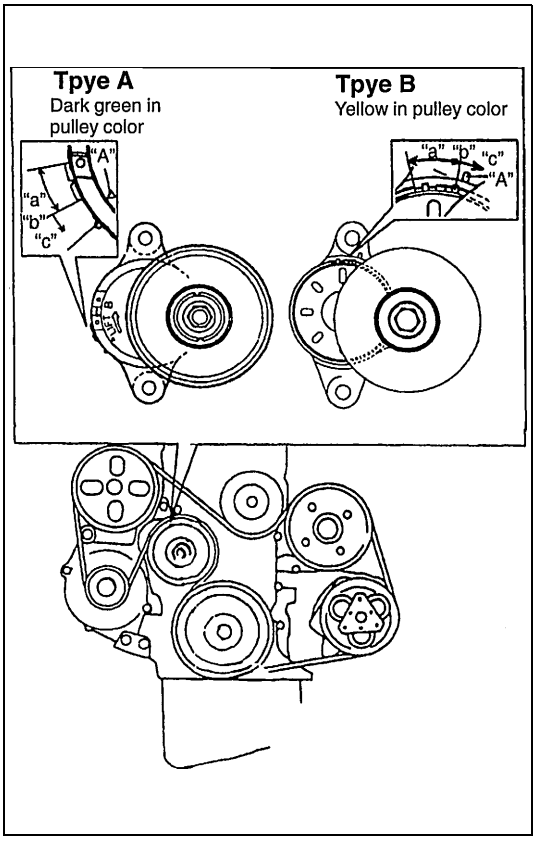
3) If belt is too tight or too loose, adjust it to specification by adjusting alternator position.
4) Tighten alternator adjusting bolt and pivot bolts.
5) Connect negative cable to battery.

1.	Crankshaft pulley
2.	Water pump pulley
3.	100 N, 10 kg or 22 lb

WATER PUMP AND GENERATOR DRIVE BELT (G16 AND H25 ENGINES) REPLACEMENT

Replace belt. Refer to "Cooling Fan Belt" in Section 6B for replacement procedure of pump belt.

WATER PUMP, GENERATOR, POWER STEERING AND/OR A/C COMPRESSOR (IF EQUIPPED) DRIVE BELT (J20 ENGINE) INSPECTION



1) Disconnect negative cable at battery.
2) Inspect belt for cracks, cuts, deformation, wear and cleanliness.
   If any of above conditions are found, replace belt.
3) Make sure that tension indicator "A" is within the range "a".
   If indicator "A" comes into the NG range "c" passing "b", replace generator belt with a new one.

NOTE:

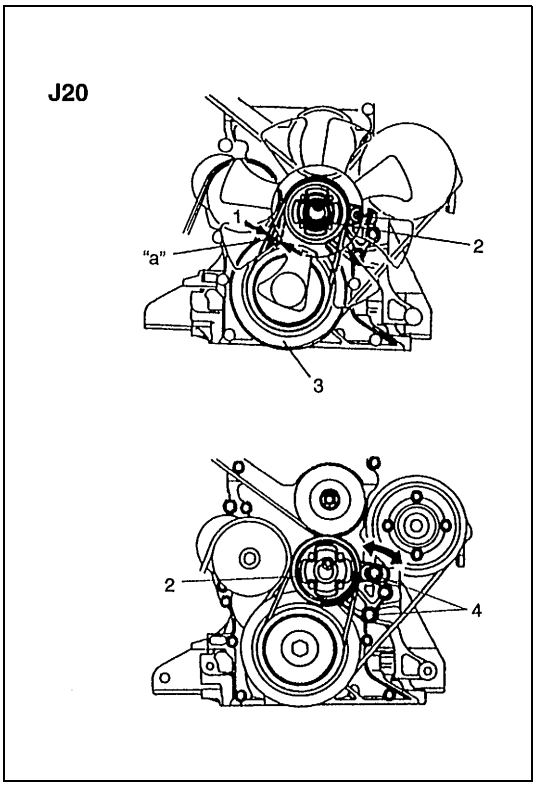
Use mirror when checking belt tension of Type A tensioner.

WATER PUMP, GENERATOR, POWER STEERING AND/OR A/C COMPRESSOR (IF EQUIPPED) DRIVE BELT (J20 ENGINE) REPLACEMENT

Replace belt referring to replacement procedure of "Generator Belt" in Section 6H.

"A" :	Indicator
"a" :	Normal range
"b" :	Limit
"c" :	NG range

ENGINE COOLING FAN DRIVE BELT (J20 ENGINE) INSPECTION



1) Disconnect negative cable at battery.
2) Inspect belt for cracks, cuts, deformation, wear and cleanliness.
   If any defect exists, replace. Check belt for tension.

Cooling fan belt tension
"a" : 5 – 7 mm (0.20 – 0.27 in.) deflection under 100 N, 10 kg or 22 lb pressure.

NOTE:

When replacing belt with a new one, adjust belt deflection to 4 – 5 mm (0.16 – 0.19 in.).

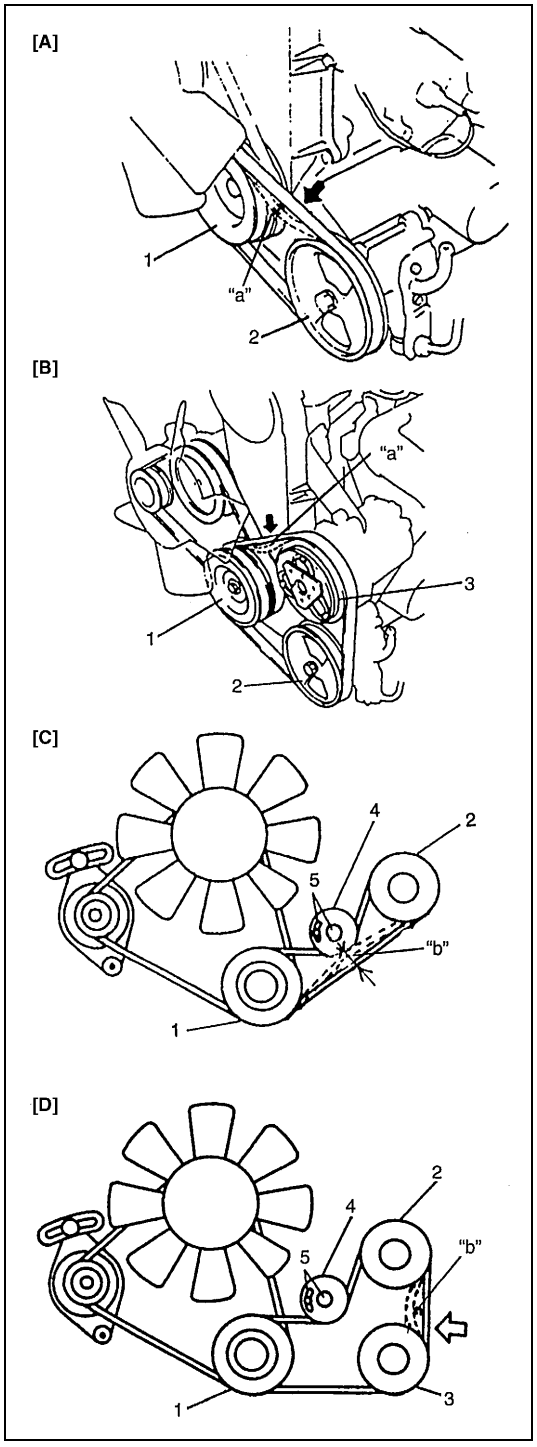
3) If the belt is too tight or too loose, adjust it to specification by adjusting cooling fan pulley position.
4) Tighten adjusting bolt and pivot bolt.
5) Connect negative cable at battery.

1.	100 N, 10 kg or 22 lb
2.	Fan pulley
3.	Crankshaft pulley
4.	Adjusting and pivot bolt

ENGINE COOLING FAN DRIVE BELT (J20 ENGINE) REPLACEMENT

Replace belt referring to “Cooling Fan Belt” in Section 6B for replacement procedure of cooling fan drive belt.

POWER STEERING PUMP AND/OR A/C COMPRESSOR DRIVE BELT (IF EQUIPPED) (G16 AND H25 ENGINES) INSPECTION



1) Disconnect negative cable at battery.
2) Inspect belt for cracks, cuts, deformation, wear and cleanliness.
   If any defect exists, replace.
   Check belt for tension.

   Power steering pump and/or A/C compressor drive belt tension.
   “a” : 6 – 9 mm (0.24 – 0.35 in.) deflection under 100 N, 10 kg or 22 lb pressure.
   “b” : 4 – 7 mm (0.16 – 0.28 in.) deflection under 100 N, 10 kg or 22 lb pressure.

If belt tension is out of above specification, adjust it referring to “Power Steering Pump Drive Belt” in Section 3B1.

3) Connect negative cable to battery.

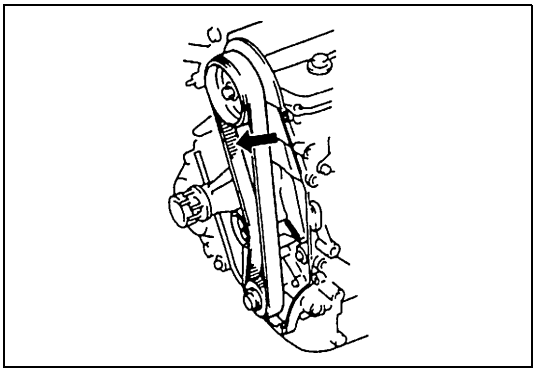
POWER STEERING PUMP AND/OR A/C COMPRESSOR DRIVE BELTS (IF EQUIPPED) (G16 AND H25 ENGINES) REPLACEMENT

Replace belt and then adjust belt tension referring to “Power Steering Pump Drive Belt” in Section 3B1 for replacement procedure of belt.

1. Crankshaft pulley
2. P/S pump pulley
3. A/C compressor pulley (if equipped)
4. Tension pulley
5. Tension pulley bolts
[A] : G16 with P/S
[B] : G16 with P/S and A/C
[C] : H25 with P/S
[D] : H25 with P/S and A/C

Camshaft timing belt (G16 engine only)

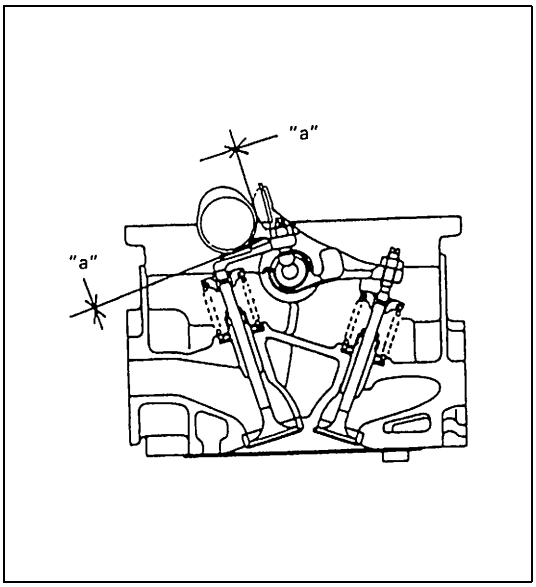
REPLACEMENT



Replace timing belt referring to “Timing Belt and Belt Tensioner” in Section 6A1.

Valve lash (G16 engine only)

INSPECTION



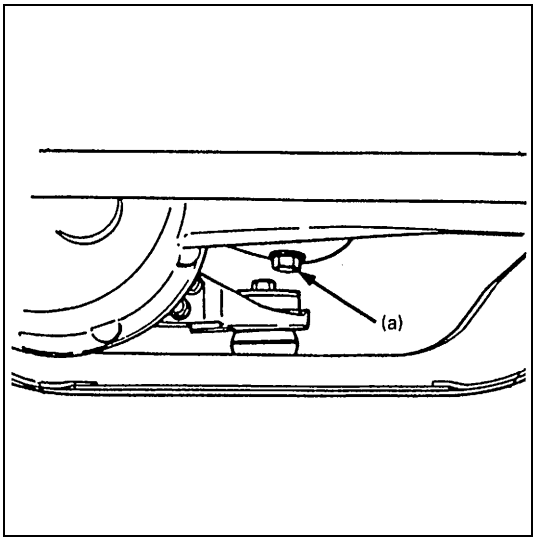
1) Remove cylinder head cover.
2) Inspect intake and exhaust valve lash and adjust as necessary.
   Refer to “Valve Lash (Clearance)” in Section 6A1 for valve lash inspection and adjustment procedure.

		When cold (Coolant temperature is 15 – 25°C or 59 – 77°F)	When hot (Coolant temperature is 60 – 68°C or 140 – 154°F)
Valve lash (gap “a”) specification	**Intake**	**0.13 – 0.17 mm (0.005 – 0.006 in.)**	**0.17 – 0.21 mm (0.007 – 0.008 in.)**
	Exhaust	**0.23 – 0.27 mm (0.009 – 0.010 in.)**	**0.28 – 0.32 mm (0.011 – 0.012 in.)**

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

Engine oil and filter

CHANGE

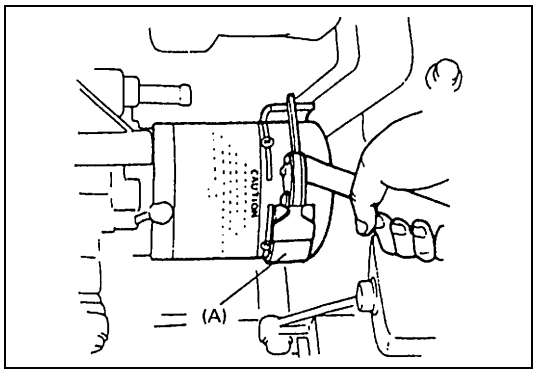


WARNING:
New and used engine oil can be hazardous.
Be sure to read “WARNING” in General Precaution in Section 0A and observe what in written there.

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

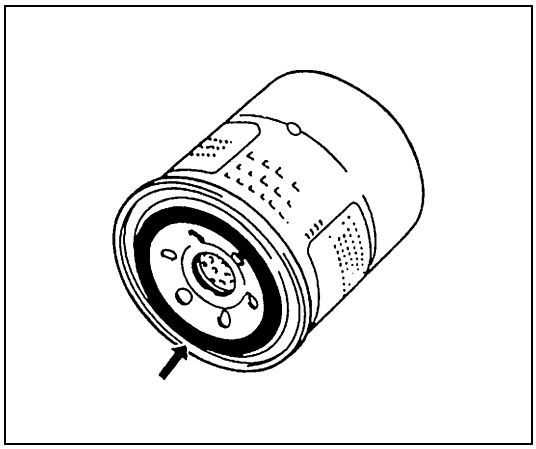
1) Drain engine oil by removing drain plug.
2) After draining oil, wipe drain plug clean. Reinstall drain plug, and tighten it securely as specified below.

Tightening torque
Engine oil drain plug (a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)



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

Special tool
(A) : 09915-47310 (H25 engine)
(A) : 09915-47330 (G16 and J20 engines)



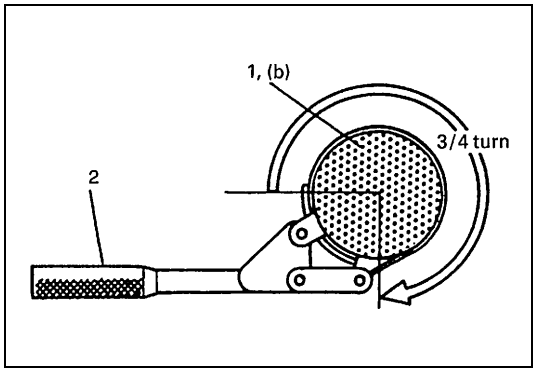
NOTE:

Before fitting new oil filter, be sure to oil its O-ring. Use engine oil for this purpose.

4) Screw new filter on oil filter stand by hand until the filter O-ring contacts the mounting surface.

CAUTION:

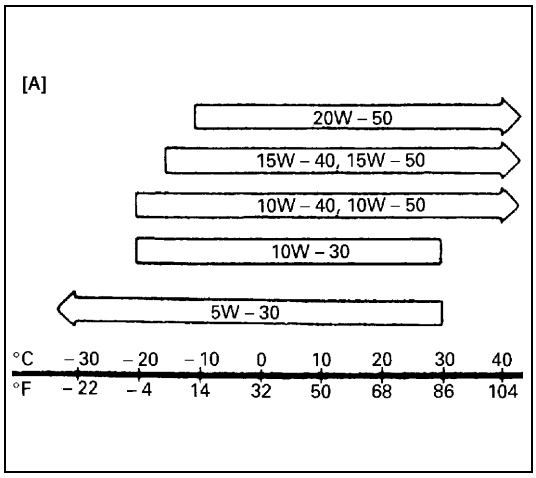
To tighten oil filter properly, it is important to accurately identify the position at which at filter O-ring first contacts the mounting surface.



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

Tightening torque
Oil filter (b) : 14 N·m (1.4 kg-m, 10.5 lb-ft) (Reference)

1. Oil filter
2. Oil filter wrench



6) Replenish oil until oil level is brought to FULL level mark on dipstick. (oil pan and oil filter capacity). The filler inlet is at the top of the cylinder head cover.
It is recommended to use engine oil of SG, SH, SJ or SL grade.
Select the appropriate oil viscosity according to the proper engine oil viscosity chart [A].

NOTE:

For temperature between –20°C (–4°F) and 30°C (86°F), it is highly recommended to use SAE 10W – 30 oil.

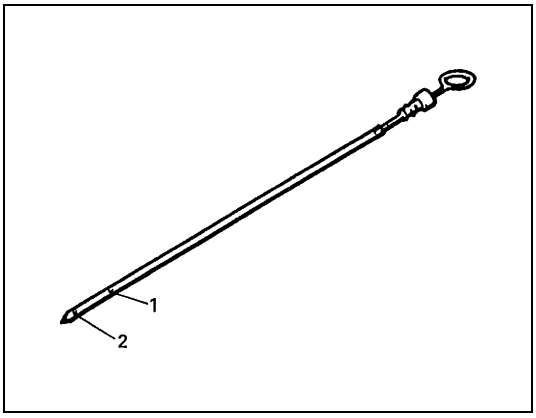
[A] : Proper engine oil viscosity chart

	G16 Engine	J20 Engine	H25 Engine
Oil pan capacity	About 4.0 liters (10.6/8.8 US/Imp pt.)	About 5.0 liters (10.6/8.8 US/Imp pt.)	←
Oil filter capacity	About 0.2 liters (0.4/0.3 US/Imp pt.)	←	About 0.5 liters (1.1/0.9 US/Imp pt.)
Others	About 0.3 liters (0.6/0.5 US/Imp pt.)	About 0.4 liters (1.1/0.9 US/Imp pt.)	About 0.7 liters (1.5/1.2 US/Imp pt.)
Total	About 4.5 liters (9.5/7.9 US/Imp pt.)	About 5.6 liters (11.8/9.8 US/Imp pt.)	About 6.2 liters (13.1/10.9 US/Imp pt.)

NOTE:

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

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



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

NOTE:

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

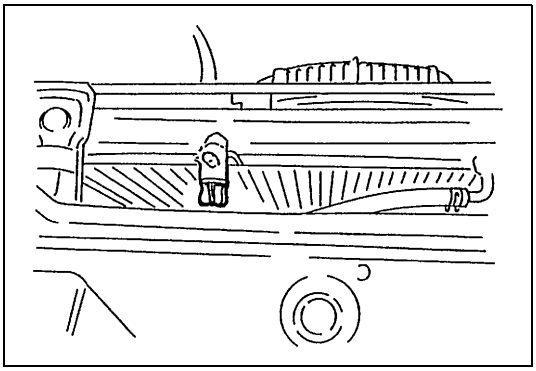
1. Full level mark (hole)
2. Low level mark (hole)

Engine coolant

CHANGE

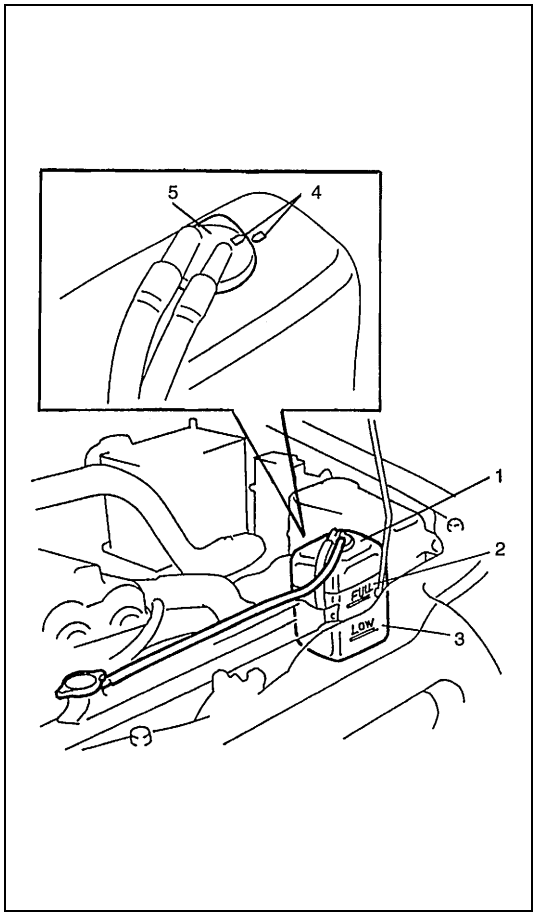
WARNING:

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



1) Remove radiator cap when engine is cool.
2) Loosen radiator drain plug to drain coolant.
3) Remove reservoir, which is on the side of radiator, and drain.
4) Tighten plug securely. Also reinstall reservoir.

5) Fill radiator with specified amount of coolant, and run engine for 2 or 3 minutes at idle. This drives out any air which may still be trapped within cooling system. STOP ENGINE. Add coolant as necessary until coolant level reaches the filler throat of radiator.
Reinstall radiator cap.



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

NOTE:

When installing reservoir cap, align arrow marks on reservoir and cap.

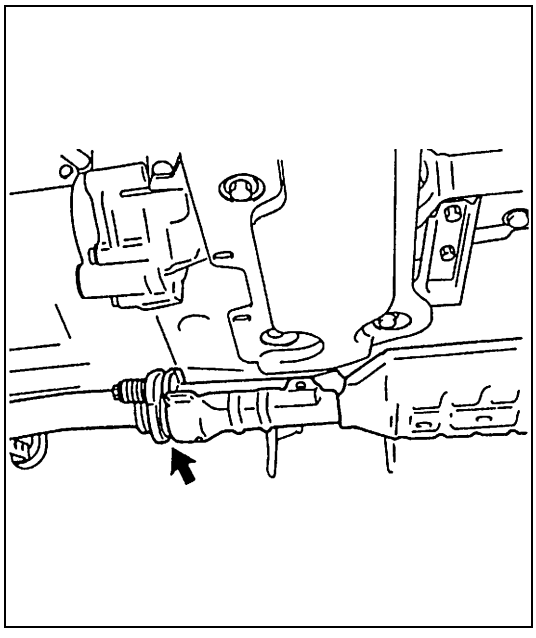
CAUTION:

When changing engine coolant, use mixture of 50% water and 50% ANTIFREEZE/ANTICORROSION COOLANT for the market where ambient temperature falls lower than –16°C (3°F) in winter, and mixture of 70% water and 30% ANTIFREEZE/ANTICORROSION COOLANT for the market where ambient temperature doesn't fall lower than –16°C (3°F).
Even in a market where no freezing temperature is anticipated, mixture of 70% water and 30% ANTIFREEZE/ANTICORROSION COOLANT should be used for the purpose of corrosion protection and lubrication.

1. Reservoir	4. Arrow mark
2. FULL level mark	5. Reservoir cap
3. LOW level mark	

Exhaust system

INSPECTION



WARNING:

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

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

- Check rubber mountings for damage, deterioration, and out of position.
- Check exhaust system for leakage, loose connections, dents and damages.

If bolts or nuts are loose, tighten them to specification.

- Check nearby body areas for damaged, missing, or mispositioned parts, open seams, holes, loose connections or other defects which could permit exhaust fumes to seep into the vehicle.

- Make sure that exhaust system components have enough clearance from the underbody to avoid overheating and possible damage to the floor carpet.
- Any defects should be fixed at once.

Ignition System

Spark plugs

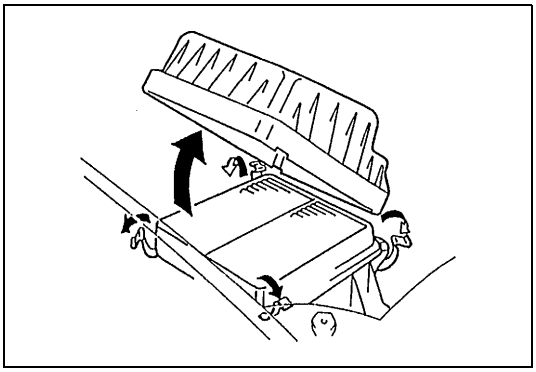
REPLACEMENT

Replace spark plugs with new ones referring to “Spark Plugs” in Section 6F1 or 6F2.

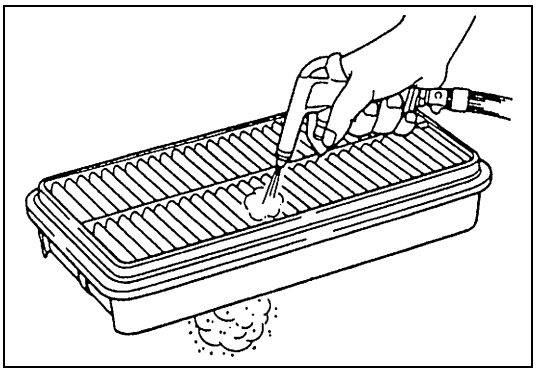
Fuel System

Air cleaner filter

INSPECTION



1) Remove air cleaner case clamps.
2) Take cleaner filter out of air cleaner case.
3) Check air cleaner filter for dirt. Replace excessively dirty filter.



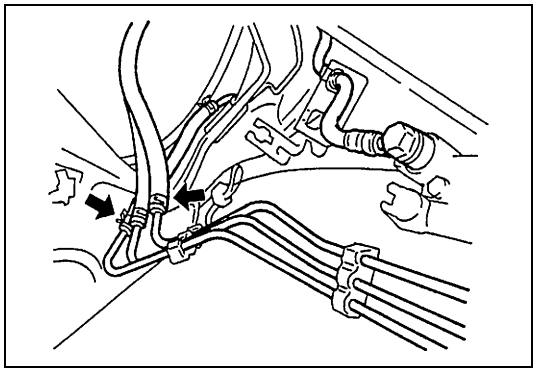
4) Blow off dust by compressed air from air outlet side of filter.
5) Install air cleaner filter into case.
6) Install air cleaner case cap and clamp it securely.

REPLACEMENT

Replace air cleaner filter with new one according to above steps 1), 2) and 5), 6).

Fuel lines and connections

INSPECTION

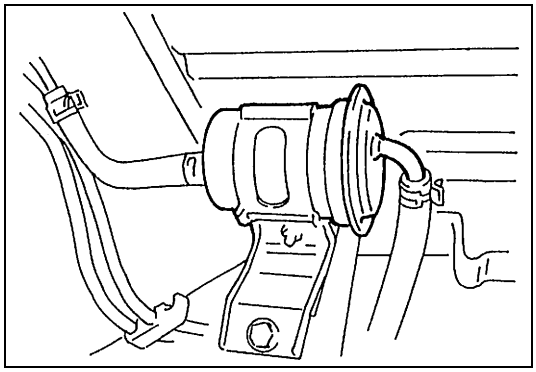


1) Visually inspect fuel lines and connections for evidence of fuel leakage, hose cracking and damage. Make sure all clamps are secure.
   Repair leaky joints, if any.
   Replace hoses that are suspected of being cracked.

Fuel filter

REPLACEMENT

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



Fuel filter is located at the front part of fuel tank, inside the right-hand side of chassis.
Replace fuel filter with new one periodically, referring to Section 6C for proper procedure.

Fuel tank

INSPECTION

Check fuel tank for damage, cracks, fuel leakage, corrosion and tank bolts looseness.
If a problem is found, repair or replace.

Emission Control System

Crankcase ventilation hoses and connections (vehicle not equipped with oxygen sensor)

INSPECTION

Refer to the following PCV valve inspection.

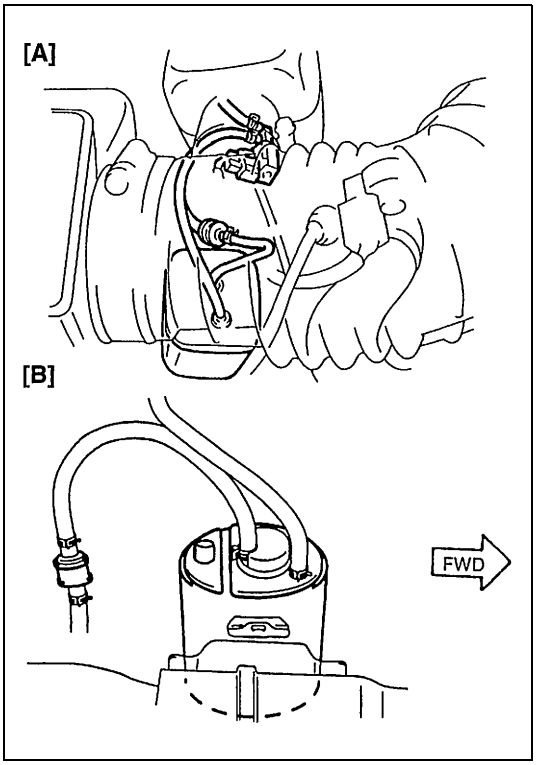
PCV (positive crankcase ventilation) valve

INSPECTION

Check crankcase ventilation hose and PCV hose for leaks, cracks or clog, and PCV valve for stick or clog. Refer to “PCV Valve” in Section 6E1/6E2 for PCV valve checking procedure.

Fuel evaporative emission control system

INSPECTION



Visually inspect hoses for cracks, damage, or excessive bends.

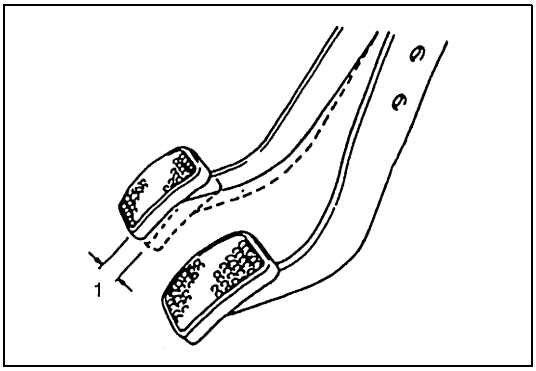
1) Inspect all clamps for damage and proper position.
2) Check EVAP canister for operation and clog, referring to “EVAP Canister Inspection” in Section 6E1/6E2.
   If a malfunction is found, repair or replace.

[A] : Type 1
[B] : Type 2

Chassis and Body

Clutch

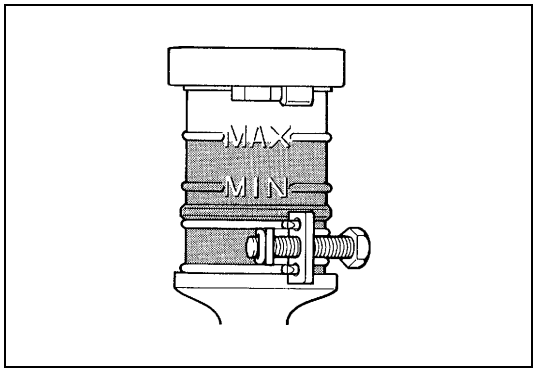
PEDAL INSPECTION



Check clutch pedal for height and free travel referring to “Clutch Pedal Height” and “Clutch Pedal Free Travel” in Section 7C1. Adjust or correct if necessary.

1. Clutch pedal free travel

FLUID INSPECTION

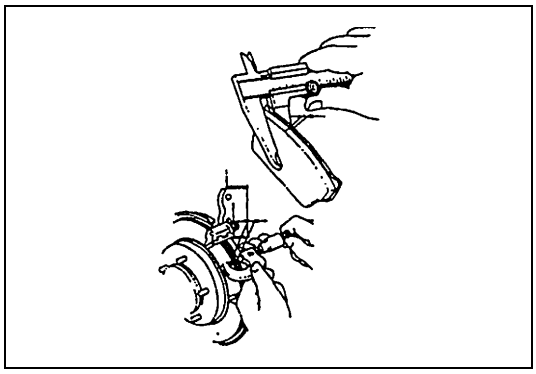


1) Check around master cylinder and reservoir for fluid leakage. If found leaky, correct.
2) Check fluid level.
   If fluid level is lower than the minimum level of reservoir, refilling is necessary. Fill reservoir with specified brake fluid indicated on clutch reservoir cap.
   For the details, refer to On-vehicle service in Section 7C1.

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

Brake discs and pads

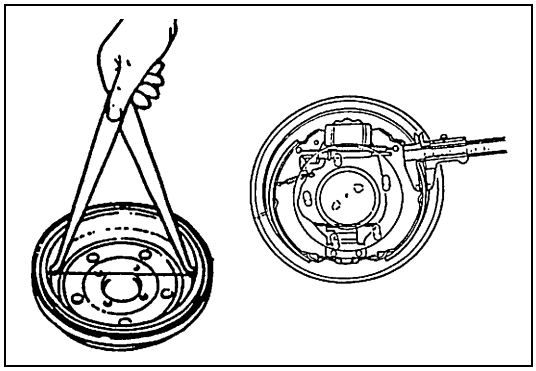
INSPECTION



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

Brake drums and shoes

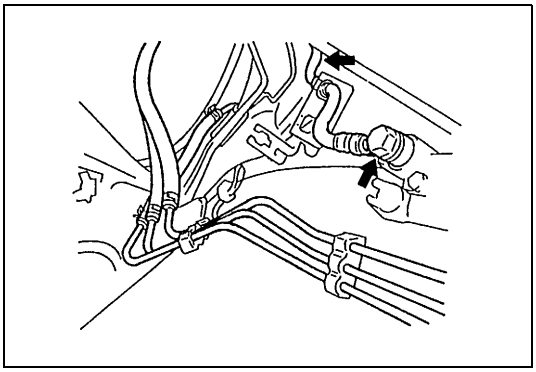
INSPECTION



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

Brake hoses and pipes

INSPECTION



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

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

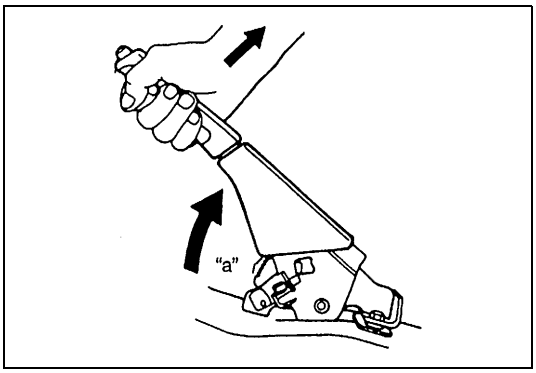
Brake fluid

CHANGE

Change brake fluid as follows.
Drain existing fluid from brake system completely, fill system with specified fluid and carry out air purge operation.
For air purging procedure, refer to “Bleeding Brakes” in Section 5.

Parking brake lever and cable

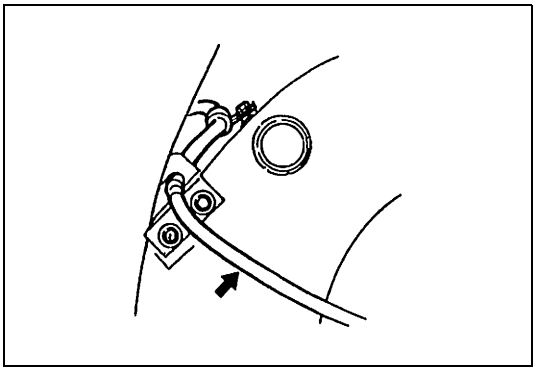
PARKING BRAKE LEVER INSPECTION



1) Check tooth tip of each notch for damage or wear. If any damage or wear is found, replace parking lever.
2) Check parking brake lever for proper operation and stroke, and adjust it if necessary.
   For checking and adjusting procedures, refer to “Parking Brake Check and Adjustment” in Section 5.

Parking brake lever stroke
“a” : 5 – 7 notches (With 20 kg or 44 lbs of pull pressure)

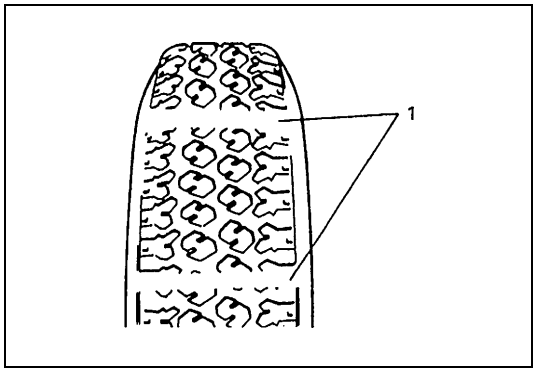
PARKING BRAKE CABLE INSPECTION



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

Tires/wheel discs

TIRE INSPECTION AND ROTATION



1) Check tires for uneven or excessive wear, or damage.
   If defective, replace.
   Refer to “Tire Diagnosis” in Section 3 for details.

1. Wear indicator

2) Check inflating pressure of each tire and adjust pressure to specification as necessary.
   Refer to “Inflation of Tires” in Section 3F for details.

NOTE:

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

3) Rotate tires.
   For details, refer to “Tire Rotation” in Section 3F.

WHEEL DISCS INSPECTION

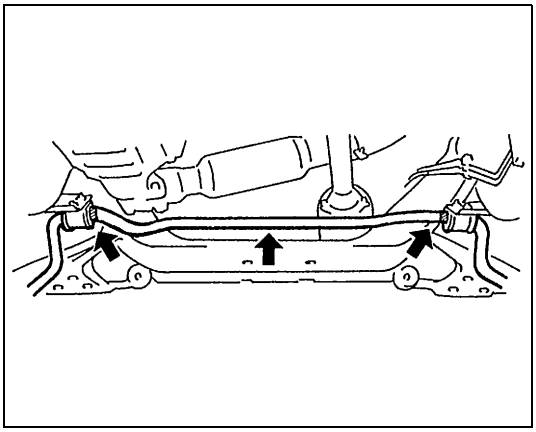
Inspect each wheel disc for dents, distortion and cracks. A disc in badly damaged condition must be replaced.

WHEEL BEARING INSPECTION

1) Check front wheel bearing for wear, damage, abnormal noise or rattles. For details, refer to “Wheel Disc, Nut and Bearing Check” in Section 3D.
2) Check rear wheel bearing for wear, damage, abnormal noise or rattles. For details, refer to “Wheel Disc, Nut and Bearing Check” in Section 3E.

Suspension system

INSPECTION



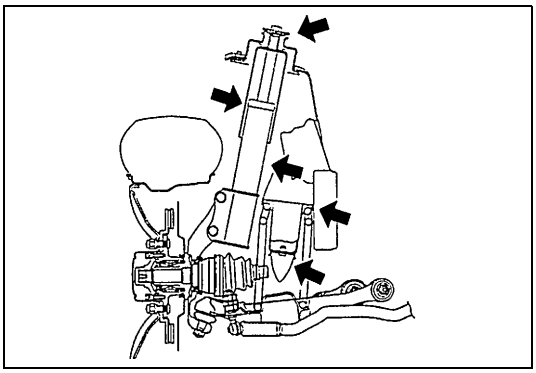
Check suspension bolts and nuts for tightness and retighten them as necessary.
Repair or replace defective parts, if any.

NOTE:

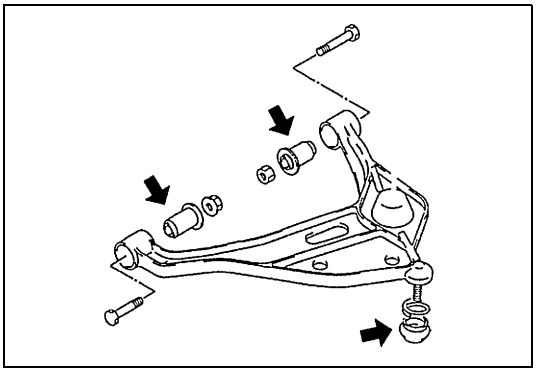
For details of check points, refer to tables of "Tightening Torque Specification" in Section 3D and 3E.

Front

1) Check stabilizer bar for damage or deformation.
2) Check bushing for damage, wear or deterioration.

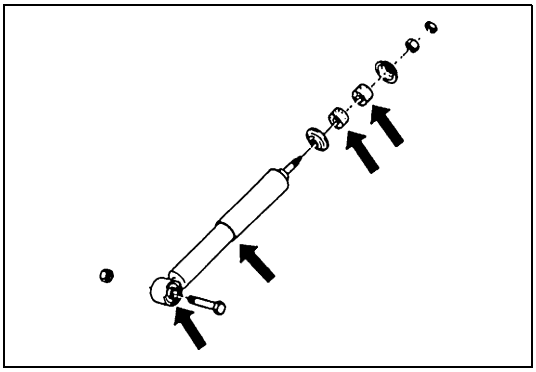


3) Inspect strut for damage, deformation, oil leakage and operation. If strut is found faulty, replace it as an assembly unit, because it can not be disassembled.
   Refer to "Strut Damper and/or Coil Spring CHeck" in Section 3D for operation check.
4) Inspect strut boot for damage or crack.
5) Inspect for cracks or deformation in spring seat.
6) Inspect for deterioration of bump stopper.
7) Inspect strut mount for wear, cracks or deformation.

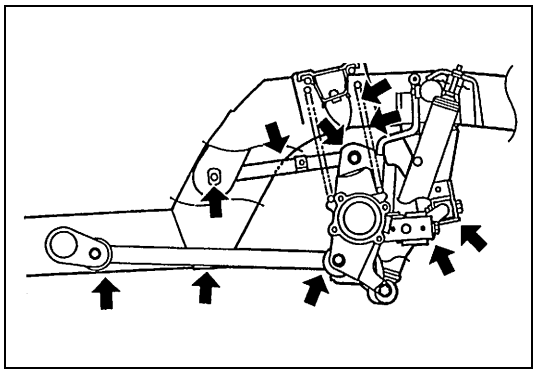


8) Check ball joint stud dust seal (boot) for leaks, detachment, tear or other damage. Check suspension arm bushing for damage, wear or deterioration.

Rear



9) Check shock absorber for damage, deformation, oil leakage and operation.
10) Check bushings for wear and damage.

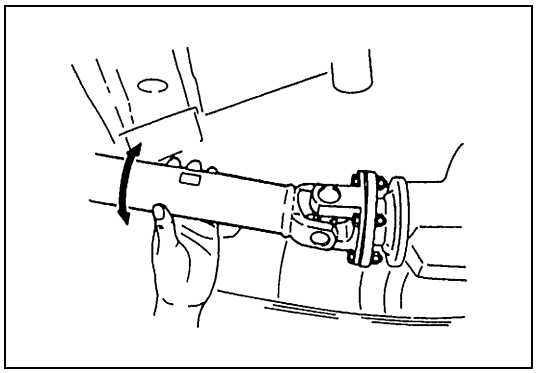


11) Check coil spring, upper rod, lower rod and lateral rod for deformation and damage.
12) Check upper rod, lower rod and lateral rod bushings and bump stopper for wear, damage and deterioration.

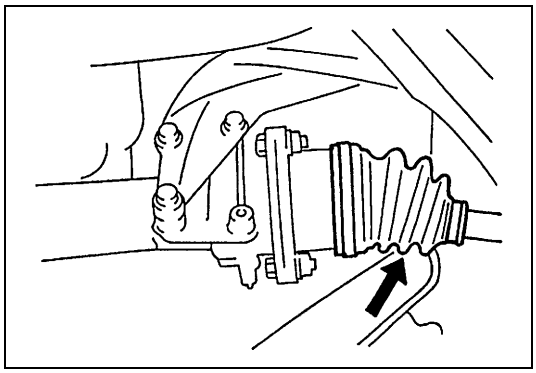
13) Check other suspension parts for damage, loose or missing parts; also for parts showing signs of wear or lack of lubrication.
    Replace any parts found defective in steps 1) to 13).

Propeller shafts and drive shafts

INSPECTION



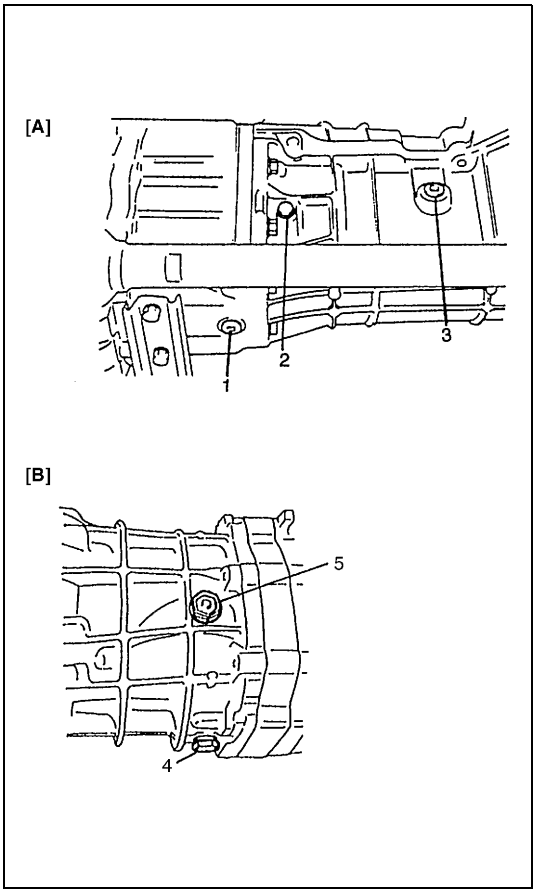
1) Check universal joint and spline of propeller shaft for rattle. If rattle is found, replace defective part with a new one.
2) Check propeller shaft (front & rear) flange yoke bolts for tightness, and retighten them as necessary.
   Refer to “Tightening Torque Specification” in Section 4B for tightening torque.



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

Manual transmission oil

INSPECTION



1) Inspect transmission case for evidence of oil leakage.
   Repair leaky point if any.
2) Make sure that vehicle is placed level for oil level check.
3) Remove level plug of transmission.
4) Check oil level.
   Oil level can be checked roughly by means of level plug hole. That is, if oil flows out of level plug hole or if oil level is found up to hole when level plug is removed, oil is properly filled.
   If oil is found insufficient, pour specified amount of specified oil.
5) Tighten level plug to specified torque.
   Refer to "Transmission Gear Oil" in Section 7A or 7A1 for installation and tightening torque.

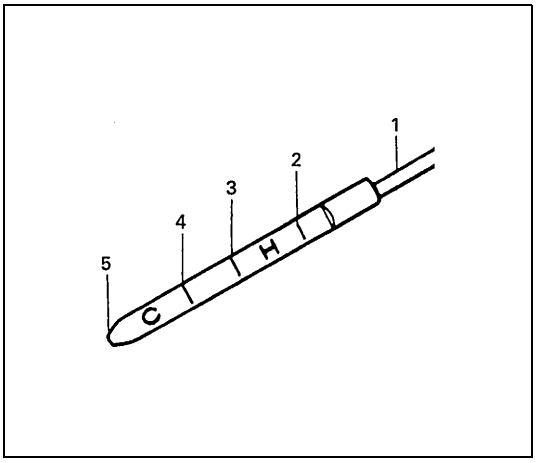
CHANGE

Change transmission oil with new specified oil referring to "Transmission Gear Oil" in Section 7A or 7A1.

[A] : Type 1	3. Filler/level plug (Apply sealant)
[B] : Type 2	4. Drain plug
1. Drain plug (Apply sealant)	5. Filler/level plug
2. Reverse idle gear shaft bolt (DO NOT LOOSEN IT)	

Automatic transmission fluid

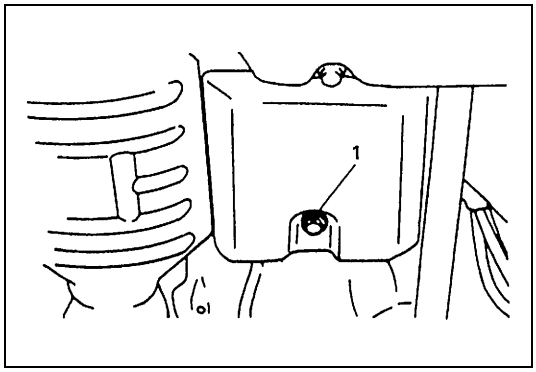
INSPECTION



1) Inspect transmission case for evidence of fluid leakage.
   Repair leaky point, if any.
2) Make sure that vehicle is placed level for fluid level check.
3) Check fluid level.
   For fluid level checking procedure, refer to "Fluid Level" in Section 7B1 and be sure to perform it under specified conditions.
   If fluid level is low, replenish specified fluid.

1. Level gauge	4. FULL COLD mark
2. FULL HOT mark	5. LOW COLD mark
3. LOW HOT mark	

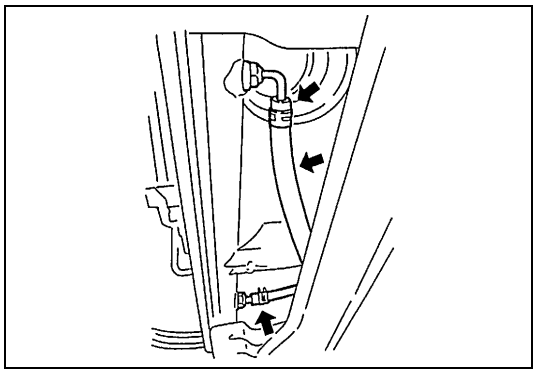
CHANGE



1) Inspect transmission case for evidence of fluid leakage. Repair leaky point, if any.
2) Make sure that vehicle is placed level for fluid level check.
3) Change fluid. For its procedure, refer to “Fluid Change” in Section 7B1.

1. Drain plug

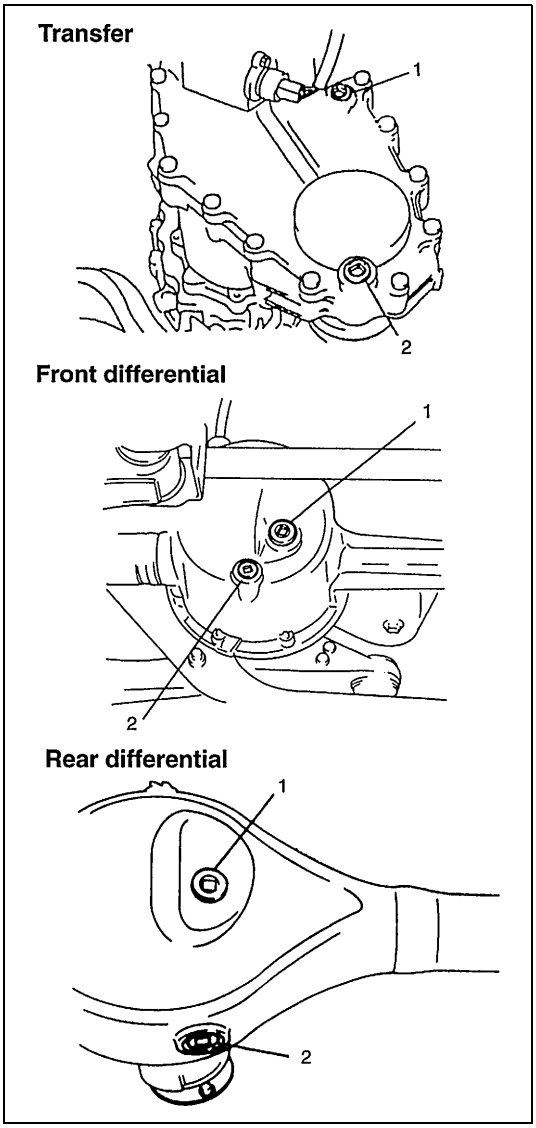
FLUID COOLER HOSE INSPECTION



Check automatic transmission fluid cooler hose for fluid leakage, cracks, damage and deterioration.
Replace hose and/or clamp if any faulty condition is found.

Transfer and differential oil

INSPECTION



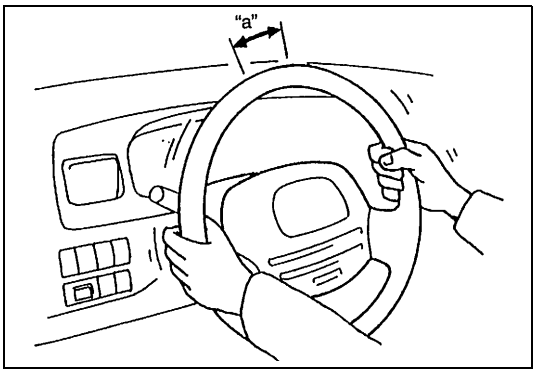
1) Check transfer case and differential for evidence of oil leakage.
   Repair leaky point if any.
2) Make sure that vehicle is placed level for oil level check.
3) Remove level plug of transfer or differentials (front and rear) and check oil level.
   Oil level can be checked roughly by means of level plug hole. That is, if oil flows out of level plug hole or if oil level is found up to hole when level plug is removed, oil is properly filled.
   If oil is found insufficient, pour specified amount of specified oil referring to "Transfer Gear Oil" in Section 7D, "Gear Oil Change" in 7E or 7F.
4) Tighten level plug to specified torque.
   Refer to "Transfer Gear Oil" in Section 7D, "Gear Oil Change" in 7E or 7F for tightening torque.

CHANGE

Change transfer oil or differentials oil with new specified oil referring to "Transfer Gear Oil" in Section 7D, "Gear Oil Change" in 7E and 7F respectively.

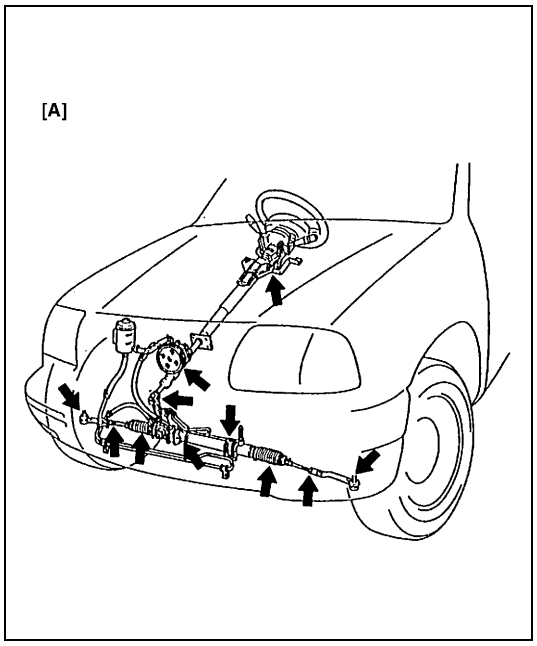
Steering system

INSPECTION



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

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



2) Check universal joints of steering shaft for rattle and damage. If rattle or damage is found, replace defective part with a new one.
3) Check steering linkage for looseness and damage. Repair or replace defective part, if any.
4) Check bolts and nuts for tightness and retighten them as necessary. Repair or replace defective parts, if any.
   Refer to table of "Tightening Torque Specification" in Section 3B (or 3B1) and 3C (or 3C1) for particular check points.
5) Check boots of steering linkage for damage (leaks, detachment, tear, dent, etc.). If damage is found, replace it with new one.
   If any dent is found on steering rack boots, correct it to original shape by turning steering wheel to the right or left as far as it stops and holding it for a few seconds.

[A] : The figure shows right-hand steering vehicle

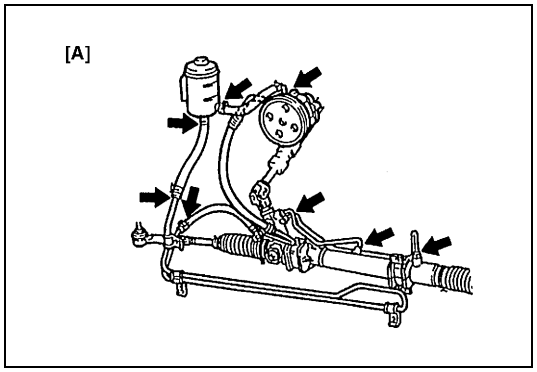
6) Check wheel alignment.

NOTE:

For details of wheel alignment, refer to "Wheel Alignment" in Section 3A.

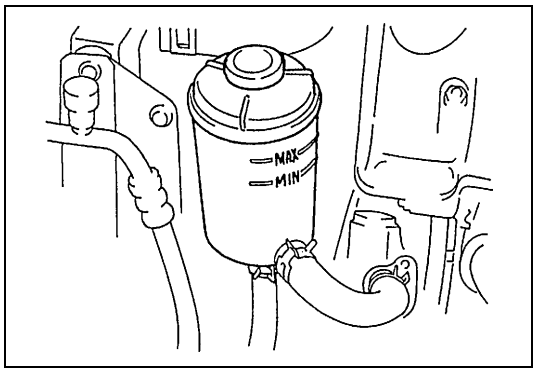
Power steering (P/S) system (if equipped)

INSPECTION



1) Visually check power steering system for fluid leakage and hose for damage and deterioration.
   Repair or replace defective parts, if any.

[A] : The figure shows right-hand steering vehicle



2) With engine stopped, check fluid level indicated on fluid tank, which should be between MAX and MIN marks. If it is lower than MIN, fill fluid up to MAX mark.

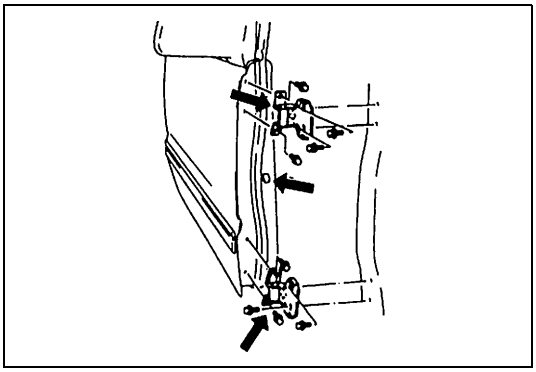
NOTE:

- **Be sure to use the specified fluid.**
- **Fluid level should be checked when fluid is cool.**

3) Visually check pump drive belt for cracks and wear.
4) Check belt for tension, referring to "Drive Belt Inspection and Replacement" in this section.
   If necessary, have belt adjusted or replaced.

All hinges, latches and locks

DOORS INSPECTION



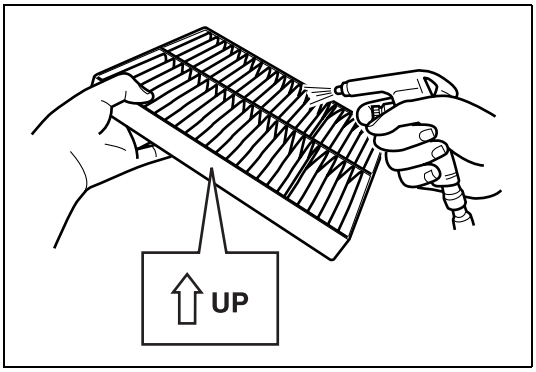
Check that each door of front, rear and back doors opens and closes smoothly and locks securely when closed.
If any malfunction is found, lubricate hinge and latch or repair door lock system.

ENGINE HOOD INSPECTION

Check that secondary latch operates properly (check that secondary latch keeps hood from opening all the way even when pulling hood release handle inside vehicle.). Also check that hood opens and closes smoothly and properly and hood locks securely when closed.
If any malfunction is found, lubricate hinge and latch, or repair hood lock system.

Air conditioning filter (if equipped)

INSPECTION



1) Remove air conditioning filter from cooling unit referring to “Air Filter Element” in Section 1B.
2) Check filter for dirt. Replace excessively dirty filter.
3) Blow off dust by compressed air from air outlet side of filter.
4) Install filter to cooling unit referring to “Air Filter Element” in Section 1B.

REPLACEMENT

Replace air conditioning filter with new one referring to “Air Filter Element” in Section 1B.

Final Inspection

WARNING:

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

SEATS

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

SEAT BELT

Inspect belt system including webbing, buckles, latch plates, retractors and anchors for damage or wear.
If "REPLACE BELT" label on front seat belt is visible, replace belt.
Check that seat belt is securely locked.

BATTERY ELECTROLYTE LEVEL CHECK

Check that the electrolyte level of all battery cells is between the upper and lower level lines on the case. If battery is equipped with built-in indicator, check battery condition by the indicator.

ACCELERATOR PEDAL OPERATION

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

ENGINE START

Check engine start for readiness.

WARNING:

Before performing the following check, be sure to have enough room around the vehicle. Then, firmly apply both the parking brake and the regular brakes. Do not use the accelerator pedal. If the engine starts, be ready to turn off the ignition promptly. Take these precautions because the vehicle could move without warning and possibly cause personal injury or property damage.

On automatic transmission vehicles, try to start the engine in each select lever position. The starting motor should crank only in "P" (Park) or "N" (Neutral).
On manual transmission vehicles, place the shift lever in "Neutral," depress clutch pedal fully and try to start.

EXHAUST SYSTEM CHECK

Check for leakage, cracks or loose supports.

CLUTCH (FOR MANUAL TRANSMISSION)

Check for the following :

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

GEARSHIFT OR SELECT LEVER (TRANSMISSION)

Check gear shift or select lever for smooth shifting to all positions and for good performance of transmission in any position.
With automatic transmission equipped vehicle, also check that shift indicator indicates properly according to which position select lever is shifted to.
With automatic transmission equipped vehicle, make sure that vehicle is at complete stop when shifting select lever to “P” range position and release all brakes.

BRAKE

[Foot brake]
Check the following :

- that brake pedal has proper travel,
- that brake works properly,
- that it is free from noise,
- that braking force is applied equally on all wheels,
- and that brake do not drag.

[Parking brake]
Check that lever has proper travel.

WARNING:
With vehicle parked on a fairly steep slope, make sure nothing is in the way downhill to avoid any personal injury or property damage. Be prepared to apply regular brake quickly even if vehicle should start to move.

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

STEERING

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

ENGINE

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

BODY, WHEELS AND POWER TRANSMITTING SYSTEM

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

METERS AND GAUGE

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

LIGHTS

Check that all lights operate properly.

WINDSHIELD DEFROSTER

Periodically check that air comes out from defroster outlet when operating heater or air conditioning.
Set air flow selector to “DEF” position and set blower speed selector to “MAX” position for this check.

Recommended Fluids and Lubricants

Engine oil	SG, SH, SJ or SL (Refer to engine oil viscosity chart in “Engine Oil and Oil Filter” of this section.)
Engine coolant (Ethylene glycol base coolant)	“Antifreeze/Anticorrosion coolant”
Brake fluid	DOT 3
Manual transmission oil	Refer to “Transmission Gear Oil” in Section 7A, 7A1 or 7D.
Transfer oil	
Differential oil (front & rear)	Refer to “Gear Oil Change” in Section 7E or 7F.
Automatic transmission fluid	Refer to “Fluid Change” in Section 7B1.
Power steering fluid	Refer to “Required Service Material” in Section 3B1.
Door hinges	Engine oil or water resistance chassis grease
Hood latch assembly	
Key lock cylinder	Spray lubricant

SECTION 1A

HEATER AND VENTILATION

WARNING:

For vehicles equipped with Supplement Restraint (Air Bag) System

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in Section 10B in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in Section 10B before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either or these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

NOTE:

The link mechanism of the heater varies depending on the specifications.

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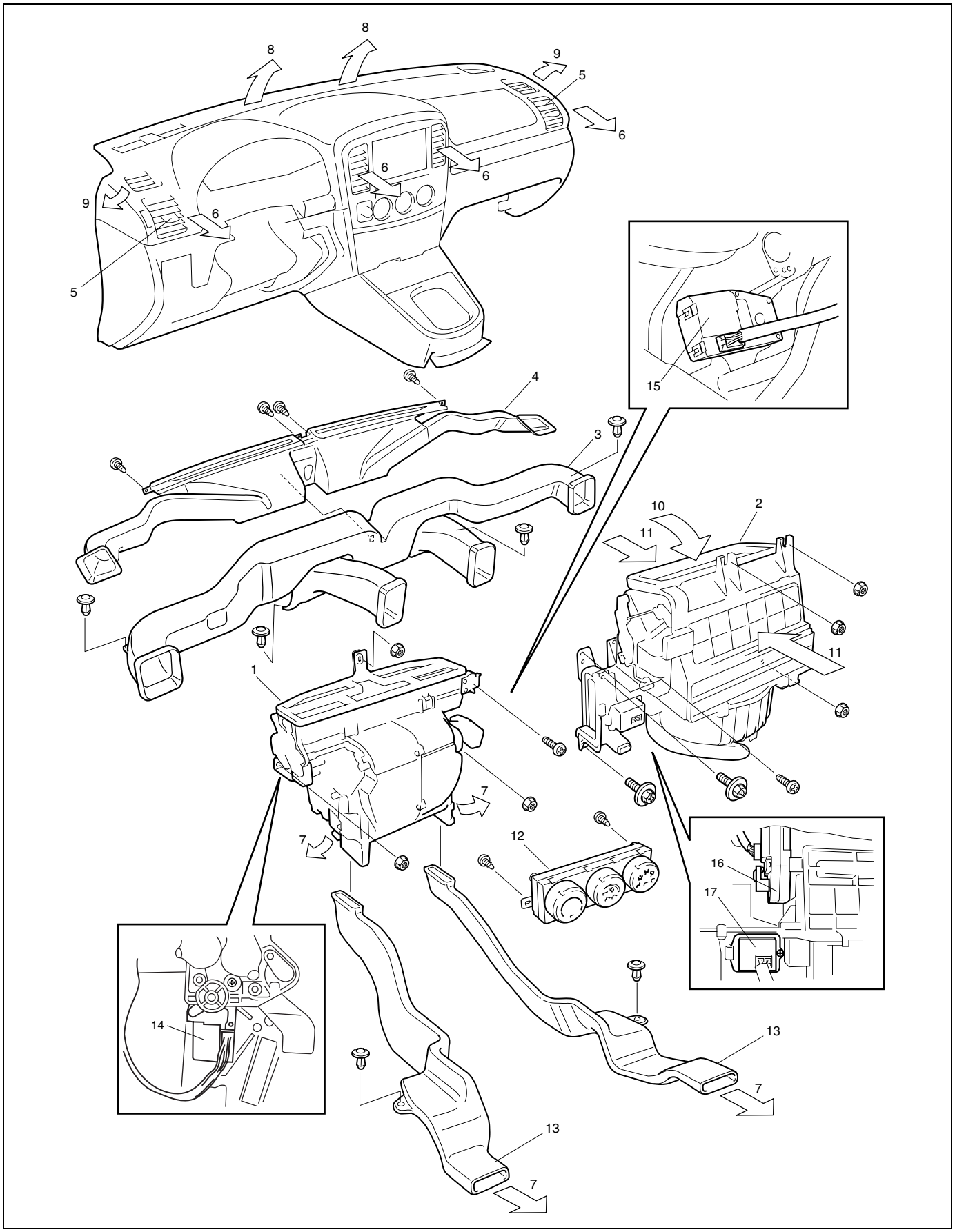
OTHER THAN CANVAS TOP MODEL

General Description

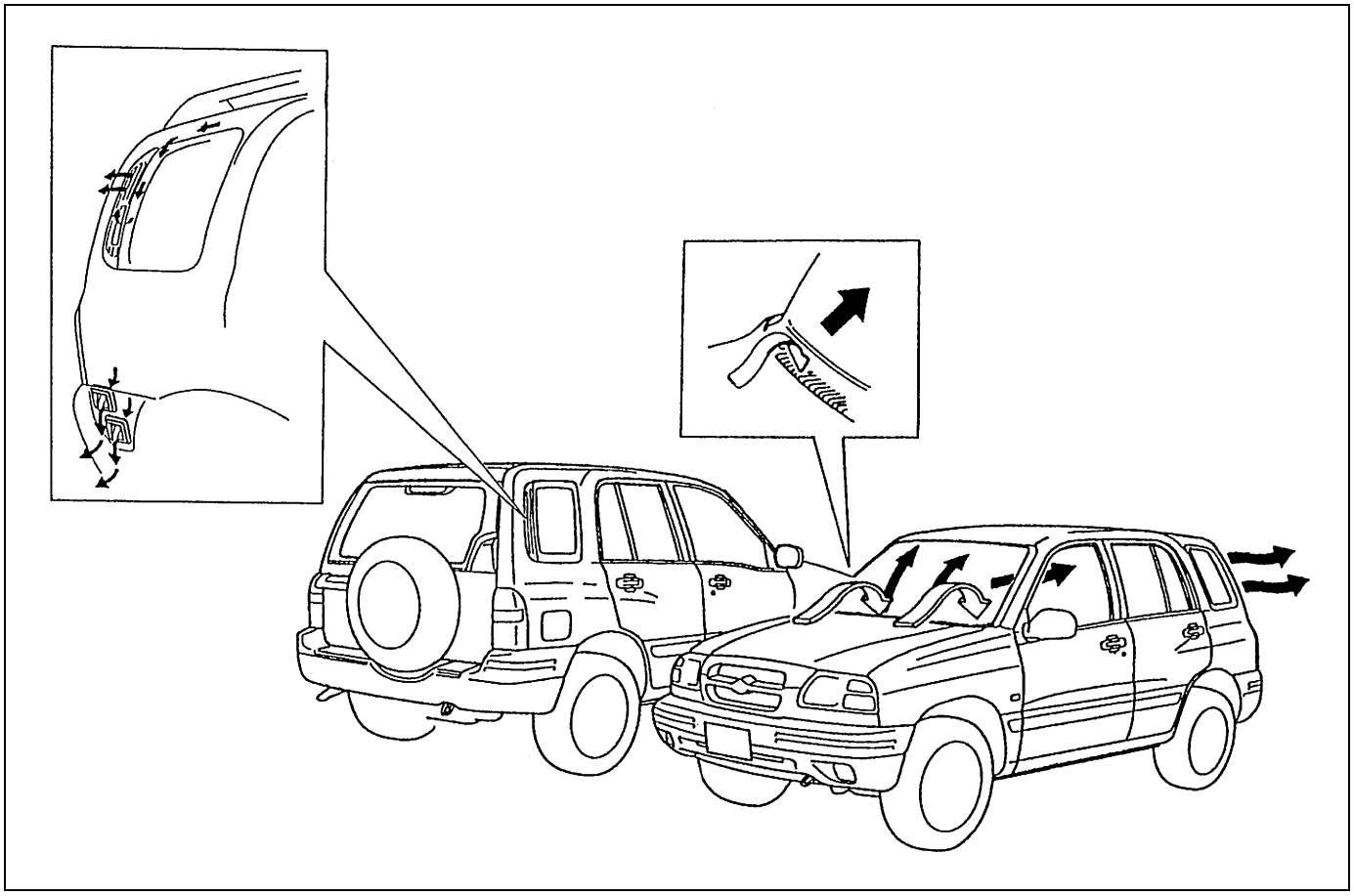
The heater, an in and out air selectable-type hot water heater, is so constructed that it is possible to assure an agreeable ventilation at all times by providing the ventilator air outlets at the center and both sides (right and left) of the instrument panel, the hot air outlet at a place close to the feet of front passengers, and the defroster air outlets at places, right and left, along the windshield glass. The heater and ventilation consist of the following parts.



1. Heater unit	4. Defroster duct	7. Foot air	10. Fresh air	13. Rear duct	16. Air intake actuator
2. Blower unit	5. Ventilation louver	8. Defroster air	11. Recirculation air	14. Air flow control actuator	17. Blower motor controller
3. Ventilator duct	6. Ventilation air	9. Demister air	12. HVAC control module	15. Temperature control actuator	

Body Ventilation

The body ventilation system of this vehicle has a fresh air intake located at the cowl top panel. When fresh air intake control lever is at “FRESH AIR” position, ventilating air is drawn into the interior from the cowl center garnish and drawn out from the ventilator outlet provided at each side body outer panel (both right and left side).



Diagnosis

Diagnosis Table

Condition	Possible Cause	Correction
Blower won’t work even when blower speed selector is ON	Blower fuse blown	Replace fuse to check for short.
	Blower motor faulty	Check blower motor referring to “Blower Motor” in this section.
	Blower motor relay faulty	Check relay referring to “Blower Motor Relay” in this section.
	Blower motor controller faulty	Check blower motor controller referring to “Blower Motor Controller” in this section.
	Blower speed selector faulty	Check HVAC control module referring to “HVAC Control Module and Its Circuits” in this section.
	Wiring or grounding faulty	Repair as necessary.

Condition	Possible Cause	Correction
Air temperature is not changed even when temperature selector is changed	Air damper broken	Repair damper.
	Heater hoses leaking or clogged	Replace hoses.
	Heater core leaking or clogged	Replace heater core referring to "Heater Unit" in this section.
	Temperature control actuator faulty	Check temperature control actuator referring to "Temperature Control Actuator" in this section.
	Temperature selector faulty	Check HVAC control module referring to "HVAC Control Module and Its Circuits" in this section.
Air outlet port is not changed when air flow selector is changed	Air damper broken	Repair damper.
	Air flow control actuator faulty	Check air flow control actuator referring to "Air Flow Control Actuator" in this section.
	Air flow selector faulty	Check HVAC control module referring to "HVAC Control Module and Its Circuits" in this section.

Wiring Circuit

Refer to "Wiring Circuit" in Section 1B.

HVAC Diagnosis

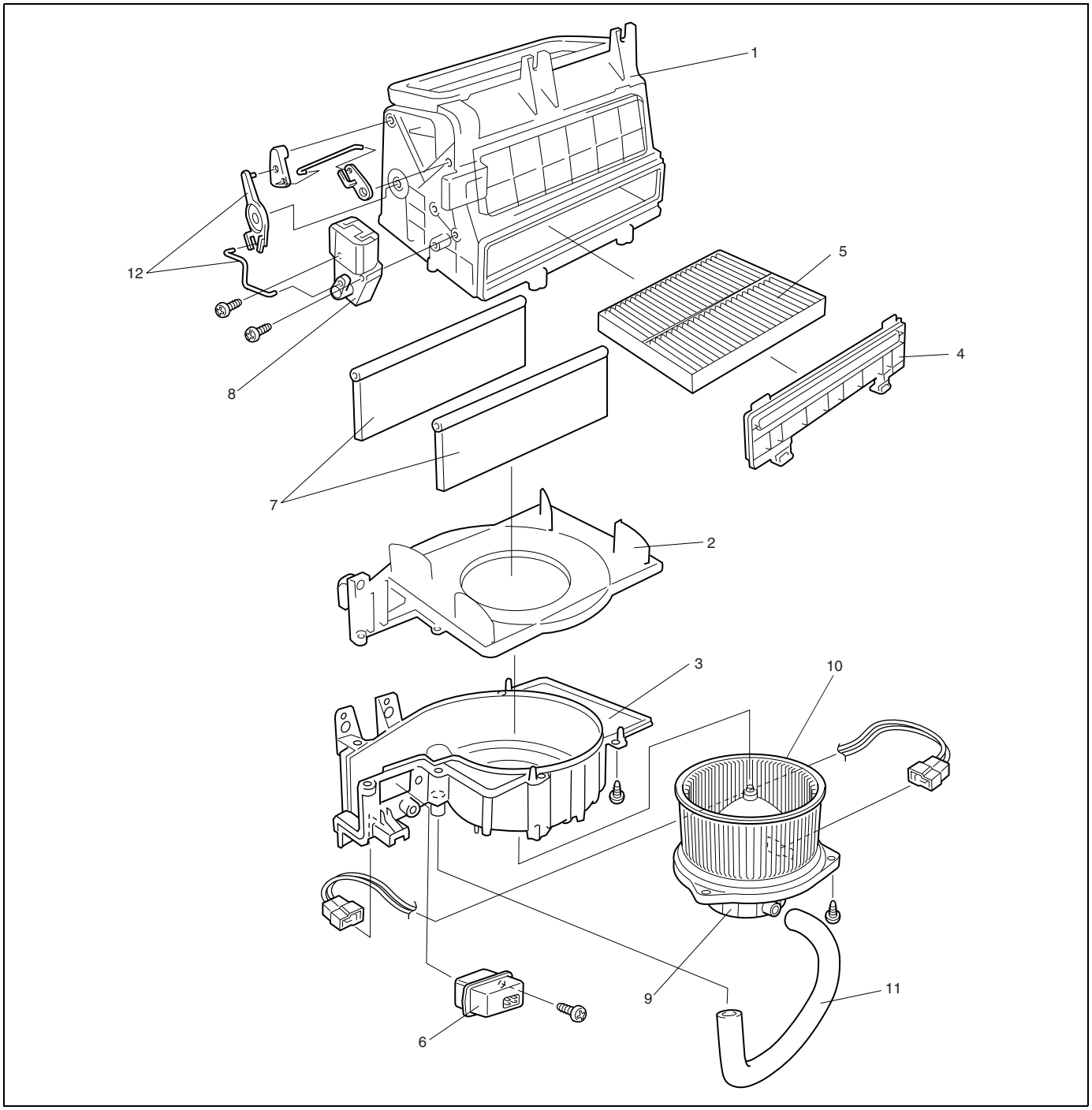
Refer to "HVAC Diagnosis " in Section 1 B.

NOTE:

- **For vehicles with air conditioning system, on-board diagnosis by using SUZUKI scan tool or A/C switch of HVAC control module is available.**
  However, for vehicles without air conditioning system, only SUZUKI scan tool can be used for on-board diagnosis because A/C switch is not on HVAC control module.
- **For vehicles without air conditioning system, when checking if there is any DTC by using SUZUKI scan tool, DTC No.1503 (A/C Evaporator Temperature Sensor and its Circuit Malfunction) is displayed on SUZUKI scan tool. Disregard the DTC because the sensor is not equipped for vehicles without air conditioning system.**

On-Vehicle Service

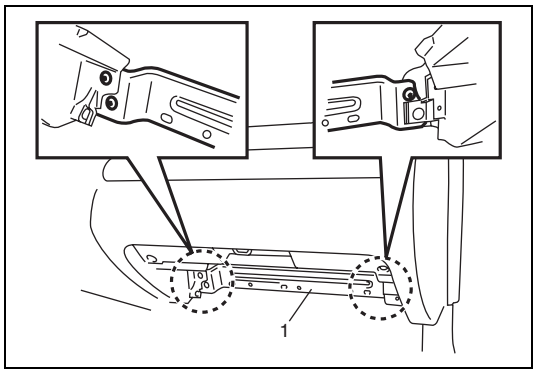
Blower Unit



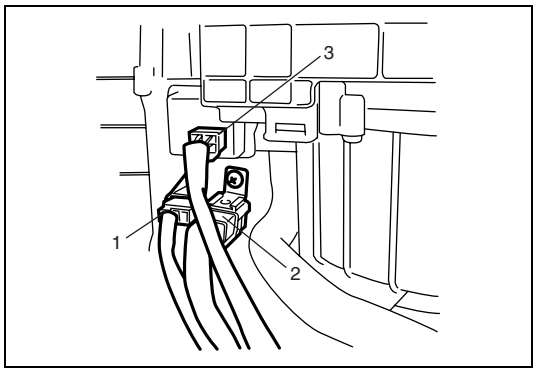
1. Air intake case	4. Air filter cover	7. Air intake door	10. Blower fan
2. Upper scroll	5. Air filter	8. Air intake actuator	11. Air hose
3. Lower scroll	6. Blower motor controller	9. Blower motor	12. Levers and rods

REMOVAL

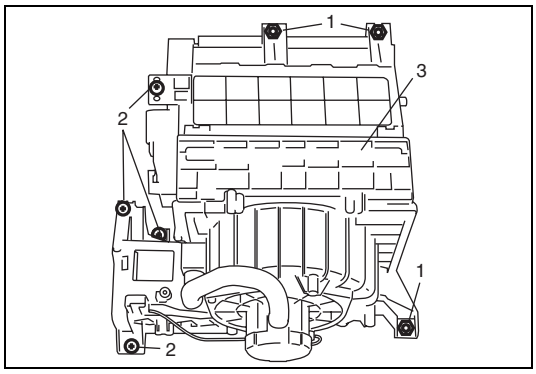
1) Disconnect negative (–) cable at battery.
2) Disable air bag system (if equipped) referring to “Disabling Air Bag System” in Section 10B.
3) Open glove box, then remove screw and damper located on the right side of the glove box.
4) Remove glove box.



5) Remove passenger lower member (1).



6) Remove ECM (PCM) with bracket from blower unit.
7) Disconnect blower motor lead wire (1), blower motor relay lead wire (2) and blower motor controller lead wire (3) at couplers.



8) Disconnect air intake actuator coupler.
9) Remove fastening nuts (1) and screw (2), and then remove blower unit (3).

INSTALLATION

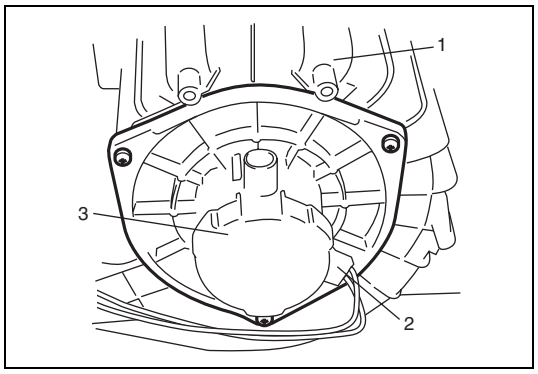
Reverse removal procedure for installation noting the following:

- Enable air bag system (if equipped) referring to “Enabling Air Bag System” in Section 10B.

Blower Motor

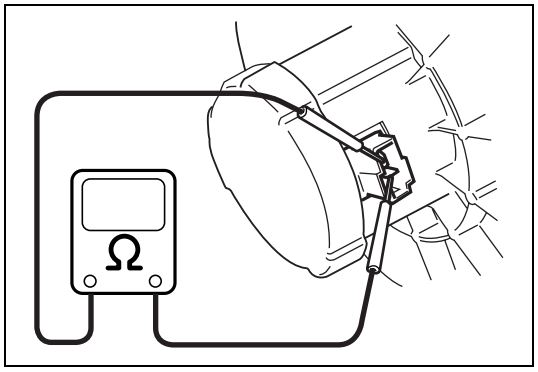
REMOVAL

1) Disconnect negative (–) cable at battery.
2) Disable air bag system (if equipped) referring to “Disabling Air Bag System” in Section 10B.
3) Remove ECM (PCM) with bracket from blower unit.

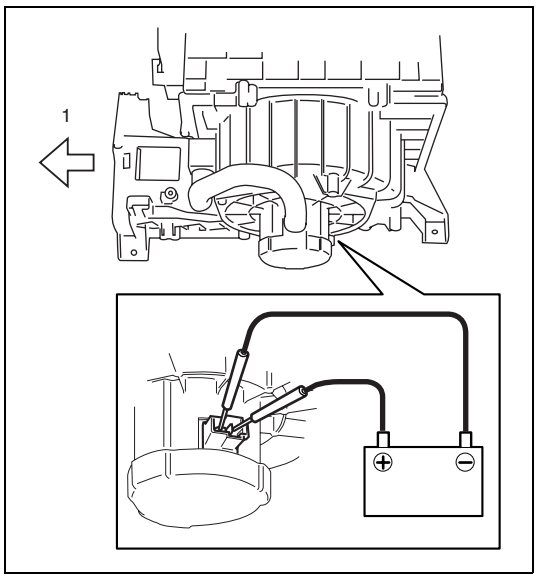


4) Disconnect blower motor lead wire (2) at coupler.
5) Remove blower motor (3) from blower unit (1).

INSPECTION



- Check for continuity between terminal to terminal as shown in the figure. If check result is good, proceed to next operation check. If not, replace.



- Connect battery to blower motor as shown, then check if the blower motor operates smoothly.

Blower motor specification: 18 – 24 A at 12 V

1. Air flow

INSTALLATION

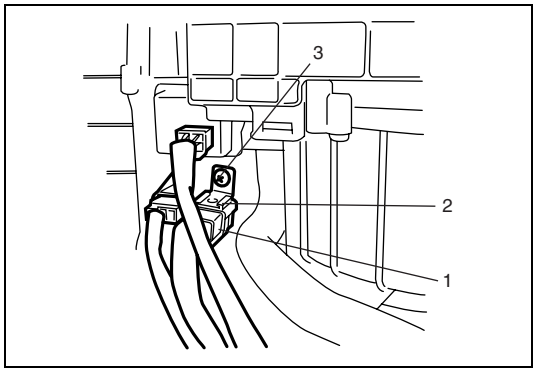
Reverse removal procedure for installation noting the following:

- Enable air bag system (if equipped) referring to “Enabling Air Bag System” in Section 10B.

Blower Motor Relay

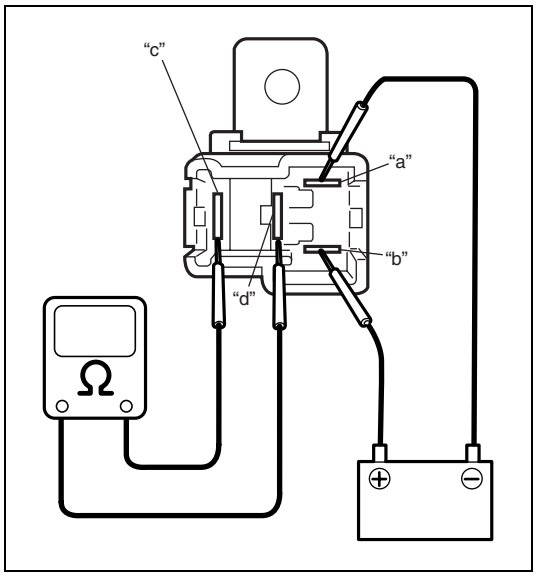
REMOVAL

1) Disconnect negative (–) cable at battery.
2) Disable air bag system (if equipped) referring to “Disabling Air Bag System” in Section 10B.
3) Open glove box, then remove screw.
4) Remove glove box.



5) Disconnect relay coupler (1).
6) Remove blower motor relay (2) by loosening its fastening screw (3).

INSPECTION



1) Connect battery positive terminal to terminal “a” and battery negative terminal to terminal “b”.
2) Check for continuity between terminal “c” and “d”. If there is no continuity, replace relay.

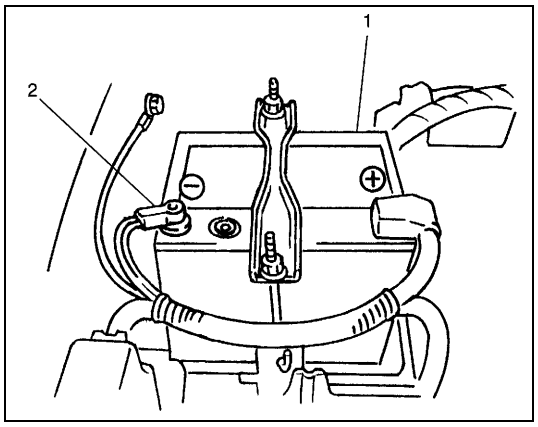
INSTALLATION

Reverse removal procedure for installation noting the following:

- Enable air bag system (if equipped) referring to “Enabling Air Bag System” in Section 10B.

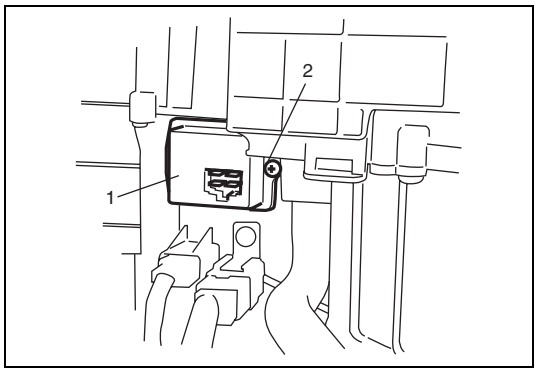
Blower Motor Controller

REMOVAL



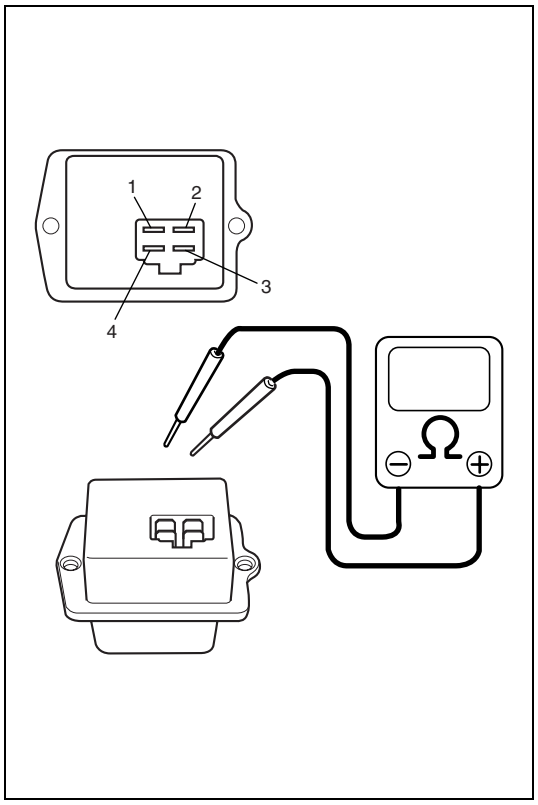
1) Disconnect negative (–) cable (2) at battery (1).
2) Disable air bag system (if equipped) referring to "Disabling Air Bag System" in Section 10B.

3) Open glove box, then remove screw and damper located on the right side of the glove box.
4) Remove glove box.



5) Remove ECM (PCM) with bracket from blower motor unit.
6) Disconnect blower motor controller coupler.
7) Remove blower motor controller (1) by loosening its fastening screw (2).

INSPECTION



Measure each terminal-to-terminal resistance on blower motor controller.

Blower motor controller specification

Terminal		Resistance (Ω)
+ Wire	– Wire	
4	2	Continuity
4	3	Approx. 10.18
2	4	No Continuity
2	3	No Continuity
3	4	Approx. 10.18
3	2	Continuity

If measured resistance is incorrect, replace blower motor controller with new one.

INSTALLATION

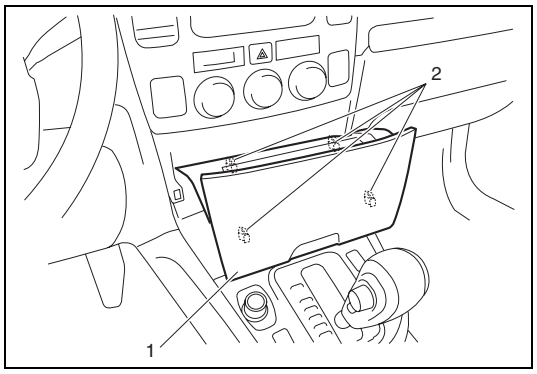
Reverse removal procedure for installation noting the following:

- Enable air bag system (if equipped) referring to "Enabling Air Bag System" in Section 10B.

HVAC Control Module

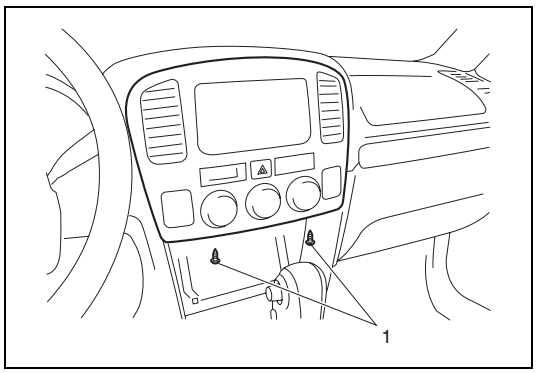
REMOVAL

1) Disconnect negative (–) cable at battery.
2) Disable air bag system (if equipped) referring to “Disabling Air Bag System” in Section 10B.

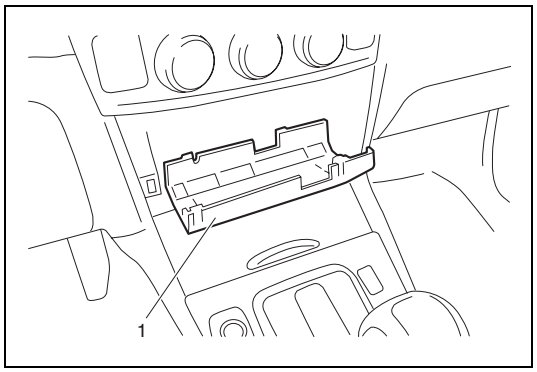


3) Remove center lower garnish (1).

2. Clip

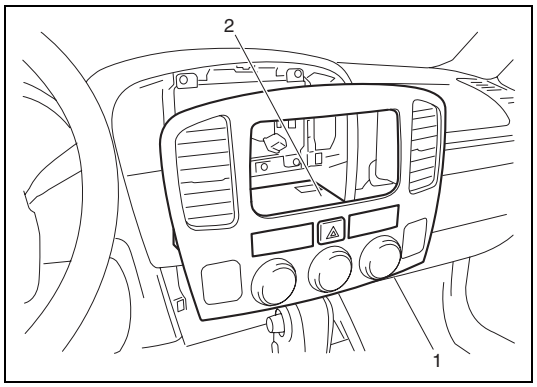


4) Remove center garnish mounting screw (1) and the pull off center garnish.

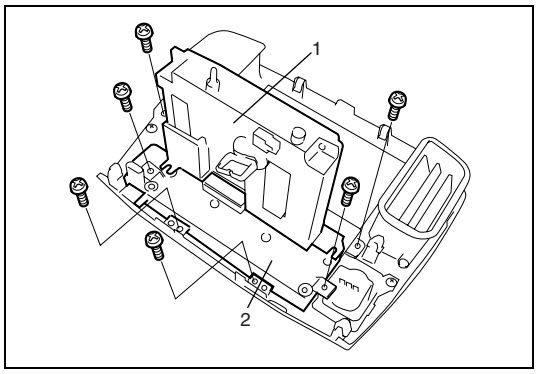


5) Remove controller cover (1).

6) Disconnect five BCM connectors and a HVAC control module connector from each controller.

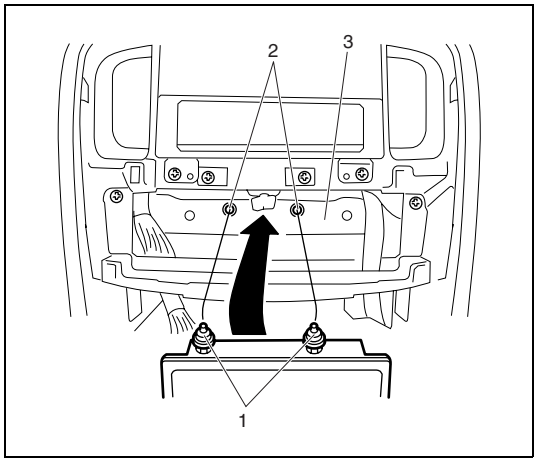


7) Remove center garnish (1) with BCM (2) and HVAC control module.



8) Remove body control module (1), and then HVAC control module (2) as shown.

INSTALLATION



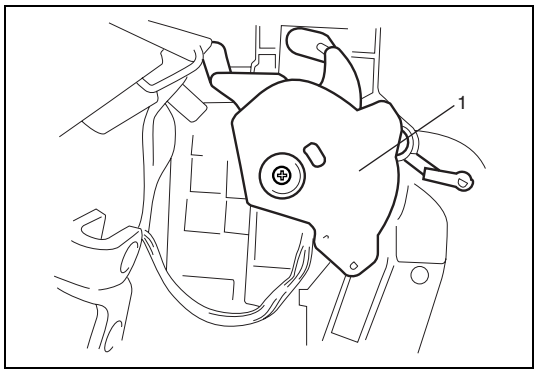
1) Install in reverse order of removal procedure, noting the following item.
   - When installing center garnish, align rubber bushing (1) with BCM installation hole (2) of instrument panel member (3).

2) Enable air bag system (if equipped) referring to “Enabling Air Bag System” Section 10B.

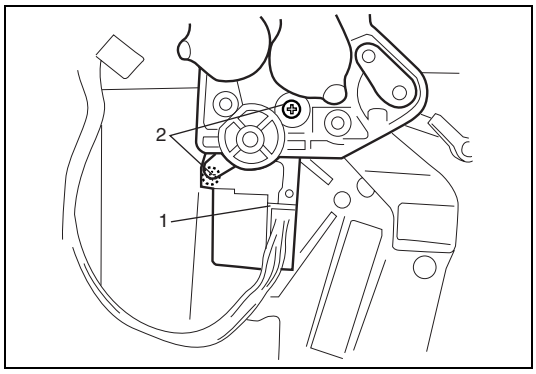
Air Flow Control Actuator

REMOVAL

1) Disconnect negative (–) cable at battery.
2) Disable air bag system (if equipped) referring to “Disabling Air Bag System” in Section 10B.
3) Remove instrument panel referring to “Instrument Panel” in Section 9.

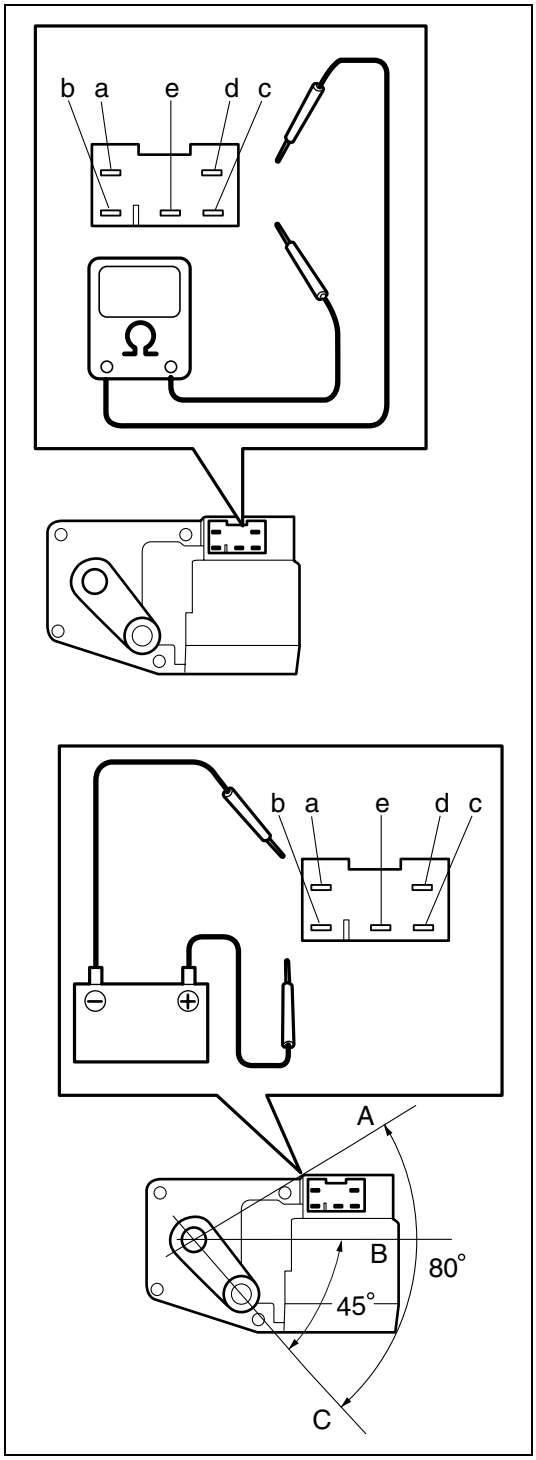


4) Disconnect air flow control actuator linkage (1) from heater unit.



5) Disconnect air flow control actuator coupler (1).
6) Remove air flow control actuator from heater unit by removing its mounting screw (2).

INSPECTION



1) Check resistance between terminals.

Air flow control actuator resistance
Terminal "d" and "e" (DEF position): Approx. 250 – 350 Ω
Terminal "c" and "d" (DEF position): Approx. 2.6 Ω
Terminal "d" and "e" (VENT position): Approx. 2.6 Ω
Terminal "c" and "d" (VENT position): Approx. 250 – 350 Ω

2) Connect battery positive (+) terminal to terminal "b" and battery negative (–) terminal to terminal "a". Check if position of air flow control actuator changes VENT to DEF.
3) Connect battery positive (+) terminal to terminal "a" and battery negative (–) terminal to terminal "b". Check if position of air flow control actuator changes DEF to VENT.

If malfunction is found, replace air flow control actuator with new one.

A: VENT
B: FOOT
C: DEF

INSTALLATION

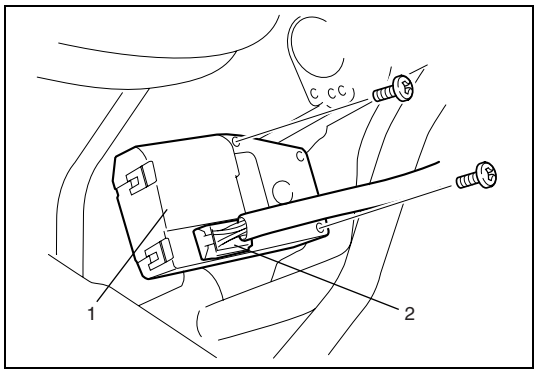
Reverse removal procedure for installation noting the following:

- If equipped with air bag, enable air bag system referring to "Enable Air Bag System" in Section 10B.

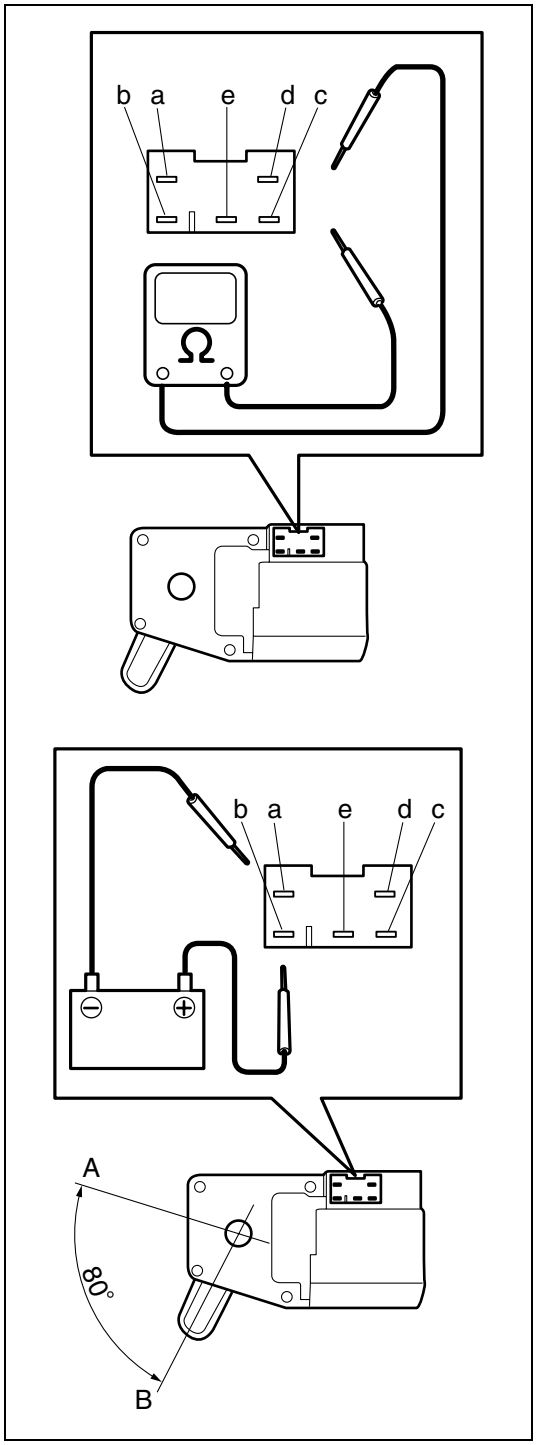
Temperature Control Actuator

REMOVAL

1) Disconnect negative (–) cable at battery.
2) Disable air bag system (if equipped) referring to "Disabling Air Bag System" in Section 10B.
3) Remove glove box.
4) Remove temperature control actuator connector (2).
5) Remove temperature control actuator (1) from heater unit.



INSPECTION



1) Check resistance between terminals.

Temperature control actuator resistance
Terminal "d" and "e" (max cold position): Approx. 150 – 250 Ω
Terminal "c" and "d" (max cold position): Approx. 2.6 Ω
Terminal "d" and "e" (max hot position): Approx. 2.6 Ω
Terminal "c" and "d" (max hot position): Approx. 150 – 250 Ω

2) Connect battery positive (+) terminal to terminal "b" and battery negative (–) terminal to terminal "a". Check if position of temperature control actuator changes COLD to HOT.
3) Connect battery positive (+) terminal to terminal "a" and battery negative (–) terminal to terminal "b". Check if position of temperature control actuator changes HOT to COLD.

If malfunction is found, replace temperature control actuator with new one.

A: Max cold
B: Max hot

INSTALLATION

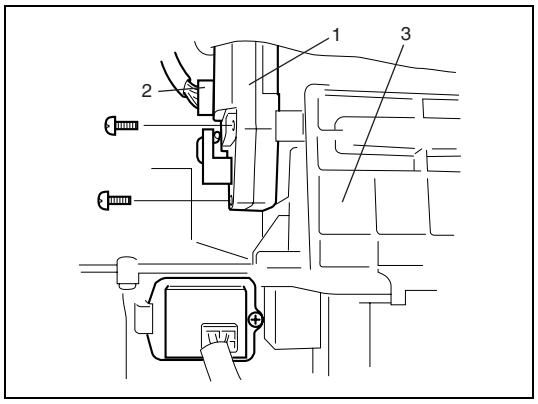
Reverse removal procedure for installation noting the following:

- If equipped with air bag, enable air bag system referring to "Enabling Air Bag System" in Section 10B.

Air Intake Actuator

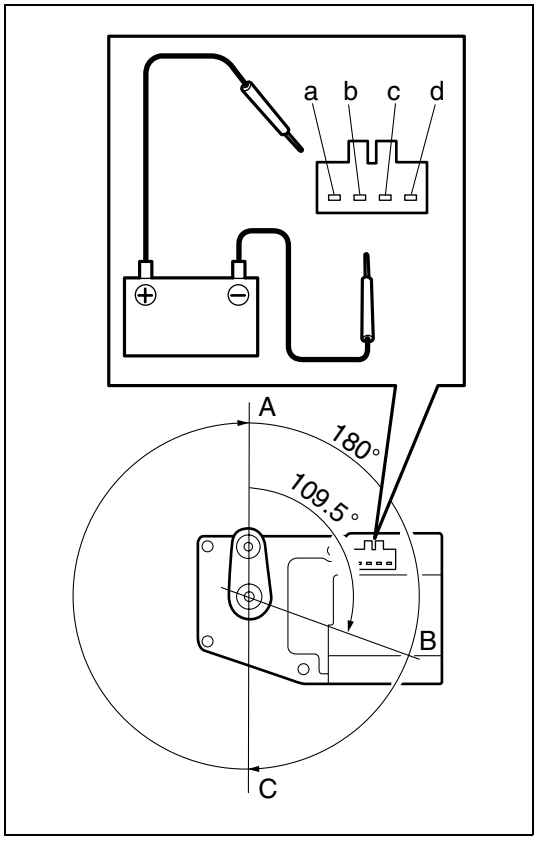
REMOVAL

1) Disconnect negative (–) cable at battery.
2) If equipped with air bag system, disable air bag system referring to “Disabling Air Bag System” in Section 10B.
3) Remove glove box.



4) Remove air intake actuator connector (2).
5) Remove air intake actuator (1) from blower unit (3).

INSPECTION



1) Connect battery positive (+) terminal to terminal “a” and battery negative (–) terminal to terminal “c”. Check if position of air intake actuator is REC.
2) Connect battery positive (+) terminal to terminal “a” and battery negative (–) terminal to terminal “b”. Check if position of air intake actuator is MIX.
3) Connect battery positive (+) terminal to terminal “a” and battery negative (–) terminal to terminal “d”. Check if position of air intake actuator is FRESH.

If malfunction is found, replace air intake actuator with new one.

A: REC
B: MIX
C: FRESH

INSTALLATION

Reverse removal procedure for installation noting the following:

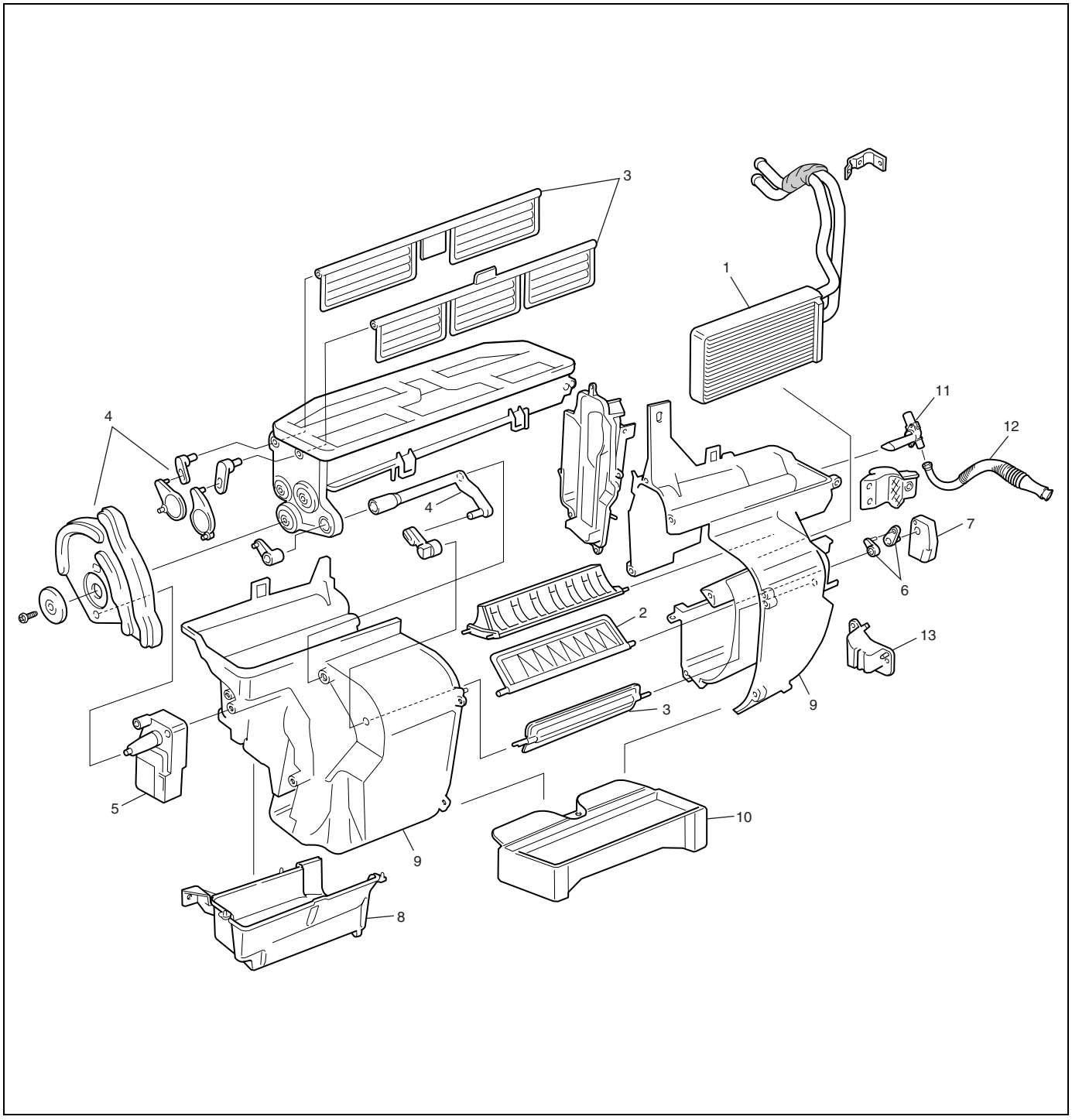
- If equipped with air bag system, enable air bag system referring to “Enabling Air Bag System” in Section 10B.

Actuator Linkage Assembly

INSPECTION

1) Remove air flow control actuator referring to “Air Flow Control Actuator” in this section.
2) Remove temperature control actuator referring to “Temperature Control Actuator” in this section.
3) Remove air intake actuator referring to “Air Intake Actuator” in this section.
4) Check if actuator linkage assembly is deformed and operates smoothly. If deformed and/or not smooth, repair actuator linkage assembly.

Heater Unit



1. Heater core	6. Temperature control link assembly	11. Aspirator (for automatic air conditioning system)
2. Temperature control door	7. Temperature control actuator	12. Aspirator hose (for automatic air conditioning system)
3. Air flow control door	8. Heater lower case	13. Heater core bracket
4. Air flow control link assembly	9. Heater upper case	
5. Air flow control actuator	10. Foot air duct	

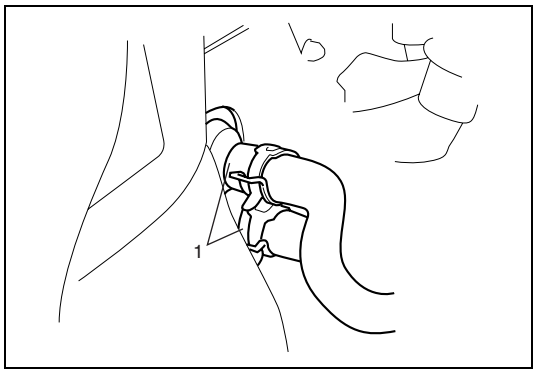
REMOVAL

WARNING:

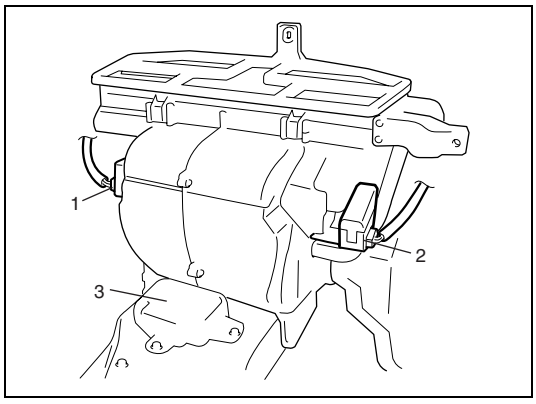
Failure to follow the following procedure and WARNING may cause air bag deployment, personal injury, damage to parts, or air bag being unable to deploy.

- **Never rest a steering column assembly on steering wheel with air bag (inflator) module face down and column vertical.**
- **When handling the air bag (inflator) modules (driver and passenger), be careful not to drop it or apply an impact to it. If an excessive impact was applied (e.g., dropped from a height of 91.4 cm (3 feet) or more, never attempt disassembly or repair but replace it with a new one.**
- **When grease, cleaning agent. Oil, water, etc. has got onto air bag (inflator) modules (driver and passenger), wipe off immediately with a dry cloth.**

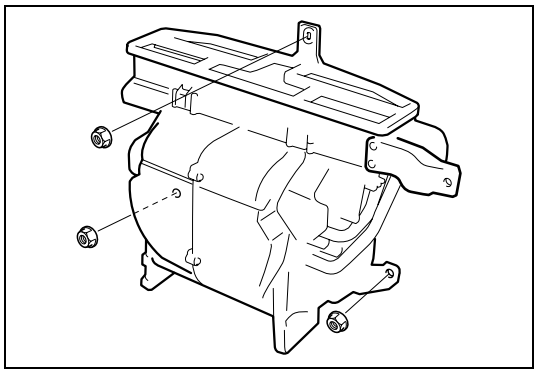
1) Disconnect negative (–) cable at battery.
2) Disable air bag system (if equipped) referring to “Disabling Air Bag System” in Section 10B.



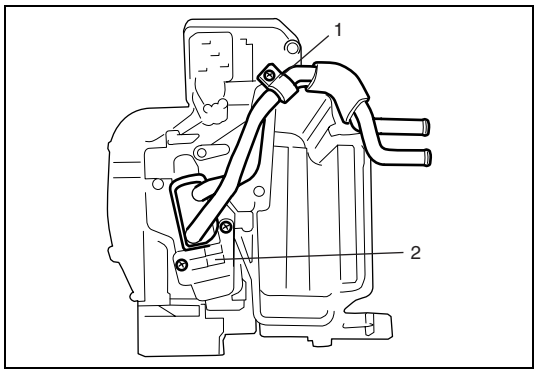
3) Drain engine coolant and disconnect heater hoses (1) from heater unit.
4) Remove instrument panel referring to “Instrument Panel” in Section 9.
5) Remove blower unit referring to “Blower Unit” in this section.



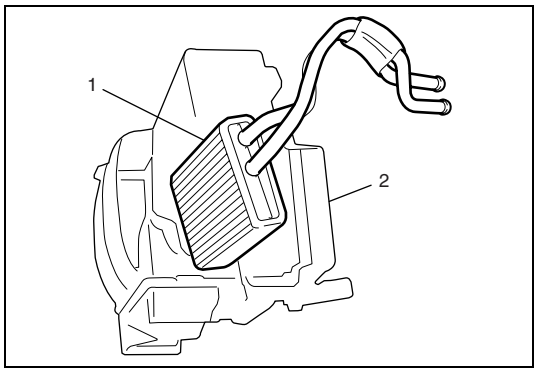
6) Disconnect rear duct from heater unit.
7) Disconnect air flow control actuator lead wire (1) at coupler and temperature control actuator lead wire (2) at coupler.
8) Remove SDM (3) (If equipped).



9) Remove heater unit (1).
10) Remove temperature control actuator from heater unit.



11) Remove heater core pipe clamp (1) and heater core bracket (2).



12) Pull out heater core (1) from heater unit (2).

INSTALLATION

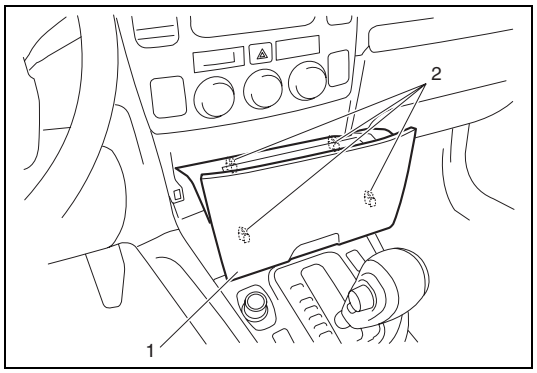
Install heater unit by reversing removal procedure, noting the following items.

- When installing each part, be careful not to catch any cable or wiring harness.
- When installing steering column assembly, refer to “Steering Column Installation” in Section 3C or 3C1.
- Fill engine coolant to radiator.
- Enable air bag system (if equipped) referring to “Enabling Air Bag System” in Section 10B.

Center Ventilation Louver

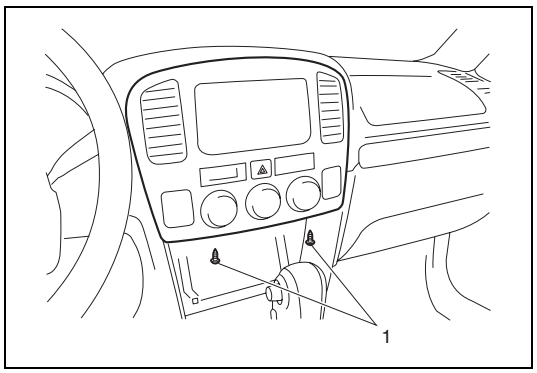
REMOVAL

1) Disconnect negative (–) cable at battery.
2) Disable air bag system (if equipped) referring to “Disabling Air Bag System” in Section 10B.

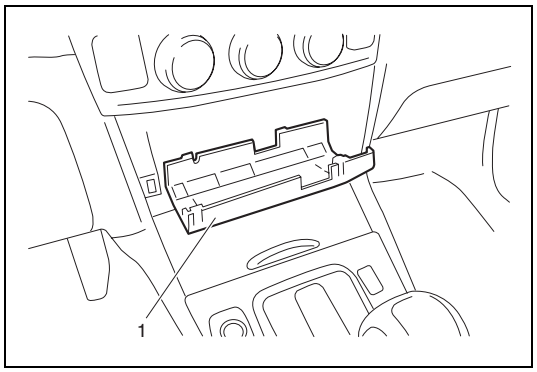


3) Remove center lower garnish (1).

2. Clip

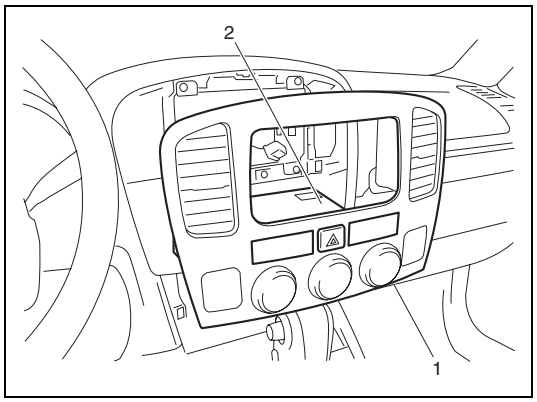


4) Remove center garnish mounting screw (1) and then pull off center garnish.

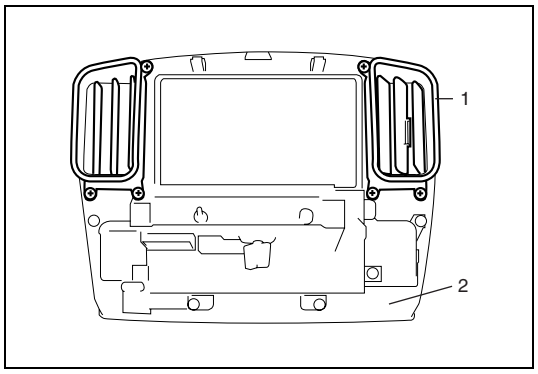


5) Remove controller cover (1).

6) Disconnect five BCM connectors and a HVAC control module connector from each controller.

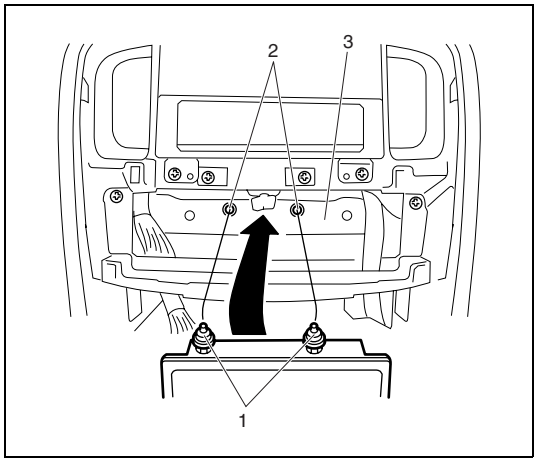


7) Remove center garnish (1) with BCM (2) and HVAC control module.



8) Remove center ventilation louver (1) from center garnish (2).

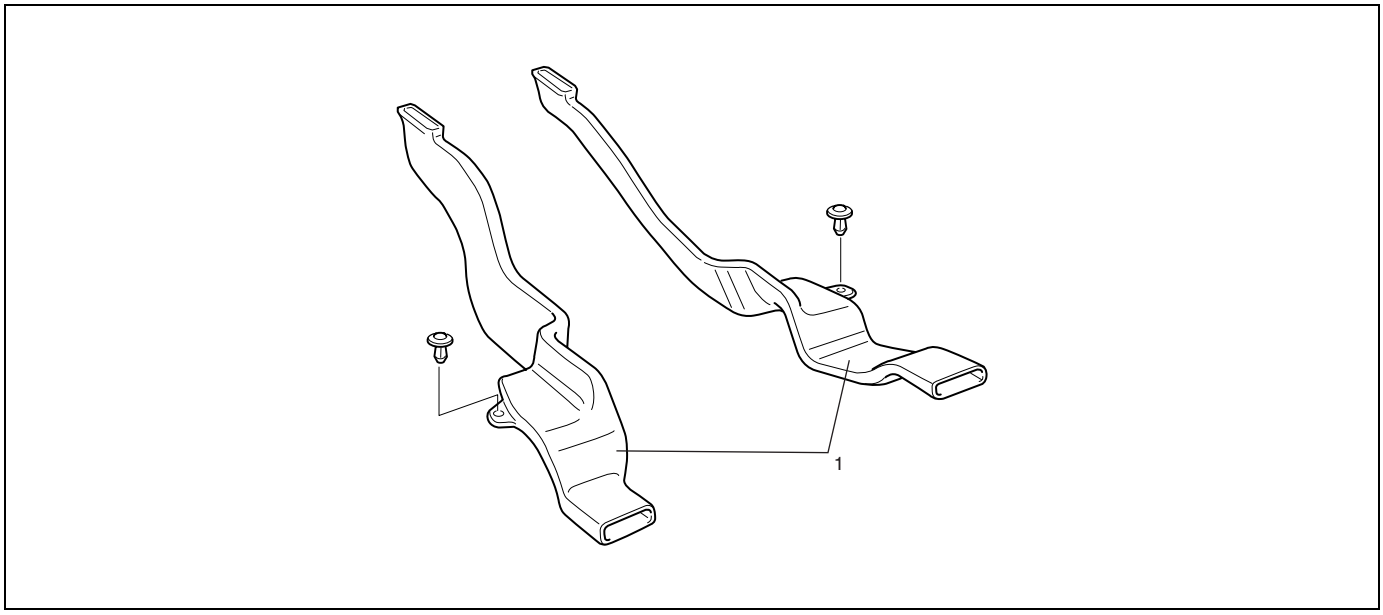
INSTALLATION



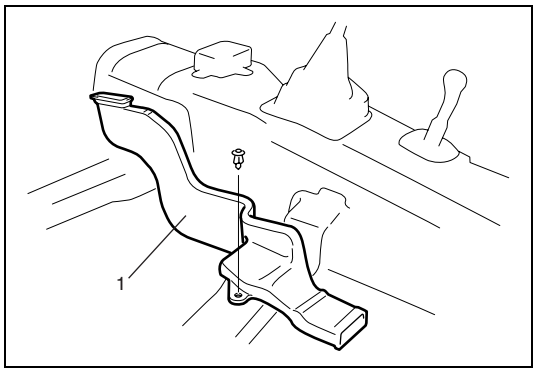
1) Install in reverse order of removal procedure noting the following item.
   - When installing center garnish, align rubber bushing (1) with BCM installation hole (2) of instrument panel member (3).

2) Enable air bag system (if equipped) referring to “Enabling Air Bag System” in Section 10B.

Rear Duct



1. Rear duct



REMOVAL

1) Disconnect negative (–) cable at battery.
2) Remove front seats.
3) Remove console box.
4) Take off carpet till rear duct is totally exposed.
5) Remove rear duct (1).

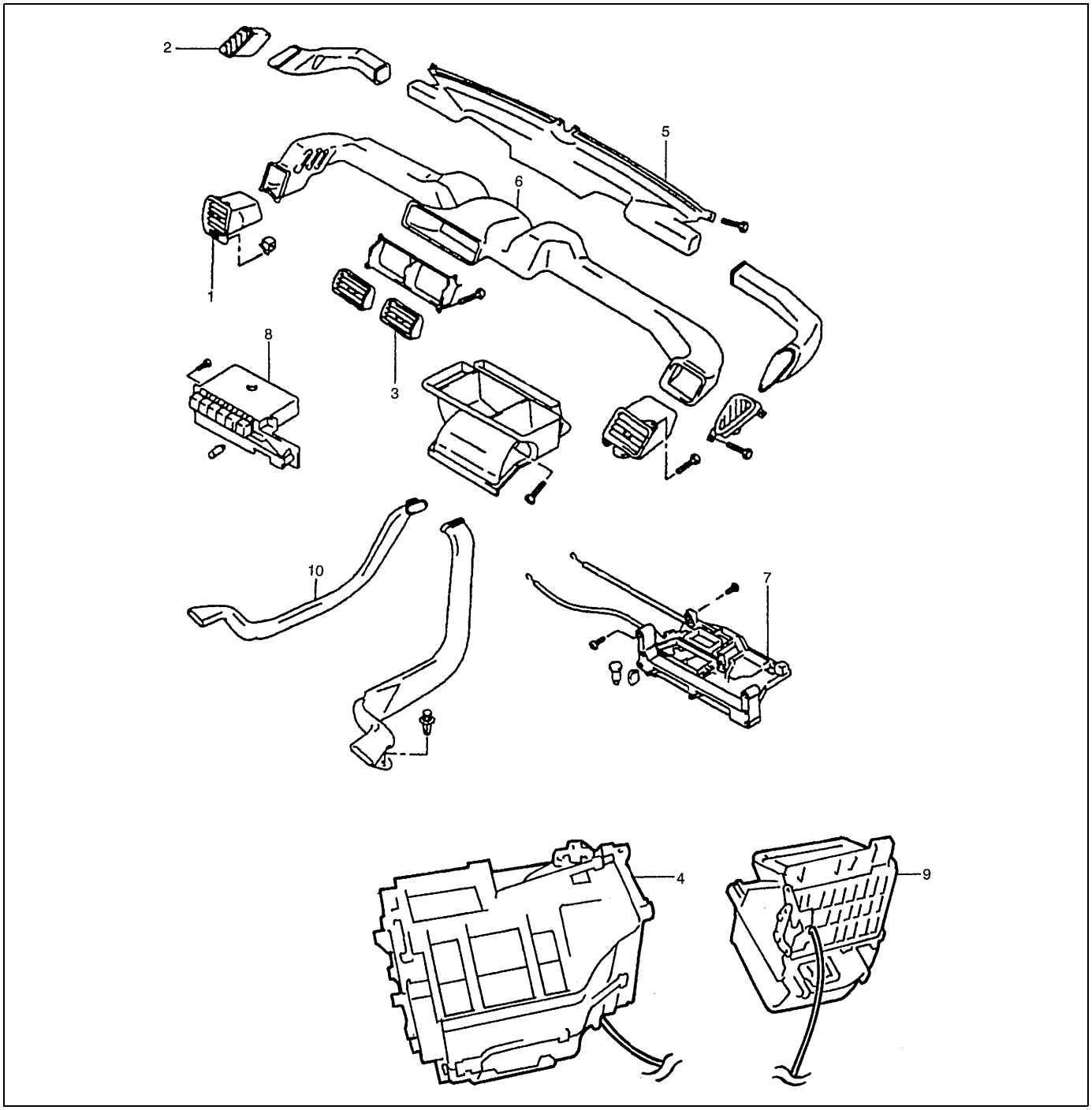
INSTALLATION

Reverse removal sequence to install rear duct.

CANVAS TOP MODEL

General Description

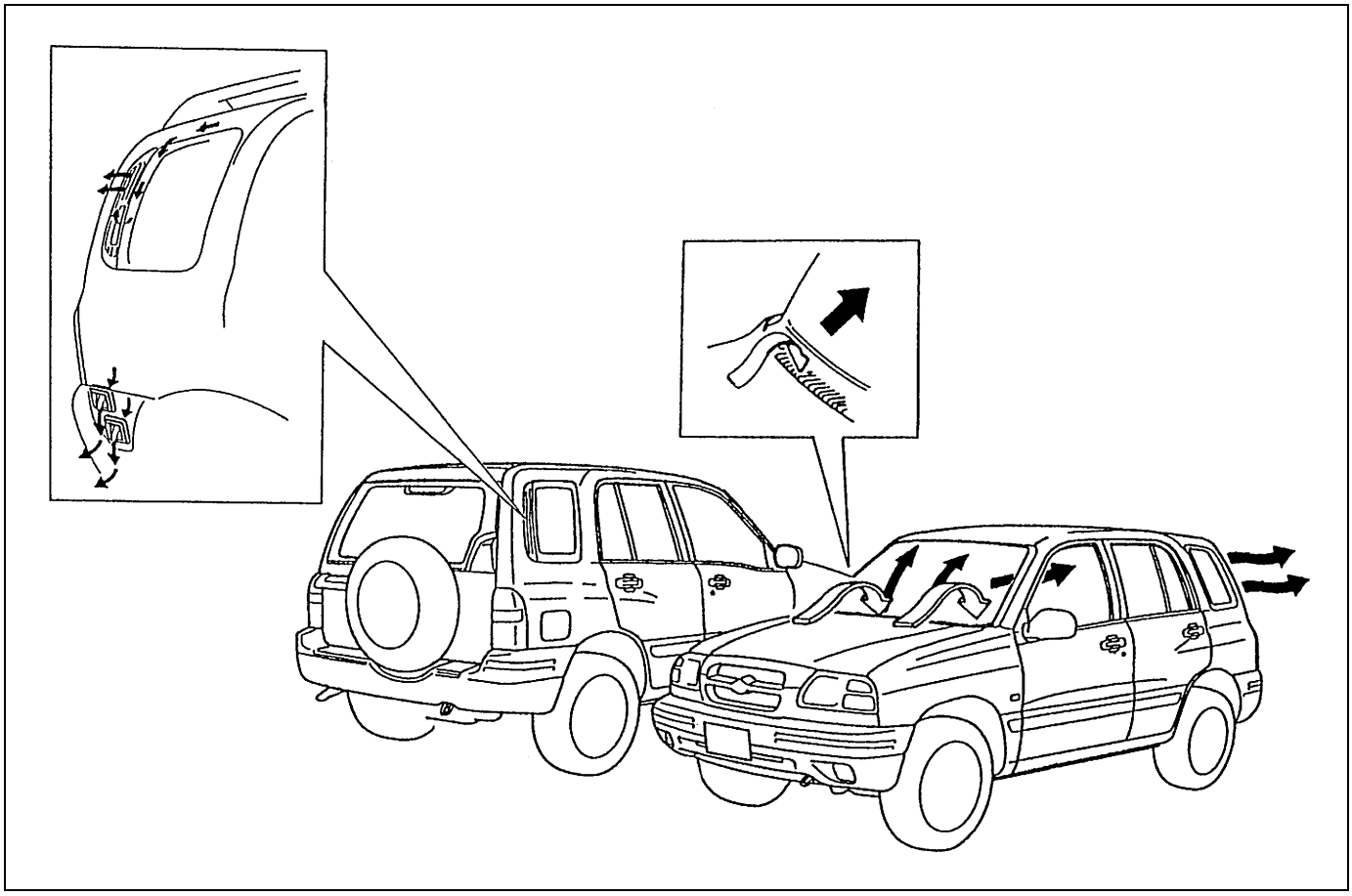
The heater, an in and out air selectable-type hot water heater, is so constructed that it is possible to assure an agreeable ventilation at all times by providing the ventilator air outlets at the center and both sides (right and left) of the instrument panel, the hot air outlet at a place close to the feet of front passengers, and the defroster air outlets at places, right and left, along the windshield glass.
The heater and ventilation consist of following parts.



1. Side ventilator outlet	4. Heater unit	7. Heater control lever assembly	10. Rear duct
2. Side defroster outlet	5. Defroster duct	8. Heater mode control switch	
3. Center ventilator outlet	6. Ventilator duct	9. Blower unit	

Body Ventilation

The body ventilation system of this vehicle has a fresh air intake located at the cowl top panel. When fresh air intake control lever is at “Fresh Air” position, ventilating air is drawn into the interior from the cowl center garnish and drawn out from the ventilator outlet provided at each side body outer panel (both right and left side).



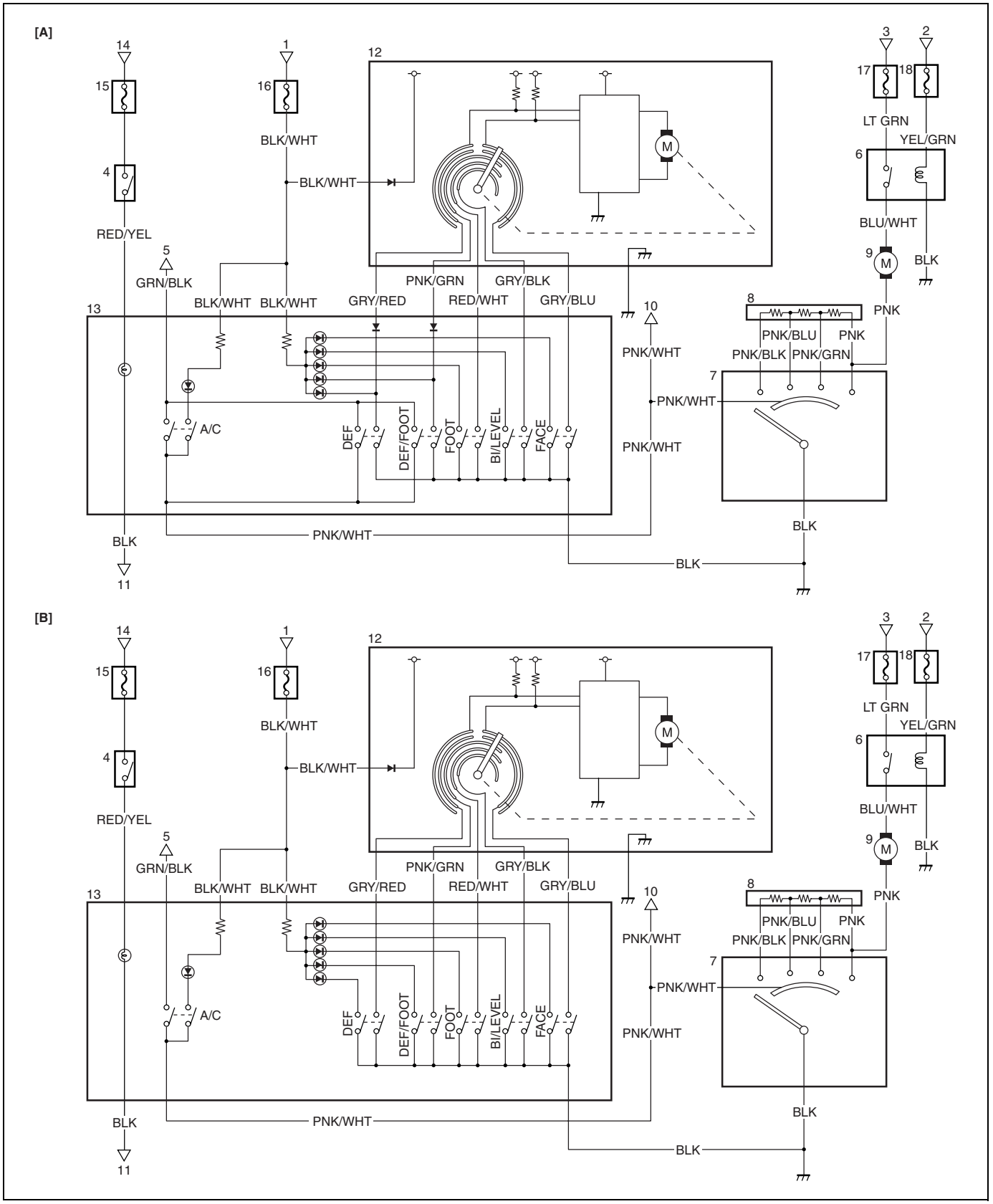
Diagnosis

Diagnosis Table

Condition	Possible Cause	Correction
Heater blower won’t work even when its switch is ON.	Blower fuse blown	Replace fuse to check for short.
	Blower resistor faulty	Check resistor referring to “Blower Motor” in this section.
	Blower motor faulty	Replace motor referring to “Blower Motor Resister” in this section.
	Wiring or grounding faulty	Repair as necessary.
Incorrect temperature output.	Control cables broken or binding	Check cables.
	Air damper broken	Repair damper.
	Air ducts clogged	Repair air ducts.
	Heater radiator leaking or clogged	Replace radiator.
	Heater hoses leaking or clogged	Replace hoses.

Condition	Possible Cause	Correction
When mode control switch is changed, air outlet port is not changed.	Mode control switch faulty	Check heater mode control switch referring to “Heater Mode Control Switch” in this section.
	Mode actuator faulty	Check heater mode control actuator referring to “Heater Mode Control Actuator” in this section.
	Fuse blown	Replace fuse to check for short.
	Wiring or grounding faulty	Repair as necessary.
	Air damper broken	Repair damper.
	Air ducts clogged	Repair air ducts.

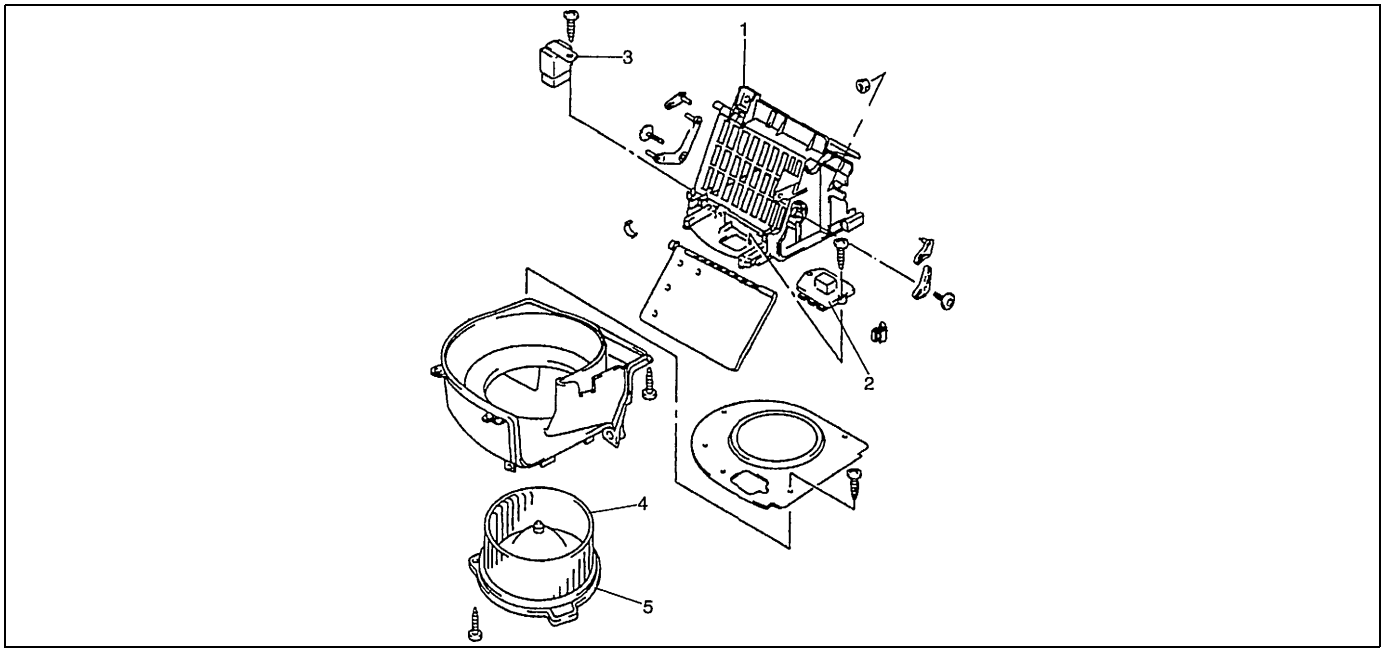
Wiring Circuit



[A] : For LH Vehicle	5. To A/C controller	11. To illumination controller (if equipped) or body ground	17. HEATER fuse 30 A
[B] : For RH Vehicle	6. Blower motor relay	12. Mode control actuator	18. REAR DEFG fuse 15 A
1. From ignition switch 1	7. Blower motor switch	13. Mode control switch	19. Drive circuit
2. From ignition switch 2	8. Blower resistor	14. From main fuse	
3. From blower fuse	9. Blower motor	15. TAIL fuse 15 A	
4. Head light relay	10. To ECM	16. IG METER fuse 20 A	

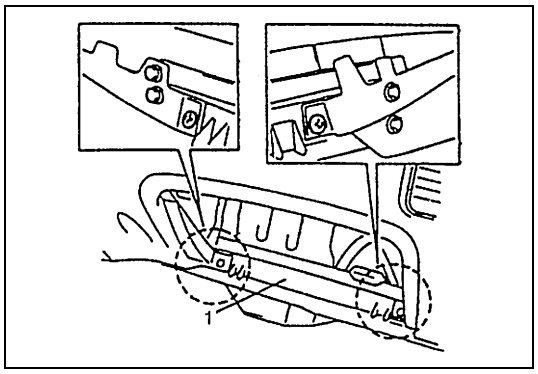
On-Vehicle Service

Blower Unit

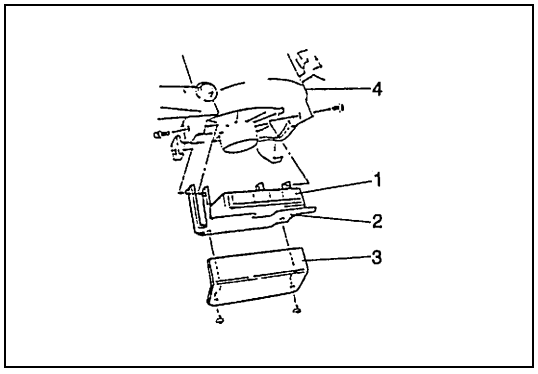


1. Blower unit	2. Blower motor resistor	3. Blower motor relay	4. Blower fan	5. Blower motor

REMOVAL

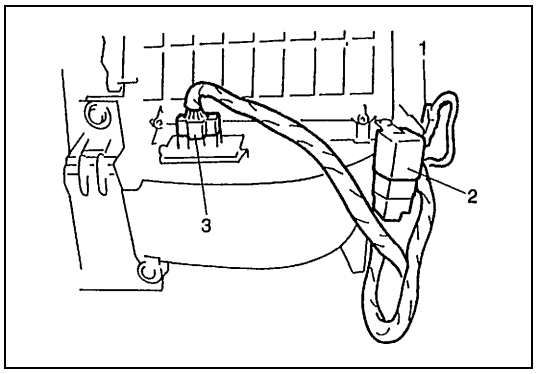


1) Disconnect negative (–) cable at battery.
2) Disable air bag system (if equipped) referring to “Disabling Air Bag System” in Section 10B.
3) Remove passenger lower member (1).



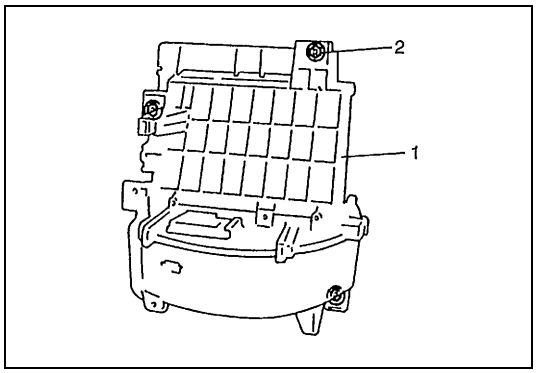
4) Remove ECM (1) with bracket (2) from blower motor unit (4).

3. Cover

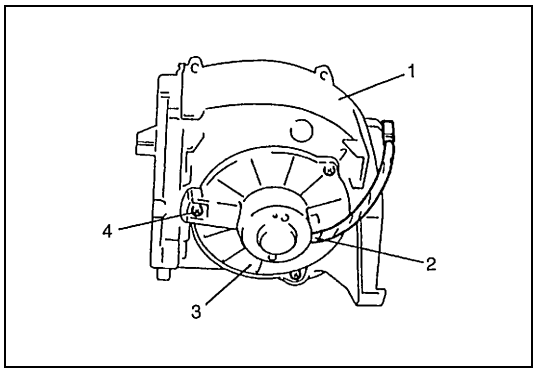


5) Disconnect blower motor (1), blower motor relay (2) and resistor lead wires (3) at couplers.

6) Remove cooling unit (if equipped) referring to item “Cooling Unit (Evaporator) Removal” in Section 1B.
7) Disconnect fresh air control cable from blower motor case.



8) Remove blower motor unit (1) by removing its fastening nuts (2).



9) Disconnect blower motor lead wire (2) at coupler from blower unit (1).
10) Remove blower motor (3) by removing its mounting screws (4).

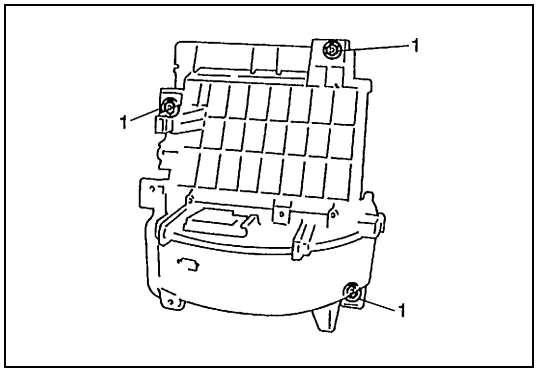
INSTALLATION

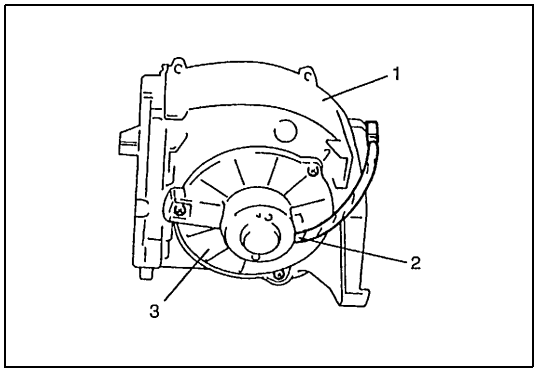
1) Reverse removal procedure for installation.
2) Connect fresh air control cable referring to “Heater Control Switch Installation” in this section.
3) Enable air bag system (if equipped) referring to “Enabling Air Bag System” in Section 10B.

Blower Motor

REMOVAL

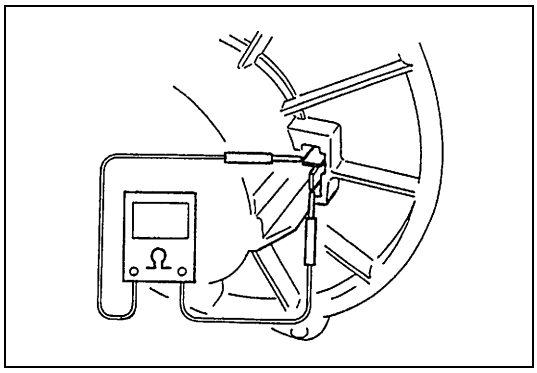
1) Disconnect negative (–) cable at battery.
2) Disable air bag system (if equipped) referring to “Disabling Air Bag System” in Section 10B.
3) Remove ECM with bracket from blower motor unit.
4) Disconnect harness clamps from dash panel.
5) Loosen three nuts (1) fastening blower unit.



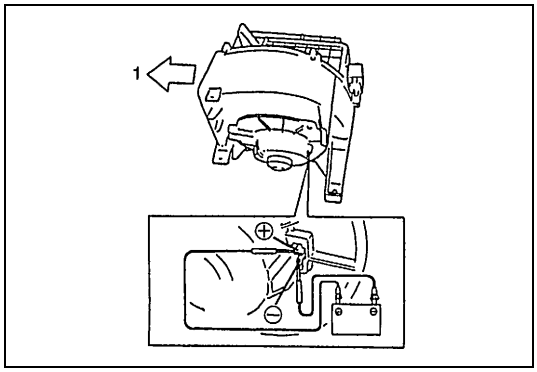


6) Disconnect blower motor lead wire at coupler (2).
7) Remove blower motor (3) from blower unit (1).

INSPECTION



- Check for continuity between terminal to terminal as shown in left figure. If check result is continuity, proceed to next operation check. If not, replace.



- Connect battery to blower motor as shown, then check if the blower motor operates smoothly and specified current.

Specified current: 14 – 17 A at 12 V

1. Air flow

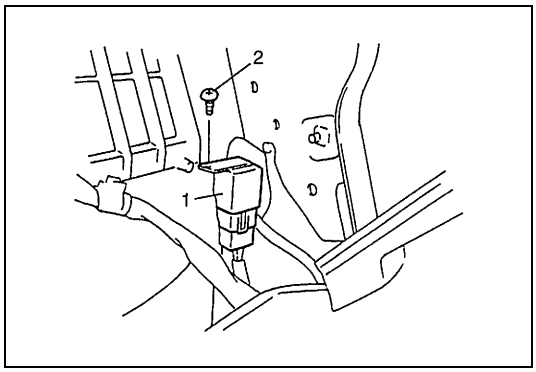
INSTALLATION

1) Reverse removal procedure for installation.
2) Enable air bag system (if equipped) referring to “Enabling Air Bag System” in Section 10B.

Blower Motor Relay

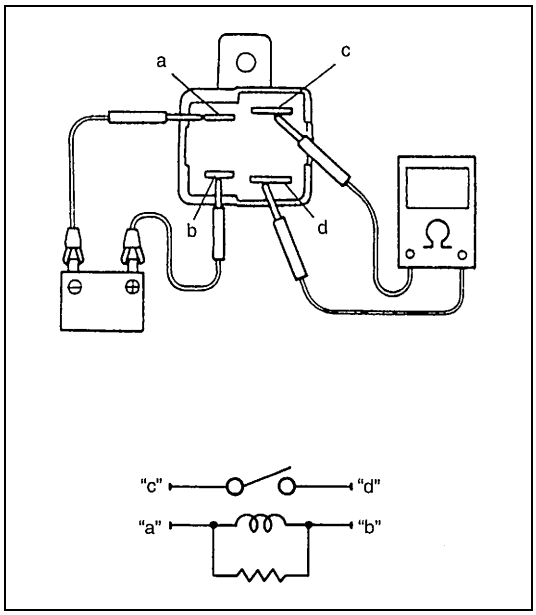
REMOVAL

1) Disconnect negative (–) cable at battery.
2) Disable air bag system (if equipped) referring to “Disabling Air Bag System” in Section 10B.
3) Open glove box, then remove screw.
4) Remove glove box.
5) Disconnect relay coupler.



6) Remove blower motor relay (1) by removing its fastening screw (2).

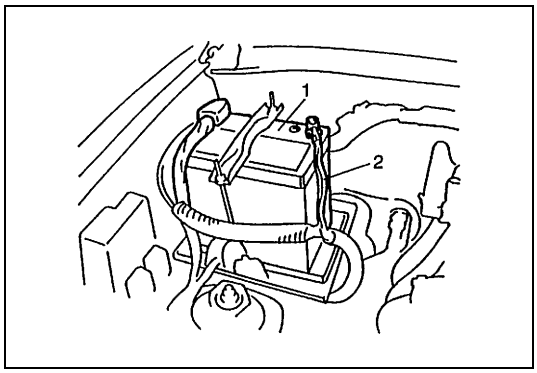
INSPECTION



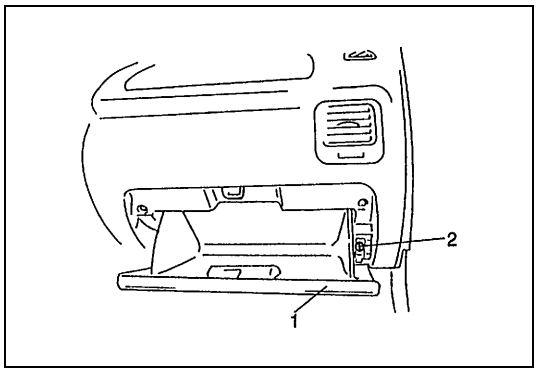
1) Check if there is continuity between terminal “c” and “d”. If there is continuity, replace relay.
2) Connect battery positive (+) terminal to terminal “b” of relay and connect battery negative (–) terminal “a” of relay, and then check for continuity between terminal “c” and “d”. If there is no continuity, replace relay.

Blower Motor Resistor

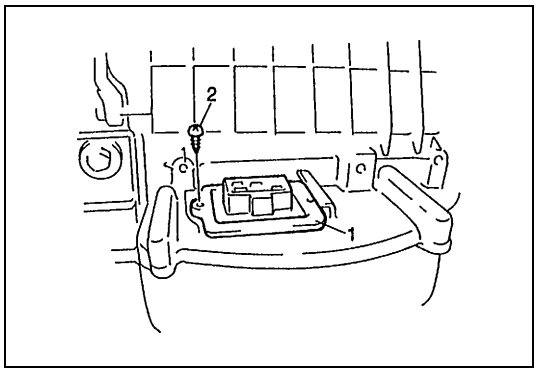
REMOVAL



1) Disconnect negative (–) cable (2) at battery (1).
2) Disable air bag system (if equipped) referring to “Disabling Air Bag System” in Section 10B.

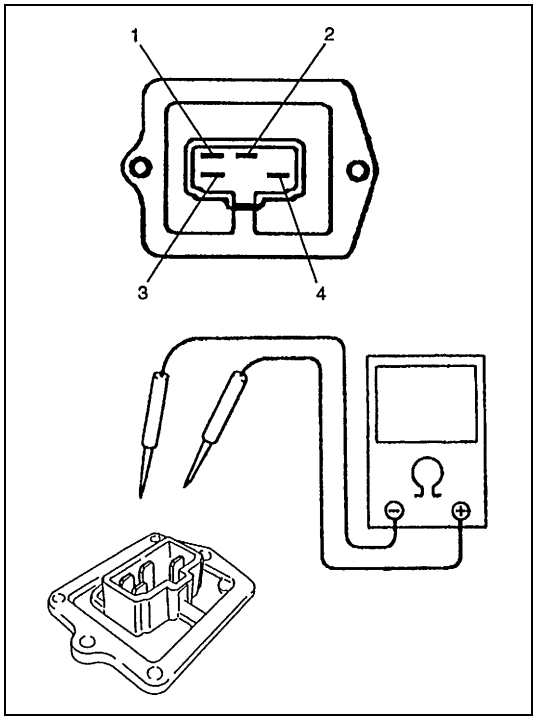


3) Open glove box (1), then remove screw (2).
4) Remove glove box.



5) Disconnect blower motor resistor (1) at coupler.
6) Remove heater blower resistor (1) by removing its fastening screw (2).

INSPECTION



Measure each terminal-to-terminal resistance on resistor.

Blower motor resistor resistance
H-LO: Approx. 2.03 Ω
H-M1: Approx. 0.7 Ω
H-M2: Approx. 0.23 Ω

If measured resistance is incorrect, replace blower motor resistor.

INSTALLATION

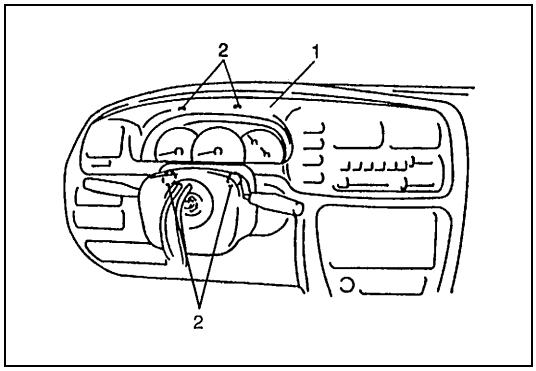
1) Install blower motor resistor with screws.
2) Enable air bag system (if equipped) referring to "Enabling Air Bag System" in Section 10B.

1. LO
2. M1
3. M2
4. HI

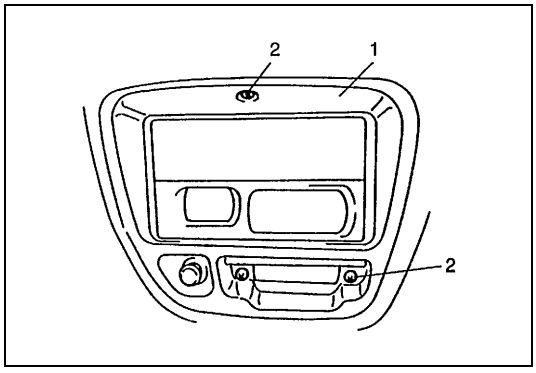
Heater Mode Control Switch

REMOVAL

1) Disconnect negative (–) cable at battery.
2) If equipped with air bag system, disable air bag system referring to "Disabling Air Bag System" in Section 10B.

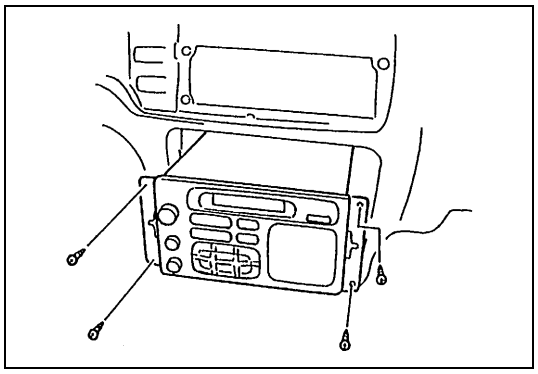


3) Remove meter cluster hood (1) by removing its mounting screws (2).

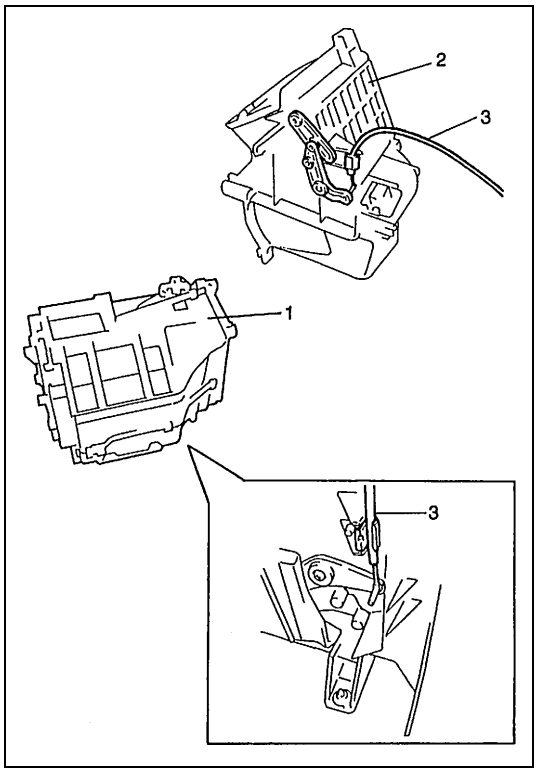


4) Remove ashtray, center garnish (1) and instrument glove box compartment.

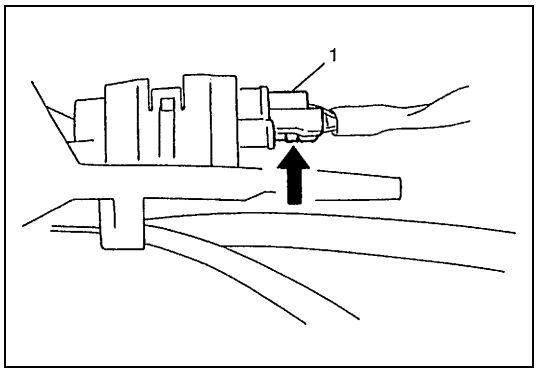
2. Screws



5) Remove radio (if equipped) or clock or accessory case.

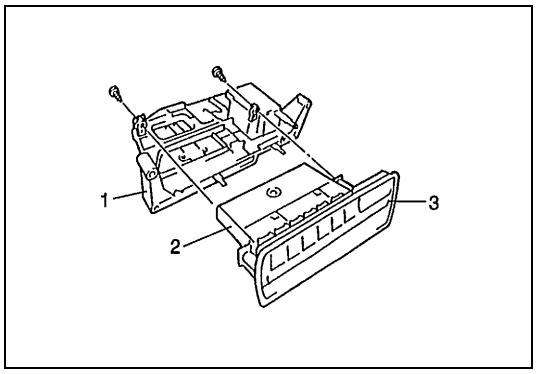


6) Disconnect control cables (3) from blower motor unit (2) and heater unit (1).



7) Disconnect heater blower motor switch connector (1).
8) Remove mode control switch with heater control lever assembly from the removed hole in mentioned Step 5).

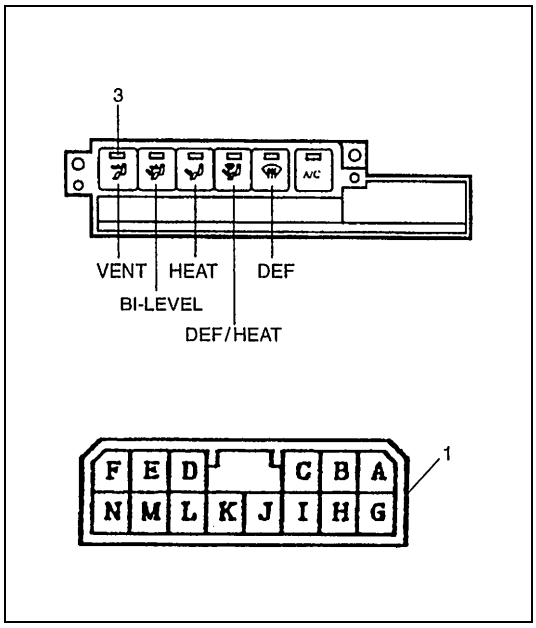
9) Pull off heater control lever knob.



10) Remove heater mode control switch (2) with heater control panel (3) from heater control lever assembly (1).
11) Remove heater control panel from mode control switch.

INSPECTION

Mode Control Switch



- Check if continuity exists between each pair of terminals listed below when mode control button is pressed.

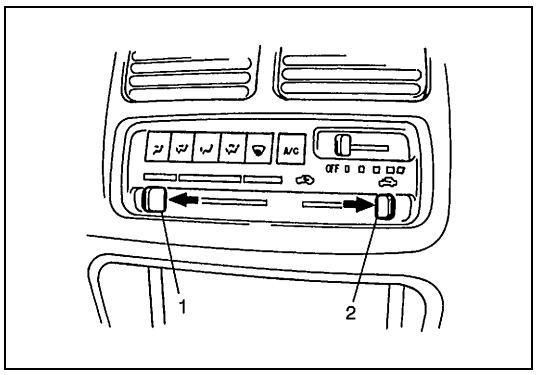
Mode control switch specification

Mode	Mode control switch terminals
VENT	F – M
BI-LEVEL	F – N
HEAT	F – E
DEF/HEAT	F – B
DEF	F – C

- With battery voltage (+) connected to terminal "I" and (–) to terminal "F", press each mode control button and check if indicator lamp (3) lights.
- With battery voltage (+) connected to terminal "A" and (–) to terminal "H", check if illumination lamp lights.

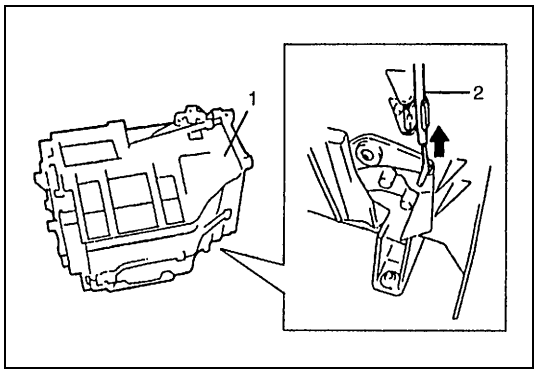
1. Mode control switch coupler

INSTALLATION



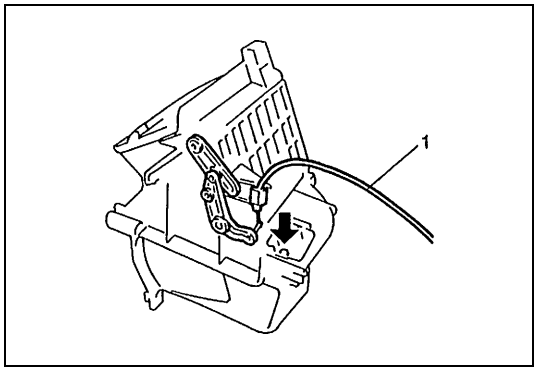
1) Install in reverse order of removal procedure.
2) Adjust cables as follows.
   a) Move control lever fully in arrow direction.

1. Temperature control lever
2. Fresh air control lever



b) Push heater lever fully in arrow direction and fix cable with clamp in position as shown in left figure.

1.	Heater unit
2.	Control cable



c) Push blower lever fully in arrow direction and fix cable with clamp in position as shown in left figure.

NOTE:

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

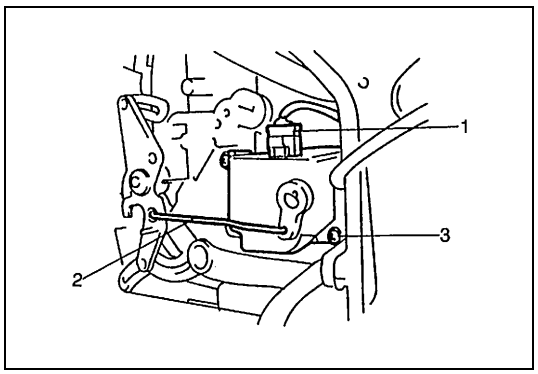
1.	Fresh air control cable

3) If equipped with air bag, enable air bag system referring to "Enabling Air Bag System" in Section 10B.

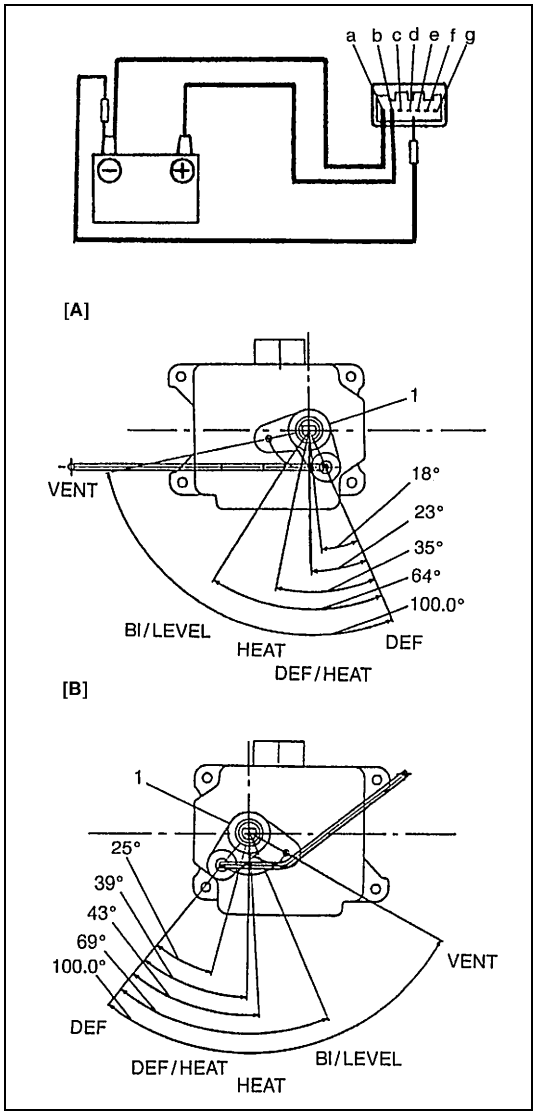
Heater Mode Control Actuator

REMOVAL

1) Disconnect negative (–) cable at battery.
2) If equipped with air bag system, disable air bag system referring to "Disabling Air Bag System" in Section 10B.
3) Remove column hole cover.



4) Disconnect heater mode control actuator coupler (1).
5) Disconnect heater mode control actuator rod (2) from heater unit.
6) Remove heater mode control actuator from heater unit by removing its mounting screw (3).



INSPECTION

1) Connect battery voltage (+) to terminal “b” and (–) to terminal “a”.
2) Connect each terminal listed below to terminal “a” (negative (–) terminal of battery) and check if lever rotation angle is as specified in figure.

Heater mode control actuator specification

MODE	TERMINAL
VENT	c
BI-LEVEL	d
HEAT	e
DEF/HEAT	f
DEF	g

[A] : For left hand steering vehicle
[B] : For right hand steering vehicle
1. Lever

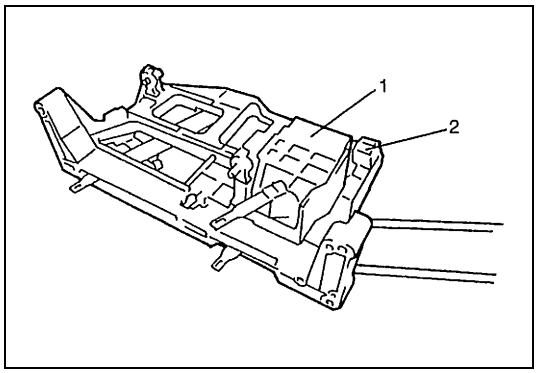
INSTALLATION

1) Install in reverse order of removal procedure.
2) If equipped with air bag system, enable air bag system referring to “Enabling Air Bag System” in Section 10B.

Heater Control Lever Assembly

REMOVAL

1) Disconnect negative (–) cable at battery.
2) If equipped with air bag system, disable air bag system referring to “Disabling Air Bag System” in Section 10B.
3) Remove mode control switch referring to item “Heater Mode Control Switch” in this section.

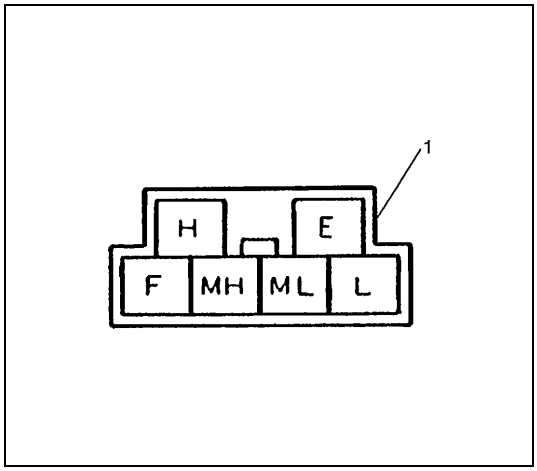


INSPECTION

Check heater blower motor switch for each terminal-to-terminal continuity. For the detail refer to “Wiring Circuit” earlier in this section.

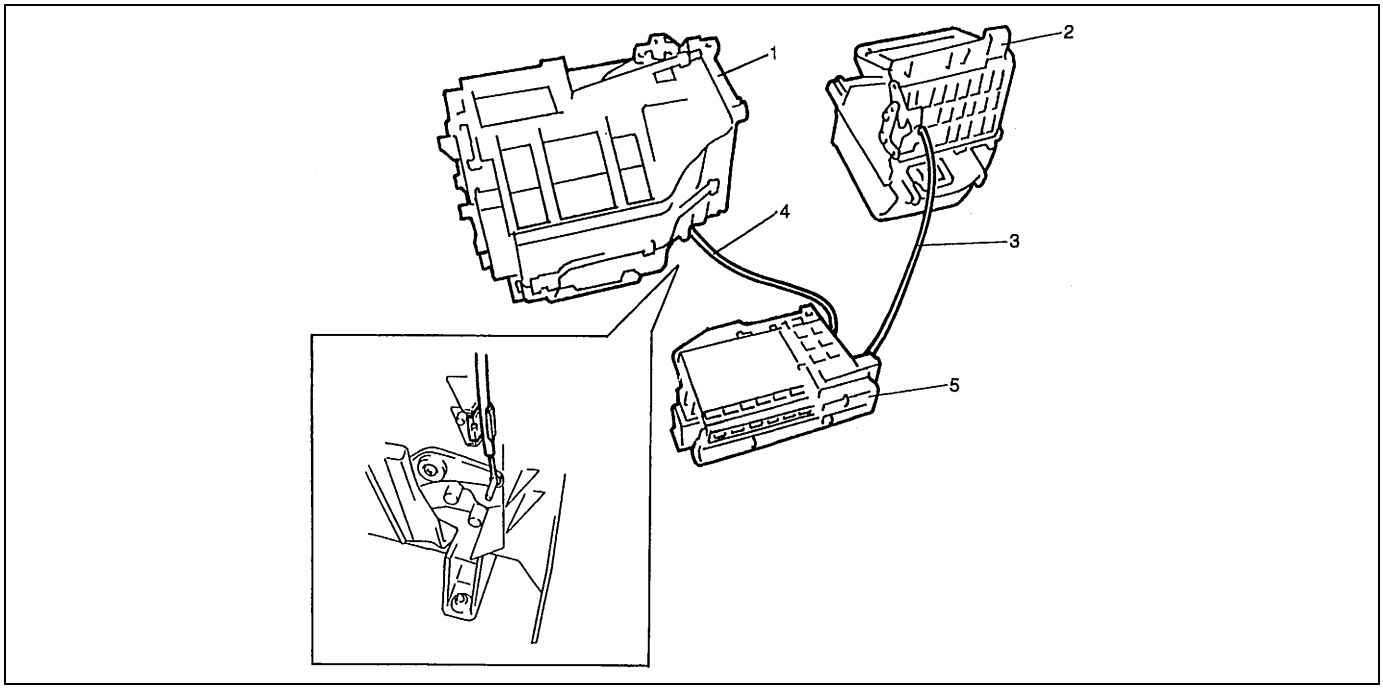
Heater blower motor switch specification

	E	F	L	ML	MH	H
LOW	○	○	○			
M1	○	○		○		
M2	○	○			○	
HIGH	○	○				○



1. Blower motor switch connector

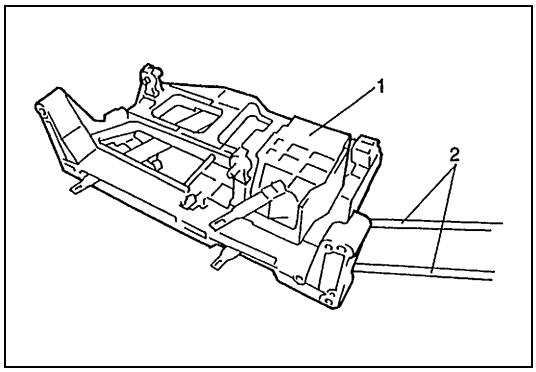
Heater Control Cables



1. Heater unit	3. Fresh air control cable	5. Heater control lever assembly
2. Blower unit	4. Temperature control cable	

REMOVAL

1) Remove heater control lever assembly referring to “Heater Control Lever Assembly” in this section.

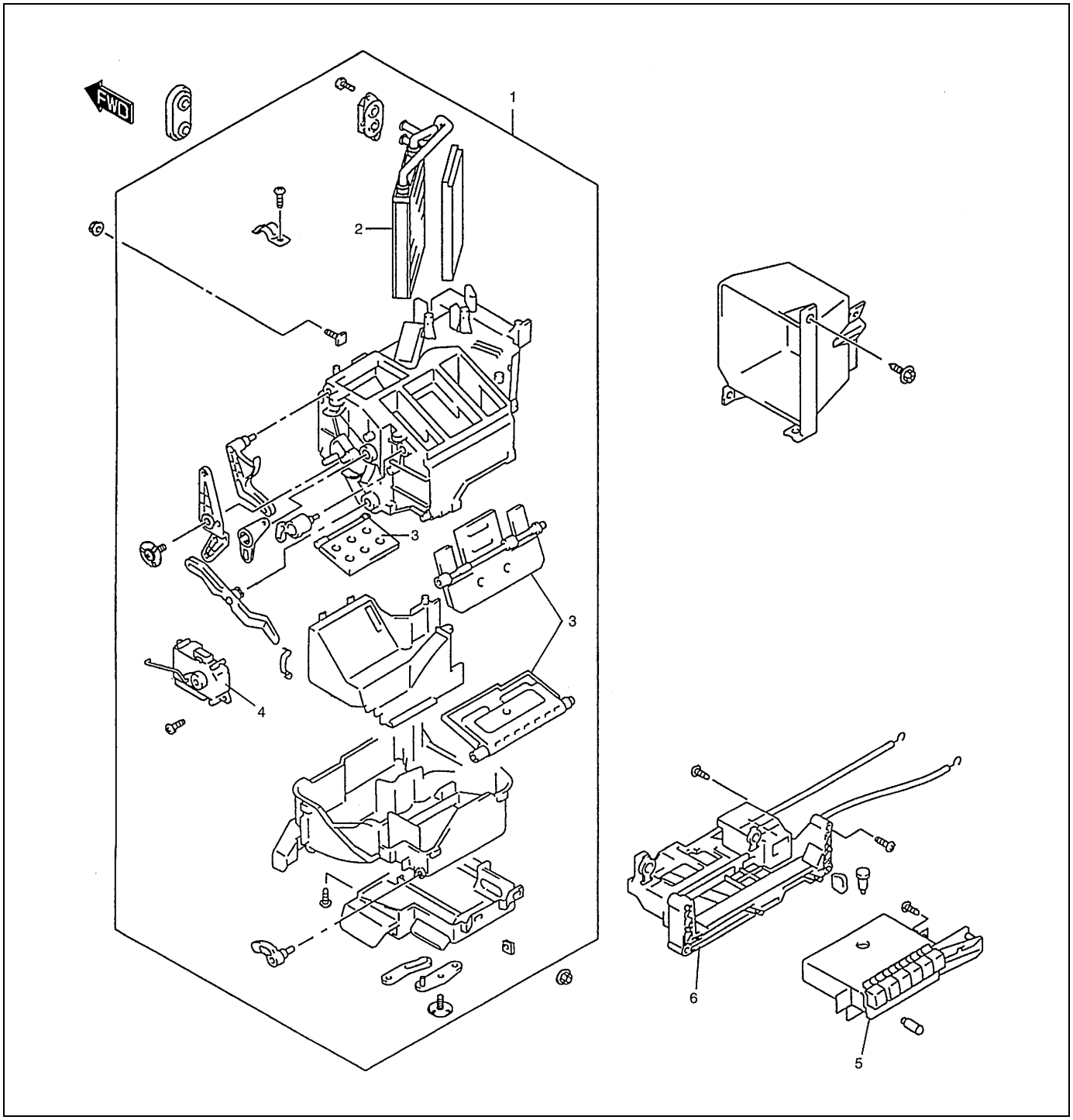


2) Remove control cables (2) from control lever assembly (1).

INSTALLATION

1) Install in reverse order of removal procedure referring to “Heater Mode Control Switch” in this section.
2) If equipped with air bag, enable air bag system referring to “Enabling Air Bag System” in Section 10B.

Heater Unit



1. Heater unit	3. Damper	5. Heater mode control switch
2. Heater core	4. Heater mode control actuator	6. Heater control lever assembly

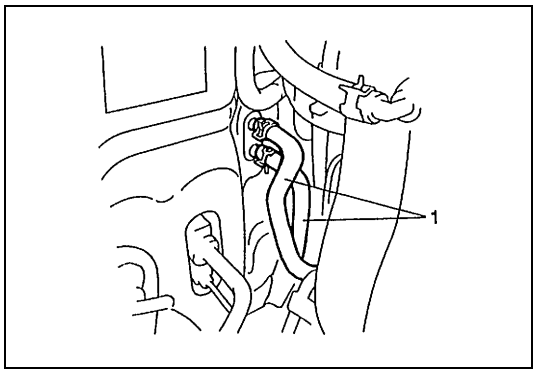
REMOVAL

WARNING:

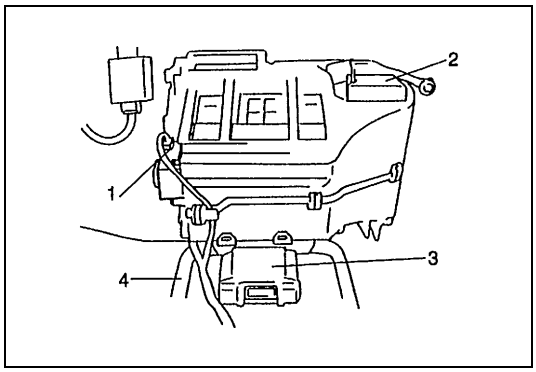
Failure to follow the following procedure and WARNING may cause air bag deployment, personal injury, damage to parts, or air bag being unable to deploy.

- **Never rest a steering column assembly on steering wheel with air bag (inflator) module face down and column vertical.**
- **When handling the air bag (inflator) modules (driver and passenger), be careful not to drop it or apply an impact to it. If an excessive impact was applied (e.g., dropped from a height of 91.4 cm (3 feet) or more, never attempt disassembly or repair but replace it with a new one.**
- **When grease, cleaning agent. Oil, water, etc. has got onto air bag (inflator) modules (driver and passenger), wipe off immediately with a dry cloth.**

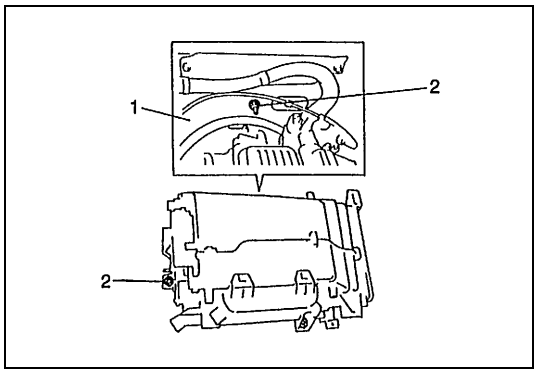
1) Disconnect negative (–) cable at battery.
2) Disable air bag system (if equipped) referring to “Disabling Air Bag System” in Section 10B.



3) Drain engine coolant and disconnect heater hose (1) from heater unit.
4) Remove instrument panel referring to “Instrumentation and Driver Information” in Section 9.
5) Remove cooling unit (If equipped).
   Refer to item “Evaporator (Cooling Unit) Removal” in Section 1B.

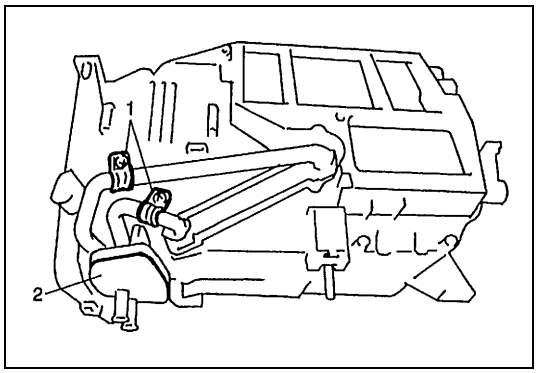


6) Disconnect rear duct (4) from heater unit.
7) Disconnect heater mode control actuator lead wire (1) at couplers.
8) Remove A/C controller (2) (If equipped).
9) Remove SDM (3) (If equipped).

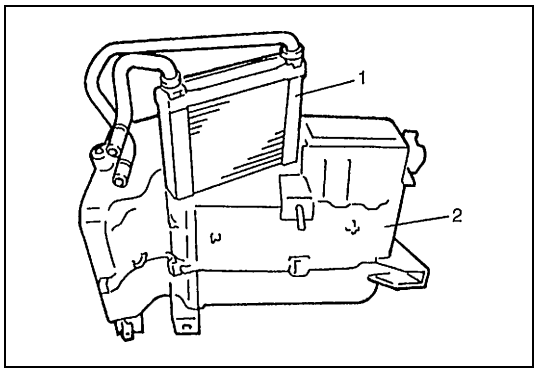


10) Remove heater unit.

1.	Dash panel (engine room)
2.	Nuts



11) Remove heater core pipe clamps (1) and grommet (2).

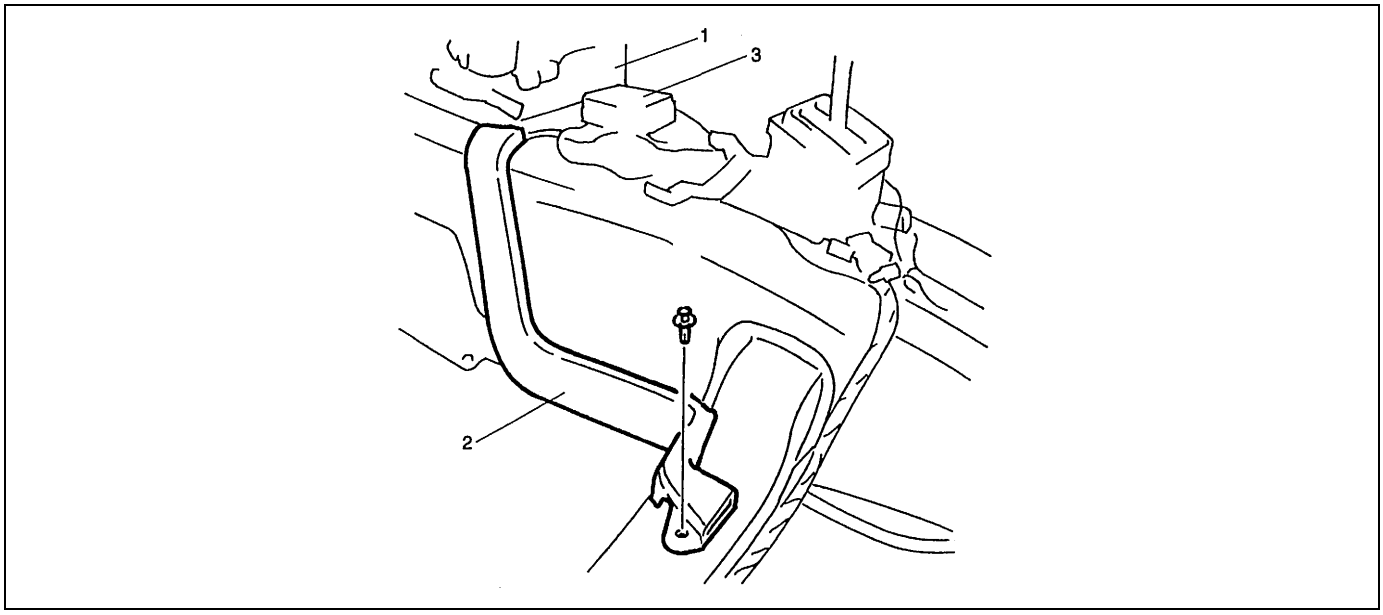


12) Pull out heater core (1) from unit (2).

INSTALLATION

1) Install heater unit by reversing removal procedure, noting the following items.
   - When installing each part, be careful not to catch any cable or wiring harness.
   - When installing steering column assembly, refer to “Steering Column Installation” in Section 3C or 3C1.
2) Install control cables referring to “Heater Control Cables” in this section.
3) Fill engine coolant to radiator.
4) Enable air bag system (if equipped) referring to “Enabling Air Bag System” in Section 10B.
5) Evacuate and charge system (if equipped with A/C system) referring to items “Evacuating System” and “Procedure of Charging” in Section 1B.

Rear Duct



1. Heater unit	2. Rear duct	3. SDM

REMOVAL

1) Disconnect negative (–) cable at battery.
2) Remove front seat.
3) Remove console box.
4) Take off carpet till rear duct is totally exposed.
5) Remove rear duct.

INSTALLATION

Reverse removal sequence to install rear duct.

SECTION 1B

AIR CONDITIONING (OPTIONAL)

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System :

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

CAUTION:

The air conditioning system of this vehicle uses refrigerant HFC-134a (R-134a).
None of refrigerant, compressor oil and component parts is interchangeable between two types of A/C : one using refrigerant CFC-12 (R-12) and the other using refrigerant HFC-134a (R-134a).
Be sure to check which refrigerant is used before any service work including inspection and maintenance. For identification between these two types, refer to the description in "Identification of Refrigerating System" in this section.
When replenishing or changing refrigerant and compressor oil and when replacing parts, make sure that the material or the part to be used is appropriate to the A/C installed in the vehicle being serviced. Use of incorrect one will result in leakage of refrigerant, damage in parts or other faulty condition.

For basic servicing method of the air conditioning system that is not described in this section, refer to "Air Conditioning Basic Manual" (99520-02130).

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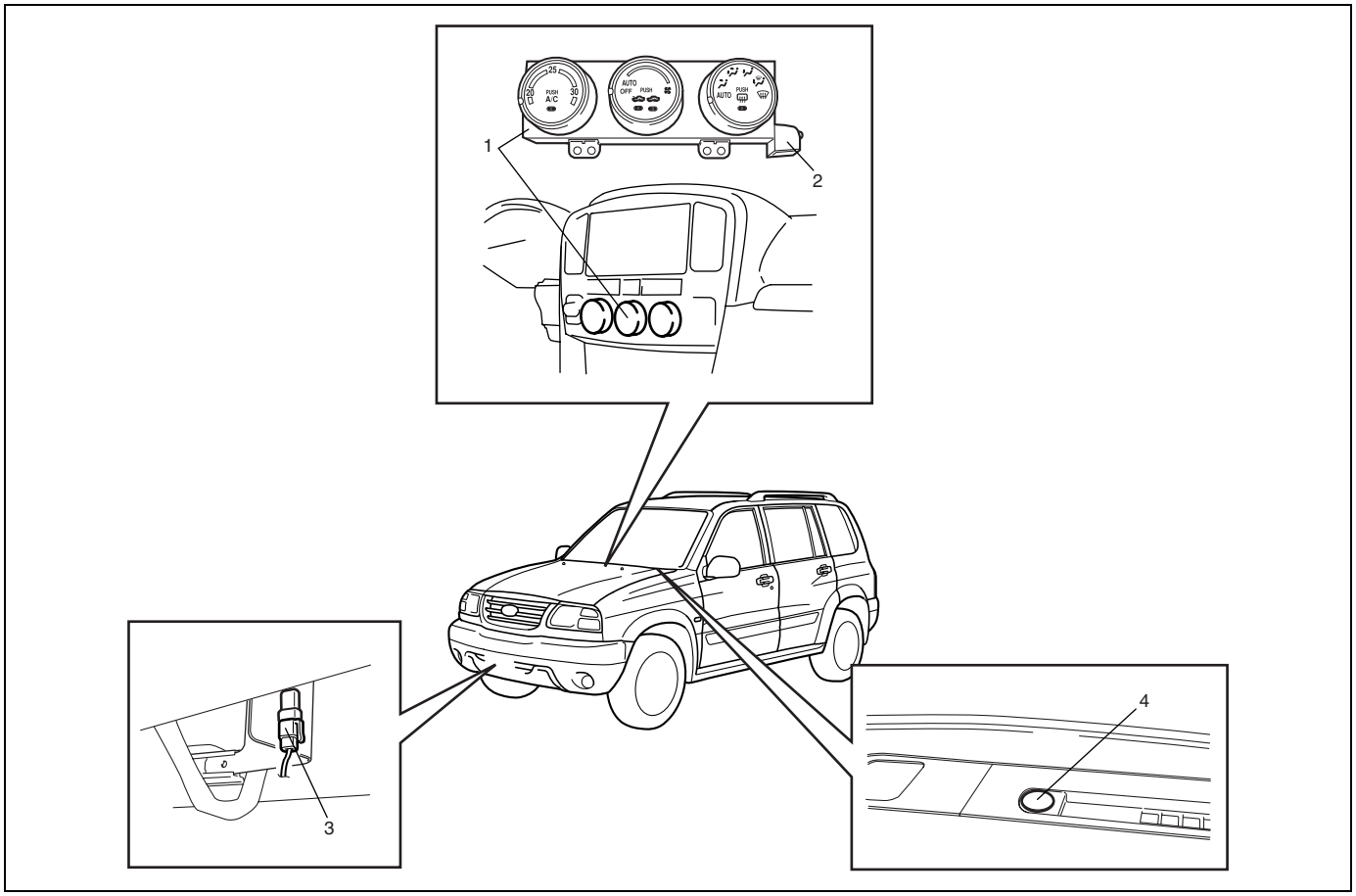
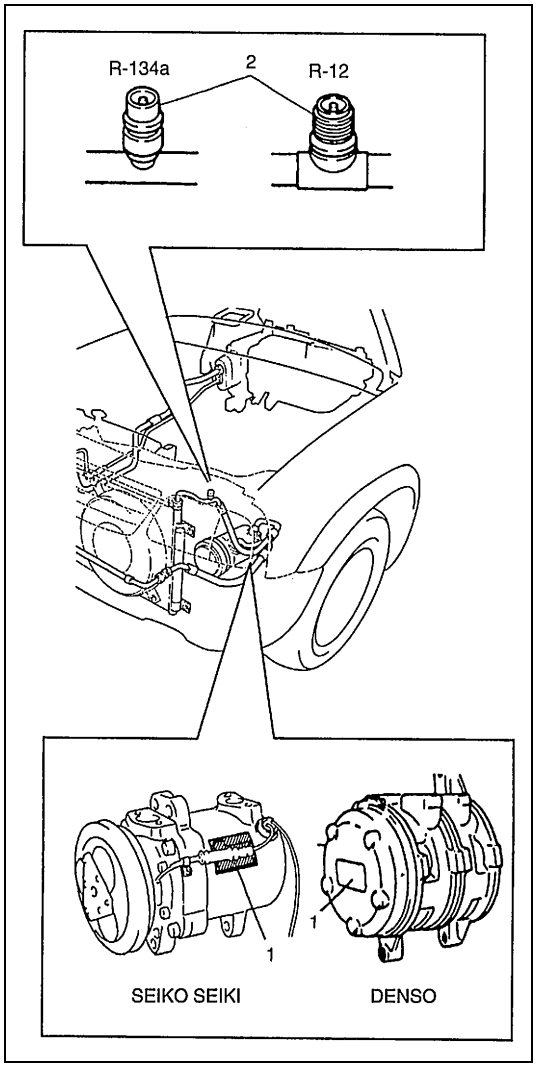
OTHER THAN CANVAS TOP MODEL

General Description

There are two types of air conditioning system, manual air conditioning system and automatic air conditioning system. For vehicles equipped with manual air conditioning system, users manually set in-car temperature, blower speed, airflow outlet and so forth by HVAC control module (1). On the other hand, automatic air conditioning system is that controller in HVAC control module automatically controls in-car temperature, blower speed, airflow outlet and so forth. Once users set up desired in-car temperature by temperature control selector of HVAC control module, controller in HVAC control module detects in-car temperature, outside air temperature, amount of sunlight, and engine coolant temperature by in-car temperature sensor (2), outside air temperature sensor (3), sunload sensor (4), and engine coolant temperature sensor. Then, controller of HVAC control module keeps desired in-car temperature at any time.



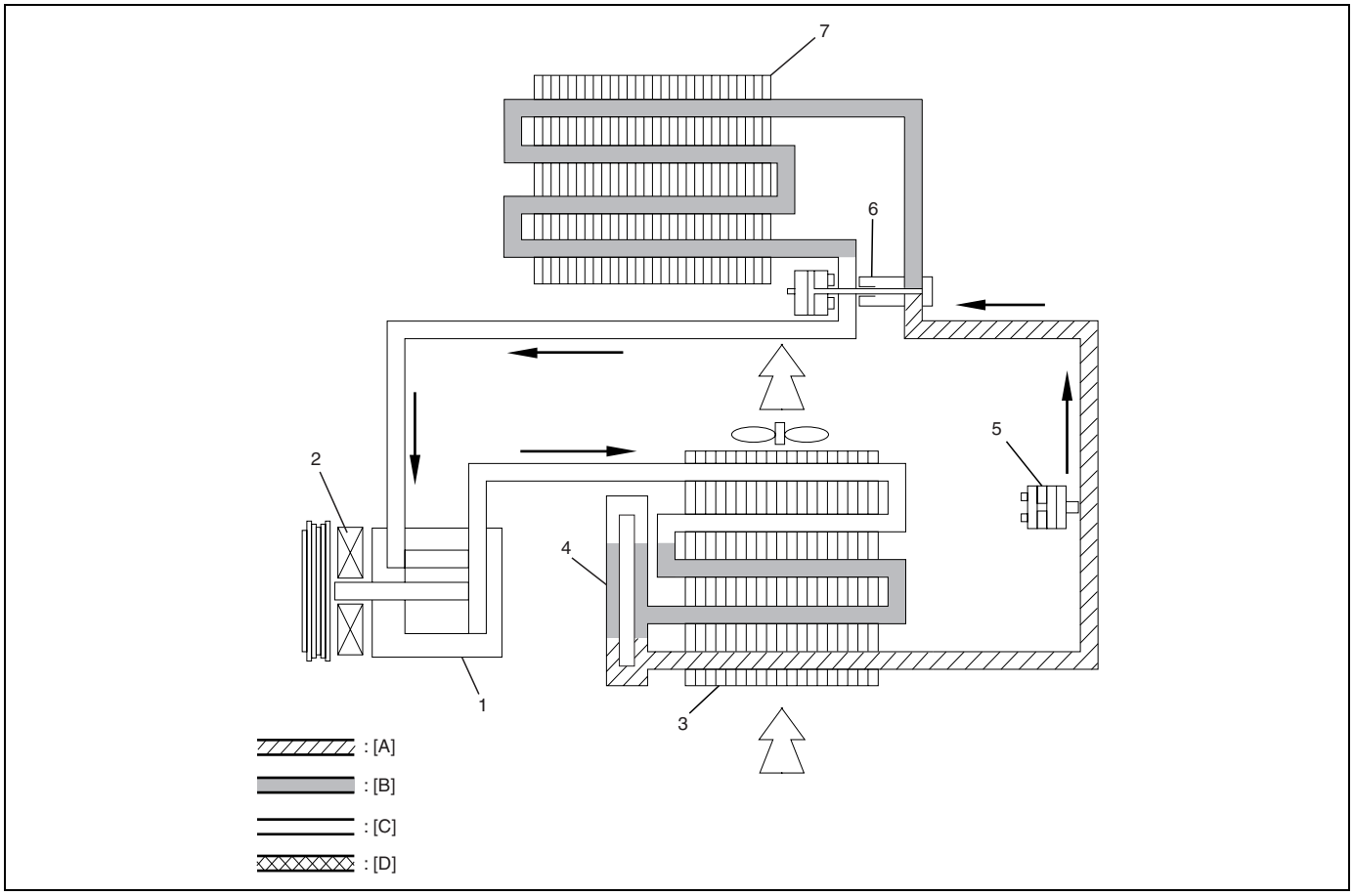
Identification of Refrigerating System



Whether the A/C equipped with the vehicle being serviced uses refrigerant R-134a or R-12 is indicated on the LABEL installed the compressor.
Also, it can be identified by the shape of the service (charge) valve. The compressor manufacturer, it can be identified by the LABEL on compressor body.

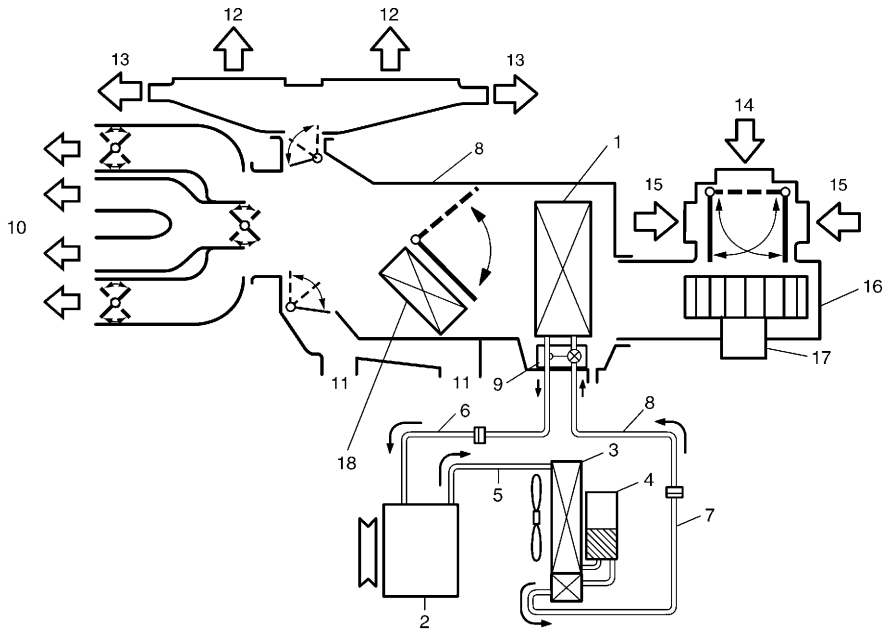
1.	Compressor label
2.	Service valve

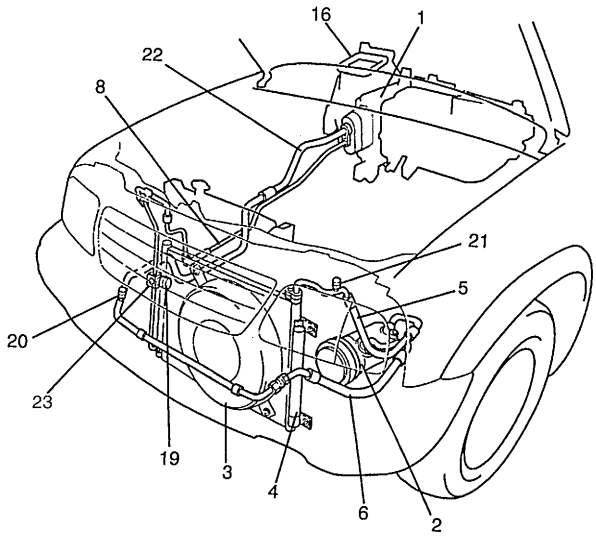
Refrigerant Flow of Air Conditioning System



[A] : Liquid	[C] : Superheated Vapor	1. Compressor	3. Condenser assembly	5. Dual pressure switch	7. Evaporator
[B] : Vapor	[D] : Cooled Vapor	2. Magnet clutch	4. Receiver/dryer	6. Expansion valve	

Major Components and Location





1. A/C evaporator	6. Suction hose	11. Foot air	16. Blower unit	21. High pressure charge valve
2. Compressor	7. Condenser outlet pipe	12. Defroster air	17. Blower fan motor	22. Suction pipe
3. Condenser assembly	8. Liquid pipe	13. Demister air	18. Heater core	23. Sight glass
4. Receiver/dryer	9. Expansion valve	14. Fresh air	19. Dual pressure switch	
5. Discharge hose	10. Ventilation air	15. Recirculation air	20. Low pressure charge valve	

General Diagnosis

General Diagnosis Table

Condition	Possible Cause	Correction
Cool air does not come out (A/C system does not operate)	No refrigerant	Perform recover, evacuation and charging referring to “Recovery”, “Evacuating” and “Charging” in this section.
	Fuse blown	Check related fuses, and check short circuit to ground.
	A/C evaporator temperature sensor faulty	Check A/C evaporator temperature sensor referring to “A/C Evaporator Thermistor (A/C Evaporator Temperature Sensor)” in this section.
	A/C refrigerant pressure switch faulty	Check A/C refrigerant (dual) pressure switch referring to “A/C Refrigerant (Dual) Pressure Switch” in this section.
	Wiring or grounding faulty	Check wiring, grounding and repair as necessary.
	ECT sensor faulty	Check ECT sensor referring to “Engine Coolant Temperature (ECT) Sensor” in Section 6E1 or 6E2.
	HVAC control module faulty	Check HVAC control module referring to “HVAC Control Module and Its Circuits” in this section.
	ECM (PCM) and/or its circuit faulty	Check ECM (PCM) and/or its circuit referring to “ECM (PCM) and Its Circuits” in this section.
Cool air does not come out (A/C compressor does not operate (does not rotate))	Fuse blown	Check related fuses, and check short circuit to ground.
	Magnet clutch faulty	Check magnet clutch referring to “Magnet Clutch” in this section.
	Compressor relay faulty	Check compressor relay referring to “A/C Compressor Relay and A/C Condenser Cooling Fan Relay” in this section.
	Drive belt loose or broken	Replace compressor drive belt.
	A/C compressor faulty	Check compressor referring to “Compressor Assembly” in this section.
	ECM (PCM) and/or its circuit faulty	Check ECM (PCM) and/or its circuit referring to “ECM (PCM) and Its Circuits” in this section.
	HVAC control module faulty	Check HVAC control module referring to “HVAC Control Module and Its Circuits” in this section.

Condition	Possible Cause	Correction
Cool air does not come out (A/C condenser cooling fan motor no operation)	Fuse blown	Check related fuses, and check short circuit to ground.
	Condenser cooling fan motor relay faulty	Check compressor relay referring to "A/C Compressor Relay and A/C Condenser Cooling Fan Relay"
	Wiring or grounding faulty	Check wiring, grounding and repair as necessary.
	ECM (PCM) and/or its circuit faulty	Check ECM (PCM) and/or its circuit referring to "ECM (PCM) and Its Circuits" in this section.
	Condenser cooling fan motor faulty	Check condenser cooling fan motor referring to "Condenser Cooling Fan Assembly" in this section.
Cool air does not come out (Blower motor does not operate)	Fuse blown	Check related fuses, and check short circuit to ground.
	Blower motor relay faulty	Check blower motor relay referring to "Blower Motor Relay" in Section 1A.
	HVAC control module faulty	Check HVAC control module referring to "HVAC Control Module and Its Circuits" in this section.
	Wiring or grounding faulty	Check wiring, grounding and repair as necessary.
	Blower motor controller faulty	Check blower motor controller referring to "Blower Motor Controller" in Section 1A.
	Blower motor faulty	Check blower motor referring to "Blower Motor" in Section 1A.
Cool air dose not come out or insufficient cooling (A/C system normal operation)	Insufficient or excessive charge of refrigerant	Check charge of refrigerant.
	Refrigerant leak in system	Check system for leaks.
	Condenser clogged	Check condenser referring to "A/C Condenser Assembly" in this section.
	A/C evaporator clogged or frosted	Check A/C evaporator and A/C evaporator thermistor (A/C evaporator temperature sensor) referring to "A/C Evaporator" and "A/C Evaporator Thermistor (A/C Evaporator Temperature Sensor)" in this section.
	A/C evaporator temperature sensor faulty	Check A/C evaporator thermistor (A/C evaporator temperature sensor) referring to "A/C Evaporator Thermistor (A/C Evaporator Temperature Sensor)" in this section.
	ECM (PCM) and/or its circuit faulty	Check ECM (PCM) and/or its circuit referring to "ECM (PCM) and Its Circuits" in this section.
	Expansion valve faulty	Check expansion valve referring to "Expansion Valve" in this section.
	Drive belt slipping	Check or replace compressor drive belt.

Condition	Possible Cause	Correction
Cool air dose not come out or insufficient cooling (A/C system normal operation)	Magnet clutch faulty	Check magnet clutch referring to "Magnet Clutch" in this section.
	A/C compressor faulty	Check compressor referring to "Compressor Assembly" in this section.
	Air in A/C system	Replace desiccant, and perform evacuation and charge.
	Air leaking from cooling unit or air duct	Repair as necessary.
	Heater and ventilation system faulty	Check air intake door and temperature control door operation.
	HVAC control module faulty	Check HVAC control module referring to "HVAC Control Module and Its Circuits" in this section.
	Blower motor faulty	Check blower motor referring to "Blower Motor" in Section 1A.
	Condenser cooling fan motor faulty	Check condenser cooling fan motor referring "Condenser Cooling Fan Assembly" in this section.
	Refrigerant pressure switch faulty	Check A/C refrigerant (dual) pressure switch referring to "A/C Refrigerant (Dual) Pressure Switch
	Excessive compressor oil existing in A/C system	Pull out compressor oil in A/C system circuit, and check compressor referring to "Compressor Assembly" in this section.
	Outside air temperature sensor faulty (for vehicle with automatic air conditioning system)	Check outside air temperature sensor referring to "Outside Air Temperature Sensor Inspection" in Section 8H.
	Sunload sensor faulty (for vehicle with automatic air conditioning system)	Check sunload sensor referring "Sunload Sensor" in this section.
	Aspirator hose faulty (for vehicle with automatic air conditioning system)	Check aspirator hose.
Cool air does not come out only intermittently	Wiring connection faulty	Repair as necessary.
	Expansion valve faulty	Check expansion valve referring to "Expansion Valve" in this section.
	Excessive moisture in A/C system	Replace desiccant, and perform evacuation and charge.
	ECM (PCM) and/or its circuit faulty	Check ECM (PCM) and/or its circuit referring to "ECM (PCM) and Its Circuits" in this section.
	Magnet clutch faulty	Check magnet clutch referring to "Magnet Clutch" in this section.
	Excessive charge of refrigerant	Check charge of refrigerant.
Cool air comes out only at high speeds	Condenser clogged	Check condenser referring to "A/C Condenser Assembly" in this section.
	Insufficient charge of refrigerant	Check charge of refrigerant.
	Air in A/C system	Replace desiccant, and perform evacuation and charging.
	Drive belt slipping	Check or replace compressor drive belt.
	A/C compressor faulty	Check compressor referring to "Compressor Assembly" in this section.

Condition	Possible Cause	Correction
Cool air does not come out only at high speeds	Excessive charge of refrigerant	Check charge of refrigerant.
	A/C evaporator frosted	Check A/C evaporator thermistor (A/C evaporator temperature sensor) referring to “A/C Evaporator Thermistor (A/C Evaporator Temperature Sensor”
Insufficient velocity of cooled air	A/C evaporator clogged or frosted	Check A/C evaporator and A/C evaporator thermistor (A/C evaporator temperature sensor referring to “A/C Evaporator” and “A/C Evaporator Thermistor (A/C Evaporator Temperature Sensor)” in this section.
	Air leaking from cooling unit or air duct	Repair as necessary.
	Blower motor faulty	Check blower motor referring to “Blower Motor” in Section 1A.
	Wiring or grounding faulty	Check wiring, grounding and repair as necessary.

Diagnosis of Abnormal Noise

There are various types of noise, ranging from those produced in the engine compartment to those from the passenger compartment, also from rumbling noises to whistling noises.

Abnormal noise from compressor

Condition	Possible Cause	Correction
During compressor operation, a rumbling noise is heard proportional to engine revolutions.	Inadequate clearance in piston area (piston or swash-plate).	Repair or replace compressor as necessary.
A loud noise is heard at a certain rpm, disproportionately to engine revolution.	Loose or faulty V-belt.	Adjust V-belt tension, or replace belt.
	Loose mounting bolts.	Retighten mounting bolts.
A loud rattle is heard at low engine rpm.	Loose compressor center bolt.	Retighten center bolt.
		Replace compressor if it was operated in this condition for a long time.

Abnormal noise from magnetic clutch

Condition	Possible Cause	Correction
A rumbling noise is heard when compressor is not operating.	Worn or damaged bearings.	Replace bearings.
A chattering noise is heard when compressor is engaged.	Faulty clutch gap (excessive).	Adjust clutch gap.
	Worn clutch friction surface.	Replace clutch.
	Compressor oil leaked from shaft seal, contaminating the friction surface.	Replace compressor shaft oil seal.

Abnormal noise from tubing

Condition	Possible Cause	Correction
A droning noise is heard inside vehicle, but not particularly noticeable in engine compartment.	Faulty tubing clamps.	Reposition clamps or increase the number of clamps.
	Resonance caused by pulsation from variations in refrigerant pressure.	Attach a silencer to tubing, or modify its position and length.

Abnormal noise from condenser

Condition	Possible Cause	Correction
Considerable vibration in condenser.	Resonance from condenser mounting stay and body.	Firmly insert a silencer between condenser mounting stay and body.

Abnormal noise from crankshaft pulley

Condition	Possible Cause	Correction
A large rattling noise is heard at idle or sudden acceleration.	Loosen pulley mounting bolt.	Retighten bolt.
	Worn or broken bearings.	Replace bearings.

Abnormal noise from tension pulley

Condition	Possible Cause	Correction
Clattering noise is heard from pulley.	Worn or damaged bearings.	Replace bearings.
Pulley cranks upon contact.	Cracked or loose bracket.	Replace or retighten bracket.

Abnormal noise from evaporator

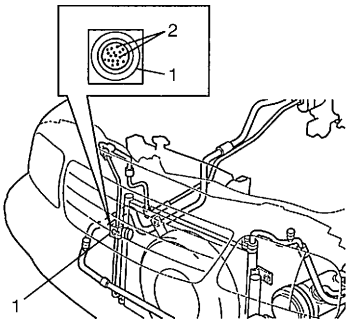
Condition	Possible Cause	Correction
Whistling sound is heard from evaporator.	Depending on the combination of the interior/exterior temperatures, engine rpm and refrigerant pressure, the refrigerant flowing out of the expansion valve may, under certain conditions, make a whistling sound.	At times, slightly decreasing refrigerant volume may stop this noise.
		Inspect expansion valve and replace if faulty.

Abnormal noise from blower motor

Condition	Possible Cause	Correction
Blower motor emits a chirping sound in proportion to its speed of rotation.	Worn or damaged motor brushes or commutator.	Repair or replace blower motor.
Fluttering noise or large droning noise is heard from blower motor.	Leaves or other debris introduced from fresh air inlet to blower motor.	Remove debris and make sure that the screen at fresh air inlet is intact.

Quickly Checking of Refrigerant Charge (If Equipped with Sight Glass)

Charge of refrigerant



1. Sight glass
2. Bubbles

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

1) Start engine and warm up to normal operating temperature (ECT more than 85°C, 180°F).
2) Operate A/C at the following conditions for a few minutes.
   - A/C switch at ON position
   - Blower speed selector at max position
   - Air flow selector at face position
   - Temperature selector at max cool position
   - Vehicle door at all open
   - Air inlet door at recirculation position
3) Look at the sight glass (1) and compare what is observed with the symptoms listed in the table.

Checking refrigerant charge

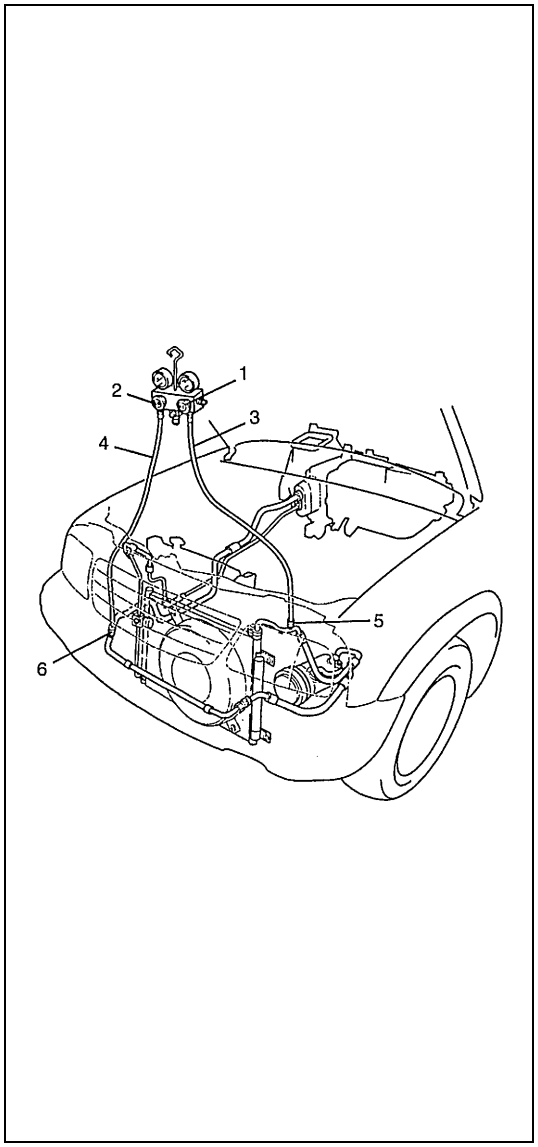
Condition	Possible Cause	Correction
Bubbles observed in sight glass	Insufficient charge of refrigerant in system	Check system for leaks with a leak tester.
No bubbles observed in sight glass	No charge or proper or too much charge of refrigerant in system	Refer to the following item.
No temperature difference between compressor inlet and outlet	Empty or nearly empty system	Recovery, evacuate and charge system and then check it for leaks with a leak tester.
Noticeable temperature difference between compressor inlet and outlet	Proper or too much charge of refrigerant in system	Refer to the following item.
When A/C is turned OFF, refrigerant in sight glass clears immediately and remains clear	Too much charge of refrigerant in system	Discharge excess charge of refrigerant to adjust it to a specified charge.
When A/C is turned OFF, refrigerant in sight glass once produces bubbles and then clears	Proper charge of refrigerant in system	No correction needed because charge of refrigerant is normal.

Compression System Diagnosis

Compressor troubles are mainly the following three types : gas leakage, noise and insufficient pressure.
Compressor gas leakages in most cases develop from the shaft seal. When detecting gas leakage, always use a leak tester. If a small amount of oil seeps out from the shaft seal, there is no necessity of replacing the seal. The shaft seal has been designed to allow a small amount of oil to leak out for lubricating purpose. Thus, the shaft seal should be replaced only when a large amount of compressor oil is leaking out or when gas leakage is discovered by using gas tester.
In regard to noise and insufficient pressure, repairs should be made only after diagnosing the trouble properly.

Condition	Possible Cause	Correction
Noise from compressor	Defective bearing	Replace.
	Defective cylinder and/or shaft	Replace.
Noise from magnetic clutch	Defective bearing	Replace.
	Defective clutch face	Replace.
Insufficient cooling	Defective gasket	Replace.
	Defective reed valve	Replace.
Not rotating	Locked compressor	Replace.
	Seized magnetic clutch	Replace.
	Rotating parts seized by insufficient oil amount	Replace.
Oil and/or gas leakage	Defective seal	Replace.
	Defective O-ring	Replace.

Performance Diagnosis



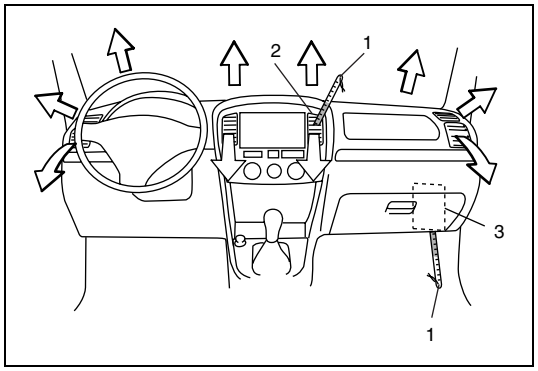
1) Confirm that vehicle and environmental conditions are as follows.
   - Vehicle is not exposed to direct sun.
   - Ambient temperature is within 15°C – 35°C (59°F – 95°F).
2) Make sure that high pressure valve (1) and low pressure valve (2) of manifold gauge are firmly closed.
3) Connect high pressure charging hose (3) to high pressure service valve (5) on vehicle, and connect low pressure charging hose (4) to low pressure service valve (6) on vehicle.
4) Bleed the air in charging hoses (3), (4) by loosening their respective nuts on manifold gauge, utilizing the refrigerant pressure.
   When a hiss is heard, immediately tighten nut.

CAUTION:

Do not interchange high and low pressure charging hoses by mistake.

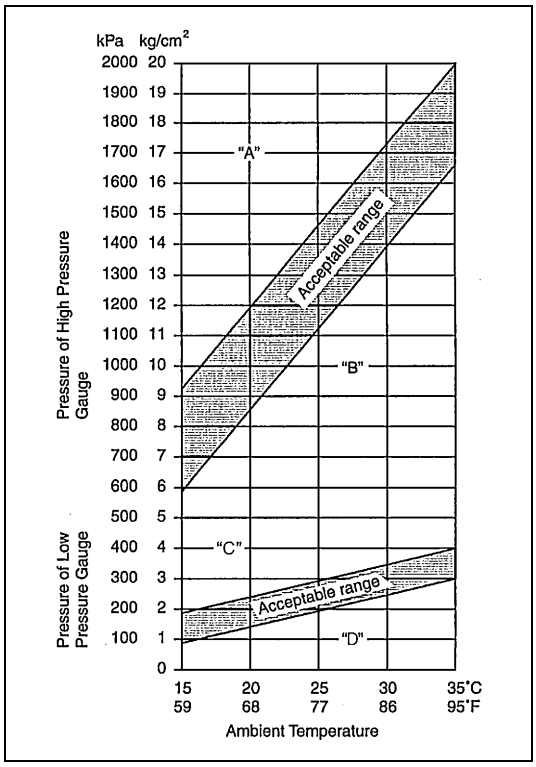
5) Warm up engine to normal operating temperature (engine coolant temperature at 80 – 90°C (176 – 194°F)) and keep it at specified idle speed.
6) Operate A/C at the following conditions.
   - A/C switch at ON position
   - Blower speed selector at max position
   - Air flow selector at face position
   - Temperature selector at max cool position
   - Vehicle door at all open
   - Air inlet door at recirculation position
7) Keep all windows, doors and engine food open.

Ambient temperature	15 – 35°C (59°F – 95°F)
Engine rpm	Keep to 1,500 – 2,000 rpm.
Blower motor switch	Max. speed position
Temperature control	Max. cool position
Air outlet control	Face position
Vehicle doors	All open
Air inlet door position	Recirculation position



8) With about 20 mm (0.8 in.) of dry bulb thermometer (1) inserted into center duct air outlet (2) and another one set near A/C evaporator air inlet, read temperature indicated on each thermometer to know temperature difference between air inlet and air outlet.

3. Blower fan motor air inlet



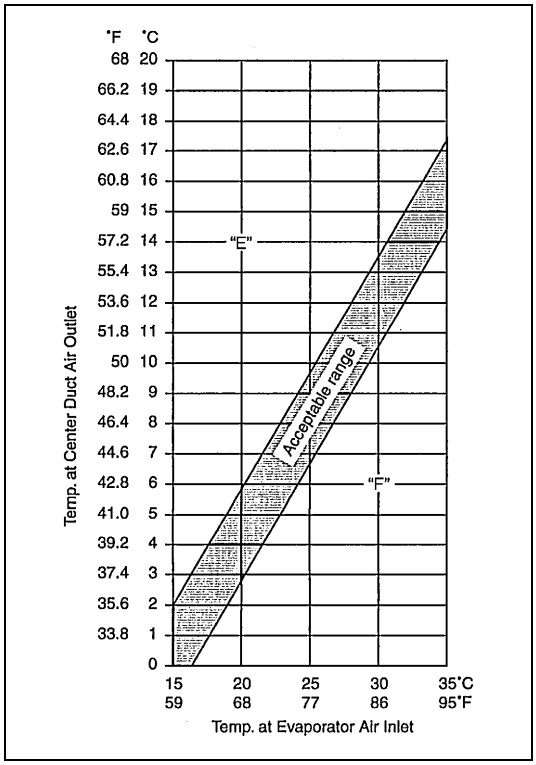
9) Check for each pressure of low side and high side if it is within shaded range of graph.
   If each gauge reading is out of specified pressure, correct defective part referring to the following Performance Diagnosis table.

Example :

Gauges should read as follows when ambient temperature is 30°C (86°F).	
Pressure on high pressure gauge (HI) :	**1400 – 1750 kPa (14.0 – 17.5 kg/cm², 199.1 – 248.9 psi)**
Pressure on high pressure gauge (LO) :	**230 – 350 kPa (2.3 – 3.5 kg/cm², 32.7 – 49.8 psi)**

NOTE:

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



10) Check inlet port temperature-to-outlet port temperature relationship using graph.
    For example, if A/C evaporator inlet port temperature is 25°C (77°F) and center duct air outlet temperature is 8°C (46.4°F), their crossing point is within acceptable range as shown in graph.
11) If crossing point is out of acceptable range, diagnose trouble referring to the following Performance Diagnosis table.

Performance diagnosis table

HIGH PRESSURE CAUGE

Condition	Possible Cause	Correction
Pressure high ("A" area of high side graph)	Refrigerant overcharged	Recharge
	Expansion valve frozen or clogged	Check expansion valve
	Clogged refrigerant passage of high side	Clean or replace
	Condenser cooling fan malfunction (Insufficient cooling of condenser)	Check condenser cooling fan
	Dirty or bent condenser fins (Insufficient cooling of condenser)	Clean or repair
	Compressor malfunction (Insufficient oil etc.)	Check compressor
	Engine overheat	Check engine cooling system
Pressure low ("B" area of high side graph)	Insufficient refrigerant (Insufficient charge or leakage)	Check for leakage, repair if necessary and recharge
	Expansion valve malfunction (Valve opens too wide)	Check expansion valve
	Compressor malfunction (Insufficient compression)	Check compressor

LOW PRESSURE GAUGE

Condition	Possible Cause	Correction
Pressure high ("C" area of low side graph)	Expansion valve malfunction (Valve opens too wide)	Check expansion valve
	Compressor malfunction (Insufficient compression)	Check compressor
Pressure low ("D" area of low side graph)	Insufficient refrigerant (Insufficient charge or leakage)	Check for leakage, repair if necessary and recharge
	Expansion valve malfunction (Valve opens too narrow)	Check expansion valve
	Clogged refrigerant passage (Crashed pipe)	Repair or replace

THERMOMETER AT CENTER DUCT

Condition	Possible Cause	Correction
Outlet air temperature at center duct is high (Crossing point is in area "E")	Insufficient or excessive charge of refrigerant	Check refrigerant pressure
	Dirty or bent A/C evaporator fins	Clean or repair
	Air leakage from cooling (heater) unit or air duct	Repair or replace
	Malfunctioning, switch over function of damper in cooling (heater) unit	Repair or replace
	Compressor malfunction	Check compressor
Outlet air temperature at center duct is low (Crossing point is in area "F")	Insufficient air volume from center duct (Heater blower malfunction)	Check blower motor and fan
	Compressor malfunction	Check compressor

NOTE:

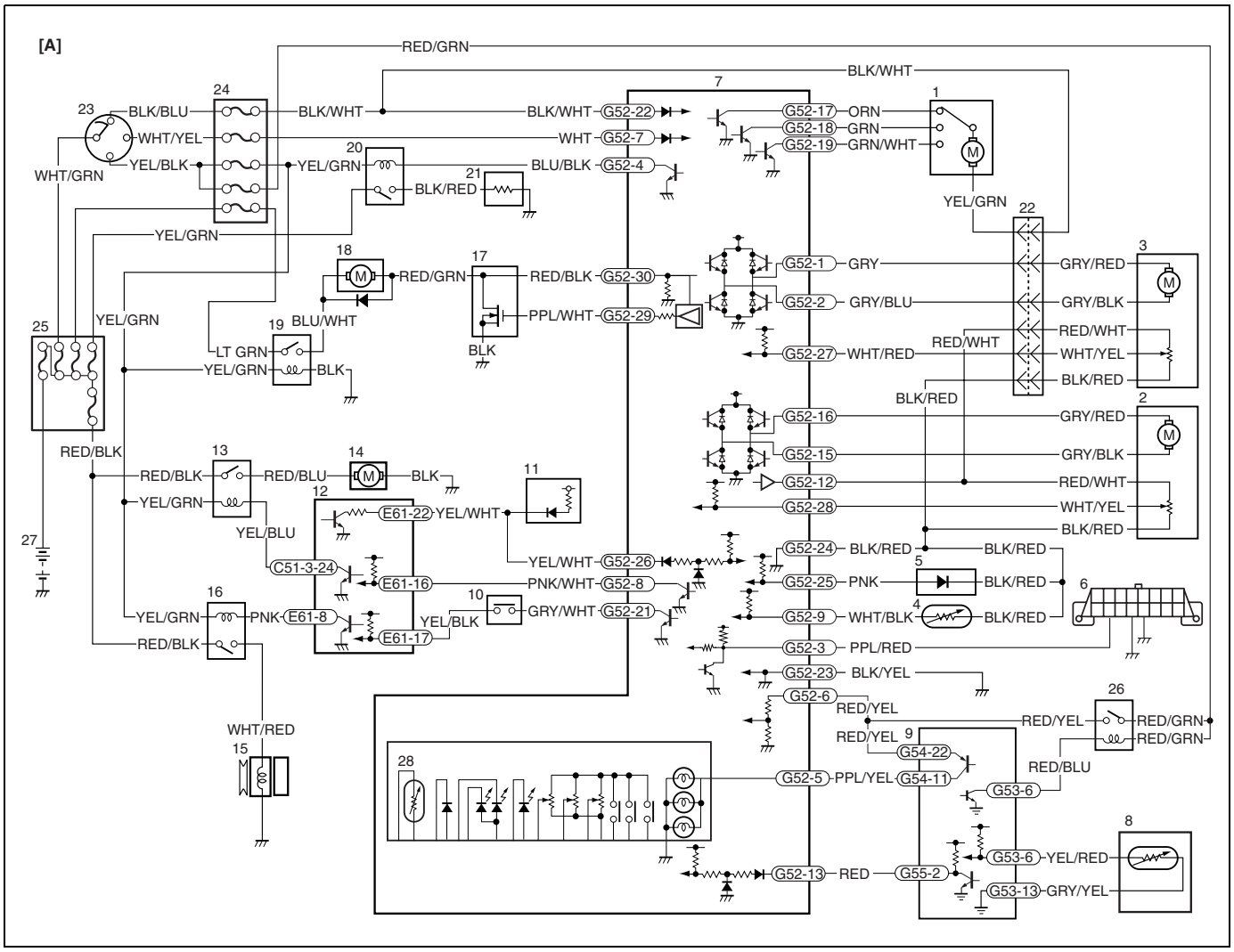
If ambient temperature is within 30 – 35°C (85 – 95°F), it is possible to do using the following table for more detail diagnosis.

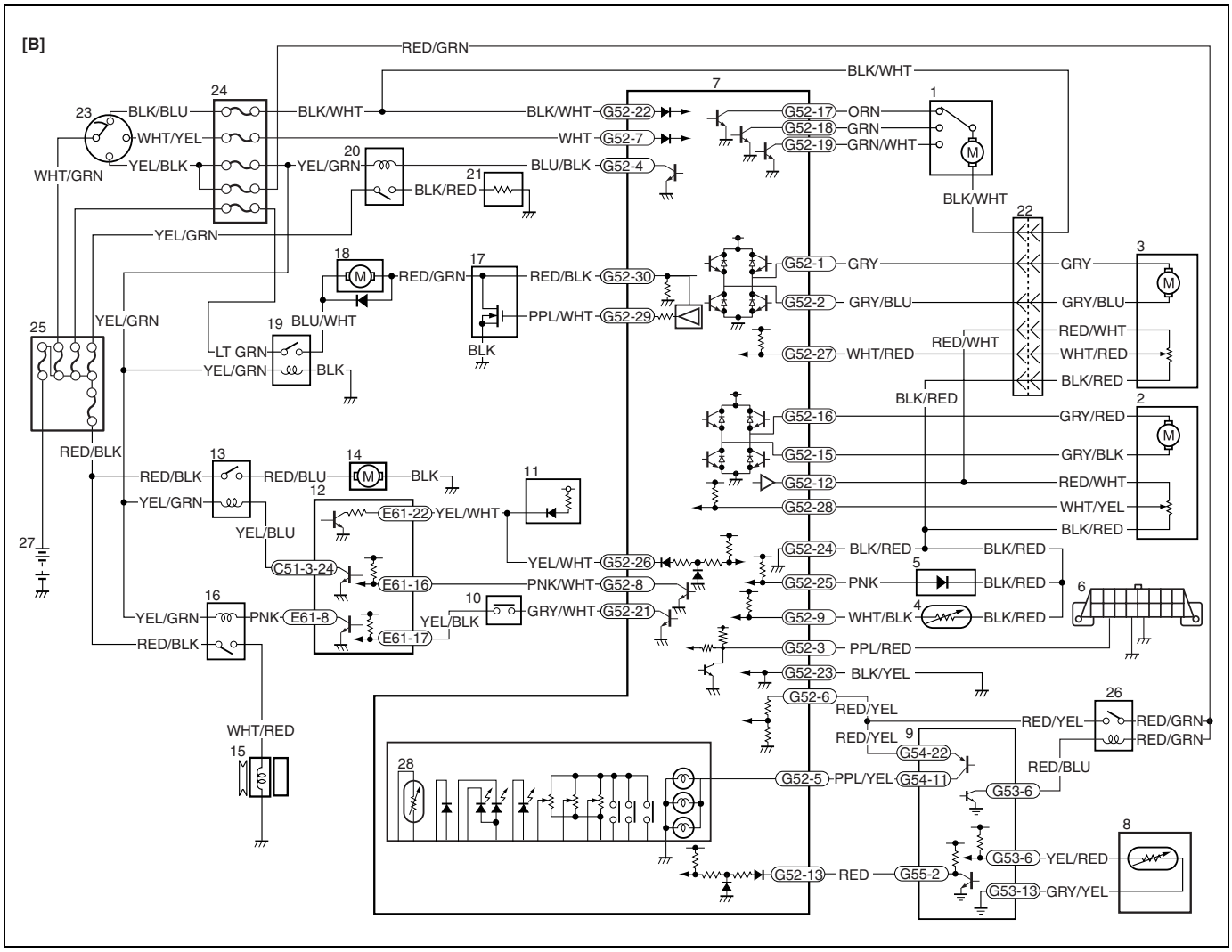
Detail diagnosis table (Ambient temperature within 30 – 35°C (85 – 95°F))

Condition			Possible Cause	Correction
Manifold Gauge	MPa (kg/cm^2) (psi)	Detail		
Lo	Hi			
0.23 – 0.35 (2.3 – 3.5) (33 – 50)	**1.4 – 1.75 (14 – 17.5) (200 – 249)**	**Normal condition.**	–	–
Negative pressure	**0.5 – 0.6 (5 – 6) (71.2 – 85.3)**	**The low pressure side reads a negative pressure, and the high pressure side reads an extremely low pressure. Presence of frost around tubing to and from receiver/dryer and expansion valve.**	Dust particles or water droplets are either stuck or frozen inside expansion valve, preventing the refrigerant from flowing.	Clean expansion valve. Replace it if it cannot be cleaned. Replace receiver/dryer. Evacuate the A/C system and recharge with fresh refrigerant.
Normal : 0.23 – 0.35 (2.3 – 3.5) (33 – 50) ↑↓ Abnormal : Negative pressure	**Normal : 1.4 – 1.75 (14 – 17.5) (200 – 249) ↑↓ Abnormal : 0.69 – 0.98 (7 – 10) (100 – 142)**	**During A/C operation, the low pressure side sometimes indicates negative pressure, and sometimes normal pressure. Also high pressure side reading fluctuates between the abnormal and normal pressure.**	Expansion valve is frozen due to moisture in the system, and temporarily shuts off the refrigeration cycle.	Replace expansion valve. Replace receiver/dryer. Evacuate A/C system and recharge with fresh refrigerant.
0.05 – 0.15 (0.5 – 1.5) (4.2 – 21.3)	**0.69 – 0.98 (7 – 10) (100 – 142)**	**Both low and high pressure sides indicate low readings. Continuous air bubbles are visible through sight glass. Output air is slightly cold.**	Insufficient refrigerant in system. (Refrigerant leaking)	Using a gas leak detector, check for leaks and repair as necessary. Recharge refrigerant to a specified amount. If the pressure reading is almost 0 when the manifold gauges are attached, check for any leaks, repair them, and evacuate the system.
0.4 – 0.6 (4 – 6) (56.9 – 85.3)		**Pressure on low pressure side is high. Pressure on high pressure side is low. Both pressure becoming equal right after A/C is turned OFF.**	Internal leak in compressor.	Inspect compressor and repair or replace as necessary.
0.35 – 0.45 (3.5 – 4.5) (50 – 64)	**1.96 – 2.45 (20 – 25) (285 – 355)**	**High pressure reading on both low and high pressure sides. Air bubbles are not visible even when engine rpm is lowered.**	Overcharged A/C system. Faulty condenser cooling operation. Faulty condenser fan operation.	Adjust refrigerant to specified amount. Clean condenser. Inspect and repair condenser fan.
		High pressure reading on both low and high pressure sides. Low pressure side tubing is not cold when touched. Air bubbles are visible through sight glass.	Presence of air in A/C system. (Improperly evacuated)	Replace receiver/dryer. Inspect quantity of compressor oil and presence of contaminants in oil. Evacuate system and recharge with fresh refrigerant.
0.45 – 0.55 (4.5 – 5.5) (64 – 78)		**High pressure reading on both low and high pressure sides. Large amount of frost or dew on the low pressure side tubing.**	Faulty expansion valve. Refrigerant flow is not regulated properly.	Replace expansion valve.

Wiring Circuit

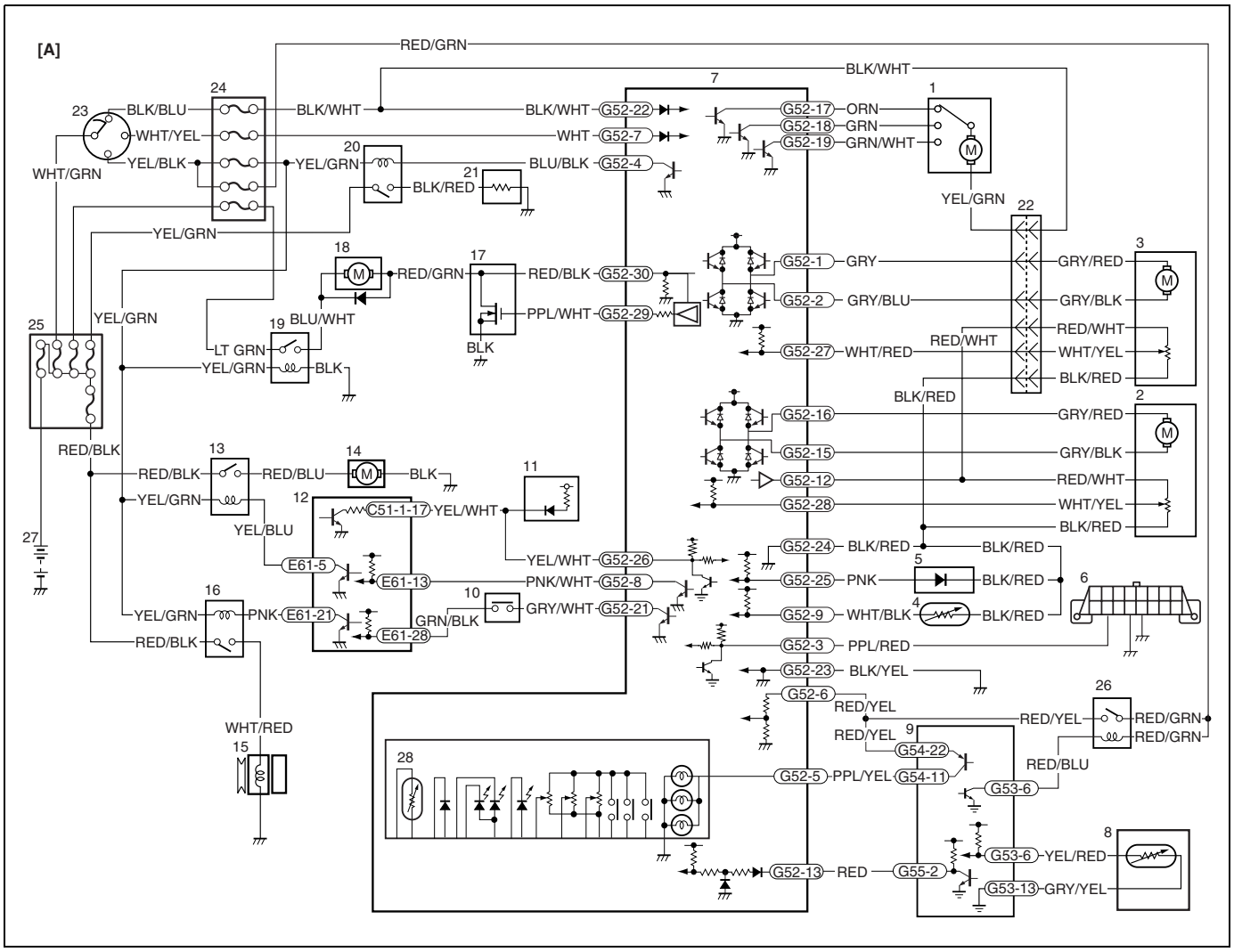
For G16 and J20 Engine Model

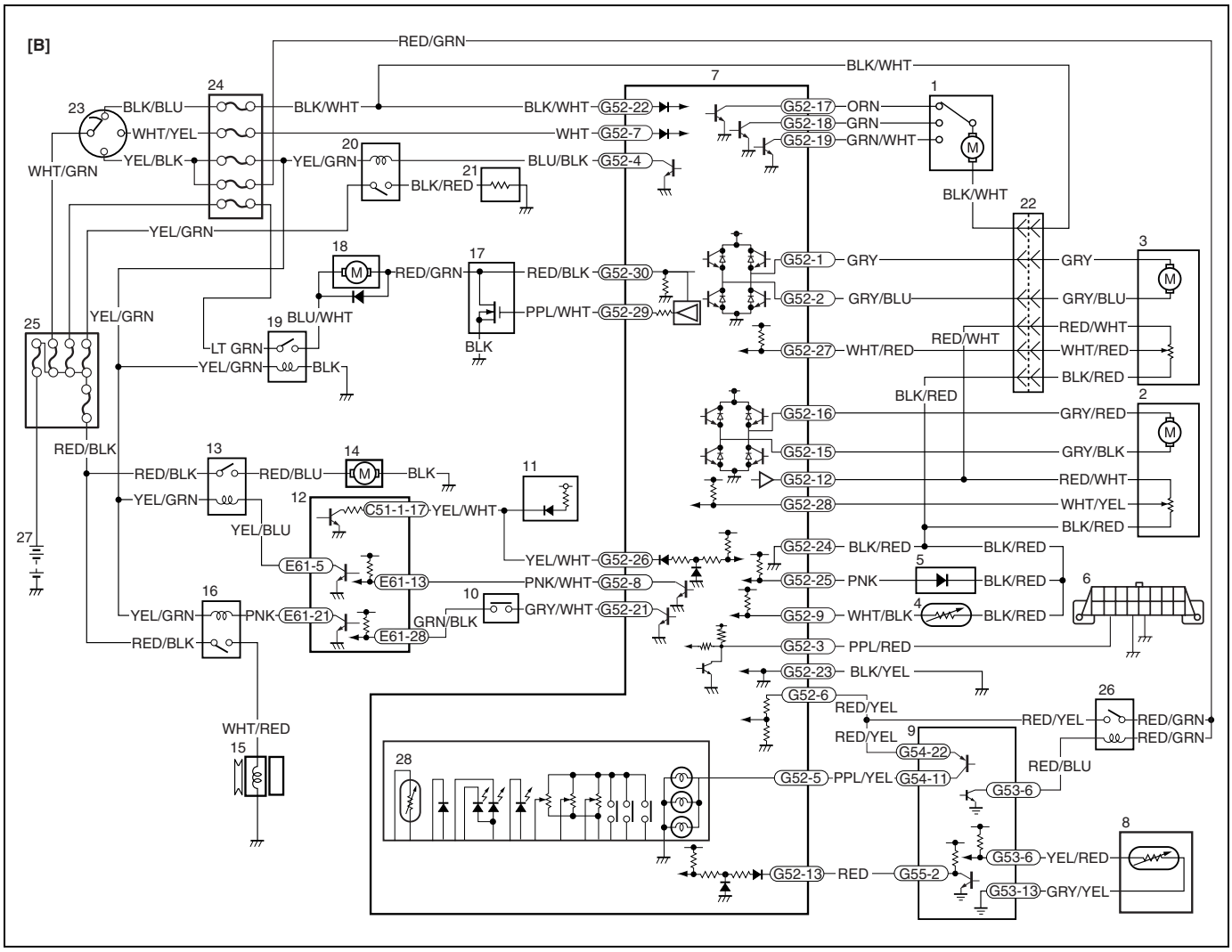




[A] : LH vehicle model	5. Sunload sensor (for vehicle with automatic air conditioning system)	11. Engine coolant temperature meter (in combination meter)	17. Blower motor controller	23. Ignition switch
[B] : RH vehicle model	6. DLC	12. ECM (PCM)	18. Blower motor	24. Fuse box
1. Air intake actuator	7. HVAC control module	13. Condenser fan motor relay	19. Blower motor relay	25. Main fuse box
2. Air flow control actuator	8. Outside air temperature sensor (for vehicle with automatic air conditioning system)	14. Condenser cooling fan motor	20. Rear window defogger relay	26. Headlight relay No.2
3. Temperature control actuator	9. BCM	15. A/C Compressor	21. Rear window defogger	27. Battery
4. A/C evaporator temperature sensor	10. A/C refrigerant (dual) pressure switch	16. A/C compressor relay	22. Connector “AC”	28. Inside air temperature sensor (for vehicle with automatic air conditioning system)

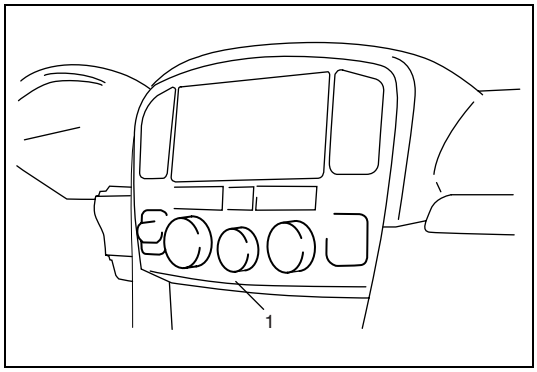
For H25 Engine Model





[A] : LH vehicle model	5. Sunload sensor (for vehicle with automatic air conditioning system)	11. Engine coolant temperature meter (in combination meter)	17. Blower motor controller	23. Ignition switch
[B] : RH vehicle model	6. DLC	12. ECM (PCM)	18. Blower motor	24. Fuse box
1. Air intake actuator	7. HVAC control module	13. Condenser fan motor relay	19. Blower motor relay	25. Main fuse box
2. Air flow control actuator	8. Outside air temperature sensor (for vehicle with automatic air conditioning system)	14. Condenser cooling fan motor	20. Rear window defogger relay	26. Headlight relay No.2
3. Temperature control actuator	9. BCM	15. A/C compressor	21. Rear window defogger	27. Battery
4. A/C evaporator temperature sensor	10. A/C refrigerant (dual) pressure switch	16. A/C compressor relay	22. Connector “AC”	28. Inside air temperature sensor (for vehicle with automatic air conditioning system)

HVAC Control Module and Its Circuits



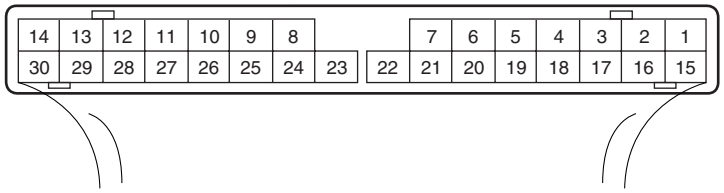
CAUTION:
HVAC control module (1) cannot be checked by itself.
It is strictly prohibited to connect voltmeter to HVAC control module with couplers disconnected from it.

HVAC control module and its circuits can be checked at HVAC control module wiring couplers by measuring voltage.

VOLTAGE CHECK

1) Remove HVAC control module from vehicle referring to "HVAC Control Module" in this section.
2) Connect HVAC control module and body control module couplers to HVAC control module and body control module.
3) Check each terminal voltage with couplers connected by referring to the "HVAC Control Module Voltage Table".

TERMINAL ARRANGEMENT OF HVAC CONTROL MODULE CONNECTOR "G52" VIEWED FROM HARNESS SIDE



HVAC control module voltage table

Terminal	Wire Color	Circuit	Measurement Ground	Normal Value	Condition
G52-1	GRY	Temperature control actuator (COOL)	Ground to body	about 10.0 V	Ignition switch ON, Temperature selector max HOT to max COOL
				less than 1.5 V	Ignition switch ON, Temperature selector max COOL to max HOT position
G52-2	GRY/BLU	Temperature control actuator (HOT)	Ground to body	about 10.0 V	Ignition switch ON, Temperature selector max COOL to max HOT position
				less than 1.5 V	Ignition switch ON, Temperature selector max HOT to max COOL
G52-3	PPL/RED	Serial communication line of data link connector	–	–	–
G52-4	BLU/BLK	Rear defogger relay output	Ground to body	less than 1.0 V	Ignition switch ON, Rear defogger switch ON
				10 – 14 V	Ignition switch ON, Rear defogger switch OFF
G52-5	PPL/YEL	Illumination switch	Ground to body	10 – 14 V	Ignition switch ON, Illumination switch ON, Illumination controller to the lightest position
				0.0 V	Ignition switch ON, Illumination switch OFF
G52-6	RED/YEL	Illumination controller switch	Ground to body	10 – 14 V	Ignition switch ON, Illumination switch ON
				0.0 V	Ignition switch ON, Illumination switch OFF
G52-7	WHT	Power Supply	Ground to body	10 – 14 V	–
G52-8	PNK/WHT	Electric load signal for blower motor	Ground to body	less than 1.0 V	Ignition switch ON, Blower speed selector more than 3rd position (not including OFF and AUTO position)
				10 – 14 V	Ignition switch ON, Blower speed selector is 1st or 2nd position (not including OFF and AUTO position)
G52-9	WHT/BLK	A/C evaporator temperature sensor	Ground to body	Reference graph No.1	Ignition switch ON
G52-10	–	–	–	–	–
G52-11	–	–	Ground to body	about 5.0 V	Ignition switch ON
G52-12	RED/WHT	Output of 5 V power source for air flow control actuator and temperature control actuator	Ground to body	about 5.0 V	Ignition switch ON
				less than 0.5 V	Ignition switch OFF

Terminal	Wire Color	Circuit	Measurement Ground	Normal Value	Condition
G52-13	RED	Serial communication line for BCM (for automatic air conditioning system)	Ground to body	Reference waveform No.1	Ignition switch ON
G52-14	–	–	–	–	–
G52-15	GRY/BLK	Air flow control actuator (VENT)	Ground to body	about 10.0 V	Ignition switch ON, Air flow selector DEF to VENT position
				less than 1.5 V	Ignition switch ON, Air flow selector VENT to DEF position
G52-16	GRY/RED	Air flow control actuator (DEF)	Ground to body	about 10.0 V	Ignition switch ON, Air flow selector VENT to DEF position
				less than 1.5 V	Ignition switch ON, Air flow selector DEF to VENT position
G52-17	ORN	Air intake actuator (FRE)	Ground to body	less than 1.0 V	Ignition switch ON, Air Intake switch to FRE (Fresh air)
				10 – 14 V	Ignition switch ON, Air Intake switch to REC (Recirculation air)
G52-18	GRN	Air intake actuator (REC)	Ground to body	less than 1.0 V	Ignition switch ON, Air Intake switch to REC (Recirculation air)
				10 – 14 V	Ignition switch ON, Air Intake switch to FRE (Fresh air)
G52-19	GRN/WHT	Air intake actuator (MIX)	Ground to body	less than 1.0 V	Ignition switch ON, Air intake switch to FRE (Fresh air), Engine coolant temperature between 60°C (140°F) and 80°C (176°F), Air flow selector to any position except VENT position
				10 – 14 V	Ignition switch ON, Air intake switch to REC (Recirculation air), Engine coolant temperature between 60°C (140°F) and 80°C (176°F), Air flow selector to DEF position
G52-20	–	–	–	–	–
G52-21	GRY/WHT	A/C request signal (if equipped)	Ground to body	less than 1.0 V	Ignition switch ON, A/C switch ON
				10 – 14 V	Ignition switch ON, A/C switch OFF
G52-22	BLK/WHT	Ignition switch signal	Ground to body	10 – 14 V	Ignition switch ON
				less than 0.5 V	Ignition switch OFF
G52-23	BLK/YEL	Ground	Ground to body	less than 0.5 V	–
G52-24	BLK/RED	Sensor ground	Ground to body	less than 0.5 V	–
G52-25	PNK	Sunload sensor (for automatic air conditioning system)	Ground to body	about 2.5 V	Ignition switch ON, Light over sunload sensor vertically with incandescent lamp of 100 watt, Distance between sunload sensor and incandescent lamp 100 mm (3.94 in.)
				about 4.5 V	Ignition switch ON, Block light to sunload sensor

Terminal	Wire Color	Circuit	Measurement Ground	Normal Value	Condition
G52-26	YEL/WHT	ECT signal	Ground to body	Reference waveform No.2	Ignition switch ON
G52-27	WHT/RED	Temperature control actuator position sensor	Ground to body	about 0.5 V	Ignition switch ON, Temperature selector to max COOL position
				about 4.5 V	Ignition switch ON, Temperature selector to max HOT position
G52-28	WHT/YEL	Air flow control actuator position sensor	Ground to body	about 4.5 V	Ignition switch ON, Air flow selector to VENT position
				about 3.7 V	Ignition switch ON, Air flow selector to VENT/FOOT position
				about 2.0 V	Ignition switch ON, Air flow selector to FOOT position
				about 1.4 V	Ignition switch ON, Air flow selector to DEF/FOOT position
				less than 0.5 V	Ignition switch ON, Air flow selector to DEF position
G52-29	PPL/WHT	Blower motor controller	Ground to body	less than 1.0 V	Ignition switch ON, Blower speed selector OFF
				about 2.5 V	Ignition switch ON, Blower speed selector 1st position (not including OFF and AUTO position)
				about 10.0 V	Ignition switch ON, Blower speed selector 8th position
G52-30	RED/BLK	Blower motor control voltage feedback	Ground to body	10 – 14 V	Ignition switch ON, Blower speed selector OFF
				about 7.5 V	Ignition switch ON, Blower speed selector 1st position (not including OFF and AUTO position)
				less than 0.2 V	Ignition switch ON, Blower speed selector 8th position

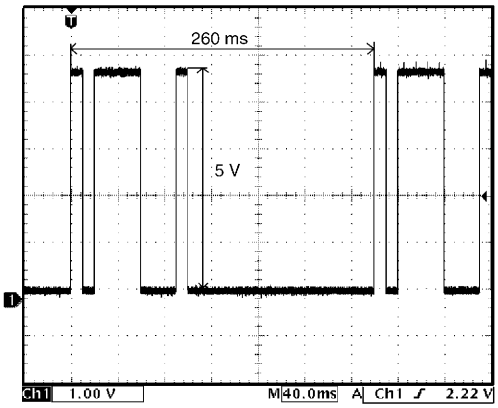
Reference waveform No.1

NOTE:

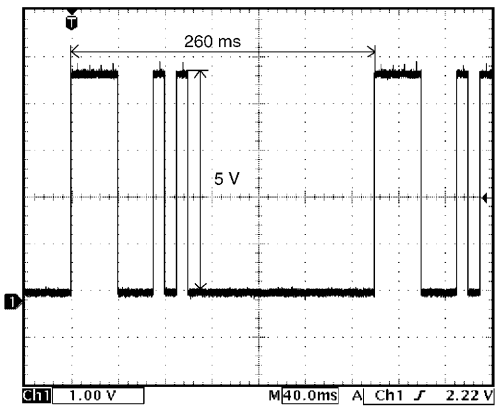
The shape of waveform varies with outside air temperature.

Measurement terminal	G52-13 to G52-23
Oscilloscope setting	CH1: 1 V / DIV TIME: 40 ms / DIV
Measurement condition	Ignition switch turned ON

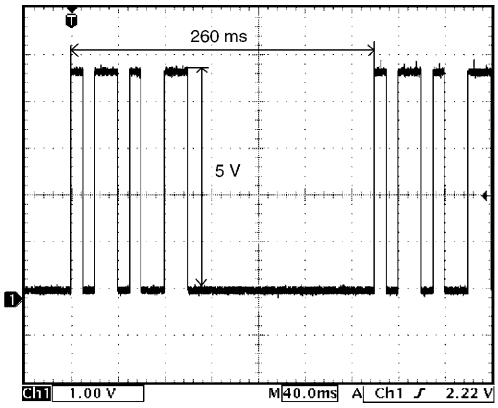
[A]



[B]



[C]



[A] : Waveform at –68°F (–20°C)	[B] : Waveform at 32°F (0°C)	[C] : Waveform at 86°F (30°C)

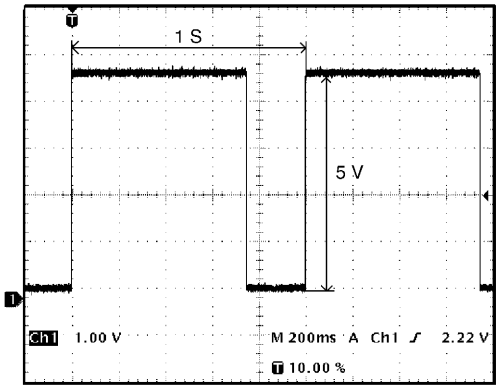
Reference waveform No.2

NOTE:

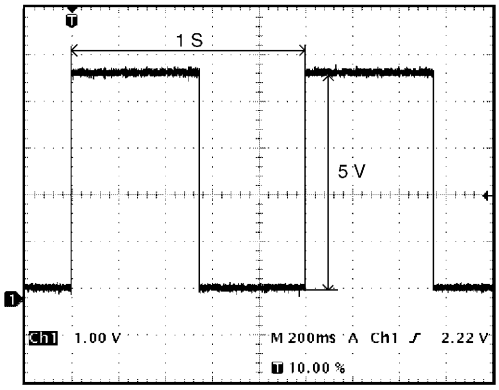
The shape of waveform varies with engine coolant temperature.

Measurement terminal	G52-23 to G52-26
Oscilloscope setting	CH1: 1 V / DIV TIME: 200 ms / DIV
Measurement condition	Ignition switch turned ON

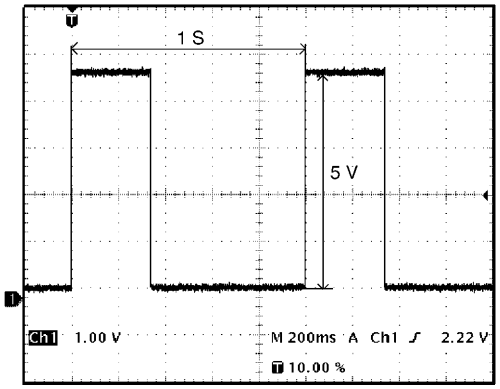
[A]



[B]

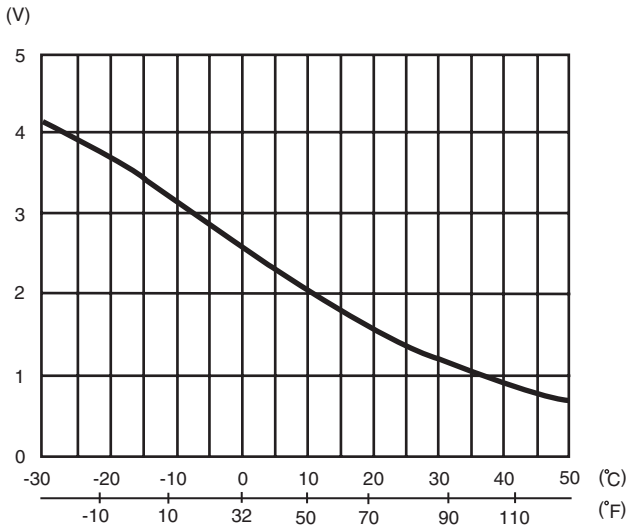


[C]



[A] : Waveform at 32°F (0°C)	[B] : Waveform at 104°F (40°C)	[C] : Waveform at 176°F (80°C)

Reference graph No.1



ECM (PCM) and Its Circuits

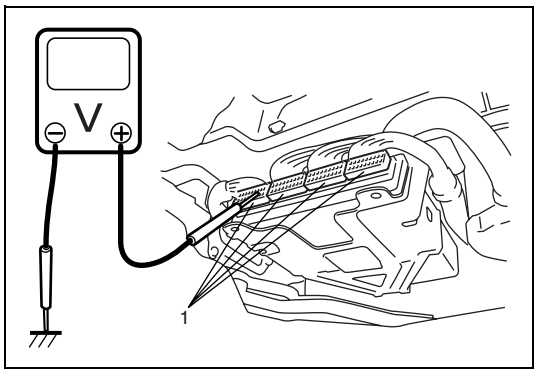
CAUTION:

ECM (PCM) cannot be checked by itself. It is strictly prohibited to connect voltmeter or ohmmeter to ECM (PCM) with couplers disconnected from it.

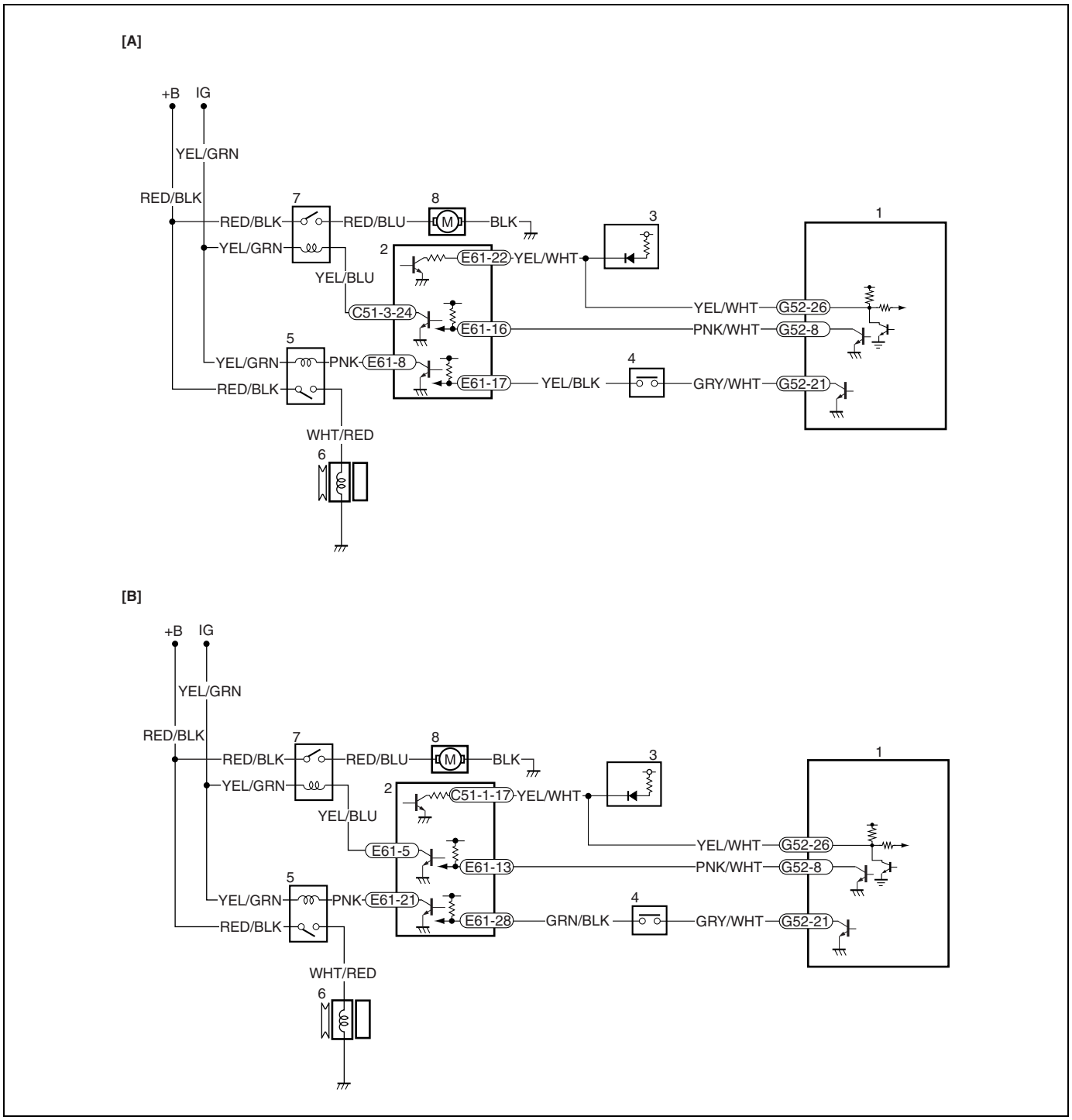
ECM (PCM) and its circuits can be checked at ECM (PCM) wiring couplers by measuring voltage.

VOLTAGE CHECK

1) Remove ECM (PCM) cover.
2) Check each terminal voltage with couplers (1) connected by referring to the following table.

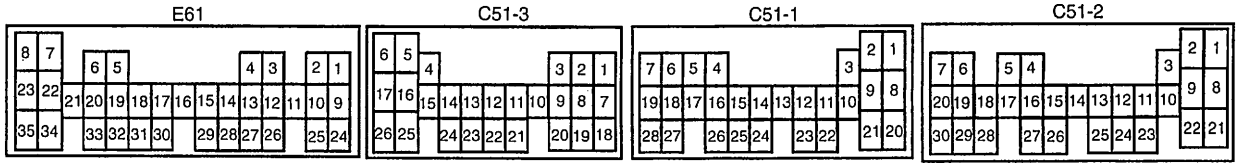


SYSTEM CIRCUIT

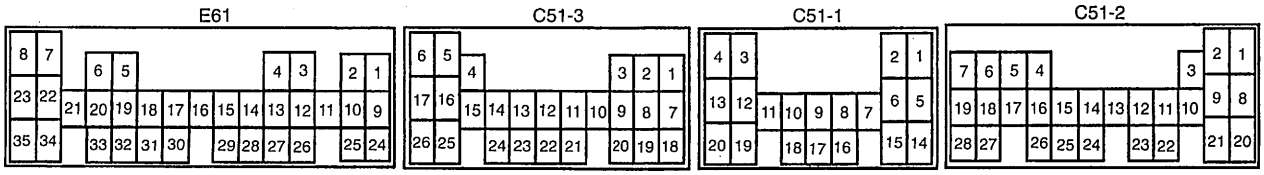


[A] : G16 and J20 engine model	4. A/C refrigerant (dual) pressure switch
[B] : H25 engine model	5. A/C compressor relay
1. HVAC control module	6. A/C compressor
2. ECM (PCM)	7. Condenser fan motor relay
3. Engine coolant temperature meter (in combination meter)	8. Condenser cooling fan motor

Terminal arrangement of ECM for G16, J20 engine



Terminal arrangement of ECM for H25 engine



ECM (PCM) voltage values table for relation of A/C control for G16 and J20 engine model

Terminal	Wire Color	Circuit	Normal Value	Condition
E61-16	PNK/WHT	Electric load signal for blower motor	10 – 14 V	Ignition switch turned ON, blower speed selector selected at under 3rd speed position
			0 – 1 V	Ignition switch turned ON, blower speed selector selected at 3rd speed position or more
E61-17	YEL/BLK	A/C request signal	10 – 14 V (High input)	Ignition switch turned ON, blower speed selector selected at OFF position or A/C switch turned OFF or A/C evaporator temperature less than 2.5°C, 36.5°F
			0 – 1 V (Low input)	Ignition switch turned ON, blower speed selector selected at ON position and A/C switch turned ON with A/C evaporator temperature more than 4°C, 39.2°F
C51-3-24	YEL/BLU	A/C condenser fan motor relay	10 – 14 V	Ignition switch turned ON, engine coolant temperature under 115°C, 239°F or A/C request signal high input
			0 – 1 V	Ignition switch turned ON, engine coolant temperature more than 114°C, 237°F or A/C request signal low input
E61-22	YEL/WHT	ECT sensor signal for combination meter	0 – 0.6 V ↑↓ 4 – 6 V (Repeated indicator)	Ignition switch turned ON (Output signal is 1Hz active low duty pulse. Duty ratio varies depending on ECT.) ECT –30°C = 10% ON duty ECT 130°C = 90% ON duty

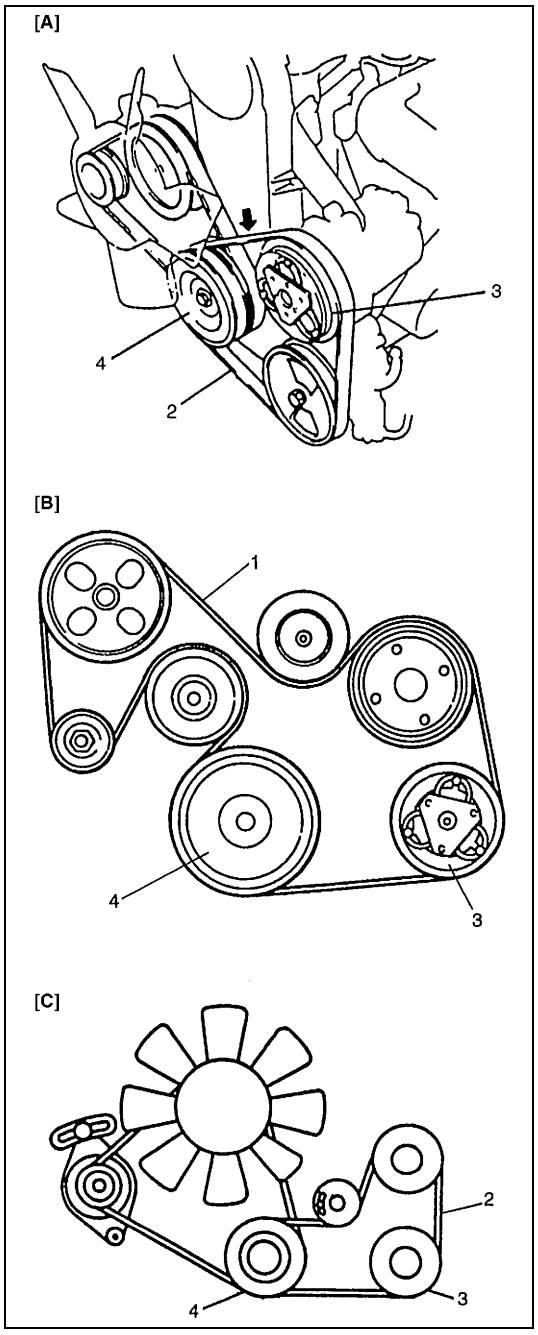
Terminal	Wire Color	Circuit	Normal Value	Condition
E61-8	PNK	A/C compressor relay output	10 – 14 V	Engine running, A/C request signal high input or ECT more than 113°C, 235°F
			0 – 1 V	Engine running, A/C request signal high input or ECT less than 110°C, 198°F

ECM (PCM) voltage values table for relation of A/C control for H25 engine model

Terminal	Wire Color	Circuit	Normal Value	Condition
E61-5	YEL/BLU	A/C condenser fan motor relay	10 – 14 V	Ignition switch turned ON, engine coolant temperature under 115°C, 239°F or A/C request signal high input
			0 – 1 V	Ignition switch turned ON, engine coolant temperature more than 114°C, 237°F or A/C request signal low input
E61-13	PNK/WHT	Electric load signal for blower motor	10 – 14 V	Ignition switch turned ON, blower speed selector selected at under 3rd speed position
			0 – 1 V	Ignition switch turned ON, blower speed selector selected at 3rd speed position or more
E61-21	PNK	A/C compressor relay output	10 – 14 V	Engine running, A/C request signal high input or ECT more than 113°C, 235°F
			0 – 1 V	Engine running, A/C request signal low input or ECT less than 110°C, 198°F
E61-28	GRN/BLK	A/C request signal	10 – 14 V (High input)	Ignition switch turned ON, blower speed selector selected at OFF position or A/C switch turned OFF or A/C evaporator temperature less than 2.5°C, 36.5°F
			0 – 1 V (Low input)	Ignition switch turned ON, blower speed selector selected at ON position and A/C switch turned ON with A/C evaporator temperature more than 4°C, 39.2°F
C51-1-17	YEL/WHT	ECT sensor signal for combination meter	0 – 0.6 V ↑↓ 4 – 6 V (Repeated indicator)	Ignition switch turned ON (Output signal is 1Hz active low duty pulse. Duty ratio varies depending on ECT.) ECT –30°C = 10% ON duty ECT 130°C = 90% ON duty

Drive Belt

INSPECTION



For G16 and H25 engines

Refer to “Power Steering Belt” in Section 3B1 for details.

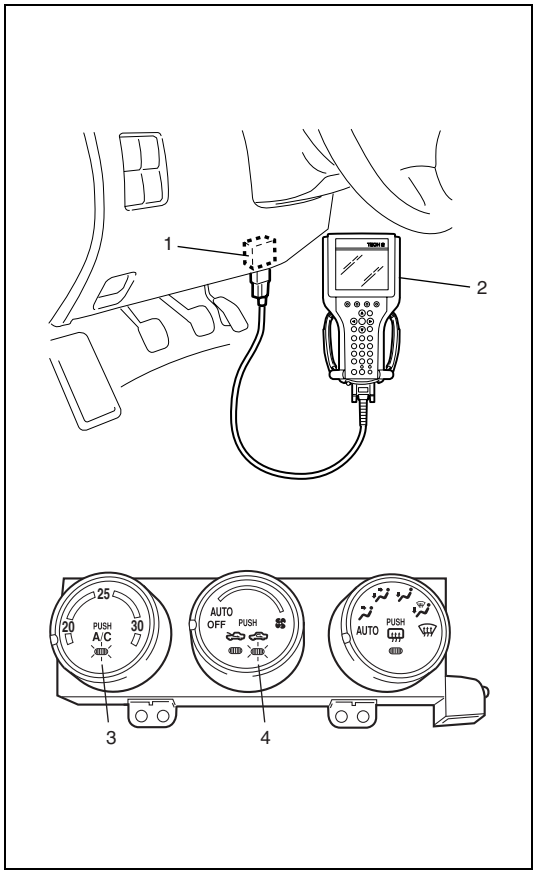
For J20 engine

Refer to “Generator Belt” in Section 6H for details.

[A] : G16 engine
[B] : J20 engine
[C] : H25 engine
1. Generator belt
2. Compressor drive belt
3. Compressor pulley
4. Crankshaft pulley

HVAC Diagnosis

On-Board Diagnostic System



HVAC control module detects malfunction, which may occur in the following area. When HVAC control module detects any malfunction, the A/C indicator lamp (3) flashes on and off for 15 seconds after turning ignition switch to ON position.

- Outside air temperature sensor (for automatic air conditioning system)
- Inside air temperature sensor in HVAC control module (for automatic air conditioning system)
- Sunload sensor (for automatic air conditioning system)
- A/C evaporator temperature sensor
- ECT sensor
- Temperature control actuator
- Air flow control actuator
- Temperature selector of HVAC control module
- Blower speed selector of HVAC control module
- Air flow selector of HVAC control module

DTC can be checked by either one of the following ways.

- DTC can be checked by using SUZUKI scan tool (2) connected to DLC (1).
- Without using SUZUKI scan tool, DTC can be checked by reading the flashing pattern of both the A/C indicator lamp (3) and the REC (recirculation air mode) indicator lamp (4).

Precautions in Diagnosing Trouble

- Do not disconnect connector from HVAC control module, battery cable from battery, or main fuse before reading diagnostic information stored in HVAC control module memory.
- When diagnosing vehicle with automatic air conditioning system indoors, sunload sensor has to be lighted over vertically with an incandescent lamp. Otherwise, DTC B1504 (No.4) is detected even if sunload sensor is normal.
- Each DTC has priority. Only DTC having the highest priority is indicated. Therefore, after troubleshooting the malfunction, diagnosis should be performed again to see if any other DTC(s) having the lower priority is detected. Refer to “DTC Table” to see the order of priority.
- Both the A/C indicator lamp and the REC (recirculation) indicator lamp have to be pushed simultaneously to read history DTC. If the A/C indicator lamp and the REC (recirculation) indicator lamp are pushed again simultaneously, current DTC can be read.
- During indication of DTC, rear window defogger switch is OFF. However, rear window defogger switch is ON during indication of history DTC.
- After troubleshooting some trouble, DTC can be stored in HVAC control module memory as history DTC.

Air Conditioning System Diagnostic Flow Table

Step	Action	Yes	No
1	Customer complaint analysis 1) Perform customer complaint analysis. Was customer complaint analysis performed according to instruction?	Go to Step 2.	Perform customer complaint analysis.
2	Visual inspection 1) Perform visual inspection. Is there any faulty condition?	Repair or replace malfunction part.	Go to Step 3.
3	Problem symptom confirmation 1) Perform problem symptom confirmation. Was problem symptom confirmation performed according to instruction?	Go to Step 4.	Perform problem symptom confirmation.
4	DTC check 1) Check DTC. Is it malfunction code?	Go to Step 5.	Go to Step 6.
5	Troubleshooting for DTC 1) Check and repair according to DTC diag. flow. Are check and repair completed?	Go to Step 8.	Check and repair malfunction part(s).
6	Check for intermittent problem 1) Check for intermittent problem. Is there faulty condition?	Repair or replace malfunction part(s).	Go to Step 7.
7	Air conditioning system symptom diagnosis 1) Inspect and repair referring to “General Diagnosis Table” in this section. Are inspect and repair complete?	Go to Step 8.	Inspect and repair malfunction part(s).
8	Final confirmation test 1) Perform DTC check. Is there any DTC?	Go to Step 5.	Air Conditioning system is in good condition.

Customer complaint analysis

Record details of the problem (failure, complaint) and how it occurred as described by the customer.
For this purpose, use a questionnaire form as shown below which will facilitate collecting information to the point required for proper analysis and diagnosis.

Customer questionnaire (example)

Customer's Name:	Model:	VIN:	
Date of Issue:	Date Reg.	Date of Problem:	Mileage:
Problem Symptoms	• "A/C" indicator lamp abnormal: fails to turn ON / fails to go OFF / flashes • Abnormal noise while "A/C" switch is turned ON: from compressor, from condenser fan motor, other_____ • Cool air does not come out: • Condenser fan motor does not work: • A/C compressor does not work: • Blower fan motor does not work:		
Frequency of Occurrence	• Continuous / Intermittent (_____ times a day, a month) / other_____		
Conditions for Occurrence of Problem	• When outside air temperature is high: • When outside air temperature is low: • For sometime after A/C switch is ON: • All the time:		
Environmental Condition	• Weather: fair / cloudy / rain / snow / other_____ • Temperature: _____ °F (_____ °C)		
DTC	• First check: Normal code / malfunction code(_____)		

Visual inspection

As a preliminary step, be sure to perform visual check of the items that support proper function of the air conditioning system referring to "Visual Inspection" in this section.

Problem symptom confirmation

This confirmation is needed before performing DTC check without using SUZUKI scan tool because A/C and REC (recirculation air model) indicator lamp are used to indicator DTC. Therefore, check if each indicator lamp flashes referring to "A/C Indicator Lamp Check" in this section.

DTC check

Refer to "DTC Check" in this section for checking procedure.

Troubleshooting for DTC

Based on the DTC indicated in Step 4 and referring to applicable DTC flow, locate the cause of the trouble, namely in a sensor, actuator, wire harness, connector, HVAC control module or other part and repair or replace faulty parts.

Check for intermittent problem

Check parts where an intermittent trouble is easy to occur (e.g., wire harness, connector, etc.), referring to "Intermittent and Poor Connection" in Section 0A.

Air conditioning system symptom diagnosis

Check the parts or system suspected as a possible cause referring to “General Diagnosis Table” in this section.

Final confirmation test

Confirm that the problem symptom has gone and the air conditioning system is free from any abnormal conditions. If what has been repaired is related to the malfunction DTC, check DTC once and confirm that no DTC is indicated.

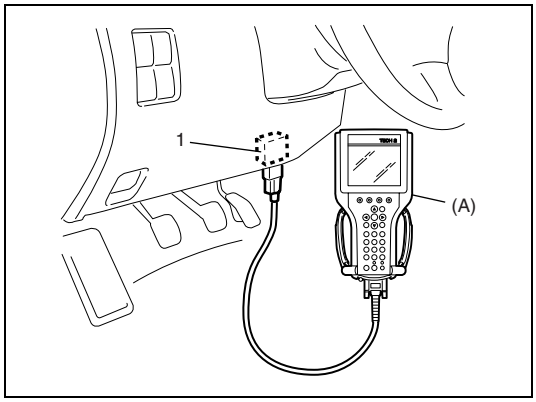
Visual inspection

Visually check the following parts and systems.

Inspection Item	Correction
• Refrigerant – – – leakage, over charge	Refer to “Quick Check of Refrigerant Charge” in this section.
• A/C compressor drive belt – – – loosen, damage	Refer to “Drive Belt” in this section.
• Fuses – – – burning	
• Battery – – – fluid level, corrosion of terminal	
• Connectors of electric wire harness – – – disconnection, friction	

DTC Check

Using SUZUKI scan tool



1) Turn ignition switch to OFF position.
2) Connect SUZUKI scan tool to data link connector (DLC) (1) located on underside of instrument panel.

Special tool
(A) : SUZUKI scan tool

3) Light over sunload sensor vertically with an incandescent lamp of approximately 100 W.

NOTE:

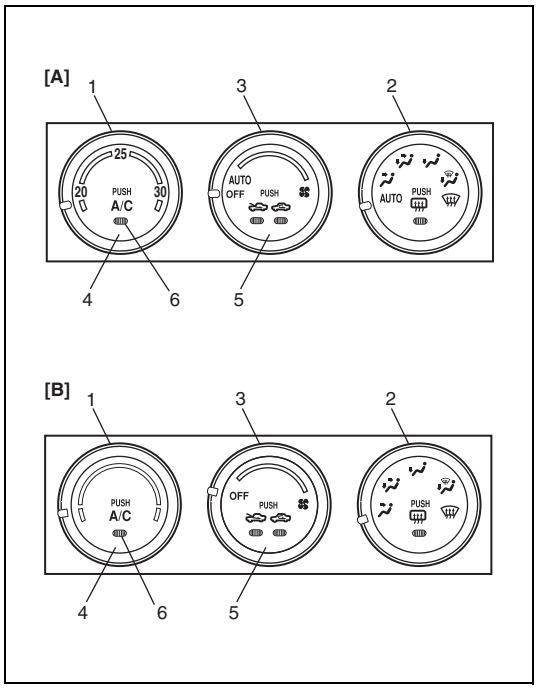
- **The distance between the sensor and lamp should be approximately 100 mm (3.94 in.).**
- **DTC B1504 is detected even if sensor is normal if sunload sensor is not lighted over with an incandescent lamp.**

4) Turn ignition switch to ON position.
5) Read DTC according to instructions displayed on SUZUKI scan tool and print it or write it down. Refer to SUZUKI scan tool operator's manual for further details.
   If communication between scan tool and ECM (PCM) is not possible, check if scan tool is communicable by connecting it to ECM (PCM) in another vehicle. If communication is possible in this case, scan tool is good condition. Then check data link connector and serial data line (circuit) in the vehicle with which communication was not possible.
6) After completing the check, turn ignition switch OFF position and disconnect SUZUKI scan tool from data link connector (DLC).

Not using SUZUKI scan tool

NOTE:

In case of malfunction of temperature selector, blower speed selector and air flow selector, the following procedure can not be used. However, SUZUKI scan tool can be used to check DTCs.



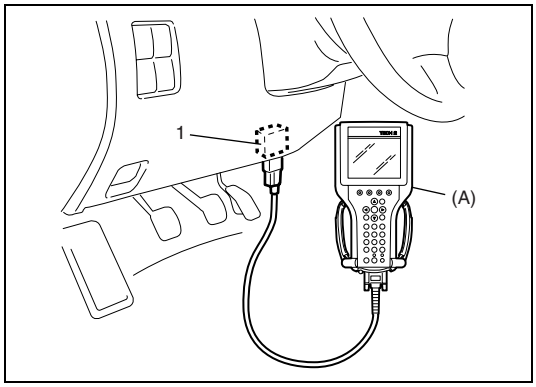
1) Check A/C switch indicator (6) for operation referring to “A/C Indicator Lamp Check” in this section.
2) Light over sunload sensor vertically with an incandescent lamp of approx. 100 W apart from about 100 mm (3.94 in.).
3) Set the following selectors to specified positions respectively.
   - Temperature selector (1): Max cool position
   - Air flow selector (2): “AUTO” (automatic air conditioning system) or “VENT” (manual air conditioning system) position
   - Blower speed selector (3): “OFF” position
4) Turn ignition switch ON position under the conditions set at the step 2 and 3 by pushing the A/C switch (4) and air intake switch (5) at the same time.
5) Read DTC from flashing pattern of A/C switch indicator (6) referring “DTC Table” in this section.

[A] :	Automatic air conditioning system
[B] :	Manual air conditioning system

6) After completing the check, turn ignition switch OFF position.

DTC Clearance

Using SUZUKI scan tool

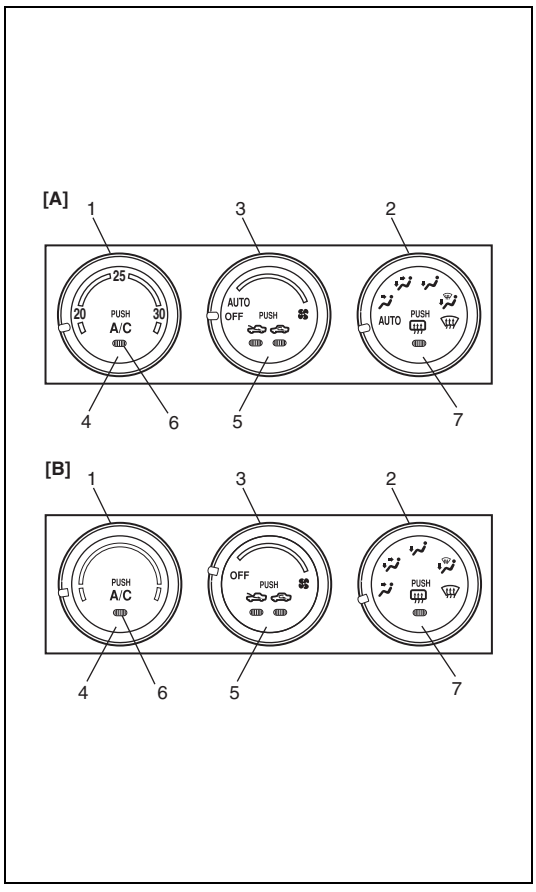


1) Turn ignition switch to OFF position.
2) Connect SUZUKI scan tool to data link connector (DLC) (1).

Special tool
(A) : SUZUKI scan tool

3) Light over sunload sensor vertically with an incandescent lamp of approx. 100 W apart from about 100 mm (3.94 in.) position.
4) Turn ignition switch to ON position.
5) Erase DTC according to instructions displayed on SUZUKI scan tool. Refer to SUZUKI scan tool operator's manual for further details.
6) After completing the clearance, turn ignition switch to OFF position and disconnect SUZUKI scan tool from DLC.
7) Perform "DTC Check" in this section and confirm if normal DTC (NO CODES) is displayed.

Not using SUZUKI scan tool



1) Check A/C switch indicator (6) for operation referring to "A/C Indicator Lamp Check" in this section.
2) Light over sunload sensor vertically with an incandescent lamp of approx. 100 W apart from about 100 mm (3.94 in.) position.
3) Set the following selectors to specified positions respectively.
   - Temperature selector (1): Max cool position
   - Air flow selector (2): "AUTO (automatic air conditioning system) or "VENT" (manual air conditioning system) position.
   - Blower speed selector (3): "OFF" position.
4) Turn ignition switch ON position under the conditions set at the Step 2) and 3) by pushing the A/C switch (4) and air intake switch (5) at the same time.
5) Push A/C switch and air intake switch at the same time.
6) Make sure that rear defogger lamp is lighted.
7) Push rear defogger switch (7) at 3 seconds or more.
8) After completing the clearance, turn ignition switch OFF position.
9) Perform "DTC Check" in this section, and confirm if normal DTC is displayed and if any other DTC is detected.

[A] :	Automatic air conditioning system
[B] :	Manual air conditioning system

DTC Table

CAUTION:
Be sure to perform "Air Conditioning System Check" in this section before starting diagnosis.

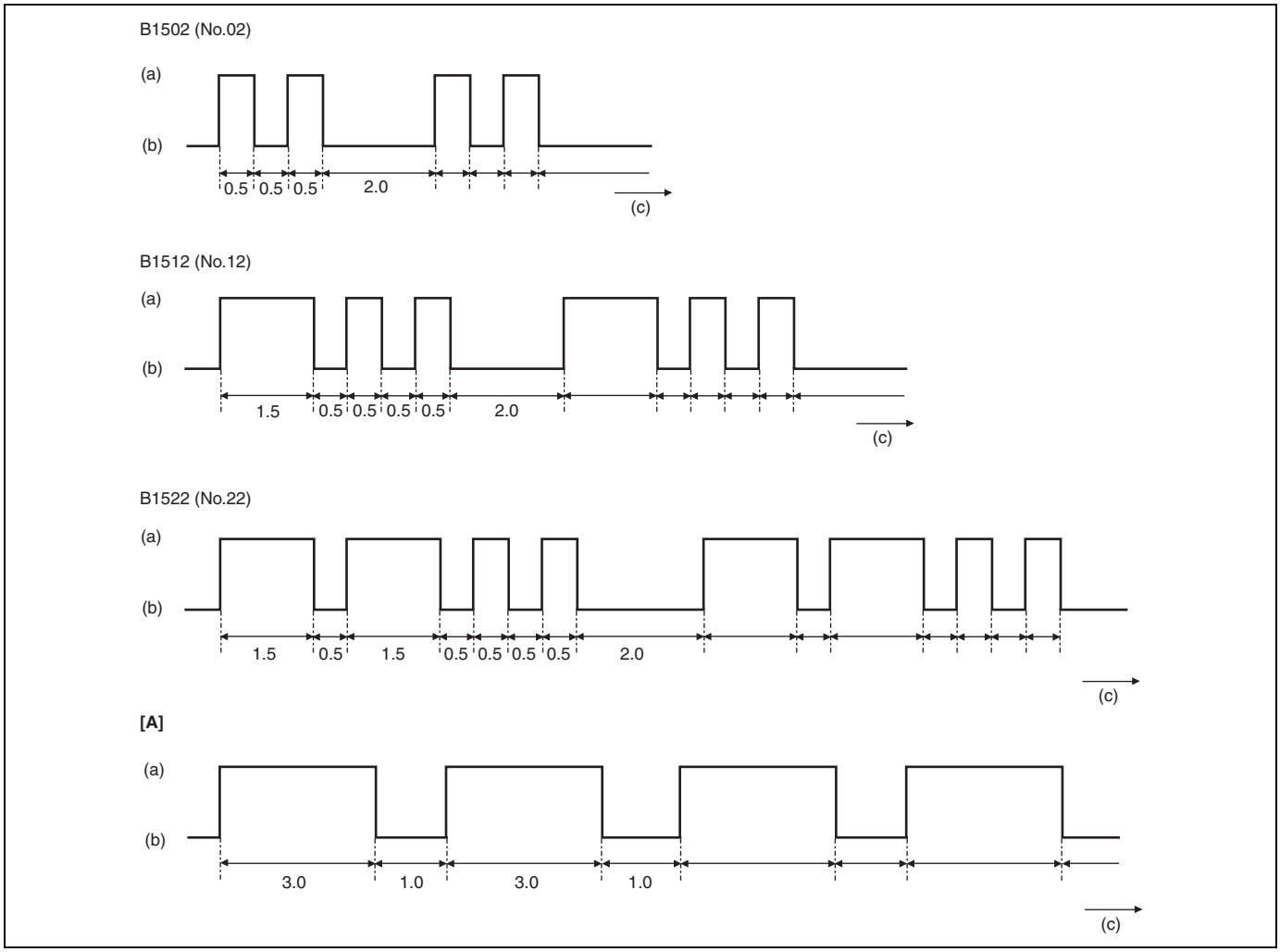
DTC No. (displayed on SUZUKI scan tool)	DTC (indicated by A/C indicator lamp)	Priority	A/C indicator lamp flashing pattern	Diagnosis	
*B1501	01	1		Outside Air Temperature Sensor and Its Circuit Malfunction	Diagnose trouble according to "Diagnostic Flow" corresponding to each DTC.
*B1502	02	2		Inside Air Temperature Sensor and Its Circuit Malfunction	
B1503	03	3		A/C Evaporator Temperature Sensor and Its Circuit Malfunction	
*B1504	04	12		Sunload Sensor and Its Circuit Malfunction	
B1510	10	4		Engine Coolant Temperature (ECT) Sensor and Its Circuit Malfunction	
B1511	11	5		Temperature Control Actuator (Position Sensor) and Its Circuit Malfunction	
B1512	12	6		Air Flow Control Actuator (Position Sensor) and Its Circuit Malfunction	
B1513	13	7		Temperature Control Actuator and Its Circuit Malfunction	
B1514	14	8		Air Flow Control Actuator and Its Circuit Malfunction	
B1520	20	9		Temperature Selector and Its Circuit Malfunction	
B1521	21	10		Blower Speed Selector and Its Circuit Malfunction	
B1522	22	11		Air Flow Selector and Its Circuit Malfunction	
–	–	–		Normal	–

	Normal	Open	Short	Lock
REC (recirculation air mode) indicator lamp flashing pattern				

NOTE:

- **Item with asterisk (*) in "DTC No." column is for vehicles with automatic air conditioning system.**
- **If no malfunction is detected, A/C indicator lamp and REC indicator lamp flash simultaneously.**

Example



[A] : Normal	(b) : A/C indicator lamp turned OFF
(a) : A/C indicator lamp turned ON	(c) : Unit (seconds)

Fail-Safe Table

When any of the following malfunctions (DTCs) is detected, HVAC control module enters fail-safe mode. However, when HVAC control module detects normal operation of A/C system, fail-safe mode is canceled.

DTC No.	Trouble Area	Fail-Safe Operation	
		When ignition switch is turned ON after malfunction is already detected	When malfunction is detected during ignition switch is ON
*B1501	Outside air temperature sensor and its circuit	20°C (68°F)	HVAC control module keeps condition just before malfunction is detected.
*B1502	Inside air temperature sensor and its circuit	25°C (77°F)	HVAC control module keeps condition just before malfunction is detected.
B1503	A/C evaporator temperature sensor and its circuit	0°C (32°F)	HVAC control module keeps condition just before malfunction is detected.

DTC No.	Trouble Area	Fail-Safe Operation	
		When ignition switch is turned ON after malfunction is already detected	When malfunction is detected during ignition switch is ON
*B1504	Sunload sensor and its circuit	0 W/m^2	HVAC control module keeps condition just before malfunction is detected.
B1510	Engine coolant temperature sensor and its circuit	80°C (176°F)	HVAC control module keeps condition just before malfunction is detected.
B1511	Temperature control actuator (position sensor) and its circuit	HVAC control module stops the operation of actuator after 1 minute.	HVAC control module stops the operation of actuator after 1 minute.
B1512	Air flow control actuator (position sensor) and its circuit	HVAC control module stops the operation of actuator after 1 minute.	HVAC control module stops the operation of actuator after 1 minute.
B1513	Temperature control actuator and its circuit	HVAC control module stops the operation of actuator after 1 minute.	HVAC control module stops the operation of actuator after 1 minute.
B1514	Air flow control actuator and its circuit	HVAC control module stops the operation of actuator after 1 minute.	HVAC control module stops the operation of actuator after 1 minute.
B1520	Temperature selector and its circuit	25°C (77°F)	HVAC control module keeps condition just before malfunction is detected.
B1521	Blower speed selector and its circuit	OFF	HVAC control module keeps condition just before malfunction is detected.
B1522	Air flow selector and its circuit	DEF	HVAC control module keeps condition just before malfunction is detected.

NOTE:

Item with asterisk (*) in "DTC No." column is for vehicle with automatic air conditioning system.

Scan Tool Data

As the data values given below are standard values estimated on the basis of values obtained from the normally operating vehicles by using a scan tool, use them as reference values. Even when the vehicles are in good condition, there may be cases where the checked values do not fall within each specifies data range. Therefore, judgement as abnormal should not be made by checking with these data alone.

Scan Tool Data	Condition	Normal Condition / Reference Value
TEMP CONT SWITCH	<For vehicle with automatic A/C> Each reference value is relative to the position of temperature selector of HVAC control module.	Max Cool, 20°C (68°F), 20.5°C (68.9°F) ... 29.5°C (85.1°F), 30°C (86°F), Max Hot
	<For vehicle with manual A/C> Each reference value is relative to the position of temperature selector of HVAC control module.	Max Cool, P1, P2 ... P20, P21, Max Hot

Scan Tool Data	Condition	Normal Condition / Reference Value
CABIN TEMPERATURE (NOTE 1)	Reference value is relative to in-car temperature.	–29°C – 47.5°C (–20.2°F – 117°F)
OUTSIDE AIR TEMP (NOTE 1)	Reference value is relative to outside air temperature.	–29°C – 47.5°C (–20.2°F – 117.5°F)
EVAPORATOR TEMP	Reference value is relative to temperature of evaporator.	–29°C – 47.5°C (–20.2°F – 117.5°F)
COOLANT TEMP	At specified idle speed after warming up	–23°C – 130°C (–9.4°F – 266°F)
SUNLOAD (NOTE 1)	Reference value depends on the situation.	0 W/m^2 – 1963.5 W/m^2
MODE CONT SWITCH	<For vehicle with automatic A/C> Each reference value is relative to the position of airflow selector of HVAC control module.	AUTO, VENT, BI-LEVEL, FOOT, DEF-FOOT DEF
	<For vehicle with manual A/C> Each reference value is relative to the position of airflow selector of HVAC control module.	VENT, BI-LEVEL, FOOT, DEF-FOOT DEF
FAN CONT SWITCH	<For vehicle with automatic A/C> Each reference value is relative to the position of blower speed selector of HVAC control module.	AUTO, 1st, 2nd ... 7th, 8th
	<For vehicle with manual A/C> Each reference value is relative to the position of blower speed selector of HVAC control module.	1st, 2nd ... 7th, 8th
FAN DESIRE VOLT	Reference value is relative to the position of blower speed selector of HVAC control module.	0 – 15.5 V
AIR MIX POS SENSOR	Reference value is relative to the position of temperature selector of HVAC control module.	0.5 V (Max Cool)
		4.5 V (Max Cool)
MODE POS SENSOR	Reference value is relative to the position of airflow selector of HVAC control module.	0.5 V (DEF)
		4.5 V (VENT)
A/C CONT SIG	A/C system is ON.	ON
	A/C system is OFF.	OFF
BLOWER FAN LOAD	Position of blower speed selector is 1st or 2nd position.	ON
	Position of blower speed selector is more than 3rd position.	OFF
AIR INTAKE MODE	Fresh air (FRE) mode is activated.	FRE
	Recirculation air (REC) mode is activated.	REC
	• Engine coolant temperature is less than 60°C. • Air outlet is except FACE position. • When air intake mode is changed to Recirculation air (REC) mode.	MIX
A/C INDICATOR LAMP	A/C indicator lamp is lighted.	ON
	A/C indicator lamp is not lighted.	OFF
FRE INDICATOR LAMP	Fresh air (FRE) indicator lamp is lighted.	ON
	Fresh air (FRE) indicator lamp is not lighted.	OFF
REC INDICATOR LAMP	Recirculation air (REC) indicator lamp is lighted.	ON
	Recirculation air (REC) indicator lamp is not lighted.	OFF
REAR DEF INDICATOR	Rear defogger indicator lamp is lighted.	ON
	Rear defogger indicator lamp is not lighted.	OFF
ILLUMINATION	Lighting switch is at parking position.	ON
	Lighting switch is at OFF position.	OFF

Scan Tool Data	Condition	Normal Condition / Reference Value
STEERING WHEEL (NOTE 1)	For vehicle equipped with left steering wheel	Left
	For vehicle equipped with right steering wheel	Right
FUEL TYPE (NOTE 2)	For vehicle which uses gasoline fuel	Gasoline
	For vehicle which uses diesel fuel	Diesel

NOTE1:

This data is for vehicle with automatic air conditioning system.

NOTE2:

This data is for vehicle with manual air conditioning system.

Scan tool data definitions

TEMP CONT SWITCH

Position of temperature control selector of HVAC control module

CABIN TEMPERATURE (for vehicle with automatic air conditioning model)

Inside air temperature detected by inside air temperature sensor installed in HVAC control module

OUTSIDE AIR TEMPERATURE (for vehicle with automatic air conditioning model)

Outside air temperature detected by outside air temperature sensor installed on 4WD air pump assembly bracket

EVAPORATOR TEMP

Temperature of air passed through evaporator

COOLANT TEMP

Engine coolant temperature detected by engine coolant temperature sensor

SUNLOAD (for vehicle with automatic air conditioning model)

Amount of sunlight detected by sunload sensor installed on the driver side on the dashboard

MODE CONT SWITCH

Position of airflow selector of HVAC control module

FAN CONT SWITCH

Position of air speed selector of HVAC control module

FAN DESIRE VOLT

Voltage for blower motor

AIR MIX POS SENSOR

Input signal from position sensor in temperature control actuator

MODE POS SENSOR

Input signal form position sensor in air flow control actuator

A/C CONT SIG (ON or OFF)
State of A/C indicator lamp

BLOWER FAN LOAD (ON or OFF)

ON: Position of blower speed selector is 1st or 2nd position.
OFF: Position of blower speed selector is more than 3rd position.

AIR INTAKE MODE (FRE, REC or MIX)

State of air intake mode

A/C INDICATOR LAMP (ON or OFF)

State of A/C indicator lamp

FRE INDICATOR LAMP (ON or OFF)

State of fresh air (FRE) indicator lamp

REC INDICATOR LAMP (ON or OFF)

State of recirculation air (REC) indicator lamp

REAR DEF INDICATOR (ON or OFF)

State of rear defogger indicator lamp

ILLUMINATION (ON or OFF)

State of lighting switch

STEERING WHEEL (RIGHT or LEFT) (for vehicle with automatic air conditioning model)

Position of steering wheel

FUEL TYPE (GASOLINE or DIESEL) (for vehicle with automatic air conditioning model)

Type of fuel which should be used

A/C Indicator Lamp Check

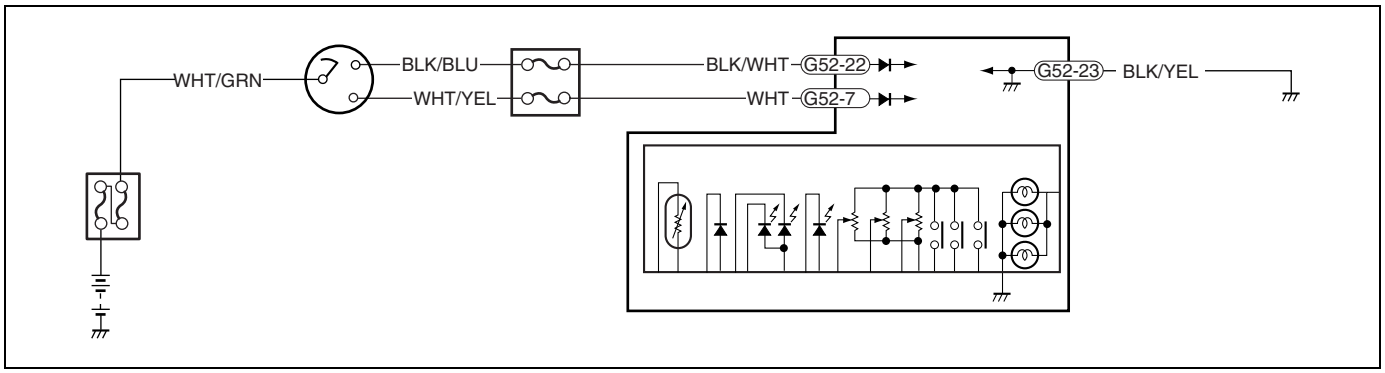
NOTE:

When some malfunction is detected, A/C indicator lamp flashes on and off automatically for 15 seconds at 0.5 second intervals.

1) Turn ignition switch to ON position.
2) Select blower speed selector other than OFF position.
3) Make sure if A/C indicator lamp flashes on and off by pushing A/C switch repeatedly. If not, perform “A/C Indicator Lamp Does Not Come ON” in this section.

A/C Indicator Lamp Does Not Come "ON"

WIRING DIAGRAM



CIRCUIT DESCRIPTION

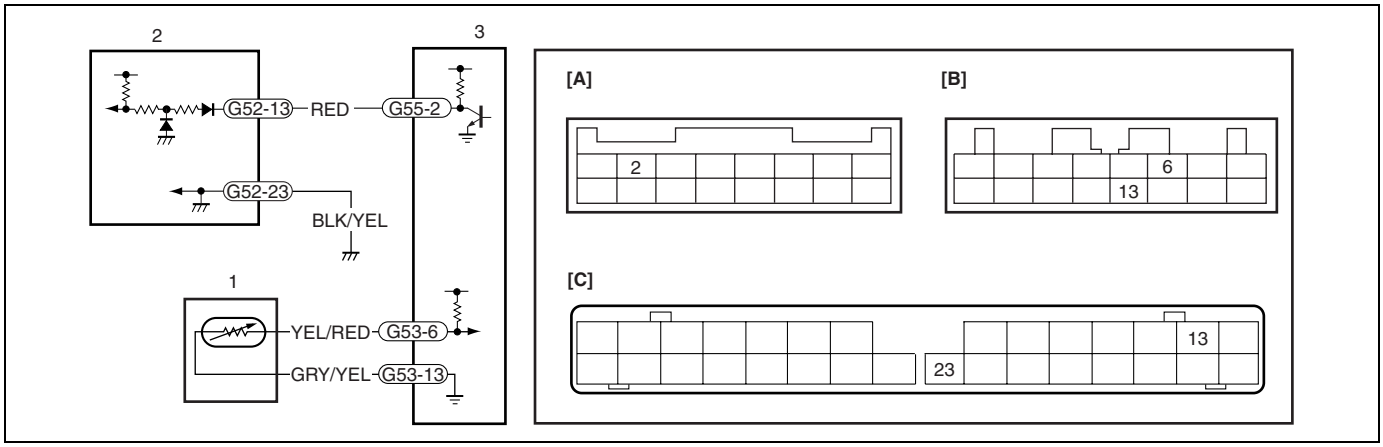
Operation (ON/OFF) of A/C indicator lamp is controlled by HVAC control module.

TROUBLESHOOTING

Step	Action	Yes	No
1	1) Remove HVAC control module referring to "HVAC Control Module" in this section. 2) With ignition switch ON, then check voltage between HVAC control module at "G52-22" wire terminal and body ground. Is voltage 11 V or more?	Go to Step 4.	Go to Step 2.
2	1) Turn ignition switch to OFF position. 2) Check "METER" fuse. Is it in good condition?	Go to Step 3.	Replace "METER" fuse and check for short circuit.
3	1) Check for proper connection of HVAC control module connector at "G52-22" wire terminal. 2) If OK, measure resistance between HVAC control module connector at "G52-22" wire terminal and "BLK/WHT" wire of "METER" fuse. Is resistance 1Ω or less?	Go to Step 4.	"BLK/WHT" wire circuit open.
4	1) Check for proper connection of HVAC control module connector at "G52-23" wire terminal. 2) If OK, measure resistance between HVAC control module connector at "G52-23" wire terminal and body ground. Is resistance 1Ω or less?	Replace HVAC control module.	"BLK/YEL" wire circuit open.

DTC B1501 (No.01) : Outside Air Temperature Sensor and Its Circuit Malfunction

WIRING DIAGRAM



[A] : BCM connector "G55" (viewed from terminal side)	1. Outside air temperature sensor
[B] : BCM connector "G53" (viewed from terminal side)	2. HVAC control module
[C] : HVAC control module connector "G52" (viewed from terminal side)	3. BCM

DTC DETECTING CONDITION AND TROUBLE AREA

DTC DETECTING CONDITION	TROUBLE AREA
• Outside air temperature signal from BCM is less than the specified. (Outside air temperature is less than –44°C, –111°F.) • Outside air temperature signal from BCM is more than the specified. (Outside air temperature is more than 170°C, 338°F.)	• Outside air temperature sensor malfunction • BCM malfunction • HVAC control module malfunction • "RED", "BLK/YEL", "YEL/RED" or "GRY/YEL" wire circuit open or short

DTC TROUBLESHOOTING

Step	Action	Yes	No
1	1) Check BCM and outside air temperature circuit referring to "Inspection of BCM and Its Circuits" and "Outside air Temperature Sensor Inspection" in Section 8H. Is it in good condition?	Go to Step 2.	Repair and replace faulty part.
2	1) Remove HVAC control module and BCM referring to "HVAC Control Module" in this section. 2) Check for proper connection of BCM connector at "G55-2" wire and HVAC control module connector at "G52-13" wire terminals. 3) If OK, measure resistance between BCM connector at "G55-2" wire and HVAC control module connector at "G52-13" wire terminals. Is resistance 1 Ω or less?	Go to Step 3.	"RED" wire circuit open.

Step	Action	Yes	No
3	1) Connect BCM connector, then with ignition switch ON. 2) Check BCM signal referring to "HVAC Control Module and Its Circuits" in this section. Is it in good condition?	Replace HVAC control module.	"RED" wire shorted to ground circuit or shorted to power circuit. If wire is OK, replace BCM.

DTC B1502 (No.02) : Inside Air Temperature Sensor and Its Circuit Malfunction

SYSTEM DESCRIPTION

Inside air temperature sensor is installed in HVAC control module.

DTC DETECTING CONDITION AND TROUBLE AREA

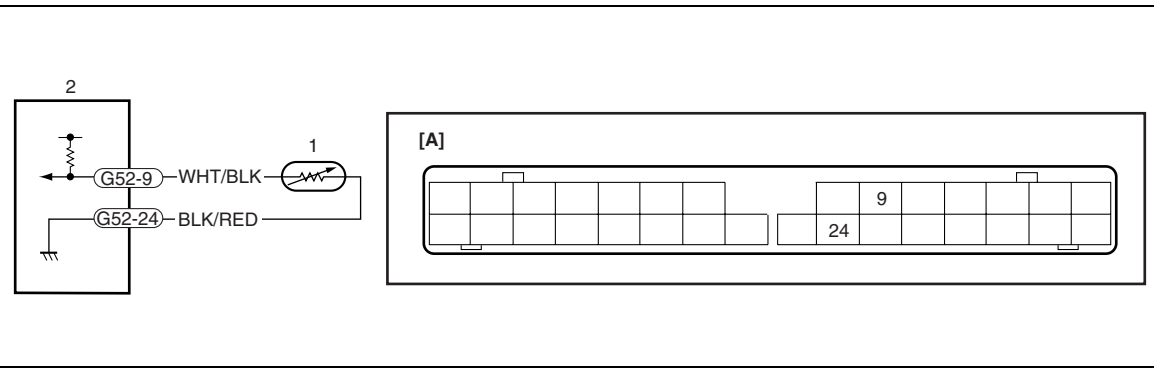
DTC DETECTING CONDITION	TROUBLE AREA
Signal from inside air temperature sensor is less than or more than the specified values.	Inside air temperature sensor malfunction (HVAC control module faulty).

DTC TROUBLESHOOTING

Step	Action	Yes	No
1	1) Turn ignition switch to OFF position. 2) Remove HVAC control module referring to "HVAC Control Module" in this section. 3) Check for proper connection of HVAC control module at all terminals. Is it in good condition?	Replace HVAC control module.	Repair faulty condition.

DTC B1503 (No.03): A/C Evaporator Temperature Sensor and Its Circuit Malfunction

WIRING DIAGRAM



[A] : HVAC control module connector "G52" (viewed from terminal side)	2. HVAC control module
1. A/C evaporator temperature sensor	

DTC DETECTING CONDITION AND TROUBLE AREA

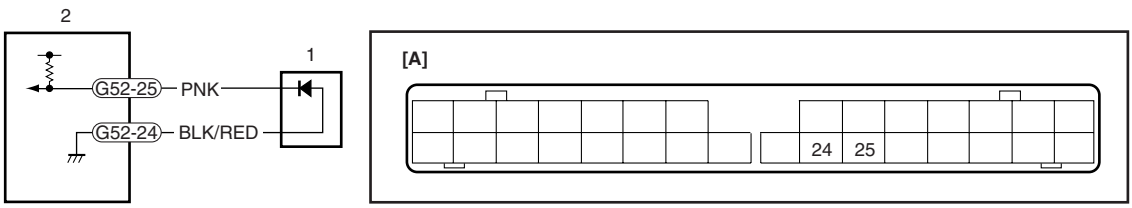
DTC DETECTING CONDITION	TROUBLE AREA
Signal from A/C evaporator temperature sensor is less than the specified (0.2 V) or more than (4.8 V).	"WHT/BLK" or "BLK/RED" wire circuit open or short A/C evaporator temperature sensor malfunction HVAC control module malfunction

DTC TROUBLESHOOTING

Step	Action	Yes	No
1	1) Turn ignition switch to OFF position. 2) Remove HVAC control module referring to "HVAC Control Module" in this section. 3) Disconnect A/C evaporator temperature sensor connector. 4) Check for proper connection of HVAC control module at "G52-9" and A/C evaporator temperature sensor connector at "WHT/BLK" wire terminals. 5) If OK, measure resistance between HVAC control module connector at "G52-9" and A/C evaporator temperature sensor at "WHT/BLK" wire terminals. Is resistance 1 Ω or less?	Go to Step 2.	"WHT/BLK" wire circuit open.
2	1) Check for proper connection of HVAC control module at "G52-24" and A/C evaporator temperature sensor connector at "BLK/RED" wire terminals. 2) If OK, measure resistance between HVAC control module at "G52-24" and A/C evaporator temperature sensor connector at "BLK/RED" wire terminals. Is resistance 1 Ω or less?	Go to Step 3.	"BLK/RED" wire circuit open.
3	1) Connect HVAC control module connector. 2) Turn ignition switch to ON position. 3) Check voltage between A/C evaporator temperature sensor connector at "WHT/BLK" wire terminal and body ground. Is voltage about 4 – 5 V?	Go to Step 4.	"WHT/BLK" wire shorted to ground circuit or shorted to power circuit.
4	1) Check voltage between A/C evaporator temperature sensor connector at "BLK/RED" wire terminal and body ground. Is voltage 0 V?	Go to Step 5.	"BLK/RED" wire shorted to power circuit.
5	1) Turn ignition switch to OFF position. 2) Check A/C evaporator temperature sensor referring to "A/C Evaporator Temperature Sensor" in this section. Is it in good condition?	Replace HVAC control module.	Replace A/C evaporator temperature sensor.

DTC B1504 (No.04) : Sunload Sensor and Its Circuit Malfunction

WIRING DIAGRAM



[A] : HVAC control module connector "G52" (viewed from terminal side)	2. HVAC control module
1. Sunload sensor	

DTC DETECTING CONDITION AND TROUBLE AREA

DTC DETECTING CONDITION	TROUBLE AREA
Signal from sunload sensor is less than the specified (1.31 V) or more than the specified (4.71 V).	"PNK" or "BLK/RED" wire circuit open or short sunload sensor malfunction HVAC control module malfunction.

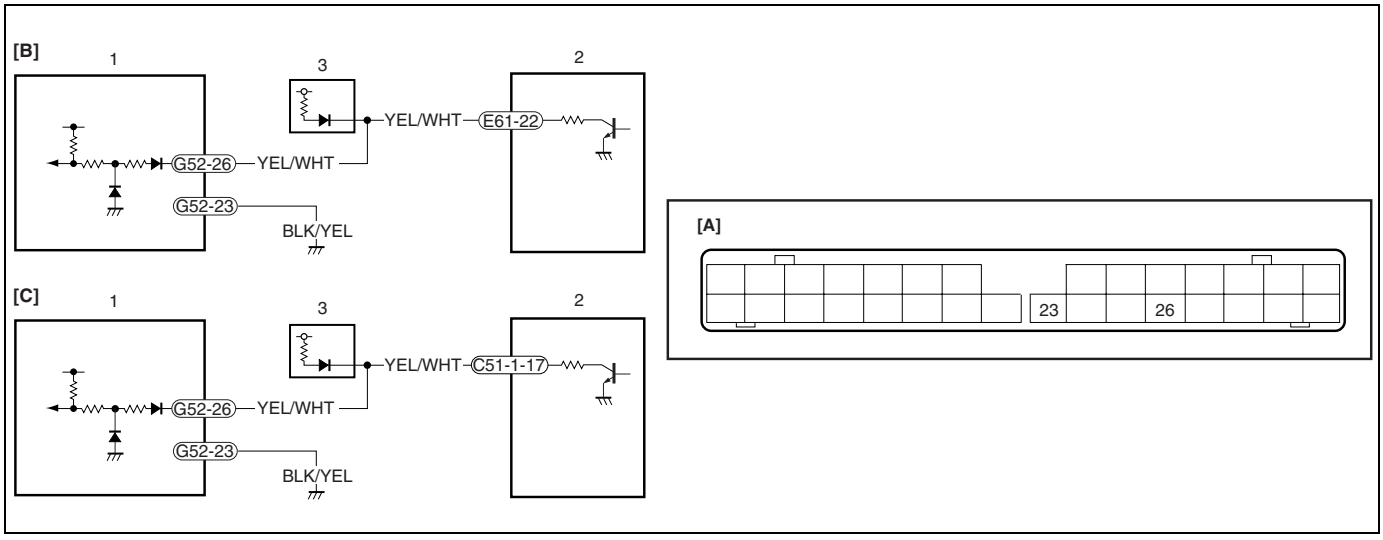
DTC TROUBLESHOOTING

Step	Action	Yes	No
1	1) Remove HVAC control module and sunload sensor referring to "HVAC Control Module" and "Sunload Sensor" in this section. 2) Check for proper connection of HVAC control module at "G52-25" wire and sunload sensor connector at "PNK" wire terminals. 3) If OK, measure resistance between HVAC control module connector at "G52-25" wire and sunload sensor connector at "PNK" wire terminals. Is resistance 1 Ω less?	Go to Step 2.	"PNK" wire circuit open.
2	1) Check for proper connection of HVAC control module at "G52-24" wire and sunload sensor connector at "BLK/RED" wire terminals. 2) If OK, measure resistance between HVAC control module connector at "G52-24" wire and sunload sensor connector at "BLK/RED" wire terminals. Is resistance 1 Ω or less?	Go to Step 3.	"BLK/RED" wire circuit open.
3	1) Connect HVAC control module connector. 2) Turn ignition switch to ON position. 3) Check voltage between sunload sensor connector at "PNK" wire terminal and body ground. Is voltage about 4 – 5 V?	Go to Step 4.	"PNK" wire shorted to ground circuit or shorted to power circuit.

Step	Action	Yes	No
4	1) Check voltage between sunload sensor connector at “BLK/RED” wire terminal and body ground. Is voltage 0 V?	Go to Step 5.	“BLK/RED” wire shorted to power circuit.
5	1) Turn ignition switch to OFF position. 2) Check sunload sensor referring to “Sunload Sensor” in this section. Is it in good condition?	Replace HVAC control module.	Replace sunload sensor.

DTC B1510 (No.10) : Engine Coolant Temperature (ECT) Sensor and Its Circuit Malfunction

WIRING DIAGRAM



[A] : HVAC control module connector “G52” (viewed from terminal side)	[C] : For H25 engine model	2. ECM (PCM)
[B] : For G16 and J20 engine model	1. HVAC control module	3. Engine coolant temperature meter in combination meter

DTC DETECTING CONDITION AND TROUBLE AREA

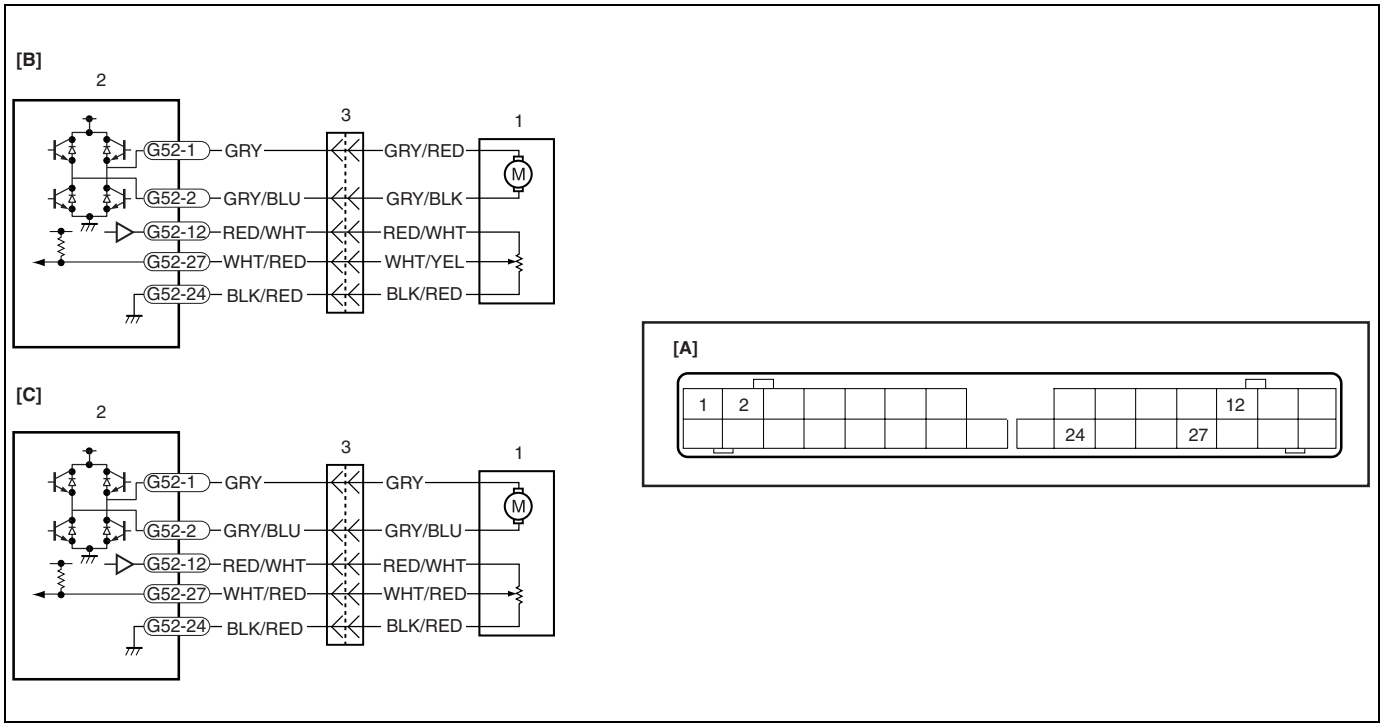
DTC DETECTING CONDITION	TROUBLE AREA
• Engine coolant temperature signal from ECM (PCM) is 0 V or more than 5 V. • DTC P0115 is detected.	• “YEL/WHT” wire circuit open or short • Engine coolant temperature (ECT) sensor malfunction • ECM (PCM) malfunction • HVAC control module malfunction • Engine coolant temperature meter malfunction

DTC TROUBLESHOOTING

Step	Action	Yes	No
1	Is DTC P0115 detected?	Go to "DTC P0115 (DTC No.14, 15) Engine Coolant Temp. Sensor Circuit Malfunction" in Section 6.	Go to Step 2.
2	1) Remove ECM (PCM). For G16 and J20 engine model, refer to "Engine Control Module (ECM)/Powertrain Control Module (PCM)" in Section 6E1. For H25 engine model, refer to "Engine Control Module (ECM)/Powertrain Control Module (PCM)" in Section 6E2. 2) Check for proper connection ECM (PCM) at "YEL/WHT" wire terminal. 3) If OK, then connect ECM (PCM) connector. 4) Check waveform at the terminal "G52-26" of HVAC control module referring to "HVAC Control Module and Its Circuits Inspection". Is it in good condition?	Poor "G52-26" wire terminal. If OK, replace HVAC control module.	Go to Step 3.
3	1) Remove combination meter referring to "Combination Meter" in Section 8. 2) Check waveform at the terminal "G52-26" of HVAC control module referring to "HVAC Control Module and Its Circuits" in this section. Is it in good condition?	"YEL/WHT" wire shorted to ground circuit or shorted to power circuit. If OK, replace combination meter.	Go to Step 4.
4	1) Disconnect connectors from ECM (PCM) and HVAC control module. 2) Measure resistance between ECM (PCM) connector at "YEL/WHT" wire and HVAC control module connector at "YEL/WHT" wire terminals. Is resistance 1 Ω or less?	Go to Step 5.	"YEL/WHT" wire circuit open.
5	1) Check voltage between HVAC control module connector at "YEL/WHT" wire terminal and body ground. Is voltage 0 V?	Go to Step 6.	"YEL WHT" wire shorted to power circuit.
6	1) Measure resistance between HVAC control module connector at "YEL/WHT" wire terminal. Is it infinite?	Replace ECM (PCM).	"YEL/WHT" wire shorted to ground circuit.

DTC B1511 (No.11) : Temperature Control Actuator (Position Sensor) and Its Circuit Malfunction

WIRING DIAGRAM



[A] : HVAC control module connector “G52” (viewed from terminal side)	[C] : RH vehicle model	2. HVAC control module
[B] : LH vehicle model	1. Temperature control actuator	3. Connector “AC”

DTC DETECTING CONDITION AND TROUBLE AREA

DTC DETECTING CONDITION	TROUBLE AREA
Signal from temperature control position sensor is less than the specified (0.12 V) or more than the specified (4.86 V).	Temperature control actuator malfunction HVAC control module “WHT/RED”, “WHT/YEL”, “RED/WHT” or “BLK/RED” wire circuit open or short

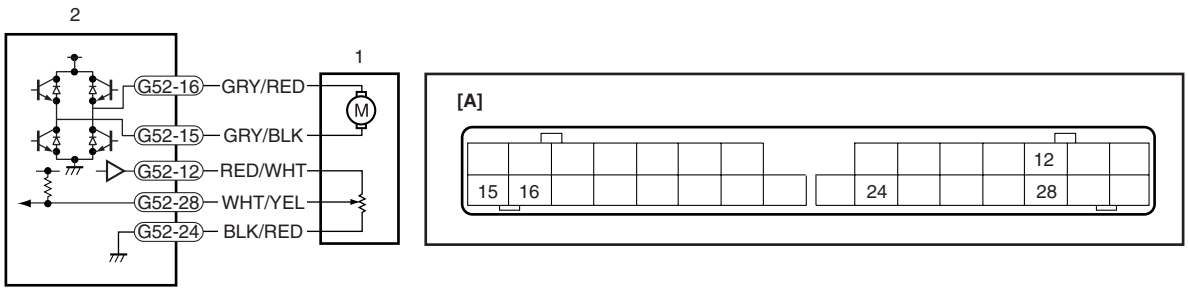
DTC TROUBLESHOOTING

Step	Action	Yes	No
1	1) Remove HVAC control module and temperature control actuator referring to "HVAC Control Module" and "Temperature Control Actuator" in this section. 2) Check for proper connection of connector "AC" at all wire terminals. 3) If OK, check for proper connection of HVAC control module at "G52-27" wire and temperature control actuator connector at "WHT/YEL" or "WHT/RED" wire terminals. 4) If OK, measure resistance between HVAC control module connector at "G52-27" wire and temperature control actuator connector at "WHT/YEL" or "WHT/RED" wire terminals. Is resistance 1 Ω or less?	Go to Step 2.	"WHT/RED" or "WHT/YEL" wire circuit open.
2	1) Check for proper connection of HVAC control module at "G52-12" wire and temperature control actuator connector at "RED/WHT" wire terminals. 2) If OK, measure resistance between HVAC control module connector at "G52-12" wire and temperature control actuator connector at "RED/WHT" wire terminals. Is resistance 1 Ω or less?	Go to Step 3.	"RED/WHT" wire circuit open.
3	1) Check for proper connection of HVAC control module at "G52-24" wire and temperature control actuator connector at "BLK/RED" wire terminals. 2) If OK, measure resistance between HVAC control module connector at "G52-24" wire and temperature control actuator connector at "BLK/RED" wire terminals. Is resistance 1 Ω or less?	Go to Step 4.	"BLK/RED" wire circuit open.
4	1) Connect HVAC control module connector. 2) Turn ignition switch to ON position. 3) Check voltage between "BLK/RED" wire terminal of temperature control actuator connector and body ground. Is voltage 0 V?	Go to Step 5.	"BLK/RED" wire shorted to power circuit.
5	1) Check voltage between "RED/WHT" wire terminal of temperature control actuator connector and body ground. Is voltage 4 – 5 V?	Go to Step 6.	"RED/WHT" wire shorted to ground circuit or shorted to power circuit. If OK, replace HVAC control module.

Step	Action	Yes	No
6	1) Check voltage between “WHT/YEL” or “WHT/RED” wire terminal of temperature control actuator connector and body ground. Is voltage 4 – 5 V?	Replace temperature control actuator.	“WHT/YEL” or “WHT/RED” wire shorted to ground circuit or shorted to power circuit. If OK, replace HVAC control module.

DTC B1512 (No.12) : Air Flow Control Actuator (Position Sensor) and Its Circuit Malfunction

WIRING DIAGRAM



[A]: HVAC control module connector “G52” (viewed from terminal side)	2. HVAC control module
1. Air flow control actuator	

DTC DETECTING CONDITION AND TROUBLE AREA

DTC DETECTING CONDITION	TROUBLE AREA
Signal from air flow control position sensor is less than the specified (0.12 V) or more than the specified (4.86 V).	• Air flow control actuator malfunction • HVAC control module malfunction • “RED/WHT”, “WHT/YEL” or “BLK/RED” wire circuit open or short

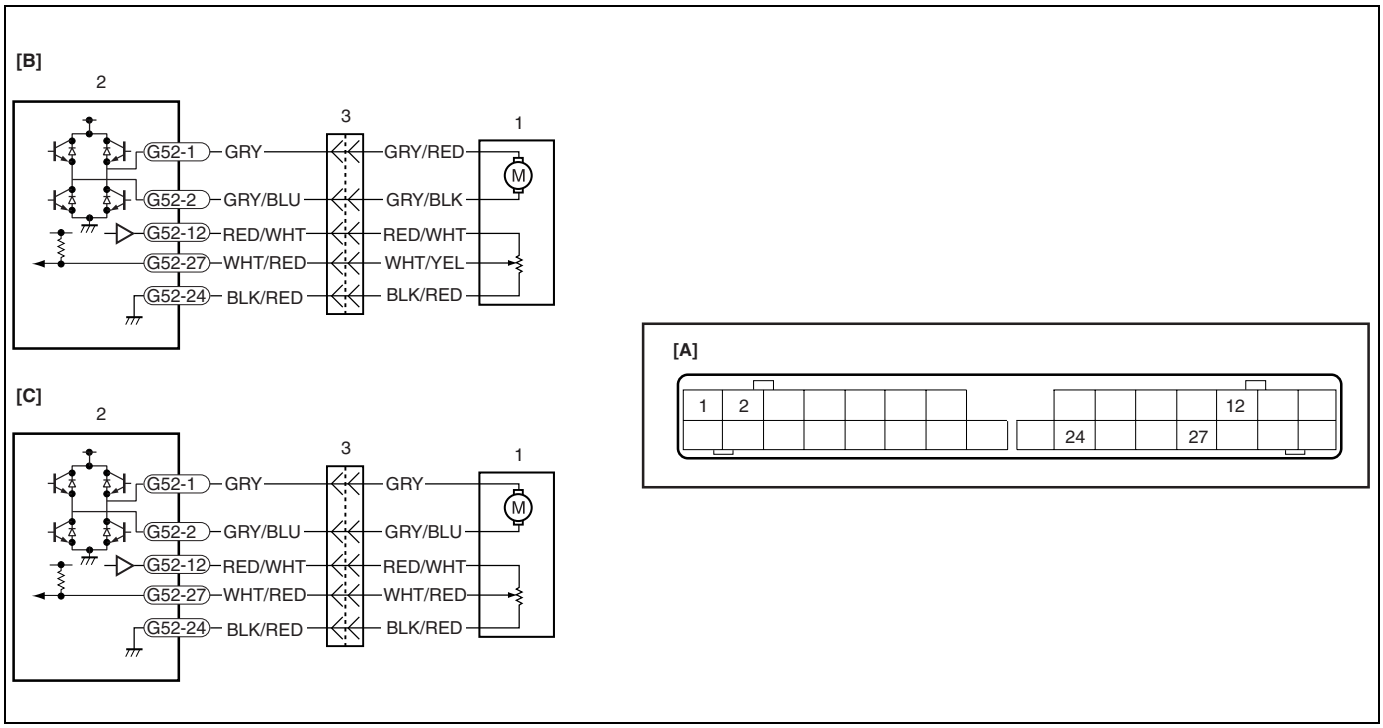
DTC TROUBLESHOOTING

Step	Action	Yes	No
1	1) Remove HVAC control module and air flow control actuator referring to “HVAC Control Module” and “Air Flow Control Actuator” in this section. 2) Check for proper connection of HVAC control module at “G52-28” wire and air flow control actuator connector at “WHT/YEL” wire terminals. 3) If OK, measure resistance between HVAC control module connector at “G52-28” wire and air flow control actuator connector at “WHT/YEL” wire terminals. Is resistance 1 Ω or less?	Go to Step 2.	“WHT/YEL” wire circuit open.

Step	Action	Yes	No
2	1) Check for proper connection of HVAC control module at "G52-12" wire and air flow control actuator connector at "RED/WHT" wire terminals. 2) If OK, measure resistance between HVAC control module connector at "G52-12" wire and air flow control actuator connector at "RED/WHT" wire terminals. Is resistance 1 Ω or less?	Go to Step 3.	"RED/WHT" wire circuit open.
3	1) Check for proper connection of HVAC control module at "G52-24" wire and air flow control actuator connector at "BLK/RED" wire terminals. 2) If OK, measure resistance between HVAC control module connector at "G52-24" wire and air flow control actuator connector at "BLK/RED" wire terminals. Is resistance 1 Ω or less?	Go to Step 4.	"BLK/RED" wire circuit open.
4	1) Connect HVAC control module connector. 2) Turn ignition switch to ON position. 3) Check voltage between "BLK/RED" wire terminal of air flow control actuator connector and body ground. Is voltage 0 V?	Go to Step 5.	"BLK/RED" wire shorted to power circuit.
5	1) Check voltage between "RED/WHT" wire terminal of air flow control actuator connector and body ground. Is voltage 4 – 5 V?	Go to Step 6.	"RED/WHT" wire shorted to ground circuit or shorted to power circuit. If OK, replace HVAC control module.
6	1) Check voltage between "WHT/TEL" wire terminals of air flow control actuator connector and body ground. Is voltage 4 – 5 V?	Replace air flow control actuator.	"WHT/YEL" wire shorted to ground circuit or shorted to power circuit. If OK, replace HVAC control module.

DTC B1513 (No.13) : Temperature Control Actuator and Its Circuit Malfunction

WIRING DIAGRAM



[A]: HVAC control module connector "G52" (viewed from terminal side)	[C]: RH vehicle model	2. HVAC control module
[B]: LH vehicle model	1. Temperature control actuator	3. Connector "AC"

DTC DETECTING CONDITION AND TROUBLE AREA

DTC DETECTING CONDITION	TROUBLE AREA
Signal from temperature control actuator is less than the specified (59 mV) in operation of temperature control actuator.	• "GRY", "GRY/RED", "GRY/BLU" or "GRY/BLK" wire circuit open or short • High resistance of "WHT/RED" or "WHT/YEL" wire circuit • Temperature control actuator malfunction • Linkage malfunction • HVAC control module malfunction

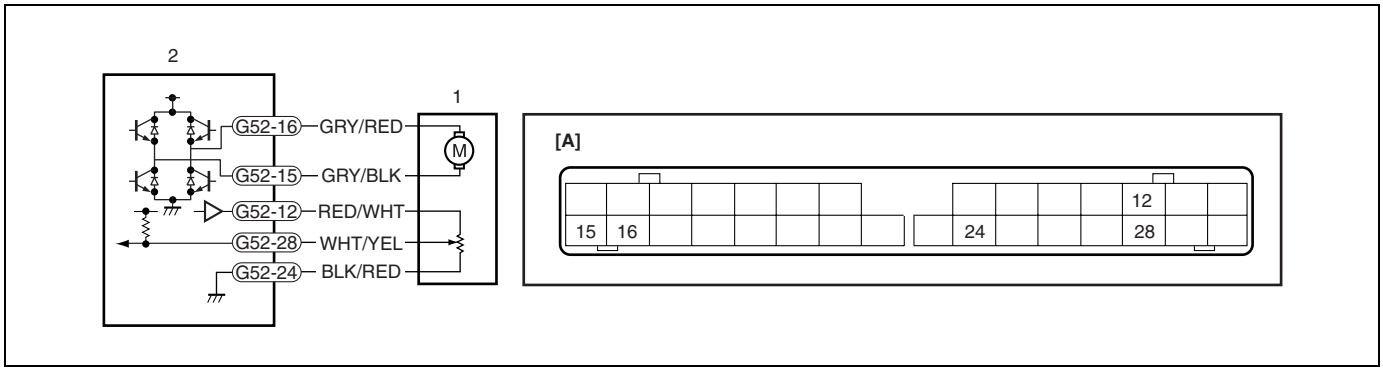
DTC TROUBLESHOOTING

Step	Action	Yes	No
1	1) Remove HVAC control module and temperature control actuator referring to "HVAC Control Module" and "Temperature Control Acxtuator" in this section. 2) Check for proper connection of connector "AC" at all wire terminals. 3) If OK, check for proper connection of HVAC control module at "G52-2" wire and temperature control actuator connector at "GRY/BLU" or "GRY/BLK" wire terminals. 4) If OK, measure resistance between HVAC control module connector at "G52-2" wire and temperature control actuator connector at "GRY/BLU" or "GRY/BLK" wire terminals. Is resistance 1 Ω or less?	Go to Step 2.	"GRY/BLU" or "GRY/BLK" wire circuit open.
2	1) Check for proper connection of HVAC control module at "G52-1" wire and temperature control actuator connector at "GRY" or "GRY/RED" wire terminals. 2) If OK, measure resistance between HVAC control module connector at "G52-1" wire and temperature control actuator connector at "GRY" or "GRY/RED" wire terminals. Is resistance 1 Ω or less?	Go to Step 3.	"GRY" or "GRY/RED" wire circuit open.
3	1) Measure resistance between temperature control actuator connector at "GRY/BLK" or "GRY/BLU" wire terminal and body ground. Is it infinite?	Go to Step 4.	"GRY/BLK" or "GRY/BLU" wire shorted to ground circuit.
4	1) Measure resistance between temperature control actuator connector at "GRY/RED" or "GRY" wire terminal and body ground. Is it infinite?	Go to Step 5.	"GRY/RED" or "GRY" wire shorted to ground circuit.
5	1) Connect HVAC control module connector. 2) Turn ignition switch to ON position. 3) Check voltage between temperature control actuator connector at "WHT/YEL" or "WHT/RED" wire terminal and body ground. Is voltage about 4 – 5 V?	Go to Step 6.	"WHT/YEL" or "WHT/RED" wire shorted to ground circuit, shorted to power circuit or high resistance circuit.

Step	Action	Yes	No
6	1) Turn ignition switch to OFF position. 2) Connect temperature control actuator connector. 3) Select temperature selector at max cool position. 4) Turn ignition switch to ON position. 5) Check voltage between temperature control actuator connector at “GRY/BLK” or “GRY/BLU” wire terminal and body ground while changing to max hot position. Is voltage about 10 V while changing to max hot position?	Check linkage referring to “Actuator Linkage Assembly” in this section. If OK, replace temperature control actuator.	Replace HVAC control module.

DTC B1514 (No.14) : Air Flow Control Actuator and Its Circuit Malfunction

WIRING DIAGRAM



[A]: HVAC control module connector “G52” (viewed from terminal side)	2. HVAC control module
1. Air flow control actuator	

DTC DETECTING CONDITION AND TROUBLE AREA

DTC DETECTING CONDITION	TROUBLE AREA
Signal from air flow control actuator is less than the specified (59 mV) in operation of air flow control actuator.	• “GRY” or “GRY/BLK” wire circuit open or short • High resistance of “WHT/YEL” wire circuit • Air flow control actuator malfunction • Linkage malfunction • HVAC control module malfunction

DTC TROUBLESHOOTING

Step	Action	Yes	No
1	1) Remove HVAC control module and air flow control actuator referring to "HVAC Control Module" and "Air Flow Control Actuator" in this section. 2) Check for proper connection of HVAC control module at "G52-16" wire and air flow control actuator connector at "GRY/RED" wire terminals. 3) If OK, measure resistance between HVAC control module connector at "G52-16" wire and air flow control actuator connector at "GRY/RED" wire terminals. Is resistance 1 Ω or less?	Go to Step 2.	"GRY/RED" wire circuit open.
2	1) Check for proper connection of HVAC control module at "G52-15" wire and air flow control actuator connector at "GRY/BLK" wire terminals. 2) If OK, measure resistance between HVAC control module connector at "G52-15" wire and air flow control actuator connector at "GRY/BLK" wire terminals. Is resistance 1 Ω or less?	Go to Step 3.	"GRY/BLK" wire circuit open.
3	1) Measure resistance between air flow control actuator connector at "GRY/RED" wire terminal and body ground. Is it infinite?	Go to Step 4.	"GRY/RED" wire shorted to ground circuit.
4	Measure resistance between air flow control actuator connector at "GRY/BLK" wire terminal and body ground. Is it infinite?	Go to Step 5.	"GRY/BLK" wire shorted to ground circuit.
5	1) Connect HVAC control module connector. 2) Turn ignition switch to ON position. 3) Check voltage between air flow control actuator connector at "WHT/YEL" wire terminal and body ground. Is voltage 4 – 5 V?	Go to Step 6.	"WHT/YEL" wire shorted to ground circuit, shorted to power circuit or high resistance circuit.
6	1) Turn ignition switch to OFF position. 2) Connect air flow control actuator connector. 3) Select air flow control selector at "VENT" position. 4) Turn ignition switch to ON position. 5) Check voltage between air flow control actuator connector at "GRY/RED" wire terminal and body ground while changing to DEF position. Is voltage about 10 V while changing to DEF position?	Check linkage referring to "Actuator Linkage Assembly" in this section. If OK, replace air flow control actuator.	Replace HVAC control module.

DTC B1520 (No.20) : Temperature Selector and Its Circuit Malfunction

DTC DETECTING CONDITION AND TROUBLE AREA

DTC DETECTING CONDITION	TROUBLE AREA
This DTC will be set when an internal malfunction is detected in the HVAC control module.	HVAC control module (temperature selector)

DTC TROUBLESHOOTING

Step	Action	Yes	No
1	1) Turn ignition switch to OFF position. 2) Remove HVAC control module referring to "HVAC Control Module" in this section. 3) Check for proper connection of HVAC control module connector at all terminals. Is it in good condition?	Replace HVAC control module.	Repair faulty condition.

DTC B1521 (No.21) : Blower Speed Selector and Its Circuit Malfunction

DTC DETECTING CONDITION AND TROUBLE AREA

DTC DETECTING CONDITION	TROUBLE AREA
This DTC will be set when an internal malfunction is detected in the HVAC control module.	HVAC control module (blower speed selector)

DTC TROUBLESHOOTING

Step	Action	Yes	No
1	1) Turn ignition switch to OFF position. 2) Remove HVAC control module referring to "HVAC Control Module" in this section. 3) Check for proper connection of HVAC control module connector at all terminals. Is it in good condition?	Replace HVAC control module.	Repair faulty condition.

DTC B1522 (No.22) : Air Flow Selector and Its Circuit Malfunction

DTC DETECTING CONDITION AND TROUBLE AREA

DTC DETECTING CONDITION	TROUBLE AREA
This DTC will be set when internal malfunction is detected in the HVAC control module.	HVAC control module (air flow selector)

DTC TROUBLESHOOTING

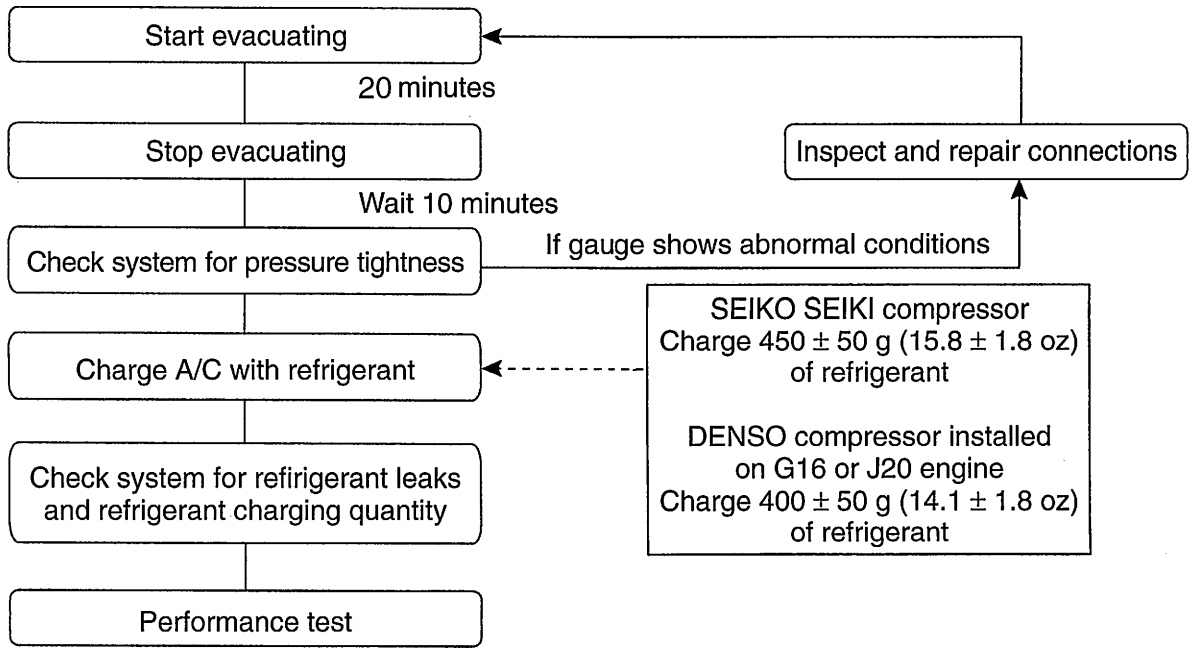
Step	Action	Yes	No
1	1) Turn ignition switch to OFF position. 2) Remove HVAC control module referring to "HVAC Control Module" in this section. 3) Check for proper connection of HVAC control module connector at all terminals. Is it in good condition?	Replace HVAC control module.	Repair faulty condition.

Refrigerant Recovery, Evacuation and Charging

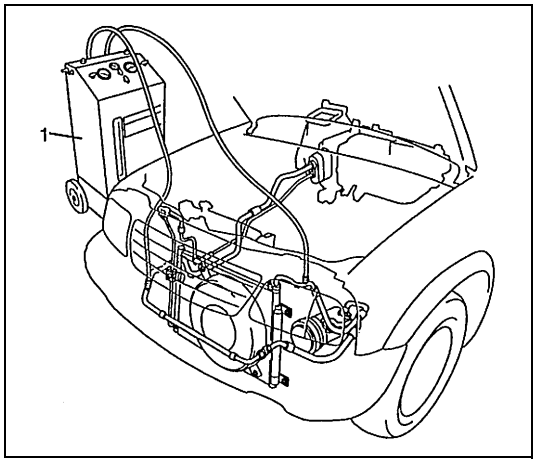
WARNING:

- **Your eyes should not be exposed to refrigerant (liquid).**
  Any liquid Refrigerant-134a escaping by accident shows a temperature as low as approx. –6°C (21.2°F) below freezing point. Should liquid HFC-134a (R-134a) get into your eyes, it may cause a serious injury. To protect your eyes against such accident, it is necessary to always wear goggles. Should it occur that HFC-134a (R-134a) strikes your eye(s), consult a doctor immediately.
  - **Do not use your hand to rub the affected eye(s). Instead, use quantities of fresh cold water to splash it over the affected area to gradually raise temperature of such area above freezing point.**
  - **Obtain proper treatment as soon as possible from a doctor or eye specialist.**
- **Should the HFC-134a (R-134a) liquid come into contact with your skin, the affected area should be treated in the same manner as when skin is frostbitten or frozen.**
- **Refrigerant must not be handled near where welding or steam cleaning is performed.**
- **Refrigerant should be kept at a cold and dark place. It should never be stored where a high temperature is anticipated, e.g. where exposed to direct sun light, close to fire or inside vehicle (including trunk room).**
- **Avoid breathing fumes produced when HFC-134a (R-134a) is burned. Such fumes may be hazardous to health.**

Operation Procedure for Charging A/C with Refrigerant



Recovery



NOTE:

- **When discharging refrigerant out of A/C system, always recover it by using refrigerant recovery and recycling equipment (1). Discharging it into atmosphere would cause adverse effect to environments.**
- **When handling recovery and recycling equipment, be sure to follow the instruction manual for the equipment.**

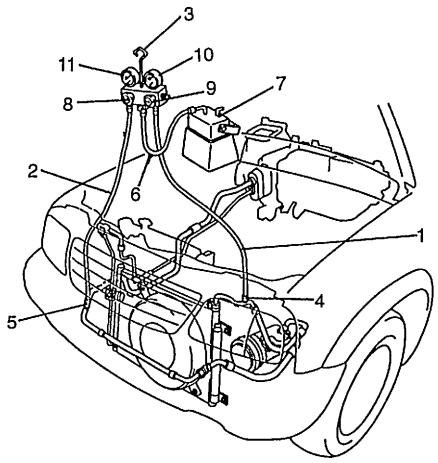
Evacuating

Evacuating procedure

CAUTION:
Do not evacuate before recovering refrigerant in system.

NOTE:

Whenever opened (exposed to atmospheric air), air conditioning system must be evacuated by using a vacuum pump. The A/C system should be attached with a manifold gauge set, and should be evacuated for approx. 20 minutes.



1) Connect high charging hose (1) and low charging hose (2) of manifold gauge set (3) respectively as follows :
   High charging hose (1) → High pressure charging valve (4) on discharge hose
   Low charging hose (2) → Low pressure charging valve (5) on suction pipe
2) Attach center charging hose (6) of manifold gauge set (3) to vacuum pump (7).
3) Operate vacuum pump (7), and then open discharge-side valve (9) (Hi) of manifold gauge set (3).
   If there is no blockage in the system, there will be an indication on high pressure gauge (10).
   When this occurs, open the other-side valve (8) (Lo) of the set.
4) Approx. 10 minutes later, low pressure gauge (11) should show –10 kPa (–10 kg/cm^2, –760 mmHg, –14.2 psi) providing no leakage exists.

NOTE:

- **If the system does not show –10 kPa (–10 kg/cm^2, –760 mmHg, –14.2 psi), close both valves, stop vacuum pump and watch movement of low pressure gauge.**
- **Increase in the gauge reading suggests existence of leakage. In this case, repair the system before continuing its evacuation.**
- **If the gauge shows a stable reading (suggesting no leakage), continue evacuation.**

5) Evacuation should be carried out for a total of at least 20 minutes.
6) Continue evacuation until low pressure gauge indicates –10 kPa (–10 kg/cm^2, –760 mmHg, –14.2 psi), and then close both valves (8), (9).
7) Stop vacuum pump (7). Disconnect center charging hose (6) from pump inlet. Now, the system is ready for charging refrigerant.

Checking system for pressure leaks

After completing the evacuation, close manifold gauge high pressure valve (HI) and low-pressure valve (LO) and wait 10 minutes. Verify that low-pressure gauge reading has not changed.

CAUTION:

If the gauge reading moves closer to "0", there is a leak somewhere. Inspect the tubing connections, make necessary corrections, and evacuate system once again, making sure that there are no leaks.

Charging

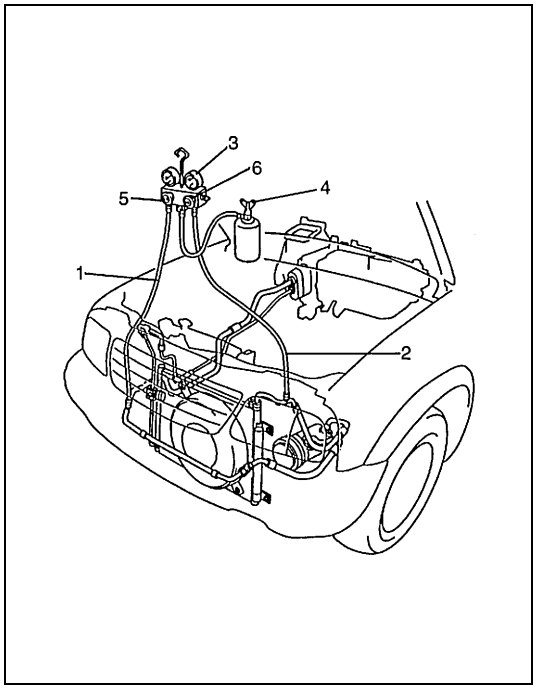
CAUTION:

- **Always charge through low pressure-side of A/C system at after the initial charging is performed from the high-pressure side with the engine stopped.**
- **Never charge to high pressure-side of A/C system with engine running.**
- **Do not charge while compressor is hot.**
- **When installing tap valve to refrigerant container to make a hole there through, carefully follow directions given by manufacturer.**
- **A pressure gauge should always be used before and during charging.**
- **The refrigerant container should be emptied of refrigerant when discarding it.**
- **The refrigerant container should not be heated up to 40°C (104°F) or over.**
- **Refrigerant container should not be reversed in direction during charging. Reversing in direction causes liquid refrigerant to enter compressor, causing troubles, such as compression of liquid refrigerant and the like.**

NOTE:

The air conditioning system contains HFC-134a (R-134a).
Described here is a method to charge the air conditioning system with refrigerant from the refrigerant service container.
When charging refrigerant recovered by using the refrigerant and recycling equipment (when recycling refrigerant), follow the procedure described in the equipment manufacturer's instruction manual.

The initial charging of the A/C system is performed from the high-pressure side with the engine stopped.
And next, this method must be followed by charging from the low-pressure side with the engine running.

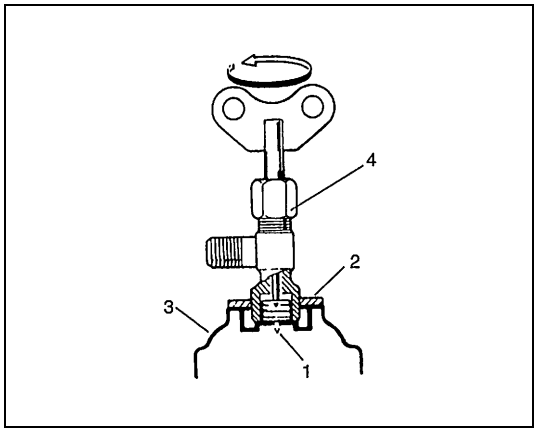


1) Check to make sure that hoses are routed properly after evacuating the system.
2) Connect Low-side hose (1) and high side hose (2) of the manifold gauge set (3) in position. Thus open refrigerant container valve (4) to purge the charging line.
3) Open the high-pressure side valve (6) and charge refrigerant to system.
4) After a while, open the low-pressure side valve (5) and close the high-pressure side valve (6).

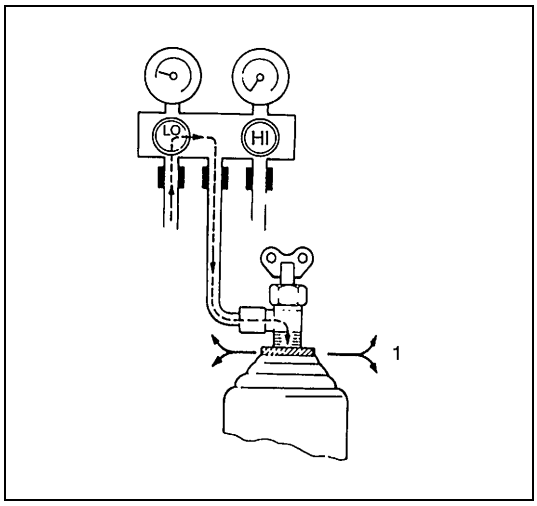
WARNING:

Make sure that high pressure-side valve is closed securely.

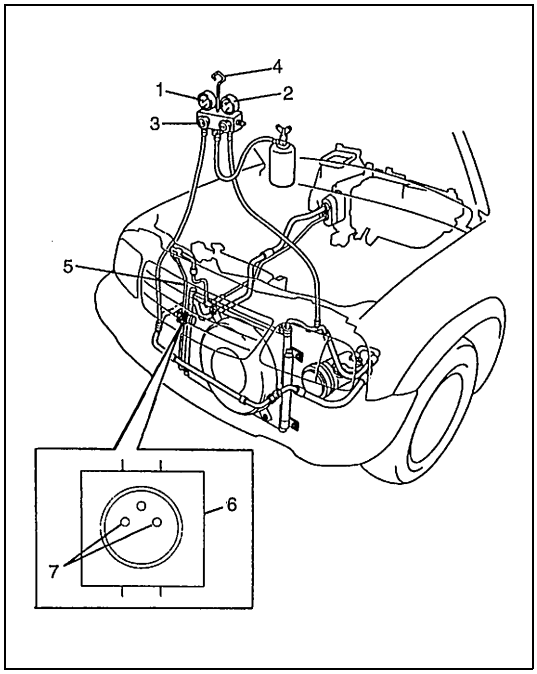
5) Start engine and keep engine speed at 1500 r/min. Then, operate air conditioning.
6) Charge A/C system with refrigerant in vapor state. At this time, refrigerant container should be held upright.



7) When refrigerant container (3) is emptied, use the following procedure to replace it with a new refrigerant container (3).
   a) Close low pressure valve.
   b) Replace empty container (3) with a refrigerant container which has been charged with refrigerant. When using refrigerant container tap valve (4), use the following procedure for replacement.
      i) Retract needle (1) and remove refrigerant container tap valve (4) by loosening its plate nut (2).
      ii) Install previously-removed refrigerant container tap valve (4) to a new refrigerant container (3).



   c) Purge any air existing in center charging hose.
      When using refrigerant container tap valve, use the following procedure to purge air.
      i) Once fully tighten refrigerant container tap valve and then loosen (open) plate nut slightly.
      ii) Open low pressure valve of manifold gauge set a little.
      iii) As soon as refrigerant comes out with a “hiss” (1) through a clearance between refrigerant container and tap valve, tighten plate nut as well as manifold gauge set low pressure valve.
      iv) Turn handle of tap valve clockwise so that its needle is screwed into the new container to make a hole for refrigerant flow.



8) After the system has been charged with specified amount of refrigerant or when low pressure gauge (1) and high pressure gauge (2) have indicated about 2 and 15 kg/cm^2 respectively, close low pressure side vale (3) of manifold gauge set (4). If equipped with sight glass in this time, look into the sight glass (6) of condenser outlet pipe (5) and check that there are no bubbles (7) in it, which means that the system is fully charged.

Low pressure gauge when charged with specified amount :

About 200 – 300 kPa (2 – 3 kg/cm^2, 29 – 43 psi)
(At A/C inlet temperature 30 – 35°C, 86 – 95°F)

High pressure gauge when charged with specified amount :

About 1370 – 1670 kPa (14 – 17 kg/cm^2, 200 – 244 psi)
(At A/C inlet temperature 30 – 35°C, 86 – 95°F)

Removing Manifold Gauge Set

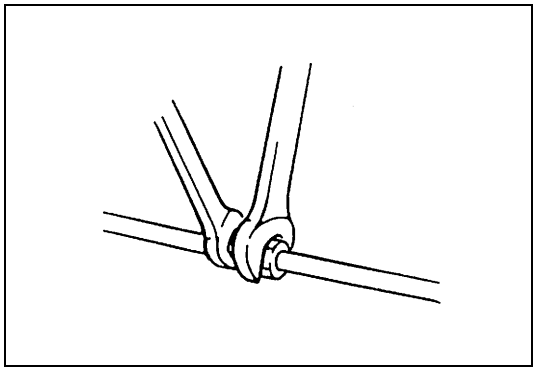
When A/C system has been charged with a specified amount of refrigerant, remove manifold gauge set as follows :

1) Close low pressure-side valve of manifold gauge set, (The high pressure-side valve is closed continuously during the process of charging.).
2) Close refrigerant container valve.
3) Stop engine.
4) Using shop rag, remove charging hoses from service valves. This operation must be performed rapidly.

WARNING:
High pressure-side is naturally under high pressure. So, care must be used to protect your eyes and skin.

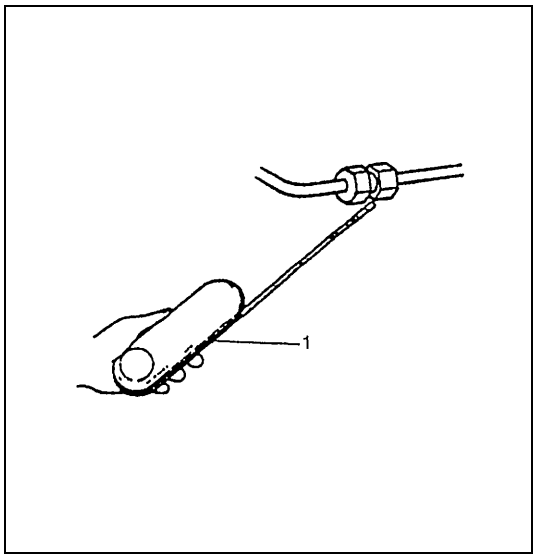
5) Put caps on service valves.

Leak-Testing Refrigerant System



Whenever a refrigerant leak is suspected in the system or any service operation has been performed which may result in disturbing lines or connections, it is advisable to test for leaks.
Common sense should be used in performing any refrigerant leak test, since the need and extent of any such test will, in general, depend upon the nature of a complaint and the type of a service performed on the system.

Liquid Leak Detectors



There are a number of fittings and places throughout the air conditioning system where a liquid leak detector solution may be used to pinpoint refrigerant leaks.
By merely applying the solution to the area in question with a swab, bubbles will form within seconds if there is a leak.
For confined areas, such as sections of the evaporator and condenser, an electronic (gas) leak detector (1) is more practical for determining leaks.

WARNING:
- **To prevent explosions or fires, make sure that there are no flammables in the vicinity.**
- **When exposed to fire, the refrigerant turns into a poisonous gas (phosgene). Do not inhale this gas.**

On-Vehicle Service

WARNING:

Should refrigerant HFC-134a (R-134a) strike your eye(s), consult a doctor immediately.

- **Do not use your hand to rub affected eye(s).**
  Instead, use quantities of fresh cold water to splash it over affected area to thus gradually raise its temperature above the freezing point.
- **Obtain proper treatment as soon as possible from a doctor or eye specialist.**
  Should liquid refrigerant HFC-134a (R-134a) get on your skin, such affected part should be treated in the same manner as when skin is frostbitten or frozen.

CAUTION:

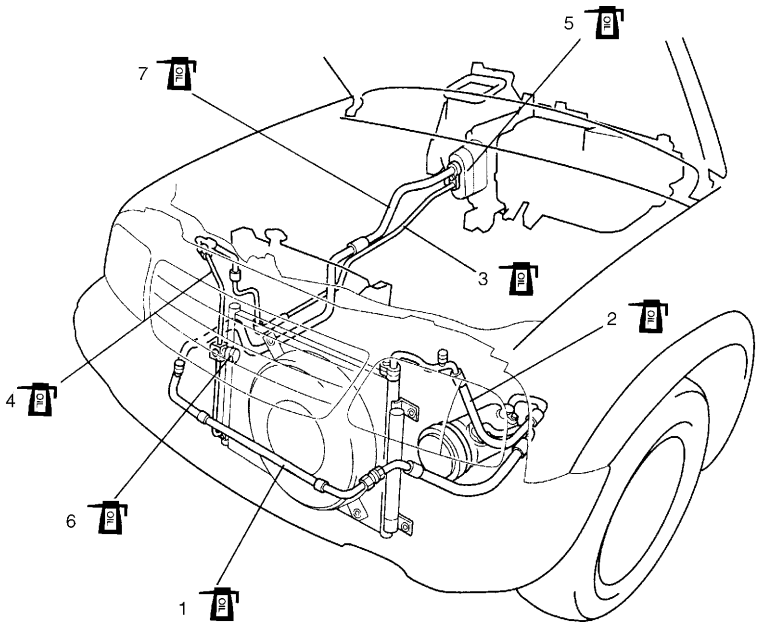
None of refrigerant, compressor oil and component parts is interchangeable between two types of A/C : one using CFC-12 (R-12) and the other using HFC-134a (R-134a).
(For identification between these two types, refer to "Identification of Refrigerating System" in this section).
When replenishing or changing refrigerant and compressor oil and when replacing parts, make sure that the material or the part to be used is appropriate to the A/C installed in the vehicle being serviced. Use of incorrect one will result in leakage of refrigerant, damage in parts or other faulty condition.

Precaution

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

Piping

- When connecting hoses and pipes, apply a few drops of compressor oil (refrigerant oil) to seats of coupling nuts and O-ring.



1. Suction hose	3. Liquid pipe	5. Expansion valve	7. Suction pipe
2. Discharge hose	4. Condenser outlet pipe	6. Dual pressure switch	: Apply compressor oil (refrigerant oil) to O-ring.

- Never use heat for bending pipes. When bending a pipe, try to make its bending radius as slight as possible.
- Keep internal parts of air conditioning free from moisture and dirt. When disconnecting any line from system, install a blind plug or cap to the fitting immediately.
- When tightening or loosening a fitting, use two wrenches, one for turning and the other for support.
- Tighten flared nuts to specified torque.

Tightening torque (Flared Nut Used for)
8 mm pipe : 13 N·m (1.3 kg-m, 9.5 lb-ft)
12.7 mm pipe : 22 N·m (2.2 kg-m, 16.0 lb-ft)
14.5 mm pipe : 23 N·m (2.3 kg-m, 17.0 lb-ft)
16 mm pipe : 33 N·m (3.3 kg-m, 24.0 lb-ft)

- Route drain hose so that drained water does not make any contact to vehicle components.

Handling refrigerant HFC-134a (R-134a)

- When handling refrigerant, always wear goggles to protect your eyes.
- Avoid you direct contact to liquid refrigerant.
- Do not heat refrigerant container higher than 40°C (104°F).
- Do not discharge refrigerant into atmosphere.
- Do not allow liquid refrigerant to touch bright metals. Refrigerant combined with moisture is corrosive and will tarnish surfaces of bright metals including chrome.
- After recovering refrigerant from system, the amount of compressor oil removed must be measured and the same amount added to the system.

Refrigerant recovery

When discharging refrigerant out of A/C system, always recover it by using refrigerant recovery and recycling equipment. Discharging refrigerant HFC-134a (R-134a) into atmosphere would cause adverse effect to environments.

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

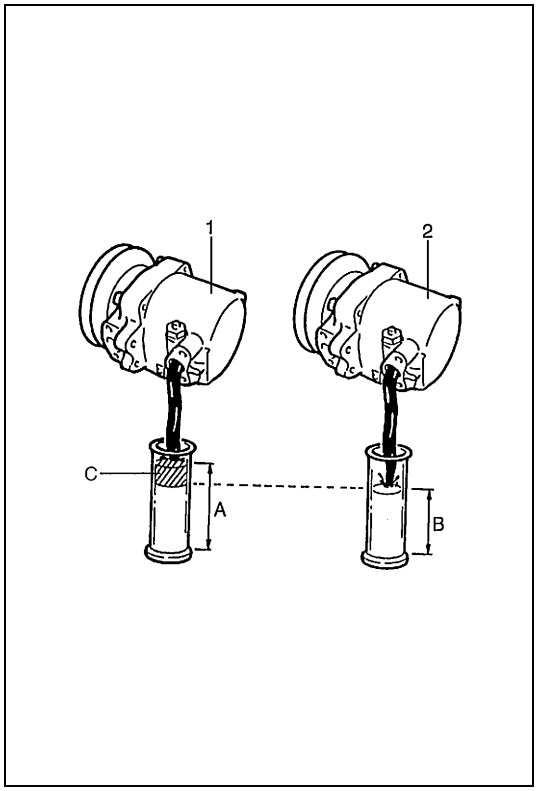
Refrigerant charge

Charge a proper amount of refrigerant to A/C system according to charging procedure described in recovery, evacuation and charging.

CAUTION:
Do not perform an additional refrigerant charging to A/C system. This cause it to overcharge.

Replenishing compressor oil

CAUTION:
Be sure to use HFC-134a (R-134a) compressor oil.



When replacing air conditioning parts with new ones, it is necessary to replenish oil by the amount supposedly remaining in each part.

When Changing Gas Only

When it is unavoidable to change gas without replacing any component part for engine removal and installation or for some other reason, replenish 20 cm^3 (20 cc) oil. When replenishing gas only, oil replenishment it not necessary.

When Replacing Compressor

Compressor oil is sealed in each new compressor (1) by the amount required for air conditioner cycle. Therefore, when using a new compressor for replacement, drain oil from it by the amount calculated as follows.

"C" = "A" – "B"

"C" : Amount of oil to be drained
"A" : Amount of oil sealed in a new compressor
"B" : Amount of oil remaining in removed compressor (2)

When Replacing Other Part

Replaced part	Amount of compressor oil to be replenished
Evaporator	25 cc
Condenser	15 cc
Receiver/dryer	20 cc
Hoses	10 cc each
Pipes	10 cc each

A/C Condenser Assembly

CAUTION:

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

NOTE:

Clogged condenser fins should be washed with water, and should be dried with compressed air.

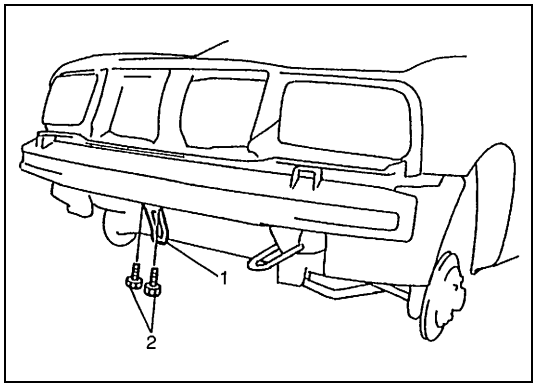
INSPECTION

Check the following items.

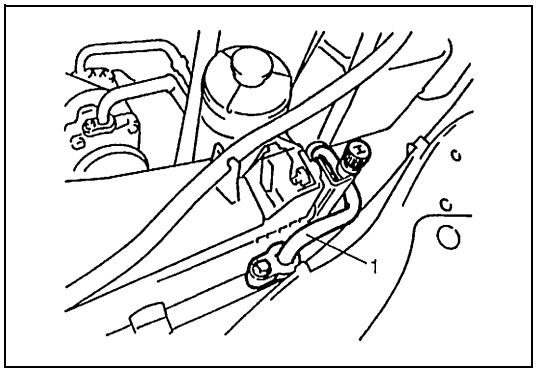
- condenser fins for blockage
- condenser fittings for leakage
- condenser fins for damage

REMOVAL

1) Disconnect negative (–) cable at battery.
2) Recover refrigerant by using recovery and recycling equipment.
   Be sure to follow the instruction manual for the equipment.
   The amount of compressor oil removed must be measured and the same amount added to the system.
3) Remove front bumper assembly and remove lower stay (1) if equipped refer to “Front Bumper” in Section 9.



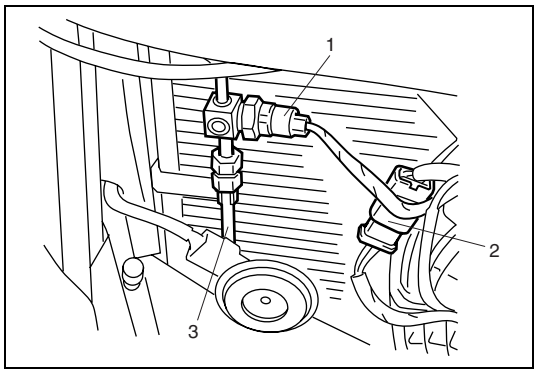
2. Bolt



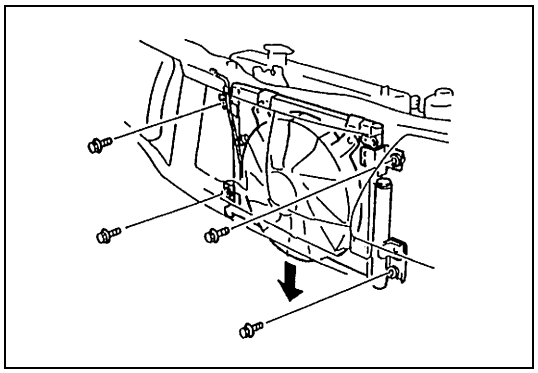
4) Disconnect compressor discharge hose (1) from condenser inlet fittings.

CAUTION:

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



5) Disconnect coupler from dual pressure switch (1).
6) Disconnect condenser outlet pipe (3).
7) Disconnect condenser cooling fan motor coupler (2).



8) Remove condenser with fan.

NOTE:
Be careful not to damage fins of condenser and radiator.

9) Remove A/C condenser cooling fan assembly from condenser.

INSTALLATION

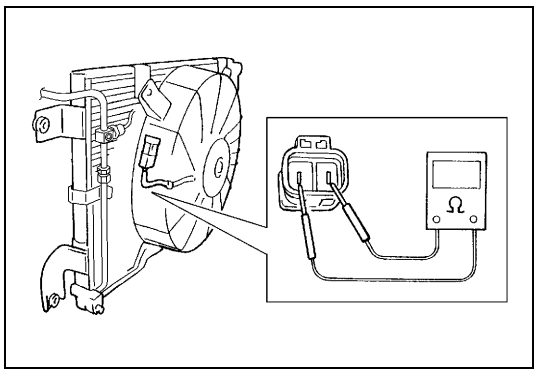
Reverse removal sequence to install condenser, noting the following point.

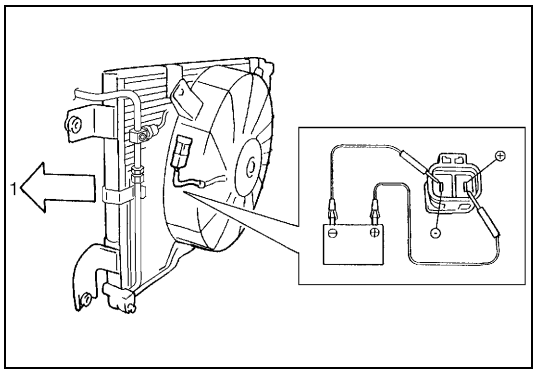
- When replacing condenser, add 20 to 30 cc of refrigerating oil from compressor suction-side.
- Evacuate and charge system according to “Evacuating” and “Charging” in this section.

Condenser Cooling Fan Assembly

INSPECTION

- Remove condenser assembly referring to “A/C Condenser Assembly” in this section.
- Check continuity between terminal to terminal as shown in the figure. If check results are continuity, proceed to next operation check. If not, replace.





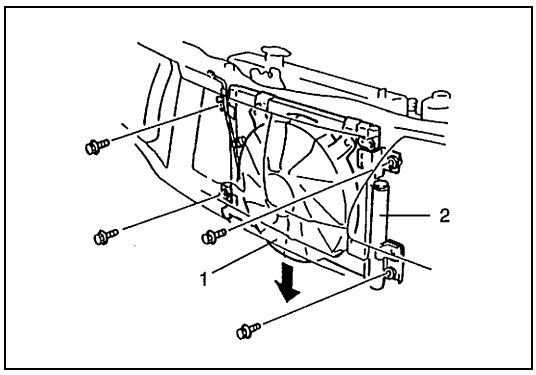
- Connect battery to condenser fan motor as shown, then check that the condenser fan motor operates smoothly.

Reference specified cousumption current :
Maximum 12 A at 12 V

1. Air flow

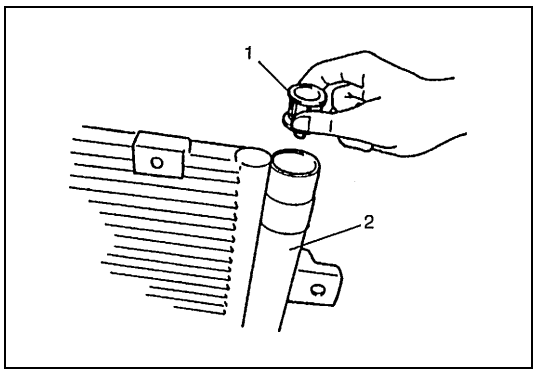
Condenser Dryer (Receiver/Dryer)

REMOVAL

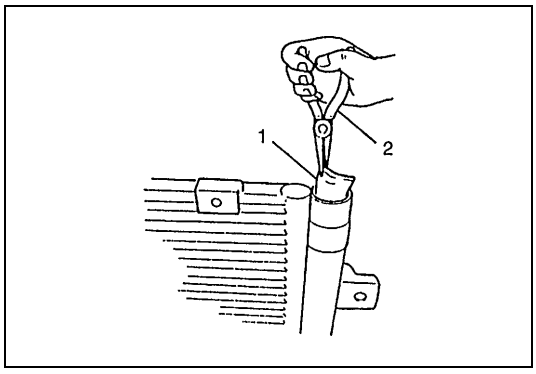


1) Remove A/C condenser assembly (1) from vehicle referring to “A/C Condenser Assembly” in this section.
2) Remove the condenser dryer cap from condenser.

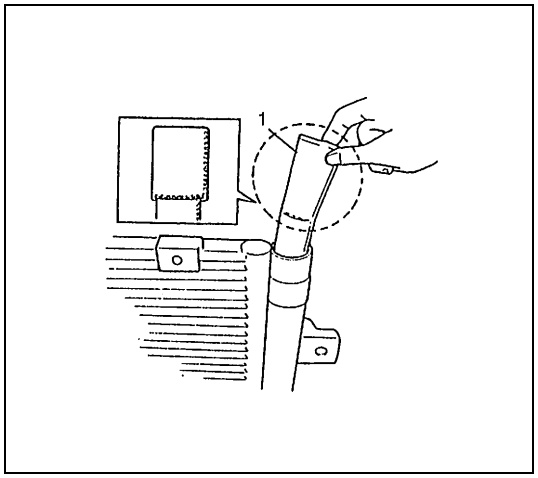
2. Condenser dryer section



3) Remove the filter (1) from the condenser (receiver/dryer) (2).



4) Remove the desiccant (1) using a pliers (2).



INSTALLATION

Reverse removal sequence to install condenser dryer, according to instruction manual with supply parts.

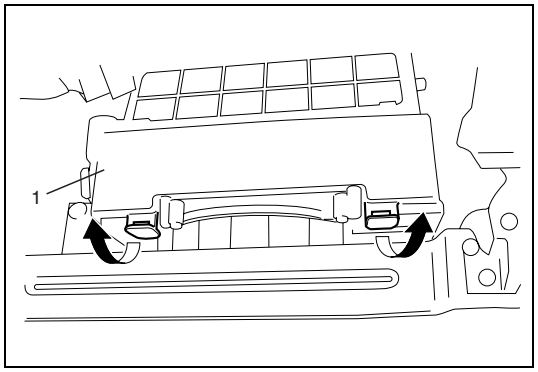
NOTE:

- **When replacing condenser dryer, add 40 cc of refrigerating oil the same as compressor oil.**
- **Do not remove the desiccant from the plastic bag until just before inserting it into the receiver/dryer.**
- **Install the desiccant (1) with its double-layer portion facing the bottom of the receiver/dryer.**
- **If desiccant cap installing is bolt type, tighten specified torque for its bolt.**

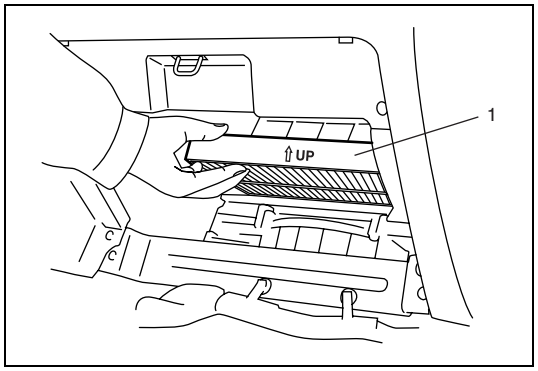
Air Filter Element

REMOVAL

1) Disconnect negative (–) cable at battery.
2) For vehicle with air bag system, disable air bag system referring to “Disabling Air Bag System” in Section 10B.
3) Open glove box, then remove screw.
4) Remove glove box from instrument panel.

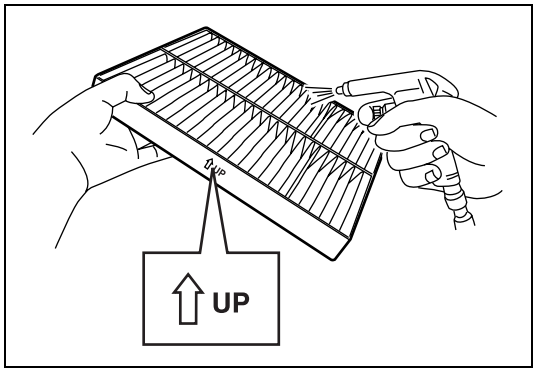


5) Remove filter cover (1).



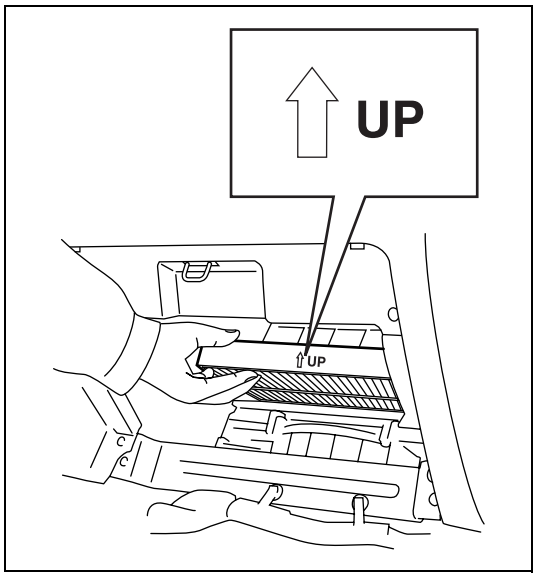
6) Pull out filter element (1).

CLEAN



Blow compressed air on air outlet side of the filter element.

INSTALLATION



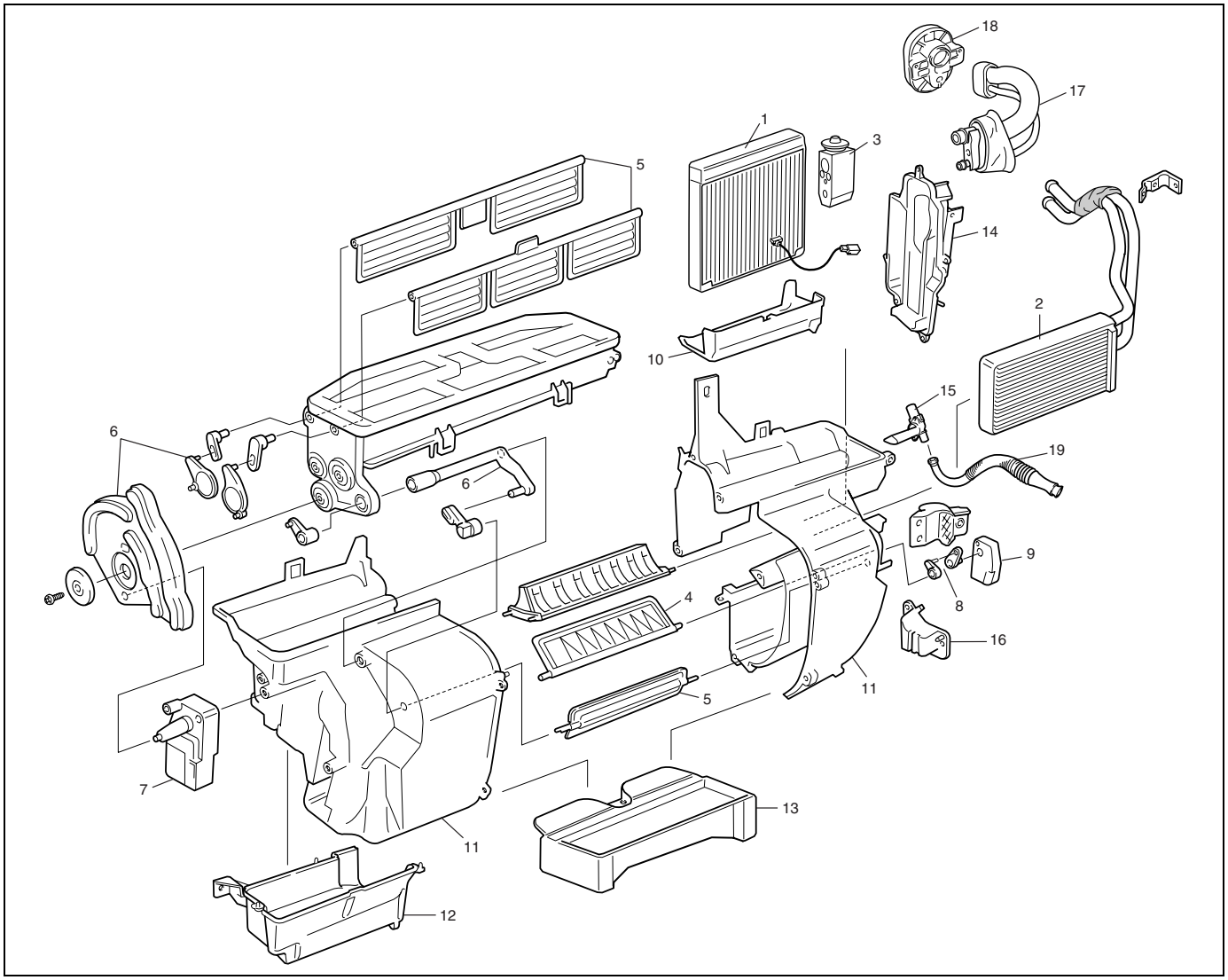
Reverse removal procedure for installation noting the followings :

- Install filter into blower unit by paying attention to direction of arrow on filter.
- Enable air bag system after installation referring to “Enabling Air Bag System” in Section 10B.

Heater and Cooling Unit

CAUTION:

Be careful not to damage A/C evaporator fins. If A/C evaporator fin is bent, straighten it by using flat head screwdriver or pair of pliers.



1. A/C evaporator	6. Air flow control link assembly	11. Heater and cooling case	16. Heater core bracket
2. Heater core	7. Air flow control actuator	12. A/C evaporator under case	17. Expansion pipe
3. Expansion valve	8. Temperature control link assembly	13. Foot air duct	18. Packing
4. Temperature control door	9. Temperature control actuator	14. Air joint duct	19. Aspirator hose
5. Air flow control door	10. A/C evaporator under cover	15. Aspirator	

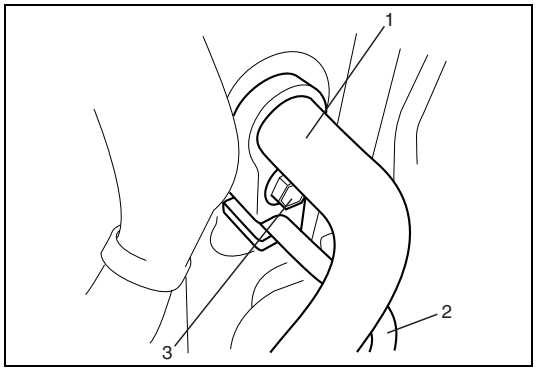
REMOVAL

WARNING:

Failure to follow the following procedure and WARNING may cause air bag deployment, personal injury, damage to parts, or air bag being unable to deploy.

- **Never rest a steering column assembly on steering wheel with air bag (inflator) module face down and column vertical.**
- **When handling the air bag (inflator) modules (driver and passenger), be careful not to drop it or apply an impact to it. If an excessive impact was applied (e.g., dropped from a height of 91.4 cm (3 feet) or more, never attempt disassembly or repair but replace it with a new one.**
- **When grease, cleaning agent. Oil, water, etc. has got onto air bag (inflator) modules (driver and passenger), wipe off immediately with a dry cloth.**

1) Disconnect negative (–) cable at battery.
2) Disable air bag system referring to “Disabling Air Bag System” in Section 10B.
3) Recover refrigerant by using recovery and recycling equipment.
   Be sure to follow the instruction manual for the equipment.
   The amount of compressor oil removed must be measured and the same amount added to the system.
4) Drain engine coolant and disconnect heater hoses from heater unit.

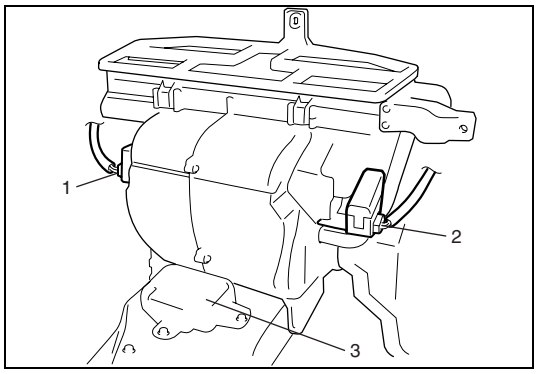


5) Disconnect suction pipe (1) and condenser outlet pipe (2) by removing attaching bolt (3).

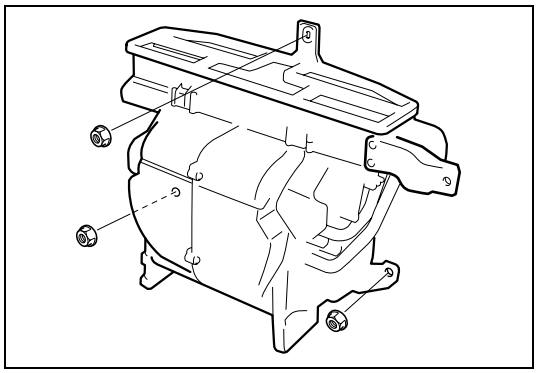
CAUTION:

As soon as above hose and pipe are disconnected, cap opened fittings so that moisture and dust may not enter cooling unit.

6) Remove instrument panel referring to “Instrument Panel” in Section 9.
7) Remove blower unit referring to “Blower Unit” in Section 1A.
8) Disconnect rear duct from heater unit.
9) Disconnect thermistor wire coupler.

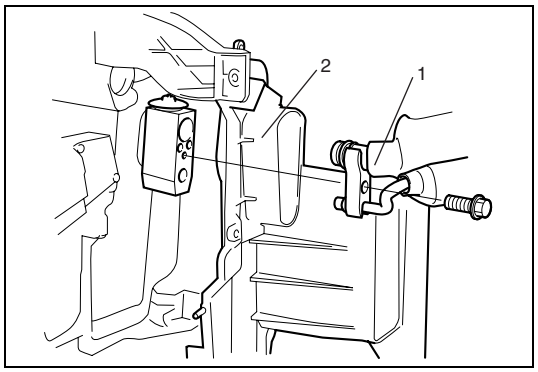


10) Disconnect air flow control actuator lead wire at coupler (1) and temperature control actuator lead wire at coupler (2).
11) Remove SDM (3).

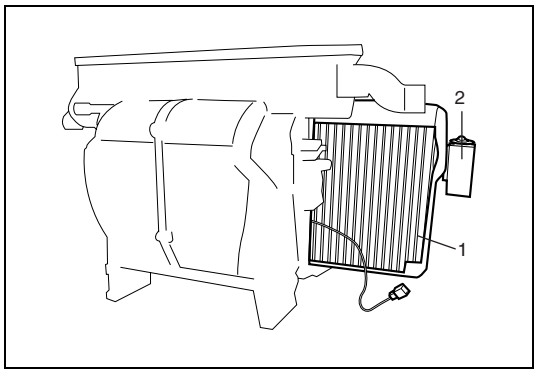


12) Remove heater and cooling unit.

13) Remove heater core referring to “Heater Unit” in Section 1A.



14) Remove expansion pipe assembly (1) from expansion valve.
15) Remove air joint duct (2) from heater and cooling unit.



16) Remove evaporator (1) with expansion valve (2), and then heater and cooling unit.

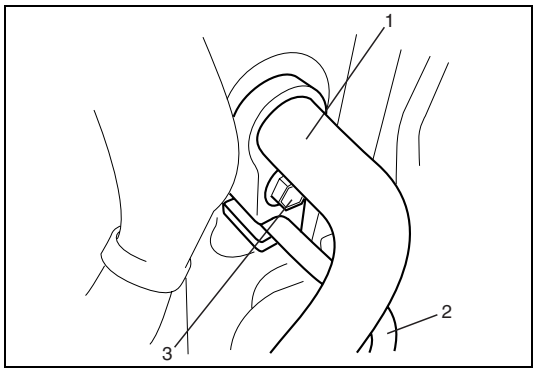
INSTALLATION

1) Install heater and cooling unit by reversing removal procedure, noting the following items.
   - When installing each part, be careful not to catch any wiring harness.
   - When installing steering column assembly, refer to “Steering Column” in Section 3C.
2) Fill engine coolant to radiator.
3) Enable air bag system referring to “Enabling Air Bag System” in Section 10B.
4) Evacuate and charge system referring to “Evacuating” and “Charging” in this section.

A/C Evaporator

REMOVAL

1) Disconnect negative (–) cable at battery.
2) Disable air bag system referring to “Disabling Air Bag System” in Section 10B.
3) Recover refrigerant by using recovery and recycling equipment. Be sure to follow the instruction manual for the equipment. The amount of compressor oil removed must be measured and the same amount added to the system.

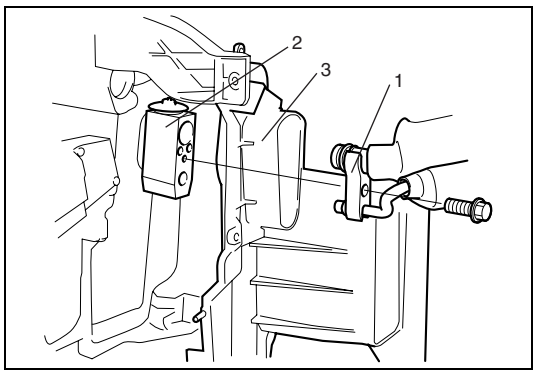


4) Disconnect suction pipe (1) and condenser outlet pipe (2) by removing attaching bolt (3).

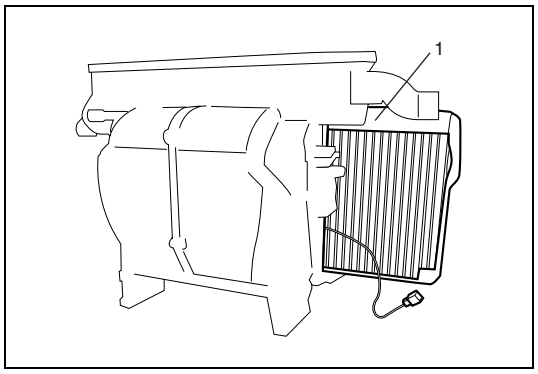
CAUTION:

As soon as above hose and pipe are disconnected, cap opened fittings so that moisture and dust may not enter cooling unit.

5) Remove blower unit referring to “Blower Unit” in Section 1A.



6) Remove expansion pipe (1) from expansion valve.
7) Remove expansion valve (2) from evaporator.
8) Remove air joint duct (3) from heater and cooling unit.



9) Remove evaporator (1).

INSPECTION

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

CAUTION:
- **Do not use water for cleaning of evaporator.**
- **Be careful not to damage evaporator fins. If evaporator fin is bent, straighten it by using a screwdriver or pair of pliers. If any leakage is found from fitting or tube, repair or replace evaporator.**

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

INSTALLATION

Reverse removal procedure to install A/C evaporator noting the following instructions.

- Install uniformly the evaporator packing to dash panel hole for expansion valve.

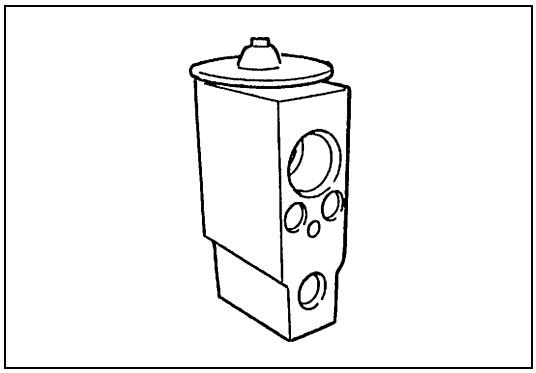
NOTE:

When the thermistor removed, it should be reinstalled in original position.
If cooling unit or evaporator is replaced, pour 50 cc of refrigerating oil to compressor suction-side.

- Enable air bag system referring to “Enabling Air Bag System” in Section 10B.
- Evacuate and charge system according to “Evacuating” and “Charging” in this section.

Expansion Valve

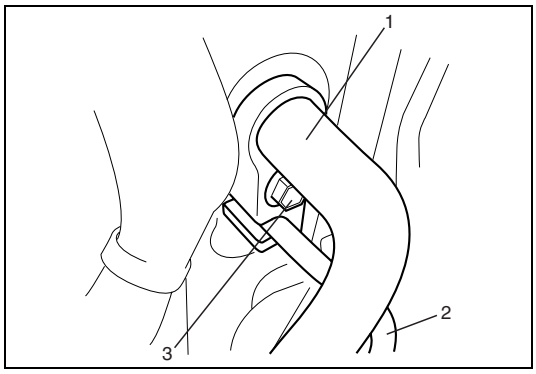
INSPECTION



Refer to “Troubleshooting Procedure Using Manifold Gauge Set” in this section.

REMOVAL

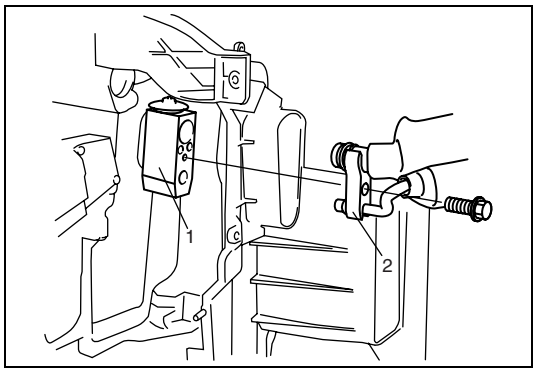
1) Disconnect negative (–) cable at battery.
2) Disable air bag system referring to “Disabling Air Bag System” in Section 10B.
3) Recover refrigerant by using recovery and recycling equipment. Be sure to follow the instruction manual for the equipment. The amount of compressor oil removed must be measured and the same amount added to the system.



4) Disconnect suction pipe (1) and condenser outlet pipe (2) by removing attaching bolt (3).

CAUTION:
As soon as above hose and pipe are disconnected, cap opened fittings so that moisture and dust may not enter cooling unit.

5) Remove blower unit referring to “Blower Unit” in Section IA.



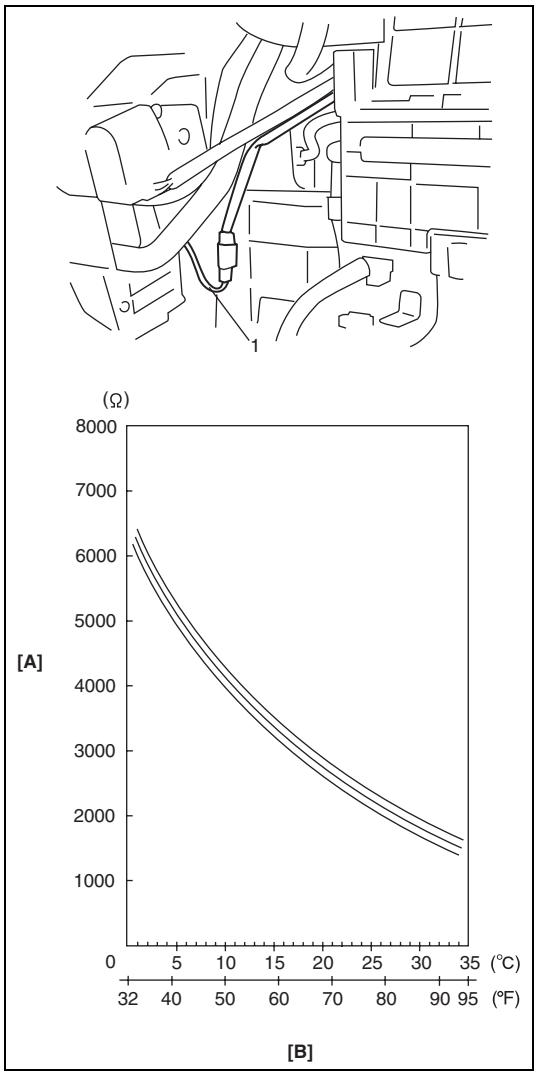
6) Remove expansion pipe (1) from expansion valve.
7) Remove expansion valve (2) from evaporator.

INSTALLATION

Reverse removal procedure to install expansion valve noting the following instructions.

- Enable air bag system referring to “Enabling Air Bag System” in Section 10B.
- Evacuate and charge system referring to “Evacuating” and “Charging” in this section.

A/C Evaporator Thermistor (A/C Evaporator Temperature Sensor)



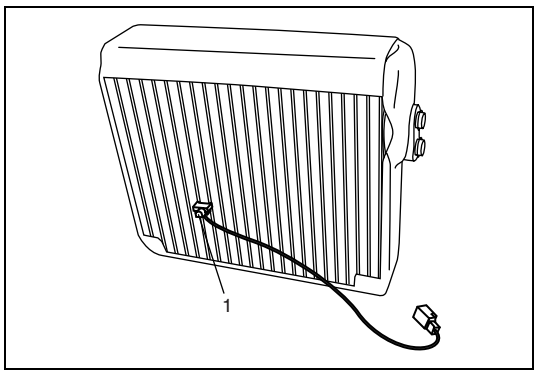
An A/C evaporator thermistor (A/C evaporator temperature sensor) (1) is a temperature sensor to sense the temperature of air discharged from evaporator. The electrical characteristic is shown in the figure.
When temperature is lower than specified, HVAC control module makes magnet clutch turn off to prevent evaporator from frosting.

INSPECTION

Check resistance between A/C evaporator thermistor (A/C evaporator temperature sensor) (1) terminals.
If check results are as not specified, replace A/C evaporator thermistor (A/C evaporator temperature sensor) with new one.

A/C evaporator thermistor (A/C evaporator temperature sensor) resistence
6.1 – 7.7 kΩ at 0°C (32°F)
2.1 – 2.3 kΩ at 25°C (77°F)

[A] : Resistance
[B] : Temperature



REMOVAL

1) Remove A/C evaporator referring to “A/C Evaporator” in this section.
2) Pull off A/C evaporator thermistor (A/C evaporator temperature sensor) (1) from A/C evaporator.

INSTALLATION

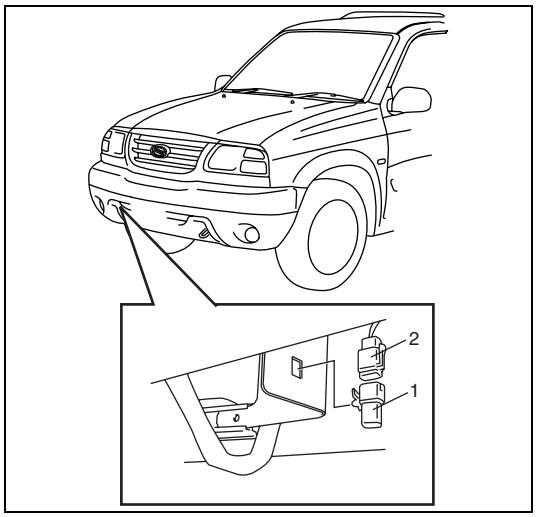
Reverse removal sequence to install thermistor.

- Install A/C evaporator thermistor (A/C evaporator temperature sensor) in original position.
- Enable air bag system referring to “Enabling Air bag System” in Section 10B.
- Evacuate and charge system referring to “Evacuating” and “Charging” in this section.

Outside Air Temperature Sensor (for Vehicle with Automatic Air Conditioning System)

REMOVAL

1) Disconnect negative (–) cable at battery.



2) Remove outside air temperature sensor (1).
3) Disconnect outside air temperature connector (2).

INSPECTION

Refer to “Outside Air Temperature Sensor Inspection” in Section 8H.

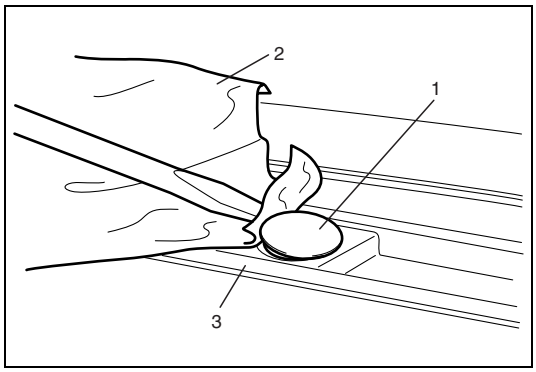
INSTALLATION

Install in the reverse order of removal procedure.

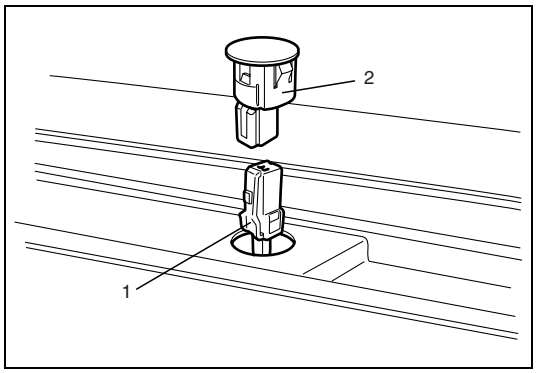
Sunload Sensor (for Vehicle with Automatic Air Conditioning System)

REMOVAL

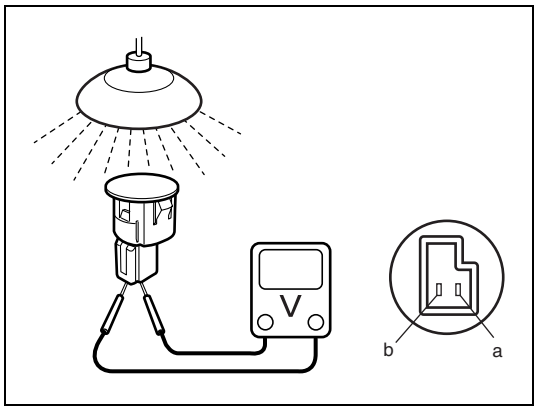
1) Disconnect negative (–) cable at battery.



2) Remove the sunload sensor (1) located on the driver side of the dashboard (3). Be carefull not to damage the sensor (1) and dashboard by using rag (2).



3) Disconnect the connector (1) from sunload sensor (2).



INSPECTION

1) Remove sunload sensor referring to “Sunload Sensor” in this section.
2) Light over sunload sensor vertically with an incandescent lamp of approx. 100 W apart from about 100 mm (3.94 in.) postion.
3) Measure the voltage between the terminals with the (+) probe on the terminal (a) and the (–) probe on the terminal (b).
4) Make sure if the voltage is approximately 0.38 – 0.42 V. If not, replace the sensor withe the new one.

Sunload sensor specification
a – b: Approx. 0.38 – 0.42 V

INSTALLATION

Install in the reverse order of removal procedure.

HVAC Control Module

REMOVAL

Remove HVAC control module referring to “HVAC Control Module” in Section IA.

INSPECTION

Refer to “HVAC Control Module and Its Circuits” in this section.

INSTALLATION

Install HVAC control module referring to “HVAC Control Module” in Section IA.

Refrigerant Pipes and Hoses

INSPECTION

- Use a leak tester to check hoses and pipes for any gas leakage.
- Check each hose or pipe clamp for tightness.
  Retighten or replace loose clamp as required, if any.

REMOVAL

CAUTION:

As soon as the above hose or pipe is disconnected, cap its opened fitting to prevent moisture and dust from entering.

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

INSTALLATION

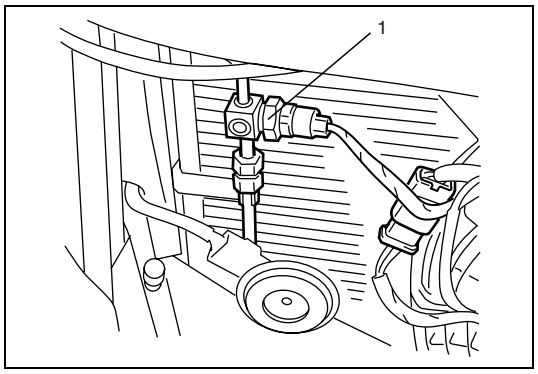
1) Reverse removal procedure to install refrigerant line.
2) Evacuate and charge system. Refer to “Evacuating” and “Charging” in this section.

INSPECTION OF IDLE SPEED WITH A/C ON

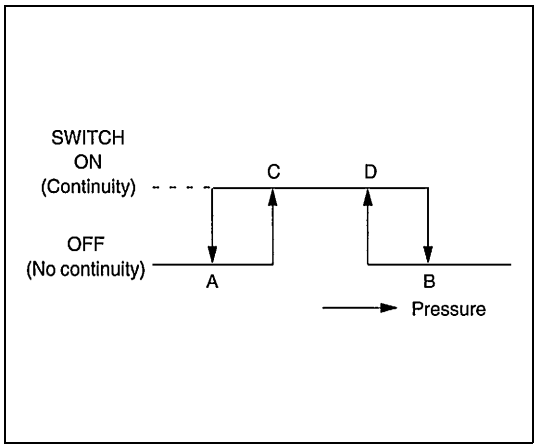
For G16 and J20 engines model, refer to Section 6E1.
For H25 engine model, refer to Section 6E2.

A/C Refrigerant (Dual) Pressure Switch

INSPECTION



1) Check dual pressure switch (1) on liquid pipe for continuity at normal temperature (approx. 25°C (77°F)) when A/C system has a proper charge of refrigerant and when A/C system (compressor) is under operation. In each of these cases, switch should show proper continuity.



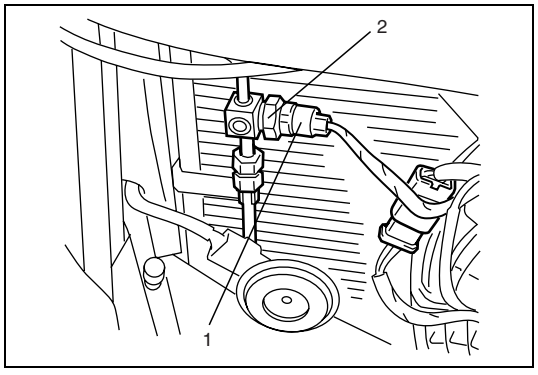
2) Using a manifold gauge set, check switch for operation at specified pressure as shown, refer to "Performance Diagnosis" in this section.

A/C refrigerant (Dual) pressure switch specification
Switch ON : above "C" and below "D"
Switch OFF : below "A" or above "B"

"A" : Approx. 200 kPa (2.0 kg/cm^2)
"B" : Approx. 3200 kPa (32 kg/cm^2)
"C" : Approx. 230 kPa (2.3 kg/cm^2)
"D" : Approx. 2800 kPa (28 kg/cm^2)

REMOVAL

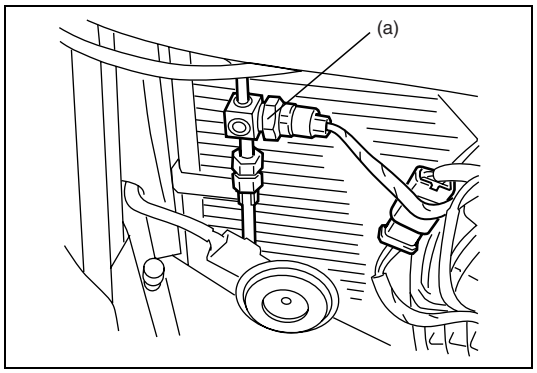
1) Disconnect negative (–) cable at battery.
2) Recover refrigerant by using recovery and recycling equipment.
   Be sure to follow the instruction manual for the equipment.
   The amount of compressor oil removed must be measured and the same amount added to the system.



3) Disconnet A/C refrigerant (dual) pressure switch connector (1).
4) Remove A/C refrigerant (dual) pressure switch (2).

INSTALLATION

Reverse removal procedure to install A/C refrigerant (dual) pressure switch noting the following instructions.



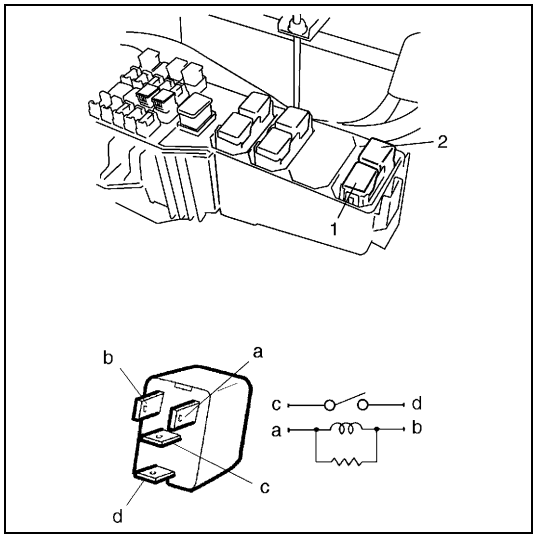
- Tighten A/C refrigerant (dual) pressure switch to specified torque.

Tightening torque
A/C refrigerant (dual) pressure switch
(a): 10 N·m (1.0kg-m, 7.5 lb-ft)

- Evacuate and charge system referring to “Evacuating” and “Charging” in this section.

A/C Compressor Relay and A/C Condenser Cooling Fan Relay

INSPECTION



1) Disconnect negative (–) cable at battery.
2) Remove condenser cooling fan motor relay (2) and/or compressor relay (1) from vehicle.
3) Check that there is no continuity between terminal “c” and “d”.
   If there is continuity, replace relay.
4) Connect battery positive (+) terminal to terminal “b” of relay.
   Connect battery negative (–) terminal “a” of relay.
   Check continuity between terminal “c” and “d”.
   If there is no continuity when relay is connected to the battery, replace relay.

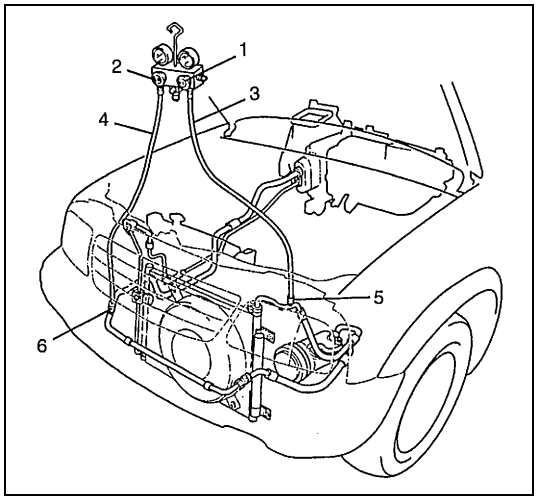
Compressor Assembly

CAUTION:
None of refrigerant, compressor oil and component parts is interchangeable between two types of A/C :
one using CFC-12 (R-12) and the other using HFC-134a (R-134a).
For identification between these two types, refer to “Identification of Refrigerating System” in this section.
When replenishing or changing refrigerant and compressor oil and when replacing parts, make sure that the material or the part to be used is appropriate to the A/C installed in the vehicle being serviced. Use of incorrect refrigerant or compressor oil will result in leakage of refrigerant, damage in parts or other faulty condition.

PRECAUTION

When servicing the compressor, keep dirt or foreign material away from getting on or into the compressor parts and system. Clean tools and a clean work area are important for proper service.
The compressor connection and the outside of the compressor should be cleaned before any “On-vehicle” repair or before removal of the compressor. The parts must be kept clean at all times and any parts to be reassembled should be cleaned with Trichloroethane, naphtha, kerosene or equivalent solvent and dried with dry air. Use only lint free cloths to wipe parts.
The operations described are based on bench overhaul with compressor removed from the vehicle, except as noted. They have been prepared in order of accessibility of the components.
When compressor is removed from the vehicle for servicing, the oil remaining in the compressor should be discarded and new refrigerant oil added to the compressor.
Minor repair procedures may be done on the vehicle without discharging the system. Major repair procedures require that the system be discharged of refrigerant.

INSPECTION



1) Install manifold gauge set (1) as shown in the figure.
2) Close Hi (4) and Lo (5) hand valves.
3) Run engine at fast idle.
4) Check compressor assembly for the following items.
   If any of the above checks indicated a defect, repair compressor assembly.
   - High pressure gauge reading is not low and low pressure gauge reading is not higher than normal.
   - Metallic sound.
   - Leakage from shaft seal.

2. High pressure side (Delivery side pipe)
3. Lower pressure side (Suction side pipe)

REMOVAL

1) Run engine at idle with A/C ON for 10 minutes.
2) Disconnect negative (–) cable at battery.
3) Recover refrigerant from refrigeration system using recovery and recycling equipment.

NOTE:

The amount of compressor oil at removed must be measured and the same amount must be poured when installing the compressor.

4) Disconnect thermal protector lead wire.
5) Disconnect suction and discharge hoses from compressor assembly.

NOTE:

Cap open fitting immediately to keep moisture out of system.

6) Remove compressor drive belt as follows:

[For G16 engine]
Remove compressor drive belt by loosening compressor assembly mounting bolts.

[For J20 engine]
Remove generator belt referring to “Generator Belt” in to Section 6H.

[For H25 engine]
Remove compressor drive belt by loosening tension pulley bolt.

7) Remove compressor with magnet clutch assembly from its mount.
8) If compressor assembly is replaced. Drain oil from compressor assembly, and measure its amount.

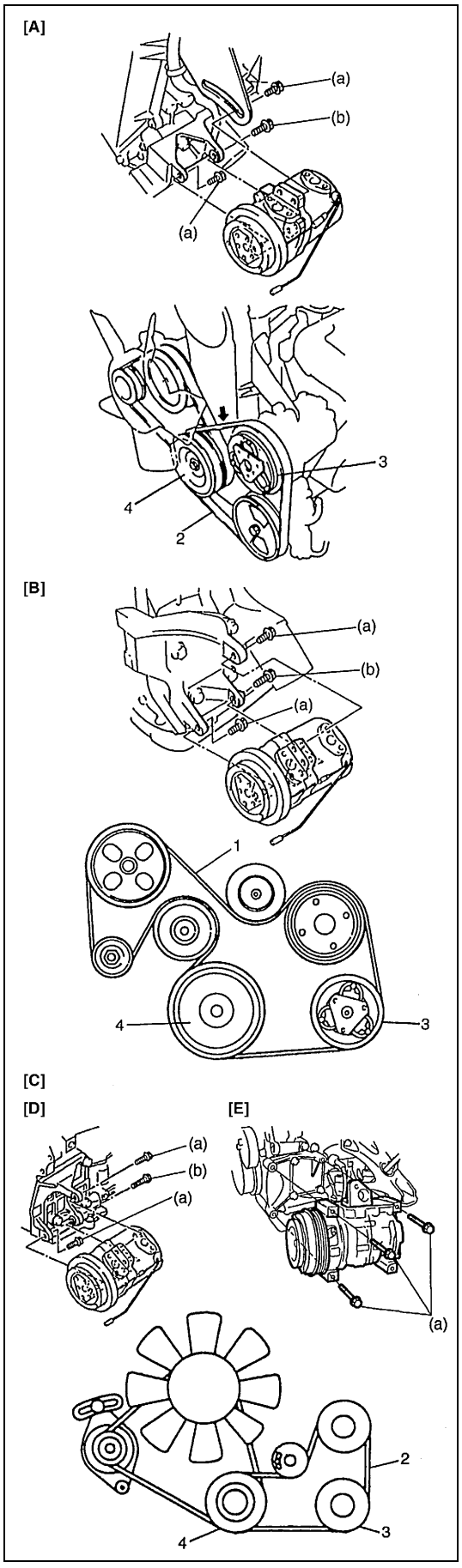
INSTALLATION

1) If compressor was replaced, pour new compressor oil with the same amount as that drained from compresor referring to “Replenishing Compressor Oil” in this section.

NOTE:

Compressor assembly supplied from factory is filled up with following amount of oil.

Amount of oil in compressor
G16 engine model: 150 cm^3 (150 cc, 9.2 in^3)
J20 and H25 engine model: 120 cm^3 (120cc, 7.5 in^3)



2) Install compressor as follows:

[For G16 engine]

Install compressor assembly temporarily to bracket, then install compressor drive belt (2).

[For J20 and H25 engines]

Install compressor assembly to its bracket.
Tighten bolts (a) first, then (b).

Tightening torque
Compressor mounting bolt
(a), (b) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

3) Connect suction and discharge hoses to compressor assembly.

4) Install and adjust drive belt as follows:

[For G16 engine]

Tension compressor drive belt (2) by tightening compressor assembly mounting bolts referring to “Belt Tension Adjustment” in Section 3B1 for drive belt tension.
Tighten bolt (a) first, then (b).

Tightening torque
Compressor mounting bolt
(a), (b) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

[For J20 engine]

Install generator belt (1) referring to “Generator Belt” in Section 6H for details.

[For H25 engine]

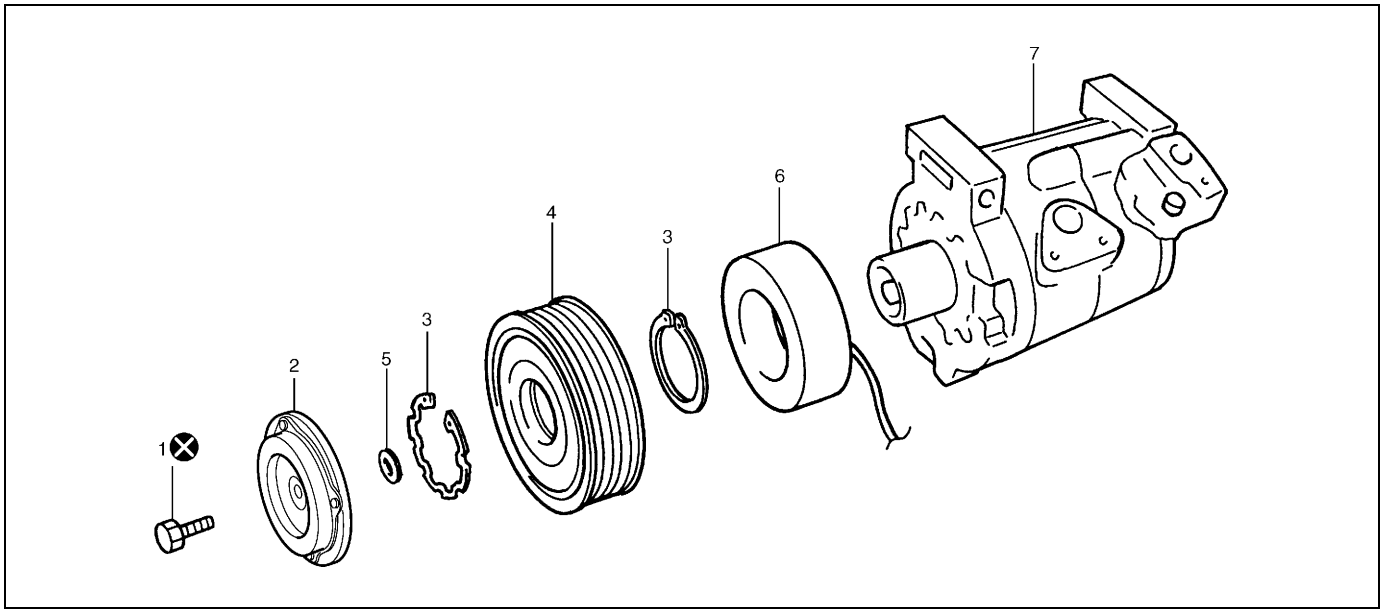
Install compressor drive belt (2) referring to “Belt Tension Adjustment” in Section 3B1 for installation and belt tension.

5) Connect thermal protector lead wire.
6) Evacuate and charge system according to “Evacuating” and “Charging” in this section.

CAUTION:
Be sure to use HFC-134a (R-134a) compressor oil.

[A] : For G16 engine model
[B] : For J20 engine model
[C] : For H25 engine model
[D] : With SEIKO SEIKI compressor model
[E] : With DENSO compressor model
3. Compressor pulley
4. Crankshaft pulley

Magnet clutch assembly (for DENSO)



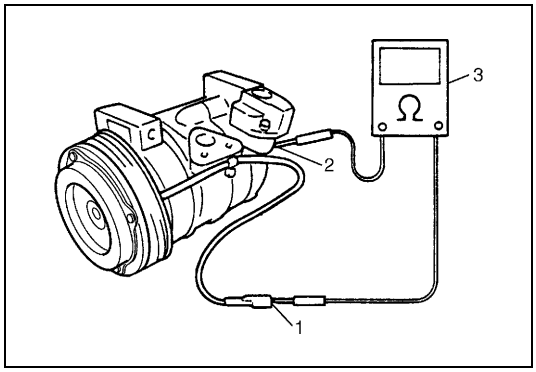
1. Armature plate bolt	3. Circlip	5. Shim	7. Compressor body assembly
2. Armature plate	4. Magnet clutch	6. Magnet clutch coil	⊗ Do not reuse.

INSPECTION

Perform the following items.

- Inspect armature plate and clutch pulley for signs of oil.
- Check clutch pulley for noise and grease leakage.
- Using an ohmmeter (3), measure resistance of clutch coil between clutch lead wire (1) and compressor body (2).

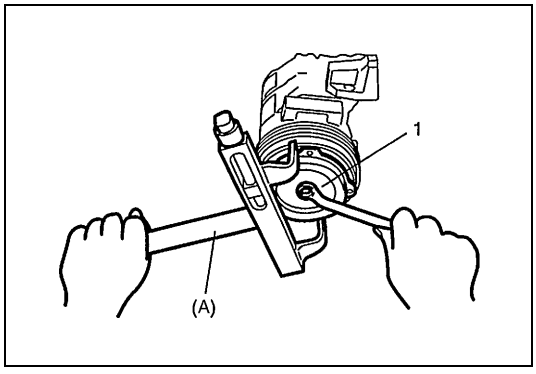
If measured resistance is not within tolerance, replace magnet clutch assembly.



Standard resistance for magnet clutch
3.5 – 5.0 Ω at 20°C, 68°F

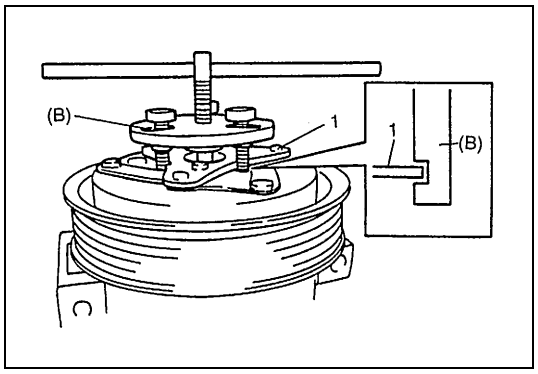
REMOVAL

1) Remove compressor assembly from vehicle referring to "Compressor Assembly" in this section.
2) Fix armature plate (1) with special tool and remove armature plate bolt.



Special tool
(A) : 09920-53740

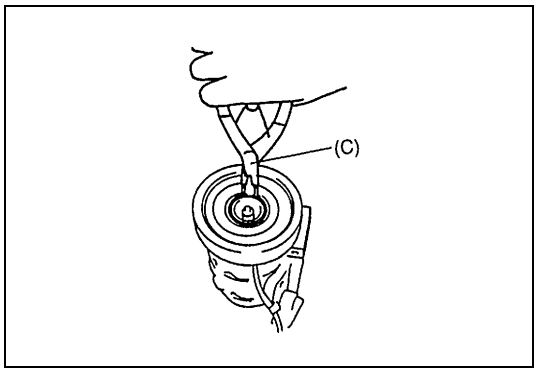
NOTE:
Do not reuse armature plate bolt.



3) Using special tool (B), remove armature plate (1).

Special tool
(B) : 09991-06030

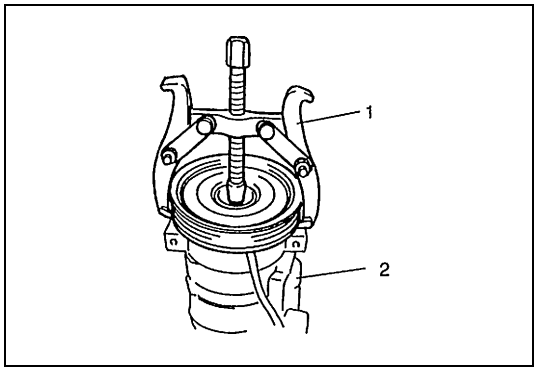
4) Remove shims from shaft.



5) Using special tool (C), remove circlip.

Special tool
(C) : 09900-06107

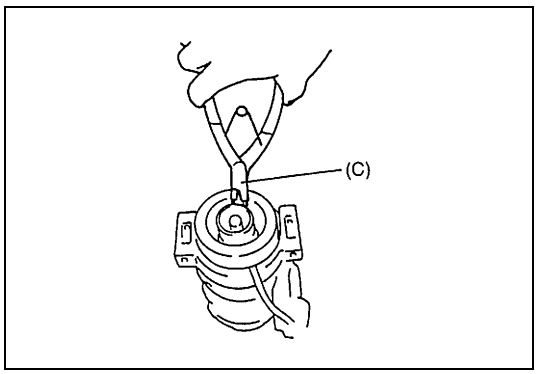
6) Remove clutch coil lead wire clamp screw, and remove clutch coil read wire ground terminal.



7) Remove clutch pulley with puller (1) from compressor (2).

NOTE:

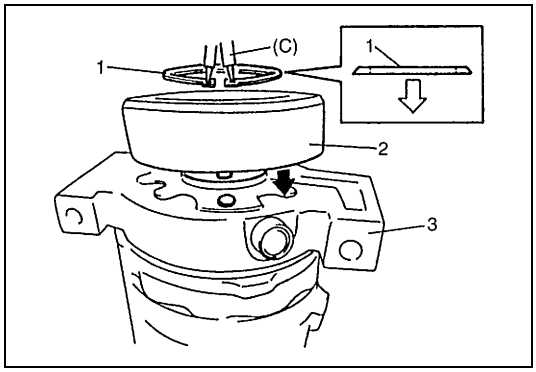
Be careful not to damage pulley when tapping magnet clutch assembly.



8) Remove clutch coil.

Special tool
(C) : 09900-06107

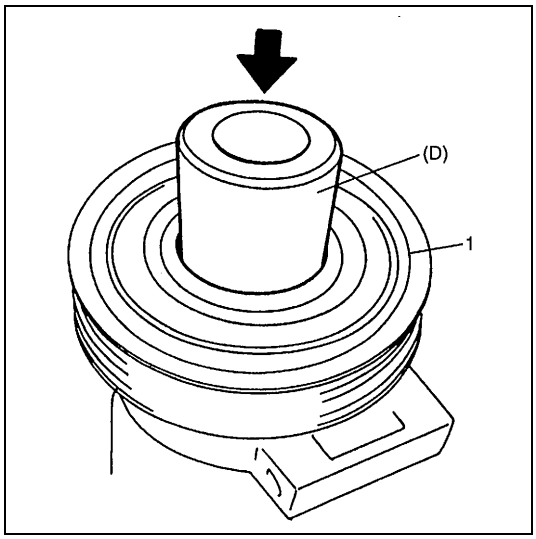
INSTALLATION



1) Install clutch coil (2).
   Protrusion on under side of coil ring must match hole in compressor assembly (3) to prevent movement ant correctly locate lead wire.
2) Using special tool (C), install snap ring (1) as shown in the figure.

Special tool
(C) : 09990-06107

3) Install clamp portion and ground terminal of lead wire.

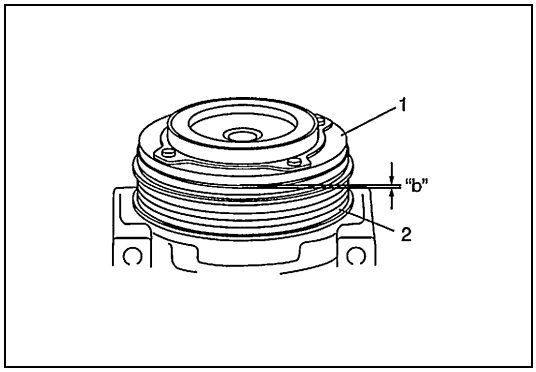


4) Install magnet clutch (1) as follows:
   a) Set clutch pulley squarely over clutch pulley installation boss.
   b) Place special tool (D) onto clutch pulley bearing.
      Ensure that edge rests only on inner race of bearing.

Special tool
(D) : 09991-06010

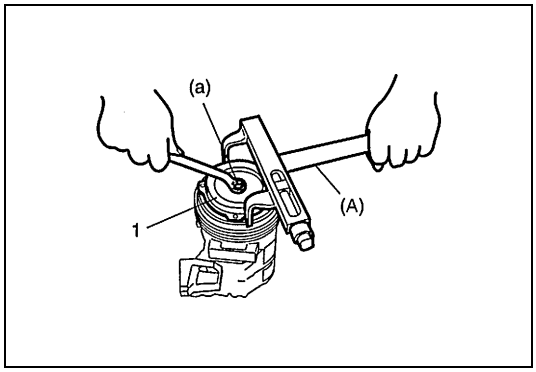
   c) Install snap ring.

CAUTION:
Be careful not to scratch bearing seal.



5) Adjust clearance, between armature plate (1) and magnet clutch (2) by putting shim on compressor shaft.

Standard clearance between armature plate and magnet clutch
"b" : 0.35 – 0.6 mm (0.014 – 0.023 in.)



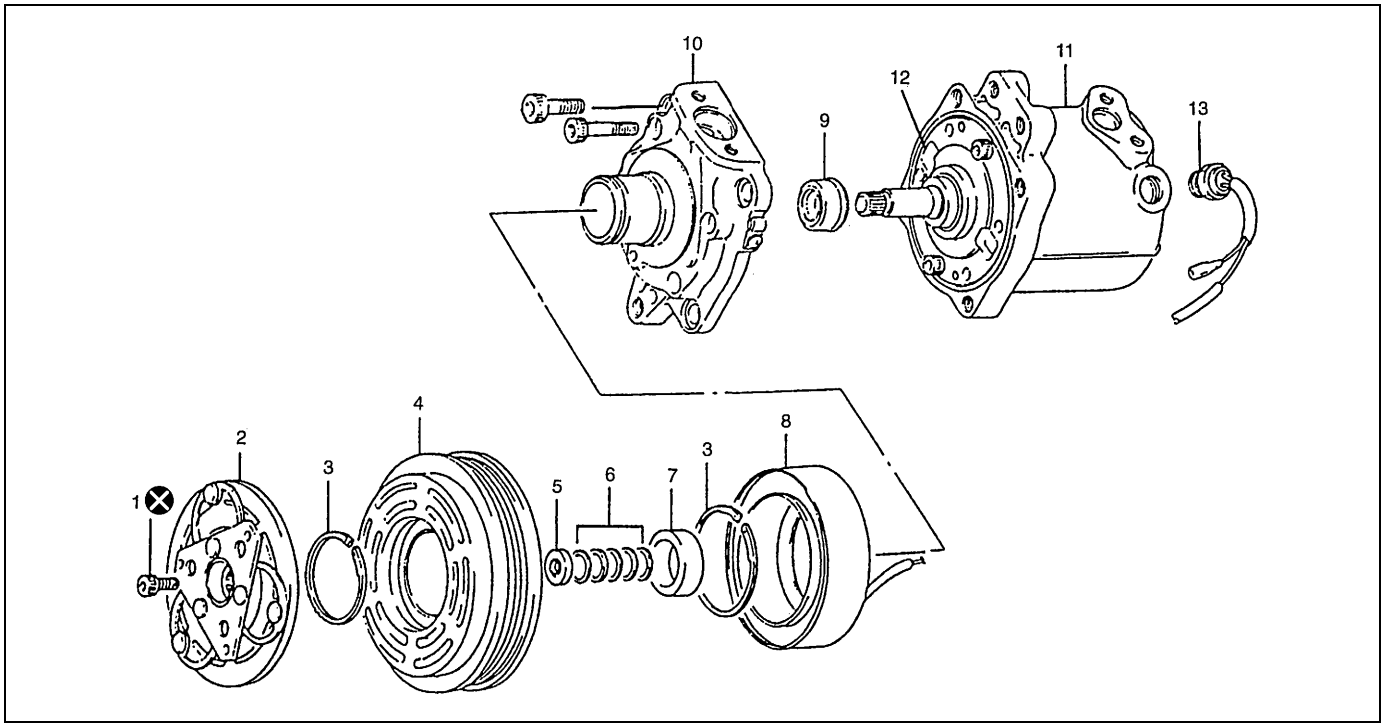
6) Tighten new armature plate nut to specified torque.

Tightening torque
Armature plate bolt
(a) : 14 N·m (1.4 kg-m, 10.5 lb-ft)

Special tool
(A) : 09920-53740

1. Armature plate

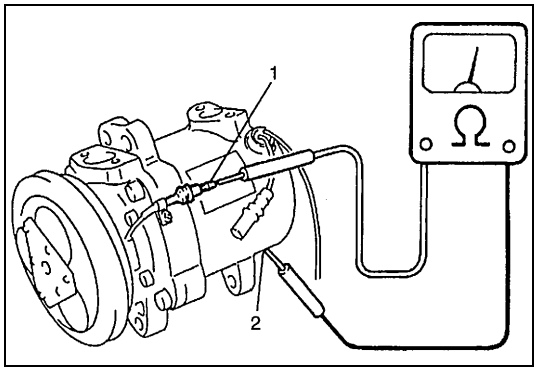
Magnet clutch assembly (for SEIKO SEIKI)



1. Armature plate bolt	5. Washer	9. Lip type seal	13. Compressor thermal switch
2. Armature plate	6. Shim	10. Compressor front head	⊗ Do not reuse.
3. Circlip	7. Oil felt ring	11. Compressor body component	
4. Clutch pulley	8. Clutch coil	12. O-ring	

INSPECTION

Magnet Clutch

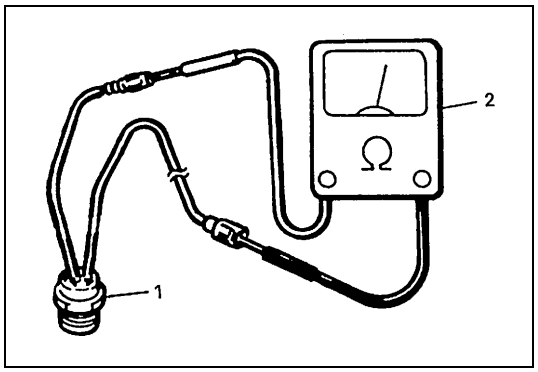


Perform the following items.

- Inspect clutch plate and clutch pulley for signs of oil.
- Check clutch pulley bearings for noise and grease leakage.
- Using and ohmmeter, measure resistance of clutch coil between clutch coil lead wire (1) and compressor body (2). If measured resistance is not within tolerance, replace coil.

Standard resistance for megnet clutch
2.5 – 4.5 Ω at 20°C, 68°F

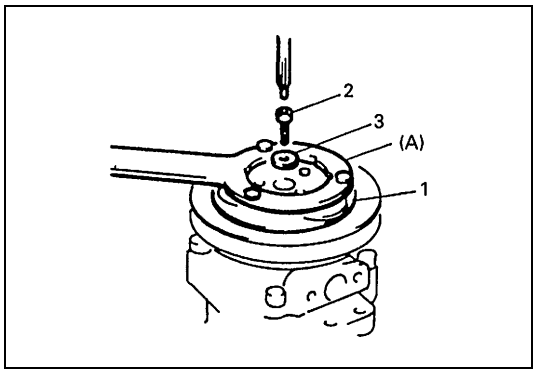
Compressor Thermal Switch



Use an ohmmeter (2) to check thermal switch (1) for continuity. If there is no continuity, replace it.

REMOVAL

1) Remove compressor assembly from vehicle. Refer to "Compressor Assembly" in this section.



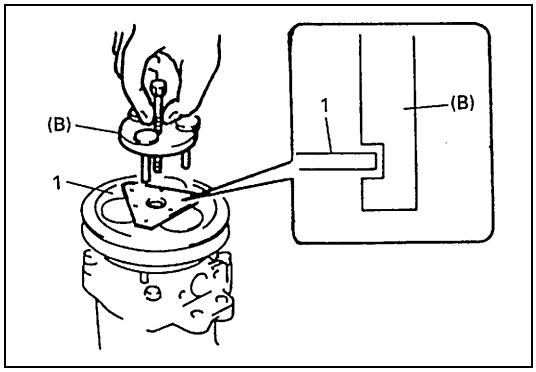
2) Fix armature plate (1) with special tool (A) and remove armature plate bolt (2).

Special tool
(A) : 09991-06020

NOTE:

Do not reuse armature plate bolt.

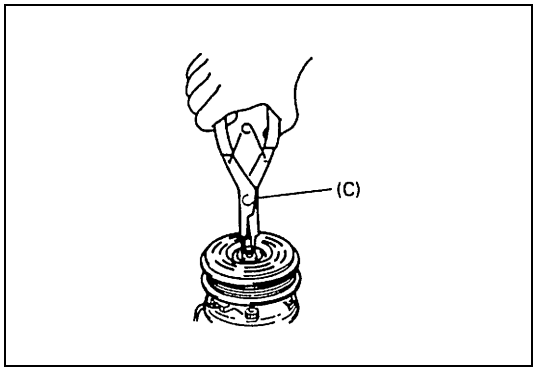
3. Washer (if equipped)



3) Using special tool (B), remove armature plate (1).

Special tool
(B) : 09991-06030

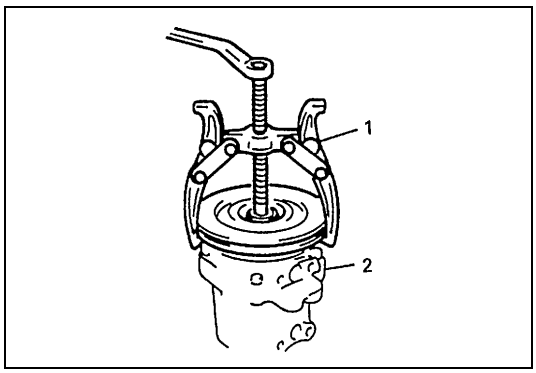
4) Disconnect clutch coil lead wire from compressor thermal switch led wire.
5) Remove felt ring (if equipped) and shims from shaft.



6) Using special tool (C), remove circlip.

Special tool
(C) : 09900-06107

7) Remove clutch coil lead wire clamp screw.



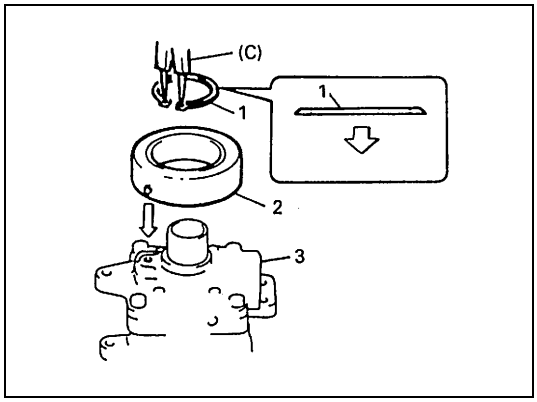
8) Remove clutch pulley with puller (1) from compressor (2).

NOTE:

Be careful not to damage pulley when tapping magnet clutch.

9) Remove clutch coil.

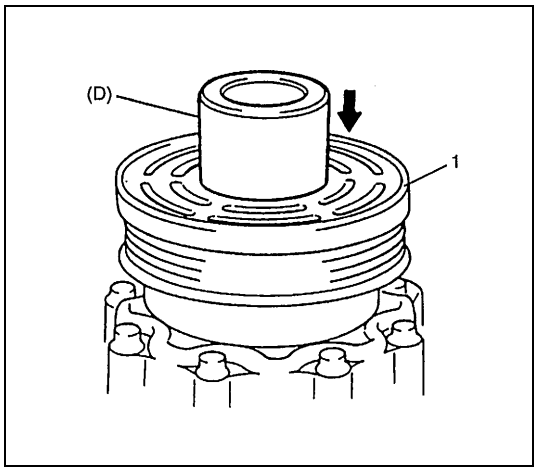
INSTALLATION



1) Install clutch coil (2).
   Protrusion on under side of clutch coil must match hole in compressor (3) to prevent movement ant correctly locate lead wire.
2) Using special tool (C), install snap ring (1) as shown in the figure.

Special tool
(C) : 09990-06107

3) Clamp covering portion of lead wire.

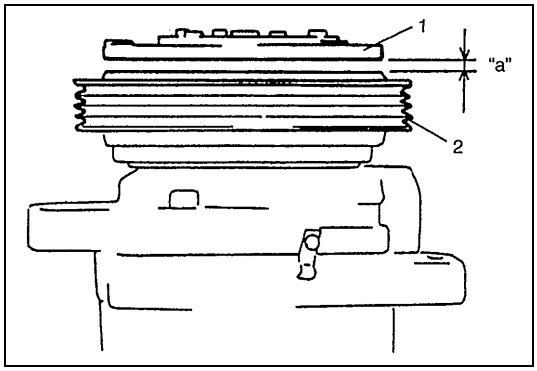


4) Install clutch pulley (1) as follows.
   a) Set clutch pulley squarely over clutch pulley installation boss.
   b) Place special tool (D) onto clutch pulley bearing.
      Ensure that edge rests only on inner race of bearing.

Special tool
(D) : 09991-06010

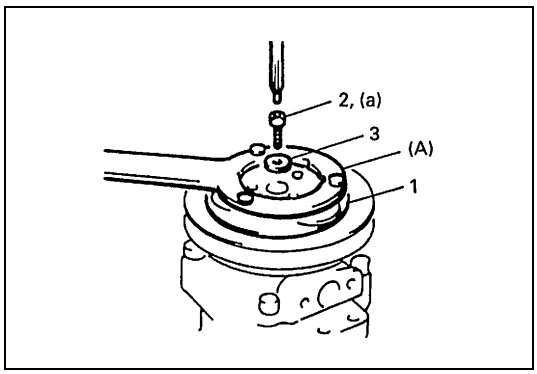
   c) Install snap ring.

CAUTION:
Be careful not to scratch bearing seal.



5) Adjust clearance, between armature plate and clutch pulley (2) by putting shim on compressor shaft.

Standard clearance between armature plate and magnet clutch
"a" : 0.3 – 0.6 mm (0.012 – 0.024 in.)



6) Tighten new armature plate (1) bolt (2) as specified torque.

Tightening torque
Armature plate bolt
(a) : 14 N·m (1.4 kg-m, 10.5 lb-ft)

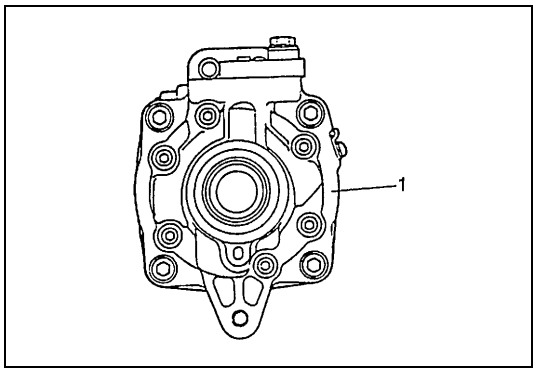
Special tool
(A) : 09991-06020

3. Washer (if equipped)

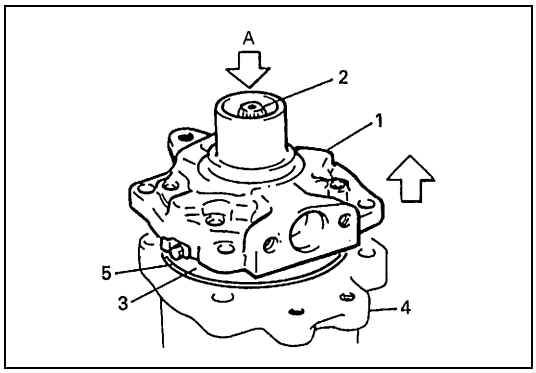
Lip type seal (for SEIKO SEIKI)

REMOVAL

1) Remove magnet clutch assembly, referring to “Magnet Clutch Assembly” in this section.



2) Remove compressor front head (1) mounting bolt (10 pcs.).



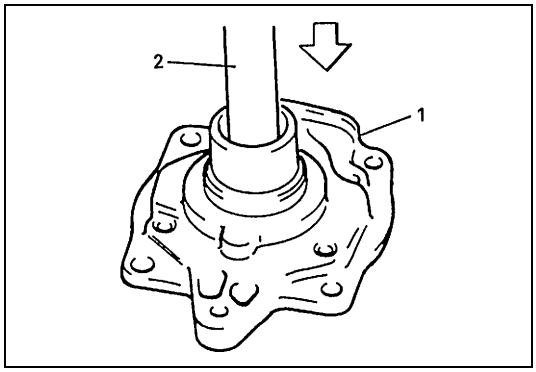
3) Remove compressor front head (1) by pushing cylinder shaft (2).

NOTE:

Be careful not to remove cylinder (3) from case (4).

4) Remove O-ring (5).

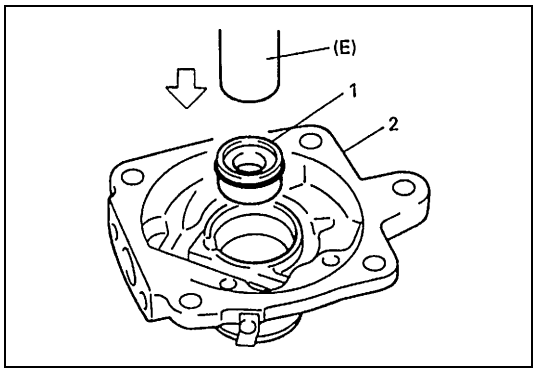
A. Push



5) Remove lip seal from compressor front head (1).

2. Bearing puller

INSTALLATION

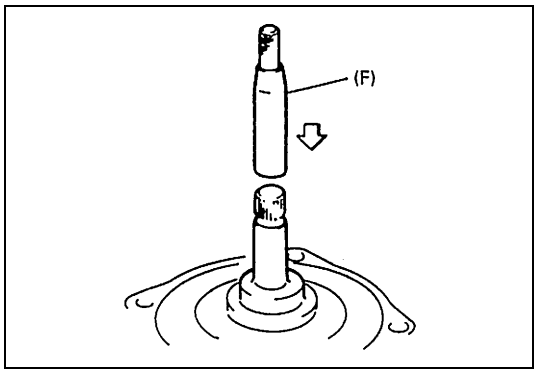


1) Press-fit lip seal (1) into compressor front head (2) using special tool (E).

Special tool
(E) : 09991-06050

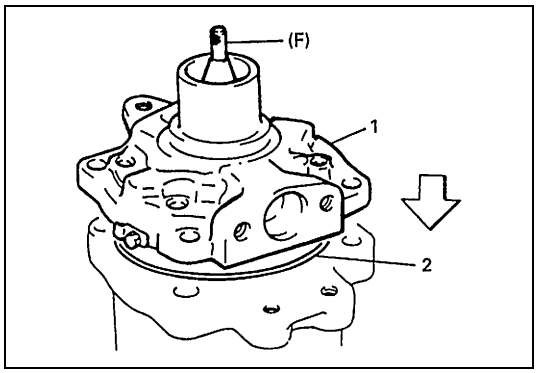
CAUTION:

Do not reuse mechanical seal once removed from compressor.

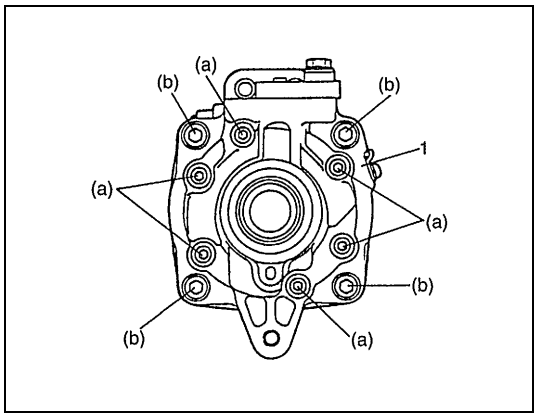


2) Coat special tool (F) surface with oil and place it on the shaft.

Special tool
(F) : 09991-06040



3) Install O-ring (2) to case.
4) Apply compressor (refringent) oil to lip seal and O-ring.
5) Install compressor front head (1).



6) Tighten compressor front head bolt.

Tightening torque
Compressor front head bolt
(a) : 14 N·m (1.4 kg-m, 10.5 lb-ft)
(b) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

NOTE:

- **Be sure to use new front head bolt washer.**
- **Tighten bolt (a) first, and next (b).**

1. Front head

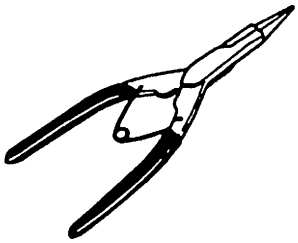
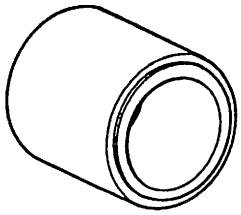
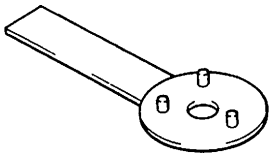
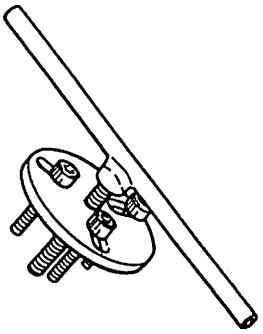
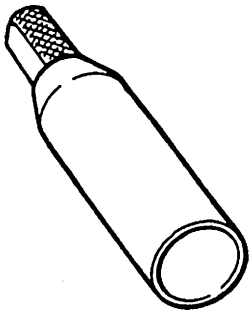
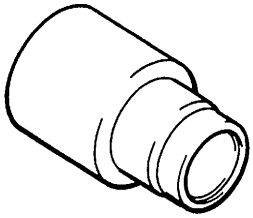
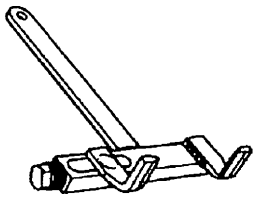
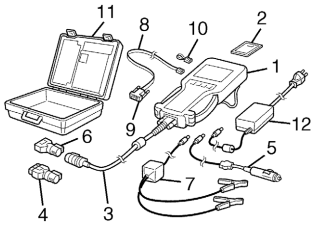
Required Service Materials

Material	Recommended SUZUKI product (Part Number)	Use
Compressor oil for DENSO compressor (Refrigerant oil)	COMPRESSOR OIL (ND-OIL 8, 250 cc) 95590-58D30	• O-ring • Each component
Compressor oil for SEIKO SEIKI compressor (Refrigerant oil)	COMPRESSOR OIL RS20 (150 cc) 99000-99088-00D	• O-ring • Each component

Tightening Torque Specification

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Refrigerant pipe (8 mm (0.31 in.))	13	1.3	9.5
Refrigerant pipe (12.7 mm (0.5 in.))	22	2.2	16.0
Refrigerant pipe (14.5 mm (0.57 in.))	23	2.3	17.0
Refrigerant pipe (16 mm (0.63 in.))	33	3.3	24.0
Condenser dryer cap bolt	12.5	1.25	9.0
A/C refrigerant (dual) pressure switch	10	1	7.5
Compressor mounting bolt	23	2.3	17.0
Armature plate bolt	14	1.4	10.5
Compressor front head bolt (6 mm)	14	1.4	10.5
Compressor front head bolt (8 mm)	23	2.3	17.0

Special Tool

 09900-06107 Snap ring pliers (Opening type)	 09991-06010 Magnet clutch pulley installer	 09991-06020 Armature plate spanner	 09991-06030 Armature plate remover
 09991-06040 Lip type seal protector	 09991-06050 Lip type seal installer	 09920-53740 Armature plate holder	 Tech-2 kit (SUZUKI scan tool) (See NOTE "A".)

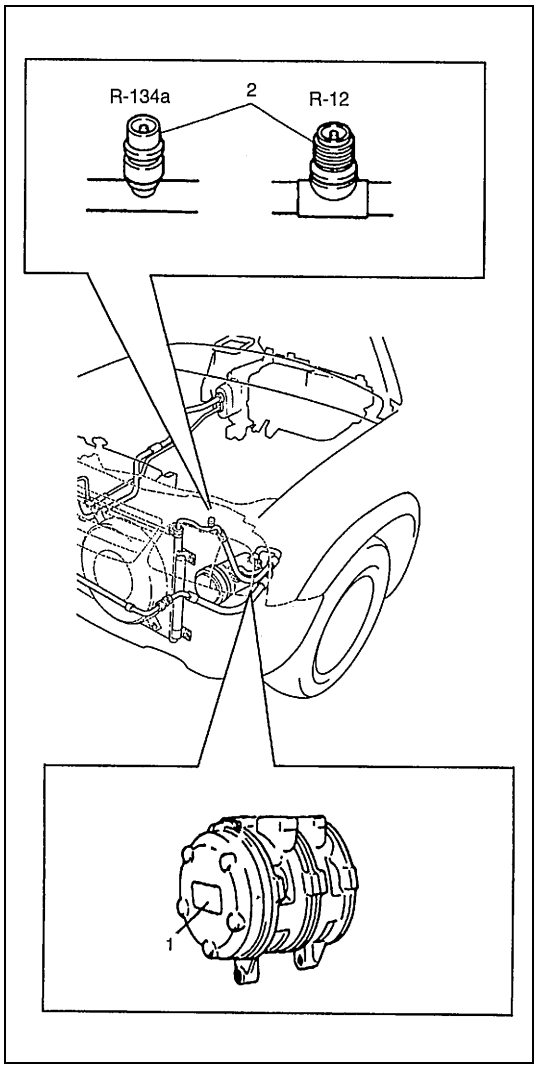
NOTE:

"A": This kit includes the following items and substitutes for the Tech-1A kit.
1. Tech 2, 2.PCMCIA card, 3. DLC cable, 4. SAE 16/19 adapter, 5. Cigarette cable, 6. DLC loopback adapter, 7. Battery power cable, 8. RS232 cable, 9. RS232 adapter, 10. RS232 loopback connector, 11. Storage case, 12. Power supply

CANVAS TOP MODEL

General Description

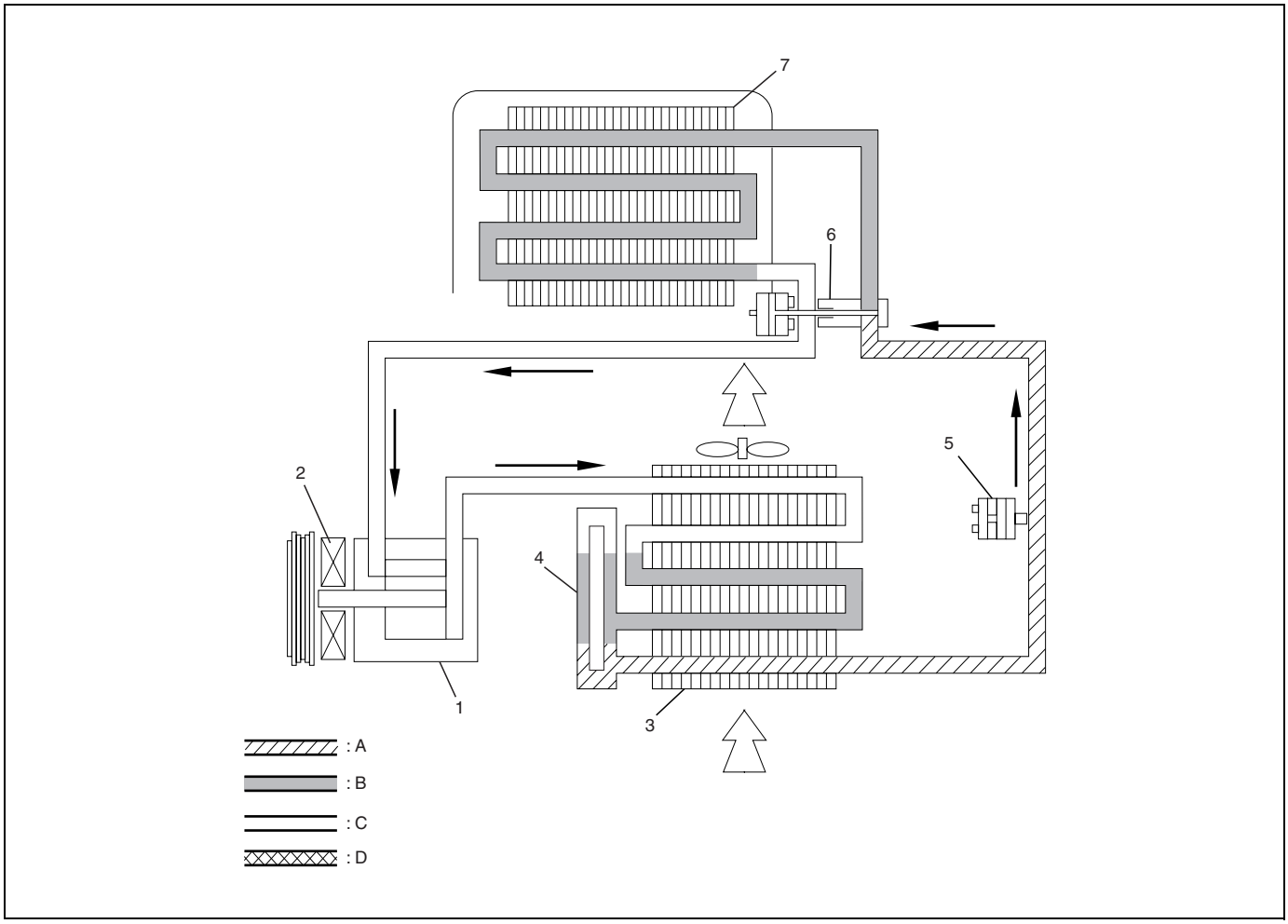
Identification of Refrigerating System



Whether the A/C equipped with the vehicle being serviced uses refrigerant R-134a or R-12 is indicated on the LABEL installed the compressor.
Also, it can be identified by the shape of the service (charge) valve. The compressor manufacturer, it can be identified by the LABEL on compressor body.

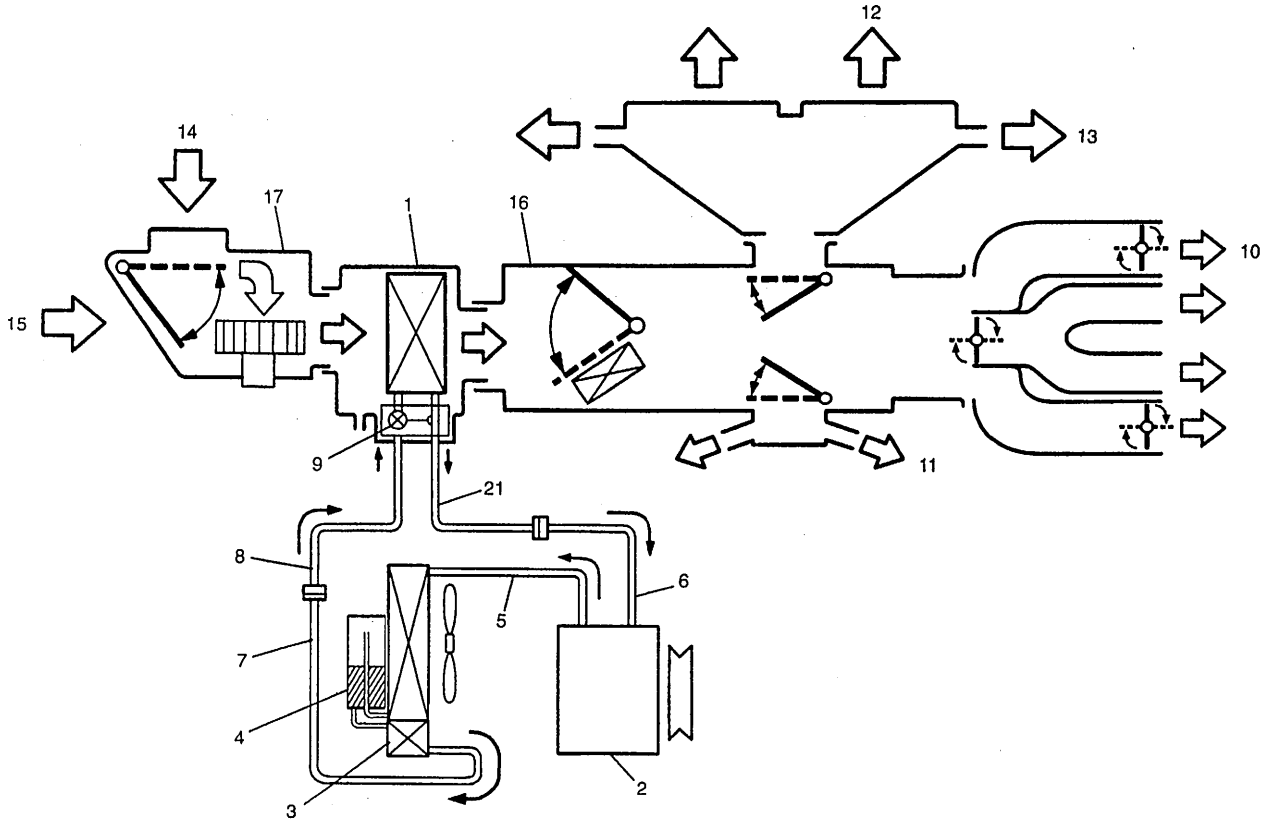
1. Compressor label
2. Service valve

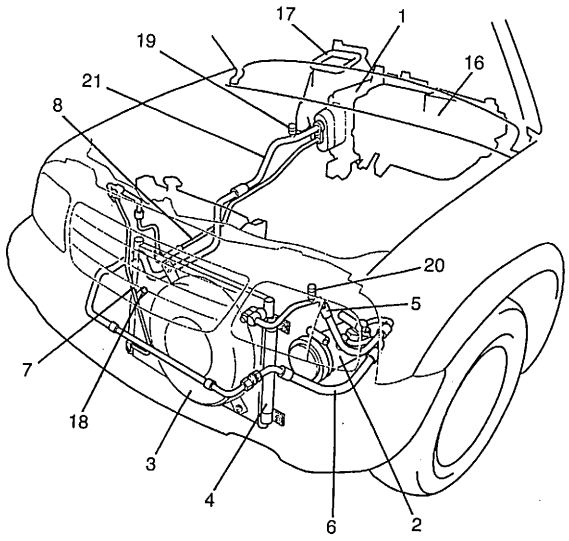
Refrigerant Flow of Air Conditioning System



A : Liquid	C : Superheated Vapor	1. Compressor	3. Condenser assembly	5. Dual pressure switch	7. Evaporator
B : Vapor	D : Cooled Vapor	2. Magnet clutch	4. Receiver/dryer	6. Expansion valve	

Major Components and Location





1. Cooling unit	8. Liquid pipe	15. Recirculation air
2. Compressor	9. Expansion valve	16. Heater unit
3. Condenser assembly	10. Ventilation air	17. Air inlet box
4. Receiver/dryer	11. Foot air	18. Dual pressure switch
5. Discharge hose	12. Defroster air	19. Low pressure charge valve
6. Suction hose	13. Demister air	20. High pressure charge valve
7. Condenser outlet pipe	14. Fresh air	21. Suction pipe

Diagnosis

General

Condition	Possible Cause	Correction
Cool air won't come out (A/C system won't operative)	No refrigerant	Perform recover, evacuation and charging referring to "Operation Procedure for Charging A/C with Refrigerant" in this section.
	Fuse blown	Check "IG METER" fuse, "REAR DEFG" fuse, and "A/C FUSE" and check short circuit to ground.
	A/C switch faulty	Check A/C switch referring to "A/C Switch" in this section.
	Blower motor switch faulty	Check blower motor switch referring to "Heater Control Lever Assembly" in Section 1A.
	A/C thermistor faulty	Check A/C thermistor referring to "A/C Evaporator Thermistor (A/C Evaporator Temperature Sensor)" in this section.
	Dual pressure switch faulty	Check dual pressure switch referring to "Dual Pressure Switch" in this section.
	Wiring or grounding faulty	Check wring, grounding and repair as necessary.
	A/C ON permission signal in ECM faulty	Check ON permission signal referring to "Inspection of A/C Controller and Its Circuits" in this section.
	A/C controller and its circuit faulty	Check A/C controller and its circuit referring to "Inspection of A/C Controller and Its Circuits" in this section.
Cool air won't come out (A/C compressor won't operative)	Magnet clutch faulty	Check magnet clutch referring to "Magnet Clutch Assembly" under "Compressor Assembly" in this section.
	Compressor relay faulty	Check compressor relay referring to "A/C Compressor Relay and A/C Condenser Cooling Fan Relay" in this section.
	Drive belt loosen or broken	Adjust or replace drive belt.
	Compressor faulty	Check compressor referring to "Compressor Assembly" in this section.
	A/C ON permission signal in ECM faulty	Check ON permission signal referring to "Inspection of A/C Controller and its Circuits" in this section.
	A/C controller faulty	Check A/C controller referring to "Inspection of A/C Controller and Its Circuits" in this section.
Cool air won't come out (A/C condenser cooling fan motor won't operative)	Condenser cooling fan relay faulty	Check condenser cooling fan relay referring to "A/C Compressor Relay and A/C Condenser Cooling Fan Relay" in this section.
	Wirring or grounding faulty	Check Wiring, grounding and repair as necessary.
	"A/C condenser cooling fan relay" signal in ECM faulty	Check A/C condenser cooling fan relay signal referring to "Inspection of A/C Controller and Its Circuits" in this section.
	Condenser cooling fan motor faulty	Check condenser cooling fan motor referring to "Condenser Cooling Fan Assembly" in this section.

Condition	Possible Cause	Correction
Cool air won't come out (Blower motor won't operative)	Fuse blown	Check "HEATER FUSE", "REAR DEFG" fuse, and "A/C FUSE" and check short circuit to ground.
	Blower motor relay faulty	Check blower motor relay referring to "Blower Motor Relay" in Section 1A.
	Blower motor resistor faulty	Check blower motor resistor referring to "Blower Motor Resistor" in Section 1A.
	Blower motor switch faulty	Check blower motor switch referring to "Heater Control Lever Assembly" in Section 1A.
	Wiring or grounding faulty	Check wiring, grounding and repair as necessary.
	Blower motor faulty	Check blower motor referring to "Blower Motor" in Section 1A.
Cool air won't come out or insufficient cooling (A/C system normal operative)	Insufficuent or excessive charge of refrigerant	Check charge of refrigerant and system leaks.
	Refrigerant leak in sytem	Check sytem for leaks.
	Condenser clogged	Check condenser referring to "A/C Condenser Assembly" in this section.
	A/C evaporator clogged or frosted	Check A/C evaporator and A/C evaporator thermistor referring to "Cooling Unit (Evaporator)" and "A/C Evaporator Thermistor (A/C Evaporator Temperature Sensor)" in this section.
	A/C thermistor faulty	Check A/C evaporator thermistor referring to "A/C Evaporator Thermistor (A/C Evaporator Temperature Sensor") in this section.
	Expansion valve faulty	Check expansion valve referring to "Expansion Valve" in this section.
	Drive belt slipping	Check or replace drive belt.
Cool air does not come out or insufficient cooling (A/C system normal operative)	Magnet clutch faulty	Check magnet clutch referring to "Magnet Clutch Assembly" under "Compressor Assembly" in this section.
	Compressor faulty	Check compressor referring to "Compressor Assembly" in this section.
	Air in A/C system	Replace condensor dryer, and perform evacuation and charging.
	Air leaking from cooling unit or air duct	Repair as necessary.
	Heater and ventilation system faulty	Repair as necessary.
	Blower motor faulty	Check blower motor referring to "Blower Motor" in Section 1A.
	Excessive compressor oil existing in A/C system	Pull out compressor oil in A/C system circuit, and replace compressor.

Condition	Possible Cause	Correction
Cool air does not comes out only intermittently	Wiring connection faulty	Repair as necessary.
	Expansion valve faulty	Check expansion valve referring to “Expansion Valve” in this section.
	Excessive moisture in A/C system	Replace condenser dryer, and perform evacuation and charging.
	A/C controller faulty	Check A/C controller referring to “Inspection of A/C Controller and Its Circuits” in this section.
	Magnet clutch faulty	Check magnet clutch referring to “Magnet Clutch Assembly” under “Compressor Assembly” in this section.
	Excessive charge of refrigerant	Check charge of refrigerant.
Cool air comes out only at high speeds	Condenser clogged	Check condenser referring to “A/C Condenser Assembly” in this section.
	Insufficuent charge of refrigerant	Check charge of refrigerant and system for leaks.
	Air in A/C system	Replace condenser dryer, and perform evacuation and charging.
	Drive belt slipping	Check or replace drive belt.
	Compressor faulty	Check compressor referring to “Compressor Assembly” in this section.
Cool air does not comes out only at high speeds	Excessive charge of refrigerant	Check charge of refrigerant.
	A/C evaporator frosted	Check A/C evaporator and A/C evaporator thermistor referring to “Cooling Unit (Evaporator)” and “A/C Evaporator Thermistor (A/C Evaporator Temperature Sensor)” in this section.
Insufficient velocity of cooled air	A/C evaporator clogged or frosted	Check A/C evaporator and A/C evaporator thermistor referring to “Cooling Unit (Evaporator)” and “A/C Evaporator Thermistor (A/C Evaporator Temperature Sensor)” in this section.
	Air leaking from cooling unit or air duct	Repair as necessary.
	Blower motor faulty	Check blower motor referring to “Blower Motor” in Section 1A.
	Wiring or grounding faulty	Check wiring, grounding and repair as necessary.

Diagnosis of Abnormal Noise

There are various types of noise, ranging from those produced in the engine compartment to those from the passenger compartment, also from rumbling noises to whistling noises.

Abnormal noise from compressor

Condition	Possible Cause	Correction
During compressor operation, a rumbling noise is heard proportional to engine revolutions.	Inadequate clearance in piston area (piston or swash-plate).	Repair or replace compressor as necessary.
A loud noise is heard at a certain rpm, disproportionately to engine revolution.	Loose or faulty V-belt.	Adjust V-belt tension, or replace belt.
	Loose mounting bolts.	Retighten mounting bolts.
A loud rattle is heard at low engine rpm.	Loose compressor center bolt.	Retighten center bolt.
		Replace compressor if it was operated in this condition for a long time.

Abnormal noise from magnetic clutch

Condition	Possible Cause	Correction
A rumbling noise is heard when compressor is not operating.	Worn or damaged bearings.	Replace bearings.
A chattering noise is heard when compressor is engaged.	Faulty clutch gap (excessive).	Adjust clutch gap.
	Worn clutch friction surface.	Replace clutch.
	Compressor oil leaked from shaft seal, contaminating the friction surface.	Replace compressor shaft oil seal.

Abnormal noise from tubing

Condition	Possible Cause	Correction
A droning noise is heard inside vehicle, but not particularly noticeable in engine compartment.	Faulty tubing clamps.	Reposition clamps or increase the number of clamps.
	Resonance caused by pulsation from variations in refrigerant pressure.	Attach a silencer to tubing, or modify its position and length.

Abnormal noise from condenser

Condition	Possible Cause	Correction
Considerable vibration in condenser.	Resonance from condenser mounting stay and body.	Firmly insert a silencer between condenser mounting stay and body.

Abnormal noise from crankshaft pulley

Condition	Possible Cause	Correction
A large rattling noise is heard at idle or sudden acceleration.	Loosen pulley mounting bolt.	Retighten bolt.
	Worn or broken bearings.	Replace bearings.

Abnormal noise from tension pulley

Condition	Possible Cause	Correction
Clattering noise is heard from pulley.	Worn or damaged bearings.	Replace bearings.
Pulley cranks upon contact.	Cracked or loose bracket.	Replace or retighten bracket.

Abnormal noise from evaporator

Condition	Possible Cause	Correction
Whistling sound is heard from evaporator.	Depending on the combination of the interior/exterior temperatures, engine rpm and refrigerant pressure, the refrigerant flowing out of the expansion valve may, under certain conditions, make a whistling sound.	At times, slightly decreasing refrigerant volume may stop this noise.
		Inspect expansion valve and replace if faulty.

Abnormal noise from blower motor

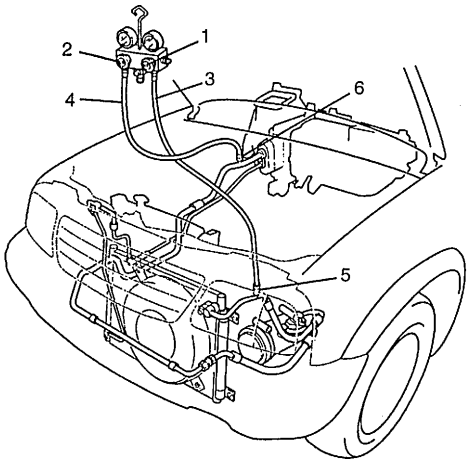
Condition	Possible Cause	Correction
Blower motor emits a chirping sound in proportion to its speed of rotation.	Worn or damaged motor brushes or commutator.	Repair or replace blower motor.
Fluttering noise or large droning noise is heard from blower motor.	Leaves or other debris introduced from fresh air inlet to blower motor.	Remove debris and make sure that the screen at fresh air inlet is intact.

Compression System Diagnosis

Compressor troubles are mainly following three types : gas leakage, noise and insufficient pressure.
Compressor gas leakages in most cases develop from the shaft seal. When detecting gas leakage, always use a leak tester. If a small amount of oil seeps out from the shaft seal, there is no necessity of replacing the seal. The shaft seal has been designed to allow a small amount of oil to leak out for lubricating purpose. Thus, the shaft seal should be replaced only when a large amount of compressor oil is leaking out or when gas leakage is discovered by using gas tester.
In regard to noise and insufficient pressure, repairs should be made only after diagnosing the trouble properly.

Condition	Possible Cause	Correction
Noise from compressor	Defective bearing	Replace.
	Defective cylinder and/or shaft	Replace.
Noise from magnetic clutch	Defective bearing	Replace.
	Defective clutch face	Replace.
Insufficient cooling	Defective gasket	Replace.
	Defective reed valve	Replace.
Not rotating	Locked compressor	Replace.
	Seized magnetic clutch	Replace.
	Rotating parts seized by insufficient oil amount	Replace.
Oil and/or gas leakage	Defective seal	Replace.
	Defective O-ring	Replace.

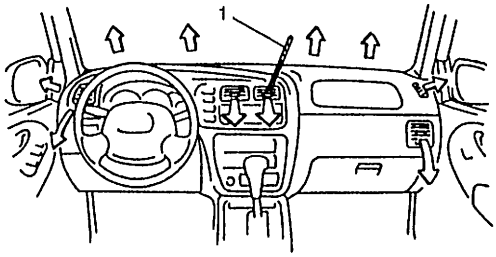
Performance Diagnosis



1) Confirm that vehicle and environmental conditions are as follows.
   - Vehicle is not exposed to direct sun.
   - Ambient temperature is within 15°C – 35°C (59°F – 95°F).
2) Make sure that high pressure valve (1) and low pressure valve (2) of manifold gauge are firmly closed.
3) Connect high pressure charging hose (3) to high pressure service valve (5) on vehicle, and connect low pressure charging hose (4) to low pressure service valve (6) on vehicle.
4) Bleed the air in charging hoses (3), (4) by loosening their respective nuts on manifold gauge, utilizing the refrigerant pressure.
   When a hiss is heard, immediately tighten nut.

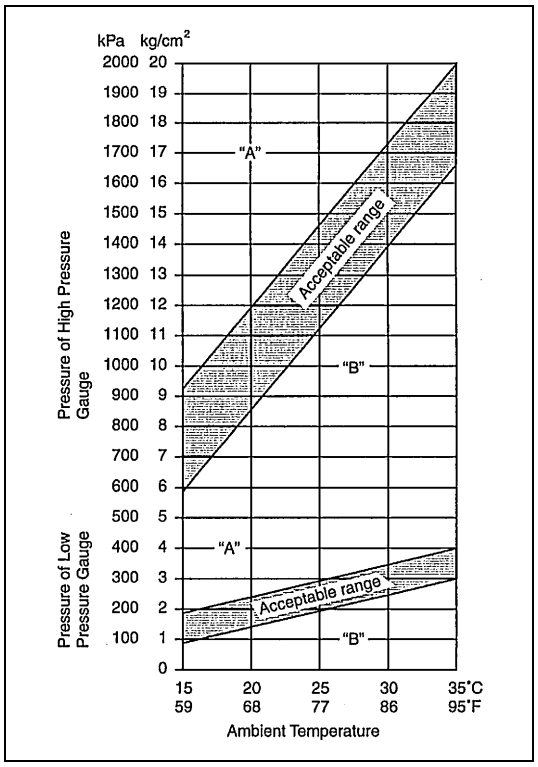
CAUTION:
Do not interchange high and low pressure charging hoses by mistake.

5) Warm up engine to normal operating temperature (engine coolant temperature at 80 – 90°C (176 – 194°F)) and keep it at specified idle speed. (Radiator cooling fan should not be working when checking pressure and temperature.)
6) Turn A/C switch ON, and set blower switch at "HI" (4th position), temperature control knob at "COOL", air outlet control knob at "VENT", fresh/recirculation control knob at "RECIRCULATION". (Confirm that A/C compressor and condenser fan are working.)
7) Keep all windows, doors and engine food open.



Ambient temperature	15 – 35°C (59°F – 95°F)
Engine rpm	Keep to 1,500 rpm.
Blower motor switch	Max. (4th position)
Temperature control	Max. cool
Air outlet control	VENT
Vehicle doors	All open
Air inlet door position	Recirculation

8) With about 20 mm (0.8 in.) of dry bulb thermometer (1) inserted into center duct air outlet and another one set near evaporator air inlet, read temperature indicated on each thermometer.



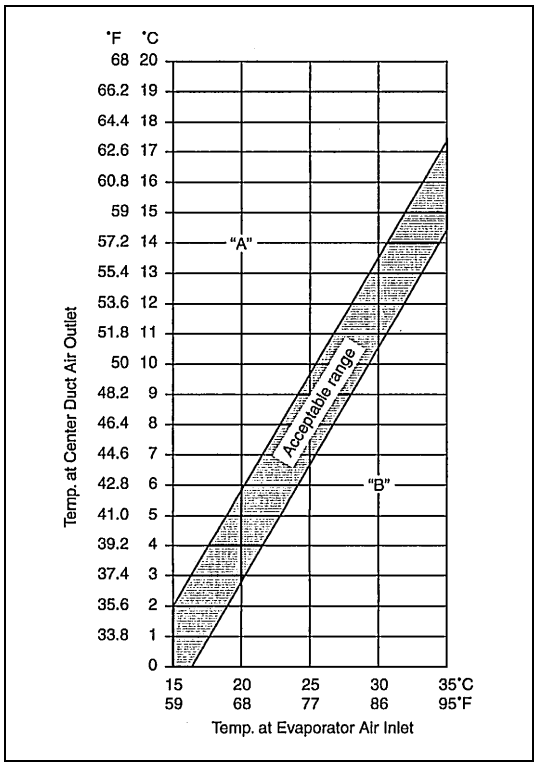
9) Check for each pressure of low side and high side if it is within shaded range of graph.
   If each gauge reading is out of specified pressure, correct defective part referring to the following diagnosis tables in this section.

Example :

Gauges should read as follows when ambient temperature is 30°C.	
Pressure on high pressure gauge (HI) :	**1400 – 1750 kPa** **14.0 – 17.5 kg/cm²**
Pressure on h6igh pressure gauge (LO) :	**230 – 350 kPa** **2.3 – 3.5 kg/cm²**

NOTE:

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



10) Check inlet port temperature-to-outlet port temperature relationship using graph.
    For example, if evaporator inlet port temperature is 25°C (77°F) and center duct air outlet temperature is 8°C (46.4°F), their crossing point is within acceptable range as shown in graph.
11) If crossing point is out of acceptable range, diagnose trouble referring to the following "Performance diagnosis table" in this section.

Performance diagnosis table

HIGH PRESSURE CAUGE

Condition	Possible Cause	Correction
Pressure high ("A" area of high side graph)	Refrigerant overcharged	Recharge
	Expansion valve frozen or clogged	Check expansion valve
	Clogged refrigerant passage of high side	Clean or replace
	Condenser fan malfunction (Insufficient cooling of condenser)	Check condenser fan
	Dirty or bent condenser fins (Insufficient cooling of condenser)	Clean or repair
	Compressor malfunction (Insufficient oil etc.)	Check compressor
	Engine overheat	Check engine cooling system
Pressure low ("B" area of high side graph)	Insufficient refrigerant (Insufficient charge or leakage)	Check for leakage, repair if necessary and recharge
	Expansion valve malfunction (Valve opens too wide)	Check expansion valve
	Compressor malfunction (Insufficient compression)	Check compressor

LOW PRESSURE GAUGE

Condition	Possible Cause	Correction
Pressure high ("A" area of low side graph)	Expansion valve malfunction (Valve opens too wide)	Check expansion valve
	Compressor malfunction (Insufficient compression)	Check compressor
Pressure low ("B" area of low side graph)	Insufficient refrigerant (Insufficient charge or leakage)	Check for leakage, repair if necessary and recharge
	Expansion valve malfunction (Valve opens too narrow)	Check expansion valve
	Clogged refrigerant passage (Crashed pipe)	Repair or replace

THERMOMETER AT CENTER DUCT

Condition	Possible Cause	Correction
Outlet air temperature at center duct is high (Crossing point is in area "A")	Insufficient or excessive charge of refrigerant	Check refrigerant pressure
	Dirty or bent evaporator fins	Clean or repair
	Air leakage from cooling (heater) unit or air duct	Repair or replace
	Malfunctioning, switchover function of damper in cooling (heater) unit	Repair or replace
	Compressor malfunction	Check compressor
Outlet air temperature at center duct is low (Crossing point is in area "B")	Insufficient air volume from center duct (Heater blower malfunction)	Check blower motor and fan
	Compressor malfunction	Check compressor

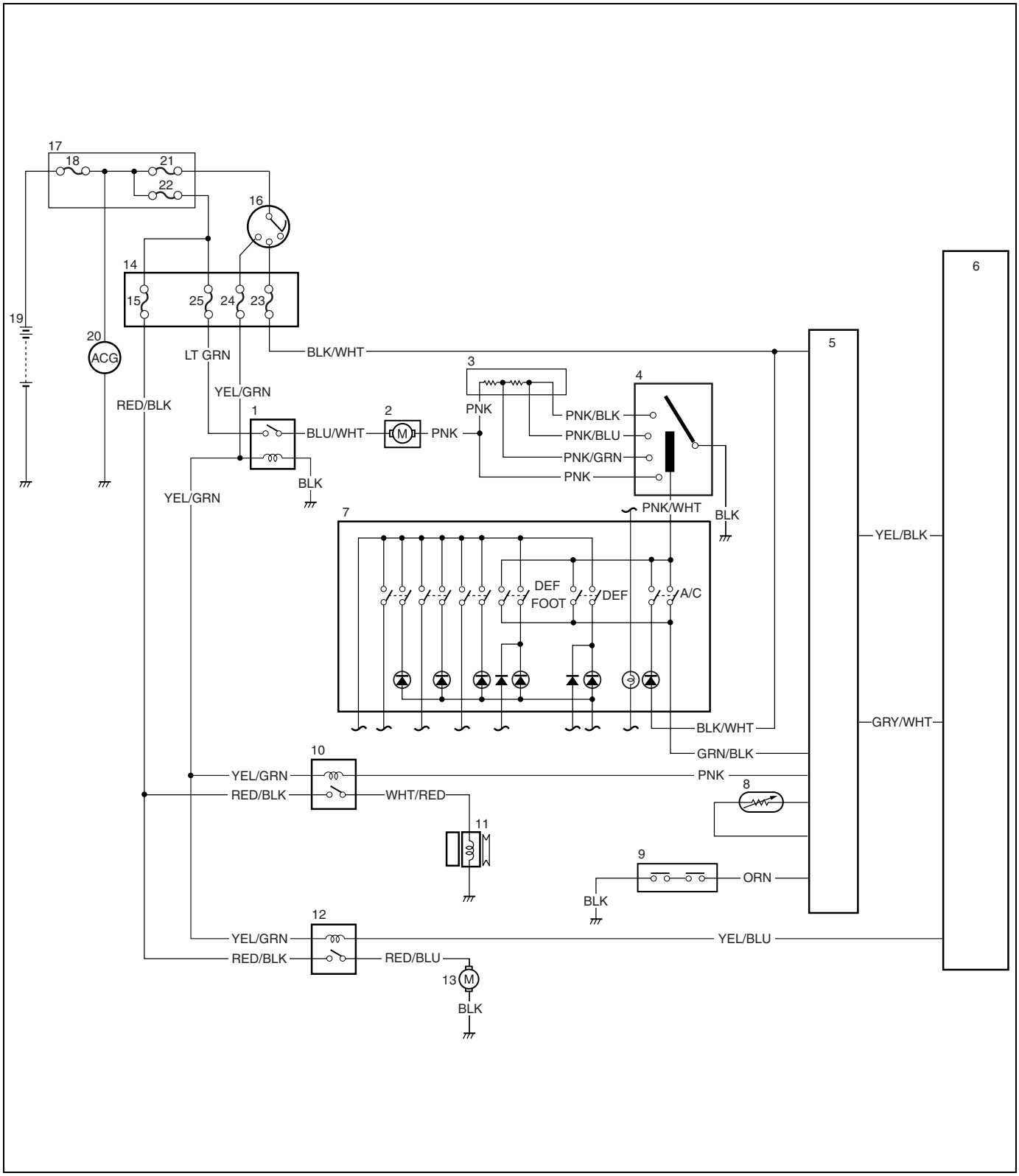
NOTE:

If ambient temperature is within 30 – 35°C (85 – 95°F), it is possible to do using the following table for more detail diagnosis.

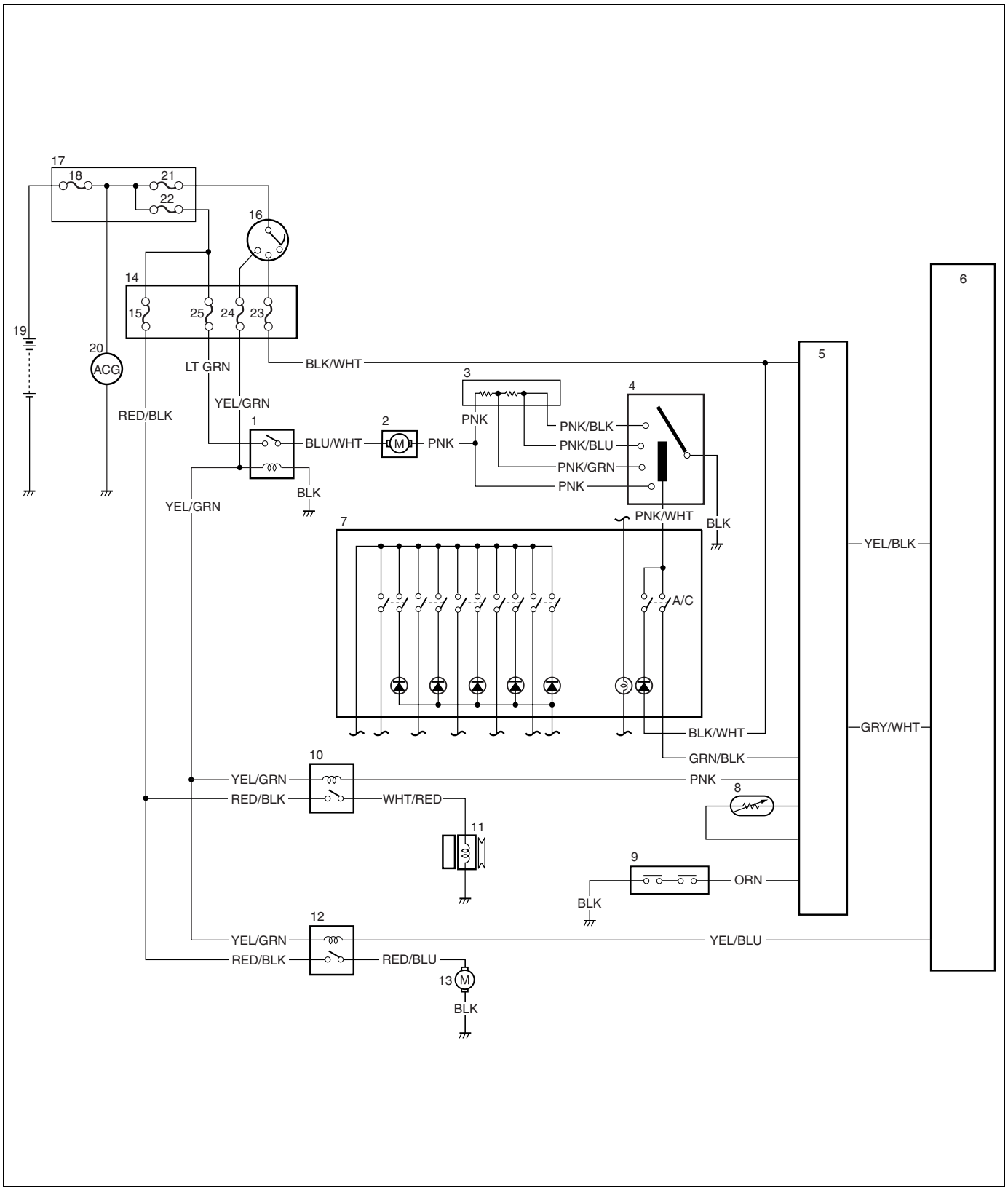
Detail diagnosis table (Ambient temperature within 30 – 35°C (85 – 95°F))

Condition			Possible Cause	Correction
Manifold Gauge	MPa (kg/cm^2) (psi)	Detail		
Lo	Hi			
0.23 – 0.35 (2.3 – 3.5) (33 – 50)	**1.4 – 1.75 (14 – 17.5) (200 – 249)**	**Normal condition.**	–	–
Negative pressure	**0.5 – 0.6 (5 – 6) (71.2 – 85.3)**	**The low pressure side reads a negative pressure, and the high pressure side reads an extremely low pressure. Presence of frost around tubing to and from receiver/dryer and expansion valve.**	Dust particles or water droplets are either stuck or frozen inside expansion valve, preventing the refrigerant from flowing.	Clean expansion valve. Replace it if it cannot be cleaned. Replace receiver/dryer. Evacuate the A/C system and recharge with fresh refrigerant.
Normal : 0.23 – 0.35 (2.3 – 3.5) (33 – 50) ↑↓ Abnormal : Negative pressure	**Normal : 1.4 – 1.75 (14 – 17.5) (200 – 249) ↑↓ Abnormal : 0.69 – 0.98 (7 – 10) (100 – 142)**	**During A/C operation, the low pressure side sometimes indicates negative pressure, and sometimes normal pressure. Also high pressure side reading fluctuates between the abnormal and normal pressure.**	Expansion valve is frozen due to moisture in the system, and temporarily shuts off the refrigeration cycle.	Replace expansion valve. Replace receiver/dryer. Evacuate A/C system and recharge with fresh refrigerant.
0.05 – 0.15 (0.5 – 1.5) (4.2 – 21.3)	**0.69 – 0.98 (7 – 10) (100 – 142)**	**Both low and high pressure sides indicate low readings. Continuous air bubbles are visible through sight glass. Output air is slightly cold.**	Insufficient refrigerant in system. (Refrigerant leaking)	Using a gas leak detector, check for leaks and repair as necessary. Recharge refrigerant to a specified amount. If the pressure reading is almost 0 when the manifold gauges are attached, check for any leaks, repair them, and evacuate the system.
0.4 – 0.6 (4 – 6) (56.9 – 85.3)		**Pressure on low pressure side is high. Pressure on high pressure side is low. Both pressure becoming equal right after A/C is turned OFF.**	Internal leak in compressor.	Inspect compressor and repair or replace as necessary.
0.35 – 0.45 (3.5 – 4.5) (50 – 64)	**1.96 – 2.45 (20 – 25) (285 – 355)**	**High pressure reading on both low and high pressure sides. Air bubbles are not visible even when engine rpm is lowered.**	Overcharged A/C system. Faulty condenser cooling operation. Faulty condenser fan operation.	Adjust refrigerant to specified amount. Clean condenser. Inspect and repair condenser fan.
		High pressure reading on both low and high pressure sides. Low pressure side tubing is not cold when touched. Air bubbles are visible through sight glass.	Presence of air in A/C system. (Improperly evacuated)	Replace receiver/dryer. Inspect quantity of compressor oil and presence of contaminants in oil. Evacuate system and recharge with fresh refrigerant.
0.45 – 0.55 (4.5 – 5.5) (64 – 78)		**High pressure reading on both low and high pressure sides. Large amount of frost or dew on the low pressure side tubing.**	Faulty expansion valve. Refrigerant flow is not regulated properly.	Replace expansion valve.

Wiring Circuit

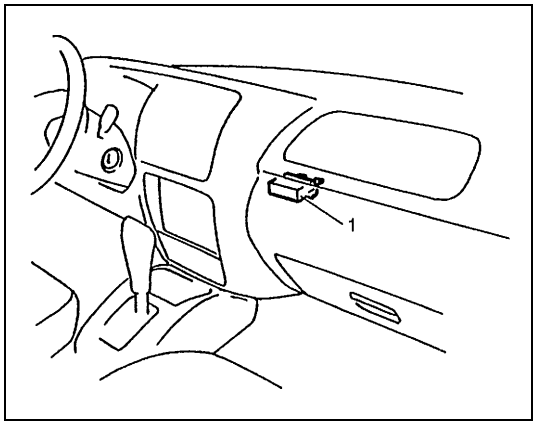


1. Blower motor main relay	7. Heater mode control switch	13. Condenser cooling fan	19. Battery	25. Heater fuse 30 A
2. Blower motor	8. Evaporator temperature sensor	14. Fuse box	20. Generator	
3. Blower motor resistor	9. Refrigerant pressure switch	15. A/C fuse 25A	21. Ignition main fuse 60A	
4. Blower motor switch	10. Compressor relay	16. Ignition switch	22. Heater/A/C main fuse 60A	
5. A/C controller	11. Compressor	17. Main fuse box	23. Ignition/meter fuse 20A	
6. ECM	12. Condenser cooling fan relay	18. Battery main fuse 80A	24. Rear defogger fuse 15A	



1. Blower motor main relay	7. Heater mode control switch	13. Condenser cooling fan	19. Battery	25. Heater fuse 30A
2. Blower motor	8. Evaporator temperature sensor	14. Fuse box	20. Generator	
3. Blower motor resistor	9. Refrigerant pressure switch	15. A/C fuse 25A	21. Ignition main fuse 60A	
4. Blower motor switch	10. Compressor relay	16. Ignition switch	22. Heater/A/C main fuse 60A	
5. A/C controller	11. Compressor	17. Main fuse box	23. Ignition/meter fuse 20A	
6. ECM	12. Condenser cooling fan relay	18. Battery main fuse 80A	24. Rear defogger fuse 15A	

Inspection of A/C Controller and Its Circuits



CAUTION:
A/C controller (1) and ECM cannot be checked by itself. It is strictly prohibited to connect voltmeter or ohmmeter to A/C controller and ECM with couplers disconnected from it.

A/C controller (1) and its circuits can be checked at A/C controller wiring couplers by measuring voltage.

VOLTAGE CHECK

1) Remove A/C controller (1) from vehicle referring to "A/C Controller Removal" in this section.
2) Remove ECM (2) from vehicle.
3) Connect A/C controller couplers to A/C controller and connect ECM couplers to ECM.
4) Check each terminal voltage with couplers connected referring to the "A/C Controller Voltage Values Table" in this section.

Fig. A

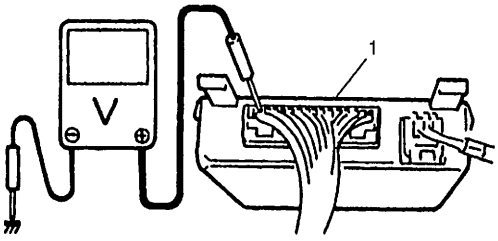


Fig. B

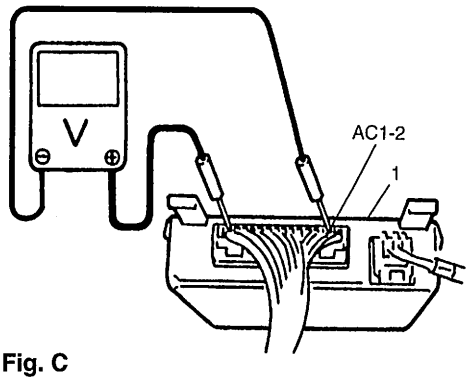
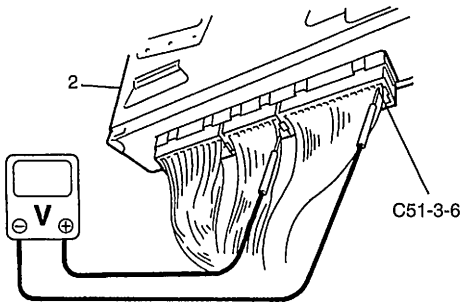
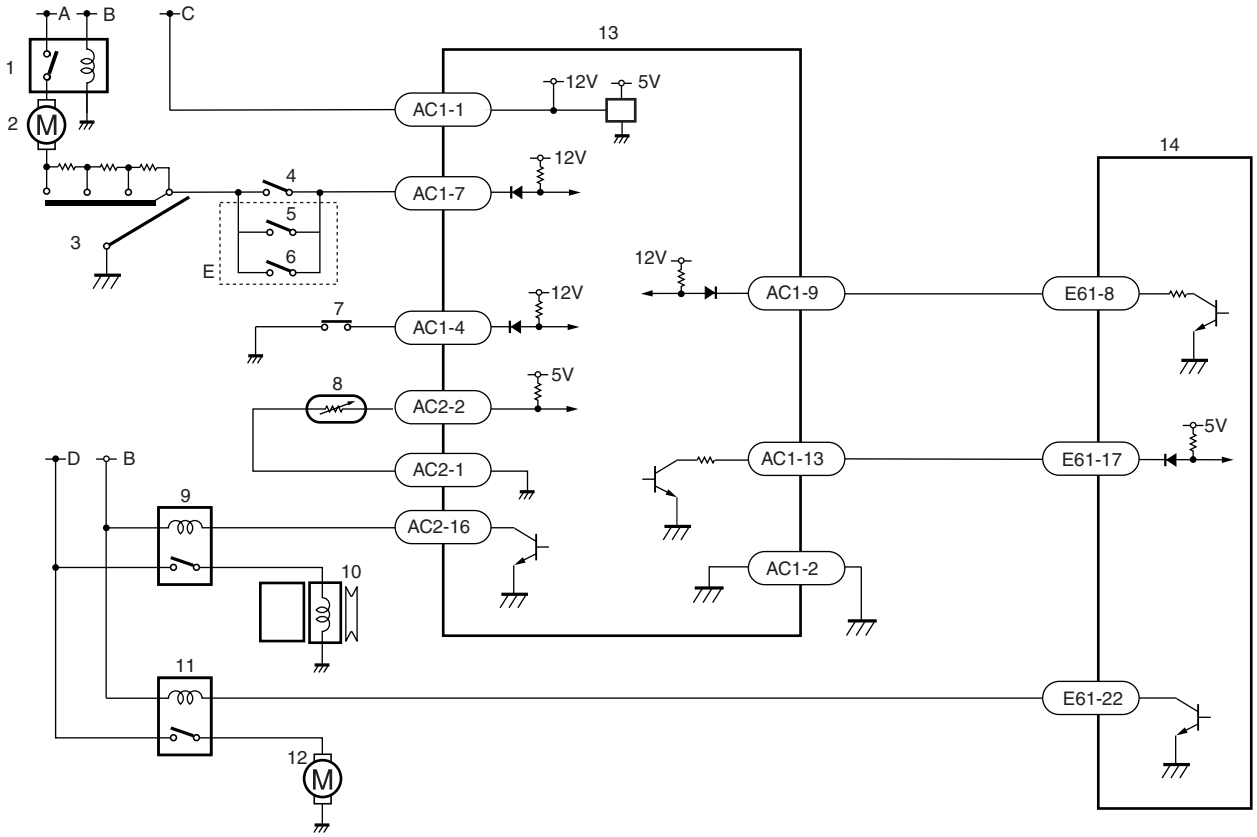


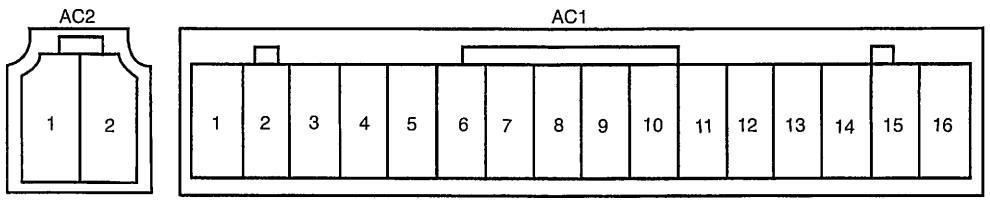
Fig. C



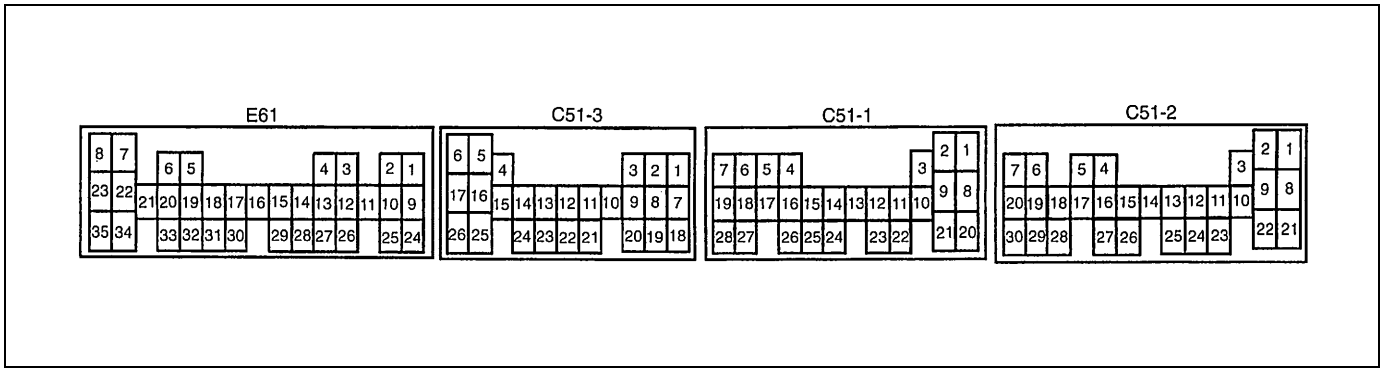


1. Blower motor relay	9. Compressor relay	A : To heater fuse
2. Blower motor	10. Compressor	B : To rear defogger fuse
3. Blower motor switch	11. Condenser fan motor relay	C : To ignition/meter fuse
4. A/C switch	12. Condenser fan motor	D : To A/C fuse
5. Deflloster position switch	13. A/C controller	E : Only LH vehicle
6. Deflloster/foot position switch	14. ECM	
7. Dual pressure (refrigerant pressure) switch		
8. A/C thermistor (evaporator temperature sensor)		

Terminal arrangement of A/C controller



Terminal arrangement of ECM



A/C controller voltage values table

Terminal	Wire	Circuit	Measurement ground	Normal value	Condition
AC1-1	B/W	Controller main power supply	Ground to engine (Fig. B)	10 – 14 volts	Ignition switch ON with engine stopped
AC1-2	B/Y	Controller main ground	Ground to body (Fig. A)	–0.4 – 0 volt	Engine running
AC1-4	Or	Refrigerant pressure switch input	Ground to engine (Fig. B)	0 – 1 volt	Refrigerant pressure within 225 kPa (2.3 kg/cm^2, 32.7 psi) to 2548 kPa (26 kg/cm^2, 370 psi) with engine running
				10 – 14 volts	Refrigerant pressure below 196 kPa (2.0 kg/cm^2, 28 psi) or above 3140 kPa (32 kg/cm^2, 455 psi) with engine running
AC1-7	G/B	A/C switch input and/or defroster position switch input (see NOTE)	Ground to engine (Fig. B)	8 – 14 volts	Blower fan motor switch and A/C or defroster position switch (see NOTE) ON with engine running
				0 – 1.5 volts	Blower fan motor switch or A/C or defroster position switch (see NOTE) OFF with engine running
AC1-9	Gr/W	Signal input from ECM (A/C ON permission signal)	Ground to engine (Fig. B)	10 – 14 volts	Approve of A/C ON
				0 – 1 volt	A/C ON forbid
AC1-13	Y/B	Signal output to ECM (A/C ON request signal)	Ground to engine (Fig. B)	0 – 1.5 volts	Blower fan motor switch and A/C or defroster position switch (see NOTE) ON with engine running at evaporator thermistor temperature input more than approx. 2.5°C (less than 2.5 V (5840 Ω)) and refrigerant pressure switch is ON
				10 – 14 volts	Except the above-mentioned with engine running
AC1-16	P	Compressor magnet clutch relay output	Ground to engine (Fig. B)	0 – 1 volt	Blower fan motor switch and A/C or defroster position switch ON with engine running at evaporator thermistor temperature input more than approx. 2.5°C (less than 2.5 V (5840 Ω)), refrigerant pressure switch ON and signal input from ECM ON
				10 – 14 volts	Except the above-mentioned with engine running
AC2-1	L/Y	Sensor ground	Ground to body (Fig. A)	–0.4 – 0 volt	Engine running
AC2-2	W/B	Evaporator thermistor temperature (evaporator temp. sensor) input	Ground to engine (Fig. B)	1.5 volts (3520 Ω) at 15°C (59°F)	Evaporator thermistor temperature at approx. 15°C (59°F) with engine running
				2.4 volts (7002 Ω) at 1°C (33.8°F)	Evaporator thermistor temperature at approx. 1°C (34°F) with engine running * If the temperature is less than approx. 1°C, in this case compressor and condenser fan should be stop (come back at more than approx. 2.5°C (less than 5840 Ω, 2.5 V))

Terminal	Wire	Circuit	Measurement ground	Normal value	Condition
E61-8	Gr/W	Signal output to A/C controller (A/C ON permission signal)	Ground to engine (Fig C)	10 – 14 volts	Required A/C ON (terminal AC-A13) at engine running with normal condition (refer to "Inspection of ECM and Its Circuit" in Section 6E)
				0 – 1 volt	Except the above-mentioned with engine running In this case compressor should be stop
E61-17	Y/B	Signal input from A/C controller (A/C ON request signal)	Ground to engine (Fig. C)	0 – 1.5 volts	Require A/C ON
				10 – 14 volts	Turn off the A/C
E61-22	Y/L	A/C condenser cooling fan relay output	Ground to engine (Fig. C)	0 – 1 volt	• Blower fan motor switch and A/C or defroster position switch (see NOTE) ON with engine running at evaporator thermistor temperature input more than approx. 2.5°C (less than 2.5 V (5840 Ω)), refrigerant pressure switch ON and signal input from ECM ON • Engine coolant temperature sensor more than 113°C (236°F) with engine running
				10 – 14 volts	Except the above-mentioned with engine running

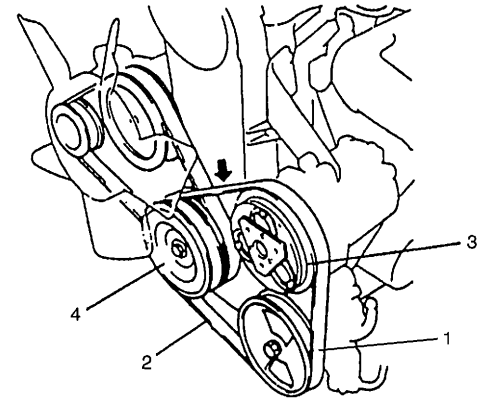
NOTE:

Defroster position switch circuit is equipped with LH vehicle only.

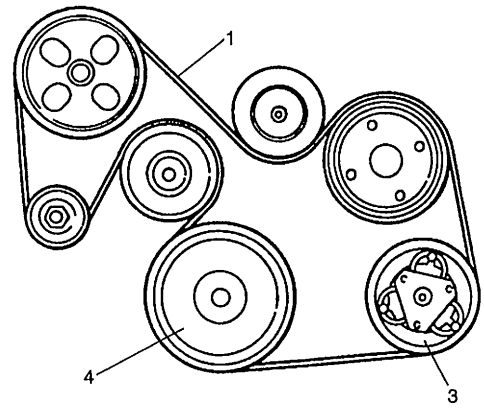
Drive belt

INSPECTION

[A]



[B]



For G16 engine

Refer to "Belt Tension Adjustment" in Section 3B1 for details.

For J20 engine

Refer to "Generator Belt" in Section 6H for details.

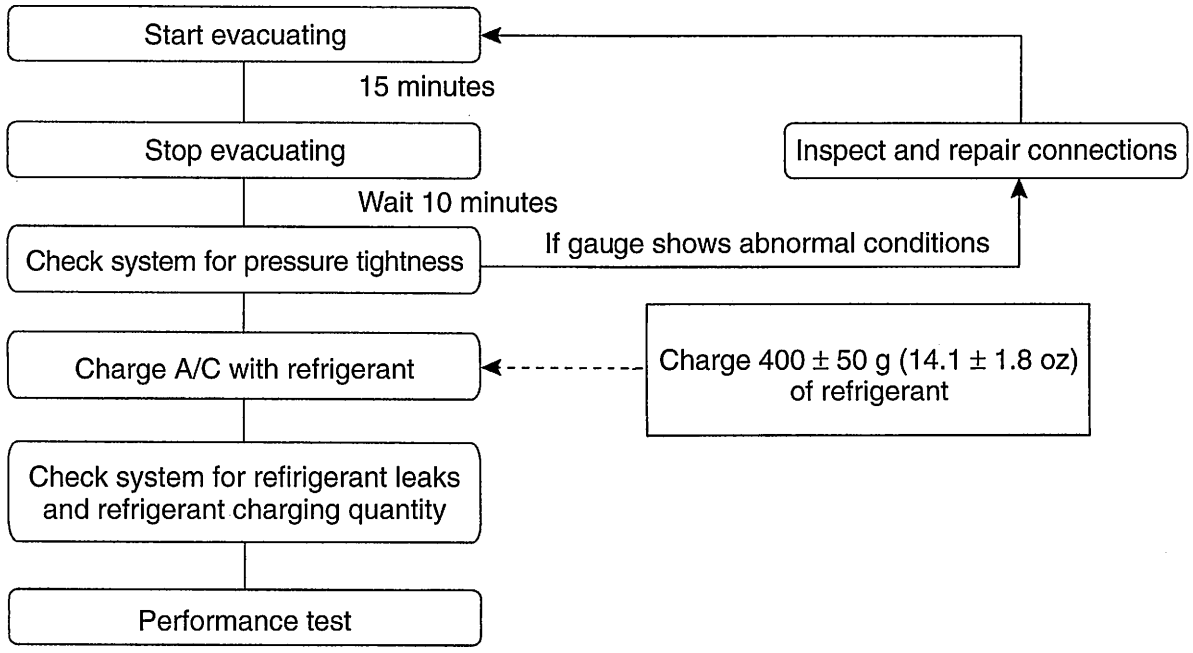
[A] : G16 engine
[B] : J20 engine
1. Generator belt
2. Compressor drive belt
3. Compressor pulley
4. Crankshaft pulley

Refrigerant Recovery, Evacuation and Charging

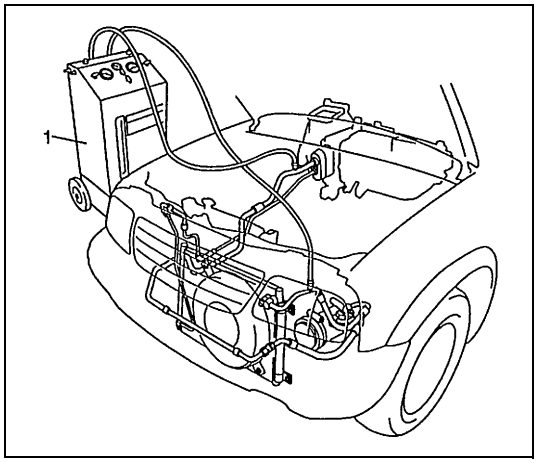
WARNING:

- **Your eyes should not be exposed to refrigerant (liquid).**
  Any liquid Refrigerant-134a escaping by accident shows a temperature as low as approx. –6°C (42.8°F) below freezing point. Should liquid HFC-134a (R-134a) get into your eyes, it may cause a serious injury. To protect your eyes against such accident, it is necessary to always wear goggles. Should it occur that HFC-134a (R-134a) strikes your eye(s), consult a doctor immediately.
  - **DO NOT USE YOUR HAND TO RUB THE AFFECTED EYE(S). INSTEAD, use quantities of fresh cold water to splash it over the affected area to gradually raise temperature of such area above freezing point.**
  - **Obtain proper treatment as soon as possible from a doctor or eye specialist.**
- **Should the HFC-134a (R-134a) liquid come into contact with your skin, the affected area should be treated in the same manner as when skin is frostbitten or frozen.**
- **Refrigerant must not be handled near where welding or steam cleaning is performed.**
- **Refrigerant should be kept at a cold and dark place. It should never be stored where a high temperature is anticipated, e.g. where exposed to direct sun light, close to fire or inside vehicle (including trunk room).**
- **Avoid breathing fumes produced when HFC-134a (R-134a) is burned. Such fumes may be hazardous to health.**

Operation Procedure for Charging A/C with Refrigerant



Recovery



NOTE:

- **When discharging refrigerant out of A/C system, always recover it by using refrigerant recovery and recycling equipment (1). Discharging it into atmosphere would cause adverse effect to environments.**
- **When handling recovery and recycling equipment, be sure to follow the instruction manual for the equipment.**

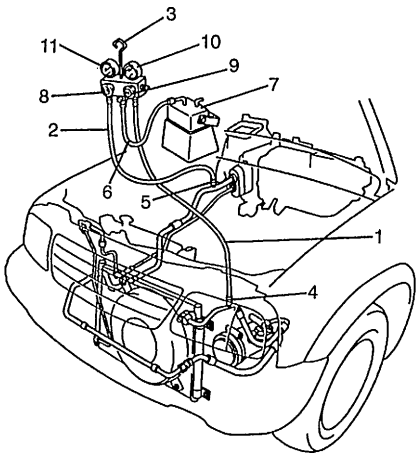
Evacuating

Evacuating procedure

CAUTION:
Do not evacuate before recovering refrigerant in system.

NOTE:

Whenever opened (exposed to atmospheric air), air conditioning system must be evacuated by using a vacuum pump. The A/C system should be attached with a manifold gauge set, and should be evacuated for approx. 15 minutes.



1) Connect high charging hose (1) and low charging hose (2) of manifold gauge set (3) respectively as follows :
   High Charging Hose (1) → High pressure charging valve (4) on Discharge Hose
   Low Charging Hose (2) → Low pressure charging valve (5) on Suction Pipe
2) Attach center charging hose (6) of manifold gauge set (3) to vacuum pump (7).
3) Operate vacuum pump (7), and then open discharge-side valve (9) (Hi) of manifold gauge set (3).
   If there is no blockage in the system, there will be an indication on high pressure gauge (10).
   When this occurs, open the other-side valve (8) (Lo) of the set.
4) Approx. 10 minutes later, low pressure gauge (11) should show a vacuum lower than –760 mmHg providing no leakage exists.

NOTE:

- **If the system does not show a vacuum below –760 mmHg, close both valves, stop vacuum pump and watch movement of low pressure gauge.**
- **Increase in the gauge reading suggests existence of leakage.**
  In this case, repair the system before continuing its evacuation.
- **If the gauge shows a stable reading (suggesting no leakage), continue evacuation.**

5) Evacuation should be carried out for a total of at least 15 minutes.
6) Continue evacuation until low pressure gauge indicates a vacuum less than –760 mmHg, and then close both valves (8), (9).
7) Stop vacuum pump (7). Disconnect center charging hose (6) from pump inlet. Now, the system is ready for charging refrigerant.

Checking system for pressure leaks

After completing the evacuation, close manifold gauge high pressure valve (HI) and low-pressure valve (LO) and wait 10 minutes. Verify that low-pressure gauge reading has not changed.

CAUTION:

If the gauge reading moves closer to "0", there is a leak somewhere. Inspect the tubing connections, make necessary corrections, and evacuate system once again, making sure that there are no leaks.

Charging

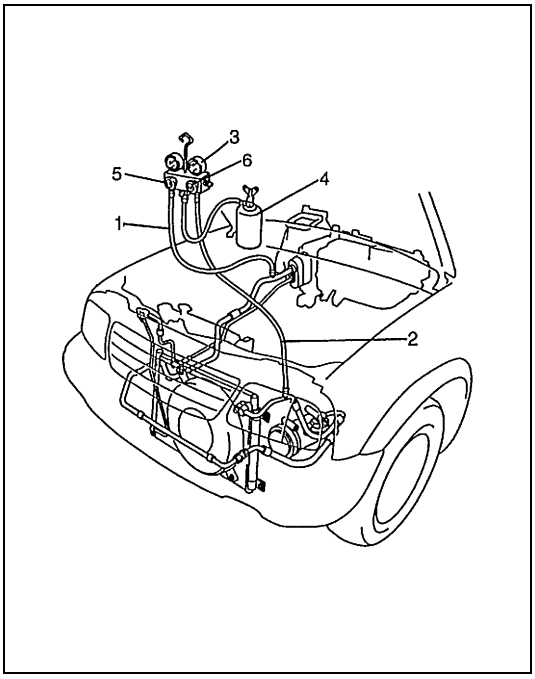
CAUTION:

- **ALWAYS CHARGE THROUGH LOW PRESSURE-SIDE of A/C system at after the initial charging is performed from the high-pressure side with the engine stopped.**
- **NEVER CHARGE TO HIGH PRESSURE-SIDE of A/C system with engine running.**
- **Do not charge while compressor is hot.**
- **When installing tap valve to refrigerant container to make a hole there through, carefully follow directions given by manufacturer.**
- **A pressure gauge should always be used before and during charging.**
- **The refrigerant container should be emptied of refrigerant when discarding it.**
- **The refrigerant container should not be heated up to 40°C (104°F) or over.**
- **Refrigerant container should not be reversed in direction during charging. Reversing in direction causes liquid refrigerant to enter compressor, causing troubles, such as compression of liquid refrigerant and the like.**

NOTE:

The air conditioning system contains HFC-134a (R-134a).
Described here is a method to charge the air conditioning system with refrigerant from the refrigerant service container.
When charging refrigerant recovered by using the refrigerant and recycling equipment (when recycling refrigerant), follow the procedure described in the equipment manufacturer's instruction manual.

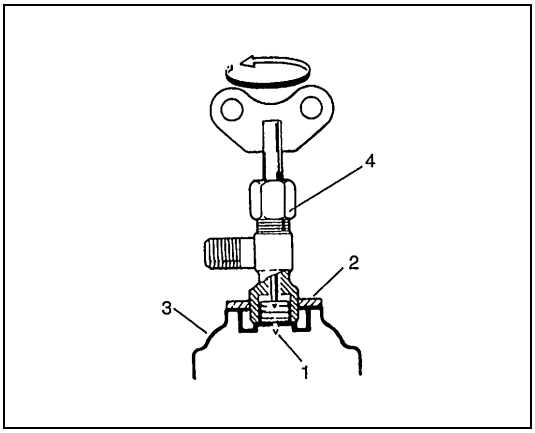
The initial charging of the A/C system is performed from the high-pressure side with the engine stopped.
And next, this method must be followed by charging from the low-pressure side with the engine running.



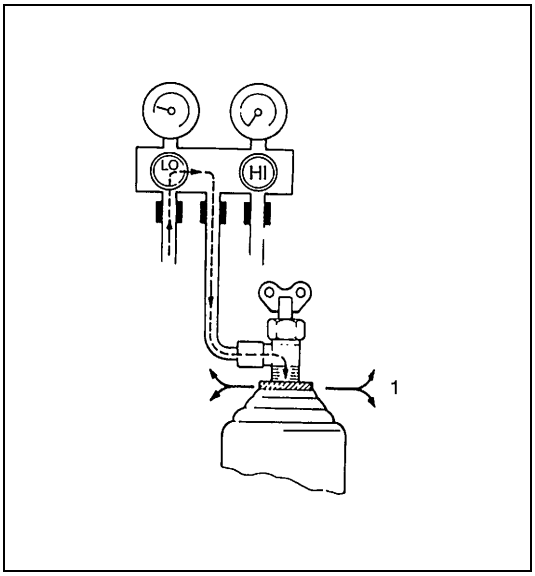
1) Check to make sure that hoses are routed properly after evacuating the system.
2) Connect Low-side hose (1) and High side hose (2) of the manifold gauge set (3) in position. Thus open refrigerant container valve (4) to purge the charging line.
3) Open the high-pressure side valve (6) and charge refrigerant to system.
4) After a while, open the low-pressure side valve (5) and close the high-pressure side valve (6).

WARNING:
Make sure that high pressure-side valve is closed securely.

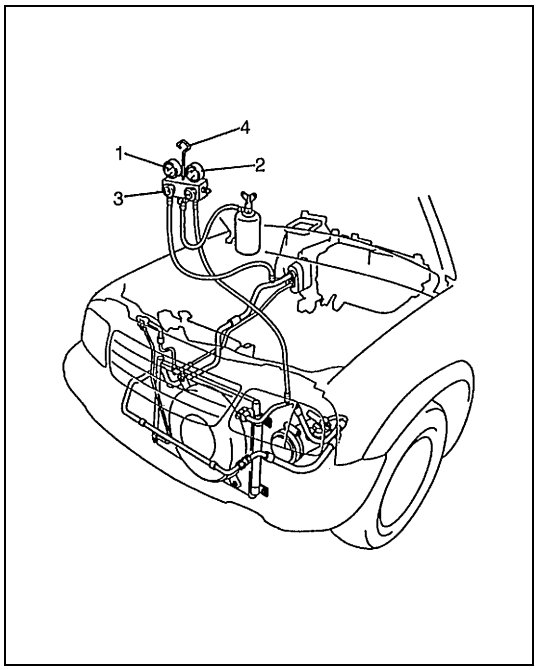
5) Start engine and keep engine speed at 1500 r/min. Then, operate air conditioning.
6) Charge A/C system with refrigerant in vapor state. At this time, refrigerant container should be held upright.



7) When refrigerant container (3) is emptied, use following procedure to replace it with a new refrigerant container (3).
   a) Close low pressure valve.
   b) Replace empty container (3) with a refrigerant container which has been charged with refrigerant. When using refrigerant container tap valve (4), use following procedure for replacement.
      i) iRetract needle (1) and remove refrigerant container tap valve (4) by loosening its plate nut (2).
      ii) Install previously-removed refrigerant container tap valve (4) to a new refrigerant container (3).



   c) Purge any air existing in center charging hose.
      When using refrigerant container tap valve, use following procedure to purge air.
      i) Once fully tighten refrigerant container tap valve and then loosen (open) plate nut slightly.
      ii) Open low pressure valve of manifold gauge set a little.
      iii) As soon as refrigerant comes out with a “hiss” (1) through a clearance between refrigerant container and tap valve, tighten plate nut as well as manifold gauge set low pressure valve.
      iv) Turn handle of tap valve clockwise so that its needle is screwed into the new container to make a hole for refrigerant flow.



8) After the system has been charged with specified amount of refrigerant or when low pressure gauge (1) and high pressure gauge (2) have indicated about 2 and 15 kg/cm^2 respectively, close low pressure side vale (3) of manifold gauge set (4). If equipped with sight glass in this time, look into the sight glass (6) of condenser outlet pipe (5) and check that there are no bubbles (7) in it, which means that the system is fully charged.

Low pressure gauge when charged with specified amount :

About 200 – 300 kPa (2 – 3 kg/cm^2, 29 – 43 psi)
(At A/C inlet temperature 30 – 35°C, 86 – 95°F)

High pressure gauge when charged with specified amount :

About 1370 – 1670 kPa (14 – 17 kg/cm^2, 200 – 244 psi)
(At A/C inlet temperature 30 – 35°C, 86 – 95°F)

Removing Manifold Gauge Set

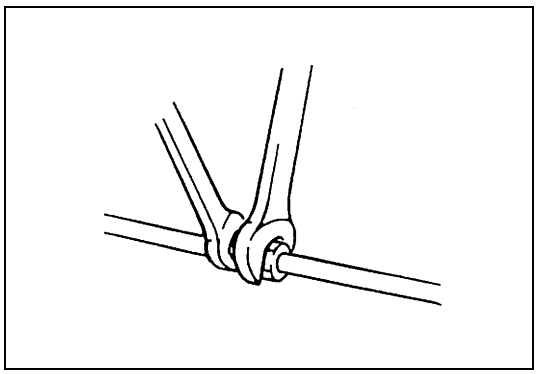
When A/C system has been charged with a specified amount of refrigerant, remove manifold gauge set as follows :

1) Close low pressure-side valve of manifold gauge set, (The high pressure-side valve is closed continuously during the process of charging.).
2) Close refrigerant container valve.
3) Stop engine.
4) Using shop rag, remove charging hoses from service valves. This operation must be performed rapidly.

WARNING:
High pressure-side is naturally under high pressure. So, care must be used to protect your eyes and skin.

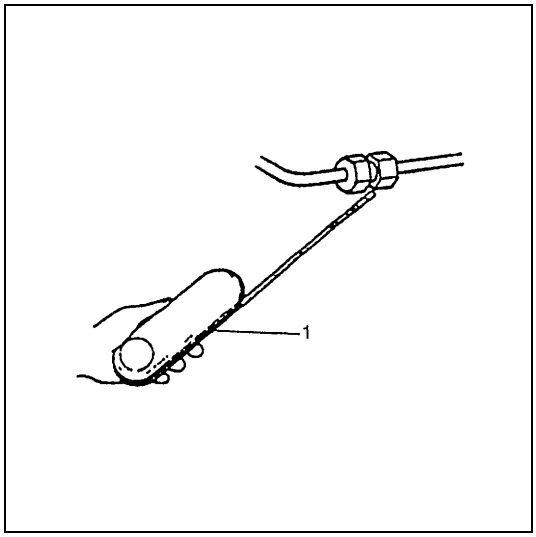
5) Put caps on service valves.

Leak-Testing Refrigerant System



Whenever a refrigerant leak is suspected in the system or any service operation has been performed which may result in disturbing lines or connections, it is advisable to test for leaks.
Common sense should be used in performing any refrigerant leak test, since the need and extent of any such test will, in general, depend upon the nature of a complaint and the type of a service performed on the system.

Liquid Leak Detectors



There are a number of fittings and places throughout the air conditioning system where a liquid leak detector solution may be used to pinpoint refrigerant leaks.
By merely applying the solution to the area in question with a swab, bubbles will form within seconds if there is a leak.
For confined areas, such as sections of the evaporator and condenser, an electronic (gas) leak detector (1) is more practical for determining leaks.

WARNING:

- **To prevent explosions or fires, make sure that there are no flammables in the vicinity.**
- **When exposed to fire, the refrigerant turns into a poisonous gas (phosgene). Do not inhale this gas.**

On-Vehicle Service

WARNING:

Should refrigerant HFC-134a (R-134a) strike your eye(s), consult a doctor immediately.

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

CAUTION:

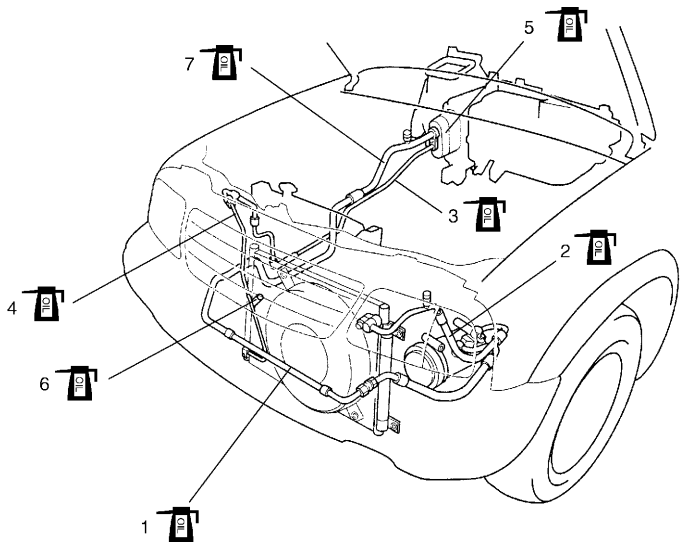
None of refrigerant, compressor oil and component parts is interchangeable between two types of A/C : one using CFC-12 (R-12) and the other using HFC-134a (R-134a).
(For identification between these two types, refer to "Identification of Refrigerating System" in this section).
When replenishing or changing refrigerant and compressor oil and when replacing parts, make sure that the material or the part to be used is appropriate to the A/C installed in the vehicle being serviced. Use of incorrect one will result in leakage of refrigerant, damage in parts or other faulty condition.

Precaution

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

Piping

- When connecting hoses and pipes, apply a few drops of compressor oil (refrigerant oil) to seats of coupling nuts and O-ring.



1. Suction hose	3. Liquid pipe	5. Expansion valve	7. Suction pipe
2. Discharge hose	4. Condenser outlet pipe	6. Dual pressure switch	: Apply compressor oil (refrigerant oil) to O-ring.

- Never use heat for bending pipes. When bending a pipe, try to make its bending radius as slight as possible.
- Keep internal parts of air conditioning free from moisture and dirt. When disconnecting any line from system, install a blind plug or cap to the fitting immediately.
- When tightening or loosening a fitting, use two wrenches, one for turning and the other for support.
- Tighten flared nuts to specified torque.

Tightening torque (Flared Nut Used for)
8 mm pipe : 13 N·m (1.3 kg-m, 9.5 lb-ft)
12.7 mm pipe : 22 N·m (2.2 kg-m, 16.0 lb-ft)
14.5 mm pipe : 23 N·m (2.3 kg-m, 16.6 lb-ft)
16 mm pipe : 33 N·m (3.3 kg-m, 23.8 lb-ft)

- Route drain hose so that drained water does not make any contact to vehicle components.

Handling refrigerant HFC-134a (R-134a)

- When handling refrigerant, always wear goggles to protect your eyes.
- Avoid you direct contact to liquid refrigerant.
- Do not heat refrigerant container higher than 40°C (104°F).
- Do not discharge refrigerant into atmosphere.
- Do not allow liquid refrigerant to touch bright metals. Refrigerant combined with moisture is corrosive and will tarnish surfaces of bright metals including chrome.
- After recovering refrigerant from system, the amount of compressor oil removed must be measured and the same amount added to the system.

Refrigerant recovery

When discharging refrigerant out of A/C system, always recover it by using refrigerant recovery and recycling equipment. Discharging refrigerant HFC-134a (R-134a) into atmosphere would cause adverse effect to environments.

NOTE:

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

Refrigerant charge

Charge a proper amount of refrigerant to A/C system according to charging procedure described in recovery, evacuation and charging.

CAUTION:

Do not perform an additional refrigerant charging to A/C system. This cause it to overcharge.

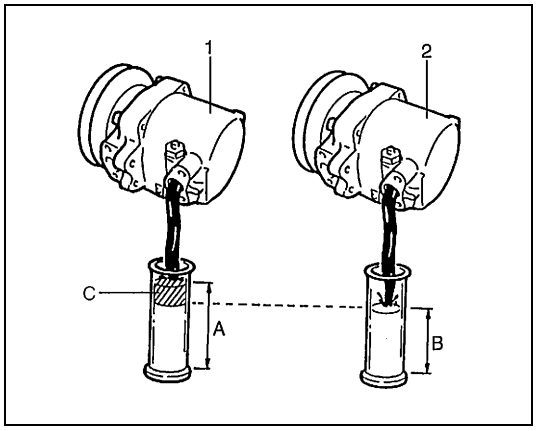
Replenishing compressor oil

When replacing air conditioning parts with new ones, it is necessary to replenish oil by the amount supposedly remaining in each part.

When Changing Gas Only

When it is unavoidable to change gas without replacing any component part for engine removal and installation or for some other reason, replenish 20 cc oil. When replenishing gas only, oil replenishment it not necessary.

When Replacing Compressor



Compressor oil is sealed in each new compressor by the amount required for air conditioner cycle. Therefore, when using a new compressor for replacement, drain oil from it by the amount calculated as follows.

"C" = "A" – "B"

"C" : Amount of oil to be drained
"A" : Amount of oil sealed in a new compressor
"B" : Amount of oil remaining in removed compressor

1. New compressor
2. Removed compressor

When Replacing Other Part

Replaced part	Amount of compressor oil to be replenished
Evaporator	25 cc
Condenser	15 cc
Receiver/dryer	20 cc
Hoses	10 cc each
Pipes	10 cc each

A/C Condenser Assembly

INSPECTION

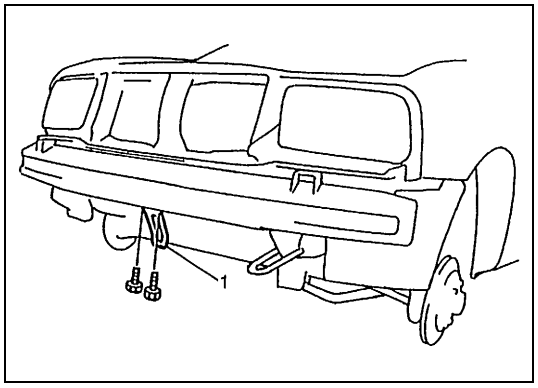
a) Check condenser fins for blockage
b) Check condenser fittings for leakage
c) Check condenser fins for damage
Clogged condenser fins should be washed with water, and should be dried with compressed air.

CAUTION:

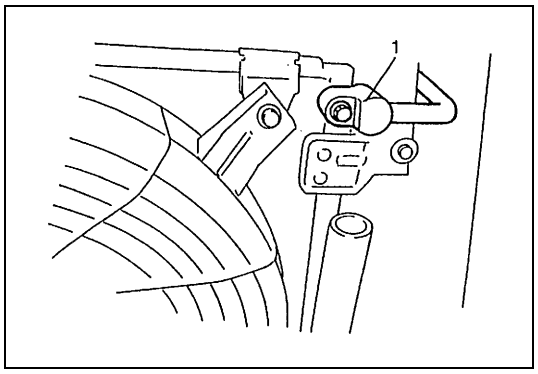
Be careful not to damage condenser fins. If condenser fin is bent, straighten it by using a screwdriver or pair of pliers. If any leakage is found from fitting or tube, repair or replace condenser.

REMOVAL

1) Disconnect negative (–) cable at battery.
2) Recover refrigerant by using recovery and recycling equipment.
Be sure to follow the instruction manual for the equipment.
The amount of compressor oil removed must be measured and the same amount added to the system.



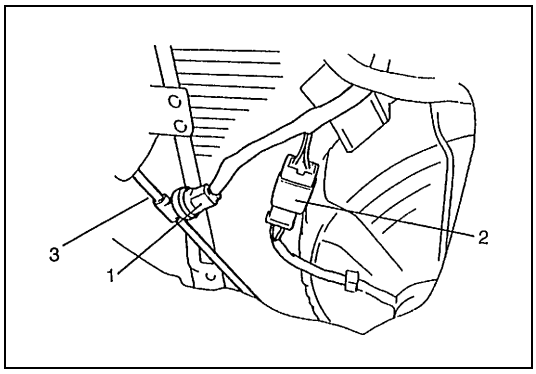
3) Remove front bumper assembly and remove lower stay (1) (if equipped) referring to “Body Service” in Section 9.



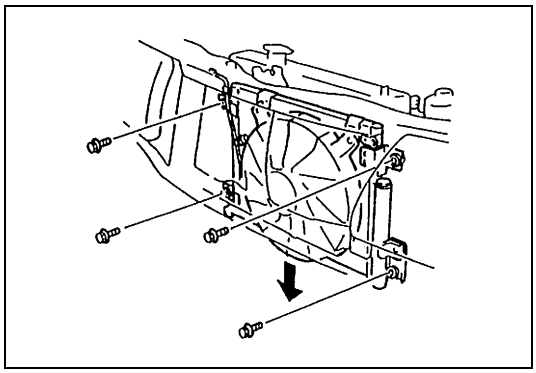
4) Disconnect compressor discharge hose (1) from condenser inlet fittings.

CAUTION:

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



5) Disconnect coupler from dual pressure switch (1).
6) Disconnect condenser outlet pipe (3).
7) Disconnect condenser cooling fan motor coupler (2).



8) Remove condenser with fan.

NOTE:
Be careful not to damage fins of condenser and radiator.

9) Remove A/C condenser cooling fan assembly from condenser.

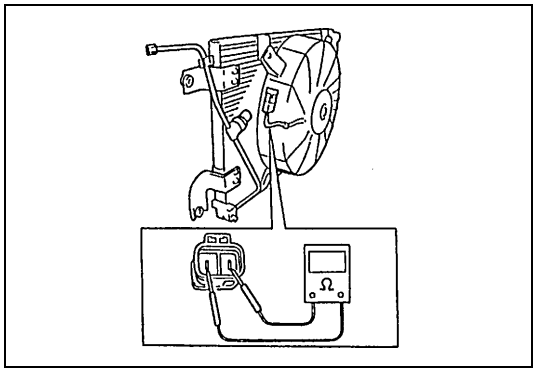
INSTALLATION

Reverse removal sequence to install condenser, noting following point.

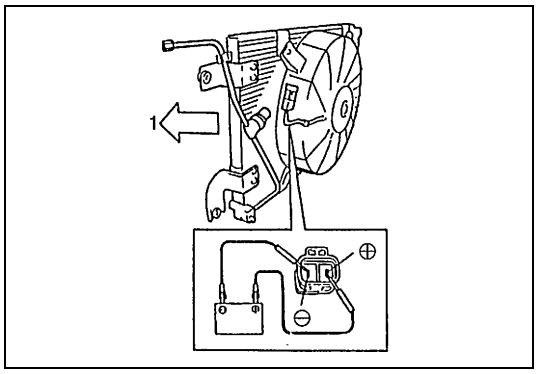
- When replacing condenser, add 20 to 30 cc of refrigerating oil from compressor suction-side.
- Evacuate and charge system according to previously-described procedure.

Condenser Cooling Fan Assembly

INSPECTION



- Remove condenser assembly referring to “A/C Condenser Assembly Removal” in this section.
- Check continuity between terminal to terminal as shown.
  If check results are continuity, proceed to next operation check. If not, replace.



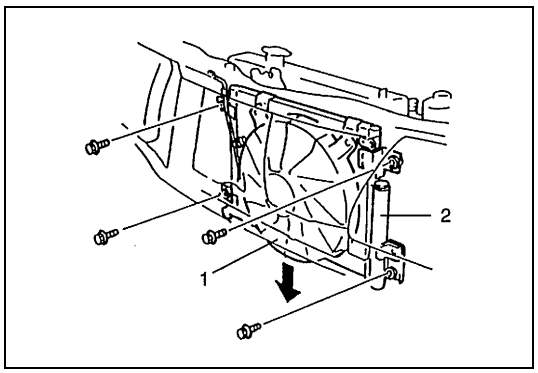
- Connect battery to condenser fan motor as shown, then check that the condenser fan motor operates smoothly and specified current.

Specified current : Maximum 12 A at 12 V

1. Air flow

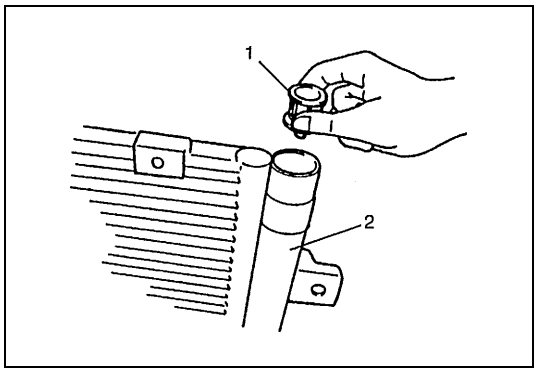
Condenser Dryer (Receiver/Dryer)

REMOVAL

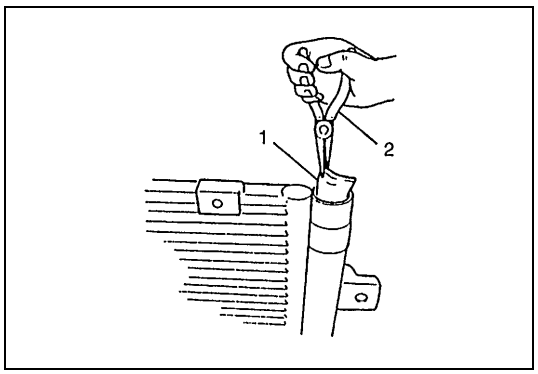


1) Remove A/C condenser assembly (1) from vehicle referring to “A/C Condenser Assembly Removal” in this section.
2) Remove the condenser dryer cap from condenser.

2. Condenser dryer section

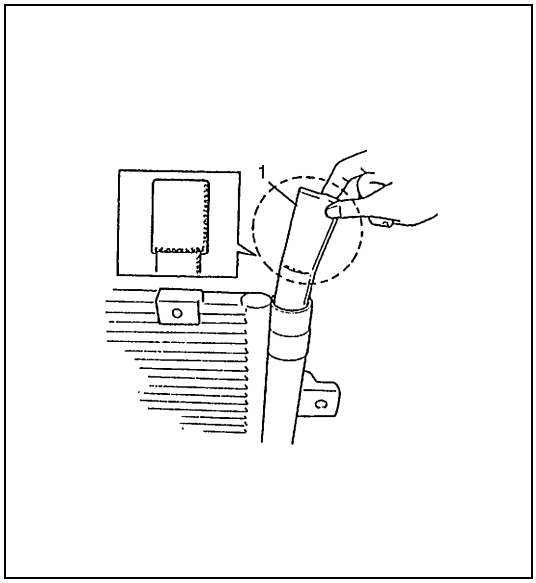


3) Remove the filter (1) from the condenser (2).



4) Remove the dryer (1) using a pliers (2).

INSTALLATION



Reverse removal sequence to install condenser dryer, according to instruction manual with supply parts.

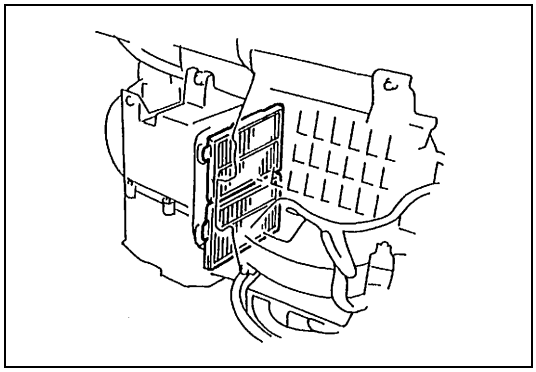
NOTE:

- **When replacing condenser dryer, add 40 cc of refrigerating oil the same as compressor oil.**
- **Do not remove the dryer from the plastic bag until just before inserting it into the receiver.**
- **Install the condenser dryer (1) with its double-layer portion facing the bottom of the receiver.**
- **If condenser dryer cap installing is bolt type, tighten specified torque for its bolt.**

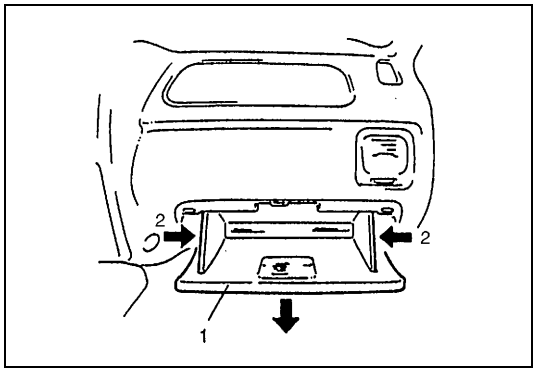
Tightening torque
Condenser dryer cap bolt : 12.5 N·m (1.25 kg-m, 9 lb-ft)

Air Filter Element

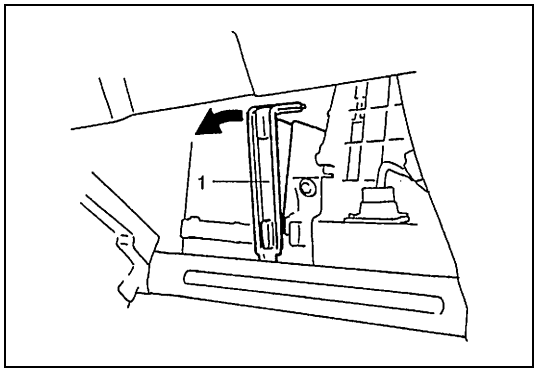
REMOVAL



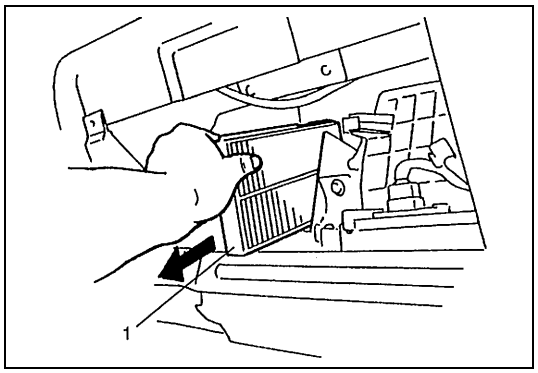
1) Disconnect negative (–) cable at battery.
2) For vehicle with air bag system, disable air bag system referring to “Disabling Air Bag System” in Section 10B.



3) Pull down glove box (1) by pushing the shown part (2).

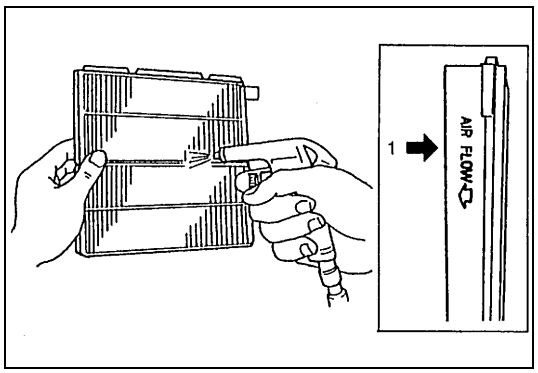


4) Remove filter cover (1).



5) Pull out filter element (1). Pull out upper filter first then the lower one.

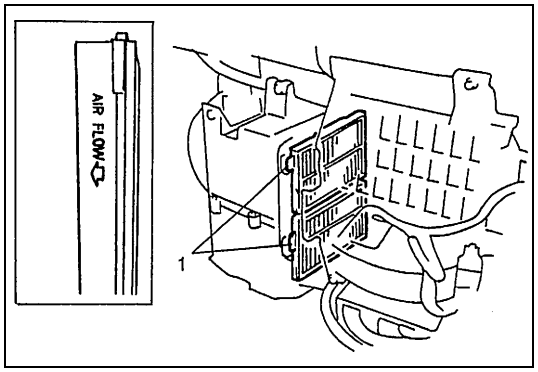
CLEAN



Blow off dust by compressed air from air outlet side of the filter element.

1. Air flow

INSTALLATION



Reverse removal procedure for installation noting the followings :

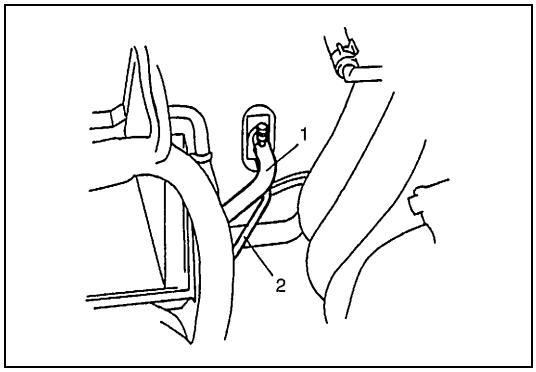
- Install filter into cooling unit directing arrow mark on its end face to heater unit.
- Enable air bag system after installation referring to “Enabling Air Bag System” in Section 10B.

1. Ears

Cooling Unit (Evaporator)

REMOVAL

1) Disconnect negative (–) cable at battery.
2) Disable air bag system referring to "Disabling Air Bag System" in Section 10B.
3) Recover refrigerant by using recovery and recycling equipment.
   Be sure to follow the instruction manual for the equipment.
   The amount of compressor oil removed must be measured and the same amount added to the system.



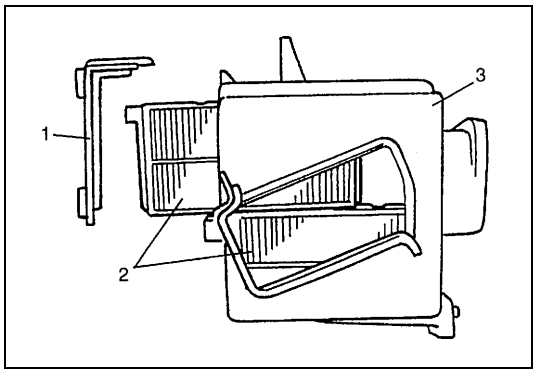
4) Disconnect suction pipe (1), and liquid pipe (2) from evaporator (cooling unit).

CAUTION:

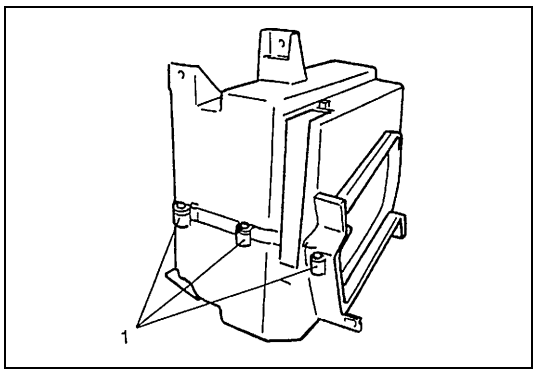
As soon as above hose and pipe are disconnected, cap opened fittings so that moisture and dust may not enter cooling unit.

5) Remove blower motor unit referring to "Blower Unit" in Section 1A.
6) Disconnect thermistor wire coupler.
7) Remove cooling unit (evaporator).

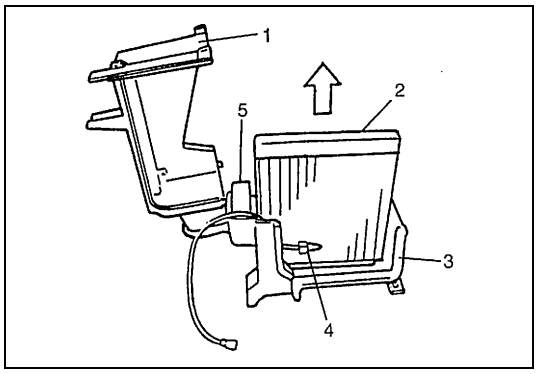
DISASSEMBLY



1) Remove filter (2) from cooling unit (3) assembly by removing filter cover (1).



2) Remove screws (1) to separate evaporator upper and lower cases from each other.



3) Remove upper case (1) and remove evaporator (2) from lower case (3).
4) Remove following components from evaporator.
   - Expansion valve (5)
   - Thermistor (A/C evaporator temperature sensor) (4)

INSPECTION

- Check evaporator fins for blockage. If found clogged, use compressed air to clean the fins.

CAUTION:

Do not use water for cleaning of evaporator.
Be careful not to damage evaporator fins. If evaporator fin is bent, straighten it by using a screwdriver or pair of pliers. If any leakage is found from fitting or tube, repair or replace evaporator.

- Check inlet and outlet fittings for crack or scratch. Repair them as required.

REASSEMBLY and INSTALLATION

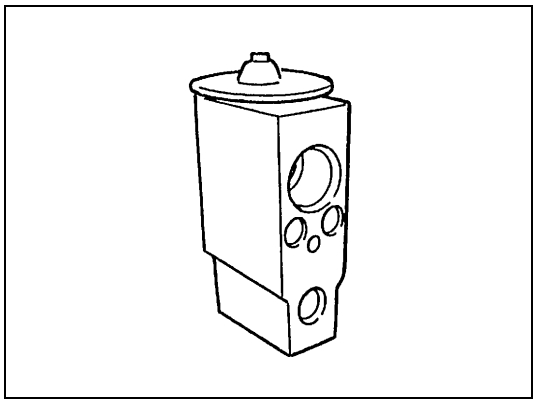
1) Reverse removal and disassembly sequence to install cooling unit, noting the following points.
   - Install uniformly the evaporator packing to dash panel hole for expansion valve.
   - Adjust fresh air control cable, refer to “Heater Mode Control Switch” in Section 1A.
2) Enable air bag system referring to “Enabling Air Bag System” in Section 10B.
3) Evacuate and charge system referring to “Evacauting“ and “Charging” in this section.

NOTE:

When the thermistor removed, it should be reinstalled in original position.
If cooling unit or evaporator is replaced, pour 25 cc of refrigerating oil to compressor suction-side.

Expansion Valve

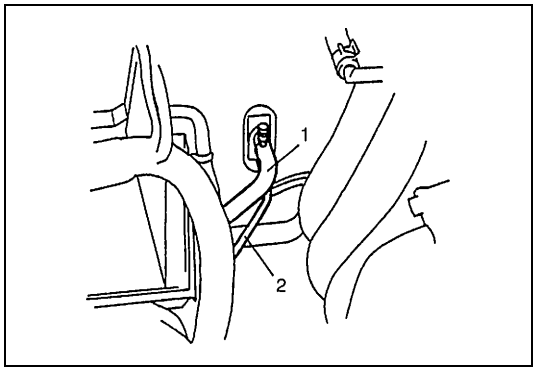
INSPECTION



Refer to “Troubleshooting Procedure Using Manifold Gauge Set” in this section.

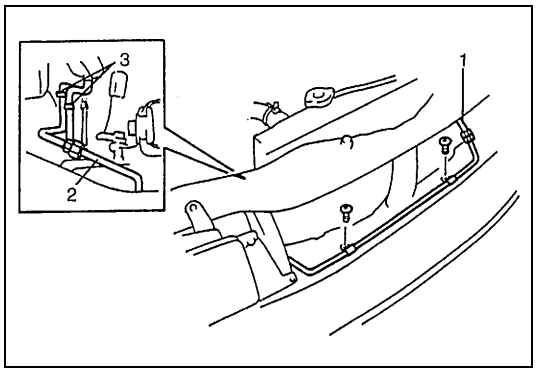
REMOVAL

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

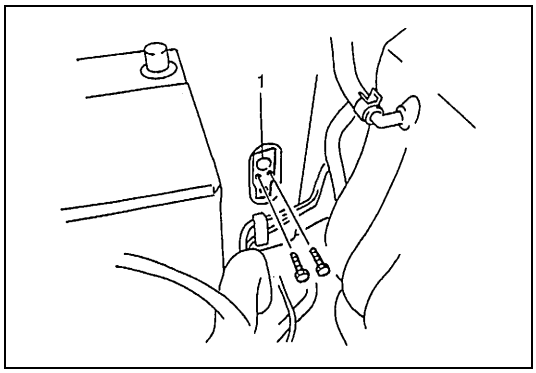


3) Disconnect suction pipe (1), and liquid pipe (2) from evaporator (Cooling unit).

CAUTION:
As soon as above hose and pipe are disconnected, cap opened fittings so that moisture and dust may not enter cooling unit.



4) Disconnect suction pipe, and liquid pipe from suction hose (1) and condenser outlet pipe (2).
5) Remove pipe clamp (3) then remove suction pipe and liquid pipe.

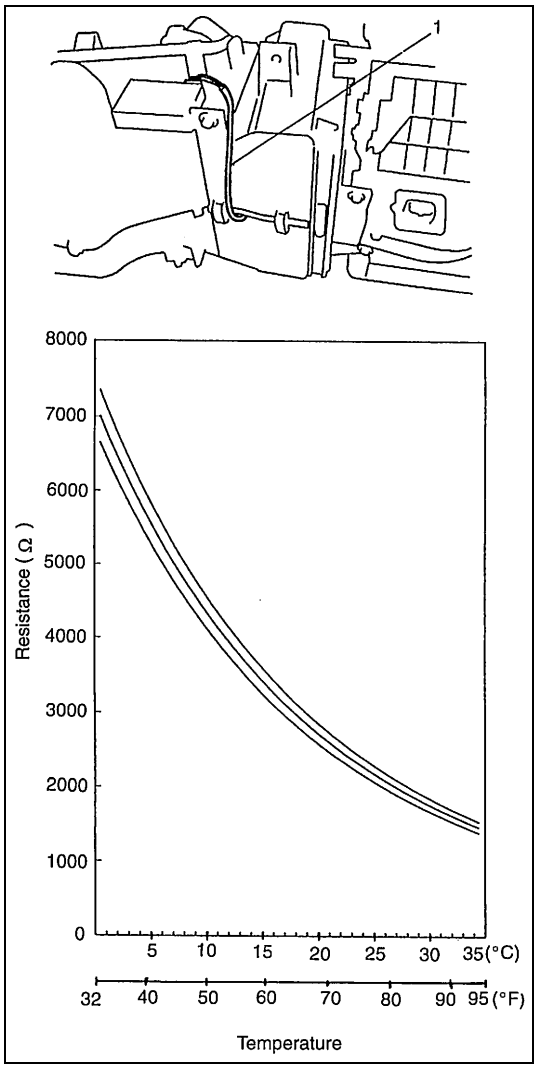


6) Remove expansion valve (1).

INSTALLATION

1) Reverse removal sequence to install expansion valve.
2) Evacuate and charge system referring to “Evacuating” and “Charging” in this section.

A/C Evaporator Thermistor (A/C Evaporator Temperature Sensor)



A thermistor is a temperature sensor to sense the temperature of air discharged from evaporator. The electrical characteristic is shown in the figure.
When temperature is lower than preset temperature, amplifier makes magnet clutch turn off to prevent evaporator from frosting.

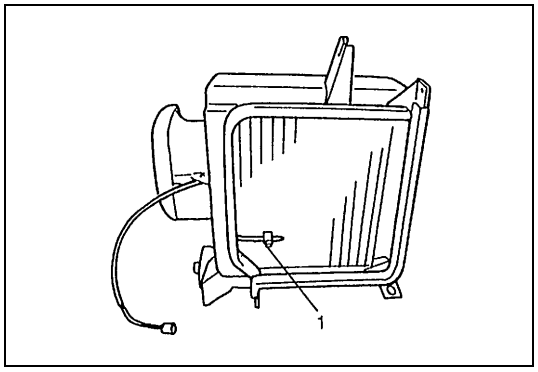
INSPECTION

Check resistance between A/C evaporator thermistor (1) terminals.
If check results are as not specified, replace thermistor.

A/C evaporator temperature sensor specification

Sensor Temperature	Resistance
0°C, 32°F	7.0 – 7.7 kΩ
25°C, 77°F	2.1 – 2.4 kΩ

REMOVAL



Refer to “Cooling Unit (Evaporator)” in this section.

1. Evaporator thermistor

INSTALLATION

1) Reverse removal sequence to install thermistor.
2) Enable air bag system referring to “Enabling Air bag System” in Section 10B.
3) Evacuate and charge system referring to “Evacuating” and “Charging” in this section.

Refrigerant Pipes and Hoses

INSPECTION

- Use a leak tester to check hoses and pipes for any gas leakage.
- Check each hose or pipe clamp for tightness.
  Retighten or replace loose clamp as required, if any.
- Check each pipe or hose for damage.

REMOVAL

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

CAUTION:

As soon as the above hose or pipe is disconnected, cap its opened fitting to prevent moisture and dust from entering.

INSTALLATION

1) Reverse removal procedure to install refrigerant line.
2) Evacuate and charge system referring to “Evacuating” and “Charging” in this section.

INSPECTION OF IDLE SPEED WITH A/C ON

Refer to “Idle Speed/Idle Air Control (IAC) Duty Inspection” in Section 6E1.

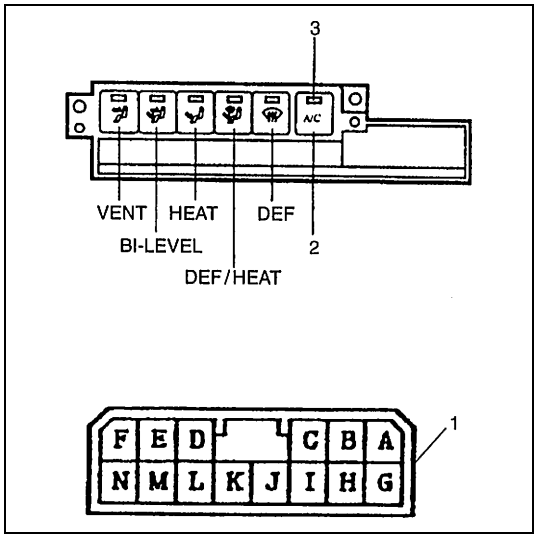
A/C Switch

REMOVAL

1) Disconnect negative (–) cable at battery.
2) If equipped with air bag system, disable air bag system referring to “Disabling Air Bag System” in Section 10B.
3) Remove mode control switch referring to “Heater Mode Control Switch” in Section 1A.

INSPECTION

A/C Switch



- Press A/C button and check if there is continuity between terminals “D” and “G”.
- With battery voltage (+) connected to terminal “K” and (–) to terminal “D”, press A/C button and check if indicator lamp lights.

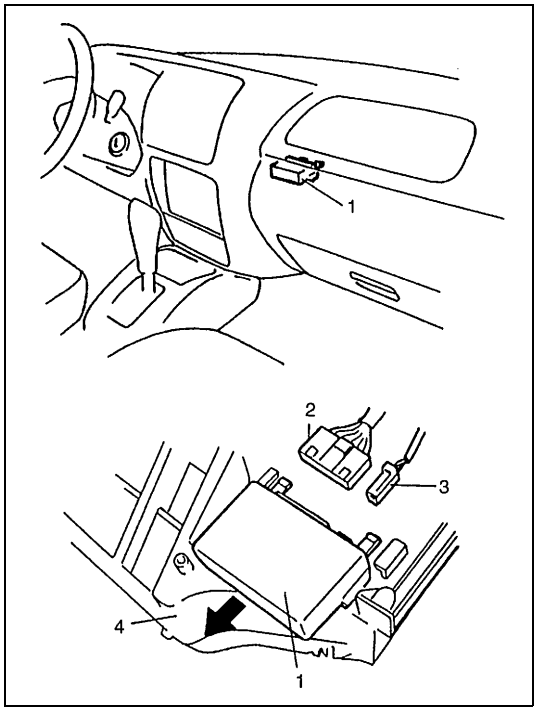
1.	Mode control switch coupler
2.	A/C switch
3.	Indicator lamp

INSTALLATION

1) Install in reverse order of removal procedure.
2) If equipped with air bag system, enable air bag system referring to “Enabling Air Bag System” in Section 10B.

A/C Controller

REMOVAL



1) Disconnect negative (–) cable at battery.
2) Disable air bag system (if equipped) referring to “Disabling Air Bag System” in Section 10B.
3) Open glove box, then remove screw.
4) Remove glove box.
5) Disconnect A/C controller coupler (2), A/C evaporator thermistor coupler (3).
6) Remove A/C controller (1) from heater unit (4).

INSPECTION

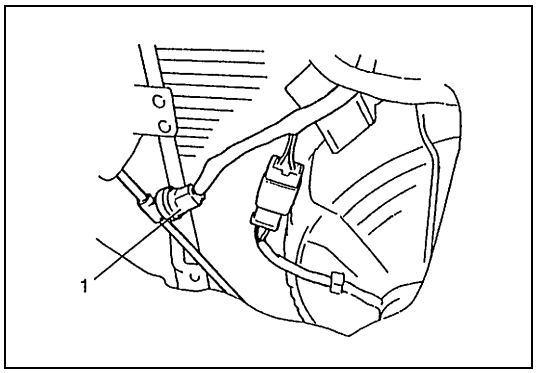
Refer to “Inspection of A/C Controller and Its Circuits” in this section.

INSTALLATION

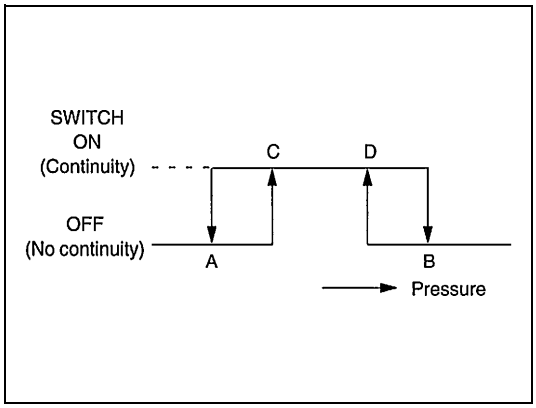
1) Install in reverse order of removal procedure.
2) If equipped with air bag system, enable air bag system referring to "Enabling Air Bag System" in Section 10B.

Dual Pressure Switch

INSPECTION



1) Check dual pressure switch (1) on liquid pipe for continuity at normal temperature (approx. 25°C (77°F)) when A/C system has a proper charge of refrigerant and when A/C system (compressor) is under operation. In each of these cases, switch should show proper continuity.



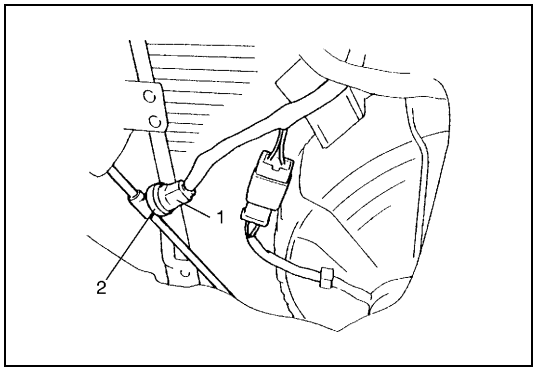
2) Using a manifold gauge set, check switch for operation at specified pressure as shown, refer to "Performance Diagnosis" in this section.

Switch ON : above "C" and below "D"
Switch OFF : below "A" or above "B"

"A" : Approx. 200 kPa (2.0 kg/cm^2)
"B" : Approx. 3200 kPa (32 kg/cm^2)
"C" : Approx. 230 kPa (2.3 kg/cm^2)
"D" : Approx. 2800 kPa (28 kg/cm^2)

REMOVAL

1) Disconnect negative (–) cable at battery.
2) Remove front bumper and radiator grille referring to "Front Bumper Components" in Section 9.



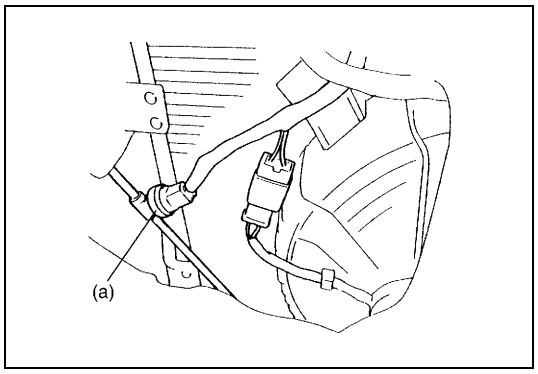
3) Disconnect dual pressure switch connector (1).
4) Remove dual pressure switch (2) from refrigerant pipe.

CAUTION:
Be careful to distort refrigerant pipe.

INSTALLATION

Reverse removal procedure to install dual pressure switch noting the following instruction.

- Apply compressor oil (refrigerant oil) to O-ring.



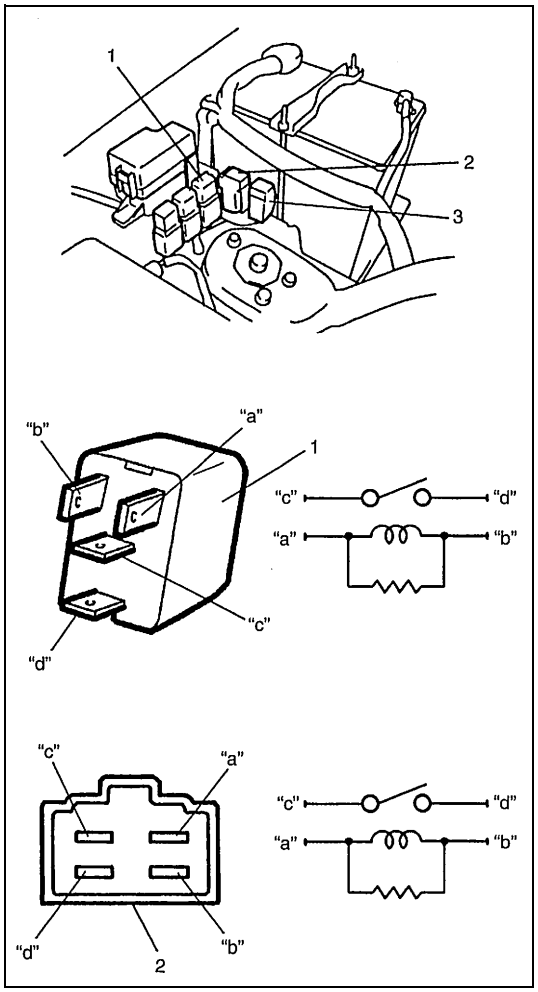
- Tighten dual pressure switch to specified torque.

Tightening torque
Dual pressure switch (a) : 10 N·m (1.0 kg-m, 7.5 lb-ft)

A/C Compressor Relay and A/C Condenser Cooling Fan Relay

INSPECTION

1) Disconnect negative (–) cable at battery.
2) Remove condenser cooling fan motor relay (2) and/or compressor relay (1) from vehicle.
3) Check that there is no continuity between terminal “c” and “d”.
   If there is continuity, replace relay.
4) Connect battery positive (+) terminal to terminal “b” of relay.
   Connect battery negative (–) terminal “a” of relay.
   Check continuity between terminal “c” and “d”.
   If there is no continuity when relay is connected to the battery, replace relay.



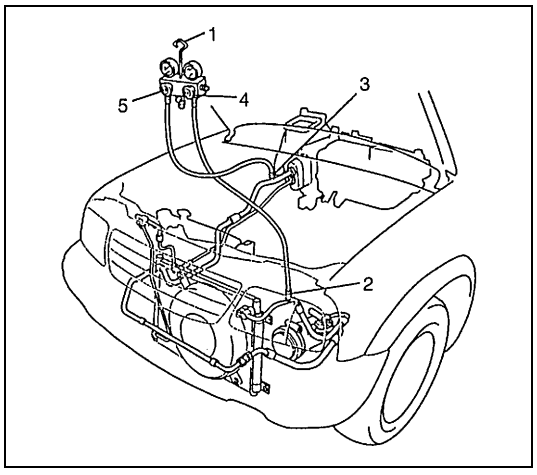
3. Compressor and condenser cooling fan fuse

Compressor Assembly

CAUTION:
None of refrigerant, compressor oil and component parts is interchangeable between two types of A/C :
one using CFC-12 (R-12) and the other using HFC-134a (R-134a).
For identification between these two types, refer to "Identification of Refrigerating System" in this section.
When replenishing or changing refrigerant and compressor oil and when replacing parts, make sure that the material or the part to be used is appropriate to the A/C installed in the vehicle being serviced. Use of incorrect refrigerant or compressor oil will result in leakage of refrigerant, damage in parts or other faulty condition.

PRECAUTION

When servicing the compressor, keep dirt or foreign material away from getting on or into the compressor parts and system. Clean tools and a clean work area are important for proper service.
The compressor connection and the outside of the compressor should be cleaned before any "On-vehicle" repair or before removal of the compressor. The parts must be kept clean at all times and any parts to be reassembled should be cleaned with Trichloroethane, naphtha, kerosene or equivalent solvent and dried with dry air. Use only lint free cloths to wipe parts.
The operations described are based on bench overhaul with compressor removed from the vehicle, except as noted. They have been prepared in order of accessibility of the components.
When compressor is removed from the vehicle for servicing, the oil remaining in the compressor should be discarded and new refrigerant oil added to the compressor.
Minor repair procedures may be done on the vehicle without discharging the system. Major repair procedures require that the system be discharged of refrigerant.



INSPECTION

1) Install manifold gauge set (1) as shown in the figure.
2) Close Hi (4) and Lo (5) hand valves.
3) Run engine at fast idle.
4) Check compressor assembly for following items.
   If any of the above checks indicated a defect, repair compressor assembly.
   - High pressure gauge reading is not low and low pressure gauge reading is not higher than normal.
   - Metallic sound.
   - Leakage from shaft seal.

2. High pressure side (Delivery side hose)
3. Lower pressure side (Suction side pipe)

REMOVAL

1) Run engine at idle with A/C ON for 10 minutes.
2) Disconnect negative (–) cable at battery.
3) Recover refrigerant from refrigeration system using recovery and recycling equipment.

NOTE:

The amount of compressor oil at removed must be measured and the same amount must be poured when installing the compressor.

4) Disconnect thermal protector lead wire.
5) Disconnect suction and discharge hoses from compressor assembly.

NOTE:

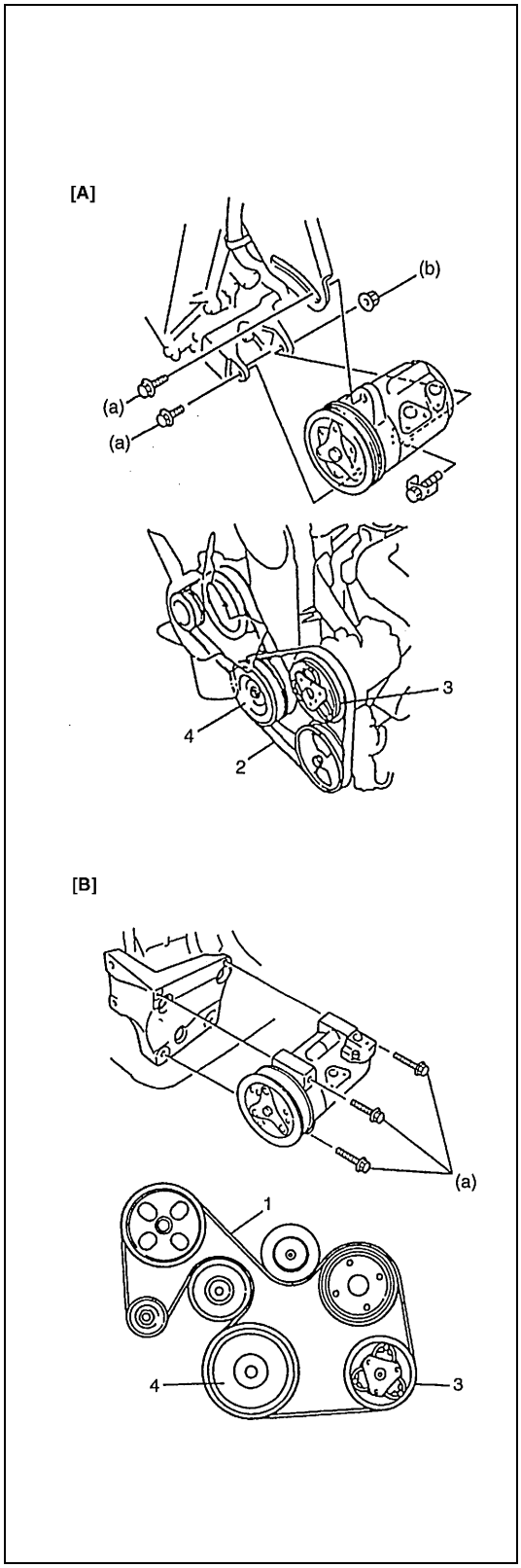
Cap open fitting immediately to keep moisture out of system.

6) **For G16 engine :**
   Remove compressor drive belt by loosening compressor assembly mounting bolts.

For J20 engine :
Remove generator belt referring to “Generator Belt” in Section 6H.

7) Remove compressor with magnet clutch assembly from its mount.
8) If compressor assembly is replaced. Drain oil from compressor assembly, and measure its amount.

INSTALLATION



1) Pour new compressor oil. The amount must be the same with the amount measured in REMOVAL.

NOTE:

Compressor assembly supplied from factory is filled up with the following amount of oil.

Amount of oil in compressor

G16 engine model : 150 cm^3 (150 cc, 9.2 in^3)

J20 engine model : 120 cm^3 (120 cc, 7.5 in^3)

2) **For G16 engine :**
Install compressor assembly temporarily to bracket, then install compressor drive belt (2).

For J20 engine :
Install compressor assembly to its bracket.
Tighten bolts (a).

Tightening torque
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

3) Connect suction and discharge hoses to compressor assembly.
4) **For G16 engine :**
Tension compressor drive belt (2) by tightening compressor assembly mounting bolts referring to “Belt Tension Adjustment” in Section 3B1 for drive belt tension.
Tighten bolt (a) first, then (b).

Tightening torque
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

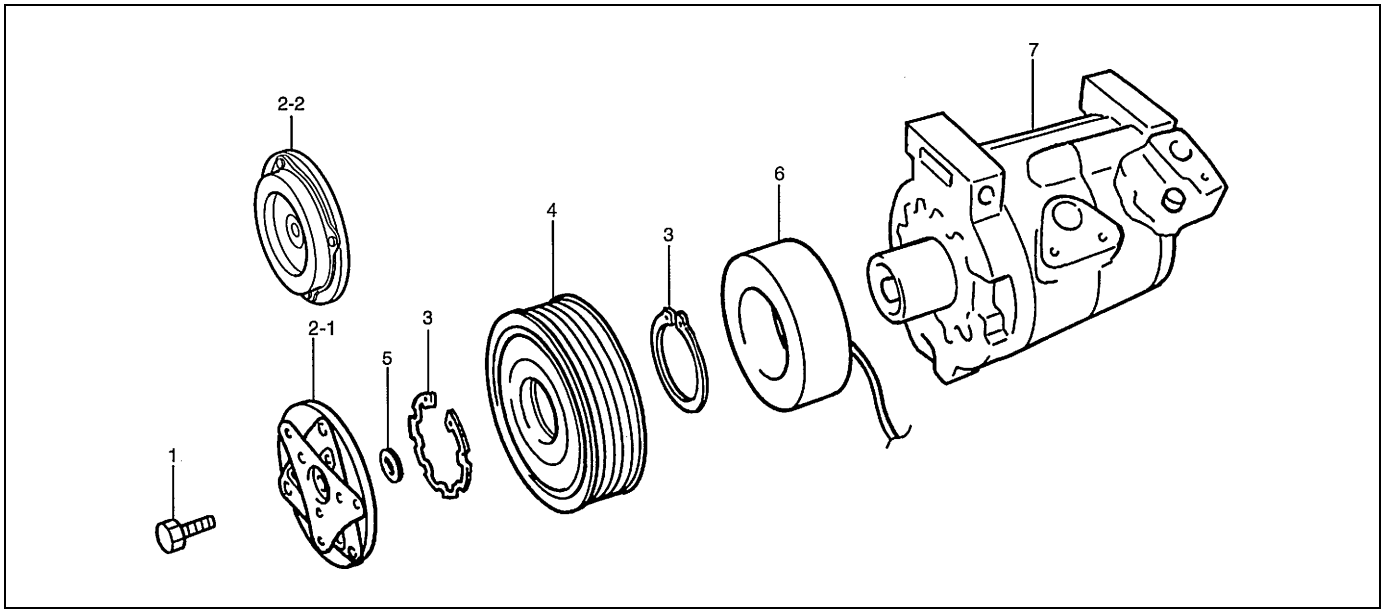
For J20 engine :
Install generator belt (1) referring to “Generator Belt” in Section 6H for details.

5) Connect thermal protector lead wire.
6) Evacuate and charge system according to previously described procedure.

CAUTION:
Be sure to use HFC-134a (R-134a) compressor oil.

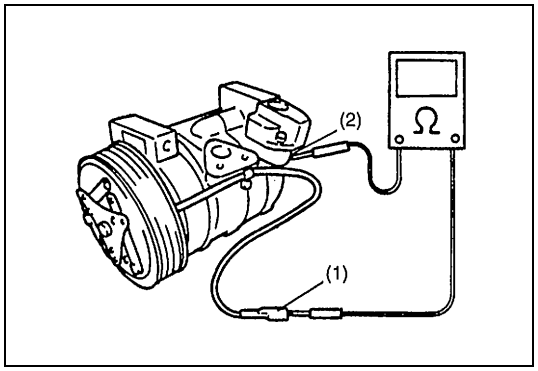
[A] : G16 engine
[B] : J20 engine
3. Compressor pulley
4. Crankshaft pulley

Magnet clutch assembly



1. Armature plate bolt	2-2. Armature plate (for H25 engine)	4. Magnet clutch	6. Magnet clutch coil
2-1. Armature plate (for G16 and J20 engine)	3. Circlip	5. Shim	7. Compressor body assembly

INSPECTION

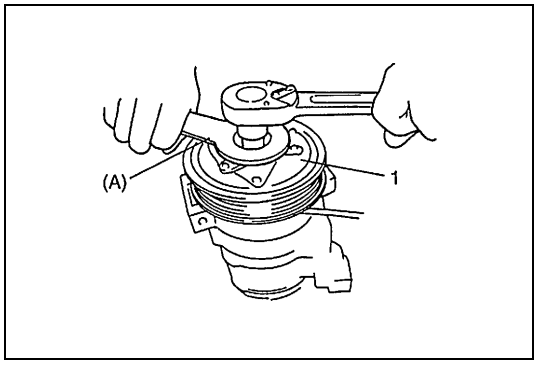


- Inspect clutch plate and clutch pulley for signs of oil.
- Check clutch pulley for noise and grease leakage.
- Using an ohmmeter, measure resistance of clutch coil between clutch lead wire (1) and compressor body (2).

If measured resistance is not within tolerance, replace magnet clutch assembly.

Magnet clutch coil resistance
3.5 – 5.0 Ω at 20°C, 68°F

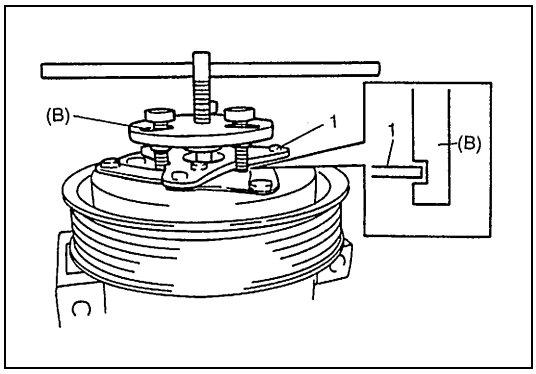
REMOVAL



1) Remove compressor assembly from vehicle referring to “Compressor Assembly” in this section.
2) Fix clutch plate (1) with special tool and remove clutch plate bolt.

Special tool
(A) : 09991-06020

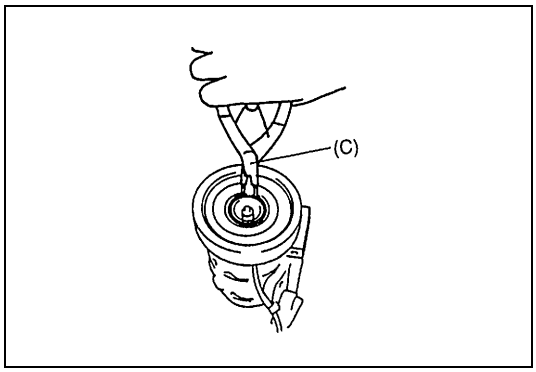
NOTE:
Do not reuse clutch plate bolt.



3) Using special tool (B), remove clutch plate (1).

Special tool
(B) : 09991-06030

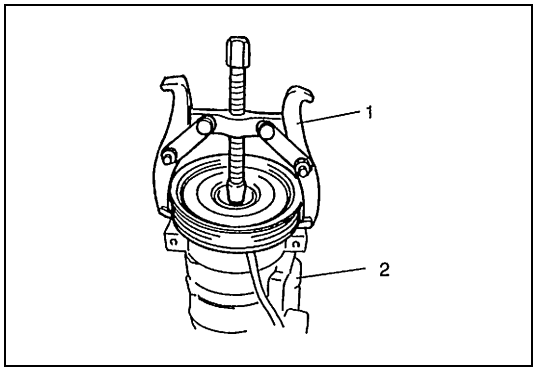
4) Remove shims from shaft.



5) Using special tool (C), remove circlip.

Special tool
(C) : 09900-06107

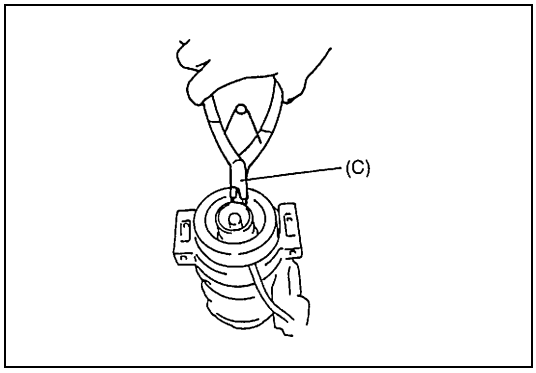
6) Remove clutch coil lead wire clamp screw, and remove clutch coil read wire ground terminal.



7) Remove clutch pulley with puller (1) from compressor (2).

NOTE:

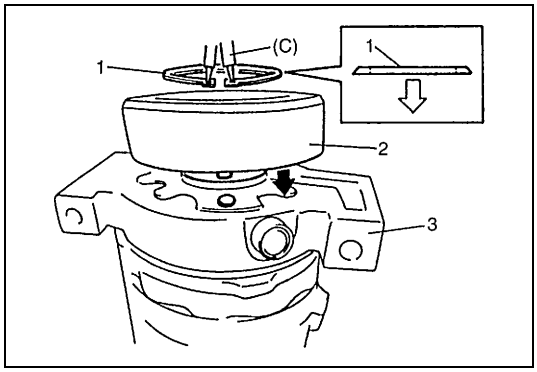
Be careful not to damage pulley when tapping magnet clutch assembly.



8) Remove clutch coil.

Special tool
(C) : 09900-06107

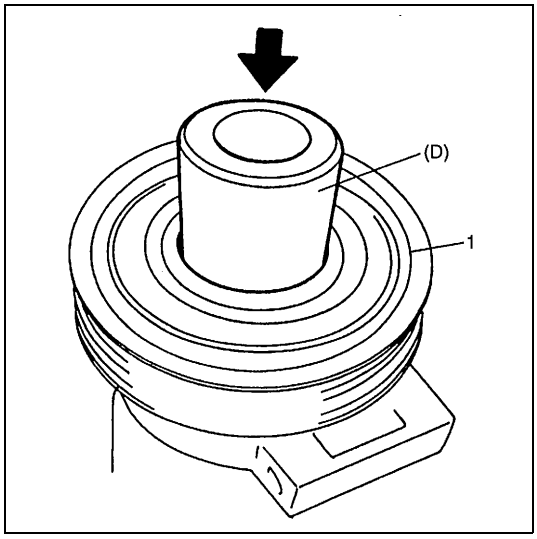
INSTALLATION



1) Install clutch coil (2).
   Protrusion on under side of coil ring must match hole in compressor (3) to prevent movement ant correctly locate lead wire.
2) Using special tool (C), install snap ring (1) as shown.

Special tool
(C) : 09990-06107

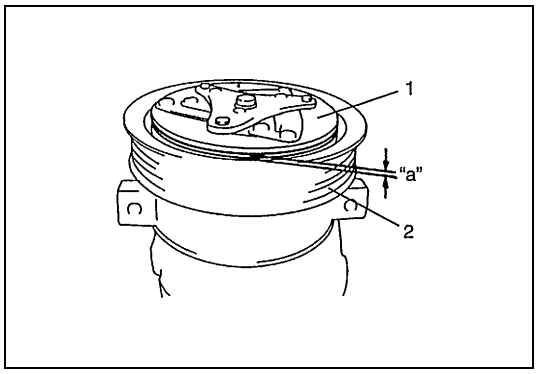
3) Install clamp portion and ground terminal of lead wire.



4) Install clutch pulley (1) as follows.
   a) Set clutch pulley squarely over clutch pulley installation boss.
   b) Place special tool (D) onto clutch pulley bearing.
      Ensure that edge rests only on inner race of bearing.
   c) Install snap ring.

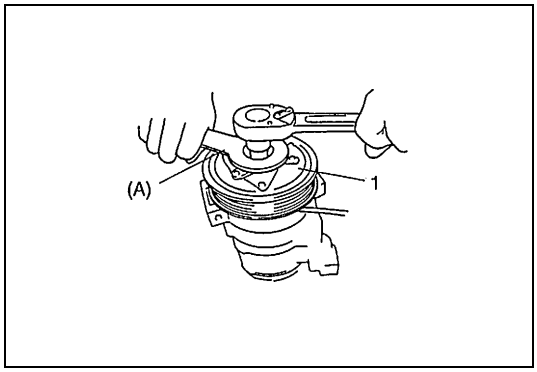
Special tool
(D) : 09991-06010

CAUTION:
Be careful not to scratch bearing seal.



5) Adjust clearance, between armature plate (1) and magnet clutch (2) by putting shim on compressor shaft.

Standard clearance between armature plate and magnet clutch (G16 and J20 engine)
"a" : 0.3 – 0.5 mm (0.012 – 0.02 in.)



6) Tighten new armature plate nut to specified torque.

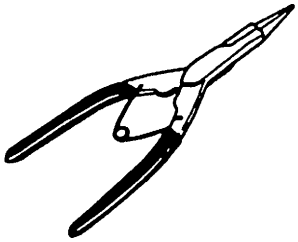
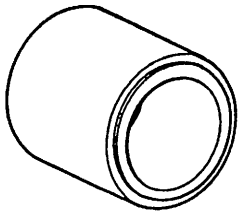
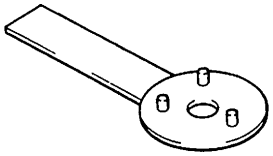
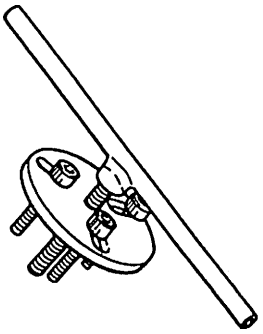
Tightening torque
Armature plate nut
(a) : 14 N·m (1.4 kg-m, 10.5 lb-ft)

Special tool
(A) : 09991-06020

Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Compressor oil (Refrigerant oil)	COMPRESSOR OIL (ND-OIL 8, 250 cc) 95590-58D30	• O-ring • Each component

Special Tool

			
09900-06107 Snap ring pliers (Opening type)	09991-06010 Magnet clutch pulley installer	09991-06020 Armature plate spanner	09991-06030 Armature plate remover

SECTION 3

STEERING, SUSPENSION, WHEELS AND TIRES

DIAGNOSIS **3-1**
FRONT END ALIGNMENT **3A-1**
POWER STEERING SYSTEM **3B1-1**
AIR BAG STEERING WHEEL AND COLUMN **3C1-1**
FRONT SUSPENSION **3D-1**
REAR SUSPENSION **3E-1**
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Irregular and/or Premature Wear 3-5
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General Diagnosis

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

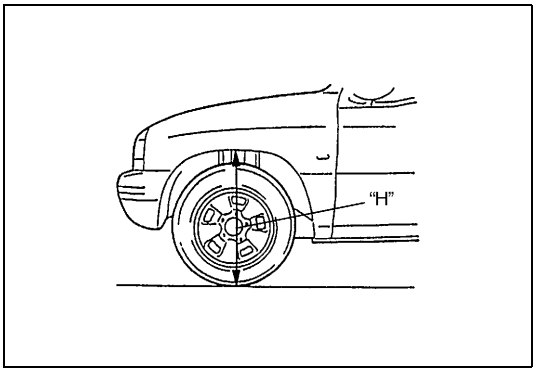
1) Inspect tires for proper pressure and uneven wear.
2) Raise vehicle on a hoist and inspect front and rear suspension and steering system for loose or damaged parts.
3) Spin front wheel. Inspect for out-of-round tires, out-of-balance tires, bent rims, loose and/or rough wheel bearings.

Diagnosis Table

Condition	Possible Cause	Correction
Vehicle Pulls (Leads)	Mismatched or uneven tires.	Replace tire.
	Tires not adequately inflated.	Adjust tire pressure.
	Broken or sagging springs.	Replace spring.
	Radial tire lateral force.	Replace tire.
	Disturbed front end alignment.	Check front end alignment.
	Disturbed rear axle alignment.	Check rear axle alignment.
	Brake dragging in one road wheel.	Repair front brake.
	Loose, bent or broken front or rear suspension parts.	Tighten or replace suspension part.
Abnormal or Excessive Tire Wear	Sagging or broken springs.	Replace spring.
	Tire out of balance.	Adjust balance or replace tire.
	Disturbed front end alignment.	Check front end alignment.
	Faulty shock absorber.	Replace shock absorber.
	Hard driving.	Replace tire.
	Overloaded vehicle.	Replace tire.
	Tires not rotating.	Replace or rotate tire.
	Worn or loose road wheel bearings.	Replace wheel bearing.
	Wobbly wheel or tires.	Replace wheel or tire.
	Tires not adequately inflated.	Adjust the pressure.
Wheel Tramp	Blister or bump on tire.	Replace tire.
	Improper shock absorber action.	Replace shock absorber.
Shimmy, Shake or Vibration	Tire or wheel out of balance.	Balance wheels or replace tire and/or wheel.
	Loose wheel bearings.	Replace wheel bearing.
	Worn tie rod ends.	Replace tie rod end.
	Worn lower ball joints.	Replace front suspension control arm.
	Excessive wheel runout.	Repair or replace wheel and/or tire.
	Blister or bump on tire.	Replace tire.
	Excessively loaded radial runout of tire/wheel assembly.	Replace tire or wheel.
	Disturbed front end alignment.	Check front end alignment.
	Loose or worn tie-rod end.	Tighten or replace tie-rod end.
	Loose steering gear case bolts.	Tighten case bolts.
Hard Steering	Bind in tie rod end ball studs or lower ball joints.	Replace tie rod end or front suspension control arm.
	Disturbed front end alignment.	Check front end alignment.
	Rack and pinion not properly adjusted. (if equipped with manual steering gear case)	Check and adjust steering gear box.
	Tire not adequately inflated.	Inflate tires to proper pressure.
	Bind in steering column.	Repair or replace.
	Low fluid level, loose drive belt or malfunction of power steering system. (if equipped with P/S)	Check and correct.

Condition	Possible Cause	Correction
Too Much Play in Steering	Wheel bearings worn.	Replace wheel bearing.
	Loose steering gear case bolts.	Tighten.
	Rack and pinion not properly adjusted. (if equipped with manual steering gear case)	Check and adjust rack and pinion torque.
	Worn steering shaft joints.	Replace joint.
	Worn tie rod ends or tie rod inside ball joints.	Replace tie rod end or steering gear case.
	Worn lower ball joints.	Replace front suspension control arm.
Poor Returnability	Bind in tie rod end ball studs.	Replace tie rod end.
	Bind in ball joints.	Replace ball joint.
	Bind in steering column.	Repair or replace.
	Poorly lubricated rack and pinion. (if equipped with manual steering gear case)	Check, repair or lubricate rack and pinion.
	Disturbed front end alignment.	Check and adjust front end alignment.
	Rack and pinion not properly adjusted. (if equipped with manual steering gear case)	Check and adjust rack and pinion torque.
	Tires not adequately inflated.	Adjust pressure.
Steering Noise (Rattle or Chuckle)	Loose bolts and nuts.	Retighten.
	Broken or otherwise damaged wheel bearings.	Replace.
	Worn or sticky tie rod ends.	Replace.
	Rack and pinion not properly adjusted. (if equipped with manual steering gear case)	Check and adjust rack and pinion torque.
Abnormal Noise, Front End	Worn, sticky or loose tie rod ends, lower ball joints, tie rod inside ball joints or drive shaft joints.	Replace tie rod end, control arm, steering gear case or drive shaft joint.
	Damaged shock absorbers, struts or mountings.	Replace or repair.
	Worn control arm bushings.	Replace.
	Loose stabilizer bar.	Tighten bolts or replace bushes.
	Loose wheel nuts.	Tighten wheel nuts.
	Loose suspension bolts or nuts.	Tighten suspension bolts or nuts.
	Broken or otherwise damaged wheel bearings.	Replace wheel bearing.
	Broken suspension springs.	Replace spring.
	Poorly lubricated or worn strut bearings.	Lubricate or replace strut bearing.
Wander or Poor Steering Stability	Mismatched or uneven tires.	Replace tire or inflate tires to proper pressure.
	Loose ball joints and tie rod ends.	Replace suspension control arm or tie rod end.
	Faulty shock absorbers/struts or mounting.	Replace absorber/strut or repair mounting.
	Loose stabilizer bar.	Tighten or replace stabilizer bar or bushes.
	Broken or sagging springs.	Replace spring.
	Rack and pinion not properly adjusted. (if equipped with manual steering gear case)	Check or adjust rack and pinion torque.
	Disturbed front end alignment.	Check and adjust front end alignment.

Condition	Possible Cause	Correction
Erratic Steering when Braking	Worn wheel bearings.	Replace wheel bearing.
	Broken or sagging springs.	Replace spring.
	Leaking wheel cylinder or caliper.	Repair or replace wheel cylinder or caliper.
	Warped discs.	Replace brake disc.
	Badly worn brake linings.	Replace brake shoe lining.
	Drum is out of round in some brakes.	Replace brake drum.
	Wheel tires are inflated unequally.	Inflate tires to proper pressure.
	Defective wheel cylinders.	Replace or repair wheel cylinder.
	Disturbed front end alignment.	Check front end alignment.
Low or Uneven Trim Height NOTE: See NOTE *1.	Broken or sagging springs.	Replace spring.
	Overloaded.	Check loading.
	Incorrect springs.	Replace spring.
Ride Too Soft	Faulty shock absorber or struts.	Replace shock absorber or strut.
Suspension Bottoms	Overloaded.	Check loading.
	Faulty shocks or struts.	Replace shock absorber or strut.
	Incorrect broken or sagging springs.	Replace spring.
Body Leans or Sways in Corners	Loose stabilizer bar.	Tighten stabilizer bar bolts or replace bushes.
	Faulty shock absorbers, struts or mounting.	Replace shock absorber, strut or tighten mounting.
	Broken or sagging springs.	Replace spring.
	Overloaded.	Check loading.
Cupped Tires	Front struts defective.	Replace strut.
	Worn wheel bearings.	Replace wheel bearing.
	Excessive tire or wheel run-out.	Replace tire or wheel disc.
	Worn ball joints.	Replace front suspension control arm.
	Tire out of balance.	Adjust tire balance.

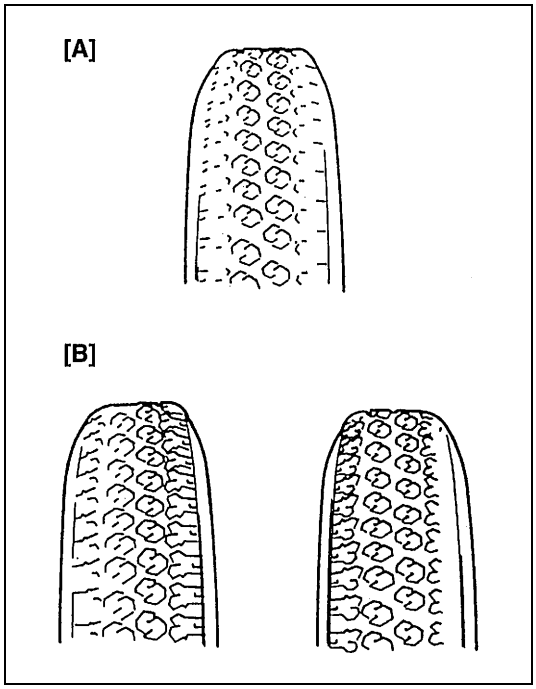


NOTE:

***1: Right-to-left trim height (H) difference should be within 15 mm (0.6 in.) with curb weight. (Same with rear side.)**

Tire Diagnosis

Irregular and/or Premature Wear



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

If the following conditions are noted, rotation is in order:

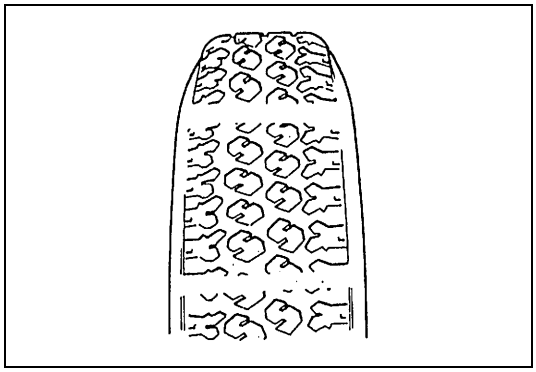
- Front tire wear is different from rear.
- Uneven wear exists across the tread of any tire.
- Left front and right front tire wear is unequal.
- Left rear and right rear tire wear is unequal.
- There is cupping, flat spotting, etc.

A wheel alignment check is in order if the following conditions are noted:

- Left front and right front tire wear is unequal.
- Wear is uneven across the tread of any front tire.
- Front tire treads have scuffed appearance with “feather” edges on one side of tread ribs or blocks.

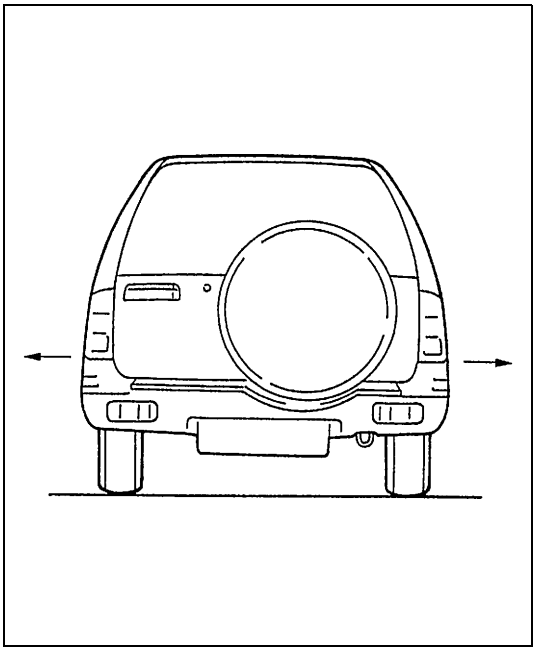
[A] :	Hard cornering, under-inflation or lack of rotation
[B] :	Incorrect wheel alignment, tire construction non-uniformity or wheel heavy acceleration

Wear Indicator



The original equipment tires have built-in tread wear indicators to show when tires need replacement. These indicators will appear as 12 mm (0.47 in.) wide bands when the tire tread depth becomes 1.6 mm (0.063 in.). When the indicators appear in 3 or more grooves at 6 locations, tire replacement is recommended.

Radial Tire Waddle

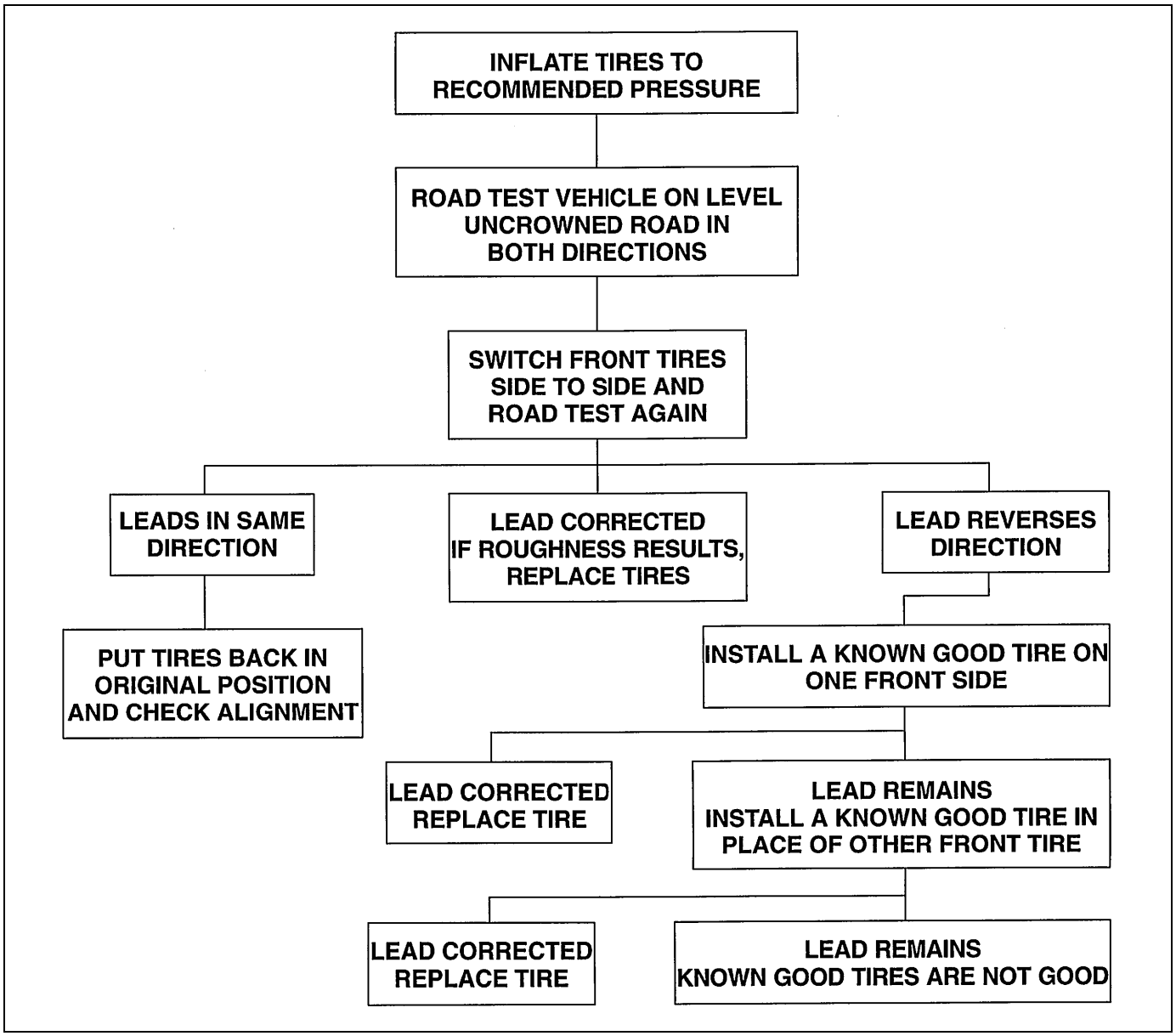


Waddle is side to side movement at the front and/or rear of the vehicle. It is caused by the steel belt not being straight within the tire. It is most noticeable at low speed, 8 to 48 km/h (5 to 30 mph). It is possible to road test a vehicle and tell on which end of the vehicle the faulty tire is located. If the waddle tire is on the rear, the rear end of the vehicle will shake from side to side or “waddle”. From the driver’s seat it feels as though someone is pushing on the side of the vehicle. If the faulty tire is on the front, the waddle is more visual. The front sheet metal appears to be moving back and forth and the driver feels as though he is at the pivot point in the vehicle.

Waddle can be quickly diagnosed by using a Tire Problem Detector (TPD) and following the equipment manufacturer's recommendations.

If a TPD is not available, the more time consuming method of substituting known good tire/wheel assemblies on the problem vehicle can be used as follows:

1) Ride vehicle to determine if the waddle is coming from the front or rear.
2) Install tires and wheels that are known to be good (on similar vehicle) in place of those on the offending end of the vehicle. If the waddle cannot be isolated to front or rear, substitute the rears.
3) Road test again. If improvement is noted, install originals one at a time until offender is found. If no improvement is noted, install known good tires in place of all four. Then install originals one at a time until offender if found.


INFLATE TIRES TO RECOMMENDED PRESSURE
ROAD TEST VEHICLE ON LEVEL UNCROWNED ROAD IN BOTH DIRECTIONS
SWITCH FRONT TIRES SIDE TO SIDE AND ROAD TEST AGAIN
LEADS IN SAME DIRECTION
LEAD CORRECTED IF ROUGHNESS RESULTS, REPLACE TIRES
LEAD REVERSES DIRECTION
PUT TIRES BACK IN ORIGINAL POSITION AND CHECK ALIGNMENT
INSTALL A KNOWN GOOD TIRE ON ONE FRONT SIDE
LEAD CORRECTED REPLACE TIRE
LEAD REMAINS INSTALL A KNOWN GOOD TIRE IN PLACE OF OTHER FRONT TIRE
LEAD CORRECTED REPLACE TIRE
LEAD REMAINS KNOWN GOOD TIRES ARE NOT GOOD

Radial Tire Lead

"Lead" is the deviation of the vehicle from a straight path on a level road with no pressure on the steering wheel.

Lead is usually caused by:

- Incorrect alignment.
- Uneven brake adjustment.
- Tire construction.

The way in which a tire is built can produce lead in a vehicle. An example of this is placement of the belt. Off center belts on radial tires can cause the tire to develop a side force while rolling straight down the road. If one side of the tire is a little larger diameter than the other, the tire will tend to roll to one side. This will develop a side force which can produce vehicle lead.

The procedure on previous page should be used to make sure that front alignment is not mistaken for tire lead.

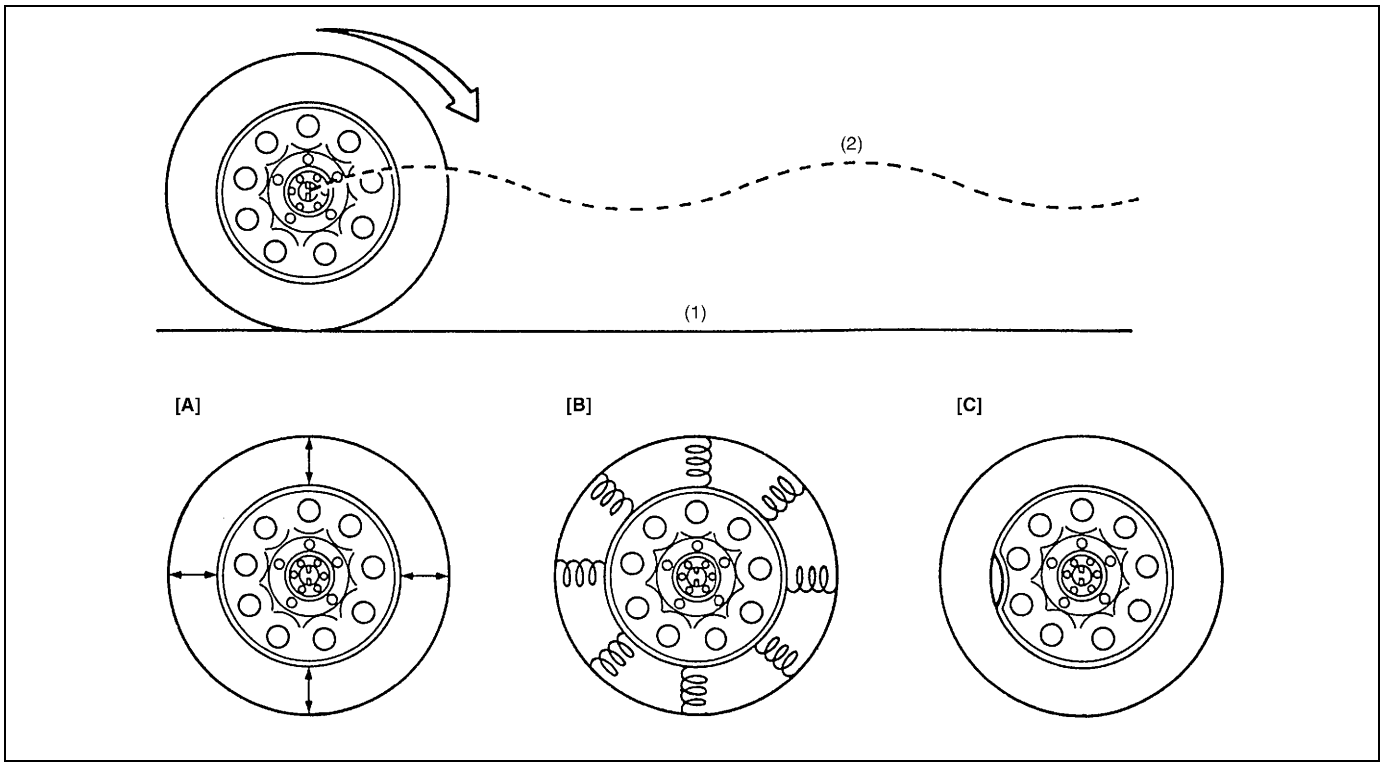
- Part of the lead diagnosis procedure is different from the tire rotation pattern currently in the owner's and service manuals. If a medium to high mileage tire is moved to the other side of the vehicle, be sure to check that ride roughness has not developed.
- Rear tires will not cause lead.

Vibration Diagnosis

Wheel unbalance causes most of the highway speed vibration problems. If a vibration remains after dynamic balancing, it can be caused by three things.

- Tire runout.
- Wheel runout.
- Tire stiffness variation.

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



[A] : Caused by tire out of round	1. Smooth road
[B] : Caused by tire stiffness variation	2. Suspension movement (loaded runout)
[C] : Caused by rim bent or out of round	

SECTION 3A

FRONT END ALIGNMENT

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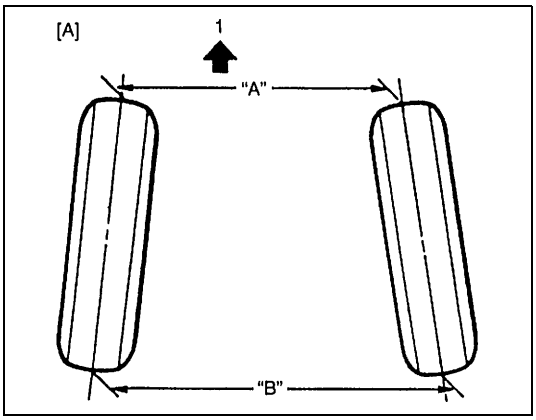
General Information 3A-2
Toe Setting 3A-2
Camber 3A-2
Caster 3A-2
Preliminary Checks Prior to Adjusting Front Alignment 3A-3
Toe Adjustment 3A-3
Camber and Caster Adjustment 3A-4
Steering Angle 3A-4
Side Slip (Reference) 3A-4

General Information

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

Toe Setting

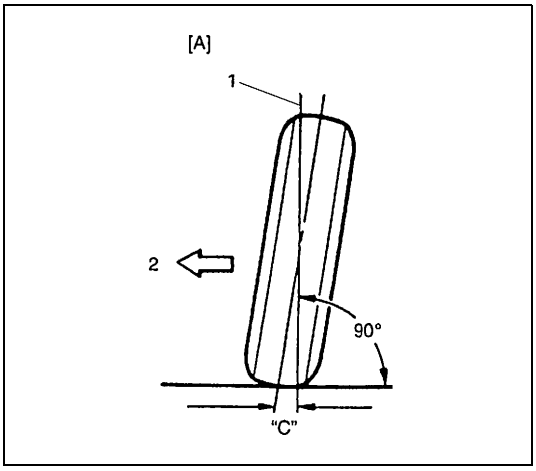


Toe is the turning in or out of the front wheels. The purpose of a toe specification is to ensure parallel rolling of the front wheels (Excessive toe-in or toe-out may increase tire wear).
Amount of toe can be obtained by subtracting "A" front "B" as shown in the figure and therefore is given in mm (in.).

Toe (Toe-in gauge measurement) for without load
"B" – "A" : 1 ± 2 mm (0.04 ± 0.08 in.)
"B" – "A" : 0 ± 2 mm (0 ± 0.08 in.) . . . Canvas top model

[A] : Top view
1. Forward

Camber



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

Camber angle for without load
"C" : 0' ± 1°

[A] : Front view
1. Center line of wheel
2. Body center

Caster

Caster angle for without load
2°40' ± 1°

Preliminary Checks Prior to Adjusting Front Alignment

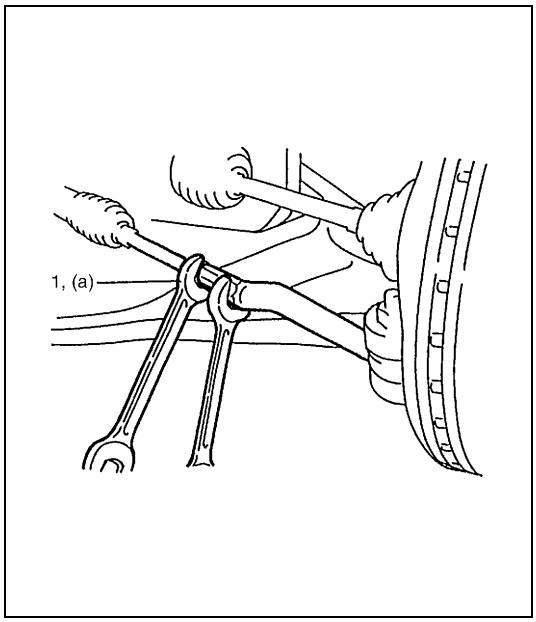
Steering and vibration complaints are not always the result of improper alignment. An additional item to be checked is the possibility of tire lead due to worn or improperly manufactured tires. “Lead” is the deviation of the vehicle from a straight path on a level road without hand pressure on the steering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

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

NOTE:

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

Toe Adjustment



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

NOTE:

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

After adjustment, tighten lock nuts (1) to specified torque.

Tightening torque
Tie rod and kock nuts (a) : 65 N·m (6.5 kg-m, 47.0 lb-ft)

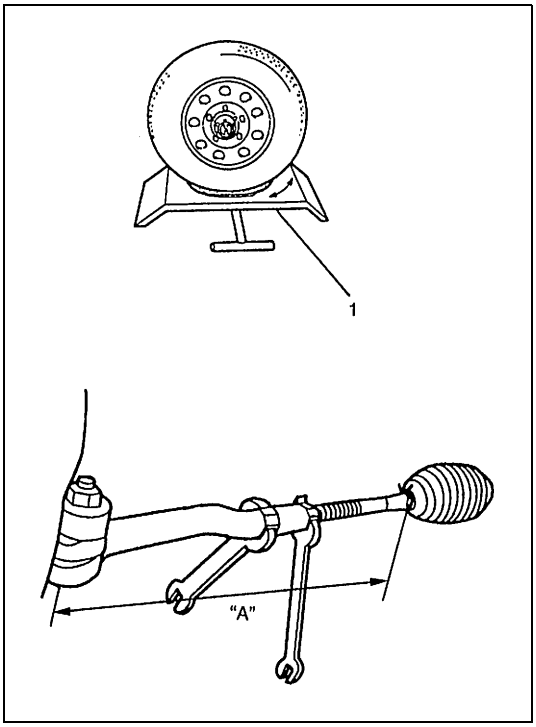
NOTE:

Make sure that rack boots are not twisted.

Camber and Caster Adjustment

Should camber or caster be found out of specifications upon inspection, locate its cause first. If it is in damaged, loose, bent, dented or worn suspension parts, they should be replaced. If it is in body, repair it so as to attain specifications.
To prevent possible incorrect reading of camber or caster, vehicle front end must be moved up and down a few times before inspection.

Steering Angle



When tie rod end was replaced, check toe and then also steering angle with turning radius gauges (1).
If steering angle is not correct, check if right and left tie-rods are equal in length ("A" in the figure).

Steering angle
inside : 35° ± 3°
outside : 33° ± 3°

NOTE:

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

Side Slip (Reference)

For inspecting front wheel side slip with side slip tester:

Side slip
Limit :
IN 3 – OUT 3 mm/m (IN 0.118 – OUT 0.118 in./3.3 ft)
Adjusting value :
IN 4 – IN 1 mm/m (IN 0.158 – IN 0.039 in./3.3 ft)
IN 1.5 – OUT 1.5 mm/m (IN 0.059 – OUT 0.059 in./3.3 ft) . .
.Canvas top model

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

NOTE:

When side slip limit is exceeded or when adjusting wheel alignment while doing some other work, adjust alignment so as to obtain above side slip adjusting value.

SECTION 3B1

POWER STEERING (P/S) SYSTEM

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System:

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

NOTE:

- **Some parts in the Power Steering Gear Box cannot be disassembled or adjusted. For detailed information, refer to the description of "Power Steering Gear Box Assembly".**
- **All steering gear fasteners are important attaching parts in that they could affect the performance of vital parts and systems, and/or could result in major repair expense. They must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of these parts.**
- **Although the figures in this section show only the left-hand steering vehicle, the same work procedure and data apply to the right-hand steering vehicle.**

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- Power Steering System 3B1-2
- Steering Gear Box 3B1-3
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Diagnosis 3B1-5
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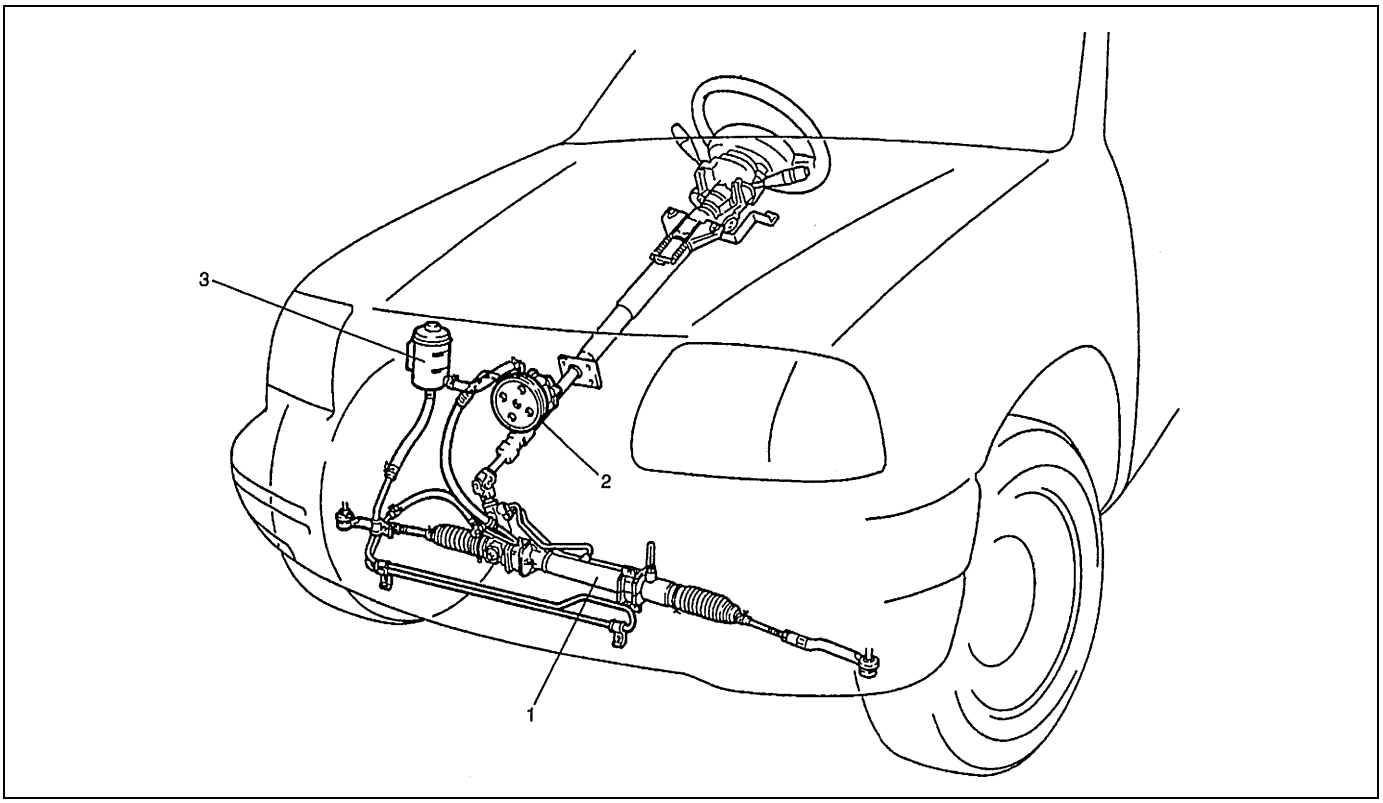
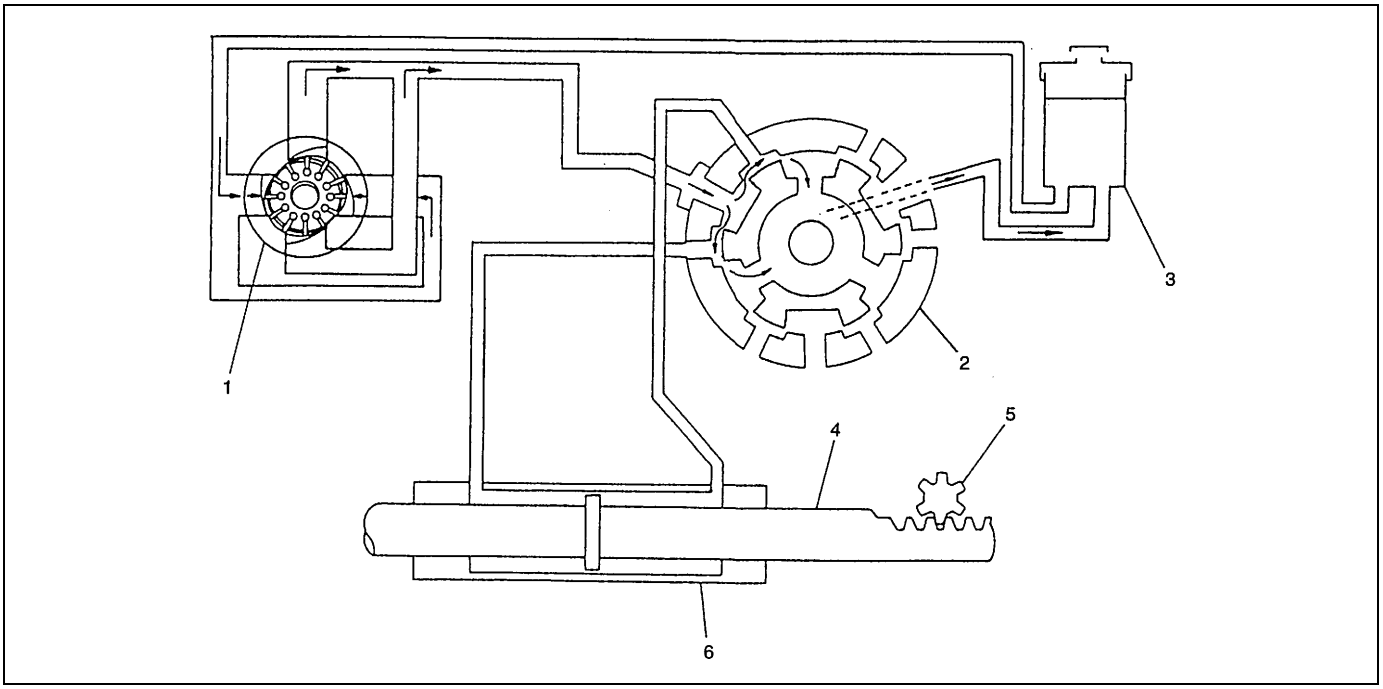
General Description

Power Steering System

The power steering (P/S) system in this vehicle reduces the driver's effort needed in turning the steering wheel by utilizing the hydraulic pressure generated by the power steering (P/S) pump which is driven by the engine. It is an integral type with the rack and pinion gears and the control valve unit, hydraulic pressure cylinder unit all built in the steering gear box.

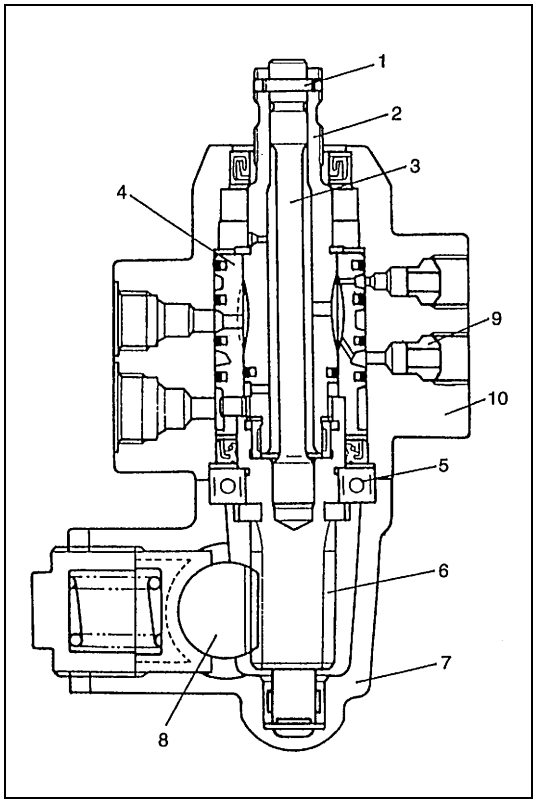


1. Power steering gear box	2. Power steering pump	3. P/S fluid reservoir



1. Power steering pump	3. P/S fluid reservoir	5. Pinion
2. Valve section	4. Rack	6. Cylinder

Steering Gear Box

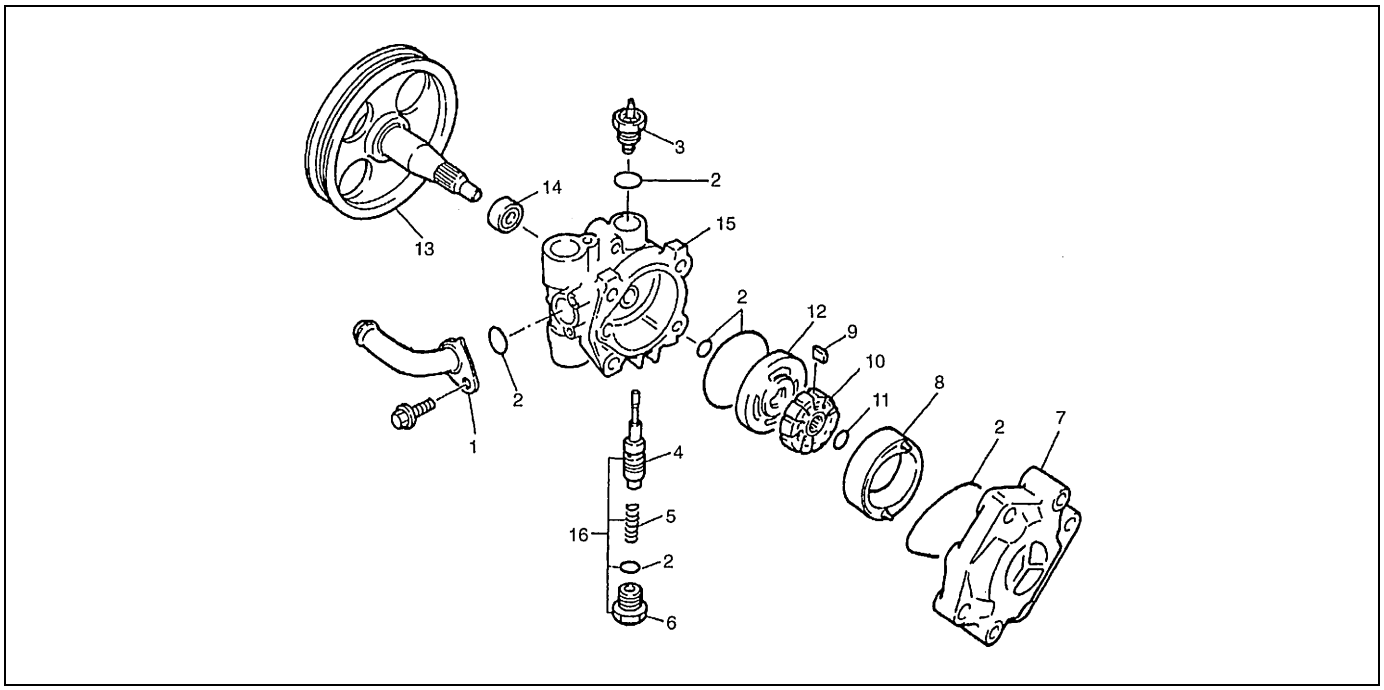


The steering gear box consists of two sections: one including a cylinder and the other a valve. Main components of the cylinder section are a gear box, a rack and a tube and those of the valve section are a valve case, a sleeve and a stub shaft. The sleeve is linked with the pinion through a pin and the valve and stub shaft are integrated into one unit. Then the pinion and the stub shaft are linked to each other by means of the torsion bar.
Thus, when the stub shaft moves, the valve changes its position, thereby switching the hydraulic passage from the pump to the cylinder to help steering operation.
When turning the steering wheel feels heavy due to P/S fluid leakage or for some other reason (i.e., when in the manual steering mode), the stub shaft and pinion are in direct linkage and the force is output directly through the pinion and rack.

1. Pin	6. Pinion
2. Stub shaft (Rotor)	7. Gear box
3. Torsion bar	8. Rack
4. Sleeve	9. Ferrule
5. Bearing	10. Valve case

Power Steering (P/S) Pump

The power steering pump is a vane type and is driven by the V-ribbed belt from the crankshaft.



1. Suction connector	5. Spring	9. Vane	13. Pulley (pump shaft)
2. O-ring	6. Plug	10. Rotor	14. Oil seal
3. Pressure switch	7. Pump cover	11. Snap ring	15. Pump body
4. Flow control valve (Relief valve)	8. Cam ring	12. Side plate	16. Flow control valve assembly

Model		Vane type
Hydraulic pressure control	Relieved pressure	6500 kPa (65 kg/cm^2, 924 psi) ..... G16 Type engine 7000 kPa (70 kg/cm^2, 995 psi) ..... J20 Type engine 7350 kPa (73.5 kg/cm^2, 1045 psi) ..... H25 Type engine
	Control device	Flow control valve
		Relief valve
Power steering pressure switch		Switch turns on (closes) when the pressure is higher than 2500 – 3500 kPa (25 – 35 kg/cm^2, 356 – 498 psi). ECM uses this signal for idle speed control.
Capacity		0.70 – 0.75 L (1.48/1.23 – 1.58/1.32 US/Imp. pt)
Specified fluid		DEXRON®II, DEXRON®III A/T fluid or equivalent

FLOW CONTROl VALVE

As the discharge rate of the P/S pump increases in proportion to the pump revolution speed, a flow control valve is added to control it so that the optimum amount of fluid for steering operation is supplied according to the engine speed (driving condition).
Described below is its operation at different engine speed.

Diagnosis

General Diagnosis Table

Condition	Possible Cause	Correction
Steering wheel feels heavy (at low speed)	Fluid deteriorated, low viscosity, different type of fluid mixed	Replace fluid.
	Pipes or hoses deformed, air entering through joint	Replace defective part.
	Insufficient air purging from P/S circuit	Purge air.
	P/S belt worn, lacking in tension	Adjust belt tension or replace belt as necessary.
	Tire inflation pressure excessively low	Inflate tire.
	Front end alignment out of order	Check and adjust front end alignment.
	Steering wheel installed improperly (twisted)	Install steering wheel correctly.
	Bind in tie rod or tie rod end ball joint	Replace defective part.
	P/S pump hydraulic pressure fails to increase	Check pressure and repair or replace defective part.
	P/S pump hydraulic pressure increases but slowly	Check pressure and repair or replace defective part.
	Steering gear box malfunction	Replace gear box.
Steering wheel feels heavy momentarily when turning it to the left or right	Air drawn in due to insufficient amount of fluid	Add fluid and purge air.
	Slipping P/S belt	Adjust belt tension or replace belt as necessary.
	P/S pump hydraulic pressure fails to increase	Check pressure and repair or replace defective part.
	P/S pump hydraulic pressure increases but slowly	Check pressure and repair or replace defective part.
	Steering gear box malfunction	Replace gear box.
Poor recovery from turns (See NOTE)	Deformed pipes or hoses	Replace defective part.
	Steering column installed improperly	Install steering column correctly.
	Front end alignment out of order	Check and adjust front end alignment.
	Ball joints binding	Replace defective part.
	P/S pump hydraulic pressure fails to increase	Check pressure and repair or replace defective part.
	P/S pump hydraulic pressure increases but slowly	Check pressure and repair or replace defective part.
	Steering gear box malfunction	Replace gear box.
Vehicle pulls to one side during straight driving	Mismatched or uneven tire	Replace tire.
	Low or uneven tire inflation pressure	Inflate tires to proper pressure or adjust right & left tires inflation pressure.
	Brake dragging in one wheel	Repair.
	Front end alignment out of order	Check and adjust front end alignment.
	Rear end alignment out of order	Check and adjust rear end alignment.
	Malfunction of control valve in gear box	Replace gear box.

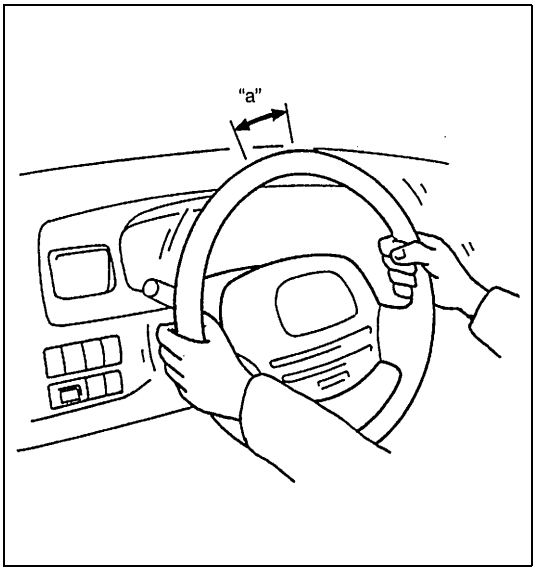
Condition	Possible Cause	Correction
Steering wheel play is large and vehicle wanders	Refer to “Diagnosis” in Section 3.	
Fluid leakage	Loose joints of (hydraulic pressure) pipes and hoses	Retighten.
	Deformed or damaged pipes or hoses	Replace defective part.
Abnormal noise	Air drawn in due to insufficient amount of fluid	Add fluid and purge air.
	Air mixed into fluid from pipes or hoses	Replace pipes or hoses.
	Slipping (loose) P/S belt	Adjust belt tension.
	Worn P/S belt	Replace belt.
	Loose gear box fastening bolt	Retighten bolts.
	Loose linkage or joints	Retighten.
	Pipes or hoses in contact with part of vehicle body	Install pipes and hoses correctly.
	Vanes of P/S pump defective	Replace defective part.
	Malfunction of control valve in gear box	Replace gear box.
	Bearing of P/S pump shaft defective	Replace bearing.
No idle up	Power steering pressure switch defective	Replace power steering pressure switch.

NOTE:

To check steering wheel for recovery, with vehicle running at 22 mile/h (35 km/h), turn steering wheel 90° and let it free. It should return more than 60°.

Steering Wheel

Steering wheel play check



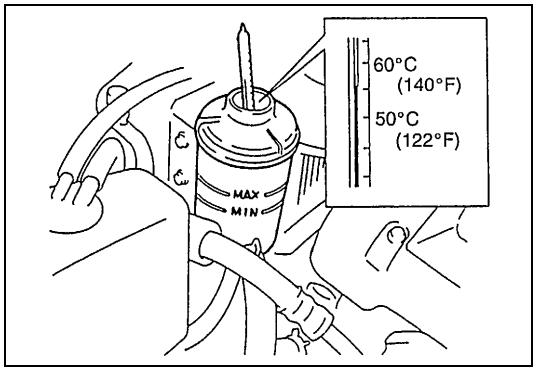
Check steering wheel for looseness or rattle by trying to move it in its shaft direction and lateral direction.
If found defective, repair or replace.
Check steering wheel for play, holding car in straight forward condition on the ground and with engine stopped.

Steering wheel play
“a” : 0 – 30 mm (0 – 1.2 in.)

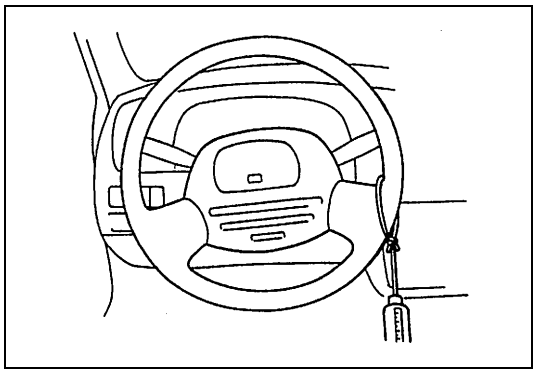
If steering wheel play is not within specification, inspect as follows and replace if found defective.

- Tie-rod end ball stud for wear
- Lower ball joint for wear
- Steering shaft joint for wear
- Steering pinion or rack gear for wear or breakage
- Each part for looseness

Steering force check



1) Place vehicle on level road and set steering wheel at straightahead position.
2) Check that tire inflation pressure is as specified. (Refer to tire placard.)
3) Start engine and keep it running till power steering fluid is warmed to 50 to 60°C (122 to 140°F).

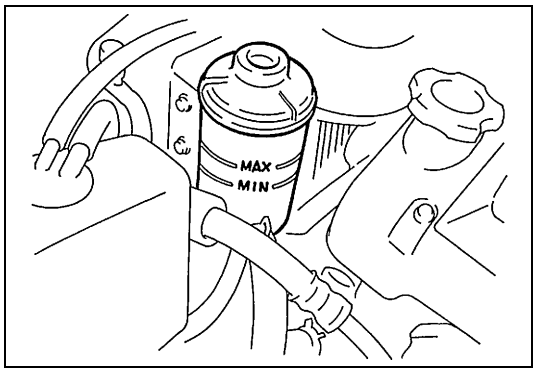


4) With engine idling, measure steering force by pulling spring balancer hooked on steering wheel in tangential direction.

Steering force
Less than 50 N (5.0 kg, 11.0 lb)

Power Steering Fluid

Power steering fluid level check



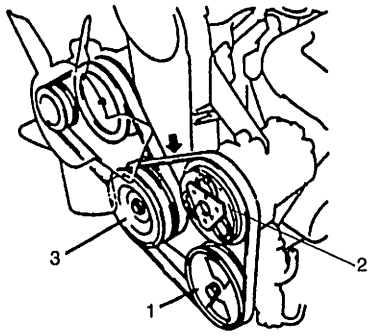
With engine stopped, check fluid level indicated on P/S fluid reservoir, which should be between “MAX” and “MIN” marks. If it is lower than “MIN” mark, fill fluid up to “MAX” mark.

NOTE:

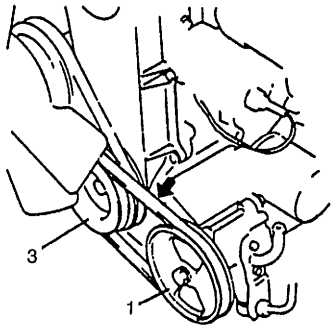
- **Be sure to use an specified power steering fluid.**
- **Fluid level should be checked when fluid is cool.**

Power Steering Pump Drive Belt

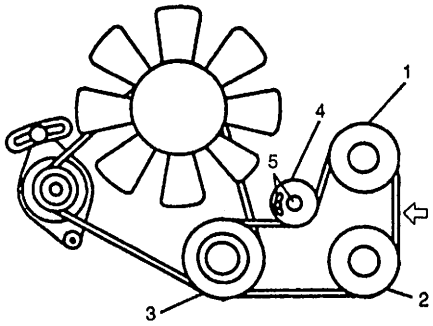
[A]



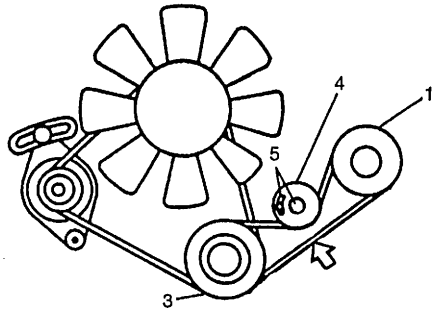
[B]



[C]



[D]



NOTE:

For J20 Type engine, refer to Section 6H "Generator Belt".

INSPECTION

Check that belt is free from any damage and properly fitted in pulley groove.

Belt tension check

Check belt tension by measuring how much it deflects when pushed at intermediate point between pulleys with about 10 kg (22 lb) force.

Deflection of P/S belt:
6 – 9 mm (0.24 – 0.35 in.) ... G16 Type engine
4 – 7 mm (0.16 – 0.28 in.) ... H25 Type engine

Belt tension adjustment

[For G16 Type engine]

a) To adjust P/S pump drive belt tension, use adjusting bolt of compressor for A/C equipped vehicles and that of P/S pump for vehicles without A/C.
b) Adjust belt tension to above specification.
c) Then tighten adjusting and mounting bolts to specified torque.

[For J20 Type engine]

To adjust P/S pump drive belt tension, refer to "Generator Belt" in Section 6H.

[For H25 Type engine]

a) To adjust P/S pump drive belt tension, loosen tension pulley bolts and turn tension pulley using hexagon wrench.
b) Adjust belt tension to above specification.
Then tighten tension pulley bolts to specified torque.

Tightening torque
Tension pulley bolts
25 N·m (2.5 kg-m, 18.5 lb-ft)

[A] : G16 type engine with A/C	2. A/C compressor pulley (if equipped)
[B] : G16 type engine without A/C	3. Crankshaft pulley
[C] : H25 type engine with A/C	4. Tension pulley
[D] : H25 type engine without A/C	5. Tension pulley bolts
1. P/S pump pulley	

Idle Up System

Idle up system check

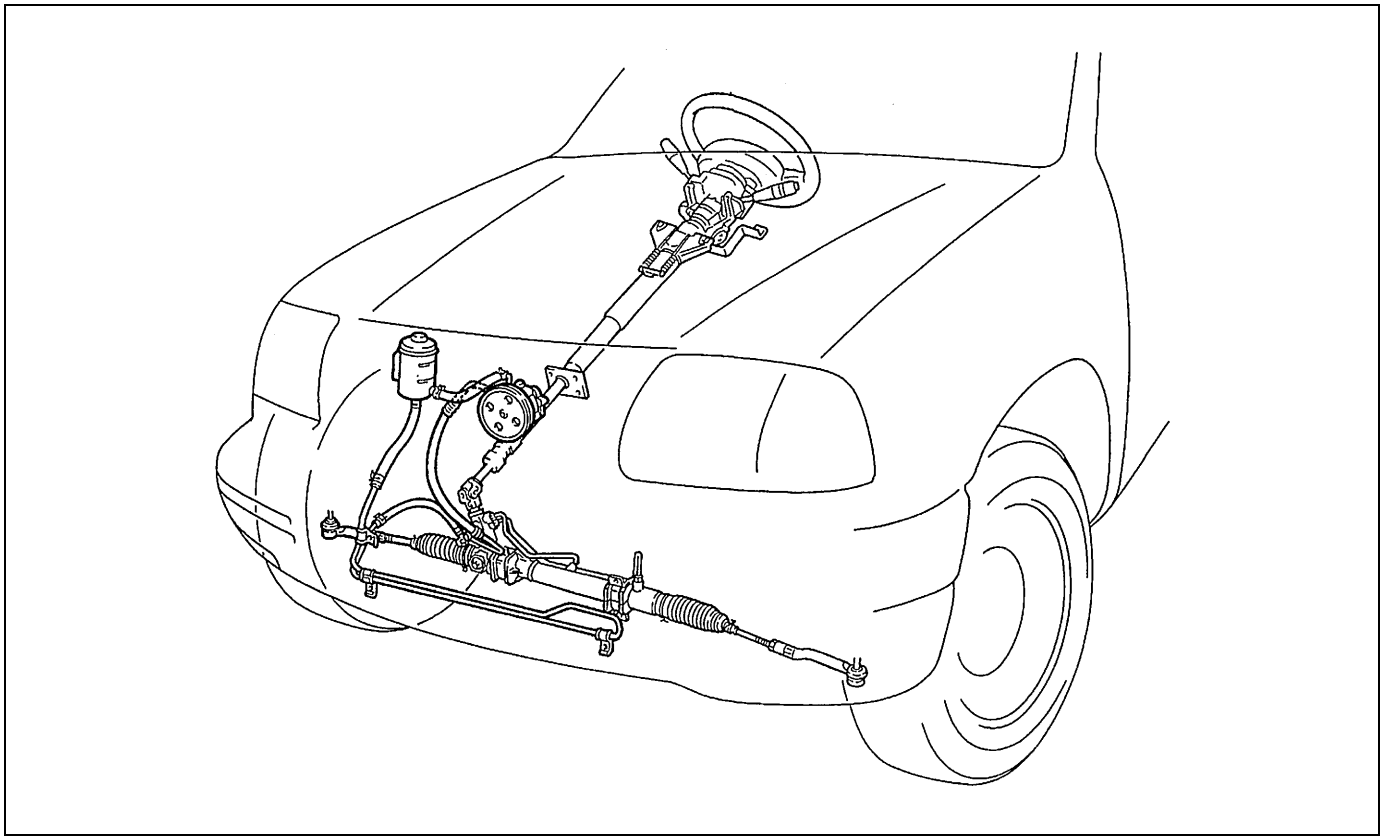
1) Warm up engine to normal operating temperature.
2) Turn A/C switch OFF, if equipped.
3) Turn steering wheel fully and check idle speed.
   Engine idle speed drops a little momentarily when steering wheel is turned fully but returns to its specified level immediately.
   If power steering pressure switch connector is connected, check the same with that connector disconnected. Momentary drop of engine idle speed should be less when it is connected than when disconnected.

Fluid

Fluid leakage check

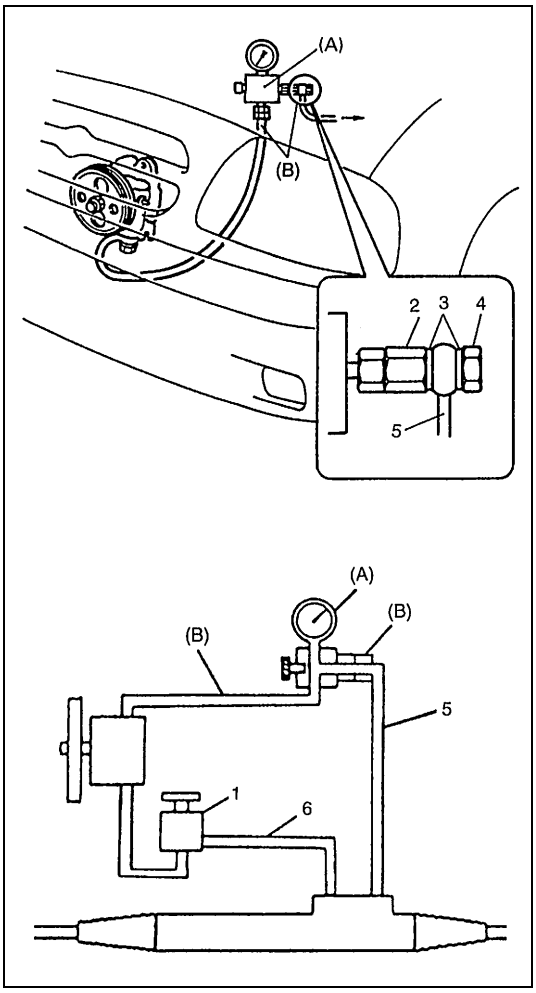
Start engine and turn steering wheel fully to the right and left so that maximum hydraulic pressure is provided. Then visually check gear box, P/S pump and P/S fluid reservoir themselves and each joint of their connecting pipes for leakage.

CAUTION:
Never keep steering wheel turned fully for longer than 10 seconds.



Hydraulic Pressure in P/S Circuit

Hydraulic pressure check



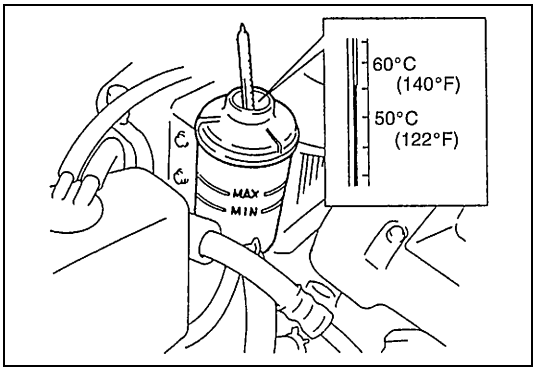
1) After cleaning joint of high pressure hose and P/S pump thoroughly, disconnect hose from pump and install special tool (oil pressure gauge, attachment and hose).
   Tighten each flare nut to specified torque.

CAUTION:
Take care not to cause damage to A/C condenser during service operation, if equipped.

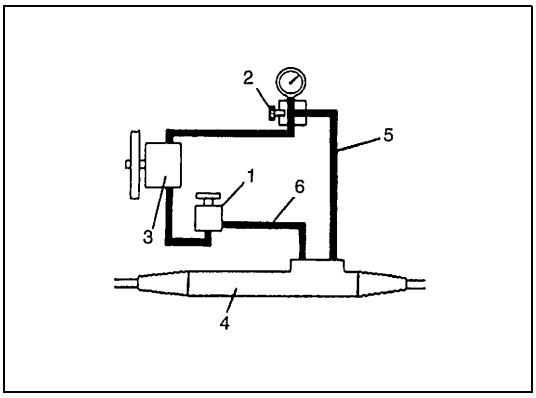
Special tool
(A) : 09915-77411 (Oil pressure gauge)
(B) : 09915-77420

2) Check each connection for fluid leakage and bleed air.
   Refer to "Air Bleeding Procedure" in this section.

1. P/S fluid reservoir	4. Union bolt
2. Attachment	5. High pressure side
3. Gasket	6. Low pressure side



3) With engine idling, turn steering wheel and warm up engine till temperature of fluid in P/S fluid reservoir rises to 50 – 60°C (122 – 140°F).



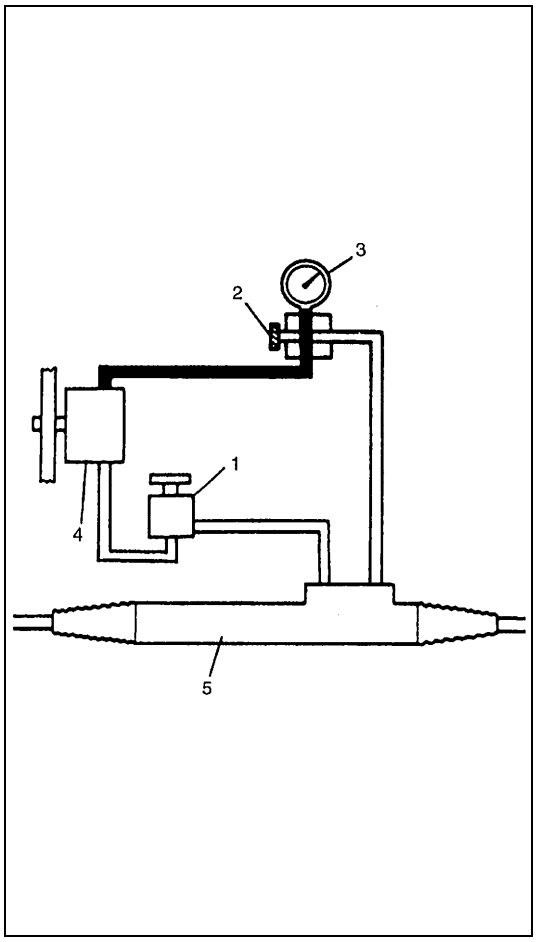
4) Check back pressure by measuring hydraulic pressure with engine idling and hands off steering wheel.

Back pressure

Lower than 1000 kPa (10 kg/cm^2, 142 psi)

When back pressure is higher than specified values, check control valve and piping for clogging.

1. P/S fluid reservoir	4. P/S gear box
2. Gauge valve (open)	5. High pressure side
3. P/S pump	6. Low pressure side



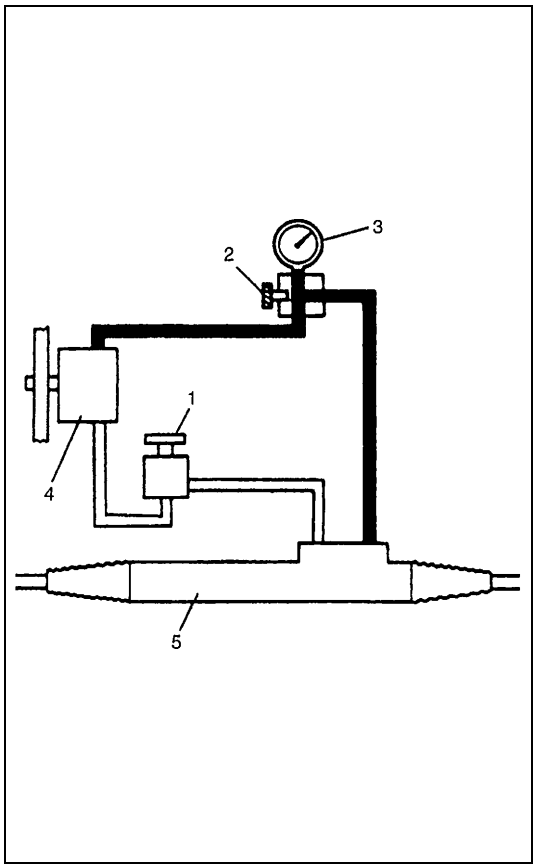
5) Check relief pressure
   - Increase engine speed to about 1,500 r/min (rpm). Close gauge valve gradually while watching pressure increase indicated by gauge and take reading of relief pressure (maximum hydraulic pressure).

Relief pressure
6200 – 7000 kPa
(62 – 70 kg/cm^2, 882 – 995 psi) ..... G16 Type engine
6700 – 7500 kPa
(67 – 75 kg/cm^2, 953 – 1067 psi) ..... J20 Type engine
7050 – 7850 kPa
(70.5 – 78.5 kg/cm^2, 1003 – 1116 psi) ..... H25 Type engine

- When it is higher than specified values, possible cause is malfunction of relief valve.
- When it is lower than specified values, possible cause is either failure of P/S pump or settling of relief valve spring.

CAUTION:
Be sure not to close gauge valve for longer than 10 seconds.

1. P/S fluid reservoir	4. P/S pump
2. Gauge valve (shut)	5. P/S gear box
3. Oil pressure gauge	



- Next, open gauge valve fully and increase engine speed to about 1,500 r/min (rpm). Then turn steering wheel to the left or right fully and take reading of relief pressure.

Relief pressure
6200 – 7000 kPa
(62 – 70 kg/cm^2, 882 – 995 psi) ..... G16 Type engine
6700 – 7500 kPa
(67 – 75 kg/cm^2, 953 – 1067 psi) ..... J20 Type engine
7050 – 7850 kPa
(70.5 – 78.5 kg/cm^2, 1003 – 1116 psi) ..... H25 Type engine

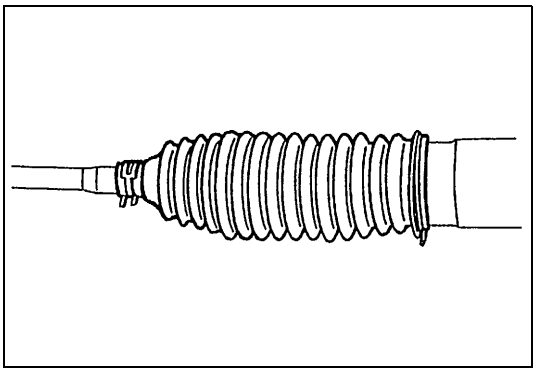
- When it is higher than specified values, possible cause is malfunction of relief valve.
- When it is lower than specified values, possible cause is failure in steering gear box. Replace gear box.

CAUTION:
Be sure not to hold steering wheel at fully turned position for longer than 10 seconds.

1. P/S fluid reservoir	4. P/S pump
2. Gauge valve (open)	5. P/S gear box
3. Oil pressure gauge	

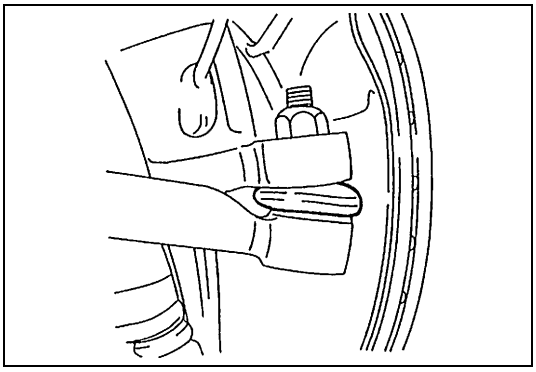
Boot

Steering rack boot check



Check boot for crack and damage which, if any, means possibility of rusty gear, entry of dust or lack of grease. Also, check if any of such faulty conditions exists.
Check steering rack boot for dent or breakage.
If there is a dent, keep boot in most compressed state for some seconds to correct dent.

Tie-rod end boot check



Check boot for crack and damage and if any, replace it with a new one.

Air Bleeding Procedure

1) Hoist the front end of vehicle and apply safety stands.
2) Fill P/S fluid reservoir with fluid up to specified level.

NOTE:

Before starting engine, place transmission gear shift lever in "Neutral" (shift selector lever to "P" range for A/T model), and set parking brake.

3) After running engine at idling speed for 3 to 5 seconds, stop it and add fluid to satisfy specification.
4) With engine stopped, turn steering wheel to the right and left as far as it stops, repeat it a few times and fill fluid to specified level.
5) With engine running at idling speed, repeat stop-to-stop turn of steering wheel till all foams in P/S fluid reservoir are gone.

NOTE:

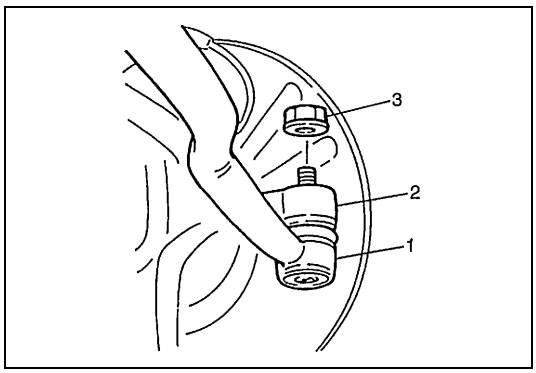
Make sure to bleed air completely. If air remains in fluid, P/S pump may make humming noise or steering wheel may feel heavy.

6) Finally check to make sure that fluid is filled to specified level.

On-Vehicle Service

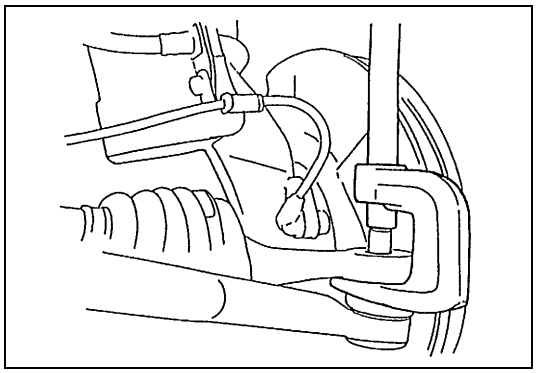
Tie-Rod End

REMOVAL

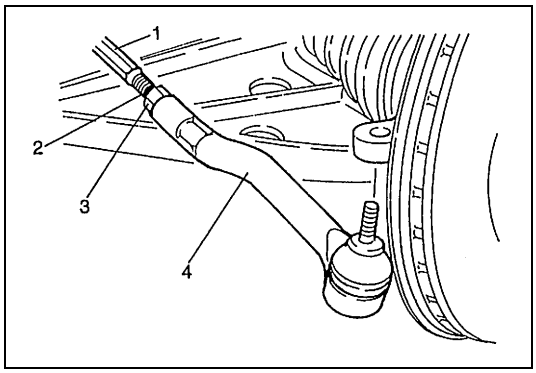


1) Hoist vehicle and remove wheel.
2) Remove tie-rod end nut (3).

1.	Tie-rod end
2.	Knuckle



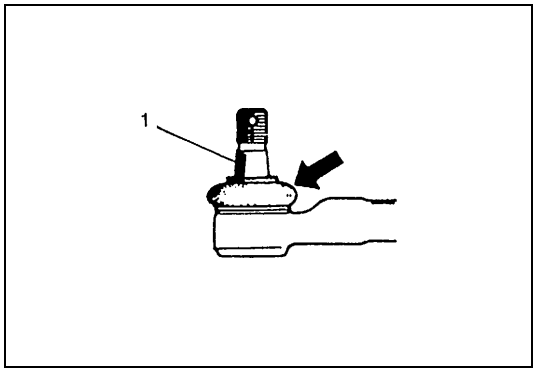
3) Disconnect tie-rod end by using puller.



4) To facilitate adjustment after installation, put a mark (2) on tie-rod thread indicating position of tie-rod end lock nut (3). Then loosen lock nut and remove tie rod end (4) from tie rod (1).

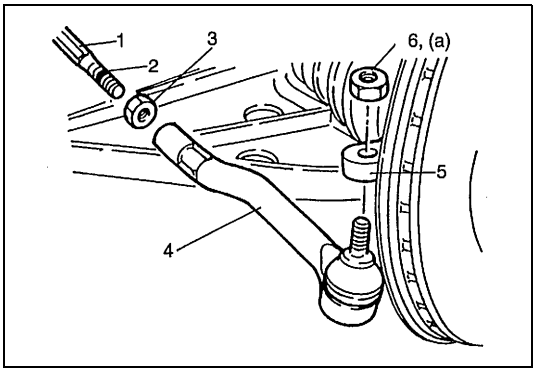
INSPECTION

Tie-Rod End Ball Joint



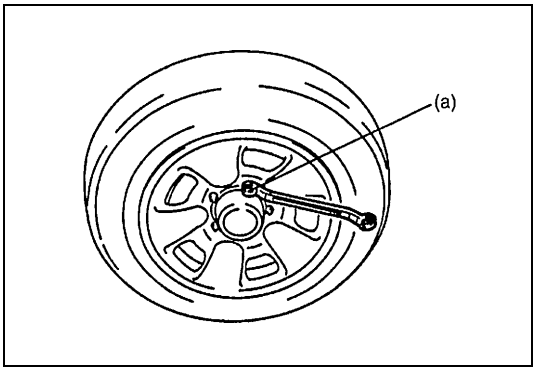
Inspect for play in tie-rod end ball joint (1). If found defective, replace.

INSTALLATION



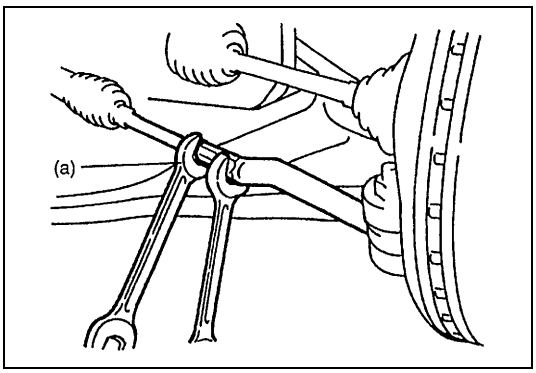
1) Install tie-rod end lock nut (3) and tie rod end (4) to tie-rod (1). Tighten lock nut (2) to mark on tie-rod thread.
2) Install tie-rod end to knuckle (5). Tighten tie-rod end nut (6) to specified torque.

Tightening torque
Tie-rod end nut
(a) : 48 N·m (4.8 kg-m, 35.0 lb-ft)



3) After installing wheels, lower vehicle and tighten wheel nuts to specified torque.

Tightening torque
Wheel nuts
(a) : 100 N·m (10.0 kg-m, 72.5 lb-ft)

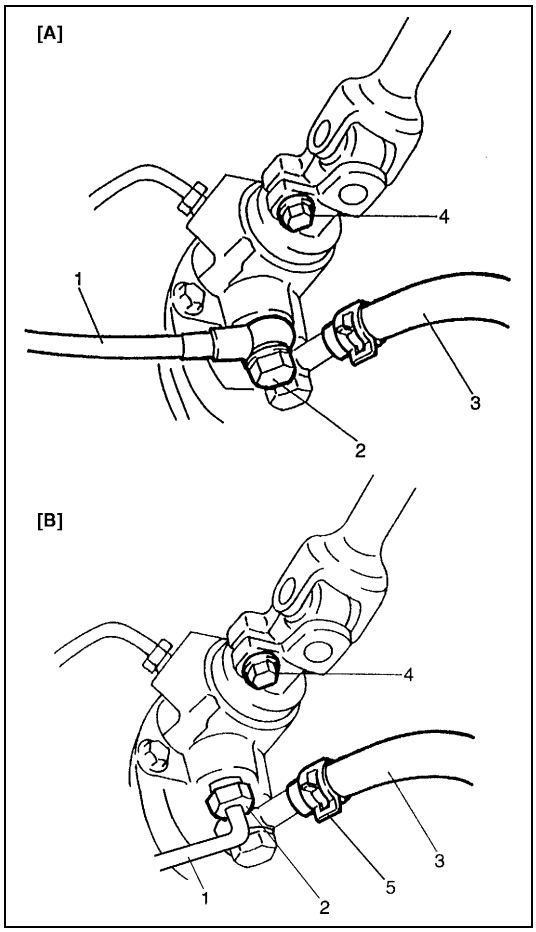


4) Check that proper amount of toe-in is obtained by referring to “Front Wheel Alignment”.
5) After confirming proper amount of toe-in, tighten tie-rod end lock nut to specified torque.

Tightening torque
Tie-rod end lock nut
(a) : 65 N·m (6.5 kg-m, 47.0 lb-ft)

Power Steering Gear Box Assembly

REMOVAL



1) Take out fluid in P/S fluid reservoir with syringe or such.
2) Disconnect high pressure pipe (1) from steering gear box by removing union bolt (2).

NOTE:

As fluid flows out of disconnected joints, put a receptacle under joints or a plug to pipe.

3) Disconnect low pressure hose (3) from steering gear box.

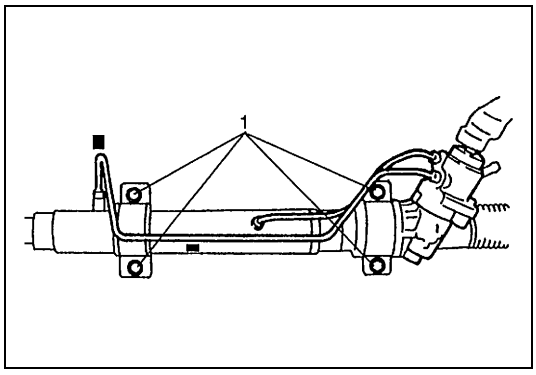
NOTE:

As fluid flows out of disconnected joints, put a receptacle under joints or a plug to hose.

4) Remove steering lower shaft bolt (4).

[A] : Other than canvas top model
[B] : Canvas top model

5) Hoist vehicle and remove both right and left wheels.
6) Disconnect both right and left tie rod ends from knuckle, refer to Steps 2) to 3) of “Tie-Rod End Removal” in this section.



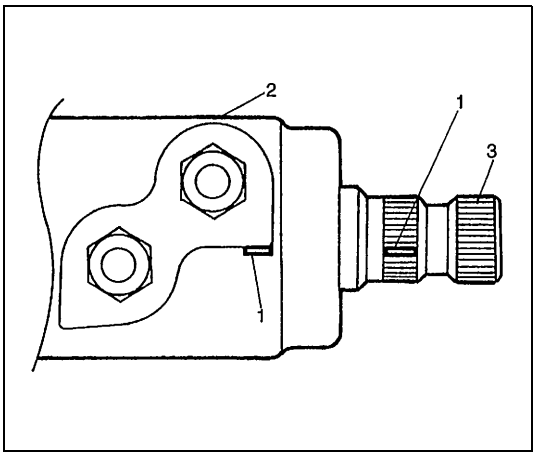
7) Remove steering gear box mounting bolts (1) and then remove steering gear box from vehicle.
   Steering gear box found to be in defective condition should be replaced with a new one.

CAUTION:

Never disassemble P/S gear box. If perform this prohibited service, it will affect original performance.

INSTALLATION

Reverse removal procedure for installation of steering gear box noting the following points.

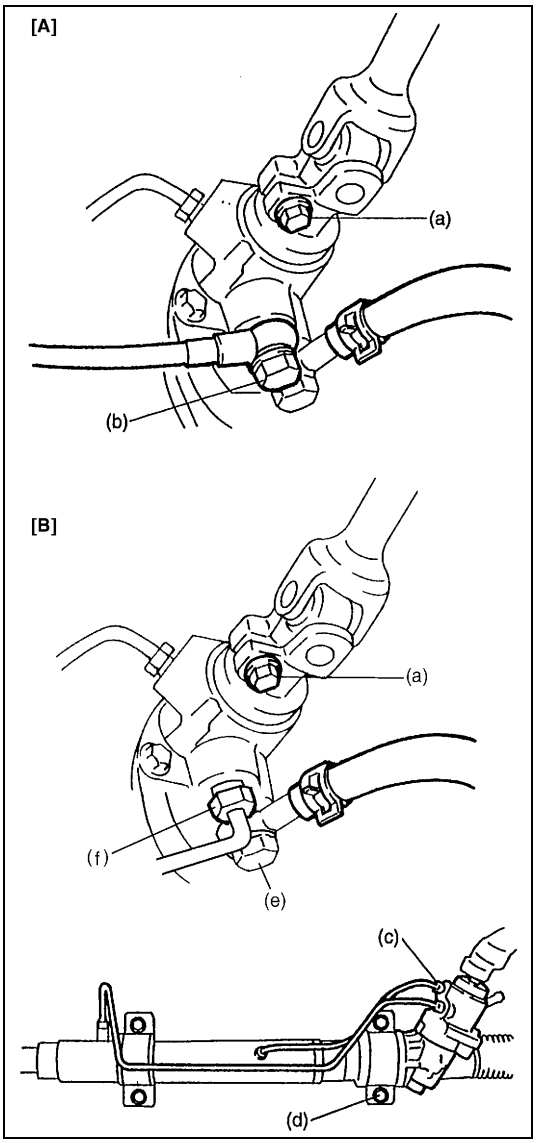


- After confirming that front tire is in straight position, install steering gear box to body temporarily. Next, with tie-rod end installed to knuckle, set rack in position close to neutral. Then obtain the neutral state by aligning match marks (1) on pinion shaft and steering gear case (2) and insert steering lower joint into pinion shaft (3).

CAUTION:

Be sure to confirm that steering wheel and front tires (wheels) are in straight position when inserting steering lower joint into steering pinion shaft.

- If a plug was put to disconnected pipe when removing steering gear box, remove that plug before reconnecting pipe.



- Use specified torque as given below.

Tightening torque
Steering lower shaft bolt
(a) : 25 N·m (2.5 kg-m, 18.0 lb-ft)
Gear box high pressure pipe union bolt
(b) : 35 N·m (3.5 kg-m, 25.5 lb-ft)
Gear box clinder pipe flare nut
(c) : 25 N·m (2.5 kg-m, 18.0 lb-ft)
Gear box mounting bolt
(d) : 55 N·m (5.5 kg-m, 40.0 lb-ft)
Gear box low pressure pipe union bolt
(e) : 40 N·m (4.0 kg-m, 29.0 lb-ft)
Gear box high pressure pipe flare nut
(f) : 25 N·m (2.5 kg-m, 18.0 lb-ft)

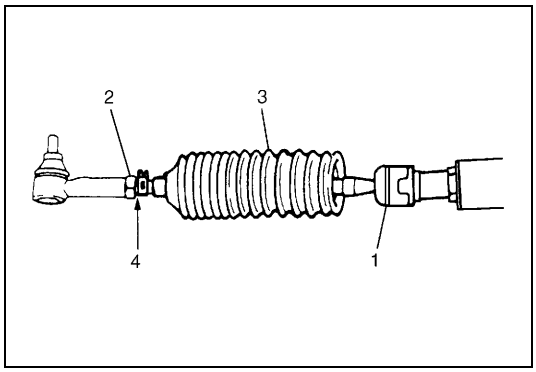
- After installation, be sure to fill specified power steering fluid and bleed air.
- Check toe setting. Adjust as required. (Refer to Section 3A)

[A] : Other than canvas top model
[B] : Canvas top model

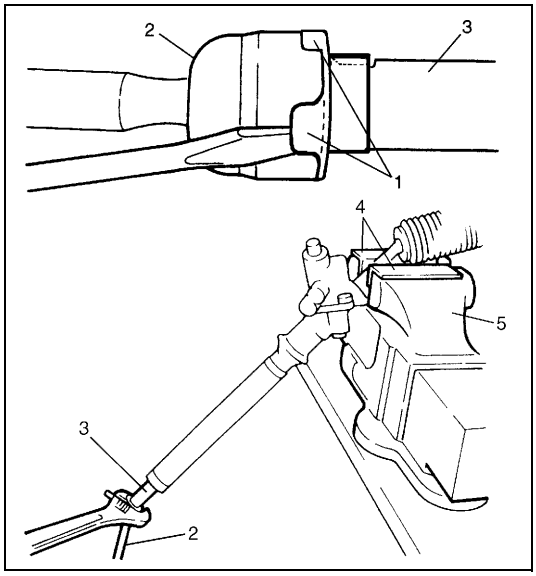
Rack Boot and Tie-Rod (Other than Canvas Top LH Model)

REMOVAL

1) Remove steering gear box from vehicle referring to “Power Steering Gear Box” in this section.



2) For ease of adjustment after installation, make marking (4) of tie rod end lock nut position of tie rod thread.
3) Loosen tie rod end lock nut (2) and remove tie rod end.
4) Remove boot wire and clip.
5) Remove boot (3) from tie rod (1).

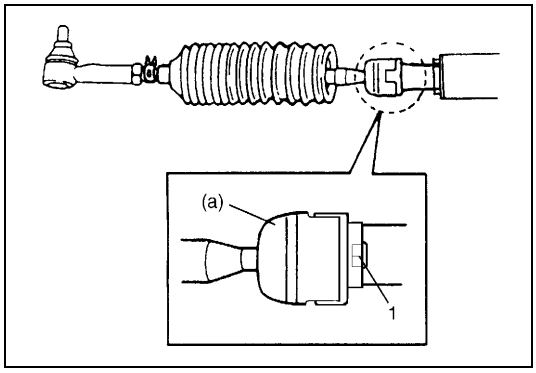


6) Unbend bent parts (4 places) (1) of tie rod lock washer and remove tie rod (2) from rack (3).

4.	Aluminum plate
5.	Vise

INSTALLATION

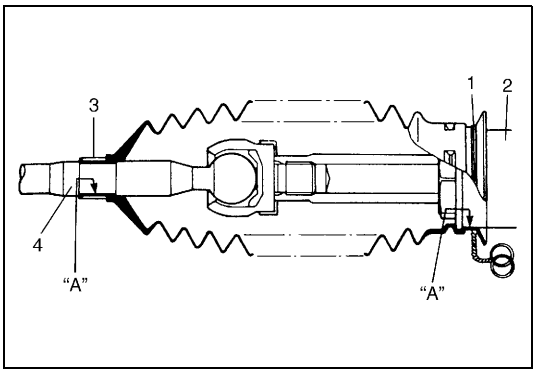
1) Install new tie rod lock washer and tie rod to rack.



2) Tighten tie rod ball nut to specified torque.

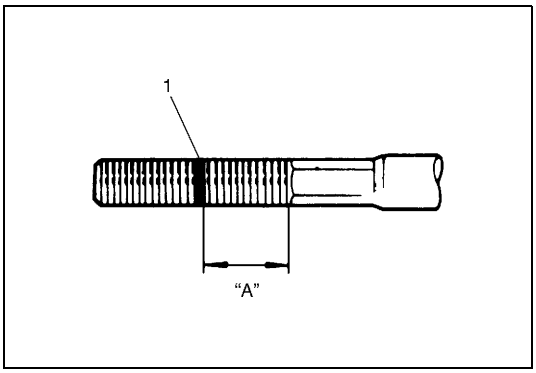
Tightening torque
Tie rod ball nut
(a) : 88 N·m (8.8 kg-m, 64.0 lb-ft)

3) Bend lock washer at 2 places (1) as shown.



4) Position boot properly in grooves of gear case (2) and tie rod (4) and clamp it with wire (1) and clip (3).
   Wire should be new and should go around twice and be tightened with its both ends twisted together. The twisted ends should be bent in the circumferential direction.
   After this, check to ensure that boot is free from twist and dent.

"A" : Apply Grease (99000-25050)



5) Install tie rod end lock nut and tie rod end to tie rod. Position lock nut to marking (1) made in removal.

NOTE:

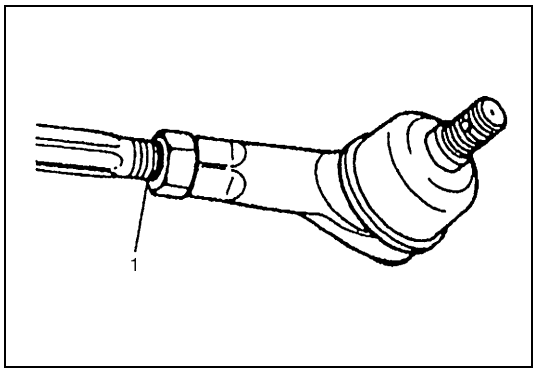
When tie rod was replaced, measure length "A" on removed tie rod and use it on new replacement tie rod so as to position lock nut properly.

6) Install steering gear box to vehicle referring to "Power Steering Gear Box" in this section.

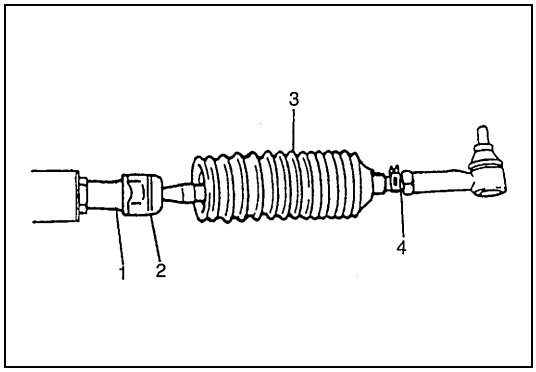
Rack Boot and Tie-Rod (Canvas Top LH Model)

REMOVAL

1) Remove steering gear case, refer to “Power Steering Gear Box Assembly Removal” in this section.

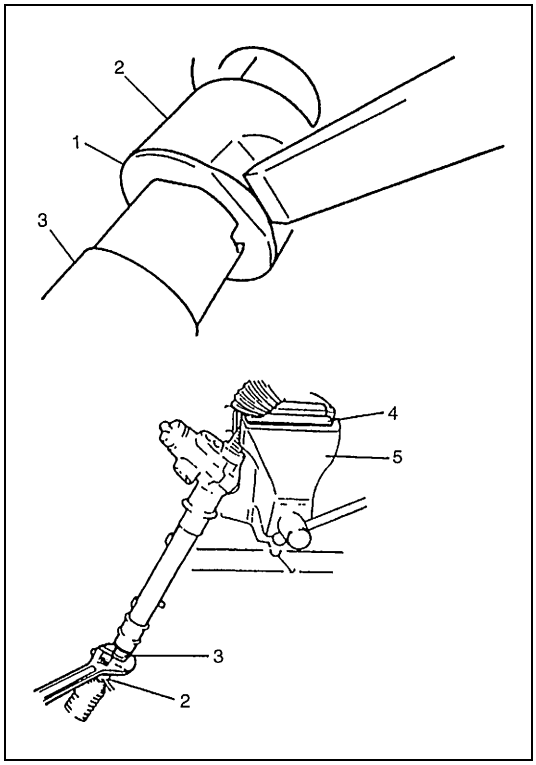


2) For ease of adjustment after installation, make marking of tie-rod end lock nut position of tie-rod thread.
3) Loosen tie-rod end lock nut and remove tie-rod end.



4) Remove boot band and clip.
5) Remove boot (3) from tie-rod (2).

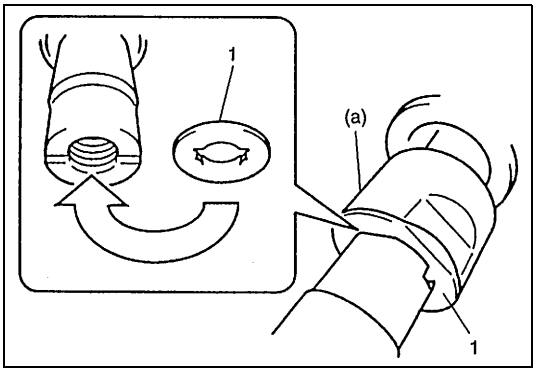
1.	Steering rack
4.	Mark



6) Unbend washer (2 places) (1), and remove tie-rod (2) from rack (3).

4.	Aluminium plate
5.	Vise

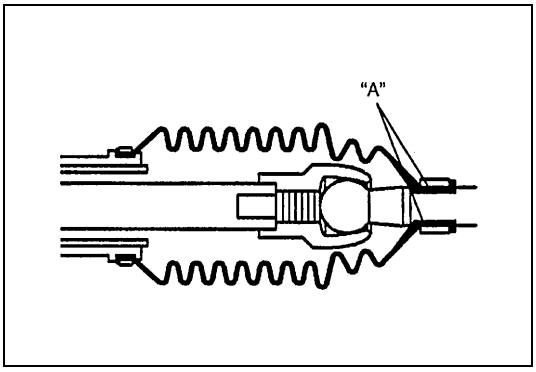
INSTALLATION



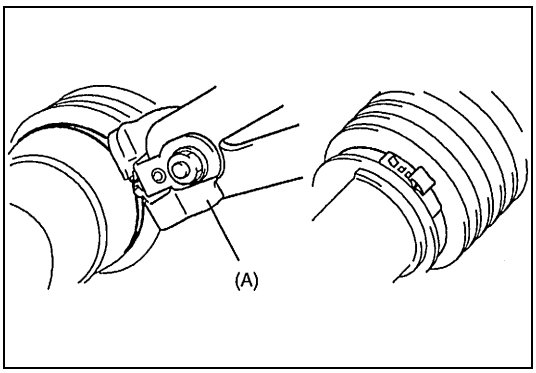
1) Install new tie-rod lock washer (1) and tie-rod to rack.
2) Tighten tie-rod ball nut to specified torque.

Tightening torque
Tie-rod ball nut
(a) : 85 N·m (8.5 kg-m, 61.5 lb-ft)

3) Bend lock washer 2 place at the flat part of tie-rod ball nut.

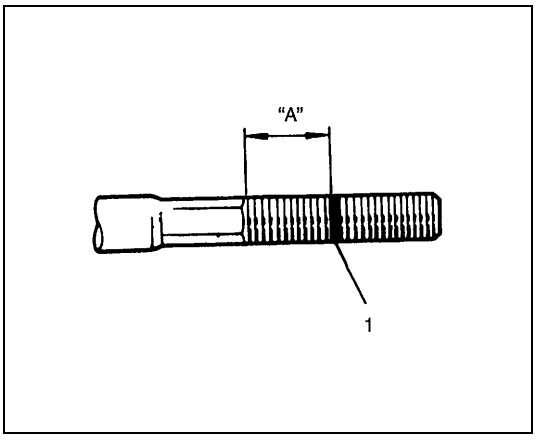


4) Apply grease to "A" indicated in figure.
5) Position boot properly in grooves of gear case and tie-rod. Check to ensure that boot is free from twist and dent.



6) Fasten boot with new clamp and clip securely.

Special tool
(A) : 09943-55010



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

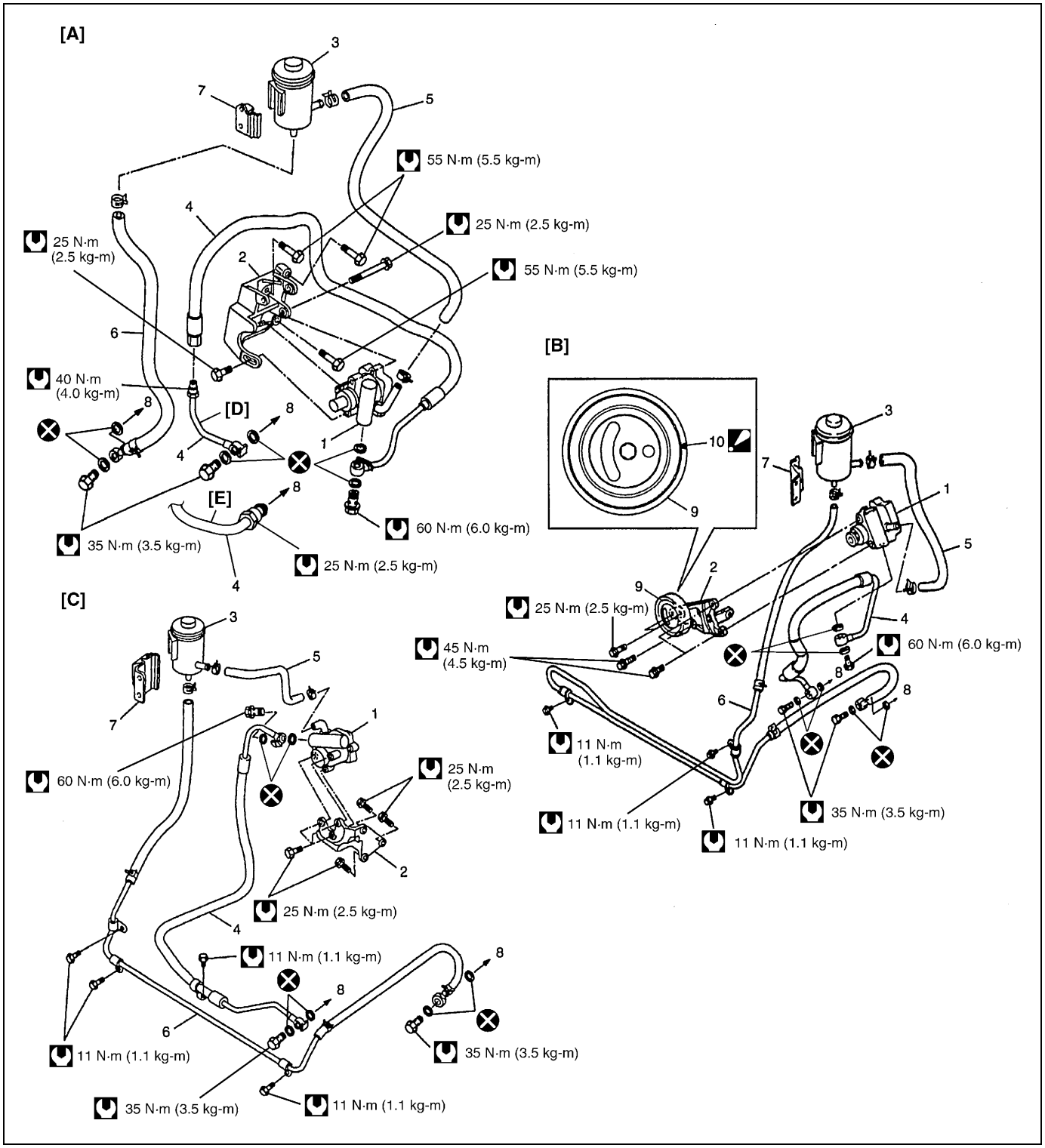
NOTE:

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

8) Install steering gear case. Refer to "Power Steering Gear Box Assembly Installation" in this section.

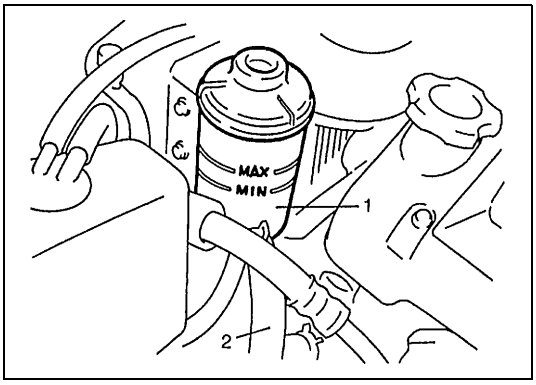
1. Mark

Power Steering Pump



[A] : G16 ENGINE MODEL	1. Power steering pump assembly	6. Low pressure return hose	When reinstalling the used pulley : Before removing the tensioner pulley, put marking on tensioner pulley to install it in the same direction. When installing new pulley : Install tensioner pulley with its punch mark (10) faced to engine.
[B] : H25 ENGINE MODEL	2. Bracket	7. P/S fluid reservoir bracket	Tightening torque
[C] : J20 ENGINE MODEL	3. P/S fluid reservoir	8. To P/S gear box	Do not reuse
[D] : Other than canvap top model	4. High pressure hose & pipe	9. Tensioner pulley	
[E] : Canvas top model	5. Suction hose	10. Punch mark	

REMOVAL



NOTE:

Be sure to clean each joint of suction and discharge sides thoroughly before removal.

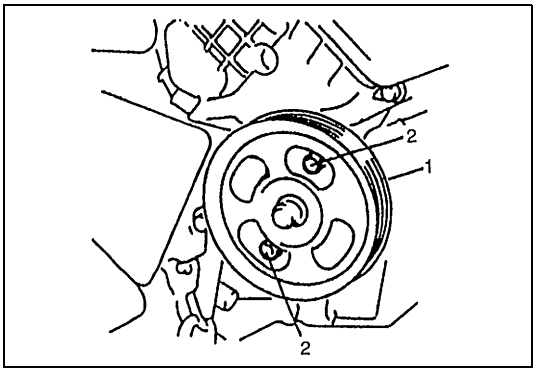
1) Remove suction hose from pump, then disconnect battery negative cable.
2) Remove P/S fluid reservoir (1) with suction hose (2).

3) Remove union bolt. Then disconnect high pressure pipe from pump.

NOTE:

As fluid flows out of disconnected joints, put a receptacle under joints or a plug to pipe.

4) Disconnect pressure switch lead wire at switch terminal.
5) Loosen related bolts and remove power steering drive belt.



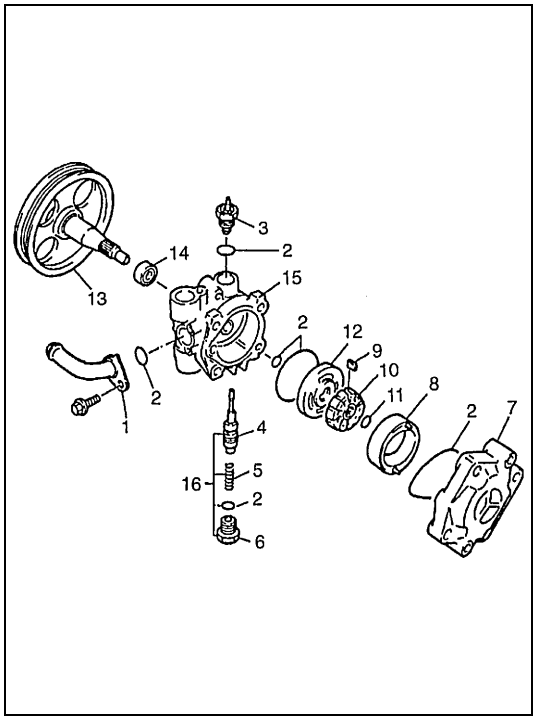
6) Remove P/S pump mounting bolt (s) (2).
7) Remove P/S pump.

NOTE:

Plug each port of removed pump to prevent dust or any other foreign matter from entering.

1. P/S pulley

DISASSEMBLY

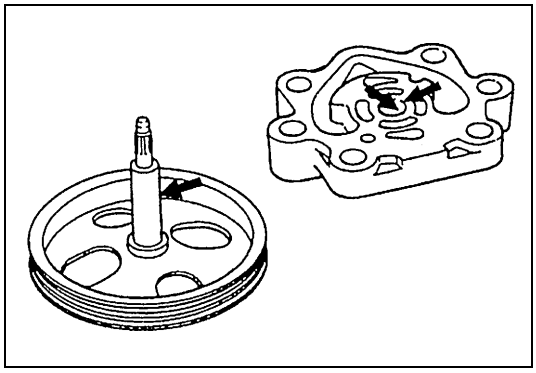


1) Clean its exterior thoroughly.
2) With aluminum plates placed on vise first, grip pump body with it.
3) Remove suction connector bolt, suction connector (1) and O-ring (2) from pump body (15).
4) Remove power steering pressure switch (terminal set) (3) from pump body.
5) Remove plug (6), flow control spring (5) and relief valve (flow control valve) (4) from pump body.
6) Remove cover bolts, pump cover (7) and O-ring from pump body.
7) Remove snap ring (11) from pump shaft.
8) Remove vanes (9) from rotor.
9) Remove cam ring (8), rotor (10), side plate (12) and O-rings from pump body.
10) Pull out pulley (13) from pump body.
11) Remove oil seal (14) from pump body.

16. Flow control valve Assembly

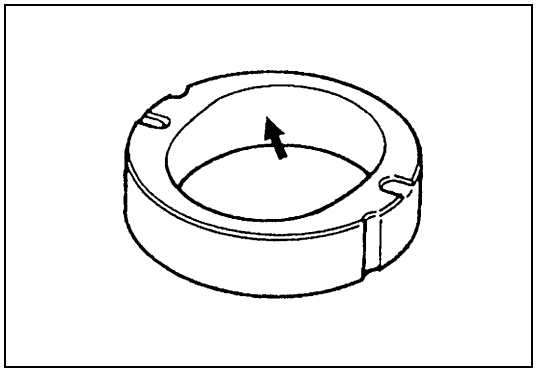
INSPECTION

Pump Body, Cover, Side Plate and Shaft



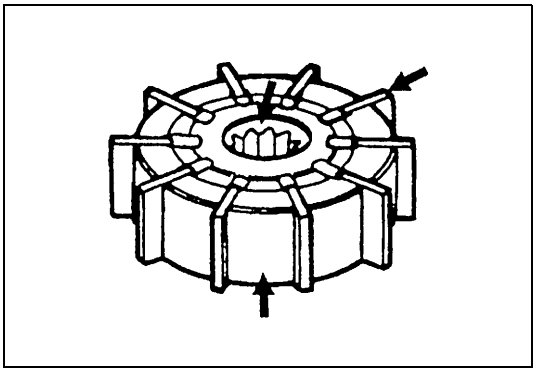
Check sliding surfaces of each part for wear and damage.
If any defect is found, replace pump assembly.

Cam Ring

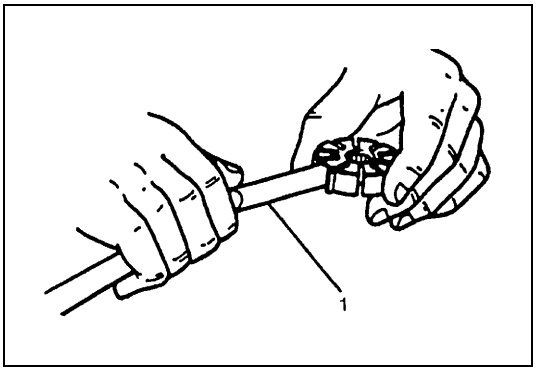


Check vane sliding surface of cam ring for wear and damage.
If any defect is found, replace pump assembly.

Rotor and Vane



- Check sliding surfaces of rotor and vane for wear and damage.



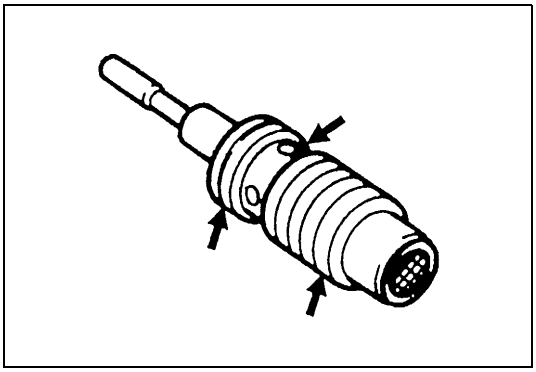
- Check clearance between rotor and vane.

Clearance between rotor and vane
Standard : 0.015 mm (0.0006 in.)
Limit : 0.027 mm (0.0011 in.)

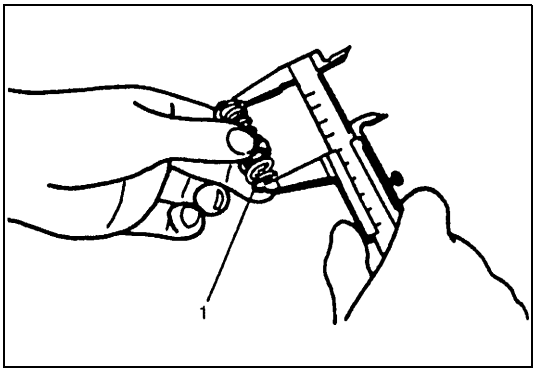
Replace pump assembly if any defect is found in above checks.

1. Thickness gauge

Relief Valve (Flow Control Valve) and Its Spring



- Check fluid passage of relief valve and orifice of connector for obstruction (clogged).
- Check sliding surface of relief valve for wear and damage.

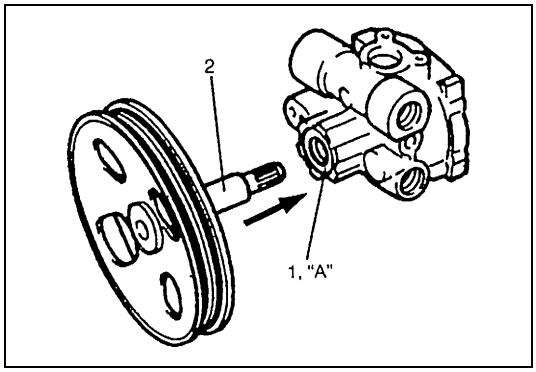


- Check free length of relief valve spring (1).

Relief valve spring free length
Standard : 22.0 mm (0.866 in.)
Limit : 19.0 mm (0.748 in.)

Replace pump assembly if any defective is found.

ASSEMBLY

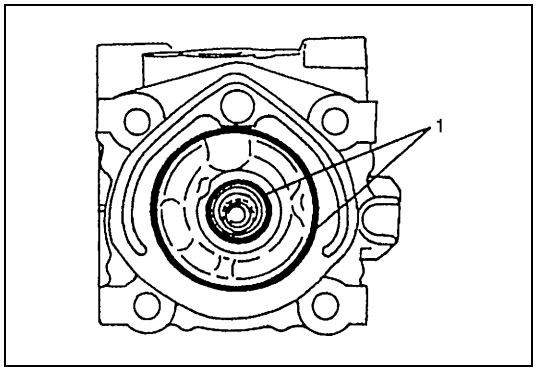


Reverse disassembly procedure for assembly, noting the following.

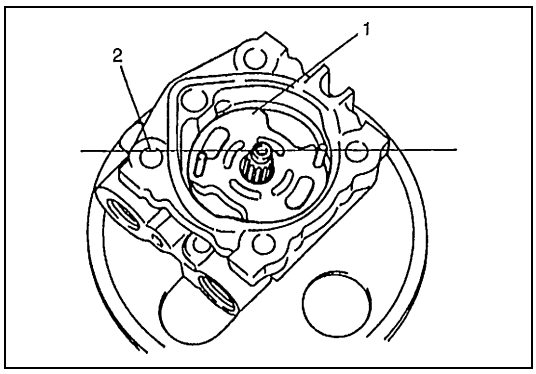
1) Apply grease to oil seal lip and apply power steering fluid to sliding surface of the shaft then insert pulley's shaft (2) from oil seal side of the pump body.

"A" : Grease 99000-25010

1. Oil seal



2) Apply power steering fluid to O-rings (1) and fit them to pump body.

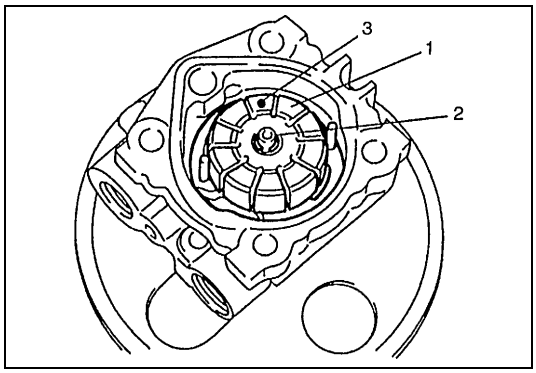


3) Install side plate (1) to pump body.

NOTE:

Carefully align the dowel pins on the side plate at bolt hole as shown in figure.

1. Side plate

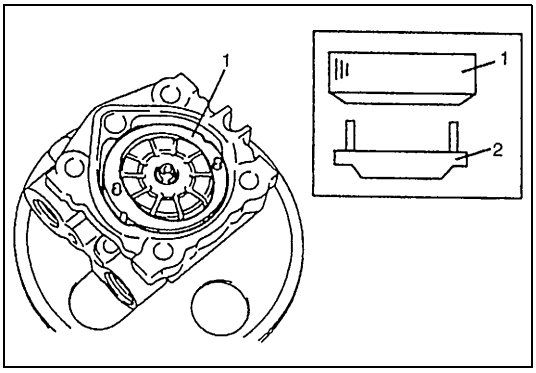


4) Apply power steering fluid to sliding surface of rotor (1).
5) Install rotor to shaft, directing dot marked side of rotor facing up.
6) Install new snap ring (2) to shaft, then make sure to fit snap into shaft groove securely.

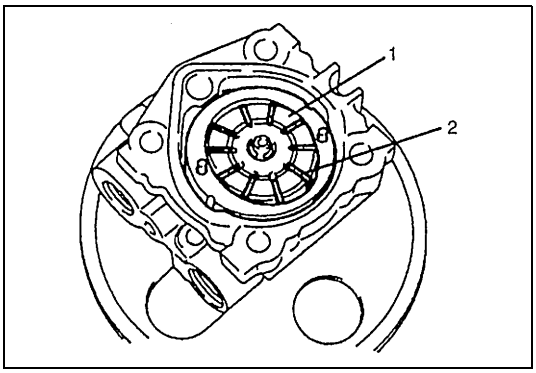
NOTE:

Never reuse the removed snap ring.

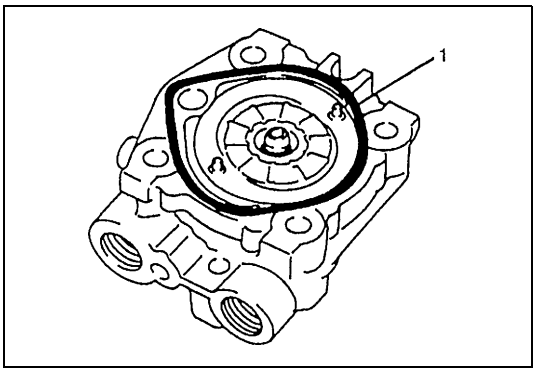
3. Dot



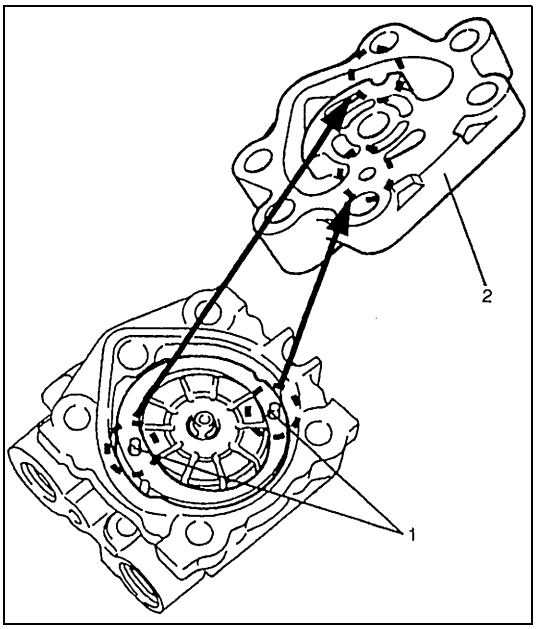
7) Apply power steering fluid to sliding surface of cam ring (1).
8) Install cam ring to pump body. The tapered end of cam ring should face the side plate (2).



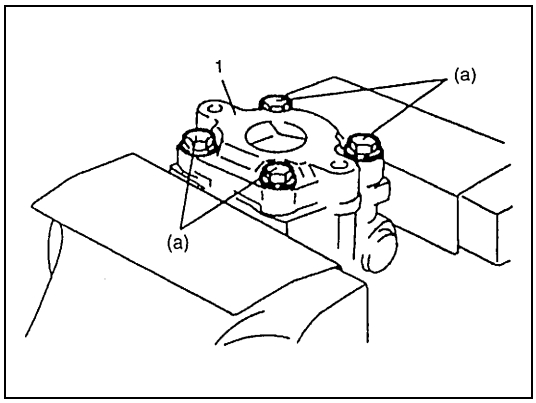
9) Apply power steering fluid to each vane (2).
10) Install vanes (10 pieces) to rotor (1).



11) Apply power steering fluid to O-ring (1).
12) Install O-ring to pump body.



13) Apply power steering fluid to sliding surface of pump cover and rotor.
14) Match the dowel pins (1) to the holes of the cover plate (2) as shown and install pump cover to pump body.



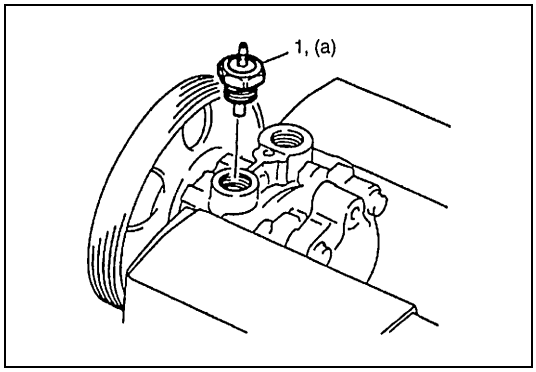
15) Gradually tighten new pump cover bolts to specified torque.

NOTE:

After installing pump cover, check to make sure that shaft can be turned by hand.

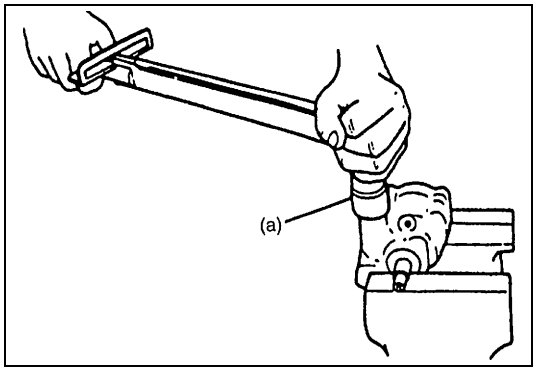
Tightening torque
Oil pump cover bolts
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

1. Pump cover



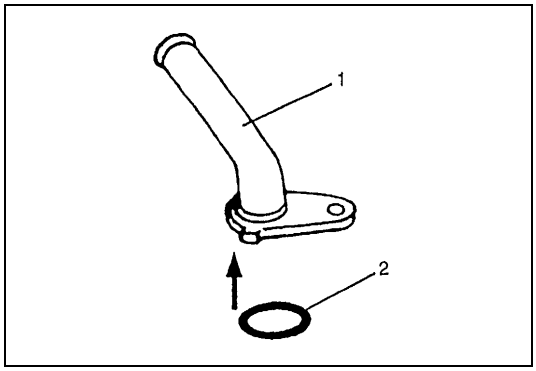
16) Apply power steering fluid to O-ring of terminal switch.
17) Install pressure switch (1) to pump body.

Tightening torque
Pressure switch
(a) : 28 N·m (2.8 kg-m, 20.0 lb-ft)

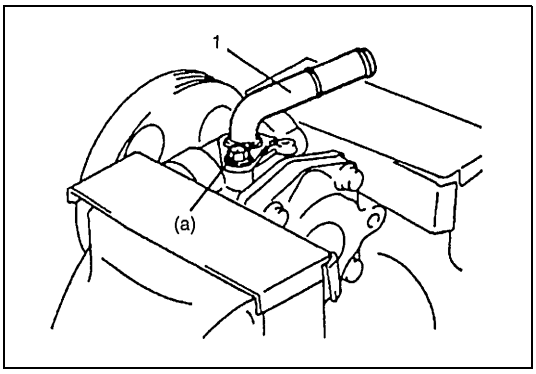


18) Apply power steering fluid to relief valve (flow control valve).
19) Install relief valve (flow control valve) to pump body.
20) Install flow control spring.
21) Apply power steering fluid to O-rings of plug.
22) Install O-rings to plug.
23) Tighten plug to specified torque.

Tightening torque
Plug
(a) : 60 N·m (6.0 kg-m, 43.5 lb-ft)



24) Apply power steering fluid to O-ring of suction connector (1).
25) Install O-ring (2) to suction connector.



26) Install suction connector (1) to pump body as shown in figure.
Tighten new suction connector bolts to specified torque.

Tightening torque
Suction connector bolt
(a) : 10 N·m (1.0 kg-m, 7.5 lb-ft)

INSTALLATION

Reverse removal procedure, and then noting the following instructions.

- For tightening torques, refer to structural diagram on previous page.
- Adjust power steering pump drive belt by referring to “Belt Tension Adjustment” under “Power Steering Pump Drive Belt” in this section.
- Fill specified power steering fluid after installation and bleed air without failure. (Refer to “Air Bleeding Procedure” in this section.)

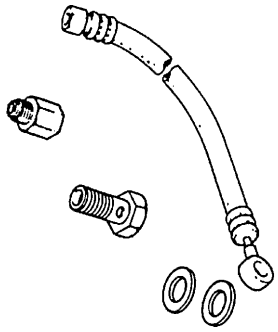
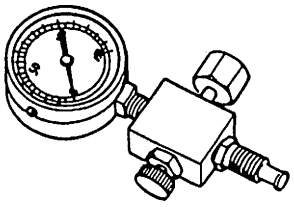
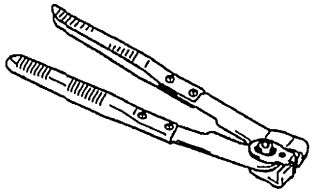
Tightening Torque Specifications

Fastening part		Tightening torque		
		N•m	kg-m	lb-ft
Gear box mounting bolts		55	5.5	40.0
Gear box cylinder pipe flare nuts		25	2.5	18.5
Gear box low pressure pipe union bolt		40	4.0	29.0
Gear box high pressure pipe union bolt (Other than canvas top model)		35	3.5	25.5
Gear box high pressure pipe flare ruts (Canvas top model)		25	2.5	18.5
Tie-rod end lock nut		65	6.5	47.0
Pump bracket bolt	G16 Type engine	55	5.5	40.0
	J20 Type engine	25	2.5	18.5
	H25 Type engine	45	4.5	32.5
Pump union bolt		60	6.0	43.5
Oil pump mount bolts		25	2.5	18.5
Pipe clamp bolt/Reservoir bracket bolt		11	1.1	8.0
Steering shaft joint bolt		25	2.5	18.0
High pressure flare nuts		40	4.0	29.0
Pump cover bolts		23	2.3	17.0
Plug		60	6.0	43.5
Pressure switch (Terminal)		28	2.8	20
Suction connector bolt		10	1.0	7.5
Tie-rod end nut		48	4.8	35.0
Tie-rod (Canvas top LH model)		85	8.5	61.5
Tie-rod (Other than canvas top LH model)		88	8.8	64.0
Wheel nut		100	10.0	72.5

Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Lithium grease	SUPER GREASE (A) (99000-25010)	• Oil seal lip of P/S pump pulley shaft
Power steering fluid	An equivalent of DEXRON®-III or DEXRON®-II	• To fill P/S fluid reservoir • Parts lubrication when installing

Special Tool

		
09915-77420 Oil pressure gauge attachment and hose set	09915-77411 Oil pressure gauge	09943-55010 Boot clamp plier

SECTION 3C

STEERING WHEEL AND COLUMN (NOT EQUIPPED WITH AIR BAG)

NOTE:

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

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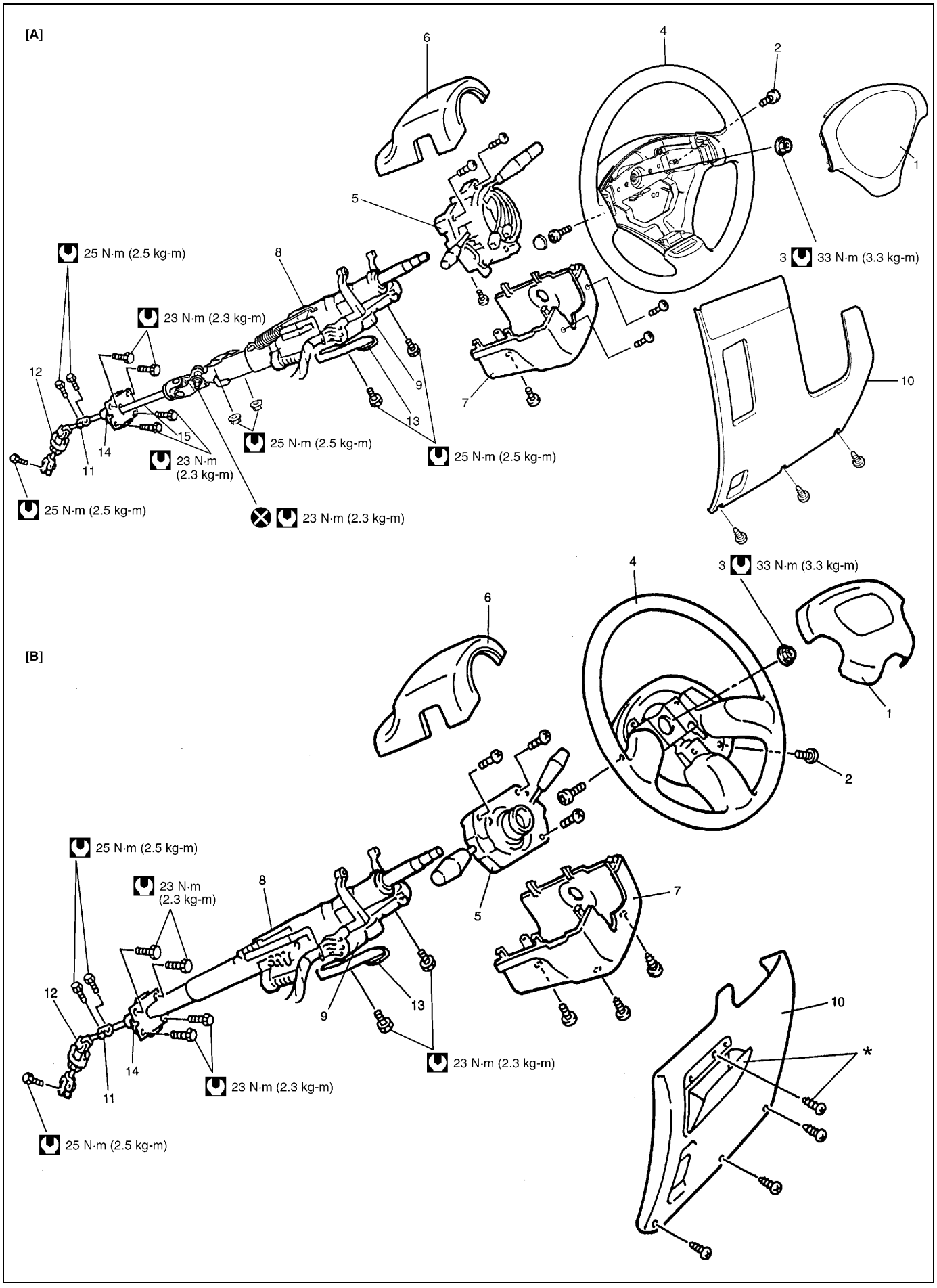
General Description

This double tube type steering column has the following three important features in addition to the steering function :

- The column is energy absorbing, designed to compress in a front-end collision.
- The ignition switch and lock are mounted conveniently on this column.
- With the column mounted lock, the ignition and steering operations can be locked to inhibit theft of the vehicle.

To insure the energy absorbing action, it is important that only the specified bolts be used as designated and that they are tightened to the specified torque. When the column assembly is removed from the vehicle, special care must be taken in handling it. Use of a steering wheel puller other than the one recommended in this manual or a sharp blow on the end of the steering shaft, leaning on the assembly, or dropping the assembly could shear the plastic shear pins which maintain column length and position.


[A]
6
4
2
1
5
3 33 N·m (3.3 kg-m)
25 N·m (2.5 kg-m)
8
23 N·m (2.3 kg-m)
12
9
10
7
13
15
14
25 N·m (2.5 kg-m)
23 N·m (2.3 kg-m)
11
25 N·m (2.5 kg-m)
23 N·m (2.3 kg-m)
[B]
4
3 33 N·m (3.3 kg-m)
6
1
2
25 N·m (2.5 kg-m)
23 N·m (2.3 kg-m)
8
7
5
12
13
10
9
*
14
23 N·m (2.3 kg-m)
11
23 N·m (2.3 kg-m)
25 N·m (2.5 kg-m)

[A] : Other than canvas top model	4. Steering wheel	9. Steering lock assembly	14. Steering column lower seal
[B] : Canvas top model	5. Combination switch	10. Steering column hole cover	15. Steering upper shaft assembly
1. Steering wheel pad	6. Steering column upper cover	11. Steering shaft joint	* : If equipped
2. Steering wheel pad screw	7. Steering column lower cover	12. Steering lower shaft assembly	⊗ Do not reuse
3. Steering wheel nut	8. Steering column assembly	13. Adjustable steering column release lever	Tightening torque

Diagnosis

For diagnosis of the steering wheel, steering column and steering shaft lower assembly, refer to Section 3.

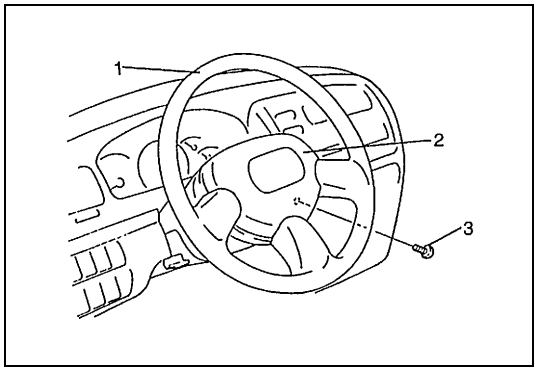
Inspection and Repair Required After Accident

After an accident, be sure to perform checks, inspections and repairs described under “Checking Steering Column for Accident Damage” in this section.

On-Vehicle Service

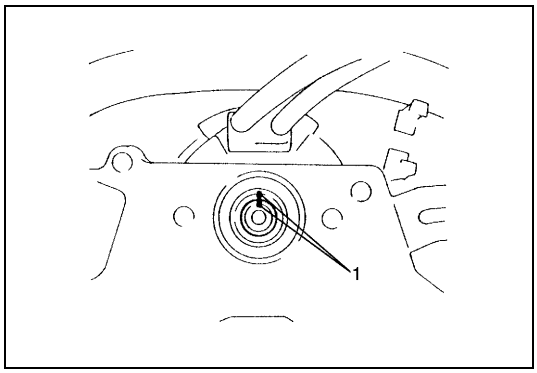
Steering Wheel

REMOVAL

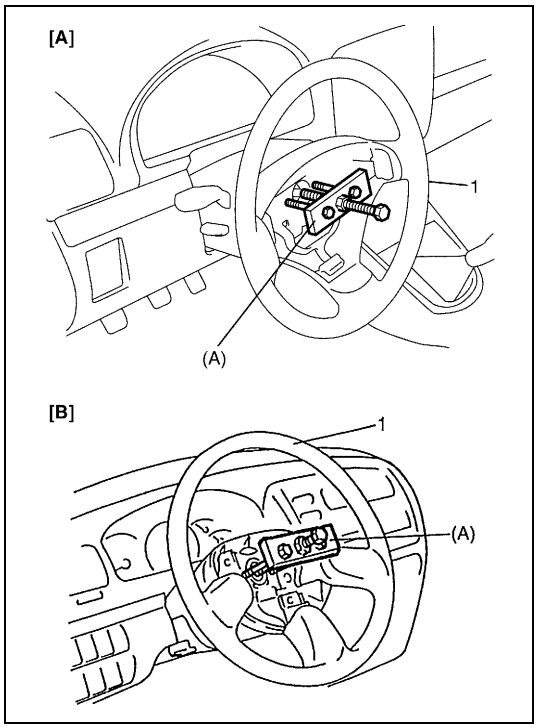


1) Disconnect negative battery cable at battery terminal.
2) Remove steering wheel pad screw (3).
3) Remove steering wheel pad (2) and disconnect horn harness.

1. Steering wheel



4) Remove steering shaft nut (1).
5) Make alignment marks on steering wheel and shaft for a guide during reinstallation.



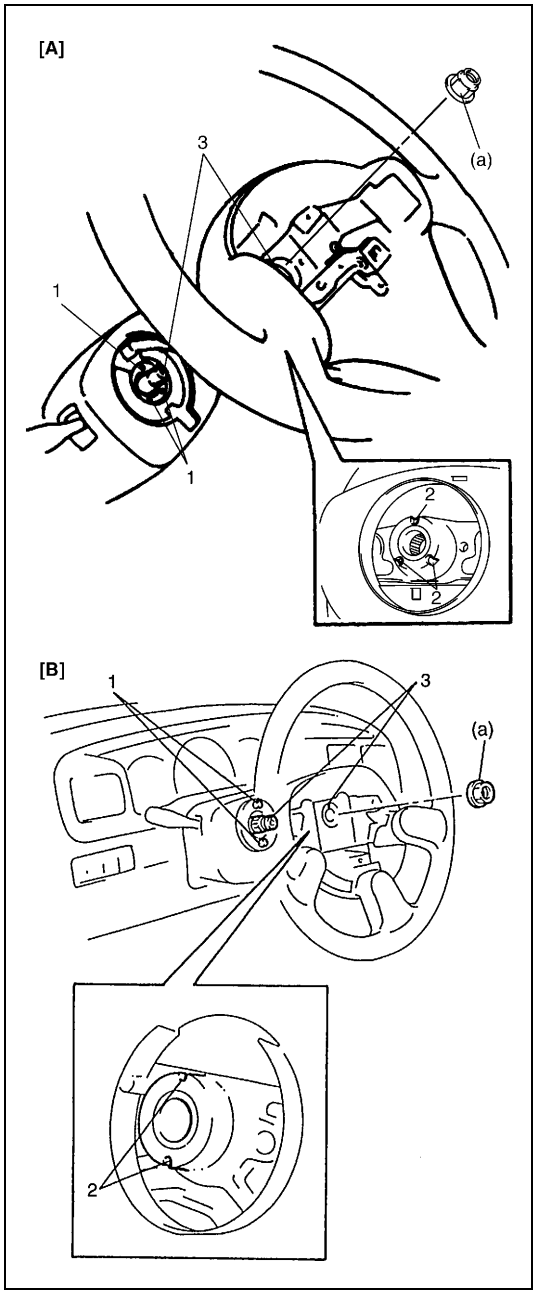
6) Remove steering wheel (1) with special tool.

Special tool
(A) : 09944-36011

CAUTION:
Do not hammer the end of the shaft. Hammering it will loosen the plastic shear pins which maintain the column length and impair the collapsible design of the column.

[A] : Other than canvas top model
[B] : Canvas top model

INSTALLATION



1) Install steering wheel to steering shaft with 3 lugs (Other than canvas top model) or 2 lugs (Canvas top model) (1) on combination switch fitted in 3 grooves (Other than canvas top model) or 2 grooves (Canvas top model) (2) in the back of steering wheel and also aligning marks (3) on steering wheel and steering shaft.
2) Tighten steering shaft nut to specified torque.

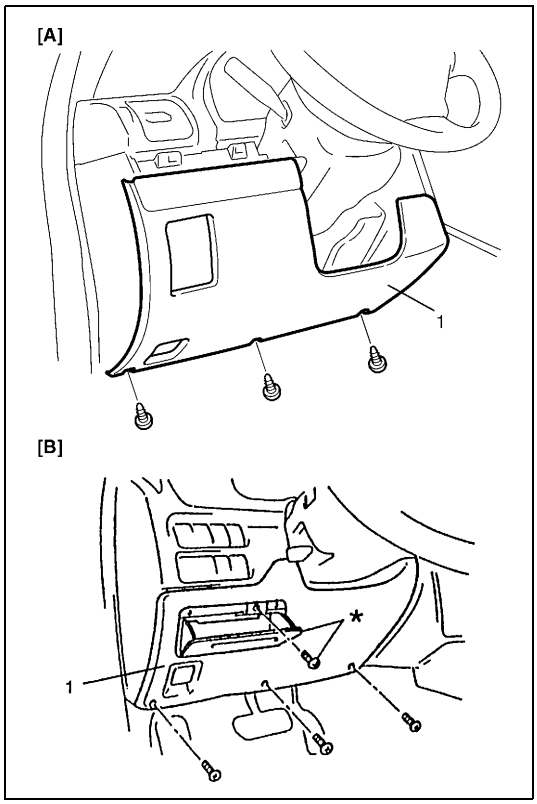
Tightening torque
Steering shaft nut
(a) : 33 N·m (3.3 kg-m, 23.5 lb-ft)

3) Connect horn harness and install steering wheel pad.
4) Tighten steering wheel pad screw.
5) Connect negative battery cable.

[A] : Other than canvas top model
[B] : Canvas top model

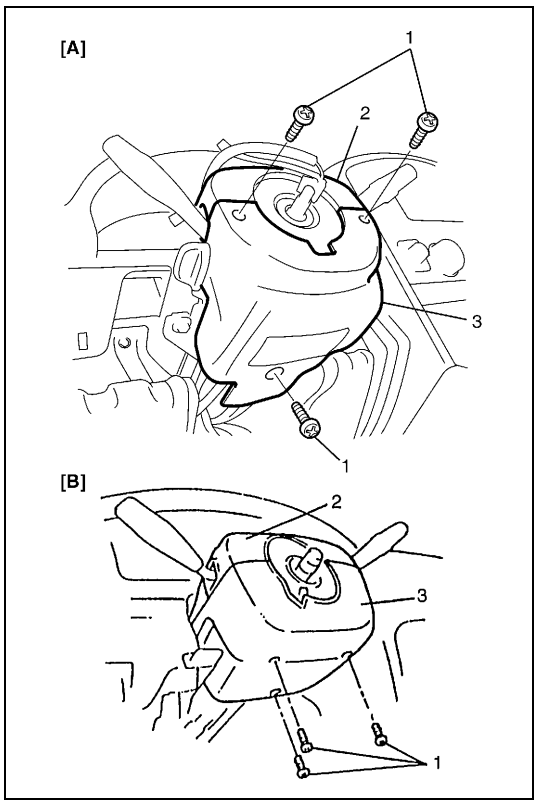
Combination Switch

REMOVAL



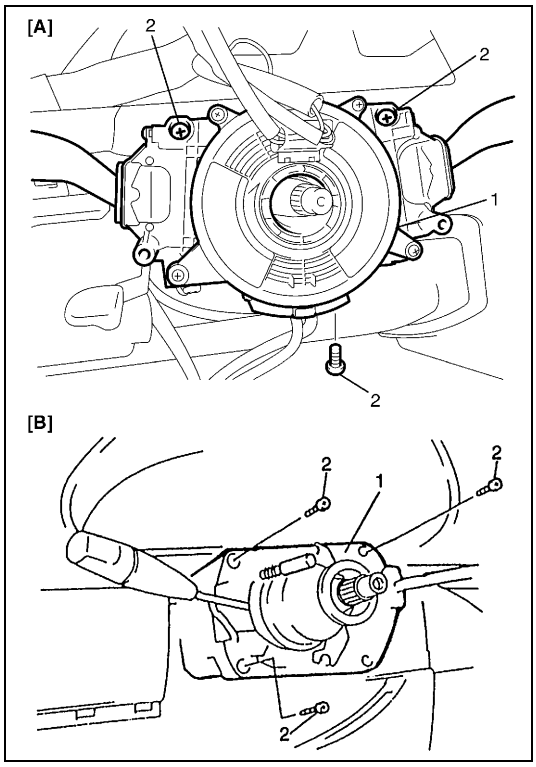
1) Disconnect negative battery cable at battery terminal.
2) Remove steering wheel from steering column. Refer to “Steering Wheel” in this section.
3) Remove steering column hole cover (1).

[A] : Other than canvas top model
[B] : Canvas top model
* : If equipped



4) Remove steering column cover screws (3 pieces) (1).
5) Separate upper cover (3) and lower cover (2), then remove them.
6) Disconnect all connectors for combination switch.

[A] : Other than canvas top model
[B] : Canvas top model



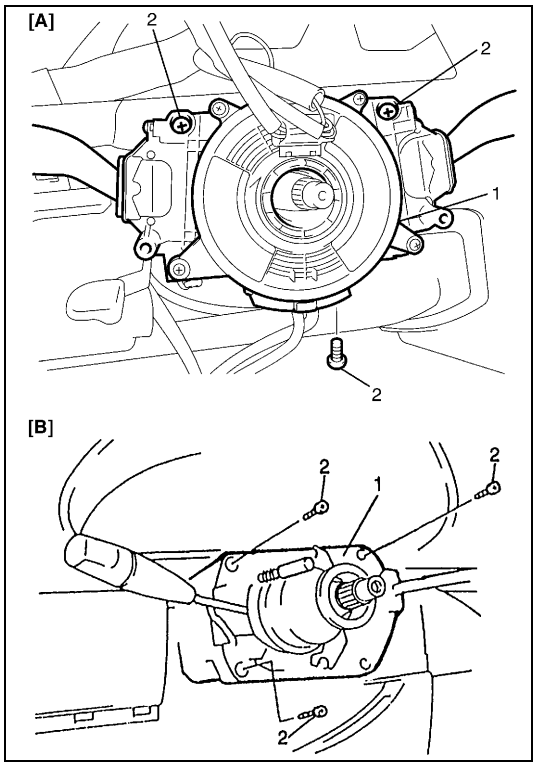
7) Remove combination switch (1) from steering column.

[A] :	Other than canvas top model
[B] :	Canvas top model
2.	Screw

INSPECTION

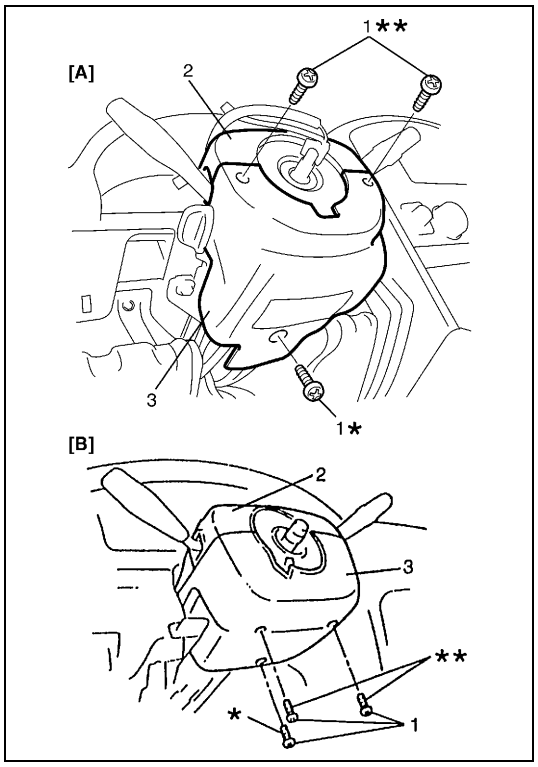
Check combination switch wire harness for any signs of scorching, melting or other damage. If it is damaged, replace.

INSTALLATION



1) Install combination switch (1) to steering column.
2) Connect all connectors that have been removed in removal.

[A] :	Other than canvas top model
[B] :	Canvas top model
2.	Screw

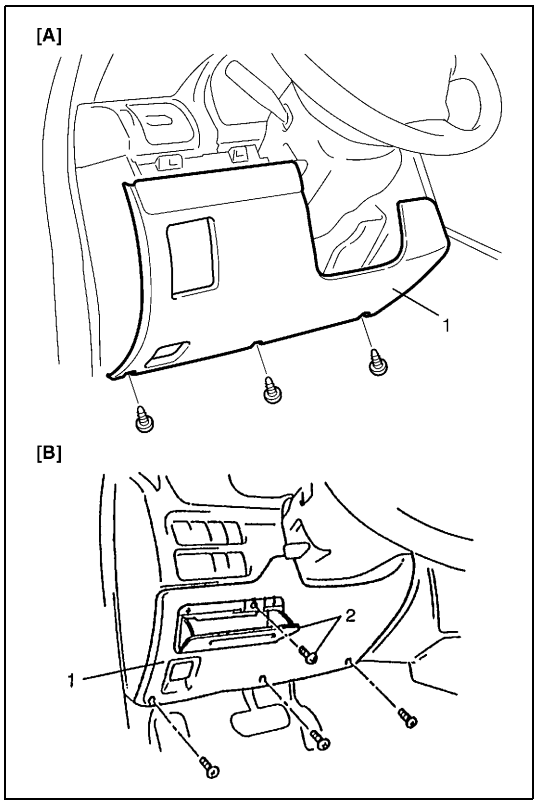


3) Install steering column upper (2) and lower cover (3).
4) Tighten steering column cover screws (1).

CAUTION:

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

[A] :	Other than canvas top model
[B] :	Canvas top model
** :	Tapping screw
* :	Standard screw



5) Install steering column hole cover (1).
6) Install steering wheel to steering column. Refer to “Steering Wheel” in this section.
7) Connect battery negative cable.

[A] :	Other than canvas top model
[B] :	Canvas top model
2.	If equipped

Steering Column (Other than Canvas Top Model)

CAUTION:

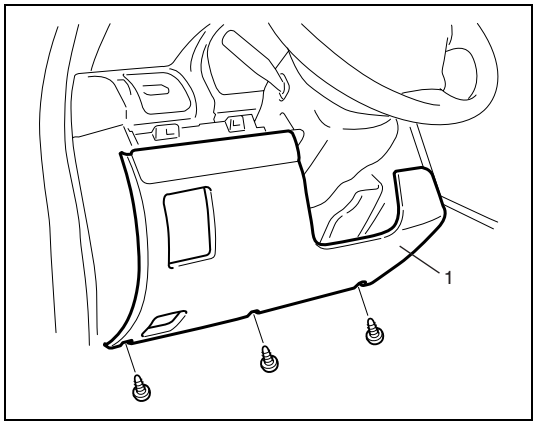
Once the steering column is removed from the vehicle, the column is extremely susceptible to damage.
Dropping the column assembly on its end could collapse the steering shaft or loosen the plastic shear pins which maintain column length leaning on the column assembly could cause it to bend or deform. Any of the above damage could impair the column's collapsible design.
When loosening steering column mounting bolts and nuts, make sure that steering column assembly and steering upper shaft assembly have been separated. Loosening them with steering column assembly and steering upper shaft assembly assembled could cause damage to upper joint and mounting bracket in steering upper shaft assembly.

NOTE:

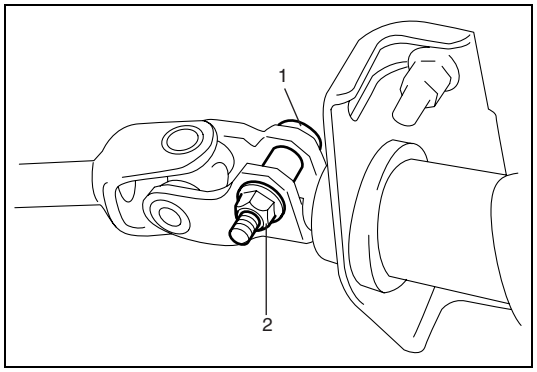
When servicing steering column or any column-mounted component, remove steering wheel. But when removing steering column simply to gain access to instrument panel components, leave steering wheel installed on steering column.

REMOVAL

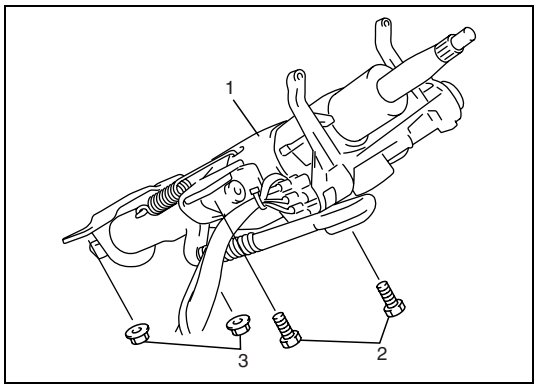
1) Disconnect negative (–) cable at battery.
2) Remove steering wheel and combination switch assembly, if necessary. Refer to "Steering Wheel" and "Combination Switch Assembly" in this section.
   Perform the following procedure if not removing steering wheel and/or combination switch.
   a) Turn steering wheel so that vehicle's front tires are at straight-ahead position.
   b) Turn ignition switch to "LOCK" position and remove key.



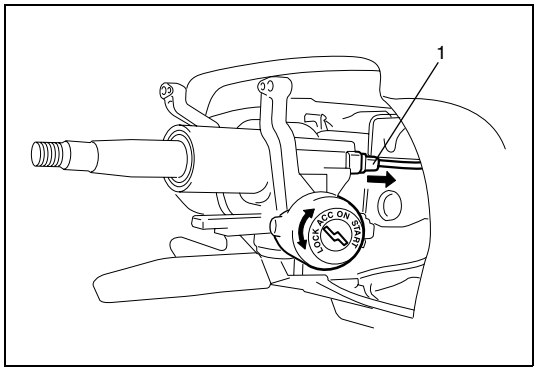
3) Remove steering column hole cover (1).
4) Disconnect all connectors for the following parts.
   - Contact coil and combination switch
   - Ignition switch
   - Immobilizer control system parts (if equipped)



5) Remove steering upper shaft upper joint bolt (1) and nut (2).



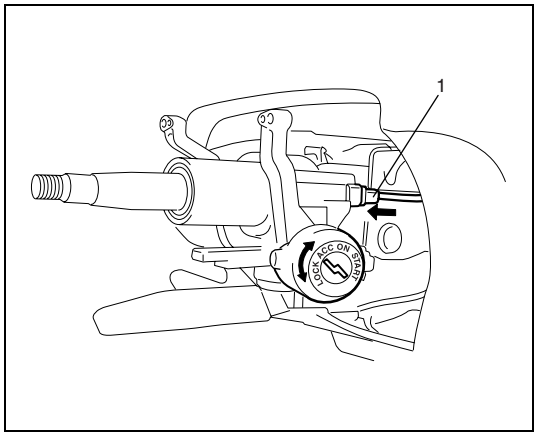
6) Remove steering column (1) mounting bolts (2 pieces) (2) and nuts (2 pieces) (3).



7) If equipped with shift (key) interlock cable (1), disconnect shift (key) interlock cable from ignition switch with ignition switch turned at "ACC" position.
8) Remove steering column from vehicle.

INSPECTION

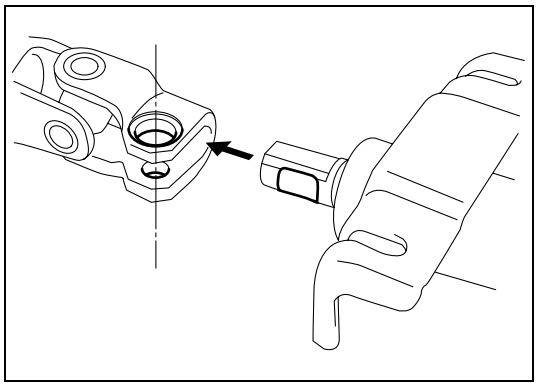
Check steering column for damage and operation referring to "Checking Steering Column and Steering Upper Shaft for Accident Damage" in this section.



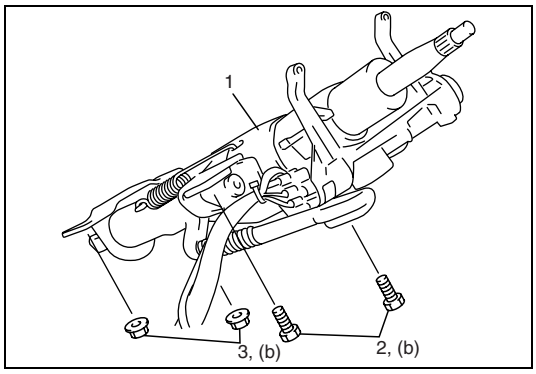
INSTALLATION

CAUTION:
After tightening steering column mounting bolts, steering shaft joint bolts should be tightened.

1) Be sure that front wheels and steering wheel are in straight-ahead position.
2) If equipped with shift (key) interlock cable (1), connect shift (key) interlock cable (1) to ignition switch with ignition switch turned at "ACC" position. And then turn ignition switch "LOCK" position.

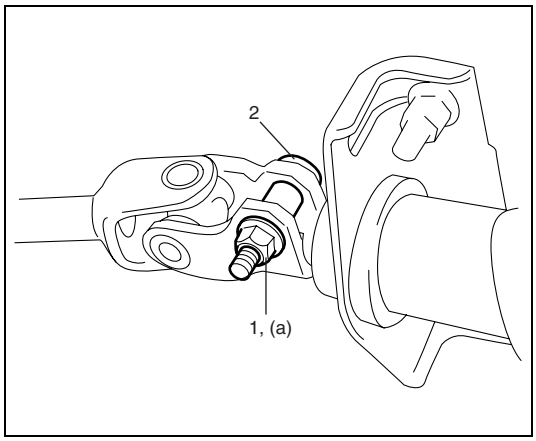


3) Align cutting point "A" of steering column assembly (1) with bolt hole "B" of steering upper shaft upper joint as shown in the figure. Then connect steering upper shaft upper joint.



4) Install steering column assembly (1) with contacting upper side of lower bracket slits to mounting bolts. Tighten steering column lower mounting nuts (3) first and then upper mounting bolts (2) to specified torque.

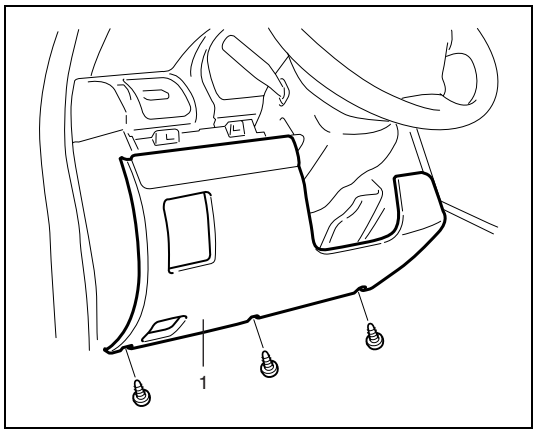
Tightening torque
Steering column mounting bolts and nuts
(b) : 25 N·m (2.5 kg-m, 18.0 lb-ft)



5) Install steering upper shaft upper joint bolt (2) and nut (1). Tighten steering upper shaft upper joint nut (1) to specified torque.

Tightening torque
Steering upper shaft upper joint nut
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

6) If contact coil and combination switch assembly is removed, install it, referring to “Combination Switch Assembly” in this section.
7) Connect all connectors that have been removed in removal.



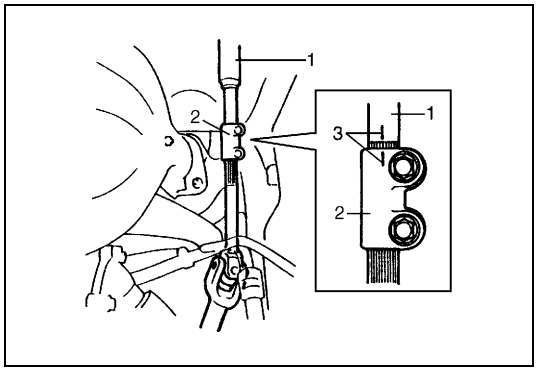
8) Install steering column hole cover (1).
9) If steering wheel is removed, install it by referring to “Steering Wheel” in this section.
10) Connect negative (–) cable to battery.

Steering Upper Shaft Assembly (Other than Canvas Top Model)

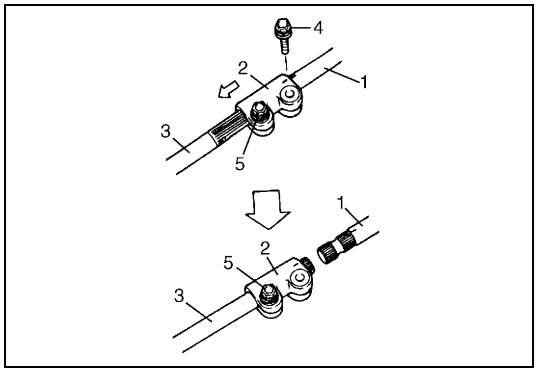
CAUTION:
Never turn steering wheel while steering upper shaft assembly is removed.
Should it have been turned and contact coil (on combination switch) have got out of its centered position, it needs to be centered again. Also, turning steering wheel more than about two and a half turns will break contact coil.

REMOVAL

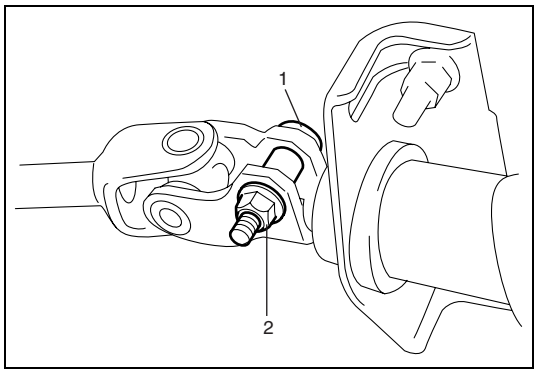
1) Turn steering wheel so that vehicle's front tires are at straight-ahead position.
2) Turn ignition switch to "LOCK" position and remove key.



3) Make alignment marks (3) on shaft joint (2) and shaft (upper shaft assembly side) (1) for a guide during reinstallation.



4) After removing bolt (4) on upper shaft assembly (1) side of shaft joint (2) and loosening bolt (5) on its lower shaft assembly (3) side, move shaft joint (2) to lower shaft assembly (3) side (in arrow direction in the figure).



5) Remove steering upper shaft upper joint bolt (1) and nut (2).

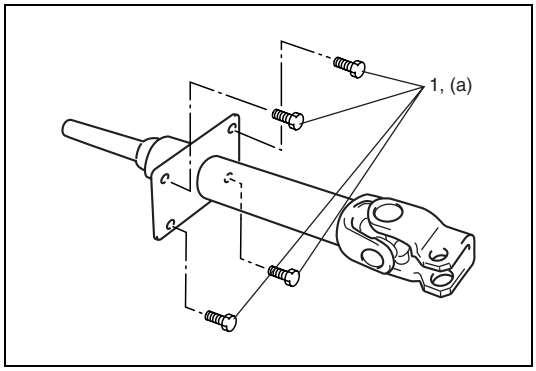
6) Remove steering upper shaft mounting bolts (4 pieces).
7) Remove steering upper shaft assembly from vehicle.

INSPECTION

Check steering shaft damage and operation referring to “Check Steering Column and Steering Upper Shaft for Accident Damage” later in this section.

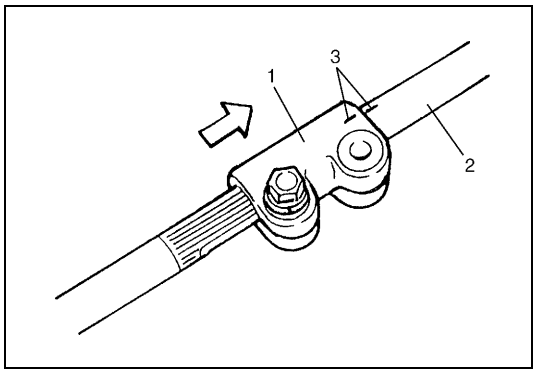
INSTALLATION

1) Be sure that front tires and steering wheel are in straight ahead position.

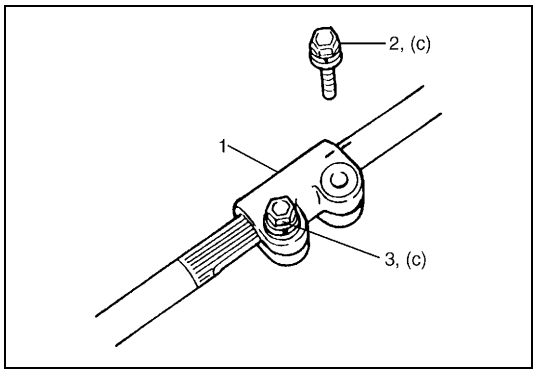


2) Install steering upper shaft assembly to dash panel. Tighten steering upper shaft mounting bolts (1) to specified torque.

Tightening torque
Steering upper shaft mounting bolts
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

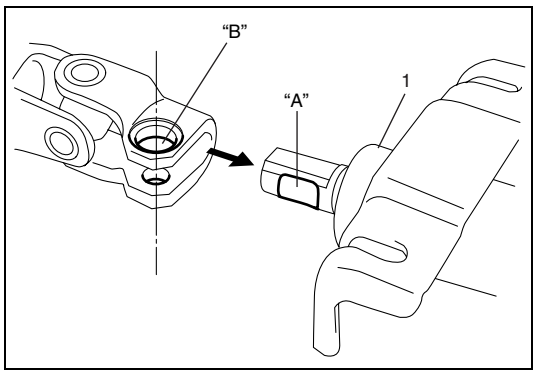


3) Install steering shaft joint (1) to steering upper shaft (2) by matching it to marks (3) made before removal.

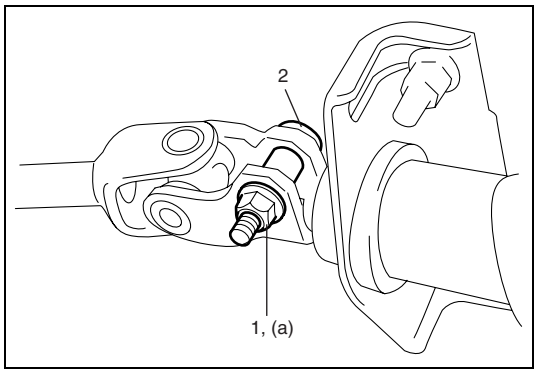


4) Install shaft joint bolt (upper shaft assembly side) (2) to steering shaft joint (1). Tighten shaft joint bolt (upper shaft assembly side) (2) to specified torque first and then shaft joint bolt (lower shaft assembly side) (3) to specified torque.

Tightening torque
Steering shaft joint bolt
(c) : 25 N·m (2.5 kg-m, 18.0 lb-ft)



5) Align cutting point “A” of steering column assembly (1) with bolt hole “B” of steering upper shaft upper joint as shown in the figure. Then connect steering upper shaft upper joint.



6) Install new steering upper shaft upper joint bolt (2) and nut (1). Tighten steering upper shaft upper joint nut (1) to specified torque.

Tightening torque
Steering upper shaft upper joint nut
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

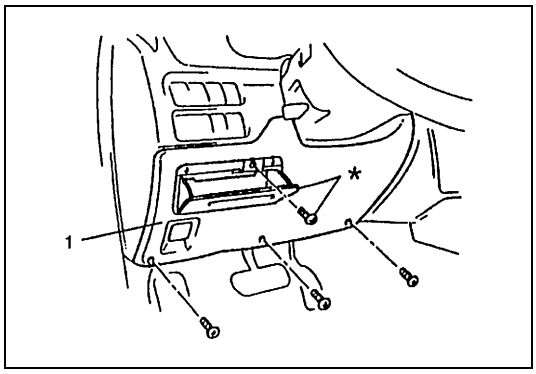
Steering Column Assembly (Canvas Top Model)

CAUTION:
Once the steering column is removed from the vehicle, the column is extremely susceptible to damage.
Dropping the column assembly on its end could collapse the steering shaft or loosen the plastic shear pins which maintain column length. Leaning on the column assembly could cause it to bend or deform.
Any of the above damage could impair the column's collapsible design.
When loosening steering column mounting bolts, make sure that steering column assembly and steering shaft lower assembly have been separated. Loosening them with steering column assembly and steering shaft lower assembly assembled could cause damage to bearing in steering shaft lower assembly.

NOTE:
When servicing steering column or any column-mounted component, remove steering wheel. But when removing steering column simply to gain access to instrument panel components, leave steering wheel installed on steering column.

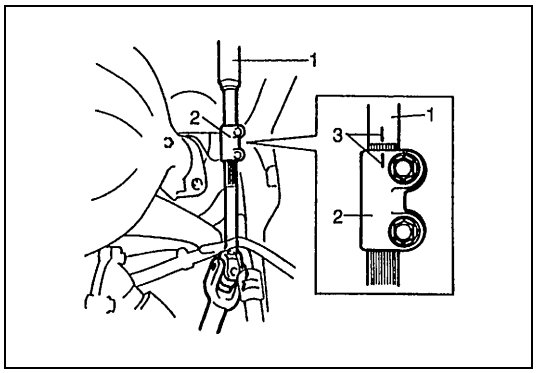
REMOVAL

1) Disconnect negative battery cable at battery terminal.
2) Remove steering wheel and combination switch, if necessary.
   Refer to “Steering Wheel” and “Combination Switch” in this section.
   Perform the following procedure if not removing steering wheel and/or combination switch.
   a) Turn steering wheel so that vehicle's front tires are at straightahead position.
   b) Turn ignition switch to “LOCK” position and remove key.

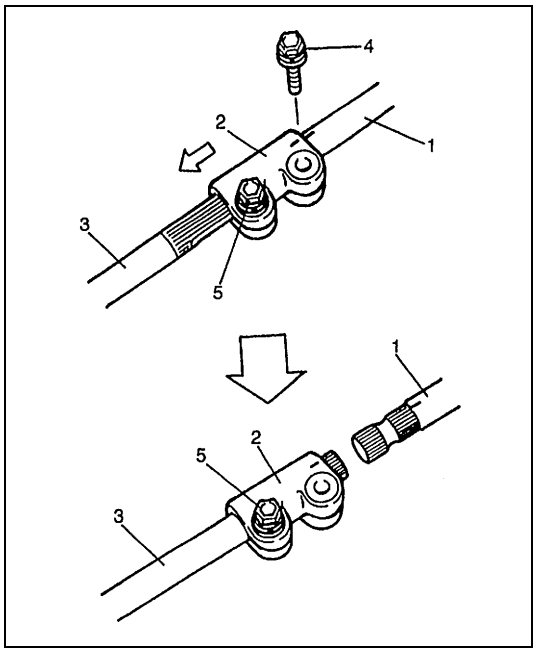


3) Remove steering column hole cover (1).
4) Disconnect all connectors for the following parts.
   - Combination switch
   - Ignition switch
   - Immobilizer control system parts (if equipped)

* : If equipped

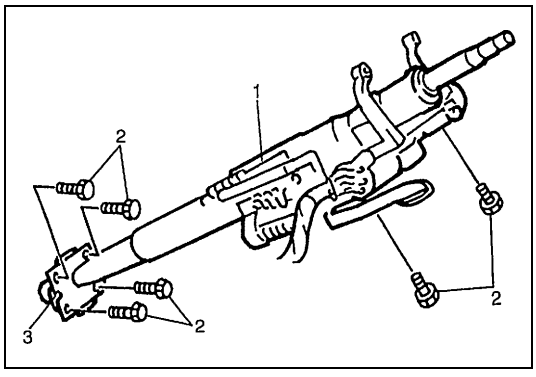


5) Make alignment marks (3) on shaft joint (2) and shaft (column side) (1) for a guide during reinstallation.



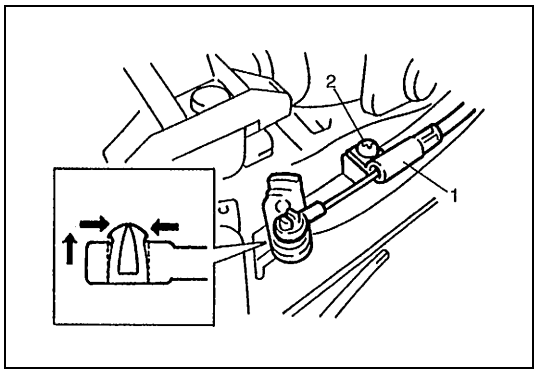
6) After removing bolt (4) on column side of shaft joint and loosening bolt (5) on its lower shaft assembly side, move shaft joint (2) to lower shaft assembly side (in arrow direction in the figure).

1. Steering column assembly
3. Steering lower shaft assembly



7) Remove steering column mounting bolts (6 pieces) (2).

1. Steering column
3. Steering column lower seal

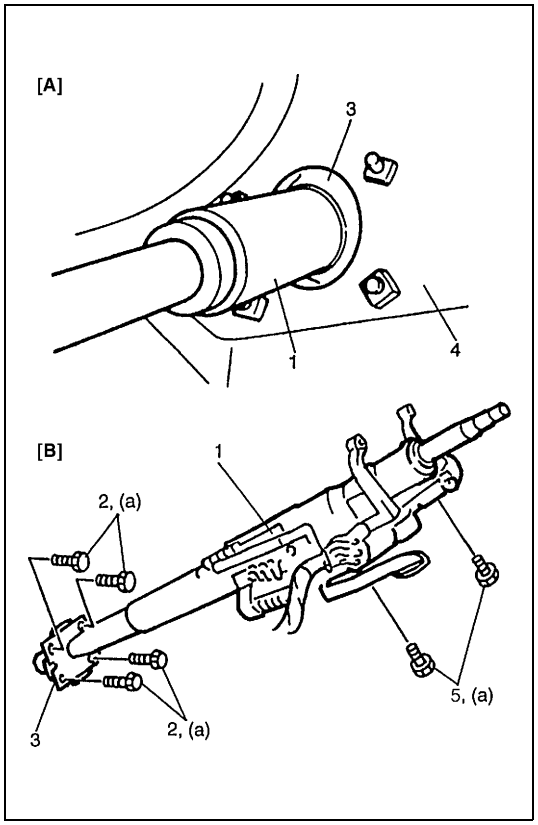


8) If equipped with shift (key) interlock cable (1), remove shift (key) interlock cable screw (2) and then disconnect its cable from ignition switch.
9) Remove steering column from vehicle.

INSPECTION

Check steering column for damage and operation referring to Check Steering Column for Accident Damage (Canvas top model) in this section.

INSTALLATION

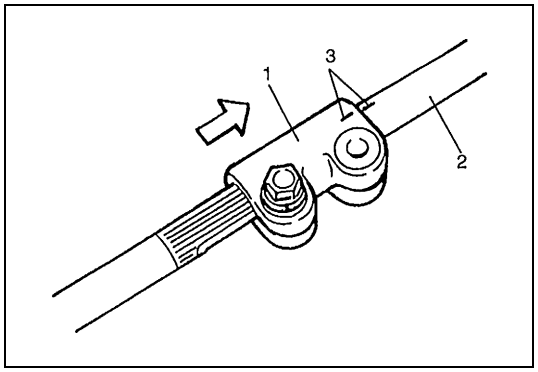


CAUTION:
- **After tightening steering column mounting bolts, steering shaft joint bolts should be tightened.**
- **After tightening steering column lower bolts, steering column upper bolts should be tightened.**

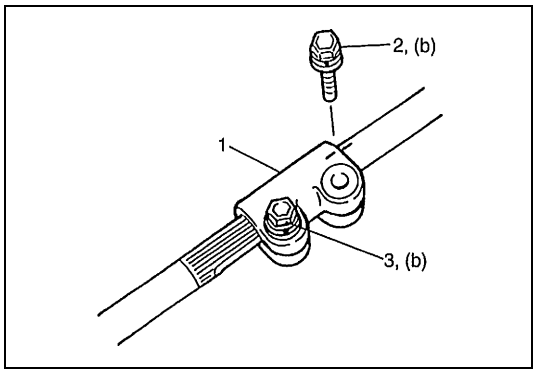
1) Be sure that front wheels and steering wheel are in straightahead position.
2) If equipped with shift (key) interlock cable, install shift (key) interlock cable to ignition switch.
3) Install steering column assembly (1) to dash panel (4) and upper bracket so that boss of steering column lower seal (3) and all around it project out of hole in dash panel into engine room. Tighten steering column lower bolts (2) (4 pieces) first and then upper bolts (5) (2 pieces) to specified torque.

Tightening torque
Steering column mounting bolt
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

[A] : In engine room
[B] : In cabin

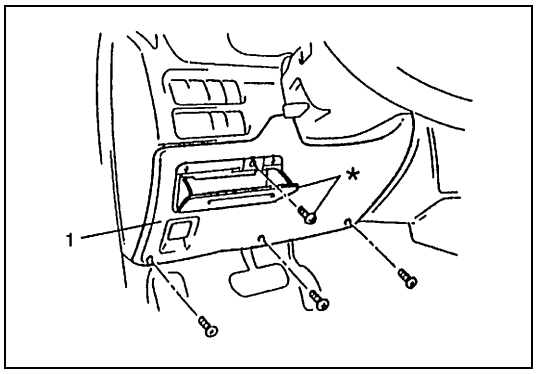


4) Install steering shaft joint (1) to steering shaft (2) by matching it to marks (3) made before removal.



5) Install shaft joint bolt (column side) to steering shaft joint (1). Tighten shaft joint bolt (column side) (2) to specified torque first and then shaft joint bolt (lower shaft assembly side) (3) to specified torque.

Tightening torque
Shaft join bolt
(b) : 25 N·m (2.5 kg-m, 18.0 lb-ft)



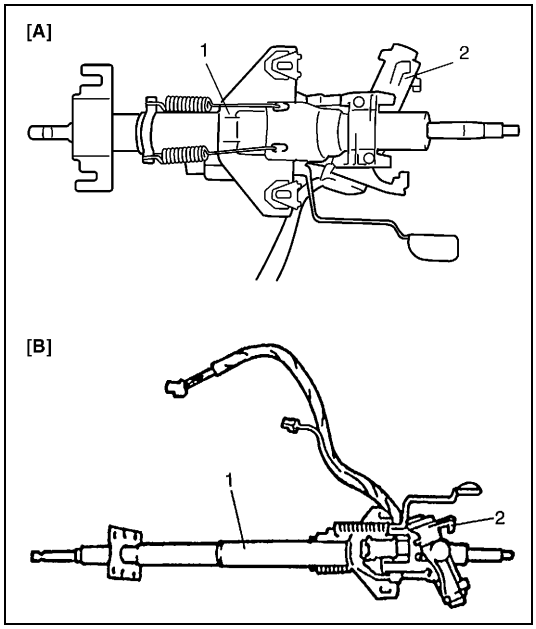
6) If combination switch is removed, install combination switch. Refer to “Combination Switch” in this section.
7) Connect all connectors that have been removed in removal.
8) Install steering column hole cover (1).

* : If equipped

9) If steering wheel is removed, install steering wheel. Refer to “Steering Wheel” in this section.
10) Connect negative battery cable.

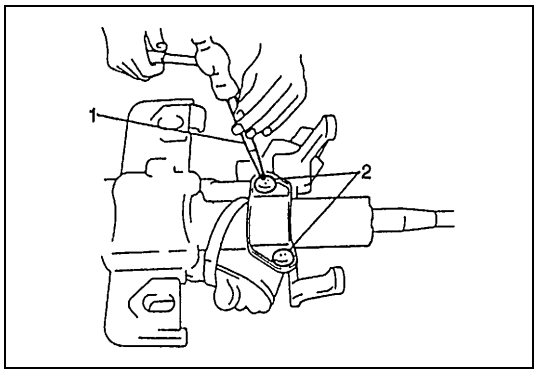
Steering Lock Assembly (Ignition Switch)

REMOVAL



1) Remove steering column (1). Refer to “Steering Column” in this section.

[A] : Other than canvas top model
[B] : Canvas top model



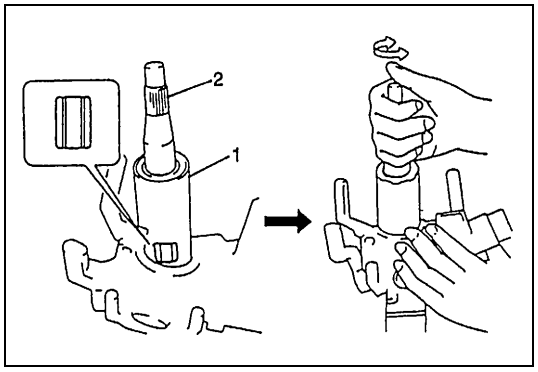
2) Using center punch (1) as shown, loosen and remove steering lock mounting bolts (2).

NOTE:

Use care not to damage aluminum part of steering lock body with center punch.

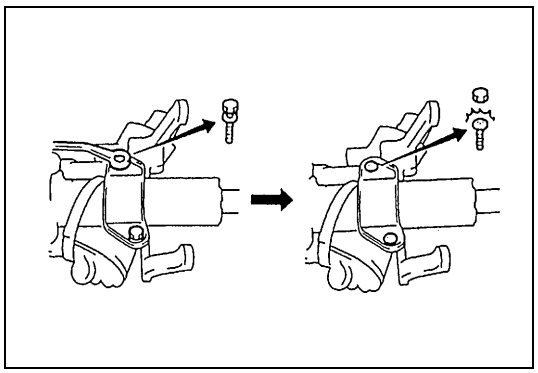
3) Turn ignition key to “ACC” or “ON” position and remove steering lock assembly from steering column.

INSTALLATION



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

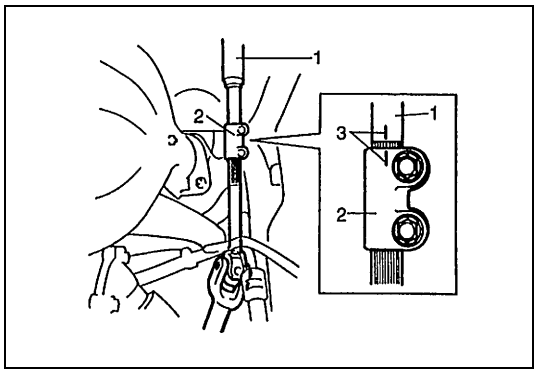
1. Steering column



5) Tighten new bolts until head of each bolt is broken off.
6) Turn ignition key to “ACC” or “ON” position and check to be sure that steering shaft rotates smoothly. Also check for lock operation.
7) Install steering column. Refer to “Steering Column” in this section.

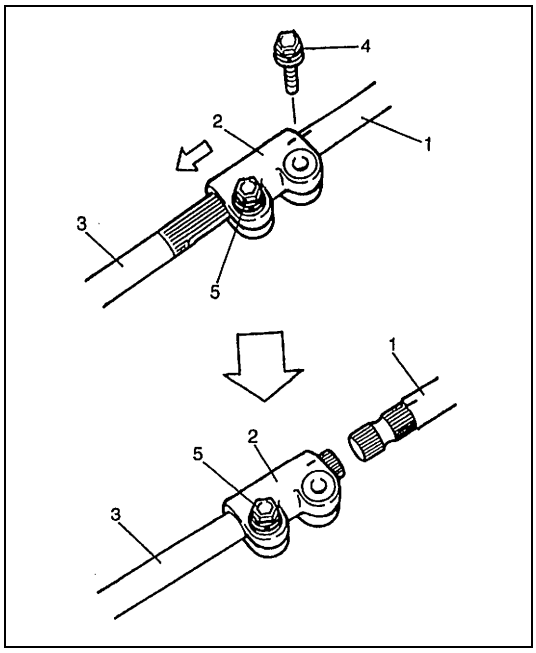
Steering Lower Shaft Assembly

REMOVAL



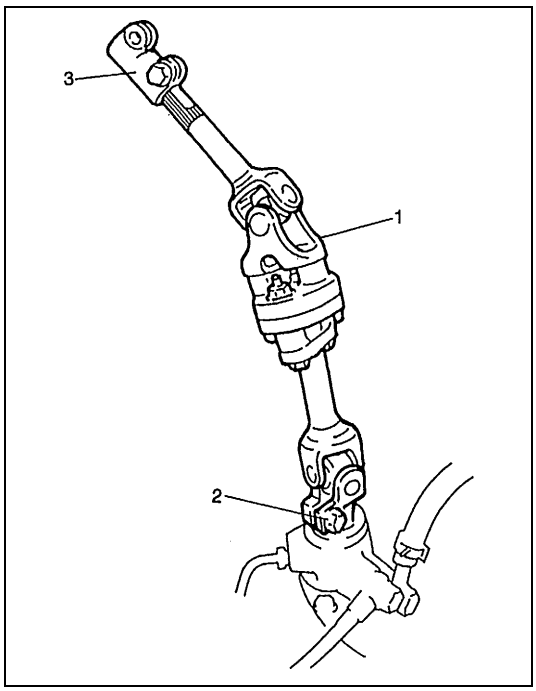
1) Turn steering wheel so that vehicle’s front tires are at straightahead position.
2) Turn ignition switch to “LOCK” position and remove key.
3) Make alignment marks (3) on shaft joint (2) and shaft (upper shaft assembly side or column side) for a guide during reinstallation.

1. Upper shaft assembly or steering column assembly
2. Steering shaft joint
3. Marks



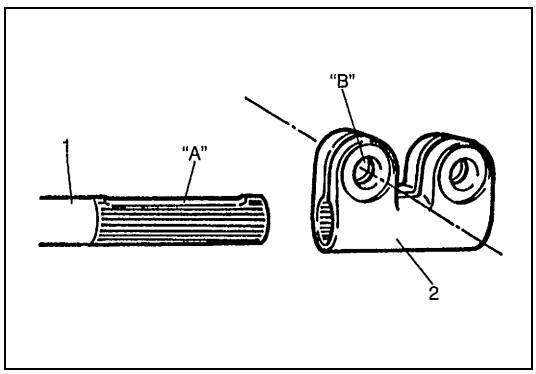
4) After removing bolt (4) on upper shaft or column side of shaft joint and loosening bolt (5) on its lower shaft assembly side, move shaft joint (2) to lower shaft assembly side (in arrow direction in figure).

1.	Upper shaft assembly or steering column assembly
3.	Steering lower shaft assembly

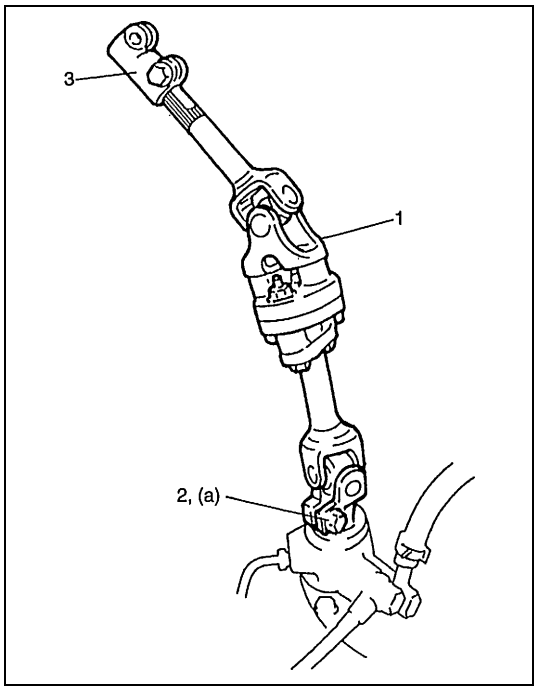


5) Make alignment marks on lower shaft assembly lower joint and pinion shaft for a guide during reinstallation.
6) Remove lower shaft assembly lower joint bolt (2) and then remove lower shaft assembly.
7) Remove shaft joint bolt (lower shaft assembly side) from shaft joint and then remove shaft joint (3) from lower shaft assembly (1).

INSTALLATION



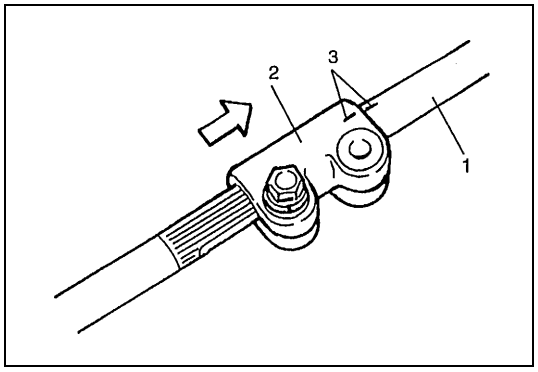
1) Be sure that front wheels and steering wheel are in straight-forward position.
2) Align flat part "A" of lower shaft assembly with bolt hole "B" of shaft joint (2) as shown. Then insert shaft joint into lower shaft assembly (1).
3) Install shaft joint bolt (lower shaft assembly side) to shaft joint. Then tighten it by hand.



4) Insert pinion shaft into lower shaft assembly lower joint by matching it to marks made before removal. And then install lower shaft assembly lower joint bolt (2) to lower shaft assembly lower joint. Tighten it to specified torque.

Tightening torque
Lower shaft assembly lower join bolt
(a) : 25 N·m (2.5 kg-m, 18.0 lb-ft)

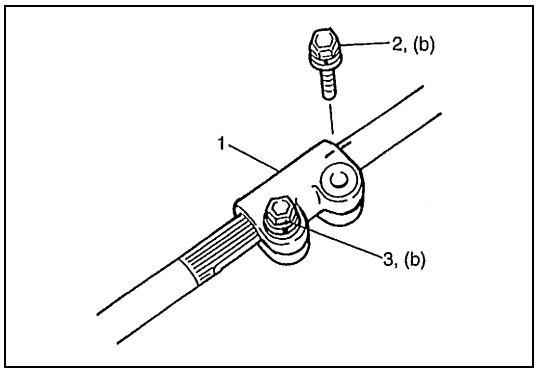
1.	Steering lower shaft assembly
3.	Steering shaft joint



5) Install steering shaft joint (2) to steering shaft by matching it to marks (3) made before removal.

NOTE:
Be sure that front wheels and steering wheel are in straightahead position.

1.	Upper shaft assembly steering column assembly



6) Install shaft joint bolt (upper shaft assembly or column side) (2) to shaft joint (1). Tighten shaft joint bolt (column side) (3) to specified torque first and then shaft joint bolt (lower shaft assembly side) to specified torque.

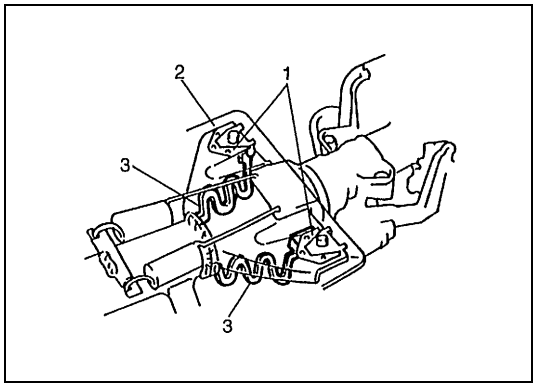
Tightening torque
Shaft join bolt
(b) : 25 N·m (2.5 kg-m, 18.0 lb-ft)

Checking Steering Column for Accident Damage (Canvas Top Model)

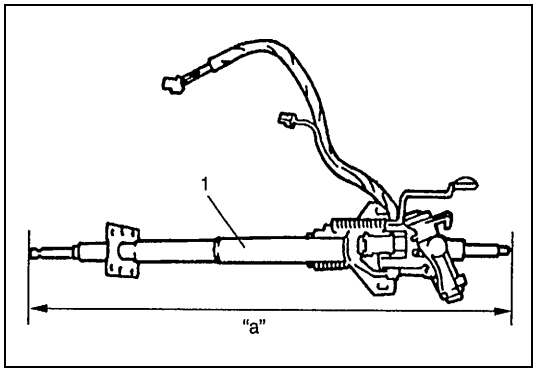
NOTE:

Vehicles involved in accidents resulting in body damage, where steering column has been impacted, may have a damaged or misaligned steering column.

CHECKING PROCEDURE



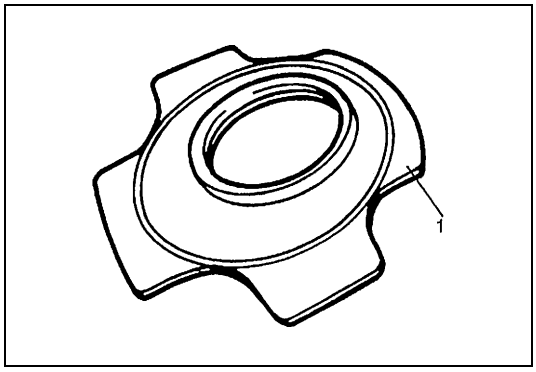
- Check that two capsules (1) are attached to steering column bracket securely. Check clearance between capsules and steering column bracket (2). Clearance should be 0 mm (0 in.) on both sides.
  If found loose or clearance, replace steering column assembly.
- Check two plates (3) for any damages such as crack or breakage.
  If anything is found faulty, replace as steering column assembly.



- Take measurement "a" as shown. If it is shorter than specified length, replace column assembly with new one.

Steering column assembly length
"a" : 895 ± 0.8 mm (35.24 ± 0.03 in.)

1. Steering column assembly



- Check steering column lower seal for breakage or deformation.
  If found defective, replace.

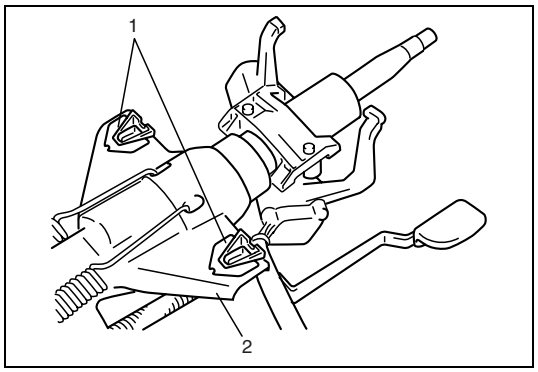
1. Steering column lower seal

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

Checking Steering Column and Steering Upper Shaft for Accident Damage (Other than Canvas Top Model)

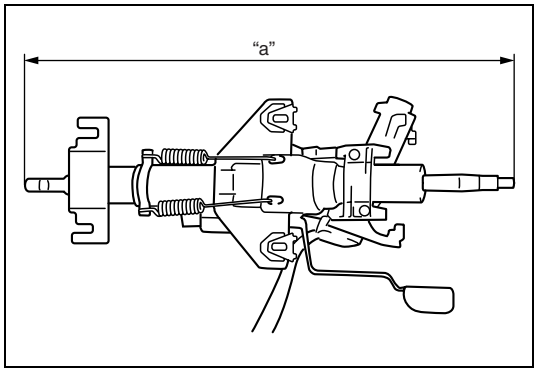
NOTE:

Vehicles involved in accidents resulting in body damage, where steering column has been impacted or air bag deployed, may have a damaged or misaligned steering column.



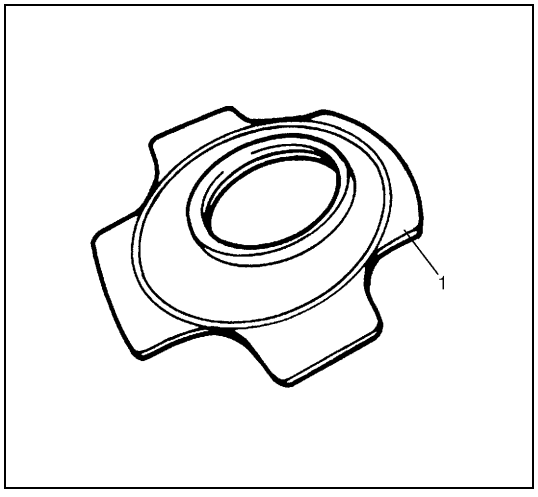
- Check that 2 capsules are attached to steering column bracket securely. Check clearance between capsules and steering column bracket. Clearance should be 0 mm (0 in.) on both sides. If found loose or clearance, replace steering column assembly.

1.	Capsule
2.	Steering column bracket

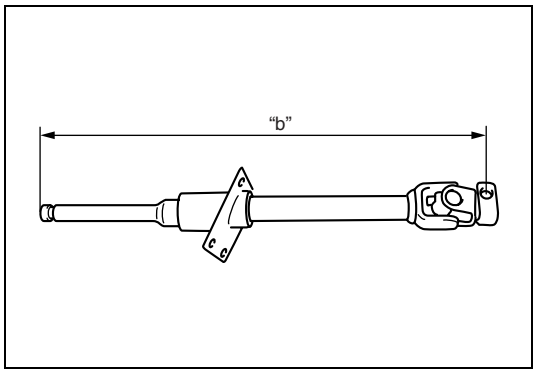


- Take measurement "a" as shown in the figure. If it is shorter than specified length, replace column assembly with new one.

Steering column assembly length
"a" : 490.3 ± 1.0 mm (19.30 ± 0.04 in.)



- Check steering shaft for smooth rotation.
  If found defective, replace as column assembly.
- Check steering shaft and column for bend, cracks or deformation.
  If found defective, replace as column assembly.
- Check steering upper shaft lower seal (1) for breakage or deformation.
  If found defective, replace.
- Check steering shaft joints and shaft for any damages such as crack, breakage, malfunction or excessive play.
  If anything is found faulty, replace steering upper shaft assembly, steering lower shaft assembly or steering column assembly.

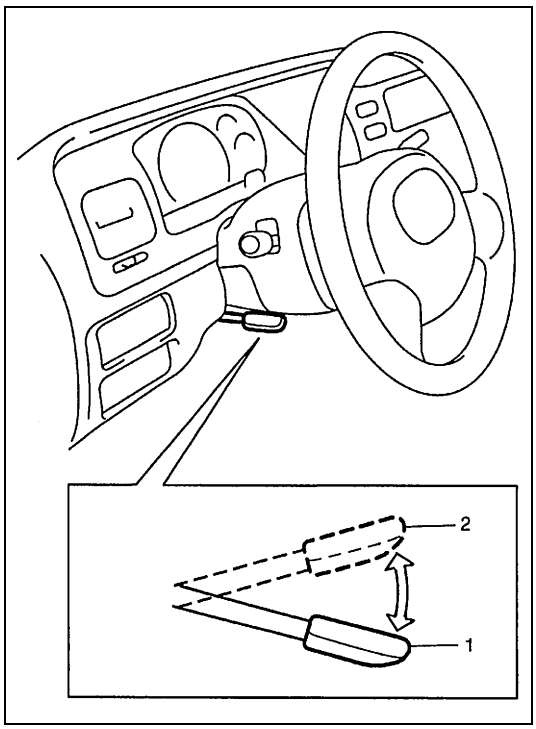


- Take measurement "b" as shown in the figure. If it is shorter than specified length, replace steering upper shaft assembly with new one.

Steering upper shaft assembly length
"b" : 419.0 ± 1.0 mm (16.50 ± 0.04 in.)

Adjustable Steering Column Release Lever

INSPECTION



Check to make sure that the following :

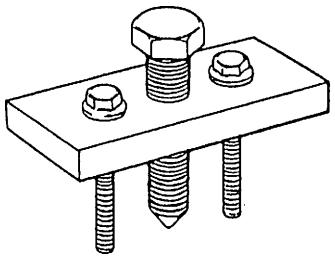
- Steering column moves smoothly when adjustable steering column release lever is at lower position (i.e., steering column is not locked).
- Steering column is fixed securely when adjustable steering column release lever is at higher position (i.e., steering column is locked).

1. Lower position
2. Upper position

Tightening Torque Specifications

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Steering shaft nut	33	3.3	23.5
Steering column mounting bolt (Canvas top model)	23	2.3	17.0
Steering column mounting bolt (Other than canvas top model)	25	2.5	18.0
Steering column mounting nut (Other than canvas top model)	25	2.5	18.0
Steering shaft joint bolt	25	2.5	18.0
Steering lower shaft assembly lower joint bolt	25	2.5	18.0
Steering upper shaft upper joint nut (Other than canvas top model)	23	2.3	17.0
Steering upper shaft mounting bolt (Other than canvas top model)	23	2.3	17.0

Special Tool



09944-36011
Steering wheel remover

SECTION 3C1

AIR BAG STEERING WHEEL AND COLUMN

WARNING:

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **The procedures in this section must be followed in the order listed to disable the air bag system temporarily and prevent false diagnostic trouble codes from setting. Failure to follow procedures could result in possible activation of the air bag system, personal injury or otherwise unneeded air bag system repairs.**

CAUTION:

When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread-locking compound, will be called out. The correct torque value must be used when installing fasteners that require it. If the above procedures are not followed, parts or system damage could result.

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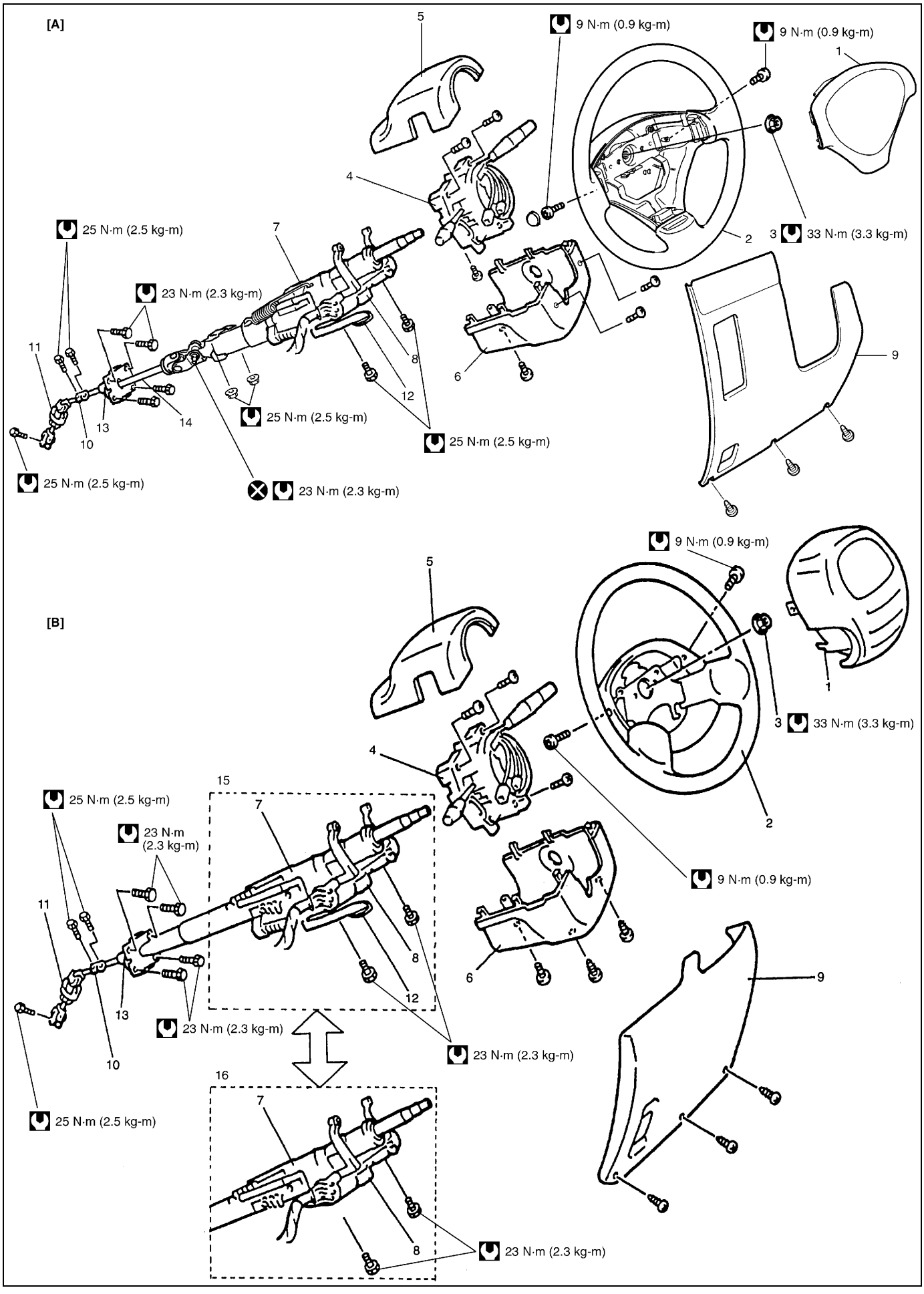
General Description

This double tube type steering column has the following three important features in addition to the steering function:

- The column is energy absorbing, designed to compress in a front-end collision.
- The ignition switch and lock are mounted conveniently on this column.
- With the column mounted lock, the ignition and steering operations can be locked to inhibit theft of the vehicle.

To insure the energy absorbing action, it is important that only the specified screws, bolts, and nuts be used as designated and that they are tightened to the specified torque. When the column assembly is removed from the vehicle, special care must be taken in handling it. Use of a steering wheel puller other than the one recommended in this manual or a sharp blow on the end of the steering shaft, leaning on the assembly, or dropping the assembly could shear the plastic shear pins which maintain column length and position.

The driver air bag (inflator) module is one of the supplemental restraint (air bag) system components and is mounted to the center of the steering wheel. During certain frontal crashes, the air bag system supplements the restraint of the driver's and passenger's seat belts by deploying the air bags. The air bag (inflator) module should be handled with care to prevent accidental deployment. When servicing, be sure to observe all WARNINGS in this section. Refer to "Service Precautions" in Section 10B.


[A]
5
9 N·m (0.9 kg-m)
9 N·m (0.9 kg-m)
1
4
25 N·m (2.5 kg-m)
7
23 N·m (2.3 kg-m)
2
3
33 N·m (3.3 kg-m)
11
8
6
9
12
13
14
25 N·m (2.5 kg-m)
10
25 N·m (2.5 kg-m)
25 N·m (2.5 kg-m)
23 N·m (2.3 kg-m)
[B]
9 N·m (0.9 kg-m)
5
1
3
33 N·m (3.3 kg-m)
4
2
15
25 N·m (2.5 kg-m)
7
23 N·m
(2.3 kg-m)
9 N·m (0.9 kg-m)
11
8
6
9
12
13
23 N·m (2.3 kg-m)
23 N·m (2.3 kg-m)
10
16
25 N·m (2.5 kg-m)
7
8
23 N·m (2.3 kg-m)

[A] : Other than canvas top model	4. Contact coil and combination switch assembly	9. Steering column hole cover	14. Steering upper shaft assembly
[B] : Canvas top model	5. Steering column upper cover	10. Steering shaft joint	15. With adjustable steering column release lever type
1. Driver air bag (inflator) module	6. Steering column lower cover	11. Steering lower shaft assembly	16. Without adjustable steering column release lever type
2. Steering wheel	7. Steering column assembly	12. Adjustable steering column release lever (if equipped)	
3. Steering wheel nut	8. Steering lock assembly	13. Steering column lower seal	

Diagnosis

For diagnosis of the steering wheel and steering column, refer to Section 3. For diagnosis of the air bag system, refer to Section 10B.

Inspection and Repair Required After Accident

After an accident, whether the air bag has been deployed or not, be sure to perform checks, inspections and repairs described under “Checking Steering Column for Accident Damage” in this section as well as “Repairs and Inspections Required After Accident” in Section 10B.

On-Vehicle Service

Service Precautions

For service precautions, refer to “Service Precautions” under “On-Vehicle Service” in Section 10B.

Diagnosis and servicing

For diagnosis and servicing, refer to “Diagnosis and Servicing” under “Service Precautions” in Section 10B.

Disabling air bag system

For disabling air bag system, refer to “Disabling Air Bag System” under “Service Precautions” in Section 10B.

Enabling air bag system

For enabling air bag system, refer to “Enabling Air Bag System” under “Service Precautions” in Section 10B.

Handling and storage

For handling and storage, refer to “Handling and Storage” under “Service Precautions” in Section 10B.

Disposal

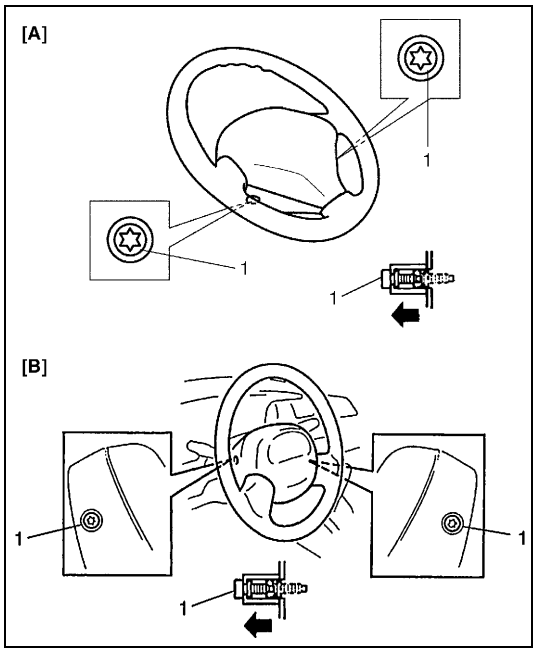
For disposal, refer to “Disposal” under “Service Precautions” in Section 10B.

Drive Air Bag (Inflator) Module

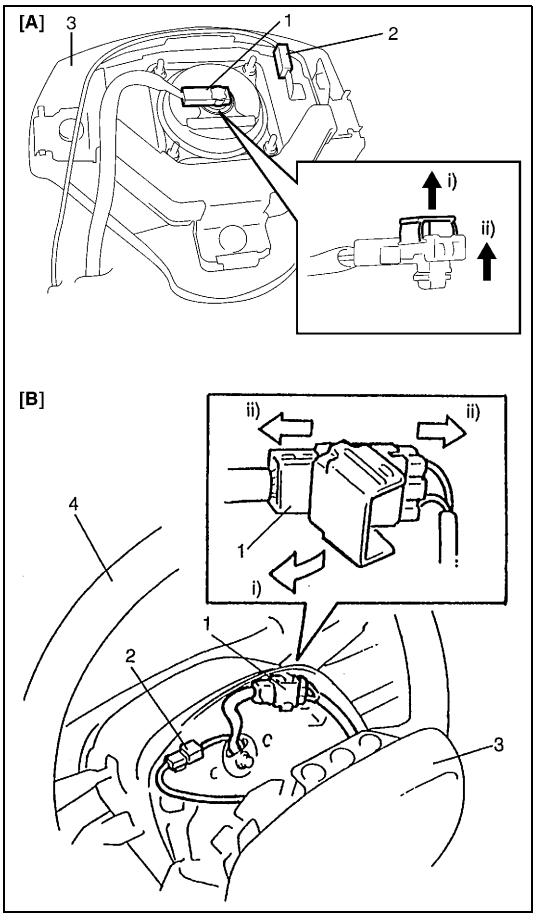
WARNING:
When handling an air bag (inflator) module, be sure to read "Service Precautions" under "On-Vehicle Service" in Section 10B and observe each instruction. Failure to follow them could cause a damage to the air bag (inflator) module or result in personal injury.

REMOVAL

1) Disconnect negative battery cable at battery terminal.
2) Disable air bag system. Refer to "Disabling Air Bag System" under "Service Precautions" in Section 10B.
3) Loosen 2 bolts (1) mounting driver air bag (inflator) module till it turns freely, pull them out and fix them to bolt clamps.
4) Remove air bag (inflator) module from steering wheel.



[A] :	Other than canvas top model
[B] :	Canvas top model



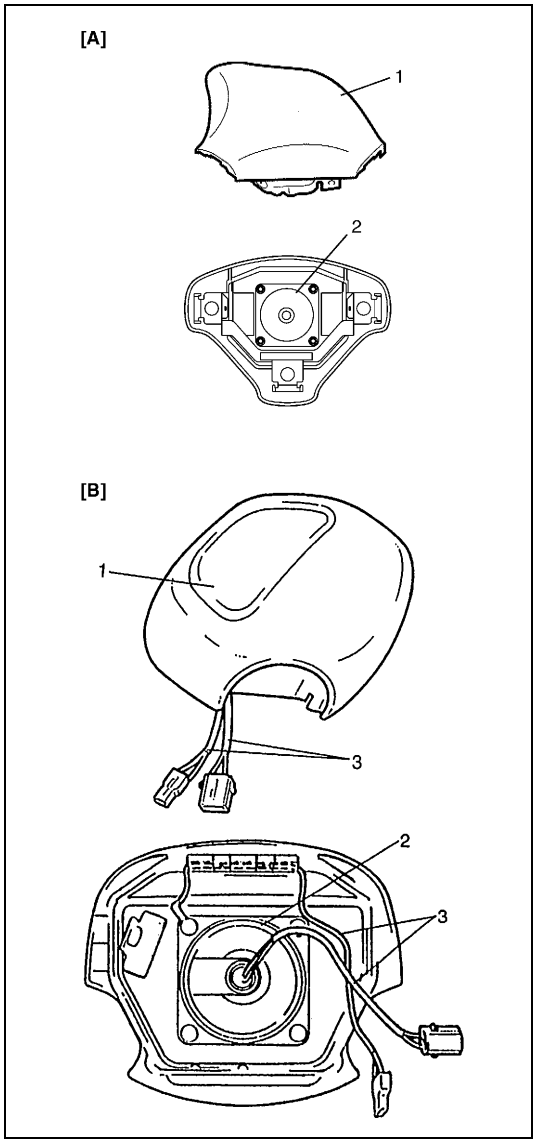
5) Remove driver air bag (inflator) module (yellow) connector (1) and horn connector (2) from steering wheel.
6) Disconnect driver air bag (inflator) module (yellow) connector of driver air bag (inflator) module (3) and horn connector as shown in the figure.
   i) Release locking of lever or unlock lock button.
   ii) After unlocked, disconnect connector.

WARNING:

Special care is necessary when handling and storing a live (undeployed) air bag (inflator) module. Observe "Service Precautions" under "On-Vehicle Service" in Section 10B. Otherwise, personal injury may result.

[A] :	Other than canvas top model
[B] :	Canvas top model
4.	Steering wheel

INSPECTION



WARNING:

Never disassemble air bag (inflator) module or measure its resistance. Otherwise, personal injury may result.

CAUTION:

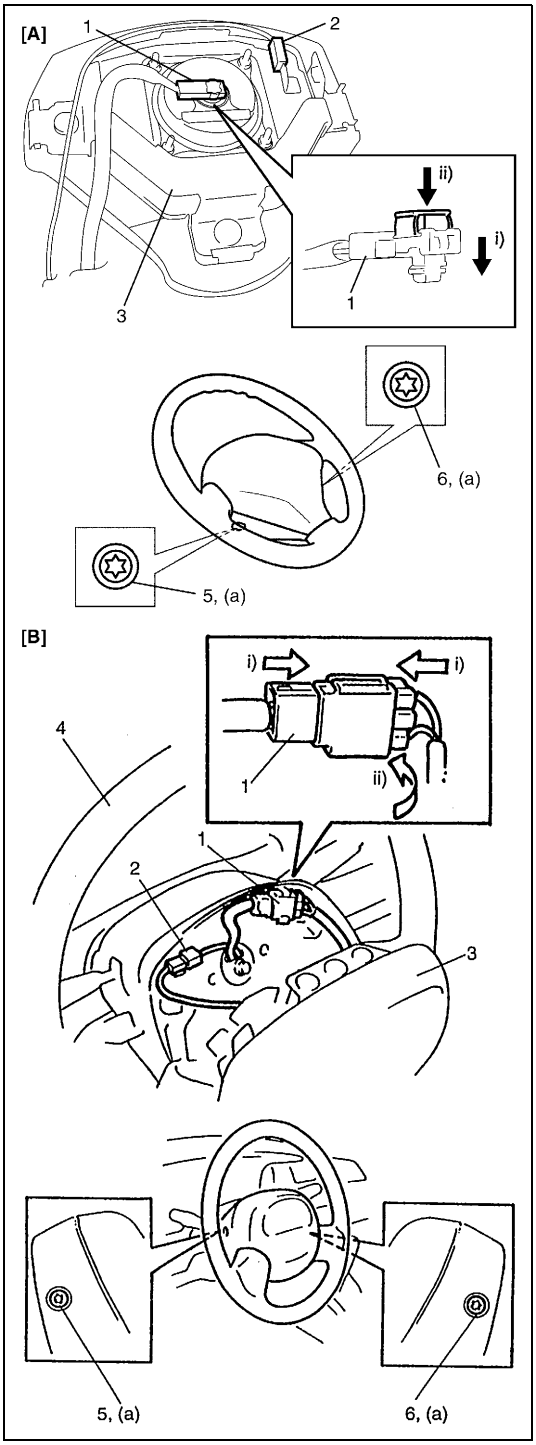
If air bag (inflator) module was dropped from a height of 90 cm (3 ft) or more, it should be replaced.

Check air bag (inflator) module visually and if any of the following is found, replace it with a new one.

- Air bag being deployed.
- Trim cover (pad surface) (1) being cracked.
- Wire harness (3) or connector being damaged.
- Air bag (inflator) module (2) being damaged or having been exposed to strong impact (dropped).

[A] :	Other than canvas top model
[B] :	Canvas top model
1.	Trim cover (pad surface)
2.	Inflator case
3.	Wire harness

INSTALLATION



1) Connect horn connector (2) securely.
2) Connect yellow connector of driver air bag (inflator) module connector (1) as shown in the figure securely.
   a) Connect connector.
   b) Lock connector with lock lever or lock button.
3) Install horn connector and driver air bag (inflator) module connector.
4) Install driver air bag (inflator) module (3) to steering wheel (4), taking care so that no part of wire harness is caught between them.
5) Make sure that clearance between module and steering wheel is uniform all the way.
6) Tighten driver air bag (inflator) module mounting bolt (left side) (5) to specified torque first and then driver air bag (inflator) module mounting bolt (right side) (6) to specified torque.

Tightening torque
Driver air bag (inflator) module mounting bolt
(a) : 9 N·m (0.9 kg-m, 6.5 lb-ft)

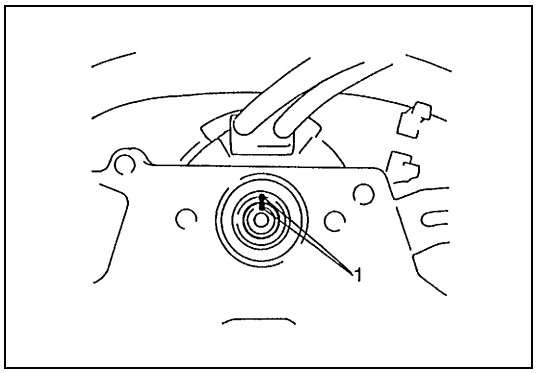
7) Connect negative battery cable.
8) Enable air bag system. Refer to “Enabling Air Bag System” under “Service Precautions” in Section 10B.

[A] :	Other than canvas top model
[B] :	Canvas top model

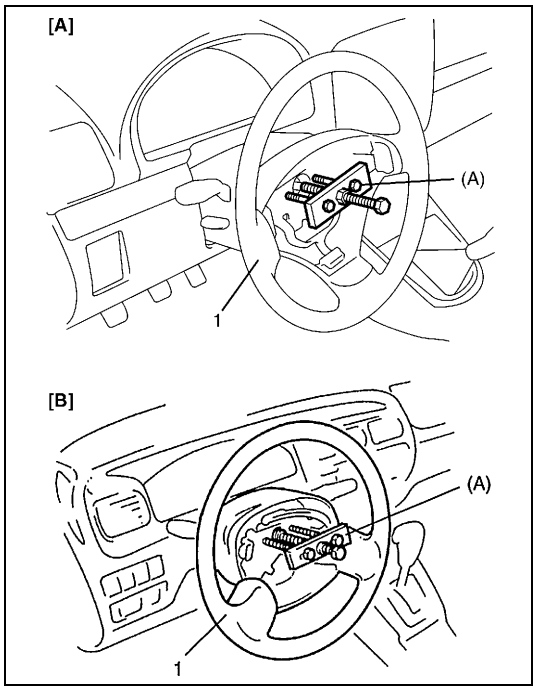
Steering Wheel

CAUTION:
Removal of the steering wheel allows the contact coil to turn freely but do not turn the contact coil (on the combination switch) more than allowable number of turns (about two and a half turns from the center position clockwise or counterclockwise respectively), or coil will break.

REMOVAL



1) Remove driver air bag (inflator) module from steering wheel referring to “Driver Air Bag (Inflator) Module” earlier in this section.
2) Remove steering shaft nut.
3) Make alignment marks (1) on steering wheel and shaft for a guide during reinstallation.



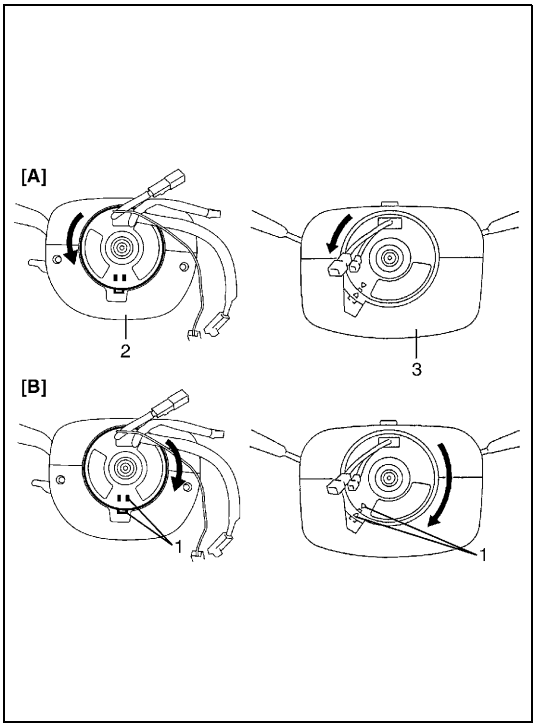
4) Remove steering wheel (1) with special tool.

Special tool
(A) : 09944-36011

CAUTION:
Do not hammer the end of the shaft. Hammering it will loosen the plastic shear pins which maintain the column length and impair the collapsible design of the column.

[A] : Other than canvas top model
[B] : Canvas top model

Centering contact coil



1) Check that vehicle's wheels (front tires) are set at straight-ahead position.
2) Check that ignition switch is at “LOCK” position.
3) Turn contact coil counterclockwise slowly with a light force till contact coil will not turn any further.

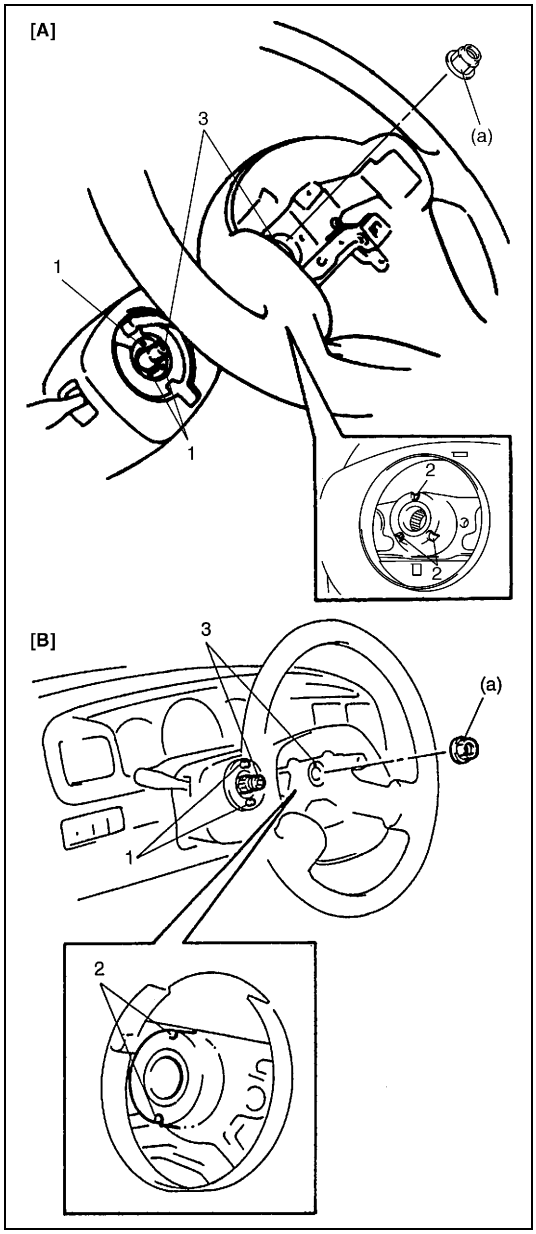
NOTE:

Contact coil can turn about 5 turns at maximum, that is, if it is at the center position, can turn about two and a half turns both clockwise and counterclockwise.

4) From the position where contact coil became unable to turn any further (it stopped), turn it back clockwise about two and a half rotations and align center mark with alignment mark (1).

[A] :	Turn slowly till coil stops
[B] :	Turn contact coil back about 2 and a half turns
2.	Other than canvas top model
3.	Canvas top model

INSTALLATION



1) Check that vehicle's front tires are at straight-ahead position and contact coil is centered. Refer to "Centering Contact Coil" in this section.

CAUTION:
These two conditions are prerequisite for installation of steering wheel. If steering wheel has been installed without these conditions, contact coil will break when steering wheel is turned.

2) Install steering wheel to steering shaft with 2 lugs on contact coil fitted in two grooves in the back of steering wheel and also aligning marks on steering wheel and steering shaft.
3) Tighten steering shaft nut to specified torque.

Tightening torque
Steering shaft nut
(a) : 33 N·m (3.3 kg-m, 23.5 lb-ft)

4) Install driver air bag (inflator) module to steering wheel. Refer to "Driver Air Bag (Inflator) Module" in this section.

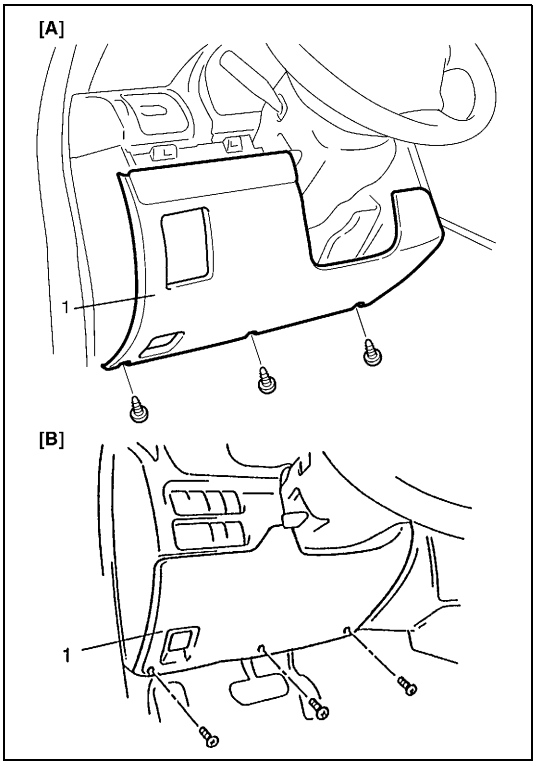
[A] :	Other than canvas top model
[B] :	Canvas top model
1.	Lugs
2.	Grooves
3.	Alignment marks

Contact Coil and Combination Switch Assembly

CAUTION:

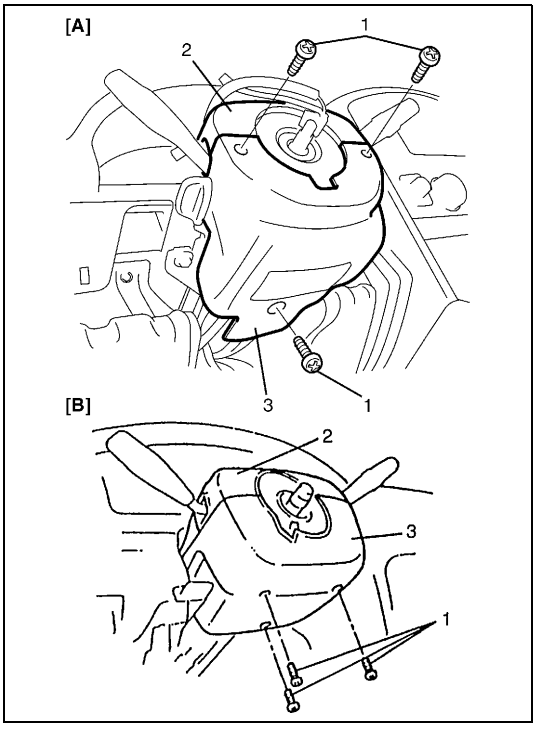
Do not turn contact coil (on combination switch) more than allowable number of turns (about two and a half turns from the center position clockwise or counterclockwise respectively), or coil will break.

REMOVAL



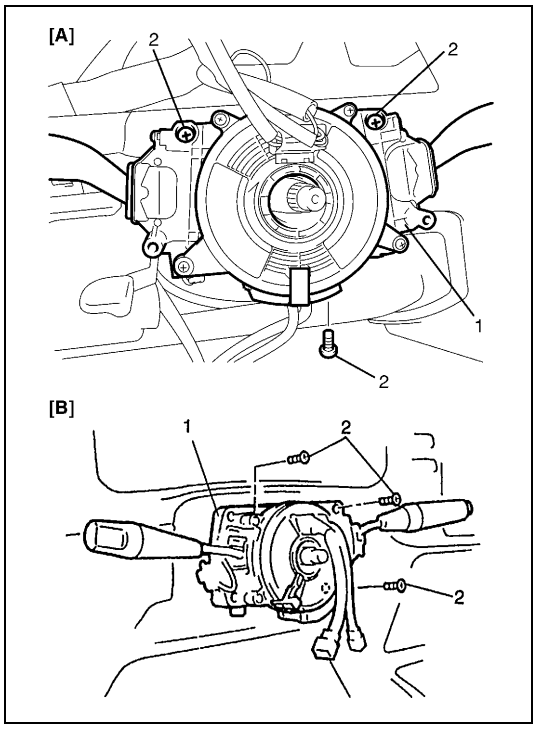
1) Remove steering wheel from steering column. Refer to "Steering Wheel" in this section.
2) Remove steering column hole cover (1).

[A] : Other than canvas top model
[B] : Canvas top model



3) Remove steering column cover screws (3 pieces) (1).
4) Separate upper cover (2) and lower cover (3), then remove them.
5) Disconnect all connectors for contact coil and combination switch assembly.

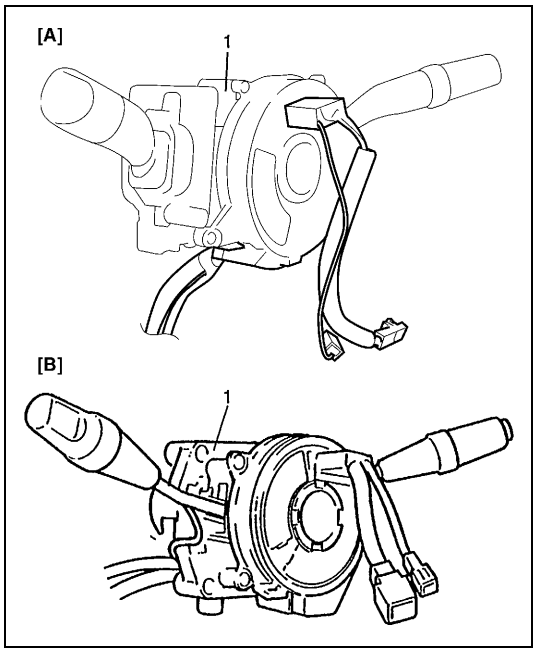
[A] : Other than canvas top model
[B] : Canvas top model



6) Remove contact coil and combination switch assembly (1) from steering column.

[A] :	Other than canvas top model
[B] :	Canvas top model
2.	Screw

INSPECTION

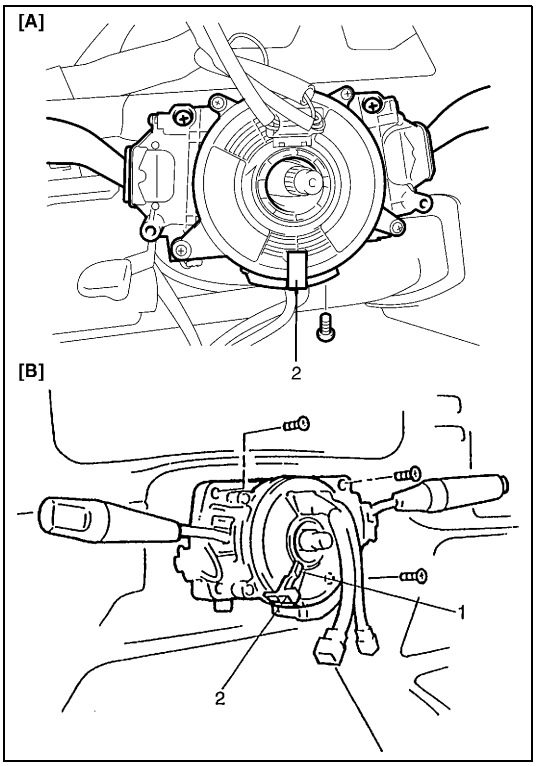


Check contact coil and combination switch wire harness for any signs of scorching, melting or other damage. If it is damaged, replace.

[A]:	Other than canvas top model
[B]:	Canvas top model
1.	Contact coil and combination switch assembly

INSTALLATION

1) Check to make sure that vehicle's front tires are set at straightahead position and then ignition switch is at “LOCK” position.

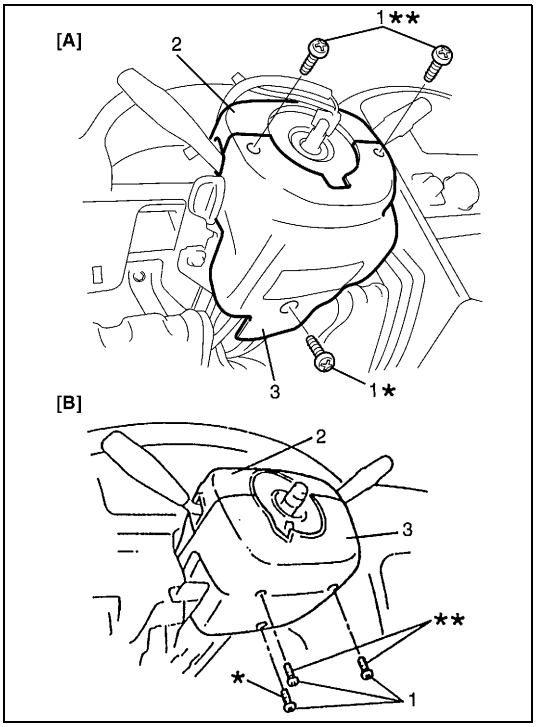


2) Install contact coil and combination switch assembly to steering column.

NOTE:

New contact coil and combination switch assembly is supplied with contact coil set and held at its center position with a lock pin and seal. Remove this lock pin after installing contact coil and combination switch assembly to steering column.

[A] :	Other than canvas top model
[B] :	Canvas top model
1.	Seal (if equipped, remove lock pin after installing contact coil and combination switch assembly.)
2.	Lock pin (if equipped, remove lock pin after installing contact coil and combination switch assembly.)

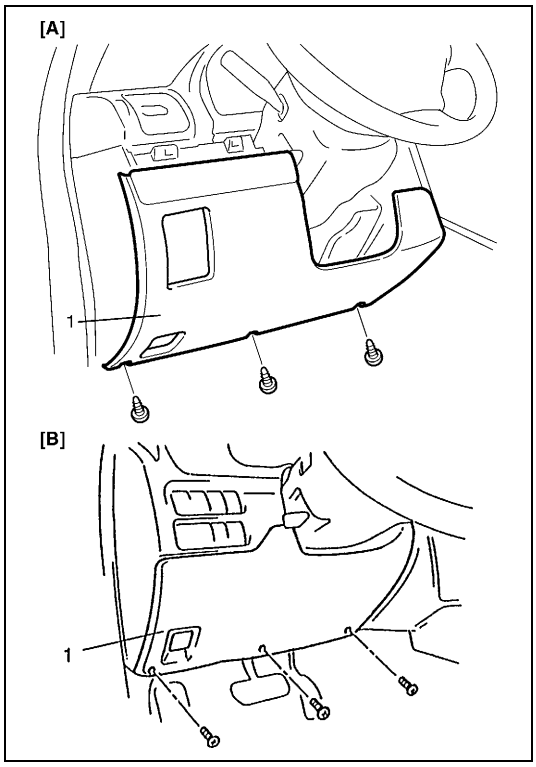


3) Connect all connectors that have been removed in removal.
4) Install steering column upper (2) and lower cover (3), and then tighten steering column cover screws (1).

CAUTION:

When installing lower cover and upper cover, be careful so that contact coil and combination switch lead wire is not caught between covers.

[A] :	Other than canvas top model	* :	Standard screw
[B] :	Canvas top model	** :	Tapping screw



5) Install steering column hole cover.
6) Install steering wheel to steering column. Refer to “Steering Wheel” in this section.

[A] :	Other than canvas top model
[B] :	Canvas top model
1.	Steering column hole cover

Steering Column (Other than Canvas Top Model)

CAUTION:

Once the steering column is removed from the vehicle, the column is extremely susceptible to damage.
Dropping the column assembly on its end could collapse the steering shaft or loosen the plastic shear pins which maintain column length leaning on the column assembly could cause it to bend or deform. Any of the above damage could impair the column's collapsible design.
When loosening steering column mounting bolts and nuts, make sure that steering column assembly and steering upper shaft assembly have been separated. Loosening them with steering column assembly and steering upper shaft assembly assembled could cause damage to upper joint and mounting bracket in steering upper shaft assembly.

NOTE:

When servicing steering column or any column-mounted component, remove steering wheel. But when removing steering column simply to gain access to instrument panel components, leave steering wheel installed on steering column.

REMOVAL

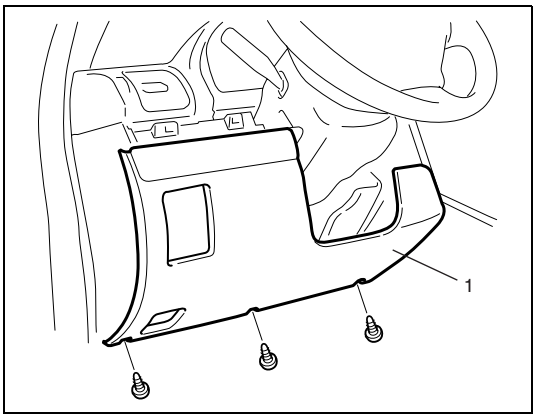
WARNING:

Never rest a steering column assembly on the steering wheel with air bag (inflator) module face down and column vertical. Otherwise personal injury may result.

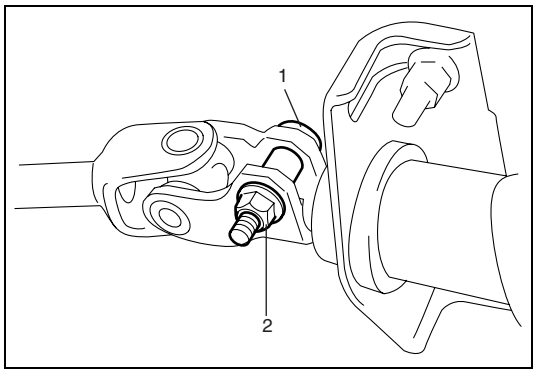
CAUTION:

Never turn steering wheel while steering column with steering wheel is removed. Turning steering wheel more than about two and a half turns will break contact coil.

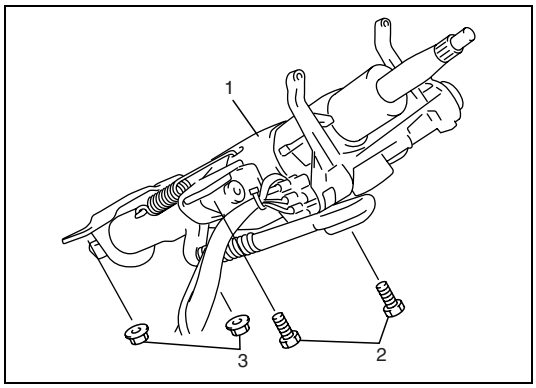
1) Disconnect negative (–) cable at battery.
2) Disable air bag system. Refer to "Disabling Air Bag System" under "Service Precautions" in Section 10B.
3) Remove steering wheel and contact coil and combination switch assembly, if necessary. Refer to "Steering Wheel" and "Contact Coil and Combination Switch Assembly" in this section.
   Perform the following procedure if not removing steering wheel and/or combination switch.
   a) Turn steering wheel so that vehicle's front tires are at straight-ahead position.
   b) Turn ignition switch to "LOCK" position and remove key.



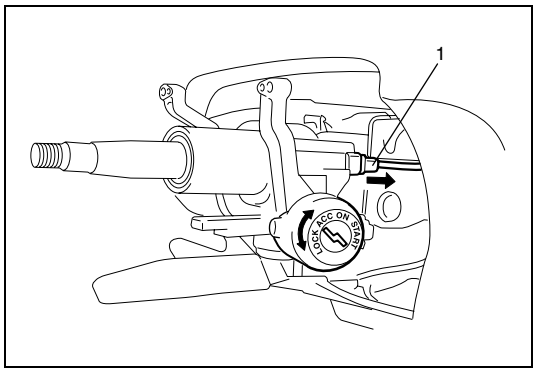
4) Remove steering column hole cover (1).
5) Disconnect all connectors for the following parts.
   - Contact coil and combination switch
   - Ignition switch



6) Remove steering upper shaft upper joint bolt (1) and nut (2).



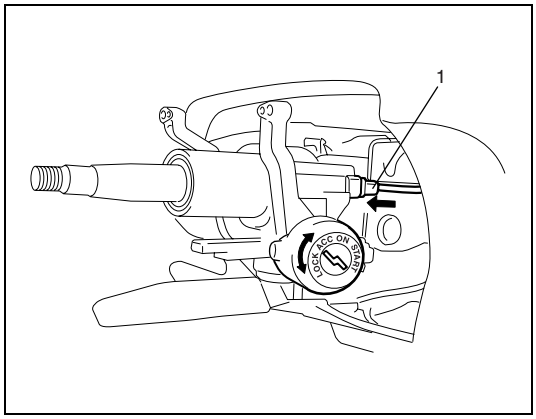
7) Remove steering column (1) mounting bolts (2 pieces) (2) and nuts (2 pieces) (3).



8) If equipped with shift (key) interlock cable (1), disconnect shift (key) interlock cable (1) from ignition switch with ignition switch turned at "ACC" position.
   After disconnecting turn ignition switch to "LOCK" position.
9) Remove steering column from vehicle.

INSPECTION

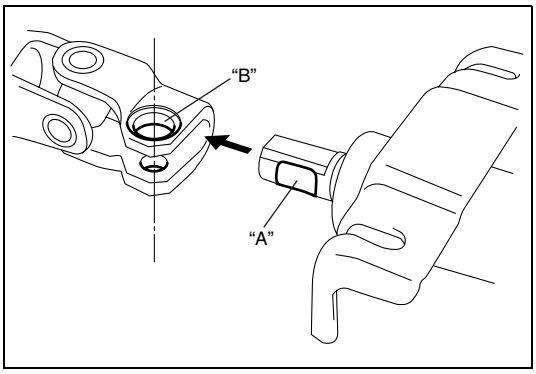
Check steering column for damage and operation referring to "Checking Steering Column and Steering Upper Shaft for Accident Damage" (Other than canvas top model) later in this section.



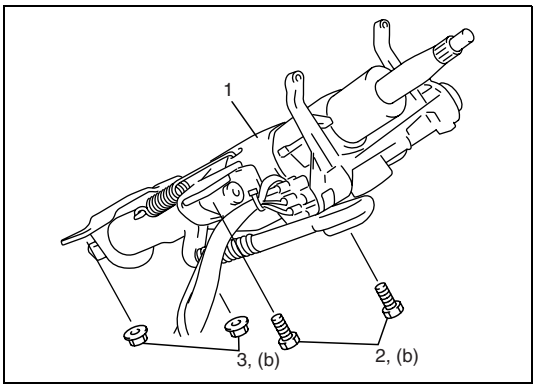
INSTALLATION

CAUTION:
After tightening steering column mounting bolts, steering shaft joint bolts should be tightened.

1) Be sure that front wheels and steering wheel are in straight-ahead position.
2) If equipped with shift (key) interlock cable (1), connect shift (key) interlock cable (1) to ignition switch with ignition switch turned at "ACC" posision.
   And then turn ignition switch to "LOCK" position.

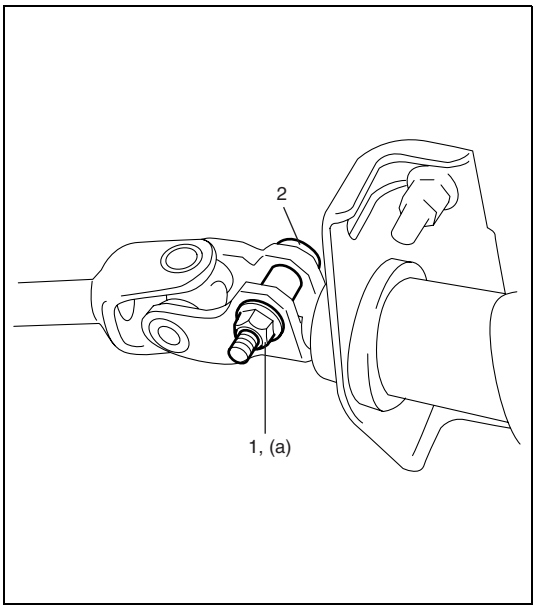


3) Align cutting point "A" of steering column assembly (1) with bolt hole "B" of steering upper shaft upper joint as shown in the figure. Then connect steering upper shaft upper joint.



4) Install steering column assembly (1) with contacting upper side of lower bracket slits to mounting bolts. Tighten steering column lower mounting nuts (3) first and then upper mounting bolts (2) to specified torque.

Tightening torque
Steering column mounting bolts and nuts
(b) : 25 N·m (2.5 kg-m, 18.0 lb-ft)



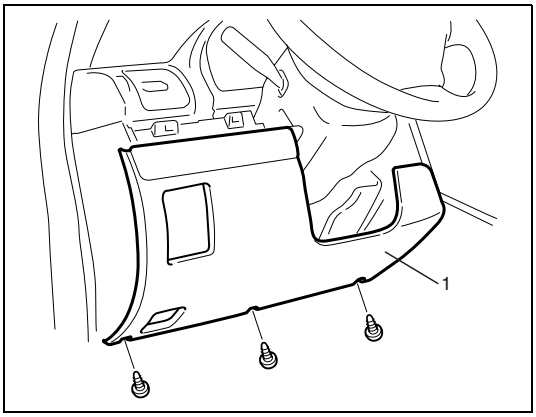
5) Install new steering upper shaft upper joint bolt (2) and nut (1). Tighten steering upper shaft upper joint nut (1) to specified torque.

NOTE:

Do not reuse steering upper shaft upper joint bolt and nut.
Be sure to use new bolt and nut when installing.

Tightening torque
Steering upper shaft upper joint nut
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

6) If contact coil and combination switch assembly is removed, install it, referring to "Contact Coil and Combination Switch Assembly" in this section.
7) Connect all connectors that have been removed in removal.



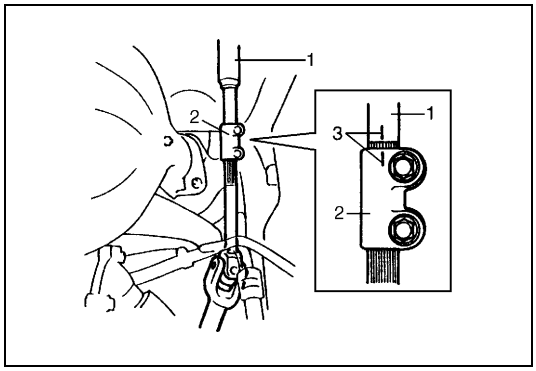
8) Install steering column hole cover (1).
9) If steering wheel is removed, install it by referring to "Steering Wheel" in this section.
10) Connect negative (–) cable to battery.
11) After installing steering column assembly, be sure to enable air bag system by referring to "Enabling Air Bag System" under "Service Precautions" in Section 10B.

Steering Upper Shaft Assembly (Other than Canvas Top Model)

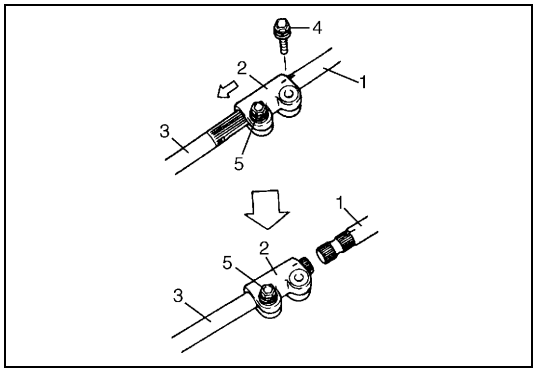
CAUTION:
Never turn steering wheel while steering upper shaft assembly is removed.
Should it have been turned and contact coil (on combination switch) have got out of its centered position, it needs to be centered again. Also, turning steering wheel more than about two and a half turns will break contact coil.

REMOVAL

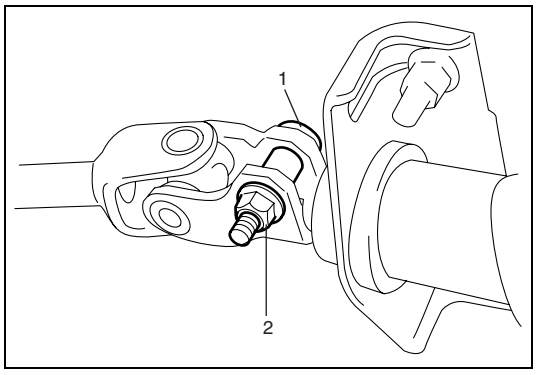
1) Turn steering wheel so that vehicle's front tires are at straight-ahead position.
2) Turn ignition switch to "LOCK" position and remove key.



3) Make alignment marks (3) on shaft joint (2) and shaft (upper shaft assembly side) (1) for a guide during reinstallation.



4) After removing bolt (4) on upper shaft assembly (1) side of shaft joint (2) and loosening bolt (5) on its lower shaft assembly (3) side, move shaft joint (2) to lower shaft assembly (3) side (in arrow direction in the figure).



5) Remove steering upper shaft upper joint bolt (1) and nut (2).

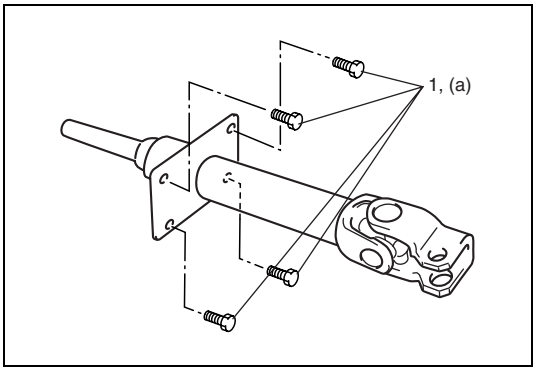
6) Remove steering upper shaft mounting bolts (4 pieces).
7) Remove steering upper shaft assembly from vehicle.

INSPECTION

Check steering shaft damage and operation referring to “Check Steering Column and Steering Upper Shaft for Accident Damage” (Other than canvas top model) later in this section.

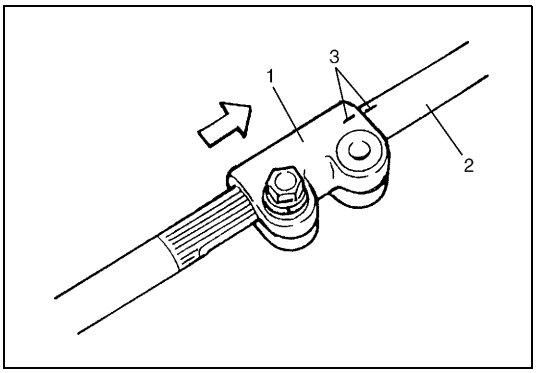
INSTALLATION

1) Be sure that front tires and steering wheel are in straight ahead position.

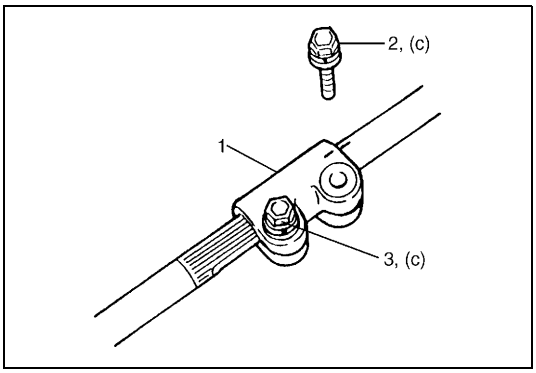


2) Install steering upper shaft assembly to dash panel. Tighten steering upper shaft mounting bolts (1) to specified torque.

Tightening torque
Steering upper shaft mounting bolts
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

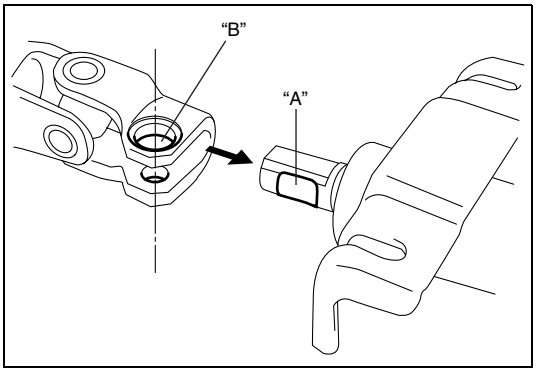


3) Install steering shaft joint (1) to steering upper shaft (2) by matching it to marks (3) made before removal.

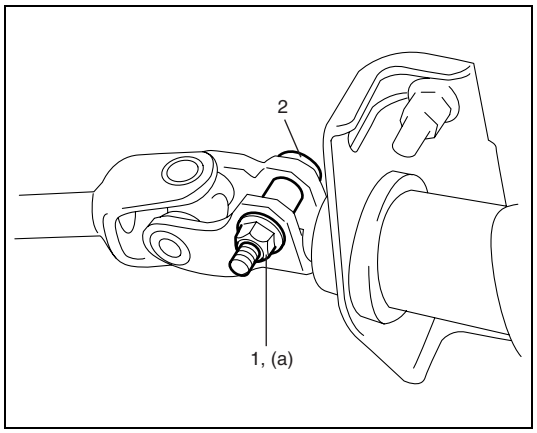


4) Install shaft joint bolt (upper shaft assembly side) (2) to steering shaft joint (1). Tighten shaft joint bolt (upper shaft assembly side) (2) to specified torque first and then shaft joint bolt (lower shaft assembly side) (3) to specified torque.

Tightening torque
Steering shaft joint bolt
(c) : 25 N·m (2.5 kg-m, 18.0 lb-ft)



5) Align cutting point “A” of steering column assembly (1) with bolt hole “B” of steering upper shaft upper joint as shown in the figure. Then connect steering upper shaft upper joint.



6) Install new steering upper shaft upper joint bolt (2) and nut (1). Tighten steering upper shaft upper joint nut (1) to specified torque.

NOTE:

Do not reuse steering upper shaft upper joint bolt and nut.
Be sure to use new bolt and nut when installing.

Tightening torque
Steering upper shaft upper joint nut
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

Steering Column (Canvas TOP Model)

CAUTION:

Once the steering column is removed from the vehicle, the column is extremely susceptible to damage.
Dropping the column assembly on its end could collapse the steering shaft or loosen the plastic shear pins which maintain column length leaning on the column assembly could cause it to bend or deform.
Any of the above damage could impair the column's collapsible design.
When loosening steering column mounting bolts, make sure that steering column assembly and steering shaft lower assembly have been separated. Loosening them with steering column assembly and steering shaft lower assembly assembled could cause damage to bearing in steering shaft lower assembly.

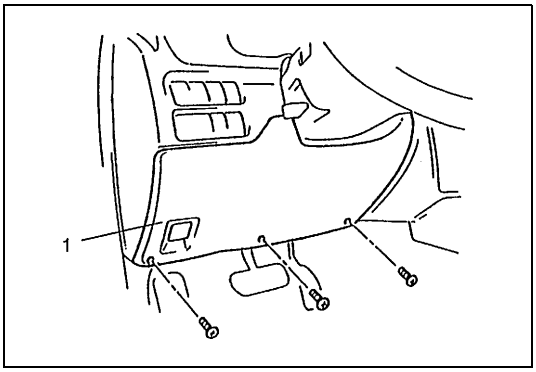
NOTE:

When servicing steering column or any column-mounted component, remove steering wheel. But when removing steering column simply to gain access to instrument panel components, leave steering wheel installed on steering column.

REMOVAL

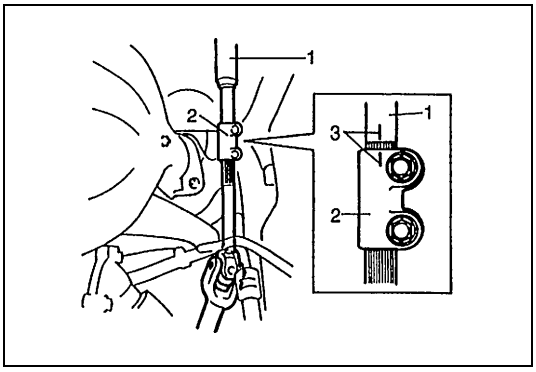
WARNING:
Never rest a steering column assembly on the steering wheel with air bag (inflator) module face down and column vertical. Otherwise personal injury may result.

1) Disconnect negative battery cable at battery terminal.
2) Disable air bag system. Refer to “Disabling Air Bag System” under “Service Precautions” in Section 10B.
3) Remove steering wheel and contact coil and combination switch assembly, if necessary. Refer to “Steering Wheel” and “Contact Coil and Combination Switch Assembly” in this section.
   Perform the following procedure if not removing steering wheel and/or combination switch.
   a) Turn steering wheel so that vehicle’s front tires are at straightahead position.
   b) Turn ignition switch to “LOCK” position and remove key.



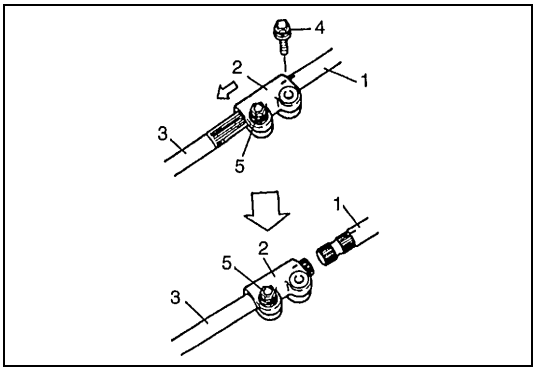
4) Remove steering column hole cover.
5) Disconnect all connectors for the following parts.
   • Contact coil and combination switch
   • Ignition switch

1.	Steering column hole cover



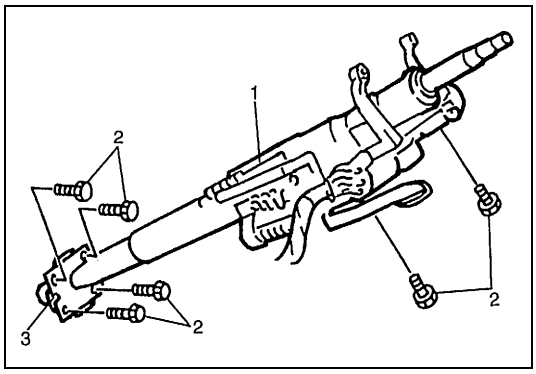
6) Make alignment marks on shaft joint and shaft (column side) for a guide during reinstallation.

1.	Steering column assembly
2.	Steering shaft joint
3.	Marks



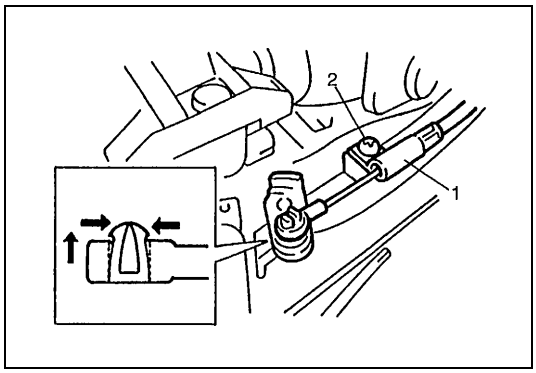
7) After removing bolt on column side of shaft joint and loosening bolt on its lower shaft assembly side, move shaft joint to lower shaft assembly side (in arrow direction in the figure).

1.	Steering column assembly
2.	Steering shaft joint
3.	Steering lower shaft assembly
4.	Bolt (column side)
5.	Bolt (lower shaft assembly side)



8) Remove steering column mounting bolts (6 pieces).

1. Steering column
2. Steering column mounting bolt
3. Steering column lower seal



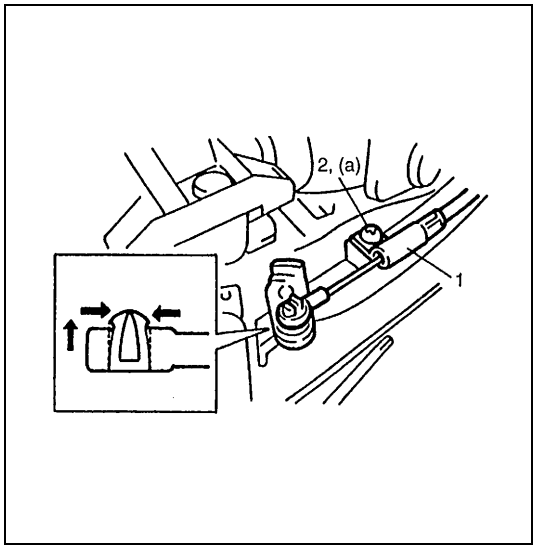
9) If equipped with shift (key) interlock cable, remove shift (key) interlock cable screw and then disconnect its cable from ignition switch.
10) Remove steering column from vehicle.

1. Shift (key) interlock cable
2. Screw

INSPECTION

Check steering column for damage and operation referring to "Checking Steering Column for Accident Damage" (Canvas top model).

INSTALLATION

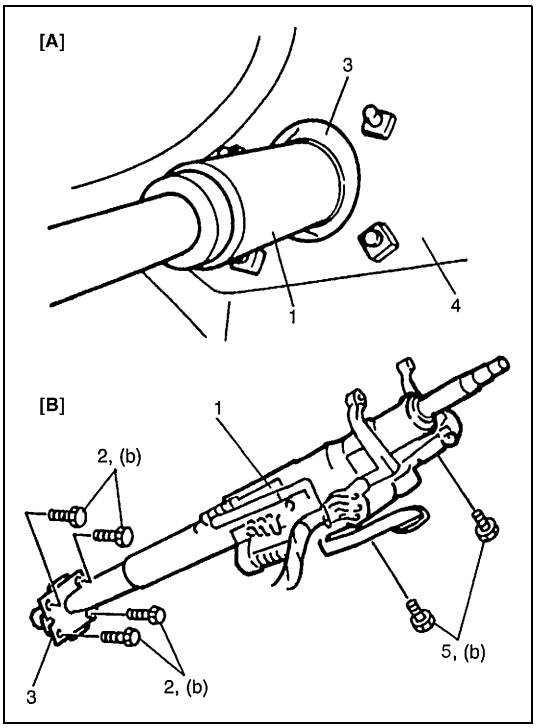


CAUTION:
After tightening steering column mounting bolts, steering shaft joint bolts should be tightened.

1) Be sure that front wheels and steering wheel are in straightahead position.
2) If equipped with shift (key) interlock cable, install shift (key) interlock cable to ignition switch.

Tightening torque
Shift (key) interlock cable screw
(a) : 2.2 N·m (0.22 kg-m, 1.6 lb-ft)

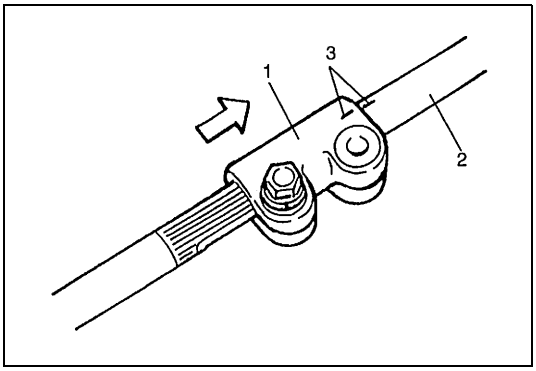
1. Shift (key) interlock cable
2. Screw



3) Install steering column assembly (1) to dash panel (4) and upper bracket so that boss of steering column lower seal (3) and all around it project out of hole in dash panel into engine room. Tighten steering column lower bolts (2) (4 pieces) first and then upper bolts (5) (2 pieces) to specified torque.

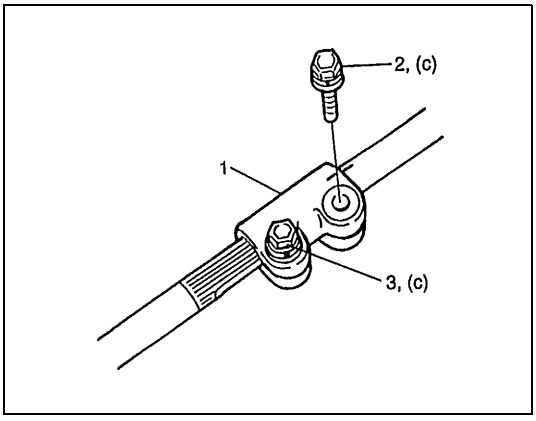
Tightening torque
Steering column mounting bolt
(b) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

[A] :	In engine room
[B] :	In cabin



4) Install steering shaft joint to steering shaft by matching it to marks made before removal.

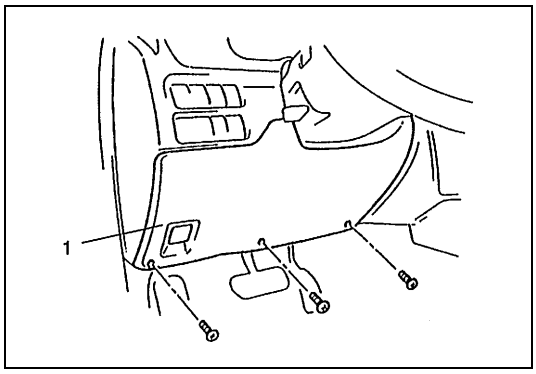
1.	Steering shaft joint
2.	Steering shaft (column side)
3.	Marks



5) Install shaft joint bolt (column side) to steering shaft joint. Tighten shaft joint bolt (column side) to specified torque first and then shaft joint bolt (lower shaft assembly side) to specified torque.

Tightening torque
Shaft join bolt
(c) : 25 N·m (2.5 kg-m, 18.0 lb-ft)

1.	Steering shaft joint
2.	Bolt (column side)
3.	Bolt (lower shaft assembly side)



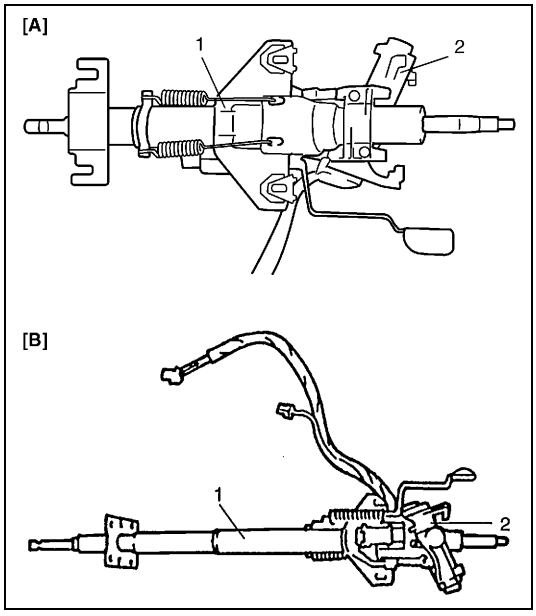
6) If contact coil and combination switch assembly is removed, install it, referring to “Contact Coil and Combination Switch Assembly” in this section.
7) Connect all connectors that have been removed in removal.
8) Install steering column hole cover.

1. Steering column hole cover

9) If steering wheel is removed, install it by referring to “Steering Wheel” in this section.
10) Connect negative battery cable.
11) After installing steering column assembly, be sure to enable air bag system by referring to “Enabling Air Bag System” under “Service Precautions” in Section 10B.

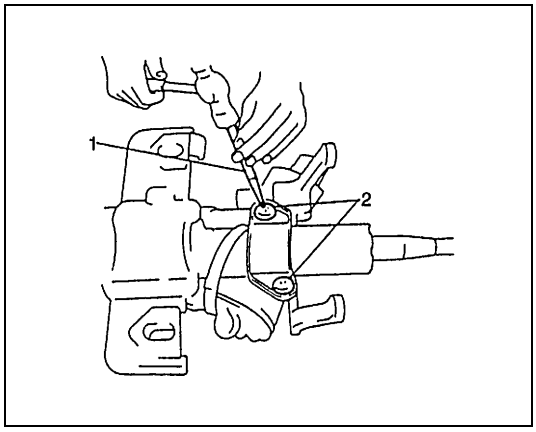
Steering Lock Assembly (Ignition Switch)

REMOVAL



1) Remove steering column (1). Refer to “Steering Column” in this section.

[A]: Other than canvas top model
[B]: Canvas top model



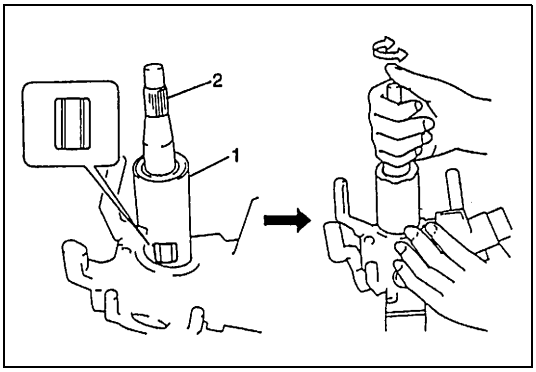
2) Using center punch (1) as shown, loosen and remove steering lock mounting bolts (2).

NOTE:

Use care not to damage aluminum part of steering lock body with center punch.

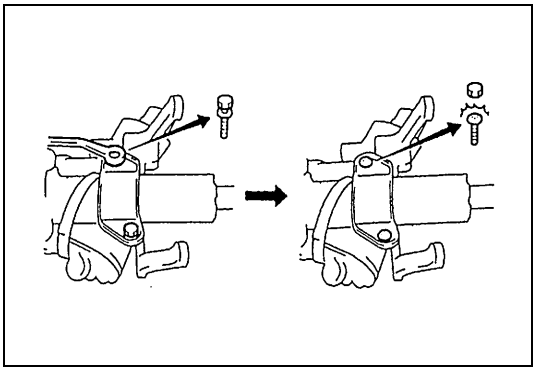
3) Turn ignition key to “ACC” or “ON” position and remove steering lock assembly from steering column.

INSTALLATION



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

1. Steering column

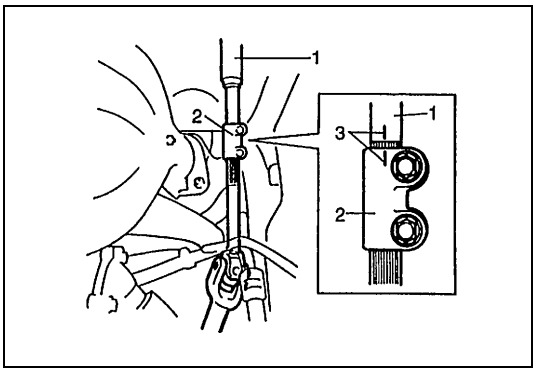


5) Tighten new bolts until head of each bolt is broken off.
6) Turn ignition key to “ACC” or “ON” position and check to be sure that steering shaft rotates smoothly. Also check for lock operation.
7) Install steering column. Refer to “Steering Column” in this section.

Steering Lower Shaft Assembly

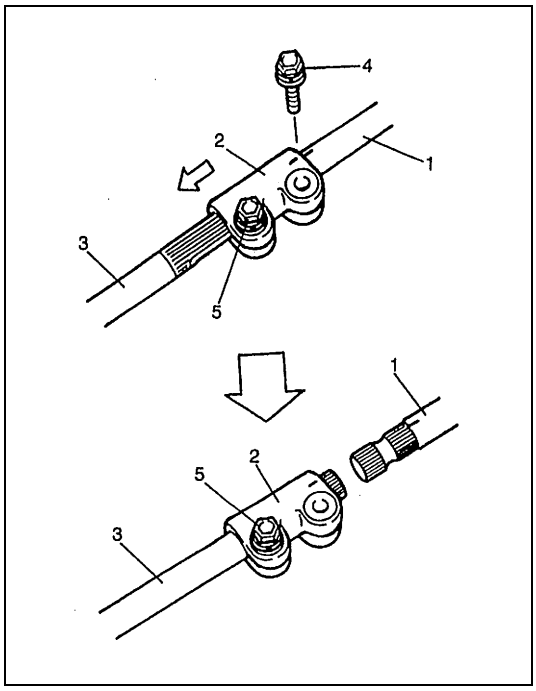
CAUTION:
Never turn steering wheel while steering lower shaft assembly is removed.
Should it have been turned and contact coil (on combination switch) have got out of its centered position, it needs to be centered again. Also, turning steering wheel more than about two and a half turns will break contact coil.

REMOVAL



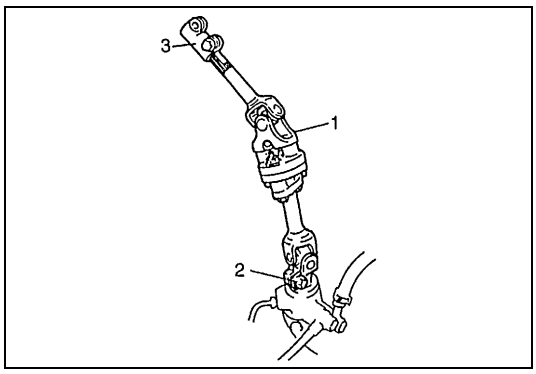
1) Turn steering wheel so that vehicle’s front tires are at straightahead position.
2) Turn ignition switch to “LOCK” position and remove key.
3) Make alignment marks on shaft joint and shaft (column side) for a guide during reinstallation.

1. Steering column assembly
2. Steering shaft joint
3. Markst



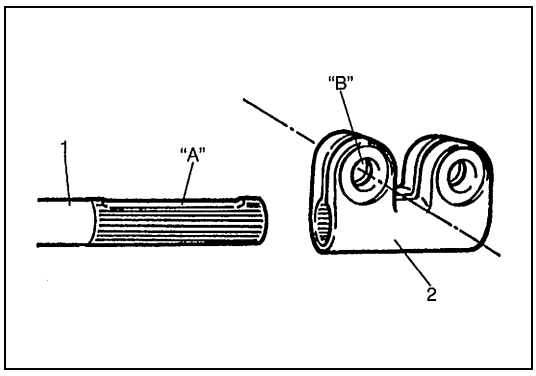
4) After removing bolt (4) on upper shaft or column side of shaft joint and loosening bolt (5) on its lower shaft assembly side, move shaft joint (2) to lower shaft assembly side (in arrow direction in figure).

1.	Upper shaft assembly steering column assembly
3.	Steering lower shaft assembly

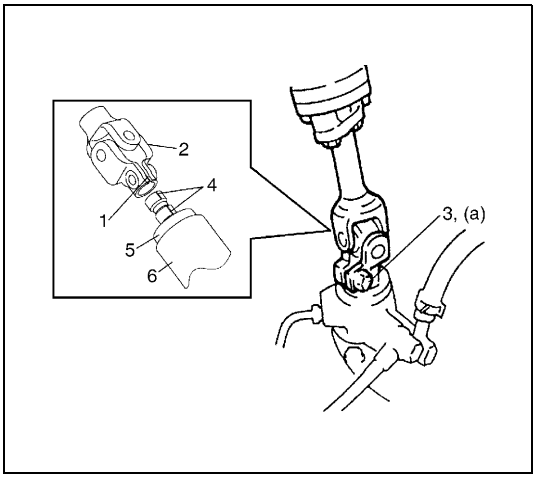


5) Make alignment marks on lower shaft assembly lower joint and pinion shaft for a guide during reinstallation.
6) Remove lower shaft assembly lower joint bolt (2) and then remove lower shaft assembly.
7) Remove shaft joint bolt (lower shaft assembly side) from shaft joint and then remove shaft (3) joint from lower shaft assembly (1).

INSTALLATION



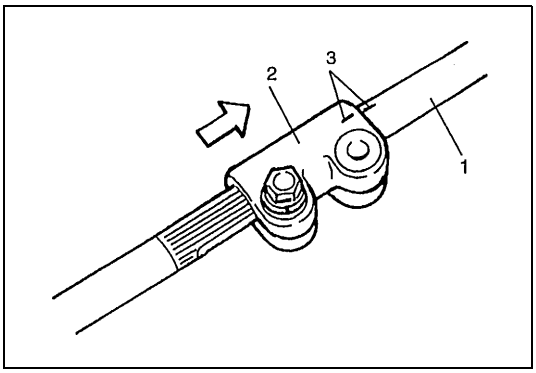
1) Be sure that front wheels and steering wheel are in straight ahead position.
2) Align flat part "A" of lower shaft assembly with bolt hole "B" of shaft joint (2) as shown. Then insert shaft joint into lower shaft assembly (1).
3) Install shaft joint bolt (lower shaft assembly side) to shaft joint.
   Then tighten it by hand.



4) Insert pinion shaft into lower shaft assembly lower joint (2) with slit (1) of lower joint, marks (4) on pinion shaft (5) and gear case (6) aligned.
And then install lower shaft assembly lower joint bolt (3) to lower shaft assembly lower joint (2). Tighten it to specified torque.

Tightening torque
Lower shaft assembly lower join bolt
(a) : 25 N·m (2.5 kg-m, 18.0 lb-ft)

1.	Steering lower shaft assembly
4.	Steering shaft joint

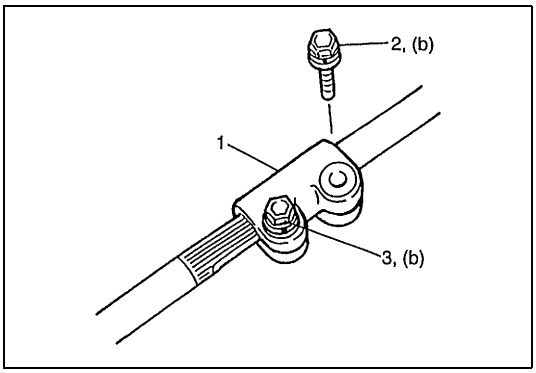


5) Install steering shaft joint (2) to steering shaft by matching it to marks (3) made before removal.

NOTE:

Be sue that front wheels and steering wheel are in straightahead position.

1.	Upper shaft assembly steering column assembly



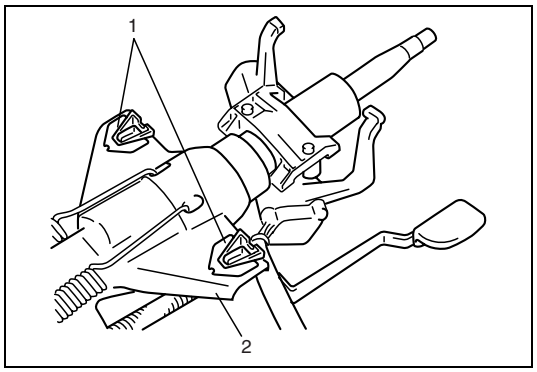
6) Install shaft joint bolt (upper shaft assembly or column side) (2) to shaft joint (1). Tighten shaft joint bolt (column side) (3) to specified torque first and then shaft joint bolt (shaft lower assembly side) to specified torque.

Tightening torque
Steering shaft joint bolt
(b) : 25 N·m (2.5 kg-m, 18.0 lb-ft)

Checking Steering Column and Steering Upper Shaft for Accident Damage (Other than Canvas Top Model)

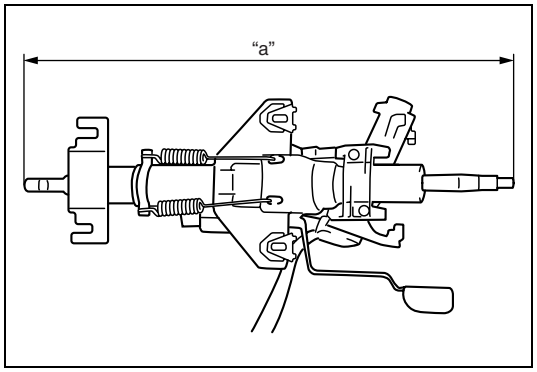
NOTE:

Vehicles involved in accidents resulting in body damage, where steering column has been impacted or air bag deployed, may have a damaged or misaligned steering column.



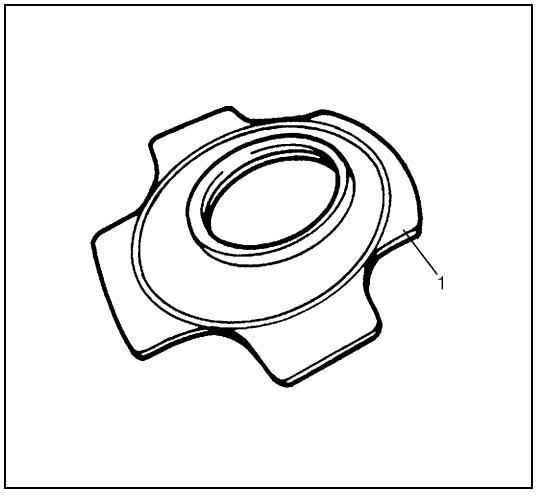
- Check that 2 capsules are attached to steering column bracket securely. Check clearance between capsules and steering column bracket. Clearance should be 0 mm (0 in.) on both sides. If found loose or clearance, replace steering column assembly.

1.	Capsule
2.	Steering column bracket

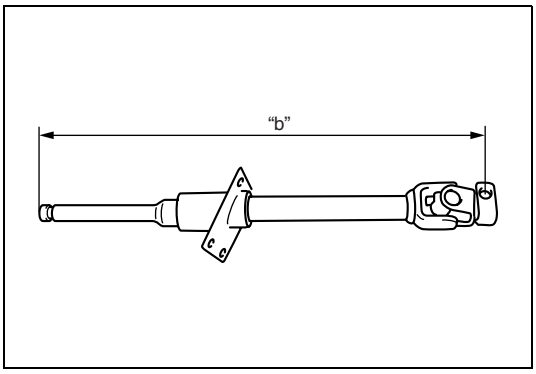


- Take measurement "a" as shown in the figure. If it is shorter than specified length, replace column assembly with new one.

Steering column assembly length
"a" : 490.3 ± 1.0 mm (19.30 ± 0.04 in.)



- Check steering shaft for smooth rotation.
  If found defective, replace as column assembly.
- Check steering shaft and column for bend, cracks or deformation.
  If found defective, replace as column assembly.
- Check steering upper shaft lower seal (1) for breakage or deformation.
  If found defective, replace.
- Check steering shaft joints and shaft for any damages such as crack, breakage, malfunction or excessive play.
  If anything is found faulty, replace steering upper shaft assembly, steering lower shaft assembly or steering column assembly.



- Take measurement "b" as shown in the figure. If it is shorter than specified length, replace steering upper shaft assembly with new one.

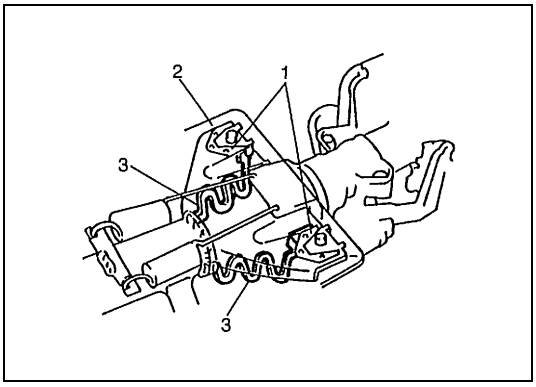
Steering upper shaft assembly length
"b" : 419.0 ± 1.0 mm (16.50 ± 0.04 in.)

Checking Steering Column for Accident Damage (Canvas Top Model)

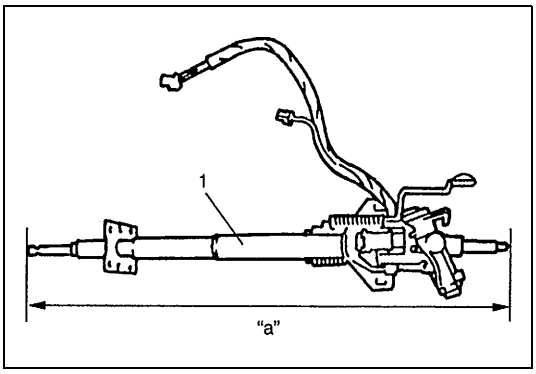
NOTE:

Vehicles involved in accidents resulting in body damage, where steering column has been impacted or air bag deployed, may have a damaged or misaligned steering column.

CHECKING PROCEDURE



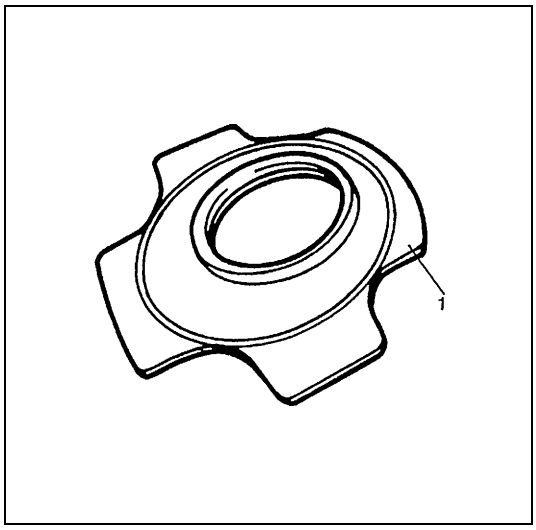
- Check that two capsules (1) are attached to steering column bracket securely. Check clearance between capsules and steering column bracket (2). Clearance should be 0 mm (0 in.) on both sides.
  If found loose or clearance, replace steering column assembly.
- Check two plates (3) for any damages such as crack or breakage.
  If anything is found faulty, replace as steering column assembly.



- Take measurement "a" as shown. If it is shorter than specified length, replace column assembly with new one.

Steering column assembly length
"a" : 895 ± 0.8 mm (35.24 ± 0.03 in.)

1. Steering column assembly

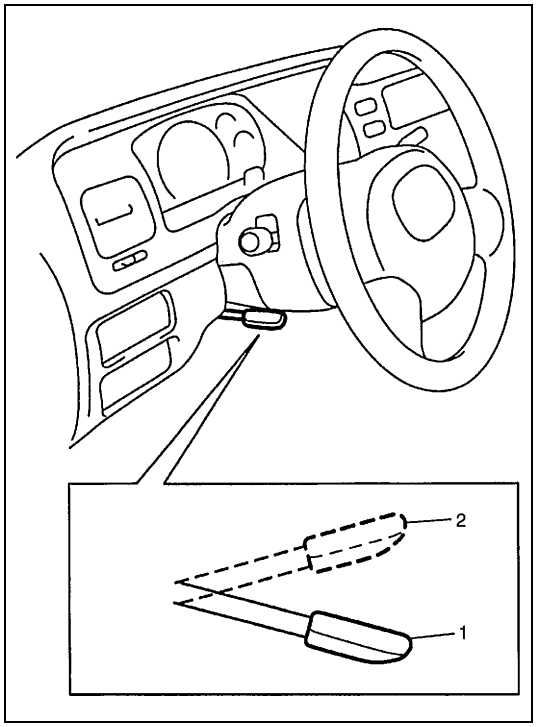


- Check steering column lower seal for breakage or deformation.
  If found defective, replace.
- Check steering shaft joints and shaft for any damages such as crack, breakage, malfunction or excessive play.
  If anything is found faulty, replace as steering shaft lower assembly or steering column assembly.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

1. Steering column lower seal

Adjustable Steering Column Release Lever

INSPECTION



Check to make sure that the following:

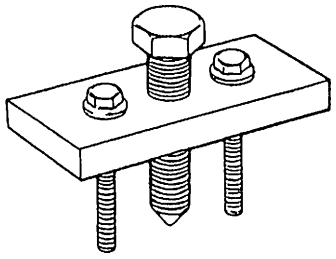
- Steering column moves smoothly when adjustable steering column release lever is at lower position (i.e., steering column is not locked).
- Steering column is fixed securely when adjustable steering column release lever is at upper position (i.e., steering column is locked).

1. Lower position
2. Upper position

Tightening Torque Specifications

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Driver air bag (inflator) module bolt	9	0.9	6.5
Steering shaft nut	33	3.3	23.5
Steering column mounting bolt (Canvas top model)	23	2.3	17.0
Steering column mounting bolt and nut (Other than canvas top model)	25	2.5	18.0
Steering shaft joint bolt	25	2.5	18.0
Steering lower shaft assembly lower joint bolt	25	2.5	18.0
Shift (key) interlock cable screw	2.2	0.22	1.6
Steering upper shaft mounting bolt (Other than canvas top model)	23	2.3	17.0
Steering upper shaft upper joint nut (Other than canvas top model)	23	2.3	17.0

Special Tool



09944-36011
Steering wheel remover

SECTION 3D

FRONT SUSPENSION

CAUTION:

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

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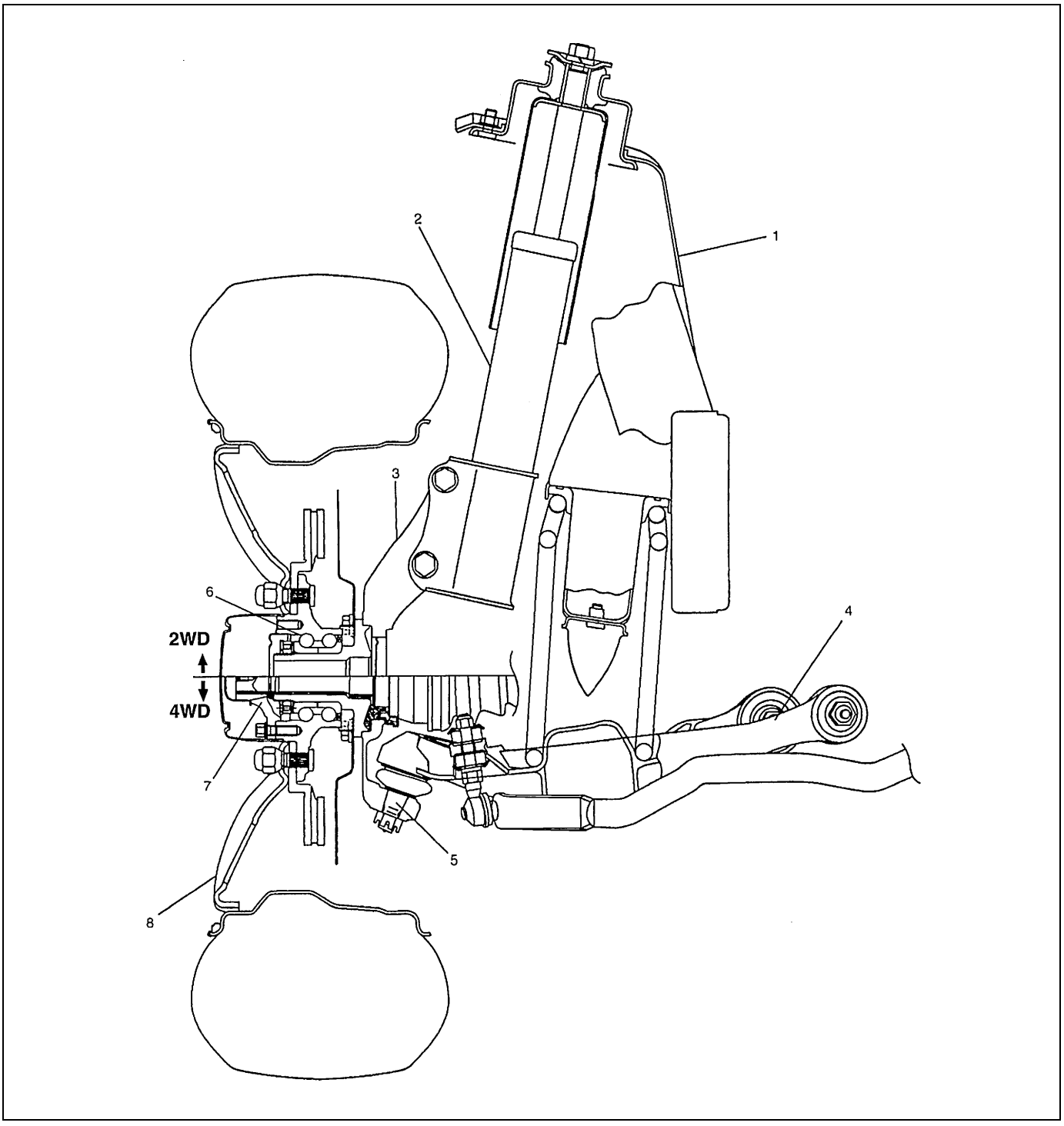
General Description

The front suspension is the strut type independent suspension. The upper end of a strut is anchored to the body by a strut support. The strut and strut support are isolated by a rubber mount.
The lower end of the strut is connected to the upper end of a steering knuckle and lower end of knuckle is attached to the stud of a ball joint which is incorporated in a unit with a suspension control arm. And this steering knuckle is connected to the tie rod end.
Thus, movement of the steering wheel is transmitted to the tie rod end and then to the knuckle, eventually causing the wheel-and-tire to move.



1. Body	4. Suspension control arm (Lower arm)	7. Axle shaft drive flange
2. Strut assembly	5. Ball stud	8. Wheel
3. Steering knuckle	6. Wheel bearing	

Diagnosis

Diagnosis Table

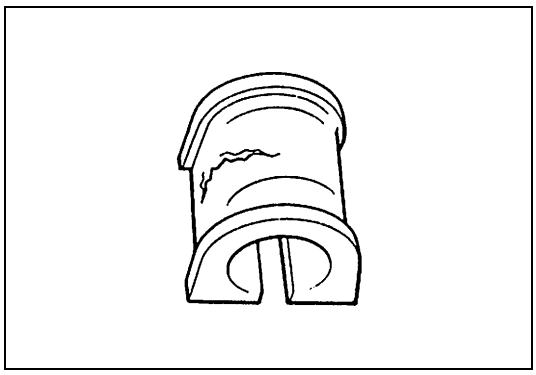
Refer to “Diagnosis Table” in Section 3.

Stabilizer Bar and Bushing Check

Bar

Inspect for damage or deformation. If defective, replace.

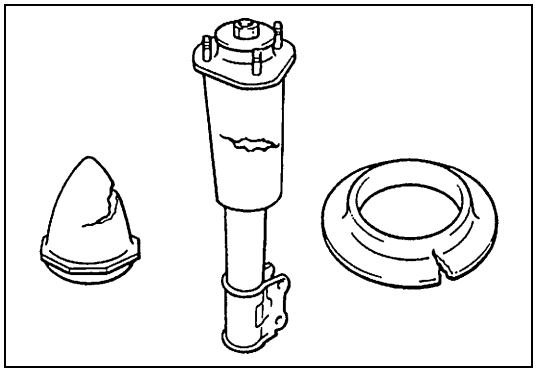
Bushing



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

Strut Damper and/or Coil Spring Check

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

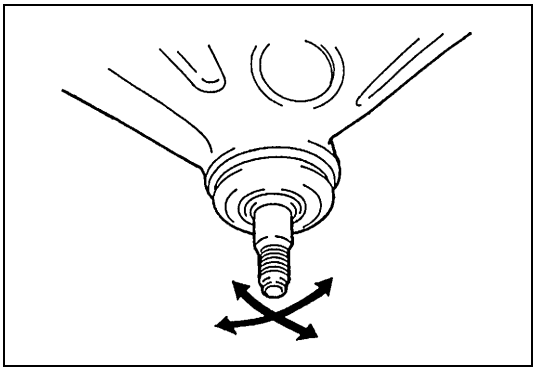


3) Inspect for damage or deformation.
4) Inspect strut boot for damage or crack.
5) Inspect for cracks or deformation in spring seat.
6) Inspect for deterioration of bump stopper.
7) Inspect strut mount for wear, cracks or deformation.
   Replace any parts found defective in steps 2) – 7).

Suspension Arm/Knuckle Check

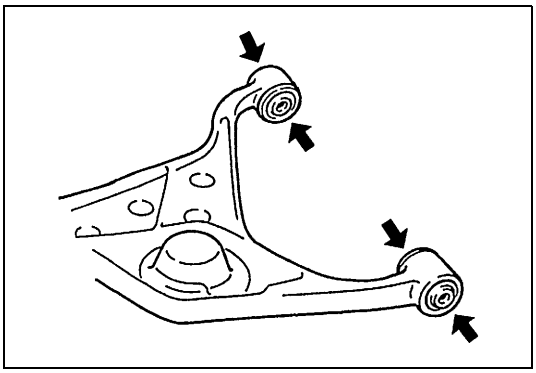
Inspect for cracks, deformation or damage.

Suspension Control Arm Joint Check



1) Check for smoothness of rotation.
2) Inspect ball stud for damage.
3) Inspect dust cover for damage.
   Replace any parts found defective in steps 1) – 3).

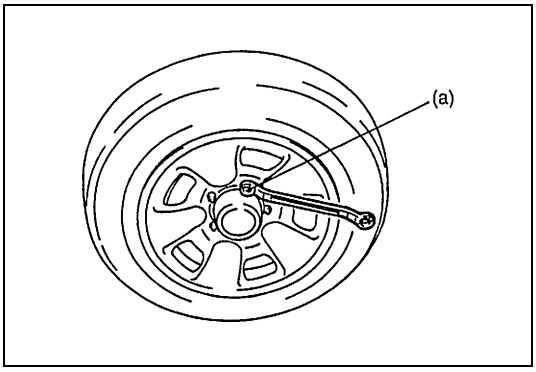
Suspension Control Arm bushing Check



Inspect for damage, wear or deterioration.

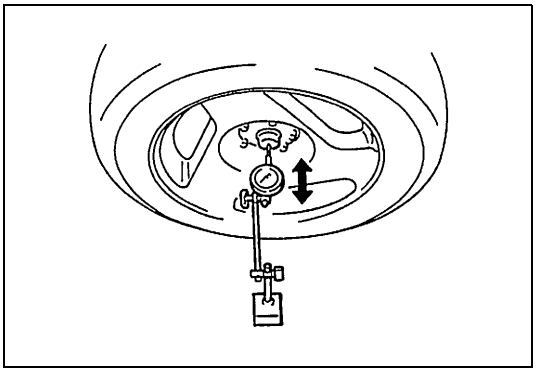
Wheel Disc, Nut & Bearing Check

1) Inspect each wheel disc for dents, distortion and cracks.
   Disc in badly damaged condition must be replaced.



2) Check wheel nuts for tightness and retighten them to specification as necessary.

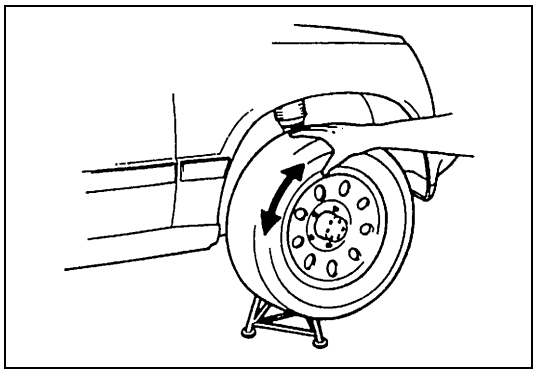
   Tightening torque
   Wheel nuts (a) : 100 N·m (10.0 kg-m, 72.5 lb-ft)



3) Check wheel bearing for wear. After retightening lock nut to specified torque, apply dial gauge to wheel hub center and measure thrust play.

   Wheel bearing thrust play limit : 0.05 mm (0.002 in.)

When measurement exceeds limit, replace bearing.



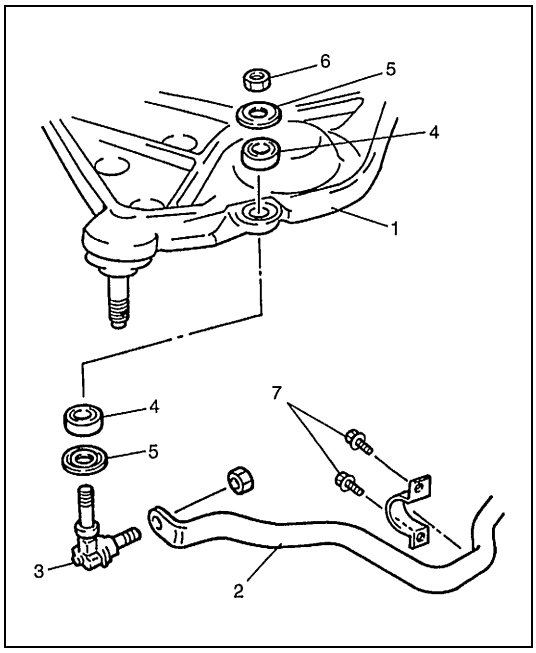
4) By rotating wheel actually, check wheel bearing for noise and smooth rotation. If defective, replace bearing.

On-Vehicle Service

Stabilizer Bar/Bushings

REMOVAL

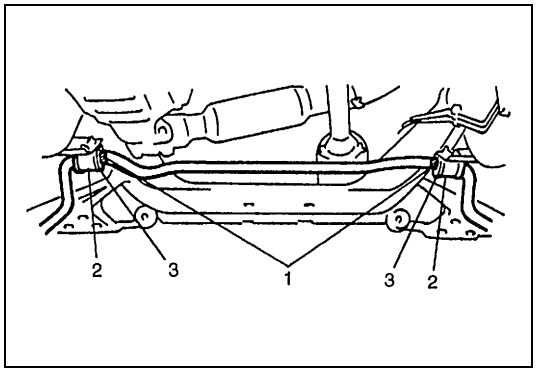
1) Hoist vehicle.



2) Remove stabilizer bar mount bush bracket bolts (7).
3) Remove stabilizer ball joint nuts (6), washers (5) and bushings (4).
4) Remove stabilizer bar (2) with its ball joints (3).
5) Disconnect stabilizer ball joints (3) from stabilizer bar (2).

1. Suspension control arm

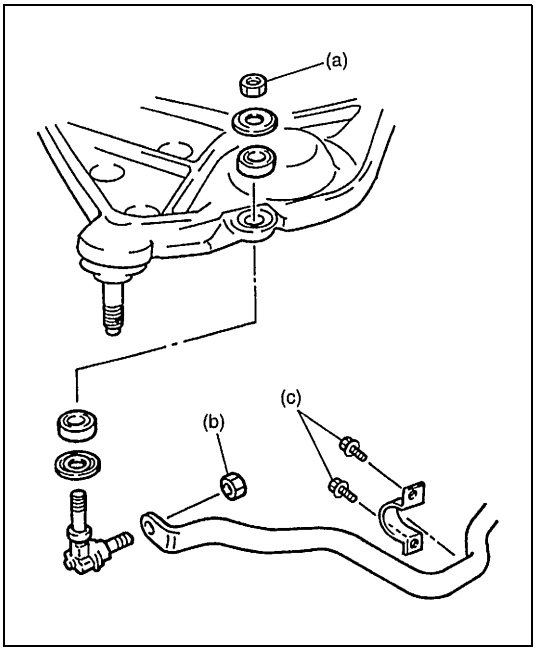
INSTALLATION



NOTE:

For correct installation of stabilizer bar, side-to-side, be sure that color paint (1) on stabilizer bar aligns with mount bush (3), both right and left, as shown.

1. Painted
2. Mount bush bracket



1) Connect stabilizer ball joints and stabilizer bar.
2) Install stabilizer ball joints to control arms.

NOTE:

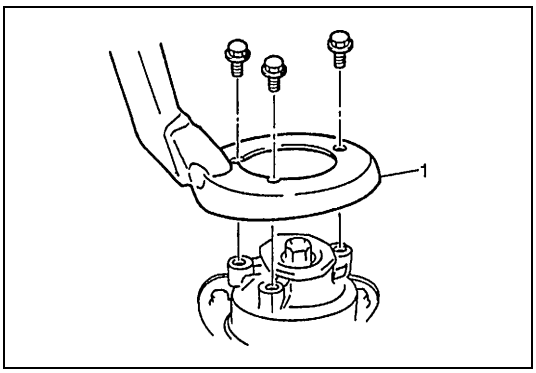
Do not tighten stabilizer ball joint nuts completely.

3) Install stabilizer bar mount bush brackets.
4) When installing stabilizer, loosely assemble all components while insuring that stabilizer is centered, side-to-side.
   Check that ball joint is set at neutral position seeing from body upper side.
5) Tighten stabilizer bracket bolts and stabilizer ball joint nuts to specified torque.

Tightening torque
Stabilizer ball joint nut (a) : 26 N·m (2.6 kg-m, 19.0 lb-ft)
Stabilizer ball joint nut (b) : 50 N·m (5.0 kg-m, 36.5 lb-ft)
Stabilizer bracket bolt (c) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

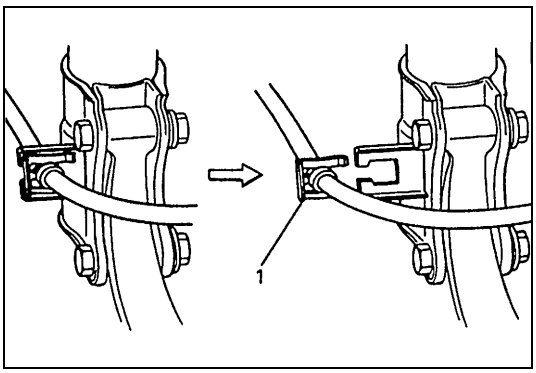
Strut Damper

REMOVAL

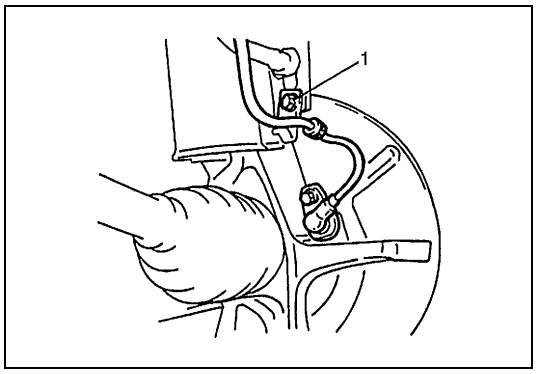


1) Remove strut tower bar (1) (if equipped).

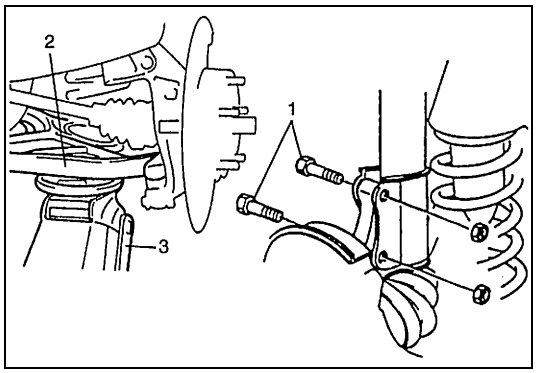
2) Hoist vehicle, allowing front suspension to hang free.
3) Remove wheel.



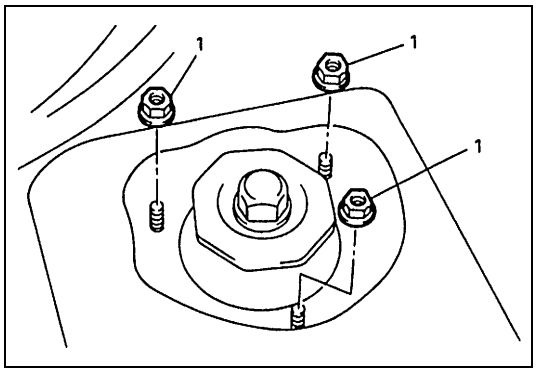
4) Remove E-ring (1) securing brake hose and take brake hose off strut bracket as shown.



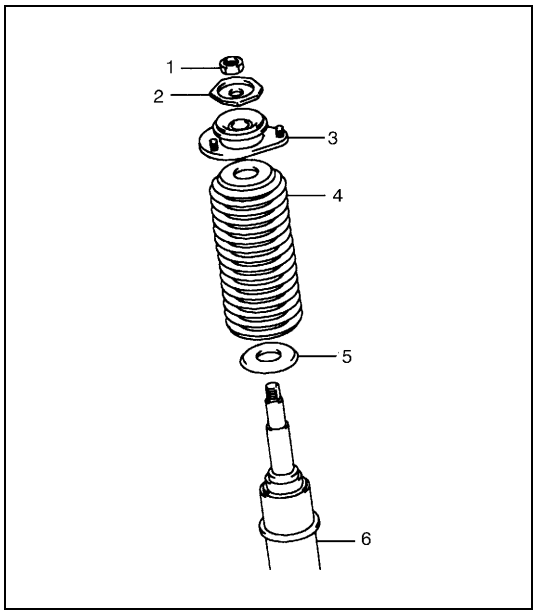
5) If equipped with ABS, remove front wheel speed sensor harness clamp bolt (1).



6) Remove strut bracket bolts (1), then support lower arm (2) with jack (3).

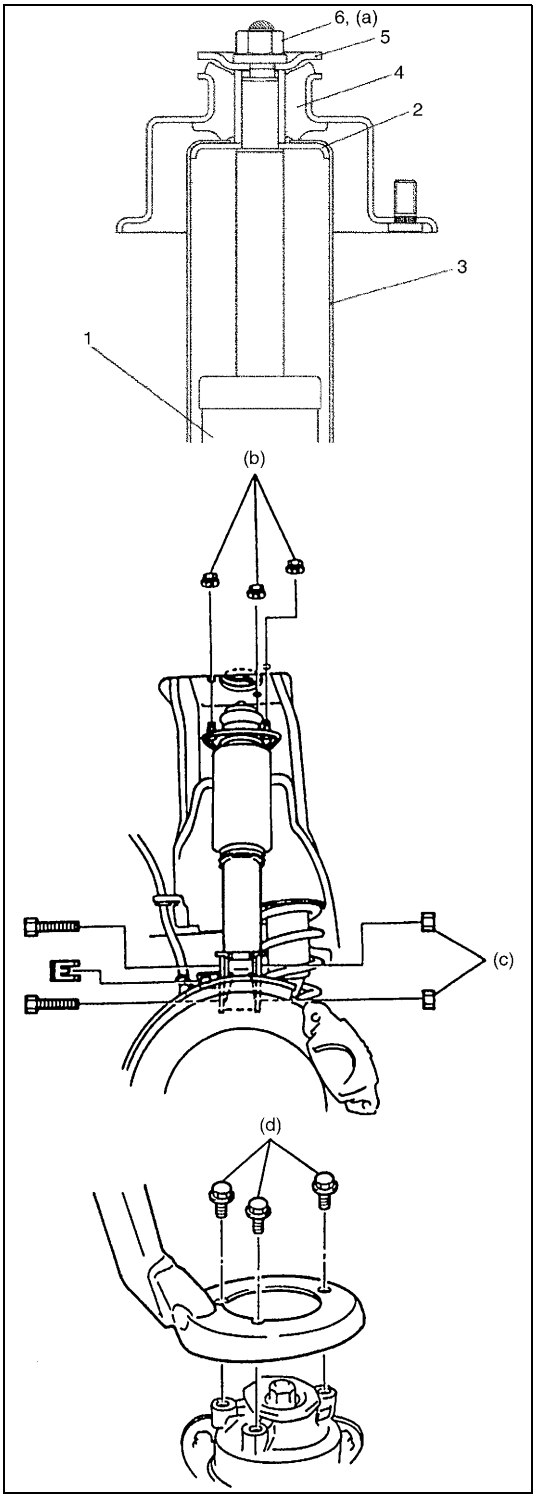


7) Remove strut support nuts (1).
   Hold strut by hand so that it will not fall off.
8) Remove strut.



9) Remove strut nut (1), upper seat (2), support (3), dust boot (4) and lower seat (5) from strut damper (6).

INSTALLATION

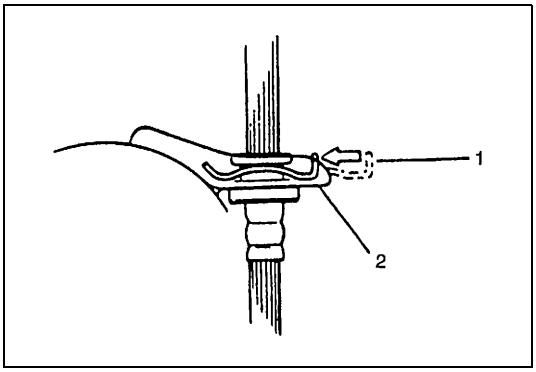


1) Install strut by reversing removal steps 1) – 9). Insert bolts in such a direction as shown.

1.	Strut damper
2.	Lower seat
3.	Dust boot
4.	Strut support
5.	Upper seat
6.	Strut nut

2) Torque all fasteners to specifications.

Tightening torque
Strut nut (a) : 90 N·m (9.0 kg-m, 65.0 lb-ft)
Strut support unt (b) : 55 N·m (5.5 kg-m, 40.0 lb-ft)
Bracket bolt (c) : 95 N·m (9.5 kg-m, 69.0 lb-ft)
Tower bar bolt (d) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

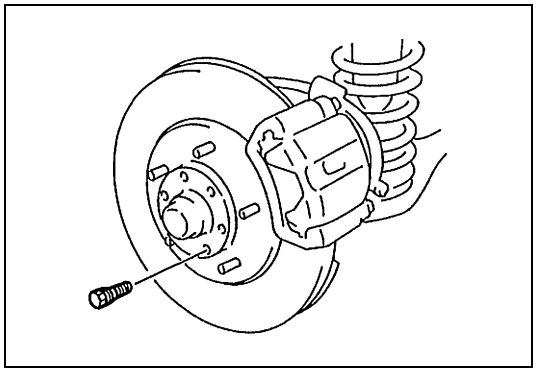


CAUTION:
Brake hose installation.
Don't twist hose when installing it. Install E-ring (1) as far as bracket end surface (2) as shown.

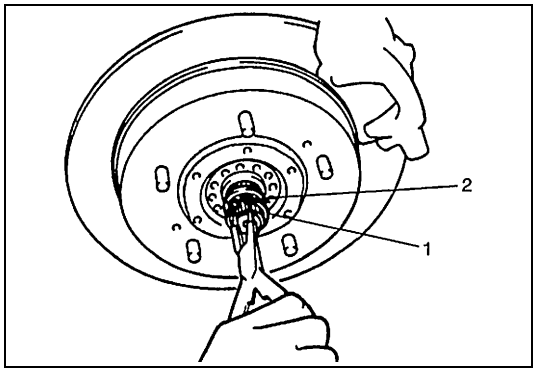
Coil Spring

REMOVAL

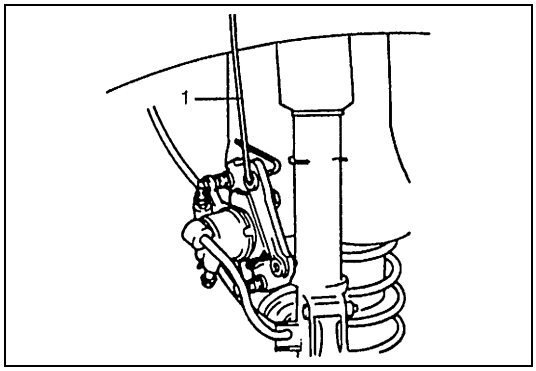
1) Hoist vehicle, allowing front suspension to hang free.
2) Remove wheels.



3) Remove axle shaft drive flange (For 4WD vehicle).

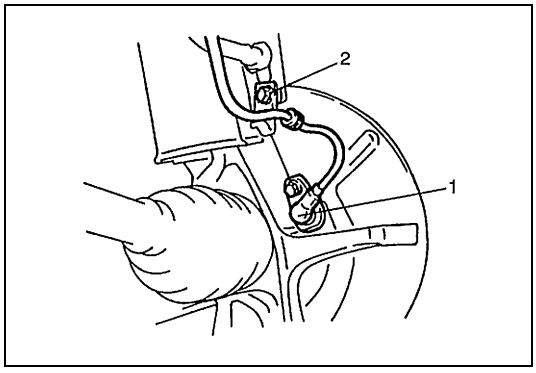


4) Remove front drive shaft circlip (1) and washer (2) (For 4WD vehicle).



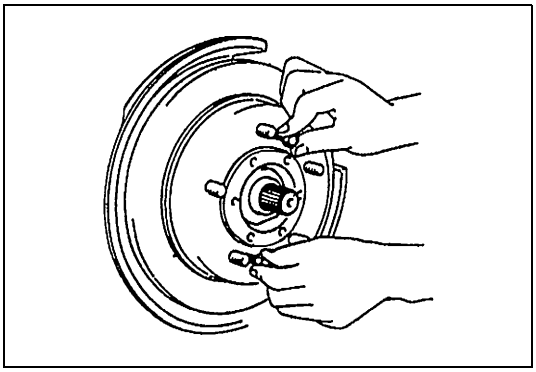
5) Remove caliper bolts and suspend caliper with a wire hook (1).

CAUTION:
Hang removed caliper with a wire hook (1) so as to prevent brake hose from bending and twisting excessively or being pulled.
Don't operate brake pedal with pads removed.



6) If equipped with ABS, remove harness clamp bolt (2) and remove front wheel speed sensor (1) from knuckle.

CAUTION:
- **Do not pull wire harness when removing front wheel speed sensor (1).**
- **Do not cause damage to surface of front wheel speed sensor (1) and do not allow dust, etc. to enter its installation hole.**

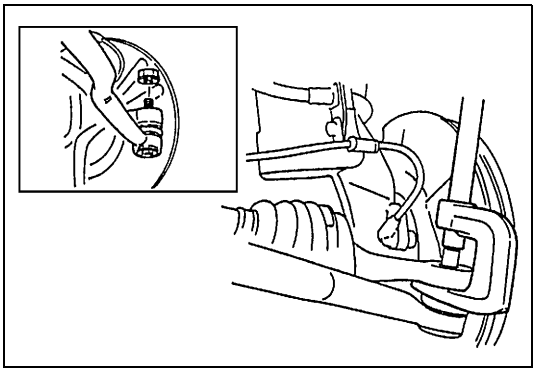


7) Remove brake disc.

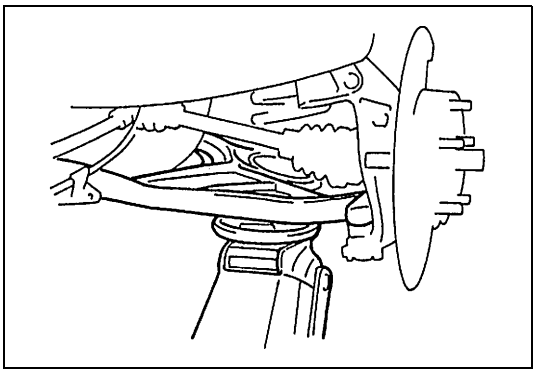
NOTE:

If brake disc can not be removed by hand, use 8 mm bolts as shown.

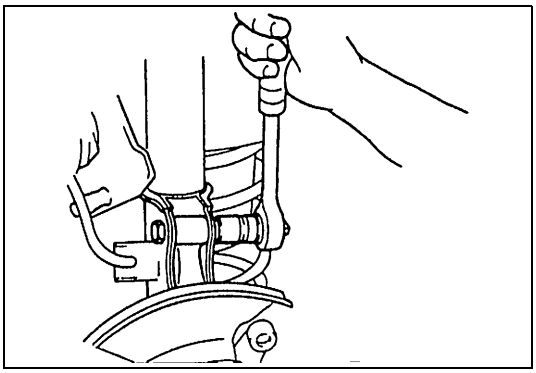
8) Remove stabilizer bar, refer to “REMOVAL” under “Stabilizer Bar/Bushings” in this section.



9) Disconnect tie rod end from knuckle by using puller.

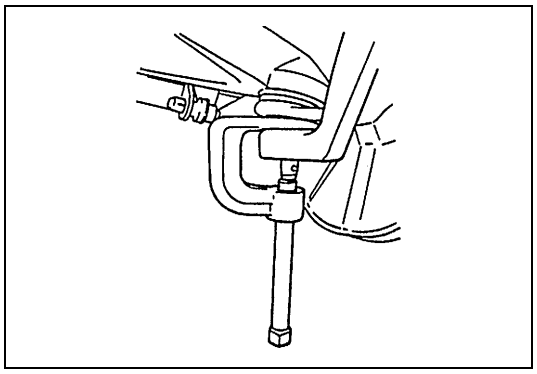


10) Support lower arm, using jack as shown.



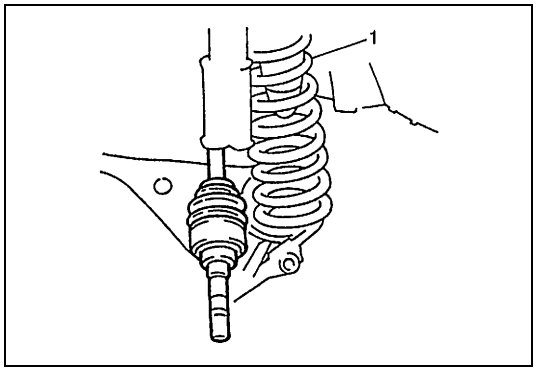
11) Remove strut bracket bolts.

12) Remove ball stud castle nut.



13) Using puller, disconnect knuckle from ball stud.

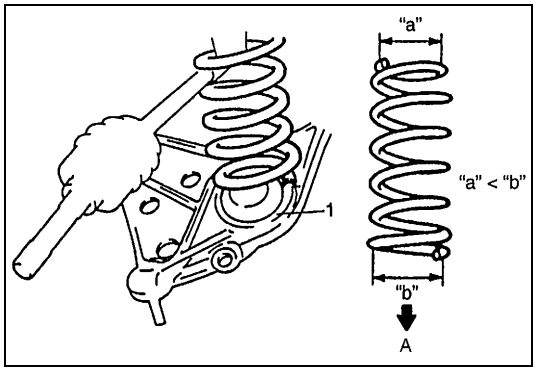
14) Remove knuckle and wheel hub comp, while lowering jack.



15) Remove coil spring (1).

INSTALLATION

Reverse removal procedure to install coil spring.

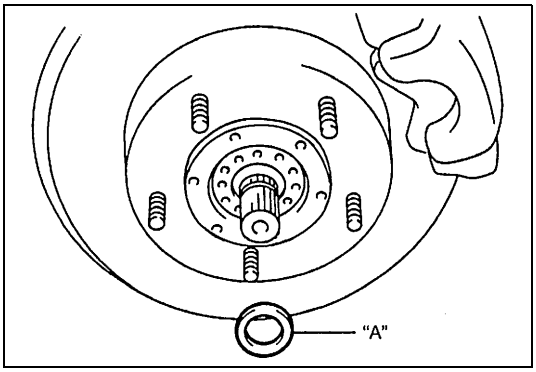


NOTE:

Upper and lower diameters of coil spring are different. Bring larger diameter end at bottom and set its open end in place on spring seat (1).

A : Bottom

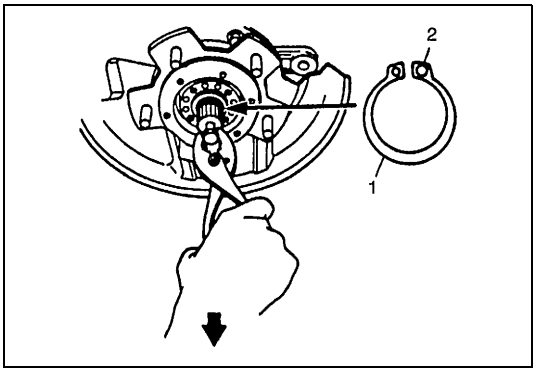
- Be sure to use specified torque for tightening each fastener.
- Refer to torque specification chart at the end of this section.
- As for ball stud nut, be sure to insert split pin and bend it after tightening it.
- Tighten tie-rod end nut with pushing ball stud to upper side so as not ball stud to be rotated.



For 4WD vehicle :

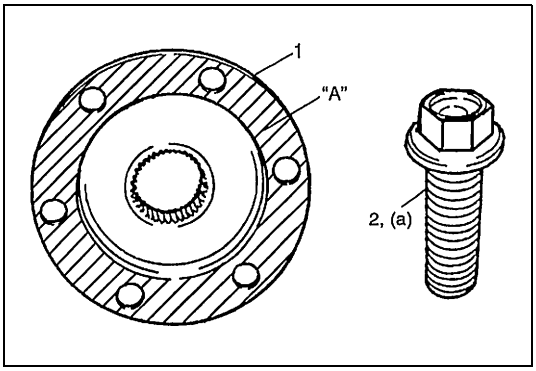
a) Apply lithium grease to front drive shaft washer and front wheel spindle outer.

"A" : Grease 99000-25010



For 4WD vehicle :

a) When installing circlip (1) to drive shaft, utilize screw hole in drive shaft to pull it out and bring large diameter (2) of circlip at right as shown.

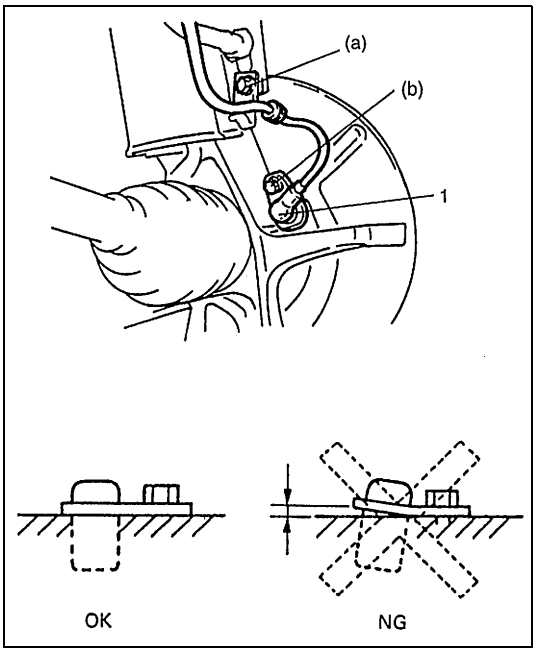


For 4WD vehicle :

a) When installing axle shaft drive flange (1) to wheel hub, apply sealant to mating surface of axle shaft drive flange and tighten flange bolt (2) to specified torque.

"A" : Sealant 99000-31090

Tightening torque
Axle shaft flange bolt (a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)



b) Check that no foreign material is attached to sensor and rotor.
Install wheel speed sensor (1) and its harness clamp.

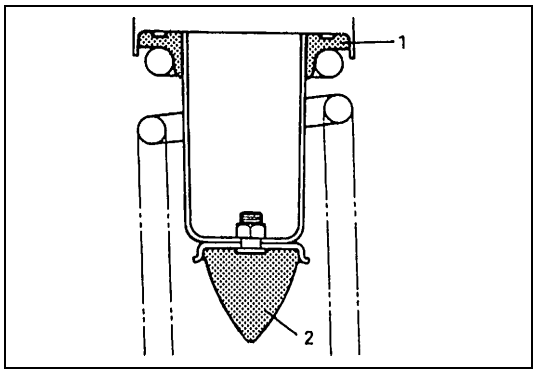
Tightening torque
Harness clamp bolt (a) : 10 N·m (1.0 kg-m, 7.5 lb-ft)
Speed sensor bolt (b) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

CAUTION:
- **Do not pull wire harness or twist more than necessary when installing front wheel speed sensor.**
- **Fit harness grommet to inner fender securely.**

c) Check that there is no clearance between sensor and knuckle.

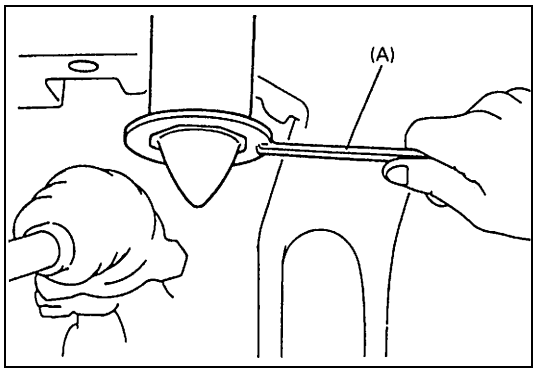
Bump Stopper/Spring Rubber Seat

REMOVAL



1) Remove coil spring. Refer to “REMOVAL” under “Coil Spring” in this section.
2) Remove spring rubber seat (1).

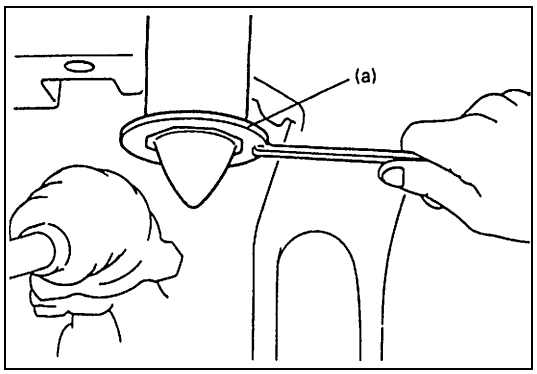
2. Bump stopper



3) Remove bump stopper, using special tool.

Special tool
(A) : 09941-66010

INSTALLATION



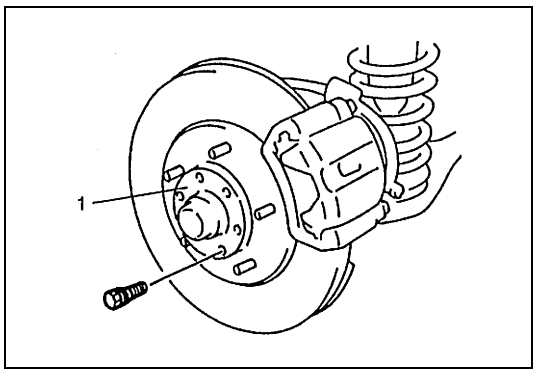
1) Tighten bump stopper to specified torque, using special tool.

Tightening torque
Bump stopper (a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

2) Install spring rubber seat.
3) Install coil spring. Refer to “INSTALLATION” under “Coil Spring” in this section.

Wheel Hub (Included Wheel Bearing)

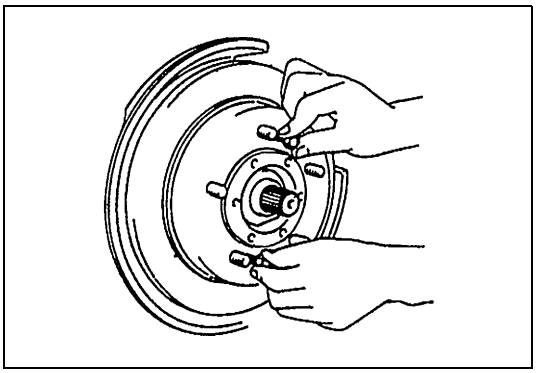
REMOVAL



1) Hoist vehicle and remove wheel.
2) Remove axle shaft drive flange (1) (4WD vehicle) or hub cap (2WD vehicle).

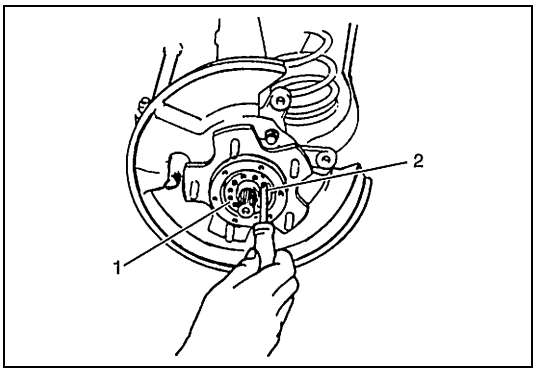
3) If equipped with ABS, remove wheel speed sensor from knuckle and harness clamp from strut.
4) Remove caliper bolt and suspend caliper.

CAUTION:
Hang removed caliper with a wire hook or the like so as to prevent brake hose from bending and twisting excessively or being pulled.
Don't operate brake pedal with pads removed.

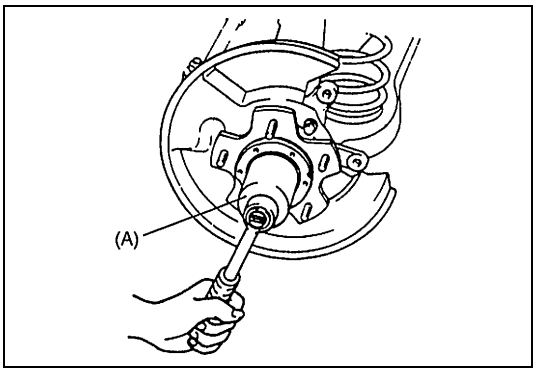


5) Remove brake disc.

NOTE:
If brake disc can not be removed by hand, use 8 mm bolts as shown.



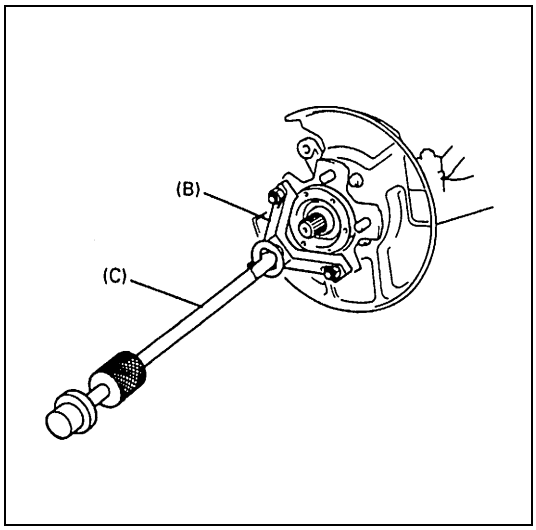
6) Remove front wheel bearing lock washer (1) by loosening 4 screws (2).



7) Remove front wheel bearing lock nut by using special tool.

Special tool
(A) : 09951-16050

8) Remove front wheel bearing washer.
9) Remove wheel hub component by hand.



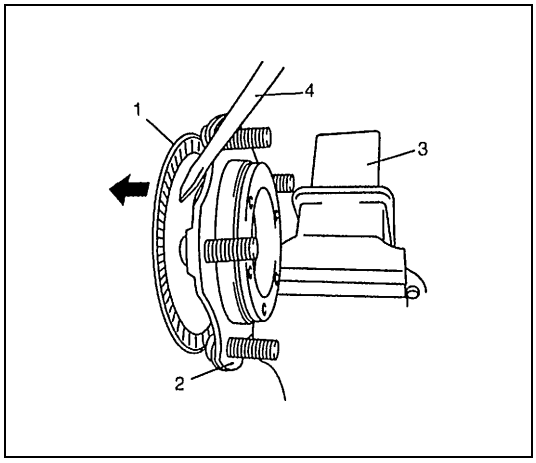
NOTE:

If wheel hub can not be removed by hand, use special tools as shown.

Special tool
(B) : 09943-35512
(C) : 09942-15510

CAUTION:

If wheel bearing inner race remains on wheel spindle when removing wheel hub, which means break of wheel bearing, replace wheel hub component (included wheel bearing).



10) Remove sensor rotor (1) from wheel hub (2) as shown (if equipped with ABS).

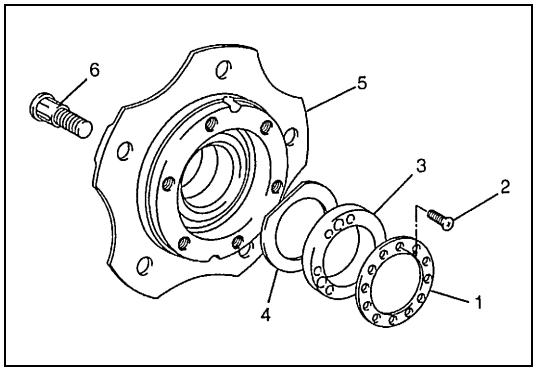
CAUTION:

- **Pull out sensor rotor from wheel hub gradually and evenly.**
- **Do not reuse sensor rotor once removed. Be sure to new sensor rotor when installing.**

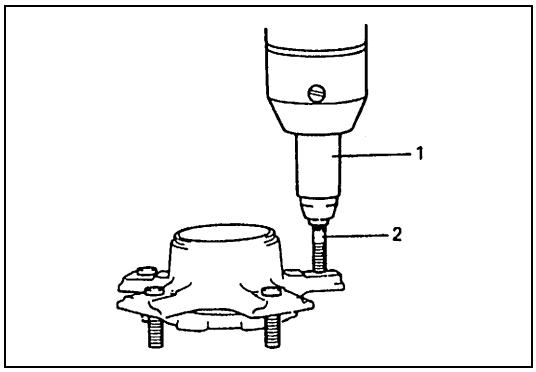
11) Remove hub bolts from hub.

3.	Vise
4.	Flat end rod

INSTALLATION

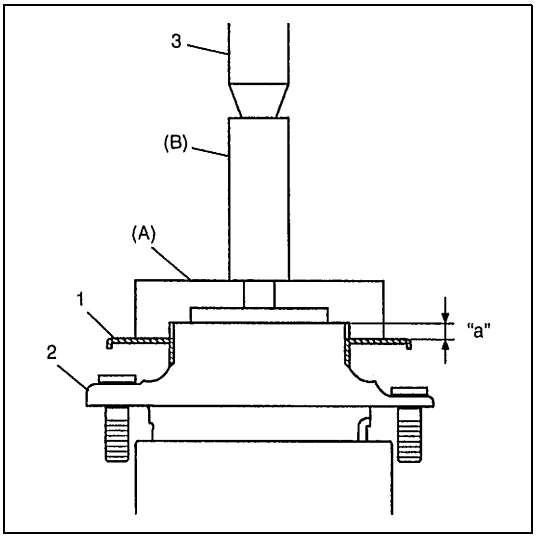


1.	Bearing lock washer
2.	Screw
3.	Bearing lock nut
4.	Wheel bearing washer
5.	Wheel hub component
6.	Bolt



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

1.	Oil hydraulic press
2.	Hub bolt



2) Install new sensor rotor (1) by using special tool (if equipped with ABS).

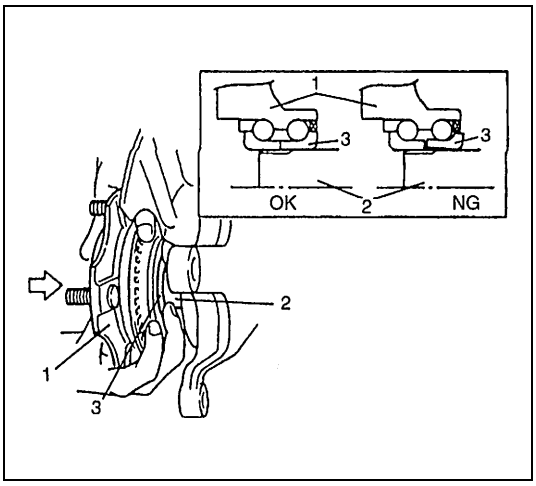
NOTE:

Use care not to insert wheel hub (2) diagonally.

Special tool
(A) : 09952-86510
(B) : 09924-74510

Wheel speed sensor rotor (1) installing position
Reference Dimension "a" : 4.9 ± 0.1 mm (0.19 ± 0.004 in.)

3. Hydraulic press



3) Install wheel hub (1) component to spindle supporting wheel bearing inner race (3) by finger as shown.

CAUTION:

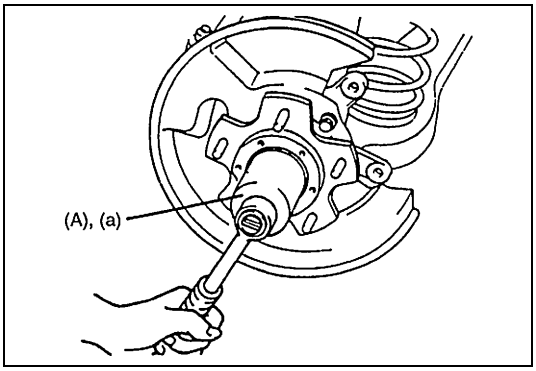
Don't tap wheel hub component by hammer or the like. Otherwise, it will be broken.

NOTE:

When it is impossible to install wheel hub component by hand, which means the inner race is out of alignment, remove wheel hub component once and reinstall it.

2. Wheel spindle

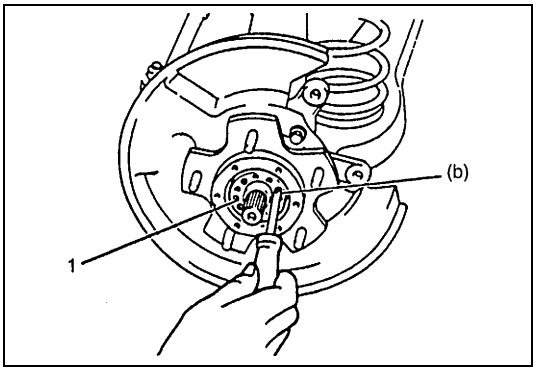
4) Install wheel bearing washer, and the install wheel bearing lock nut.



5) Tighten wheel bearing lock nut to specified torque while turning wheel hub by hand.

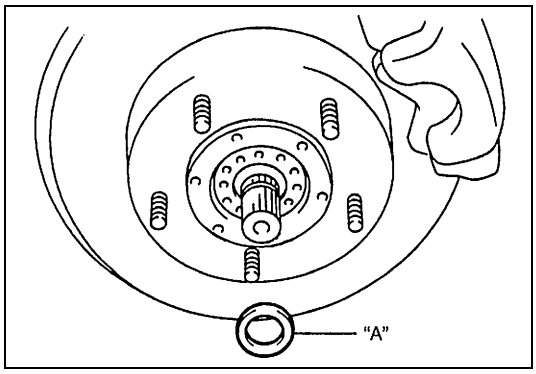
Special tool
(A) : 09951-16050

Tightening torque
Wheel bearing lock nut (a) : 216 N·m (21.6 kg-m, 157 lb-ft)



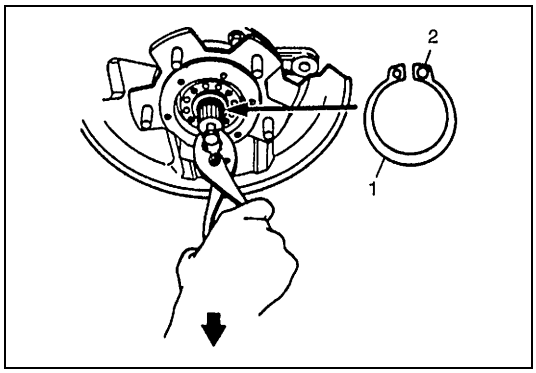
6) Using lock washer (1), lock bearing lock nut. If lock screw hole is not aligned with screw hole in lock nut, turn lock nut in tightening direction till they align.

Tightening torque
Lock screw (b) : 1.5 N·m (0.15 kg-m, 1.1 lb-ft)

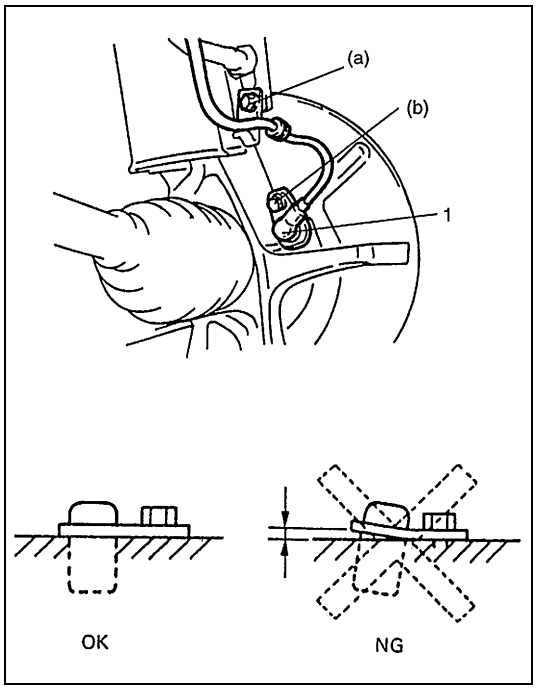


7) For 4WD vehicle, apply lithium grease to front drive shaft washer and front wheel spindle outer.

"A" : Grease 99000-25010



8) For 4WD vehicle, when installing circlip (1) to drive shaft, utilize screw hole in drive shaft to pull it out and bring large diameter (2) of circlip at right as shown.

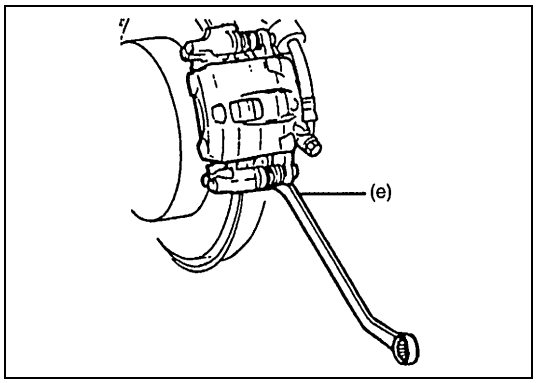


9) For vehicle with ABS, check that no foreign material is attached to sensor and rotor. Install wheel speed sensor (1) and its harness clamp.

Tightening torque
Harness clamp bolt (a) : 10 N·m (1.0 kg-m, 7.5 lb-ft)
Sensor bolt (b) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

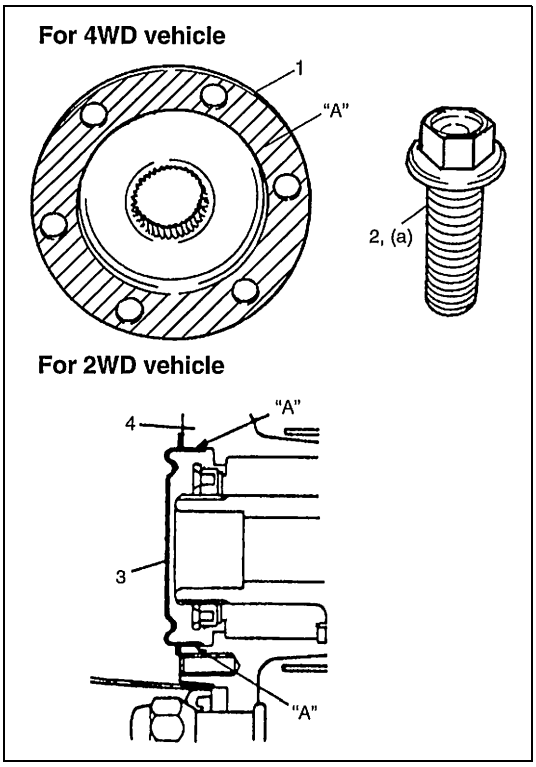
CAUTION:
- **Do not pull wire harness or twist more than necessary when installing front wheel speed sensor (1).**
- **Fit harness grommet to inner fender securely.**

Check that there is no clearance between sensor and knuckle.



10) Install brake disc and caliper assembly.

Tightening torque
Brake caliper bolt (e) : 85 N·m (8.5 kg-m, 61.5 lb-ft)



11) Apply sealant and install axle shaft drive flange or hub cap.

For 4WD vehicle :

a) Apply sealant mating surface of axle shaft drive flange (1), then install axle shaft drive flange and tighten flange bolt (2) to specified torque.

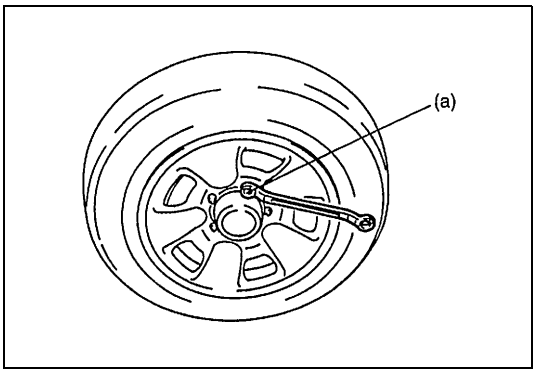
Tightening torque
Drive flange bolt (a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

"A" : Sealant 99000-31090

For 2WD vehicle :

a) Remove grease, old sealant and dusts from mating surfaces of hub cap (3) and hub (4) to clean, apply water tight sealant "A" to cap mating surface evenly, and install cap to hub.

"A" : Sealant 99000-31090



12) Install wheel.

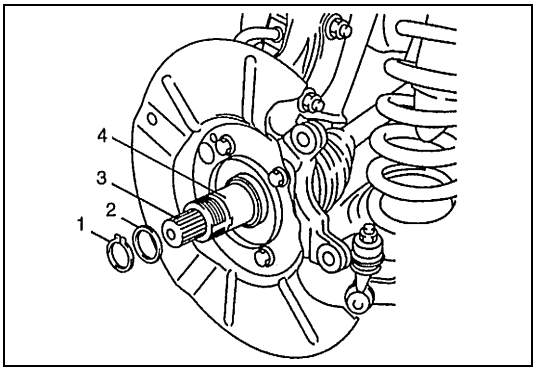
Tightening torque
Wheel nut (a) : 100 N·m (10.0 kg-m, 72.5 lb-ft)

13) For vehicle equipped with ABS, perform driving test referring to "Driving Test" under "ABS Diagnostic Flow Table" in Section 5E1.

Knuckle/Wheel Spindle

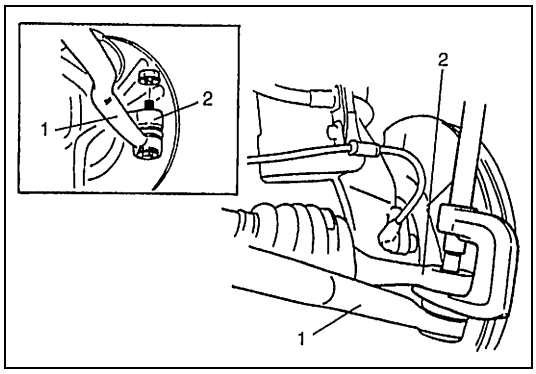
REMOVAL

1) Remove wheel hub. Refer to "Wheel Hub (Included Wheel Bearing)" in this section.



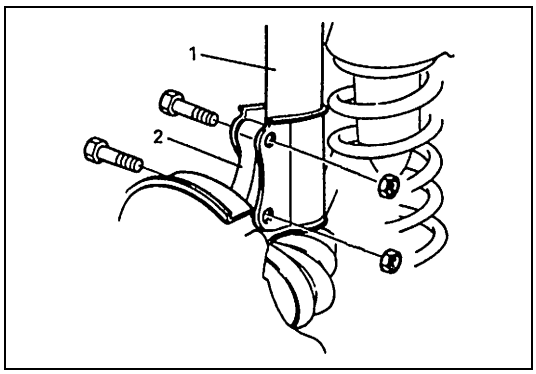
2) Remove front drive shaft circlip (1) and front spindle thrust washer (2) (for 4WD vehicle) or front hub cap (for 2WD vehicle).

3.	Drive shaft
4.	Wheel spindle



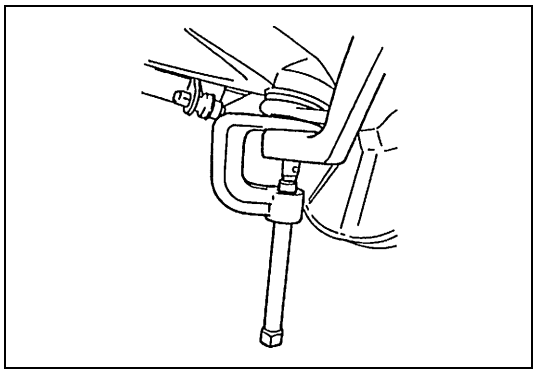
3) Disconnect tie-rod end (1) from knuckle (2).
4) Remove stabilizer bar. Refer to “Stabilizer Bar/Bushings” in this section.

5) Remove ball stud nut.
6) Support lower arm with jack.



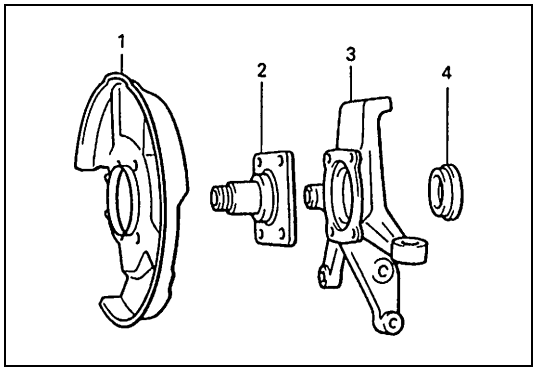
7) Remove strut bracket bolts from strut bracket.

1. Strut
2. Knuckle



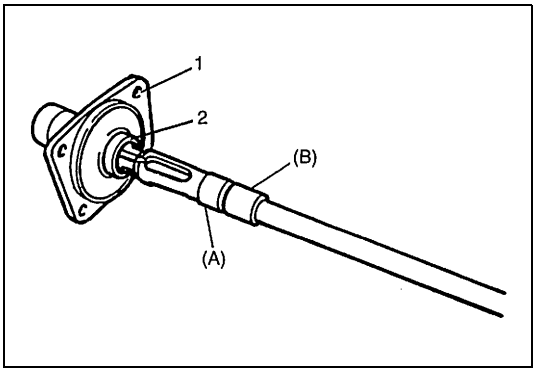
8) By using puller, disconnect knuckle from ball stud.

9) While lowering jack, remove knuckle/wheel spindle comp.



10) Remove inner oil seal (for 4WD vehicle), knuckle cap (4) (for 2WD vehicle), dust cover (1) and wheel spindle (2).

3. Knuckle

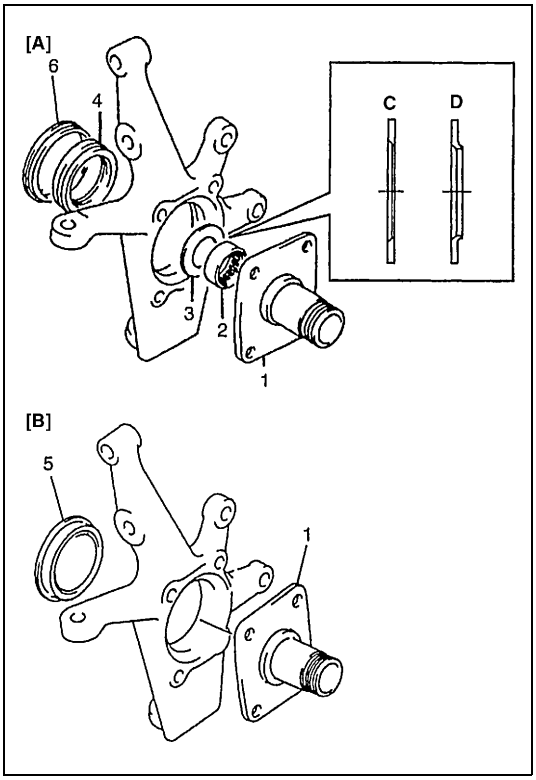


11) For 4WD vehicle
Remove drive shaft bearing (2) by using special tool.

Special tool
(A) : 09923-74510
(B) : 09930-30102

1. Wheel spindle

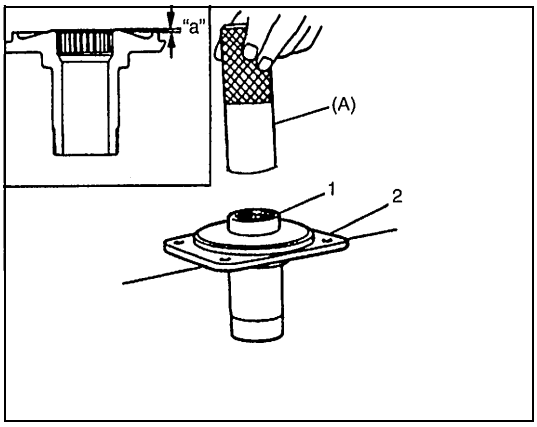
INSTALLATION



Reverse removal sequence to install knuckle, wheel spindle oil seal and drive shaft bearing (2), noting following points.

1.	Wheel spindle
3.	Front drive shaft thrust washer (Used “C” or “D” type)
4.	Inner oil seal
5.	Knuckle cap
6.	Drive shaft oil seal
[A] :	4WD vehicle
[B] :	2WD vehicle
C :	Flat type
D :	Flanged type (For Canvas top model)

For 4WD vehicle :

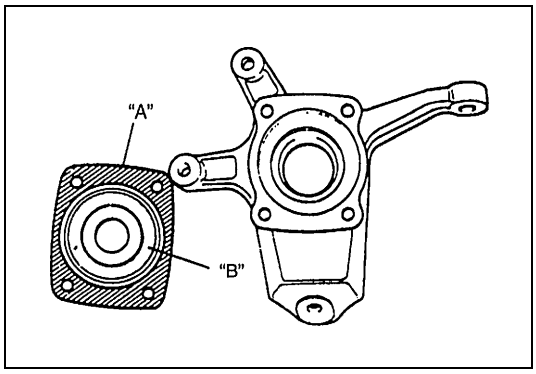


a) Install drive shaft bearing (1) by using special tool.

Special tool
(A) : 09913-76010 ... Type C drive shaft thrust washer
(A) : 09913-80112 ... Type D drive shaft thrust washer

Type A drive shaft thrust washer
Dimension “a” : 0 – 1 mm (0 – 0.04 in.)
Type B drive shaft thrust washer
Dimension “a” : 1.75 – 2.50 mm (0.069 – 0.098 in.)

2. Wheel spindle



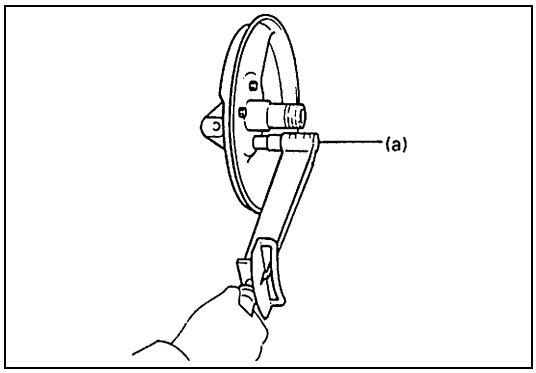
b) When installing wheel spindle to knuckle, coat their mating surfaces with sealant.

"A" : Sealant 99000-31110

For 4WD vehicle :

a) Also, fill recess in wheel spindle with about 10 g lithium grease.

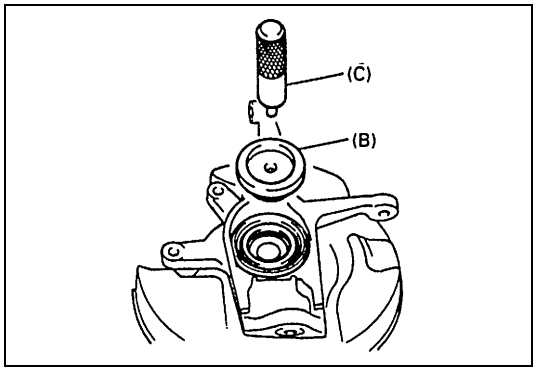
"B" : Grease 99000-25010



b) Tighten wheel spindle nut to specified torque.

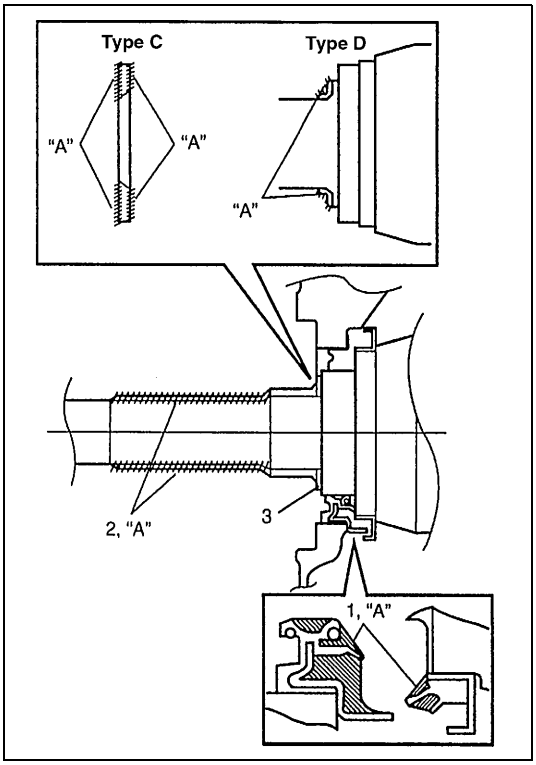
Tightening torque
Wheel spindle nut (a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

For 4WD vehicle :



a) Press-fitting inner oil seal.
Drive in inner oil seal until its end contacts stepped surface of knuckle by using special tools.

Special tool
(B) : 09944-66010
(C) : 09924-74510



For 4WD vehicle :

a) Apply lithium grease to oil seal lip and into its hollow to fill more than 60% of its vacant space.
b) Apply lithium grease "A" to drive shaft (2).

"A" : Grease 99000-25010

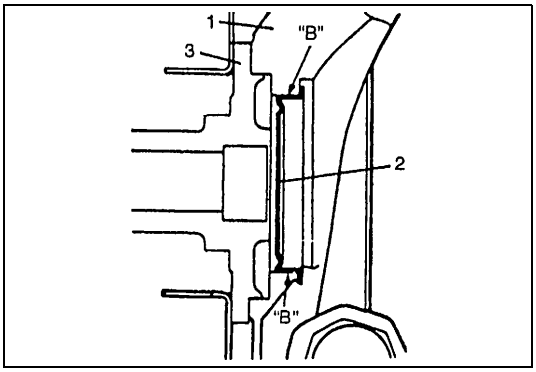
c) Press-fit front drive shaft thrust washer (3) to drive shaft (2), if it is removed (for Type B drive shaft thrust washer). Apply lithium grease "A" to drive shaft thrust washer.

"A" : Grease 99000-25010

d) Apply lithium grease "A" and install front drive shaft thrust washer (3) with its chamfered side facing to center side (for Type A drive shaft thrust washer).

"A" : Grease 99000-25010

Type C : Flat washer
Type D : Flanged washer (For Canvas top model)

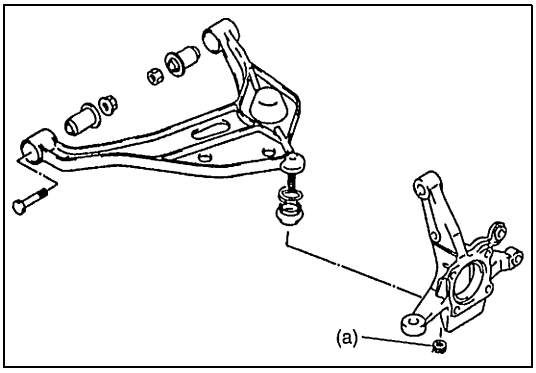


For 2WD vehicle :

a) Remove grease, old sealant and dusts from mating surfaces of knuckle cap (2) and knuckle (1) to clean, apply water tight sealant to cap mating surface evenly, and install cap to knuckle.

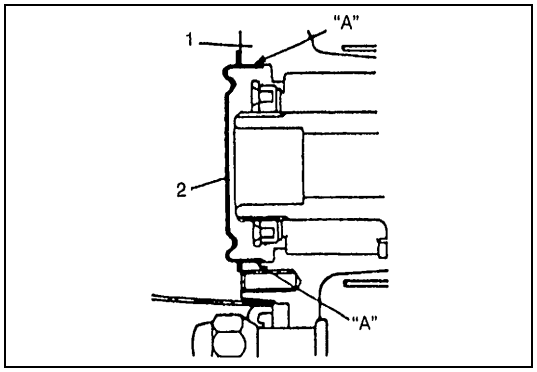
"B" : Sealant 99000-31090

3. Wheel spindle



b) Tighten control arm ball stud nut
When tightening ball stud nut, use new nut and tighten it to specified torque.

Tightening torque
Ball stud nut (a) : 60 N·m (6.0 kg-m, 43.5 lb-ft)

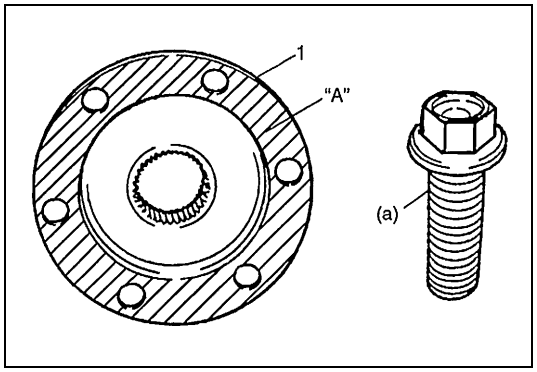


For 2WD vehicle :

a) Apply water tight sealant to mating surface of wheel hub (1) and install hub cap (2) to wheel hub.

"A" : Sealant 99000-31090

For 4WD vehicle :

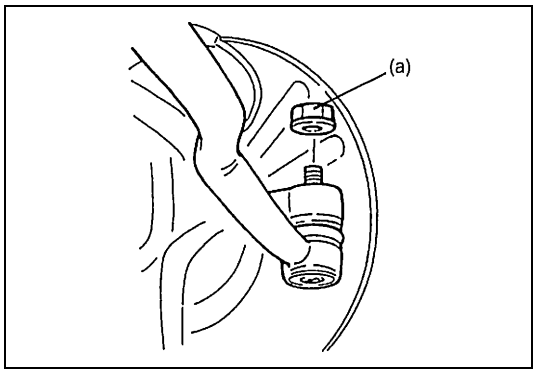


a) When installing axle shaft drive flange (1) to wheel hub, apply sealant to mating surface of axle shaft drive flange (1).

"A" : Sealant 99000-31090

Tightening torque
Drive flange bolt (a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

b) For installation procedures of wheel hub component, refer to "Wheel Hub (Included Wheel Bearing)" in this section.



c) Connect tie-rod end to knuckle and tighten new tie-rod end nut.

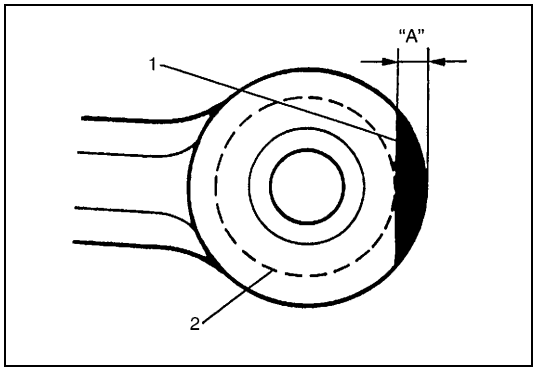
Tightening torque
Tie-rod end nut (a) : 40 N·m (4.0 kg-m, 29.0 lb-ft)

d) For any tightening torque other than those specified in text, refer to "Tightening Torque Specification" in this section.

Suspension Control Arm/Bushings

REMOVAL

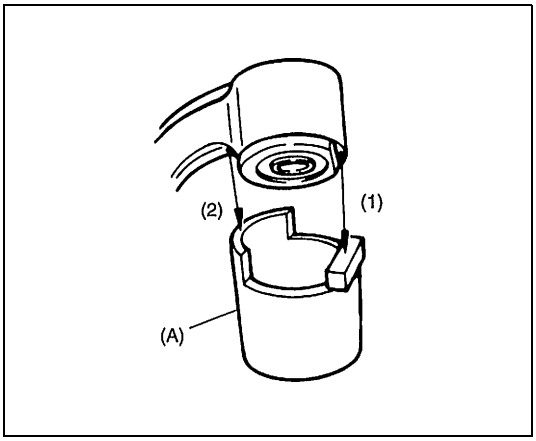
1) Remove coil spring. Refer to "Coil Spring" in this section.
2) Remove control arm bolts and nuts. Then remove control arm.



3) Cut flange part of control arm bush (rubber and steel) with using care not to damage control arm end surface.

Dimension "A" : Approx. 6 mm (0.236 in.)

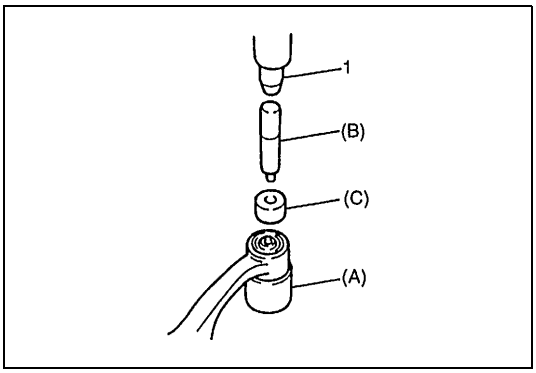
1.	Cut off flange
2.	Bush outer diameter



4) Place control arm and special tool on hydraulic press. Set control arm cutting flange to welded part (1) of the special tool and control arm joint side to the stepped part (2) of special tool.

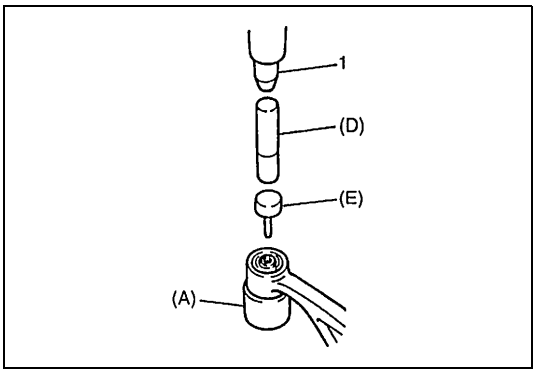
CAUTION:
Use special care in driving out control arm bush to press it vertically.
Or it may cause personally injury.

Special tool
(A) : 09951-46020



5) Remove front bushing by using hydraulic press (1) and special tools, pull out bushing.

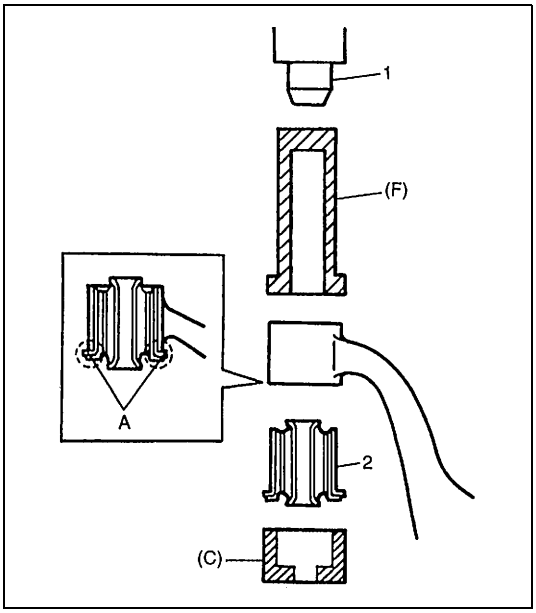
Special tool
(A) : 09951-46020
(B) : 09924-74510
(C) : 09951-16060



6) Remove rear bushing by using hydraulic press (1) and special tools, pull out bushing.

Special tool
(A) : 09951-46020
(D) : 09913-80112
(E) : 09925-58210

INSTALLATION



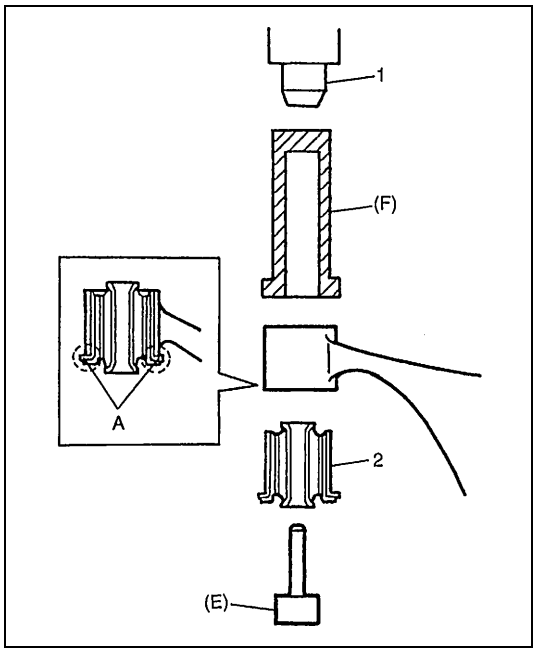
1) Front bushing
Press-fit front bushing (2) until its flange contacts housing edge of control arm, use special tools as shown.

Special tool
(C) : 09951-16060
(F) : 09913-85210

NOTE:

When press-fitting bushing, compounding oil or soap water applied to inside of control arm housing will facilitate work.

1. Hydraulic press
A : Bushing flange contacts housing edge



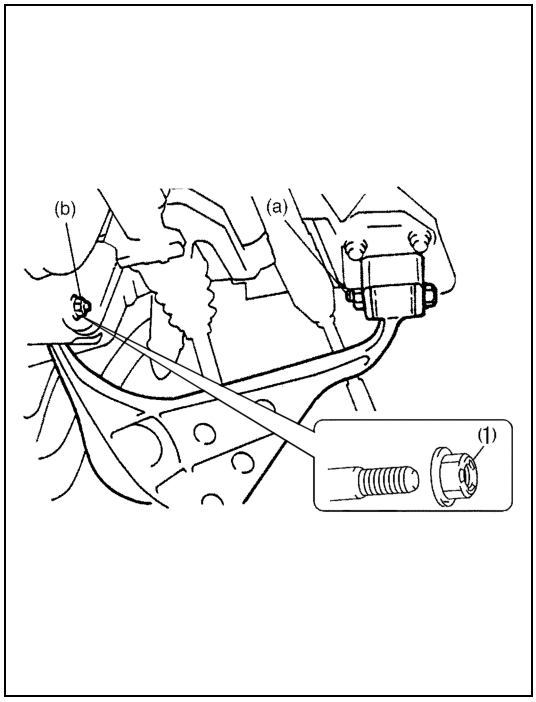
2) Rear bushing
Press-fit rear bushing (2) until its flange contacts housing edge of control arm, use special tools as shown.

Special tool
(E) : 09925-58210
(F) : 09913-85210

NOTE:

When press-fitting bushing, compounding oil or soap water applied to inside of control arm housing will facilitate work.

1.	Hydraulic press
A :	Bushing flange contacts housing edge



3) Install suspension control arm to chassis.
Tighten control arm nut to specified torque after lowering hoist and vehicle in non-loaded condition.

NOTE:

For H27 engine model, don't reuse front control arm rear nut (1).

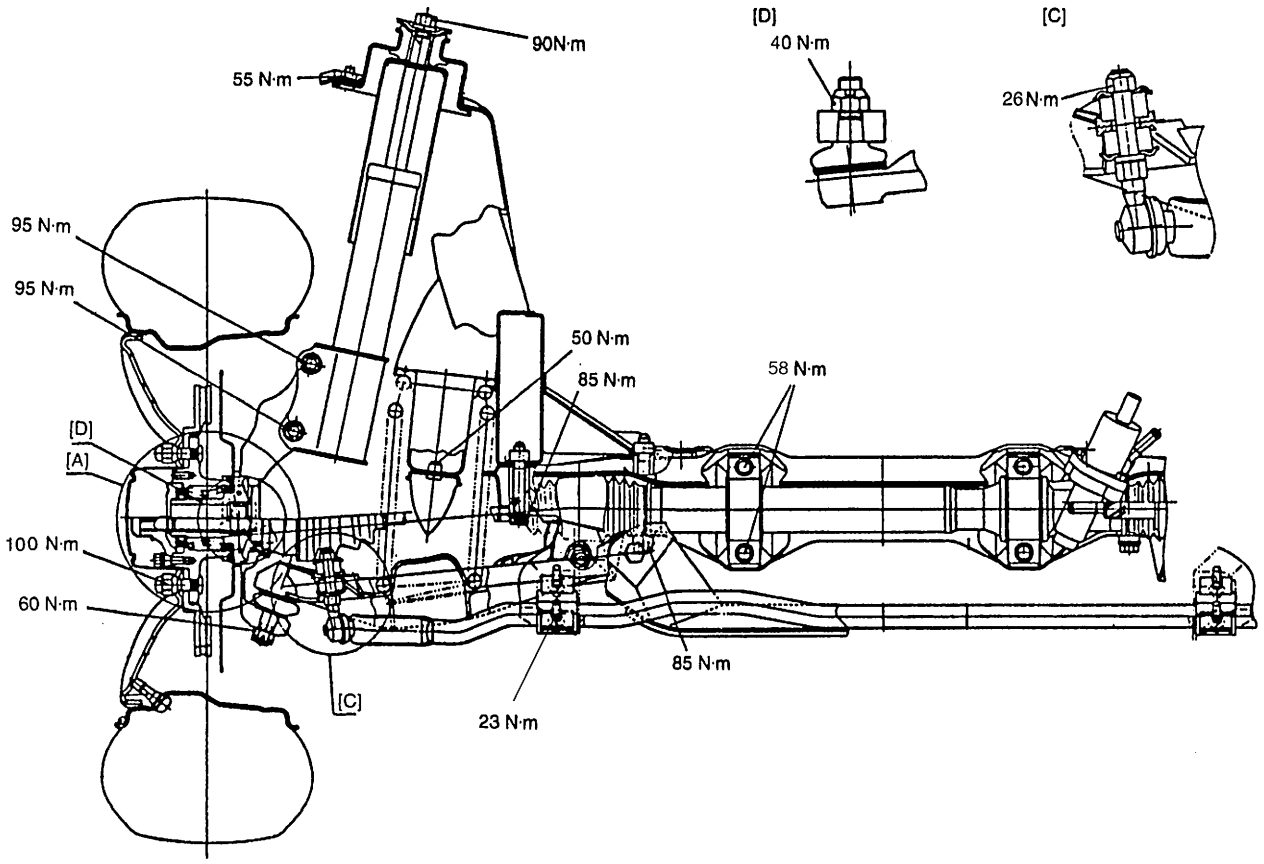
Tightening torque
Control arm front nut (a) : 85 N·m (8.5 kg-m, 61.5 lb-ft)
Control arm rear nut (b) : 126 N·m (12.6 kg-m, 91.0 lb-ft)

4) As installation procedure hereafter is the same as that for coil spring. Refer to "Coil Spring" in this section.

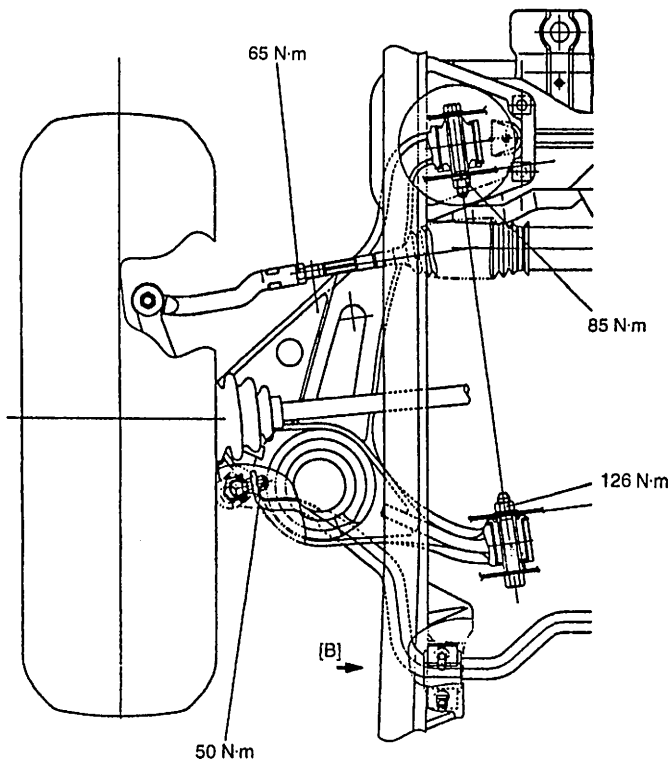
NOTE:

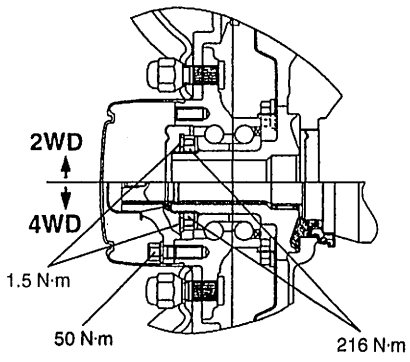
For any tightening torque other than those specified in text, refer to "Torque Specification Table" at the end of this section.

Tightening Torque Specifications

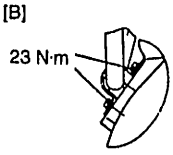


[A]





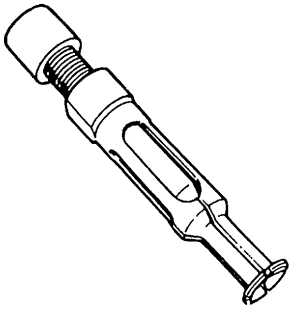
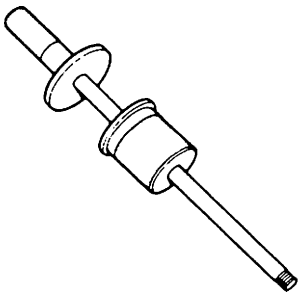
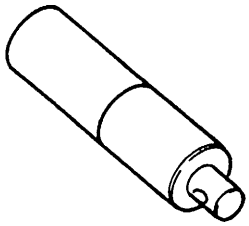
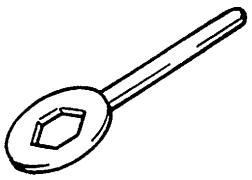
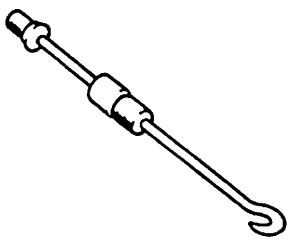
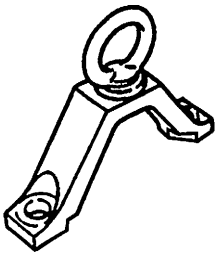
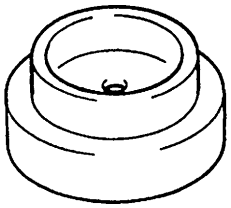
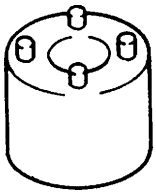
[B]

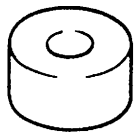
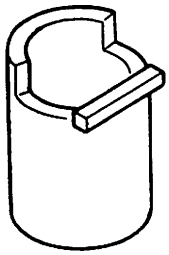
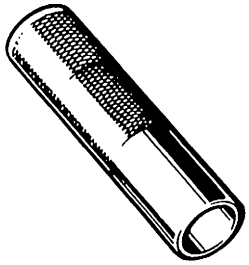
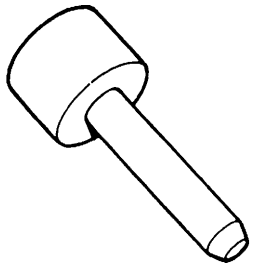
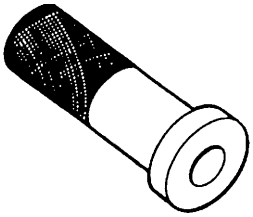
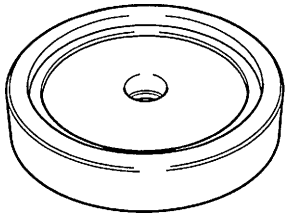
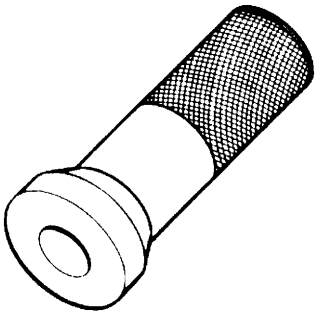


Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Lithium grease	SUZUKI SUPER GREASE (A) (99000-25010)	• Bearing inner oil seal/drive shaft oil seal • Recess of wheel spindles • Spindle outer washer • Spindle part of drive shaft • Spindle bush (inside and flange part) • Spindle inner washer
Sealant	SUZUKI BOND NO. 1215 (99000-31110)	• Mating surfaces of wheel spindle and knuckle
Sealing compound	SUZUKI SEALING COMPOUND 366E (99000-31090)	• Front axle cap • Mating surfaces of wheel hub and drive flange • Knuckle cap • Hub cap

Special Tool

 09923-74510 Bearing remover	 09930-30102 Sliding shaft	 09924-74510 Bearing installer handle	 09941-66010 Bump stopper wrench
 09942-15510 Sliding hammer	 09943-35512 Brake drum remover	 09944-66010 Wheel hub/knuckle oilseal installer	 09951-16050 Wheel bearing tightening tool

 09951-16060 Control arm bush remover (front)	 09951-46020 Control arm remover support	 09913-80112 Bearing installer	 09925-58210 Oil seal installer
 09913-85210 Oil seal installer	 09952-86510 Front sensor rotor installer	 09913-76010 Bearing installer	

SECTION 3E

REAR SUSPENSION

NOTE:

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

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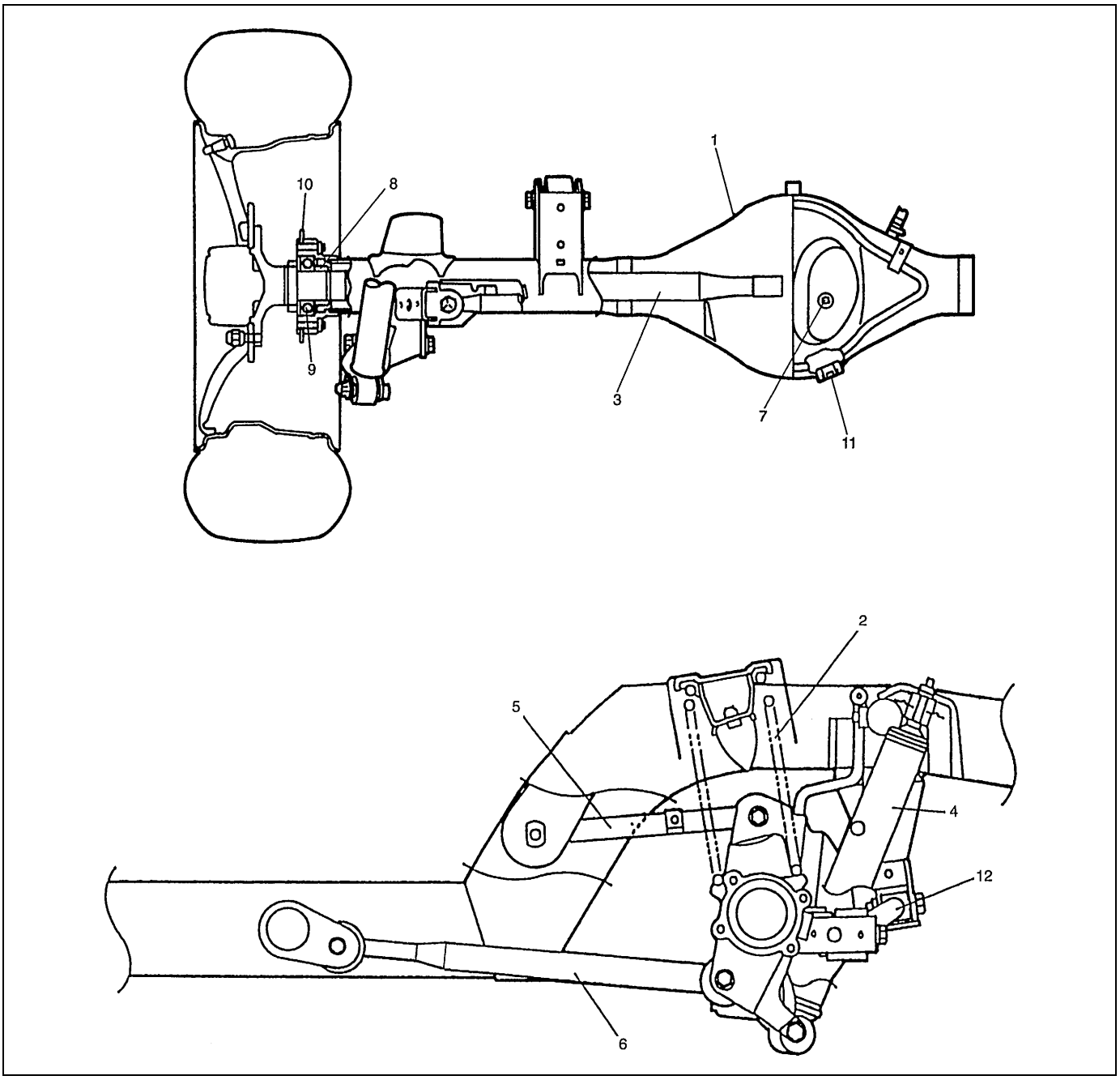
General Description

Rear suspension is 5 link type of rigid axle which consists of coil springs, rear axle, shock absorbers, upper rods, lower rods and lateral rod.
The lower rod and upper rod are connected with the axle and body by using bushes so that axle moves up and down with bushes as their supporting points.
The shock absorber is installed between the body and axle to absorb up-and-down movement of the vehicle body.

NOTE:

When installing differential gear oil drain plug, clean the thread portion of the plug and then apply sealant (SUZUKI BOND No. 1215, 99000-31110) to the portion.



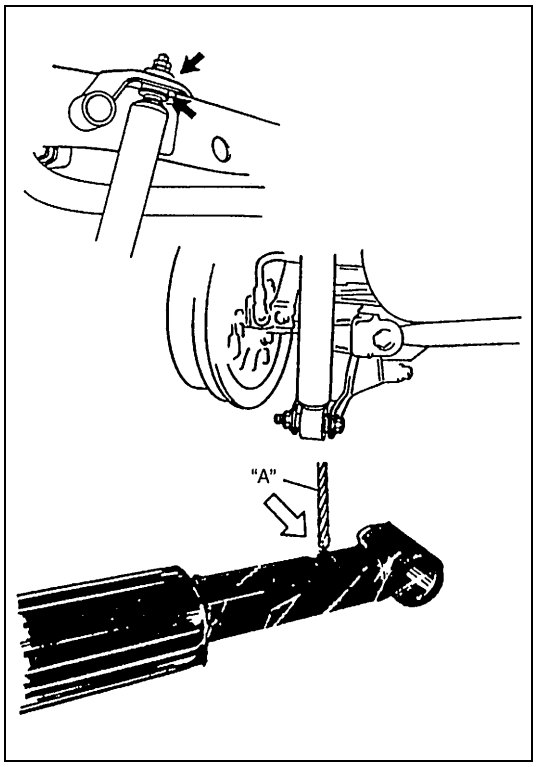
1. Rear axle housing	4. Shock absorber	7. Oil level plug	10. Brake back plate
2. Coil spring	5. Upper rod	8. Wheel bearing retainer	11. Oil drain plug
3. Axle shaft	6. Lower rod	9. Rear wheel bearing	12. Lateral rod

Diagnosis

Diagnosis Table

Refer to “Diagnosis Table” in Section 3.

Shock Absorber Check



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

Replace any defective part.

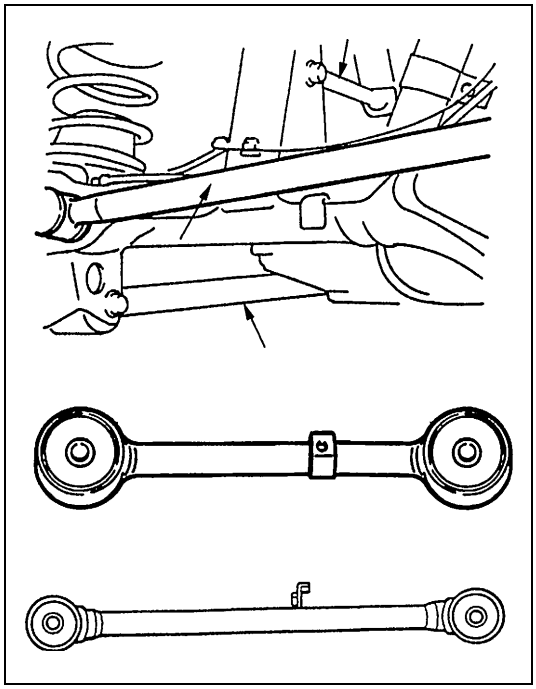
WARNING:

When handling rear shock absorber in which high-pressure gas is sealed, make sure to observe the following precautions.

- **Don’t disassemble it.**
- **Don’t put it into the fire.**
- **Don’t store it where it gets hot.**
- **Before disposing it, be sure to drill a hole in it where shown by an arrow in the figure and let gas and oil out. Lay it down sideways for this work.**
- **The gas itself is harmless but it may issue out of the hole together with chips generated by the drill. Therefore, be sure to wear goggle.**

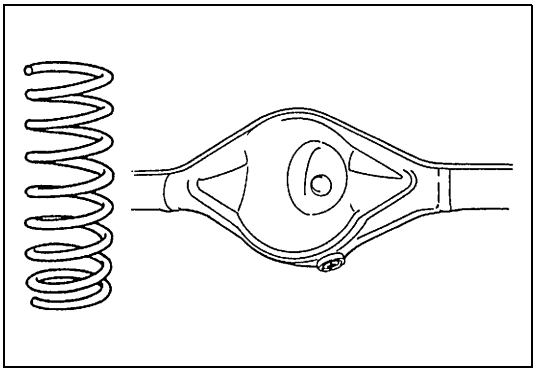
“A” : Drill hole with approximately 3 mm (0.12 in.) diameter.

Lower Rod, Upper Rod, Lateral Rod Check



Inspect for cracks, deformation or damage.
Replace any defective part.
Inspect each bush for wear and breakage. If found defective, replace.

Axle Housing and Coil Spring Check

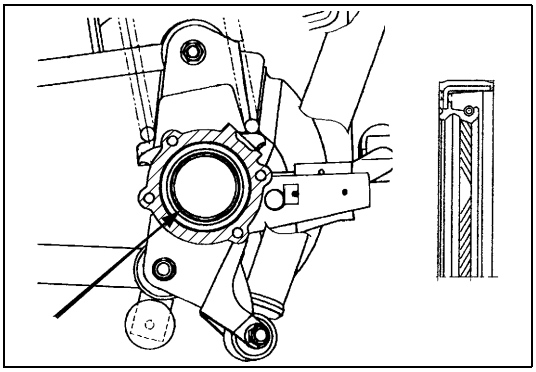


Inspect for cracks, deformation or damage.
Inspect for evidence of oil leakage at axle housing.
If any, replace defective part.

Rear suspension fasteners

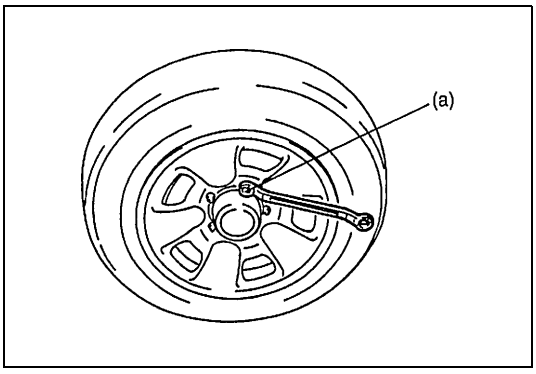
Check each bolt and nut fastening suspension parts for tightness. Tighten loose one, if any, to specified torque, referring to "Tightening Torque Specifications" of this section.

Bearing Retainer and Axle Shaft Inner Oil Seal Check



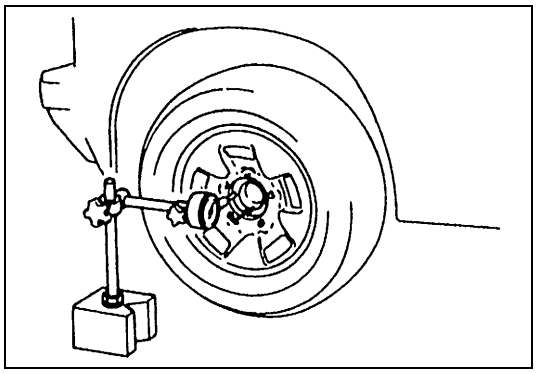
- When brake drum has been removed, check inside of brake drum for gear oil leakage.
- Also, check backside of brake back plate for oil leakage.
  If oil leakage is found, replace defective oil seal.
- Whenever it is possible to check oil seal during disassembly, check its lip for wear.
  If oil leakage or worn lip is found, replace defective oil seal.

Wheel Disc, Nut & Bearing Check



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

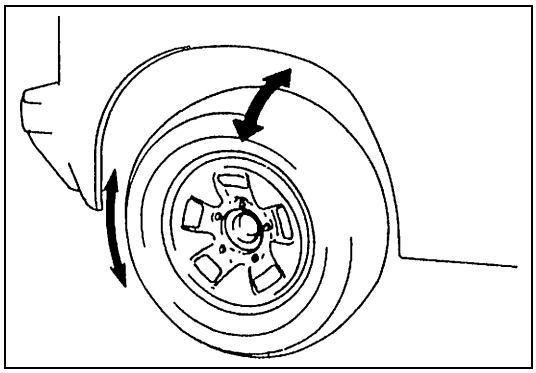
Tightening torque
Wheel nut (a) : 100 N·m (10.0 kg-m, 72.5 lb-ft)



- Check wheel bearings for wear. When measuring thrust play, apply a dial gauge to axle shaft center after removing wheel center cap from wheel.

Wheel bearing thrust play limit : 0.8 mm (0.03 in.)

When measurement exceeds limit, replace bearing.



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

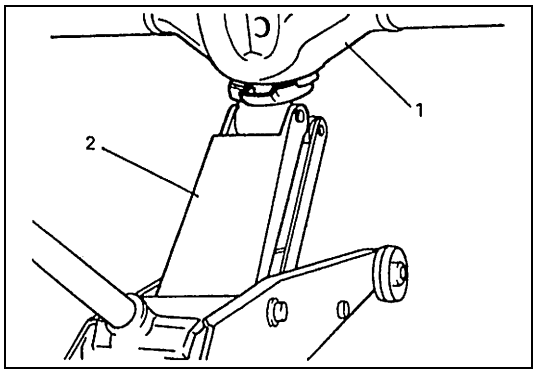
On-Vehicle Service

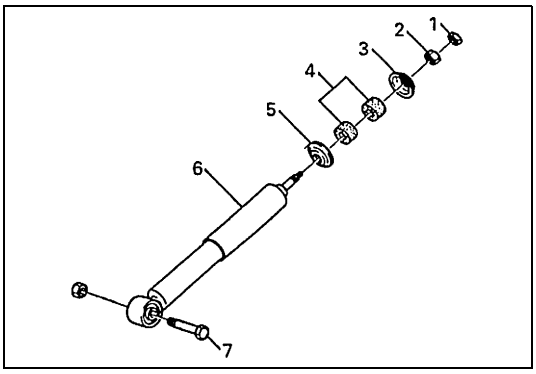
Shock Absorber

The shock absorber is non-adjustable, non-refillable, and cannot be disassembled. The only service the shock absorber requires is replacement when it has lost its resistance, is damaged, or leaking fluid.

REMOVAL

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

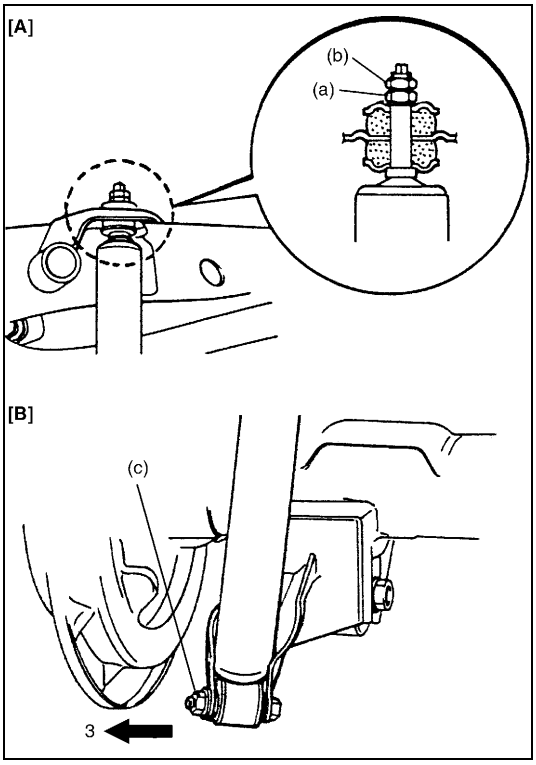




3) Remove lock nut (1) (if equipped) and absorber nut (2).
4) Remove lower mounting bolt (7).
5) Remove shock absorber (6).

3.	Upper support
4.	Rubber bush
5.	Lower support

INSTALLATION



1) Install shock absorber. Refer to figure for proper installing direction of lower mounting bolt.
2) Remove floor jack.
3) Lower hoist.
4) Tighten nuts to specified torque.

NOTE:

Tighten lower nut with vehicle off hoist and in non-loaded condition.

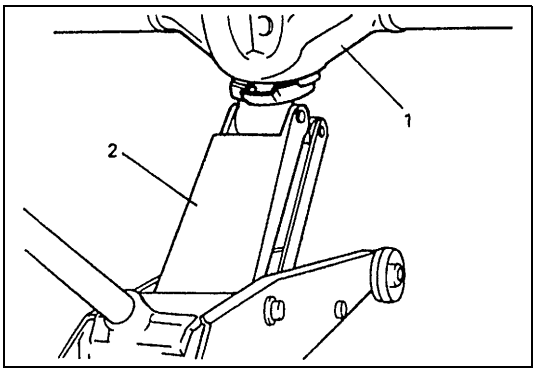
Tightening torque
Shock absorber nut (a) : 29 N·m (2.9 kg-m, 21.0 lb-ft)
Shock absorber lock nut (b) : 29 N·m (2.9 kg-m, 21.0 lb-ft)
Shock absorber lower nut
(c) : 100 N·m (10.0 kg-m. 72.5 lb-ft)

[A] :	Upper side
[B] :	Lower side
3.	Body outside

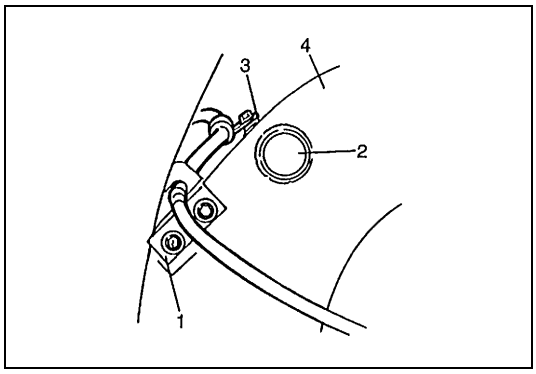
Coil Spring

REMOVAL

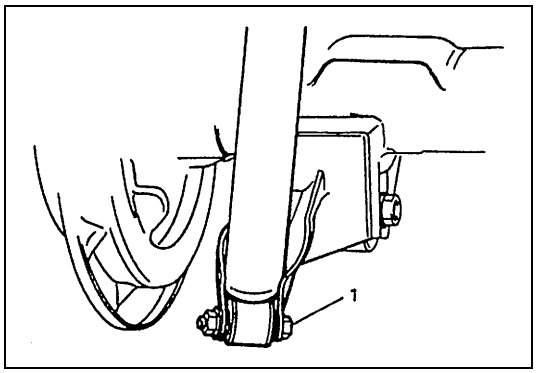
1) Hoist vehicle and remove rear wheel.



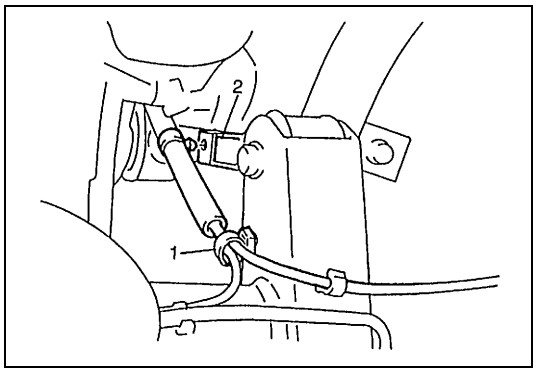
2) Support rear axle housing (1) by using floor jack (2).



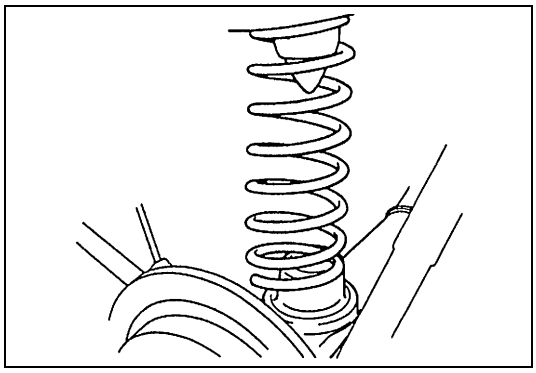
3) Disconnect parking brake cable hanger (1) from chassis frame (4) and clamp (3) from cross member (2).



4) Remove shock absorber lower mounting bolt (1).

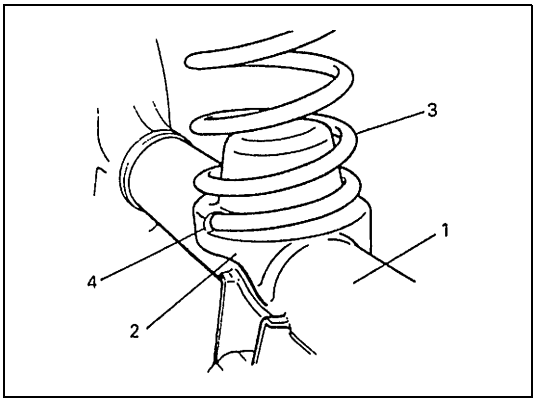


5) Remove wheel speed sensor clamps (1) from upper rod (2) and axle housing, if equipped with ABS.
   For right side, remove E-ring for fixing brake pipe from cross member and disconnect breather hose from axle housing.



6) Lower rear axle housing gradually as far down as where coil spring can be removed.
7) Remove coil spring.

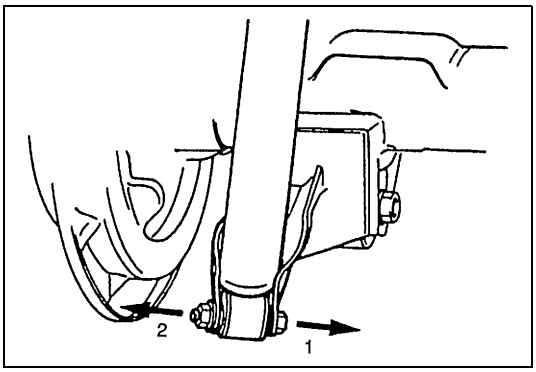
INSTALLATION



1) Install coil spring (3) on spring seat (2) of axle housing (1) and then raise axle housing.

NOTE:

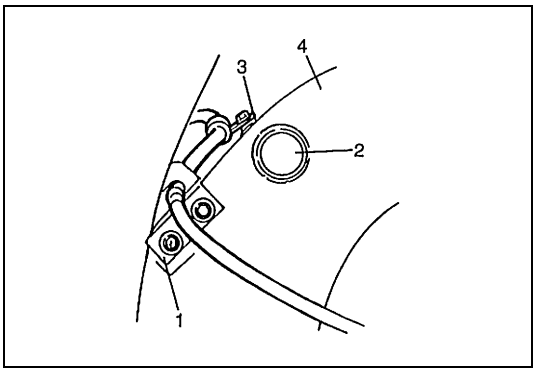
When seating coil spring, mate spring end with stepped part (4) of rear axle spring seat as shown.



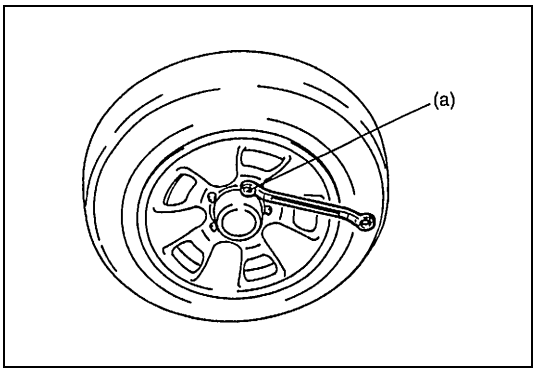
2) Install shock absorber lower bolt. For its proper installing direction, refer to figure.
Nut should not be tightened.

1.	Body center
2.	Body outside

3) Install wheel speed sensor clamp (if equipped) and E-ring, and connect breather hose to axle housing.

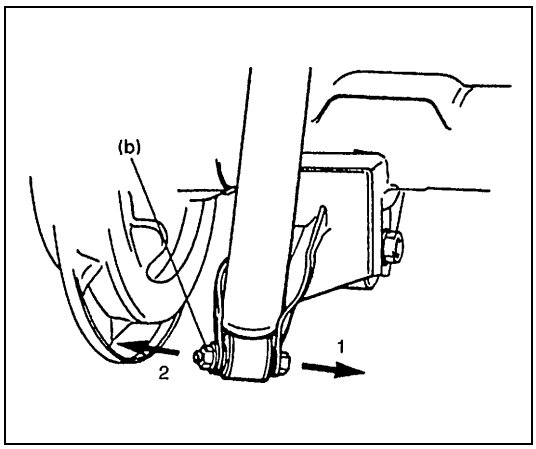


4) Connect cable hanger (1) to chassis frame (4) and clamp (3) to cross member (2). Remove floor jack from axle housing.



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

Tightening torque
Wheel nut (a) : 100 N·m (10.0 kg-m, 72.5 lb-ft)



6) Lower hoist and tighten absorber lower nut to specified torque.

Tightening torque
Shock absorber lower nut
(b) : 100 N·m (10.0 kg-m, 72.5 lb-ft)

NOTE:

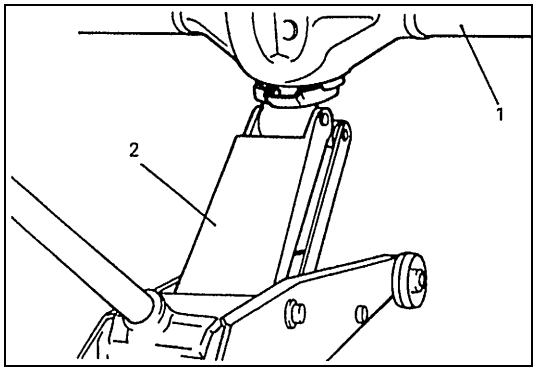
For tightening of lower nut, refer to NOTE given "INSTALLATION" under "Shock Absorber" in this section.

1.	Body center
2.	Body outside

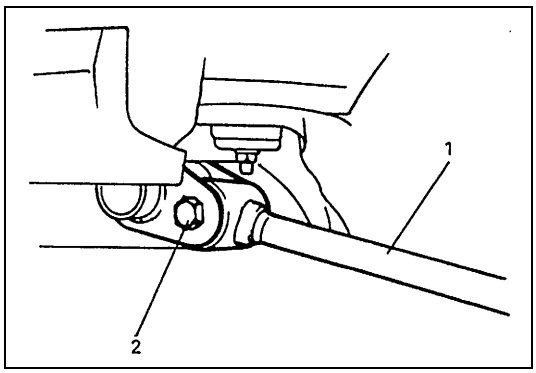
Lower Rod

REMOVAL

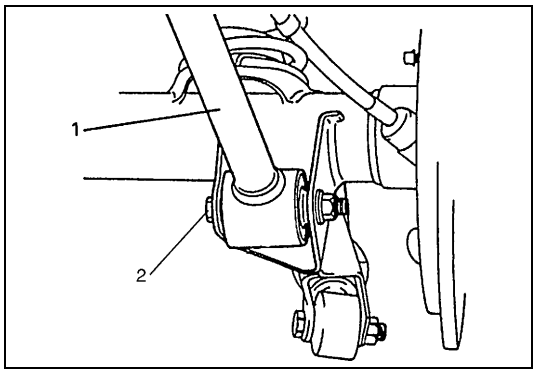
1) Hoist vehicle and remove rear wheel.



2) Support rear axle housing (1) by using floor jack (2).

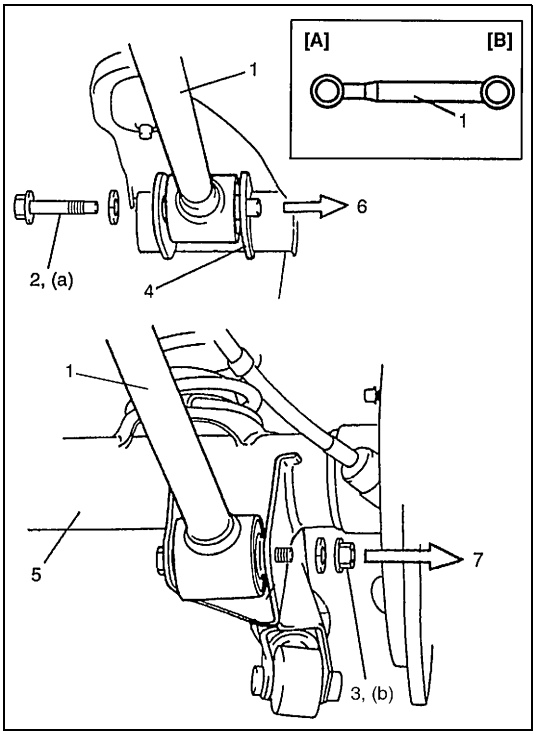


3) Remove lower rod (1) front mount bolt (2).



4) Remove lower rod (1) rear mount bolt (2).

INSTALLATION



1) Install lower rod (1) to chassis frame (4) and axle housing (5), referring to figure for proper installing direction of bolts.

Nuts should not be tightened.

2) Remove floor jack from rear axle housing (5).
3) Install wheel and tighten wheel nuts to specified torque.

Tightening torque
Wheel nuts : 100 N·m (10.0 kg-m, 72.5 lb-ft)

4) Lower hoist and with vehicle in non loaded condition, tighten front bolt (2) and rear nut (3) of lower rod (1) to specified torque.

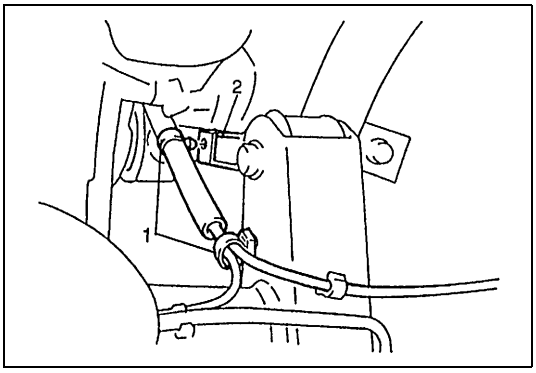
Tightening torque
Lower rod front bolt (a) : 100 N·m (10.0 kg-m, 72.5 lb-ft)
Lower rod rear nut (b) : 90 N·m (9.0 kg-m, 65.0 lb-ft)

6.	Body center
7.	Body out side
[A] :	Body side
[B] :	Axle side

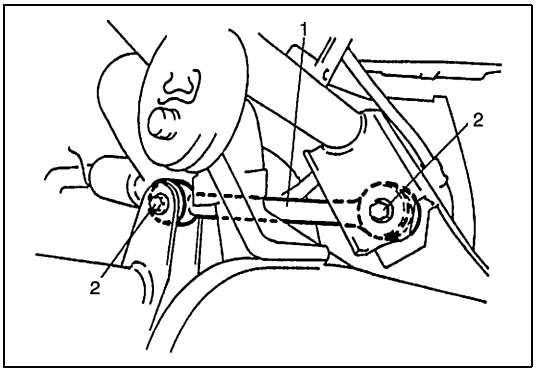
Upper Rod

REMOVAL

1) Hoist vehicle and remove rear wheel.



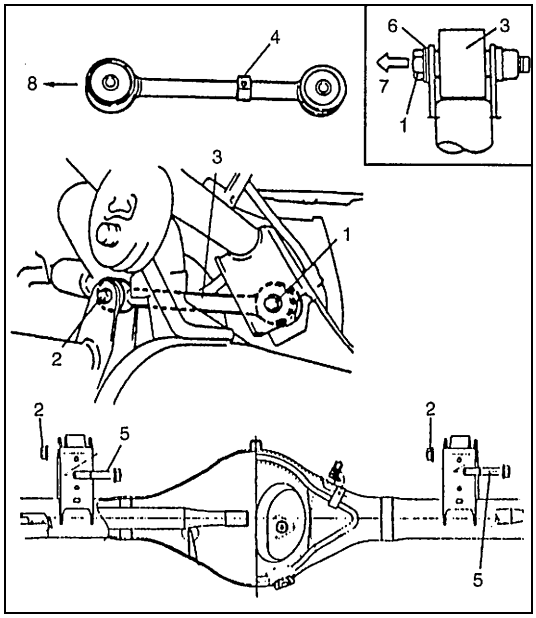
2) If equipped with ABS, disconnect wheel speed sensor harness clamp (1) from left upper rod (2).



3) Remove upper rod (1).

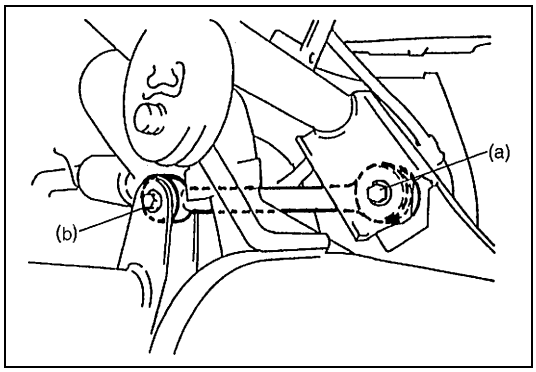
2.	Bolt

INSTALLATION



1) Install upper rod (3) to chassis frame and axle housing, referring to figure for installing direction of bolts.
   Nuts should not be tightened.
2) See figure for distinction of installing direction of left side upper rod (3) for vehicle equipped with ABS.
3) Connect wheel speed sensor harness clamp (4) to upper rod (3) (if equipped with ABS).

1. Upper rod front bolt
2. Nut
5. Upper rod rear bolt
6. Washer
7. Body center
8. Front side



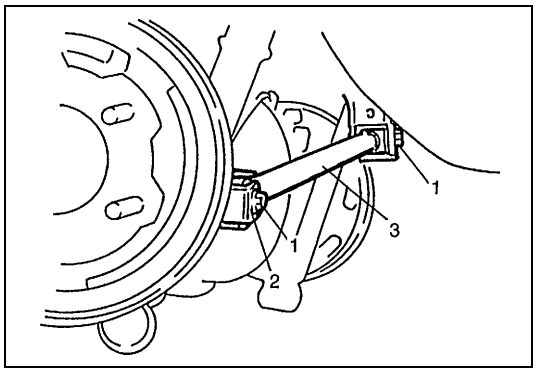
4) Lower hoist and with vehicle in non-loaded condition, tighten front bolt and rear nut of upper rod to specified torque.

Tightening torque
Upper rod front bolt (a) : 95 N·m (9.5 kg-m, 69 lb-ft)
Upper rod rear bolt (b) : 90 N·m (9.0 kg-m, 65 lb-ft)

Lateral Rod

REMOVAL

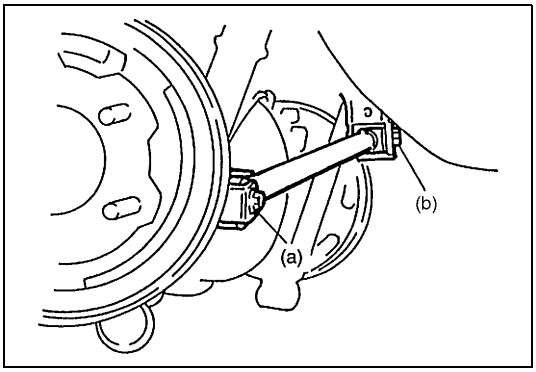
1) Hoist vehicle.



2) Remove lateral rod mounting bolts (1).
3) Remove lateral rod (3).

2. Washer

INSTALLATION

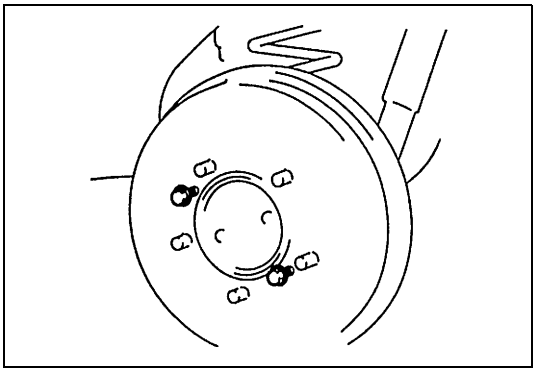


1) Install lateral rod to rear axle, and vehicle body.
2) Lower hoist.
3) Tighten lateral rod mounting bolts to specified torque.

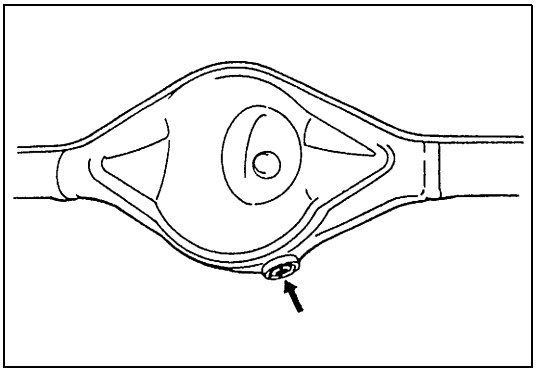
Tightening torque
Left side bolt (a) : 100 N·m (10.0 kg-m, 72.5 lb-ft)
Right side bolt (b) : 95 N·m (9.5 kg-m, 69.0 lb-ft)

Rear Axle Shaft and Wheel Bearing

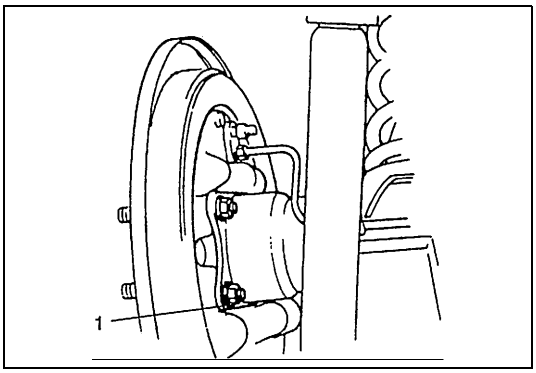
REMOVAL



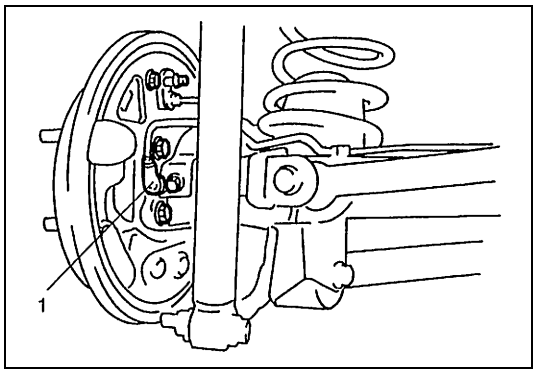
1) Remove rear brake drum. For details, refer to “REMOVAL” under “Rear Brake Drum” in Section 5C.



2) Drain gear oil from rear axle housing by loosening drain plug.

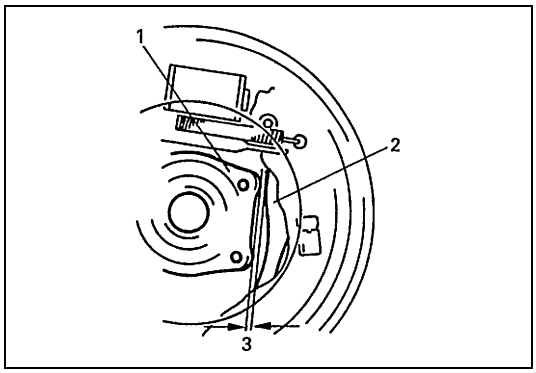


3) Remove rear wheel bearing retainer nuts (1) from axle housing.

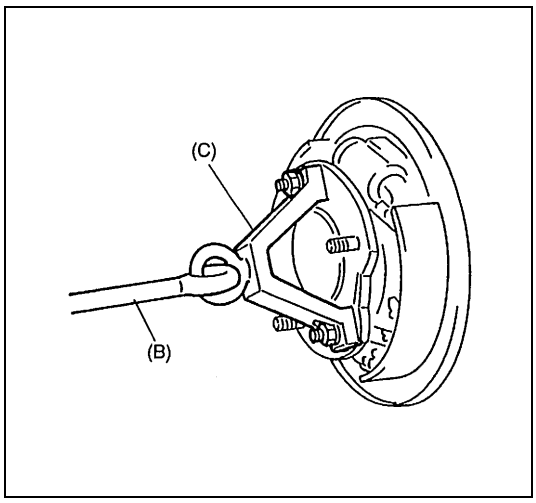


4) Remove wheel speed sensor (1) from rear axle housing (if equipped with ABS).

CAUTION:
- **Do not pull wire harness or twist more than necessary when removing rear wheel speed sensor.**
- **Do not cause damage to surface of rear wheel speed sensor or pole piece and do not allow dust, etc. to enter its installation hole.**



5) Check to ensure that there is clearance between rear wheel bearing retainer (1) and parking brake shoe lever (2). If no clearance (3) is found, loosen cable locking nut further to obtain clearance.



6) Using special tools (B) & (C) indicated below, draw out axle shaft.

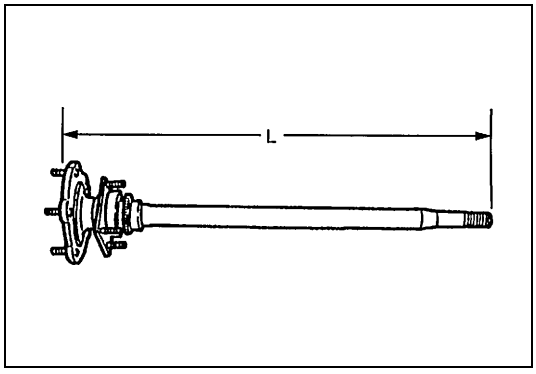
NOTE:

Use care not to pull brake back plate along with shaft.

CAUTION:

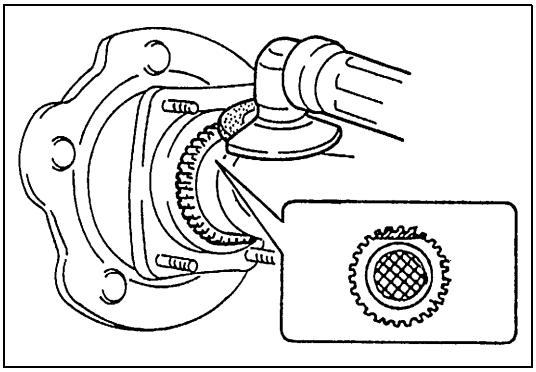
Pull out axle shaft using care so that upper and lower brake struts and parking cable are not caught.

Special tool
(C) : 09943-35512
(B) : 09942-15510

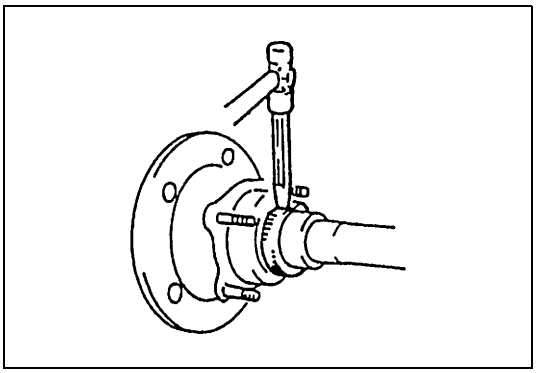


7) Rear axle shaft that was drawn out.

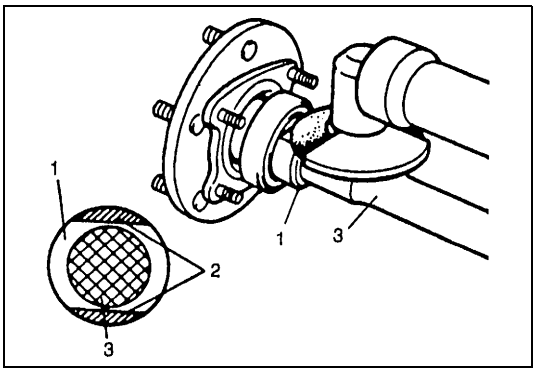
Shaft length "L"
Left side : 711.5 mm (28.0 in.)
Right side : 757.5 mm (29.8 in.)



8) If equipped with ABS, in order to remove sensor rotor from retainer ring, grind with a grinder one part of the sensor rotor as illustrated till it becomes thin.

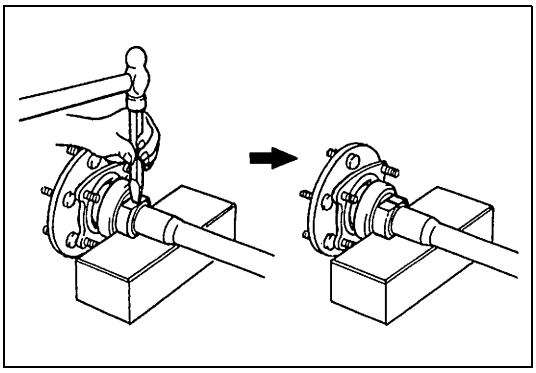


9) Break with a chisel the thin ground sensor rotor, and it can be removed (if equipped with ABS).

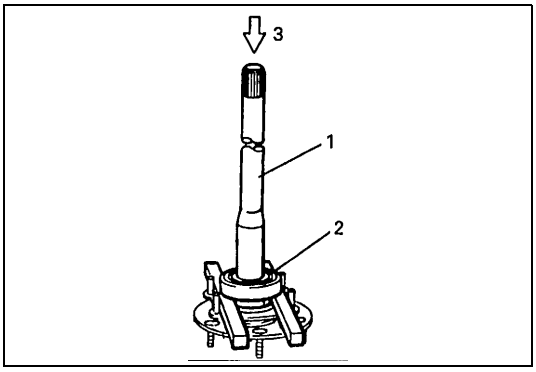


10) In order to remove the retainer ring (1) from the shaft (3), grind with a grinder two parts (2) of the bearing retainer ring (1) as illustrated till it becomes thin.

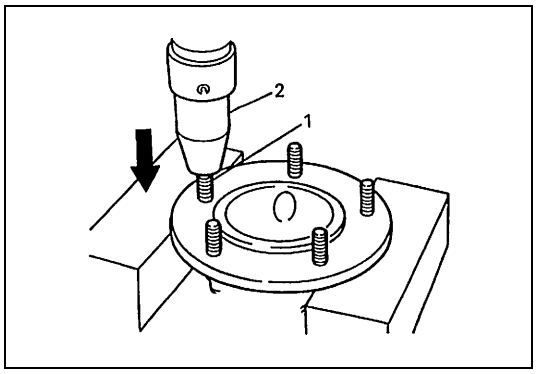
CAUTION:
Be careful not to grind too far not to damage the shaft.



11) Break with a chisel the thin ground retainer ring, and it can be removed.



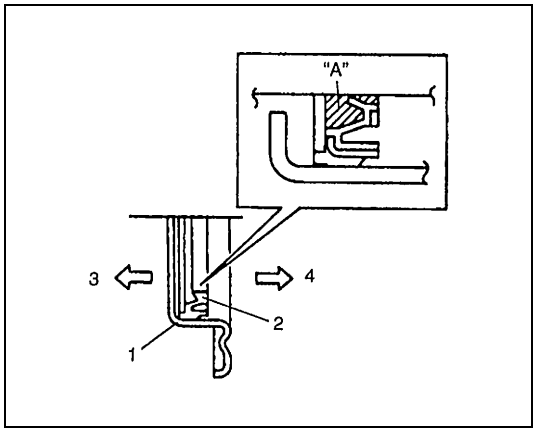
12) Remove bearing (2) from shaft (1) by using hydraulic press (3).
13) Remove bearing retainer.



14) Remove stud bolt(s) (1) by using hydraulic press (2).

INSTALLATION

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



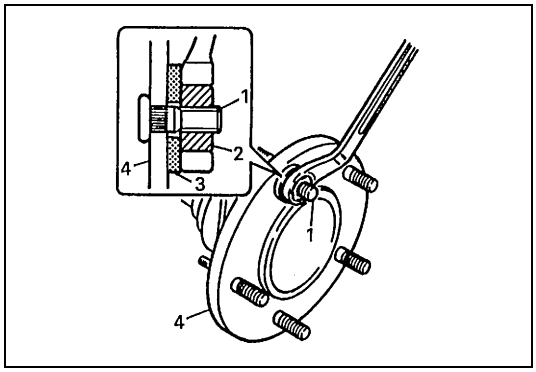
1) Apply grease to oil seal lip as shown.

NOTE:

Amount of grease applied to hollow in oil seal should be more than 60% of its vacant space.

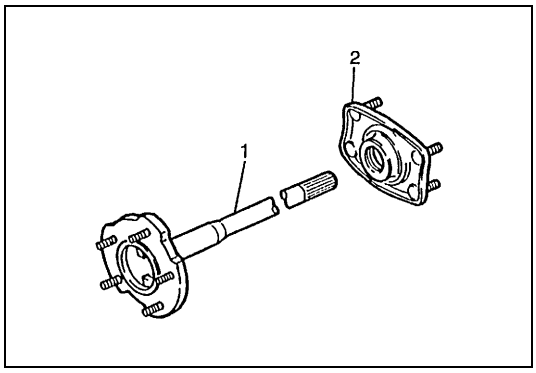
"A" : Grease 99000-25010

1.	Bearing retainer
2.	Oil seal
3.	Wheel side
4.	Differential side

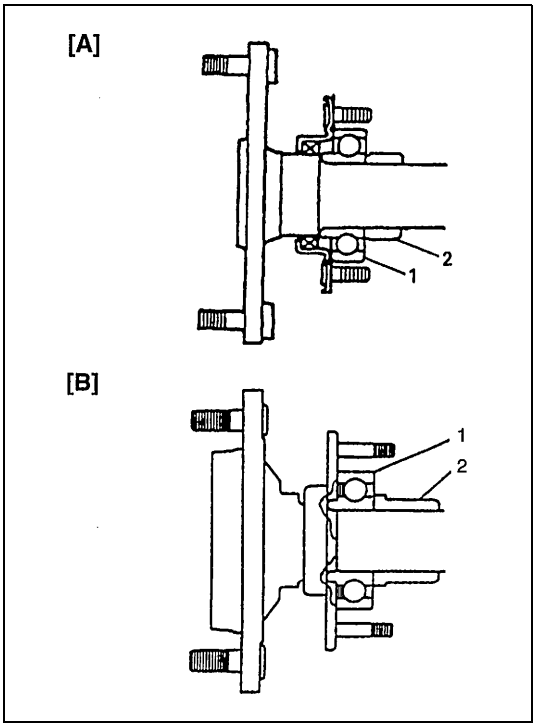


2) Aligning serrations between new stud bolt(s) (1) and flange (4), install new stud bolt(s) (1) by tightening nut as shown.

2.	Nut
3.	Washer



3) Install bearing retainer (2) to shaft (1).

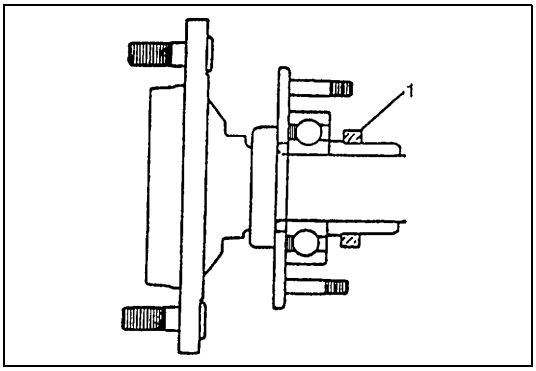


4) Press-fit wheel bearing (1) and retainer ring (2) as shown.

NOTE:

- **Use care not to cause any damage to outside of retainer ring.**
- **Refer to figure so that wheel bearing is installed in proper direction.**

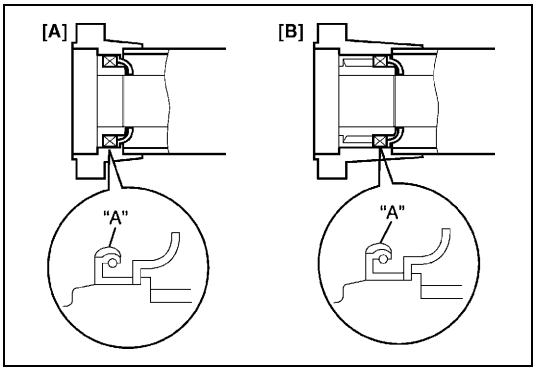
[A] :	Vehicle without ABS
[B] :	Vehicle with ABS



5) For vehicle with ABS, press-fit new sensor rotor (1) as shown.

NOTE:

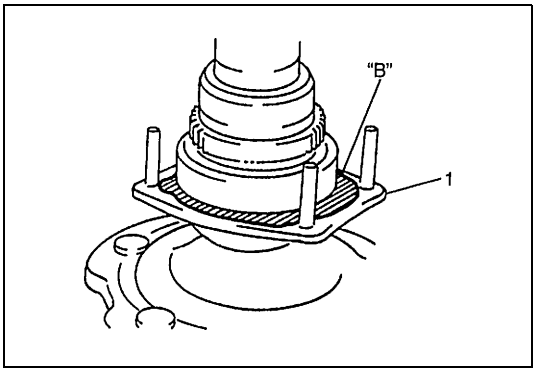
Use care not to cause any damage to outside of retainer ring.



6) Apply grease to axle shaft inner oil seal lip as shown.

"A" : Grease 99000-25010

[A] :	For vehicle without ABS
[B] :	For vehicle with ABS

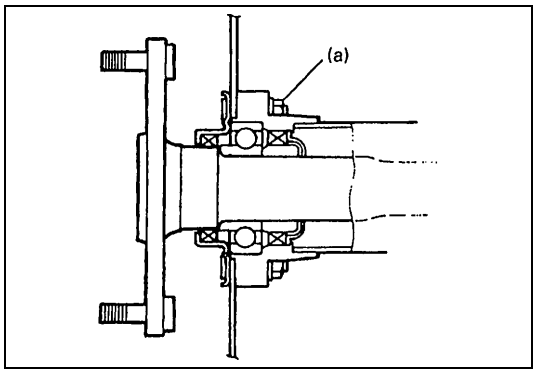


7) Apply sealant to mating surface of bearing retainer (1) with brake back plate.

NOTE:

Make sure to remove old sealant before applying it anew.

"B" : Sealant 99000-31110

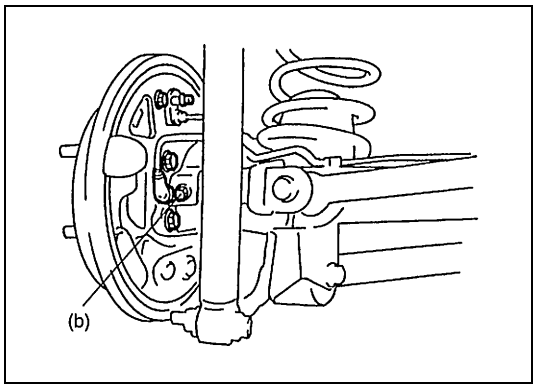


8) Install rear axle shaft to rear axle housing and tighten bearing retainer nuts to specified torque.

NOTE:

When installing rear axle shaft, be careful not to cause damage to oil seal lip in axle housing.

Tightening torque
Retainer nut (a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)



9) Tighten wheel speed sensor bolt to specified torque (if equipped with ABS).

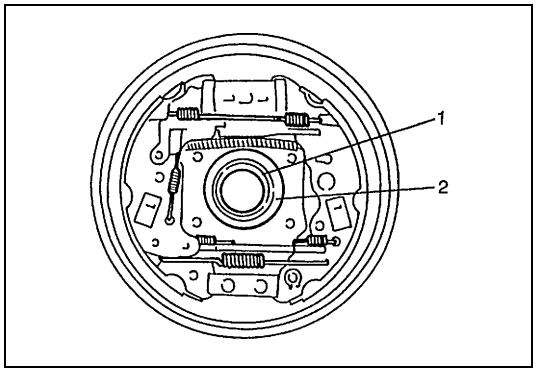
Tightening torque
Speed sensor bolt (b) : 21 N·m (2.1 kg-m, 15.5 lb-ft)

10) Refill rear axle (differential) housing with new specified gear oil.
Refer to “Maintenance Service” in Section 7F.
11) Install brake drum reffering to “INSTALLATION” under “Rear Brake Drum” in Section 5C.

Rear Axle Shaft Inner Oil Seal

REMOVAL

1) Remove rear axle shaft. For details, refer to Steps 1) to 7) of “REMOVAL” under “Rear Axle Shaft” in this section.
2) Fix brake back plate by inserting screwdriver to the hole for bearing retainer mounting.



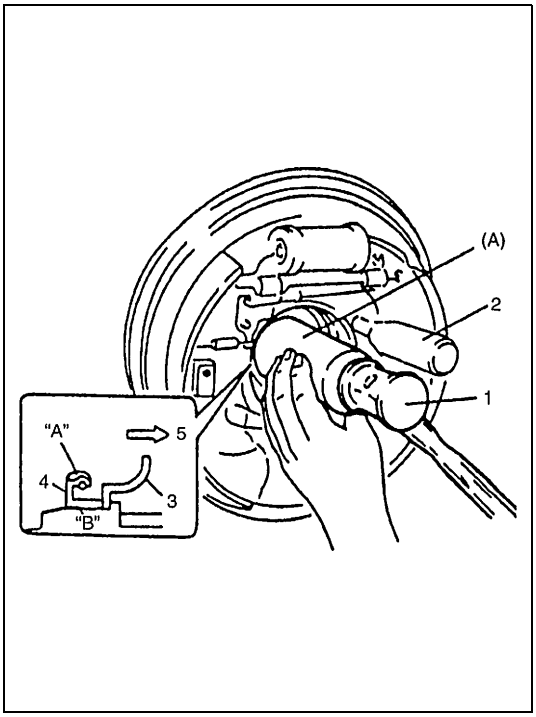
3) Remove rear axle shaft inner oil seal (1).

NOTE:

Take care not to bend the brake pipe.

2. Axle housing

INSTALLATION



1) Using special tool drive in oil seal (4) until it contacts oil seal protector (3) in axle housing.

NOTE:

- **Make sure that oil seal (4) is free from inclination as it is installed.**
- **Refer to figure so that oil seal (4) is installed in proper direction.**

Special tool
(A) : 09913-75510

"A" : Grease 99000-25010
"B" : Sealant 99000-31110

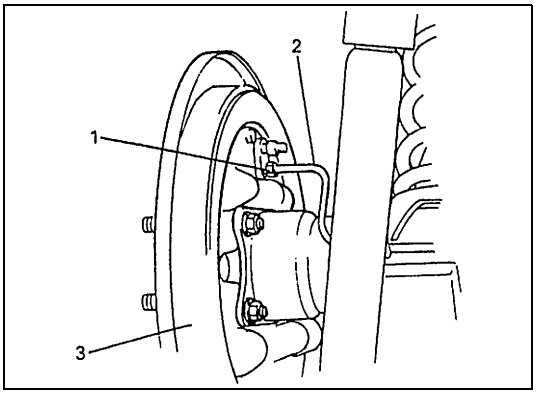
2) For procedure hereafter, refer to Steps 6) to 11) of "INSTALLATION" under "Rear Axle Shaft" in this section.

1. Hammer
2. Screwdriver
5. Body center

Rear Axle Housing

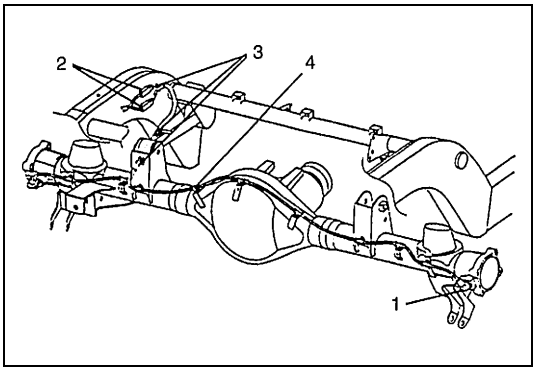
REMOVAL

1) Drain differential gear oil.
   Carry out steps 2) to 7) and 15) to 18) on both right and left wheels.
   Note that left wheel and its related parts are used in illustrations in this section.
2) Remove rear brake drum. (Refer to Steps 1) to 5) of "REMOVAL" under "Brake Drum".)



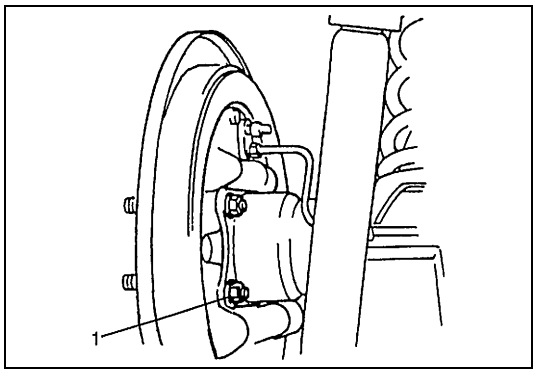
3) Disconnect brake pipe (2) from wheel cylinder. With right side wheel cylinder, disconnect 2 brake pipes.

1. Brake pipe flare nut
3. Brake back plate

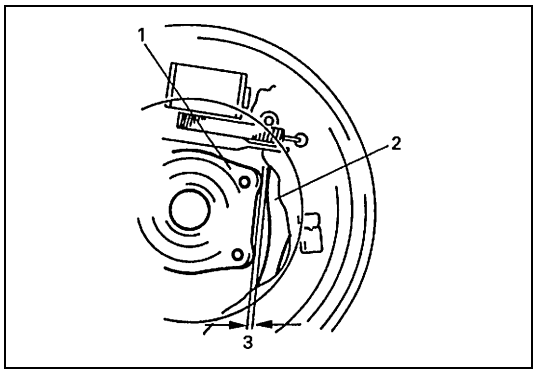


4) For vehicle with ABS, disconnect wheel speed sensor coupler (2) and remove wheel speed sensor (1) with its harness (4).

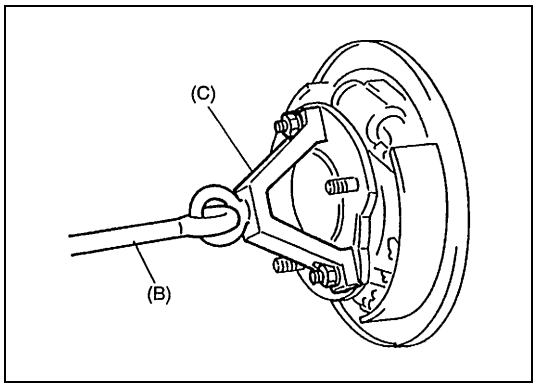
3. Wheel speed sensor harness clamp



5) Remove rear wheel bearing retainer nuts (1) from rear axle housing.



6) Check to ensure that there is clearance (3) between rear wheel bearing retainer (1) and parking brake shoe lever (2). If no clearance is found, loosen cable locking nut further to obtain clearance (3).

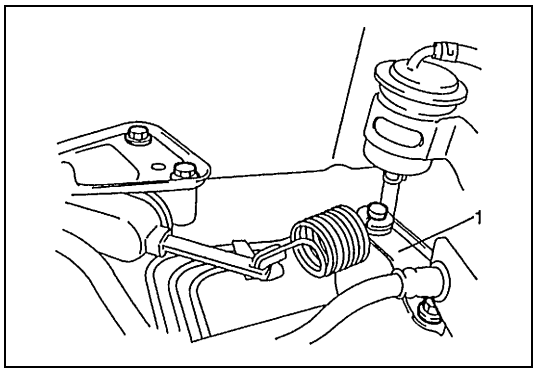


7) Using special tools (B) & (C) indicated below, draw out axle shafts. For vehicle equipped with ABS, remove wheel speed sensor from axle housing before drawing out axle shaft.

NOTE:

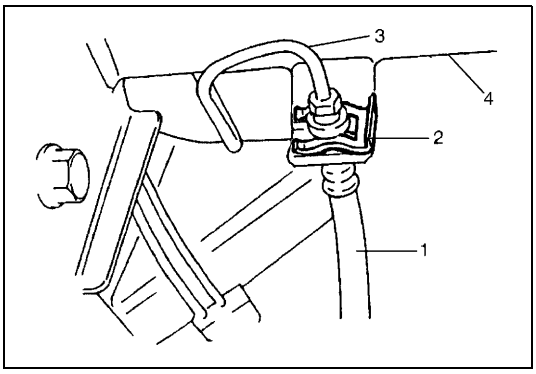
Use care not to pull brake back plate along with shaft.

Special tool
(C) : 09943-35512
(B) : 09942-15510



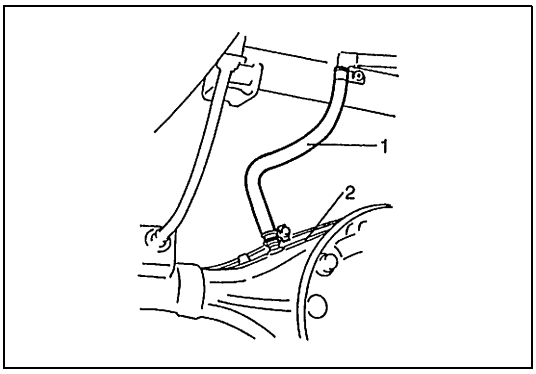
8) For vehicle without ABS, remove LSPV stay (1) from axle housing.

9) Remove brake back plate from rear axle housing.

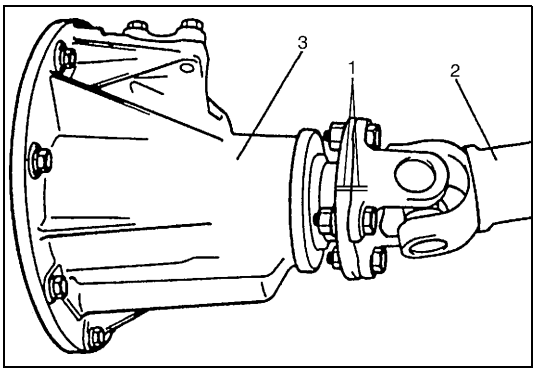


10) Disconnect brake pipe (3) from flexible hose (1) and remove E-ring (2) (front side).

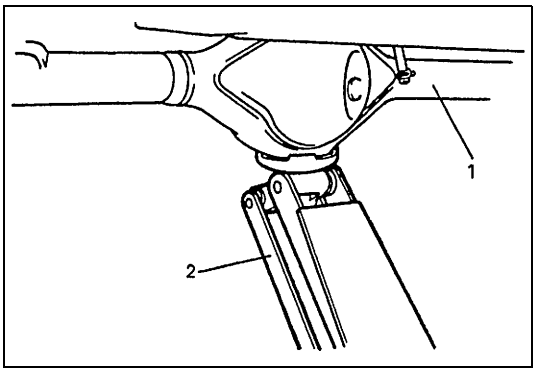
4. Cross member



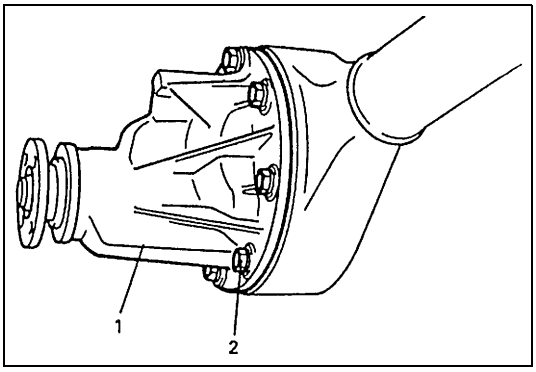
11) Remove brake pipe clamps and pipes from axle housing and disconnect breather hose (1) from axle housing (2).



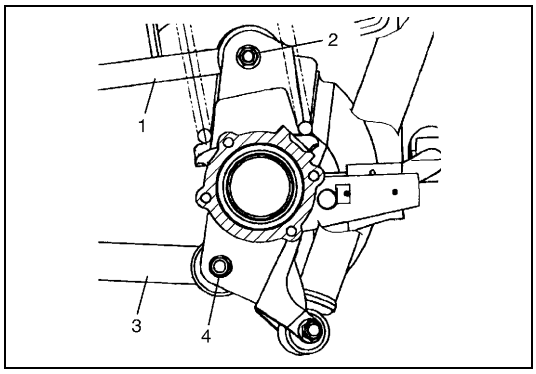
12) Before removing propeller shaft, give match marks (1) on join flange and propeller shaft as shown in the figure and disconnect propeller shaft (2) from differential (3) and remove propeller shaft from transmission.



13) For jobs hereafter, support rear axle housing (1) by using floor jack (2) under axle housing (1).

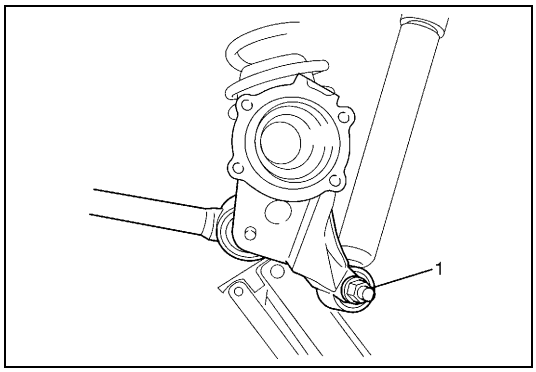


14) Remove differential carrier nuts (2) and differential carrier assembly (1).



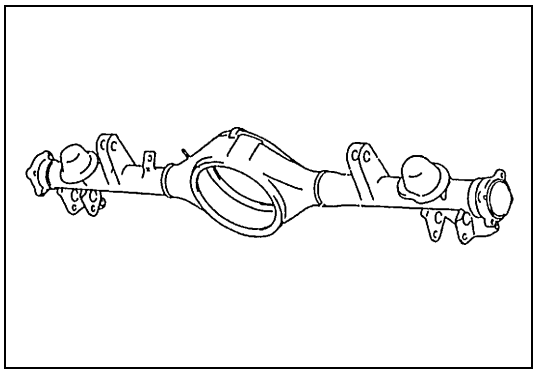
15) Loosen rear mount nut (2) of upper rod (1) but don't remove bolt.
16) Loosen rear mount nut (4) of lower rod (3) but don't remove bolt.

17) Remove rear axle side lateral rod mount bolt.



18) Remove shock absorber lower mount bolt (1).

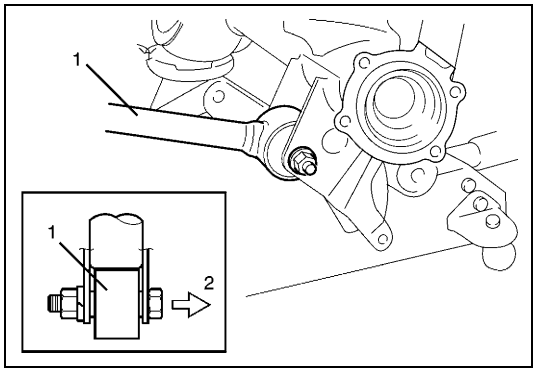
19) Lower floor jack until tension of suspension coil spring becomes a little loose and remove rear mount bolt of upper, lower and lateral rod.
20) Lower rear axle housing gradually.



21) Remove axle housing.

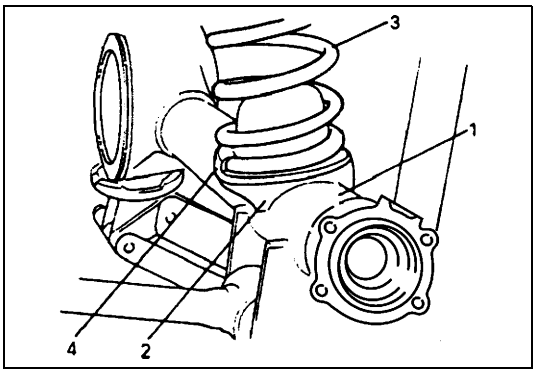
INSTALLATION

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



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

1.	Lower rod
2.	Body center

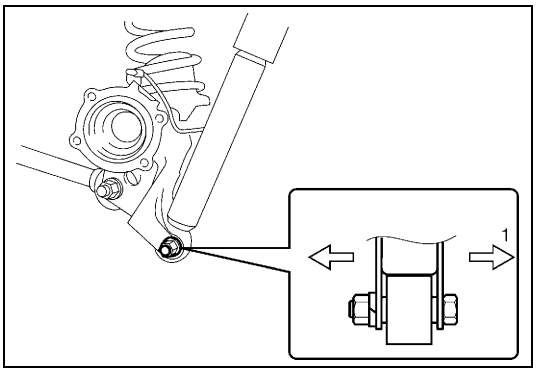


2) Install coil spring (3) (right & left) on spring seat (2) of axle housing (1) and raise axle housing (1).

NOTE:

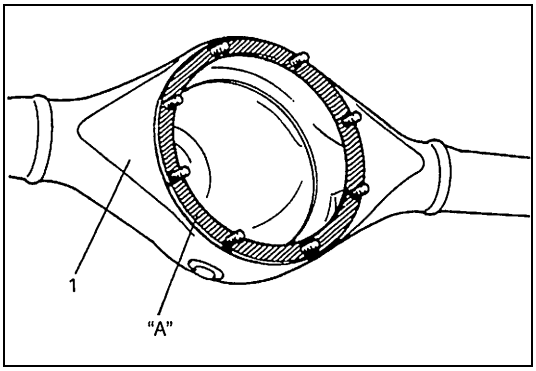
When seating coil spring, mate spring end with stepped part (4) of rear axle spring seat as shown.

3) Install lateral rod to rear axle housing.



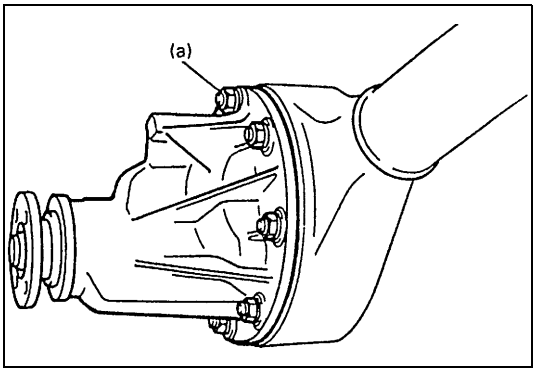
4) Install lower part of shock absorber to right and left sides of axle housing and install bolts in proper direction as shown in figure.
   At this time, mount nuts but don't tighten them.

1. Body center



5) Clean mating surfaces of axle housing (1) and differential carrier and apply sealant "A" to housing side.

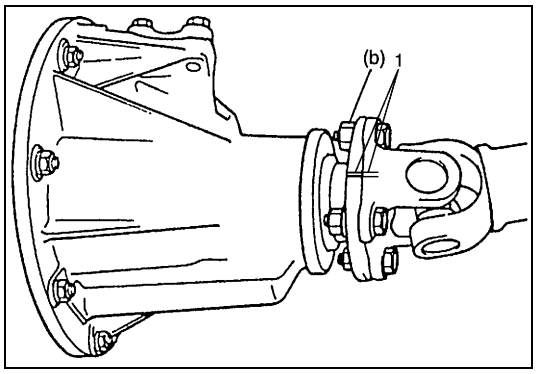
"A" : Sealant 99000-31110



6) Install differential carrier assembly to axle housing and tighten carrier nuts to specified torque.

Tightening torque
Rear differential carrier nuts
(a) : 55 N·m (5.5 kg-m, 40.0 lb-ft)

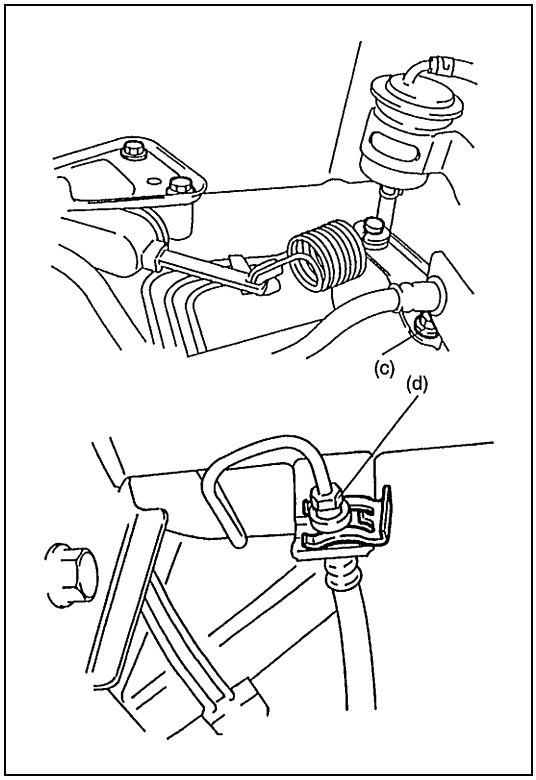
7) For vehicle with ABS, connect wheel speed sensor coupler and install harness.



8) Align the match marks (1) and install propeller shaft and torque nuts to specification.

Tightening torque
Rear prop. shaft bolts (b) : 55 N·m (5.5 kg-m, 40.0 lb-ft)

9) Remove floor jack from axle housing and connect breather hose onto axle housing and clamp it securely.
10) Connect brake pipes onto axle housing and clamp them securely.
For clamping positions, refer to “Rear Brake Hose/Pipe” in Section 5A.
11) Connect brake flexible hose to bracket on axle housing and secure it with E-ring.

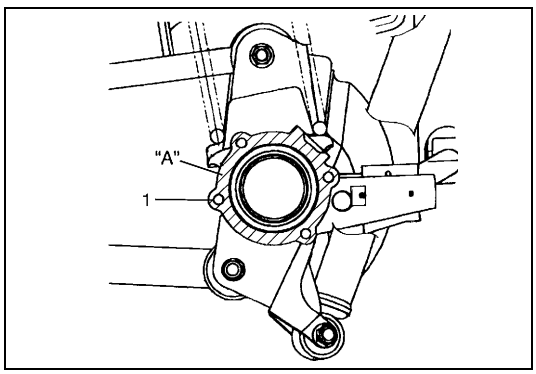


12) Install LSPV stay to axle housing, tighten LSPV stay bolt to specified torque.
And adjust LSPV referring to “INSPECTION and ADJUSTMENT” under “LSPV (Load Sensing Proportioning Valve) Assembly (if equipped)” in Section 5A.

Tightening torque
LSPV stay bolt (c) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

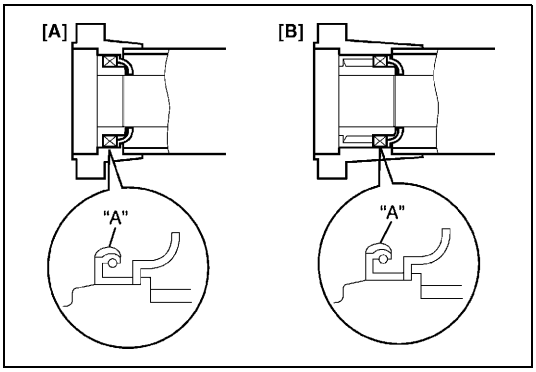
13) Connect brake pipe to brake flexible hose and tighten brake pipe flare nut to specified torque.

Tightening torque
Brake pipe flare nut (d) : 16 N·m (1.6 kg-m, 11.5 lb-ft)



14) Clean mating surface of axle housing (1) (right & left) and brake back plate, then apply sealant as shown.

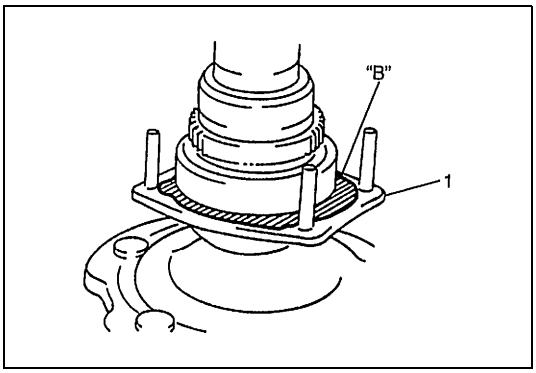
“A” : Sealant 99000-31110



15) Apply grease to axle shaft inner oil seal lip as shown.

"A" : Grease 99000-25010

[A] : Vehicle without ABS
[B] : Vehicle with ABS

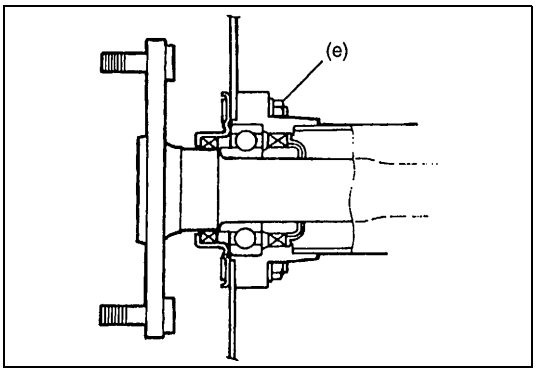


16) Apply sealant to mating surface of bearing retainer (1) with brake back plate.

NOTE:

Make sure to remove old sealant before applying it anew.

"B" : Sealant 99000-31110

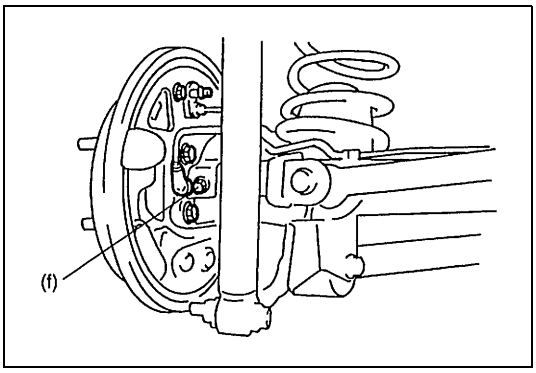


17) Install rear axle shaft to rear axle housing and tighten bearing retainer nuts to specified torque.

NOTE:

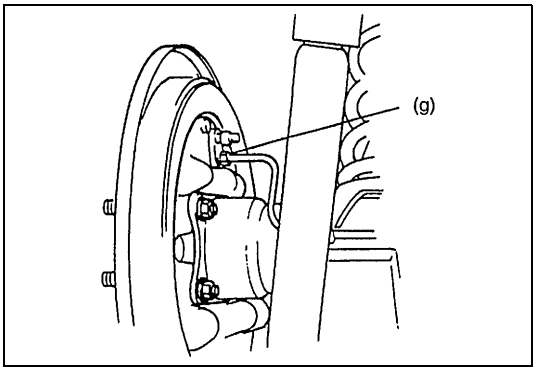
When installing rear axle shaft, be careful not to cause damage to oil seal lip in axle housing.

Tightening torque
Bearing retaniner nut (e) : 23 N·m (2.3 kg-m, 17.0 lb-ft)



18) For vehicle with ABS, tighten wheel speed sensor bolt to specified torque.

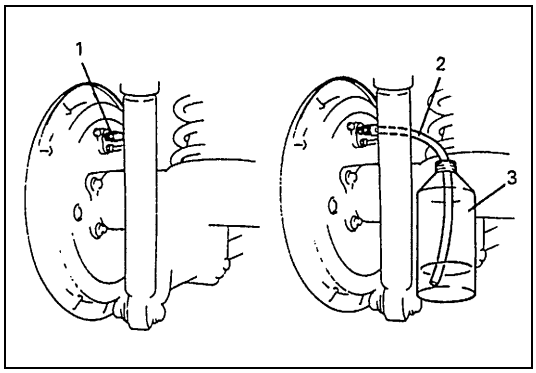
Tightening torque
Wheel speed sensor bolt (f) : 21 N·m (2.1 kg-m, 15.5 lb-ft)



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

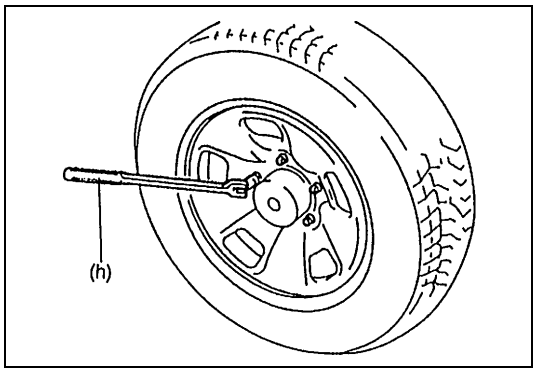
Tightening torque
Brake pipe flare nut (g) : 16 N·m (1.6 kg-m, 11.5 lb-ft)

20) Install brake drum (right & left). For details, refer to “INSTALLATION” under “Brake Drum” in Section 5C.
21) Tighten drain plug to specified torque and refill differential gear housing with new specified gear oil. Refer to “Maintenance Service” in Section 7F.
22) Tighten oil filler plug to specified torque refering to “Section 7F”.



23) Fill reservoir with brake fluid and bleed brake system. (Refer to “Bleeding Brakes” in Section 5.)

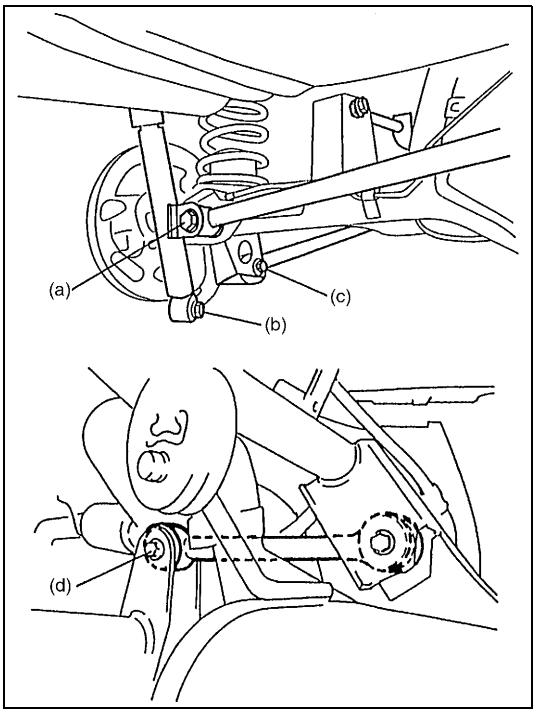
1.	Plug cap
2.	Vinyl tube
3.	Container



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

Tightening torque
Wheel nuts (h) : 100 N·m (10.0 kg-m, 72.5 lb-ft)

25) Upon completion of all jobs, depress brake pedal with about 30 kg (66 lbs) load three to ten times so as to obtain proper drum-to-shoe clearance.
Adjust parking brake cable. Refer to “Parking Brake Check and Adjustment” in Section 5.
26) Tighten rear console box screws.
27) Lower hoist.



28) Tighten right and left lower/upper rod nuts lateral rod mount bolt and shock absorber nuts to specified torque.

NOTE:

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

Tightening torque
Lateral rod left side bolt (a) : 100 N·m (10.0 kg-m, 72.5 lb-ft)
Absorber lower nut (b) : 100 N·m (10.0 kg-m, 72.5 lb-ft)
Lower rod rear bolt (c) : 90 N·m (9.0 kg-m, 65.0 lb-ft)
Upper rod rear bolt (d) : 90 N·m (9.0 kg-m, 65.0 lb-ft)

29) Check to ensure that brake drum is free from dragging and proper braking is obtained.
30) Perform brake test (foot brake and parking brake).
31) Check each installed part for oil leakage.

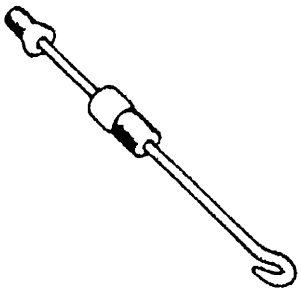
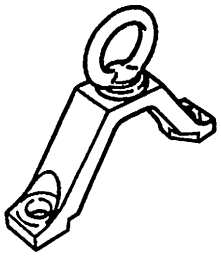
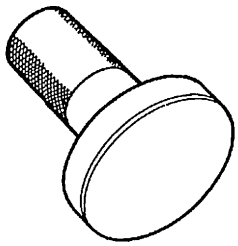
Tightening Torque Specifications

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Wheel nut	100	10.0	72.5
Shock absorber lock nut	29	2.9	21.0
Shock absorber nut	29	2.9	21.0
Shock absorber lower nut	100	10.0	72.5
Lower rod front bolt	100	10.0	72.5
Lower rod rear bolt	90	9.0	65.0
Upper rod front bolt	95	9.5	69.0
Upper rod rear bolt	90	9.0	65.0
Lateral rod mounting bolt left side	100	10.0	72.5
Lateral rod mounting bolt right side	95	9.5	69.0
Wheel speed sensor bolt	21	2.1	15.5
Rear differential carrier nut	55	5.5	40.0
Rear propeller shaft bolt	55	5.5	40.0
LSPV stay bolt	23	2.3	17.0
Brake pipe frare nut	16	1.6	11.5
Bearing retainer nut	23	2.3	17.0

Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	Oil seal lip
Brake fluid	DOT 3	Brake reservoir tank
Sealant	SUZUKI BOND NO. 1215 (99000-31110)	• Joint seam of axle and brake back plate • Joint seam of bearing retainer and brake back plate • Joint seam of differential carrier and axle housing • Drain plug • Mating surface of oil seal and axle housing
Gear oil	For gear oil information, refer to “Maintenance Service” in Section 7F.	Differential gear (Refer axle housing.)

Special Tool

		
09942-15510 Sliding hammer	09943-35512 Brake drum remover	09913-75510 Oil seal installer

SECTION 3F

WHEELS AND TIRES

NOTE:

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

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General Description

Tires

This vehicle is equipped with following tire. P215/65 R16, 215/65 R16 or 235/60 R16
The tires are of tubeless type. The tires are designed to operate satisfactorily with loads up to the full rated load capacity when inflated to the recommended inflation pressure
Correct tire pressures and driving habits have an important influence on tire life. Heavy cornering, excessively rapid acceleration, and unnecessary sharp braking increase tire wear.

Wheels

Standard equipment wheels are following steel wheel. 16 x 6 1/2 J or 16 x 7JJ

Replacement Tires

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

NOTE:

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

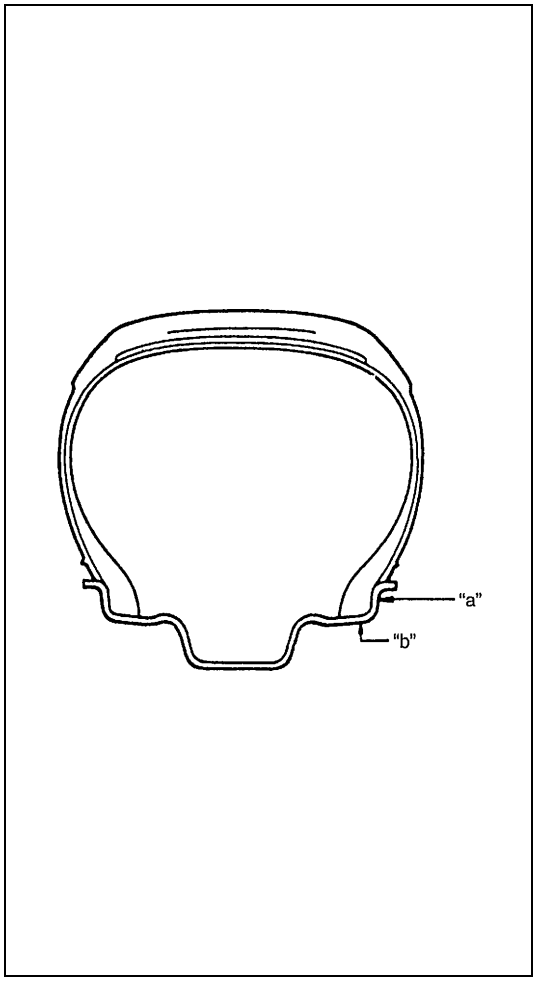
It is recommended that new tires be installed in pairs on the same axle. If necessary to replace only one tire, it should be paired with the tire having the most tread, to equalize braking traction.

kPa	kgf/cm^2	psi
160	1.6	23
180	1.8	26
200	2.0	29
220	2.2	32
240	2.4	35
260	2.6	38
280	2.8	41
300	3.0	44
320	3.2	47
340	3.4	50

The metric term for tire inflation pressure is the kilopascal (kPa). Tire pressures will usually be printed in both kPa and psi on the Tire Placard. Metric tire gauges are available from tool suppliers. The chart, left table, converts commonly used inflation pressures from kPa to psi.

Conversion
: 1 psi = 6.895 kPa
: 1 kgf/cm^2 = 98.066 kPa

Wheels Replacement



Wheels must be replaced if they are bent, dented, have excessive lateral or radial runout, leak air through welds, have elongated bolt holes, if lug nuts won't stay tight, or if they are heavily rusted. Wheels with greater runout than shown in the figure may cause objectional vibrations.

Wheels for replacement must be equivalent to the originally equipped wheels in load capacity, diameter, rim width, off-set and mounting configuration. A wheel of improper size or type may affect wheel and bearing life, brake cooling, speedometer/odometer calibration, ground clearance to the body and chassis.

To measure the wheel runout, it is necessary to use accurate dial indicator. The tire may be on or off the wheel. The wheel should be installed to the wheel balancer of the like for proper measurement.

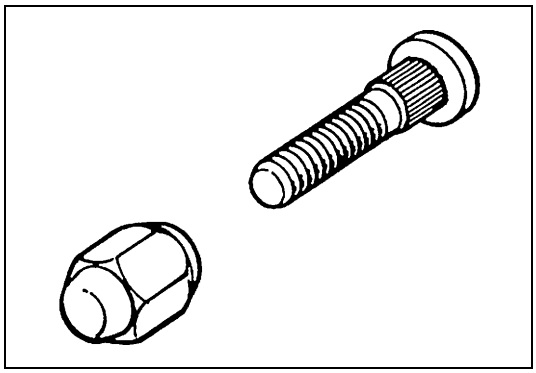
Take measurements of both lateral runout and radial runout at both inside and outside of the rim flange. With dial indicator set in place securely, turn the wheel one full revolution slowly and record every reading of the indicator.

When the measured runout exceeds the specification and correction by the balancer adjustment is impossible, replace the wheel.

If the reading is affected by welding, paint or scratch, it should be ignored.

Lateral runout limit "a" : 1.20 mm (0.047 in.)
Radial runout limit "b" : 1.20 mm (0.047 in.)

Metric Lug Nuts and Wheel Studs



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

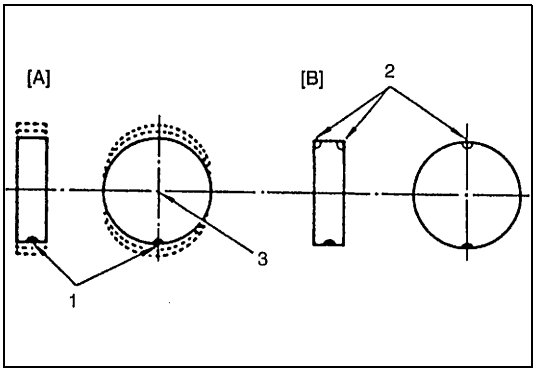
Diagnosis

Diagnosis Table

Refer to “Diagnosis Table” in Section 3.

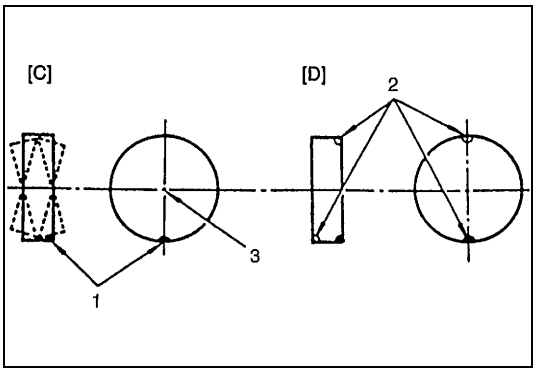
Balancing Wheels

There are two types of wheel and tire balance: static and dynamic.



Static balance, as shown in the figure, is equal distribution of weight around wheel. Wheels that are statically unbalanced cause bouncing action called tramp. This condition will eventually cause uneven tire wear.

1. Heavy spot wheel tramp	[A] : Before correction
2. Balance weights addition point	[B] : Corrective weights
3. C/L of spindle	



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

1. Heavy spot wheel shimmy	[C] : Before correction
2. Balance weights addition point	[D] : Corrective weights
3. C/L of spindle	

General balance procedure

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

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

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

Off-vehicle balancing

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

On-vehicle balancing

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

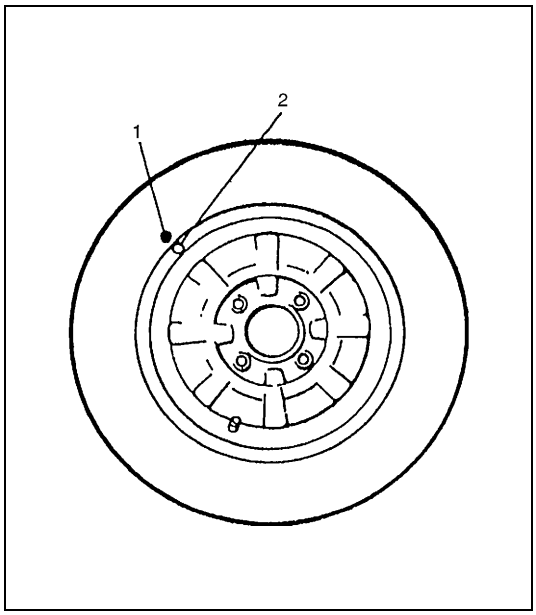
Maintenance and Minor Adjustments

Wheel and Tire

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

Studs

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



Matched tires and wheels (For vehicle equipped with steel wheels)

Tires and wheels are matchmounted at the assembly plant.
This means that the radially stiffest part of the tire, or “high spot”, is matched to the smallest radius or “low spot” of the wheel.
This is done to provide the smoothest possible ride.
The “high spot” of the tire is originally marked by paint dot (1) on the outboard sidewall. This paint dot (1) will eventually wash off the tire.
The “low spot” of the wheel is originally marked by paint dot (2) on the wheel rim-flange. Properly assembled, the wheel rims’ paint dot (2) should be aligned with the tires’ paint dot (1) as shown in the figure.
Whenever a tire is dismounted from its wheel, it should be remounted so that the tire and wheel are matched. If the tire’s paint dot (1) cannot be located, a line should be scribed on the tire and wheel before dismounting to assure that it is remounted in the same position.

Inflation of tires

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

Higher than recommended pressure can cause :

- Hard ride
- Tire bruising or carcass damage
- Rapid tread wear at center of tire

Unequal pressure on same axle can cause :

- Uneven braking
- Steering lead
- Reduced handling
- Swerve on acceleration

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

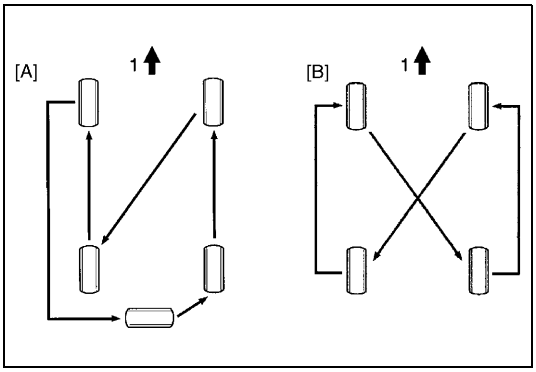
Lower than recommended pressure can cause :

- Tire squeal on turns
- Hard steering
- Rapid and uneven wear on the edges of the tread
- Tire rim bruises and rupture
- Tire cord breakage
- High tire temperatures
- Reduced handling
- High fuel consumption

Tire placard

The tire placard is located on the driver's side door lock pillar and should be referred to for tire information. The placard lists the maximum load, tire size and cold tire pressure where applicable.

Tire rotation



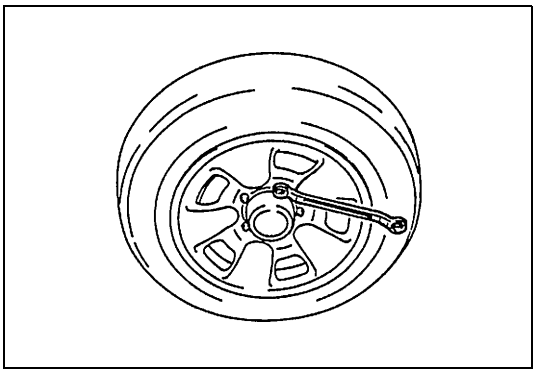
To equalize wear, rotate tires periodically as shown in figure.

[A] : 5-tire rotation
[B] : 4-tire rotation
1. Front

On-Vehicle Service

Wheel

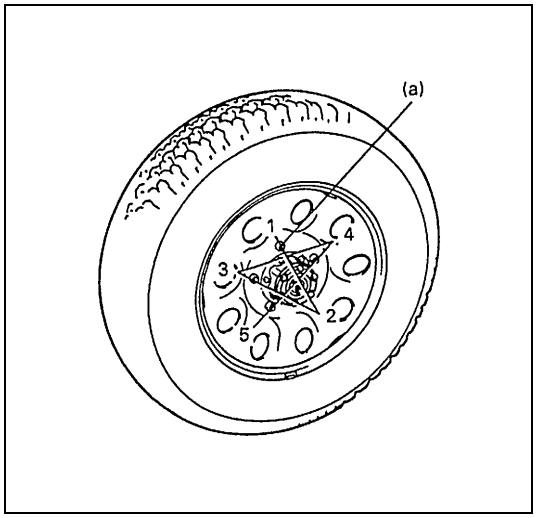
REMOVAL



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

NOTE:

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



INSTALLATION

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

NOTE:

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

Tightening torque
Wheel nut (a) : 100 N·m (10.0 kg-m, 72.5 lb-ft)

Tire

Mounting and demounting

Use tire changing machine to mount or demount tires. Follow equipment manufacturer's instructions. Do not use hand tools or tire irons alone to change tires as they may damage tire beads or wheel rim.
Rim bead seats should be cleaned with wire brush or coarse steel wool to remove lubricants, old rubber and light rust. Before mounting or demounting tire, bead area should be well lubricated with approved tire lubricant.
After mounting, inflate to 240 kPa (35psi) so that beads are completely seated. Then adjust pressure to specified shown an tire placard.

WARNING:

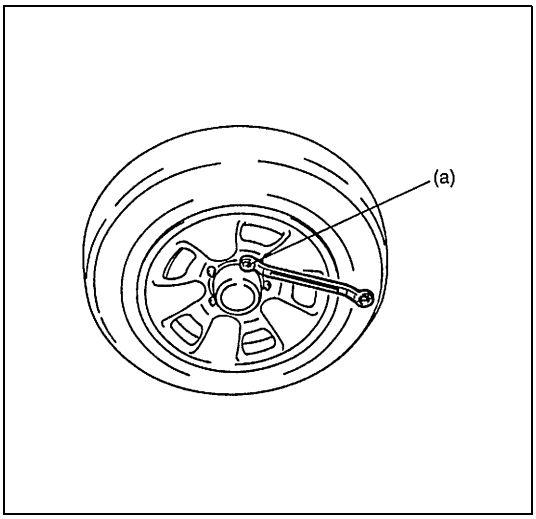
Do not stand over tire when inflating. Bead may break when bead snaps over rim's safety hump and cause serious personal injury.
Do not exceed 240 kPa (35 psi) pressure when inflating. If 240 kPa (35 psi) pressure will not seat beads, deflate, relubricate and reinflate. Over inflation may cause bead to break and cause serious personal injury.

Install valve core and inflate to proper pressure.

Tire repair

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

Tightening Torque Specifications



Tightening torque
wheel nut (a) : 100 N·m (10.0 kg-m, 72.5 lb-ft)

SECTION 4A2

FRONT DRIVE SHAFT/SHAFT BEARING, OIL SEAL

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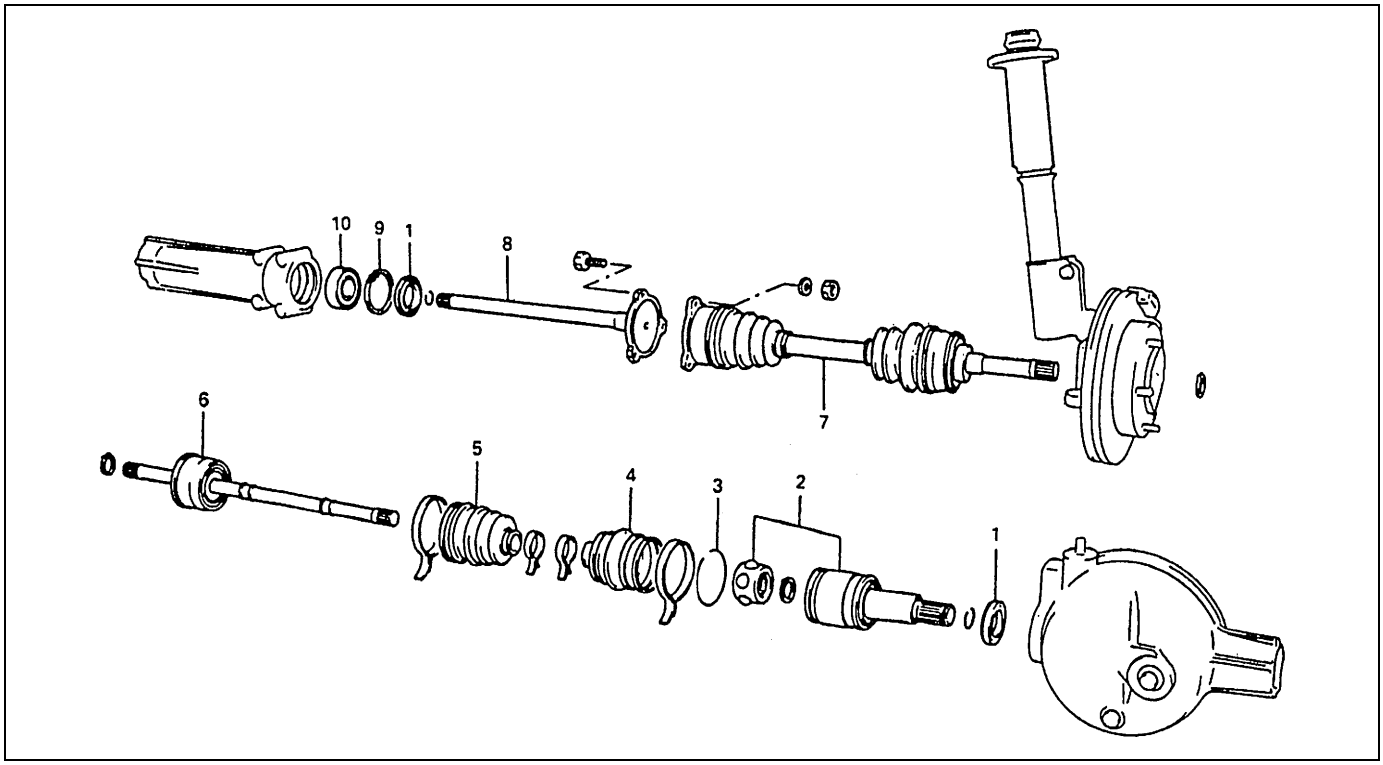
4A2

General Description

The drive shaft joint is a constant velocity joint (C.V. joint) which slides in the axial direction. The joint is composed of an outer race, cage, inner race and balls. In the turning direction, the joint rotates in the same way as a ball bearing. The balls lock rotation completely and transmit drive. In addition this vehicle is also characterized by a function that the shaft can slide through the balls in the grooves of the outer race in the extension/contraction direction of the drive shaft.



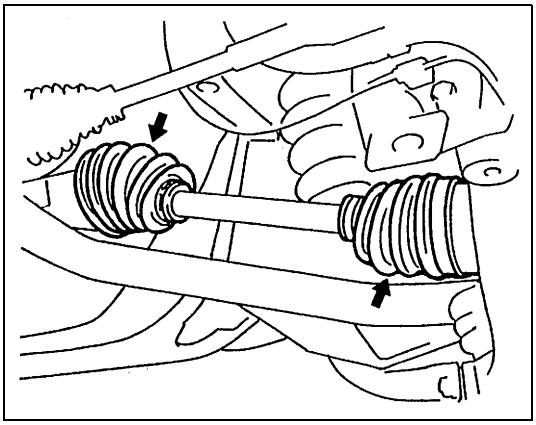
1. Drive shaft oil seal	4. DOJ boot	7. Drive shaft assembly (LH side)	10. Drive shaft bearing
2. Double off set joint (DOJ)	5. Ball joint boot	8. Left drive shaft	
3. Joint circlip	6. Ball joint assembly (RH side)	9. Drive shaft bearing circlip	

Diagnosis

Diagnosis Table

Condition	Possible Cause	Correction
When starting : Abnormal Noise	Loose wheel nuts.	Tighten wheel nuts.
	Loose drive shaft flange bolts.	Tighten drive shaft flange bolts.
	Broken or otherwise damaged wheel bearing.	Replace or change.
When making turns : Abnormal Noise	Grease leakage from drive shaft joint boot.	Replace joint boot and apply grease.
	Worn or broken drive shaft joint.	Replace drive shaft joint.
When running : Abnormal Noise	Broken drive shaft joint.	Replace drive shaft joint.
	Poorly lubricated or worn drive shaft joint.	Lubricate or replace joint.
	Loose drive shaft flange bolts.	Tighten drive shaft flange bolts.
	Deformed drive shaft oil seal.	Replace.
Vibration	Worn drive shaft joint.	Replace drive shaft joint.
	Deformed drive shaft oil seal.	Replace.
	Deformed drive shaft.	Replace.

Drive Shaft Boot and Joint Check

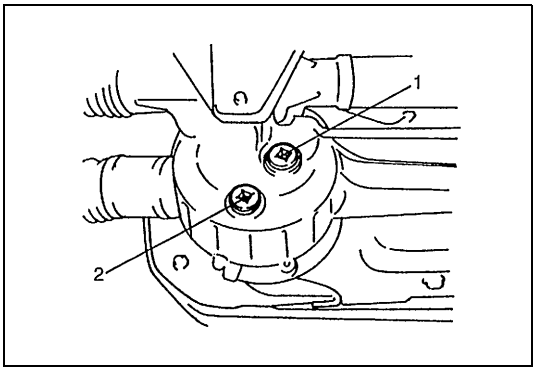


Check drive shaft boot for tear. If even a small tear is noted, replace with new one.
Check drive shaft joint for wear, breakage and other damage and replace if any defect exists.

On-Vehicle Service

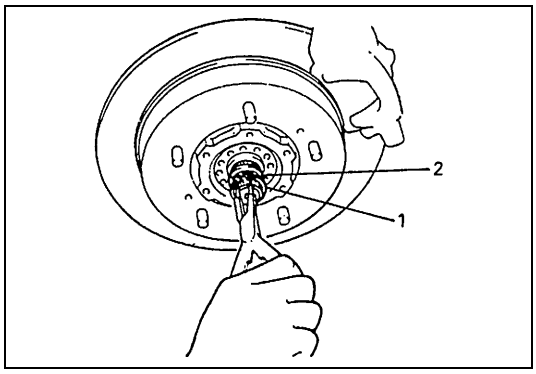
Drive Shaft

REMOVAL (LEFT SIDE)



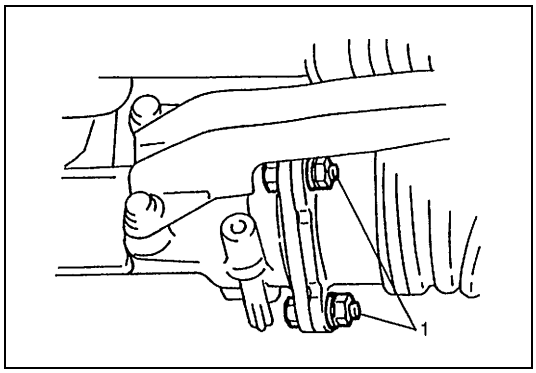
1) Hoist vehicle and remove wheel.

1. Oil filler/level plug
2. Front drain plug



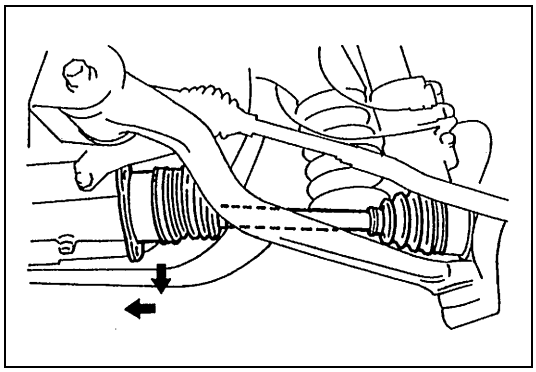
2) Remove axle shaft drive flange.
3) Remove drive shaft circlip and front spindle thrust washer.

1.	Circlip
2.	Washer



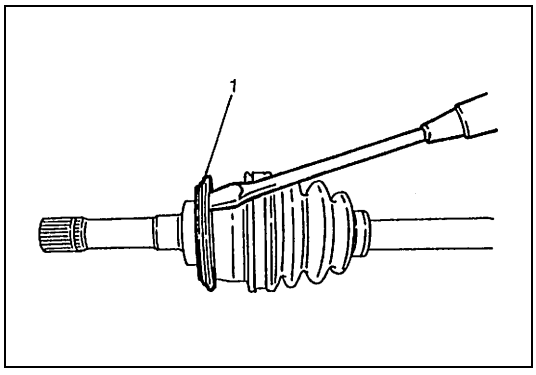
4) Remove drive shaft flange bolts and nuts.

1.	Drive shaft flange bolts and nuts



5) Remove drive shaft assembly to differential side as shown in left figure.

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

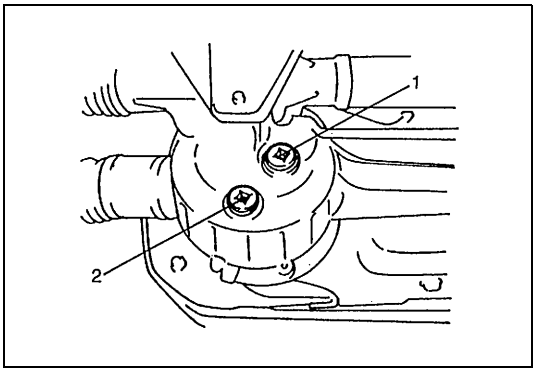


6) Remove drive shaft thrust washer (vehicle with G16 or J20 engine) from drive shaft and remove drive shaft oil seal as shown in figure.

CAUTION:
Be careful not to cause damage to drive shaft joint.

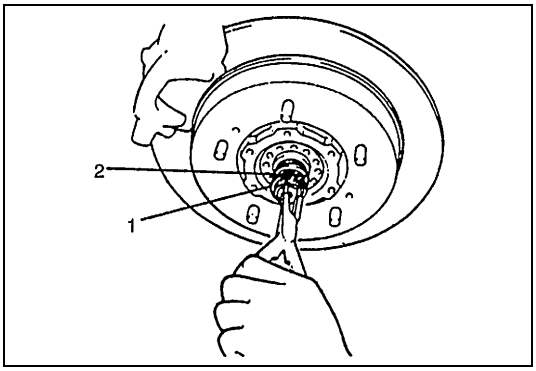
1.	Oil seal

REMOVAL (RIGHT SIDE)



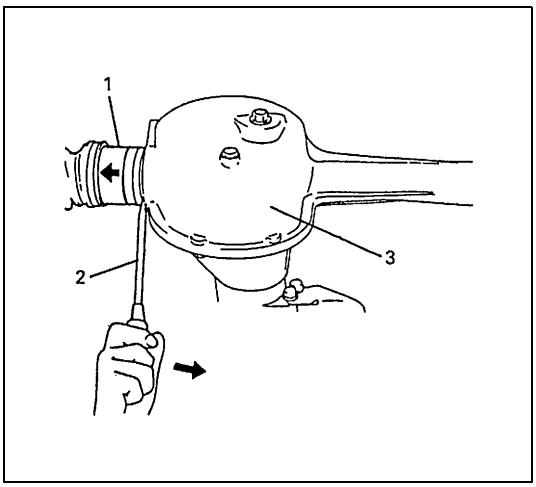
1) Hoist vehicle and remove wheel.
2) Drain differential gear oil.

1. Oil filler/level plug
2. Front drain plug



3) Remove axle shaft drive flange.
4) Remove circlip and front spindle thrust washer.
5) Remove knuckle and wheel hub comp, referring to Steps 5) to 7) and 9) to 14) of item “Coil Spring Removal” in Section 3D.

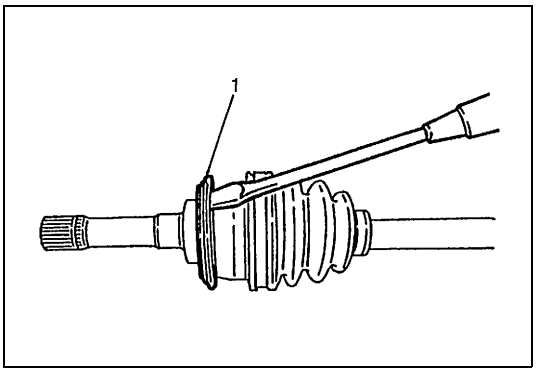
1. Circlip
2. Washer



6) Remove drive shaft assembly.
   To detach snap ring fitted on the spline of differential side joint (inboard joint) from differential side gear, pull inboard joint by using a tire lever.

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

1. Differential side joint
2. Tire lever
3. Front differential assembly

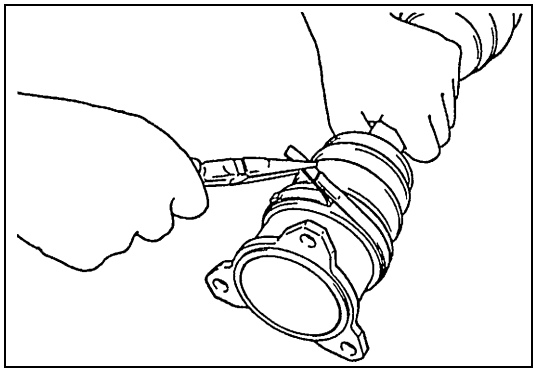


7) Remove drive shaft thrust washer (to vehicle with G16 or J20 engine) from drive shaft and remove drive shaft oil seal as shown in figure.

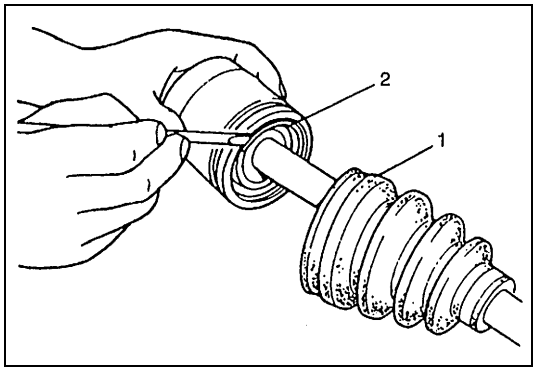
CAUTION:
Be careful not to cause damage to drive shaft joint.

1. Oil seal

DISASSEMBLY

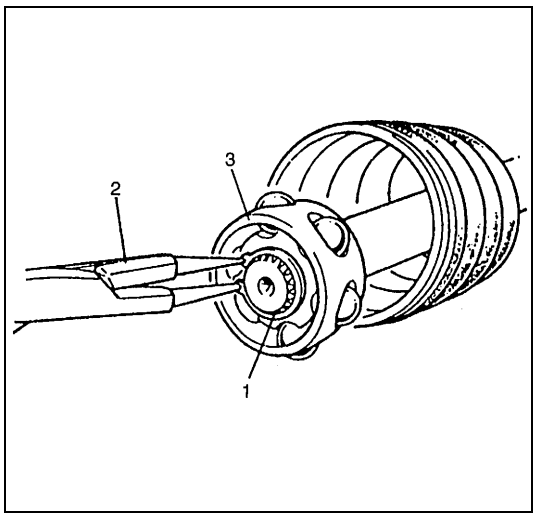


1) Remove boot band of differential side joint.



2) Slide boot toward the center of shaft and remove snap ring from outer race, then take shaft out of outer race.

1. Boot
2. Snap ring



3) Remove circlip and then cage.
4) Remove inside and outside boots from shaft.

CAUTION:
- **Do not disassemble wheel side joint (outboard joint). If any malcondition is found in joint, replace it as assembly.**
- **Do not disassemble ball joint of differential side joint. If any malcondition is found in ball joint, replace differential side joint assembly.**

1. Circlip
2. Snap ring plier
3. Cage

INSPECTION

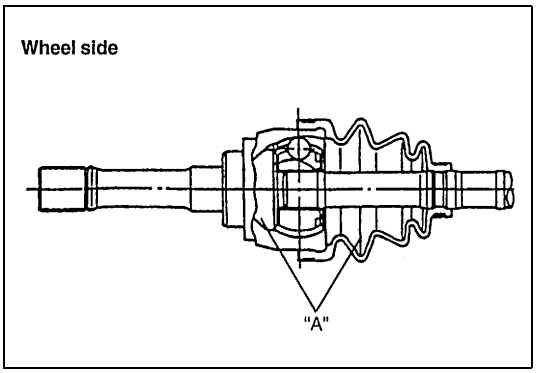
- Check boots for breakage or deterioration. Replace them as necessary.
- Check circlip, snap ring and boot bands for breakage or deformation. Replace as necessary.

CLEANING

- Wash disassembled parts (except boots) in degreaser. After washing, dry parts completely by blowing air.
- Clean boots with cloth. DO NOT wash boots in degreaser, such as gasoline or kerosene, etc.
  Washing in degreaser causes deterioration of boot.

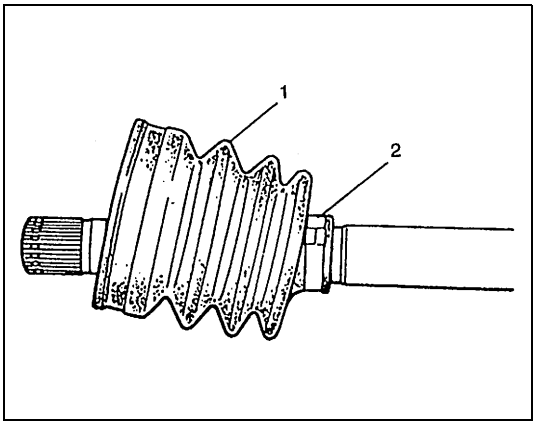
ASSEMBLY

CAUTION:
- **To prevent any problem caused by washing solution, do not wash joint boots. Degreasing of those parts with cloth is allowed.**
- **For M/T vehicle with H25 engine**
  To ensure full performance of joint as designed, be sure to distinguish between two types of grease in repair set and apply specified volume to respective joint. i.e. yellow grease to wheel side joint and black one to differential side.
- **Bend each boot band against forward rotation.**
- **Do not squeeze or distort boot when fastening it with bands.**
  Distorted boot caused by squeezing air may reduce its durability.



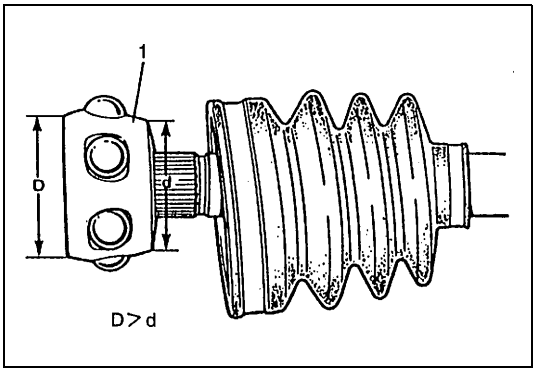
1) Fully apply joint grease to wheel side joint.
   Use joint grease in the tube included in spare part.

"A" : Fill grease 85g (3.0 oz)



2) Fit wheel side boot on shaft.
   Fill up inside of boot with joint grease of about 90 gram.
   Before fixing boot band, insert screwdriver into boot on joint side and allow air to enter boot so that air pressure in boot becomes the same as atmospheric pressure.
3) Fixing boot band.
4) Install boot onto drive shaft till its small diameter side fits to shaft groove and fix there with boot band.

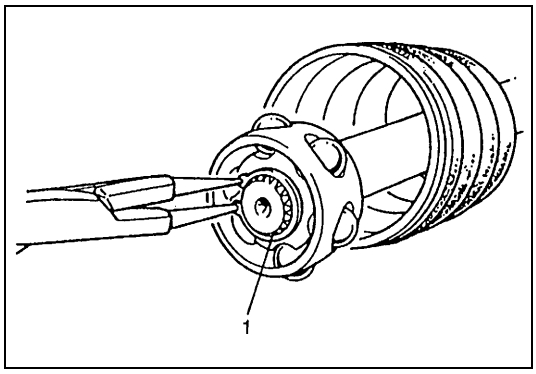
1. Boot
2. Boot band



5) Install cage to shaft.

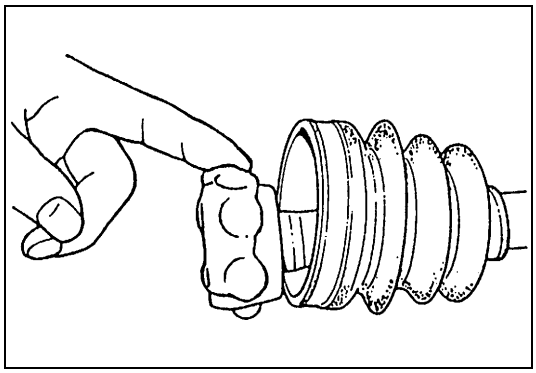
CAUTION:
Install cage directing smaller outside diameter side to shaft end.

1. Cage

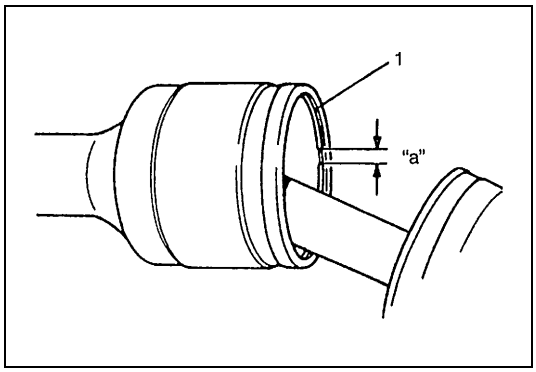


6) Install circlip by using snap ring pliers.

1. Circlip



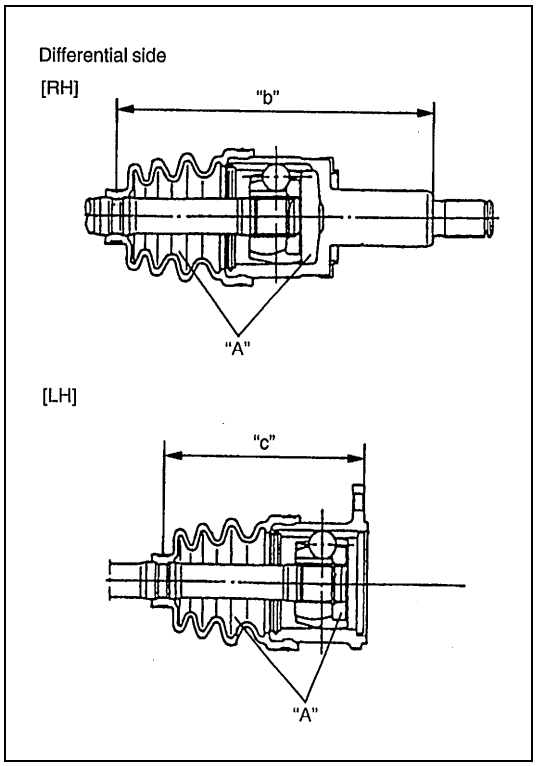
7) Apply grease to entire surface of cage.
Use joint grease in tube included in spare part or joint grease (99000-25120).



8) Insert cage into outer race and fit circlip into groove of outer race.

CAUTION:
Position opening of circlip "a" so that it will not be lined up with a ball.

1. Circlip



9) Apply grease to inside of outer race, and fit boot to outer race.
Fill up inside of boot with joint grease.

"A" : Joint Grease 99000-25120 (about 90 – 95g/3.2 – 3.4 oz)

10) Fitting boot to outer race, adjust so that measurements "b" and "c" become as indicated in figure.

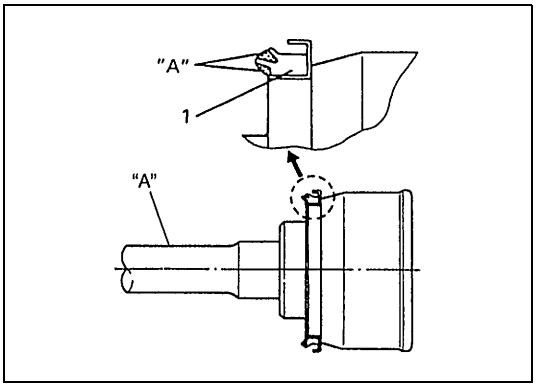
Length "b" : 203.2 – 213.2 mm (8.00 – 8.40 in.)
196.8 – 206.8 mm (7.75 – 8.14 in.) ... M/T vehicle with H25 engine
"c" : 125.5 – 135.5 mm (4.94 – 5.33 in.)
127.5 – 137.5 mm (5.02 – 5.41 in.) ... M/T vehicle with H25 engine

Before fixing boot band, insert screwdriver into boot on joint side and allow air to enter boot so that air pressure in boot becomes the same as atmospheric pressure.

11) Clamp boot band. Check boots for distortion or dent.

"A" : Fill grease 90 – 95 g (3.2 – 3.4 oz)

INSTALLATION



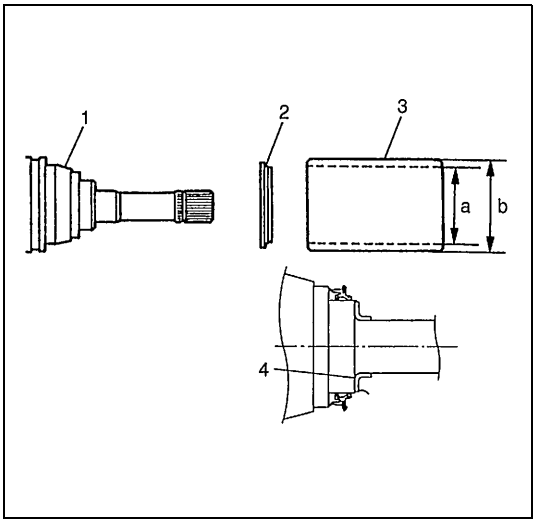
Install drive shaft assembly by reversing removal procedure and noting following points.

- Clean front drive shaft oil seal and then apply lithium grease to oil seal and DOJ shaft.

"A" : Grease 99000-25010

- Check oil seal for breakage or deterioration.
  Replace it as necessary.

1.	Drive shaft oil seal

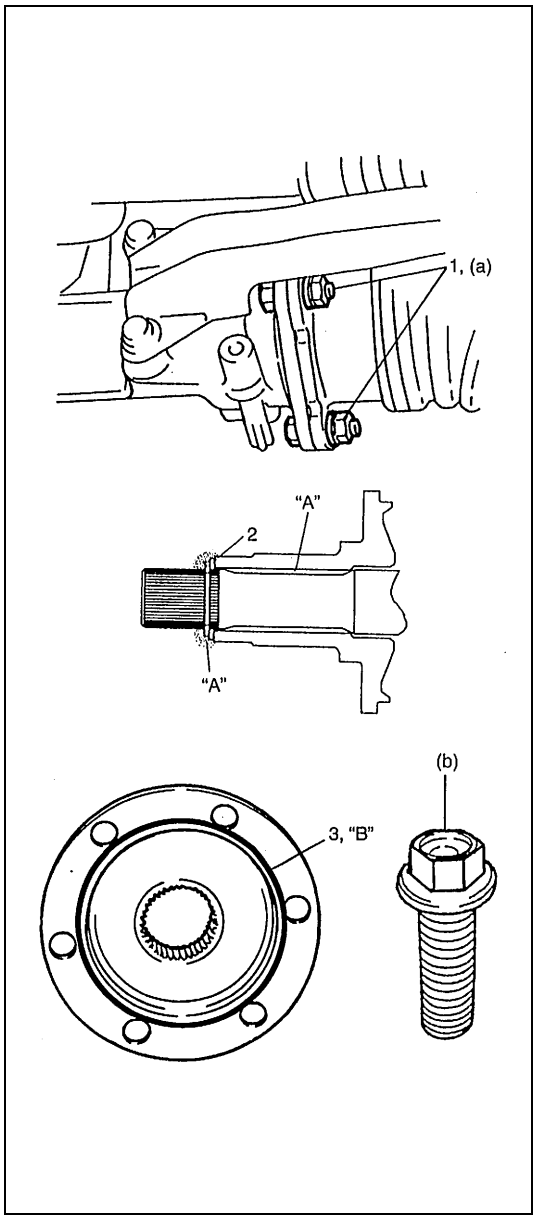


- Drive in oil seal until its end contacts stepped surface of drive shaft joint by using a pipe whose inner diameter is 76 mm (2.992 in.) or more and outer diameter is 80 mm (3.150 in.) or less.

Diameter "a" : 76 mm (2.992 in.) or more
Diameter "b" : 80 mm (3.150 in.) or less

- Drive in drive shaft thrust washer (Vehicle with G16 or J20 engine).

1.	Drive shaft joint
2.	Oil seal
3.	Pipe
4.	Thrust washer



- RH Side
  Push differential side joint by hand until it is positioned by snap ring fitted to its spline.
- LH Side
  Connect drive shaft flange bolts and nuts.

Tightening torque
(a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

- Apply grease to front spindle thrust washer and front spindle part of drive shaft.

"A" : Grease 99000-25010

- When installing axle shaft drive flange to wheel hub, apply sealant to mating surface of axle shaft drive flange.

"B" : Sealant 99000-31090

Tightening torque
(b) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

CAUTION:

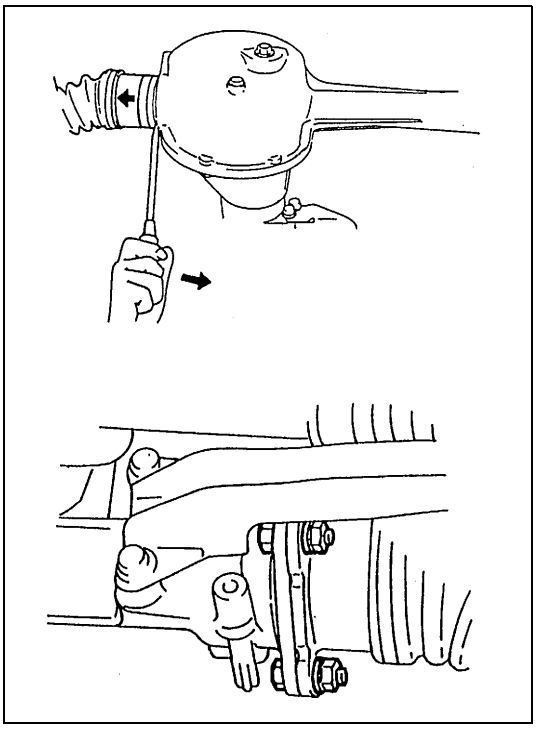
- **To prevent breakage of boots (wheel side and differential side), be careful not to bring them into contact with other parts when installing drive shaft assembly.**
- **Do not pull housing of differential side joint.**
  If housing is pulled, it may be detached from drive shaft.

- Fill specified differential gear oil into differential case to specified level.

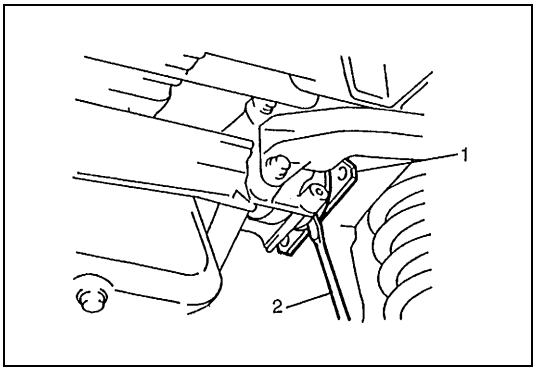
1.	Drive shaft flange bolt and nut
2.	Front spindle thrust washer
3.	Axle shaft drive flange

Shaft Bearing/Oil Seal

REMOVAL

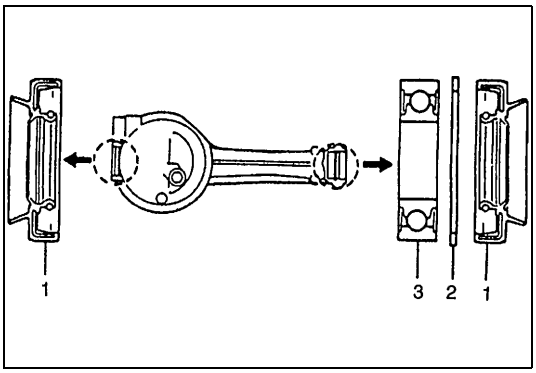


1) Remove drive shaft assembly.
   Refer to item “Drive Shaft Removal (LEFT and RIGHT)” in this section.
   For right side shaft bearing/oil seal removal, drain differential gear oil.



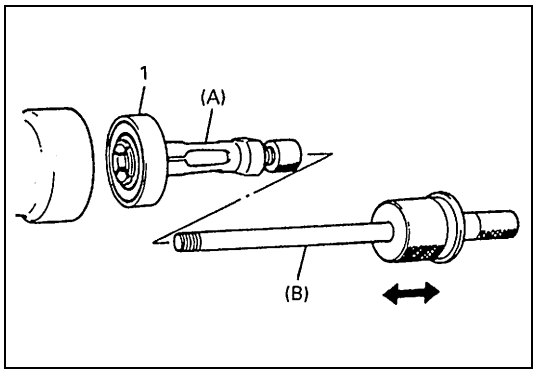
2) Remove left drive shaft by using tire lever.
3) Remove left side strut. Refer to Steps 1) and 4) to 8) of item “Strut Damper Removal” in Section 3D.

1.	Left drive shaft
2.	Tire lever



4) Remove oil seal, using plain screw driver.
5) Remove circlip.

1.	Axle oil seal
2.	Circlip
3.	Axle bearing

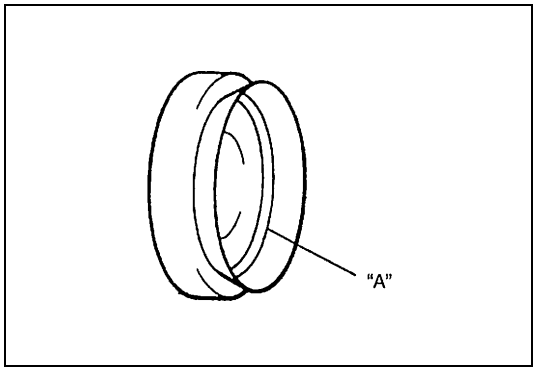


6) Remove bearing, using special tools (A) and (B).

Special tool
(A) : 09941-64510
(B) : 09930-30102

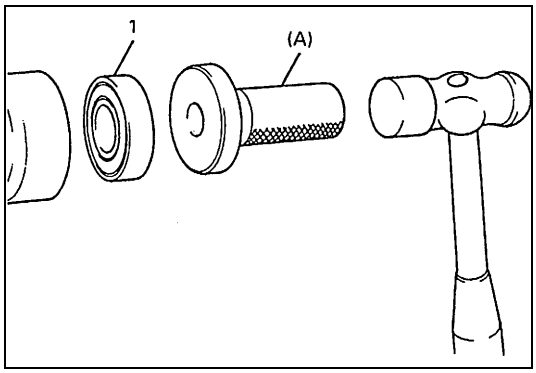
1. Shaft bearing

INSTALLATION



1) Clean drive shaft oil seal and then apply lithium grease.
Check oil seal for breakage or deterioration.
Replace it as necessary.

"A" : Grease 99000-25010

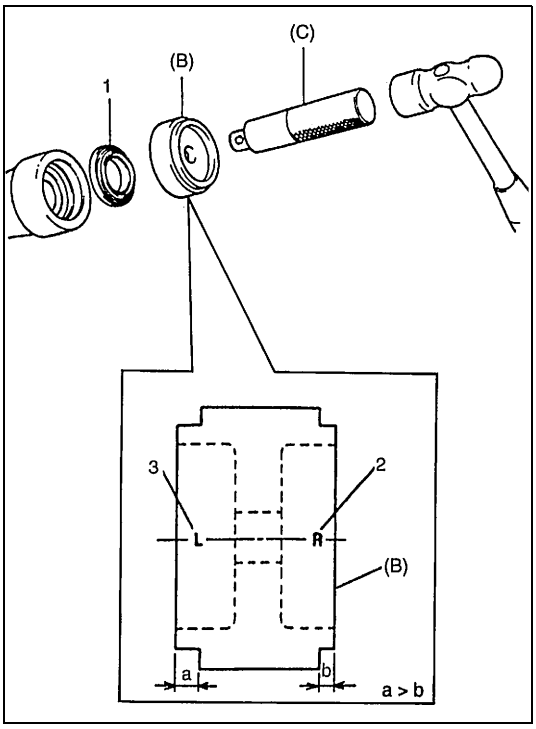


2) Drive in drive shaft bearing with special tool (A) (on left hand side).

Special tool
(A) : 09913-75520

3) Install circlip.

1. Shaft bearing



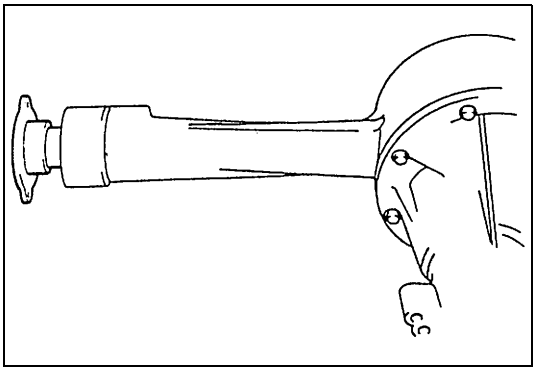
4) Drive in oil seal with special tools (B) and (C).

Special tool
(B) : 09951-16090
(C) : 09924-74510

NOTE:

As depth to which oil seal should be driven into axle housing is different between the left and right, be sure to check stamped marks on special tool (B) and drive each oil seal to corresponding mark.

1.	Shaft oil seal
2.	Right side
3.	Left side



5) Install left drive shaft.
6) Install left side strut. Refer to Steps 1) to 2) of item “Strut Dumper Installation” in Section 3D.
7) Install drive shaft assembly.
   Refer to “Drive Shaft Installation” in this section.
8) Fill specified differential gear oil into differential case to specified level.

Tightening Torque Specifications

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Drive shaft flange nut (Dif. side)	50	5.0	36.5
Oil level plug	23	2.3	17.0
Drain plug	23	2.3	17.0
Axle shaft drive flange bolt	48	4.8	35.0

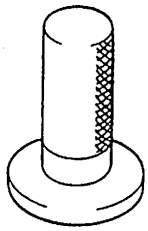
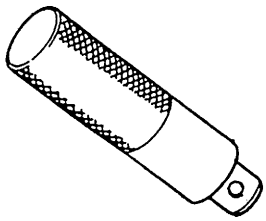
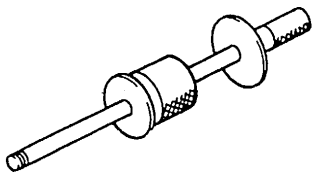
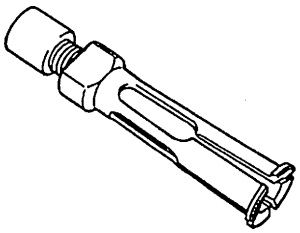
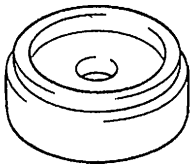
NOTE:

Refer to standard tightening torque specifications, if no description or specification is provided.

Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Joint grease (Molybdenum grease)	SUZUKI SUPER GREASE H (99000-25120)	Drive axle joint
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	Drive shaft oil seal Wheel spindle part of differential side drive shaft (RH)
Sealant	SEALING COMPOUND 366E (99000-31090)	Axle shaft drive flange

Special Tool

 09913-75520 Bearing installer	 09924-74510 Installer attachment	 09930-30102 Sliding shaft	 09941-64510 Bearing remover
 09951-16090 Oil seal installer			

SECTION 4B

PROPELLER SHAFTS

NOTE:

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

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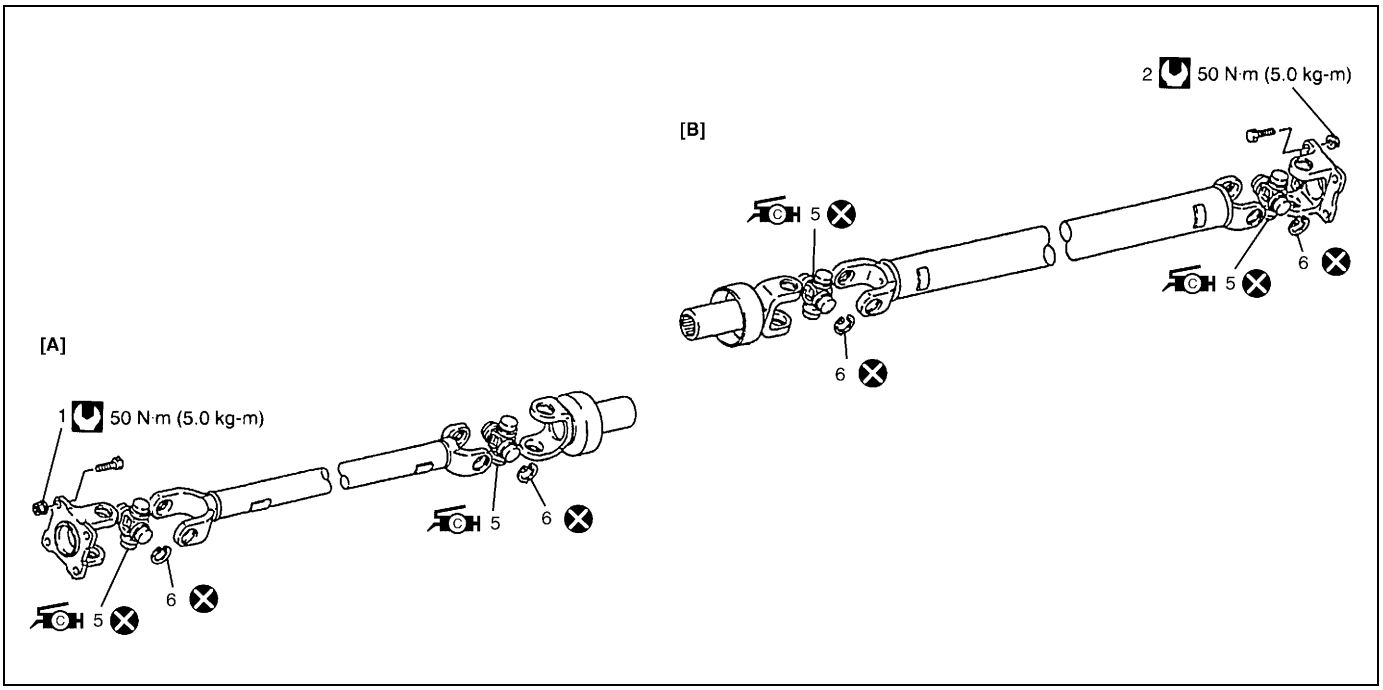
Propeller Shaft 4B-3
Tightening Torque Specification 4B-8
Required Service Material 4B-8
Special Tool 4B-8

General Description

Most universal joints require no maintenance. They are lubricated for life and cannot be lubricated on the vehicle.
If a universal joint becomes noisy or worn, it must be replaced.
The propeller shaft is a balanced unit. Handle it carefully so that balance can be maintained.

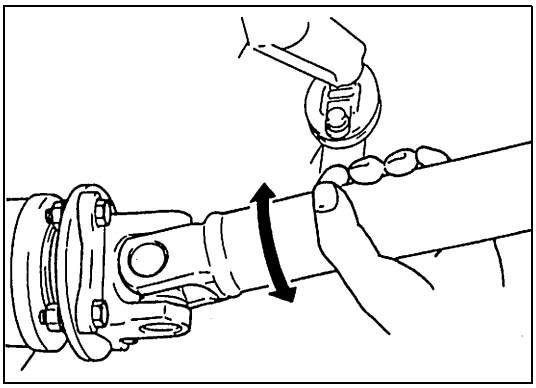


[A] : Front propeller shaft	1. Front propeller shaft flange nut	4. Center support	Tightening torque
[B] : Rear propeller shaft	2. Rear propeller shaft flange nut	5. Spider and its bearing : Apply grease (99000-25030) to spider bearing race.	Do not reuse.
	3. Center support mounting bolt	6. Circlip	

Diagnosis

Diagnosis Table

Condition	Possible Cause	Correction
Abnormal noise	Loose propeller shaft flange nut	Tighten propeller shaft flange nut.
	Spider bearing worn out or stuck	Replace.
	Wear spider	Replace propeller shaft.
Vibration	Deformed propeller shaft	Replace.



Propeller shaft joint check

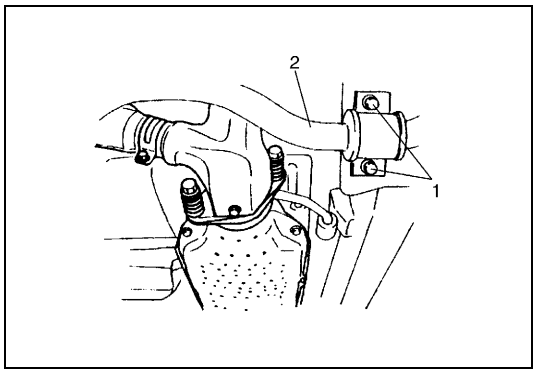
If universal joints are suspected of producing chattering or rattling noise, inspect them for wear. Check to see if cross spider rattles in yokes or if splines are worn down and replace defective propeller shaft with new one.
Noise coming from universal joint can be easily distinguished from other noises because rhythm of chattering or rattling is in step with cruising speed. Noise is pronounced particularly on standing start or in coasting condition (when braking effect of engine is showing in the drive line).

On-Vehicle Service

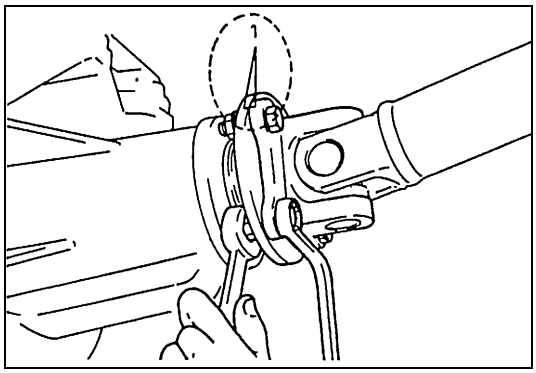
Propeller Shaft

REMOVAL

1) Hoist vehicle.



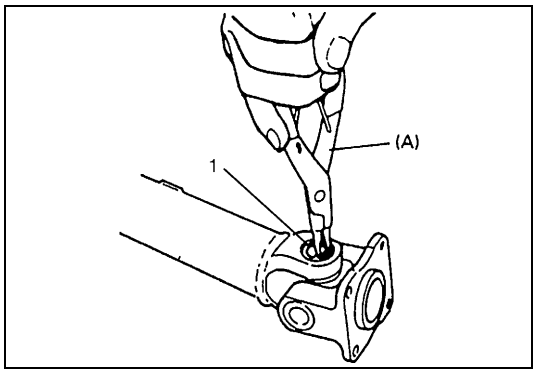
2) For front propeller shaft removal, perform the following step a) and b).
   a) Drain transfer oil referring to “Transfer Gear Oil” in Section 7D.
   b) Remove stabilizer bar mounting bracket bolts (1) and pull down stabilizer bar (2).



3) Give match marks (1) on joint flange and propeller shaft as shown.

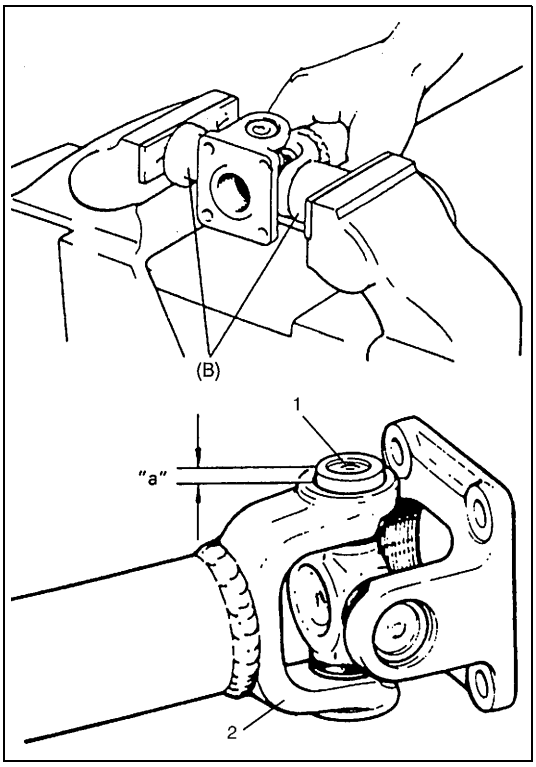
4) Remove propeller shaft.

DISASSEMBLY



1) Using special tool(A), remove 2 circlips (1).

Special tool
(A) : 09900-06108



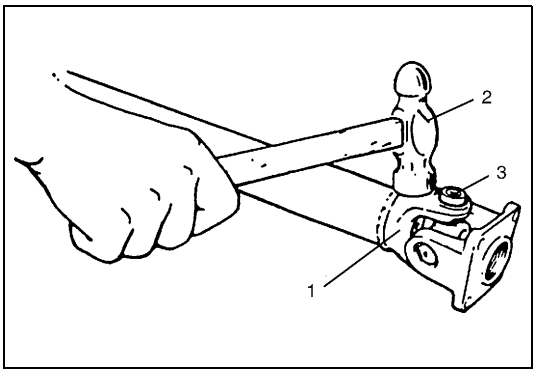
2) Using special tool(B), push spider bearing race (1) out 3 – 4 mm (0.12 – 0.16 in.) from shaft yoke race (2).

NOTE:

Before pushing it out, apply penetrate lubricant between bearing race (1) and yoke race (2).

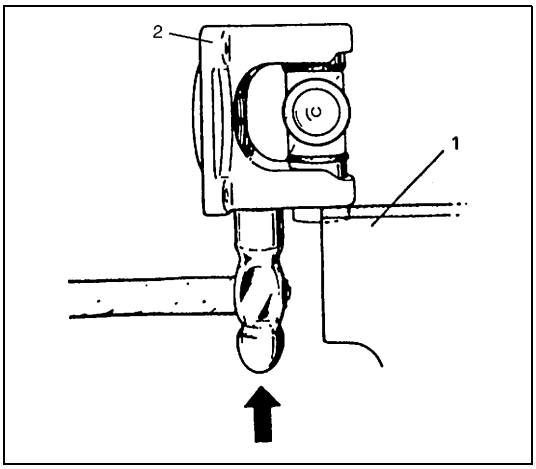
Special tool
(B) : 09926-48010

Length "a" : 3 – 4 mm (0.12 – 0.16 in.)



3) Tapping yoke (1) with a hammer (2), completely remove bearing race (3).

4) Take out bearing race on the other side in the same way as in 2) and 3).

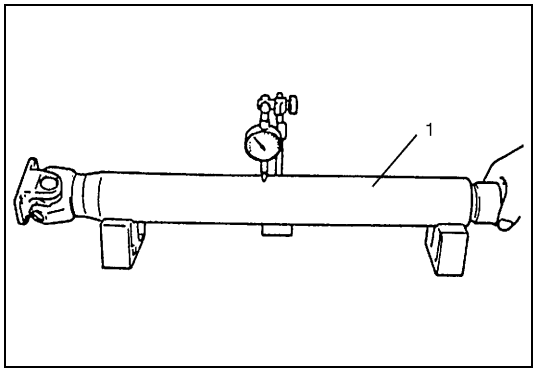


5) Push out bearing race on flange yoke side as described in 1) and 2), and then, holding bearing race (2) in a vise (1), tap flange yoke and take out race. (Refer to the figure.)
Remove bearing race on the opposite side in the same way.

NOTE:

- **Take care not to lose rollers in spider bearing race when removing it.**
- **Fit removed bearings temporarily in spider so that they can be reinstalled in their original positions.**

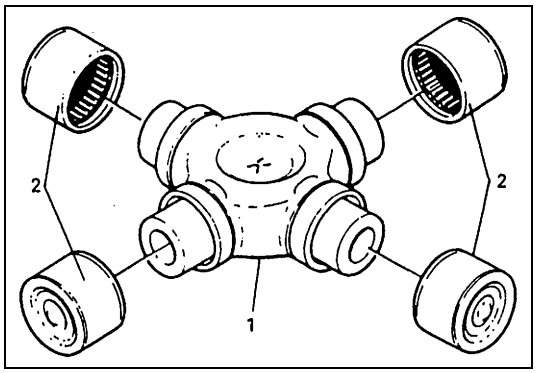
INSPECTION



Inspect propeller shaft and flange yoke for damage, and propeller shaft for (1) runout.
If damage is found or shaft runout exceeds its limit, replace.

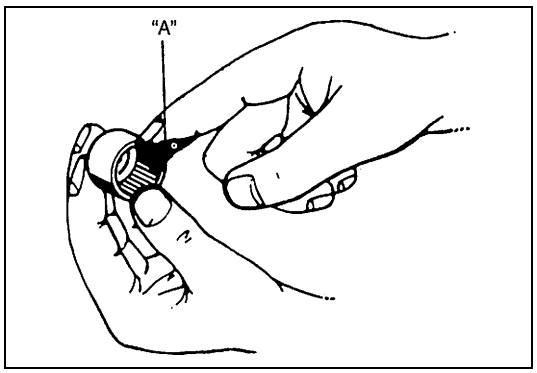
Runout limit : 0.8 mm (0.031 in.)

ASSEMBLY



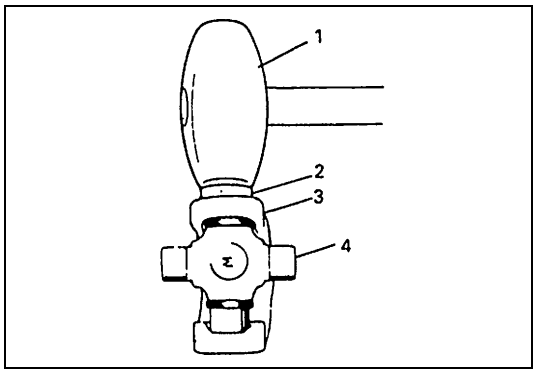
CAUTION:
In assembly, be sure to use new circlips, spider (1) and bearings (2). Reuse of circlips, spider and bearings once assembled is prohibited.

NOTE:
Make sure that rollers inside spider bearing race are all in place.

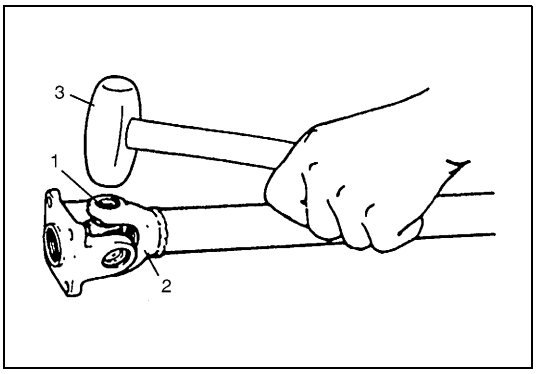


1) Make sure to apply grease to spider bearing race.

"A" : Grease 99000-25030



2) Insert bearing race (2) into yoke (3), tapping it with a copper hammer (1), until it is flush with yoke (3) face. When doing this, insert spider (4) into bearing race (2) to prevent rollers in bearing race (2) from coming out.



3) Insert the other bearing race (1) on the opposite side into yoke (2), tapping with a copper hammer (3) until it is flush with yoke (2) face.

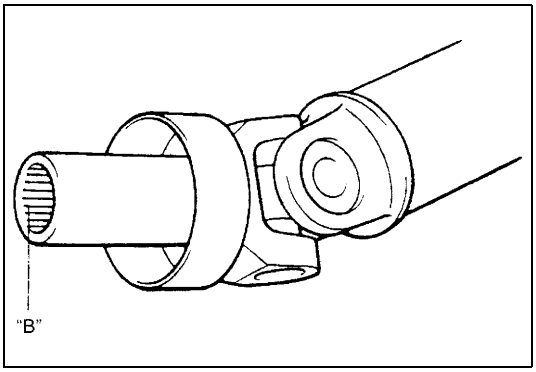
4) Insert bearing races on the flange yoke side in the same way as described in 2) and 3) above.
5) Place a metal plate on bearing races when tapping them in to avoid damaging yoke.
6) Securely fit 4 circlips to shaft and flange yoke.

NOTE:
Make sure that each circlip is fitted in groove securely.

7) After assembly, check to ensure that both shaft yoke and flange yoke move smoothly.

INSTALLATION

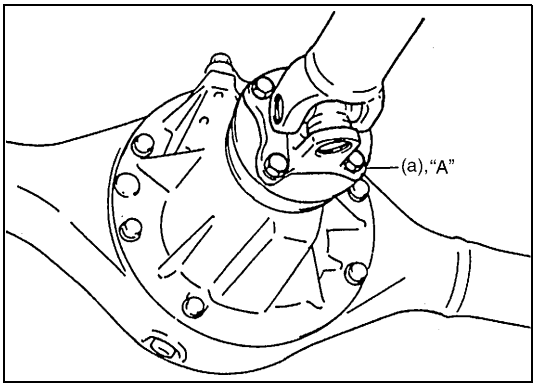
Reverse removal procedure to install propeller shaft noting the following points.



- Clean and inspect sliding portion of propeller shaft end (where oil seal contacts) before installation and if even small dent or scrach exists, correct end clean it again.
  Then apply grease inside splines of propeller shaft.

"B" : Grease 99000-25010

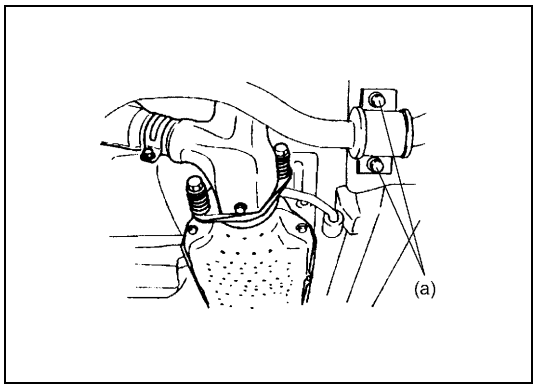
- Install propeller shaft aligning match marks otherwise, vibration may occur during driving.



- Use the following specification to torque propeller shaft flange bolts and nuts. For rear propeller shaft, apply thread lock cement to thread part of bolts if reused.

"A" : Cement 99000-32110

Tightening torque
Front and rear propeller shaft flange nuts
(a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)



- For front propeller shaft installation, perform the following Steps a) and b).

a) Install stabilizer bar.
   Tighten stabilizer bar mounting bracket bolts to specified torque.

Tightening torque
Stabilizer bar mounting bracket bolt
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

b) Fill transfer oil referring to “Transfer Gear Oil” in Section 7D.

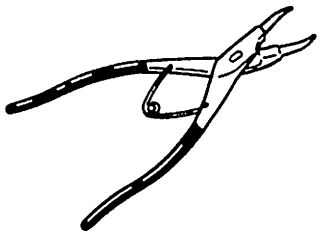
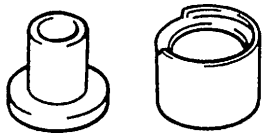
Tightening Torque Specification

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Propeller shaft nut	50	5.0	36.5

Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Lithium grease	SUPER GREASE C (99000-25030)	Spider bearing race
Thread lock cement	Thread lock 1322 99000-32110	Rear propeller shaft flange bolt

Special Tool

	
09900-06108 Snap ring pliers (Closing type)	09926-48010 Universal joint disassembling tool set

SECTION 5

BRAKES

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System :

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

NOTE:

- **When inspecting and servicing vehicle equipped with ABS, be sure to refer to section 5E1 first.**
- **All brake fasteners are important attaching parts in that they could affect the performance of vital parts and systems, and/or could result in major repair expense. They must be replaced with one of same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of all parts. There is to be no welding as it may result in extensive damage and weakening of the metal.**

DIAGNOSIS 5-3
BRAKE PIPE/HOSE/MASTER CYLINDER 5A-1
FRONT BRAKE 5B-1
PARKING AND REAR BRAKE 5C-1

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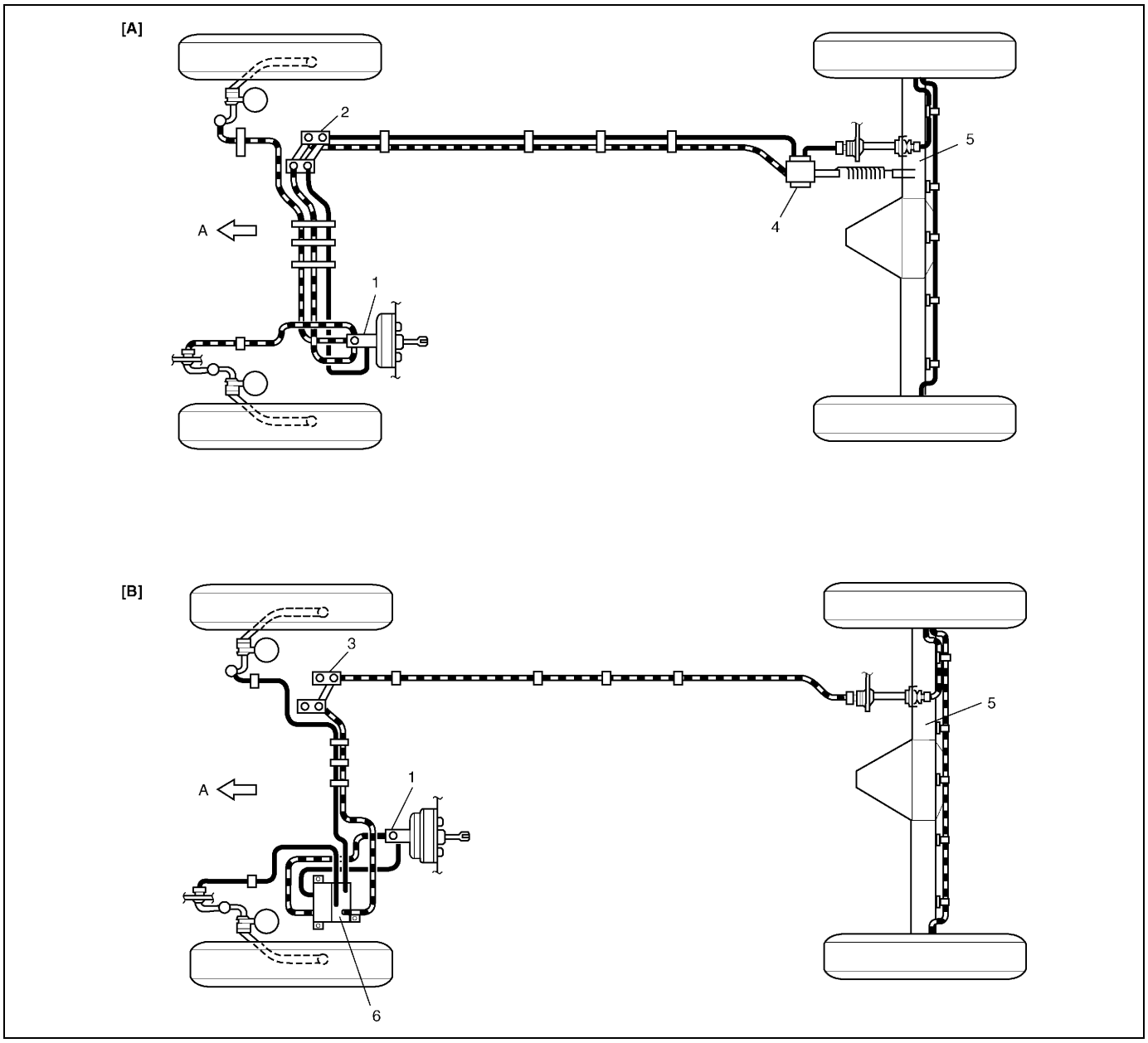
General Description

When the foot brake pedal is depressed, hydraulic pressure is developed in the master cylinder to actuate pistons (two in front and four in rear).
The master cylinder is a tandem master cylinder. Brake pipes are connected to the master cylinder and they make two independent circuits. One connects front brakes (right and left) and the other connects rear brakes (right and left).
The load sensing proportioning valve (LSPV) is included in these circuits between the master cylinder and the rear brake for the vehicle without ABS.
In this brake system, the disc brake type is used for the front wheel brake and a drum brake type (leading/trailing shoes) for the rear brake.
The parking brake system is mechanical. It applies brake force to only rear wheels by means of the cable and mechanical linkage system. The same brake shoes are used for both parking and foot brakes.

NOTE:

The figure shows left hand steering vehicle.



[A] : For vehicle without ABS	2. 4-way joint	5. Rear axle housing
[B] : For vehicle with ABS	3. 2-way joint	6. ABS hydraulic unit
1. Master cylinder	4. LSPV (Load Sensing Proportioning Valve)	A : Front side

Diagnosis

Road Testing Brakes

Brakes should be tested on dry, clean, smooth and reasonably level roadway which is not crowned. Road test brakes by making brake applications with both light and heavy pedal forces at various speeds to determine if the vehicle stops evenly and effectively.
Also drive vehicle to see if it leads to one side or the other without brake application. If it does, check the tire pressure, front end alignment and front suspension attachments for looseness. See diagnosis chart for other causes.

Brake Fluid Leaks

Check the master cylinder fluid levels. While a slight drop in reservoir level does result from normal lining wear, an abnormally low level indicates a leak in the system. In such a case, check the entire brake system for leakage. If even a slight evidence of leakage is noted, the cause should be corrected or defective parts should be replaced.
If fluid level is lower than the minimum level of reservoir, refilling is necessary. Fill reservoir with specified brake fluid.
Brake fluid : Refer to reservoir tank cap.

CAUTION:
Since brake system of this vehicle is factory-filled with brake fluid indicated on reservoir tank cap, do not use or mix different type of fluid when refilling; otherwise serious damage will occur.
Do not use old or used brake fluid, or any fluid from a unsealed container.

Substandard or Contaminated Brake Fluid

Improper brake fluid, mineral oil or water in the fluid may cause the brake fluid to boil or the rubber components in the hydraulic system to deteriorate.
If primary piston cups are swollen, then rubber parts have deteriorated. This deterioration may also be evidenced by swollen wheel cylinder piston cups on the drum brake wheels.
If deterioration of rubber is evident, disassemble all hydraulic parts and wash with alcohol. Dry these parts with compressed air before assembly to keep alcohol out of the system. Replace all rubber parts in the system, including hoses. Also, when working on the brake mechanisms, check for fluid on the linings. If excessive fluid is found, replace the linings.
If master cylinder piston seals are satisfactory, check for leakage or excessive heat conditions. If condition is not found, drain fluid, flush with brake fluid, refill and bleed system.
The system must be flushed if there is any doubt as to the grade of fluid in the system or if fluid has been used which contained parts that have been subjected to contaminated fluid.

Diagnosis Table

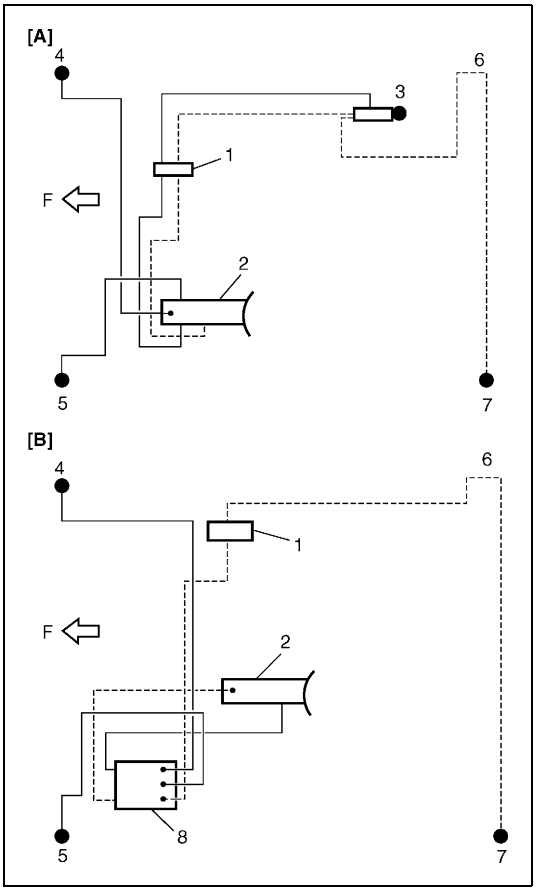
Condition	Possible Cause	Correction
Not enough braking force	Brake fluid leakage from brake lines.	Locate leaking point and repair.
	Brake disc or pads stained with fluid.	Clean or replace.
	Overheated brakes.	Determine cause and repair.
	Poor contact of shoes on brake drum.	Repair for proper contact.
	Brake shoes linings stained with fluid or wet with water.	Replace.
	Badly worn brake shoe linings.	Replace.
	Defective wheel cylinders.	Repair or replace.
	Malfunctioning caliper assembly.	Repair or replace.
	Air in system.	Bleed system.
	Maladjusted sensor spring length of LSPV, if equipped.	Check or adjust.
	Broken sensor spring of LSPV, if equipped.	Replace.
	Defective collar of LSPV, if equipped.	Replace.
	Malfunctioning ABS (Antilock brake system), if equipped.	Check system and replace as necessary.
Brake pull (Brakes not working in unison)	Pad or shoe linings are wet with water or stained with fluid in some brakes.	Replace.
	Drum-to-shoe clearance out of adjustment in some brakes. (Malfunctioning auto adjusting mechanism)	Check for inoperative auto adjusting mechanism.
	Drum is out of round in some brakes.	Replace.
	Wheel tires are inflated unequally.	Inflate equally.
	Malfunctioning wheel cylinders.	Repair or replace.
	Disturbed front end alignment.	Adjust as prescribed.
	Unmatched tires on same axle.	Tires with approximately the same amount of tread should be used on the same axle.
	Restricted brake pipes or hoses.	Check for soft hoses and damaged lines. Replace with new hoses and new brake pipes.
	Malfunctioning caliper assembly.	Check for stuck or sluggish pistons and proper lubrication of caliper slide bush.
	Loose suspension parts.	Caliper should slide. Check all suspension mountings.
	Loose calipers.	Check and torque bolts to specifications.
Noise (High pitched squeak without brake applied)	Front lining worn out.	Replace linings.
Rear brake locked prematurely	Maladjusted sensor spring length of LSPV, if equipped.	Check or adjust.
	Malfunction LSPV assembly, if equipped.	Replace assembly.

Condition	Possible Cause	Correction
Brake locked (For vehicles equipped with ABS)	Malfunctioning ABS, if equipped.	Check system and replace as necessary.
Excessive pedal travel (Pedal stroke too large)	Partial brake system failure.	Check brake systems and repair as necessary.
	Insufficient fluid in master cylinder reservoirs.	Fill reservoirs with approved brake fluid. Check for leaks and air in brake systems. Check warning light. Bleed system if required.
	Air in system. (pedal soft/spongy)	Bleed system.
	Rear brake system not adjusted. (malfunctioning auto adjusting mechanism)	Repair auto adjusting mechanism. Adjust rear brakes.
	Bent brake shoes.	Replace brake shoes.
	Worn rear brake shoes.	Replace brake shoes.
Dragging brakes (A very light drag is present in all disc brakes immediately after pedal is released)	Master cylinder pistons not returning correctly.	Replace master cylinder.
	Restricted brake pipes or hoses.	Check for soft hoses or damaged pipes and replace with new hoses and/or new brake pipes.
	Incorrect parking brake adjustment on rear brakes.	Check and adjust to correct specifications.
	Weakened or broken return springs in the brake.	Replace.
	Sluggish parking-brake cables or linkage.	Repair or replace.
	Wheel cylinder or caliper piston sticking.	Repair as necessary.
	Malfunctioning ABS, if equipped with ABS.	Check system and replace as necessary.
Pedal pulsation (Pedal pulsates when depressed for braking)	Damaged or loose wheel bearings.	Replace wheel hub component.
	Distorted steering knuckle or rear axle shafts.	Replace knuckle or rear axle shaft.
	Excessive disc lateral runout.	Check per instructions. If not within specifications, replace or machine the disc.
	Parallelism not within specifications.	Check per instructions. If not within specifications, replace or machine the disc.
	Rear drums out of round.	Check runout. Repair or replace drum as necessary.
Braking noise	Glazed shoe linings, or foreign matters stuck to linings.	Repair or replace shoe lining.
	Worn or distorted shoe linings.	Replace shoe lining (or pad).
	Loose front wheel bearings.	Replace wheel hub component.
	Distorted backing plates or loose mounting bolts.	Replace or retighten securing bolts.

Condition	Possible Cause	Correction
Brake warning light turns ON after engine start	Parking brake applied.	Release parking brake and check that brake warning light turns off.
	Insufficient amount of brake fluid.	Add brake fluid.
	Brake fluid leaking from brake line.	Investigate leaky point, correct it and add brake fluid.
	Brake warning light circuit faulty.	Repair circuit.
	Malfunctioning EBD system, if equipped with ABS.	Check system referring to "Table-E EBD Warning Lamp (Brake Warning Lamp) Check – Lamp Comes ON Steady" in Section 5E1.
Brake warning light turns ON when brake is applied	Brake fluid leaking from brake line.	Investigate leaky point, correct it and add brake fluid.
	Insufficient amount of brake fluid.	Add brake fluid.
Brake warning light fails to turn ON even when parking brake is applied	Bulb burnt out with canvas top model.	Replace bulb.
	Brake warning light circuit open.	Repair circuit.
	Malfunctioning combination meter without canvas top model.	Replace combination meter.
ABS warning light does not turn ON for 2 sec. after ignition switch has turned ON	Bulb burnt out with canvas top model.	Replace bulb.
	ABS warning light circuit open, if equipped with ABS. (including check relay)	Check system referring to "Table-A ABS Warning Lamp Circuit Check – Lamp Does Not Come ON at Ignition Switch ON" in Section 5E1.
	Malfunctioning combination meter without canvas top model.	Replace combination meter.
ABS warning light remains ON after ignition switch has turned ON for 2 sec.	Malfunctioning ABS, if equipped with ABS.	Check system referring to "Table-B ABS Warning Lamp Circuit Check – Lamp Comes ON Steady" in Section 5E1

Check and Adjustment

Bleeding Brakes



CAUTION:

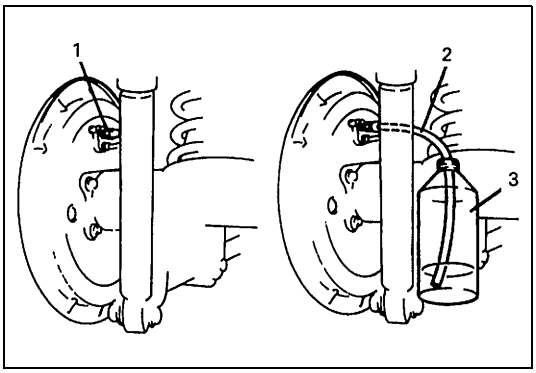
Brake fluid is extremely damaging to paint. If fluid should accidentally touch painted surface, immediately wipe fluid from paint and clean painted surface.

NOTE:

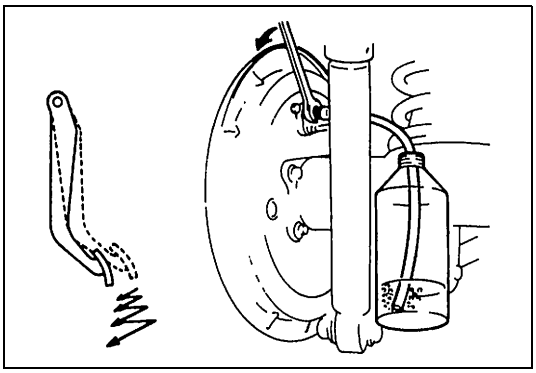
For vehicle equipped with ABS, make sure that ignition switch turns off.

Be sure to bleed air of brake system according to following procedure when its oil hydraulic circuit has been disconnected.
Hydraulic lines of brake system consists of two separate lines, one for front wheel brakes and the other for rear wheel brakes.
Air bleeding is necessary at right and left front wheel brakes, left rear wheel brake and LSPV (if equipped without ABS), i.e. 4 places (3 places for vehicle with ABS) in all.

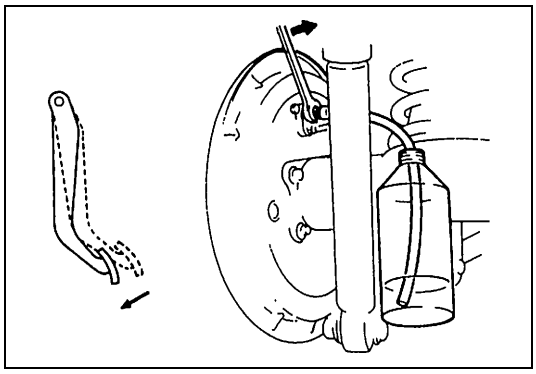
[A] : Without ABS	5. Left brake caliper
[B] : With ABS	6. Right wheel cylinder
1. 4-way joint / 2-way joint	7. Left wheel cylinder
2. Master cylinder	8. ABS actuator
3. LSPV	● : Air bleeding point
4. Right brake caliper	F : Front side



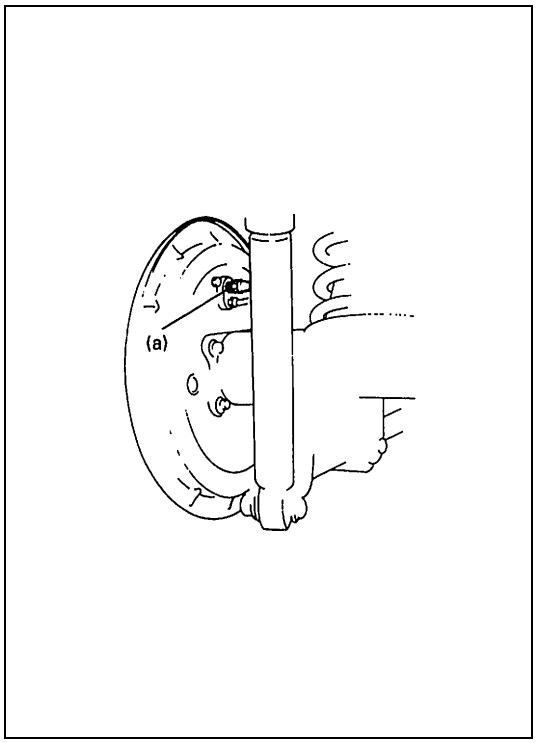
1) Fill master cylinder reservoir with brake fluid and keep at least one-half full of fluid during bleeding operation.
2) Remove bleeder plug cap (1).
   Attach a vinyl tube (2) to bleeder plug of wheel cylinder, and insert the other end into container (3).



3) Depress brake pedal several times, and then while holding it depressed, loosen bleeder plug about one-third to one half turn.



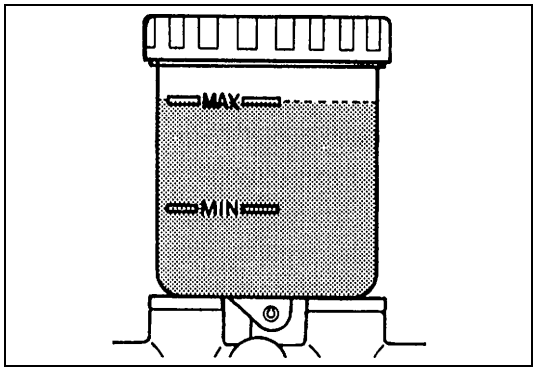
4) When fluid pressure in the cylinder is almost depleted, retighten bleeder plug.



5) Repeat this operation until there are no more air bubbles in hydraulic line.
6) When bubbles stop, depress and hold brake pedal and tighten bleeder plug.

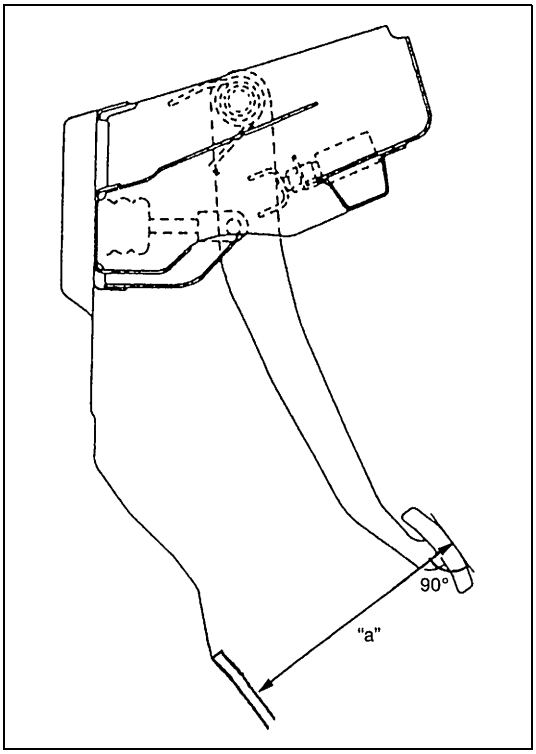
Tightening torque
[Front brake]
TOKICO brake caliper bleeder plug : 8.5 N·m (0.85 kg-m, 6.5 lb-ft) ... Refer to "Front Brake Caliper Assembly" in Section 5B.
SUMITOMO ELECTRIC brake caliper bleeder plug : 8.0 N·m (0.8 kg-m, 6.0 lb-ft) ... Refer to "Front Brake Caliper Assembly" in Section 5B.
[Rear brake]
Wheel cylinder bleeder plug (a) : 7.5 N·m (0.75 kg-m, 5.5 lb-ft)
LSPV bleeder plug (if equipped) : 7.5 N·m (0.75 kg-m, 5.5 lb-ft)

7) Then attach bleeder plug cap.



8) After completing bleeding operation, apply fluid pressure to pipe line and check for leakage.
9) Replenish fluid into reservoir up to specified level.
10) Check brake pedal for "sponginess". If found spongy, repeat entire procedure of bleeding.

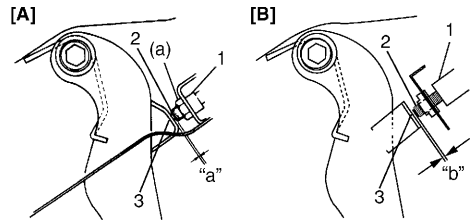
Brake Pedal Free Height Check



Remove foot rest and displace carpet and dash silencer(s) so as to measure brake pedal free height between pedal face and asphalt sheet installed on dash panel.
If the measurement is not within the specification, check the position of booster push rod clevis and/or stop light switch according to the instruction shown in this section.
The free height varies depending on installation position of booster push rod clevis and stop light switch.

Brake pedal free height "a" from asphalt sheet
"a" : 208 – 218 mm (8.19 – 8.58 in.)

Brake Light Switch Adjustment



CAUTION:

Do not apply any oil or grease (including rust preventives, lubricant, etc.) to following sections.

- **Stop light switch (1) (including its tip end (2))**
- **Switch (2) contacting section of brake pedal bracket (3)**

Oil or grease, if applied, will enter the contact point in the switch, causing contact failure. Also, when checking, adjusting or replacing brake switch, check that no oil or grease is attached to switch contacting section on brake pedal side or tip end of switch. Wipe off oil or grease being attached.

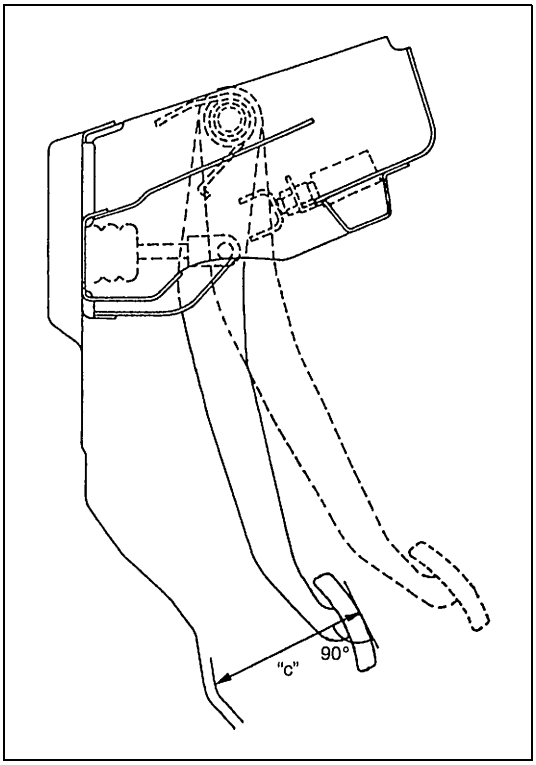
Adjustment should be made as follows when installing brake light switch (1). Pull up brake pedal toward you and while holding it there, adjust switch position so that clearance between end of thread and brake pedal bracket (shown as "a" or "b" in figure). Then tighten lock nut to specified torque if equipped.

Clearance between end of thread and brake pedal bracket
For equipped with lock nut type
"a" : 1.5 – 2.0 mm (0.06 – 0.08 in.)
For not equipped with lock nut
"b" : 0.5 – 1.5 mm (0.02 – 0.06 in.)

Tightening torque
Brake light switch lock nut
(a) : 7.5 N·m (0.75 kg-m, 5.5 lb-ft)

[A] : For equipped with lock nut
[B] : For not equipped with lock nut

Excessive Pedal Travel Check

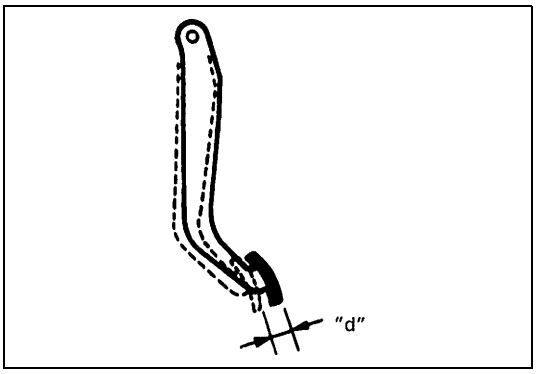


1) Remove foot rest and displace carpet and dash silencer(s).
2) Start engine.
3) Depress brake pedal a few times.
4) With brake pedal depressed with approximately 30 kg (66 lbs) load, measure pedal to asphalt sheet clearance "c".

Clearance between brake pedal (with depressed) and asphalt sheet
"c" : over 115 mm (4.53 in.)

If clearance "c" is less than specification, the most possible cause is either rear brake shoes are worn out beyond limit or air is in lines.
Should clearance "c" remain less than specification even after replacement of brake shoes and bleeding of system, other possible but infrequent cause is malfunction of rear brake shoe adjusters or booster push rod length out of adjustment.

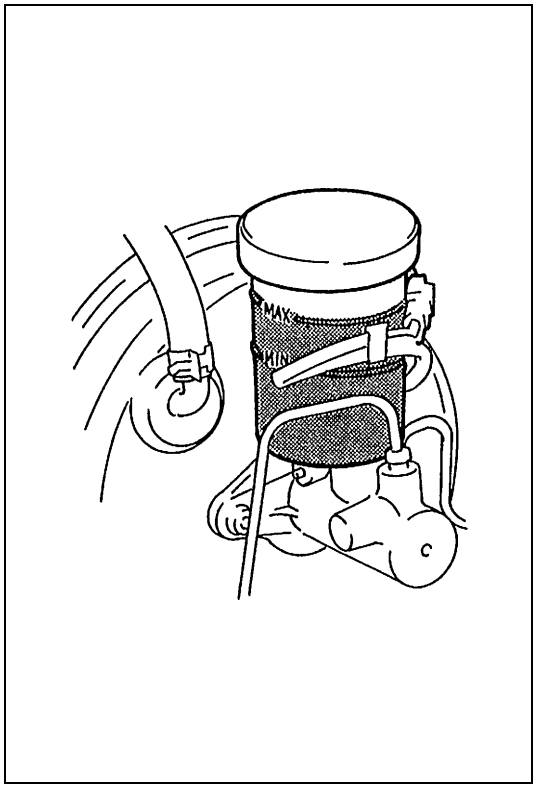
Brake Pedal Play Check



Pedal play should be within specification. If out of specification, check brake light switch for proper installation position and adjust if necessary.
Also check pedal shaft bolt and master cylinder pin installation for looseness and replace if defective.

Brake pedal play "d" : 1 – 8 mm (0.04 – 0.32 in.)

Brake Fluid Level Check



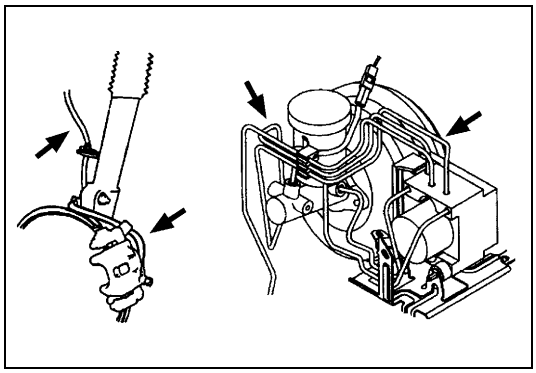
Be sure to use particular brake fluid either as indicated on reservoir cap of that vehicle or recommended in owner's manual which comes along with that vehicle.
Use of any other fluid is strictly prohibited.
Fluid level should be between MIN and MAX lines marked on reservoir.
When warning light lights sometimes during driving, replenish fluid to MAX line.
When fluid decreases quickly, inspect brake system for leakage. Correct leaky points and then refill to specified level.

CAUTION:

Do not use shock absorber fluid or any other fluid which contains mineral oil. Do not use a container which has been used for mineral oil or a container which is wet from water.

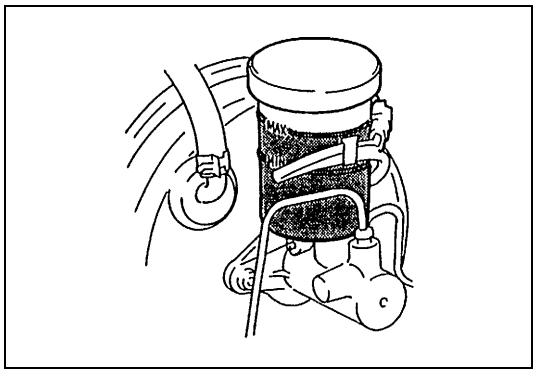
Mineral oil will cause swelling and distortion of rubber parts in hydraulic brake system and water mixed into brake fluid will lower fluid boiling point. Keep all fluid containers capped to prevent contamination.

Brake Hose and Pipe Check



The brake hose assembly should be checked for road hazard damage, for cracks and chafing of the outer cover, for leaks and blisters.
A light and mirror may be needed for an adequate inspection. If any of the above conditions are observed on the brake hose, it is necessary to replace it.
Inspect the pipe for damage, cracks, dents and corrosion. If any defect is found, replace it.

Master Cylinder Check

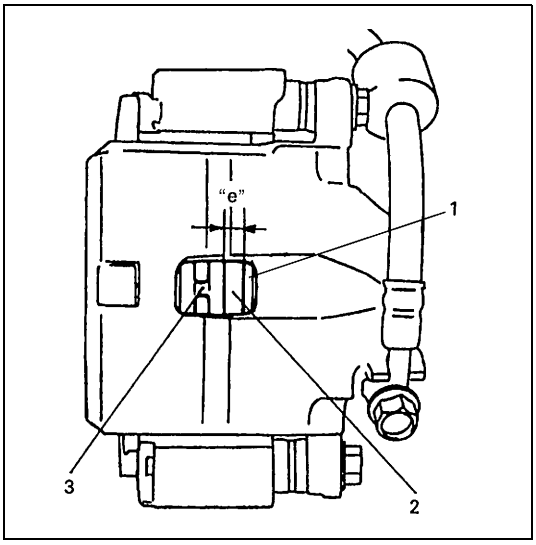


Check for a cracked master cylinder casting or brake fluid around the master cylinder. Leaks are indicated only if there is at least a drop of fluid. A damp condition is not abnormal.

Brake Disc Check

Refer to “Front Disc Brake Pad” of Section 5B for inspection point and procedure.

Brake Pad Check

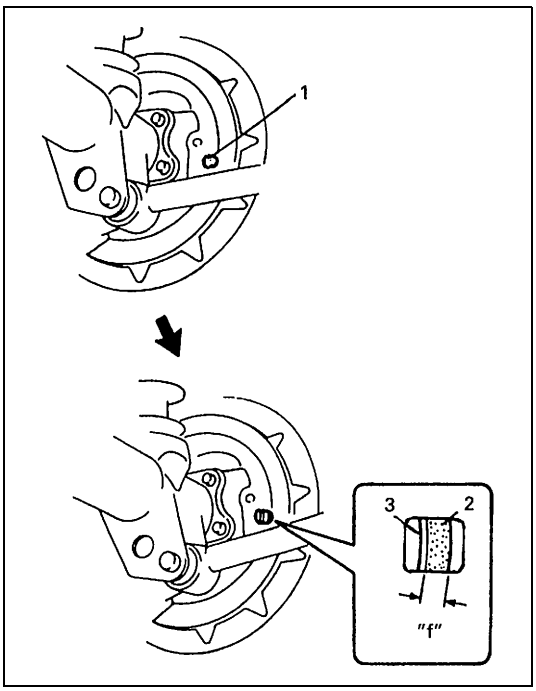


Inspect pad linings (2) periodically according to maintenance schedule whenever wheels are removed (for tire rotation or other reason).
Take a look through hole of caliper and check lining thickness of inside pad.
If one of brake pad is worn to service limit, all linings must be replaced at the same time.

Front brake pad thickness "e"
Standard : 10.0 mm (0.39 in.)
Service Limit : 2.0 mm (0.08 in.)

1.	Pad rim
3.	Disc

Brake Shoe Check



Inspection should be carried out on following points after brake pedal travel "c" (pedal to asphalt sheet clearance) check as described on "Excessive Pedal Travel Check" of this section, even when it is more than 115 mm (4.53 in.).
Amount of brake shoe wear can be checked as follows.

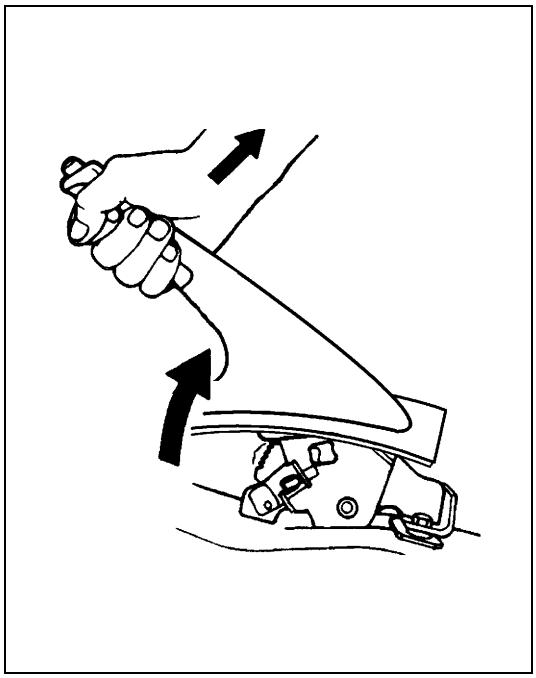
1) Hoist vehicle.
2) Remove rubber plug (1) from brake back plate.
3) Through hole of back plate, visually check for thickness of brake shoe lining (2). If lining thickness "f" is found less than below specified wear limit, replace with new brake shoes.

Rear brake shoe thickness "f"
Service Limit : 1.0 mm (0.04 in.)

3.	Brake shoe rim

Parking Brake Check and Adjustment

CHECK

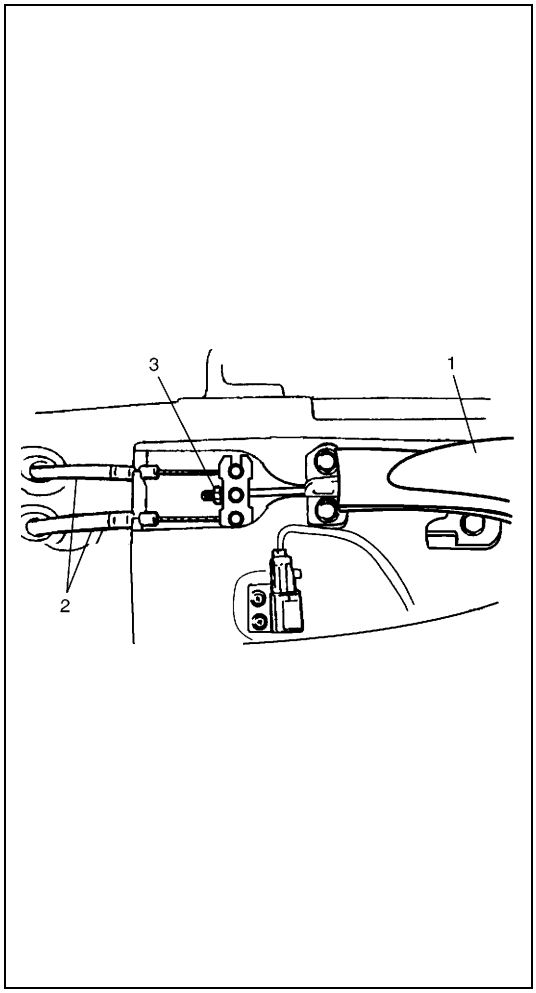


Hold center of parking brake lever grip and pull it up with 20 kg (40 lbs) force.
With parking brake lever pulled up as shown, count ratchet notches.
There should be 5 to 7 notches.
Also, check if both right and left rear wheels are locked firmly.
To count number of notches easily, listen to click sounds that ratchet makes while pulling parking brake lever without pressing its button.
One click sound corresponds to one notch.
If number of notches is out of specification, adjust cable by referring to adjustment procedure described on the following as to obtain specified parking brake stroke.

NOTE:

Check tooth tip of each notch for damage or wear. If any damage or wear is found, replace parking brake lever.

ADJUSTMENT



NOTE:

Make sure for following conditions before cable adjustment.

- **No air is trapped in brake system.**
- **Brake pedal travel is proper.**
- **Brake pedal has been depressed a few times with about 30 kg (66 lbs) load.**
- **Parking brake lever (1) has been pulled up a few times with about 20 kg (44 lbs) force.**
  If parking brake cable is replaced with new one, pull up parking brake lever a few times with about 50 kg force.
- **Rear brake shoes are not worn beyond limit, and self adjusting mechanism operates properly.**
- **To slacken parking brake cable (2), loosen self locking nut (3) as far as end of bolt. Then depress brake pedal a few times with about 30 kg (66 lbs) load.**

After confirming that above conditions are all satisfied, adjust parking brake lever stroke by loosening or tightening locking nut.

CAUTION:
Check brake drum for dragging after adjustment.

Parking brake stroke
(When lever is pulled up at 200 N·m (20 kg, 44 lbs).)
5 to 7 notches

Flushing Brake Hydraulic System

It is recommended that entire hydraulic system be thoroughly flushed with clean brake fluid whenever new parts are installed in hydraulic system.
Periodical change of brake fluid is also recommended.

Fluid Pressure Test (if equipped with LSPV)

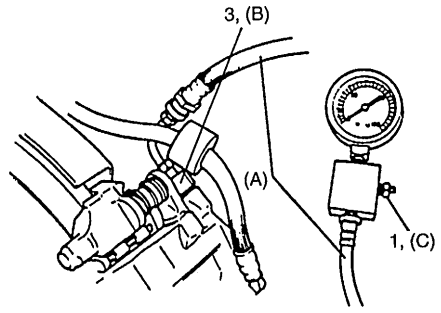
Test procedure for LSPV assembly is as follows.
Before testing, confirm the following.

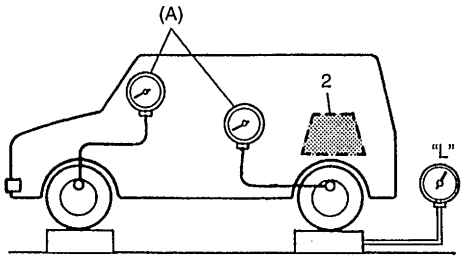
- Fuel tank is filled with fuel fully.
- Vehicle is equipped with spare tire, tools, jack and jack handle.

1) Stop vehicle on level floor and place approximately about 200 kg (441 lbs) weight (2) on rear housing so that rear axle weight 800 kg (1764 lb).

Rear axle weight
"L" : 800 kg (1764 lb)

2) Install special tool to front and rear brake.





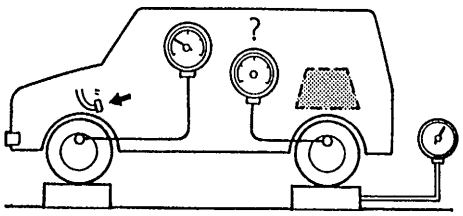
NOTE:

Special tool should be connected to breather of front (driver's side brake) and rear brakes.

Special tool
Front brake
(A) : 09956-02310
(B) : 09952-46510 (Attachment for vehicle with SUMITOMO ELECTRIC brake caliper)
(C) : 55473-82030 (Air bleeder plug (1) supplied as a spare part)
Rear brake
(A) : 09956-02310
(B) : 09952-36310 (Attachment for thread diameter 7 mm of bleeder plug) or 09952-46510 (Attachment for thread diameter 8 mm of bleeder plug)
(C) : 55473-82030 (Air bleeder plug supplied as a spare part)

NOTE:

- **Special tool (B) is used instead of thread diameter 10 mm attachment (3) of special tool (A).**
  So remove the attachment from (A) and install (B) as shown in figure.
- **For vehicle with TOKICO brake caliper, use the attachment included in special tool (A).**
- **For identification of brake caliper type, refer to "Disc Brake Caliper Assembly" in Section 5B.**



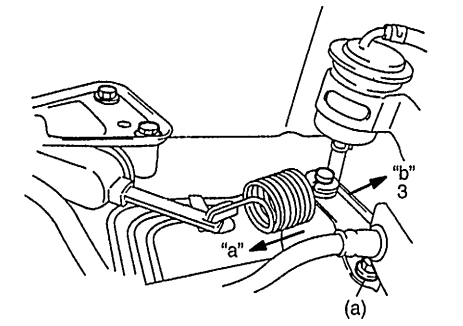
3) Depress brake pedal gradually till fluid pressure of front brake becomes as specified below and check corresponding pressure of rear brake then. It should be within specification given below.

   Rear brake pressure with applied by 8,000 kPa (80 kg/cm^2, 1,138 psi) on front brake.

Front brake	Rear brake	
8,000 kPa 80 kg/cm^2 1,138 psi	3 Door or Canvas top model	6,000 – 7,300 kPa 60 – 73 kg/cm^2 853 – 1,038 psi
	5 Door	4,500 – 7,300 kPa 45 – 73 kg/cm^2 640 – 1,038 psi

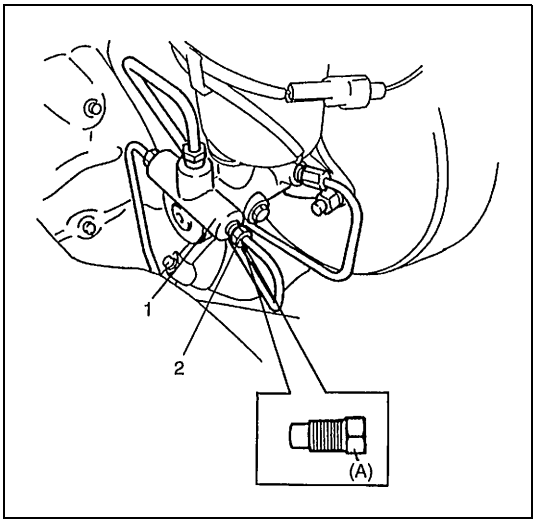
4) As done above, apply 100 kg/cm^2 pressure to front brake and check that rear brake pressure then is within specification as given below.

Front brake	Rear brake	
10,000 kPa 100 kg/cm^2 1,422 psi	3 Door or Canvas top model	6,500 – 8,000 kPa 65 – 80 kg/cm^2 924 – 1,138 psi
	5 Door	5,000 – 8,000 kPa 50 – 80 kg/cm^2 711 – 1,138 psi



5) If rear brake pressure is not within specification, adjust it by changing stay (3) position as follows.
   - If rear brake pressure is higher than specification, move stay (3) to direction "a" and if it is lower, to direction "b".
   - Repeat steps 3) to 5) until rear brake pressure is within specification.
   - After adjustment, be sure to torque bolt to specification.

Tightening torque
LSPV stay bolt (a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)



6) Disconnect brake pipe (2) (connecting between master cylinder secondary side and 4-way joint) from master cylinder (1). Tighten plug (special tool) to master cylinder.
Depress brake pedal. If rear brake pressure is 95 – 100 kg/cm^2 when front brake pressure is 100 kg/cm^2, it means that front failsafe system functions properly.

Front brake	Rear brake
10,000 kPa 100 kg/cm^2 1,422 psi	9,500 – 10,000 kPa 95 – 100 kg/cm^2 1,350 – 1,422 psi

Special tool
(A) : 09956-02210

7) Upon completion of fluid pressure test, bleed brake system and perform brake test.

Booster Operation Check

There are two ways to perform this inspection, with and without a tester. Ordinarily, it is possible to roughly determine its condition without using a tester.

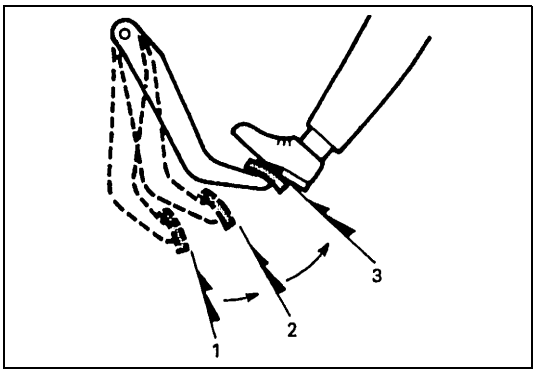
NOTE:

For this check, make sure that no air is in hydraulic line.

INSPECTION WITHOUT TESTER

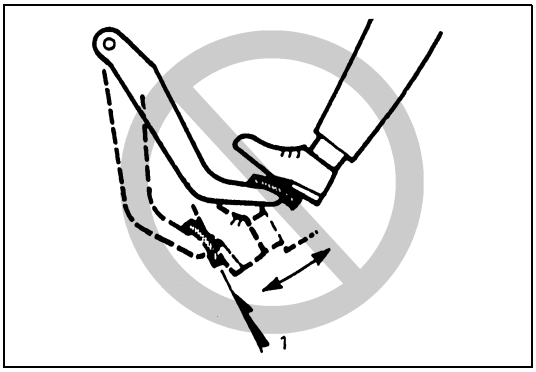
Check Air Tightness

1) Start engine.
2) Stop engine after running for 1 to 2 minutes.



3) Depress brake pedal several times with the same load as in ordinary braking and observe pedal travel. If pedal goes down deep the first time but its travel decreases as it is depressed the second and more times, air tightness is obtained.

1. 1st
2. 2nd
3. 3rd



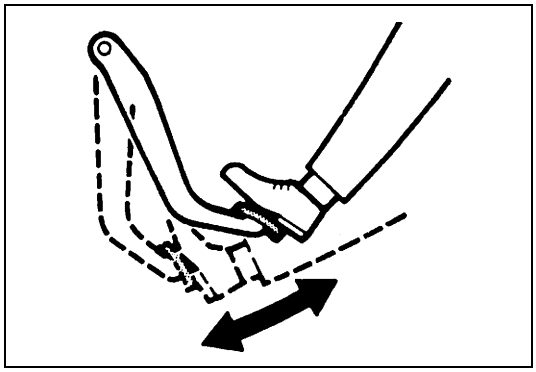
4) If pedal travel doesn't change, air tightness isn't obtained.

NOTE:

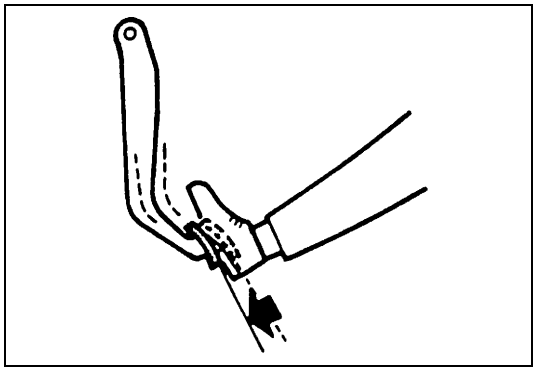
If defective, inspect vacuum lines and sealing parts, and replace any faulty part.
When this has been done, repeat the entire test.

1. 1st, 2nd, 3rd

CHECK OPERATION

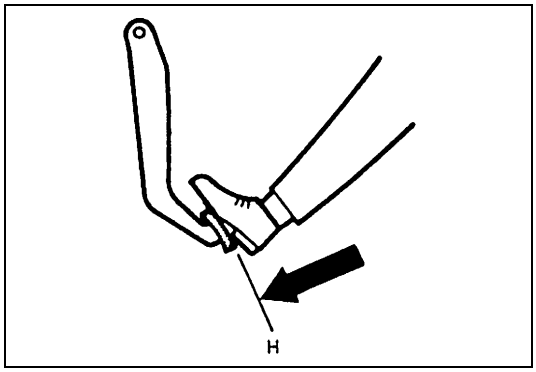


1) With engine stopped, depress brake pedal several times with the same load and make sure that pedal travel doesn't change.



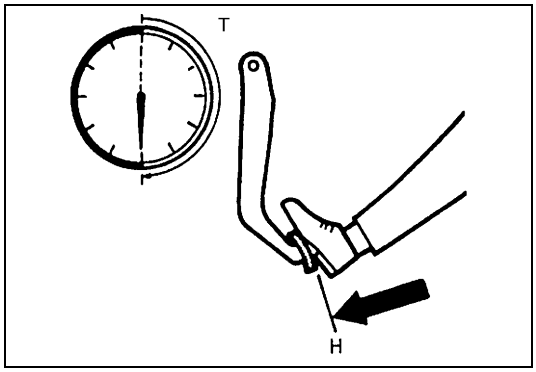
2) Start engine while depressing brake pedal. If pedal travel increases a little, operation is satisfactory. But no change in pedal travel indicates malfunction.

CHECK AIR TIGHTNESS UNDER LOAD



1) With engine running, depress brake pedal. Then stop engine while holding brake pedal depressed.

H: Hold



2) Hold brake pedal depressed for 30 seconds. If pedal height does not change, condition is good. But it isn't if pedal rises.

H: Hold
T: 30 seconds

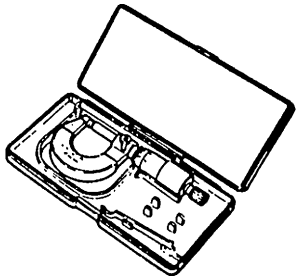
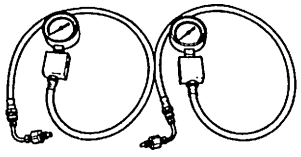
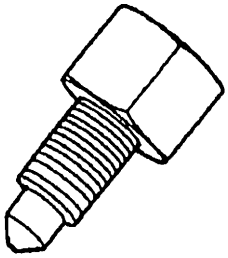
Tightening Torque Specification

Fastening part			Tightening torque		
			N•m	kg-m	lb-ft
Brake pipe 2 – way (or 4 – way) joint bolt			11	1.1	8.0
Brake pipe flare nut			16	1.6	11.5
Brake bleeder plug	Front caliper	M8	8.0	0.8	6.0
		M10	8.5	0.85	6.5
	Wheel cylinder		7.5	0.75	5.5
	LSPV		7.5	0.75	5.5
LSPV mounting bolt			23	2.3	17.0
LSPV stay bolt			23	2.3	17.0
LSPV spring nut			23	2.3	17.0
Wheel nut			100	10.0	72.5
Brake light switch lock nut			7.5	0.75	5.5

Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Brake fluid	Indicated on reservoir cap or described in owner's manual of vehicle	• To fill master cylinder reservoir. • To clean and apply to inner parts of master cylinder, brake caliper and wheel cylinder when they are disassembled.

Special Tool

 09950-78220 Flare nut wrench (10 mm)	 09900-20205 Micrometer (0 – 25 mm)	 09956-02310 Fluid pressure gauge	 09956-02210 Brake circuit plug
 09952-36310/ 09952-46510 Pressure gauge attachment			

SECTION 5A

BRAKES PIPE/HOSE/MASTER CYLINDER

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

NOTE:

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

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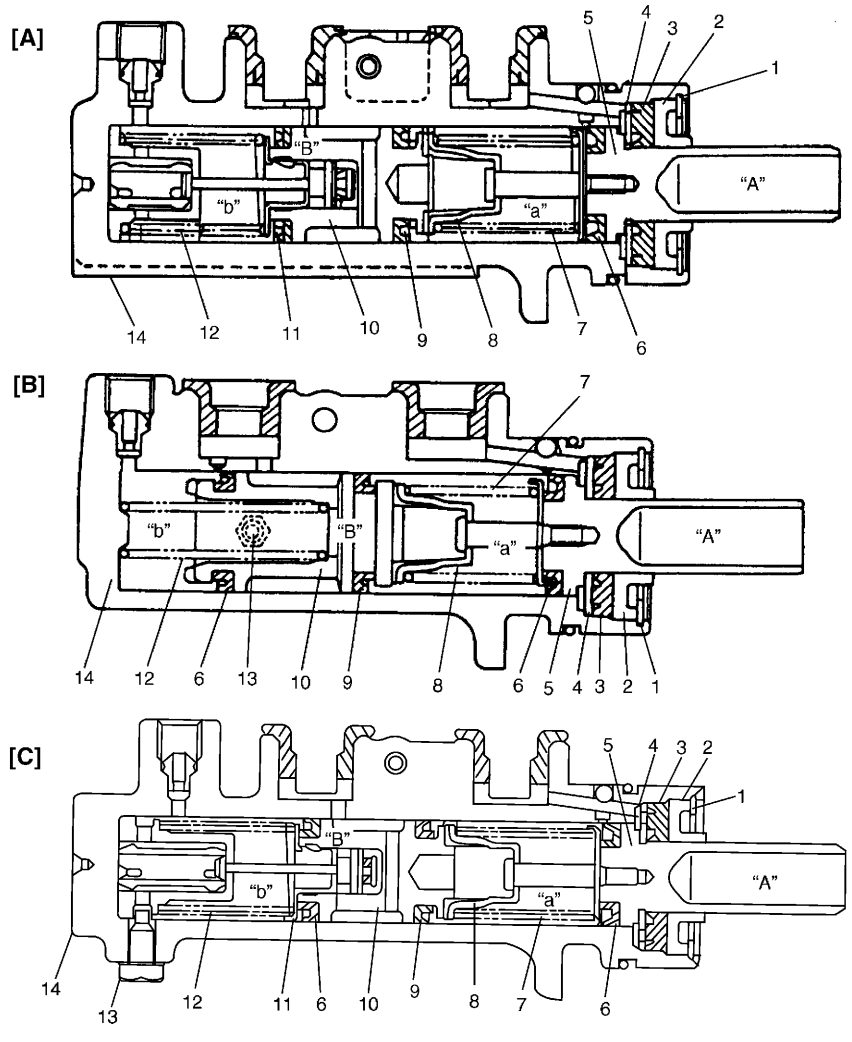
General Description

Master Cylinder Assembly

The master cylinder has two pistons and three piston cups. Its hydraulic pressure is produced in the primary (“a” in the figure) and secondary (“b”) chambers. The hydraulic pressure produced in the primary chamber (“a”) acts on the front (for vehicle without ABS, rear) wheel brakes.
Also, the hydraulic pressure produced in the secondary chamber (“b”) acts on the rear (for vehicle without ABS, front) wheel brakes.

NOTE:

Replace all components included in repair kits to service this master cylinder. Lubricate rubber parts with clean, fresh brake fluid to ease assembly. Do not use lubricated shop air on brake parts as damage to rubber components may result. If any hydraulic component is removed or brake line disconnected, bleed the brake system.
The torque values specified are for dry, unlubricated fasteners.



[A] : With ABS	5. Primary piston	12. Secondary piston return spring
[B] : Without ABS	6. Piston cup	13. Secondary piston stopper bolt
[C] : With ABS for Canvas top model	7. Primary piston return spring	14. Master cylinder body
1. Piston stopper circlip	8. Primary spring retainer	“A” : Primary piston
2. Piston stopper	9. Secondary piston pressure cup	“B” : Secondary piston
3. Cylinder cup	10. Secondary piston	
4. Plate	11. Return spring secondary seat	

Booster Assembly

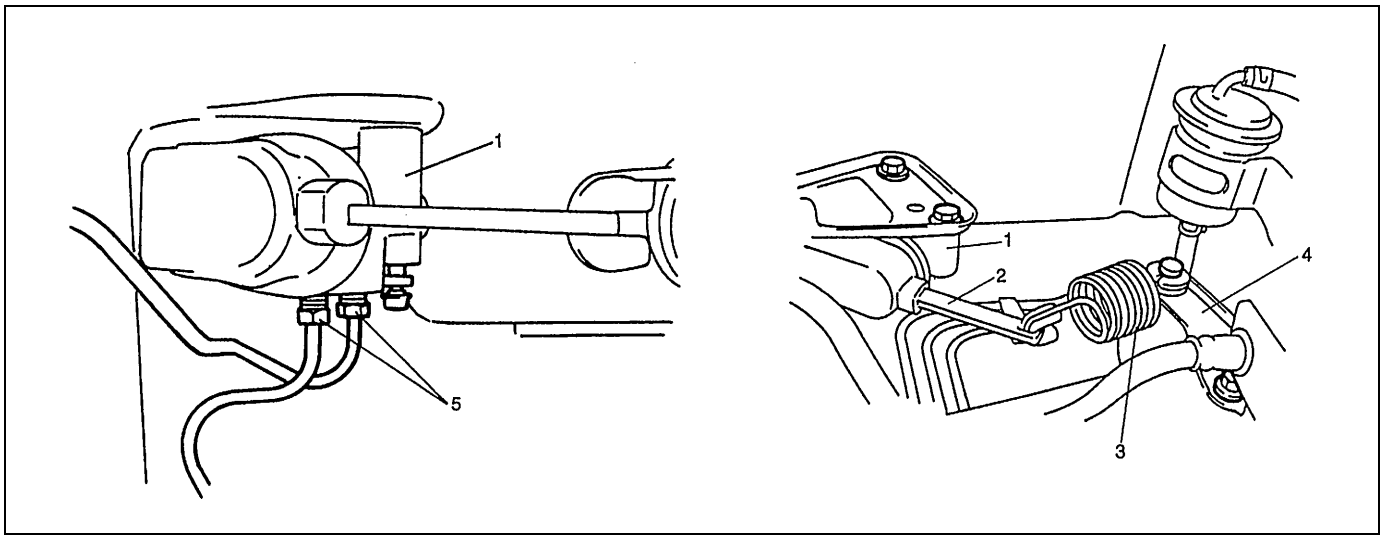
The booster is located between the master cylinder and the brake pedal. It is so designed that the force created when the brake pedal is depressed is mechanically increased combined with the engine vacuum.

CAUTION:

- **Never disassemble brake booster assembly. If it is found faulty, replace it with new assembly.**
- **The torque values specified are for dry, unlubricated fasteners. If any hydraulic component is removed or brake line disconnected, bleed the brake system.**

LSPV (Load Sensing Proportioning Valve) Assembly (if equipped)

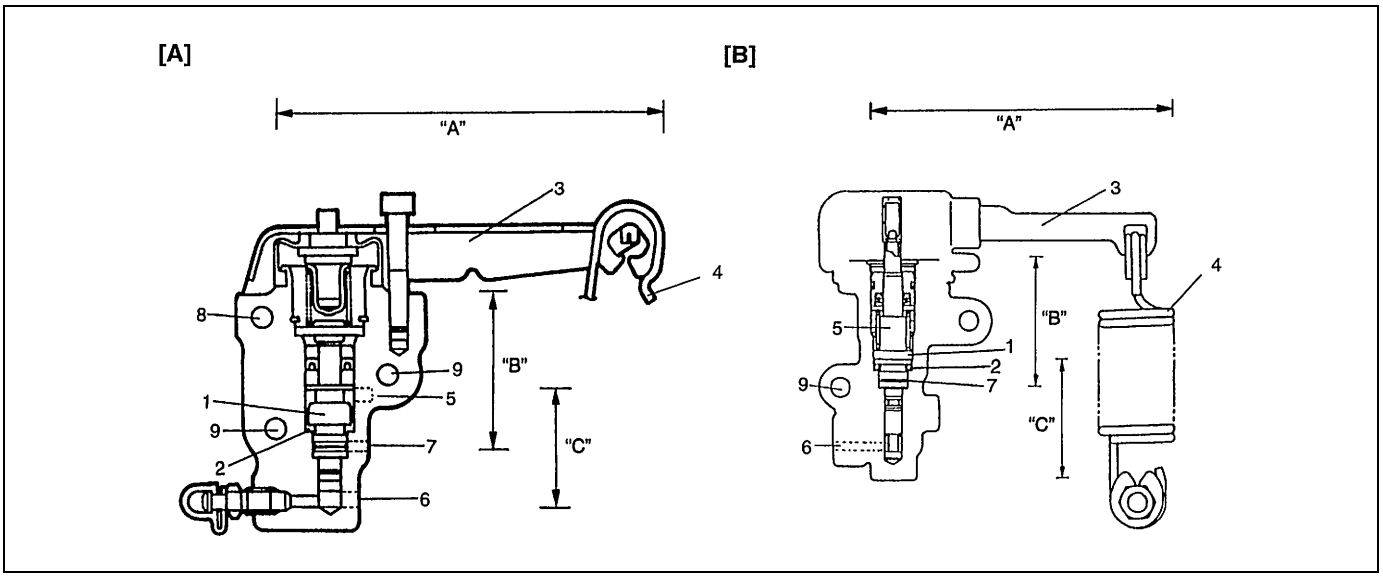
As shown in figure below, LSPV is included within the brake circuit which connects the master cylinder and the rear wheel brake. It controls the hydraulic pressure applied to the rear wheel brake according to the loaded state of the vehicle (or weight of the load), whereby preventing the rear wheels from getting locked prematurely.
Also, it releases the above described control over the hydraulic pressure applied to the rear wheel brake, should any failure occur in the hydraulic circuit of the front wheel brake so that the hydraulic pressure produced in the master cylinder is applied to the rear wheel brake directly to operate it.



1. LSPV	3. Spring	5. Brake flare nut
2. LSPV lever	4. LSPV stay	

Constitution

The LSPV components are grouped into three sections as follows.
“A” : Sensor section
The main parts in this section are a lever and a spring which senses variation in the vehicle height as affected by the loaded condition and converts it into the load.
“B” : Hydraulic pressure control section
Included in this section are a stepped plunger and valve mechanism to execute proportional control.
“C” : Fail-safe section
The main parts in this section are a chamber which draws in the hydraulic pressure from the front wheel brake system and a fail-safe piston which releases the valve mechanism in the control section connected to the rear wheel brake, should any failure occur in the front wheel brake system.



[A] : Type A	3. LSPV lever	7. To rear wheel brake
[B] : Type B	4. Sensor spring	8. Pin
1. Plunger	5. From master cylinder primary chamber (Rear wheel brake)	9. Bolt hole
2. Lip seal	6. From master cylinder secondary chamber (Front wheel brake)	

Diagnosis

Refer to Section 5 (BRAKES)

Check and Adjustment

Refer to Section 5 (BRAKES)

On-Vehicle Service

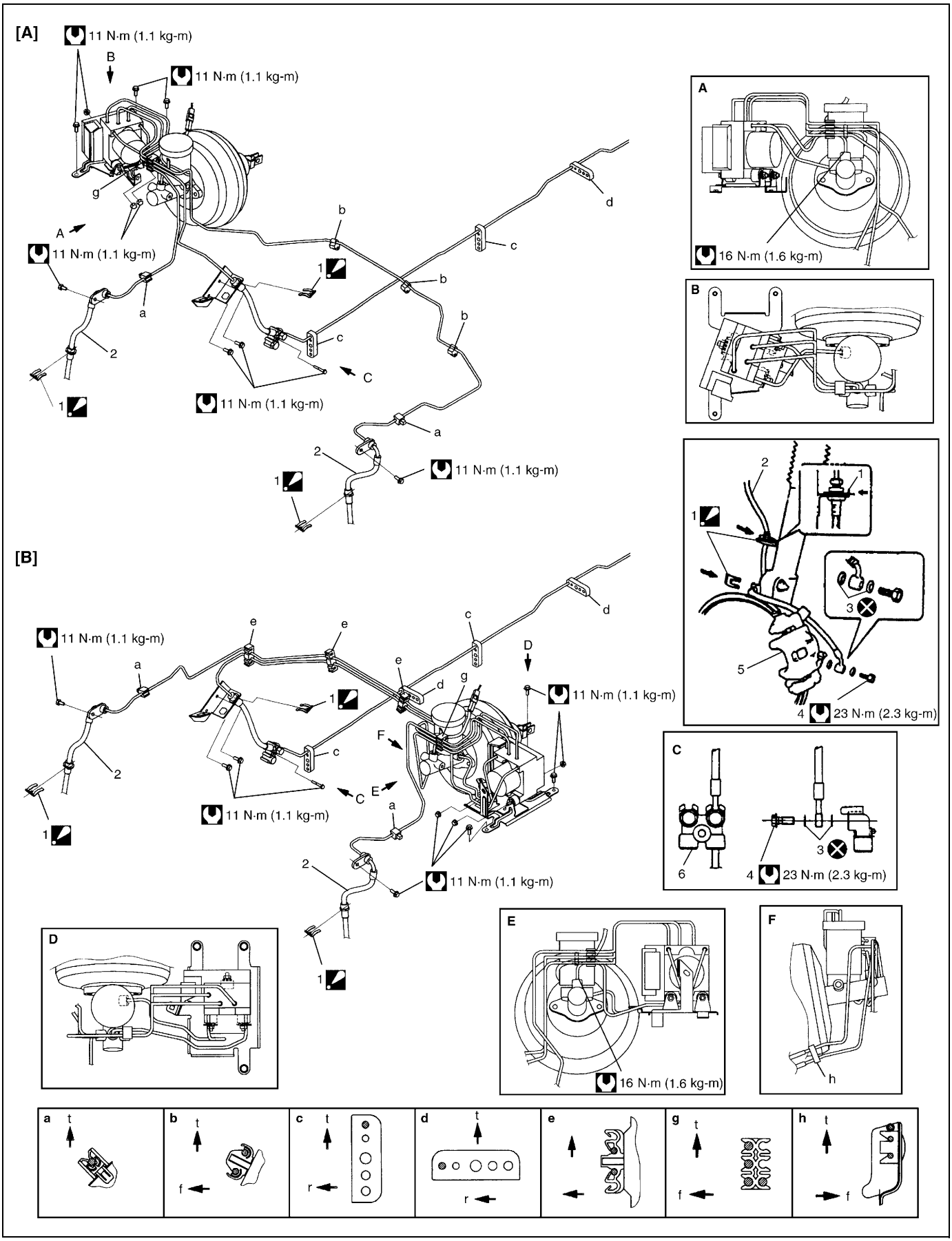
Front Brake Hose/Pipe

REMOVAL

1) Raise and suitably support vehicle. Remove tire and wheel.
   This operation is not necessary when removing pipes connecting master cylinder and flexible hose.
2) Clean dirt and foreign material from both hose end or pipe end fittings. Remove brake hose or pipe.

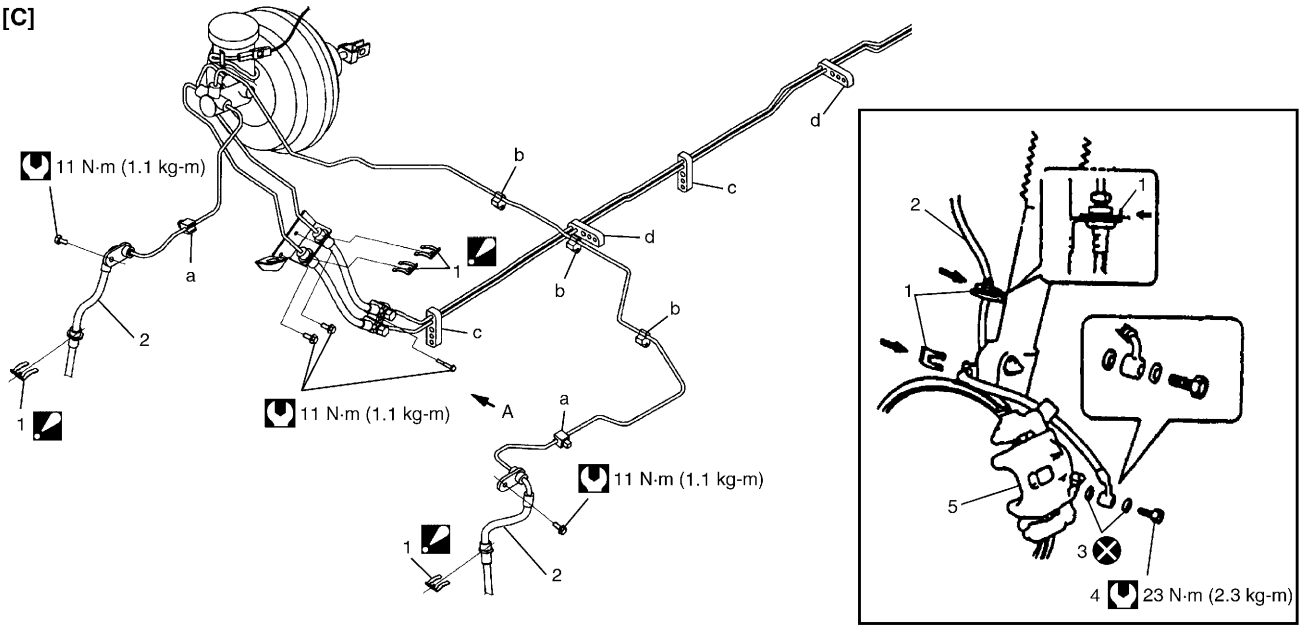
INSTALLATION

1) Reverse removal procedure for brake hose and pipe installation procedure.
   For installation, make sure that steering wheel is in straightforward position and hose has no twist or kink. Check to make sure that hose doesn't contact any part of suspension, both in extreme right and extreme left turn conditions. If it does at any point, remove and correct. Fill and maintain brake fluid level in reservoir. Bleed brake system.
2) Perform brake test and check installed part for fluid leakage.


[A]
11 N·m (1.1 kg-m)
B
11 N·m (1.1 kg-m)
g
A
11 N·m (1.1 kg-m)
a
2
1
b
c
d
C
11 N·m (1.1 kg-m)
11 N·m (1.1 kg-m)
[B]
11 N·m (1.1 kg-m)
e
a
2
1
c
d
D
11 N·m (1.1 kg-m)
F
C
E
11 N·m (1.1 kg-m)
11 N·m (1.1 kg-m)
A
16 N·m (1.6 kg-m)
B
C
6
4
23 N·m (2.3 kg-m)
3
D
E
16 N·m (1.6 kg-m)
F
h
a t
b t
f
c t
r
d t
r
e
g t
f
h t
f

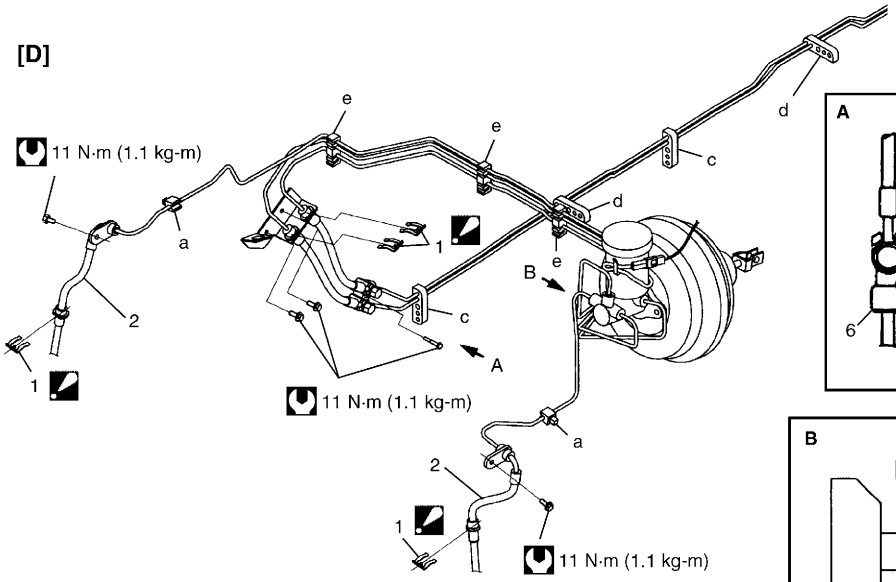
[A] : Vehicle with ABS for right hand steering vehicle	5. Brake caliper	E : View E	e : Clamp e	Tightening torque
[B] : Vehicle with ABS for left hand steering vehicle	6. 2 way joint	F : View F	f : Front side	Do not reuse
1. E-ring : Insert E-ring till its end surface is flush with or lower than bracket end surface.	A : View A	a : Clamp a	g : Clamp g	Note on reassembly
2. Flexible hose	B : View B	b : Clamp b	h : Clamp h	
3. Hose washer	C : View C	c : Clamp c	t : Top side	
4. Hose bolt	D : View D	d : Clamp d	r : Rear side	

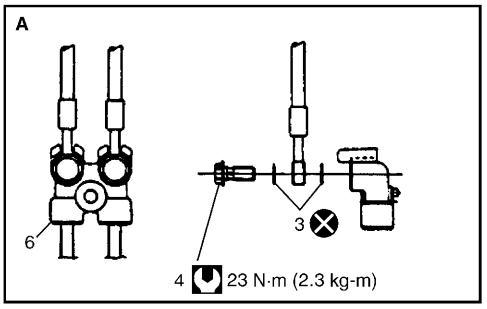
[C]

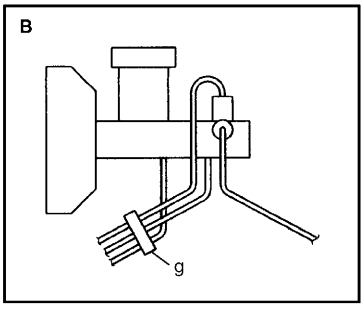

11 N·m (1.1 kg-m)
a
b
c
d
1
2
A
11 N·m (1.1 kg-m)
11 N·m (1.1 kg-m)
11 N·m (1.1 kg-m)

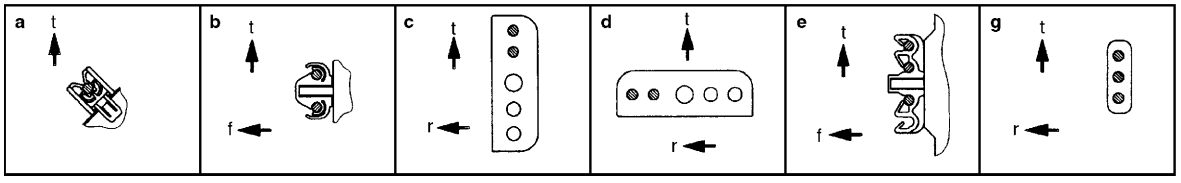
1
2
3
4 23 N·m (2.3 kg-m)
5

[D]


11 N·m (1.1 kg-m)
a
b
c
d
e
1
2
A
B
11 N·m (1.1 kg-m)
11 N·m (1.1 kg-m)


A
3
4 23 N·m (2.3 kg-m)
6


B
g


a t
b t f
c t r
d t r
e t f
g t r

[C] : Vehicle without ABS for right hand steering vehicle	5. Brake caliper	c : Clamp c	t : Top side
[D] : Vehicle without ABS for left hand steering vehicle	6. 4way joint	d : Clamp d	Tightening torque
1. E-ring : Insert E-ring till its end surface is flush with or lower than bracket end surface.	A : View A	e : Clamp e	Do not reuse
2. Flexible hose	B : View B	f : Front side	Note on reassembly
3. Hose washer	a : Clamp a	g : Clamp g, if equipped	
4. Hose bolt	b : Clamp b	r : Right side	

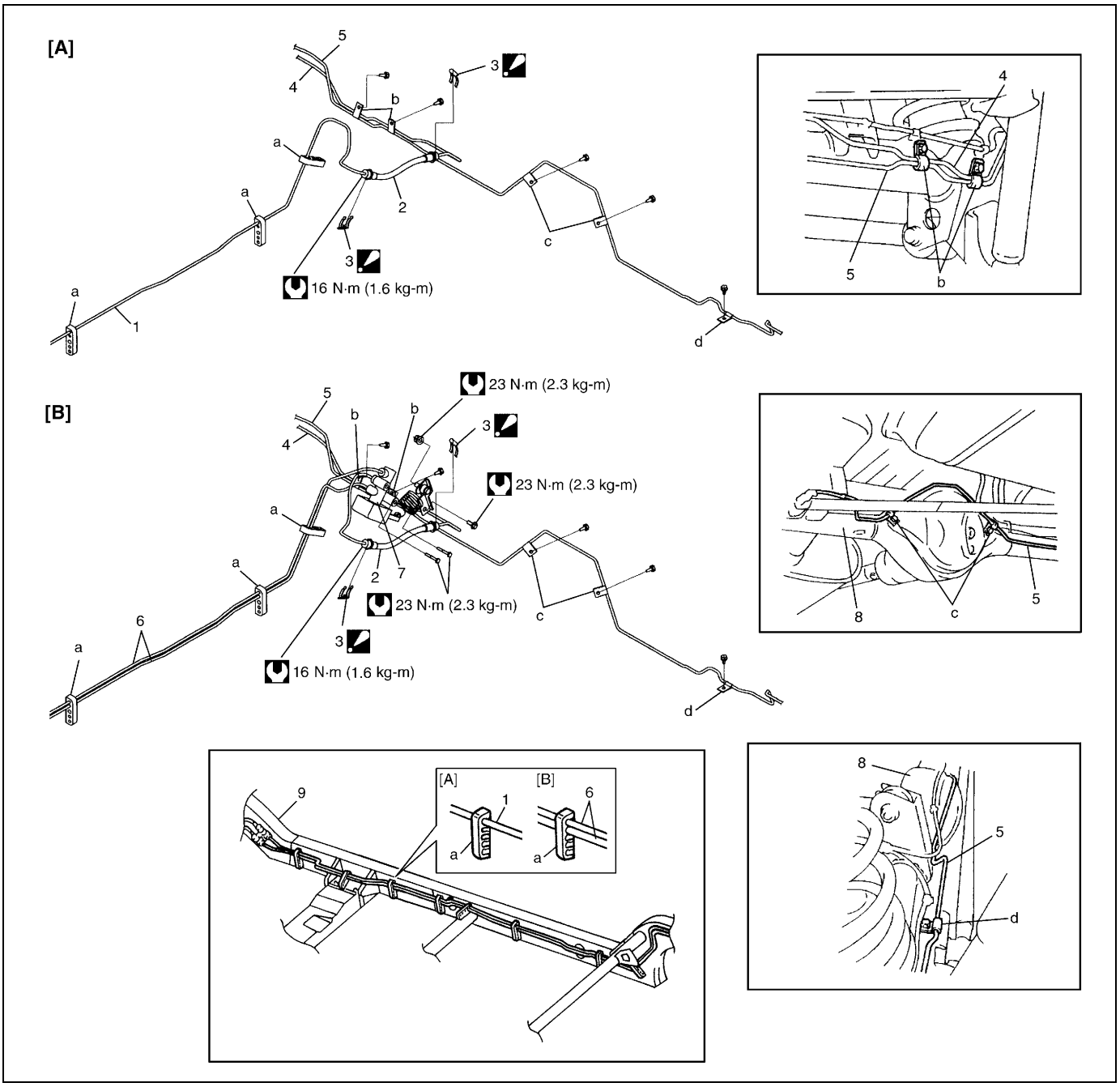
Rear Brake Hose/Pipe

REMOVAL

1) Raise and suitably support vehicle. Remove tire and wheel.
2) Clean dirt and foreign material from both hose end or pipe end fittings. Remove brake hose or pipe.

INSTALLATION

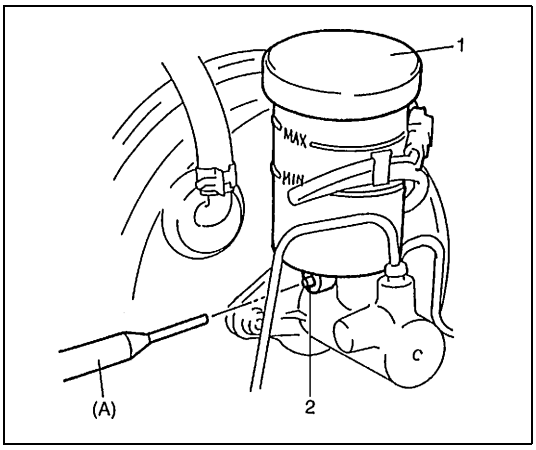
1) Reverse removal procedure for brake hose or pipe installation procedure.
   - Be sure to obtain more than 3 mm (0.118 in.) clearance between axle housing and brake pipe.
   - Install clamps properly referring to figure and tighten bolts.
   - When installing hose, make sure that it has no twist or kink.
2) Fill and maintain brake fluid level in reservoir. Bleed brake system.
3) Perform brake test and check each installed part for fluid leakage.



[A] : With ABS	4. Brake pipe (From rear brake hose to right wheel cylinder)	9. Chassis frame
[B] : Without ABS	5. Brake pipe (From right wheel cylinder to left wheel cylinder)	a – d. Clamp
1. From 2-way joint to rear brake hose	6. Brake pipe (From 4-way joint to LSPV)	Tightening torque
2. Rear brake hose	7. LSPV	
3. E-ring : Insert E-ring till its end surface is flush with or lower than bracket end surface.	8. Rear axle housing	

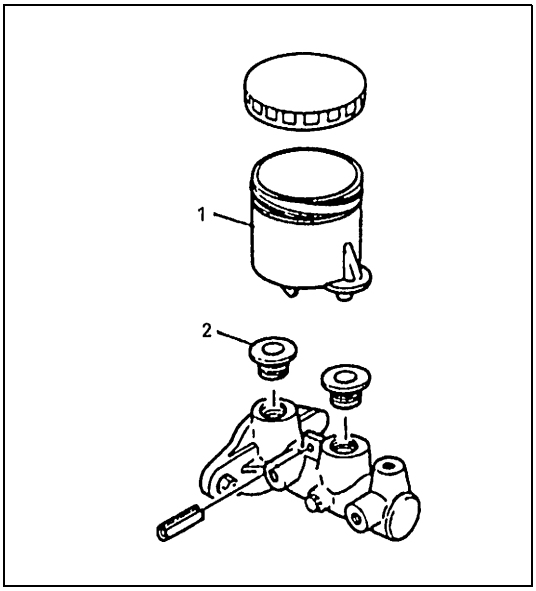
Master Cylinder Reservoir

REMOVAL



1) Disconnect reservoir lead wire at coupler.
2) Clean outside of reservoir (1).
3) Take out fluid with syringe or such.
4) Remove reservoir connector pin (2) by using special tool.

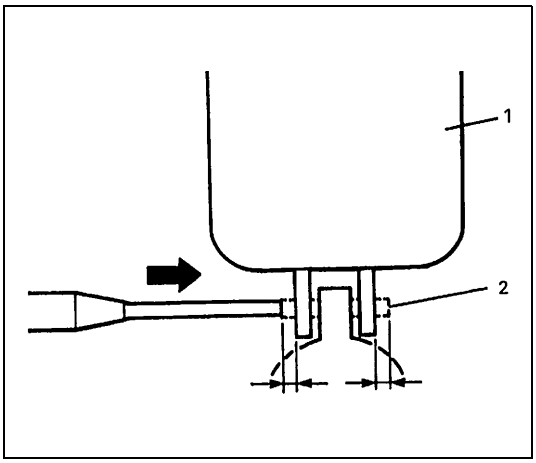
Special tool
(A) : 09922-85811



5) Remove reservoir (1) and grommets (2).

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

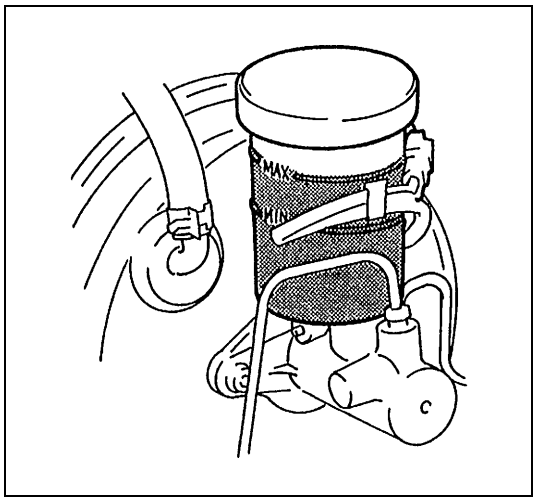
INSTALLATION



NOTE:
See NOTE at the beginning of this section.

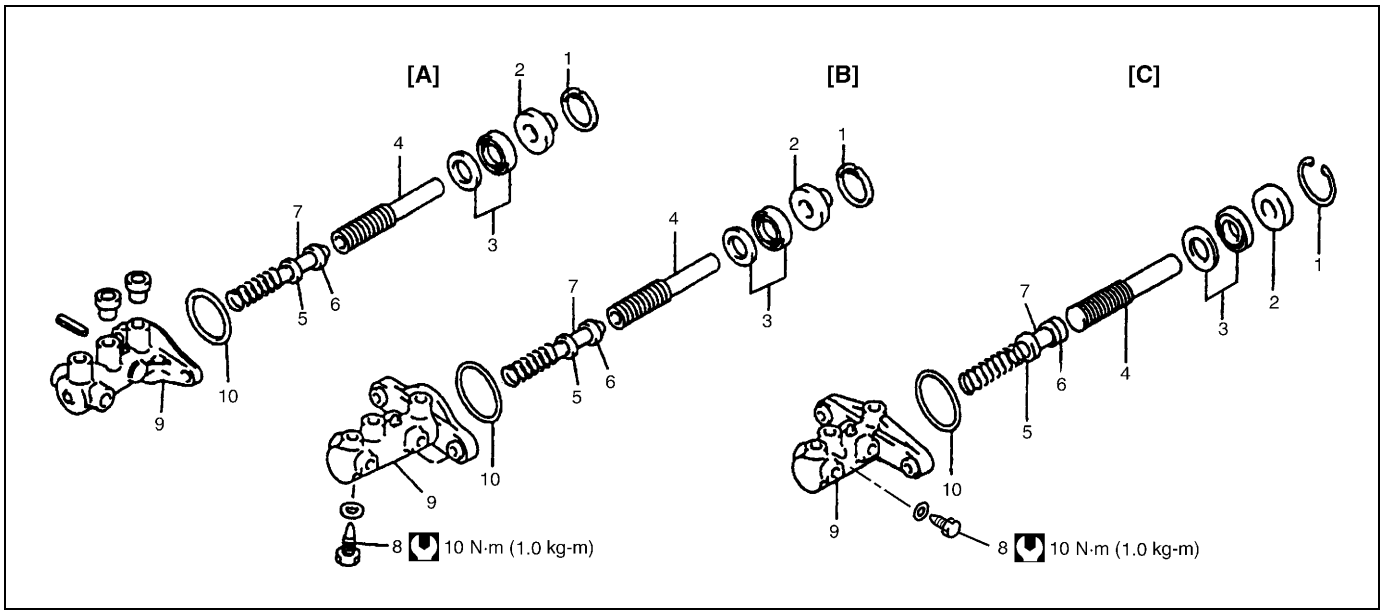
1) When using new grommets, lubricate them with the same fluid as the one to fill reservoir with. Then press-fit grommets to master cylinder. Grommets must be seated in place.
2) Install reservoir (1) and drive in reservoir connector pin (2).

NOTE:
Drive in reservoir pin till both of its ends at the right and left of reservoir becomes the same length.



3) Connect reservoir lead wire.
4) Fill reservoir with specified fluid.
5) Upon completion of installation, check for fluid leakage.

Master Cylinder Assembly

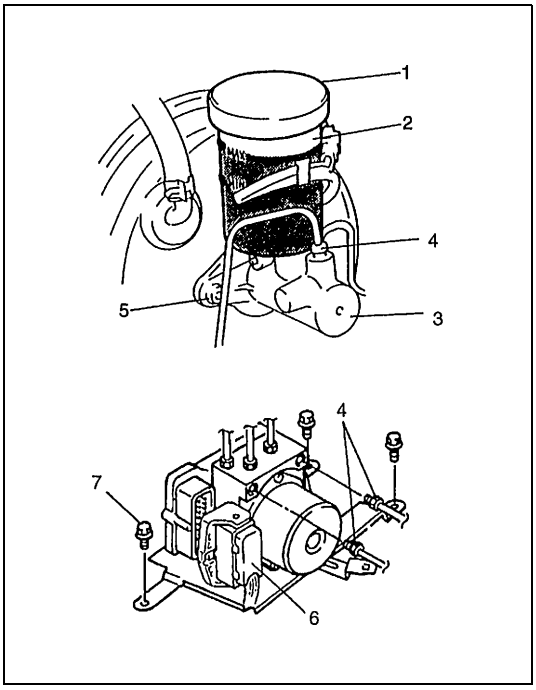


[A] : With ABS	3. Cylinder cup and plate	8. Secondary piston stopper bolt
[B] : With ABS for Canvas top model	4. Primary piston	9. Master cylinder body
[C] : Without ABS	5. Piston cup	10. O-ring
1. Piston stopper circlip	6. Secondary piston pressure cup	Tightening torque
2. Piston stopper	7. Secondary piston	

REMOVAL

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

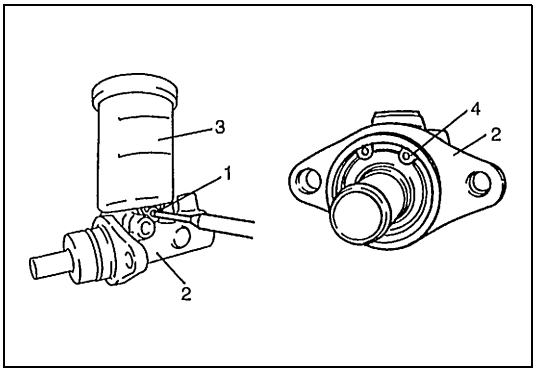
1) Disconnect reservoir lead wire at coupler.



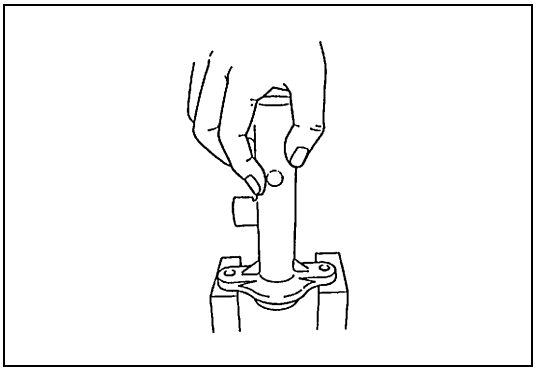
2) Clean around reservoir cap (1) and take out fluid with syringe or such.
3) Remove master cylinder (3) with reservoir (2) from brake booster.
   a) For vehicle with ABS
      i) Loosen flare nuts (4) for master cylinder and ABS hydraulic unit as shown.
      ii) For LH steering vehicle, disconnect ABS control module connector (6).
      iii) For RH steering vehicle, remove ABS hydraulic unit bracket bolts (7).
      iv) Disconnect brake pipes between master cylinder and ABS hydraulic unit.
   b) For vehicle without ABS
      i) Loosen flare nuts for master cylinder.
      ii) Disconnect brake pipes for master cylinder.

5. Master cylinder attaching nut

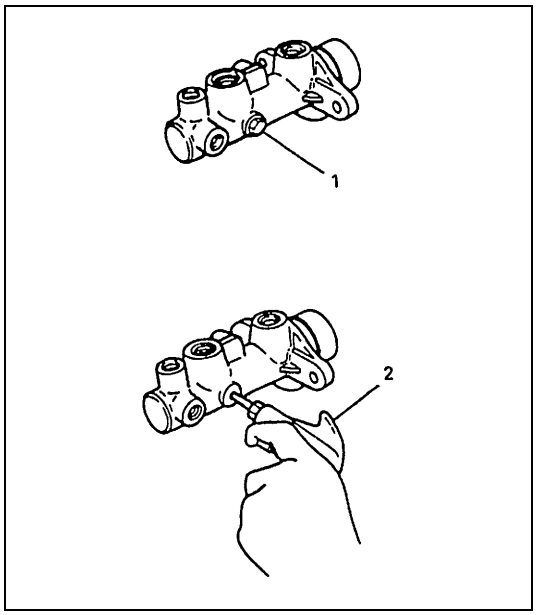
DISASSEMBLY



1) Remove reservoir pin (1) and reservoir (3).
2) Remove circlip (4) from master cylinder (2).



3) Remove Pistons as following procedure.
   a) For vehicle with ABS
      i) Pull out primary piston assembly straight so as not to cause any damage to inside of cylinder wall.
      ii) Pull out secondary piston assembly straight so as not to cause any damage to inside of cylinder wall and by tapping flange with a piece of wood or something soft.



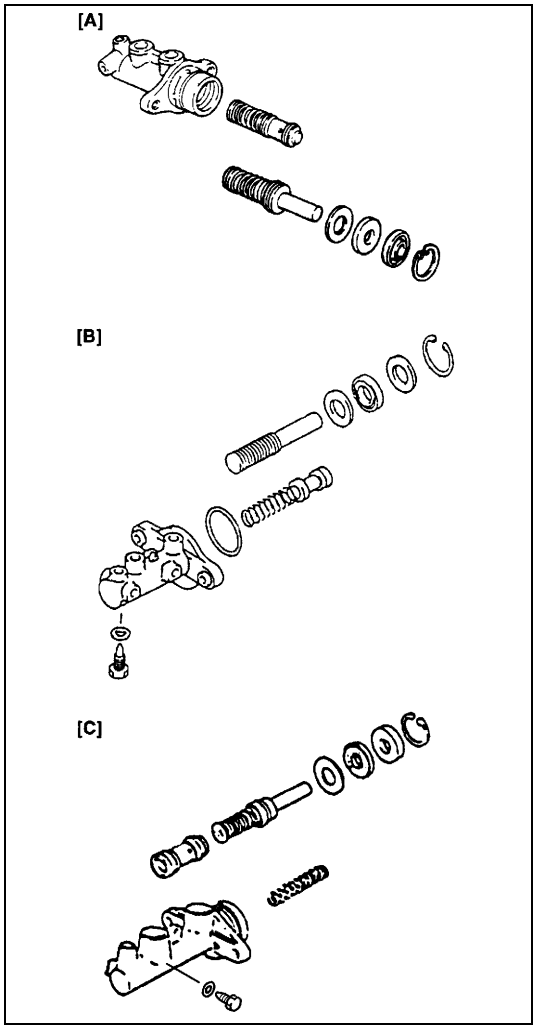
b) For vehicle without ABS and vehicle with ABS for Canvas top model.

i) Remove piston stopper bolt (1).
ii) Remove secondary piston by blowing compressed air (2) into hole from which piston stopper bolt was removed.

CAUTION:

Be cautious during removal as secondary piston jumps out.

INSPECTION



- Inspect all disassembled parts for wear or damage, and replace parts if necessary.

NOTE:

- **Wash disassembled parts with brake fluid.**
- **Do not reuse piston cups.**

- Inspect master cylinder bore for scoring or corrosion. It is best to replace corroded cylinder.
  Corrosion can be identified as pits or excessive roughness.

NOTE:

Polishing bore or master cylinder with cast aluminum body with anything abrasive is prohibited, as damage to cylinder bore may occur.

Rinse cylinder in clean brake fluid. Shake excess rinsing fluid from cylinder. Do not use a cloth to dry cylinder, as lint from cloth cannot be kept from cylinder bore surfaces.

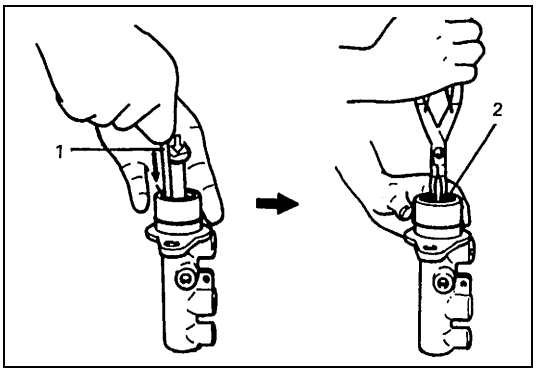
[A] : Vehicle equipped with ABS
[B] : Vehicle equipped with ABS for Canvas top model
[C] : Vehicle not equipped with ABS

ASSEMBLY

NOTE:

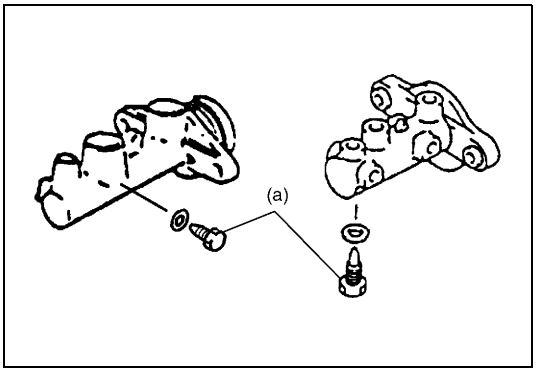
- **See NOTE at the beginning of this section.**
- **Before assembling, wash each part in fluid recommended to use for that vehicle.**

1) Install secondary piston assembly into cylinder.
2) Install primary piston assembly in cylinder.



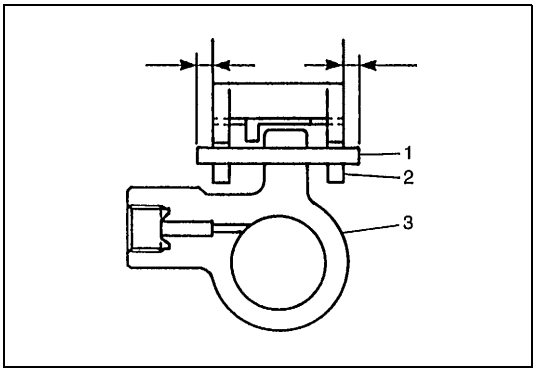
3) Depress, and install circlip (2).

1. Rod



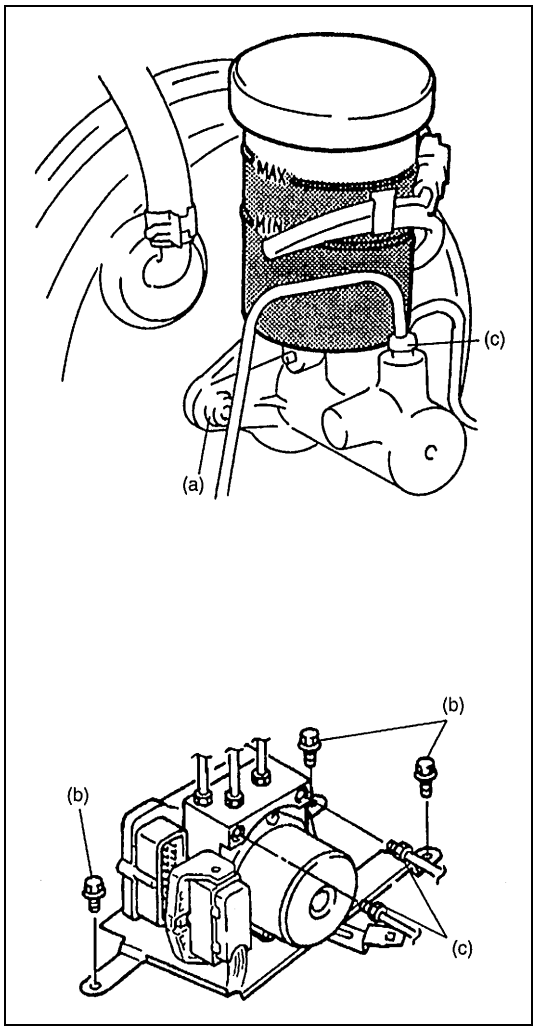
4) Install piston stopper bolt with pistons pushed in all the way and tighten it to specified torque (For vehicle without ABS and vehicle with ABS for Canvas top model).

Tightening torque
Master cylinder piston stopper bolt (a) : 10 N·m (1.0 kg-m, 7.5 lb-ft)



5) Apply thin coat of brake fluid to all around new grommets (2pcs.) and install them to cylinder body (3), then install reservoir (2).
6) Set a new pin (1) in reservoir hole and drive it in. At this time, make end of pin and end face margin of reservoir equal.

INSTALLATION



NOTE:

- **See NOTE at the beginning of this section.**
- **Adjust clearance between booster piston rod and primary piston with special tool, referring to "Clearance Between Booster Piston and Master Cylinder Piston Adjustment" under "Brake Booster" in this section.**

1) Install master cylinder to brake booster.
2) Tighten master cylinder attaching nuts to specification.

Tightening torque
Master cylinder attaching nut (a) : 13 N·m (1.3 kg-m, 9.5 lb-ft)

3) Connect brake pipes to master cylinder.

For vehicle with ABS

– Connect brake pipes between master cylinder and ABS hydraulic unit.
– For LH steering vehicle, connect ABS control module connector.
– For RH steering vehicle, install ABS hydraulic unit bracket bolts and tighten it to specified torque.

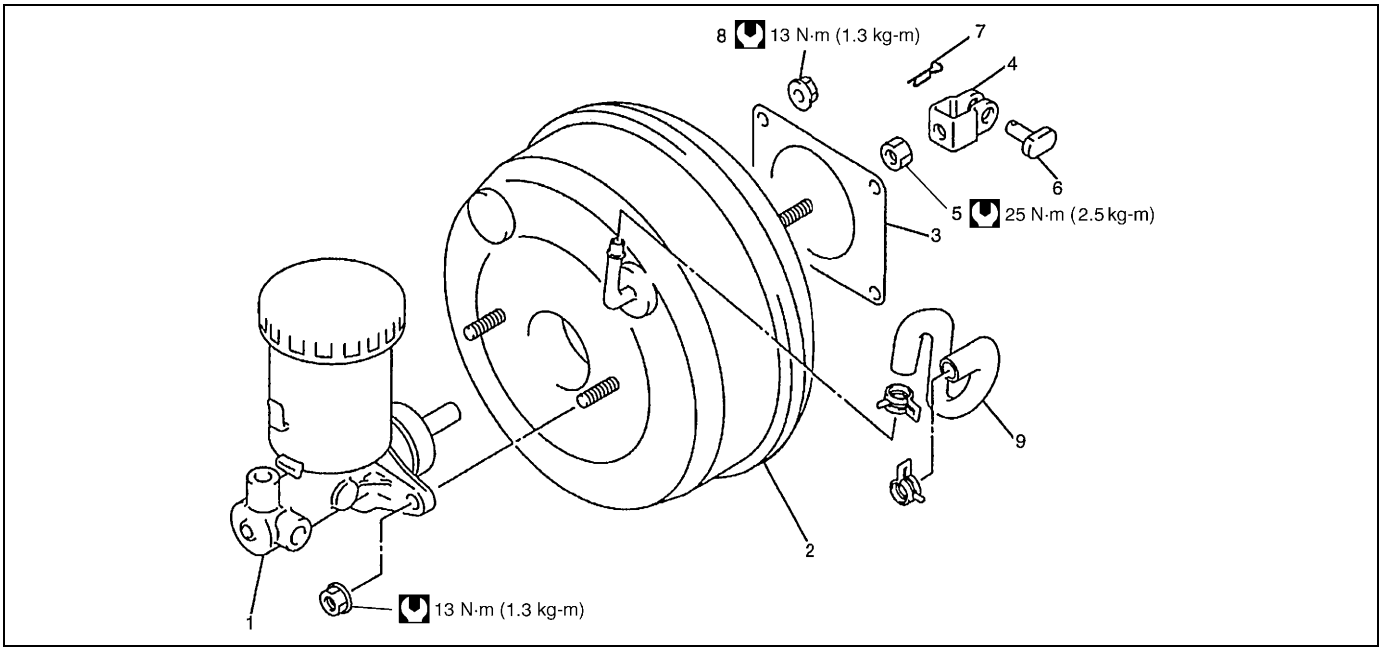
Tightening torque
ABS hydraulic unit bracket bolt (b) : 11 N·m (1.1 kg-m, 8.0 lb-ft)

4) Tighten flare nuts to specification.

Tightening torque
Brake pipe flare nut (c) : 16 N·m (1.6 kg-m, 12.0 lb-ft)

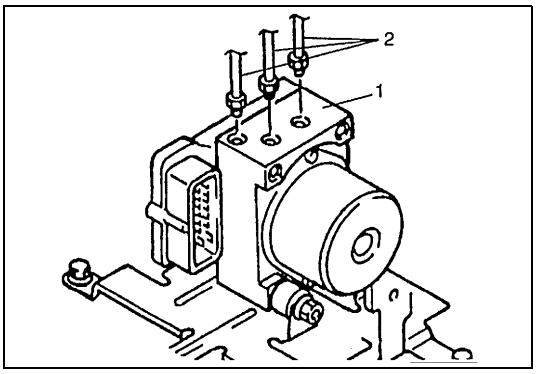
5) Connect reservoir lead wire.
6) Fill reservoir with specified brake fluid.
7) Check brake pedal play and bleed air from system.
8) Perform brake test and check each installed part for fluid leakage.

Brake Booster



1. Brake master cylinder	4. Push rod clevis	7. Clip	Tightening torque
2. Brake booster	5. Clevis nut	8. Booster nut	
3. Gasket	6. Clevis pin	9. Brake vacuum hose	

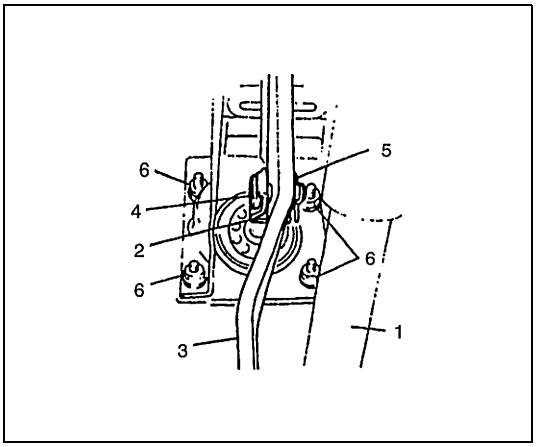
REMOVAL



NOTE:

Do not allow brake fluid to get on painted surfaces.

1) For vehicle equipped with ABS, disconnect brake pipes (2) from ABS hydraulic unit (1).
2) Remove master cylinder assembly, referring to “REMOVAL” under “Master Cylinder Assembly” in this section.
3) Disconnect brake vacuum hose from brake booster.



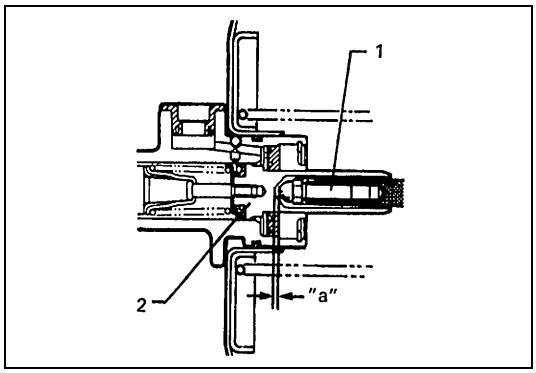
4) Disconnect push rod clevis (2) from brake pedal arm (3).
5) Remove attaching nuts (6) and then booster as shown in the figure.

CAUTION:

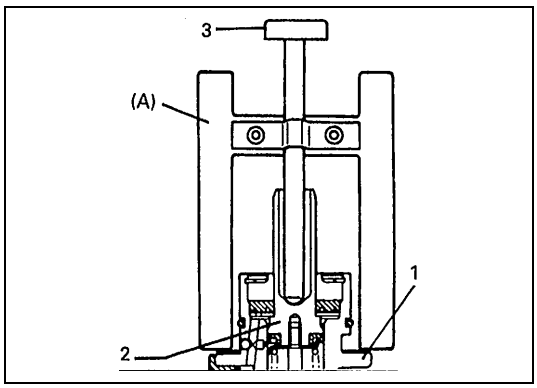
Never disassemble brake booster. Disassembly will spoil its original function. If it is found faulty, replace it with new one.

1. Steering column	
4. Clevis pin	
5. Clip	

Clearance Between Booster Piston Rod and Master Cylinder Piston Adjustment



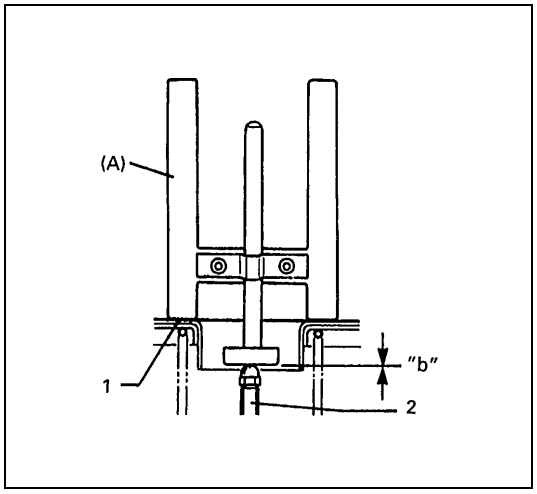
The length of booster piston rod (1) is adjusted to provide specified clearance "a" between piston rod end and master cylinder piston (2).



- Before measuring clearance, push piston rod several times so as to make sure reaction disc is in place.
- Keep inside of booster at atmospheric pressure for measurement.

1) Set special tool (A) on master cylinder (1) and push pin (3) until contacts piston (2).

Special tool
(A) : 09950-96010



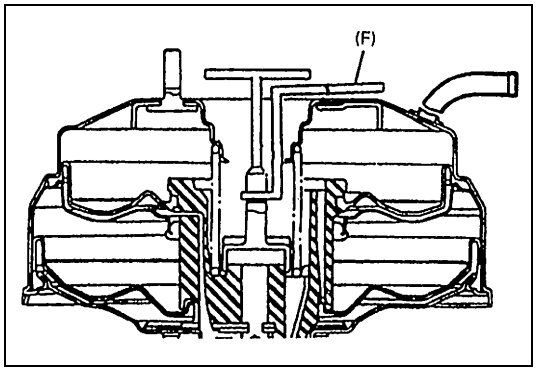
2) Turn special tool upside down and place it on booster (1). Adjust booster piston rod (2) length until rod end contacts pin head.

Special tool
(A) : 09950-96010

Clearance between special tool and piston rod
"b" : 0 mm (0 in.)

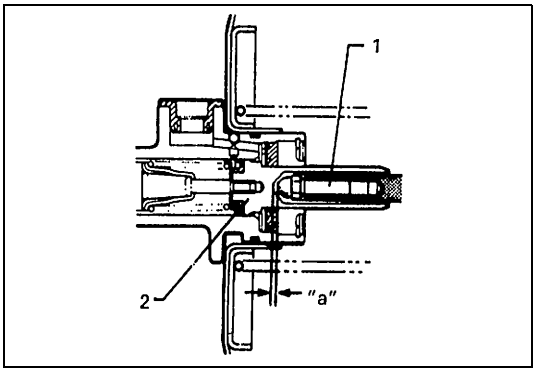
NOTE:

Take measurement with booster set vertically and rod at the center.



3) Adjust clearance by turning adjusting screw of piston rod.

Special tool
(F) : 09952-16010

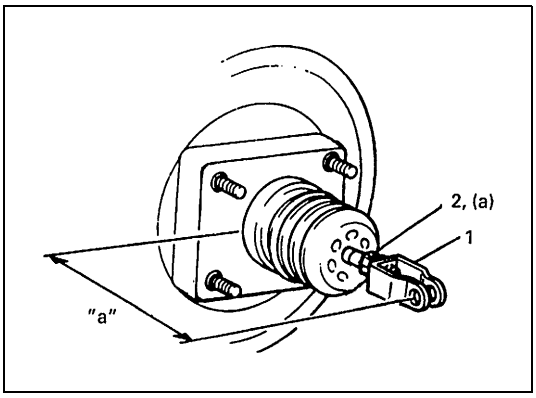


Reference

When adjusted as above, its negative pressure is applied to booster with engine at idle, piston (2) to piston rod (1) clearance "a" should become below.

Clearance between master cylinder piston to booster piston rod with engine at idle
"a" : 0.25 – 0.5 mm (0.010 – 0.020 in.)
"a" : 0.14 – 0.35 mm (0.006 – 0.013 in.) ... for Canvas top model

Booster Push Rod Clevis Adjustment



Install push rod clevis (1) so that measurement "a" is obtained and torque nut (2) to specification.

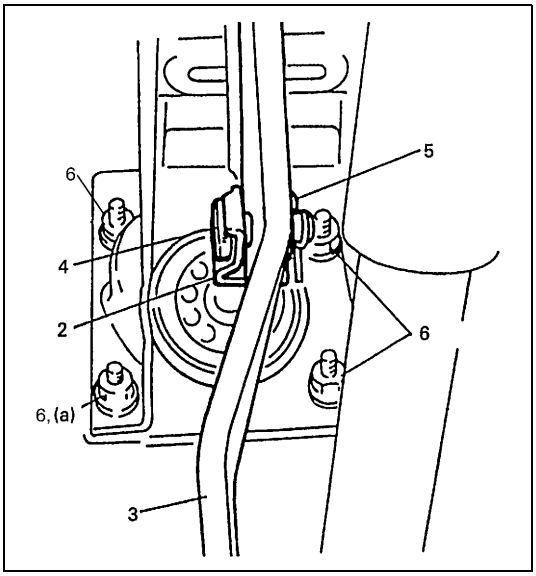
Tightening torque
Booster push rod clevis nut (a) : 25 N·m (2.5 kg-m, 18.0 lb-ft)

Length between center of booster clevis pin hole and booster surface
"a" : 109.5 – 110.5 mm (4.31 – 4.35 in.)

INSTALLATION

NOTE:

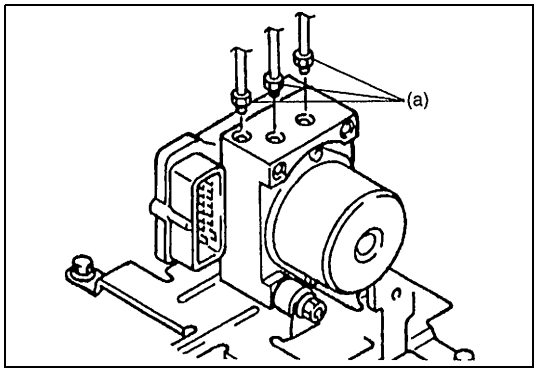
- **See NOTE at the beginning of this section.**
- **Check length of push rod clevis. (Refer to "Booster Push Rod Clevis Adjustment" under "Brake Booster" in this section.)**
- **Before installing master cylinder, adjust booster piston rod. (Refer to "Clearance Between Booster Piston Rod and Master Cylinder Piston Adjustment" under "Brake Booster" of this section.)**
- **Apply silicone grease to master cylinder piston.**



1) Install booster to dash panel as shown. Then connect booster push rod clevis (2) to pedal arm (3) with clevis pin (4) and clip (5).
2) Tighten booster attaching nuts to (6) the specified torque.

Tightening torque
Booster nut (a) : 13 N·m (1.3 kg-m, 9.5 lb-ft)

3) Connect brake vacuum hose to brake booster.



4) For vehicle equipped with ABS, connect brake pipes to ABS hydraulic unit. If ABS hydraulic unit bracket bolts removed, tighten flare nuts to specification after installing master cylinder.

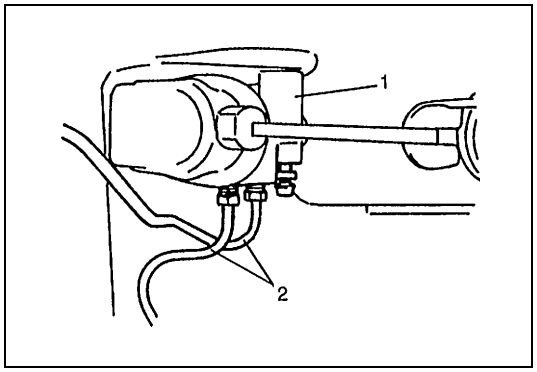
Tightening torque
Booster pipe flare nut (a) : 16 N·m (1.6 kg-m, 12.0 lb-ft)

5) Install master cylinder, referring to "INSTALLATION" under "Master Cylinder Assembly" in this section.

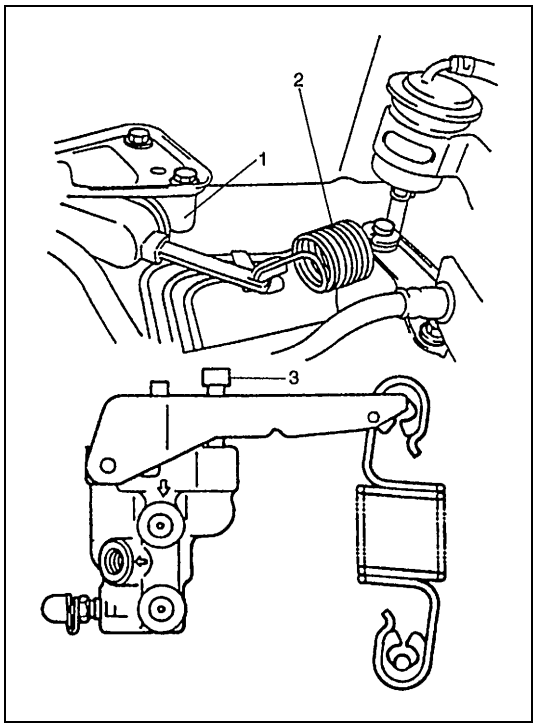
LSPV (Load Sensing Proportioning Valve) Assembly (if equipped)

REMOVAL

1) Clean around reservoir cap and take out fluid with syringe or such.
2) Hoist vehicle.



3) Disconnect brake pipes (2) from LSPV (1).



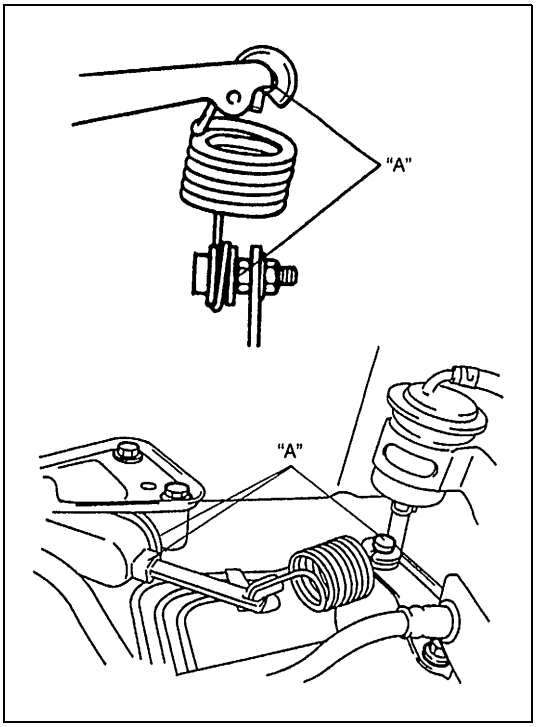
4) Remove LSPV assembly (1) with spring (2) from vehicle body.
5) Remove spring from lever.

CAUTION:
- **LSPV assembly must not be disassembled. Replace with new one if defective.**
- **Stopper bolt (3) should not be loosened or tightened. (if equipped)**

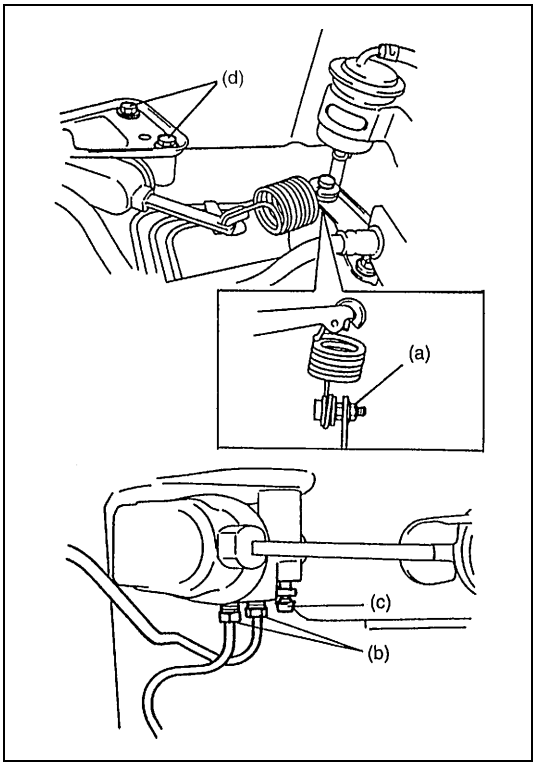
INSTALLATION

CAUTION:
- **LSPV assembly must not be disassebled. Replace with new one if defective.**
- **Stopper bolt should not be loosened or tightened. (if equipped)**

Install by reversing removal procedure, noting the following.



1) Apply multi-purpose grease "A" to upper and lower joint of coil spring.



2) Torque each bolt and nut to specification as indicated respectively in figure.

Tightening torque
LSPV spring nut (a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)
Brake pipe flare nut (b) : 16 N·m (1.6 kg-m, 11.5 lb-ft)
LSPV bleeder plug (c) : 7.5 N·m (0.75 kg-m, 5.5 lb-ft)
LSPV bolt (d) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

3) Upon completion of installation, fill reservoir tank with specified fluid and bleed air from brake system.

NOTE:

Make sure to bleed air from LSPV bleeder without failure.

4) After bleeding air, check that LSPV is installed properly, referring to "INSPECTION & ADJUSTMENT" under "LSPV Assembly" in this section.

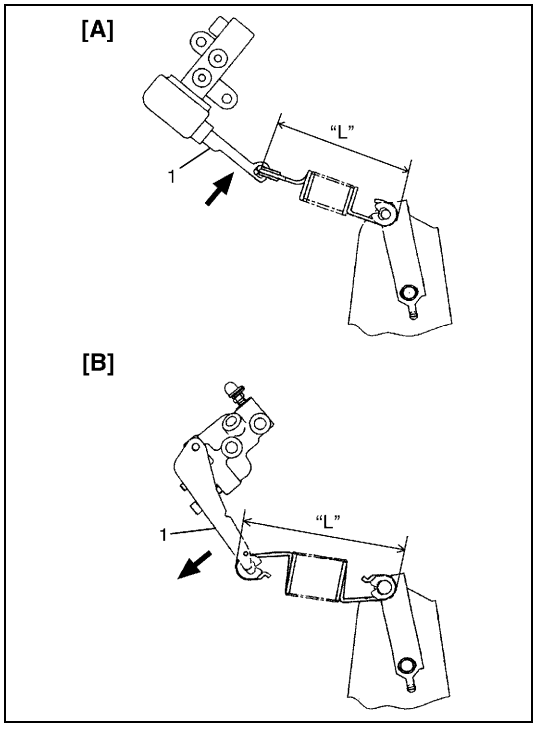
INSPECTION & ADJUSTMENT

Confirm the following before inspection and adjustment.

- Fuel tank is filled with fuel fully.
- Vehicle is equipped with spare tire, tools, jack and jack handle.
- Vehicle is free from any other load.

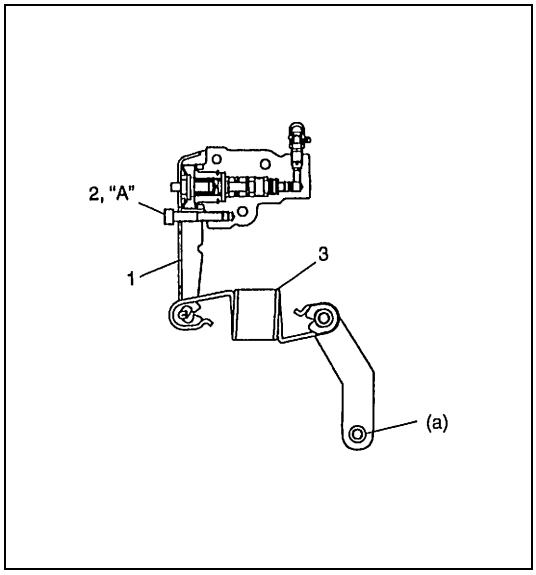
With vehicle in above conditions;

1) Place it on level floor.



2) Push up (for 5 door model) or push down (for 3 door model) LSPV lever (1) with finger till it stops and measure length "L" of coil spring as it is pulled.
3) Spring length "L" should be the value specified.

Spring length (between spring ends)
"L" : 103 mm (4.06 in.) ... [A] : For 5 door or Canvas top model
"L" : 157 mm (6.18 in.) ... [B] : For 3 door model



4) If it isn't, adjust it to specification by changing stay positions as shown in figure. After adjustment, tighten bolt to specified torque.
   For details, refer to the figure.

Tightening torque
LSPV stay bolt (a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

NOTE:

Check to make sure that LSPV body and brake pipe joints are free from fluid leakage. Replace defective parts, if any.

1. LSPV lever	3. Coil spring
2. Stopper bolt (if equipped)	"A" : Don't turn

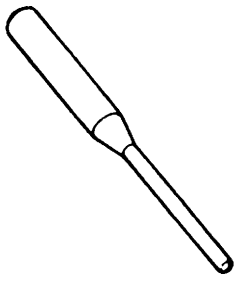
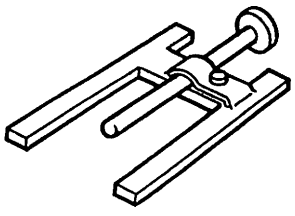
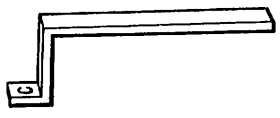
Tightening Torque Specification

Fastening part			Tightening torque		
			N•m	kg-m	lb-ft
Brake flexible hose bolt (Brake caliper /2 (4) way joint)			23	2.3	17.0
Master cylinder attaching nut			13	1.3	9.5
Booster nut			13	1.3	9.5
Booster clevis nut			25	2.5	18.0
2-way (or 4-way) joint mounting bolt			11	1.1	8.0
Brake pipe flare nut			16	1.6	11.5
Brake bleeder plug	Front caliper	M8	8.0	0.8	6.0
		M10	8.5	0.85	6.5
	Wheel cylinder		7.5	0.75	5.5
	LSPV		7.5	0.75	5.5
LSPV mounting bolt			23	2.3	17.0
LSPV stay bolt					
LSPV spring nut					
Wheel nut			100	10.0	72.5
Master cylinder piston stopper bolt			10	1.0	7.5
ABS hydraulic unit bracket bolt			11	1.1	8.0

Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Brake fluid	Indicated on reservoir cap or described in owner's manual of vehicle	• To fill master cylinder reservoir. • To clean and apply to inner parts of master cylinder, brake caliper and wheel cylinder when they are disassembled.

Special Tool

		
09922-85811 Connector pin remover	09950-96010 Booster piston rod gauge	09952-16010 Booster piston rod adjuster

SECTION 5B

FRONT BRAKE

NOTE:

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

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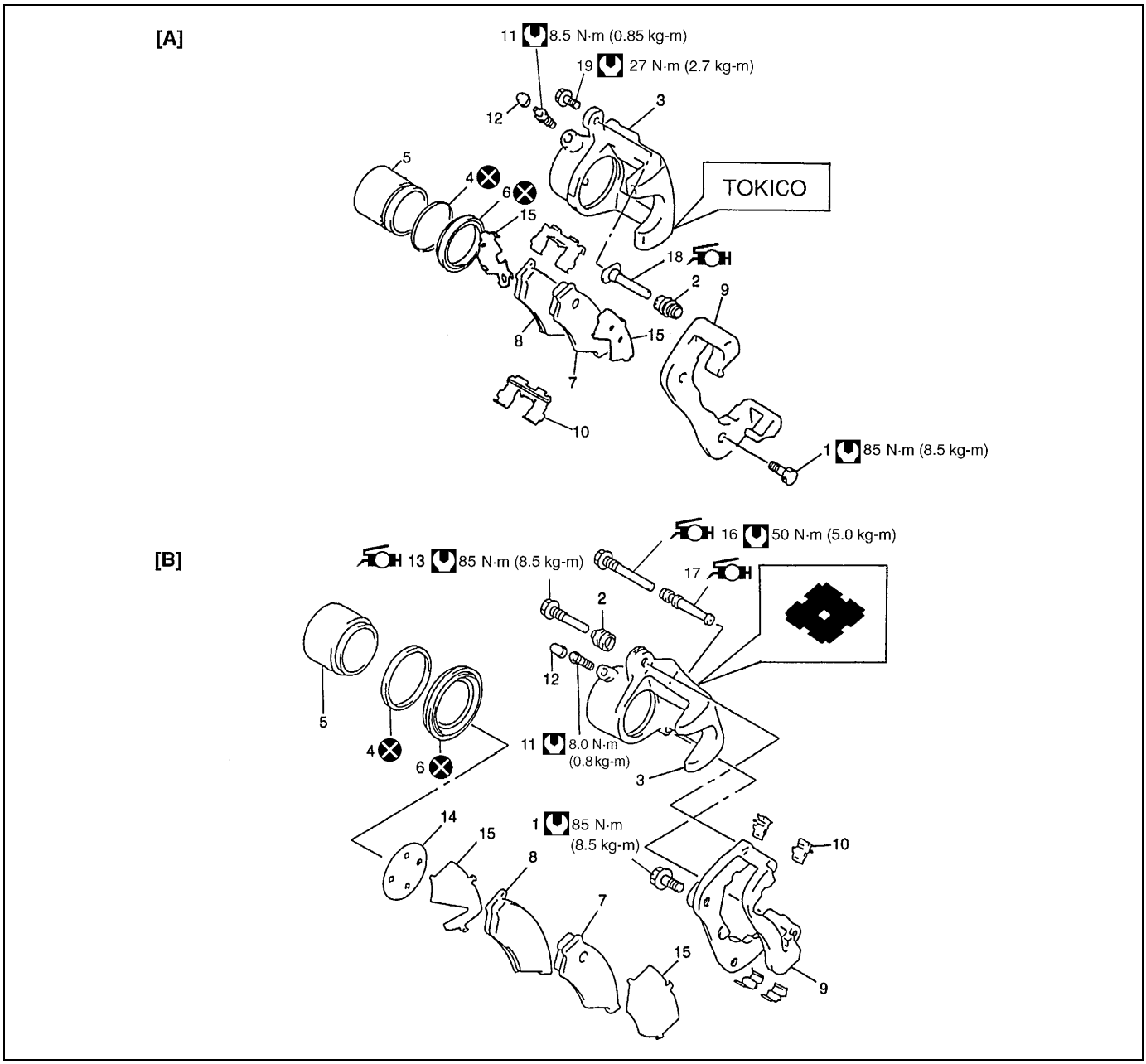
General Description

Disc Brake Caliper Assembly

This caliper is mounted to the brake caliper carrier with two caliper pin bolts. Hydraulic force, created by applying force to the brake pedal, is converted by the caliper to friction. The hydraulic force acts equally against the piston and the bottom of the caliper bore to move the piston outward and to move (slide) the caliper inward, resulting in a clamping action on the disc. This clamping action forces the pads (linings against the disc, creating friction to stop the vehicle.

NOTE:

- **Lubricate parts as specified. Do not use lubricated shop air on brake parts as damage to rubber components may result. If any component is removed or line disconnected, bleed the brake system. Replace pads in axle sets only. The torque values specified are for dry, unlubricated fasteners.**
- **For identification of the brake caliper type, see maker name or mark on brake caliper as shown.**



[A] : TOKICO produced	4. Piston seal	9. Brake caliper carrier	14. Anti noise shim	19. Caliper pin bolt
[B] : SUMITOMO ELECTRIC produced	5. Disc brake piston	10. Pad spring	15. Inner shim	Tightening torque
1. Brake carrier bolt	6. Cylinder boot	11. Bleeder plug	16. Caliper slide pin bolt (M10)	Apply rubber grease
2. Boot	7. Disc brake inner pad	12. Bleeder plug cap	17. Caliper slide bush	Do not reuse
3. Disc brake caliper (Disc brake cylinder)	8. Disc brake outer pad	13. Caliper slide pin bolt (M12)	18. Caliper slide pin	

Diagnosis

Refer to Section 5 (BRAKES).

Check and Adjustment

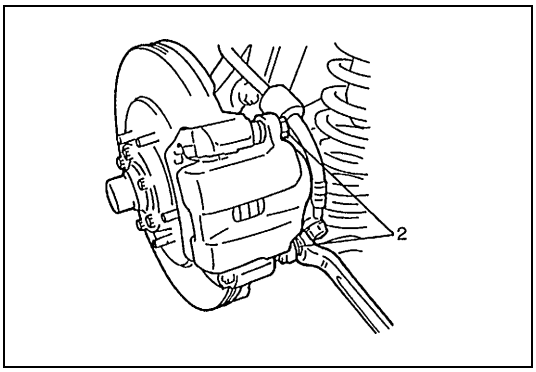
Refer to Section 5 (BRAKES).

On-Vehicle Service

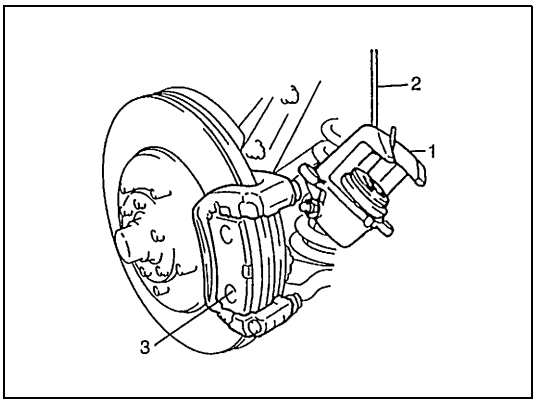
Front Disc Brake Pad

REMOVAL

1) Hoist vehicle and remove wheel.



2) Remove caliper pin bolts (2).



3) Remove E-ring from strut and then remove caliper (1) from caliper carrier.

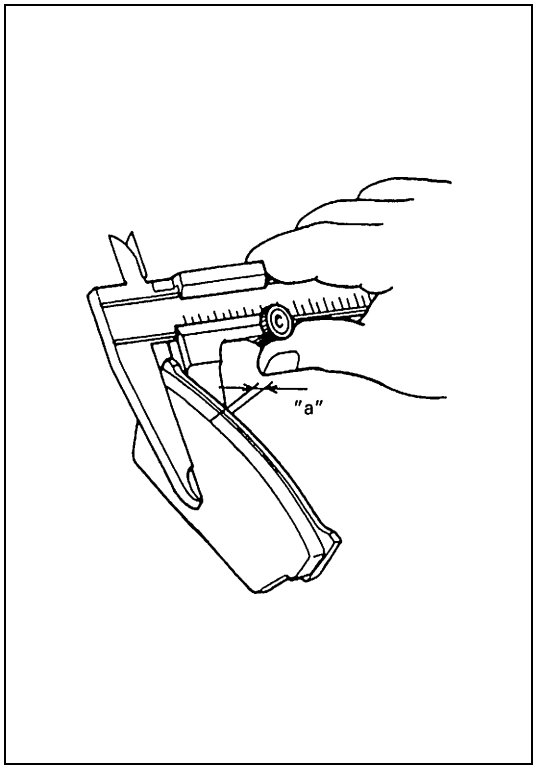
NOTE:

Hang removed caliper with a wire hook (2) or the like so as to prevent brake hose from bending and twisting excessively or being pulled. Don't operate brake pedal with pads (3) removed.

4) Remove pads (3).

INSPECTION

Brake pad



Check pad lining for wear. When wear exceeds limit, replace with new one.

CAUTION:

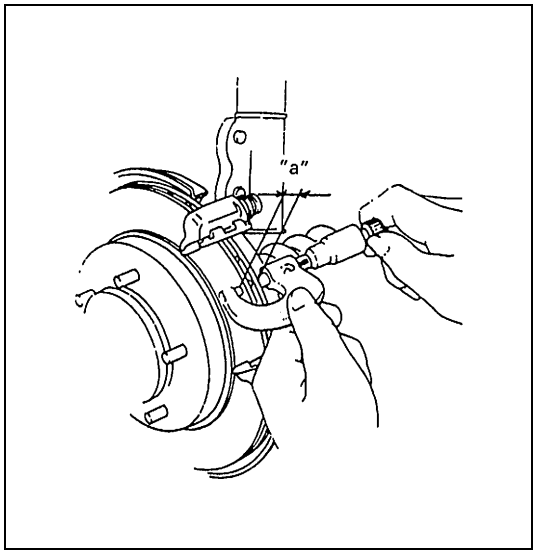
Never polish pad lining with sandpaper. If lining is polished with sandpaper, hard particles of sandpaper will be deposited in lining and may damage disc. When pad lining requires correction, replace it with a new one.

Pad thickness (lining + rim) "a"
"SUMITOMO" brake caliper
Standard : 15.0 mm (0.590 in.)
Service limit : 7.0 mm (0.275 in.)
"TOKIKO" brake caliper
Standard : 15.5 mm (0.610 in.)
Service limit : 7.5 mm (0.295 in.)

NOTE:

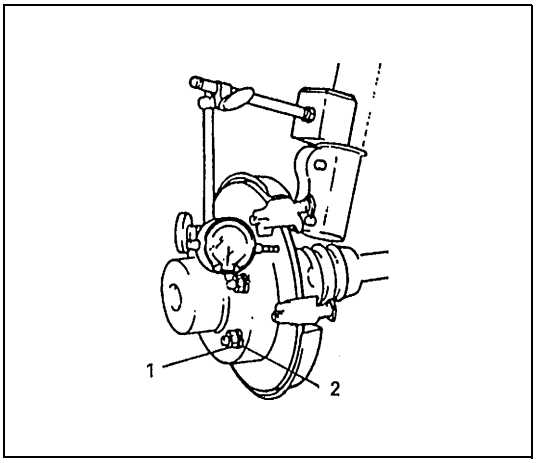
When pads are removed, visually inspect caliper for brake fluid leak. Correct leaky point, if any.

Brake disc



Before this inspection, brake pads must be removed.
Check disc surface for scratches in wearing parts. Scratches on disc surface noticed at the time of specified inspection or replacement are normal and disc is not defective unless they are serious. But when there are deep scratches or scratches all over disc surface, replace it. When only one side is scratched, polish and correct that side.

Pad thickness (lining + rim) "a"
"SUMITOMO" brake caliper
Standard : 22 mm (0.866 in.)
Service limit : 20 mm (0.787 in.)
"TOKIKO" brake caliper
Standard : 17 mm (0.670 in.)
Service limit : 15 mm (0.590 in.)



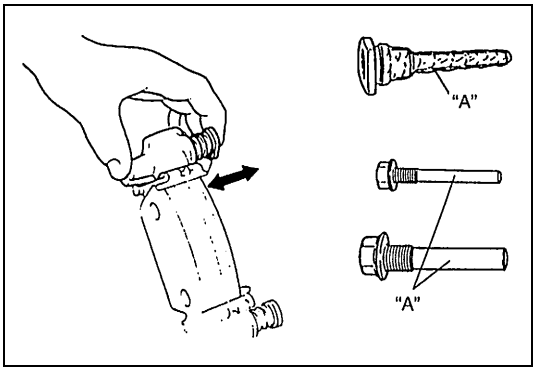
Use wheel nuts and suitable plain washers to hold the disc securely against the hub, then mount a dial indicator as shown and measure the runout at 25 mm (0.98 in.) from the outer edge of the disc.

Limit on disc deflection
0.15 mm (0.006 in.)

NOTE:
Check front wheel bearing for looseness before measurement.

1.	Wheel nut
2.	Washer (or spacer)

Cylinder slide pin (bush)/pin bolt



Check slide pin for smooth movement as shown.
If it is found faulty, correct or replace. Apply rubber grease “A” to slide pin or slide pin bolt outer surface. Rubber grease should be the on whose viscosity is less affected by such low temperature a –40°C (–40°F).

Dust boot

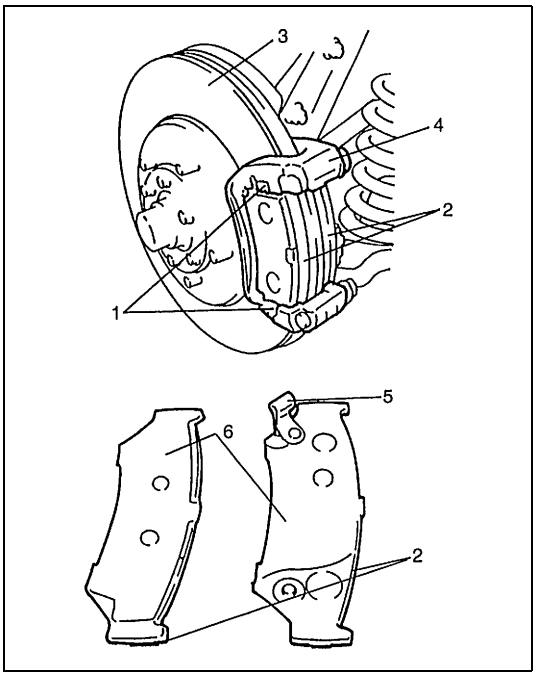
Check boot for breakage, crack and damage. If defective, replace.

INSTALLATION

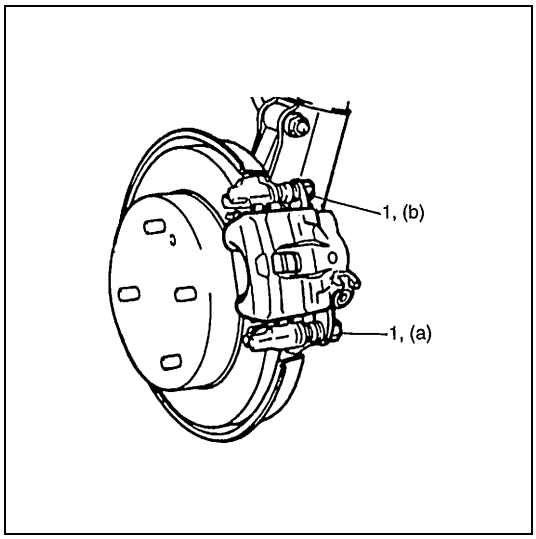
NOTE:
See NOTE at the beginning of this section.

1) Install pad clips (1) and pads (2).

NOTE:
Install pad with sensor to (5) body center side of caliper.



3.	Disc
4.	Caliper carrier
6.	Shim

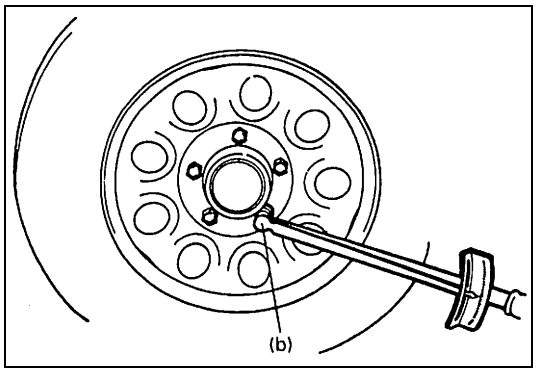


2) Install caliper and torque caliper pin bolts (1) or caliper slide pin bolts (1) to specification.

Tightening torque
"TOKIKO" brake caliper
Caliper pin bolt (a), (b) : 27 N·m (2.7 kg-m, 20.0 lb-ft)
"SUMITOMO" brake caliper
Caliper slide pin bolt (M10) (a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)
Caliper slide pin bolt (M12) (b) : 85 N·m (8.5 kg-m, 61.5 lb-ft)

NOTE:

Make sure that boots are fit into groove securely.



3) Torque front wheel nuts to specification.

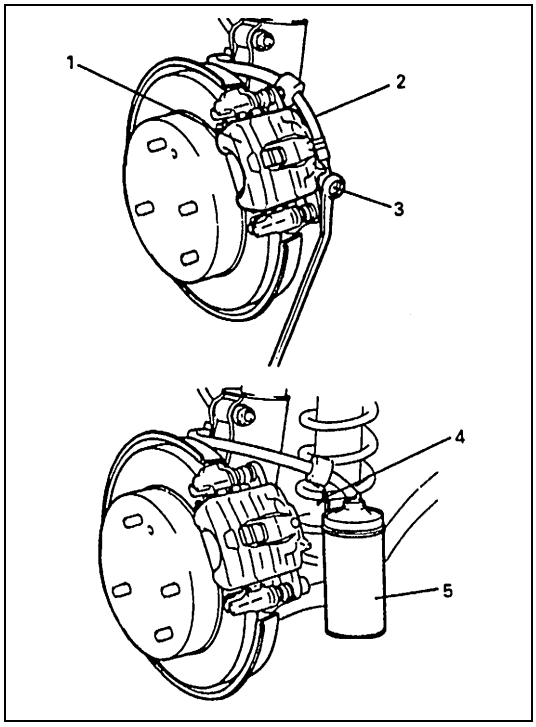
Tightening torque
Wheel nut (b) : 100 N·m (10.0 kg-m, 72.5 lb-ft)

4) Upon completion of installation, perform brake test.

Front Disc Brake Caliper

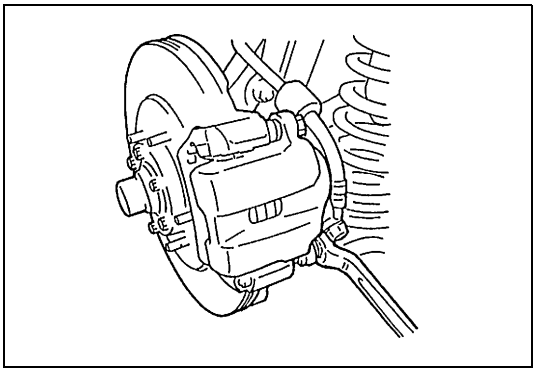
REMOVAL

1) Hoist vehicle and remove wheel.



2) Remove brake flexible hose mounting bolt (3) from caliper (1). As this will allow fluid to flow out of hose (2), have a container (5) ready beforehand.

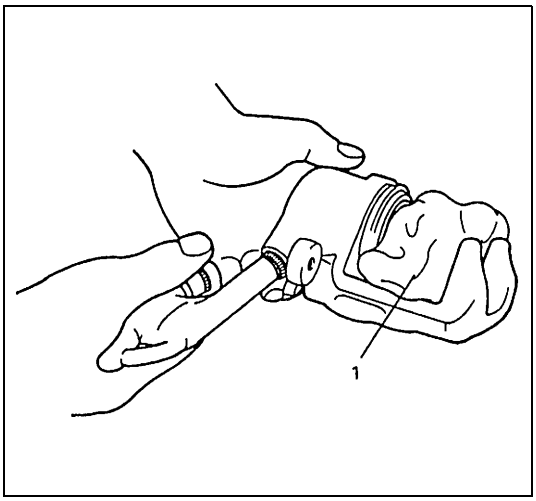
4. Wire hook



3) Remove caliper pin bolts or caliper slide pin bolts.
4) Remove caliper.

DISASSEMBLY

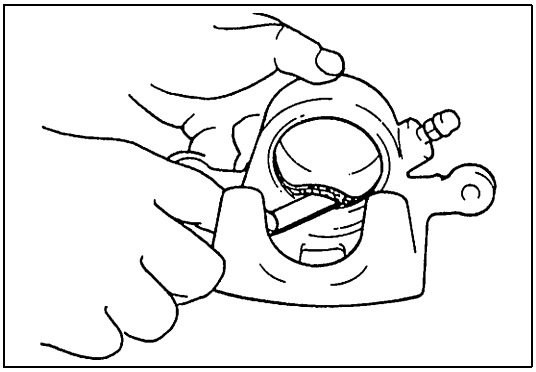
Before disassembly, clean all around caliper with brake fluid.



1) Remove anti noise shim (if equipped) and blow compressed air into cylinder through bolt hole where flexible hose was fitted.
   With this air pressure, piston can be pushed out of cylinder.

WARNING:
Do not apply too highly compressed air which will cause piston to jump out of cylinder. It should be taken out gradually with moderately compressed air. Do not place your fingers in front of piston when using compressed air.

1. Cloth

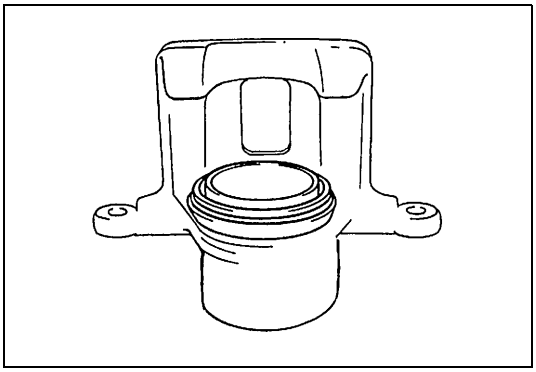


2) Remove piston seal using a thin blade like a thickness gauge, etc.

CAUTION:
Be careful not to damage inside (bore side) of cylinder.

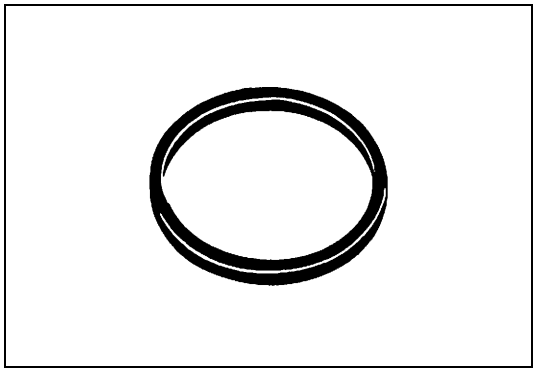
INSPECTION

Cylinder boot



Check boots for breakage, crack and damage. If defective, replace.

Piston seal



Excessive or uneven wear of pad lining may indicate unsmooth return of the piston. In such a case, replace rubber seal.

ASSEMBLY

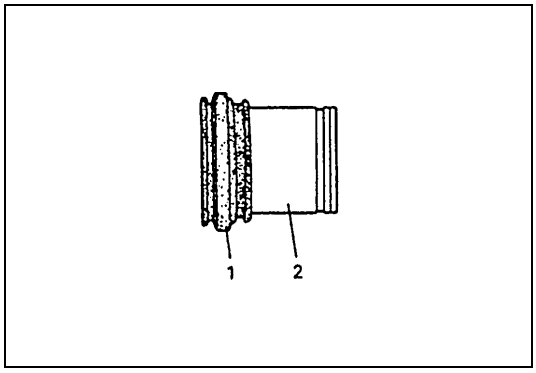
Reassemble front brake in reverse order of disassembly, noting the following points.

CAUTION:
- **Wash each part cleanly before installation in the same fluid as the one used in master cylinder reservoir.**
- **Never use other fluid or thinner.**
- **Before installing piston and piston seal to cylinder, apply fluid to them.**
- **After reassembling brake lines, bleed air from them.**

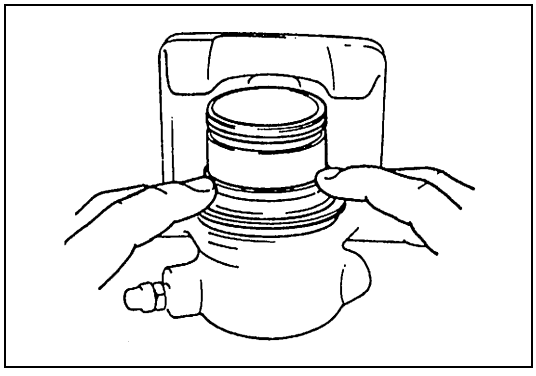
Piston seal

Piston seal is used to seal piston and cylinder and to adjust clearance between pad and disc. Replace with a new one at every overhaul. Fit piston seal into groove in cylinder taking care not to twist it.

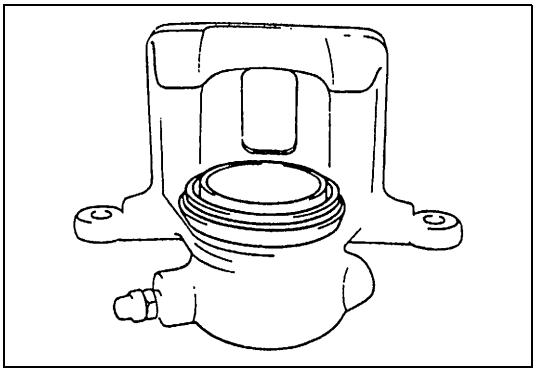
Piston and boot



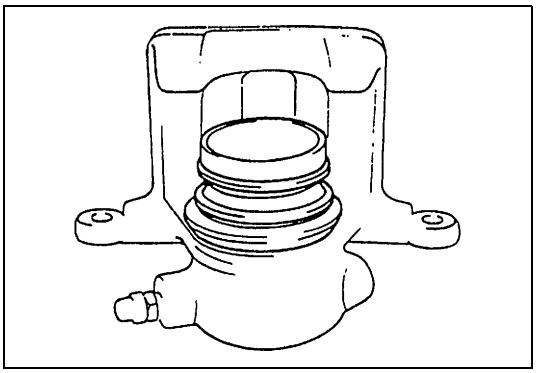
1) Before inserting piston (2) into cylinder, install boot (1) onto piston as shown.



2) Fit boot as it is in Step 1) into boot groove in cylinder with fingers.
   Check to make sure that boot is fitted into boot groove in cylinder completely in its circumference.

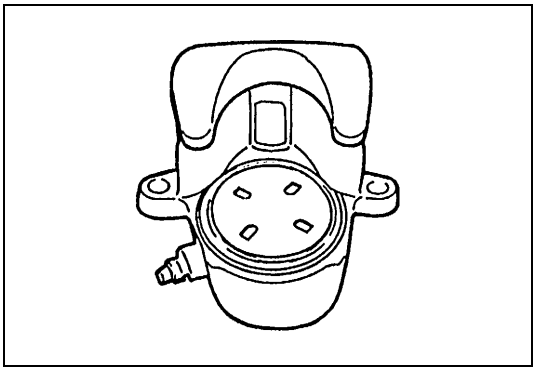


3) Insert piston into cylinder by hand and fit boot in boot groove in piston.



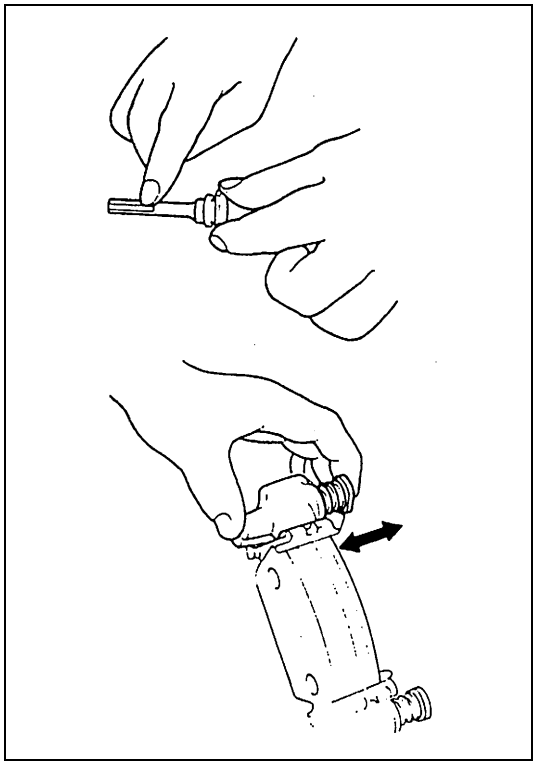
4) To confirm that boot is fitted in its groove in cylinder properly, pull piston out of cylinder a little but do not take it all out.

5) Insert piston into cylinder by hand.



6) Install anti noise shim, if equipped.

Caliper

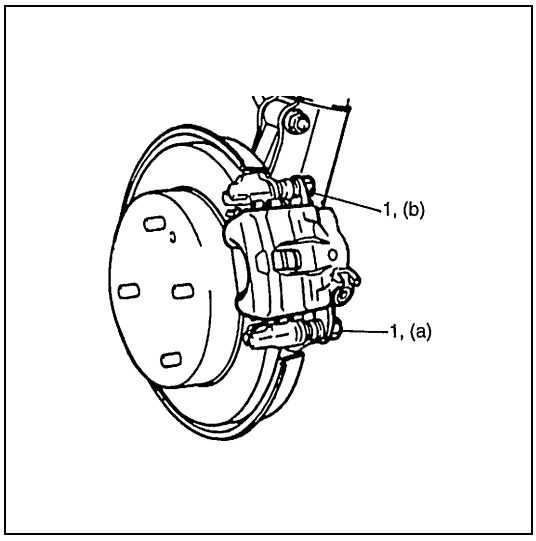


Before installing caliper (cylinder body) to carrier, check to ensure that slide pin or slide pin bolt inserted in each caliper carrier hole can be moved smoothly in thrust direction.

NOTE:

Where temperature gets as low as –30°C in cold weather, use rubber grease whose viscosity varies very little even at –40°C (–40°F).

INSTALLATION

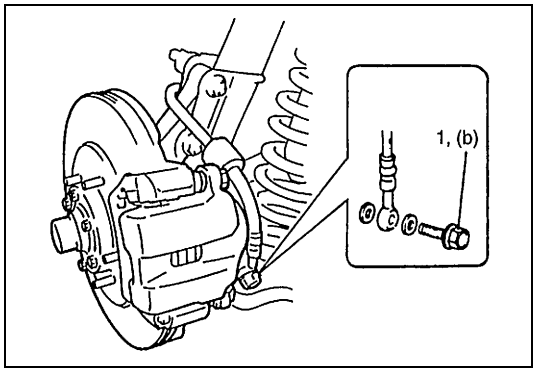


1) Install caliper to caliper carrier.
2) Torque caliper pin bolts (or caliper slide pin bolts) (1) to specifications.

Tightening torque
"TOKIKO" brake caliper
Caliper pin bolt (a), (b) : 27 N·m (2.7 kg-m, 20.0 lb-ft)
"SUMITOMO" brake caliper
Caliper slide pin bolt (M10) (a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)
Caliper slide pin bolt (M12) (b) : 85 N·m (8.5 kg-m, 61.5 lb-ft)

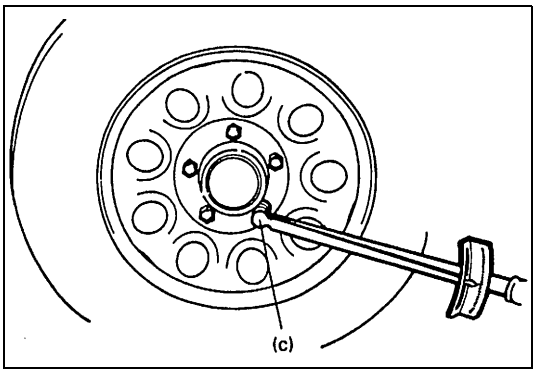
NOTE:

Make sure that boots are fit into groove securely.



3) Install brake flexible hose as shown and torque hose bolt (1) to specification.

Tightening torque
Flexible hose bolt (b) : 23 N·m (2.3 kg-m, 17.0 lb-ft)



4) Torque wheel nuts to specification.

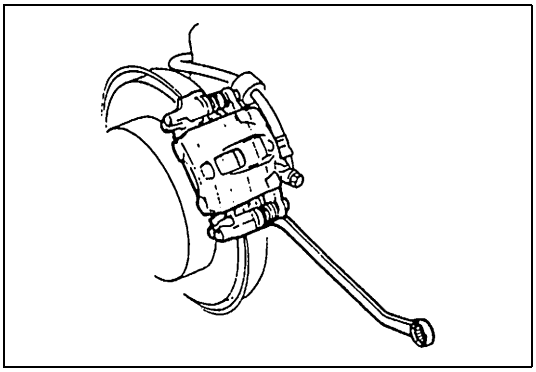
Tightening torque
Wheel nut (c) : 100 N·m (10.0 kg-m, 72.5 lb-ft)

5) After completing installation, fill reservoir with brake fluid and bleed brake system. Perform brake test and check each installed part for oil leakage.

Front Brake Disc

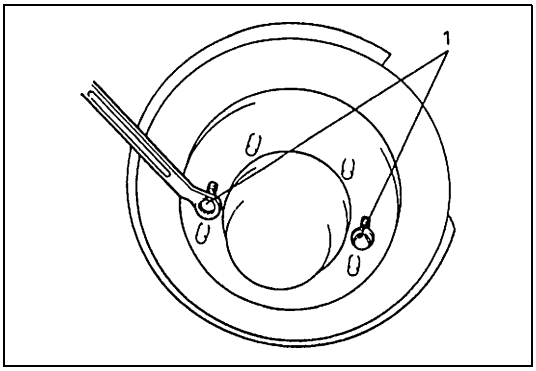
REMOVAL

1) Hoist vehicle and remove wheel.



2) Remove caliper assembly by loosening carrier bolts (2 pcs.).

CAUTION:
During removal, be careful not to damage brake flexible hose and not to depress brake pedal.



3) Remove disc by using 8 mm bolts (1) (2 pcs.).

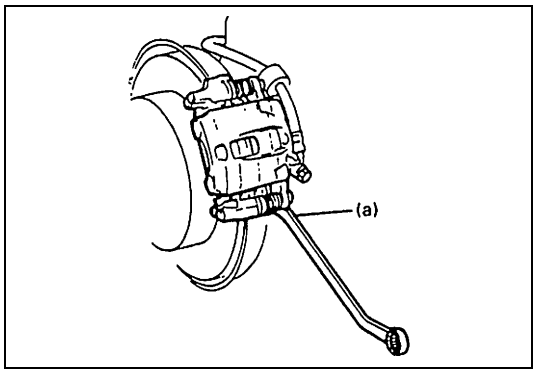
INSPECTION

Refer to “INSPECTION” under “Front Disc Brake Pad” in this section.

INSTALLATION

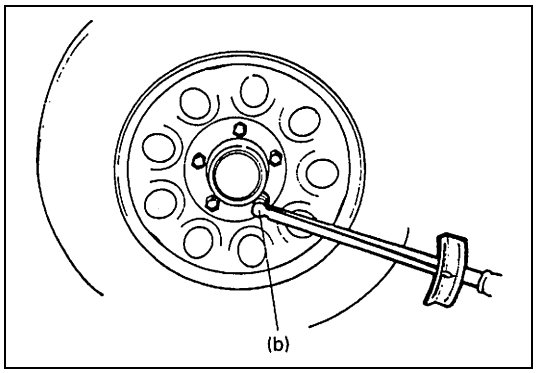
NOTE:
See NOTE at the beginning of this section.

1) Install disc to wheel hub.
2) Install caliper assembly to steering knuckle.



3) Torque caliper carrier bolts to specification.

Tightening torque
Caliper carrier bolt (a) : 85 N·m (8.5 kg-m, 61.5 lb-ft)



4) Torque front wheel nuts to specifications.

Tightening torque
Wheel nut (b) : 100 N·m (10.0 kg-m, 72.5 lb-ft)

5) Upon completion of installation, perform brake test.

Tightening Torque Specification

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Brake caliper bleeder plug (For SUMITOMO ELECTRIC brake caliper)	8.0	0.80	6.0
Brake caliper bleeder plug (For TOKICO brake caliper)	8.5	0.85	6.5
Caliper pin bolt (For TOKICO brake caliper)	27	2.7	20.0
Caliper slide pin bolt (M10) (For SUMITOMO ELECTRIC brake caliper)	50	5.0	36.5
Caliper slide pin bolt (M12) (For SUMITOMO ELECTRIC brake caliper)	85	8.5	61.5
Flexible hose bolt	23	2.3	17.0
Brake carrier bolt	85	8.5	61.5
Wheel nut	100	10.0	72.5

Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Brake fluid	Indicated on reservoir cap or described in owner's manual of vehicle	• To fill master cylinder reservoir. • To clean and apply to inner parts of master cylinder, brake caliper and wheel cylinder when they are disassembled.

SECTION 5C

PARKING AND REAR BRAKE

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

NOTE:

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

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General Description

Drum Brake Assembly

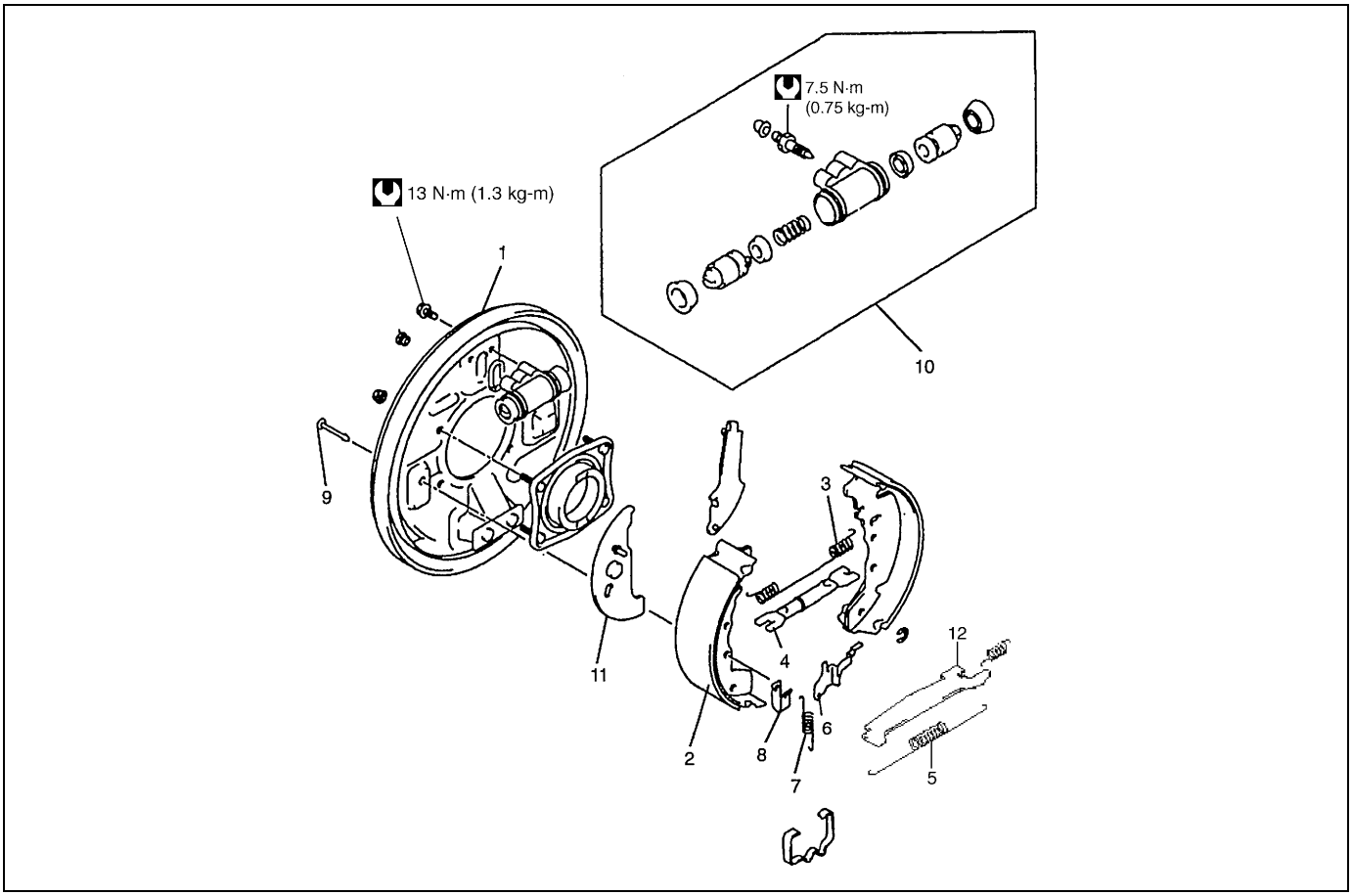
The drum brake assembly has a self shoe clearance adjusting system so that drum-to-shoe clearance is maintained appropriate at all times. Rear brake is a drum type. It uses leading trailing operation when brake pedal is depressed and when parking brake is applied on level road.
It also uses duo servo operation when parking brake is applied on gradient road and load is applied in longitudinal direction of vehicle.

NOTE:

Replace all components included in repair kits to service this drum brake. Lubricate parts as specified.

WARNING:

If any hydraulic component is removed or brake line disconnected, bleed the brake system. The torque values specified are for dry, unlubricated fasteners.



1. Brake back plate	4. Adjuster assembly	7. Adjuster spring	10. Wheel cylinder	Tightening torque
2. Brake shoe	5. Shoe return lower spring	8. Shoe hold down spring	11. Link	
3. Shoe return upper spring	6. Adjuster lever	9. Shoe hold down pin	12. Strut assembly	

Diagnosis

Refer to Section 5 (BRAKES).

Check and Adjustment

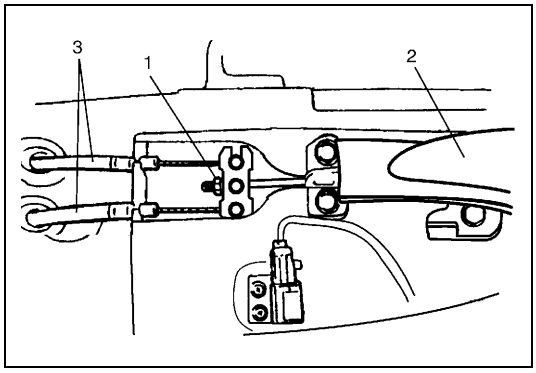
Refer to Section 5 (BRAKES).

On-Vehicle Service

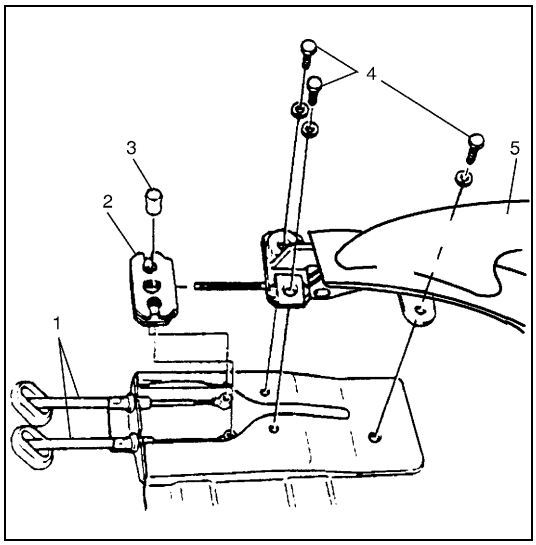
Parking Brake Lever

REMOVAL

1) Disconnect negative (–) cable at battery.
2) Block vehicle wheels and release parking brake lever.
3) Remove rear center console box.
4) Disconnect lead wire of parking brake switch at coupler.
5) Remove parking brake cable locking nut (1).



2.	Parking brake lever
3.	Brake cable

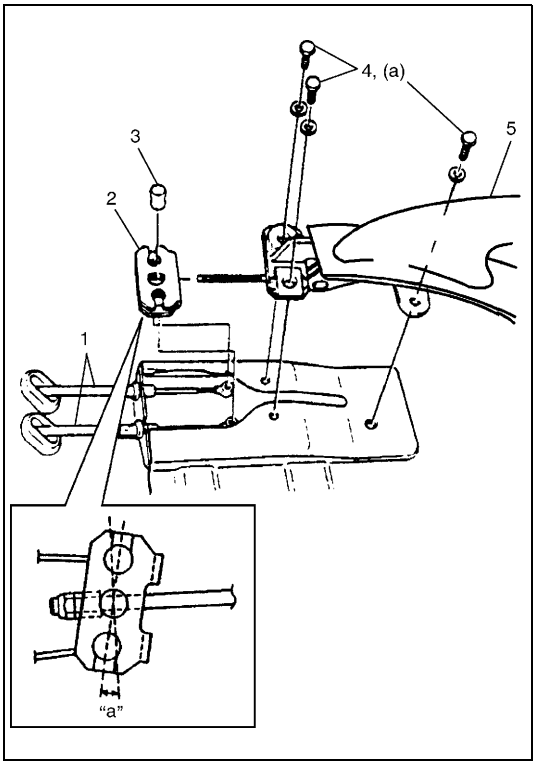


6) Remove parking brake lever bolts (4) and then remove parking brake lever assembly (5) from equalizer (2) and pin (3).
7) Remove equalizer from parking brake cable (1).

NOTE:

Don't disassemble parking brake lever switch. It must be removed and installed as a complete switch assembly.

INSTALLATION



1) Install in reverse order of REMOVAL procedure.
   Check equalizer (2) inclined angle.

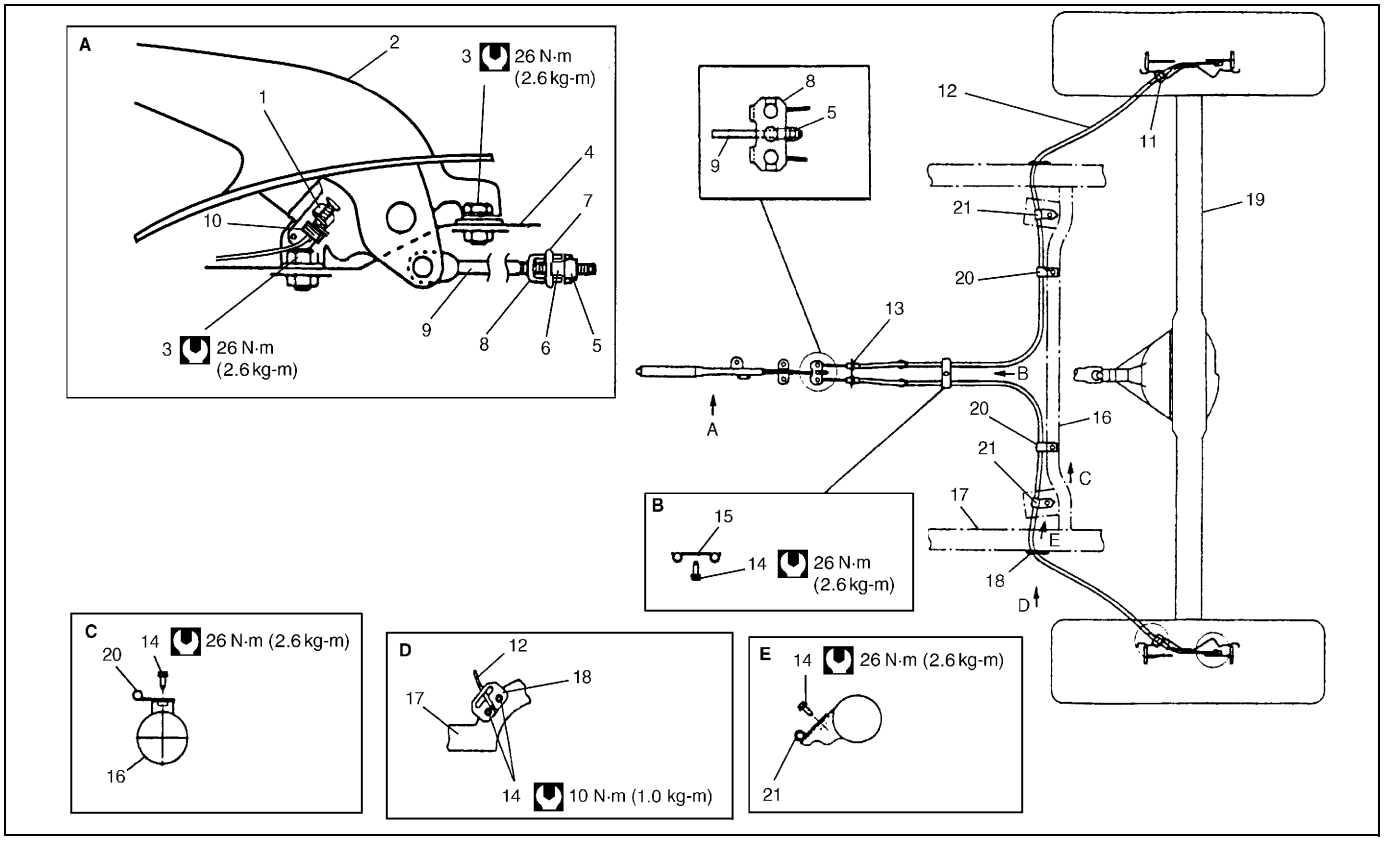
Equalizer inclined ange
"a" : within 15 degrees

Tightening torque
Parking brake lever bolt (a) : 26 N·m (2.6 kg-m, 19.0 lb-ft)

1.	Parking brake cable
3.	Pin
4.	Parking brake lever bolt
5.	Parking brake lever assembly

2) After all parts are installed, parking brake lever needs to be adjusted.
   Refer to "Parking Brake Check and Adjustmet" in Section 5.
3) Check brake drum for dragging and brake system for proper performance.

Parking Brake Cable



A. Viewed A	3. Parking brake lever bolt	10. Coupler	17. Chassis frame
B. Viewed B	4. Floor	11. Color tape (or ring)	18. Hanger
C. Viewed C	5. Locking nut	12. Brake cable	19. Rear axle
D. Viewed D	6. Spacer	13. Grommet	20. Clamp
E. Viewed E	7. Pin	14. Clamp bolt	21. Clamp (if equipped)
1. Parking brake switch	8. Equalizer	15. Clamp (if equipped)	Tightening torque
2. Parking brake lever	9. Adjust rod	16. Cross member	

REMOVAL

1) Remove brake drum. (Refer to Steps 1) to 6) of “REMOVAL” under “Brake Drum” in this section.)
2) Check the color of ring or tape for reinstallation.

NOTE:

Color ring on brake cable is for the purpose of identification.

3) Disconnect parking brake cable from brake shoe lever. (Refer to Steps 2) to 5) of “REMOVAL” under “Brake Shoe” in this section.)
4) Disconnect brake cable from brake back plate. (Refer to Step 4) of “REMOVAL” under “Brake Back Plate” in this section.)

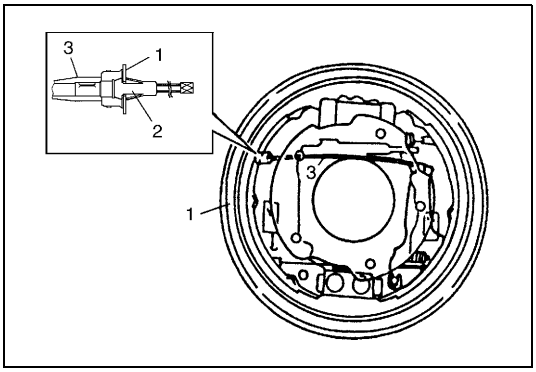
NOTE:

When it is necessary to remove both right and left parking brake cables, repeat above Steps 1) to 4) on right and left wheels.

5) Remove cable from parking brake lever. (Refer to Steps 1) and 4) to 6) of "REMOVAL" under "Parking Brake Lever" in this section.)

INSTALLATION

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

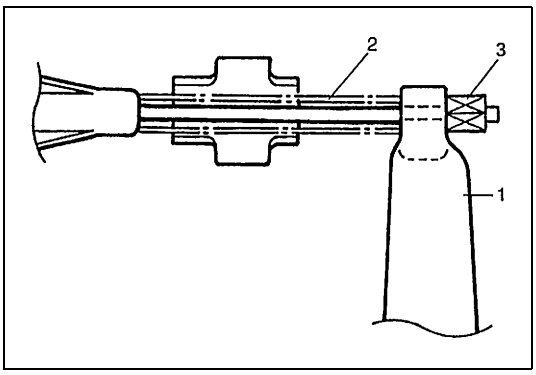


1) Install brake cable cap (2) to brake back plate (1) securely as shown in figure.

NOTE:

Color ring or tape on brake cable is for the purpose of identification. Use cable with the same colored ring as before removal.

3. Brake cable



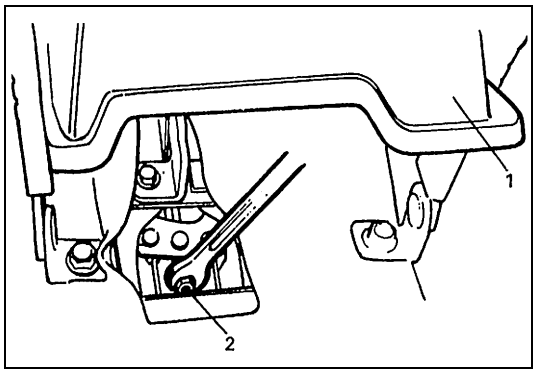
2) Install brake cable spring (2) and nipple end (3) to parking brake shoe lever (1) securely as shown in figure.

3) For brake shoe installation, refer to Steps 1) to 5) of "INSTALLATION" under "Brake Shoe" in this section.
4) For brake drum installation, refer to Steps 1) and 2) of "INSTALLATION" under "Brake Drum" in this section.
5) For proper routing and secure clamping of parking brake cable.
6) For installation of cable to parking brake lever, refer to "INSTALLATION" under "Parking Brake Lever" in this section.
7) Upon completion of installation, adjust cable. (Refer to "Parking Brake Check and Adjustment" in Section 5.) Then check brake drum for dragging and brake system for proper performance. After removing vehicle from hoist, brake test should be performed.

Brake Drum

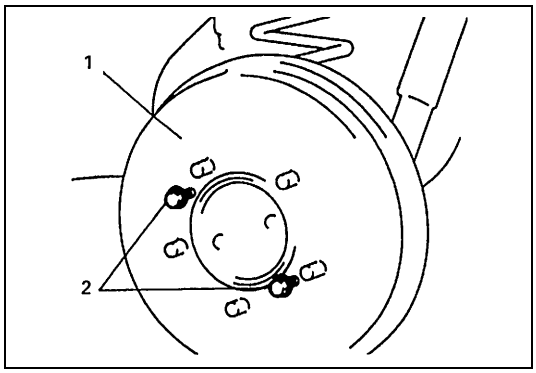
REMOVAL

1) Hoist vehicle and pull up parking brake lever.
2) Remove wheel.



3) Release parking brake lever.
4) Remove rear center console box (1) and loosen parking brake cable locking nut (2).

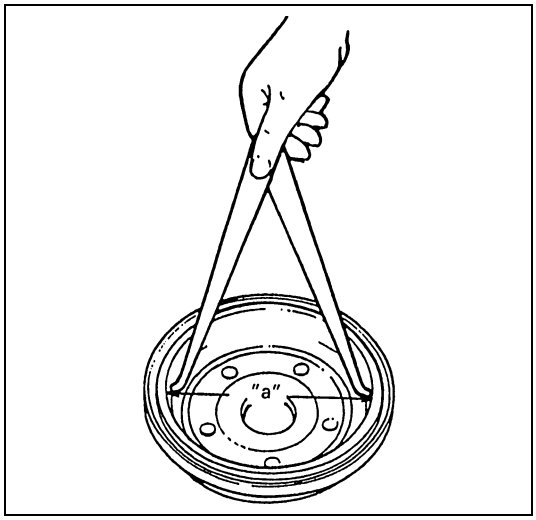
1. Parking brake lever cover



5) Remove brake drum (1) by using 8 mm bolts (2) (2 pcs.).

INSPECTION

Brake Drum



- Inspect drum for cleanliness. Check wear of its braking surface by measuring its inside diameter.

Brake drum inside diameter "a"
Standard : 220 mm (8.66 in.)
Service Limit : 222 mm (8.74 in.)

- Whenever brake drums are removed, they should be thoroughly cleaned and inspected for cracks, scores, deep grooves.

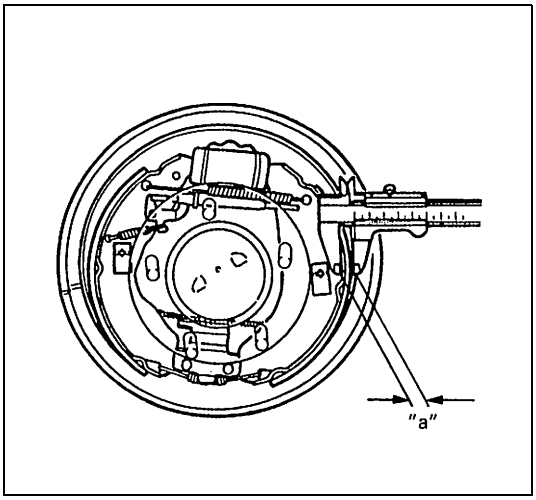
Cracked, Scored, or Grooved Drum

A cracked, drum is unsafe for further service and must be replaced.
Do not attempt to weld a cracked drum.
Smooth up any slight scores. Heavy or extensive scoring will cause excessive brake lining wear and it will probably be necessary to resurface drum braking surface.
If brake linings are slightly worn and drum is grooved, drum should be polished with fine emery cloth but should no be turned.

NOTE:

When drum is removed, visually inspect wheel cylinder for brake fluid leakage. Correct leaky point, if any.

Brake Shoe



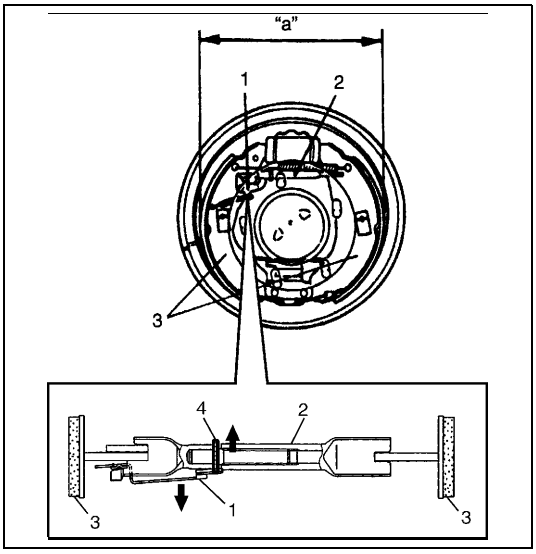
Where lining is worn out beyond service limit, replace shoe.
If one of brake linings is to service limit, all linings must be replaced at the same time.

Brake shoe thickness "a"
Standard : 6.5 mm (0.24 in.)
Service limit : 3.0 mm (0.12 in.)

CAUTION:
Never polish lining with sandpaper. If lining is polished with sandpaper, hard particles of sandpaper will be deposited in lining and may damage drum. When it is required to correct lining, replace it with a new one.

INSTALLATION

NOTE:
See NOTE at the beginning of the section.

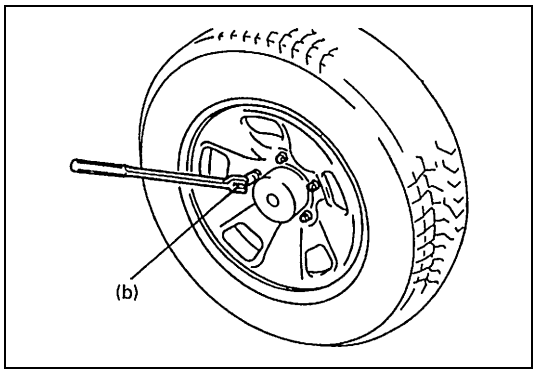


1) Before installing brake drum, check outer diameter of brake shoes (3). If it is not within value as specified below, adjust it to specification by turning adjuster (4).

Outer diameter of brake shoes
"a" : 219.4 – 219.7 mm (8.638 – 8.650 in.)

1. Stopper lever
2. Adjuster rod

2) Install brake drum after making sure that inside of brake drum and brake shoes are free from dirt and oil.
3) Upon completion of all jobs, depress brake pedal with about 30 kg (66 lbs) load three to ten times so as to obtain proper drum-to-shoe clearance.
   Adjust parking brake cable. (For adjustment, refer to "Parking Brake Check and Adjustment" in Section 5.)
4) Install rear center console box.



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

Tightening torque
Wheel nut (b) : 100 N·m (10.0 kg-m, 72.5 lb-ft)

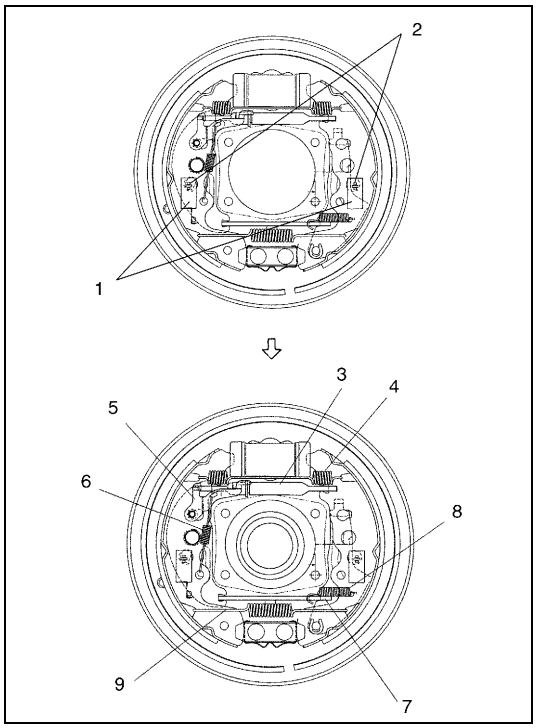
6) Check to ensure that brake drum is free from dragging and proper braking is obtained. Then remove vehicle from hoist and perform brake test (foot brake and parking brake).

Brake Shoe

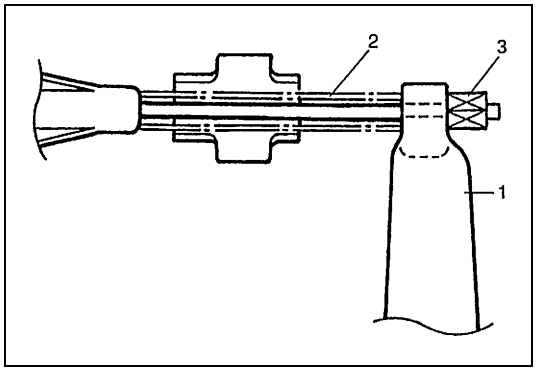
REMOVAL

1) Perform Steps 1) to 5) of "REMOVAL" under "Brake Drum" in this section.

WARNING:
Use special care when installing brake shoe return spring. Failure in its proper installation may allow it to springback and cause personal injury.

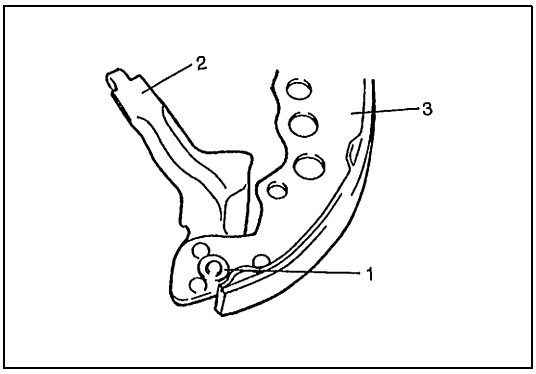


2) Remove shoe hold down springs (1) by turning shoe hold down pins (2).
3) Remove upper return spring (4), adjuster assembly (3), adjuster lever (5), adjuster lever spring (6), strut spring (8), and strut (7).
4) Remove brake shoes and lower shoe return spring (9).



5) Remove brake shoes and disconnect parking brake cable (2) from parking brake shoe lever (1).

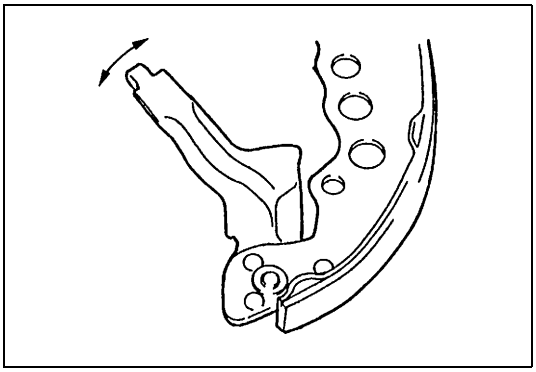
3. Brake cable nipple end



6) Remove parking brake shoe lever (2) and retainer (1) from brake shoe (3).

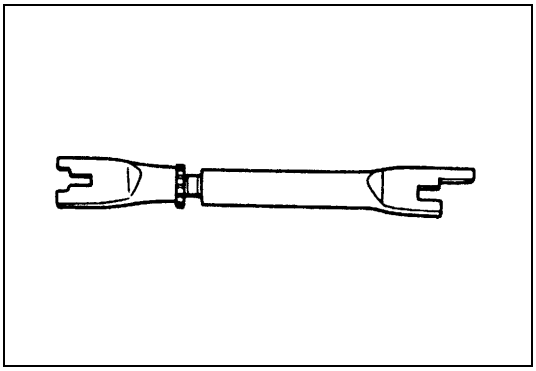
INSPECTION

Parking Shoe Lever



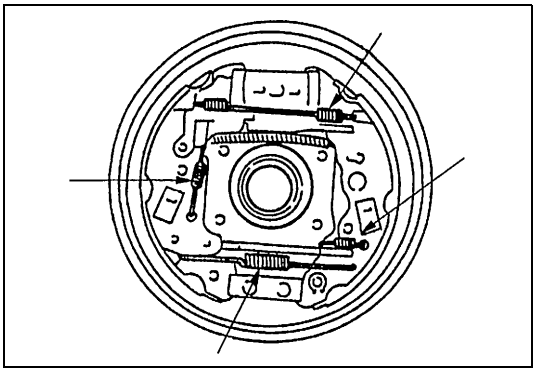
Inspect brake shoe lever for free movement against brake shoe web. If defective, correct or replace.

Adjuster Assembly



Check thread or ratchet of strut and adjuster for wear, sticking and corrosion.

Springs

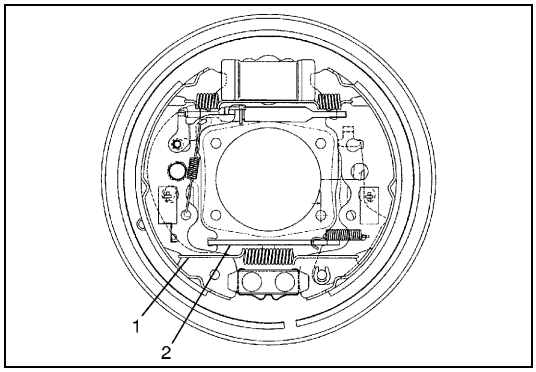


Inspect for damage or weakening.
Inspect each part with arrow for rust. If found defective, replace.

Brake Shoe

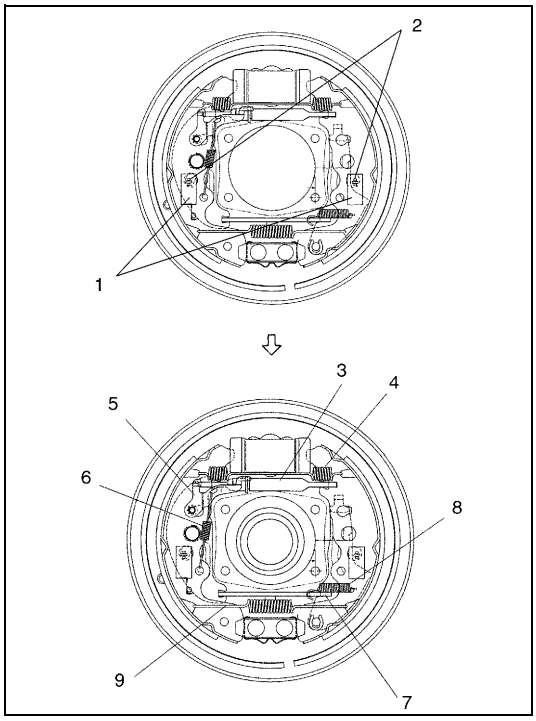
Refer to “INSPECTION” under “Brake Drum” in this section.

INSTALLATION



1) Assemble parts as shown in reverse order of removal.

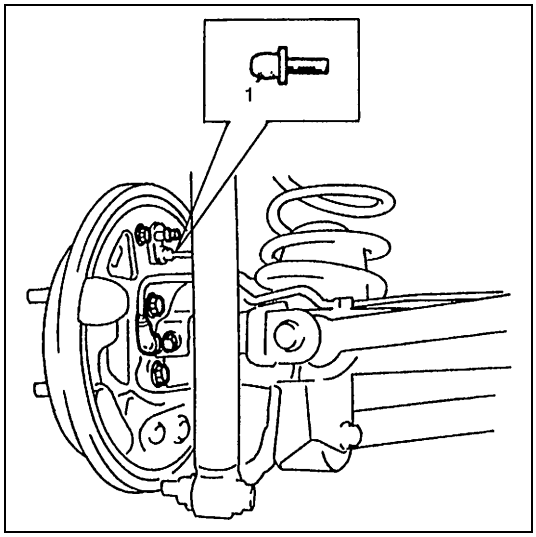
1.	Lower return spring
2.	Lower strut



2) Install shoe hold down springs (1) by pushing them down in place and turning hold down pins (2).
3) Install adjuster assebly (3) and upper shoe return spring (4).
4) Install adjuster lever (5), adjuster lever spring (6), strut assembly (7) and strut spring (8).
5) Install lower shoe return spring (9).
6) For procedure hereafter, refer to Steps 1) to 6) of “INSTALLATION” under “Brake Drum” in this section.

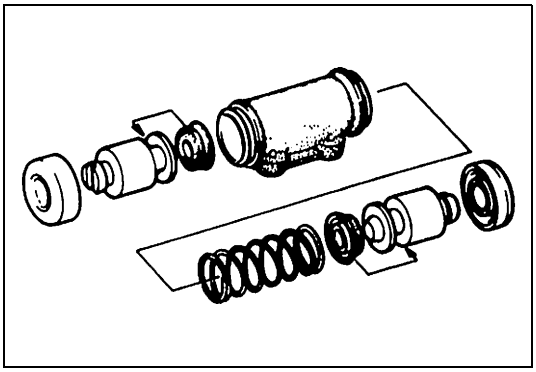
Wheel Cylinder

REMOVAL



1) Perform Steps 1) to 6) of “REMOVAL” under “Brake Drum” in this section.
2) Perform Steps 2) to 4) of “REMOVAL” under “Brake Shoe” in this sectjion.
3) Loosen brake pipe flare nut (or nuts) but only within the extent that fluid does not leak.
4) Remove wheel cylinder mounting bolts. Disconnect brake pipe (or pipes) from wheel cylinder and put wheel cylinder bleeder plug cap (1) onto pipe to prevent fluid from spilling.

INSPECTION

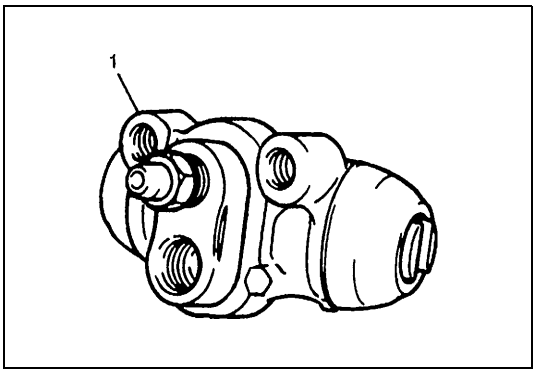


Inspect wheel cylinder disassembled parts for wear, cracks, corrosion or damage.

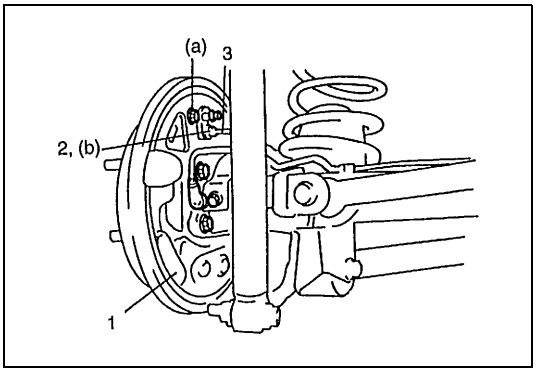
NOTE:

Clean wheel cylinder components with brake fluid.

INSTALLATION (For non sealed type)



1) Take off bleeder plug cap from brake pipe and connect pipe (or pipes) to wheel cylinder (1) just enough to prevent fluid from leaking.



2) Tighten wheel cylinder to brake back plate (1) to specified torque.

Tightening torque
Wheel cylinder bolt (a) : 13 N·m (1.3 kg-m, 9.5 lb-ft)

3) Torque flare nut (2) (or nuts) of brake pipe (3) which was connected in Step 1) to specification.

Tightening torque
Brake pipe flare nut (b) : 16 N·m (1.6 kg-m, 12.0 lb-ft)

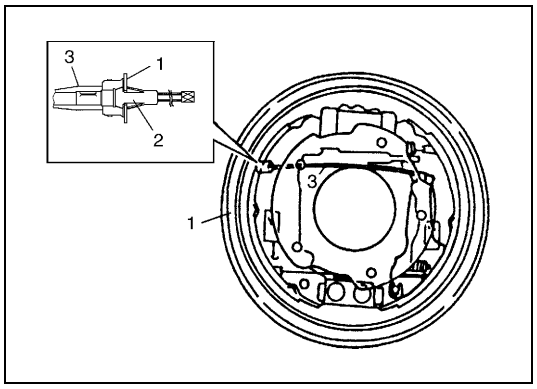
4) Install bleeder plug cap taken off from pipe back to bleeder plug.
5) For procedure hereafter, refer to Steps 1) to 6) of “INSTALLATION” under “Brake Shoe” in this section.

NOTE:

Be sure to bleed brake system. (for bleeding operation, refer to “Bleeding Brakes” in Section 5.)

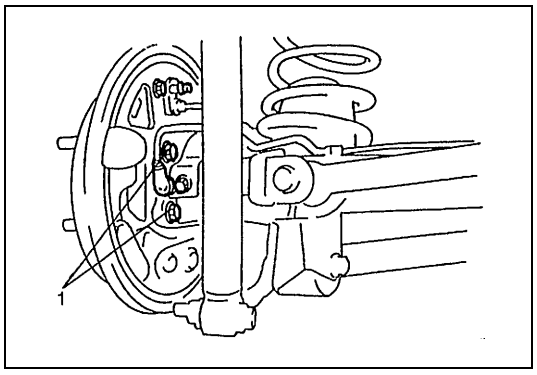
Brake Back Plate

REMOVAL

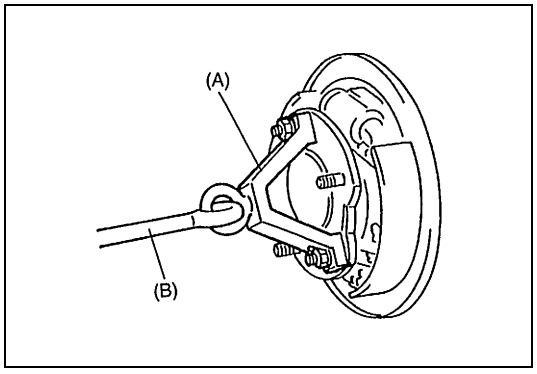


1) Perform Steps 1) to 5) of “REMOVAL” under “Brake Drum” in this section.
2) Perform Steps 2) to 5) of “REMOVAL” under “Brake Shoe” in this section.
3) Perform Steps 3) and 4) of “REMOVAL” under “Wheel Cylinder” in this section.
4) Remove cable (3) from brake back plate (1) by squeezing parking brake cable cap (2).

5) Drain rear differential gear oil.

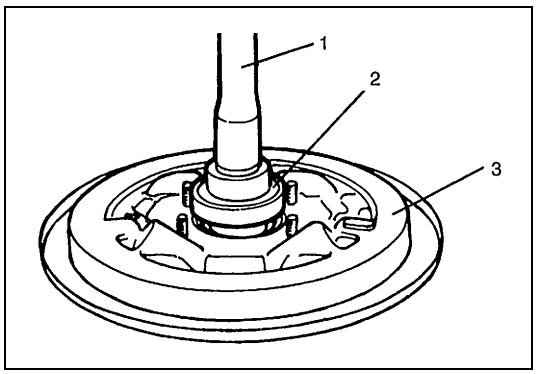


6) Remove wheel bearing retainer nuts (1) from rear axle housing.



7) Using special tools, draw out rear axle shaft with brake back plate.

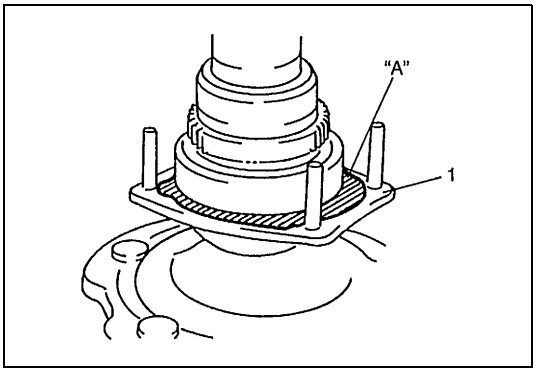
Special tool
(A) : 09943-35512
(B) : 09942-15510



8) Remove brake back plate (3) from rear axle shaft (1).

2. Wheel bearing

INSTALLATION

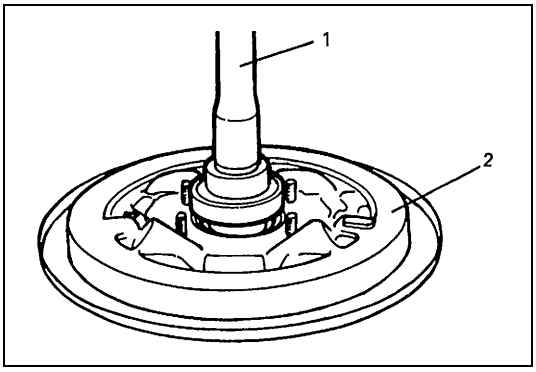


1) Apply sealant to mating surface of bearing retainer (1) with brake back plate.

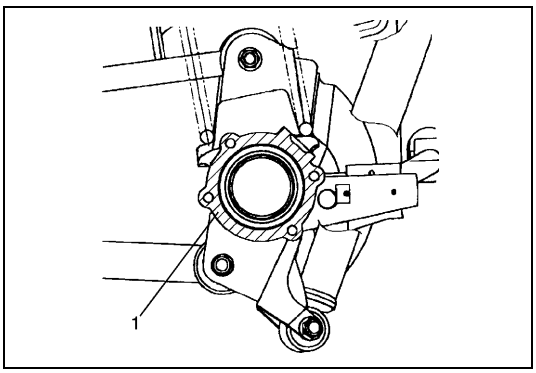
"A" : Sealant 99000-31110

NOTE:

Make sure to remove old sealant before applying it anew.



2) Install brake back plate (2) to rear axle shaft (1).



3) Apply sealant to joint seam of rear axle housing (1) and brake back plate.

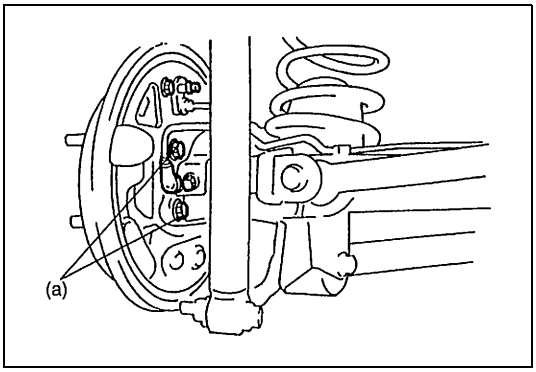
"A" : Sealant 99000-31110

NOTE:

Make sure to remove old sealant before applying it anew.

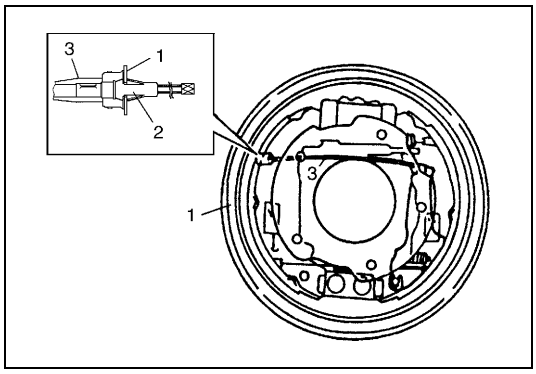
1. Rear axle housing

4) Install rear axle shaft to rear axle housing.



5) Tighten brake back plate nuts to specified torque.

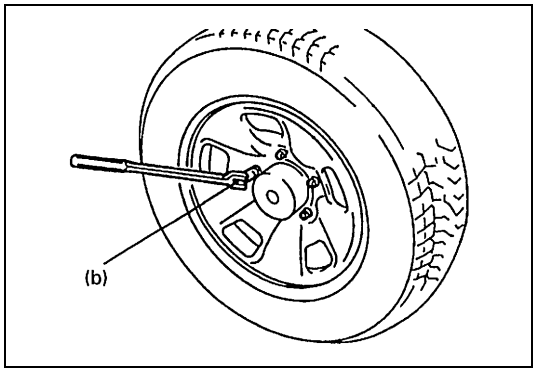
Tightening torque
Brake back plate nut (a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)



6) Install wheel cylinder, and tighten wheel cylinder bolts and brake pipe flare nut (or nuts) to specified torque. (Refer to Steps 1) to 4) of “INSTALLATION” under “Wheel Cylinder” in this section.)
7) Install parking brake cable (3) to brake back plate (1).

2. Cable cap

8) Install brake shoes, referring to Steps 1) to 5) of “INSTALLATION” under “Brake Shoe” in this section.
9) Install brake drum. Refer to Steps 1) to 2) of “INSTALLATION” under “Brake Drum” in this section.
10) Refill differential housing with new specified gear oil. Refer to “Maintenance Service” in Section 7F for refill.
11) Fill reservoir with brake fluid and bleed brake system. (For bleeding operation, refer to “Bleeding Brakes” in Section 5.)



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

Tightening torque
Wheel nut (b) : 100 N·m (10.0 kg-m, 72.5 lb-ft)

13) Upon completion of all jobs, depress brake pedal with about 30 kg (66 lbs) load three to ten times so as to obtain proper drumto-shoe clearance.
Adjust parking brake cable. (For adjustment, refer to “Parking Brake Check and Adjustment” in Section 5.)
14) Install rear center console box.
15) Check to ensure that brake drum is free from dragging and proper braking is obtained. Then remove vehicle from hoist and perform brake test (foot brake and parking brake).
16) Check each installed part for oil leakage.

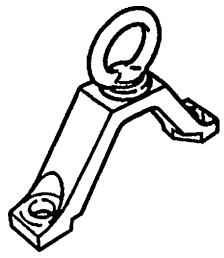
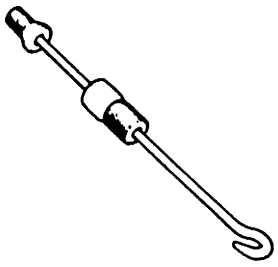
Tightening Torque Specification

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Wheel cylinder bleeder plug	7.5	0.75	5.5
Parking brake lever bolt	26	2.6	19.0
Wheel cylinder bolt (For non sealed type)	13	1.3	9.5
Brake pipe flare nut	16	1.6	12.0
Brake back plate nut	23	2.3	17.0
Wheel nut	100	10.0	72.5

Required Service Material

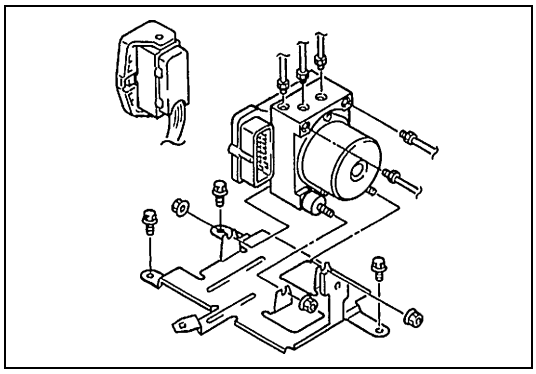
Material	Recommended SUZUKI product (Part Number)	Use
Brake fluid	Indicated on reservoir cap or described in owner's manual of vehicle	• To fill master cylinder reservoir. • To clean and apply to inner parts of master cylinder, brake caliper and wheel cylinder when they are disassembled.
Sealant	SUZUKI BOND NO. 1215 99000-31110	• To apply to mating surfaces of brake back plate and rear axle housing. • To apply mating surfaces of brake back plate and rear wheel bearing retainer.

Special Tool

	
09943-35512 Brake drum remover (Front wheel hub remover)	09942-15510 Sliding hammer

SECTION 5E1

ANTILOCK BRAKE SYSTEM (ABS) (OPTIONAL)



WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System :

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

NOTE:

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

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General Description

The ABS (Antilock Brake System) controls the fluid pressure applied to the wheel cylinder of each brake from the master cylinder so that each wheel is not locked even when hard braking is applied. This ABS is a 4-wheel type which controls the fluid pressure applied to the wheel cylinder of each of the four brakes to prevent each wheel from getting locked.

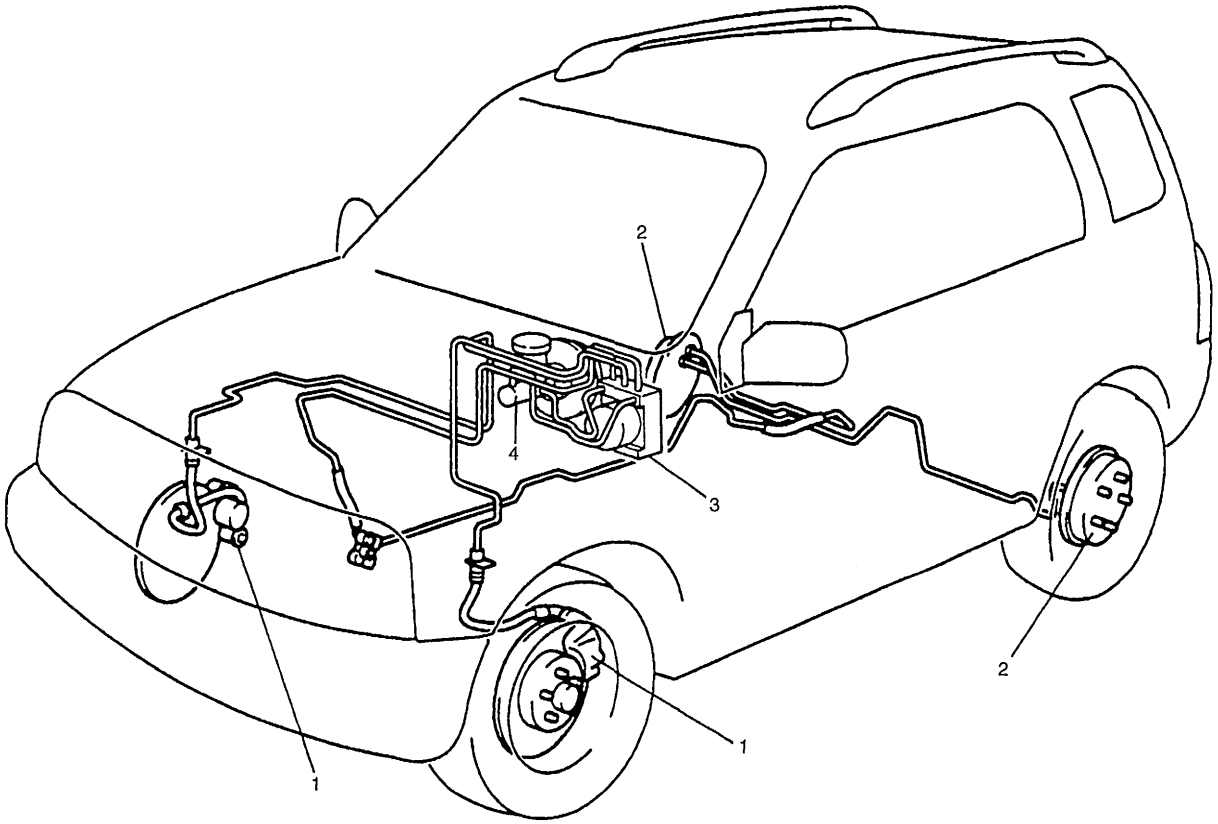
The component parts of this ABS includes following parts in addition to those of the conventional brake system.

- Wheel speed sensor which senses revolution speed of each wheel and outputs its signal.
- In this ABS, ABS hydraulic unit (actuator assembly), ABS control module, pump motor relay and fail-safe relay are combined as one component.
- ABS control module which sends operation signal to ABS hydraulic unit to control fluid pressure applied to each wheel cylinder based on signal from each wheel speed sensor so as to prevent wheel from locking.
- ABS hydraulic unit which operates according to signal from ABS control module to control fluid pressure applied to wheel cylinder of each of 4 wheels.
- Fail-safe (solenoid valve) relay which supplies power to solenoid valve in ABS hydraulic unit and pump motor relay.
- Pump motor relay which supplies power to pump motor in ABS hydraulic unit.
- “ABS” warning lamp which lights to inform abnormality when system fails to operate properly.
- G sensor which detects body deceleration speed.

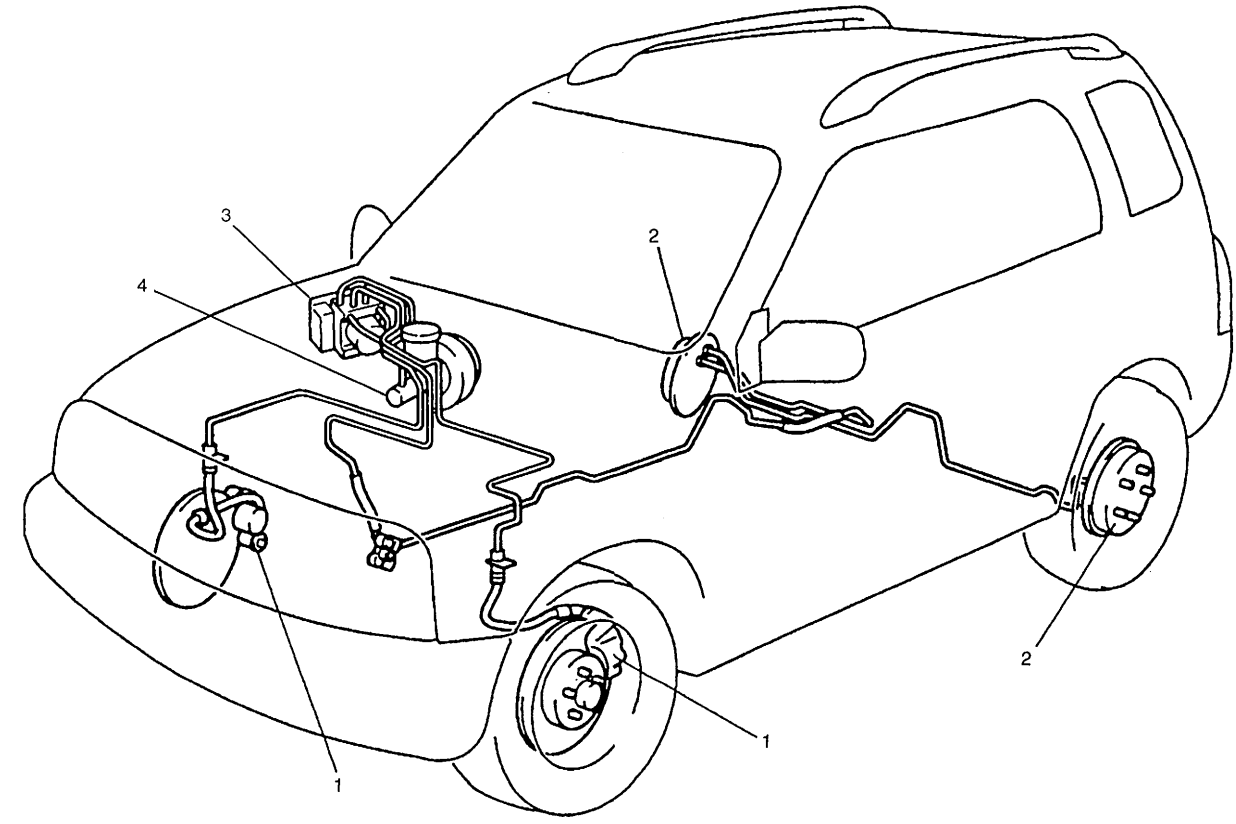
This ABS is equipped with Electronic Brake force Distribution (EBD) system that controls a fluid pressure of rear wheels to best condition, which is the same function as that of proportioning valve, by the signal from wheel sensor independently of change of load due to load capacity and so on. And if the EBD system fails to operate properly, the brake warning lamp lights to inform abnormality.

Brake Hose/Pipe Routing

[A]

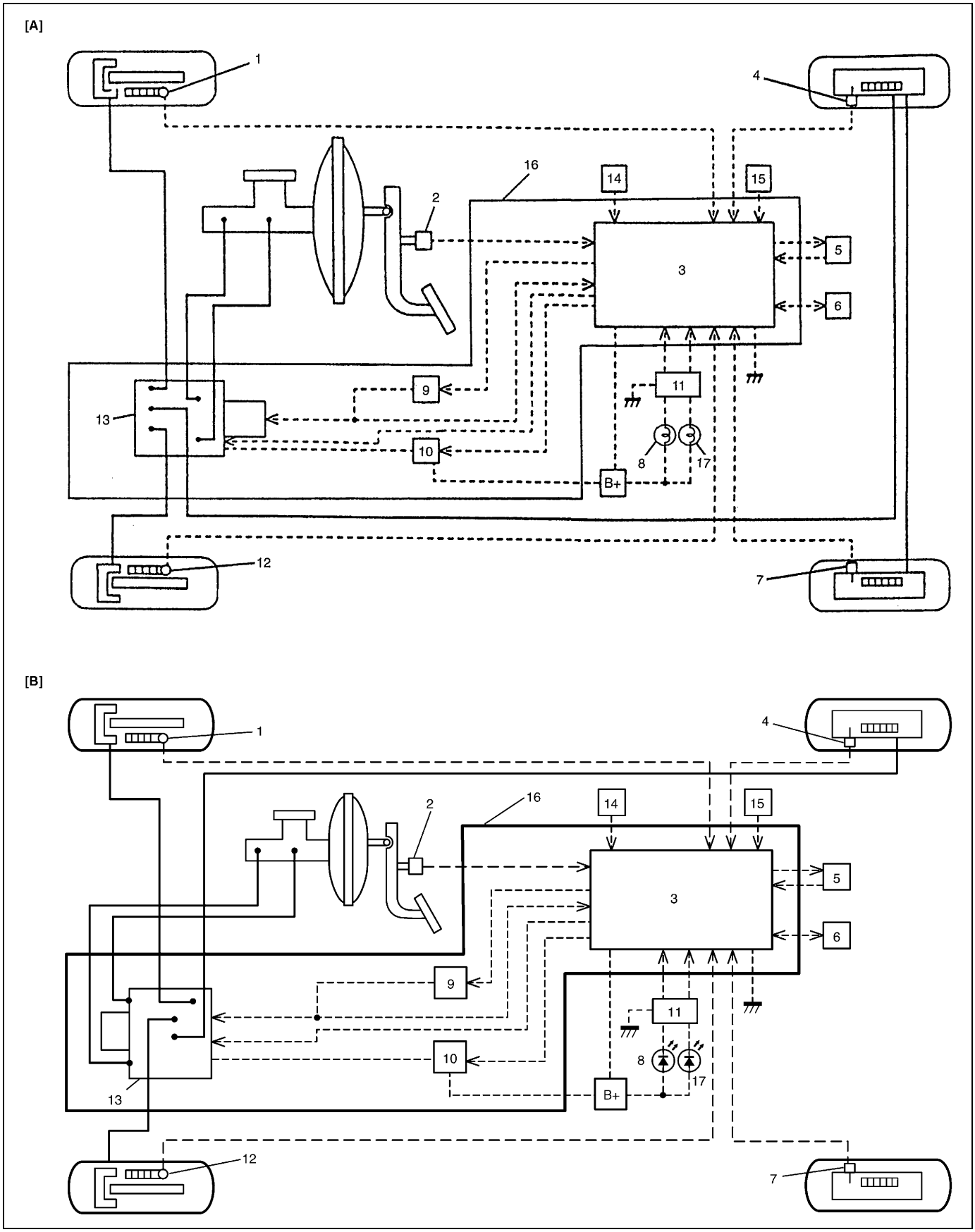


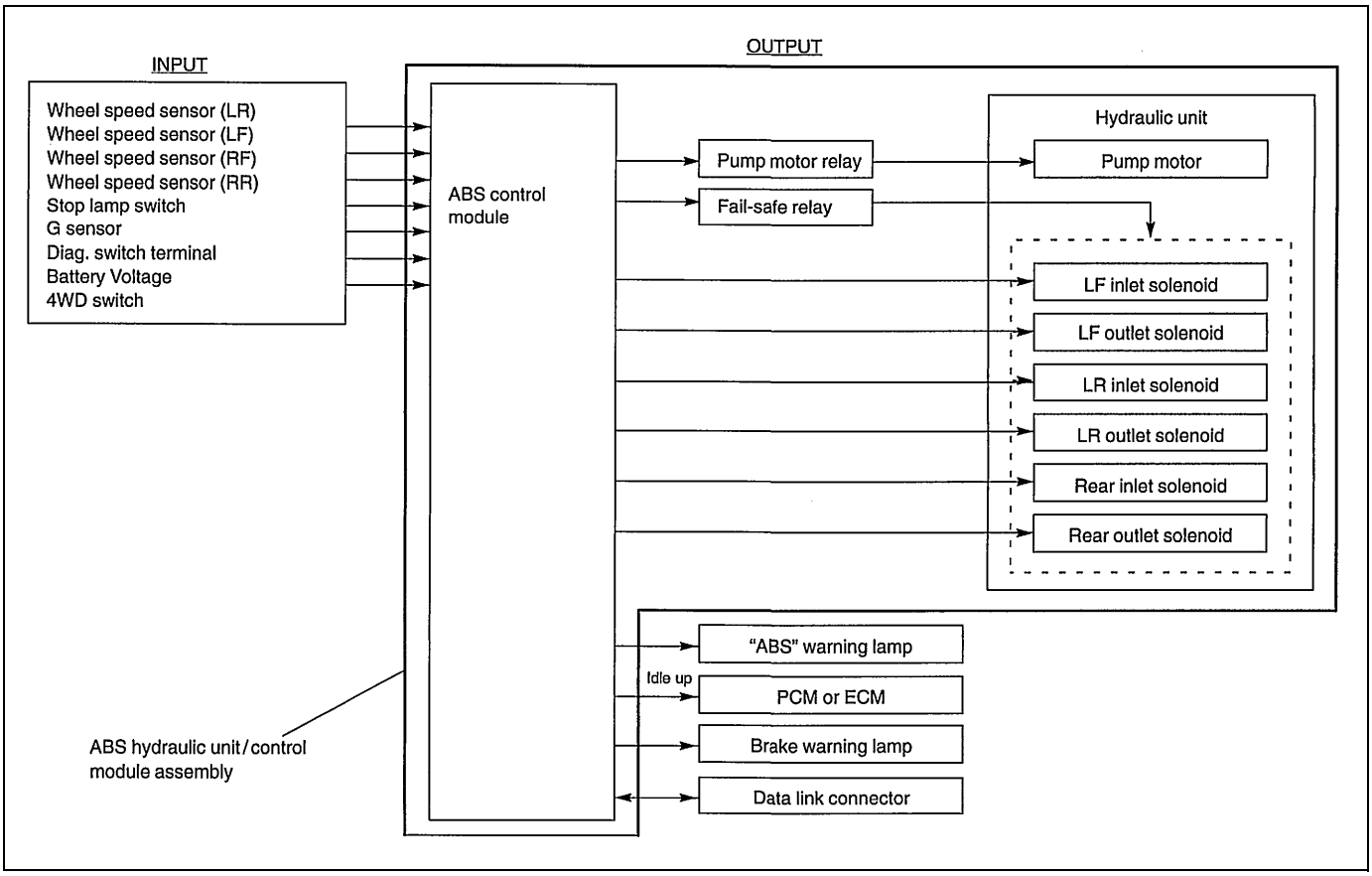
[B]



[A] : LH steering vehicle	1. Front disc brake	3. ABS hydraulic unit/control module assembly (with ABS pump motor relay and fail-safe relay)
[B] : RH steering vehicle	2. Rear drum brake	4. Brake master cylinder/Reservoir

System Schematic

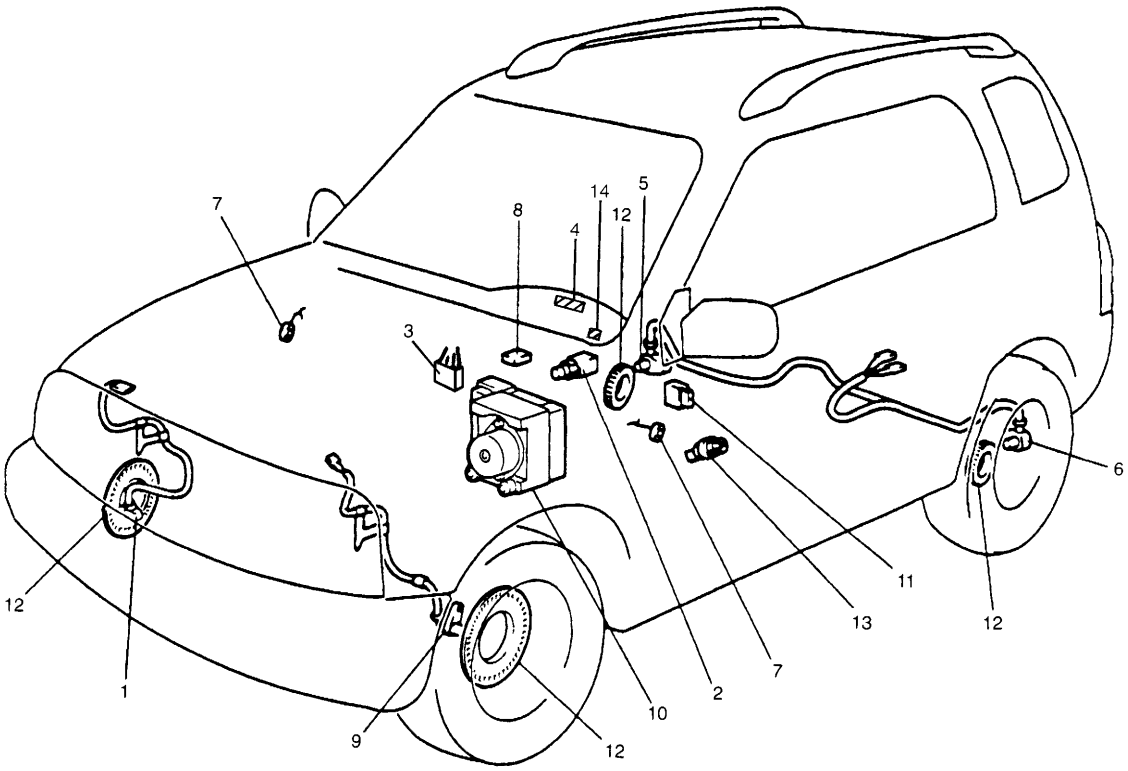




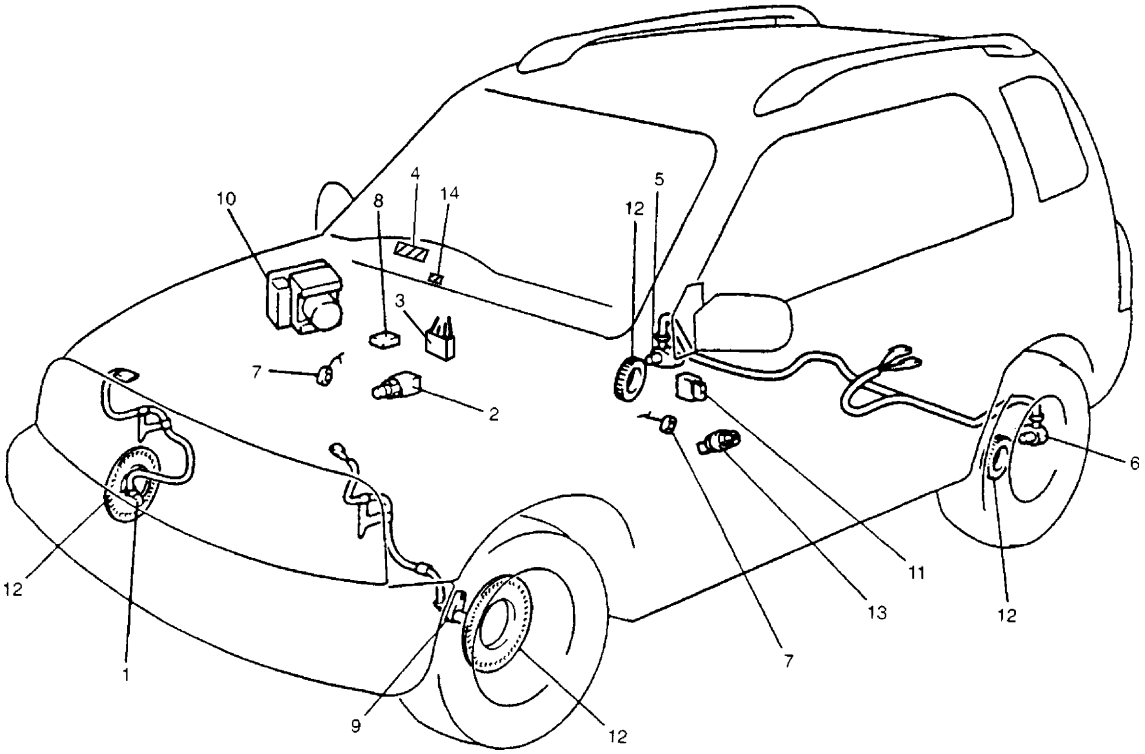
[A] : Canvas top model	6. Data link connector	13. ABS hydraulic unit
[B] : Other than canvas top model	7. Wheel speed sensor (Left-rear)	14. G sensor
1. Wheel speed sensor (Right-front)	8. "ABS" warning lamp	15. 4WD switch
2. Stop lamp switch	9. ABS pump motor relay	16. ABS hydraulic unit/control module assembly (with ABS pump motor & fail-safe relays)
3. ABS control module	10. ABS fail-safe relay (Solenoid valve relay)	17. "EBD" warning lamp (Brake warning lamp)
4. Wheel speed sensor (Right-rear)	11. Lamp drive module	
5. Diagnosis connector	12. Wheel speed sensor (Left-front)	

ABS Component Parts Location

[A]



[B]



[A] : LH steering vehicle	5. Wheel speed sensor (Right-rear)	11. G sensor
[B] : RH steering vehicle	6. Wheel speed sensor (Left-rear)	12. Wheel speed sensor rotor (ring)
1. Wheel speed sensor (Right-front)	7. Ground	13. 4WD switch
2. Stop lamp switch	8. Diagnosis connector (Black connector for canvas top model, Blue connector except for canvas top model)	14. EBD warning lamp (Brake warning lamp)
3. Data link connector	9. Wheel speed sensor (Left-front)	
4. “ABS” warning lamp	10. ABS hydraulic unit/control module assembly (with ABS pump motor relay and fail-safe relay)	

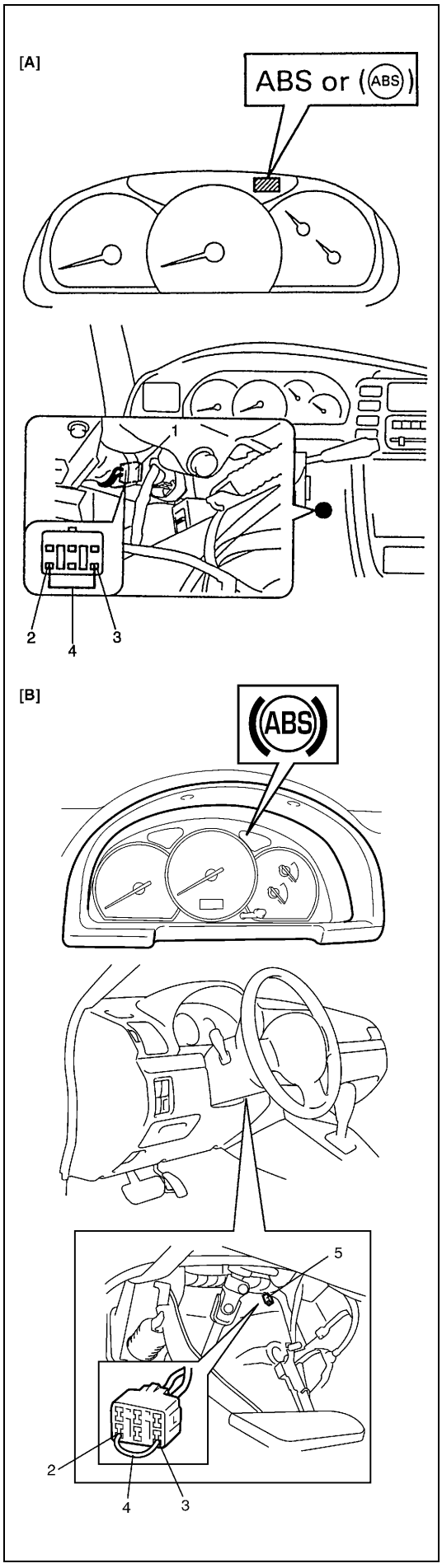
ABS Hydraulic Unit/Control Module Assembly

ABS control module is a component of ABS hydraulic unit/control module assembly and has the following functions.

Self-Diagnosis Function

ABS control module diagnoses conditions of the system component parts (whether or not there is any abnormality) all the time and indicates the results (warning of abnormality occurrence and DTC) through the “ABS” warning lamp as described below.

1) When ignition switch is turned ON, “ABS” warning lamp lights for 2 seconds to check warning lamp circuit.
2) When no abnormality has been detected (the system is in good condition), “ABS” warning lamp turns OFF after 2 seconds.
3) When the vehicle starts to move after the ignition switch is turned ON (more than one wheel speed sensor signals are inputted), solenoid valves and motor of ABS hydraulic unit operate once one after another for electrical check.
   During this check, motor operation sound may be heard but that means nothing abnormal.
4) When an abnormality in the system is detected, “ABS” warning lamp lights and the area where that abnormality lies is stored in the memory of EEPROM in ABS control module.



5) When Diag. switch "PNK" wire terminal (3) of black diagnosis connector (1) or blue diagnosis connector (5) (monitor connector) is grounded (that is, it is connected to "BLK" wire terminal (2) using service wire (4)), the abnormal area is output as DTC. It is indicated by flashing of "ABS" warning lamp. (Refer to the table below.)

SYSTEM CONDITION		ABS WARNING LAMP	
		Diag. switch terminal is not grounded	Diag. switch terminal is grounded
In good condition at present	No trouble in the past	OFF	DTC 12
	Trouble occurred in the past	OFF	History DTC
Abnormality exists at present	No trouble in the past	ON	Current DTC
	Trouble occurred in the past	ON	Current and history DTCs

For procedure to clear all DTC's, refer to "Diagnostic Trouble Code Clearance" in this section.

Also ABS control module turns ON EBD warning lamp (brake warning lamp) depending on the trouble that detected by the module and EBD warning lamp does not indicate DTC as well as "ABS" warning lamp.

[A] : Canvas top model
[B] : Other than canvas top model

Fail-Safe Function

When an abnormality occurs (an abnormal DTC is detected), ABS control module turns OFF the fail-safe relay which supplies power to ABS hydraulic unit. Thus, with ABS not operating, brakes function just like the brake system of the vehicle not equipped with ABS.

Diagnosis

To ensure that the trouble diagnosis is done accurately and smoothly, observe “Precautions in Diagnosing Troubles” and follow “ABS Diagnostic Flow Table”.

Precaution in Diagnosing Troubles

- If the vehicle was operated in any of the following ways, “ABS” warning light may light momentarily but this does not indicate anything abnormal in ABS.
  - The vehicle was driven with parking brake pulled.
  - The vehicle was driven with brake dragging.
  - The vehicle was stuck in mud, sand, etc.
  - Wheel spin occurred while driving.
  - Wheel(s) was rotated while the vehicle was jacked up.
- Be sure to read “Precautions for Electronic Circuit Service” in “General Information” section before inspection and observe what is written there.
- Be sure to use the trouble diagnosis procedure as described in the flow table. Failure to follow the flow table may result in incorrect diagnosis. (Some other diag. trouble code may be stored by mistake in the memory of ABS control module during inspection.)

ABS Diagnostic Flow Table

Refer to the following items for the details of each step.

Step	Action	Yes	No
1	Perform customer complaint analysis, problem symptom confirmation and diagnostic trouble code check record and clearance. Is there any trouble code?	Go to Step 2.	Go to Step 5.
2	Perform driving test. Is trouble symptom identified?	Go to Step 3.	Go to Step 6.
3	Check diagnostic trouble code. Is it malfunction code?	Go to Step 4.	Go to Step 5.
4	Inspect and repair referring to applicable diagnostic trouble code table in this section. Then perform final confirmation test after clearing diagnostic trouble code. Is trouble recur?	Go to Step 7.	END.
5	Inspect brake system referring to “Diagnosis Table” in “Brakes” section. Then perform final confirmation test after clearing diagnostic trouble code. Is trouble recur?	Go to Step 7.	System is in good condition.
6	Check for intermittent problems referring to “Intermittent and Poor Connection” in “General Information” section and related circuit of trouble code recorded in Step 1-3. Then perform final confirmation test after clearing diagnostic trouble code. Is trouble recur?	Go to Step 7.	System is in good condition.
7	Perform diagnostic trouble code check record and clearance. Is there any trouble code?	Go to Step 2.	Go to Step 5.

Step 1-1. CUSTOMER COMPLAINT ANALYSIS

Record details of the problem (failure, complaint) and how it occurred as described by the customer.
For this purpose, use of such a questionnaire form as shown below will facilitate collecting information to the point required for proper analysis and diagnosis.

CUSTOMER QUESTIONNAIRE (EXAMPLE)

Customer's name:	Model:	VIN:	
Date of issue:	Date Reg.	Date of problem:	Mileage:

Problem Symptoms	● "ABS" warning light abnormal: fails to turn on/fails to go off/ flashes ● Abnormal noise while vehicle is running: from motor, from valve, other_____ ● Wheel is locked at braking: ● Pump motor does not stop (running): ● Braking does not work: ● Other:
Frequency of occurrence	● Continuous/Intermittent (times a day, a month)/ other_____
Conditions for Occurrence of Problem	● Vehicle at stop & ignition switch ON: ● When starting: at initial start only/at every start/Other_____ ● Vehicle speed: while accelerating/while decelerating/at stop/ while turning/while running at constant speed/ other_____ ● Road surface condition: Paved road/rough road/snow-covered road/other_____ ● Chain equipment:
Environmental Condition	● Weather: fair/cloudy/rain/snow/other_____ ● Temperature: °F (°C)
Diagnostic Trouble Code	● First check: Normal code/malfunction code ( ) ● Second check after test drive: Normal code/malfunction code ( )

Step 1-2. PROBLEM SYMPTOM CONFIRMATION

Check if what the customer claimed in "Customer Questionnaire" is actually found in the vehicle and if that symptom is found, whether it is identified as a failure. (This step should be shared with the customer if possible.)
When "ABS" warning lamp is not operated correctly, proceed to "Diagnostic Flow Table-A, B or C".

Step 1-3. DIAGNOSTIC TROUBLE CODE (DTC) CHECK, RECORD AND CLEARANCE

Perform "Diagnostic Trouble Code Check" as shown below, record it and then clear it referring to "Diagnostic Trouble Code Clearance" in this section.
If the malfunction DTC which was once displayed and then cleared cannot be detected (indicated) again when the ignition switch is turned ON, attempt to diagnose the trouble based on the DTC recorded in this step may mislead the diagnosis or make diagnosing difficult. Proceed to Step 2 to check ABS control module for proper self-diagnosis function.
If the malfunction DTC which was once displayed and then cleared can be detected (indicated) again when ignition switch is turned ON, proceed to Step 3.

Step 2. DRIVING TEST

WARNING:
When performing a driving test, select a safe place where there is neither any traffic nor any traffic accident possibility and be very careful during testing to avoid occurrence of an accident.

Test drive the vehicle at 40 km/h for more than a minute and check if any trouble symptom (such as abnormal lighting of "ABS" warning lamp) exists.
If the malfunction DTC is confirmed again at ignition switch ON, driving test as described in above is not necessary. Proceed to Step 3.

Step 3. DIAGNOSTIC TROUBLE CODE CHECK

Recheck diagnostic trouble code referring to item "DTC Check" in this section.

Step 4. DIAGNOSTIC TROUBLE CODE FLOW CHART

According to Diagnostic flow table for the diagnostic trouble code confirmed in Step 3, locate the cause of the trouble, namely in a sensor, switch, wire harness, connector, actuator, ABS control module or other part and repair or replace faulty parts.

Step 5. "DIAGNOSIS TABLE" IN SECTION 5

Check the parts or system suspected as a possible cause referring to "Diagnosis Table" in "Brakes" section and based on symptoms appearing on the vehicle (symptoms obtained through Steps 1-1, 1-2 and 2 and repair or replace faulty parts, if any.

Step 6. CHECK FOR INTERMITTENT PROBLEM

Check parts where an intermittent trouble is easy to occur (e.g., wire harness, connector, etc.), referring to "Intermittent and Poor Connection" in "General Information" section and related circuit of trouble code recorded in Step 1-3.

Step 7. FINAL CONFIRMATION TEST

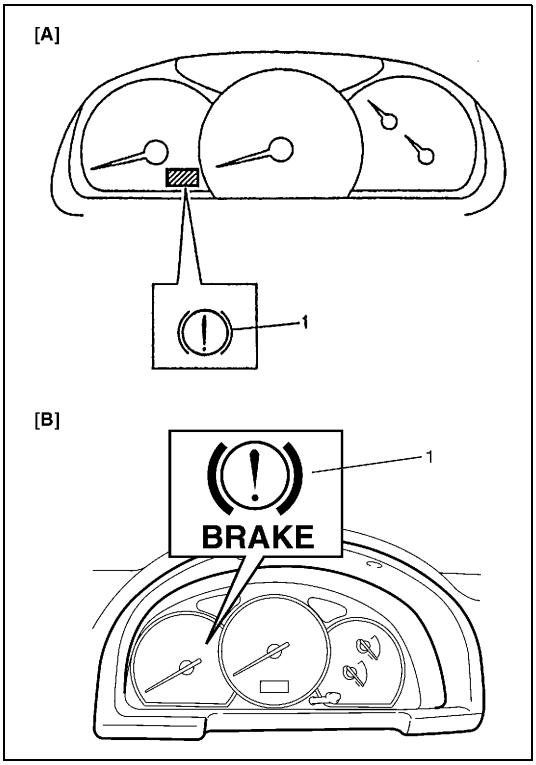
Confirm that the problem symptom has gone and the ABS is free from any abnormal conditions. If what has been repaired is related to the malfunction DTC, clear the DTC once and perform test driving and confirm that a normal code is indicated.

EBD Warning Lamp (Brake Warning Lamp) Check

NOTE:

Perform this check on a level place.

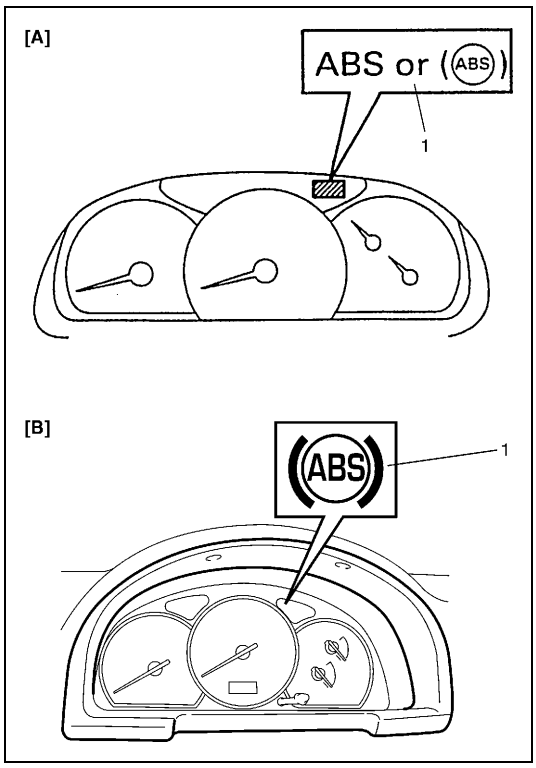
1) Turn ignition switch ON with parking brake applied.
2) Check that EBD warning lamp (brake warning lamp) (1) is turned ON.



[A] :	Canvas top model
[B] :	Other than canvas top model

3) Release parking brake with ignition switch ON and check that EBD warning lamp (brake warning lamp) goes off.
   If it doesn't go off, go to "Table-E" in this section.

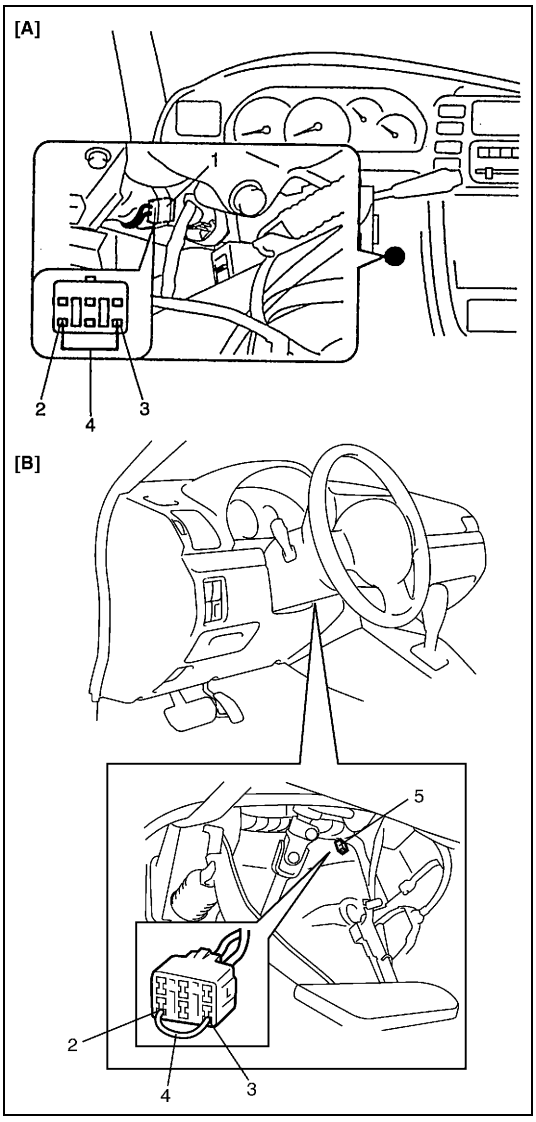
“ABS” Warning Lamp Check



1) Turn ON the ignition switch.
2) Check that “ABS” warning lamp (1) lights for about 2 seconds and then goes OFF.
   If anything faulty is found, advance to “Diagnostic Table – A, B or C” in this section.

[A] :	Canvas top model
[B] :	Other than canvas top model

Diagnostic Trouble Code (DTC) Check (Using "ABS" Warning Lamp)

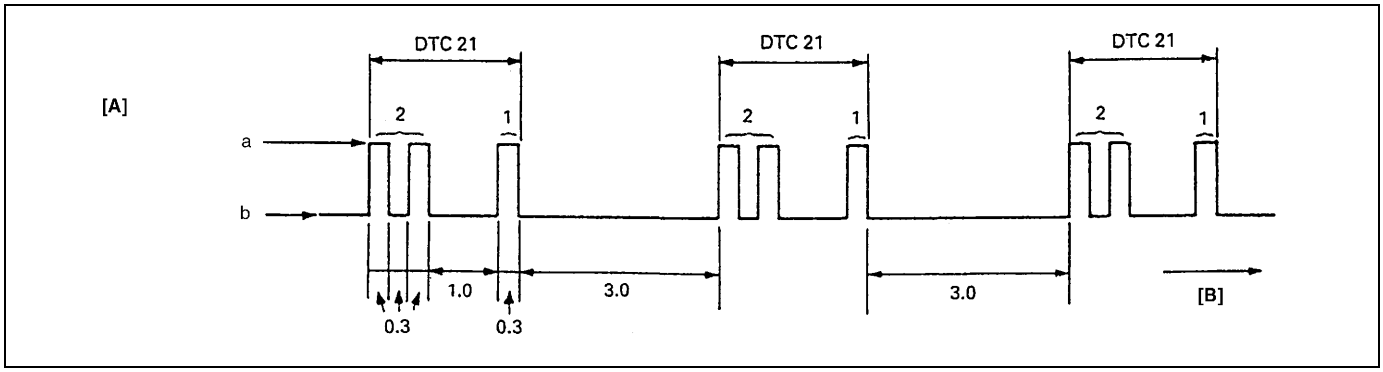


1) Using service wire (4), connect diag. switch "PNK" wire terminal (3) of black diagnosis connector (1) or blue diagnosis connector (5) to "BLK" wire terminal (2) or body ground.

[A] :	Canvas top model
[B] :	Other than canvas top model

2) Turn ignition switch ON.
3) Read flashing of "ABS" warning lamp which represents DTC as shown in example below and write it down. When more than 2 DTC's are stored in memory, deflection and flashing for each DTC is repeated three times starting with the smallest DTC number in increasing order.
   For details of DTC, refer to "DTC Table" in this section.

Example: When right-front wheel speed sensor circuit opens (DTC 21)



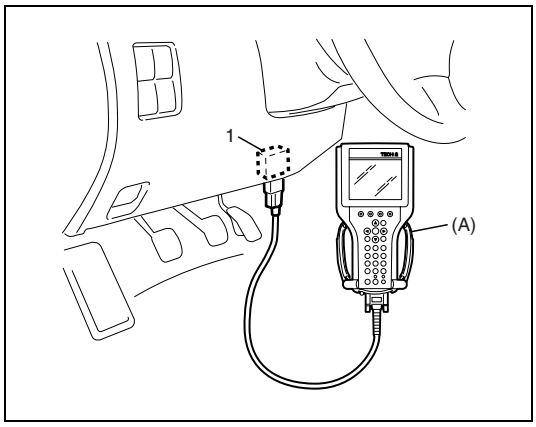
[A] : Voltmeter indicator (or "ABS" warning lamp)	a. HIGH (ON)
[B] : Time (sec.)	b LOW (OFF)

NOTE:

"ABS" warning lamp indicates only following DTC's, DTC 12 which means that no malfunction DTC is stored and history DTC which indicates history trouble area. When there is a current trouble, "ABS" warning lamp remains ON and therefore DTC is not indicated.

4) After completing the check, turn ignition switch off and disconnect service wire from DIAG. connector.

DTC Check (Using SUZUKI Scan Tool)



1) Connect SUZUKI scan tool to data link connector (1).

Special tool
(A) : SUZUKI scan tool

2) Turn ignition switch ON.
3) Read DTC according to instructions displayed on SUZUKI scan tool and print it or write it down. Refer to SUZUKI scan tool operator's manual for further details.
4) After completing the check, turn ignition switch off and disconnect SUZUKI scan tool from DLC.

Diagnostic Trouble Code (DTC) Clearance

WARNING:

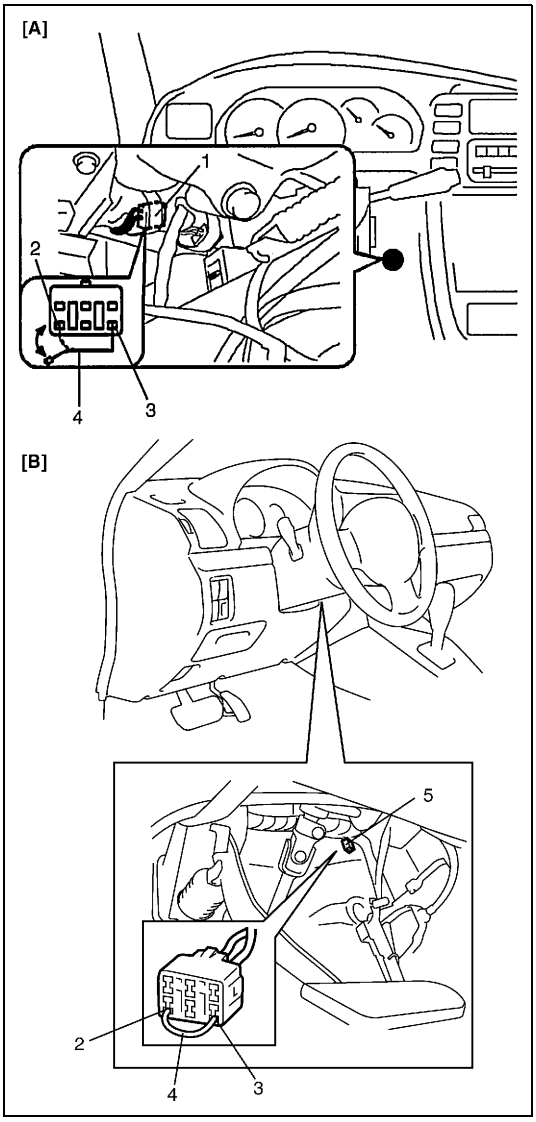
When performing a driving test, select a safe place where there is neither any traffic nor any traffic accident possibility and be very careful during testing to avoid occurrence of an accident.

After repair or replace malfunction part(s), clear all DTC's by performing the following procedure.

1) Turn ignition switch OFF.
2) Using service wire (4), connect diag. switch "PNK" wire terminal (3) of black diagnosis connector (1) or blue diagnosis connector (5) to "BLK" wire terminal (2) or body ground.
3) With connection described in above Step 2) maintained, turn ignition switch ON.
4) Repeat on/off operation of service wire at diag. ground terminal at least 5 times within 10 seconds.

NOTE:

Service wire ON time must be for 0.1 second or more.

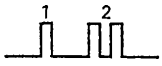
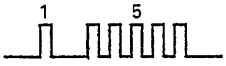
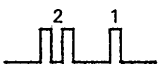
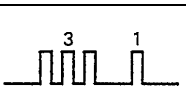
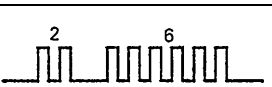
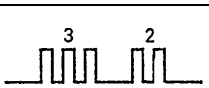
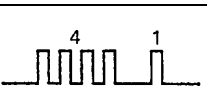


5) Turn ignition switch OFF and disconnect service wire from diag. connector.
6) Perform “Driving Test” under “ABS Diagnostic Flow Table” and “DTC Check” in this section and confirm that normal DTC (DTC 12) is displayed; not malfunction DTC.

NOTE:

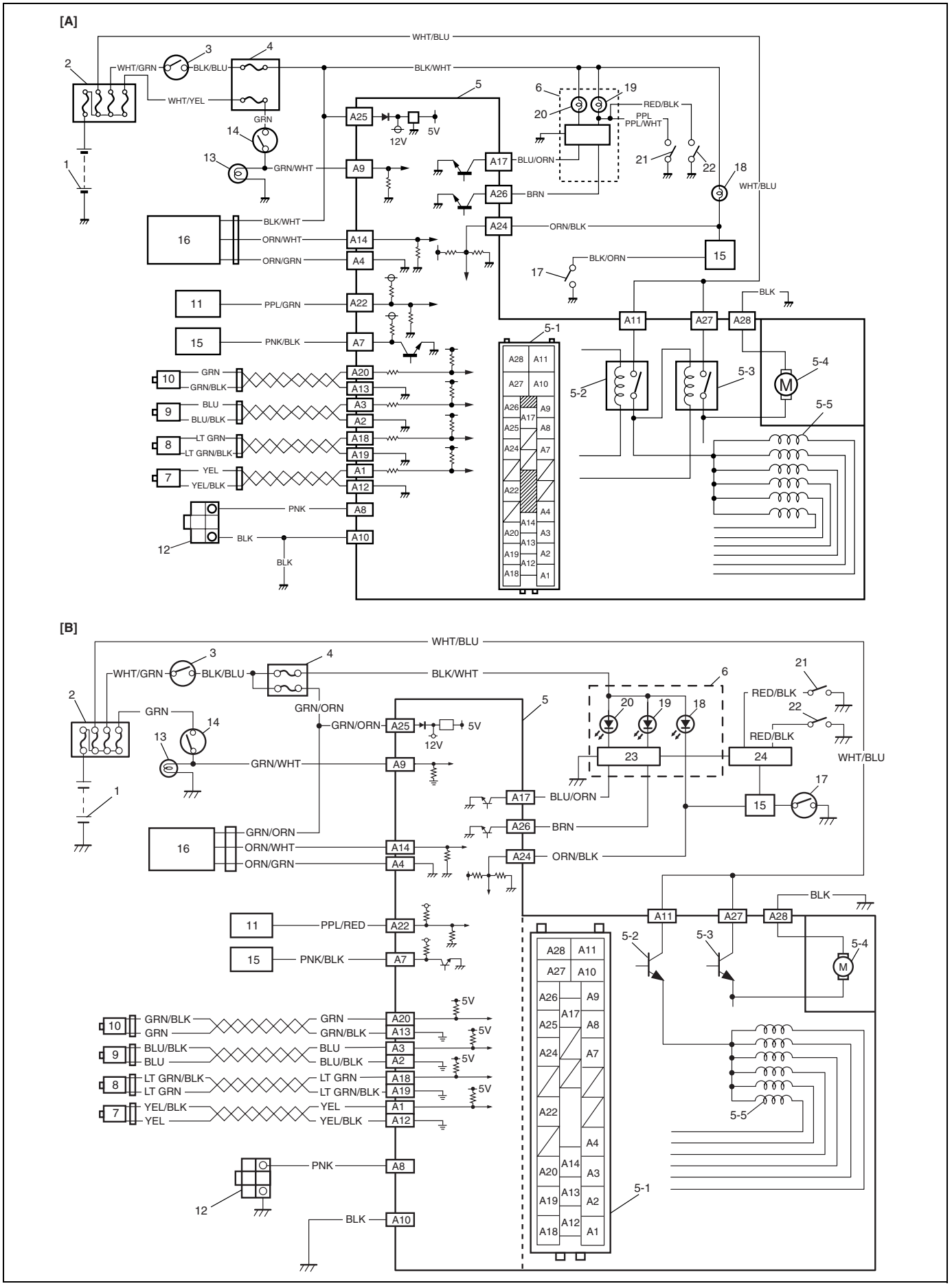
It is also possible to clear DTC by using SUZUKI scan tool.
Refer to Operator’s Manual for procedure to clear DTC.

Diagnostic Trouble Code (DTC) Table

DTC (indicated by ABS warning lamp)	DTC (displayed on SUZUKI scan tool)	VOLTMETER INDICATION (or “ABS” warning lamp flashing pattern)	DIAGNOSTIC AREA	
12	–		Normal	
13	C1013		ABS control module	
15	C1015		G sensor	
21	C1021		Right-front	Wheel speed sensor circuit and rotor
25	C1025		Left-front	
31	C1031		Right-rear	
35	C1035		Left-rear	
22	C1022		Right-front	
26	C1026		Left-front	
32	C1032		Right-rear	
36	C1036		Left-rear	
41	C1041		Right-front	Inlet solenoid circuit
	C1042			Outlet solenoid circuit

DTC (indicated by ABS warning lamp)	DTC (displayed on SUZUKI scan tool)	VOLTMETER INDICATION (or "ABS" warning lamp flashing pattern)	DIAGNOSTIC AREA	
45	C1045		Left-front	Inlet solenoid circuit
	C1046			Outlet solenoid circuit
56	C1055		Rear	Inlet solenoid circuit
	C1056			Outlet solenoid circuit
57	C1057		Power source circuit	
61	C1061		ABS pump motor (in hydraulic unit) circuit	
63	C1063		ABS fail-safe relay circuit	
71	C1071		ABS control module	Internal malfunction

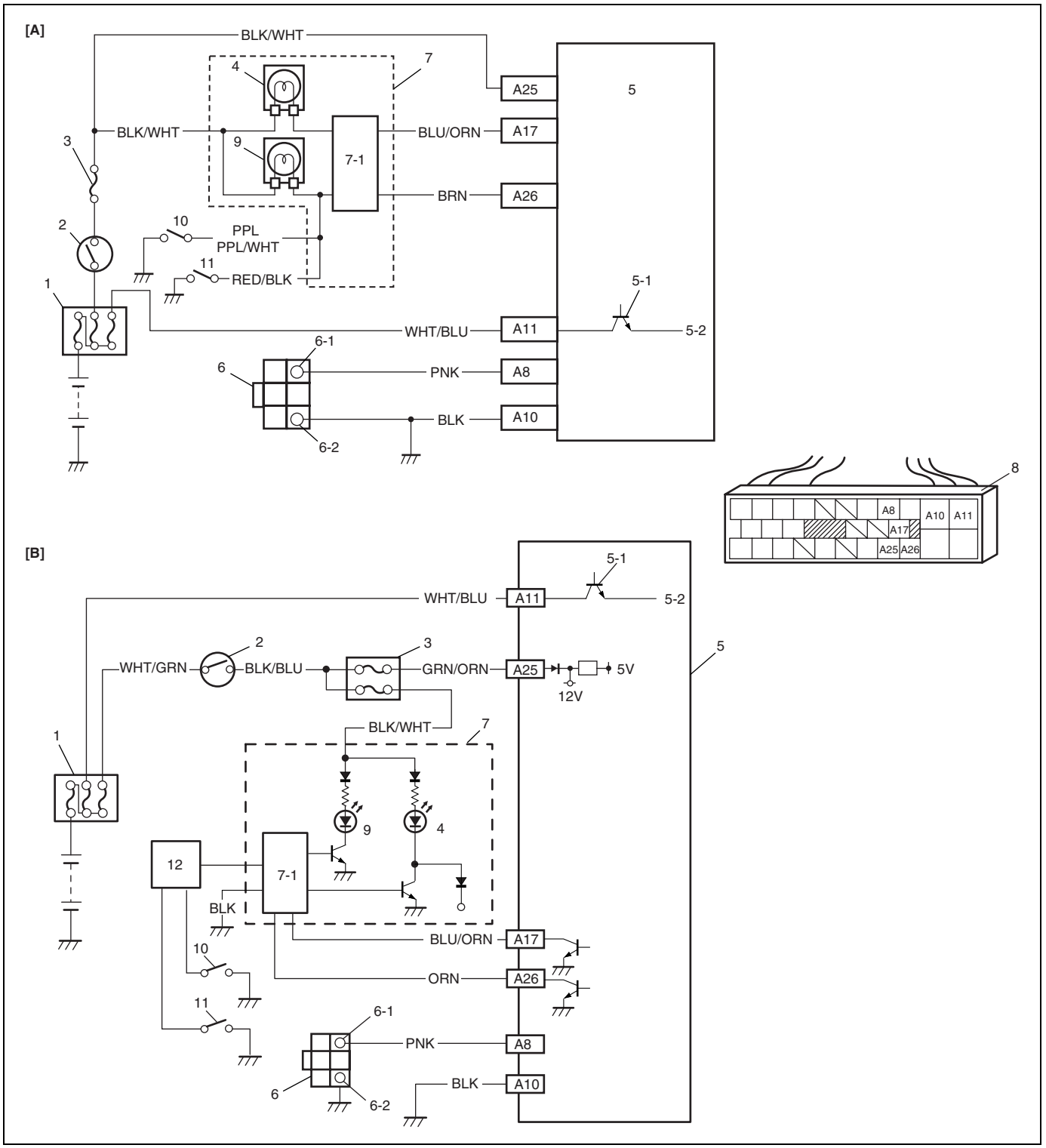
System Circuit



[A] : Canvas top model	5-5. Solenoid valves	16. G sensor
[B] : Other than canvas top model	6. Combination meter	17. 4WD switch
1. Battery	7. Right-rear wheel speed sensor	18. 4WD indicator lamp
2. Main fuses	8. Left-rear wheel speed sensor	19. EBD warning lamp (Brake warning lamp)
3. Ignition switch	9. Right-front wheel speed sensor	20. “ABS” warning lamp
4. Circuit fuses	10. Left-front wheel speed sensor	21. Parking brake switch
5. ABS hydraulic unit/control module	11. Data link connector	22. Brake fluid lever switch
5-1. ABS hydraulic unit/control module connector (Terminal arrangement for ABS hydraulic unit/control module assembly)	12. Diagnosis connector	23. Warning lamp driver module
5-2. ABS fail-safe relay (Solenoid valve relay)	13. Stop lamp	24. BCM
5-3. ABS pump motor relay	14. Stop lamp switch	
5-4. Pump motor	15. ECM (PCM)	

TERMINAL	CIRCUIT
A1	Right-rear wheel speed sensor (+)
A2	Right-front wheel speed sensor (–)
A3	Right-front wheel speed sensor (+)
A4	G sensor ground
A5	–
A6	–
A7	Idle up signal
A8	Diagnosis switch terminal
A9	Stop lamp switch
A10	Ground (For ABS control module)
A11	ABS fail-safe relay
A12	Right-rear wheel speed sensor (–)
A13	Left-front wheel speed sensor (–)
A14	G sensor signal
A15	–
A16	–
A17	“ABS” warning lamp
A18	Left-rear wheel speed sensor (+)
A19	Left-rear wheel speed sensor (–)
A20	Left-front wheel speed sensor (+)
A21	–
A22	Data link connector
A23	–
A24	4WD switch
A25	Ignition switch
A26	“EBD” warning lamp
A27	ABS pump motor relay
A28	Ground (For ABS pump motor)

Table – A "ABS" Warning Lamp Circuit Check – Lamp Does not Come "ON" at Ignition Switch ON



[A] : Canvas top model	4. "ABS" warning lamp	6-1. Diag. switch terminal	9. EBD warning lamp (Brake warning lamp)
[B] : Other than canvas top model	5. ABS hydraulic unit/control module assembly	6-2. Diag. ground terminal	10. Parking brake switch
1. Main fuse	5-1. Fail-safe relay	7. Combination meter	11. Brake fluid level switch
2. Ignition switch	5-2. To solenoid valves and pump motor relay (ABS hydraulic unit)	7-1. ABS lamp driver module	12. BCM
3. Circuit fuse	6. Diagnosis connector (Black connector for Canvas top model, blue connector except for canvas top model)	8. ABS hydraulic unit/control module connector of harness	

CIRCUIT DESCRIPTION

Operation (ON/OFF) of the “ABS” warning lamp is controlled by the ABS control module through ABS lamp driver module in combination meter.
If the antilock brake system is in good condition, the ABS control module turns the “ABS” warning lamp ON at the ignition switch ON, keeps it ON for 2 seconds only and then turns it OFF. If an abnormality in the system is detected, the lamp is turned ON by ABS control module. Also, it is turned ON by ABS lamp driver module in combination meter when the connector of the ABS control module was disconnected.

INSPECTION

Canvas Top Model

Step	Action	Yes	No
1	1) Turn ON ignition switch. Do other warning lamps come ON?	Go to Step 2.	Go to Step 4.
2	1) Turn OFF ignition switch. 2) Disconnect ABS hydraulic unit/control module connector. 3) Turn ON ignition switch. Does ABS warning lamp light with ignition switch ON?	Replace ABS hydraulic unit/control module assembly.	Go to Step 3.
3	1) Remove combination meter with ignition switch turned OFF. Is bulb of ABS warning lamp in good condition?	“BLU/ORN” circuit shorted to ground. If OK, replace ABS warning circuit (lamp driver module).	Replace bulb.
4	Is IG fuse in good condition?	Open in “BLK/WHT” wire to combination meter or poor connection.	Repair and replace.

Other than Canvas Top Model

Step	Action	Yes	No
1	1) Turn ignition switch to ON position. Do other warning lamps come ON?	Go to Step 2.	Go to Step 4.
2	1) Turn OFF ignition switch. 2) Disconnect ABS hydraulic unit/control module connector. 3) Turn ON ignition switch. Dose ABS warning lamp light with ignition switch ON?	Replace ABS hydraulic unit/control module assembly.	Go to Step 3.
3	1) Remove combination meter with ignition switch turned OFF. 2) Measure resistance between “BLU/ORN” wire of 22 pin combination meter connector and ground. Is it infinite (∞)?	Go to Step 6.	“BLU/ORN” circuit shorted to ground.
4	Is “METER” fuse in good condition?	Go to Step 5.	Replace fuse and check for short circuit to ground.

Step	Action	Yes	No
5	1) Remove combination meter with ignition switch turned OFF. 2) Check for proper connection to “BLK/WHT” wire of 20 pin combination meter connector. 3) If OK, turn ON ignition switch and measure voltage at “BLK/WHT” wire of 20 pin combination meter connector. Is it 10 – 14 V?	Go to Step 6.	“BLK/WHT” circuit open.
6	1) Measure resistance between “BLK” wire of 20 pin combination meter connector and ground. Is resistance below 5 Ω?	Replace combination meter.	“BLK” circuit open or high resistance.

Table – B "ABS" Warning Lamp Circuit Check – Lamp Comes "ON" Steady

Refer to "Table – A" for System Circuit Diagram and Circuit Description.

INSPECTION

Step	Action	Yes	No
1	Perform diagnostic trouble code check. Is there any DTC (including code No.12, NO CODES on SUZUKI scan tool) exists?	Go to Step 2.	Go to Step 3.
2	Is malfunction DTC (other than code No.12) exists at Step1?	Go to Step 7 of "ABS Diagnostic Flow Table" in this section.	Go to Step 3.
3	Is "IG" fuse (Canvas Top model) or "ABS" fuse (other than Canvas Top model) in good condition?	Go to Step 4.	Replace fuse and check for short circuit to ground.
4	1) Turn OFF ignition switch. 2) Disconnect ABS hydraulic unit/control module connector (1). 3) Check for proper connection to ABS hydraulic unit/control module connector at terminals "A17", "A25" and "A10". 4) If OK, turn ON ignition switch and measure voltage at terminal "A25" of connector. Is it 10 – 14 V?	Go to Step 5.	"BLK/WHT" circuit (Canvas Top model) or "GRN/ORN" circuit (other than Canvas Top model) open.
5	1) With ABS control module connector disconnected, turn ignition switch ON and light ABS warning lamp. 2) Connect terminal "A17" of disconnected connector to ground using service wire. Does "ABS warning lamp" turn off?	Go to Step 6.	"BLU/ORN" circuit open. If wire and connection are OK, replace ABS lamp driver module (Canvas Top model) or combination meter (other than Canvas Top model).
6	1) Measure resistance from connector terminal "A10" to body ground. Is resistance below 5 Ω?	Substitute a known-good ABS hydraulic unit/control module assembly and recheck.	"BLK" circuit open or high resistance.

Fig. for Step 4

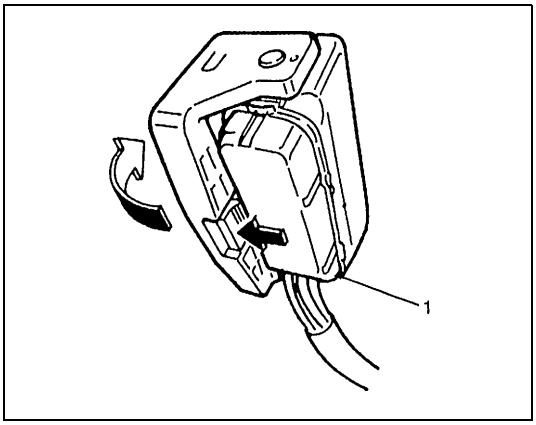
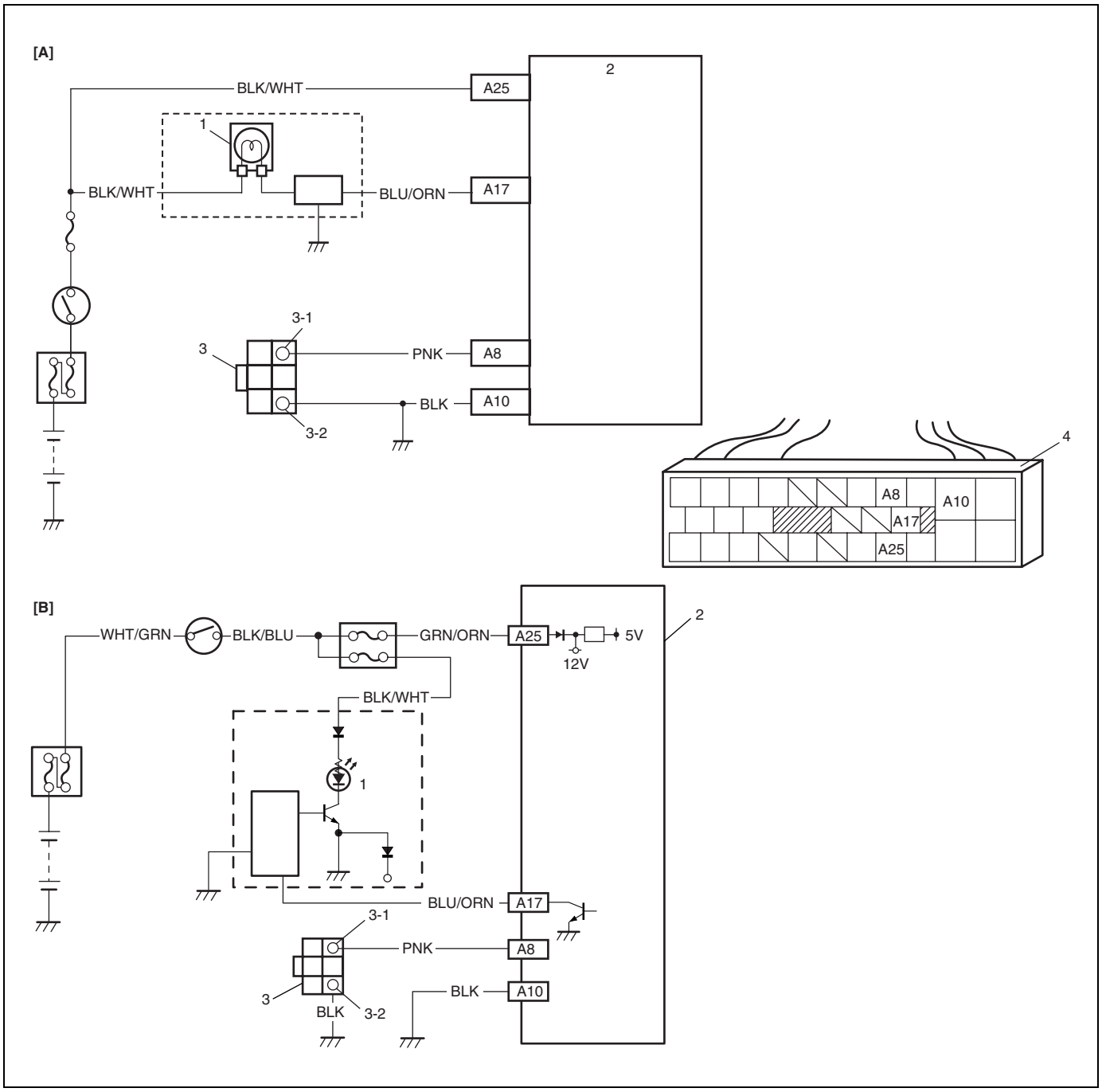


Table – C "ABS" Warning Lamp Circuit Check – The Lamp Flashes Continuously While Ignition Switch is ON



[A] : Canvas top mode	2. ABS hydraulic unit/control module assembly	3-2. Diag. ground terminal
[B] : Other than canvas top model	3. Diagnosis connector	4. ABS hydraulic unit/control module connector
1. "ABS" warning lamp	3-1 Diag. switch terminal	

CIRCUIT DESCRIPTION

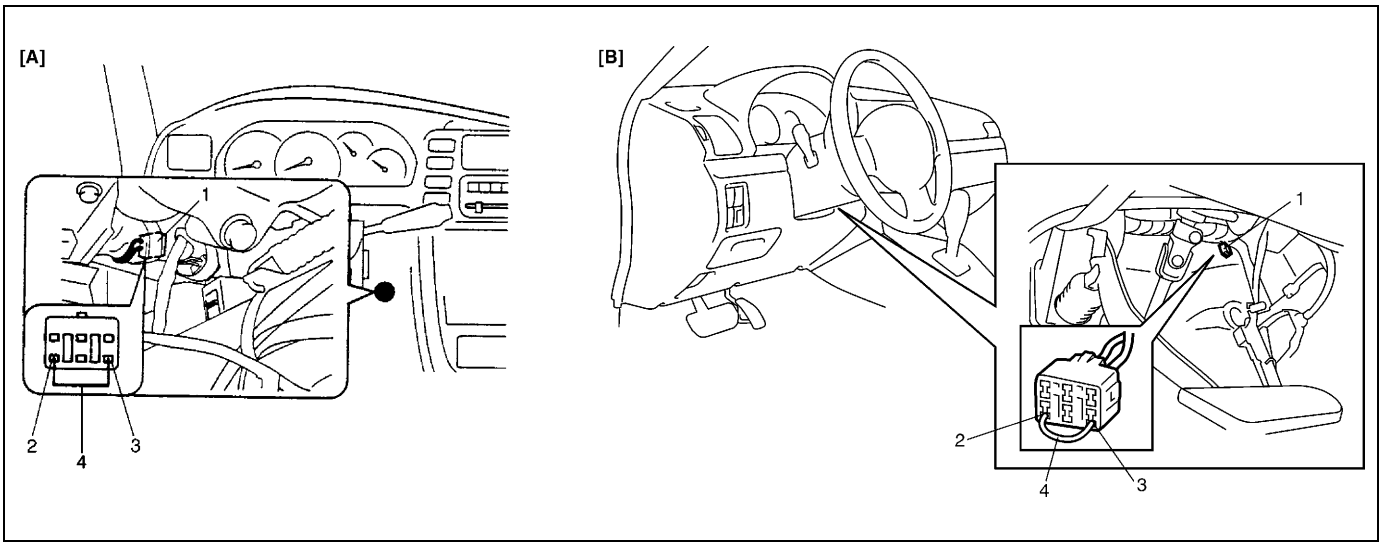
When the diag. switch terminal is shorted or connected to the ground with the ignition switch ON, the diag. trouble code (DTC) is indicated by flashing of the "ABS" warning lamp only in the following cases.

- Normal DTC (12) is indicated if no malfunction DTC is detected in the ABS.
- A history malfunction DTC is indicated by flashing of the lamp if a current malfunction DTC is not detected at that point although a history malfunction DTC is stored in memory.

INSPECTION

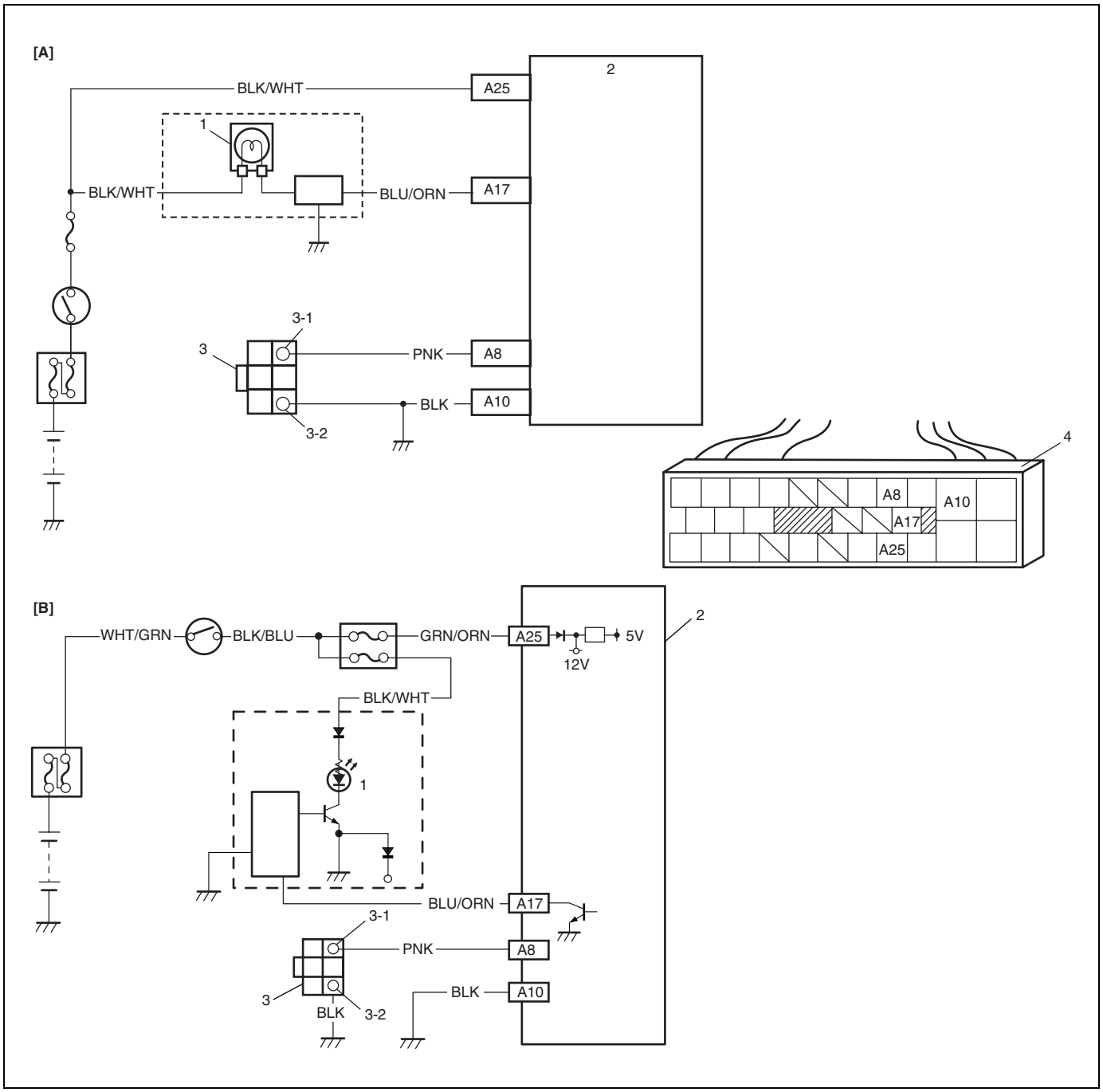
Step	Action	Yes	No
1	Is diag. switch “PNK” wire terminal (3) connected to “BLK” wire terminal (2) via service wire (4)?	Go to Step 3.	Go to Step 2.
2	1) Ignition switch ON. 2) Measure voltage between diag. switch terminal and ground. Is it 10 – 14 V?	Substitute a known-good ABS hydraulic unit/control module assembly and recheck.	“PNK” wire circuit shorted to ground.
3	1) Ignition switch ON. 2) Does flashing of “ABS” warning lamp indicate DTC?	Go to Step 7 of “ABS Diagnostic Flow Table” in this section.	Substitute a known-good ABS hydraulic unit/control module assembly and recheck.

Fig. for Step 1



[A] : Canvas top mode
[B] : Other than canvas top model
1. Diagnosis connector

Table – D Code (DTC) is not Outputted Even with Diag. Switch Terminal Connected to Ground



[A] : Canvas top mode	2. ABS hydraulic unit/control module assembly	3-2. Diag. ground terminal
[B] : Other than canvas top model	3. Diagnosis connector	4. ABS hydraulic unit/control module connector
1. "ABS" warning lamp	3-1. Diag. switch terminal	

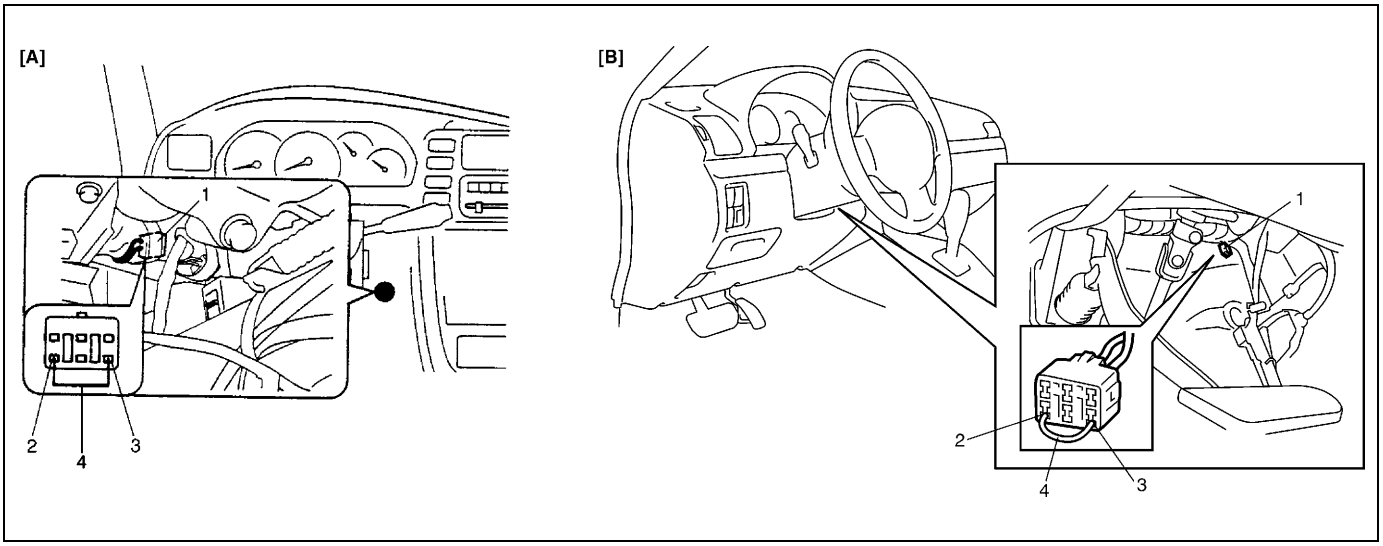
CIRCUIT DESCRIPTION

When the diag. switch terminal is connected to the ground with the ignition switch turned ON, the ABS control module outputs a diagnostic trouble code by flashing "ABS" warning lamp.

INSPECTION

Step	Action	Yes	No
1	Is it shorted diag. switch “PNK” wire terminal (3) and “BLK” wire terminal (2) by service wire (4) properly?	Go to Step 2.	Connect service wire securely.
2	1) Disconnect service wire. 2) Turn OFF ignition switch. 3) Disconnect ABS hydraulic unit/control module connector (1). 4) Measure resistance between diag. switch terminal and connector terminal “A8”. Is it infinite (∞) ?	“PNK” circuit open.	Go to Step 3.
3	1) Measure resistance between ground terminal of monitor connector and body ground. Is resistance below 5 Ω?	Go to Step 4.	“BLK” circuit open or poor connection.
4	1) Check for proper connection to ABS hydraulic unit/control module at terminal “A8” and “A10”. 2) If OK, then check “ABS” warning lamp circuit referring to “Table A, B and C” in this section. Is it in good condition?	Substitute a known-good ABS hydraulic unit/control module assembly and recheck.	Repair “ABS” warning lamp circuit.

Fig. for Step 1



[A] : Canvas top mode
[B] : Other than canvas top model
1. Diagnosis connector

Fig. for Step 2

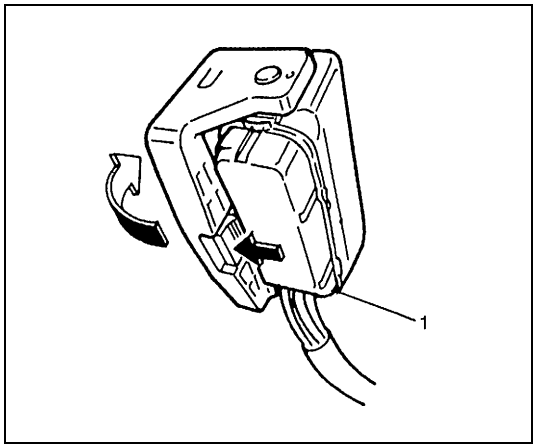


Table – E EBD Warning Lamp (Brake Warning Lamp) Check-Lamp Comes "ON" Steady

CIRCUIT DESCRIPTION

EBD warning lamp (brake warning lamp) is controlled by parking brake switch, brake fluid level switch and ABS control module/hydraulic unit assembly through lamp driver module in combination meter. Refer to "Table-A" for circuit diagram.

INSPECTION

Step	Action	Yes	No
1	1) Make sure that: • Parking brake is completely released. • Brake fluid level is upper than the minimum level. Are the check results OK?	Go to Step 2.	Release parking brake completely and/or replenish brake fluid.
2	Is it Canvas Top model?	Go to Step 4.	Go to Step 3.
3	Brake warning indicator circuit check. 1) Check brake warning indicator circuit referring to "Brake Warning Indicator Diagnosis Table" in Section 8C. Is it good condition?	Go to Step 4.	Repair or replace the malfunction parts.
4	Does "ABS" warning lamp come on?	Perform "TABLE B" in this section.	Go to Step 5.

Step	Action	Yes	No
5	1) Disconnect ABS hydraulic unit/control module connector with ignition switch turned OFF. 2) Check for proper connection to ABS hydraulic unit/control module connector at terminals “A26”. 3) If OK, apply chocks to wheels and select gear in neutral position (P range for A/T). 4) Keep brake pedal depressed and turn ON ignition switch. 5) Release parking brake. 6) Connect terminal “A26” of disconnected connector to ground using service wire. Does EBD warning lamp (brake warning lamp) turn off?	Substitute a known-good ABS hydraulic unit/control module assembly and recheck.	“BRN” circuit (Canvas Top model) or “ORN” circuit (other than Canvas Top model) open. If wire and connection are OK, replace combination meter.

DTC 13 (DTC C1013) – System Specifications Different from ABS Control Module Specifications

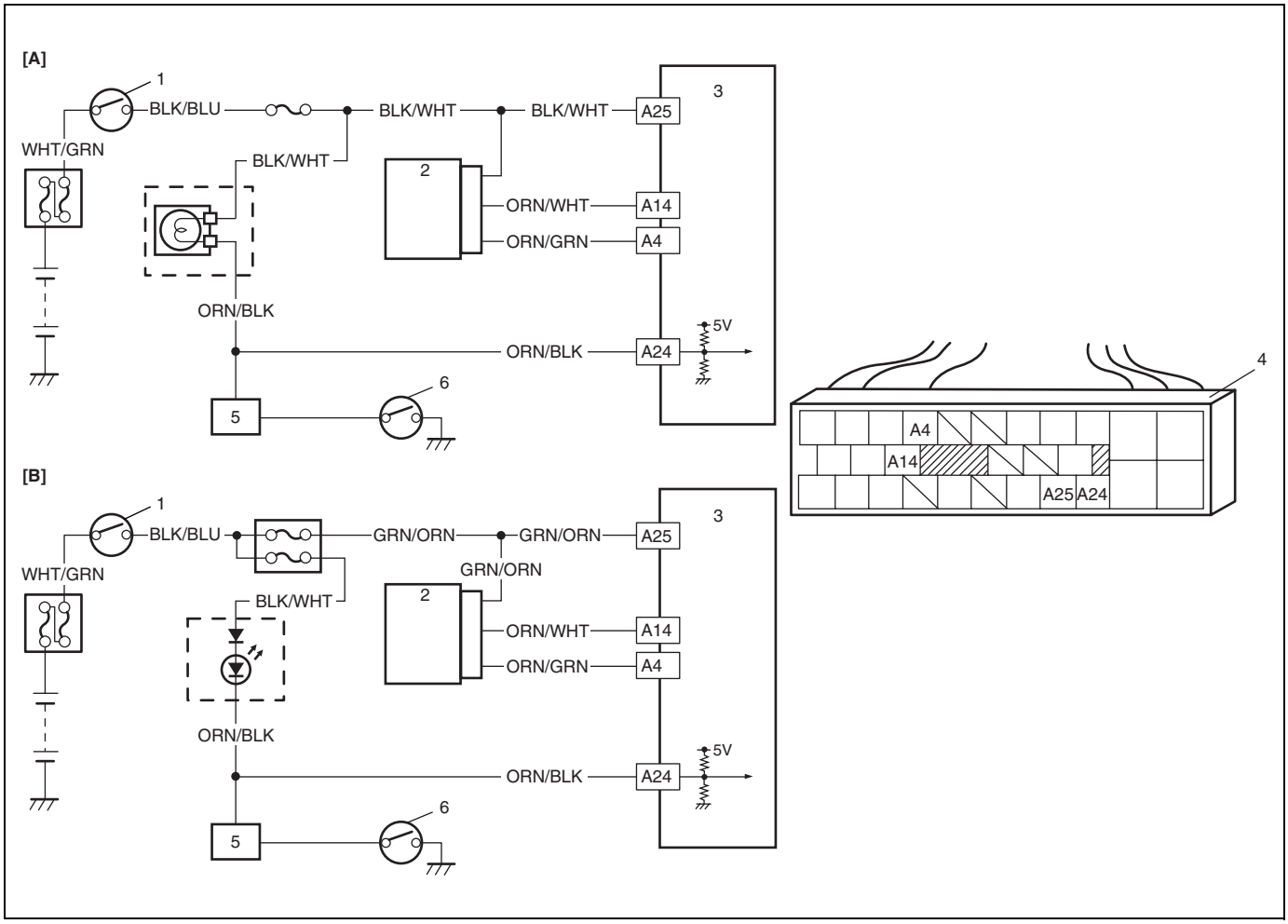
DESCRIPTION

When abnormal signal is inputted to a no-used terminal of control module while running or wrong ABS hydraulic unit/control module assembly is installed, this DTC will be set.

INSPECTION

1) Ignition switch OFF.
2) Check for proper connection from harness to control module.
3) If OK, substitute a known-good and correct specifications ABS hydraulic unit/control module assembly.
4) Recheck system.

DTC 15 (DTC C1015) – G Sensor Circuit and 4WD Circuit



[A] : Canvas top mode	3. ABS hydraulic unit control module assembly	7. 4WD lamp
[B] : Other than canvas top model	4. ABS hydraulic unit/control module connector	8. Combination meter
1. Ignition switch	5. ECM (PCM)	
2. G sensor	6. 4WD switch	

DESCRIPTION

- While a vehicle is at stop or running, if the potential difference between the sensor signal terminal “A14” and the sensor ground terminal “A4” is not within the specified voltage value, or if the signal voltage while at a stop does not vary from that while running, this DTC is set.
  Therefore, this DTC may be set when a vehicle is lifted up and its wheel(s) is turned. In such case, clear the DTC and check again.
- When G sensor is installed to 2WD vehicle, this DTC is set.
- When 4WD lamp circuit open or shorted to ground, this DTC is set.

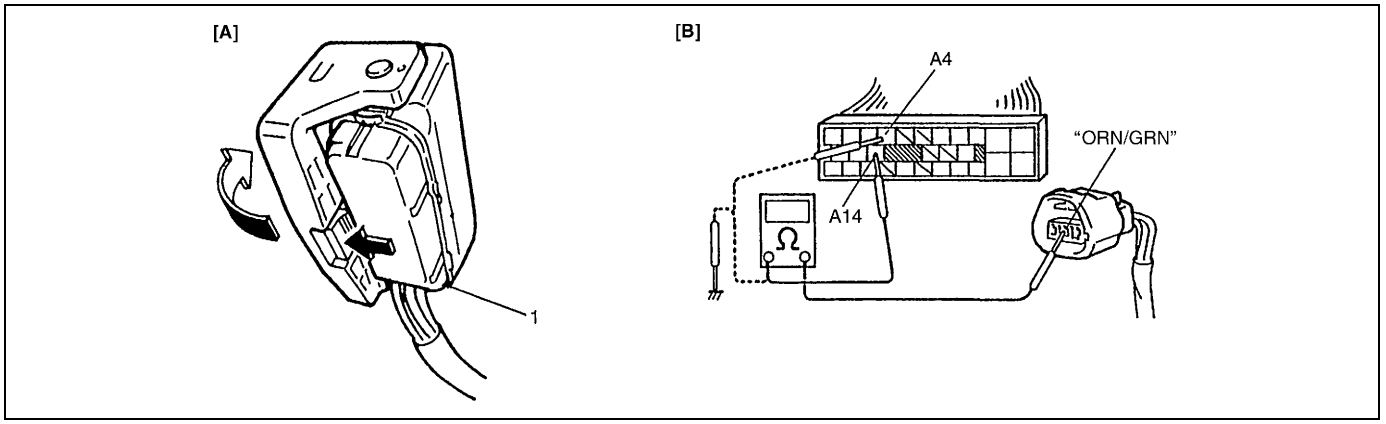
INSPECTION

Step	Action	Yes	No
1	1) Turn ignition switch ON. Does 4WD lamp turn ON when transfer shift control lever in “4H” or “4L”?	Go to Step 7.	Go to Step 2.

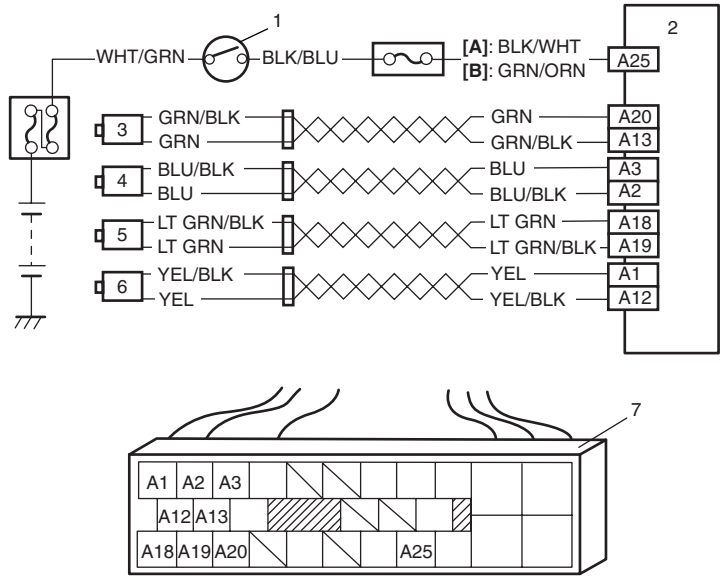
Step	Action	Yes	No
2	1) Turn OFF ignition switch. 2) Check "METER" fuse (other than Canvas Top model) or "IG" fuse (Canvas Top model) for open. Is "IG" fuse (Canvas Top model) or "METER" fuse (other than Canvas Top model) in good condition?	Go to Step 3.	Replace fuse and check for short circuit to ground.
3	1) Remove combination meter. 2) Check for proper connection to "BLK/WHT" wire of 16 pin (Canvas Top model) or 20 pin (other than Canvas Top model) combination meter connector. 3) If OK, turn ON ignition switch and measure voltage at "BLK/WHT" wire of 20 pin combination meter connector. Is it 10 – 14 V?	Go to Step 4.	"BLK/WHT" circuit open.
4	1) Connect combination meter connector. 2) Connect "ORN/BLK" wire of 16 pin (Canvas Top model) or 22 pin (other than Canvas Top model) combination meter connector to ground using service wire. 3) Check for 4WD lamp lighting with ignition switch turned ON. Does 4WD lamp turn ON?	Go to Step 5.	Replace combination meter.
5	1) Turn OFF ignition switch. 2) Check for proper connection to ECM (PCM) and 4WD switch. 3) If OK, then check 4WD control system referring to "4WD Control System Inspection" in Section 7E. Is it good condition?	Go to Step 6.	Repair 4WD control system.
6	1) Turn OFF ignition switch. 2) Disconnect connector from ABS hydraulic unit/control module assembly. 3) Check for proper connection to ABS control module at terminal "A24". 4) If OK, turn ON ignition switch and select transfer shift control lever to "2H". 5) Measure voltage between terminal "A24" of module connector and body ground. Is it 8 V or more?	Substitute a known-good ABS hydraulic unit/control module assembly.	"ORN/BLK" circuit open.
7	Is G sensor installed floor securely?	Go to Step 8.	Tighten sensor or bracket screw securely. If not, using new screw.

Step	Action	Yes	No
8	1) Ignition switch OFF. 2) Remove G sensor with bracket (for Canvas Top model). 3) Check for proper connection to G sensor. 4) If OK then check G sensor referring to "Inspection of "G Sensor" in this section. Is it in good condition?	Go to Step 9.	Replace G sensor.
9	1) Disconnect connectors from ABS hydraulic unit/control module assembly (1) and G sensor. 2) Check for proper connection to ABS control module at terminals "A14" and "A4". 3) If OK, then turn ignition switch ON and measure voltage between "BLK/WHT" terminal (Canvas Top model) or "GRN/ORN" terminal (other than Canvas Top model) of sensor connector and body ground. Is it 10 – 14 V?	Go to Step 10.	"BLK/WHT" circuit (Canvas Top model) or "GRN/ORN" circuit (other than Canvas Top model) open.
10	Measure voltage between "ORN/WHT" terminal of sensor connector and body ground. Is it 0 V?	Go to Step 11.	"ORN/WHT" circuit shorted to power circuit.
11	1) Ignition switch OFF. 2) Check that "ORN/WHT" circuit is free from open or short to ground and "ORN/GRN" circuit. Is it in good condition?	"ORN/GRN" circuit open. If circuit is OK, substitute a known-good ABS hydraulic unit/control module assembly.	"ORN/WHT" circuit open or shorted to ground or "ORN/GRN" circuit.

[A] : Fig. for Step 9 / [B] : Fig. for Step 11



DTC 21 (DTC C1021), 22 (DTC C1022) – Right-Front Wheel Speed Sensor Circuit
DTC 25 (DTC C1025), 26 (DTC C1026) – Left-Front Wheel Speed Sensor Circuit
DTC 31 (DTC C1031), 32 (DTC C1032) – Right-Rear Wheel Speed Sensor Circuit
DTC 35 (DTC C1035), 36 (DTC C1036) – Left-Rear Wheel Speed Sensor Circuit



[A] : Canvas top model	2. ABS hydraulic unit/control module assembly	5. Left-rear wheel speed sensor
[B] : Other than canvas top model	3. Left-front wheel speed sensor	6. Right-rear wheel speed sensor
1. Ignition switch	4. Right-front wheel speed sensor	7. ABS hydraulic unit/control connector

DESCRIPTION

The ABS control module monitors the voltage at the terminal of each sensor while the ignition switch is ON. When the voltage is not within the specified range, an applicable DTC will be set. Also, when no sensor signal is inputted at starting or while running, an applicable DTC will be set.

NOTE:

When the vehicle was operated in any of the following ways, one of these DTC's may be set even when the sensor is in good condition. If such possibility is suspected, repair the trouble (dragging of brake, etc.) of the vehicle, clear DTC once and then after performing the driving test as described in Step 2 of "ABS Diag. Flow Table", check whether or not any abnormality exists.

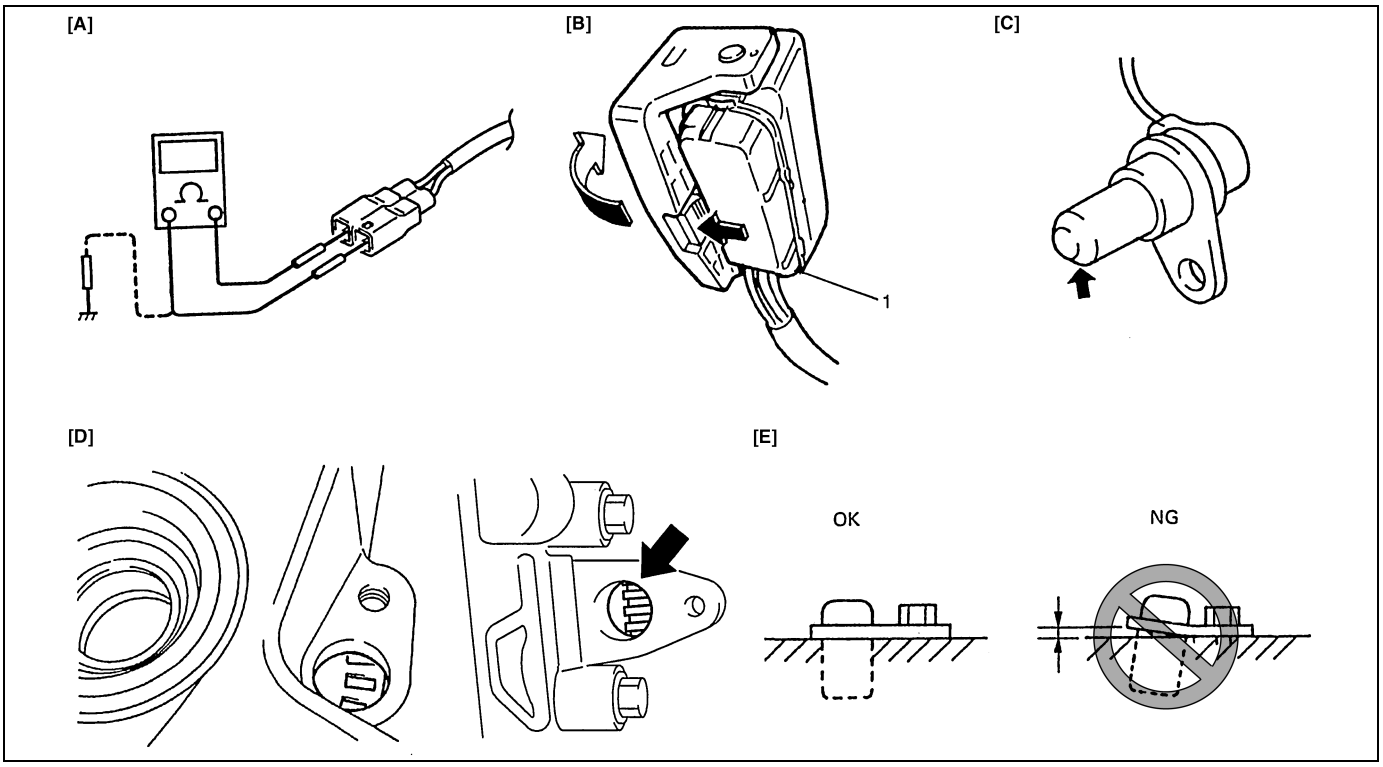
- **The vehicle was driven with parking brake pulled.**
- **The vehicle was driven with brake dragging.**
- **Wheel spin occurred while driving.**
- **Wheel(s) was turned while the vehicle was jacked up.**
- **The vehicle was stuck.**

INSPECTION

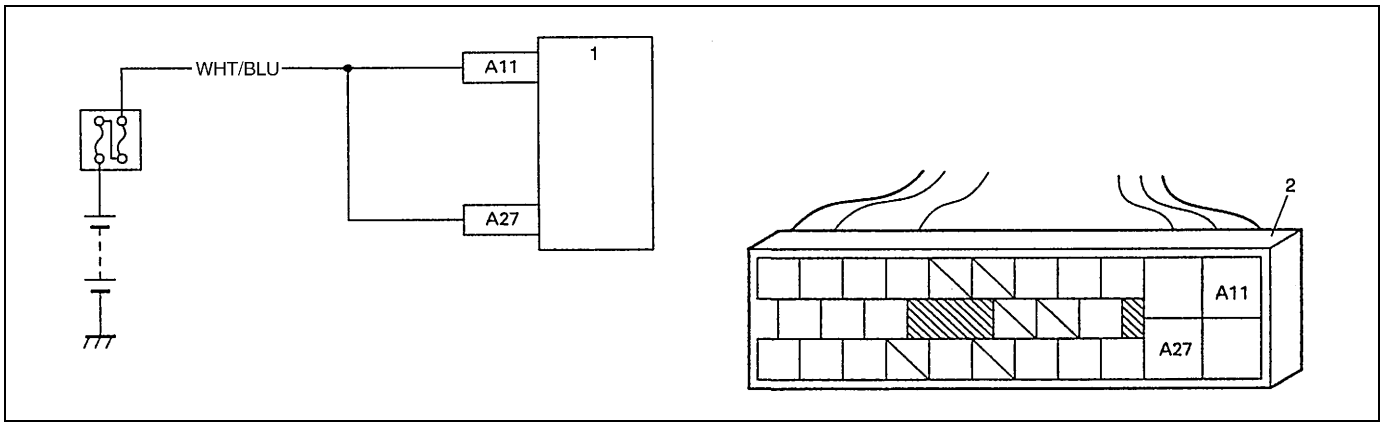
Step	Action	Yes	No
1	1) Disconnect the applicable sensor connector with ignition switch OFF. 2) Measure resistance between sensor terminals. **Resistance of wheel speed sensor** **1.2 – 1.6 kΩ (at 20°C, 68°F)** 3) Measure resistance between each terminal and body ground. **Insulation resistance of wheel speed sensor** **1MΩ or higher** Were measured resistance values as specified?	Go to Step 2.	Replace sensor.
2	1) Ignition switch OFF. 2) Disconnect connector from ABS hydraulic unit/control module assembly (1). 3) Check for proper connection to ABS hydraulic unit/control module assembly at each sensor terminal. 4) If OK then, turn ignition switch ON and measure voltage between sensor positive terminal of module connector and body ground. Is it 0 V?	Go to Step 3.	Sensor positive circuit shorted to power.
3	1) Ignition switch OFF. 2) Connect connector to sensor. 3) Measure resistance between sensor terminals at module connector. 4) Measure resistance between sensor positive terminal and negative terminal of module connector, between positive terminal and body ground. Are measured resistance values within each specified range described in above Step 1?	Go to Step 4.	Circuit open or shorted to ground.
4	1) Remove wheel speed sensor. 2) Check sensor for damage or foreign material being attached. Is it in good condition?	Go to Step 5.	Clean or replace sensor.
5	Check visually through wheel speed sensor installation hole for the following. • Rotor neither missing or damaged. • No foreign material being attached. • Rotor not being eccentric. • Wheel bearing free from excessive play. Are they in good condition?	Go to Step 6.	Clean, repair or replace.

Step	Action	Yes	No
6	1) Install sensor to knuckle or axle housing. 2) Tighten sensor bolt to specified torque and check that there is not any clearance between sensor and knuckle or axle housing. Replace sensor if any. 3) Referring to “Output Voltage Inspection” of “Front Wheel Speed Sensor”, check output voltage or waveform of sensor. Is proper output voltage or waveform obtained?	Substitute a known-good ABS hydraulic unit/control module assembly and recheck.	Replace sensor and recheck.

[A] : Fig. for Step 1 / [B] : Fig. for Step 2 / [C] : Fig. for Step 4 / [D] : Fig. for Step 5 / [E] : Fig. for Step 6



DTC 41 (DTC C1041/C1042) – Right-Front Solenoid Circuit
DTC 45 (DTC C1045/C1046) – Left-Front Solenoid Circuit
DTC 56 (DTC C1055/C1056) – Rear Solenoid Circuit



1. ABS hydraulic unit/control module assembly
2. ABS hydraulic unit/control module connector

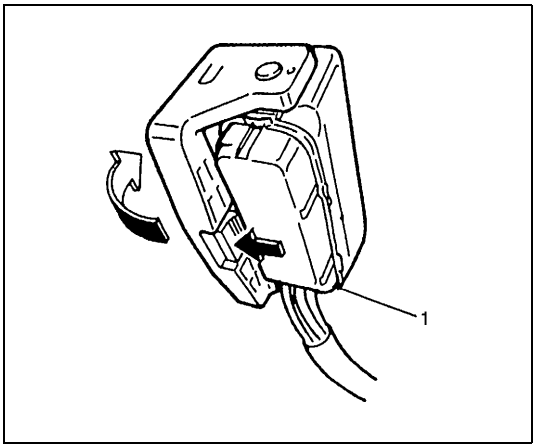
DESCRIPTION

The ABS control module monitors the voltage of the terminal of the solenoid circuit constantly with the ignition switch turned ON. It sets this DTC when the terminal voltage does not become low/high for the ON/OFF command to the solenoid or the voltage difference between solenoid circuit terminals exceeds the specified value with the solenoid turned OFF.

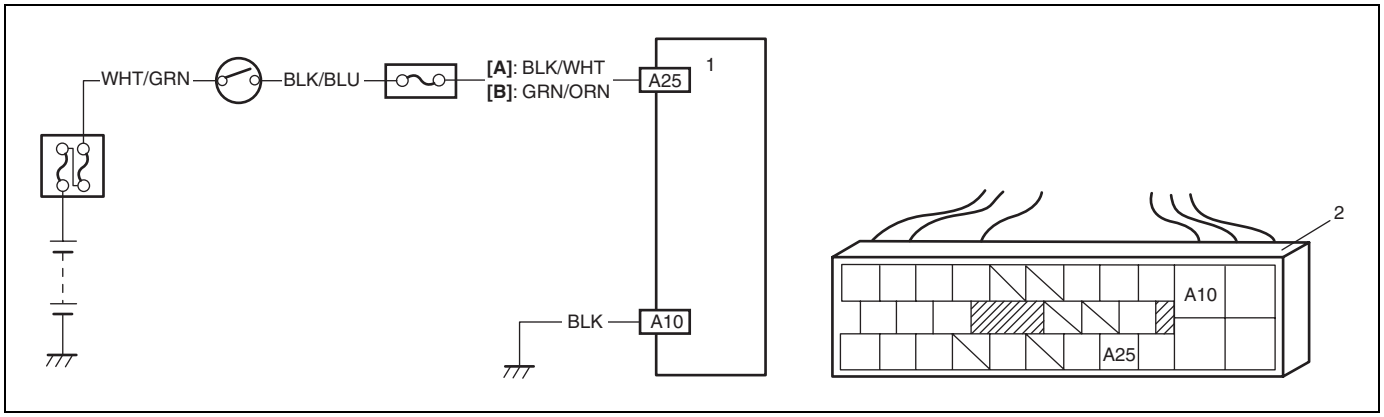
INSPECTION

Step	Action	Yes	No
1	1) Check solenoid referring to “ABS Hydraulic Unit Operation Check” in this section. Is it in good condition?	Check terminals “A11” and “A27” connection. If connections OK, substitute a known-good ABS hydraulic nit/control module assembly and recheck.	Go to Step 2.
2	1) Ignition switch OFF. 2) Disconnect ABS hydraulic unit/control module connector (1). 3) Check for proper connection to ABS hydraulic unit/control module connector at terminal “A11”. 4) If OK, then measure voltage between terminal “A11” of module connector and body ground. Is it 10 – 14 V?	Substitute a known-good ABS hydraulic unit/control module assembly and recheck.	“WHT/BLU” circuit open.

Fig. for Step 2



DTC 57 (DTC C1057) – Power Source Circuit



[A] : Canvas top model	1. ABS hydraulic unit/control module assembly
[B] : Other than canvas top model	2. ABS hydraulic unit/control module connector

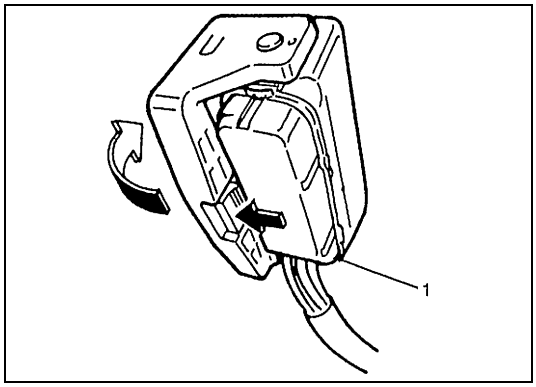
DESCRIPTION

The ABS control module monitors the power source voltage at terminal "A25". When power source voltage becomes extremely high or low, this DTC will be set. As soon as the voltage rises or lowers to the specified level, the set DTC will be cleared.

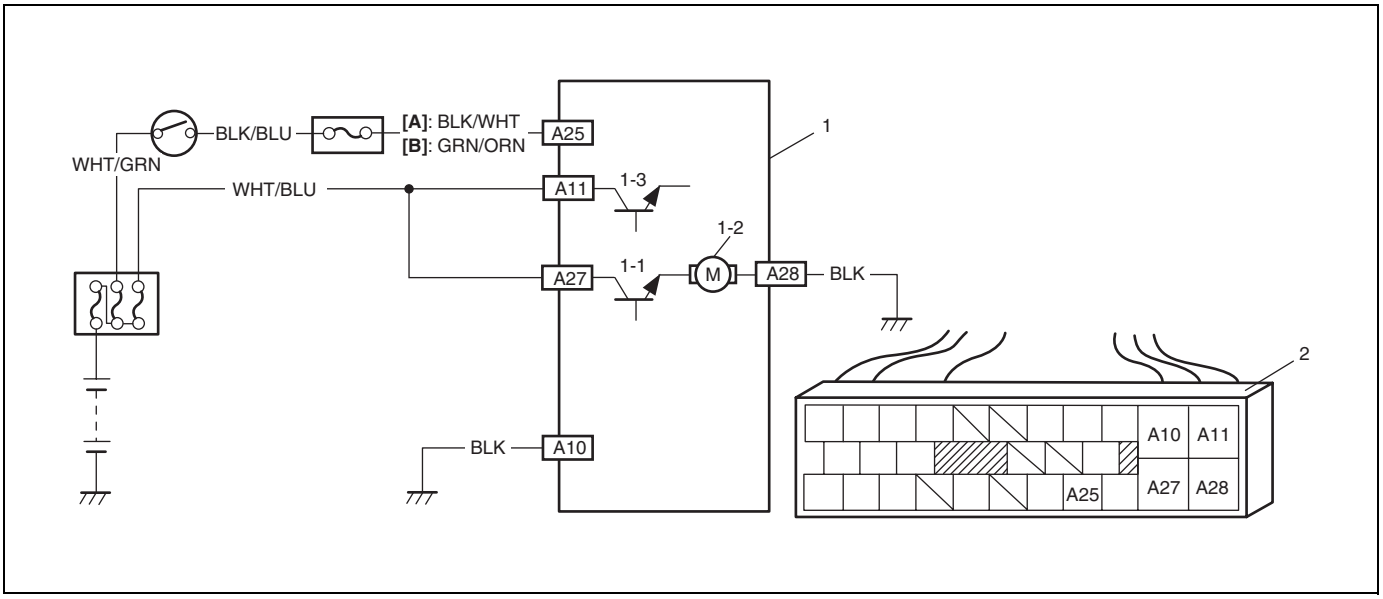
INSPECTION

Step	Action	Yes	No
1	1) Connect a voltmeter between battery positive (+) terminal and body ground. 2) Start the engine and measure the maximum voltage when racing the engine. Is it over 18 V?	Check charging system referring to "Overcharged Battery" under "Generator" in Section 6H.	Go to Step 2.
2	Check ABS main fuse and connection. Is it good condition?	Go to Step 3.	Repair and/or replace fuse.
3	1) Disconnect ABS hydraulic unit/control module connector (1). 2) Keep the engine idling, measure the voltage between terminal "E136-18" of ABS control module connector and body ground. Is it always under 9 V?	Check charging system referring to "Undercharged Battery" under "Generator" in Section 6H. Imperfect short between "BLK/WHT" wire (Canvas Top model) or "GRN/ORN" wire (other than Canvas Top model) and ground.	Poor connection of terminal "A25" or "A10" of the ABS control module. If the above are in good condition, substitute a known-good ABS hydraulic unit/control module and recheck.

Fig. for Stop 3



DTC 61 (DTC C1061) – ABS Pump Motor Circuit



1. ABS hydraulic unit/control module assembly	1-2. ABS pump motor	2. ABS hydraulic unit/control module connector
1-1. ABS pump motor relay	1-3. ABS fail safe relay	

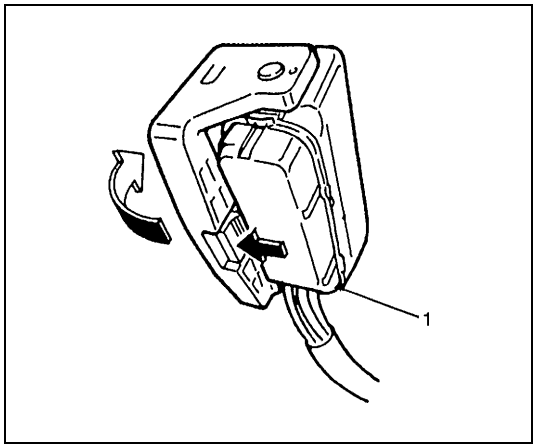
DESCRIPTION

The ABS control module monitors the voltage at the monitor terminal of the pump motor circuit constantly with the ignition switch turned ON. It sets this DTC when the voltage at the monitor terminal does not become high/low according to ON/OFF commands to the motor relay of the module (does not follow these commands).

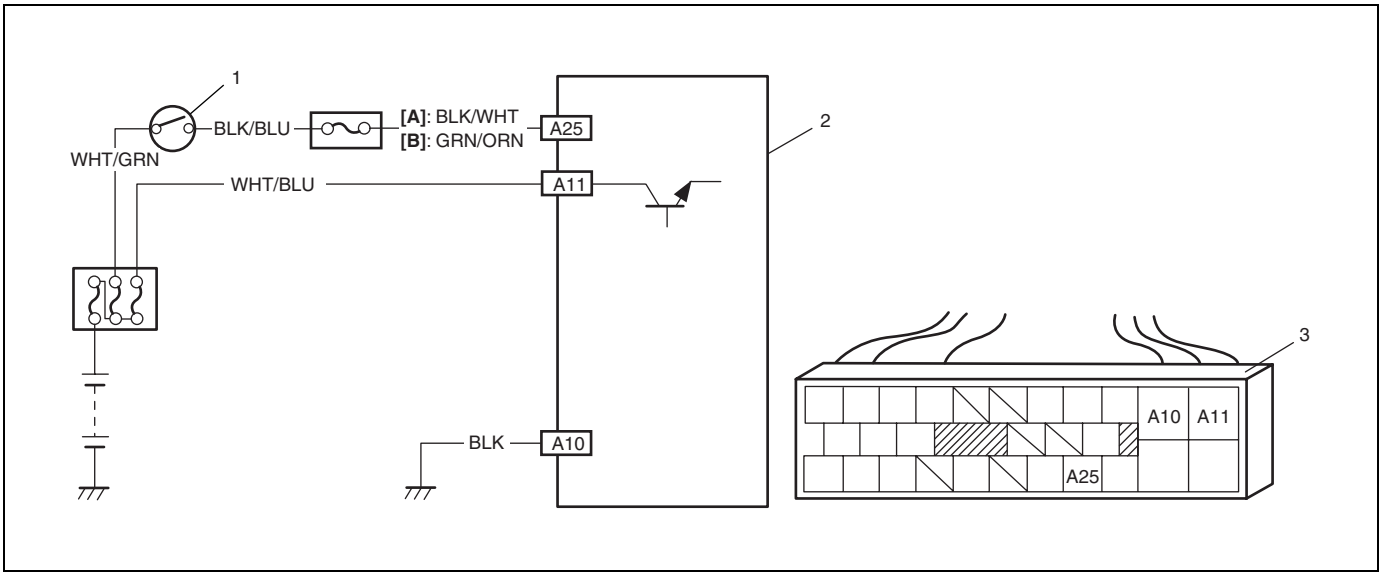
INSPECTION

Step	Action	Yes	No
1	1) Check pump motor referring to “ABS Hydraulic Unit Operation Check” in this section. Is it in good condition?	Check terminals “A11” and “A27” connection. If connections OK, substitute a known-good ABS hydraulic unit/control module assembly and recheck.	Go to Step 2.
2	1) Ignition switch OFF. 2) Disconnect ABS hydraulic unit/control module connector (1). 3) Check for proper connection to ABS hydraulic unit/control module connector at terminal “A27”. 4) If OK, then measure voltage between terminal “A27” of module connector and body ground. Is it 10 – 14 V?	Go to Step 3.	“WHT/BLU” circuit open.
3	Measure resistance between connector terminal “A28” of ABS hydraulic unit/control module assembly. Is it 5 Ω or less?	High resistance or open “BLK” circuit.	Substitute a known-good ABS hydraulic unit/control module assembly and recheck.

Fig. for Stop 2



DTC 63 (DTC C1063) – ABS Fail-Safe Relay Circuit



[A] : Canvas top model	1. Ignition switch	3. ABS hydraulic unit/control module connector of harness
[B] : Other than canvas top model	2. ABS hydraulic unit/control module assembly	

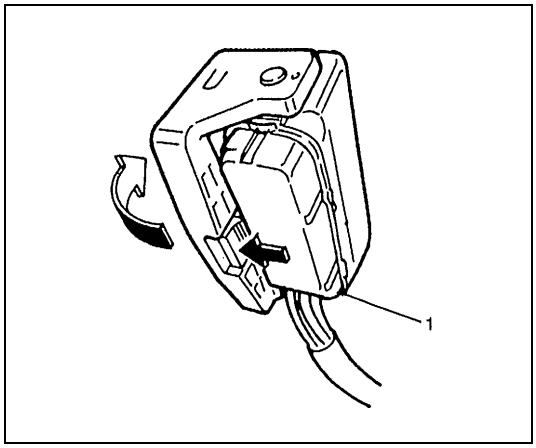
DESCRIPTION

The ABS control module monitors the voltage at the terminal of the solenoid circuit constantly with the ignition switch turned ON. Also, immediately after the ignition switch is turned "ON", perform an initial check as follows. Switch the fail-safe relay in the order of ON → OFF → ON and check if the voltage at 6 solenoid circuit terminals changes to High → Low →High. If anything faulty is found in the initial check and when the voltage at all solenoid circuit terminals is low with the ignition switch turned ON and ABS not operated, this DTC will be set.

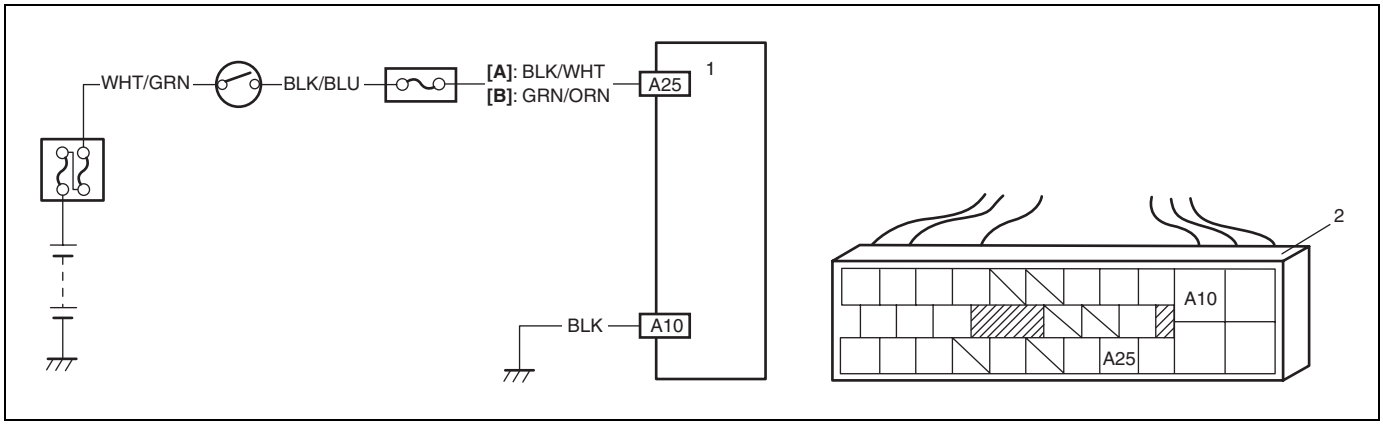
INSPECTION

Step	Action	Yes	No
1	Check battery voltage. Is it about 11 V or higher?	Go to Step 2.	Check charging system referring to "Battery" or "Generator" in Section 6H.
2	Check ABS main fuse and connection. Is it in good condition?	Go to Step 3.	Repair and/or replace fuse.
3	1) Ignition switch OFF. 2) Disconnect ABS hydraulic unit/control module connector (1). 3) Check proper connection to ABS hydraulic unit/control module at terminal "A11". 4) If OK, then measure voltage between connector terminal "A11", and body ground. Is it 10 – 14 V?	Go to Stop 4.	"WHT/BLU" circuit open or short to ground.
4	1) Measure resistance between terminal "A10" of ABS hydraulic unit/control module connector and body ground. Is it 5 Ω or less?	Substitute a known-good ABS hydraulic unit/control module assembly and recheck.	"BLK" circuit open.

Fig. for Stop 3



DTC 71 (DTC C1071) – ABS Control Module



[A] : Canvas top model	1. ABS hydraulic unit/control module assembly
[B] : Other than canvas top model	2. ABS hydraulic unit/control module connector

DESCRIPTION

This DTC will be set when an internal fault is detected in the ABS control module.

INSPECTION

Step	Action	Yes	No
1	Clear all DTCs and check DTC. Is it DTC 71?	Go to Step 2.	Could be a temporary malfunction of the ABS control module.
2	1) Check proper connection of ABS hydraulic unit/control module connector. 2) If OK, disconnect ABS hydraulic unit/control module connector and check the following. • Voltage “A25” terminal : 10 – 14 V • Resistance between “A10” and body ground : Continuity Are the check result as specified above?	Replace ABS hydraulic unit/control module assembly.	Repair and recheck.

On-Vehicle Service

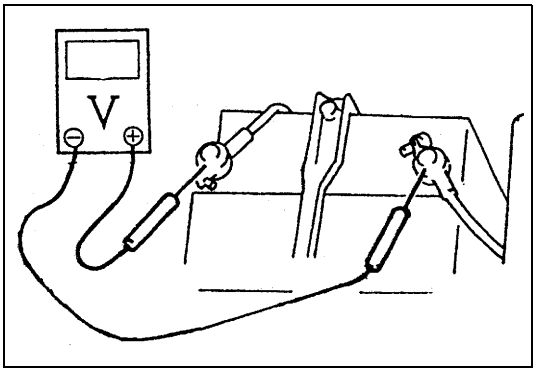
Precaution

When connector is connected to ABS hydraulic unit/control module assembly, do not disconnect connectors of sensors and turn ignition switch ON. Then DTC will be set in ABS control module.

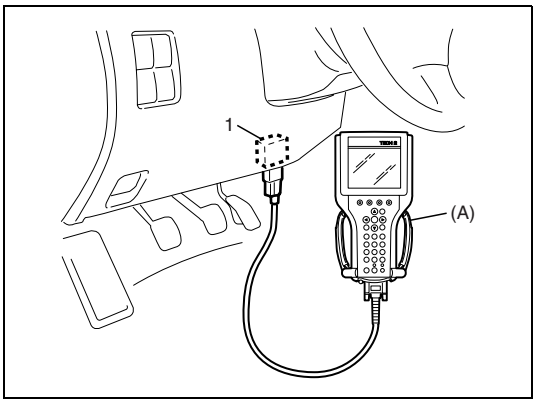
ABS Hydraulic Unit Operation Check

USING SUZUKI SCAN TOOL

1) Check that basic brake system other than ABS is in good condition.

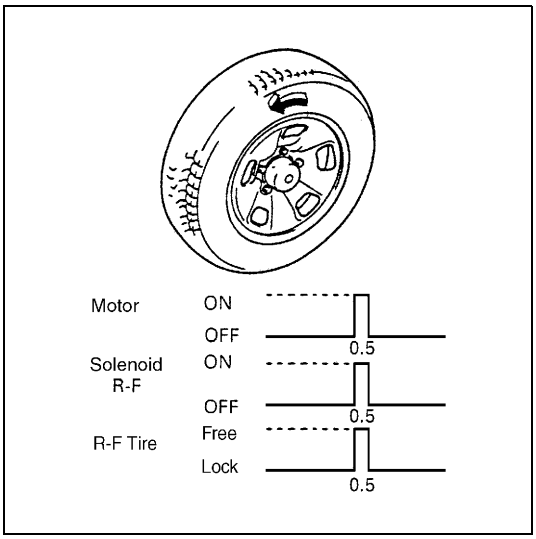


2) Check that battery voltage is 11 V or higher.
3) With "ABS" warning lamp, check that no abnormality is detected in ABS. Refer to "Diagnostic Trouble Code (DTC) Check" in this section.
4) Lift up vehicle.
5) Set transmission to neutral and release parking brake.
6) Turn each wheel gradually by hand to check if brake dragging occurs. If it does, correct.



7) Connect SUZUKI scan tool to data link connector (DLC) (1) with ignition switch OFF.

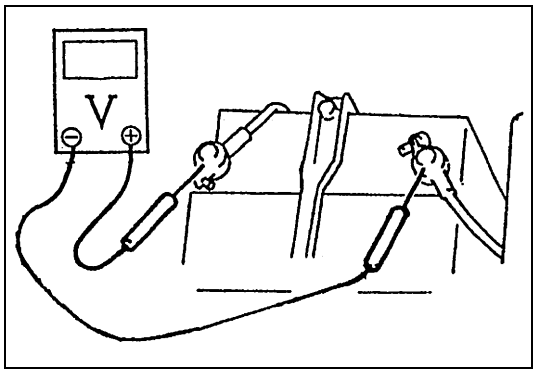
Special tool
(A) : SUZUKI scan tool



8) Turn ignition switch to ON position and check actuator operation using "HYDRAULIC CONTROL TEST" under "miscellaneous test" ("MISC. TEST") mode of SUZUKI scan tool.
9) Check that each wheel turns when only brake force is depressurized (about 0.5 sec.).
   If a faulty condition is found in this step, replace hydraulic unit/control module assembly.

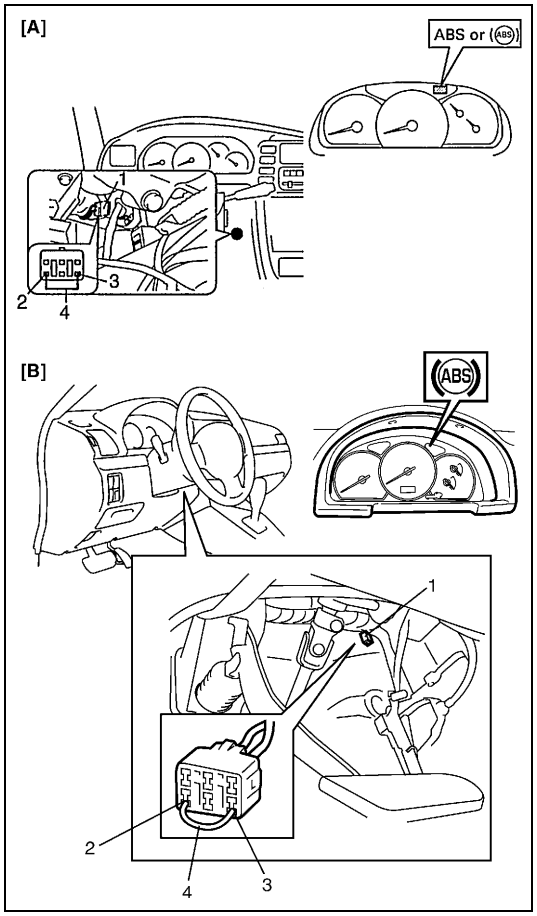
NOT USING SUZUKI SCAN TOOL

1) Check that basic brake system other than ABS is in good condition.



2) Check that battery voltage is 11 V or higher.

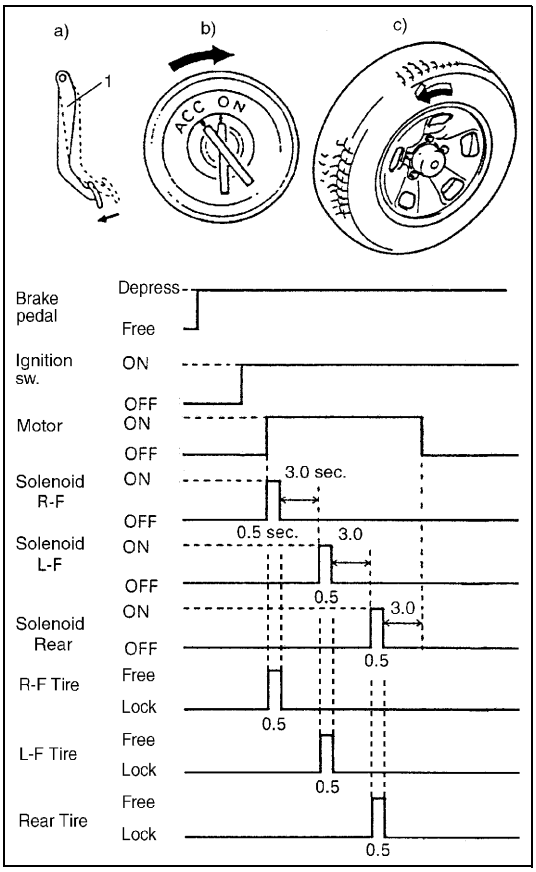
3) With “ABS” warning lamp, check that no abnormality is detected in ABS. Refer to “Diagnostic Trouble Code (DTC) Check” in this section.
4) Lift up vehicle.
5) Set transmission to neutral and release parking brake.
6) Turn each wheel gradually by hand to check if brake dragging occurs. If it does, correct.



7) With diag. switch “PNK” wire terminal (3) of black or blue diagnosis connector (1) connected to “BLK” wire terminal (2) by using service wire (4), turn ignition switch ON and check that “ABS” warning lamp indicates DTC 12 referring to “Diagnostic Trouble Code (DTC) Check” in this section.

[A] :	Canvas top model
[B] :	Other than canvas top model

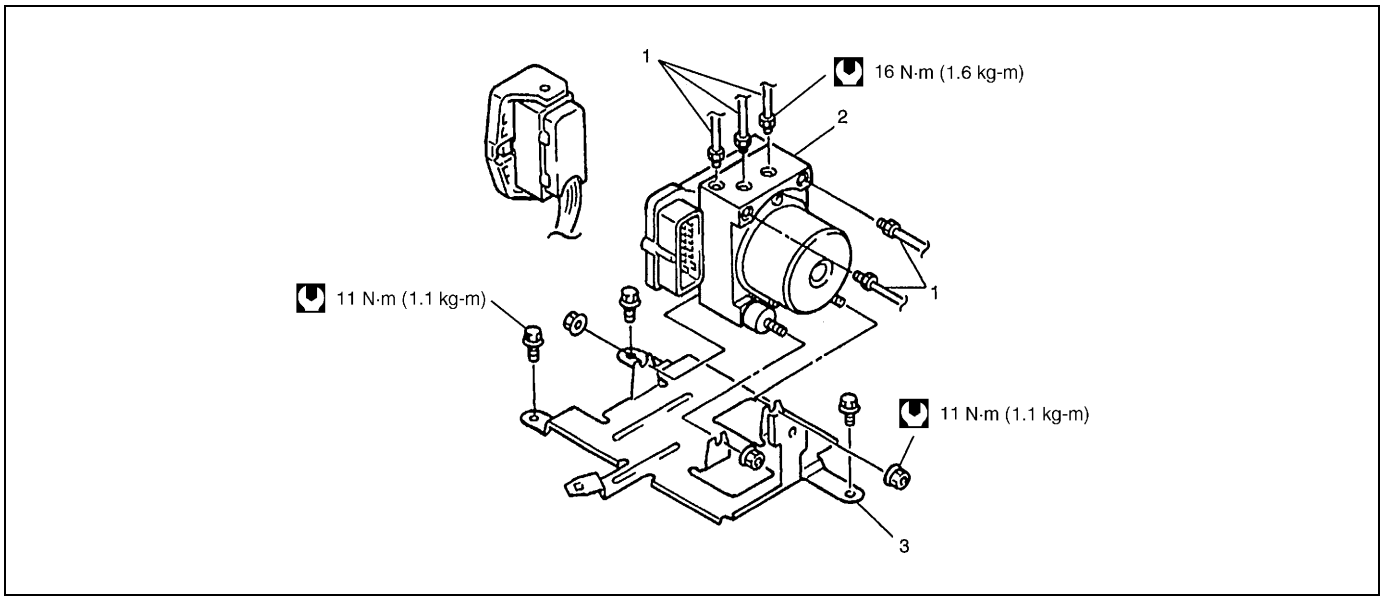
8) Turn ignition switch OFF.



9) Check that wheel turns when only brake force is depressurized (about 0.5 sec.).
   a) Brake pedal should be depressed.
   b) Ignition switch turned ON by one person.
   c) Wheel should be turned by another person's hand. At this time, there is the following operation :
   - Operation sound of solenoid is heard and wheel turns only about 0.5 sec. (Brake force is depressurized).
   - Operation sound of pump motor is heard and pulsation is felt at brake pedal.
10) If all 4-wheels cannot be checked during one ignition cycle (OFF → ON), repeat Steps 8) and 9) till all 4 wheels are checked.
    If a faulty condition is found in Steps 9) and 10), replace hydraulic unit/control module assembly.
11) Turn ignition switch OFF and remove service wire from diagnosis connector.

ABS Hydraulic Unit/Control Module Assembly

COMPONENTS



1. Brake pipe	3. Bracket
2. ABS hydraulic unit/control module assembly	

CAUTION:

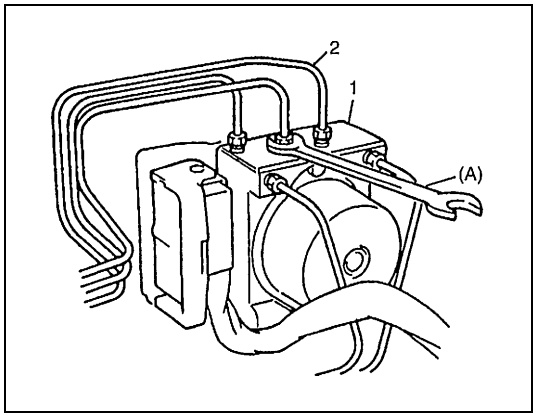
Never disassemble ABS hydraulic unit/control module assembly, loosen blind plug or remove motor. Performing any of these prohibited services will affect original performance of ABS hydraulic unit/ control module assembly.

HYDRAULIC UNIT INSPECTION

- Check hydraulic unit for fluid leakage.
  If any, repair or replace.

REMOVAL

1) Disconnect negative cable at battery.

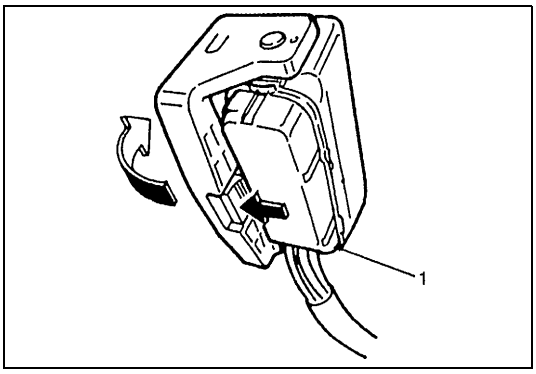


2) Using special tool, disconnect brake pipes (2) from ABS hydraulic unit/control module assembly (1) and loosen flare nuts as shown figure.

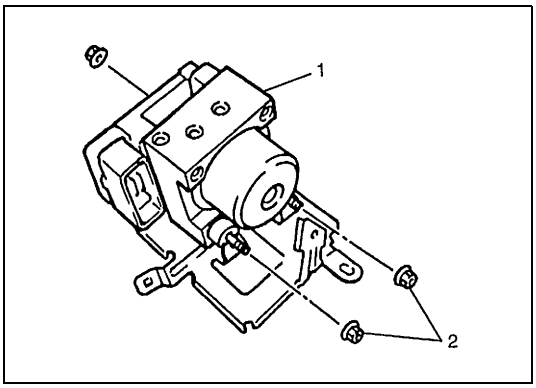
Special tool
(A) : 09950-78220

NOTE:

Put bleeder plug cap onto pipe to prevent fluid from spilling.
Do not allow brake fluid to get on painted surfaces.



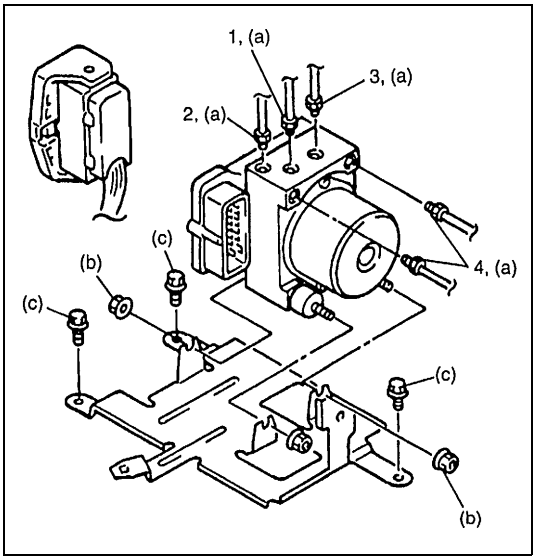
3) Disconnect ABS hydraulic unit/control module assembly connector (1).



4) Remove three nuts (2) and take out ABS hydraulic unit/control module assembly (1) from bracket.

CAUTION:
- **Do not give an impact to hydraulic unit.**
- **Use care not to allow dust to enter hydraulic unit.**
- **Do not place hydraulic unit on its side or upside down. Handling it in inappropriate way will affect its original performance.**

INSTALLATION



1) Install hydraulic unit by reversing removal procedure.

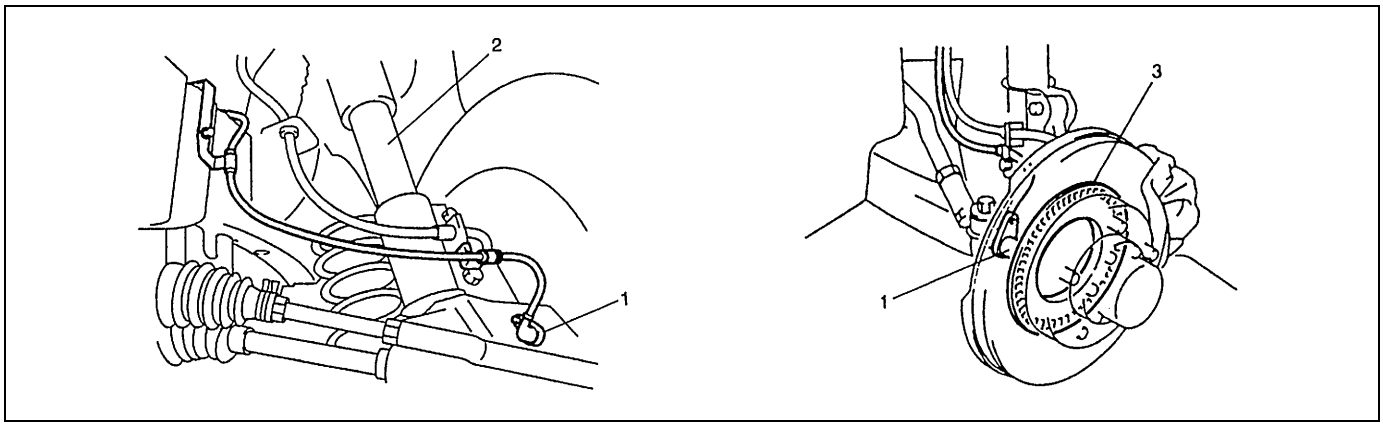
Tightening torque
Brake pipe flare nut
(a) : 16 N·m (1.6 kg-m, 12.0 lb-ft)
ABS hydraulic unit/control module assembly nut
(b) : 11 N·m (1.1 kg-m, 8.0 lb-ft)
ABS hydraulic unit bracket bolt
(c) : 11 N·m (1.1 kg-m, 8.0 lb-ft)

1.	To left-front
2.	To right-front
3.	To rear
4.	From master cylinder

2) Bleed air from brake system. Refer to “Bleeding Brakes” in Section 5.
3) Check each installed part for fluid leakage and perform hydraulic unit operation check.

Front Wheel Speed Sensor

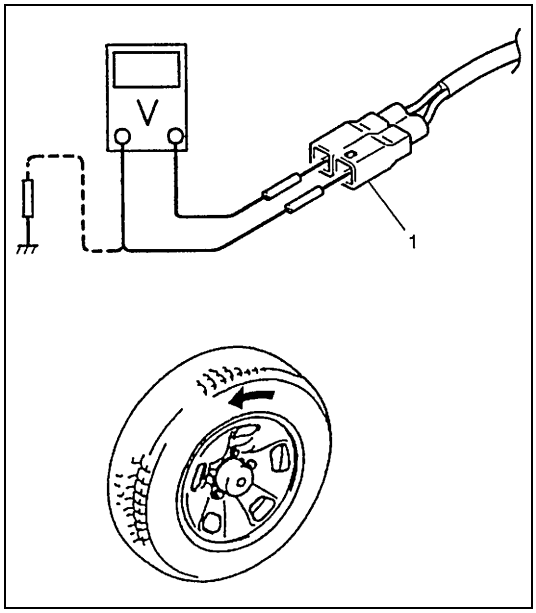
LOCATION



1.	Left front wheel speed sensor
2.	Left front strut
3.	Sensor rotor

OUTPUT VOLTAGE INSPECTION

1) Turn ignition switch OFF.
2) Hoist vehicle a little.

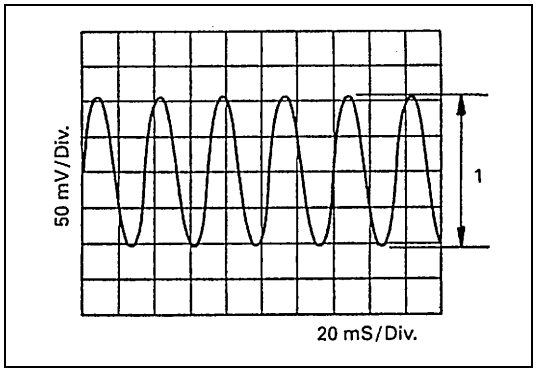


3) Disconnect connector (1) of wheel speed sensor.
4) Connect voltmeter between connector terminals.
5) While turning wheel at a speed of approximately 2/3 to 1 full rotation per second, check AC voltage of sensor.

Front wheel speed sensor output AC voltage at 2/3 to one rotation per second (35 – 53 Hz)
106 mV or more

If measured voltage is not as specified, check sensor, rotor and their installation conditions.

Reference

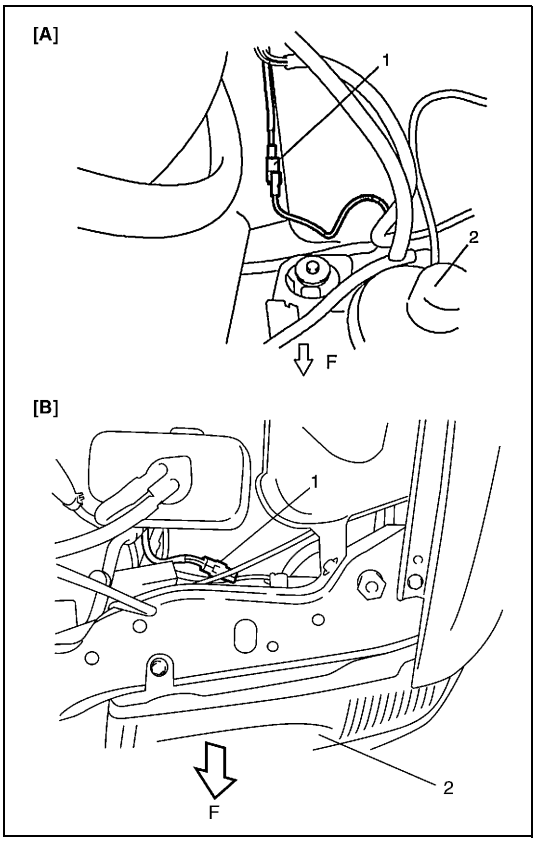


When using oscilloscope for this check, check if peak-to-peak voltage (1) meets specification and waveform is complete.

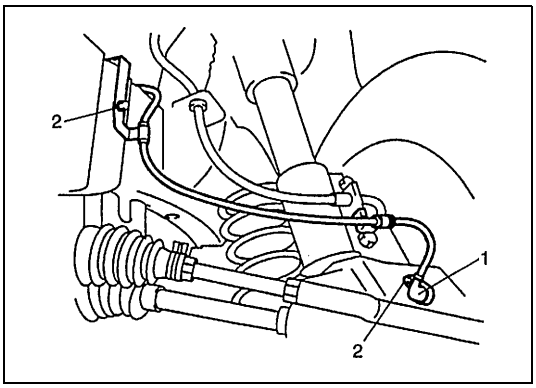
Front wheel speed sensor peak-to-peak voltage at 2/3 to one rotation per second (35 – 53 Hz)
150 mV or more

REMOVAL

1) Disconnect negative cable at battery.
2) Hoist vehicle and remove wheel.
3) Disconnect front wheel speed sensor connector (1).



[A] :	Canvas top model
[B] :	Other than canvas top model
2.	Headlight assembly
F :	FORWARD



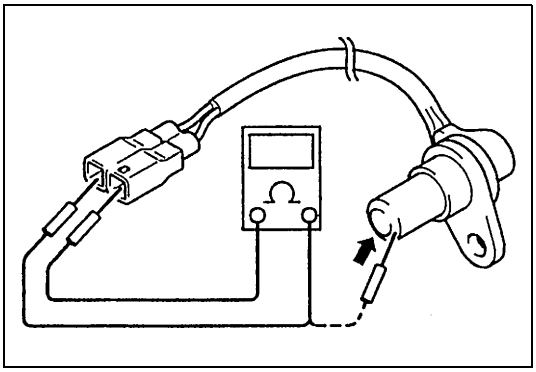
4) Remove harness clamp bolts (2) and remove front wheel speed sensor (1) from knuckle.

CAUTION:
- **Do not pull wire harness when removing front wheel speed sensor.**
- **Do not cause damage to surface of front wheel speed sensor and do not allow dust, etc. to enter its installation hole.**

INSPECTION

Sensor

- Check sensor for damage.
- Check sensor for resistance.

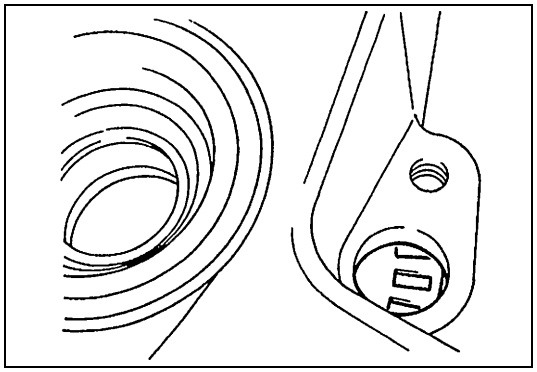


Resistance between terminals of front wheel speed sensor
1.2 – 1.6 kΩ at 20°C (68°F)

Resistance between terminal and sensor body of front wheel speed sensor
1 MΩ or more

If any faulty is found, replace.

Sensor Rotor

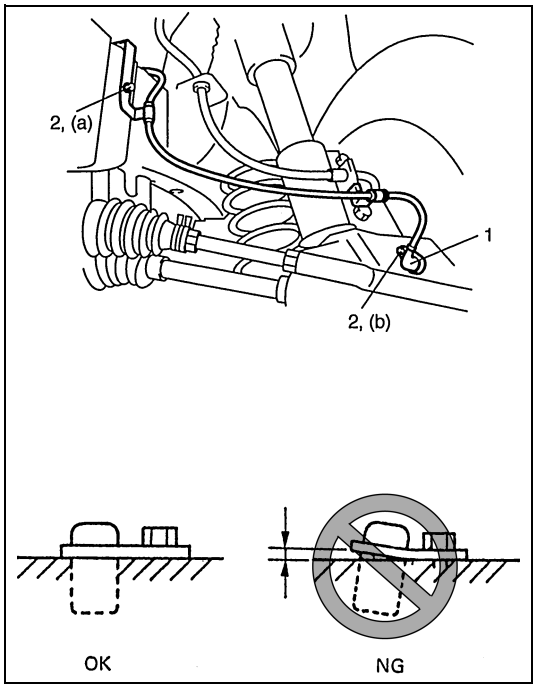


- Check rotor for being missing, damaged or deformed.
- Turn drive shaft and check if rotor rotation is free from eccentricity and looseness.
- Check that no foreign material is attached.

If any faulty is found, repair or replace. Refer to “Wheel Hub” in Section 3D.

INSTALLATION

1) Check that no foreign material is attached to sensor and rotor.



2) Install it by reversing removal procedure.

CAUTION:
Do not pull wire harness or twist more than necessary when installing front wheel speed sensor.

Tightening torque
Front wheel speed sensor harness clamp bolt
(a) : 10 N·m (1.0 kg-m, 7.5 lb-ft)
Front wheel speed sensor bolt
(b) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

3) Check that there is no clearance between sensor (1) and knuckle.

2. Bolt

Front Sensor Rotor

REMOVAL

Remove front sensor rotor referring to “Wheel Hub” in Section 3D.

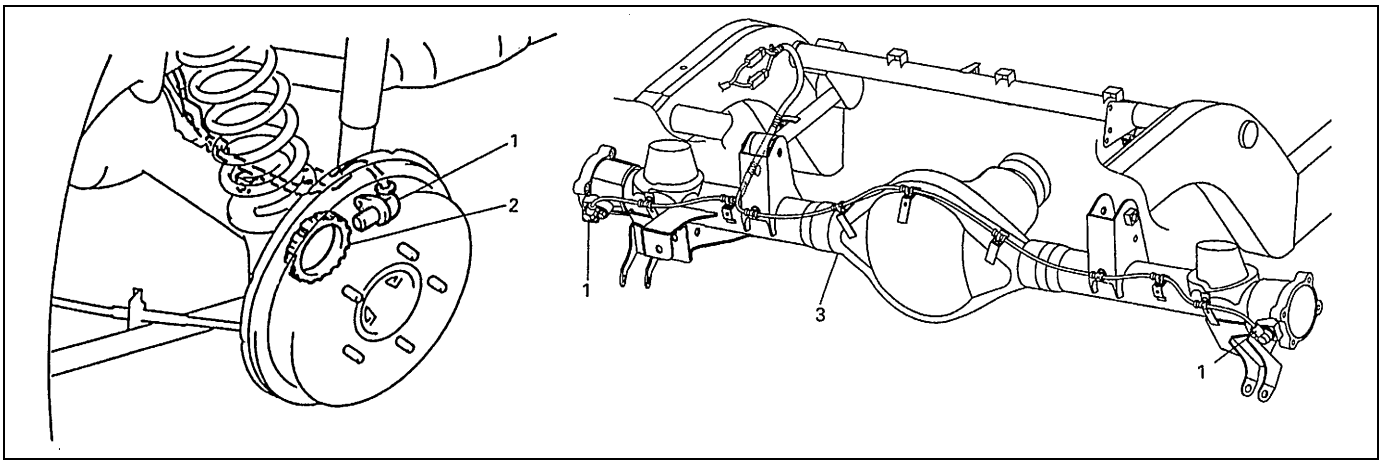
INSTALLATION

CAUTION:
Don’t reuse front sensor rotor removed from front wheel hub because of it for being deformed.

Install new front sensor rotor referring to “Wheel Hub” in Section 3D.

Rear Wheel Speed Sensor

LOCATION



1. Rear wheel speed sensor	3. Rear axle housing
2. Sensor rotor	

OUTPUT VOLTAGE INSPECTION

Check in the same procedure as that used of front wheel speed sensor check.

Rear wheel speed sensor output AC voltage at 2/3 to one rotation per second (25 – 38 Hz)
106 mV or more

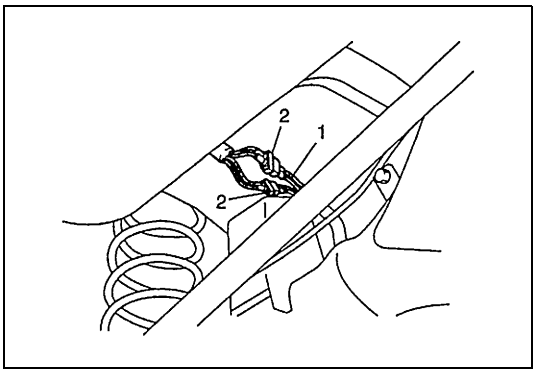
Reference

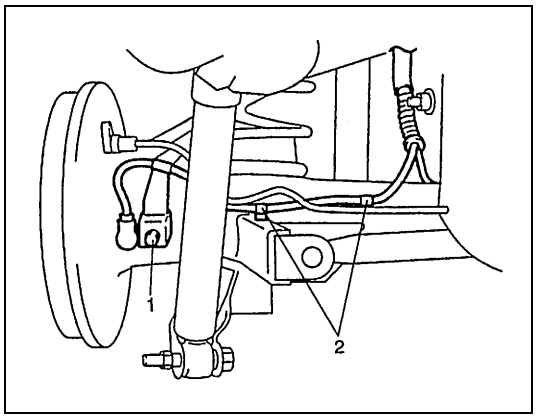
When using oscilloscope for this check, check if peak-to-peak voltage meets specification and waveform is complete.

Rear wheel speed sensor peak-to-peak voltage at 2/3 to one rotation per second (25 – 38 Hz)
150 mV or more

REMOVAL

1) Disconnect negative cable at battery.
2) Hoist vehicle.
3) Disconnect rear wheel speed sensor connector (2) and detach wire harness (1) from vehicle body and rear axle.





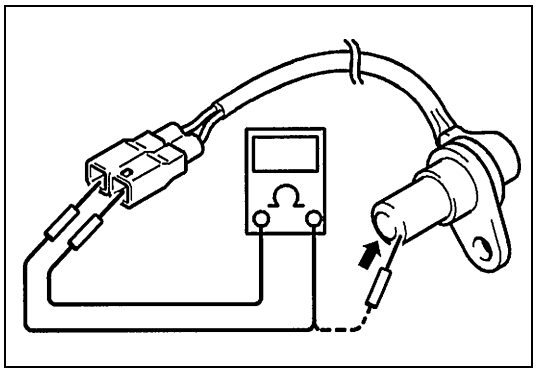
4) Remove harness clamps (2) and remove rear wheel speed sensor from rear axle.

CAUTION:
- **Do not pull wire harness when removing rear wheel speed sensor.**
- **Do not cause damage to surface of rear wheel speed sensor and do not allow dust, etc. to enter its installation hole.**

1. Sensor bolt

INSPECTION

Sensor



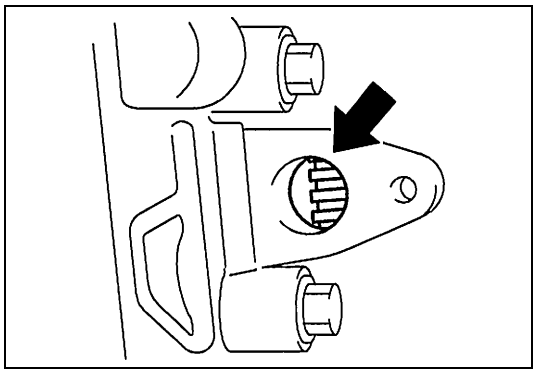
- Check sensor (pole piece) for damage or bent.
- Check sensor for resistance.

Resistance between terminals of front wheel speed sensor
1.2 – 1.6 kΩ at 20°C, 68°F

Resistance between terminal and sensor body of front wheel speed sensor
1 MΩ or more

If any faulty is found, replace.

Sensor Rotor

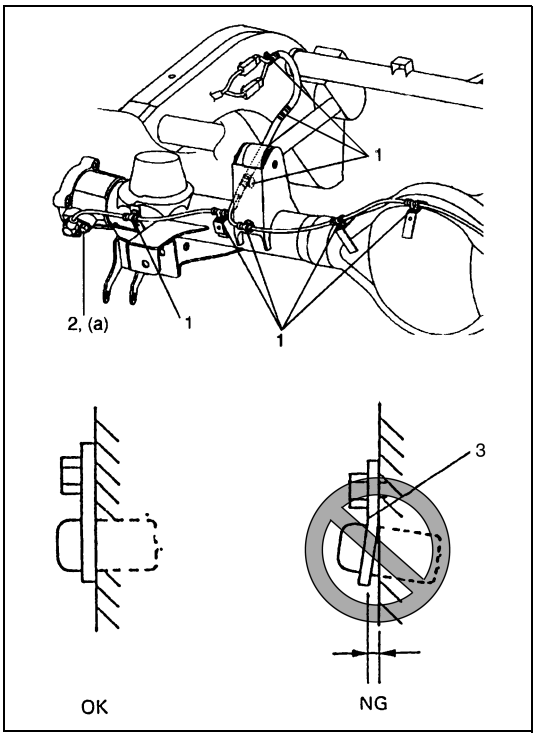


- Check rotor serration (teeth) for being missing, damaged or deformed.
- Turn wheel and check if rotor rotation is free from eccentricity and looseness.
- Check that no foreign material is attached.

If any faulty is found, repair or replace.

INSTALLATION

1) Check that no foreign material is attached to sensor and rotor.



2) Install it by reversing removal procedure.

Tightening torque
Rear wheel speed sensor bolt
(a) : 21 N·m (2.1 kg-m, 15.5 lb-ft)

CAUTION:
Do not pull wire harness or twist more than necessary when installing rear wheel speed sensor.

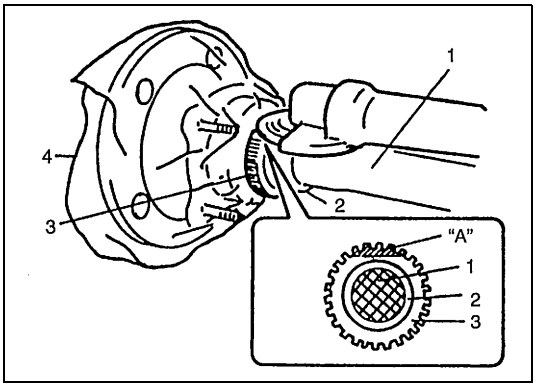
3) Check that there is no clearance between sensor (3) and knuckle.

1.	Clamps
2.	Sensor bolt

Rear Sensor Rotor

REMOVAL

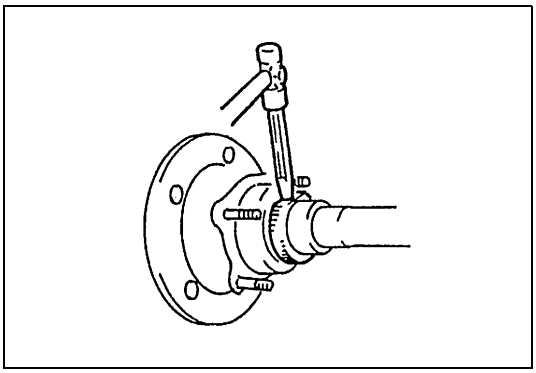
1) Remove rear axle shaft. Refer to "Rear Axle Shaft and Wheel Bearing" in Section 3E.



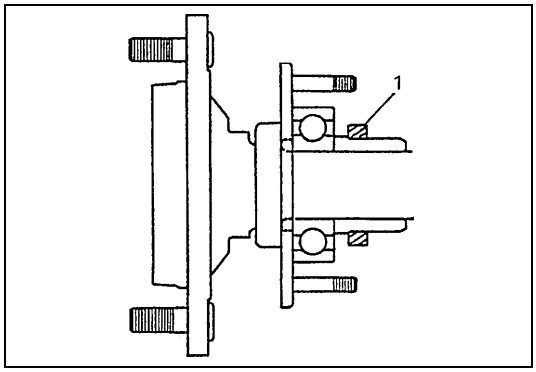
2) In order to remove sensor rotor (3) from retainer ring (2), grind with a grinder one part "A" of the sensor rotor as illustrated till it becomes thin.

CAUTION:
- **Cover vinyl sheet or the like (4) over wheel bearing so that fine grains from grinding will not enter there.**
- **Be careful not to go so far as to grind the retainer ring.**

1.	Rear axle shaft



3) Break with a chisel the thin ground sensor rotor, and it can be removed.



INSTALLATION

1) Press-fit new sensor rotor (1) as shown.

NOTE:

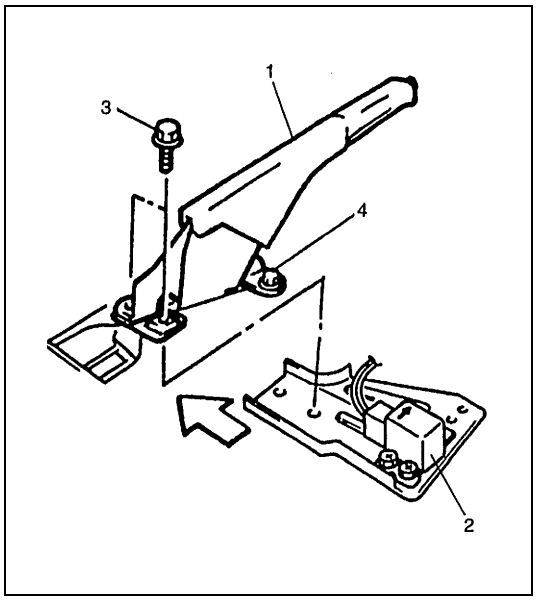
Use care not to cause any damage to outside of retainer ring.

2) Install rear axle shaft. Refer to "Rear Axle Shaft and Wheel Bearing" in Section 3E.

G Sensor (for Canvas Top Model)

REMOVAL

1) Turn ignition switch OFF and disconnect battery negative cable.
2) Remove rear center console box.
3) Remove parking brake lever bolts (3) and G sensor (2) with bracket from floor.



NOTE:

Loosen only bolt (4).

4) Remove sensor with bracket from floor.
5) Disconnect connector from sensor.

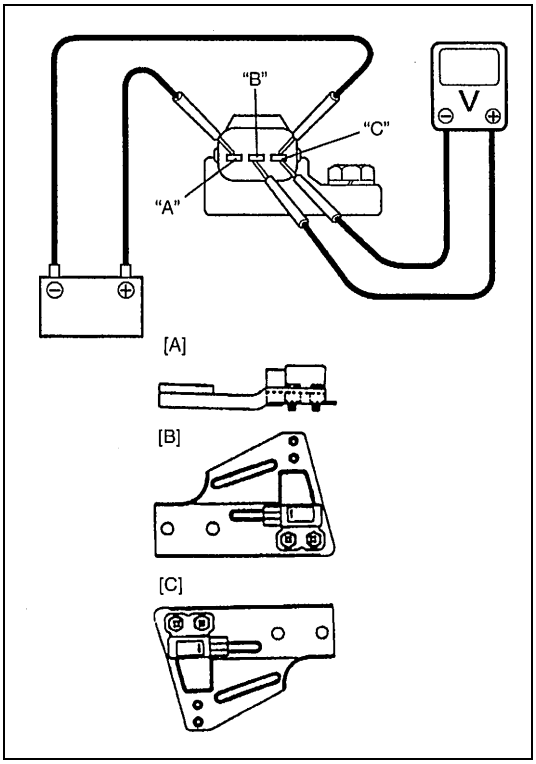
CAUTION:

- **Do not separate sensor and bracket. It will lead to erroneous assembly.**
- **Sensor must not be dropped or shocked. It will affect its original performance.**

1. Parking brake lever assembly

INSPECTION

1) Check sensor bracket for bend.

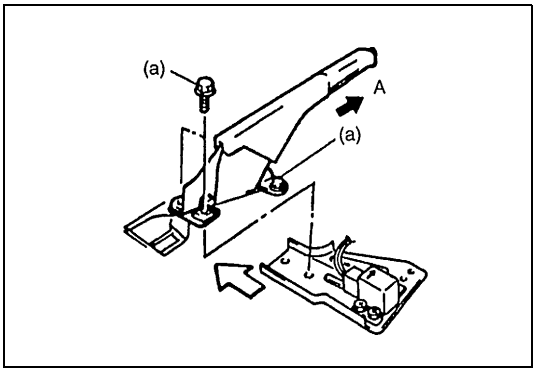


2) Connect positive cable of 12 volt battery to "A" terminal of sensor and ground cable to "C" terminal. Then using voltmeter, check voltage between "B" terminal and "C" terminal.

G sensor specification
When placed horizontally [A] : 2 – 3 V
When placed upright with arrow upward [B] : 3 – 4 V
When placed upright with arrow downward [C] : 1 – 2 V

If measured voltage is not as specified, replace sensor with bracket.

INSTALLATION



1) Connect connector to sensor securely.
2) Install sensor with bracket and parking lever assembly onto floor so that arrow mark directs vehicle forward.

Tightening torque
Parking lever assembly mounting bolt
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

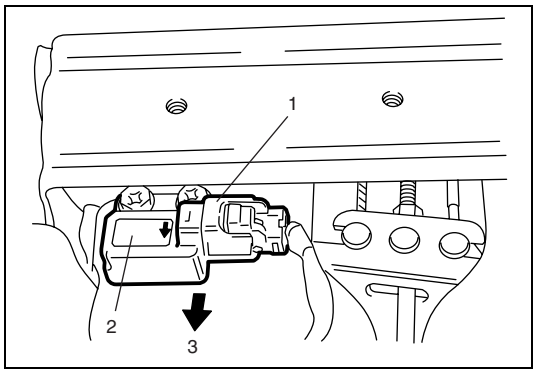
A : Forward

3) Install rear console box.

G Sensor (Other than Canvas Top Model)

REMOVAL

1) Turn ignition switch OFF and disconnect battery negative cable.
2) Remove rear center console box.

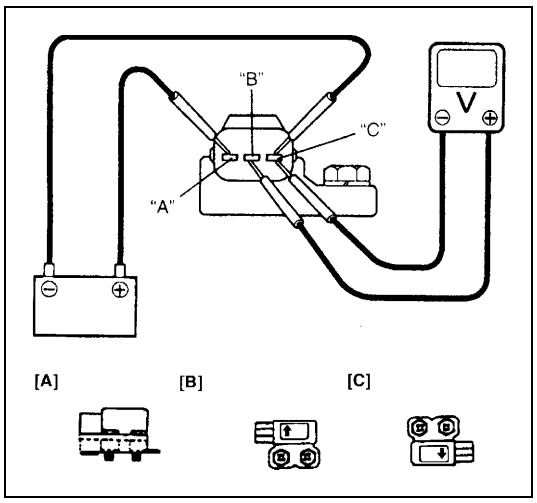


3) Disconnect connector (1) from sensor (2).
4) Remove G sensor (2) from floor.

CAUTION:
Sensor must not be dropped or shocked. It will affect its original performance.

1. Forward

INSPECTION

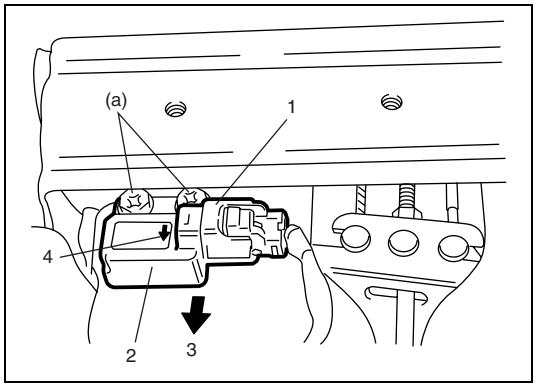


1) Connect positive cable of 12 volt Battery to "A" terminal of sensor and ground cable to "C" terminal. Then using voltmeter, check voltage between "B" terminal and "C" terminal.

G sensor specification
When placed horizontally [A] : 2 – 3 V
When placed upright with arrow upward [B] : 3 – 4 V
When placed upright with arrow downward [C] : 1 – 2 V

If measured voltage is not as specified, replace sensor with bracket.

INSTALLATION



1) Connect connector (1) to sensor (2) securely.
2) Install sensor (2) onto floor so that arrow mark (4) directs vehicle forward.

Tightening torque
G sensor mounting bolt
(a) : 6 N·m (0.6 kg-m, 4.3 lb-ft)

3) Install rear console box.

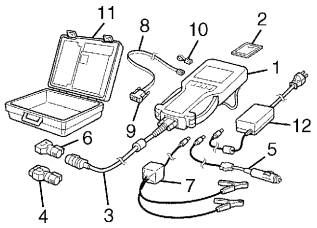
Transfer 4WD Switch

For removal, inspection and installation of this switch, refer to "Switches" in Section 7A.

Tightening Torque Specifications

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Brake pipe flare nut	16	1.6	11.5
ABS hydraulic unit/control module assembly nut	11	1.1	8.0
ABS hydraulic unit bracket bolt	11	1.1	8.0
Front wheel speed sensor bolt	23	2.3	17.0
Rear wheel speed sensor bolt	21	2.1	15.5
Parking lever assembly mounting bolt	23	2.3	17.0
Front wheel speed sensor harness clamp bolt	10	1.0	7.5
G sensor mounting bolt	6	0.6	4.3

Special Tool

	
09950-78220 Flare nut wrench (10 mm)	Tech 2 kit (SUZUKI scan tool) See NOTE below.

NOTE:

This kit includes the following items and substitutes for the Tech 1A kit.
1. Tech 2, 2. PCMCIA card, 3. DLC cable, 4. SAE 16/19 adapter, 5. Cigarette cable, 6. DLC loopback adapter, 7. Battery power cable, 8. RS232 cable, 9. RS232 adapter, 10. RS232 loopback connector, 11. Storage case, 12. Power supply

SECTION 7A

MANUAL TRANSMISSION (TYPE 1)

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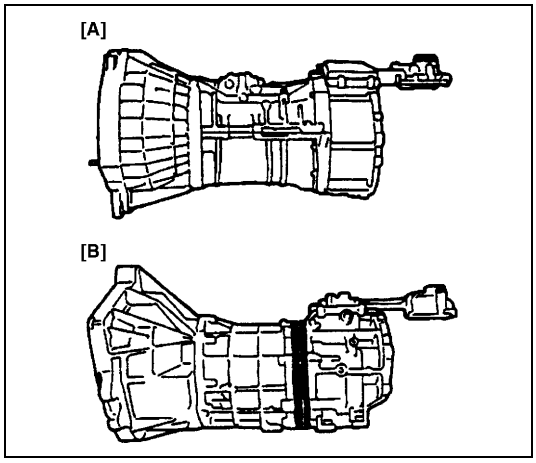
7A

General Description

Identification of Transmission Type



Check shape of transmission, and identify transmission as type 1 or type 2.

[A] :	Fig. for type 1 transmission
[B] :	Fig. for type 2

System Description

The manual transmission consists of the input shaft, main shaft, countershaft and reverse gear which are installed in the aluminum case. Its gears are of forward five speeds in synchro mesh and reverse one speed in constant mesh system.
The main shaft gears are held by the needle bearings and on them the synchronizer rings and synchronizer sleeve & hubs are assembled.
The gear shift lever case is located at the upper behind the transmission case and has a cam which prevents direct gear shift from the 5th speed gear to the reverse gear.
As the aluminum case is sealed with liquid type gasket, it is necessary to use genuine sealant or its equivalent on its mating surfaces when reassembling it.
Also, the case fastening bolts must be tightened to specified torque by means of the torque wrench and tightening over or below the specified torque should be avoided.

Diagnosis

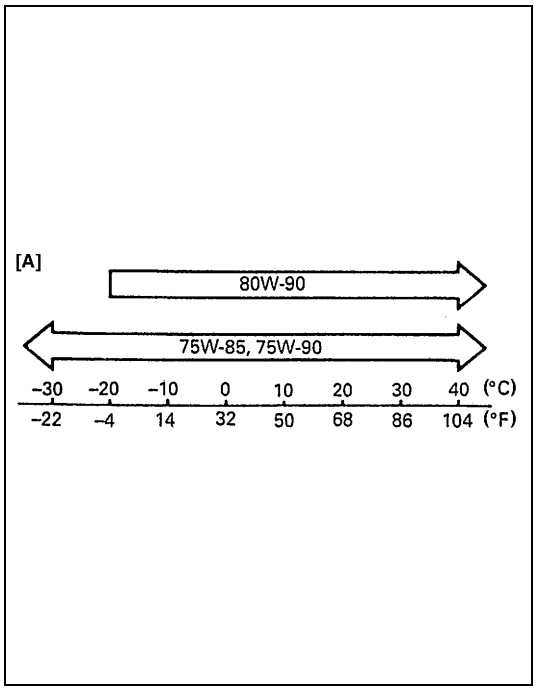
Condition	Possible Cause	Correction
Gear slipping out of mesh	Worn shift fork shaft	Replace
	Worn shift fork or synchronizer sleeve	Replace
	Weak or damaged locating spring	Replace
	Worn bearings on input shaft or main shaft	Replace
	Worn chamfered tooth on sleeve or gear	Replace sleeve and gear
	Missing or disengagement of circlip(s)	Install or replace
Gears refusing to disengage	Weakened or broken synchronizer spring	Replace
	Distorted shift shaft or shift fork	Replace
Hard shifting	Improper clutch pedal free travel	Adjust
	Distorted or broken clutch disc	Replace
	Damaged clutch pressure plate	Replace clutch cover
	Worn synchronizer ring	Replace
	Worn chamfered tooth on sleeve or gear	Replace sleeve and gear
	Distorted shift shaft	Replace
Noise	Inadequate or insufficient lubricant	Replenish
	Damaged or worn bearing(s)	Replace
	Damaged or worn gear(s)	Replace
	Damaged or worn synchronizer ring	Replace
	Damaged or worn chamfered tooth on sleeve or gear	Replace

On-Vehicle Service

Gear Oil

INSPECTION AND CHANGE

1) Before changing or inspecting oil, be sure to stop engine and lift vehicle horizontally.
2) With vehicle lifted up, check oil level and leakage. If leakage exists, correct or repair it.



3) Drain old oil and fill new specified oil as shown below by specified amount (roughly up to level hole).

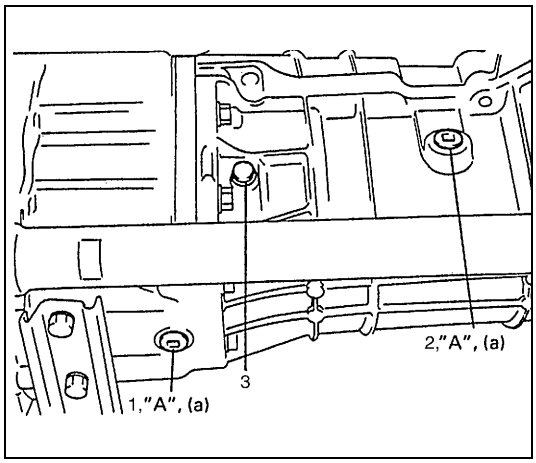
NOTE:

- **It is highly recommended to use SAE 75W-90 gear oil.**
- **Whenever vehicle is hoisted for any other service work than oil change, also be sure to check for oil leakage and status of breather hoses.**
- **If water or rust is mixed in drained oil, be sure to check breather hose and boot of transmission and transfer.**

Gear Oil Specification
Oil grade : API GL-4
Viscosity : SAE 75W-85, 75W-90 or 80W-90

Oil Capacity:
1.5 liters (3.2/2.6 US/Imp. pt)

[A] : Viscosity chart SAE



4) Torque drain plug (1) and level/filler plug (2) as specified below after applying sealant to its thread.

CAUTION:

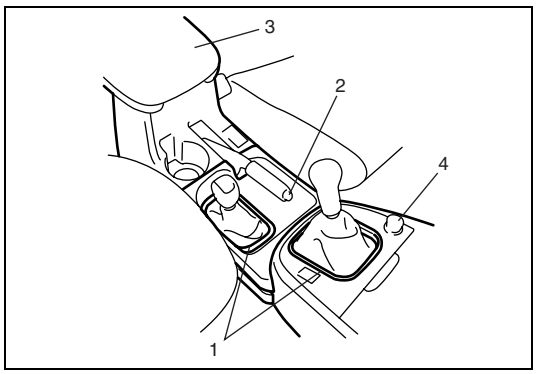
- **Transmission oil must not be poured through gear shift control lever part.**
- **Do not loosen or remove reverse idle gear shaft bolt (3).**

"A" : Sealant 99000-31110

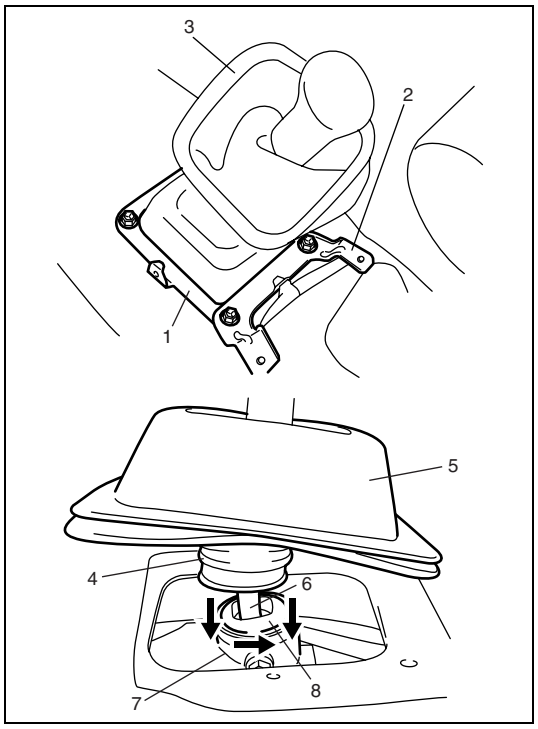
Tightening torque
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

Transmission Shift Control Lever

REMOVAL



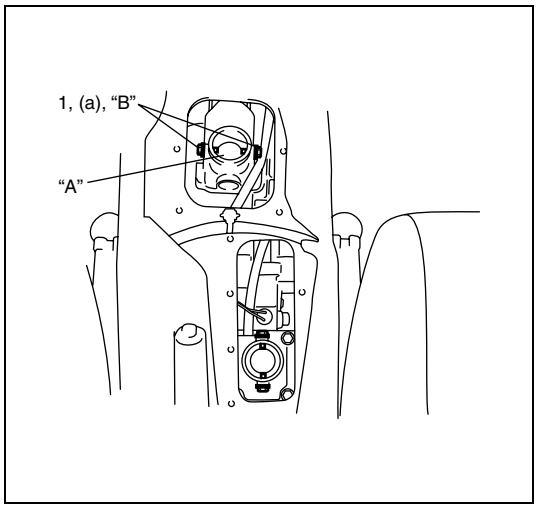
1) Remove covers (1) from center console boxes.
2) Remove rear center console box upper cover (2).
3) Remove 6 screws, and then take off rear center console box (3) and front center console box (4).



4) Remove console box bracket (2) and boot cover (1).
5) Lift up boot No.3 (3) and boot No.2 (5).
6) Remove boot clamp and then lift up boot No.1 (4) from transmission shift lever case (7).
7) With gear shift control case cover (8) pushed down with fingers, turn it to counter clockwise and take out shift control lever (6).

INSPECTION AND INSTALLATION

1) Check shift control lever lower portion and control lever locating sheet for excessive wear, and boot for damage. Correct or replace if necessary.



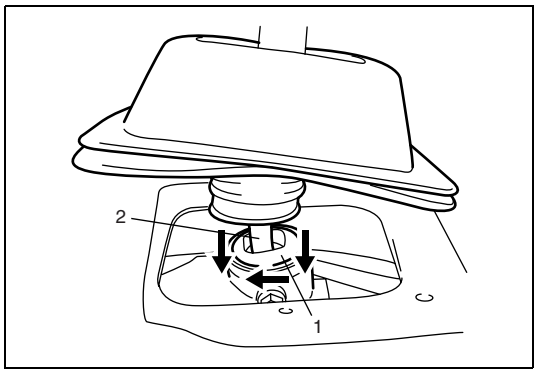
2) If control lever locating bolts (1) are replaced or retightened, torque them as specified below.
   Replacing or control lever locating bolts (1) requires thread lock cement.

"B" : Cement 99000-32110

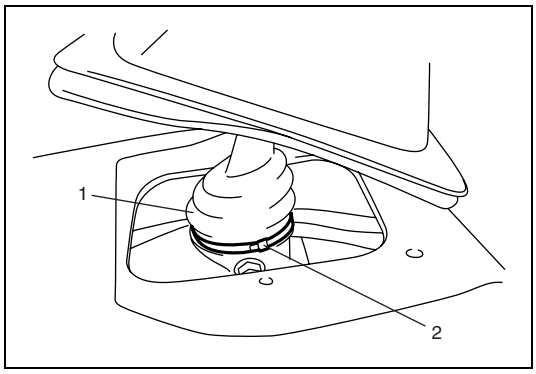
Tightening torque
Control lever locating bolt
(a) : 17 N·m (1.7 kg-m, 12.5 lb-ft)

3) Apply grease to pivot portions and seat, then install shift control lever.

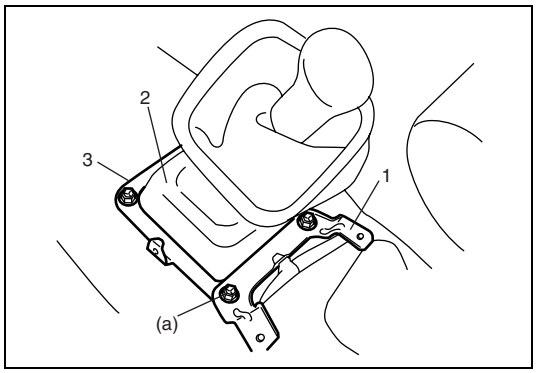
"A" : Grease 99000-25010



4) Set shift control lever (2) to shift lever case.
5) With gear shift control case cover (1) pushed down by hand, turn gear shift control case cover (1) to clockwise.



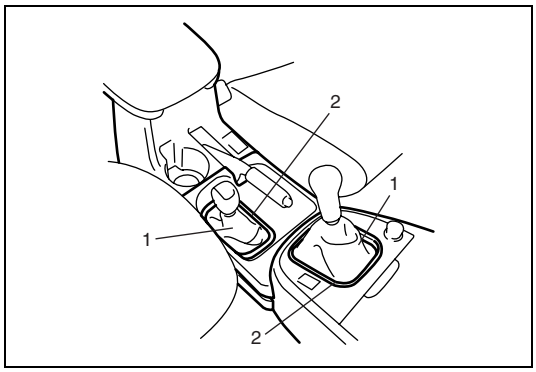
6) Install boot No.1 (1) from inside of cabin and clamp it with a new clamp (2) securely.



7) Install boot No.2 (2) with boot cover (3) and console box bracket (1).

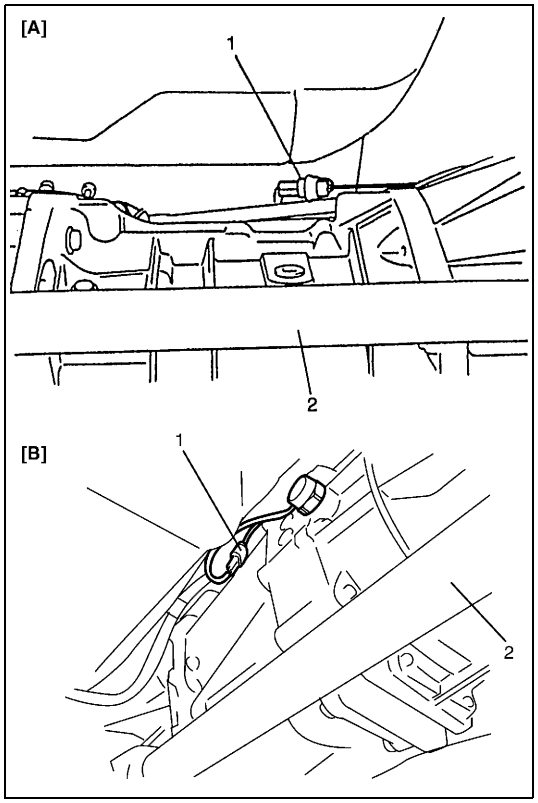
Tightening torque
Control lever boot cover bolt
(a) : 15 N·m (1.5 kg-m, 11.0 lb-ft)

8) Install console box.



9) After fitting boot No.3 (1) to covers (2), install covers (2) to center console boxes.

BACK UP LIGHT SWITCH



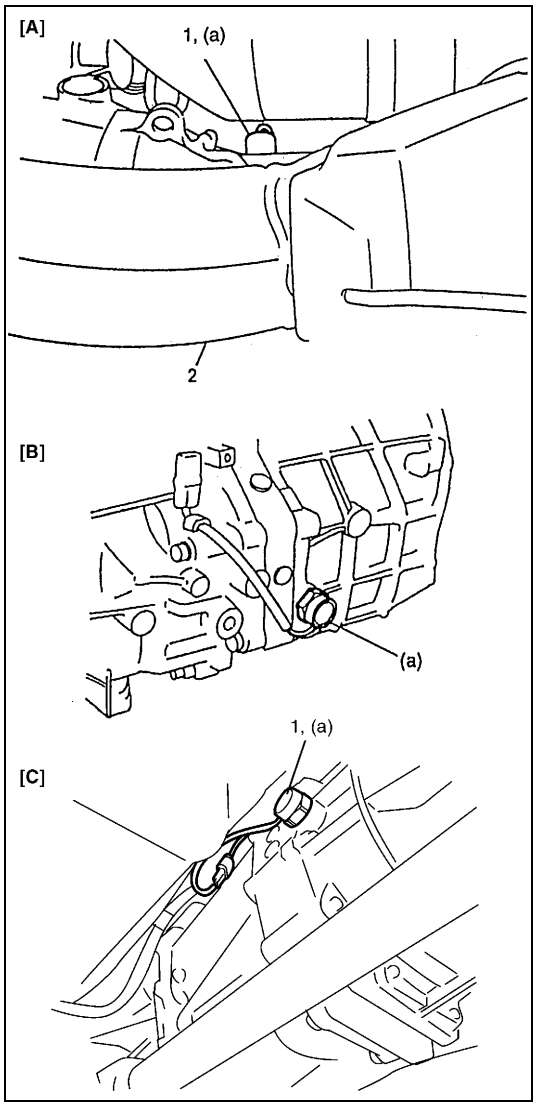
WARNING:
Refrain from work while exhaust center pipe is hot.

REMOVAL AND INSTALLATION

NOTE:
When replacing switch, use care not to let dust enter transmission through switch hole.

1) Lift up vehicle.
2) Remove coupler(s) for switch wiring.

[A] :	Type 1 and Type 2
[B] :	Type 3
1.	Back up light switch coupler
2.	Front propeller shaft



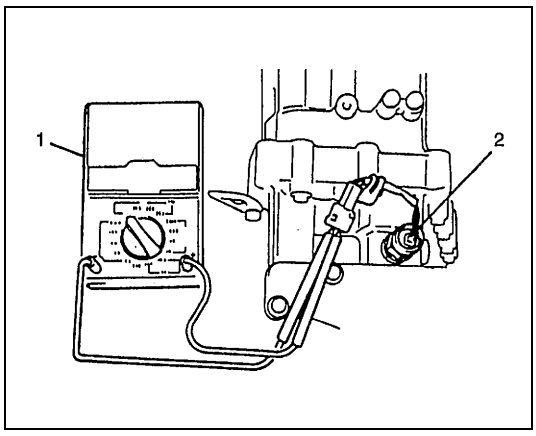
3) Replace back up light switch (1), connect and clamp as they were.

Tightening torque
(a) : 20 N·m (2.0 kg-m, 14.5 lb-ft) (Type 1)
(a) : 45 N·m (4.5 kg-m, 32.5 lb-ft) (Type 2 and Type 3)

4) When back up light switch has been replaced, check switch for proper function with ignition switch turned ON and gear shifted to reverse position. Turn OFF switch after checking its function.

[A] : Type 1
[B] : Type 2
[C] : Type 3
2. Exhaust center pipe

INSPECTION



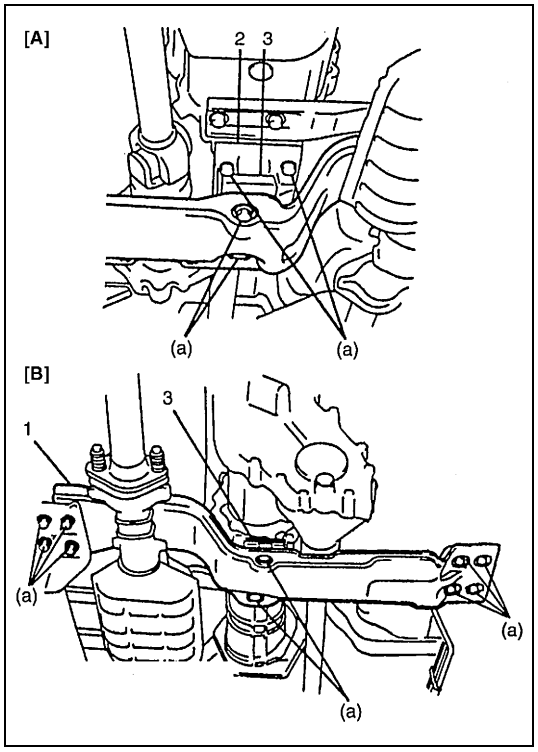
1) Undo clamp and disconnect coupler of back up light switch.
2) Function of back up light switch (1) can be checked as shown in figure.
   There should be continuity at its terminals only when shift lever is shifted to reverse position.

Upon completion of check, connect coupler and clamp wiring harness as they were.

NOTE:

When replacing switch, use care not to let dust enter transmission through switch hole.

Engine Rear Mounting



When replacement of mounting parts are necessary, torque bolts and nut as specified below.

Tightening torque
(a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

[A] :	Front side
[B] :	Rear side
1.	Engine rear mounting member
2.	Mounting bracket
3.	Engine rear mounting

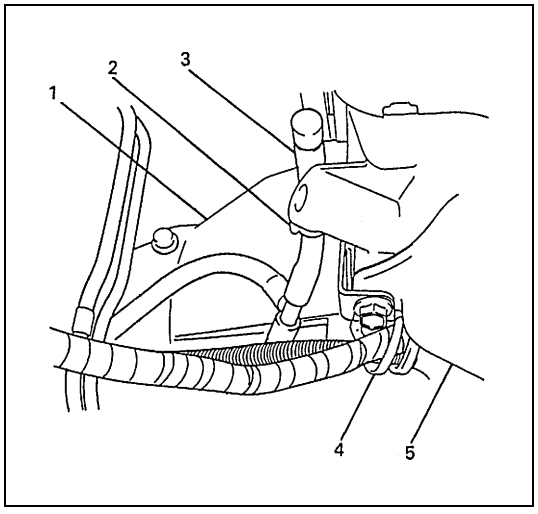
Dismounting of Transmission Unit

IN CABIN

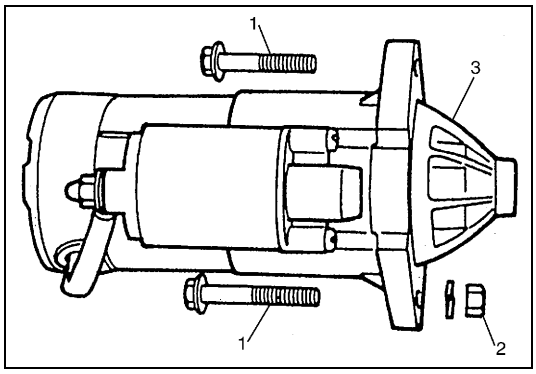
1) Remove transmission shift control lever referring to “Transmission Shift Control Lever” is this section.
2) Remove transfer shift control lever knob.

IN ENGINE ROOM

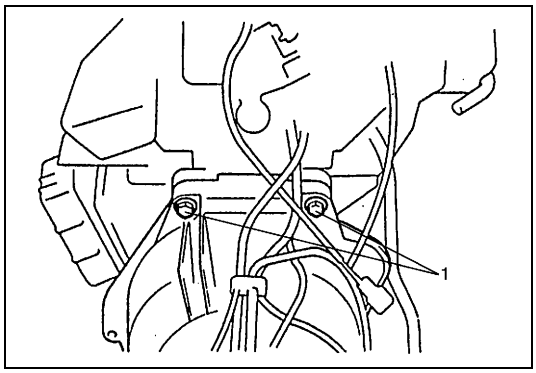
1) Disconnect negative (–) cable of battery.
2) Remove breather hose (3) from breather clamp (2) at the rear end of cylinder head.



1.	Transmission
4.	Wiring harness clamp
5.	Intake manifold



3) Remove starting motor fixing bolts (1) and nut (2), and then remove starter (3).



4) Remove transmission fastening bolts (1).

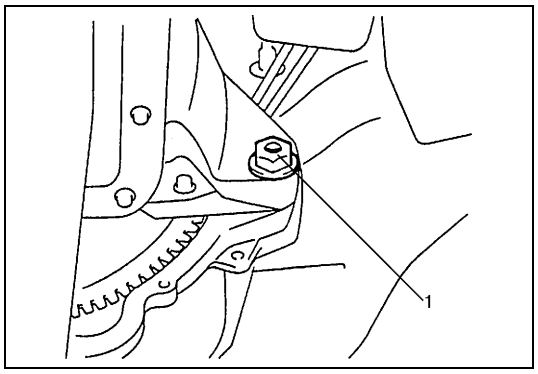
ON LIFT

1) Drain oil from transmission and transfer.

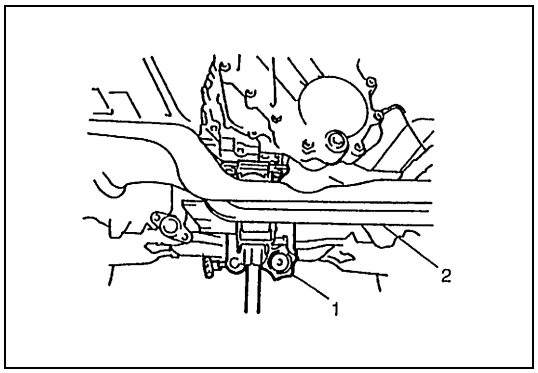
NOTE:

- **It is not necessary to drain transmission oil when dismounting transmission and transfer for clutch maintenance only.**
- **Work without draining transfer oil is possible if front propeller shaft is dismounted together with transmission and transfer.**

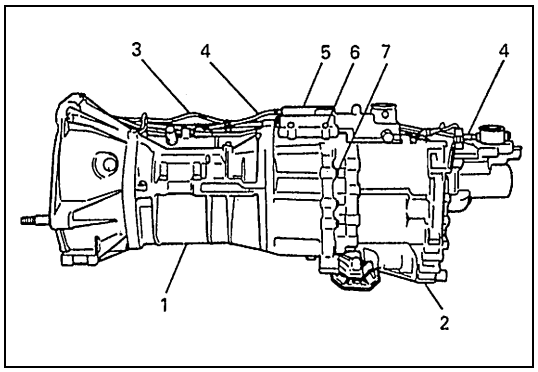
2) Remove front and rear propeller shafts referring to “Propeller Shaft” in Section 4B.
3) Remove exhaust No.1 and No.2 pipes referring to “Components” in Section 6K.
4) Remove clutch operating cylinder from transmission. It is not necessary to disconnect clutch hose from operating cylinder.
5) Remove clutch housing lower plate.
6) Disconnect couplers from 4WD switch, back up light switch and speed sensor assembly and release their harness from clamps.



7) Remove nuts (1) from joint with engine.



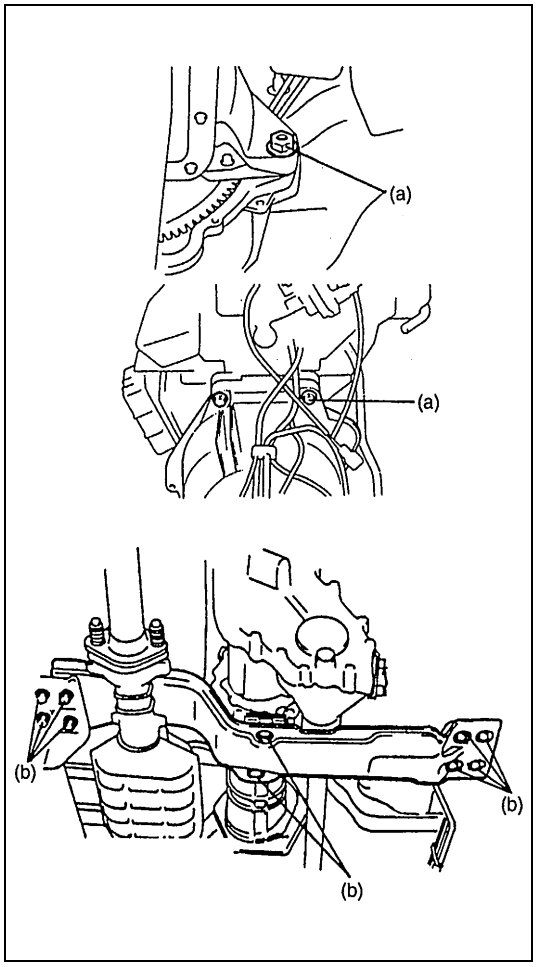
8) Apply transmission jack (1) and remove engine rear mounting member (2) taking off its bolts.
9) After removing mounting member (2), move rearward transmission and transfer assemblies placed on transmission jack (1) and then lower them.



10) Remove wiring harness (3) and breather hose (4).
11) Separate gear shift lever case (5) and transfer assembly (or extension case : 2WD model) (2) from transmission (1).

6. Bolt
7. Bolt

Remounting of Transmission Unit



For remounting, reverse dismounting procedure noting followings.

- Use specified torques as given below.

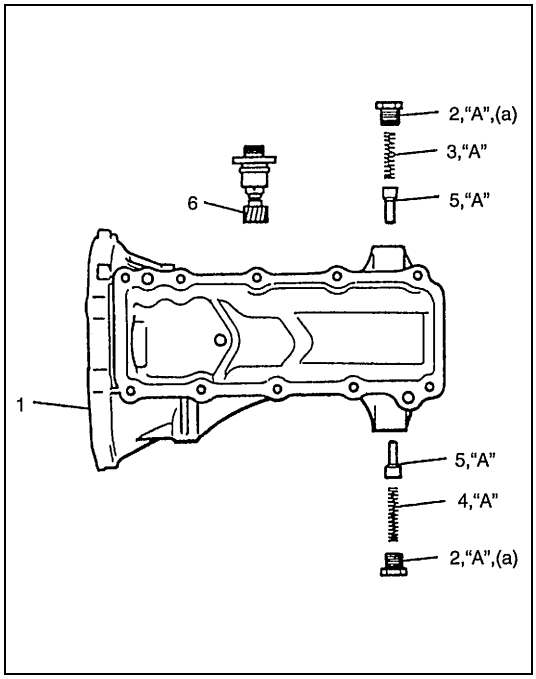
Tightening torque
(a) : 85 N·m (8.5 kg-m, 61.5 lb-ft)
(b) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

- For tightening torque of transmission stiffener bolt, refer to "Engine Mechanical" section.
- Install exhaust No.1 and No.2 pipes referring to "Components" in Section 6K.
- Set each clamp for wiring, hose and cable securely.
- Set clamp for shift control lever boots securely.
- After installing clutch operating cylinder, check clutch pedal free travel referring to "Clutch Pedal Free Travel" in Section 7C1.
- Fill transmission gear oil to transmission referring to "Transmission gear oil" in this section.
- Fill transfer Gear Oil to transfer referring to "Transfer Gear Oil" in Section 7D.
- Connect battery and check function of engine, clutch and transmission.
- Install propeller shaft referring to "Propeller Shaft" in Section 4B.

Extension Case (for 2WD Model of G16 and J20 Engine)

DISASSEMBLY

1) Remove oil seal referring to "Extension Case Oil Seal (for 2WD Model of G16 and J20 Engine)" in this section.
2) Remove select return spring bolts (2) and then springs (3 and 4) and guide pins (5).
3) Remove speed sensor assembly (6).



REASSEMBLY

1) Install oil seal referring to "Extension Case Oil Seal (for 2WD Model of G16 and J20 Engine) in this section.
2) After applying grease, install select guide pins (5), select return springs (3 and 4) and select return spring bolts (2) and torque them to specification.
   After installing, check to make sure that each pin moves smoothly.

"A" : Grease 99000-25010

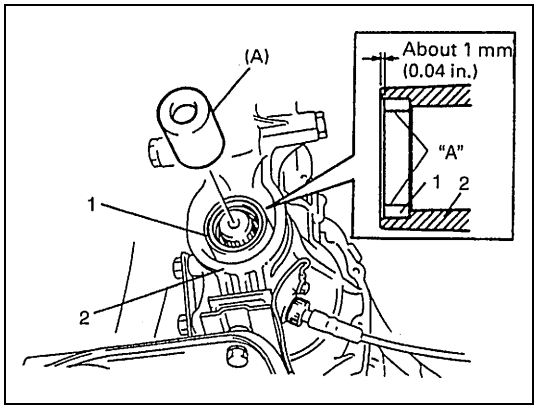
Tightening torque
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

3) Install speedometer sensor assembly to extension case (1).

Extension Case Oil Seal (for 2WD Model of G16 and J20 Engine)

REMOVAL AND INSTALLATION

1) Remove propeller shaft referring to “Propeller shaft” in Section 4B.



2) Using screwdriver, remove oil seal (1) from extension case (2).
3) Using special tool (A) and plastic hammer, press fit new oil seal (1) into extension case (2) till oil seal (1) contacts stepped part of extension case (2) as shown. Be sure to apply grease to oil seal lip.

“A” : Grease 99000-25010

Tightening torque
(A) : 09951-16060

4) Install propeller shaft referring to “Propeller Shaft” in Section 4B.

Unit Repair

Refer to the same section of “Unit Repair Manual” mentioned in “Foreword” of this manual.

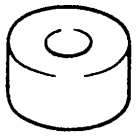
Tightening Torque Specifications

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Oil filler/level and drain plugs	23	2.3	17.0
Control lever boot cover bolts	15	1.5	11.0
Back up light switch (Type 1)	20	2.0	14.5
Back up light switch (Type 2)	45	4.5	32.5
Control lever locating bolts	17	1.7	12.5
Transmission to engine bolts and nuts	85	8.5	61.5
Engine rear mounting bolts and nut	50	5.0	36.5

Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	• Shift control lever. • Select return springs, bolts and guides. • Extension case oil seal
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 (99000-32110)	• Shift control lever locating bolts.
Sealant	SUZUKI BOND No. 1215 (99000-31110)	• Oil drain and filler/level plugs.

Special Tool



09951-16060
Oil seal installer

SECTION 7A1

MANUAL TRANSMISSION (TYPE 2)

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Identification of Transmission Type 7A1-2
System Description 7A1-2
Diagnosis 7A1-2
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Back Up Light Switch 7A1-4
Engine Rear Mounting 7A1-4
Dismounting/
Remounting of Transmission Unit 7A1-4
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General Description

Identification of Transmission Type

Refer to “Identification of Transmission Type” in Section 7A.

System Description

The manual transmission consists of the input shaft, main shaft, counter shaft and reverse gear which are installed in the aluminum and castings cases. Its gears are of forward five speeds in synchro mesh and reverse one speed in sliding idler gear arrangement system.
The main shaft gears are held by the needle bearings and on them the synchronizer rings and synchronizer sleeve & hubs are assembled.
The gear shift lever case is located at the upper behind the transmission case and has a cam which prevents direct gear shift from the 5th speed gear to the reverse gear.
As the aluminum and castings cases are sealed with liquid type gasket, it is necessary to use genuine sealant or its equivalent on its mating surfaces when reassembling them. Also, the case fastening bolts must be tightened to specified torque by means of the torque wrench and tightening over or below the specified torque should be avoided.

Diagnosis

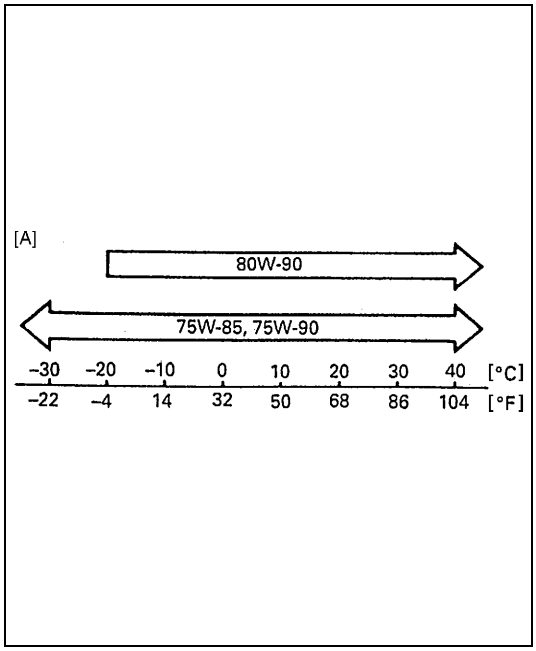
Condition	Possible Cause	Correction
Gear slipping out of mesh	Worn shift fork shaft	Replace
	Worn shift fork or synchronizer sleeve	Replace
	Weak or damaged locating spring	Replace
	Worn bearings on input shaft or main shaft	Replace
	Worn chamfered tooth on sleeve or gear	Replace sleeve and gear
	Missing or disengagement of circlip(s)	Install or replace
Gears refusing to disengage	Weakened or broken synchronizer spring	Replace
	Distorted shift shaft or shift fork	Replace
Hard shifting	Improper clutch pedal free travel	Adjust
	Distorted or broken clutch disc	Replace
	Damaged clutch pressure plate	Replace clutch cover
	Worn synchronizer ring	Replace
	Worn chamfered tooth on sleeve or gear	Replace sleeve and gear
	Distorted shift shaft	Replace
Noise	Inadequate or insufficient lubricant	Replenish
	Damaged or worn bearing(s)	Replace
	Damaged or worn gear(s)	Replace
	Damaged or worn synchronizer ring	Replace
	Damaged or worn chamfered tooth on sleeve or gear	Replace

On-Vehicle Service

Transmission Gear Oil

INSPECTION AND CHANGE

1) Before changing or inspecting oil, be sure to stop engine and lift vehicle horizontally.
2) With vehicle lifted up, check oil level and leakage. If leakage exists, correct or repair it.



3) Drain old oil and fill new specified oil as shown below by specified amount (roughly up to level hole).

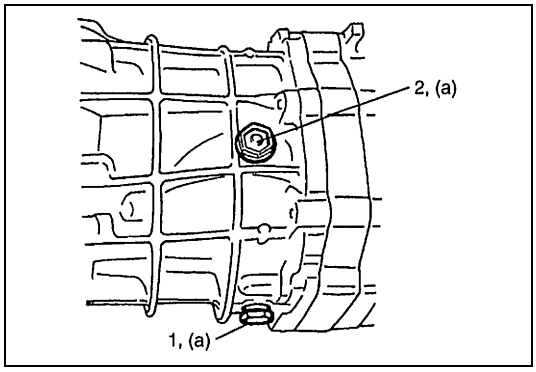
NOTE:

- **It is highly recommended to use SAE 75W-90 gear oil.**
- **Whenever vehicle is hoisted for any other service work than oil change, also be sure to check for oil leakage and status of breather hoses.**
- **If water or rust is mixed in drained oil, be sure to check breather hose and boot of transmission and transfer.**

Gear Oil Specification
Oil grade : API GL-4
Viscosity : SAE 75W-85, 75W-90 or 80W-90

Oil Capacity :
2.6 liters (5.5/4.6 US/Imp. pt)

[A]: Viscosity chart SAE



4) Torque drain plug (1) and level/filler plug (2) as specified.

CAUTION:
Transmission oil must not be poured through gear shift control lever part.

Tightening torque
(a) : 38 N·m (3.8 kg-m, 27.5 lb-ft)

Transmission Shift Control Lever

Refer to “Transmission Shift Control Lever” in Section 7A.

Back Up Light Switch

Refer to “Back Up Light Switch” in Section 7A.

Engine Rear Mounting

Refer to “Engine Rear Mounting” in Section 7A.

Dismounting/Remounting of Transmission Unit

Refer to “Dismounting/Remounting of Transmission Unit” in Section 7A.
For tightening torque of filler and level/drain plug, refer to “Inspection and Change” under “Transmission Gear Oil” in this section.

Unit Repair

Refer to the same section of “Unit Repair Manual” mentioned in “Foreword” of this manual.

Tightening Torque Specifications

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Transmission oil filler/level and drain plugs	38	3.8	27.5

SECTION 7B1

AUTOMATIC TRANSMISSION (4 A/T)

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System :

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

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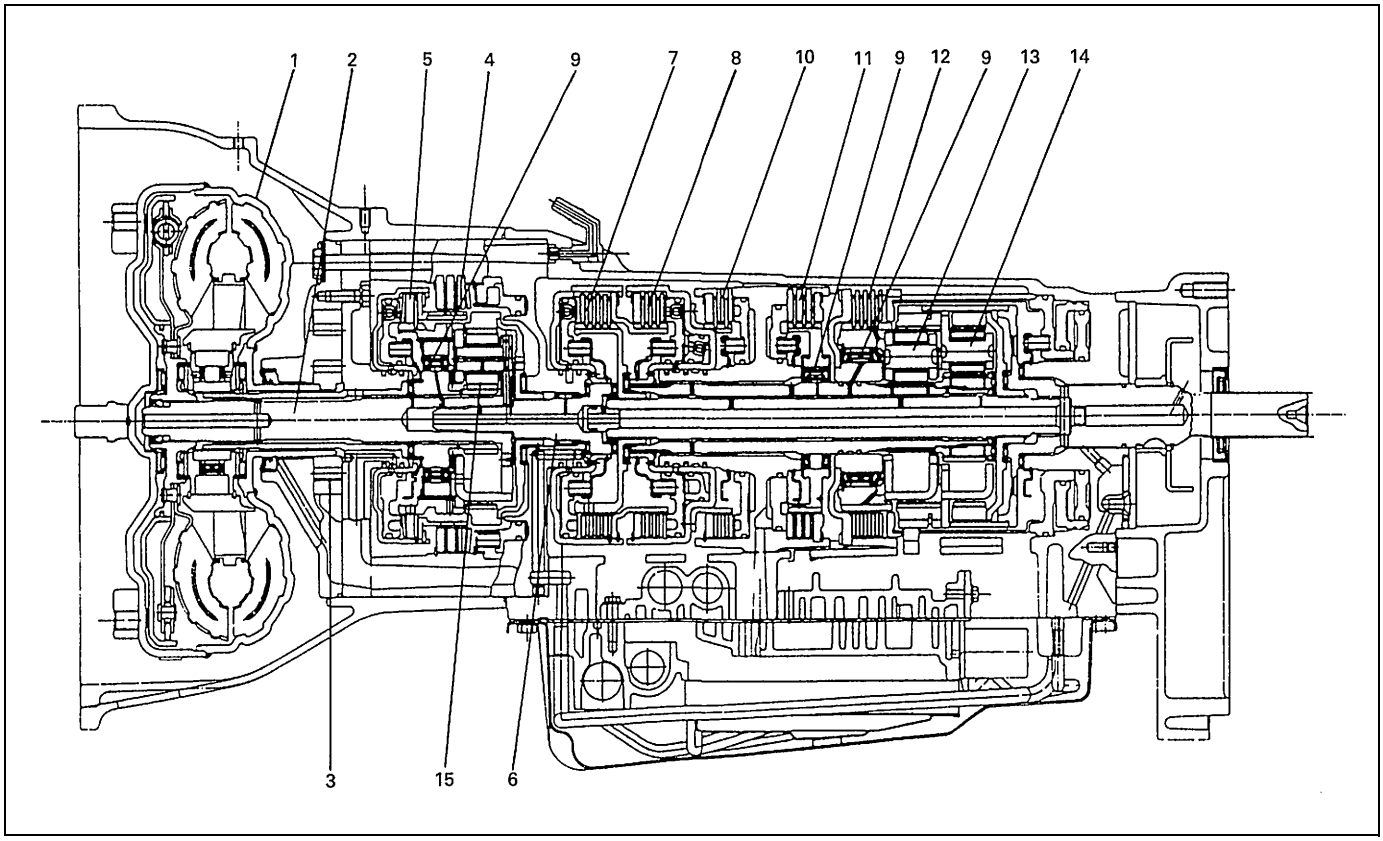
General Description

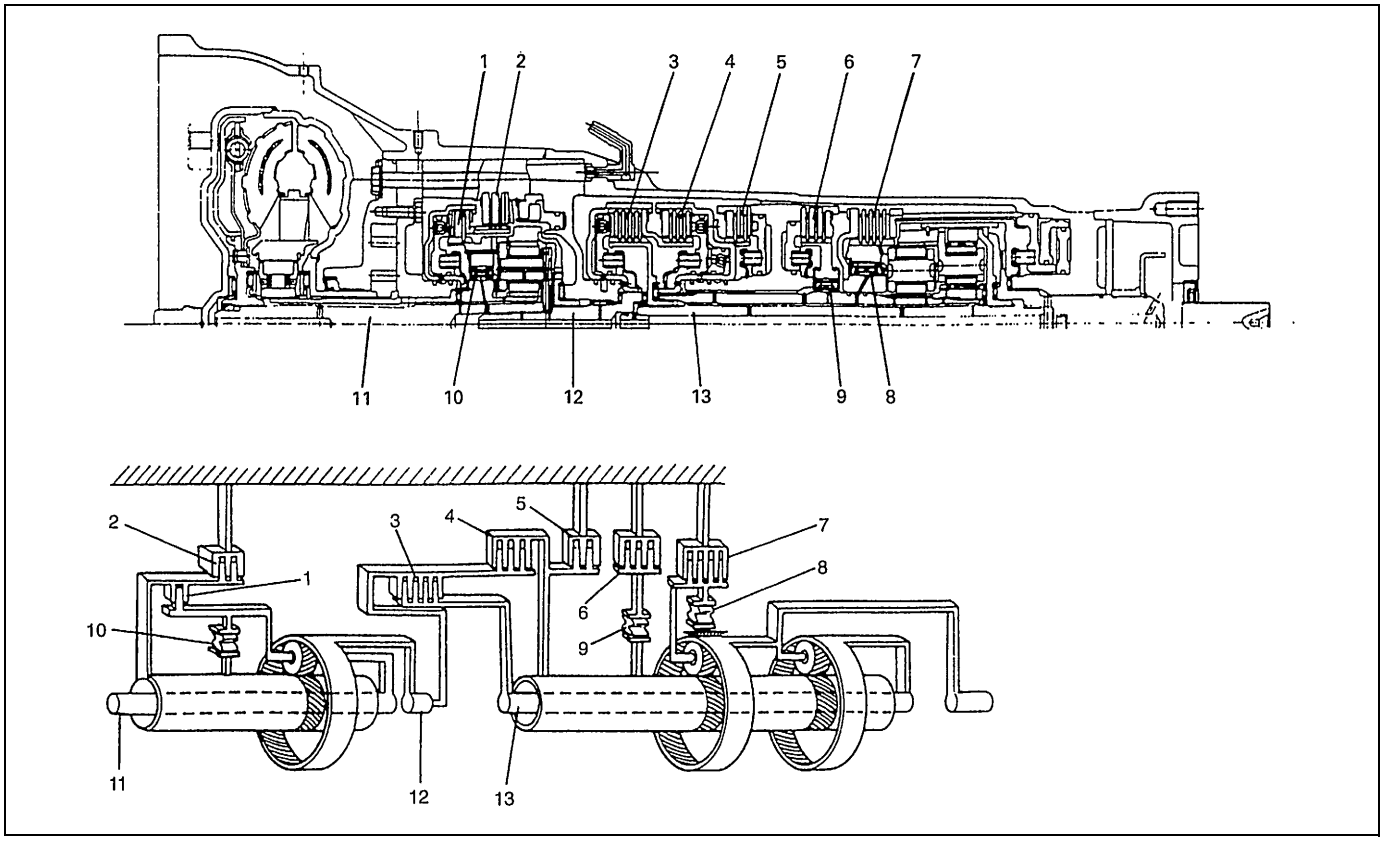
This automatic transmission is a full automatic type with 3-speed plus overdrive (O/D).
The torque converter is a 3-element, 1-step and 2-phase type and is equipped with an electronically controlled lock-up mechanism. The gear shift device consists of 3 sets of planetary gear units, 3 disc type clutches, 4 disc type brakes and 3 one-way clutches. The gear shift is done by selecting one of 6 positions (“P”, “R”, “N”, “D”, “2” and “L”) by means of the select lever installed on the floor. On the shift knob, there is an overdrive (O/D) cut switch which allows shift-up to the overdrive mode (except at 4L) and shift-down from the overdrive mode. Also, by using the P/N change switch located on the console box, it is possible to select the gear change timing of 2 modes, normal and power.



1. Torque converter	4. Overdrive brake	7. Forward clutch	10. Second coast brake	13. Front planetary gear
2. Overdrive input shaft	5. Overdrive clutch	8. Direct clutch	11. Second brake	14. Rear planetary gear
3. Oil pump	6. Forward clutch input shaft	9. One-way clutch	12. Reverse brake	15. Overdrive planetary gear

Item			Specifications		
Torque converter	Type Stall torque ratio		3-element, 1-step, 2-phase type (with TCC (lock-up) mechanism) 2.4 (G16 engine) 2.0 (J20 engine) 1.9 (H25 engine)		
Oil pump	Type Drive system		Trochoid type oil pump Engine driven		
Gear change device	Type		Forward 4-step, reverse 1-step planetary gear type		
	Shift position		"P" range: Gear in neutral, output shaft fixed, engine start "R" range: Reverse "N" range: Gear in neutral, engine start "D" range (O/D ON): Forward 1st ↔ 2nd ↔ 3rd ↔ 4th (O/D) automatic gear change "D" range (O/D OFF): Forward 1st ↔ 2nd ↔ 3rd automatic gear change "2" range: (Normal mode) Forward 1st ↔ 2nd ← 3rd automatic gear change (Power mode) Forward 2nd ← 3rd automatic gear change and fixed at 2nd gear "L" range: Forward 1st ← 2nd ← 3rd reduction, and fixed at 1st gear		
	Engine type		G16 engine	J20/H25 engines	
	Gear ratio	1st (low gear)	2.826	2.826	
		2nd (second gear)	1.493	1.493	
		3rd (top gear)	1.000	1.000	
		4th (overdrive gear)	0.730	0.689	
		Reverse (reverse gear)	2.703	2.703	
	Control elements		Wet type multi-disc clutch .... 3 sets Wet type multi-disc brake .... 4 sets One-way clutch .... 3 sets		
	Transfer		Hi : 1.000 Lo : 1.816 (4WD model only)		
	Final gear reduction ratio (Differential)		5.125 (G16 engine) 4.875 (J20/H25 engines)		
Lubrication	Lubrication system		Force feed system by oil pump		
Cooling	Cooling system		Radiator assisted cooling (water-cooled)		
Fluid used			An equivalent of DEXRON®III		

Clutch/Brake Functions



1. Overdrive clutch	4. Direct clutch	7. Reverse brake	10. Overdrive one-way clutch	13. Intermediate shaft
2. Overdrive brake	5. Second coast brake	8. One-way clutch No.2	11. Overdrive input shaft	
3. Forward clutch	6. Second brake	9. One-way clutch No.1	12. Forward clutch input shaft	

Part Name	Function
Overdrive clutch	Meshes overdrive carrier and overdrive sun gear.
Overdrive brake	Fixes overdrive sun gear.
Overdrive one-way clutch	Meshes overdrive carrier and overdrive sun gear only when driven by engine.
Forward clutch	Meshes input shaft and intermediate shaft.
Direct clutch	Meshes input shaft with front sun gear and rear sun gear.
Second coast brake	Fixes front sun gear and rear sun gear.
Second brake	Fixes outer race of one-way clutch No.1, to prevent front sun gear and rear sun gear from turning counterclockwise (reverse direction of engine input rotation direction).
Reverse brake	Fixes front planetary carrier.
One-way clutch No.1	Prevents front sun gear and rear sun gear from turning counterclockwise only when second brake is at work.
One-way clutch No.2	Prevents front planetary carrier from turning counterclockwise.

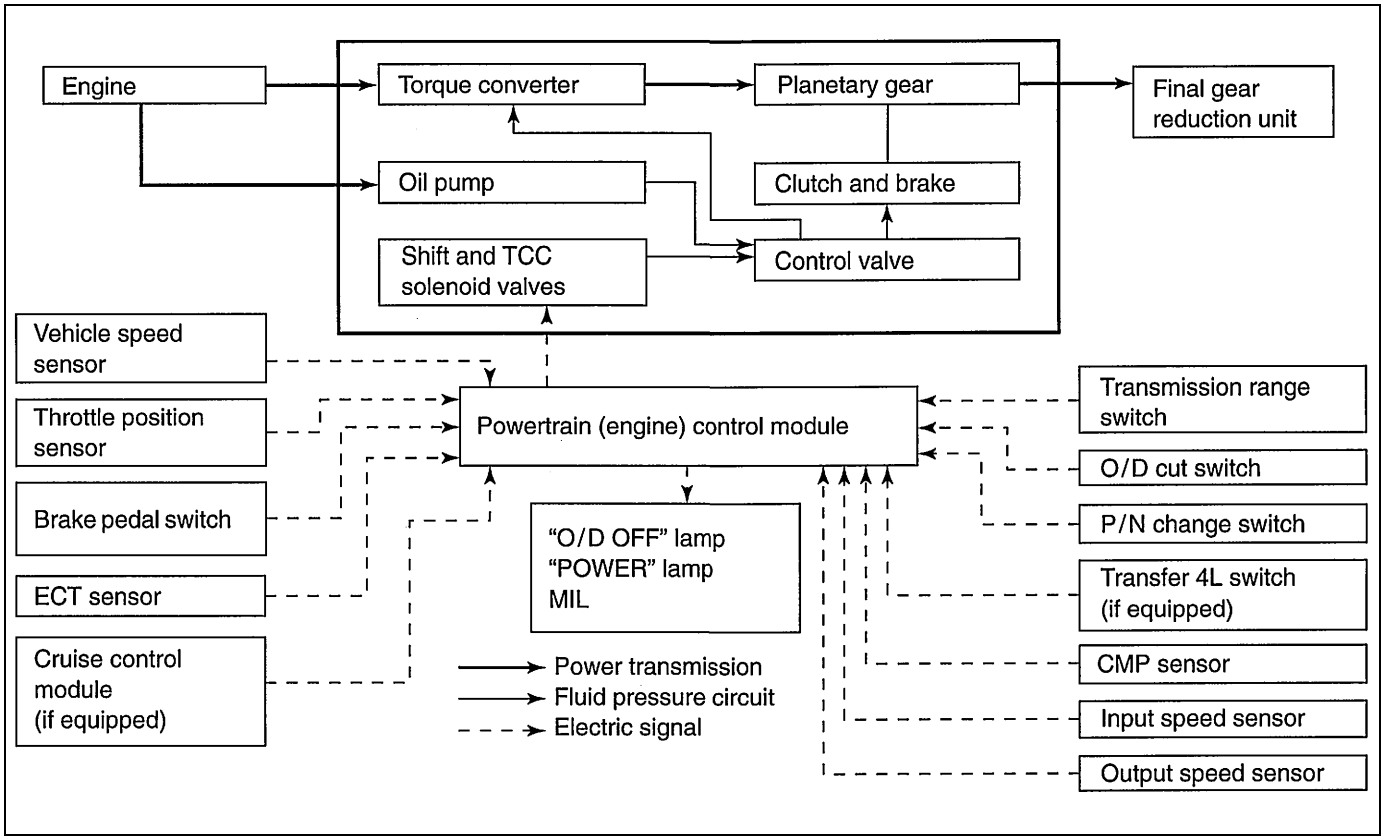
Table of Component Operation

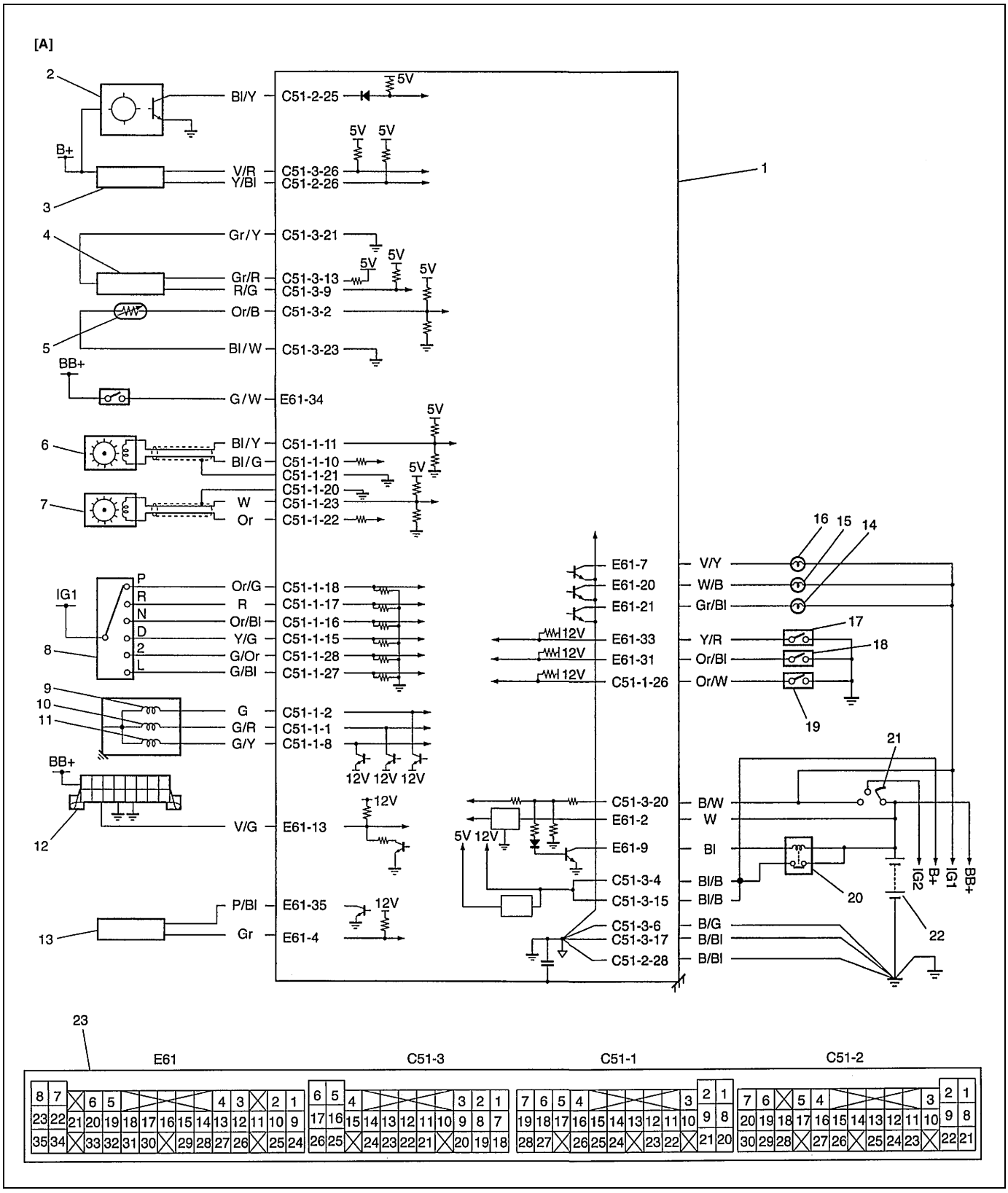
Shift position \ Element		Solenoid valve No. 1–A	Solenoid valve No. 1–B	O/D clutch	Forward clutch	Direct clutch		O/D brake	Second coast brake	Second brake	Reverse brake		O/D one-way clutch	One-way clutch No. 1	One-way clutch No. 2
						Inner piston	Outer piston				Inner piston	Outer piston			
P		○	X	○	–	–	–	–	–	–	–	–	○	–	–
R		○	X	○	–	○	○	–	–	–	○	○	○	–	–
N		○	X	○	–	–	–	–	–	–	–	–	○	–	–
D	1st gear	○	X	○	○	–	–	–	–	–	–	–	○	–	○
	2nd gear	○	○	○	○	–	–	–	–	○	–	–	○	○	–
	3rd gear	X	○	○	○	–	○	–	–	○	–	–	○	–	–
	O/D	X	X	–	○	–	○	○	–	○	–	–	–	–	–
2	1st gear	○	X	○	○	–	–	–	–	–	–	–	○	–	○
	2nd gear	○	○	○	○	–	–	–	○	○	–	–	○	–	–
	3rd gear (Fail safe)	X	○	○	○	–	○	–	–	○	–	–	○	–	–
L	1st gear	○	X	○	○	–	–	–	–	–	○	○	○	–	–
	2nd gear (Fail safe)	○	○	○	○	–	–	–	○	○	–	–	○	–	–

○: ON, X: OFF

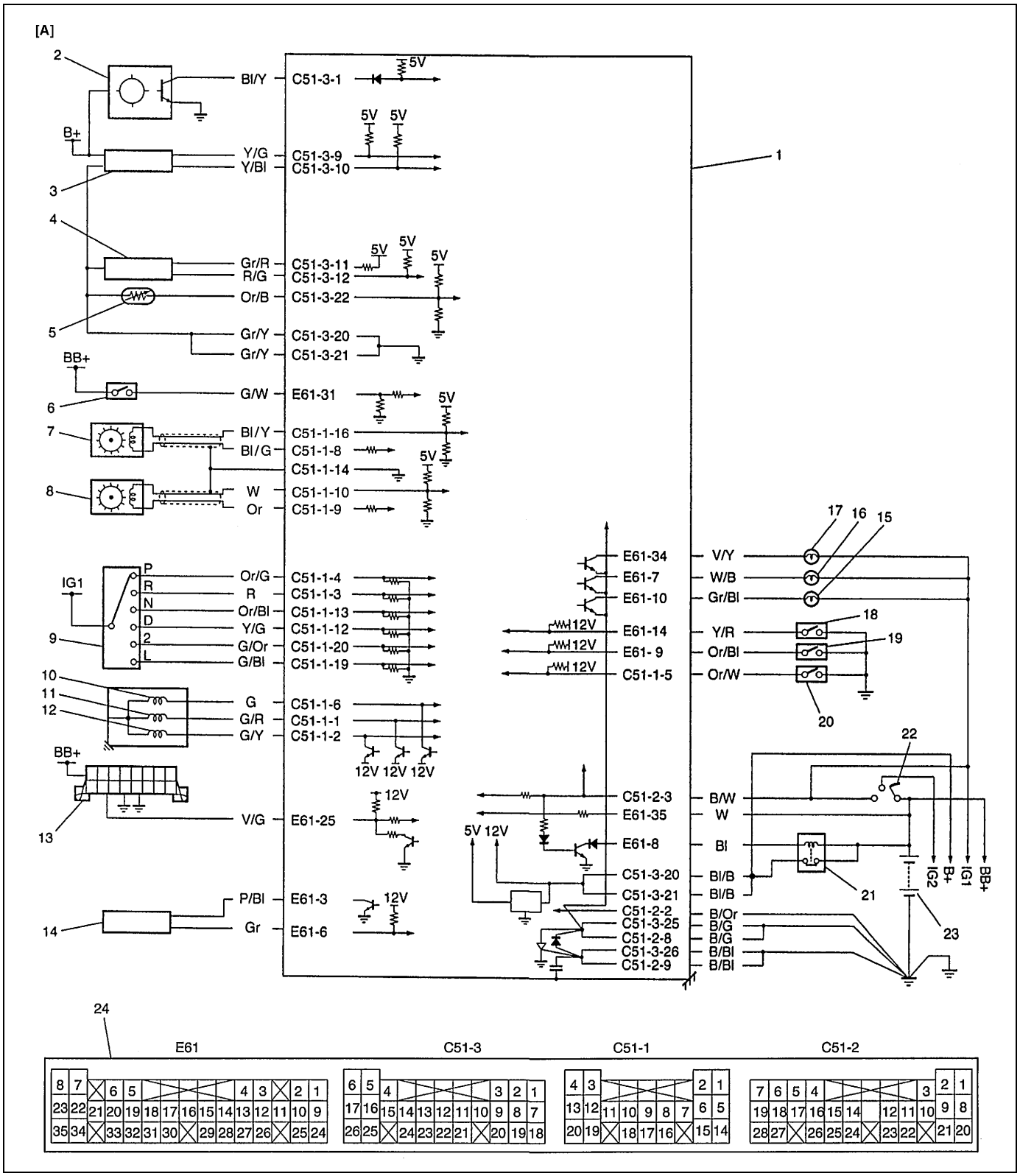
Electronic Shift Control System

The gear ratio change in “D” or “2” range and torque converter clutch operation are controlled by Powertrain (Engine) Control Module.





[A] : G16/J20 Engines	5. ECT sensor	10. Shift solenoid-B	15. "O/D OFF" lamp	20. Main relay
1. PCM (ECM)	6. A/T input speed sensor	11. TCC solenoid	16. MIL	21. Ignition switch
2. VSS	7. A/T output speed sensor	12. Data link connector	17. O/D cut switch	22. Battery
3. CMP sensor	8. Transmission range switch	13. Cruise control module	18. P/N change switch	23. PCM (ECM) connector terminal (viewed from harness side)
4. TP sensor	9. Shift solenoid-A	14. "POWER" lamp	19. 4WD low switch	



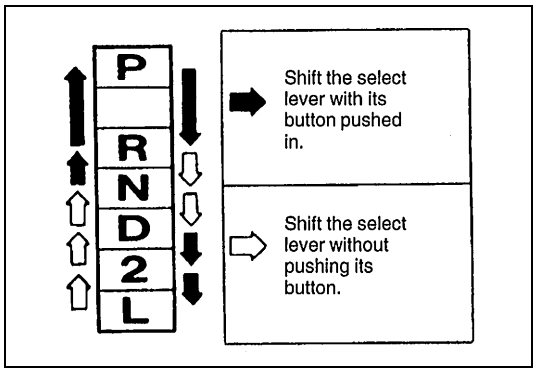
[A] : H25 Engine	5. ECT sensor	10. Shift solenoid-A	15. “POWER” lamp	20. 4WD low switch
1. PCM (ECM)	6. Brake pedal switch	11. Shift solenoid-B	16. “O/D OFF” lamp	21. Main relay
2. VSS	7. A/T input speed sensor	12. TCC solenoid	17. MIL	22. Ignition switch
3. CMP sensor	8. A/T output speed sensor	13. Data link connector	18. O/D cut switch	23. Battery
4. TP sensor	9. Transmission range switch	14. Cruise control module	19. P/N change switch	24. PCM (ECM) connector terminal (viewed from harness side)

Fail safe function

This function is provided by the safe mechanism that assures safe driveability even when the shift solenoid valve or speed sensor fails.
The table below shows the gear position in each shift under a normal/abnormal condition.

Shift position	Condition			
	Normal	Shift solenoid valve-A (#1) abnormal	Shift solenoid valve-B (#2) abnormal	Shift solenoid valves-A & B (#1 and #2) abnormal
D	1st	3rd	1st	O/D
	2nd		O/D	
	3rd			
	O/D	O/D		
2	1st	3rd	1st	3rd
	2nd		3rd	
	(3rd)			
L	1st	1st	1st	1st
	(2nd)	(2nd)		

Change mechanism



The same select pattern shift lever is used as the floor type and frequently used “N” and “D” ranges are made selectable freely.

Operation of shift solenoids and TCC solenoid

RANGE / GEAR / SOLENOIDS	D				2		L	P, N & R	
	1st	2nd	3rd	4th (O/D)	1st	2nd	1st	—	
Shift solenoid-A (#1, NO.1)	○	○	×	×	○	○	○	○	
Shift solenoid-B (#2, NO.2)	×	○	○	×	×	○	×	×	
TCC solenoid	×	×	○	○	×	×	×	×	

○: ON (valve is open) ×: OFF (valve is closed)

Automatic gear shift diagram

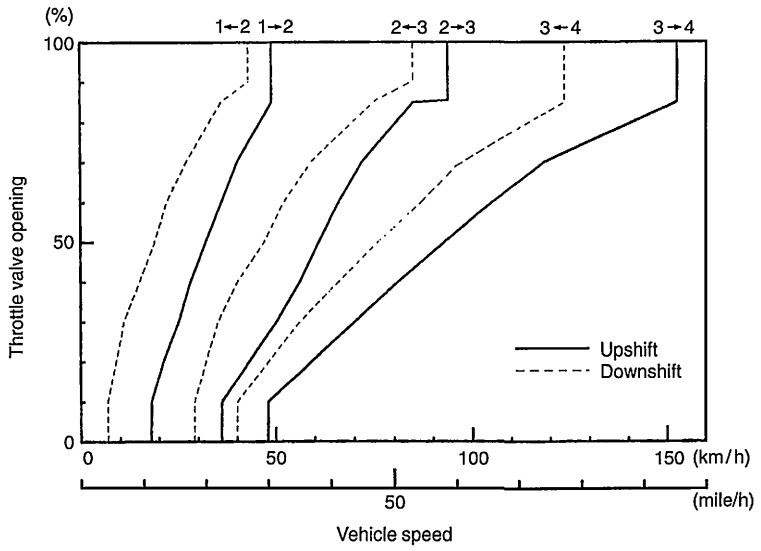
Automatic shift schedule as a result of shift control is shown below. In case that select lever is shifted to L at a higher than 52 km/h or 33 mile/h speed for G16 engine (45 km/h or 28 mile/h for J20 engine, 55 km/h or 34 mile/h for H25 engine), 2nd or 3rd gear is operated and then down shifts to 1st at a speed lower than that. No up shift is available in L.
The same as, the select lever is shifted to 2 at a higher than 102 km/h (64 mile/h) speed for G16/J20 engines (105 km/h or 65 mile/h for H25 engine), 3rd gear is operated and then down shifts to 2nd at a speed lower than that.

Power Mode For G16 Engine

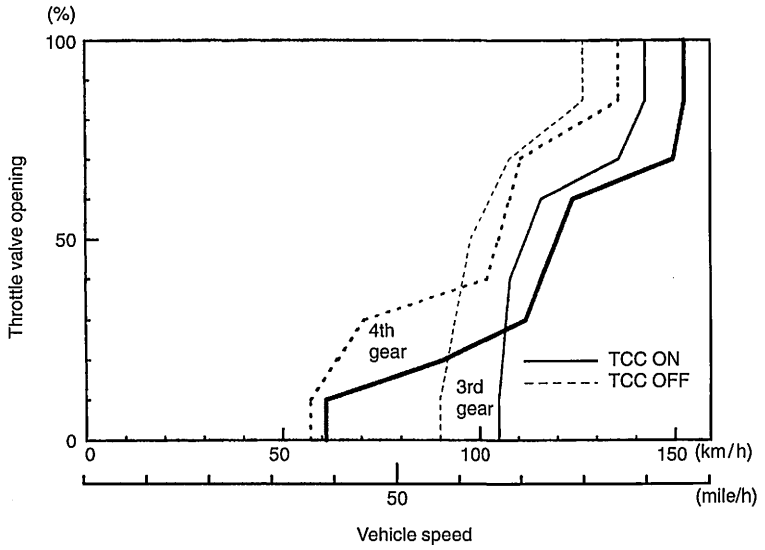
	Shift					
Throttle opening	1→2	2→3	3→4	4→3	3→2	2→1
Full throttle km/h (mile/h)	49 (30)	94 (58)	153 (95)	124 (77)	85 (53)	43 (27)
Closed throttle km/h (mile/h)	18 (11)	36 (23)	48 (30)	40 (25)	29 (18)	7 (4)

GEAR SHIFT DIAGRAM [A] AND TCC LOCK-UP DIAGRAM [B]

[A]



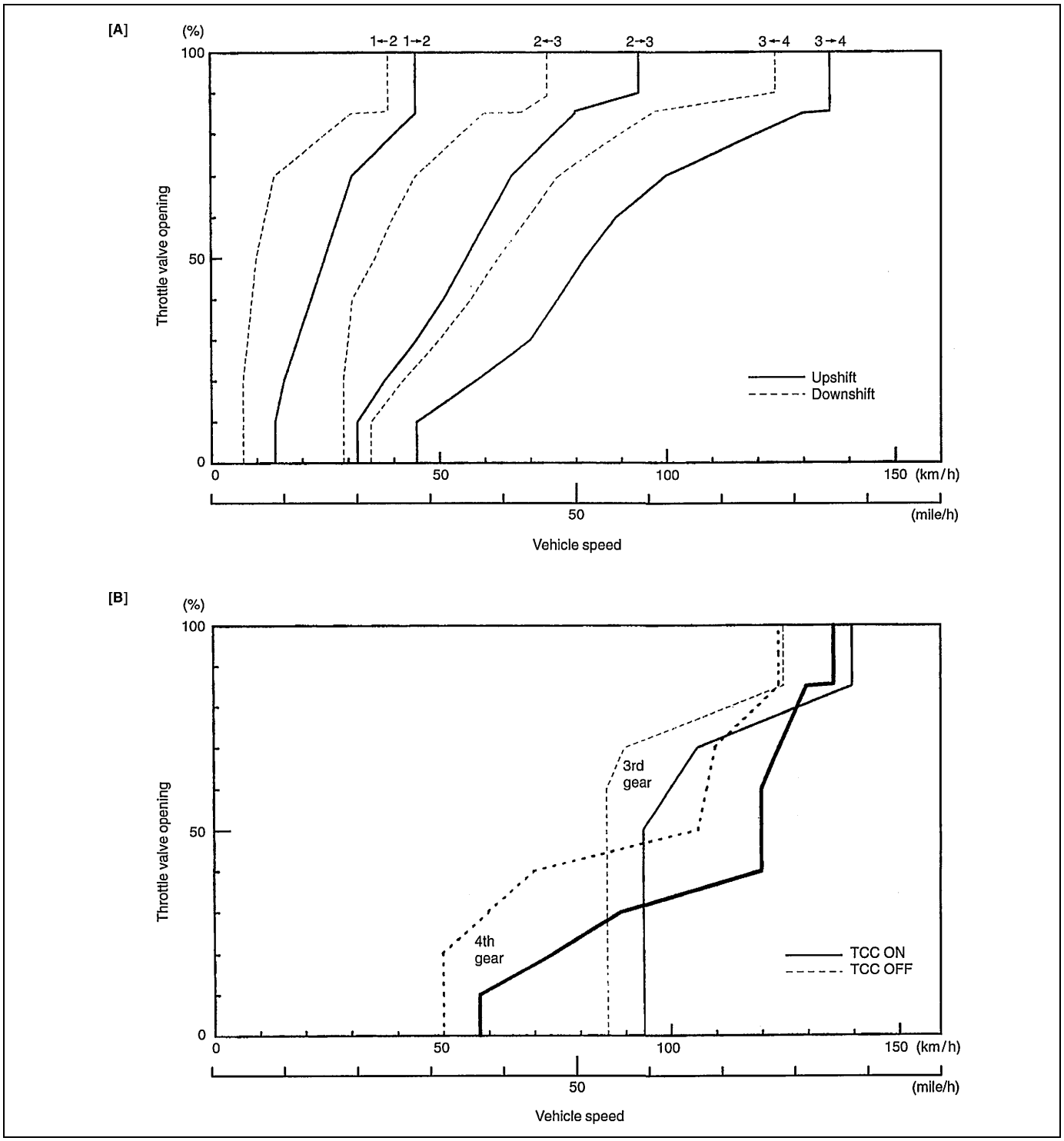
[B]



Normal Mode For G16 Engine

	Shift					
Throttle opening	1→2	2→3	3→4	4→3	3→2	2→1
Full throttle km/h (mile/h)	45 (28)	94 (58)	136 (85)	124 (77)	74 (46)	39 (24)
Closed throttle km/h (mile/h)	14 (9)	32 (20)	45 (28)	35 (22)	29 (18)	7 (4)

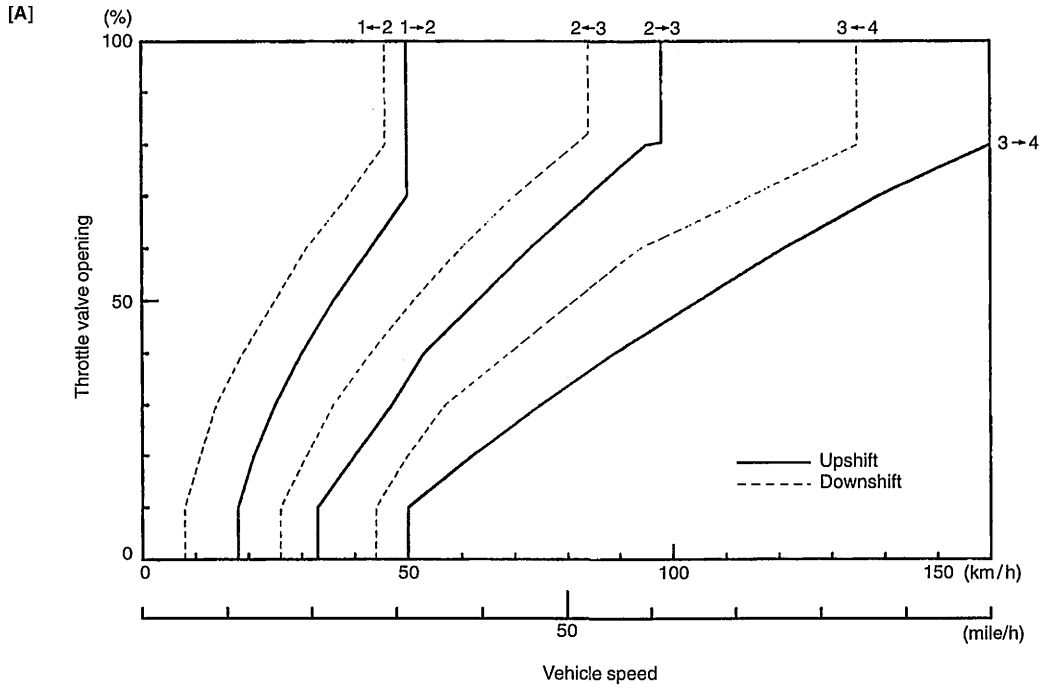
GEAR SHIFT DIAGRAM [A] AND TCC LOCK-UP DIAGRAM [B]

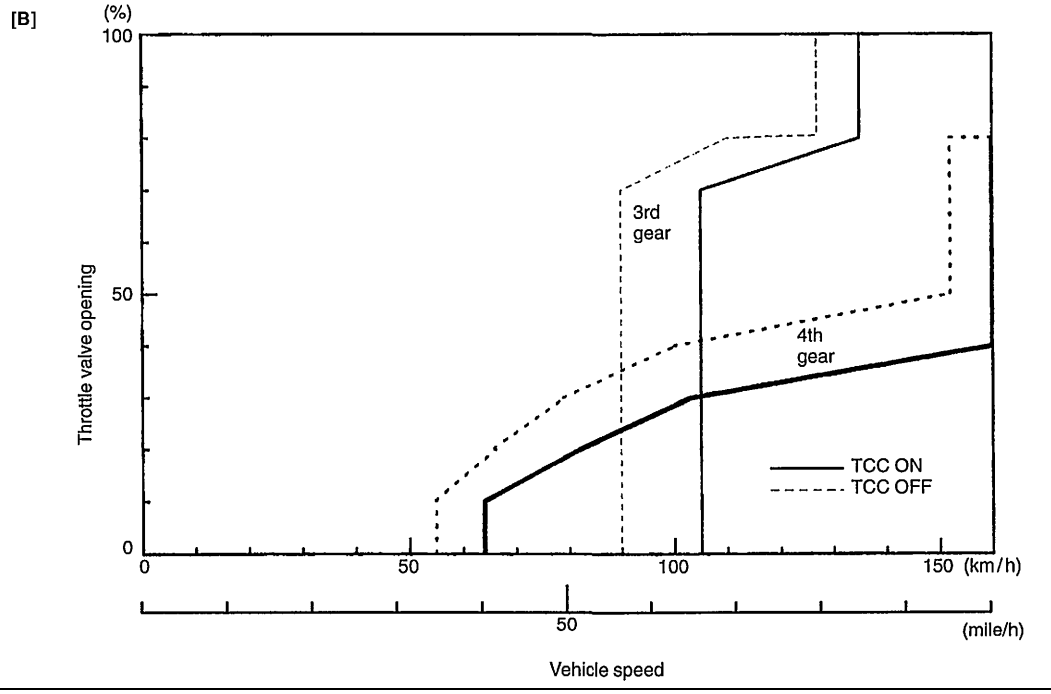


Power Mode For J20 Engine

	Shift					
Throttle opening	1→2	2→3	3→4	4→3	3→2	2→1
Full throttle km/h (mile/h)	50 (31)	98 (61)	–	135 (84)	84 (52)	46 (29)
Closed throttle km/h (mile/h)	18 (11)	33 (21)	50 (31)	44 (27)	26 (16)	8 (5)

GEAR SHIFT DIAGRAM [A] AND TCC LOCK-UP DIAGRAM [B]

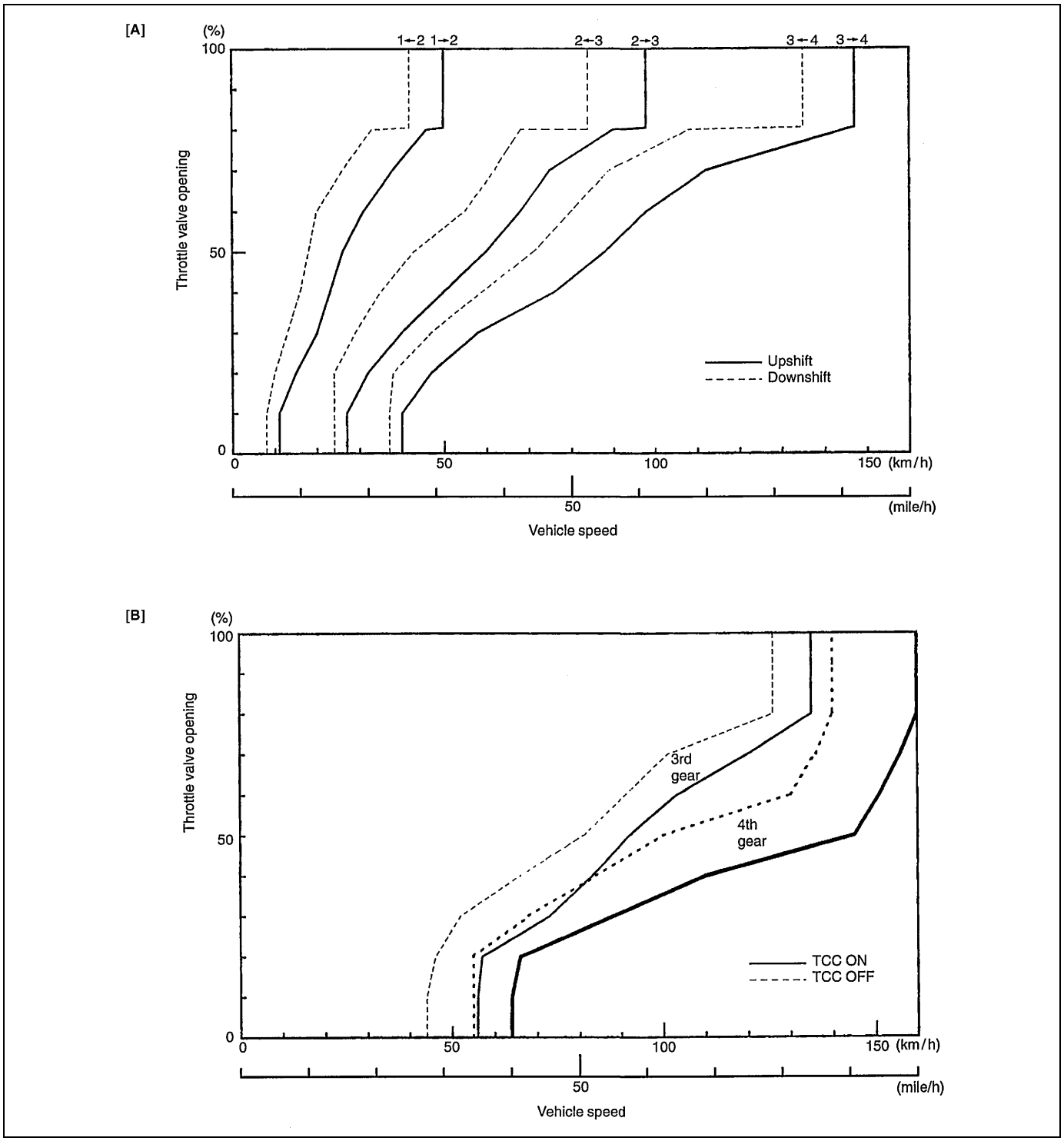




Normal Mode For J20 Engine

	Shift					
Throttle opening	1→2	2→3	3→4	4→3	3→2	2→1
Full throttle (km/h) (mile/h)	50 (31)	98 (61)	147 (91)	135 (84)	84 (52)	42 (26)
Closed throttle (km/h) (mile/h)	11 (7)	27 (17)	40 (25)	37 (23)	24 (15)	8 (5)

GEAR SHIFT DIAGRAM [A] AND TCC LOCK-UP DIAGRAM [B]

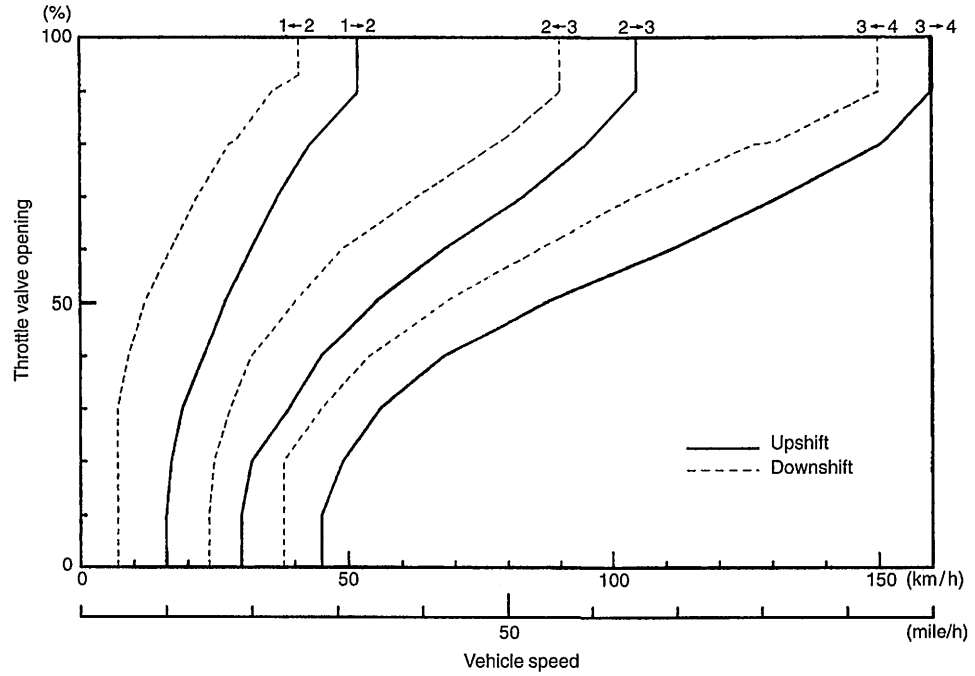


Power Mode For H25 Engine

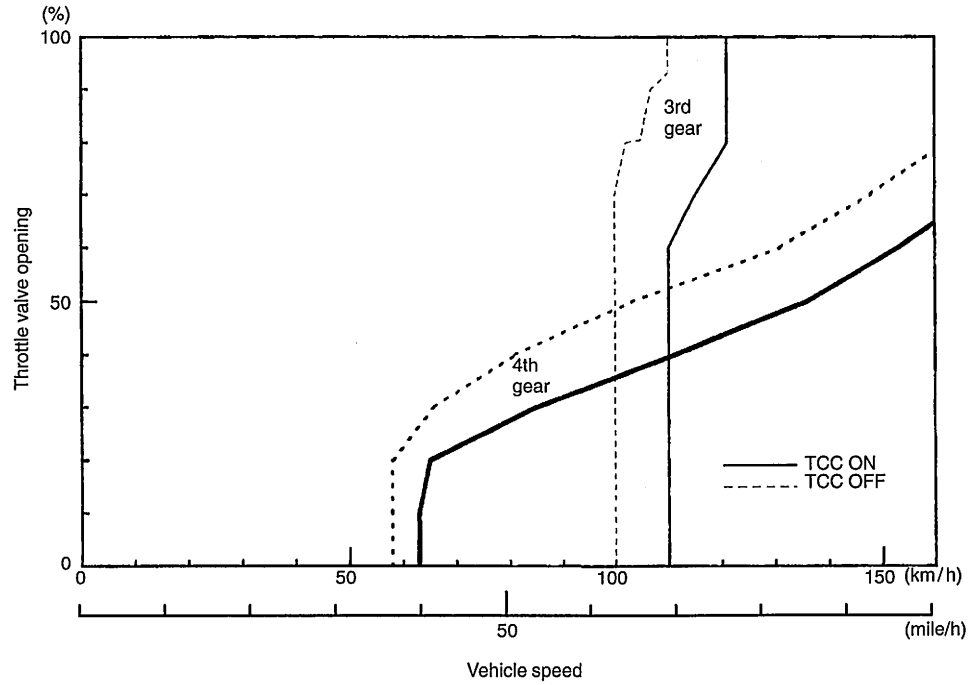
	Shift					
Throttle opening	1→2	2→3	3→4	4→3	3→2	2→1
Full throttle km/h (mile/h)	52 (33)	105 (66)	160 (99)	150 (93)	90 (56)	41 (25)
Closed throttle km/h (mile/h)	16 (10)	30 (19)	45 (28)	38 (24)	24 (15)	7 (4)

GEAR SHIFT DIAGRAM [A] AND TCC LOCK-UP DIAGRAM [B]

[A]



[B]

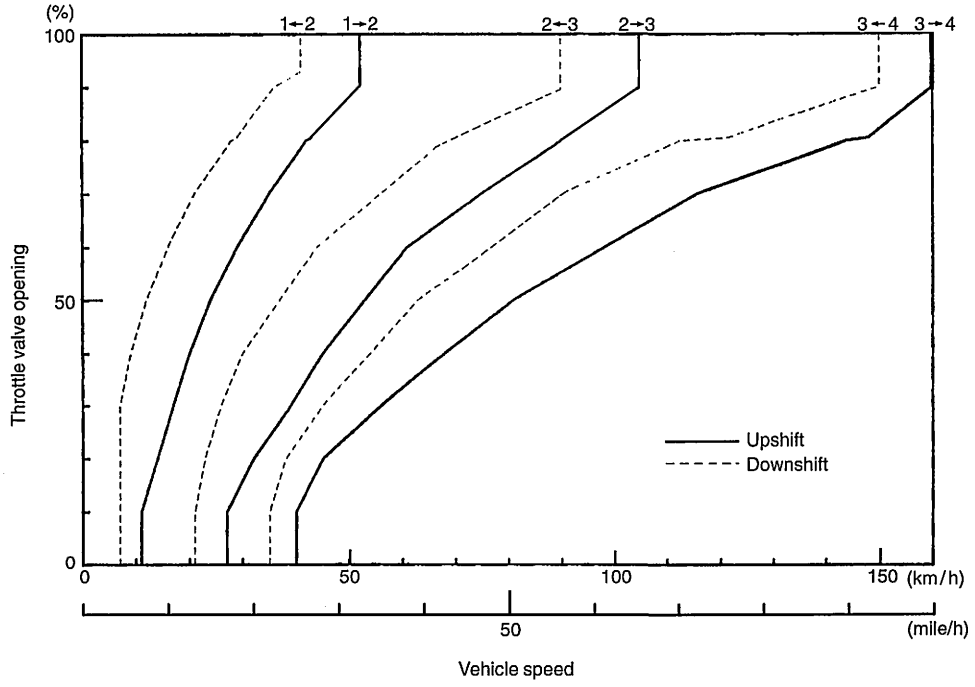


Normal Mode For H25 Engine

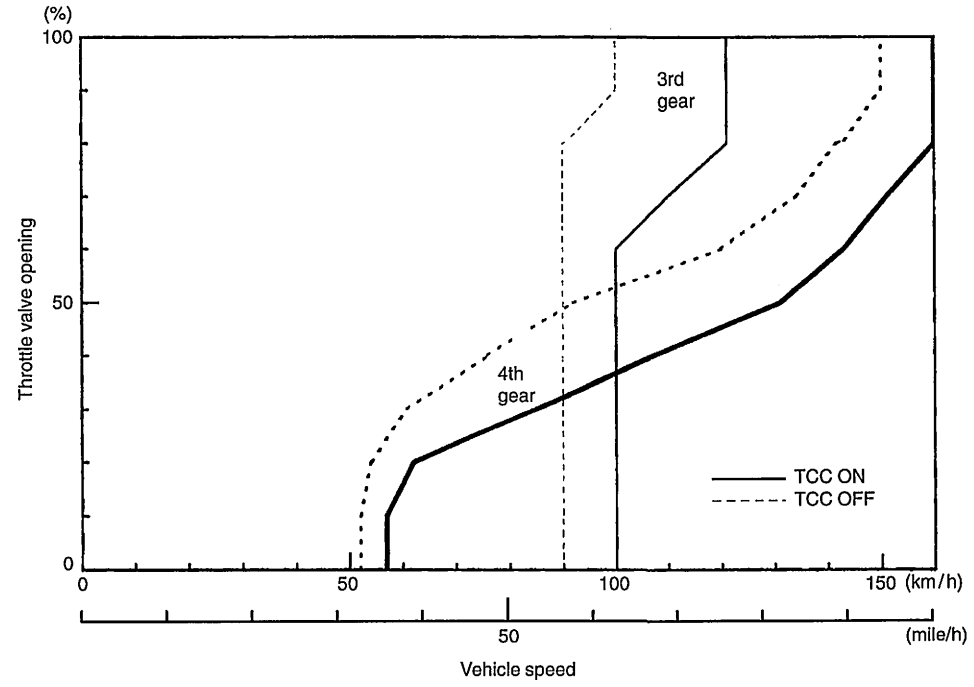
	Shift					
Throttle opening	1→2	2→3	3→4	4→3	3→2	2→1
Full throttle km/h (mile/h)	52 (33)	105 (66)	160 (99)	150 (93)	90 (56)	41 (25)
Closed throttle km/h (mile/h)	11 (7)	27 (17)	40 (25)	35 (22)	21 (13)	7 (4)

GEAR SHIFT DIAGRAM [A] AND TCC LOCK-UP DIAGRAM [B]

[A]

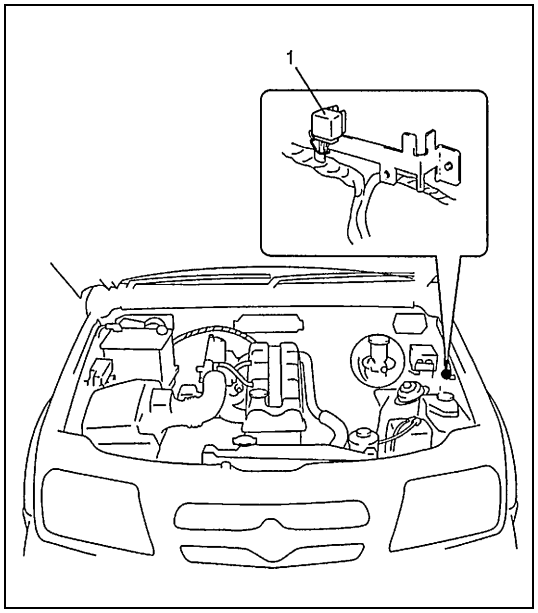


[B]



Automatic Transmission Diagnosis

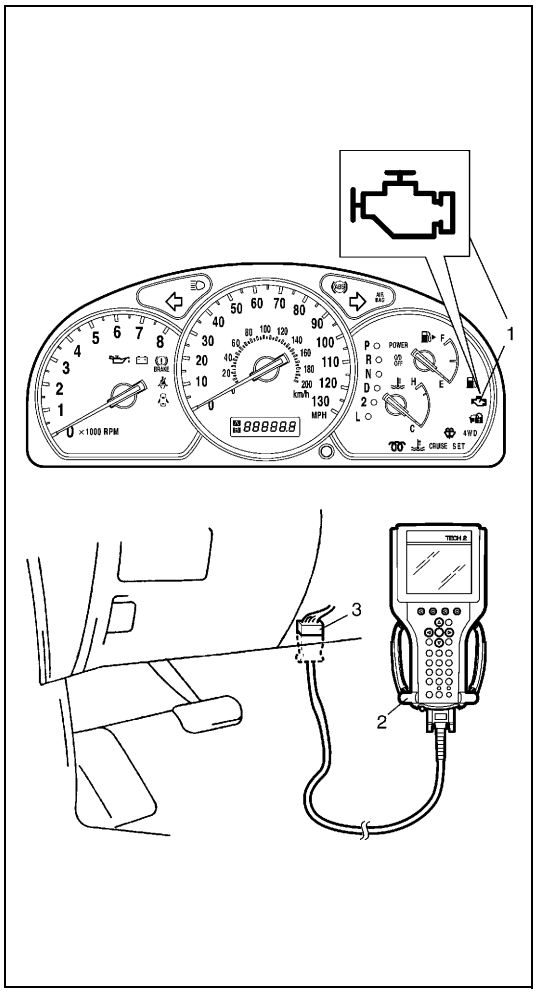
This vehicle is equipped with an electronic transmission control system, which control the automatic shift up and shift down timing, TCC operation, etc. suitably to vehicle driving conditions.
PCM (ECM) has an On-Board Diagnosis system which detects a malfunction in this system and abnormality of those parts that influence the engine exhaust emission.
When diagnosing a trouble in transmission including this system, be sure to have full understanding of the outline of “On-board Diagnostic System” and each item in “Precaution in Diagnosing Trouble” and execute diagnosis according to “Automatic Transmission Diagnostic Flow Table” given below to obtain correct result smoothly.



NOTE:

There are two types of “On-Board Diagnostic System” depending on vehicle specifications. The type of system for vehicle being serviced can be identified by whether equipped with monitor connector or not.

1. Monitor connector



[For Vehicle without Monitor Connector]

On-board diagnostic system

For automatic transmission control system, PCM (ECM) has following functions. Refer to Section 6/6-1 for details.

- When the ignition switch is turned ON with the engine at a stop, malfunction indicator lamp (MIL) turns ON to check the bulb of the MIL.
- When PCM detects a malfunction in A/T control system (and/or a malfunction which gives an adverse effect to vehicle emission) while the engine is running, it makes the malfunction indicator lamp in the meter cluster of the instrument panel turn ON and stores the malfunction area in its memory. (If it detects that continuously 3 driving cycles are normal after detecting a malfunction, however, it makes MIL turn OFF although DTC stored in its memory will remain.)
- It is possible to communicate through DLC by using not only SUZUKI scan tool (Tech-2) but also generic scan tool. (Diagnostic information can be accessed by using a scan tool.)

2 Driving Cycle Detection Logic

Refer to Section 6/6-1 for details.

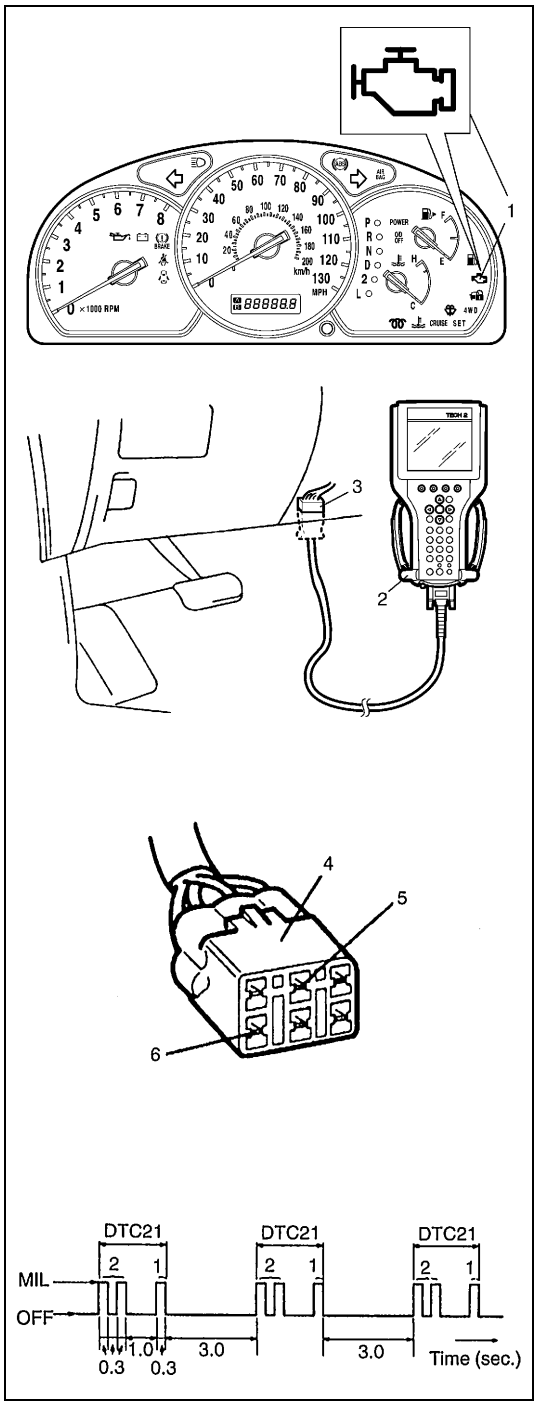
Pending DTC

Refer to Section 6/6-1 for details.

Freeze Frame Data

Refer to Section 6/6-1 for details.

1.	Malfunction indicator lamp (MIL)
2.	Scan tool
3.	DLC



[For Vehicle with Monitor Connector]

On-board diagnostic system

For automatic transmission control system, PCM (ECM) has following functions. Refer to Section 6/6-1 for details.

- When the ignition switch is turned ON with the engine at a stop, malfunction indicator lamp (MIL) turns ON to check the bulb of the MIL.
- When PCM detects a trouble in electronic shift control system, it stores its trouble code in back-up memory in itself. (The memory is kept as it is even if the trouble was only temporary and disappeared immediately. And it is not erased unless the power to PCM is shut off for 30 seconds or longer.)
- It is possible to communicate through DLC by using not only SUZUKI scan tool (Tech-2) but also generic scan tool. (Diagnostic information can be accessed by using a scan tool.)
- It is also possible to communicate by not using scan tool. PCM indicates trouble area in memory by means of flashing of malfunction indicator lamp at the time of inspection (i.e. when diagnosis switch terminal is grounded and ignition switch is turned ON).

1.	Malfunction indicator lamp (MIL)
2.	Scan tool
3.	DLC
4.	Monitor connector
5.	Diagnosis switch terminal
6.	Ground terminal

Precaution in Diagnosing Trouble

- Don't disconnect couplers from PCM (ECM), battery cable from battery, PCM ground wire harness from engine or main fuse before checking the diagnosis information (DTC, freeze frame data, etc.) stored in PCM memory.
  Such disconnection will clear memorized information in PCM memory.
- Using SUZUKI scan tool (Tech-1), or also generic scan tool for vehicle without monitor connector, the diagnostic information stored in PCM memory can be checked and cleared as well. Before its use, be sure to read Operator's (instruction) Manual supplied with it carefully to have good understanding of its functions and usage.
- Priorities for diagnosing troubles (Only for vehicle without monitor connector)
  If two or more diagnostic trouble codes (DTCs) are stored, proceed to the flow table of the DTC which was detected earliest in the order and follow the instruction in that table.
  If no instructions are given, troubleshoot diagnostic trouble codes according to the following priorities.
  – Diagnostic trouble codes (DTCs) other than DTC P0171/P0172 (Fuel system too lean/too rich) and DTC P0400 (EGR flow malfunction)
  – DTC P0171/P0172 (Fuel system too lean/too rich) and DTC P0400 (EGR flow malfunction)
- Be sure to read "Precautions for Electrical Circuit Service" in Section 0A before inspection and observe what is written there.
- PCM replacement
  When substituting a known-good PCM, check for following conditions.
  Neglecting this check may result in damage to good PCM.
  – All relays and actuators have resistance of specified value.
  – MAF sensor, MDP sensor, TP sensor and fuel tank pressure sensor are in good condition. Also, the power circuit of these sensors is not shorted to the ground.

Automatic Transmission Diagnostic Flow Table

Refer to the following pages for the details of each step.

Step	Action	Yes	No
1	Customer Complaint Analysis 1) Perform customer complaint analysis referring to the next page. Was customer complaint analysis performed according to instruction on the next page?	Go to Step 2.	Perform customer complaint analysis.
2	Diagnostic Trouble Code (DTC) and Freeze Frame Data Check, Record and Clearance 1) Check for DTC (including pending DTC) referring to the next page. Is there any DTC(s)?	1) Print DTC and freeze frame data or write them down and clear them by referring to "DTC Clearance" in this section. 2) Go to Step 3.	Go to Step 4.
3	Visual Inspection 1) Perform visual inspection referring to the next page. Is there any faulty condition?	1) Repair or replace malfunction part. 2) Go to Step 11.	Go to Step 5.
4	Visual Inspection 1) Perform visual inspection referring to the next page. Is there any faulty condition?		Go to Step 8.

Step	Action	Yes	No
5	Trouble Symptom Confirmation 1) Confirm trouble symptom referring to the next page. Is trouble symptom identified?	Go to Step 6.	Go to Step 7.
6	Rechecking and Record of DTC/Freeze Frame Data 1) Recheck for DTC and freeze frame data referring to “DTC Check” in this section. Is there any DTC(s)?	Go to Step 9.	Go to Step 8.
7	Rechecking and Record of DTC/Freeze Frame Data 1) Recheck for DTC and freeze frame data referring to “DTC Check” in this section. Is there any DTC(s)?	Go to Step 9.	Go to Step 10.
8	Automatic Transmission Basic Inspection and Trouble Diagnosis Table 1) Check and repair according to “A/T Basic Check” and “Trouble Diagnosis Table” in this section. Are check and repair complete?	Go to Step 11.	1) Check and repair malfunction part(s). 2) Go to Step 11.
9	Troubleshooting for DTC 1) Check and repair according to applicable DTC diag. flow Table. Are check and repair complete?		
10	Check for Intermittent Problems 1) Check for intermittent problems referring to the next page. Is there any faulty condition?	1) Repair or replace malfunction part(s). 2) Go to Step 11.	Go to Step 11.
11	Final Confirmation Test 1) Clear DTC if any. 2) Perform final confirmation test referring to the next page. Is there any problem symptom, DTC or abnormal condition?	Go to Step 6.	End.

1. Customer Complaint Analysis
Record details of the problem (failure, complaint) and how it occurred as described by the customer.
For this purpose, use of such a inspection form will facilitate collecting information to the point required for proper analysis and diagnosis.

2. Diagnostic Trouble Code (DTC)/Freeze Frame Data Check, Record and Clearance
First, referring to DTC check section, check DTC (including pending DTC). If DTC exists, print or write down DTC and freeze frame data and then clear them by referring to DTC clearance section. DTC indicates malfunction in the system but it is not possible to know from it whether the malfunction is occurring now or it occurred in the past and normal condition has been restored. In order to know that, check symptom in question according to Step 5 and then recheck DTC according to Step 6.
Diagnosing a trouble based on the DTC in this step only or failure to clear the DTC in this step may result in an faulty diagnosis, trouble diagnosis of a normal circuit or difficulty in troubleshooting which is otherwise unnecessary.

3 and 4. Visual Inspection
As a preliminary step, be sure to perform visual check of the items that support proper function of the A/T and engine referring to Visual Inspection section.

5. Trouble Symptom Confirmation
Check trouble symptoms based on information obtained in Step 1 “Customer Complaint Analysis” and Step 2 “DTC/Freeze Frame Data Check”.
Also, recheck DTC according to “DTC Confirmation Procedure” described in each “DTC Flow Table”.

6 and 7. Rechecking and Record of DTC/Freeze Frame Data
Refer to “DTC Check” section for checking procedure.

8. A/T Basic Check and Trouble Diagnosis Table
Perform A/T basic check according to the “A/T Basic Check Flow Table” first. When the end of the flow table has been reached, check the parts of the system suspected as a possible cause referring to “Trouble Diagnosis Table” and based on symptoms appearing on the vehicle (symptoms obtained through steps of customer complaint analysis, trouble symptom confirmation and/or A/T basic check) and repair or replace faulty parts, if any.

9. Diagnostic Trouble Code Flow Table
Based on the DTC indicated in Step 6 and 7 and referring to “Diagnostic Trouble Code Flow Table” in this section, locate the cause of the trouble, namely in a sensor, switch, wire harness, connector, actuator, PCM or other part and repair or replace faulty parts.

10. Check for Intermittent Problem
Check parts where an intermittent trouble is easy to occur (e.g., wire harness, connector, etc.), referring to “Intermittent and Poor Connection” in Section 0A and related circuit of DTC recorded in Step 2.

11. Final Confirmation Test
Confirm that the problem symptom has gone and the A/T is free from any abnormal conditions.
If what has been repaired is related to the malfunction DTC, clear the DTC once, set conditions under which DTC was detected and A/T and/or vehicle was repaired and confirm that no DTC is indicated.

Customer Problem Inspection Form (Example)

User name:	Model:	VIN:	
Date of issue:	Date of Reg:	Date of problem:	Mileage:

PROBLEM SYMPTOMS	
☐Engine does not start	☐Engine stops
☐Vehicle does not move (forward, rearward)	☐Transmission does not shift (1st, 2nd, 3rd, 4th, Rev) gear
☐No lock-up (TCC clutch operation)	☐Automatic shift does not occur
☐Shift point too high or too low	☐Transmission slipping in (1st, 2nd, 3rd, 4th, Rev) gear
☐Excessive gear change shock	☐Other:

VEHICLE/ ENVIRONMENTAL CONDITION WHEN PROBLEM OCCURS	
Environmental Condition	
Weather	☐Fair/☐Cloudy/☐Rain/☐Snow/☐Always/☐Other ( )
Temperature	☐Hot/☐Warm/☐Cool/☐Cold/☐(°C °F)/☐Always
Frequency	☐Always/☐Sometimes/☐(times/ day, month)/☐Only Once
Road	☐Urban/☐Suburb/☐Highway/☐Mountainous (uphill/downhill)/☐Paved road/☐Gravel/ ☐Other( )
Vehicle Condition	
Transmission range	☐(P,R,N,D,2,L) range/☐(→) range
Transmission temp.	☐Cold/☐Warming up phase/☐Warmed up
Vehicle	☐At stop/☐During driving (constant speed/accelerating/decelerating/ right hand corner/left hand corner)/☐Other ( )/☐Speed (km/h mile/h)
Engine	☐Speed(r/min)/☐Throttle opening(idle/about %/full)
Brake	☐Apply/☐Not apply
O/D cut switch	☐ON/☐OFF
P/N change switch	☐Power/☐Normal
Malfunction indicator lamp condition ☐Always ON ☐Sometimes ON ☐Always OFF ☐Good condition	
Diagnostic trouble code	First check : ☐No code ☐Malfunction code( )
	Second check : ☐No code ☐Malfunction code( )

NOTE:

The above form is a standard sample. It should be modified according to conditions characteristic of each market.

Malfunction Indicator Lamp (MIL) Check

Refer to the same item in Section 6/6-1 for checking procedure.

"O/D OFF" Lamp Check

1) Turn ignition switch ON.
2) Check that "O/D OFF" lamp lights for about 2 – 4 sec. and then goes OFF.
   If anything faulty is found, advance "Diagnostic flow table B-1 or B-2 "O/D OFF" Lamp Circuit Check".

"Power" Lamp Check

1) Check that Power/Normal change switch button is at Normal position.
2) Turn ignition switch ON.
3) Check that "Power" Lamp light for 2 – 4 sec. and then goes OFF.
   If anything faulty is found, advance "Diagnostic flow table B-3 or B-4 POWER Lamp Circuit Check 2".

Diagnostic Trouble Code (DTC) Check

Refer to the same item in Section 6/6-1 for checking procedure.

Diagnostic Trouble Code (DTC) Clearance

Refer to the same item in Section 6/6-1 for clearance procedure.

Diagnostic Trouble Code (DTC) Table (A/T Related Code)

DTC NO.		DETECTED ITEM	DETECTING CONDITION	MIL	
Using scan tool	Not using scan tool			Vehicle without monitor connector	Vehicle with monitor connector
–	12	–	No trouble.	–	–
P0705	72	Transmission range sensor circuit malfunction	Multiple signals inputted simultaneously or no signal inputted while running at 60 km/h or more.	2 driving cycles	Not applicable
P0715	76	Input/Turbine speed sensor circuit malfunction	Input shaft revolution speed is lower than specified value while vehicle is running with "D" range and specified engine speed or higher.	2 driving cycles	1 driving cycle
P0720	75	Output speed sensor circuit malfunction	Output speed sensor signal not inputted while VSS signal being inputted.	2 driving cycles	1 driving cycle
*1 P0741	Not applicable	TCC (lock-up) solenoid performance or stack off	Actual TCC operation does not agree with ON/OFF control from PCM to TCC.	2 driving cycles	Not applicable
P0743	65 66	TCC (lock-up) solenoid electrical	Monitor signal OFF is detected When TCC control solenoid is ON or monitor signal ON is detected when it is OFF.	1 driving cycle	1 driving cycle
*1 P0751	Not applicable	Shift solenoid A (#1) performance or stuck off	Gear change control from PCM to A/T does not agree with actual gear position of A/T.	2 driving cycles	Not applicable
P0753	61 62	Shift solenoid A (#1) electrical	Monitor signal OFF is detected when shift solenoid A (#1) is ON or monitor signal ON is detected when it is OFF.	1 driving cycle	1 driving cycle

Diagnostic Trouble Code (DTC) Table (A/T Related Code) (cont'd)

DTC NO.		DETECTED ITEM	DETECTING CONDITION	MIL	
Using scan tool	Not using scan tool			Vehicle without monitor connector	Vehicle with monitor connector
*1 P0756	Not applicable	Shift solenoid B (#2) performance or stuck off	Gear change control from PCM to A/T does not agree with actual gear position of A/T.	2 driving cycles	Not applicable
P0758	63 64	Shift solenoid B (#2) electrical	Monitor signal OFF is detected when shift solenoid B (#2) is ON or monitor signal ON is detected when it is OFF.	1 driving cycle	1 driving cycle
*1 P1875	Not applicable	4WD low switch circuit malfunction	Difference between vehicle speed detected by VSS and vehicle speed detected by output speed sensor and compensated by 4WD low switch is larger than specification.	2 driving cycles	Not applicable

NOTE:

***1 : Applicable to vehicle without monitor connector only.**

Fail-Safe Table

When any of the following DTC is detected, ECM (PCM) enters fail-safe mode as long as malfunction continues to exist but that mode is canceled when ECM detects normal condition after that.

DTC NO.		TROUBLE AREA	FAIL SAFE OPERATION
Using scan tool	Not using scan tool		
P0177 P0118	14 15	ECT SENSOR	• Each control except 4-A/T is permitted on the basis of 30.1°C engine coolant temp. • 4-A/T control is performed assuming 31°C (engine warmed up) or higher after 15 min. from engine start.
P0122 P0123	21 22	TP SENSOR	• Each control except 4-A/T is performed on the basis of 124° throttle valve opening. • 4-A/T control is performed on the basis of 0° throttle valve opening.
P0705	72	TR SWITCH	A/T control is performed in priority order of L, 2, N, D, R and P.
P0720	75	OUTPUT SPEED SENSOR CIRCUIT MALFUNCTION	A/T control is performed by using signal from VSS.
P0753	61 62	SHIFT SOLENOID A (#1)	• A/T control using 3rd gear is performed when D range, 1st or 2nd gear is used. • TCC solenoid OFF.
P0758	63 64	SHIFT SOLENOID B (#2)	• A/T control using 4th gear is performed when D range 2nd or 3rd gear is used. • When both shift solenoid A (#1) and B (#2) failed simultaneously, A/T control using 4th gear is always performed in D range. • TCC solenoid OFF.
P0743	65 66	TCC (Lock-up) SOLENOID	TCC (lock-up) solenoid OFF.

Visual Inspection

Visually check following parts and systems.

INSPECTION ITEM	REFERRING SECTION
• A/T fluid ----- level, leakage, color	Section 0B
• A/T fluid hoses ----- disconnection, looseness, deterioration	Section 7B1
• Throttle (accelerator) cable ----- play, installation	Section 6E1/6E2
• A/T throttle cable ----- play, installation	Section 7B1
• A/T select cable ----- installation, operation	Section 7B1
• Engine oil ----- level, leakage	Section 0B
• Engine coolant ----- level, leakage	Section 0B
• Battery ----- fluid level, corrosion of terminal	
• Connectors of electric wire harness ----- disconnection, friction	Section 6/6-1/7B1
• Fuses ----- burning	Section 8
• Parts ----- installation, damage	
• Bolt ----- looseness	
• Other parts that can be checked visually	
Also check following items at engine start, if possible	
• “O/D OFF” lamp (Operation)	Section 7B1
• “POWER” lamp (Operation)	Section 7B1
• Malfunction indicator lamp (Operation)	Section 6/6-1
• Charge warning lamp (Operation)	Section 6H
• Engine oil pressure warning lamp (Operation)	Section 8 (Section 6A1/6A2/6A4 for pressure check)
• Engine coolant temp. meter (Operation)	
• Other parts that can be checked visually (Operation)	

A/T Basic Check

This inspection is important for troubleshooting when PCM (ECM) has detected no DTC and no abnormality has been noted in visual inspection.
Follow flow table carefully.

Step	Action	Yes	No
1	Was “A/T Diag. Flow Table” performed?	Go to Step 2.	Go to “A/T Diag. Flow Table”.
2	Perform “Manual Road Test” in this section. Is it OK?	Go to Step 3.	Go to Step 4.
3	Proceed to “Trouble Diagnosis Table 1” in this section. Is trouble identified?	Repair or replace defective parts.	Go to Step 5.
4	Perform stall test, time rag test, line pressure test, engine brake test and “P” range test referring to “Stall Test, Line Pressure Test, Engine Brake Test” and “P” “Range Test” in this section. Are the test results satisfactory?	Go to Step 5.	Proceed to “Trouble Diagnosis Table 3” in this section.
5	Proceed to “Trouble Diagnosis Table 2” in this section. Is trouble identified?	Repair or replace defective parts.	Proceed to “Trouble Diagnosis Table 3” in this section.

Trouble Diagnosis Table 1

Condition	Possible Cause	Correction
TCC does not operate	Brake pedal (stop lamp) switch or its circuit faulty (H25 engine only)	"Diagnostic Flow Table A-1"
	4WD low switch or its circuit faulty	
	Engine coolant temp. sensor or its circuit faulty	
	Cruise control signal circuit faulty (if equipped)	
Gear does not change to 4th	O/D cut switch or its circuit faulty	"Diagnostic Flow Table A-2"
	4WD low switch or its circuit faulty	
	Engine coolant temp. sensor or its circuit faulty	
	Cruise control signal circuit faulty (if equipped)	

Trouble Diagnosis Table 2

Transmission Fluid

Condition	Possible Cause	Correction
Low fluid pressure	Clogged oil pump strainer	Wash strainer.
	Malfunction of pressure regulator valve	Overhaul valve body.
High fluid pressure	Pressure regulator valve	Overhaul valve body.

Running Condition

Condition	Possible Cause	Correction
Unable to run in all range	Regulator valve stick	Replace.
	Clogged oil strainer	Wash strainer.
	Seized or broken planetary gear	Repair or replace.
	Faulty manual valve	Replace.
Poor 1st speed running or excessive slippage in "D" or "2"	Faulty 1–2 shift valve	Replace.

Gear Shift

Condition	Possible Cause	Correction
Poor 1–2 shift, excessive slippage	Regulator valve sticking	Replace.
	1–2 shift valve sticking	Replace.
	Shift solenoid valve-B sticking	Replace.
	Intermediate coast modulator valve sticking	Replace.
Poor 2–3 shift, excessive slippage	2–3 shift valve sticking	Replace.
	Shift solenoid valve-A sticking	Replace.
Poor start or surging in "D" range	Regulator valve sticking	Replace.
Poor 3–4 shift, excessive slippage	3–4 shift valve sticking	Replace.
	Shift solenoid valve-B sticking	Replace.
Excessive shock on 1–2 shift	Regulator valve sticking	Replace.
	Faulty accumulator, second brake piston	Replace.
Excessive shock on 2–3 shift	Regulator valve sticking	Replace.
	Faulty accumulator, direct clutch piston	Replace.

Condition	Possible Cause	Correction
Excessive shock on 3–4 shift	Regulator valve sticking	Replace.
Non operate lock-up system	TCC (Lock-up) control valve sticking	Replace.
	Solenoid valve No.2 (TCC solenoid valve) sticking	Replace.

Trouble Diagnosis Table 3

Transmission Fluid

Condition	Possible Cause	Correction
Low fluid pressure	Leakage from oil pressure circuit	Overhaul.

Running Condition

Condition	Possible Cause	Correction
Unable to run in all range	Wear in oil pump	Replace.
	Seizure in oil pump	Replace.
	Fluid pressure leakage to over drive clutch due to wear of oil pump bushing	Replace.
	Faulty in torque converter	Replace.
Poor 1st speed running or excessive slippage in "D" or "2"	Fluid pressure leakage from forward clutch due to wear or breakage of O/D case seal ring	Replace.
	Overdrive clutch slipping	Replace.
Unable to run or excessive slippage in "L" range	Fluid pressure leakage of forward clutch due to wear or breakage of O/D case seal ring	Replace.
	Reverse brake disc slipping	Replace.
	Broken brake piston O-ring	Replace.
Unable to run or excessive slippage in "R" range	Fluid pressure leakage to direct clutch due to wear or breakage of center support seal ring	Replace.
	Worn direct clutch	Replace.

Gear Shift

Condition	Possible Cause	Correction
Poor 1–2 shift, excessive slippage	Fluid pressure leakage to overdrive clutch due to wear or breakage of O/D case seal ring	Replace.
	Faulty second brake	Replace.
	Broken O-ring of second brake piston	Replace.
	Faulty second coast brake (in "2" range)	Replace.
Poor 2–3 shift, excessive slippage	Fluid pressure leakage to overdrive clutch due to wear or breakage of O/D case seal ring	Replace.
	Worn direct clutch bushing	Replace.
	Direct clutch slipping	Replace.
	Foreign material caught in direct clutch piston check ball	Replace.
Poor start or surging in "D" range	Fluid pressure leakage of forward clutch due to wear or breakage of O/D case seal ring	Replace.
	Malfunction of forward clutch	Replace.

Condition	Possible Cause	Correction
Poor 3–4 shift, excessive slippage	Faulty overdrive brake	Replace.
	Faulty overdrive clutch	Replace.
Poor start or juddering in "R" range	Fluid pressure leakage of direct clutch due to wear or breakage of oil center support seal ring	Replace.
	Worn direct clutch	Replace.
Excessive shock on 1–2 shift	Faulty one-way clutch	Replace.
Non operate lock-up system	Faulty torque converter	Replace.

Abnormal Noise

Condition	Possible Cause	Correction
Abnormal noise in "P" or "N" range	Worn oil pump	Replace.

Scan Tool Data

Refer to Section 6/6-1.

Inspection of PCM and Its Circuit

Refer to Section 6/6-1.

Wire Harness and Connectors

Refer to Section 6/6-1.

Diagnostic Flow Table A-1 (No TCC Lock-Up Occurs)

System Description

PCM turns TCC solenoid OFF under any of the following conditions.

- Brake pedal switch : ON
- 4WD LOW switch : ON
- Cruise control module : TCC OFF command signal is output (if equipped).
- ECT : ECT < 30°C (86°F)

Troubleshooting

WARNING:

- **When performing a road test, select a place where there is no traffic or possibility of a traffic accident and very careful during testing to avoid occurrence of an accident.**
- **Road test should be carried out with 2 person, a driver and tester, on a level road.**

Step	Action	Yes	No
1	Was "Automatic Transmission Diagnostic Flow Table" performed?	Go to Step 2.	Go to "Automatic Transmission Diagnostic Flow Table".
2	ECT check : 1) Warm up engine to normal operating temperature. 2) Check ECT using scan tool. Is ECT more than 30°C (86°F)?	Go to Step 3.	Faulty ECT sensor, its circuit or engine cooling system. If OK, substitute a known-good PCM and recheck.

Step	Action	Yes	No
3	Perform running test under the following conditions and check voltage between C51-1-8 (G16/J20 engines) or C51-1-2 (H25 engine) terminal of PCM coupler and ground. • Normal mode in "D" range. • Transfer "2H" position. • Cruise control is not operated (if equipped). • Brake pedal released. • Drive vehicle with TCC ON condition referring to "TCC lock-up diagram" in this section. Is it battery voltage?	Faulty TCC solenoid valve, its circuit or transmission.	Go to Step 4.
4	Is vehicle equipped with H25 engine?	Go to Step 5.	Go to Step 6.
5	Brake switch signal inspection : 1) With ignition switch ON, check voltage between E61-31 terminal of PCM coupler terminal and ground. **Brake switch signal specification** **Brake pedal released : 0 V** **Brake pedal depressed : Battery voltage** Is the result as specified?	Go to Step 6.	Faulty brake pedal switch or its circuit. If OK, substitute a known-good PCM and recheck.
6	"4WD LOW" switch signal inspection : 1) With ignition switch ON, check voltage between C51-1-26 (G16/J20 engines) or C51-1-5 (H25 engine) terminal of PCM coupler and ground. **"4WD LOW" switch signal specification** **Transfer gear position "4L" or "N" : 0 V** **Transfer gear position "4H" or "2H" : Battery voltage** Is the result as specified?	Go to Step 7.	Faulty "4WD LOW" switch or its circuit. If OK, substitute a known-good PCM and recheck.
7	Is vehicle equipped with cruise control system?	Go to Step 8.	Substitute a known-good PCM and recheck.
8	Cruise control signal inspection : 1) With ignition switch ON, check voltage between E61-35 (G16/J20 engines) or E61-3 (H25 engine) terminal of PCM coupler and ground. Is it battery voltage?	Substitute a known-good PCM and recheck.	Faulty cruise control module or its circuit. If OK, substitute a known-good PCM and recheck.

Diagnostic Flow Table A-2 (No Gear Shift to O/D)

System Description

PCM does not shift to O/D gear under any of the following conditions.

- O/D cut switch : ON
- 4WD LOW switch : ON
- Cruise control module : O/D OFF command signal is output (if equipped).
- ECT : ECT < 30°C (86°F)

Troubleshooting

WARNING:

- **When performing a road test, select a place where there is no traffic or possibility of a traffic accident and very careful during testing to avoid occurrence of an accident.**
- **Road test should be carried out with 2 person, a driver and tester, on a level road.**

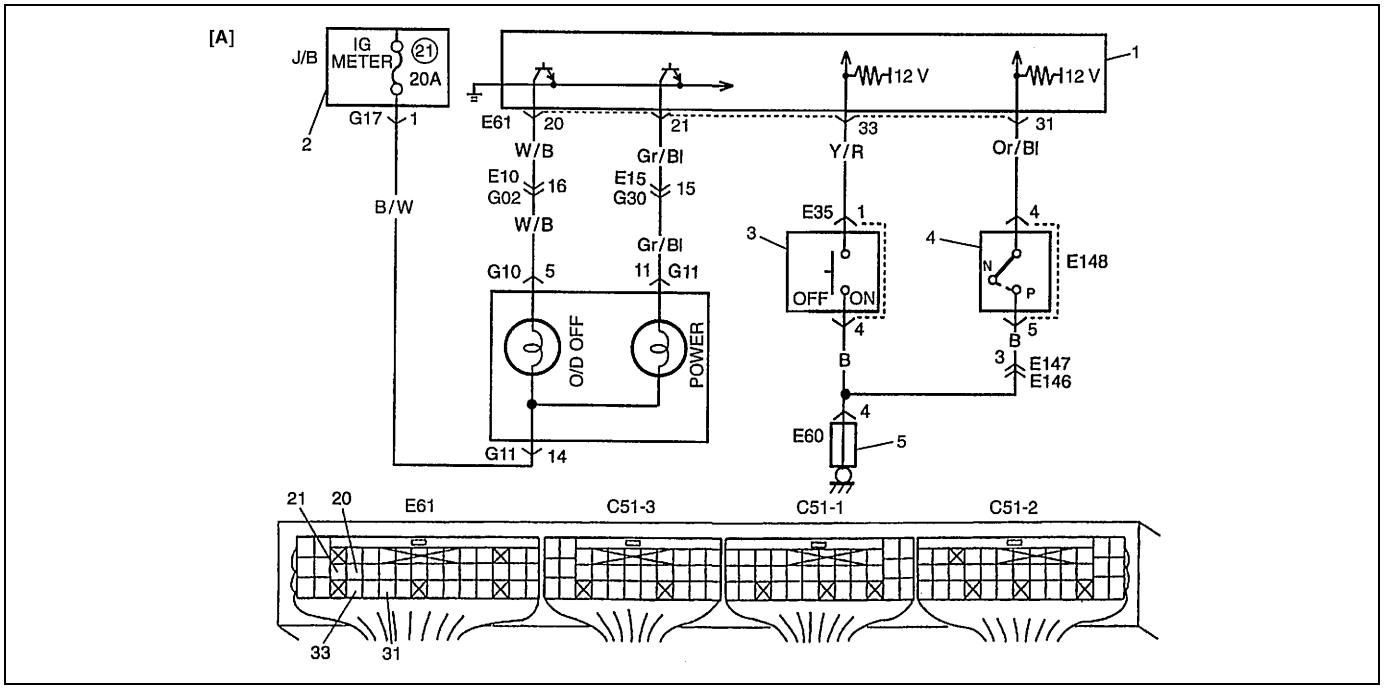
Step	Action	Yes	No
1	Was “Automatic Transmission Diagnostic Flow Table” performed?	Go to Step 2.	Go to “Automatic Transmission Diagnostic Flow Table”.
2	ECT check : 1) Warm up engine to normal operating temperature. 2) Check ECT using scan tool. Is ECT more than 30°C (86°F)?	Go to Step 3.	Faulty ECT sensor, its circuit or engine cooling system. If OK, substitute a known-good PCM and recheck.
3	Perform running test under the following conditions and check voltage between C51-1-2 (G16/J20 engines) or C51-1-6 (H25 engine) terminal of PCM coupler and ground, C51-1-1 terminal of PCM coupler and ground. • O/D cut switch OFF (“O/D OFF” lamp OFF). • Normal mode in “D” range. • Transfer “2H” position. • Cruise control is not operated (if equipped). • Drive vehicle with 4th gear condition referring to “Gear shift diagram” in this section. Is each voltage about 0 V?	Faulty shift solenoid valve, its circuit or transmission.	“G” wire or “G/R” wire shorted to power circuit. If OK, go to Step 4.
4	O/D cut switch signal inspection : 1) With ignition switch ON, check voltage between E61-33 (G16/J20 engines) or E61-14 (H25 engine) terminal of PCM coupler and ground. **O/D cut switch signal specification** **O/D cut switch OFF : Battery voltage** **O/D cut switch ON : 0 V** Is the result as specified?	Go to Step 5.	Faulty O/D cut switch or its circuit. If OK, substitute a known-good PCM and recheck.

Step	Action	Yes	No
5	4WD LOW switch signal inspection : 1) With ignition switch ON, check voltage between C51-1-26 (G16/J20 engines) or C51-1-5 (H25 engine) terminal of PCM coupler and ground. **"4WD LOW" switch signal specification** **Transfer gear position "4L" or "N" : 0 V** **Transfer gear position "4H" or "2H" : Battery voltage** Is the result as specified?	Go to Step 6.	Faulty 4WD LOW switch or its circuit. If OK, substitute a known-good PCM and recheck.
6	Is vehicle equipped with cruise control system?	Go to Step 7.	Substitute a known-good PCM and recheck.
7	Cruise control signal inspection : 1) With ignition switch ON, check voltage between E61-35 (G16/J20 engines) or E61-3 (H25 engine) terminal of PCM coupler and ground. Is it battery voltage?	Substitute a known-good PCM and recheck.	Faulty cruise control module or its circuit. If OK, substitute a known-good PCM and recheck.

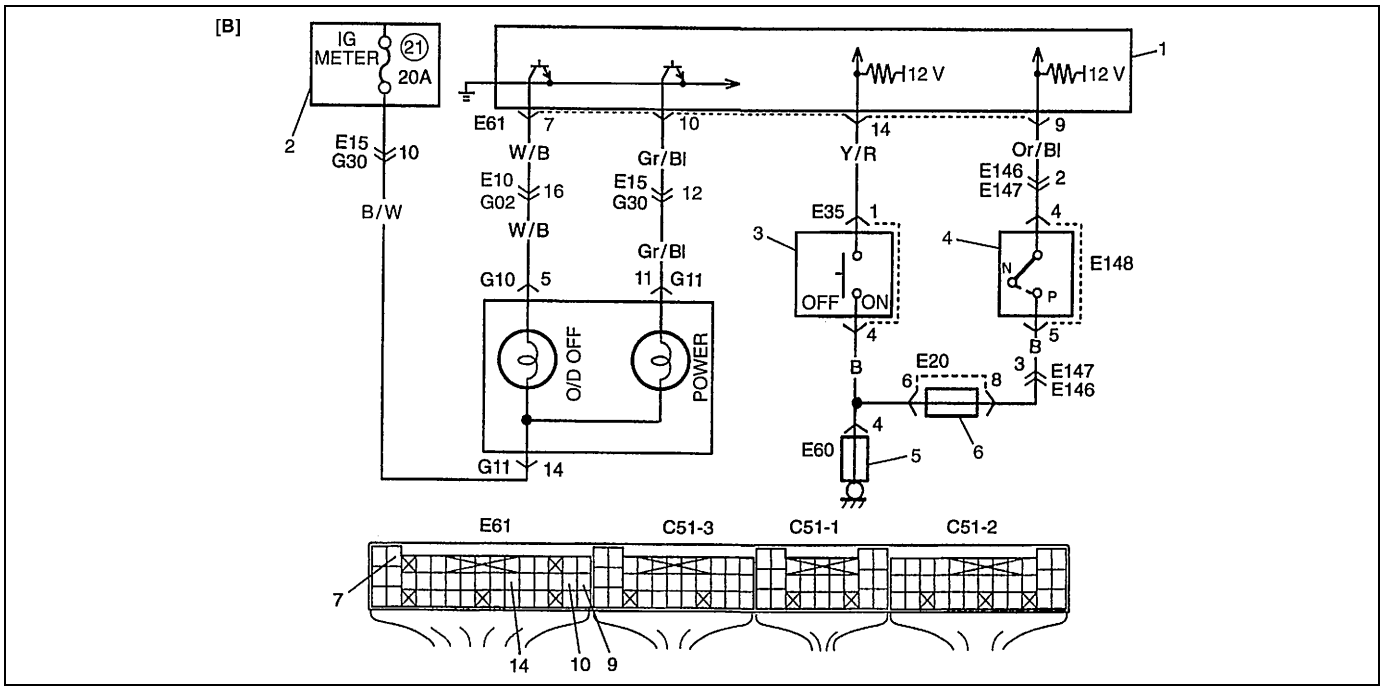
Diagnostic Flow Table B-1 “O/D OFF” Light Circuit Check

(“O/D OFF” Light Does Not Light at Ignition Switch on But Engine Starts Up)

Wiring Diagram



[A] : G16/J20 Engines	2. J/B	4. P/N change switch
1. PCM	3. O/D cut switch	5. J/C



[B] : H25 Engine	2. Fuse	4. P/N change switch	6. J/C
1. PCM	3. O/D cut switch	5. J/C	

Troubleshooting

Step	Action	Yes	No
1	"O/D OFF" light circuit check : 1) With ignition switch OFF, disconnect couplers from PCM. 2) Using service wire, connect E61-20 (G16/J20 engines) or E61-7 (H25 engine) terminal of disconnected PCM coupler and ground. Does "O/D OFF" light turn ON at ignition switch ON?	Poor E61-20 (G16/J20 engines) or E61-7 (H25 engine) terminal connection. If OK, substitute a known-good PCM and recheck.	Bulb burned out or faulty "W/B", "B/W" wire.

Diagnostic Flow Table B-2 “O/D OFF” Light Circuit Check

(“O/D OFF” Light Comes on Steadily)

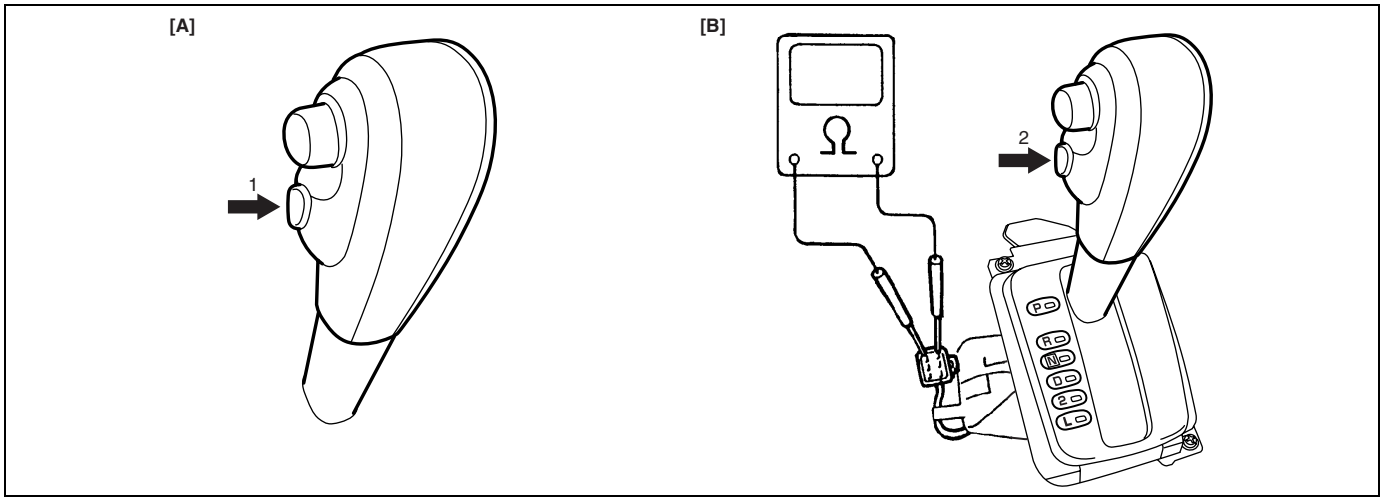
Wiring Diagram

Refer to Table B-1 in this section.

Troubleshooting

Step	Action	Yes	No
1	Check O/D cut Switch Status. Press O/D cut switch button (1). Does “O/D OFF” lamp come ON steadily?	Go to Step 2.	System is OK.
2	Check Lamp Circuit for Short. 1) Turn ignition switch OFF and disconnect PCM connectors. 2) Turn ignition switch ON. Does “O/D OFF” lamp come ON steadily?	“W/B” circuit shorted to ground.	Go to Step 3.
3	Check O/D cut Switch Circuit. 1) Check resistance between terminal E61-33 (G16/J20 engines) or E61-14 (H25 engine) of disconnected PCM connector and body ground with O/D cut switch OFF. Is continuity indicated?	Go to Step 4.	Check PCM ground circuit for open. If ground circuit is OK, substitute a known-good PCM and recheck.
4	Check O/D cut Switch for Operation. 1) Remove console box. 2) Disconnect O/D cut switch connector. 3) Check continuity between switch terminals under each condition below. **Switch released : No continuity** **Switch held pushed in : Continuity** Is check result satisfactory?	“Y/R” circuit shorted to ground.	Replace O/D cut switch.

[A] Fig. for Step 1 / [B] Fig. for Step 4

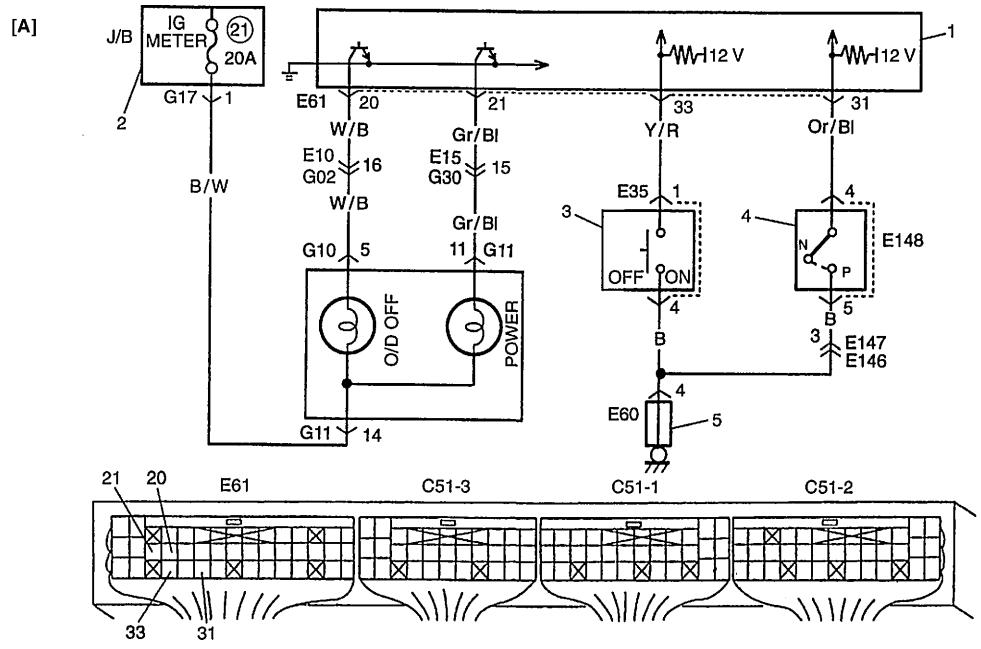


1. (When ignition switch ON)
   Push button to turn O/D cut switch ON.
   Push button again to turn O/D cut switch OFF.
2. (When O/D cut switch connector is disconnected)
   Hold button pushed in to short switch terminals.
   Release button to open switch terminals.

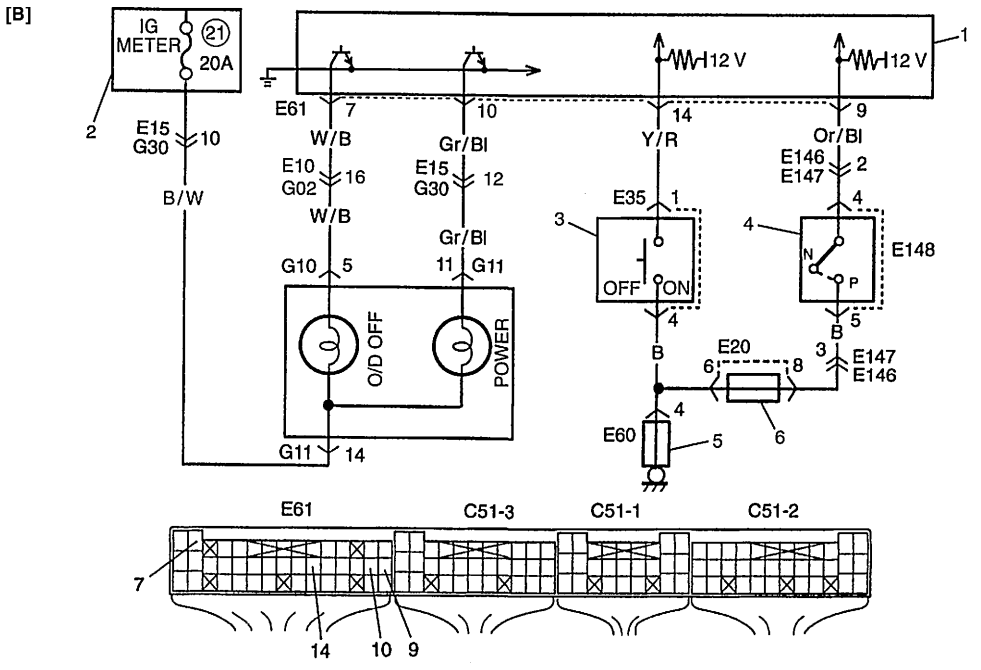
Diagnostic Flow Table B-3 “Power” Light Circuit Check

(“Power” Light Does not Light at Ignition Switch on But Engine Starts Up)

Wiring Diagram



[A] : G16/J20 Engines	2. J/B	4. P/N change switch
1. PCM	3. O/D cut switch	5. J/C



[B] : H25 Engine	2. Fuse	4. P/N change switch	6. J/C
1. PCM	3. O/D cut switch	5. J/C	

Troubleshooting

Step	Action	Yes	No
1	"POWER" light circuit check : 1) With ignition switch OFF, disconnect couplers from PCM. 2) Using service wire, connect E61-21 (G16/J20 engines) or E61-10 (H25 engine) terminal of disconnected PCM coupler and ground. Does "POWER" light turn ON at ignition switch ON?	Poor E61-21 (G16/J20 engines) or E61-10 (H25 engine) terminal connection. If OK, substitute a known-good PCM and recheck.	Bulb burned out or faulty "Gr/Bl", "B/W" wire.

Diagnostic Flow Table B-4 “Power” Light Circuit Check

(“Power” Light Comes on Steadily)

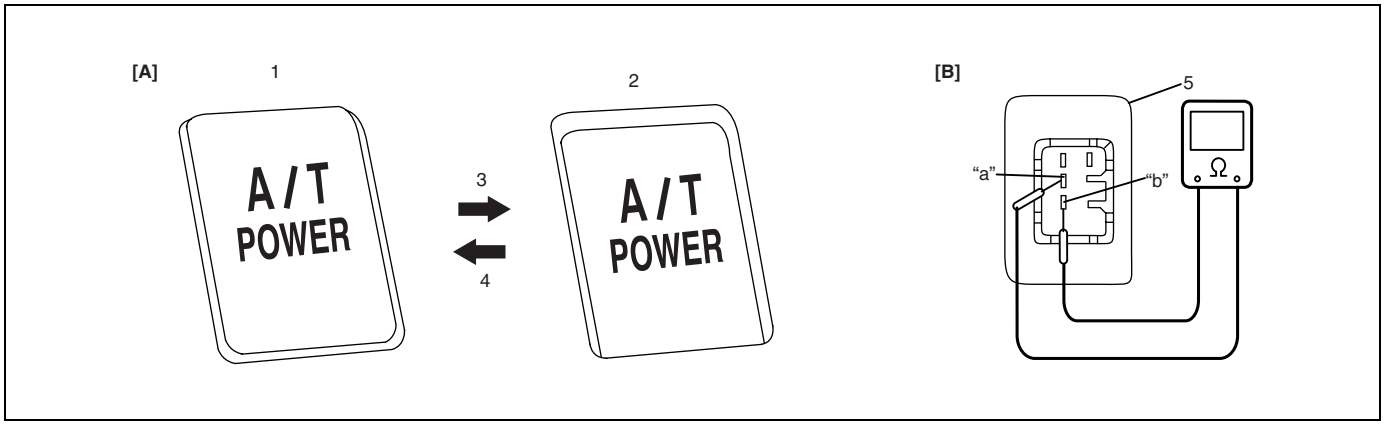
Wiring Diagram

Refer to Table B-3 in this section.

Troubleshooting

Step	Action	Yes	No
1	Check Power/Normal Change Switch Position. Is switch button at Normal position?	Go to Step 2.	Set Power/Normal change switch at Normal position.
2	Check Lamp Circuit for Short. 1) Turn ignition switch OFF and disconnect PCM connectors. 2) Turn ignition switch ON. Does “POWER” lamp come ON steadily?	“Gr/Bl” circuit shorted to ground.	Go to Step 3.
3	Check Power/Normal Change Switch Circuit. 1) Check resistance between terminal E61-31 (G16/J20 engines) or E61-9 (H25 engine) of disconnected PCM connector and body ground with P/N change switch OFF. Is continuity indicated?	Go to Step 4.	Check PCM ground circuit for open. If ground circuit is OK, substitute a known-good PCM and recheck.
4	Check Power/Normal Change Switch for Operation. 1) Remove Power/Normal change switch. 2) Check continuity between switch terminals “a” and “b” under each condition below. **Normal position : No continuity** **Power position : Continuity** Is check result satisfactory?	“Or/Bl” circuit shorted to ground.	Replace Power/Normal change switch.

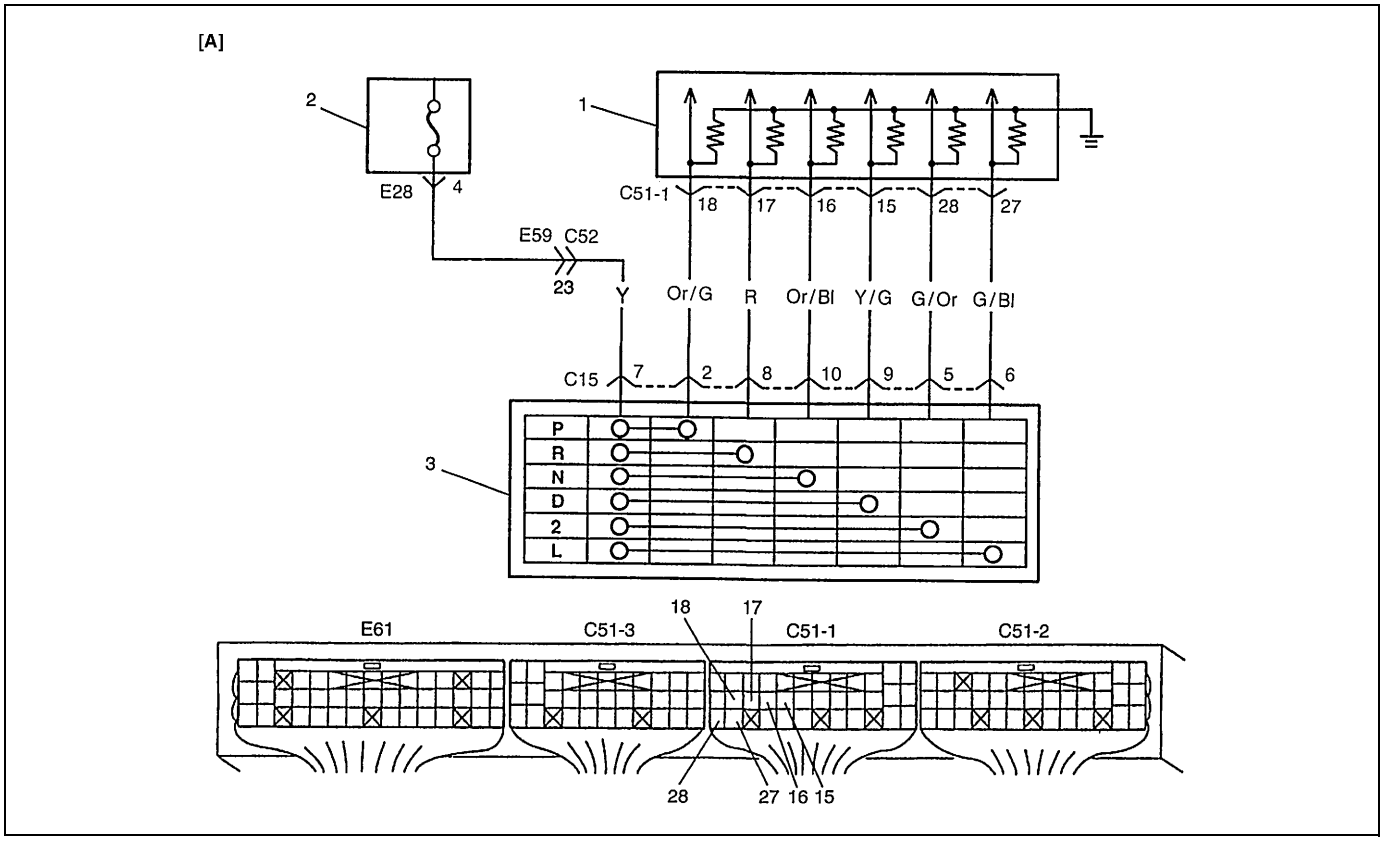
[A] Fig. for Step 1 / [B] Fig. for Step 4.



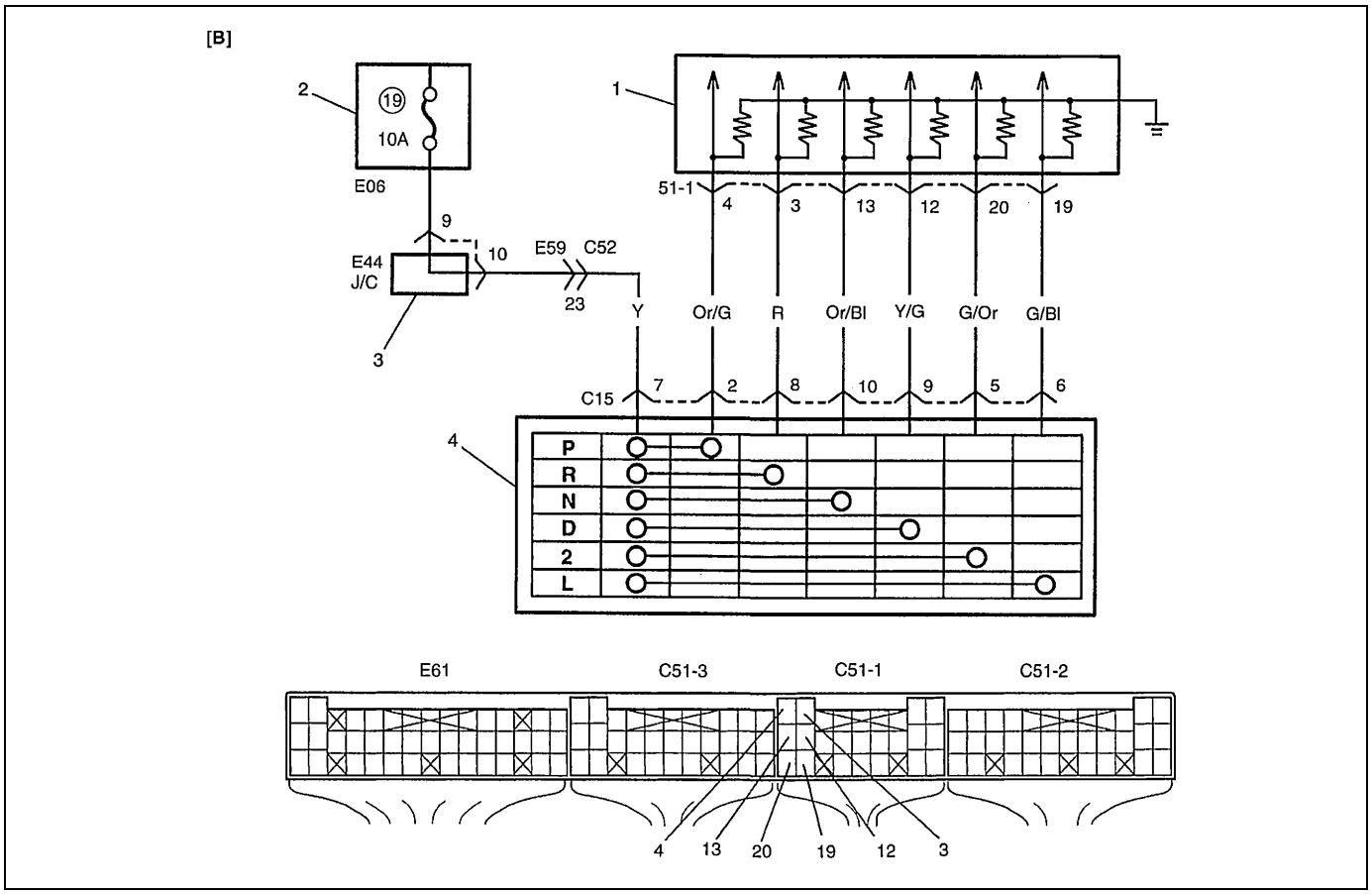
1. Normal position	3. Push	5. Power / Normal change switch
2. Power position	4. Push again to release	

DTC P0705 (DTC NO.72) Transmission Range Sensor (Switch) Circuit Malfunction

Wiring Diagram



[A] : G16/J20 Engines	2. J/B
1. PCM	3. Transmission range sensor (switch)



[B] : H25 Engine	2. Fuse	4. Transmission range sensor (switch)
1. PCM	3. J/C	

DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
• Transmission range switch signal (P, R, N, D, 2 or L) is not inputted for 25 sec. at 60 km/h (38 mph) or higher vehicle speed. or • Multiple signals are inputted simultaneously for 25 sec. (2 driving cycles detection logic)	• Transmission range sensor (switch) maladjusted. • Transmission range sensor (switch) or its circuit malfunction. • PCM

DTC Confirmation Procedure

WARNING:
- **When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.**
- **Road test should be carried out with 2 persons, a driver and a tester, on a level road.**

1) Connect scan tool to DLC with ignition switch OFF, if available.
2) Clear DTC and start engine.
3) Shift A/T selector lever to each of L, 2, D, N, R and P ranges for 30 seconds each.
4) Increase vehicle speed to about 70 km/h (45 mph) in D range.
5) Keep driving above vehicle speed for 30 seconds.
6) Release accelerator pedal, decrease vehicle speed and stop vehicle.
7) Check DTC and/or pending DTC.

Troubleshooting (DTC P0705)

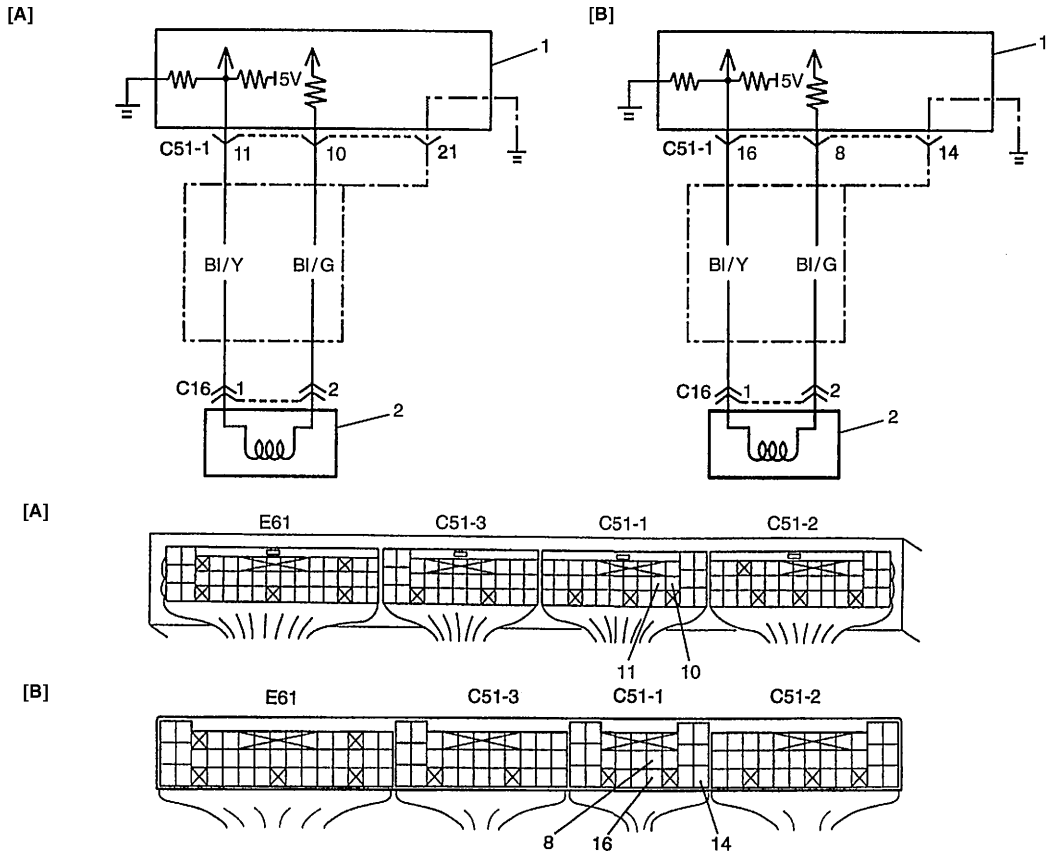
Step	Action	Yes	No
1	Was “A/T Diag. Flow Table” performed?	Go to Step 2.	Go to “A/T Diag. Flow Table”.
2	Check Transmission Range Switch (Sensor) Circuit for Operation. When using SUZUKI scan tool : 1) Connect SUZUKI scan tool to DLC with ignition switch OFF. 2) Turn ignition switch ON and check transmission range signal (P, R, N, D, 2 or L) on display when shifting select lever to each range. Is applicable range indicated? When not using SUZUKI scan tool : 1) Turn ignition switch ON. 2) Check voltage at terminals C51-1-15, C51-1-16, C51-1-17, C51-1-18, C51-1-27 and C51-1-28 for G16/J20 (C51-1-4, C51-1-3, C51-1-13, C51-1-12, C51-1-20 and C51-1-19 for H25) respectively with select lever shifted to each range. Taking terminal C51-1-28 for G16/J20 (C51-1-20 for H25) as an example, is battery voltage indicated only when select lever is shifted to “2” range and 0 V for other ranges as shown in figure? Check voltage at other terminals likewise, referring to figure. Are check results satisfactory?	Intermittent trouble. Check for intermittent referring to “Intermittent and Poor Connection” in Section 0A.	Go to Step 3.
3	Check Select Cable for Adjustment referring to “Select Cable Adjustment” in this section. Is it adjusted correctly?	Go to Step 4.	Adjust.
4	Check Transmission Range Switch for Installation Position. 1) Shift select lever to “N” range. 2) Check that “N” reference line on switch and center line on shaft are aligned. Are they aligned?	Go to Step 5.	Adjust.
5	Check Transmission Range Switch (Sensor) referring to “Transmission Range Switch” in this section. Are check results satisfactory?	“Y”, “Or/G”, “R”, “Or/Bl”, “Y/G”, “G/Or” or “G/Bl” circuit open or short. If wires and connections are OK, substitute a known-good PCM and recheck.	Replace TR switch.

Fig. for Step 2

Terminal / Select lever position	G16/J20	C51-1 -18	C51-1 -17	C51-1 -16	C51-1 -15	C51-1 -28	C51-1 -27
	H25	C51-1-4	C51-1-3	C51-1-13	C51-1-12	C51-1-20	C51-1-19
P		B + V	0 V	0 V	0 V	0 V	0 V
R		0 V	B + V	0 V	0 V	0 V	0 V
N		0 V	0 V	B + V	0 V	0 V	0 V
D		0 V	0 V	0 V	B + V	0 V	0 V
2		0 V	0 V	0 V	0 V	B + V	0 V
L		0 V	0 V	0 V	0 V	0 V	B + V

DTC P0715 (DTC NO.76) Input/Turbine Speed Sensor Circuit Malfunction

Wiring Diagram



[A] : G16/J20 Engines	1. PCM
[B] : H25 Engine	2. A/T input speed sensor

DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
Input speed sensor detected speed is lower than specification while vehicle running under all of the following conditions : • at higher than 10 km/h (7 mph) with 1st gear in D range for 1 sec. or more. • at higher than 20 km/h (13 mph) with 2nd gear in D range for 2 sec. or more. • at higher than 30 km/h (20 mph) with 3rd gear in D range for 2 sec. or more. (2 driving cycles detection logic)	• Input speed sensor and its circuit • PCM

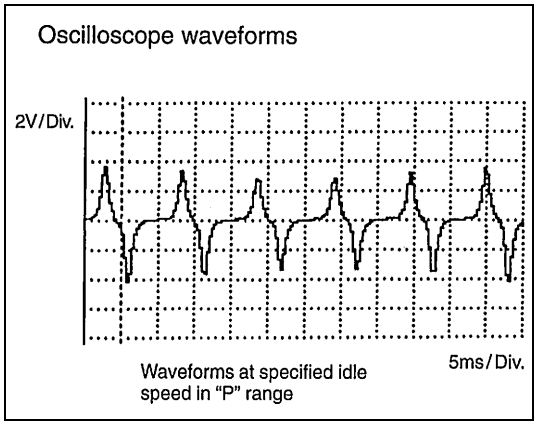
DTC Confirmation Procedure

WARNING:
- **When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.**
- **Road test should be carried out with 2 persons, a driver and a tester, on a level road.**

1) Connect scan tool to DLC with ignition switch OFF, if available.
2) Clear DTC.
3) Start engine and turn O/D cut switch ON.
4) Shift select lever to D range and start vehicle.
5) Keep vehicle speed at higher than 10 km/h (7 mph) with 1st gear in D range for 2 sec. or more.
6) Increase vehicle speed and keep it at higher than 20 km/h (13 mph) with 2nd gear in D range for 2 sec. or more.
7) Increase vehicle speed and keep it at higher than 30 km/h (20 mph) with 3rd gear in D range for 2 sec. or more.
8) Stop vehicle.
9) Check DTC and/or pending DTC.

Troubleshooting (DTC P0715)

Step	Action	Yes	No
1	Was “A/T Diag. Flow Table” performed?	Go to Step 2.	Go to “A/T Diag. Flow Table”.
2	Input speed sensor circuit check : 1) Remove PCM cover. 2) With ignition switch OFF, disconnect PCM connectors. 3) Check for proper connection to input speed sensor at C51-1-10 and C51-1-11 terminals for G16/J20 (at C51-1-8 and C51-1-16 terminals for H25) 4) If OK, check resistance of sensor circuit. Resistance between C51-1-10 and C51-1-11 for G16/J20 (C51-1-8 and C51-1-16 for H25) : 530 – 650 Ω at 20°C, 68°F Resistance between C51-1-10/C51-1-11 for G16/J20 (C51-1-8/C51-1-16 for H25) and ground : 1 MΩ or more Are check results satisfactory?	Go to Step 4.	Go to Step 3.
3	Input speed sensor check : 1) With ignition switch OFF, disconnect input speed sensor connector. 2) Check for proper connection to input speed sensor at each terminals. 3) If OK, then check resistance of input speed sensor. Are measured values as specified in Step 2?	“Bl/G” or “Bl/Y” wire open or shorted to ground.	Replace input speed sensor.
4	Check visually input speed sensor and overdrive clutch drum for the followings. • No damage • No foreign material attached • Correct installation Are they in good condition?	Intermittent trouble or faulty PCM. Check for intermittent referring to “Intermittent and Poor Connection” in Section 0A.	Clean, repair or replace.

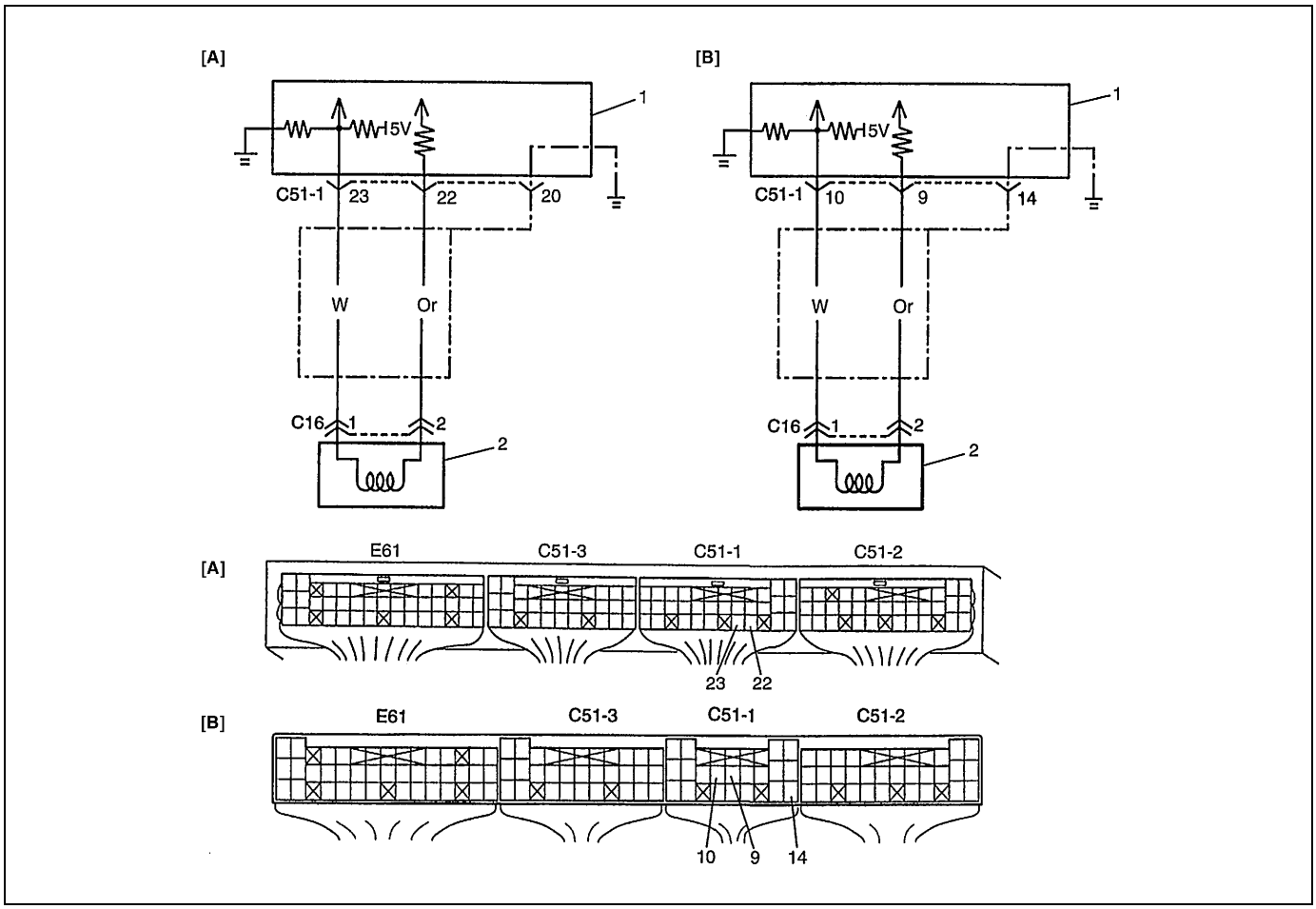


Reference

Connect oscilloscope between C51-1-11 (+) and C51-1-10 (–) for G16/J20 (C51-1-16 (+) and C51-1-8 (–) for H25) of PCM connector connected to PCM and check input speed sensor signal.

DTC P0720 (DTC NO.75) Output Speed Sensor Circuit Malfunction

Wiring Diagram



[A] : G16/J20 Engines	1. PCM
[B] : H25 Engine	2. A/T output speed sensor

DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
• With 4WD LOW switch OFF, no output speed sensor signal is inputted while vehicle speed sensor signal are inputted. or • With 4WD LOW switch OFF, no output speed sensor signal is inputted while engine running at higher than specified engine speed with "D" range. (2 driving cycles detection logic)	• A/T output speed sensor or its circuit • PCM

DTC Confirmation Procedure

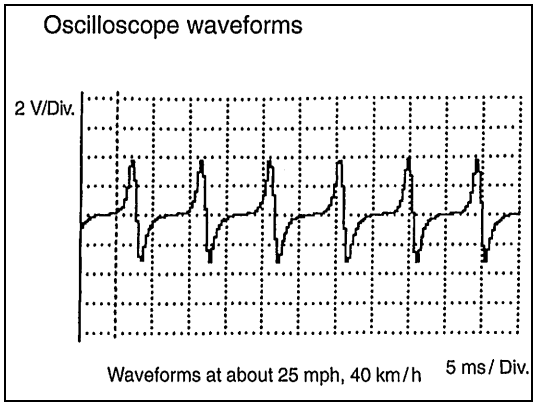
WARNING:

- **When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.**
- **Road test should be carried out with 2 persons, a driver and a tester, on a level road.**

1) Connect scan tool to DLC with ignition switch OFF, if available.
2) Clear DTC.
3) Start engine and shift transfer lever to “2H” or “4H” range.
4) Drive vehicle at 40 km/h (25 mph) or more for longer than 10 sec. (or higher than 3500 rpm engine speed with D range for longer than 10 sec.)
5) Stop vehicle and check DTC and/or pending DTC.

Troubleshooting (DTC P0720)

Step	Action	Yes	No
1	Was “A/T Diag. Flow Table” performed?	Go to Step 2.	Go to “A/T Diag. Flow Table”.
2	Output speed sensor circuit check : 1) Remove PCM cover. 2) With ignition switch OFF, disconnect PCM connectors. 3) Check for proper connection to output speed sensor at C51-1-22 and C51-1-23 terminals for G16/J20 (at C51-1-9 and C51-1-10 terminals for H25). 4) If OK, check resistance of sensor circuit. Resistance between C51-1-22 and C51-1-23 for G16/J20 (C51-1-9 and C51-1-10 for H25) : 387 – 473 Ω at 20°C, 68°F Resistance between C51-1-22/C51-1-23 for G16/J20 (C51-1-9/C51-1-10 for H25) and ground : 1 MΩ or more Are check results satisfactory?	Go to Step 4.	Go to Step 3.
3	Output speed sensor check : 1) With ignition switch OFF, disconnect output speed sensor connector. 2) Check for proper connection to output speed sensor at each terminals. 3) If OK, then check resistance of output speed sensor. Are measured values as specified in Step 2?	“Or” or “W” wire open or shorted to ground.	Replace output speed sensor.
4	Check visually output speed sensor and sensor rotor for the followings. • No damage • No foreign material attached • Correct installation Are they in good condition?	Intermittent trouble or faulty PCM. Check for intermittent referring to “Intermittent and Poor Connection” in Section 0A.	Clean, repair or replace.



Reference

Connect oscilloscope between C51-1-23 (+) and C51-1-22 (–) for G16/J20 (C51-1-10 (+) and C51-1-9 (–) for H25) of PCM connector connected to PCM and check output speed sensor signal.

DTC P0741 TCC (Lock-Up) Solenoid Valve Performance or Stuck OFF

DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
While running in 2nd or 4th gear, D range, TCC control of PCM does not agree with actual operation of transmission TCC even though solenoid valve is electrically in good condition. (2 driving cycles detection logic)	• TCC (lock-up) solenoid valve stuck • TCC control valve stuck • Valve body fluid passage clogged • TCC faulty

DTC Confirmation Procedure

WARNING:
- **When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.**
- **Road test should be carried out with 2 persons, a driver and a tester, on a level road.**

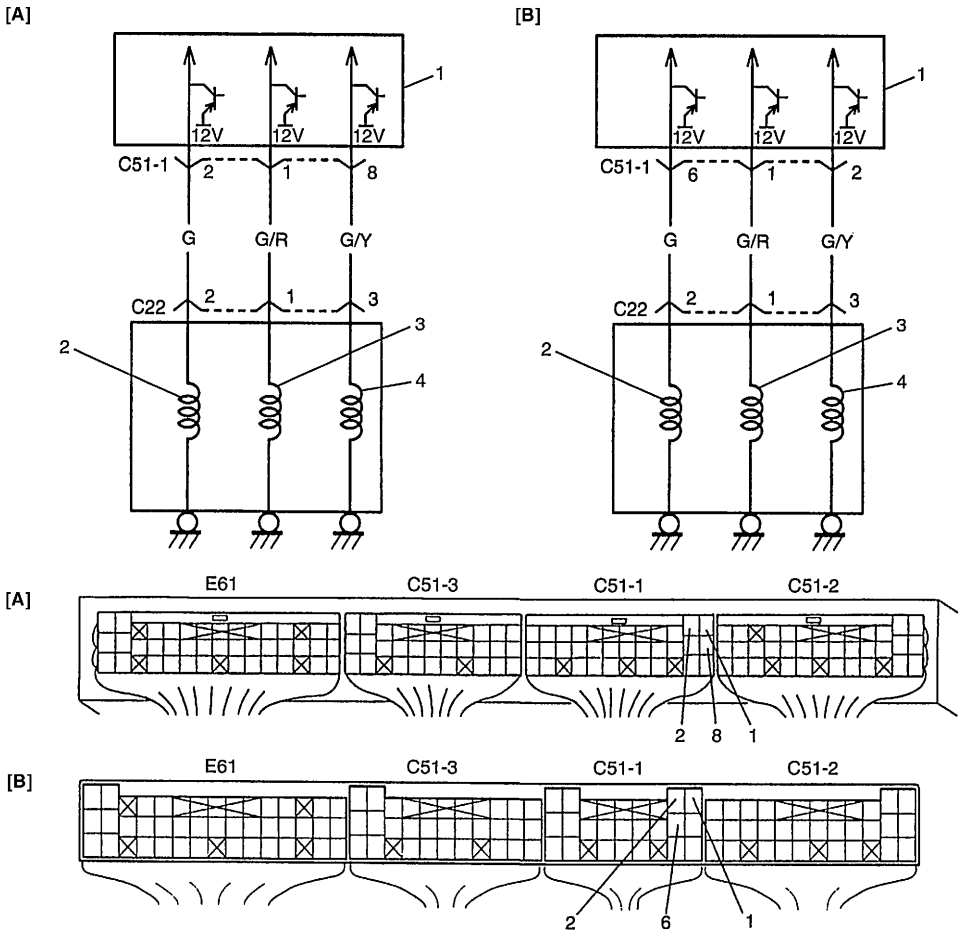
1) Connect scan tool to DLC with ignition switch OFF.
2) Clear DTC, pending DTC and freeze frame data in PCM memory by using scan tool and check fuel level meter indication is 1/4 or more.
3) Start engine, warm it up to normal operating temperature and shift transfer lever to “2H” or “4H” range.
4) Increase vehicle speed with D range, and check that gear position changes from 1st to 2nd and keep driving about 20 mph, 30 km/h in 2nd of “D” range for 10 seconds. (Throttle valve should be not at idle position and the opening should be kept constant in this step.)
5) Keep driving about 50 mph, 80 km/h in 4th of “D” range for 10 seconds.
6) Release accelerator pedal, decrease vehicle speed and stop vehicle.
7) Check pending DTC and DTC by using scan tool.

Troubleshooting

Step	Action	Yes	No
1	Was “A/T Diag. Flow Table” performed?	Go to Step 2.	Go to “A/T Diag. Flow Table”.
2	TCC solenoid valve operation check : 1) Check TCC solenoid valve operation referring to “Solenoid Valves Operation Check” in this section. Is it in good condition?	Go to Step 3.	Faulty TCC solenoid valve.
3	Valve body check : 1) Check valve body referring to “Unit Repair” in this section. Is it in good condition?	Faulty torque converter.	Faulty valve body.

DTC P0743 (DTC NO.65/66) TCC (Lock-Up) Solenoid Electrical

Wiring Diagram



[A] : G16/J20 Engines	1. PCM	3. Shift solenoid-B
[B] : H25 Engine	2. Shift solenoid-A	4. TCC solenoid

DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
Voltage at terminal C51-1-8 for G16/J20 (C51-1-2 for H25) of PCM is high while TCC solenoid OFF is commanded or low while TCC solenoid ON is commanded.	• TCC (lock-up) solenoid valve • TCC (lock-up) solenoid valve circuit • PCM

DTC Confirmation Procedure

WARNING:
- **When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.**
- **Road test should be carried out with 2 persons, a driver and a tester, on a level road.**

1) Connect scan tool to DLC with ignition switch OFF, if available.
2) Clear DTC.
3) Start engine, warm it up to normal operating temperature and shift transfer lever to “2H” or “4H” range.
4) Shift selector lever in D range and keep it there for 10 seconds.
5) Increase vehicle speed to about 80 km/h (50 mph) in 4th gear and in D range.
6) Keep driving at above speed for 20 seconds.
7) Release accelerator pedal, decrease vehicle speed and stop vehicle.
8) Check DTC and/or pending DTC.

Troubleshooting

Step	Action	Yes	No
1	Was “A/T Diag. Flow Table” performed?	Go to Step 2.	Go to “A/T Diag. Flow Table”.
2	Is the vehicle equipped with monitor connector?	Go to Step 3.	Go to Step 4.
3	Is DTC NO.65?	G to Step 4.	Go to Step 6.
4	Check TCC Solenoid Circuit for Open or Short. 1) Turn ignition switch OFF and disconnect PCM connectors. 2) Check for proper connection to PCM at terminals C51-1-8 for G16/J20 (C51-1-2 for H25). 3) If OK, then measure resistance between terminal C51-1-8 for G16/J20 (C51-1-2 for H25) of disconnected PCM connector and ground. Is it 11 – 15 Ω at 20°C, 68°F?	Go to Step 5.	“G/Y” circuit open or shorted to ground. If wire and connections are OK, replace malfunction shift solenoid.
5	Check TCC Solenoid Circuit for Short. 1) Turn ignition switch ON. 2) Measure voltage between terminal C51-1-8 for G16/J20 (C51-1-2 for H25) of disconnected PCM connector and ground. Is it about 0 V?	Intermittent trouble or faulty PCM. Check for “Intermittent and Poor Connection” in Section 0A.	“G/Y” circuit shorted to power circuit.

Step	Action	Yes	No
6	Check TCC Solenoid Circuit for Short. 1) Turn ignition switch OFF and disconnect PCM connectors. 2) Check for proper connection to PCM at terminals C51-1-8 for G16/J20 (C51-1-2 for H25) or C51-1-1. 3) If OK, then measure resistance between terminal C51-1-8 for G16/J20 (C51-1-2 for H25) of disconnected PCM connector and ground. Is it 11 – 15 Ω at 20°C, 68°F?	Intermittent trouble or faulty PCM. Check for "Intermittent and Poor Connection" in Section 0A.	"G/Y" circuit shorted to ground. If wire and connections are OK, replace malfunction shift solenoid.

DTC P0751 Shift Solenoid Valve-A (#1) Performance or Stuck OFF
DTC P0756 Shift Solenoid Valve-B (#2) Performance or Stuck OFF

DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
While running in D range, gear change control from PCM to A/T does not agree with actual A/T gear position even though solenoid valve is electrically in good condition. (A/T gear position is calculated based on engine speed signal and vehicle speed sensor signal.) (2 driving cycles detection logic)	DTC P0751 : • Shift solenoid valve-A stuck or leakage. • 2-3 shift valve stuck. • Valve body fluid passage clogged. • Mechanical malfunction in transmission. (Direct clutch malfunction) DTC P0756 : • Shift solenoid valve-B stuck or leakage. • 1-2 shift valve stuck. • 3-4 shift valve stuck. • Valve body fluid passage clogged. • Mechanical malfunction in transmission. (2nd brake malfunction)

DTC Confirmation Procedure

WARNING:
- **When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.**
- **Road test should be carried out with 2 persons, a driver and a tester, on a level road.**

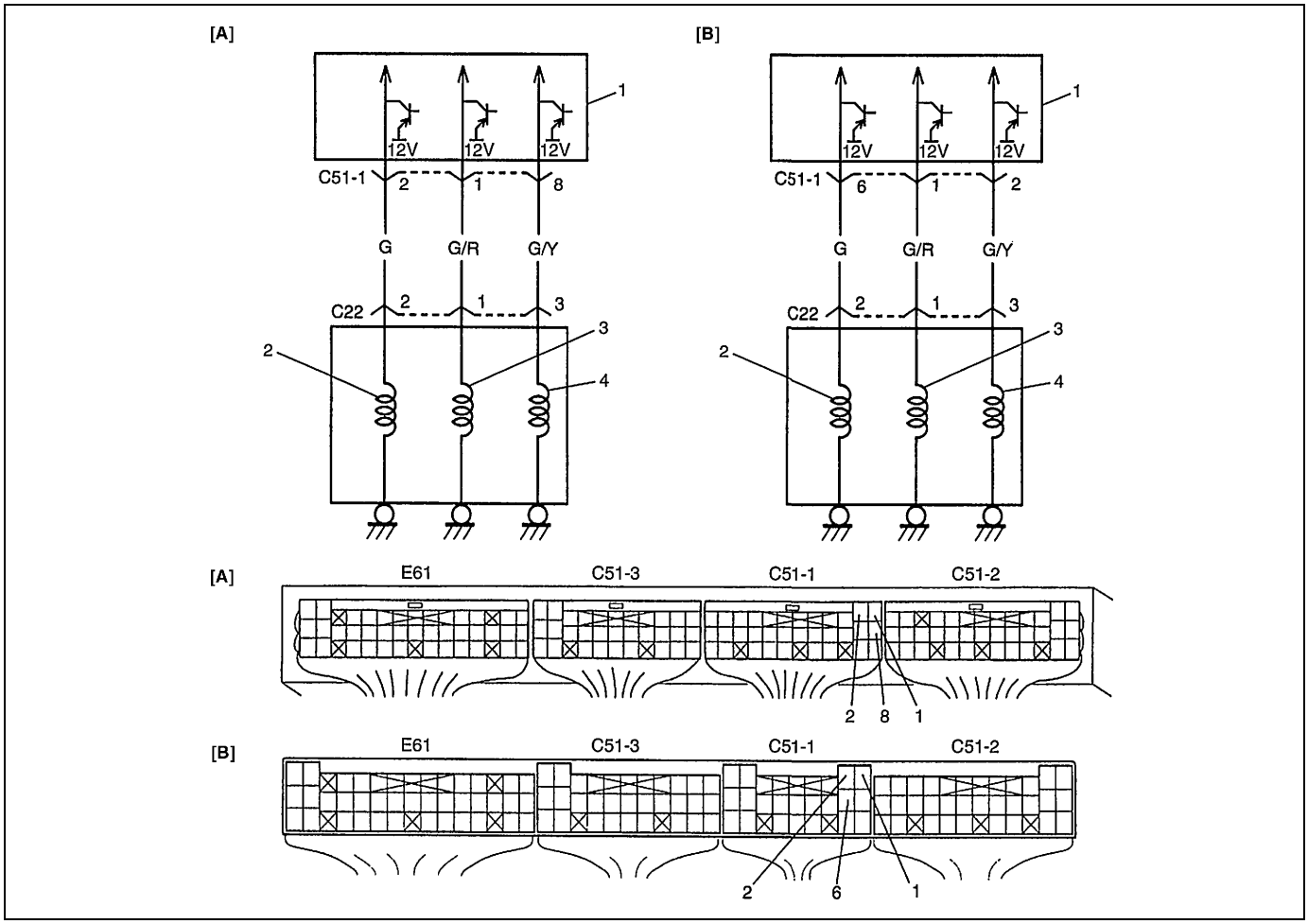
1) Connect scan tool to DLC with ignition switch OFF.
2) Clear DTC, pending DTC and freeze frame data in PCM memory by using scan tool and check fuel level meter indication is 1/4 or more.
3) Start engine, warm it up to normal operating temperature and shift transfer lever to "2H" or "4H" range.
4) Increase vehicle speed with D range, and check that gear position changes from 1st to 2nd, 3rd and 4th in that order as vehicle speed increases, referring to "Gear Shift Diagram" in this section.
5) Stop vehicle and check pending DTC and DTC by using scan tool.

Troubleshooting

Step	Action	Yes	No
1	Was “A/T Diag. Flow Table” performed?	Go to Step 2.	Go to “A/T Diag. Flow Table”.
2	Shift solenoid valve-A or -B operation check : 1) Check shift solenoid valve-A or -B for operation referring to “Solenoid Valves Operation Check” section. Is it in good condition?	Go to Step 3.	Faulty shift solenoid valve-A or -B.
3	Valve body check : 1) Check valve body and its passage referring to “Unit Repair” section. Are they in good condition?	Overhaul and repair automatic transmission.	Faulty valve body.

DTC P0753 (DTC NO.61/62) Shift Solenoid-A (#1) Electrical
DTC P0758 (DTC NO.63/64) Shift Solenoid-B (#2) Electrical

Wiring Diagram



[A] : G16/J20 Engines	1. PCM	3. Shift solenoid-B
[B] : H25 Engine	2. Shift solenoid-A	4. TCC solenoid

DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
DTC P0753 : Voltage detected at C51-1-2 for G16/J20 (C51-1-6 for H25) terminal is specified voltage or lower when shift solenoid valve-A is ON or specified voltage or higher when it is OFF.	• Shift solenoid valve-A • Shift solenoid valve-A circuit • PCM
DTC P0758 : Voltage detected at C51-1-1 terminal is specified voltage or lower when shift solenoid valve-B is ON or specified voltage or higher when it is OFF.	• Shift solenoid valve-B • Shift solenoid valve-B circuit • PCM

DTC Confirmation Procedure

WARNING:
- **When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.**
- **Road test should be carried out with 2 persons, a driver and a tester, on a level road.**

1) Connect scan tool to DLC with ignition switch OFF, if available.
2) Clear DTC.
3) Start engine and shift transfer lever to “2H” or “4H” range.
4) Shift selector lever in D range and keep it for 10 seconds.
5) Drive vehicle about 30 km/h (20 mph) with 2nd gear in D range for 10 seconds.
6) Increase vehicle speed to about 80 km/h (50 mph) with 4th gear in D range and keep it for 10 seconds.
7) Release accelerator pedal, decrease vehicle speed and stop vehicle.
8) Check DTC and/or pending DTC.

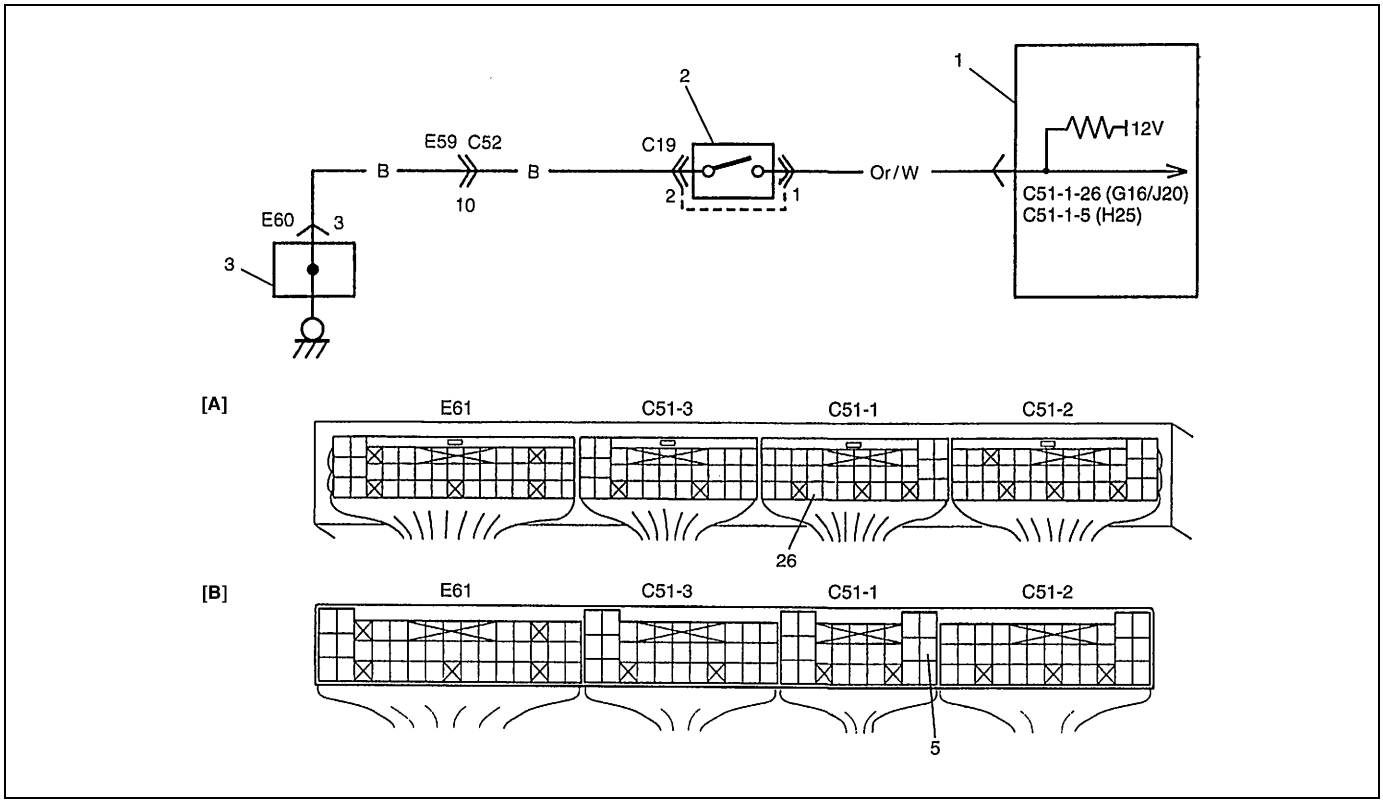
Troubleshooting (DTC P0753/P0758)

Step	Action	Yes	No
1	Was “A/T Diag. Flow Table” performed?	Go to Step 2.	Go to “A/T Diag. Flow Table”.
2	Is the vehicle equipped with monitor connector?	Go to Step 3.	Go to Step 4.
3	Is DTC NO.61 or 63?	Go to Step 4.	Go to Step 6.
4	Check Shift Solenoid Circuit for Open or Short. 1) Turn ignition switch OFF and disconnect PCM connectors. 2) Check for proper connection to PCM at terminals C51-1-2 for G16/J20 (C51-1-6 for H25) or C51-1-1. 3) If OK, then measure resistance between terminal C51-1-2 for G16/J20 (C51-1-6 for H25) or C51-1-1 of disconnected PCM connector and ground. Is it 11 – 15 Ω at 20°C, 68°F?	Go to Step 5.	“G” or “G/R” circuit open or shorted to ground. If wire and connections are OK, replace malfunction shift solenoid.

Step	Action	Yes	No
5	Check Shift Solenoid Circuit for Short. 1) Turn ignition switch ON. 2) Measure voltage between terminal C51-1-2 for G16/J20 (C51-1-6 for H25) or C51-1-1 of disconnected PCM connector and ground. Is it about 0 V?	Intermittent trouble or faulty PCM. Check for "Intermittent and Poor Connection" in Section 0A.	"G" or "G/R" circuit shorted to power circuit.
6	Check Shift Solenoid Circuit for Short. 1) Turn ignition switch OFF and disconnect PCM connectors. 2) Check for proper connection to PCM at terminals C51-1-2 for G16/J20 (C51-1-6 for H25) or C51-1-1. 3) If OK, then measure resistance between terminal C51-1-2 for G16/J20 (C51-1-6 for H25) or C51-1-1 of disconnected PCM connector and ground. Is it 11 – 15 Ω at 20°C, 68°F?	Intermittent trouble or faulty PCM. Check for "Intermittent and Poor Connection" in Section 0A.	"G" or "G/R" circuit shorted to ground.

DTC P1875 4WD Low Switch Circuit Malfunction (If Equipped)

Wiring Diagram



[A] : G16/J20 Engines	1. PCM	3. J/C
[B] : H25 Engine	2. 4WD low switch	

DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
While driving at higher than specified vehicle speed and with more than specified throttle valve opening, the following conditions are satisfied for specified time. • Vehicle speed sensed by vehicle speed sensor is more than 10 km/h higher than that sensed by A/T output speed sensor. (2 driving cycles detection logic)	• 4WD LOW switch or its circuit • PCM

DTC Confirmation Procedure

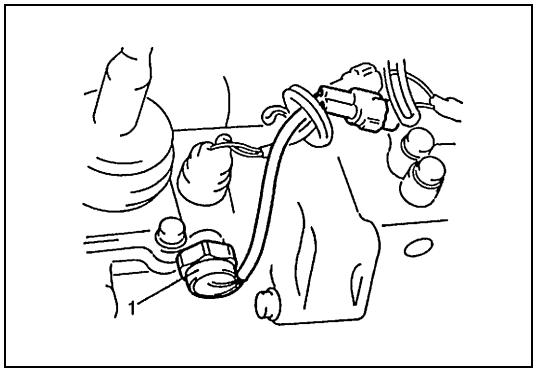
WARNING:
- **When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.**
- **Road test should be carried out with 2 persons, a driver and a tester, on a level road.**

1) Connect scan tool to DLC with ignition switch OFF.
2) Clear DTC, pending DTC and freeze frame data in PCM memory by using scan tool.
3) Start engine.
4) Increase vehicle speed to about 30 km/h (19 mph) or more in D range and is in 2H position.
5) Keep driving at above vehicle speed for 30 seconds.
6) Stop vehicle and shift transfer lever to 4L position with A/T selector lever is in P range
7) Increase vehicle speed to about 25 km/h (15 mph) or more in D range and is in 4L position.
8) Keep driving at above vehicle speed for 30 seconds.
9) Stop vehicle and check pending DTC and DTC by using scan tool.

Troubleshooting (DTC P1875)

Step	Action	Yes	No
1	Was “A/T Diag. Flow Table” performed?	Go to Step 2.	Go to “A/T Diag. Flow Table”.

Step	Action	Yes	No
2	4WD low switch and its circuit check : When using SUZUKI scan tool : 1) Connect SUZUKI scan tool to DLC with ignition switch OFF. 2) Turn ignition switch ON. 3) Select "Data list" mode on scan tool. 4) Check 4WD low switch signal (ON or OFF) on display when shifting transfer lever to each position. **4H or 2H position : OFF** **4L position : ON** Is OFF/ON displayed as described above? When not using SUZUKI scan tool : 1) Remove PCM cover. 2) Turn ignition switch ON. 3) Check voltage at terminal C51-1-26 for G16/J20 (C51-1-5 for H25) of PCM connector connected when shifting transfer lever to each position. **4H or 2H position : 10 – 14 V** **4L position : 0 – 1 V** Is voltage as specified?	Check for poor connection at the terminal of PCM if voltmeter is used in Step 2. If connection is OK, intermittent trouble or faulty PCM. Check for intermittent referring to "Intermittent and Poor Connection" in Section 0A.	Go to Step 3.
3	4WD low switch check : 1) Check 4WD low switch for operation referring to "4WD Low Switch Inspection" below. Is check result satisfactory?	"Or/W" or "B" circuit open or short. If wires and connections are OK, substitute a known-good PCM and recheck.	Replace 4WD low switch.

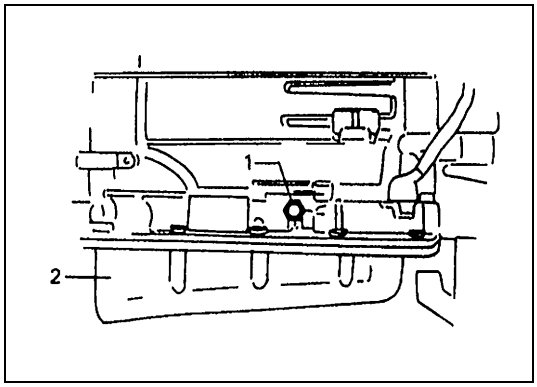


1. 4WD low switch

4WD Low Switch Inspection

1) Disconnect negative cable at battery.
2) Disconnect 4WD low switch coupler.
3) Check continuity between 4WD low switch terminals.
   There should be continuity when transfer lever shifted to 4L position and should be infinity when transfer lever shifted to 4H or 2H positions.
   If not, replace 4WD low switch.
4) Connect 4WD low switch coupler and battery negative cable.

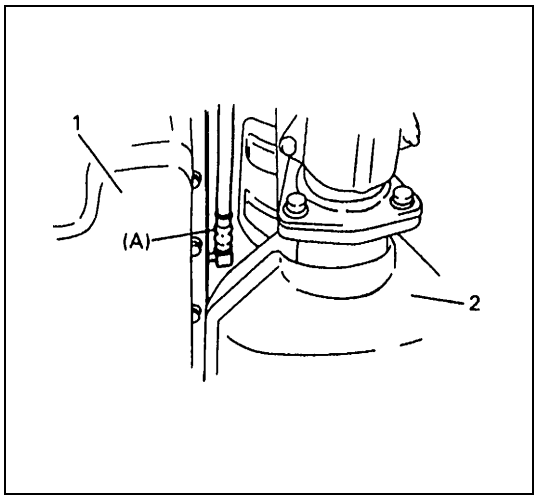
Line pressure test



Purpose of this test is to check operating conditions of each part by measuring fluid pressure in fluid pressure line. Line pressure test requires following conditions.

- Automatic fluid is at normal operating temperature (70 to 80°C/158 – 176°F).
- Fluid is filled to proper level (between FULL HOT and LOW HOT on dipstick).

1. Fluid pressure check hole
2. Oil pan



1) Apply parking brake securely and place checks against wheels.
2) Attach oil pressure gauge to fluid pressure check hole in transmission case.

Special tool
(A) : 09925-37810

CAUTION:
After attaching oil pressure gauge, check that not fluid leakage exists.

1. Oil pan
2. Exhaust pipe

3) Depress foot brake fully, run engine at idle and stall and then check fluid pressure in “D” or “R” range.

CAUTION:
Do not continue running engine at stall speed longer than 5 seconds.

G16 Engine

Engine running mode	Line pressure	
	“D” range	“R” range
At idle speed	3.9 – 4.4 kg/cm^2 55 – 63 psi	5.1 – 5.7 kg/cm^2 73 – 81 psi
At stall speed	11.7 – 13.2 kg/cm^2 166 – 188 psi	14.2 – 16.7 kg/cm^2 202 – 237 psi

J20 Engine

Engine running mode	Line pressure	
	“D” range	“R” range
At idle speed	3.8 – 4.3 kg/cm^2 54 – 61 psi	5.3 – 5.9 kg/cm^2 75 – 84 psi
At stall speed	9.7 – 11.2 kg/cm^2 138 – 159 psi	12.9 – 15.5 kg/cm^2 183 – 220 psi

H25 Engine

Engine running mode	Line pressure	
	"D" range	"R" range
At idle speed	3.9 – 4.4 kg/cm^2 55 – 63 psi	6.6 – 7.2 kg/cm^2 94 – 102 psi
At stall speed	11.3 – 12.7 kg/cm^2 161 – 181 psi	14.7 – 22.7 kg/cm^2 209 – 323 psi

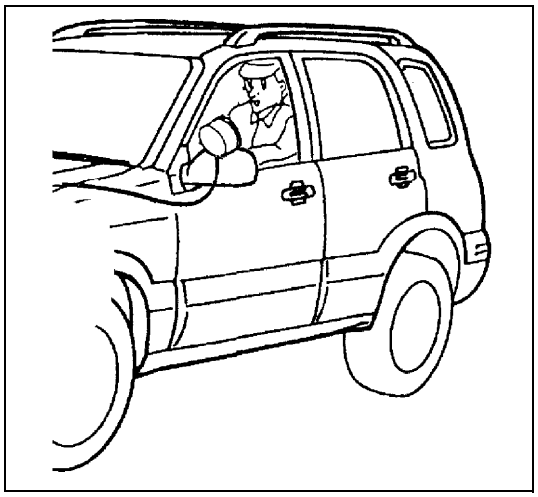
Check result	Possible cause
Line pressure higher than standard level in each range	• Malfunctioning regulator valve • Malfunctioning throttle valve • Maladjusted A/T throttle cable
Line pressure lower than standard level in each range	• Defective O/D clutch • Defective oil pump • Malfunctioning throttle valve • Malfunctioning regulator value • Maladjusted A/T throttle cable
Line pressure lower than standard level only in "D" range	• Fluid leakage from forward clutch • Defective O/D clutch • Leakage from "D" range fluid pressure circuit
Line pressure lower than standard level only in "R" range	• Fluid leakage from direct clutch • Defective O/D clutch • Fluid leakage from reverse brake • Fluid leakage from "R" range fluid circuit

Tightening torque of transmission case plug :
17 N·m (1.7 kg-m, 12.0 lb-ft)

Stall test

This test is to check overall performance of automatic transmission and engine by measuring stall speed at “D” and “R” ranges. Be sure to perform this test only when transmission fluid is at normal operating temperature and its level is between FULL and LOW marks.

CAUTION:
- **Do not run engine at stall more than 5 seconds continuously, for fluid temperature may rise excessively high.**
- **After performing stall test, be sure to leave engine running at idle for longer than 30 seconds before another stall test.**



1) Apply parking brake and block wheels.
2) Install tachometer.
3) Start engine with select lever shifted to “P”.
4) Depress brake pedal fully.
5) Shift select lever to “D” and depress accelerator pedal fully while watching tachometer. Read engine rpm quickly when it has become constant (stall speed).
6) Release accelerator pedal immediately after stall speed is checked.
7) In the same way, check stall speed in “R” range.
8) Stall speed should be within the following specification.

Stall speed :
2,100 – 2,400 r/min. for G16 engine
2,300 – 2,600 r/min. for J20 engine
2,300 – 2,600 r/min. for H25 engine

Check result	Possible cause
Lower than standard level	• Faulty engine output • Defective torque converter
Higher than standard level in “D” range	• Slippery O/D clutch • Slippery forward clutch • Malfunctioning O/D one-way clutch • Malfunctioning one-way clutch No. 2 • Low line pressure
Higher than standard level in “R” range	• Slippery direct clutch • Slippery reverse brake • Low fluid pressure • Slippery O/D clutch • Defective O/D one-way clutch

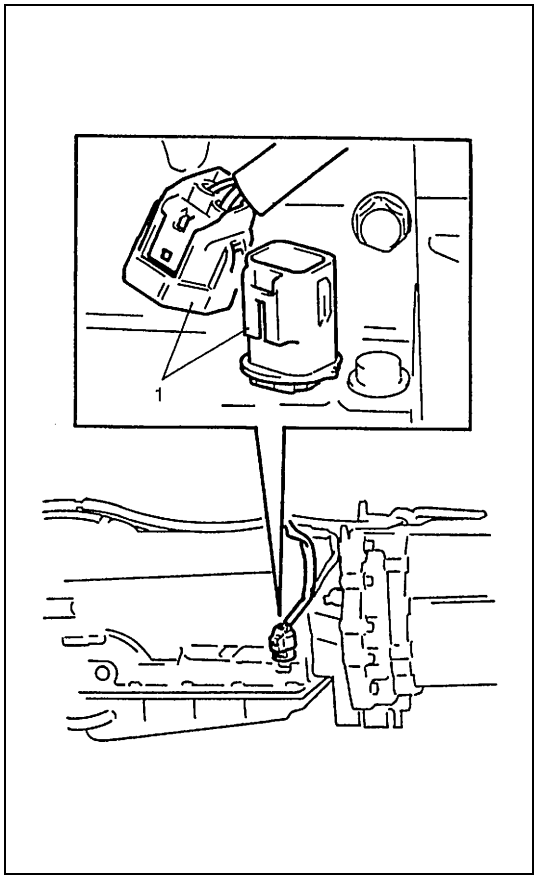
Road test

This test is to check if upshift and downshift take place at specified speed while actually driving vehicle on a level road.

WARNING:
- **Carry out test in very little traffic area to prevent an accident.**
- **Test requires 2 persons, a driver and a tester.**

1) Warm up engine.
2) With engine running at idle, shift select lever “D”.
3) Accelerate vehicle speed by depressing accelerator pedal gradually.
4) While driving in “D” range, check if gear shift occurs properly as shown in Gear Shift Diagram in this section.

Test result	Possible cause
When 1 → 2 upshift fails to occur	1–2 shift valve stuck
When 2 → 3 upshift fails to occur	2–3 shift valve stuck
When 3 → O/D upshift fails to occur	3–4 shift valve stuck
When gear shift point is incorrect	• Maladjusted throttle cable • Defective shift solenoid valve-A or -B • 1–2, 2–3 or 3–4 shift valve not operating properly



Manual road test

This test checks the gear being used in “L”, “2” or “D” range when driven with unoperated gear shift control system. Test drive vehicle on a level road.

NOTE:

Before this test, check diagnostic trouble code (DTC).

1) Disconnect coupler of shift solenoid valves on transmission.

WARNING:

To avoid the danger of being burned, do not touch the hot exhaust system when disconnecting shift solenoid valves coupler.

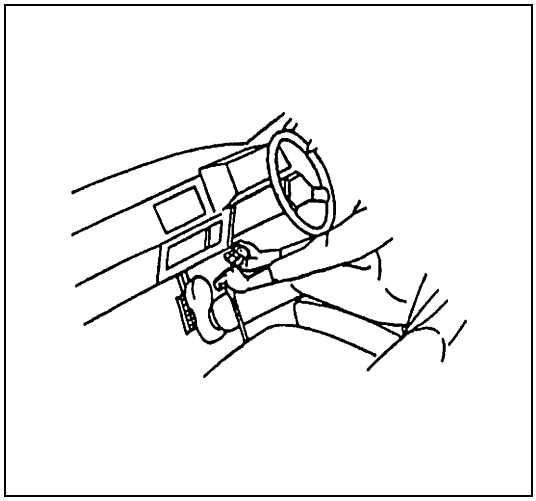
2) With select lever in “P”, start engine and warm it up.
3) With select lever in “L” range, start vehicle and accelerate to 20 km/h (12.5 mile/h). Check in this state that 1st gear is being used.
4) At 20 km/h (12.5 mile/h), shift select lever to 2 range and accelerate to 40 km/h (25 mile/h). Check in this state that 3rd gear is being used.
5) At 40 km/h (25 mile/h), shift select lever to D range and check that O/D gear is used when speed is higher than 40 km/h (25 mile/h).
6) After above checks, stop vehicle then engine, and connect shift solenoids coupler with ignition switch OFF.

WARNING:

To avoid the danger of being burned, do not touch the hot exhaust system when connecting shift solenoid valves coupler.

7) Clear DTC with scan tool.

1. Shift solenoids connector



Time lag test

This test is to check conditions of clutch, reverse brake and fluid pressure. "Time lag" means time elapsed since select lever is shifted with engine idling till shock is felt.

1) With chocks placed before and behind front and rear wheels respectively, depress brake pedal.
2) Start engine.
3) With stop watch ready, shift select lever from "N" to "D" range and measure time from that moment till shock is felt.
4) Similarly measure time lag by shifting select lever from "N" to "R" range.

Specification for time lag	"N"→"D"	Less than 1.2 sec.
	"N"→"R"	Less than 1.5 sec.

NOTE:

- **When repeating this test, be sure to wait at least one minute after select lever is shifted back to "N" range.**
- **Engine should be warmed up fully for this test.**

Test result	Possible cause
When "N"→"D" time lag exceeds specification	• Low line pressure • Worn forward clutch
When "N"→"R" time lag exceeds specification	• Low line pressure • Worn direct clutch • Worn reverse brake

Engine brake test

WARNING:
Before test, make sure that there is no vehicle behind so as to prevent rear-end collision.

1) While driving vehicle in 3rd gear of "D" range, shift select lever down to "2" range and check if engine brake operates.
2) In the same way as in step 1, check engine brake for operation when select lever is shifted down to "L" range.
3) If engine brake fails to operate in above tests, possible causes for such failure are as follows. Check each part which is suspected to be the cause.

Condition	Possible cause
Fails to operate when shifted down to "2" range	Second coast brake defective
Fails to operate when shifted down to "L" range	Reverse brake defective

"P" range test

1) Stop vehicle on a slope, shift select lever to "P" range and at the same time apply parking brake.
2) After stopping engine, depress brake pedal and release parking brake.
3) Then, release brake pedal gradually and check that vehicle remains stationary.
4) Depress brake pedal and shift select lever to "N" range.
5) Then, release brake pedal gradually and check that vehicle moves.

WARNING:
Before test, check to make sure no one is around vehicle or down on a slope and keep watchful for safety during test.

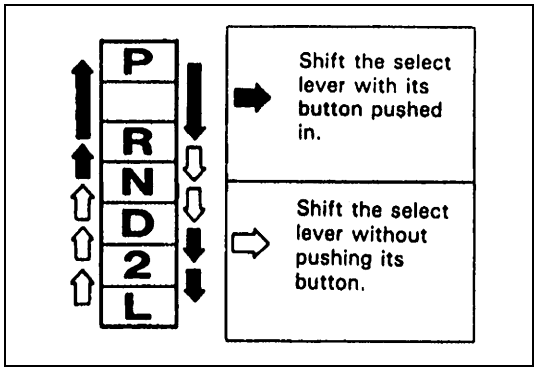
On-Vehicle Service

Maintenance Service

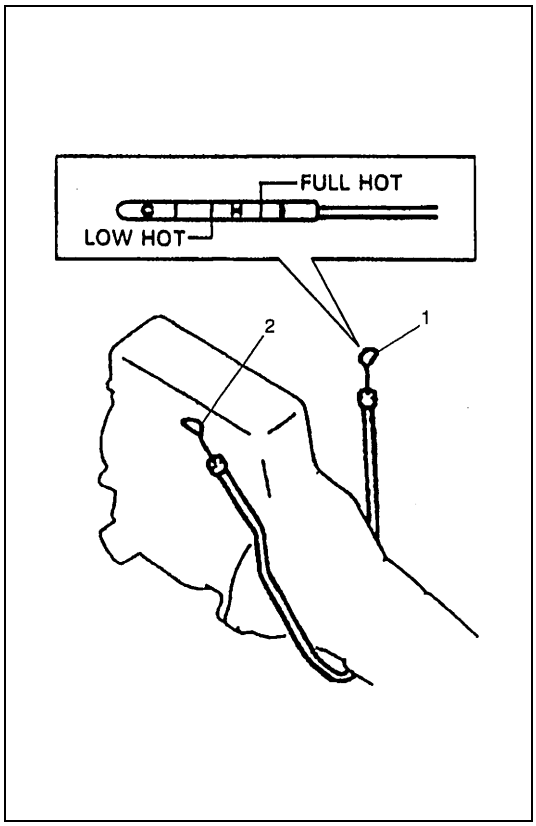
Fluid level

LEVEL CHECK AT NORMAL OPERATING TEMPERATURE

1) Stop vehicle and place it level.
2) Apply parking brake and place chocks against wheels.
3) With selector at P position, start engine.
4) Warm up engine till fluid temperature reaches normal operating temperature (70 – 80°C/158 – 176°F). As a guide to check fluid temperature, warm up engine till engine coolant temperature meter indicated around 1 unit above "C" point.



5) Keep engine idling and shift selector slowly to L and back to P position.
6) With engine idling, pull out dipstick, wipe it off with a clean cloth and put it back into place.



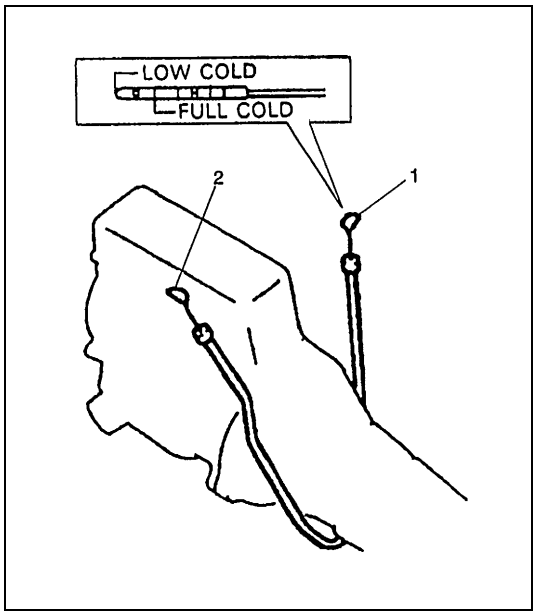
7) Pull out dipstick again and check fluid level indicated on it. Fluid level should be between FULL HOT and LOW HOT. If it is below LOW HOT, add an equivalent of DEXRON®-III up to FULL HOT.

Fluid specification
An equivalent of DEXRON®-III

NOTE:

- **DO NOT RACE ENGINE while checking fluid level, even after the engine start.**
- **DO NOT OVERFILL. Overfilling can cause foaming and loss of fluid through breather. Then slippage and transmission failure can result.**
- **Bringing the level from LOW HOT to FULL HOT requires 0.3 liters (0.64/0.53 US/Imp.pt).**
- **If vehicle was driven under high load such as pulling a trailer, fluid level should be checked about half an hour after it is stopped.**

1. Dipstick (G16/J20)
2. Dipstick (H25)

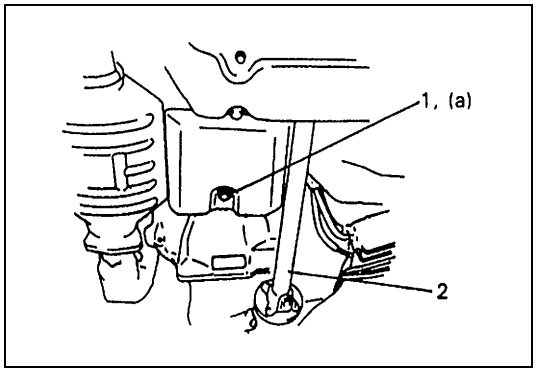


LEVEL CHECK AT ROOM TEMPERATURE

The fluid level check at room temperature performed after repair or fluid change before test driving is just preparation for level check of normal operating temperature. The checking procedure itself is the same as that described previously. If the fluid level is between FULL COLD and LOW COLD, proceed to test drive. And when the fluid temperature has reached the normal operating temperature, check fluid level again and adjust it as necessary.

1. Dipstick (G16/J20)
2. Dipstick (H25)

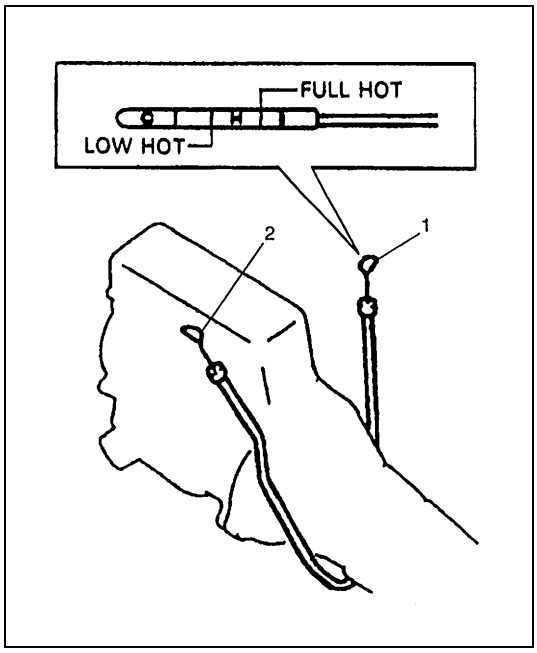
Fluid change



1) Lift up vehicle.
2) With engine cooled, remove drain plug from oil pan and drain A/T fluid.
3) Install drain plug.

Tightening torque
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

1. Drain plug
2. Propeller shaft



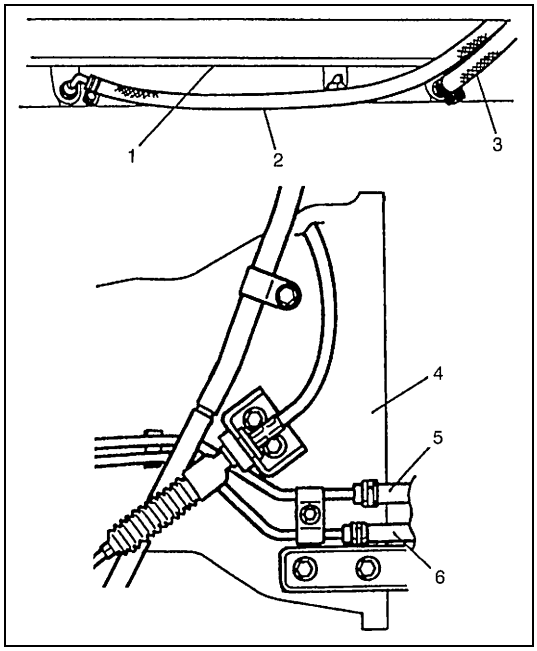
4) Lower vehicle and fill proper amount of an equivalent of DEXRON®-III.
5) Check fluid level according to procedure described under "Level Check Normal Operating Temperature".

Fluid specification
An equivalent of DEXRON®-III

Fluid capacity	
When draining from drain plug hole	2.5 liters (5.28/4.40 US/Imp.pt.)
When overhauling	6.9 liters (14.58/12.14 US/Imp.pt.) for G16 7.1 liters (15.00/12.50 US/Imp.pt.) for J20/H25

1. Dipstick (G16/J20)
2. Dipstick (H25)

Oil cooler hoses

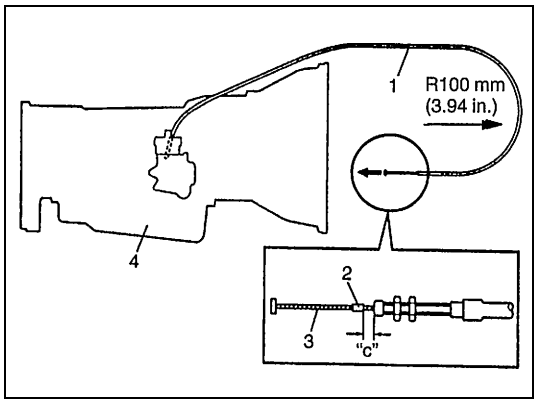


When replacing them, be sure to note the followings.
- to replace clamps at the same time.
- to insert hose as far as its limit mark.
- to clamp hose securely.

1. Radiator
2. Inlet hose (Outlet from oil cooler)
3. Outlet hose (Inlet to coil cooler)
4. Converter housing
5. Outlet hose
6. Inlet hose

A/T Throttle Cable

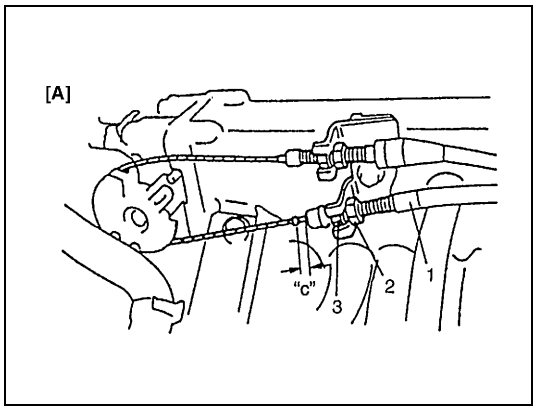
ADJUSTMENT



1) Pull inner cable by force of 2 N (0.2 kg, 0.45 lb) or less to be no slack of inner cable with A/T throttle cable curved as shown in the figure.
2) Fix stopper to inner cable with clearance "c".

Clearance "c" : 0.8 – 1.5 mm (0.03 – 0.06 in.)

1. A/T throttle cable
2. Stopper
3. Inner cable
4. A/T assembly



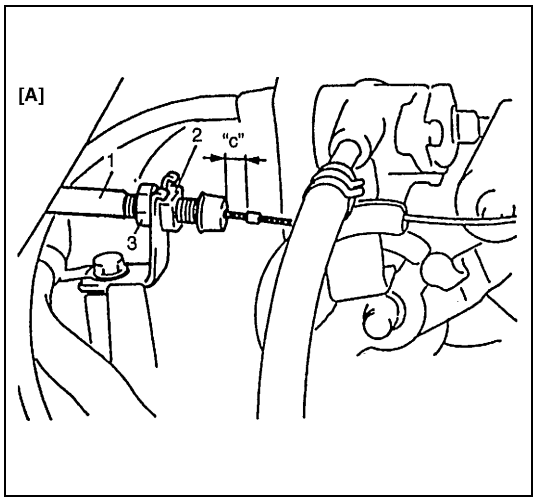
3) For G16/J20 engines

a) Check clearance "c". If it is out of specifications, adjust it by turning cable adjusting nut.

Clearance "c" : 0.8 – 1.5 mm (0.03 – 0.06 in.)

b) Tighten lock nut securely.

[A] : G16/20
1. A/T throttle cable
2. Adjusting nut
3. Lock nut



For H25 engine

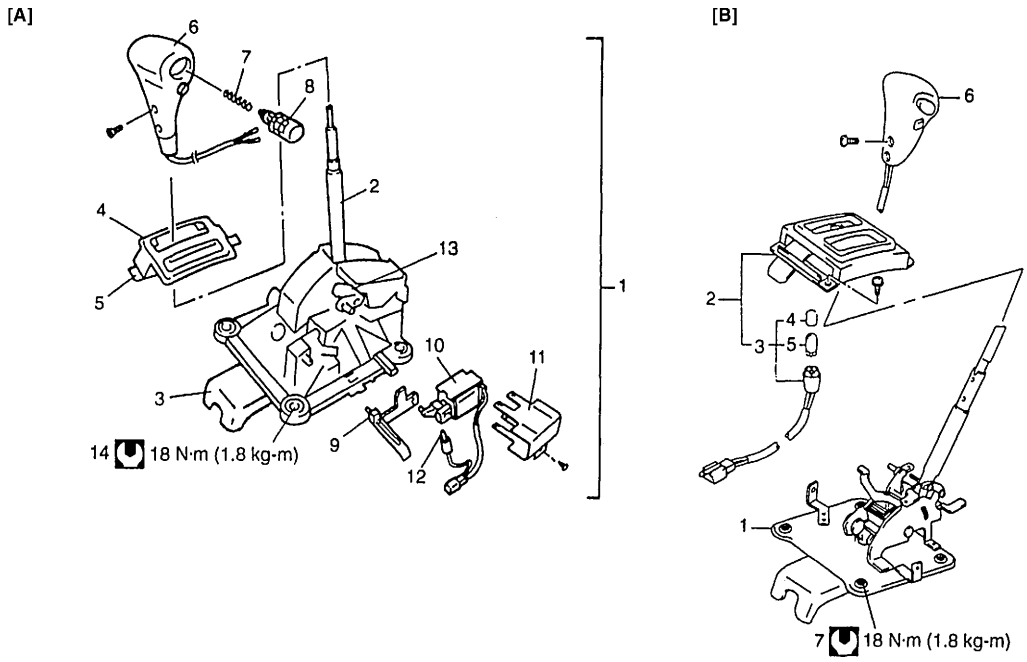
a) Warm up engine and transmission to normal operating temperature.
b) Make sure that accelerator cable is adjusted as specified.
c) With throttle valve closed, check clearance "c" which should be within the following specification.

Clearance "c" : 0.8 – 1.5 mm (0.03 – 0.06 in.)

If it is out of specification, adjust it by turning cable adjusting nut.

[A] : H25
1. A/T throttle cable
2. Adjusting nut
3. Lock nut

Manual Selector Assembly



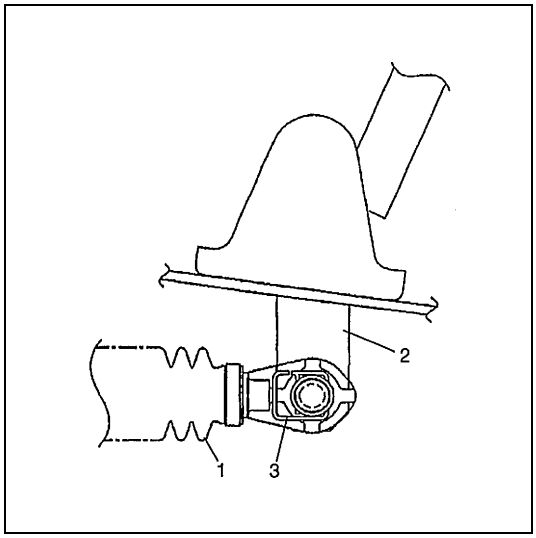
[A] Type-1	5. Slide cover	10. Shift lock solenoid	[B] : Type-2	5. Bulb
1. Manual selector assembly (Select lever assembly)	6. Select lever knob	11. Cover	1. Manual lever assembly	6. Knob assembly
2. Manual lever assembly	7. Spring	12. Illumination lamp	2. Select indicator assembly	7. Mounting bolt
3. Select cable bracket	8. Knob button	13. Interlock cam	3. Illumination lamp assembly	Tightening torque
4. Select indicator	9. Shift lock solenoid rod	14. Mounting bolt	4. Bulb filter	

REMOVAL

(For Type-1)

1) Disconnect negative cable at battery.
2) Remove console box.
3) Disconnect connector for illumination lamp, shift lock solenoid and overdrive OFF switch.
4) Disconnect interlock cable from interlock cam of selector assembly.
5) Remove selector assembly mounting bolts.
6) Disconnect selector cable from lever of selector assembly.

(For Type-2)

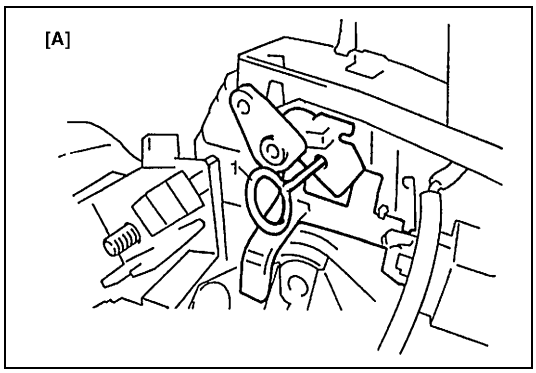


1) Disconnect negative (–) cable at battery.
2) Remove console box.
3) Disconnect connector for illumination lamp, shift lock solenoid (if equipped) and overdrive OFF switch.
4) Remove selector assembly mounting bolts.
5) Disconnect selector cable from manual selector assembly expanding selector cable clip.

1.	Selector cable
2.	Manual selector assembly
3.	Expanding selector cable clip

INSTALLATION

(For Type-1)



NOTE:

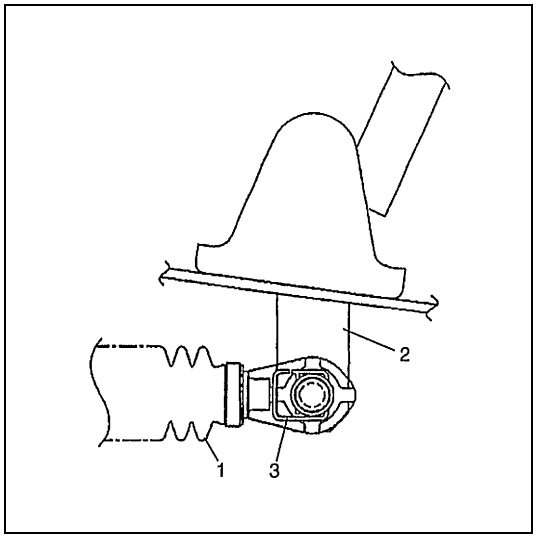
New selector assembly of Type-1 is supplied with interlock cam held at interlock cable connecting position with pin. Remove this pin after connecting interlock cable to interlock cam and tightening cable nut.

[A]	Type-1
1.	Interlock cam pin (only for new selector assembly)

Reverse removal procedure to install noting the followings.

- Connect interlock cable end to cam referring to Steps 2) to 8) of “Interlock Cable Installation” section.
- Upon completion of installation, confirm that brake (key) interlock system operates properly.

(For Type-2)

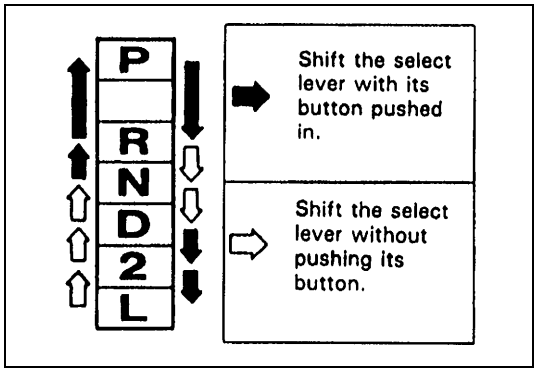


Reverse removal procedure to install manual selector assembly noting the following instructions.

- Make sure that selector cable clip holds selector cable on manual selector assembly securely.
- Tighten manual selector assembly mounting bolts as specified torque.

Tightening torque
Manual selector assembly mounting bolts
18 N·m (1.8 kg-m, 13.5 lb-ft)

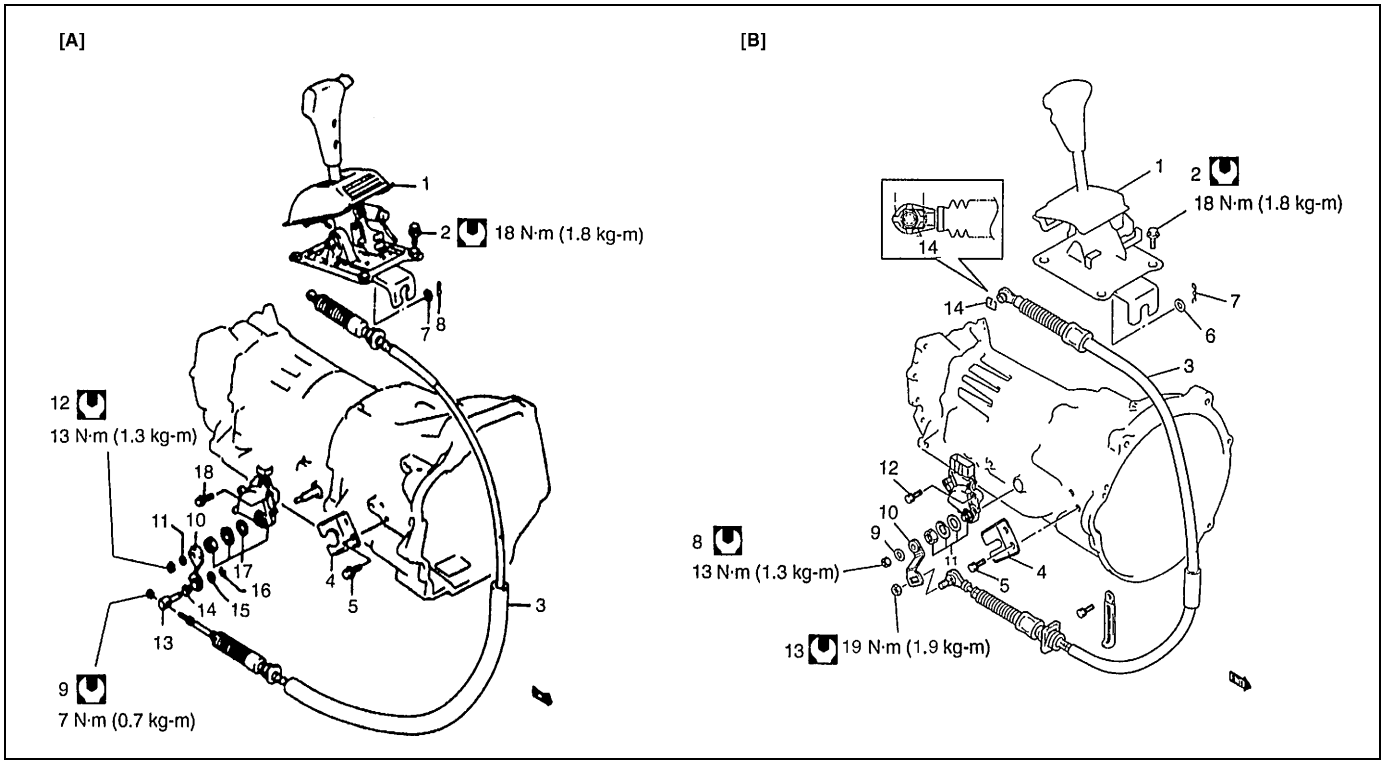
1.	Selector cable
2.	Manual selector assembly
3.	Expanding selector cable clip



INSPECTION

Check select lever for smooth and clear-cut movement and position indicator for correct indication.
For operation of select lever, refer to the figure.

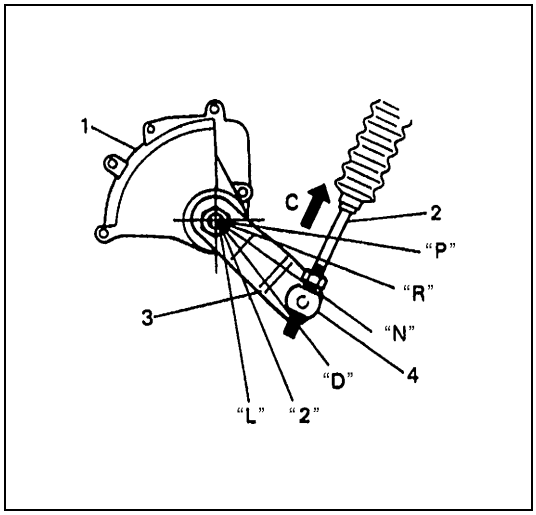
Select Cable



[A] Type-1	10. Manual select lever	[B] : Type-2	10. Manual select lever
1. Select lever assembly	11. Lock washer	1. Selector lever assembly	11. Transmission range switch assembly
2. Bolt	12. Nut	2. Selector lever assembly mounting bolt	12. Transmission range switch mounting bolt
3. Select cable	13. Select cable joint	3. Selector cable	13. Manual select lever nut (selector cable side)
4. Cable bracket	14. Bush	4. Cable bracket	14. Selector cable clip
5. Bolt	15. Washer	5. Cable bracket mounting bolt	Tightening torque
6. Blank	16. E-ring	6. Washer	
7. Washer	17. Transmission range switch assembly	7. Clip	
8. Clip	18. Bolt	8. Manual select lever nut (transmission range switch side)	
9. Nut		9. Lock washer	

ADJUSTMENT

(For Type-1)

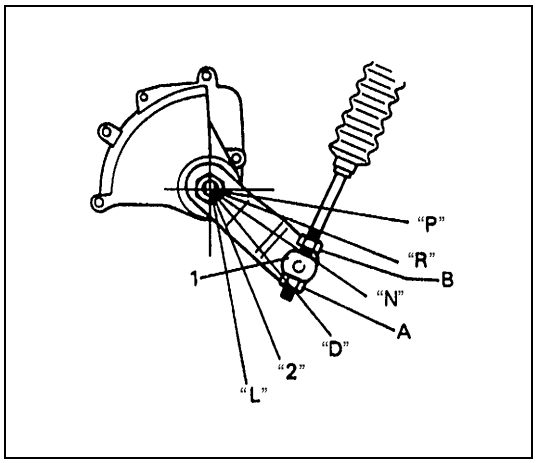


1) Before tightening cable end nut, shift select lever to "N".
2) Also shift manual shift lever to "N".

NOTE:

- **Make sure that nut and cable joint have clearance under above conditions.**
- **If select cable has been moved, push it in arrow C direction as shown in figure at the left till it stops and then confirm that select lever is in "N" position.**

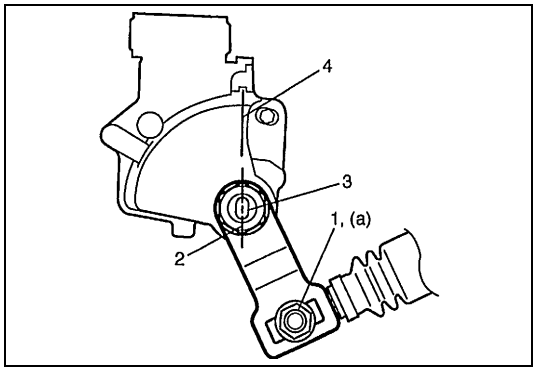
1. Transmission range sensor (switch)
2. Select cable
3. Manual shift lever
4. Select cable joint



3) Turn nut A by hand till it contacts manual select cable joint. Then tighten nut B with wrench.
4) After select cable was installed, check for the following.
   - Push vehicle with select lever shifted to "P". Vehicle should not move.
   - Vehicle cannot be driven in "N".
   - Vehicle can be driven in "D", "2", and "L".
   - Vehicle can be backed in "R".

1. Select cable joint
A. Align with cable joint
B. Tighten with wrench

(For Type-2)



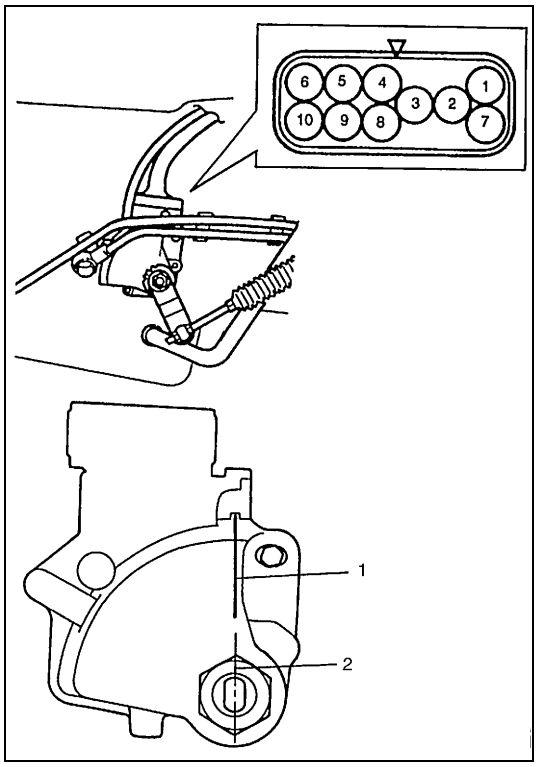
1) Loosen manual shift lever (select cable side) nut (1).
2) Shift select lever to "N" range.
3) Align center line (2) on manual valve shaft (3) to "N" reference line (4) as shown.
4) Tighten manual shift lever nut (selector cable side) (1) as specified torque.

Tightening torque
Manual shift lever nut
(a) : 19 N·m (1.9 kg-m, 14.0 lb-ft)

5) After select cable was installed, check for the following.
   - Push vehicle with selector lever shifted to "P" range. Vehicle should not move.
   - Vehicle cannot be driven in "N" range.
   - Vehicle can be driven in "D", "2" and "L" ranges.
   - Vehicle can be backed in "R" range.

Transmission Range Switch (Sensor)

INSPECTION & ADJUSTMENT



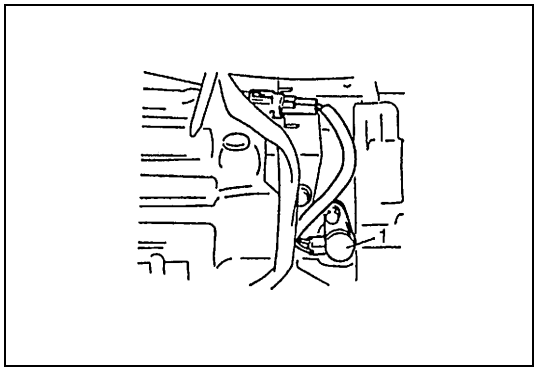
1) Shift select lever to “N” range.
2) Check that center line on manual valve shaft and “N” reference line on switch are aligned. If not, loosen switch bolt and align them.
3) Check that engine starts in “N” and “P” ranges but it doesn’t start in “D”, “2”, “L” or “R” range. Also, check that back-up lamp lights in “R” range.
4) If faulty condition cannot be corrected by adjustment, disconnect transmission range switch coupler and check that continuity exists as shown by moving select lever.

Switch position \ Terminal No.	5	4	9	8	2	3	10	7	6
P					○—○			○—○	
R				○	—	—	—	—	○
N					○—○		○	—	○
D			○	—	—	—	—	—	○
2		○	—	—	—	—	—	—	○
L	○	—	—	—	—	—	—	—	○

1. “N” reference line
2. Center line on manual valve shaft

A/T Output Speed Sensor

INSPECTION



Check A/T output speed sensor for resistance between terminals of sensor or PCM coupler.

A/T output speed sensor resistance value :
387 – 473 Ω at 20°C, 68°F

1. A/T vehicle (output) speed sensor

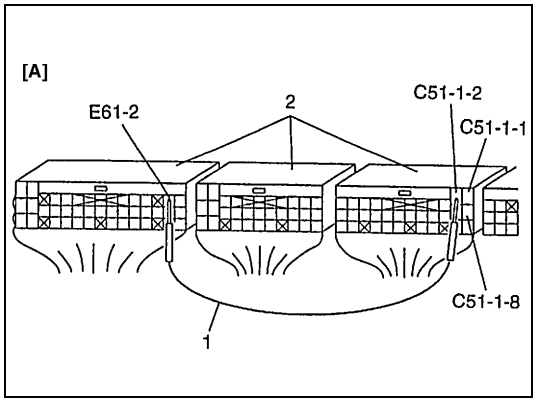
O/D Cut Switch

INSPECTION

Check O/D cut switch for operation referring to step 4 of Diag. Flow Table B-2 in this section.
If malfunction is found, replace.

Solenoid Valves (Shift solenoid valves & TCC solenoid valve)

INSPECTION

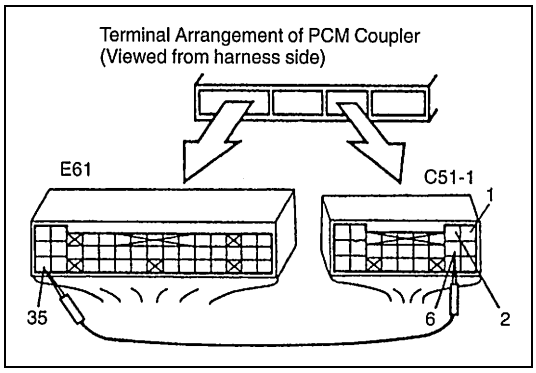


With couplers of PCM disconnected and using service wire as shown at the left, check each solenoid valve for clicking sound.

G16/J20 Engines

Shift solenoid valve-A (#1)	C51-1-2
Shift solenoid valve-B (#2)	C51-1-1
TCC (Lock-up) solenoid valve	C51-1-8

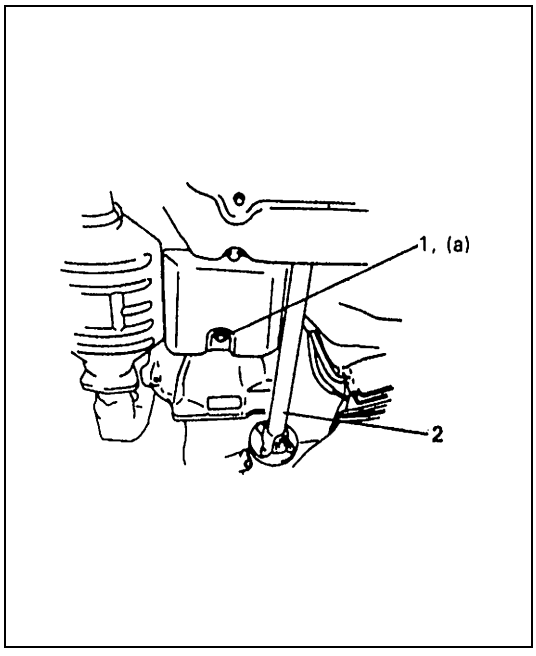
[A] : G16/J20
1. Service wire
2. PCM connectors disconnected



H25 Engine

Shift solenoid valve-A (#1)	C51-1-6
Shift solenoid valve-B (#2)	C51-1-1
TCC (Lock-up) solenoid valve	C51-1-2

REMOVAL

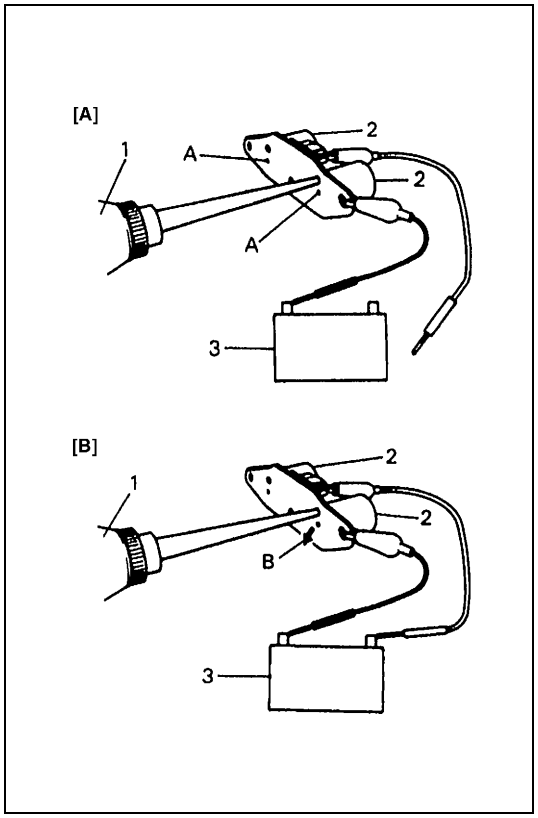


1) Pull out dipstick and lift up vehicle.
2) With engine cooled, remove drain plug from oil pan and drain A/T fluid.
3) Install drain plug with gasket.

Tightening torque
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

4) Remove exhaust pipe bracket and disconnect front propeller shaft from front differential (if equipped).
5) Remove oil pan bolts.
6) Remove oil pan.
7) Remove oil tubes.
8) Remove solenoid valve No.1 (shift solenoid valve A and B) or solenoid valve No.2 (TCC solenoid valve).

1. Drain plug
2. Propeller shaft



OPERATION CHECK

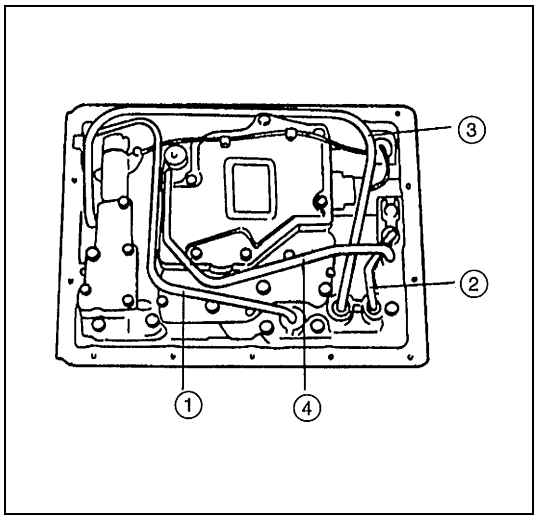
Whenever shift solenoid valves and TCC (lock-up) solenoid valve are removed from transmission, verify their valve function physically before they are reinstalled.

1) Apply transmission fluid with oiler to solenoid valve and give compression by hands and then check to be sure that transmission fluid from oiler does not come out of holes in solenoid valve when battery voltage is not conducted.
2) Under the same conditions as above, conduct battery voltage and then make sure that fluid comes out with vigor.

NOTE:

- **If fluid does not come out with vigor in above step 2 inspection, do not re-use that solenoid valve.**
- **Figure at the left shows shift solenoid valve check. Check TCC solenoid valve also in the same way.**

[A] :	Without battery voltage
[B] :	With battery voltage
1.	Oiler (with transmission fluid)
2.	Solenoid valve
3.	Battery
A :	Hole (Should be dry)
B :	Exhausting fluid



INSTALLATION

Reverse removal procedure to install solenoid valves and noting the following points.

- For details of solenoid valve installation, refer to “Unit Repair” section. Use new gasket and O-ring.
- Install oil tubes in such order as shown in figure.
- For details of oil pan installation, refer to “Unit Repair” section.
  Use new oil pan gasket.
- Tighten universal joint flange bolts & nuts and exhaust pipe bracket bolts to specified torque.
- Fill A/T fluid and check fluid level according to procedure described in “CHANGING FLUID” previously.
- Check for fluid leakage after warming up A/T.

Throttle Position Sensor

INSPECTION

Refer to Section 6E1/6E2 for inspection.

Power/Normal Change Switch

INSPECTION

Check Power/Normal change switch for operation referring to Step 4 of Diag. Flow Table B-4 in this section.
If malfunction is found, replace.

Oil Cooler Pipes

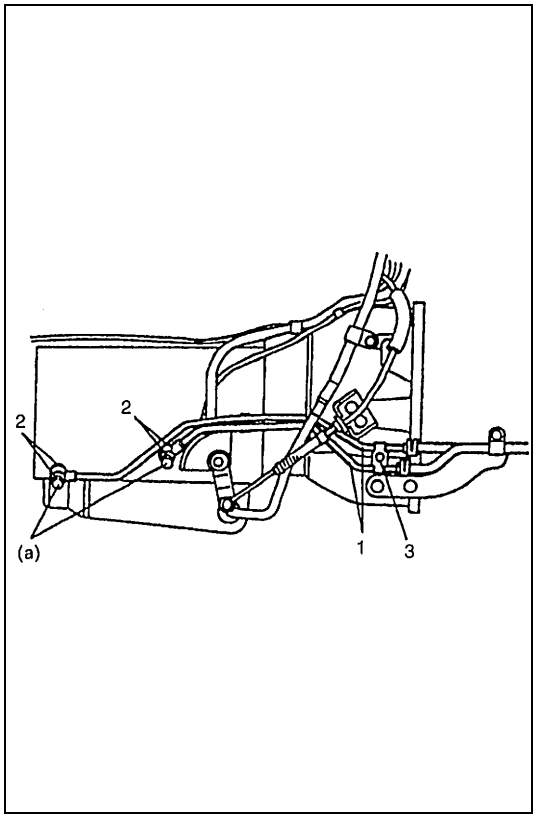
REMOVAL

1) Lift up vehicle.
2) Make sure to wash dirt off from around pipe joints.
3) With engine cooled, loosen oil cooler pipe union bolts with oil outlet union locked and remove oil cooler pipes from oil outlet unions and hoses.

NOTE:

To avoid fluid leakage, plug open ends of oil outlet unions and hoses right after they are disconnected.

INSTALLATION



1) Use new union gaskets and connect oil cooler pipes to oil outlet unions.
2) Connect hoses to pipes and clamp them securely.
3) Tighten union bolts to specified torque with oil outlet union locked.

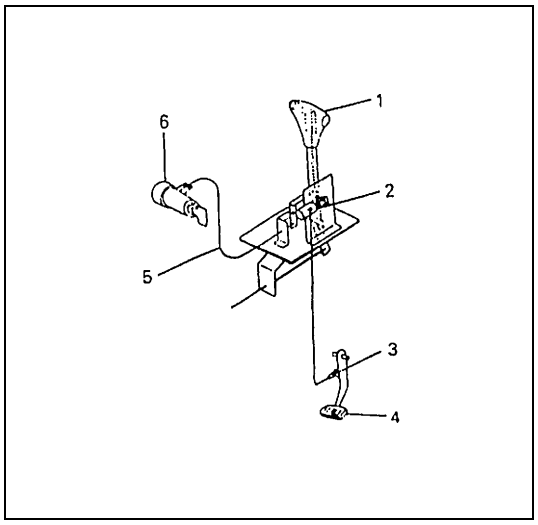
Tightening torque
(a) : 35 N·m (3.5 kg-m, 25.5 lb-ft)
In case copper base alloy gaskets (bronze in color) are used
(a) : 25 N·m (2.5 kg-m, 18.0 lb-ft)
In case rubber coated steel gaskets (black in color) are used

4) Tighten pipe bolt securely.
5) Check A/T fluid level according to procedure described in "Fluid Level" section.
   Add if necessary.
6) Check for fluid leakage after warming up A/T.

1.	Oil cooler pipes
2.	Union gaskets
3.	Pipe bolt

Brake Interlock System

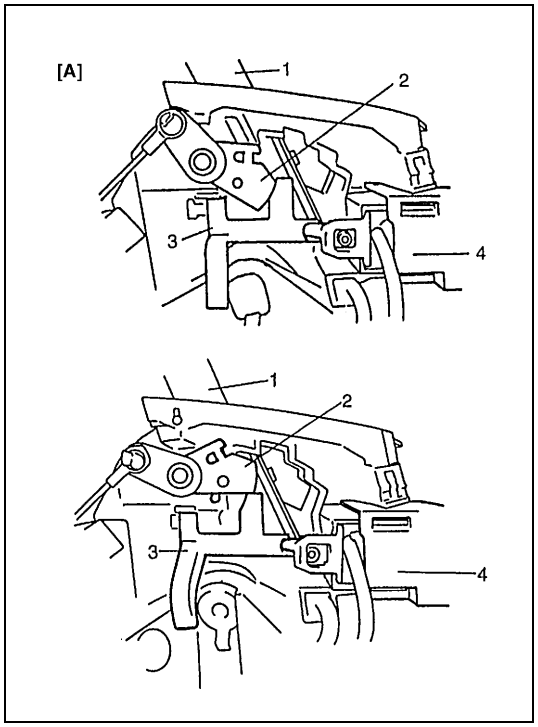
Shift lock solenoid control



This system consists of shift lock solenoid control system and interlock cable control system.
The shift lock solenoid control system is so designed that the selector lever cannot be shifted from “P” range position unless the ignition switch is turned ON and the brake pedal is depressed. And the interlock cable control system is so designed that the selector lever cannot be shifted from “P” range position unless the ignition switch is turned to “ACC” or “ON” position. Also, the ignition key cannot be pulled out of the key slot unless the selector lever is in “P” range.

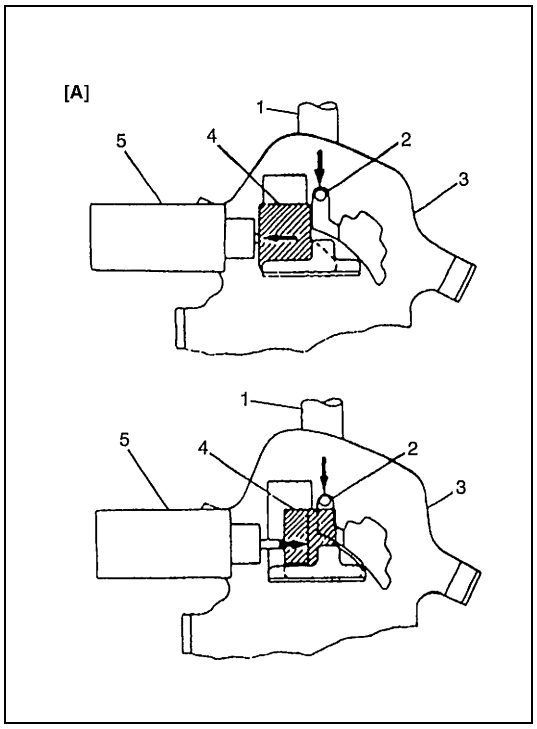
1. Select lever	4. Brake pedal
2. Shift lock solenoid	5. Cable
3. Brake light switch	6. Ignition switch

Shift lock solenoid control operations



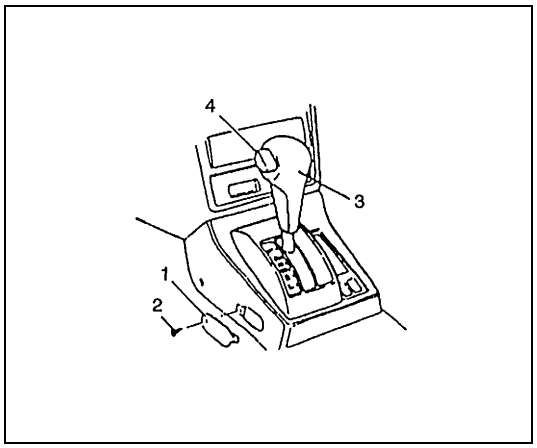
When the select lever is in “P” range, the ignition key position is “ON” and depressing the brake pedal cause the electric current to flow to the solenoid. As the shift lock solenoid rod (or the lock plate) is drawn toward the solenoid in this state, it frees the interlock cam (or the detent pin), which then allows the select lever to be shifted from “P” range to any other position.
Even when the select lever is in “P” range, if the ignition key position is “LOCK” or “ACC” or the brake pedal is not depressed, the electric current does not flow to the solenoid.
In this state, the shift lock solenoid rod (or the lock plate) is pushed away from the solenoid by spring force and it obstructs the interlock cam (or the detent pin) movement. Thus the select lever button does not work even when pressed and the select lever shift is prevented.

[A] : Type-1
1. Select lever
2. Interlock cam
3. Shift lock solenoid rod
4. Shift lock solenoid



[A] :	Type-2
1.	Select lever
2.	Detent pin
3.	Detent plate
4.	Lock plate
5.	Shift lock solenoid

Shift lock (solenoid) manual release

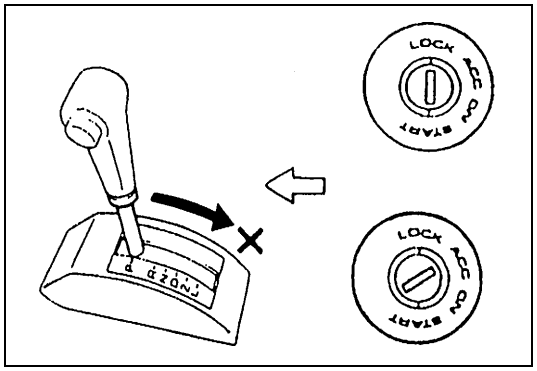


Shift lock can be manually released by following procedure.

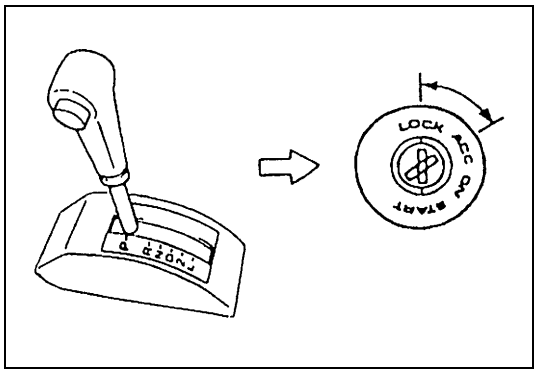
1) Remove access hole cover by unfastening screw.
2) Turn ignition key to “ACC” position and move shift lock solenoid rod (or manual release plate) toward rear side of vehicle by using screw driver or the like.
3) In this state, select lever can be moved to any range or position.

1.	Cover
2.	Screw
3.	Select lever
4.	Button

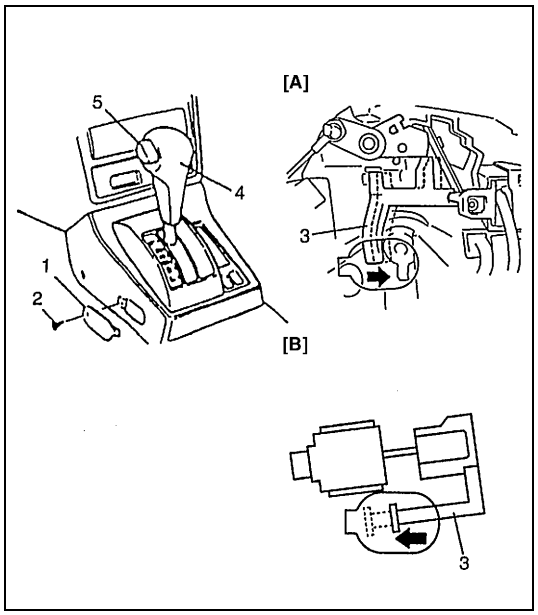
System inspection



1) Check to make sure that select lever cannot be moved to any other range from “P” range position when ignition switch key is at “ACC” position, at “LOCK” position (or it is removed from keyhole of ignition switch) or brake pedal is not depressed.

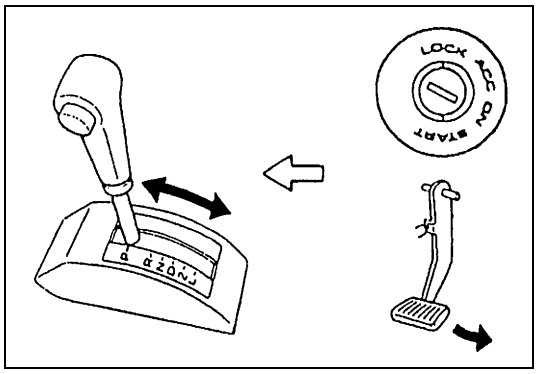


2) Shift select lever to “P” range position, release knob button and check for the following.
- Ignition key can be turned between “LOCK” and “ACC” positions back and forth and also it can be removed from ignition switch.

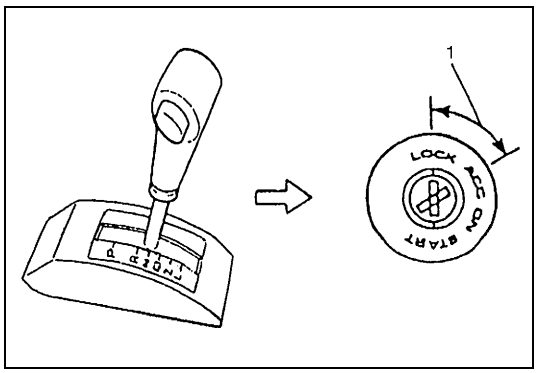


- With shift lock solenoid rod (or manual release plate) moved in arrow direction and ignition key turned to “ACC” position, select lever can be shifted from “P” range position to any other range.
- With shift lock solenoid rod (or manual release plate) moved in arrow direction and ignition key turned to “LOCK” position, select lever cannot be shifted from “P” range position to any other range.

[A] : Type-1
[B] : Type-2
1. Cover
2. Screw
3. Shift lock solenoid rod (or manual release plate)
4. Select lever
5. Button



- When ignition switch is turned “ON” and brake pedal is depressed, select lever can be shifted from “P” range position to any other range.



3) With select lever shifted to any position other than “P” range, check that ignition key cannot be turned “LOCK” position and it cannot be removed from ignition switch unless it is at “LOCK” position.

1. Not turn between “ACC” and “LOCK” positions.

Key Interlock Cable

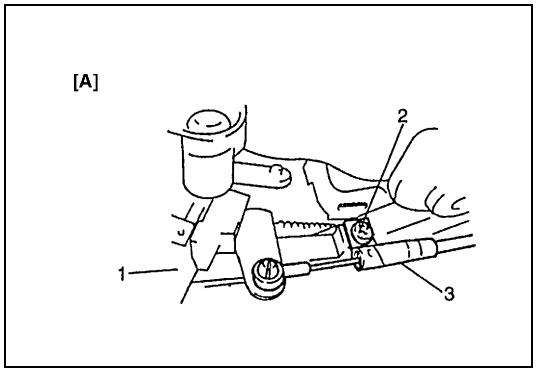
NOTE:

Do not bend interlock cable excessively when removing and installing it, or system will not operate correctly.

REMOVAL

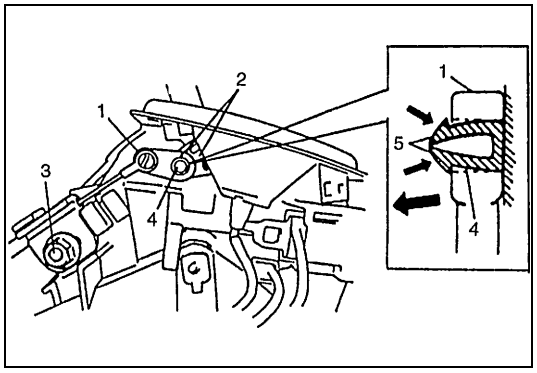
1) Disconnect negative (–) cable from battery.
2) If equipped with air bag system, disable air bag system. Refer to “Disabling Air bag System” in Section 10B.
3) Remove steering column hole cover.
4) Tilt steering column if steering column is adjustable. If no adjustable, loosen steering column bolts.
5) Remove steering column cover.

Type-1



1) Remove interlock cable clamp screw located at ignition switch assembly.
2) Disconnect interlock cable inner end. (Ignition switch side.)

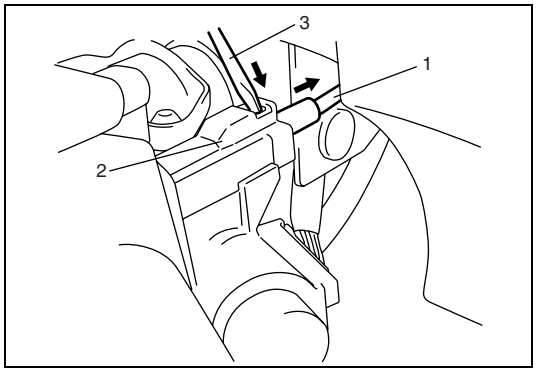
[A] :	Ignition switch side
1.	Ignition switch assembly
2.	Clamp screw
3.	Interlock cable



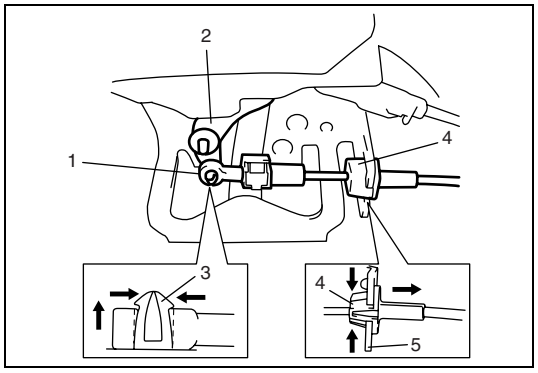
3) With console box removed, take out interlock cable by loosening lock nuts.
4) Detach cable end from interlock cam (or key release cam) while pressing claws of interlock cam boss. At this time, be careful not to cause damage to its claws.

1.	Inner end of interlock cable
2.	Interlock cam (or key release cam)
3.	Stud bolt
4.	Cam boss
5.	Claw

Type-2



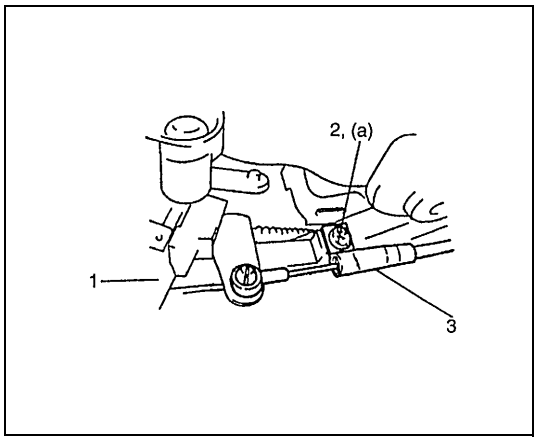
1) Turn ignition switch to “ACC” position.
2) Pull out key interlock cable (1) from key cylinder cover (2) while pressing checkhook with slotted screwdriver (3) or the like.
3) Turn ignition switch to “LOCK” position.



4) Remove console box.
5) Detach cable end (1) from interlock cam (2) while pressing claws (3) of interlock cam boss.
   At this time, be careful not to cause damage to its claws.
   Detach cable casing cap (4) from selector bracket (5) while pressing checkhook.
6) Remove interlock cable.

INSTALLATION

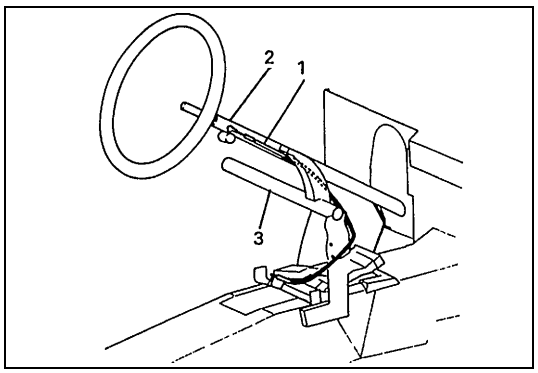
Type-1



1) Shift select lever to “N” range and turn ignition key to “ACC” position.
2) Connect inner end of interlock cable to key interlock lever (Ignition switch side).
3) Install outer end bracket of interlock cable to ignition switch assembly, and tighten screw to specified torque.

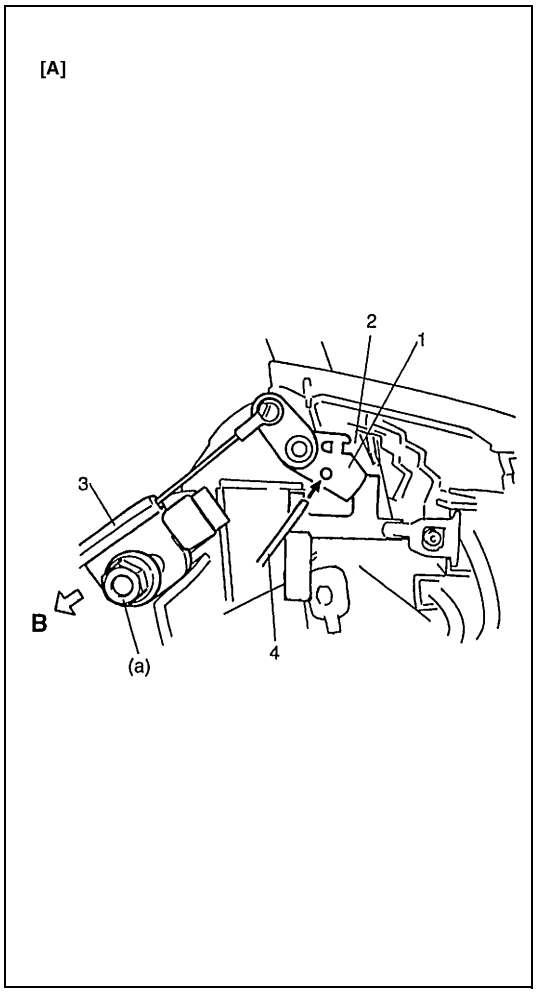
Tightening torque
(a) : 2.2 N·m (0.22 kg-m, 1.5 lb-ft)

1. Ignition switch assembly	3. Outer end
2. Clamp screw	



4) Pass and connect interlock cable as shown at the left figure.

1. Interlock cable
2. Steering column
3. Steering column holder



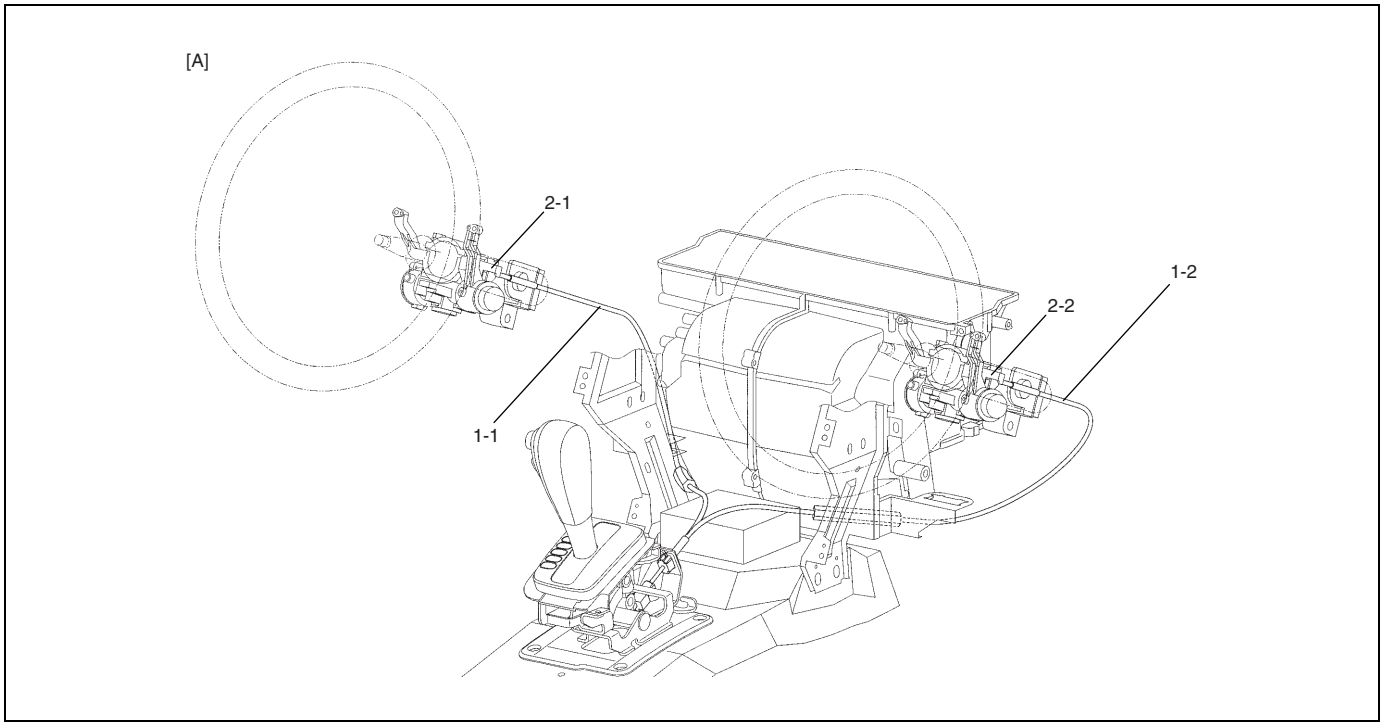
5) Fix interlock cam by inserting pin with about 4 mm (0.15 in.) dia. into holes of cam and lever plate.
6) Install cable end to interlock cam and stud bolt and after making sure that cable outer is pushed in arrow direction B by leaf spring, tighten mounting nut to specified torque. Remove pin.

Tightening torque
(a) : 13 N·m (1.3 kg-m, 9.5 lb-ft)

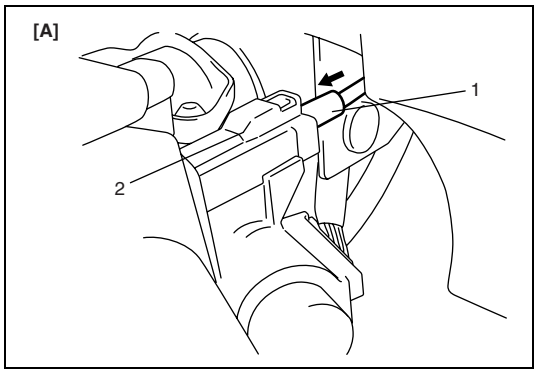
7) Turn ignition key to "ACC" position and shift select lever to "N" range, and check for the followings.
   a) When select lever is shifted at "P" range with knob button depressed, ignition key cannot be turned from "ACC" to "LOCK" position.
   b) When knob button is released, ignition key can be turned to "LOCK" position.
   c) When ignition key is at "LOCK" position, select lever can not be shifted from "P" to any other range.
8) Install console box.
9) Install steering column cover.
10) Adjust steering column or tighten steering column bolts.
11) Install steering column hole cover.
12) If equipped with air bag system, enable air bag system. Refer to "Enabling Air bag System" in Section 10B.

[A] : Type-1	1. Interlock cam	3. Interlock cable
	2. Lever plate	4. Pin with 4 mm (0.15 in.) dia.

Type-2



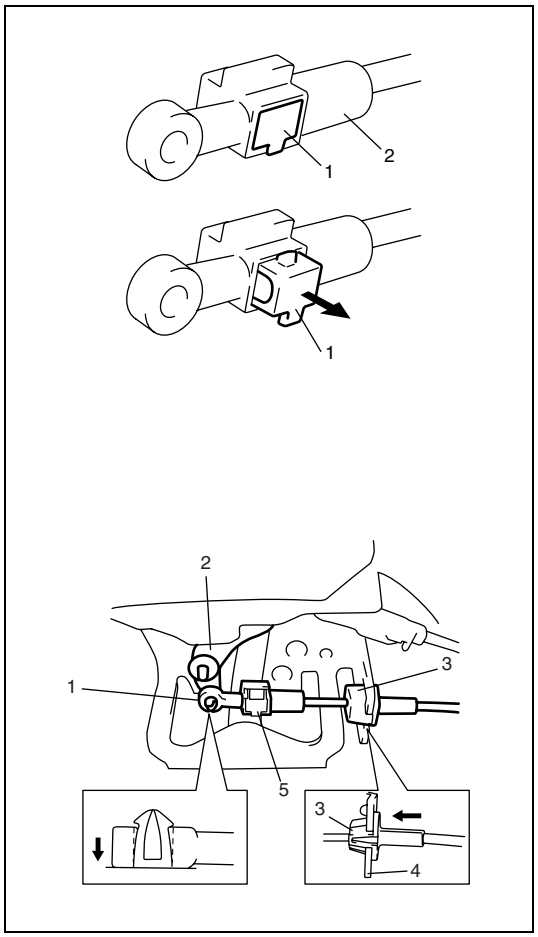
[A]: Type 2	1-2. Interlock cable for RH steering vehicle	2-2. Key cylinder for RH steering vehicle
1-1. Interlock cable for LH steering vehicle	2-1. Key cylinder for LH steering vehicle	



1) Lay interlock cable to its original cabling route.
2) Turn ignition switch to “ACC” position.
3) Insert cable casing cap (1) into key cylinder cover (2) securely.

[A] : Type-2

4) Pass and connect interlock cable as shown in the figure above.



5) Pull out lock button (1) of selector side cable end (2).
6) Shift selector lever to “N” position.

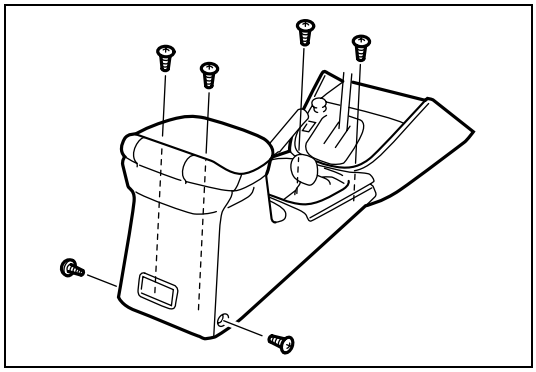
NOTE:

If selector lever is in “P” position, shift selector lever referring to “Selector Lever Inspection”.

7) Install cable casing cap (3) to selector bracket (4).
8) Connect cable end (1) to interlock cam (2) with ignition switch turned to “ACC” position.
9) Drive lock button (5) in cable end until it locks cable expansion and contraction.
10) With selector lever set at “P” position, turn ignition key to “ACC” position and then check for the following conditions.
    - With knob button released, ignitioin key can be turned from “ACC” position to “LOCK” position.
    - With knob button pressed, ignition key cannot be turned from “ACC” position to “LOCK” position.
11) Install console box.
12) Install steering column cover.
13) Adjust steering column or tighten steering column bolts.
14) Install steering column hole cover.
15) If the vehicle is equipped with air bag system, connect negative cable at battery and enable air bag system, referring to “Enabling Air Bag System” in Section 10B.

Dismounting of Transmission (If Equipped with Transfer)

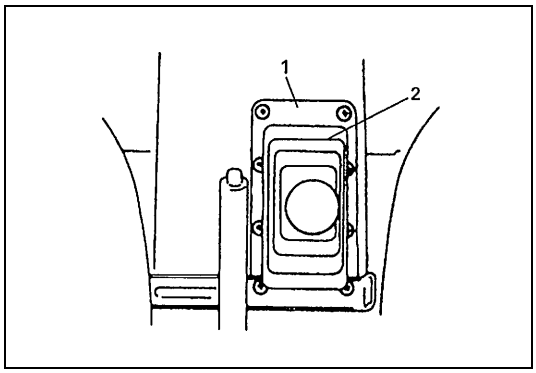
In Cabin



1) Remove console box.

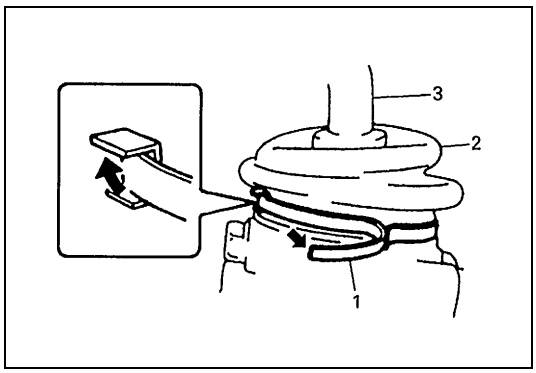
NOTE:

To remove clip, push in its center pin first.



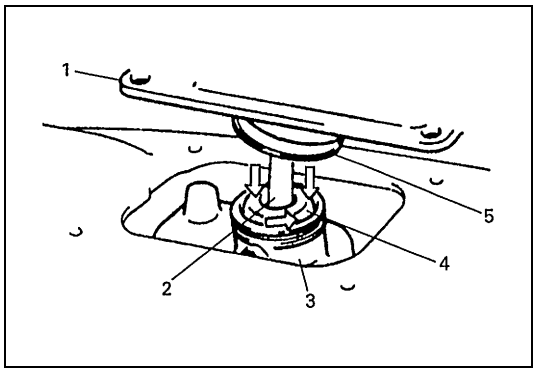
2) Remove boot cover and boot No.2. (if equipped)

1.	Boot cover
2.	Boot No.2



3) Remove boot clamp and then remove boot No.1 from transfer gear shift lever case. (if equipped)

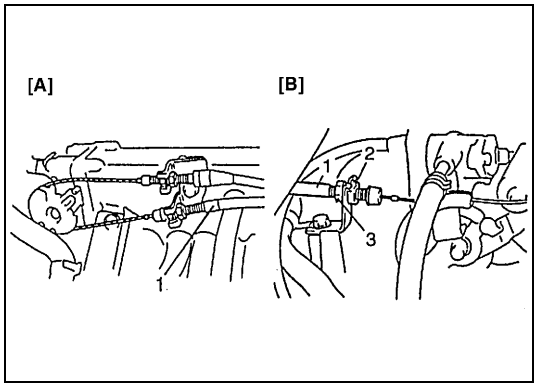
1.	Boot clamp
2.	Boot No.1
3.	Gear shift control lever



4) With transfer shift control case cover pushed down with fingers, turn it counterclockwise and take out shift control lever. (if equipped)

1.	Boot No.2
2.	Transfer shift control lever
3.	Transfer shift lever case
4.	Transfer shift control case cover
5.	Boot No.1

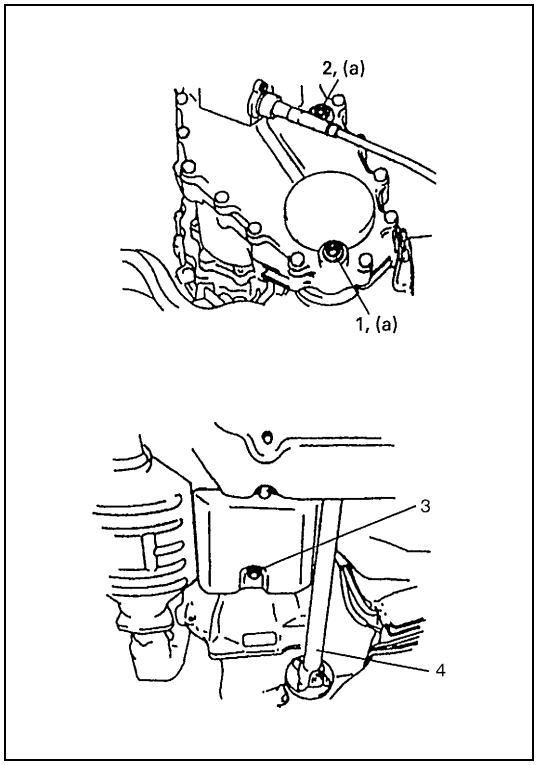
In Engine Room



1) Remove battery, dipstick and oil filler tube.
2) Disconnect A/T throttle cable from throttle cam and bracket.
3) Remove starter motor. But do not disconnect its wiring harness.
4) Remove transmission to engine bolt and nut.

[A] :	G16/J20
[B] :	H25
1.	A/T throttle cable
2.	Adjusting nut
3.	Lock nut

On Lift



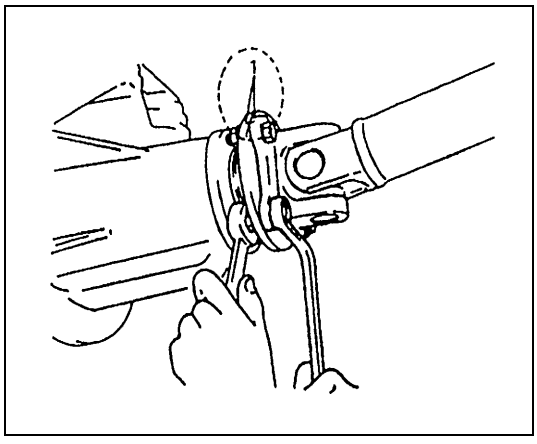
1) Drain transfer oil for 4WD vehicle or A/T fluid for 2WD vehicle.

NOTE:

If 4WD automatic transmission is overhauled later on, draining A/T fluid at this point will facilitate work.

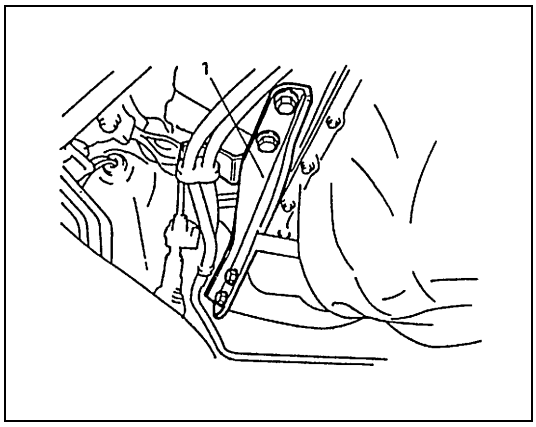
Tightening torque
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

1.	Drain plug
2.	Filler and level plug
3.	Drain plug
4.	Front propeller shaft



2) Before removing propeller shaft, give match marks on joint flange and propeller shaft as shown in left figure.
3) Remove universal joint flange bolts and take out rear propeller shaft.
4) Likewise, take out front propeller shaft. (if equipped)
5) Remove nut from the end of select cable and bracket to set cable free.
6) Remove select cable bracket by removing its 2 bolts.
7) Remove exhaust No.1 and No.2 pipes.

1.	Match marks



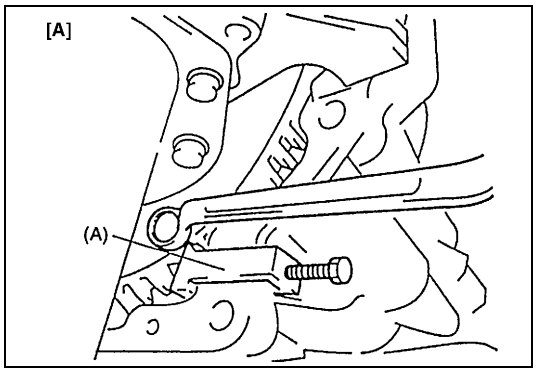
8) Remove transmission stiffener (right side) if equipped.
9) Unclamp and disconnect oil cooler hoses from pipes.

NOTE:

To avoid leakage of transmission fluid, plug open ends of oil cooler pipes and hoses right after they are disconnected.

10) Remove torque converter housing lower plate.

1. Right side transmission stiffener (if equipped)



11) Holding drive plate stationary with special tool or the like, remove torque converter mounting bolts with wrench.

Special tool (only for G16/J20)
(A) : 09927-56010

[A] : G16/J20

12) Remove engine to transmission nuts.
13) Disconnect connectors from VSS, output speed sensor, input speed sensor, TR switch, shift & TCC solenoid valves and other electrical parts, and release their wire harness from clamps.
14) Apply transmission jack and take off rear mounting member by removing its bolts.
15) With transmission (and transfer if equipped) assembly held up on jack, move them to the rear and lower them including torque converter.

WARNING:

Transmission (and transfer if equipped) assembly may tilt rearward on jack. It is recommended to use an auxiliary arm of jack for the purpose of safety.

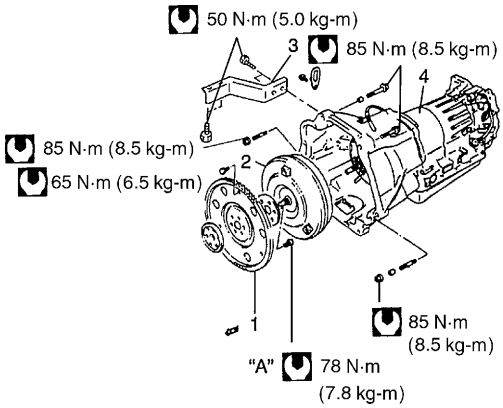
After Dismounting

WARNING:

Be sure to keep transmission (and transfer if equipped) assembly horizontal throughout the work. Should they be tilted, torque converter may fall off and cause personal injury and A/T fluid may flow out.

1) Remove breather hoses.
2) Remove transfer by removing its bolts, if equipped.

Remounting



WARNING:

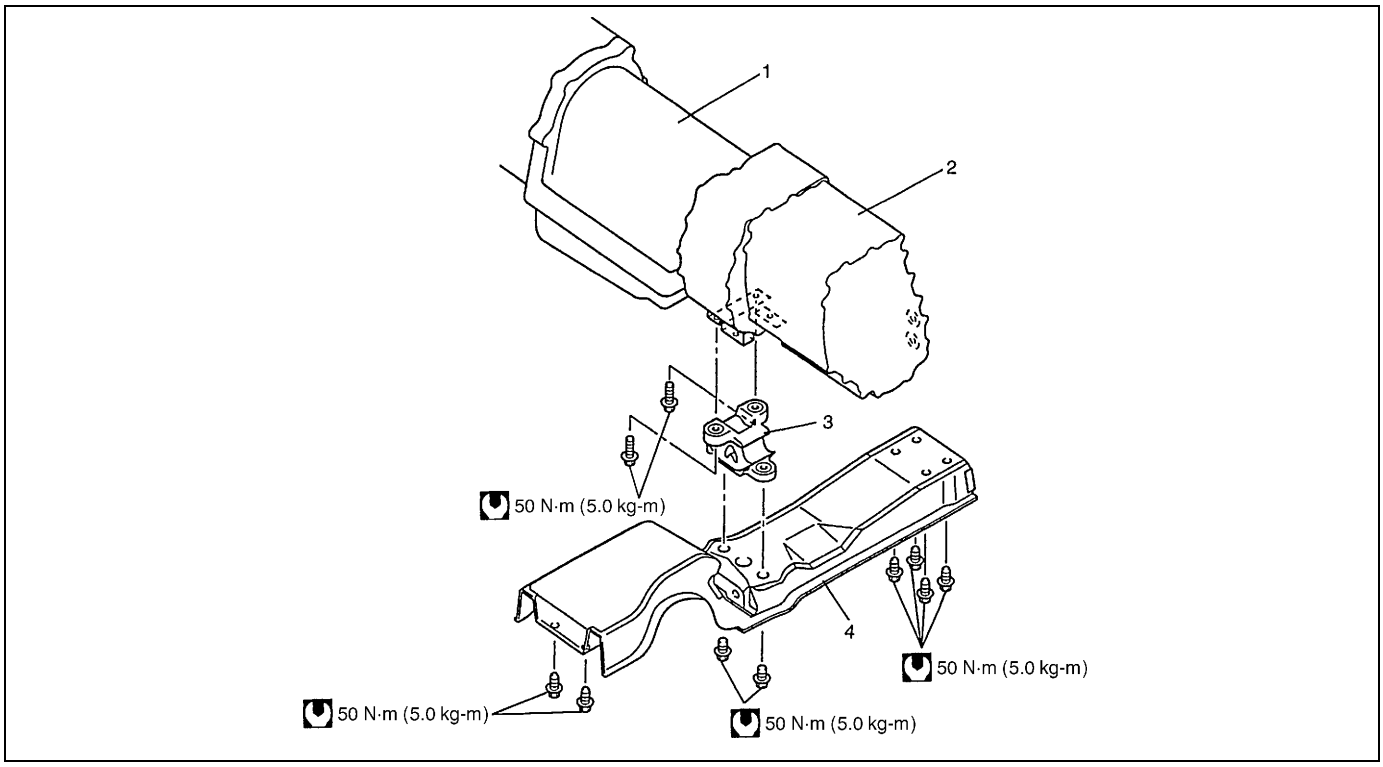
When moving transmission assembly with torque converter equipped in it, be sure to keep it horizontal. Tilting it with its front facing down may allow converter to fall off. Whereby an injury may result.

For remounting, reverse dismounting procedure. Use specified torque as given below and left.

Tightening torque	N·m	kg-m	lb-ft
Exhaust No.1 pipe to manifold bolts or nuts	50	5.0	36.5
Muffler to exhaust No.2 pipe nuts	60	6.0	43.5
Universal joint flange bolts and nuts	50	5.0	36.5
• Oil filler tube bolts • Select cable bracket bolts	23	2.3	17.0

- Clamp wiring harness and hoses securely.
- Refer to “Select Cable” section for adjusting procedure of select cable.
- Refer to “A/T Throttle Cable” section for tuning of A/T throttle cable.
- Follow fluid level check procedure for refilling automatic transmission fluid and its level adjusting.
- Connect battery, and confirm that engine and transmission function acceptably.
- When remounting drive plate, use specified bolts.

1. Drive plate	4. Automatic transmission
2. Torque converter	“A” : Sealant 99000-31110
3. Case right stiffener (if equipped)	Tightening torque



1. Automatic transmission	3. Engine rear mounting	Tightening torque
2. Transfer (4WD)	4. Engine rear mounting member	

Unit Repair

Refer to the same section of “Unit Repair Manual” mentioned in FOREWORD of this manual.

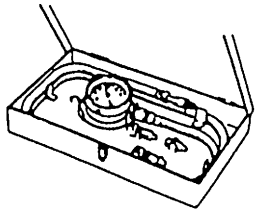
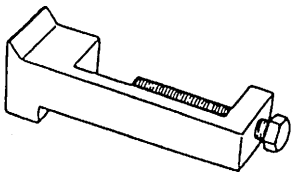
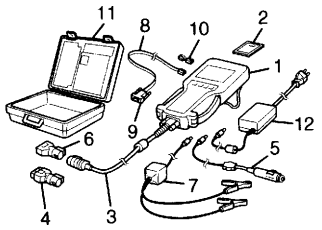
Tightening Torque Specifications

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Automatic transmission fluid drain plug	23	2.3	17.0
Transfer oil filler/level and drain plugs	23	2.3	17.0
Transmission case plug	17	1.7	12.5
Manual select lever nut	13	1.3	9.5
Manual select cable nut	7	0.7	5.5
Manual selector assembly bolts	18	1.8	13.5
Transmission to engine bolts and nuts	85	8.5	61.5
Engine rear mounting bolts Engine rear mounting member bolts Transmission case right stiffener bolts	50	5.0	36.5
Universal joint flange bolts and nuts	50	5.0	36.5
Torque converter mounting bolts	65	6.5	47.0
Adapter case or extension case bolts (G16 engine)	35	3.5	25.5
Adapter case or extension case bolts (J20/H25 engines)	42	4.2	30.0
Transmission range switch lock bolt	5.5	0.55	4.0
Oil pipe union bolts (In case copper base alloy gaskets (bronze in color) are used)	35	3.5	22.5
Oil pipe union bolts (In case rubber coated steel gaskets (black in color) are used)	25	2.5	18.0
Drive plate bolts	78	7.8	56.5
Interlock cable clamp screw	2.2	0.22	1.5
Interlock cable outer mounting nut	13	1.3	9.5

Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
A/T fluid	An equivalent of DEXRON®-III	• Automatic transmission • Parts lubrication when installing
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	• Cable ends
Sealant	SUZUKI BOND NO.1215 (99000-31110)	• Flywheel bolts

Special Tool

		
09925-37810 Oil pressure gauge	09927-56010 Gear stopper (only for G16/J20)	Tech 2 kit (SUZUKI scan tool) (See NOTE.)

NOTE:

This kit includes the following items.

1. Tech 2, 2. PCMCIA card, 3. DLC cable, 4. SAE 16/19 adapter, 5. Cigarette cable, 6. DLC loopback adapter, 7. Battery power cable, 8. RS232 cable, 9. RS232 adapter, 10. RS232 loopback connector, 11. Storage case, 12. Power supply

SECTION 7C1

CLUTCH

CONTENTS

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Clutch Cover, Clutch Disc and Flywheel 7C1-10
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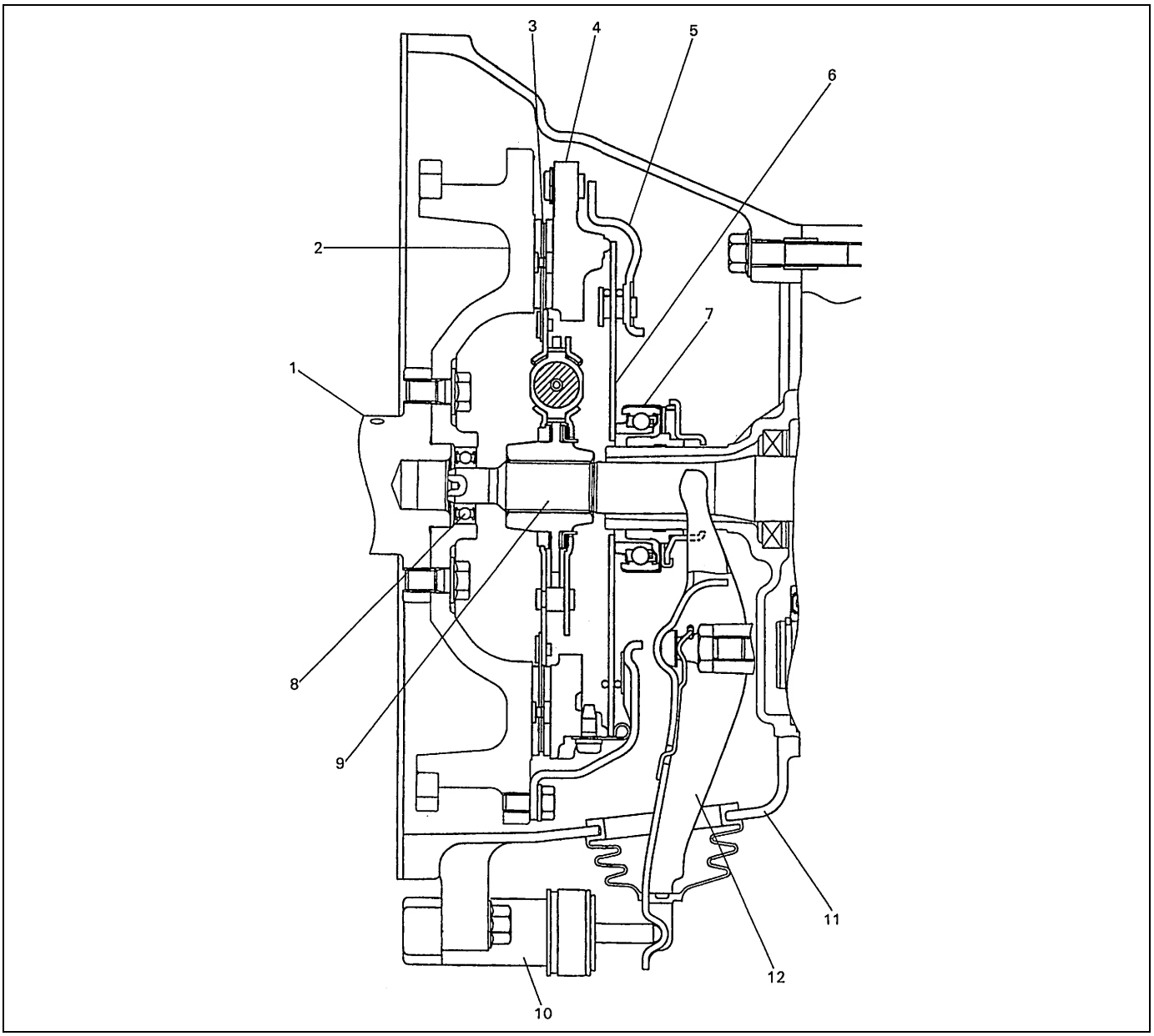
General Description

The clutch is a diaphragm-spring clutch of a dry single disc type. The diaphragm spring is of a tapering-finger type, which is a solid ring in the outer diameter part, with a series of tapered fingers pointing inward.

The disc, carrying torsional coil springs, is positioned on the transmission input shaft with an involute spline fit. The clutch cover is secured to the flywheel, and carries the diaphragm spring in such a way that the peripheral edge part of the spring pushes on the pressure plate against the flywheel (with the disc in between), when the clutch release bearing is held back.
This is the engaged condition of the clutch.

Depressing the clutch pedal causes the release bearing to advance and pushes on the tips of the tapered fingers of the diaphragm spring. When this happens, the diaphragm spring pulls the pressure plate away from the flywheel, thereby interrupting the flow of drive from flywheel through clutch disc to transmission input shaft.



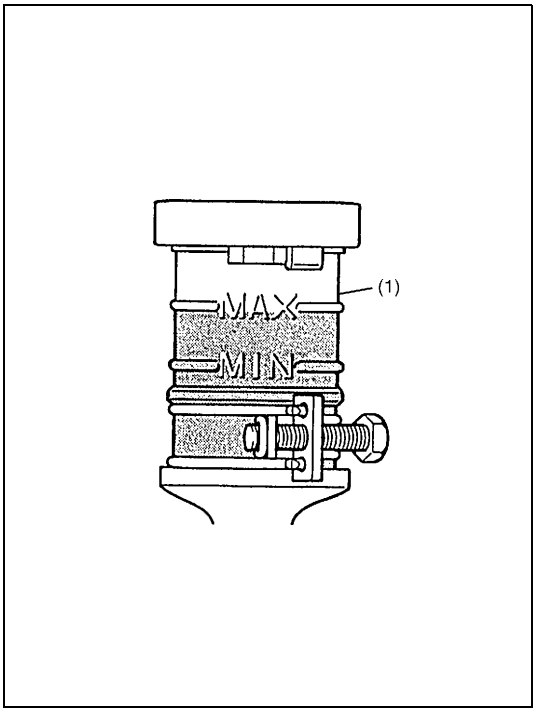
1. Crankshaft	5. Clutch cover	9. Input shaft
2. Flywheel	6. Diaphragm spring	10. Operating cylinder
3. Clutch disc	7. Release bearing	11. Clutch housing
4. Pressure plate	8. Input shaft bearing	12. Release fork

Diagnosis

Condition	Possible Cause	Correction
Slipping	Improper clutch pedal free travel.	Bleed air or replace master cylinder.
	Worn or oily clutch disc facing.	Replace disc.
	Warped disc, pressure plate or flywheel surface.	Replace disc, clutch cover or flywheel.
	Weakened diaphragm spring.	Replace clutch cover.
	Master cylinder piston or seal cup not returning.	Repair master cylinder.
Dragging clutch	Improper clutch pedal free travel.	Bleed air or replace master cylinder.
	Weakened diaphragm spring, or worn spring tip.	Replace clutch cover.
	Rusted input shaft splines.	Lubricate.
	Damaged or worn splines of transmission input shaft.	Replace input shaft.
	Excessively wobbly clutch disc.	Replace disc.
	Clutch facings broken or dirty with oil.	Replace disc.
	Fluid leakage.	Repair or replace.
Clutch vibration	Glazed (glass-like) clutch facings.	Repair or replace disc.
	Clutch facings dirty with oil.	Replace disc.
	Release bearing slides unsmoothly on input shaft bearing retainer.	Lubricate or replace input shaft bearing retainer.
	Wobbly clutch disc, or poor facing contact.	Replace disc.
	Weakened torsion springs in clutch disc.	Replace disc.
	Clutch disc rivets loose.	Replace disc.
	Distorted pressure plate or flywheel surface.	Replace clutch cover or flywheel.
	Weakened or loosened engine mounting bolt or nut.	Retighten or replace mounting.
Noisy clutch	Worn or broken release bearing.	Replace release bearing.
	Input shaft front bearing worn down.	Replace input shaft bearing.
	Excessive rattle of clutch disc hub.	Replace disc.
	Cracked clutch disc.	Replace disc.
	Pressure plate and diaphragm spring rattling.	Replace clutch cover.
Grabbing clutch	Clutch disc facings soaked with oil.	Replace disc.
	Clutch disc facings excessively worn.	Replace disc.
	Rivet heads showing out of facing.	Replace disc.
	Weakened torsion springs.	Replace disc.

On-Vehicle Service

Fluid Inspection

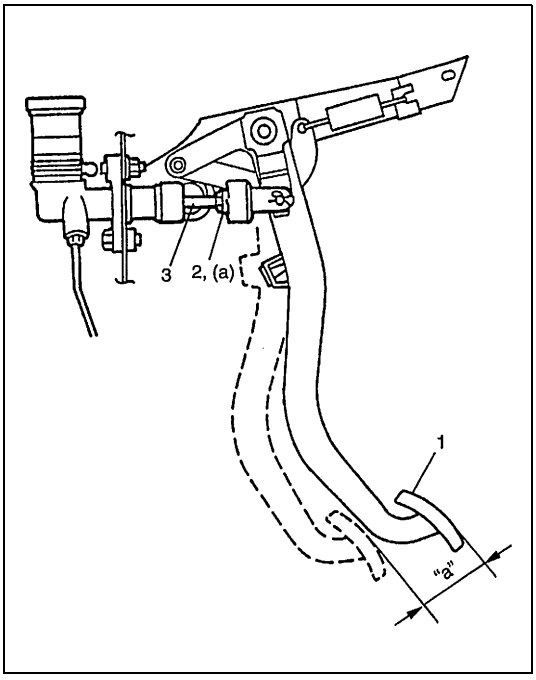


Fluid level should be always between MIN and MAX lines on reservoir (1).
If fluid decreases quickly, check for leakage, repair leaky point, if any, and add fluid up to MAX level.

NOTE:

- **Brake fluid damages painted surface badly. Should it get on painted surface, remove it immediately and clean surface thoroughly.**
- **Do not use shock absorber fluid or any other fluid which contains mineral oil. Do not use container which has been used for mineral oil or which is wet from water. Mineral oil will cause swelling and distortion of rubber parts in hydraulic clutch system and water will mix with brake fluid, lowering fluid boiling point. Keep all fluid containers capped to prevent contamination.**
- **Make sure not to use fluid whose container cap was first opened more than a year ago.**

Clutch Pedal Height



Adjust clutch pedal (1) height by loosening clevis lock nut (2) and turning push rod (3) as shown.

Clutch pedal height is normal if clutch pedal is about 20 mm (0.79 in.) higher than brake pedal.

After adjusting, tighten lock nut to specified torque.

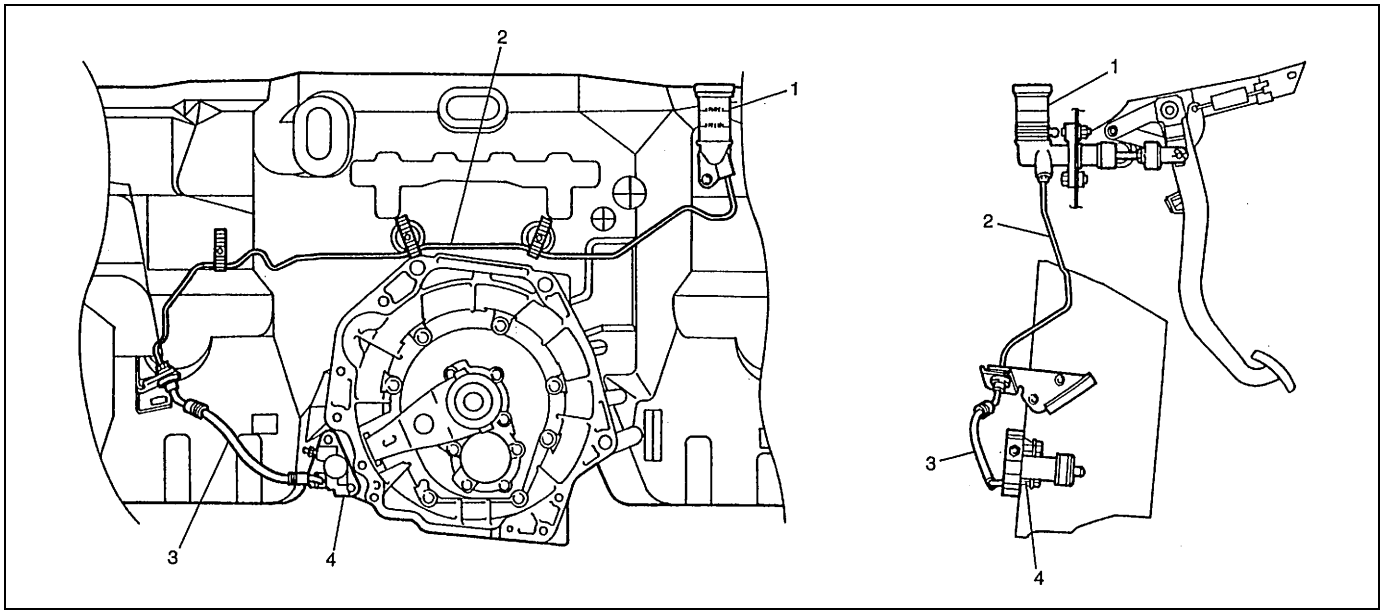
Tightening torque
(a) : 10 N·m (1.0 kg-m, 7.5 lb-ft)

Clutch Pedal Free Travel

Depress clutch pedal (1), stop the moment clutch resistance is felt and measure distance (clutch pedal free travel). Free travel should be within following specification.

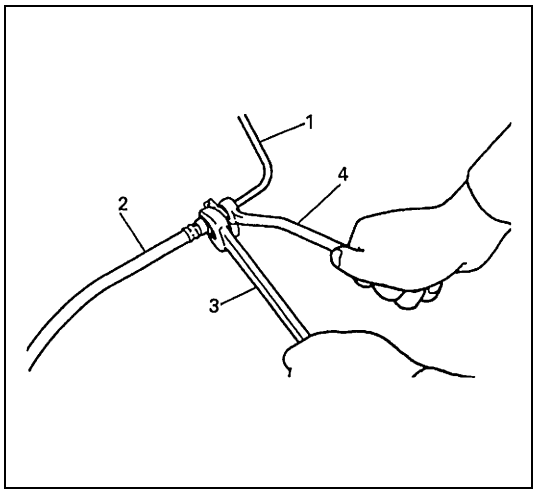
Pedal free travel
"a" : 15 – 25 mm (0.6 – 1.1 in.)

Clutch Fluid Pipe and Hose



1. Clutch master cylinder	2. Clutch pipe	3. Clutch hose	4. Clutch operating cylinder

REMOVAL



NOTE:

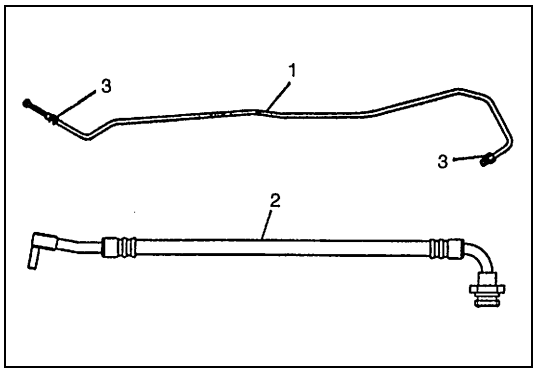
Do not allow fluid to get on painted surface.

1) Remove dust and dirt from each joint of hose (2) and pipe (1) to be disconnected and clean around reservoir cap.
2) Take out fluid with syringe or such.
3) Disconnect fluid pipe from hose.

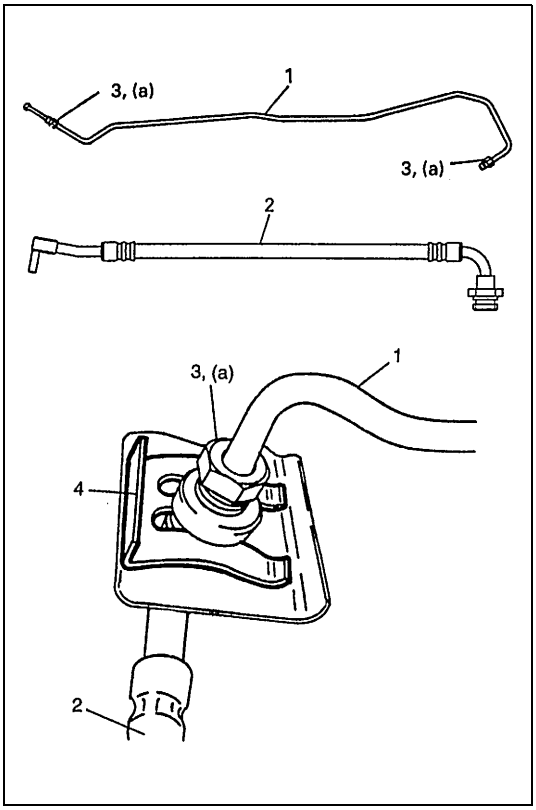
NOTE:

To disconnect pipe (1) from hose (2), separate them by using flare nut wrench (4) and spanner (3) so as not to kink them.

INSPECTION



Check pipe (1) and hose (2) for dent, kink, crack, dirt and dust. Replace if check result is not satisfactory.



INSTALLATION

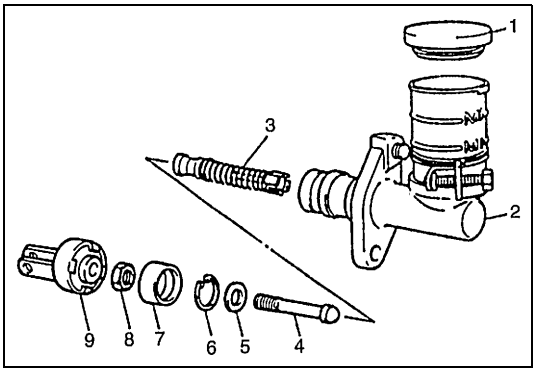
Reverse removal sequence noting following points.
Tighten flare nuts (3) to specified torque.

Tightening torque
(a) : 16 N·m (1.6 kg-m, 11.5 lb-ft)

NOTE:

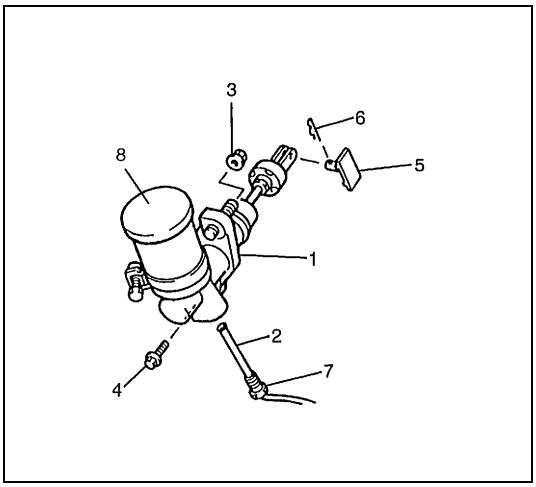
- **For air bleeding of master cylinder alone, it must be removed from vehicle.**
  (For procedures of removal and installation of master cylinder assembly and air bleeding, refer to "Clutch Master Cylinder" section.)
- **Do not allow fluid to get on painted surface.**
- **Do not allow pipe (1) and hose (2) to contact hard against vehicle or other parts.**
- **Install each clamp securely.**
- **Install E-ring (3) securely as shown.**
- **After installation, check clutch pedal free travel and bleed air from system.**
- **Check fluid leakage.**
- **Add fluid close to MAX level of reservoir.**

Clutch Master Cylinder



1. Reservoir cap	6. Circlip
2. Cylinder	7. Boot
3. Piston assembly	8. Lock nut
4. Push rod	9. Clevis
5. Piston stopper	

REMOVAL



1) Clean around reservoir cap (8) and take out fluid with syringe or such.
2) Remove push rod clevis pin (5).
3) Disconnect fluid pipe (2) from master cylinder (1).

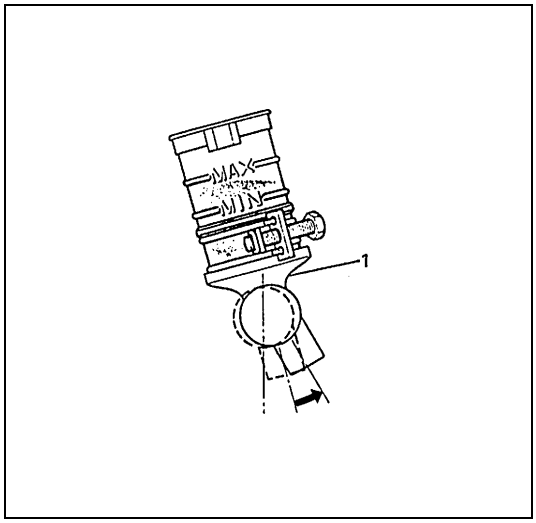
NOTE:

Do not allow fluid to get on painted surfaces.

4) Remove master cylinder attaching nut (3) and bolt (4).
5) Remove master cylinder assembly (1) and gasket.

6. Clip	
7. Flare nut	

INSTALLATION



1) To bleed air from master cylinder (1) itself, tilt it as shown in figure and add fluid into it.

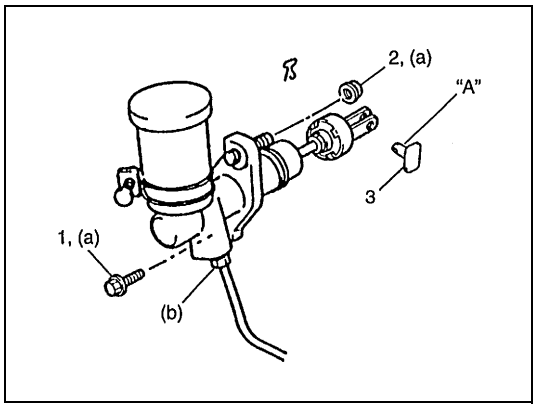
NOTE:

After bleeding air from master cylinder (1), plug pipe hole in it to prevent fluid from spilling out of it till pipe is connected.

2) Install master cylinder assembly (1) and new gasket to body, attaching bolt, nuts and push rod clevis pin.

NOTE:

Do not reuse gasket.



3) Torque attaching bolt (1) and nut (2) to specification.

Tightening torque
(a) : 13 N·m (1.3 kg-m, 9.5 lb-ft)

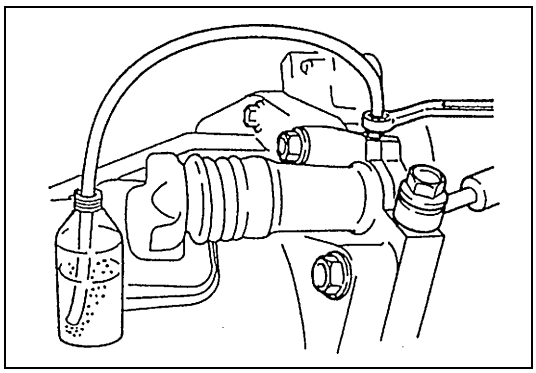
4) Connect fluid pipe and torque flare nut to specification.

Tightening torque
(b) : 16 N·m (1.6 kg-m, 11.5 lb-ft)

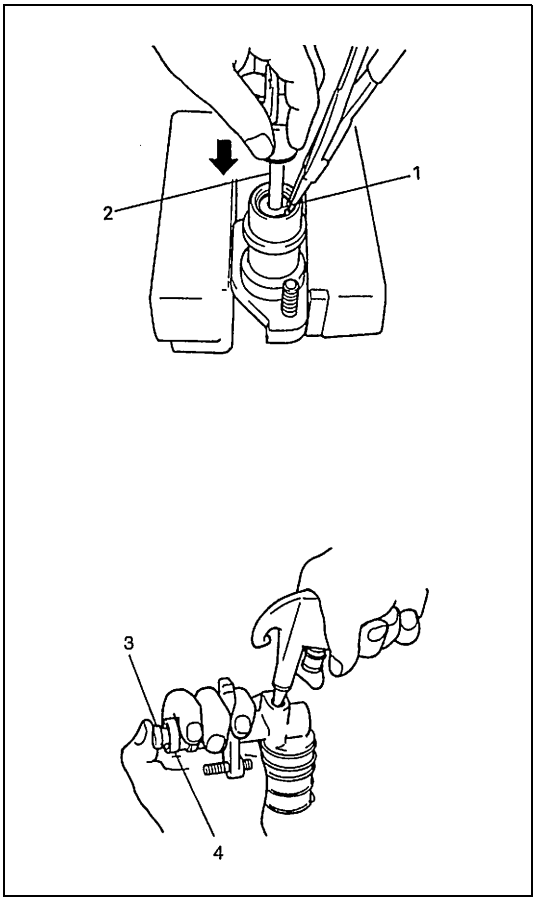
5) Apply grease to clevis pin (3) and install it.

"A" : Grease 99000-25010

6) Fill reservoir with specified brake fluid and check fluid leakage.



7) After installation, bleed air from system and check clutch pedal free travel. Refer to BRAKE section for air bleeding procedure.



DISASSEMBLY

1) Remove boot and then circlip (1) with piston pushed in.
2) Remove push rod (2) and blow compressed air gradually into hole for pipe connection to remove piston assembly (3), using care to prevent it from jumping out.

INSPECTION

Inspect all disassembled parts for wear or damage and replace parts if necessary.

NOTE:

- **Wash disassembled parts with brake fluid.**
- **Do not reuse piston assembly (3) and circlip (1).**

Inspect cylinder bore for scoring or corrosion. It is best to replace corroded cylinder (4). Corrosion can be identified as pits or excessive roughness.

NOTE:

Polishing bore of cylinder (4) with anything abrasive is prohibited, as damage to cylinder bore may occur.

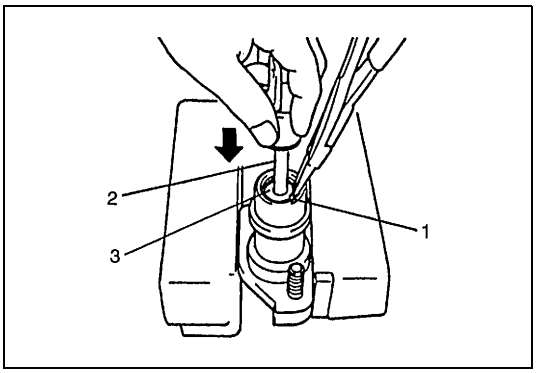
Rinse cylinder (4) in clean brake fluid. Shake excess rinsing fluid from cylinder (4). Do not use a cloth to dry cylinder (4), as lint from cloth cannot be kept away from cylinder bore surfaces.

ASSEMBLY

NOTE:

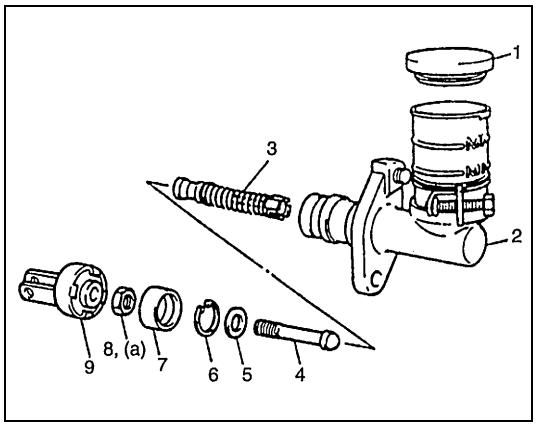
Before installation, wash each part in specified brake fluid.

1) Apply brake fluid to inside of piston assembly and cylinder body.
2) Install piston assembly into cylinder.



3) With piston pushed down, install circlip (1) as shown.
   And install boot.

2.	Push rod
3.	Piston stopper



4) Tighten lock nut (8) to specified torque.

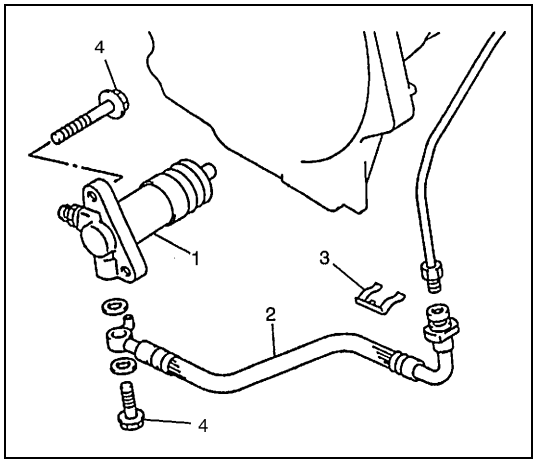
Tightening torque
(a) : 10 N·m (1.0 kg-m, 7.5 lb-ft)

1. Reservoir cap	6. Circlip
2. Cylinder	7. Boot
3. Piston assembly	8. Lock nut
4. Push rod	9. Clevis
5. Piston stopper	

5) For installation of master cylinder to vehicle, refer to “Clutch Master Cylinder” in this section.

Clutch Operation Cylinder

REMOVAL

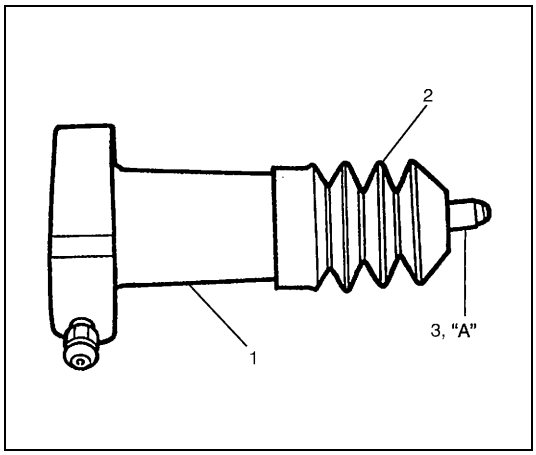


NOTE:
Do not allow fluid to get on painted surfaces.

1) Clean around reservoir cap and take out fluid with syringe or such.
2) Disconnect fluid hose (2) from clutch operating cylinder (1).
3) Remove operating cylinder attaching bolts (4) and clutch operating cylinder (1).

3. E-ring

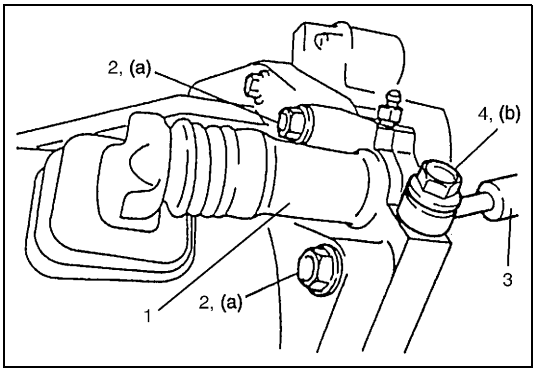
INSTALLATION



1) For air bleeding of master cylinder alone, it must be removed from vehicle.
   For procedures of removal and installation of master cylinder assembly and air bleeding, refer to “Clutch Master Cylinder” in this section.
2) Apply small amount of grease to rod tip (3) of clutch operating cylinder (1).

“A” : Grease 99000-25010

NOTE:
Don’t allow any grease to be on boot (2).



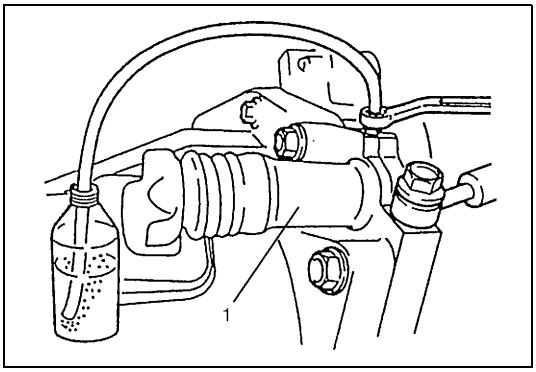
3) Install clutch operating cylinder (1) and torque attaching bolts (2) to specification.

Tightening torque
(a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

4) Connect clutch fluid hose (3) and torque union bolt (4) to specification.

Tightening torque
(b) : 23 N·m (2.3 kg-m, 16.5 lb-ft)

5) Fill reservoir with specified brake fluid and check for fluid leakage.

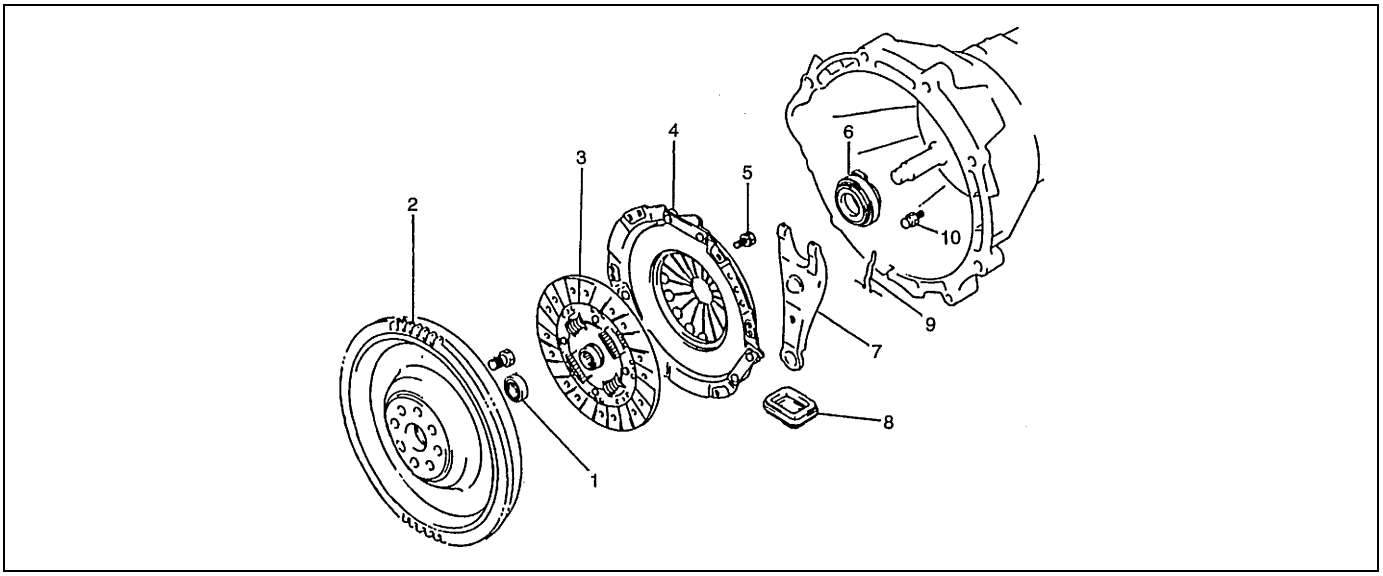


6) Bleed air from system and check clutch pedal free travel. Refer to BRAKE section for air bleeding procedure.

1. Clutch operating cylinder

Unit Pepair

Clutch Cover, Clutch Disc and Flywheel

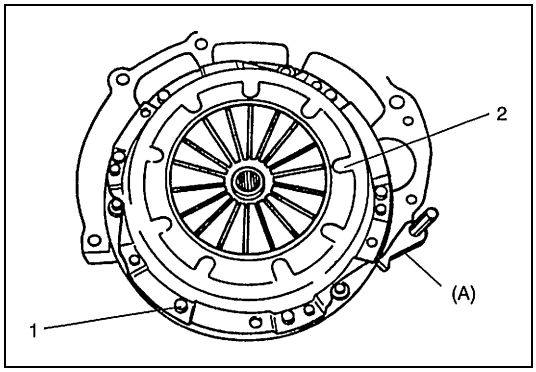


1. Input shaft bearing	3. Clutch disc	5. Bolt	7. Clutch release fork	9. Clip
2. Flywheel	4. Clutch cover	6. Release bearing	8. Boot	10. Clutch release fork support

DISMOUNTING/REMOUNTING

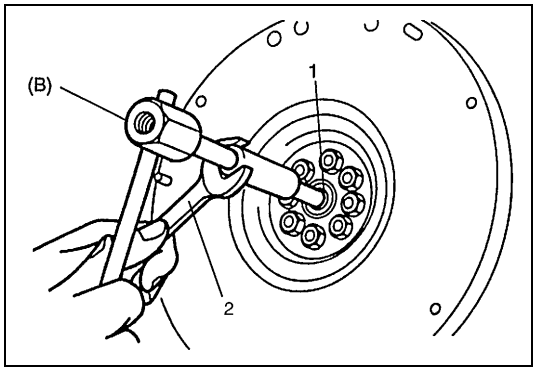
Refer to “Dismounting/Remounting of Transmission Unit” in Section 7A.

REMOVAL



1) Hold flywheel stationary with special tool (A) and remove clutch cover bolts (1), clutch cover (2) and clutch disc.

Special tool
(A) : 09924-17810



2) Pull out input shaft bearing (1) by using special tool (B) and wrench (2).

Special tool
(B) : 09917-58010 (G16 engine)
(B): 09923-73210 (J20, H25 and H27 engines)

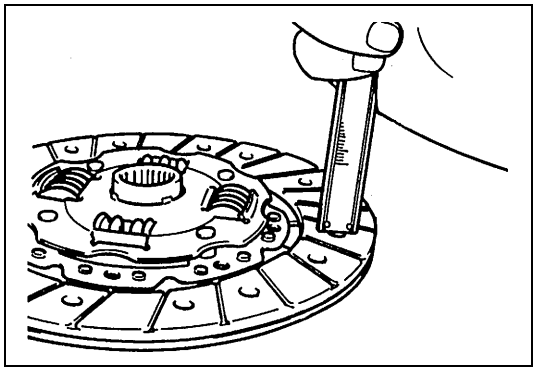
3) Remove release bearing and release fork.

INSPECTION

Input Shaft Bearing and Release Bearing

Check bearing for smooth rotation and replace it if abnormality is found.

Clutch Disc



Measure depth of rivet head depression, i.e. distance between rivet head and facing surface. If depression is found to have reached service limit at any of holes, replace disc assembly.

Rivet head depth
Standard : 1.6 mm (0.06 in.)
Service limit : 0.5 mm (0.02 in.)

Clutch Cover

1) Check diaphragm spring for abnormal wear or damage.
2) Inspect pressure plate for wear or heat spots.
3) If abnormality is found, replace it as assembly. Do not disassemble it into diaphragm and pressure plate.

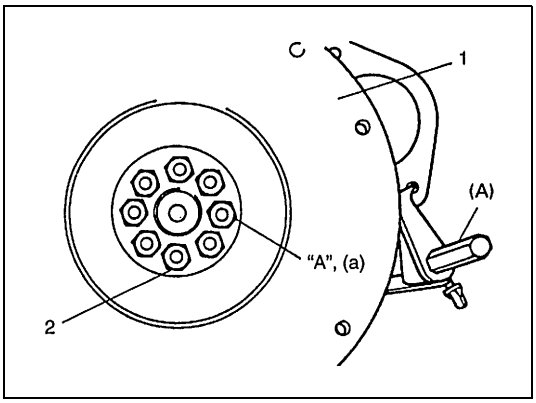
Flywheel

Check surface contacting clutch disc for abnormal wear or heat spots. Replace or repair as required.

INSTALLATION

NOTE:

Before assembling, make sure that flywheel surface and pressure plate surface have been cleaned and dried thoroughly.

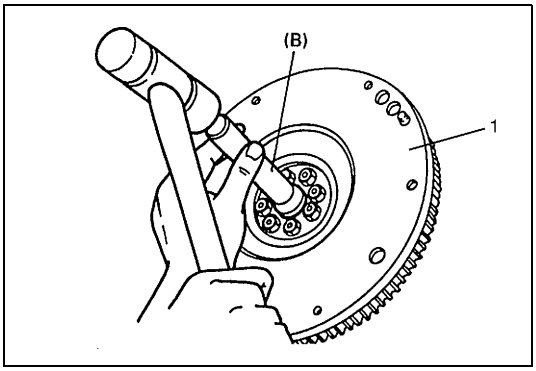


1) Install flywheel (1) to crankshaft and tighten bolts (2) to which sealant is applied to specification.

Special tool
(A) : 09924-17810

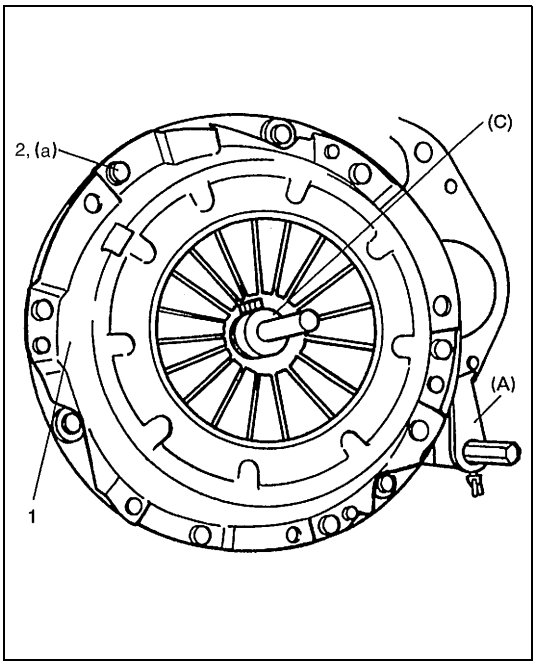
"A" : Sealant 99000-31110

Tightening torque
(a) : 78 N·m (7.8 kg-m, 56.5 lb-ft) (G16 engine)
(a) : 70 N·m (7.0 kg-m, 50.5 lb-ft) (J20, H25 and H27 engines)



2) Using special tool (B), install input shaft bearing to flywheel (1).

Special tool
(B) : 09925-98210



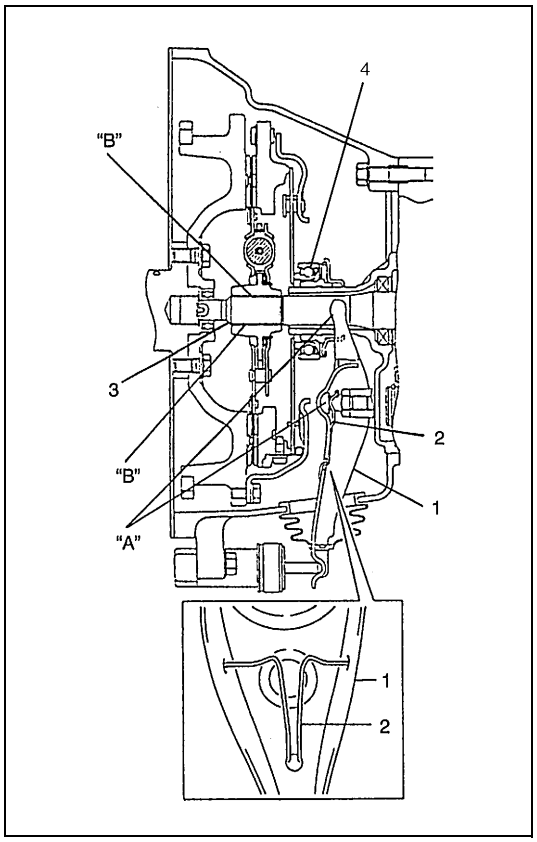
3) Aligning clutch disc to flywheel center by using special tool (C), install clutch cover (1) and bolts (2). Then tighten bolts to specification.

NOTE:

- **While tightening clutch cover bolts (2), compress clutch disc with special tool (C) by hand so that disc centered.**
- **Tighten cover bolts little by little evenly in diagonal order.**

Special tool
(A) : 09924-17811
(C) : 09923-36330 (G16 engine)
(C) : 09923-36320 (J20, H25 and H27 engines)

Tightening torque
(a) : 23 N·m (2.3 kg-m, 16.5 lb-ft)



4) Install clip (2) to release fork (1), and apply grease to release fork (1).
   Then install release fork (1) and release bearing (4) as shown in figure.

"A" : Grease 99000-25010

5) Slightly apply grease to input shaft (3). Then join transmission assembly with engine. Refer to Section 7A.

"B" : Grease 99000-25210

NOTE:

Turn crankshaft with wrench from front while inserting transmission input shaft (3) to clutch disc until splines mesh.

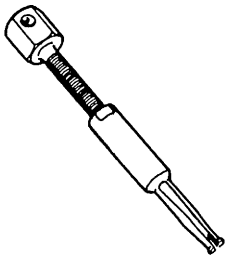
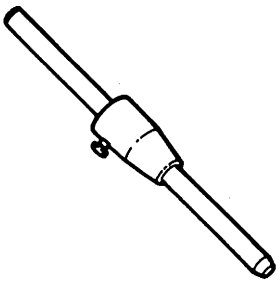
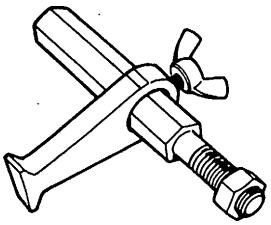
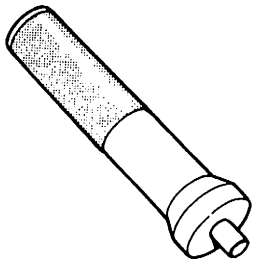
Tigtening Torque Specifications

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Flare nut	16	1.6	11.5
Master cylinder nut	13	1.3	9.5
Lock nut	10	1.0	7.5
Flywheel bolts (G16 engine)	78	7.8	56.5
Flywheel bolts (J20, H25 and H27 engines)	70	7.0	50.5
Clutch cover bolts	23	2.3	16.5
Clutch operating cylinder bolt	50	5.0	36.5
Clutch hose union bolt	23	2.3	16.5

Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	• Clutch master cylinder clevis pin.
		• Release fork.
		• Push rod tip of clutch operating cylinder.
	SUZUKI SUPER GREASE I (99000-25210)	Input shaft spline front end.
Clutch fluid (Brake fluid)	DOT3 or SAE J1703	• Clutch reservoir.
		• Clutch master cylinder.
		• Clutch operating cylinder.
Sealant	SUZUKI BOND No.1215 (99000-31110)	Flywheel bolts

Special Tool

			
09917-58010 (G16 engine) 09923-73210 (J20, H25 and H27 engines) Bearing remover	09923-36330 (G16 engine) 09923-36320 (J20, H25 and H27 engines) Clutch center guide	09924-17811 Flywheel holder	09925-98210 Input shaft bearing installer

SECTION 7D

TRANSFER

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General Description

WARNING:

For towing the vehicle for the purpose of repair or the like, follow the towing instructions in Owner's Manual.

The aluminum transfer case directly connected to the back of the transmission contains the input gear, counter-shaft & gear, output rear shaft, output low gear and output front shaft (for front drive) connected by way of the hyvo-chain.

The transfer has such a selective mechanism as to enable the shift control lever to make selection of high speed (direct connection with transmission output: main shaft), low speed (speed reduction by input gear, counter gear and output low gear) or neutral by way of the reduction sleeve located between input gear and output low gear, and selection of two-wheel-drive (high speed only) or four-wheel-drive (high or low speed) by way of the front drive clutch sleeve located at the center of the output rear shaft. Also, with a synchronizer installed to the front drive clutch, it is possible to change the drive mode between 2WD (high speed only) and 4WD (high speed only) even while running.

The front drive shift fork has an auxiliary spring to make a smooth shift from 4H to 2H possible.

The case has an oil gutter and a plate at synchronizer to provide proper lubrication even under the strict conditions of use.

Diagnosis

Diagnosis Table

Before attempting to repair the transfer or related components for any reason other than mechanical failure, the condition and possible causes should be identified.
Transfer failures are revealed by shifting difficulties such as excessive shifting effort, gear clash or gear grinding. When any of these conditions occur, the following inspections should be made before disassembling the transfer.

1) Check transfer oil level for insufficient or incorrect oil. Refer to “Transfer and Differential Oil Inspection and Change” in Section 0B “Maintenance and Lubrication”.
2) Check transfer mountings for wear or looseness.
3) Check gearshift control lever for distortion or excessive wear.
   After performing the above inspections, refer to following diagnosis table.

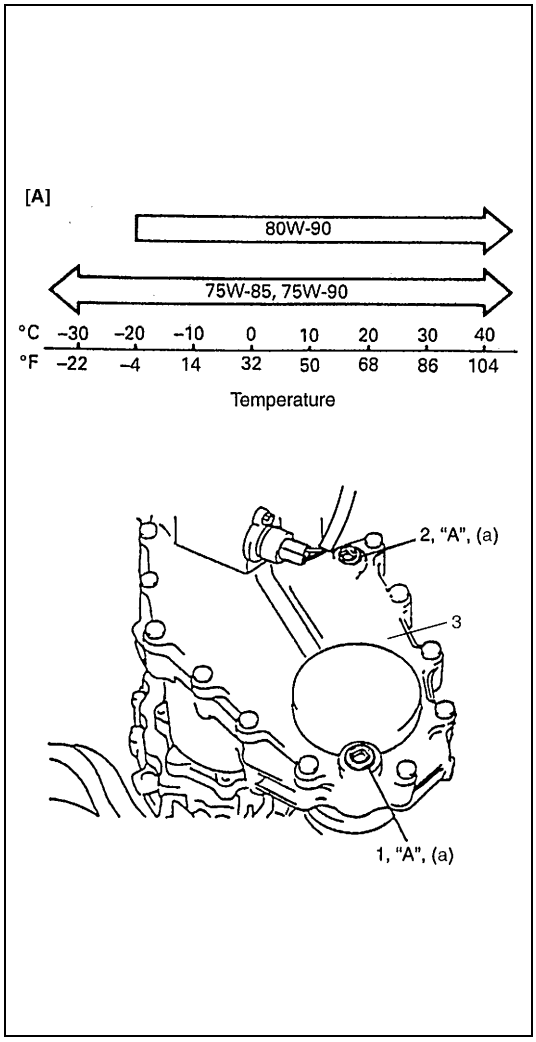
Condition	Possible Cause	Correction
Gear slipping out of mesh	Worn shift fork shaft	Replace.
	Worn shift fork or synchronizer sleeve	Replace.
	Weak or damaged locating spring	Replace.
	Worn bearings on output rear shaft	Replace.
	Worn chamfered tooth on sleeve or gear	Replace sleeve and gear.
	Missing or disengagement of circlip(s)	Repair or replace.
Gears refusing to disengage	Weakened or broken synchronizer spring	Replace.
	Distorted shift shaft or shift fork	Replace.
Hard shifting	Weakened front drive shift shaft spring	Replace.
	Distorted or mispositioned front drive shift shaft circlip and washer	Replace.
	Inadequate or insufficient lubricant	Replenish transfer oil.
	Worn synchronizer ring	Replace.
	Worn chamfered tooth on sleeve or gear	Replace sleeve and gear.
	Distorted shift shaft	Replace.
Noise	Inadequate or insufficient lubricant	Replenish transfer oil.
	Damaged or worn bearing(s)	Replace.
	Damaged or worn gear(s)	Replace.
	Damaged or worn synchronizer ring	Replace.
	Damaged or worn chamfered tooth on sleeve or gear	Replace.

On-Vehicle Service

Transfer Gear Oil

INSPECTION AND CHANGE

1) Before changing or inspecting oil, be sure to stop engine and lift vehicle horizontally.
2) With vehicle lifted up, check oil level and leakage. If leakage exists, correct or repair it.



3) Drain old oil removing drain plug (1).

NOTE:

- **Whenever vehicle is hoisted for any other service work than oil change, also be sure to check for oil leakage and status of breather hoses.**
- **If water or rust is mixed in drained oil, be sure to check breather hose and boot of transfer.**

4) Fill new specified oil as shown by specified amount (up to level hole).

NOTE:

It is highly recommended to use SAE 75W-90 gear oil.

Transfer Gear Oil Specification
Oil grade : API GL-4
Viscosity : SAE 75W-85, 75W-90 or 80W-90

Oil Capacity :
1.7 liters (3.6/3.0 US/Imp. pt)

5) Torque drain plug (1) and level/filler plug (2) as specified below after applying sealant to thread of plugs (1 and 2).

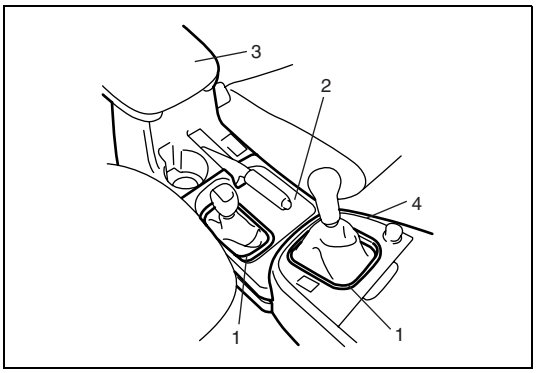
"A" : Sealant 99000-31110

Tightening torque
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

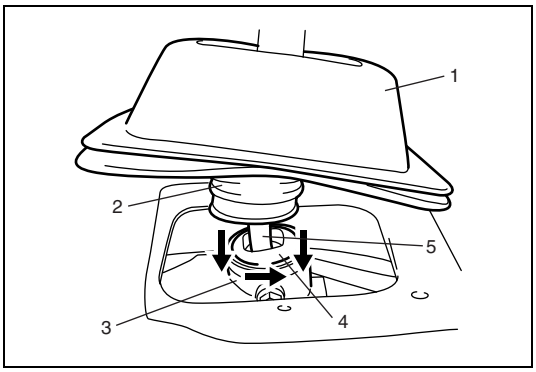
[A] :	Viscosity chart SAE
3.	Transfer case

Transfer Shift Control Lever

REMOVAL



1) Remove covers (1) from center console boxes.
2) Remove rear center console box upper cover (2).
3) Remove 6 screws, and then take off rear center console box.

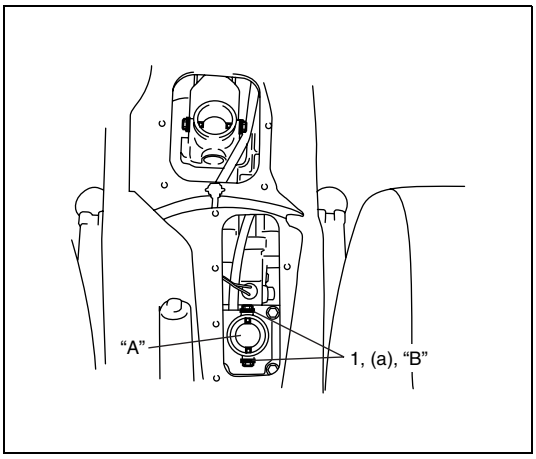


4) Remove boot cover.
5) Lift up boot No. 3 boot No. 2 (1).
6) Remove boot clamp and then lift up boot No. 1 (2) from transmission shift lever case (3).
7) With gear shift control case cover (4) pushed down with fingers, turn it to counter clockwise and take out shift control lever (5).

INSPECTION

- Check transfer shift control lever lower portion and control lever locating sheet for excessive wear.
- Check boot for damage.

Correct or replace if necessary.



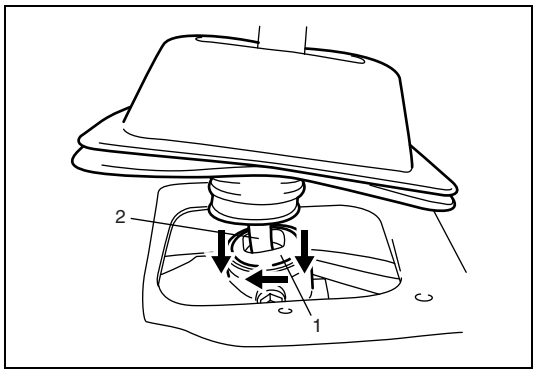
1) If control lever locating bolts (1) are replaced or retightened, torque them as specified below.
   Replacing of control lever locating bolts (1) requires thread lock cement.

"B" : Cement 99000-32110

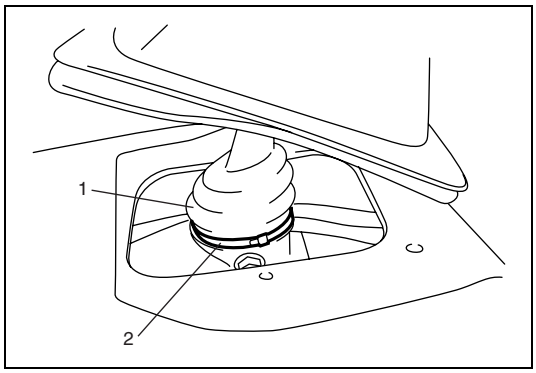
Tightening torque
(a) : 17 N·m (1.7 kg-m, 12.5 lb-ft)

2) Apply grease to pivot portions and seat, then install shift control lever.

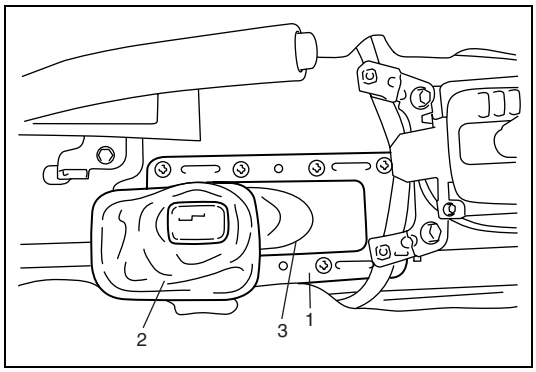
"A" : Grease 99000-25010



3) Set shift control lever (2) to shift lever case.
4) With gear shift control case cover (1) pushed down by hand, turn gear shift control case cover (1) to clockwise.



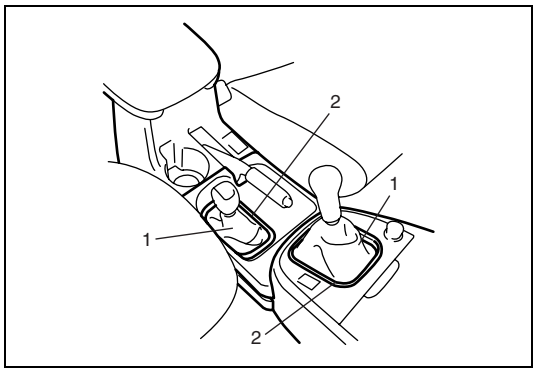
5) Install boot No. 1 (1) from inside of cabin and clamp it with a new clamp (2) securely.



6) Install boot No. 2 (2) with boot cover (3) and console box bracket (1).
7) Install console box.

NOTE:

Be sure that flare end of boot No. 3 is engaged with console box.

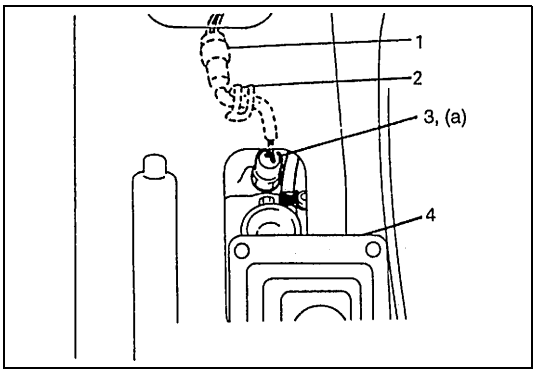


8) After fitting boot No. 3 (1) to covers (2), install covers (2) to center console boxes.

Transfer 4WD Switch

REPLACEMENT

1) Remove console box and lift transmission control lever boots No. 2 and No. 3 referring to "Transmission Shift Control Lever" in Section 7A.



2) Remove transfer control lever boot No. 2 (4), unclamp wiring on transfer case to free it and pull off coupler (1).
3) Replace 4WD switch (3) and connect as it was.

Tightening torque
(a): 20 N·m (2.0 kg-m, 14.5 lb-ft)

2. Clamp

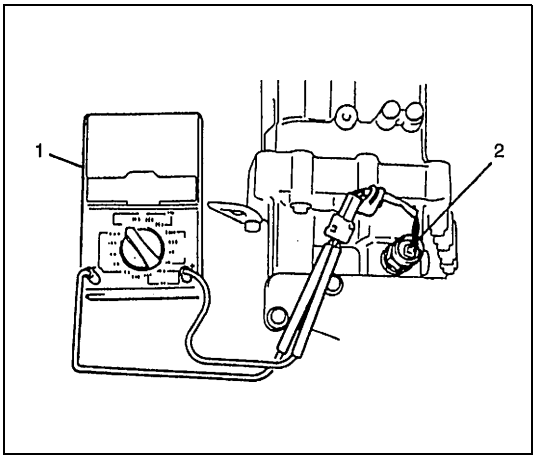
4) Turn ON ignition switch, shift transfer shift control lever to 4WD position and check that indicator lights. Turn OFF switch after checking.

NOTE:

- **When removing and reinstalling switch, use care not to let dust enter transfer box inside.**
- **Make sure to reset clamp for wiring which is located where invisible directly.**
- **It is recommended to work on transfer shift control lever boot No. 1 from underside of vehicle on lift.**

INSPECTION

1) Undo clamp and disconnect coupler of 4WD switch.



2) Function of transfer 4WD switch (2) can be checked as shown in figure.
   There should be conduction at these terminals when shift lever is shifted to 4H, and 4L positions.

Upon completion of check, connect coupler and clamp wiring harness as they were.

NOTE:

When replacing switch, use care not to let dust enter transfer through switch hole.

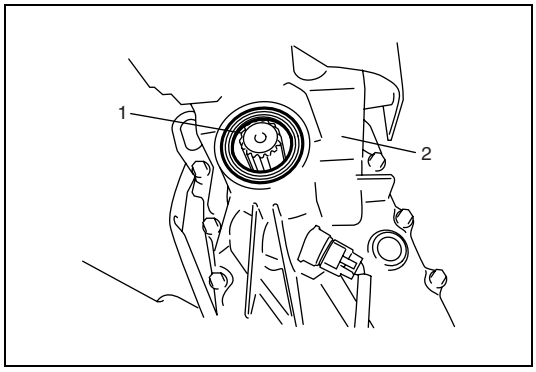
1. Ohmmeter

Transfer Oil Seals

Rear case oil seal

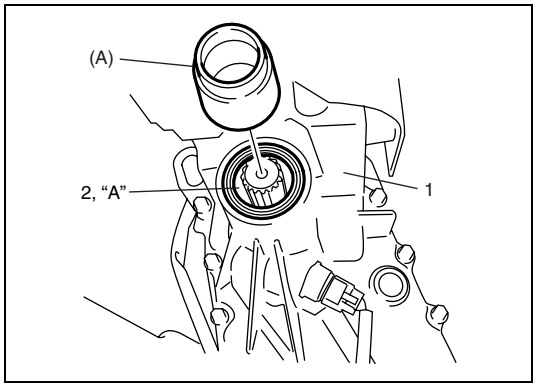
REMOVAL

1) Remove rear propeller shaft referring to “Propeller Shaft” in Section 4B.



2) Using flat head screwdriver or the like, remove oil seal (1) from transfer case (2).

INSTALLATION



1) Using special tool (A) and plastic hammer, pressfit new oil seal (2) up to transfer rear case (1) surface. Be sure to apply grease to oil seal lip.

“A” : Grease 99000-25010

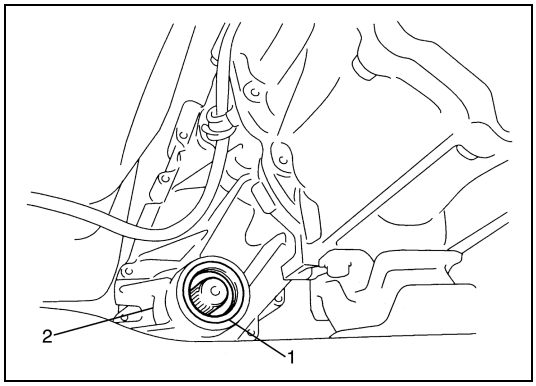
Special tool
(A) : 09940-53111

2) Install rear propeller shaft referring to “Propeller Shaft” in Section 4B.

Center case oil seal (front side)

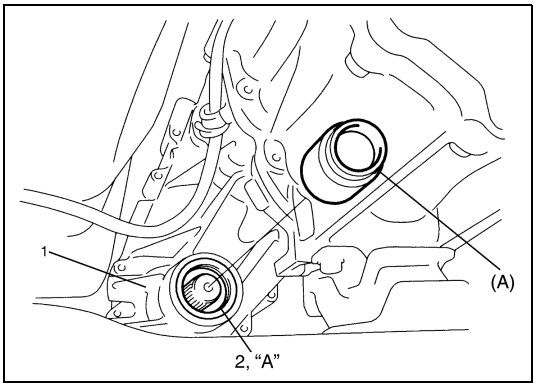
REMOVAL

1) Remove front propeller shaft referring to “Propeller Shaft” in Section 4B.



2) Using flat end rod or the like, remove oil seal (1) from transfer center case (2).

INSTALLATION



1) Using special tool and plastic hammer, press fit new oil seal (2) up to transfer center case (1) surface. Be sure to apply grease to oil seal lip.

"A" : Grease 99000-25010

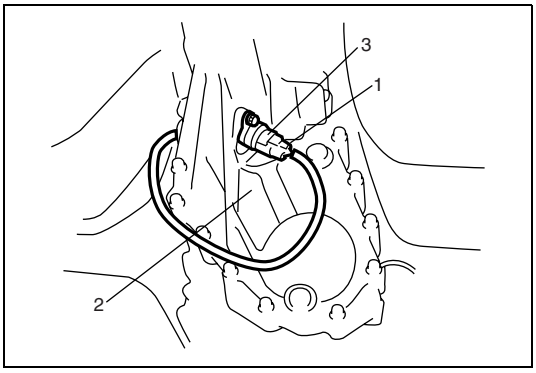
Special tool
(A) : 09940-53111

2) Install propeller shaft referring to "Propeller Shaft" in Section 4B.

Speed Sensor

REMOVAL

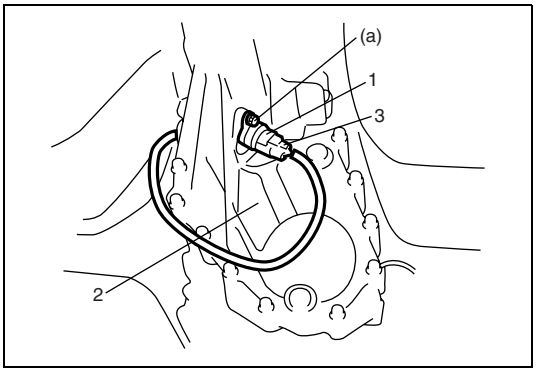
1) Lift up vehicle horizontally or rear up.



2) Disconnect speed sensor coupler (1).
3) Remove bolt and take off speed sensor (3) from transfer (2).

INSTALLATION

1) Make sure that O-ring and speed sensor have not been damaged.
2) Inspect speed sensor for abnormal wear of gear teeth or bend of shaft portion and replace it if necessary.
3) Make sure speed sensor driver gear is smooth rotation.



4) Install speed sensor assembly (1) to transfer (2) and connect coupler as it was.

Tightening torque
(a) : 6 N·m (0.6 kg-m, 4.5 lb-ft)

Engine Rear Mounting

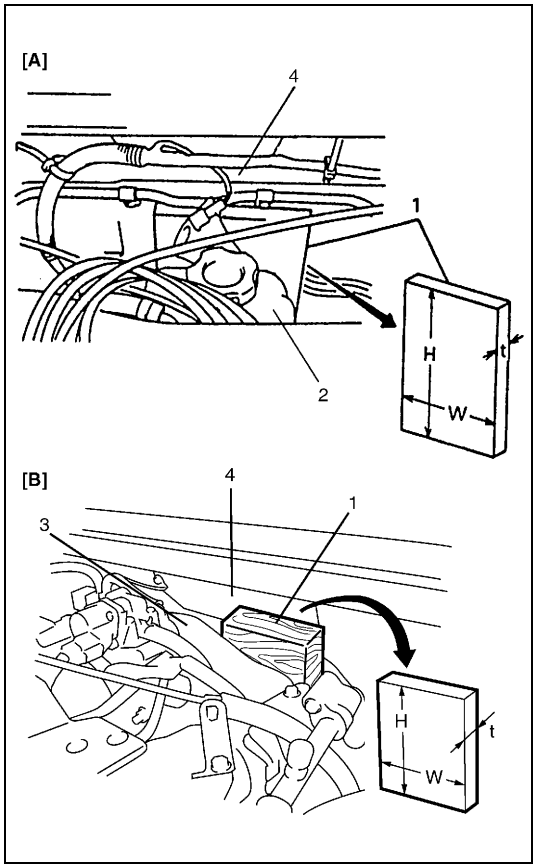
Refer to "Engine Rear Mounting" in Section 7A.

Transfer Assembly

Dismounting and remounting of transfer and transmission together as a unit is described in Section 7A for Manual Transmission or 7B1 for Automatic Transmission, but it is also possible to dismount and remount transfer assembly by itself as described below.

Dismounting

In Engine Room



1) Disconnect negative (–) cable from battery.
2) Place wood block (1) between engine (2) or intake manifold (3) and dash panel (4) so that it serves as stopper when engine, transmission and transfer unit hangs down as rear mounting member is removed.

CAUTION:

Make sure to use wood block to prevent contact which may occur between dash panel and CMP sensor case (G16), CMP sensor (J20) or intake manifold (H25 and H27), and fan and shroud.

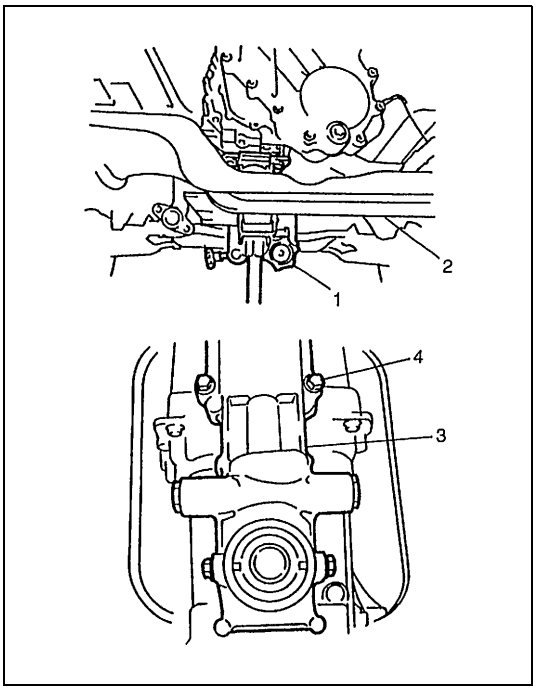
[A] :	For G16 and J20 engine models
[B] :	For H25 and H27 engine models
t :	45 mm (1.8 in.)
H :	200 mm (8 in.)
W :	100 – 150 mm (4 – 6 in.)

In Cabin

1) Remove console box.
2) Remove transmission shift control lever referring to “Transmission Shift Control Lever” in Section 7A.
3) Remove transfer shift control lever referring to “Transfer Shift Control Lever” in this section.

On Lift

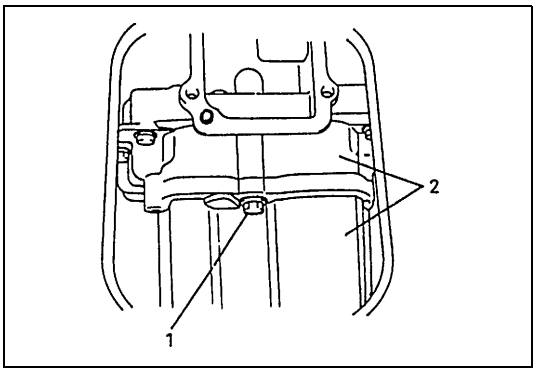
1) Drain transfer oil referring to “Transfer Gear Oil” in this section.
2) Remove front and rear propeller shafts referring to “Propeller Shaft” in Section 4B.
3) Disconnect exhaust No. 2 pipe referring to “Components” in Section 6K.
4) Disconnect speed sensor coupler.



5) Place transmission jack (1) and remove engine rear mounting member (2).
6) Lower transmission jack (1) gradually and check to ensure that wood block serves as stopper between engine or intake manifold and dash panel.
7) Remove bolts (4) for gear shift lever case (3).

8) Pull off breather hose.

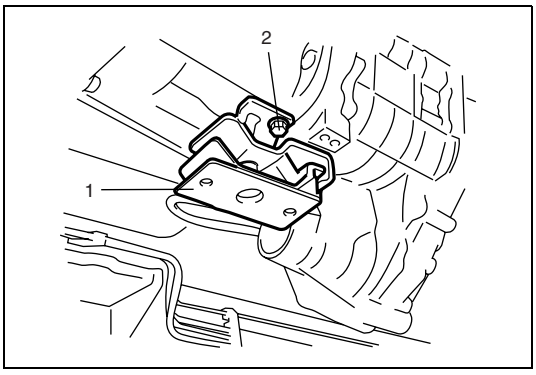
In Cabin



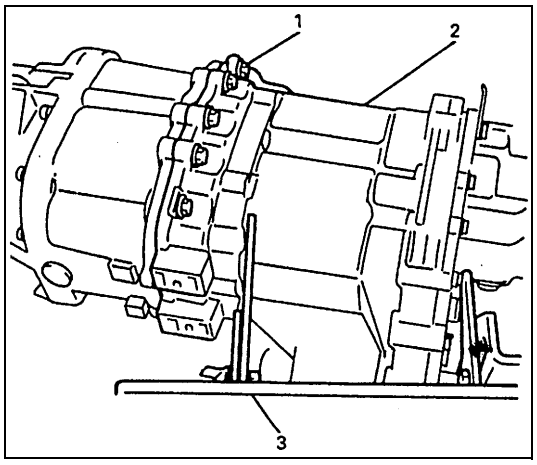
Remove gear shift lever case and then remove transfer rear case bolt (1).

2. Transfer assembly

On Lift



1) Remove transfer mounting (engine rear mounting) (1) by removing bolts (2).



2) Apply transmission jack (3) to transfer assembly (2) to support it.
3) Remove couplers for 4WD/4WD-LOW switches lead.
4) Remove transfer front case bolts (1).
5) With transfer assembly (2) supported with transmission jack (1), slide it rearward and when it is apart from transmission, lower it.

Remounting

For remounting, reverse dismounting procedure noting the following.

- Be sure to use specified torque for tightening.
- Clamp wiring and breather hose securely.
- Clamp shift lever boot securely.
- Fill specified gear oil by specified amount referring to “Transfer Gear Oil” in this section.
- Connect battery and check for function.

Unit Repair

Refer to the same section of “Unit Repair Manual” mentioned in “Foreword” of this manual.

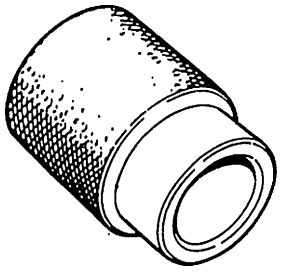
Tightening Torque Specifications

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Oil filler/level and drain plugs	23	2.3	17.0
Transfer shift control lever locating bolts	17	1.7	12.5
4WD switch	20	2.0	14.5
Speed sensor bolt	6	0.6	4.5

Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	• Oil seal lips and O-rings. • Shift control lever.
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 (99000-32110)	• Shift control lever locating bolts.
Sealant	SUZUKI BOND No. 1215 (99000-31110)	• Oil drain and filler/level plugs.

Special Tool



09940-53111
Bearing installer

SECTION 7E

DIFFERENTIAL (FRONT)

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4WD Control System 7E-2
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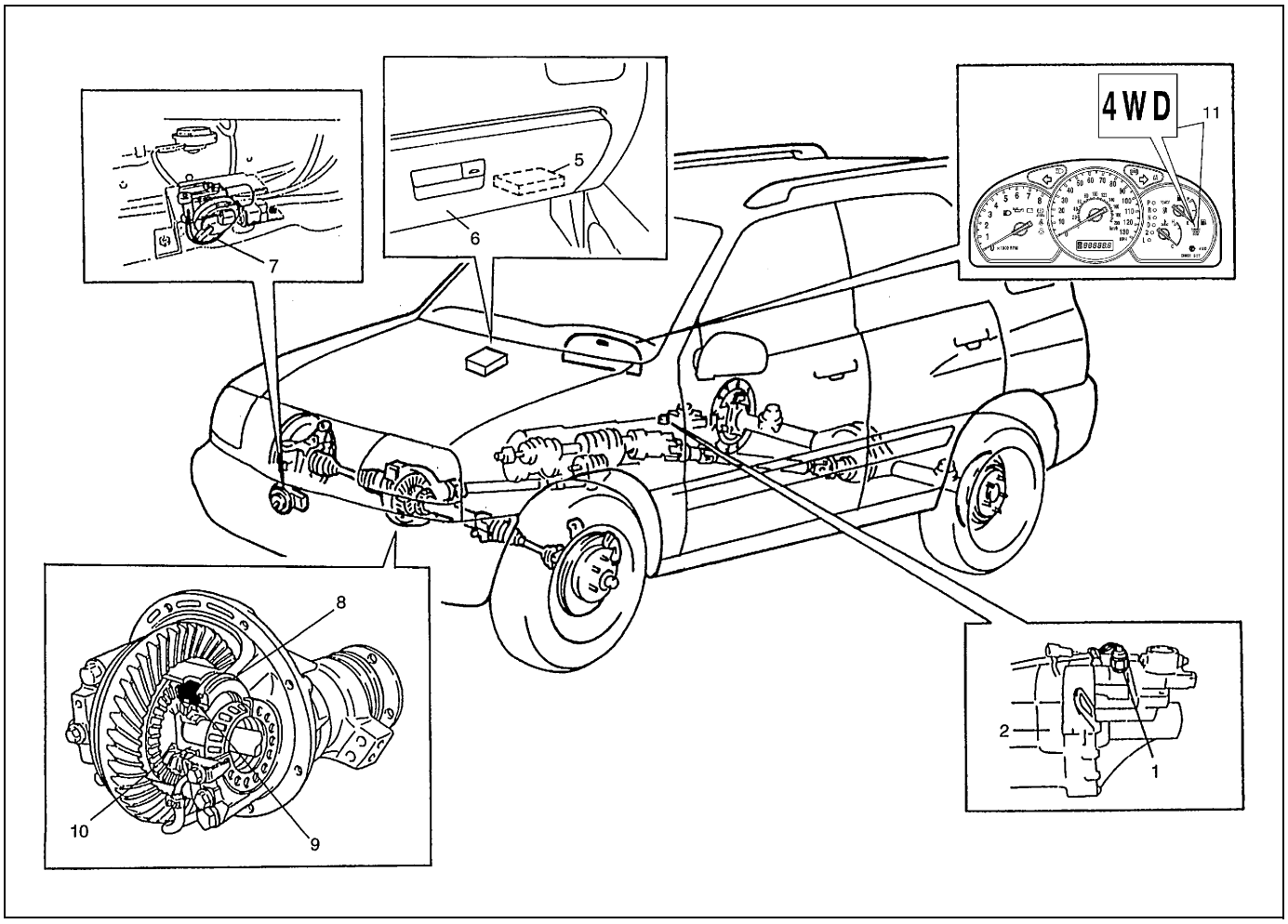
General Description

The differential assembly using a hypoid bevel pinion and gear is installed to the front axle.
4WD control system controls drive force to be transmitted to front axles or not. The reduction ratio varies depending on transmission or engine type.
The differential assembly is decisive in that the drive power is concentrated there. Therefore, use of genuine parts and specified torque is compulsory. Further, because of sliding tooth meshing with high pressure between bevel pinion and gear, it is mandatory to lubricate them by hypoid gear oil.

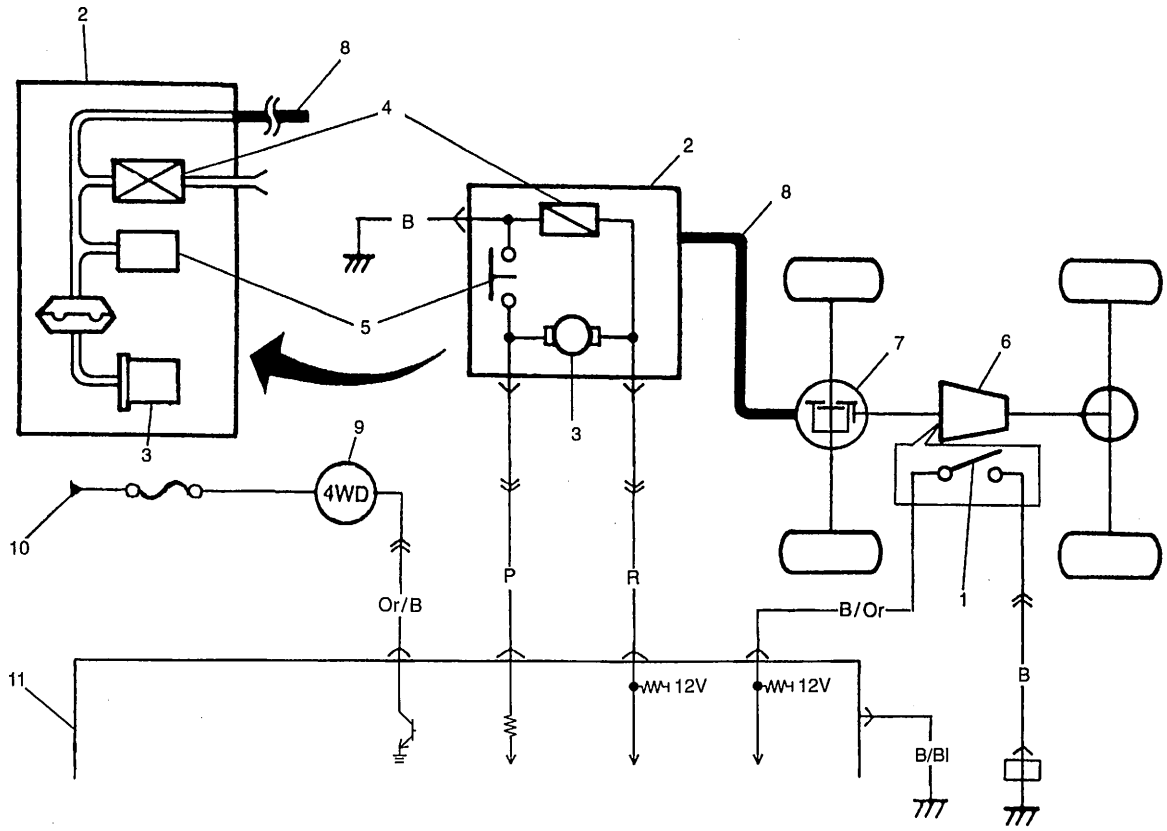
4WD Control System

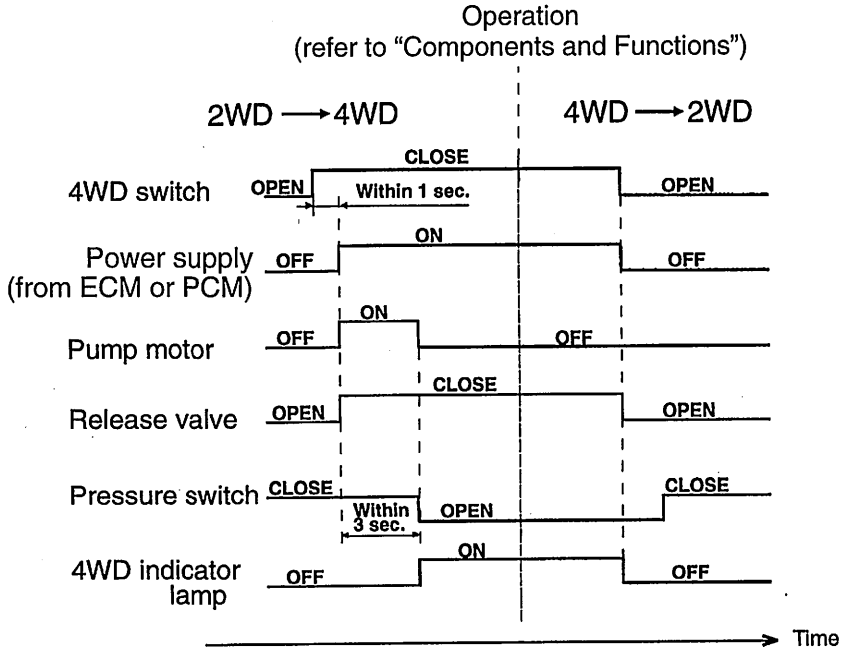
When the 4WD switch is turned ON by shifting the transfer shift lever, ECM (PCM) (G16 and J20 engine models) or 4WD controller (H25 engine model) actuates (energizes) the air pump assembly. Then positive pressure is sent from the air pump assembly to the actuator installed to the differential case and causes the axle lock clutch and the free axle hub in the differential case to be engaged, resulting in the 4WD mode. Only when running in the 4WD mode, front axles are joined to differential case, and they become free when 2WD mode is used (or when transfer shift lever is shifted to N position), thereby reducing the power loss.



1. 4WD switch	4. Blank	7. Air pump assembly	10. Free axle hub
2. Transfer	5. ECM or PCM	8. Actuator	11. 4WD indicator lamp
3. Blank	6. Glove box	9. Axle lock clutch	

System circuit and operation





1. 4WD switch	4. Release valve	7. Front differential	10. To ignition switch
2. Air pump assembly	5. Pressure switch	8. Air hose and pipe	11. ECM or PCM
3. Pump motor	6. Transfer	9. 4WD indicator lamp	

Components and functions

Component	Function
4WD switch	When the transfer shift lever is shifted to 4L or 4H position, this switch turns ON and causes the 4WD control system to turn ON, unless it is shifted to N or 2H within 1 second.
ECM or PCM	When the 4WD switch turns ON [unless it turns OFF within 1 second], this component actuates the pump assembly. If the pressure in the air pump assembly fails to increase higher than the set level even after the pump motor has run more than 10 seconds, this component stops the motor to protect it.
Air pump assembly • Pump motor • Release valve • Pressure switch	The air pump assembly consists of a pump motor, release valve and a pressure switch. Pump motor : Produces positive pressure which actuates the actuator. Release valve : Closes when transfer shift lever is shifted to 4H or 4L so that the positive pressure is applied to the actuator, and opens when N or 2H to release the pressure to the atmosphere. Pressure switch : Turns ON and OFF depending on the pressure level in the pump assembly (whether higher or lower than the set pressure level). ECM or PCM detects the pressure level through this switch.
Differential case assembly • Free axle hub • Axle lock clutch • Actuator	The free axle hub, axle lock clutch and actuator are installed in the differential left case. The positive pressure produced in the air pump assembly is applied to the actuator which then pushes the axle lock clutch to be engaged with the free axle hub. In this state, the drive force is transmitted to the front axle, resulting in the 4WD mode. When the actuator is free from the positive pressure [when it is under the atmospheric pressure], the axle lock clutch is pushed back by the return spring force and cannot be engaged with the free axle hub, resulting in the 2WD mode.
“4WD” indicator lamp	It lights up when 4WD control system is in the 4WD mode.

Diagnosis

Diagnosis Table

Differential assembly

Condition	Possible Cause	Correction
Gear noise	Deteriorated or water mixed lubricant	Repair and replenish
	Inadequate or insufficient lubricant	Repair and replenish
	Maladjusted backlash between bevel pinion and gear	Adjust
	Improper tooth contact in the mesh between bevel pinion and gear	Adjust or replace
	Loose bevel gear securing bolts	Replace or retighten
	Damaged side gear(s) or side pinion(s)	Replace
Bearing noise	(Constant noise) Deteriorated or water mixed lubricant	Repair and replenish
	(Constant noise) Inadequate or insufficient lubricant	Repair and replenish
	(Noise while coasting) Damaged bearing(s) of bevel pinion	Replace
	(Noise while turning) Damaged diff. side bearing(s) or axle bearing(s)	Replace
Oil leakage	Worn or damaged oil seal	Replace
	Excessive oil	Adjust oil level
	Loose differential carrier bolts	Replace or retighten
2WD/4WD switching error	Defective actuator	Replace
	Abnormality in 4WD control system	Inspect referring to “4WD Control System Diagnostic Flow Table”.

4WD control system diagnostic flow table

Before performing the trouble diagnosis, check that the transfer and front differential are in good condition and there is no air leakage from air hoses and the actuator. Refer to “On-Vehicle Service” in this section for air leakage.

[NOTES ON SYSTEM CIRCUIT INSPECTION]

- Be sure to read "Precautions for Electrical Circuit Service" in Section 0A before circuit inspection and observe what is written there.
- For system circuit, refer to the figure of “General Description” in this section.
- For terminal arrangement, refer to “4WD Control Circuit Inspection” in this section.

Step	Action	Yes	No
1	Turn ON ignition switch (but engine at stop) and check malfunction indicator lamp. Does lamp light up?	Go to step 2.	A trouble has occurred at some place. Repair it referring to “Malfunction Indicator Lamp (“Check Engine” Lamp) Check” of Section 6.

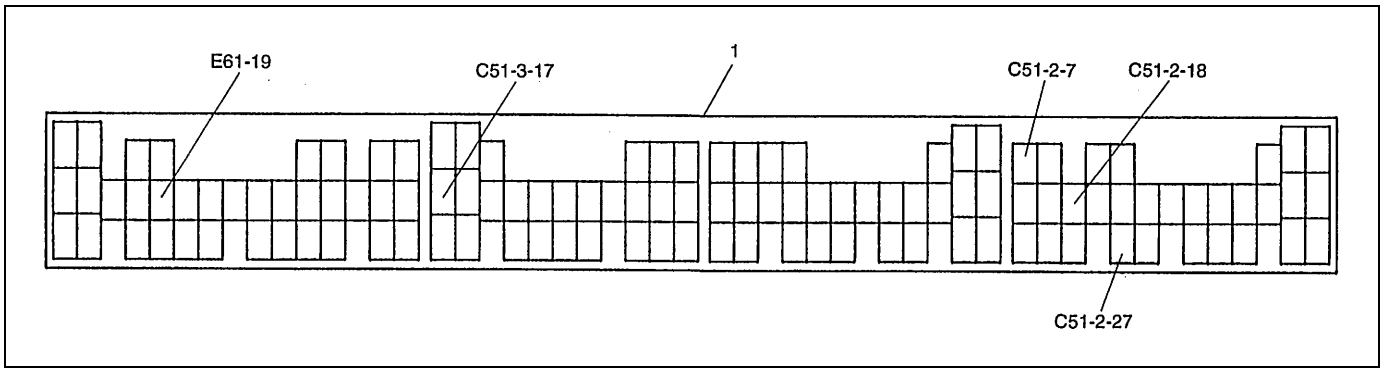
Step	Action	Yes	No
2	Check 4WD switch circuit. Turn ignition switch ON and check that voltage between terminal C51-2-18 and terminal C51-3-17 (ground) for G16/J20 (terminal C51-1-11 and terminal C51-3-26 (ground) for H25) is as follows. • When transfer shift lever is in N or 2H : 10 – 14 V • When transfer shift lever is in 4L or 4H : 0 – 1 V Is the check result satisfactory?	Go to step 3.	Check 4WD switch (refer to Section 7A), "B/Or" and "B" circuits of 4WD switch. If OK, substitute a known-good ECM (PCM) and recheck.
3	Check power supply. 1) Turn ignition switch ON. 2) Check voltage between C51-2-7 and C51-3-17 (ground) for G16/J20 (C51-1-15 and C51-3-26 (ground) for H25). The check results should be as follows. • When transfer shift lever is in N or 2H : 0 – 1 V • When transfer shift lever is in 4L or 4H : 10 – 14 V Is the check result satisfactory?	Go to step 4.	Check "R" circuit. If it is OK, substitute a known-good ECM (PCM) and recheck.
4	Check air pump assembly circuit. 1) Check for proper connection to air pump assembly at all terminals. 2) Turn ignition switch ON. 3) Check voltage between C51-2-27 and C51-3-17 (ground) for G16/J20 (C51-1-18 and C51-3-26 (ground) for H25). The check result should be as follows. • When transfer shift lever is in 2H or N : 0 – 1 V • When transfer shift lever is in 4L or 4H (more than 4 seconds after shifted to 4L or 4H) : 10 – 14 V Is the check result satisfactory?	Go to step 5.	Check air pump assembly referring to "On-Vehicle Service", and then "P" circuit. If OK, substitute a known-good ECM (PCM) and recheck.
5	Check 4WD indicator lamp circuit. 1) Turn ignition switch ON. 2) Check voltage between E61-19 and C51-3-17 (ground) for G16/J20 (C51-1-7 and C51-3-26 (ground) for H25). The check result should be as follows. • When transfer shift lever is in 2H or N : 10 – 14 V • When transfer shift lever is in 4L or 4H : 0 – 1 V Is the check result satisfactory?	4WD control system is in good condition.	Check "Or/B" circuit (including indicator lamp and combination meter). If OK, substitute a known-good ECM (PCM) and recheck.

4WD Control Circuit Inspection

Voltage Check [G16 and J20 engine models]

Check for input or output voltage (voltage between each circuit and body ground) of ECM (PCM) with ECM (PCM) connector connected and ignition switch turned ON.

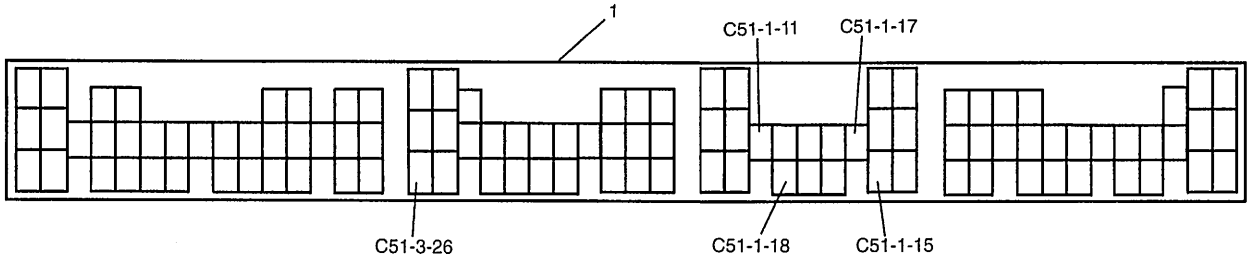
TERMINAL	CIRCUIT	WIRE COLOR	NORMAL VOLTAGE	CONDITION
E61-19	4WD Indicator lamp	Or/B	10 – 14 V	Transfer shift lever : 2H or N
			0 – 1 V	4 seconds after transfer shift lever shifted to 4H or 4L
C51-2-7	Air pump assembly (Pump motor and release valve)	R	0 – 1 V	Transfer shift lever : 2H or N
			10 – 14 V	1 seconds after transfer shift lever shifted to 4H or 4L
C51-2-18	4WD switch	B/Or	10 – 14 V	Transfer shift lever : 2H or N
			0 – 1 V	Transfer shift lever : 4H or 4L
C51-3-17	Ground	B/Bl	0 – 1	–
C51-2-27	Air pump assembly (pressure switch)	P	0 – 1 V	Transfer shift lever : 2H or N
			10 – 14 V	4 seconds after transfer shift lever shifted to 4H or 4L



1. ECM (PCM); viewed from harness side

Voltage Check [H25 engine model]

TERMINAL	CIRCUIT	WIRE COLOR	NORMAL VOLTAGE	CONDITION
C51-1-7	4WD Indicator lamp	Or/B	10 – 14 V	Transfer shift lever : 2H or N
			0 – 1 V	4 seconds after transfer shift lever shifted to 4H or 4L
C51-1-15	Air pump assembly (Pump motor and release valve)	R	0 – 1 V	Transfer shift lever : 2H or N
			10 – 14 V	1 seconds after transfer shift lever shifted to 4H or 4L
C51-1-11	4WD switch	B/Or	10 – 14 V	Transfer shift lever : 2H or N
			0 – 1 V	Transfer shift lever : 4H or 4L
C51-3-26	Ground	B/Bl	0 – 1 V	–
C51-1-18	Air pump assembly (pressure switch)	P	0 – 1 V	Transfer shift lever : 2H or N
			10 – 14 V	4 seconds after transfer shift lever shifted to 4H or 4L



1. ECM (PCM); viewed from harness side

On-Vehicle Service

Maintenance Service

NOTE:

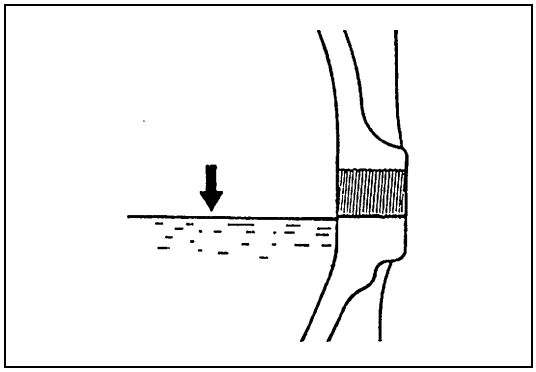
- **When having driven through water, check immediately if water has entered (if so, oil is cloudy). Water mixed oil must be changed at once.**
- **Whenever vehicle is hoisted for any other service work than oil change, also be sure to check for oil leakage and status of breather hoses.**

Gear oil change

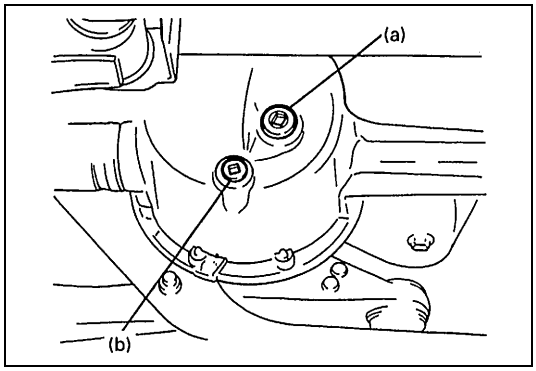
NOTE:

- **Hypoid gear oil must be used for differential.**
- **It is highly recommended to use SAE 75W-90 viscosity.**

1) Before oil change or inspection, be sure to stop engine and lift up vehicle horizontally.



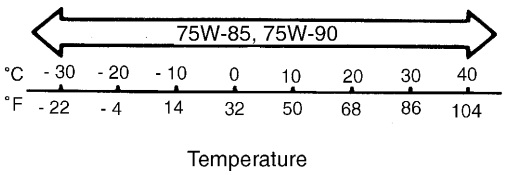
2) Check oil level and existence of leakage. If leakage is found, correct its cause.
3) Drain old oil and pour proper amount of gear oil as specified below (roughly up to level hole).



4) Apply sealant to thread of drain plug (b) and torque plugs to specification.

Sealant 99000-31110

Tightening torque
(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)
(b) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

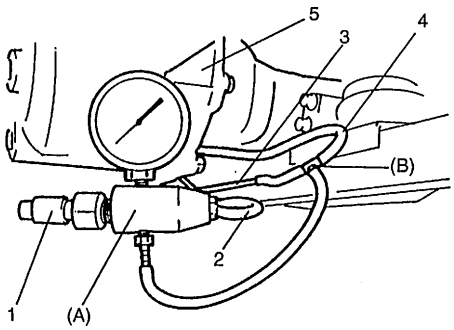


Specified gear oil :
Hypoid gear oil API GL-4
SAE 75W-85, 75W-90
For oil viscosity, refer to left chart.

Oil capacity :
1.0 liters (2.1/1.8 US/Imp. pt)

Inspection

4WD control system



1) Install special tool to air hose connecting between air pump assembly and differential (actuator) as shown in figure. Tighten adjusting screw of special tool as far as it stops. Close air check side opening by using fuel hose as blind plug.

Special tool
(A) : 09918-18110
(B) : 09367-04002

NOTE:
Use care not to bend any part of hose.

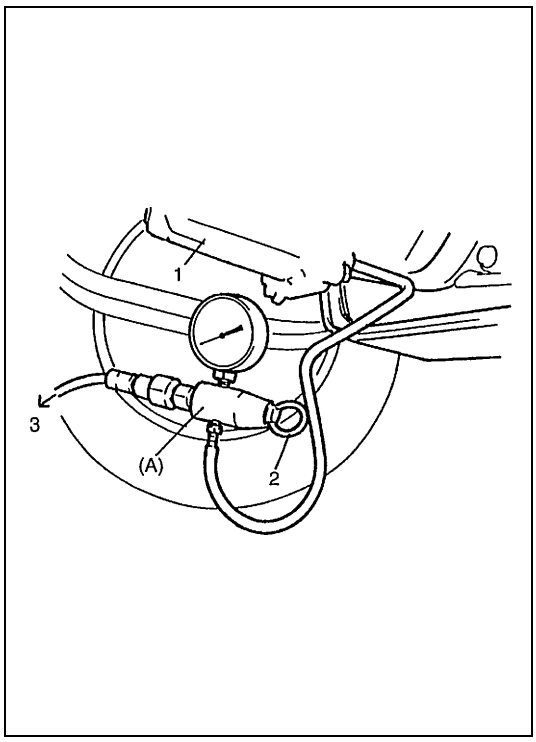
2) Turn ON ignition switch and shift transfer lever from 2H to 4H range.
3) Check that motor starts running (a sound can be heard) within 1 second and it stops when gauge of special tool indicates specified pressure value.
   Check also for air leakage.

Pressure specification :
30.0 – 45.0 kPa (0.30 – 0.45 kg/cm^2, 4.25 – 6.40 psi)

4) Check that pressure value indicated on gauge of special tool drops as soon as transfer lever is shifted to 2H position.
5) Start motor by shifting transfer lever to 4H position again. Loosen adjusting screw to lower pressure value on gauge. Motor should start to run again and stop in about 4 seconds.
6) With the adjusting screw of special tool loosened, shift transfer shift lever to N or 2H position and then 4L or 4H position. Pump motor should stop about 10 seconds after motor starts to run.

1. Plugged hose
2. Adjusting screw
3. Pipe (to air pump assembly)
4. Hose (to differential carrier)
5. Differential housing

Actuator



1) Disconnect air hose from pump assembly and install special tool to air hose as shown in figure. Loosen adjusting screw of special tool.

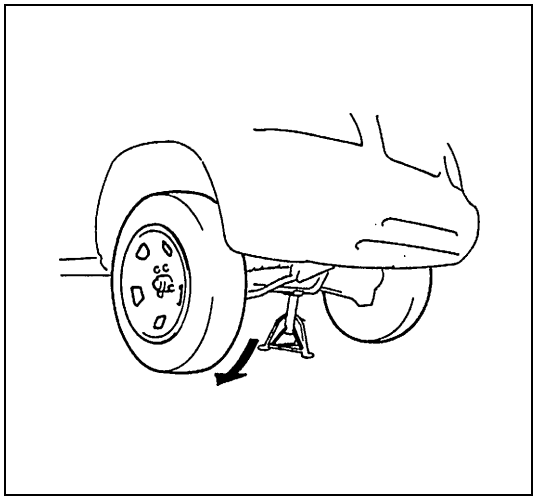
Special tool
(A) : 09918-18110

2) Connect compressor air hose to special tool.
Blow air and turn adjusting screw to obtain specified pressure.

Specified pressure :
30.0 kPa (0.3 kg/cm^2, 4.25 psi)

CAUTION:
Do not apply a pressure exceeding 200 kPa (2.0 kg/cm^2, 28.4 psi) which may cause damage to diaphragm.

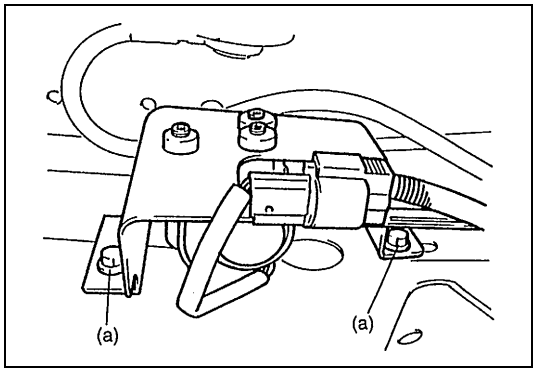
1. Differential housing
2. Adjusting screw
3. To air compressor



3) With the vehicle lifted so that both of the front wheels are off the ground, turn one of the front wheels by hand and check the other wheel, which should act as described below.
- When the pressure from compressor is applied to actuator :
  The other front wheel should turn in the direction opposite to the wheel being turned by hand.
- When the pressure from compressor is not applied to actuator :
  The other front wheel should remain stationary while the wheel pushed by hand is turning.
  If the result is not satisfactory, inspect differential assembly, referring to “Inspection” of Section 7E in “Unit Repair Manual”.

Air pump assembly

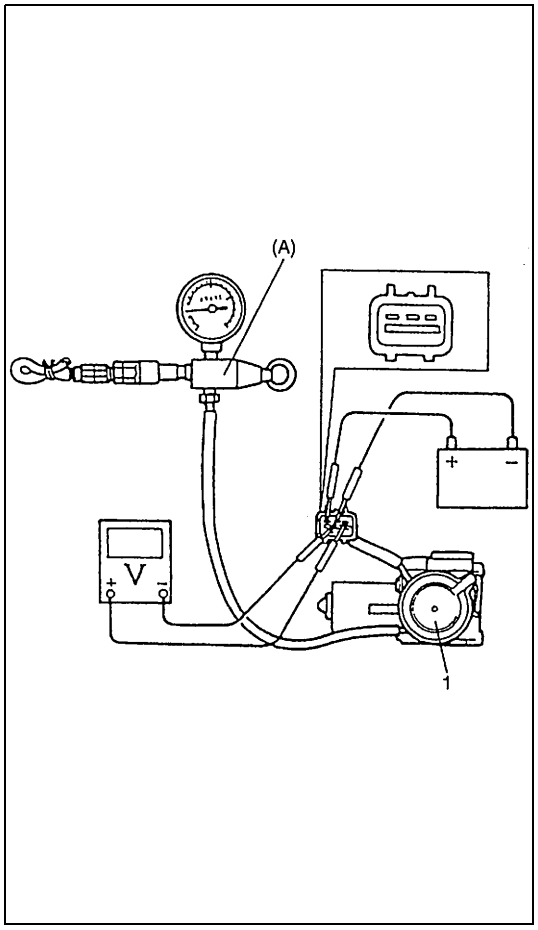
REMOVAL/INSTALLATION



1) Disconnect air hoses and coupler from air pump assembly.
2) Remove pump assembly by removing bolts.
3) Reverse removal procedure for installation.

Tightening torque
(a) : 13 N·m (1.3 kg-m, 9.5 lb-ft)

INSPECTION



1) Install special tool, voltmeter and battery to pump assembly as shown in figure.
2) Tighten adjusting screw of special tool as far as it stops and close its air check side opening by using fuel hose as blind plug.

Special tool
(A) : 09918-18110

3) Check that motor starts to run (a sound can be heard) when battery is connected and it stops when specified pressure is obtained.
   Check also for air leakage.

Specified pressure :
30.0 – 45.0 kPa (0.30 – 0.45 kg/cm^2, 4.25 – 6.40 psi)

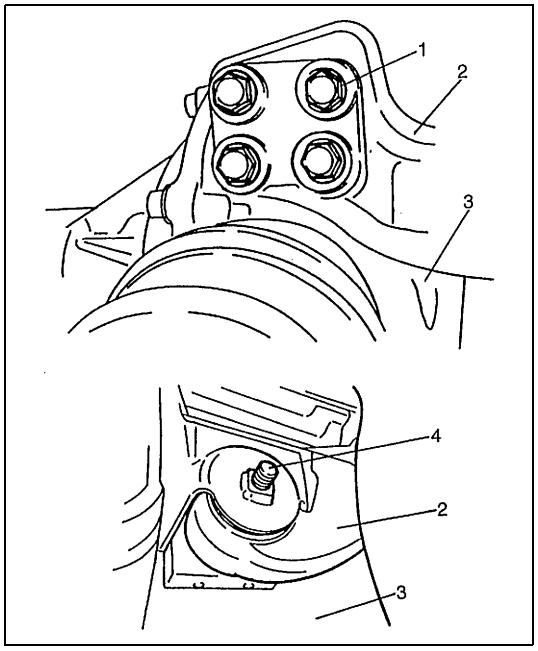
4) Check that value indicated on voltmeter is within specification shown below.
When motor is running : 0 – 1 V
When motor has stopped running : 10 – 14 V

CAUTION:
Do not run motor more than 10 seconds continuously to prevent motor breakage.

1. Pump assembly

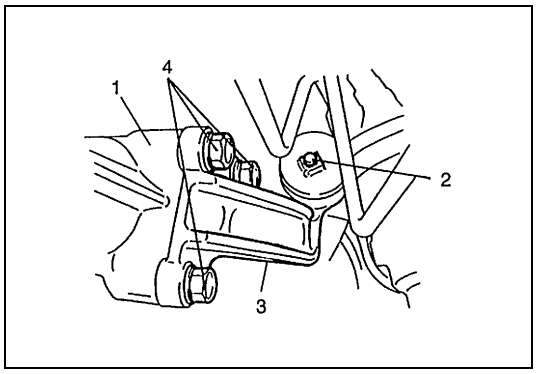
Removal and Installation

Differential mountings



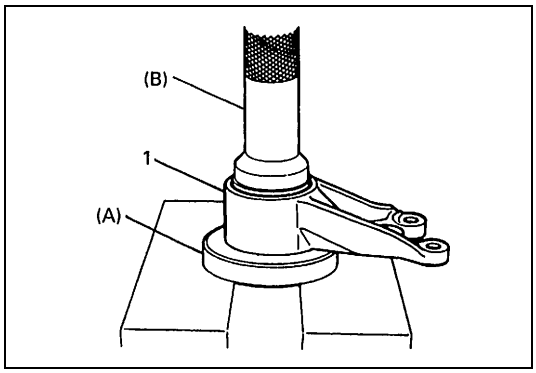
1) Lift up vehicle and turn steering wheel all way to the right.
2) Separate mounting bracket R from differential housing by removing bolts from its lower part.
3) Remove mounting bracket R by removing mounting front bolt from its upper part.

1. Mounting bracket bolt
2. Mounting bracket R
3. Differential housing
4. Mounting front bolt



4) Remove mounting bracket L by removing upper and lower fastening bolts.

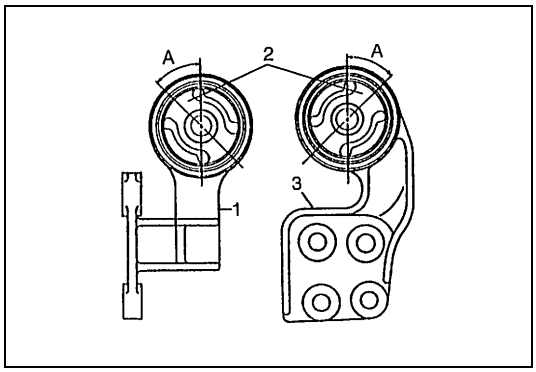
1.	Differential housing
2.	Mounting front bolt
3.	Mounting bracket L
4.	Mounting bracket bolt



5) Check conditions of each bush. If it is damaged or deteriorated, drive it out with special tools and hydraulic press for replacement.

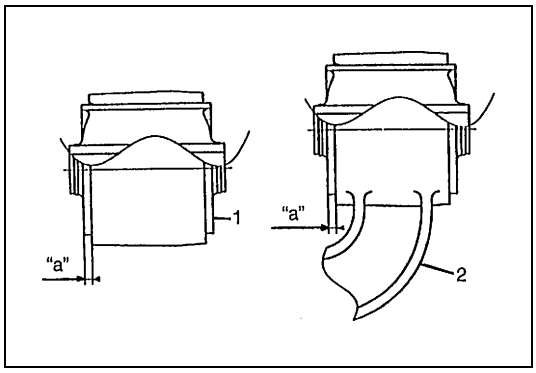
Special tool
(A) : 09951-26010
(B) : 09951-16080

1.	Mounting bracket



6) Position slit in each bush as shown when press-fitting it.

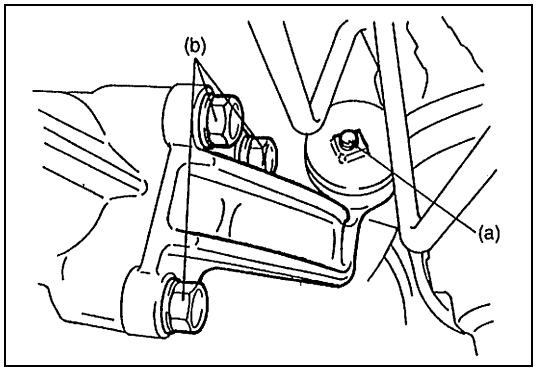
1.	Mounting bracket L
2.	Bush
3.	Mounting bracket R
A :	Slit alignment 45°



7) Position each bush to bracket as shown.

Length "a" : 3.0 mm (0.12 in.)

1.	Mounting bracket R
2.	Mounting bracket L

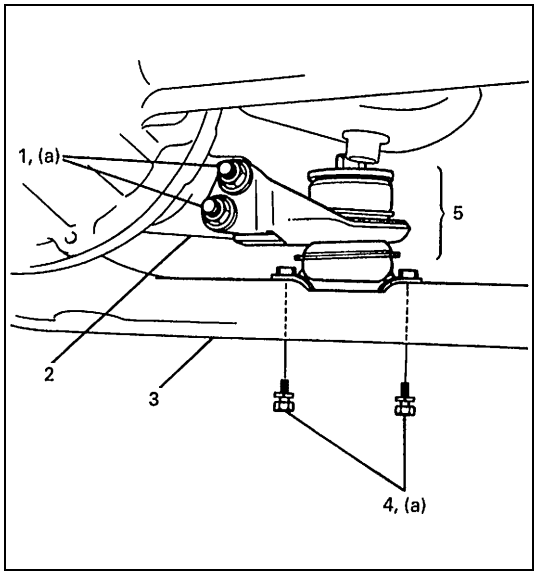


8) Use following torque for reinstallation.

Tightening torque
(a) : 85 N·m (8.5 kg-m, 61.5 lb-ft)
(b) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

REAR MOUNTING (For front differential carrier)

Solid Type

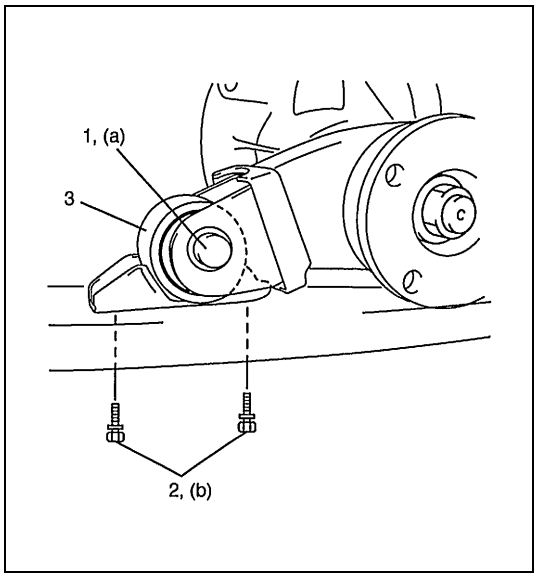


1) Lift up vehicle and remove mounting assembly by removing 2 bolts and nuts from differential carrier side and 2 bolts from cross member side.
2) Check mounting rubber for damage or deterioration and replace as necessary.
3) Use following torque for reinstallation.

Tightening torque
(a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

1.	Rear mounting bracket bolt and nut
2.	Differential carrier
3.	Cross member
4.	Rear mounting bracket bolt
5.	Differential rear mounting assembly

Bush Type



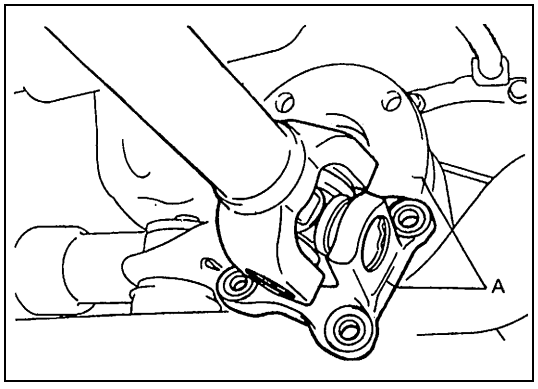
1) Lift up vehicle and remove rear mounting bracket by removing rear mounting bolt and rear mounting bracket bolts.
2) Check mounting rubber for damage or deterioration and replace as necessary.
3) Tighten rear mounting bolts and rear mounting bracket bolts to specified torque for reinstallation.

Tightening torque
Rear mounting bolt (a) : 85 N·m (8.5 kg-m, 61.5 lb-ft)
Rear mounting bracket bolts (b) :
50 N·m (5.0 kg-m, 36.5 lb-ft)

1.	Rear mounting bolt
2.	Rear mounting bracket bolt
3.	Rear mounting bracket

Dismounting

1) Lift up vehicle and drain oil.
2) Disconnect air hose and breather hose from differential housing.

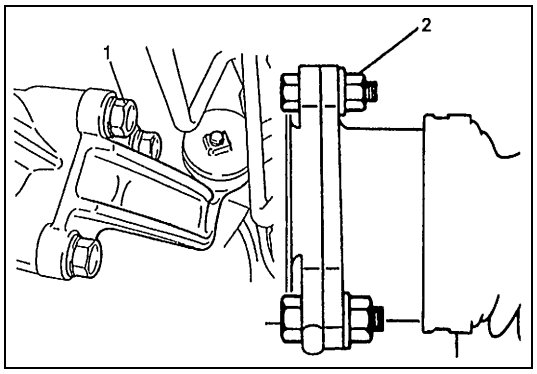


3) Before removing propeller shaft, give match marks on joint flange and propeller shaft as shown.
4) Remove propeller shaft flange by removing its 4 bolts and suspend it with cord or the like.

NOTE:

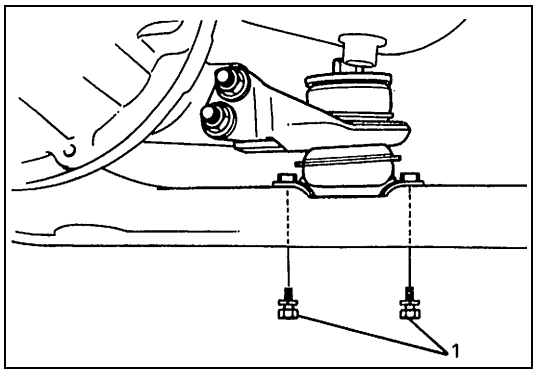
In case of pulling out propeller shaft, transfer oil must be drained before pulling out.

A :	Match marks



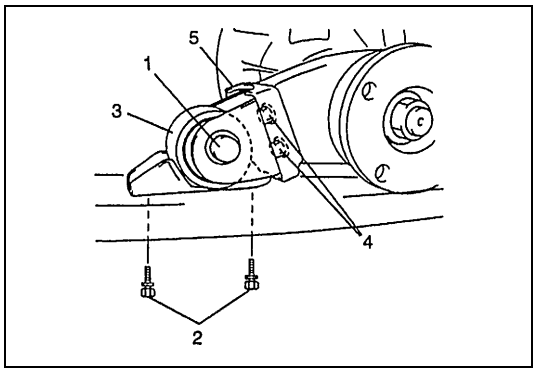
5) Remove 3 bolts for left mounting bracket and 3 bolts for drive shaft flange to set left side of differential free.

1.	Mounting bracket bolt
2.	Flange bolt and nut



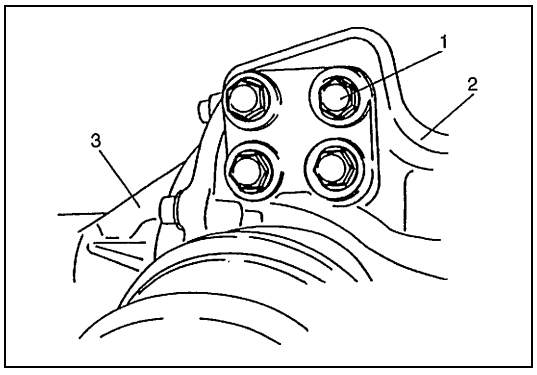
6) Remove 2 bolts from cross member to set differential rear mounting free.

1.	Bolts



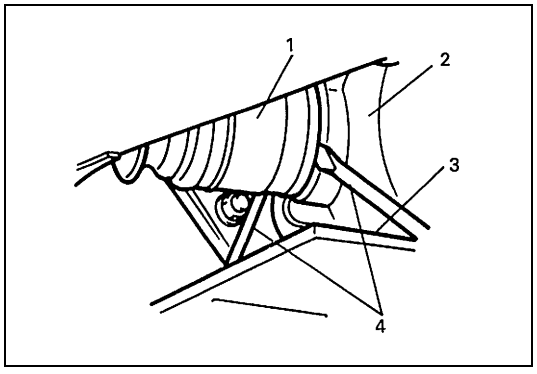
7) For bush type rear mounting, remove bolts and rear mounting bracket.
8) For bush type rear mounting, remove bolts and rear mounting bracket No.2.

1.	Rear mounting bolt
2.	Rear mounting bracket bolt
3.	Rear mounting bracket
4.	Rear mounting bracket No.2 bolt
5.	Rear mounting bracket No.2



9) With differential housing assembly held with transmission jack, remove mounting bolts on right end of housing.

1.	Mounting bracket bolt
2.	Mounting bracket R
3.	Differential housing

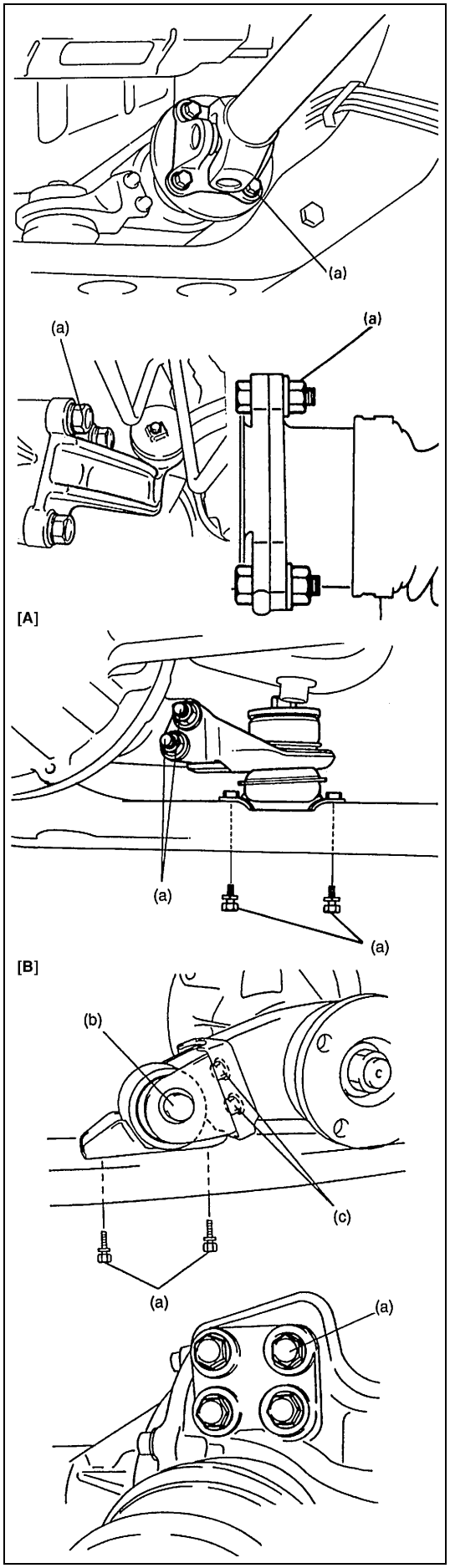


10) Using 2 large screwdrivers as levers, pull out right side drive shaft joint from differential and dismount housing assembly from vehicle.

CAUTION:
During above work, use care not to cause damage to drive shaft boot.

1.	Drive shaft joint R	3.	Transmission jack
2.	Differential housing	4.	Screw driver

Remounting



For remounting, reverse dismounting procedure and use following tightening torque.

Tightening torque
Front drive shaft flange bolts
(a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)
Propeller shaft flange bolts
(a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)
Front mounting bracket bolts
(a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)
Rear mounting bracket bolts
(a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)
Rear mounting bolt
(b) : 85 N·m (8.5 kg-m, 61.5 lb-ft)
Rear mounting bracket No.2 bolts
(c) : 85 N·m (8.5 kg-m, 61.5 lb-ft)

After tightening all fasteners properly, fill hypoid gear oil as specified and check tightening of plugs with specification.

[A] : For Solid Type
[B] : For Bush Type

Unit Repair

Refer to the same section of “Unit Repair Manual” mentioned in FOREWORD of this manual.

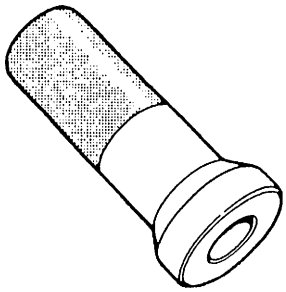
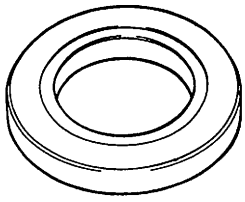
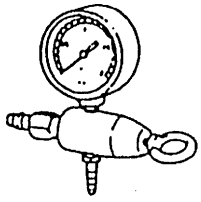
Tightening Torque Specifications

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Differential oil level/filler plug	23	2.3	17.0
Differential oil drain plug	23	2.3	17.0
Front mounting bolts	85	8.5	61.5
Front mounting bracket bolts	50	5.0	36.5
Front drive shaft flange bolts	50	5.0	36.5
Propeller shaft flange bolts	50	5.0	36.5
Pump assembly bolts	13	1.3	9.5
Rear mounting bolt	85	8.5	61.5
Rear mounting bracket bolts	50	5.0	36.5
Rear mounting bracket No.2 bolts	85	8.5	61.5

Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Sealant	SUZUKI BOND NO. 1215 (99000-31110)	Front differential drain plug

Special Tool

		
09951-16080 Bearing installer	09951-26010 Bush remover plate	09918-18110 Air pressure regulator 09367-04002 3-way joint

SECTION 7F

DIFFERENTIAL (REAR)

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Tightening Torque Specifications 7F-5
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General Description

The differential assembly using a hypoid bevel pinion and gear is installed to the rear axle. It is set in the conventional type axle housing.
The reduction ratio and differential case vary depending on transmission or engine type.
The differential assembly is decisive in that the drive power is concentrated there. Therefore, use of genuine parts and specified torque is compulsory. Further, because of sliding tooth meshing with high pressure between bevel pinion and gear, it is mandatory to lubricate them by hypoid gear oil.

Diagnosis

Condition	Possible Cause	Correction
Gear noise	Deteriorated or water mixed lubricant	Repair and replenish
	Inadequate or insufficient lubricant	Repair and replenish
	Maladjusted backlash between bevel pinion and gear	Adjust as prescribed
	Improper tooth contact in the mesh between bevel pinion and gear	Adjust or replace
	Loose bevel gear securing bolts	Replace or retighten
	Damaged side gear(s) or side pinion(s)	Replace
Bearing noise	(Constant noise) Deteriorated or water mixed lubricant	Repair and replenish
	(Constant noise) Inadequate or insufficient lubricant	Repair and replenish
	(Noise while coasting) Damaged bearing(s) of bevel pinion	Replace
	(Noise while turning) Damaged diff. side bearing(s) or axle bearing(s)	Replace
Oil leakage	Clogged breather plug	Clean
	Worn or damaged oil seal	Replace
	Excessive oil	Adjust oil level

On-Vehicle Service

Maintenance Service

NOTE:

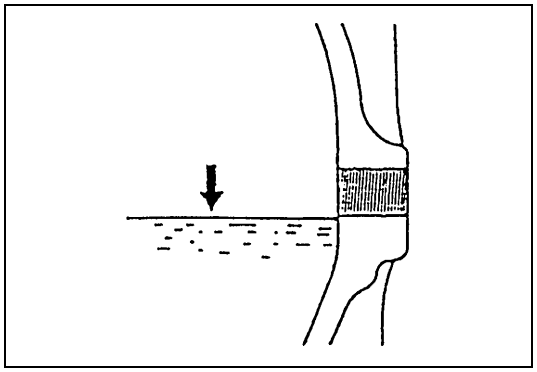
- **When having driven through water, check immediately if water has entered (if so, oil is cloudy). Water mixed oil must be changed at once.**
- **Whenever vehicle is hoisted for any other service work than oil change, also be sure to check for oil leakage and status of breather hoses.**

Changing oil

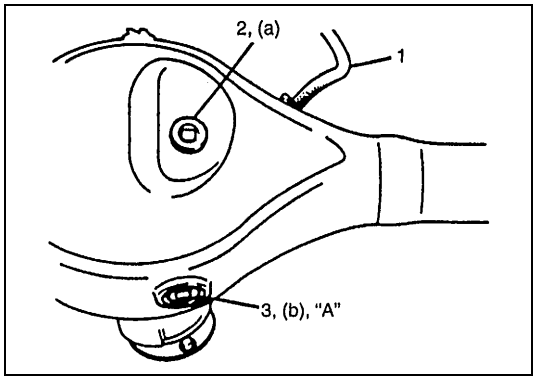
NOTE:

- **Hypoid gear oil must be used for differential.**
- **It is highly recommended to use SAE 80W-90 viscosity.**

1) Before oil change or inspection, be sure to stop engine and lift up vehicle horizontally.



2) Check oil level and existence of leakage. If leakage is found, correct its cause.
3) Drain old oil and pour proper amount of gear oil as specified (roughly up to level hole).

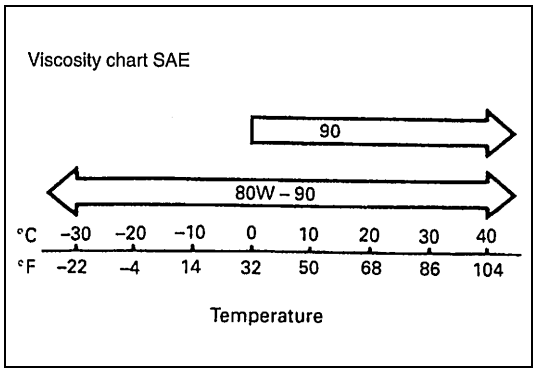


4) Torque drain and level/filler plugs to specification.

"A" : Sealant 99000-31110

Tightening torque
(a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)
(b) : 28 N·m (2.8 kg-m, 20.5 lb-ft)

1.	Breather hose
2.	Oil filler/level plug
3.	Rear drain plug (Apply sealant)

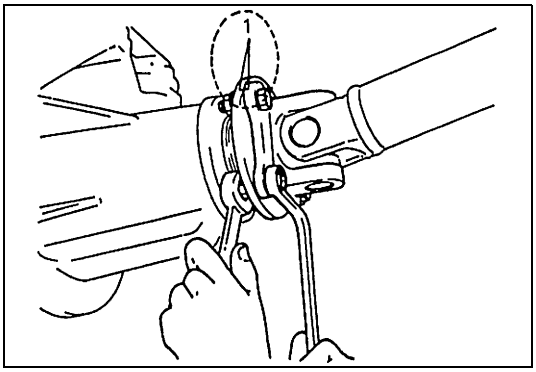


Specified gear oil :
Hypoid gear oil API GL-5 SAE 80W-90 or 90
For oil viscosity, refer to the chart at the left.

Oil capacity : 2.2 liters (4.6/3.9 US/Imp. pt.)

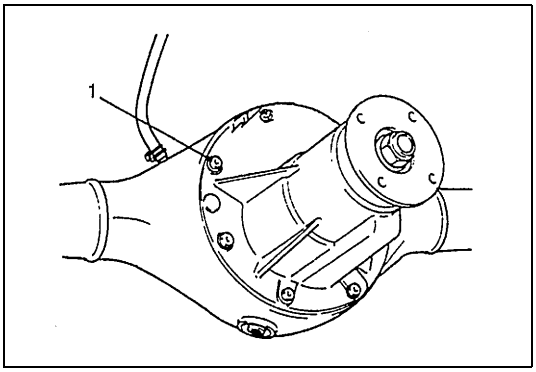
Dismounting

1) Lift up vehicle and drain oil from rear differential housing.
2) Remove rear brake drums and pull out right and left rear axle shafts. (Refer to rear axle shaft removal of Section 3E.)



3) Before removing propeller shaft, give match marks on joint flange and propeller shaft as shown.
4) Remove propeller shaft by removing its 4 flange bolts and nuts.

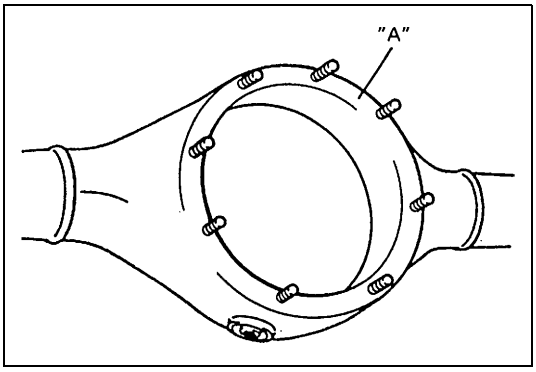
1. Match mark



5) Remove differential assembly by removing its 8 fastening nuts.

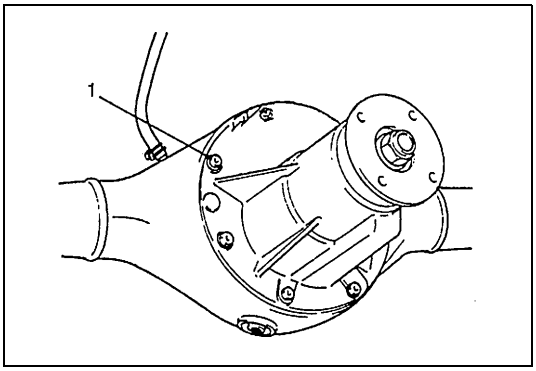
1. Differential to rear axle nut

Remounting



1) Clean mating surfaces of rear axle and differential assembly and apply sealant (Suzuki bond 1215) to axle side evenly.

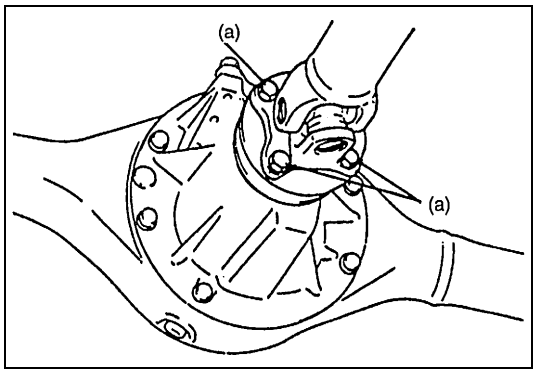
"A" : Sealant 99000-31110



2) Install differential assembly to axle and fix it with nuts tightened to specified torque.

Tightening torque
(a) : 55 N·m (5.5 kg-m, 40.0 lb-ft)

1. Differential to rear axle nut



3) Install propeller shaft to joint flange aligning match marks and torque flange bolts to specification.

Tightening torque
(a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

4) Install right and left rear axle shafts and drums.
(Refer to rear axle installation of Section 3E and rear brake drum installation of Section 5.)
5) Install wheels.
6) Fill hypoid gear oil as specified and tighten plug to specification. Lower lift.

Unit Repair

Refer to the same section of “Unit Repair Manual” mentioned in Foreword of this manual.

Tightening Torque Specifications

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Differential oil filler/level plug	50	5.0	36.5
Differential oil drain plug	28	2.8	20.5
Propeller shaft flange bolts	50	5.0	36.5
Differential carrier nuts	55	5.5	40.0

Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Sealant	SUZUKI BOND No.1215 (99000-31110)	• Rear differential oil drain plug • Mating surface of differential housing • Mating surface of rear axle housing

SECTION 8

BODY ELECTRICAL SYSTEM

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

WIRING SYSTEM (Harnesses, Connectors, Fuses, Relay, Switches, Grounds, System Circuit Diagram) . . . . . Section 8A
LIGHTING SYSTEM . . . . . Section 8B
INSTRUMENTATION AND DRIVER INFORMATION. . . . . Section 8C
WINDOWS, MIRRORS, SECURITY AND LOCKS. . . . . Section 8D
IMMOBILIZER CONTROL SYSTEM . . . . . Section 8F

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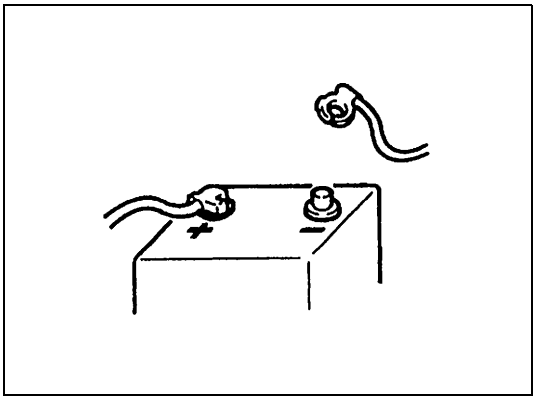
General Description

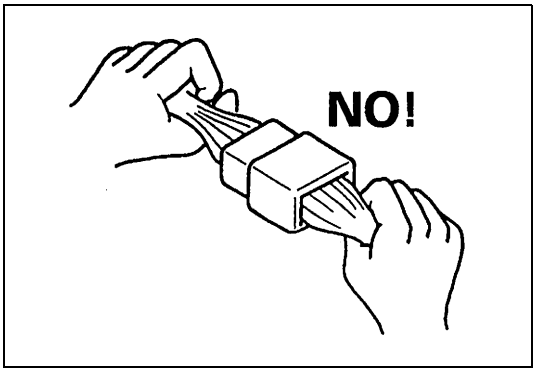
The body electrical components of this vehicle are designed to operate on 12 Volts power supplied by the battery.
The electrical system utilizes negative ground polarity.

Cautions in Servicing

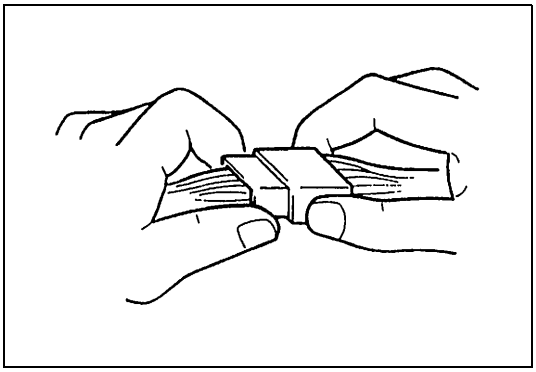
When performing works related to electric systems, observe following cautions for the purpose of protection of electrical parts and prevention of a fire from occurrence.



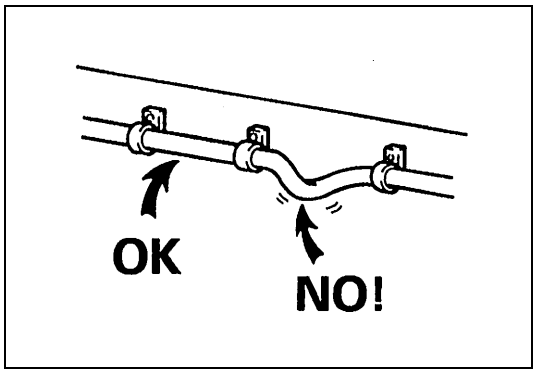
- When removing the battery from the vehicle or disconnecting the cable from the battery terminals for inspection or service works on the electric systems, always confirm first that the ignition switch and all the other switches have been turned OFF. Otherwise, the semi-conductor part may be damaged.
- When disconnecting cables from the battery, be sure to disconnect the one from the negative (–) terminal first and then the other from the positive (+) terminal.
- Reverse the above order when connecting the cables to the battery terminals.



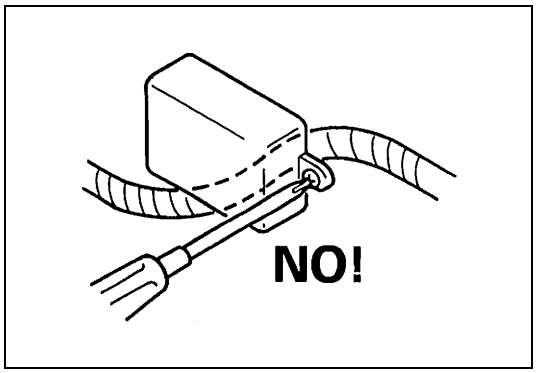
- When disconnecting connectors, never pull the wiring harnesses.
  Unlock the connector lock first and then pull them apart by holding connectors themselves.



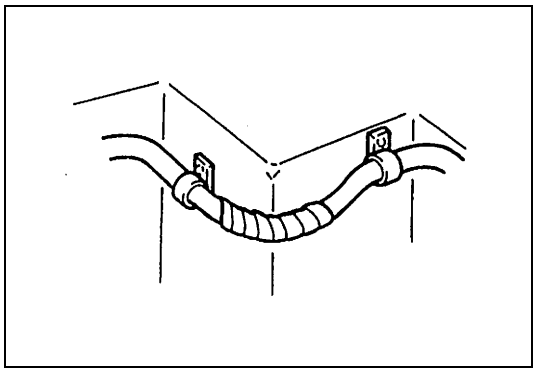
- When connecting connectors, also hold connectors and put them together until they lock securely (a click is heard).



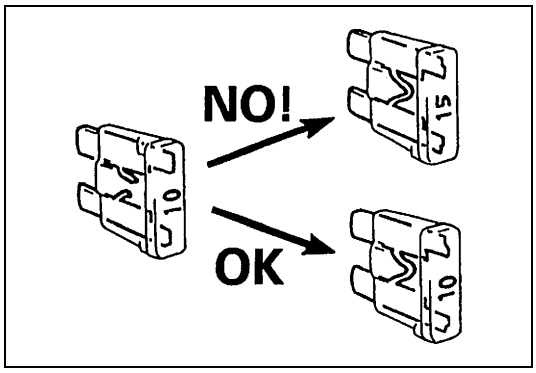
- When installing the wiring harness, fix it with clamps so that no slack is left.



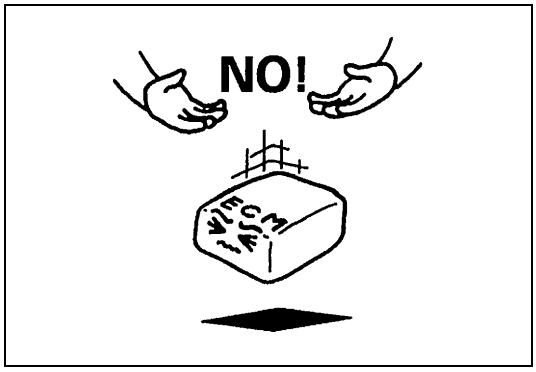
- When installing vehicle parts, be careful so that the wiring harness is not interfered with or caught by any other part.



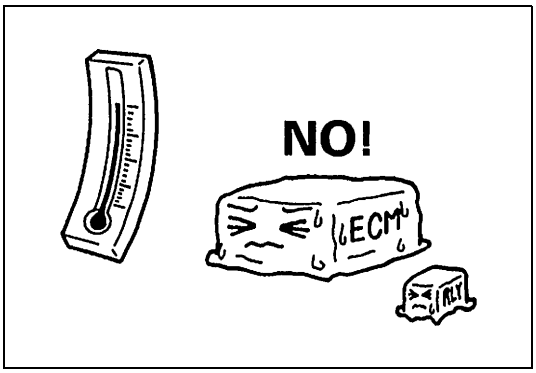
- To avoid damage to the harness, protect its part which may contact against a part forming a sharp angle by winding tape or the like around it.



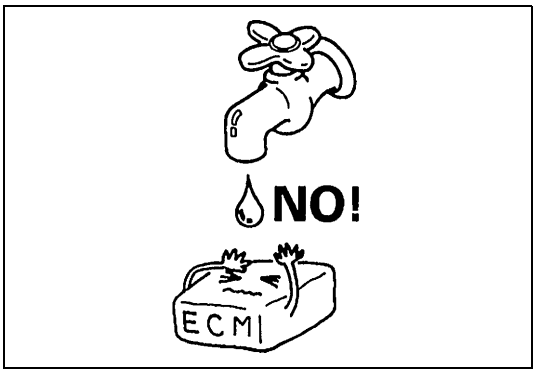
- When replacing a fuse, make sure to use a fuse of the specified capacity. Use of a fuse with a larger capacity will cause a damage to the electrical parts and a fire.



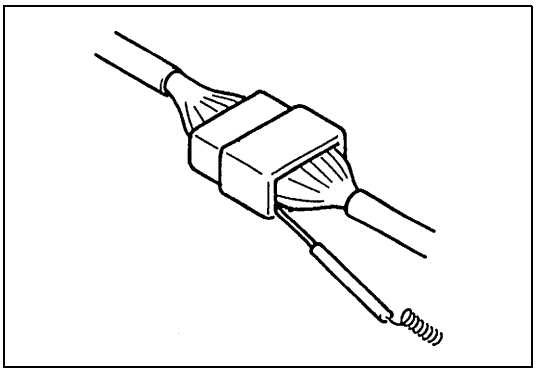
- Always be careful not to handle electrical parts (computer, relay, etc.) in a rough manner or drop them.



- When performing a work that produces a heat exceeding 80°C in the vicinity of the electrical parts, remove the heat sensitive electrical part(s) beforehand.



- Use care not to expose connectors and electrical parts to water which will be a cause of a trouble.



- When using a tester for checking continuity or measuring voltage, be sure to insert the tester probe from the wire harness side.

Symbols and Marks

Refer to Section 8A.

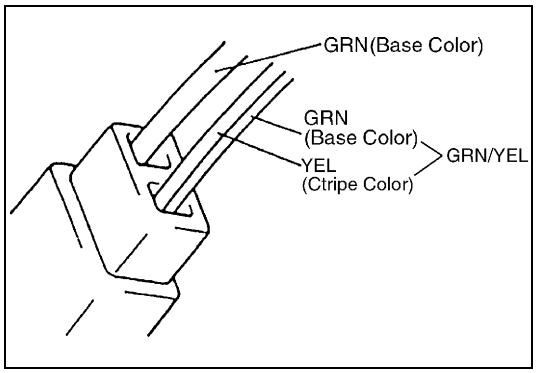
Abbreviations

Refer to Section 8A.

Wire Color Symbols

Symbol		Wire Color	Symbol		Wire Color
B	BLK	Black	O, Or	ORN	Orange
Bl	BLU	Blue	R	RED	Red
Br	BRN	Brown	W	WHT	White
G	GRN	Green	Y	YEL	Yellow
Gr	GRY	Gray	P	PNK	Pink
Lbl	LT BLU	Light blue	V	PPL	Violet
Lg	LT GRN	Light green			

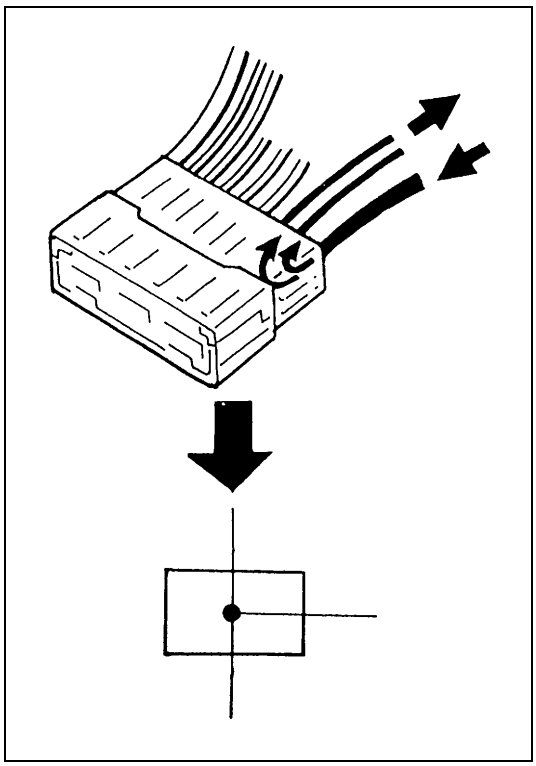
The wire color is abbreviated to three or five alphabets of each color.



There are two kinds of colored wire used in this vehicle. One is single-colored wire and the other is dual-colored (striped) wire.
The single-colored wire uses only one color symbol (i.e. “GRN”).
The dual-colored wire uses two color symbols (i.e. “GRN/YEL”).
The first symbol represents the base color of the wire (“GRN” in the figure) and the second symbol represents the color of the stripe (“YEL” in the figure).

GRN :	Green
GRN/YEL :	Green/Yellow

Joint Connector (J/C)



- Wiring of this vehicle employs joint connector (J/C) which divide one wire into several different wires or combine several different wires into one wire.
- The joint connector is as shown in the figure.

Fuse Box and Relay

Refer to Section 8A.

Power Supply Diagram

Refer to Section 8A.

SECTION 8B

LIGHTING SYSTEM

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System:

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

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OTHER THAN CANVAS TOP MODEL

General Description

Cautions in Servicing

Refer to Section 8A.

Symbols and Marks

Refer to Section 8A.

Wiring Color Symbols

Refer to Section 8A.

Abbreviations

Refer to Section 8A.

Joint Connector

Refer to Section 8A.

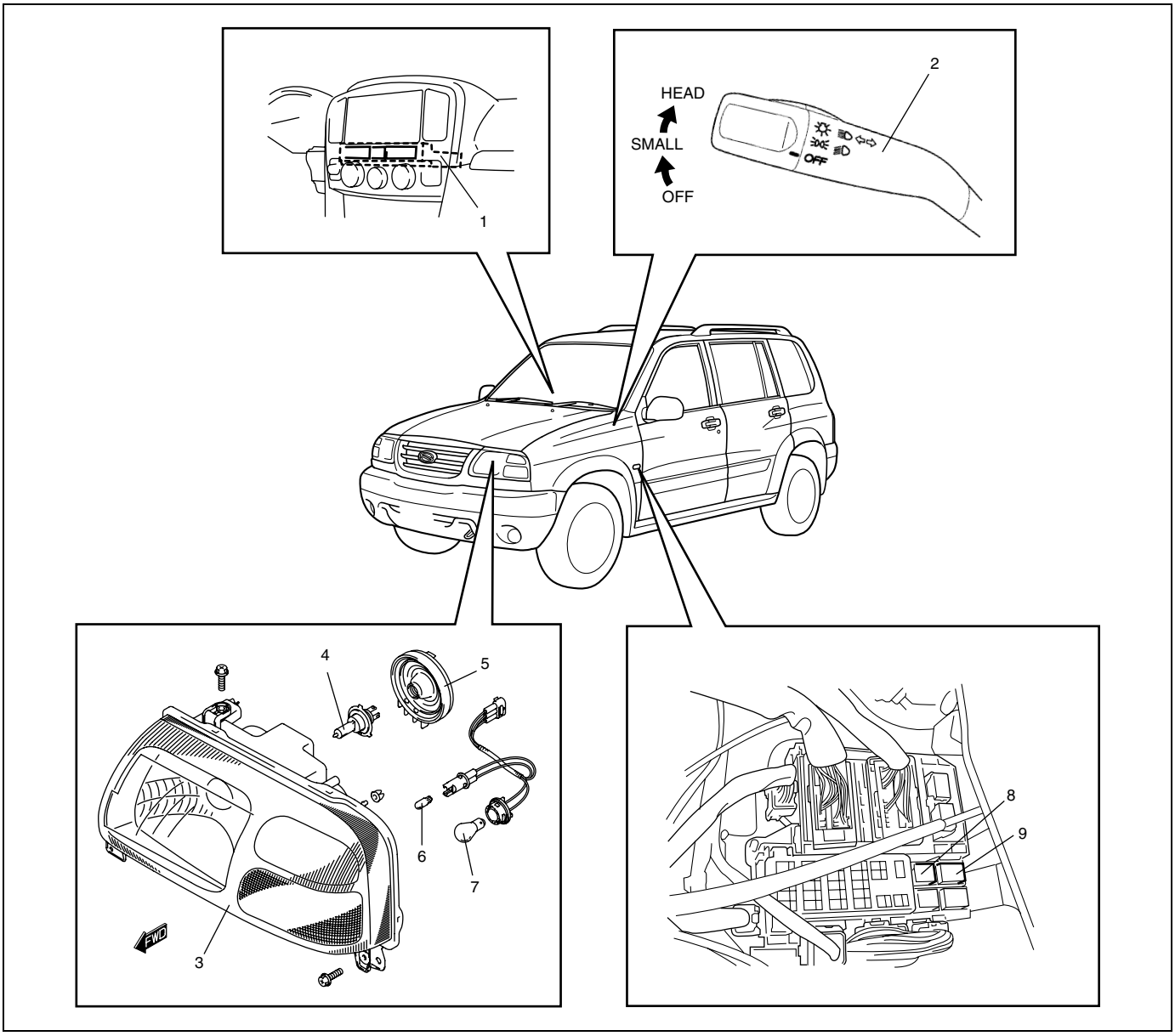
Fuse Box and Relay

Refer to Section 8A.

Power Supply Diagram

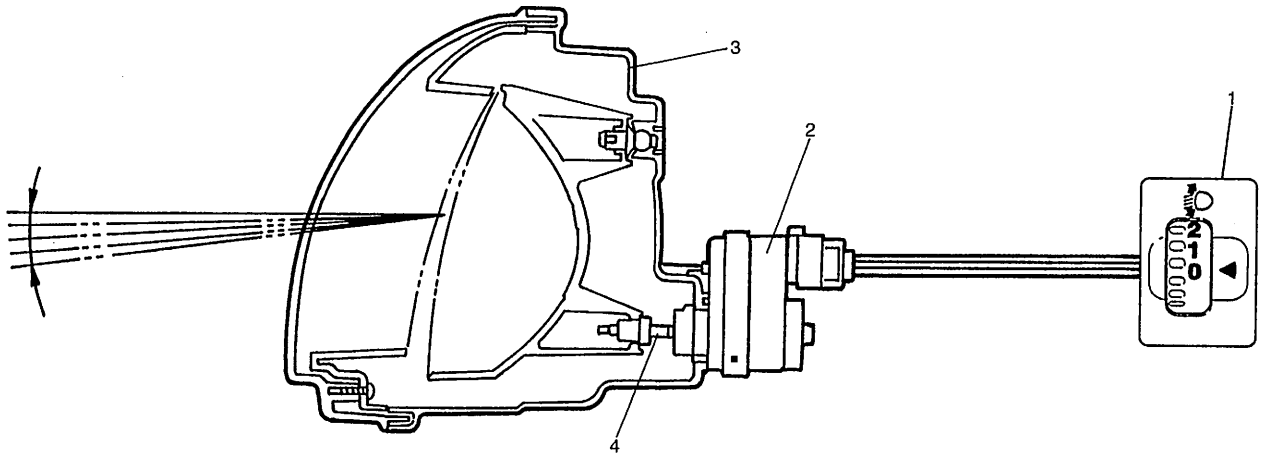
Refer to Section 8A.

Headlights



1. BCM	4. Headlight bulb (Halogen)	7. Turn signal light bulb
2. Headlight switch	5. Socket cover	8. Headlight relay
3. Headlight assembly	6. Position light bulb	9. Clearance light relay

Headlight with Leveling System (If Equipped)



[A]	[B]
0	———
1	0.624°
2	1.243°
3	1.867°
4	2.479°

[A]: Switch position	1. Headlight leveling switch	3. Headlight
[B]: Headlight beam down angle	2. Headlight leveling unit (actuator)	4. Headlight leveling unit shaft

Diagnosis

Headlights

Condition	Possible Cause	Correction
Only one light of headlights does not light	Bulb burnt out	Replace bulb.
	Fuse blown	Replace fuse.
	Socket, wiring or grounding faulty	Repair as necessary.
Headlights do not light	Main fuse and/or each circuit fuses blown	Replace main fuse and/or fuse to check for short.
	Headlight switch faulty	Check headlight switch referring to “Headlight Switch (in Lighting Switch)” in this section.
	Defective light relay	Check headlight relay referring to “Headlight and Clearance Light Relays” in this section.
	Headlight diode faulty	Check headlight diode referring to “Headlight Diode” in this section.
	Wiring or grounding faulty	Repair as necessary.
	BCM faulty	Check BCM referring to “Inspection of BCM and Its Circuits” in Section 8H.
Only one beam (“Hi” or “Lo”) of headlights does not light	Bulb burnt out	Replace bulb.
	Headlight switch faulty	Check headlight switch referring to “Headlight Switch (in Lighting Switch)” in this section.
	Wiring or grounding faulty	Repair as necessary.
Headlights remains lighting even after lighting switch turned OFF	Wiring or grounding faulty	Repair as necessary.
	BCM faulty	Check BCM referring to “Inspection of BCM and Its Circuits” in Section 8H.

Headlights with Leveling System (If Equipped)

Condition	Possible Cause	Correction
Both headlights do not move	Fuse blown	Replace fuse to check for short.
	Leveling switch faulty	Replace switch.
	Supply voltage too low	Recharge or replace battery.
One of headlights (either Right ot Left) does not move	Socket, wiring or grounding faulty	Repair.
	Actuator faulty	Replace actuator.
	Vehicle body around headlight deformed	Repair body.
	Headlight ass'y itself deformed	Replace headlight ass'y.

Interior Lights

Condition	Possible Cause	Correction
Interior light(s) does (do) not light up	Bulb burnt out	Replace.
	Fuse blown	Replace fuse to check for short.
	Wiring or grounding faulty	Repair as necessary.
	Door open switch faulty	Check door switch referring to "Door Switch" in Section 8C.
	Interior light(s) faulty	Check light(s).
	BCM faulty	Check BCM referring to "Inspection of BCM and Its Circuist" in Section 8H.
Front spot light(s) does (do) not light up	Bulb burnt out	Replace.
	Wiring or grounding faulty	Repair as necessary.
	Spot light faulty	Check light.

Clearance, Side Marker, Tail and License Plate Lights

Condition	Possible Cause	Correction
All lights (clearance, side marker, tail and licence plate lights) do not light	Main fuse and/or fuses blown	Replace fuses to check for short.
	Clearance light relay faulty	Check clearance light relay referring to "Headlight and Clearance Light Relays" in this section.
	Lighting switch faulty	Check headlight switch referring to "Headlight Switch (in Lighting Switch)" in this section.
	Wiring or grounding faulty	Repair as necessary.
	BCM faulty	Check BCM referring to "Inspection of BCM and Its Circuits" in Section 8H.
One of lights (clearance, side marker, tail and licence plate lights) does not light	Bulb burnt out	Replace.
	Wiring or grounding faulty	Repair as necessary.

Turn Signal and Hazard Warning Lights

Condition	Possible Cause	Correction
Turn signal and hazard warning lights flash on high rate or one side only	Wiring or grounding faulty	Repair as necessary.
	Incorrect bulb	Replace bulb.
	One of light bulbs burnt out	Replace bulb.
	Turn signal and hazard warning relay faulty	Check turn signal and hazard warning relay referring to “Turn Signal and Hazard Warning Lights System Circuit” in this section.
	Turn signal light switch faulty	Check turn signal light switch referring to “Turn Signal Light Switch (In Lighting Switch)” in this section.
Turn signal and/or hazard warning lights do not flash	Blown fuse on turn signal and hazard warning circuit	Replace fuse to check to short.
	Wiring or grounding faulty	Repair as necessary.
	Turn signal and hazard warning relay faulty	Check turn signal and hazard warning relay referring to “Turn Signal and Hazard Warning Lights System Circuit” in this section.
	Turn signal light switch faulty	Check turn signal light switch referring to “Turn Signal Light Switch (in Lighting Switch)” in this section.
	Hazard warning lights switch faulty	Check BCM referring to “Inspection of BCM and Its Circuits”.
Turn signal and hazard warning lights flash on low rate	Supply voltage too low	Recharge battery.
	Turn signal and hazard warning relay faulty	Check turn signal and hazard warning relay referring to “Turn Signal and Hazard Warning Lights System Circuit” in this section.

Back-Up Lights

Condition	Possible Cause	Correction
Back-up lights do not light	Fuse blown	Replace fuse to check for short.
	Bulb burnt out	Replace.
	Back-up light switch or shift switch faulty	Check back-up light switch or shift switch referring to “Back Up Light Switch” in this section.
	Wiring or grounding faulty	Repair as necessary.
Back-up lights remains ON	Back-up light switch or shift switch faulty	Check back-up light switch or shift switch referring to “Back Up Light Switch” in this section.
	Wiring or grounding faulty	Repair as necessary.

Brake Lights

Condition	Possible Cause	Correction
Stop (brake) lights do not light	Fuse blown	Replace fuse to check for short.
	Bulb burnt out	Replace.
	Brake light switch faulty	Adjust or check brake light switch referring to, “Brake Light Switch Adjustment” in Section 5 or “Brake Light Switch” in this section.
	Wiring or grounding faulty	Repair as necessary.
Stop (brake) lights stay ON	Brake light switch faulty	Adjust or check brake light switch referring to, “Brake Light Switch Adjustment” in Section 5 or “Brake Light Switch” in this section.
Only one light of stop (brake) lights does not light	Bulb burnt out	Replace.
	Wiring or grounding faulty	Repair as necessary.

Rear Fog Light (If Equipped)

Condition	Possible Cause	Correction
Rear fog light does not come on	Fuse blown	Replace fuse to check for short.
	Rear fog light switch faulty	Check rear fog light switch referring to “Rear Fog Light Switch” in this section.
	Lighting switch faulty	Check headlight switch referring to “Headlight Switch (in Lighting Switch)” in this section.
	Wiring or grounding faulty	Repair.
	Bulb blown	Replace bulb.

Front Fog Lights

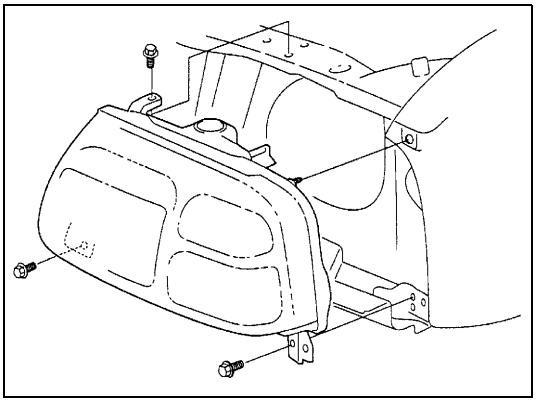
Condition	Possible Cause	Correction
Only one light of front fog lights does not light	Bulb burnt out	Replace bulb.
	Socket, wiring or grounding faulty	Repair as necessary.
Front fog lights do not light	Fuse blown	Replace fuse.
	Front fog lights switch faulty	Check front fog light switch referring to “Front Fog Light Switch” in this section.
	Front fog lights relay faulty	Check front fog lights relay referring to “Front Fog Light Relay” in this section.
	Headlight switch faulty	Check headlight switch referring to “Headlight Switch (in Lighting Switch)” in this section.
	Wiring or grounding faulty	Repair as necessary.
	BCM faulty	Check BCM referring to “Inspection of BCM and Its Circuits” in Section 8H.

On-Vehicle Service

Headlight Assembly

REMOVAL

1) Disconnect negative (–) cable at battery.
2) Remove front grille.
3) Disconnect harness and couplers from headlight assembly.
4) Remove three bolts and pull headlight assembly off vehicle.



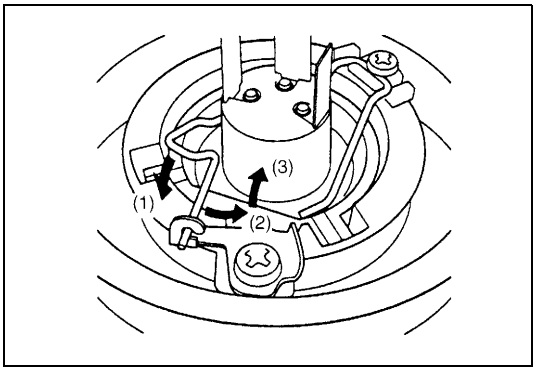
INSTALLATION

Reverse removal procedure for installation.
Make sure to follow “Headlight Aiming with Screen” in this section and aim headlight after installation.

Headlight Bulb Replacement

WARNING:
Don’t touch when the bulb is hot.

1) Disconnect negative (–) cable at battery.
2) Disconnect connector from bulb.
3) Remove socket cover and bulb.
4) Replace bulb and install in reverse removal procedure.

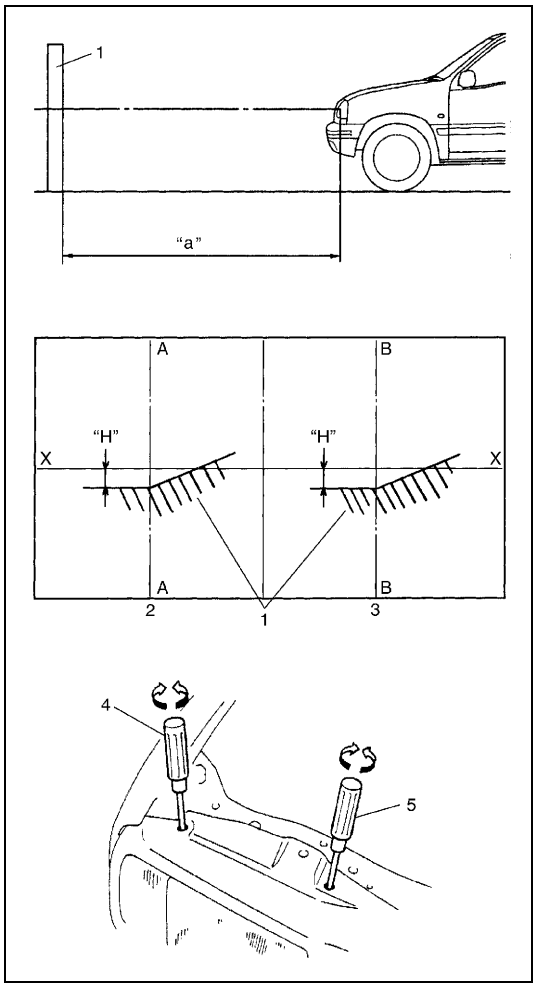


Headlight Aiming with Screen

ADJUSTMENT

NOTE:

- **Unless otherwise obligated by local regulations, adjust headlight aiming according to the following procedure.**
- **After replacing headlight, be sure to perform its aiming**



1) Before adjustment, make sure the following.
   a) Place vehicle on a flat surface in front of blank wall as below ahead of headlight surface.

Distance between screen and headlight
"a" : 10 m (32.8 ft.)

   b) Adjust air pressure of all tires to a specified value respectively.
   c) Bounce vehicle body up and down by hand to stabilize suspension.
   d) Carry out one driver aboard.

Driver's weight : 75 kg (165 lb)

2) Check to see if hot spot (high intensity zone) of each main (low) beam axis falls as illustrated.

Hot spot specification:
"H" : Approx. 100 mm (3.94 in.)

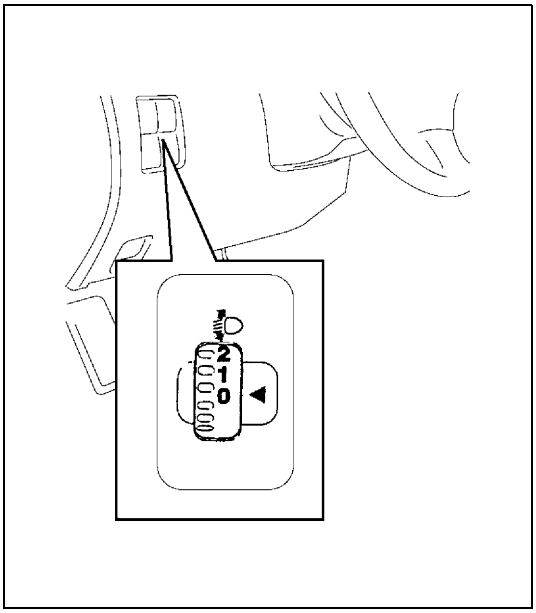
3) If headlight aiming is not set properly, align it to specification by adjusting aiming gear.
4) If horizontal aiming is not set properly, check headlight installation or body bending.

X-X: Horizontal center light of headlights	2. LH headlight
A-A: Vertical center light of left headlights	3. RH headlight
B-B: Vertical center light of right headlights	4. For up/down adjustment
1. Hot spot	5. For right/left adjustment

Headlights with Leveling System (If Equipped)

Leveling switch

INSPECTION



To check the switch operation, substitute it with a new one. If proper operation is obtained, it means the switch is defective. Replace it with a new one.

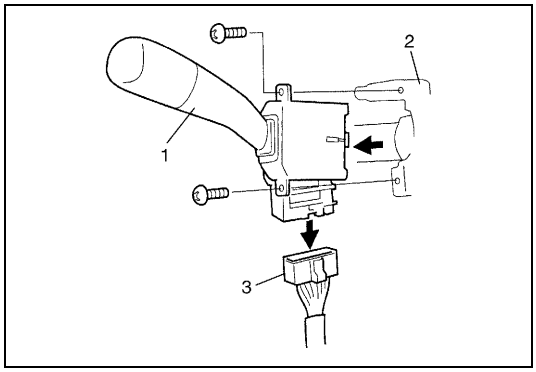
Leveling actuator

INSPECTION

All headlight system couples connected including leveling actuator and switch, and at Ignition switch ON, listen to the leveling actuator sound on both actuators according to the movement of the leveling switch. If no sound is heard with the movement of the leveling switch, replace headlight assembly.

Lighting Switch (Including Headlight Switch and Turn Signal Light Switch)

REMOVAL



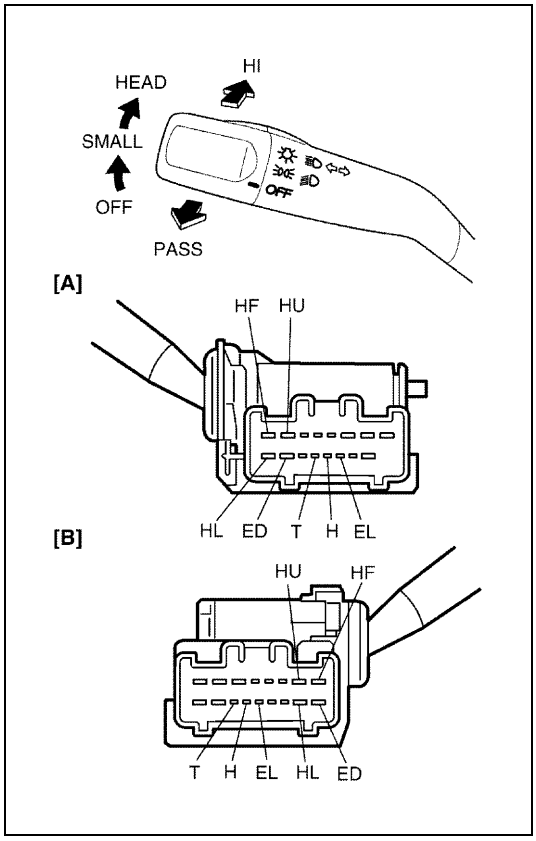
1) Disconnect negative cable at battery.
2) Remove steering column hole cover.
3) Remove steering column covers.
4) Remove lighting switch (1) from combination switch assembly (2) and disconnect its coupler (3).

INSTALLATION

Reverse removal procedure for installation.

Headlight Switch (in Lighting Switch)

INSPECTION



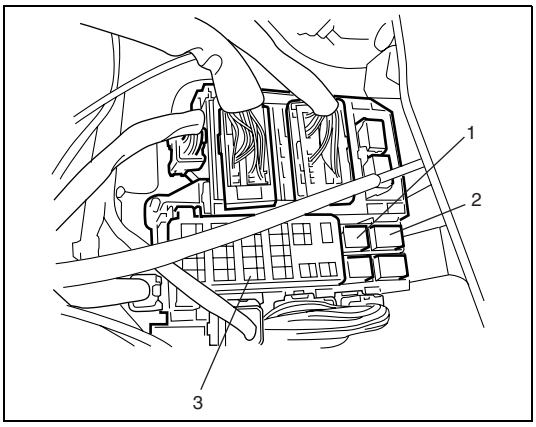
Use a circuit tester to check the continuity at each switch position as shown in the following figure.
If check result is not as specified, replace.

Switch Position \ Terminal		ED	HL	HU	HF	EL	T	H	A
OFF	LO	○	○						
	PASS	○		○	○				
	HI	○		○					
CLEARANCE	LO	○	○						
	PASS	○		○	○	○	○		
	HI	○		○					
HEAD	LO	○	○						
	PASS	○		○	○	○	○	○	
	HI	○		○					

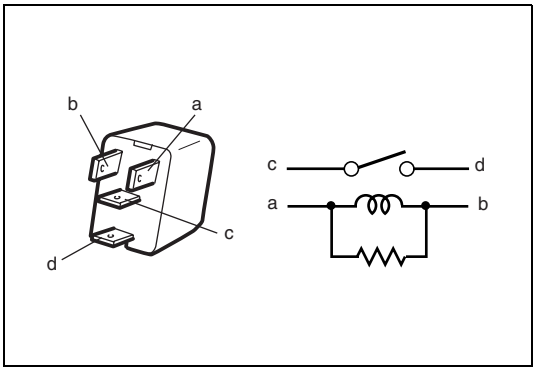
[A]: LH steering vehicle
[B]: RH steering vehicle

Headlight and Clearance Light Relays

INSPECTION



1) Disconnect negative (–) cable from battery.
2) Remove headlight relay (1) and/or clearance light relay (2) from fuse box (3).

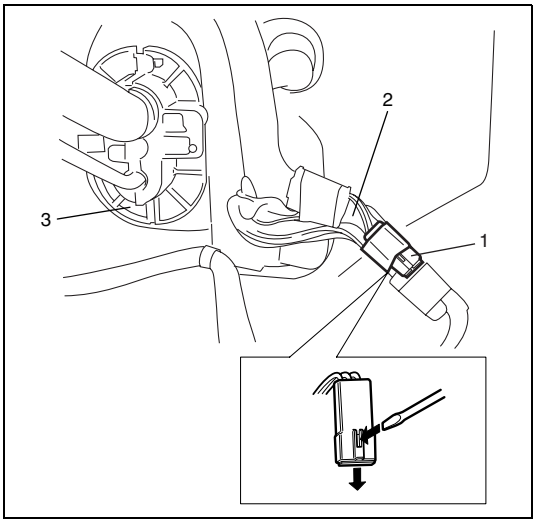


3) Check that there is no continuity between terminal “c” and “d”. If there is continuity, replace relay.
4) Connect that there is continuity between terminals “c” and “d” when a 12 V battery is connected to terminals “a” and “b”. If malfunction is found, replace it with a new one.

Headlight Diode

REMOVAL

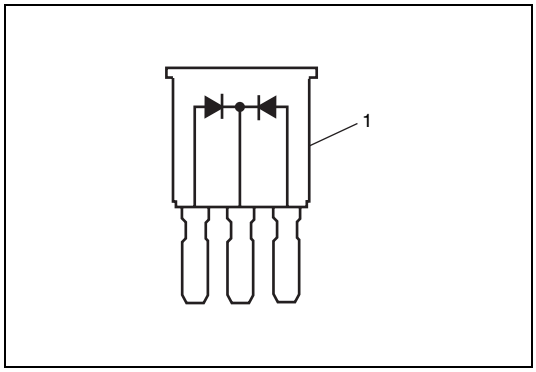
1) Remove heater blower unit referring to “Blower Unit” in Section 1A.



2) Remove headlight diode (1) from main harness (2) as shown in the figure.

3. A/C pipe packing

INSPECTION



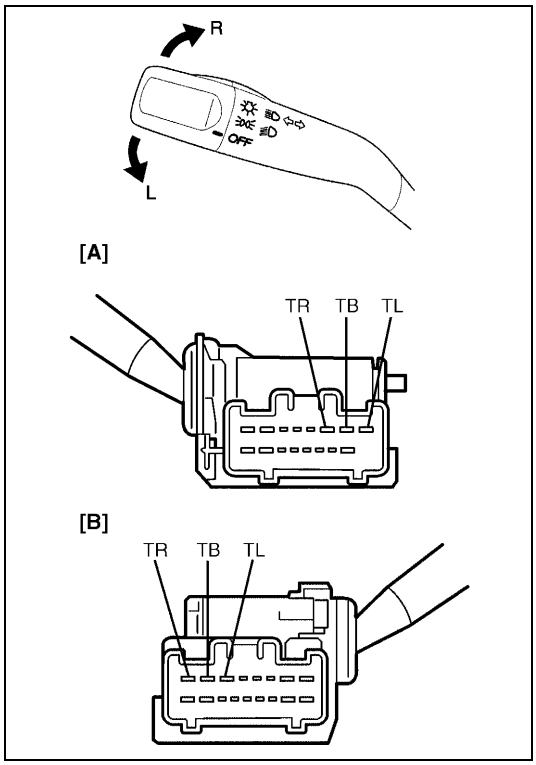
Check internal circuit of headlight diode (1) using multimeter (diode check range) as shown circuit.

INSTALLATION

Reverse removal procedure for installation.

Turn Signal Light Switch (in Lighting Switch)

INSPECTION



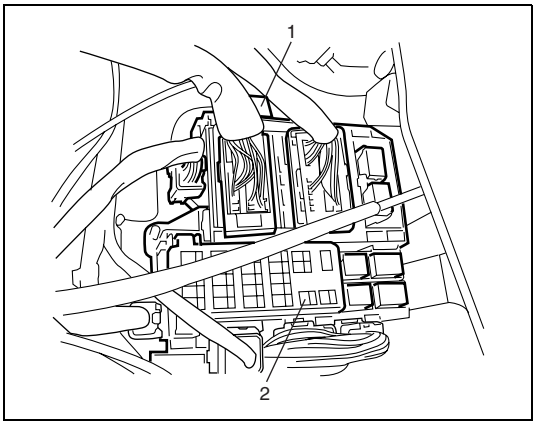
Use a circuit tester to check the continuity at each switch position as shown in the following figure.
If check result is not as specified, replace.

Turn signal SW \ Terminal	TL	TB	TR
L	○—○		
N			
R		○—○	

[A]: LH steering vehicle
[B]: RH steering vehicle

Turn Signal and Hazard Warning Lights System Circuit

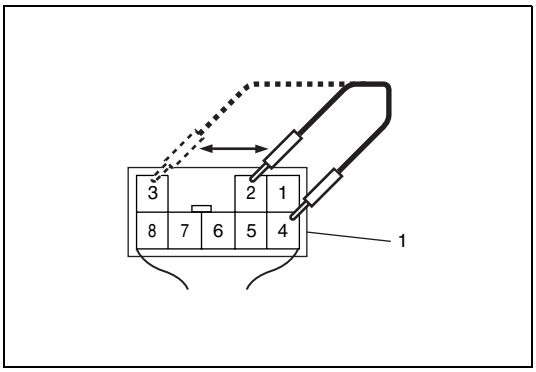
INSPECTION



1) Disconnect negative (–) cable from battery.
2) Disconnect turn signal and hazard warning relay (1) connector “E218”.

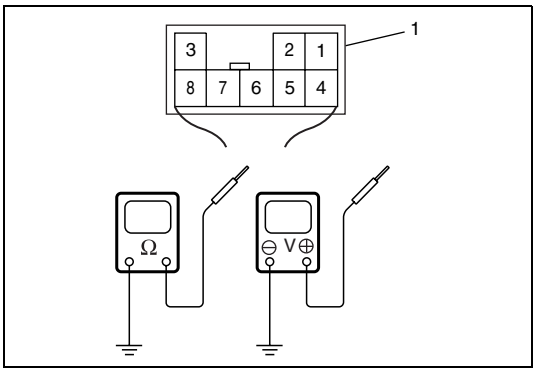
2. Fuse box

3) Connect negative (–) cable to battery.



4) Confirm that right or left side turn signal lights turn on when connecting “E218-4” terminal to “E218-2” or “E218-3” terminal with service wire.
   If turn signal light does not turn on, check bulb or repair applicable circuit.

1. Turn signal and hazard warning relay connector “E218” viewed from harness side



5) Check for voltage and continuity between the following each terminal and body ground under each condition.
   If check result is not as specified, repair applicable circuit.
   If all check result are OK, replace turn signal and hazard warning relay and recheck.

1. Turn signal and hazard warning relay connector “E218” viewed from harness side

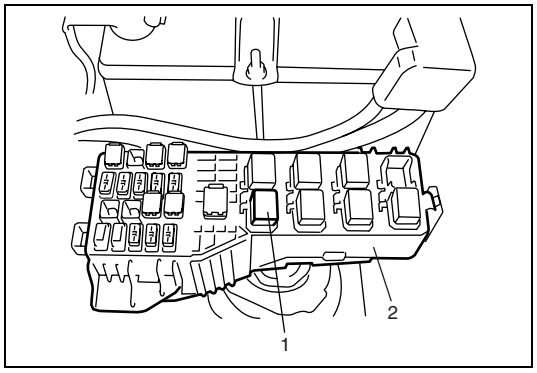
Terminal	Wire	Circuit	Specification	Condition
E218-1	YEL	Ignition switch circuit	10 – 14 V	Ignition switch is ON position.
			0 – 1 V	Ignition switch is OFF position.
E218-4	WHT/GRN	Power supply for turn signal and hazard warning lights	10 – 14 V	–
E218-5	GRN/RED	Right side turn signal light switch circuit	Continuity	Turn signal light switch is R position.
			No continuity	Turn signal light switch is N or L position.
E218-6	GRN/YEL	Left side turn signal light switch circuit	Continuity	Turn signal light switch is L position.
			No continuity	Turn signal light switch is N or R position.
E218-7	BLK	Ground	0 – 1 V	–

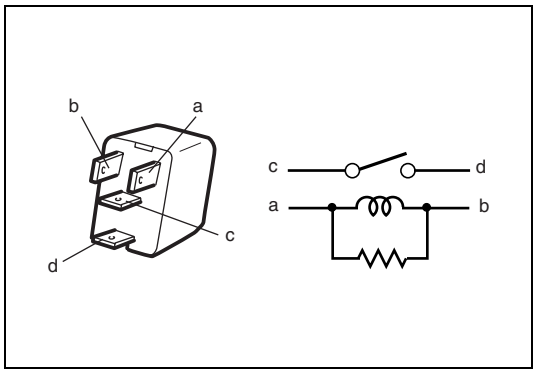
Terminal	Wire	Circuit	Specification	Condition
E218-8	YEL/RED	Hazard warning switch and keyless entry system (if equipped) circuits from BCM	Continuity	Hazard warning switch is ON position.
				Approx. 1.2 sec. after pushing UNLOCK button on transmitter.
				Approx. 0.6 sec. after pushing LOCK button on transmitter.
			No continuity	Hazard warning switch is OFF position.

Front Fog Light Relay

INSPECTION

1) Disconnect negative (–) cable from battery.
2) Remove front fog light relay (1) from fuse/relay box (2).

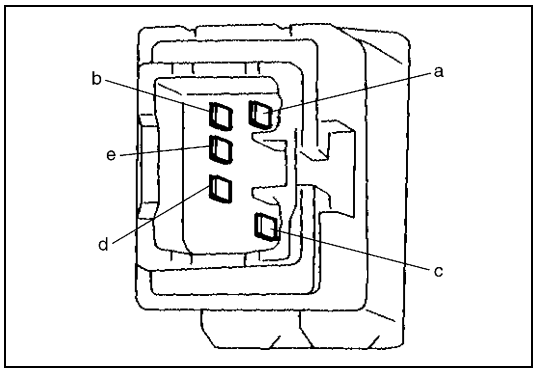




3) Check that there is no continuity between terminal “c” and “d”. If there is continuity, replace relay.
4) Check that there is continuity between terminals “c” and “d” when a 12 V battery is connected to terminals “a” and “b”. If malfunction is found, replace it with a new one.

Front Fog Light Switch

INSPECTION



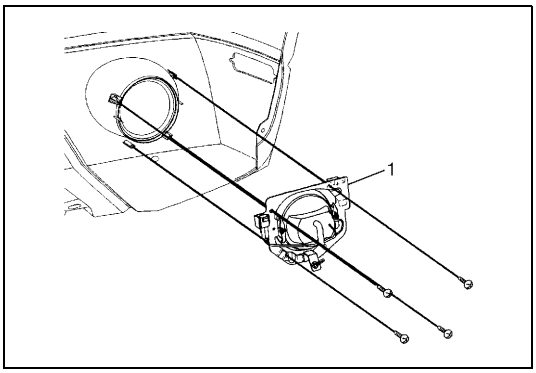
Check front fog light switch for each terminal-to-terminal continuity.
If check results are not specified, replace front fog light switch.

TERMINAL / POSITION	a	b	c	d	e
OFF	○—⌒—○		○—⌒—○		
ON	○—⌒—○		○—⌒—○		○

Front Fog Light

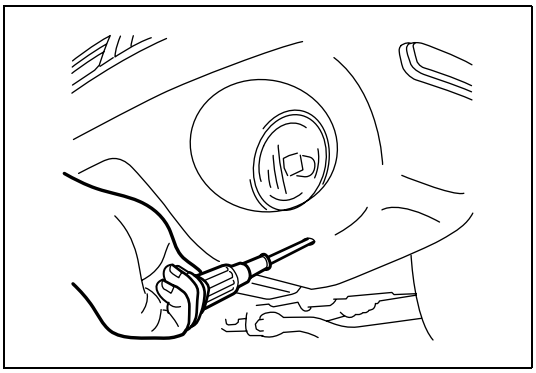
REMOVAL

1) Disconnect negative (–) cable at battery.
2) Remove front fender lining.
3) Disconnect front fog light coupler.
4) Remove front fog light from front bumper (1).

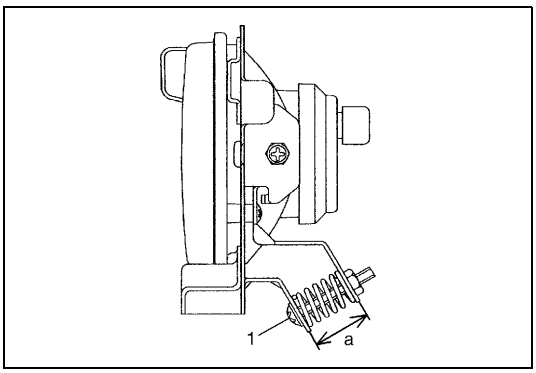


INSTALLATION

Reverse removal procedure for installation nothing the following.



- After installing, adjust aiming with adjusting screw according to local regulation if obligated.



- Unless otherwise obligated by local regulations, check aiming adjusting screw height “a” before installing and adjust it if it is not specified height below.

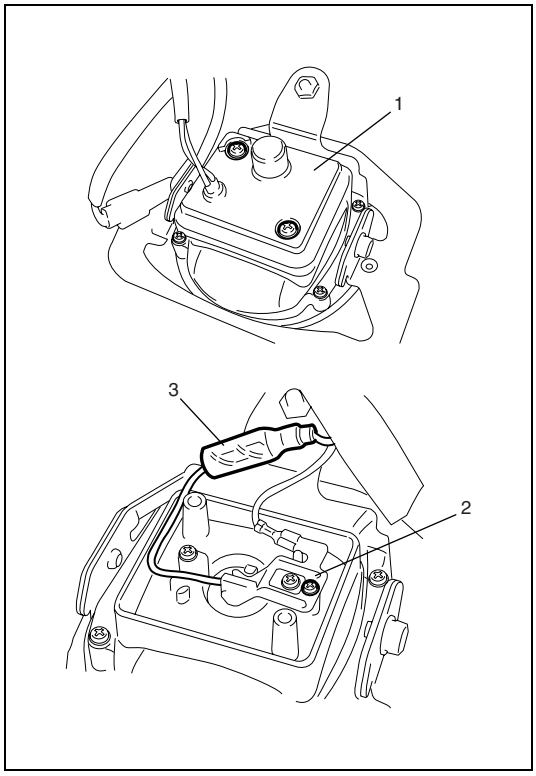
Aiming adjusting screw height
“a”: 24.5 mm (0.964 in.)

1. Aiming adjusting screw

Front Fog Light Bulb Replacement

WARNING:
- **To avoid danger of being burned, don't touch when bulb is hot.**
- **Don't touch glass surface of bulb, to avoid deteriorate as the case may be unclear when bulb light on at dirty condition.**

1) Remove front fog light referring to "Front Fog Light" in this section.

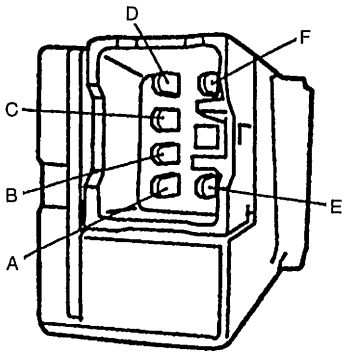


2) Remove bulb cover (1) and bulb mounting plate (2).
3) Disconnect connector (3).
4) Pull out bulb.
5) Replace bulb and install in reverse removal procedure.

Rear Fog Light (If Equipped)

Rear fog light switch

INSPECTION



Check for continuity between terminals at each switch position shown below. Hold the switch button (ON or OFF) pushed in during checking switch.

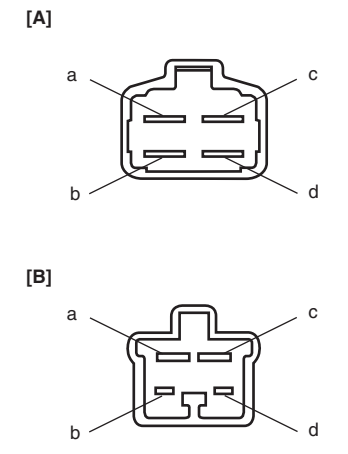
RR FOG SW / OFF SW / TERMINAL		B	E	D	A	C	F
FREE	FREE		○	○	○	○	○
	PUSH		○	○	○	○	○
PUSH	FREE	○	○		○	○	○
	PUSH		○	○	○	○	○

NOTE:

Rear fog light lights up only when headlights (low or high beams) or front fog lights (if equipped) are ON.
Rear fog lights turns OFF automatically when headlights or front lights are turned OFF.

Brake Light Switch

INSPECTION



Check brake light switch for continuity under each shaft condition as shown.
If check result is not as specified, replace switch.

Type A:

Shaft condition / Terminal	a	b	c	d
FREE	○		○	
		○		○
PUSH				

Type B:

Shaft condition / Terminal	a	b	c	d
FREE	○		○	
PUSH		○		○

[A]: Type A
[B]: Type B

CANVAS TOP MODEL

General Description

Cautions in Servicing

Refer to Section 8.

Symbols and Marks

Refer to Section 8.

Wiring Color Symbols

Refer to Section 8.

Abbreviations

Refer to Section 8.

Joint Connector

Refer to Section 8.

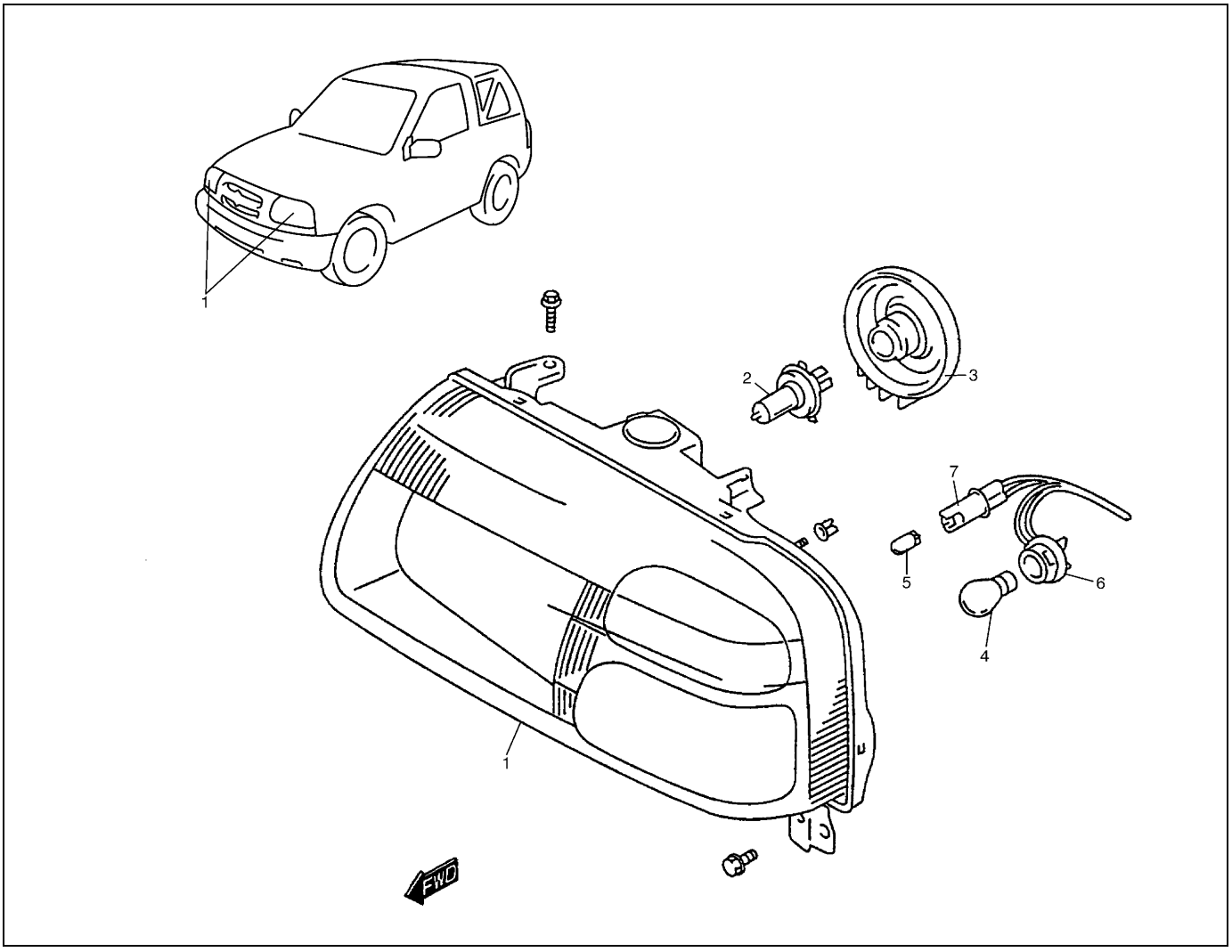
Fuse Box and Relay

Refer to Section 8.

Power Supply Diagram

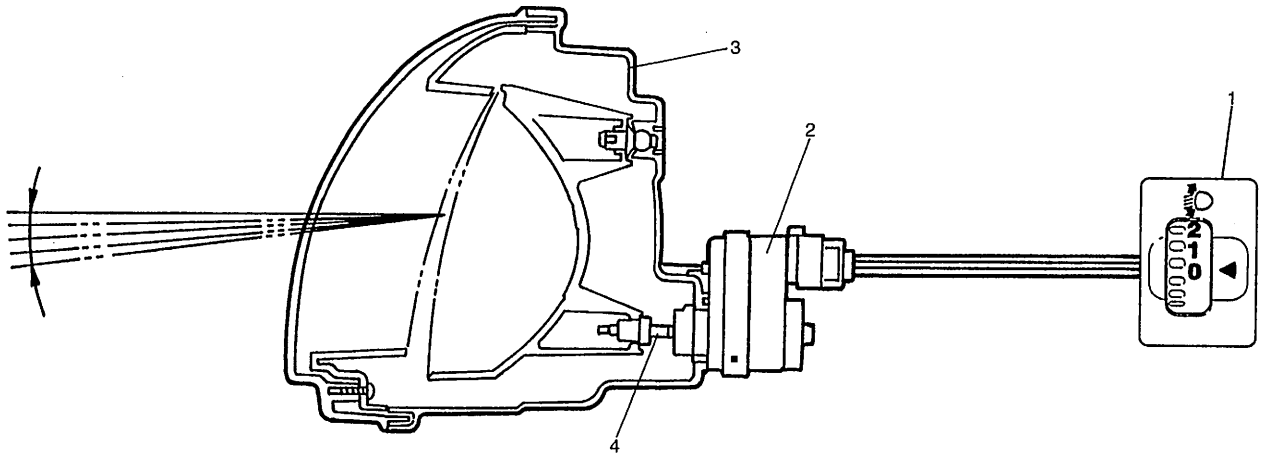
Refer to Section 8.

Headlights



1. Headlight assembly	3. Socket cover	5. Position light bulb	7. Position light bulb socket
2. Halogen bulb	4. Turn signal light bulb	6. Turn signal light bulb socket	

Headlight with Leveling System (If Equipped)



A	B
0	———
1	0.624°
2	1.243°
3	1.867°
4	2.479°

A. Switch position	1. Headlight leveling switch	3. Headlight
B. Headlight beam down angle	2. Headlight leveling unit (actuator)	4. Headlight leveling unit shaft

Diagnosis

NOTE:

Fuse name (“ ”) in the table below is shown on the junction box.

Headlights

Condition	Possible Cause	Correction
Only one light does not light	Bulb blown	Replace bulb
	Headlight L or R fuse blown	Replace fuse to check for short
	Socket, wiring or grounding faulty	Repair
Headlights do not light	Headlight L and R fuses blown	Replace fuses to check for short
	Lighting and dimmer switch faulty	Replace switches
	Defective light relay	Replace light relay
	Wiring or grounding faulty	Repair
Only one beam (“Hi” or “Lo”) does not light	Bulb blown	Replace bulb
	Lighting or dimmer switch faulty	Replace switch

Headlights with Leveling System (If Equipped)

Condition	Possible Cause	Correction
Both headlights do not move	"TURN/BACK" fuse blown	Replace fuse to check for short
	Leveling switch faulty	Replace switch
	Supply voltage too low	Recharge or replace battery
One of headlights (either Right or Left) does not move	Socket, wiring or grounding faulty	Repair
	Actuator faulty	Replace actuator
	Vehicle body around headlight deformed	Repair body
	Headlight assembly itself deformed	Replace headlight assembly

Turn Signal and Hazard Warning Lights

Condition	Possible Cause	Correction
Flash rate high or one side only flashes	Incorrect bulb	Replace bulb
	One of light bulbs burnt out	Replace
	Turn signal and hazard warning relay faulty	Replace relay
	Open circuit or high resistance existing between combination switch (turn signal switch) and lights on one side	Repair
	Wiring or grounding faulty	Repair
No flashing	"TURN/BACK" and/or "HAZARD" fuse(s) blown	Replace fuse(s) to check for short
	Open circuit or high resistance existing between battery and switch	Check bulb and check circuit
	Turn signal and hazard warning relay faulty	Replace relay
	Combination switch or hazard warning switch faulty	Replace switch
	Wiring or grounding faulty	Repair
Flash rate low	Supply voltage too low	Check charging system
	Turn signal and hazard warning relay faulty	Replace relay

Clearance, Tail and Licence Plate Lights

Condition	Possible Cause	Correction
All lights do not light	"TAIL" fuse blown	Replace fuse to check for short
	Lighting switch faulty	Replace switch
	Wiring or grounding faulty	Repair
Some lights do not light up	Bulb(s) blown	Replace bulb(s)
	Wiring or grounding faulty	Repair

Back-up Lights

Condition	Possible Cause	Correction
Back-up lights do not light	"TURN/BACK" fuse blown	Replace fuse to check for short
	Bulb blown	Replace bulb
	Back-up light switch or shift switch faulty	Replace switch
	Wiring or grounding faulty	Repair
Back-up lights remains ON	Back-up light switch or shift switch faulty	Replace switch
	Wiring or grounding faulty	Repair

Brake Lights

Condition	Possible Cause	Correction
Brake lights do not light up	"STOP/HORN" fuse blown	Replace fuse to check for short
	Bulb(s) blown	Replace bulb(s)
	Brake light switch faulty	Adjust or replace switch
	Wiring or grounding faulty	Repair
Brake lights stay on	Brake light switch faulty	Adjust or replace switch
Only one light does not light	Bulb blown	Replace bulb
	Wiring or grounding faulty	Repair

Rear Fog Light (If Equipped)

Condition	Possible Cause	Correction
Rear fog light does not come on	"FOG" fuse blown	Replace fuse to check for short
	Rear fog light switch faulty	Replace fog light switch
	Lighting switch faulty	Replace switch
	Wiring or grounding faulty	Repair
	Bulb blown	Replace bulb

Interior Lights

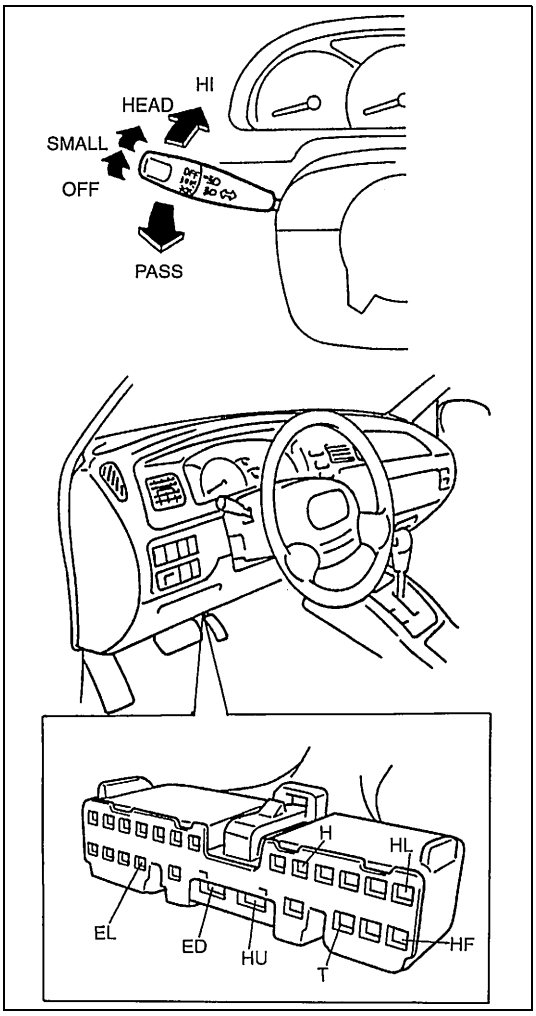
Condition	Possible Cause	Correction
Interior light (s) does (do) not light up	Bulb(s) blown	Replace bulb(s)
	"DOME" fuse blown	Replace fuse to check for short
	Wiring or grounding faulty	Repair
	Door switch faulty	Replace switch
	Interior light switch faulty	Replace light assy
Front spot lights do not light up	Bulb(s) blown	Replace bulb(s)
	Wiring or grounding faulty	Repair
	Spot light switch faulty	Replace light assy

On-Vehicle Service

Headlights

Headlight switch (In combination switch)

INSPECTION



1) Disconnect negative cable at battery.
2) Disconnect combination switch lead wire coupler.
3) Check for continuity between terminals at each switch position shown below. If check result is not as specified, replace switch.

Lighting Switch

Switch Position \ Terminal / Wire Color	EL	T	H
	WHT	GRN	RED
OFF			
SMALL	○	○	
HEAD	○	○	○

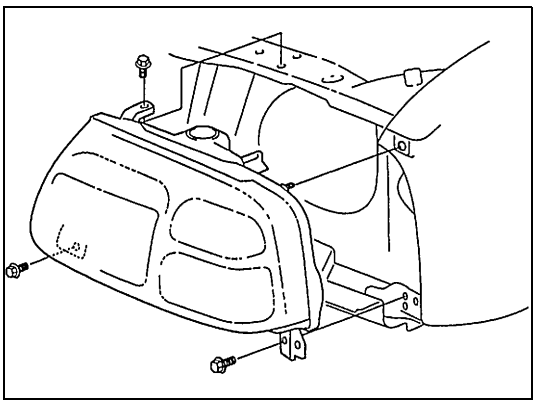
Dimmer & Passing Switch

Switch Position \ Terminal / Wire Color	ED	HL	HU	HF
	WHT/BLK	RED/WHT	RED	RED/BLK
Passing (PASS)	○		○	○
Low Beam	○	○		
High Beam (HI)	○		○	

REMOVAL AND INSTALLATION

For vehicle without air bag system, referring to “Combination Switch” in Section 3C, or for vehicle with air bag system, referring to “Contact Coil and Combination Switch Assembly” in Section 3C1.

REMOVAL

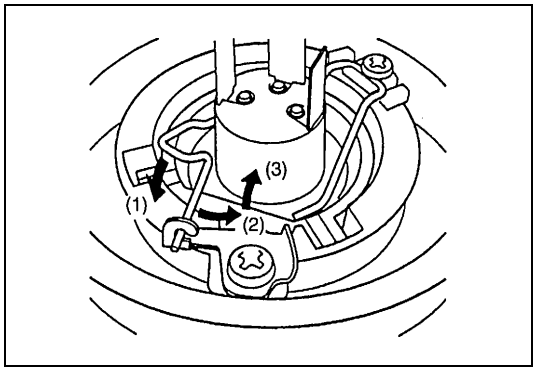


1) Disconnect negative cable at battery.
2) Remove front grille.
3) Disconnect harness and couplers from headlight assembly.
4) Remove three bolts and pull headlight assembly off vehicle.

INSTALLATION

Reverse removal procedure for installation.
Make sure to follow “Headlight Aiming with Screen” and aim headlight after installation.

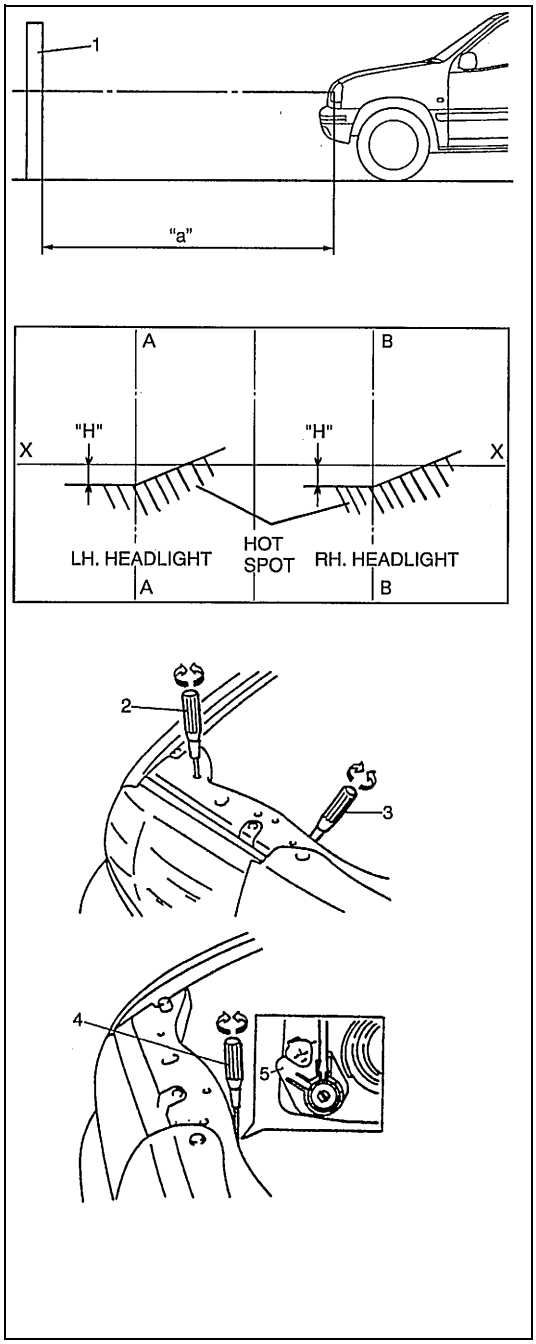
Bulb replacement



WARNING:
Don't touch when the bulb is hot.

1) Disconnect negative cable at battery.
2) Disconnect harness from bulb.
3) Remove socket cover and bulb.
4) Replace bulb and install in reverse removal procedure.

Headlight aiming with screen



NOTE:

- **Unless otherwise obligated by local regulations, adjust headlight aiming according to following procedure.**
- **After replacing headlight, be sure to perform its aiming.**
- **When inspecting and adjusting headlight with leveling system, make sure to set the leveling switch to "0" position with IG switch ON.**

Before adjustment, make sure the following.

a) Place vehicle on a flat surface in front of blank wall as below ahead of headlight surface.

Clearance "a" : 10 m (32.8 ft)

b) Adjust air pressure of all tires to a specified value respectively.
c) Bounce vehicle body up and down by hand to stabilize suspension.
d) Carry out one driver aboard.

Driver's weight : 75 kg (165 lb)

ADJUSTMENT

1) Check to see if hot spot (high intensity zone) of each main (low) beam axis falls as illustrated.

Clearance "H" : Approx. 130 mm (5.15 in.)

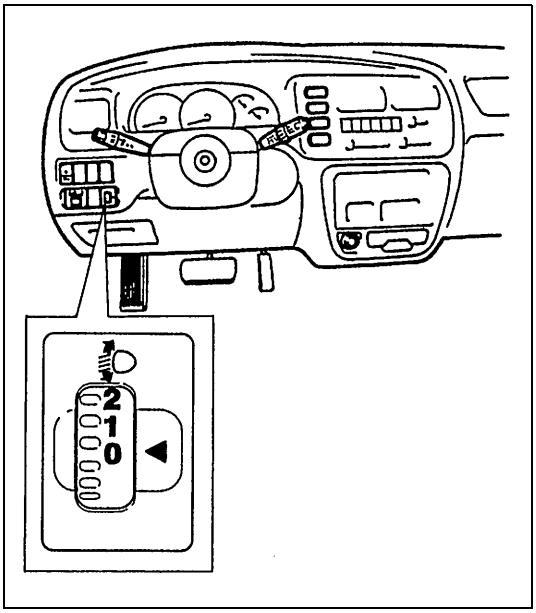
2) If headlight aiming is not set properly, align it to specification by adjusting aiming screw and aiming gear.

X-X :	Horizontal center line of headlight bulbs
A-A :	Vertical center line of left headlight bulb
B-B :	Vertical center line of right headlight bulb
1.	Screen
2.	For right/left adjustment
3.	For up/down adjustment (for vehicle without leveling system)
4.	For up/down adjustment (for vehicle with leveling system)
5.	Headlight leveling actuator

Headlights with Leveling System (If Equipped)

Leveling switch

INSPECTION



To check the switch operation, substitute it with a new one. If proper operation is obtained, it means the switch is defective. Replace it with a new one.

Leveling actuator

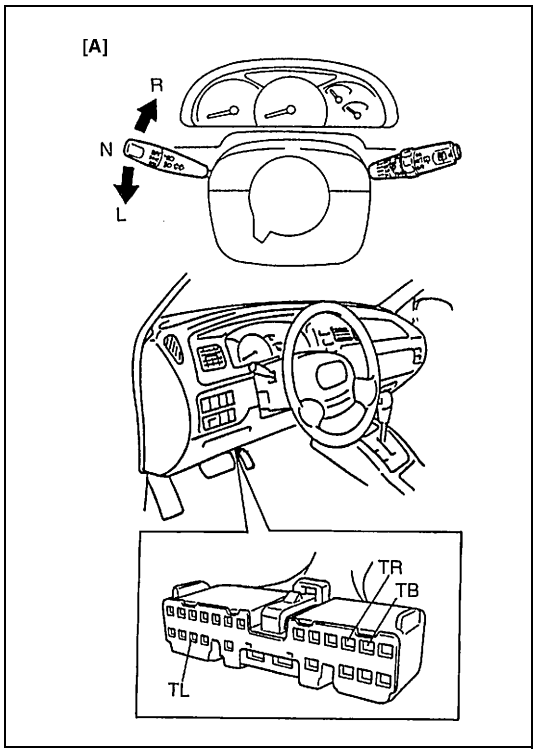
INSPECTION

All headlight system couples connected including leveling actuator and switch, and at Ignition switch ON, listen to the leveling actuator sound on both actuators according to the movement of the leveling switch. If no sound is heard with the movement of the leveling switch, replace headlight assembly.

Turn Signal and Hazard Warning Lights

Turn signal switch (In combination switch)

INSPECTION



1) Disconnect negative cable at battery.
2) Disconnect combination switch lead wire coupler.
3) Check for continuity between terminals at each switch position shown below. If check result is not as specified, replace switch.

Terminal / Switch Position / Wire Color	TL	TB	TR
	GRN/RED	GRN	GRN/YEL
L	○——	——○	
N			
R		○——	——○

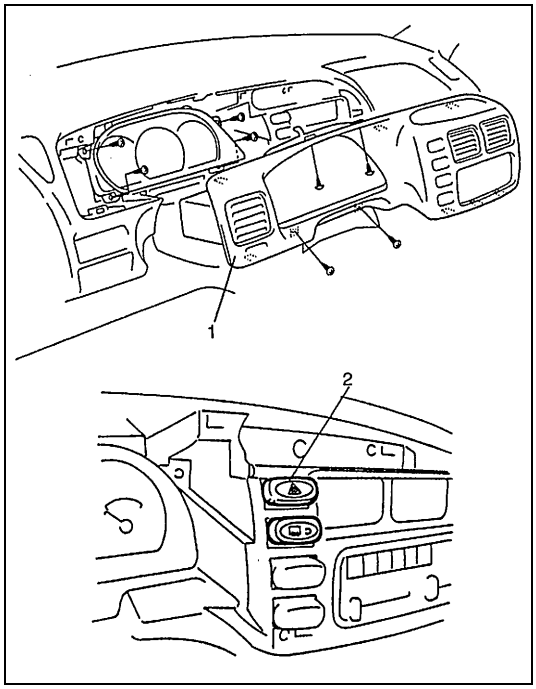
REMOVAL AND INSTALLATION

For vehicle without air bag system, referring to “Combination Switch” in Section 3C, or for vehicle with air bag system, referring to “Contact Coil and Combination Switch Assembly” in Section 3C1.

[A] : LH steering vehicle shown

Hazard warning switch

REMOVAL

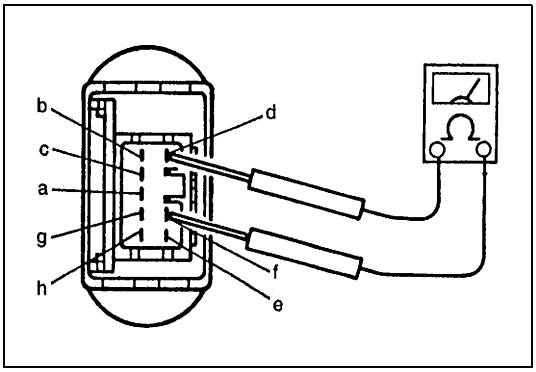


1) Remove meter cluster.
2) Pull hazard warning switch out of instrument panel.
3) Disconnect coupler from hazard warning switch.
4) Remove hazard warning switch.

INSTALLATION

Reverse removal procedure.

1. Meter cluster
2. Hazard warning switch



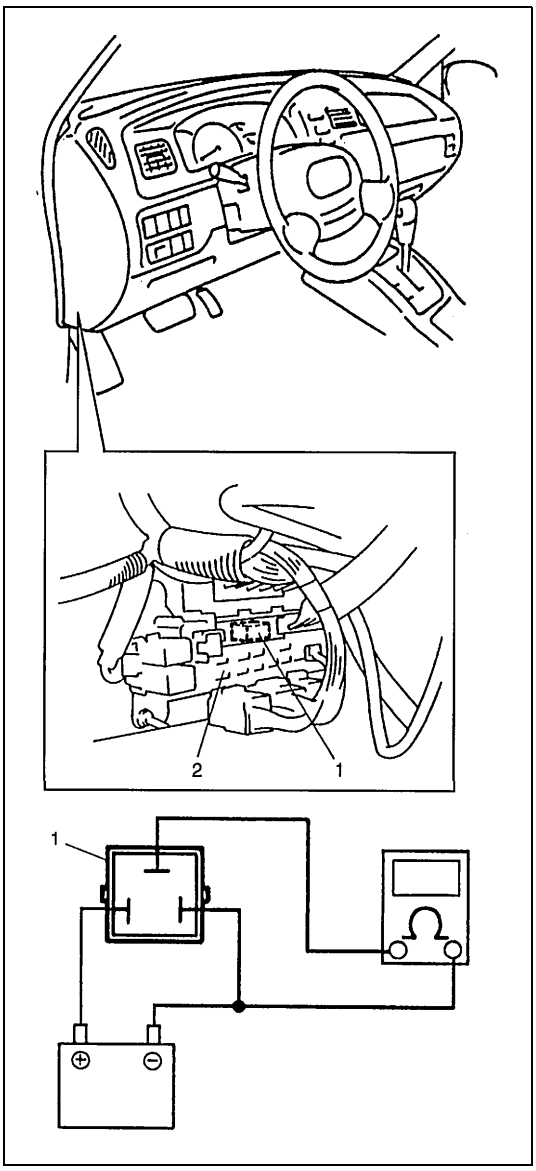
INSPECTION

Check for continuity between terminals at each switch position shown below. If check result is not as specified, replace siwtch.

	a	b	c	d	e	f	g	h
OFF	○—○						○—⓪—○	
ON		○—○	○—○	○—○	○—○		○—⓪—○	

Turn signal and hazard warning relay

INSPECTION



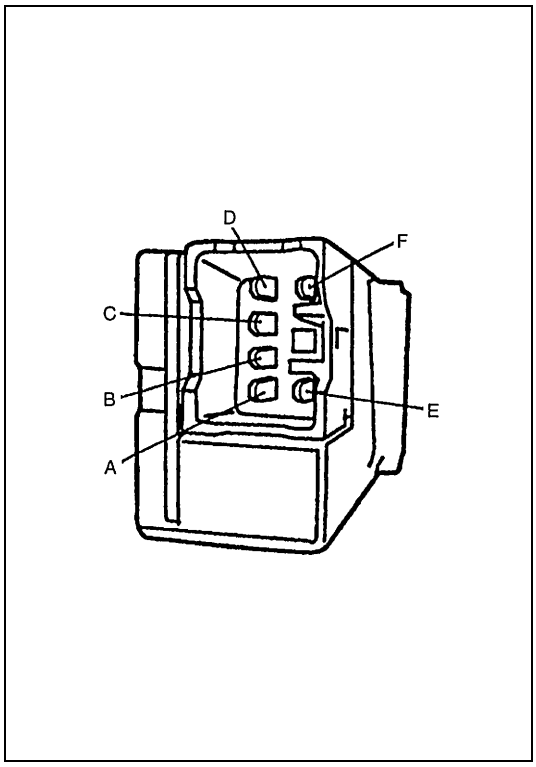
Connect battery and tester as shown.
Unless a continued click sound is heard, replace relay.

1.	Turn signal and hazard warning relay
2.	Junction box

Rear Fog Light (If Equipped)

Rear fog light switch

INSPECTION



Check for continuity between terminals at each switch position shown below. Hold the switch button (ON or OFF) pushed in during checking switch.

RR FOG SW \ OFF SW \ TERMINAL		B	E	D	A	C	F
FREE	FREE						
	PUSH						
PUSH	FREE						
	PUSH						

NOTE:

Rear fog light lights up only when headlights (low or high beams) or front fog lights (if equipped) are ON.
Rear fog lights turns OFF automatically when headlights or front lights are turned OFF.

SECTION 8C

INSTRUMENTATION/DRIVER INFORMATION

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

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OTHER THAN CANVAS TOP MODEL

General Description

Cautions in Servicing

Refer to Section 8A.

Symbols and Marks

Refer to Section 8A.

Abbreviations

Refer to Section 8A.

Wiring Color Symbols

Refer to Section 8A.

Join Connector

Refer to Section 8A.

Fuse Box and Relay

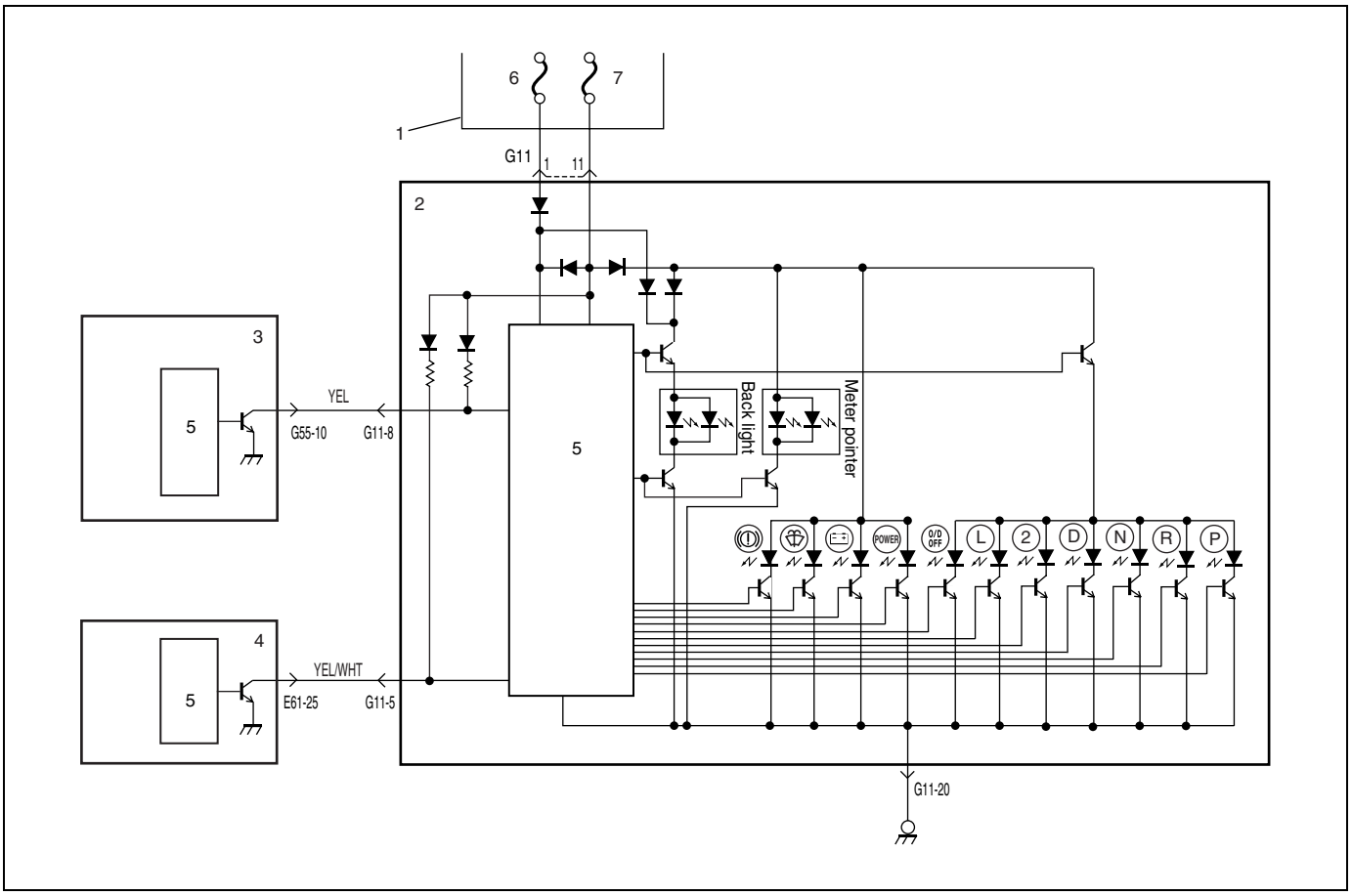
Refer to Section 8A.

Power Supply Diagram

Refer to Section 8A.

BCM-METER Signal Circuit Construction

- BCM-METER signal is a voltage signal (0 – 12 volts) which is outputted from BCM to combination meter through the signal circuit, based on charging system warning signal, Brake indicator signal, windshield washer level switch signal and light switch cognition.
- CPU in combination meter operates charging system warning indicator, Brake indicator and washer level indicator by analyzing BCM-METER signal.
- If CPU in combination meter detects a malfunction of BCM-METER signal, it makes each lights in combination meter turn OFF or flashing at the same time as follows when ignition switch is turned to ON position and warn the driver of such occurrence of trouble.
  - Charging system warning indicator keep flashing
  - Brake indicator keep flashing
  - Washer level indicator keep flashing



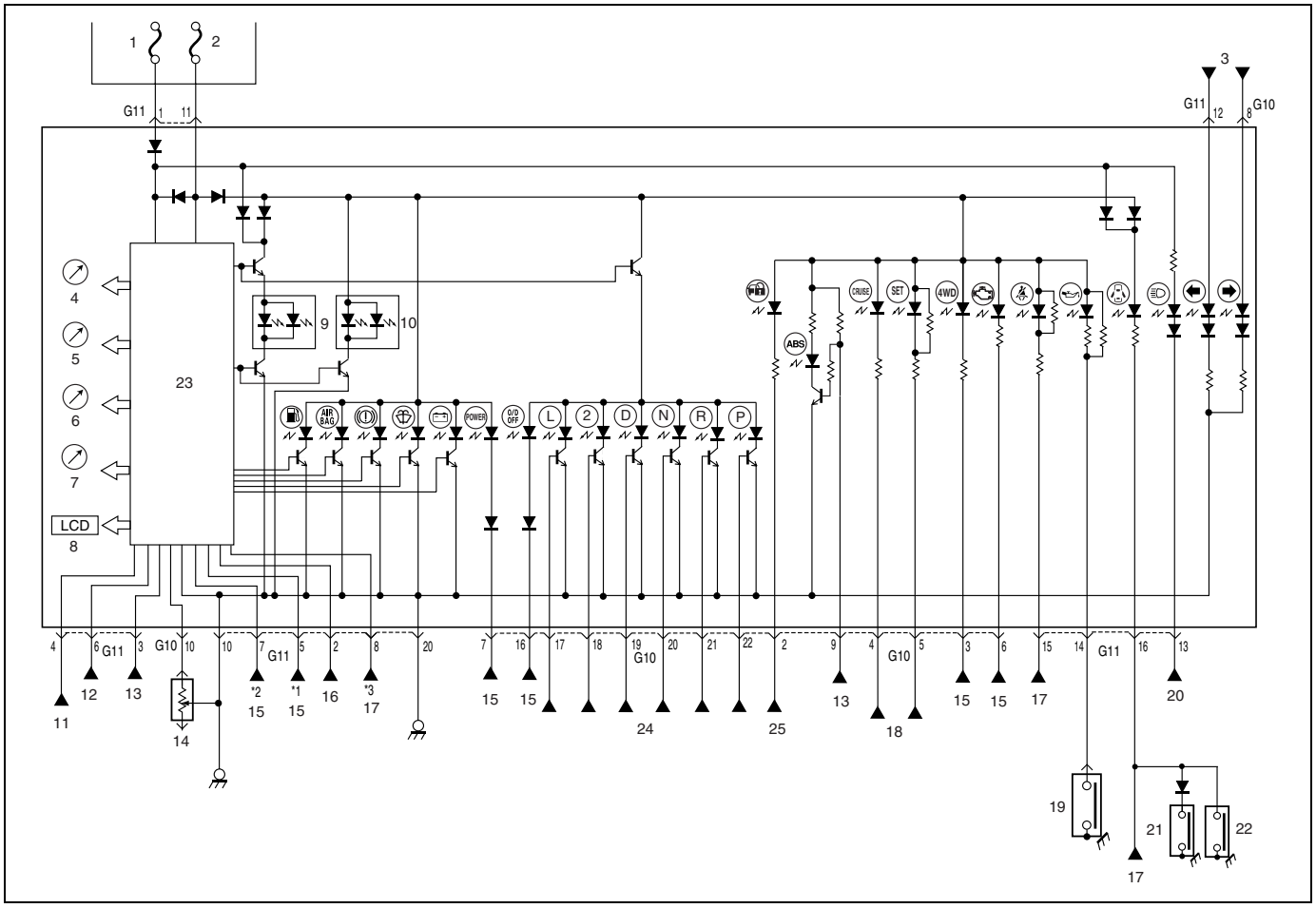
1. Circuit fuse box	3. BCM	5. CPU	7. METER fuse	9. Meter pointer
2. Combination meter	4. ECM (PCM)	6. RADIO DOME fuse	8. Back light	

Combination Meter

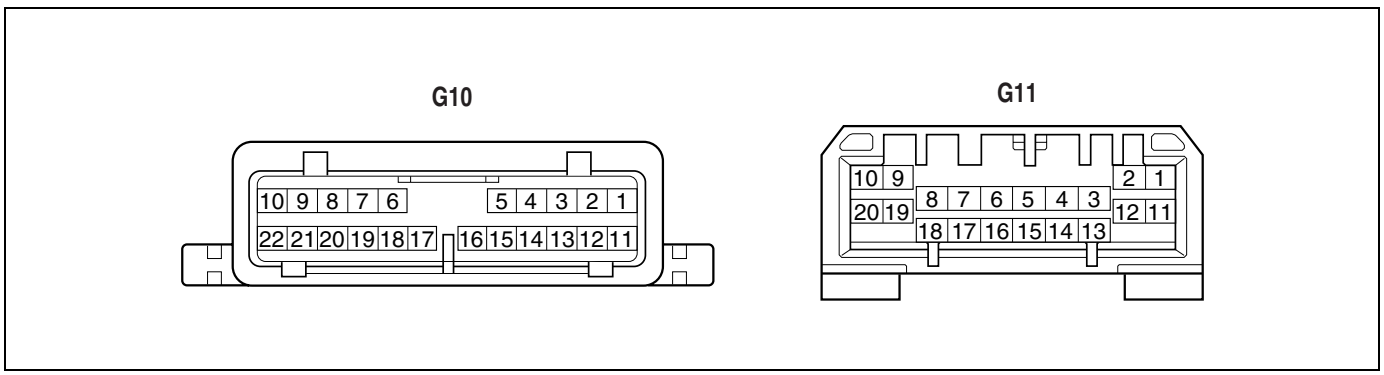
Combination meter internal circuits and couplers

NOTE:

Terminal arrangement of coupler viewed from harness side.



1. RADIO DOME fuse	7. ECT meter	13. ABS control module	19. Oil pressure switch	25. Immobilizer control module
2. METER fuse	8. ODO-TRIP	14. Fuel level gauge	20. Lighting switch	*1. Serial communication
3. Turn signal relay	9. Back light	15. ECM	21. Driver side door switch	*2. Engine revolution signal
4. Tachometer	10. Meter pointer	16. SDM	22. Except driver side door switch	*3. Serial communication
5. Speedometer	11. Illumination controller	17. BCM	23. CPU	
6. Fuel meter	12. VSS	18. Cruise control module	24. Transmission range switch	



Terminal	Wire Color	Circuit
G10-1	–	–
G10-2	PPL	To Immobilizer control module (if equipped)
G10-3	ORN/BLK	To ECM (PCM) (4WD indicator control signal)
G10-4	LT GRN/WHT	To Cruise control module (CRUISE indicator control signal) (if equipped)
G10-5	GRY/YEL	To Cruise control module (SET indicator control signal) (if equipped)
G10-6	PPL/YEL	To ECM (PCM) (CHECK ENGINE indicator control signal)
G10-7	GRY/BLU	To PCM (POWER indicator control signal)
G10-8	GRN/YEL	To combination switch (Turn R signal indicator control signal)
G10-9	BLU/ORN	To ABS control module (ABS indicator control signal) (if equipped)
G10-10	BLU/WHT	To fuel level gauge
G10-11	–	–
G10-12	–	–
G10-13	–	–
G10-14	–	–
G10-15	PPL/RED	To data link connector
G10-16	WHT/BLK	To PCM (O/D OFF indicator control signal)
G10-17	GRN/BLU	To transmission range sensor (“L” range indicator control signal)
G10-18	GRN/ORN	To transmission range sensor (“2” range indicator control signal)
G10-19	YEL/GRN	To transmission range sensor (“D” range indicator control signal)
G10-20	ORN/BLU	To transmission range sensor (“N” range indicator control signal)
G10-21	RED	To transmission range sensor (“R” range indicator control signal)
G10-22	ORN/GRN	To transmission range sensor (“P” range indicator control signal)
G11-1	WHT	To RADIO DOME fuse (+BB)
G11-2	BLU	To SDM (if equipped)
G11-3	BRN	To ABS control module (EBD warning indicator control signal) (if equipped)
G11-4	RED/GRN	To illumination controller (if equipped)
G11-5	YEL/WHT	To ECM (PCM) (ECT meter signal)
G11-6	BLU/YEL	To VSS
G11-7	BRN	To ECM (PCM) (Tachometer signal)
G11-8	YEL	To BCM (Brake fluid level, Parking brake, Charge warning, Washer level indicator control and Light switch cognition signal)
G11-9	–	–
G11-10	BLK/YEL	To Fuel level gauge ground
G11-11	BLK/WHT	To METER fuse (IG1)
G11-12	GRN/ORN	To combination switch (Turn L signal indicator control signal)
G11-13	RED	To combination switch (High beam indicator control signal)
G11-14	YEL/BLK	To oil pressure switch
G11-15	GRN	To BCM (Driver side seat belt reminder control signal)
G11-16	BLK/RED	To door switch
G11-17	–	–
G11-18	–	–
G11-19	–	–
G11-20	BLK	To ground

Diagnosis

Speedometer and VSS

NOTE:

Before troubleshooting of this system, check whether DTC P0500 is outputted from ECM (PCM) referring to "DTC Check" in Section 6 or "DTC check" in Section 6-1. If the DTC is outputted, repair vehicle speed signal circuit referring to "DTC P0500: Vehicle Speed Sensor (VSS) Malfunction" in Section 6 or "DTC P0500: Vehicle Speed Sensor (VSS) Malfunction" in Section 6-1.

Condition	Possible Cause	Correction
Speedometer shows no operation or incorrect operation	"METER" fuse blown	After checking short circuit, replace "METER" fuse.
	Wiring or grounding faulty	Repair circuit.
	VSS faulty	Check VSS referring to "DTC P0500: Vehicle Speed Sensor (VSS) Malfunction" in Section 6 or "DTC P0500: Vehicle Speed Sensor (VSS) Malfunction" in Section 6-1.
	Combination meter faulty	Replace combination meter.

Tachometer

Condition	Possible Cause	Correction
Tachometer shows no operation or incorrect operation	"METER" fuse blown	After checking short circuit, replace "METER" fuse.
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	ECM (PCM) faulty	Check ECM circuit referring to "Inspection of ECM (PCM) and Its Circuits" in Section 6 or "Inspection of ECM (PCM) and Its Circuits" in Section 6-1.

Engine Coolant Temperature (ECT) Meter

NOTE:

When ECT meter signal circuit is shorted to ground circuit and/or open circuit, ECT meter indicates cold even if engine coolant temperature rises.

Condition	Possible Cause	Correction
Engine coolant temperature (ECT) meter shows no operation or incorrect operation	"METER" fuse blown	After checking short circuit, replace "METER" fuse.
	ECT sensor faulty	Check ECT sensor referring to "Engine Coolant Temperature (ECT) Sensor Inspection" in Section 6 or "Engine Coolant Temperature (ECT) Sensor Inspection" in Section 6-1.
	ECT (PCM)-METER signal circuit faulty	Check ECM (PCM)-METER signal circuit.
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	HVAC control module faulty (Auto A/C model only)	Check HVAC control module referring to "HVAC Control Module and Its Circuits Inspection".
	ECM (PCM) faulty	Check ECM circuit referring to "Inspection of ECM (PCM) and Its Circuits" in Section 6 or "Inspection of ECM (PCM) and Its Circuits" in Section 6-1.

Main Beam (High Beam) Indicator Lamp

Condition	Possible Cause	Correction
Main beam (High beam) indicator lamp does not come ON	"RADIO/DOME" fuse blown	After checking short circuit, replace "RADIO/DOME" fuse.
	Wiring or grounding faulty	Repair circuit.
	Headlight switch faulty	Check headlight switch referring to "Headlight Switch (in Lighting Switch)" in Section 8B.
	Combination meter faulty	Replace combination meter.
Main beam (High beam) indicator lamp stay ON	Wiring faulty	Repair circuit.
	Lighting switch in combination switch faulty	Check combination switch referring to "Headlight Switch (in Lighting Switch)" in Section 8B.
	Combination meter faulty	Replace combination meter.

Turn signal Indicator

Condition	Possible Cause	Correction
Turn signal indicator does not flashing	Turn signal and hazard warning relay faulty	Check turn signal and hazard warning relay referring to “Turn Signal and Hazard Warning Lights System Circuit” in Section 8B.
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
Turn signal indicator stay ON	Turn signal and hazard warning relay faulty	Check turn signal and hazard warning relay referring to “Turn SIgnal and Hazard Warning Lights System Circuit” in Section 8B.
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.

4WD Indicator

Condition	Possible Cause	Correction
4WD indicator does not come ON	“METER” fuse blown	After checking short circuit, replace “METER” fuse.
	4WD switch faulty	Check 4WD switch referring to “Transfer 4WD Switch” in Section 7D.
	Wiring or Grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	ECM faulty	Check ECM circuit referring to “Inspection of ECM (PCM) and Its Circuits” in Section 6 or “Inspection of ECM (PCM) and Its Circuits” in Section 6-1.
4WD indicator stay ON	4WD switch faulty	Check 4WD switch referring to “Transfer 4WD Switch Inspection”.
	Wiring or Grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	ABS hydraulic unit/control module	Replace ABS hydraulic unit/control module.
	ECM faulty	Check ECM circuit referring to “Inspection of ECM (PCM) and Its Circuits” in Section 6 or “Inspection of ECM (PCM) and Its Circuits” in Section 6-1.

Low Fuel Warning Lamp

NOTE:

- **Confirm that fuel meter is in good condition before diagnosis.**
- **When fuel level meter circuit is shorted to ground circuit, fuel level meter indicates empty and low fuel warning lamp comes ON even if fuel tank does not empty.**
- **The low fuel warning lamp comes ON when the fuel level is lower than specification below.**

Low fuel warning light operation	Fuel level in fuel tank	Fuel level sensor resistance
OFF	Approx. 10.5 liter	Approx. 18 – 103 Ω
ON	Approx. 0 – 10.5 liter	Approx. 103 – 112 Ω

Condition	Possible Cause	Correction
Low fuel warning lamp does not come ON when fuel level is lower than specification	"METER" fuse blown	After checking short circuit, replace "METER" fuse.
	Wiring or grounding faulty	Repair.
	Combination meter faulty	Replace combination meter.
Low fuel warning lamp comes ON steady	Low fuel	Refill fuel.
	Fuel level sensor (gauge unit) faulty	Check fuel level sensor (gauge unit) referring to "Fuel Level Sensor (Sender Gauge)" in this section.
	Wiring or grounding faulty	Repair.
	Combination meter faulty	Replace combination meter.

Driver Side Seat Belt Reminder

NOTE:

Before troubleshooting of this system, check whether DTC B1151 is outputted from BCM referring to "DTC Check". If the DTC is outputted, repair driver side seat belt indicator circuit referring to "DTC B1151 (No.51): Driver Side Seat Belt Indicator Circuit Open".

Condition	Possible Cause	Correction
Drive side seat belt reminder does not come ON	"METER" fuse blown	After checking short circuit, replace "METER" fuse.
	Seat belt buckle faulty	Check seat belt buckle referring to "Seat Belt Buckle Switch" in this section.
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	BCM faulty	Check BCM referring to "Inspection of BCM and Its Circuits".
Driver side seat belt reminder come ON steady	Seat belt buckle switch faulty	Check seat belt buckle referring to "Seat Belt Buckle Switch" in this section.
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	BCM faulty	Check BCM referring to "Inspection of BCM and Its Circuits".

Open Door Warning Lamp

Condition	Possible Cause	Correction
Open door warning lamp stay ON	Door switch faulty	Check door switch referring to “Door Switch” in this section.
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
Open door warning lamp does not ON	“RADIO/DOME” fuse blown	After checking short circuit, replace “RADIO/DOME” fuse.
	Door switch faulty	Check door switch referring to “Door Switch” in this section.
	Combination meter faulty	Replace combination meter.

Engine Oil Pressure Indicator

Condition	Possible Cause	Correction
Engine oil pressure indicator does not come ON	“METER” fuse blown	After checking short circuit, replace “METER” fuse.
	Oil pressure switch faulty	Check oil pressure switch referring to “Oil Pressure Switch” in this section.
	Wiring faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
Engine oil pressure indicator stay ON	Oil pressure switch faulty	Check oil pressure switch referring to “Oil Pressure Switch” in this section.
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.

A/T Selector Position Indicator

Condition	Possible Cause	Correction
Selected A/T selector position indicator does not come ON	Transmission range sensor (switch) faulty	Check transmission range sensor (switch) referring to “DTC P0705 Transmission Range Sensor Circuit Malfunction” in Section 7B1.
	Wiring faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	PCM faulty	Check PCM referring to “Inspection of ECM (PCM) and Its Circuits” in Section 6 or “Inspection of ECM (PCM) and Its Circuits” in Section 6-1.
All A/T selector position indicators does not come ON	“METER” fuse blown	After checking short circuit, replace “METER” fuse.
	Transmission range sensor (switch) faulty	Check transmission range sensor (switch) referring to “DTC P0705 Transmission Range Sensor Circuit Malfunction” in Section 7B1.
	Combination meter faulty	Replace combination meter.
	PCM faulty	Check PCM referring to “Inspection of ECM (PCM) and Its Circuits” in Section 6 or “Inspection of ECM (PCM) and Its Circuits” in Section 6-1.

Charge Warning Indicator Lamp

Condition	Possible Cause	Correction
Charge warning indicator lamp stay ON	Charging system faulty	Check charging system.
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	BCM faulty	Check BCM referring to “Inspection of BCM and Its Circuits”.
Charge warning indicator lamp keep flashing	BCM-METER signal circuit faulty	Check BCM-METER signal circuit referring to “BCM-METER Signal Circuit” in this section.
	Combination meter faulty	Replace combination meter.
	BCM faulty	Check BCM referring to “Inspection of BCM and Its Circuits” in Section 8H.

O/D OFF Indicator Lamp

Condition	Possible Cause	Correction
O/D OFF indicator lamp does not come ON (when O/D OFF switch is pushed on)	"METER" fuse blown	After checking short circuit, replace "METER" fuse.
	O/D OFF switch faulty	Check O/D OFF switch referring to "O/D Cut Switch" in Section 7B1.
	Wiring faulty or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	PCM faulty	Check PCM referring to "Inspection of ECM (PCM) and Its Circuits" in Section 6 or "Inspection of ECM (PCM) and Its Circuits" in Section 6-1.
O/D OFF indicator lamp stay ON	O/D OFF switch faulty	Check O/D OFF switch referring to "O/D Cut Switch" in Section 7B1.
	Wiring faulty or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	PCM faulty	Check PCM referring to "Inspection of ECM (PCM) and Its Circuits" in Section 6 or "Inspection of ECM (PCM) and Its Circuits" in Section 6-1.
O/D OFF indicator lamp keep flashing	A/T system faulty	See NOTE.

POWER Indicator Lamp

Condition	Possible Cause	Correction
POWER indicator does not come ON	"METER" fuse blown	After checking short circuit, replace "METER" fuse.
	A/T mode switch faulty	Check A/T mode switch referring to "Power/Normal Change Switch" in Section 7B1.
	Wiring faulty or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	PCM faulty	Check PCM referring to "Inspection of ECM (PCM) and Its Circuits" in Section 6 or "Inspection of ECM (PCM) and Its Circuits" in Section 6-1.
POWER indicator lamp stay ON	A/T mode switch faulty	Check A/T mode switch referring to "Power/Normal Change Switch" in Section 7B1.
	Wiring faulty or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	PCM faulty	Check PCM referring to "Inspection of ECM (PCM) and Its Circuits" in Section 6 or "Inspection of ECM (PCM) and Its Circuits" in Section 6-1.

Brake Warning Lamp

Condition	Possible Cause	Correction
Brake warning lamp does not come ON (when brake fluid low level and/or parking brake lever pull up)	"METER" fuse blown	After checking short circuit, replace "METER" fuse.
	Wiring or grounding faulty	Repair circuit.
	Parking brake switch faulty	Check parking brake switch referring to "Parking Brake Switch" in this section.
	Brake fluid level switch faulty	Check brake fluid level switch referring to "Brake Fluid Level Switch" in this section.
	Combination meter faulty	Replace combination meter.
	BCM faulty	Check BCM referring to "Inspection of BCM and Its Circuits" in Section 8H.
Brake warning lamp stay ON	Parking brake switch faulty	Check parking brake switch referring to "Parking Brake Switch" in this section.
	Brake fluid level switch faulty	Check brake fluid level switch referring to "Brake Fluid Level Switch" in this section.
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	BCM faulty	Check BCM referring to "Inspection of BCM and Its Circuits" in Section 8H.
Brake warning lamp keep flashing	ABS control module/hydraulic unit faulty	Replace ABS control module/hydraulic unit
	BCM-METER signal circuit faulty	Check BCM-METER signal circuit referring to "BCM-METER Signal Circuit" in this section.
	Combination meter faulty	Replace combination meter.
	BCM faulty	Check BCM referring to "Inspection of BCM and Its Circuits" in Section 8H.

Windshield Washer Level Indicator Lamp

Condition	Possible Cause	Correction
Windshield washer level indicator lamp does not come ON (when windshield washer fluid low level)	"METER" fuse blown	After checking short circuit, replace "METER" fuse.
	Windshield washer level switch faulty	Check windshield washer level switch referring to "Windshield Washer Level Switch" in this section.
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	BCM faulty	Check BCM referring to "Inspection of BCM and Its Circuits" in Section 8H.
Windshield washer level indicator lamp stay ON	Windshield washer level switch faulty	Check windshield washer level switch referring to "Windshield Washer Level Switch" in this section.
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	BCM faulty	Check BCM referring to "Inspection of BCM and Its Circuits" in Section 8H.
Windshield washer level indicator lamp keep flashing	BCM-METER signal circuit faulty	Check BCM-METER signal circuit referring to "BCM-METER Signal Circuit" in this section.
	Combination meter faulty	Replace combination meter.
	BCM faulty	Check BCM referring to "Inspection of BCM and Its Circuits" in Section 8H.

Clock/Temp. Display (in BCM)

NOTE:

This thermometer indicates the ambient temperature in front of the radiator. Under any one of the following listed conditions, however, even when the ambient temperature goes up, the thermometer display does not rise so as to correct the rise of the ambient temperature caused by the radiant heat of the engine. When the ambient temperature drops, the thermometer reading follows the change in the temperature.

Be sure to bear this in mind when diagnosing trouble.

- **The vehicle speed is 30 km/h (18 mph) or lower.**
- **VSS signal is faulty.**

Condition	Possible Cause	Correction
No display of clock/ temp. display	"DOOR LOCK" and/or "METER" fuse blown	After checking short circuit, replace "DOOR LOCK" and/or "METER" fuse.
	Wiring or grounding faulty	Repair circuit.
	Clock/temp. display (in BCM) faulty	Replace BCM.
Incorrect thermometer display	Outside air temperature sensor faulty	Check outside air temperature sensor referring to "Outside Air Temperature Sensor Inspection".
	VSS signal faulty	Check VSS referring to "DTC P0500: Vehicle Speed Sensor (VSS) Malfunction" in Section 6 or "DTC P0500: Vehicle Speed Sensor (VSS) Malfunction" in Section 6-1.
	Wiring or grounding faulty	Repair circuit.
No charging display at –40°C (–26°F))	Outside air temperature is less than –40°C (–26°F)	–
	Outside air temperature sensor faulty	Check outside air temperature sensor referring to "Outside Air Temperature Sensor Inspection".
	Outside air temperature sensor wiring circuit open circuit and/or short to power circuit	Check circuit referring to "DTC B1141/BN1142 (No.41/42): Outside Air Temperature (Ambient Temp.) Sensor Circuit Open/Short to Ground" in Section 8H.
No charging display at 60°C (140°F)	Outside air temperature is less than 60°C (140°F)	–
	Outside air temperature sensor faulty	Check outside air temperature sensor referring to "Outside Air Temperature Sensor Inspection".
	Outside air temperature sensor wiring circuit open circuit and/or short to power circuit	Check circuit referring to "DTC B1141/B1142 (No.41/42): Outside Air Temperature (Ambient Temp.) Sensor Circuit Open Short to Ground" in Section 8H.

Radio

Condition	Possible Cause	Correction
Poor radio reception	Out of service area (Poor location)	–
	Antenna faulty	Replace antenna.
	Electronic part/system faulty	Repair or replace electrical part/system referring to below NOTE.
	Wiring and/or grounding faulty	Repair as necessary.
	Radio assembly faulty	Replace radio assembly.
Radio does not operate and speaker does not sound	"CIGAR" and/or "RADIO DOME" fuse(s) blown	Replace fuse(s) to check for short.
	Wiring and/or grounding faulty	Repair as necessary.
	Radio assembly faulty	Replace radio assembly.
Radio does not operate, but speaker sound	Wiring and/or grounding faulty	Repair as necessary.
	Radio assembly faulty	Replace radio assembly.
Radio is operative, but all speakers does not sound	Wiring and/or grounding faulty	Repair as necessary.
	Radio assembly faulty	Replace radio assembly.
Individual speaker is noisy or inoperative	Speaker faulty	Replace speaker.
	Wiring and/or grounding faulty	Repair as necessary.
	Radio assembly faulty	Replace radio assembly.
Sound quality is poor	Out of service area (Poor location)	–
	Speaker installed incorrectly	Install correctly.
	Speaker faulty	Replace speaker.
	Wiring and/or grounding faulty	Repair as necessary.
	Radio assembly faulty	Replace radio assembly.

NOTE:

Electronic part/system with undiagnosed problem may cause electromagnetic interference. Electromagnetic interference condition may have poor radio reception. To test for presence of electromagnetic interference in part/system, perform the following procedures.

- **Turn ignition switch to OFF.**
- **Systematically disconnect the electronic part/system connector(s) one at a time.**
- **Turn ignition switch to ON.**
- **Check any improvement in radio reception.**

CD Player

Condition	Possible Cause	Correction
CD-ROM does not insert	Another CD-ROM already inserted	Eject CD-ROM.
	"CIGAR" fuse blown	Replace fuse to check for short.
	Extraneous material come to be mixed in CD player	Clear extraneous material from CD player or replace radio assembly.
	Wiring and/or grounding faulty	Repair as necessary.
	Radio assembly faulty	Replace radio assembly.
CD-ROM does not eject	"CIGAR" fuse blown	Replace fuse to check for short.
	Wiring and/or grounding faulty	Repair as necessary.
	Extraneous material come to be mixed in CD player	Clear extraneous material from CD player or replace radio assembly.
	Radio assembly faulty	Replace radio assembly
CD player does not load CD-ROM	CD-ROM faulty	–
	CD-ROM inserted with incorrect side up	Insert correctly.
	Temperature in cabin is too hot	–
	Water droplets form on internal lens	Dry about 1 hour with power on.
	Radio assembly faulty	Replace radio assembly.
Sound skips or is noisy	CD-ROM faulty	–
	Driving vibration	–
	Water droplets form on internal lens	Dry about 1 hour with power on.
	Radio assembly installed incorrectly	Install correctly.
	Radio assembly faulty	Replace radio assembly.
CD player is operative, but all speakers does not sound	Wiring and/or grounding faulty	Repair as necessary.
	Radio assembly faulty	Replace radio assembly.
Individual speaker is noisy or inoperative	Speaker faulty	Replace speaker.
	Wiring and/or grounding faulty	Repair as necessary.
	Radio assembly faulty	Replace radio assembly.
Sound quality or volume is poor	CD-ROM faulty	–
	Speaker installed incorrectly	Install correctly.
	Speaker faulty	Replace speaker.
	Wiring and/or grounding faulty	Repair as necessary.

Tape Player

Condition	Possible Cause	Correction
Cassette tape does not insert	Another cassette tape already inserted	Eject cassette tape.
	Cassette tape jammed	Replace cassette tape.
	"CIGAR" fuse blown	Replace fuse to check for short.
	Extraneous material come to be mixed in tape player	Clear extraneous material from tape Player or replace radio assembly.
	Wiring and/or grounding faulty	Repair as necessary.
	Radio assembly faulty	Replace radio assembly.
Cassette tape does not eject	"CIGAR" fuse blown	Replace fuse to check for short.
	Extraneous material come to be mixed in tape player	Clear extraneous material from tape player or replace radio assembly.
	Wiring and/or grounding faulty	Repair as necessary.
	Radio assembly faulty	Replace radio assembly.
Tape player does not load cassette tape	Cassette tape faulty	–
	Radio assembly faulty	Replace radio assembly.
Tape player jam cassette tape or malfunction with tape speed/ auto-reverse	Cassette tape faulty	–
	Extraneous material come to be mixed in tape player	Clear extraneous material from tape player or replace radio assembly.
	Tape player head dirty	Clean tape player head.
	Radio assembly installed incorrectly	Install correctly.
	Radio assembly faulty	Replace radio assembly.
Tape player is operative, but all speakers does not sound	Wiring and/or grounding faulty	Repair as necessary.
	Radio assembly faulty	Replace radio assembly.
Individual speaker is noisy or inoperative	Speaker faulty	Replace speaker.
	Wiring and/or grounding faulty	Repair as necessary.
	Radio assembly faulty	Replace radio assembly.
Sound quality or volume is poor	Cassette tape faulty	–
	Tape player head dirty	Clean tape player head.
	Speaker installed incorrectly	Install correctly.
	Speaker faulty	Replace speaker.
	Wiring and/or grounding faulty	Repair as necessary.

Remote Audio Control Switch

Condition	Possible Cause	Correction
Audio system is operative, but remote control switch does not control audio system	Remote audio control switch faulty	Replace remote audio control switch.
	Contact coil faulty	Replace contact coil.
	Wiring and/or grounding faulty	Repair as necessary.
	Radio assembly faulty	Replace radio assembly.

On-Vehicle Service

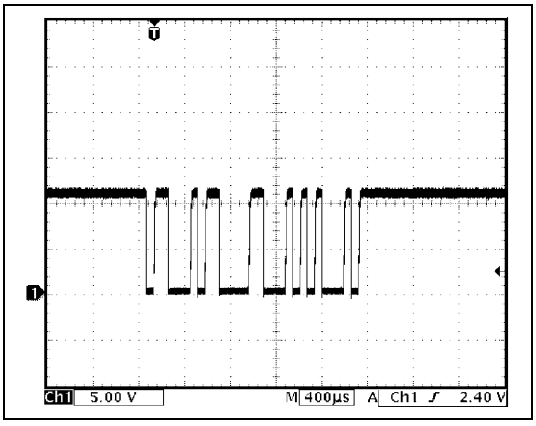
BCM-METER Signal Circuit

INSPECTION

NOTE:

- **When BCM-Meter signal circuit is malfunction, combination meter indicates the following condition at the same time. Be sure to bear this mind when diagnosing trouble.**
  - **– Charge warning indicator keeps flashing**
  - **– DRL indicator keeps flashing**
  - **– Brake indicator keeps flashing**
  - **– Windshield washer level indicator keeps flashing**
- **If charging system warning indicator, DRL indicator, Brake indicator and washer level indicator, display abnormal condition of BCM-METER signal circuit described in "Description", perform the following procedure.**

1) Check open, short to ground and short to power circuit of BCM-METER signal circuit wire harness ("YEL") between "G55-10" and "G11-8" terminals.
   If OK, go to next step.
   If found abnormal condition, repair circuit.
2) Substitute a known-good BCM, and check that related indicator lights come to good conditions.
   If found abnormal condition, go to next step.
3) Substitute a known-good combination meter, and recheck that the above indicators and warning operate in normal.

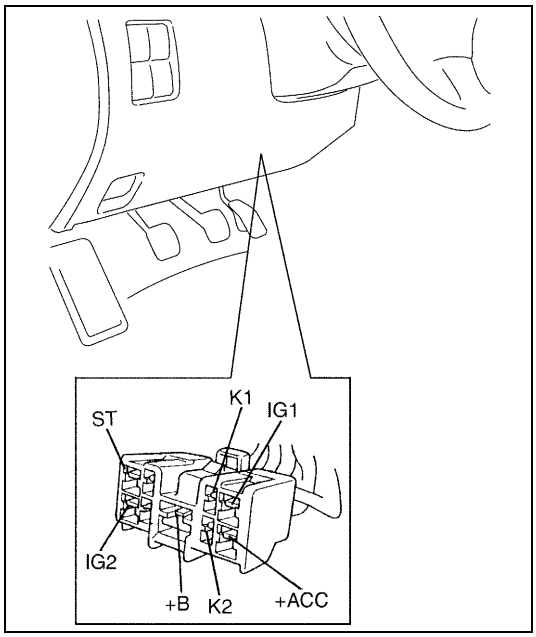


Measurement terminal	CH1:
Oscilloscope setting	CH1: 5 V / DIV TIME: 400 µs / DIV
Measurement condition	• Ignition switch ON • Parking brake is applied • Washer level switch is full position

Ignition (Main) Switch

INSPECTION

1) Disconnect negative cable at battery.
2) Disable air bag system. Refer to “Disabling Air Bag System” in Section 10B.
3) Disconnect main switch lead wire coupler.



4) Check continuity between terminals. Use circuit tester to check continuity at each switch position. If continuity is not obtained according to the table below, replace ignition (main) switch.

Terminal / Wire color / Key / Position		+B	+ACC	IG1-1	IG2	ST	K1	K2
		WHY/GRN	BLU	BLU/BLK	YEL/BLK	BLK/YEL	BLK	BLK
OUT	LOCK	○						
IN	ACC	○	○					
	ON	○	○	○	○		○	○
	START	○		○		○		

REMOVAL

1) Disconnect negative cable at battery.
2) Disable air bag system. Refer to “Disabling Air Bag System” in Section 10B.
3) Remove steering lock assembly (ignition switch) from steering column referring to “Steering Lock Assembly (Ignition Switch)” in Section 3C.

INSTALLATION

1) Install steering lock (ignition switch) to steering column referring to “Steering Lock Assembly (Ignition Switch)” in Section 3C.
2) Enable air bag system. Refer to “Enabling Air Bag System” in Section 10B.

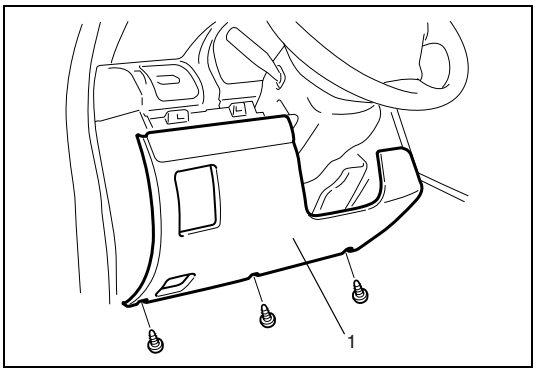
NOTE:

When installing steering column, special care must be taken for tightening sequence and its torque.

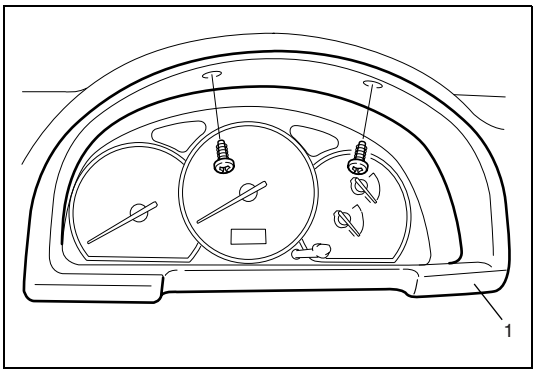
Combination Meter

REMOVAL

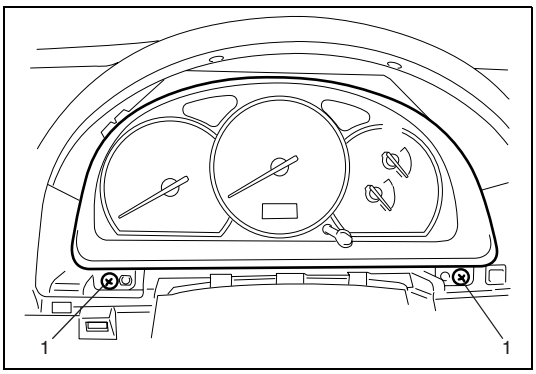
1) Disconnect negative cable (–) at battery.
2) Disable air bag system. Refer to “Disabling Air Bag System” in Section 10B.
3) Tilt steering column fully down position.



4) Remove steering column hole cover (1).



5) Remove combination meter cluster panel (1).



6) Remove screws (1) fastening combination meter.
7) Disconnect couplers from combination meter.
8) Remove combination meter from instrument panel.

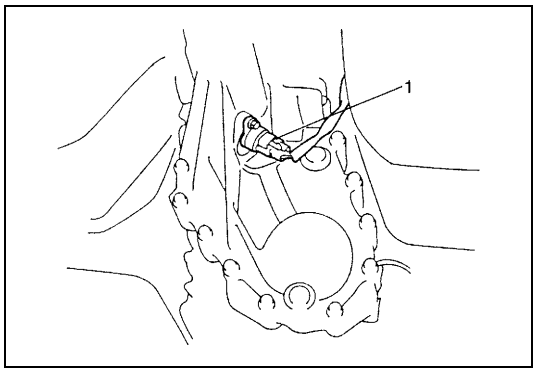
INSTALLATION

Reverse removal procedure for installation, noting the following.

- Be sure to enable air bag system after installation. Refer to “Enabling Air Bag System” in Section 10B.

Vehicle Speed Sensor (VSS)

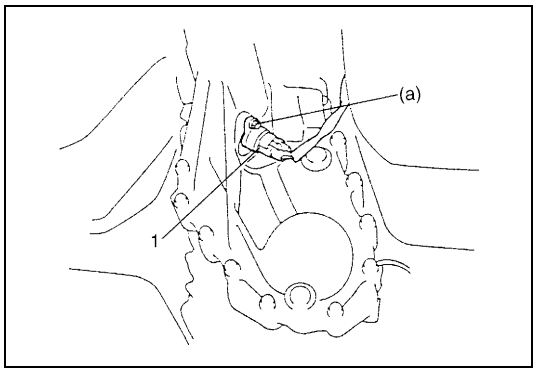
REMOVAL



1) Hoist vehicle.
2) Disconnect coupler from VSS (1).
3) Remove VSS (1).

INSTALLATION

Reverse removal procedure for installation noting following point.



- Tighten vehicle speed sensor bolt to specification.

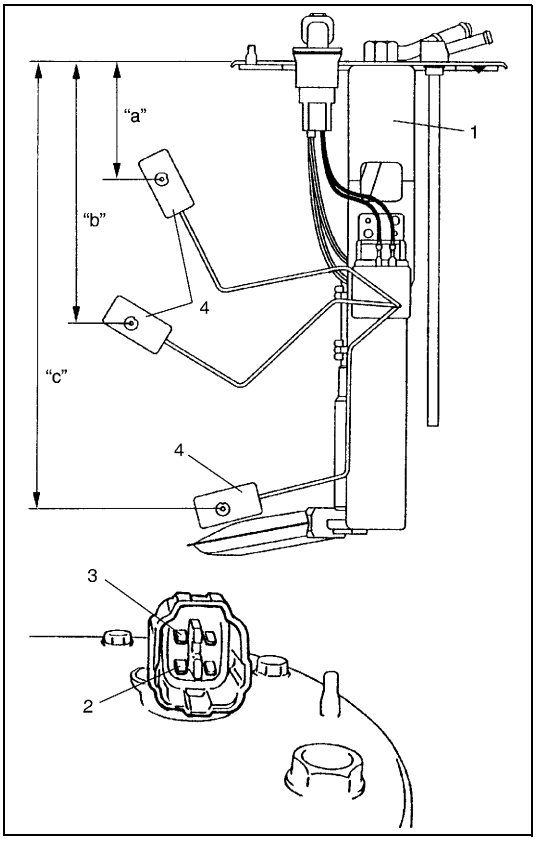
Tightening torque
Vehicle speed sensor bolt
(a): 5.5 N·m (0.55 kg-m, 4.0 lb-ft)

1. VSS

Fuel Level Sensor (Sender Gauge)

INSPECTION

1) Remove fuel pump assembly referring to “Fuel Pump” in Section 6C.
2) Use an ohmmeter to confirm that resistance of sender gauge unit changes with change of float position.
   If measured value is out of specification, replace fuel sender gauge.

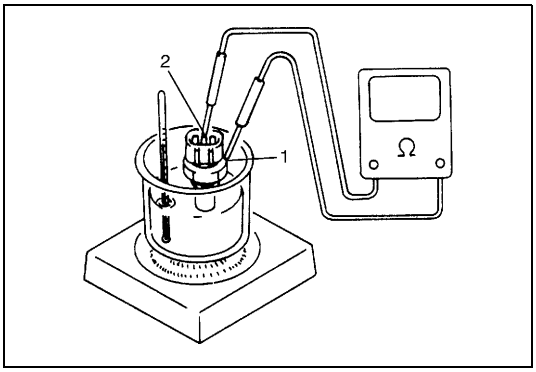


Float Position			Fuel Meter	Resistance (Ω)
	56 L model	66 L model		
“a”	90.1 mm (3.55 in.)	55 mm (2.16 in.)	F	17 – 19
“b”	157.2 mm (6.20 in.)	139.6 mm (5.50 in.)	1/2	62 – 68
“c”	254.9 mm (10.04 in.)	254.9 mm (10.04 in.)	E	111 – 113

1. Fuel pump assembly
2. Fuel level gauge (–) terminal
3. Fuel level gauge (+) terminal
4. Float

Engine Coolant Temperature (ECT) Sensor

INSPECTION



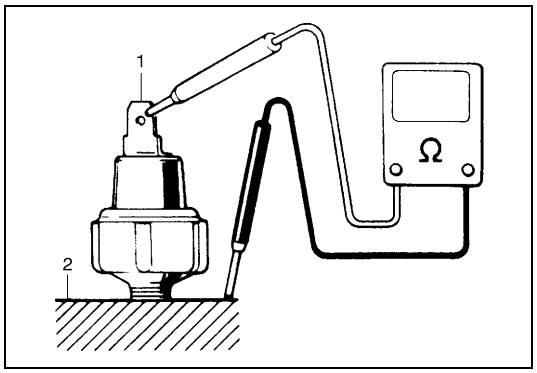
Warm up sender gauge (2). Thus make sure its resistance is decreased with increase of its temperature.

ECT sender gauge specifications
136 – 216 Ω at 50 °C (122 °F)
16.4 – 19.4 Ω at 120 °C (248 °F)

1. ECT sensor

Oil Pressure Switch

INSPECTION



Use an ohmmeter to check switch continuity.

Oil pressure switch specifications
During engine running: No continuity (∞ Ω)
At engine stop: Continuity (0 Ω)

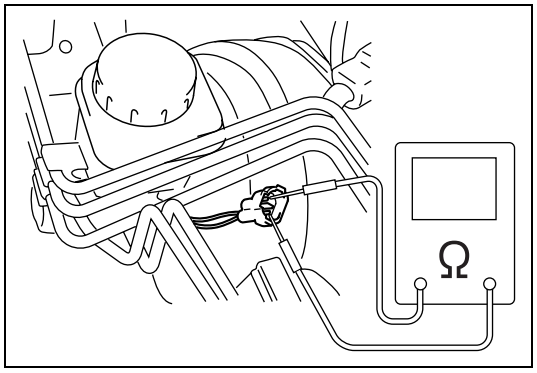
1.	To wiring harness
2.	Cylinder block

REMOVAL AND INSTALLATION

Refer to “Oil Pressure Check” in Section 6A1.

Brake Fluid Level Switch

INSPECTION

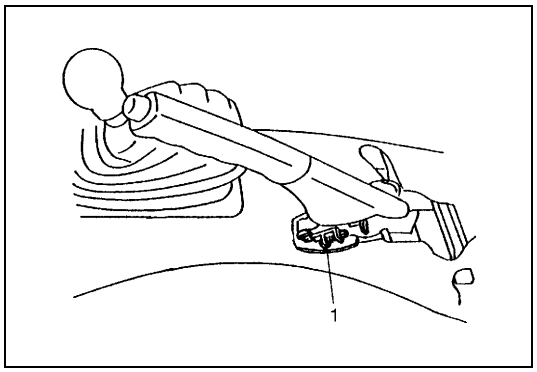


Use an ohmmeter to check switch for continuity.
If found defective, replace switch (reservoir).

Brake fluid level switch specifications
OFF position (float up): No continuity
ON position (float down): Continuity

Parking Brake Switch

INSPECTION



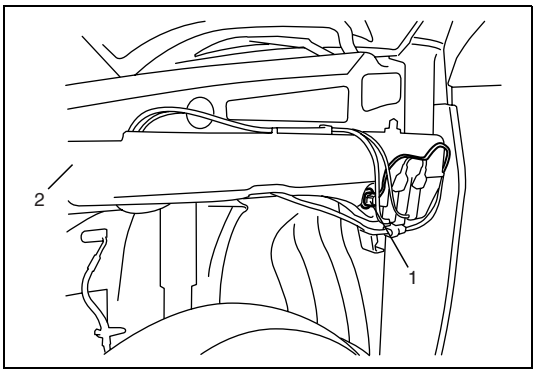
Use an ohmmeter to check switch for continuity. If found defective, replace switch.

Parking brake switch specifications
OFF position (parking brake lever released): No continuity
ON position (parking brake lever pulled up): Continuity

1.	Parking brake switch

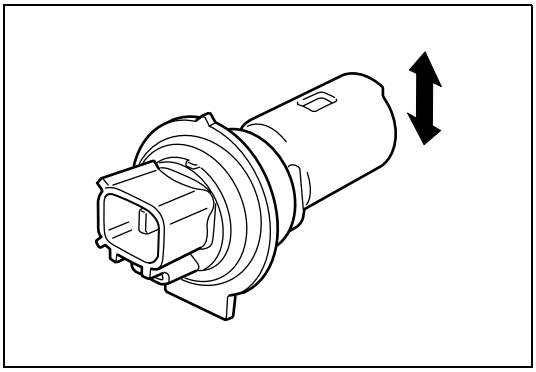
Windshield Washer Level Switch

REMOVAL



1) Remove left side front fender referring to “Front Fender” in Section 9.
2) Remove windshield washer level switch (1) from windshield washer tank (2).

INSPECTION

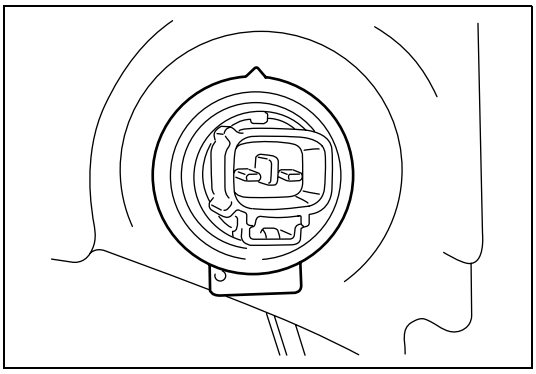


Use an ohmmeter to check switch continuity. If found defective, replace switch.

Windshield washer level switch specifications
OFF position (float up): No continuity
ON position (float down): Continuity

INSTALLATION

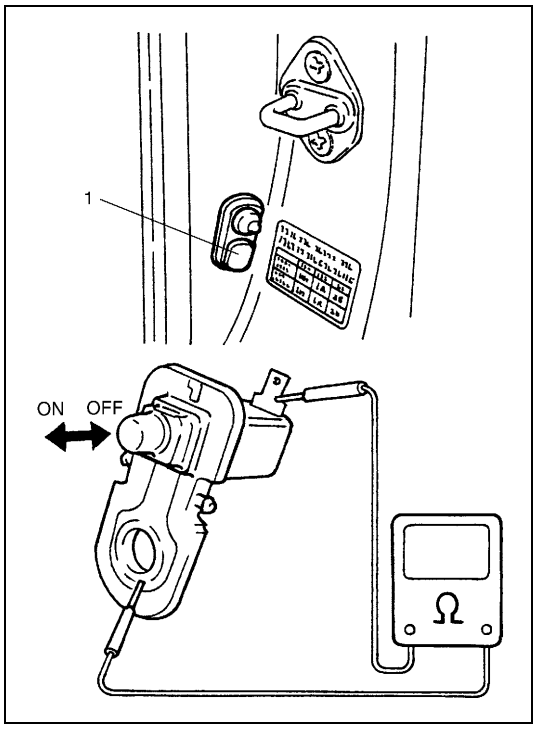
Reverse removal procedure to install windshield washer level switch noting the following point.



- Install windshield washer level switch as shown in the figure.

Door Switch

INSPECTION



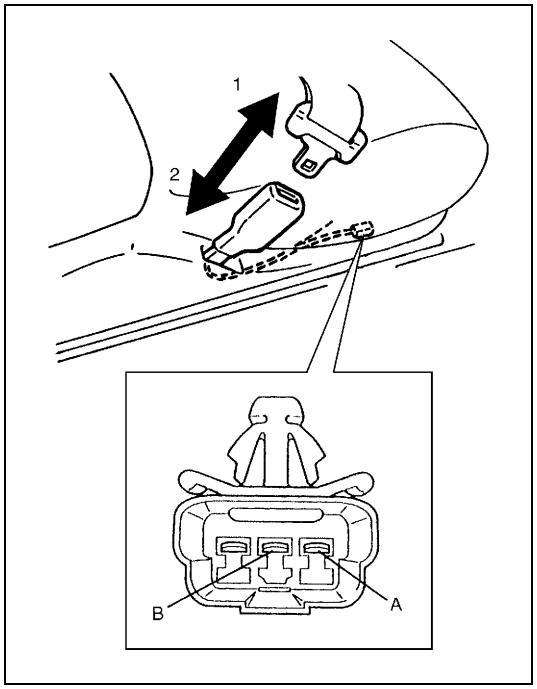
Use an ohmmeter to check switch for continuity. If found defective, replace switch.

Door switch specifications
OFF position (Door closed): No continuity
ON position (Door open): Continuity

1. Door switch

Seat Belt Buckle Switch

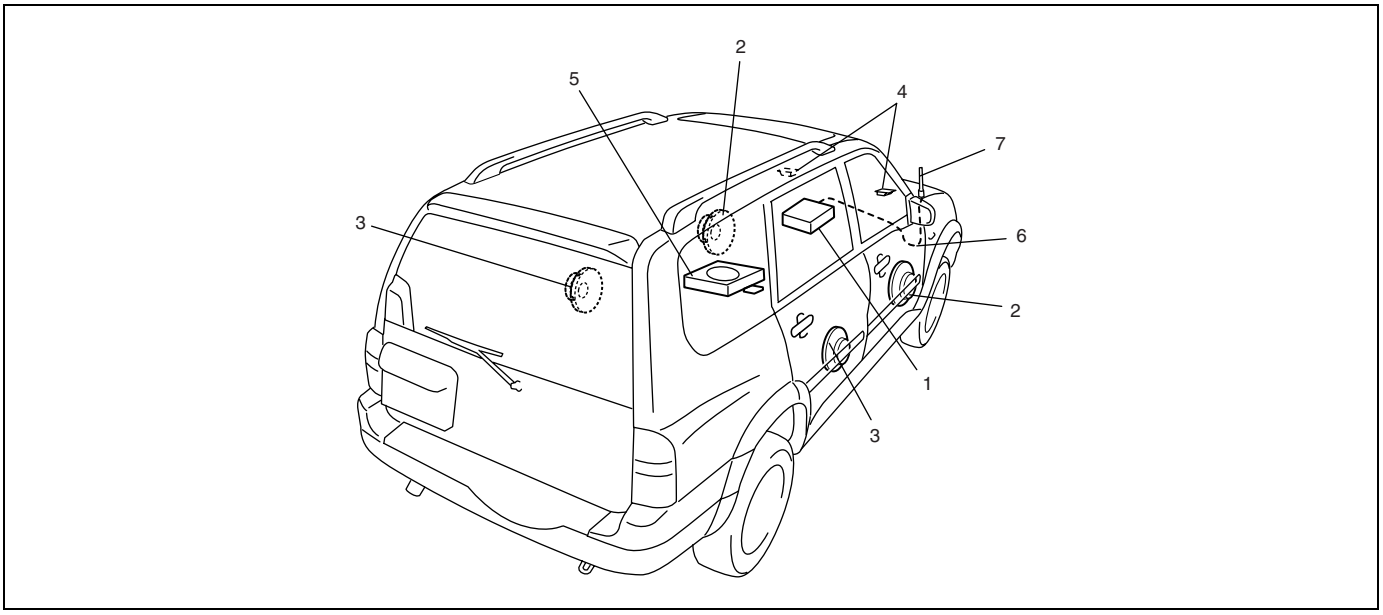
INSPECTION



Check continuity between seat belt buckle switch terminal “A” and “B” at the following condition. If seat belt buckle switch does not follow the above condition, replace seat belt buckle switch.

Seat belt buckle switch specifications
Buckle out (seat belt not fastened) (1): Continuity
Buckle in (seat belt fastened) (2): No Continuity

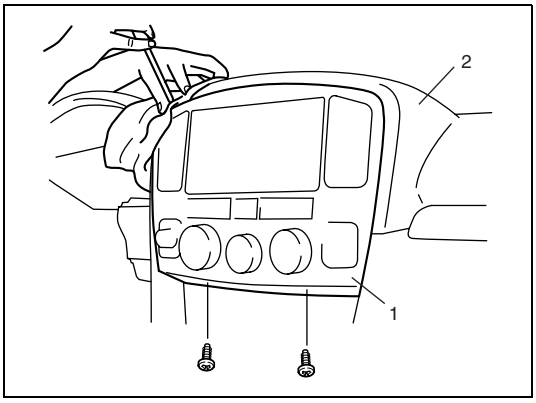
Audio System



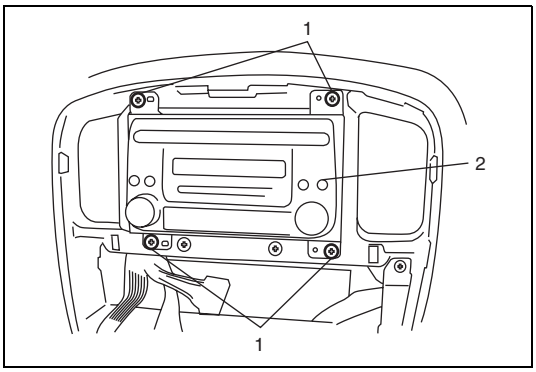
1. Radio assembly	4. Tweeter speaker (if equipped)	7. Antenna
2. Front speaker	5. Sub woofer speaker (if equipped)	
3. Rear speaker for wagon	6. Antenna feeder	

Radio assembly

REMOVAL



1) Remove center garnish (1) from instrument panel (2).



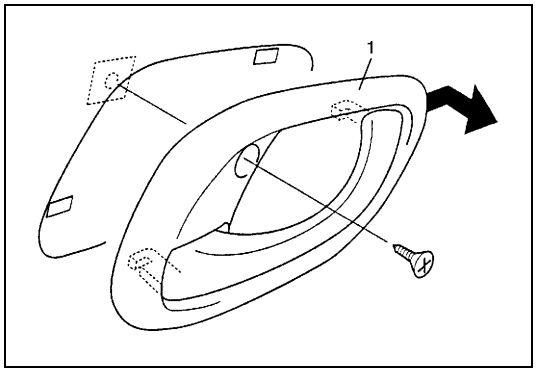
2) Remove 4 mounting screws (1) of radio assembly (2).
3) Remove radio assembly (2) from instrument panel.
4) Disconnect radio assembly coupler and antenna feeder from radio assembly (2).

INSTALLATION

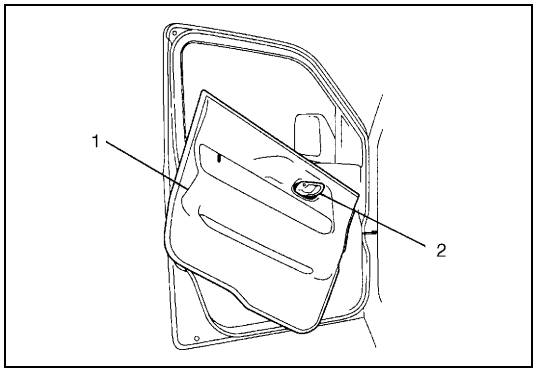
Reverse removal procedure to install radio assembly.

Front speaker

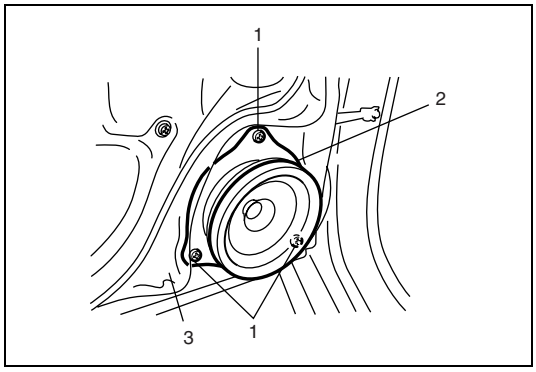
REMOVAL



1) Remove inside handle bezel (1).
2) Remove inside lock knob and door inside pull handle case fitting screw.



3) Remove door trim (1).
   With inside handle bezel (2) tilted as shown in figure, turn door trim (1) 90° clockwise to remove it.
   And disconnect power window switch lead wire at coupler.

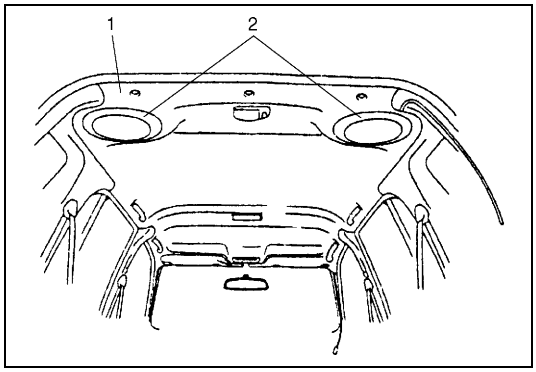


4) Remove 3 speaker mounting screws (1).
5) Remove speaker (2) from door (3).
6) Disconnect speaker coupler from speaker (2).

INSTALLATION

Reverse removal procedure to install speaker.

Rear Speaker



1) Remove head lining (1) referring to “Head Lining” in Section 9.
2) Remove rear speaker.

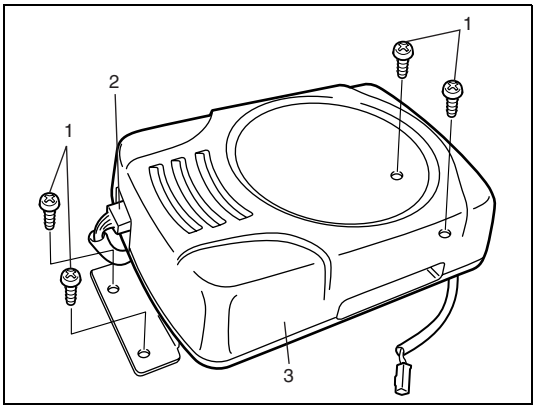
NOTE:

Do not remove speaker cover (2) from head lining.

Sub woofer speaker

REMOVAL

1) Disconnect negative (–) cable at battery.
2) Remove driver side front seat referring to "Front Seat" in Section 9.



3) Remove 4 speaker mounting screws (1).
4) Disconnect speaker coupler (2) from sub woofer speaker (3).

INSTALLATION

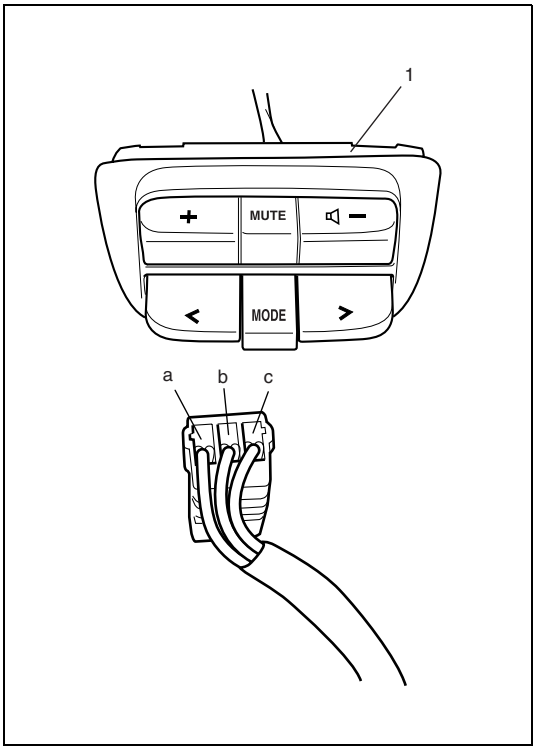
Reverse removal procedure to install sub woofer speaker noting the following point.

- When installing sub woofer speaker, be careful not to catch any wiring harness.

Remote audio control switch

INSPECTION

1) Remove driver air bag (inflator) module referring to "Driver Air Bag (Inflator) Module" in Section 10B.
2) Disconnect remote audio control switch connector from contact coil.



3) Check switch (1) for resistance between "a" and "b" terminals under each condition below.
   If check result is not satisfactory, replace remote audio control switch.

"MUTE", "+" and "–" switch resistance
All switches released (OFF): 90 – 110 kΩ
"MUTE" switch pushing on (ON): 300 – 360 Ω
"+" switch pushing on (ON): 900 – 1100 Ω
"–" switch pushing on (ON): 2900 – 3500 Ω

4) Check switch (1) for resistance between "a" and "c" terminals under each condition below.
   If check result is not satisfactory, replace remote audio control switch.

"MODE", "<" and ">" switch resistance
All switches released (OFF): 90 – 110 kΩ
"MODE" switch pushing on (ON): 300 – 360 Ω
"<" switch pushing on (ON): 900 – 1100 Ω
">" switch pushing on (ON): 2900 – 3500 Ω

Tightening Torque Specification

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Vehicle speed sensor bolt	5.5	0.55	4.0

CANVAS TOP MODEL

General Description

Cautions in Servicing

Refer to Section 8.

Symbols and Marks

Refer to Section 8.

Wiring Color Symbols

Refer to Section 8.

Abbreviations

Refer to Section 8.

Joint Connector

Refer to Section 8.

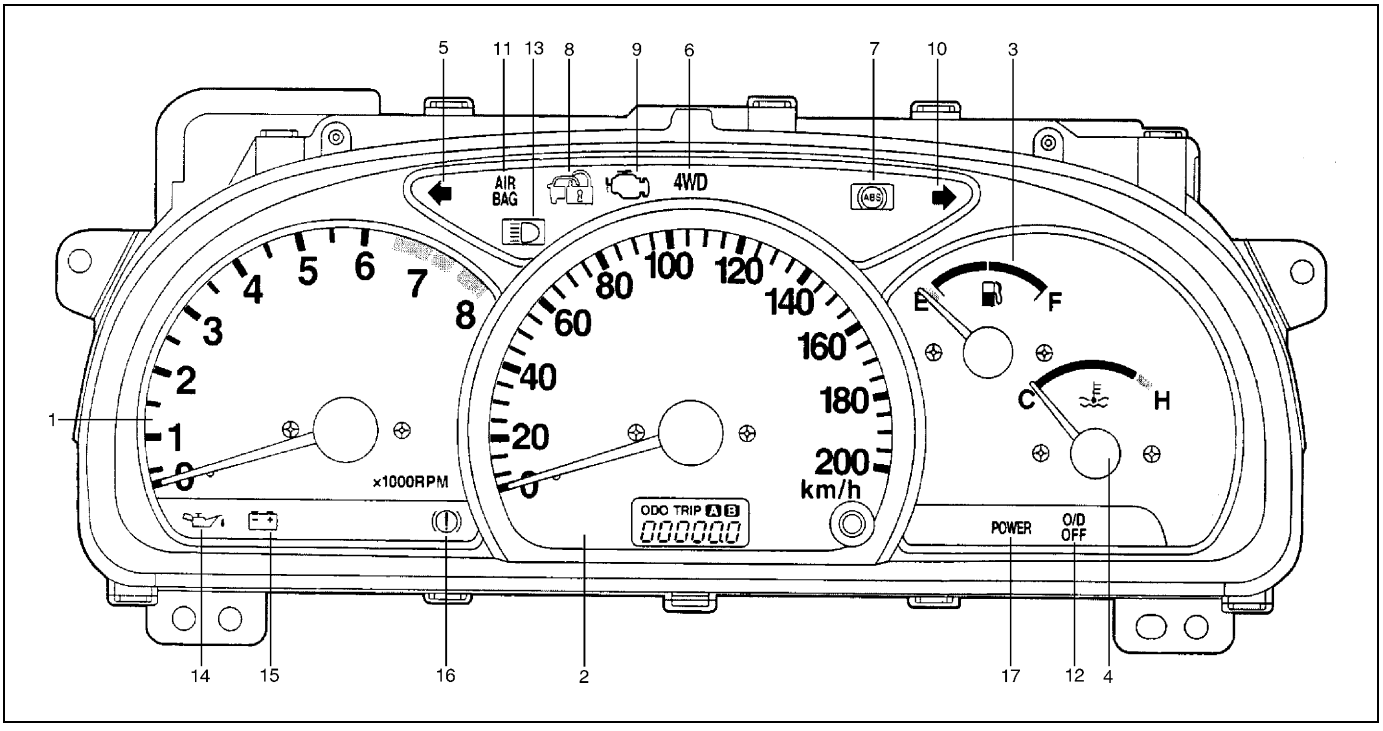
Fuse Box and Relay

Refer to Section 8.

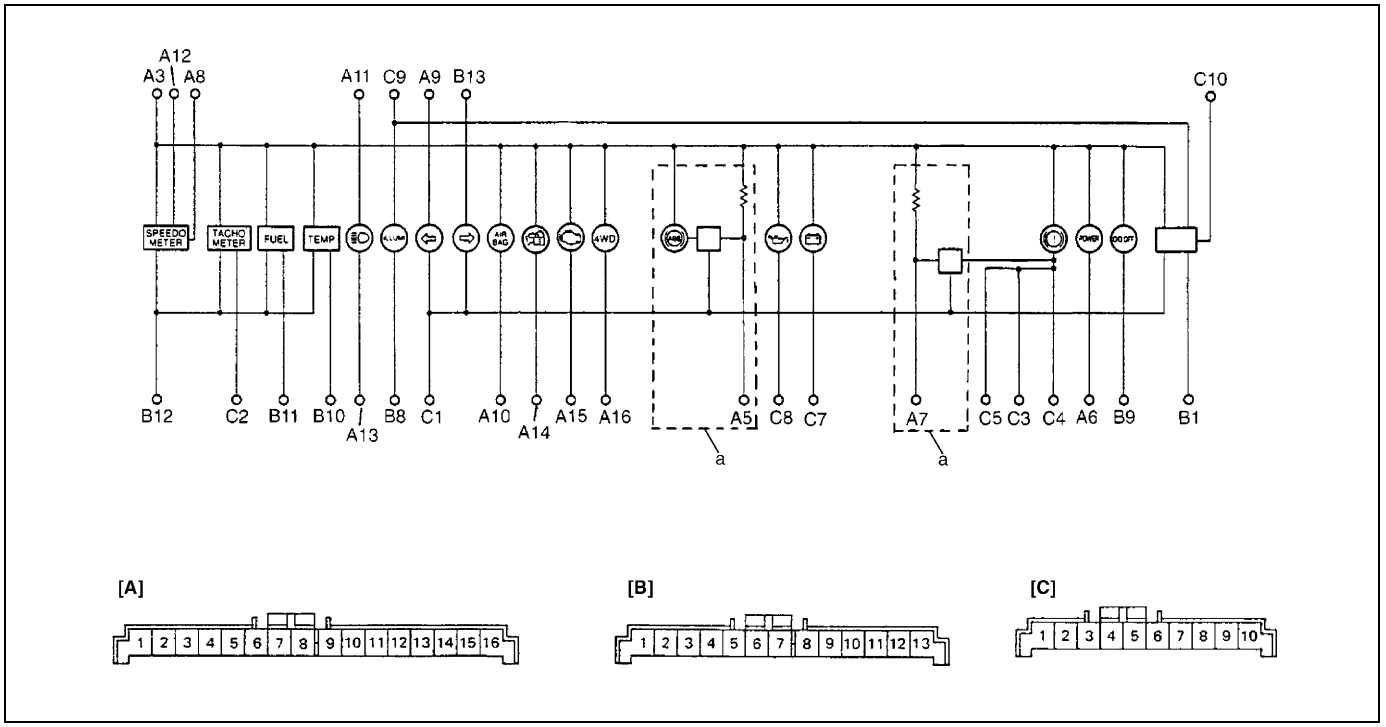
Power Supply Diagram

Refer to Section 8.

Combination Meter



1. Tachometer	6. 4WD indicator (if equipped)	11. AIR BAG warning light (if equipped)	16. Brake and parking brake warning light
2. Speedometer	7. ABS warning light (if equipped)	12. O/D OFF light (A/T vehicle only)	17. POWER indicator light (A/T vehicle only)
3. Fuel level meter	8. Immobilizer warning light (if equipped)	13. High beam light	
4. Water temperature meter	9. CHECK ENGINE light	14. Oil pressure warning light	
5. Turn signal pilot light (LH)	10. Turn signal pilot light (RH)	15. Charge warning light	



NOTE:

Terminal arrangement of coupler viewed from harness side.

a : If equipped					
[A] : Coupler A		[B] : Coupler B		[C] : Coupler C	
1. Blank	–	1. To door switch (driver side)	BLK/BLU	1. To ground	BLK
2. Blank	–	2. Blank	–	2. To ECM (PCM for A/T vehicle)	BRN
3. To ignition switch	BLK/WHT	3. Blank	–	3. To ignition switch (if equipped)	PPL/RED
4. Blank	–	4. Blank	–	4. To brake fluid level switch	RED/BLK
5. To ABS control module (if equipped)	BLU/ORN	5. Blank	–	5. To parking brake switch	PPL
6. To PCM (A/T vehicle only)	GRY/BLU	6. Blank	–	6. Blank	–
7. To ABS control module (if equipped)	BRN	7. Blank	–	7. To generator	WHT/RED
8. To VSS	BLU/YEL	8. To ground	BLK	8. To oil pressure switch	YEL/BLK
9. To combination switch	GRN/RED	9. To PCM (A/T vehicle only)	WHT/BLK	9. To combination switch	RED/YEL
10. To SDM (if equipped)	YEL/GRN or BLU	10. To ECT sensor	YEL/WHT	10. To ignition switch (if equipped)	BLU/RED
11. To main fuse	WHT/BLU	11. To fuel level gauge	BLU/WHT		
12. To fuse box	WHT	12. To ground	BLK/YEL		
13. To combination switch	RED	13. To combination switch	GRN/YEL		
14. To ECM (PCM for A/T vehicle) (if equipped)	PPL				
15. To ECM (PCM for A/T vehicle)	PPL/YEL				
16. To ECM (PCM for A/T vehicle) (if equipped)	ORN/BLK				

Diagnosis

NOTE:

Fuse name (“ ”) in the table below is shown on the junction box.

Speedometer and VSS

Condition	Possible Cause	Correction
Speedometer shows no operation	“IG/METER” fuse blown	Replace fuse to check for short
	VSS faulty	Replace VSS
	Printed plate in combination meter faulty	Replace printed plate
	Speedometer faulty	Replace speedometer
	Wiring or grounding faulty	Repair

Fuel Meter/Fuel Gauge Unit

Condition	Possible Cause	Correction
Fuel meter shows no operation	“IG/METER” fuse blown	Replace fuse to check for short
	Fuel gauge unit faulty	Replace fuel gauge unit
	Printed plate in combination meter faulty	Replace printed plate
	Fuel meter faulty	Replace fuel meter
	Wiring or grounding faulty	Repair

Engine Coolant Temp. (ECT) Meter and Sensor

Condition	Possible Cause	Correction
Engine coolant temp. meter shows no operation	“IG/METER” fuse blown	Replace fuse to check for short
	ECT meter faulty	Replace ECT meter
	Printed plate in combination meter faulty	Replace printed plate
	ECT sensor faulty	Replace ECT sensor
	Wiring or grounding faulty	Repair

Oil Pressure Light

Condition	Possible Cause	Correction
Oil pressure warning light does not light up	Bulb in combination meter blown	Replace bulb
	“IG/METER” fuse blown	Replace fuse to check for short
	Printed plate in combination meter faulty	Replace printed plate
	Oil pressure switch faulty	Replace oil pressure switch
	Wiring or grounding faulty	Repair

Brake and Parking Brake Warning Light

Condition	Possible Cause	Correction
Brake warning light does not light up	Bulb in combination meter blown	Replace bulb
	"IG/METER" fuse blown	Replace fuse to check for short
	Printed plate in combination meter faulty	Replace printed plate
	Parking brake switch faulty	Replace parking brake switch
	Brake fluid level switch faulty	Replace brake fluid level switch
	Wiring or grounding faulty	Repair

Light Remainder Warning Buzzer

Condition	Possible Cause	Correction
Light remainder warning buzzer shows no sounding	"TAIL" fuse blown	Replace fuse to check for short
	Buzzer faulty	Replace buzzer
	Wiring or grounding faulty	Repair
	Driver side door switch faulty	Replace door switch

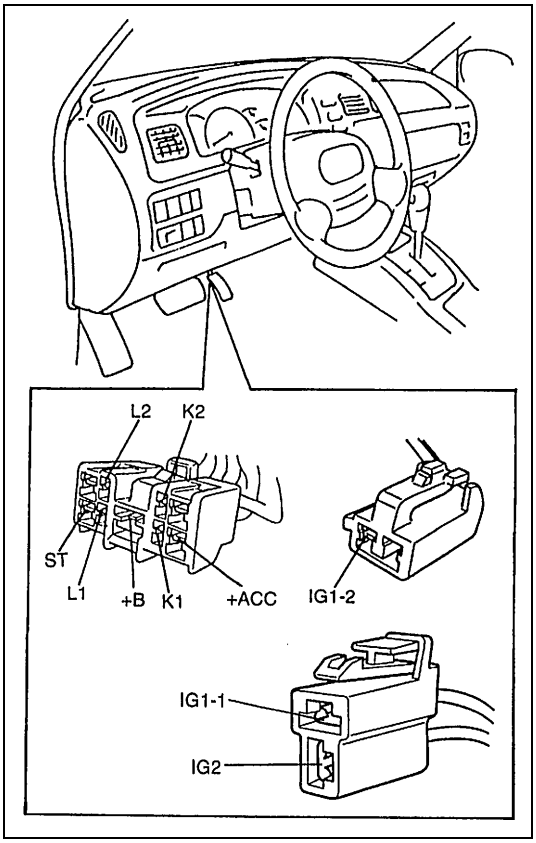
Cigarette Lighter and Accessory Socket

Condition	Possible Cause	Correction
Cigarette lighter/ accessory socket shows no operation	"CIGAR" fuse blown	Replace fuse to check for short
	Ignition switch faulty	Replace ignition switch
	Cigarette lighter/accessory socket faulty	Replace cigarette lighter/accessory socket
	Wiring or grounding faulty	Repair

On-Vehicle Service

Ignition (Main) Switch

INSPECTION



1) Disconnect negative cable at battery.
2) Disable air bag system. Refer to “Disabling Air Bag System” in Section 10B of this manual.
3) Disconnect main switch lead wire coupler.
4) Check for continuity between terminals at each switch position shown below. If check result is not as specified, replace ignition (main) switch.

Terminal / Wire color		+B	+ACC	IG1-1	IG1-2	IG2	ST	L1	L2	K1	K2
Key	Position	WHT/YEL	BLU	BLK/WHT	BLK/WHT	YEL/BLK	BLK/YEL	BLK	BLK	GRN	GRN
OUT	LOCK	○									
IN	ACC	○	○								
	ON	○	○	○	○	○				○	○
	START	○		○	○		○	○	○		

REMOVAL

1) Disconnect negative cable at battery.
2) Disable air bag system. Refer to “Disabling Air Bag System” in Section 10B of this manual.
3) Remove steering column referring to “Steering Column” in Section 3C1 of this manual. Then remove steering lock/ignition (main) switch from steering column.

INSTALLATION

1) Install steering lock/ignition (main) switch to steering column. Install steering column assembly referring to Section 3C1 of this manual.
2) Enable air bag system. Refer to “Enabling Air Bag System” in Section 10B of this manual.

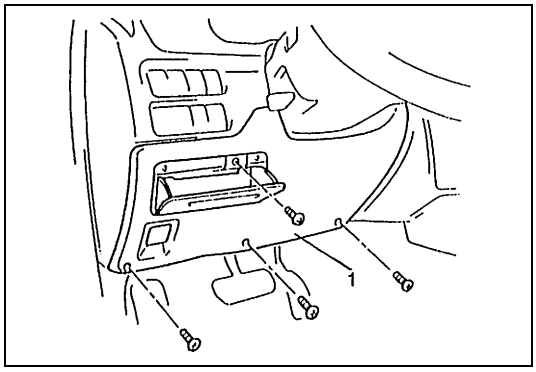
NOTE:

When installing steering column, special care must be taken for tightening sequence and its torque.

Combination Meter

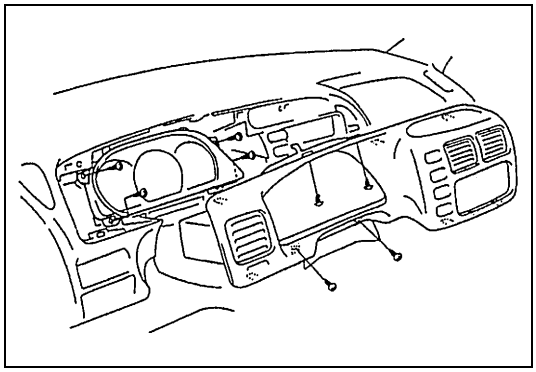
REMOVAL

1) Disconnect negative cable at battery.
2) If the vehicle is equipped with air bag system, disable air bag system. Refer to “Disabling Air Bag System” in Section 10B of this manual.



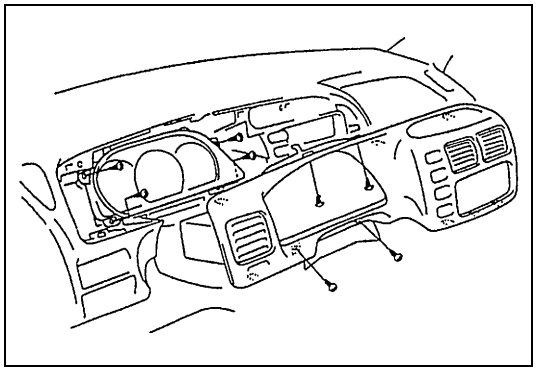
3) Remove column hole cover.

1. Steering column hole cover



4) Remove instrument cluster panel.
5) Remove screws fastening combination meter.
6) Disconnect couplers from combination meter.
7) Remove combination meter from instrument panel.

INSTALLATION



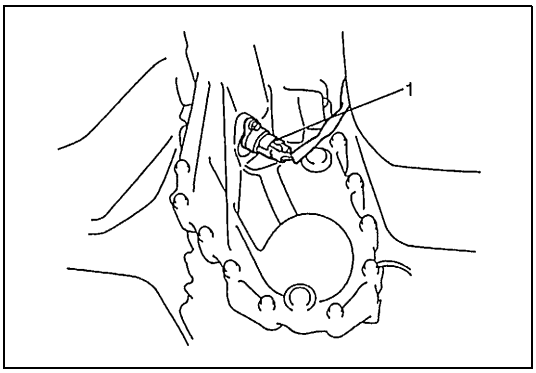
Reverse removal procedure for installation, noting the following.

- If the vehicle is equipped with air bag system, be sure to enable air bag system after installation. Refer to “Enabling Air Bag System” in Section 10B of this manual for details.

Speedometer and VSS

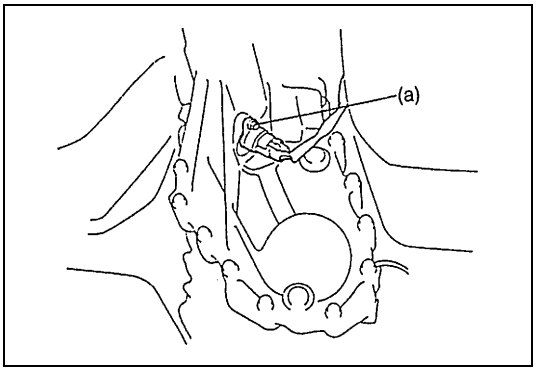
Vehicle speed sensor (VSS)

REMOVAL



1) Hoist vehicle.
2) Disconnect coupler from VSS (1).
3) Remove VSS.

INSTALLATION



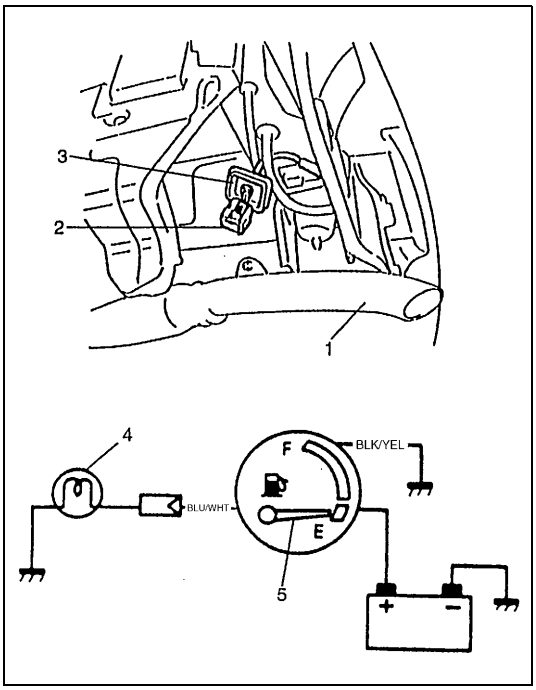
Reverse removal procedure for installation.

Tightening torque
(a) : 5.5 N·m (0.55 kg-m, 4.0 lb-ft)

Fuel Meter/Fuel Gauge Unit

Fuel meter

INSPECTION

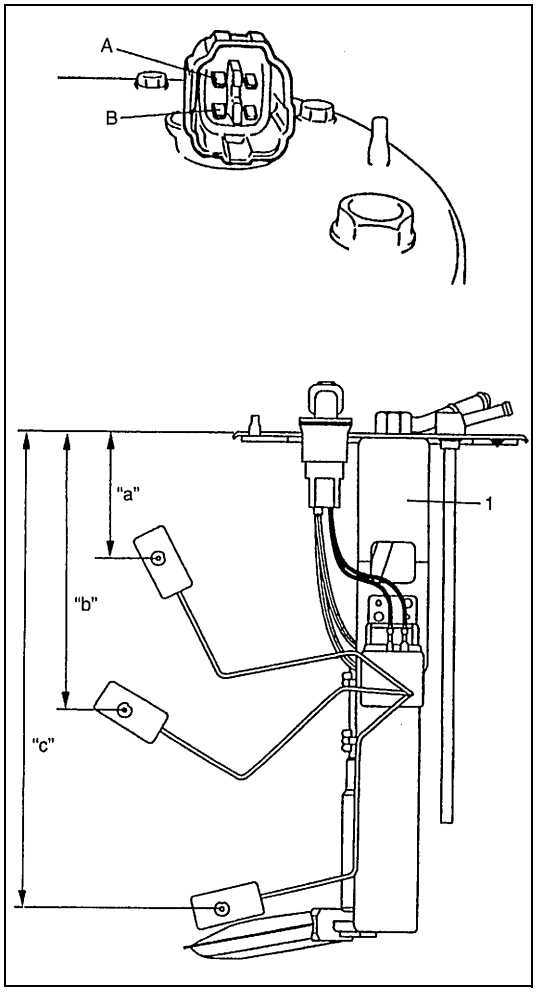


1) Remove rear bumper facing.
2) Detach grommet (3) from vehicle.
3) Disconnect coupler (2) of fuel pump and gauge.
4) Turning switch ON, and check that fuel meter indicates E.
5) Turn ignition switch OFF.
6) Ground Bl/W lead through a 3.4 W test bulb (4) as illustrated.
7) Turn ignition switch ON and check that bulb light up and pointer (5) moves to F side.
8) If fuel meter shows no operation, repair or replace defective parts.

1. Exhaust pipe

Fuel sender gauge

INSPECTION



1) Remove fuel pump assembly (1) referring to “Fuel Pump” in Section 6C.
2) Check resistance between terminals (A) and (B) under each float position.

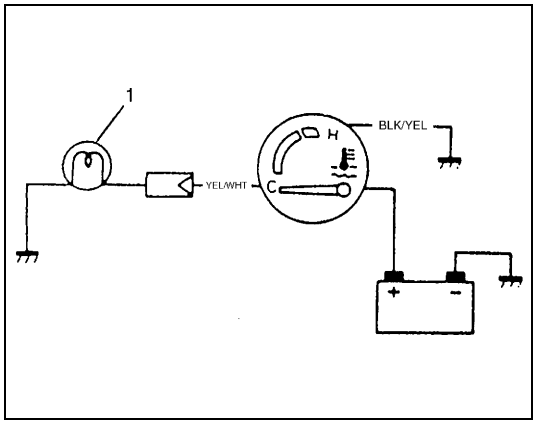
Float Position		Fuel Meter	Resistance (Ω)
	56 L model		
“a”	88.3 mm (3.48 in.)	F	6 – 8
“b”	157.2 mm (6.20 in.)	1/2	29.5 – 35.5
“c”	254.9 mm (10.0 in.)	E	94 – 96

If measured valve is out of specification, replace fuel sender gauge.

Engine Coolant Temp. (ECT) Meter and Sensor

Engine coolant temperature (ECT) meter

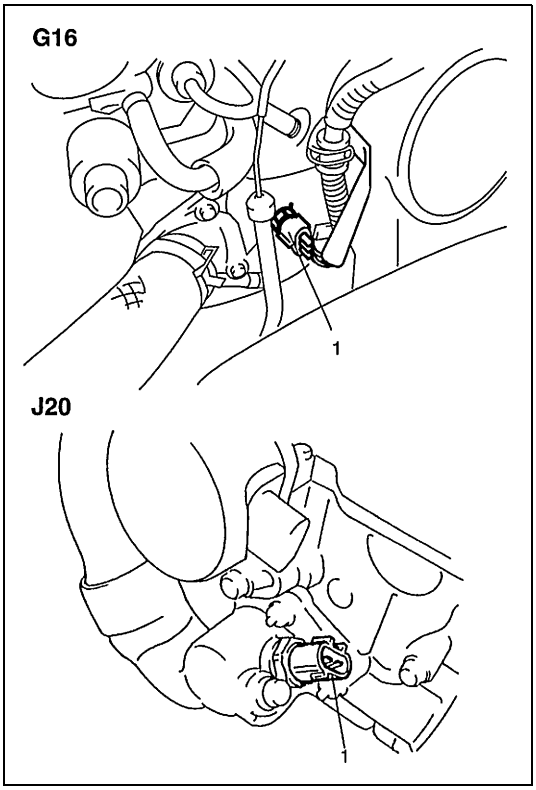
INSPECTION



1) Disconnect YEL/WHT lead wire going to ECT sensor.
2) Turn ignition switch ON, and check that ECT meter indicates COOL.
3) Turn ignition switch OFF.
4) Ground YEL/WHT lead wire through a 3.4 W test bulb (1) as illustrated.
5) Turn ignition switch ON, and check that bulb light up and pointer (2) moves to hot side.
6) If ECT meter shows no operation, repair or replace defective parts.

Engine coolant temperature (ECT) sensor

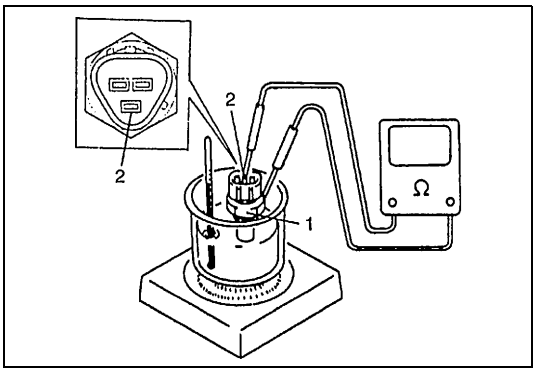
REMOVAL AND INSTALLATION



Refer to “ECT Sensor” in Section 6E1 (for G16 and J20) of this manual for details.

1. ECT sensor

INSPECTION



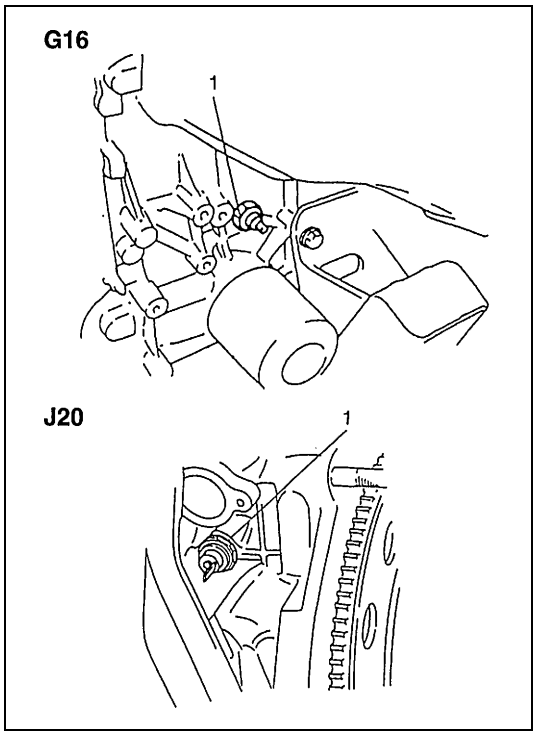
1) Warm up ECT sensor (1) observing resistance between sensor terminal (2) and sensor unit (1). Resistance should be decreased with increase of its temperature.
2) Check resistance between sensor terminal (2) and sensor unit (1) shown below. If check result is not as specified, replace sensor.

Temperature	Resistance
50 °C (122 °F)	136 – 216 Ω

Oil Pressure Light

Oil pressure switch

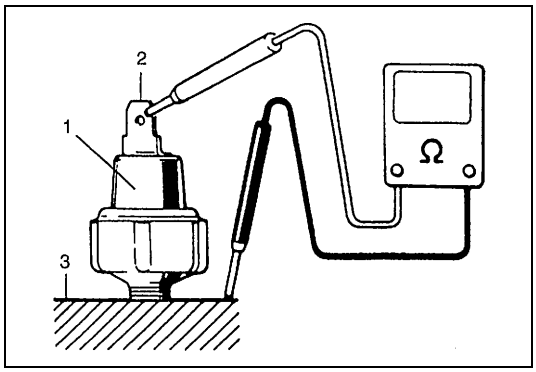
REMOVAL AND INSTALLATION



Refer to “Oil Pressure Check” in Section 6A1 (for G16), or Section 6A4 (for J20) of this manual for details.

1. Oil pressure switch

INSPECTION



1) Disconnect oil pressure switch (1) lead wire.
2) Check for continuity between oil pressure switch terminal (2) and cylinder block (3) as shown.

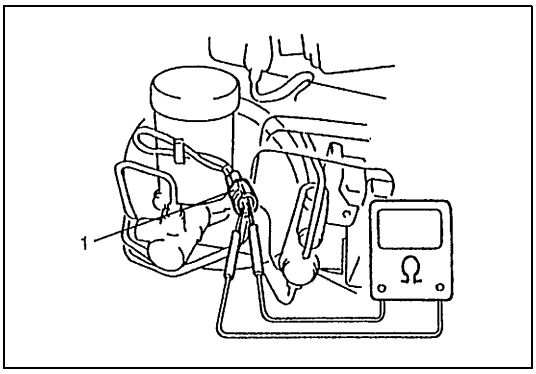
During Engine Running	No continuity
At Engine Stop	Continuity

If check result is not as specified, replace oil pressure switch (1).

Brake and Parking Brake Warning Light

Brake fluid level switch

INSPECTION

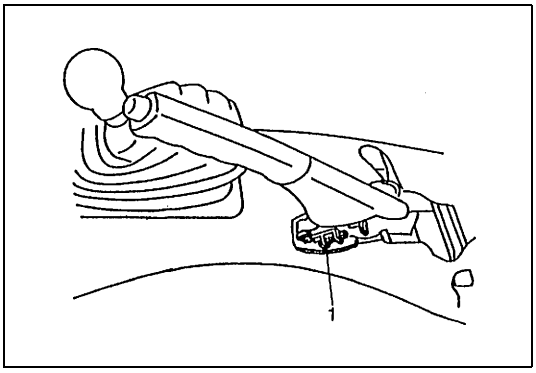


Check switch (1) for continuity.
If check result is not as specified, replace switch (reservoir).

OFF position (float up)	No continuity
ON position (float down)	Continuity

Parking brake switch

INSPECTION

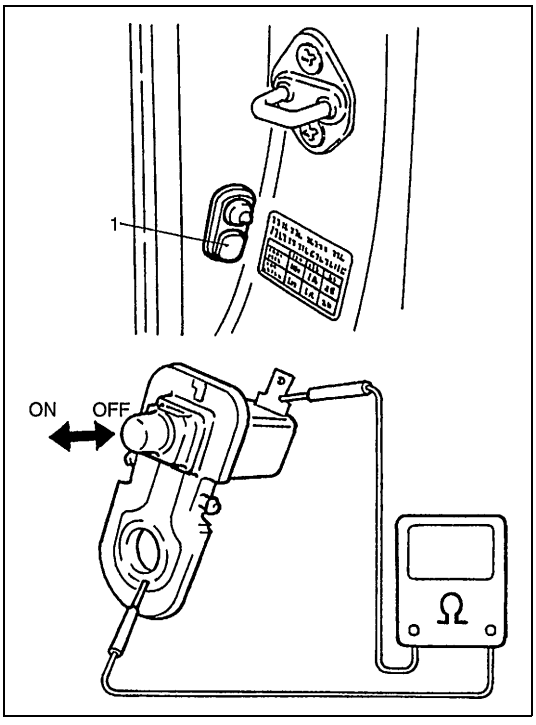


Check switch (1) for continuity.
If check result is not as specified, replace switch.

OFF position (parking brake lever released)	No continuity
ON position (parking brake lever pulled up)	Continuity

Door Switch

INSPECTION



Remove door switch (1) from body and check switch for continuity.
If found defective, replace switch.

OFF position (Door closed)	No continuity
ON position (Door open)	Continuity

SECTION 8D

WINDOWS, MIRRORS, SECURITY AND LOCKS

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System :

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

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OTHER THAN CANVAS TOP MODEL

General Description

Cautions in Servicing

Refer to Section 8A.

Symbols and Marks

Refer to Section 8A.

Abbreviations

Refer to Section 8A.

Wiring Color Symbols

Refer to Section 8A.

Joint Connector

Refer to Section 8A.

Fuse Box and Relay

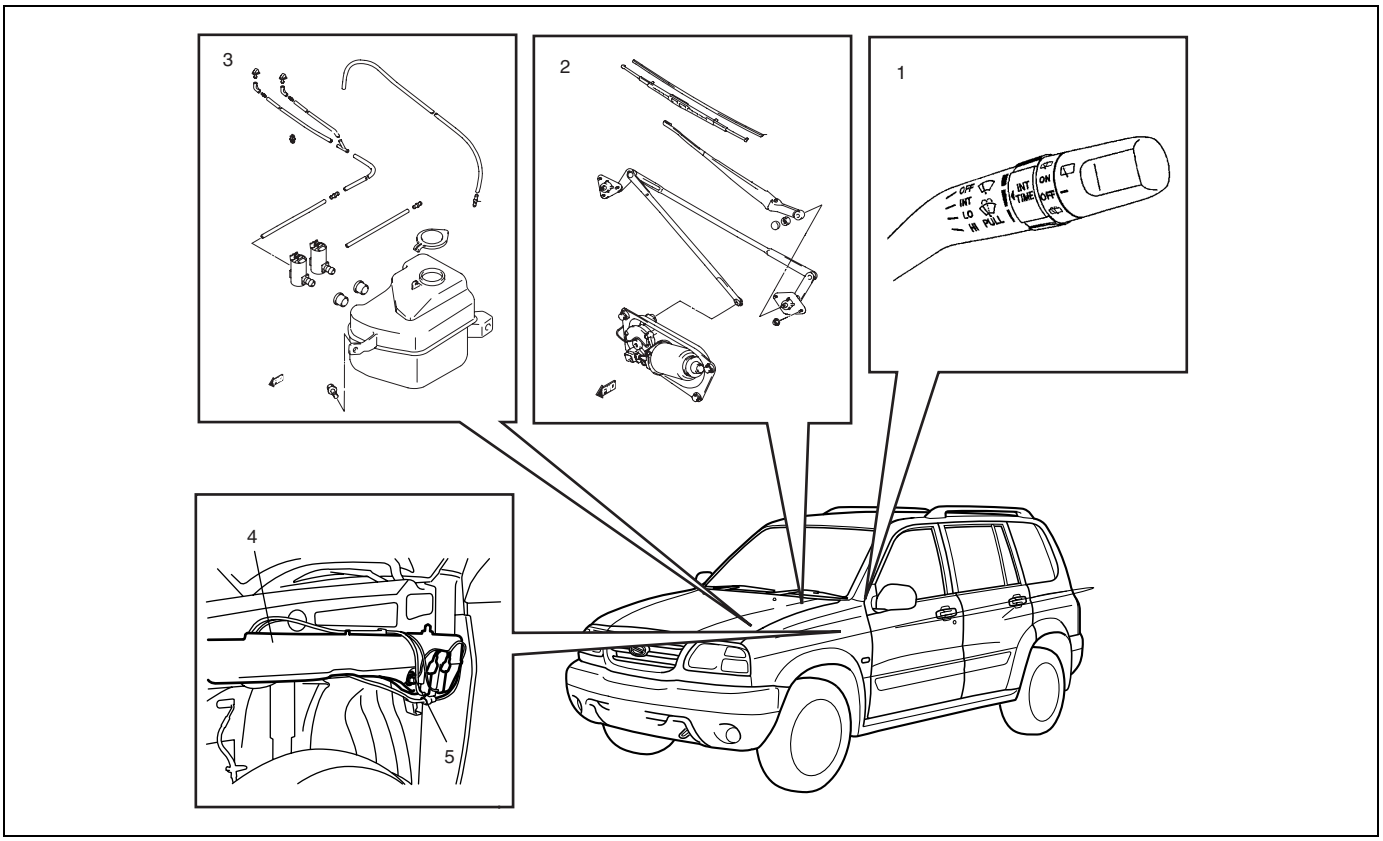
Refer to Section 8A.

Power Supply Diagram

Refer to Section 8A.

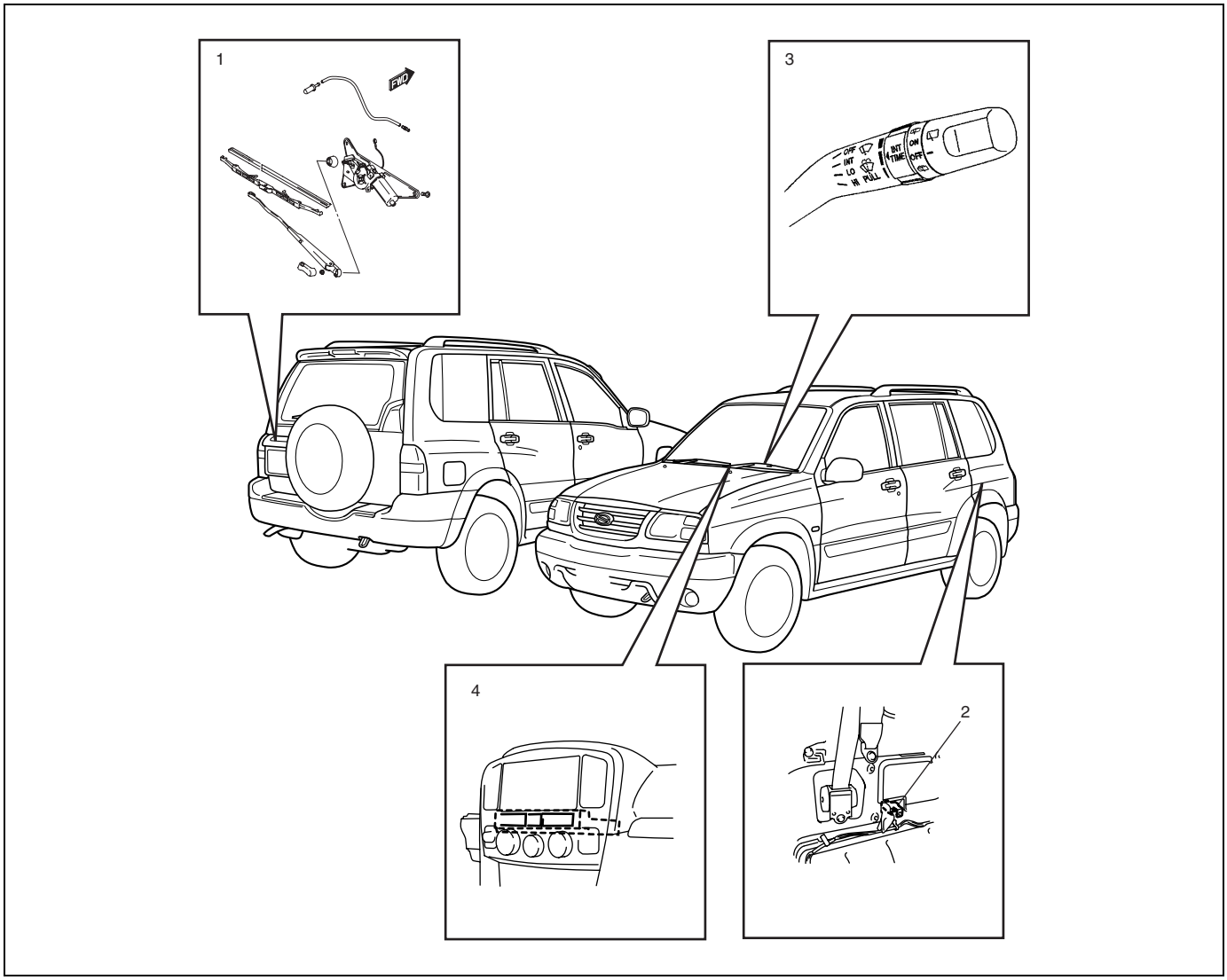
Windshield Wiper and Washer

Front wiper and washer



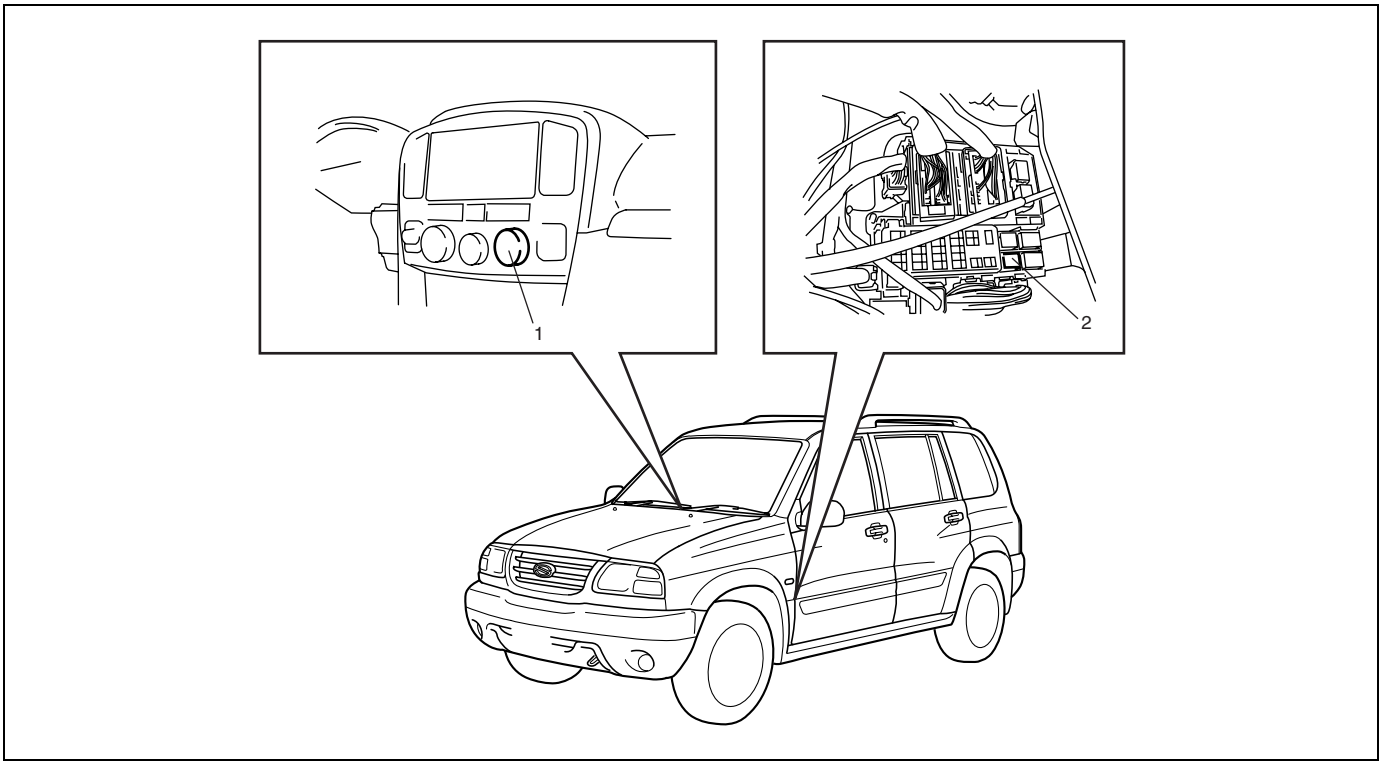
1. Front wiper and washer switch	4. Windshield washer tank (Type 2)
2. Front wiper assembly	5. Windshield washer level switch
3. Windshield washer assembly (Type 1)	

Rear wiper and washer



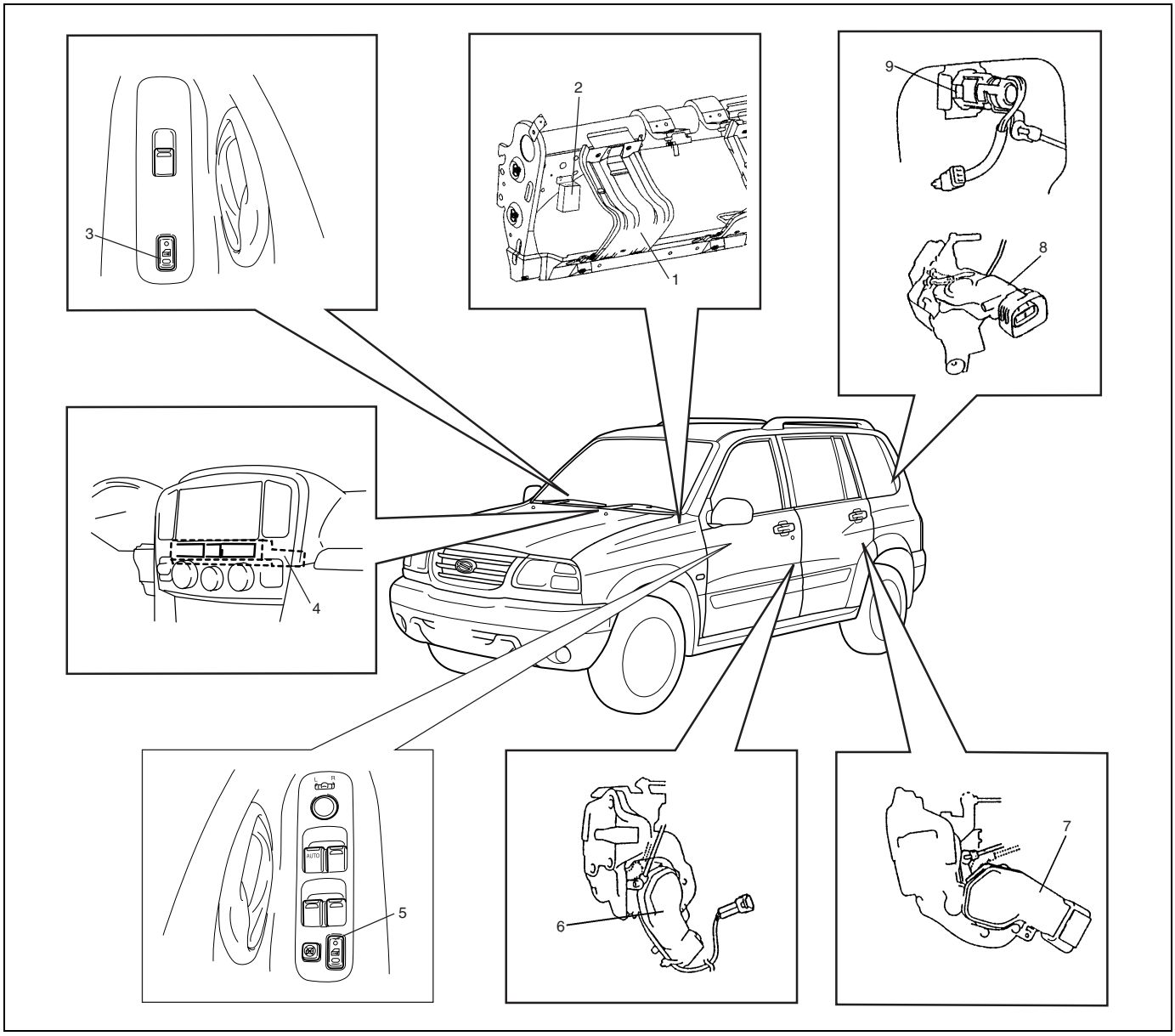
1. Rear wiper assembly	3. Rear wiper and washer switch
2. Rear wiper relay	4. BCM

Rear Window Defogger



1.	Rear window defogger switch
2.	Rear window defogger relay

Power Door Lock and Keyless Entry System



1. Knee bolster	4. BCM	7. Rear door actuator
2. Keyless entry receiver	5. Power door lock switch (Driver side)	8. Back door actuator
3. Power door lock switch (Passenger side)	6. Front door actuator	9. Back door key switch

Diagnosis

Windshield Wiper and Washer

Front wiper and washer

Condition	Possible Cause	Correction
Wiper malfunctions or does not return to original position	WIPER WASHER fuse blown	Replace blown fuse to check for short.
	Wiper motor faulty	Check front wiper motor referring to "Front Wiper Motor" in this section.
	Wiper switch faulty	Check front wiper switch referring to "Front Wiper and washer Switch" in this section.
	Wiring or grounding faulty	Repair as necessary.
Washer malfunctions	Washer hose or nozzle clogged	Repair as necessary.
	Washer motor faulty	Check washer pump referring to "Front and Rear Washer Pump" in this section.
	Washer switch faulty	Check washer switch referring to "Front Wiper and Washer Switch" in this section.
	Wiring faulty	Repair.

Rear Wiper and Washer

Condition	Possible Cause	Correction
Wiper malfunctions or does not return to original position	WIPER WASHER fuse blown	Replace blown fuse to check for short.
	Wiper motor faulty	Check rear wiper motor referring to "Rear Wiper Motor" in this section.
	Wiper switch faulty	Check rear wiper and washer switch referring to "Rear Wiper and Washer Switch" in this section.
	Rear wiper relay faulty	Check rear wiper relay referring to "Rear Wiper Relay" in this section.
	Wiring or grounding faulty	Repair as necessary.
	BCM faulty	Check BCM referring to "Inspection of BCM and Its Circuits" in Section 8H.
Washer malfunction	Washer hose or nozzle clogged	Repair as necessary.
	WIPER WASHER fuse blown	Replace blown fuse to check for short.
	Washer motor faulty	Check washer motor.
	Washer switch faulty	Check rear wiper and washer switch referring to "Rear Wiper and Washer Switch" in this section.
	Wiring or grounding faulty	Repair as necessary.
	BCM faulty	Check BCM referring to "Inspection of BCM and Its Circuits in Section 8H.

Rear Window Defogger

Condition	Possible Cause	Correction
Defogger does not work	"REAR DEFG" fuse blown	Replace fuse to check for short.
	Defogger switch faulty	Check HVAC control module referring to "HVAC Control Module and Its Circuits Inspection" in Section 1B.
	Defogger heat wire faulty	Check heat wire referring to "Rear Window Defogger Wire Inspection and Repair" in this section.
	Defogger relay faulty	Check defogger relay referring to "Rear Window Defogger Relay" in this section.
	Wiring or grounding faulty	Repair as necessary.

Power Window Control System

Condition	Possible Cause	Correction
None of power windows functions	Main and/or "POWER WINDOW" fuse blown	Replace fuse to check for short.
	Ignition switch faulty	Check ignition switch referring to "Ignition (Main) Switch" in Section 8C.
	Wiring or grounding faulty	Repair as necessary.
Only one power window does not function	Power window main switch faulty	Check power window main switch referring to "Power Window Main Switch" in this section.
	Power window sub switch faulty	Check power window sub switch referring to "Power Window Sub Switch" in this section.
	Power window motor (actuator) faulty	Check motor.
	Window lock switch faulty	Check power window main switch referring to "Power Window Main Switch" in this section.
	Wiring or grounding faulty	Repair as necessary.

Power Door Lock

Condition	Possible Cause	Correction
All power doors are not locked/unlocked by all of switches	"DOOR LOCK" fuse blown	After checking short circuit, replace "DOOR LOCK" fuse.
	Wiring or grounding faulty	Repair circuit.
	BCM faulty	Check the system related circuits referring to "Inspection of BCM and Its Circuits" in Section 8H.
Driver side or except driver side doors are not lock/unlock by all of switches	Wiring or grounding faulty	Repair circuit.
	BCM faulty	Check the system related circuits referring to "Inspection of BCM and Its Circuits" in Section 8H.
All power doors are not locked/unlocked by only door key switch	"DOOR LOCK" fuse blown	After checking short circuit, replace "DOOR LOCK" fuse.
	Door key cylinder switch faulty	Check door key cylinder switch referring to "Key Cylinder Switch" in this section.
	Wiring or grounding faulty	Repair circuit.
	BCM faulty	Check the system related circuits referring to "Inspection of BCM and Its Circuits" in Section 8H.
All power doors are not locked/unlocked by only manual door lock switch	"DOOR LOCK" fuse blown	After checking short circuit, replace "DOOR LOCK" fuse.
	Manual door lock switch faulty	Check manual door key switch referring to "Manual Door Lock Switch" in this section.
	Wiring or grounding faulty	Repair circuit.
	BCM faulty	Check the system related circuits referring to "Inspection of BCM and Its Circuits" in this Section 8H.
Only one door is not locked/unlocked	Wiring harness connected to applicable door lock actuator faulty	Repair circuit.
	Power door lock actuator faulty	Check power door lock actuator referring to "Power Door Lock Actuator" in this section.

Keyless Entry System

NOTE:

Confirm that power door lock system is in good condition before referring to the following possible causes.

Condition	Possible Cause	Correction
All doors are not locked/unlocked by keyless entry transmitter	Transmitter battery dead	Replace transmitter battery referring to "Replacement Transmitter Battery" in this section.
	Transmitter faulty	Replace transmitter.
	Keyless entry receiver faulty	Check keyless entry receiver referring to "Keyless Entry Receiver and Its Circuit" in this section.
	Key reminder switch in ignition switch faulty	Replace ignition switch "Ignition (Main) Switch" in Section 8C.
	Wiring or grounding faulty	Repair circuit.
	BCM faulty	Check the system related circuits referring to "Inspection of BCM and Its Circuits" in Section 8H.
Turn signal lights are not flashed when doors are locked/ unlocked by keyless entry transmitter	Turn signal and hazard warning relay faulty	Replace turn signal and hazard warning relay.
	Wiring or grounding faulty	Repair circuit.
	BCM faulty	Check the system related circuits referring to "Inspection of BCM and Its Circuits" in Section 8H.
Interior lights does not turn ON when doors are unlocked by keyless entry transmitter	Wiring or grounding faulty	Repair circuit.
	BCM faulty	Check the system related circuits referring to "Inspection of BCM and Its Circuits" in Section 8H.
Transmitter code does not program to keyless receiver	Door switch faulty	Check door switch referring to "Door Switch" in Section 8C.
	Key reminder switch in ignition switch faulty	Replace ignition switch "Ignition (Main) Switch Removal and Installation".
	Keyless entry receiver faulty	Check keyless entry receiver referring to "Keyless Entry Receiver Circuit" in this section.
	Wiring or grounding faulty	Repair circuit.
	BCM faulty	Check the system related circuits referring to "Inspection of BCM and Its Circuits" in Section 8H.

NOTE:

The operation distance of this system varies depending on the position where the transmitter is operated, at the front side, the rear side or the lateral side. The distance can be affected by radio noises from a TV station, a power plant, a broadcasting station and so forth.

Power Door Mirror Control System

Condition	Possible Cause	Correction
All power mirrors do not operate	"CIGAR" fuse blown	Replace fuse to check for short.
	Power door mirror switch faulty	Check power door mirror switch referring to "Power Door Mirror Switch" in this section.
	Wiring or grounding faulty	Repair as necessary.
One power mirror does not operate.	Power door mirror switch faulty	Check power door mirror switch referring to "Power Door Mirror Switch" in this section.
	Actuator (power door mirror motor) faulty	Check power door mirror actuator referring to "Power Door Mirror Actuator" in this section.
	Wiring or grounding faulty	Repair as necessary.

Door Mirror Heater

Condition	Possible Cause	Correction
The surface of mirror is not defrosted although door mirror heater switch is ON	"REAR DEFG" fuse blown	Replace fuse to check for short.
	Door mirror heater switch faulty	Check door mirror heater switch referring to "Door Mirror Heater Switch" in this section.
	Door mirror heater faulty	Check door mirror neater referring to "Door Mirror Heater" in this section.
	Wiring or grounding faulty	Repair.

Power Sliding Roof

Condition	Possible Cause	Correction
Sliding roof does not operate (sliding roof motor runs OK)	Foreign object stuck in sliding roof rail	Remove or clean stuck object.
	Mis-installation of sliding roof rail	Install correctly.
	Conflicts of sliding roof parts	Fix conflicts.
	Mis-installation of sliding roof drive cable	Install correctly.
Sliding roof does not operate (sliding roof motor does not run)	"SUN ROOF" fuse blown	Replace fuse to check for short.
	Sliding roof switch faulty	Replace switch.
	Sliding roof motor assembly faulty	Replace motor.
	Wiring or grounding faulty	Repair.

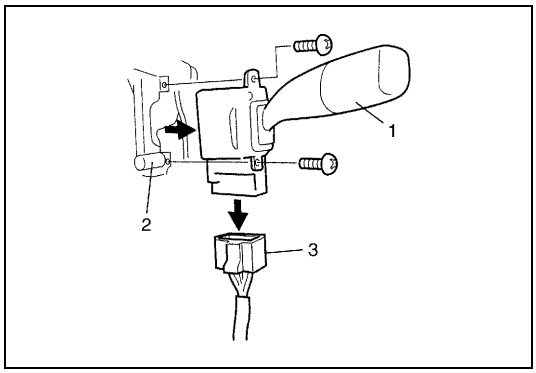
On-Vehicle Service

Front Wiper and Washer

Front wiper and washer switch

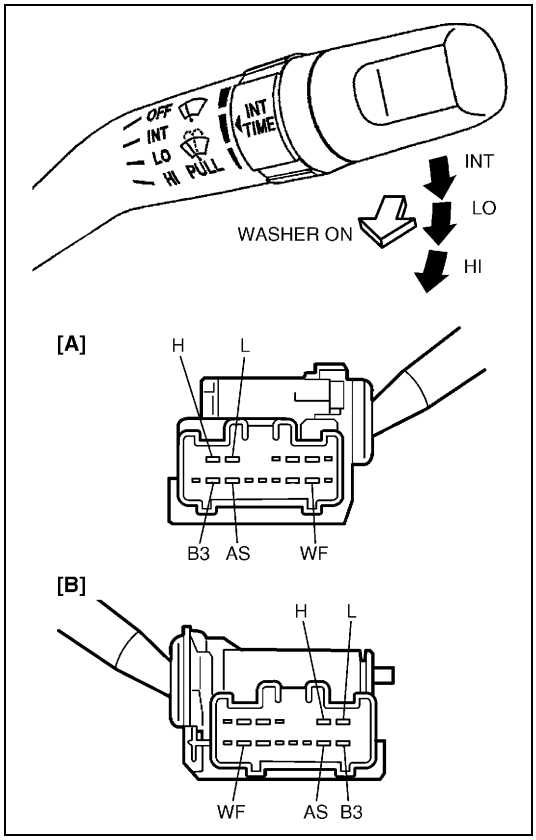
REMOVAL

1) Disconnect negative cable at battery.
2) Remove steering column hole cover.
3) Remove steering column covers.
4) Remove wiper and washer switch (1) from combination switch assembly (2) and disconnect its coupler (3).



INSPECTION

Check for continuity between terminals at each switch position as shown in the following figure. If check result is not as specified, replace.



Wiper SW \ Terminal	B3	H	L	AS
OFF			○	○
INT			○	○
LO	○		○	
HI	○	○		

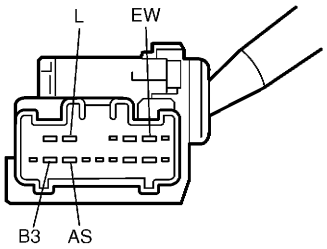
Washer SW \ Terminal	B3	WF
OFF		
ON	○	○

[A]: LH steering vehicle
[B]: RH steering vehicle

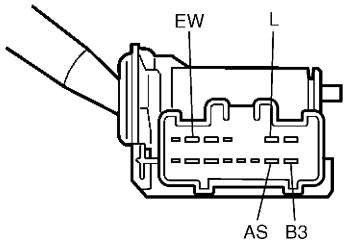
INSTALLATION

Reverse removal procedure for installation.

[A]



[B]

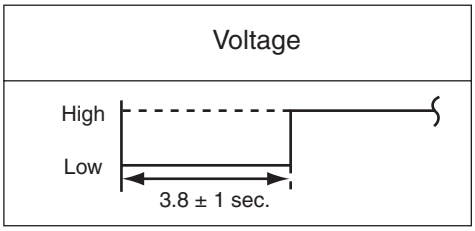


Intermittent wiper relay circuit

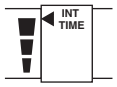
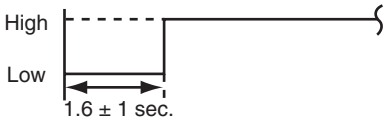
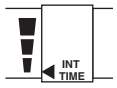
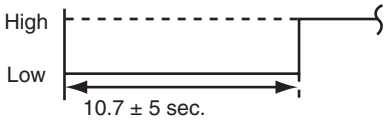
INSPECTION

1) Turn the front wiper switch to "INT" position.
2) Connect battery positive terminal to terminal "B3" and its negative terminal to terminal "EW".
3) Connect voltmeter positive lead to terminal "L" and its negative lead to terminal "EW".
4) Check that the voltmeter indicates the battery voltage (10 – 14 V).
5) Connect terminal "AS" and terminal "B3" for 5 sec. or more by a jumper wire.
6) Disconnect end of the jumper wire from terminal "B3".
7) Connect disconnected jumper wire end to terminal "EW", then check that voltage between terminal "L" and terminal "EW" changes as shown in figure.
   If check result is not satisfied, replace.

[C]



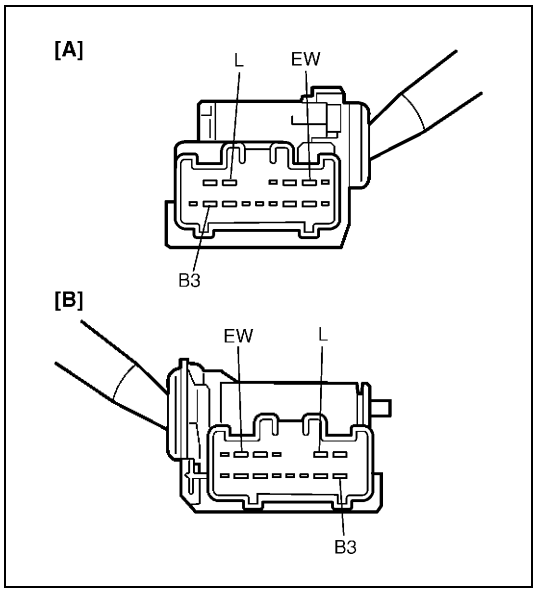
[D]

INT time control switch position	Voltage
	
	

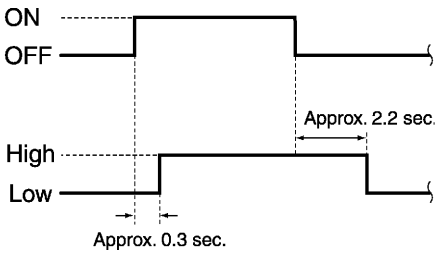
[A]: LH steering vehicle
[B]: RH steering vehicle
[C]: For vehicle without INT time control switch
[D]: For vehicle with INT time control switch

Washer linked circuit

INSPECTION



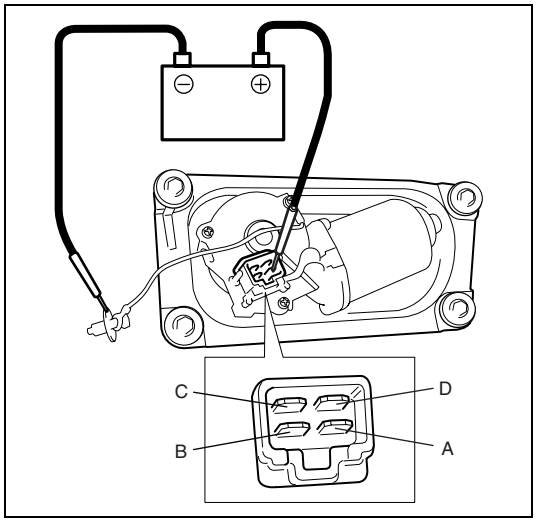
1) Make sure that front wiper switch is at “OFF” position.
2) Connect battery positive terminal to terminal “B3” and its negative terminal to terminal “EW”.
3) Connect voltmeter positive lead to terminal “L” and its negative lead to terminal “EW”.
4) When front washer switch is ON, check that voltage changes as shown in the figure.



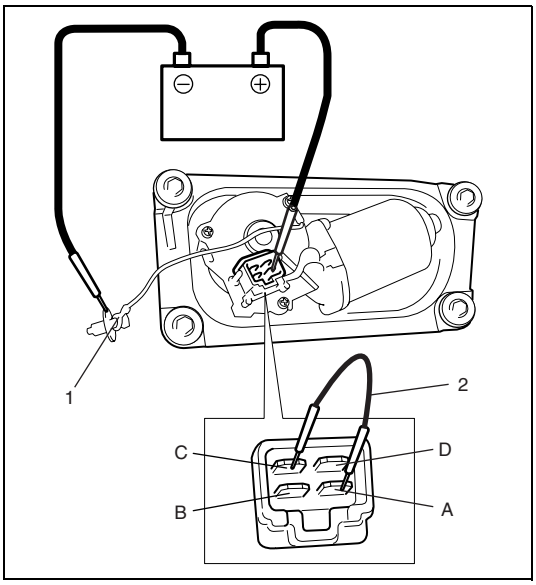
[A]: LH steering vehicle
[B]: RH steering vehicle

Front wiper motor

INSPECTION



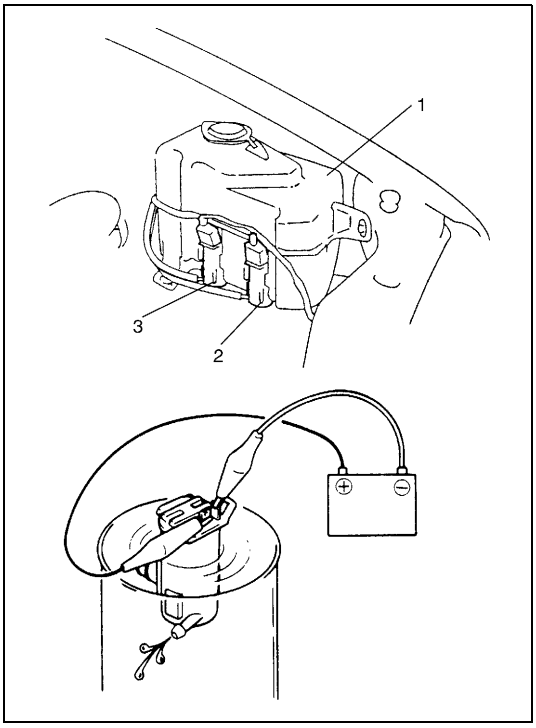
1) As illustrated, use a 12 V battery to connect its (+) terminal to terminal “A”, and its (–) terminal to Black lead wire.
   If motor rotates at a low revolution speed of 44 to 52 rpm, it is proper. For high speed check, connect battery (+) terminal to terminal “B”, and its (–) terminal to Black lead wire. If motor rotates at a high revolution speed of 64 to 78 rpm, it is proper.



2) Testing automatic stop action.
   a) Connect 12 V battery (+) terminal to terminal "A" of wiper motor and (–) terminal to "Black" lead wire (1) and let the motor turn.
   b) Disconnect terminal "A" from battery, and let the motor stop.
   c) Connect terminal "A" and "C" with a jumper wire (2), and connect terminal "D" to battery (+) terminal. Observe the motor turns once again then stops at a given position.
   d) Repeat a) thru c) several times and inspect if the motor stops at the given position every time.

Front and rear washer pump

INSPECTION



Connect battery (+) and (–) terminals to pump (+) and (–) terminals respectively to check pumping rate.
Check for both front and rear washer pump.

Pumping Rate
Front washer pump
: more than 1.2 L/min. (2.5 US pt./min., 2.1 Imp pt./min.)
Rear washer pump
: more than 1.0 L/min. (2.1 US pt./min., 1.8 Imp pt./min.)

1.	Washer tank
2.	Rear washer pump
3.	Front washer pump

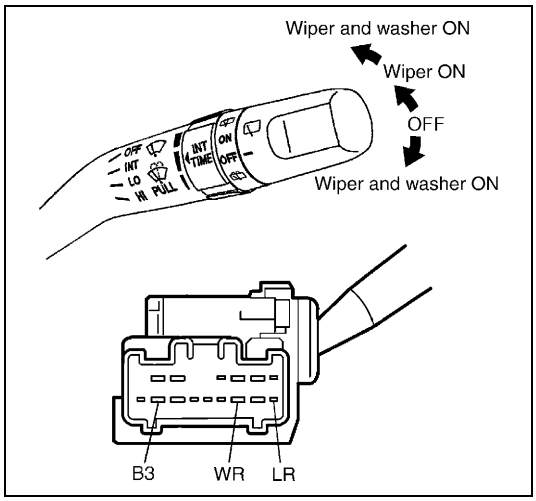
Rear Wiper and Washer

Rear wiper and washer switch

REMOVAL

Refer to “Front Wiper and Washer Switch” in this section.

INSPECTION



Check for continuity between terminals at each switch position as shown in the following figure. If check result is not as specified, replace.

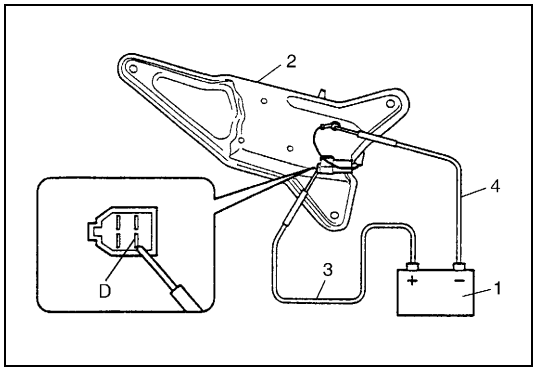
Position \ Terminal	B3	LR	WR
OFF			
Wiper ON	○	○	
Wiper and washer ON	○	○	○

INSTALLATION

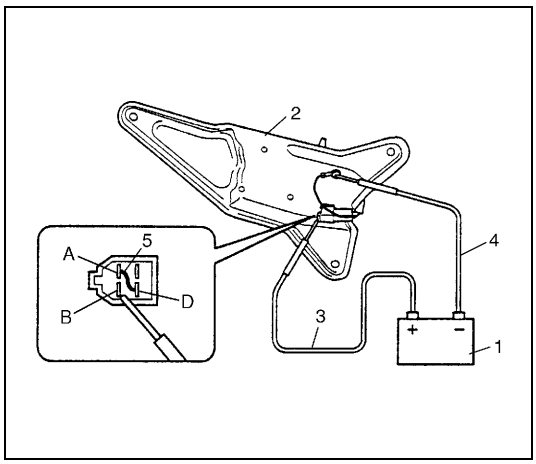
Refer to “Front Wiper and Washer Switch” in this section.

Rear wiper motor

INSPECTION



- Testing wiper motor
  As shown, use a 12 V battery (1) to connect its (+) (“Red” lead wire (3)) and (–) terminals to terminal “D” and “Black” lead wire (4) respectively. Then motor (2) should rotate at 35 to 45 rpm.



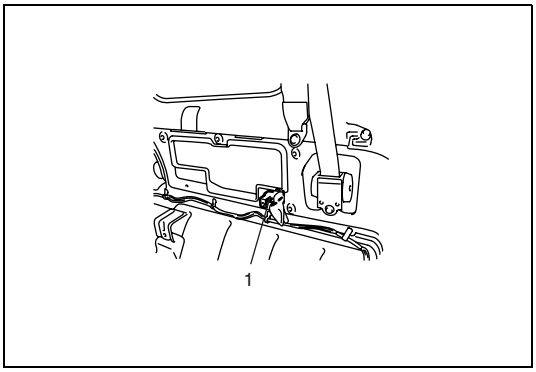
- Testing automatic stop action

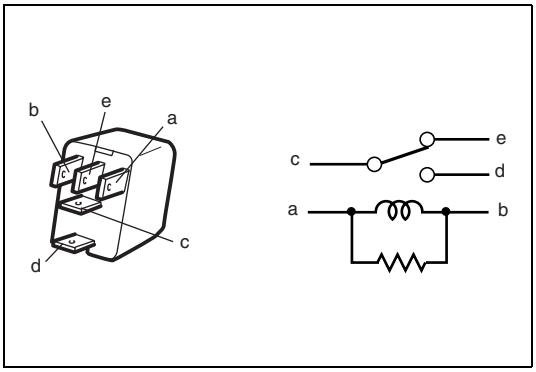
a) First, connect battery (+) terminal (“Red” lead wire (3)) to terminal “D” and battery (–) terminal to “Black” lead wire (4) and let the motor (2) turn.
b) Then disconnect terminal “D” from battery (1) and let the motor (2) stop.
c) Next connect terminal “D” and terminal “A” with a jumper wire (5) and connect terminal “B” to battery (+) terminal. Observe the wiper motor (2) turns once again, then stops at a given position.
d) Repeat these steps several times, and inspect if the motor (2) stops at the given position every time.

Rear wiper relay

INSPECTION

1) Disconnect negative (–) cable from battery.
2) Remove rear right side inner lower trim (H27 engine model) or rear left side inner lower trim (H25 engine model).
3) Remove rear wiper relay (1) from vehicle.





4) Check that there is no continuity between terminal “c” and “d”. If there is continuity, replace relay.
5) Check that there is continuity between terminal “c” and “e”. If there is no continuity, replace relay.
6) Connect that there is continuity between terminals “c” and “d” when a 12 V battery is connected to terminals “a” and “b”. If malfunction is found, replace it with a new one.

Rear Window Defogger

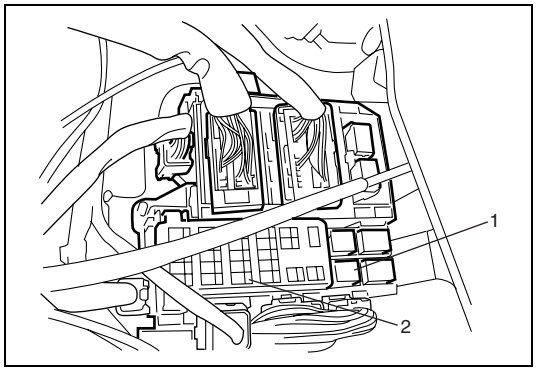
Rear window defogger switch

INSPECTION

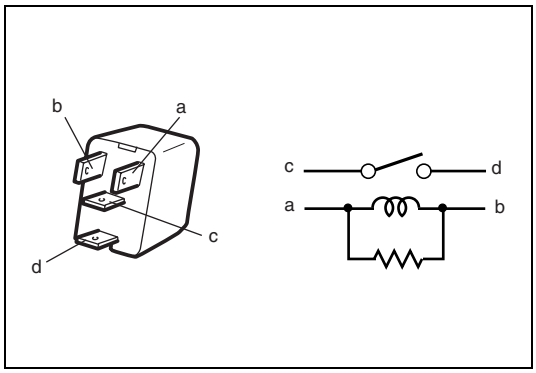
For rear window defogger switch Inspection referring to “HVAC Control Module and Its Circuits Inspection” in Section 1B.

Rear window defogger relay

INSPECTION



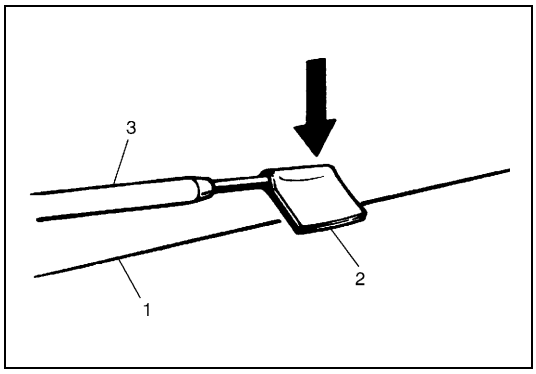
1) Disconnect negative (–) cable from battery.
2) Remove rear window defogger relay (1) from fuse / relay box (2).



3) Check that there is no continuity between terminal “c” and “d”. If there is continuity, replace relay.
4) Connect that there is continuity between terminals “c” and “d” when a 12 V battery is connected to terminals “a” and “b”. If malfunction is found, replace it with a new one.

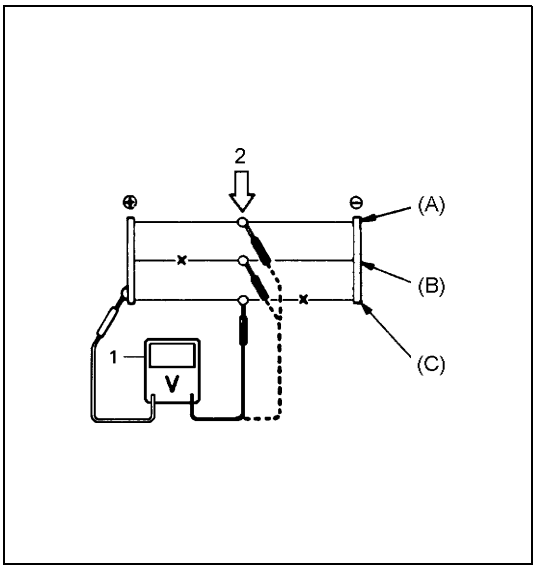
Rear window defogger wire

INSPECTION



NOTE:

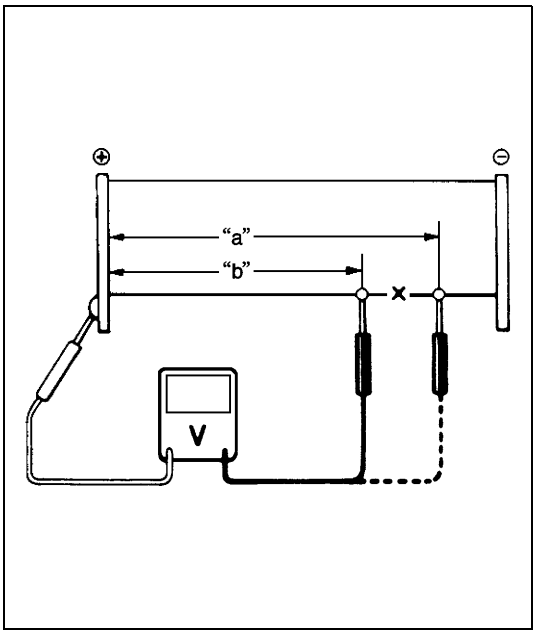
- **When cleaning rear window glass, use a dry cloth to wipe it along wire direction.**
- **When cleaning glass, do not use detergent or abrasive-containing glass cleaner.**
- **When measuring wire voltage, use a tester with negative probe (3) wrapped with a tin foil (2) which should be held down on wire (1) by finger pressure.**



1) Checking wire damage.
   a) Turn main switch ON.
   b) Turn defogger switch ON.
   c) Use a voltmeter (1) to check voltage at the center of each heat wire, as shown.
      If measured voltage is 10V, wire must be damaged between its center and positive end. If voltage is zero, wire must be damaged between its center and ground.

Voltage	Criteria
(A): Approx. 5 V	Good (No break in wire)
(A), (B): Approx. 10 V or 0 V	Broken wire

(A): Good	(C): Broken wire
(B): Broken wire	2. At center



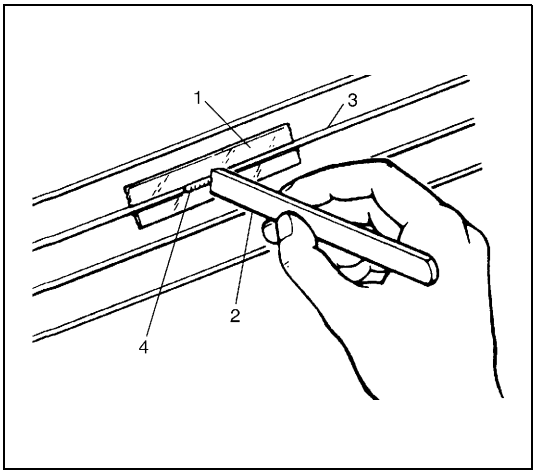
2) Locating damage in wire.
   a) Touch voltmeter positive (+) lead to heat wire positive terminal end.
   b) Touch voltmeter negative (–) lead with a foil strip to heat wire positive terminal end, then move it along wire to the negative terminal end.
   c) The place where voltmeter fluctuates from zero to several volts is where there is damage.

NOTE:

If heat wire is free from damage, voltmeter should indicate 12 V at heat wire positive terminal end and its indication should decrease gradually toward zero at the other terminal (ground).

"a": Several volts
"b": 0 volt

REPAIR



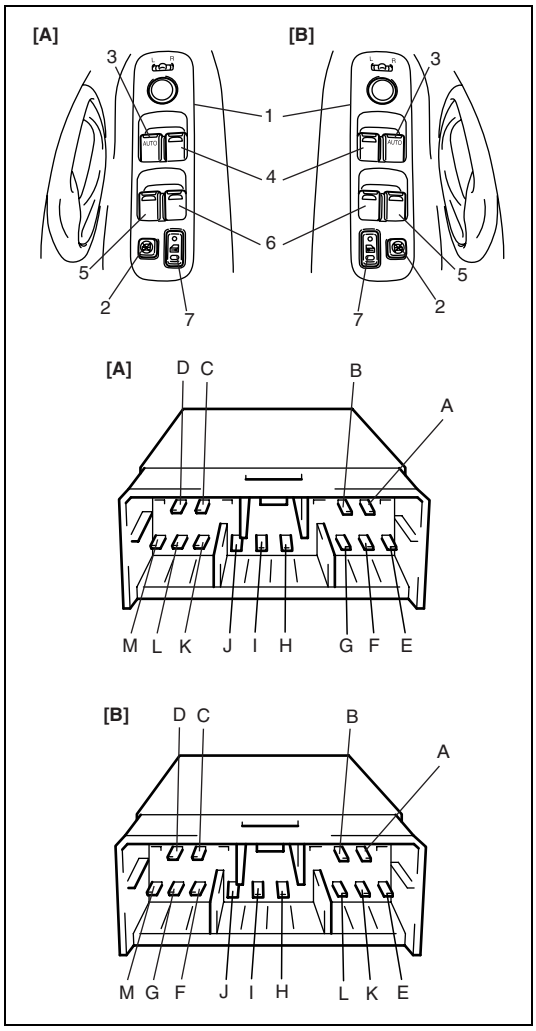
1) Clean broken wire tips and its surrounding area with grease, wax and silicone remover.
2) Apply masking tape (1) at both upper and lower sides of heat wire to be repaired.
3) Apply commercially-available repair agent (4) with a fine-tip brush.
4) 2 to 3 minutes later, remove masking tapes (1) previously applied.
5) Leave repaired heat wire as it is for at least 24 hours before operating defogger again.

2. Wood spatula
3. Broken wire

Power Window Control System

Power window main switch

INSPECTION



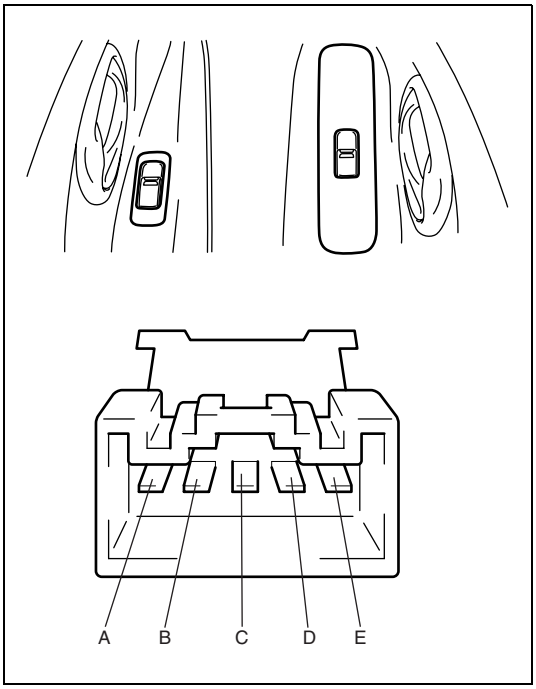
Inspect switch continuity between terminals.

Window Lock Switch	Switch \ Terminal	Driver Side Window Switch				Passenger Side Window Switch				Rear RH Window Switch				Rear LH Window Switch			
		H	J	B	A	H	J	D	C	H	J	L	K	H	J	G	F
OFF	UP	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	OFF		○	○	○		○	○	○		○	○	○		○	○	
	DOWN	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
ON	UP	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	OFF		○	○	○			○	○			○	○			○	○
	DOWN	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

[A]: LH steering vehicle	4. Passenger side window switch
[B]: RH steering vehicle	5. Rear LH window switch
1. Power window main switch	6. Rear RH window switch
2. Power window lock switch	7. Door lock switch
3. Driver side window switch	

Power window sub switch

INSPECTION



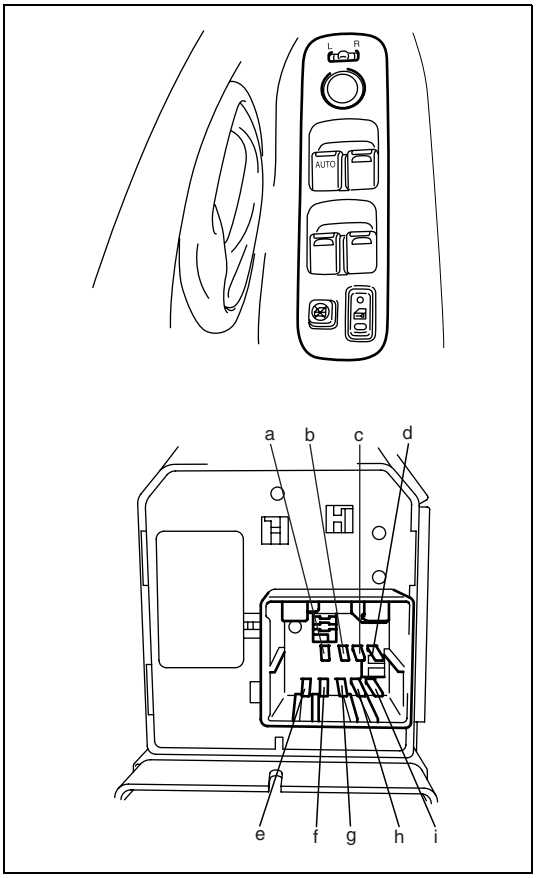
Inspect switch continuity between terminal.

Switch Position \ Terminal	C	B	E	A	D
UP	○	○		○	○
OFF		○	○	○	○
DOWN	○		○	○	○

Power Door Mirror Control System

Power door mirror switch

INSPECTION

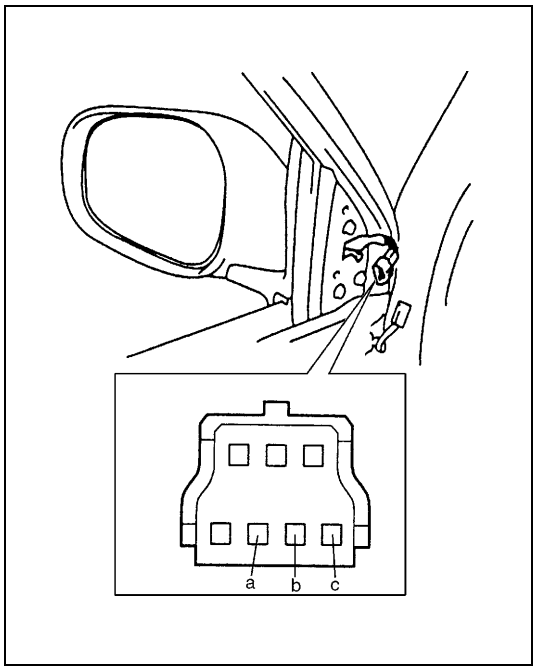


1) Remove mirror switch from instrument panel.
2) Check continuity at each switch position by using a circuit tester. If any continuity is not obtained, replace mirror switch.

L	h	g	c	b	f
R				a	e
UP	○	○	○		○
DOWN	○	○	○		○
LEFT	○	○	○	○	
RIGHT	○	○	○	○	

Power door mirror actuator

INSPECTION



1) Remove garnish from door.
2) Disconnect door mirror coupler.
3) Check that door mirror operates properly when battery voltage is applied to connector terminals. Connect battery positive and negative terminal to the door mirror terminal as shown in the figure.
   If it does not follow the table's operation, replace door mirror assembly.

Operation \ Terminal	a	c	b
UP	⊖	⊕	
DOWN	⊕	⊖	
LEFT	⊖		⊕
RIGHT	⊕		⊖

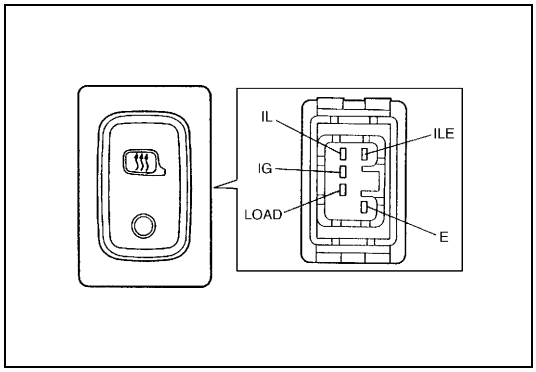
NOTE:

When installing door mirror to door, be careful not to pinch harness between door and door mirror.

Door Mirror Heater

Door mirror heater switch

INSPECTION



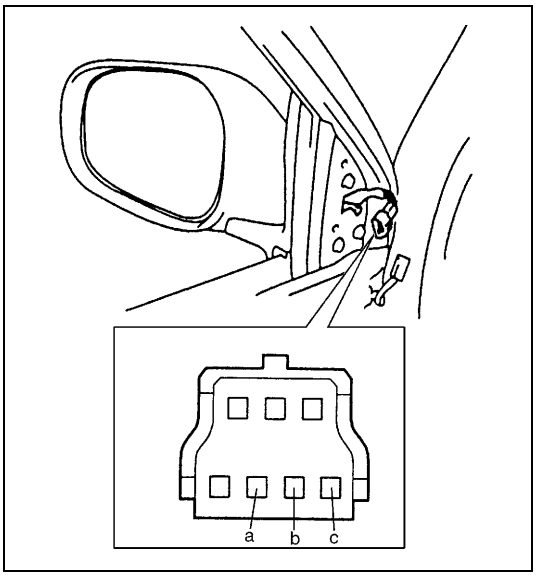
1) Remove mirror heater switch from instrument panel.
2) Check for continuity between terminals at each switch position as shown in the figure. If check result is not as specified, replace switch.

Position \ Terminal	IG	LOAD	E	IL	ILE
FREE		○	○	○	○
PUSH (ON)	○	○	○	○	○

Door mirror heater

INSPECTION

1) Remove garnish from door.
2) Disconnect door mirror coupler.
3) Check for continuity between terminals “a” and “b”. If not continuity, replace outside mirror.



Power Door Lock System

Power door lock system

SYSTEM INSPECTION

Step	Action	Yes	No
1	Check power door lock operation referring to “Power Door Lock System Operation” in this section. Is power door lock system in good condition?	System is in good condition.	Go to Step 2.
2	Check BCM referring to “DTC Check” in Section 8H. Are there any malfunction DTC(s)?	Inspect and repair referring to applicable DTC inspection flow.	Go to Step 3.
3	Inspect and repair referring to “Power Door Lock of Diagnosis” in this section. Are check and repair completed?	Go to Step 4.	Check and repair malfunction parts. Then go to Step 4.
4	1) Clear DTC it any. 2) Perform system check. Is there any problem symptom malfunction DTC or abnormal condition?	Go to Step 2.	End

Power door lock system operation

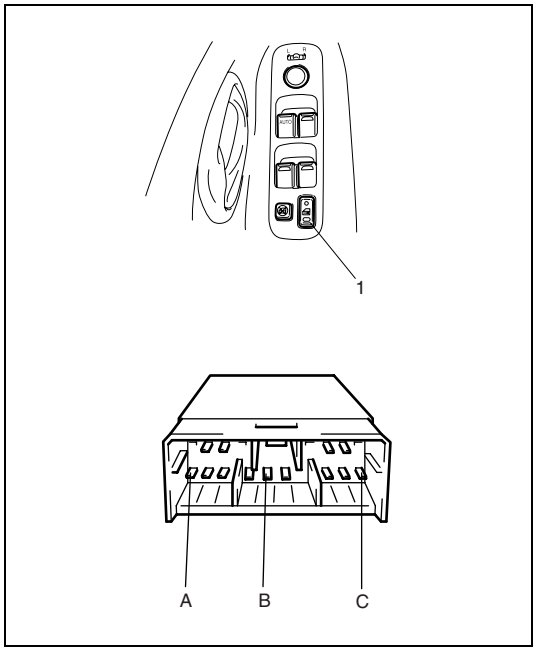
INSPECTION

1) Check the following operation.
   a) When the driver side key cylinder is turned LOCK, check all doors lock.
   b) When the driver side door key cylinder is turned UNLOCK, check all doors unlock.

If check result is not satisfied, go to "Power Door Lock System Circuit Inspection" in this section.

Manual door lock switch

INSPECTION

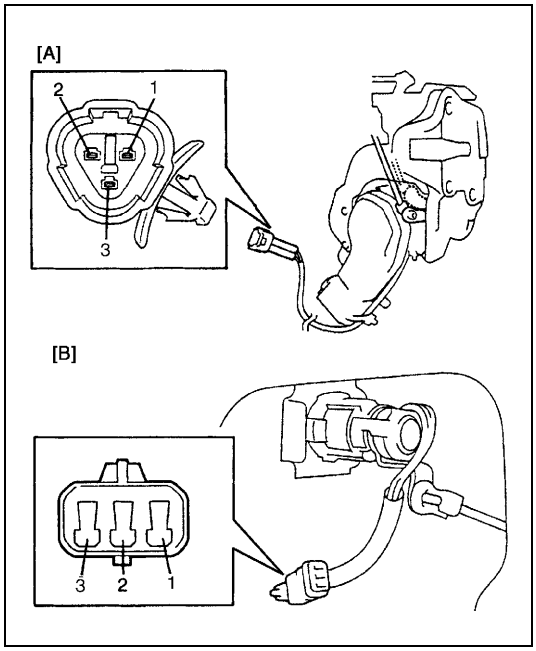


Inspect continuity at terminals according to the door lock switch (1) action.

Switch \ Terminal	A	B	C
LOCK	○		○
OFF			
UNLOCK	○	○	

Key cylinder switch

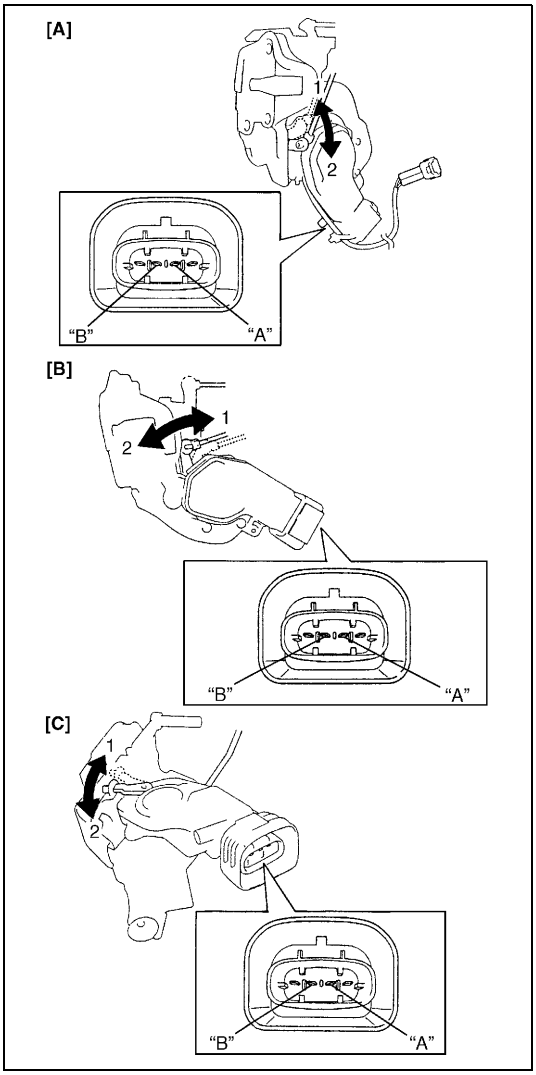
INSPECTION



Inspect continuity at terminals according to the key action.

Key \ Terminal	3	2	1
LOCK	○	○	
OFF			
UNLOCK		○	○

[A]: Front door
[B]: Back door



Power door lock actuator

INSPECTION

1) Disconnect power door lock actuator coupler.
2) Connect 12 V battery positive and negative terminals to the door lock actuator terminals shown below.
   If it does not follow the table's operation, replace the faulty door lock actuator.

Operation / Terminal	UNLOCK (1)	LOCK (2)
"A"	⊖	⊕
"B"	⊕	⊖

[A]: Front door	1. Lock
[B]: Rear door	2. Unlock
[C]: Back door	

Keyless Entry System

Keyless entry system

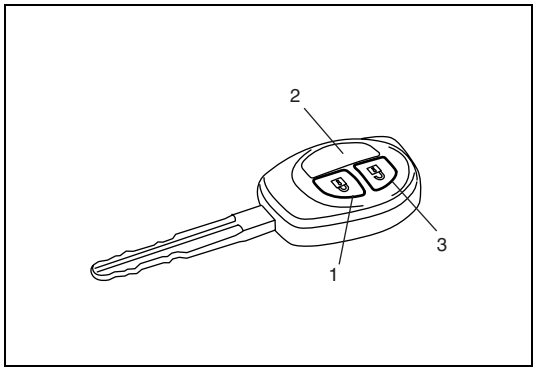
SYSTEM INSPECTION

Step	Action	Yes	No
1	Check keyless entry system operation referring to “Keyless Entry System Operation” in this section. Is keyless entry system in good condition?	System is in good condition.	Go to Step 2.
2	Check BCM referring to “DTC Check” in Section 8H. Are there any malfunction DTC(s)?	Inspect and repair referring to applicable DTC inspection flow.	Go to Step 3.
3	Inspect and repair referring to “Keyless Entry System of Diagnosis” in this section. Are check and repair completed?	Go to Step 4.	Check and repair malfunction parts. Then go to Step 4.
4	1) Clear DTC it any. 2) Perform system check. Is there any problem symptom malfunction DTC or abnormal condition?	Go to Step 2.	End

Keyless entry system operation

INSPECTION

1) Confirm that power door lock system is good condition referring to “Power Door Lock System Operation Inspection” in this section.
2) Confirm that turn signal and hazard warning light system is good condition referring to “Turn Signal and Hazard Warning Light System” in this section.
3) Check transmitter battery for dead. If battery is dead, replace battery referring to “Replacement of Transmitter Battery” under “Transmitter” in this section.
4) Confirm that all doors are closed and unlocked.

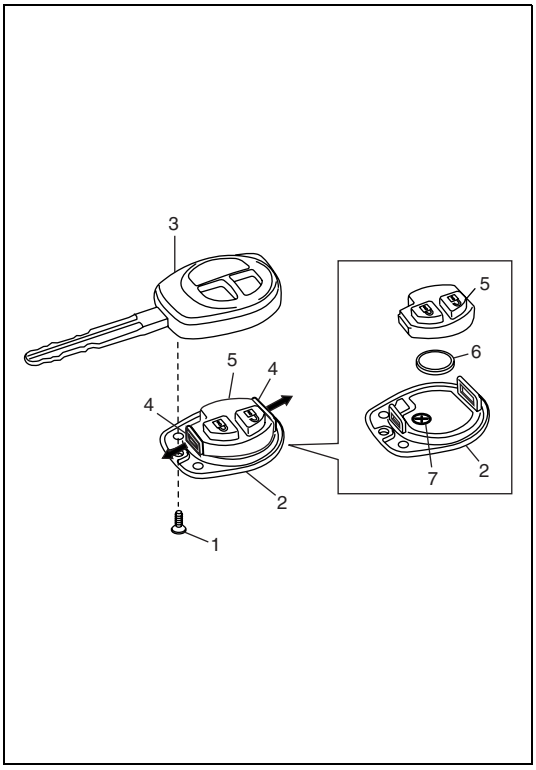


5) Check the following operation:
   a) When pushing “LOCK” button (1) on transmitter (2), check all doors lock and hazard warning lights flash once.
   b) When pushing “UNLOCK” button (3) on transmitter (2), check all doors unlock and hazard warning lights flash twice and interior light turn on about 15 seconds with the interior light switch in the middle position.

If check result is not satisfied, go to “Keyless Entry System Circuit Inspection” in this section.

Replacement of transmitter battery

If transmitter becomes unreliable, replace transmitter battery as follows.



1) Remove screw (1) and remove cover (2) from ignition key (3).
2) Unhook tabs (4) and remove transmitter (5).
3) Replace battery (lithium disc-type CR1616 or equivalent battery) (6).
4) Set transmitter to cover (2).
5) Install cover (2) to ignition key (3) and tighten screw (1).
6) Make sure that keyless entry system can be operated with transmitter.

CAUTION:
Use care not to allow grease or dirt to be attached on the printed circuit board and the battery.

NOTE:

- **To prevent theft, be sure to break the transmitter before discarding it.**
- **Dispose of the used battery properly according to applicable rules or regulations. Do not dispose of lithium batteries with ordinary household trash.**

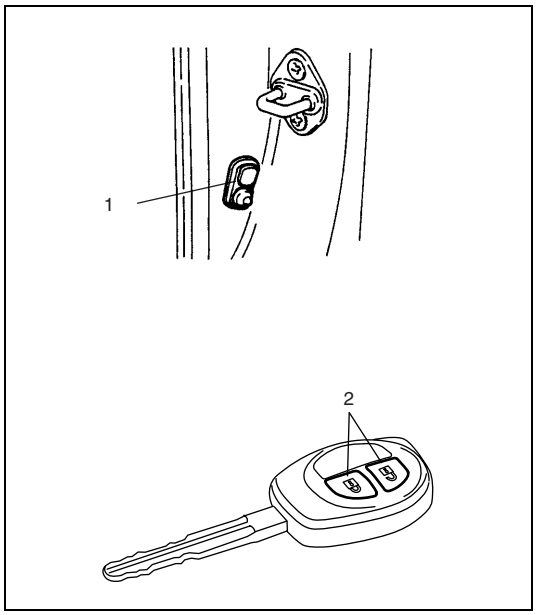
Programming transmitter code

NOTE:

- **For transmitter codes can be registered at the same time.**
- **When fifth transmitter code is registered, the oldest one will be cleared.**
- **Register transmitter code(s) to be used in total four times to delete registered transmitter code(s).**

If transmitter/door lock controller is replaced with new one or additional transmitter(s) is necessary, program transmitter code(s) as follows.

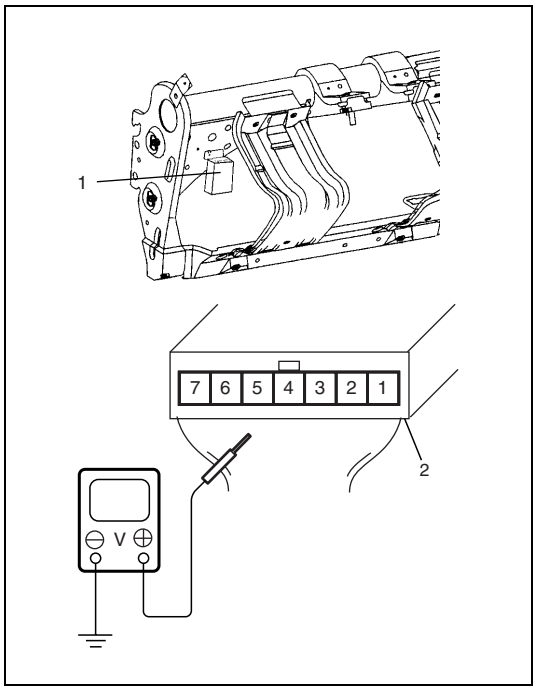
1) Confirm that all the doors are closed and the ignition key is out of the ignition cylinder.
2) Open the driver's door. Insert the key and turn the ignition switch to "ON" position within 10 seconds.
3) Turn the ignition switch to "OFF" position within 10 seconds.



4) Push and release the driver's door switch (1) 3 times within 20 seconds.
5) Turn the ignition switch to "ON" position within 10 seconds.
6) Turn the ignition switch to "OFF" position within 10 seconds.
7) Press and hold both "LOCK" and "UNLOCK" buttons (2) on the transmitter (3) for more than 5 seconds within 20 seconds (after step 6). All the doors will lock/unlock to confirm that this process has been properly done.
8) Press "LOCK" or "UNLOCK" button (2) on the transmitter (3) within 5 seconds (after step 7). All the doors will lock/unlock to confirm that this process has been properly done. With this process, the transmitter has been programmed.
9) If you want to program the additional transmitter, repeat the procedure from Step 1) through Step 8).
10) Make sure that the keyless entry system properly operates by operating each transmitter.

Keyless entry receiver circuit

INSPECTION

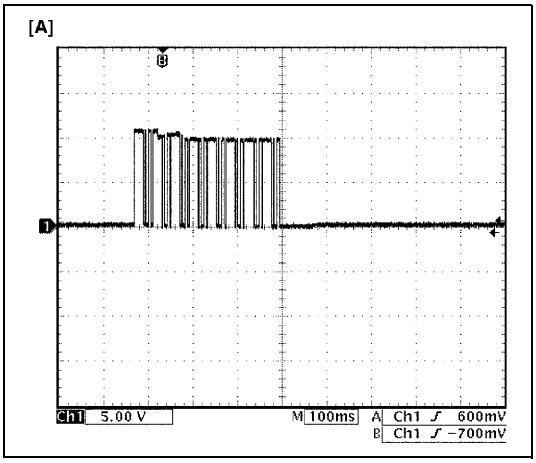


Check that the voltage between the following terminals and body ground are specifications under each conditions. If check result is not as specified, check applicable circuit for open or short. If circuit is normal, recheck keyless entry receiver (1) as follows.

1) Substitute a known-good keyless entry receiver.
2) Record key code referring to "Programming Transmitter Code" in this section.
3) Recheck keyless entry receiver system.

2. Keyless entry receiver connector (view from harness side)

Terminal	Wire color	Circuit	Specification	Condition
G36-1	WHT	Main power supply	10 – 14 V	–
G36-2	BLK/WHT	Lock/Unlock output signal circuit	Figure [A]	Push "Lock" or "Unlock" button on transmitter.
			0 – 1 V	Ignition switch is ON position.
G36-4	BRN	Enabling signal of programmable transmitter input circuit	0 – 1 V	Ignition switch is ON position.
G36-7	BLK	Ground	0 – 1 V	–

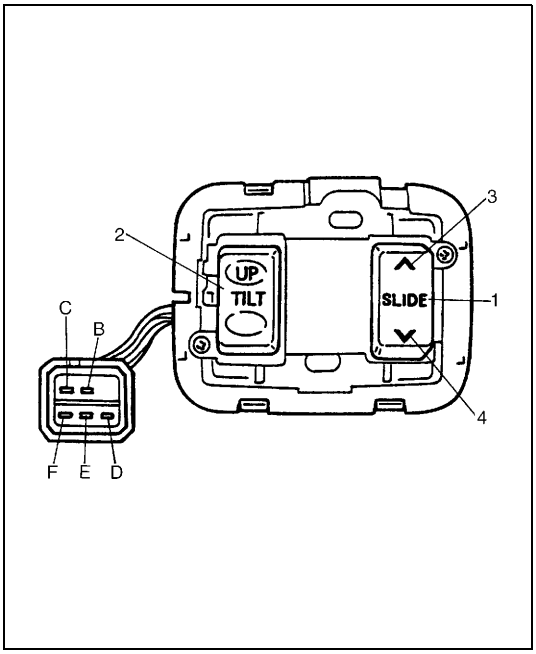


Oscilloscope setting
CH1: 5 V / DIV
TIME: 100ms / DIV

Power Sliding Roof (If Equipped)

INSPECTION

Sliding Roof Switch



Check switch for continuity between terminals as shown below.

Slide Switch (1)

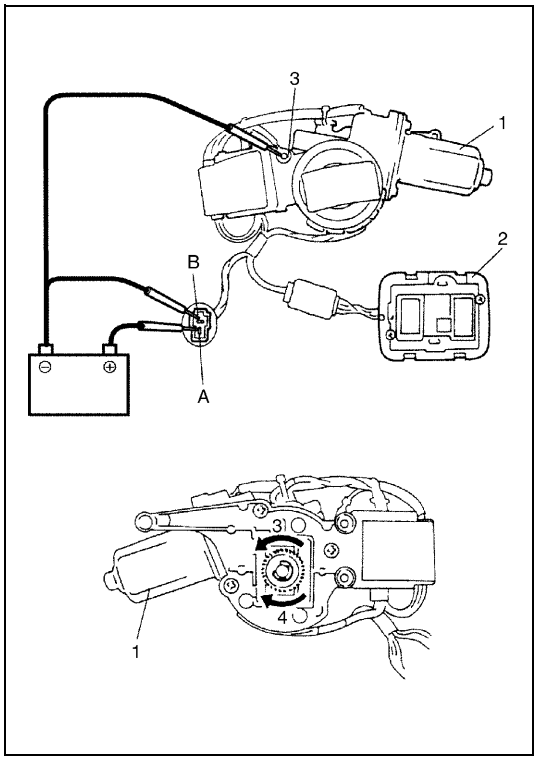
Switch \ Terminal	C	D	F
OPEN	○——	——○	
OFF			
CLOSE		○——	——○

Tilt Switch (2)

Switch \ Terminal	E	D	B
UP	○——	——○	
OFF			
DOWN		○——	——○

3.	To open
4.	To close

Sliding Roof Motor Assembly



1) Remove head lining. Refer to Section 9 for detail.
2) Remove sliding roof motor assembly (1).
3) Connect known-good sliding roof switch (2) to sliding roof motor assembly.
4) Connect 12 V battery positive terminal to terminal “A” of motor assembly (1) and battery negative terminal to terminal “B” of motor assembly (1).
5) Check that the sliding roof motor (1) runs according to the movement of the sliding roof switch (2).
   If motor does not operate as above, replace sliding roof motor assembly (1).

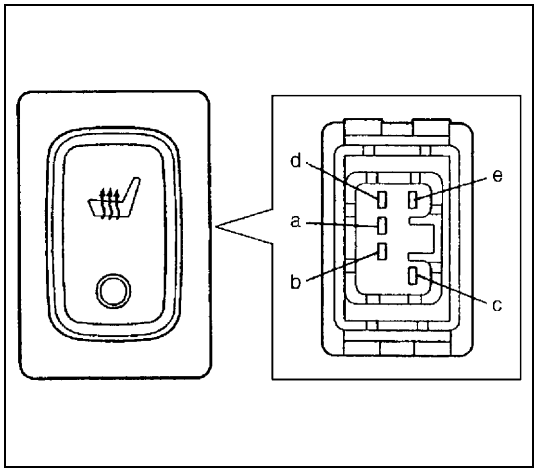
Sliding Roof Switch	Motor
Tilt up	turns left
Tilt down	turns right
Slide open	turns right
Slide close	turns left

3. Left turn
4. Right turn

Front Seat Heater (If Equipped)

Seat heater switch (driver and passenger side)

INSPECTION

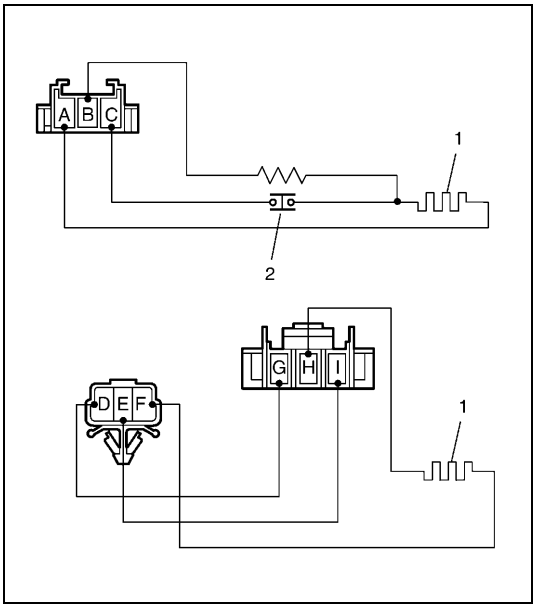


1) Confirm that ignition switch is OFF position.
2) Pull out seat heater switch from front center console box.
3) Disconnect seat heater switch coupler.
4) Check for continuity between terminals at each switch position as shown below. If check result is not as specified, replace.

Terminal / Position	a	b	c	d	e
OFF		○	○	○	○
ON	○	○	○	○	○

Seat heater wire

INSPECTION



1) Confirm that seat heater switch is OFF position.
2) Disconnect two couplers of seat heater under the seat cushion. (If seat under tray is equipped, pull out coupler between tray and seat cushion.)
3) Check for continuity between terminals as shown below. If not continuity, replace faulty seat heater.

Seat heater circuit in seat cushion
Between A and C
Between A and B
Seat heater circuit in seat back
Between F and H
Between E and I
Between D and G

1. Heater wire
2. Thermostat

CANVAS TOP MODEL

General Description

Cautions in Servicing

Refer to Section 8.

Symbols and Marks

Refer to Section 8.

Wiring Color Symbols

Refer to Section 8.

Abbreviations

Refer to Section 8.

Joint Connector

Refer to Section 8.

Fuse Box and Relay

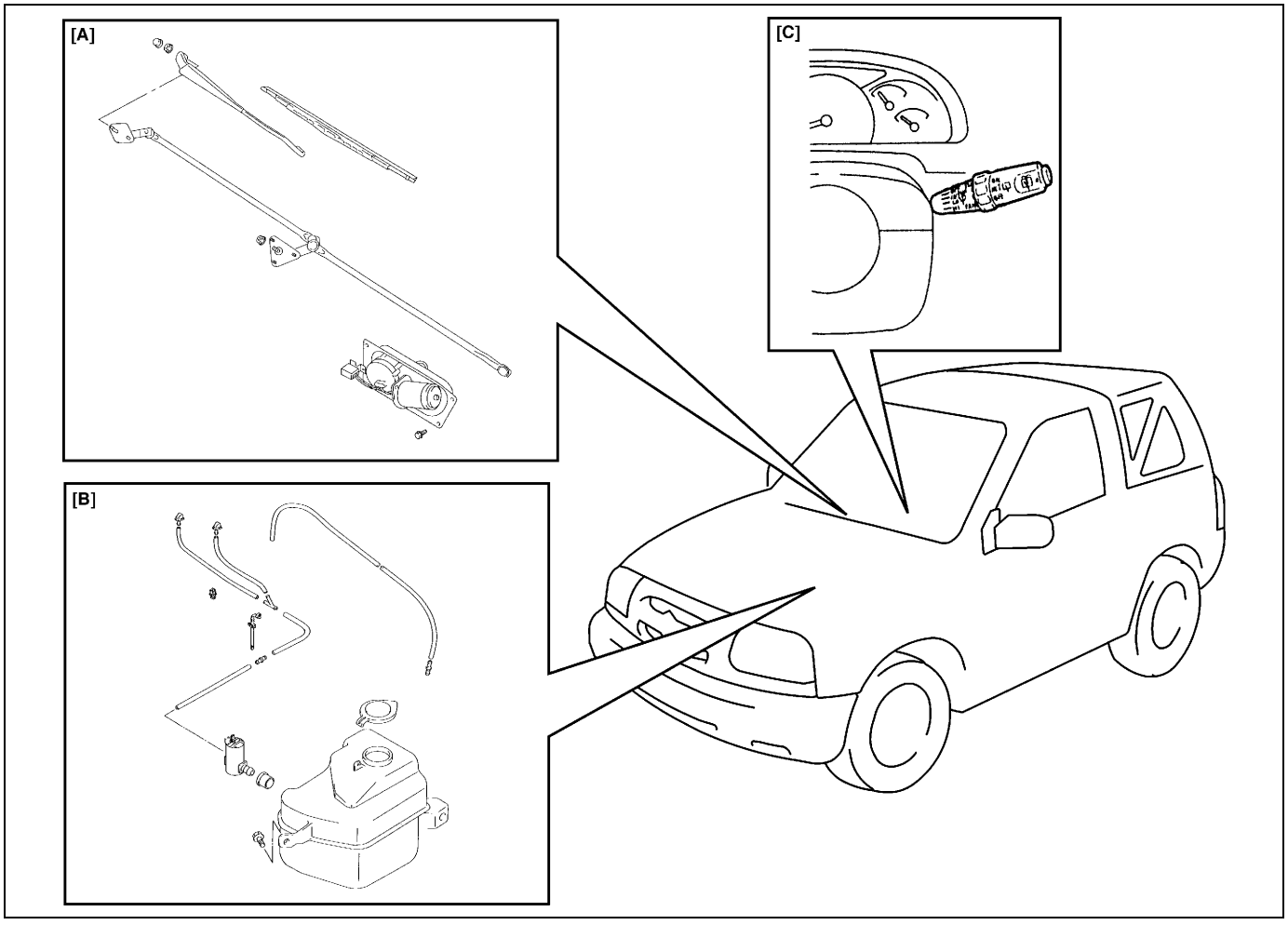
Refer to Section 8.

Power Supply Diagram

Refer to Section 8.

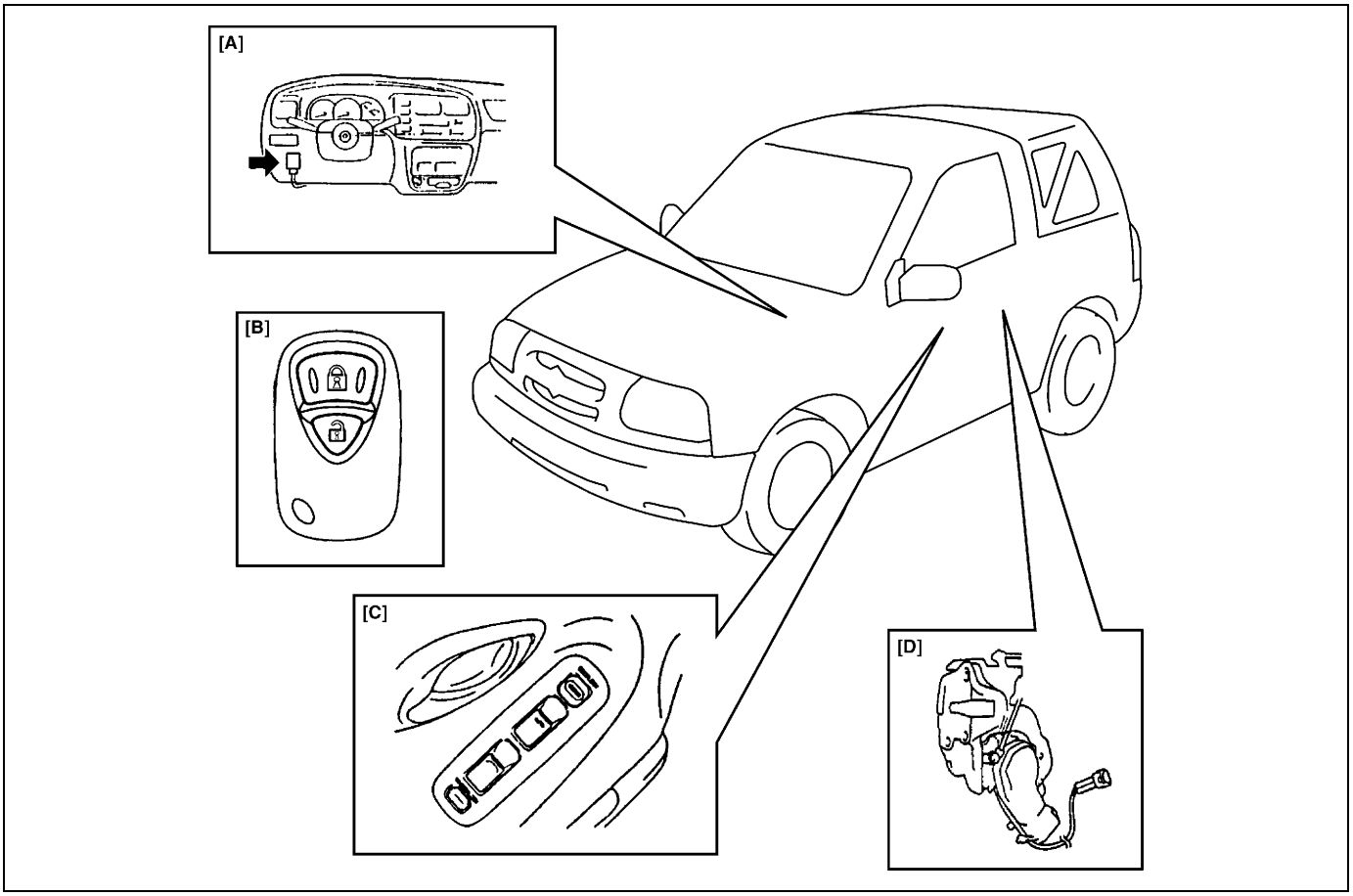
Windshield Wiper and Washer

Front wiper and washer



[A] : Front wiper assembly	[B] : Washer assembly	[C] : Front wiper switch

Power Door Lock and Keyless Entry (If Equipped) System



[A] :	Power door lock and keyless entry (if equipped) controller
[B] :	Keyless entry transmitter (if keyless entry is equipped)
[C] :	Power door lock switch
[D] :	Front door actuator

Diagnosis

NOTE:

Fuse name (“ ”) in the table below is shown on the junction box.

Windshield Wiper and Washer

Front wiper and washer

Condition	Possible Cause	Correction
Wiper malfunctions	“WIPER/WASHER” fuse blown	Replace fuse to check for short
	Wiper motor faulty	Replace motor
	Wiper switch faulty	Replace switch
	Wiring or grounding faulty	Repair
Washer malfunctions	Washer hose or nozzle clogged	Clean or repair clogged hose or nozzle
	“WIPER/WASHER” fuse blown	Replace fuse to check for short
	Washer motor faulty	Replace motor
	Washer switch faulty	Replace switch
	Wiring faulty	Repair

Power Door Lock System (If Keyless Entry Is Not Equipped)

Condition	Possible Cause	Correction
All power doors are not locked/unlocked by both driver side door key switch and power door lock switch	“DOOR LOCK” fuse blown	Replace fuse to check for short
	Power door controller faulty	Replace controller
	Wiring or grounding faulty	Repair
All power doors are not locked/unlocked by only power door lock switch	Power door lock switch faulty	Replace switch
	Wiring or grounding faulty	Repair
All power doors are not locked/unlocked by only driver side door key switch	Driver side door key switch faulty	Replace switch
	Wiring or grounding faulty	Repair
Only one power door is not locked/unlocked	Wiring or coupler faulty	Repair
	Actuator (door lock motor) faulty	Replace actuator

Power Door Lock and Keyless Entry System (If Keyless Entry Is Equipped)

Condition	Possible Cause	Correction
• **All power doors are not locked/unlocked by both driver side door key switch and power door lock switch. But all power doors are locked/unlocked by keyless entry transmitter** • **All power doors are not locked/unlocked by driver side door key switch, power door lock switch and keyless entry transmitter** • **When power doors are locked/unlocked by keyless entry transmitter, hazard warning lights do not flash**	"DOOR LOCK" fuse blown	Replace fuse to check for short
	Power door lock and keyless entry system faulty	Refer to "System Inspection of Power Door Lock and Keyless Entry System (If Keyless Entry Is Equippd)" in this section
All power doors are not locked/unlocked by only power door lock switch	Power door lock switch faulty	Replace switch
	Wiring or grounding faulty	Repair
All power doors are not locked/unlocked by only driver side door key switch	Driver side door key switch faulty	Replace switch
	Wiring or grounding faulty	Repair
All power doors are not locked/unlocked by only keyless entry transmitter	Code registration error	Register code
	Transmitter battery dead	Replace battery
	Transmitter faulty	Replace transmitter
	Power door lock and keyless entry system faulty	Refer to "System Inspection of Power Door Lock and Keyless Entry System (If Keyless Entry Is Equipped)" in this section
Although any door is opened within 30 seconds after power door(s) unlocked by keyless entry transmitter, all power doors are locked again automatically	Door switch faulty	Replace switch
	Wiring harness connected to door switch brakes	Repair
Only one power door is not locked/unlocked	Wiring or coupler faulty	Repair
	Actuator (door lock motor) faulty	Replace actuator
Operation distance of keyless entry is unstable	Transmitter battery dead	Replace battery
	Transmitter faulty	Replace transmitter

Power Door Mirror Control System

Condition	Possible Cause	Correction
All power mirrors do not operate	"CIGAR/RADIO" fuse blown	Replace fuse to check for short
	Power door mirror switch faulty	Replace switch
	Wiring or grounding faulty	Repair
One power mirror does not operate	Power door mirror switch faulty	Replace switch
	Actuator (power door mirror motor) faulty	Replace actuator
	Wiring or grounding faulty	Repair

Door Mirror Heater (If Equipped)

Condition	Possible Cause	Correction
The surface of mirror is not defrosted although door mirror heater switch is ON	"REAR DEFG" fuse blown	Replace fuse to check for short
	Door mirror heater switch faulty	Replace switch
	Door mirror heater faulty	Replace outside mirror
	Wiring or grounding faulty	Repair

Front Seat Heater (If Equipped)

Condition	Possible Cause	Correction
Both seat back and cushion do not become hot although seat heater switch is LO/HI position	"SEAT HEATER" fuse blown	Replace fuse to check for short
	Seat heater switch faulty	Replace switch
	Seat heater circuit in seat back and/or seat cushion faulty	Replace heater front back and/or heater front cushion
	Wiring or grounding faulty	Repair
Only seat back does not become hot although seat heater switch is HI position	Seat heater circuit in seat back and/or seat cushion faulty	Replace heater front back and/or heater front cushion
	Seat heater switch faulty	Replace switch
	Wiring faulty	Repair
Only seat cushion does not become hot although seat heater switch is HI position	Seat heater circuit in seat cushion	Replace heater front cushion
	Seat heater switch faulty	Replace switch
	Wiring faulty	Repair

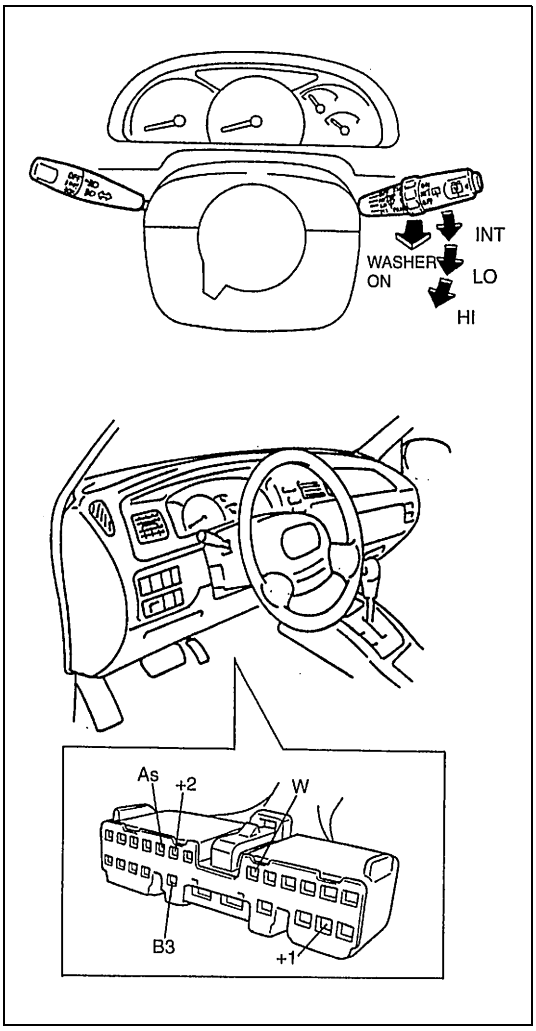
On-Vehicle Service

Windshield Wiper and Washer

Front wiper and washer

INSPECTION

Front Wiper and Washer Switch (in Combination Switch)



1) Disconnect negative cable at battery.
2) Disconnect combination switch lead wire coupler.
3) Check for continuity between terminals at each switch position as shown below. If check result is not as specified, replace switch.

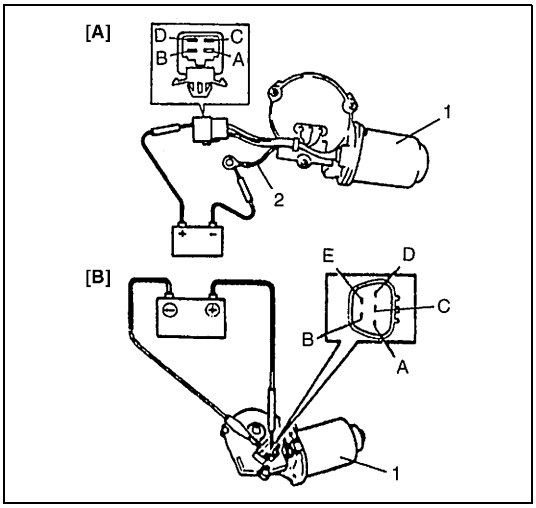
Wiper SW \ Terminal	B3	+2	+1	As
OFF			○—○	
INT			○—○	
LO	○———○			
HI	○—○			

Wiper SW \ Terminal	B3	W
OFF		
ON	○—○	

REMOVAL AND INSTALLATION

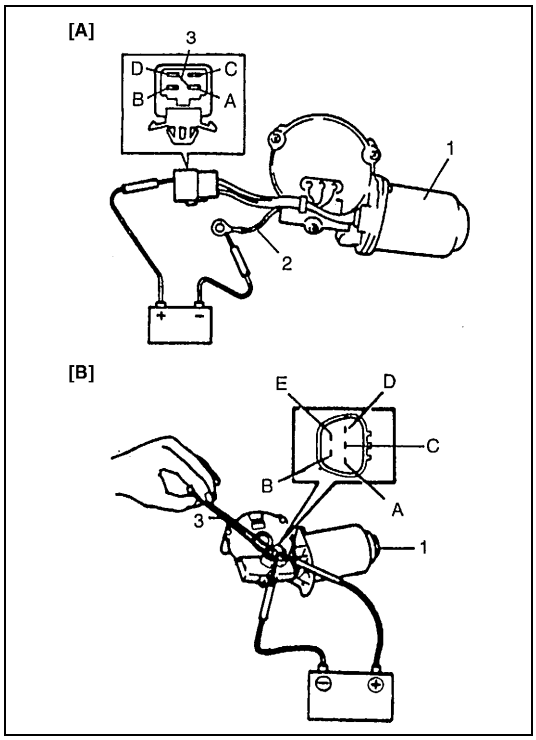
For vehicle without air bag system, referring to “Combination Switch” in Section 3C, or for vehicle with air bag system, referring to “Contact Coil and Combination Switch Assembly” in Section 3C1.

Wiper Motor



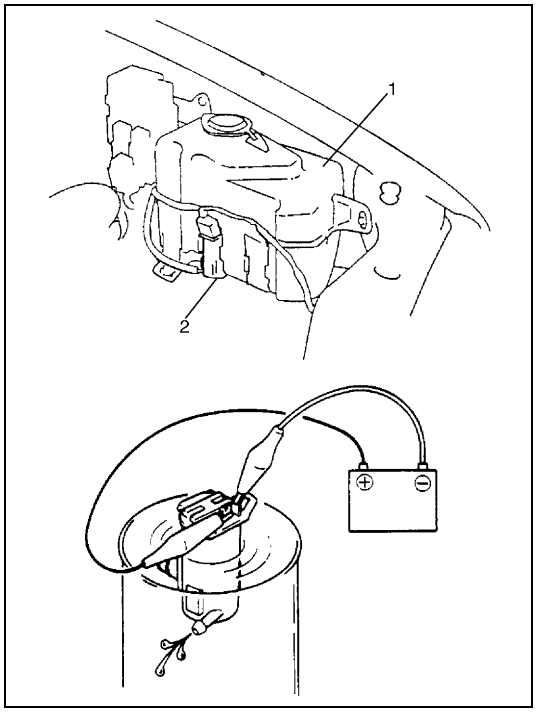
1) As illustrated, use a 12 V battery to connect its (+) terminal to terminal “A”, and its (–) terminal to Black lead wire (2) (Type A) or terminal “E” (Type B).
   If motor (1) rotates at a low revolution speed of 45 to 55 rpm, it is proper. For high speed check, connect battery (+) terminal to terminal “B”, and its (–) terminal to Black lead wire (2) (Type A) or terminal “E” (Type B). If motor rotates at a high revolution speed of 67 to 83 rpm, it is proper.

[A] : Type A
[B] : Type B



2) Testing automatic stop action.
   a) Connect 12 V battery (+) terminal to terminal "A" of wiper motor (1) and (–) terminal to Black lead wire (2) (Type A) or terminal "E" (Type B), and let the motor turn.
   b) Disconnect terminal "A" from battery, and let the motor stop.
   c) Connect terminal "A" and "D" with a jumper wire (3), and connect terminal "C" to battery (+) terminal. Observe the motor turns once again then stops at a given position.
   d) Repeat a) thru c) several times and inspect if the motor stops at the given position every time.

[A] : Type A
[B] : Type B



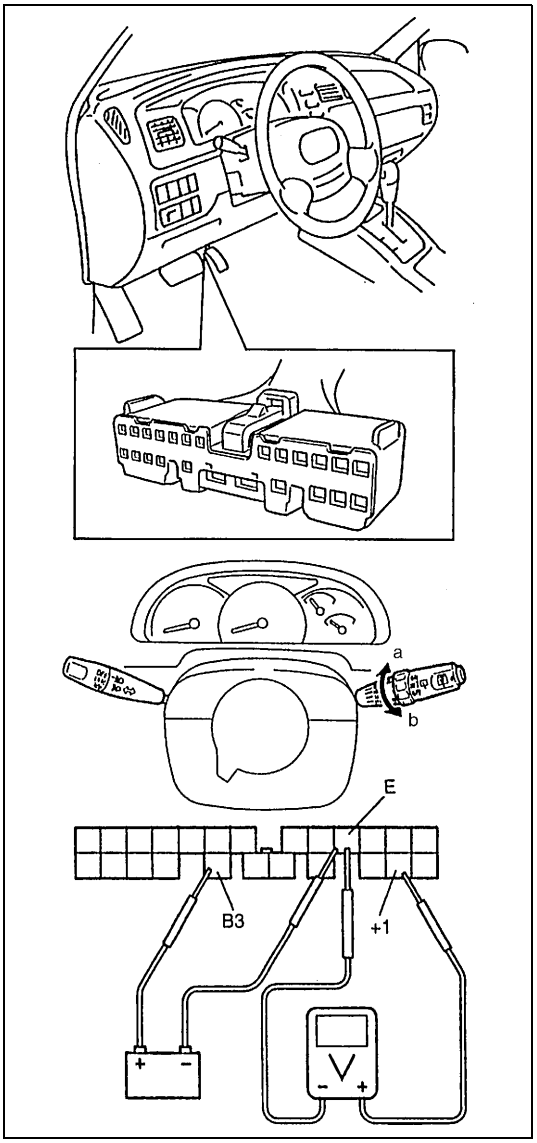
Washer Pump

Connect battery (+) and (–) terminals to pump (+) and (–) terminals respectively to check pumping rate.
Check for both front (2) washer pump.

Pumping Rate :
More than 1.0 l/min. (2.1 US pt./min., 1.76 Imp pt./min.).

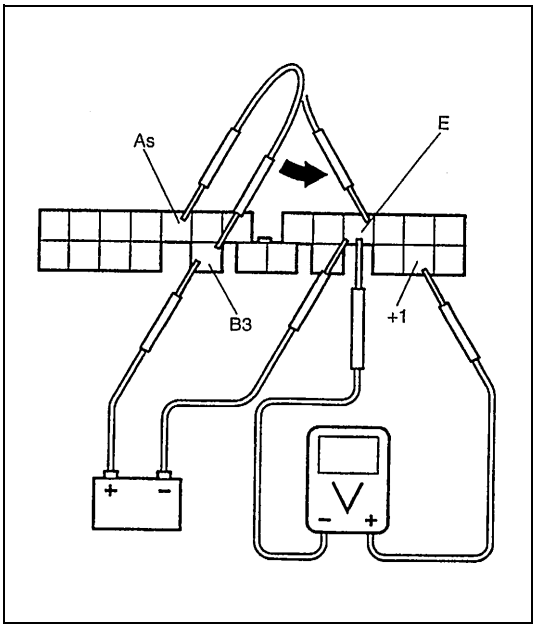
1. Washer tank

Intermittent Wiper Relay Circuit

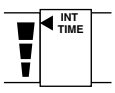
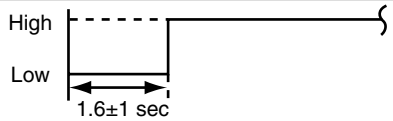
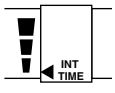
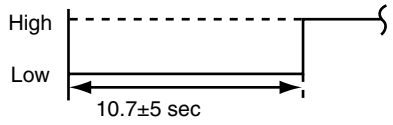


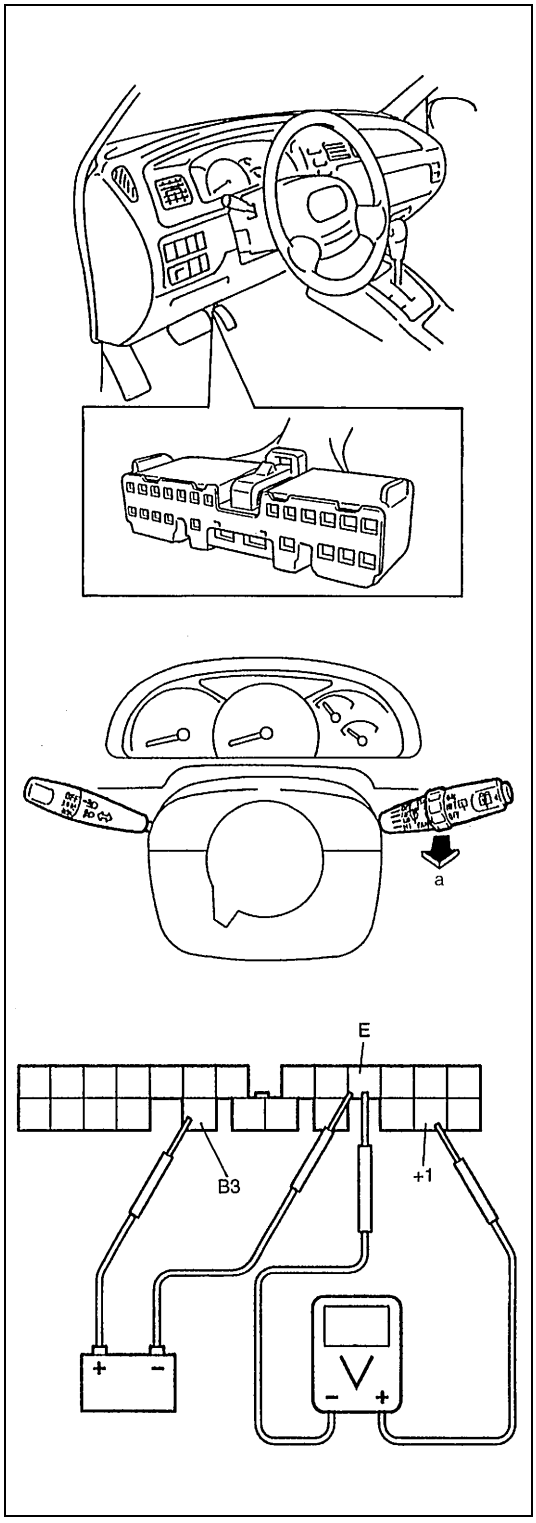
1) Disconnect negative cable at battery.
2) Disconnect combination switch lead wire coupler.
3) Turn the front wiper switch to INT position.
4) Turn the intermittent time control switch to FAST position.
5) Connect battery positive terminal to terminal “B3” and battery negative terminal to terminal “E”.
6) Connect voltmeter positive lead to terminal “+1” and negative lead to terminal “E”.
   Check that the voltmeter indicates the battery voltage (10 – 14 V).

a.	Slow
b.	Fast



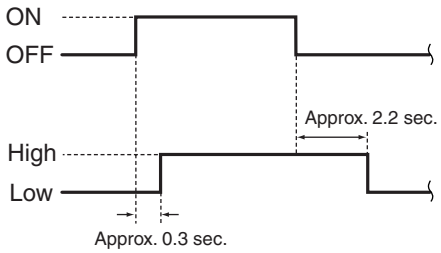
7) Connect terminal “As” and terminal “B3” by a jumper wire. Then move jumper wire end connected to terminal “B3” to terminal “E”. Observe the voltmeter voltage drops to 0 V right after connecting the jumper wire from terminal “B3” to “E”. Then the voltage rises to battery voltage (10 – 14 V) within the time shown in the table below.

INT time control switch position	Voltage
	
	



Washer Linked Operation

1) Disconnect negative cable at battery.
2) Disconnect combination switch lead wire coupler.
3) Make sure that front wiper switch is at OFF position.
4) Connect battery positive terminal to terminal “B3” and battery negative terminal to terminal “E”.
5) Connect voltmeter positive lead to terminal “+1” and negative lead to terminal “E”.
6) Pull washer switch and check that voltage changes as shown in figure.



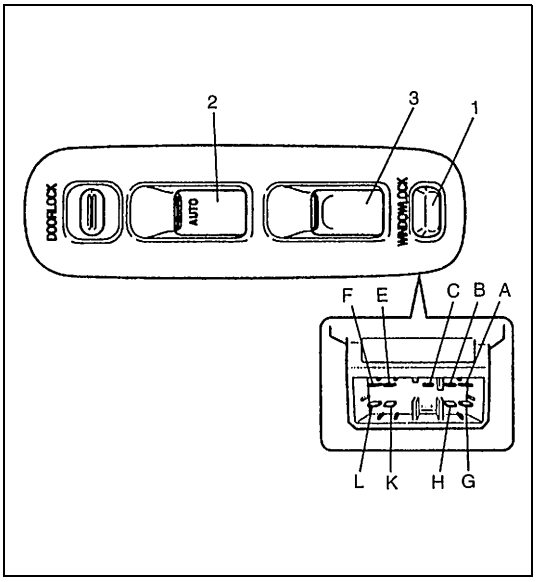
a. Washer ON

Power Window Control System

INSPECTION

Power Window Main Switch

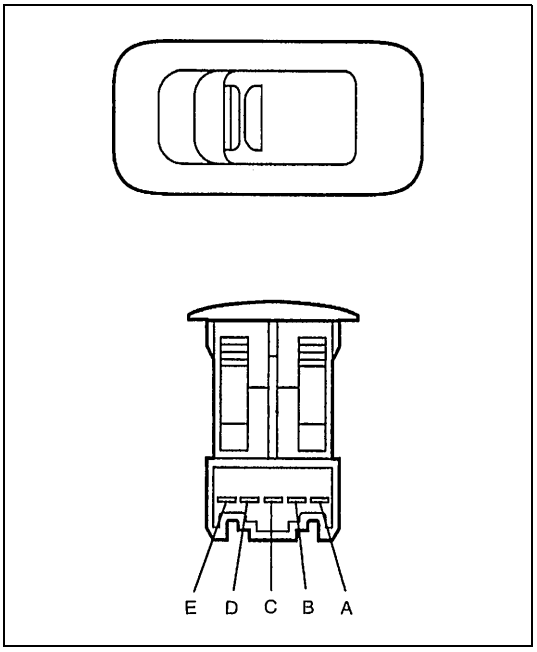
Check switch for continuity between terminals as shown below.



Window Lock Switch (1)	Switch \ Terminal	Driver Side Window Switch (2)				Passenger Side Window Switch (3)					
		C	H	G	A	C	E	B	A	A	F
OFF	UP	○—○		○—○		○—○		○—○			
	OFF		○—○	○—○			○—○	○—○		○—○	
	DOWN	○—○	○—○			○—○	○—○				
ON	UP	○—○		○—○		○—○					
	OFF		○—○	○—○			○—○				
	DOWN	○—○	○—○			○—○					

Power Window Sub Switch

Check switch for continuity between terminals as shown below.



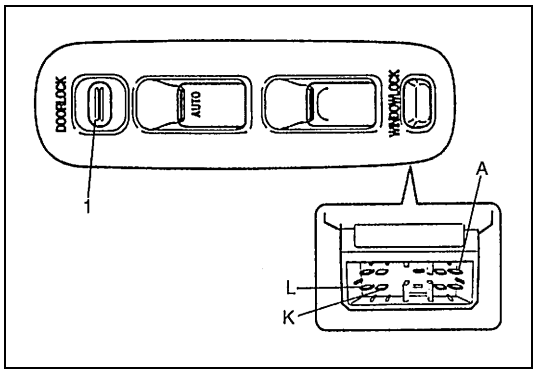
Switch Position \ Terminal	C	B	E	A	D
UP	○—○	○—○		○—○	
OFF		○—○	○—○	○—○	
DOWN	○—○		○—○	○—○	

Power Door Lock System (If Keyless Entry Is Not Equipped)

INSPECTION

Power Door Lock Switch

Check for continuity between terminals at each switch position as shown below.

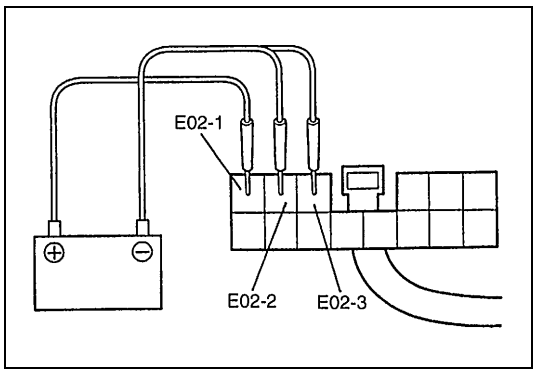


Switch \ Terminal	A	L	K
LOCK	○	○	
NEUTRAL			
UNLOCK	○		○

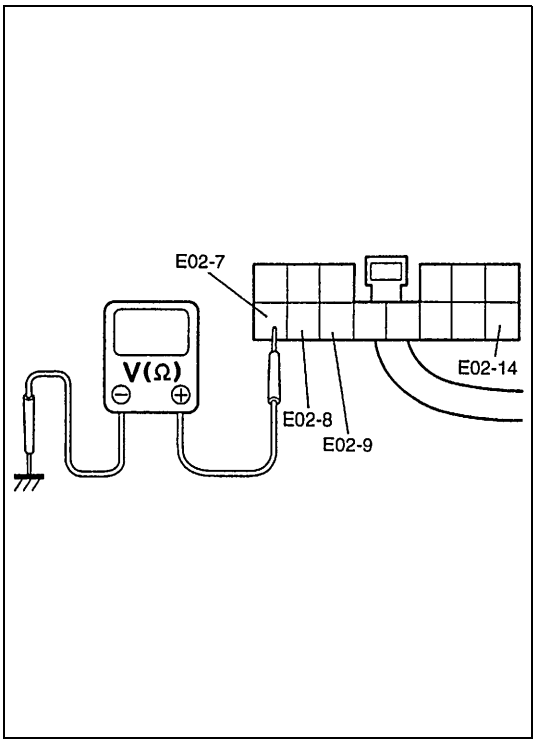
1. Door lock switch

Power Door Lock Controller

1) With the driver side door key turned LOCK, check all power doors are locked.
2) With the driver side door key turned UNLOCK, check only the driver side power door is unlocked.
   Turn the driver side door key to UNLOCK again within 5 seconds, check all power doors are unlocked.
   If check result of Step 1) and Step 2) is satisfactory, power door lock controller is OK. If check result is not satisfactory, go to next Step 3).



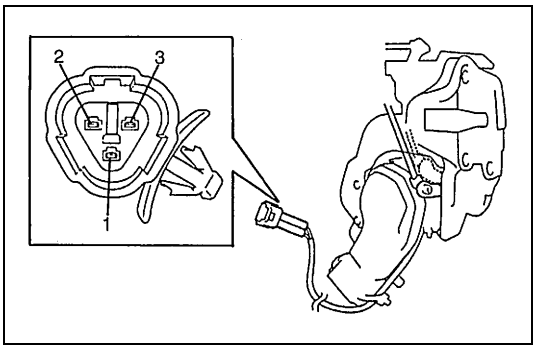
3) Disconnect negative cable at battery.
4) Disconnect coupler of power door lock controller.
5) Use a 12 V battery to connect its (+) terminal to terminal E02-1, and its (–) terminal to terminal E02-2 and E02-3. Check all power doors are locked.
   If check result is not satisfactory, repair circuit and recheck.
   If check result is satisfactory, go to next Step 6).



6) Connect negative cable at battery.
7) Check that the voltage and resistance between following terminals are specifications.

Terminals	Condition	Specification
E02-7 and ground	Anytime	10 – 14 V
E02-14 and ground	Anytime	Continuity
E02-8 and ground	When driver side door key switch is OFF position	No continuity
	When driver side door key switch is LOCK position	Continuity
E02-9 and ground	When driver side door key switch is OFF position	No continuity
	When driver side door key switch is UNLOCK position	Continuity

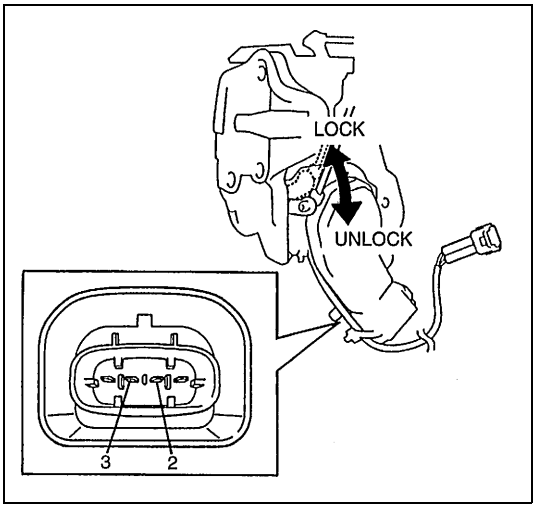
If check result is not satisfactory, repair circuit and recheck.
If check result is satisfactory, replace controller.



Key Cylinder Switch (Driver Side)

Check for continuity between terminals according to the key action shown below.

Key \ Terminal	3	2	1
LOCK	○	○	
OFF			
UNLOCK		○	○



Power Door Lock Actuator

1) Disconnect power door lock actuator coupler.
2) Connect 12 V battery positive and negative terminals to the door lock actuator terminals shown below and check operation.
   If it does not operate as specified in table below, replace door lock actuator.

Terminal \ Operation	UNLOCK	LOCK
2	⊖	⊕
3	⊕	⊖

Power Door Lock and Keyless Entry System (If Keyless Entry Is Equipped)

SYSTEM INSPECTION

Step	Action	Yes	No
1	Check power door lock operation referring to "Power door lock operation" in this section. Is this operation OK?	Go to Step 2.	Go to Step 3.
2	Check keyless entry operation referring to "Keyless entry operation" in this section. Is this operation OK?	Go to Step 4.	Go to Step 6.
3	Check keyless entry operation referring to "Keyless entry operation" in this section. Is this operation OK?	Go to Step 5.	Go to Step 7.
4	Check hazard warning lights operation referring to "Hazard warning lights operation" in this section. Is this operation OK?	This system is OK.	Go to Step 10.
5	Check door lock key and power door lock switch circuit referring to "Door lock key and power door lock switch circuit" in this section. Is this circuit OK?	Replace controller and recheck. And go to Step 4.	Repair circuit referring to "Wiring Diagram Manual" and recheck. And go to Step 4.
6	Check ignition switch and door switch circuit referring to "Ignition switch and door switch circuit" in this section. Is this circuit OK?	Replace controller and recheck. And go to Step 4.	Repair circuit referring to "Wiring Diagram Manual" and recheck. And go to Step 4.
7	Check power door lock actuator circuit referring to "Power door lock actuator circuit" in this section. Is this circuit OK?	Go to Step 8.	Repair circuit referring to "Wiring Diagram Manual" and recheck. If OK, go to Step 4. If not OK, go to next Step 8.
8	Check power supply and grounding circuit referring to "Power supply and grounding circuit" in this section. Is this circuit OK?	Go to Step 9.	Repair circuit referring to "Wiring Diagram Manual" and recheck. If OK, go to Step 4. If not OK, go to next Step 9.
9	1) Check door lock key and power door lock switch circuit referring to "Door lock key and power door lock switch circuit" in this section. 2) Check ignition switch and door switch circuit referring to "Ignition switch and door switch circuit" in this section. Are these circuits OK?	Replace controller and recheck. And go to Step 4.	Repair circuit referring to "Wiring Diagram Manual" and recheck. And go to Step 4.
10	Check that hazard warning lights flash with hazard switch ON. Is check result OK?	Go to Step 11.	Refer to "Turn Signal and Hazard Warning Lights" in "Diagnosis" and repair. And go to Step 4.
11	Check door knob switch and turn signal relay circuit referring to "Door knob switch and turn signal relay circuit" in this section. Is this circuit OK?	Replace controller and recheck.	Repair circuit referring to "Wiring Diagram Manual" and recheck.

Power door lock operation

INSPECTION

1) With the driver side door key turned LOCK, check all power doors are locked.
2) With the driver side door key turned UNLOCK, check only the driver side power door is unlocked.
   Turn the driver side door key to UNLOCK again within 5 seconds, check all power doors are unlocked.
   If check result of Step 1) and Step 2) is satisfactory, this operation is OK.

Keyless entry operation

INSPECTION

1) With the IG switch OFF and all doors closed, push LOCK button on transmitter. Check all power doors are locked.
2) Push UNLOCK button on transmitter. Check only driver side power door is unlocked.
3) Push UNLOCK button on transmitter again within 5 seconds. Check all power doors are unlocked.
   But if any door is not opened within 30 seconds after power door(s) unlocked, all power doors are locked again automatically.
   If check result of Step 1) to Step 3) is satisfactory, this operation is OK.

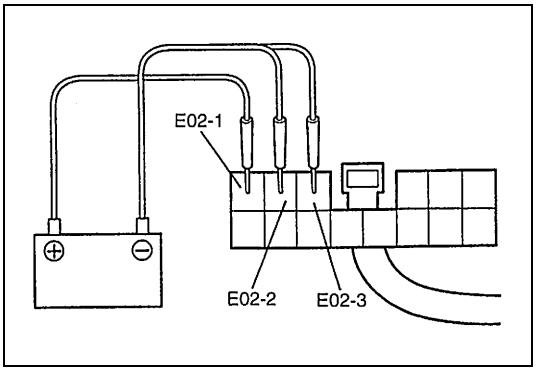
Hazard warning lights operation

INSPECTION

1) Check that hazard warning lights flash one time when power doors are locked by pushing LOCK button on transmitter.
2) Check that hazard warning lights flash two times when power door(s) is (are) unlocked by pushing UNLOCK button on transmitter.
   If check result of Step 1) and Step 2) is satisfactory, this operation is OK.

Power door lock actuator circuit

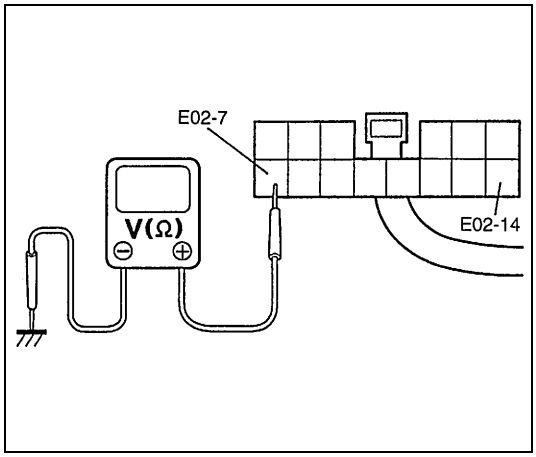
INSPECTION



1) Disconnect negative cable at battery.
2) Disconnect coupler of power door lock and keyless entry controller.
3) Use a 12 V battery to connect its (+) terminal to terminal E02-1, and its (–) terminal to terminal E02-2 and E02-3. Check all power doors are locked.
   If check result is satisfactory, this circuit is OK.

Power supply and grounding circuit

INSPECTION

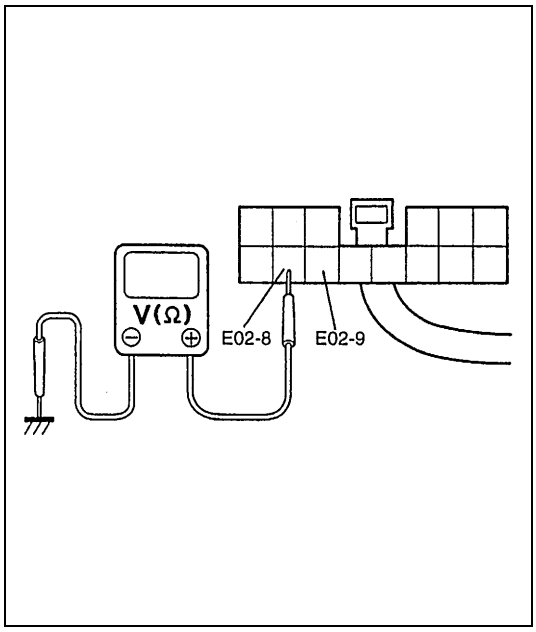


1) Disconnect negative cable at battery.
2) Disconnect coupler of power door lock and keyless entry controller, and connect negative cable at battery.
3) Check that the voltage and resistance between following terminals are specifications.
   If check result is satisfactory, this circuit is OK.

Terminals	Condition	Specification
E02-7 and ground	Anytime	10 – 14 V
E02-14 and ground	Anytime	Continuity

Door lock key and power door lock switch circuit

INSPECTION

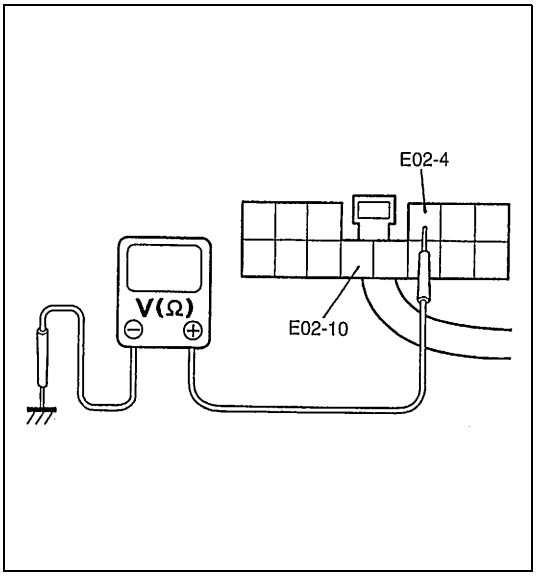


1) Disconnect negative cable at battery.
2) Disconnect coupler of power door lock and keyless entry controller.
3) Check for continuity between following terminals at each condition.
   If check result is satisfactory, this circuit is OK.

Terminals	Condition	Specification
E02-8 and ground	When driver side door key switch is OFF position	No continuity
	When driver side door key switch is LOCK position	Continuity
E02-9 and ground	When driver side door key switch is OFF position	No continuity
	When driver side door key switch is UNLOCK position	Continuity

Ignition switch and door switch circuit

INSPECTION

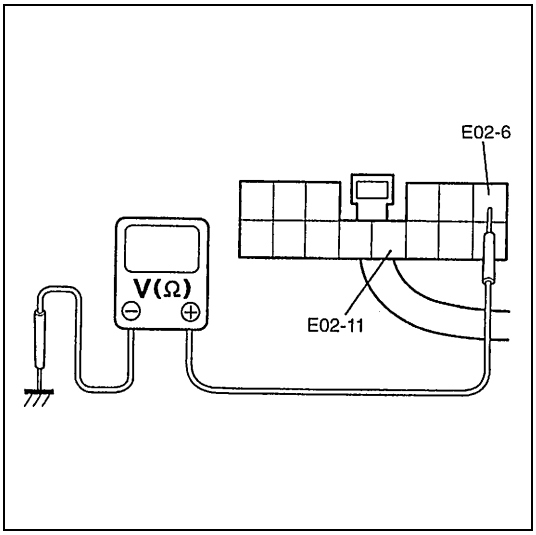


1) Disconnect negative cable at battery.
2) Disconnect coupler of power door lock and keyless entry controller, and connect negative cable at battery.
3) Check that the voltage and resistance between following terminals are specifications.
   If check result is satisfactory, this circuit is OK.

Terminals	Condition	Specification
E02-4 and ground	When ignition switch is OFF position	0 V
	When ignition switch is ON position	10 – 14 V
E02-10 and ground	When all doors are closed	No continuity
	When any one door is opened	Continuity

Door knob switch and answer back relay circuit

INSPECTION



1) Disconnect negative cable at battery.
2) Disconnect coupler of power door lock and keyless entry controller, and connect negative cable at battery.
3) Check that the voltage and resistance between following terminals are specifications.
   If check result is satisfactory, this circuit is OK.

Terminals	Condition	Specification
E02-6 and ground	Anytime	10 – 14 V
E02-11 and ground	When driver side door lock knob is pulled up	Continuity
	When driver side door lock knob is pushed down	No continuity

Power door lock switch

INSPECTION

Refer to “Power Door Lock Switch Inspection of Power Door Lock System (If Keyless Entry is Not Equipped)” in this section.

Key cylinder switch (driver side)

INSPECTION

Refer to “Key Cylinder Switch (Driver Side) Inspection of Power Door Lock System (If Keyless Entry Is Not Equipped)” in this section.

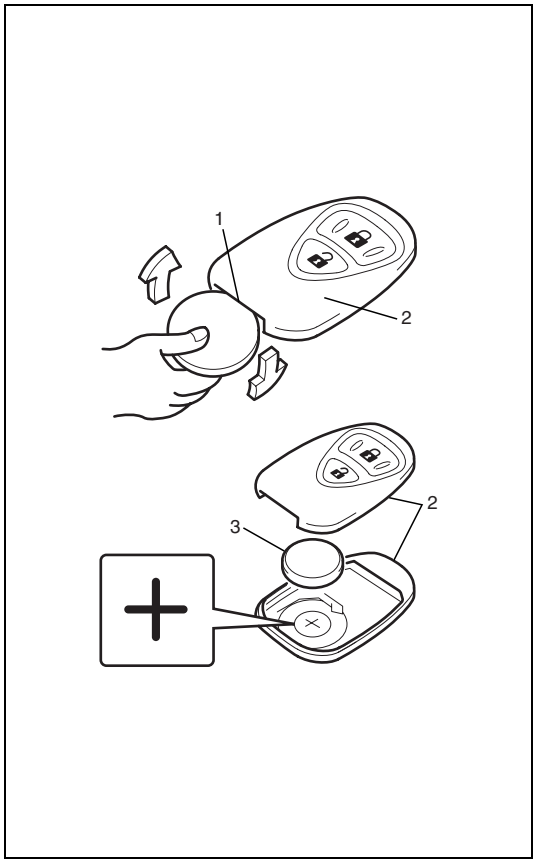
Power door lock actuator

INSPECTION

Refer to “Power Door Lock Actuator Inspection of Power Door Lock System (If Keyless Entry Is Not Equipped)” in this section.

Transmitter

REPLACEMENT OF THE BATTERY



If the transmitter becomes unreliable, replace the battery.
As the battery power is consumed, the operation distance will be shorter.

1) Put the edge of a coin or a flat blade screw driver in the slot (1) of the transmitter (2) and pry it open.
2) Replace the battery (3) (lithium disc-type CR2032 or equivalent) so its “+” terminal faces the “+” mark of the transmitter (2).

CAUTION:
Use care not to allow grease or dirt to be attached on the printed circuit board and the battery.

3) Close the transmitter (2) firmly.
4) Make sure the door locks can be operated with the transmitter (2).

NOTE:

- **To prevent theft, be sure to break the transmitter before discarding it.**
- **Dispose of the used battery properly according to applicable rules or regulations. Do not dispose of lithium batteries with ordinary household trash.**

CODE RESISTRATION PROCEDURE

1) Confirm that IG switch is OFF position and all doors are closed.
2) Open driver side door and then turn the IG switch to ON position within 10 seconds.
3) Turn the IG switch to OFF position within 10 seconds after it is turned to ON position.
4) Push and release the door switch to turn OFF and ON at three times by hand within 20 seconds after the IG switch is turned to OFF position.
5) Within 10 seconds after the door switch is turned to ON, turn the IG switch to ON position and then OFF position.
6) Push and hold the LOCK and UNLOCK buttons on transmitter at the same time within 20 seconds after IG switch is turned to OFF position. Hold the buttons for at least 5 seconds. During this time, the driver side door should lock and unlock once.
7) Push LOCK or UNLOCK buttons on transmitter within 5 seconds after Step 6), and then confirm that driver side door is locked and unlocked once.

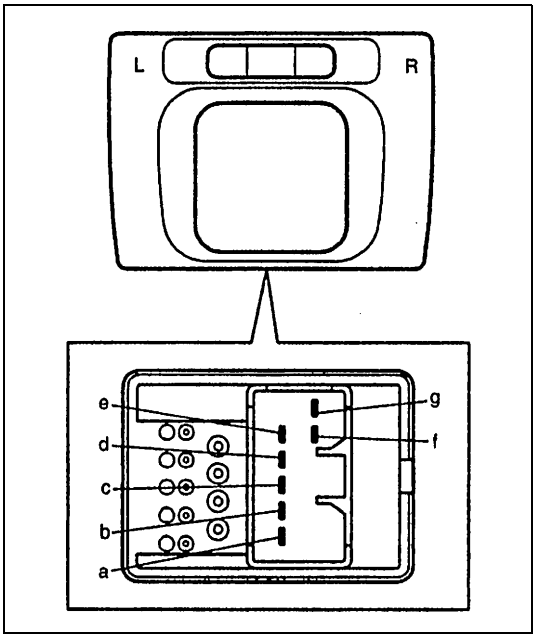
NOTE:

- **Two transmitter codes can be registered.**
- **When a new transmitter is registered, the oldest one will be cleared.**

Power Door Mirror Control System

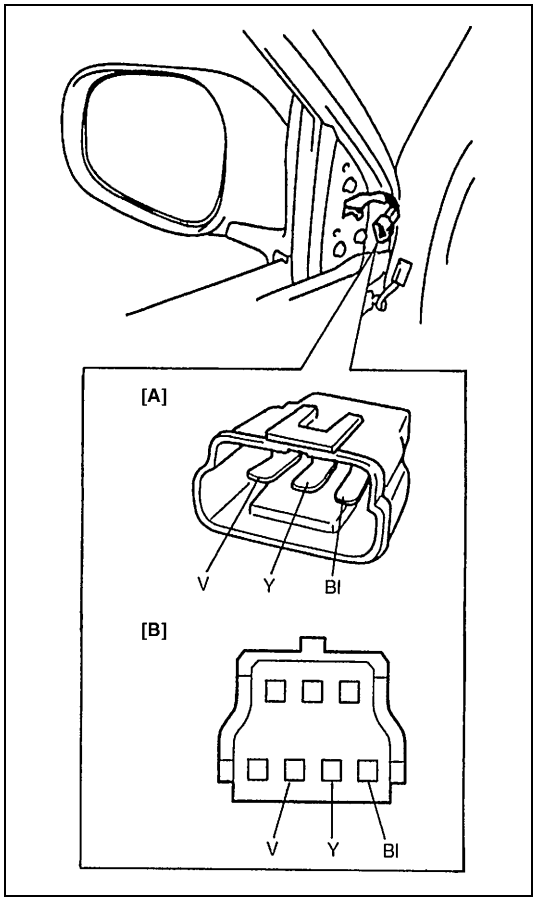
INSPECTION

Mirror Switch



1) Remove mirror switch from instrument panel.
2) Check for continuity between terminals at each switch position as shown below.
   If check result is not as specified, replace mirror switch.

L / R	a	b	c	d / e	g / f
UP	○				○
		○	○		
DOWN	○	○			
			○		○
LEFT	○			○	
		○	○		
RIGHT	○	○			
			○	○	



Door Mirror Actuator

1) Remove garnish from door.
2) Disconnect door mirror coupler.
3) Check that door mirror operates properly when battery voltage is applied to connector terminals.
   Connect battery positive and negative terminal to the door mirror terminal shown below and check operation.
   If it does not operate as specified in table below, replace door mirror assembly.

Terminal / Operation	V	Bl	Y
Up	⊖	⊕	
Down	⊕	⊖	
Left	⊖		⊕
Right	⊕		⊖

[A] : If mirror heater is not equipped
[B] : If mirror heater is equipped

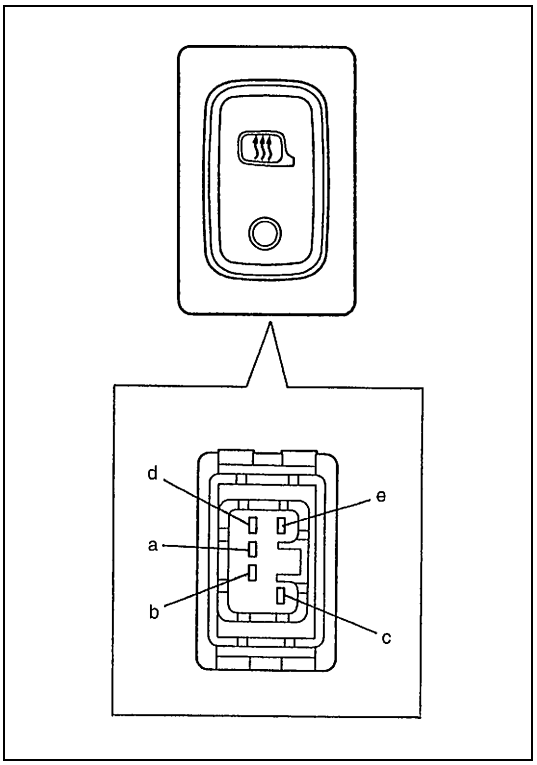
NOTE:

When installing door mirror to door, be careful not to pinch harness between door and door mirror.

Door Mirror Heater (If Equipped)

INSPECTION

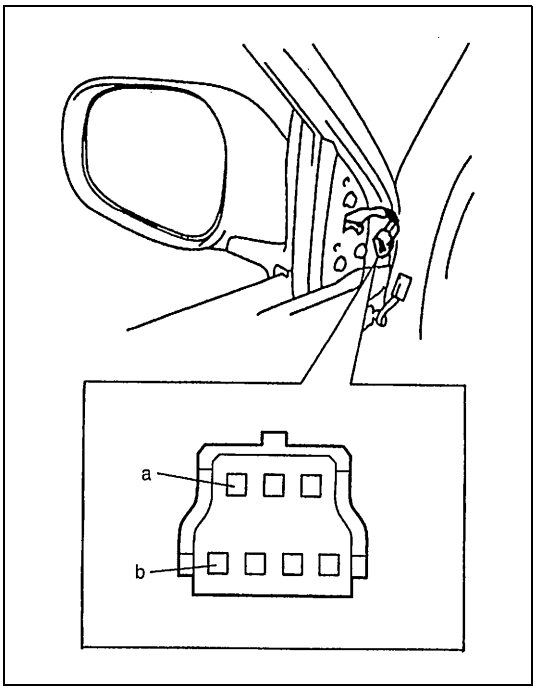
Mirror Heater Switch



1) Remove mirror heater switch from instrument panel.
2) Check for continuity between terminals at each switch position as shown below. If check result is not as specified, replace switch.

Position \ Terminal	a	b	c	d	e
FREE		○	○	○	○
PUSH	○	○	○	○	○

Mirror Heater (If Equipped)

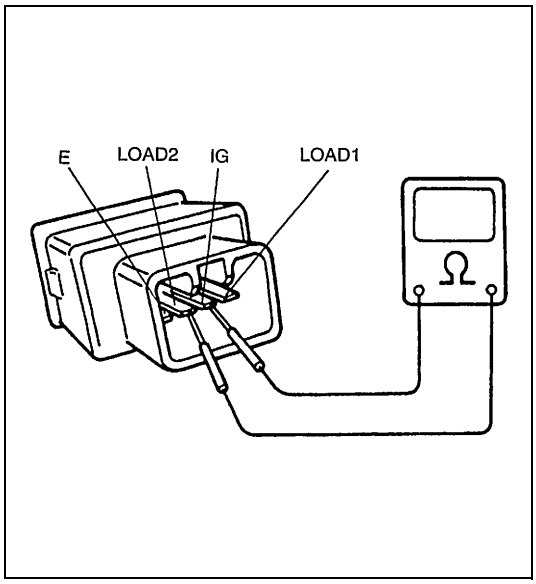


1) Remove garnish from door.
2) Disconnect door mirror coupler.
3) Check for continuity between terminals “a” and “b”.
   If not continuity, replace outside mirror.

Front Seat Heater (If Equipped)

Seat heater switch (driver and passenger side)

INSPECTION

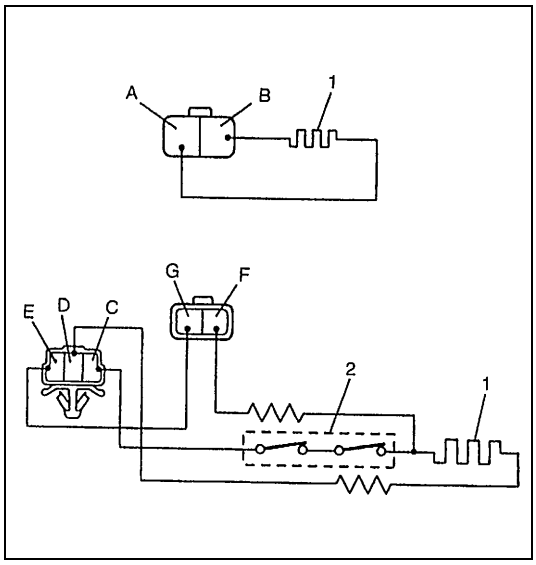


1) Confirm that ignition switch is OFF position.
2) Pull out seat heater switch from front center console box.
3) Disconnect seat heater switch coupler.
4) Check for continuity between terminals at each switch position as shown below. If check result is not as specified, replace.

Switch Position \ Terminal	IG	LOAD 1	LOAD 2	E
OFF				
LO	○ ○	○ ⌀	○	○
HI	○ ○	○ ⌀	○	○ ○

Seat heater wire

INSPECTION



1) Confirm that seat heater switch is OFF position.
2) Disconnect two couplers of seat heater under the seat cushion. (If seat under tray is equipped, pull out coupler between tray and seat cushion.)
3) Check for continuity between terminals as shown below. If not continuity, replace faulty seat heater.

Seat heater circuit in seat back
Between A and B
Seat heater circuit in seat cushion
Between C and D
Between D and F
Between E and G

1. Heater wire
2. Thermostat

SECTION 8E

CRUISE CONTROL SYSTEM

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System :

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

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General Description

Cautions in Servicing

Refer to Section 8.

Symbols and Marks

Refer to Section 8A.

Abbreviations

Refer to Section 8A.

Wiring Color Symbols

Refer to Section 8.

Joint Connector

Refer to Section 8.

Fuse Box and Relay

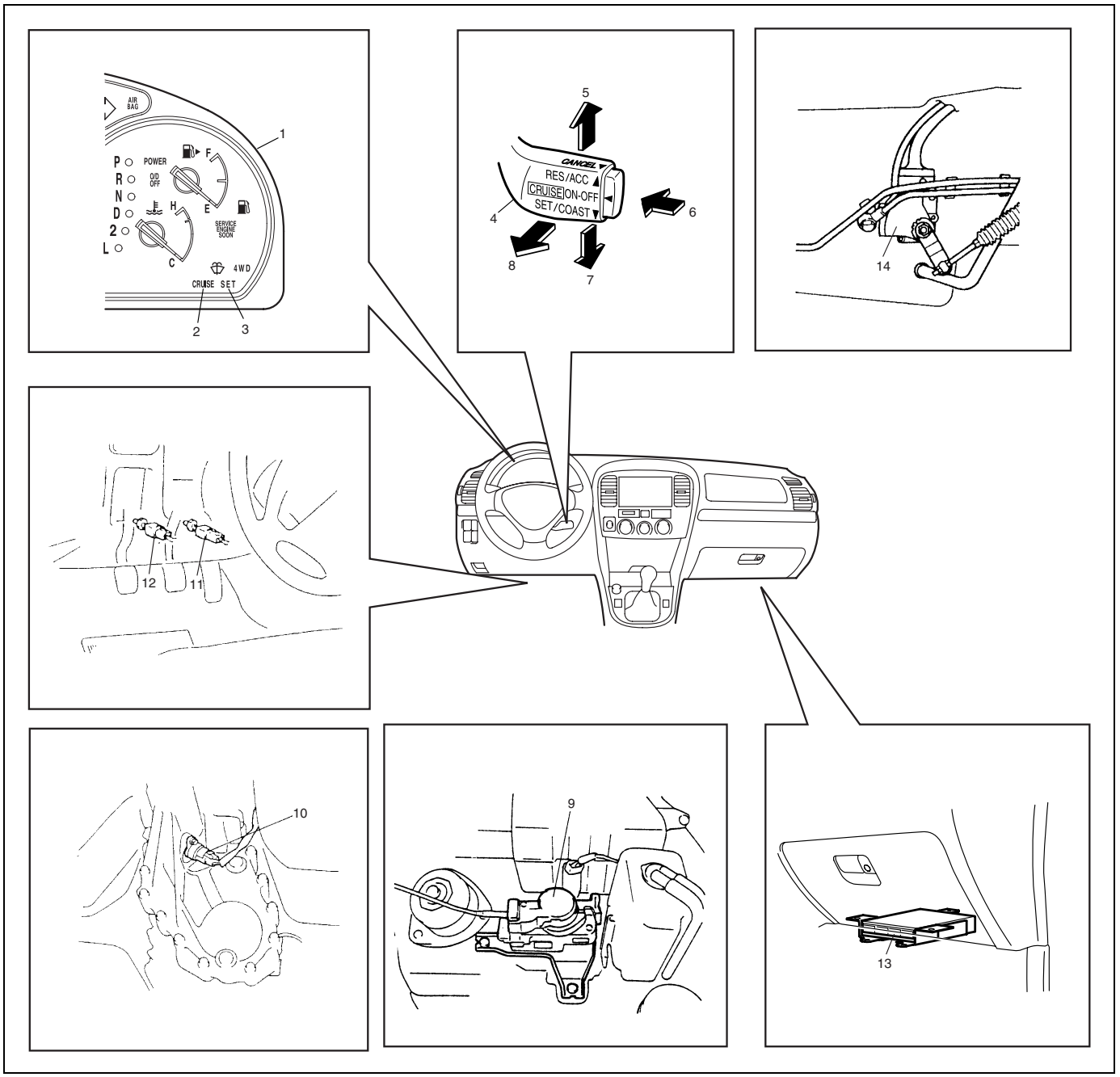
Refer to Section 8A.

Power Supply Diagram

Refer to Section 8A.

Cruise Control System

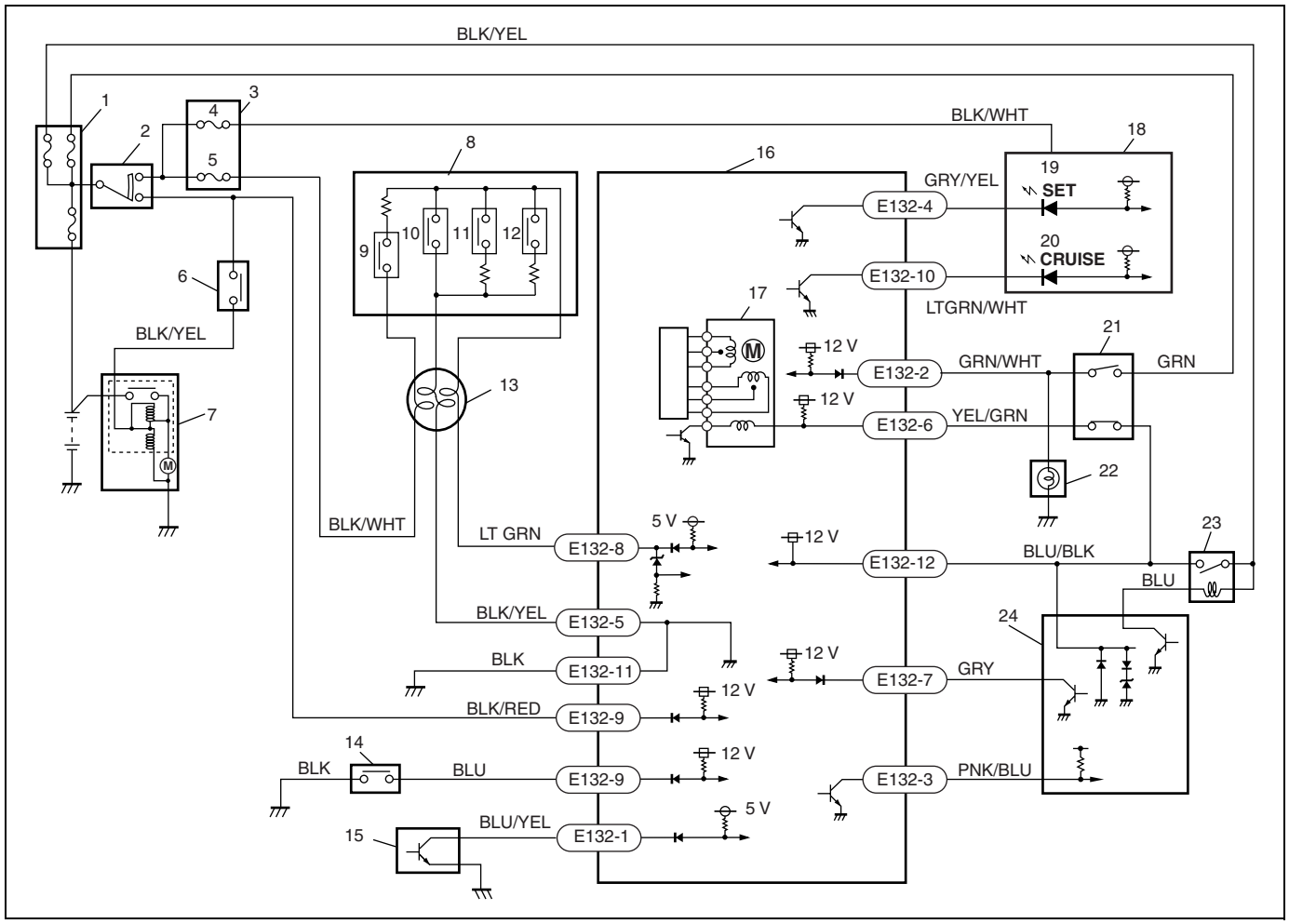
The cruise control system is a device which maintains a preset vehicle speed while driving at a high speed, e.g., on a highway. It allows the driver to drive his vehicle at a constant speed of 40 km/h (25 mile/h) or higher without depressing the accelerator pedal (constant cruising). The system also has such functions as to change the vehicle speed without operating the accelerator pedal (but using SET/COAST and RES/ACC switches), cancel cruise control (CANCEL switch) and resume the speed in memory automatically after cruise control is cancelled (RES/ACC switch). The system mainly consists of a vehicle speed sensor, an actuator assembly incorporated with control module, cruise main switch, SET/COAST switch, RES/ACC switch and CANCEL switch, etc.



1. Combination meter	6. Cruise ON/OFF switch	11. Brake light switch with brake pedal position switch
2. “CRUISE” indicator lamp	7. SET/COAST switch	12. Clutch pedal position switch (M/T vehicle only)
3. “SET” indicator lamp	8. CANCEL switch	13. ECM (PCM)
4. Cruise control lever	9. Cruise control actuator assembly with control module	14. Transmission range sensor (shift switch) (A/T vehicle only)
5. RES/ACC switch	10. Vehicle speed sensor (VSS)	

Cruise control system circuit

Refer to Section 8A.



1. Main fuse box	7. Starter	13. Contact coil	19. “SET” indicator lamp
2. Ignition switch	8. Cruise control lever	14. Clutch pedal position (CPP) switch (M/T vehicle only)	20. “CRUISE” indicator lamp
3. Circuit fuse box	9. Cruise ON/OFF switch	15. Vehicle speed sensor (VSS)	21. Brake light switch with brake pedal position switch
4. “METER” fuse	10. CANCEL switch	16. Cruise control module	22. Brake light (for A/T vehicle only)
5. “IG” fuse	11. SET/COAST switch	17. Cruise control actuator	23. Main relay
6. Transmission range sensor (shift switch)	12. RES/ACC switch	18. Combination meter	24. ECM (PCM)

Components and functions

Component	Function
Cruise control actuator assembly with control module	Cruise control module : Executes centralized control by means of a microcomputer over all functions including setting a constant speed, resuming it, setting coast, limiting minimum speed and cancelling cruise control. Cruise control actuator (stepping motor & clutch) : Actuates accelerator pedal through cruise cable and arm according to a signal from cruise control module to control vehicle speed.
Cruise ON/OFF switch	This switch has a momentary contact type button to turn the cruise control system ON and OFF.
SET/COAST switch	When this switch is moved downward and then released (OFF) while vehicle is running at a speed 40 km/h (25 mile/h) or higher, vehicle speed at that OFF moment is stored in memory and it is maintained (constant cruising). Rotating this switch (ON) continuously during constant cruising keeps slowing down vehicle speed as long as it is ON. When it is released (OFF), vehicle speed at that moment is stored in memory and vehicle starts constant cruising.
RES/ACC switch	When this switch is moved upward during constant cruising, vehicle speed keeps increasing as long as it is ON. When it is released (OFF), vehicle speed at that moment is stored in memory and vehicle starts constant cruising. If vehicle speed is higher than 40 km/h (25 mile/h) after cruise control is cancelled, turning this switch ON momentarily will resume the speed at which vehicle was running before cancellation.
CANCEL switch	When this switch is pressed (ON), cruise control (accelerator pedal control) is cancelled.
Vehicle speed sensor (VSS)	The vehicle speed sensor (VSS) is mounted on the transfer or transmission. The VSS converts vehicle speed into pulse signal and send it to the cruise control module.
Brake light switch	The brake light switch has 2 contact points. One contact point closes when the brake pedal is depressed to light the brake light and provides a voltage signal to the cruise control module. This signal, when inputted cancels cruise control (sets the accelerator pedal free). The other contact point (brake pedal position switch) opens when the brake pedal is depressed, to shut off the power to the magnetic clutch in the actuator, thereby cancelling cruise control (setting the accelerator pedal free). This switch is installed to cancel cruise control (constant cruising) without fail.
Clutch pedal position switch (M/T vehicle only)	When the clutch pedal is depressed, the clutch pedal position switch closes and provides a ground signal to cruise control module. The cruise control module cancels cruise control (accelerator pedal control) when this signal is inputted.
Transmission range switch (Park/Neutral position switch) (A/T vehicle only)	When the selector lever is places in either “P” or “N” position, the transmission range switch closes and provides a ground signal to cruise control module. The cruise control module cancels cruise control (accelerator pedal control) when signal is inputted.
PCM – Throttle opening signal (4 A/T vehicle only)	Throttle opening signal is inputted from PCM. According to this signal, the cruise control module detects the throttle opening and uses it as one of the factors to output the overdrive and TCC OFF command signal to PCM.

Component	Function
PCM – Overdrive and TCC off command signal output	When the throttle opening for the vehicle speed exceeds the specified value during cruise control, the cruise control module sends this signal to PCM. PCM uses this signal as one of signals to control 4-A/T.
"CRUISE" indicator lamp	In the state with the ignition switch ON and the cruise control system OFF, pressing cruise ON/OFF switch once and releasing it will activate the cruise control system and the cruise control module will cause the indicator lamp to light up.
"SET" indicator lamp	It lights up when cruise control (accelerator pedal control) is functioning.

Cancel conditions

Constant cruising is cancelled under the following conditions.

- Ignition switch is turned OFF.
- Cruise ON/OFF switch is turned OFF.
- Vehicle speed has slowed down to lower than minimum operating speed (40 km/h (25 mile/h)).
- *Vehicle speed varies beyond cancel speed range (–15 km/h (–9 mile/h)) from preset speed.
- *Brake pedal is depressed. (Brake light switch is turned ON).
- *Clutch pedal is depressed (Clutch pedal position switch is turned ON) (For M/T vehicle).
- *Selector lever is shifted to N range (Park/Neutral position switch in transmission range switch is turned ON).
- *CANCEL switch is turned ON.

NOTE:

When constant cruising is cancelled under above any condition with * (asterisk), vehicle speed before cancellation can be resumed by operating RES/ACC switch, provided that vehicle speed is higher than 40 km/h (25 mile/h).

Diagnosis

Diagnosis Table

Condition	Possible Cause	Correction
"CRUISE" indicator lamp fails to light up or remains ON.	"CRUISE" indicator lamp circuit faulty	Refer to "CRUISE" Indicator Lamp Circuit Check" in this section.
	Cruise control module power and ground circuits faulty	Refer to "CRUISE Control Module Power and Ground Circuit Check" in this section.
	Actuator assembly faulty	Replace actuator assembly.
"SET" indicator lamp fails to light up or remains ON.	"SET" indicator lamp circuit	Refer to ""SET" Indicator Lamp Circuit Check" in this section.
	Cruise control module power and ground circuits	Refer to "Cruise Control Module Power and Ground Circuit Check" in this section.
	Actuator assembly faulty	Replace actuator assembly.

Condition	Possible Cause	Correction
Vehicle speed can not be set.	Actuator cable play maladjusted or actuator cable faulty	Refer to “Cruise Cable Play Inspection and Adjustment” in this section.
	Cruise ON/OFF switch, “SET/COAST”, “RES/ACC” and “CANCEL” switch circuits faulty circuits faulty	Refer to “Cruise ON/OFF, SET/COAST, RES/ACC and CANCEL Switches Circuits Check” in this section.
	VSS circuit faulty	Refer to “VSS Circuit Check” in this section.
	Brake light switch circuit faulty	Refer to “Brake Light Switch With Pedal Position Switch Circuits Check” in this section.
	Transmission range switch circuit (4 A/T model only) faulty	Refer to “Transmission Range Switch Circuit Check” in this section.
	Clutch pedal position switch circuit faulty	Refer to “Clutch Pedal Position Switch Circuit Check” in this section.
	Cruise control module power and ground circuits faulty	Refer to “Cruise Control Module Power and Ground Circuit Check” in this section.
	Actuator assembly faulty	Replace actuator assembly.
Vehicle set speed is unstable.	Actuator cable play maladjusted or actuator cable faulty	Refer to “Cruise Cable Play Inspection and Adjustment” in this section.
	VSS circuit faulty	Refer to “VSS Circuit Check” in this section.
	Throttle valve opening signal circuit faulty	Refer to “Throttle Valve Opening Signal Circuit Check” in this section.
	Actuator assembly faulty	Replace actuator assembly.
Actual vehicle speed deviates above or below set speed.	Actuator cable play maladjusted or actuator cable faulty	Refer to “Cruise Cable Play Inspection and Adjustment” in this section.
	Throttle valve opening signal circuit faulty	Refer to “Throttle Valve Opening Signal Circuit Check” in this section.
	Actuator assembly faulty	Replace actuator assembly.
Acceleration or deceleration by using “RES/ACC” or “SET/ COAST” switch is not attained.	Cruise ON/OFF switch, “SET/COAST”, “RES/ACC” and “CANCEL” switch circuits faulty	Refer to “Cruise ON/OFF Switch, SET/ COAST, RES/ACC and CANCEL Switches Circuits Check” in this section.
	Actuator assembly faulty	Replace actuator assembly.
Cruise control is not cancelled even when “CANCEL” switch is operated.	Cruise ON/OFF switch, “SET/COAST”, “RES/ACC” and “CANCEL” switch circuits faulty	Refer to “Cruise ON/OFF Switch, SET/ COAST, RES/ACC and CANCEL Switches Circuits Check” in this section.
	Actuator assembly faulty	Replace actuator assembly.
“RES/ACC” switch fails to resume preset vehicle speed after cruise control is cancelled.	Cruise ON/OFF switch, “SET/COAST”, “RES/ACC” and “CANCEL” switch circuits faulty	Refer to “Cruise ON/OFF Switch, SET/ COAST, RES/ACC and CANCEL Switches Circuits Check” in this section.
	Actuator assembly faulty	Replace actuator assembly.
Cruise control is not cancelled even when brake pedal is depressed.	Brake light switch circuit faulty	Refer to “Brake Lihgt Switch (With Pedal Position Switch) Circuits Check” in this section.
	Actuator assembly faulty	Replace actuator assembly.

Condition	Possible Cause	Correction
Cruise control is not cancelled even when clutch pedal is depressed.	Clutch pedal position switch circuit faulty	Refer to “Clutch Pedal Position Switch Circuit Check” in this section.
	Actuator assembly faulty	Replace actuator assembly.
Cruise control is not cancelled even when selector lever is shifted to “N” position.	Transmission range switch circuit (4 A/T model only) faulty	Refer to “Transmission Range Switch Circuit Check” in this section.
	Actuator assembly faulty	Replace actuator assembly.
4 speed A/T gear shifting is frequent between 3rd and overdrive when driving on uphill road (Hunting).	Throttle valve opening signal circuit faulty	Refer to “Throttle Valve Opening Signal Circuit Check” in this section.
	Overdrive and TCC off command signal circuit faulty	Refer to “Overdrive and TCC Off Command Signal Circuit Check” in this section.
	Actuator assembly faulty	Replace actuator assembly.
4 speed A/T is not shifted to overdrive gear even though not on uphill road.	Throttle valve opening signal circuit faulty	Refer to “Throttle Valve Opening Signal Circuit Check” in this section.
	Overdrive and TCC off command signal circuit faulty	Refer to “Overdrive and TCC Off Command Signal Circuit Check” in this section.
	Actuator assembly faulty	Replace actuator assembly.

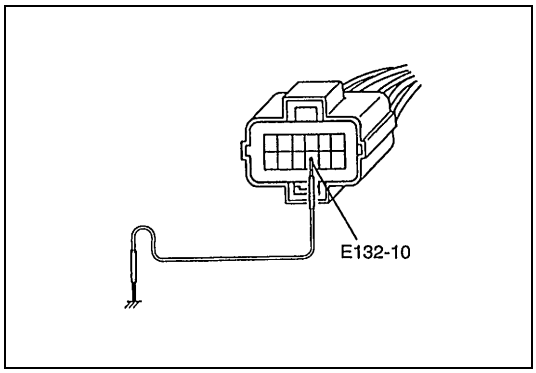
Note On System Circuit Inspection

Refer to “Precaution for Electrical Circuit Service” in Section 0A.

“CRUISE” Indicator Lamp Circuit Check

Step	Action	Yes	No
1	Check Circuit for Short. 1) Disconnect connector from cruise control module with ignition switch OFF. 2) Turn ignition switch ON. Does “CRUISE” indicator lamp turn ON?	“LT GRN/WHT” circuit is shorted to ground.	Go to Step 2.
2	Check Circuit for Open 1) Check for proper connection to cruise control module at terminal E132-10. 2) If OK, connect terminal E132-10 to ground. Does indicator lamp turn ON at ignition switch ON?	Lamp circuit is OK.	“BLK/WHT” or “LT GRN/WHT” circuit is open. If circuit is OK, replace combination meter.

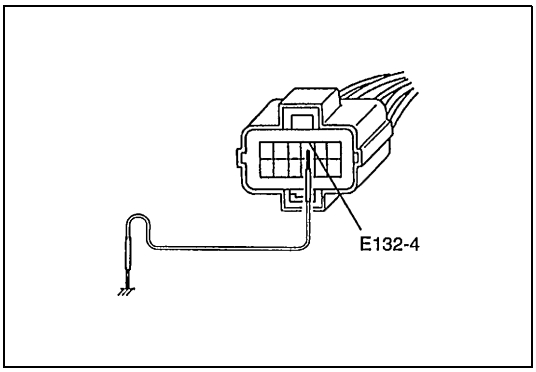
Fig. for Step 2



“SET” Indicator Lamp Circuit Check

Step	Action	Yes	No
1	Check Circuit for Short. 1) Disconnect connector from cruise control module with ignition switch OFF. 2) Turn ignition switch ON. Does “SET” indicator lamp turn ON?	”GRY/YEL” circuit is shorted to ground.	Go to Step 2.
2	Check Circuit for Open 1) Check for proper connection to cruise control module at terminal E132-4. 2) If OK, connect terminal E132-4 to ground. Does indicator lamp turn ON at ignition switch ON?	Lamp circuit is OK.	“BLK/WHT” or “GRY/YEL” circuit open. If circuit is OK, replace combiration meter.

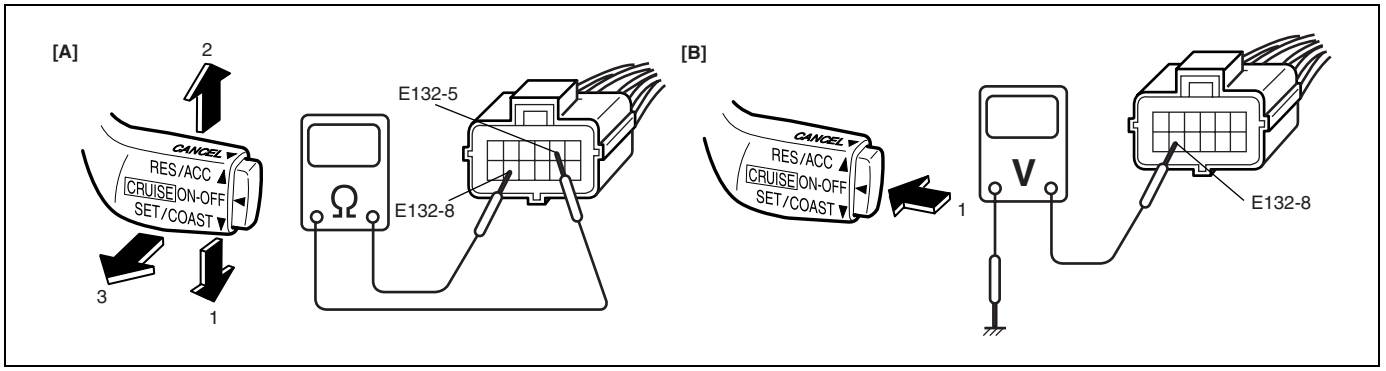
Fig. for Step 2



Cruise ON/OFF, SET/COAST, RES/ACC and CANCEL Switches Circuits Check

Step	Action	Yes	No
1	SET/COAST, RES/ACC and CANCEL switches circuit check 1) Disconnect connector from cruise control module with ignition switch OFF. 2) Check for proper connection to cruise control module at terminal “E132-8”. 3) If OK, check resistance between terminal “E132-8” and “E132-5” under each condition as follows. **Switch circuit specifications (resistance)** **All switches OFF : Infinity** **SET/COAST switch (1) moved downward (ON) : 217 – 223 Ω** **RES/ACC switch (2) moved upward (ON) : 900 – 920 Ω** **CANCEL switch (3) pulled (ON) : About 0 Ω** Are check results satisfactory?	Go to Step 3.	Go to Step 2.
2	SET/COAST, RES/ACC and CANCEL switches check 1) Check SET/COAST, RES/ACC and CANCEL switches referring to “Cruise ON/OFF, SET/COAST, RES/ACC and CANCEL Switches Inspection” in this section. Is switch in good condition?	“BLK/YEL” circuit, “LT GRN” circuit or contact coil is open or short.	Replace cruise control lever.
3	Cruise ON/OFF switch circuit check 1) Turn ignition switch ON and check voltage between terminal “E132-8” and ground under each condition as follows. **Switch circuit specification s** **Cruise ON/OFF switch (1) released (OFF) : 0 V** **Cruise ON/OFF switch (1) pressed (ON) : 10 – 14 V** Are check results satisfactory?	Cruise control lever circuit are OK.	Go to Step 4.
4	Cruise ON/OFF switch check 1) Check cruise ON/OFF switch referring to “Cruise ON/OFF, SET/COAST, RES/ACC and CANCEL Switches” in this section. Is switch in good condition?	“BLK/WHT” circuit or contact coil is open or short.	Replace cruise control lever.

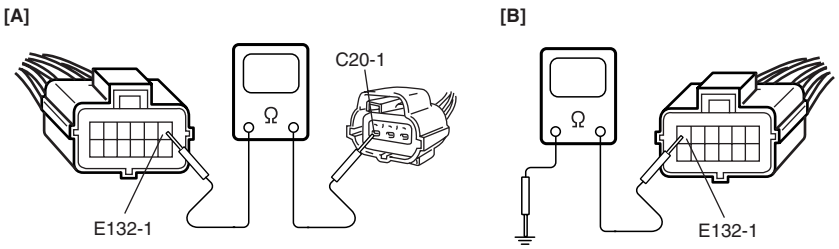
[A] Fig. for Step 1 / [B] Fig. for Step 2



VSS Circuit Check

Step	Action	Yes	No
1	Engine control module (ECM) DTC check 1) Check DTC in ECM referring to “DTC Check” in Section 6. Is DTC P0500 detected?	Go to “DTC P0500 : Vehicle Speed Ssensor (VSS) Malfunction” in Section 6.	Go to Step 2.
2	Check VSS circuit for open 1) Disconnect VSS connector “C20” and cruise control module connector “E132” with ignition switch OFF. 2) Check for proper connection to VSS connector at “C20-1” terminal and cruise control module connector at “E132-1” terminal. 3) If OK, check for continuity between terminals “C20-1” and “E132-1”. Is check result satisfactory?	Go to Step 3.	“BLU/YEL” circuit is open.
3	Check VSS circuit for short 1) Check for resistance between “E132-1” terminal and body ground. Is resistance infinity?	VSS circuit is OK.	“BLU/YEL” circuit is short.

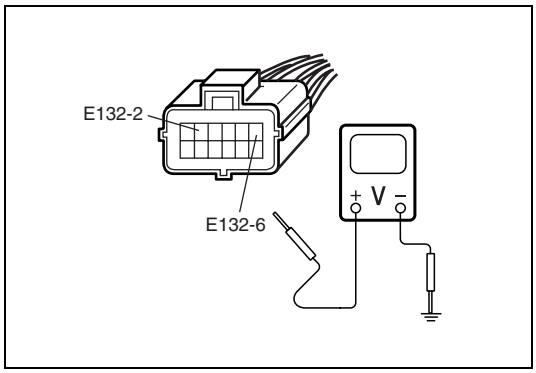
[A] Fig. for Step 2 / [B] Fig. for Step 3



Brake Light Switch With Pedal Position Switch Circuits Check

Step	Action	Yes	No
1	Brake Light Switch With Pedal Position Switch Circuits Check 1) Disconnect connector from cruise control module with ignition switch OFF. 2) Check for proper connection to cruise control module at terminals E132-2 and E132-6. 3) If OK, turn ignition switch ON. 4) Check Voltage between each terminal and ground under each condition below. Brake light switch circuit specification Brake pedal released terminal E132-2 : 0 V Brake pedal released terminal E132-6 : 10 – 14 V Brake pedal depressed terminal E132-2 : 10 – 14 V Brake pedal depressed terminal E132-6 : 0 V Is check result satisfactory?	Brake light switch with pedal position switch circuits are OK.	Go to Step 2.
2	Brake Light Switch Position Check 1) Check brake light switch for installation position referring to “Brake Light Switch” in Section 5. Is check result satisfactory?	Go to Step 3.	Adjust brake light switch position.
3	Brake light Switch With Pedal Position Switch Check 1) Disconnect connector from brake light switch. 2) Check for proper connection to brake light switch at all terminals. 3) If OK, check brake light and pedal position switches for operation referring to “Stop Lamp Switch” in this section. Is this switch in good condition?	“YEL/GRN” or “GRN/WHT” circuit is open or short.	Replace brake light switch.

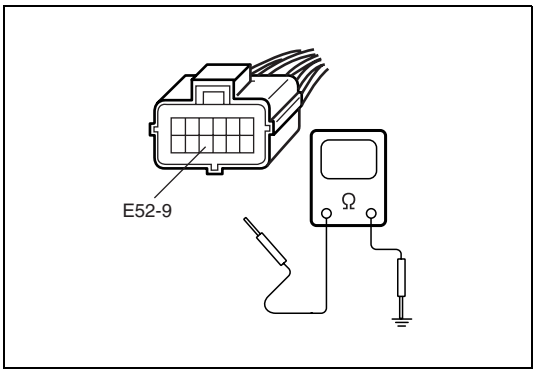
Fig. for Step 1



Transmission Range Sensor (Shift Switch) Circuit Check

Step	Action	Yes	No
1	Transmission Range Sensor (Shift Switch) Circuit Check 1) Disconnect connector from cruise control module with ignition switch OFF. 2) Check for proper connection to cruise control module at terminal E132-9. 3) If OK, connect ohmmeter between terminal E132-9 and ground. 4) Check for continuity under each condition below. Transmission range sensor (shift switch) circuit specification Selector lever at “P” or “N” range : Continuity “R”, “D”, “2” or “L” range : Infinity Is check result satisfactory?	Transmission range sensor (shift switch) circuit is OK.	Go to Step 2.
2	Transmission Range Sensor (Shift Switch) Check 1) Disconnect transmission range sensor (shift switch) connector. 2) Check for proper connection to transmission range sensor (shift switch) at disconnected connector terminals. 3) If OK, check transmission range sensor (shift switch) for operation referring to “Transmission Range Sensor (Shift Switch)” in Section 7B1. Is check result satisfactory?	“BRK/RED” or “BLK/YEL” circuit is open or short.	Adjust or replace transmission range sensor (shift switch).

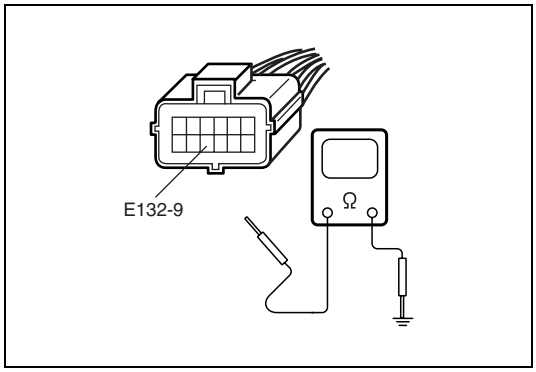
Fig. for Step 1



Clutch Pedal Position Switch Circuit Check

Step	Action	Yes	No
1	Clutch Pedal Position Switch Circuit Check 1) Disconnect connector from cruise control module with ignition switch OFF. 2) Check for proper connection to cruise control module at terminal E132-9. 3) If OK, check for resistance between terminal E132-9 and ground under each condition below. Clutch pedal position switch circuit specification Clutch pedal released : Infinity Clutch pedal depressed : Continuity Is check result satisfactory?	Clutch pedal position switch circuit is OK.	Go to Step 2.
2	Clutch Pedal Position Switch Position Check 1) Check clutch pedal position switch for installation position referring to “Clutch Pedal Position Switch” in this section. Is check result satisfactory?	Go to Step 3.	Adjust.
3	Clutch Pedal Position Switch Check 1) Disconnect connector from clutch pedal position switch. 2) Check for proper connection to clutch pedal position switch at all terminals. 3) If OK, check clutch pedal position switch for operation referring to “Clutch Pedal Position Switch” in this section. Is this switch in good condition?	“BLU” or “BLK” circuit is open or short.	Replace.

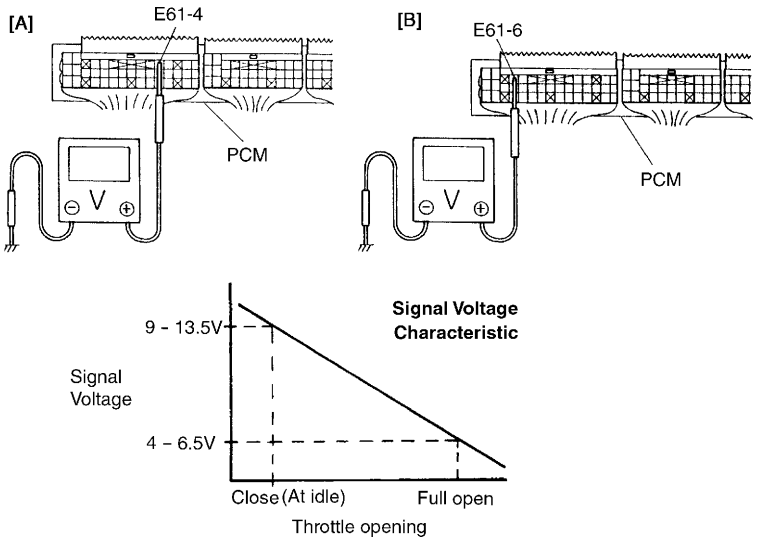
Fig. for Step 1



Throttle Valve Opening Signal Circuit Check

Step	Action	Yes	No
1	Powertrain Control Module (PCM) Diagnostic Trouble Code Check 1) Check PCM for DTC. Is there a DTC related to throttle position sensor?	Check and repair TP sensor referring to Section 6-1.	Go to Step 2.
2	Throttle Valve Opening Signal Circuit Check 1) Turn ignition switch ON. 2) Check voltage between terminal “E61-4” (for H27 engine model [A]) or “E61-6” (for H25 engine model [B]) of PCM connector connected and ground. Does voltage vary linearly according to throttle opening?	Throttle valve opening signal circuit is OK.	Go to Step 3.
3	Supply Voltage Check 1) Disconnect connector from PCM with ignition switch OFF. 2) Check for proper connection to PCM at terminal “E61-4” (for H27 engine model) or “E61-6” (for H25 engine model). 3) If OK, connect “BLU” wire terminal of main relay to ground with service wire. 4) Turn ignition switch ON. 5) Check voltage between “E61-4” (for H27 engine model) or “E61-6” (for H25 engine model) of PCM connector and ground. Is it 10 – 14 V?	Check TP sensor and circuits referring to Section 6-1. If OK, substitute a known-good PCM and recheck.	Check “GRY” wire for open and short. If OK, proceed to cruise control module power and ground circuits check.

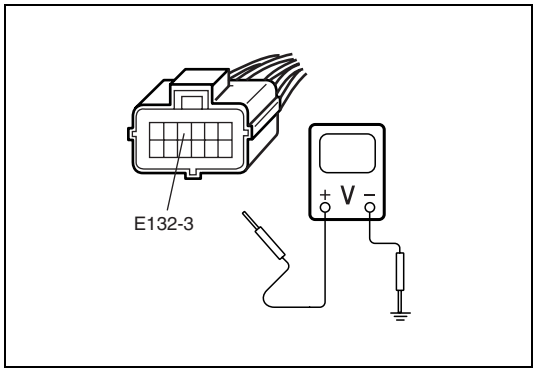
Fig. for Step 2



Overdrive and TCC OFF Command Signal Circuit Check

Step	Action	Yes	No
1	Overdrive off Command Signal Circuit Check 1) Disconnect connector from cruise control module with ignition switch OFF. 2) Check for proper connection to cruise control module at terminal E132-3. 3) If OK, turn ignition switch ON. 4) Check voltage between terminal E132-3 and ground. Is it 10 –14 V?	This signal circuit is OK.	Check “PNK/BLU” wire for open and short. If OK, substitute a known-good PCM and recheck.

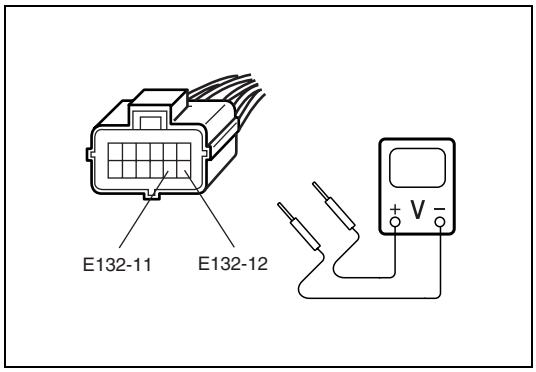
Fig. for Step 1



Cruise Control Module Power and Ground Circuits Check

Step	Action	Yes	No
1	Power and Ground Circuits Check 1) Disconnect connector from cruise control module with ignition switch OFF. 2) Check for proper connection to cruise control module at terminals E132-12 and E132-11. 3) If OK, turn ignition switch ON. 4) Check voltage between terminals E132-12 and E132-11. Does voltmeter indicate 10 – 14 V?	Power and ground circuits are OK.	“BLU/BLK” or “BLK” circuit is open.

Fig. for Step 1



Cruise Control Module and Its Circuit Inspection

CAUTION:

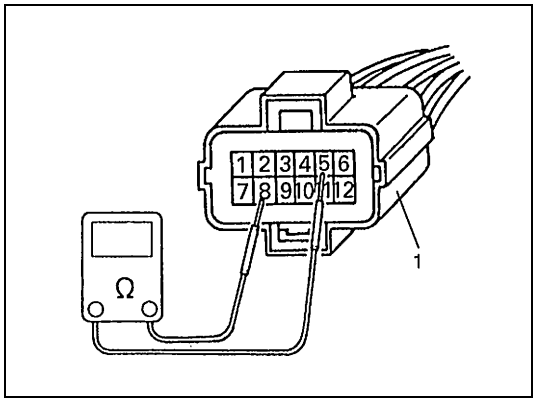
Cruise control module can not be checked by itself. It is strictly prohibited to connect voltmeter or ohmmeter to cruise control module with coupler disconnected from it.

VOLTAGE CHECK

Check for input or output voltage of control module (voltage between each circuit and body ground) with cruise control module connector connected.

CIRCUIT	NORMAL VOLTAGE	CONDITION
Vehicle speed sensor	Indicator deflection repeated between 0 – 1 V and 10 – 14 V	Ignition switch ON and cruise ON/OFF switch ON. Vehicle hoisted and rear left tire turned slowly with rear right tire locked.
Brake light switch	0 – 2 V	Brake pedal released.
	10 – 14 V	Brake pedal depressed.
Overdrive and TCC off signal (A/T only)	10 – 14 V	Ignition switch ON.
"SET" indicator light	10 – 14 V	Ignition switch ON.
Ground	–	–
Brake pedal position switch in Brake light switch	10 – 14 V	Ignition switch ON and brake pedal released.
	0 V	Ignition switch ON and brake pedal depressed.
Throttle valve opening signal from PCM (A/T only)	Ignition switch ON. Voltage varies as specified by graph in "Throttle Valve Opening Signal Circuit Check".	
Cruise ON/OFF switch	4 – 5 V	Ignition switch ON and cruise ON/OFF switch released.
	7 – 9 V	Ignition switch ON and cruise ON/OFF switch pressed.
CANCEL switch	0 – 1 V	Ignition switch ON and CANCEL switch pressed.
SET/COAST switch	1 – 2 V	Ignition switch ON and SET/COAST switch rotated.
RES/ACC switch	2.5 – 4 V	Ignition switch ON and RES/ACC switch rotated.
Clutch pedal position switch (M/T only)	10 – 14 V	Ignition switch ON and clutch pedal released.
	0 – 1 V	Ignition switch ON and clutch pedal depressed fully.
Transmission range sensor (Park / Neutral position switch) (A/T only)	0 V	Ignition switch ON and selector lever in "P" or "N" range.
	10 – 14 V	Ignition switch ON and selector lever in "R", "D", "2" or "L" range.
"CRUISE" indicator lamp	10 – 14 V	Ignition switch ON.
Ground	0 V	–
Main power supply	0 – 1 V	Ignition switch OFF.
	10 – 14 V	Ignition switch ON.

RESISTANCE CHECK



1) Disconnect cruise control module connector from cruise control module with ignition switch OFF.

CAUTION:
Never touch terminals of cruise control module itself or connect voltmeter or ohmmeter.

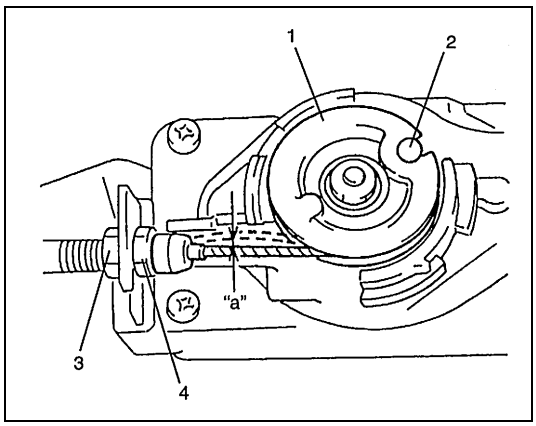
2) Check resistance between each pair of terminals of disconnected connectors as shown in the following table.

1. Cruise control module connector (E132)

TERMINALS	CIRCUIT	STANDARD RESISTANCE	CONDITION
E132-11 – body ground	Ground	Continuity	–
E132-6 – E132-12	Brake pedal position switch in brake light switch	Continuity	Brake pedal released.
		No continuity	Brake pedal depressed.
E132-8 – E132-5	CANCEL switch	No continuity	CANCEL switch OFF (released).
		Continuity	CANCEL switch ON (pressed).
	SET/COAST switch	No continuity	SET/COAST switch OFF (released).
		200 – 240 Ω	SET/COAST switch ON (rotated).
	RES/ACC switch	No continuity	RES/ACC switch OFF (released).
		820 – 1000 Ω	RES/ACC switch ON (rotated).
E132-9 – E132-11 (M/T)	Clutch pedal position switch (M/T only)	No continuity	Clutch pedal released.
		Continuity	Clutch pedal depressed fully.
E132-9 – E132-11 (A/T)	Transmission range switch (Park/neutral position switch) (A/T only)	Continuity	Selector lever in “P” or “N” range.
		No continuity	Selector lever in “R”, “D”, “2” or “L” range.

Cruise Cable Play Inspection and Adjustment

INSPECTION AND ADJUSTMENT



1) Remove actuator cap.
2) With actuator lever (1) returned at original position (2) (Where lever does not move clockwise any further), check cruise cable for play.
   If it is out of specification, adjust it as follows

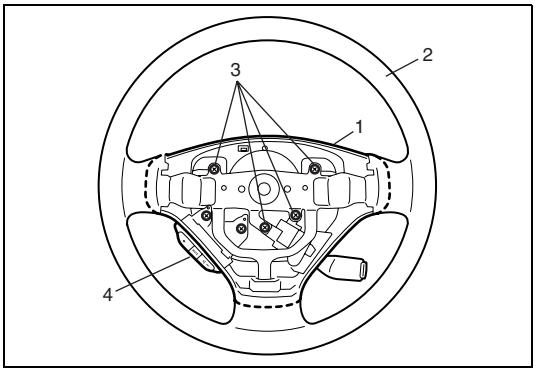
Cruise Cable play “a” : 1 – 2 mm (0.04 – 0.08 in.)

3) Loosen cable lock nut (3).
4) Adjust cable play to specified value by turning adjusting nut (4).
5) Tighten lock nut (3) securely after adjustment.

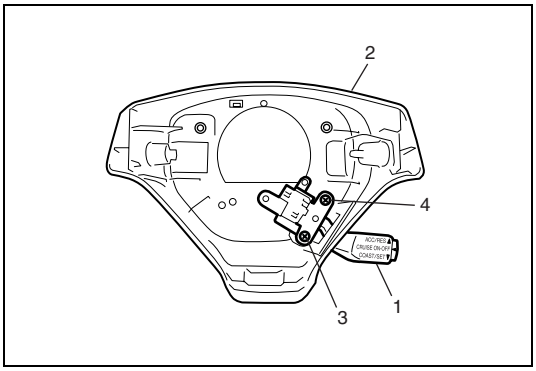
On-Vehicle Service

Cruise ON/OFF, SET/COAST, RES/ACC and CANCEL Switches

REMOVAL



1) Disconnect negative (–) cable at battery.
2) Remove steering wheel referring to “Steering Wheel Removel and Installation”.
3) Remove audio control switch (if equipped) (4) from steering wheel (2).
4) Remove steering wheel lower cover (1) from steering wheel (2) removing 4 screws (3).

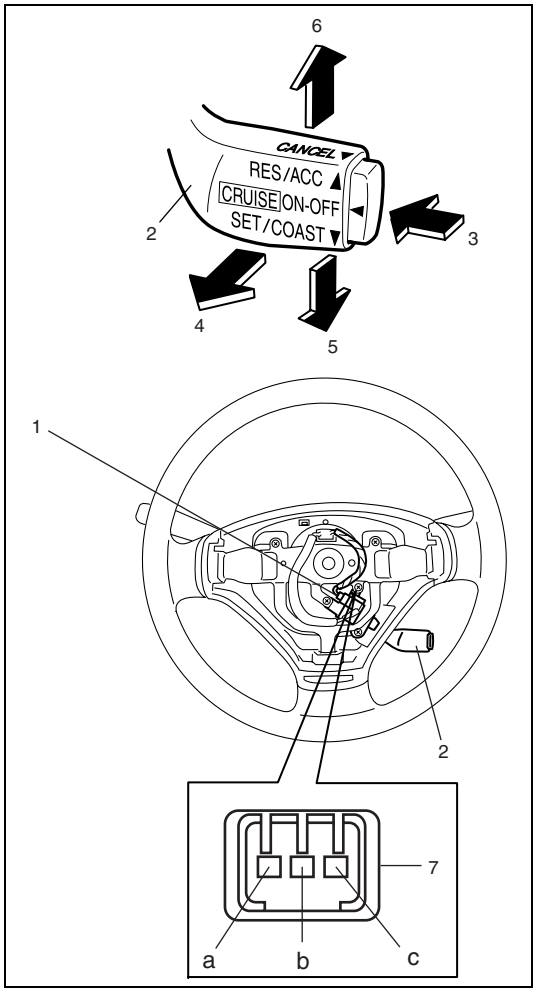


5) Remove cruise control lever (1) from steering wheel lower cover (2) removing cruise control lever bolt (3) and cruise control lever screw (4).

INSPECTION

CAUTION:
Never disassemble cruise control lever. Disassembly will spoil its original functions.

Cruise ON/OFF Switch



Check for resistance between “a” and “b” terminals under each condition below.
If check result is not satisfactory, replace cruise control lever (2).

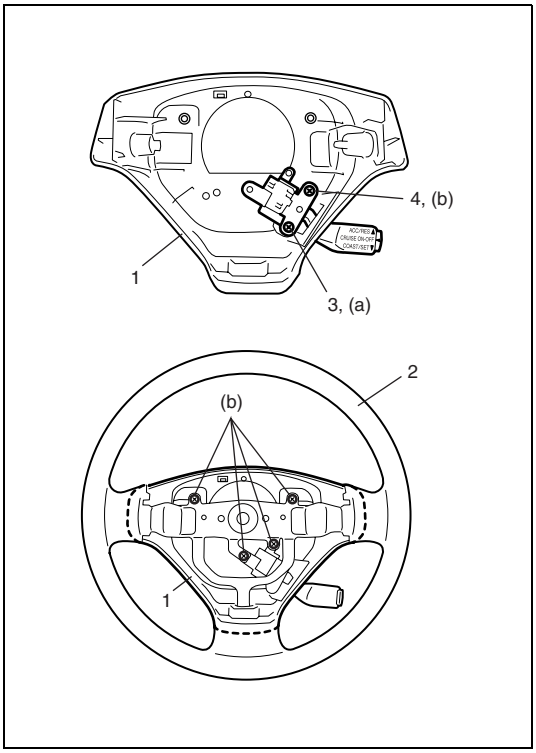
Cruise ON/OFF switch (3) resistance
Switch button released : Infinity
Switch button pressed : About 3.9 kΩ

Set/Coast, Resume/Accel and Cancel Switch

Check for resistance between “b” and “c” terminals under each condition below.
If check result is not satisfactory, replace cruise conrol lever (2).

SET/COAST, RESUME/ACCEL and CANCEL switches resistance
All switches released (OFF): Infinity
CANCEL switch (4) pulled (ON) : About 0 Ω
SET/COAST switch (5) rotated (ON) : 217 – 223 Ω
RES/ACC switch (6) rotated (ON) : 900 – 920 Ω

7. Cruise control lever terminal viewed from harness side.



INSTALLATION

NOTE:

- **Be sure to replace steering wheel cover with a new one if it is removed from steering wheel.**
- **Inspect cruise control lever with installing on steering wheel to prevent screws from loosing.**

Reverse removal procedure to install cruise control lever noting the following.

- Install new steering wheel lower cover (1) to steering wheel (2).
- Tighten cruise control lever bolt (3), cruise control lever screw (4) and steering wheel lower cover screws (5) as specified torque.

Tightening torque
Cruise control lever bolt
(a) : 1.0 N·m (0.10 kg-m, 0.7 lb-ft)
Cruise control lever screw and steering wheel lower cover screws
(b) : 0.85 N·m (0.085 kg-m, 0.60 lb-ft)

Vehicle Speed Sensor (VSS)

INSPECTION

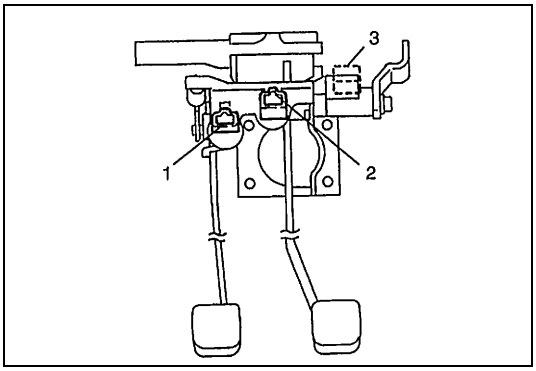
Refer to Section 6E2.

Transmission Range Sensor (Shift Switch)

Refer to Section 7B1 for inspection, removal, installation and adjustment.

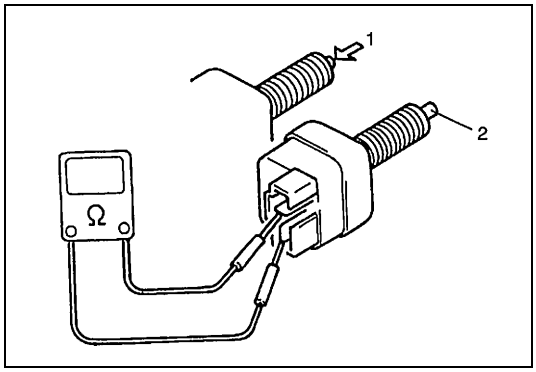
Clutch Pedal Position (CPP) Switch

REMOVAL



1) Disconnect CPP switch connector with ignition switch OFF.
2) Remove CPP switch from pedal bracket.

1.	CPP switch for cruise control
2.	Stop lamp switch
3.	CPP switch for starter (if equipped)

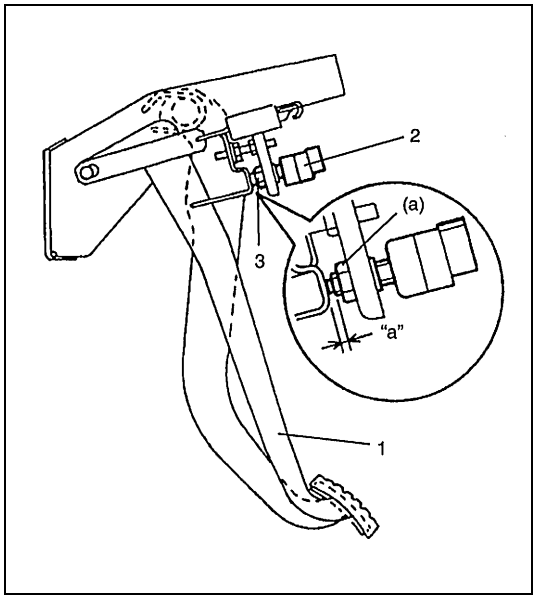


INSPECTION

Check for resistance between terminals under each condition below.
If check result is not satisfactory, replace.

CPP switch resistance
When switch shaft is free : Continuity
When switch shaft is pushed : No continuity

1.	Push
2.	Free



INSTALLATION

1) Install CPP switch to pedal bracket.
2) With clutch pedal released, adjust switch position so that clearance between end of thread and clutch pedal bracket is within specification.

Clearance "a" between end of thread and clutch pedal bracket : 1.5 – 2.0 mm (0.06 – 0.08 in)

3) Tighten lock nut to specified torque.

Tightening torque
CPP switch lock nut (a) : 7.5 N·m (0.75 kg-m, 5.5 lb-ft)

4) Connect connector to CPP switch securely.

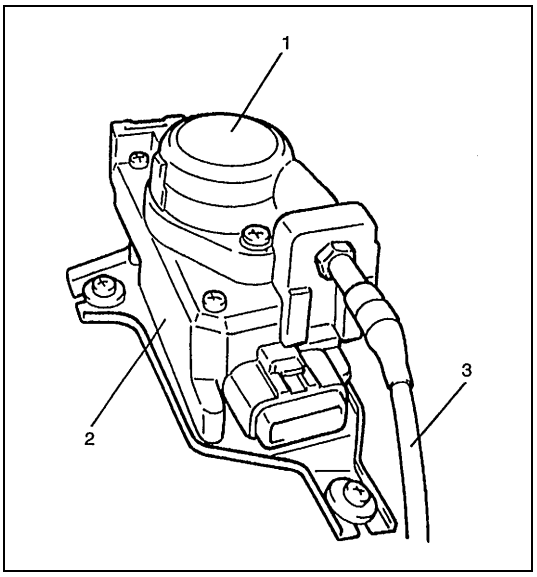
1.	Clutch pedal
2.	CPP switch for cruise control
3.	Lock nut

Brake Light Switch With Pedal Position Switch

INSPECTION

Check for contiguity between terminals referring to "Brake Light Switch Inspection" in this section.

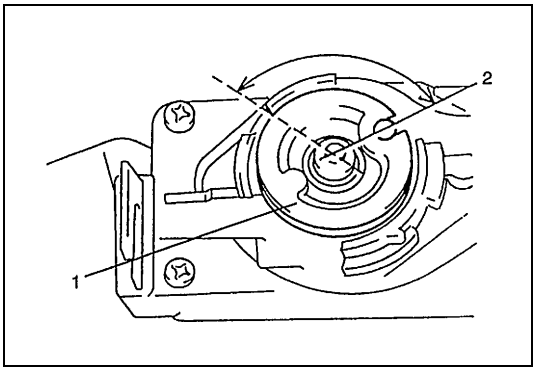
Cruise Control Actuator Assembly (With Control Module)



CAUTION:
Never disassemble cruise control actuator assembly. Disassembly will spoil its original function.

REMOVAL

1) Disconnect negative (–) cable at battery.
2) Disconnect connector from actuator assembly (2) (with control module).
3) Remove actuator cap (1) from actuator assembly (2).
4) Disconnect cruise cable (3) from actuator assembly (2).
5) Remove actuator assembly (2) from vehicle.



INSPECTION

Move actuator lever (1) by hand and check its operation as described below.

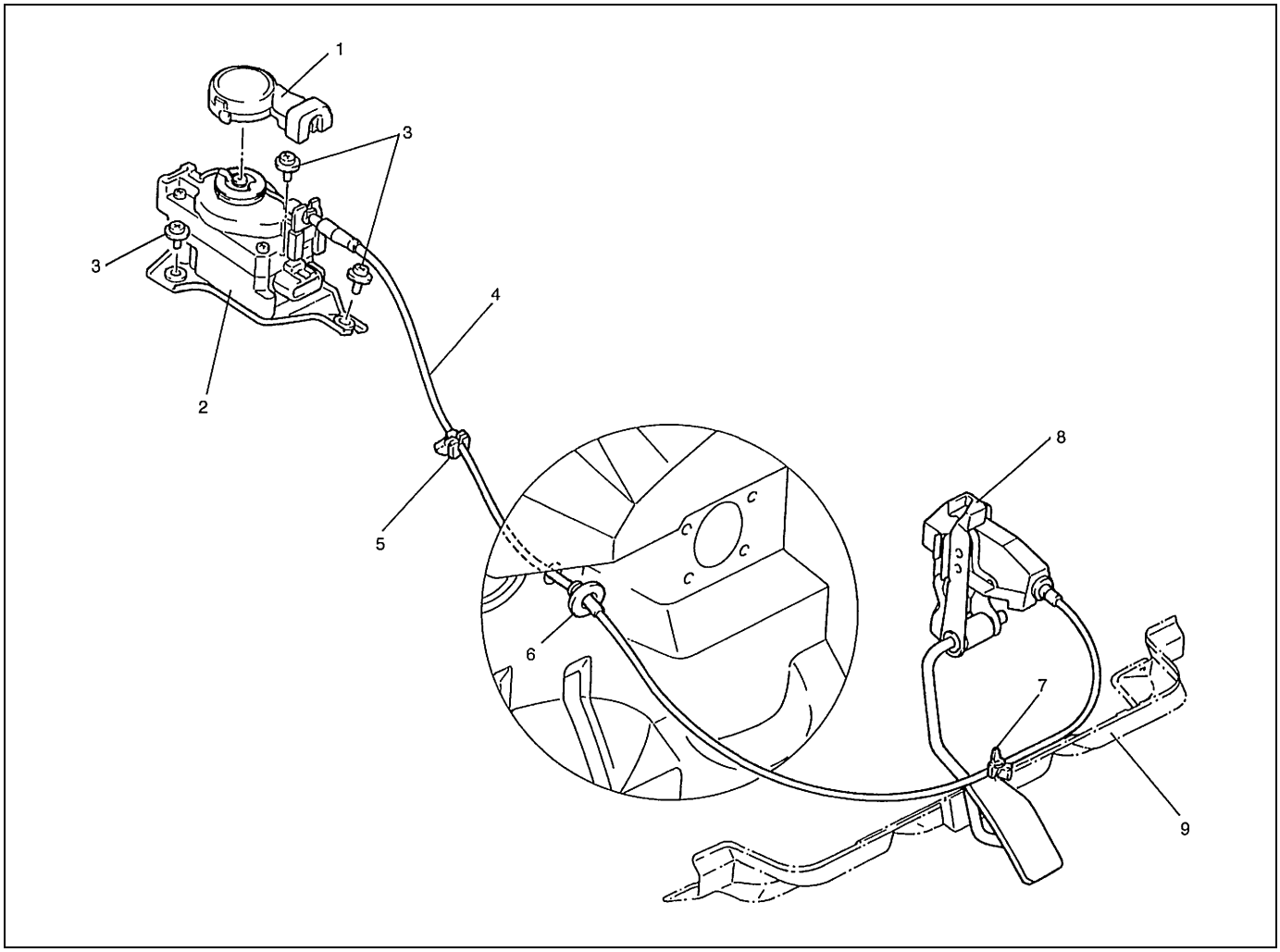
1) Actuator lever (1) should not turn clockwise.
2) Actuator lever (1) should turn smoothly by about 1/3 rotation counterclockwise and contact internal stopper.
3) When hand is taken off from actuator lever (1) at the position in 2) above, it should return to its original position (2) by return spring force. If actuator lever (1) does not operate as described above, replace it.

INSTALLATION

Install actuator assembly by reversing removal procedure, noting the following point.

- Adjust cruise cable play to specification referring to “Cruise Cable Play Inspection and Adjustment” in this section.

Cruise Cable



1. Actuator cap	4. Cruise cable	7. Clamp at member
2. Actuator assembly	5. Clamp	8. Accelerator pedal
3. Screw	6. Grommet	9. Member

REMOVAL

1) Disconnect cruise cable from cruise control arm and accelerator bracket.
2) Remove actuator cap and disconnect cruise cable from actuator.
3) Release cable from all clamps.
4) Remove cable from vehicle.

INSTALLATION

Install cruise cable by reversing removal procedure, noting the following points.

- Refer to the figure for proper clamp location and cable routing.
- Adjust cable play to specification referring to “Cruise Cable Play Inspection and Adjustment” in this section.

SECTION 8G

IMMOBILIZER CONTROL SYSTEM (IF EQUIPPED)

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

NOTE:

Whether the immobilizer indicator lamp is used in the particular vehicle or not depends on vehicle specifications. If there is a heated oxygen sensor (sensor 2) in exhaust pipe, the vehicle is equipped with immobilizer indicator lamp and if there isn't, it is not equipped with immobilizer indicator lamp. For details of heated oxygen sensor (sensor 2), refer to Section 6E in this manual. Be sure to bear this in mind when performing service work.

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OTHER THAN CANVAS TOP MODEL

General Description

The immobilizer control system designed to prevent vehicle burglar consists of following components.

- Engine control module (ECM)
- Immobilizer control module (1) with coil antenna
- Ignition key (2) with built-in transponder

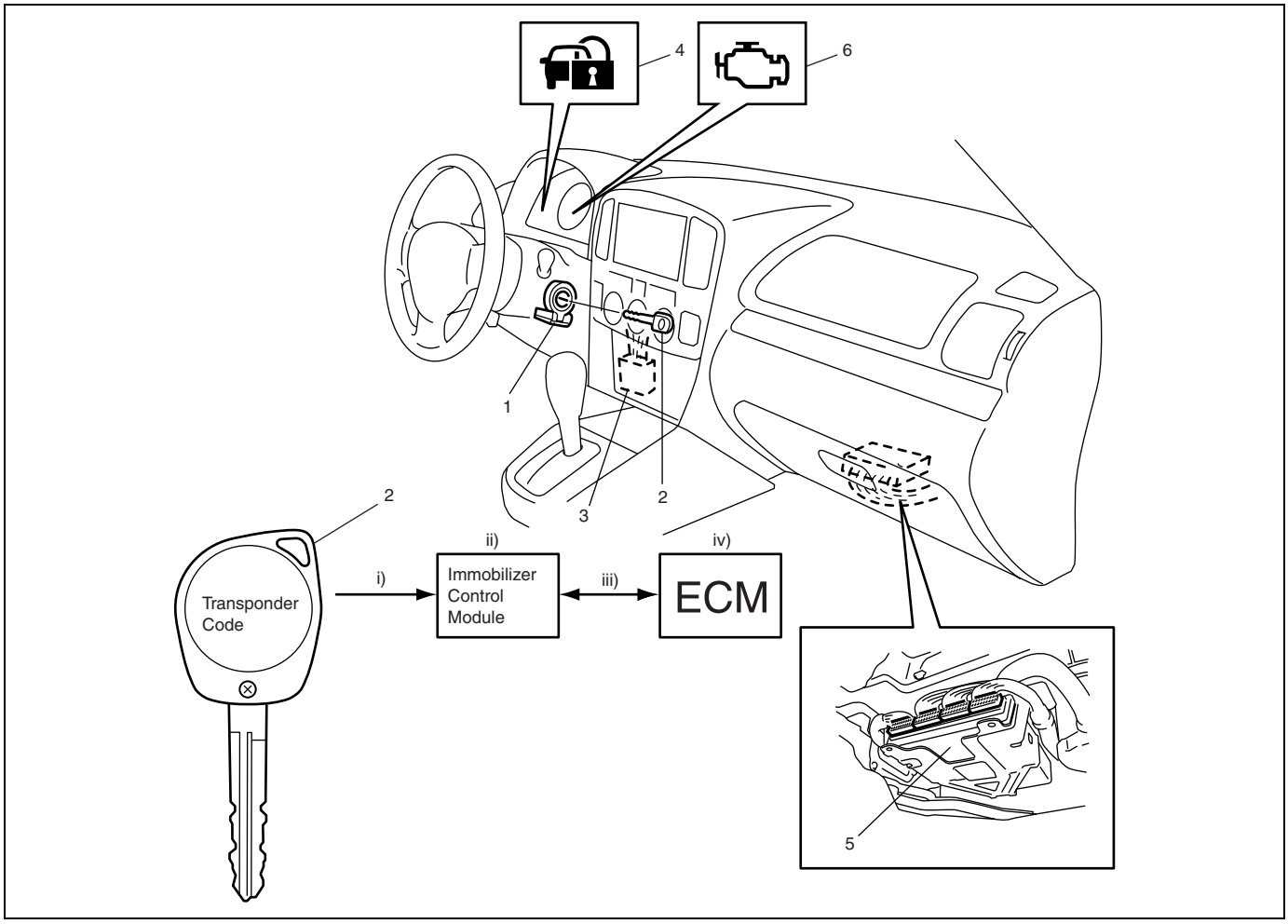
Operation of this system is as follows.

i) Each ignition key has its own code (Transponder code) stored in memory. When the ignition switch is turned ON, Immobilizer Control Module tries to read the Transponder code through the coil antenna installed to the steering lock assembly.

ii) Immobilizer Control Module compares the Transponder code read in Step (i) and that registered in Immobilizer Control Module and checks if they match.

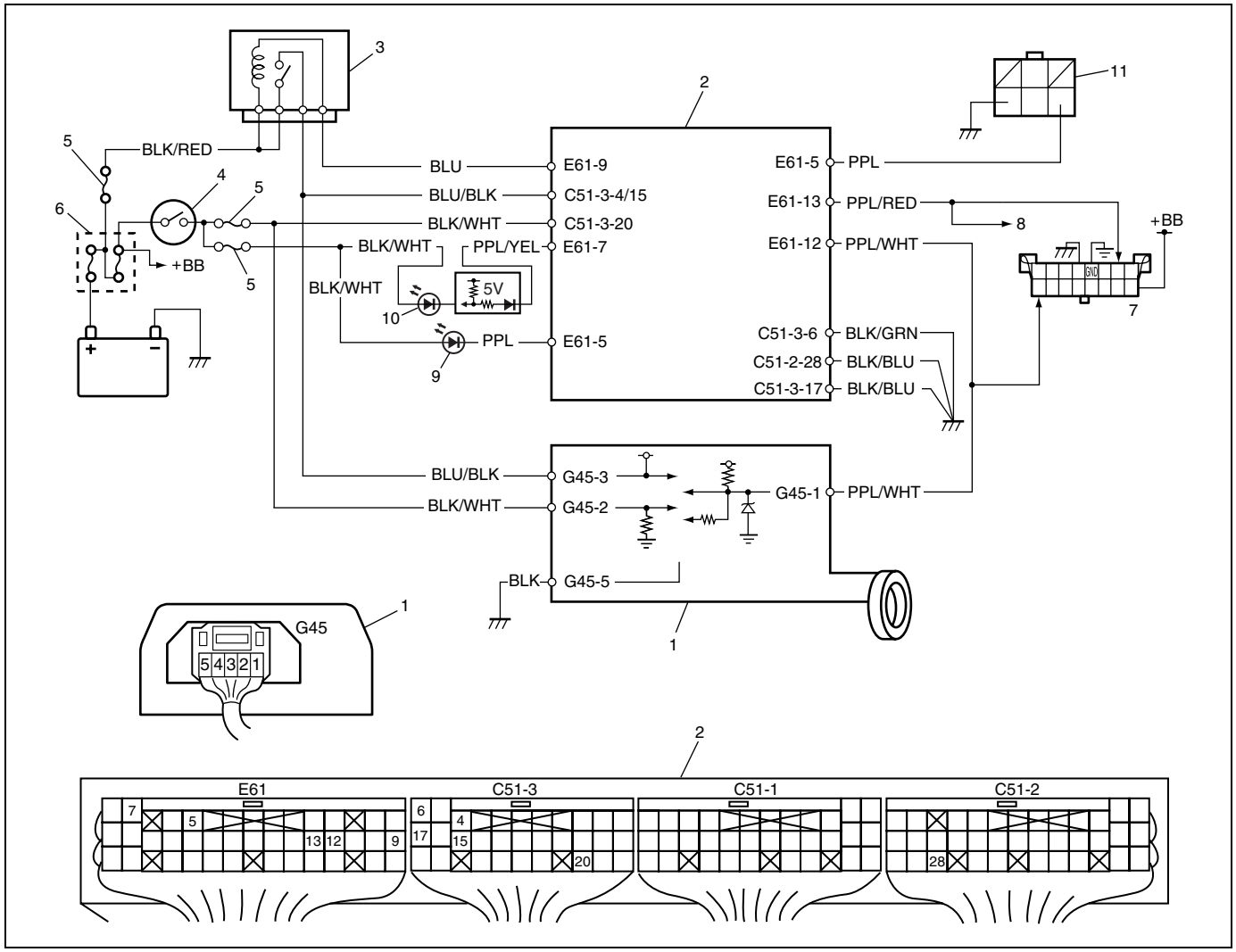
iii) When it is confirmed that two Transponder codes match each other as described above, Immobilizer Control Module and ECM check if ECM/Immobilizer Control Module (ECU) codes registered in them respectively match.

iv) Only when it is confirmed that ECM/Immobilizer Control Module codes match, the engine starts running. If Transponder codes in Step (ii) or ECM/Immobilizer Control Module (ECU) codes in Step (iii) do not match, ECM will stop operation of the injector and ignition of spark plug.



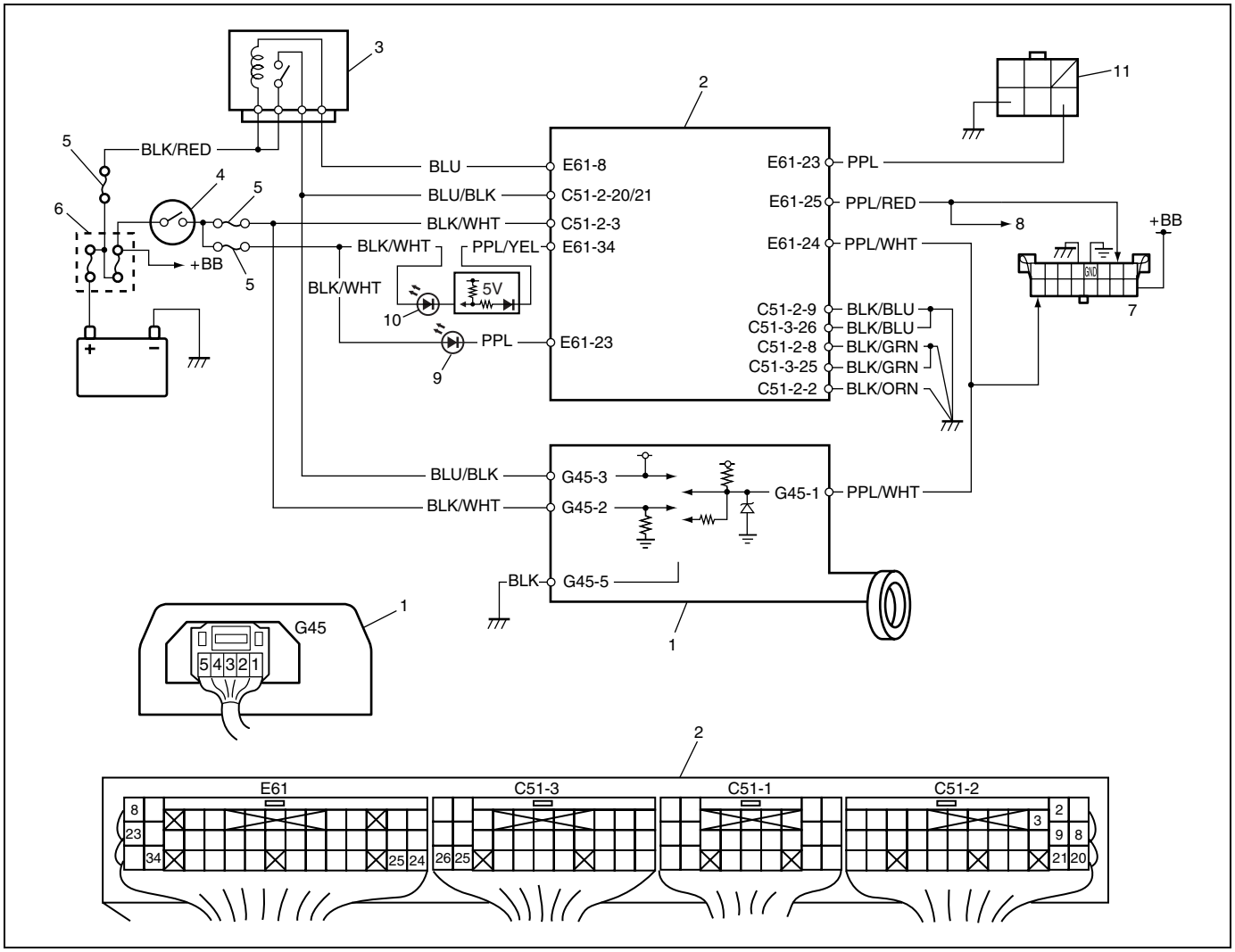
3.	Data link connector (DLC)
4.	Immobilizer indicator lamp (if equipped)
5.	ECM
6.	Malfunction indicator lamp

Wiring Circuit for G16 and J20 Engine Models



1. Immobilizer Control Module	5. Fuse	9. Immobilizer indicator lamp (if equipped)
2. ECM	6. Main fuse	10. Malfunction indicator lamp
3. Main relay	7. Data link connector	11. Diagnosis connector (Vehicle not equipped with immobilizer indicator lamp)
4. Ignition switch	8. To ABS control module, SDM and TCM	

Wiring Circuit for H25 Engine Model



1. Immobilizer Control Module	5. Fuse	9. Immobilizer indicator lamp (if equipped)
2. ECM	6. Main fuse	10. Malfunction indicator lamp
3. Main relay	7. Data link connector	11. Diagnosis connector (Vehicle not equipped with immobilizer indicator lamp)
4. Ignition switch	8. To ABS control module, SDM and TCM	

On-board Diagnostic System (Self-diagnosis Function)

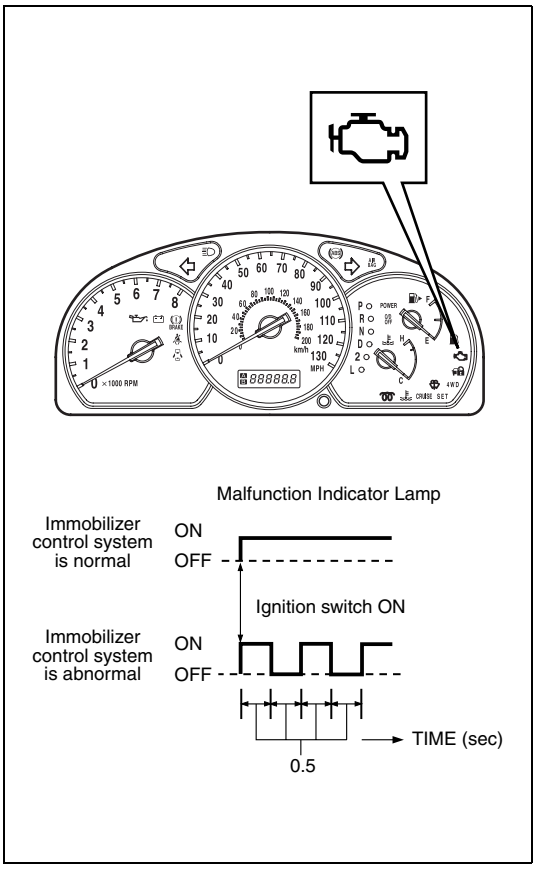
Immobilizer Control Module and ECM diagnose troubles which may occur in the area including the following parts when the ignition switch is ON.

ECM :

- ECM/Immobilizer Control Module (ECU) code
- Serial data link circuit
- ECM

Immobilizer Control Module :

- Transponder code
- Coil antenna
- ECM/Immobilizer Control Module (ECU) code
- Serial data link circuit
- Immobilizer Control Module
- Ignition signal



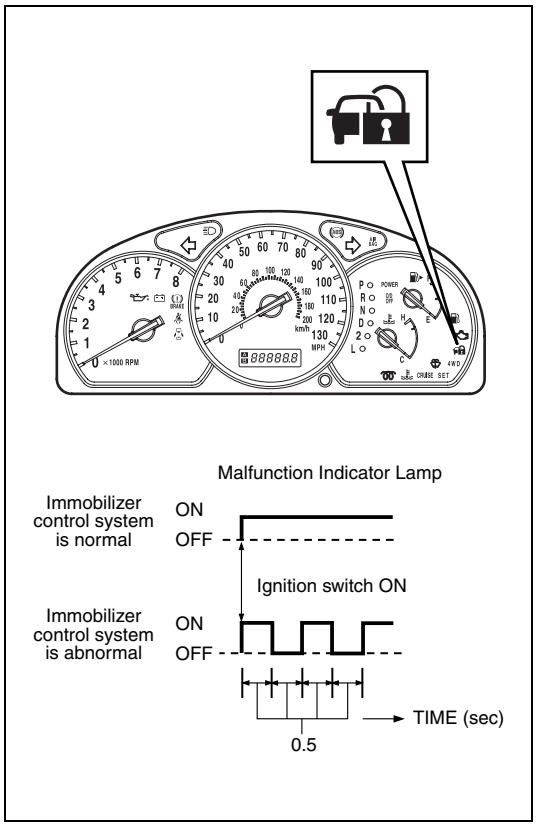
<Vehicle not equipped with immobilizer indicator lamp>

With the diagnosis switch terminal of diagnosis connector for ECM not grounded, the ignition switch turned ON (but the engine at stop) and regardless of the condition of the engine fuel injection system, ECM indicates whether a trouble has occurred in the immobilizer control system or not by causing the malfunction indicator lamp to flash or turn ON.

Malfunction indicator lamp is ON :
No trouble exists in the immobilizer control system.
Malfunction indicator lamp is flashing :
ECM or Immobilizer Control Module has detected some trouble in the immobilizer control system.

NOTE:

As soon as the ignition switch is turned ON, ECM and Immobilizer Control Module diagnose if a trouble has occurred in the immobilizer control system. While the diagnosis is being made, the malfunction indicator lamp stays ON and if the diagnosis result is "abnormal", it immediately changes to flashing but if the result is "normal", it remains ON. Diagnosis takes about 3 seconds at maximum.



<Vehicle equipped with immobilizer indicator lamp>
With the ignition switch turned ON (but the engine at stop) regardless of the condition of the engine and emission control system, ECM indicates whether a trouble has occurred in the immobilizer control system or not by causing the immobilizer indicator lamp to flash or turn ON.

Immobilizer indicator lamp is ON :
No trouble exists in the immobilizer control system.
Immobilizer indicator lamp is flashing :
ECM or Immobilizer Control Module has detected some trouble in the immobilizer control system.

NOTE:

As soon as the ignition switch is turned ON, ECM and Immobilizer Control Module diagnose if a trouble has occurred in the immobilizer control system. While the diagnosis is being made, the immobilizer indicator lamp stays ON and if the diagnosis result is "abnormal", it immediately changes to flashing but if the result is "normal", it remains ON. Diagnosis takes about 3 seconds at maximum.

When ECM and Immobilizer Control Module detects a trouble which has occurred in the above areas, it stores DTC corresponding to the exact trouble area in ECM and Immobilizer Control Module memory.

DTCs stored in memory of each controller (Immobilizer Control Module and ECM) can be read by using the procedure described in "Diagnostic Trouble Code Check (Immobilizer Control Module)" and "Diagnostic Trouble Code Check (ECM)" in this section.

Diagnosis

Precautions in Diagnosing Troubles

Precautions in identifying diagnostic trouble code

ECM

<Vehicle not equipped with immobilizer indicator lamp>

- Before identifying diagnostic trouble code indicated by malfunction indicator lamp or SUZUKI scan tool, don't disconnect couplers from ECM, battery cable from battery, ECM ground wire harness from engine.
  Such disconnection will clear trouble codes for engine and emission control system and immobilizer control system stored in memory of ECM.
- If abnormality or malfunction lies in two or more areas, malfunction indicator lamp indicates applicable codes three times each.
  And flashing of these codes is repeated as long as diagnosis terminal is grounded and ignition switch is held at ON position.
- When ECM detects a trouble in both engine and emission control system and immobilizer control system, malfunction indicator lamp indicates trouble codes of both systems alternately while the ignition switch is turned ON and the diagnosis terminal is grounded.
- Take a note of diagnostic trouble code indicated first.

<Vehicle equipped with immobilizer indicator lamp>

- Before identifying diagnostic trouble code indicated through SUZUKI scan tool, don't disconnect couplers from ECM, battery cable from battery, ECM ground wire harness from engine.
  Such disconnection will clear trouble codes for engine and emission control system and immobilizer control system stored in memory of ECM.
- Take a note of diagnostic trouble code indicated first.

IMMOBILIZER CONTROL MODULE

- Take a note of diagnostic trouble code indicated first.

INTERMITTENT TROUBLES

- There is case where SUZUKI scan tool or malfunction indicator lamp (if not equipped with immobilizer indicator lamp) indicate a diagnostic trouble code representing a trouble which occurred only temporarily and has gone. In such case, it may occur that good parts are replaced unnecessarily. To prevent such accident, be sure to follow instructions given below when checking by using “Diagnostic Flow Table”.
  - When trouble can be identified, it is not an intermittent one :
    Check coil antenna, ignition key, wires and each connection and if they are all in good condition, substitute a known-good ECM and recheck.
  - When trouble can not be identified but SUZUKI scan tool or malfunction indicator lamp (if not equipped with immobilizer indicator lamp) indicate a trouble code :
    Diagnose trouble by using that code No. and if ignition key, coil antenna, wires and each connection are all in good condition, turn OFF ignition switch and then ON.

Then check what SUZUKI scan tool indicate.Only when they indicate trouble code again, substitute a known-good ECM or Immobilizer Control Module and check again.
If they indicate not trouble code but normal code, it means that an intermittent trouble did occur and has gone. In this case, check wires and connections carefully again.

Diagnostic Flow Table

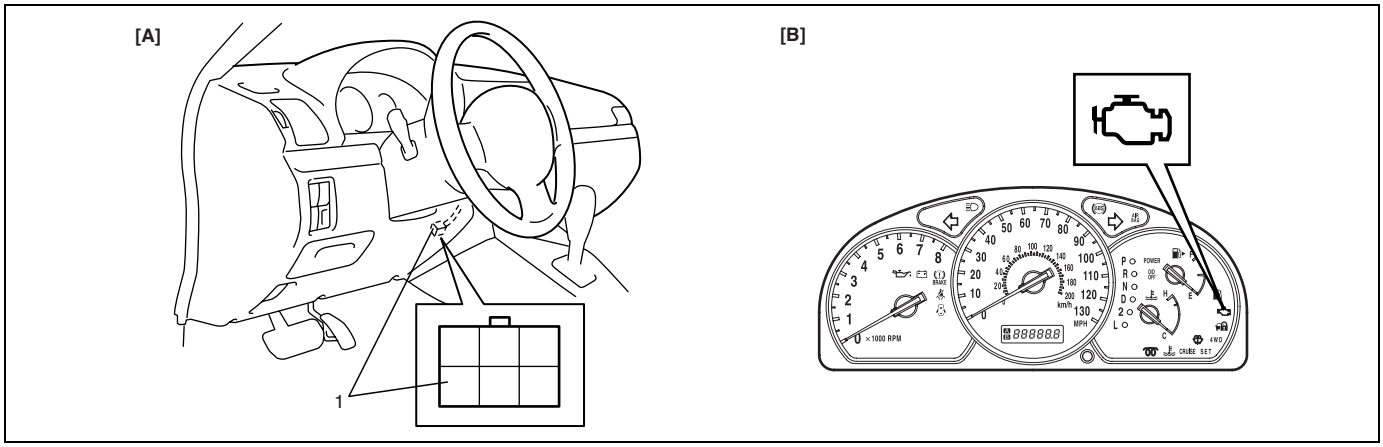
<Vehicle not equipped with immobilizer indicator lamp>

Step	Action	Yes	No
1	1) Make sure that diagnosis switch terminal in diagnosis connector (color : natural) is not grounded by service wire. See Fig.1. 2) Check malfunction indicator lamp while ignition switch is ON (but without starting engine). See Fig. 2. Does malfunction indicator lamp flash?	Go to Step 3.	• If malfunction indicator lamp remains ON, go to Step 2. • If malfunction indicator lamp remains OFF, go to "Malfunction Indicator Lamp Check" in Section 6.
2	1) Using service wire, ground diagnostic switch terminal in diagnosis connector. See Fig.3. Does malfunction indicator lamp flash?	Immobilizer control system is in good condition.	Go to "Malfunction Indicator Lamp Check" in Section 6.
3	Does malfunction indicator lamp flash as Fig.4?	Go to Step 4.	Go to "Malfunction Indicator Lamp Check" in Section 6.
4	1) Check DTC stored in immobilizer control module referring to "Diagnostic Trouble Code Check (Immobilizer Control Module)" in this section. Is there any DTC(s)?	Go to flow table for DTC No.	Go to Step 5.
5	1) Check DTC stored in ECM referring to "Diagnostic Trouble Code Check (ECM)" in this section. Is there any DTC(s)?	Go to flow table for DTC No.	Substitute a known-good ECM and recheck. See NOTE below.

NOTE:

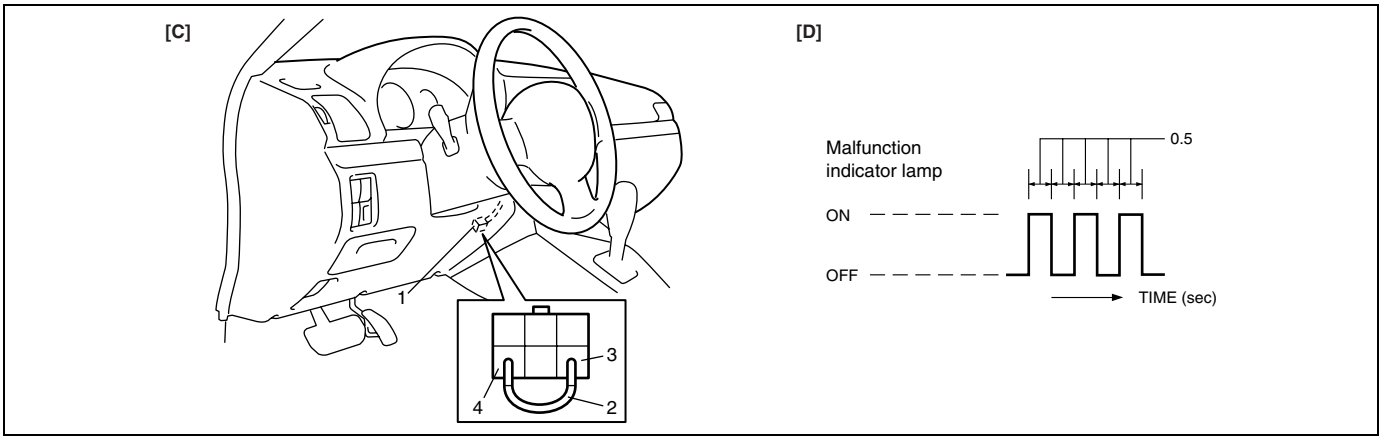
After replacing with a known-good ECM, register ECM/Immobilizer Control Module (ECU) code in ECM by performing procedure described in "Procedure after ECM Replacement" section.

[A] Fig. 1 for Step 1 / [B] Fig. 2 for Step 1



1. Diagnosis connector (color : natural)

[C] Fig. 3 for Step 2 / [D] Fig. 4 for Step 3



1. Diagnosis connector (color : natural)	2. Service wire	3. Diagnostic switch terminal	4. Ground terminal

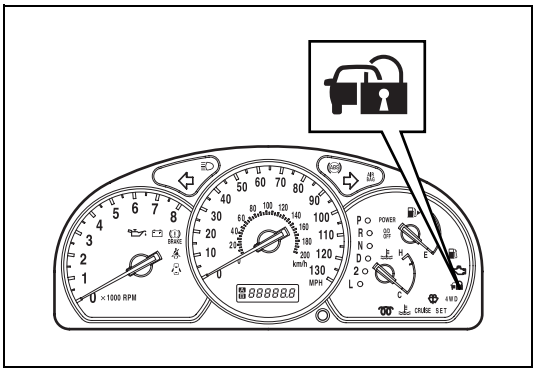
<Vehicle equipped with immobilizer indicator lamp>

Step	Action	Yes	No
1	1) Check immobilizer indicator lamp while ignition switch is ON (but without starting engine). See Fig. 1. Does immobilizer indicator lamp flash?	Go to Step 3.	If immobilizer indicator lamp remains ON, go to Step 2. If immobilizer indicator lamp remains OFF, go to "Table A Immobilizer Indicator Lamp Check" in this section.
2	1) Check DTC stored in ECM referring to "Diagnostic trouble Code Check (ECM)" in this section. Is there any DTC(s)?	Go to "Table B Immobilizer Indicator Lamp Check" in this section.	Immobilizer control system is in good condition.
3	1) Check DTC stored in immobilizer control module referring to "Diagnostic Trouble Code Check (Immobilizer Control Module)" in this section. Is there any DTC(s)?	Go to flow table for DTC No.	Go to Step 4.
4	1) Check DTC stored in ECM referring to "Diagnostic Trouble Code Check (ECM)" in this section. Is there any DTC(s) for immobilizer control system?	Go to flow table for DTC No.	Substitute a known-good ECM and recheck. See NOTE below.

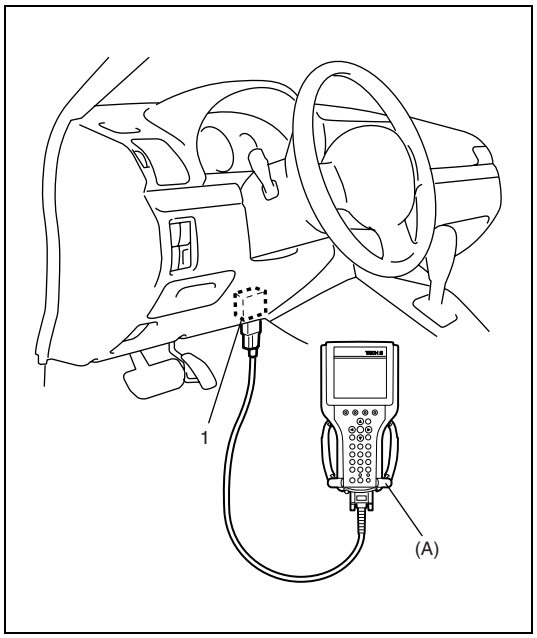
NOTE:

After replacing with a known-good ECM, register ECM/Immobilizer Control Module (ECU) code in ECM by performing procedure described in "Procedure after ECM Replacement" section.

Fig. 1 for Step 1



Diagnostic Trouble Code (DTC) Check (Immobilizer Control Module)



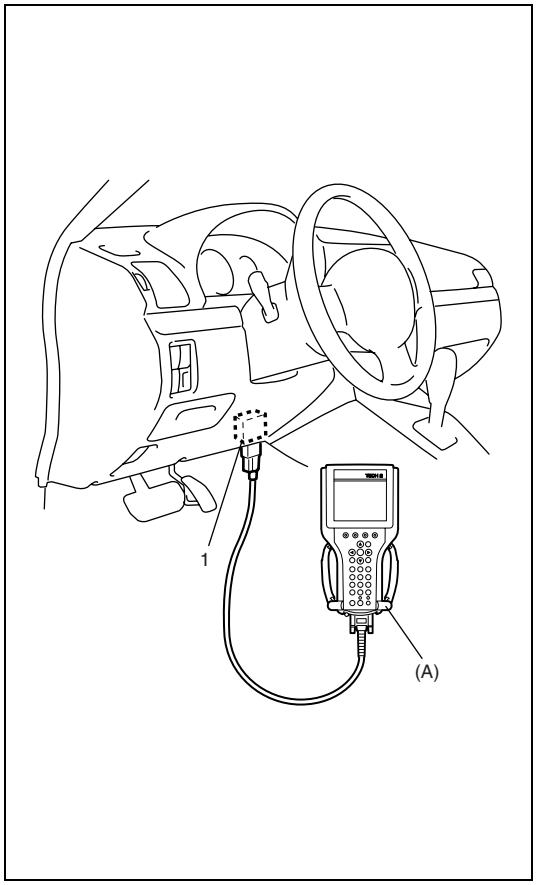
[Using SUZUKI scan tool]

1) Turn ignition switch OFF.
2) After setting cartridge or program card to SUZUKI scan tool, connect it to data link connector (DLC) (1) located on underside of instrument panel at driver's seat side.

   Special tool
   (A) : SUZUKI scan tool

3) Turn ignition switch ON.
4) Read DTC stored in immobilizer control module according to instructions displayed on SUZUKI scan tool and print it or write it down. Refer to SUZUKI scan tool operator's manual for further details.
   If communication between SUZUKI scan tool and immobilizer control module is not possible, go to "Diagnostic Flow Table C".
5) After completing the check, turn ignition switch OFF and disconnect SUZUKI scan tool from data link connector (DLC).

Diagnostic Trouble Code (DTC) Check (ECM)



[Using SUZUKI scan tool]

1) Turn ignition switch OFF.
2) After setting cartridge or program card to SUZUKI scan tool, connect it to data link connector (DLC) (1) located on underside of instrument panel at driver's seat side.

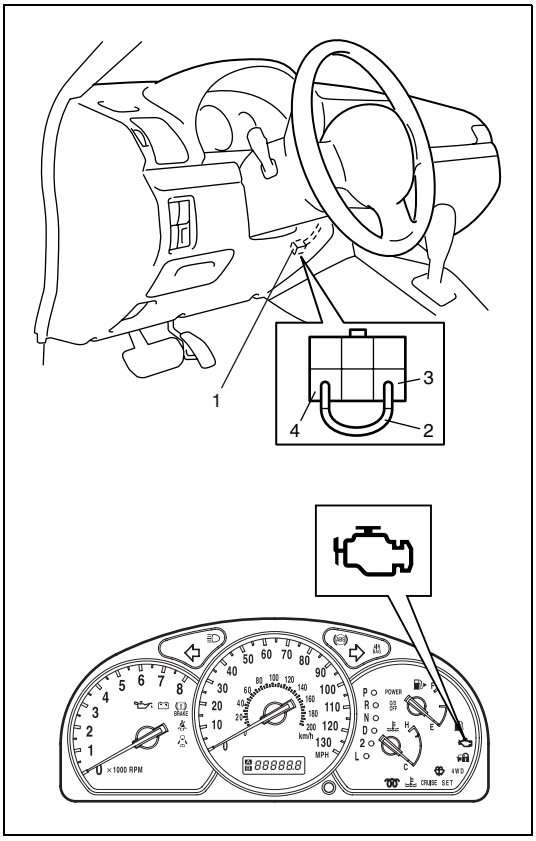
   Special tool
   (A) : SUZUKI scan tool

3) Turn ignition switch ON.
4) Read DTC stored in ECM according to instructions displayed on SUZUKI scan tool and print it or write it down. Refer to SUZUKI scan tool operator's manual for further details.
   If communication between SUZUKI scan tool and ECM is not possible, check if SUZUKI scan tool is communicable by connecting it to ECM in another vehicle. If communication is possible in this case, SUZUKI scan tool is in good condition. Then check data link connector and serial data line (circuit) in the vehicle with which communication was not possible.

   NOTE:

   If ECM detects a trouble in both engine and emission control system and immobilizer control system, SUZUKI scan tool indicates trouble codes of both systems.

5) After completing the check, turn ignition switch OFF and disconnect SUZUKI scan tool from data link connector (DLC).



[Not using SUZUKI scan tool] (Except for vehicle equipped with immobilizer indicator lamp)

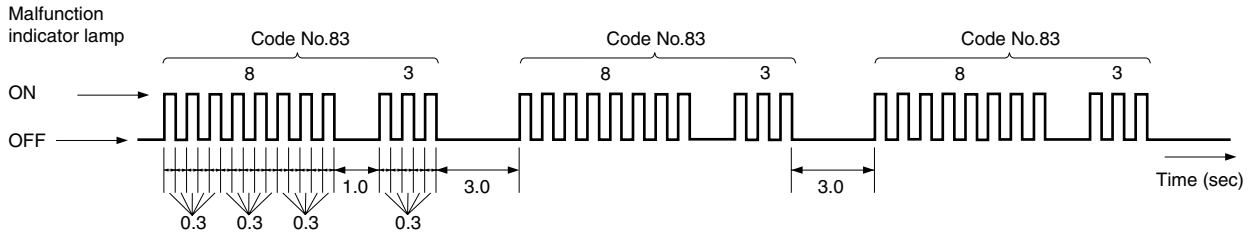
1) Using service wire, ground diagnostic switch terminal in diagnosis connector (color : natural).
2) Read DTC from flashing pattern of malfunction indicator lamp as shown in example below and write it down. For details of DTC, refer to ECM side in “Diagnostic Trouble Code Table”.
   If lamp remains ON, go to “Malfunction Indicator Lamp Check” in Section 6.

NOTE:

If abnormality or malfunction lies in two or more areas, malfunction indicator lamp indicates applicable codes three times each.
And flashing of these codes is repeated as long as diagnosis terminal is grounded and ignition switch is held at ON position.

1. Diagnosis connector (color : natural)
2. Service wire
3. Diagnostic switch terminal
4. Ground terminal

EXAMPLE : When serial data link wire is defective (Code No.83)



3) After completing the check, turn ignition switch OFF and disconnect service wire from diagnosis connector.

Diagnostic Trouble Code Table

IMMOBILIZER CONTROL MODULE

DTC (indicated on SUZUKI scan tool)	DIAGNOSTIC AREA	DIAGNOSIS
NO DTC	Normal (No code)	This code appears when none of the other codes are identified.
11	Transponder code	Diagnose trouble according to “Diagnostic Flow Table” corresponding to each code No.
31		
32		
12	Immobilizer Control Module	
13	Coil antenna or ignition key with built-in transponder	
21	ECM/Immobilizer Control Module (ECU) code	
22	Ignition switch circuit	
23	Serial data link circuit	

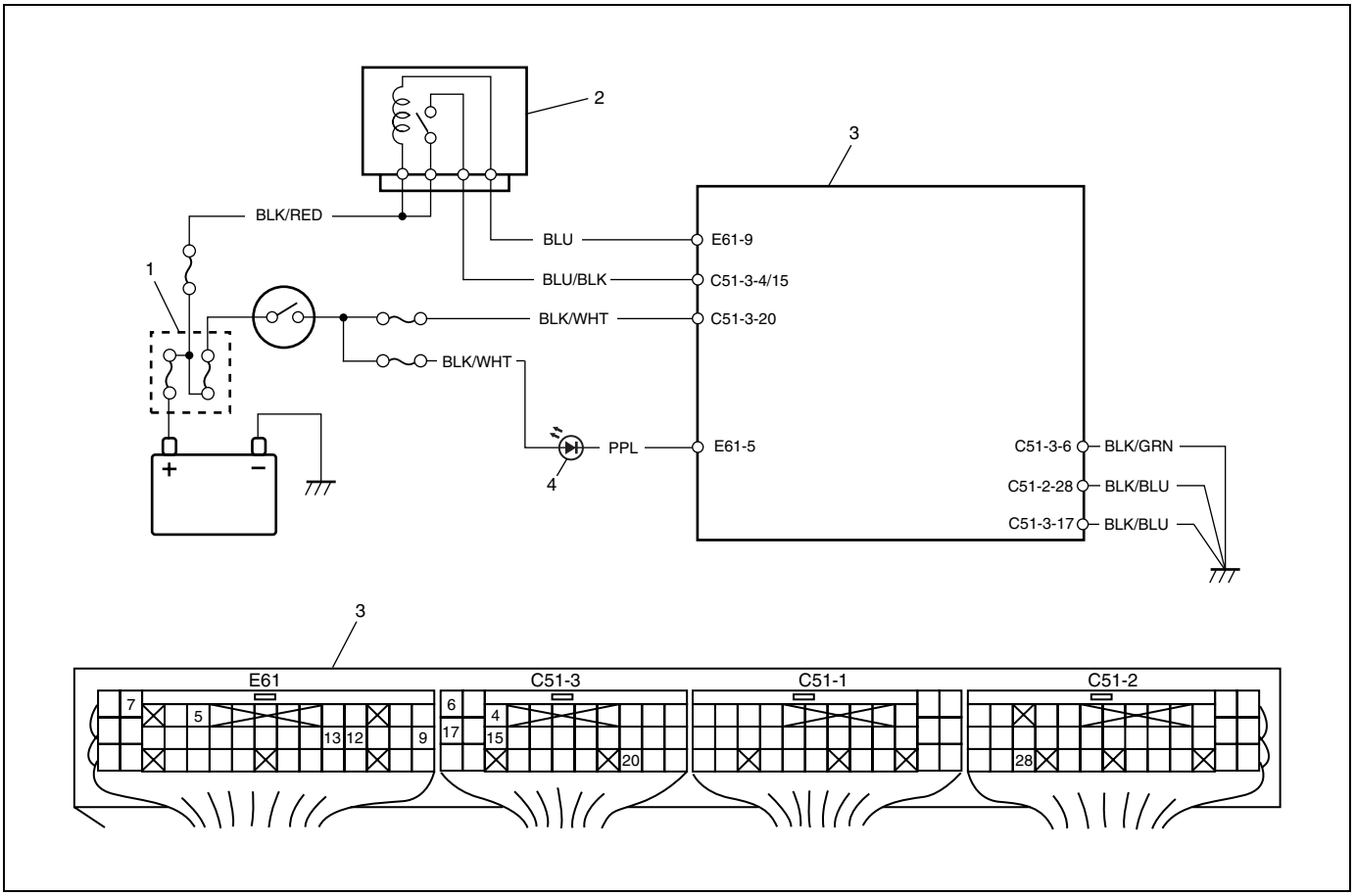
ECM

To learn how to read diagnostic trouble code (DTC) from flashing of malfunction indicator lamp, refer to Section 6.

DTC (indicated on SUZUKI scan tool)	DTC (indicated by MIL)	Malfunction Indicator Lamp (MIL) flashing pattern	DIAGNOSTIC AREA	DIAGNOSIS
NO DTC	12		Normal	This code appears when it is confirmed that none of other trouble codes is set for immobilizer control system or engine and emission control system.
P1623	81		ECM/Immobilizer Control Module (ECU) code	Diagnose trouble according to “DIAGNOSTIC FLOW TABLE” corresponding to each code No.
P1620	84			
P1622	82		ECM	
P1621	83		Serial data link wire	

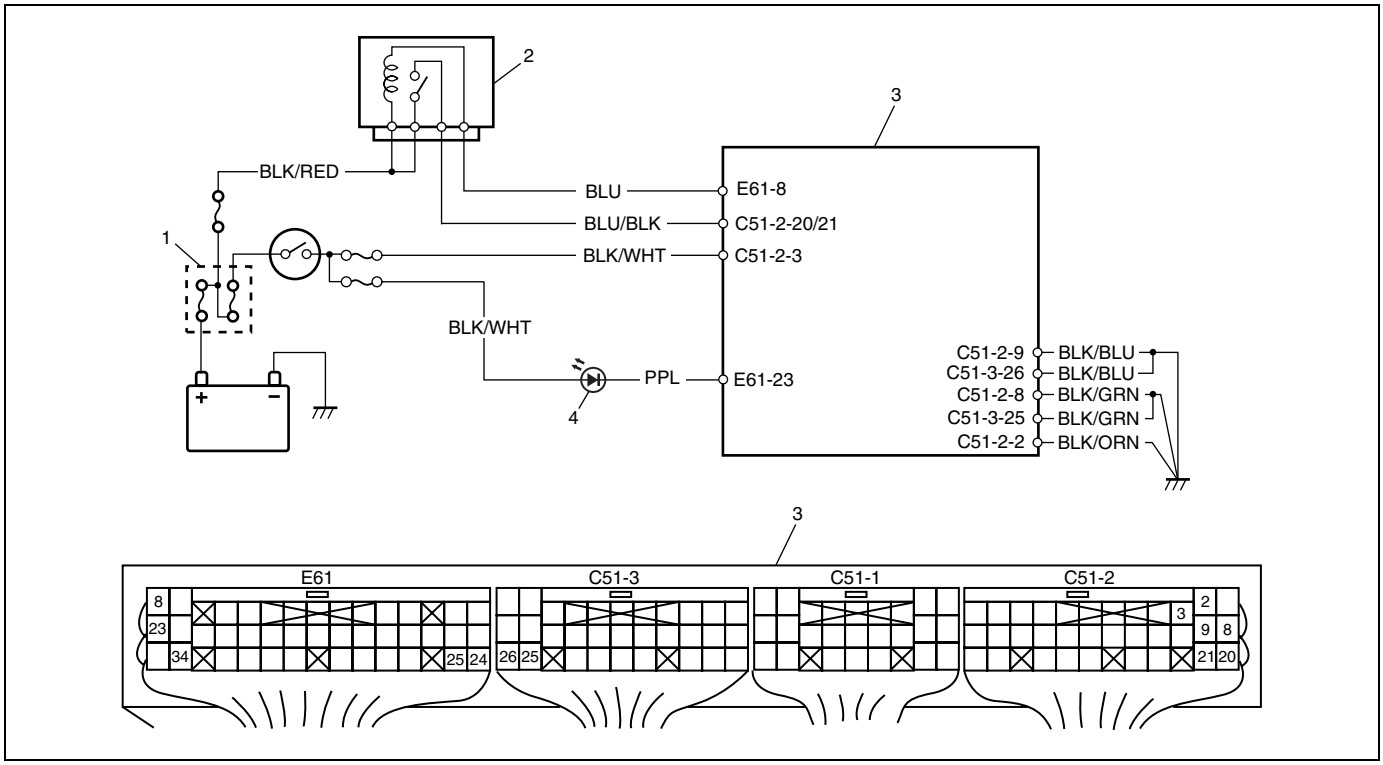
Table A – Immobilizer Indicator Lamp Check: Immobilizer Indicator Lamp Does Not Light at Ignition Switch ON (Equipped with Immobilizer Indicator Lamp)

WIRING DIAGRAM for G16 and J20 Engine Models



1. Main fuse	2. Main relay	3. ECM	4. Immobilizer indicator lamp

WIRING DIAGRAM for H25 Engine Model



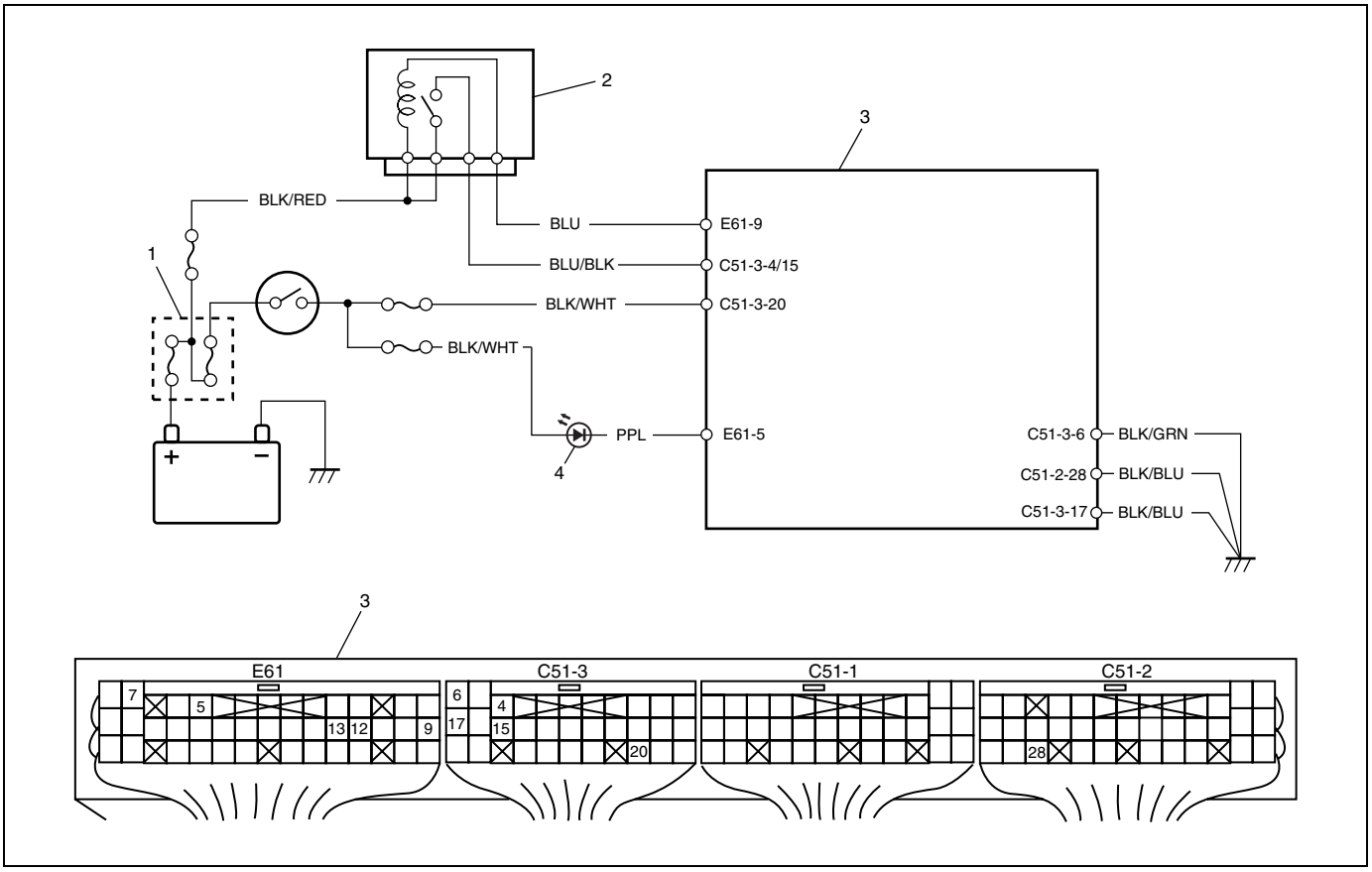
1. Main fuse	2. Main relay	3. ECM	4. Immobilizer indicator lamp

INSPECTION

Step	Action	Yes	No
1	1) Turn ignition switch ON. Do other indicator/warning lights in combination meter come ON?	Go to Step 2.	"IG" fuse blown, main fuse blown, ignition switch malfunction, "BLK/WHT" circuit between "IG" fuse and combination meter or poor coupler connection at combination meter.
2	1) Turn ignition switch OFF and disconnect connectors from ECM. 2) Check for proper connection to ECM at terminal E61-5 for G16 and J20 engine models or E61-23 for H25 engine model. 3) If OK, then using service wire, ground terminal E61-5 for G16 and J20 engine models or E61-23 for H25 engine model in connector disconnected. Does immobilizer indicator lamp turn on at ignition switch ON?	Substitute a known-good ECM and recheck.	LED faulty or "PPL" wire circuit open.

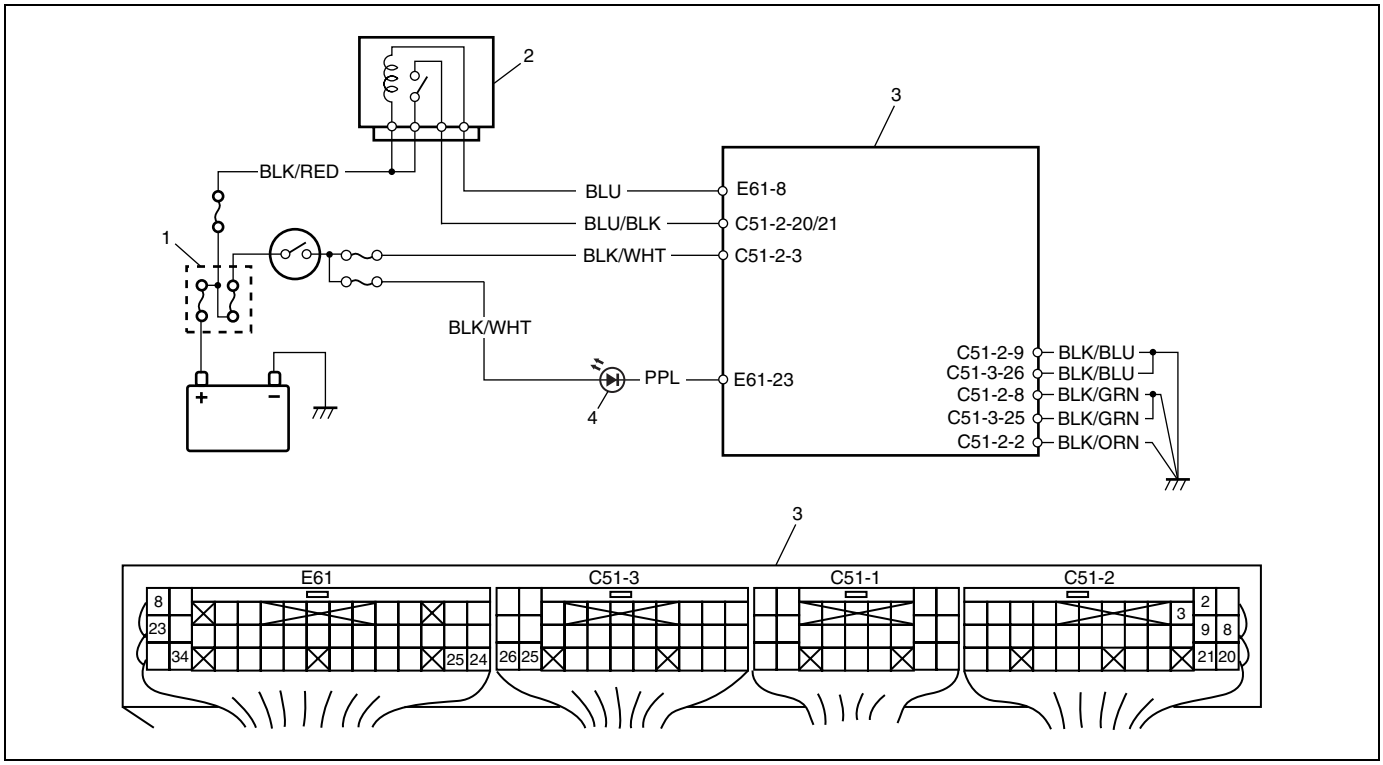
Table B – Immobilizer Indicator Lamp Check: Immobilizer Indicator Lamp Remains ON after Engine Starts (Equipped with Immobilizer Indicator Lamp)

WIRING DIAGRAM for G16 and J20 Engine Models



1. Main fuse	2. Main relay	3. ECM	4. Immobilizer indicator lamp

WIRING DIAGRAM for H25 Engine Model



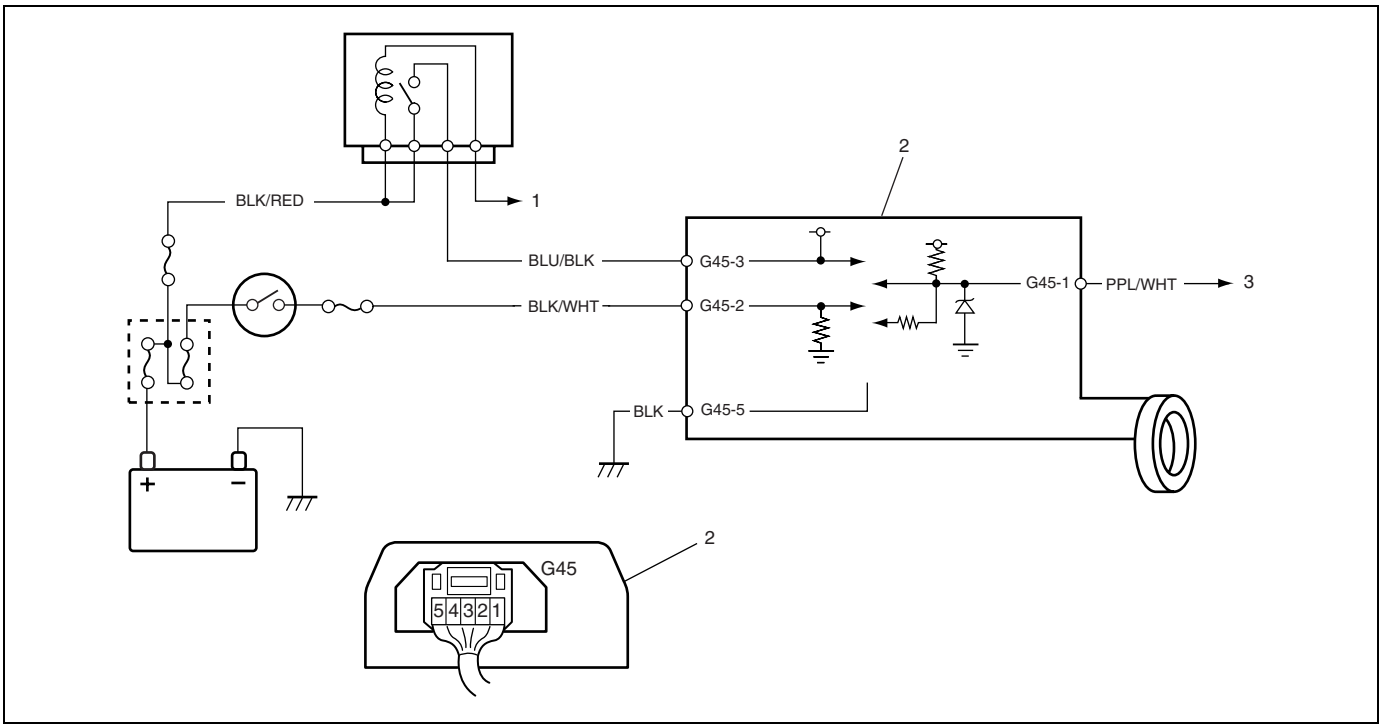
1. Main fuse	2. Main relay	3. ECM	4. Immobilizer indicator lamp

INSPECTION

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect couplers from ECM. Does immobilizer indicator lamp turn ON at ignition switch ON?	"PPL" wire shorted to ground circuit.	Substitute a known-good ECM and recheck.

Table C – DTC Is Not Output from Immobilizer Control Module

WIRING DIAGRAM



1. To ECM	2. Immobilizer control module	3. To #9-pin in DLC

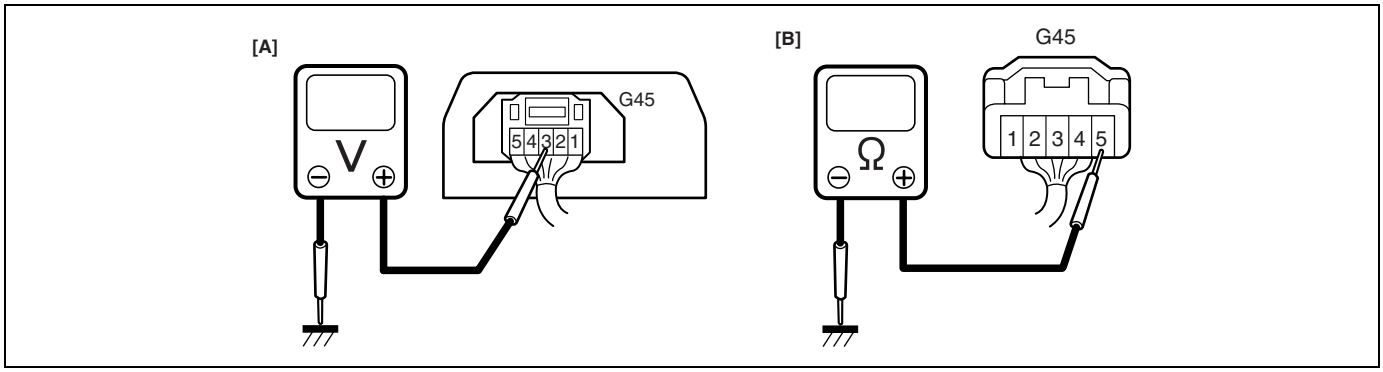
INSPECTION

Step	Action	Yes	No
1	Check voltage between G45-3 terminal and body ground with ignition switch turned ON. See Fig. 1. Is it 10 – 14 V?	Go to Step 2.	"BLU/BLK" wire open or short to ground.
2	1) Disconnect coupler (1) at immobilizer control module. Is there continuity between coupler terminal G45-5 and body ground? See Fig. 2.	• Poor G45-3 or G45-5 connection • Poor #9-pin connection in DLC • Serial data line "PPL/WHT" open or short to ground If connections and line are OK, substitute a known-good Immobilizer Control Module and recheck. See NOTE below.	"BLK" wire open.

NOTE:

After replacing with a known-good Immobilizer Control Module, register ECM/Immobilizer Control Module (ECU) code in ECM and Transponder code and ECM/Immobilizer Control Module (ECU) code in Immobilizer Control Module by performing procedure described in "Procedure After Immobilizer Control Module Replacement" in this section.

[A] Fig. 1 for Step 1 / [B] Fig. 2 for Step 2



DTC11/32 Transponder Code Not Matched

DESCRIPTION

Immobilizer Control Module checks if Transponder code transmitted from ignition key and that registered in Immobilizer Control Module match when ignition switch is ON. If they do not, DTC 11 and/or 32 are set.

INSPECTION

Register ignition key with built-in transponder by using SUZUKI scan tool and performing following steps.

1) Register Transponder code in Immobilizer Control Module by performing procedure described in “How To Register Ignition Key”.
2) Turn ignition switch OFF, then turn it ON and check that DTC11 and/or 32 are not set.

DTC31 Transponder Code Not Registered

DESCRIPTION

Immobilizer Control Module checks if Transponder code transmitted from ignition key and that registered in Immobilizer Control Module match when ignition switch is ON. If there is no Transponder code registered in Immobilizer Control Module, this DTC is set.

INSPECTION

Register ignition key with built-in transponder by using SUZUKI scan tool and performing following steps.

1) Register Transponder code in Immobilizer Control Module by performing procedure described in “How To Register Ignition Key”.
2) Turn ignition switch OFF, then turn it ON and check that DTC31 is not set.

DTC12 Fault in Immobilizer Control Module

DESCRIPTION

This DTC is set when an internal fault is detected in Immobilizer Control Module.

INSPECTION

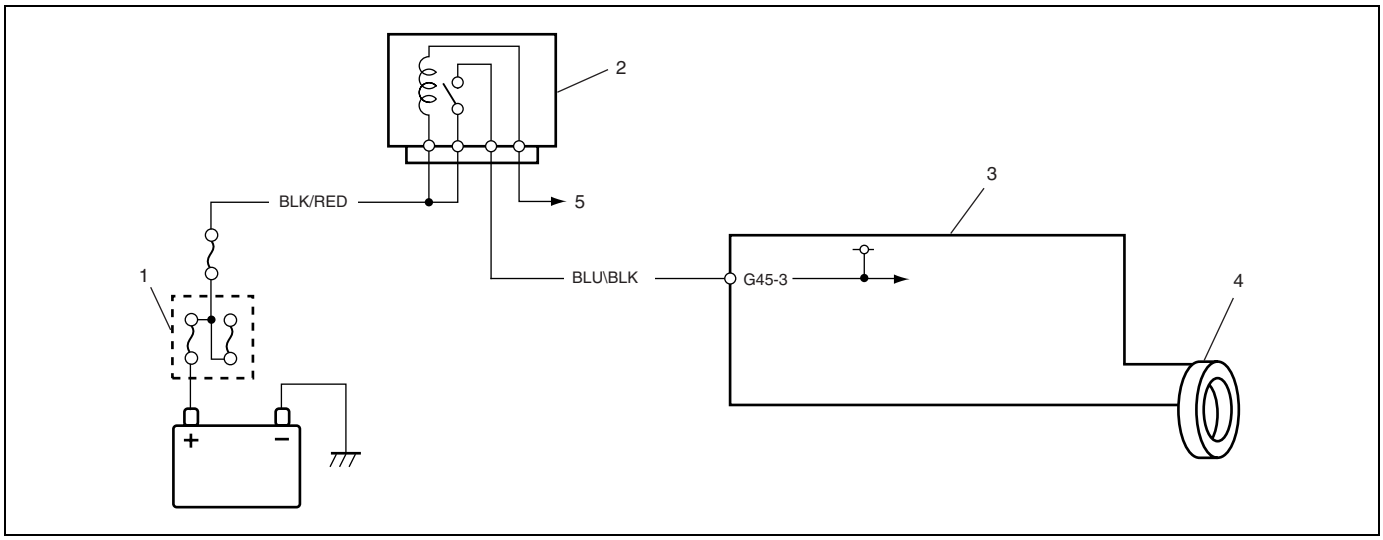
Step	Action	Yes	No
1	1) Ignition switch OFF. 2) Disconnect connectors from Immobilizer Control Module. 3) Check for proper connection to Immobilizer Control Module at all terminals. Are they in good condition?	Substitute a known-good Immobilizer Control Module and recheck. See NOTE below.	Repair or replace.

NOTE:

After replacing with a known-good Immobilizer Control Module, register ECM/Immobilizer Control Module (ECU) code in ECM and Transponder code and ECM/Immobilizer Control Module (ECU) code in Immobilizer Control Module by performing procedure described in "Procedure After Immobilizer Control Module Replacement" in this section.

DTC13 No Transponder Code Transmitted or Coil Antenna Opened/Shorted

WIRING DIAGRAM



1. Main fuse	2. Main relay	3. Immobilizer Control Module	4. Coil antenna	5. To ECM

DESCRIPTION

Immobilizer Control Module energizes the coil antenna when the ignition switch is ON and reads Transponder code from the ignition key. When Immobilizer Control Module cannot read Transponder code from the ignition key even when the coil antenna is energized, this DTC is set.

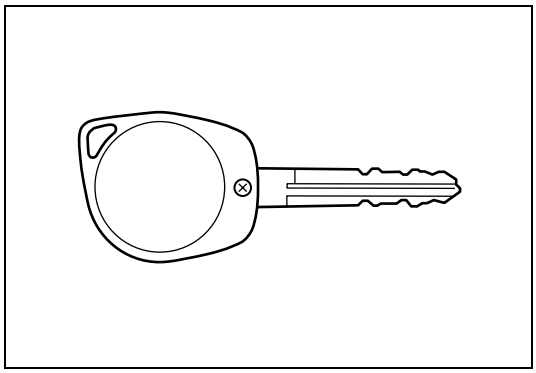
INSPECTION

Step	Action	Yes	No
1	Check that knob shape and color for ignition key are as shown below. • Knob color : Black and grey • Knob shape : See Fig.1. Is it the original one?	Substitute a known-good Immobilizer Control Module and recheck. See NOTE below.	Replace ignition key with original one and follow "Diagnostic Flow Table" again.

NOTE:

After replacing with a known-good Immobilizer Control Module, register ECM/Immobilizer Control Module (ECU) code in ECM and Transponder code and ECM/Immobilizer Control Module (ECU) code in Immobilizer Control Module by performing procedure described in "Procedure After Immobilizer Control Module Replacement" in this section.

Fig. 1 for Step 1



DTC21 ECM/Immobilizer Control Module Code Not Matched (Immobilizer Control Module Side)

DTC81 (P1623) ECM/Immobilizer Control Module Code Not Matched (ECM Side)

DTC84 (P1620) ECM/Immobilizer Control Module Code Not Registered

DESCRIPTION

- DTC21
  Immobilizer Control Module checks if ECM/Immobilizer Control Module code transmitted from ECM and that registered in Immobilizer Control Module match when ignition switch is ON. If they do not, this DTC is set.
- DTC 81 (P1623)
  ECM checks if ECM/Immobilizer Control Module code transmitted from Immobilizer Control Module and that registered in ECM match when ignition switch is ON. If they do not, this DTC is set.
- DTC 84 (P1620)
  ECM checks if code transmitted from Immobilizer Control Module and that registered in ECM match when ignition switch is ON. If there is no ECM/Immobilizer Control Module code registered in ECM, this DTC is set.

INSPECTION

Perform procedure described in “Procedure After ECM Replacement” in the section.

DTC82 (P1622) Fault in ECM

DESCRIPTION

This DTC is set when an internal fault is detected in ECM.

INSPECTION

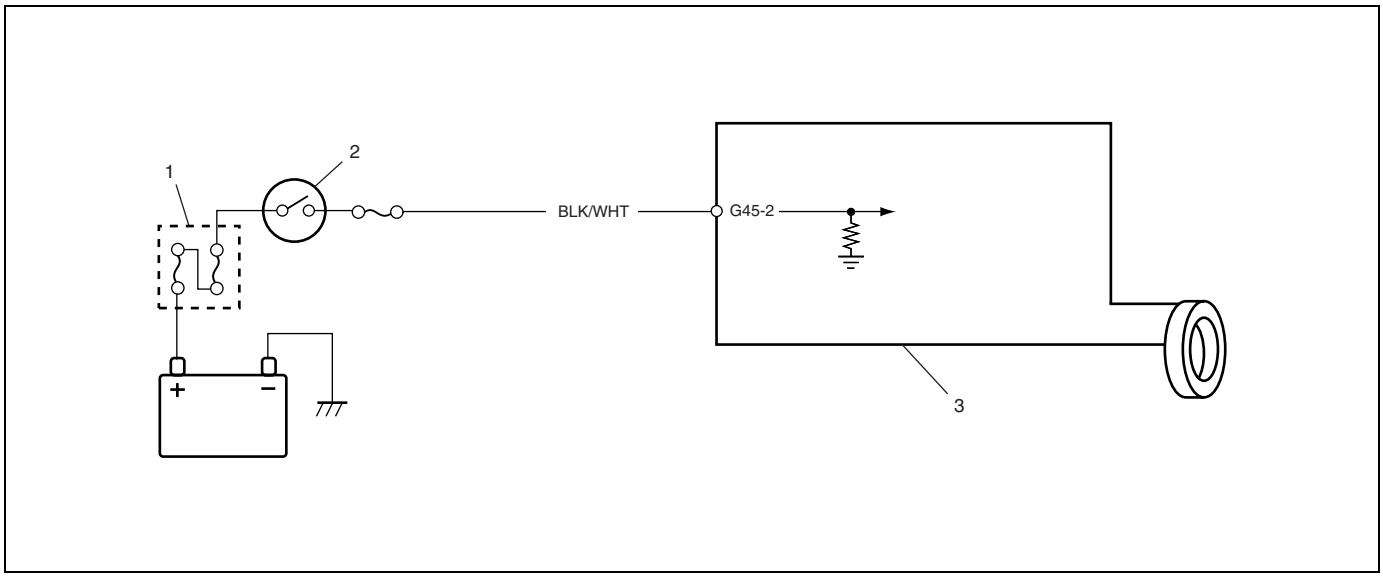
Step	Action	Yes	No
1	1) Ignition switch OFF. 2) Disconnect connectors from ECM. 3) Check for proper connection to ECM at all terminals. Are they in good condition?	Substitute a known-good ECM and recheck. See NOTE below.	Repair or replace.

NOTE:

After replacing with a known-good ECM, register ECM/Immobilizer Control Module (ECU) code in ECM by performing procedure described in “Procedure After ECM Replacement” in this section.

DTC22 Ignition Switch Circuit Open/Short

WIRING DIAGRAM



1. Main fuse	2. Ignition switch	3. Immobilizer Control Module

DESCRIPTION

Immobilizer Control Module monitors ignition signal when the ignition switch is ON. This DTC is set when no ignition signal input is detected by Immobilizer Control Module.

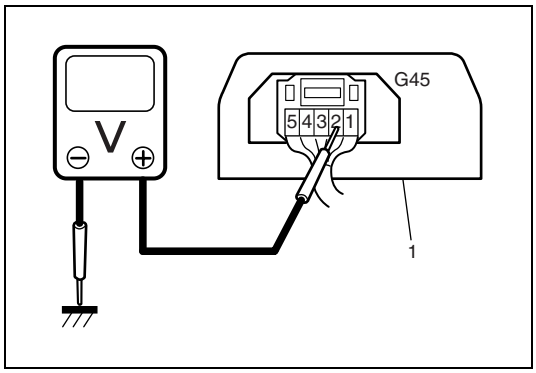
INSPECTION

Step	Action	Yes	No
1	Check voltage between Immobilizer Control Module (1) coupler terminal G45-2 and body ground with ignition switch turned ON. See Fig. 1. Is it 10 – 14V?	Poor G45-2 terminal connection. If connection is OK, substitute a known-good Immobilizer Control Module and recheck. See NOTE below.	"BLK/WHT" wire open or short.

NOTE:

After replacing with a known-good Immobilizer Control Module, register ECM/Immobilizer Control Module (ECU) code in ECM and Transponder code and ECM/Immobilizer Control Module (ECU) code in Immobilizer Control Module by performing procedure described in "Procedure After Immobilizer Control Module Replacement" in this section.

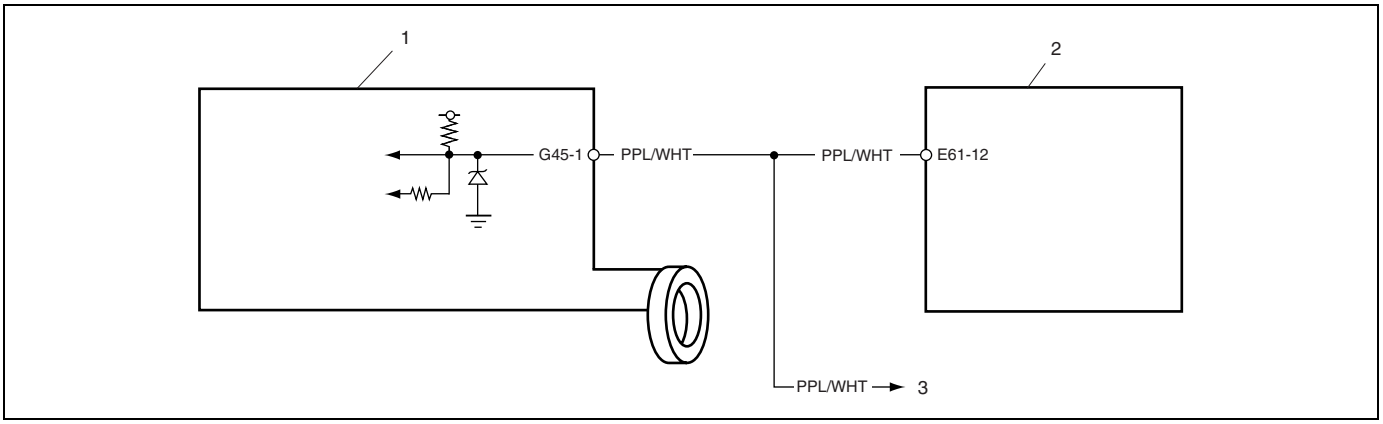
Fig. 1 for Step 1



DTC23 No ECM/Immobilizer Control Module Code Transmitted from ECM or DLC Circuit Opened/Shorted

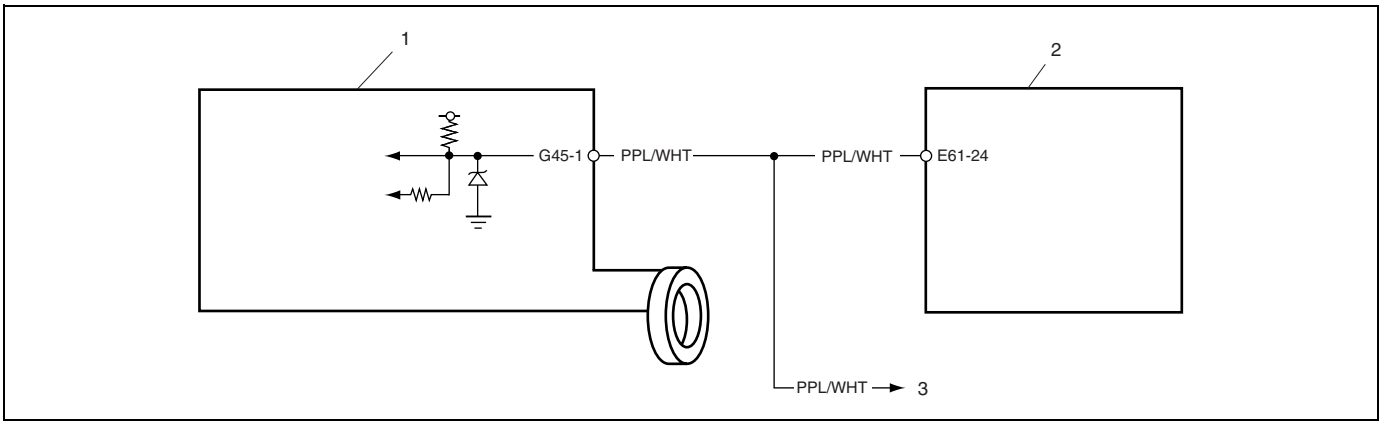
DTC83 (P1621) No ECM/Immobilizer Control Module Code Transmitted from Immobilizer Control Module or DLC Circuit Opened/Shorted

WIRING DIAGRAM for G16 and J20 Engine Models



1. Immobilizer Control Module	2. ECM	3. To #9-pin in DLC

WIRING DIAGRAM for H25 Engine Model



1. Immobilizer Control Module	2. ECM	3. To #9-pin in DLC

DESCRIPTION

When the ignition switch is ON, Immobilizer Control Module requests ECM and ECM requests Immobilizer Control Module to transmit ECM/Immobilizer Control Module code. If ECM/Immobilizer Control Module code is not transmitted from ECM or Immobilizer Control Module, Immobilizer Control Module sets DTC23 and ECM sets DTC 83 (P1621).

INSPECTION

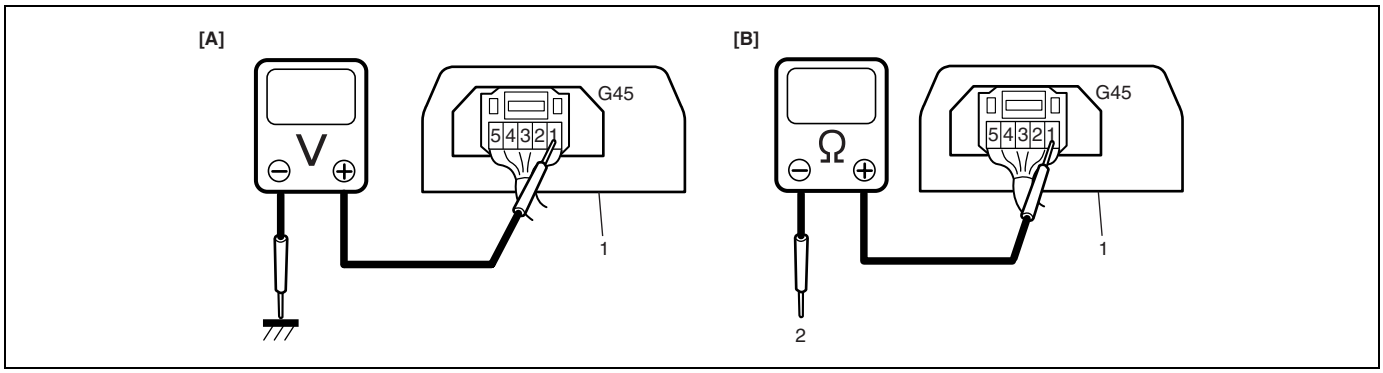
Step	Action	Yes	No
1	Check voltage between Immobilizer Control Module (1) coupler terminal G45-1 and body ground with ignition switch turned ON. See Fig. 1. Is it 4 – 5V?	Go to Step 2.	"PPL/WHT" wire short.

Step	Action	Yes	No
2	1) Disconnect ECM coupler with ignition switch turned OFF. 2) Is there continuity between Immobilizer Control Module coupler (1) terminal G45-1 and serial data link terminal E61-12 for G16 and J20 engine models or E61-24 for H25 engine model of ECM coupler? See Fig. 2. (For positions of Data link connector terminal of ECM coupler, refer to "Wiring Circuit" in this section.)	Poor G45-1 terminal connection (Immobilizer Control Module) or Poor Data link connector terminal connection (ECM). If connections are OK, substitute a known-good ECM or Immobilizer Control Module and recheck. See NOTE below.	"PPL/WHT" wire between Immobilizer Control Module and ECM open.

NOTE:

- **After replacing with a known-good ECM, register ECM/Immobilizer Control Module (ECU) code in ECM by performing procedure described in "Procedure After ECM Replacement" in this section.**
- **After replacing with a known-good Immobilizer Control Module, register ECM/Immobilizer Control Module (ECU) code in ECM and Transponder code and ECM/Immobilizer Control Module (ECU) code in Immobilizer Control Module by performing procedure described in "Procedure After Immobilizer Control Module Replacement" in the section.**

[A] Fig. 1 for Step 1 / [B] Fig. 2 for Step 2



2. Connect to serial data link terminal (G07-8) of ECM coupler disconnected

Inspection of ECM, Immobilizer Control Module and Its Circuit

ECM, Immobilizer Control Module and its circuit can be checked at ECM wiring couplers and Immobilizer Control Module wiring coupler by measuring voltage. Described here is only inspection of Immobilizer Control Module. For inspection of ECM, refer to "Engine & Emission Control Input/Output Table" in Section 6E1.

CAUTION:

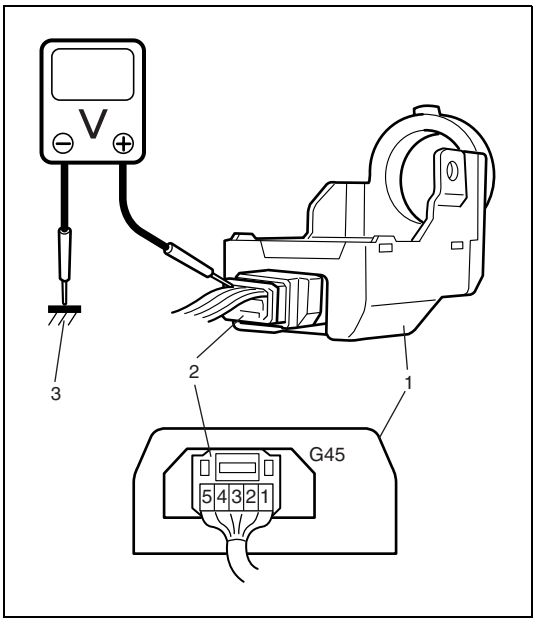
Immobilizer Control Module cannot be checked by itself. It is strictly prohibited to connect voltmeter or ohmmeter to Immobilizer Control Module with coupler disconnected from it.

Voltage check

1) Remove Immobilizer Control Module from steering lock assembly with ignition switch OFF, referring to "Removal" of "Immobilizer Control Module" in this section.
2) Connect Immobilizer Control Module coupler to Immobilizer Control Module.
3) Check voltage at each terminal of coupler connected.

NOTE:

As each terminal voltage is affected by the battery voltage, confirm that it is 11V or more when ignition switch is ON.

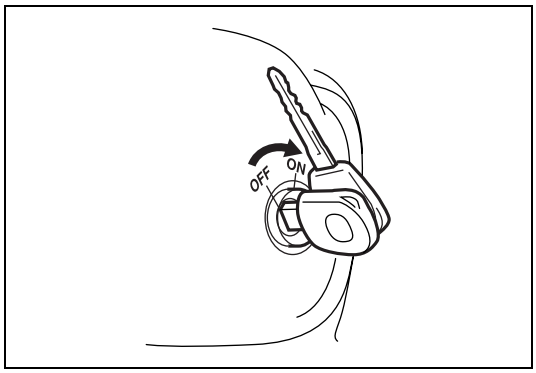


1.	Immobilizer Control Module
2.	Immobilizer Control Module coupler
3.	Body ground

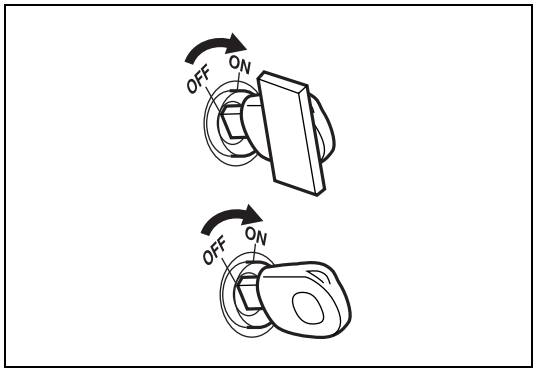
TERMINAL	CIRCUIT	NOMAL VOLTAGE	CONDITION
G45-1	Data link connector (Serial data terminal)	4 – 5V	Ignition switch ON
G45-2	Ignition signal	10 – 14V	Ignition switch ON
		0 – 0.8V	Ignition switch OFF
G45-3	Power source	10 – 14V	Ignition switch ON
G45-4	–	–	–
G45-5	Ground	–	–

On-vehicle Service

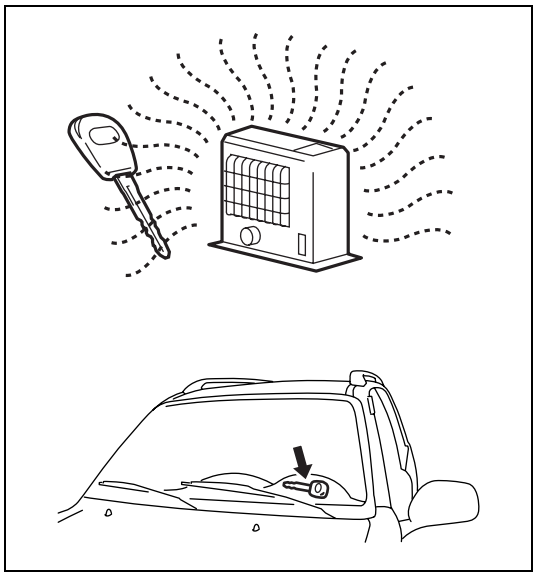
Precautions in Handling Immobilizer Control System



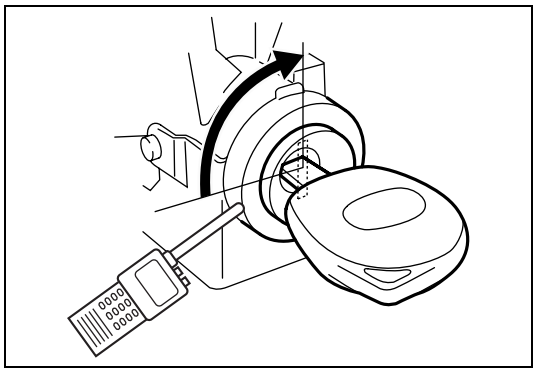
- Don't turn ON ignition switch with ignition key for immobilizer control system put together with another one or placed quite close to another one. Or the system may detect abnormal condition and prevent engine from starting.



- Do not turn ON ignition switch by using ignition key with any type of metal wound around its grip or in contact with it. Or the system may detect abnormal condition and prevent engine from starting.



- Do not leave ignition key where high temperature is anticipated. High temperature will cause transponder in ignition key to be abnormal or damaged.

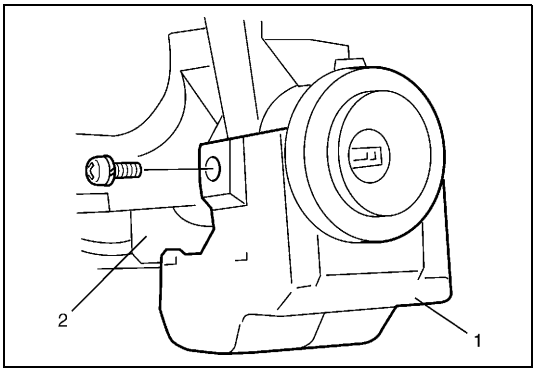


- Do not turn ON ignition switch with a radio antenna placed near Immobilizer Control Module. Or the system may detect abnormal condition and prevent engine from starting.

Immobilizer Control Module

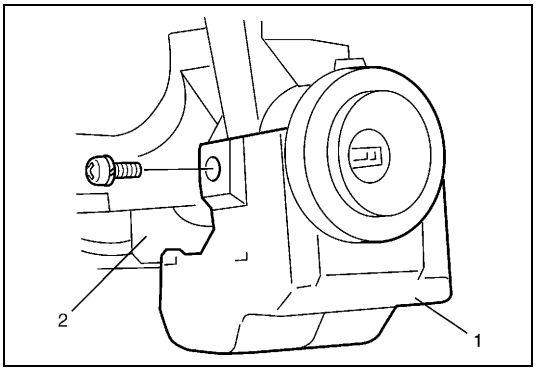
REMOVAL

1) Disconnect negative (–) cable at battery.
2) Remove driver air bag (inflator) module from steering wheel. Refer to “Driver Air Bag (Inflator) Module” in Section 3.
3) Remove steering wheel. Refer to “Steering Wheel” in Section 3.
4) Remove steering column upper cover, steering column lower cover, contact coil and combination switch assembly. Refer to “Contact Coil and Combination Switch Assembly” in Section 3.



5) Remove immobilizer control module (1) from steering lock assembly (2).

INSTALLATION



1) Install immobilizer control module (1) on steering lock assembly (2).
2) Connect coupler at immobilizer control module.
3) Install combination switch assembly, contact coil, steering column lower cover, and steering column upper cover. Refer to “Contact Coil and Combination Switch Assembly” in Section 3.
4) Install steering wheel. Refer to “Steering Wheel” in Section 3.
5) Install driver air bag (inflator) module on steering wheel. Refer to “Driver AIr Bag (Inflator) Module” in Section 3.
6) Connect negative (–) cable at battery.

NOTE:

After replacing Immobilizer Control Module, be sure to register Transponder code and ECM/Immobilizer Control Module (ECU) code in Immobilizer Control Module and ECM/Immobilizer Control Module (ECU) code in ECM by performing procedure described in "Procedure After Immobilizer Control Module Replacement" in this section.

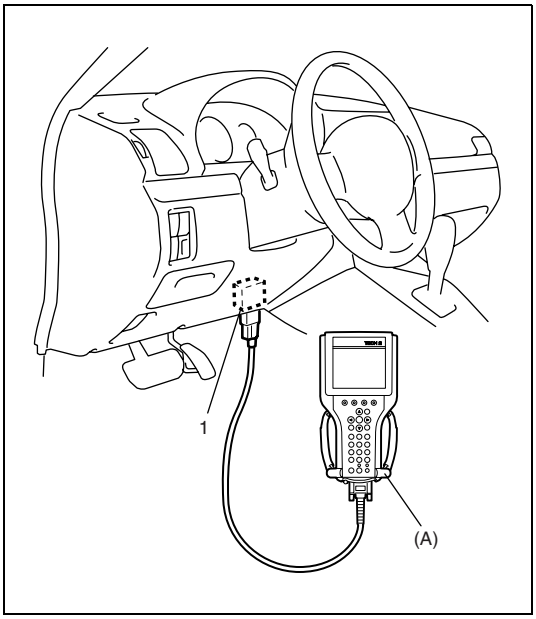
How to Register Ignition Key

Register the ignition key with a built-in transponder in Immobilizer Control Module by using the following procedure.

CAUTION:

When registering the ignition key including a transponder into the immobilizer control module by using SUZUKI scan tool, confirm that the knob color of the ignition key to be registered for the vehicle is black. The ignition key with wrong knob color cannot be registered.

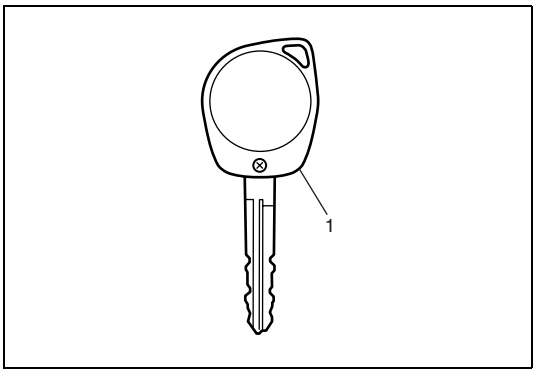
1) Prepare SUZUKI scan tool and cartridge or program card for immobilizer control system.
2) With ignition switch OFF, connect SUZUKI scan tool to data link connector (DLC) (1) located on underside of instrument panel at driver's seat side.



(A) : SUZUKI scan tool

NOTE:

For operation procedure of SUZUKI scan tool, refer to SUZUKI scan tool operator's manual.



3) Prepare ignition key with a built-in transponder (1). And then turn ignition switch ON.
4) Number of Transponder codes for ignition key with a built-in transponder that can be registered in Immobilizer Control Module is limited to 4. If needed, clear all Transponder codes for ignition key with a built-in transponder that have been registered in Immobilizer Control Module by using SUZUKI scan tool.

NOTE:

When clearing Transponder code(s) for vehicle equipped with the immobilizer indicator lamp or malfunction indicator lamp (if not equipped with immobilizer indicator lamp) ON, it remains ON even after clearing Transponder code(s). It will start flashing on and off when the ignition switch is turned OFF once and then turned ON after some seconds.

5) Using SUZUKI scan tool, register Transponder code in Immobilizer Control Module.
6) Make sure that immobilizer indicator lamp or malfunction indicator lamp (if not equipped with immobilizer indicator lamp) lights when ignition switch is turned OFF once and then ON.
7) If any other Transponder code needs to be registered, repeat above steps 3), 5) and 6).

NOTE:

- **Up to 4 Transponder codes for ignition key with a built-in transponder can be registered.**
- **It is not possible to register the Transponder code which is already registered in Immobilizer Control Module.**

Procedure after Immobilizer Control Module Replacement

When Immobilizer Control Module was replaced, including when replaced because rechecking by using a known-good Immobilizer Control Module was necessary during trouble diagnosis, register Transponder code and ECM/Immobilizer Control Module code in Immobilizer Control Module and ECM/Immobilizer Control Module code in ECM by performing following procedure.

CAUTION:

When registering the ignition key including a transponder into the immobilizer control module by using SUZUKI scan tool, confirm that the knob color of the ignition key to be registered for the vehicle is black. The ignition key with wrong knob color cannot be registered.

1) Perform steps 1) and 2) described in “How To Register Ignition Key”.
2) Prepare ignition key with a built-in transponder. And then turn ignition switch ON.
3) Using SUZUKI scan tool, clear all transponder codes registered in Immobilizer Control Module.

NOTE:

When clearing Transponder codes for vehicle equipped with the immobilizer indicator lamp or malfunction indicator lamp (if not equipped with immobilizer indicator lamp) ON, it remains ON even after clearing Transponder code(s). It will start flashing on and off when the ignition switch is turned OFF once and then turned ON after some seconds.

4) Using SUZUKI scan tool, register Transponder code in Immobilizer Control Module.
5) Using SUZUKI scan tool, register ECM/Immobilizer Control Module code in both Immobilizer Control Module and ECM.
6) Make sure that immobilizer indicator lamp or malfunction indicator lamp (if not equipped with immobilizer indicator lamp) lights when ignition switch is turned OFF once and then ON.
7) If any other Transponder code needs to be registered, repeat above steps 2), 4) and 6).

NOTE:

- **Up to 4 Transponder codes for ignition key with a built-in transponder can be registered.**
- **It is not possible to register the Transponder code which is already registered in Immobilizer Control Module.**

Procedure after ECM Replacement

When ECM was replaced, including when replaced because rechecking by using a known-good ECM was necessary during trouble diagnosis, register ECM/Immobilizer Control Module code in ECM by performing following procedure.

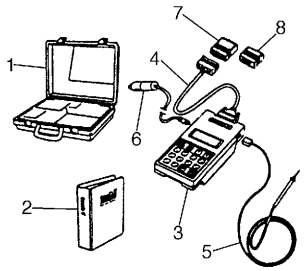
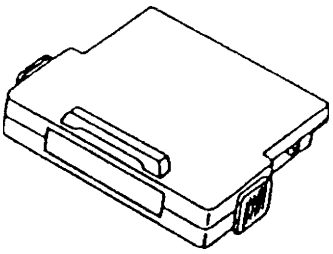
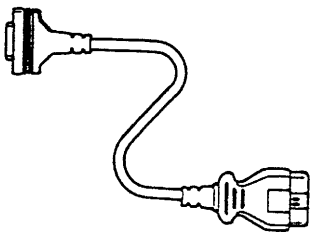
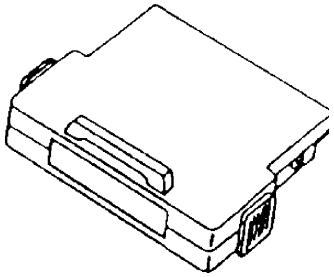
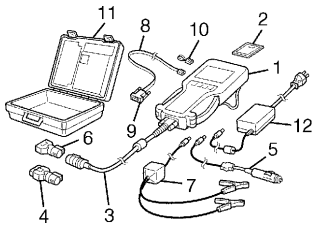
1) Perform steps 1) and 2) described in "How To Register Ignition Key". And then turn ignition switch ON.
2) Using SUZUKI scan tool, register ECM/Immobilizer Control Module code in ECM.

NOTE:

For operation procedure of SUZUKI scan tool, refer to SUZUKI scan tool operator's manual.

3) Make sure that immobilizer indicator lamp or malfunction indicator lamp (if not equipped with immobilizer indicator lamp) lights when ignition switch is turned OFF once and then ON.

Special Tool

 09931-76011 Tech 1A kit (SUZUKI scan tool) See NOTE "A" below.	 Immobilizer cartridge of version 1.1 or more for Tech 1A	 09931-76030 16/14 pin DLC cable for Tech 1A	 Mass storage cartridge of version 1.7 or more for Tech 1A
 Tech 2 kit (SUZUKI scan tool) See NOTE "B" below.			

NOTE:

- **"A" : This kit includes the following items and substitutes for the Tech 2 kit.**
  1. Storage case, 2. Operator's manual, 3. Tech 1A, 4. DLC cable, 5. Test lead/probe, 6. Power source cable, 7. DLC cable adaptor, 8. Self-test adaptor
- **"B" : This kit includes the following items and substitutes for the Tech 1 kit.**
  1. Tech 2, 2. PCMCIA card, 3. DLC cable, 4. SAE16/19 adapter, 5 Cigarette cable, 6. DLC loopback adapter, 7. Battery power cable, 8. RS232 cable, 9. RS232 adapter, 10. RS232 loopback connector, 11. Storage case, 12. Power supply

CANVAS TOP MODEL

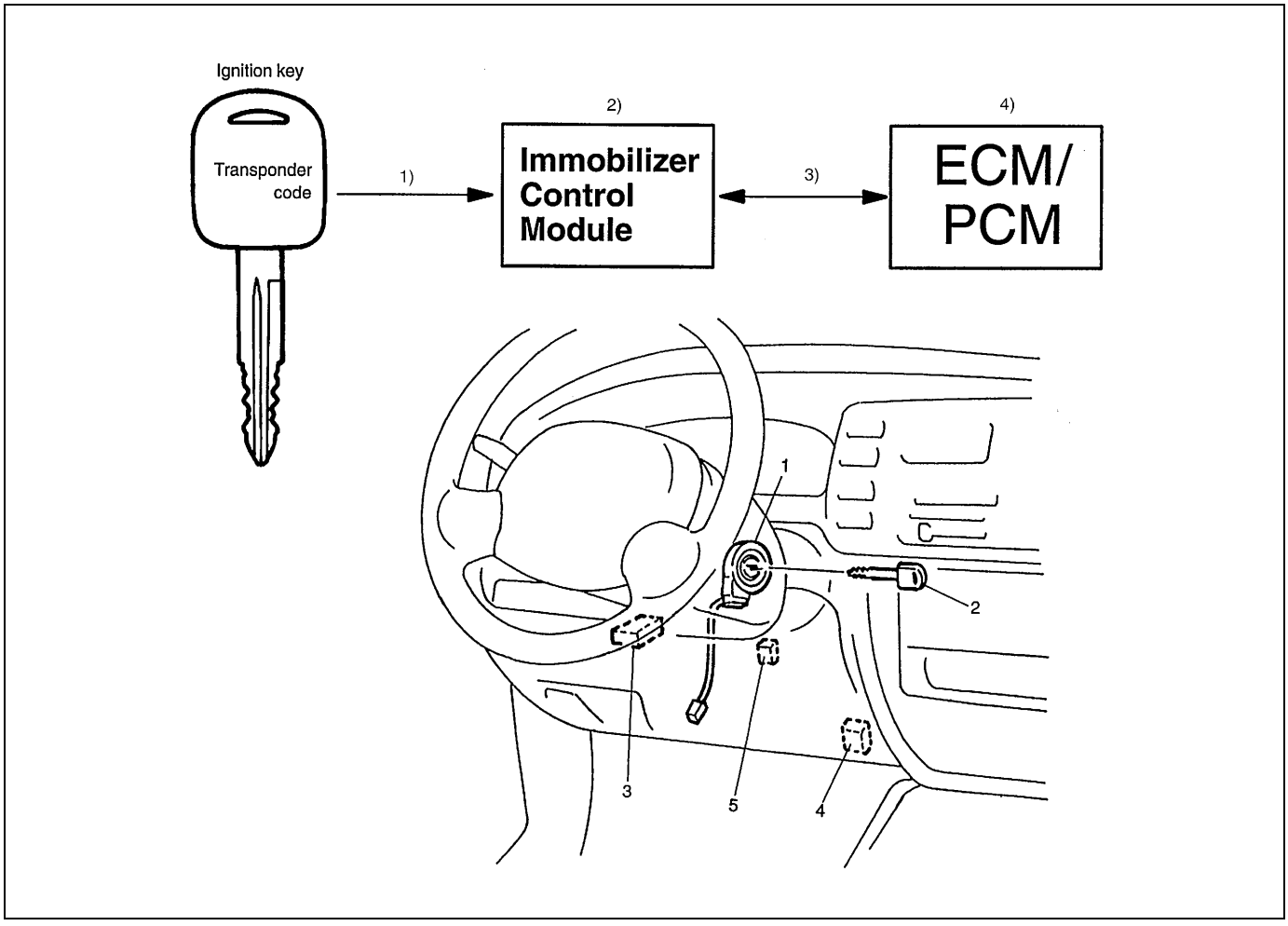
General Description

The immobilizer control system designed to prevent vehicle burglar consists of following components.

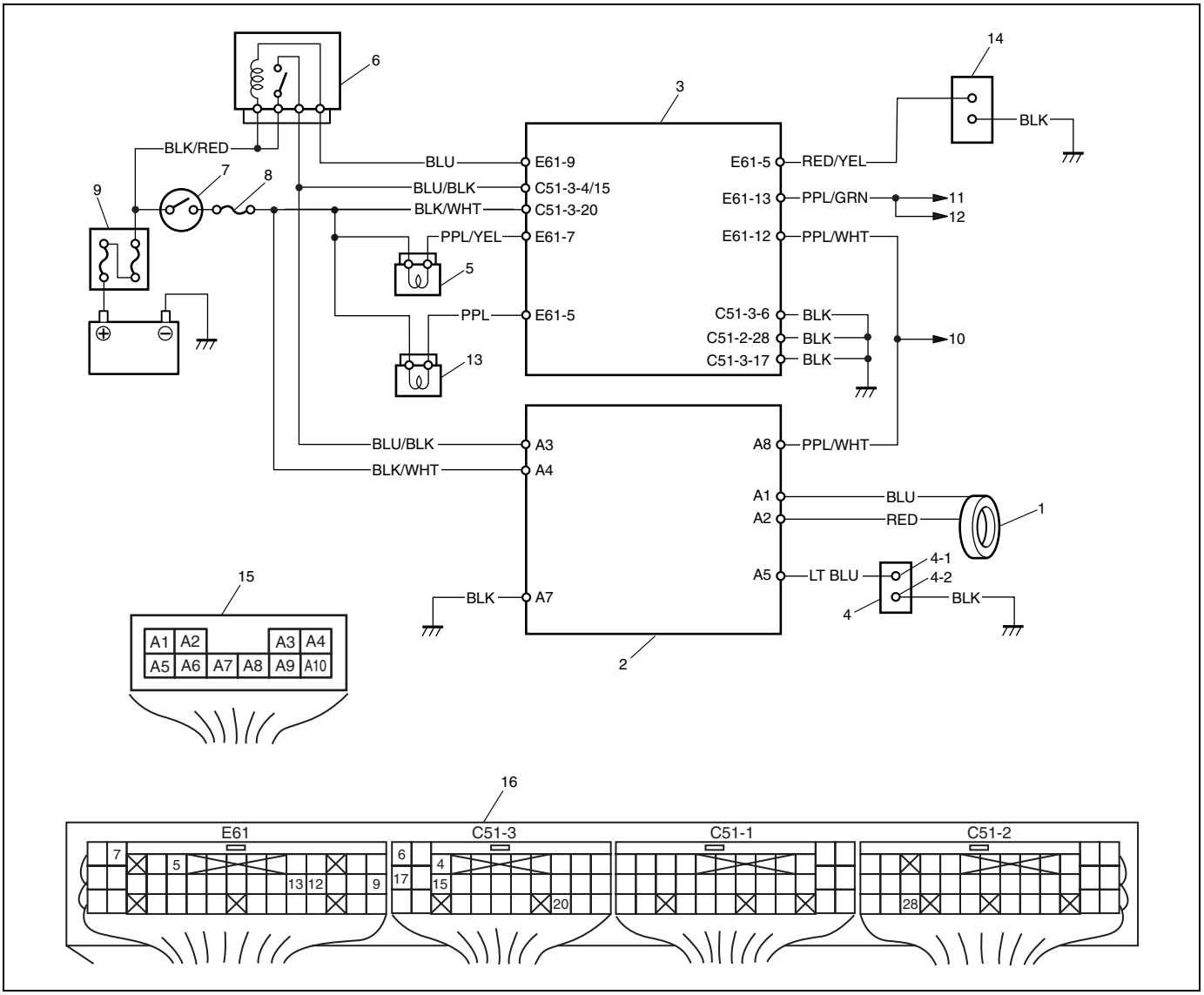
- Engine Control Module (ECM)/Powertrain Control Module (PCM)
- Immobilizer Control Module
- Ignition key (with built-in transponder)
- Coil antenna

Operation of this system is as follows.

1) Each ignition key has its own code (Transponder code) stored in memory. When the ignition switch is turned ON, Immobilizer Control Module tries to read the Transponder code through the coil antenna installed to the steering lock assembly.
2) Immobilizer Control Module compares the Transponder code read in (1) and that registered in Immobilizer Control Module and checks if they match.
3) When it is confirmed that two Transponder codes match each other as described above, Immobilizer Control Module and ECM/PCM check if ECM/Immobilizer Control Module codes registered in them respectively match.
4) Only when it is confirmed that ECM/Immobilizer Control Module codes match, the engine starts running. If Transponder codes in Step (2) or ECM/Immobilizer Control Module codes in Step (3) do not match, ECM/PCM will stop operation of the injector and ignition of spark plug.

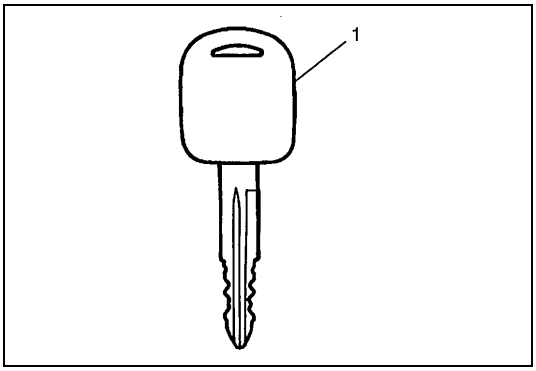


1. Coil antenna	3. Immobilizer Control Module	5. Immobilizer diagnostic coupler
2. Ignition key	4. Data link connector (DLC)	



1. Coil antenna	5. Malfunction indicator lamp	11. To #7-pin in Data link connector
2. Immobilizer Control Module	6. Main relay	12. To ABS control module
3. ECM/PCM	7. Ignition switch	13. Immobilizer indicator lamp (Vehicle not equipped with diagnosis connector)
4. Immobilizer diagnostic coupler	8. Fuse	14. Diagnosis connector (Vehicle not equipped with immobilizer indicator lamp)
4-1. Diagnostic output terminal	9. Main fuse	15. Terminal arrangement of Immobilizer Control Module coupler (Viewed from harness side)
4-2. Ground terminal	10. To #9-pin in Data link connector	16. Terminal arrangement of ECM/PCM coupler (Viewed from harness side)

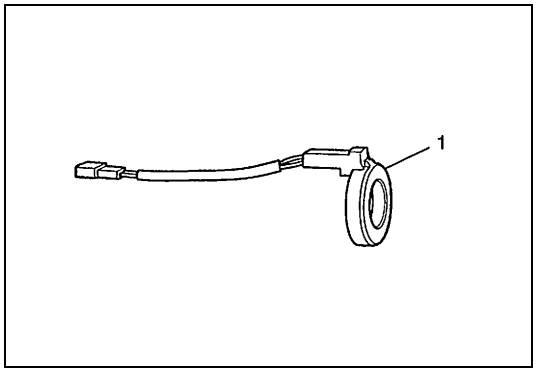
Ignition Key



The ignition key for the immobilizer control system has a built-in transponder. Each transponder in the key has an each transmitting code (Transponder code). The code will transmitted from the key via the coil antenna to Immobilizer Control Module when the ignition switch is turned ON.

1. Ignition key with built-in transponder

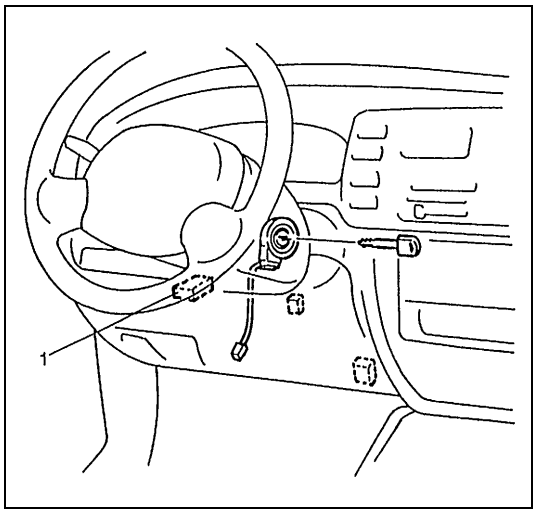
Coil Antenna



The coil antenna is installed to the steering lock assembly. As it is energized by Immobilizer Control Module, it transmits the transponder code of the ignition key to Immobilizer Control Module.

1. Coil antenna

Immobilizer Control Module



Immobilizer Control Module is installed to the underside of the instrument panel at the driver's seat side.
As main functions, Immobilizer Control Module checks matching not only between the Transponder Code transmitted from the ignition key and that registered in Immobilizer Control Module (Up to 4 different Transponder codes can be registered.) but also between the ECM/Immobilizer Control Module code transmitted from ECM/PCM and that registered in Immobilizer Control Module. In addition, it has an on-board diagnostic system (self-diagnosis function) which is described in “On-Board Diagnostic System (Self-Diagnosis Function)” in this section.

1. Immobilizer Control Module

ECM/PCM

As main functions, ECM/PCM not only checks matching of ECM/Immobilizer Control Module code but also has an on-board diagnostic system (self-diagnosis function) as described in “On-Board Diagnostic System (Self-Diagnosis Function)” in this section.
For installation position of ECM/PCM, refer to “Electronic Control System” in Section 6E1 or 6E2.

On-Board Diagnostic System (Self-Diagnosis Function)

Immobilizer Control Module and ECM/PCM diagnose troubles which may occur in the area including the following parts when the ignition switch is ON.

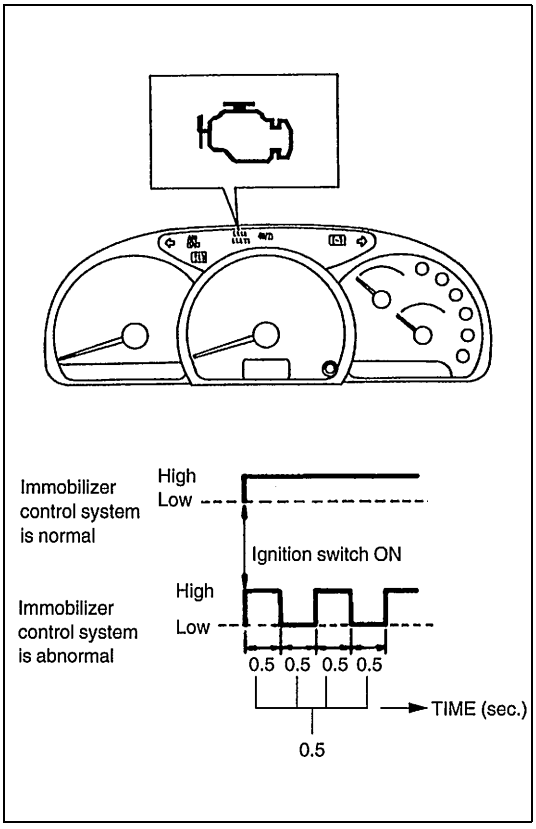
ECM/PCM :

- ECM/Immobilizer Control Module code
- Serial data link circuit
- ECM/PCM

Immobilizer Control Module :

- Transponder code
- Coil antenna
- ECM/Immobilizer Control Module code
- Serial data link circuit
- Immobilizer Control Module
- Ignition signal

<Vehicle equipped with diagnosis connector>

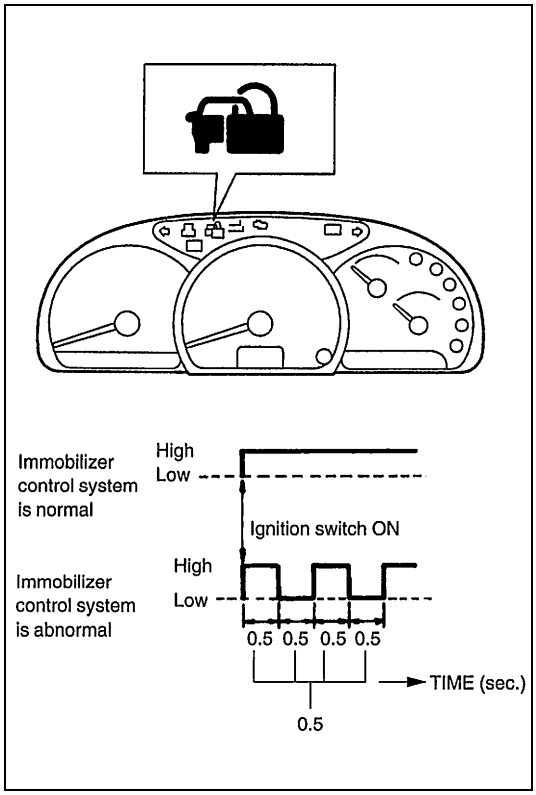


With the diagnosis switch terminal of diagnosis connector for ECM/PCM not grounded, the ignition switch turned ON (but the engine at stop) and regardless of the condition of the electronic fuel injection system, ECM/PCM indicates whether a trouble has occurred in the immobilizer control system or not by causing the malfunction indicator lamp to flash or turn ON.

Malfunction indicator lamp is ON :
No trouble exists in the immobilizer control system.
Malfunction indicator lamp is flashing :
ECM/PCM or Immobilizer Control Module has detected some trouble in the immobilizer control system.

NOTE:

As soon as the ignition switch is turned ON, ECM/PCM and Immobilizer Control Module diagnose if a trouble has occurred in the immobilizer control system. While the diagnosis is being made, the malfunction indicator lamp stays ON and if the diagnosis result is "abnormal", it immediately changes to flashing but if the result is "normal", it remains ON. Diagnosis takes about 3 seconds at maximum.



<Vehicle not equipped with diagnosis connector>

With the ignition switch turned ON (but the engine at stop) regardless of the condition of the electronic fuel injection system, ECM/PCM indicates whether a trouble has occurred in the immobilizer control system or not by causing the immobilizer indicator lamp to flash or turn ON.

Immobilizer indicator lamp is ON :
No trouble exists in the immobilizer control system.
Immobilizer indicator lamp is flashing :
ECM/PCM or Immobilizer Control Module has detected some trouble in the immobilizer control system.

NOTE:

As soon as the ignition switch is turned ON, ECM/PCM and Immobilizer Control Module diagnose if a trouble has occurred in the immobilizer control system. While the diagnosis is being made, the Immobilizer indicator lamp stays ON and if the diagnosis result is "abnormal", it immediately changes to flashing but if the result is "normal", it remains ON. Diagnosis takes about 3 seconds at maximum.

When ECM/PCM and Immobilizer Control Module detects a trouble which has occurred in the above areas, it stores DTC corresponding to the exact trouble area in ECM/PCM and Immobilizer Control Module memory.

DTCs stored in memory of each controller (Immobilizer Control Module and ECM/PCM) can be read by using the procedure described in "Diagnostic Trouble Code Check (Immobilizer Control Module)" and "Diagnostic Trouble Code Check (ECM/PCM)" in this section.

Diagnosis

ECM/PCM and Immobilizer Control Module have on-board diagnostic system (a system self-diagnosis function) as described previously.
Investigate where the trouble is by referring to “Diagnostic Flow Table” and “Diagnostic Trouble Code Table” on later pages.

Precautions in Diagnosing Troubles

[PRECAUTIONS IN IDENTIFYING DIAGNOSTIC TROUBLE CODE]

ECM/PCM

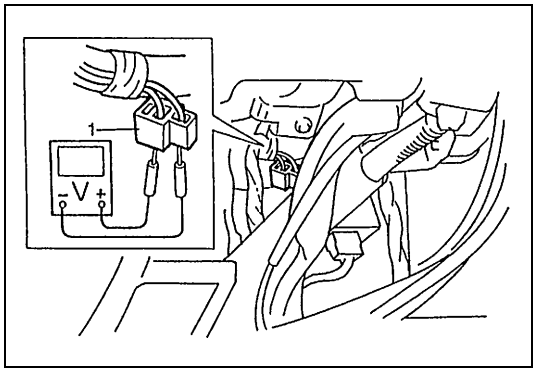
<Vehicle equipped with diagnosis connector>

- Before identifying diagnostic trouble code indicated by malfunction indicator lamp, don't disconnect couplers from ECM/PCM, battery cable from battery, ECM/PCM ground wire harness from engine.
  Such disconnection will clear trouble codes for electronic fuel injection system stored in memory of ECM/PCM.
- If abnormality or malfunction lies in two or more areas, malfunction indicator lamp indicates applicable codes three times each.
  And flashing of these codes is repeated as long as diagnosis terminal is grounded and ignition switch is held at ON position.
- When ECM/PCM detects a trouble in both electronic fuel injection system and immobilizer control system, malfunction indicator lamp indicates trouble codes of both systems alternately while the ignition switch is turned ON and the diagnosis terminal is grounded.
- Take a note of diagnostic trouble code indicated first.

<Vehicle not equipped with diagnosis connector>

- Before identifying diagnostic trouble code indicated through Suzuki scan tool, don't disconnect couplers from ECM/PCM, battery cable from battery, ECM/PCM ground wire harness from engine.
  Such disconnection will clear trouble codes for electronic fuel injection system stored in memory of ECM/PCM.
- Take a note of diagnostic trouble code indicated first.

IMMOBILIZER CONTROL MODULE



- Take a note of diagnostic trouble code indicated first.

1. Immobilizer diagnostic coupler

[INTERMITTENT TROUBLES]

<Vehicle equipped with diagnosis connector>

- There are cases where output of diagnostic output terminal and/or malfunction indicator lamp indicate a diagnostic trouble code representing a trouble which occurred only temporarily and has gone. In such case, it may occur that good parts are replaced unnecessarily. To prevent such accident, be sure to follow instructions given below when checking by using “Diagnostic Flow Table”.
  - When trouble can be identified, it is not an intermittent one : Check coil antenna, ignition key, wires and each connection and if they are all in good condition, substitute a known-good ECM/PCM and recheck.
  - When trouble can not be identified but output of diagnostic output terminal and/or malfunction indicator lamp indicate a trouble code :
    Diagnose trouble by using that code No. and if ignition key, coil antenna, wires and each connection are all in good condition, turn OFF ignition switch and then ON.

Then check what malfunction indicator lamp and/or output of diagnostic output terminal indicate.

Only when they indicate trouble code again, substitute a known-good ECM/PCM or Immobilizer Control Module and check again.

If they indicate not trouble code but normal code, it means that an intermittent trouble did occur and has gone. In this case, check wires and connections carefully again.

<Vehicle not equipped with diagnosis connector>

- There are cases where output of diagnostic output terminal and/or SUZUKI scan tool indicates a diagnostic trouble code representing a trouble which occurred only temporarily and has gone. In such case, it may occur that good parts are replaced unnecessarily. To prevent such accident, be sure to follow instructions given below when checking by using "Diagnostic Flow Table".
  - When trouble can be identified, it is not an intermittent one : Check coil antenna, ignition key, wires and each connection and if they are all in good condition, substitute a known-good ECM/PCM and recheck.
  - When trouble can not be identified but output of diagnostic output terminal and/or SUZUKI scan tool indicates a trouble code :
    Diagnose trouble by using that code No. and if ignition key, coil antenna, wires and each connection are all in good condition, turn OFF ignition switch and then ON.

Then check what SUZUKI scan tool and/or output of diagnostic output terminal indicates.
Only when they indicate trouble code again, substitute a known-good ECM/PCM or Immobilizer Control Module and check again.
If they indicate not trouble code but normal code, it means that an intermittent trouble did occur and has gone. In this case, check wires and connections carefully again.

[NOTES ON SYSTEM CIRCUIT INSPECTION]
Refer to "Precautions for Electrical Circuit Service" and "Intermittents and Poor Connection" in Section 0A.

[Precaution after replacing ECM/PCM or Immobilizer Control Module]

- When ECM/PCM was replaced, including when replaced because rechecking by using a known-good ECM/PCM was necessary during trouble diagnosis, the ECM/Immobilizer Control Module code must be registered in ECM/PCM and Immobilizer Control Module by performing procedure described in "Procedure after ECM/PCM Replacement" in this section. If it is not registered, the engine would not start and accurate trouble diagnosis would not be assured.
- When Immobilizer Control Module was replaced, including when replaced because rechecking by using a known-good Immobilizer Control Module was necessary during trouble diagnosis, the Transponder code and ECM/Immobilizer Control Module code must be registered in Immobilizer Control Module and ECM/Immobilizer Control Module code in ECM/PCM by performing procedure described in "Procedure after Immobilizer Control Module Replacement" in this section. If they are not registered, the engine would not start and accurate trouble diagnosis would not be assured.

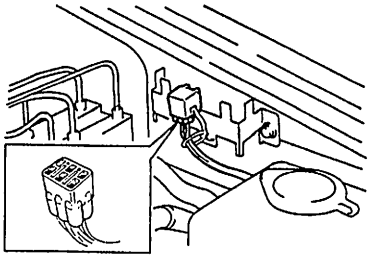
Diagnostic Flow Table

<Vehicle equipped with diagnosis connector>

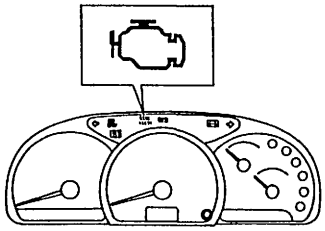
Step	Action	Yes	No
1	1) Make sure that diagnosis switch terminal in diagnosis connector is not grounded by service wire. See Fig. 1. 2) Check malfunction indicator lamp while ignition switch is ON (but without starting engine). See Fig. 2. Dose malfunction indicator lamp flash?	Go to Step 3.	• If malfunction indicator lamp remains ON, go to Step 2. • If malfunction indicator lamp remains OFF, go to "Malfunction Indicator Lamp Check" in Section 6.
2	1) Using service wire (2), ground diagnosis switch terminal (3) in diagnosis connector (1). See Fig. 3. Dose malfunction indicator lamp flash?	Immobilizer control system is in good condition.	Go to "Malfunction Indicator Lamp Check" in Section 6.
3	Dose malfunction indicator lamp flash as Fig. 4?	Go to Step 4.	Go to "Malfunction Indicator Lamp Check" in Section 6.
4	1) Check DTC stored in Immobilizer Control Module referring to "Diagnosis Trouble Code Check (Immobilizer Control Module)" in this section. Is there any DTC(s)?	Go to flow table for DTC No.	Go to Step 5.
5	1) Check DTC stored in ECM/PCM referring to "Diagnostic Trouble Code Check (ECM/PCM)" in this section. Is there any DTC(s)?	Go to flow table for DTC No.	Substitute a known-good ECM/PCM and recheck. NOTE : After replacing with a known-good ECM/PCM, register ECM/Immobilizer Control Module code in ECM/PCM by performing procedure described in "Procedure after ECM/PCM Replacement" section.

[A] Fig. 1 for Step 1 / [B] Fig. 2 for Step 1 / [C] Fig. 3 for Step 2 / [D] Fig. 4 for Step 3

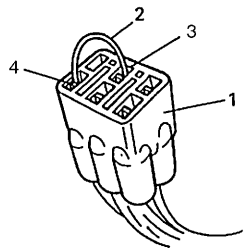
[A]



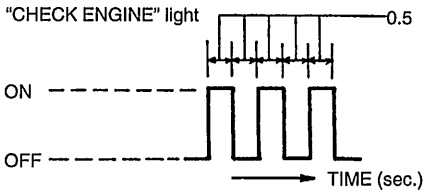
[B]



[C]



[D]



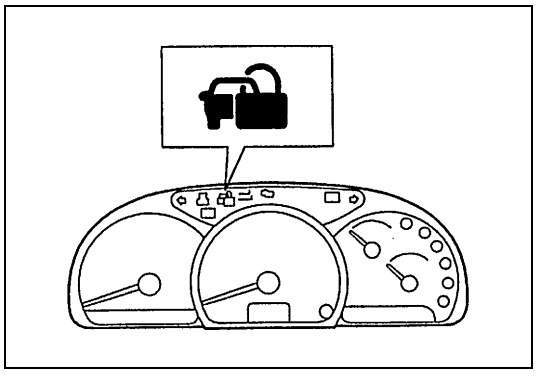
4. Ground terminal

Diagnostic Flow Table

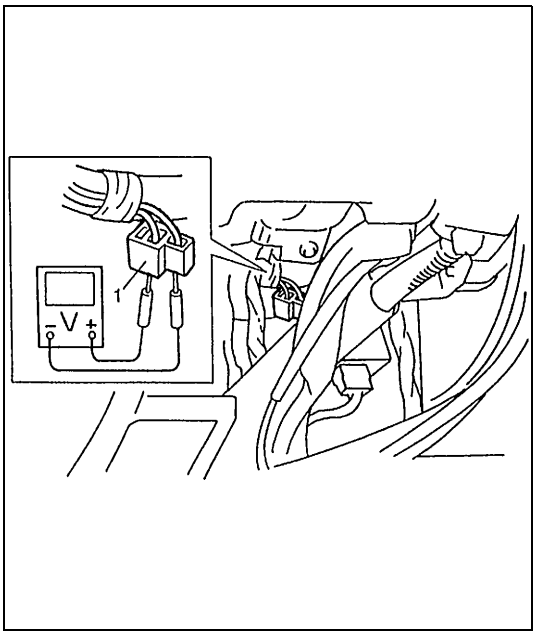
<Vehicle not equipped with diagnosis connector>

Step	Action	Yes	No
1	1) Check immobilizer indicator lamp while ignition switch is ON (but without starting engine). See Fig. 1. Dose immobilizer indicator lamp flash?	Go to Step 3.	• If immobilizer indicator lamp remains ON, go to Step 2. • If immobilizer indicator lamp remains OFF, go to "Immobilizer Indicator Lamp Check" in this section.
2	1) Check DTC stored in ECM/PCM referring to "Diagnostic Trouble Code Check (ECM/PCM)" in this section. Is there any DTC(s)?	Go to "Immobilizer Indicator Lamp Check" in this section.	Immobilizer control system is in good condition.
3	1) Check DTC stored in Immobilizer Control Module referring to "Diagnostic Trouble Code Check (Immobilizer Control Module)" in this section. Is there any DTC(s)?	Go to flow table for DTC No.	Go to Step 4.
4	1) Check DTC stored in ECM/PCM referring to "Diagnostic Trouble Code Check (ECM/PCM)" in this section. Is there any DTC(s) for immobilizer control system?	Go to flow table for DTC No.	Substitute a known-good ECM/PCM and recheck. NOTE : After replacing with a known-good ECM/PCM, register ECM/Immobilizer Control Module code in ECM/PCM by performing procedure described in "Procedure after ECM/PCM Replacement" section.

FIg. 1 for Step 1



Diagnostic trouble code (DTC) check (Immobilizer Control Module)

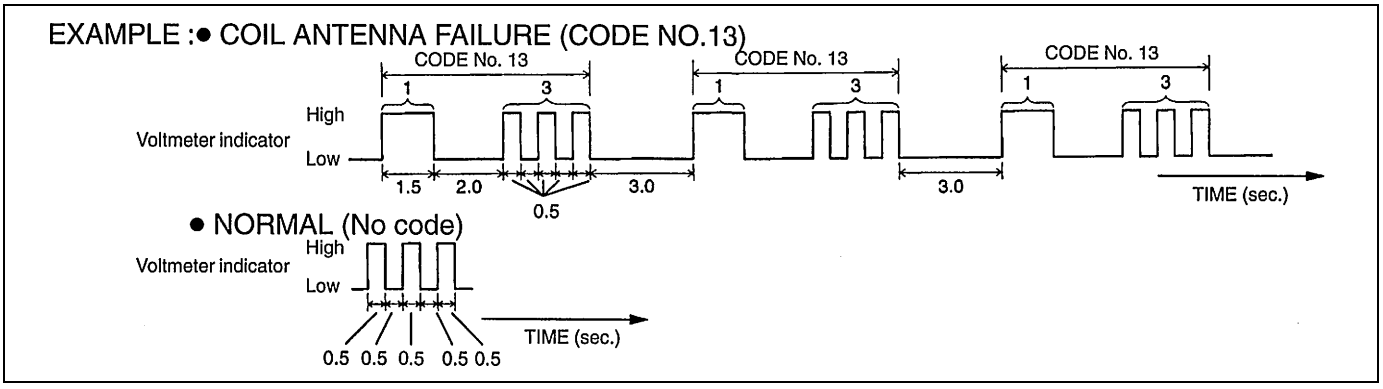


1) Using analog type voltmeter, connect positive probe to diagnostic output terminal and negative probe to ground of immobilizer diagnostic coupler with ignition switch turned ON.
2) Read deflection of voltmeter indicator which represents DTC as shown in example below and write it down. For details of DTC, refer to Immobilizer Control Module side in “Diagnostic Trouble Code Table”.
   If voltmeter indicator dose not deflect, go to “Diagnostic Flow Table A”.

NOTE:

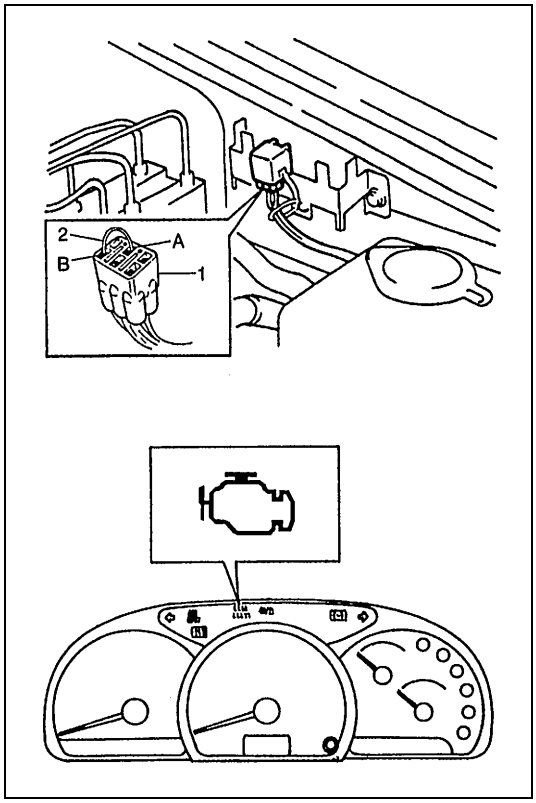
If abnormality or malfunction lies in two or more areas, voltmeter indicates applicable codes three times each.

1. Immobilizer diagnostic coupler



Diagnostic trouble code (DTC) check (ECM/PCM)

[Not using SUZUKI scan tool] (Vehicle equipped with diagnosis connector)



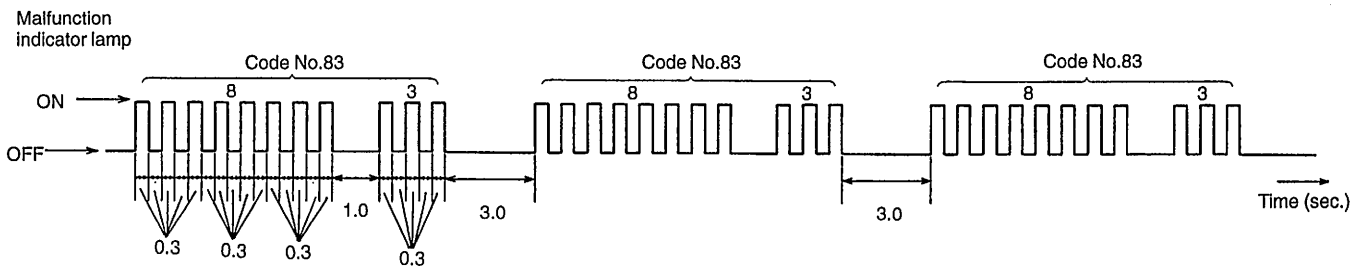
1) Using service wire, ground diagnostic switch terminal in diagnosis connector.
2) Read DTC from flashing pattern of malfunction indicator lamp as shown in example below and write it down. For details of DTC, refer to ECM/PCM side in "Diagnostic Trouble Code Table".
   If lamp remains ON, go to "Malfunction Indicator Lamp Check" in Section 6.

NOTE:

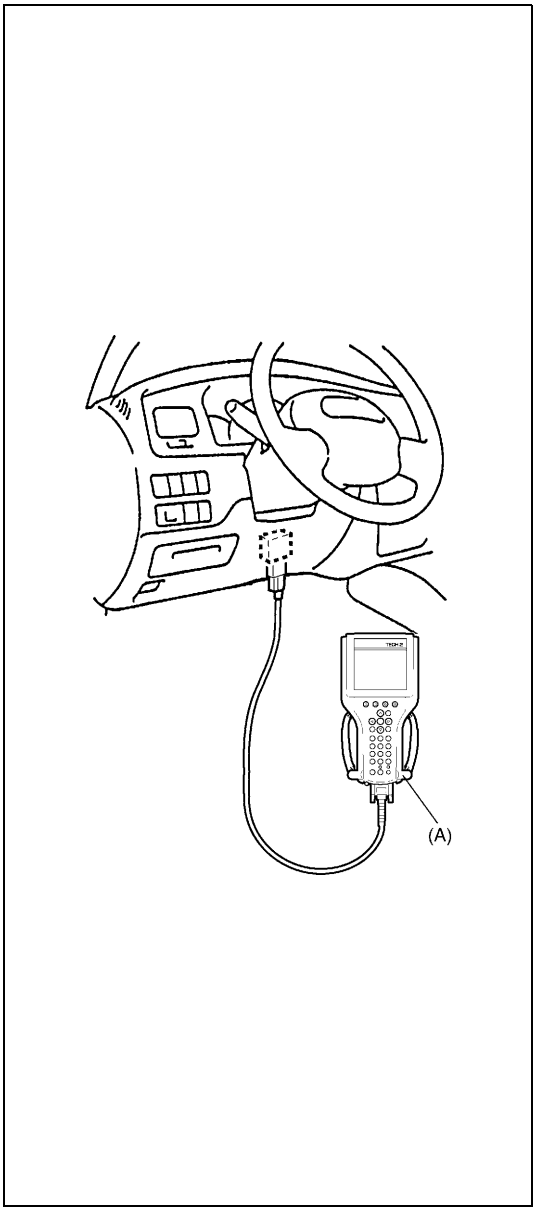
If abnormality or malfunction lies in two or more areas, malfunction indicator lamp indicates applicable codes three times each.
And flashing of these codes is repeated as long as diagnosis terminal is grounded and ignition switch is held at ON position.

1.	Diagnosis connector
2.	Service wire
A :	Diagnosis switch terminal
B :	Ground terminal

EXAMPLE: When serial data link wire is defective (Code No.83)



3) After completing the check, turn ignition switch OFF and disconnect service wire from diagnosis connector.



[Using SUZUKI scan tool]

1) Turn ignition switch OFF.
2) After setting cartridge to SUZUKI scan tool, connect it to data link connector (DLC) located on underside of instrument panel at driver's seat side.

Special tool
(A) : SUZUKI scan tool

3) Turn ignition switch ON.
4) Read DTC according to instructions displayed on SUZUKI scan tool and print it or write it down. Refer to SUZUKI scan tool operator's manual for further details.
   If communication between SUZUKI scan tool and ECM/PCM is not possible, check if SUZUKI scan tool is communicable by connecting it to ECM/PCM in another vehicle. If communication is possible in this case, SUZUKI scan tool is in good condition. Then check data link connector and serial data line (circuit) in the vehicle with which communication was not possible.

NOTE:

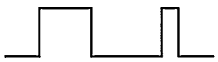
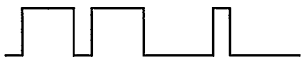
- **When reading DTC stored in ECM/PCM using SUZUKI scan tool, select "ECM" from the applications menu and "SUZUKI mode" from the communication mode menu displayed on SUZUKI scan tool.**
- **If ECM/PCM detects a trouble in both electric fuel injection system and immobilizer control system, SUZUKI scan tool indicates trouble codes of both systems using "SUZUKI mode" of ECM application.**

5) After completing the check, turn ignition switch OFF and disconnect SUZUKI scan tool from data link connector (DLC).

1. Data link connector (DLC)

Diagnostic Trouble Code Table

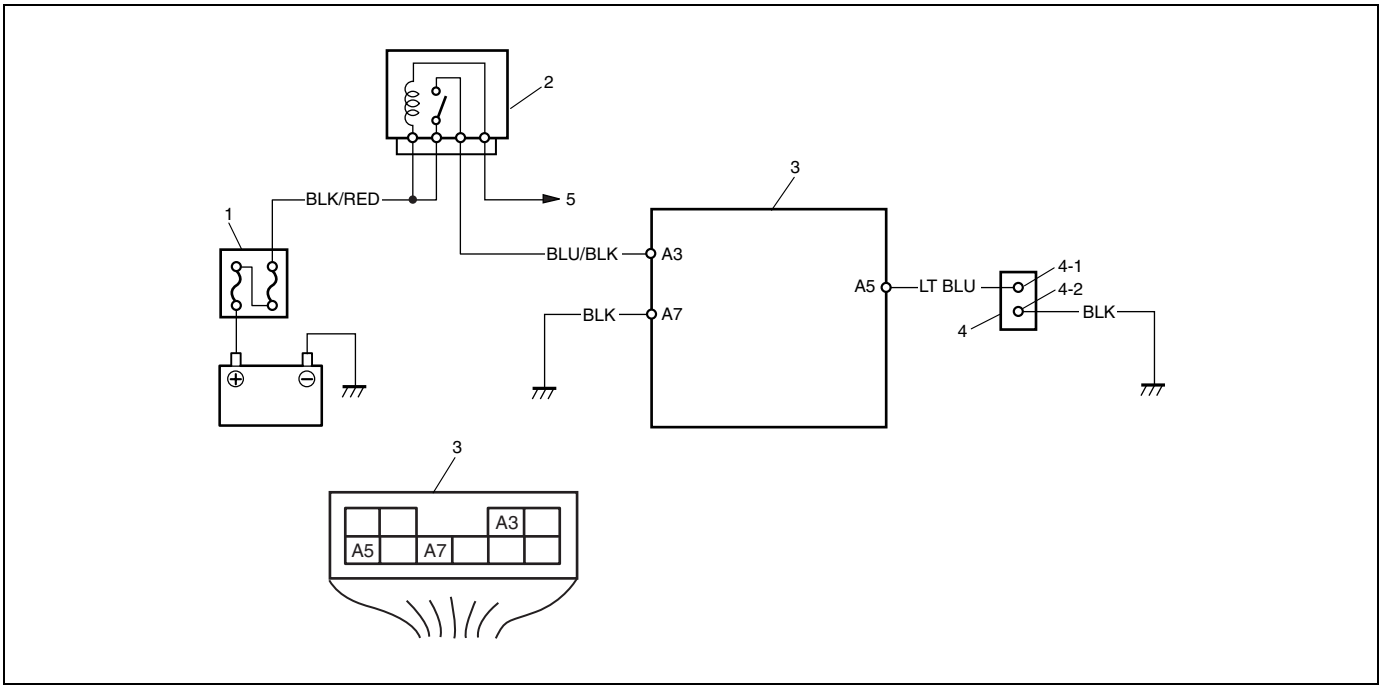
IMMOBILIZER CONTROL MODULE SIDE

DIAGNOSTIC TROUBLE CODE		DIAGNOSTIC AREA	DIAGNOSIS
NO.	VOLTMETER INDICATION		
–		Normal (No code)	This code appears when none of the other codes are identified.
11		Transponder code	Diagnose trouble according to “Diagnostic Flow Table” corresponding to each code No.
31			
12		Immobilizer Control Module	
13		Coil antenna or ignition key with built-in transponder	
21		ECM/Immobilizer Control Module code	
22		Ignition switch circuit	
23		Serial data link wire	

ECM/PCM SIDE

DTC (indicated on Suzuki scan tool)	DTC (indicated by MIL)	Malfunction Indicator lamp (MIL) flashing pattern	DIAGNOSTIC AREA	DIAGNOSIS
NO DTC	12		Normal	This code appears when it is confirmed that none of other trouble codes is set for immobilizer control system or electronic fuel injection system.
P1623	81		ECM/Immobilizer Control Module code	Diagnose trouble according to “Diagnostic Flow Table” corresponding to each code No.
P1620	84			
P1622	82		ECM/PCM	
P1621	83		Serial data link wire	

Table A DTC Is Not Output from Diagnostic Output Terminal



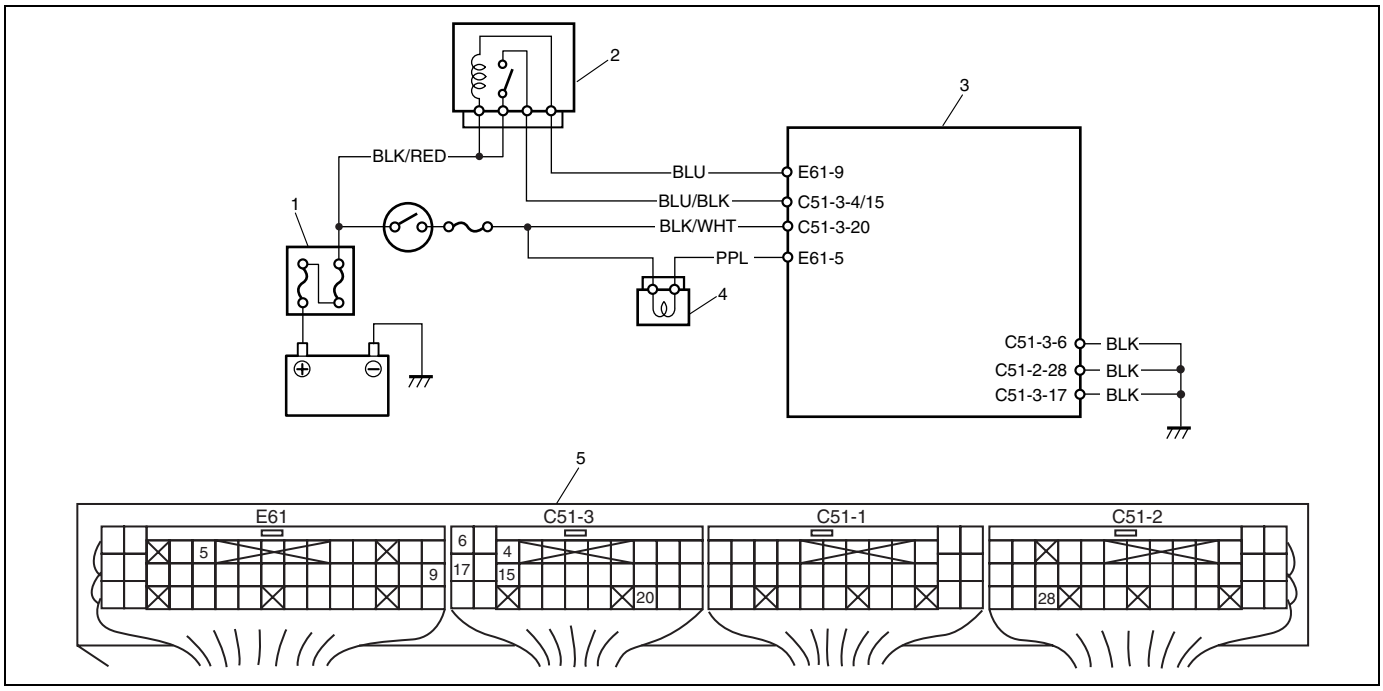
1. Main fuse	3. Terminal arrangement of Immobilizer Control Module coupler (viewed from harness side)	4-1. Ground terminal	5. To ECM/PCM
2. Main relay	4. Immobilizer diagnostic coupler	4-2. Diagnostic output terminal	

Step	Action	Yes	No
1	Check voltage between A3 terminal and body ground with ignition switch turned ON. Is it 10 – 14V?	Go to Step 2.	"BLU/BLK" wire open.
2	1) Connect voltmeter between A5 terminal and body ground. 2) Does voltmeter indicator deflect?	Go to Step 3.	• Poor A3, A5 or A7 connection. • "BLK" wire of A7 terminal open. • "LT BLU" wire between A5 terminal and diagnostic output terminal of immobilizer diagnostic coupler short. If wire and connections are OK, substitute a known-good Immobilizer Control Module and recheck (See NOTE).
3	1) Connect voltmeter between diagnostic output terminal of immobilizer diagnostic coupler and body ground. 2) Is it possible to read DTC by checking deflection of voltmeter indicator?	"BLK" wire of ground terminal for immobilizer diagnostic coupler open.	"LT BLU" wire between A5 terminal and diagnostic output terminal of immobilizer diagnostic coupler open.

NOTE:

After replacing with a known-good Immobilizer Control Module, register ECM/Immobilizer Control Module code in ECM/PCM and Transponder code and ECM/Immobilizer Control Module code in Immobilizer Control Module by performing procedure described in "Procedure after Immobilizer Control Module Replacement" section.

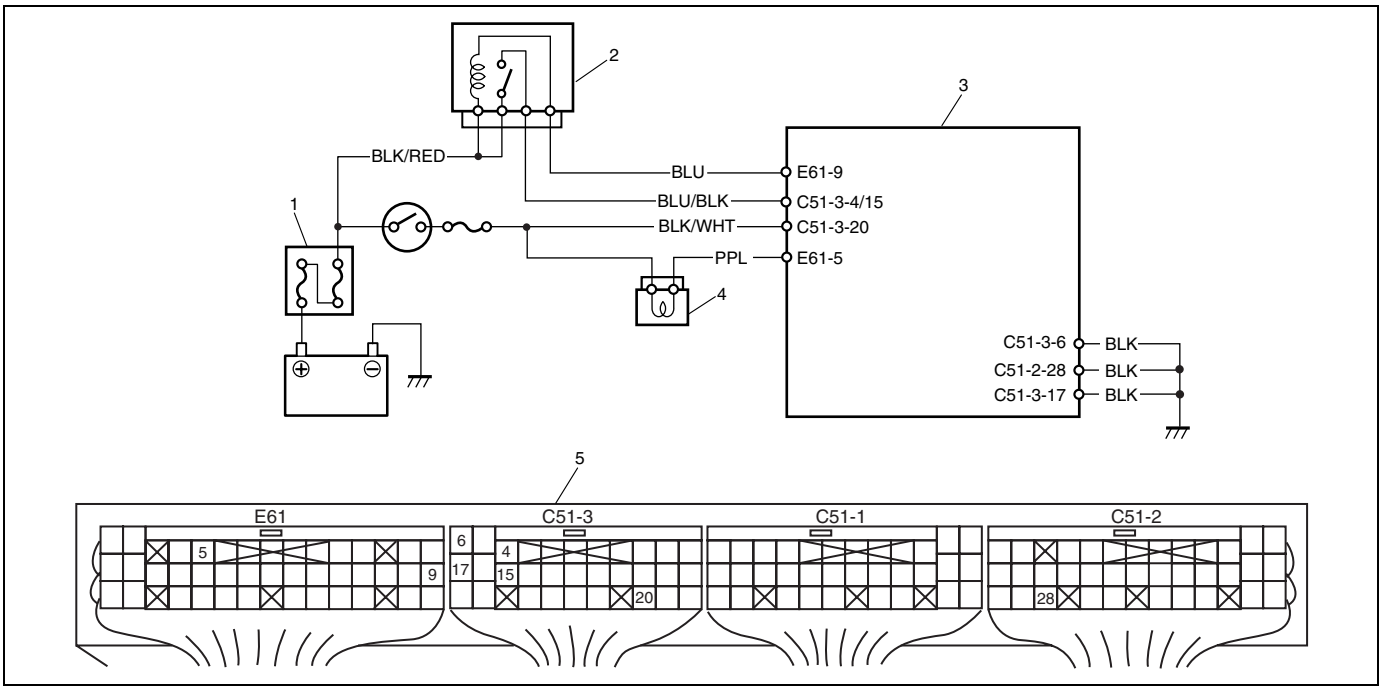
Table B Immobilizer Indicator Lamp Check (Immobilizer Indicator Lamp Dose Not Light at Ignition)



1. Main fuse	3. ECM/PCM	5. Terminal arrangement of ECM/PCM coupler (Viewed from harness side)
2. Main relay	4. Immobilizer indicator lamp (Vehicle not equipped with diagnosis connector)	

Step	Action	Yes	No
1	1) Turn ignition switch ON. Do other indicator/warning lights in combination meter come ON?	Go to Step 2.	"IG" fuse blown, main fuse blown, ignition switch malfunction, "BLK/WHT" circuit between "IG" fuse and combination meter or poor coupler connection at combination meter.
2	1) Turn ignition switch OFF and disconnect connectors from ECM/PCM. 2) Check for proper connection to ECM/PCM at terminal E61-5. 3) If OK, then using service wire, ground terminal E61-5. Does immobilizer indicator lamp turn on at ignition switch ON?	Substitute a known-good ECM/PCM and recheck.	Bulb burned out or "BLU" wire circuit open.

Table C Immobilizer Indicator Lamp Check (Immobilizer Indicator Lamp Remains on After Engine Starts)



1. Main fuse	3. ECM/PCM	5. Terminal arrangement of ECM/PCM coupler (Viewed from harness side)
2. Main relay	4. Immobilizer indicator lamp (Vehicle not equipped with diagnosis connector)	

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect couplers from ECM/PCM. Does immobilizer indicator lamp turn ON at ignition switch ON?	"PPL" wire shorted to ground circuit.	Substitute a known-good ECM/PCM and recheck.

DTC11 Transponder Code Not Matched

DESCRIPTION

Immobilizer Control Module checks if Transponder code transmitted from ignition key and that registered in Immobilizer Control Module match when ignition switch is ON. If they do not, this DTC is set.

INSPECTION

Register ignition key with built-in transponder by using SUZUKI scan tool and performing following steps.

1) Register Transponder code in Immobilizer Control Module by performing procedure described in "How to register ignition key" section.
2) Turn ignition switch OFF, then turn it ON and check that DTC11 is not set.

DTC31 Transponder Code Not Registered

DESCRIPTION

Immobilizer Control Module checks if Transponder code transmitted from ignition key and that registered in Immobilizer Control Module match when ignition switch is ON. If there is no Transponder code registered in Immobilizer Control Module, this DTC is set.

INSPECTION

Register ignition key with built-in transponder by using SUZUKI scan tool and performing following steps.

1) Register Transponder code in Immobilizer Control Module by performing procedure described in "How to register ignition key" section.
2) Turn ignition switch OFF, then turn it ON and check that DTC31 is not set.

DTC12 Fault in Immobilizer Control Module

DESCRIPTION

This DTC is set when an internal fault is detected in Immobilizer Control Module.

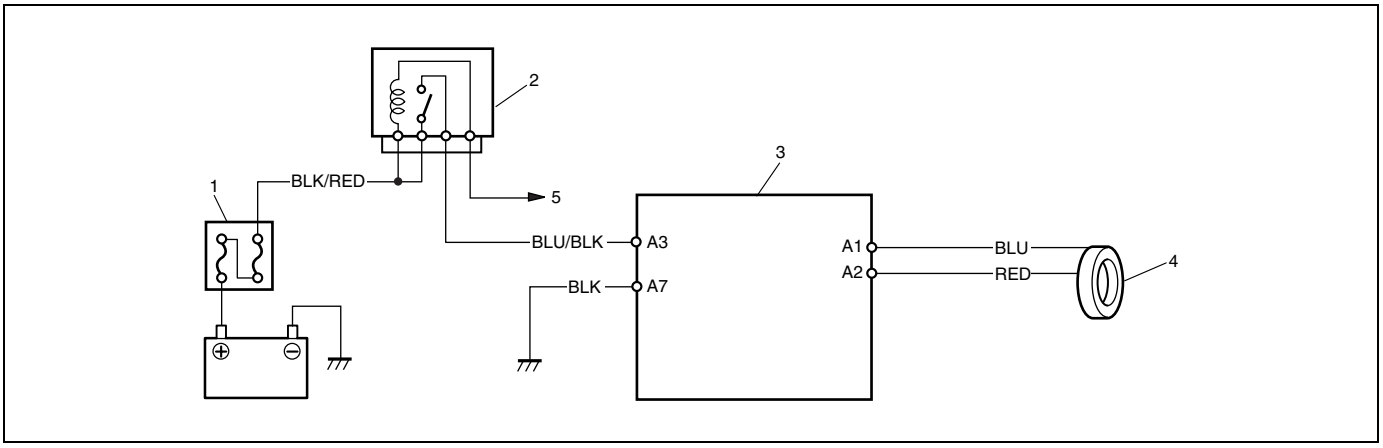
INSPECTION

Step	Action	Yes	No
1	1) Ignition switch OFF. 2) Disconnect connectors from Immobilizer Control Module. 3) Check for proper connection to Immobilizer Control Module at all terminals. Are they in good condition?	Substitute a known-good Immobilizer Control Module and recheck. (See NOTE.)	Repair or replace.

NOTE:

After replacing with a known-good Immobilizer Control Module, register ECM/Immobilizer Control Module code in ECM/PCM and Transponder code and ECM/Immobilizer Control Module code in Immobilizer Control Module by performing procedure described in "Procedure after Immobilizer Control Module Replacement" section.

DTC13 No Transponder Code Transmitted or Coil Antenna Opened/Shorted



1. Main fuse	3. Immobilizer Control Module	5. To ECM/PCM
2. Main relay	4. Coil antenna	

DESCRIPTION

Immobilizer Control Module energizes the coil antenna when the ignition switch is ON and reads Transponder code from the ignition key. When Immobilizer Control Module cannot read Transponder code from the ignition key even when the coil antenna is energized, this DTC is set.

INSPECTION

Step	Action	Yes	No
1	Does ignition key being used have built-in transponder? (See Fig. 1.)	Go to Step 2.	Replace ignition key with built-in transponder and follow “Diagnostic Flow Table” again.
2	1) Disconnect coil antenna coupler (1) with ignition switch turned OFF. 2) Is there continuity between coil antenna coupler terminals A and B? (See Fig. 2.)	Go to Step 3.	Coil antenna open.
3	Measure resistance between terminals of coil antenna coupler (1) and body ground. (See Fig. 3.) Is it ∞ (infinity) Ω?	Go to Step 4.	Coil antenna shorted to ground.
4	1) With coil antenna coupler disconnected, disconnect Immobilizer Control Module coupler (1). 2) Measure resistance between coil antenna terminals of Immobilizer Control Module coupler. (See Fig. 4.) Is it ∞ (infinity) Ω?	Go to Step 5.	“BLU” wire shorted to “RED” wire.
5	Measure resistance between terminal A1 of Immobilizer Control Module coupler (1) and body ground. (See Fig. 5.) Is it ∞ (infinity) Ω?	Go to Step 6.	“BLU” wire shorted to ground.
6	Measure resistance between terminal A2 of Immobilizer Control Module coupler (1) and body ground. (See Fig. 6.) Is it ∞ (infinity) Ω?	Go to Step 7.	“RED” wire shorted to ground.

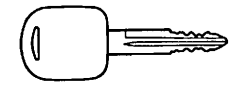
Step	Action	Yes	No
7	1) Connect coil antenna coupler. 2) Is there continuity between Immobilizer Control Module coupler (1) terminals A1 and A2? (See Fig. 7.)	Go to Step 8.	• "BLU" or "RED" wire open. • Poor coil antenna-to-coupler.
8	Poor A1 or A2 connection. 1) If connections are OK, connect Immobilizer Control Module coupler and substitute a known-good coil antenna. 2) Is DTC 13 also indicated with ignition switch turned ON?	Go to Step 9.	Faulty coil antenna.
9	Is DTC 13 still indicated even when another ignition key (with built-in transponder) for that vehicle used?	Substitute a known-good Immobilizer Control Module and recheck. (See NOTE.)	Faulty ignition key.

NOTE:

After replacing with a known-good Immobilizer Control Module, register ECM/Immobilizer Control Module code in ECM/PCM and Transponder code and ECM/Immobilizer Control Module code in Immobilizer Control Module by performing procedure described in "Procedure after Immobilizer Control Module Replacement" section.

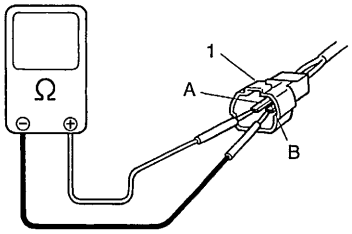
[A] Fig. 1 for Step 1 / [B] Fig. 2 for Step 2 / [C] Fig. 3 for Step 3 / [D] Fig. 4 for Step 4 / [E] Fig. 5 for Step 5
[F] Fig. 6 for Step 6 / [G] Fig. 7 for Step 7

[A]



Ignition key with built-in transponder

[B]



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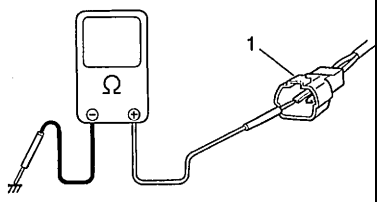

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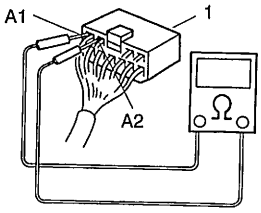
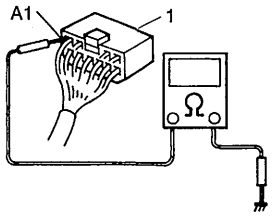


[E]



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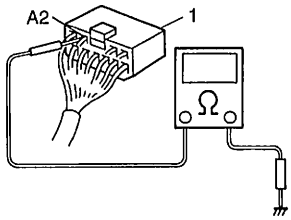
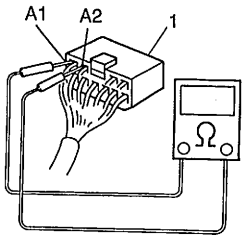


[G]



DTC21 ECM/Immobilizer Control Module Code Not Matched (Immobilizer Control Module Side)
DTC81 (P1623) ECM/Immobilizer Control Module Code Not Matched (ECM/PCM Side)
DTC84 (P1620) ECM/Immobilizer Control Module Code Not Registered

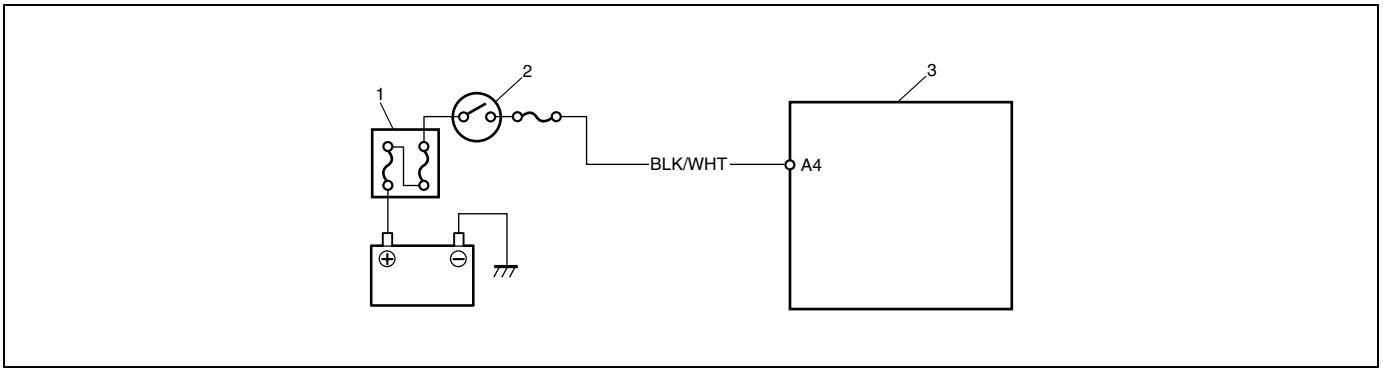
DESCRIPTION

- DTC21
  Immobilizer Control Module checks if ECM/Immobilizer Control Module code transmitted from ECM/PCM and that registered in Immobilizer Control Module match when ignition switch is ON. If they do not, this DTC is set.
- DTC81 (P1623)
  ECM/PCM checks if ECM/Immobilizer Control Module code transmitted from Immobilizer Control Module and that registered in ECM/PCM match when ignition switch is ON. If they do not, this DTC is set.
- DTC84 (P1620)
  ECM/PCM checks if code transmitted from Immobilizer Control Module and that registered in ECM/PCM match when ignition switch is ON. If there is no ECM/Immobilizer Control Module code registered in ECM/PCM, this DTC is set.

INSPECTION

Perform procedure described in “Procedure after ECM/PCM Replacement” section.

DTC22 Ignition Switch Circuit Open/Short



1. Main fuse	2. Ignition switch	3. Immobilizer Control Module

DESCRIPTION

Immobilizer Control Module monitors ignition signal when the ignition switch is ON. This DTC is set when no ignition signal input is detected by Immobilizer Control Module.

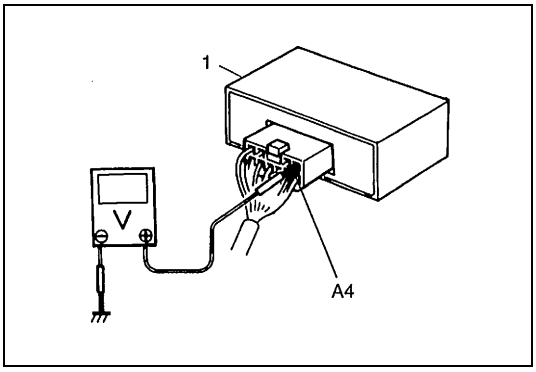
INSPECTION

Step	Action	Yes	No
1	Check voltage between Immobilizer Control Module (1) coupler terminal A4 and body ground with ignition switch turned ON. (See Fig.1.) Is it 10 – 14V?	Poor A4 terminal connection. If connection is OK, substitute a known-good Immobilizer Control Module and recheck. (See NOTE.)	"BLK/WHT" wire open or short.

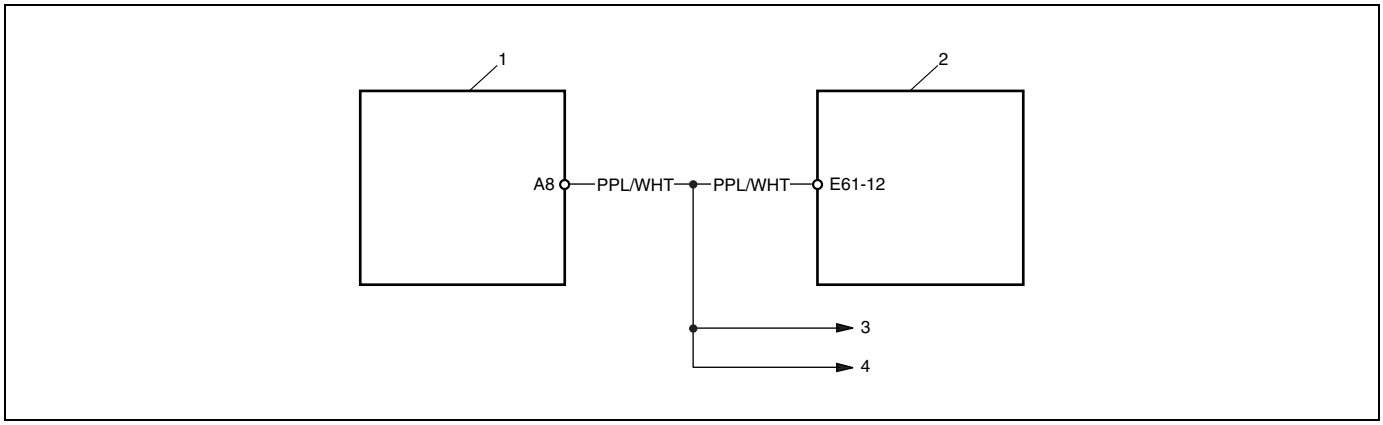
NOTE:

After replacing with a know-good Immobilizer Control Module, register ECM/Immobilizer Control Module code in ECM/PCM and Transponder code and ECM/ Immobilizer Control Module code in Immobilizer Control Module by performing procedure described in "Procedure after Immobilizer Control Module Replacement" section.

Fig. 1 for Step 1



DTC23 No ECM/Immobilizer Control Module Code Transmitted from ECM/PCM or DLC Circuit Opened/Shorted
DTC83 (P1621) No ECM/Immobilizer Control Module Code Transmitted from Immobilizer Control Module or DLC Circuit Opened/Shorted



1. Immobilizer Control Module	2. ECM/PCM	3. To SDM (if equipped with AIR BAG)	4. To data link connector (DLC)

DESCRIPTION

When the ignition switch is ON, Immobilizer Control Module requests ECM/PCM and ECM/PCM requests Immobilizer Control Module to transmit ECM/Immobilizer Control Module code. If ECM/Immobilizer Control Module code is not transmitted from ECM/PCM or Immobilizer Control Module, Immobilizer Control Module sets DTC23 and ECM/PCM sets DTC83 (P1621).

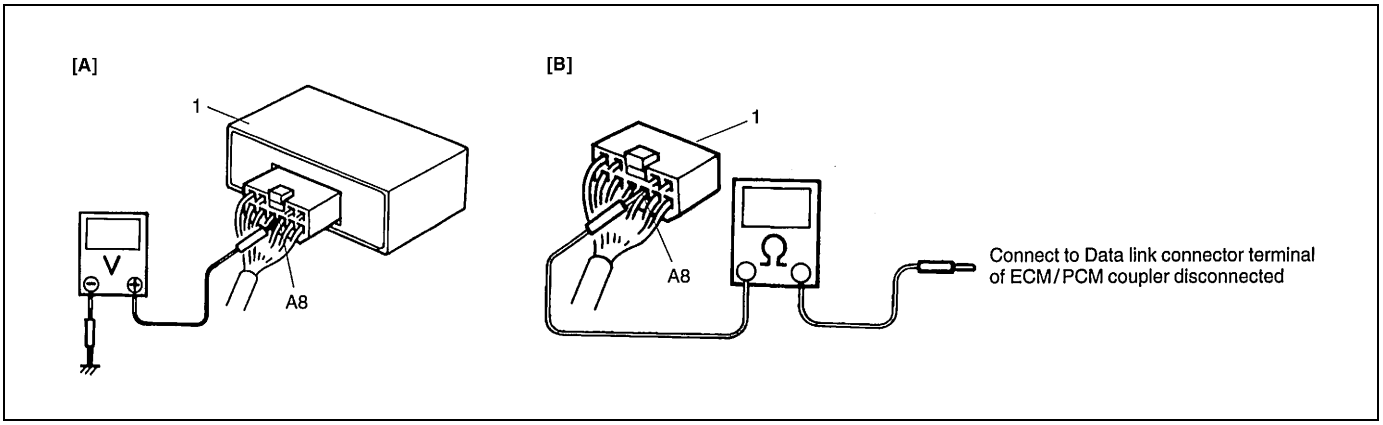
INSPECTION

Step	Action	Yes	No
1	Check voltage between Immobilizer Control Module (1) coupler terminal A8 and body ground with ignition switch turned ON. Is it 4 – 5V?	Go to Step 2.	"PPL/WHT" wire short.
2	1) Disconnect ECM/PCM coupler with ignition switch turned OFF. 2) Is there continuity between Immobilizer Control Module coupler terminal A8 and Data link connector terminal of ECM/PCM coupler? (For positions of Data link connector terminal of ECM/PCM coupler, refer to Section 6E1 or 6E2.)	Poor A8 connection (Immobilizer Control Module) or Poor Data link connector terminal connection (ECM/PCM). If connections are OK, substitute a known-good ECM/PCM or Immobilizer Control Module and recheck. (See NOTE.)	"PPL/WHT" wire between Immobilizer Control Module and ECM/PCM open.

NOTE:

- **After replacing with a known-good ECM/PCM, register ECM/Immobilizer Control Module code in ECM/PCM by performing procedure described in "Procedure after ECM/PCM Replacement" section.**
- **After replacing with a known-good Immobilizer Control Module, register ECM/Immobilizer Control Module code in ECM/PCM and Transponder code and ECM/Immobilizer Control Module code in Immobilizer Control Module by performing procedure described in "Procedure after Immobilizer Control Module Replacement" section.**

[A] Fig. 1 for step 1 / [B] Fig. 2 for step 2



DTC82 (P1622) Fault in ECM/PCM

DESCRIPTION

This DTC is set when an internal fault is detected in ECM/PCM.

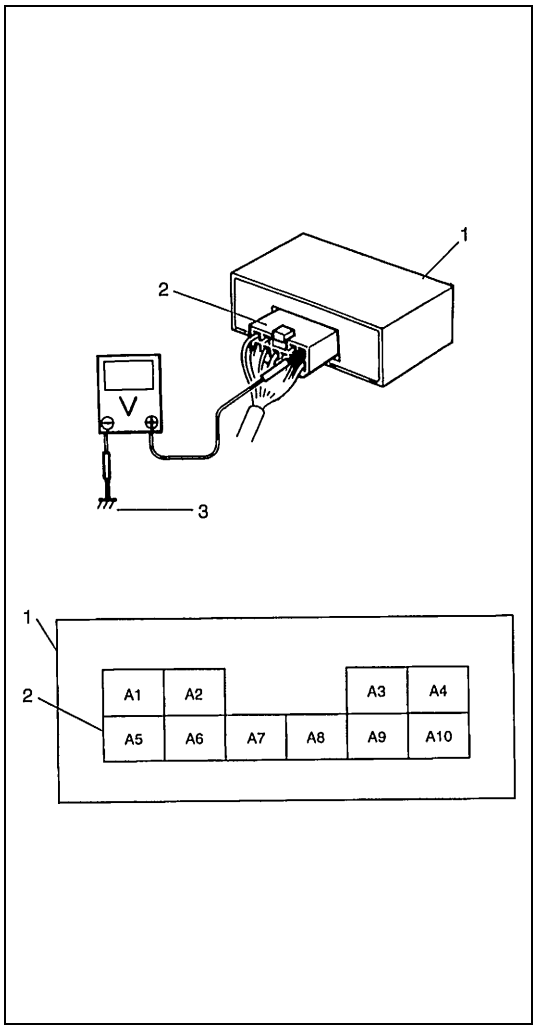
INSPECTION

Step	Action	Yes	No
1	1) Ignition switch OFF. 2) Disconnect connectors from ECM/PCM. 3) Check for proper connection to ECM/PCM at all terminals. Are they in good condition?	Substitute a known-good ECM/PCM and recheck. (See NOTE.)	Repair or replace.

NOTE:

After replacing with a known-good ECM/PCM, register ECM/Immobilizer Control Module code in ECM/PCM by performing procedure described in "Procedure after ECM/PCM Replacement" section.

Inspection of ECM/PCM, Immobilizer Control Module and Its Circuit



ECM/PCM, Immobilizer Control Module and its circuit can be checked at ECM/PCM wiring couplers and Immobilizer Control Module wiring coupler by measuring voltage and resistance. Described here is only inspection of Immobilizer Control Module. For inspection of ECM/PCM, refer to "Section 6E1 or 6E2".

CAUTION:

Immobilizer Control Module cannot be checked by itself. It is strictly prohibited to connect voltmeter or ohmmeter to Immobilizer Control Module with coupler disconnected from it.

Voltage Check

1) Remove Immobilizer Control Module from body with ignition switch OFF referring to "Immobilizer Control Module" in this section.
2) Connect Immobilizer Control Module coupler to Immobilizer Control Module.
3) Check voltage at each terminal of coupler connected.

NOTE:

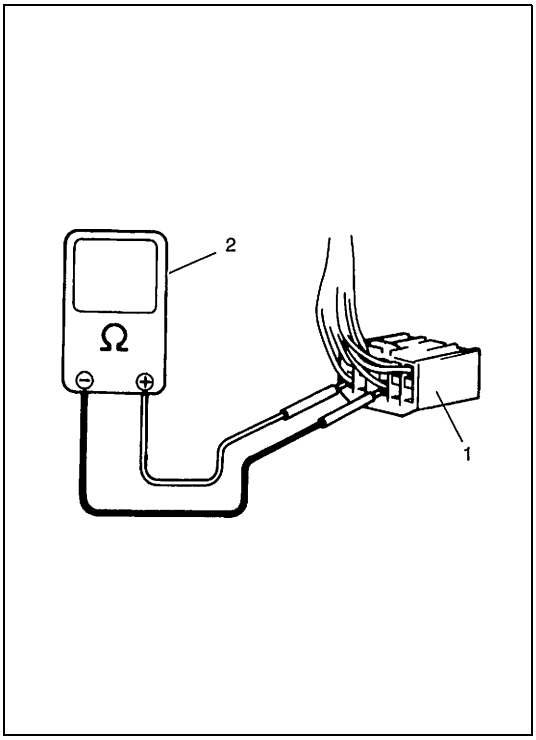
As each terminal voltage is affected by the battery voltage, confirm that it is 11 V or more when ignition switch is ON.

1. Immobilizer Control Module
2. Immobilizer Control Module coupler (viewed from harness side)
3. Body ground

TERMINAL	CIRCUIT	NORMAL VOLTAGE	CONDITION
A1	Coil antenna 1	0 V	Ignition switch ON
A2	Coil antenna 2	0 V	
A3	Power source	10 – 14 V	
A4	Ignition signal	10 – 14 V	Ignition switch ON
		0 – 0.8 V	Ignition switch OFF
A5	Diagnosis output	0 – 14 V	Ignition switch ON
		0 V	Ignition switch OFF
A6	Blank	–	–
A7	Ground	–	–
A8	Data link connector (Serial data terminal)	4 – 5 V	Ignition switch ON
A9 A10	Blank	–	–

NOTE:

When measuring voltage at A1 and A2 terminals with ignition switch turned ON, be sure to turn ignition switch ON before connecting positive probe of voltmeter to A1 or A2 terminal. If it is not turned ON first, DTC13 (Diagnostic Trouble Code 13) may be indicated.



Resistance Check

1) Disconnect Immobilizer Control Module couplers from Immobilizer Control Module with ignition switch OFF.

CAUTION:
Never touch terminals of Immobilizer Control Module itself or connect voltmeter or ohmmeter.

2) Check resistance between each terminal of coupler disconnected.

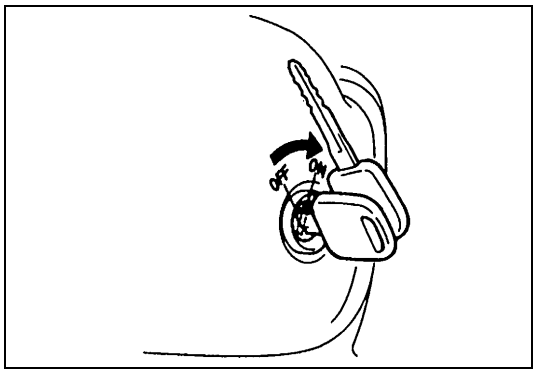
CAUTION:
- **Be sure to connect ohmmeter probe from wire harness side of coupler.**
- **Be sure to turn OFF ignition switch for this check.**
- **Resistance in table below represents that when parts temperature is 20°C (68°F).**

1. Immobilizer Control Module coupler disconnected
2. Ohmmeter

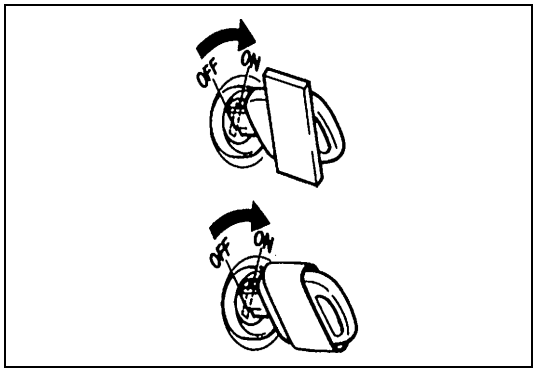
TERMINAL	CIRCUIT	NORMAL RESISTANCE	CONDITION
A1 – A2	Coil antenna	Continuity	–

On-Vehicle Service

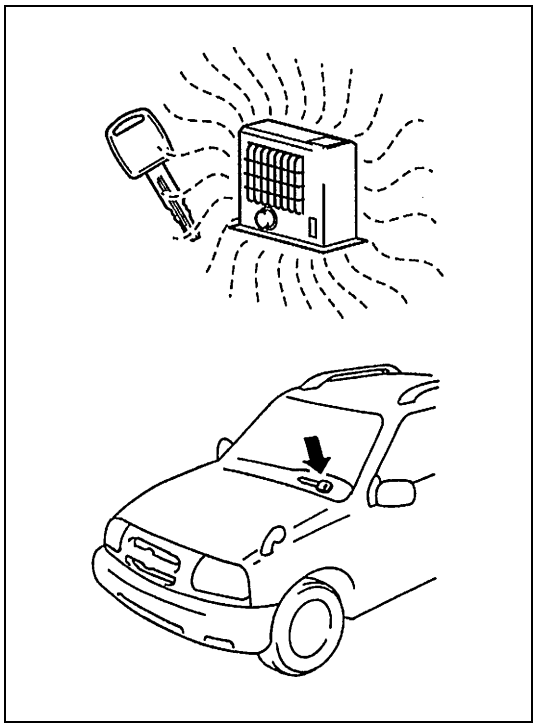
Precautions in Handling Immobilizer Control System



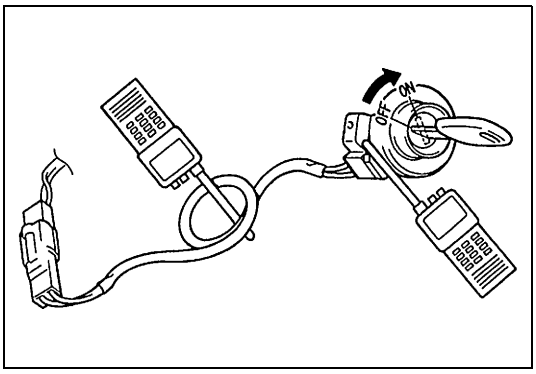
- Do not turn ON ignition switch with ignition key for immobilizer control system put together with another one or placed quite close to another one. Or the system may detect abnormal condition and prevent engine from starting.



- Do not turn ON ignition switch by using ignition key with any type of metal wound around its grip or in contact with it. Or the system may detect abnormal condition and prevent engine from starting.



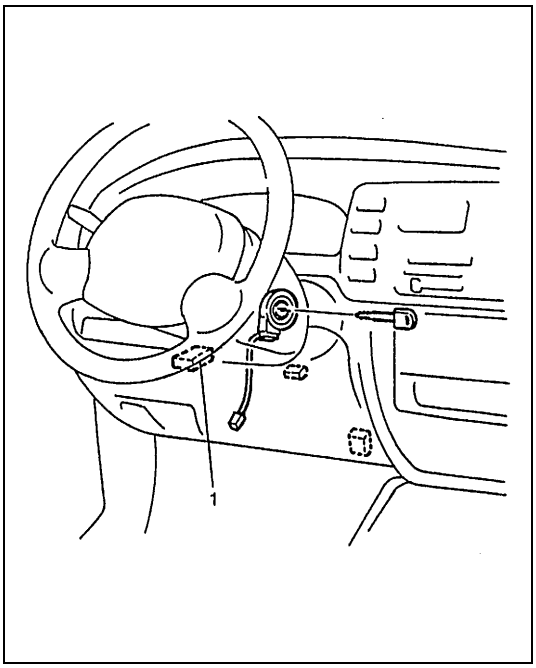
- Do not leave ignition key where high temperature is anticipated.
  High temperature will cause transponder in ignition key to be abnormal or damaged.



- Do not turn ON ignition switch with a radio antenna placed near coil antenna or its harness to Immobilizer Control Module. Or the system may detect abnormal condition and prevent engine from starting.

Immobilizer Control Module

REMOVAL



1) Disconnect negative (–) cable at battery.
2) Remove steering column hole cover.
3) Disconnect coupler at Immobilizer Control Module.
4) Remove Immobilizer Control Module.

INSTALLATION

Reverse removal procedure for installation.

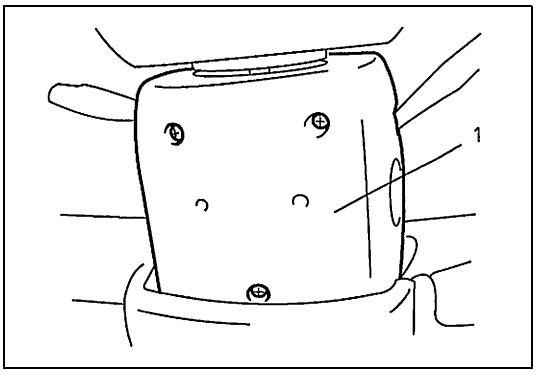
NOTE:

After replacing Immobilizer Control Module, be sure to register Transponder code and ECM/Immobilizer Control Module code in Immobilizer Control Module and ECM/ Immobilizer Control Module code in ECM/PCM by performing procedure described in "Procedure after Immobilizer Control Module Replacement" section.

1. Immobilizer Control Module

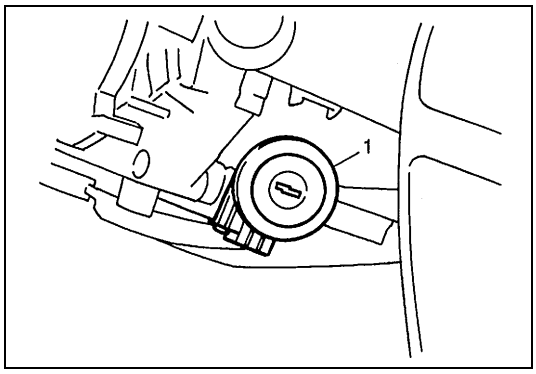
Coil Antenna

REMOVAL



1) Disconnect negative (–) cable at battery.
2) Remove steering column upper and lower cover by removing 3 screws.
3) Remove steering column hole cover.

1. Steering column lower cover



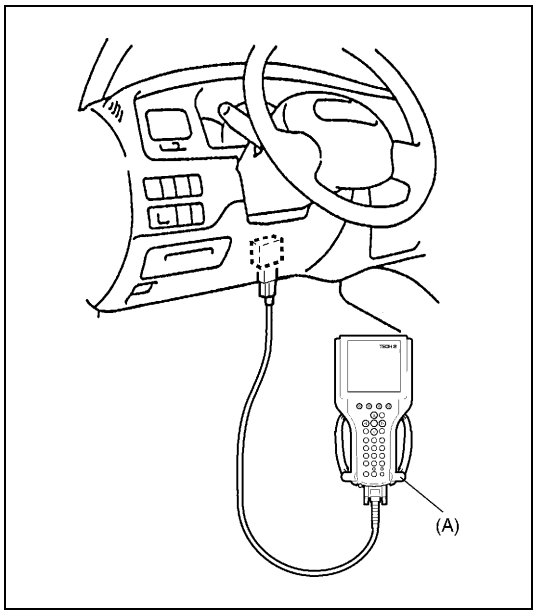
4) Remove coil antenna.

INSTALLATION

For installation, reverse removal procedure.

1. Coil antenna

How to Register Ignition Key



Register the ignition key with a built-in transponder in Immobilizer Control Module by using the following procedure.

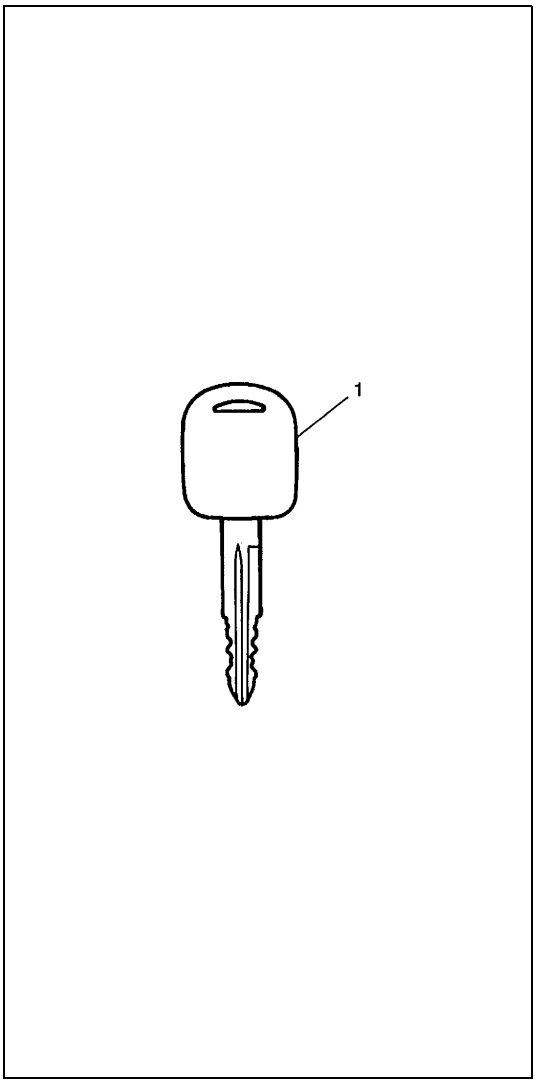
1) Prepare SUZUKI scan tool.
2) With ignition switch OFF, connect SUZUKI scan tool to data link connector (DLC) located on underside of instrument panel at driver's seat side.

Special tool
(A) : SUZUKI scan tool

NOTE:

For operation procedure of SUZUKI scan tool, refer to SUZUKI scan tool operator's manual.

1. Data link connector (DLC)



3) Prepare ignition key with a built-in transponder. And then turn ignition switch ON by using it.
4) Number of Transponder codes for ignition key with a built-in transponder that can be registered in Immobilizer Control Module is limited to 4. If needed, clear all Transponder codes for ignition key with a built-in transponder that have been registered in Immobilizer Control Module by using SUZUKI scan tool.

NOTE:

When clearing transponder code(s) for vehicle equipped with the malfunction indicator lamp (the lamp for vehicles equipped with the diagnosis connector) ON or the immobilizer indicator lamp (the lamp for vehicle not equipped with the diagnosis connector) ON, it remains ON even after clearing Transponder code(s). It will start flashing on and off when the ignition switch is turned OFF once and then turned ON after some seconds.

5) Using SUZUKI scan tool, register Transponder code in Immobilizer Control Module.
6) [Vehicle equipped with diagnosis connector]
   Make sure that malfunction indicator lamp lights when ignition switch is turned OFF once and then ON.
   [Vehicle not equipped with diagnosis connector]
   Make sure that immobilizer indicator lamp lights when ignition switch is turned OFF once and then ON.

1. Ignition key with built-in transponder

7) If any other Transponder code needs to be registered, repeat above Steps 3), 5) and 6).

NOTE:

- **Up to 4 Transponder codes for ignition key with a built-in transponder can be registered.**
- **It is not possible to register the Transponder code which is already registered in Immobilizer Control Module.**

Procedure After Immobilizer Control Module Replacement

When Immobilizer Control Module was replaced, including when replaced because rechecking by using a known-good Immobilizer Control Module was necessary during trouble diagnosis, register Transponder code and ECM/Immobilizer Control Module code in Immobilizer Control Module and ECM/Immobilizer Control Module code in ECM/PCM by performing following procedure.

1) Perform Steps 1) and 2) described in "How to register ignition key" section.
2) Prepare ignition key with a built-in transponder. And then turn ignition switch ON.
3) Using Suzuki scan tool, clear all transponder codes registered in Immobilizer Control Module.

NOTE:

When clearing Transponder code(s) for vehicle equipped with the malfunction indicator lamp (the lamp for vehicles equipped with the diagnosis connector) ON or the immobilizer indicator lamp (the lamp for vehicles not equipped with the diagnosis connector) ON, it remains ON even after clearing Transponder code(s). It will start flashing on and off when the ignition switch is turned OFF once and then turned ON after some seconds.

4) Using SUZUKI scan tool, register Transponder code in Immobilizer Control Module.
5) Using SUZUKI scan tool, register ECM/Immobilizer Control Module code in both Immobilizer Control Module and ECM/PCM.
6) [Vehicle equipped with diagnosis connector]
   Make sure that malfunction indicator lamp lights when ignition switch is turned OFF once and then ON.
   [Vehicle not equipped with diagnosis connector]
   Make sure that immobilizer indicator lamp lights when ignition switch is turned OFF once and then ON.
7) If any other Transponder code for ignition key with a built-in transponder needs to be registered, repeat above Steps 2), 4) and 6).

NOTE:

- **Up to 4 Transponder codes for ignition key with a built-in transponder can be registered.**
- **It is not possible to register the Transponder code which is already registered in Immobilizer Control Module.**

Procedure After ECM/PCM Replacement

When ECM/PCM was replaced, including when replaced because rechecking by using a known-good ECM/PCM was necessary during trouble diagnosis, register ECM/Immobilizer Control Module code in ECM/PCM by performing following procedure.

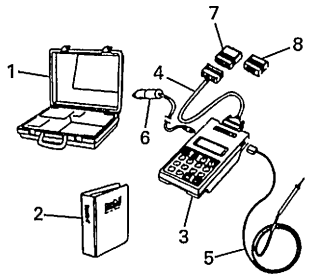
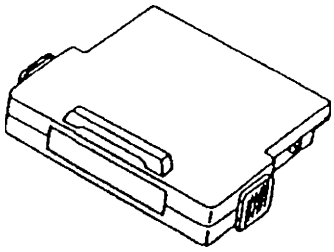
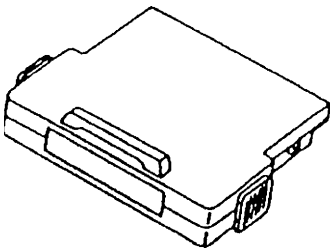
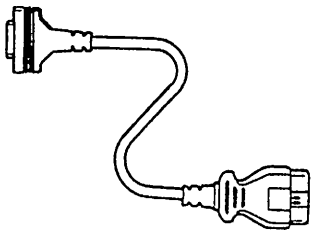
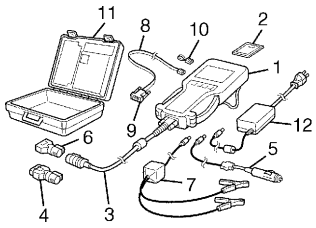
1) Perform Steps 1) and 2) described in "How to register ignition key" section. And then turn ignition switch ON.
2) Using SUZUKI scan tool, register ECM/Immobilizer Control Module code in ECM/PCM.

NOTE:

For operation procedure of SUZUKI scan tool, refer to SUZUKI scan tool operator's manual.

3) [Vehicle equipped with diagnosis connector]
   Make sure that malfunction indicator lamp lights when ignition switch is turned OFF once and then ON.
   [Vehicle not equipped with diagnosis connector]
   Make sure that immobilizer indicator lamp lights when ignition switch is turned OFF once and then ON.

Special Tool

 09931-76011 Tech 1A kit (SUZUKI scan tool) See NOTE “A” below.	 Immobilizer cartridge of version 1.1 or more for Tech 1A	 Mass storage cartridge of version 1.7 or more for Tech 1A	 09931-76030 16/14 pin DLC cable for Tech 1A
 Tech 2 kit (SUZUKI scan tool) See NOTE “B” below.			

NOTE:

- **“A” : This kit includes the following items and substitutes for the Tech 2 kit.**
  1. Storage case, 2. Operator’s manual, 3. Tech 1A, 4. DLC cable (14/26 pin, 09931-76040),
  5. Test lead/probe, 6. Power source cable, 7. DLC cable adapter 8. Self-test adapter
- **“B” : This kit includes the following items and substitutes for the Tech 1 kit.**
  1. Tech 2, 2. PCMCIA card, 3. DLC cable, 4. SAE16/19 adapter, 5 Cigarette cable,
  6. DLC loopback adapter, 7. Battery power cable, 8. RS232 cable, 9. RS232 adapter,
  10. RS232 loopback connector, 11. Storage case, 12. Power supply

SECTION 8H

BODY ELECTRICAL CONTROL MODULE

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

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General Description

BCM GENERAL DESCRIPTION

The Body electrical Control Module (BCM) incorporates relay and controll functions for the following systems and parts.

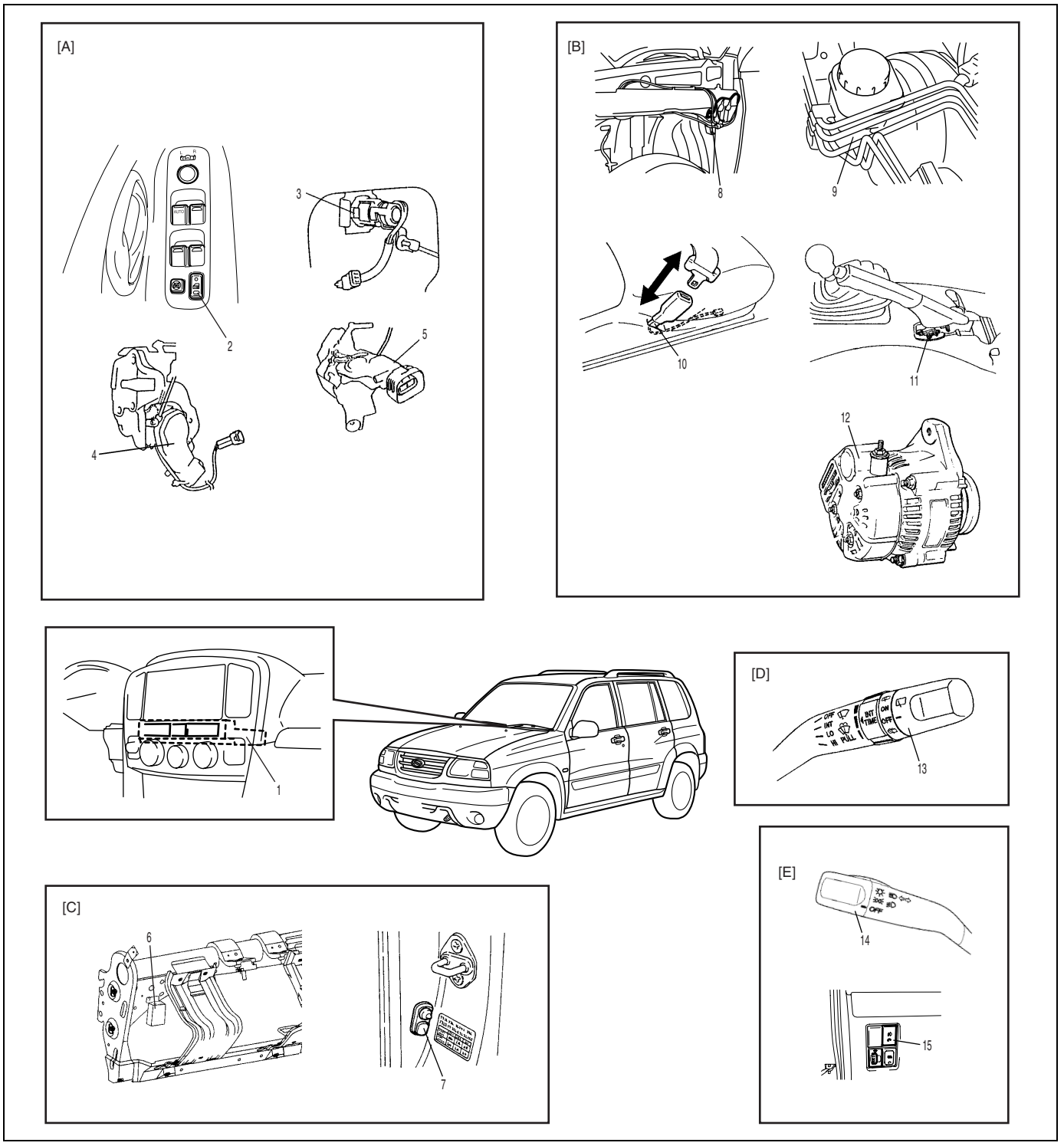
- Power door lock system
- Keyless entry system
- Lighting system
- Rear wiper and washer
- Combination meter
- Interior light
- Warning buzzer

For the each system diagnosis, refer to “Power Door Lock System Check”, “Keyless Entry System Check”, “Headlight System Diagnosis”, “Front Fog Lights System Diagnosis”, “Rear Wiper and Washer System Diagnosis”, “BCM-METER Signal Circuit Construction” in this section.

BCM also has a self-diagnosis function and a communication function for SUZUKI scan tool, and using this scan tool, parameter of each system (condition of input signal from each switch) can be observed and operation checks can be performed for system diagnosis.

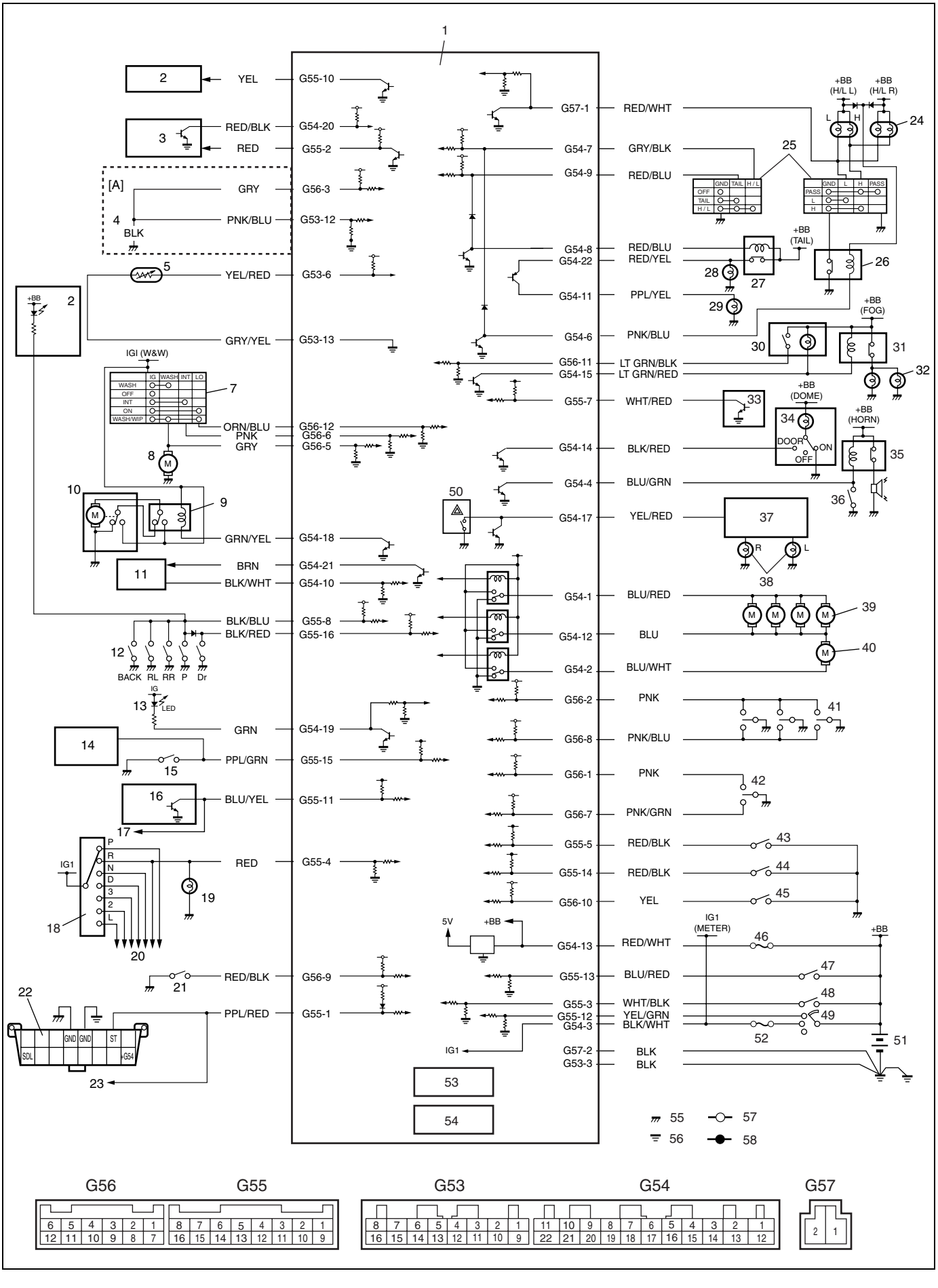
Component Locator

BCM AND RELATED SYSTEM LOCATOR



[A] : Power door lock system components	3. Key cylinder switch	10. Seat belt buckle switch
[B] : Combination meter control (input signal parts)	4. Door lock actuator	11. Parking brake switch
[C] : Keyless entry system (input signal parts : 6, 7 and key remainder switch in ignition switch)	5. Back door lock actuator	12. Generator
[D] : Rear wiper and washer control (input signal parts)	6. Keyless entry receiver (if equipped)	13. Rear wiper and washer switch
[E] : Lighting system (input signal parts : 14, 15 and generator L terminal)	7. Driver side door switch	14. Headlight and tail light switch
1. BCM	8. Windshield washer level switch	15. Front fog light switch (if equipped)
2. Manual door lock switch	9. Brake fluid level switch	

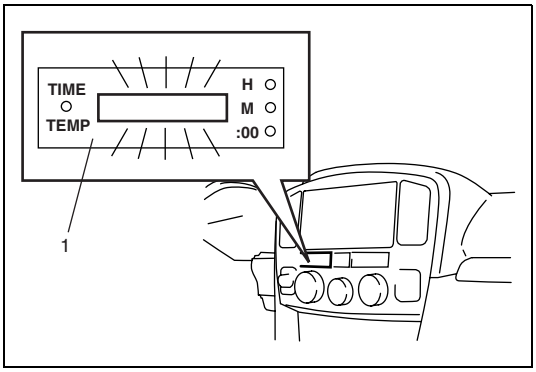
System Wiring Circuit



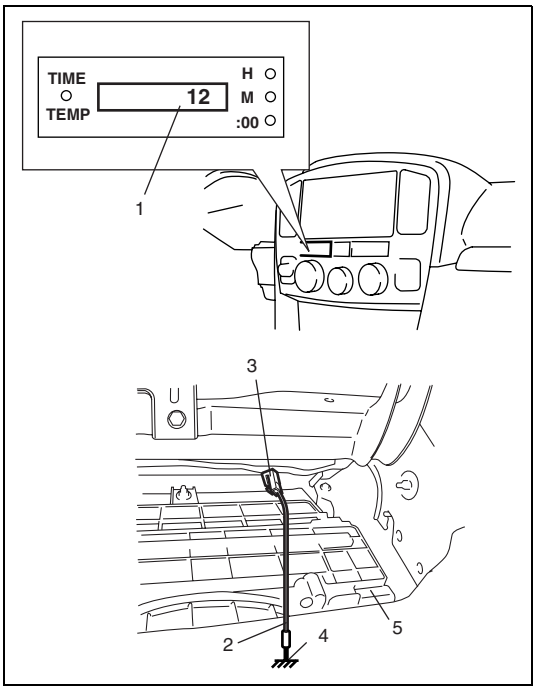
[A] : Vehicle equipped with DRL	20. PCM	40. Driver side door lock actuator
1. BCM	21. Diagnosis switch (BCM monitor connector)	41. Driver side key cylinder switch
2. Combination meter	22. Data link connector	42. Manual door lock switch
3. HVAC control module	23. To ECM(PCM), SDM, ABS control module, HVAC control module and Combination meter	43. Parking brake switch
4. DRL function option connector	24. Headlight bulb	44. Brake fluid level switch
5. Outside air temperature sensor	25. Lighting switch	45. Windshield washer level switch
6. blank	26. Headlight relay	46. DOOR LOCK fuse
7. Rear wiper and washer switch	27. Clearance light relay	47. Key reminder switch
8. Rear washer motor	28. Clearance, tail, license plate and illumination lamp	48. Accessory switch
9. Rear wiper intermittent relay	29. Radio dimmer	49. Ignition switch
10. Rear wiper motor	30. Front fog light switch	50. Hazard warning switch
11. Keyless entry receiver	31. Front fog light relay	51. Battery
12. Door switch	32. Front fog light	52. METER fuse
13. Driver side seat belt indicator (in combination meter)	33. Generator	53. Clock/Temp. display
14. SDM	34. Interior light	54. Warning buzzer
15. Driver side seat belt buckle switch	35. Horn relay	55. Body ground
16. VSS	36. Horn switch	56. Engine ground
17. To ECM(PCM), METER	37. Turn signal and hazard warning relay	57. 5 V
18. Transmission range switch (sensor)	38. Turn signal and hazard warning light	58. 12 V
19. Back up light	39. Door lock actuator (Except driver side)	

Self-Diagnosis Function

BCM diagnoses conditions of the system component parts and its circuit (whether or not there is any abnormality) all the time and indicates the results (warning of abnormality occurrence and DTC) through the “Clock/Temp. display” as described below.



- When an abnormality in the system is detected, “Clock/Temp. display” (1) keeps flashing and the area where that abnormality lies is stored in the memory of EEPROM in BCM.



- When Diagnosis switch terminal (3) of BCM monitor connector is grounded, the abnormal area is output as DTC
  If any malfunction code is existing, “Clock/Temp. display” (1) indicates DTCs in number order at every 3 seconds (Refer to the table below.)

2. Service wire
4. Body ground
5. Blower unit

System Condition		Clock/Temp. Display	
		Diag. Switch terminal is not grounded	Diag. Switch terminal is grounded
In good condition at present	No trouble in the past	Turn ON	DTC 12
	Trouble occurred in the past	Turn ON	History DTC
Abnormality exists at present	No trouble in the past	Keep flashing	Current DTC
	Trouble occurred in the past	Keep flashing	Current and history DTCs

BCM Input/Output Table

System/Parts	Input signal	Controiled device
Power door lock system	• Key cylinder switch • Manual door lock switch	• All of door lock actuators
Keyless entry system	• Key reminder switch (in ignition switch) • Keyless entry receiver (if equipped) • Driver side door switch	• All of door lock actuators • Turn signal and hazard warning relay • Interior light • Keyless entry receiver (if equipped)
Lighting system	• Headlight switch • Tail light switch • Front fog light switch (if equipped) • Generator L terminal	• Headlight • Tail light • Front fog light (if equipped) • Illumination lamp
Rear wiper and washer	• Rear wiper INT switch • Rear wiper switch • Rear washer switch	• Rear wiper motor • Rear washer motor
Combination meter	• Headlight switch • Tail light switch • Brake fluid level switch • Charging system monitor switch • Washer level switch	• Combination meter
Interior light	• All of door switches • Key reminder switch (in ignition switch)	• Interior light
Warning buzzer	• Key reminder switch (in ignition switch) • Headlight switch • Tail light switch • Driver side seat belt switch • Driver side door switch	• Warning buzzer (located in BCM)

Precaution In Diagnosing Trouble

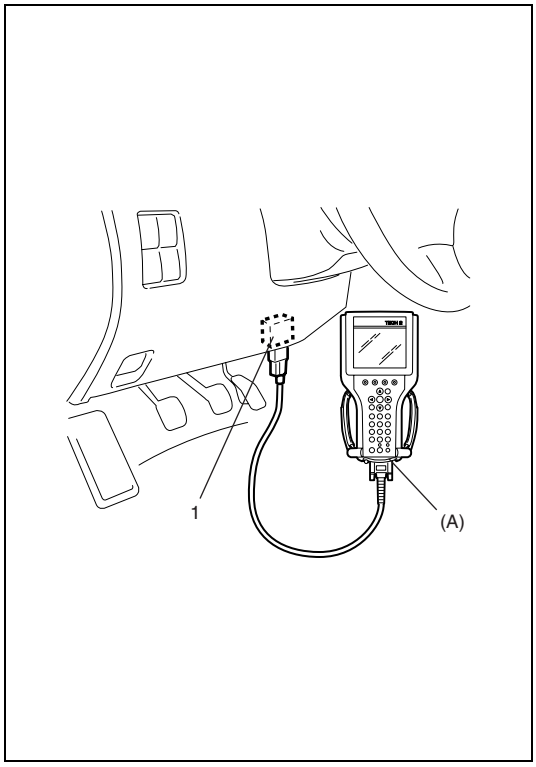
- Diagnostic information stored in BCM memory can be cleared as well as checked by using SUZUKI scan tool. Before using scan tool, read its Operator's (Instruction) Manual carefully to have good understanding as to what functions are available and how to use it.
- Be sure to read "Precaution For Electrical Circuit Service" before inspection and observe what is written there.

Body Electrical Control System Check

Step	Action	Yes	No
1	Was customer complaint analysis performed?	Go to Step 2.	Perform customer complaint analysis.
2	1) Turn ignition switch to ON position and check "Clock/Temp. display" in BCM. Does "Clock/Temp. display" come ON or keep flashing?	Go to step 3.	Proceed to Step 1 from Step3 of "BCM power circuit and ground circuit check". If OK, substitute a known-good BCM and recheck.
3	Check DTC referring to "Diagnostic Trouble Code (DTC) Check". Is it malfunction code?	Go to Step 4.	Go to Step 5.
4	Inspect and repair referring to applicable DTC flow. Does trouble occur?	Go to Step 3.	Go to Step 7.
5	Check relational system of BCM referring to "BCM Input/output Table". Is trouble symptom identified?	Go to its system symptom diagnosis table.	Go to Step 6.
6	Check BCM and its circuit referring to "BCM and Its Circuit Inspection" Is it in good condition.	Substitute a known-good BCM and recheck.	Go to Step 7.
7	Perform "Final Confirmation Test" after cleared DTC. Does trouble recur?	Go to Step 3.	BCM is in good condition.

Diagnostic trouble code (DTC) check

[Using SUZUKI Scan Tool]

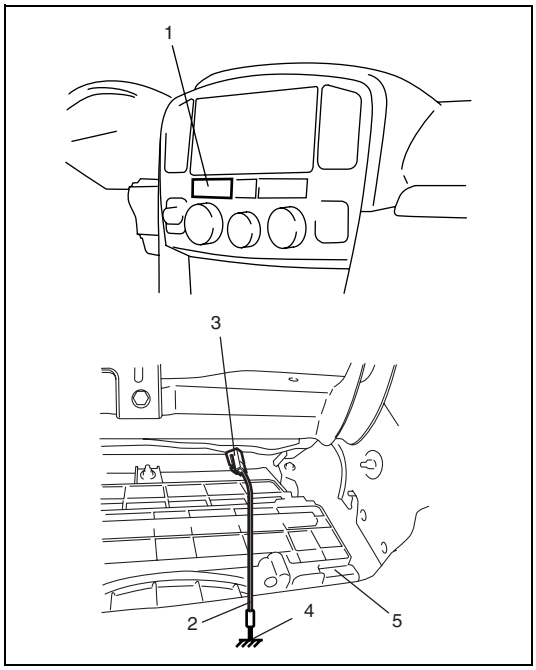


1) Prepare SUZUKI scan tool.
2) With ignition switch OFF, connect it to data link connector (DLC) (1) located underside of instrument panel at driver's seat side.

Special tool
(A) : SUZUKI scan tool

3) Turn ignition switch ON.
4) Read DTC according to instructions displayed on SUZUKI scan tool and print it or write it down.
   Refer to SUZUKI scan tool operator's manual for further details.
   If communication between SUZUKI scan tool and BCM is not possible, check if SUZUKI scan tool is communicable by connecting it to BCM in another vehicle. If communication is possible in this case, SUZUKI scan tool is in good condition. Then check data link connector and serial data line (circuit) in the vehicle with which communication was not possible.
5) After completing the check, turn ignition switch off and disconnect SUZUKI scan tool from data link connector.

[Without Using SUZUKI Scan Tool]



1) Check that "Clock/Temp. display" comes ON when ignition switch is turned to ON position.
2) Using service wire (2), ground diagnosis switch terminal in monitor coupler (3).
3) With the ignition switch ON position and leaving engine OFF, read DTC from "Clock/Temp. display". Refer to "Diagnostic Trouble Code Table".
4) After completing the check, turn the ignition switch OFF position and disconnect service wire from monitor coupler.

4. Body ground
5. Blower unit

Diagnostic trouble code (DTC) clearance

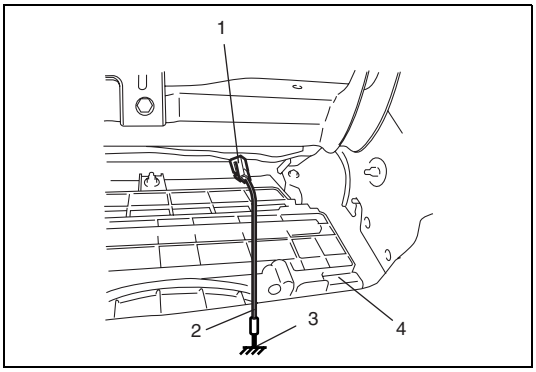
After repair or replace malfunction part(s), clear all DTCs by performing the following procedure.

[Using SUZUKI Scan Tool]

1) Connect SUZUKI scan tool to data link connector in the same manner as when making this connection for DTC check.
2) Turn ignition switch ON.
3) Erase DTC according to instructions displayed on scan tool. Refer to scan tool operator's manual for further details.
4) After completing the clearance, turn ignition switch off and disconnect scan tool from data link connector.

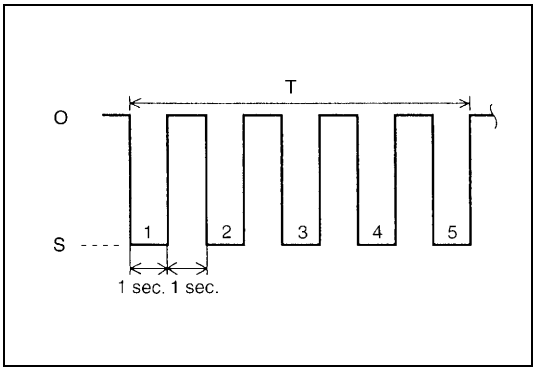
[Without Using SUZUKI Scan Tool]

1) Turn ignition switch OFF.



2) Using service wire (2), connect diagnosis switch terminal of diagnosis monitor coupler (1) to body ground (3).
3) With connection described in above Step 2) maintained, turn ignition switch ON.

4. Blower unit



4) Repeat disconnecting and reconnecting of service wire between diagnosis switch terminal and body ground 5 times or more at about 1sec. interval within 10 seconds.

O : Open
S : Short
T : About 10 seconds

5) After completing the clearance, turn ignition switch OFF and disconnect service wire from monitor coupler.

Diagnostic Trouble Code (DTC) Table

DTC (displayed on SUZUKI scan tool)	DTC (indicated by "Clock/Temp." display)	DETECTED PARTS ITEM	DETECTING CONDITION
NO DTC	12	Normal	Normal
B1121	21	DRL circuit malfunction (Vehicle with DRL function model only)	DRL control circuit open or shorted to ground
B1141	41	Outside air temperature (ambient temp.) sensor circuit open	Sensor output voltage too high
B1142	42	Outside air temperature (ambient temp.) sensor circuit short to ground	Sensor output voltage too low
B1170	70	Factory register error	Memory error
B1171	71	Memory check sum error	
B1172	72	Memory write error	

Scan Tool Data

Scan Tool Data	Condition	Normal Condition/ Reference Value
VEHICLE SPEED	At stop.	0 km/h 0 MPH
IGNITION SWITCH	Ignition switch ON	ON
KEY REMINDER SWITCH	Ignition switch ON	Key in
REAR WIPER SWITCH	Ignition switch ON, rear wiper switch OFF	OFF
REAR WASHER SWITCH	Ignition switch ON, rear wiper switch OFF	OFF
WASHER LEVEL	Vehicle without windshield washer level switch : Ignition switch ON Vehicle with windshield washer level switch : Ignition switch ON, windshield washer level is more than specified value (if equipped)	Normal
FRONT FOG LIGHT SW	Ignition switch ON, front fog light switch OFF	OFF
DOOR KEY SW	Ignition switch ON, all door key cylinder switch NEUTRAL	Neutral
DOOR LOCK SW	Ignition switch ON, driver and passenger sides manual door lock switch NEUTRAL	Neutral
DRIV DOOR SWITCH	Ignition switch ON, driver side door closed	Close
PASS DOOR SW	Ignition switch ON, all door closed	Close
PARKING BRAKE SW	Ignition switch ON, parking brake lever released	OFF
REAR DEFOGGER SWITCH	Ignition switch ON, rear defogger switch OFF	OFF
HEADLIGHT SW	Ignition switch ON, headlight switch OFF	OFF
DIAG SW TERMINAL	Ignition switch ON, diagnosis switch circuit OPEN	OPEN
BRAKE FLUID LEVEL	Ignition switch ON, brake fluid level is more than MIN level.	Normal

Scan Tool Data Definitions

VEHICLE SPEED (km/h, MPH)

It is computed based on pulse signals from vehicle speed sensor on transfer or transmission.

IGNITION SWITCH (START/ON)

START: Ignition switch is at start position.
ON: Ignition switch is at ON position

KEY REMINDER SWITCH (KEY IN/PULLED)

It is detected by key reminder switch.

REAR WIPER SWITCH (OFF/ON/INT)

OFF: Rear wiper switch is at OFF position.
ON: Rear wiper switch is at ON and WASH/WIPER position.
INT: Rear wiper switch is at INTERMITTENT position.

REAR WASHER SWITCH (OFF/ON)

This parameter indicates the state of the rear windshield washer switch.

WASHER LEVEL (Normal/Low)

Normal: Normal condition. (if vehicle is not equipped with Windshield washer tank switch, this parameter indicates Normal even if windshield washer tank is empty.)
Low: Windshield washer tank level is lower than specified level.

FRONT FOG LIGHT SWITCH (OFF/ON)

This parameter indicates the state of the front fog light control signal.

DOOR KEY SWITCH (Driver side/Passenger side and back door key switch, Neutral/LOCK/UNLOCK)

Neutral: All door key switch is neutral position.
LOCK: Any one of the door key switch is lock position.
UNLOCK: Driver side door key switch is unlock position.

DOOR LOCK SWITCH (Both side manual lock switch, Neutral/LOCK/UNLOCK)

This parameter indicates the state of the manual lock switch.

DRIV DOOR SWITCH (Driver side door switch, CLOSE/OPEN)

This parameter indicates the state of the driver side door switch.

PASS DOOR SWITCH (All door switch, CLOSE/OPEN)

CLOSE: All door switch is close position.
UNLOCK: Any one of the door switch (including driver side door switch) is unlock position.

PARKING BRAKE SWITCH (OFF/ON)

OFF: Parking brake lever released
ON: Parking brake lever pulled up

REAR DEFOGGER SWITCH (OFF/ON)

This parameter indicates the state of the dear defogger switch.

HEADLIGHT SWITCH (OFF/PARKING/HEADLIGHT)

This parameter indicates the state of the headlight switch.

DIAG SWITCH TERMINAL (Diagnosis switch terminal, OPEN/GROUND)

OPEN: Normal condition.
GROUND: Diagnosis switch terminal in monitor coupler shorts to ground circuit.

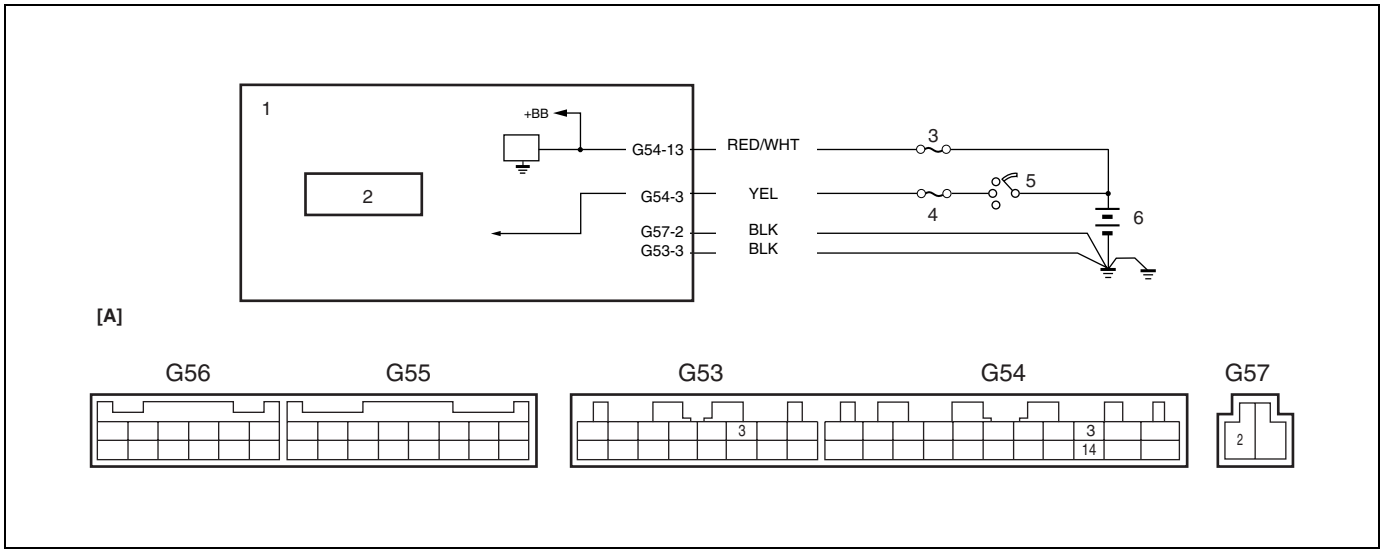
BRAKE FLUID LEVEL (Normal/Low)

Normal: Normal condition.
Low: Brake fluid level is lower than specified level.

SUZUKI Scan Tool Output (MISC) Test Mode Table

Item	Controlled system
Hazard Warning Light	Turn signal and hazard warning relay
Dome Light	Interior light (when interior light switch is DOOR position)
Head light	Headlight
Parking/Tail Light	Clearance, side maker, tail and license plate light
Front Fog Light	Front fog light (When lighting switch is small or head position)
Driv Side Door Lock	Driver side door lock actuator
Pass Side Door Lock	Passenger, rear and back doors lock actuator
Warning Buzzer	Warning buzzer (in combination meter)

BCM Power Circuit and Ground Circuit Check



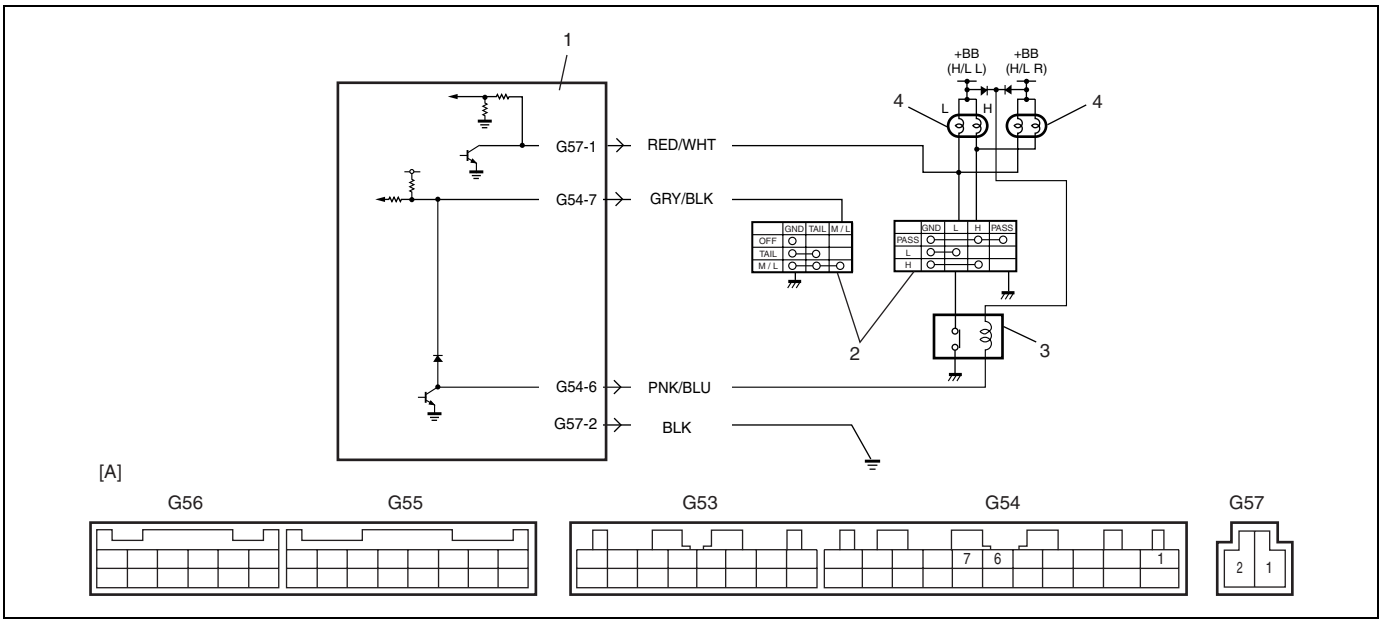
[A] : Viewed from harness side	2. Clock/Temp. display	4. "METER" fuse	6. Battery
1. BCM	3. "DOOR LOCK" fuse	5. Ignition switch	

INSPECTION

Step	Action	Yes	No
1	Fuse check: Are "DOOR LOCK" and "METER" fuses in good condition.	Go to Step 2.	Check for short circuits connected to these fuses.
2	BCM power circuit check 1) Turn OFF ignition switch and disconnect connectors from BCM. 2) Check for proper connection to BCM at terminals G54-13 and G54-3. 3) If OK, then measure voltage between terminal G54-13 and body ground, G54-3 and body ground at ignition switch ON. Is each voltage 10 – 14 V?	Go to Step 3.	"RED/WHT" and/or "BLK/WHT" circuit open.
3	BCM ground circuit check Measure resistance between "G57-2" and body ground, "G53-3 and body ground. Is resistance continuity?	Go to Step 4	"BLK" circuit open.
4	1) Make sure that battery voltage is about 11 V or higher. 2) Note "Clock/Temp. display" in BCM as ignition switch is tuned ON. Does "Clock/Temp. display" come ON or keep flashing when ignition switch is tuned ON?	BCM power circuit and ground circuit are good condition.	Substitute a known-good BCM and recheck.

DTC B1121 – DRL Circuit Malfunction

WIRING DIAGRAM



[A] : View from harness side	2. Headlight switch (in lighting switch)	4. Headlight bulb
1. BCM	3. Headlight relay	

DTC DETECTING CONDITION	POSSIBLE CAUSE
• Low voltage at terminal G57-1 when DRL is not active, headlight switch is OFF position and headlight relay is not active.	• Both headlight fuse blown • Both headlight bulb burned out • "RED/WHT" circuit open or shorted to ground • "PNK/BLU" circuit shorted to ground • BCM malfunction

TABLE TEST DESCRIPTION

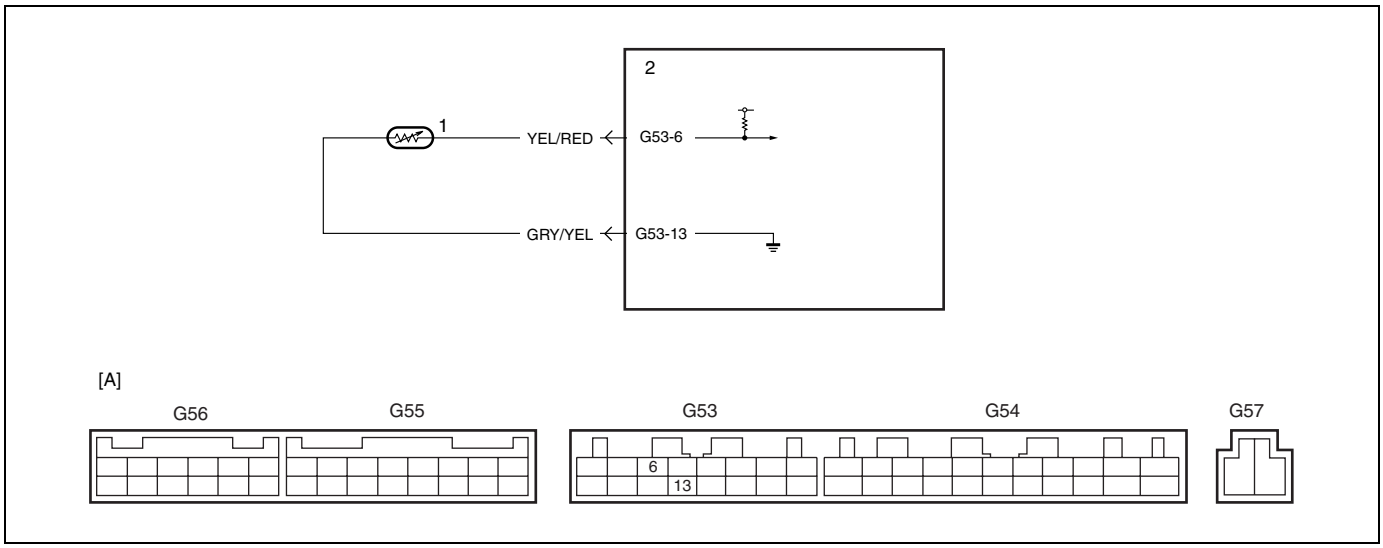
STEP 1 : Check headlight bulb and fuse.
STEP 2 : Check DRL control circuit.
STEP 3 : Check headlight control circuit.

TROUBLESHOOTING

Step	Action	Yes	No
1	Check headlight bulb and headlight fuses "H/L, L" and "H/L, R". Are they in good condition?	Go to Step 2.	Replace headlight bulb or headlight fuses.
2	1) Disconnect BCM connector "G57" with ignition switch OFF. 1) Measure voltage between "G57-1" and body ground. Is voltage 10 – 14V?	Go to Step 3.	"RED/WHT" circuit open or short to ground.
3	1) Disconnect BCM connector "G54" with ignition switch OFF. 2) Measure resistance between "G54-6" and body ground. Is resistance infinity?	Replace BCM.	"PNK/BLU" wire shorted to ground circuit. If wire and connection are OK, substitute a known-good BCM and recheck.

DTC B1141 Outside Air Temperature (ambient temp.) Sensor Circuit Open
DTC B1142 Outside Air Temperature (ambient temp.) Sensor Circuit Short To Ground

WIRING DIAGRAM



[A] : View from harness side	2. BCM
1. Outside air temperature sensor	

DTC DETECTING CONDITION	POSSIBLE CAUSE
DTC B1141: • High voltage at terminal G53-14 when ignition switch on position	• "YEL/RED" circuit open • "GRY/YEL" circuit open • Illumination controller malfunction • BCM malfunction
DTC B1142: • Low voltage at terminal G53-14 when ignition switch on position	• "YEL/RED" circuit short to ground • Illumination controller malfunction • BCM malfunction

TABLE TEST DESCRIPTION

STEP 1 : Check whether malfunction is in outside air temperature sensor.
STEP 2 : Check outside air temperature sensor input circuit.
STEP 3 : Check outside air temperature sensor ground circuit.(for DTC B1141 only)

TROUBLESHOOTING

DTC B1141 :

Step	Action	Yes	No
1	1) Disconnect outside air temperature sensor coupler. 2) Check outside air temperature sensor referring to "Outside Air Temperature Sensor". Is it good condition?	Go to Step 2.	Replace outside air temperature sensor.
2	With ignition switch ON, measure voltage between "YEL/RED" circuit terminal of outside temperature sensor coupler and body ground. Is voltage 4.5 – 5.5 V?	Go to Step 3.	"YEL/RED" wire open or short to power circuit. If wire and connection are OK, substitute a known-good BCM and recheck.

Step	Action	Yes	No
3	Measure resistance between outside air temperature sensor coupler and “G53-13” terminal. Is resistance infinity?	“GRY/YEL” wire open.	Replace BCM.

TROUBLESHOOTING

DTC B1142:

Step	Action	Yes	No
1	1) Disconnect outside air temperature sensor coupler. 2) Check outside air temperature sensor referring to “Outside Air Temperature Sensor”. Is it good condition?	Go to Step 2.	Replace outside air temperature sensor.
2	1) Disconnect BCM connector “G53” from BCM. 2) Measure resistance between “G53-6” terminal and body ground. 3) Is resistance continuity?	“YEL/RED” wire short to ground.	Replace BCM.

DTC B1170 Factory Register Error
DTC B1171 Memory Check Sum Error
DTC B1172 Memory Write Error

DTC DETECTING CONDITION	POSSIBLE CAUSE
• Data write error or check sum error	• BCM

DIAGNOSTIC

NOTE:
Before executing items below, be sure to perform BCM Diagnostic System Check Flow Table.

1) Ignition switch OFF.
2) Replace BCM.
3) Repeat BCM Check Flow Table.

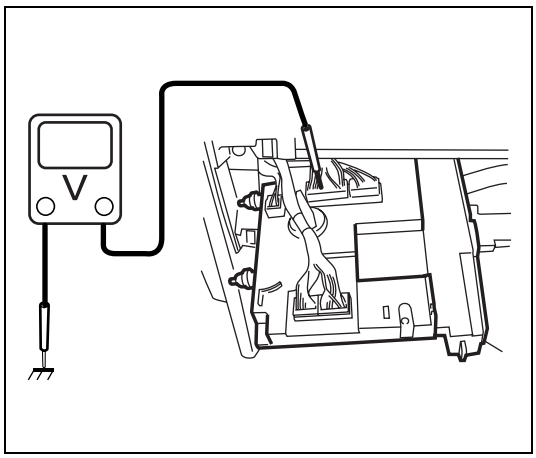
On-Vehicle Service

Inspection of BCM and Its Circuits

BCM and its circuits can be checked at BCM wiring couplers by measuring voltage and resistance.

CAUTION:
BCM cannot be checked by itself. It is strictly prohibited to connect voltmeter or ohmmeter to BCM with couplers disconnected from it.

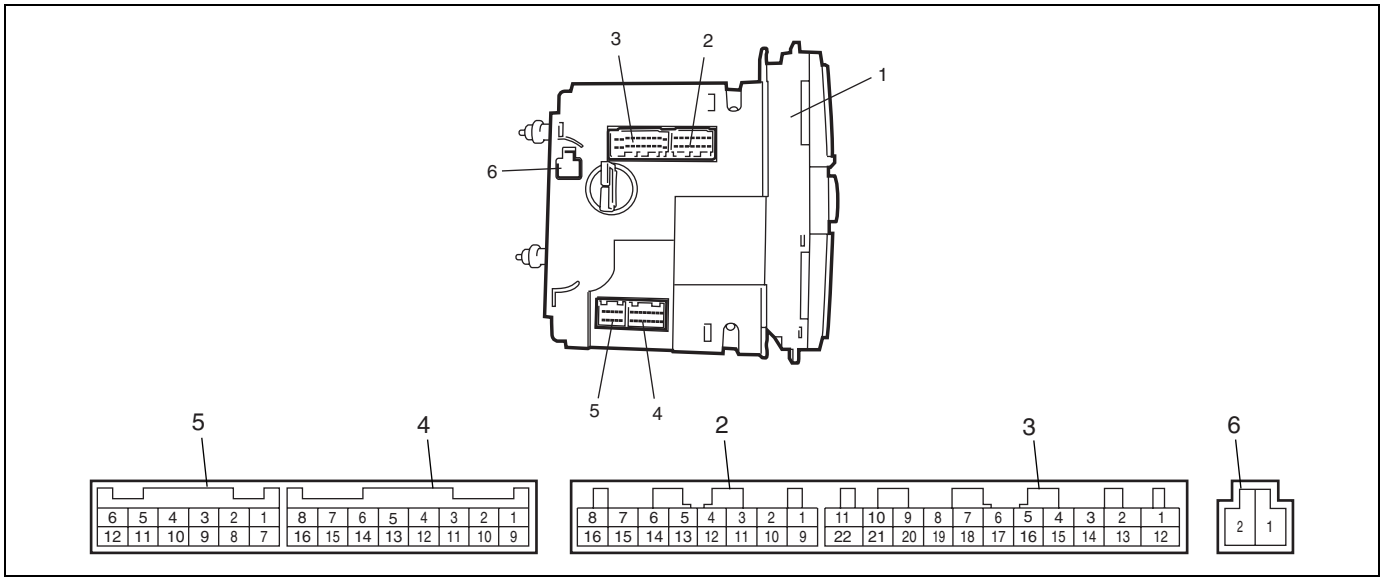
VOLTAGE CHECK



1) Disconnect negative cable (–) at battery.
2) Remove BCM referring to “BCM removal and installation”.
3) Connect BCM connector as shown in figure.
4) Check voltage at each terminal of couplers connected.

NOTE:

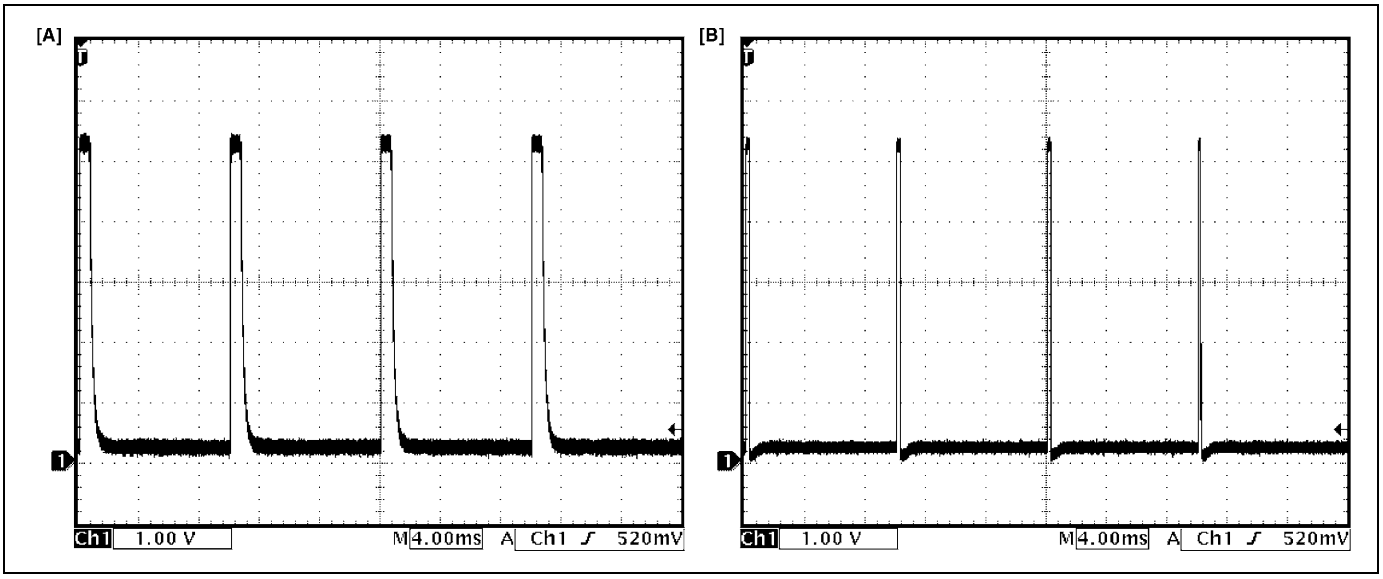
- **As each terminal voltage is affected by the battery voltage, confirm that it is 11 V or more when ignition switch is ON.**
- **Pulse signal cannot be measured by voltmeter. It can be measured by oscilloscope.**



1. BCM	3. G54 BCM connector (viewed from harness side)	5. G56 BCM connector (viewed from harness side)
2. G53 BCM connector (viewed from harness side)	4. G55 BCM connector (viewed from harness side)	6. G57 BCM connector (viewed from harness side)

As the input signal of the switch described below repeats ON and OFF at every 10ms as shown in the figure below, measurement of the terminal voltage will indicate an abnormal voltage value.
Also, if no signal input/output occurs for 10seconds or longer while the ignition switch remains OFF, the stand-by current is controlled by reducing its ON time (Sleep mode).

Applicable switch:
Manual door lock/unlock switch
Door key cylinder lock/unlock switch
Diagnosis switch
Windshield washer level switch



[A] : Normal mode (Ignition switch : ON)
[B] : Sleep mode

Measurement terminal	CH1: “G56-1” or “G56-7” to “G53-3” (Manual door lock/unlock switch) CH1: “G56-2” or “G56-8” to “G53-3” (Door key cylinder lock/unlock switch) CH1: “G56-9” to “G53-3” (Diagnosis switch) CH1: “G56-10” to “G53-3” (Windshield washer level switch)
Oscilloscope setting	CH1: 5V/DIV TIME: 4.0 ms/DIV
Measurement condition	Ignition switch turns to ON position.

NOTE:
Type A : Vehicle with DRL function model

Terminal “G53”

Terminal	Wire Color	Circuit	Normal Voltage	Condition
G53-1	—	—	—	—
G53-2	—	—	—	—
G53-3	BLK	Ground	—	—
G53-4	—	—	—	—
G53-5	—	—	—	—
G53-6	YEL/RED	Outside air temperature sensor	2.5 V	Ignition switch: ON Outside air temperature at approx. 25 °C (77 °F)
G53-7	—	—	—	—
G53-8	—	—	—	—

Terminal	Wire Color	Circuit	Normal Voltage	Condition
G53-9	—	—	—	—
G53-10	—	—	—	—
G53-11	—	—	—	—
G53-12	PNK/BLU	DRL selector line (Type A only: Seen NOTE)	0 V	Ignition switch: ON
G53-13	GRY/YEL	Sensor ground	—	—
G53-14	—	—	—	—
G53-15	—	—	—	—
G53-16	—	—	—	—

Terminal "G54"

Terminal	Wire Color	Circuit	Normal Voltage	Condition
G54-1	BLU/RED	Door unlock control (except driver side)	0 V	Ignition switch: ON
			10 – 14 V (Reference waveform No.1)	Manual door unlock or door key cylinder unlock switch turned ON
G54-2	BLU/WHT	Driver side door unlock control	0 V	Ignition switch turned ON
			10 – 14 V (Reference waveform No.1)	Manual door unlock or door key cylinder unlock switch turned ON
G54-3	BLK/WHT	Power source (IG1)	10 – 14 V	Ignition switch: ON
G54-4	BLU/GRN	Horn control	10 – 14 V	Horn switch: OFF
G54-5	—	—	—	—
G54-6	PNK/BLU	Headlight control	10 – 14 V	Headlight switch: OFF
			0 V	Headlight switch: ON
G54-7	GRY/BLK	Headlight switch	10 – 14 V	Headlight switch: OFF
			0 V	Headlight switch: ON
G54-8	RED/BLU	Tail light control	10 – 14 V	Taillight switch: OFF
			0 V	Taillight switch: ON
G54-9	RED/BLU	Tail light switch	10 – 14 V	Taillight switch: OFF
			0 V	Taillight switch: ON
G54-10	BLK/WHT	Keyless entry system communication line	0 – 1 V ↑↓ 10 – 14 V (Reference waveform No.3)	Unlock switch pushed ON of keyless entry transmitter
			0 V	Ignition switch: ON
G54-11	PPL/YEL	Illumination control	10 – 14 V	Tail or head lamp switch: ON
			0 V	Tail or head light switch: OFF
G54-12	BLU	Door lock control	10 – 14 V (Reference waveform No.2)	Manual door lock or door key cylinder lock switch: ON
			0 V	Ignition switch: ON
G54-13	RED/ WHT	Backup power source	10 – 14 V	—

Terminal	Wire Color	Circuit	Normal Voltage	Condition
G54-14	BLK/RED	Interior light control	10 – 14 V	Dome lamp switch DOOR position and all door
			0 V	Dome lamp: ON
G54-15	LT GRN/ RED	Fog light control	10 – 14 V	Front fog lamp: OFF
			0 V	Front fog lamp: ON
G54-16	—	—	—	—
G54-17	YEL/RED	Hazard warning light control	10 – 14 V	Hazard warning switch: OFF
			0 V	Hazard warning switch: ON
G54-18	GRN/YEL	Rear wiper control	10 – 14 V	Rear wiper switch: OFF
			0 V	Rear wiper switch: ON
G54-19	GRN	Driver seat belt warning indicator	10 – 14 V	Driver seat belt warning indicator turned OFF
			0 V	Driver seat belt warning indicator turned ON
G54-20	BLK/BLK	Rear defogger input	10 – 14 V	Rear defogger switch: OFF
			0 V	Rear defogger switch: ON
G54-21	BRN	Keyless entry system communication	0 V	Ignition switch: ON
G54-22	RED/YEL	Power supply for illumination	10 – 14 V	Tail or head light switch: ON DRL or Auto-on headlight: Active
			0 V	Tail or head light switch: OFF

Terminal "G55"

Terminal	Wire Color	Circuit	Normal Voltage	Condition
G55-1	PPL/RED	Data link connector	10 – 14 V	Scan tool not connected to DLC
G55-2	RED	Outside air temperature communication line	0 V ↑↓ 4.75 – 5.25 V	Refer to "Reference waveform No.2" of "HVAC Control Module and Its Circuits Inspection".
G55-3	WHT/BLK	Accessory switch	10 – 14 V	Ignition switch: ACC
G55-4	RED	Reverse switch (for AT model) (if equipped)	10 – 14 V	Transmission ramge switch: R
			0 V	Other than R range
G55-5	RED/BLK	Parking brake switch	10 – 14 V	Release parking brake lever
			0 V	Apply parking brake lever
G55-6	—	—	—	—
G55-7	WHT/ RED	Generator "L" terminal	10 – 14 V	Engine running
			0 V	Ignition switch: OM
G55-8	BLK/BLU	Driver side door switch	10 – 14 V	All door is closed
			0 V	Driver side door is opened
G55-9	—	—	—	—
G55-10	YEL	BCM-Meter communication line	0 V ↑↓ 10 – 14 V	Refer to "BCM-METR Signal Circuit Construction" and "BCM-METER Signal Circuit Inspection" in Section 8C.
G55-11	BLU/YEL	VSS	10 – 14 V	Ignition switch: ON
G55-12	YEL/GRN	IG2 switch	10 – 14 V	Ignition switch: ON
G55-13	BLU/RED	Key reminder switch	10 – 14 V	Insert key to key cylinder
G55-14	RED/BLK	Brake fluid level switch	10 – 14 V	Brake fluid level normal condition

Terminal	Wire Color	Circuit	Normal Voltage	Condition
G55-15	PPL/GRN	Driver side seat belt switch	10 – 14 V	Driver side seat belt: Unfastened
			0 V	Driver side seat belt: Fastened
G55-16	BLK/RED	Door switch (except driver side)	10 – 14 V	All door is closed
			0 V	Any one of the door is opened

Terminal "G56"

Terminal	Wire Color	Circuit	Normal Voltage	Condition
G56-1	PNK/BLK	Manual door lock switch	0 V ↑↓ 4.75 – 5.25 V (Reference waveform No.2)	Ignition switch: ON
			0 V	Manual lock switch: ON
G56-2	PNK	Door key cylinder lock switch	0 V ↑↓ 4.75 – 5.25 V (Reference waveform No.2)	Ignition switch: ON
			0 V	Key lock switch: ON
G56-3	GRY	—	—	—
		DRL selector line (Type A only: See NOTE)	0 V	Ignition switch:ON
G56-4	—	—	—	—
G56-5	GRY	Rear washer switch	10 – 14 V	Rear washer switch: ON
			0 V	Rear washer switch: OFF
G56-6	PNK	Rear wiper interval switch	10 – 14 V	Rear wiper interval switch: ON
			0 V	Rear wiper interval switch: OFF
G56-7	PNK/GRN	Manual door unlock switch	0 V ↑↓ 4.75 – 5.25 V (Reference waveform No.1)	Ignition switch: ON
			0 V	Manual unlock switch: ON
G56-8	PNK/BLU	Door key cylinder unlock switch	0 V ↑↓ 4.75 – 5.25 V (Reference waveform No.1)	Ignition switch: ON
			0 V	Door key cylinder unlock switch: ON
G56-9	RED/BLK	Diagnosis switch (monitor connector)	0 V ↑↓ 4.75 – 5.25 V (Reference waveform No.4)	Ignition switch: ON Diagnosis switch: OFF (monitor connector unconnected to ground circuit)
			0 V	Diagnosis switch: ON (monitor connector short to ground circuit)

Terminal	Wire Color	Circuit	Normal Voltage	Condition
G56-10	GRN	Windshield washer level switch (if equipped)	10 – 14 V	Windshield washer level switch: OFF
			0 V	Windshield washer level switch: ON
G56-11	LT GRN/ BLK	Fog light switch	10 – 14 V	Tail or head light: ON Front fog lamp switch: ON
			0 V	Except above condition
G56-12	ORN/BLU	Rear wiper low switch	10 – 14 V	Rear wiper low switch: ON
			0 V	Rear wiper low switch: OFF

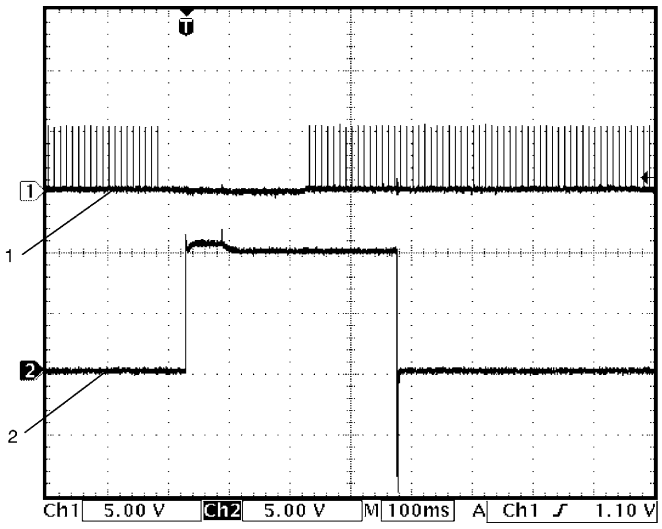
Terminal "G57"

Termi-nal	Wire Color	Circuit	Normal Voltage	Condition
G57-1	RED/ WHT	DRL control & headlight low monitor (LH steering vehicle only)	10 – 14 V	Headlight and DRL: OFF
			0 V	Headlight: ON or DRL: ON
G57-2	BLK	Ground	—	—

1. Reference waveform No.1

Passenger side or driver side door lock actuator UNLOCK signal (2) with manual unlock switch or door key cylinder unlock switch signal (1)

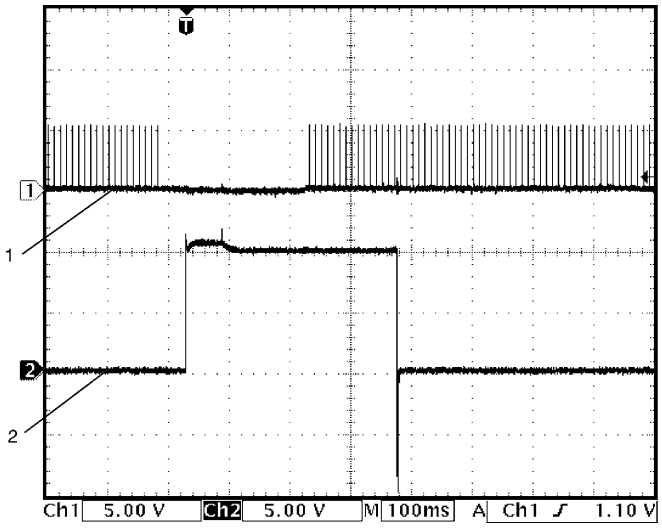
Measurement terminal	GH1: “G56-7” or “G56-8” to “G53-3” CH2: “G54-1” or “G54-2” to “G53-3”
Oscilloscope setting	CH1: 5 V/DIV CH2: 5 V/DIV TIME: 100 ms/DIV
Measurement condition	Ignition switch turns to ON position



2. Reference waveform No.2

Door lock actuator LOCK signal (2) with manual lock switch or door key cylinder lock switch signal (1)

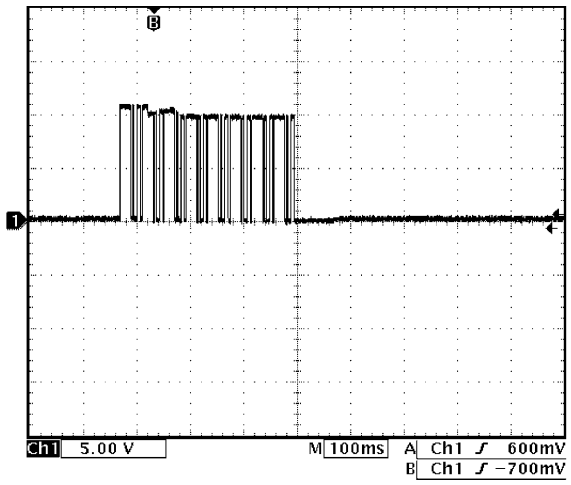
Measurement terminal	GH1: “G56-1” or “G56-2” to “G53-3” CH2: “G54-12” or “G53-3”
Oscilloscope setting	CH1: 5 V/DIV CH2: 5 V/DIV TIME: 100 ms/DIV
Measurement condition	Ignition switch turns to ON position



3. Reference waveform No.3

Keyless entry receiver LOCK / UNLOCK signal

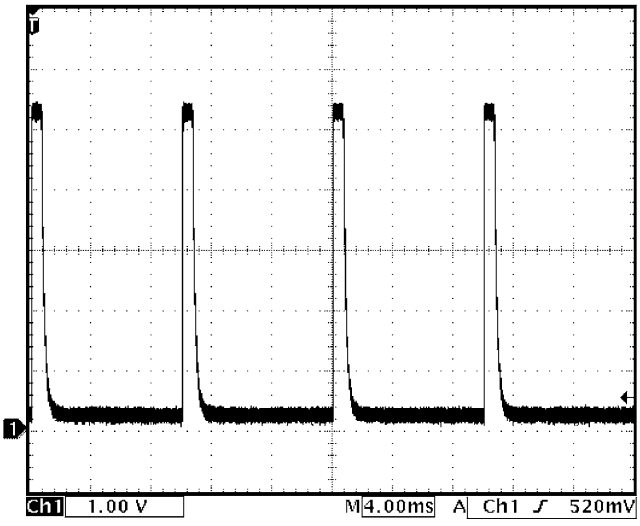
Measurement terminal	GH1: “G54-10” to “G53-3”
Oscilloscope setting	CH1: 5 V/DIV TIME: 100 ms/DIV
Measurement condition	Ignition key: Pull off



4. Reference waveform No.4

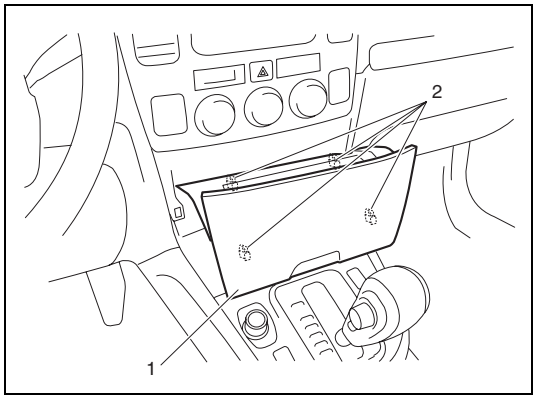
Diagnosis switch position signal

Measurement terminal	GH1: “G56-9” to “G53-3”
Oscilloscope setting	CH1: 1 V/DIV TIME: 100 ms/DIV
Measurement condition	Ignition switch turns to ON position

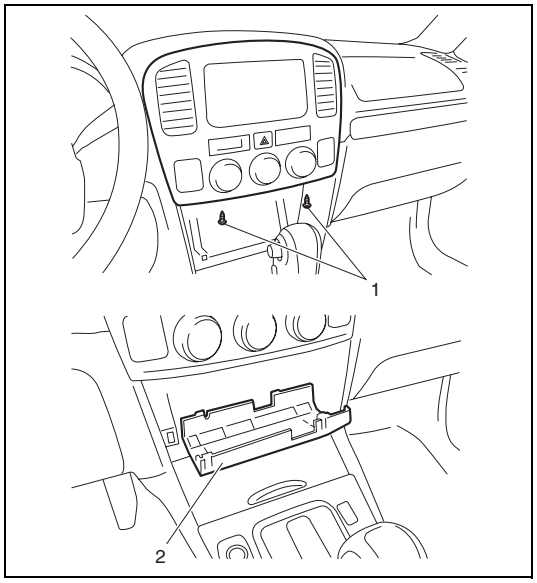


BCM removal and installation

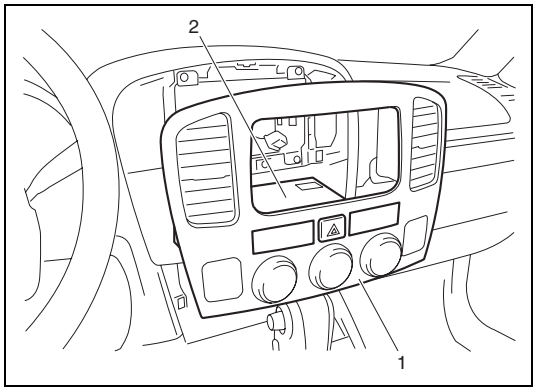
REMOVAL



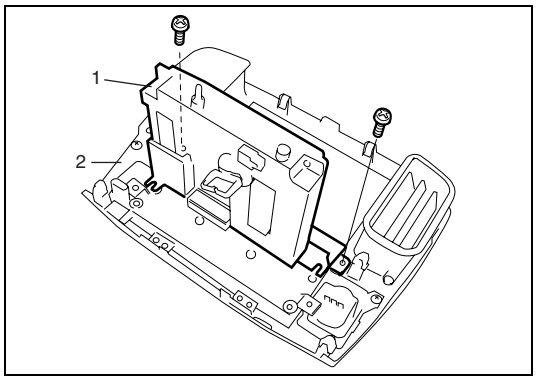
1) Disconnect negative (–) cable from battery.
2) Remove center lower garnish (1).



3) Remove center garnish mounting screw (1) and then pull off center garnish.
4) Remove harness and controller cover (2).

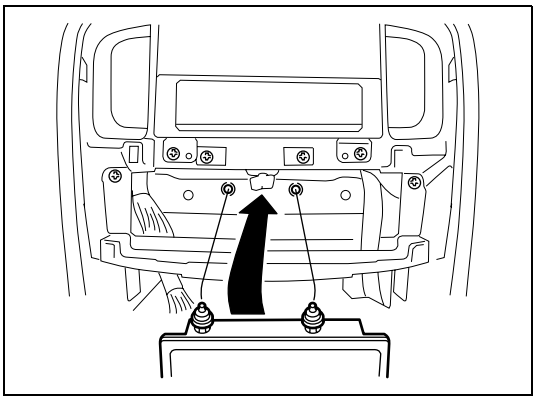


5) Disconnect BCM connectors and HVAC control module connector from each controller.
6) Remove center garnish (1) with BCM (2) and HVAC control module.



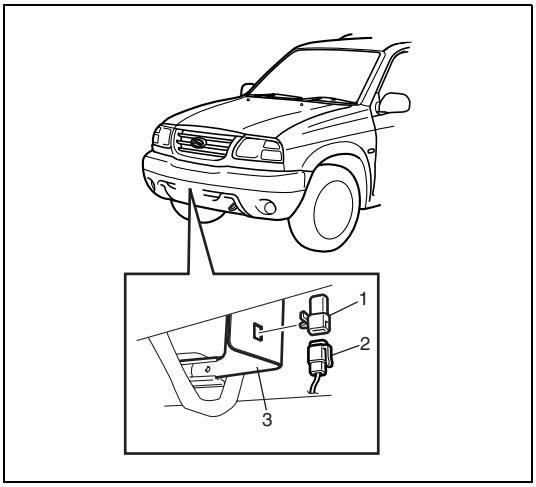
7) Remove BCM (1) from center garnish (2).

INSTALLATION

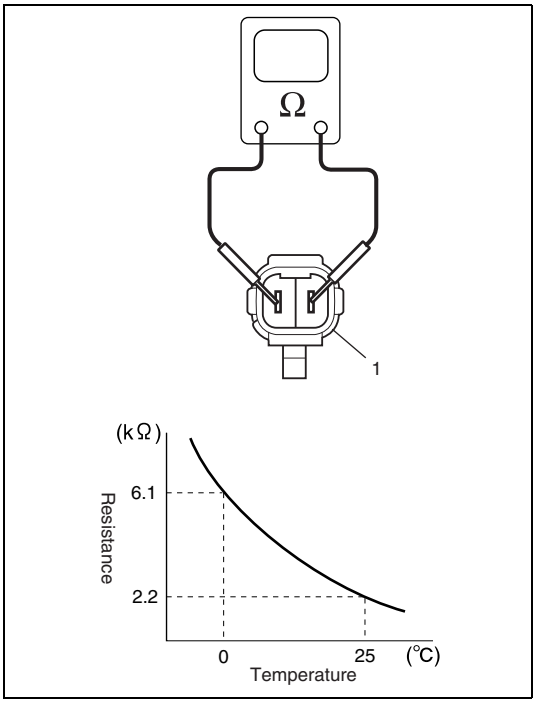


Reverse removal procedure for installation noting the following point.
When installing center garnish, align rubber bushing (1) with BCM installation hole (2) of instrument panel member (3).

Outside air temperature sensor inspection



1) Remove front bumper referring to “Front Bumper and Rear Bumper Components”.
2) Disconnect outside air temperature sensor connector (2).
3) Remove outside air temperature sensor (1) from 4WD air pump assembly bracket (3).



4) Immerse temperature sensing part of outside air temperature sensor (1) in ice water and measure resistance between sensor terminals while heating water gradually.

SECTION 9

BODY SERVICE

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**
- **When body servicing, if shock may be applied to air bag system component parts, remove those parts beforehand. (Refer to Section 10B.)**

NOTE:

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

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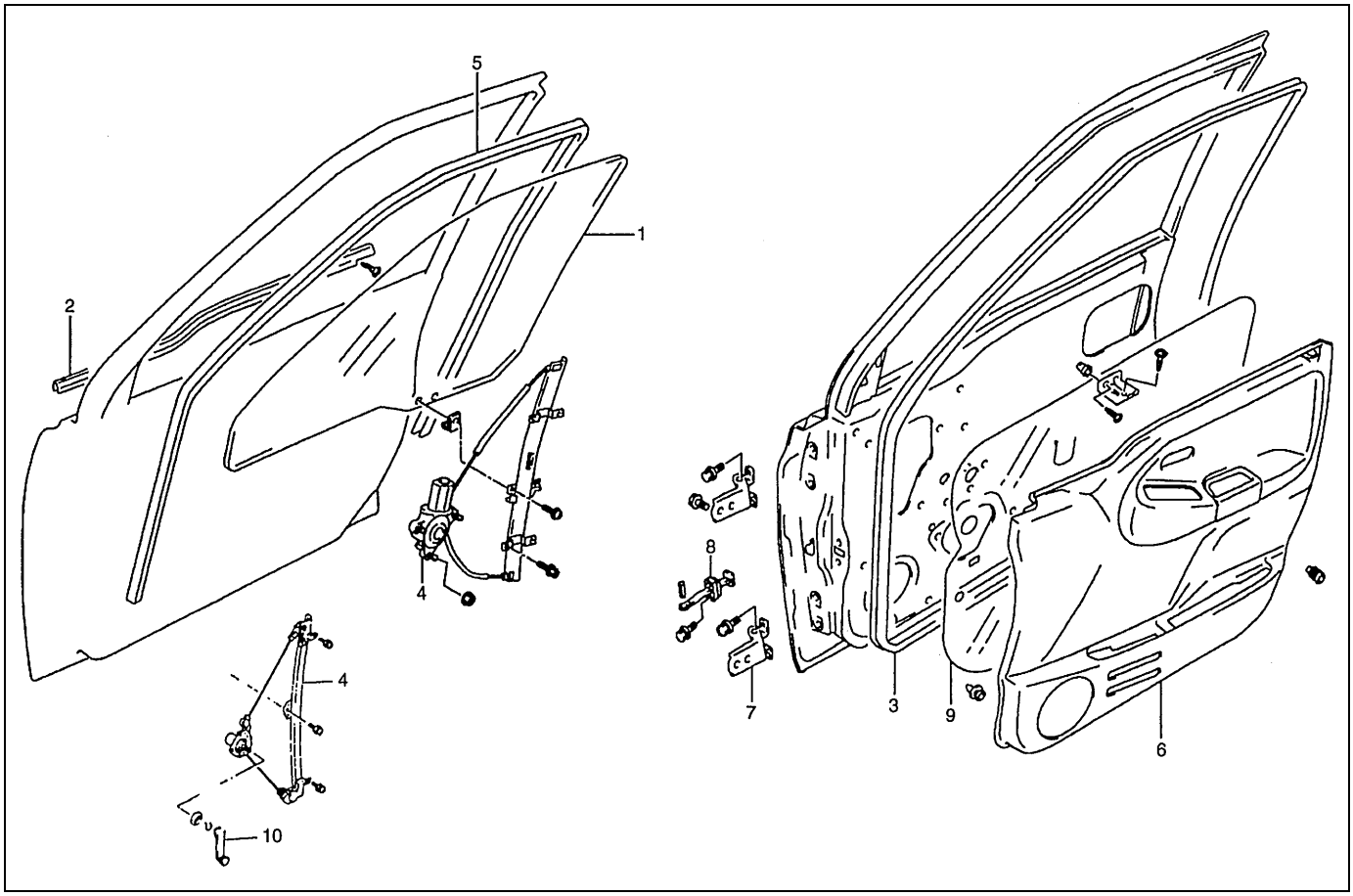
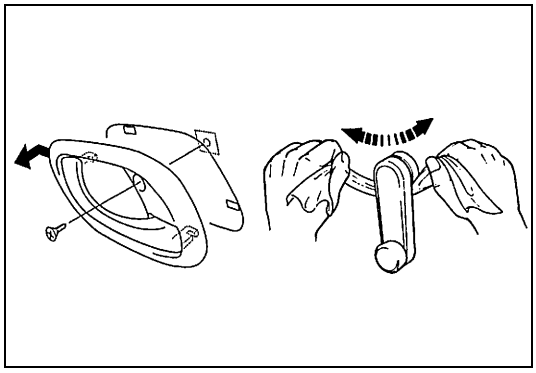
Glass, Windows and Mirror

Front Door Glass

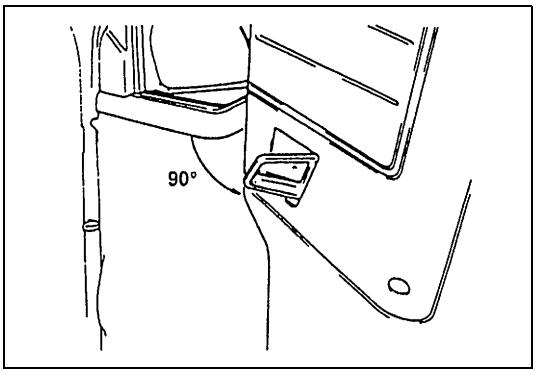


1. Door glass	6. Door trim
2. Weatherstrip	7. Door hinge
3. Opening weatherstrip	8. Door open stop
4. Window regulator	9. Door sealing cover
5. Glass run	10. Window regulator handle (if equipped)

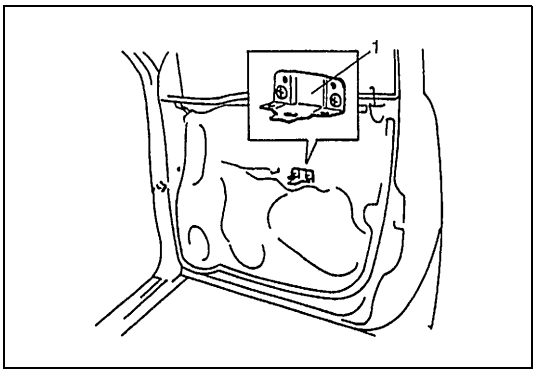
REMOVAL



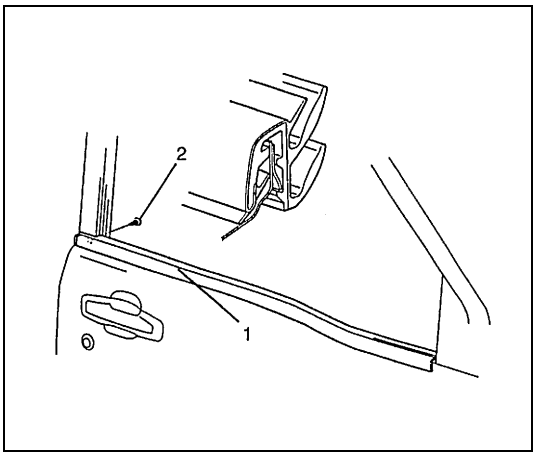
1) Remove inside handle bezel.
2) Remove door mirror bezel (if equipped).
3) Remove inside lock knob and door inside pull handle case fitting screw.
   a) Remove window regulator handle (if equipped).
      To remove regulator handle, pull off snap ring by using a cloth as shown below.



4) Remove door trim.
With inside handle bezel tilted as shown in figure, turn door trim 90° counterclockwise to remove it.
And disconnect power window switch lead wire at coupler (if equipped).



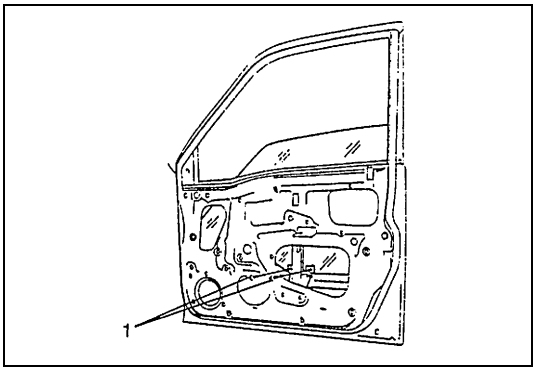
5) Remove door inside pull handle bracket (1).
6) Remove door sealing cover.



7) Remove door outside weatherstrip (1).
Lower window all the way down. Then, use a tape-wrapped putty knife (or screwdriver) to pry off weatherstrip.

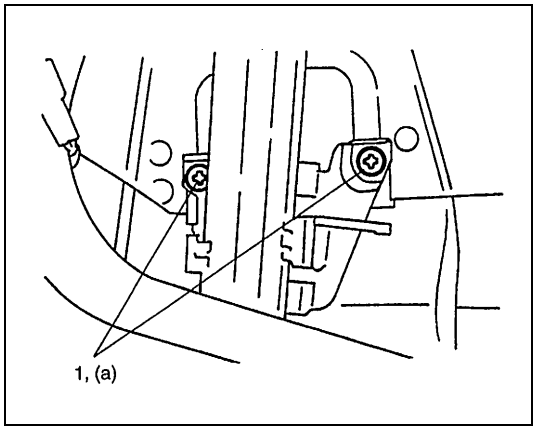
CAUTION:
Use a tape-wrapped putty knife (or screwdriver) to pry off weatherstrip. Use of an unwrapped tool will cause damage to painting.

2. Screw



8) Remove glass attaching screws (1).
9) Take out door glass.

INSTALLATION

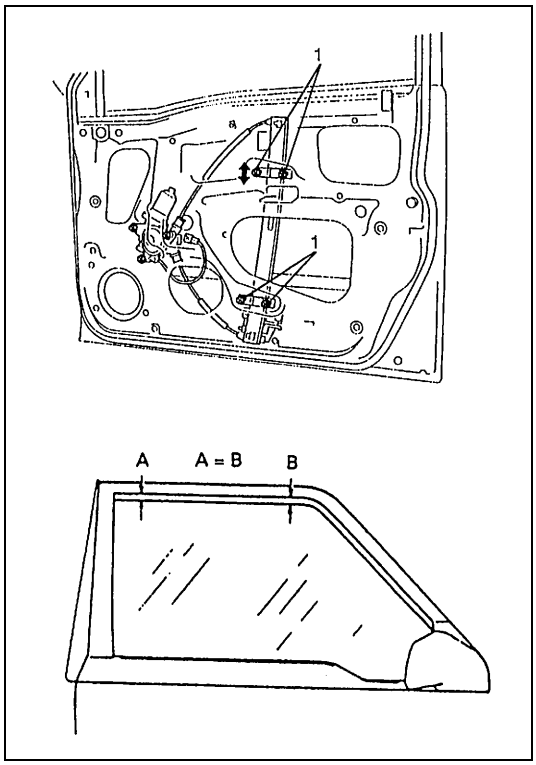


Reverse removal procedure to install door glass noting following points :

- Tighten glass attaching screws to specified torque. Tighten front screw first, then rear screw.

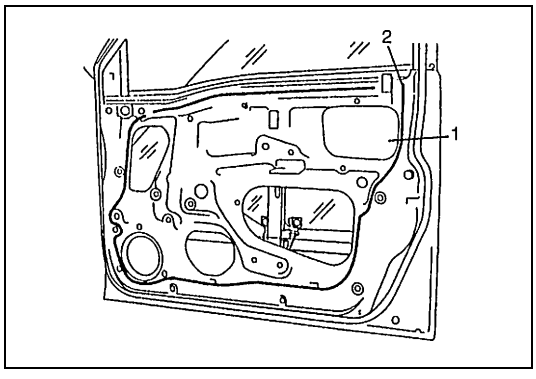
Tightening torque
(a) : 2.5 N·m (0.25 kg-m, 1.8 lb-ft)

- When window becomes hard to raise and lower, adjust screws (1) to correct tilted glass as shown in figure.



- Adjust equalizer of window regulator so that measurement A and B are equal.

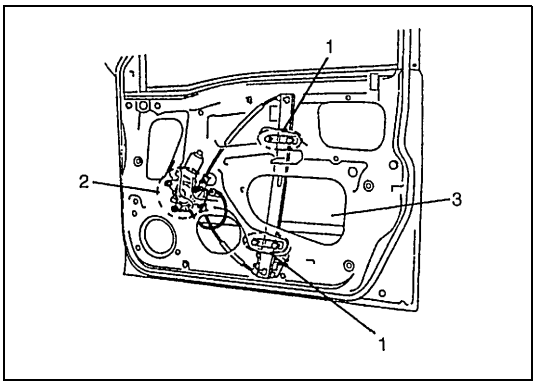
1. Bolts



- Secure door sealing cover (1) with adhesive (2).

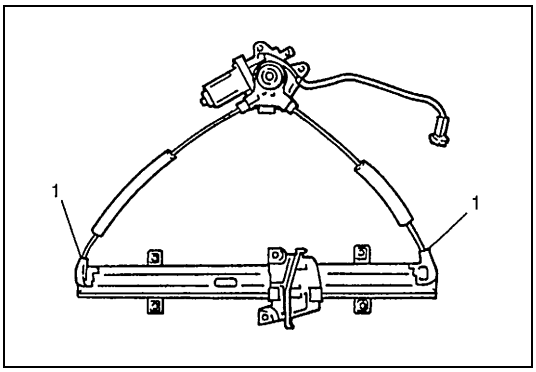
Front Door Window Regulator

REMOVAL



1) Remove door glass, referring to “Front Door Glass Removal” in this section.
2) Disconnect power window motor lead wire at coupler and loosen clamp.
3) Loosen regulator mounting bolts (1), nuts (2) and take out regulator through hole (3) as shown in left figure.

INSPECTION

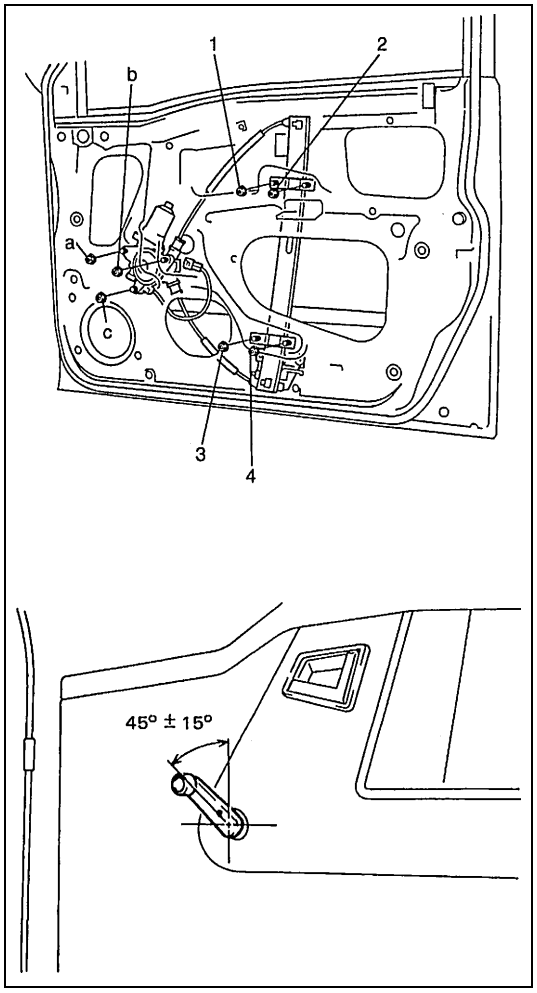


Check the following parts:

- Regulator sliding and rotating parts for greasing
- Rollers for wear and damage
- Wire for damage

1. Window regulator lubrication point

INSTALLATION

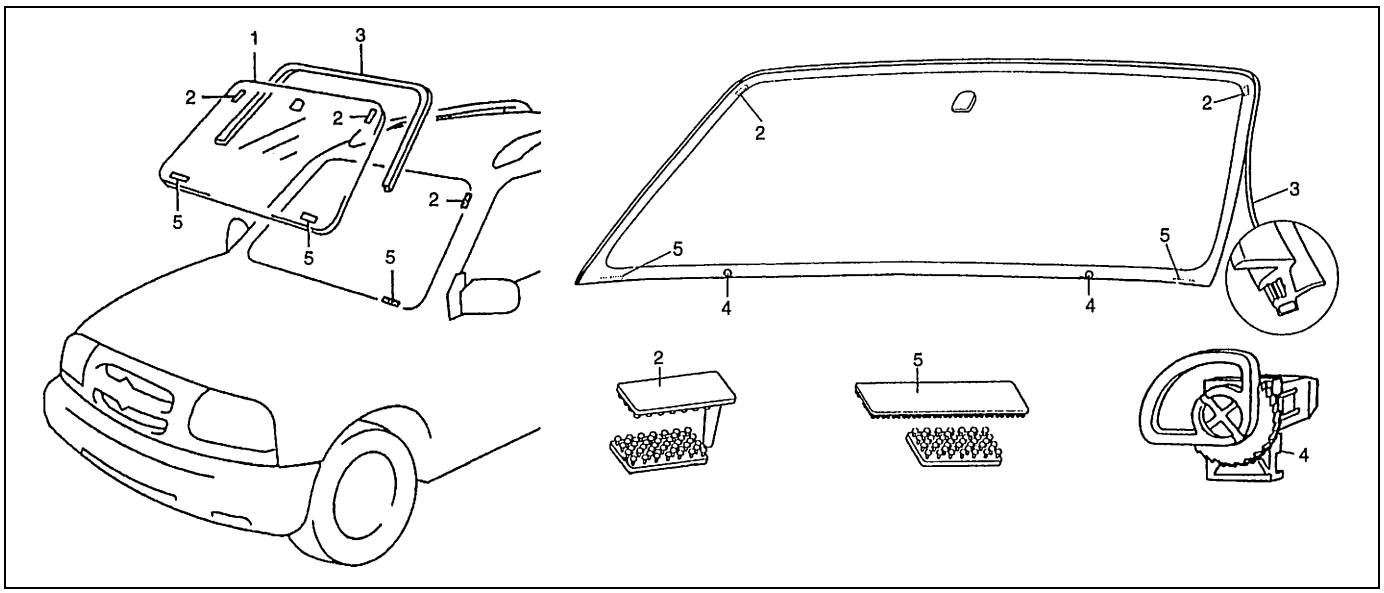


Reverse removal procedure to install window regulator noting the following point.

- Tighten bolts and nuts according to the order (a, b, c/1, 2, 3, 4) shown in left figure.
- When installing glass, check that the top part of the glass contacts the glass run evenly and that the glass moves up and down smoothly.
  If the glass is tilted with respect to the glass run, make a fine adjustment with the screws.
- Install door window regulator handle (if equipped) so that it has an angle as shown in figure when glass is fully closed.

Windshield

The front windshield is installed by using a special type of adhesive (that is, one component urethane adhesive used with primer). For the Windshield replacement, it is important to use an adhesive which provides sufficient adhesion strength and the follow the proper procedure.



1. Windshield glass	3. Windshield molding	5. Fastener No. 2
2. Fastener No. 1	4. Stopper	

CAUTION:

- **Described in this section is the glass replacement by using 3 types of primers and 1 type of adhesive made by YOKOHAMA (one component urethane adhesive to be used with primer in combination). When using primer and adhesive made by other manufacturers, be sure to refer to handling instructions supplied with them. Negligence in following such procedure or misuse of the adhesive in any way hinders its inherent adhesive property. Therefore, before the work, make sure to read carefully the instruction and description given by the maker of the adhesive to be used and be sure to follow the procedure and observe each precaution throughout the work.**
- **Should coated surface be scratched or otherwise damaged, be sure to repair damaged part, or corrosion may start from there.**

Use an adhesive of above mentioned type which has following property.

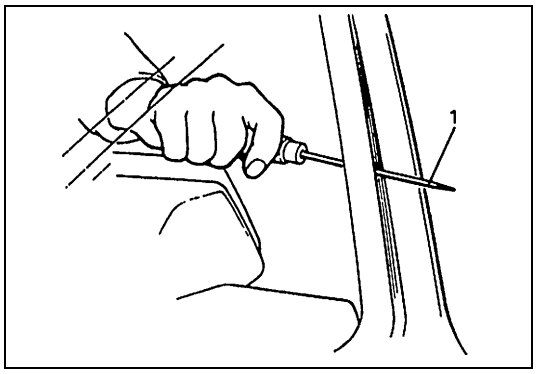
Shearing strength : 40 kg/cm^2 (569 lb/in^2) or more

Adhesive materials and tools required for removal and installation.

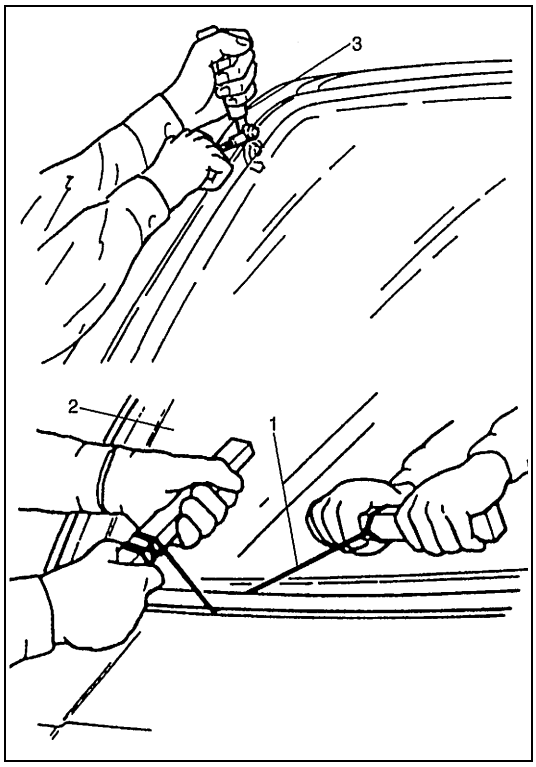
- One component urethane adhesive and primers used in combination (for one sheet of windshield).
  - Adhesive (470 g (15.7 oz.))
  - Primer for glass (30 g (1.0 oz.))
  - Primer for body (30 g (1.0 oz.))
  - Primer for molding (30 g (1.0 oz.))
- Eyeleteer
- Piano string
- Windshield knife
- Brush for primer application (2 pcs.)
- Knife
- Rubber sucker grip
- Sealant gun (for filling adhesive)
- Putty spatula (for correcting adhered parts)

REMOVAL

1) Clean both inside and outside of glass and around it.
2) Remove wiper arms and garnish.
3) Using tape, cover body surface around glass to prevent any damage.
4) Remove rear view mirror, sunvisor, and front pillar trims (right & left).
5) If necessary, remove instrument panel. Refer to “Instrument Panel” in this section.
6) If necessary, remove head lining. Refer to “Head Lining” in this section.
7) If necessary, remove roof trim. Refer to “Roof Trim” in this section.
8) Remove (or cut) windshield molding all around until windshield edge comes out.



9) Drill hole with eyeleteer (1) through adhesive and let piano string through it.

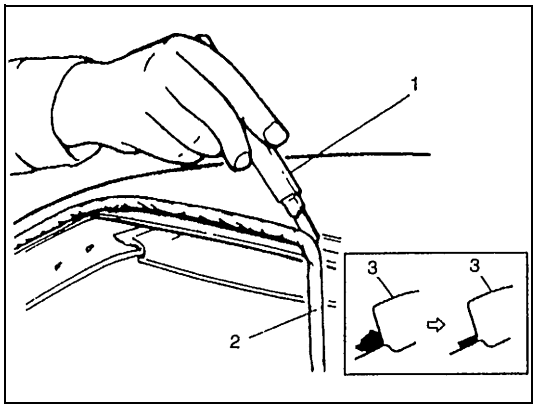


10) Cut adhesive all around windshield (2) with piano string (1). When using tool to cut adhesive, be careful not to cause damage to windshield. Use wire to cut adhesive along lower part of windshield.

NOTE:

Use piano string as close to glass as possible so as to prevent damage to body and instrument panel.

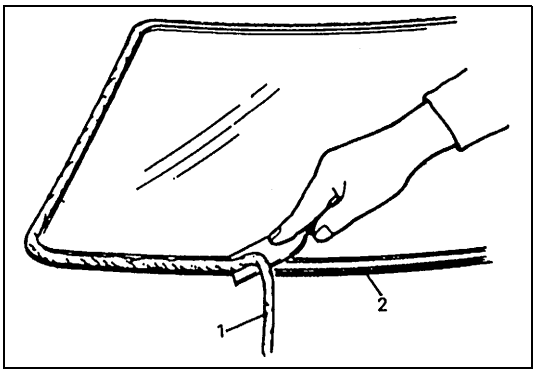
3. Windshield knife



11) Using knife (1), smoothen adhesive (2) remaining on body (3) side so that it is 1 to 2 mm thick all around.

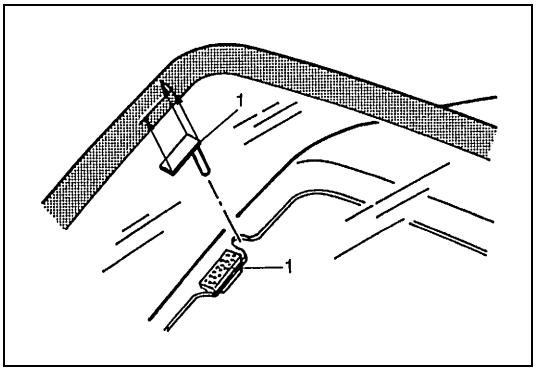
NOTE:

Before using knife, clean it with alcohol or the like to remove oil from it.

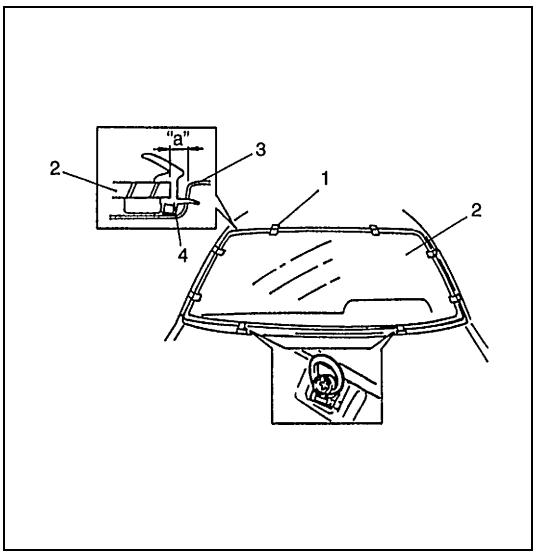


12) When reusing windshield, remove the adhesive (1) from it, using care not to damage primer coated surface (2).

INSTALLATION



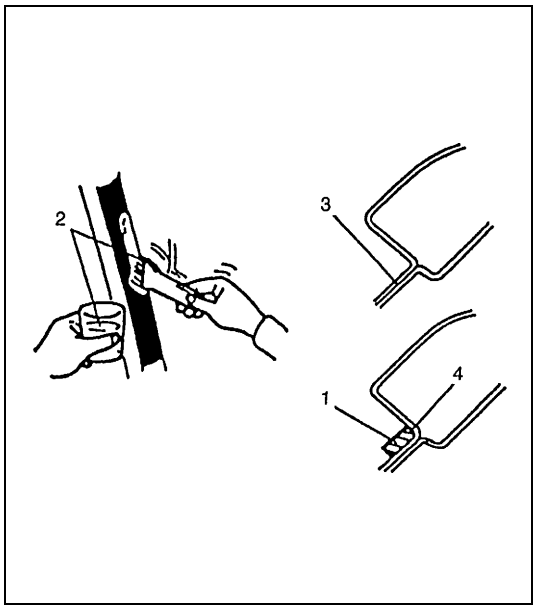
1) Using cleaning solvent, clean windshield edge where windshield glass is to be adhered. (Let it dry for more than 10 minutes.)
2) Install new glass stoppers (2pcs.) to lower side of windshield and new fastener (1) to body.
   When reusing wind shield, install new fastener to wind shield.



3) To determine installing position of glass (2) to body (3), position glass against body so that clearance between upper end of glass and body is about 5 mm (0.197 in.) and clearances between each side end (right & left) of glass and body are even. Place glass so that lug of fastener is matched with cut in body and fit fastener.
   Then mark mating marks (1) on glass and body as shown.
   Upper clearance can be adjusted by moving stoppers position.

Windshield clearance
"a" : approx. 5mm (0.197 in)

4. Molding

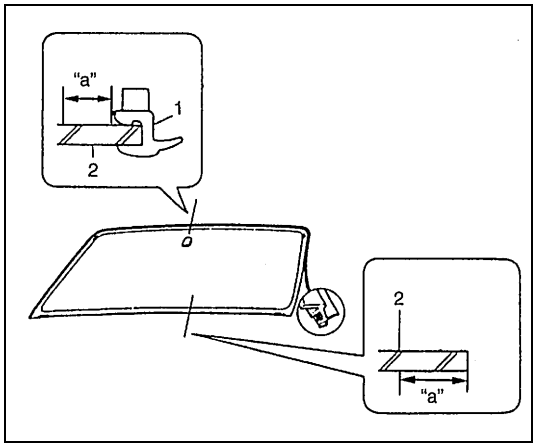


4) Clean contact surfaces of old adhesive, paint or bare metal thoroughly.
   If surfaces of paint or bare metal come out, apply primer (3) for body with caution not to apply primer to surface of adhesive remaining on body.

NOTE:

- **Be sure to refer to primer maker's instruction for proper handling and drying time.**
- **Do not touch body and old adhesive (4) surfaces where glass is to be adhered.**

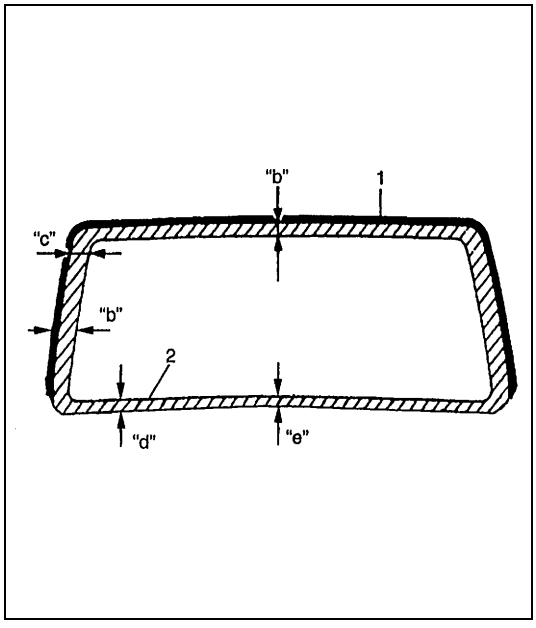
1.	Do not apply primer
2.	Primer



5) Install new molding (1) to glass (2).
6) Clean glass surface to be adhered to body with clean cloth. If cleaning solvent is used, let it dry for more than 10 minutes.

Cleaning Area

Distance from the edge of glass or molding
"a" : 30 – 50 mm (1.18 – 1.97 in.)



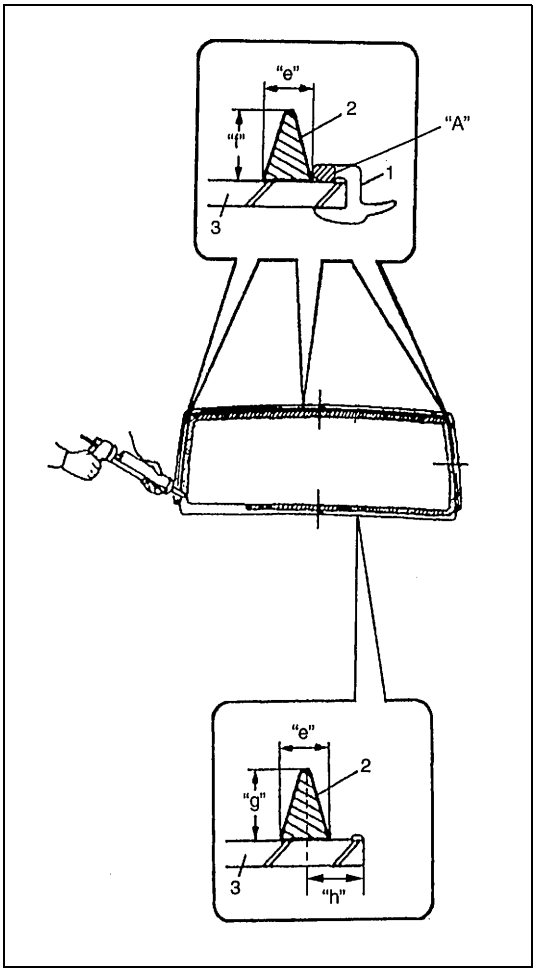
7) Using new brush, apply sufficient amount of primer for glass along glass surface to be adhered to body.

NOTE:

- **Be sure to refer to maker's instruction for proper handling and drying time.**
- **Do not apply primer on outside of ceramic coated surface.**
- **Do not touch primer coated surface.**

Width "b" : 18 – 19 mm (0.71 – 0.75 in.)
Width "c" : 16 – 17 mm (0.63 – 0.67 in.)
Width "d" : 24 mm (0.94 in.)
Width "e" : 27 mm (1.06 in.)

1.	Molding
2.	Fastener



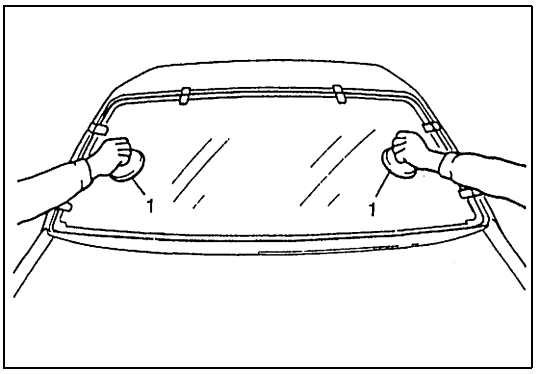
8) Apply primer for molding (1) along molding surface all around as shown in figure.
9) Apply adhesive (2) referring to figure at the left.

NOTE:

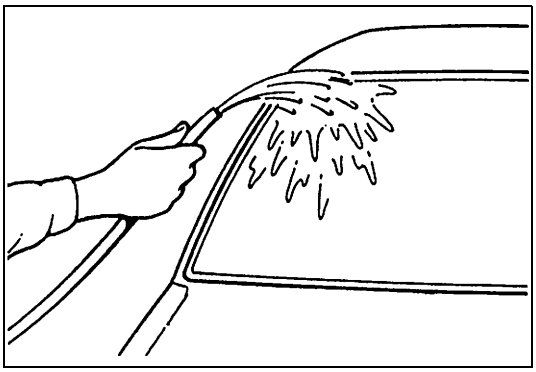
- **Start from bottom side of glass (3).**
- **Be careful not to damage primer.**
- **Height of adhesive applied to lower side should be higher than that of other three sides.**
- **Press glass against body quickly after adhesive is applied.**
- **Use of rubber sucker grip is helpful to hold and carry glass after adhesive is applied.**
- **Perform Steps 9) to 10) within 10 min. to ensure sufficient adhesion.**
- **Be sure to refer to adhesive maker's instruction for proper handling and drying time.**

Upper, right and left sides
Width "e" : Approx. 11 mm (0.43 in.)
Height "f" : Approx. 17 mm (0.67 in.)
Height "g" : Approx. 25 mm (0.98 in.)
Distance "h" : Approx. 16 mm (0.63 in.)

"A" : Primer for molding



10) Holding rubber sucker grips (1), place glass onto body by aligning mating marks marked in Step 3) and press it.



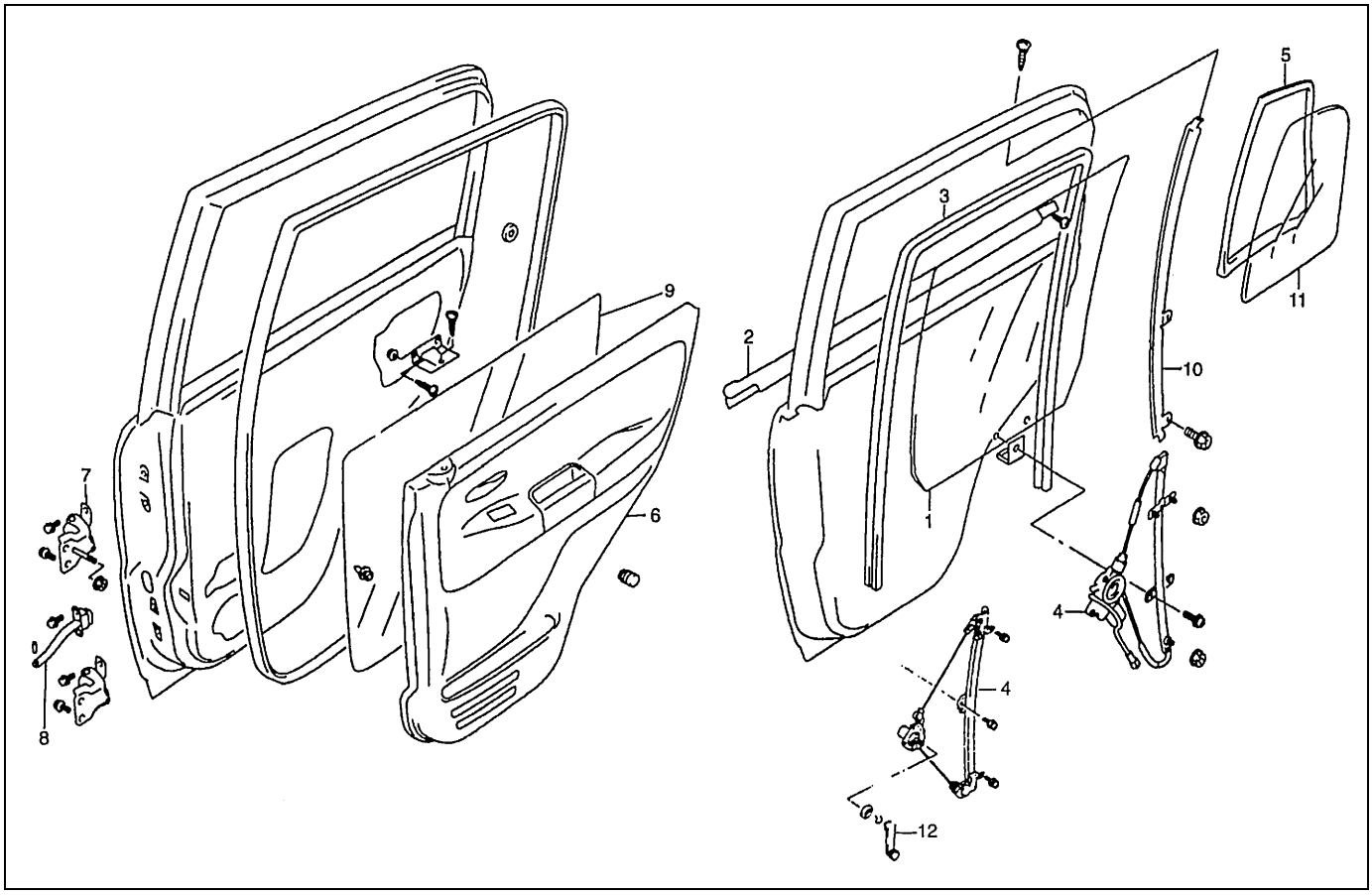
11) Check for water leakage by pouring water over windshield through hose. If leakage is found, dry windshield and fill leaky point with adhesive. If water still leaks even after that, remove glass and start installation procedure all over again.

CAUTION:

Upon completion of installation, note the following.

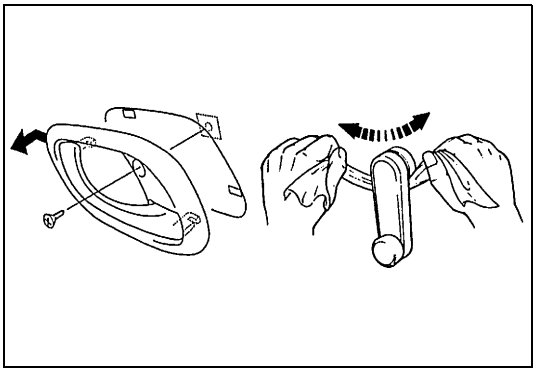
- **Do not use high pressure water.**
- **Do not blow compressed air directly at adhesive applied part when drying.**
- **Do not use infrared lamp or like for drying.**
- **Sudden closing of door before adhesive is completely set may cause glass to become loose or to come off. Therefore, if door is opened or closed before adhesive is completely set, make sure to open all door glasses and use proper care.**
- **If molding is not securely in place, hold it down with a tape until adhesive is completely set.**
- **Each adhesive has its own setting time. Be sure to refer to its maker's instruction, check setting time of adhesive to be used and observe precautions to be taken before adhesive is set.**
- **Refrain from driving till adhesive is completely set so as to ensure proper and sufficient adhesion.**

Rear Door Glass

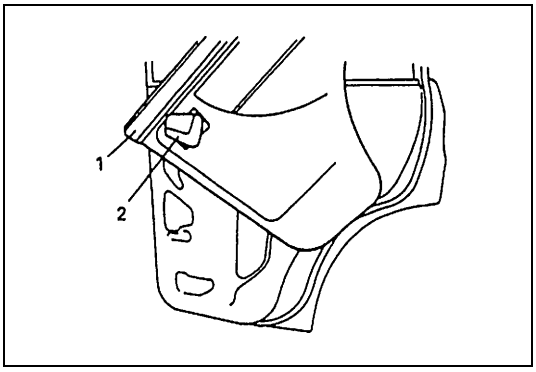


1. Door glass	5. Partition weather strip	9. Door sealing cover
2. Weatherstrip (outside)	6. Door trim	10. Door center sash
3. Glass run	7. Door hinge	11. Partition glass
4. Window regulator	8. Door open stop	12. Window regulator handle (if equipped)

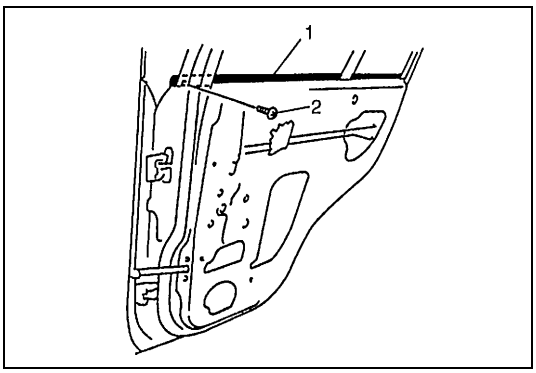
REMOVAL



1) Remove inside handle bezel.
2) Remove inside lock knob and door inside pull handle case fitting screw.
   a) Window regulator handle (if equipped).
      To remove regulator handle, pull off snap ring by using a cloth as shown below.



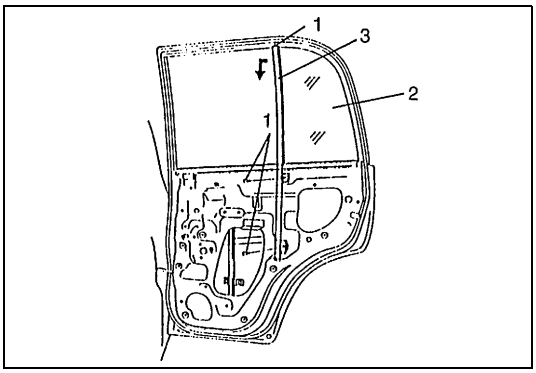
3) Remove door trim (1) with inside weatherstrip.
   With inside handle bezel (2) tilted as shown in figure, turn door trim 90° counterclockwise to remove it. And disconnect power window switch lead wire.
4) Remove door sealing cover.



5) Remove outer weatherstrip.

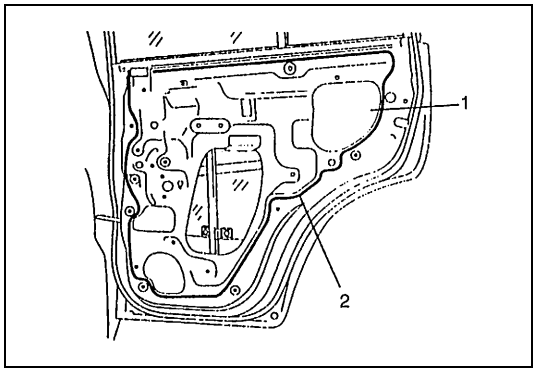
CAUTION:
Using a tape-wrapped putty knife (or tape-wrapped screwdriver), pry off weatherstrip. Use of an unwrapped tool will cause damage to painting.

1.	Door outer weatherstrip
2.	Screw



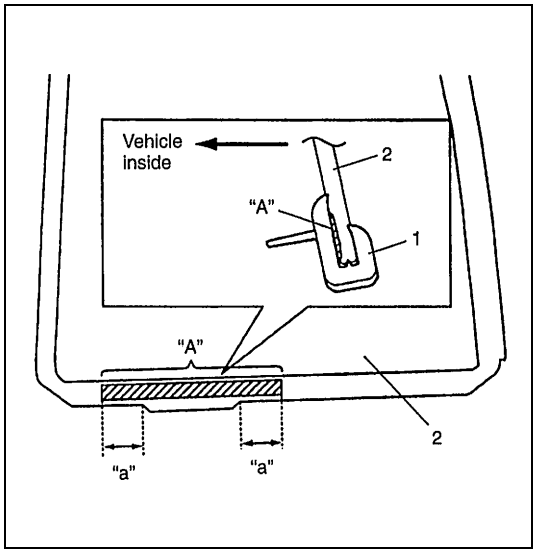
6) Remove glass fitting screws (1). Then down door glass.
7) Detach rear part of glass run from center sash.
8) Remove door center sash (3) (by removing two screws with door glass lowered all the way down).
9) When remove partition glass (2), slide to front to remove it.
10) Take out glass.

INSTALLATION



Reverse removal procedure to install rear door glass noting the following instructions.

- Secure door sealing cover (1) with adhesive (2).



- Apply instantaneous adhesive to hatched part "A" between partition glass (2) and partition weather strip (1).

NOTE:

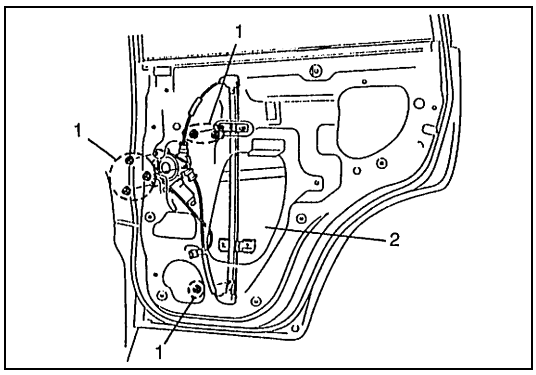
- **Horizontal adhesive application range should be in 25 – 35 mm (0.98 – 1.38 in.) from each convex corner of partition glass.**
- **Do not overflow instantaneous adhesive from edge of partition weather strip.**

CAUTION:
Never use instantaneous adhesive eroding rubber.

"A" :	Instantaneous adhesive area
"a" :	25 – 35 mm (0.98 – 1.38 in.)

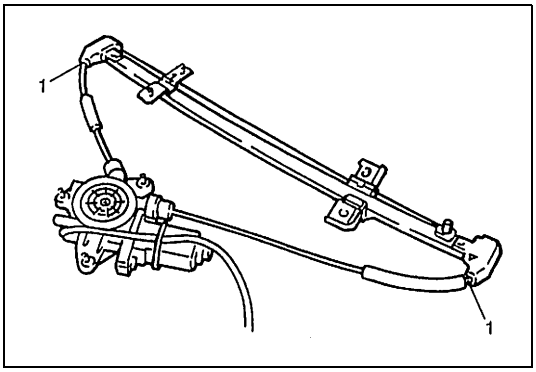
Rear Door Window Regulator

REMOVAL



1) Remove door glass, refer to Steps 1) to 10) of "Rear Door Glass Removal" in this section.
2) Disconnect power window motor lead wire at coupler and clamp.
3) Remove door window regulator attaching nuts (6 pcs.), and take out regulator through hole as shown in left figure.

1.	Door window regulator attaching nuts
2.	Hole



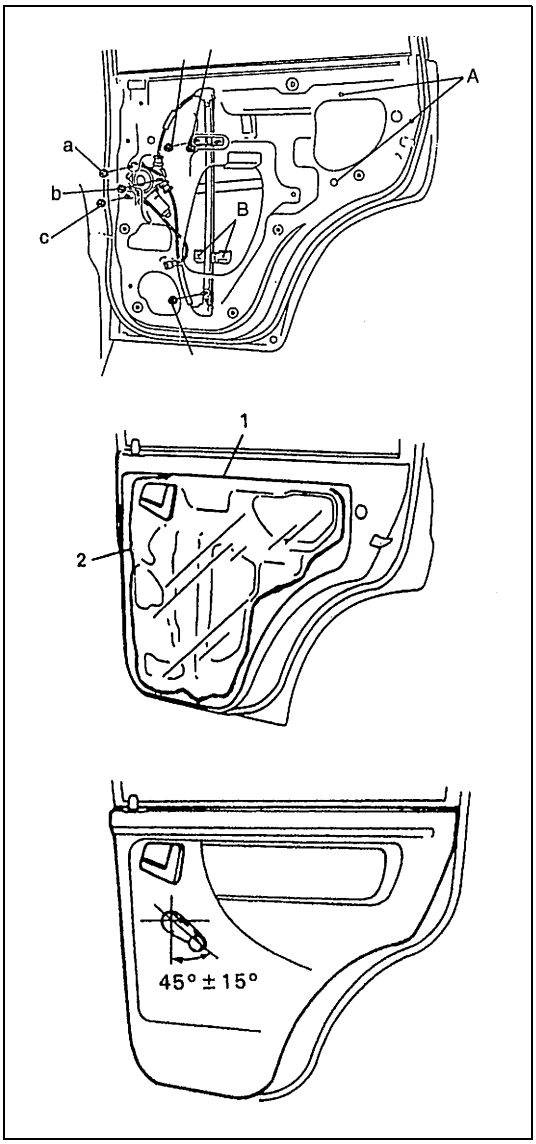
INSPECTION

Check the following parts:

- Regulator sliding and rotating parts for greasing
- Rollers for wear and damage
- Wire for damage

1. Window regulator lubrication points

INSTALLATION



Reverse removal sequence to install door window regulator noting following points.

- Tighten regulator base nuts according to the order (a, b, c) shown in figure.
- Adjust door window regulator according to following procedure.

a) Loosen three nuts, two screws and two bolts.
b) Raise window fully.
c) Tighten three regulator rail nuts according to the order (d, e, f) shown in figure and two center sash bolts A.
d) Lower window.
e) Tighten two screws B to specified torque. Tighten front screw first, then rear.

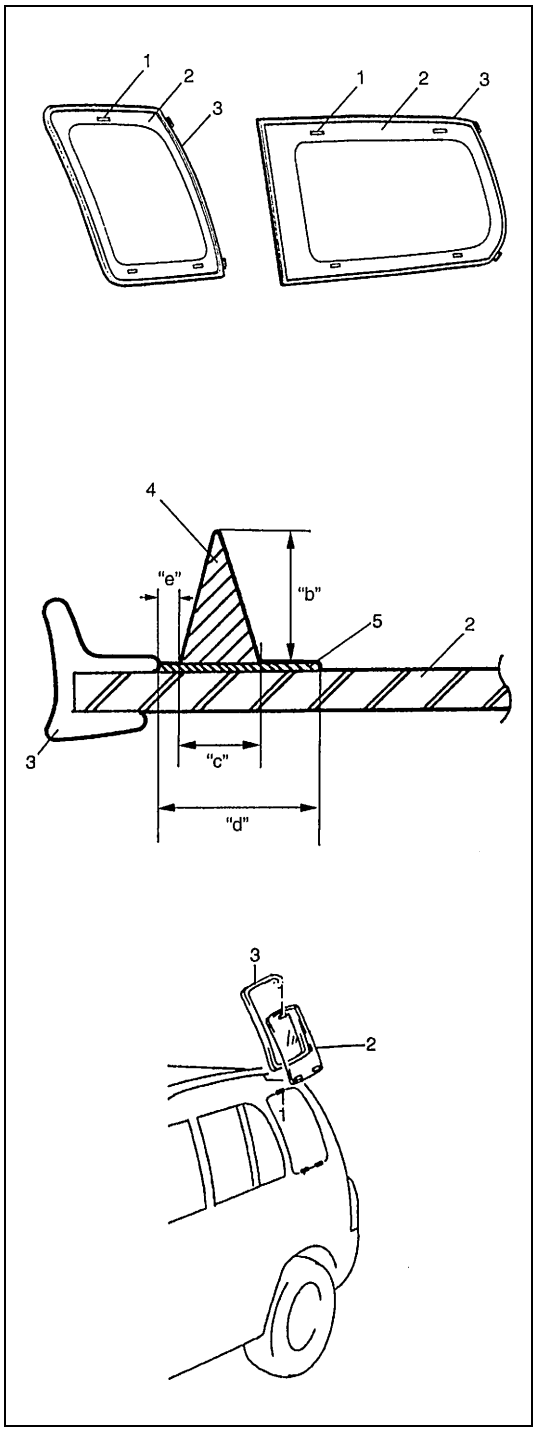
Tightening torque for glass attaching screws
2.5 N·m (0.25 kg-m, 1.8 lb-ft)

f) Check that the glass moves up and down smoothly and that the top part of the glass contacts the glass run evenly.

- Securely seal door sealing cover (1) with adhesive (2).
- Install door window regulator handle (if equipped) so that it has an angle as shown when glass is fully closed.

Quarter Window

REMOVAL AND INSTALLATION



Refer to "Windshield" section as removal and installation procedures and cautions are basically the same. However, note the following.

NOTE:

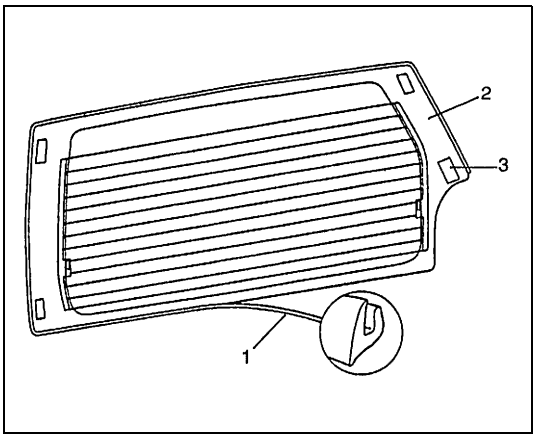
- **Before applying primer (5) to glass (2) edge, install molding (3) according to installing position shown in figure.**
- **Observe following precautions when applying adhesive (4) along glass edge.**
  - **– Adhesive should be applied evenly especially in height.**
  - **– Be careful not to damage primer.**
  - **– Press glass against body quickly after adhesive is applied.**

Height "b" : 12 mm (0.47 in.)
Width "d" : 16 mm (0.63 in.)
Width "c" : 8 mm (0.31 in.)
Clearance "e" : 1 mm (0.04 in.)

1. Fastener

Back Door Glass

REMOVAL AND INSTALLATION

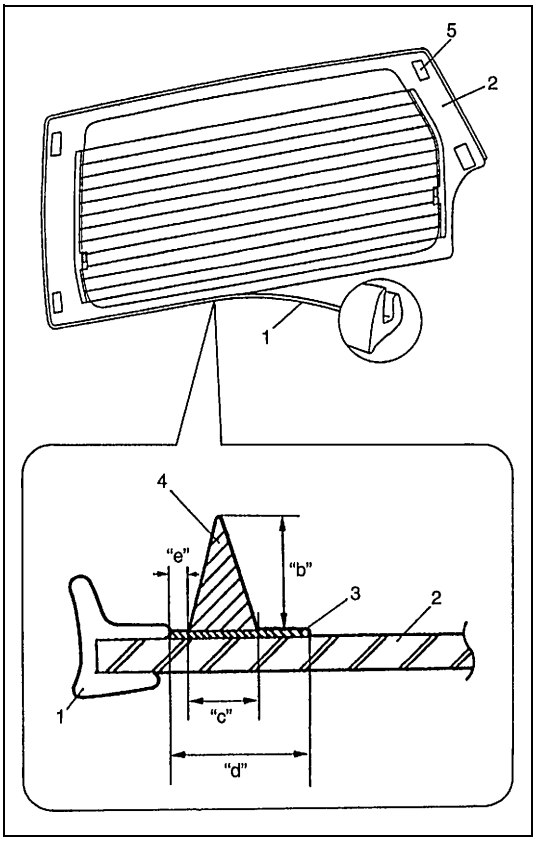


Refer to “Windshield” section as removal and installation procedures and cautions are basically the same. However, note the following.

NOTE:

Before applying primer to glass (2) edge, install molding (1) according to installing position shown in figure.

3. Fastener



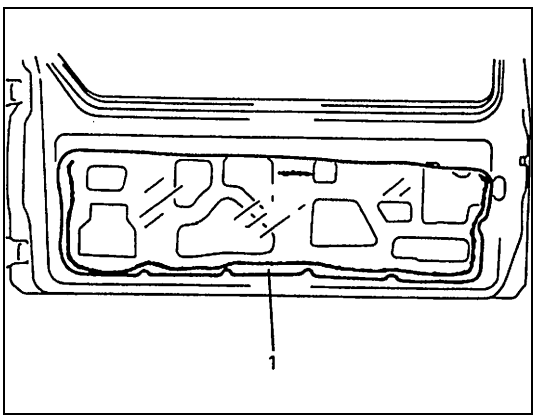
NOTE:

Observe following precautions when applying adhesive along glass edge.

- **– Adhesive should be applied evenly especially in height.**
- **– Be careful not to damage primer.**
- **– Press glass against body quickly after adhesive is applied.**

Height “b” : 15 mm (0.59 in.)
Width “c” : 8 mm (0.31 in.)
Width “d” : 16 mm (0.63 in.)
Clearance “e” : 1 mm (0.04 in.)

1. Molding
2. Glass
3. Primer
4. Adhesive
5. Fastener



NOTE:

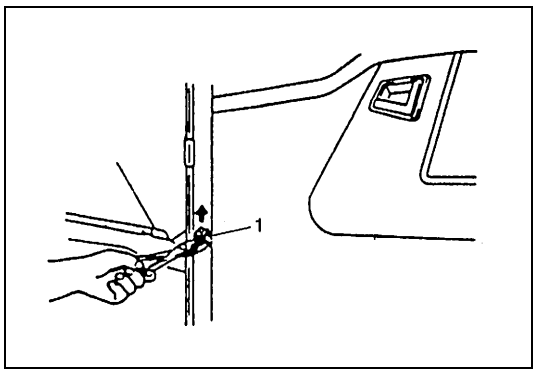
- **When replacing back door, coat replacement door inside with wax for proper anticorrosive treatment. Refer to “Under Coating/Anti-Corrosion Compound Application Area” in this section.**
- **Apply sealing compound to peripheral of door hem area and reinstall door sealing cover.**
- **When weatherstrip is hardened and water leaks have developed, replace it.**

1. Door sealing cover

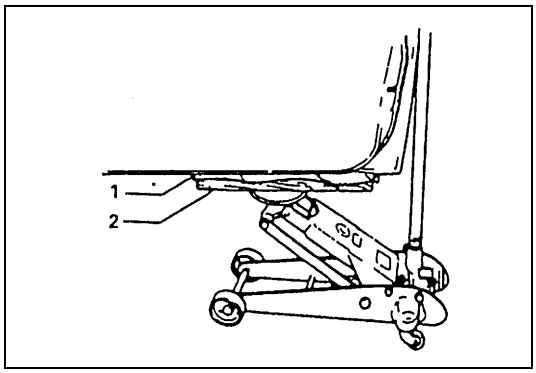
Body Structure

Front Door Assembly

REMOVAL

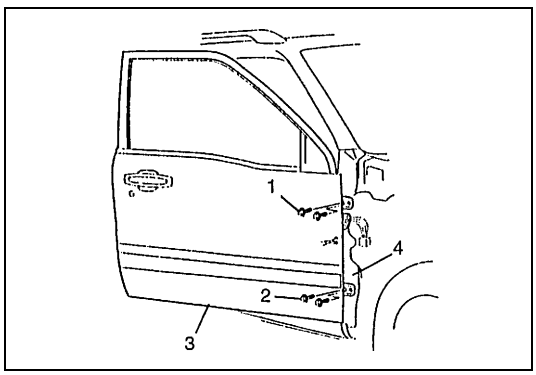


1) Remove front fender. Refer to “Front Fender” in this section.
2) Disconnect door harness lead wires at each coupler.
3) Remove stopper pin (1).



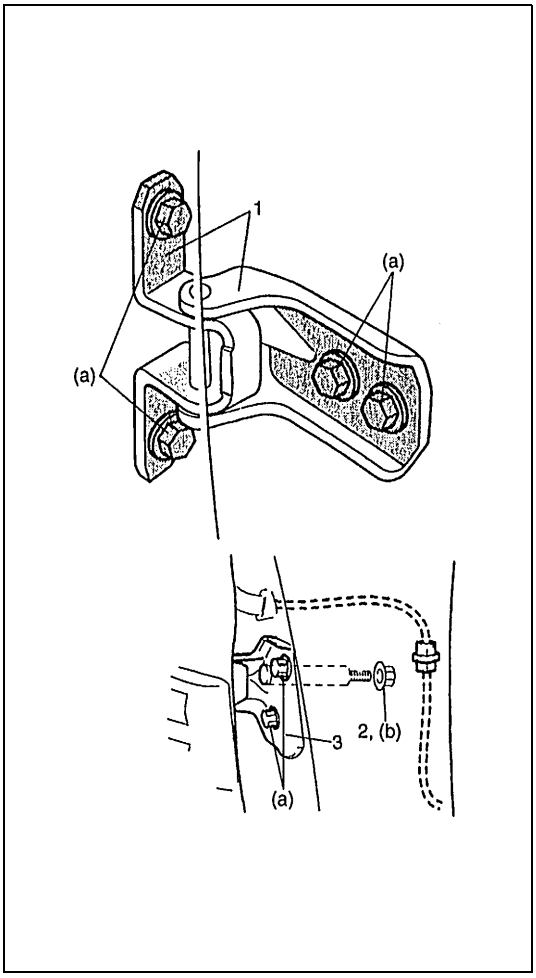
4) Support door panel using a jack with a piece of wood (2) placed between jack and panel, as shown.

1. Rags



5) Remove door assembly (3) by loosening hinge mounting bolts.

1. Upper hinge mounting bolts
2. Lower hinge mounting bolt
4. Body



INSTALLATION

Reverse removal procedure to install door assembly, noting following point.

NOTE:

When replacing door, coat replacement door inside with wax for proper anticorrosion treatment.
Refer to "Undercoating/Anti-Corrosion Compound Application Area" in this section.

- Tighten door hinge bolts (and nut) to specified torque.

Tightening torque
(a) : 27 N·m (2.7 kg-m, 19.5 lb-ft)
(b) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

- Adjust door latch striker position by referring to "Front Door Lock Installation" section so that door is positioned correctly.
- Adjust front door cushion so that door contacts body when closed.
- After installation, open and close the door to check looseness.
  Replace door open stopper pin when there is looseness.
- When weatherstrip is hardened, water leak may develop.
  In such case, replace it with new one.

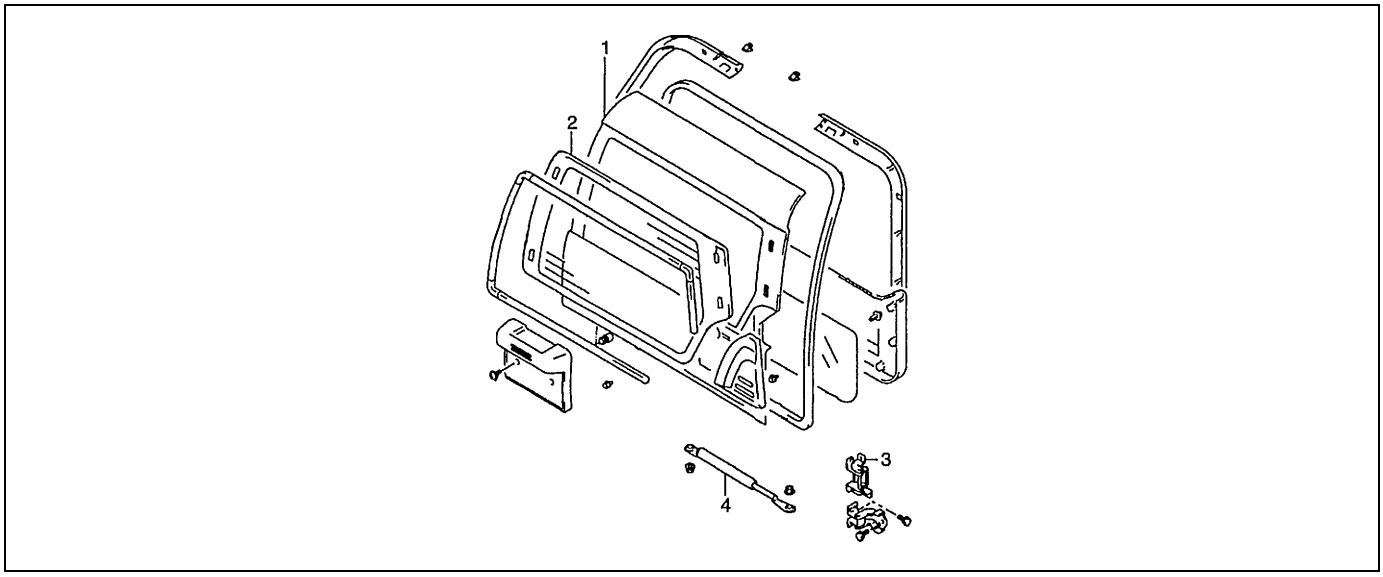
1.	Front door hinge
2.	Upper hinge nut (rear door)
3.	Rear door hinge

Rear Door Assembly

REMOVAL AND INSTALLATION

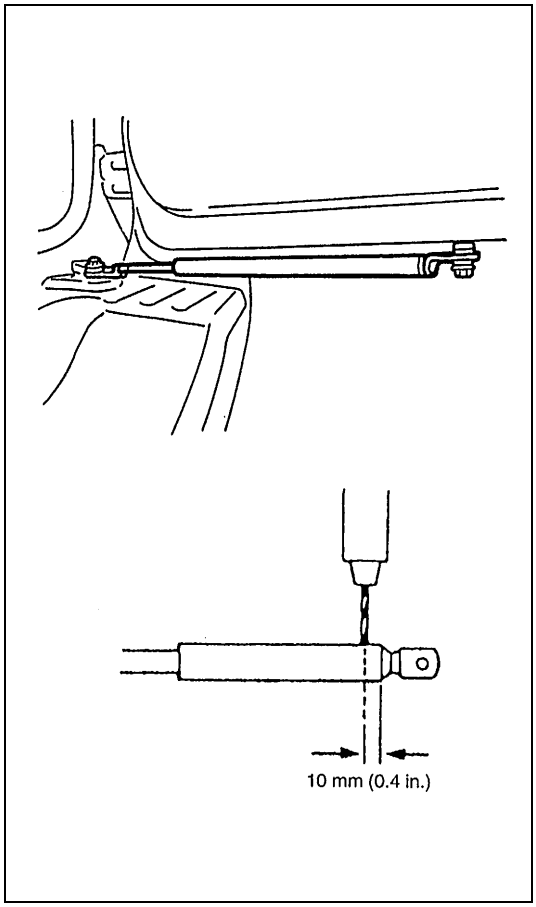
Follow procedures for Front Door removal/installation in this section.

Back Door/Rear Gate Assembly



1. Back door panel assy	3. Back door hinge
2. Back door window glass	4. Back door/Rear gate balancer unit

REMOVAL

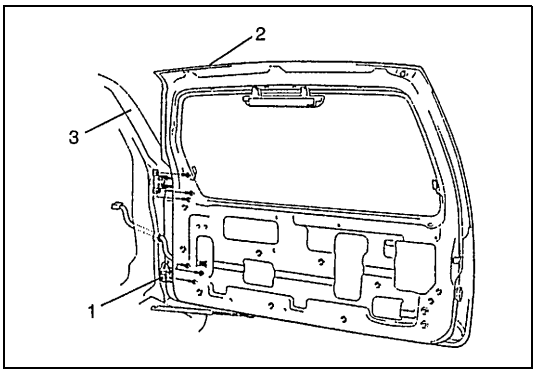


1) Remove back door trim, and door/rear gate sealing cover, refer to Steps 1) to 4) of “Back Door Lock Assembly” in this section.
2) Remove wire harness connector inside the back door/rear gate.
3) Remove back door/rear gate balancer (first at its door-side and next at its body-side), as shown.

WARNING:

Handling of Back Door/Rear Gate Balancer (Damper)

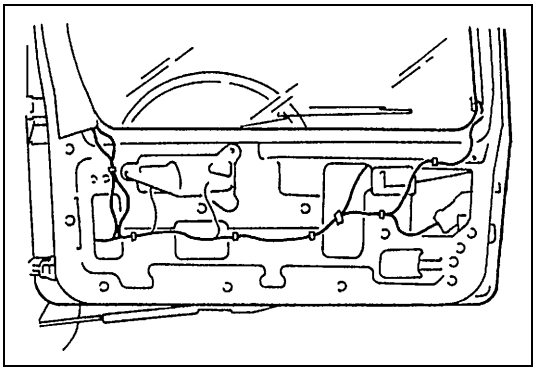
- **Do not disassemble balancer because its cylinder is filled with gas.**
- **The gas itself is harmless but it may issue out of the hole together with chips generated by the drill. Therefore, be sure to wear goggle.**
- **When discarding removed back door/rear gate balancer (damper), use a 2 to 3 mm (0.08 to 0.12 in.) drill to make a hole as shown.**
- **Handle balancer carefully. Do not scar or scratch exposed surface of its piston rod, and never allow any paint or oil to stick to its surface.**
- **Do not turn piston rod with balancer fully extended.**



4) Remove back door/rear gate hinge bolts and back door/rear gate.

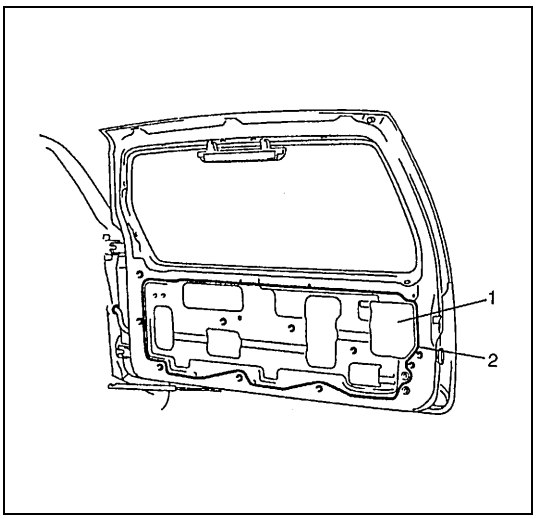
1.	Back door hinge
2.	Back door
3.	Body

INSTALLATION



Reverse removal procedure to install back door/rear gate noting following points.

- Secure wiring harness.



- Secure back door/rear gate sealing cover (1).

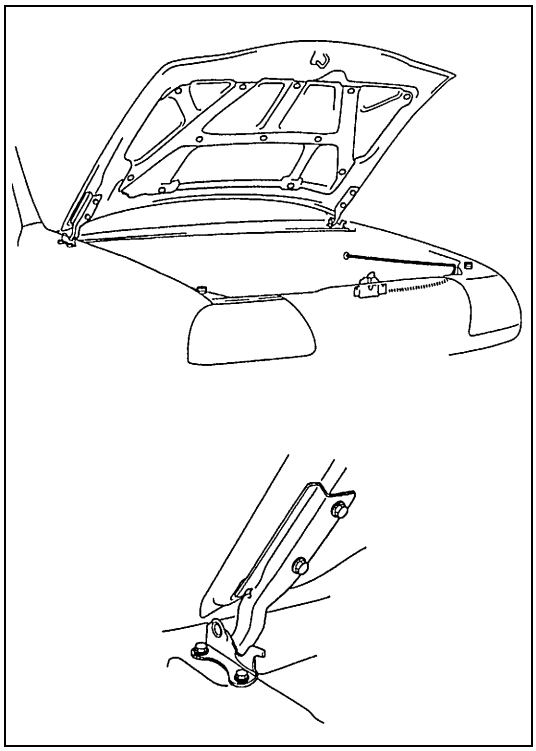
NOTE:

Use adhesive (2) to seal sealing cover to back door/rear gate.

- Adjust back door/rear gate latch striker position by referring “Back Door Lock Assembly Installation” so that back door/rear gate is positioned correctly.
- Adjust back door/rear gate cushion so that back door/rear gate contacts body when closed.

Hood

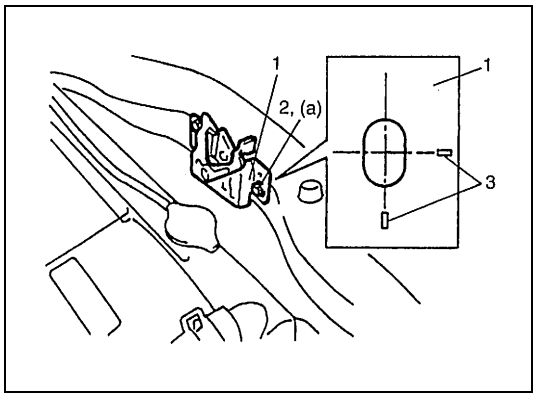
REMOVAL



1) Remove window washer hose from hood.
2) Remove four mounting bolts to detach hood.

ADJUSTMENT

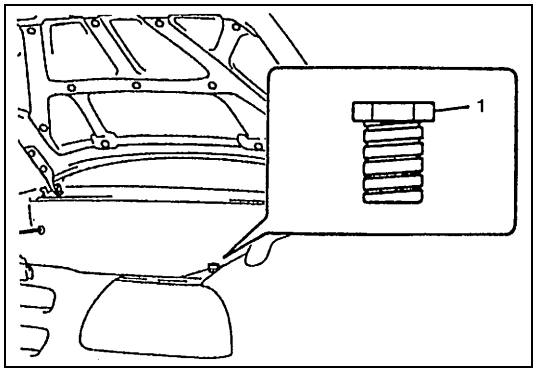
- Fore-and-aft and right-and-left adjustment.
  Loosen four mounting bolts for adjustment.



- Hood lock (1) adjustment
  When installing hood lock, bring bolt at intersection point of match marks (2) and move it in vertical direction for adjustment, if necessary.

Tightening torque
(a) : 10 N·m (1.0 kg-m, 7.5 lb-ft)

2. Hood lock bolts



- Vertical adjustment
  If only one side (right or left) of hood is not level with front fender, make it level by tightening or loosening hood cushion (1).

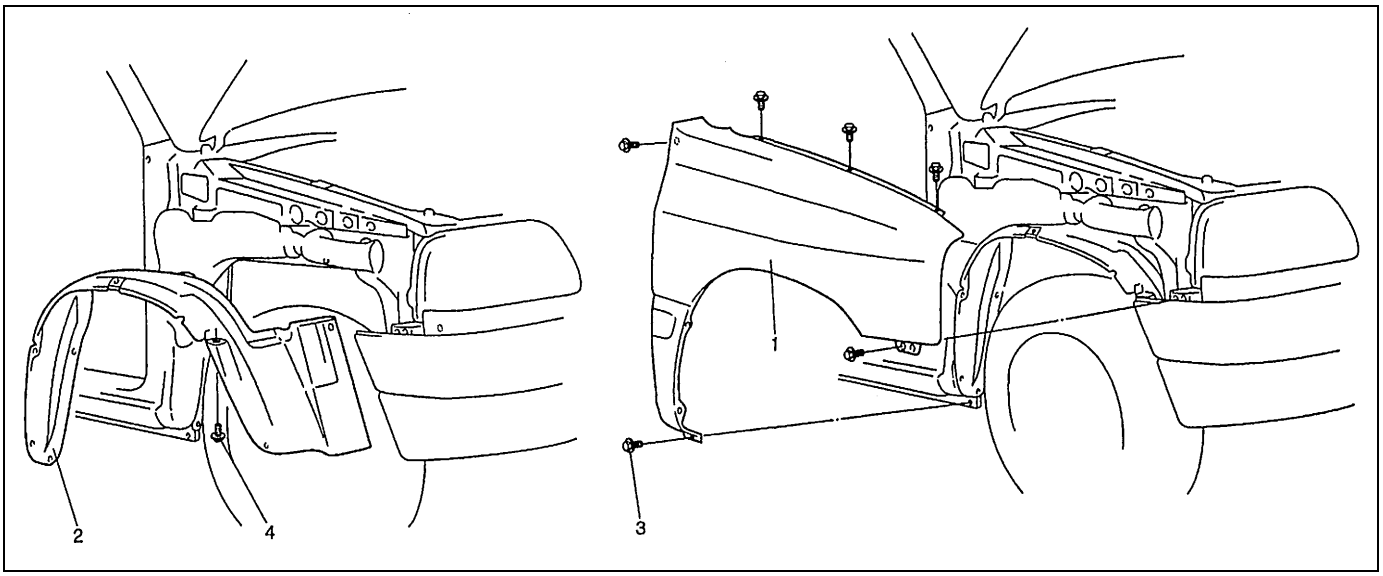
INSTALLATION

Reverse removal procedure to install hood.

INSPECTION

Check that secondary latch operates properly (check that secondary latch keeps hood from opening all the way even when pulling hood release handle inside vehicle.) Also check that hood opens and closes smoothly and properly and hood locks securely when closed.
If any malfunction is found, lubricate hinge and latch, or repair hood lock system.

Front Fender

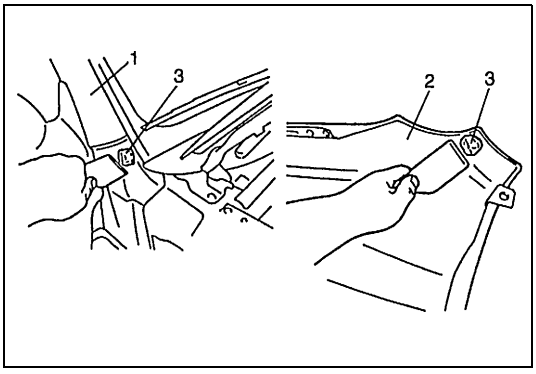


1. Front fender	3. Fender attaching bolts
2. Front fender lining	4. Fender lining attaching screws

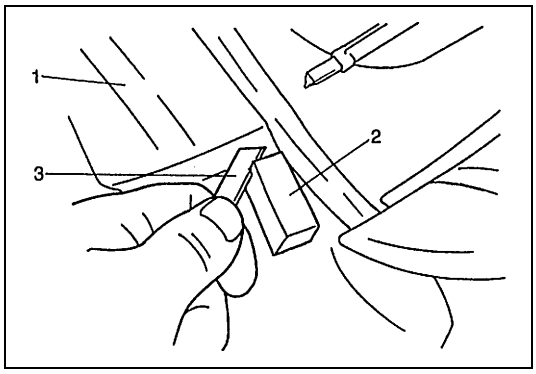
REMOVAL

1) Remove front bumper.
2) Remove fender splash guard (H25 engine).
3) Remove front fender lining.
4) Remove front fender.

INSTALLATION



1) Remove pad (3) from side body (1) and (or) fender (2), using care not to damage painted surface.



2) Attach new pad (2) cutting appropriately size temporarily and adjust height with a knife (3) so that fender becomes flush with side body (1).
3) Reverse removal procedure for installation.

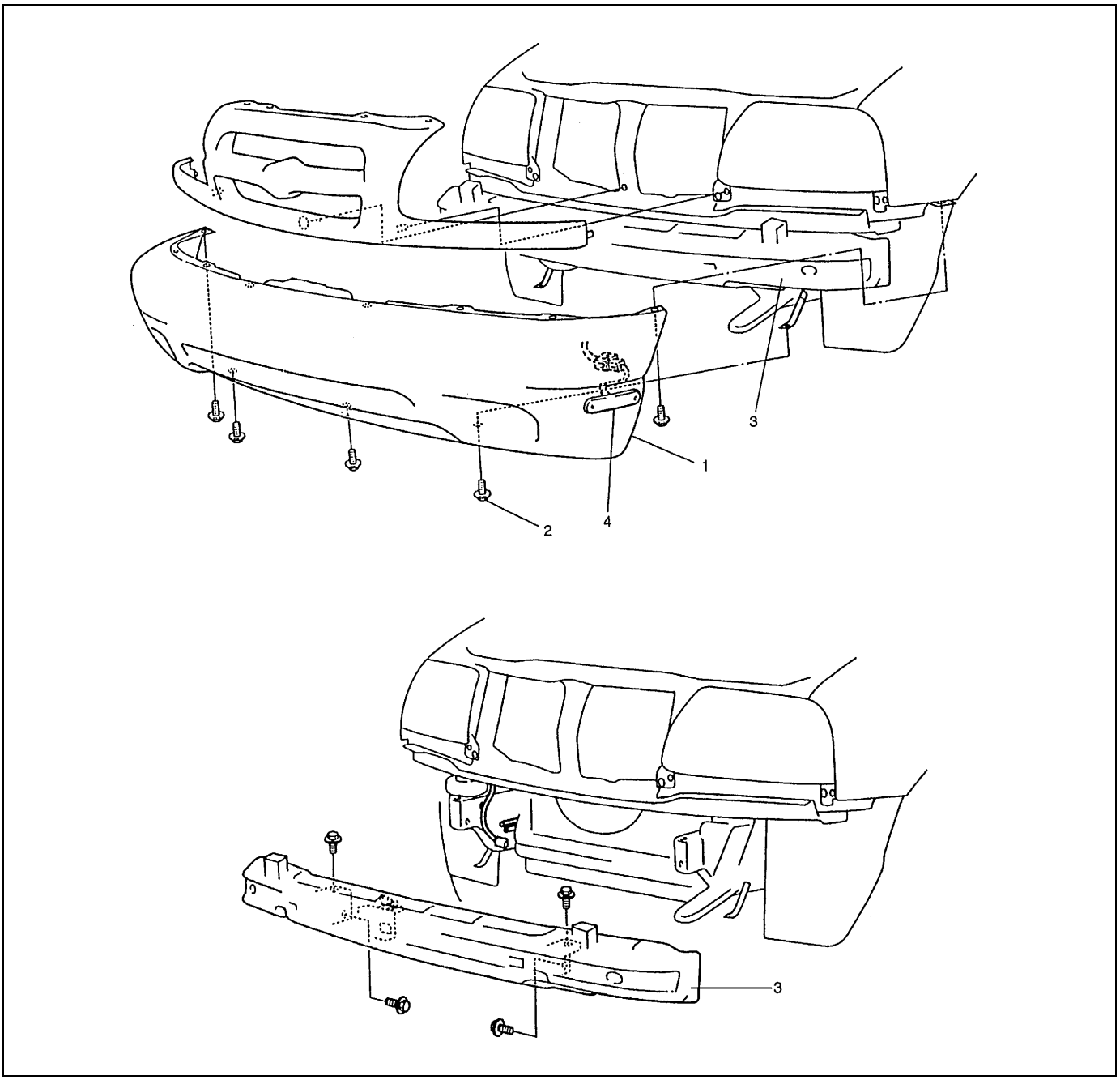
NOTE:

If paint on fender bolt is peeled off, be sure to apply paint again.

Front Bumper

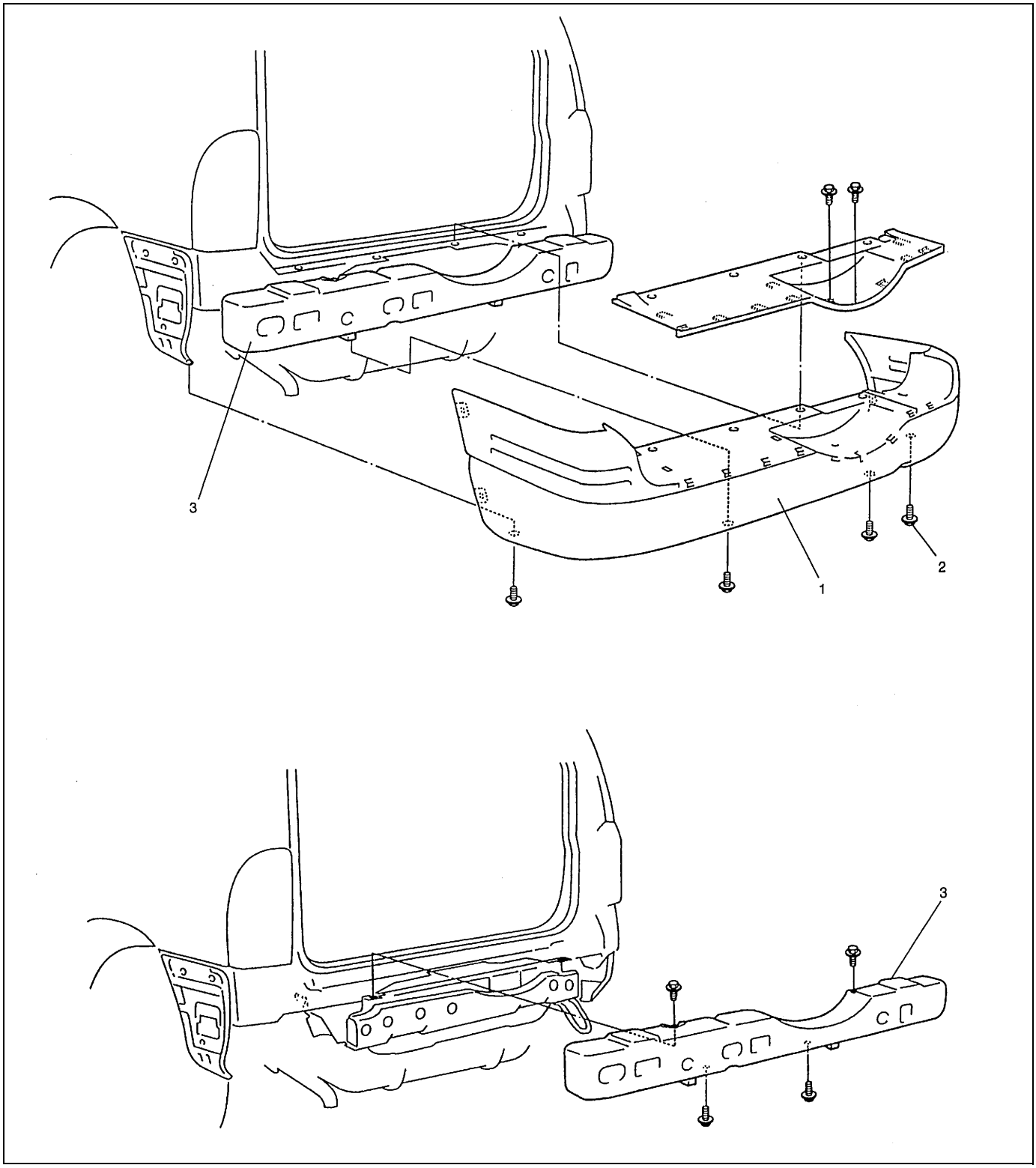
NOTE:

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



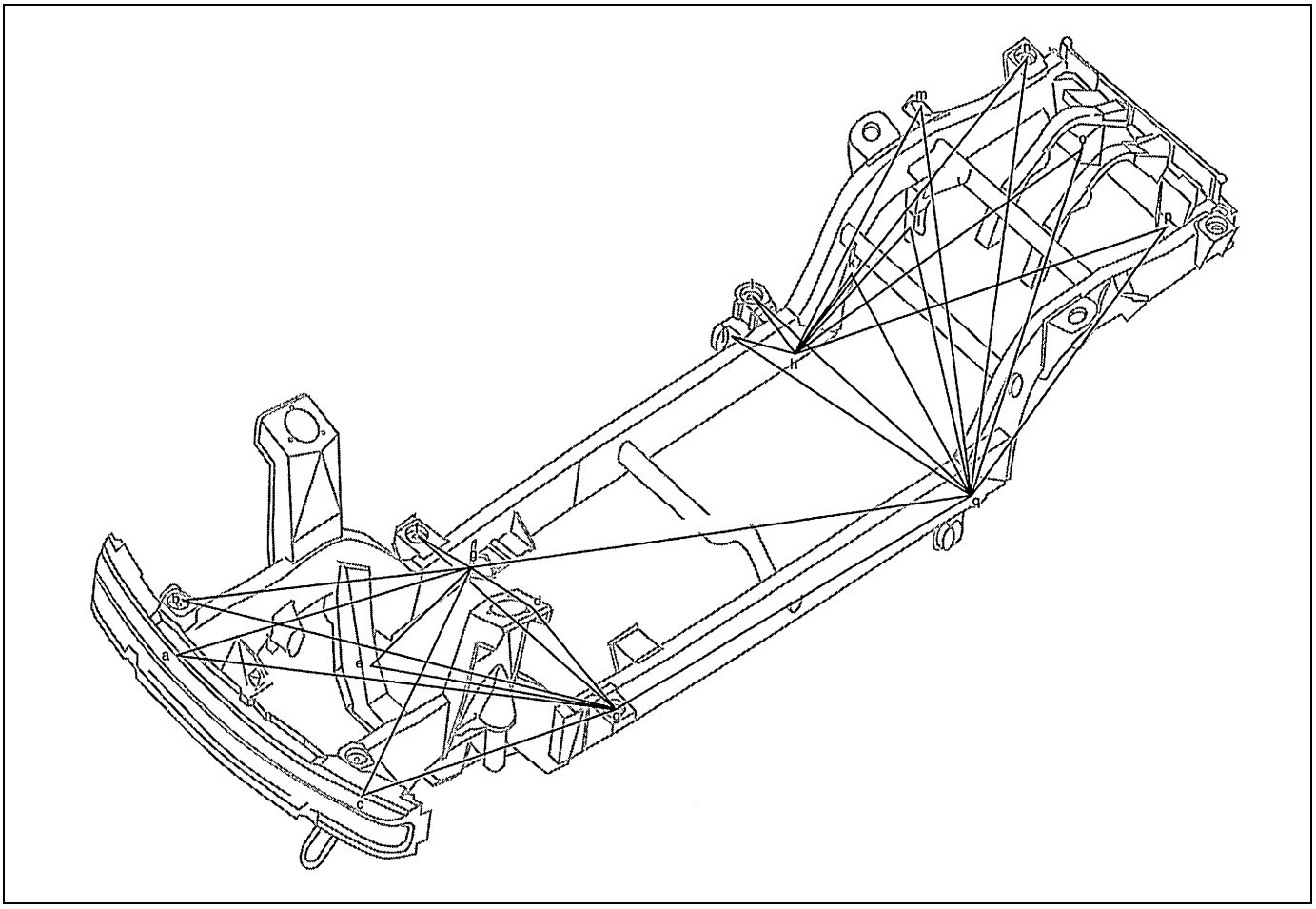
1. Front bumper	3. Front bumper member
2. Screws	4. Side marker

Rear Bumper



1. Rear bumper
2. Rear bumper screws
3. Rear bumper member

Under Body Dimensions



a. Front bumper	f. 2nd mounting	k. Upper rod	p. Fuel tank
b. 1st mounting	g (g'). Jig hole 20 mm in dia.	l. Lateral rod	q. Lower rod
c. Suspension frame	h (h'). Jig hole 20 mm in dia.	m. Rear shock absorber	
d. Front strut	i. 3rd mounting	n. 4th mounting	
e. Suspension arm	j. Lower rod	o. Fuel tank	

Other than canvas top model

Hole to hole distance

a – g : 1315 mm (51.77 in.)	**e – g' : 857 mm (33.74 in.)**	**h – p : 1190 mm (46.85 in.)**
a – g' : 1534 mm (60.39 in.)	**f – g' : 927 mm (36.50 in.)**	**i – q : 999 mm (39.33 in.)**
b – g : 1243 mm (48.94 in.)	**h – i : 178 mm (7.01 in.)**	**j – q : 997 mm (39.25 in.)**
b – g' : 1518 mm (59.76 in.)	**h – j : 133 mm (5.24 in.)**	**k – q : 824 mm (32.44 in.)**
c – g : 1377 mm (54.21 in.)	**h – k : 325 mm (12.80 in.)**	**l – q : 1130 mm (44.49 in.)**
c – g' : 1105 mm (43.50 in.)	**h – l : 674 mm (26.54 in.)**	**m – q : 1258 mm (49.53 in.)**
d – g' : 1319 mm (51.93 in.)	**h – m : 803 mm (31.61 in.)**	**n – q : 1483 mm (58.39 in.)**
d – f : 874 mm (34.41 in.)	**h – n : 1161 mm (45.71 in.)**	**o – q : 1349 mm (53.11 in.)**
e – g : 525 mm (20.67 in.)	**h – o : 1184 mm (46.61 in.)**	**p – q : 1334 mm (52.52 in.)**

For 5 door model

g' – q : 1275 mm (50.20 in.)
g – q : 1534 mm (60.39 in.)

For 3 door model

g' – q :	995 mm (39.17 in.)
g – q :	1310 mm (51.57 in.)

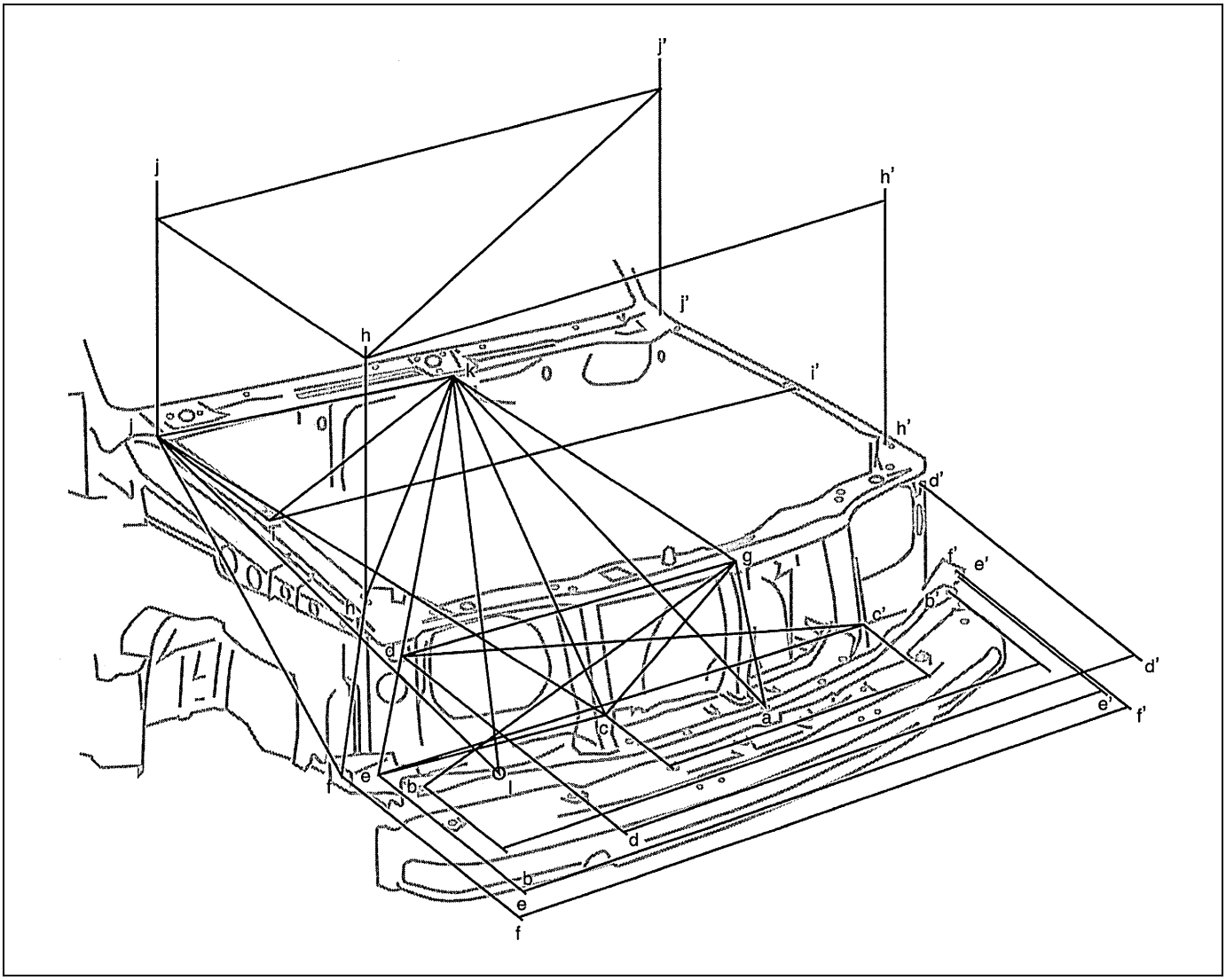
Canvas top model

Hole to hole distance

a – g :	1315 mm (51.77 in.)	f – g' :	927 mm (36.50 in.)	h – p :	1190 mm (46.85 in.)
a – g' :	1534 mm (60.39 in.)	g – q :	1310 mm (51.57 in.)	i – q :	999 mm (39.33 in.)
b – g :	1243 mm (48.94 in.)	g' – q :	995 mm (39.17 in.)	j – q :	997 mm (39.25 in.)
b – g' :	1518 mm (59.76 in.)	h – i :	178 mm (7.01 in.)	k – q :	824 mm (32.44 in.)
c – g :	1377 mm (54.21 in.)	h – j :	133 mm (5.24 in.)	l – q :	1130 mm (44.49 in.)
c – g' :	1105 mm (43.50 in.)	h – k :	325 mm (12.80 in.)	m – q :	1258 mm (49.53 in.)
d – g' :	1319 mm (51.93 in.)	h – l :	674 mm (26.54 in.)	n – q :	1483 mm (58.39 in.)
d – f :	874 mm (34.41 in.)	h – m :	803 mm (31.61 in.)	o – q :	1349 mm (53.11 in.)
e – g :	525 mm (20.67 in.)	h – n :	1161 mm (45.71 in.)	p – q :	1334 mm (52.52 in.)
e – g' :	857 mm (33.74 in.)	h – o :	1184 mm (46.61 in.)		

Body Dimensions

Engine room (all models)

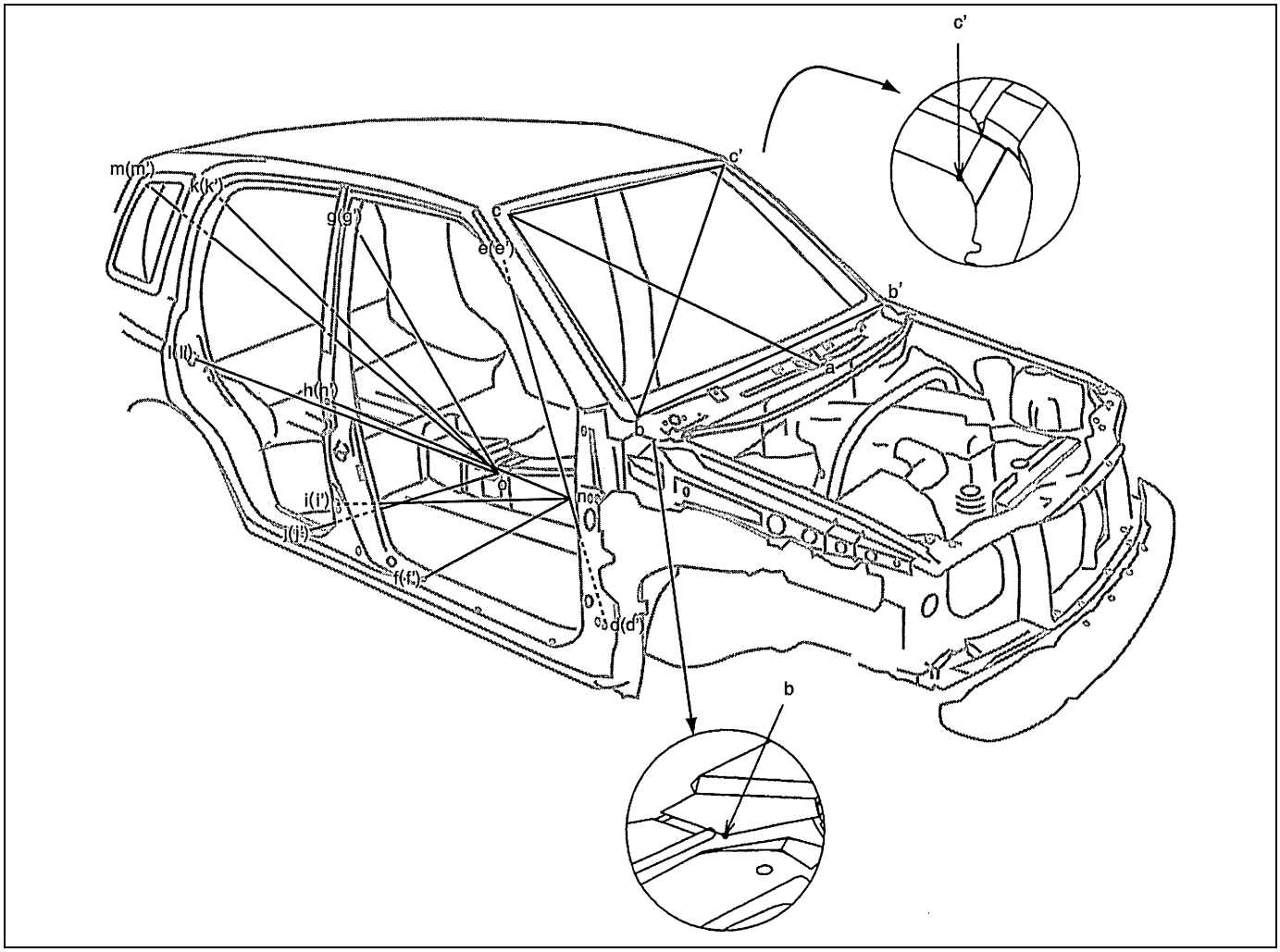


a. Front bumper installation clip hole	e (e'). Headlight installation hole	i (i'). Fender installation hole
b (b'). Front bumper installation hole	f (f'). Front fender installation hole	j (j'). Fender installation reference hole
c (c'). Headlight installation hole	g. Center member installation hole	k. Garnish installation clip hole
d (d'). Headlight installation resin nut hole	h (h'). Fender installation reference hole	l. Mounting installation hole

Hole to hole distance

a – g :	**276 mm (10.87 in.)**	**d – e :**	**189 mm (7.44 in.)**	**h – j' :**	**1504 mm (59.21 in.)**
a – k :	**1000 mm (39.37 in.)**	**d – c' :**	**1016 mm (40.00 in.)**	**h – j :**	**677 mm (26.65 in.)**
b – b' :	**1302 mm (51.26 in.)**	**d – g :**	**672 mm (26.46 in.)**	**h – k :**	**927 mm (36.50 in.)**
b – g :	**730 mm (28.74 in.)**	**d – k :**	**968 mm (38.11 in.)**	**i – i' :**	**1344 mm (52.91 in.)**
c – c' :	**668 mm (26.30 in.)**	**e – e' :**	**1456 mm (57.32 in.)**	**i – j :**	**391 mm (15.39 in.)**
c – e :	**414 mm (16.30 in.)**	**f – f' :**	**1550 mm (61.02 in.)**	**i – k :**	**760 mm (29.92 in.)**
c – g :	**406 mm (15.98 in.)**	**f – h :**	**299 mm (11.77 in.)**	**j – j' :**	**1348 mm (53.07 in.)**
c – j :	**1029 mm (40.51 in.)**	**f – j :**	**811 mm (31.93 in.)**	**j – k :**	**676 mm (26.61 in.)**
c – k :	**1000 mm (39.37 in.)**	**g – k :**	**854 mm (33.62 in.)**	**l – j :**	**961 mm (37.83 in.)**
d – d' :	**1302 mm (51.26 in.)**	**h – h' :**	**1339 mm (52.72 in.)**	**l – k :**	**1018 mm (40.08 in.)**

Inner body (other than canvas top model)



a. Garnish installation clip hole	g (g'). Trim installation hole	m (m'). Trim installation hole
b (b'). Front end of front windshield lower installation section	h (h'). Hole in R door upper hinge in upper part	n. Installation hole for F seat front inside
c (c'). Front end of front windshield upper installation section	i (i'). Hole in R door lower hinge in lower part	o. Installation hole for F seat rear inside Opposite side of the point shown in figure
d. Hole in F door lower hinge at rear	j (j'). Rear scuff installation hole (at front end)	
e. Trim installation clip hole	k (k'). Trim installation hole	
f (f'). Scuff installation hole (at rearmost end)	l (l'). R door striker lower section installation hole	

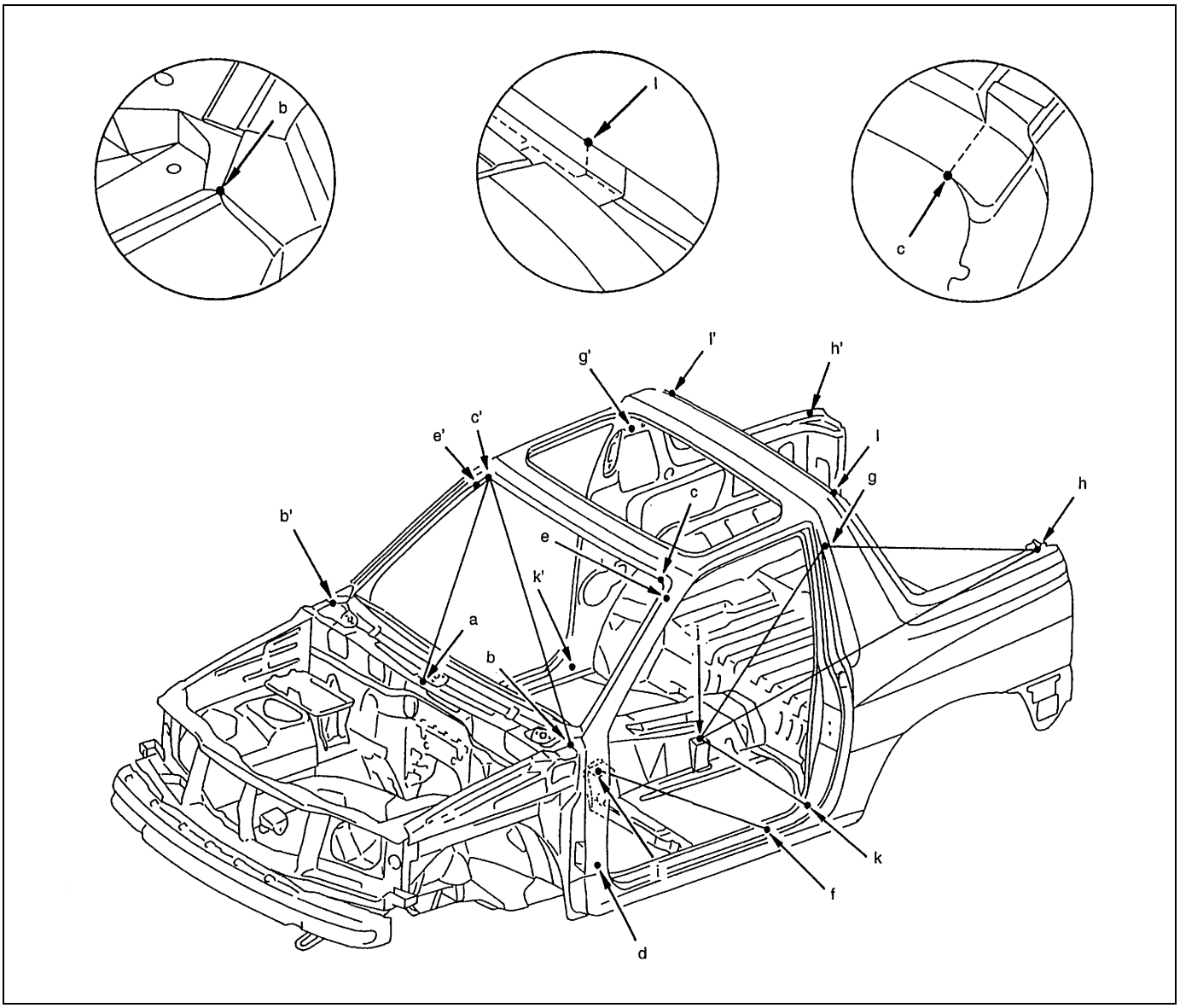
Hole to hole distance

a – c :	**982 mm (38.66 in.)**	**f – f' :**	**1511 mm (59.49 in.)**	**j – o :**	**649 mm (25.55 in.)**
b – b' :	**1390 mm (54.72 in.)**	**f – n :**	**620 mm (34.41 in.)**	**k – k' :**	**1126 mm (44.33 in.)**
b – c' :	**1406 mm (55.35 in.)**	**g – g' :**	**1085 mm (42.72 in.)**	**k – o :**	**1350 mm (53.15 in.)**
b – c :	**755 mm (29.72 in.)**	**g – o :**	**1099 mm (43.27 in.)**	**l – l' :**	**1491 mm (58.70 in.)**
c – c' :	**1012 mm (39.84 in.)**	**h – h' :**	**1521 mm (59.88 in.)**	**l – o :**	**1130 mm (44.49 in.)**
d – d' :	**1545 mm (60.83 in.)**	**h – o :**	**901 mm (35.47 in.)**	**m – m' :**	**939 mm (36.97 in.)**
d – n :	**800 mm (31.50 in.)**	**i – i' :**	**1547 mm (60.91 in.)**	**m – o :**	**1725 mm (67.91 in.)**
e – e' :	**1110 mm (43.70 in.)**	**j – n :**	**806 mm (31.73 in.)**		
e – n :	**1036 mm (40.79 in.)**	**j – j' :**	**1511 mm (59.49 in.)**		

For 3 door model

f – n :	**688 mm (27.09 in.)**	**l – o :**	**888 mm (34.96 in.)**	**k – n :**	**1265 mm (49.80 in.)**
f – f" :	**1514 mm (59.61 in.)**	**m – o :**	**1514 mm (59.61 in.)**	**k – k' :**	**1084 mm (42.68 in.)**

Inner body (canvas top model)

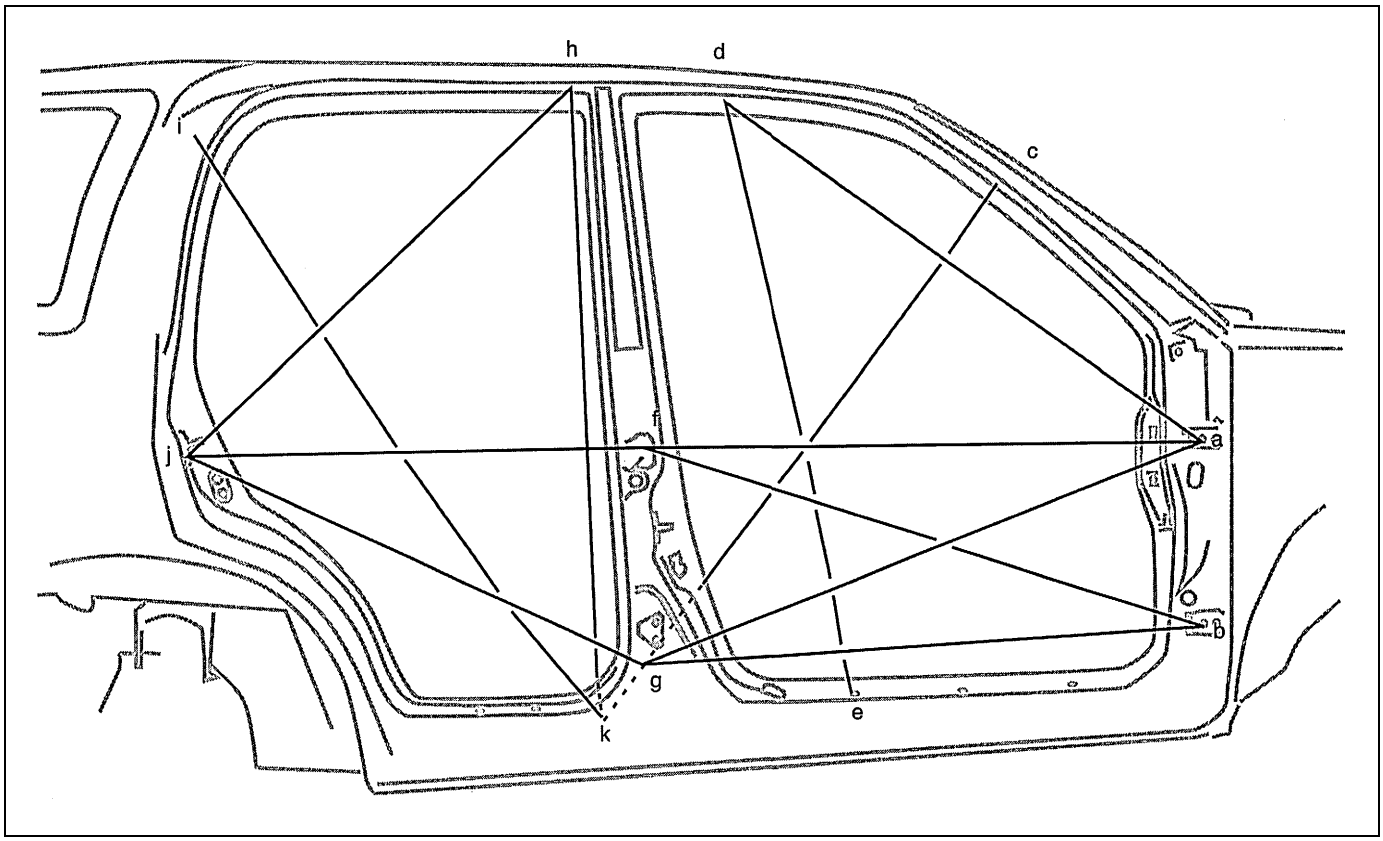


a. Garnish installation clip hole	e. Trim installation clip hole	i. Installation hole for F seat front inside
b (b'). Front end of front windshield lower installation section	f (f'). Scuff installation hole (at rearmost end)	j. Installation hole for F seat rear inside
c (c'). Front end of front windshield upper installation section	g (g'). Trim installation hole	k (k'). F seat belt installation hole
d. Hole in F door lower hinge at rear	h (h'). ϕ11 jig hole	l (l'). Innermost end of side body installation section

Hole to hole distance

a – c :	**981 mm (38.62 in.)**	**e – i :**	**1036 mm (40.79 in.)**	**h – h' :**	**1338 mm (52.68 in.)**
b – b' :	**1390 mm (54.72 in.)**	**f – i :**	**688 mm (27.09 in.)**	**h – j :**	**1459 mm (57.44 in.)**
b – c' :	**1404 mm (55.28 in.)**	**g – g' :**	**1145 mm (45.08 in.)**	**j – k :**	**548 mm (21.57 in.)**
c – c' :	**1008 mm (39.69 in.)**	**g – h :**	**1017 mm (40.04 in.)**	**l – l' :**	**956 mm (37.64 in.)**
e – e' :	**1110 mm (43.70 in.)**	**g – j :**	**1078 mm (42.44 in.)**		

Side body (other than canvas top model)



a. Hole in F door upper hinge at rear	e. Scuff installation hole (rearmost end)	i. Trim installation hole
b. Hole in F door lower hinge at rear	f. Hole n R door upper hinge in upper part	j. Door striker lower section installation hole
c. Trim installation clip hole	g. Hole in R door lower hinge in lower part	k. F seat belt installation hole
d. ϕ7 jig hole	h. Assistant grip installation hole	

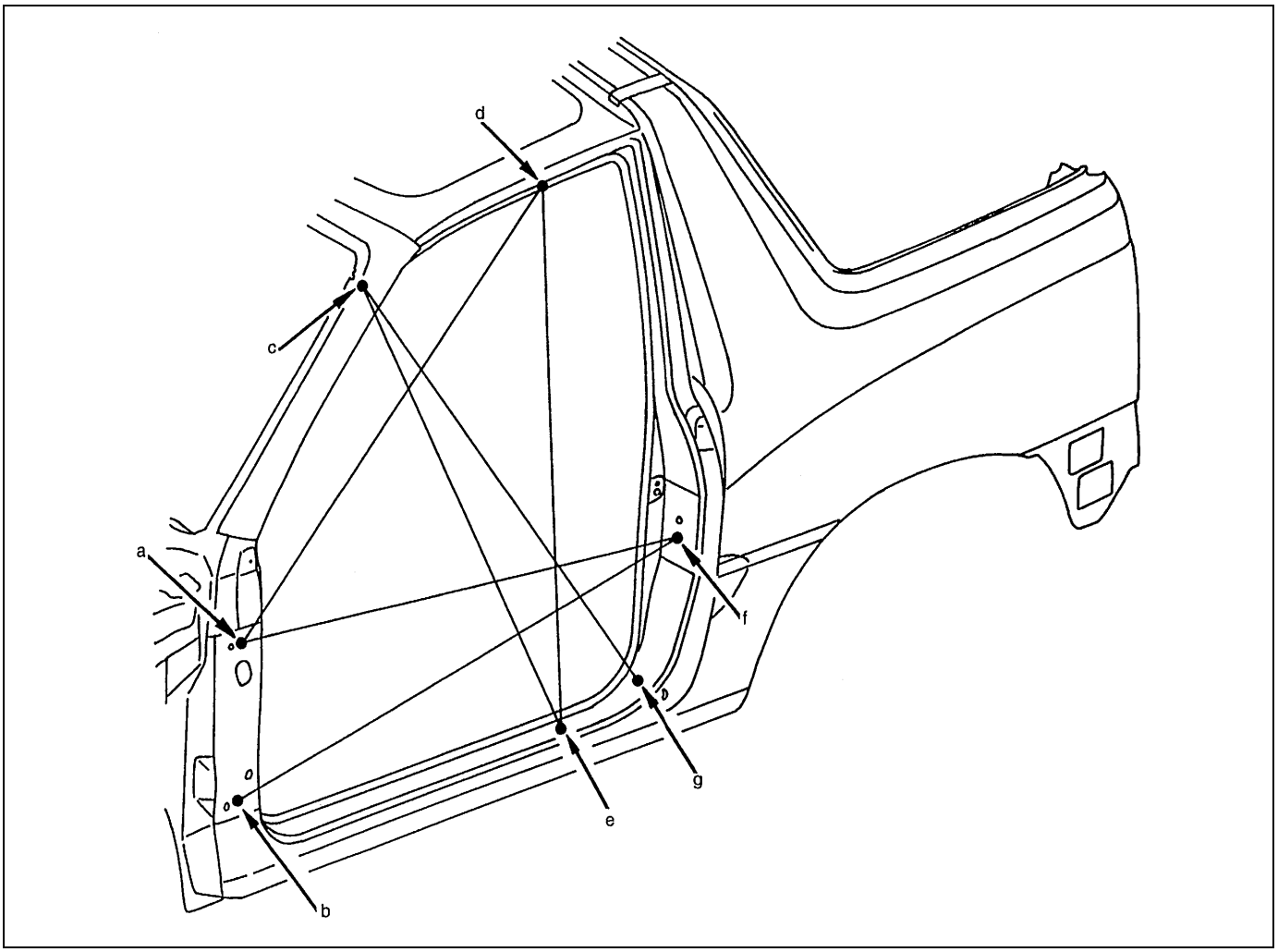
Hole to hole distance

a – d :	**1155 mm (45.47 in.)**	**b – g :**	**1140 mm (44.88 in.)**	**g – j :**	**918 mm (36.14 in.)**
a – g :	**1090 mm (42.91 in.)**	**c – k :**	**1245 mm (49.02 in.)**	**h – j :**	**941 mm (37.04 in.)**
a – f :	**1046 mm (41.18 in.)**	**d – e :**	**1174 mm (46.22 in.)**	**h – k :**	**1189 mm (46.81 in.)**
b – f :	**1120 mm (44.09 in.)**	**f – j :**	**839 mm (33.03 in.)**	**i – k :**	**1309 mm (51.53 in.)**

For 3 door model

a – j :	**1150 mm (45.28 in.)**	**b – j :**	**1165 mm (45.87 in.)**	**c – k :**	**1246 mm (49.06 in.)**
b – f :	**1165 mm (45.87 in.)**	**c – e :**	**1142 mm (44.96 in.)**	**d – e' :**	**1146 mm (45.12 in.)**

Side body (canvas top model)

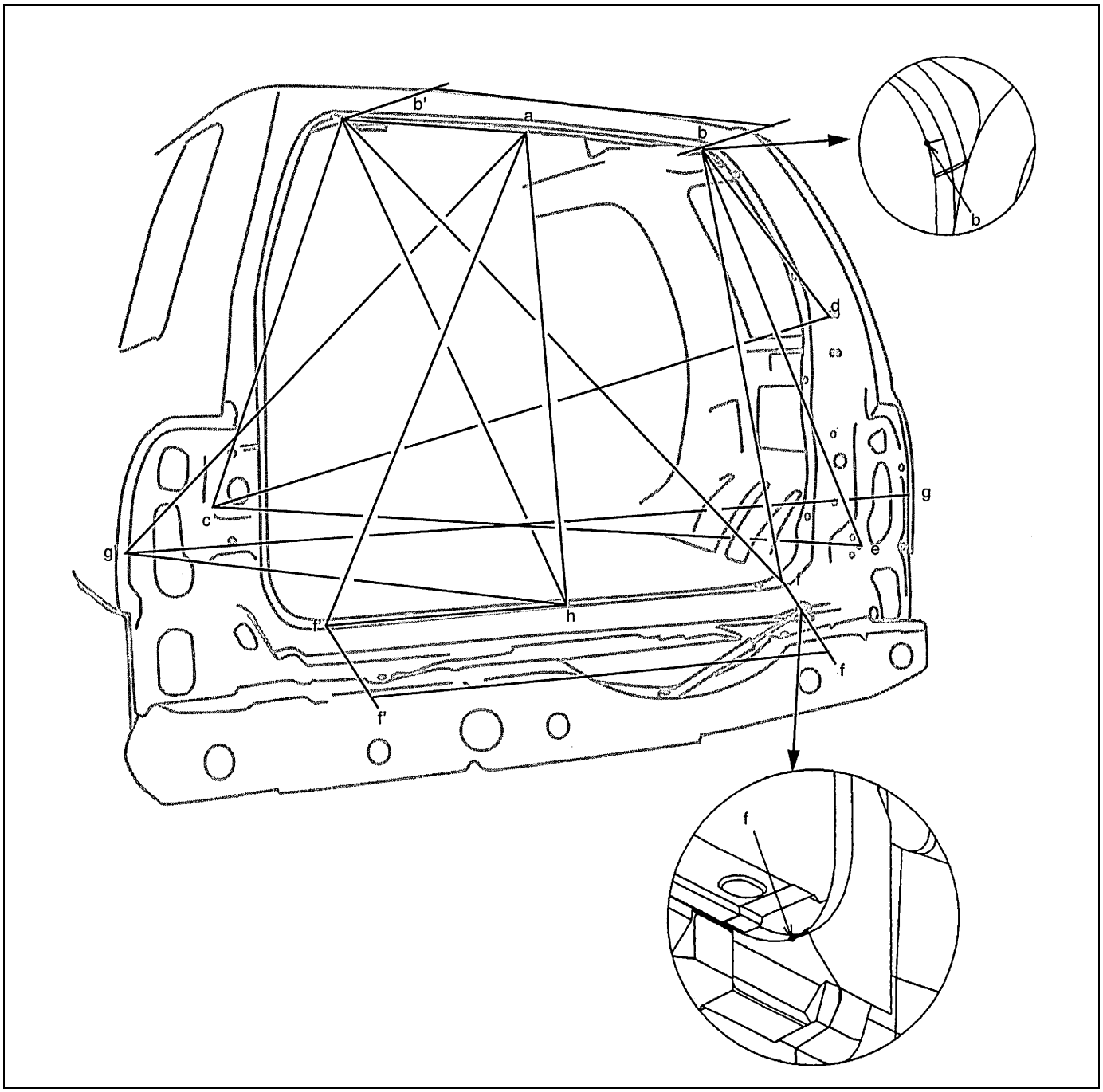


a. Hole in door upper hinge at rear	d. ϕ7 jig hole	g. F seat belt installation hole
b. Hole in door lower hinge at rear	e. Scuff installation hole (rearmost end)	
c. Trim installation clip hole	f. Door striker lower section installation hole	

Hole to hole distance

a – d :	**1154 mm (45.43 in.)**	**b – f :**	**1165 mm (45.87 in.)**	**c – g :**	**1246 mm (49.06 in.)**
a – f :	**1150 mm (45.28 in.)**	**c – e :**	**1142 mm (44.96 in.)**	**d – e :**	**1146 mm (45.12 in.)**

Back door (other than canvas top model)

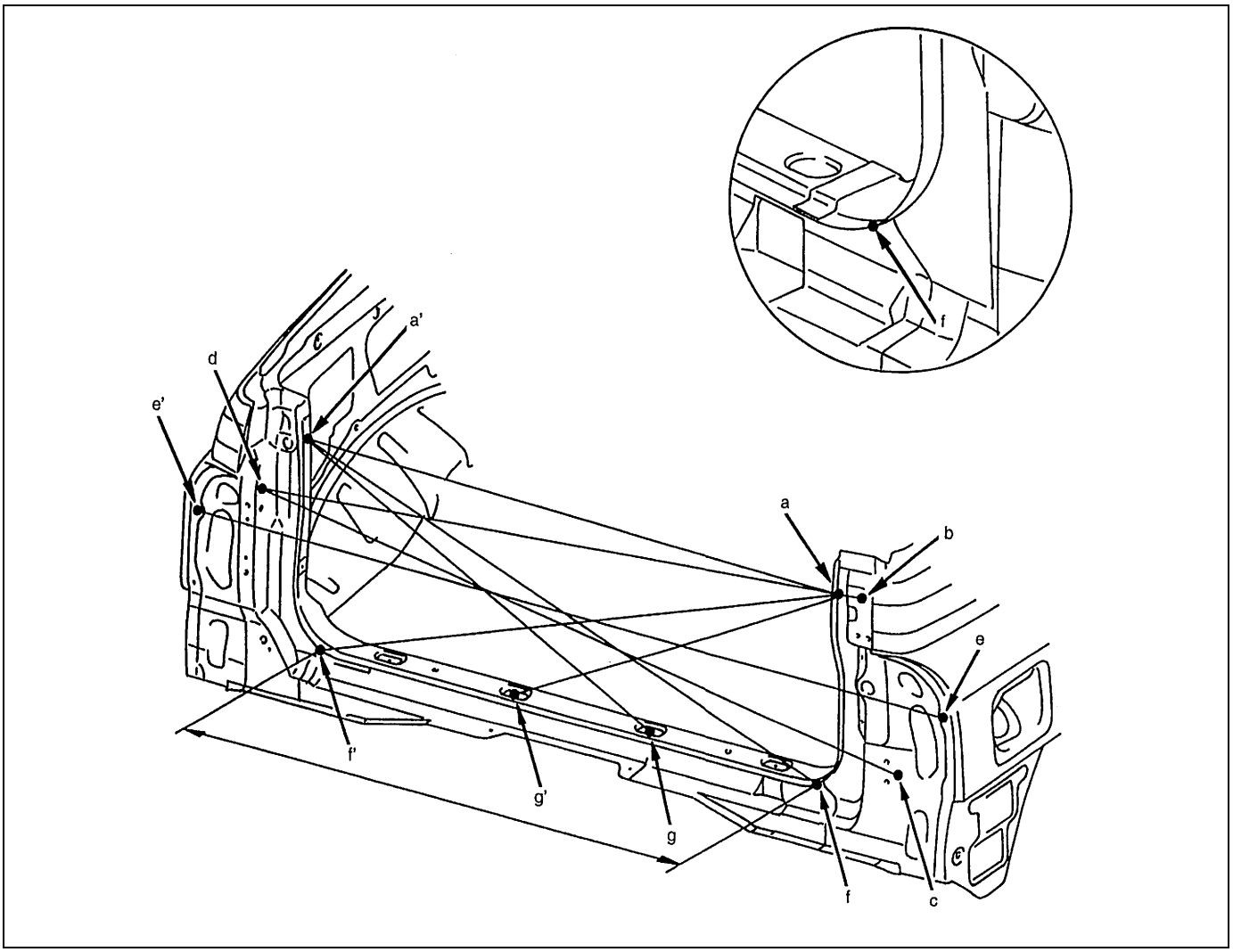


a. Clip hole in the center of head lining rear installation section	d. Installation hole in uppermost part of upper hinge	g (g'). Installation hole in outer upper section of R-COMB R lamp
b (b'). Innermost end of roof panel installation section	e. Installation hole in uppermost part of lower hinge	h. Nut hole
c. Installation hole in upper part of back door striker	f (f'). Innermost end of rear floor tail member installation section	

Hole to hole distance

a – b' :	**448 mm (17.64 in.)**	**b' – f :**	**1314 mm (51.73 in.)**	**c – d :**	**1245 mm (49.02 in.)**
a – f' :	**1054 mm (41.50 in.)**	**b – e :**	**837 mm (32.95 in.)**	**c – e :**	**1293 mm (50.90 in.)**
a – h :	**926 mm (36.43 in.)**	**b – f :**	**892 mm (35.12 in.)**	**f – f' :**	**1030 mm (40.55 in.)**
a – g :	**1050 mm (41.34 in.)**	**b' – c :**	**650 mm (25.59 in.)**	**f' – g :**	**512 mm (20.16 in.)**
b – b' :	**888 mm (34.96 in.)**	**b' – g :**	**996 mm (39.21 in.)**	**g – h :**	**808 mm (31.79 in.)**
b – d :	**400 mm (15.75 in.)**	**b' – f :**	**1314 mm (51.73 in.)**	**g – g' :**	**1544 mm (60.79 in.)**

Back door (canvas top model)



a (a'). Trim installation clip hole	d. Installation hole in uppermost part of rear gate striker	g (g'). Garnish installation clip hole
b. Installation hole in uppermost part of upper hinge	e (e'). Installation hole in outer upper section of R-COMB R (L) lamp	
c. Installation hole in outside part of lower hinge	f (f'). Innermost end of rear floor tail member installation section	

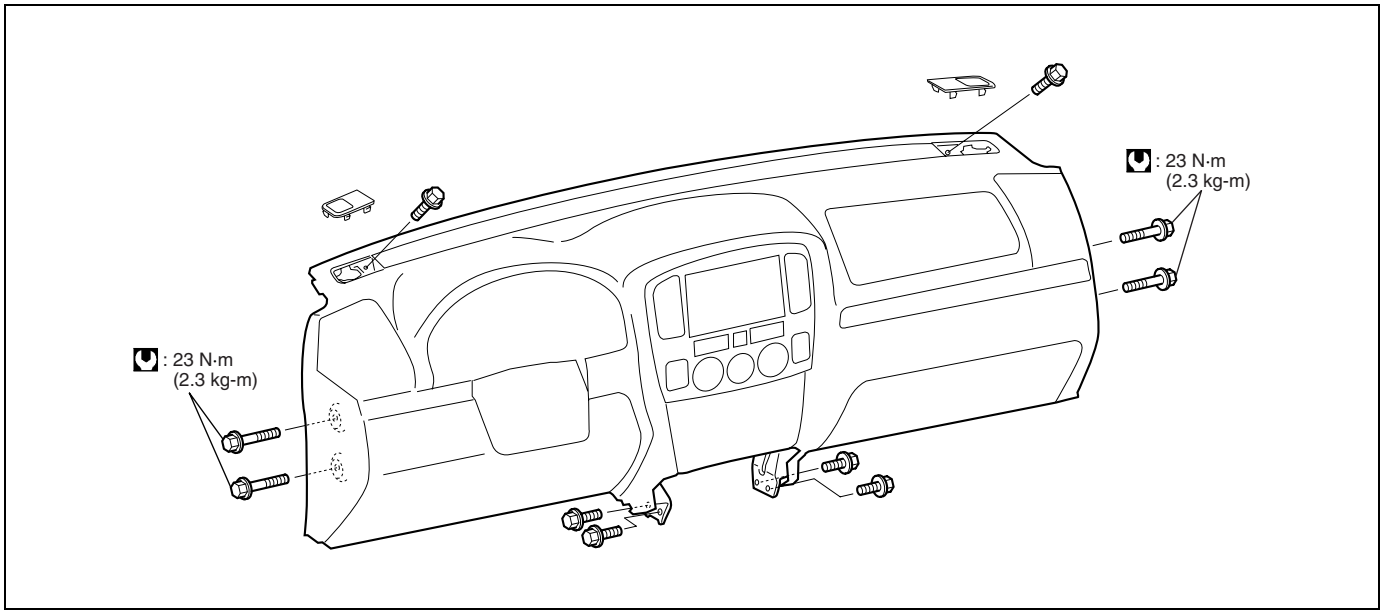
Hole to hole distance

a – a' :	**1112 mm (43.78 in.)**	**a' – f :**	**1156 mm (45.51 in.)**	**c – d :**	**1324 mm (52.13 in.)**
a – f' :	**1134 mm (44.65 in.)**	**a' – g :**	**824 mm (32.44 in.)**	**e – e' :**	**1544 mm (60.79 in.)**
a – g' :	**796 mm (31.34 in.)**	**b – d :**	**1229 mm (48.39 in.)**	**f – f' :**	**1029 mm (40.51 in.)**

Instrumentation and Driver Information

Instrument Panel

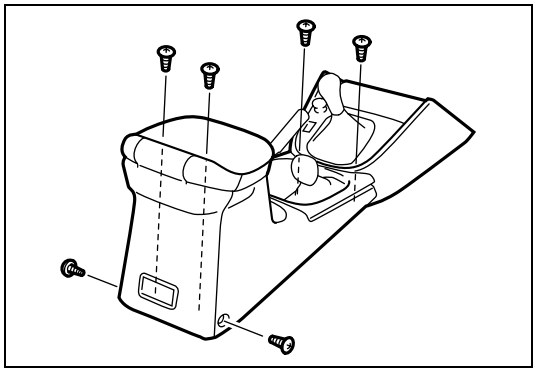
Other than canvas top model



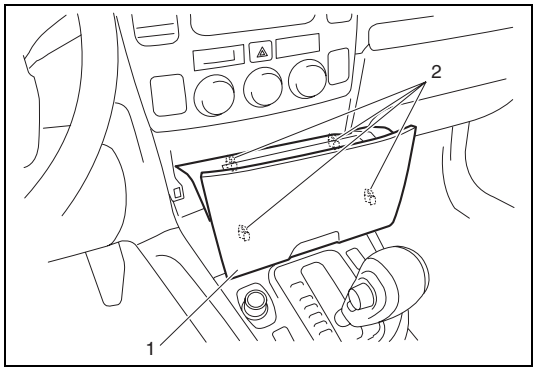
	Tightening torque

REMOVAL

1) Disconnect negative cable at battery.
2) Disable air bag system referring to “Disabling Air Bag System” in Section 10B.

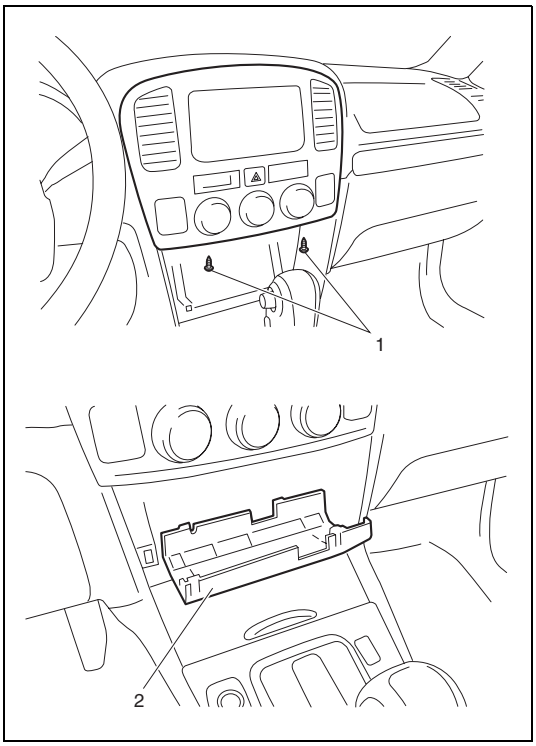


3) Remove console box (1).

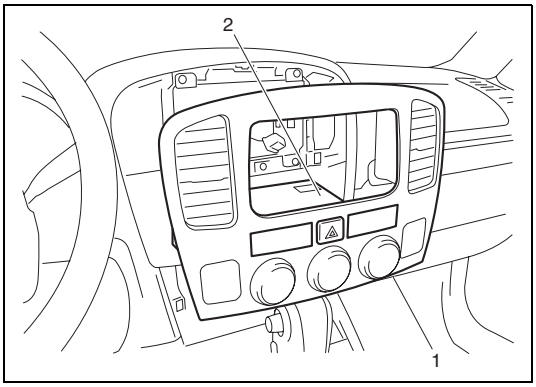


4) Remove center lower garnish (1).

2.	Clip



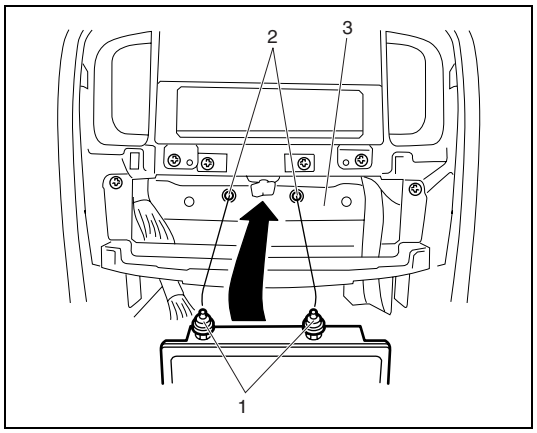
5) Remove center garnish mounting screw (1) and then pull off center garnish.
6) Remove harness and controller cover (2).



7) Disconnect BCM connectors and HVAC control module connector from each controller.
8) Remove center garnish (1) with BCM (2) and HVAC control module.

9) Remove passenger air bag (inflator) referring to “Disabling Air Bag System” in Section10B.
10) Remove glove box and column hole cover.
11) Remove steering column assembly referring to “Steering Column” in Section 3C1.
12) Disconnect speedometer connector and remove speedometer assembly referring to “Combination Meter” in Section 8C.
13) Remove engine hood opener.
14) Disconnect couplers which need to be disconnected for instrument panel removal.
15) Remove front pillar trims.
16) Remove instrument panel mounting bolt.
17) Remove instrument panel.

CAUTION:
For vehicle with Air Bag, instrument panel could not be removed with SDM coupler connected.
Use care not to damage Air Bag harness.



INSTALLATION

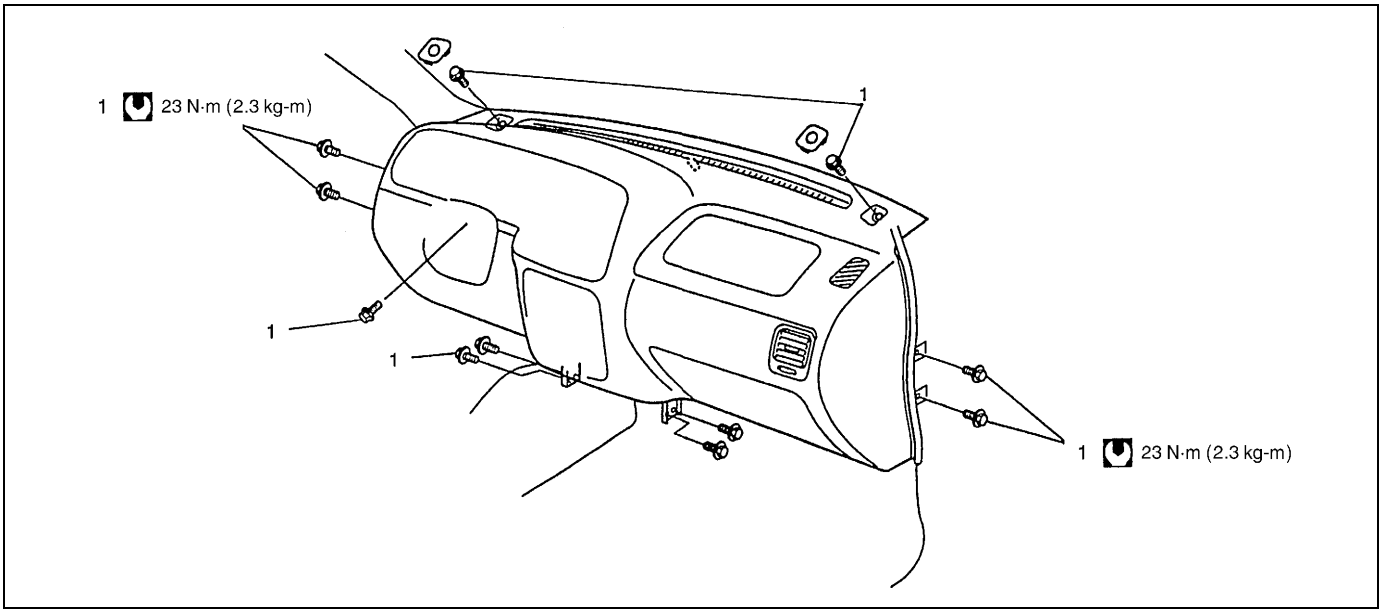
Install instrument panel by reversing removal procedure, noting the following items.

- When installing each part, be careful not to catch wiring harness.
- Tighten instrument panel bolt to specified torque.

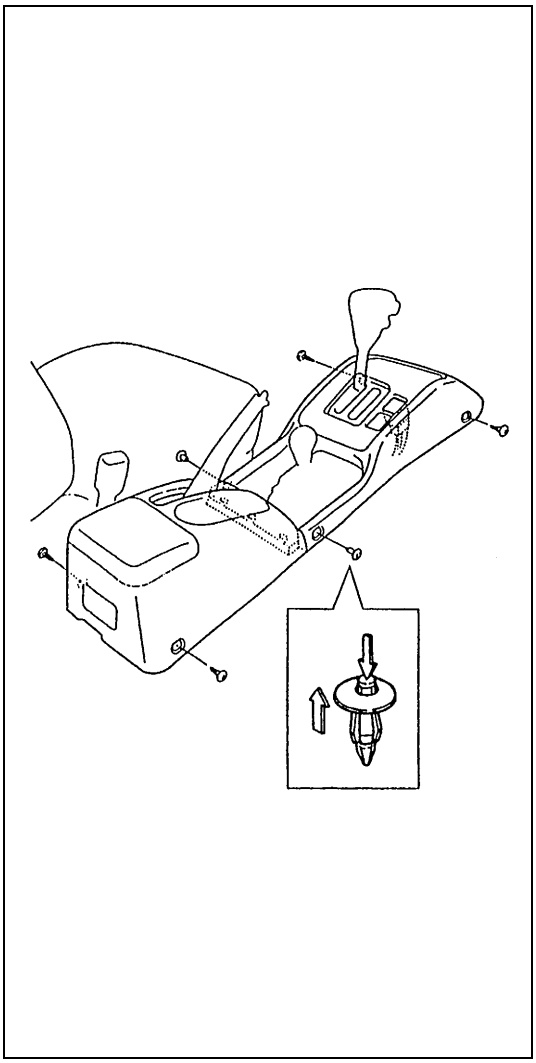
Tightening torque
Instrument panel bolt (a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

- When installing steering column assembly, refer to “Steering Column” in Section 3C1.
- Enable air bag system referring to “Disabling Air Bag System” in Section 10B.
- When installing center garnish, align rubber bushing (1) with BCM installation hole (2) of instrument panel member (3).

Canvas top model



1. Bolt	Tightening torque



WARNING:
See WARNING at the beginning of this section.

REMOVAL

1) Disconnect negative cable at battery.
2) Disable air bag system. Refer to “Disabling Air Bag System” in Section 10B.
3) Remove console box.
4) Remove glove box and column hole cover.
5) Disconnect wires and cables from heater unit and blower motor assembly.
6) Remove steering column assembly referring to “Steering Column” in Section 3C1.
7) Disconnect speedometer connector and remove speedometer assembly. If equipped with air bag, disconnect wire coupler at SDM and air bag ground terminal for air bag.
8) Remove engine hood opener.
9) Disconnect couplers which need to be disconnected for removal for instrument panel.
10) Remove instrument panel mounting screws.
11) Remove instrument panel mounting bolt.
12) Remove instrument panel.

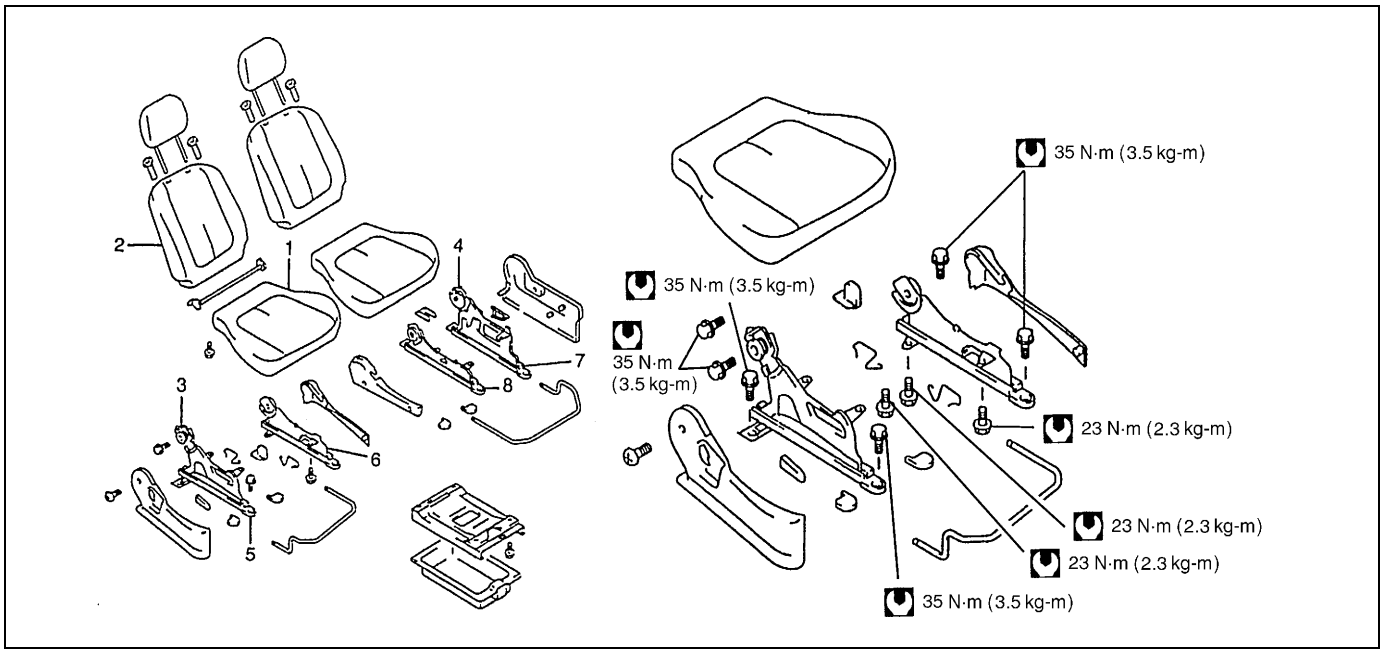
CAUTION:
For vehicle with Air Bag, instrument panel could not be removed with SDM coupler connected and ground terminal installed.
Use care not to damage Air Bag harness.

INSTALLATION

1) Install instrument panel by reversing removal procedure, noting the following items.
   - When installing each part, be careful not to catch any cable or wiring harness.
   - When installing steering column assembly, refer to “Air Bag Steering Column Installation” in Section 3C1.
2) Adjust control cables. (Refer to Section 1A “Heater Control Cables”.)
3) Enable air bag system. Refer to “Enabling Air Bag System” in Section 10B.

Seat

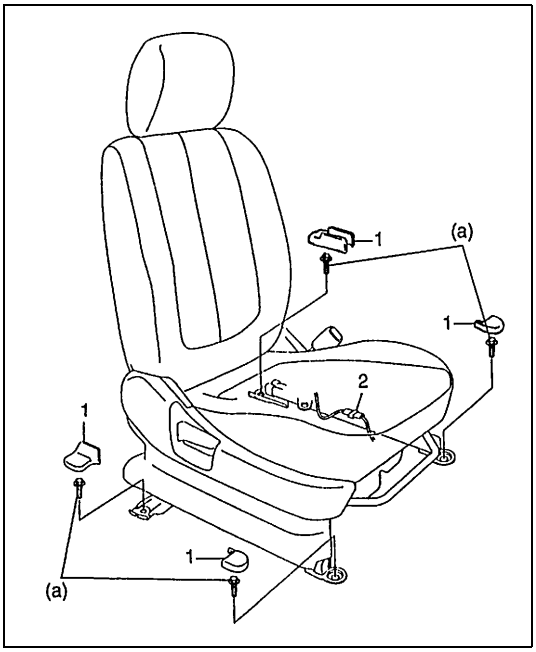
Front Seat



1. Seat cushion	4. Reclining assy (LH side)	7. Seat adjuster (LH outside)
2. Seat back	5. Seat adjuster (RH outside)	8. Seat adjuster (LH inside)
3. Reclining assy (RH side)	6. Seat adjuster (RH inside)	Tightening torque

REMOVAL

1) Disconnect lead wire(s) at coupler (if equipped). Remove four mounting bolts fixing front seat to seat rail to remove front seat.
2) Disassemble and repair seat as necessary.



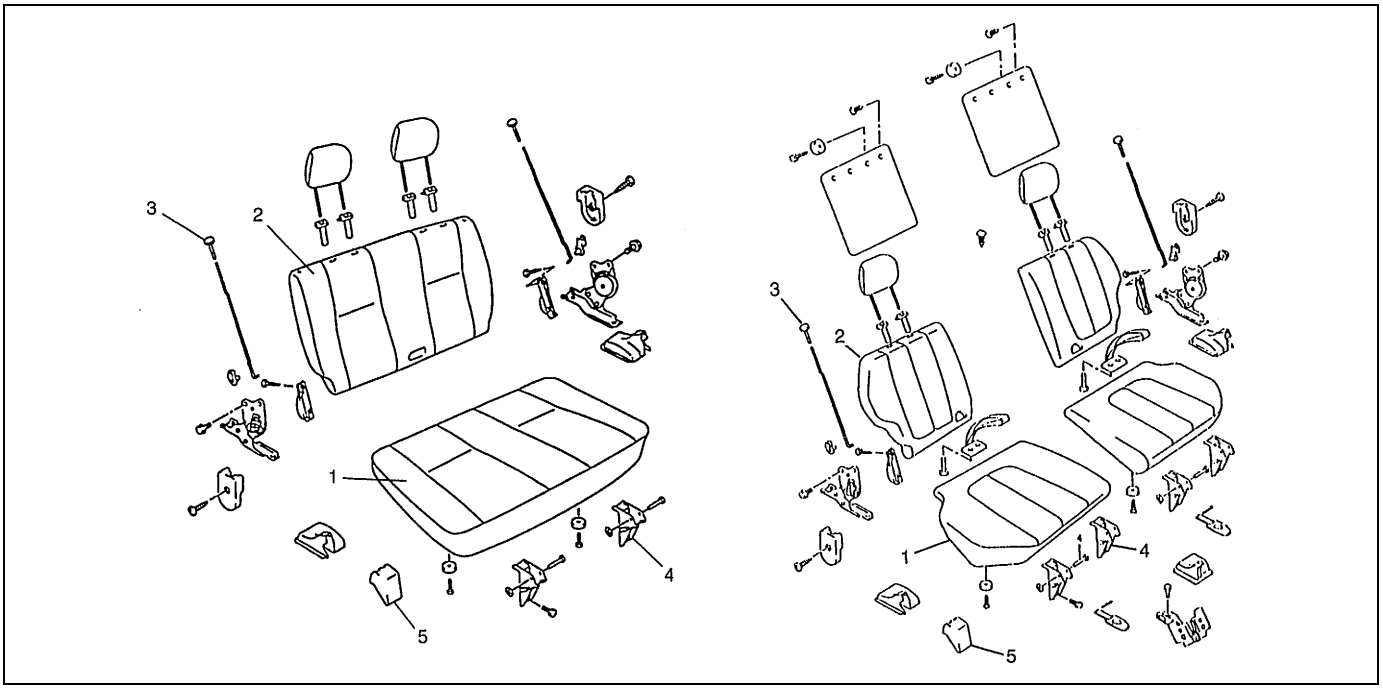
INSTALLATION

Reverse removal procedure to install front seat.
Torque to specifications, as shown.

Tightening torque
(a) : 35 N·m (3.5 kg-m, 25.5 lb-ft)

1.	Cover
2.	Coupler

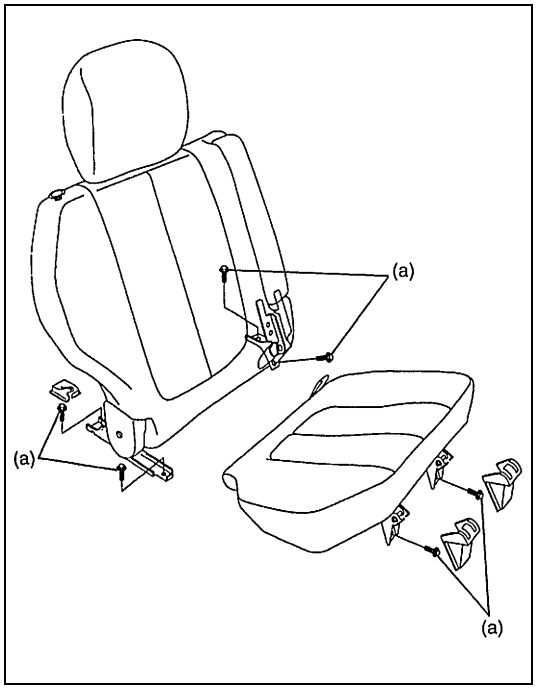
Rear Seat



1. Seat cushion	3. Seat auto lock release handle	5. Hinge male cover
2. Seat back	4. Seat hinge male	

REMOVAL

1) Remove four mounting bolt to remove seat cushion.
2) Remove four mounting bolts to remove seat back.
3) Disassemble and repair seat as necessary.



INSTALLATION

Reverse removal procedure to install rear seat.
Torque to specifications, as shown.

Tightening torque
(a) : 35 N·m (3.5 kg-m, 25.5 lb-ft)

Paint and Coatings

Anti-Corrosion Treatment

WARNING:

Standard shop practices, particularly eye protection, should be followed during the performance of the below-itemized operations to avoid personal injury.

As rust proof treatment, steel sheets are given corrosion resistance on the interior and/or exterior.
These corrosion resistance steel sheet materials are called one of two-side galvanized steel sheets.
It is for the sake of rust protection that these materials are selected and given a variety of treatments as described blow.

1) Steel sheets are treated with cathodic electroprimer which is excellent in corrosion resistance.
2) Rust proof wax coatings are applied to door and side sill insides where moisture is liable to stay.
3) Vinyl coating is applied to body underside and wheel housing inside.
4) Sealer is applied to door hem, engine compartment steel sheet-to-steel sheet joint, and the like portions to prevent water penetration and resulting in rust occurrence.

In panel replacement or collision damage repair, leaving the relevant area untreated as it is in any operation which does disturb the above-mentioned rust proof treatment will cause corrosion to that area. Therefore, it is the essential function of any repair operation to correctly recoat the related surfaces of the relevant area.
All the metal panels are coated with metal conditioners and primer coating during vehicle production. Following the repair and/or replacement parts installation, every accessible bare metal surface should be cleaned and coated with rust proof primer. Perform this operation prior to the application of sealer and rust proof wax coating.
Sealer is applied to the specific joints of a vehicle during production.
The sealer is intended to prevent dust from entering the vehicle and serves also as an anticorrosion barrier. The sealer is applied to the door and hood hem areas and between panels. Correct and reseal the originally sealed joints if damaged. Reseal the attaching joints of a new replacement panel and reseal the hem area of a replacement door or hood.
Use a quality sealer to seal the flanged joints, overlap joints and seams. The sealer must have flexible characteristics and paintability after it's applied to repair areas.
For the sealer to fill open joints, use caulking material.
Select a sealer in conformance with the place and purpose of a specific use. Observe the manufacturer's label-stand instructions when using the sealer.
In many cases, repaired places require color painting.
When this is required, follow the ordinary techniques specified for the finish preparation, color painting and undercoating build-up.
Rust proof wax, a penetrative compound, is applied to the metal-to-metal surfaces (door and side sill insides) where it is difficult to use ordinary undercoating material for coating. Therefore, when selecting the rust proof wax, it may be the penetrative type.
During the undercoating (vinyl coating) application, care should be taken that sealer is not applied to the engine-related parts and shock absorber mounting or rotating parts. Following the under coating, make sure that body drain holes are kept open.
The sequence of the application steps of the anti-corrosion materials are as follows :

1) Clean and prepare the metal surface.
2) Apply primer.
3) Apply sealer (all joints sealed originally).
4) Apply color in areas where color is required such as hem flanges, exposed joints and under body components.
5) Apply anticorrosion compound (penetrative wax).
6) Apply undercoating (rust proof material).

When the welding or heating operation causes the original galvanization or other anticorrosive materials to be burnt, the interior and under-body panel surfaces must be cleaned.
Removal of residues of the burning should be carried out carefully when the relevant place has boxtype construction or has shape which limits the access to the interior surfaces. In general, the following method can be used satisfactorily for the removal of those residues.
Scrape the accessible places. If a standard putty knife or scraper does not fit to the elevant place, consider to use a more flexible scraper to a place narrowly enclosed by sheet metals.
A jet of compressed air can remove most residues, and is effective to limited areas.
However, this type of operation absolutely requires eye protection.

Metal Replacement Parts Finishing

The metal service replacement parts (or assemblies) are coated with electro-deposition primer.
For the proper adhesion of a paint, the following finish process (refinish steps) becomes necessary.

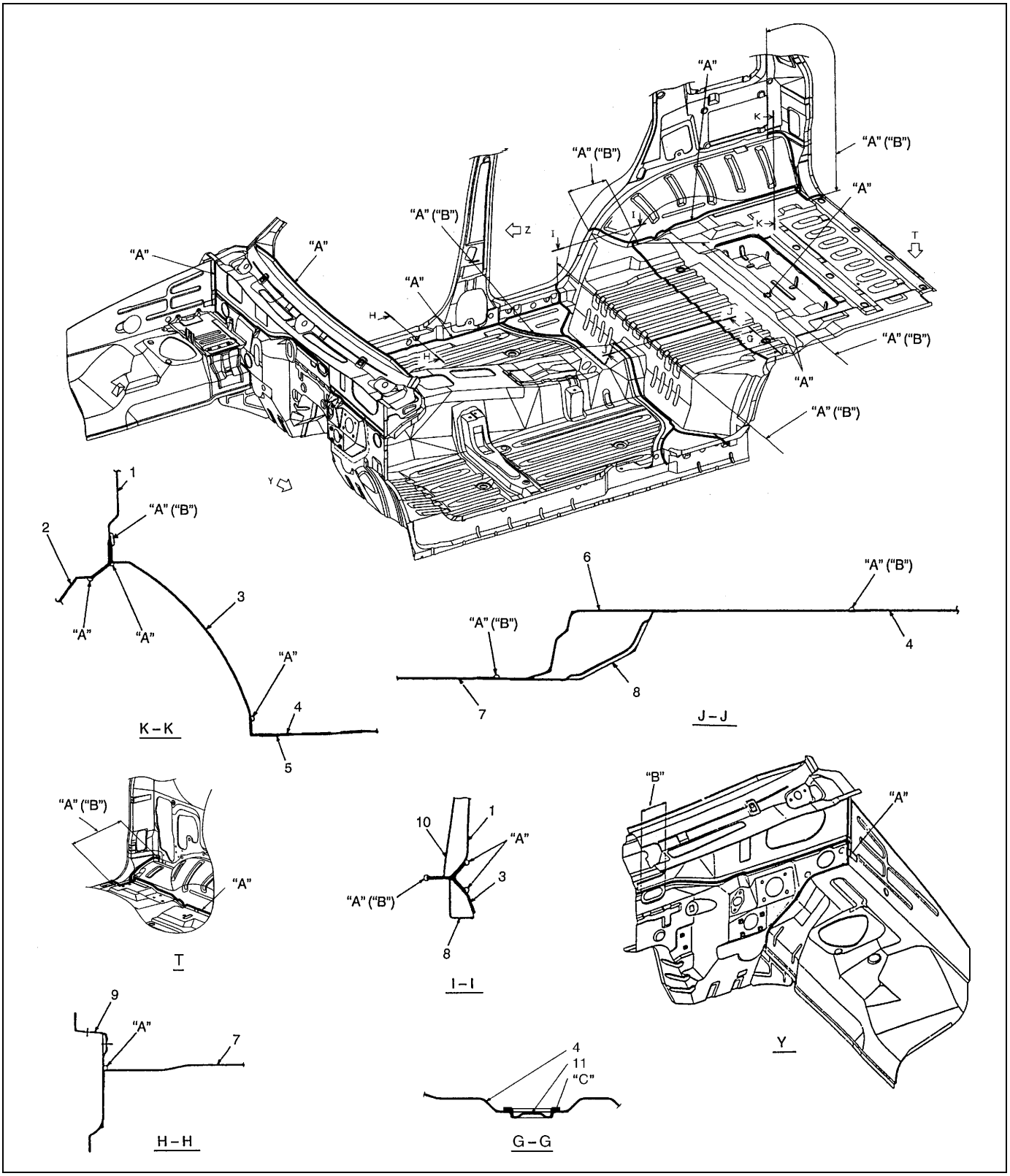
1) Use wax or grease-removing solvent to clean the part.
2) Use a wet or dry sand-paper (No. 400) to polish the panel lightly. Do not polish it forcibly to produce any scratch. Clean the part again.
3) If factory-applied primer coating is cut through to the bare metal, apply metal conditioner to the bare metal exposed to open air. As for method of use of the metal conditioner, follow directions on the container.
4) Apply primer-surfacer to the part completely dry before starting sand-paper polishing. As for drying time, follow directions advised on the primer-surfacer container.
5) Use a wet or dry sand-paper (No. 400) and water to polish the panel lightly.
6) Wash the part again.
7) Apply color, coating to the part.
8) Different paints demand different drying methods.
   Hence, follow directions advised on the pertinent paint container.
9) When lacquer coating (quick-drying paint coating) is applied, dry coated surface and polish it with compound.
   In the case of the melamine or acrylic coating, compound polishing can be omitted after drying.
10) If the case of lacquer coating, wax should not be applied to coated surface until the surface has dried completely (for approx. two months).

Before replacing exterior parts or assemblies, check paint conditions of all the covered or hidden interior surfaces. If any rust scale is found at these places, proceed as follows :

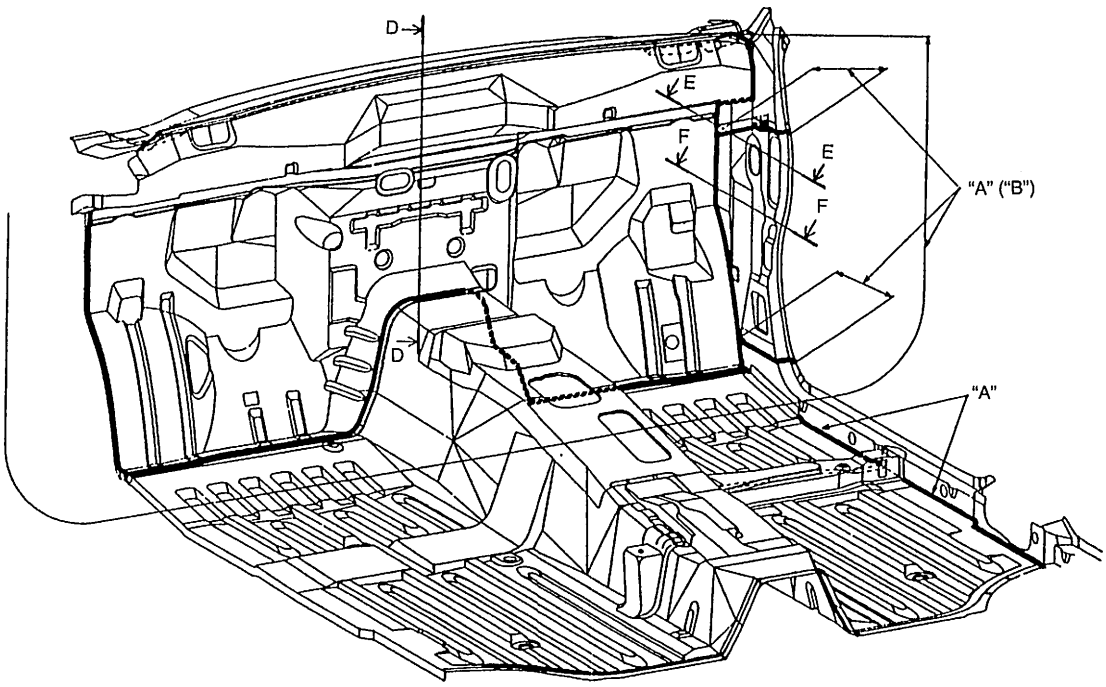
1) Use a proper wire brush, adhesive or liquid rust removing agent to remove rust. As for the method of use, follow directions advised for respecitve materials.
2) If necessary, wash parts with detergent, rinse, and dry them.
3) Before installing exterior body parts, apply anticorrosive compound to all cleaner surfaces of exterior body parts. Also, apply anticorrosive compound to inner surfaces of exterior body parts to be installed.

Sealant application area

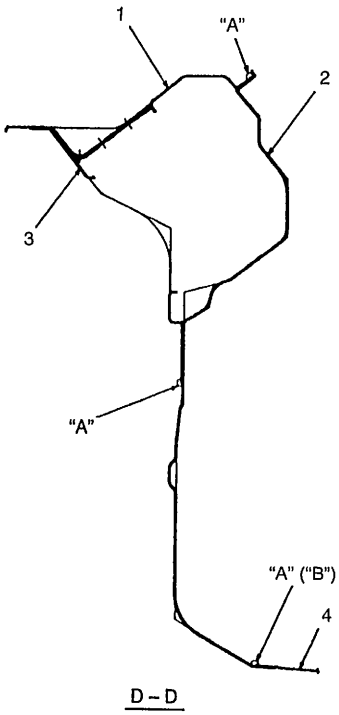
Other Than Canvas Top Model (5 Door)



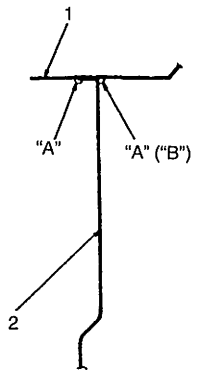
"A" : Apply sealant	3. Rear wheel housing panel	8. Center floor member
"B" : Brush treatment	4. Rear floor panel	9. Side sill inner panel
"C : Sealant between cap and panel (all around)	5. Tail lower member	10. Side outer panel
1. Side body inner panel	6. Center floor panel	11. Rear floor cap
2. Rear wheel housing outer rear panel	7. Front floor panel	



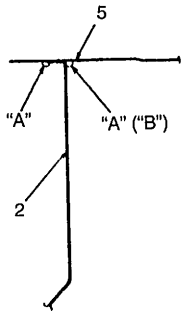
Z



D – D

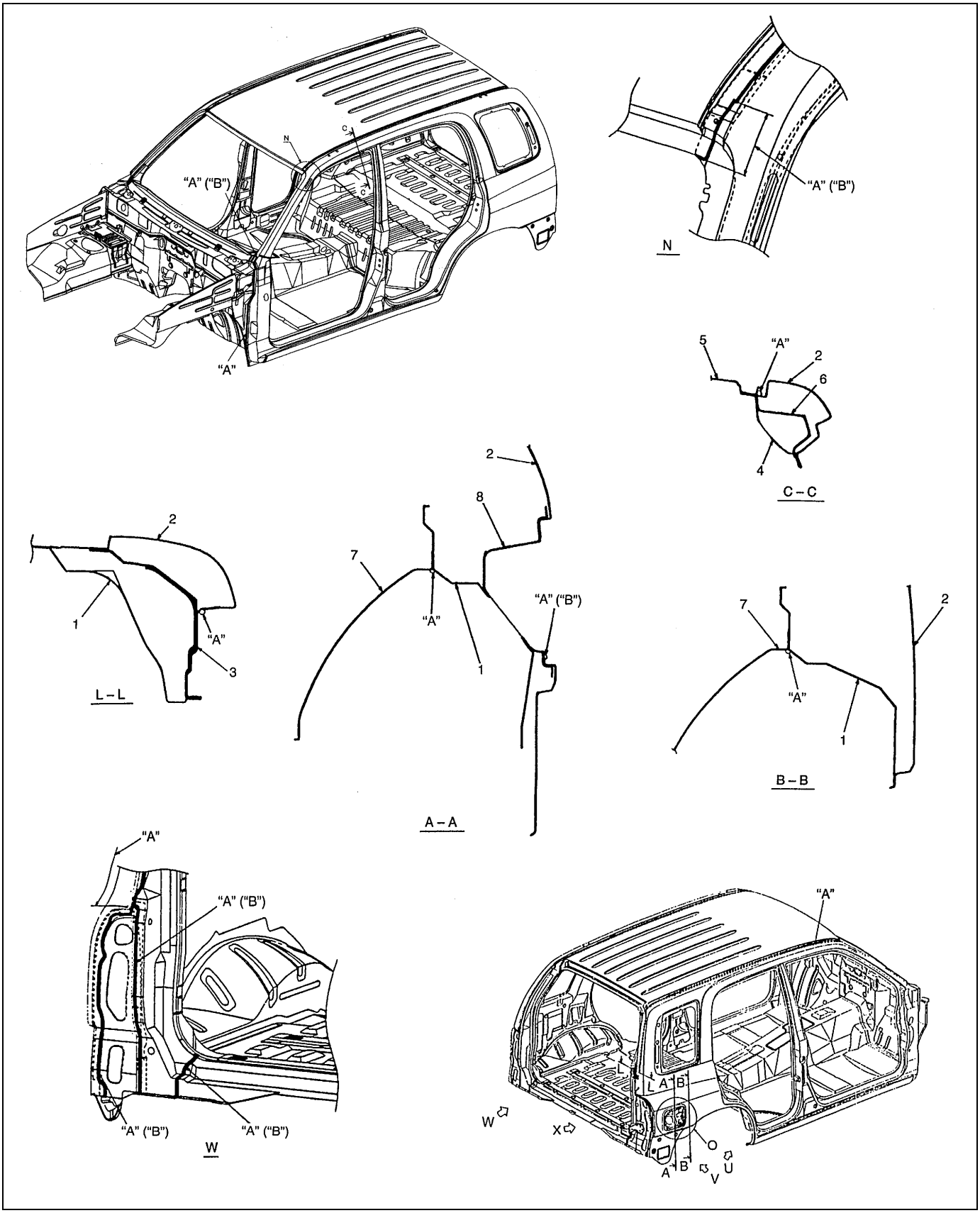


E – E

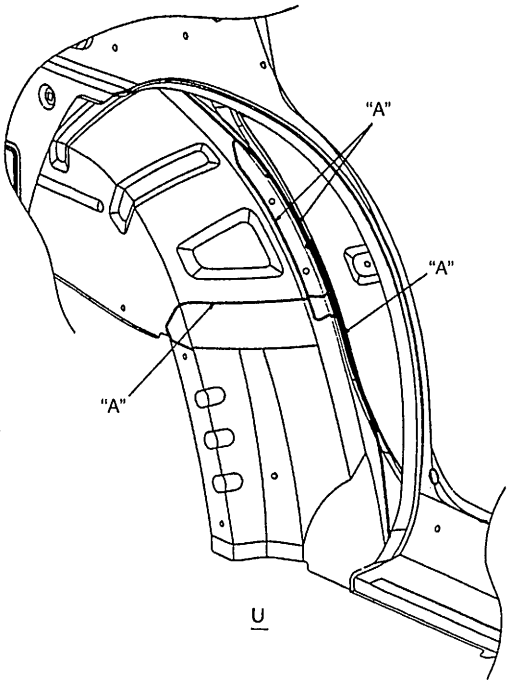


F – F

"A" : Apply sealant	2. Dash panel	5. Front pillar inner lower panel
"B" : Brush treatment	3. Cowl front panel	
1. Cowl top panel	4. Front floor panel	



"A" : Apply sealant	3. Back pillar outer panel	7. Rear wheel housing panel
"B" : Brush treatment	4. Front pillar inner panel	8. Fuel inlet box
1. Side body inner panel	5. Roof panel	
2. Side body outer panel	6. Front pillar upper reinforcement	



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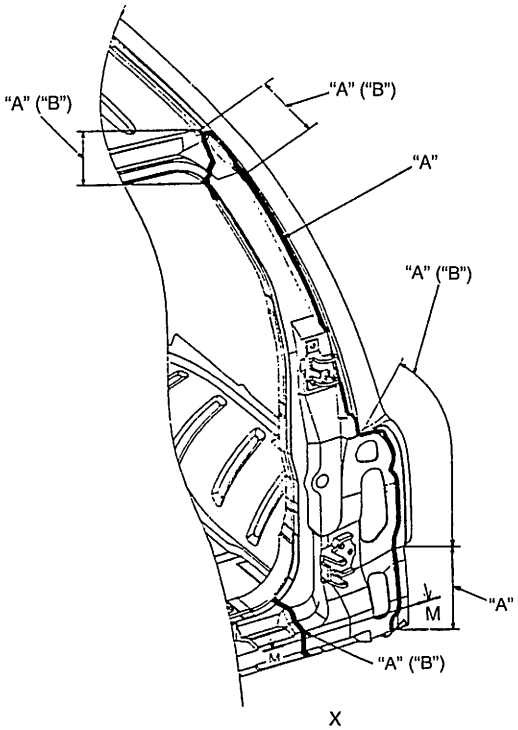
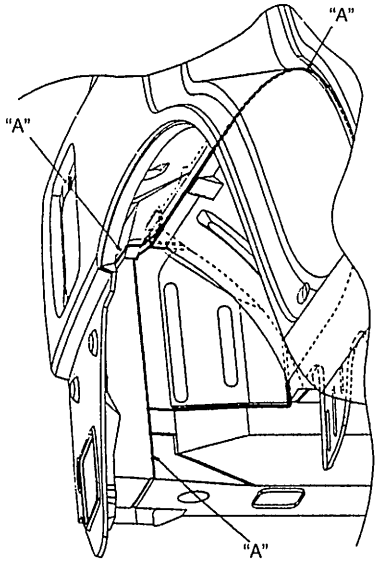


X



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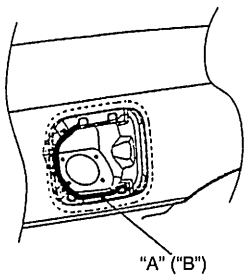
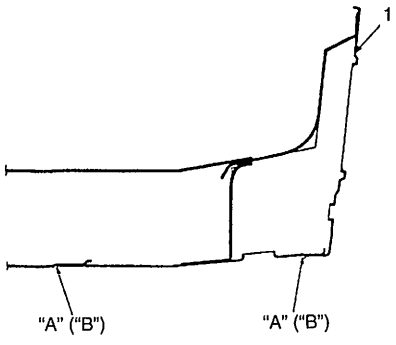
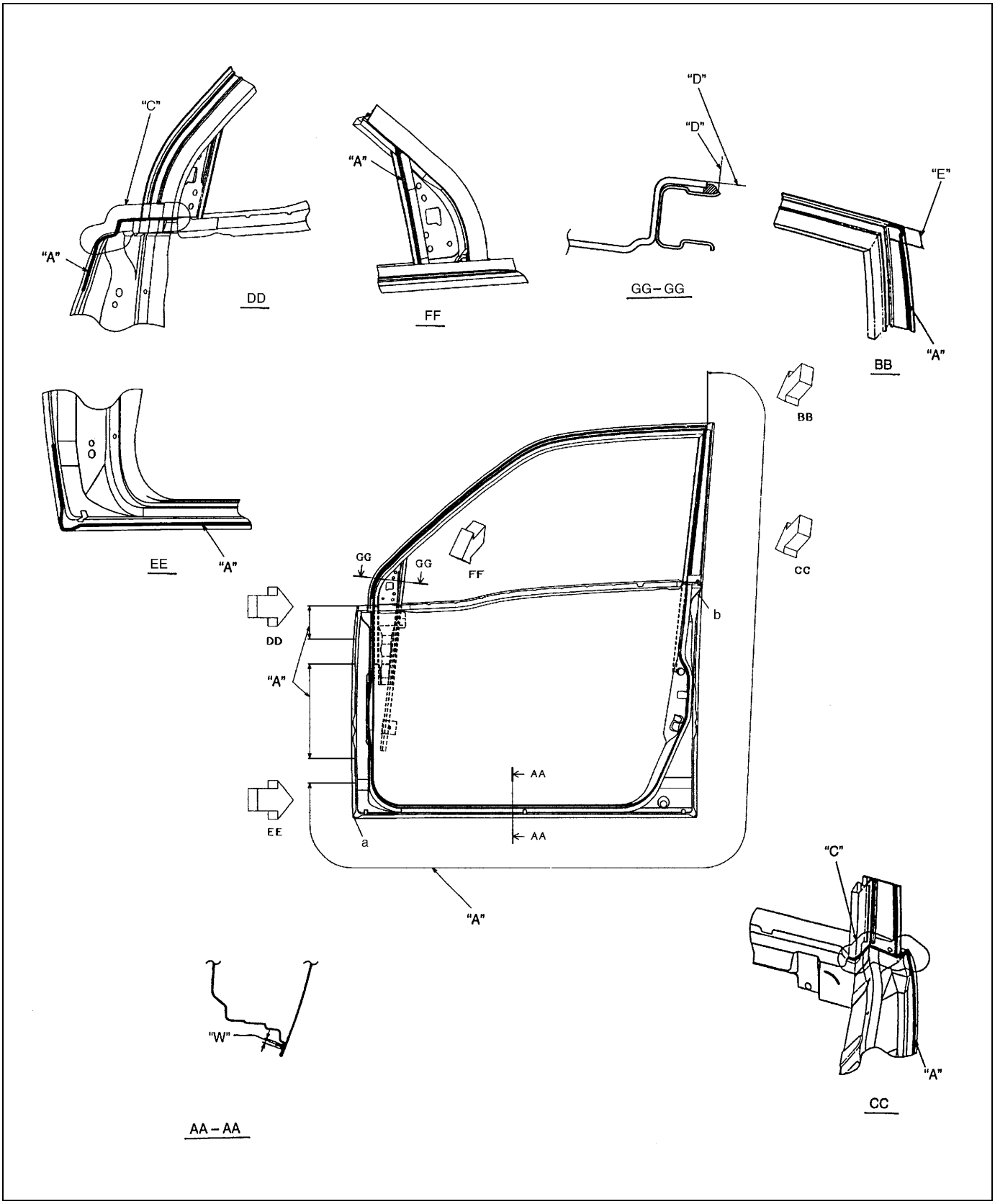


O

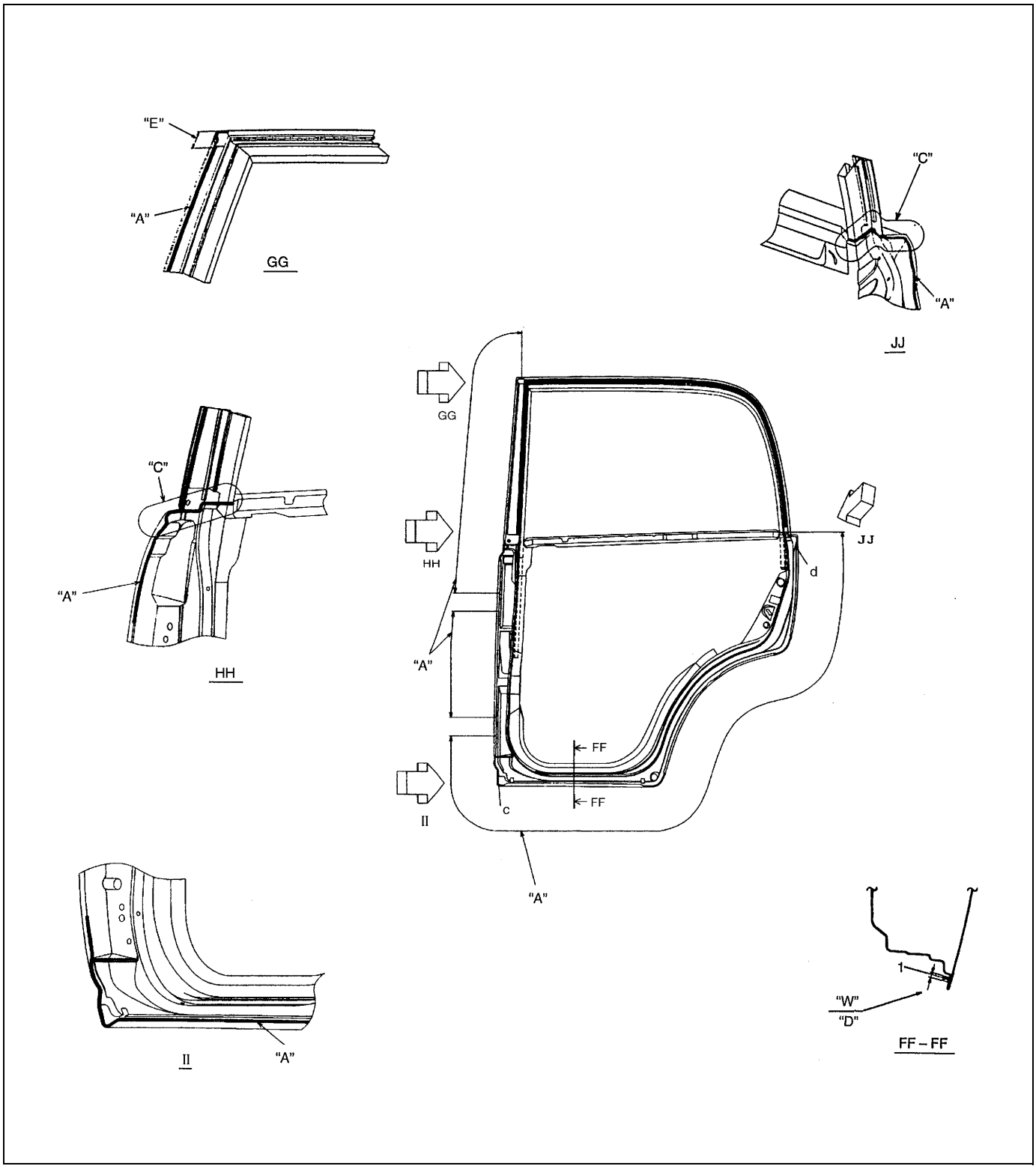


M – M

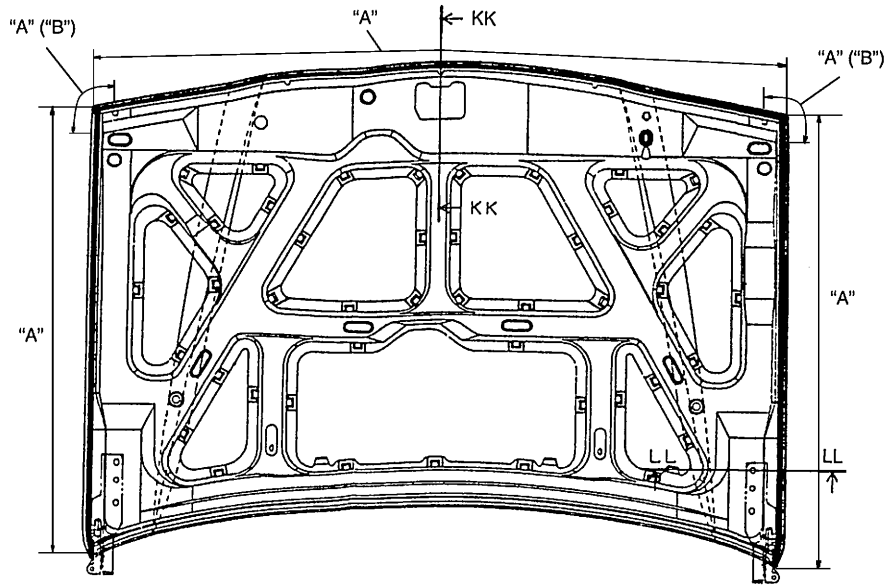
"A" :	Apply sealant
"B" :	Brush treatment
1.	Side body outer panel

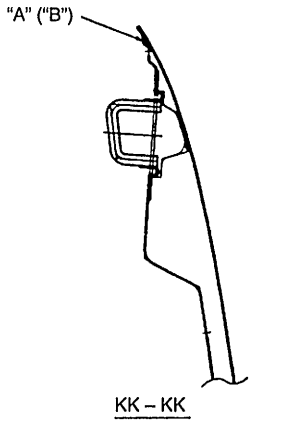


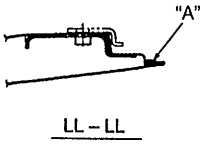
"W" : More than 5 mm between a and b	"C" : Wipe sealant away	1. Sealant application area
"A" : Apply sealant	"D" : Be free from protrude of sealant outside from this line	2. Outside of body
"B" : Brush treatment	"E" : Wipe sealant away (15 – 20 mm (0.59 – 0.79 in.))	

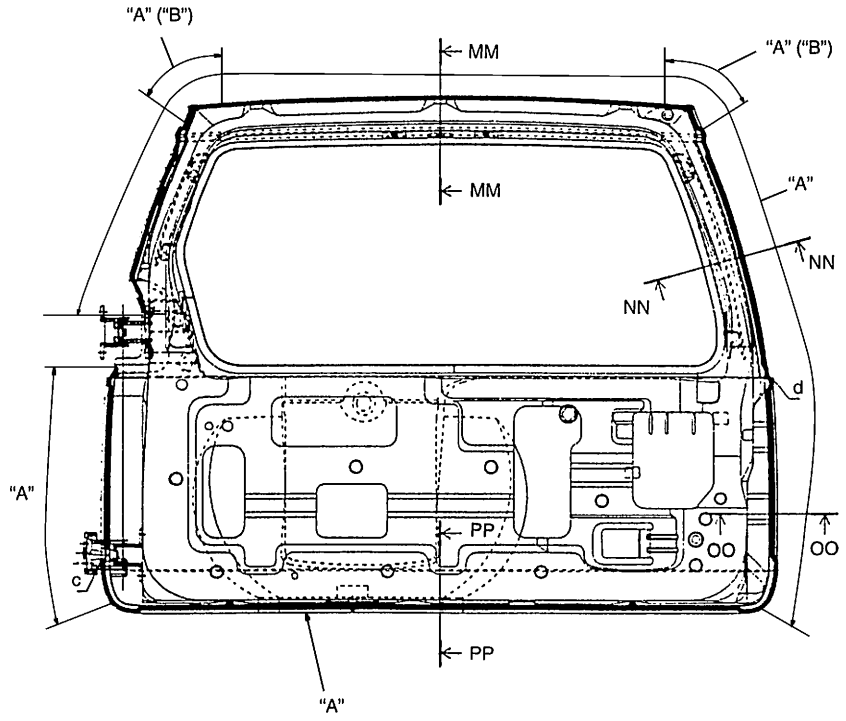


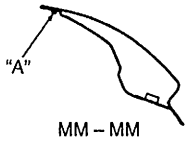
"W" : More than 5 mm between c and d	"C" : Wipe sealant away	1. Sealant application area
"A" : Apply sealant	"D" : Role sealant between c and d	
"B" : Brush treatment	"E" : Wipe sealant away (15 – 20 mm (0.59 – 0.79 in.))	

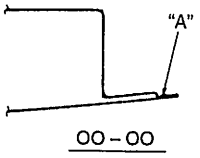


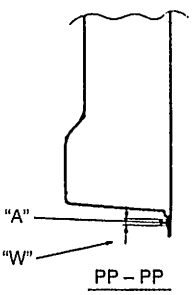






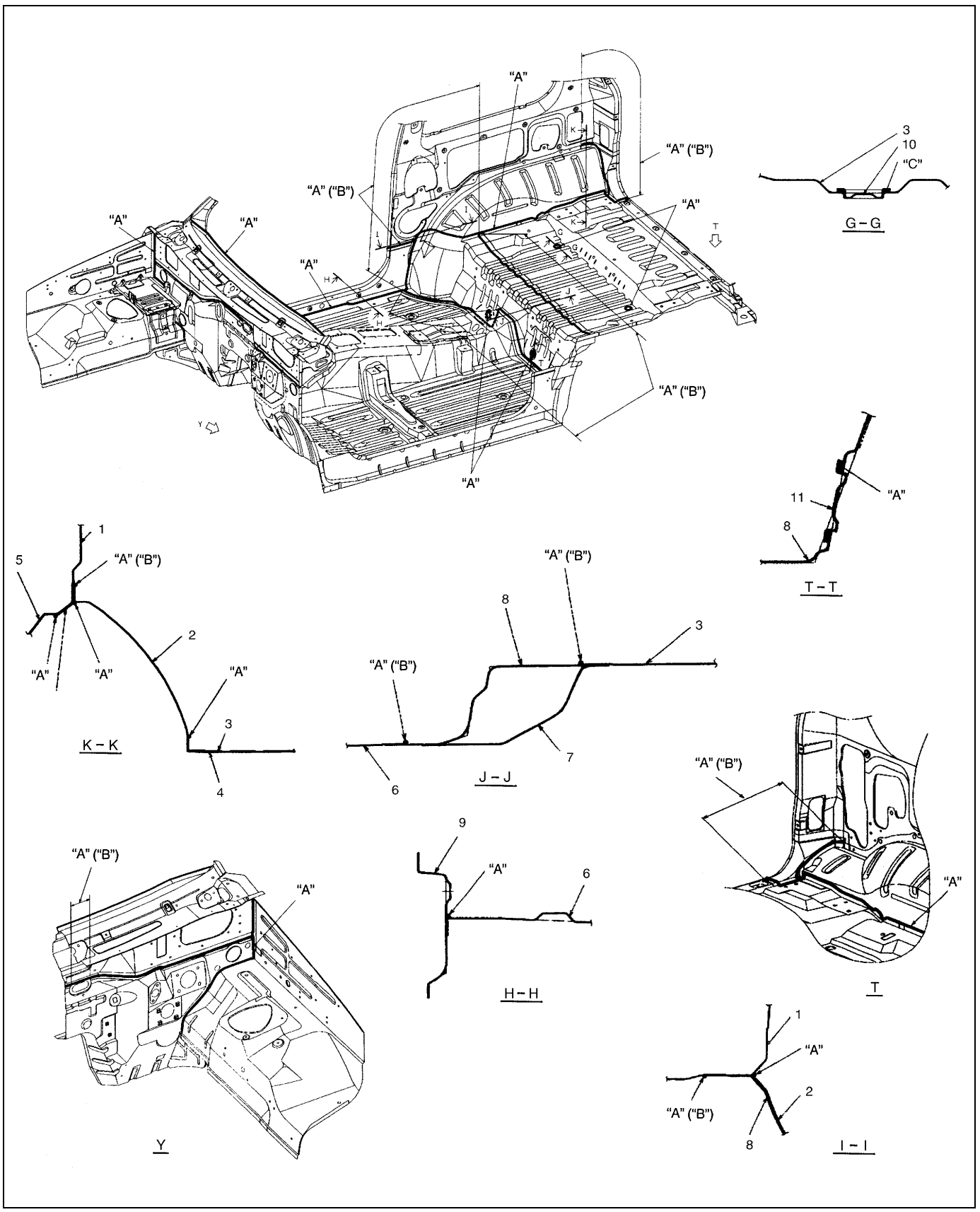




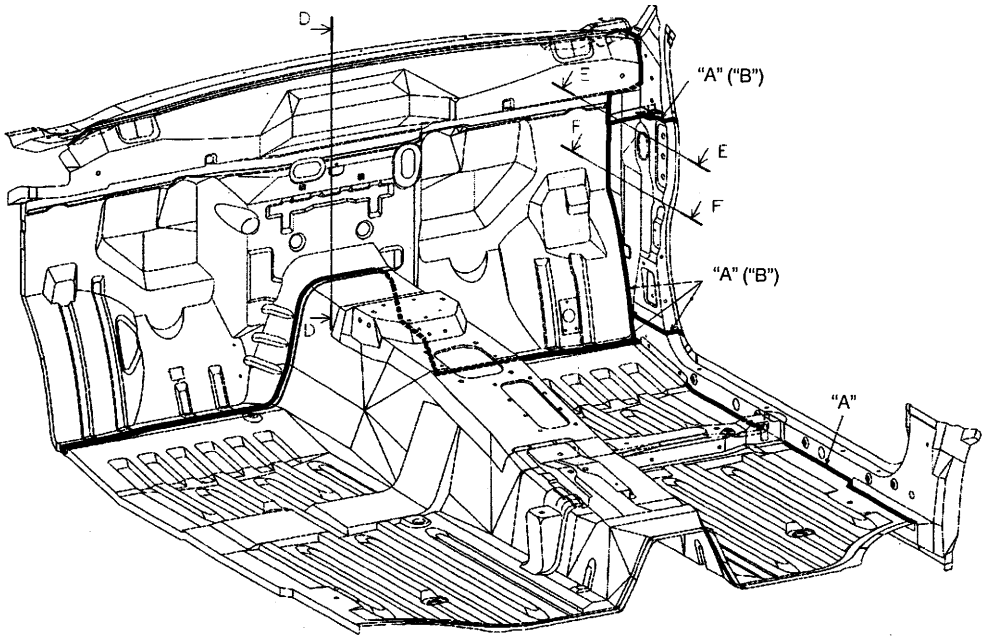


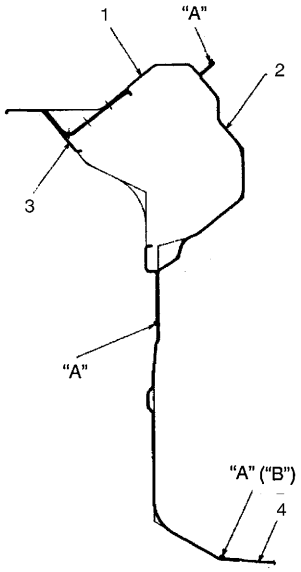
"W" : More than 5 mm between c and d	"Y" : More than 5 mm
"A" : Apply sealant	

Other Than Canvas Top Model (3 Door)

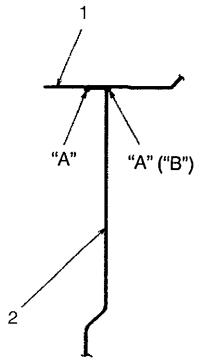


"A" : Apply sealant	3. Rear floor panel	8. Center floor panel
"B" : Brush treatment	4. Tail lower member	9. Side sill inner panel
"C" : Sealant between cap and panel (all around)	5. Rear wheel housing extension	10. Rear floor cap
1. Side body inner panel	6. Front floor panel	11. Center floor cap
2. Rear wheel housing panel	7. Center floor member	

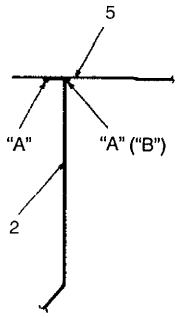




D – D

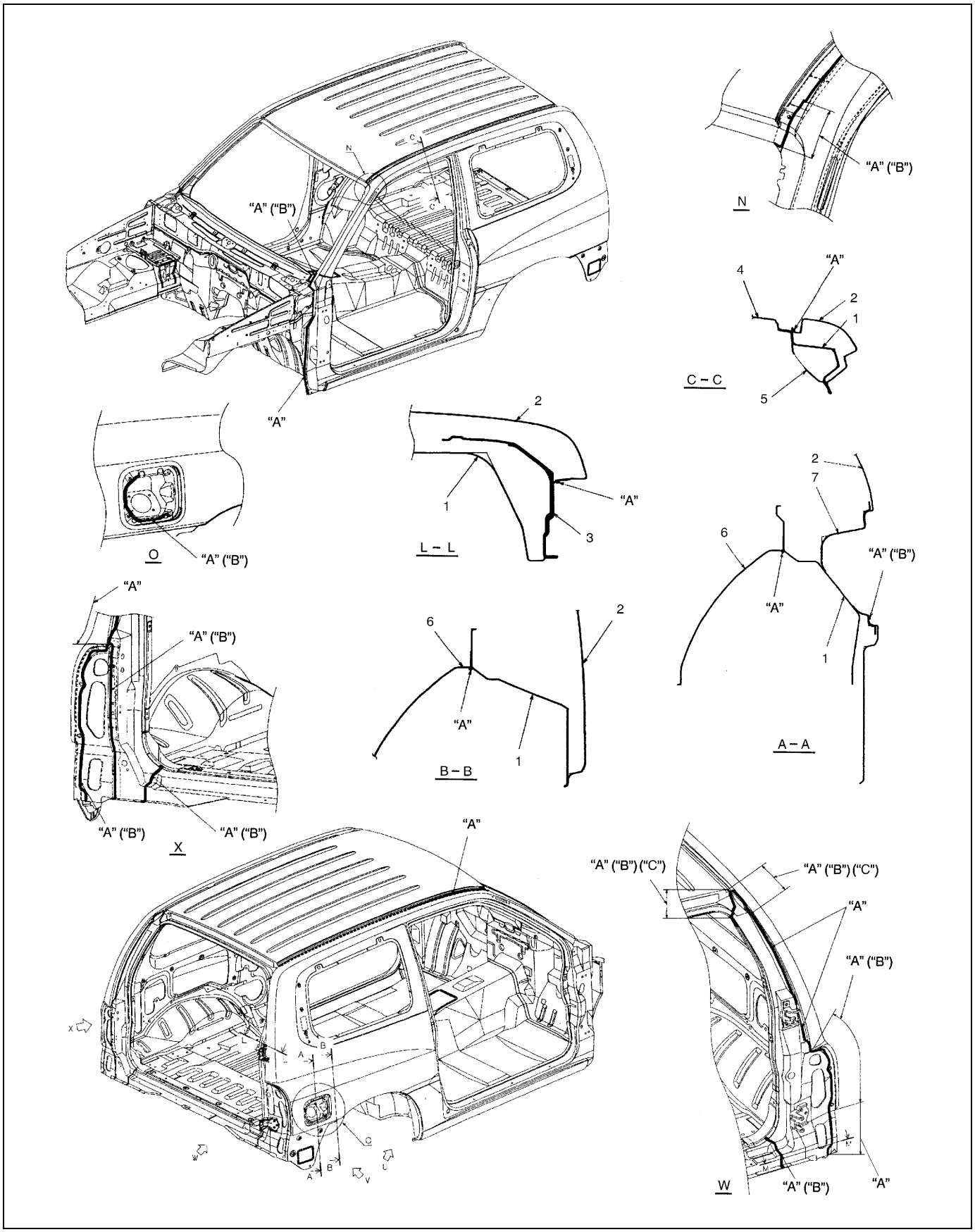


E – E

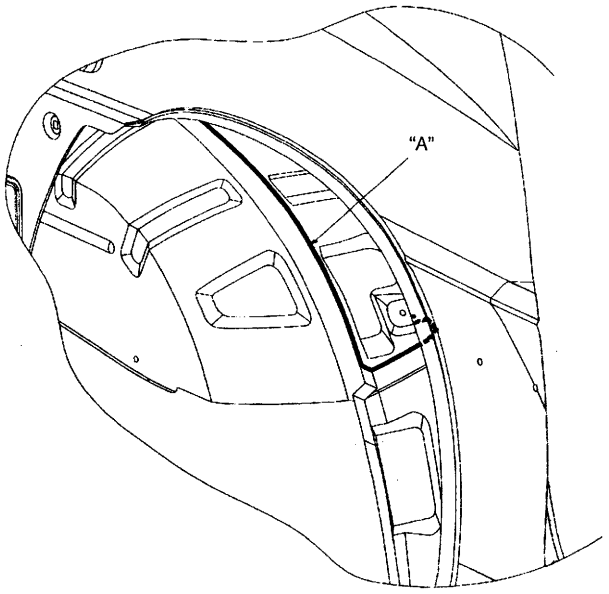


F – F

"A" : Apply sealant	2. Dash panel	5. Front pillar inner lower panel
"B" : Brush treatment	3. Cowl front panel	
1. Cowl top panel	4. Front floor panel	



"A" : Apply sealant	1. Side body inner panel	4. Roof panel	7. Fuel inlet box
"B" : Brush treatment	2. Side body outer panel	5. Front pillar inner panel	
"C" : Wipe sealant away	3. Rear pillar center right panel	6. Rear wheel housing panel	



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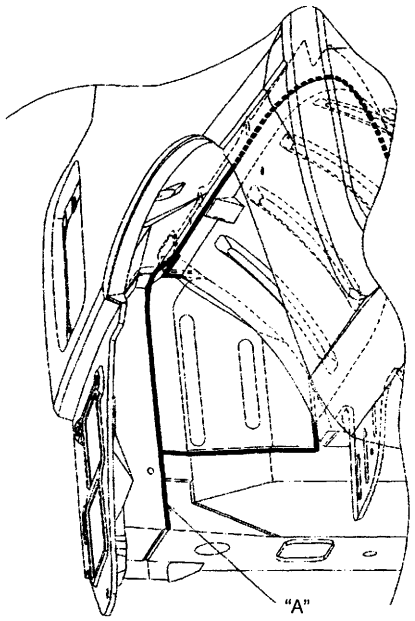
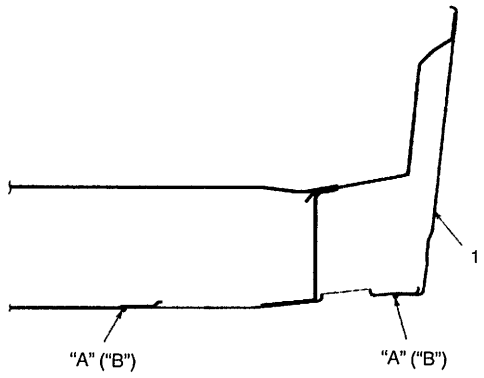
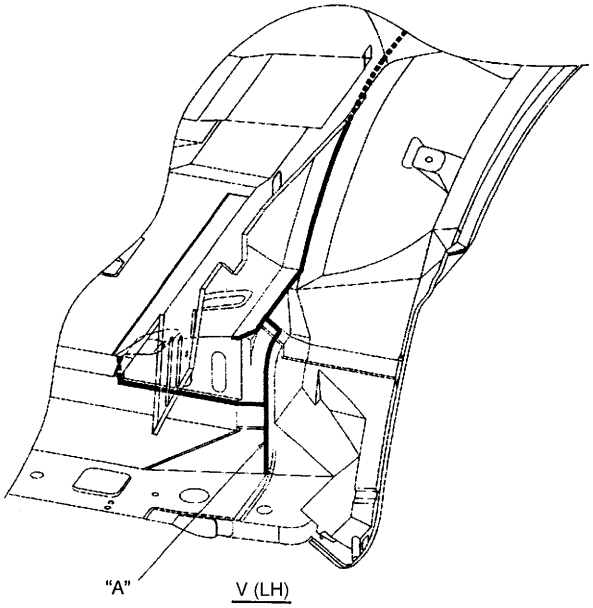


V (RH)

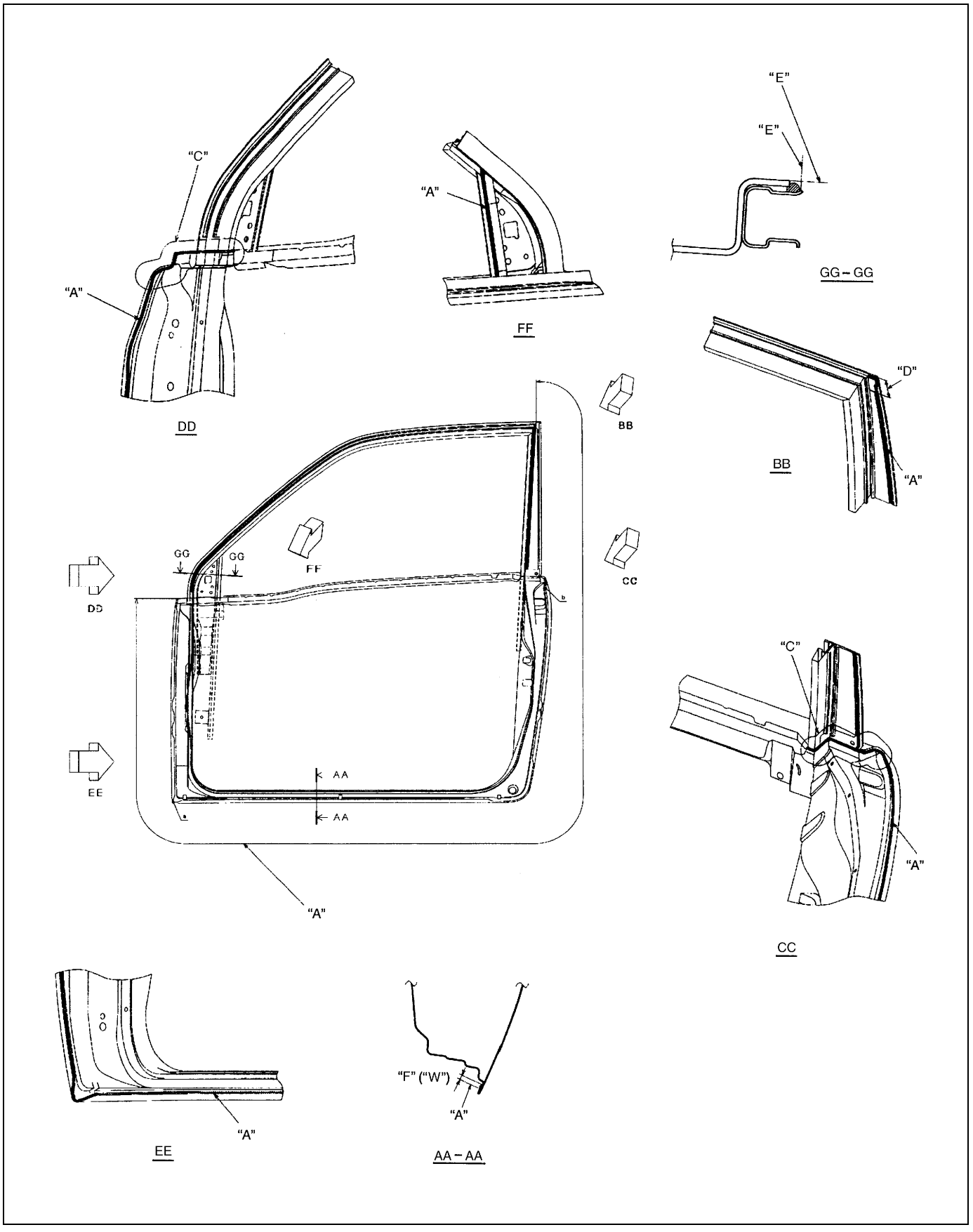


M – M

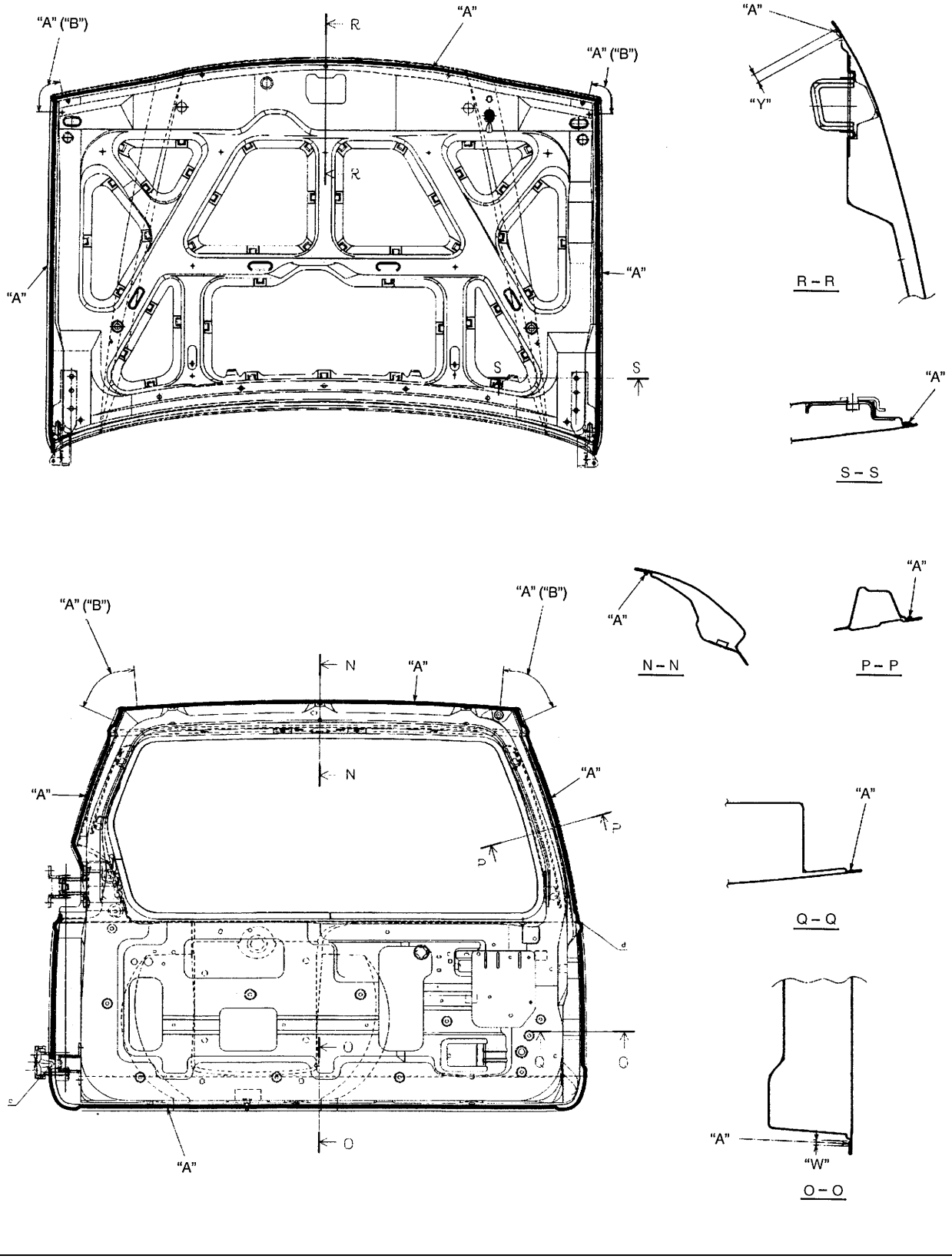


V (LH)

"A" :	Apply sealant
"B" :	Brush treatment
1.	Side body outer panel

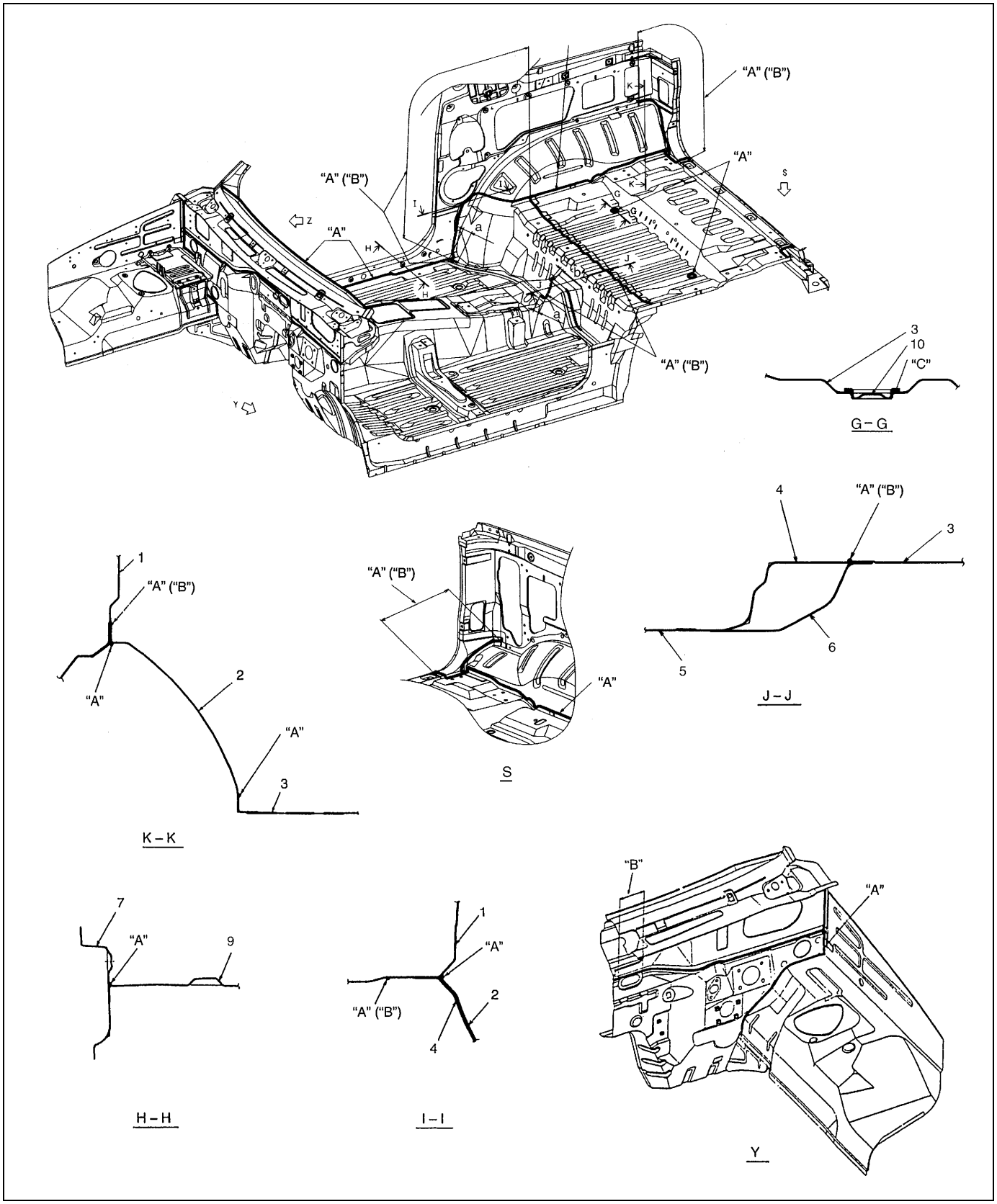


"A" : Apply sealant	"D" : Wipe sealant away (15 – 20 mm (0.59 – 0.79 in.))	"W" : More than 5 mm between a – b
"B" : Brush treatment	"E" : Be free from protrude of sealant outside from this line	
"C" : Wipe sealant away	"F" : Role sealant between a – b	

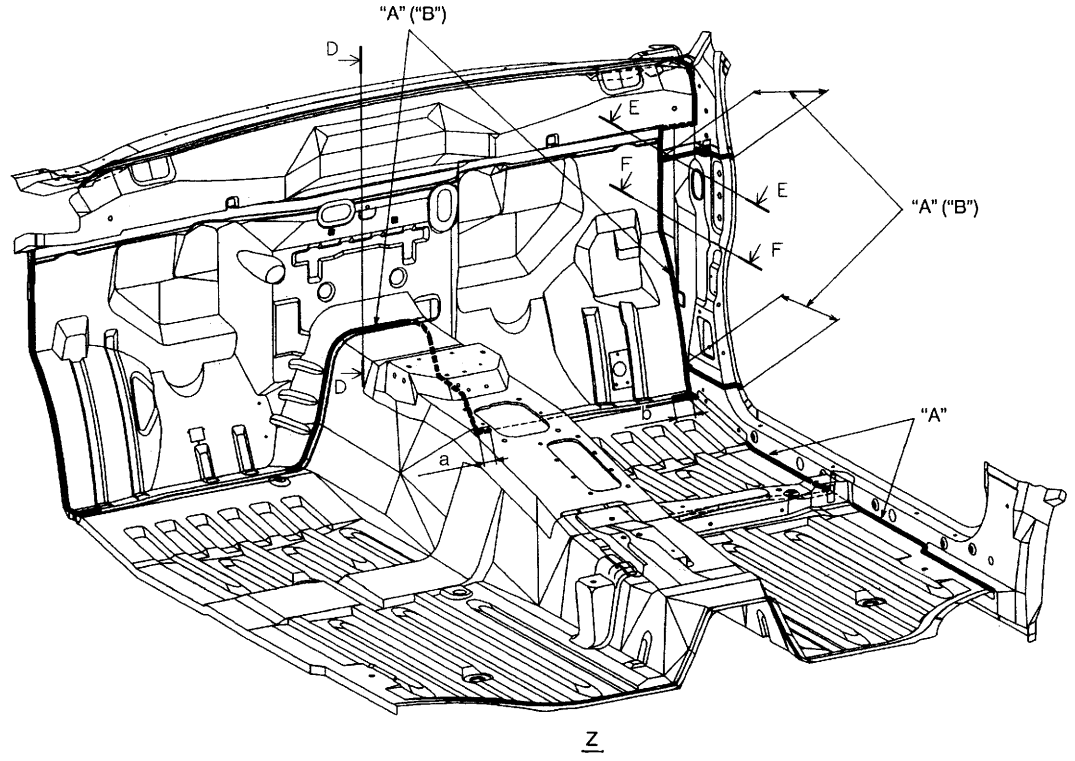


"A" : Apply sealant	"W" : More than 5 mm between c and d
"B" : Brush treatment	"Y" : More than 5 mm

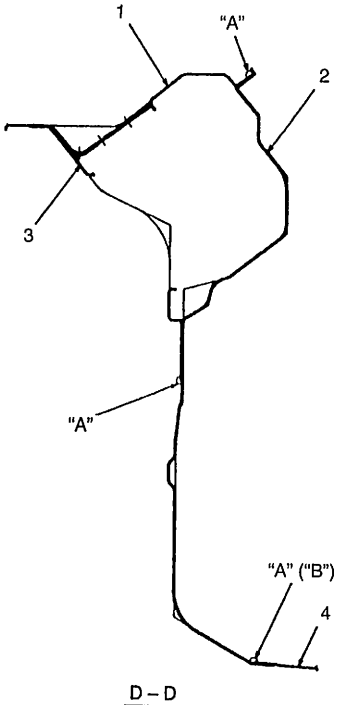
Canvas Top



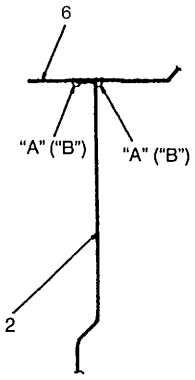
"A" : Apply sealant	b : 30 mm (1.18 in.)	4. Center floor panel	8. Rear floor cap
"B" : Brush treatment	1. Side body inner panel	5. Main floor panel	9. Front floor panel
"C" : Sealant between cap and panel (all around)	2. Rear wheel housing panel	6. Center floor member	
a : 50 mm (1.97 in.)	3. Rear floor panel	7. Side sill inner panel	



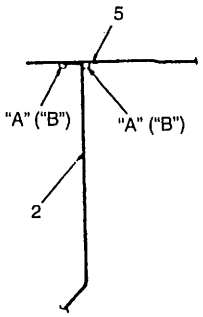
Z



D – D

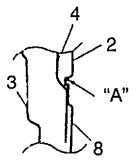


E – E

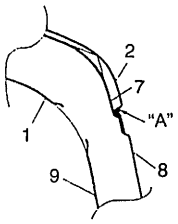


F – F

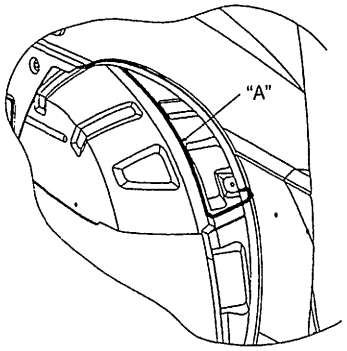
"A" : Apply sealant	b : 50 mm (1.97 in.)	3. Cowl front panel	6. Dash side panel
"B" : Brush treatment	1. Cowl top panel	4. Front floor panel	
a : 30 mm (1.18 in.)	2. Dash panel	5. Front pillar inner lower panel	



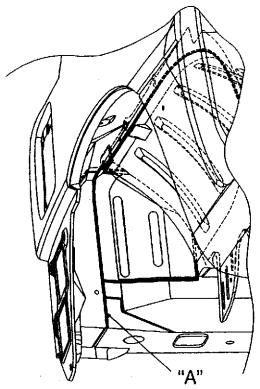
C – C



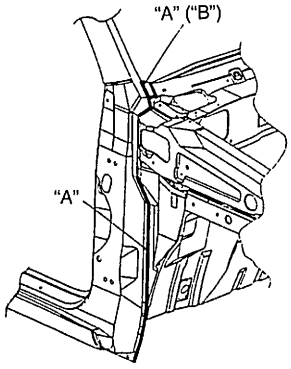
L – L



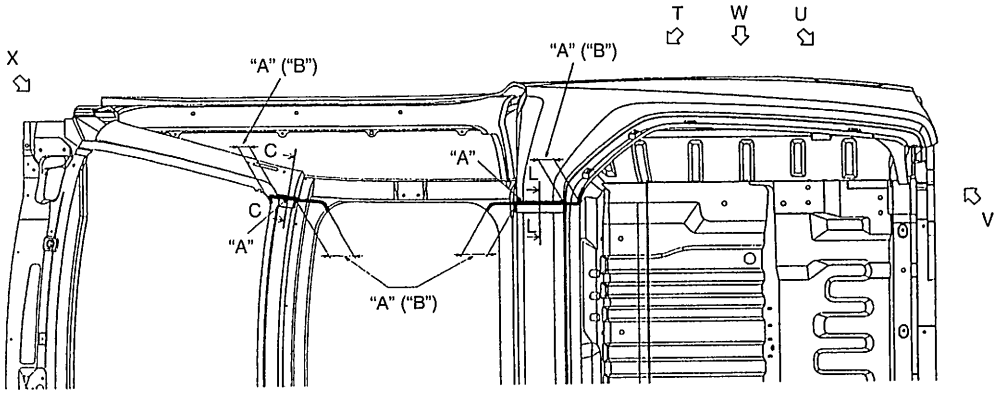
VIEW: T

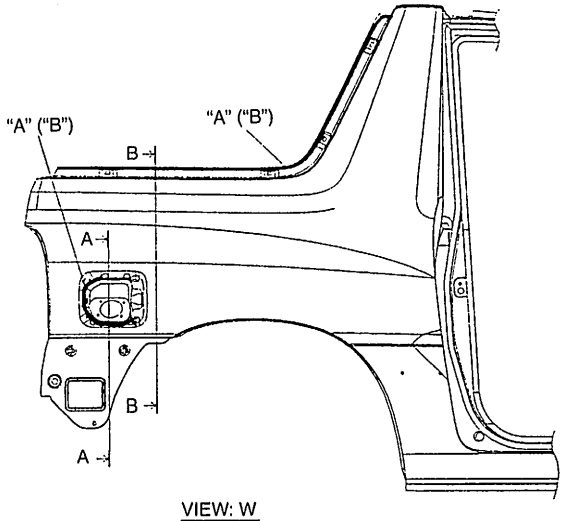


VIEW: U (RH)

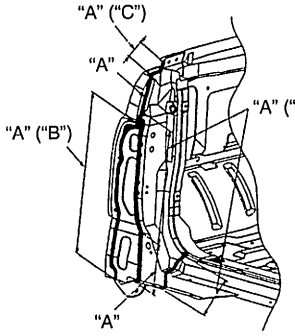


VIEW: X

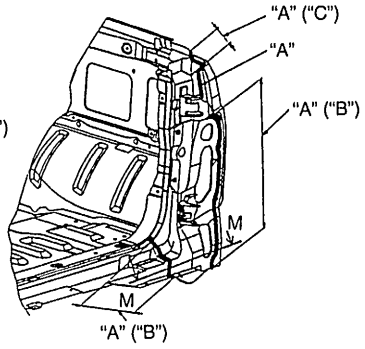




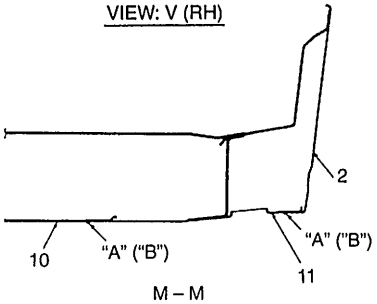
VIEW: W



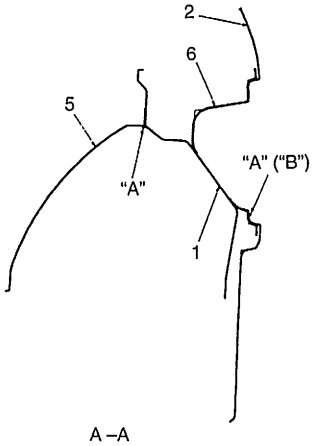
VIEW: V (LH)



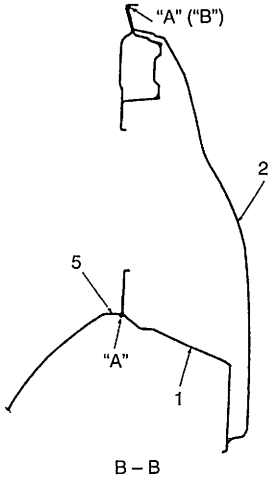
VIEW: V (RH)



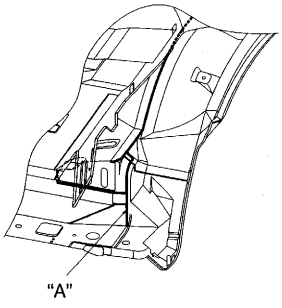
M – M



A – A

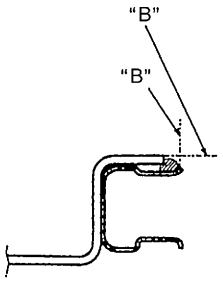


B – B

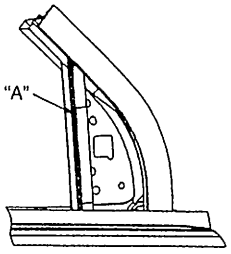


VIEW: U (LH)

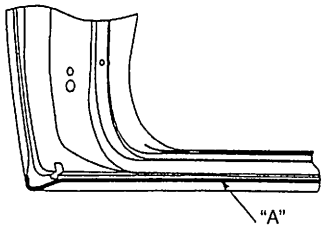
“A” : Apply sealant	3. Front pillar inner panel	8. Center pillar joint outer panel
“B” : Brush treatment	4. Front pillar upper reinforcement	9. Center pillar joint inner panel
“C” : Wipe	5. Rear wheel housing panel	10. Tail upper member
1. Side body inner panel	6. Fuel inlet box	11. Back pillar outer panel
2. Side body outer panel	7. Center pillar reinforcement	12. Front pillar joint outer panel



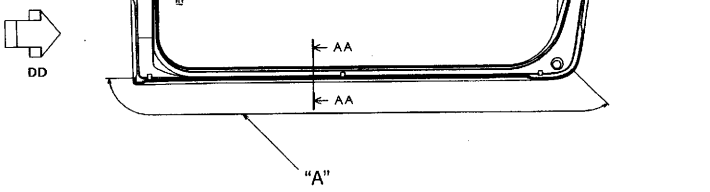
BB – BB

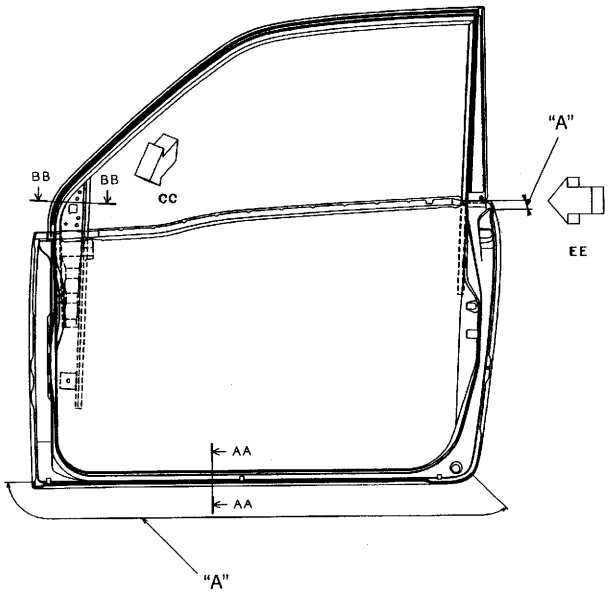


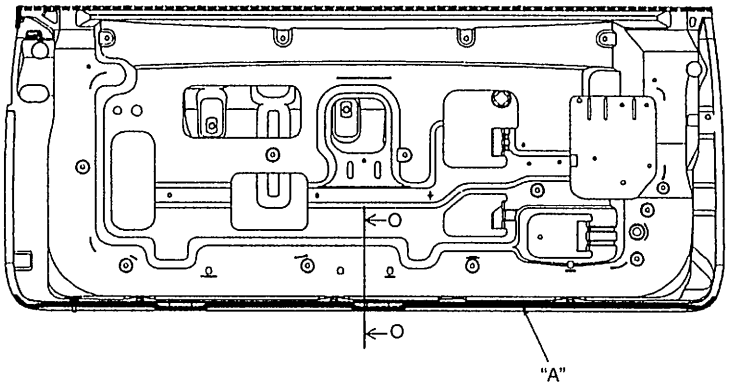
VIEW:CC

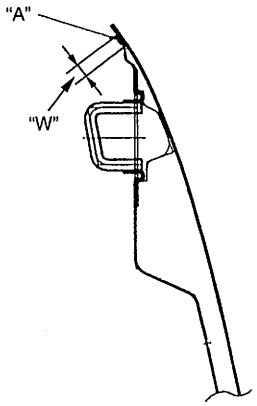


VIEW:DD

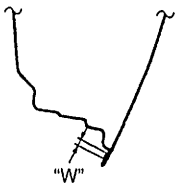




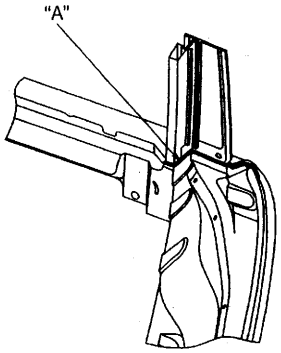




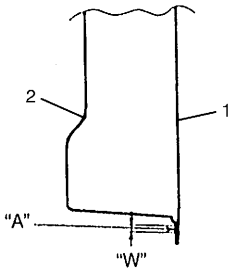
N – N



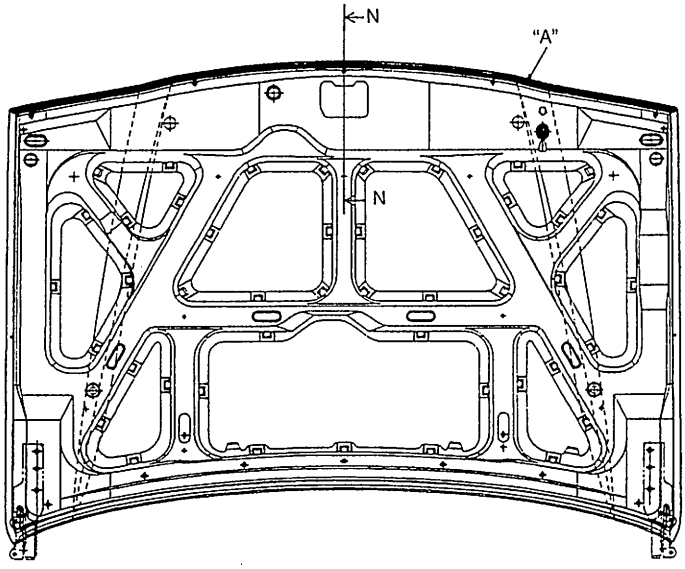
AA – AA



VIEW:EE



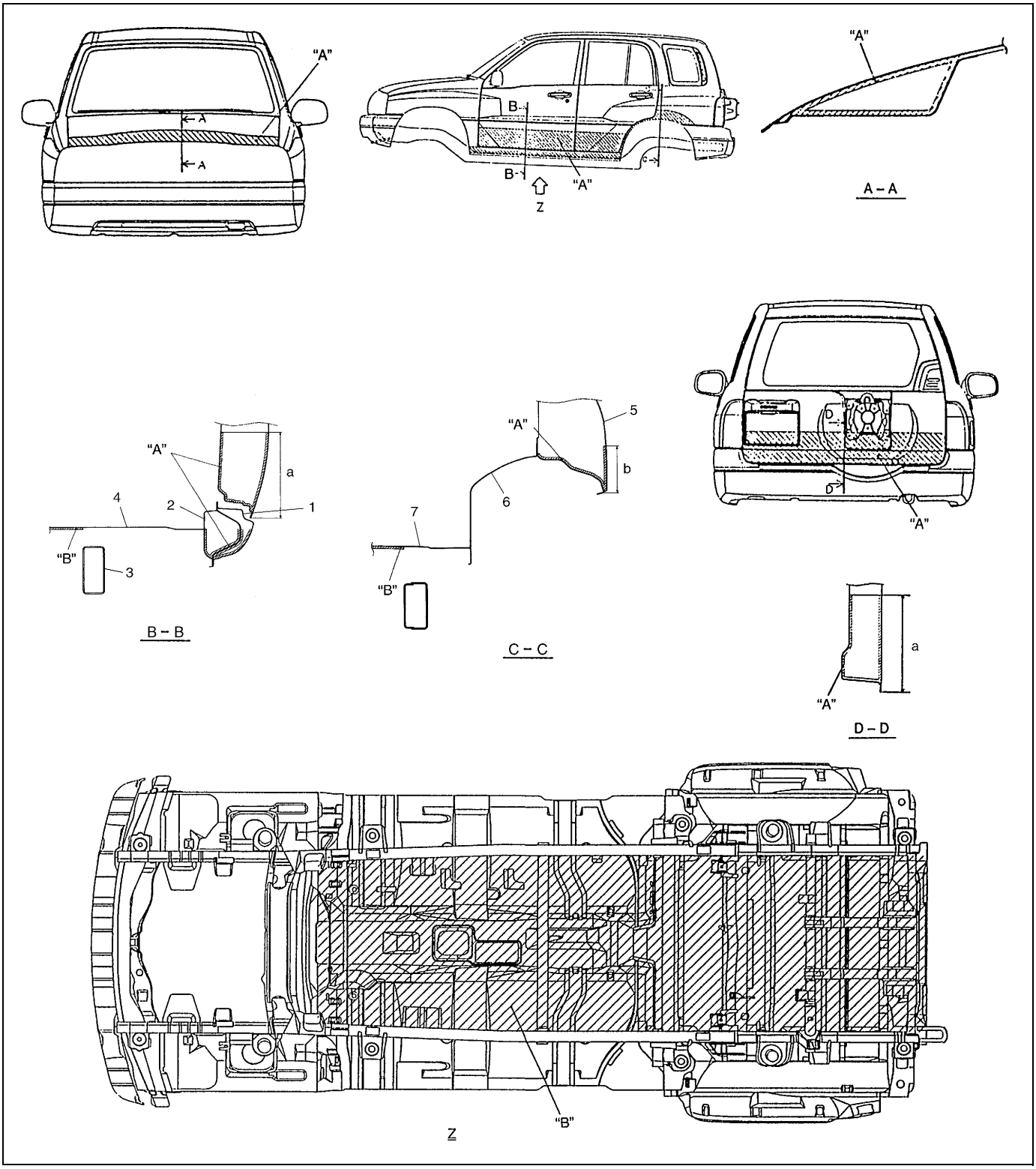
O – O



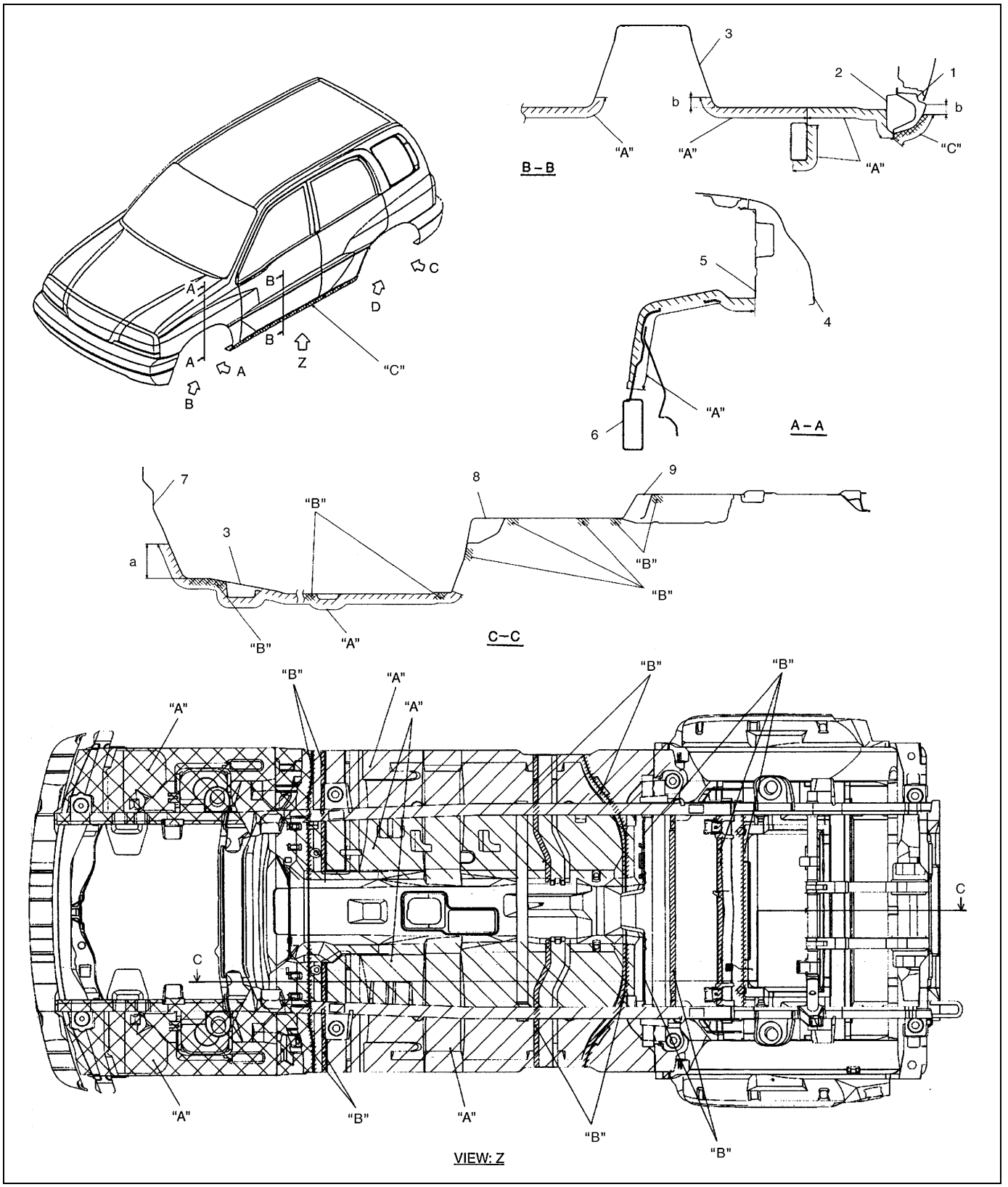
"A" : Apply sealant	"B" : Be free from protrude of sealant outside from this line	"W" : 5 mm (0.20 in.)	1. Rear gate outer panel	2. Rear gate inner panel

Undercoating/anti-corrosion compound application area

Other Than Canvas Top Model (5 Door)

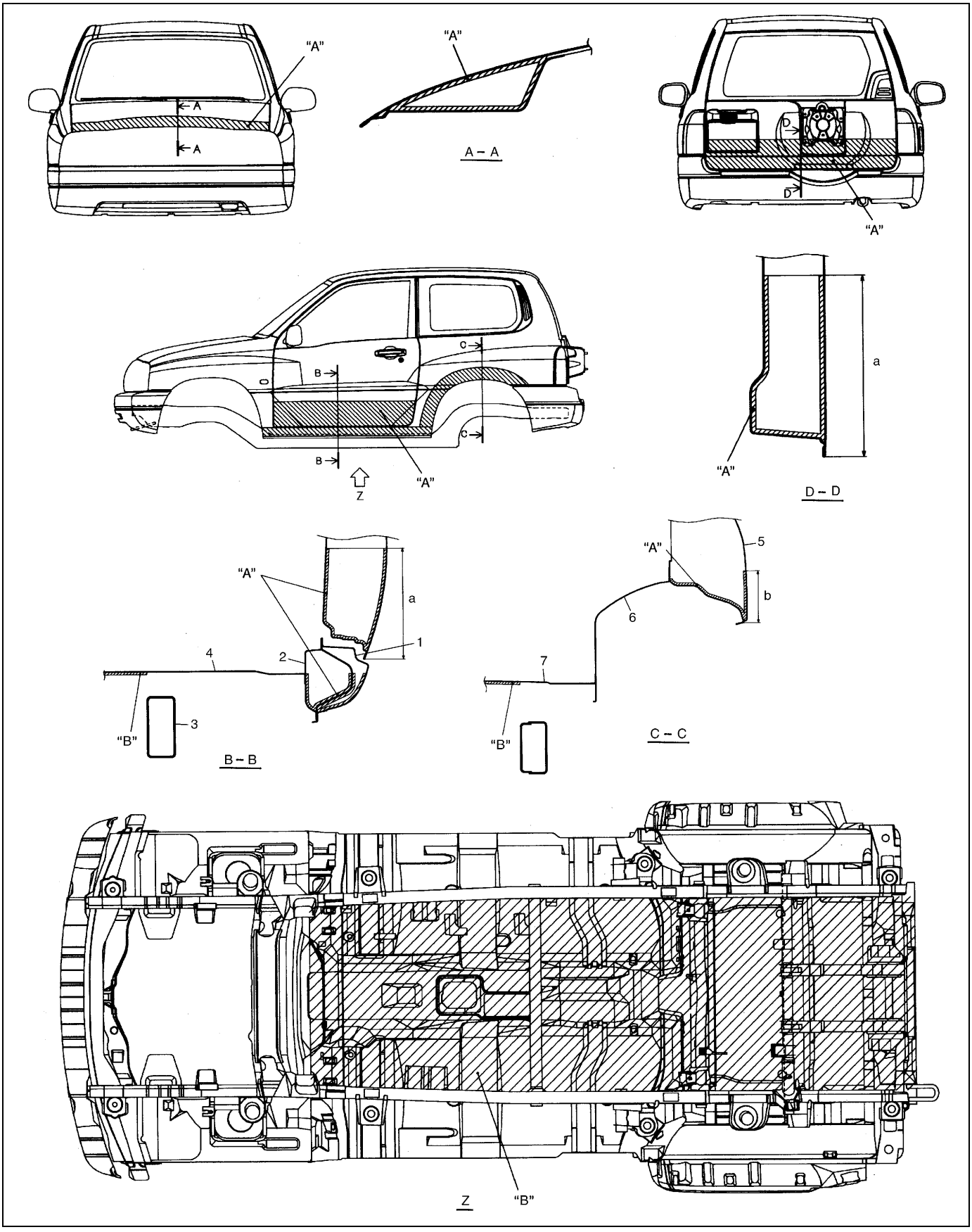


"A" : Apply rust proof wax (hot wax 50 μm or more)	1. Side body outer	5. Rear fender
"B" : Apply rust proof wax (high viscosity wax 50 μm or more)	2. Side sill inner	6. Rear wheel housing
a : 200 mm (7.87 in.)	3. Frame	7. Center floor
b : 100 mm (3.94 in.)	4. Main floor	

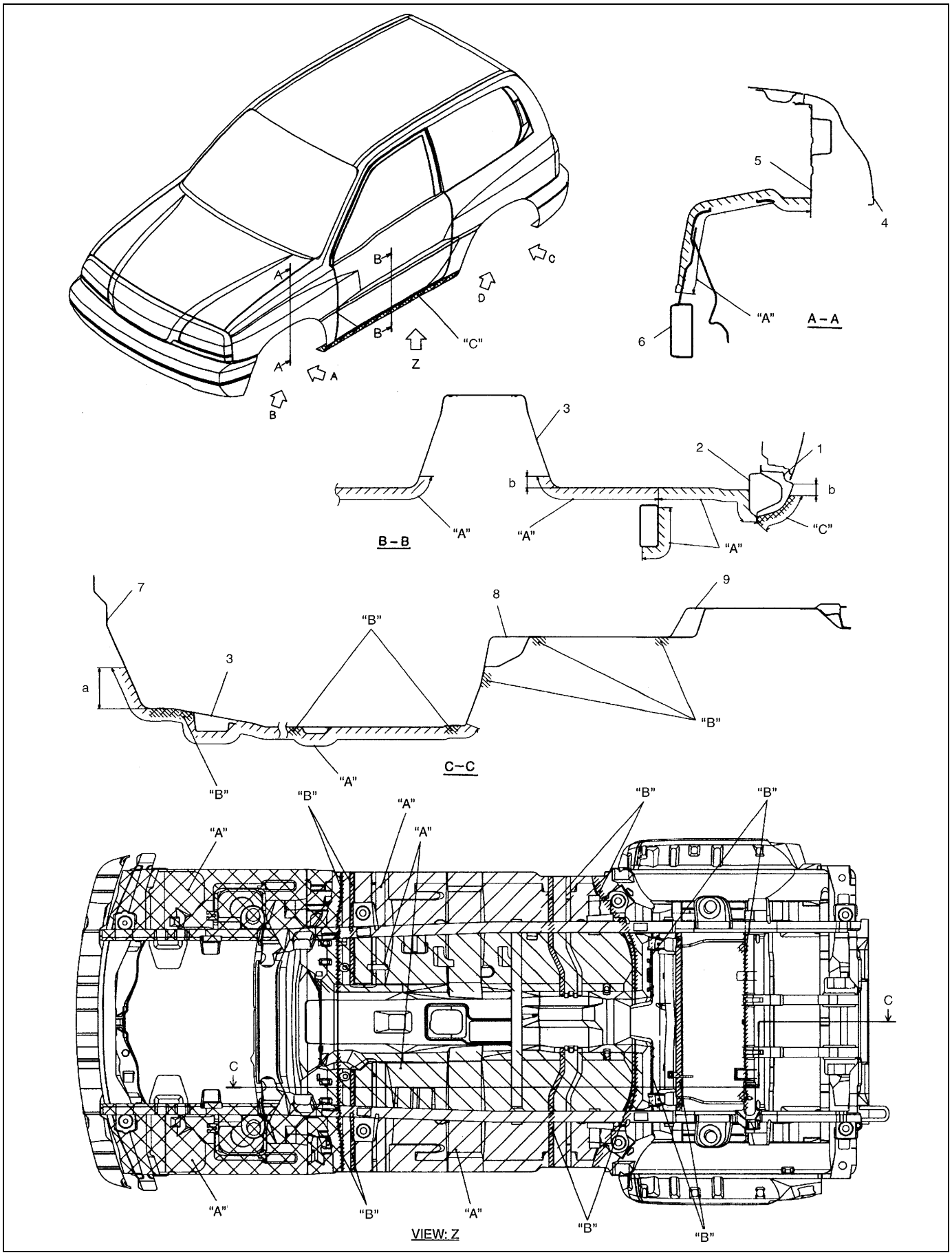


"A" : Apply undercoating (PVC, 400 μm or more)	1. Side body outer	6. Frame
"B" : Additional applying of under coating (for 5 door vehicle without splash guard)	2. Side sill inner	7. Dash panel
"C" : Apply PVC chip resistant material (200 μm or more)	3. Main floor	8. Center floor
a : 100 mm (3.94 in.)	4. Front fender	9. Rear floor
b : 30 mm (1.18 in.)	5. Front wheel housing	

Other Than Canvas Top Model (3 Door)

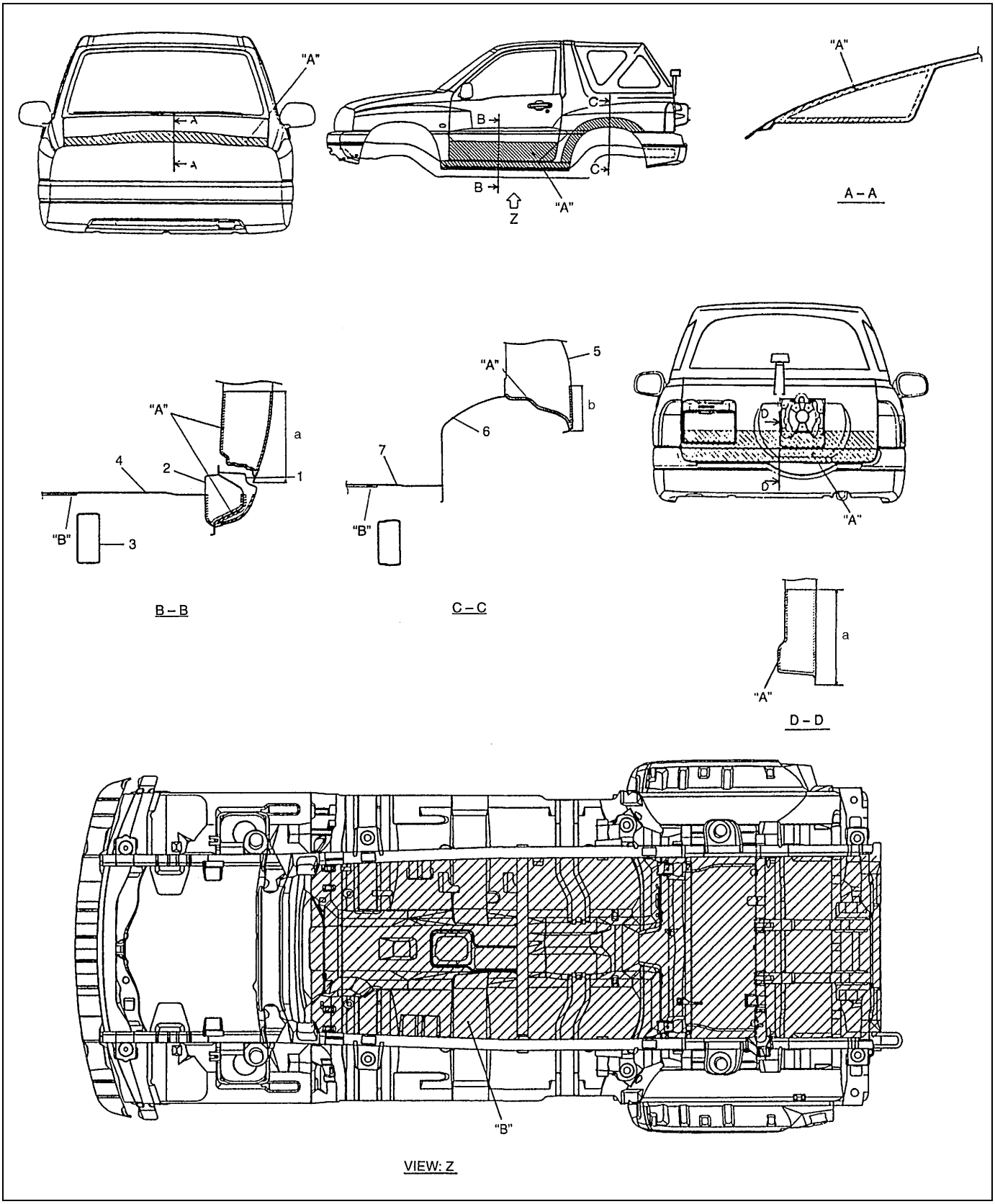


"A" : Apply rust proof wax (hot wax 50 μm or more)	b : 100 mm (3.94 in.)	4. Main floor
"B" : Apply rust proof wax (high viscosity wax 50 μm or more)	1. Side body outer	5. Rear fender
"D" : Apply black painting	2. Side sill inner	6. Rear wheel housing
a : 200 mm (7.87 in.)	3. Frame	7. Center floor

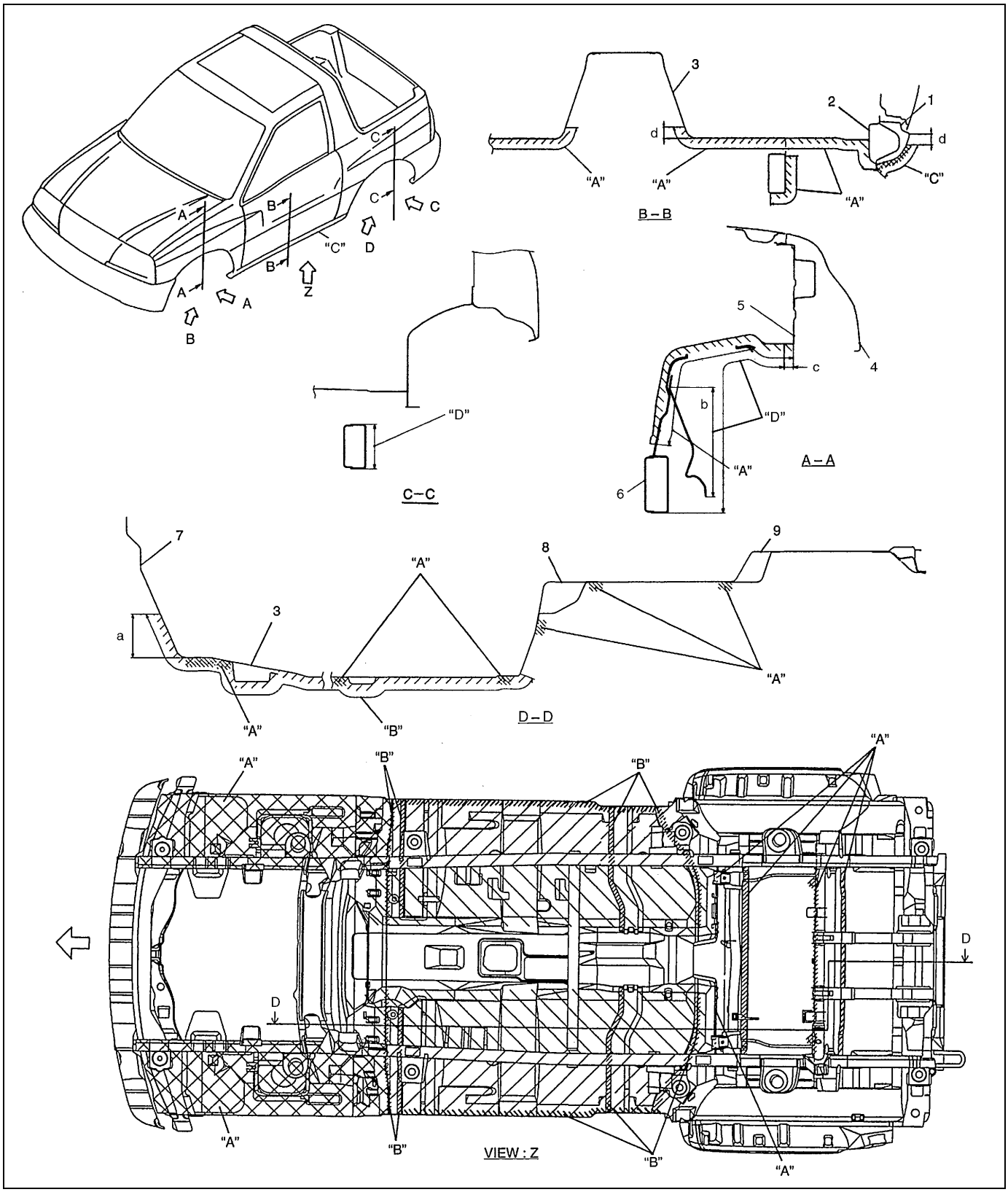


"A" : Apply undercoating (PVC, 400 μm or more)	a : 100 mm (3.94 in.)	2. Side sill inner	5. Front wheel housing	8. Center floor
"B" : Additional applying of under coating	b : 30 mm (1.18 in.)	3. Main floor	6. Frame	9. Rear floor
"C" : Apply PVC chip resistant material (200 μm or more)	1. Side body outer	4. Front fender	7. Dash panel	

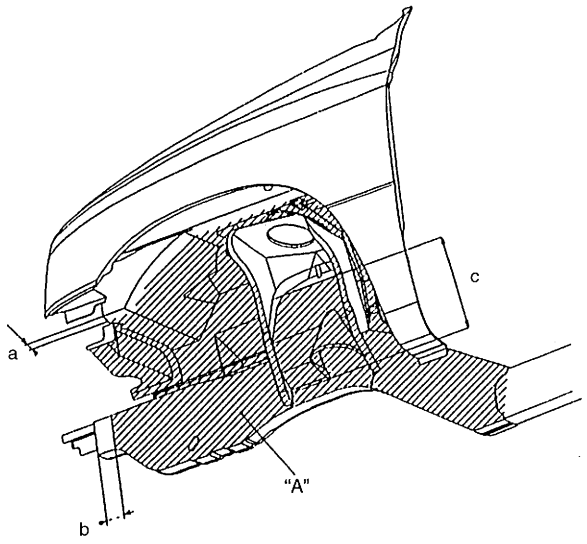
Canvas Top



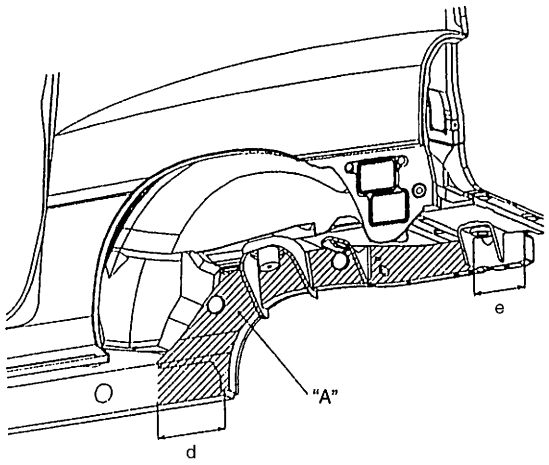
"A" : Apply rust proof wax (hot wax 50 μm or more)	1. Side body outer	5. Rear fender
"B" : Apply rust proof wax (high viscosity wax 50 μm or more)	2. Side sill inner	6. Rear wheel housing
a : 200 mm (7.87 in.)	3. Frame	7. Center floor
b : 100 mm (3.94 in.)	4. Main floor	



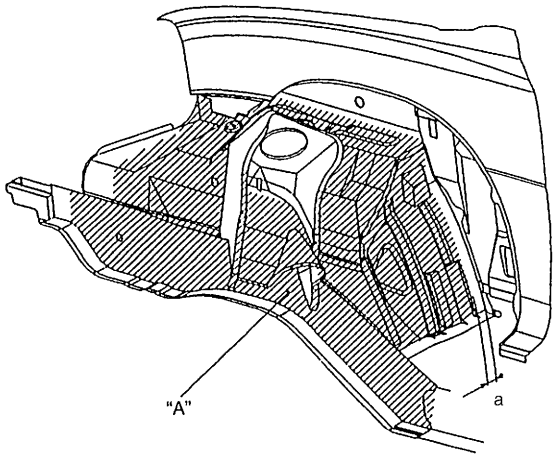
"A" : Apply undercoating (PVC, 400 μm or more)	b : 240 mm (9.45 in.)	3. Main floor	8. Center floor
"B" : Additional applying of under coating must cover edges and mating parts more than 70 mm (2.76 in.)	c : 20 mm (0.79 in.)	4. Front fender	9. Rear floor
"C" : Apply PVC chip resistant material (200 μm or more)	d : 30 mm (1.18 in.)	5. Front wheel housing	
"D" : Apply black paint	1. Side body outer	6. Frame	
a : 100 mm (3.94 in.)	2. Side sill inner	7. Dash panel	



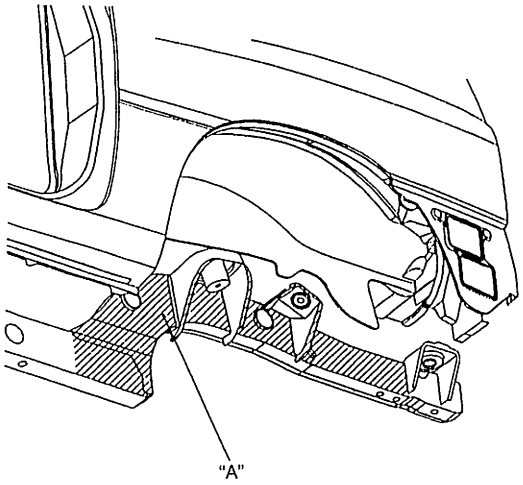
VIEW : A



VIEW : C



VIEW : B



VIEW : D

"A" : Black paint	c : 240 mm (9.45 in.)
a : 20 mm (0.79 in.)	d : 177 mm (6.97 in.)
b : 40 mm (1.57 in.)	e : 134 mm (5.28 in.)

Plastic Parts Finishing

Paintable plastic parts are ABS plastic parts.

Painting

Rigid or hard ABS plastic needs no primer coating.
General acrylic lacquers can be painted properly over hard ABS plastic in terms of adherence.

1) Use cleaning solvent for paint finish to wash each part.
2) Apply conventional acrylic color lacquer to part surface.
3) Follow lacquer directions for required drying time. (Proper drying temperature range is 60 to 70°C).

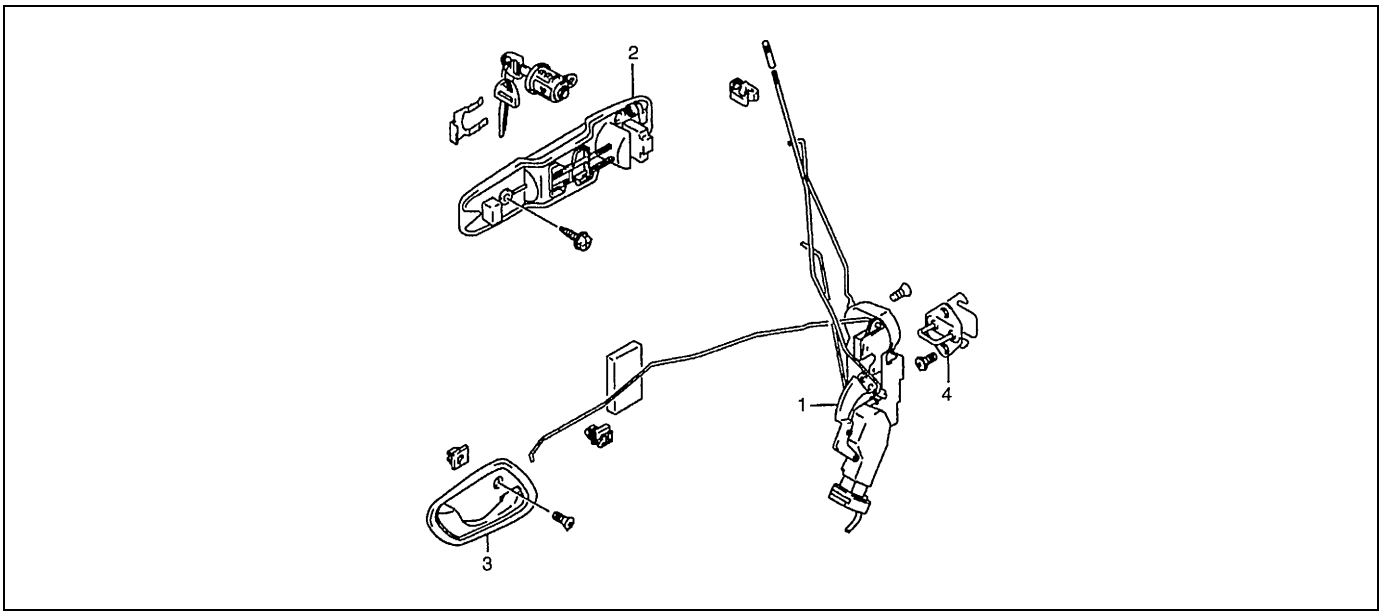
Reference

Plastic parts employ not only ABS (Acrylonitrile Butadiene Styrene) plastic but also polypropylene, vinyl, or the like plastic. Burning test method to identify ABS plastic is described below.

1) Use a sharp blade to cut off a plastic sliver from the part at its hidden backside.
2) Hold sliver with pincers and set it on fire.
3) Carefully observe condition of the burning plastic.
4) ABS plastic must raise readily distinguishable back smoke while burning with its residue suspended in air temporarily.
5) Polypropylene must raise no readily distinguishable smoke while burning.

Security and Locks

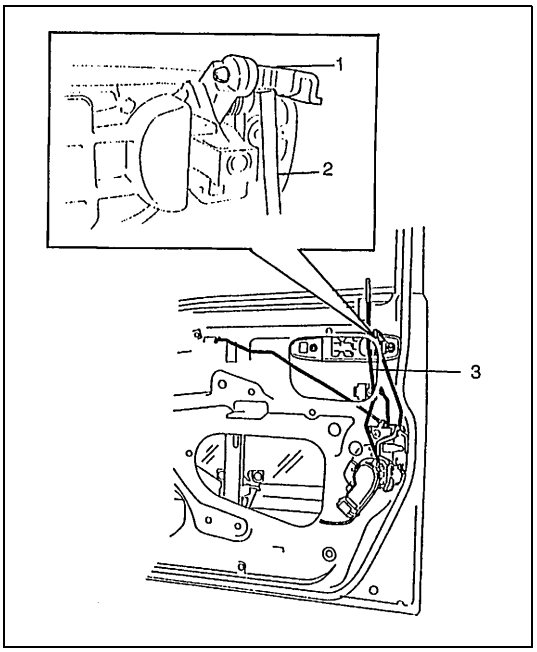
Front Door Lock Assembly



1. Door latch	3. Inside handle bezel
2. Outside handle	4. Latch striker

REMOVAL

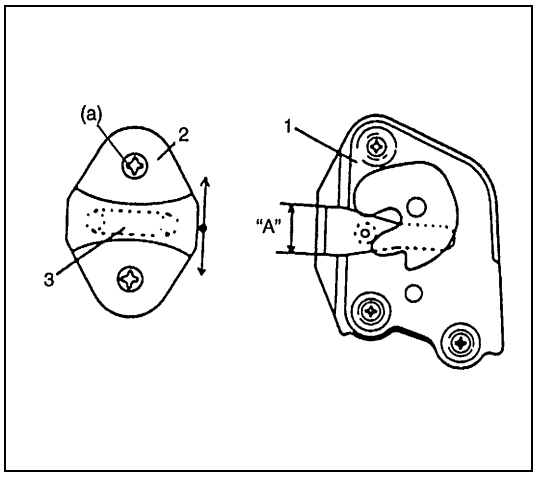
1) Raise window all the way up.
2) Remove door trim and door sealing cover, refer to Steps 1) to 6) of “Front Door Glass Removal” in this section.



3) Remove door opening control rods (2).
   Unlock door lock rod pin retainer (1) and disconnect control rod.
4) Remove door lock control rod (3).
5) Disconnect door lock motor lead wire (if equipped).
6) Remove lock assembly.

INSTALLATION

To install front door lock, reverse removal procedure, noting following.



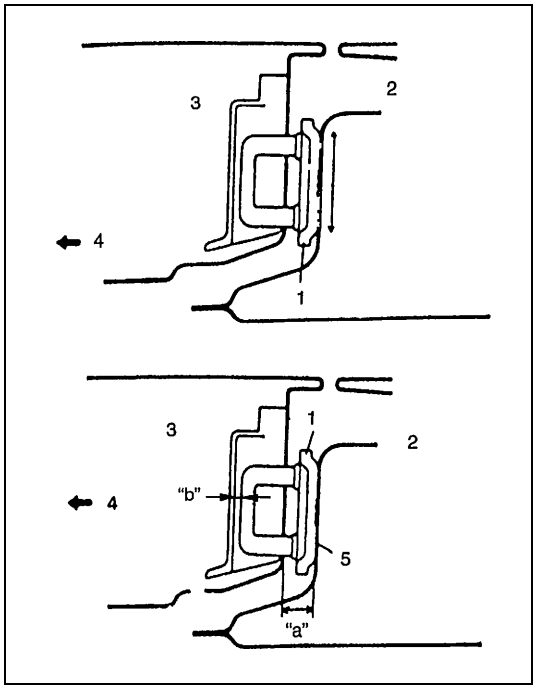
- Door latch striker (2).
  Move door latch striker up or down so its center aligns with the center of groove “A” on the door, as shown.

NOTE:

Striker should be moved vertically and placed level. Do not adjust door lock.

Tightening torque
(a) : 13 N·m (1.3 kg-m, 9.5 lb-ft)

1. Door latch
3. Shaft



- Move door latch striker sideways to adjust door surface flush with body (2) surface, as shown.
  In order to correctly obtain door latch striker (1) position in the foreand-aft direction, increase or decrease number of shims inserted between body and striker to adjust it.

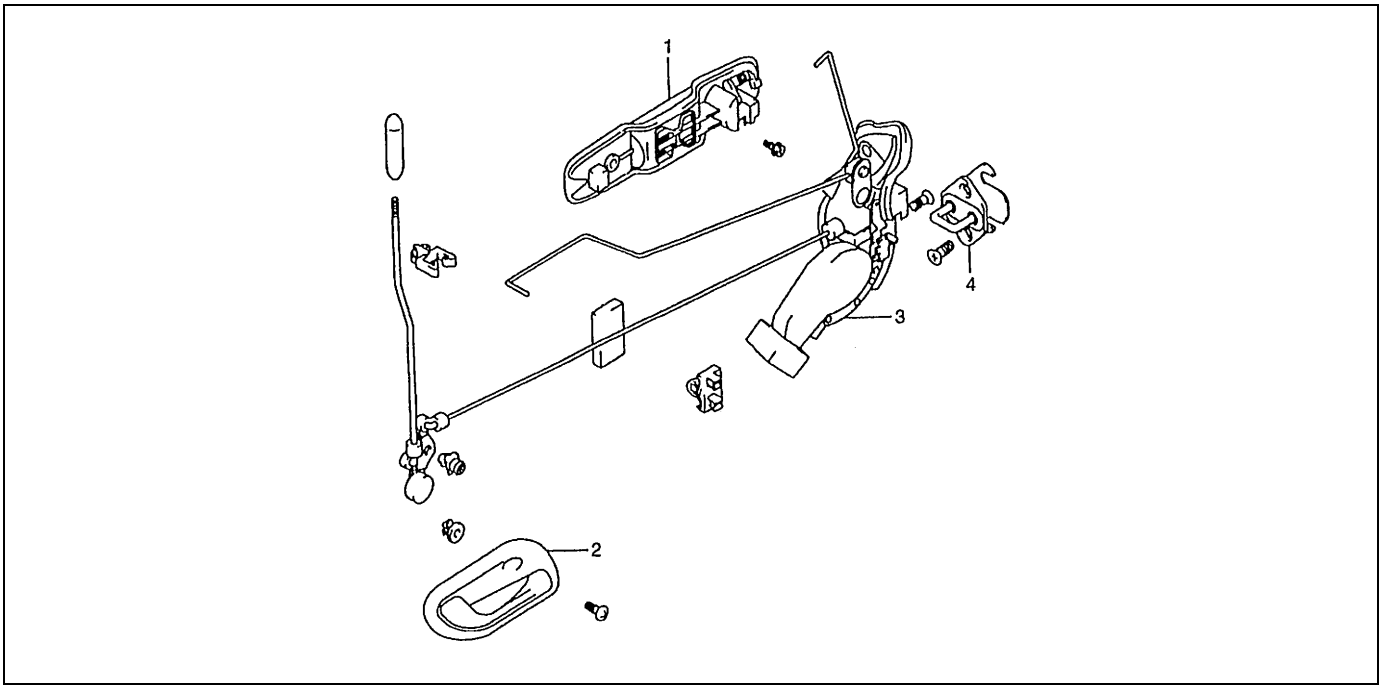
Dimension “a” : 10.9 – 12.9 mm (0.43 – 0.5 in.)
Dimension “b” : 3.4 – 5.4 mm (0.13 – 0.21 in.)

NOTE:

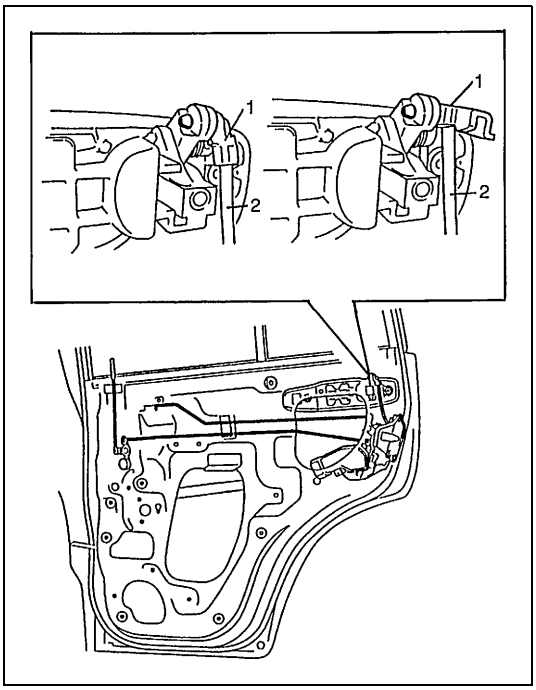
Apply oil or grease to striker joints periodically.

3. Door
4. Front side
5. Shim

Rear Door Lock Assembly



1. Outside handle	3. Latch assembly
2. Inside handle bezel	4. Latch striker



REMOVAL

1) Remove door trim and door sealing cover, refer to Steps 1) to 4) of “Rear Door Glass Removal” in this section.
2) Remove door opening control rod (2) and door lock control rod.
3) Remove lock assembly.

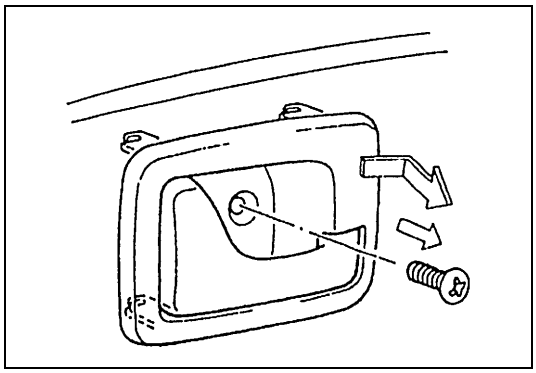
1. Door opening rod pin

INSTALLATION

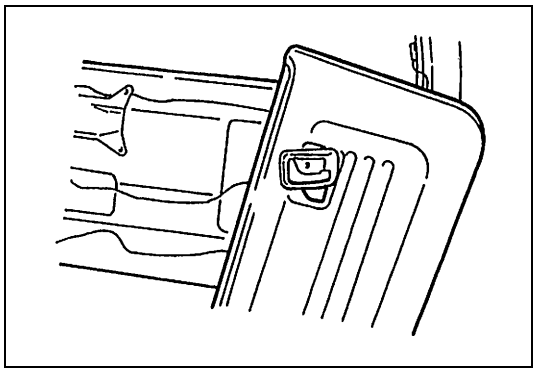
Reverse removal sequence to install rear door lock, noting points mentioned in “Front Door Lock Assembly”.

Back Door/Rear Gate Lock Assembly

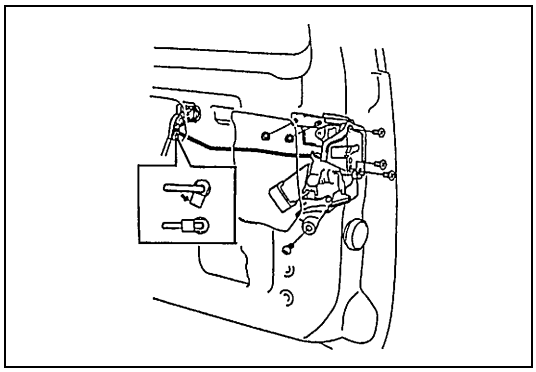
REMOVAL



1) Remove inside handle bezel (if equipped).
2) Remove inside lock knob.

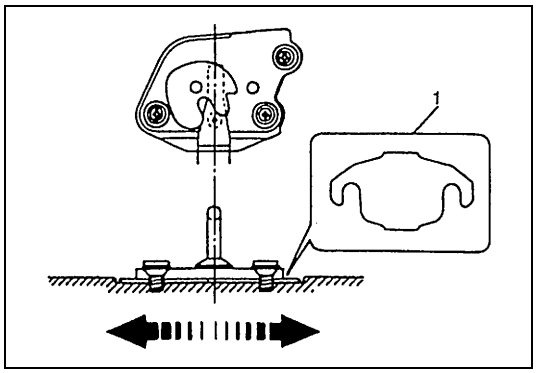


3) Remove door trim.
   With inside handle bezel tilted as shown in figure, turn door trim 90° counterclockwise to remove it (if equipped with inside handle).
4) Remove back door/rear gate sealing cover.



5) Remove back door/rear gate lock control rod.
   Unlock back door/rear gate lock rod pin retainer and disconnect control rod.
6) Disconnect back door lock motor lead wire (if equipped).
7) Remove lock assembly.

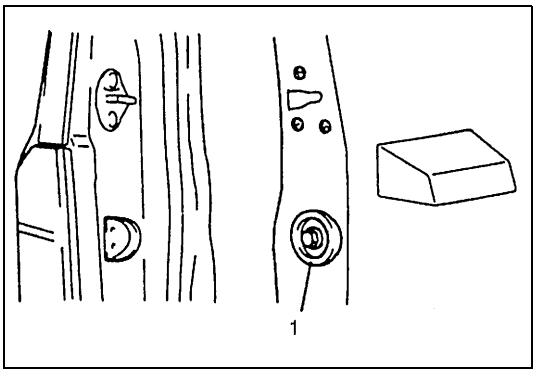
INSTALLATION



Reverse removal procedure to install back door/rear gate lock assembly noting following points.

- Back door/Rear gate latch striker.
  Adjust back door/rear gate latch striker so that its center aligns with the center of groove in back door/rear gate latch base.
  To adjust back door/rear gate latch and striker with each other, insert proper number of shims below the bottom of striker, as shown.

1. Shim



- Back door/Rear gate rubber cushion (1).
  Move rubber cushion installed at the left side of back door/rear gate to align it with its guide.

Key Coding

Key usage and identification

Key is used for ignition and door lock cylinder. Keys are cut on both edges to make them reversible.
Key identification is obtained from five character key code stamped on key code tag. Using this key code, key code cutting combination can be determined from a code list (available to owners of key cutting equipment from suppliers).
If key codes are not available from records or tags, key code can be obtained from the right hand door lock cylinder (if lock has not been replaced). Lock cylinders supplied by the factory as service parts are unmarked.
If original key is available, key code cutting combination can be determined by laying key.

Ignition switch lock cylinder

REMOVAL AND INSTALLATION

See Section 3C1, “Air Bag Steering Wheel and Column”.

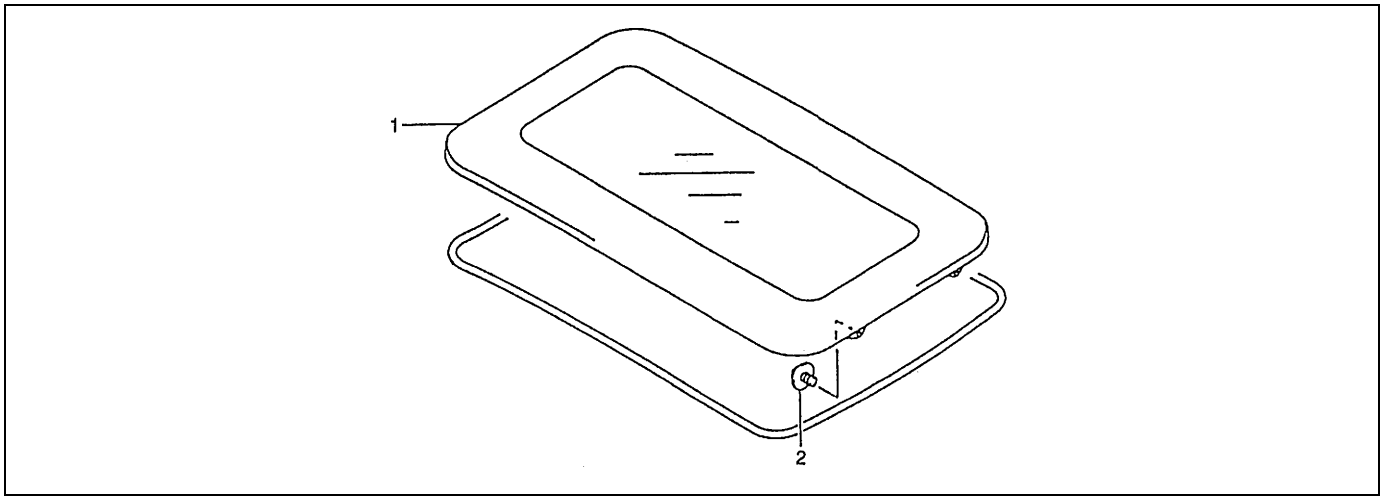
ELECTRICAL DIAGNOSIS

For ignition switch electrical troubleshooting, see Section 8, “Body Electrical System”.

Sunroof/Convertible Top

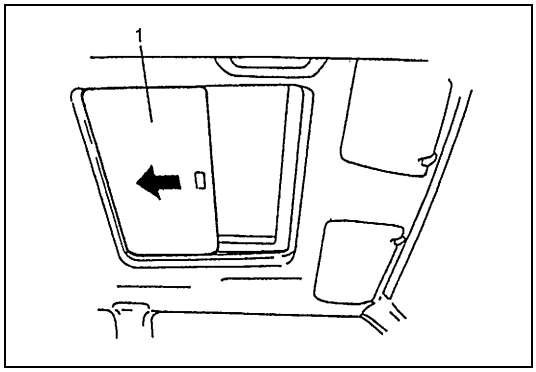
Sliding Roof (If Equipped)

Sliding roof glass



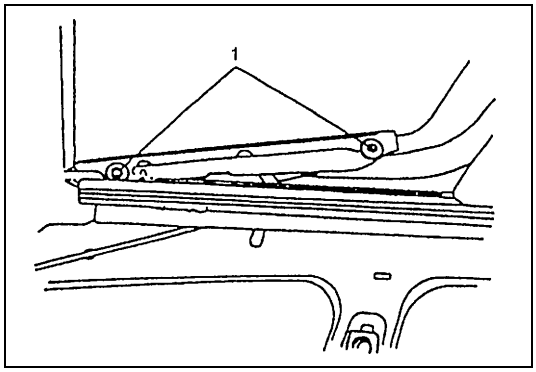
1. Sliding roof glass	2. Bolt

REMOVAL



1) Open sunshade fully and tilt up sliding roof.
2) Disconnect battery negative cable at battery.

1. Sun shade



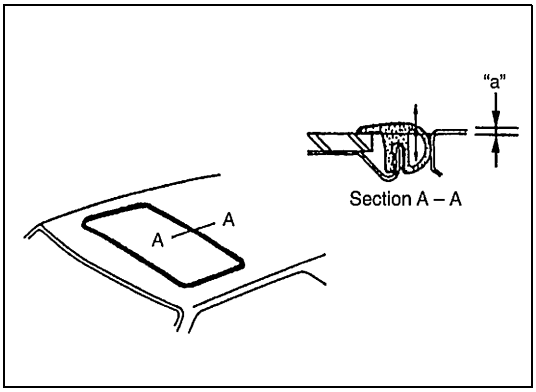
3) Remove sliding roof glass by removing bolts (torx).

1. Bolt (Torx T25)

INSTALLATION

For installation, reverse removal procedure, noting following points.

1) Tighten glass fixing bolts temporarily.
2) Position sliding roof glass by closing sliding roof glass completely.
3) Tighten glass fixing bolts.



ADJUSTMENT

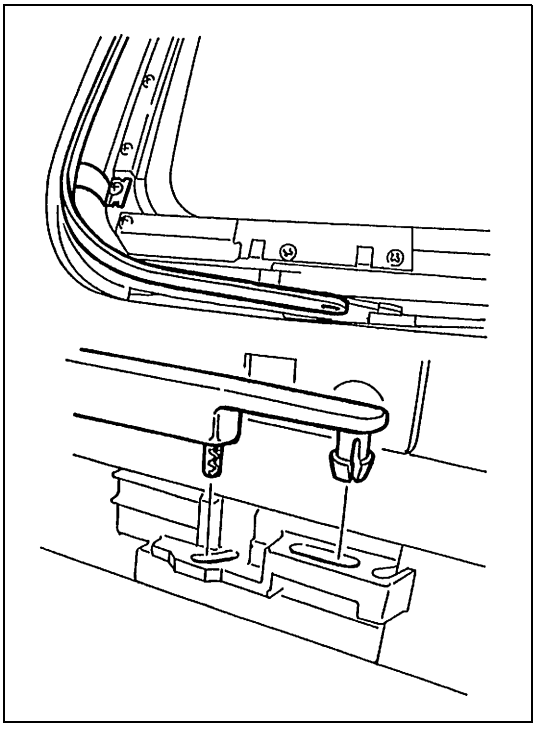
1) Loosen sunroof glass fixing screws (at 4 locations) and move sunroof glass up and down 2 to 3 times. In this way, sunroof glass can be positioned in both vertical and horizontal directions by elasticity of sliding roof weather strip.
2) Position sunroof glass by such dimensions with respect to roof panel surface as specified below.

Dimension "a" : 0 mm (0.0 in.)

3) After installing all parts and adjusting properly, check sunroof for proper operation (open, close and up).

Sliding roof deflector

REMOVAL



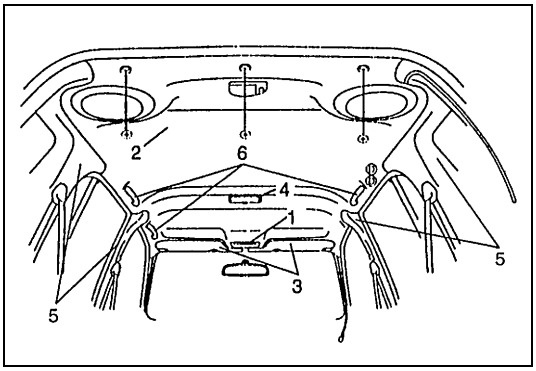
1) Open sliding roof.
2) Disconnect negative cable at battery.
3) Remove screws and disconnect deflector from deflector link.

INSTALLATION

Reverse removal procedure to install deflector.

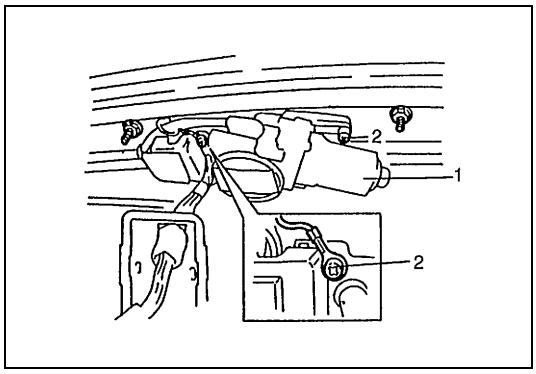
Sliding roof motor/relay

REMOVAL



1) Remove head lining (2), refer to "Head Lining Removal" in this section.

1.	Spot light
3.	Sunvisor assemblies
4.	Room light
5.	Trim
6.	Assist grips

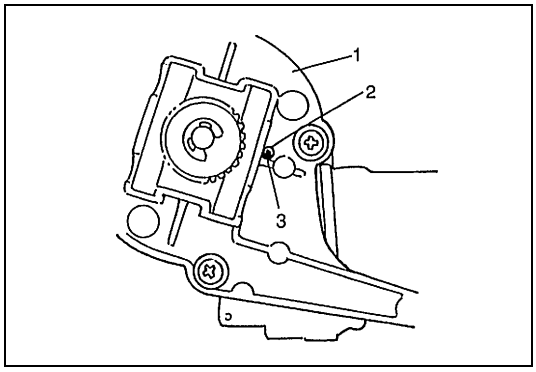


2) Disconnect coupler and remove sliding roof motor assembly by removing 3 screws.

CAUTION:
After removing sliding motor assembly, do not move guide and link.

1.	Sliding roof motor
2.	Mounting screw

INSTALLATION



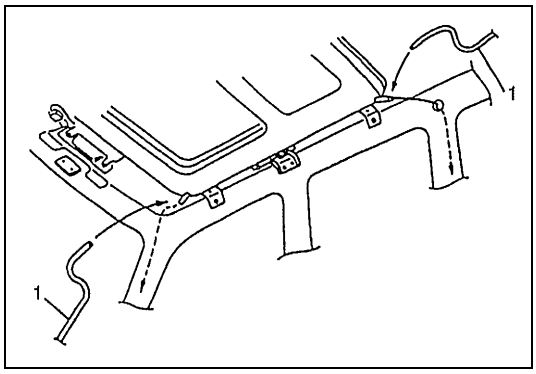
For installation, reverse removal procedure, noting following point.
Before installing, connect coupler and push the CLOSE side of the slide switch.

1.	Motor assy
2.	Hole (body)
3.	Hole (cam)

Sliding roof assembly

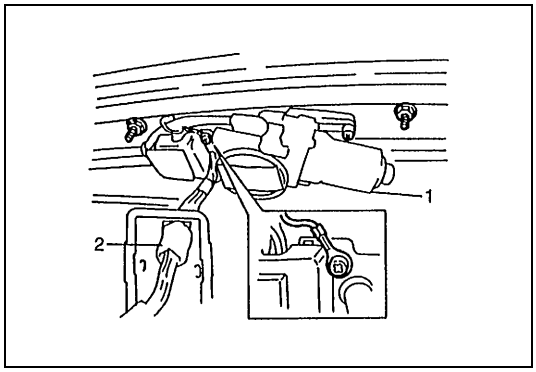
REMOVAL

1) Remove roof lining. Refer to “Head Lining Removal” in this section.
2) Remove sliding roof glass. Refer to “Sliding Roof Glass Removal”.

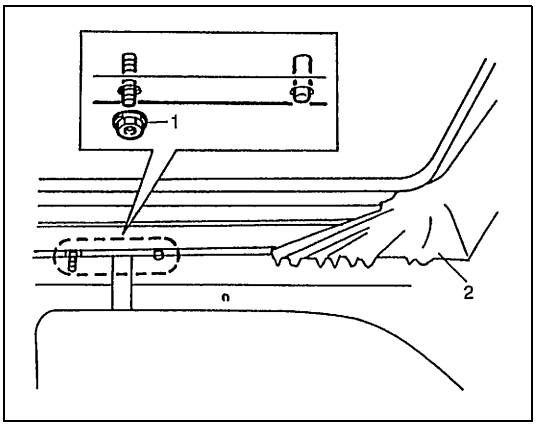


3) Disconnect drain hoses connected to sliding roof assembly at 4 locations.

1.	Drain hoses



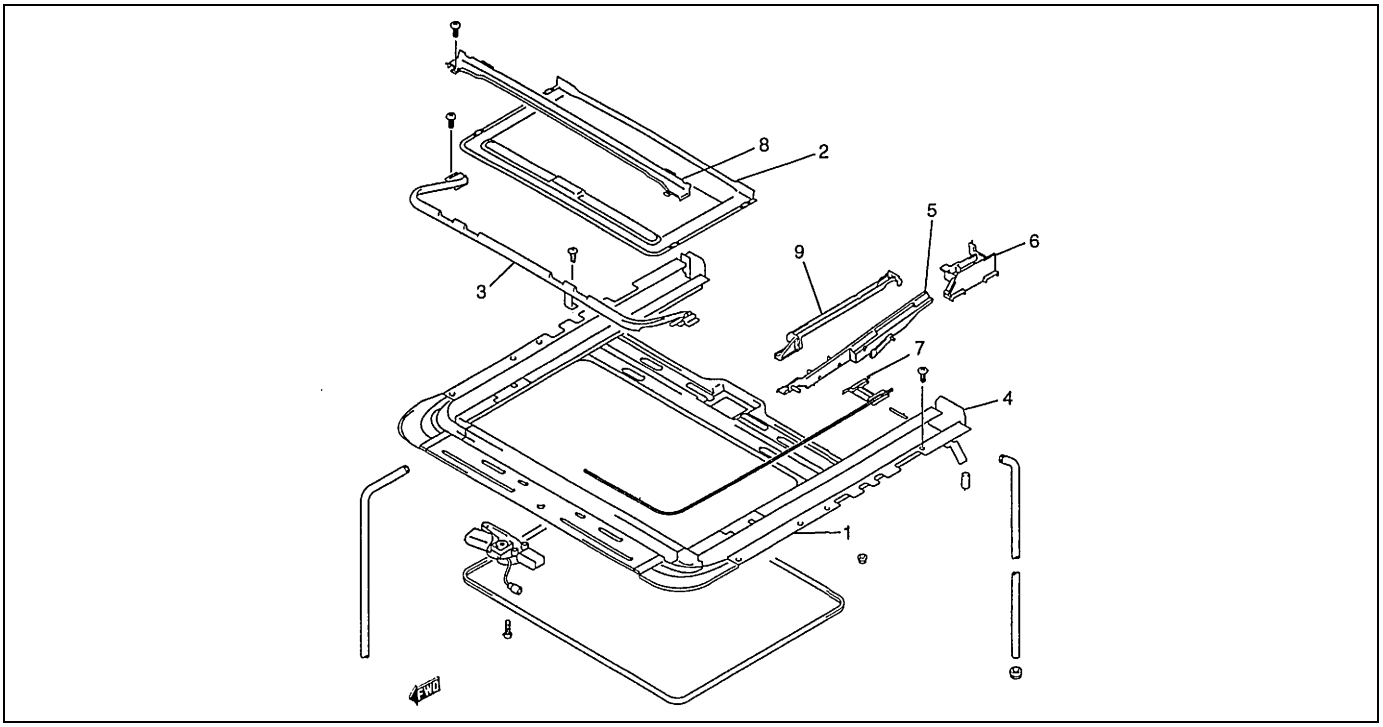
4) Disconnect sliding roof motor (1) at coupler (2).



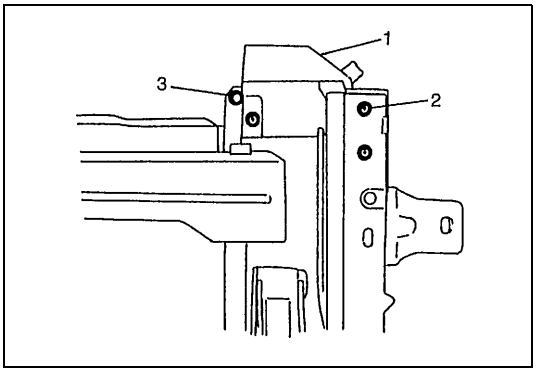
5) Remove 6 nuts and then remove sliding roof assembly.

1.	Sliding roof assembly fixing nuts
2.	Sliding roof assembly

DISASSEMBLY



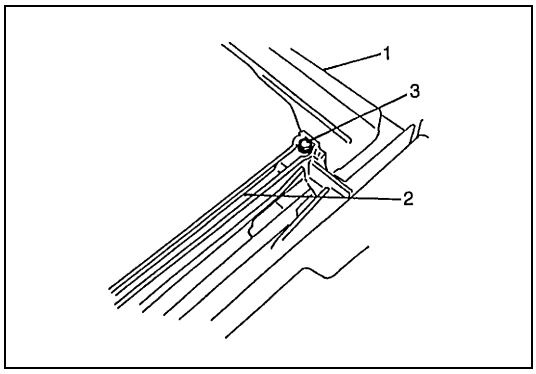
1. Sunroof frame	4. Rear drip	7. Cable
2. Sunshade	5. Guide	8. Drip rail
3. Deflector	6. Drip shoe	9. Drip link



Before disassembling, be sure that sliding roof is “CLOSE” state.

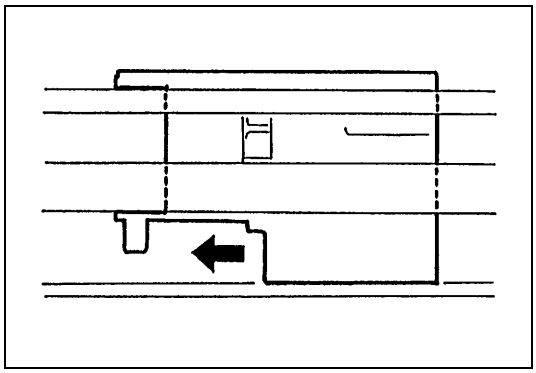
1) Remove rear drip (1).

2.	Screw
3.	Clip (LH only)

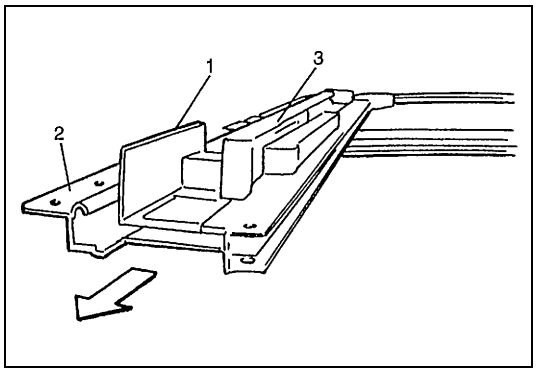


2) Pull out sunshade by sliding it.
3) Remove drip rail (1).

2. Drip link
3. Screw

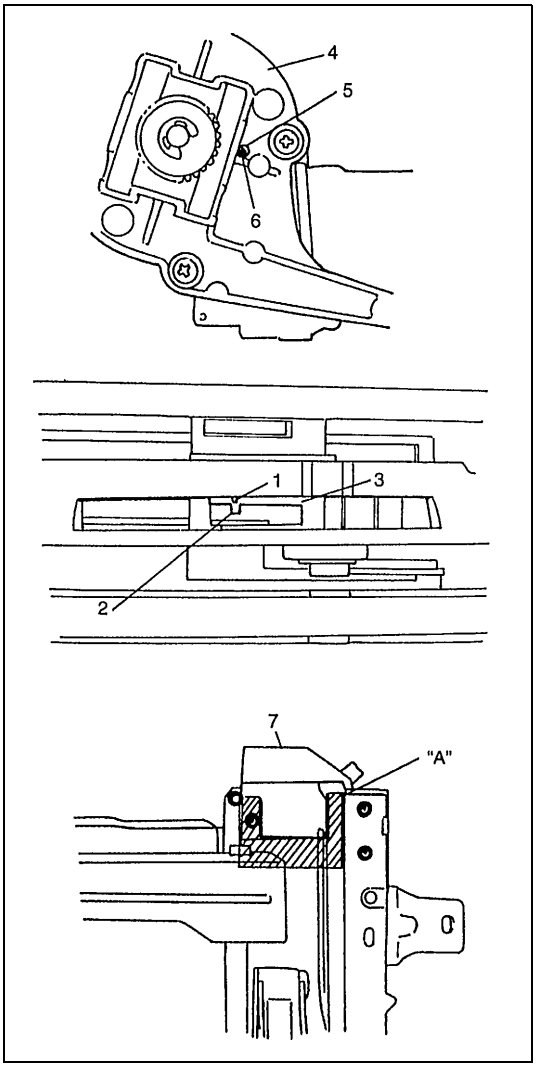


4) Remove sliding motor assy.
5) Move cable fully to the direction shown in figure.



6) Remove sliding roof deflector.
7) Pull out drip shoe (1), guide (3) and cable assy as a set.

2. Frame



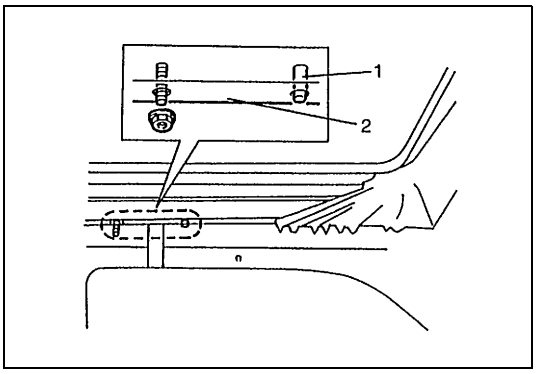
ASSEMBLY

Reverse disassembly procedure for assembly, observing following instructions.

CAUTION:
Match protrusion of guide and dent in cable for completely closed position of sliding roof drive cable and match marks (holes) for completely closed position of sliding roof motor assembly (4) and then install sliding roof motor assembly.

- Press the CLOSE side switch to match marks of sliding roof motor assembly.
- Apply butyl rubber sealant to contact surface of the rear drip (7).

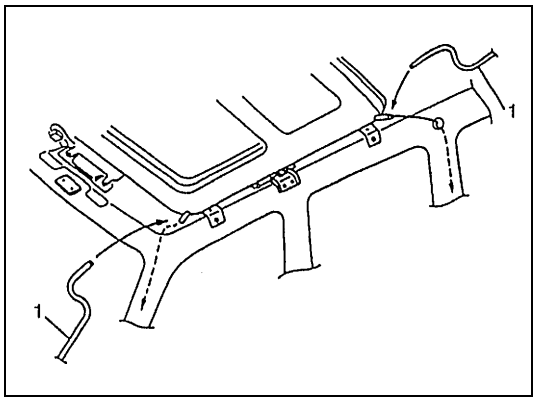
"A" :	Apply sealant
1.	Dent
2.	Protrusion of lifter
3.	Resin part
5.	Hole
6.	Hole (cam)



INSTALLATION

For installation, reverse removal procedure, noting following points.

- Align positioning holes in sliding roof (2) assembly at right and left and pins on body side (1) for installation.



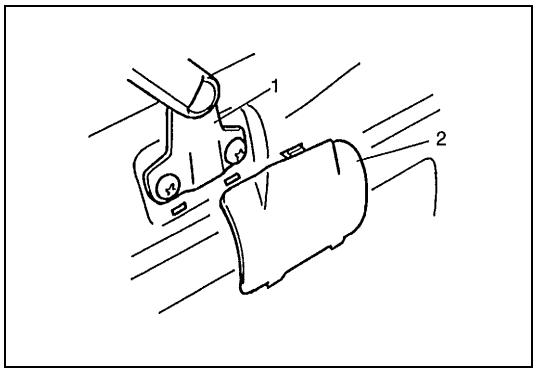
- Connect drain hoses to sliding roof assembly at 4 locations. Pass front drain hose (1) between roof panel and inner panel and through front pillar down to sill side. Pass rear drain hose into baring hole in rear quarter inner panel and through C pillar down to jig hole in rear side bumper.

NOTE:

After reinstalling sliding roof assembly, be sure to make glass adjustment. (Refer to "Sliding Roof Glass Adjustment" described previously.)

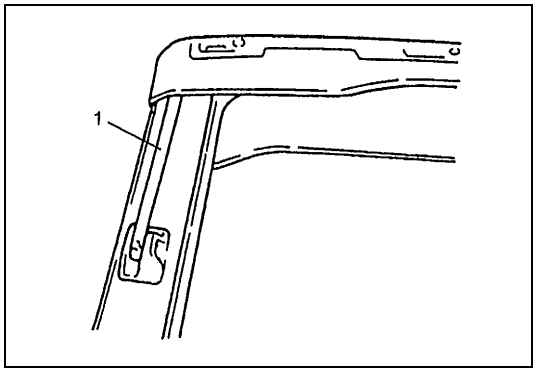
Canvas Top and Topbow Frames

REMOVAL



1) Open canvas to referring to Owner's Manual.
2) Remove fording top and rear canvas top.
3) Remove topbow bracket cover (2).

1. Topbow center frame



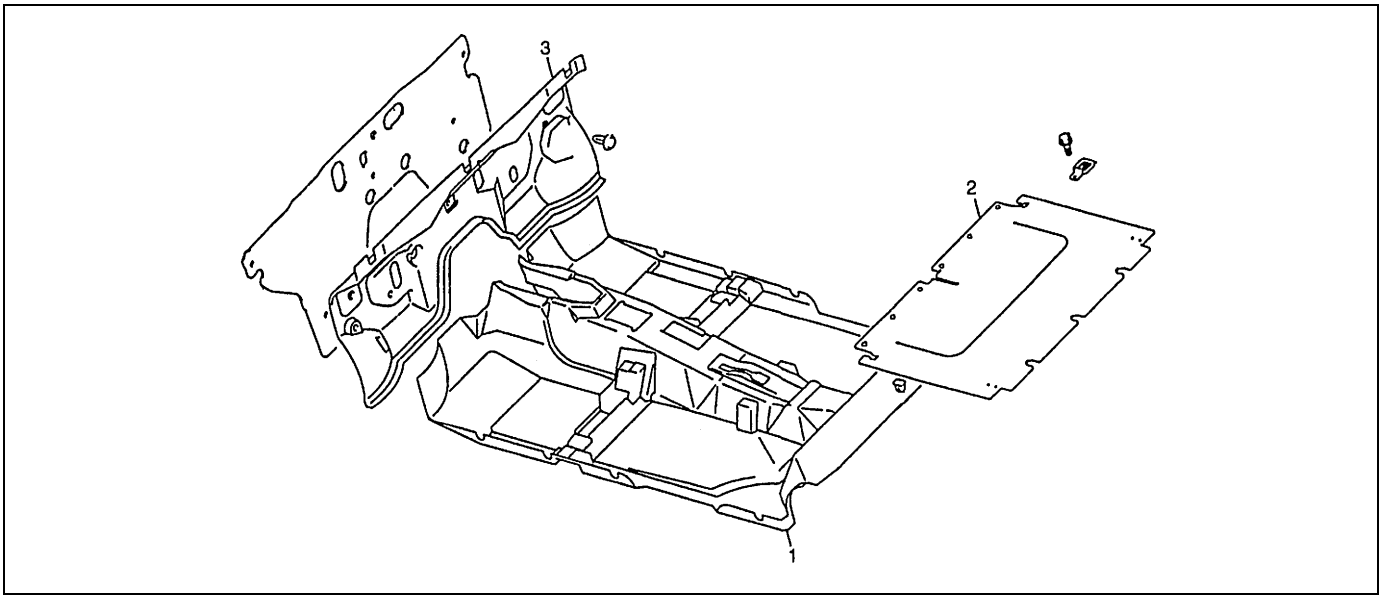
4) Remove topbow center frame.
5) Remove topbow front frame (1).

INSTALLATION

Install in reverse order of removal procedure.

Exterior and Interior Trim

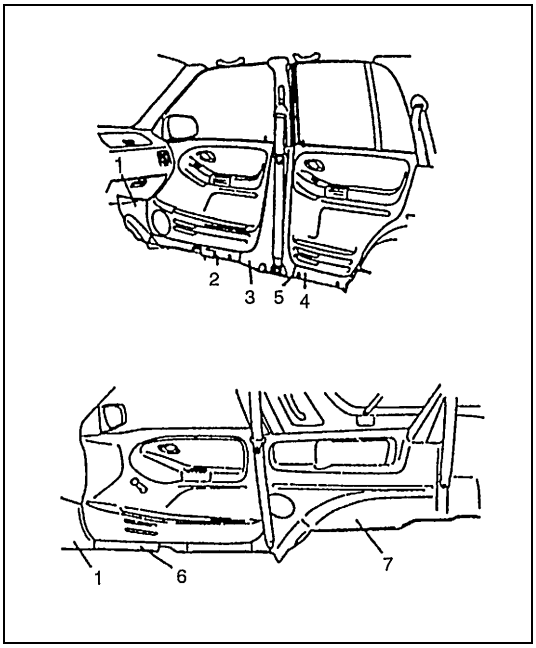
Floor Carpet



1. Front floor carpet	3. Dash panel insulation
2. Luggage floor carpet	

Front floor carpet

REMOVAL



1) Remove front seats and rear seat cushions.
2) Remove seat belt lower anchor bolt.
3) Remove dash side trims (1), front side sill scuffs (2) (4 door model), center pillar inner lower rims (3) (4 door model), rear side sill scuffs (4) (4 door model), side sill scuffs (6) (2 door model) and rear quarter lower trim (7).
4) Remove parking brake lever cover, console box and console box front extension.
5) Remove front floor carpet.

INSTALLATION

Reverse removal sequence to install front floor carpet, noting following point.

- When tightening seat belt anchor bolt, refer to Section 10A “Front Seat Belt” for tightening torque.

5. Fastener

Luggage floor carpet

Luggage floor carpet is fixed to floor with clips.

REMOVAL

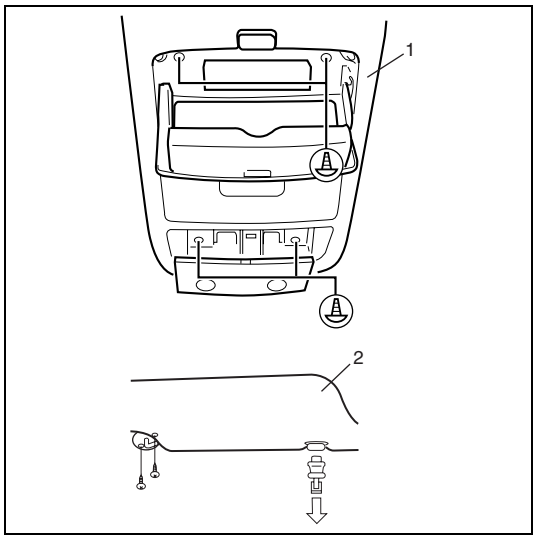
Detach clips, using care not to pull up carpet with force and break clips. And remove inner trim.

INSTALLATION

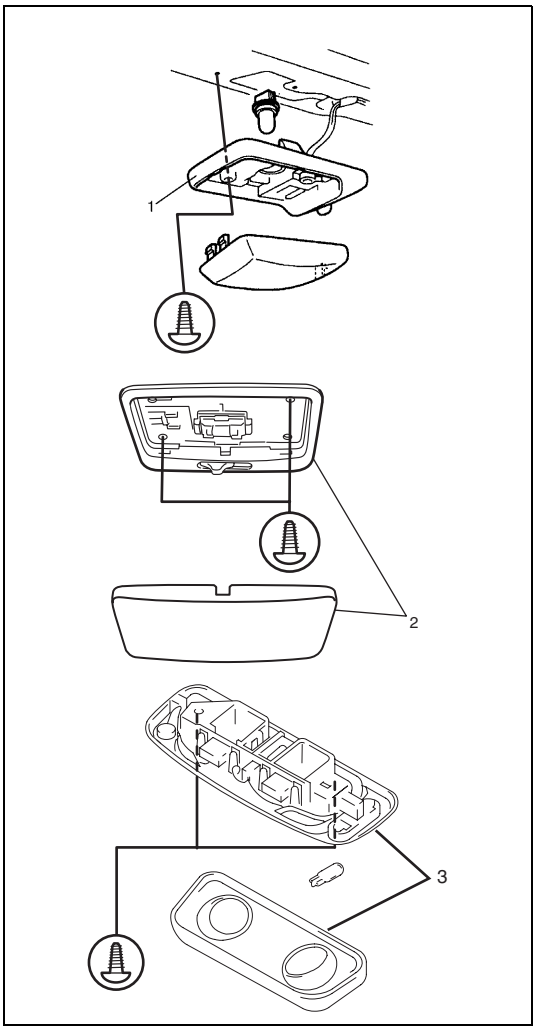
Reverse removal sequence to install luggage floor carpet.

Head lining

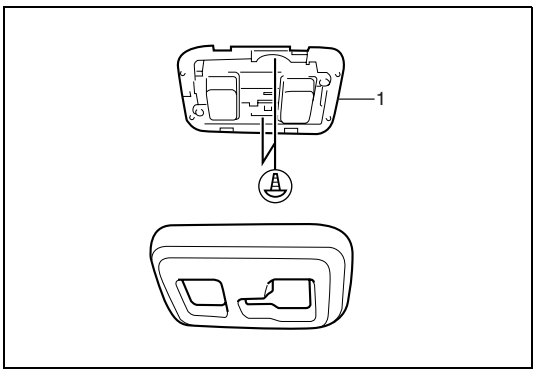
REMOVAL



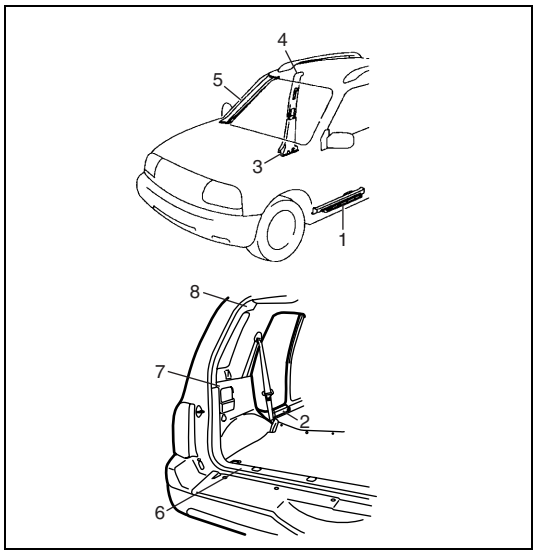
1) Remove overhead console (1) (if equipped) and sunvisor (2).



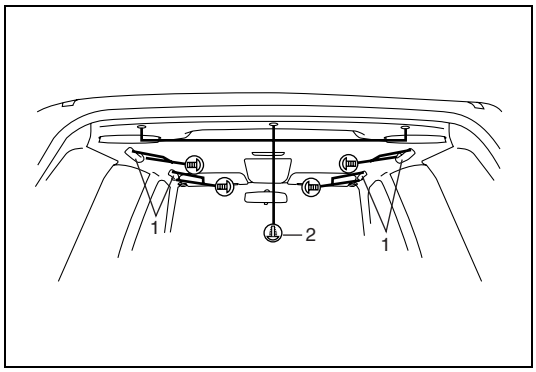
2) Remove room lamp (2), luggage lamp (1) and spot lamp (3) (if equipped).



3) Remove sliding roof switch (1) and sliding roof trim (if equipped).

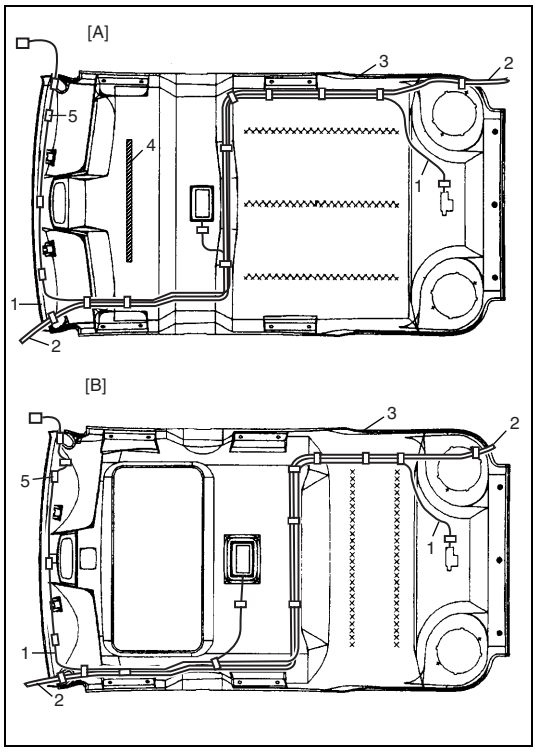


4) Remove front side sill scuffs (1), rear side sill scuffs (2), center pillar lower trims (3), center pillar upper trim (4), front pillar upper trims (5), rear luggage mat end garnish (6), rear quarter lower trims (7) and rear quarter upper trims (8).



5) Remove assistant grips (1).
6) Disconnect rear washer hose and roof harness.
7) Remove head lining clips (2) and head lining.

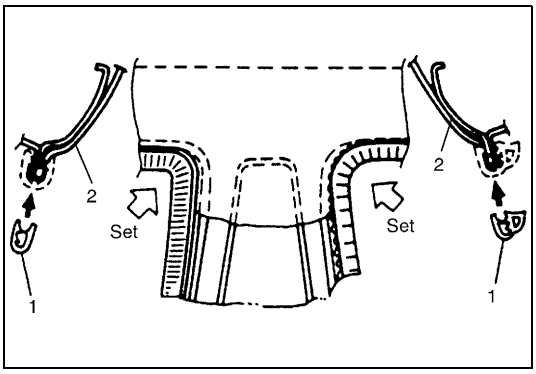
INSTALLATION



Reverse removal procedure to install head lining noting the following instructions.

- Set roof harness (1) and rear washer hose (2) to head lining (3) with adhesive tape (5) as shown.
- For without sunroof model, apply double coated tape (4) to head lining as shown.

[A] :	Vehicle without sunroof
[B] :	Vehicle with sunroof

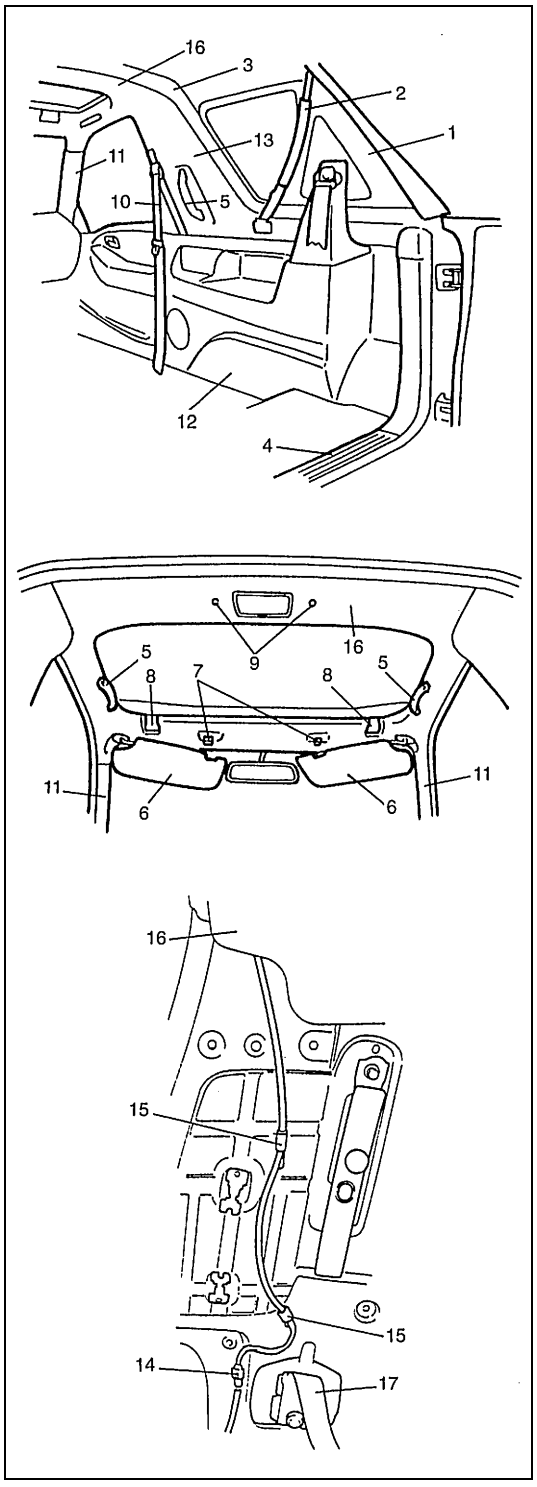


- Tighten seat belt anchor bolt as specified torque referring to “On-Vehicle Service” in Section 10A.
- Install door opening trim (1) as shown.

2. Head lining

Roof Trim (Canvas Top Model)

REMOVAL



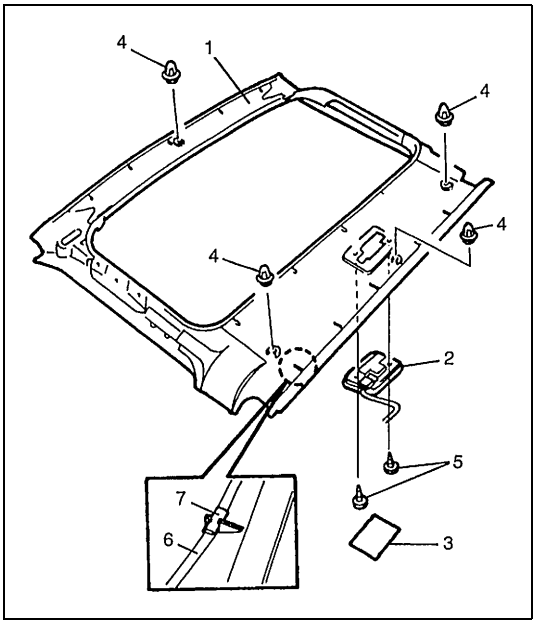
1) Remove canvas top (1).
2) Remove rear topbow (2).
3) Remove side body garnishes (3).
4) Remove luggage mat end garnish (4).
5) Remove assistant grips (5).
6) Remove sunshade assemblies (6).
7) Remove sunshade hooks (7).
8) Remove front topbow locks (8).
9) Remove canvas top snaps (9).
10) Remove front seat belts (10).
11) Remove front pillar trims (11).
12) Remove rear side inner lower trims (12).
13) Remove rear side inner upper trims (13).
14) Disconnect room light connector (14) and remove room light harness clamp (15).
15) Remove roof trim (16).

CAUTION:

Be very careful not to separate roof trim consists of 4 components when removing. If disassemble it, it could not be assembled to original unit.

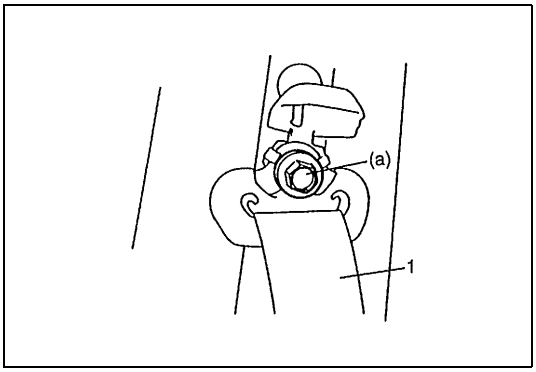
17. Left-front seat belt

INSTALLATION



1) Set room light (2) and clip to roof trim (1).
2) Set room light harness (6) to roof trim with marking tape (7).

3.	Room light lens
4.	Clip
5.	Screw

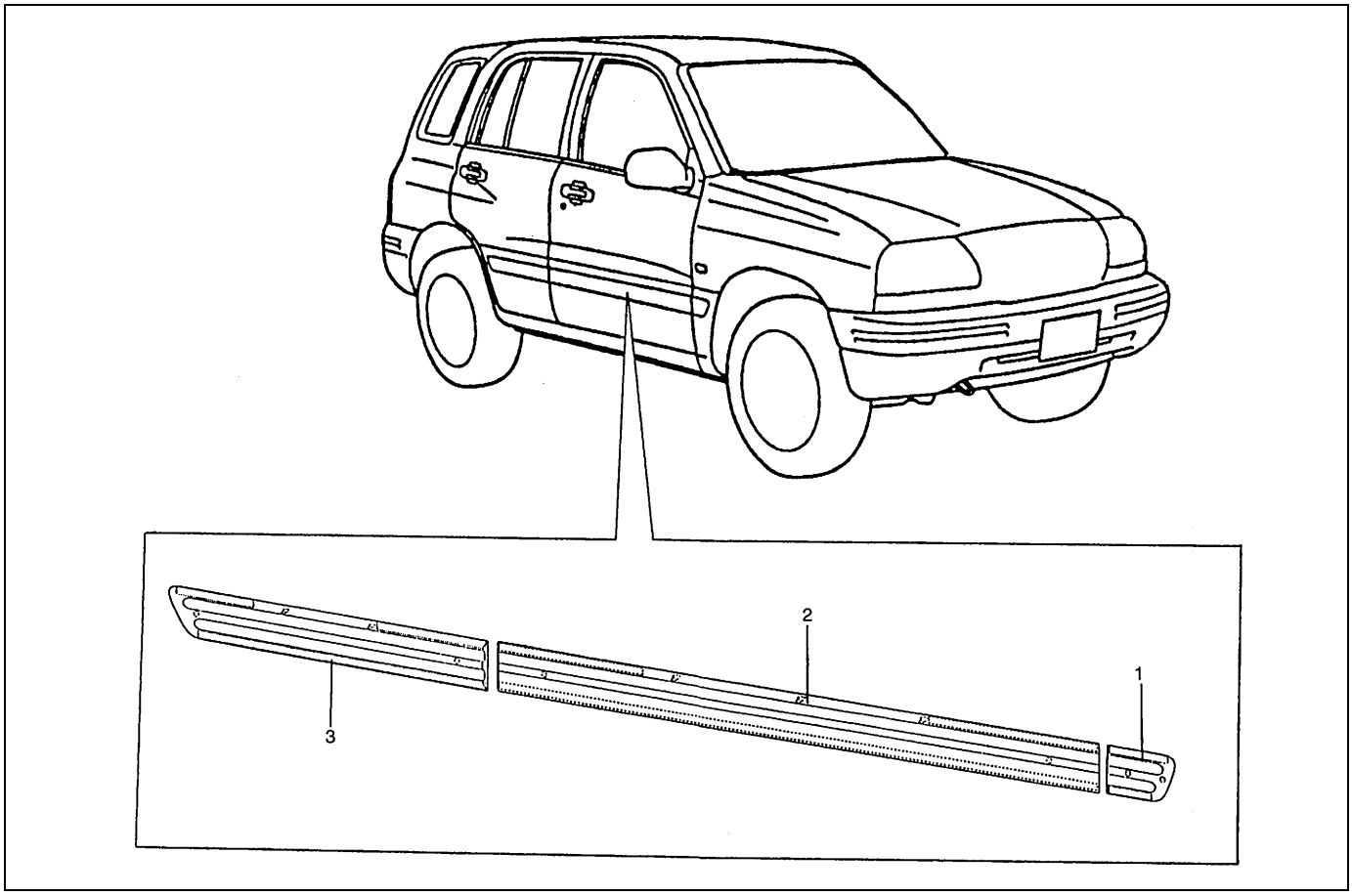


3) Reverse removal sequence to install roof trim.

Tightening torque
(a) : 35 N·m (3.5 kg-m, 25.3 lb-ft)

1.	Seat belt

Side Moldings (If Equipped)

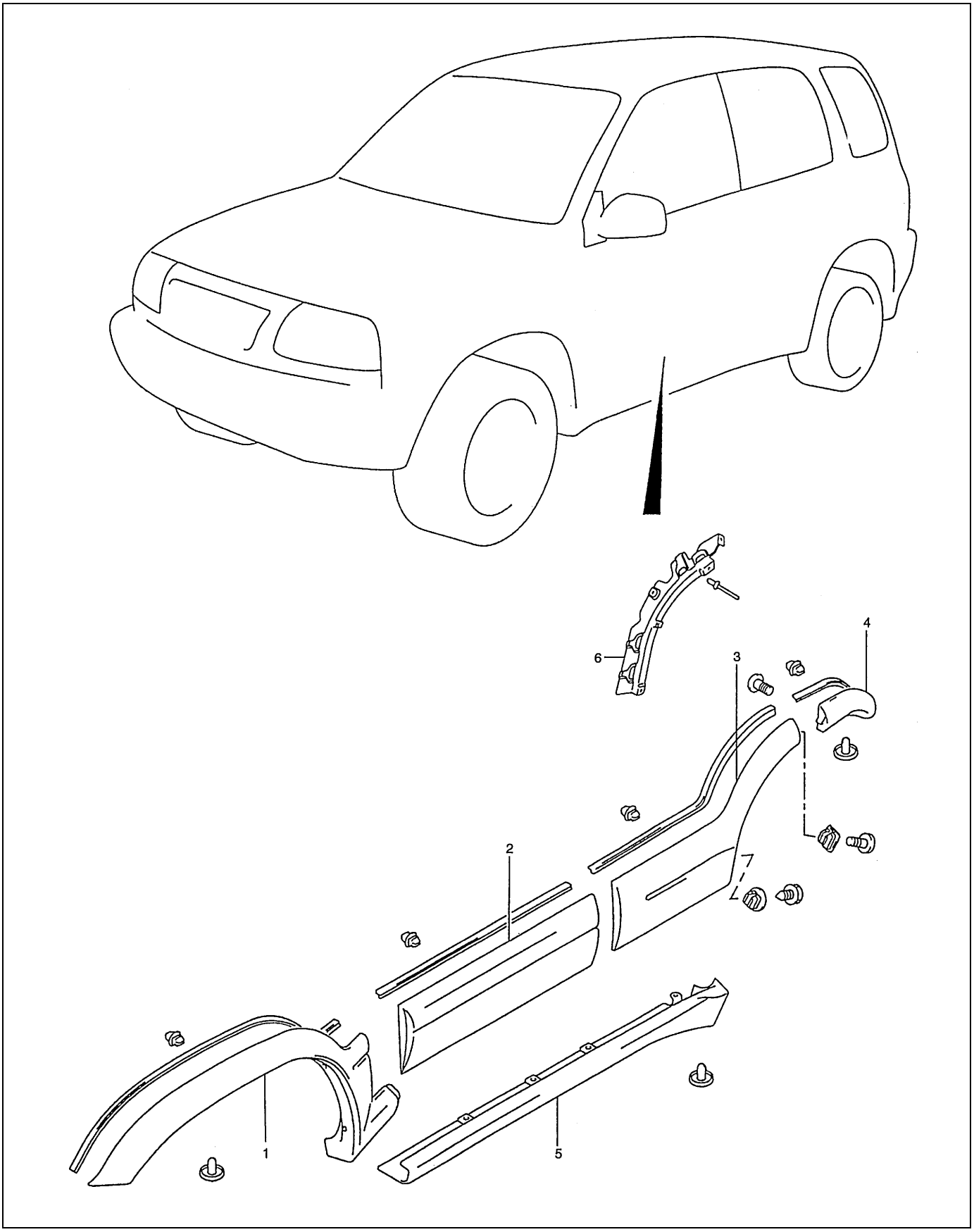


1. Front door molding	3. Front fender molding
2. Rear door molding	

INSTALLATION

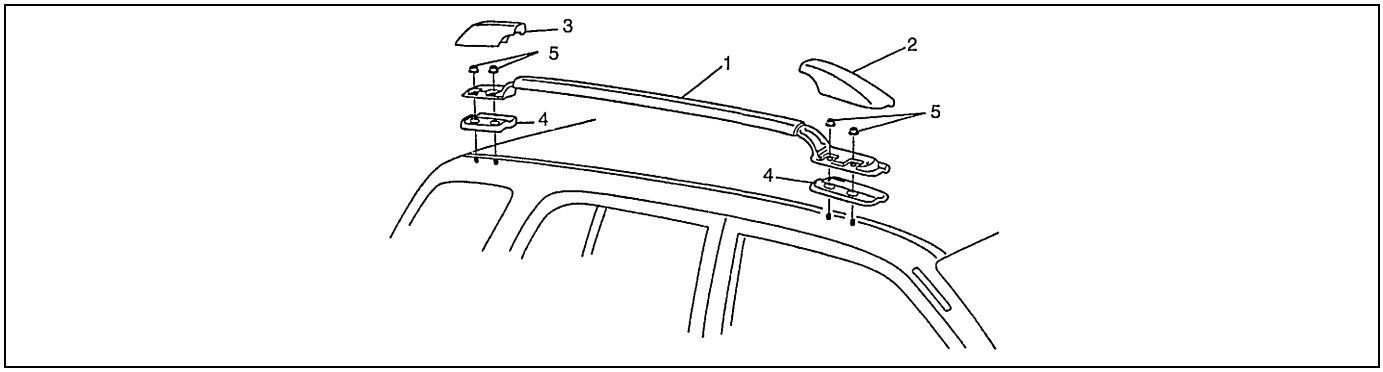
1) Bonding surfaces should be cleaned thoroughly.
2) Install molding by aligning it to clip holes and pulling it to the rear so that fender or door will not interfere with it when door is opened.
3) If adequate adhesive force is not available, use urethane adhesive.

Splash Guard (If Equipped)

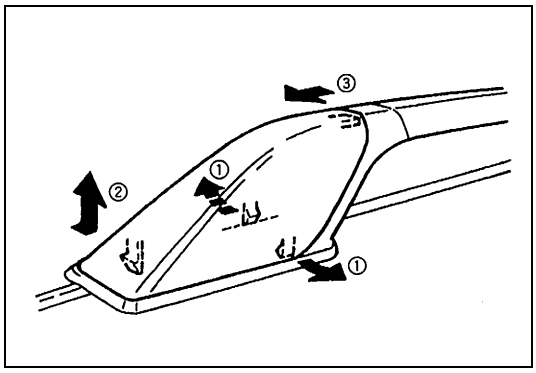


1. Fender splash guard	3. Rear door splash guard	5. Side sill splash guard
2. Front door splash guard	4. Rear splash guard	6. Rear door guard holder

Roof Rail (If Equipped)



1. Roof rail assembly	3. Rear cap	5. Nut
2. Front cap	4. Base seal	



REMOVAL

1) Remove roof rail front and rear caps as shown in figure.
2) Remove nuts.
3) Remove roof rail assembly.

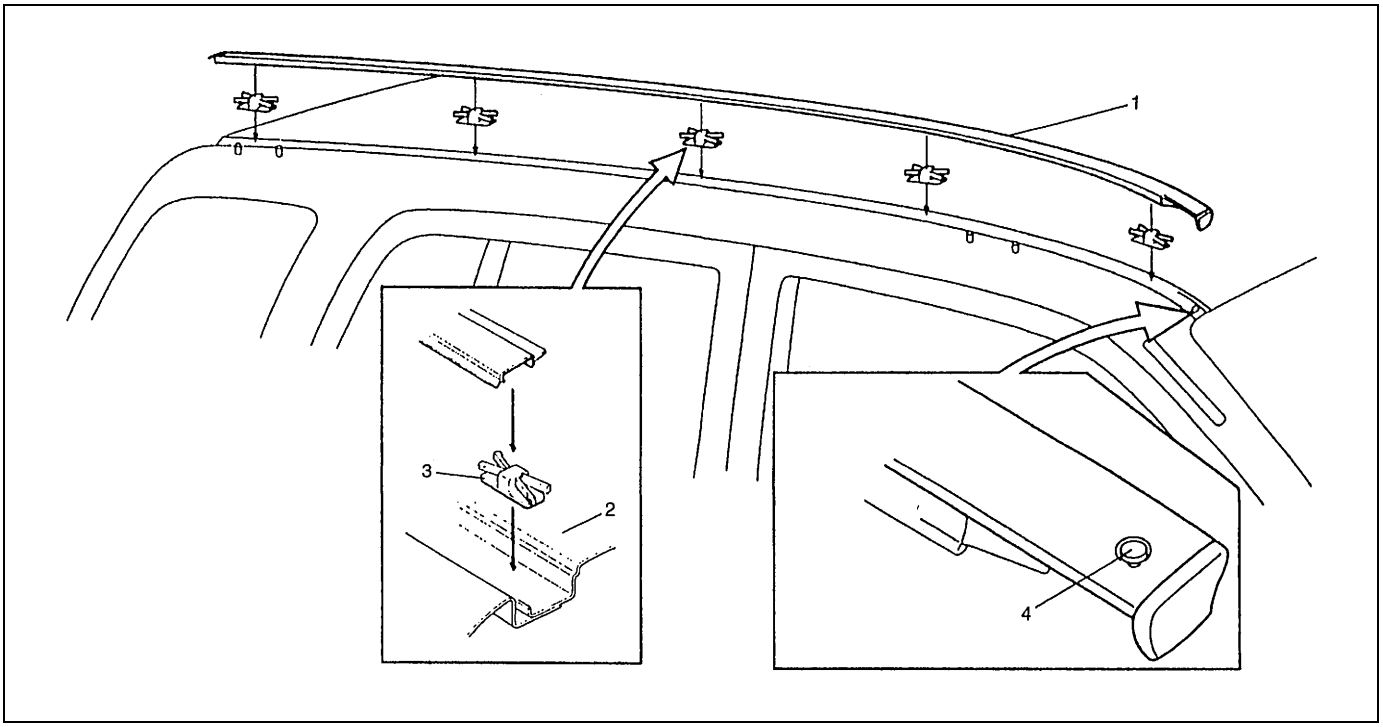
INSTALLATION

Reverse removal procedure for installation.
Confirm that each roof rail fixing nut is tightened securely.

Roof Molding

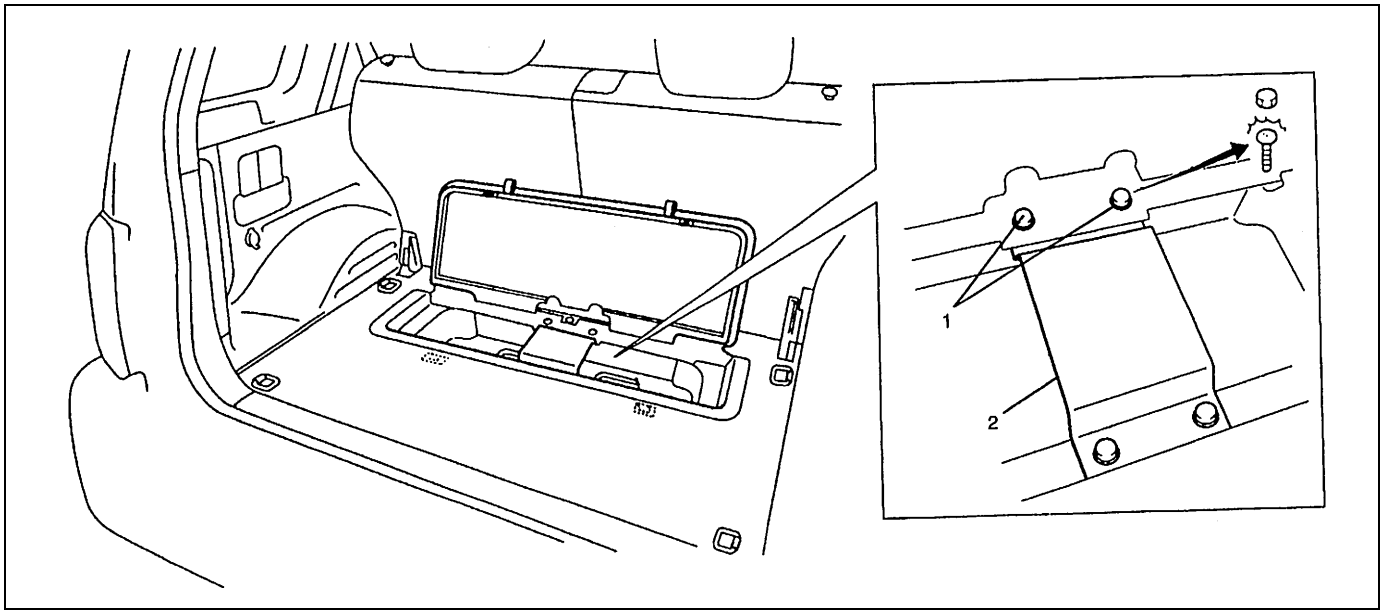
REMOVAL AND INSTALLATION

- If roof rail is equipped, remove it in advance (refer to “Roof Rail” section).
- When reusing roof molding, be careful not to make roof molding warped.



1. Roof molding	3. Clip
2. Roof panel	4. Molding stud

Luggage Under Box



1. Bolt
2. Member

WARNING:

Do not remove member in the center of luggage under box.

If member had to be removed temporarily for repair or for some other reason, be sure to reinstall it by using specified new bolts until head of bolt is broken off.

SECTION 10

RESTRAINT SYSTEM

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System

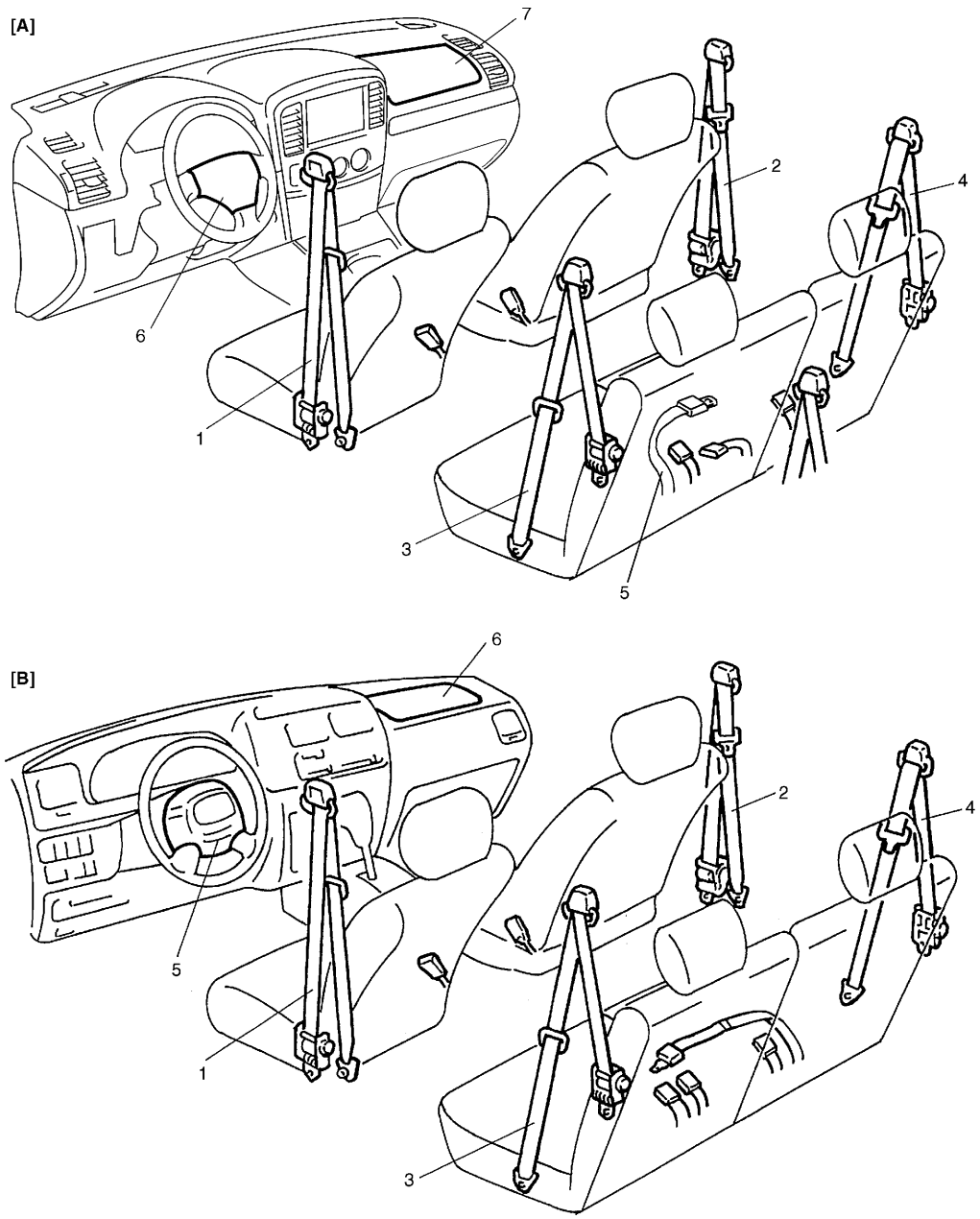
- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

SEAT BELT . . . . . Section 10A
AIR BAG SYSTEM . . . . . Section 10B
DIAGNOSIS . . . . . Refer to "Diagnosis" in Section 10A and 10B.

CONTENTS

General Description 10- 2

General Description



[A] : Other than canvas top model	2. Front passenger side seat belt with ELR and pretensioner (if equipped)	5. Rear center seat belt (If equipped)
[B] : Canvas top model	3. Rear left seat belt with A-ELR	6. Driver side air bag
1. Driver side seat belt with ELR and pretensioner (if equipped)	4. Rear right seat belt with A-ELR	7. Passenger side air bag

Seat belt with ELR

The seat belt with Emergency Locking Retractor (ELR) is designed so that it locks immediately (to prevent the webbing from being pulled out of the retractor any further) when any of the following items is detected as exceeding each set value; speed at which the webbing is pulled out of the retractor, acceleration or deceleration of the vehicle speed, and inclination.

Seat belt with A-ELR

The automatic and emergency locking retractor (A-ELR) works as an Emergency Locking Retractor (ELR) till its webbing is pulled all the way out and then on as an Automatic Locking Retractor (ALR) till it is retracted fully.
ALR :
Automatically locks when the webbing is pulled out from the retractor and allowed to retract even a little.
Then the webbing can not be pulled out any further, unless it is wound all the way back into the retractor, which releases the lock and allows the webbing to be pulled out.

Seat Belt with Pretensioner (If equipped)

The seat belt with ELR and a pretensioner has a pretensioner mechanism which operates in linkage with the air bag in addition to the above described ELR. The pretensioner takes up the sag of the seat belt in occurrence of a front collision with an impact larger than a certain set value, thereby enhancing restraint performance.

Driver and front passenger side air bags

The driver and front passenger side air bags are components of the air bag system. In occurrence of a front collision with an impact larger than a certain set value, they are activated by the ignition signal from SDM to supplement protection offered by the driver and front passenger seat belts.

- the driver air bag (inflator) module is deployed from the center of the steering column
- the passenger air bag (inflator) module from the top of the instrument panel in front of the front passenger seat

SECTION 10A

SEAT BELT

WARNING:

For vehicles equipped with Supplemental Restraint (Air Bag) System:

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).**

CAUTION:

When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread-locking compound, will be called out. The correct torque value must be used when installing fasteners that require it. If the above procedures are not followed, parts or system damage could result.

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Enabling air bag system.....10A-2
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Disposal 10A-2
Front Seat Belt 10A-3
Rear Seat Belt.....10A-7
Tightening Torque Specification 10A- 8

On-Vehicle Service

Service Precautions

Service and diagnosis

WARNING:

If replacing seat belt is necessary, replace buckle and ELR (or webbing) together as a set. This is for the reason of ensuring locking of tongue plate with buckle. If these parts are replaced individually, such a locking condition may become unreliable. For this reason, SUZUKI will supply only the spare buckle and ELR (or webbing) in a set part.

Before servicing or replacing seat belts, refer to following precautionary items.

- Seat belts should be normal relative to strap retractor and buckle portions.
- Keep sharp edges and damaging objects away from belts. Avoid bending or damaging any portion of belt buckle, latch plate and ELR.
- Do not bleach or dye belt webbing. (Use only mild soap and lukewarm water to clean it.)
- When installing a seat belt anchor bolt, start bolt by hand to prevent cross-threading.
- Use only the correct seat belt anchor bolts and screws and tighten to the correct torque value.
- Do not attempt any repairs on retractor mechanisms or retractor covers. Replace defective assemblies with new replacement parts.
- Keep belts dry and clean at all times.
- If there exist any parts in question, replace such parts.
- Replace belts whose webbing is cut or otherwise damaged.
- Do not put anything into trim panel opening which seat belt webbing passes through.

For Seat Belt with Pretensioner

Refer to “Service and Diagnosis” of “Service Precautions” in Section 10B.

WARNING:

When performing service on or around air bag system components or air bag system wiring, disable the air bag system referring to “Disabling Air Bag System” in Section 10B.
Failure to follow procedures could result in possible air bag activation, personal injury or unneeded air bag system repairs.

Disabling air bag system

Refer to “Disabling Air Bag System” in Section 10B.

Enabling air bag system

Refer to “Enabling Air Bag System” in Section 10B.

Handling and storage

Refer to “Handling and Storage” in Section 10B.

Disposal

Refer to “Disposal” in Section 10B.

Front Seat Belt

INSPECTION ON VEHICLE

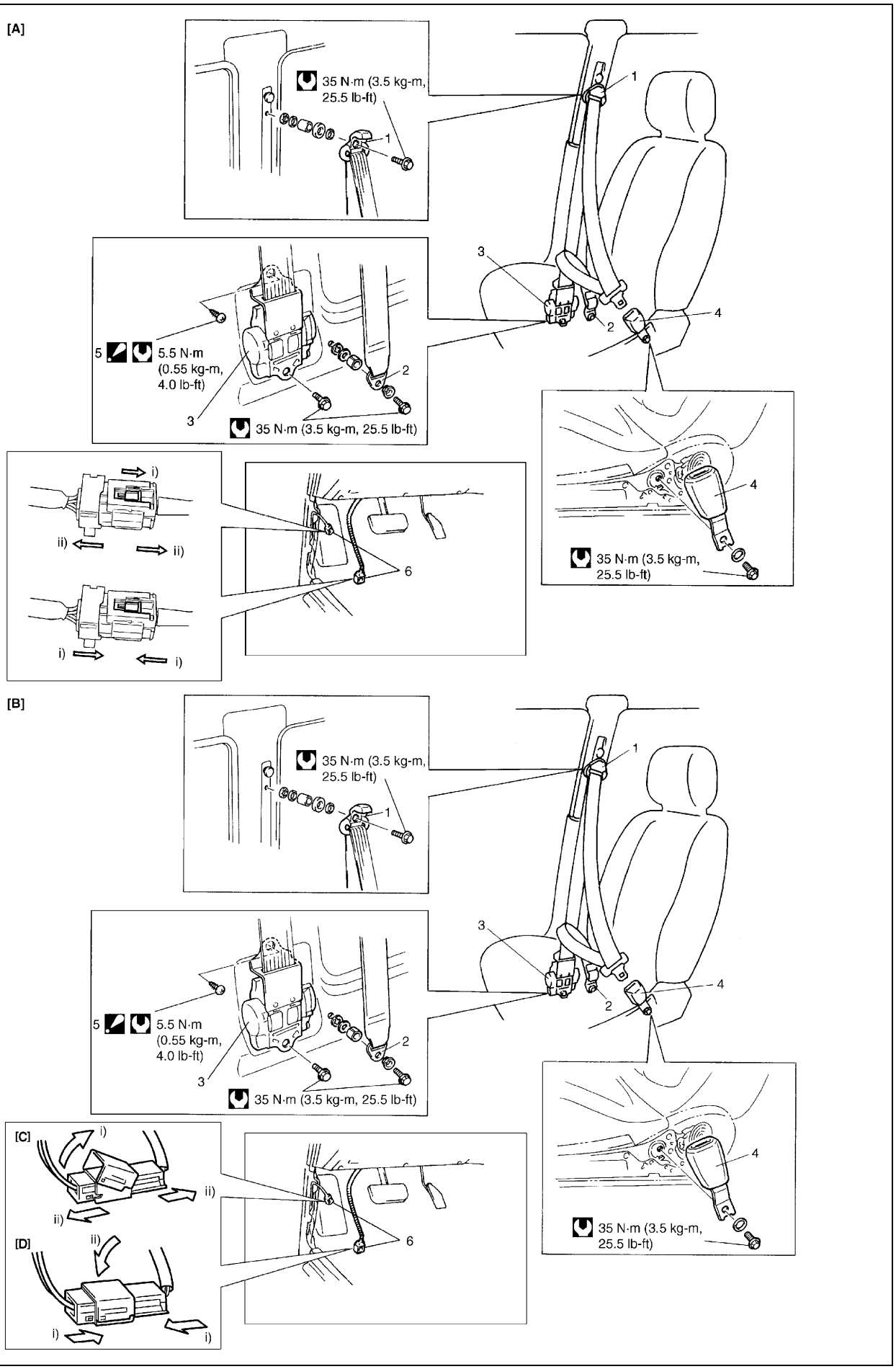
Seat Belts with ALR

As to seat belts with ALR (other than driver side seat belt), check them as follows in addition to above check.

- With vehicle at stop, pull seat belt all the way out, let it retract a little and try to pull it. It should not be pulled out, that is, it should be locked where retracted.
- Let seat belt retract to its original state. Next, pull it half way out, let it retract a little and try to pull it again. It should be pulled out smoothly, that is it should not be locked at this time.

WARNING:

- **Never attempt to disassemble or repair the seat belt pretensioner (retractor assembly). If any abnormality is found, be sure to replace it with new one as an assembly.**
- **Be sure to read "Service Precautions", before starting to work and observe every precaution during work. Neglecting them may result in personal injury or unactivation of the seat belt pretensioner, if necessary.**

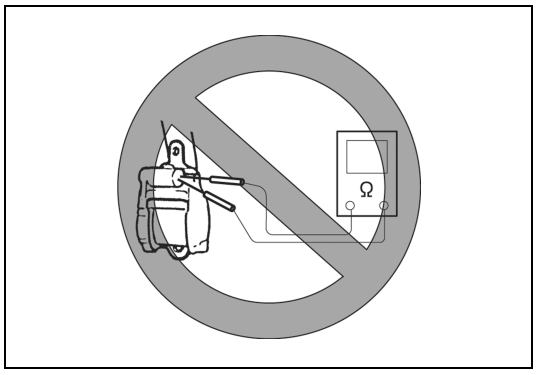

[A]
35 N·m (3.5 kg-m, 25.5 lb-ft)
1
3
2
4
5
5.5 N·m (0.55 kg-m, 4.0 lb-ft)
2
3
35 N·m (3.5 kg-m, 25.5 lb-ft)
i)
ii)
ii)
i)
i)
6
4
35 N·m (3.5 kg-m, 25.5 lb-ft)
[B]
35 N·m (3.5 kg-m, 25.5 lb-ft)
1
3
2
4
5
5.5 N·m (0.55 kg-m, 4.0 lb-ft)
2
3
35 N·m (3.5 kg-m, 25.5 lb-ft)
[C]
i)
ii)
ii)
[D]
ii)
i)
i)
6
4
35 N·m (3.5 kg-m, 25.5 lb-ft)

1. Upper anchor	5. Retractor assembly upper mounting bolt : After tightening lower bolt, tightening upper bolt	[B] : Canvas top model
2. Lower anchor	6. Yellow connector for seat belt pretensioner (if equipped)	[C] : Removal
3. Retractor assembly	Tightening Torque	[D] : Installation
4. Buckle	[A] : Other than canvas top model	

REMOVAL

1) Disconnect negative cable at battery.
2) Disable air bag system referring to “Disabling Air Bag System” of “Service Precautions” under “On-Vehicle Service” in Section 10B, if necessary.
3) Remove front pillar lower trim.
4) Disconnect Yellow connector for seat belt pretensioner, if necessary.
   a) Release locking of lock lever.
   b) After unlocking, disconnect to connector.
5) Remove front seat belts from the vehicle.

INSPECTION



WARNING:
Never measure resistance of pretensioner or disassemble it. Otherwise, personal injury may result.

CAUTION:
If seat belt pretensioner (retractor assembly) was dropped from a height of 30 cm (1 ft) or more, it should be replaced.

Seat belts and attaching parts can affect the vital components and systems of a vehicle. Therefore, they should be inspected carefully and replaced with genuine parts only.

Seat belt

- The seat belt webbing or strap should be free from damage.
- Fully extend the seat belt to make sure there are no twists or tears in it.

Retractor assembly

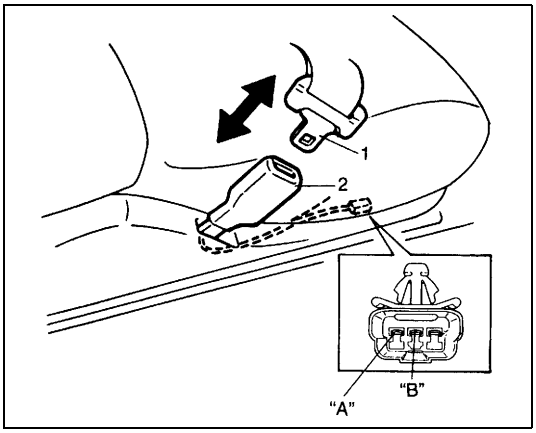
1) Let the seat belt retract fully to confirm its easy retraction.
   - The retractor assembly should lock webbing when pulled quickly.
   - The retractor assembly should lock webbing even when tilted (approx. 15°) toward the fore and aft or right and left directions.
2) Check retractor assembly with seat belt pretensioner appearance visually for following symptoms and if any one of them is applicable, replace it with a new one as an assembly.
   - Pretensioner has activated.
   - There is a crack in seat belt pretensioner (retractor assembly).
   - Wire harness or connector is damage.
   - Seat belt pretensioner (retractor assembly) is damaged or a strong impact (e.g., dropping) was applied to it.

Anchor bolt

- Inspect all seat belt anchor bolts to verify that they are secure.
- All anchor bolts should be secure and torqued to specification.

Belt latch

- Belt latch should be secure when latched.
- Inspect the seat belt buckle, ensuring that it locks and unlocks easily.
- After buckling the seat belt, tug sharply on the belt, checking that the buckle remains locked.



Seat belt buckle switch

Check driver side seat belt buckle switch for continuity by using ohmmeter.

Seat belt buckle switch specification
Without inserted buckle tongue to buckle catch:
Terminal "A" and "B" : Continuity
With inserted buckle tongue to buckle catch:
Terminal "A" and "B" : No continuity (∞Ω)

1.	Buckle tongue
2.	Buckle catch

INSTALLATION

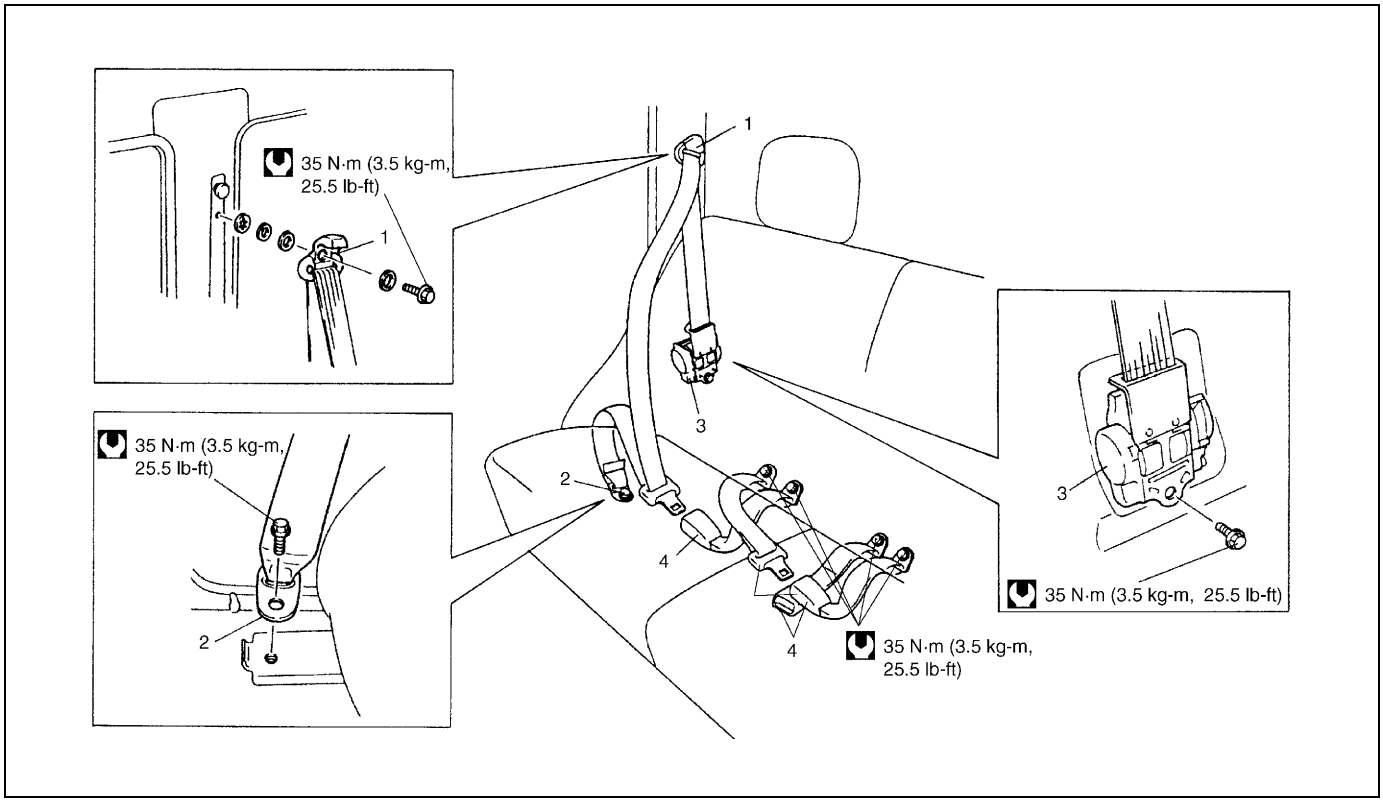
Install in reverse order of removal, noting the followings.

- Seat belt anchor bolts should have an unified fine thread (7/16-20 UNF). Under no circumstances should any different sized or metric screw threads be used.
- Connect Yellow connector for seat belt pretensioner securely and fit seat belt pretensioner connector onto front pillar lower panel, if equipped.
- Enable air bag system if equipped with pretensioner referring to "Enabling Air Bag System" in Section 10B.

Rear Seat Belt

WARNING:

Be sure to read "Service Precautions" in this section before starting to work and observe every precaution during work.



1. Upper anchor	4. Buckle
2. Lower anchor	Tightening Torque
3. Retractor assembly	* If equipped

REMOVAL

Refer to the figure above to remove rear seat belts.

INSPECTION

Check second rear seat belt in the same way as when inspecting front seat belt except pretesioner inspection. (Refer to "Front Seat Belt" in this section.)

INSTALLATION

Install in reverse order of removal, noting the followings.

- Seat belt anchor bolts should have an unified fine thread (7/16-20 UNF). Under no circumstances should any different sized or metric screw threads be used.

Tightening Torque Specification

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Upper and lower anchor bolt	35	3.5	25.5
Retractor assembly bolt	35	3.5	25.5
Retractor assembly screw	5.5	0.55	4.0
Buckle bolt	35	3.5	25.5

SECTION 10B

AIR BAG SYSTEM

WARNING:

- **Service on or around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in this section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintended activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **The procedures in this section must be followed in the order listed to disable the air bag system temporarily and prevent false diagnostic trouble codes from setting. Failure to follow procedures could result in possible activation of the air bag system, personal injury or otherwise unneeded air bag system repairs.**

CAUTION:

When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread-locking compound, will be called out. The correct torque value must be used when installing fasteners that require it. If the above conditions are not followed, parts or system damage could result.

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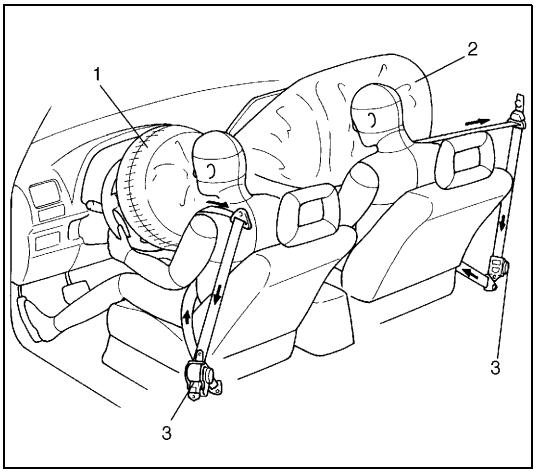
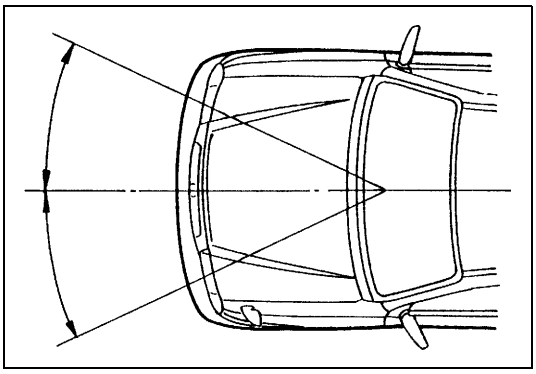
OTHER THAN CANVAS TOP MODEL

General Description

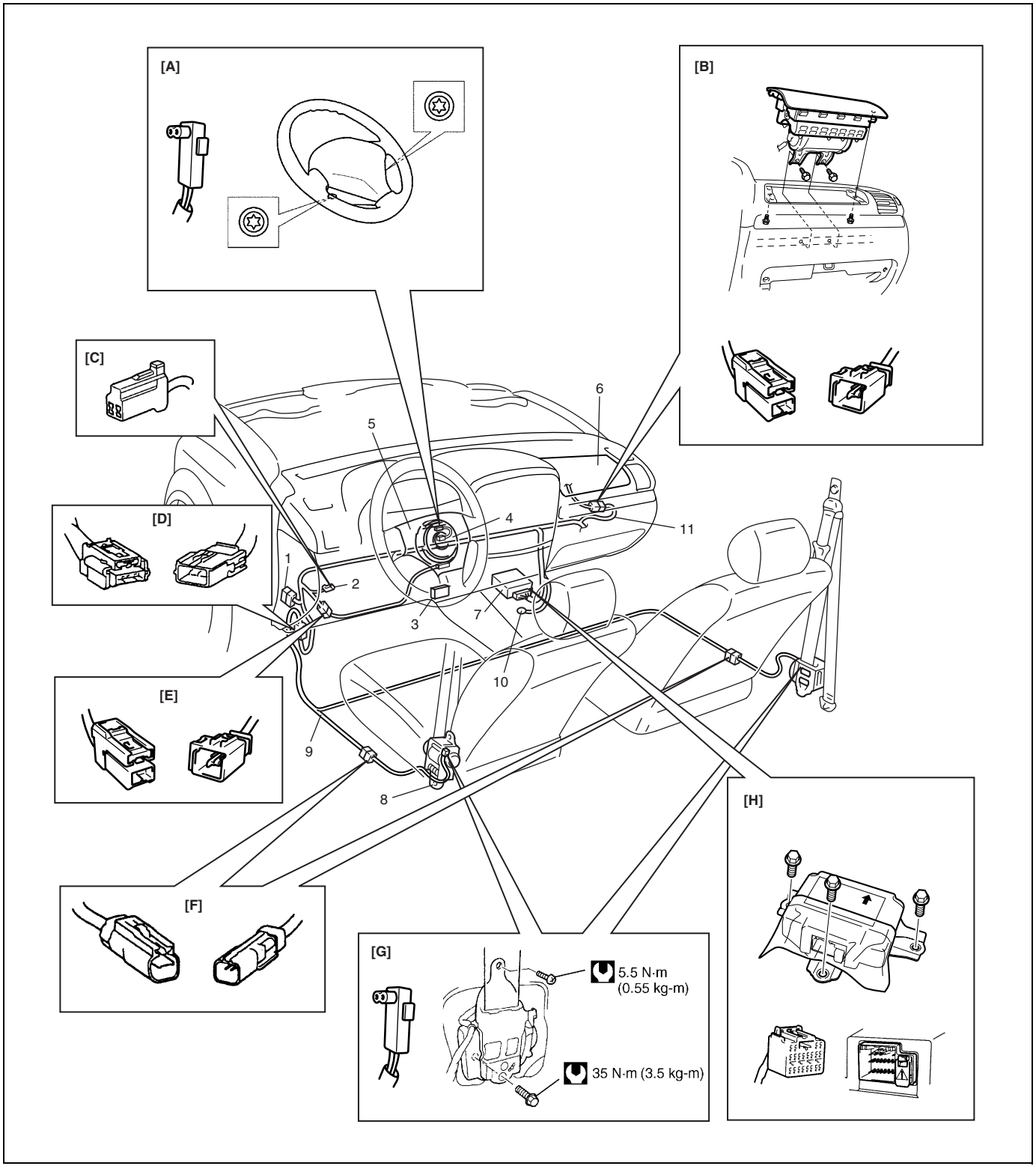


With the air bag system which includes air bags for both the driver's and passenger's sides as well as the seat belt pretensioners (3) (if equipped), the sag of the seat belt is taken up (for seat belt with pretensioner), the driver air bag (1) (inflator) module is deployed from the center of the steering column and the passenger air bag (2) (inflator) module from the top of the instrument panel in front of the front passenger seat in occurrence of a front collision with an
impact larger than a certain set value to supplement protection offered by the driver and front passenger seat belts.



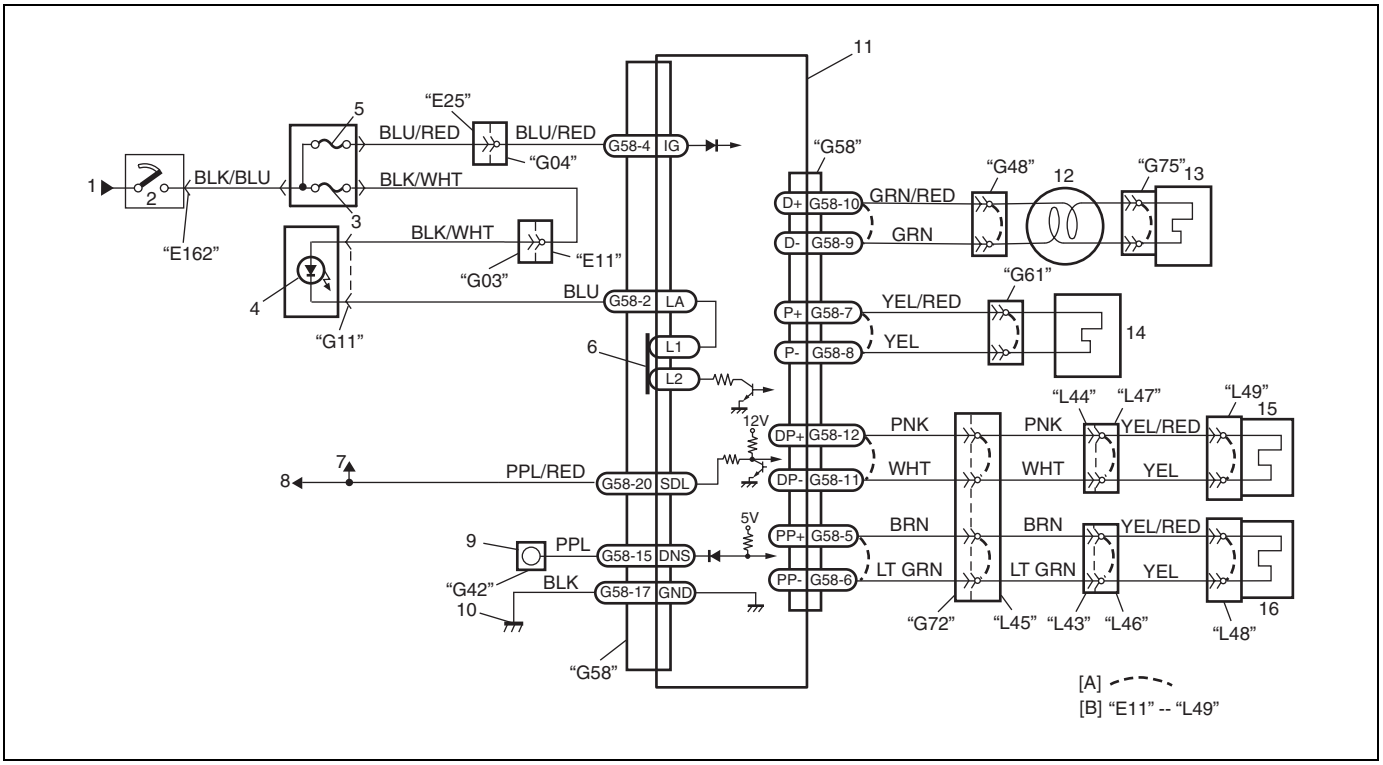
The air bag system is designed to activate only in severe frontal collisions. It is not designed to activate in rear impacts, side impacts, rollovers, or minor frontal collisions, since it would offer no protection in those types of accidents.

System Components and Wiring Location View and Connectors



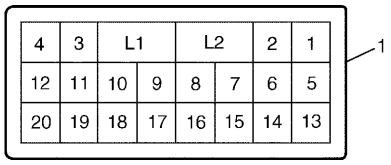
[A] : Connector “G75”	[H] : Connector “G58”	7. SDM
[B] : Connector “G61”	1. Connector “G04”, “E25”	8. Seat belt pretensioner (retractor assembly) (if equipped)
[C] : Connector “G42”	2. “AIR BAG” monitor coupler	9. Air bag harness in floor harness
[D] : Connector “G72”, “L45”	3. DLC	10. Ground for air bag system
[E] : Connector “G48”	4. Contact coil assembly	11. Air bag harness in instrument panel harness
[F] : Connector “L47”, “L44”, “L46”, “L43”	5. Driver air bag (inflator) module	
[G] : Connector “L49”, “L48”	6. Passenger air bag (inflator) module	

System Wiring Diagram



[A] : Shorting bar	5. "AIR BAG" fuse	11. SDM
[B] : Connector	6. Connection detection pin	12. Contact coil assembly
1. From main fuse	7. To ECM (PCM) and ABS control module (if equipped)	13. Driver air bag (inflator) module
2. Ignition switch	8. To data link connector (DLC)	14. Passenger air bag (inflator) module
3. "METER" fuse	9. "AIR BAG" monitor coupler	15. Driver seat belt pretensioner (if equipped)
4. "AIR BAG" warning lamp in combination meter	10. Ground for air bag system	16. Passenger seat belt pretensioner (if equipped)

Terminal Arrangement of SDM (Viewed from Harness Side)



1. Connector "G58" (SDM Connector)

Connector “G58” (SDM connector)

TERMINAL	CIRCUIT		TERMINAL	CIRCUIT	
G58-1	–		G58-11	Driver pretensioner (if equipped)	Low
G58-2	“AIR BAG” warning lamp		G58-12		High
G58-3	–		G58-13	–	High
G58-4	Ignition switch (power source)		G58-14	–	Low
G58-5	Passenger pretensioner (if equipped)	High	G58-15	Diagnosis switch	
G58-6		Low	G58-16	–	
G58-7	Passenger air bag (inflator) module	High	G58-17	Ground	
G58-8		Low	G58-18	–	
G58-9	Driver air bag (inflator) module	Low	G58-19	–	
G58-10		High	G58-20	Data link connector (DLC)	

Diagnosis

WARNING:
To avoid deployment when troubleshooting the air bag system, do not use electrical test equipment such as a battery powered or AC powered voltmeter, ohmmeter, etc., or any type of electrical equipment other than that specified in this manual. Do not use a non-powered probe type tester. Instructions in this manual must be followed carefully, otherwise personal injury may result.

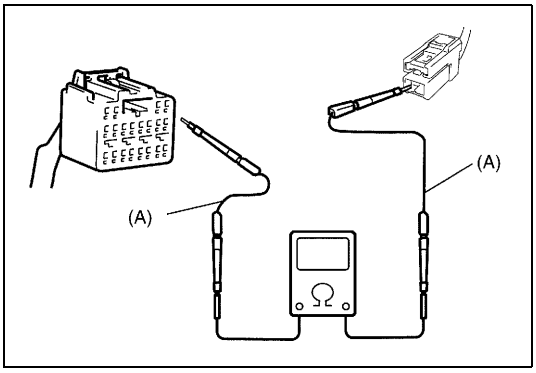
Diagnostic Trouble Code (DTC)

The "Air Bag Diagnostic System Check" must always be the starting point of any air bag system diagnosis. "The Air Bag Diagnostic System Check" checks for proper "AIR BAG" warning lamp operation and checks for air bag diagnostic trouble codes (DTCs) using on-board diagnosis function or SUZUKI scan tool.

Use of Special Tool

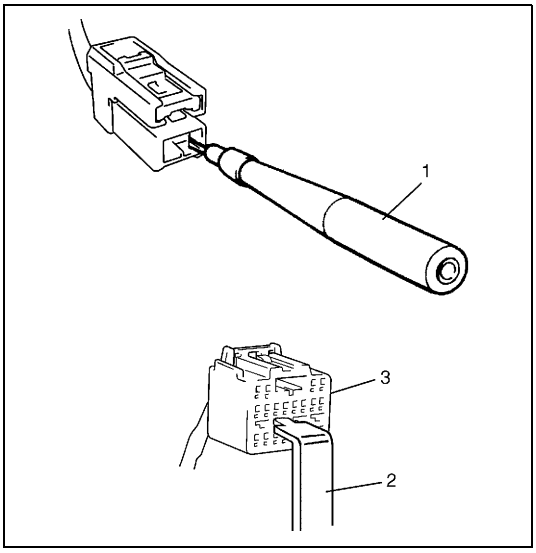
WARNING:
To avoid deployment when troubleshooting the air bag system, do not use electrical test equipment such as a battery powered or AC powered voltmeter, ohmmeter, etc., or any type of electrical equipment other than that specified in this manual. Do not use a non-powered probe type tester. Instructions in this manual must be followed carefully, otherwise personal injury may result.

You should be familiar with the tools listed in this section under the heading "Special Tools". You should be able to measure voltage and resistance. You should be familiar with proper use of a scan tool such as Air Bag Driver/ Passenger Load Tool, Connector Test Adapter Kit and the Digital Multimeter.



Special tool
(A) : 09932-76010 (Connector Test Adapter Kit)

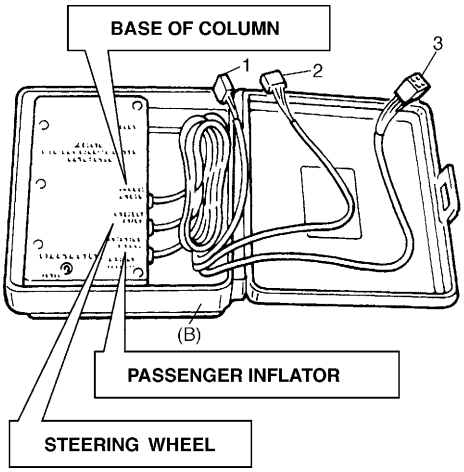
This must be used whenever a diagnostic procedure requests checking or probing a terminal.
Using the appropriate adapter in the special tool will ensure that no damage to the terminal will occur from the multimeter probe, such as spreading or bending.



The adapter (1) will also give an idea of whether contact tension is sufficient, helping to find an open or intermittent open due to poor terminal contact.

An SDM short bar release tool (2) is included in the connector test adapter kit.

Inserting it into the SDM connector (3) will release the shorting bar.



Special tool
(B) : 09932-75010 (Air Bag Driver/Passenger Load Tool)

This tool is used only when called for in this section. It is used as a diagnostic aid and safety device to prevent inadvertent air bag (inflator) module deployment.
The load tool has three connectors attached to its case which are electrically functional and serve as resistive load substitutions.
No more than two connectors are used at any time.

One of connectors ("STEERING WHEEL") is used to substitute the load of followings.

- Driver air bag (inflator) module when it is connected at the top of the column to the contact coil assembly.
- Passenger air bag (inflator) module when it is connected to the air bag harness connector for passenger air bag (inflator) module.
- Each of driver and passenger seat belt pretensioners when it is connected to air bag harness connector for driver and passenger seat belt pretensioner (if equipped).

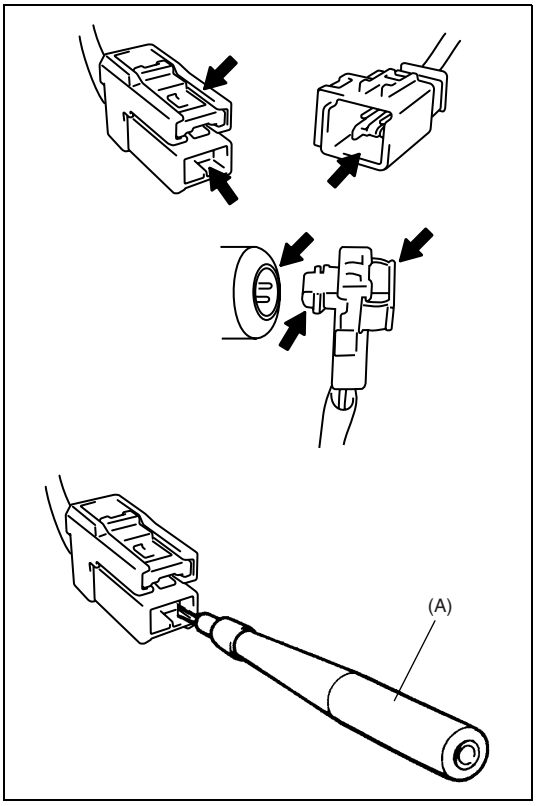
Another connector ("BASE OF COLUMN") is used to substitute the load of the driver air bag (inflator) module and the contact coil assembly when it is connected at the base of the column to the air bag wire harness.
The third connector ("PASSENGER INFLATOR") is not used.

By substituting the resistance of the load tool when called for, a determination can be made as to whether an inflator circuit component is causing system malfunction and which component is causing the malfunction.
The load tool should be used only when specifically called for in the diagnostic procedures.

1. Connector for contact coil and driver air bag (inflator) module (Located near the base of the steering column)
2. Connector for driver, passenger air bag (inflator) module and driver and passenger seat belt pretensioners
3. Not used

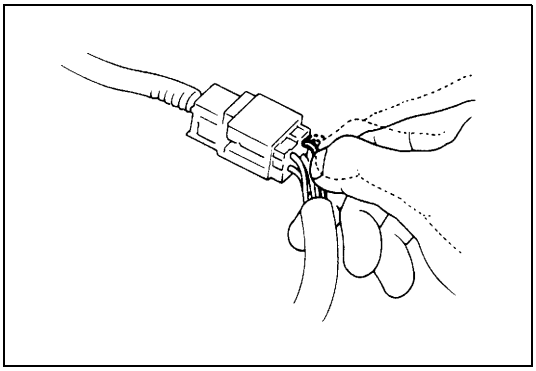
Intermittents and Poor Connections

Most intermittents are caused by faulty electrical connections or wiring. When a check for proper connection is requested in a diagnostic flow table, perform careful check of suspect circuits for :

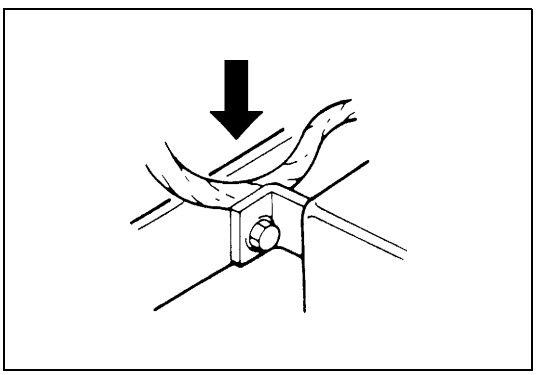


- Poor mating of connector halves, or terminals not fully seated in the connector body (backed out).
- Dirt or corrosion on the terminals. The terminals must be clean and free of any foreign material which could impede proper terminal contact.
  However, cleaning the terminal with a sand paper or the like is prohibited.
- Damaged connector body, exposing the terminals to moisture and dirt, as well as not maintaining proper terminal orientation with the component or mating connector.
- Improperly formed or damaged terminals.
  Check each connector terminal in problem circuits carefully to ensure good contact tension by using the corresponding mating terminal included in the connector test adapter kit (special tool).
  If contact tension is not enough, reform it to increase contact tension or replace.

Special tool
(A) : 09932-76010 (Connector Test Adapter Kit)



- Poor terminal-to-wire connection.
  Check each wire harness in problem circuits for poor connection by shaking it by hand lightly. If any abnormal condition is found, change the wire harness assembly or component parts with new ones.



- Wire insulation which is rubbed through, causing an intermittent short as the bare area touches other wiring or parts of the vehicle.
- Wire broken inside the insulation. This condition could cause a continuity check to show a good circuit, but if only 1 or 2 strands of a multi-strand-type wire are intact, resistance could be far too high.

If any abnormality is found, repair or replace as a wire harness assembly.

Air Bag Diagnostic System Check

WARNING:

To avoid deployment when troubleshooting the air bag system, do not use electrical test equipment such as a battery powered or AC powered voltmeter, ohmmeter, etc., or any type of electrical equipment other than that specified in this manual. Do not use a non-powered probe type tester. Instructions in this manual must be followed carefully, otherwise personal injury may result.

CAUTION:

The order in which diagnostic trouble codes are diagnosed is very important. Failure to diagnose the diagnostic trouble codes in the order specified may result in extended diagnostic time, incorrect diagnosis and incorrect parts replacement.

The diagnostic procedures used in this section are designed to find and repair air bag system malfunctions. To get the best results, it is important to use the diagnostic flow tables and follow the sequence listed below.

1) Perform the “Air Bag Diagnostic System Check Flow Table” in this section.
   (The “Air Bag Diagnostic System Check Flow Table” must be the starting point of any air bag system diagnosis.
   The “Air Bag Diagnostic System Check Flow Table” checks for proper “AIR BAG” warning lamp operation through “AIR BAG” warning lamp and whether air bag diagnostic trouble codes exist.)
2) Refer to the proper diagnostic table as directed by the “Air Bag Diagnostic System Check Flow Table” in this section.
   (The “Air Bag Diagnostic System Check Flow Table” will lead you to the correct table to diagnose any air bag system malfunctions. Bypassing these procedures may result in extended diagnostic time, incorrect diagnosis and incorrect parts replacement.)
3) Repeat the “Air Bag Diagnostic System Check Flow Table” after any repair or diagnostic procedures have been performed.
   (Performing the “Air Bag Diagnostic System Check Flow Table” after all repair or diagnostic procedures will ensure that the repair has been made correctly and that no other malfunctions exist.)

FLOW TABLE TEST DESCRIPTION

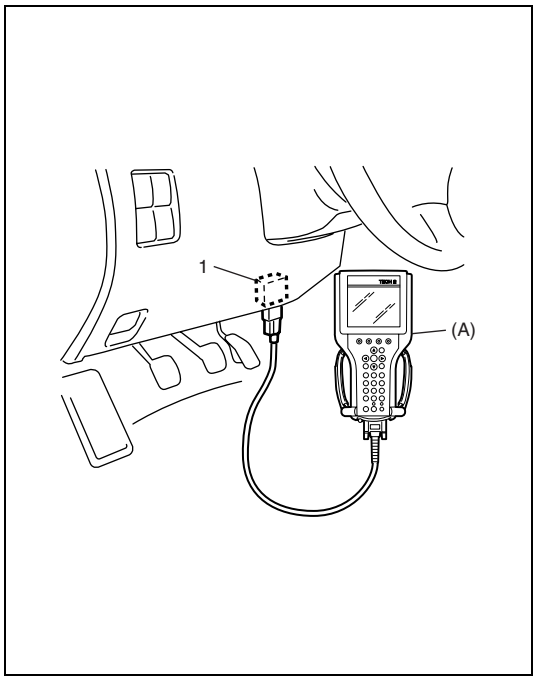
STEP 1 : Check that “AIR BAG” warning lamp lights.
STEP 2 : Check that “AIR BAG” warning lamp lights.
STEP 3 : Check diagnosis switch circuit.
STEP 4 : Check that “AIR BAG” warning lamp flashes 6 times after ignition switch is turned ON.
STEP 6 : Check that history codes are in SDM memory. (using SUZUKI scan tool)
STEP 7 : Check that history codes are in SDM memory. (using monitor coupler)
STEP 9 : Check that current code is in SDM memory. (using SUZUKI scan tool)
STEP 10 : Check that current code is in SDM memory. (using monitor coupler)

Air Bag Diagnostic System Check Flow Table

Step	Action	Yes	No
1	1) Make sure that battery voltage is about 11V or higher. 2) Note "AIR BAG" warning lamp as ignition switch is tuned ON. Does "AIR BAG" warning lamp come ON when ignition switch is tuned ON?	Go to step 2.	Proceed to ""AIR BAG" Warning Lamp Does Not Come On" in this section.
2	Does "AIR BAG" warning lamp come ON steady?	Proceed to ""AIR BAG" Warning Lamp Comes On Steady" in this section.	Go to step 3.
3	Does "AIR BAG" warning lamp keep flashing (indicating DTC) when ignition switch is ON?	Proceed to ""AIR BAG" Warning Lamp Flashes" in this section.	Go to step 4.
4	Does "AIR BAG" warning lamp turn OFF, after flashing 6 times?	Go to step 5.	Go to step 8.
5	Do you have SUZUKI scan tool?	Go to step 6.	Go to step 7.
6	1) Check DTC referring to "Using SUZUKI Scan Tool" under "DTC Check" in this section. Is "NO CODES" displayed on SUZUKI scan tool?	Air bag system is in good condition.	An intermittent trouble has occurred at some place. Check the connector harness, etc. related to the sensed DTC. Refer to "Intermittent and Poor Connections" in this section. Then clear DTC referring to "DTC Clearance" in this section, and repeat this table.
7	1) Check DTC referring to "Not Using SUZUKI Scan Tool" under "DTC Check" in this section. Is flashing pattern No.12 indicated on "AIR BAG" warning lamp?	Air bag system is in good condition.	An intermittent trouble has occurred at some place. Check the connector harness, etc. related to the sensed DTC. Refer to "Intermittent and Poor Connections" in this section. Then clear DTC referring to "DTC Clearance" in this section, and repeat this table.
8	Do you have SUZUKI scan tool?	Go to step 9.	Go to step 10.
9	1) Check DTC referring to "Using SUZUKI Scan Tool" under "DTC Check" in this section. Is "NO CODES" displayed on SUZUKI scan tool?	Substitute a known-good SDM and recheck.	Check and repair according to corresponding DTC flow table.
10	1) Check DTC referring to "Not Using SUZUKI Scan Tool" under "DTC Check" in this section. Is flashing pattern No.12 indicated on "AIR BAG" warning lamp?	Substitute a known-good SDM and recheck.	Check and repair according to corresponding DTC flow table.

DTC Check

Using SUZUKI scan tool

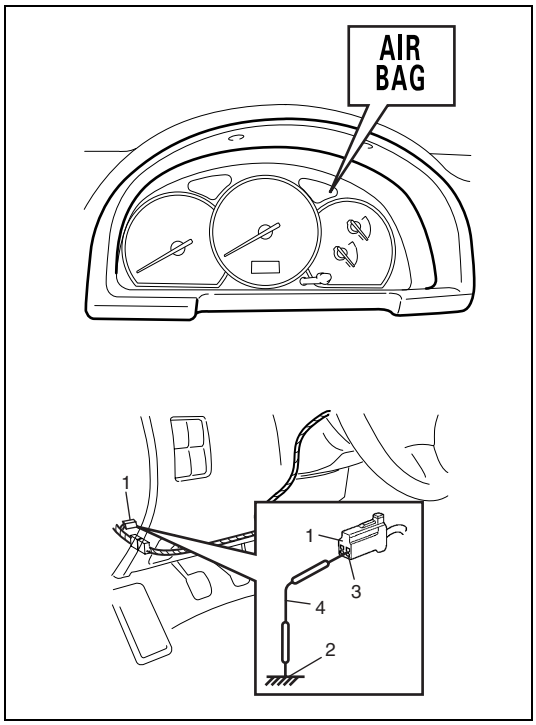


1) Turn ignition switch to OFF position.
2) After setting cartridge to SUZUKI scan tool, connect it to data link connector (DLC) located on underside of instrument panel at driver's seat side.

Special tool
(A) : SUZUKI scan tool

3) Turn ignition switch to ON position.
4) Read DTC according to instructions displayed on SUZUKI scan tool and print it or write it down. Refer to SUZUKI scan tool operator's manual for further details.
   If communication between scan tool and SDM is not possible, proceed to "SDM Cannot Communicate through the Serial Data Circuit" in this section.
5) After completing the check, turn ignition switch to OFF position and disconnect SUZUKI scan tool from data link connector (DLC) (1).

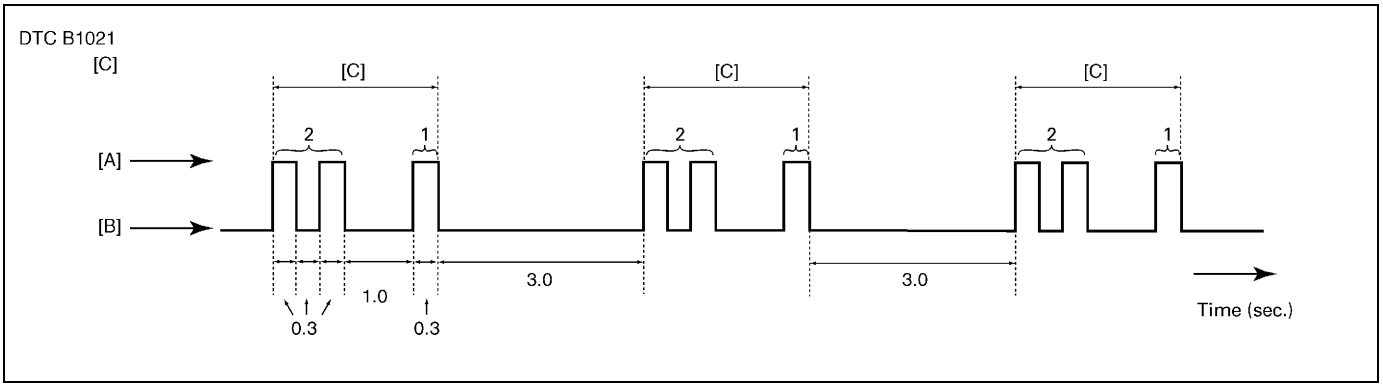
Not using SUZUKI scan tool



1) Check that malfunction indicator lamp ("AIR BAG" warning lamp) comes ON when ignition switch is turned to ON position.
   If it does not come "ON", proceed to ""AIR BAG" Warning Lamp Does Not Come ON" in this section.
2) Using service wire (4), ground diagnosis switch terminal (3) in monitor coupler (1).
3) Read DTC from flashing pattern of malfunction indicator lamp ("AIR BAG" warning lamp). Refer to DTC TABLE in this section.
   If lamp does not indicate DTC, proceed to ""AIR BAG" Warning Lamp Cannot Indicate Flashing Pattern of DTC" in this section.
4) After completing the check, turn ignition switch to OFF position and disconnect service wire from "AIR BAG" monitor coupler.

2. Body ground

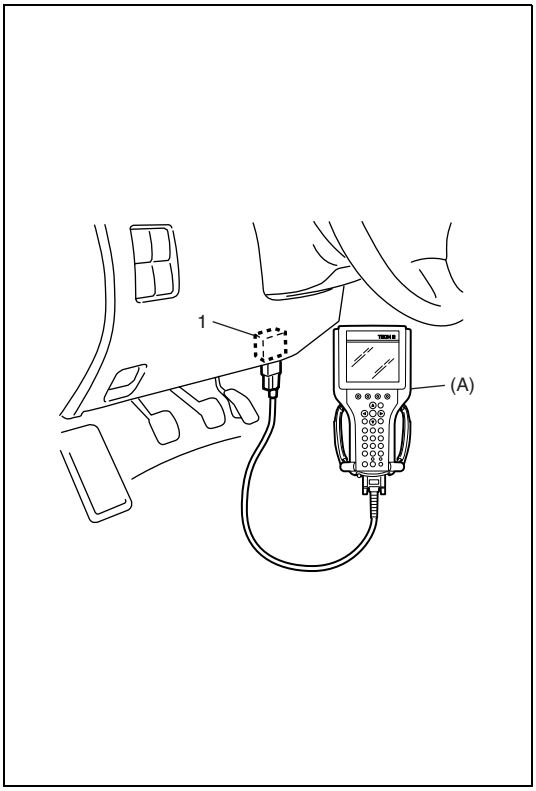
EXAMPLE : When driver air bag initiator circuit resistance high (DTC B1021) is set



[A] : "AIR BAG" warning lamp is turned ON
[B] : "AIR BAG" warning lamp is turned OFF
[C] : Code No.21

DTC Clearance

Using SUZUKI scan tool



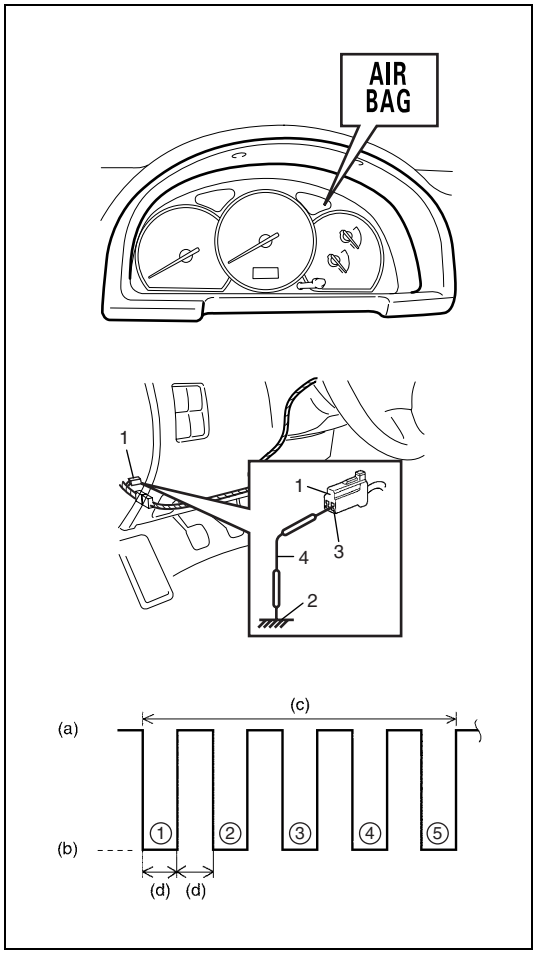
1) Turn ignition switch to OFF position.
2) Connect SUZUKI scan tool to data link connector (DLC) (1) in the same manner as when making this connection for DTC check.

Special tool
(A) : SUZUKI scan tool

3) Turn ignition switch to ON position.
4) Erase DTC according to instructions displayed on SUZUKI scan tool. Refer to SUZUKI scan tool operator's manual for further details.
5) After completing the check, turn ignition switch to OFF position and disconnect SUZUKI scan tool from DLC.
6) Perform "DTC Check" in this section, and confirm that normal DTC ("NO CODES") is displayed and not malfunction DTC.

NOTE:

If DTC B1051 or DTC B1071 is stored in SDM, it is not possible to clear DTC.



Not using SUZUKI scan tool

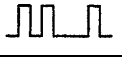
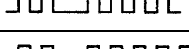
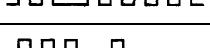
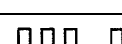
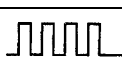
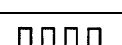
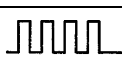
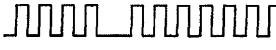
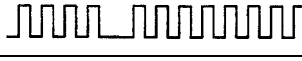
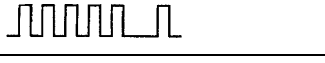
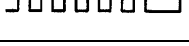
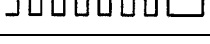
1) Turn ignition switch to ON position and wait about 6 seconds or more.
2) Using service wire (4), repeat shorting and opening between diagnosis switch terminal (3) on "AIR BAG" monitor coupler (1) and body ground (2) 5 times at about 1 second intervals.
3) Perform "DTC Check" in this section, and confirm that normal DTC (DTC 12) is displayed and not malfunction DTC.

NOTE:

If DTC B1051 or DTC B1071 is stored in SDM, it is not possible to clear DTC.

(a)	Open
(b)	Short
(c)	Max. 10 seconds
(d)	About 1 sec.

DTC Table

DTC	"AIR BAG" warning lamp flashing pattern		Diagnosis		
	NO.	MODE			
–	12		Normal		–
B1015	15		Passenger air bag circuit	Resistance high	Diagnose trouble according to diagnostic flow table corresponding to each code No.
B1016	16			Resistance low	
B1018	18			Short to ground	
B1019	19			Short to power circuit	
B1021	21		Driver air bag circuit	Resistance high	
B1022	22			Resistance low	
B1024	24			Short to ground	
B1025	25			Short to power circuit	
B1031	31		Power source voltage	Too high	
B1032	32			Too low	
B1041	41		Driver pretensioner circuit	Resistance high	
B1042	42			Resistance low	
B1043	43			Short to ground	
B1044	44			Short to power circuit	
B1045	45		Passenger pretensioner circuit	Resistance high	
B1046	46			Resistance low	
B1047	47			Short to ground	
B1048	48			Short to power circuit	
B1051	51		SDM	Frontal crash detected	
B1061	61			"AIR BAG" warning lamp circuit failure	
B1071	71			Internal fault	
B1013	13			Specifications different between air bag system and SDM	

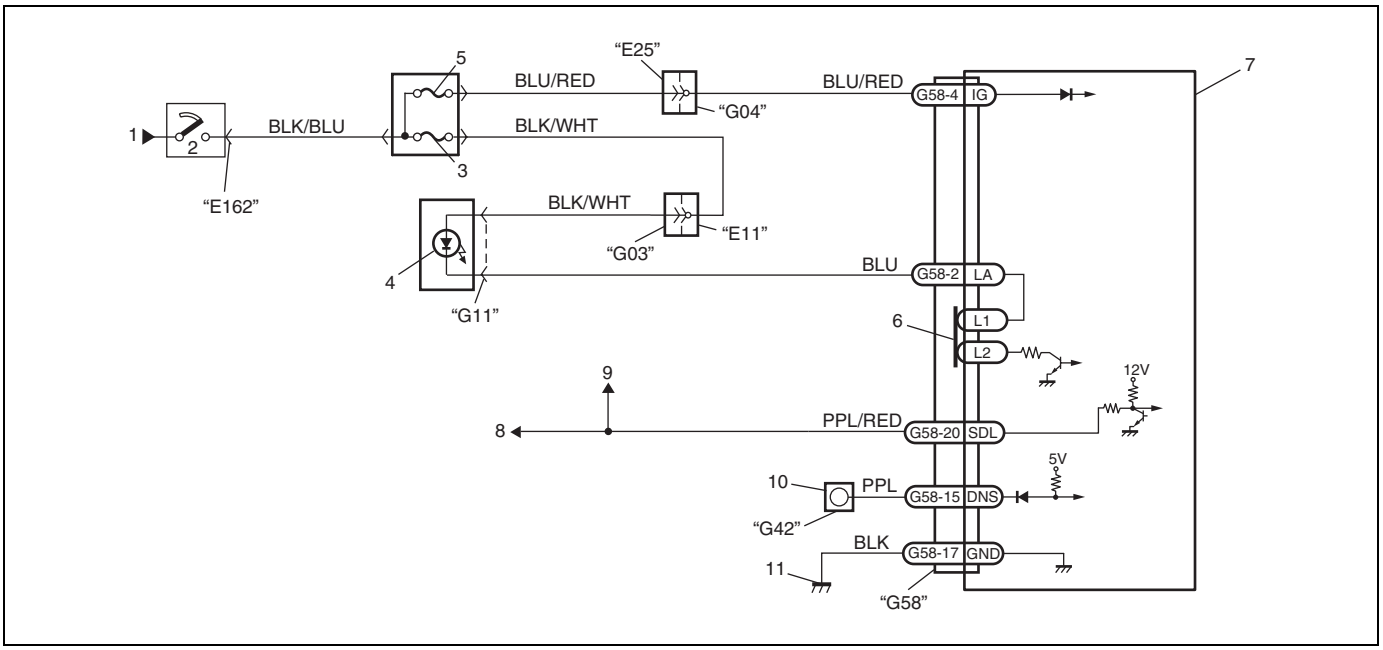
NOTE:

- **When 2 or more codes are indicated, the lowest numbered code will appear first.**
- **Current DTC and history DTC can be identified by lighting and flashing of "AIR BAG" warning lamp as follows. However, if a multiple number of DTC's are set or even one of them is a current DTC, "AIR BAG" warning lamp remains on after ignition switch is turned ON. Therefore, it is not possible to identify any of them as to whether it is a current one or a history one. (But use of SUZUKI scan tool will make identification possible.)**

	Current DTC is set. (Abnormality exists at present.)	History DTC is set only. (Faulty condition occurred once in the past but normal condition is restored at present.)
"AIR BAG" warning lamp after ignition switch ON	Flashing 6 times and turns on.	Flashing 6 times and turns off.
"AIR BAG" warning lamp when grounding diagnosis switch	Current DTC is displayed.	History DTC is displayed.

"AIR BAG" Warning Lamp Circuit Trouble Diagnosis Table

WIRING DIAGRAM



1. From main fuse	5. "AIR BAG" fuse	9. To ECM (PCM) and ABS control module (if equipped)
2. Ignition switch	6. Connection detection pin	10. "AIR BAG" monitor coupler
3. "METER" fuse	7. SDM	11. Ground for air bag system
4. "AIR BAG" warning lamp in combination meter	8. To DLC	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

"AIR BAG" warning lamp comes on steady

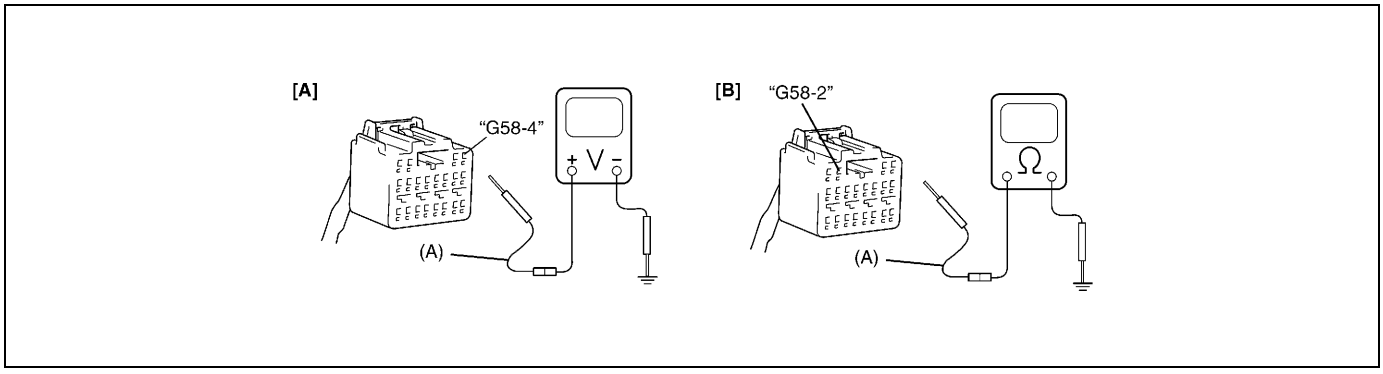
TABLE TEST DESCRIPTION

STEP 1 : Check for "AIR BAG" fuse blown.
STEP 2 : Check for loose connection between main wire harness and instrument panel wire harness.
STEP 3 : Check for loose connection between SDM connector and SDM.
STEP 4 : Check for power supply circuit.
STEP 5 : Check for short circuit between "AIR BAG" warning lamp circuit and ground.

DIAGNOSTIC FLOW TABLE

Step	Action	Yes	No
1	1) Ignition switch OFF. 2) Remove and inspect "AIR BAG" fuse. Is fuse good?	Go to Step 2.	"BLU/RED" wire short to ground. After repair, replace "AIR BAG" fuse.
2	1) Check for loose connection between "E25" and "G04" connectors. Is connection good?	Go to Step 3.	Clear up loose connection between "E25" and "G04" connectors.
3	1) Check for loose connection between SDM connector "G58" and SDM. Is connection good?	Go to Step 4.	Clear up loose connection between SDM connector "G58" and SDM.
4	1) Disconnect SDM connector "G58". 2) Check proper connection to SDM at terminal "G58-4". 3) If OK then check voltage between "G58-4" terminal of SDM connector and body ground with ignition switch ON. Is it 8 V or more?	Go to Step 5.	"BLU/RED" wire (between "AIR BAG" fuse and SDM connector) open "BLK/BLU" wire (between ignition switch and "AIR BAG" fuse) open or short to ground.
5	1) Disconnect 20-pin connector "G11" from combination meter referring to. 2) Check resistance between "G58-2" terminal of SDM connector and body ground. Is resistance 1 MΩ or more?	Substitute a known-good SDM and recheck.	"BLU" wire (between combination meter and SDM connector) short to ground.

[A] Fig. for STEP 4/[B] Fig. for STEP 5



Special tool
(A) : 09932-76010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

"AIR BAG" warning lamp does not come on

TABLE TEST DESCRIPTION

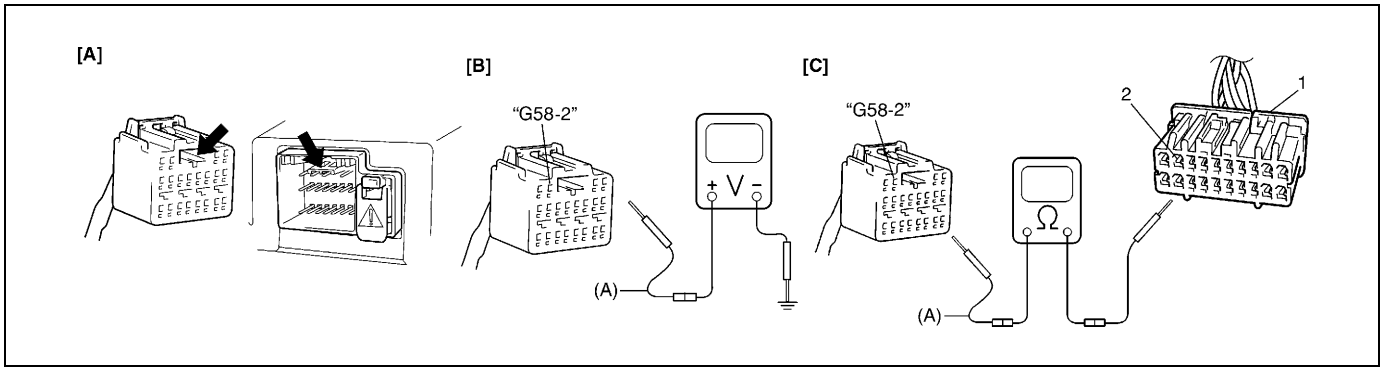
STEP 1 : Check combination meter power feed circuit.
STEP 2 : Check electrical connection check mechanism in SDM connector.
STEP 3 : Check "AIR BAG" warning lamp circuit.
STEP 4 : Check open in "AIR BAG" warning lamp circuit.
STEP 5 : Check short from "AIR BAG" warning lamp circuit to power circuit.

DIAGNOSTIC FLOW TABLE

Step	Action	Yes	No
1	1) Set parking brake. 2) Note combination meter when ignition switch is turned ON. Does the "BRAKE" indicator (warning lamp) come ON?	Go to Step 2.	Check and clear up the following possible cause. Open circuit in "BLK/BLU" or "BLK/WHT" wire. Short circuit between "BLK/BLU" or "BLK/WHT" and ground. "METER" fuse blown. Poor connection of "E11" connector and "G03" connector.
2	1) With ignition switch OFF, disconnect SDM connector. 2) Check electrical connection check mechanism. Is it in good condition?	Go to Step 3.	Repair electrical connection check mechanism.
3	1) Check proper connection to SDM at terminal "G58-2". 2) If OK, then check voltage from "G58-2" terminal of SDM connector to body ground with ignition switch ON. Is it 8 V or more?	Substitute a known-good SDM and recheck.	Go to Step 4.
4	1) Remove combination meter referring to "Combination Meter Removal and Installation". 2) Check proper connection to combination meter at "BLU" terminal for "AIR BAG" warning lamp and to SDM at terminal "G58-2". 3) If OK, then check resistance between "BLU" wire terminal (2) of combination meter connector (20-pin connector) (1) and "G58-2" terminal of SDM connector. Is resistance 1 Ω or less?	Go to Step 5.	Repair high resistance or open in "BLU" wire circuit (between combination meter and SDM).

Step	Action	Yes	No
5	1) Measure voltage from “G58-2” terminal of SDM connector to body ground with ignition switch ON. Is it 8 V or more?	Repair short from “BLU” wire circuit (between combination meter and SDM) to power circuit.	Replace combination meter.

[A] Fig. for STEP 2/[B] Fig. for STEP 3 and 5/[C] Fig. for STEP 4



Special tool
(A) : 09932-76010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Repeat “Air Bag Diagnostic System Check” in this section to confirm that the trouble has been corrected.**

"AIR BAG" warning lamp flashes

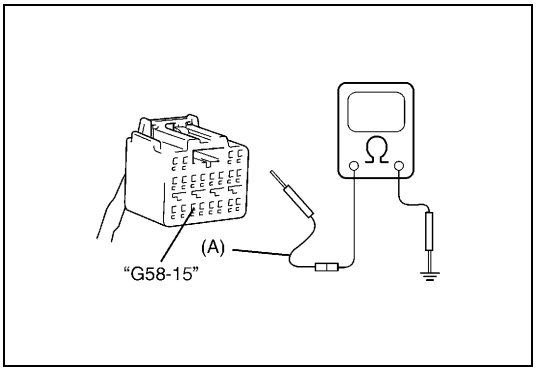
TABLE TEST DESCRIPTION

STEP 1 : Check "AIR BAG" monitor coupler.
STEP 2 : Check diagnosis switch circuit for air bag system.

DIAGNOSTIC FLOW TABLE

Step	Action	Yes	No
1	1) Check "AIR BAG" monitor coupler. Is it connected diagnosis switch terminal in "AIR BAG" monitor coupler and body ground by service wire?	Remove service wire.	Go to Step 2.
2	1) With ignition switch OFF, disconnect SDM connector. 2) Measure resistance between "G58-15" terminal of SDM connector and body ground. Is resistance infinity?	Substitute a known-good SDM and recheck.	Repair short from "PPL" wire circuit to ground.

Fig. for STEP 2



Special tool
(A) : 09932-76010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

"AIR BAG" warning lamp cannot indicate flashing pattern of DTC

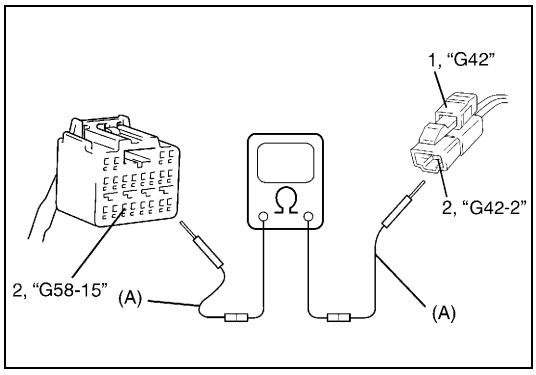
TABLE TEST DESCRIPTION

STEP 1 : Check "AIR BAG" monitor coupler.
STEP 2 : Check diagnosis switch circuit for air bag system.

DIAGNOSTIC FLOW TABLE

Step	Action	Yes	No
1	1) Inspect connection between diagnostic switch terminal on "AIR BAG" monitor coupler and body ground by service wire. Is it securely connected between them by service wire?	Go to step 2.	Properly connection diagnostic switch terminal on "AIR BAG" monitor coupler and body ground by service wire.
2	1) Disconnect SDM connector from SDM. 2) Check for proper connection at "PPL" wire ("G58-15" terminal of SDM connector and "G42-2" terminal of "AIR BAG" monitor coupler (1)) terminals. 3) If OK then measure resistance between "G58-15" terminal and "G42-2" terminal. Is resistance 1Ω or more?	Check "PPL" wire terminals (2). If OK, then "PPL" wire circuit high resistance or open.	Substitute a known good SDM and recheck

Fig. for STEP 2



Special tool
(A) : 09932-76010

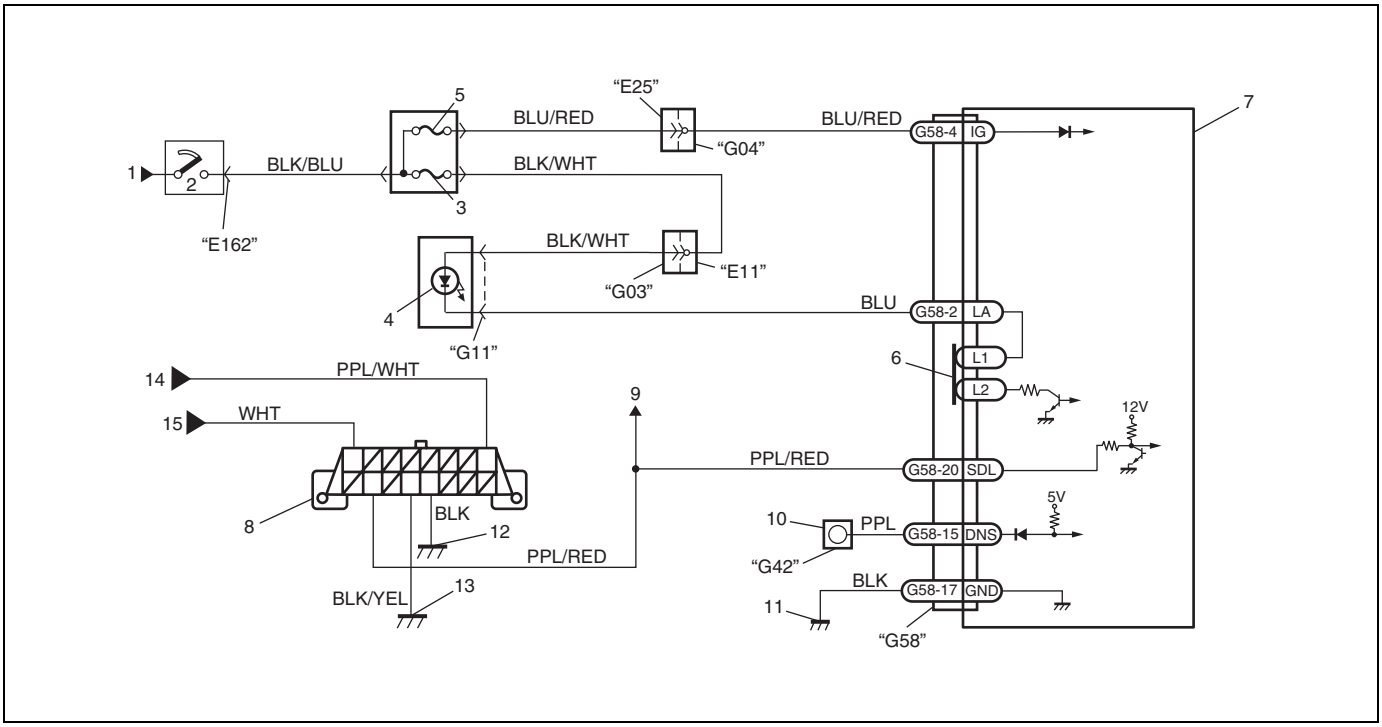
NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

SDM Cannot Communicate Through the Serial Data Circuit

WIRING DIAGRAM



1. From main fuse	6. Connection detection pin	11. Ground for air bag system
2. Ignition switch	7. SDM	12. Ground on body
3. "METER" fuse	8. DLC	13. Ground on Engine
4. "AIR BAG" warning lamp in combination lamp	9. To ECM (PCM) and ABS control module (if equipped)	14. From ECM (PCM)
5. "AIR BAG" fuse	10. "AIR BAG" monitor coupler	15. From "RADIO DOME" fuse

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

TABLE TEST DESCRIPTION

STEP 1 : An improper connection to the data link connector (DLC) will prevent communications from being established.

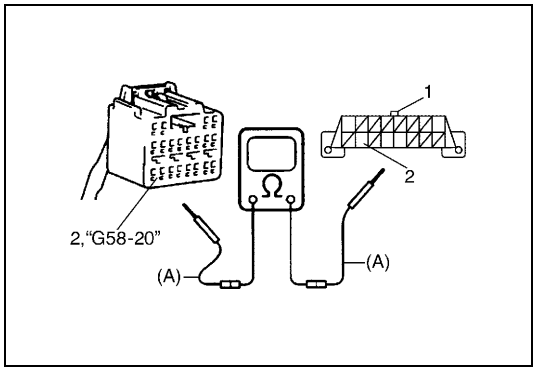
STEP 2 : This test checks whether it is possible to communicate with other control module.

STEP 3 : This test checks for an open in "PPL/RED" circuit.

DIAGNOSTIC FLOW TABLE

Step	Action	Yes	No
1	1) Make sure that SUZUKI scan tool is free from malfunction and air bag system is used. 2) Ignition switch OFF. 3) Check proper connection of SUZUKI scan tool to DLC. Is connection in good condition?	Go to step 2.	Properly connect SUZUKI scan tool to DLC.
2	1) Check if communication is possible by trying communication with other control module (ECM (PCM)) or ABS control module (if equipped)). Is it possible to communicate with other control module?	Go to step 3.	Repair open in common section of serial data circuit (“PPL/RED” wire circuit) used by all controllers or short to ground or power circuit which has occurred some-where in serial data circuit (“PPL/RED” wire circuit).
3	1) With ignition switch OFF, disconnect SDM connector “G58”. 2) Check proper connection at “G58-20” (“PPL/RED” wire) terminal of SDM connector. 3) If OK, then check resistance between “PPL/RED” wire terminal of DLC (1) and “G58-20” (“PPL/RED” wire) terminal of SDM connector. Is resistance 1 Ω or less?	Substitute a known-good SDM and recheck.	Repair high resistance or open in “PPL/RED” wire (2) circuit.

Fig. for STEP 3



Special tool
(A) : 09932-76010

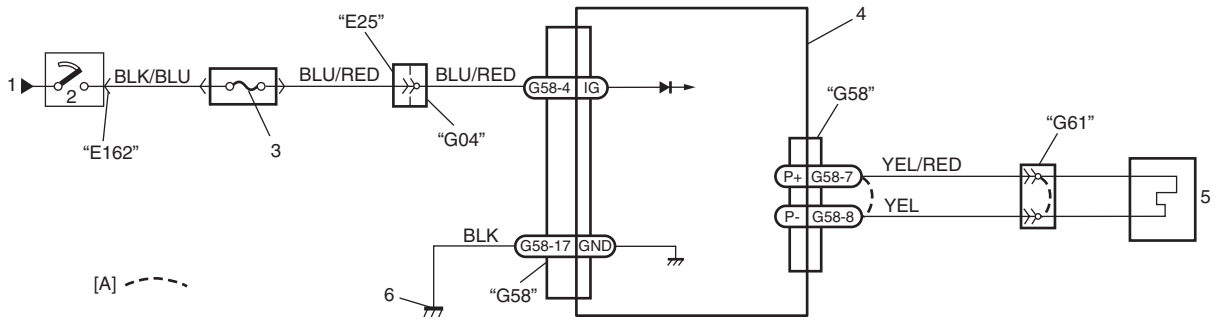
NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Repeat “Air Bag Diagnostic System Check” in this section to confirm that the trouble has been corrected.**

DTC B1015 – Passenger Air Bag Initiator Circuit Resistance High
DTC B1016 – Passenger Air Bag Initiator Circuit Resistance Low
DTC B1018 – Passenger Air Bag Initiator Circuit Short to Ground
DTC B1019 – Passenger Air Bag Initiator Circuit Short to Power Circuit

WIRING DIAGRAM



[A] : Shorting bar	2. Ignition switch	4. SDM	6. Ground for air bag system
1. From main fuse	3. "AIR BAG" fuse	5. Passenger air bag (inflator) module	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC WILL SET WHEN

DTC B1015 :

The combined resistance of the passenger air bag (inflator) module, harness wiring and connector terminal contact is above a specified value for specified time.

DTC B1016 :

The combined resistance of the passenger air bag (inflator) module, harness wiring and connector terminal contact is below a specified value for specified time.

DTC B1018 :

The voltage measured at passenger air bag initiator circuit is below a specified value for specified time.

DTC B1019 :

The voltage measured at passenger air bag initiator circuit is above a specified value for specified time.

TABLE TEST DESCRIPTION

DTC B1015, B1016, B1018 and B1019 :

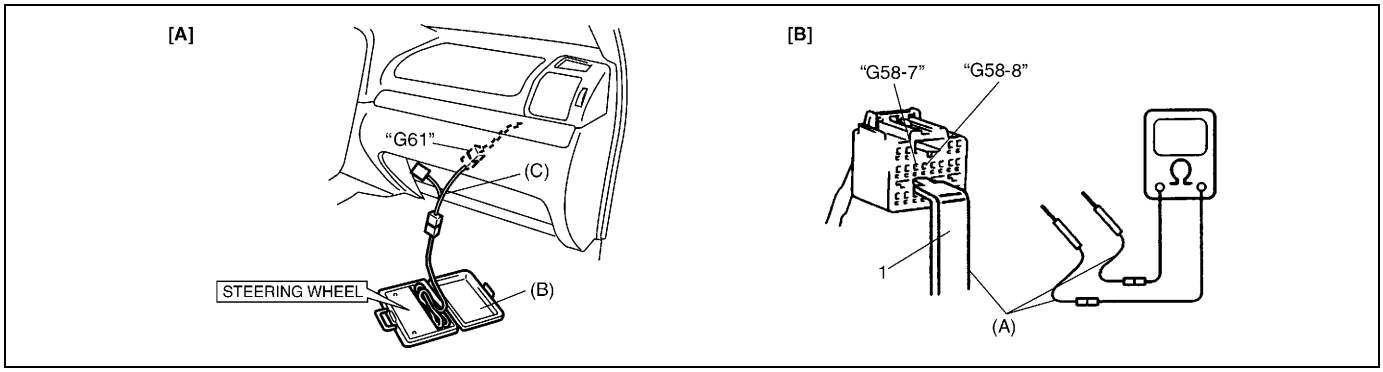
STEP 1 : Check whether malfunction is in passenger air bag (inflator) module.
STEP 2 : Check passenger air bag (inflator) module initiator circuit.
STEP 3 : Check passenger air bag (inflator) module initiator circuit. (for DTC B1019 only)

DIAGNOSTIC FLOW TABLE

DTC B1015 : PASSENGER AIR BAG INITIATOR CIRCUIT RESISTANCE HIGH

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect passenger air bag (inflator) module connector behind the glove box. 2) Check proper connection to passenger air bag (inflator) module at terminals in "G61" connector. 3) If OK then connect special tool (B) to passenger air bag (inflator) module connector disconnected at the Step 1). With ignition switch ON, is DTC B1015 current?	Go to step 2.	Ignition switch OFF. Replace passenger air bag (inflator) module (Refer to "Passenger Air Bag (Inflator) Module" in this section).
2	1) With ignition switch OFF, disconnect SDM connector. 2) Check proper connection to SDM at terminals "G58-7" and "G58-8". 3) If OK, release shorting bar in SDM connector inserting release tool (1) included in special tool (A). 4) Measure resistance between "G58-7" and "G58-8" terminals with connected special tools (B) and (C). Is resistance 4.5 Ω or less?	Substitute a known-good SDM and recheck.	Repair high resistance or open in "YEL/RED" or "YEL" wire circuit.

[A] Fig. for STEP 1 and 2/[B] Fig. for STEP 2



Special tool
(A) : 09932-76010
(B) : 09932-75010
(C) : 09932-78340

NOTE:

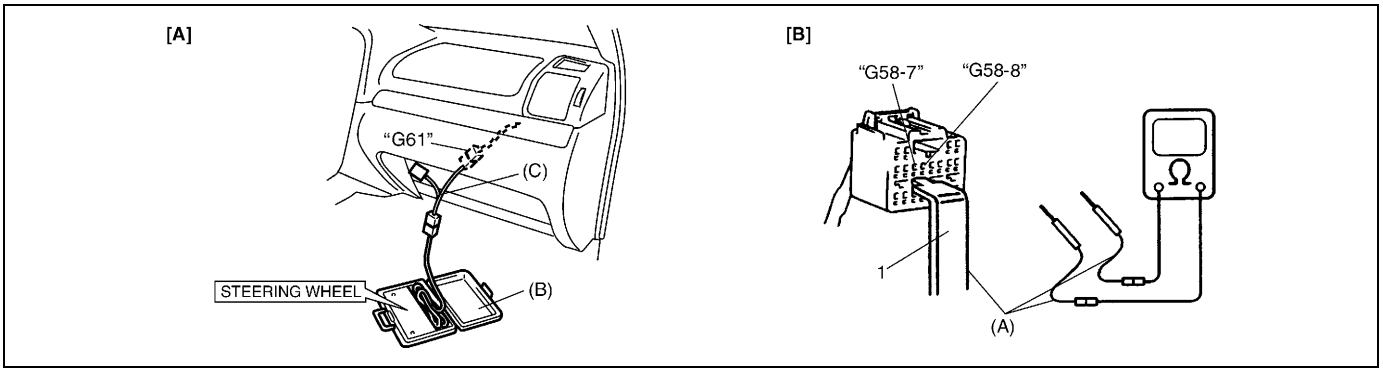
Upon completion of inspection and repair work, perform the following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes referring to "DTC Clearance" in this section, if any.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

DTC B1016 : PASSENGER AIR BAG INITIATOR CIRCUIT RESISTANCE LOW

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect passenger air bag (inflator) module connector behind the glove box. 2) Check proper connection to passenger air bag (inflator) module at terminals in "G61" connector. 3) If OK then connect special tools (B) and (C) to passenger air bag (inflator) module connector disconnected at the Step 1. With ignition switch ON, is DTC B1016 current?	Go to step 2.	Ignition switch OFF. Replace passenger air bag (inflator) module (Refer to "Passenger Air Bag (Inflator) Module" in this section).
2	1) With ignition switch OFF, disconnect SDM connector. 2) Check proper connection to SDM at terminals "G58-7" and "G58-8". 3) If OK, release shorting bar in SDM connector inserting release tool (1) included in special tool (A). 4) Measure resistance between "G58-7" and "G58-8" terminals with connected special tools (B) and (C). Is resistance 1.4 Ω or more?	Substitute a known-good SDM and recheck.	Repair short from "YEL/RED" wire circuit to "YEL" wire circuit or from "YEL/RED" or "YEL" wire circuit to other wire circuit.

[A] Fig. for STEP 1 and 2/[B] Fig. for STEP 2



Special tool
(A) : 09932-76010
(B) : 09932-75010
(C) : 09932-78340

NOTE:

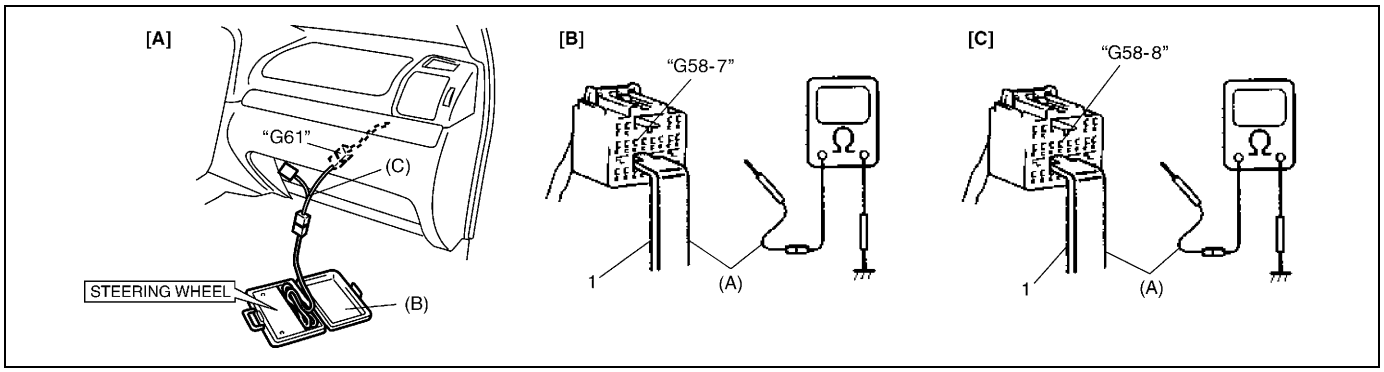
Upon completion of inspection and repair work, perform the following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes referring to "DTC Clearance" in this section, if any.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

DTC B1018 : PASSENGER AIR BAG INITIATOR CIRCUIT SHORT TO GROUND

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect passenger air bag (inflator) module connector behind the glove box. 2) Check proper connection to passenger air bag (inflator) module at terminals in "G61" connector. 3) If OK then connect special tools (B) and (C) to passenger air bag (inflator) module connector disconnected at the Step 1. With ignition switch ON, is DTC B1018 current?	Go to step 2.	Ignition switch OFF. Replace passenger air bag (inflator) module (Refer to "Passenger Air Bag (Inflator) Module" in this section).
2	1) With ignition switch OFF, disconnect special tools (B) and (C) from "G61" connector and SDM connector "G58" from SDM respectively. 2) Release shorting bar in SDM connector inserting release tool (1) included in special tool (A). 3) Measure resistance between "G58-7" terminal and body ground. Is resistance infinity?	Go to step 3.	Repair short from "YEL/RED" wire circuit to ground.
3	1) Measure resistance between "G58-8" terminal and body ground. Is resistance infinity?	Substitute a known-good SDM and recheck.	Repair short from "YEL" wire circuit to ground.

[A] Fig. for STEP 1, 2 and 3/[B] Fig. for STEP 2/[C] Fig. for STEP 3



Special tool
(A) : 09932-76010
(B) : 09932-75010
(C) : 09932-78340

NOTE:

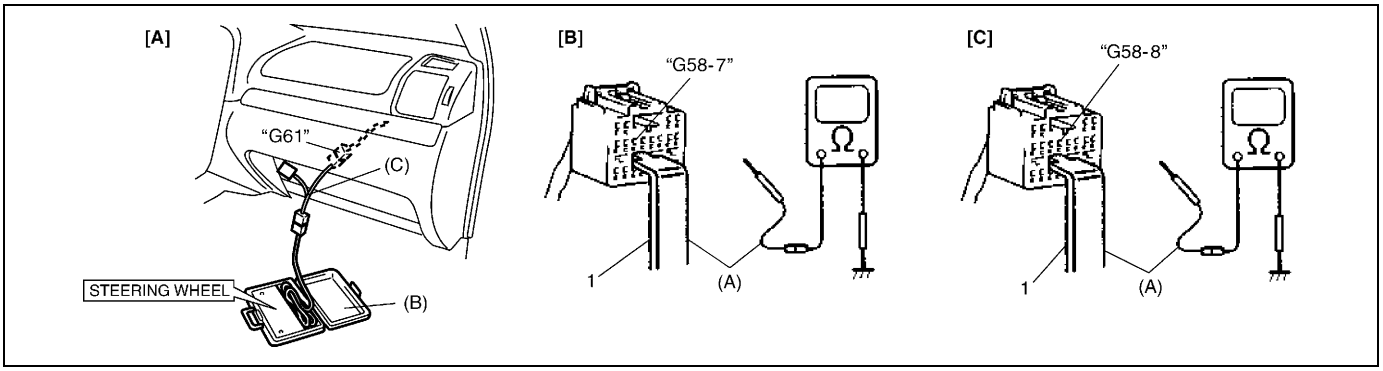
Upon completion of inspection and repair work, perform the following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes referring to "DTC Clearance" in this section, if any.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

DTC B1019 : PASSENGER AIR BAG INITIATOR CIRCUIT SHORT TO POWER CIRCUIT

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect passenger air bag (inflator) module connector behind the glove box. 2) Check proper connection to passenger air bag (inflator) module at terminals in "G61" connector. 3) If OK then connect special tools (B) and (C) to passenger air bag (inflator) module connector disconnected at the Step 1. With ignition switch ON, is DTC B1019 current?	Go to step 2.	Ignition switch OFF. Replace passenger air bag (inflator) module (Refer to "Passenger Air Bag (Inflator) Module" in this section).
2	1) With ignition switch OFF, disconnect special tools (B) and (C) from "G61" connector and SDM connector, "G58" from SDM respectively. 2) Release shorting bar in SDM connector inserting release tool (1) included in special tool (A). 3) Measure voltage from "G58-7" terminal to body ground. With ignition switch ON, is voltage 1 V or less?	Go to step 3.	Repair short from "YEL/RED" wire circuit to power circuit.
3	1) Measure voltage from "G58-8" terminal to body ground. With ignition switch ON, is voltage 1 V or less?	Substitute a known-good SDM and recheck.	Repair short from "YEL" wire circuit to power circuit.

[A] Fig. for STEP 1, 2 and 3/[B] Fig. for STEP 2/[C] Fig. for STEP 3



Special tool
(A) : 09932-76010
(B) : 09932-75010
(C) : 09932-78340

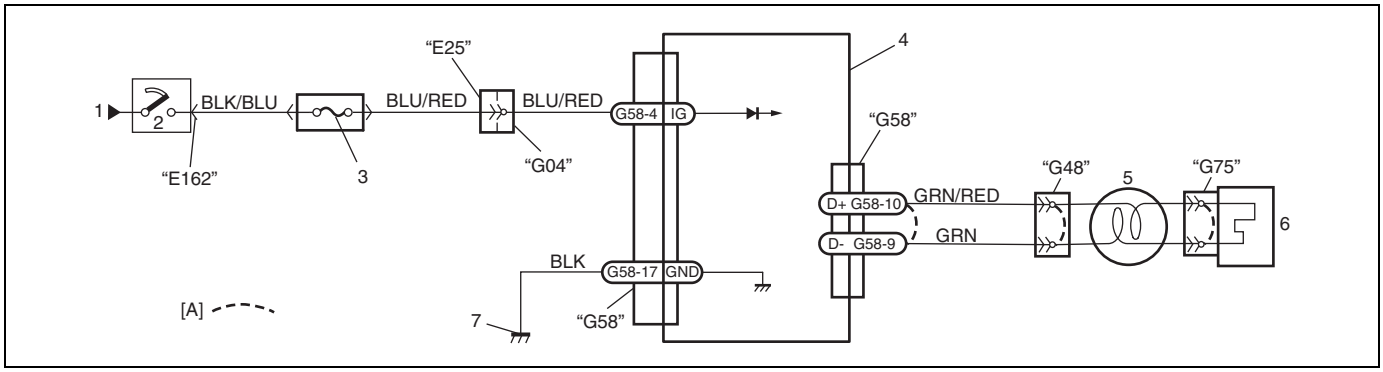
NOTE:

Upon completion of inspection and repair work, perform the following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes referring to "DTC Clearance" in this section, if any.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

DTC B1021 – Driver Air Bag Initiator Circuit Resistance High
DTC B1022 – Driver Air Bag Initiator Circuit Resistance Low
DTC B1024 – Driver Air Bag Initiator Circuit Short to Ground
DTC B1025 – Driver Air Bag Initiator Circuit Short to Power Circuit

WIRING DIAGRAM



[A] : Shorting bar	3. "AIR BAG" fuse	6. Driver air bag (inflator) module
1. From main fuse	4. SDM	7. Ground for air bag system
2. Ignition switch	5. Contact coil assembly	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC WILL SET WHEN

DTC B1021 :

The combined resistance of the driver air bag (inflator) module, contact coil assembly, harness wiring and connector terminal contact is above a specified value for specified time.

DTC B1022 :

The combined resistance of the driver air bag (inflator) module, contact coil assembly, harness wiring and connector terminal contact is below a specified value for specified time.

DTC B1024 :

The voltage measured at driver air bag initiator circuit is below a specified value for specified time.

DTC B1025 :

The voltage measured at driver air bag initiator circuit is above a specified value for specified time.

TABLE TEST DESCRIPTION

DTC B1021, B1022, B1024 and B1025 :

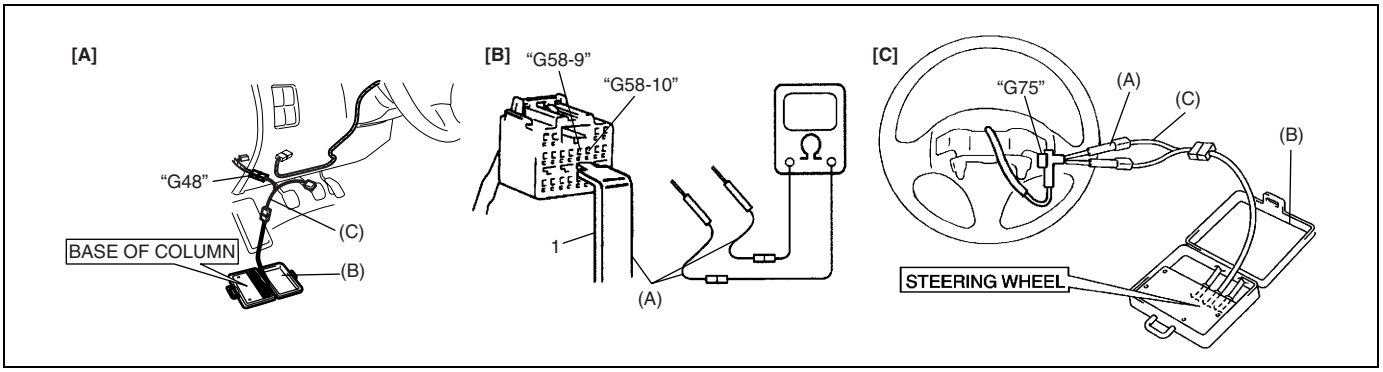
STEP 1 : Check whether malfunction is in contact coil and driver air bag (inflator) module or the others.
STEP 2 : Check driver air bag (inflator) module initiator circuit.
STEP 3 : Check whether malfunction is in contact coil or driver air bag (inflator) module.

DIAGNOSTIC FLOW TABLE

DTC B1021 : DRIVER AIR BAG INITIATOR CIRCUIT RESISTANCE HIGH

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect contact coil connector located near the base of the steering column. 2) Check proper connection to contact coil at terminals in “G48” connector. 3) If OK then connect special tools (B) and (C) to contact coil connector disconnected at Step 1. With ignition switch ON, is DTC B1021 current?	Go to step 2.	Go to step 3.
2	1) With ignition switch OFF, disconnect SDM connector. 2) Check proper connection to SDM at terminals “G58-9” and “G58-10”. 3) If OK, release shorting bar in SDM connector inserting release tool (1) included in special tool (A). 4) Measure resistance between “G58-9” and “G58-10” terminals with connected special tools (B) and (C). Is resistance 4.5 Ω or less?	Substitute a known-good SDM and recheck.	Repair high resistance or open in “GRN” or “GRN/RED” wire circuit.
3	1) With ignition switch OFF, disconnect special tool (B) and (C) from “G48” connector then reconnect contact coil connector located near the base of the steering column. 2) Remove driver air bag (inflator) module from steering wheel (Refer to “Driver Air Bag (Inflator) Module” in Section 3C1). 3) Check proper connection to driver air bag (inflator) module at terminals in “G75” connector. 4) If OK then connect special tools (B) and (C) to “G75” connector. With ignition switch ON, is DTC B1021 current?	Ignition switch OFF. Replace contact coil assembly (Refer to “Contact Coil and Combination Switch Assembly” in Section 3C1).	Ignition switch OFF. Replace driver air bag (inflator) module (Refer to “Driver Air Bag (Inflator) Module” in Section 3C1).

[A] Fig. for STEP 1, 2 and 3/[B] Fig. for STEP 2/[C] Fig. for STEP 3



Special tool
(A) : 09932-76010
(B) : 09932-75010
(C) : 09932-78310

NOTE:

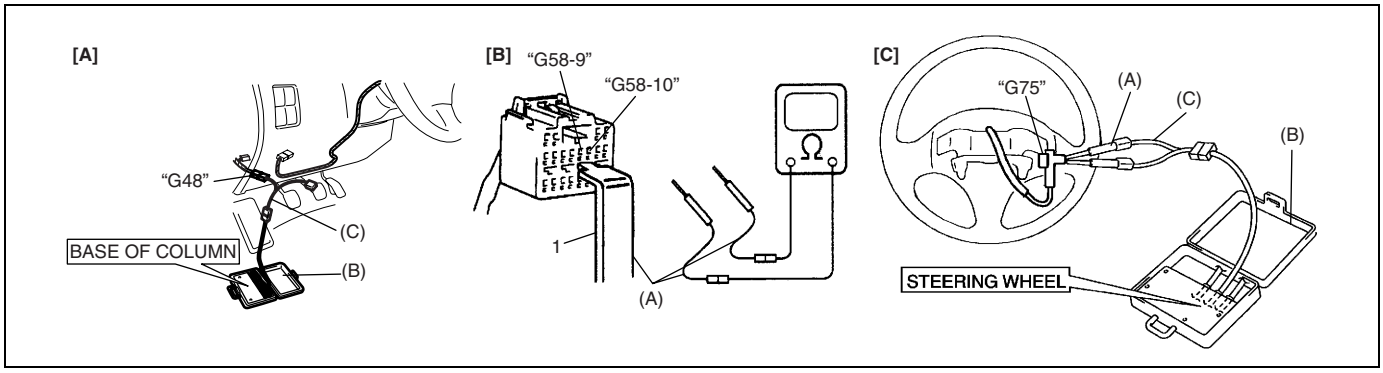
Upon completion of inspection and repair work, perform the following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes referring to "DTC Clearance" in this section, if any.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

DTC B1022 : DRIVER AIR BAG INITIATOR CIRCUIT RESISTANCE LOW

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect contact coil connector located near the base of the steering column. 2) Check proper connection to contact coil at terminals in "G48" connector. 3) If OK then connect special tools (B) and (C) to contact coil connector disconnected at Step 1. With ignition switch ON, is DTC B1022 current?	Go to step 2.	Go to step 3.
2	1) With ignition switch OFF, disconnect SDM connector. 2) Check proper connection to SDM at terminals "G58-9" and "G58-10". 3) If OK, release shorting bar in SDM connector inserting release tool (1) included in special tool (A). 4) Measure resistance between "G58-9" and "G58-10" terminals with connected special tool (B). Is resistance 1.7 Ω or more?	Substitute a known-good SDM and recheck.	Repair short from "GRN" wire circuit to "GRN/RED" wire circuit or from "GRN" or "GRN/RED" wire circuit to other wire circuit.
3	1) With ignition switch OFF, disconnect special tools (B) and (C) from "G48" connector then reconnect contact coil connector located near the base of the steering column. 2) Remove driver air bag (inflator) module from steering column (Refer to "Driver Air Bag (Inflator) Module" in Section 3C1). 3) Check proper connection to driver air bag (inflator) module at terminals in "G75" connector. 4) If OK then connect special tools (B) and (C) to "G75" connector. With ignition switch ON, is DTC B1022 current?	Ignition switch OFF. Replace contact coil assembly (Refer to "Contact Coil and Combination Switch Assembly" in Section 3C1).	Ignition switch OFF. Replace driver air bag (inflator) module (Refer to "Driver Air Bag (Inflator) Module" in Section 3C1).

[A] Fig. for STEP 1, 2 and 3/[B] Fig. for STEP 2/[C] Fig. for STEP 3



Special tool
(A) : 09932-76010
(B) : 09932-75010
(C) : 09932-78310

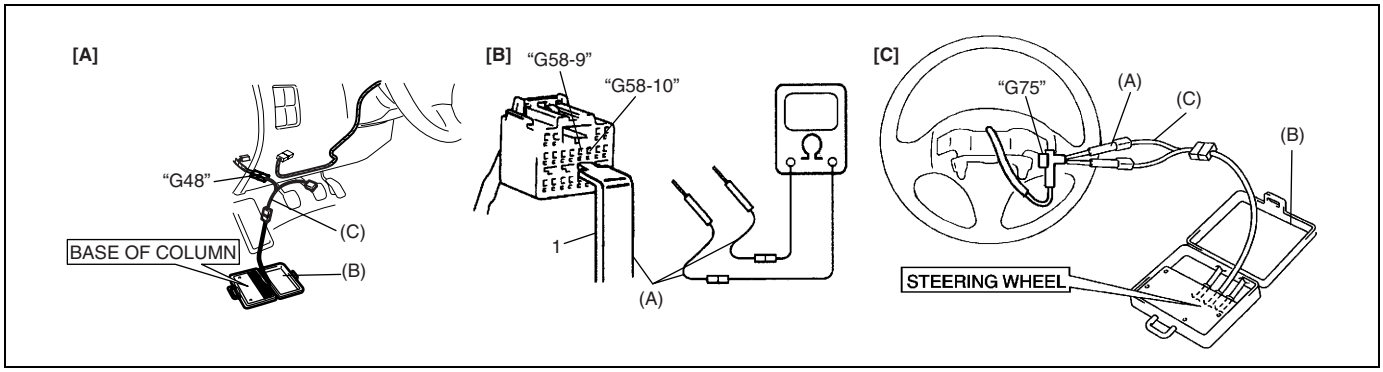
NOTE:

Upon completion of inspection and repair work, perform the following items.
- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes referring to "DTC Clearance" in this section, if any.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

DTC B1024 : DRIVER AIR BAG INITIATOR CIRCUIT SHORT TO GROUND

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect contact coil connector located near the base of the steering column. 2) Check proper connection to contact coil at terminals in "G48" connector. 3) If OK then connect special tools (B) and (C) to contact coil connector disconnected at Step 1. With ignition switch ON, is DTC B1024 current?	Go to step 2.	Go to step 3.
2	1) With ignition switch OFF, disconnect special tools (B) and (C) from "G48" connector and SDM connector "G58" from SDM respectively. 2) Release Shorting bar in SDM connector inserting release tool (1) included in special tool (A). 3) Measure resistance between "G58-9" terminal and body ground and between "G58-10" terminal and body ground. Are resistances infinity?	Substitute a known-good SDM and recheck.	Repair short from "GRN" or "GRN/RED" wire circuit to ground.
3	1) With ignition switch OFF, disconnect special tools (B) and (C) from "G48" connector then reconnect contact coil connector located near the base of the steering column. 2) Remove driver air bag (inflator) module from steering column referring to "Driver Air Bag (Inflator) Module Removal and Installation". 3) Check proper connection to driver air bag (inflator) module at terminals in "G75" connector. 4) If OK, then connect special tools (B) and (C) to "G75" connector. With ignition switch ON, is DTC B1024 current?	Ignition switch OFF. Replace contact coil assembly (Refer to "Contact Coil and Combination Switch Assembly" in Section 3C1).	Ignition switch OFF. Replace driver air bag (inflator) module (Refer to "Driver Air Bag (Inflator) Module" in Section 3C1).

[A] Fig. for STEP 1, 2 and 3/[B] Fig. for STEP 2/[C] Fig. for STEP 3



Special tool
(A) : 09932-76010
(B) : 09932-75010
(C) : 00932-78340

NOTE:

Upon completion of inspection and repair work, perform the following items.

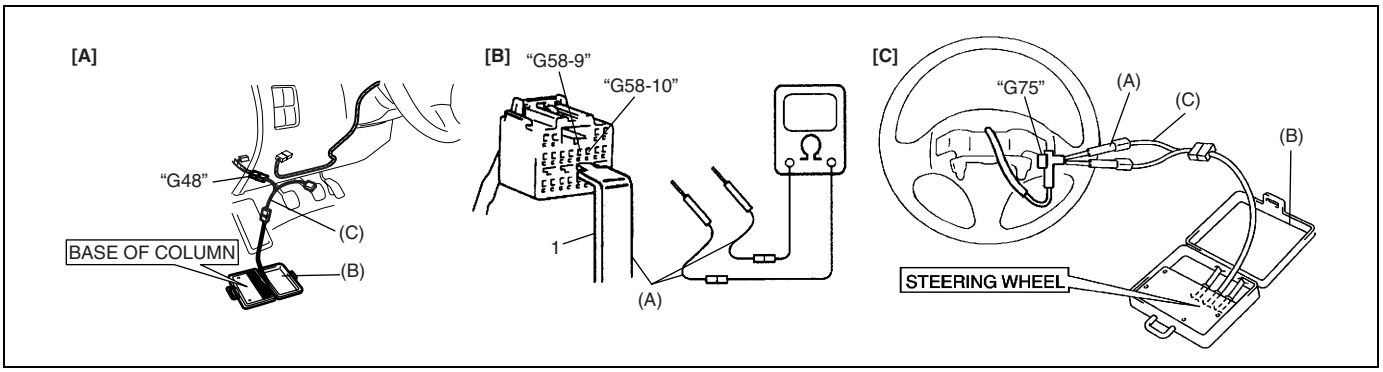
- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes referring to "DTC Clearance" in this section, if any.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

DTC B1025 : DRIVER AIR BAG INITIATOR CIRCUIT SHORT TO POWER CIRCUIT

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect contact coil connector located near the base of the steering column. 2) Check proper connection to contact coil at terminals in "G48" connector. 3) If OK then connect special tools (B) and (C) to contact coil connector disconnected at Step 1. With ignition switch ON, is DTC B1025 current?	Go to step 2.	Go to step 3.
2	1) With ignition switch OFF, disconnect special tools (B) and (C) from "G48" connector and SDM connector "G58" from SDM respectively. 2) Release Shorting bar in SDM connector inserting release tool (1) included in special tool (A). 3) Measure voltage from "G58" terminal to body ground and between "G58" terminal to body ground. With ignition switch ON, are they 1 V or less?	Substitute a known-good SDM and recheck.	Repair short from "GRN" or "GRN/RED" wire circuit to power circuit.

Step	Action	Yes	No
3	1) With ignition switch OFF, disconnect special tools (B) and (C) from "G48" connector then reconnect contact coil connector located near the base of the steering column. 2) Remove driver air bag (inflator) module from steering column referring to "Driver Air Bag (Inflator) Module Removal and Installation". 3) Check proper connection to driver air bag (inflator) module at terminal in "G75" connector. 4) If OK, then connect special tools (B) and (C) to "G75" connector. With ignition switch ON, is DTC B1025 current?	Ignition switch OFF. Replace contact coil assembly (Refer to "Contact Coil and Combination Switch Assembly" in Section 3C1).	Ignition switch OFF. Replace driver air bag (inflator) module (Refer to "Driver Air Bag (Inflator) Module" in Section 3C1).

[A] Fig. for STEP 1, 2 and 3/[B] Fig. for STEP 2/[C] Fig. for STEP 3



Special tool
(A) : 09932-76010
(B) : 09932-75010
(C) : 09932-78340

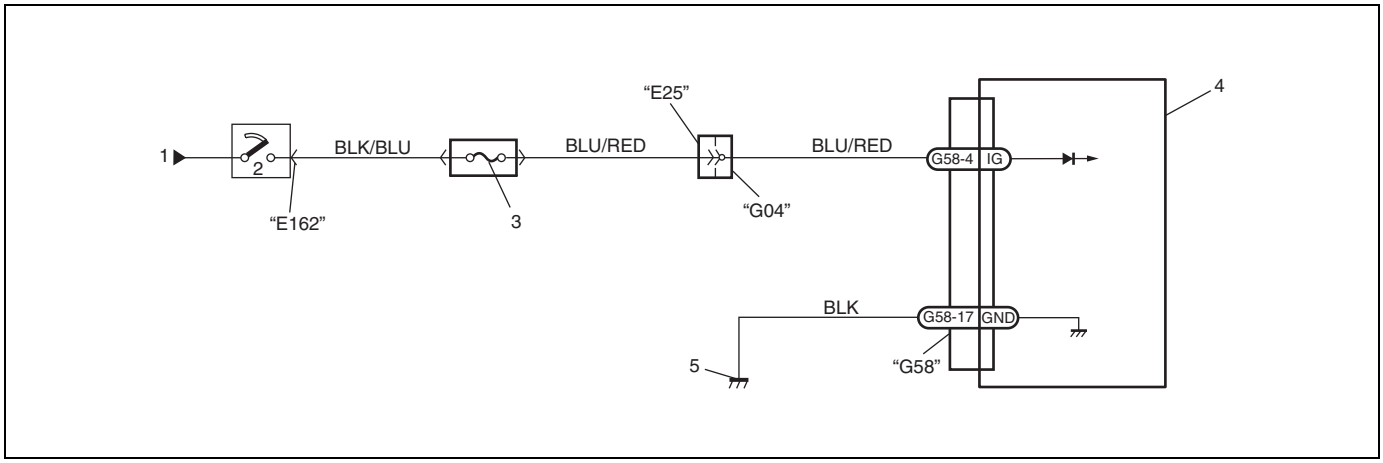
NOTE:

Upon completion of inspection and repair work, perform the following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes referring to "DTC Clearance" in this section, if any.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

DTC B1031 – Power Source Voltage High
DTC B1032 – Power Source Voltage Low

WIRING DIAGRAM



1. From main fuse	3. "AIR BAG" fuse	5. Ground for air bag system
2. Ignition switch	4. SDM	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC WILL SET WHEN

DTC B1031 :

The power source voltage to SDM is above specified value for specified time.

DTC B1032 :

The power source voltage is below an approx. 8 V for specified time.

TABLE TEST DESCRIPTION

DTC B1031 :

STEP 1 : Check if voltage applied to SDM is within normal range.
STEP 2 : Check if DTC B1031 still exists.

DTC B1032 :

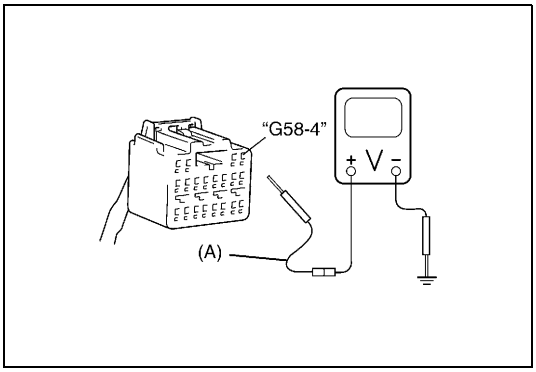
STEP 1 : Check if voltage on battery is within normal range.
STEP 2 : Check if voltage applied to SDM is within normal range.
STEP 3 : Check if voltage applied to "E25" connector is within normal range.
STEP 4 : Check if DTC B1032 still exists.

DIAGNOSTIC FLOW TABLE

DTC B1031 : POWER SOURCE VOLTAGE HIGH

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect SDM connector. 2) Check proper connection to SDM at "G58-4" terminal. 3) If OK then ignition switch ON, and then check voltage from "G58-4" terminal on SDM connector to body ground. Is voltage 14 V or less?	Go to step 2.	Check Charging System and repair as necessary. (Refer to DIAGNOSIS in Section 6H)
2	1) With ignition switch OFF, reconnect SDM connector. With ignition switch ON, is DTC B1031 current?	Substitute a known-good SDM and recheck.	Check Charging System and repair as necessary. (Refer to DIAGNOSIS in Section 6H)

Fig. for STEP 1



Special tool
(A) : 09932-76010

NOTE:

Upon completion of inspection and repair work, perform the following items.

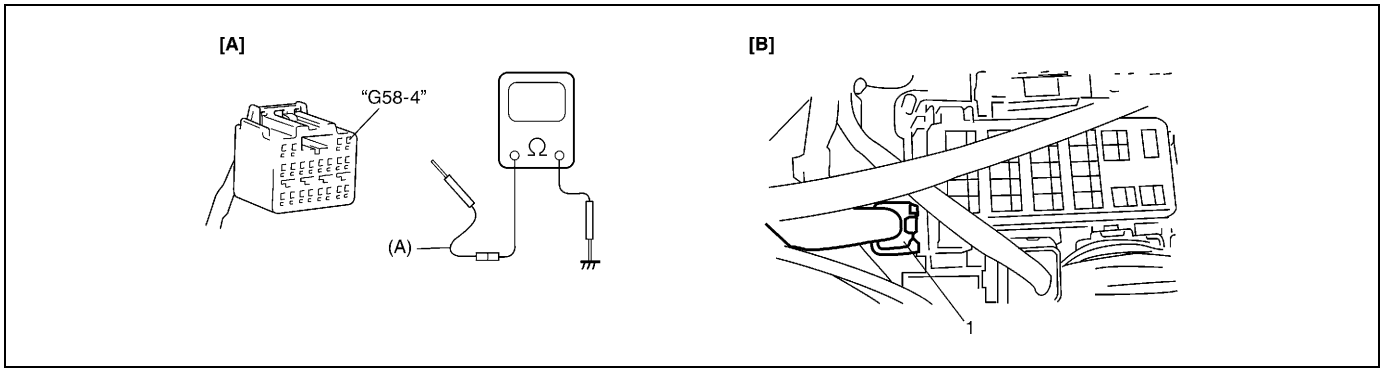
- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes referring to "DTC Clearance" in this section, if any.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

DTC B1032 : POWER SOURCE VOLTAGE LOW

Step	Action	Yes	No
1	1) Measure voltage on battery. Is voltage 11 V or more?	Go to step 2.	Check Charging System and repair as necessary. (Refer to DIAGNOSIS in Section 6H)
2	1) With ignition switch OFF, disconnect SDM connector. 2) Check proper connection to SDM at "G58-4" terminal. 3) If OK then ignition switch ON, and then check voltage from "G58-4" terminal on SDM connector to body ground. Is voltage 8 V or more?	Go to step 4.	Go to step 3.

Step	Action	Yes	No
3	1) With ignition switch OFF, disconnect “E25” connector (1) in main harness. 2) Check proper connection at “E25-1” (“BLU/RED” wire) terminal. 3) If OK, then ignition switch ON, and then check voltage from “E25-1” (“BLU/RED” wire) terminal to body ground. Is voltage 8 V or more?	Go to Step 4.	Check circuit from battery to “E25” connector and charging system.
4	1) With ignition switch OFF, reconnect SDM connector. With ignition switch ON, does DTC B1032 exist?	Substitute a known-good SDM and recheck.	Check charging system and repair as necessary referring to “Generator Symptom Diagnosis”.

[A] Fig. for STEP 2 / [B] Fig. for STEP 3



Special tool
(A) : 09932-76010

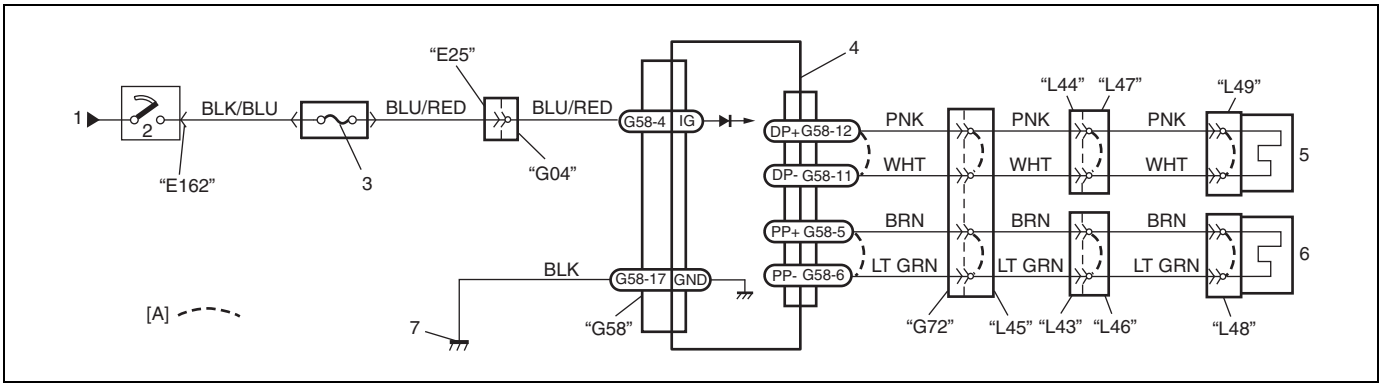
NOTE:

Upon completion of inspection and repair work, perform the following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes referring to “DTC Clearance” in this section, if any.**
- **Repeat “Air Bag Diagnostic System Check” in this section to confirm that the trouble has been corrected.**

DTC B1041 – Driver Pretensioner Initiator Circuit Resistance High
DTC B1042 – Driver Pretensioner Initiator Circuit Resistance Low
DTC B1043 – Driver Pretensioner Initiator Circuit Short to Ground
DTC B1044 – Driver Pretensioner Initiator Circuit Short to Power Circuit
DTC B1045 – Passenger Pretensioner Initiator Circuit Resistance High
DTC B1046 – Passenger Pretensioner Initiator Circuit Resistance Low
DTC B1047 – Passenger Pretensioner Initiator Circuit Short to Ground
DTC B1048 – Passenger Pretensioner Initiator Circuit Short to Power Circuit

WIRING DIAGRAM



[A] : Shorting bar	3. "AIR BAG" fuse	6. Passenger seat belt pretensioner
1. From main fuse	4. SDM	7. Ground for air bag system
2. Ignition switch	5. Driver seat belt pretensioner	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC WILL SET WHEN

DTC B1041 and B1045 :

The resistance of driver or passenger seat belt pretensioner initiator circuit is above a specified value for specified time.

DTC B1042 and B1046 :

The resistance of driver or passenger seat belt pretensioner initiator circuit is below a specified value for specified time.

DTC B1043 and B1047 :

The voltage measured at driver or passenger seat belt pretensioner initiator circuit is below a specified value for specified time.

DTC B1044 and B1048 :

The voltage measured at driver or passenger seat belt pretensioner initiator circuit is above a specified value for specified time.

TABLE TEST DESCRIPTION

DTC B1041, B1042, B1043, B1044, B1045, B1046, B1047 and B1048 :

STEP 1 : Check whether malfunction is in seat belt pretensioner.
STEP 2 : Check seat belt pretensioner initiator circuit. (between “L47” and “L49” or “L46” and “L48”)
STEP 3 : Check seat belt pretensioner initiator circuit. (between “L44” and “L45” or “L43” and “L45”)
STEP 4 : Check seat belt pretensioner initiator circuit. (between “G72” and “G58”)

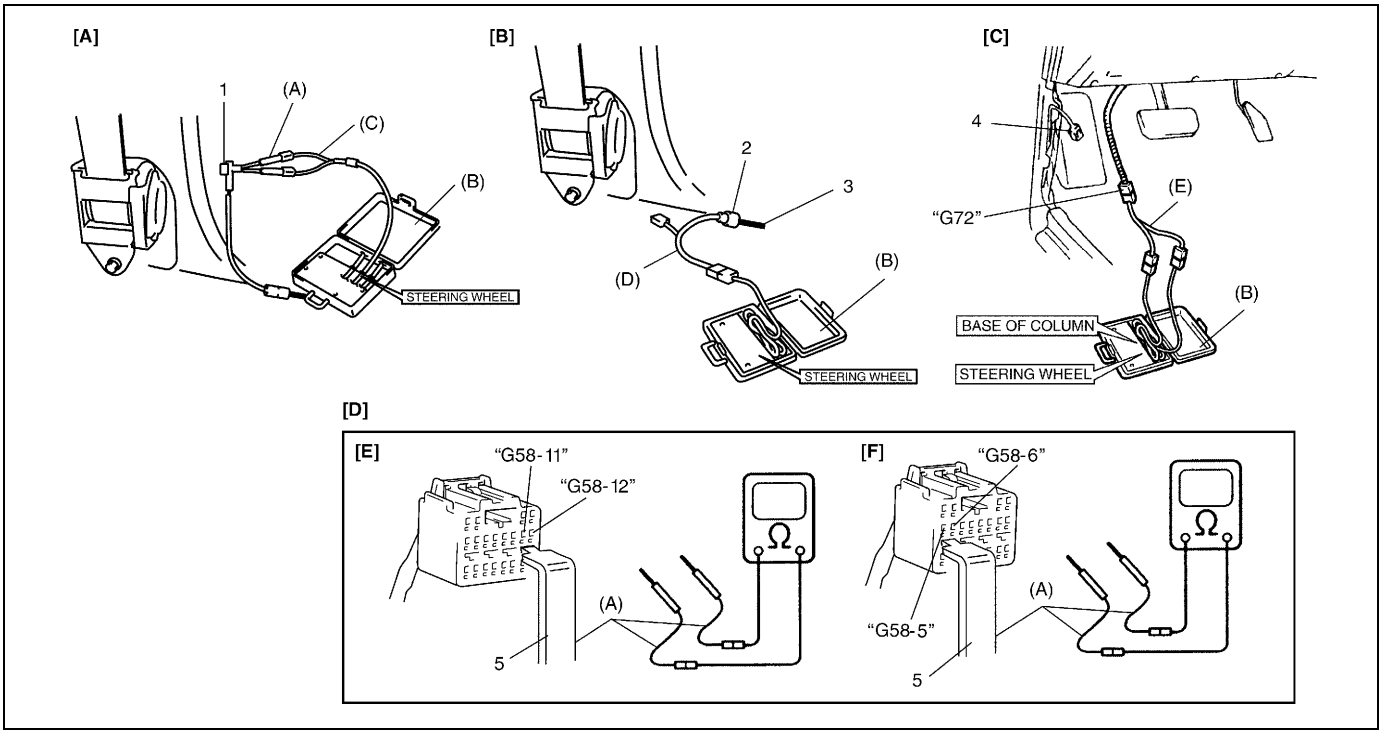
DIAGNOSTIC FLOW TABLE

DTC B1041 : DRIVER PRETENSIONER INITIATOR CIRCUIT RESISTANCE HIGH
DTC B1045 : PASSENGER PRETENSIONER INITIATOR CIRCUIT RESISTANCE HIGH

Step	Action	Yes	No
1	1) With ignition switch OFF, remove center pillar lower trim of applicable side then disconnect seat belt pretensioner connector “L49” or “L48” (1). 2) Check proper connection to applicable seat belt pretensioner at terminals in “L49” or “L48” connector. 3) If OK, then connect special tools (A), (B) and (C) to seat belt pretensioner connector disconnected at Step 1. With ignition switch ON, is DTC B1041 or B1045 still current?	Go to step 2.	Ignition switch OFF. Replace seat belt pretensioner (Refer “Front Seat Belt” to Section 10A).
2	1) With ignition switch OFF, disconnect special tools from “L49” or “L48” connector. 2) Disconnect “L44” or “L43” connector (2) from air bag harness on floor harness (3). 3) Check proper connection to applicable seat belt pretensioner at terminal in “L44” or “L43” connector. 4) If OK, then connect special tools (B) and (D) to seat belt pretensioner connector disconnected at Step 2. With ignition switch ON, is DTC B1041 or B1045 still current?	Go to step 3.	DTC B1041 : Repair high resistance or open in “PNK” or “WHT” wire circuit. (Between “L47” and “L49” connector) DTC B1045 : Repair high resistance or open in “BRN” or “LT GRN” wire circuit. (Between “L46” and “L48” connector)
3	1) With ignition switch OFF, disconnect special tools from “L44” or “L43” connector. 2) Remove left side front pillar trim then disconnect “G75” connector from air bag wire harness in floor harness (4). 3) Check proper connection to applicable seat belt pretensioner at terminal in “G72” connector. 4) If OK, then connect special tools (B) and (E) to “G72” connector. With ignition switch ON, is DTC B1041 or B1045 still current?	Go to step 4.	DTC B1041 : Repair high resistance or open in “PNK” or “WHT” wire circuit. (Between “L45” and “L44” connector) DTC B1045 : Repair high resistance or open in “BRN” or “LT GRN” wire circuit. (Between “L45” and “L43” connector)

Step	Action	Yes	No
4	1) With ignition switch OFF, disconnect SDM connector. 2) Check proper connection to SDM at terminals in "G58-11" and "G58-12" (for DTC B1041 [E]) or "G58-6" and "G58-5" (for DTC B1045 [F]). 3) If OK, release shorting bar in SDM connector inserting release tool (5) included in special tool (A). 4) Measure resistance between "G58-11" and "G58-12" terminals (for DTC B1041 [E]) or "G58-6" and "G58-5" terminals (for DTC B1045 [F]) with connected special tools (B) and (E). Is resistance 4.5 Ω or less?	Substitute a known-good SDM and recheck.	DTC B1041 : Repair high resistance or open in "PNK" or "WHT" wire circuit. (Between "G72" and "G58" connector) DTC B1045 : Repair high resistance or open in "BRN" or "LT GRN" wire circuit. (Between "G72" and "G58" connector)

[A] Fig. for STEP 1/[B] Fig. for STEP 2/[C] Fig. for STEP 3 and 4/[D] Fig. for STEP 4/[E] Fig for DTC B1041/[F] Fig. for DTC B1045



Special tool
(A) : 09932-76010
(B) : 09932-75010
(C) : 09932-78310
(D) : 09932-78340
(E) : 09932-77320

NOTE:

Upon completion of inspection and repair work, perform the following items.

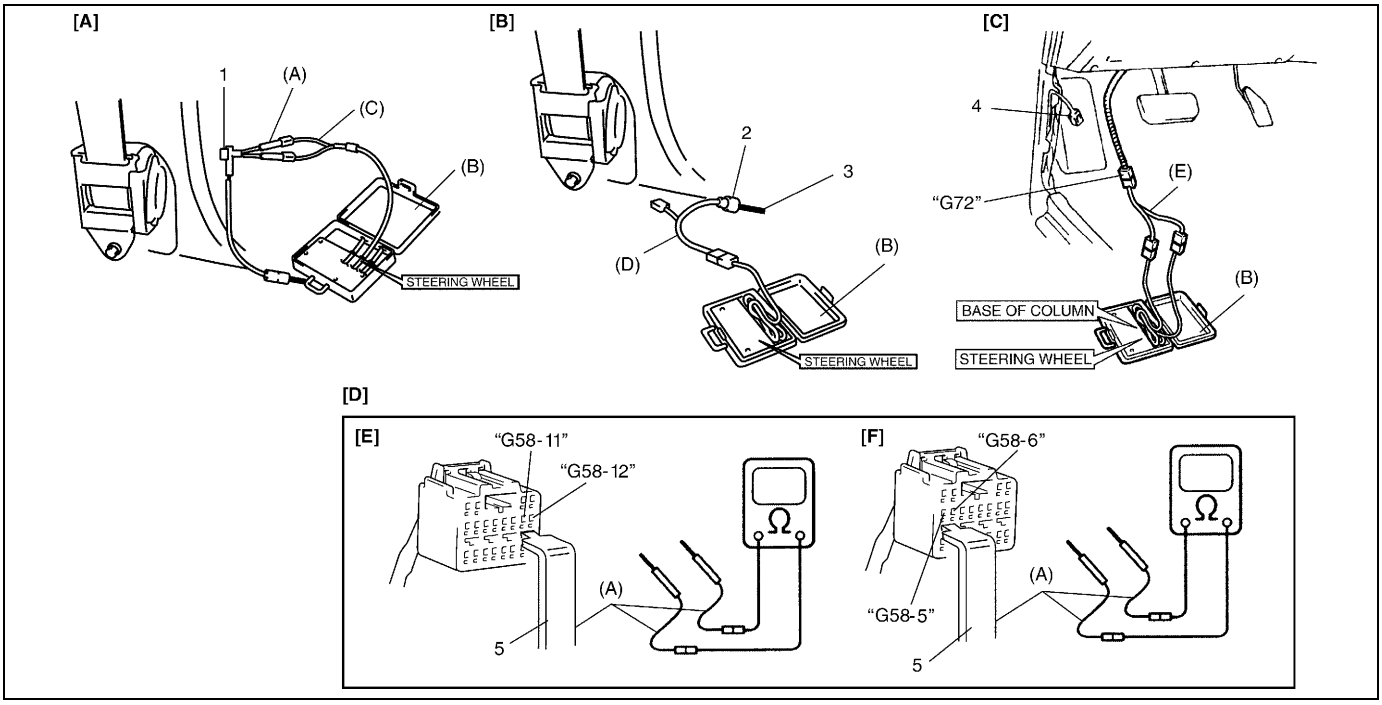
- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes referring to "DTC Clearance" in this section, if any.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

DTC B1042 : DRIVER PRETENSIONER INITIATOR CIRCUIT RESISTANCE LOW
DTC B1046 : PASSENGER PRETENSIONER INITIATOR CIRCUIT RESISTANCE LOW

Step	Action	Yes	No
1	1) With ignition switch OFF, remove center pillar lower trim of applicable side then disconnect seat belt pretensioner connector “L49” or “L48” (1). 2) Check proper connection to applicable seat belt pretensioner at terminals in “L49” or “L48” connector. 3) If OK, then connect special tools (A), (B) and (C) to seat belt pretensioner connector disconnected at Step 1. With ignition switch ON, is DTC B1042 or B1046 still current?	Go to step 2.	Ignition switch OFF. Replace seat belt pretensioner (Refer to “Front Seat Belt” in Section 10A).
2	1) With ignition switch OFF, disconnect special tools from “L49” or “L48” connector. 2) Disconnect “L44” or “L43” connector (2) from air bag harness on floor harness (3). 3) Check proper connection to applicable seat belt pretensioner at terminal in “L44” or “L43” connector. 4) If OK, then connect special tools (B) and (D) to seat belt pretensioner connector disconnected at Step 2. With ignition switch ON, is DTC B1042 or B1046 still current?	Go to step 3.	DTC B1042 : Repair short from “PNK” wire circuit to “WHT” wire circuit or from “PNK” or “WHT” wire circuit to other wire circuit. (Between “L47” and “L49” connector) DTC B1046 : Repair short from “BRN” wire circuit to “LT GRN” wire circuit or from “BRN” or “LT GRN” wire circuit to other wire circuit. (Between “L46” and “L48” connector)
3	1) With ignition switch OFF, disconnect special tools from “L44” or “L43” connector. 2) Remove left side front pillar trim then disconnect “G72” connector from air bag wire harness in floor harness (4). 3) Check proper connection to applicable seat belt pretensioner at terminal in “G72” connector. 4) If OK, then connect special tools (B) and (E) to “G72” connector. With ignition switch ON, is DTC B1042 or B1046 still current?	Go to step 4.	DTC B1042 : Repair short from “PNK” wire circuit to “WHT” wire circuit or from “PNK” or “WHT” wire circuit to other wire circuit. (Between “L45” and “L44” connector) DTC B1046 : Repair short from “BRN” wire circuit to “LT GRN” wire circuit or from “BRN” or “LT GRN” wire circuit to other wire circuit. (Between “L45” and “L44” connector)

Step	Action	Yes	No
4	1) With ignition switch OFF, disconnect SDM connector. 2) Check proper connection to SDM at terminals in "G58-11" and "G58-12" (for DTC B1041 [E]) or "G58-6" and "G58-5" (for DTC B1046 [F]). 3) If OK, release shorting bar in SDM connector inserting release tool (5) included in special tool (A). 4) If OK, then measure resistance between "G58-11" and "G58-12" terminals (for DTC B1042 [E]) or "G58-6" and "G58-5" terminals (for DTC B1046 [F]) with connected special tools (B) and (E). Is resistance 1.4 Ω or less?	Substitute a known-good SDM and recheck.	DTC B1042 : Repair short from "PNK" wire circuit to "WHT" wire circuit or from "PNK" or "WHT" wire circuit to other wire circuit. (Between "G72" and "G58" connector) DTC B1046 : Repair short from "BRM" wire circuit to "LT GRN" wire circuit or from "BRM" or "LT GRN" wire circuit to other wire circuit. (Between "G72" and "G58" connector)

[A] Fig. for STEP1/[B] Fig. for STEP2/[C] Fig. for STEP 3 and 4/[D] Fig. for STEP 4/[E] Fig. for DTC B1042/[F] Fig. for DTC B1046



Special tool
(A) : 09932-76010
(B) : 09932-75010
(C) : 09932-78310
(D) : 09932-78340
(E) : 09932-77320

NOTE:

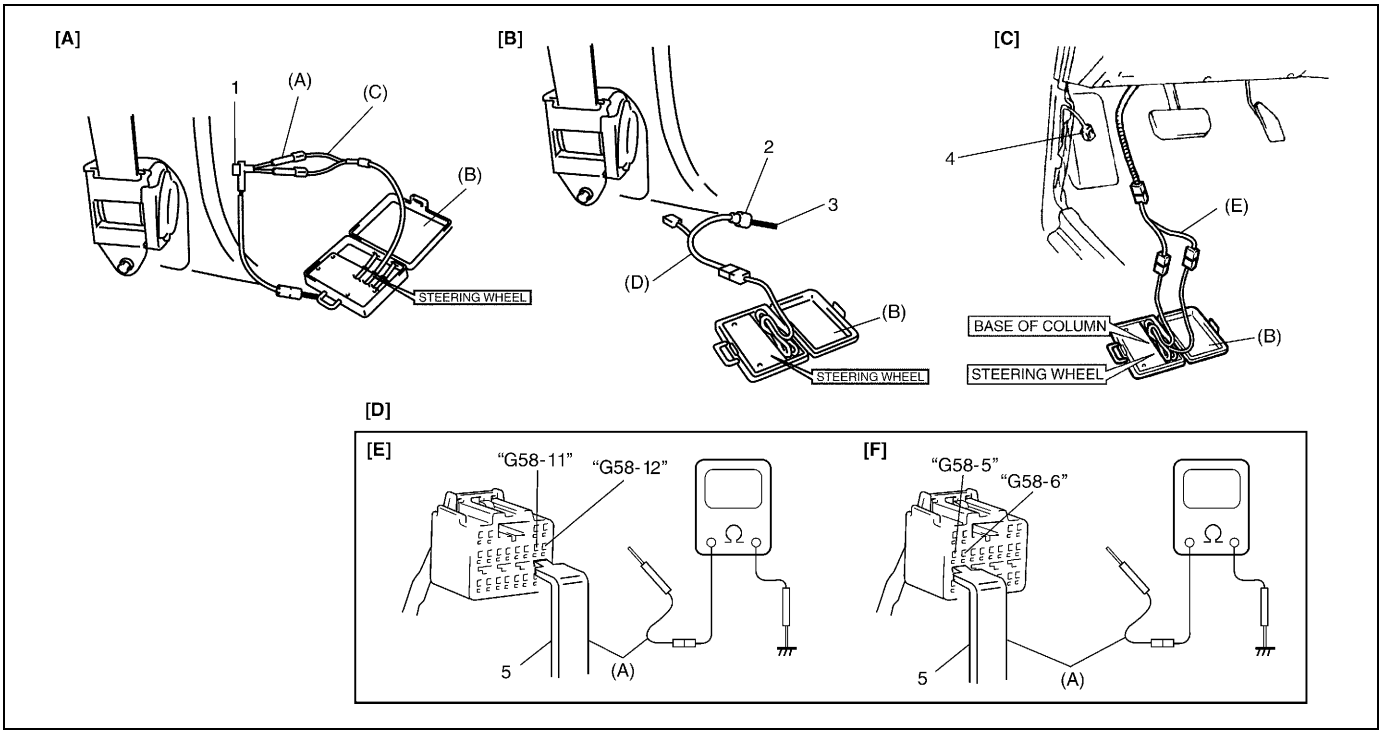
Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes referring to "DTC Clearance" in this section, if any.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

DTC B1043 : DRIVER PRETENSIONER INITIATOR CIRCUIT SHORT TO GROUND
DTC B1047 : PASSENGER PRETENSIONER INITIATOR CIRCUIT SHORT TO GROUND

Step	Action	Yes	No
1	1) With ignition switch OFF, remove center pillar lower trim of applicable side then disconnect seat belt pretensioner connector "L49" or "L48" (1). 2) Check proper connection to applicable seat belt pretensioner at terminals in "L49" or "L48" connector. 3) If OK, then connect special tools (A), (B) and (C) to seat belt pretensioner connector disconnected at Step 1. With ignition switch ON, is DTC B1043 or B1047 still current?	Go to Step 2.	Ignition switch OFF. Replace seat belt pretensioner (Refer to "Front Seat Belt" in Section 10A).
2	1) With ignition switch OFF, disconnect special tools from "L49" or "L48" connector. 2) Disconnect "L44" or "L43" connector (2) from air bag harness in floor harness (3). 3) Check proper connection to applicable seat belt pretensioner at terminal in "L44" or "L43" connector. 4) If OK, then connect special tools (B) and (D) to seat belt pretensioner connector disconnected at Step 2. With ignition switch ON, is DTC B1043 or B1047 still current?	Go to step 3.	DTC B1043 : Repair short from "PNK" or "WHT" wire circuit to ground. (Between "L47" and "L49" connector) DTC B1047 : Repair short from "BRN" or "LT GRN" wire circuit to ground. (Between "L46" and "L48" connector)
3	1) With ignition switch OFF, disconnect special tools from "L44" or "L43" connector. 2) Remove left side front pillar trim then disconnect "G72" connector from air bag wire harness in floor harness (4). 3) Check proper connection to applicable seat belt pretensioner at terminal in "G72" connector. 4) If OK, then connect special tools (B) and (E) to "G72" connector. With ignition switch ON, is DTC B1043 or B1047 still current?	Go to step 4.	DTC B1043 : Repair short from "PNK" or "WHT" wire circuit to ground. (Between "L45" and "L44" connector) DTC B1047 : Repair short from "BRN" or "LT GRN" wire circuit to ground. (Between "L45" and "L43" connector)
4	1) With ignition switch OFF, disconnect special tools and SDM connector. 2) Release shorting bar in SDM connector inserting release tool (5) included in special tool (A). 3) Measure resistance between "G58-11" and body ground, and between "G58-12" and body ground (for DTC B1043 [E]) or between "G58-5" and body ground, and between "G58-6" and body ground (for DTC B1047 [F]). Is resistance infinity?	Substitute a known-good SDM and recheck.	DTC B1043 : Repair short from "PNK" or "WHT" wire circuit to ground. (Between "G72" and "G58" connector) DTC B1047 : Repair short from "BRN" or "LT GRN" wire circuit to ground. (Between "G72" and "G58" connector)

[A] Fig. for STEP1/[B] Fig. for STEP2/[C] Fig. for STEP 3 and 4/[D] Fig. for STEP 4/[E] Fig. for DTC B1043/[F] Fig. for DTC B1047



Special tool
(A) : 09932-76010
(B) : 09932-75010
(C) : 09932-78310
(D) : 09932-78340
(E) : 09932-77320

NOTE:

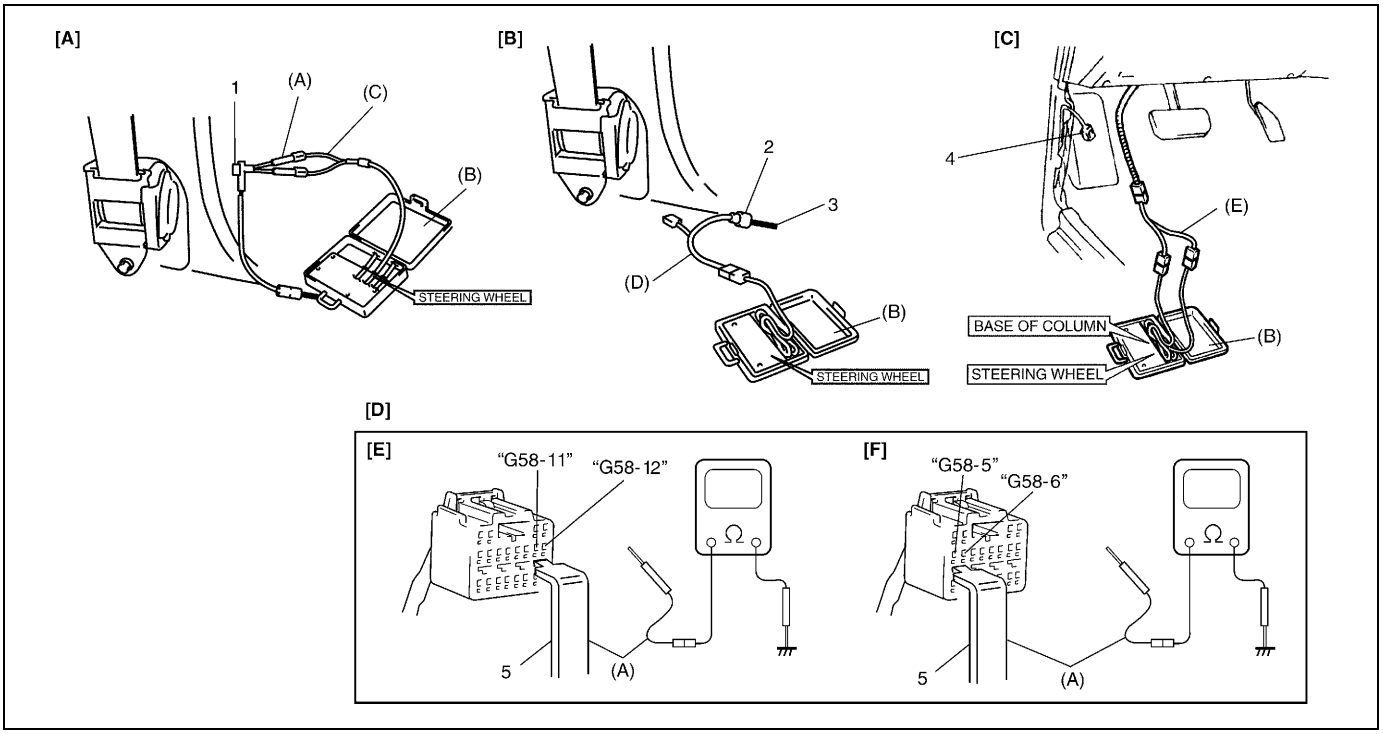
Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes referring to "DTC Clearance" in this section, if any.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

DTC B1044 : DRIVER PRETENSIONER INITIATOR CIRCUIT SHORT TO POWER CIRCUIT
DTC B1048 : PASSENGER PRETENSIONER INITIATOR CIRCUIT SHORT TO POWER CIRCUIT

Step	Action	Yes	No
1	1) With ignition switch OFF, remove center pillar lower trim of applicable side then disconnect seat belt pretensioner connector "L49" and "L48" (1). 2) Check proper connection to applicable seat belt pretensioner at terminals in "L49" or "L48" connector. 3) If OK, then connect special tools (A), (B) and (C) to seat belt pretensioner connector disconnected at Step 1. With ignition switch ON, is DTC B1044 or B1048 still current?	Go to Step 2.	Ignition switch OFF. Replace seat belt pretensioner (Refer to "Front Seat Belt" in Section 10A).
2	1) With ignition switch OFF, disconnect special tools from "L49" or "L48" connector. 2) Disconnect "L44" or "L43" connector (2) from air bag harness on floor harness (3). 3) Check proper connection to applicable seat belt pretensioner at terminal in "L44" or "L43" connector. 4) If OK, then connect special tools (B) and (D) to seat belt pretensioner connector disconnected at Step 2. With ignition switch ON, is DTC B1044 or B1048 still current?	Go to step 3.	DTC B1044 : Repair short from "PNK" or "WHT" wire circuit to power circuit. (Between "L47" and "L49" connector) DTC B1048 : Repair short from "BRN" or "LT GRN" wire circuit to power circuit. (Between "L46" and "L48" connector)
3	1) With ignition switch OFF, disconnect special tools from "L44" or "L43" connector. 2) Remove left side front pillar trim then disconnect "G72" connector from air bag wire harness in floor harness (4). 3) Check proper connection to applicable seat belt pretensioner at terminal in "G72" connector. 4) If OK, then connect special tools (B) and (E) to "G72" connector. With ignition switch ON, is DTC B1044 or B1048 still current?	Go to step 4.	DTC B1044 : Repair short from "PNK" or "WHT" wire circuit to power circuit. (Between "L45" and "L44" connector) DTC B1048 : Repair short from "BRN" or "LT GRN" wire circuit to power circuit. (Between "L45" and "L43" connector)
4	1) With ignition switch OFF, disconnect special tools and SDM connector. 2) Release shorting bar in SDM connector inserting release tool (5) included in special tool (A). 3) Measure voltage between "G58-11" and body ground, and between "G58-12" and body ground (for DTC B1044 [E]) or between "G58-5" and body ground, and between "G58-6" and body ground (for DTC B1048 [F]). With ignition switch ON, is voltage 1 V or less?	Substitute a known-good SDM and recheck.	DTC B1044 : Repair short from "PNK" or "WHT" wire circuit to power circuit. (Between "G72" and "G58" connector) DTC B1048 : Repair short from "BRN" or "LT GRN" wire circuit to power circuit. (Between "G72" and "G58" connector)

[A] Fig. for STEP1/[B] Fig. for STEP2/[C] Fig. for STEP 3 and 4/[D] Fig. for STEP 4/[E] Fig. for DTC B1044/[F] Fig. for DTC B1048



Special tool
(A) : 09932-76010
(B) : 09932-75010
(C) : 09932-78310
(D) : 09932-78340
(E) : 09932-77320

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes referring to "DTC Clearance" in this section, if any.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

DTC B1051 – Frontal Crash Detected (System Activation Command Outputted)

DTC WILL SET WHEN

The SDM detects a frontal crash of sufficient force to warrant activation of the air bag system. (SDM outputs a deployment command.)

TABLE TEST DESCRIPTION

STEP 1 : Check that DTC B1051 has been set although air bag has not been deployed.
STEP 2 : Check that DTC has been set due to failure of SDM.

NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic System Check" in this section.

Step	Action	Yes	No
1	1) Ignition switch OFF. Has air bag deployed?	Replace components and perform inspections as directed in "Repairs and Inspections Required after an Accident" in this section.	Go to step 2.
2	1) Inspect front of vehicle and undercarriage for signs of impact. Are there signs of impact?	Replace components and perform inspections as directed in "Repairs and Inspections Required after an Accident" in this section.	Substitute a known-good SDM and recheck.

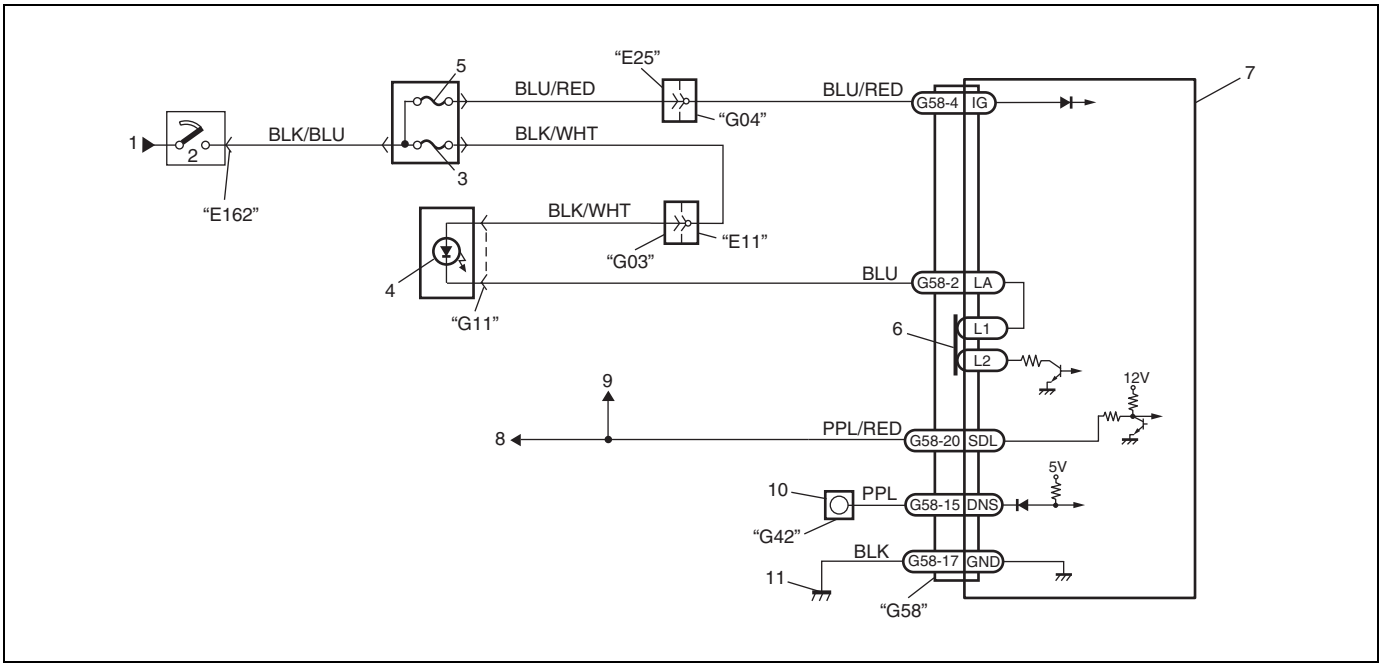
NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Repeat "Air Bag Diagnostic System Check" in this section to confirm that the trouble has been corrected.**

DTC B1061 – "AIR BAG" Warning Lamp Circuit Failure

WIRING DIAGRAM



1. From main fuse	5. "AIR BAG" fuse	9. To ECM (PCM) and ABS control module (if equipped)
2. Ignition switch	6. Connection detection pin	10. "AIR BAG" monitor coupler
3. "METER" fuse	7. SDM	11. Ground for air bag system
4. "AIR BAG" warning lamp in combination meter	8. To DLC	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC WILL SET WHEN :

The voltage at the "AIR BAG" warning lamp circuit terminal "G58-2" does not match the commanded state of the warning lamp driver for specified time.

TABLE TEST DESCRIPTION

STEP 1 : This test rechecks “AIR BAG” warning lamp operation.
STEP 2 : This test rechecks whether an abnormality is in SDM.

DTC B1061 :

Step	Action	Yes	No
1	1) This DTC is set when there is a trouble in “AIR BAG” warning lamp circuit. Failure to properly perform “Air Bag Diagnostic System Check” in this section may also result in misdiagnosis. Therefore, check “AIR BAG” warning lamp circuit again according to “Air Bag Diagnostic System Check” in this section. Is “AIR BAG” warning lamp circuit in good condition?	Go to step 2.	Repair “AIR BAG” warning lamp circuit.
2	1) Clear DTC (Refer to “DTC Clearance” in this section). 2) Check DTC (Refer to “DTC Check” in this section). Is DTC B1061 set?	Substitute a known-good SDM and recheck.	Recheck air bag system. Refer to “Air Bag Diagnostic System Check” in this section.

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Repeat “Air Bag Diagnostic System Check” in this section to confirm that the trouble has been corrected.**

DTC B1071 – Internal SDM Fault

DTC WILL SET WHEN

An internal SDM fault is detected by SDM.

NOTE:

DTC B1071 can never be cleared once it has been set.

1) Ignition switch OFF.
2) Replace SDM.
3) Repeat “Air Bag Diagnostic System Check” in this section.

DTC B1013 – System Specifications Different from SDM Specifications

DTC WILL SET WHEN

Specifications of the air bag system differ from those of SDM.

NOTE:

Before executing items below, be sure to perform “Air Bag Diagnostic System Check” in this section.

1) Ignition switch OFF.
2) Replace SDM.
3) Repeat “Air Bag Diagnostic System Check” in this section.

On-Vehicle Service

Service Precautions

Service and diagnosis

WARNING/CAUTION labels are attached on each part of air bag system components (SDM, air bag (inflator) modules and seat belt pretensioners). Be sure to follow the instructions.

WARNING:

- **If the air bag system and another vehicle system both need repair, Suzuki recommends that the air bag system be repaired first, to help avoid unintended air bag system activation.**
- **Do not modify the steering wheel, dashboard or any other on or around air bag system components. Modifications can adversely affect air bag system performance and lead to injury.**
- **Failure to follow procedures could result in possible air bag system activation, personal injury or unneeded air bag system repairs.**

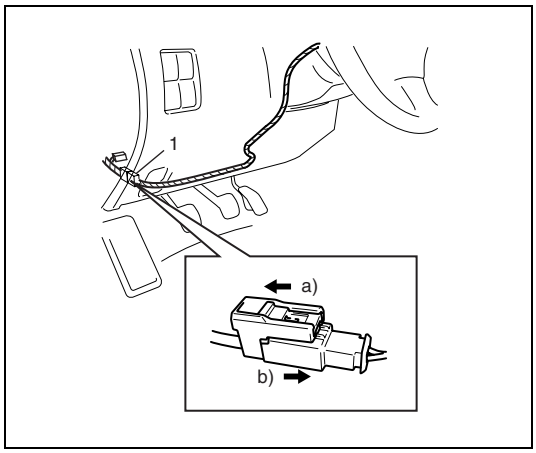
- Many of service procedures require disconnection of "AIR BAG" fuse and air bag (inflator) module(s) (driver and passenger) from initiator circuit to avoid an accidental deployment.
- Do not apply power to the air bag system unless all components are connected or a diagnostic chart requests it, as this will set a diagnostic trouble code (DTC).
- The "Air Bag Diagnostic System Check" must be the starting point of any air bag diagnostics. The "Air Bag Diagnostic System Check" will verify proper "AIR BAG" warning lamp operation and will lead you to the correct table to diagnose any air bag malfunctions. Bypassing these procedures may result in extended diagnostic time, incorrect diagnosis, and incorrect parts replacements.
- Never use air bag component parts from another vehicle.
- If the vehicle will be exposed to temperatures over 93°C (200°F) (for example, during a paint baking process), remove the air bag system components beforehand to avoid component damage or unintended system activation.
- When handling the air bag (inflator) modules (driver and passenger), seat belt pretensioners (driver and passenger) or SDM, be careful not to drop it or apply an impact to it. If an excessive impact was applied (e.g., SDM is dropped, air bag (inflator) module is dropped from a height of 90 cm (3 ft) or more, seat belt pretensioner (retractor assembly) is dropped from a height of 30 cm (1 ft) or more), never attempt disassembly or repair but replace it with a new one.
- When using electric welding, be sure to disconnect air bag (inflator) module connectors (driver and passenger) and seat belt pretensioner connectors (driver and passenger) respectively.
- When applying paint around the air bag system related parts, use care so that the harness or connector will not be exposed to the paint mist.
- Never expose air bag system component parts directly to hot air (drying or baking the vehicle after painting) or flames.

WARNING:

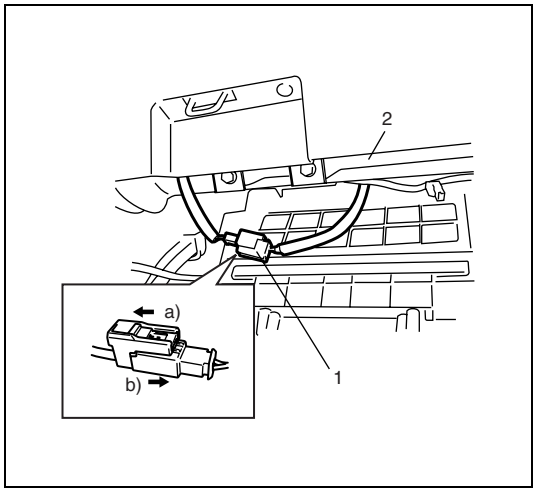
When performing service on or around air bag system components or air bag wiring, disable the air bag system temporarily referring to "Disabling Air Bag System" in this section.
Failure to follow procedures could result in possible air bag system activation, personal injury or unneeded air bag system repairs.

Disabling air bag system

1) Turn steering wheel so that vehicle's wheels (front tires) and pointing straight ahead.
2) Turn ignition switch to “LOCK” position and remove key.
3) Remove “AIR BAG” fuse from “AIR BAG” fuse box.



4) Disconnect Yellow connector (1) of contact coil and combination switch assembly.
   a) Release locking of lock slider.
   b) After unlocked, disconnect to connector.



5) Pull out glove box while pushing its stopper from both right and left sides and disconnect Yellow connector (1) of passenger air bag (inflator) module.
   a) Release locking of lock slider.
   b) After unlocked, disconnect to connector.

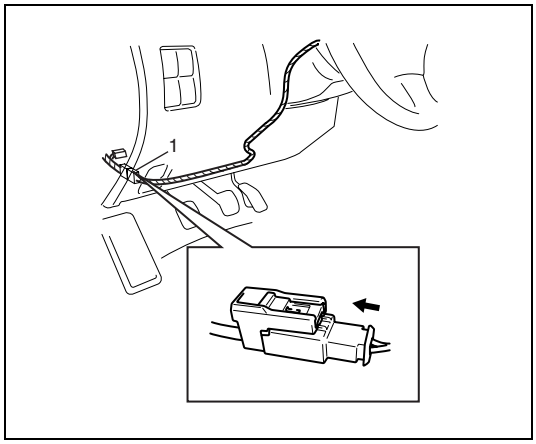
NOTE:

With “AIR BAG” fuse removed and ignition switch ON, “AIR BAG” warning lamp will be ON.
This is normal operation and does not indicate an air bag system malfunction.

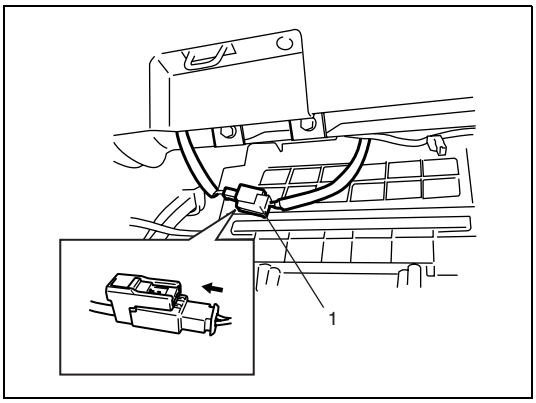
2. Steering support member

Enabling air bag system

1) Turn ignition switch to “LOCK” and remove key.



2) Connect Yellow connector (1) of contact coil and combination switch assembly, by pushing connector till click is heard from it.

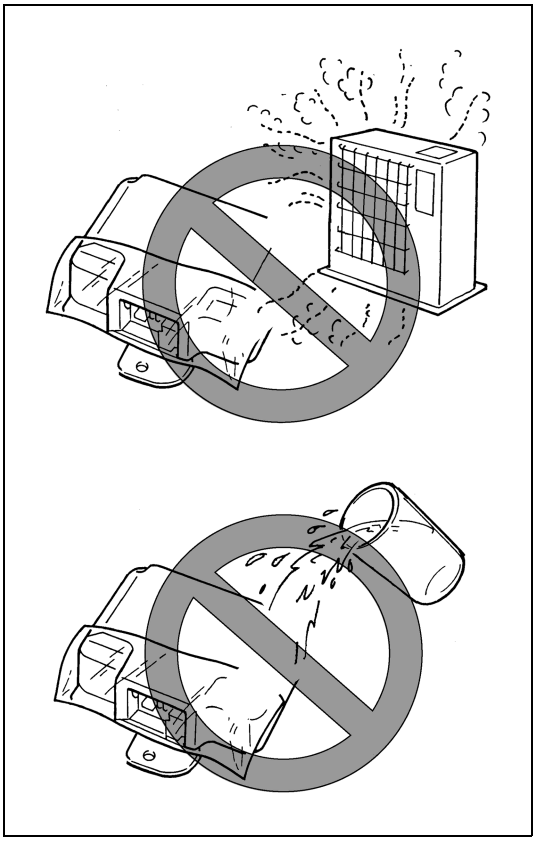


3) Connect Yellow connector (1) of passenger air bag (inflator) module by pushing connector till click is heard from it.

4) Install glove box.
5) Install "AIR BAG" fuse to fuse box.
6) Turn ignition switch to ON and verify that "AIR BAG" warning lamp flashes 6 times and then turns OFF.
   If it does not operate as described, perform "Air Bag Diagnostic System Check" in this section.

Handling and storage

SDM



WARNING:

Never power up air bag system when SDM is not rigidly attached to the vehicle. Otherwise, personal injury may result.

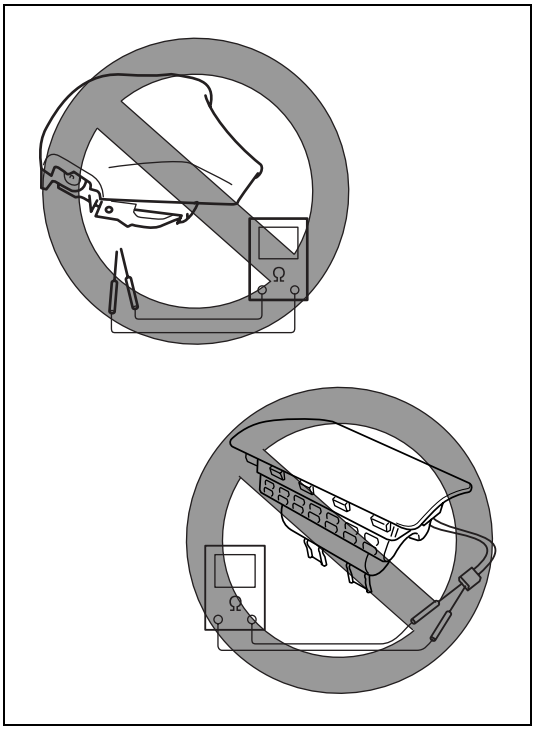
CAUTION:

After detecting one time of such collision as to meet deployment conditions, the SDM must not be used. Refer to "Air Bag Diagnostic System Check" in this section when checking the SDM.

- Never attempt disassembly of SDM.
- When storing SDM, select a place where neither high temperature nor high humidity is anticipated and oil, water and dust are kept off.
- If SDM has been dropped, replace it with a new one.
- If installation part of SDM was damaged, repair that part completely before reinstallation.
- All SDM and mounting bracket fasteners must be carefully torqued and the arrow must be pointed toward the front of the vehicle to ensure proper operation of the air bag system.

LIVE (UNDEPLOYED) AIR BAG (INFLATOR) MODULES

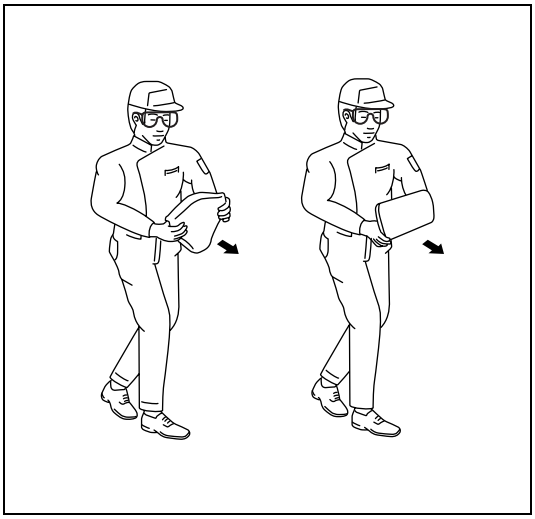
Special care is necessary when handling and storing a live (undeployed) air bag (inflator) modules.
The rapid gas generation produced during deployment of the air bag could cause the air bag (inflator) module, or an object in front of the air bag (inflator) module, to be thrown through the air in the unlikely event of an accidental deployment.



WARNING:

Never attempt to measure the resistance of the air bag (inflator) modules (driver and passenger). It is very dangerous as the electric current from the tester may deploy the air bag.

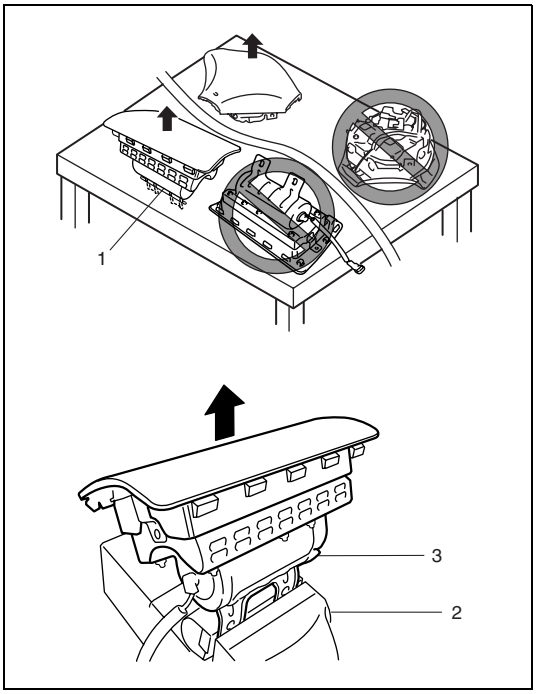
- Never attempt disassembly of the air bag (inflator) modules.
- If any abnormality is found, be sure to replace it with new one as an assembly.
- When an abnormality is noted as existing in the live (undeployed) air bag (inflator) module, be sure to deploy it before discarding it.
- When grease, cleaning agent, oil, water, etc., got on the air bag (inflator) modules (driver and passenger), wipe it off immediately with a dry cloth.
- If air bag (inflator) module was dropped from a height of 90 cm (3 ft) or more, it should be replaced with a new one as an assembly.



WARNING:

- **For handling and storage of a live air bag (inflator) module, select a place where the ambient temperature below 65°C (150°F), without high humidity and away from electric noise.**
- **When carrying a live air bag (inflator) module, make sure the bag opening is pointed away from you. In case of an accidental deployment, the bag will then deploy with minimal chance of injury. Never carry the air bag (inflator) module by the wires or connector on the underside of the module.**

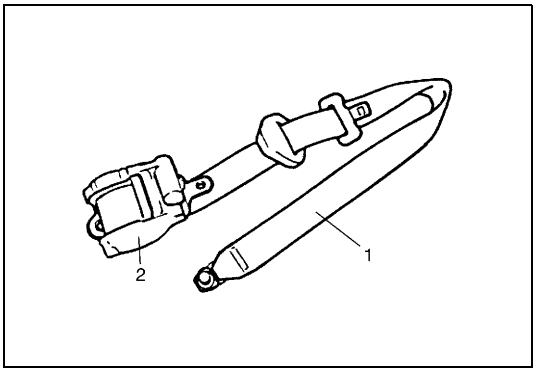
Otherwise, personal injury may result.



WARNING:

When placing a live air bag (inflator) module on bench or other surface, always face the bag up, away from the surface. As the live passenger air bag (inflator) module must be placed with its bag (trim cover) facing up, place it on the workbench with a slit (1) or use the workbench vise (2) to hold it securely at its lower mounting bracket (3).
It is also prohibited to place anything on top of the trim cover and stack air bag (inflator) modules.
This is necessary so that a free space is provided to allow the air bag to expand in the unlikely event of accidental deployment.
Otherwise, personal injury may result.

LIVE (INACTIVATED) SEAT BELT PRETENSIONER

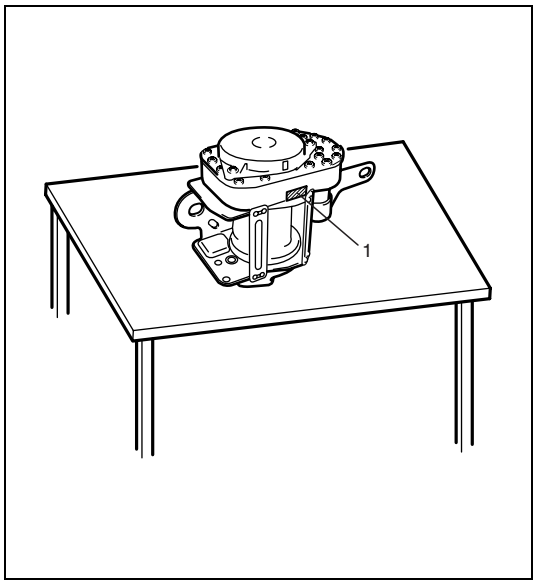


Special care is necessary when handling and storing a live (inactivated) seat belt pretensioners.
Also, when the seat belt pretensioners activate, gas is generated and the seat belt (1) is retracted into the retractor assembly (2) quickly.
Note, therefore, that if they activate accidentally, the seat belt pretensioners and other object(s) around them may be thrown through the air.

WARNING:

Never attempt to measure the resistance of the seat belt pretensioners. It is very dangerous as the electric current from the tester may activate pretensioner.

- Never attempt to disassemble the seat belt pretensioners (retractor assembly).
- If any abnormality is found, be sure to replace it with new one as an assembly.
- When an abnormality is noted as existing in the live (inactivated) seat belt pretensioner, be sure to activate it before discarding it.
- When grease, cleaning agent oil, water, etc., got on the seat belt pretensioners (retractor assembly), wipe it off immediately with a dry cloth.
- If seat belt pretensioner was dropped from a height of 30 cm (1 ft) or more, it should be replaced with a new one as an assembly.



WARNING:

- **For handling and storage of a live seat belt pretensioner, select a place where the ambient temperature below 65°C (150°F), without high humidity and away from electric noise.**
- **Never carry the seat belt pretensioner by webbing.**
- **When placing a live seat belt pretensioner on the workbench or other surface, be sure not to lay it with its exhaust hole (1) provided side facing down. It is also prohibited to put something on its face with an exhaust hole (1) or to put a seat belt pretensioner on top of another.**

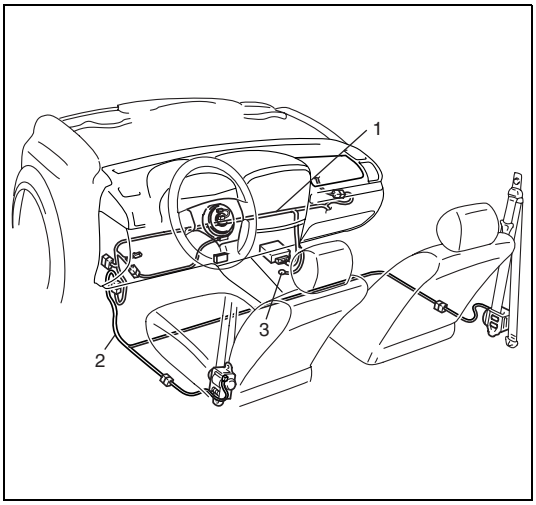
Otherwise, personal injury may result.

DEPLOYED AIR BAG (INFLATOR) MODULE AND ACTIVATED SEAT BELT PRETENSIONER

WARNING:

- **The air bag (inflator) module and seat belt pretensioner immediately after deployment/activation is very hot. Wait for at least 30 minutes to cool it off before proceeding the work.**
- **Do not apply water, oil, etc. to deployed air bag (inflator) module and to activate seat belt pretensioner.**
- **After an air bag (inflator) module has been deployed, the surface of the air bag may contain a powdery residue. This powder consists primarily of cornstarch (used to lubricate the bag as it inflates) and by-products of the chemical reaction. As with many service procedures, gloves and safety glasses should be worn.**
- **Wash your hands with mild soap and water after completing the work.**

Refer to the procedure described under “Deployed Air Bag (Inflator) Module and Activated Seat Belt Pretensioner Disposal” in this section for disposal.



AIR BAG WIRE HARNESS AND CONNECTOR

Air bag wire harness is included in instrument panel harness (1) and floor harness (2). The part of connector side wire harness can be identified easily as it is covered with a yellow protection tube. Be very careful when handling it.

- When an open in air bag wire harness, damaged wire harness, connector or terminal is found, replace wire harness, connectors and terminals as an assembly.
- When installing it, be careful so that the air bag wire harness is not caught or does not interfere with other parts.
- Make sure all air bag system grounding points (3) is clean and grounds is securely fastened for optimum metal-to-metal contact. Poor grounding can cause intermittent problems that are difficult to diagnose.

DISPOSAL

Do not dispose of the live (undeployed) air bag (inflator) modules and the live (inactivated) seat belt pretensioners. When disposal is necessary, be sure to deploy/activate the air bag and seat belt pretensioner according to deployment/activation procedure described in “Air Bag (Inflator) Module and Seat Belt Pretensioner Disposal” in this section.

WARNING:

Failure to follow proper air bag (inflator) module and seat belt pretensioner disposal procedures can result in air bag deployment and pretensioner activation which could cause personal injury. Undeployed air bag (inflator) module and inactivated seat belt pretensioner must not be disposed of through normal refuse channels.

The undeployed air bag (inflator) module and inactivated seat belt pretensioner contain substances that can cause severe illness or personal injury if the sealed container is damaged during disposal.

Repairs and Inspections Required After an Accident

CAUTION:

- **All air bag system components, including the electrical harness (component mounting points), must be inspected after an accident. If any components are damaged or bent, they must be replaced even if air bag system activation did not occur.**
- **Never use air bag system parts from another vehicle.**
- **Do not attempt to service the parts below. Service of these parts is by replacement only.**
  - **– Driver/Passenger air bag (inflator) modules**
  - **– Driver/Passenger seat belt pretensioners (if equipped)**
  - **– Forward sensors**
  - **– SDM**
  - **– Contact coil and combination switch assembly**
  - **– Air bag wire harness in main harness, instrument panel harness and floor harness**
- **Proper operation of the sensors and air bag system requires that any repairs to the vehicle structure return it to its original production configuration.**

CAUTION:

After detecting one time of such collision as to meet deployment conditions, the SDM must not be used. Refer to "Air Bag Diagnostic System Check" in this section when checking the SDM.

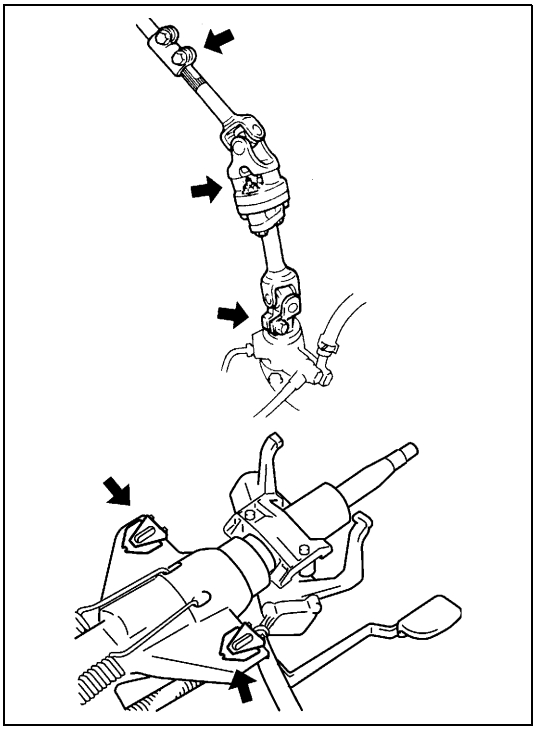
Accident with deployment/activation – component replacement

Certain air bag system components must be replaced. Those components are :

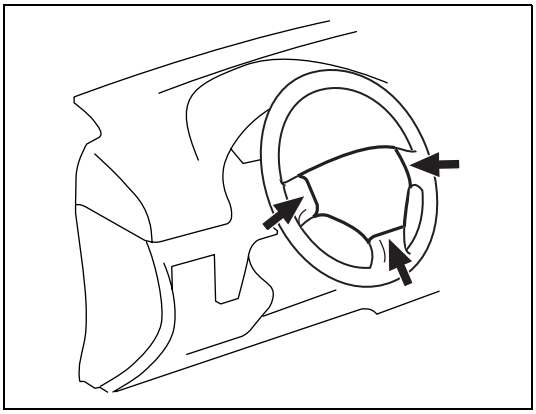
- Driver and passenger air bag (inflator) modules
  - – Replace with new one.
- Driver and Passenger seat belt pretensioners (if equipped)
  - – Replace with new one.
- SDM after detecting such collision as to meet deployment conditions
  - – Replace with new one.
- Forward sensors
  - – Replace with new one.

Accident with or without deployment/activation - component inspections

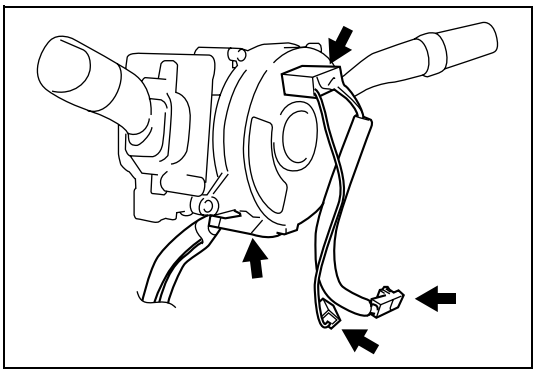
Certain air bag and restraint system components must be inspected after any crash, whether the air bag system activated or not.
Those components are :



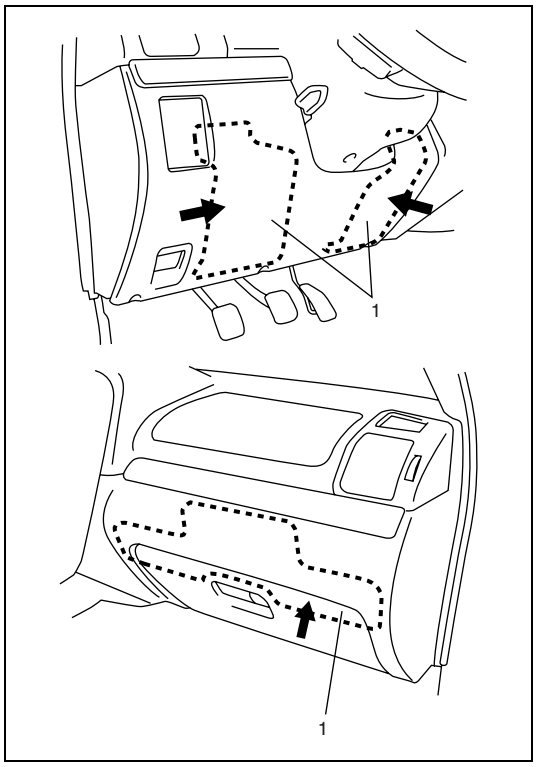
- Steering column and shaft joints
  – Check for length, damage and bend according to “Checking Steering Column for Accident Damage” in Section 3C1.
- Steering column bracket and capsules
  – Check for damage and bent.
- If any faulty condition is found in above checks, replace faulty part.



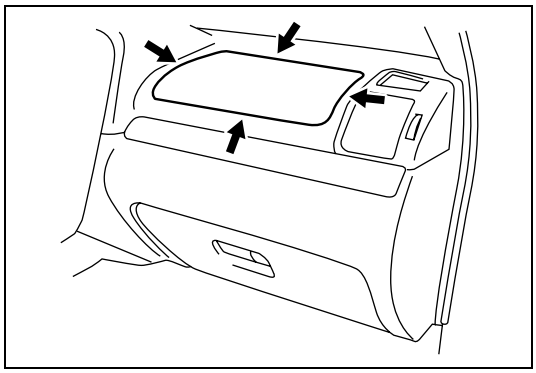
- Steering wheel and driver air bag (inflator) module
  – Check for damage or air bag (inflator) module fitness.
  – Check trim cover (pad surface) for cracks.
  – Check wire harness and connector for damage or tightness.
- If any faulty condition is found in above checks, replace faulty part.



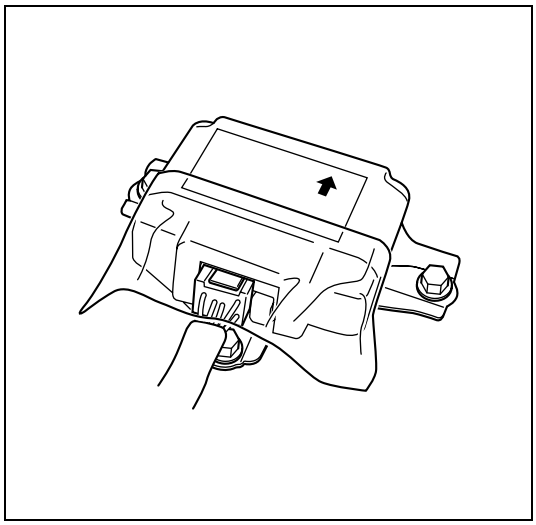
- Contact coil and combination switch assembly
  – Check wire harness and connectors for damage or tightness.
  – Check contact coil case for damage.
- If any faulty condition is found in above checks, replace.



- Instrument panel member, reinforcement and knee bolster and panel (1) (driver and passenger)
  - Check for any distortion, bending, cracking or other damage.
- If any faulty condition is found in above checks, replace.

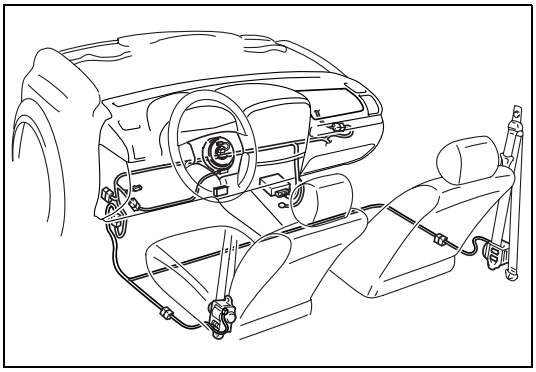


- Passenger air bag (inflator) module
  - Check for dents, cracks, damage or fitness.
  - Check trim cover for cracks or deformities.
  - Check harness and connector for damage or tightness.
- If any faulty condition is found in above checks, replace.



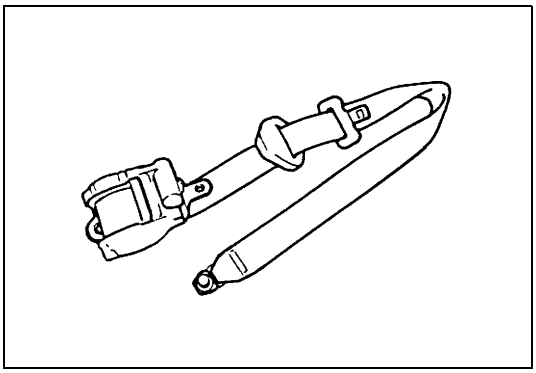
- SDM
  - Check for external damage such as deformation, scratch, crack, peeled paint, etc.
  - Check that SDM cannot be installed properly due to a cause in itself. (There is a gap between SDM and SDM plate, or it cannot be fixed securely.)
  - Check that connector or lead wire of SDM has a scorching, melting or damage.
  - Check SDM connector and terminals for tightness.
  - Check SDM sets a diagnostic trouble code referring to “DTC Check” in this section, and the diagnostic table leads to a malfunctioning SDM.

If any faulty condition is found in above checks, replace.



- Air bag wire harness and connections
  - Check for damages, deformities or poor connections referring to “Intermittents and Poor Connections” in this section.
  - Check wire harness clamps for tightness.

If any faulty condition is found, correct or replace.



- Seat belt pretensioner (if
  - Check for dents, cracks, damage or fitness
  - Check harness and connector for damage or tightness.

If any faulty condition is found in above checks, replace.

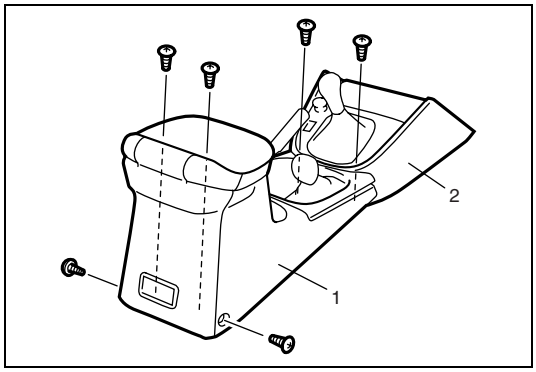
- Seat belts and mounting points
  - Refer to “Front Seat Belt” in Section 10.
- “AIR BAG” warning lamp
  - After vehicle is completely repaired, perform “Air Bag Diagnostic System Check” in this section.

SDM

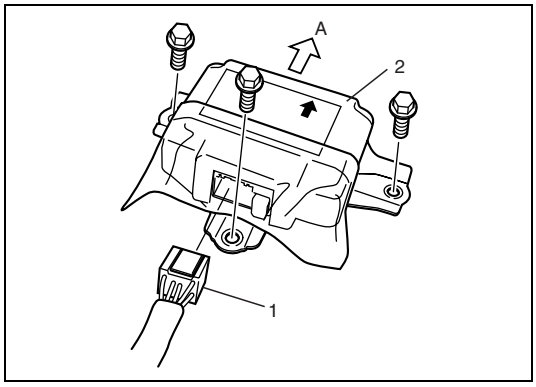
WARNING:
During service procedures, be very careful when handling a Sensing and Diagnostic Module (SDM).
Be sure to read "Service Precautions" in this section before starting to work and observe every precaution during work. Neglecting them may result in personal injury or inactivation of the air bag system when necessary.

REMOVAL

1) Disconnect negative (–) cable at battery.
2) Disable air bag system referring to "Disabling Air Bag System" in this section.



3) Remove rear center console box (1) and front center console box (2) by removing screws.



4) Disconnect SDM connector (1) from SDM (2).
5) Remove SDM (2) from vehicle.

A : Forward

INSPECTION

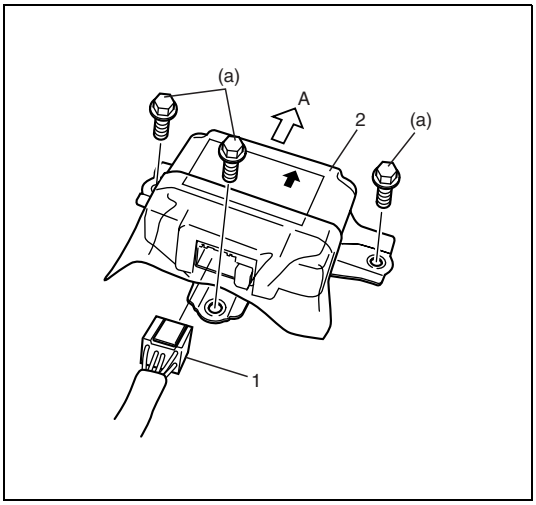
CAUTION:
- **Do not connect a tester whatever type it may be.**
- **Never repair or disassemble SDM.**
- **If SDM has been dropped, it should be replaced.**

- Check SDM and SDM plate for dents, cracks or deformation.
- Check SDM connector for damage, cracks or lock mechanism.
- Check SDM terminal for bent, corrosion or rust.

If any faulty condition is found in above checks, replace.

INSTALLATION

1) Check that none of following faulty conditions exists.
   - Bend, scratch, deformity in vehicle body mounted on SDM
   - Foreign matter or rust on mating surface of vehicle body mounted on SDM



2) Install SDM (2) to vehicle.

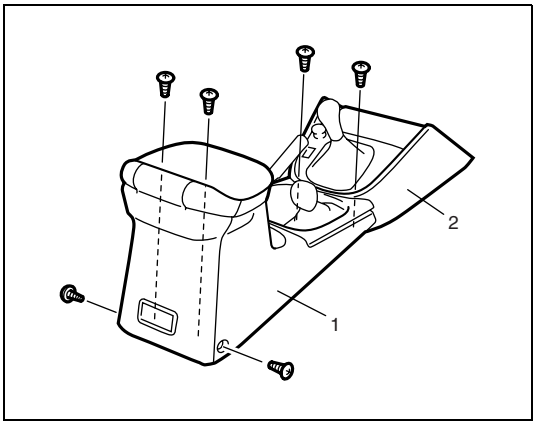
CAUTION:
Ensure that arrow on the SDM is pointing toward the front of the vehicle.

3) Tighten SDM bolts to specified torque.

Tightening torque
SDM bolt (a) : 7 N·m (0.7 kg-m, 5 lb-ft)

4) Connect SDM connector (1) to SDM (2) securely.

A : Forward



5) Install front center console box (2) and rear center console box (1).

6) Connect negative cable to battery.
7) Enable air bag system. Refer to “Enabling Air Bag System” in this section.

Seat Belt Pretensioner

Refer to “Front Seat Belt” in Section 10A for removal, inspection and installation.

Air Bag (Inflator) Module and Seat Belt Pretensioner Disposal

WARNING:

Failure to follow proper air bag (inflator) module and seat belt pretensioner disposal procedures can result in air bag deployment and pretensioner activation which may cause personal injury.
Do not dispose of live (undeployed) air bag (inflator) modules and seat belt pretensioners. Because undeployed air bag (inflator) module/inactivated seat belt pretensioner must not be disposed of through normal refuse channels.
Undeployed air bag (inflator) module and inactivated seat belt pretensioner contain substances that can cause severe illness or personal injury if sealed container is damaged during disposal.

Air bag (inflator) module/seat belt pretensioner can be deployed/activated inside or outside of vehicle. Deployment/Activation method used depends upon final disposition of vehicle. Review the following instructions in order to determine which will work best in a given situation.

Deployment/Activation Outside of Vehicle :
When you intend to return the vehicle to service, deploy the air bag (inflator) module(s) or activate seat belt pretensioner(s) outside of the vehicle.

Deployment/Activation Inside of Vehicle :
When the vehicle will be destroyed, or salvaged for component parts, deploy the air bag modules and/or activate seat belt pretensioners installed on vehicle.

WARNING:

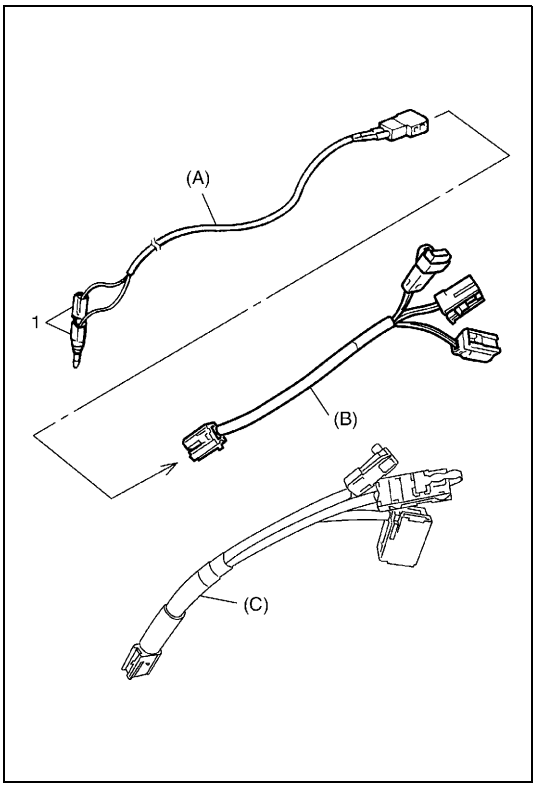
The following precautions must be observed for this work. Failure to observe any of them may result in personal injury.

- **Procedure should be followed strictly as described here.**
- **Be sure to read "Service Precautions" in this section beforehand.**
- **To avoid accidental deployment/activation, this work should be performed by no more than one person.**
- **Since smoke is produced when air bag (inflator) module is deployed and pretensioner is activated, select well-ventilated area.**
- **Air bag (inflator) module and seat belt pretensioner will immediately deploy/activate when 12 volts vehicle battery is connected to it. Wear safety glasses throughout this entire deployment/activation and disposal procedure.**
- **Wear suitable ear protection when deploying air bag (inflator) module/activating seat belt pretensioner. Also, advise those who are in area close to deployment/activation site to wear suitable ear protection.**
- **Do not deploy/activate two or more air bag system components (air bag (inflator) modules and seat belt pretensioners) at the same time.**
- **Never connect deployment harness to any 12 volts vehicle battery before connecting deployment harness to air bag (inflator) module and seat belt pretensioner. Deployment harness shall remain shorted and not be connected to 12 volts vehicle battery till you are ready to deploy air bag (inflator) module or activate seat belt pretensioner.**

Deployment/Activation Outside of Vehicle

When you intend to return the vehicle to service, deploy the air bag (inflator) module(s) or activate seat belt pretensioner(s) outside of the vehicle.

1) Turn ignition switch to "LOCK" position and remove key.
2) Wear safety glasses during this deployment/activation procedure.



3) Check that there is no open, short or damage in special tools (deployment harness (A), adapter cable (B) and adapter cable (C)). If any faulty is found, do not use it and be sure to use new special tool.

Special tool
(A) : 09932-75031
(B) : 09932-78332
(C) : 09932-78320

NOTE:

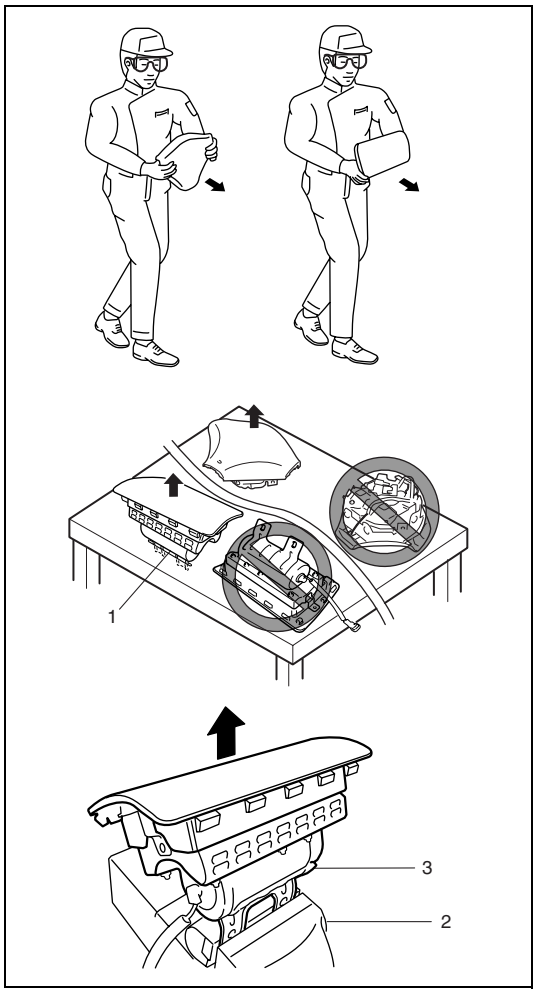
If faulty seat belt pretensioner connector of adapter cable (C) is found, replace it to spare connector (special tool).

4) Short two deployment harness leads (1) together by fully seating one banana plug into the other.

WARNING:

Deployment harness (A) shall remain shorted and not be connected to 12 volts vehicle battery till you are ready to deploy air bag module or activate seat belt pretensioner.

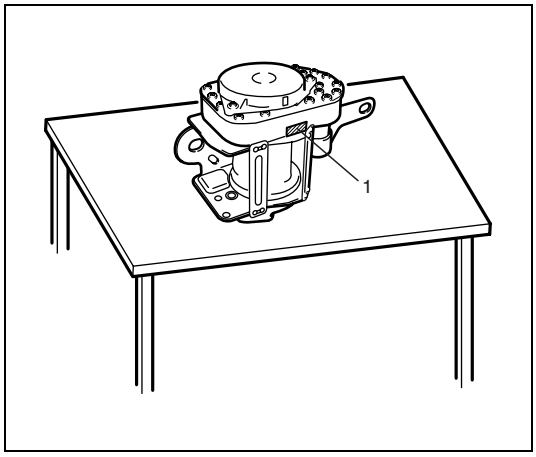
5) Remove applicable air bag (inflator) module or seat belt pretensioner as follows.
   - For driver air bag (inflator) module
     Remove driver air bag (inflator) module referring to "Driver Air Bag (Inflator) Module" in Section 3C.
   - For passenger air bag (inflator) module
     Remove passenger air bag (inflator) module referring to "Passenger Air Bag (inflator) Module" in this section.
   - For seat belt pretensioner
     Remove seat belt referring to "Front Seat Belt" in Section 10.



WARNING:

- **For handing and storage of live air bag (inflator) module, select place where ambient temperature below 65°C (150°F), without high humidity and away from electric noise.**
- **Always carry live air bag (inflator) module with trim cover away from you.**
- **When storing live air bag (inflator) module or when leaving live air bag (inflator) module unattended on bench or other surface, always face trim cover up and away from surface. As the live passenger air bag (inflator) module must be placed with its bag (trim cover) facing up, place it on the work bench with a slit (1) or use the work bench vise (2) to hold it securely at its lower mounting bracket (3). It is also prohibited to place anything on top of the trim cover and stack air bag (inflator) modules. This is necessary so that free space is provided to allow air bag (inflator) module to expand in the unlikely event of accidental deployment.**

Failure to follow procedures may result in personal injury.

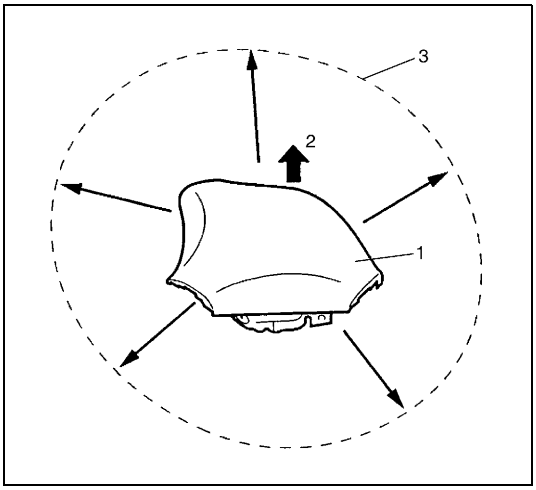


WARNING:

- **For handing and storage of seat belt pretensioner, select place where ambient temperature below 65 °C (150 °F), without high humidity and away from electric noise.**
- **Never carry seat belt pretensioner by webbing.**
- **When placing seat belt pretensioner on workbench or other surface, be sure to lay it with its exhaust hole side facing up. It is also prohibited to put something on seat belt pretensioner.**

Otherwise, personal injury may result.

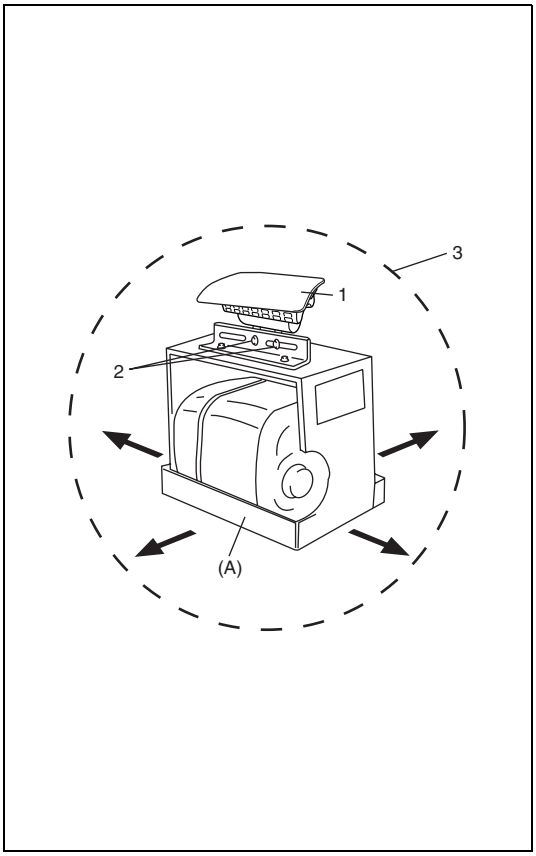
6) Set air bag (inflator) module or seat belt pretensioner as follows.



• For driver air bag (inflator) module

a) Clear space (3) on ground about 185 cm (6 ft) in diameter where driver air bag (inflator) module (1) for deployment. Paved, outdoor location where there is no activity is preferred. If outdoor location is not available, space on shop floor where there is no activity and provide sufficient ventilation. Ensure no loose or flammable objects are within deployment area.

b) Place driver air bag (inflator) module (1) with its vinyl trim cover facing up (2) on ground in step a).



• For passenger air bag (inflator) module

a) Clear space (3) on ground about 185 cm (6 ft) in diameter where passenger air bag (inflator) module (1) for deployment. Paved, outdoor location where there is no activity is preferred. If outdoor location is not available, space on shop floor where there is no activity and provide sufficient ventilation. Ensure no loose or flammable objects are within deployment area.

b) Place deployment fixture (A) on ground in step i).

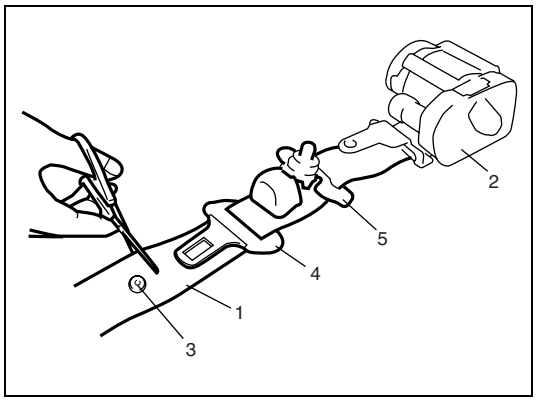
Special tool
(A) : 09932-75041

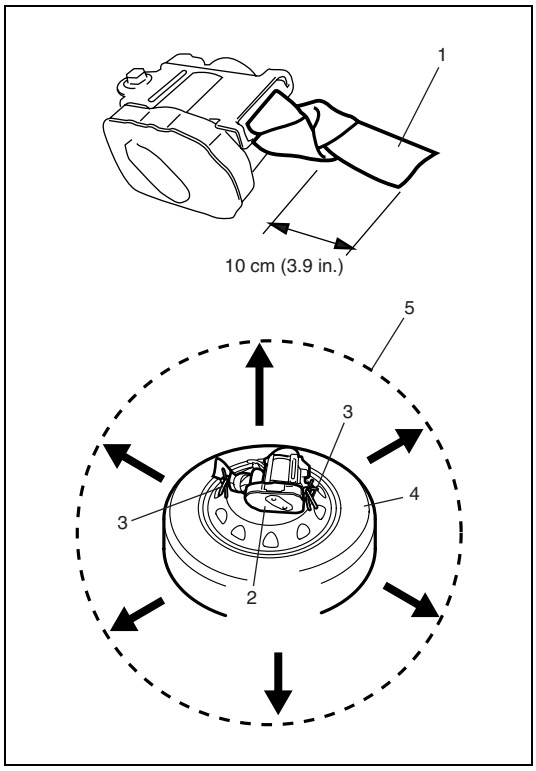
c) Fill plastic reservoir in deployment fixture (A) with water or sand. This is necessary to provide sufficient stabilization of fixture during deployment.

d) Attach passenger air bag (inflator) module (1) in deployment fixture (A) securely using M8 bolt (2).

CAUTION:

Be sure to use M8 size and 7T strength bolt for fixing passenger air bag (inflator) module (1) to deployment fixture (A).





• For seat belt pretensioner

a) Cut webbing (1) at tongue plate stopper (3) of seat belt pretensioner (2) side as shown.

NOTE:

Hold seat belt pretensioner (2) vertically in the same condition as it is installed. Otherwise, webbing can't be pulled out.

b) Remove tongue plate (4) and shoulder anchor (5) from webbing.

c) Tie webbing (1) tightly at 10 cm (3.9 in.) from cutting edge as shown.

d) Tie seat belt pretensioner (2) with wire harness (3) to wheel-installed tire (4) as shown.

Wire harness specification :

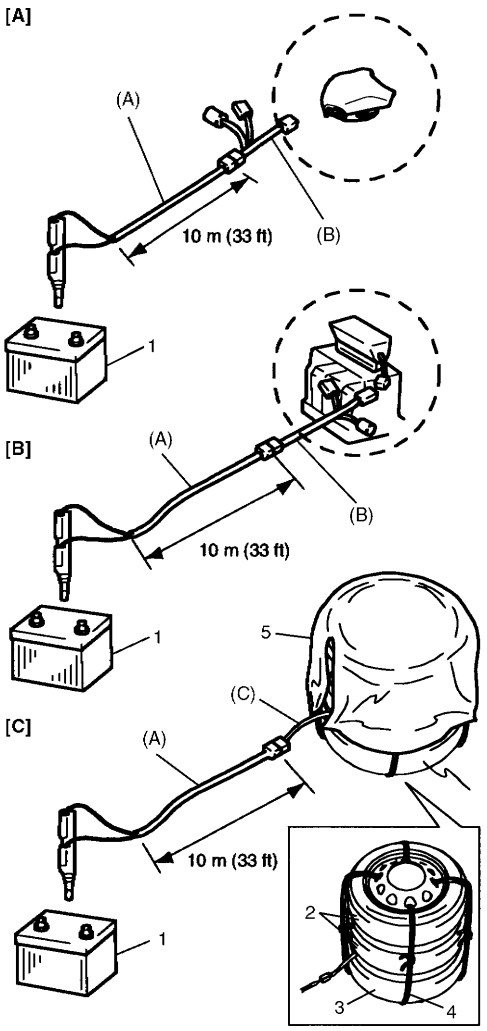
Stripped wire harness section 1.25 mm^2 (0.0019 $in.^2$) or more (Stripped wire harness diameter 1.25 mm (0.05 in.) or more)

NOTE:

Wind wire harness (3) around at least 3 times.

e) Clear space (5) on ground about 185 cm (6 ft) in diameter where seat belt pretensioner (2) is to be activated. Paved, outdoor location where there is no activity is preferred. If outdoor location is not available, space on shop floor where there is no activity and provide sufficient ventilation. Ensure no loose or flammable objects are within activation area.

f) Place wheel-installed tire (4) with seat belt pretensioner (2) on ground in step e).



7) Stretch deployment harness (A) from air bag (inflator) module or seat belt pretensioner to its full length 10 m (33 ft).

Special tool
(A) : 09932-75031

8) Place 12 volts vehicle battery (1) near shorted end of deployment harness (A).
9) Verify that area around air bag (inflator) module or seat belt pretensioner is clear of all people and loose or flammable objects.
10) Connect adapter cable (B) or (C) as follows.

Special tool
(B) : 09932-78332
(C) : 09932-78320

- For driver air bag (inflator) module
  Verify that driver air bag (inflator) module is resting with its vinyl trim cover facing up, and connect adapter cable (B) to driver air bag (inflator) module.
- For passenger air bag (inflator) module
  Verify that passenger air bag (inflator) module is firmly and properly secured on deployment fixture (special tool), and connect adapter cable (B) to passenger air bag (inflator) module.
- For seat belt pretensioner

a) Connect adapter cable (C) to seat belt pretensioner.
b) Pile 2 wheel-installed tires (2) on top of tire with seat belt pretensioner (3), and tie them with wire harness (4) as shown.

Wire harness specification :

Stripped wire harness section 1.25 mm^2 (0.0019 in.^{2}) or more (Stripped wire harness diameter 1.25 mm (0.05 in.) or more)

NOTE:

Wind wire harness around at least 2 times.

c) Drape blanket (5) over those tires.
11) Connect adapter cable (B) or (C) to deployment harness (A) connector and lock connectors with lock lever.

[A] :	For driver air bag (inflator) module
[B] :	For passenger air bag (inflator) module
[C] :	For seat belt pretensioner

12) Notify all people in immediate area that you intend to deploy/ activate air bag (inflator) module or seat belt pretensioner.

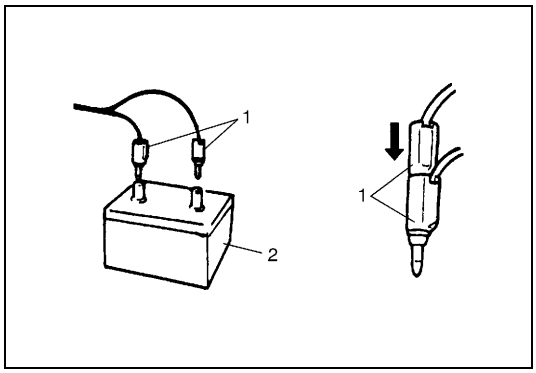
NOTE:

- **When air bag (inflator) module deploys and seat belt pretensioner activates, rapid gas expansion will create substantial report. Wear suitable ear protection. Notify all people in immediate area that you intend to deploy air bag (inflator) module or activate seat belt pretensioner and suitable ear protection should be worn.**
- **When driver air bag (inflator) module deploys, driver air bag (inflator) module may jump about 30 cm (1 ft) vertically. This is normal reaction to force of rapid gas expansion inside of drive air bag (inflator) module.**
- **After air bag (inflator) module has been deployed, surface of air bag (inflator) may contain powdery residue. This powder consists primarily of cornstarch (used to lubricate bag (inflator) as it inflates) and byproducts of chemical reaction.**

WARNING:

- **Do not place deployed air bag (inflator) module and activated seat belt pretensioner near any flammable objects.**
- **Do not apply water, oil, etc. to deployed air bag (inflator) module and activated seat belt pretensioner.**
- **Wait for about 30 minutes before touching any metal surface of air bag (inflater) module or seat belt pretensioner module. Disregarding these precautions may cause fire or personal injury.**

Failure to follow procedures may result in fire or personal injury.

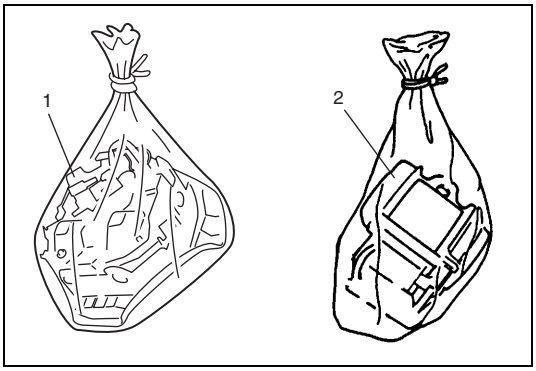


13) Separate two banana plugs (1) on deployment harness.
14) Connect deployment harness to 12 volts vehicle battery (2). This will immediately deploy or activate air bag (inflator) module or seat belt pretensioner.
15) Disconnect deployment harness from 12 volts vehicle battery (2) and short two deployment harness leads together by fully seating one banana plug into the other.

16) In the unlikely event that air bag (inflator) module or seat belt pretensioner did not deploy / activate after following these procedures, proceed immediately with Step 22) through 25). If air bag (inflator) module or seat belt pretensioner did deploy or activate, proceed with Steps 18) through 21).
17) Put on pair of shop gloves to protect your hands from possible irritation and heat when handling deployed air bag (inflator) module or activated seat belt pretensioner.
18) Disconnect adapter cable (special tool) from air bag (inflator) module or seat belt pretensioner as soon as possible. This will prevent adapter cable (special tool) from damage due to possible contact with hot air bag (inflator) module or hot seat belt pretensioner.
19) Check adapter cable connector as follows.
    - For air bag (inflator) module
      Air bag (inflator) module connector of adapter cable (special tool) are designed to be reused. However they should be inspected for damage after deployment and replace it with new adapter cable (special tool), if necessary.
    - For seat belt pretensioner
      Seat belt pretensioner connector of adapter cable (special tool) should be inspected for damage when seat belt pretensioner is activated. Replace it with spare connector (special tool), if necessary.

NOTE:

Do not reuse faulty seat belt pretensioner connector of adapter cable (special tool) because it can be destroyed by shock when seat belt pretensioner is activated.



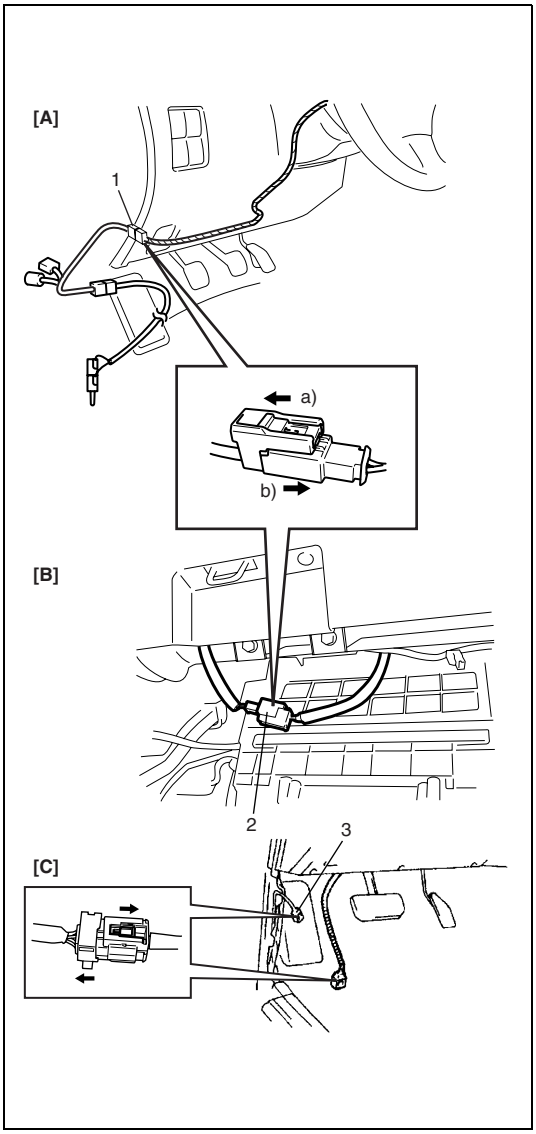
20) Dispose of deployed air bag (inflator) module (1) or activated seat belt pretensioner (2) through normal refuse channels after it has cooled for at least 30 minutes and tightly seal air bag (inflator) module (1) or seat belt pretensioner (2) in strong vinyl bag. (Refer to “Deployed Air Bag (Inflator) Module and Activated Seat Belt Pretensioner Disposal” in detail.)
21) Wash your hands with mild soap and water afterward.

NOTE:

Remaining steps are to be followed in the unlikely event that air bag (inflator) module did not deploy or seat belt pretensioner did not activate.

22) Ensure that deployment harness has been disconnected from 12 volts vehicle battery and that its two banana plugs have been shorted together by fully seating one banana plug into the other.
23) Disconnect deployment harness and adapter cable from air bag (inflator) module or seat belt pretensioner.
24) Temporarily store undeployed air bag (inflator) module or unactivated seat belt pretensioner referring to “Service Precautions” for details.
25) Contact your local distributor for further assistance.

Deployment/Activation Inside Vehicle



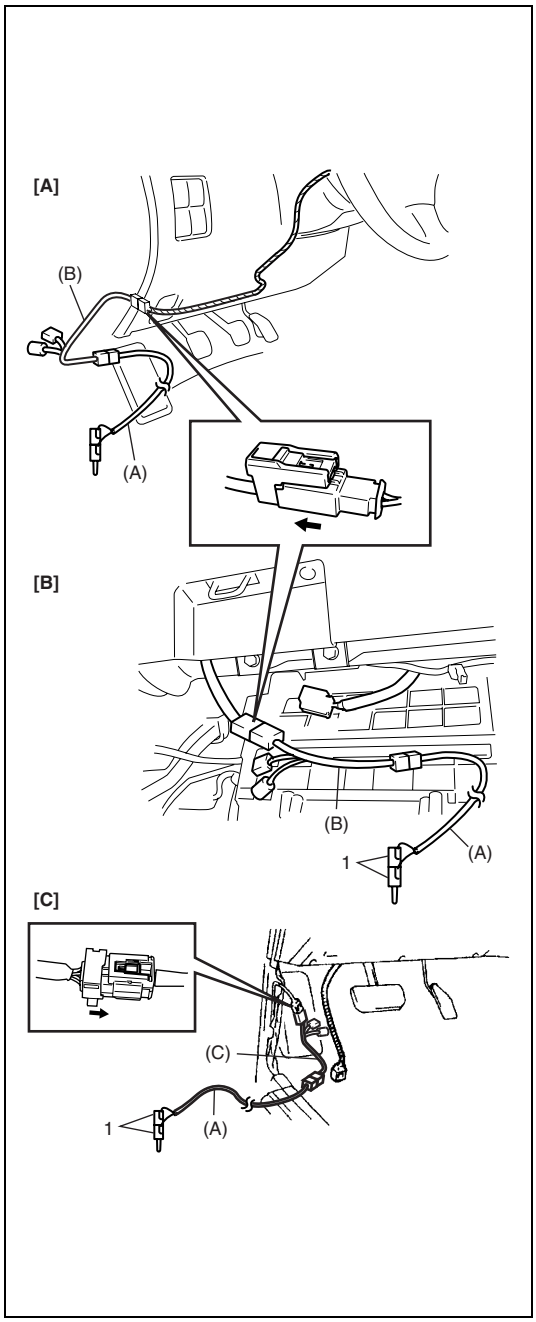
When the vehicle will be destroyed, or salvaged for component parts, deploy the air bag modules and/or activate seat belt pretensioners installed on vehicle.

NOTE:

If equipped with the seat belt pretensioners, deploy both side seat belt pretensioners at the same time.

1) Turn ignition switch to “LOCK” position, remove key and put on safety glasses.
2) Remove all loose objects from front seats and instrument panel.
3) Disconnect air bag (inflator) module or seat belt pretensioner connector as follows.
   a) For driver air bag (inflator) module
      Disconnect contact coil connector (1) located near base of steering column.
   b) For passenger air bag (inflator) module
      Remove glove box from instrument panel and disconnect passenger air bag (inflator) module connector (2).
   c) For seat belt pretensioners (right and left)
      Remove left side front pillar lower trim and disconnect seat belt pretensioner connector (3) for both side seat belt pretensioners.
4) Confirm that each air bag (inflator) module and/or seat belt pretensioners is securely mounted.

[A] :	Driver Air Bag (Inflator) Module
[B] :	Passenger Air Bag (Inflator) Module
[C] :	Seat Belt Pretensioner



5) Check that there is no open, short or damage in special tools (deployment harness (A), adapter cable (B) and adapter cable (C)). If any faulty condition is found, do not use it and be sure to use new special tool. And connect adapter cable (B) or (C) to deployment harness (A) and lock connectors with lock lever.

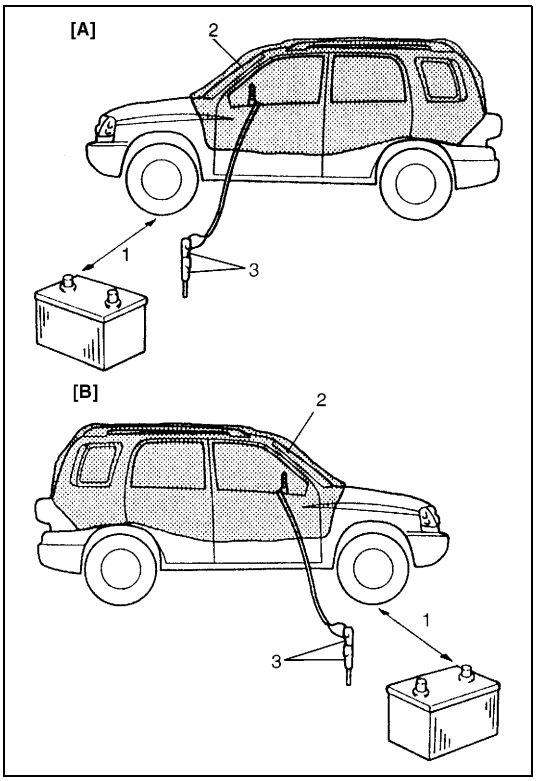
Special tool
(A) : 09932-75031
(B) : 09932-78332
(C) : 09932-77320

6) Short two deployment harness leads (1) together by fully seating one banana plug into the other.

WARNING:
Deployment harness (A) shall remain shorted and not be connected to 12 volts vehicle battery until you are ready to deploy air bag (inflator) module or activate seat belt pretensioner.

7) Connect adapter cable (B) or (C) in series with deployment harness (A) to air bag (inflator) module or seat belt pretensioner as follows.
   a) For air bag (inflator) module
      Connect adapter cable (B) in series with deployment harness (A) and push adapter cable (B) connector to air bag (inflator) module connector (driver or passenger) till click can be heard.
   b) For seat belt pretensioners (right and left)
      Connect adapter cable (C) in series with deployment harness (A) and push adapter cable (C) connector to seat belt pretensioner connector till click is heard.

[A] :	Driver air bag (inflator) module
[B] :	Passenger air bag (inflator) module
[C] :	Seat belt pretensioner (right and left)



8) Route deployment harness (1) out of vehicle.
9) Verify that inside of vehicle and area surrounding vehicle are clear of all people and loose or flammable objects.
10) Stretch deployment harness (1) to its full length 10 m (33 ft).
11) Place 12 volts vehicle battery (2) near shorted end of deployment harness (1).
12) Completely cover windshield area and front door window openings with drop cloth, a blanket or any similar item. This reduces possibility of injury due to possible fragmentation of vehicle's glass or interior.

[A] : Driver side for left hand steering vehicle
[B] : Driver side for right hand steering vehicle

13) Notify all people in immediate area that you intend to deploy air bag (inflator) module or activate seat belt pretensioner.

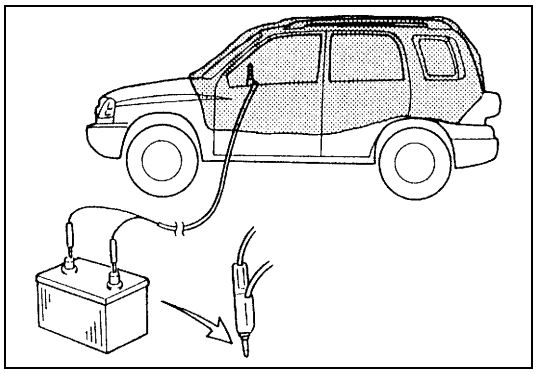
NOTE:

- **When air bag (inflator) module deploys or seat belt pretensioner activates, rapid gas expansion will create substantial report. Wear suitable ear protection. Notify all people in immediate area that you intend to deploy air bag (inflator) module or to activate seat belt pretensioner and suitable ear protection should be worn.**
- **After air bag (inflator) module has been deployed, surface of air bag may contain powdery residue. This powder consists primarily of cornstarch (used to lubricate air bag (inflator) module as it inflates) and by-products of chemical reaction.**

WARNING:

- **Do not place deployed air bag (inflator) module and activated seat belt pretensioner near any flammable objects.**
- **Do not apply water, oil, etc. to deployed air bag (inflator) module and activated seat belt pretensioner.**
- **Wait for about 30 minutes before touching any metal surface of air bag (inflater) module or seat belt pretensioner module. Disregarding these precautions may cause fire or personal injury.**

Failure to follow procedures may result in fire or personal injury.



14) Separate two banana plugs (1) on deployment harness (2).
15) Connect deployment harness (2) to 12 volts vehicle battery (3). This will immediately deploy or activate air bag (inflator) module or seat belt pretensioner.
16) Disconnect deployment harness (2) from 12 volts vehicle battery (3) and short two deployment harness leads together by fully seating one banana plug into the other.
17) Repeat Step 3) through Step 16) to deploy/activate air bag (inflator) modules and seat belt pretensioners which has not been deployed/activated, if any.
18) In the unlikely event that air bag (inflator) module and seat belt pretensioners after following these procedures, proceed immediately with Step 24) through 26). If air bag (inflator) module and seat belt pretensioners did deploy/activate, proceed with Steps 19) through 23).
19) Carefully remove drop cloth from vehicle and clean off any fragments or discard it entirely.
20) Put on pair of shop gloves to protect your hands from possible irritation and heat when handling deployed air bag (inflator) module and activated seat belt pretensioner.
21) Disconnect adapter cable (special tool) from air bag (inflator) module or seat belt pretensioner as soon as possible. This will prevent adapter cable (special tool) from damage due to possible contact with hot air bag (inflator) module or hot seat belt pretensioner.
22) Check adapter cable connector as follows.
    Adapter cable connector (special tool) are designed to be reused. However they should be inspected for damage after deployment and replaced if necessary.
23) With air bag (inflator) modules deployed and seat belt pretensioners activated, vehicle may be scrapped in the same manner as non-air bag system/seat belt pretensioner equipped vehicle.

NOTE:

Remaining steps are to be followed in the unlikely event that air bag (inflator) module did not deploy or seat belt pretensioner did not activate.

24) Remove undeployed air bag (inflator) module(s) and/or inactivated seat belt pretensioner(s) from vehicle as follows.
    - For driver air bag (inflator) module
      Remove driver air bag (inflator) module referring to “Driver Air Bag (Inflator) Module” in Section 3C.
    - For passenger air bag (inflator) module
      Remove passenger air bag (inflator) module referring to “Passenger Air Bag (Inflator) Module” in this section.
    - For seat belt pretensioner
      Remove seat belt referring to “Front Seat Belt” in Section 10.

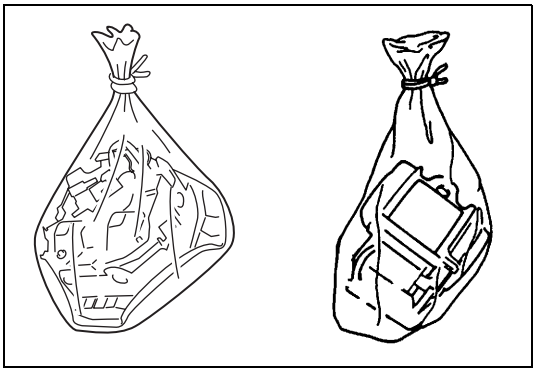
25) Temporarily store undeployed air bag (inflator) module and/or unactivated seat belt pretensioner referring to “Service Precautions” in this section.
26) Contact your local distributor for further assistance.

Deployed Air Bag (Inflator) Module and Activated Seat Belt Pretensioner Disposal

WARNING:
Failure to follow proper air bag (inflator) module and seat belt pretensioner disposal procedures can result in air bag deployment and pretensioner activation which may cause personal injury. The undeployed air bag (inflator) module and the inactivated seat belt pretensioner must not be disposed of through normal refuse channels.
The undeployed air bag (inflator) module and the inactivated seat belt pretensioner contains substances that can cause severe illness or personal injury if the sealed container is damaged during disposal.

Deployed air bag (inflator) module and the activated seat belt pretensioner can be disposed of through normal refuse channels just like any other parts. For their disposal, however, following points should be noted.

- The air bag (inflator) module and the seat belt pretensioner immediately after deployment/activation is very hot. Wait for 30 minutes to cool it off before handling it.
- Never apply water, oil, etc. to deployed air bag (inflator) module and the activated seat belt pretensioner to cool it off and be careful so that water, oil etc. does not get on the deployed air bag (inflator) module and the activated seat belt pretensioner.
- After the air bag (inflator) module has been deployed, the surface of the air bag may contain a powdery residue. This powder consists primarily of cornstarch (used to lubricate the bag as it inflates) and by-products of the chemical reaction. As with many service procedures, you should wear gloves and safety glasses.

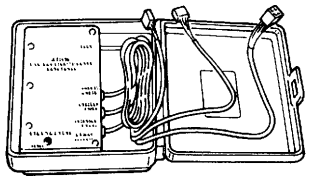
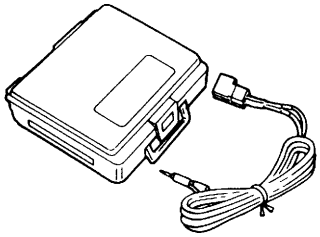
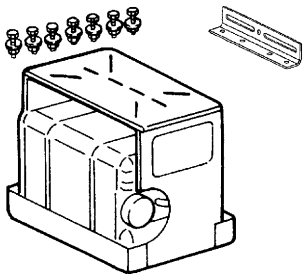
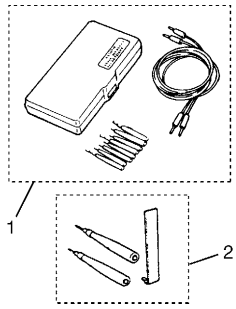
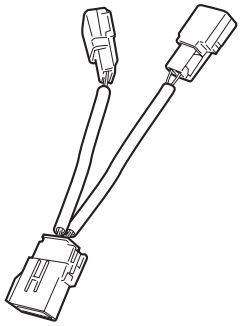
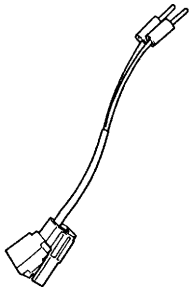
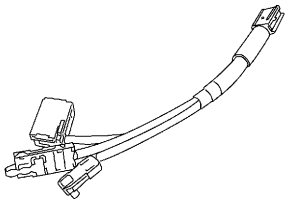
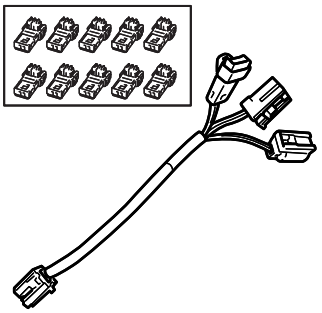


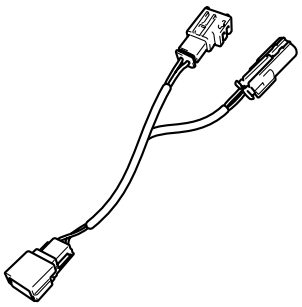
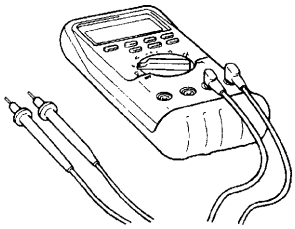
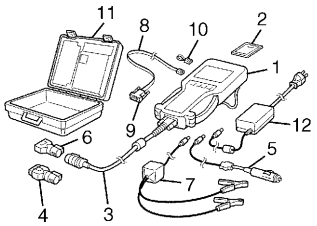
- When disposing of the deployed air bag (inflator) module and the activated seat belt pretensioner, be sure to seal it in a vinyl bag.
- When air bag (inflator) module and seat belt pretensioner have been deployed/activated inside the vehicle which is going to be scrapped, leave them as installed to the vehicle.
- Be sure to wash your hands with mild soap and water after handling it.

Tightening Torque Specification

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
SDM bolt	7	0.7	5
Passenger air bag (inflator) module screw	5.5	0.55	4.0
Passenger air bag (inflator) module bolt	23	2.3	16.5
Driver air bag (inflator) module bolt	Refer to Section 3C1.		
Seat belt pretensioner (retractor assembly) bolt	Refer to Section 10A.		

Special Tool

 09932-75010 Air bag driver/passenger load tool	 09932-75031 Air bag deployment harness	 09932-75041 Passenger air bag (inflator) module deployment fixture	 09932-76010 Connector test adapter set (See NOTE “A”.)
 09932-77320 Diagnosis adapter cable 4P	 09932-78310 Adapter cable	 09932-78320 Adapter cable	 09932-78332 Adapter cable (See NOTE “D”.)

		
09932-78340 Adapter cable	Digital multimeter (See NOTE “B” and WARNING.)	Tech-2 kit (SUZUKI scan tool) (See NOTE “C”.)

WARNING:

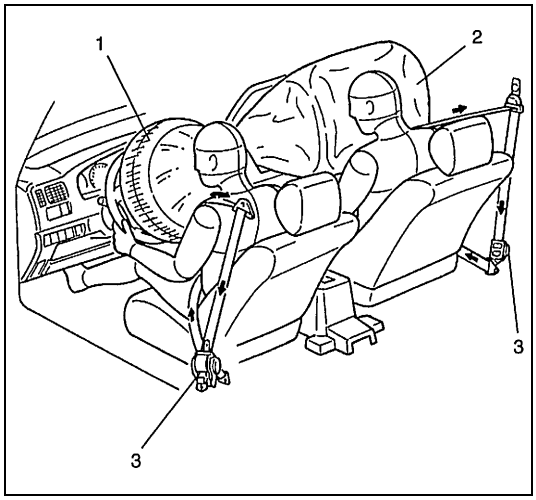
Be sure to use the specified digital multimeter. Otherwise, air bag (inflator) module deployment or personal injury may result.

NOTE:

- **“A” : This set includes the following items.**
  1. Connector test adapter kit (09932-75020), 2. Connector test adapter & shorting bar release tool (09932-76020)
- **“B” : Digital multimeter specification : Maximum test current is 10 mA or less at minimum range of resistance measurement.**
- **“C” : This kit includes the following items and substitutes for the Tech 2 kit.**
  1. Tech 2, 2. PCMCIA card, 3. DLC cable, 4. SAE 16/19 adapter, 5. Cigarette cable, 6. DLC loopback adapter, 7. Battery power cable, 8. RS232 cable, 9. RS232 adapter, 10. RS232 loopback connector, 11. Storage case, 12. Power supply
- **“D” : These connector are spare connector for adaptor cable (09932-78320).**

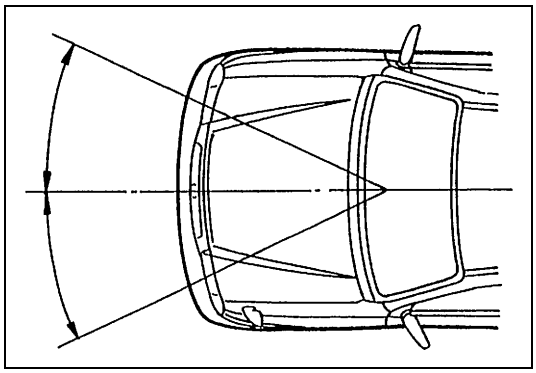
CANVAS TOP MODEL

General Description

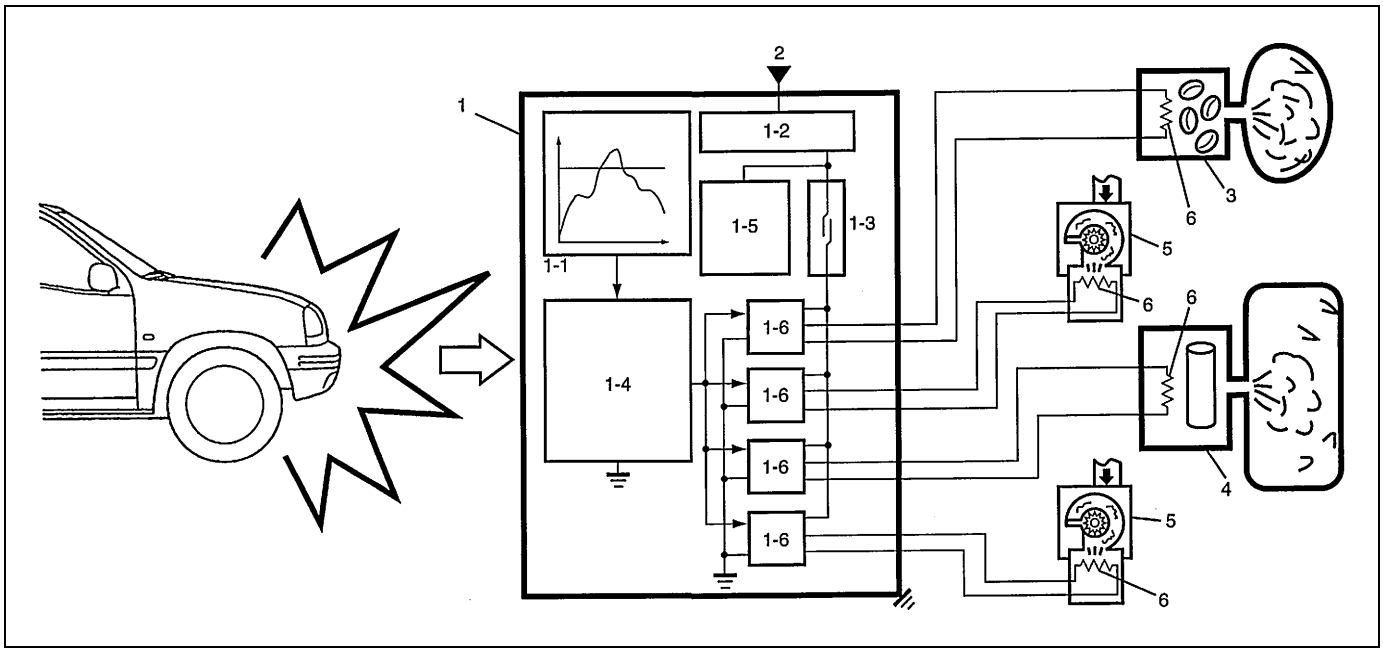


With the air bag system which includes air bags for both the driver's and passenger's sides as well as the seat belt pretensioners (if equipped), the sag of the seat belt is taken up, the driver air bag (inflator) module is deployed from the center of the steering column and the passenger air bag (inflator) module from the top of the instrument panel in front of the front passenger seat in occurrence of a front collision with an impact larger than a certain set value to supplement protection offered by the driver and front passenger seat belts.

1.	Driver side air bag
2.	Passenger side air bag
3.	Seat belt pretensioner (if equipped)

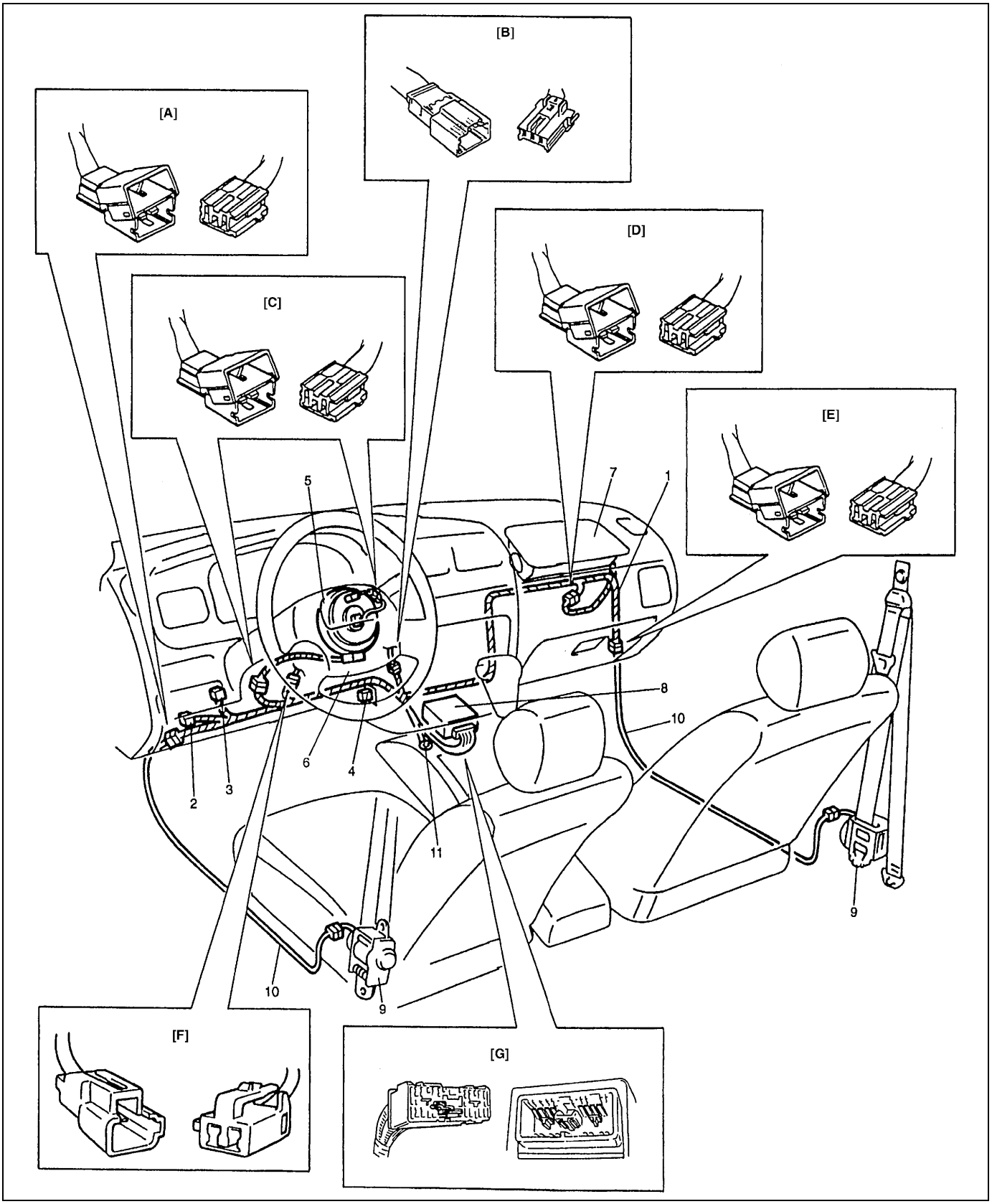


The air bag system is designed to activate only in severe frontal collisions. It is not designed to activate in rear impacts, side impacts, rollovers, or minor frontal collisions, since it would offer no protection in those types of accidents.



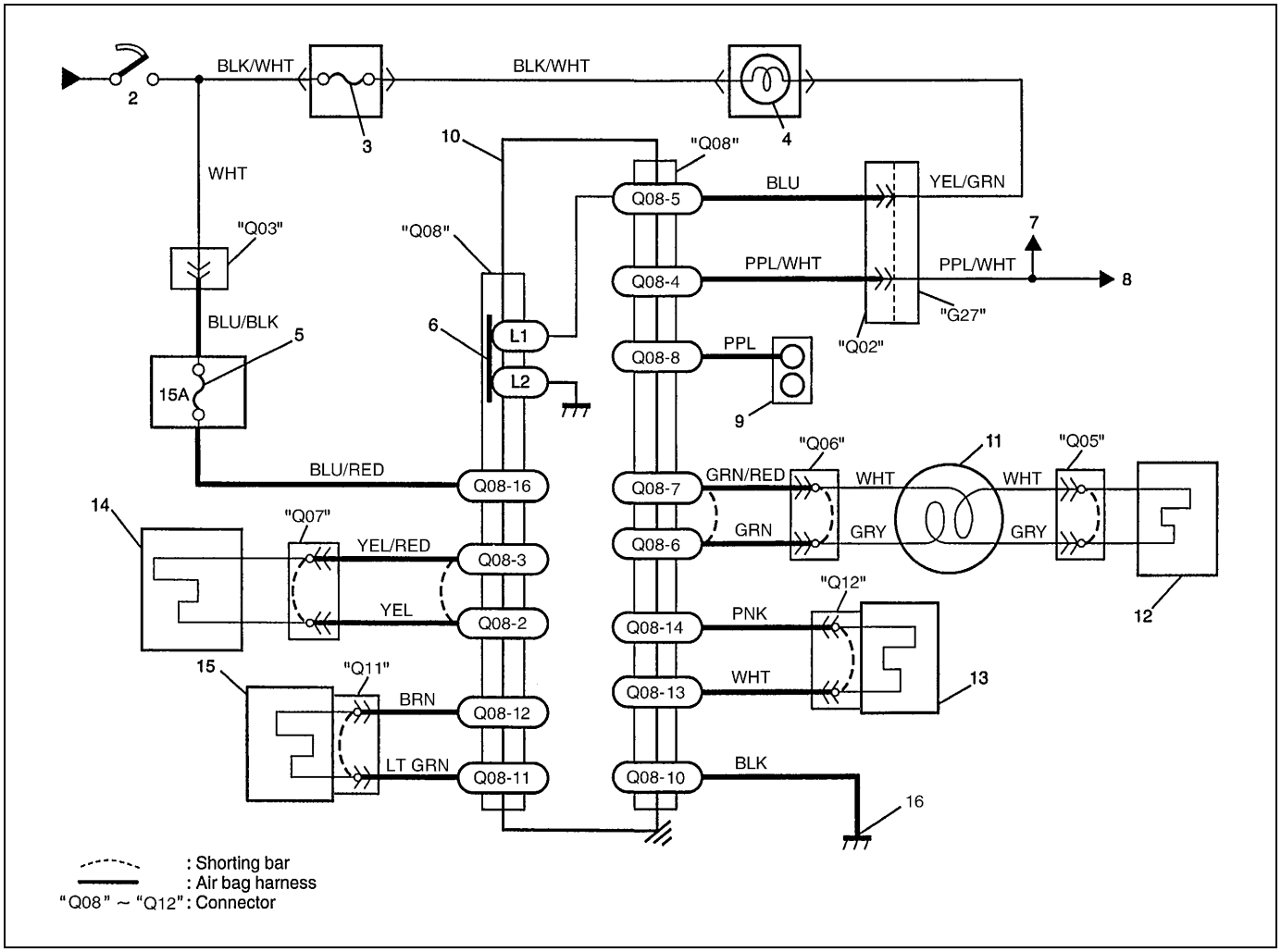
1. SDM	1-4. Micro-controller	3. Driver air bag
1-1. Sensor	1-5. Energy reserve circuit	4. Passenger air bag
1-2. Voltage converter	1-6. Ignition driver circuit	5. Seat belt pretensioner (if equipped)
1-3. Safing sensor	2. Power source	6. Squib circuit

System Components and Wiring Location View and Connectors



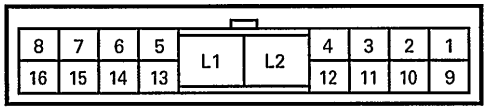
[A] : CONNECTOR “Q12”	[G] : CONNECTOR “Q08”	6. Driver air bag (inflator) module
[B] : CONNECTOR “Q02”, “G27”	1. Air bag harness	7. Passenger air bag (inflator) module
[C] : CONNECTOR “Q06”, “Q05”	2. “AIR BAG” fuse box	8. SDM
[D] : CONNECTOR “Q07”	3. “AIR BAG” monitor coupler	9. Seat belt pretensioner (retractor assembly) (if equipped)
[E] : CONNECTOR “Q11”	4. DLC	10. Pretensioner harness (if equipped)
[F] : CONNECTOR “Q03”	5. Contact coil assembly	11. Ground for air bag system

System Wiring Diagram



1. From main fuse	7. To ECM (or PCM), Immobilizer control module (if equipped) and ABS controller (if equipped)	13. Driver seat belt pretensioner (if equipped)
2. Ignition switch	8. To data link connector (DLC)	14. Passenger air bag (inflator) module
3. “IG.COIL METER” fuse in J/B	9. “AIR BAG” monitor coupler	15. Passenger seat belt pretensioner (if equipped)
4. “AIR BAG” warning lamp in combination meter	10. SDM	16. Ground for air bag system
5. “AIR BAG” fuse in “AIR BAG” fuse box	11. Contact coil assembly	
6. Connection detection pin	12. Driver air bag (inflator) module	

TERMINAL ARRANGEMENT OF SDM (VIEWED FROM HARNESS SIDE)



"Q08"

CONNECTOR “A” (SDM connector)

TERMINAL	CIRCUIT		TERMINAL	CIRCUIT	
Q08-1	–		Q08-10	Ground	
Q08-2	Passenger air bag (inflator) module	Low	Q08-11	Passenger pretensioner	Low
Q08-3		High	Q08-12		High
Q08-4	Data link connector (DLC)		Q08-13	Driver pretensioner	Low
Q08-5	“AIR BAG” warning lamp		Q08-14		High
Q08-6	Driver air bag (inflator) module	Low	Q08-15	–	
Q08-7		High	Q08-16	Ignition switch (power source)	
Q08-8	Diagnosis switch		L1	Connection detection pin	
Q08-9	–		L2		

Diagnosis

WARNING:
To avoid deployment when troubleshooting the air bag system, do not use electrical test equipment such as a battery powered or AC powered voltmeter, ohmmeter, etc., or any type of electrical equipment other than that specified in this manual. Do not use a non-powered probe type tester. Instructions in this manual must be followed carefully, otherwise personal injury may result.

Diagnostic Trouble Codes

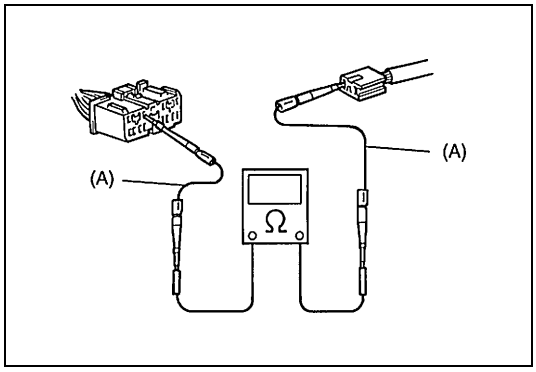
The "Air Bag Diagnostic System Check" must always be the starting point of any air bag system diagnosis. The "Air Bag Diagnostic System Check" checks for proper "AIR BAG" warning lamp operation and checks for air bag diagnostic trouble codes using SUZUKI scan tool or on-board diagnosis function.

- Current diagnostic trouble code – Malfunction that are presently being detected.
- History diagnostic trouble code – All malfunction detected since the last time the history memory was cleared.

Use of Special Tools

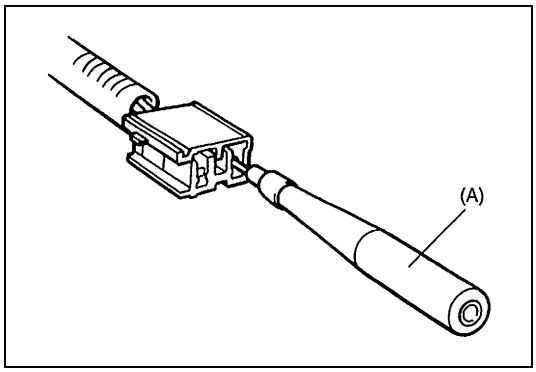
WARNING:
To avoid deployment when troubleshooting the air bag system, do not use electrical test equipment such as a battery powered or AC powered voltmeter, ohmmeter, etc., or any type of electrical equipment other than that specified in this manual. Do not use a non-powered probe type tester. Instructions in this manual must be followed carefully, otherwise personal injury may result.

You should be familiar with the tools listed under "Special Tools" in this section. You should be able to measure voltage and resistance. You should be familiar with proper use of a scan tool such as SUZUKI scan tool Diagnostic Computer, Driver/Passenger Load Tool, Connector Test Adapter Kit and the Digital Multimeter.

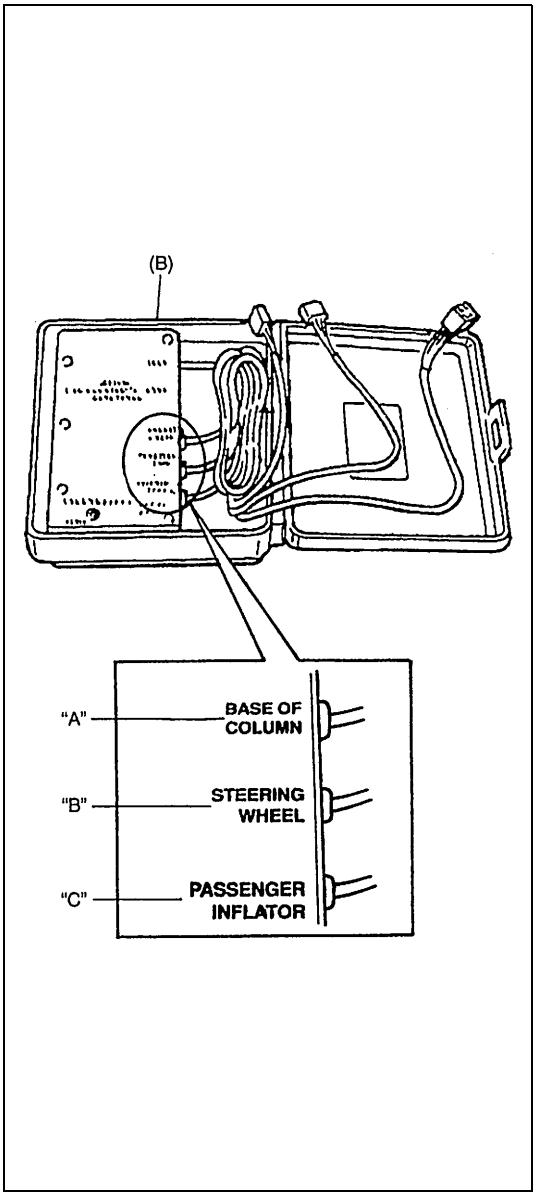


Special tool (Connector Test Adapter Kit)
(A) : 09932-76010

This must be used whenever a diagnostic procedure requests checking or probing a terminal.
Using the appropriate adapter in the special tool will ensure that no damage to the terminal will occur from the multimeter probe, such as spreading or bending.



The adapter will also give an idea of whether contact tension is sufficient, helping to find an open or intermittent open due to poor terminal contact.



Special tool (Air Bag Driver/Passenger Load Tool)
(B) : 09932-75010

This tool is used only when called for in this section. It is used as a diagnostic aid and safety device to prevent inadvertent air bag (inflator) module deployment and seat belt pretensioner activation.
The load tool has three connectors attached to its case are electrically functional and serve as resistive load substitutions.
No more than two connectors are used at any time.

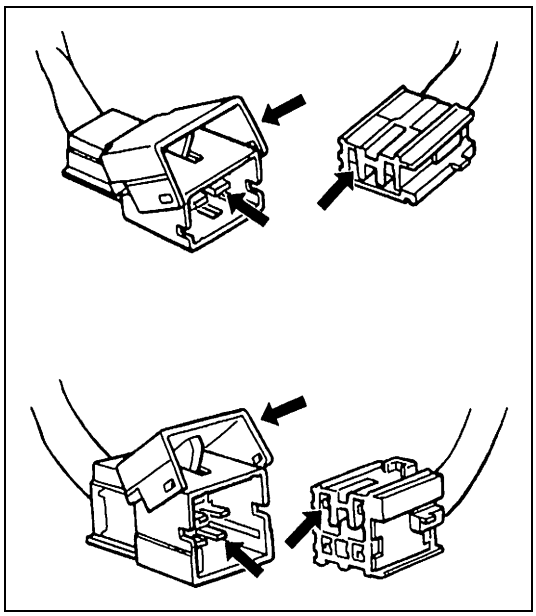
One of connectors ("A" : BASE OF COLUMN) is used to substitute the load of the driver air bag (inflator) module and the contact coil assembly when it is connected at the base of the column to the air bag wire harness.
Another connector ("B" : STEERING WHEEL) is used to substitute the load of followings.

- Driver air bag (inflator) module when it is connected at the top of the column to the contact coil assembly.
- Passenger air bag (inflator) module when it is connected to the air bag harness connector for passenger air bag (inflator) module.
- Driver and passenger seat belt pretensioner when it is connected to air bag harness connector for driver and passenger seat belt pretensioner.

The third connector ("C" : PASSENGER INFLATOR) is not used.
By substituting the resistance of the load tool when called for, a determination can be made as to whether an inflator circuit component is causing system malfunction and which component is causing the malfunction.
The load tool should be used only when specifically called for in the diagnostic procedures.

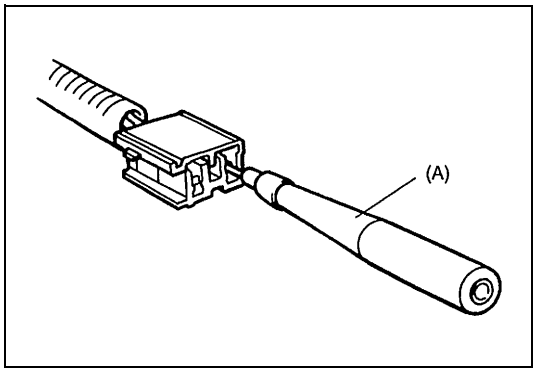
Intermittent and Poor Connections

Most intermittent are caused by faulty electrical connections or wiring. When a check for proper connection is requested in a diagnostic flow table, perform careful check of suspect circuits for :



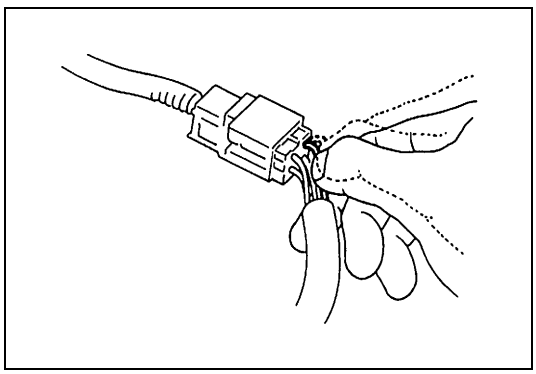
- Poor mating of connector halves, or terminals not fully seated in the connector body (backed out).
- Dirt or corrosion on the terminals. The terminals must be clean and free of any foreign material which could impede proper terminal contact.
  However, cleaning the terminal with a sand paper or the like is prohibited.
- Damaged connector body, exposing the terminals to moisture and dirt, as well as not maintaining proper terminal orientation with the component or mating connector.
- Improperly formed or damaged terminals.

If any abnormality is found, repair or replace as a wire harness assembly.

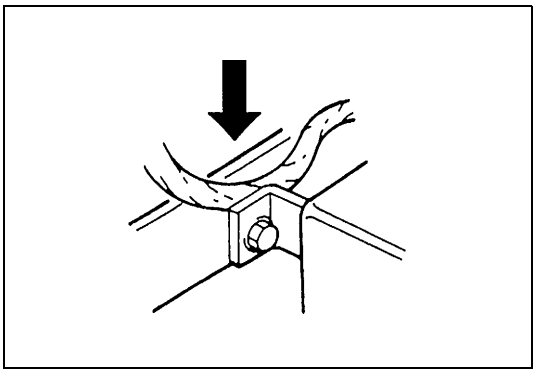


Check each connector terminal in problem circuits carefully to ensure good contact tension by using the corresponding mating terminal included in the connector test adapter kit (special tool).
If contact tension is not enough, reform it to increase contact tension or replace.

Special tool (Connector Test Adapter Kit)
(A) : 09932-76010



- Poor terminal-to-wire connection.
  Check each wire harness in problem circuits for poor connection by shaking it by hand lightly.
  If any abnormal condition is found, change the wire harness assembly or component parts with new ones.



- Wire insulation which is rubbed through, causing an intermittent short as the bare area touches other wiring or parts of the vehicle.
- Wiring broken inside the insulation. This condition could cause a continuity check to show a good circuit, but if only 1 or 2 strands of a multi-strand-type wire are intact, resistance could be far too high.

If any abnormality is found, repair or replace as a wire harness assembly.

Air Bag Diagnostic System Check

WARNING:

To avoid deployment when troubleshooting the air bag system, do not use electrical test equipment such as a battery powered or AC powered voltmeter, ohmmeter, etc., or any type of electrical equipment other than that specified in this manual. Do not use a non-powered probe type tester. Instructions in this manual must be followed carefully, otherwise personal injury may result.

CAUTION:

The order in which diagnostic trouble codes are diagnosed is very important. Failure to diagnose the diagnostic trouble codes in the order specified may result in extended diagnostic time, incorrect diagnosis and incorrect parts replacement.

The diagnostic procedures used in this section are designed to find and repair air bag system malfunctions. To get the best results, it is important to use the diagnostic flow tables and follow the sequence listed below.

1) PERFORM THE “AIR BAG DIAGNOSTIC SYSTEM CHECK FLOW TABLE”
   The “Air Bag Diagnostic System Check Flow Table” must be the starting point of any air bag system diagnostics.
   The “Air Bag Diagnostic System Check Flow Table” checks for proper “AIR BAG” warning lamp operation, the ability of the SDM to communicate through “AIR BAG” warning lamp and whether air bag diagnostic trouble codes exist.
2) REFER TO THE PROPER DIAGNOSTIC TABLE AS DIRECTED BY THE “AIR BAG DIAGNOSTIC SYSTEM CHECK FLOW TABLE”.
   The “Air Bag Diagnostic System Check Flow Table” will lead you to the correct chart to diagnose any air bag system malfunctions. Bypassing these procedures may result in extended diagnostic time, incorrect diagnosis and incorrect parts replacement.
3) REPEAT THE “AIR BAG DIAGNOSTIC SYSTEM CHECK FLOW TABLE” AFTER ANY REPAIR OR DIAGNOSTIC PROCEDURES HAVE BEEN PERFORMED.
   Performing the “Air Bag Diagnostic System Check Flow Table” after all repair or diagnostic procedures will ensure that the repair has been made correctly and that no other malfunctions exist.

Air Bag Diagnostic System Check Flow Table

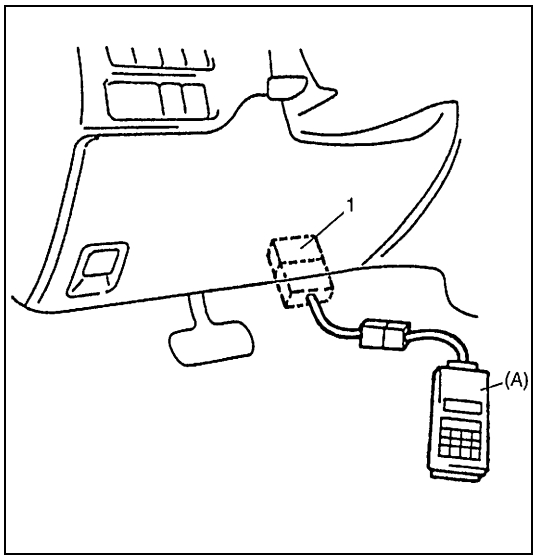
Step	Action	Yes	No
1	1) Make sure that battery voltage is about 11V or higher. 2) Note "AIR BAG" warning lamp as ignition switch is turned ON. 3) Does "AIR BAG" warning lamp flash 6 times when ignition switch is turned ON?	Go to Step 2.	Proceed to "Table B – AIR BAG Warning Lamp Does Not Come ON" in this section.
2	Does "AIR BAG" warning lamp keep flashing (indicating DTC) when ignition switch is turned ON?	Proceed to "Table C – AIR BAG Warning Lamp Flashes" in this section.	Go to Step 3.
3	After flashing 6 times then does "AIR BAG" warning lamp turned OFF?	Go to Step 4.	Go to Step 7.
4	Is SUZUKI scan tool available?	Go to Step 5.	Go to Step 6.
5	Check DTC referring to "Diagnostic Trouble Code (DTC) Check" in this section. Is "NO CODES" displayed? See NOTE 1.	Air bag system is in good condition.	See NOTE 2. An intermittent trouble has occurred at some place. Check the connector harness, etc. related to the sensed DTC referring to "Intermittent and Poor Connections" in this section. Then clear DTC referring to "Diagnostic Trouble Code (DTC) Clearance" in this section.
6	Check DTC referring to "Diagnostic Trouble Code (DTC) Check" in this section. Is DTC 12 indicated?	Air bag system is in good condition.	See NOTE 2. An intermittent trouble has occurred at some place. Check the connector harness, etc. related to the sensed DTC referring to "Intermittent and Poor Connections" in this section. Then clear DTC referring to "Diagnostic Trouble Code (DTC) Clearance in this section.
7	Is SUZUKI scan tool available?	Go to Step 8.	Go to Step 9.
8	Check DTC referring to "Diagnostic Trouble Code (DTC) Check" in this section. Is "NO CODES" displayed? See NOTE 1.	Proceed to "Table A – AIR BAG Warning Lamp Comes ON Steady" in this section.	See NOTE 2. Check and repair according to Flow Table Corresponding to that DTC.
9	Check DTC referring to "Diagnostic Trouble Code (DTC) Check" in this section. Is DTC 12 indicated?	Proceed to "Table A – AIR BAG Warning Lamp Comes ON Steady" in this section.	See NOTE 2. Check and repair according to Flow Table corresponding to that DTC.

NOTE:

1. If SDM can not communicate through serial data circuit, proceed to "Table D – SDM Can Not Communicate Through The Serial Data Circuit" in this section.
2. As execution of the "Diagnostic Trouble Code (DTC) Clearance" will clear all DTCs, be sure to record all DTCs before servicing.

Diagnostic Trouble Code (DTC) Check

[Using SUZUKI Scan Tool]



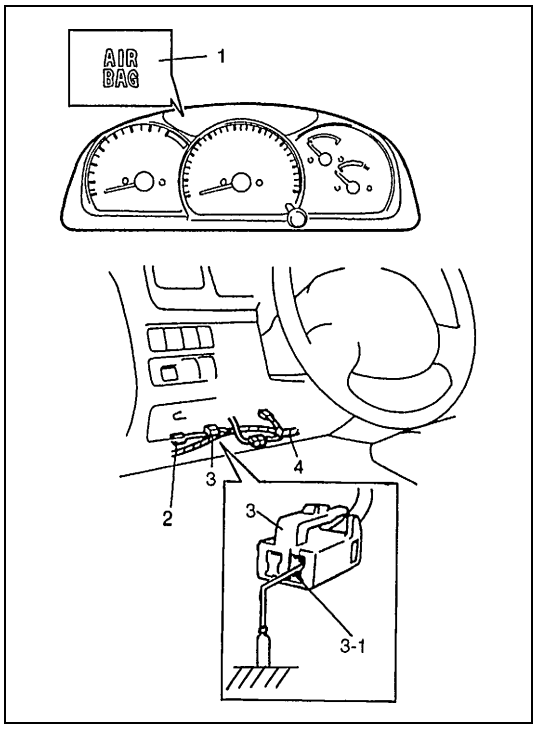
1) Turn ignition switch OFF.
2) After setting cartridge to SUZUKI scan tool, connect it to data link connector (DLC) located on underside of instrument panel at driver's seat side.

Special tool
(A) : SUZUKI scan tool

3) Turn ignition switch ON.
4) Read DTC according to instructions displayed on SUZUKI scan tool and print it or write it down. Refer to SUZUKI scan tool operator's manual for further details.
5) After completing the check, turn ignition switch OFF and disconnect SUZUKI scan tool from data link connector (DLC).

1. Data link connector (DLC)

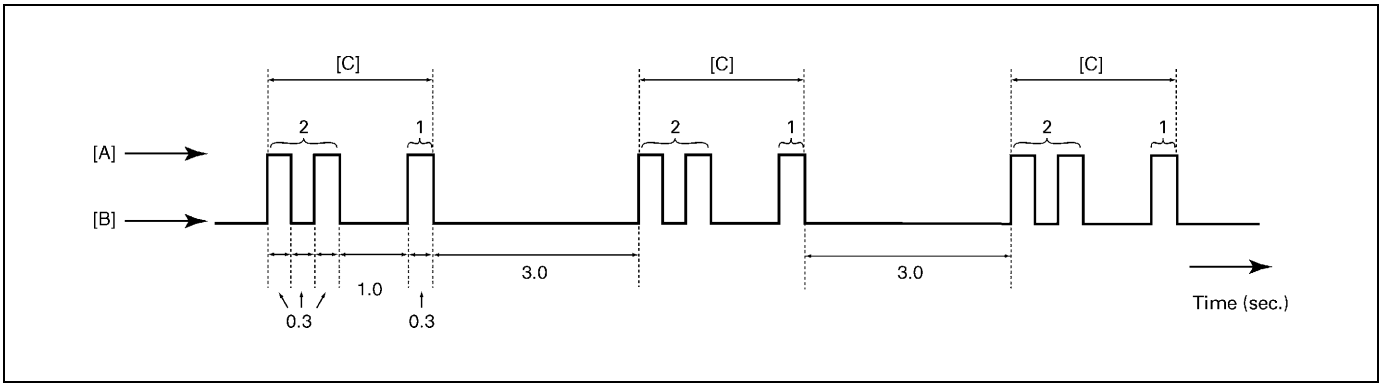
[Not Using SUZUKI Scan Tool]



1) Check that malfunction indicator lamp ("AIR BAG" warning lamp) comes ON when ignition switch is turned ON.
   If it does not come "ON", proceed to "Table B".
2) Using service wire, ground diagnosis switch terminal in monitor coupler.
3) Read DTC from flashing pattern of malfunction indicator lamp ("AIR BAG" warning lamp). (Refer to "Diagnostic Trouble Code Table")
4) After completing the check, turn ignition switch OFF and disconnect service wire from "AIR BAG" monitor coupler.

1. "AIR BAG" warning lamp
2. "AIR BAG" fuse box
3. "AIR BAG" monitor coupler
3-1. Diagnostic switch terminal
4. Air bag harness (covered yellow tube)

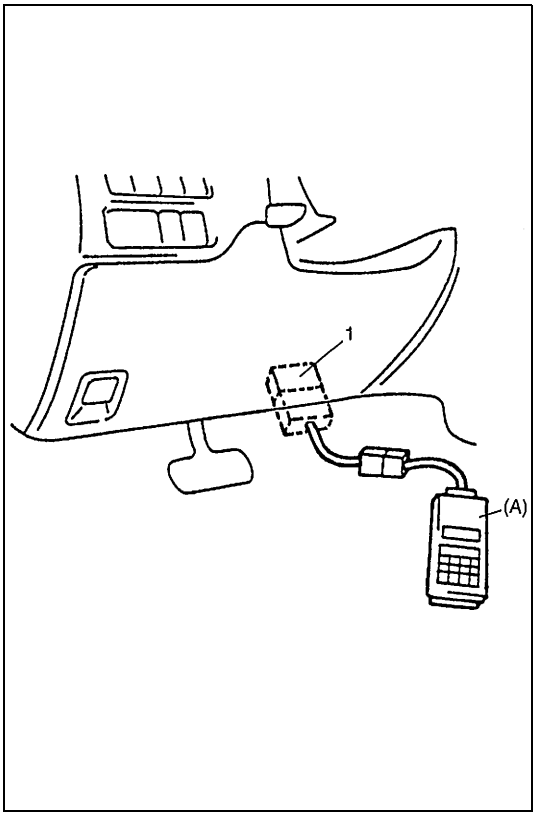
EXAMPLE: When driver air bag initiator circuit resistance high (Code No.21) is set



[A] : "AIR BAG" warning lamp is turned ON
[B] : "AIR BAG" warning lamp is turned OFF
[C] : Code No.21

Diagnostic Trouble Code (DTC) Clearance

[Using SUZUKI Scan Tool]



1) Turn ignition switch OFF.
2) Connect SUZUKI scan tool to data link connector (DLC) in the same manner as when making this connection for DTC check.

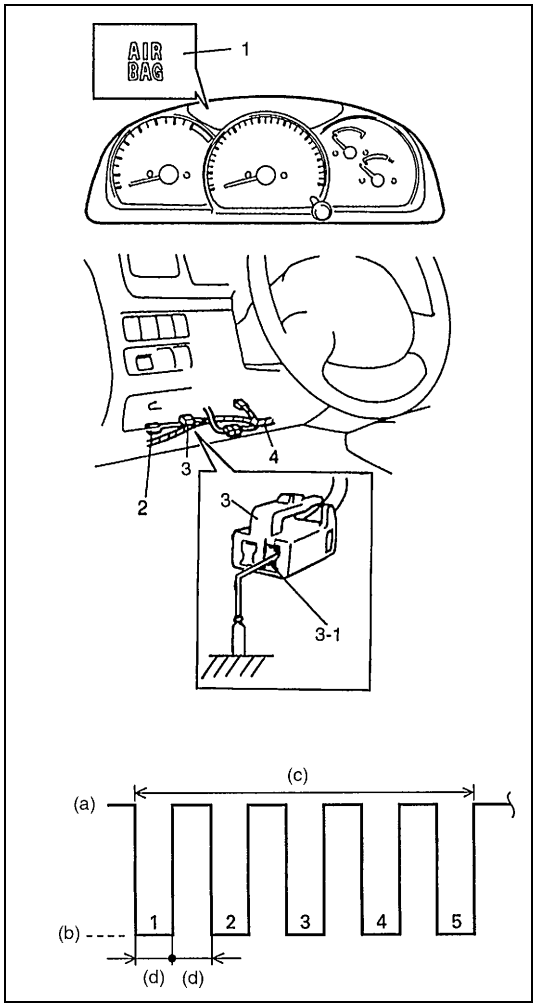
Special tool
(A) : SUZUKI scan tool

3) Turn ignition switch ON.
4) Erase DTC according to instructions displayed on SUZUKI scan tool.
5) Refer to SUZUKI scan tool operator's manual for further details.
6) After completing the check, turn ignition switch OFF and disconnect SUZUKI scan tool from data link connector (DLC).
7) Perform "Diagnosis Trouble Code (DTC) Check" and confirm that normal DTC (NO CODES) is displayed and not malfunction DTC.

NOTE:

If DTC 51 or DTC 71 is stored in SDM, it is not possible to clear DTC.

1. Data link connector (DLC)



[Not Using SUZUKI Scan Tool]

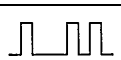
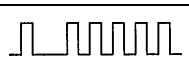
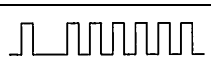
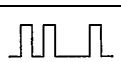
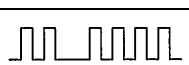
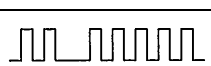
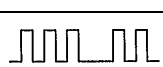
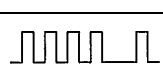
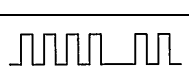
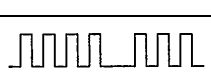
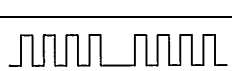
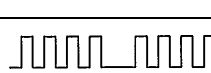
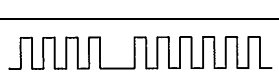
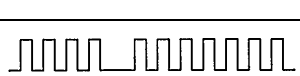
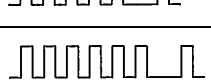
1) Turn ignition switch ON and wait about 6 seconds or more.
2) Using service wire, repeat shorting and opening between diagnosis switch terminal and ground terminal on “AIR BAG” monitor coupler 5 times at about 1 second intervals.
3) Perform “Diagnosis Trouble Code (DTC) Check” and confirm that normal DTC (DTC 12) is displayed and not malfunction DTC.

NOTE:

If DTC 51 or DTC 71 is stored in SDM, it is not possible to clear DTC.

1. “AIR BAG” warning lamp	(a) : Open
2. “AIR BAG” fuse box	(b) : Short
3. “AIR BAG” monitor coupler	(c) : About 10 seconds
3-1. Diagnostic switch terminal	(d) : 1 sec.
4. Air bag harness (covered yellow tube)	

Diagnostic Trouble Code Table

DIAGNOSTIC TROUBLE CODE		DIAGNOSIS		
NO.	MODE			
12		Normal		–
15		Passenger air bag circuit	Resistance high	Diagnose trouble according to “Diagnostic Flow Table” corresponding to each code No.
16			Resistance low	
18			Short to ground	
19			Short to power circuit	
21		Driver air bag circuit	Resistance high	
22			Resistance low	
24			Short to ground	
25			Short to power circuit	
31		Power source voltage	Too high	
32			Too low	
41		Driver pretensioner circuit (if equipped)	Resistance high	Diagnose trouble according to “Diagnostic Flow Table” corresponding to each code No.
42			Resistance low	
43			Short to ground	
44			Short to power circuit	
45		Passenger pretensioner circuit (if equipped)	Resistance high	
46			Resistance low	
47			Short to ground	
48			Short to power circuit	
51		SDM	Frontal crash detected	
61		“AIR BAG” warning lamp circuit		
71		SDM	Internal fault	

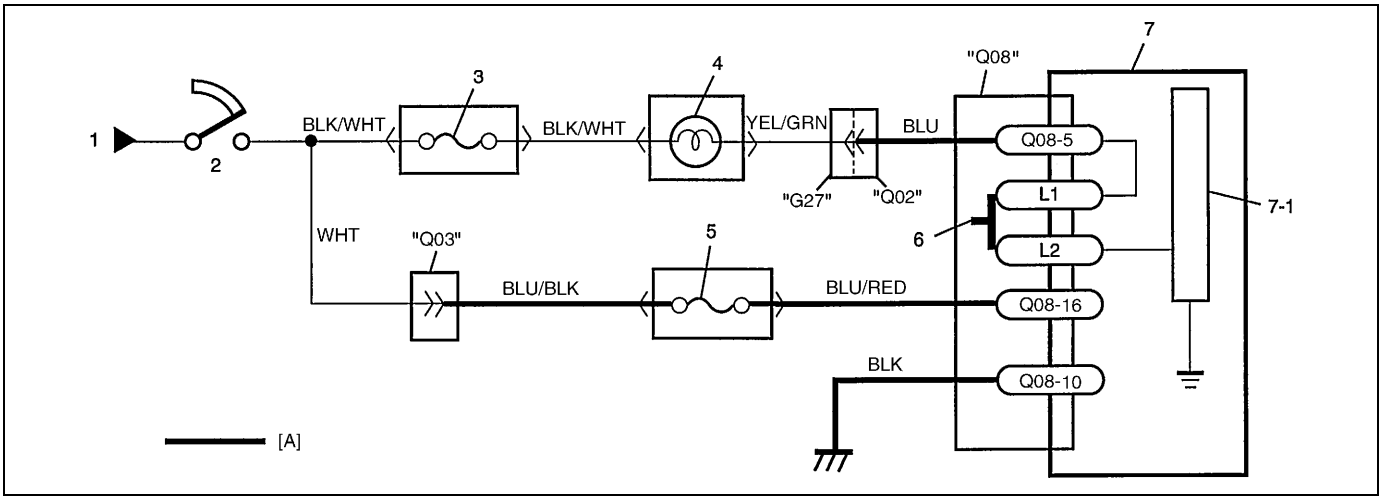
NOTE:

- **When 2 or more codes are indicated, the lowest numbered code will appear first.**
- **If a code not listed on the table is displayed, then the SDM is faulty.**
- **Current DTC and history DTC can be identified by lighting and flashing of "AIR BAG" warning lamp as follows.**

	Current DTC is set. (Abnormality exists at present.)	History DTC is set only. (Faulty condition occurred once in the past but normal condition is restored at present.)
"AIR BAG" warning lamp after ignition switch ON	Remains ON.	Flashing 6 times and turns OFF.
"AIR BAG" warning lamp when grounding diagnosis switch	Current DTC is displayed.	History DTC is displayed.

However, if a multiple number of DTC's are set an even one of them is a current DTC, "AIR BAG" warning lamp remains on after ignition switch is turned ON. Therefore, it is not possible to identify any of them as to whether it is a current one or a history one. (But use of SUZUKI scan tool will make identification possible.)

Table A – "Air Bag" Warning Lamp Comes "ON" Steady



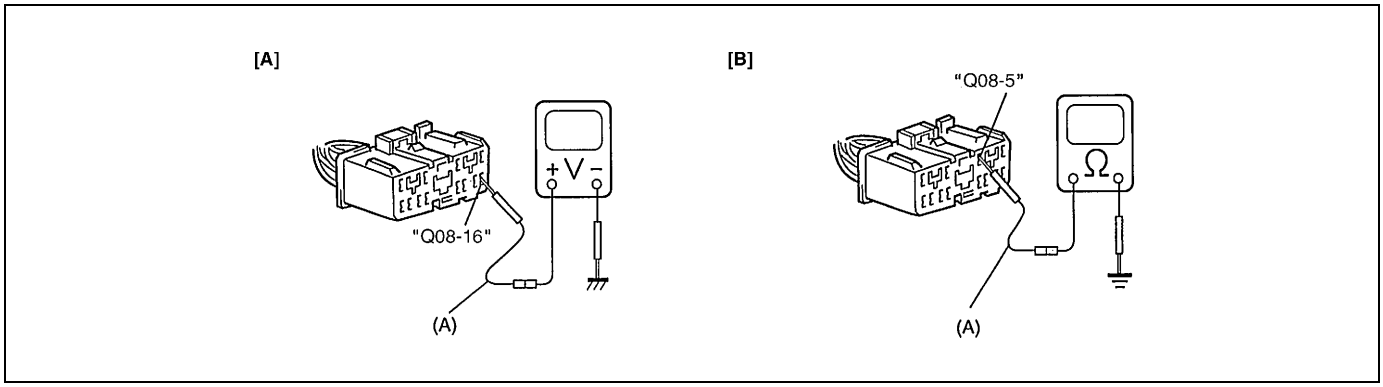
[A] : Air bag harness	5. "AIR BAG" fuse in "AIR BAG" fuse box
1. From main fuse	6. Connection detection pin
2. Ignition switch	7. SDM
3. "IG.COIL METER" fuse in J/B	7-1. "AIR BAG" warning lamp driver circuit
4. "AIR BAG" warning lamp in combination meter	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

Step	Action	Yes	No
1	1) Ignition switch OFF. 2) Remove and inspect "AIR BAG" fuse. Is fuse good?	Go to Step 2.	"BLU/RED" wire short to ground. After repair, replace "AIR BAG" fuse.
2	1) Disconnect SDM. 2) Check proper connection to SDM at terminal "Q08-16". 3) If OK then check voltage between "Q08-16" terminal of SDM connector and body ground with ignition switch ON. Is it 8 V or more?	Go to Step 3.	"BLU/RED" wire (between "AIR BAG" fuse and SDM connector) open "BLU/BLK" wire (between ignition switch and "AIR BAG" fuse) open or short to ground.
3	1) Disconnect 16p connector from combination meter, referring to Section 8C. 2) Check resistance between "Q08-5" terminal of SDM connector and body ground. Is resistance 1 kΩ or more?	Substitute a known-good SDM and recheck.	"BLU" wire (between combination meter and SDM connector) short to ground.

[A] Fig. for STEP 2 / [B] Fig. for STEP 3



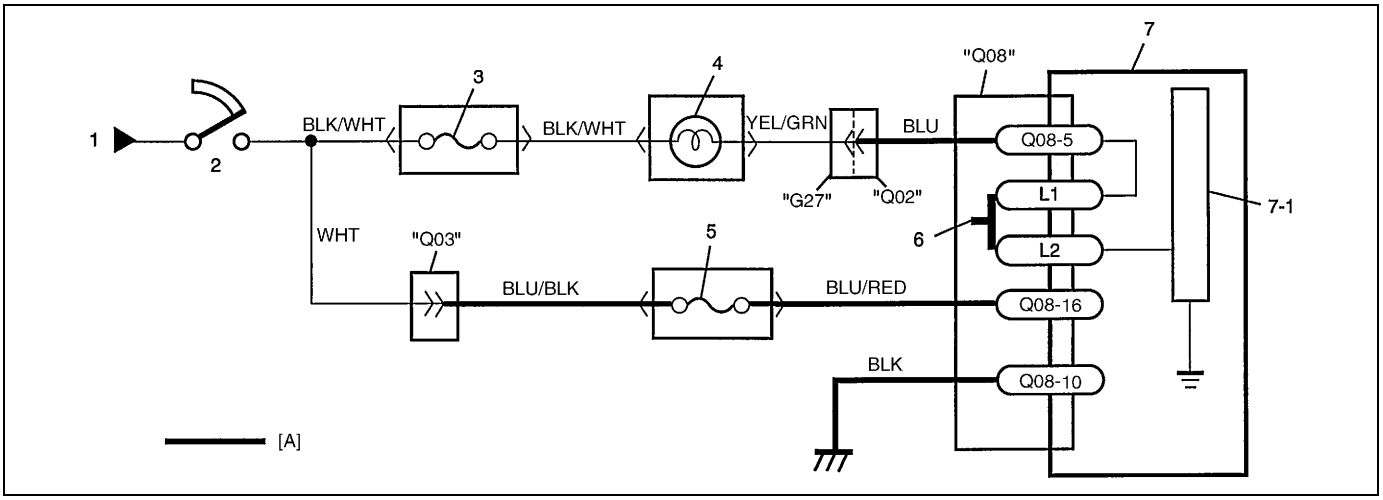
Special tool
(A) : 09932-76010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Repeat "Air Bag Diagnostic System Check Flow Table" to confirm that the trouble has been corrected.**

Table B – "Air Bag" Warning Lamp Does Not Come "ON"



[A] : Air bag harness	5. "AIR BAG" fuse in "AIR BAG" fuse box
1. From main fuse	6. Connection detection pin
2. Ignition switch	7. SDM
3. "IG.COIL METER" fuse in J/B	7-1. "AIR BAG" warning lamp driver circuit
4. "AIR BAG" warning lamp in combination meter	

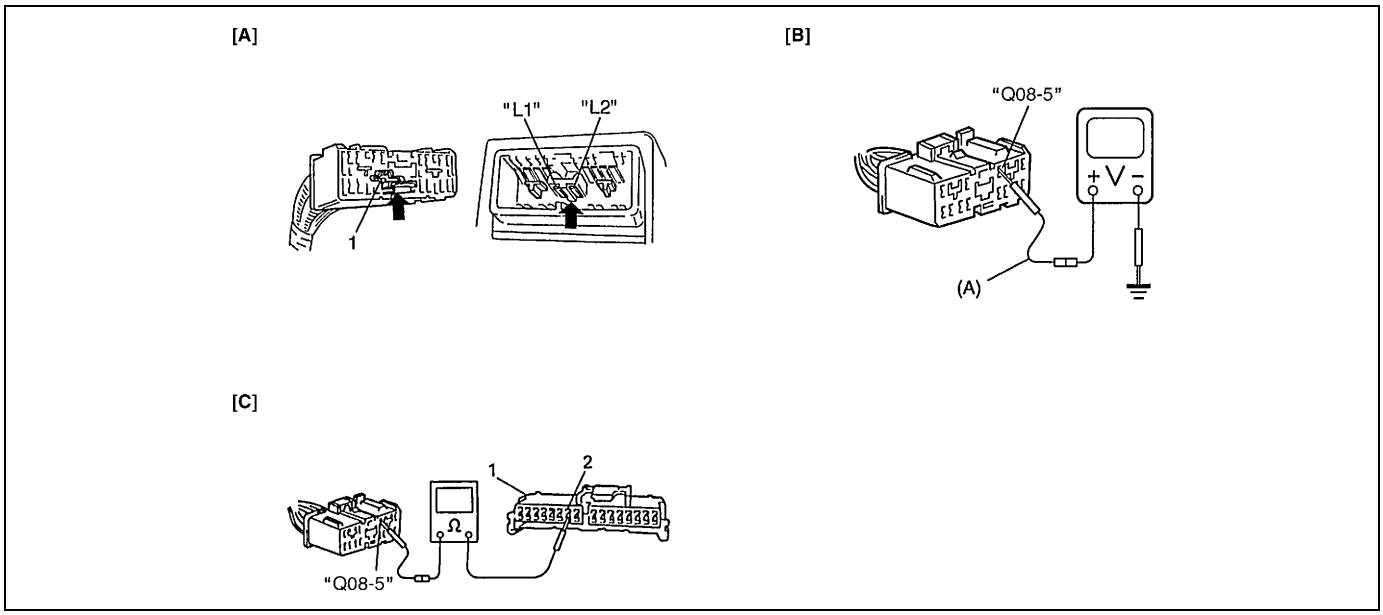
CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

Step	Action	Yes	No
1	1) Set parking brake. 2) Note combination meter as ignition switch is turned ON. Does the "BRAKE" indicator (warning lamp) come ON?	Go to Step 2.	"BLK/WHT" wire, "IG.COIL METER" fuse or J/B (between ignition switch and combination meter) open or short to ground.
2	1) With ignition switch OFF, disconnect SDM. 2) Check electrical connection check mechanism (connection detection pin (1)). Is it in good condition?	Go to Step 3.	Repair electrical connection check mechanism.
3	1) Disconnect SDM. 2) Check proper connection to SDM at terminal "Q08-5". 3) If OK then check voltage from "Q08-5" terminal of SDM connector to body ground with ignition switch ON. Is it 9 V or more?	Substitute a known-good SDM and recheck.	Go to Step 4.

Step	Action	Yes	No
4	1) Remove combination meter, referring to Section 8C. 2) Check proper connection to combination meter at terminal for “AIR BAG” warning lamp and to SDM at terminal “Q08-5”. 3) If OK then check resistance between “YEL/GRN” wire terminal (2) of combination meter connector (16p) (1) and “Q08-5” terminal of SDM connector. Is resistance 1 Ω or less?	Go to step 5.	Repair high resistance or open in “BLU” or “YEL/GRN” wire circuit (between combination meter and SDM).
5	1) Measure voltage from “Q08-5” terminal of SDM connector to body ground with ignition switch ON. Is it 9 V or more?	Repair short from “BLU” or “YEL/GRN” wire circuit (between combination meter and SDM) to power circuit.	Go to step 6.
6	1) Remove and inspect “AIR BAG” bulb. Is bulb good?	Substitute a known-good combination meter and recheck.	Replace bulb.

[A] Fig. for STEP 2 / [B] Fig. for STEP 3 and 5 / [C] Fig. for STEP 4



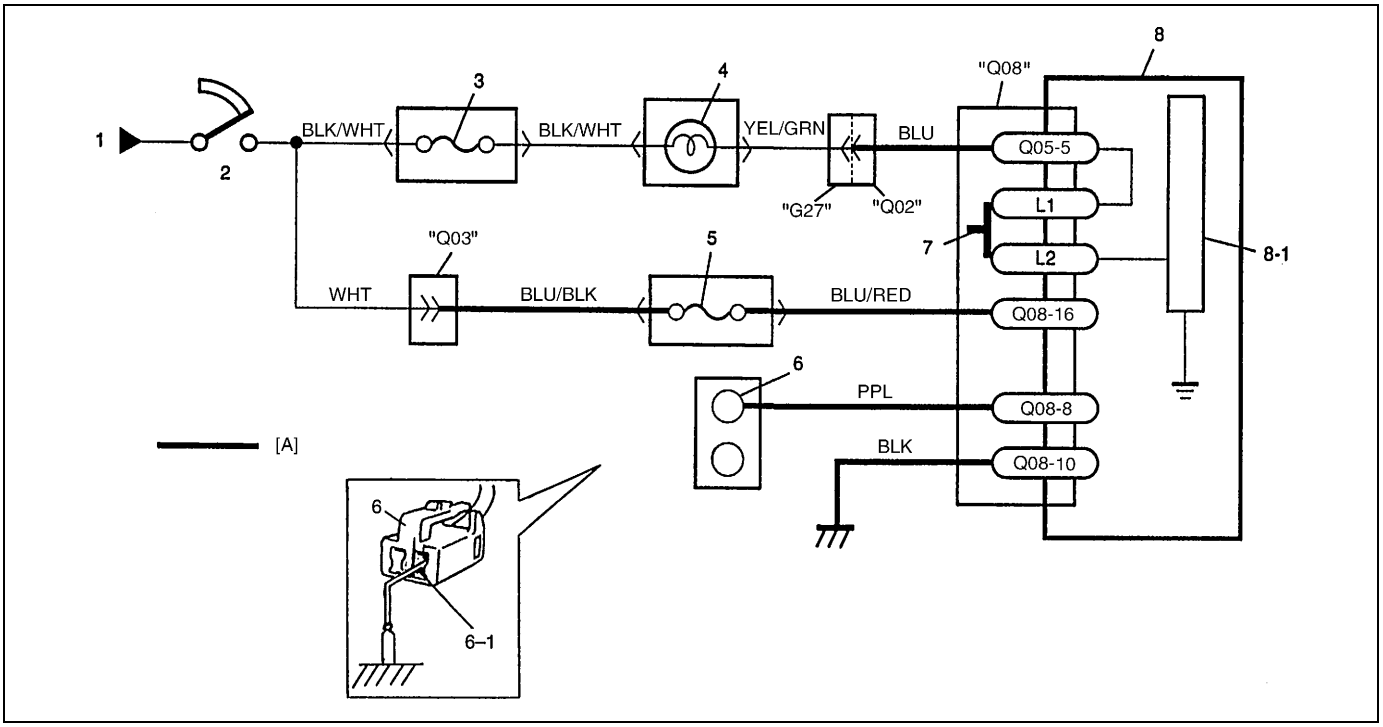
Special tool
(A) : 09932-76010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Repeat “Air Bag Diagnostic System Check Flow Table” to confirm that the trouble has been corrected.**

Table C – "Air Bag" Warning Lamp Flashes



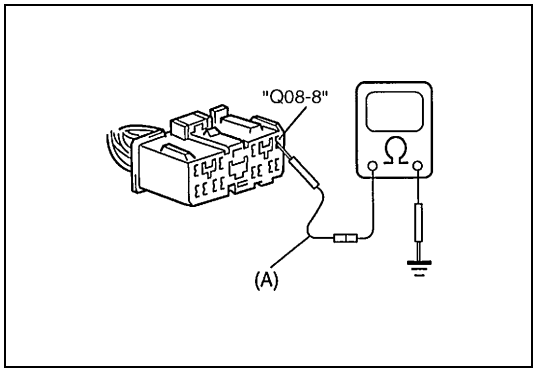
[A] : Air bag harness	4. "AIR BAG" warning lamp in combination meter	7. Connection detection pin
1. From main fuse	5. "AIR BAG" fuse in "AIR BAG" fuse box	8. SDM
2. Ignition switch	6. "AIR BAG" monitor coupler	8-1. "AIR BAG" warning lamp driver circuit
3. "IG.COIL METER" fuse in J/B	6-1. Diagnosis switch terminal	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

Step	Action	Yes	No
1	1) Check "AIR BAG" monitor coupler. Is it connected diagnosis switch terminal and ground terminal in "AIR BAG" monitor coupler by service wire?	Remove service wire.	Go to Step 2.
2	1) With ignition switch OFF, disconnect SDM. 2) Measure resistance between "Q08-8" terminal of SDM connector and body ground. Is resistance 1 kΩ or more?	Substitute a known-good SDM and recheck.	Repair short from "PPL" wire circuit to ground.

Fig. for STEP 2



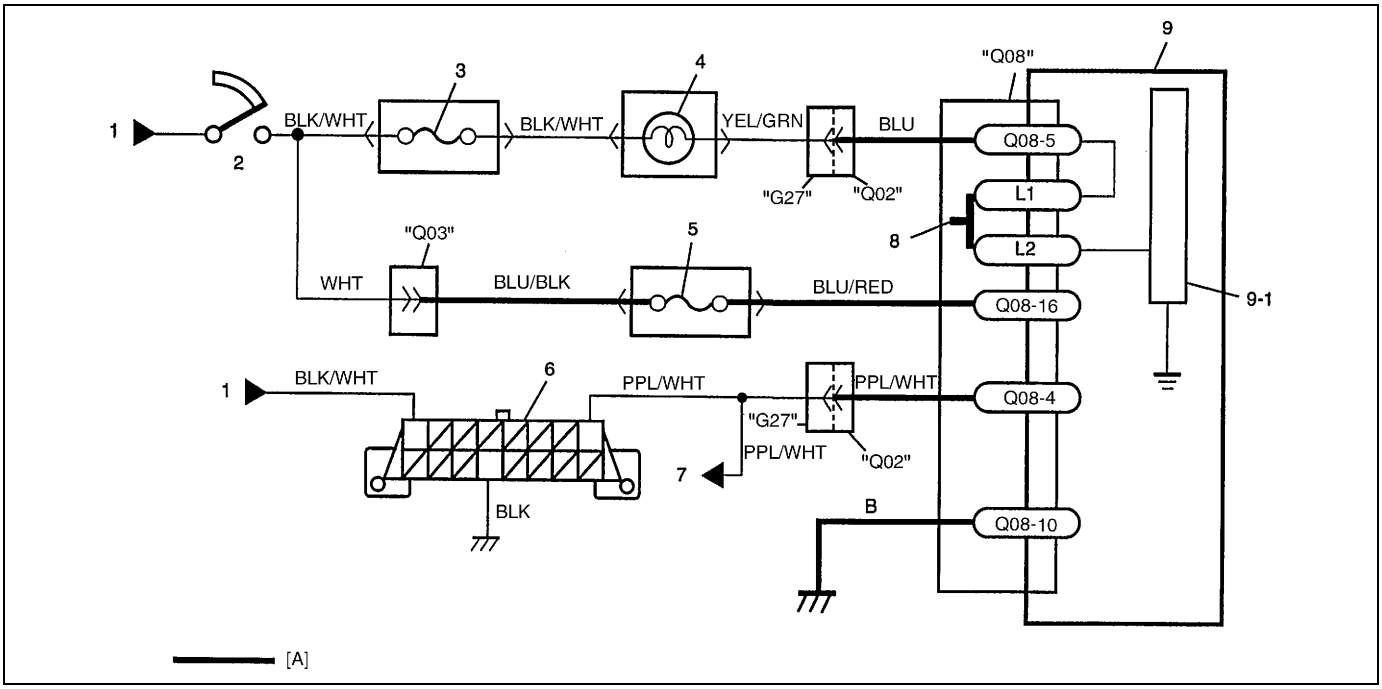
Special tool
(A) : 09932-76010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Repeat "Air Bag Diagnostic System Check Flow Table" to confirm that the trouble has been corrected.**

Table D – SDM Cannot Communicate Through the Serial Data Circuit



[A] : Air bag harness	4. "AIR BAG" warning lamp in combination lamp	8. Connection detection pin
1. From main fuse	5. "AIR BAG" fuse in "AIR BAG" fuse box	9. SDM
2. Ignition switch	6. DLC	9-1. "AIR BAG" warning lamp driver circuit
3. "IG.COIL METER" fuse in J/B	7. To, Immobilizer control module (if equipped)	

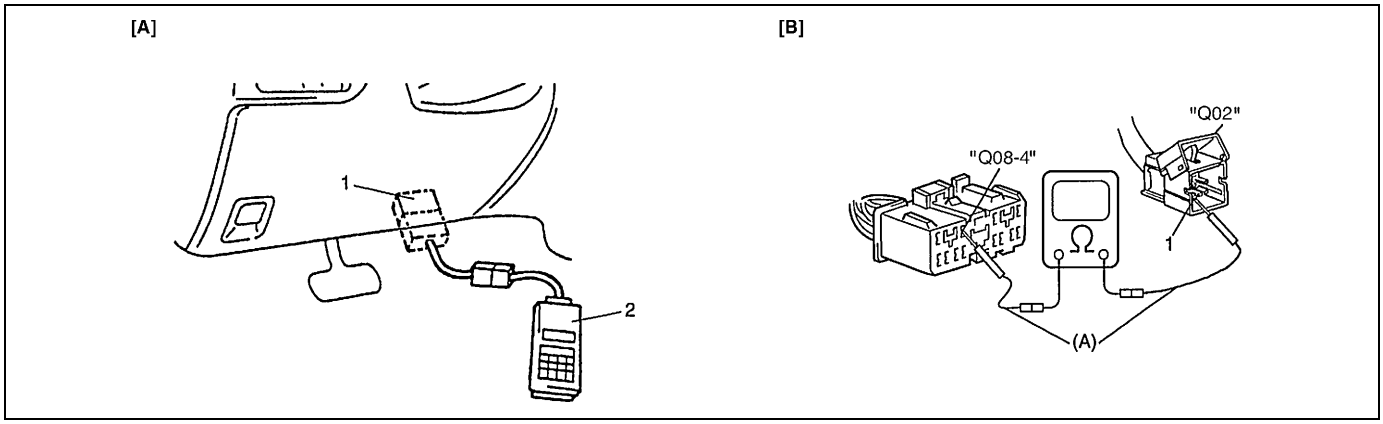
CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

Step	Action	Yes	No
1	1) Make sure that SUZUKI scan tool is free from malfunction and correct cartridge for air bag system is used. 2) Ignition switch OFF. 3) Check proper connection of SUZUKI scan tool (2) to DLC (1). Is connection in good condition?	Go to Step 2.	Properly connect scan tool to DLC.

Step	Action	Yes	No
2	1) Check if communication is possible by trying communication with other controller (ECM (or PCM), Immobilizer control module or ABS controller). Is it possible to communicate with other controller?	Go to Step 3.	Repair open in common section of serial data circuit (“WHT/BLK” wire circuit) used by all controllers or short to ground or power circuit which has occurred somewhere in serial data circuit (“WHT/BLK” wire circuit).
3	1) With ignition switch OFF, disconnect SDM and “Q02” connector. 2) Check proper connection at “WHT/BLK” wire terminal for DLC in “Q02” connector. 3) If OK, then check resistance between “WHT/BLK” wire terminal (1) in “Q02” connector and “Q08-4” terminal of SDM connector. Is resistance 1 Ω or less?	Substitute a known-good SDM and recheck.	Repair high resistance or open in “WHT/BLK” wire circuit (in air bag harness).

[A] Fig. for STEP 1 / [B] Fig. for STEP 3



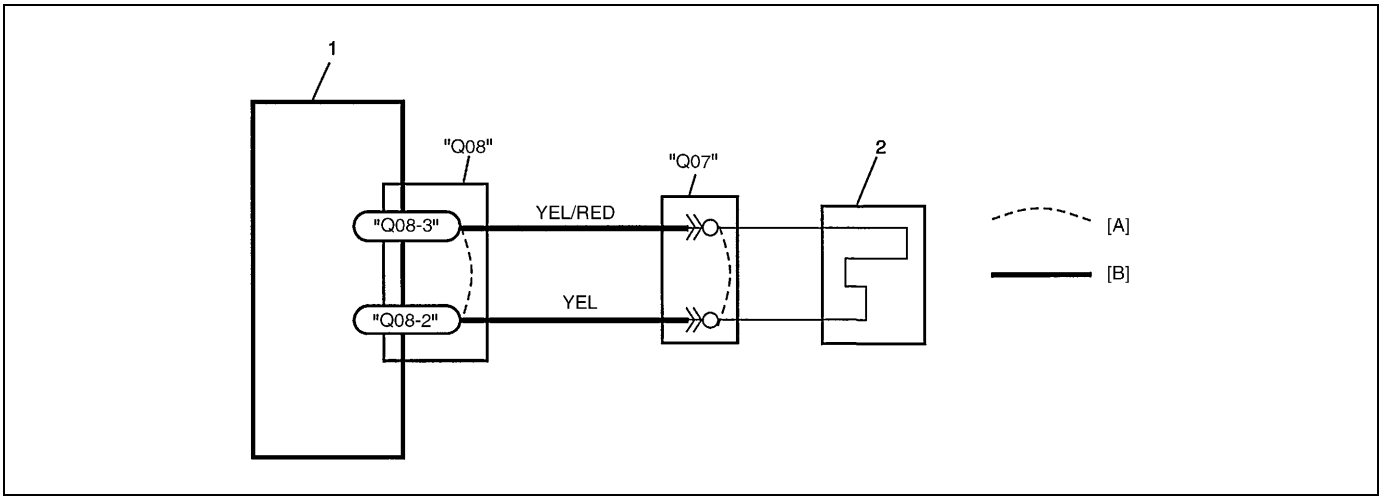
Special tooll
(A) : 09932-76010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Repeat “Air Bag Diagnostic System Check Flow Table” to confirm that the trouble has been corrected.**

Code 15 – Passenger Air Bag Initiator Circuit Resistance High



[A] : Shorting bar	1. SDM
[B] : Air bag harness	2. Passenger air bag (inflator) module

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

The combined resistance of the passenger air bag (inflator) module, harness wiring and connector terminal contact is above a specified value for specified time.

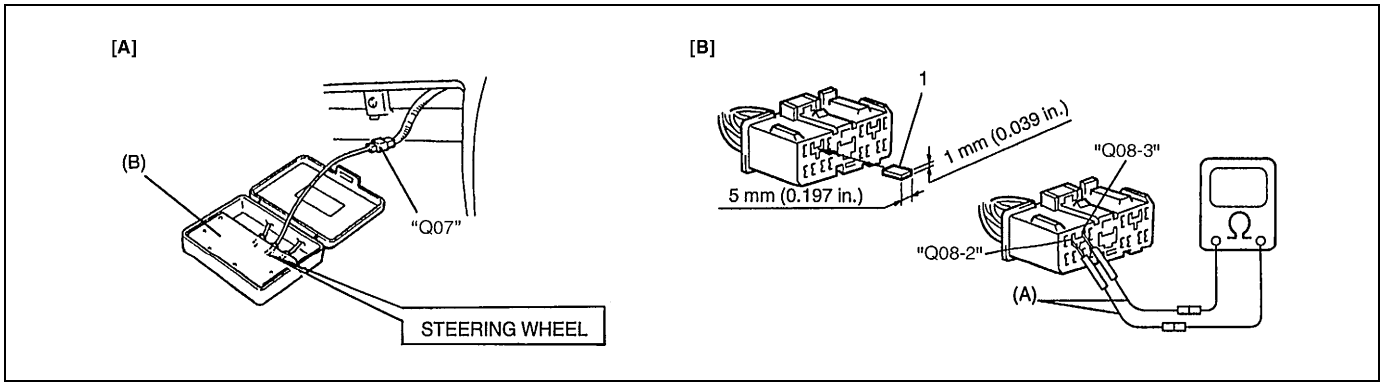
NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect passenger air bag (inflator) module connector behind the glove box. 2) Check proper connection to passenger air bag (inflator) module at terminals in "Q07" connector. 3) If OK then connect Special Tool (B) to passenger air bag (inflator) module connector disconnected at the step 1). With ignition switch ON, is DTC 15 current?	Go to Step 2.	Ignition switch OFF. Replace passenger air bag (inflator) module.

Step	Action	Yes	No
2	1) With ignition switch OFF, disconnect SDM. 2) Check proper connection to SDM at terminals “Q08-2” and “Q08-3”. 3) Release shorting bar in SDM connector by inserting a piece of paper (1), referring to the figure below. 4) If OK then measure resistance between “Q08-2” and “Q08-3” terminals with connected Special Tool (B). Is resistance 2.9 Ω or less?	Substitute a known-good SDM and recheck.	Repair high resistance or open in “YEL” or “YEL/RED” wire circuit.

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2



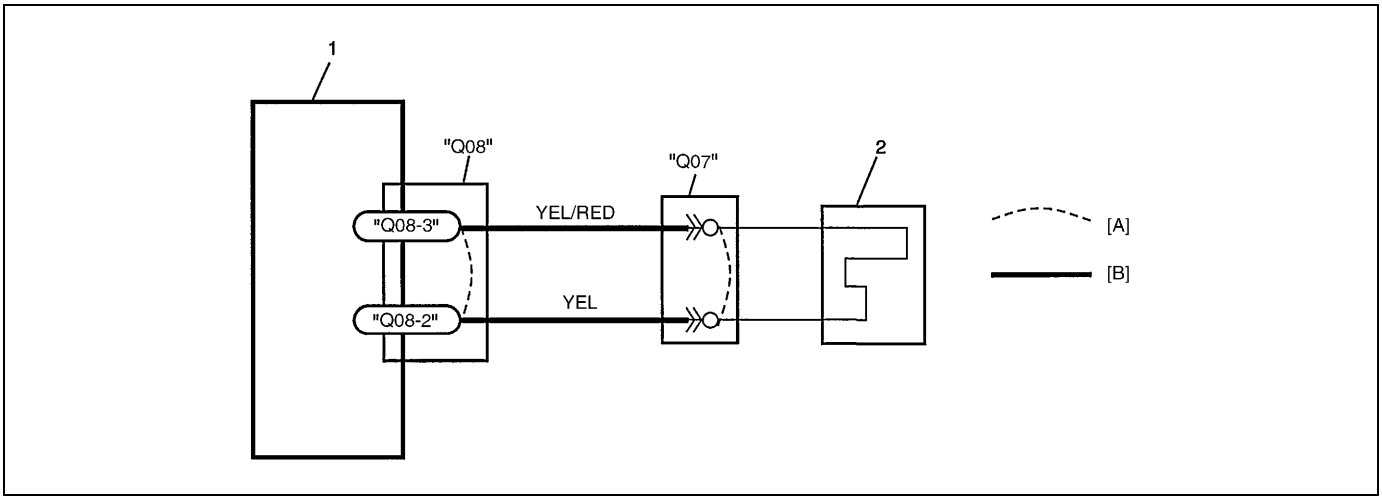
Special tool
(A) : 09932-76010
(B) : 09932-75010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (refer to “Diagnostic Trouble Code (DTC) Clearance”), if any.**
- **Repeat “Air Bag Diagnostic System Check Flow Table” to confirm that the trouble has been corrected.**

Code 16 – Passenger Air Bag Initiator Circuit Resistance Low



[A] : Shorting bar	1. SDM
[B] : Air bag harness	2. Passenger air bag (inflator) module

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

The combined resistance of the passenger air bag (inflator) module, harness wiring and connector terminal contact is below a specified value for specified time.

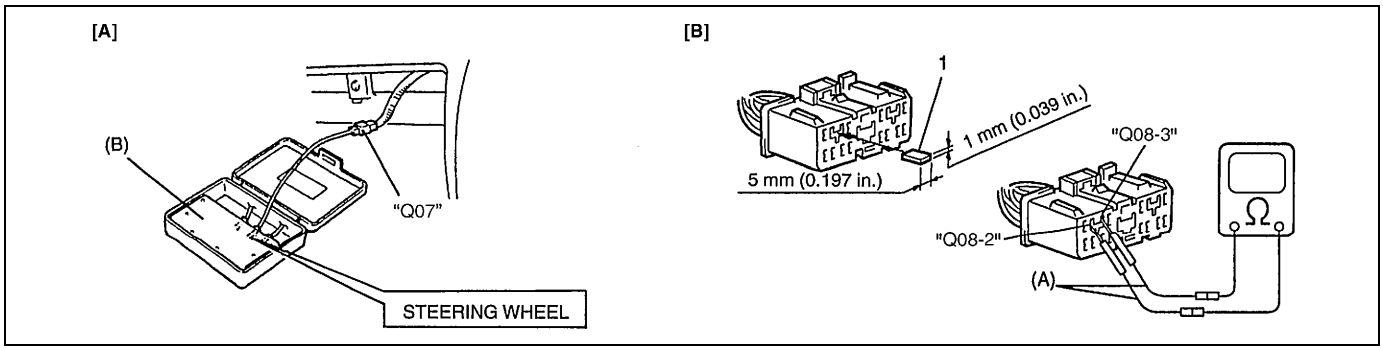
NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect passenger air bag (inflator) module connector behind the glove box. 2) Check proper connection to passenger air bag (inflator) module at terminals in "Q07" connector. 3) If OK then connect Special Tool (B) to passenger air bag (inflator) module connector disconnected at the Step 1). With ignition switch ON, is DTC 16 current?	Go to Step 2.	Ignition switch OFF. Replace passenger air bag (inflator) module.

Step	Action	Yes	No
2	1) With ignition switch OFF, disconnect SDM. 2) Check proper connection to SDM at terminals “Q08-2” and “Q08-3”. 3) Release shorting bar in SDM connector by inserting a piece of paper (1), referring to the figure below. 4) If OK then measure resistance between “Q08-2” and “Q08-3” terminals with connected Special Tool (B). Is resistance 1.7 Ω or more?	Substitute a known-good SDM and recheck.	Repair short from “YEL” wire circuit to “YEL/RED” wire circuit or from “YEL” or “YEL/RED” wire circuit to other wire circuit.

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2



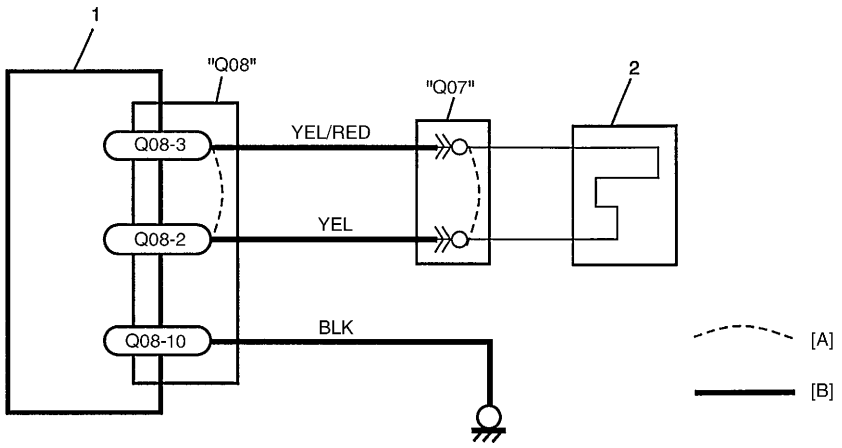
Special tool
(A) : 09932-76010
(B) : 09932-75010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (refer to “Diagnostic Trouble Code (DTC) Clearance”), if any.**
- **Repeat “Air Bag Diagnostic System Check Flow Table” to confirm that the trouble has been corrected.**

Code 18 – Passenger Air Bag Initiator Circuit Short to Ground



[A] : Shorting bar	1. SDM
[B] : Air bag harness	2. Passenger air bag (inflator) module

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

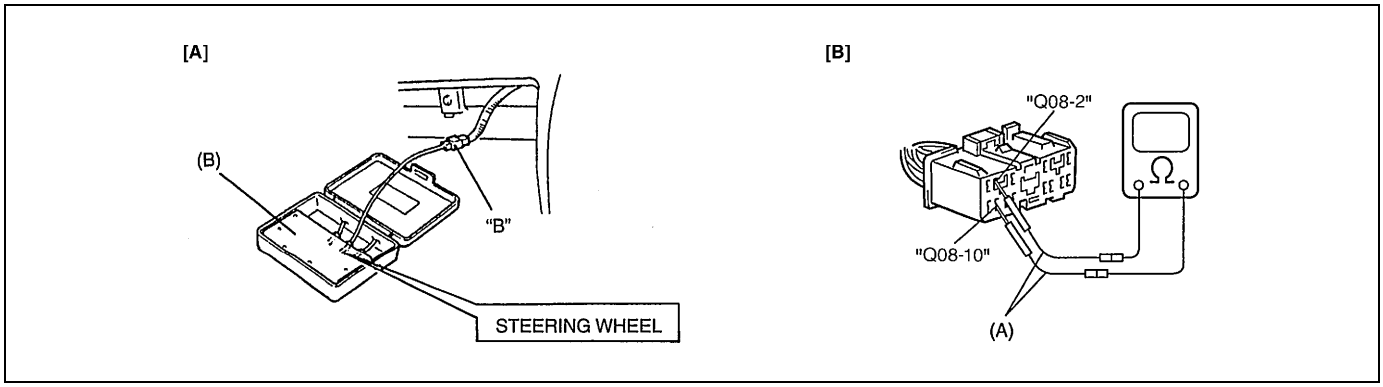
The voltage measured at passenger air bag initiator circuit is below a specified value for specified time.

NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect passenger air bag (inflator) module connector behind the glove box. 2) Check proper connection to passenger air bag (inflator) module at terminals in "Q07" connector. 3) If OK then connect Special Tool (B) to passenger air bag (inflator) module connector disconnected at the step 1). With ignition switch ON, is DTC 18 current?	Go to Step 2.	Ignition switch OFF. Replace passenger air bag (inflator) module.
2	1) With ignition switch OFF, disconnect Special Tool (B) and SDM. 2) Measure resistance between "Q08-2" and "Q08-10" terminals. Is resistance 1 kΩ or more?	Substitute a known-good SDM and recheck.	Repair short from "YEL" or "YEL/RED" wire circuit to ground.

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2



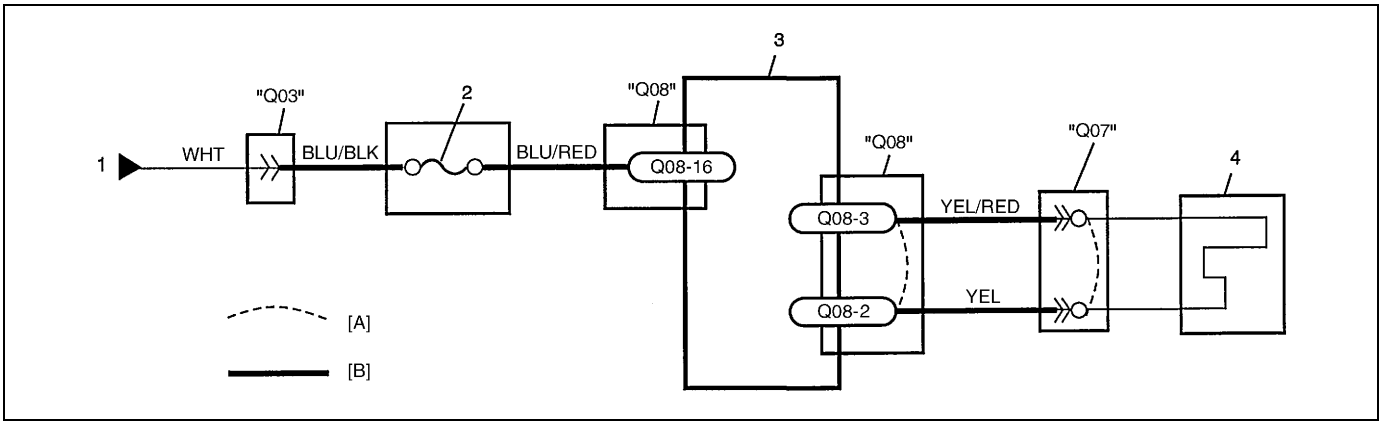
Special tool
(A) : 09932-76010
(B) : 09932-75010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (refer to "Diagnostic Trouble Code (DTC) Clearance"), if any.**
- **Repeat "Air Bag Diagnostic System Check Flow Table" to confirm that the trouble has been corrected.**

Code 19 – Passenger Air Bag Initiator Circuit Short to Power Circuit



[A] : Shorting bar	1. From ignition switch	3. SDM
[B] : Air bag harness	2. "AIR BAG" fuse in "AIR BAG" fuse box	4. Passenger air bag (inflator) module

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

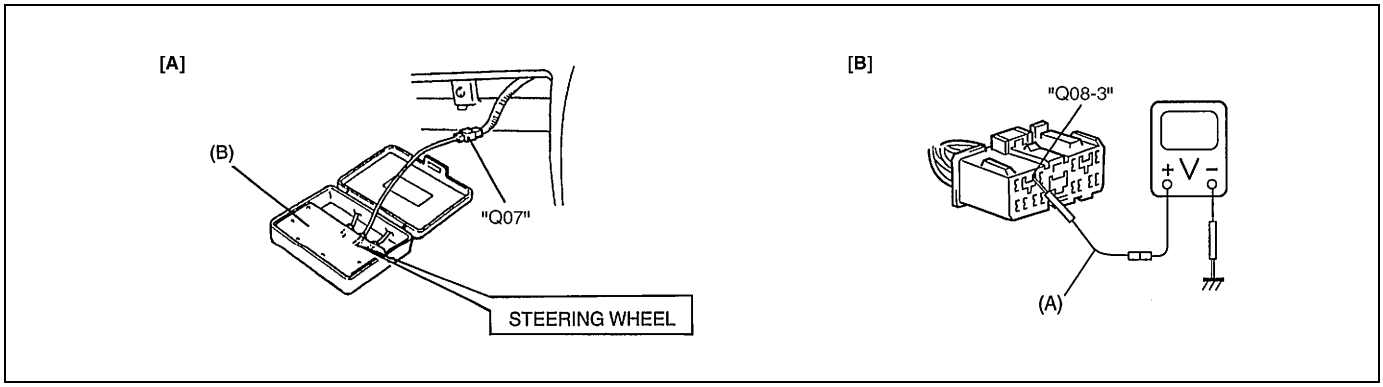
The voltage measured at passenger air bag initiator circuit is above a specified value for specified time.

NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect passenger air bag (inflator) module connector behind the glove box. 2) Check proper connection to passenger air bag (inflator) module at terminals in "Q07" connector. 3) If OK then connect Special Tool (B) to passenger air bag (inflator) module connector disconnected at the step 1). With ignition switch ON, is DTC 19 current?	Go to Step 2.	Ignition switch OFF. Replace passenger air bag (inflator) module.
2	1) With ignition switch OFF, disconnect Special Tool (B) and SDM. 2) Measure voltage from "Q08-3" terminal to body ground. With ignition switch ON, is voltage 1 V or less?	Substitute a known-good SDM and recheck.	Repair short from "YEL" or "YEL/RED" wire circuit to power circuit.

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2



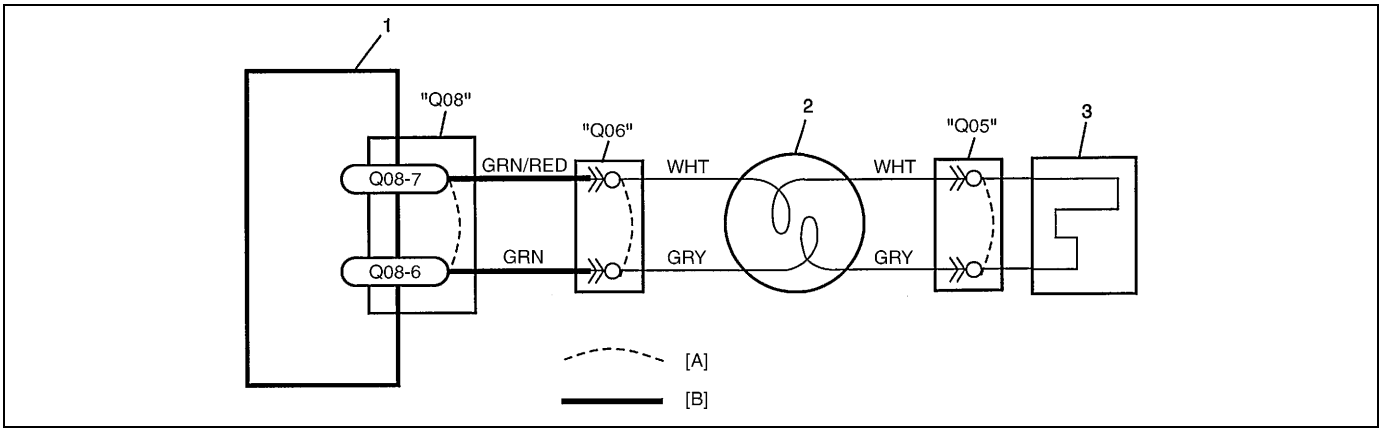
Special tool
(A) : 09932-76010
(B) : 09932-75010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (refer to "Diagnostic Trouble Code (DTC) Clearance"), if any.**
- **Repeat "Air Bag Diagnostic System Check Flow Table" to confirm that the trouble has been corrected.**

Code 21 – Driver Air Bag Initiator Circuit Resistance High



[A] : Shorting bar	1. SDM	3. Driver air bag (inflator) module
[B] : Air bag harness	2. Contact coil assembly	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

The combined resistance of the driver air bag (inflator) module, contact coil assembly, harness wiring and connector terminal contact is above a specified value for specified time.

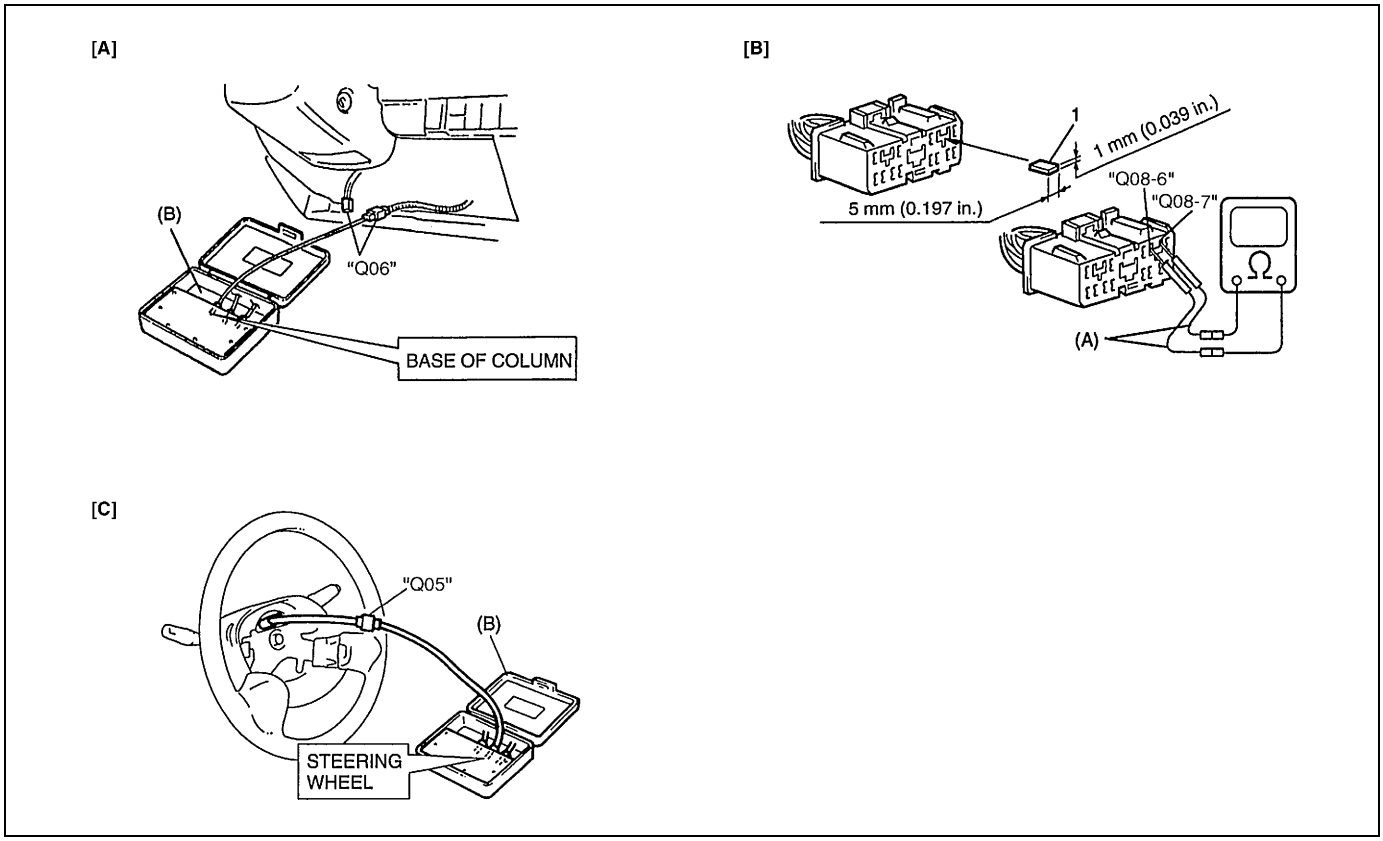
NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect contact coil connector located near the base of the steering column. 2) Check proper connection to contact coil at terminals in "Q06" connector. 3) If OK then connect Special Tool (B) to contact coil connector disconnected at Step 1). With ignition switch ON, is DTC 21 current?	Go to Step 2.	Go to Step 3 on the next page.
2	1) With ignition switch OFF, disconnect SDM. 2) Check proper connection to SDM at terminals "Q08-6" and "Q08-7". 3) Release shorting bar in SDM connector, referring to the figure below. 4) If OK then measure resistance between "Q08-6" and "Q08-7" terminals with connected Special tool (B). Is resistance 3.5 Ω or less?	Substitute a known-good SDM and recheck.	Repair high resistance or open in "GRN" or "GRN/RED" wire circuit.

Step	Action	Yes	No
3	1) With ignition switch OFF, disconnect Special Tool (B) then reconnect contact coil connector located near the base of the steering column. 2) Remove driver air bag (inflator) module from steering wheel (Refer to Section 3C1). 3) Check proper connection to driver air bag (inflator) module at terminals in "Q05" connector. 4) If OK then connect Special Tool (B) to driver air bag (inflator) module disconnected at Step 2). With ignition switch ON, is DTC 21 current?	Ignition switch OFF. Replace contact coil assembly (Refer to Section 3C1).	Ignition switch OFF. Replace driver air bag (inflator) module (Refer to Section 3C1).

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2 / [C] Fig. for STEP 3



1. Paper

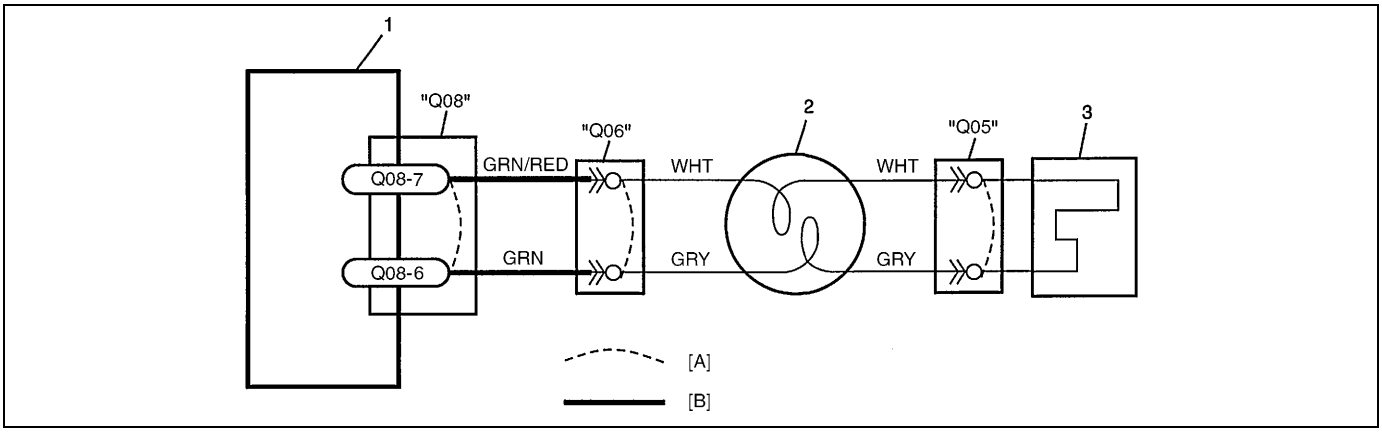
Special tool
(A) : 09932-76010
(B) : 09932-75010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (refer to "Diagnostic Trouble Code (DTC) Clearance"), if any.**
- **Repeat "Air Bag Diagnostic System Check Flow Table" to confirm that the trouble has been corrected.**

Code 22 – Driver Air Bag Initiator Circuit Resistance Low



[A] : Shorting bar	1. SDM	3. Driver air bag (inflator) module
[B] : Air bag harness	2. Contact coil assembly	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

The combined resistance of the driver air bag (inflator) module, contact coil assembly, harness wiring and connector terminal contact is below a specified value for specified time.

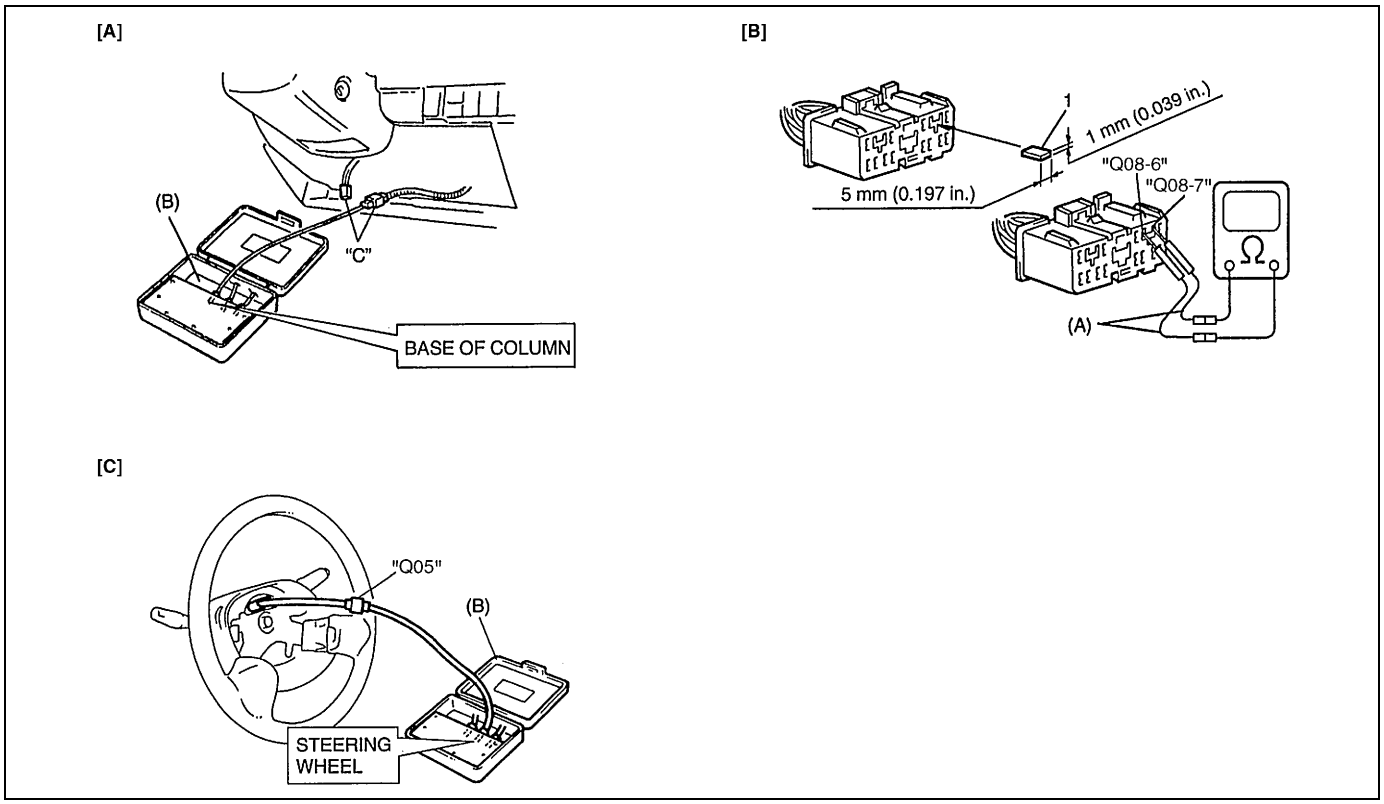
NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect contact coil connector located near the base of the steering column. 2) Check proper connection to contact coil at terminals in "Q06" connector. 3) If OK then connect Special Tool (B) to contact coil connector disconnected at Step 1). With ignition switch ON, is DTC 22 current?	Go to Step 2.	Go to Step 3 on the next page.
2	1) With ignition switch OFF, disconnect SDM. 2) Check proper connection to SDM at terminals "Q08-6" and "Q08-7". 3) Release shorting bar in SDM connector, referring to the figure below. 4) If OK then measure resistance between "Q08-6" and "Q08-7" terminals with connected Special Tool (B). Is resistance 1.7 Ω or more?	Substitute a known-good SDM and recheck.	Repair short from "GRN" wire circuit to "GRN/RED" wire circuit or from "GRN" or "GRN/RED" wire circuit to other wire circuit.

Step	Action	Yes	No
3	1) With ignition switch OFF, disconnect Special Tool (B) then reconnect contact coil connector located near the base of the steering column. 2) Remove driver air bag (inflator) module from steering wheel (Refer to Section 3C1). 3) Check proper connection to driver air bag (inflator) module at terminals in "Q05" connector. 4) If OK then connect Special Tool (B) to driver air bag (inflator) module disconnected at Step 2). With ignition switch ON, is DTC 22 current?	Ignition switch OFF. Replace contact coil assembly (Refer to Section 3C1).	Ignition switch OFF. Replace driver air bag (inflator) module (Refer to Section 3C1).

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2 / [C] Fig. for STEP 3



1. Paper

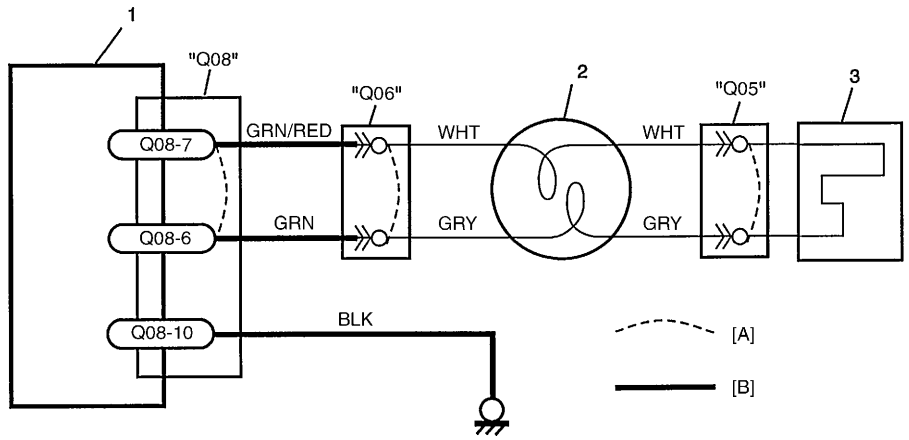
Special tool
(A) : 09932-76010
(B) : 09932-75010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (refer to "Diagnostic Trouble Code (DTC) Clearance"), if any.**
- **Repeat "Air Bag Diagnostic System Check Flow Table" to confirm that the trouble has been corrected.**

Code 24 – Driver Air Bag Initiator Circuit Short to Ground



[A] : Shorting bar	1. SDM	3. Driver air bag (inflator) module
[B] : Air bag harness	2. Contact coil assembly	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

The voltage measured at driver air bag initiator circuit is below a specified value for specified time.

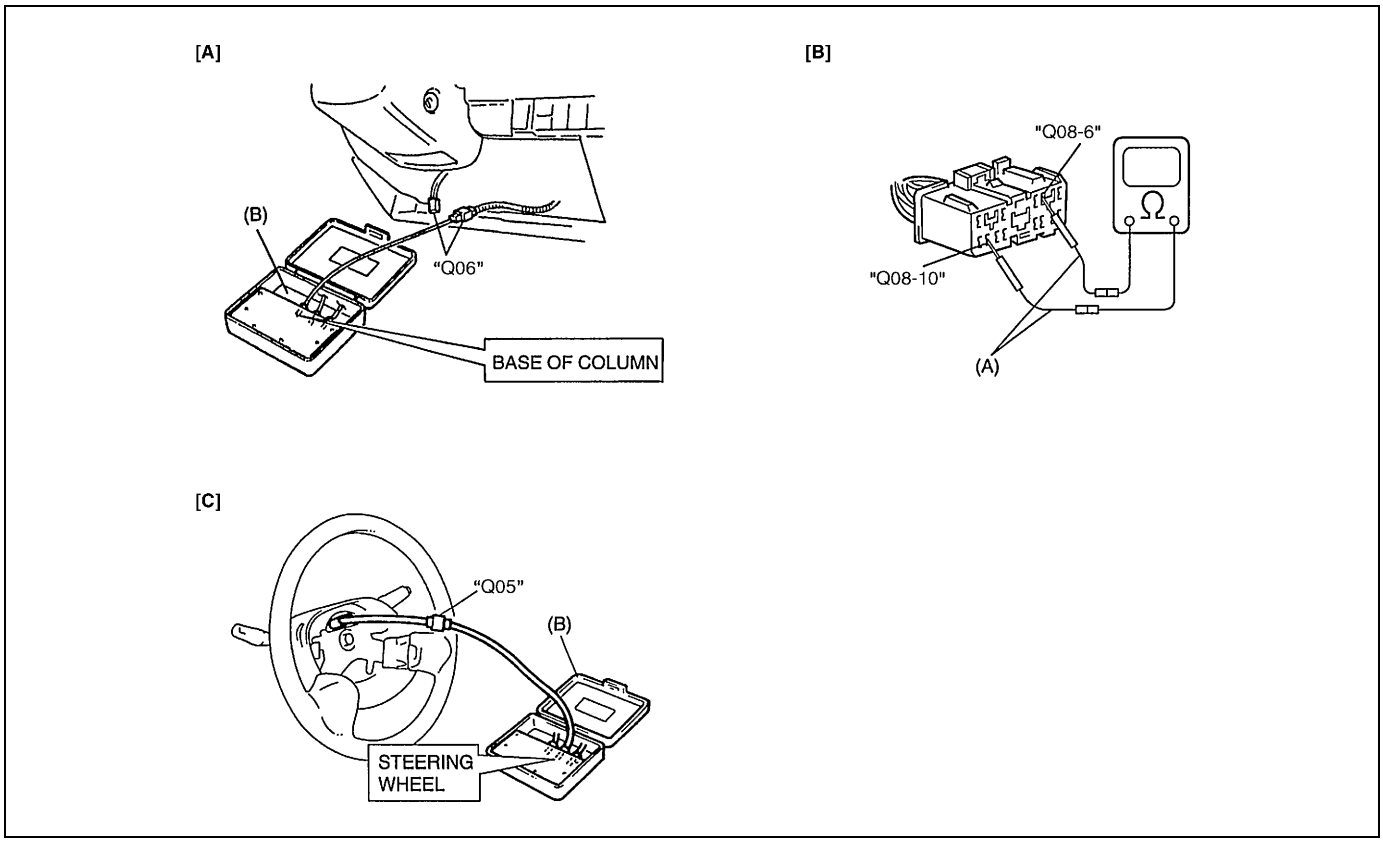
NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect contact coil connector located near the base of the steering column. 1) Check proper connection to contact coil at terminals in "Q06" connector. 1) If OK then connect Special Tool (B) to contact coil connector disconnected at Step 1). With ignition switch ON, is DTC 24 current?	Go to Step 2.	Go to Step 3.
2	1) With ignition switch OFF, disconnect Special Tool (B) and SDM. 2) Measure resistance between "Q08-6" and "Q08-10" terminals. Is resistance 1 kΩ or more?	Substitute a known-good SDM and recheck.	Repair short from "GRN" or "GRN/RED" wire circuit to ground.

Step	Action	Yes	No
3	1) With ignition switch OFF, disconnect Special Tool (B) then reconnect contact coil connector located near the base of the steering column. 2) Remove driver air bag (inflator) module from steering wheel (Refer to Section 3C1). 3) Check proper connection to driver air bag (inflator) module at terminals in "Q05" connector. 4) If OK then connect Special Tool (B) to driver air bag (inflator) module disconnected at Step 2). With ignition switch ON, is DTC 24 current?	Ignition switch OFF. Replace contact coil assembly (Refer to Section 3C1).	Ignition switch OFF. Replace driver air bag (inflator) module (Refer to Section 3C1).

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2 / [C] Fig. for STEP 3



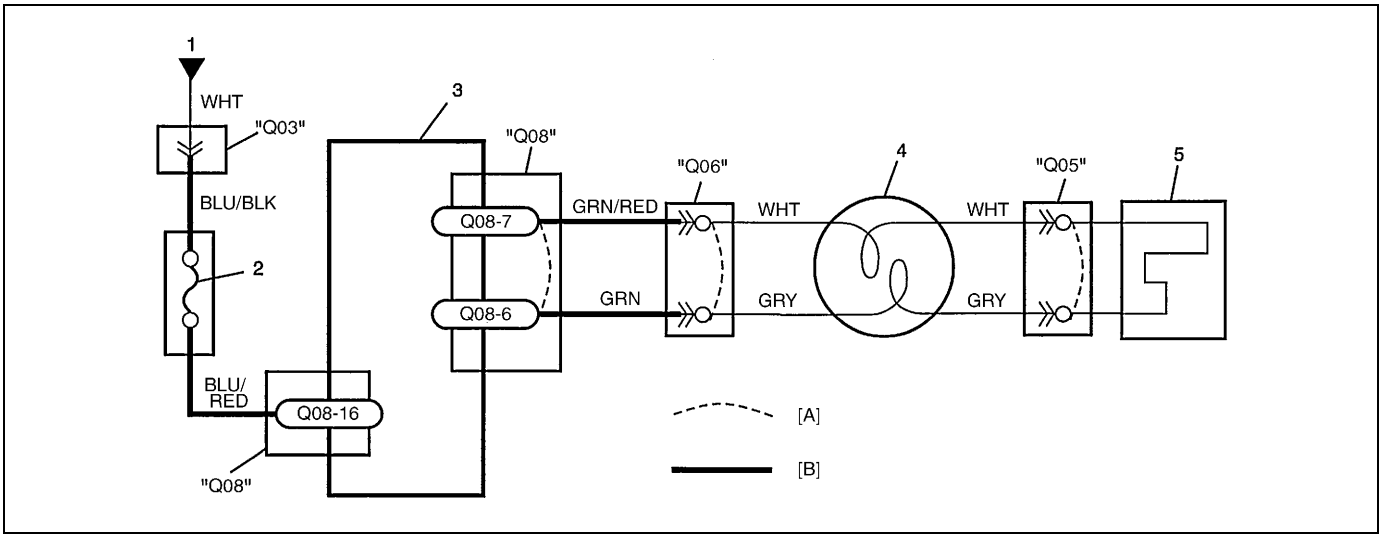
Special tool
(A) : 09932-76010
(B) : 09932-75010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (refer to "Diagnostic Trouble Code (DTC) Clearance"), if any.**
- **Repeat "Air Bag Diagnostic System Check Flow Table" to confirm that the trouble has been corrected.**

Code 25 – Driver Air Bag Initiator Circuit Short to Power Circuit



[A] : Shorting bar	1. From ignition switch	3. SDM	5. Driver air bag (inflator) module
[B] : Air bag harness	2. "AIR BAG" fuse in "AIR BAG" fuse box	4. Contact coil assembly	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

The voltage measured at driver air bag initiator circuit is above a specified value for specified time.

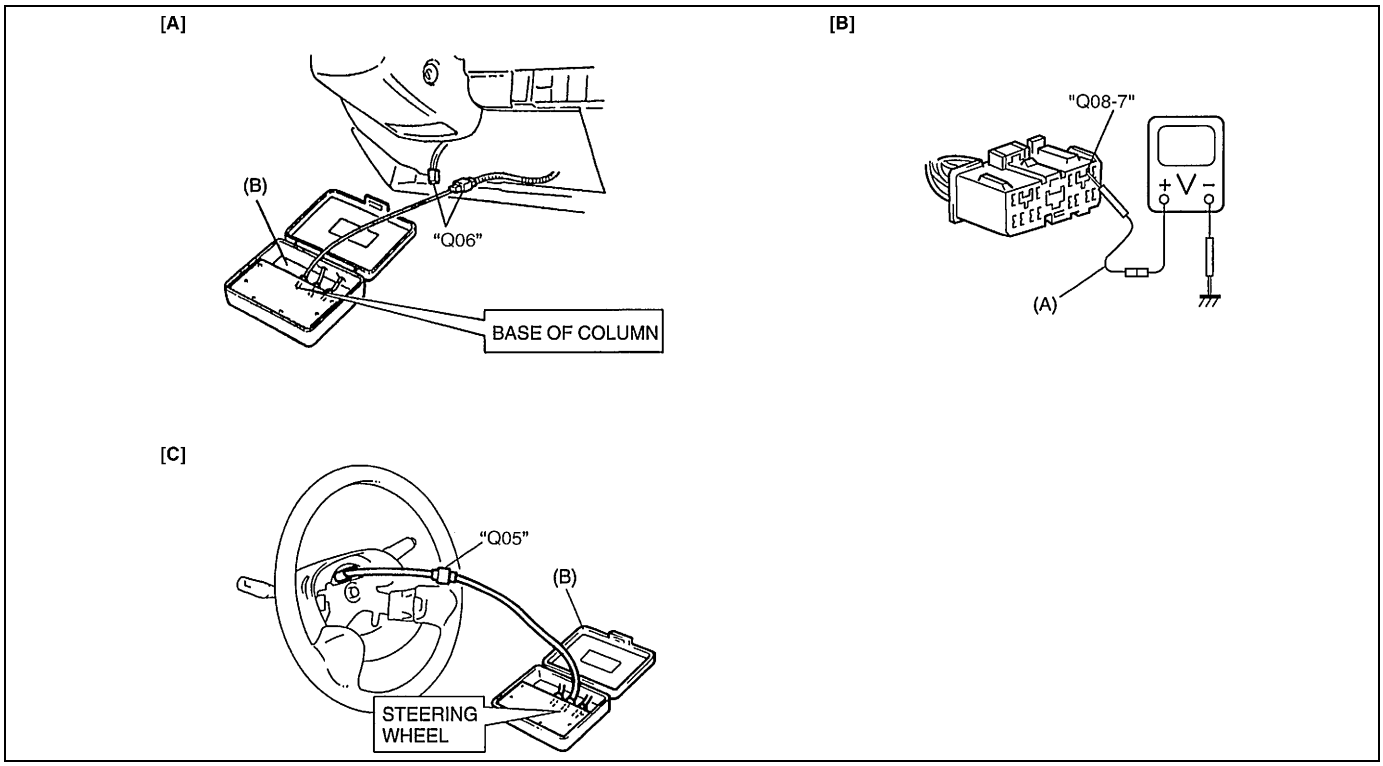
NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect contact coil connector located near the base of the steering column. 2) Check proper connection to contact coil at terminals in "Q06" connector. 3) If OK then connect Special Tool (B) to contact coil connector disconnected at Step 1). With ignition switch ON, is DTC 25 current?	Go to Step 2.	Go to Step 3 on the next page.
2	1) With ignition switch OFF, disconnect Special Tool (B) and SDM. 2) Measure voltage from "Q08-7" terminal to body ground. With ignition switch ON, is voltage 1 V or less?	Substitute a known-good SDM and recheck.	Repair short from "GRN" or "GRN/RED" wire circuit to power circuit.

Step	Action	Yes	No
3	1) With ignition switch OFF, disconnect Special Tool (B) then reconnect contact coil connector located near the base of the steering column. 2) Remove driver air bag (inflator) module from steering wheel (Refer to Section 3C1). 3) Check proper connection to driver air bag (inflator) module at terminals in "Q05" connector. 4) If OK then connect Special Tool (B) to driver air bag (inflator) module disconnected at Step 2). With ignition switch ON, is DTC 25 current?	Ignition switch OFF. Replace contact coil assembly (Refer to Section 3C1).	Ignition switch OFF. Replace driver air bag (inflator) module (Refer to Section 3C1).

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2 / [C] Fig. for STEP 3



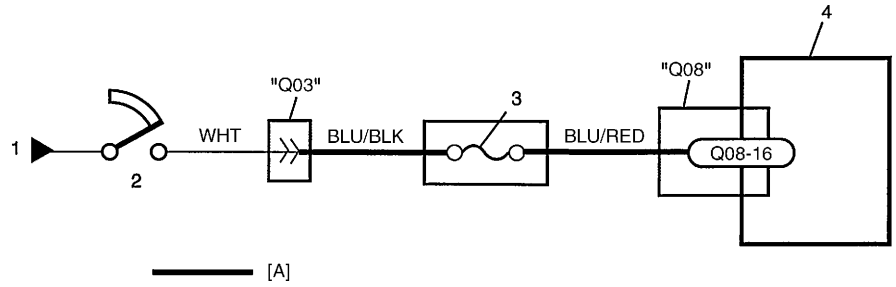
Special tool
(A) : 09932-76010
(B) : 09932-75010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (refer to "Diagnostic Trouble Code (DTC) Clearance"), if any.**
- **Repeat "Air Bag Diagnostic System Check Flow Table" to confirm that the trouble has been corrected.**

Code 31 – Power Source Voltage High



[A] : Air bag harness	2. Ignition switch	4. SDM
1. From main fuse	3. "AIR BAG" fuse in "AIR BAG" fuse box	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

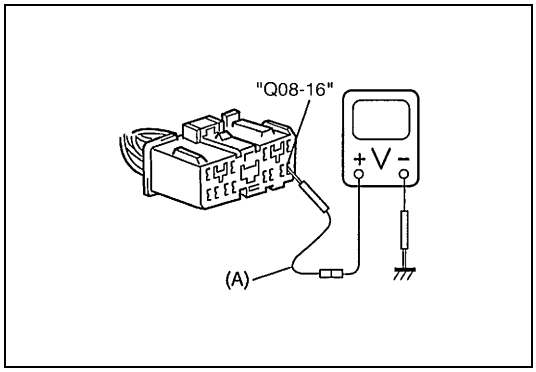
The power source voltage to SDM is above specified value for specified time.

NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect SDM. 2) Check proper connection to SDM at "Q08-16" terminal. 3) If OK then ignition switch ON, and then check voltage from "Q08-16" terminal on SDM harness connector to body ground. Is voltage 14 V or less?	Go to Step 2.	Check Charging System and repair as necessary. (Refer to Section 6H "Charging System")
2	1) With ignition switch OFF, reconnect SDM With ignition switch ON, is DTC 31 current?	Substitute a known-good SDM and recheck.	Check Charging System and repair as necessary. (Refer to Section 6H "Charging System")

Fig. for STEP 1



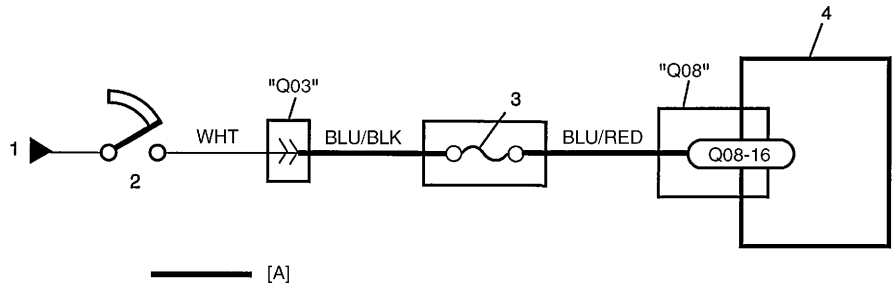
Special tool
(A) : 09932-76010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (refer to "Diagnostic Trouble Code (DTC) Clearance"), if any.**
- **Repeat "Air Bag Diagnostic System Check Flow Table" to confirm that the trouble has been corrected.**

Code 32 – Power Source Voltage Low



[A] : Air bag harness	2. Ignition switch	4. SDM
1. From main fuse	3. "AIR BAG" fuse in "AIR BAG" fuse box	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

The power source voltage is below an approx. 8 V for specified time.

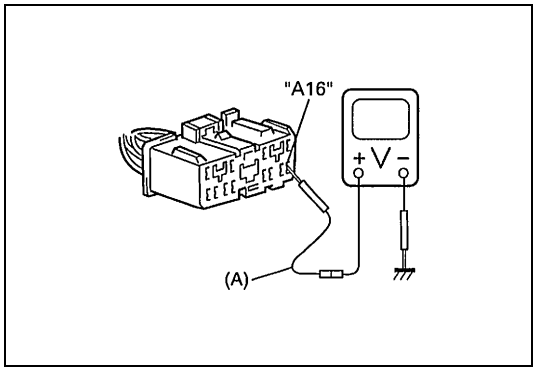
NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) Measure voltage on battery. Is voltage 11 V or more?	Go to Step 2.	Check Charging System and repair as necessary. (Refer to Section 6H "Charging System")
2	1) With ignition switch OFF, disconnect SDM. 2) Check proper connection to SDM at "Q08-16" terminal. 3) If OK then ignition switch ON, and then check voltage from "Q08-16" terminal on SDM harness connector to body ground. Is voltage 8 V or more?	Go to Step 4.	Go to Step 3.

Step	Action	Yes	No
3	1) With ignition switch OFF, disconnect ignition connector (“Q03” connector) in air bag harness. 2) Check proper connection at terminal in “Q03” connector. 3) If OK then ignition switch ON, and then check voltage from terminal in “Q03” connector on main harness to body ground. Is voltage 8 V or more?	Repair poor connection, high resistance in “BLU/RED” or “BLU/BLK” circuit of air bag harness or “AIR BAG” fuse.	Possibly faulty points are as follows. Check each of them and repair as necessary. Circuit from battery to “Q03” connector Charging System (Refer to Section 6H “Charging System”)
4	1) With ignition switch OFF, reconnect SDM With ignition switch ON, is DTC 32 current?	Substitute a known-good SDM and recheck.	Check Charging System and repair as necessary. (Refer to Section 6H “Charging System”)

Fig. for STEP 2



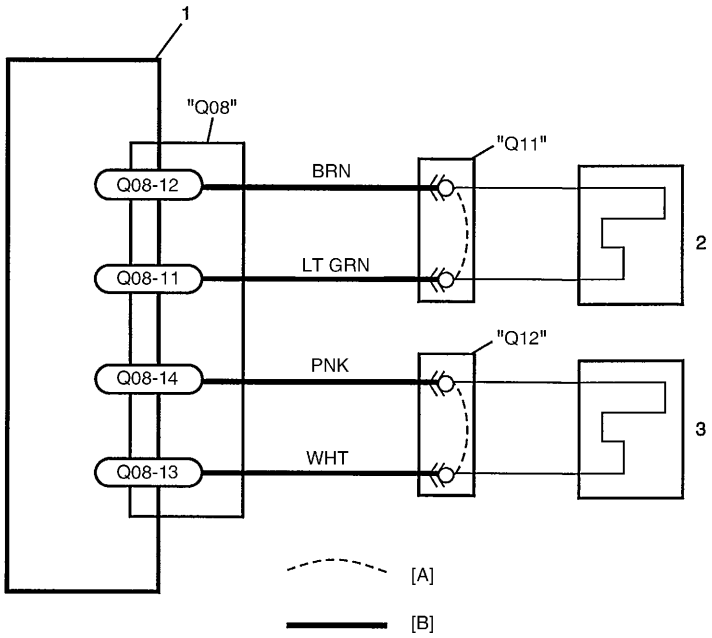
Special tool
(A) : 09932-76010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (refer to ‘‘Diagnostic Trouble Code (DTC) Clearance’’), if any.**
- **Repeat ‘‘Air Bag Diagnostic System Check Flow Table’’ to confirm that the trouble has been corrected.**

Code 41 – Driver Pretensioner Initiator Circuit Resistance High
Code 45 – Passenger Pretensioner Initiator Circuit Resistance High



[A] : Shorting bar	1. SDM	3. Driver seat belt pretensioner
[B] : Air bag harness	2. Passenger seat belt pretensioner	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

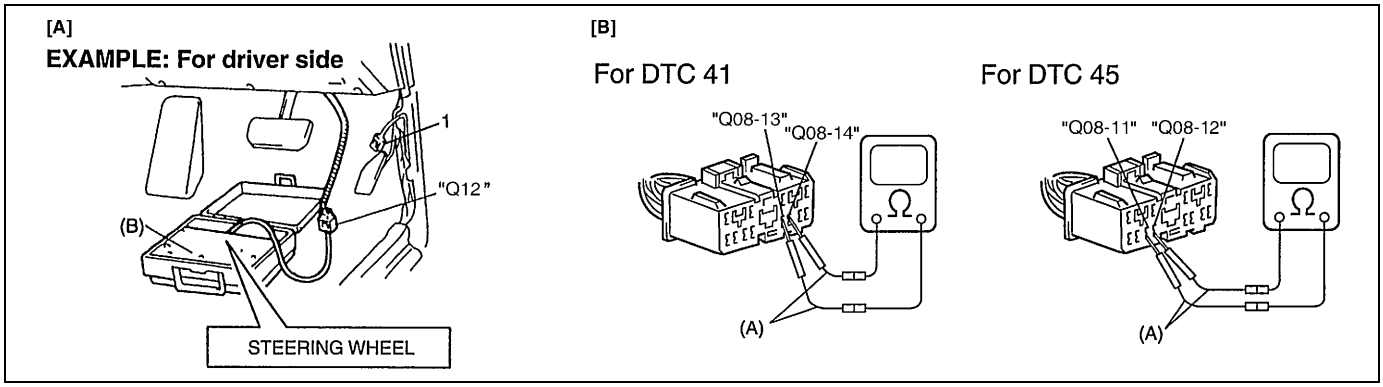
The resistance of driver or passenger seat belt pretensioner initiator circuit is above a specified value for specified time.

NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) With ignition switch OFF, remove front pillar lower trim of applicable side then disconnect seat belt pretensioner connector. 2) Check proper connection to applicable seat belt pretensioner at terminals in “Q11” or “Q12” connector. 3) If OK then connect Special Tool (B) to seat belt pretensioner connector disconnected at the Step 1). With ignition switch ON, is DTC 41 or 45 still current?	Go to Step 2.	Ignition switch OFF. Replace seat belt pretensioner (Refer to Section 10A).
2	1) With ignition switch OFF, disconnect SDM. 2) Check proper connection to SDM at terminals “Q08-13” and “Q08-14” or “Q08-11” and “Q08-12”. 3) If OK then measure resistance between “Q08-13” and “Q08-14” terminals or “Q08-11” and “Q08-12” terminals with connected Special Tool (B). Is resistance 2.9 Ω or less?	Substitute a known-good SDM and recheck.	**DTC41 :** Repair high resistance or open in “PNK” or “WHT” wire circuit. **DTC45 :** Repair high resistance or open in “LT GRN” or “BRN” wire circuit.

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2



1. Pretensioner harness

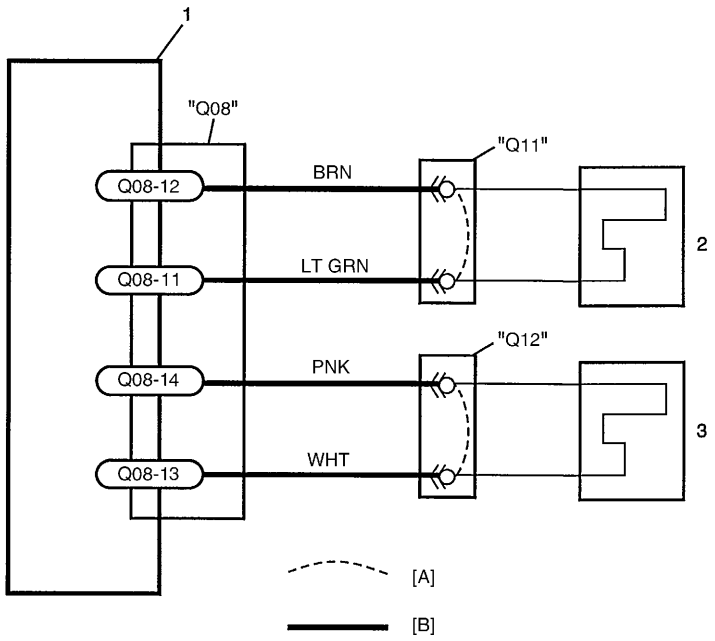
Special tool
(A) : 09932-76010
(B) : 09932-75010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (refer to “Diagnostic Trouble Code (DTC) Clearance”), if any.**
- **Repeat “Air Bag Diagnostic System Check Flow Table” to confirm that the trouble has been corrected.**

Code 42 – Driver Pretensioner Initiator Circuit Resistance Low
Code 46 – Passenger Pretensioner Initiator Circuit Resistance Low



[A] : Shorting bar	1. SDM	3. Driver seat belt pretensioner
[B] : Air bag harness	2. Passenger seat belt pretensioner	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

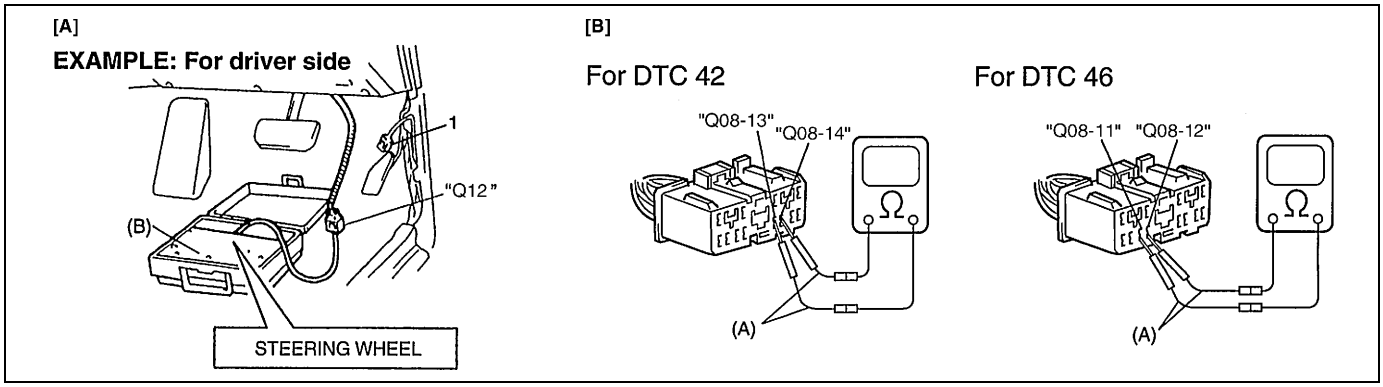
The resistance of driver or passenger seat belt pretensioner initiator circuit is below a specified value for specified time.

NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) With ignition switch OFF, remove front pillar lower trim of applicable side then disconnect seat belt pretensioner connector. 2) Check proper connection to applicable seat belt pretensioner at terminals in "Q11" or "Q12" connector. 3) If OK then connect Special Tool (B) to seat belt pretensioner connector disconnected at the Step 1). With ignition switch ON, is DTC 42 or 46 still current?	Go to Step 2.	Ignition switch OFF. Replace seat belt pretensioner (Refer to Section 10A).
2	1) With ignition switch OFF, disconnect SDM. 2) Check proper connection to SDM at terminals "Q08-13" and "Q08-14" or "Q08-11" and "Q08-12". 3) If OK then measure resistance between "Q08-13" and "Q08-14" terminals or "Q08-11" and "Q08-12" terminals with connected Special Tool (B). Is resistance 1.7 Ω or more?	Substitute a known-good SDM and recheck.	**DTC42 :** Repair short from "PNK" wire circuit to "WHT" wire circuit or from "PNK" or "WHT" wire circuit to other wire circuit. **DTC46 :** Repair short from "LT GRN" wire circuit to "BRN" wire circuit or from "LT GRN" or "BRN" wire circuit to other wire circuit.

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2



1. Pretensioner harness

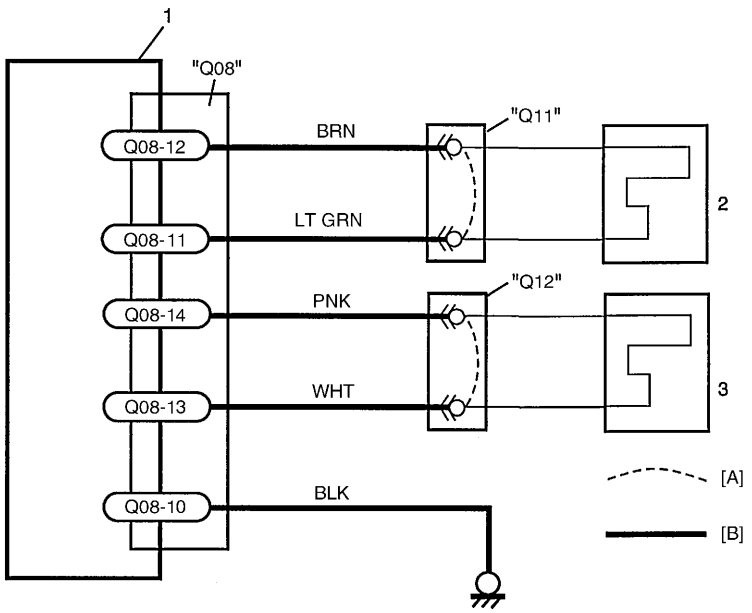
Special tool
(A) : 09932-76010
(B) : 09932-75010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (refer to "Diagnostic Trouble Code (DTC) Clearance"), if any.**
- **Repeat "Air Bag Diagnostic System Check Flow Table" to confirm that the trouble has been corrected.**

Code 43 – Driver Pretensioner Initiator Circuit Short to Ground
Code 47 – Passenger Pretensioner Initiator Circuit Short to Ground



[A] : Shorting bar	1. SDM	3. Driver seat belt pretensioner
[B] : Air bag harness	2. Passenger seat belt pretensioner	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

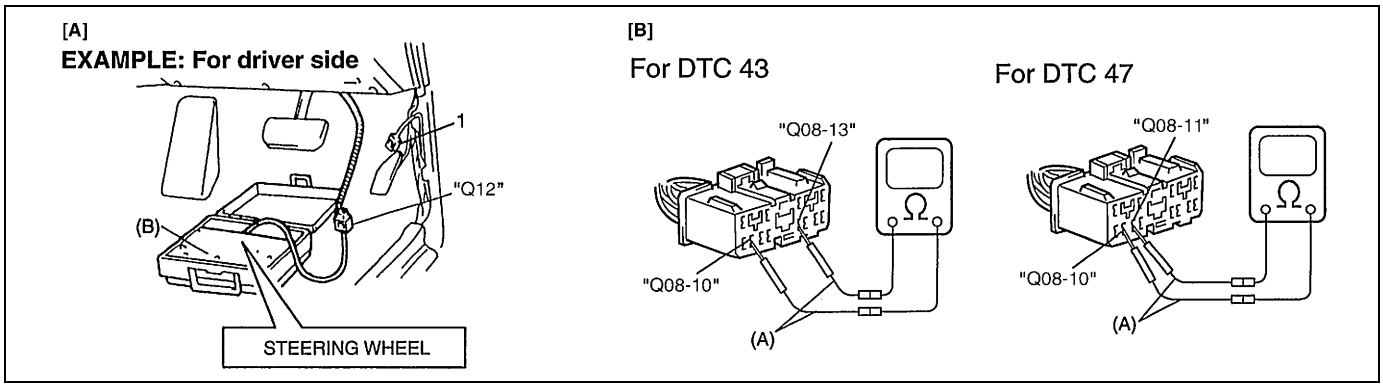
The voltage measured at driver or passenger seat belt pretensioner initiator circuit is below a specified value for specified time.

NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) With ignition switch OFF, remove front pillar lower trim of applicable side then disconnect seat belt pretensioner connector. 2) Check proper connection to applicable seat belt pretensioner at terminals in “Q11” or “Q12” connector. 3) If OK then connect Special Tool (B) to seat belt pretensioner connector disconnected at the Step 1). With ignition switch ON, is DTC 43 or 47 still current?	Go to Step 2.	Ignition switch OFF. Replace seat belt pretensioner (Refer to Section 10A).
2	1) With ignition switch OFF, disconnect Special Tool (B) and SDM. 2) Measure resistance between “Q08-13” or “Q08-11” and “Q08-10” terminals. Is resistance 1 kΩ or more?	Substitute a known-good SDM and recheck.	**DTC43 :** Repair short “PNK” or “WHT” wire circuit to ground. **DTC47 :** Repair short from “LT GRN” or “BRN” wire circuit to ground.

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2



1. Pretensioner harness

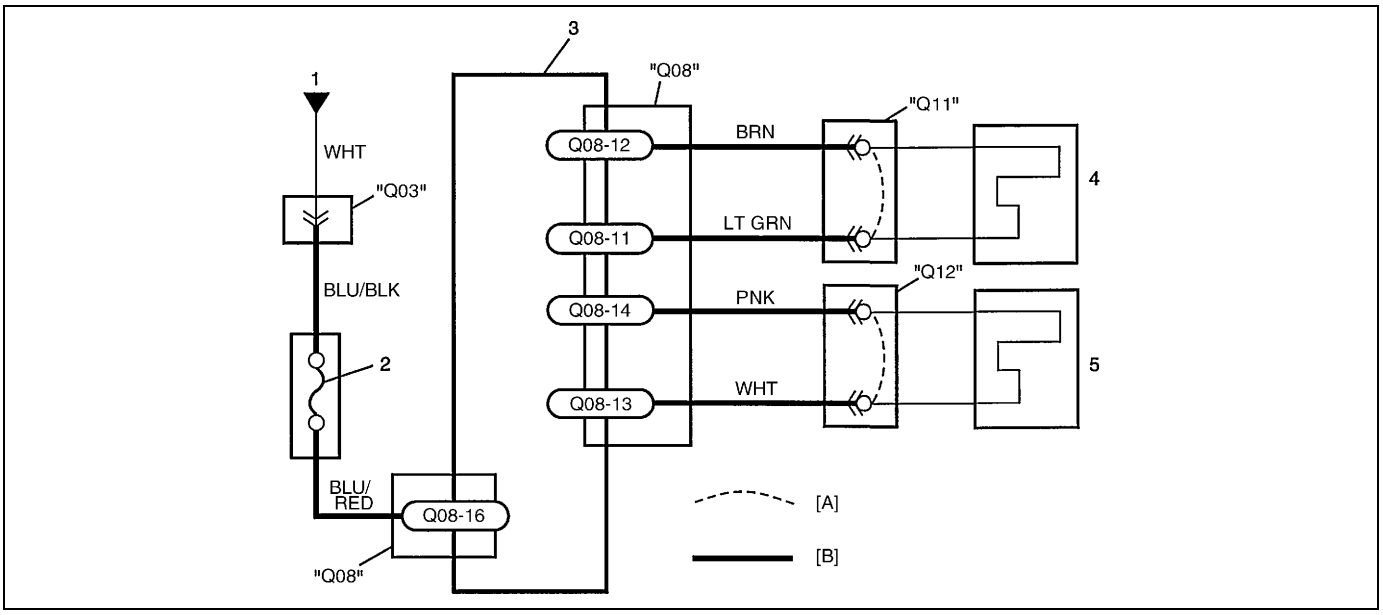
Special tool
(A) : 09932-76010
(B) : 09932-75010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (refer to “Diagnostic Trouble Code (DTC) Clearance”), if any.**
- **Repeat “Air Bag Diagnostic System Check Flow Table” to confirm that the trouble has been corrected.**

Code 44 – Driver Pretensioner Initiator Circuit Short to Power Circuit
Code 48 – Passenger Pretensioner Initiator Circuit Short to Power Circuit



[A] : Shorting bar	2. "AIR BAG" fuse in "AIR BAG" fuse box	5. Driver seat belt pretensioner
[B] : Air bag harness	3. SDM	
1. From ignition switch	4. Passenger seat belt pretensioner	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

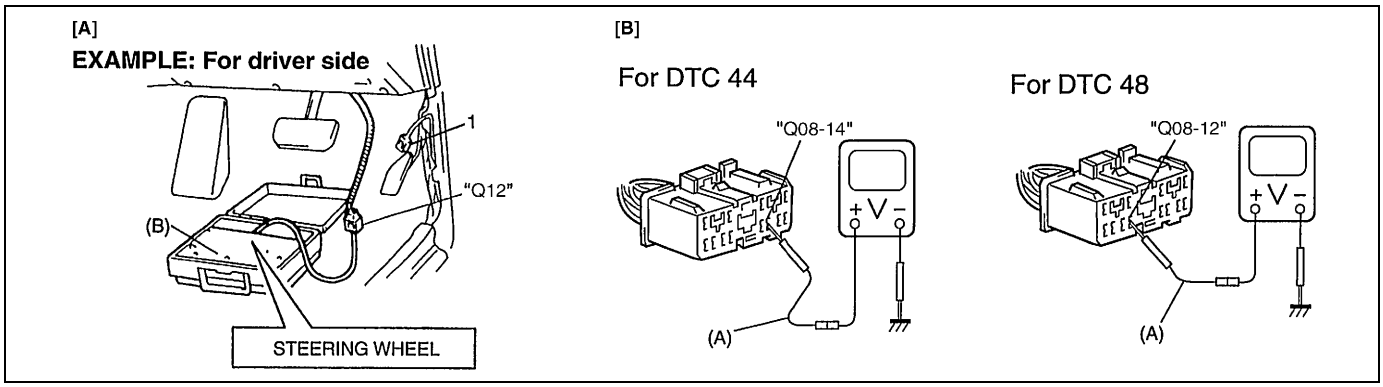
The voltage measured at driver or passenger seat belt pretensioner initiator circuit is above a specified value for specified time.

NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) With ignition switch OFF, remove front pillar lower trim of applicable side then disconnect seat belt pretensioner connector. 2) Check proper connection to applicable seat belt pretensioner at terminals in “Q11” or “Q12” connector. 3) If OK then connect Special Tool (B) to seat belt pretensioner connector disconnected at the Step 1). With ignition switch ON, is DTC 44 or 48 still current?	Go to Step 2.	Ignition switch OFF. Replace seat belt pretensioner (Refer to Section 10A).
2	1) With ignition switch OFF, disconnect Special Tool (B) and SDM. 2) Measure voltage from “Q08-14” or “Q08-12” terminal to body ground. With ignition switch ON, is voltage 1 V or less?	Substitute a known-good SDM and recheck.	**DTC44 :** Repair short “PNK” or “WHT” wire circuit to power circuit. **DTC48 :** Repair short from “LT GRN” or “BRN” wire circuit to power circuit.

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2



1. Pretensioner harness

Special tool
(A) : 09932-76010
(B) : 09932-75010

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (refer to “Diagnostic Trouble Code (DTC) Clearance”), if any.**
- **Repeat “Air Bag Diagnostic System Check Flow Table” to confirm that the trouble has been corrected.**

Code 51 – Frontal Crash Detected (System Activation Command is Outputted)

DTC Will Set When

The SDM detects a frontal crash of sufficient force to warrant activation of the air bag system. (SDM outputs a deployment/activation command.)

NOTE:

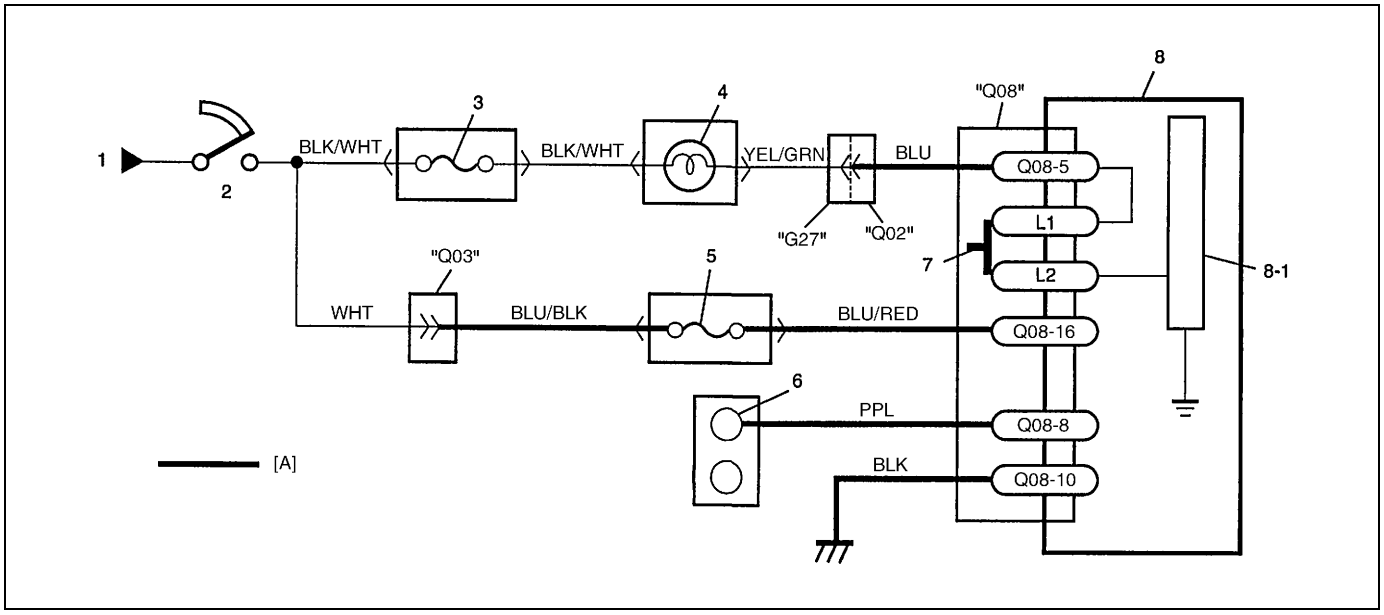
Before executing items in this table, be sure to perform "Air Bag Diagnostic Check Flow Table".

Step	Action	Yes	No
1	1) Ignition switch OFF. Has air bag system deployed?	Replace components and perform inspections as directed in "Repairs and Inspections Required after an Accident" in this section.	Go to Step 2.
2	1) Inspect front of vehicle and undercarriage for signs of impact. Are there signs of impact?	Replace components and perform inspections as directed in "Repairs and Inspections Required after an Accident" in this section.	Substitute a known-good SDM and recheck.

NOTE:

- **CODE 51 can never be cleared once it has been set.**
- **Upon completion of inspection and repair work, perform following items.**
  - **Replace SDM.**
  - **Reconnect all air bag system components, ensure all components are properly mounted.**
  - **Repeat "Air Bag Diagnostic System Check Flow Table" to confirm that the trouble has been corrected.**

Code 61 – "Air Bag" Warning Lamp Circuit Failure



[A] : Air bag harness	4. "AIR BAG" warning lamp in combination meter	8. SDM
1. From main fuse	5. "AIR BAG" fuse in "AIR BAG" fuse box	8-1. "AIR BAG" warning lamp driver circuit
2. Ignition switch	6. "AIR BAG" monitor coupler	
3. "IG.COIL METER" fuse in J/B	7. Connection detection pin	

CAUTION:

- **Be sure to perform "Air Bag Diagnostic System Check" in this section before starting diagnosis according to flow table.**
- **When measurement of resistance or voltage is required in this table, use a specified digital multimeter described in "Special Tool" in this section along with a correct terminal adapter from special tool (Connector test adapter kit).**
- **When a check for proper connection is required, refer to "Intermittent and Poor Connections" in this section.**
- **If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.**

DTC Will Set When

The voltage at the "AIR BAG" warning lamp circuit terminal "Q08-5" does not match the commanded state of the warning lamp driver for specified time.

NOTE:

Before executing items in this table, be sure to perform "Air Bag Diagnostic System Check Flow Table".

Step	Action	Yes	No
1	1) This DTC is set when there is a trouble in "AIR BAG" warning lamp circuit. Failure to properly perform "Air Bag Diagnostic System Check Flow Table" may also result in misdiagnosis. Therefore, check "AIR BAG" warning lamp circuit again according to "Air Bag Diagnostic System Check Flow Table". Is "AIR BAG" warning lamp circuit in good condition?	Go to Step 2.	Repair "AIR BAG" warning lamp circuit.

Step	Action	Yes	No
2	1) Clear diagnostic trouble codes. Is DTC 61 set?	Substitute a known-good SDM and recheck.	Recheck air bag system, referring to “Air Bag Diagnostic System Check Flow Table”.

NOTE:

Upon completion of inspection and repair work, perform following items.

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Repeat “Air Bag Diagnostic System Check Flow Table” to confirm that the trouble has been corrected.**

Code 71 – Internal SDM Fault

DTC Will Set When

An internal SDM fault is detected by SDM.

NOTE:

CODE 71 can never be cleared once it has been set.

1) Ignition switch OFF.
2) Replace SDM.
3) Repeat “Air Bag Diagnostic System Check Flow Table”.

On-Vehicle Service

Service Precautions

Service and diagnosis

WARNING/CAUTION labels are attached on each part of air bag system components (SDM, air bag (inflator) modules and seat belt pretensioners). Be sure to follow the instructions.

WARNING:

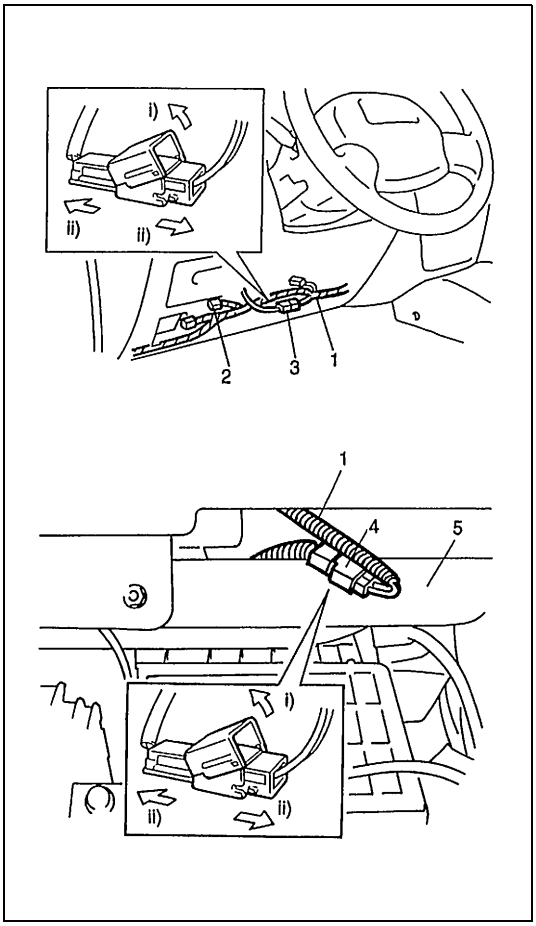
- **If the air bag system and another vehicle system both need repair, Suzuki recommends that the air bag system be repaired first, to help avoid unintended air bag system activation.**
- **Do not modify the steering wheel, dashboard or any other air bag system components. Modifications can adversely affect air bag system performance and lead to injury.**
- **Failure to follow procedures could result in possible air bag system activation, personal injury or unneeded air bag system repairs.**

- Many of service procedures require disconnection of “AIR BAG” fuse and air bag (inflator) modules (driver and passenger) from initiator circuit to avoid an accidental deployment.
- Do not apply power to the air bag system unless all components are connected or a diagnostic chart requests it, as this will set a diagnostic trouble code.
- The “Air Bag Diagnostic System Check” must be the starting point of any air bag diagnostics. The “Air Bag Diagnostic System Check” will verify proper “AIR BAG” warning lamp operation and will lead you to the correct chart to diagnose any air bag malfunctions. Bypassing these procedures may result in extended diagnostic time, incorrect diagnosis, and incorrect parts replacements.
- Never use air bag component parts from another vehicle.
- If the vehicle will be exposed to temperatures over 93°C (200°F) (for example, during a paint baking process), remove the air bag system components beforehand to avoid component damage or unintended system activation.
- When servicing, if shocks may be applied (eg., dropped from a height of 90 cm (3 ft) or more) to air bag system component parts, remove those parts beforehand.
- When using electric welding, be sure to disconnect air bag (inflator) module and seat belt pretensioner connectors (driver and passenger) respectively.
- When applying paint around the air bag system related parts, use care so that the harness or connector will not be exposed to the paint mist.
- Never expose air bag system component parts directly to hot air (drying or baking the vehicle after painting) or flames.

WARNING:

When performing service on or around air bag system components or air bag wiring, follow the procedures listed in the following pages to temporarily disable the air bag system. Refer to appropriate service manual procedures. Failure to follow procedures could result in possible air bag system activation, personal injury or unneeded air bag system repairs.

Disabling air bag system



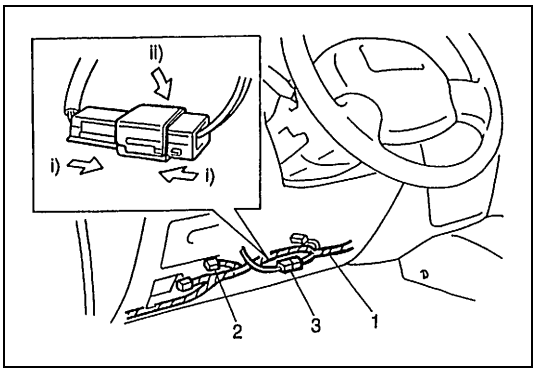
1) Turn steering wheel so that vehicle's wheels (front tires) and pointing straight ahead.
2) Turn ignition switch to "LOCK" position and remove key.
3) Remove "AIR BAG" fuse from "AIR BAG" fuse box.
4) Disconnect Yellow connector of contact coil and combination switch assembly.
   a) Release locking of lock lever.
   b) After unlocked, disconnect to connector.
5) Pull out glove box while pushing its stopper from both right and left sides and disconnect Yellow connector of passenger air bag (inflator) module.
   a) Release locking of lock lever.
   b) After unlocked, disconnect to connector.

NOTE:

With "AIR BAG" fuse removed and ignition switch ON, "AIR BAG" warning lamp will be ON.
This is normal operation and does not indicate an air bag system malfunction.

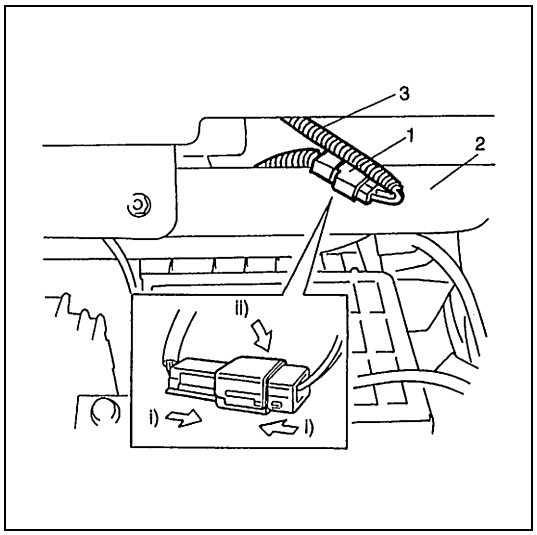
1.	Air bag harness
2.	"AIR BAG" monitor coupler
3.	Yellow connector of contact coil and combination switch assembly
4.	Yellow connector of passenger air bag (inflator) module
5.	Steering support member

Enabling air bag system



1) Turn ignition switch to "LOCK" and remove key.
2) Connect Yellow connector of contact coil and combination switch assembly, and be sure to lock connector with lock lever.
   a) Connect connector.
   b) Lock connector with lock lever.

1.	Air bag harness
2.	"AIR BAG" monitor coupler
3.	Yellow connector of contact coil and combination switch assembly

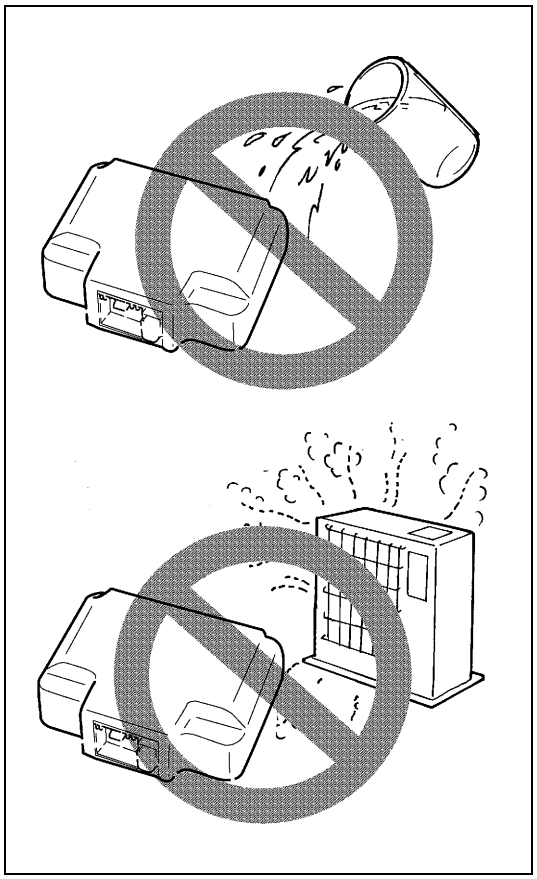


3) Connect Yellow connector of passenger air bag (inflator) module, and be sure to lock connector with lock lever.
   a) Connect connector.
   b) Lock connector with lock lever.
4) Install glove box.
5) Install "AIR BAG" fuse to "AIR BAG" fuse box.
6) Turn ignition switch to ON and verify that "AIR BAG" warning lamp flashes 6 times and then turns off.
   If it does not operate as described, perform "Air Bag Diagnostic System Check" in this section.

1. Yellow connector of passenger air bag (inflator) module
2. Steering support member
3. Air bag harness

Handling and storage

SDM



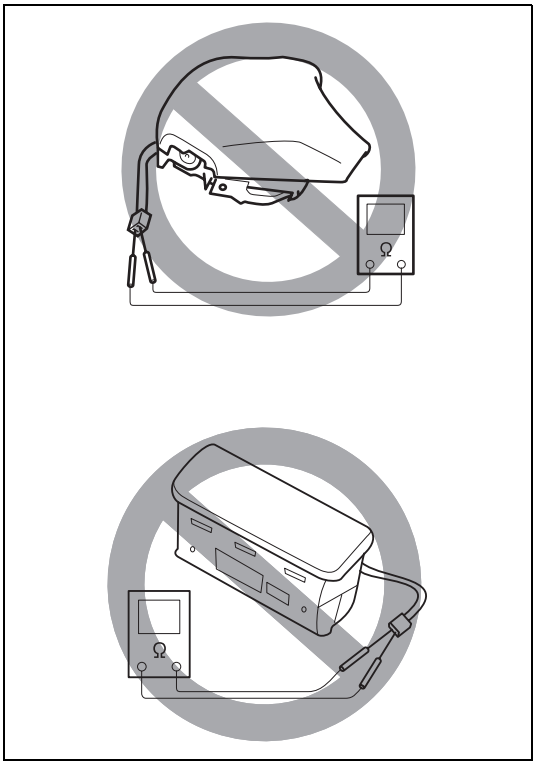
WARNING:
Never power up air bag system when SDM is not rigidly attached to the vehicle. Otherwise, personal injury may result.

CAUTION:
After detecting one time of such collision as to meet deployment conditions, the SDM must not be used. Refer to "Diagnosis" when checking the SDM.

- Never attempt disassembly of SDM.
- When storing SDM, select a place where neither high temperature nor high humidity is anticipated and oil, water and dust are kept off.
- If SDM was dropped from a height of 90 cm (3 ft) or more or if it is found to be damaged or deformed, replace it with a new one.
- If installation part of SDM was damaged, repair that part completely before reinstallation.
- All SDM and mounting bracket fasteners must be carefully torqued and the arrow must be pointed toward the front of the vehicle to ensure proper operation of the air bag system.

LIVE (UNDEPLOYED) AIR BAG (INFLATOR) MODULES

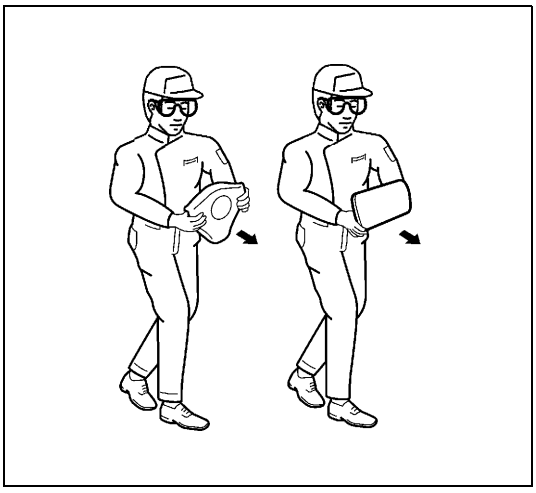
Special care is necessary when handling and storing a live (undeployed) air bag (inflator) modules.
The rapid gas generation produced during deployment of the air bag could cause the air bag (inflator) module, or an object in front of the air bag (inflator) module, to be thrown through the air in the unlikely event of an accidental deployment.



WARNING:

Never attempt to measure the resistance of the air bag (inflator) modules (driver and passenger). It is very dangerous as the electric current from the tester may deploy the air bag.

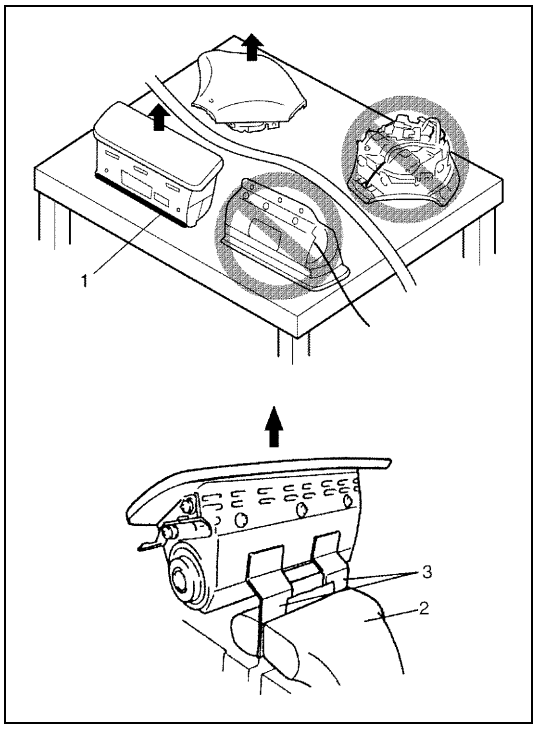
- Never attempt disassembly of the air bag (inflator) modules.
- If any abnormality is found, be sure to replace it with new one as an assembly.
- When an abnormality is noted as existing in the live (undeployed) air bag (inflator) module, be sure to deploy it before discarding it.
- When grease, cleaning agent, oil, water, etc., got on the air bag (inflator) modules (driver and passenger), wipe it off immediately with a dry cloth.
- If air bag (inflator) module was dropped from a height of 90 cm (3 ft) or more, it should be replaced with a new one as an assembly.



WARNING:

- **For handling and storage of a live air bag (inflator) module, select a place where the ambient temperature below 65°C (150°F), without high humidity and away from electric noise.**
- **When carrying a live air bag (inflator) module, make sure the bag opening is pointed away from you. In case of anaccidental deployment, the bag will then deploy with minimal chance of injury. Never carry the air bag (inflator) module by the wires or connector on the underside of the module.**

Otherwise, personal injury may result.

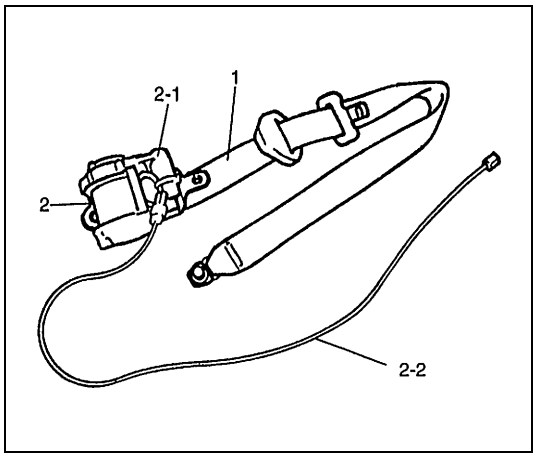


WARNING:

When placing a live air bag (inflator) module on bench or other surface, always face the bag up, away from the surface. As the live passenger air bag (inflator) module must be placed with its bag (trim cover) facing up, place it on the workbench with a slit or use the workbench vise to hold it securely at its lower mounting bracket.
It is also prohibited to place anything on top of the trim cover and stack air bag (inflator) modules.
This is necessary so that a free space is provided to allow the air bag to expand in the unlikely event of accidental deployment.
Otherwise, personal injury may result.

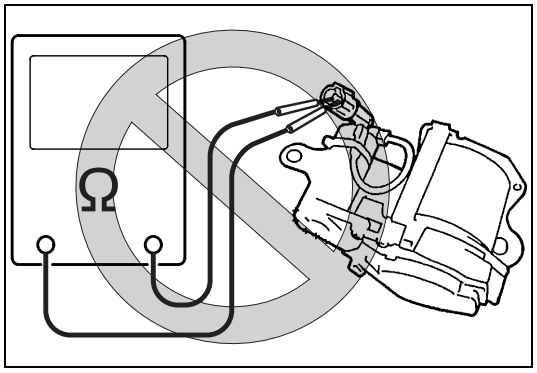
1.	Slit on workbench
2.	Workbench vise
3.	Lower mounting bracket

LIVE (INACTIVATED) SEAT BELT PRETENSIONERS



Special care is necessary when handling and storing a live (inactivated) seat belt pretensioners.
Also, when the seat belt pretensioners activate, gas is generated and the seat belt is retracted into the retractor quickly.
Note, therefore, that if they activate accidentally, the seat belt pretensioners and other object(s) around them may be thrown through the air.

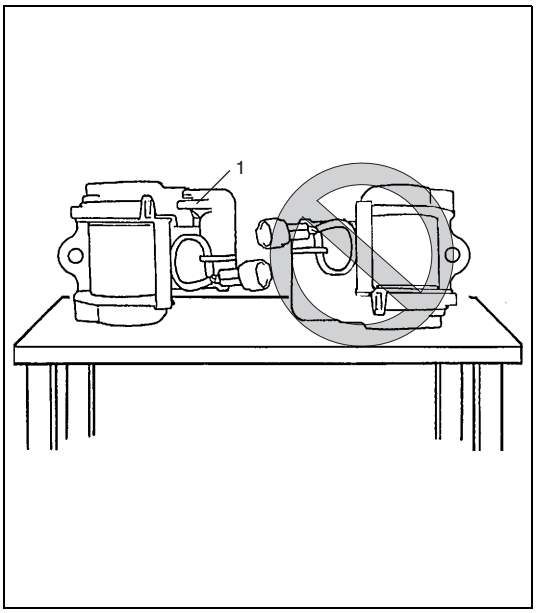
1.	Webbing
2.	Retractor assembly
2-1.	Seat belt pretensioner
2-2.	Seat belt pretensioner harness



WARNING:

Never attempt to measure the resistance of the seat belt pretensioners. It is very dangerous as the electric current from the tester may activate pretensioner.

- Never attempt to disassemble the seat belt pretensioners (retractor assembly).
- If any abnormality is found, be sure to replace it with new one as an assembly.
- When an abnormality is noted as existing in the live (inactivated) seat belt pretensioner, be sure to activate it before discarding it.
- When grease, cleaning agent oil, water, etc., got on the seat belt pretensioners (retractor assembly), wipe it off immediately with a dry cloth.
- If seat belt pretensioner was dropped from a height of 30 cm (1 ft) or more, it should be replaced with a new one as an assembly.



1. Exhaust hole

WARNING:

- **For handling and storage of a live seat belt pretensioner, select a place where the ambient temperature below 65°C (150°F), without high humidity and away from electric noise.**
- **Never carry the seat belt pretensioner by the wires or connector on the underside of the pretensioner.**
- **When placing a live seat belt pretensioner on the workbench or some place like that, be sure not to lay it with its exhaust hole provided side facing down. It is also prohibited to put something on its face with an exhaust hole or to put a seat belt pretensioner on top of another.**

Otherwise, personal injury may result.

DEPLOYED AIR BAG (INFLATOR) MODULES

WARNING:

- **The air bag (inflator) module immediately after deployment is very hot. Wait for at least 30 minutes to cool it off before proceeding the work.**
- **Do not apply water, oil, etc. to deployed air bag (inflator) module.**
- **After an air bag (inflator) module has been deployed, the surface of the air bag may contain a powdery residue. This powder consists primarily of cornstarch (used to lubricate the bag as it inflates) and byproducts of the chemical reaction. As with many service procedures, gloves and safety glasses should be worn.**
- **Wash your hands with mild soap and water after completing the work.**

Refer to the procedure described under “Deployed Air Bag (Inflator) Modules Disposal” in this section.

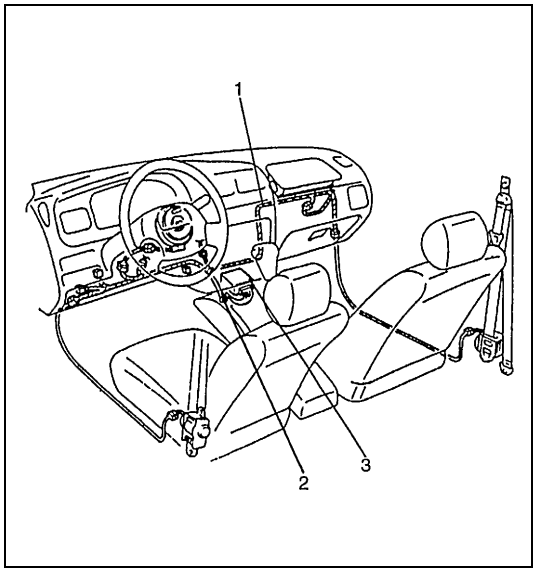
ACTIVATED SEAT BELT PRETENSIONERS

WARNING:

- **The seat belt pretensioner immediately after activation is very hot. Wait for at least 30 minutes to cool it off before proceeding the work.**
- **Do not apply water, oil, etc. to activated seat belt pretensioner.**
- **With many service procedures, gloves and safety glasses should be worn to prevent any possible irritation of the skin or eyes.**
- **Wash your hands with mild soap and water after completing the work.**

Refer to the procedure described under “Activated Seat Belt Pretensioners Disposal” in this section.

AIR BAG WIRE HARNESS AND CONNECTORS



Air bag wire harness can be identified easily as it is covered with a yellow protection tube. Be very careful when handling it.

- When an open in air bag wire harness, damaged wire harness, connector or terminal is found, replace wire harness, connectors and terminals as an assembly.
- When installing it, be careful so that the air bag wire harness is not caught or does not interfere with other parts.
- Make sure all air bag system grounding points are clean and grounds are securely fastened for optimum metal-to-metal contact. Poor grounding can cause intermittent problems that are difficult to diagnose.

1.	Air bag wire harness
2.	Ground
3.	SDM case ground

Disposal

Do not dispose of the live (undeployed) air bag (inflator) modules and the live (inactivated) seat belt pretensioners. When disposal is necessary, be sure to deploy the air bag according to deployment procedure described under “Air Bag (Inflator) Modules Disposal” and to activate the pretensioner according to activation procedure described under “Seat Belt Pretensioners Disposal”.

WARNING:

Failure to follow proper air bag (inflator) module and seat belt pretensioner disposal procedures can result in air bag deployment and pretensioner activation which could cause personal injury. Undeployed air bag (inflator) module and inactivated seat belt pretensioner must not be disposed of through normal refuse channels.

The undeployed air bag (inflator) module and inactivated seat belt pretensioner contain substances that can cause severe illness or personal injury if the sealed container is damaged during disposal.

Repairs and Inspections Required After an Accident

CAUTION:

- **All air bag system components, including the electrical harness (component mounting points), must be inspected after an accident. If any components are damaged or bent, they must be replaced even if air bag system activation did not occur.**
- **Never use air bag system parts from another vehicle.**
- **Do not attempt to service the parts below. Service of these parts is by replacement only.**
  - **– Driver/Passenger air bag (inflator) module**
  - **– Driver/Passenger seat belt pretensioner**
  - **– SDM**
  - **– Contact coil and combination switch assembly**
  - **– Air bag wire harness**
- **Proper operation of the sensors and air bag system requires that any repairs to the vehicle structure return it to its original production configuration.**

CAUTION:

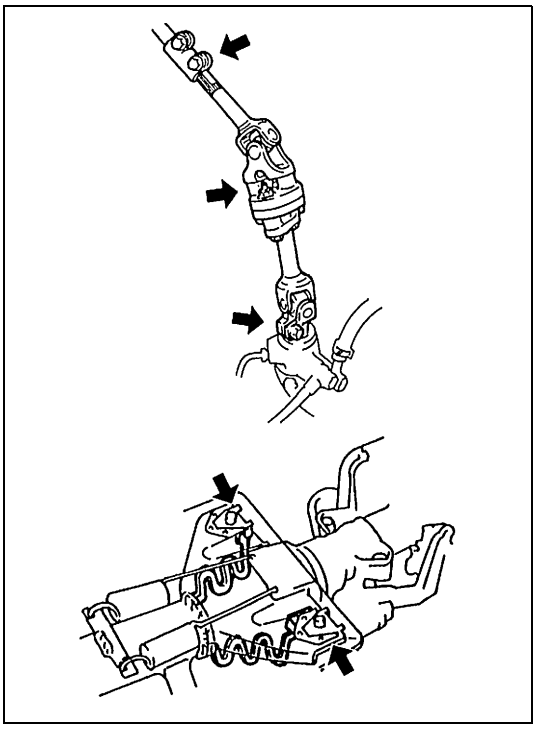
After detecting one time of such collision as to meet deployment conditions, the SDM must not be used. Refer to "Diagnosis" when checking the SDM.

Accident with deployment – component replacement

Certain air bag system components must be replaced. Those components are :

- Driver and passenger air bag (inflator) modules
  - – Replace with new one.
- Driver and passenger seat belt pretensioners
  - – Replace with new one as an assembly.
- SDM after detecting such collision as to meet deployment conditions
  - – Replace with new one.

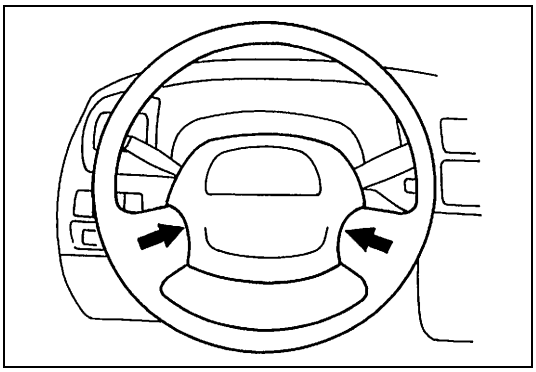
Accident with or without deployment – component inspections



Certain air bag and restraint system components must be inspected after any crash, whether the air bag deployed or not.
Those components are :

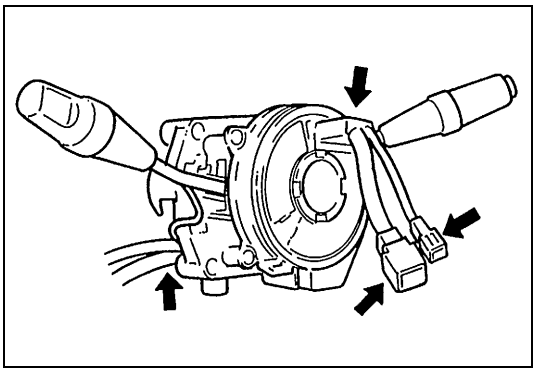
- Steering column and shaft joints
  - – Check for length, damage and bend according to “Checking Steering Column for Accident Damage” in Section 3C1.
- Steering column bracket and capsules
  - – Check for damage and bent.

If any faulty condition is found in above checks, replace faulty part.



- Steering wheel and driver air bag (inflator) module
  - – Check for damage or air bag (inflator) module fitness.
  - – Check trim cover (pad surface) for cracks.
  - – Check wire harness and connector for damage or tightness.

If any faulty condition is found in above checks, replace faulty part.

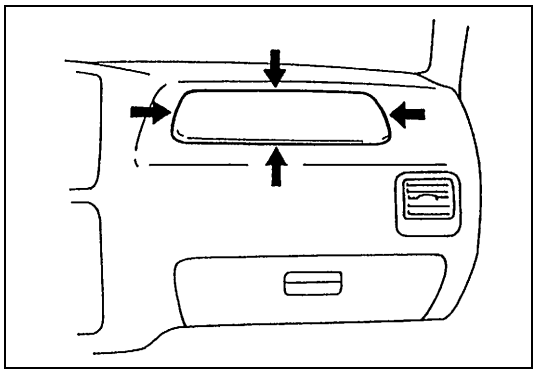


- Contact coil and combination switch assembly
  - – Check wire harness and connectors for damage or tightness.
  - – Check contact coil case for damage.

If any faulty condition is found in above checks, replace.

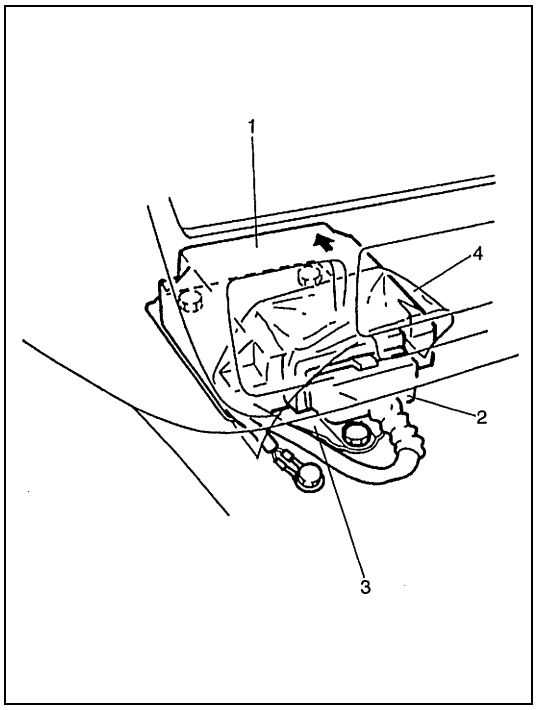
- Instrument panel member and reinforcement
  - – Check for any distortion, bending, cracking or other damage.

If any faulty condition is found in above checks, replace.



- Passenger air bag (inflator) module
  - Check for dents, cracks, damage or fitness.
  - Check trim cover for cracks or deformities.
  - Check harness and connector for damage or tightness.

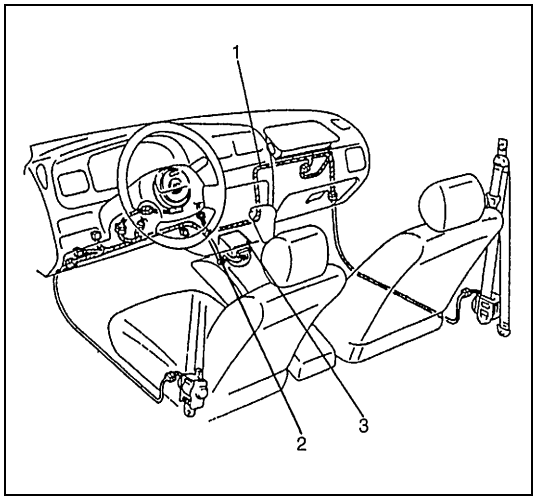
If any faulty condition is found in above checks, replace.



- SDM and SDM plate
  - Check for external damage such as deformation, scratch, crack, peeled paint, etc.
  - Check whether SDM can installed properly due to a cause in itself. (There is a gap between SDM and SDM plate, or it cannot be fixed securely.)
  - Check whether connector or lead wire of SDM has a scorching, melting or damage.
  - Check whether connector can be connected securely or locked.
  - Check SDM connector and terminals for tightness.
  - Check SDM sets a diagnostic trouble code and the diagnostic table leads to a malfunctioning SDM.

If any faulty condition is found in above checks, replace.

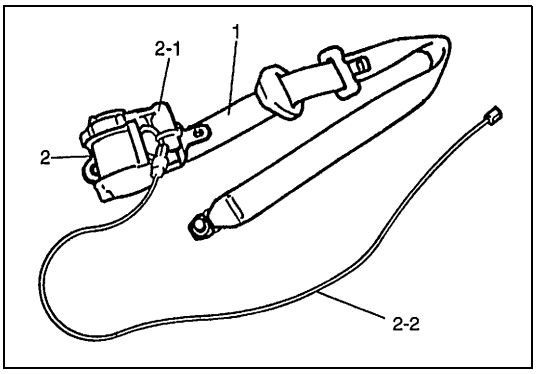
1.	SDM
2.	SDM connector
3.	SDM plate
4.	SDM cover



- Air bag wire harness and connections
  - Check for damages, deformities or poor connections. (Refer to “Intermittent And Poor Connections” in this section.)
  - Check wire harness clamps for tightness.

If any faulty condition is found, correct or replace.

1.	Air bag wire harness
2.	Ground
3.	SDM case ground



- Seat belt pretensioner
  - Check for dents, cracks, damage or fitness.
  - Check harness and connector for damage or tightness.

If any faulty condition is found in above checks, replace.

1.	Webbing
2.	Retractor assembly
2-1.	Seat belt pretensioner
2-2.	Seat belt pretensioner harness

- Seat belts and mounting points
  - Refer to Section 10A.
- "AIR BAG" warning lamp (air bag system)
  - After vehicle is completely repaired, perform "Air Bag Diagnostic System Check" under "Diagnosis" in this section.

Driver Air Bag (Inflator) Module

Refer to Section 3C1 for removal, inspection and installation.

Contact Coil and Combination Switch Assembly

Refer to Section 3C1 for removal, inspection and installation.

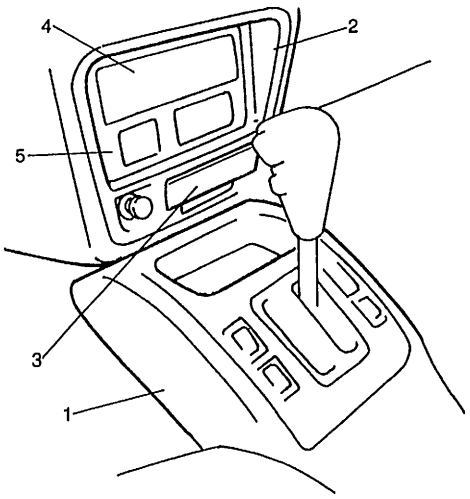
Seat Belt Pretensioner

Refer to Section 10A for removal, inspection and installation.

"Air Bag" Warning Lamp

Refer to Section 8C for removal and installation of combination meter.

SDM



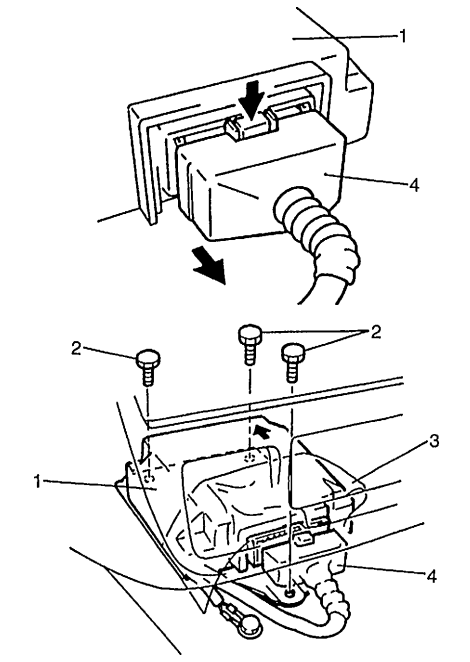
WARNING:

During service procedures, be very careful when handling a Sensing and Diagnostic Module (SDM).
Be sure to read "Service Precautions" in this section before starting to work and observe every precaution during work. Neglecting them may result in personal injury or inactivation of the air bag system when necessary.

REMOVAL

1) Disconnect negative cable at battery.
2) Disable air bag system. Refer to "Disabling Air Bag System" earlier in this section.
3) Remove rear and front center console box by removing screw and clips.
4) Remove center garnish panel.
5) Remove ashtray and tuner assembly, clock assembly, tuner pocket, radio hole cover, etc.

1, Front center console box
2. Center garnish panel
3. Ashtray
4. Radio hole cover
5. Clock assembly



6) Disconnect SDM connector from SDM.
7) Remove SDM (with SDM plate) as an assembly from vehicle.

NOTE:

Do not separate SDM and SDM plate.

INSPECTION

CAUTION:

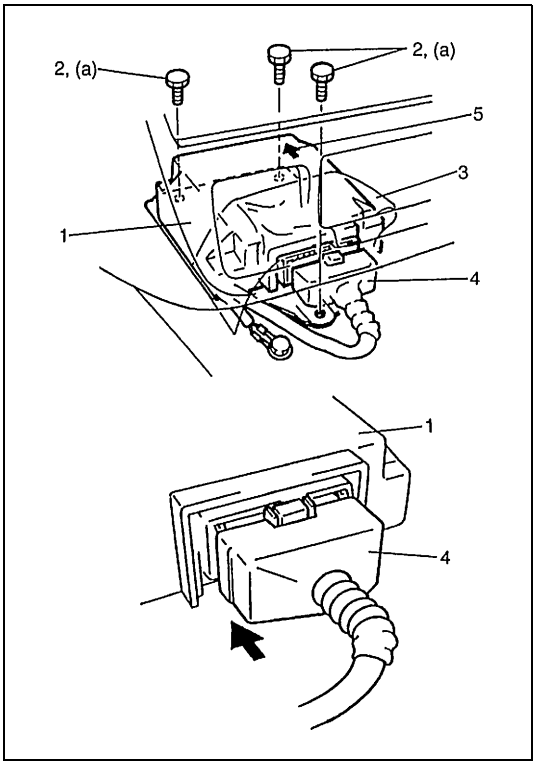
- **Do not connect a tester whatever type it may be.**
- **Never repair or disassemble SDM.**
- **If SDM was dropped from a height of 90 cm (3 ft) or more, it should be replaced.**

- Check SDM and SDM plate for dents, cracks or deformation.
- Check SDM connector for damage, cracks or lock mechanism.
- Check SDM terminal for bent, corrosion or rust.

If any faulty condition is found in above checks, replace.

1, SDM
2. SDM bolt
3. SDM cover
4. SDM connector

INSTALLATION



1) Check that none of following faulty conditions exists.
   - Bend, scratch, deformity in vehicle body mounted on SDM
   - Foreign matter or rust on mating surface of vehicle body mounted on SDM
2) Install SDM (with SDM plate) to vehicle.

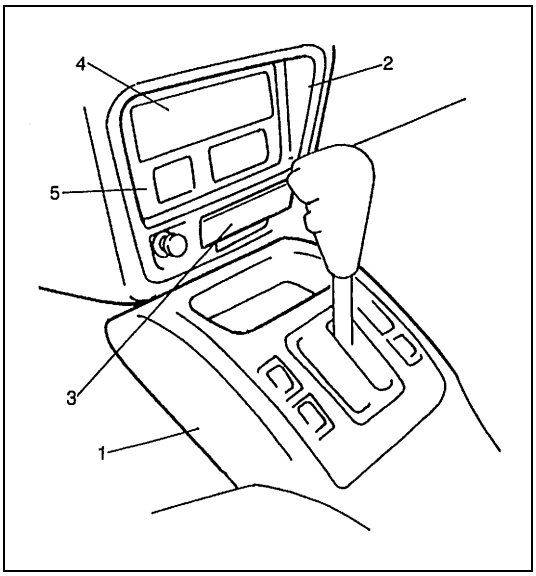
CAUTION:
Ensure that arrow on the SDM is pointing toward the front of the vehicle.

3) Tighten SDM bolts to specified torque.

Tightening torque
(a) : 6.0 N·m (0.6 kg-m, 4.5 lb-ft)

4) Connect SDM connector to SDM securely.

1,	SDM
2.	SDM bolt
3.	SDM cover
4.	SDM connector
5.	Arrow



5) Install tuner assembly, clock assembly, tuner pocket, radio hole cover, etc. and ashtray.
6) Install center garnish panel.
7) Install front and rear center console box.
8) Connect negative cable to battery.
9) Enable air bag system. Refer to “Enabling Air Bag System” earlier in this section.

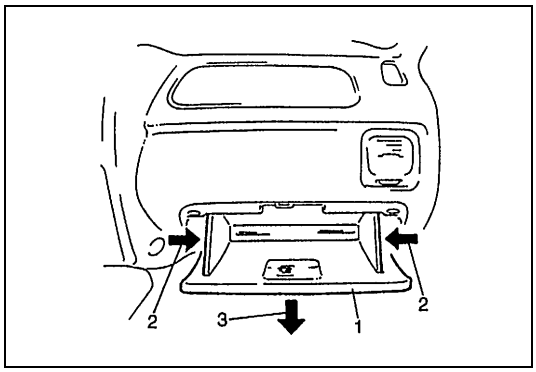
1,	Front center console box
2.	Center garnish panel
3.	Ashtray
4.	Radio hole cover
5.	Clock assembly

Passenger Air Bag (Inflator) Module

WARNING:

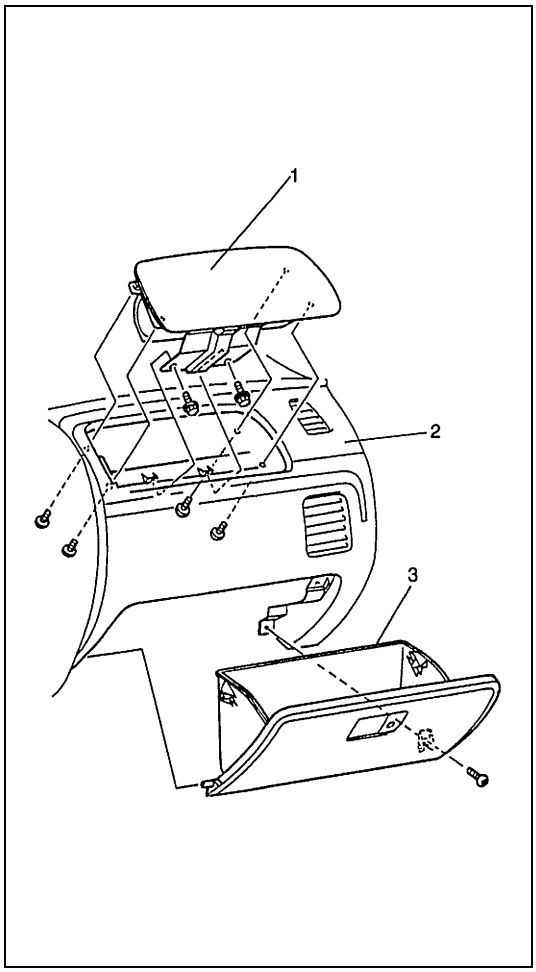
- **Never attempt to disassemble or repair the passenger air bag (inflator) module. If any abnormality is found, be sure to replace it with new one as an assembly.**
- **Be sure to read "Service Precautions" in this section before starting to work and observe every precaution during work. Neglecting them may result in personal injury or undeployment of the air bag when necessary.**

REMOVAL



1) Disconnect negative battery cable at battery.
2) Disable air bag system. Refer to "Disabling Air Bag System" earlier in this section.
3) Open glove box, then while pressing glove box stopper, pull out glove box from instrument panel.

1,	Glove box
2.	Push
3.	Pull



4) Remove glove box from instrument panel.
5) Remove passenger air bag (inflator) module attaching bolts and screws, and passenger air bag (inflator) module from vehicle.

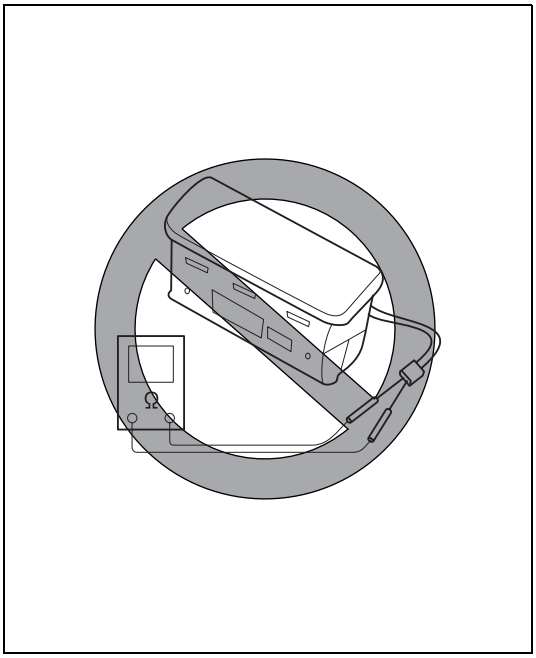
WARNING:

- **When carrying a live air bag (inflator) module, make sure the bag opening is pointed away from you.**
  Never carry air bag (inflator) module by wires or connector on the side of the module. In case of an accidental deployment, the bag will then deploy with minimal chance of injury.
- **As the live passenger air bag (inflator) module must be kept with its bag (trim cover) facing up while being stored or left standing, place it on the workbench with a slit or use the workbench vise to hold it securely at its lower mounting bracket. This is necessary so that a free space is provided to allow the air bag to expand in the unlikely event of accidental deployment.**
- **Observe "Service Precautions" earlier in this section for handling and storing it.**

Otherwise personal injury may result.

1,	Passenger air bag (inflator) module
2.	Instrument panel
3.	Glove box

INSPECTION



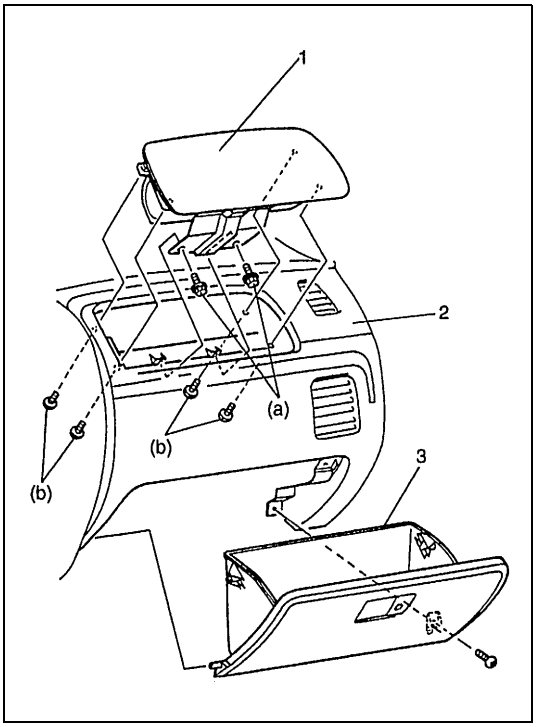
WARNING:
Never measure resistance of passenger air bag (inflator) module or disassemble it. Otherwise personal injury may result.

CAUTION:
If air bag (Inflator) module was dropped from a height or 90 cm (3 ft) or more, it should be replaced.

Check air bag (inflator) module appearance visually for following symptoms and if any one of them is applicable, replace with a new one.

- Air bag has deployed.
- There is a crack in trim cover (pad surface).
- Wire harness or connector is damaged.
- Air bag (inflator) module is damaged or a strong impact (e.g., dropping) was applied to it.

INSTALLATION



1) Install passenger air bag (inflator) module to vehicle.
2) Tighten passenger air bag (inflator) module attaching bolts and screws to specified torque.

Tightening torque
(a) : 23 N·m (2.3 kg-m, 16.5 lb-ft)
(b) : 5.5 N·m (0.55 kg-m, 4.0 lb-ft)

3) Connect negative battery cable to battery.
4) Enable air bag system. Refer to “Enabling Air Bag System” earlier in this section.

1. Passenger air bag (inflator) module
2. Instrument panel
3. Glove box

Air Bag (Inflator) Module and Seat Belt Pretensioner Disposal

WARNING:

Failure to follow proper air bag (inflator) module and seat belt pretensioner disposal procedures can result in air bag deployment and pretensioner activation which may cause personal injury.
Do not dispose of live (undeployed) air bag (inflator) modules and seat belt pretensioners. Because undeployed air bag (inflator) module/inactivated seat belt pretensioner must not be disposed of through normal refuse channels.
Undeployed air bag (inflator) module and inactivated seat belt pretensioner contain substances that can cause severe illness or personal injury if sealed container is damaged during disposal.

Air bag (inflator) module/seat belt pretensioner can be deployed/activated inside or outside of vehicle. Deployment/Activation method used depends upon final disposition of vehicle. Review the following instructions in order to determine which will work best in a given situation.

Deployment/Activation Outside of Vehicle :
When you intend to return the vehicle to service, deploy the air bag (inflator) module(s) or activate seat belt pretensioner(s) outside of the vehicle.

Deployment/Activation Inside of Vehicle :
When the vehicle will be destroyed, or salvaged for component parts, deploy the air bag modules and/or activate seat belt pretensioners installed on vehicle.

WARNING:

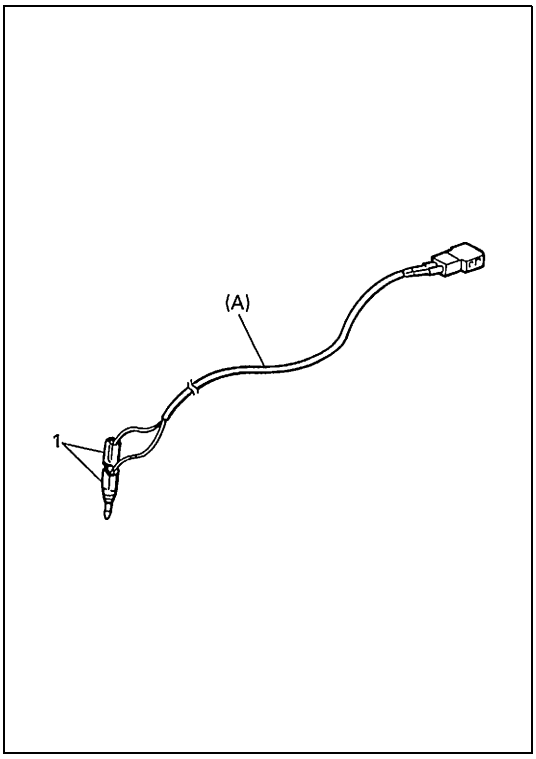
The following precautions must be observed for this work. Failure to observe any of them may result in personal injury.

- **Procedure should be followed strictly as described here.**
- **Be sure to read "Service Precautions" in this section beforehand.**
- **To avoid accidental deployment/activation, this work should be performed by no more than one person.**
- **Since smoke is produced when air bag (inflator) module is deployed and pretensioner is activated, select well-ventilated area.**
- **Air bag (inflator) module and seat belt pretensioner will immediately deploy/activate when 12 volts vehicle battery is connected to it. Wear safety glasses throughout this entire deployment/activation and disposal procedure.**
- **Wear suitable ear protection when deploying air bag (inflator) module/activating seat belt pretensioner. Also, advise those who are in area close to deployment/activation site to wear suitable ear protection.**
- **Do not deploy/activate two or more air bag system components (air bag (inflator) modules and seat belt pretensioners) at the same time.**
- **Never connect deployment harness to any 12 volts vehicle battery before connecting deployment harness to air bag (inflator) module and seat belt pretensioner. Deployment harness shall remain shorted and not be connected to 12 volts vehicle battery till you are ready to deploy air bag (inflator) module or activate seat belt pretensioner.**

Deployment/Activation Outside of Vehicle

When you intend to return the vehicle to service, deploy the air bag (inflator) module(s) or activate seat belt pretensioner(s) outside of the vehicle.

1) Turn ignition switch to “LOCK” position and remove key.
2) Wear safety glasses during this deployment/activation procedure.



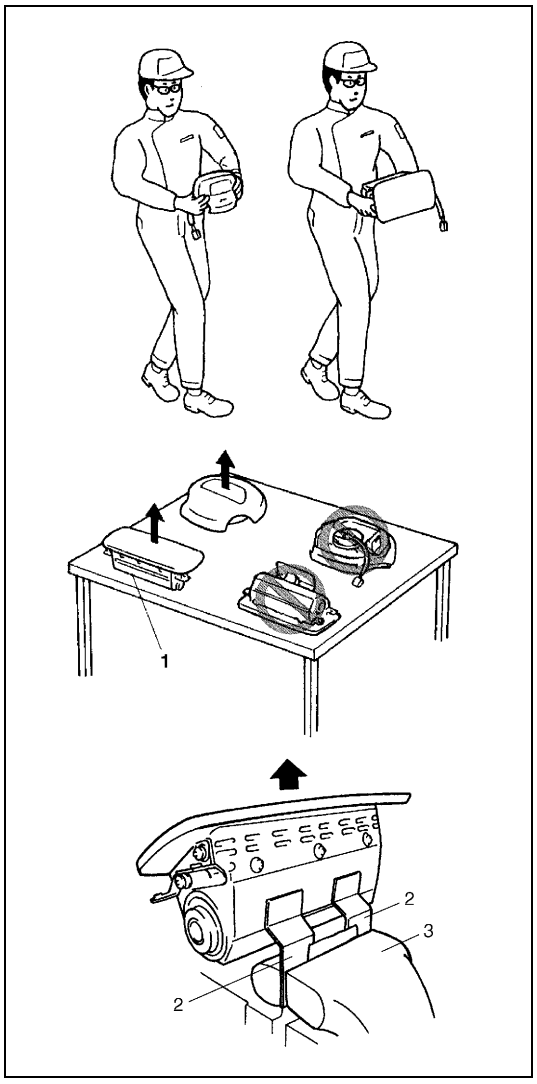
3) Check that there is no open, short or damage in special tools (deployment harness (A)). If any faulty is found, do not use it and be sure to use new special tool.

Special tool
(A) : 09932-75031

4) Short two deployment harness leads (1) together by fully seating one banana plug into the other.

WARNING:
Deployment harness (A) shall remain shorted and not be connected to 12 volts vehicle battery till you are ready to deploy air bag module or activate seat belt pretensioner.

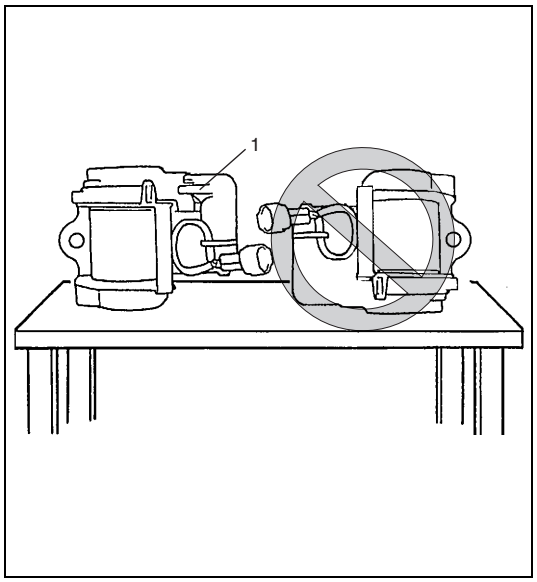
5) Remove applicable air bag (inflator) module or seat belt pretensioner as follows.
- For driver air bag (inflator) module
  Remove driver air bag (inflator) module referring to “Driver Air Bag (Inflator) Module” in Section 3C.
- For passenger air bag (inflator) module
  Remove passenger air bag (inflator) module referring to “Passenger Air Bag (inflator) Module” in this section.
- For seat belt pretensioner (if equipped)
  Remove seat belt referring to “Front Seat Belt” in Section 10.



WARNING:

- **For handing and storage of live air bag (inflator) module, select place where ambient temperature below 65°C (150°F), without high humidity and away from electric noise.**
- **Always carry live air bag (inflator) module with trim cover away from you.**
- **When storing live air bag (inflator) module or when leaving live air bag (inflator) module unattended on bench or other surface, always face trim cover up and away from surface. As the live passenger air bag (inflator) module must be placed with its bag (trim cover) facing up, place it on the work bench with a slit (1) or use the work bench vise (3) to hold it securely at its lower mounting bracket (2). It is also prohibited to place anything on top of the trim cover and stack air bag (inflator) modules. This is necessary so that free space is provided to allow air bag (inflator) module to expand in the unlikely event of accidental deployment.**

Failure to follow procedures may result in personal injury.

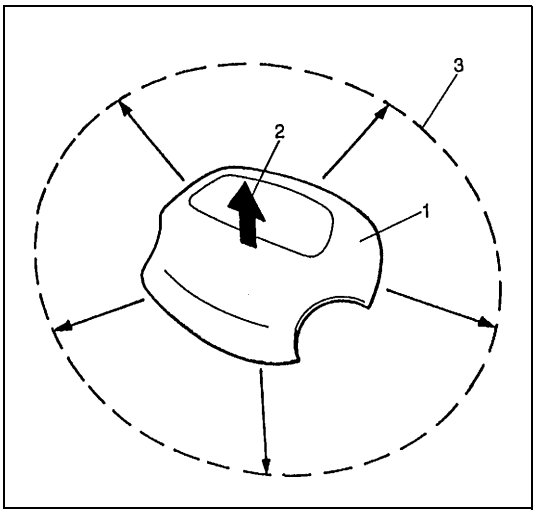


WARNING:

- **For handing and storage of a live seat belt pretensioner, select a place where the ambient temperature below 65°C (150°F), without high humidity and away from electric noise.**
- **Do not carry the seat belt pretensioner by webbing.**
- **When placing a live seat belt pretensioner on the workbench or other surface, be sure not to lay it with its exhaust hole (1) provided side facing down. It is also prohibited to put something on its face with an exhaust hole (1) or to put a seat belt pretensioner on top of another.**

Otherwise, personal injury may result.

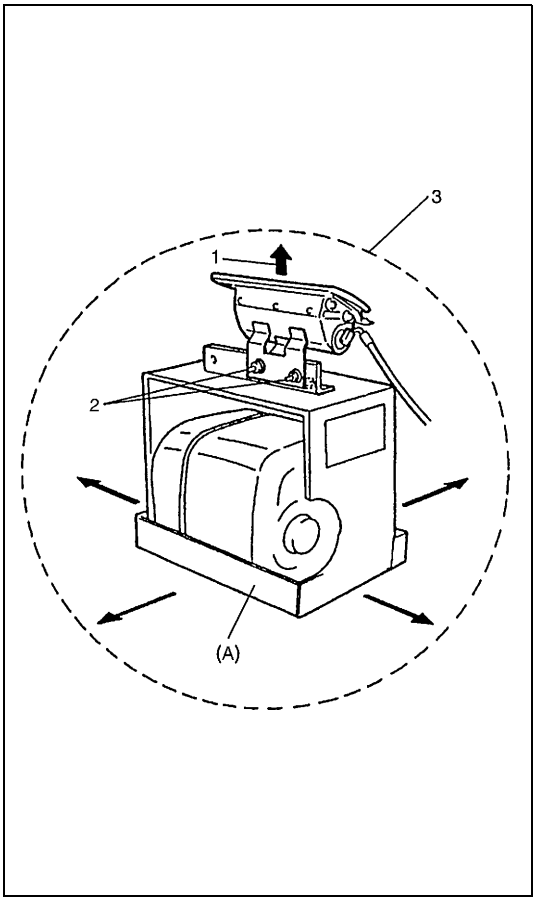
6) Set air bag (inflator) module or seat belt pretensioner as follows.



• For driver air bag (inflator) module

a) Clear space (3) on ground about 185 cm (6 ft) in diameter where driver air bag (inflator) module (1) for deployment. Paved, outdoor location where there is no activity is preferred. If outdoor location is not available, space on shop floor where there is no activity and provide sufficient ventilation. Ensure no loose or flammable objects are within deployment area.

b) Place driver air bag (inflator) module (1) with its vinyl trim cover facing up (2) on ground in step a).



• For passenger air bag (inflator) module

a) Clear space (3) on ground about 185 cm (6 ft) in diameter where passenger air bag (inflator) module (1) for deployment. Paved, outdoor location where there is no activity is preferred. If outdoor location is not available, space on shop floor where there is no activity and provide sufficient ventilation. Ensure no loose or flammable objects are within deployment area.

b) Place deployment fixture (A) on ground in step a).

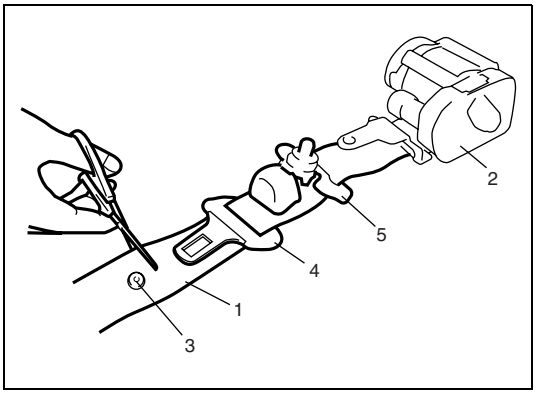
Special tool
(A) : 09932-75041

c) Fill plastic reservoir in deployment fixture (A) with water or sand. This is necessary to provide sufficient stabilization of fixture during deployment.

d) Attach passenger air bag (inflator) module (1) in deployment fixture (A) securely using mounting attachment, hold-down bolts & nuts and M8 bolts & nuts (2).

CAUTION:

Be sure to use M8 size and 7T strength bolt for fixing passenger air bag (inflator) module (1) to deployment fixture (A).



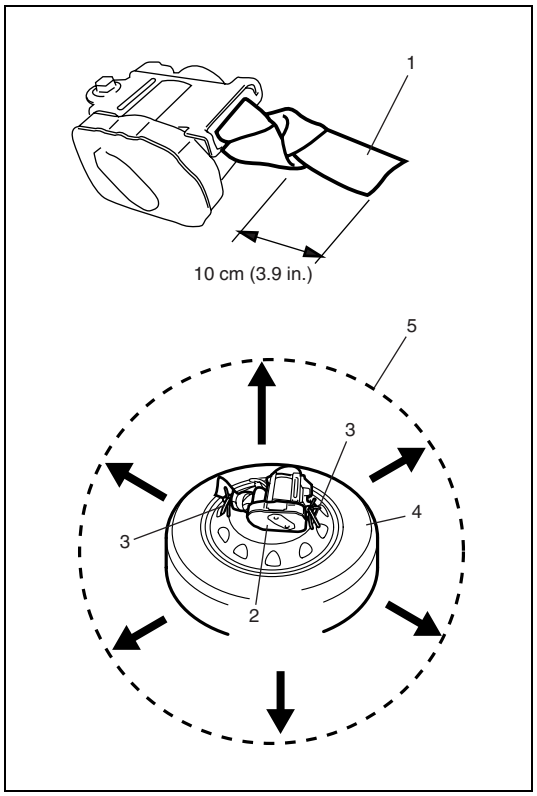
• For seat belt pretensioner

a) Cut webbing (1) at tongue plate stopper (3) of seat belt pretensioner (2) side as shown.

NOTE:

Hold seat belt pretensioner (2) vertically in the same condition as it is installed. Otherwise, webbing can't be pulled out.

b) Remove tongue plate (4) and shoulder anchor (5) from webbing.



c) Tie webbing (1) tightly at 10 cm (3.9 in.) from cutting edge as shown.
d) Tie seat belt pretensioner (2) with wire harness (3) to wheel-installed tire (4) as shown.

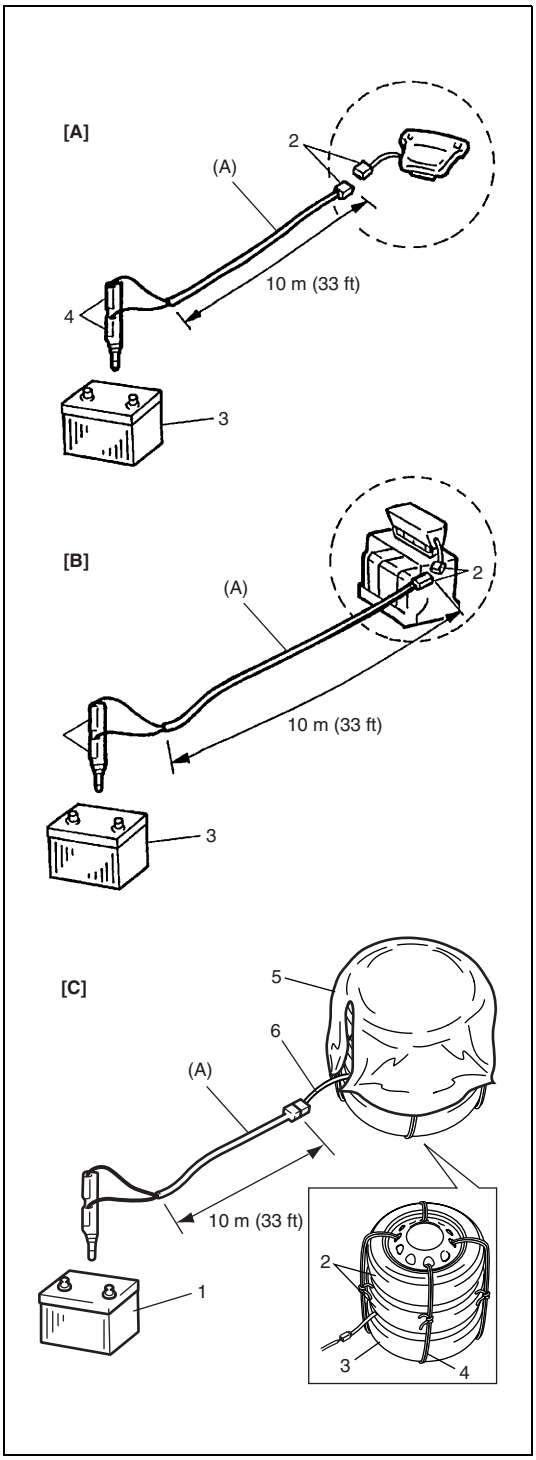
Wire harness specification:

Stripped wire harness section 1.25 mm^2 (0.0019 in.^{2}) or more (Stripped wire harness diameter 1.25 mm (0.05 in.) or more)

NOTE:

Wind wire harness (3) around at least 3 times.

e) Clear space (5) on ground about 185 cm (6 ft) in diameter where seat belt pretensioner (2) is to be activated. Paved, outdoor location where there is no activity is preferred. If outdoor location is not available, space on shop floor where there is no activity and provide sufficient ventilation. Ensure no loose or flammable objects are within activation area.
f) Place wheel-installed tire (4) with seat belt pretensioner (2) on ground in step e).



7) Stretch deployment harness (A) from air bag (inflator) module or seat belt pretensioner to its full length 10 m (33 ft).

Special tool
(A) : 09932-75031

8) Place 12 volts vehicle battery (1) near shorted end of deployment harness (A).
9) Verify that area around air bag (inflator) module or seat belt pretensioner is clear of all people and loose or flammable objects.
10) [For driver air bag (inflator) module]
Verify that driver air bag (inflator) module is resting with its vinyl trim cover facing up.
[For passenger air bag (inflator) module]
Verify that passenger air bag (inflator) module is firmly and properly secured on deployment fixture (special tool).

[For seat belt pretensioner]

a) Connect seat belt pretensioner harness (6) to seat belt pretensioner.
b) Pile 2 wheel-installed tires (2) on top of tire with seat belt pretensioner (3), and tie them with wire harness (4) as shown.

Wire harness specification:

Stripped wire harness section 1.25 mm^2 (0.0019 in.^{2}) or more (Stripped wire harness diameter 1.25 mm (0.05 in.) or more)

NOTE:

Wind wire harness around at least 2 times.

c) Drape blanket (5) over those tires.

11) Connect the driver, passenger or seat belt pretensioner harness to deployment harness (A) connector and lock connectors with lock lever.

[A] :	For driver air bag (inflator) module
[B] :	For passenger air bag (inflator) module
[C] :	For seat belt pretensioner

12) Notify all people in immediate area that you intend to deploy/ activate air bag (inflator) module or seat belt pretensioner.

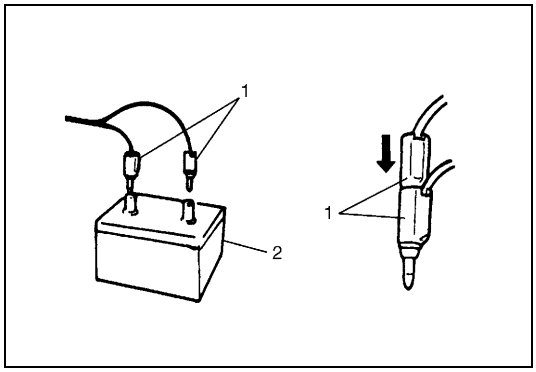
NOTE:

- **When air bag (inflator) module deploys and seat belt pretensioner activates, rapid gas expansion will create substantial report. Wear suitable ear protection. Notify all people in immediate area that you intend to deploy air bag (inflator) module or activate seat belt pretensioner and suitable ear protection should be worn.**
- **When driver air bag (inflator) module deploys, driver air bag (inflator) module may jump about 30 cm (1 ft) vertically. This is normal reaction to force of rapid gas expansion inside of drive air bag (inflator) module.**
- **After air bag (inflator) module has been deployed, surface of air bag (inflator) may contain powdery residue. This powder consists primarily of cornstarch (used to lubricate bag (inflator) as it inflates) and byproducts of chemical reaction.**

WARNING:

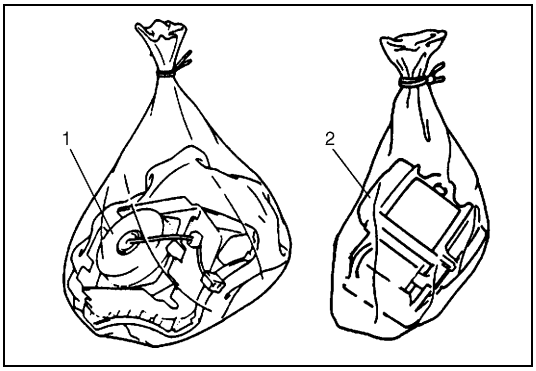
- **Do not place deployed air bag (inflator) module and activated seat belt pretensioner near any flammable objects.**
- **Do not apply water, oil, etc. to deployed air bag (inflator) module and activated seat belt pretensioner.**
- **Wait for about 30 minutes before touching any metal surface of air bag (inflater) module or seat belt pretensioner module. Disregarding these precautions may cause fire or personal injury.**

Failure to follow procedures may result in fire or personal injury.



13) Separate two banana plugs (1) on deployment harness.
14) Connect deployment harness to 12 volts vehicle battery (2). This will immediately deploy or activate air bag (inflator) module or seat belt pretensioner.
15) Disconnect deployment harness from 12 volts vehicle battery (2) and short two deployment harness leads together by fully seating one banana plug into the other.

16) After confirming that air bag (inflator) module deployed and/or seat belt pretensioner activated, proceed to Step (7) through Step 21). In the unlikely event that air bag (inflator) module did not deploy or seat belt pretensioner did not activate, proceed to Step 22) through Step 25).
17) Put on pair of shop gloves to protect your hands from possible irritation and heat when handling deployed air bag (inflator) module or activated seat belt pretensioner.
18) Disconnect adapter cable (special tool) from air bag (inflator) module or seat belt pretensioner as soon as possible. This will prevent adapter cable (special tool) from damage due to possible contact with hot air bag (inflator) module or hot seat belt pretensioner.
19) Disconnect the deployment harness from the air bag (inflator) module as soon after deployment as possible. This will prevent damage to the deployment harness due to possible contact with the hot air bag (inflator) module canister. The deployment harness are designed to be reused. They should, however, be inspected for damage after each deployment and replaced if necessary.



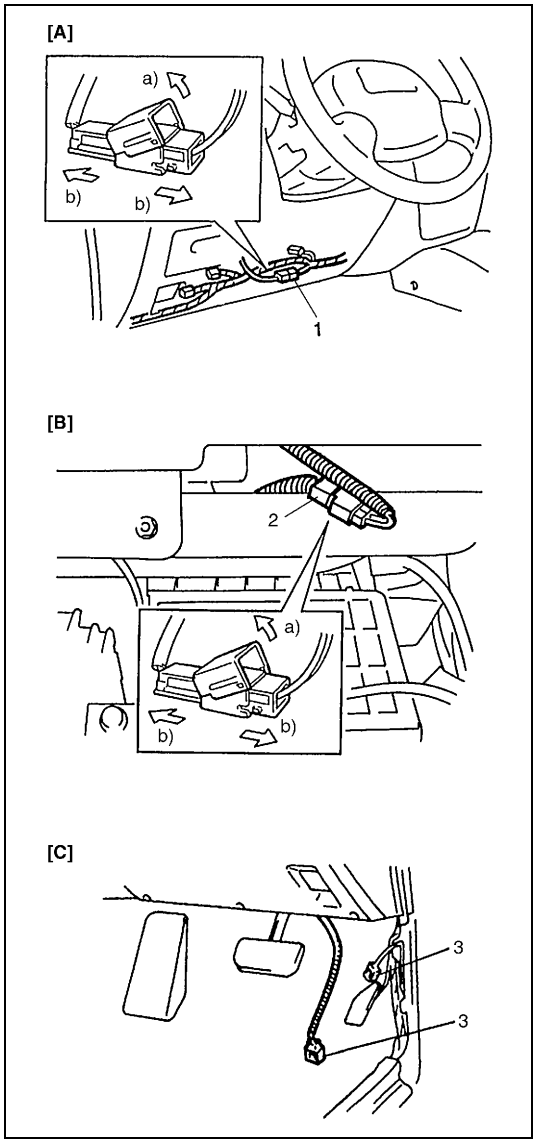
20) Dispose of deployed air bag (inflator) module (1) or activated seat belt pretensioner (2) through normal refuse channels after it has cooled for at least 30 minutes and tightly seal air bag (inflator) module (1) or seat belt pretensioner (2) in strong vinyl bag. (Refer to “Deployed Air Bag (Inflator) Module and Activated Seat Belt Pretensioner Disposal” in detail.)
21) Wash your hands with mild soap and water afterward.

NOTE:

Remaining steps are to be followed in the unlikely event that air bag (inflator) module did not deploy or seat belt pretensioner did not activate.

22) Ensure that deployment harness has been disconnected from 12 volts vehicle battery and that its two banana plugs have been shorted together by fully seating one banana plug into the other.
23) Disconnect deployment harness from air bag (inflator) module or seat belt pretensioner.
24) Temporarily store undeployed air bag (inflator) module or unactivated seat belt pretensioner referring to “Service Precautions” for details.
25) Contact your local distributor for further assistance.

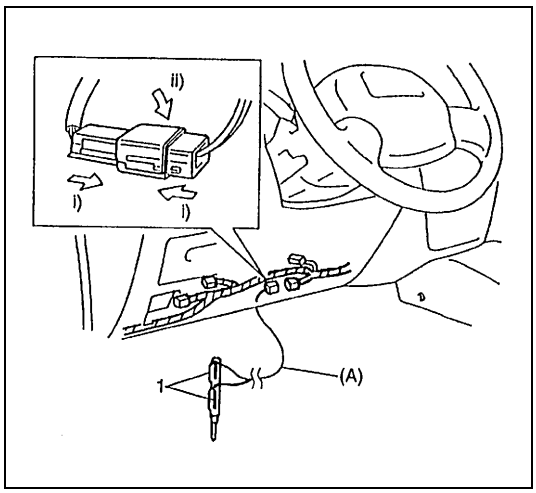
Deployment/Activation Inside Vehicle



When the vehicle will be destroyed, or salvaged for component parts, deploy the air bag modules and activate seat belt pretensioners installed on vehicle.

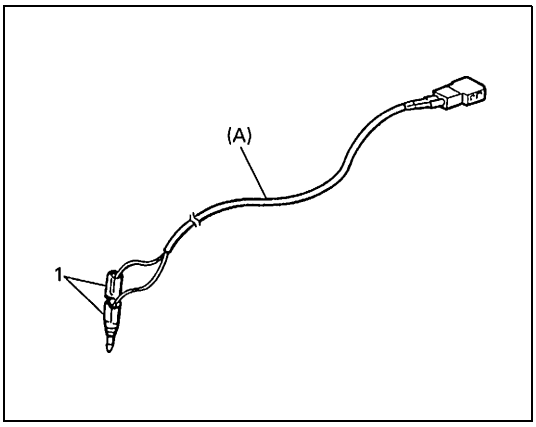
1) Turn ignition switch to "LOCK" position, remove key and put on safety glasses.
2) Remove all loose objects from front seats and instrument panel.
3) Disconnect air bag (inflator) module or seat belt pretensioner connector as follows.
   - For driver air bag (inflator) module
     Disconnect contact coil connector (1) located near base of steering column.
   - For passenger air bag (inflator) module
     Remove glove box from instrument panel and disconnect passenger air bag (inflator) module connector (2).
   - For seat belt pretensioner
     Remove both side (driver and passenger side) front pillar lower trims and disconnect seat belt pretensioner connectors (3).
4) Confirm that each air bag (inflator) module and seat belt pretensioner is securely mounted.

[A] :	Driver air bag (inflator) module
[B] :	Passenger air bag (inflator) module
[C] :	Seat belt pretensioner



5) Check that there is no open, short or damage in special tools (deployment harness (A)). If any faulty condition is found, do not use it and be sure to use new deployment harness (A).

Special tool
(A) : 09932-75031

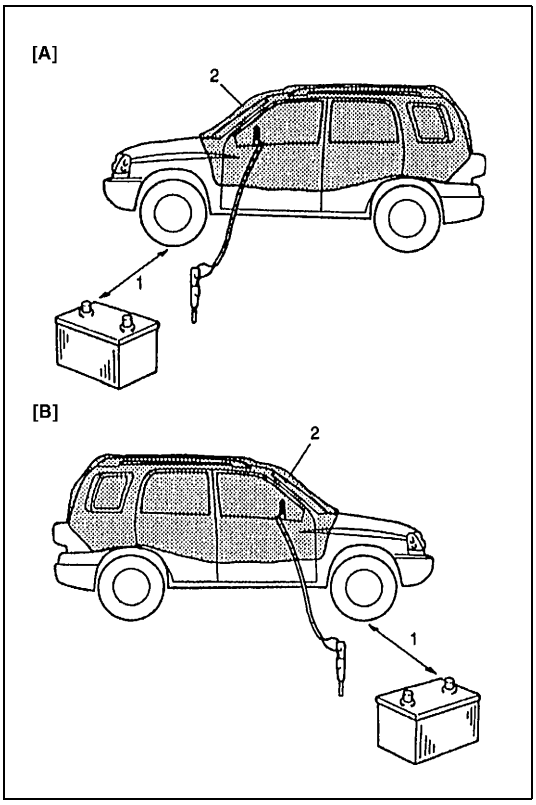


6) Short two deployment harness leads (1) together by fully seating one banana plug into the other.

WARNING:

Deployment harness (A) shall remain shorted and not be connected to 12 volts vehicle battery until you are ready to deploy air bag (inflator) module or activate seat belt pretensioner.

7) Connect the deployment harness connector to the seat belt pretensioner harness and lock the connector with lock lever.



8) Route deployment harness out the vehicle.
9) Verify that the inside of the vehicle and the area surrounding the vehicle are clear of all people and loose or flammable objects.
10) Stretch the deployment harness to its full length 10 m (33 ft).
11) Place a power source near the shorted end of the deployment harness. Recommended application : 12 Volts minimum, 2 amps minimum. A vehicle battery is suggested.
12) Completely cover windshield area and front door window openings with a drop cloth, blanket to similar item. This reduces the possibility of injury due to possible fragmentation of the vehicle's glass or interior.
13) Notify all people in the immediate area that you intend to activate the seat belt pretensioner.

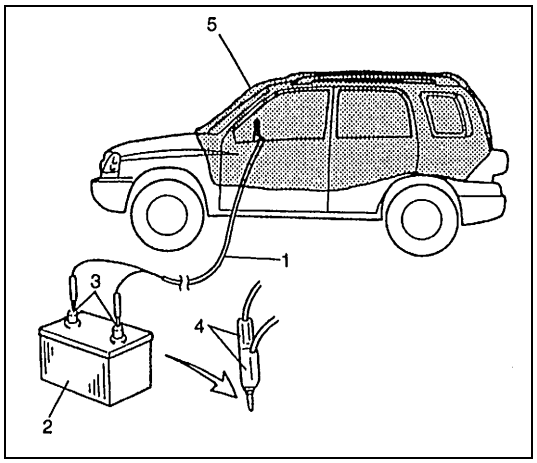
[A] :	Driver side for left hand steering vehicle
[B] :	Driver side for right hand steering vehicle
1.	Stretch deployment harness to its full length 10 m (33 ft).
2.	Drop cloth, blanket or similar item.

NOTE:

- **When air bag (inflator) module deploys or seat belt pretensioner activates, rapid gas expansion will create substantial report. Wear suitable ear protection. Notify all people in immediate area that you intend to deploy air bag (inflator) module or to activate seat belt pretensioner and suitable ear protection should be worn.**
- **After air bag (inflator) module has been deployed, surface of air bag may contain powdery residue. This powder consists primarily of cornstarch (used to lubricate air bag (inflator) module as it inflates) and by-products of chemical reaction.**

WARNING:
- **Do not place deployed air bag (inflator) module and activated seat belt pretensioner near any flammable objects.**
- **Do not apply water, oil, etc. to deployed air bag (inflator) module and activated seat belt pretensioner.**
- **Wait for about 30 minutes before touching any metal surface of air bag (inflater) module or seat belt pretensioner module. Disregarding these precautions may cause fire or personal injury.**

Failure to follow procedures may result in fire or personal injury.



14) Separate two banana plugs (3) on deployment harness (1).
15) Connect deployment harness (1) to 12 volts vehicle battery (2). This will immediately deploy or activate air bag (inflator) module or seat belt pretensioner.
16) Disconnect deployment harness (1) from 12 volts vehicle battery (2) and short two deployment harness leads (4) together by fully seating one banana plug into the other.

5. Drop cloth, blanket or similar them.

17) Repeat Step 3) through Step 16) to deploy/activate air bag (inflator) modules and seat belt pretensioners which has not been deployed/activated, if any.
18) After confirming that air bag (inflator) module and seat belt pretensioner deployed and/or activated, proceed to Step 19) through Step 23). In the unlikely event that air bag (inflator) module did not deploy or seat belt pretensioner did not activate, proceed to Step 24) through Step 26).
19) Carefully remove drop cloth from vehicle and clean off any fragments or discard it entirely.
20) Put on pair of shop gloves to protect your hands from possible irritation and heat when handling deployed air bag (inflator) module and activated seat belt pretensioner.
21) Disconnect the deployment harness from the seat belt pretensioner as soon after activation as possible. This will prevent damage to the deployment harness due to possible contact with the hot seat belt pretensioner canister. The deployment harness are designed to be reused. They should, however, be inspected for damage after each activation and replaced if necessary.
22) Scrap the vehicle in the same manner as the vehicle without air bag system.

NOTE:

Remaining steps are to be followed in the unlikely event that air bag (inflator) module did not deploy or seat belt pretensioner did not activate.

23) Remove undeployed air bag (inflator) module(s) and/or inactivated seat belt pretensioner(s) from vehicle as follows.
   - For driver air bag (inflator) module
     Remove driver air bag (inflator) module referring to “Driver Air Bag (Inflator) Module” in Section 3C.
   - For passenger air bag (inflator) module
     Remove passenger air bag (inflator) module referring to “Passenger Air Bag (Inflator) Module” in this section.
   - For seat belt pretensioner
     Remove seat belt referring to “Front Seat Belt with Pretensioner” in Section 10.
24) Temporarily store undeployed air bag (inflator) module and/or unactivated seat belt pretensioner referring to “Service Precautions” in this section.
25) Contact your local distributor for further assistance.

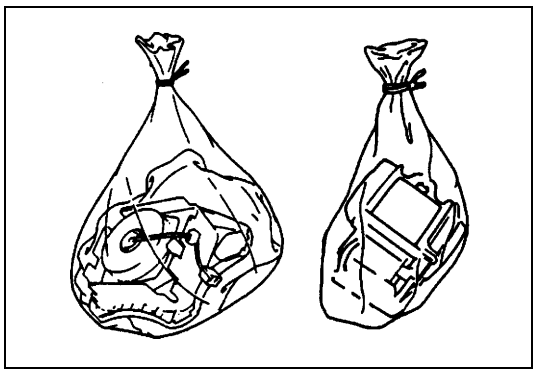
Deployed Air Bag (Inflator) Module and Activated Seat Belt Pretensioner Disposal

WARNING:

Failure to follow proper air bag (inflator) module and seat belt pretensioner disposal procedures can result in air bag deployment and pretensioner activation which may cause personal injury. The undeployed air bag (inflator) module and the inactivated seat belt pretensioner must not be disposed of through normal refuse channels.
The undeployed air bag (inflator) module and the inactivated seat belt pretensioner contains substances that can cause severe illness or personal injury if the sealed container is damaged during disposal.

Deployed air bag (inflator) module and the activated seat belt pretensioner can be disposed of through normal refuse channels just like any other parts. For their disposal, however, the following points should be noted.

- The air bag (inflator) module and the seat belt pretensioner immediately after deployment/activation is very hot. Wait for 30 minutes to cool it off before handling it.
- Never apply water, oil, etc. to deployed air bag (inflator) module and the activated seat belt pretensioner to cool it off and be careful so that water, oil etc. does not get on the deployed air bag (inflator) module and the activated seat belt pretensioner.
- After the air bag (inflator) module has been deployed, the surface of the air bag may contain a powdery residue. This powder consists primarily of cornstarch (used to lubricate the bag as it inflates) and by-products of the chemical reaction. As with many service procedures, you should wear gloves and safety glasses.

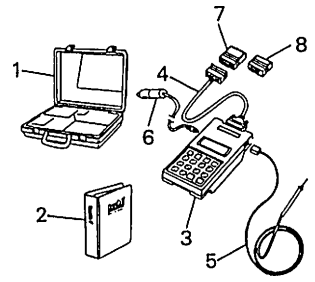


- When disposing of the deployed air bag (inflator) module and the activated seat belt pretensioner, be sure to seal it in a vinyl bag.
- When air bag (inflator) module and seat belt pretensioner have been deployed/activated inside the vehicle which is going to be scrapped, leave them as installed to the vehicle.
- Be sure to wash your hands with mild soap and water after handling it.

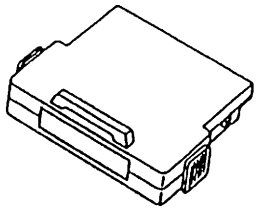
Tightening Torque Specification

Fastening part		Tightening torque		
		N•m	kg-m	lb-ft
SDM bolt		6	0.6	4.5
Passenger air bag (inflator) module	screw	5.5	0.55	4.0
	bolt	23	2.3	16.5
Driver air bag (inflator) module bolt		Refer to Section 3C1.		
Seat belt pretensioner (retractor assembly) bolt		Refer to Section 10A.		

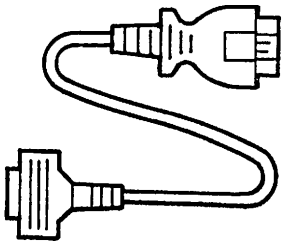
Special Tool



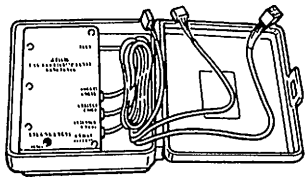
09931-76011
Suzuki scan tool (tech 1A) kit (See NOTE “A”)



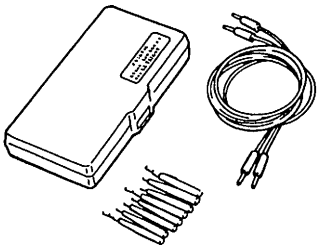
Mass storage cartridge for air bag system



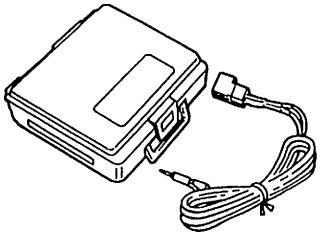
09931-76030
16/14 pin DLC cable



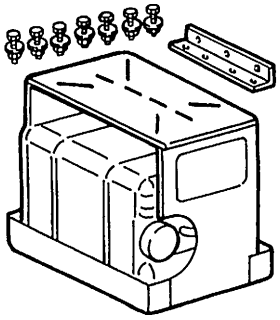
09932-75010
Air bag driver/passenger load tool



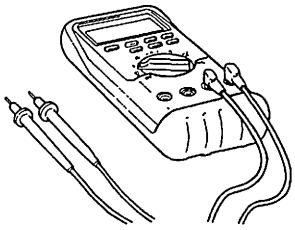
09932-76010
Connector test adapter kit



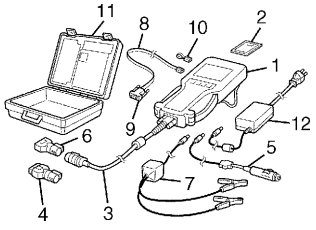
09932-75030
Air bag deployment harness



09932-75040
Passenger air bag (inflator) module deployment fixture



Digital multimeter
(See NOTE “B” and WARNING)



SUZUKI scan tool (tech 2)
(See NOTE “C”)

WARNING:

Be sure to use the specified digital multimeter.
Otherwise, air bag deployment or personal injury may result.

NOTE:

- **"A" : This kit includes the following items and substitutes for the Tech 2 kit.**
  1. Storage case, 2. Operator's manual, 3. Tech 1A, 4. DLC cable, 5. Test lead/probe, 6. Power source cable, 7. DLC cable adapter, 8. Self-test adapter
- **"B" : Digital multimeter for which the maximum test current is 10 mA or less at the minimum range of resistance measurement.**
- **"C" : This kit includes the following items and substitutes for the Tech 1A kit.**
  1. Tech 2, 2. PCMCIA card, 3. DLC cable, 4. SAE 16/19 adapter, 5. Cigarette cable, 6. DLC loopback adapter, 7. Battery power cable, 8. RS232 cable, 9. RS232 adapter, 10. RS232 loopback connector, 11. Storage case, 12. Power supply

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