

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 technicians only. Inexperienced technicians or technicians without the proper tools and equipment may not be able to properly perform the services described in this manual.

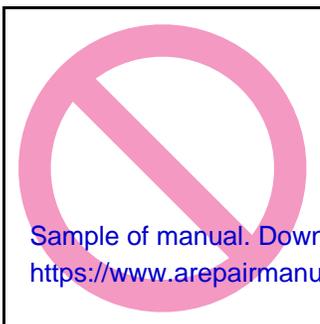
Improper repair may result in injury to the technician and may render the vehicle unsafe for the driver and passengers.

▲ 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, that is air bag (inflator) modules, SDM and/or seat belt with pretensioner, 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”.



Product: 2005 Suzuki GRAND VITARA JB416/JB420 Car Service Repair Workshop Manual

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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 General information, Engine, Suspension, Drive/Axle and Brakes sections (Sections 0 – 4).
VOLUME 2 contains Transmission/Transaxle, Steering, HVAC, Restraint, Body/Cab/Accessories and Control Systems sections (Sections 5 – 10).

Applicable model:

GRAND VITARA (JB416/JB420) vehicles

The contents are classified into sections each of which is given a section number as indicated in the Table of Contents on following 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 as specified in each description.

All information, illustrations and specifications contained in this literature are based on the latest product information available at the time of publication approval. And used as the main subject of description is the vehicle of standard specifications among others.

Therefore, note that illustrations may differ from the vehicle being actually serviced.

The right is reserved to make changes at any time without notice.

SUZUKI MOTOR CORPORATION

RECOMMENDATION OF GENUINE SUZUKI PARTS AND ACCESSORIES USE

SUZUKI strongly recommends the use of genuine SUZUKI parts* and accessories. Genuine SUZUKI parts and accessories are built to the highest standards of quality and performance, and are designed to fit the vehicle's exact specifications.

A wide variety of non-genuine replacement parts and accessories for SUZUKI vehicles are currently available in the market. Using these parts and accessories can affect the vehicle performance and shorten its useful life. Therefore, installation of non-genuine SUZUKI parts and accessories is not covered under warranty.

Non-Genuine SUZUKI Parts and Accessories

Some parts and accessories may be approved by certain authorities in your country.

Some parts and accessories are sold as SUZUKI authorized replacement parts and accessories. Some genuine SUZUKI parts and accessories are sold as re-use parts and accessories. These parts and accessories are non-genuine Suzuki parts and accessories and use of these parts are not covered under warranty.

Re-use of Genuine SUZUKI Parts and Accessories

The resale or re-use of the following items which could give rise to safety hazards for users is expressly forbidden:

- 1) Air bag components and all other pyrotechnic items, including their components (e.g. cushion, control devices and sensors)
- 2) Seatbelt system, including their components (e.g. webbing, buckles, and retractors)

The air bag and seat belt pretensioner components contain explosive chemicals. These components should be removed and disposed of properly by SUZUKI authorized service shop or scrap yard to avoid unintended explosion before scrapping.

*The parts remanufactured under SUZUKI's approval can be used as genuine SUZUKI parts in Europe.

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Section 00

Precautions

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Precautions

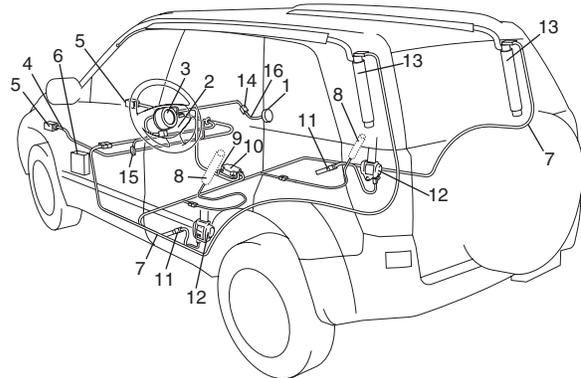
Precautions

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

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▲ 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 "Precautions on Service and Diagnosis of Air Bag System in Section 8B". 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.



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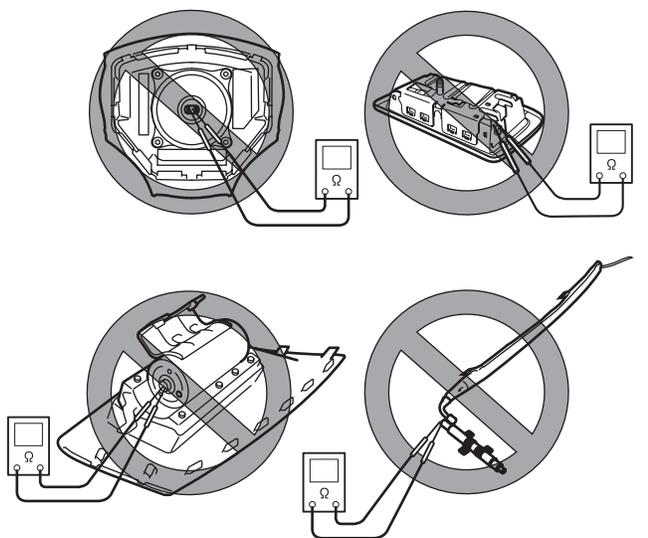
1. Passenger air bag (inflator) module	9. Ground for air bag system
2. Driver air bag (inflator) module	10. SDM
3. Contact coil assembly	11. Side-sensor (if equipped)
4. Air bag harness in main harness	12. Seat belt pretensioner
5. Forward-sensor	13. Side curtain-air bag (inflator) module (if equipped)
6. "A/B" fuse in junction block assembly	14. Air bag harness in instrument panel harness
7. Air bag harness in floor harness	15. "AIR BAG" monitor coupler (if equipped)
8. Side-air bag (inflator) module (if equipped)	16. Passenger air bag harness

Diagnosis

- When troubleshooting air bag system, be sure to follow "Air Bag Diagnostic System Check in Section 8B". Bypassing these procedures may result in extended diagnostic time, incorrect diagnosis, and incorrect parts replacement.
- Never use electrical test equipment other than that specified.

⚠ WARNING

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



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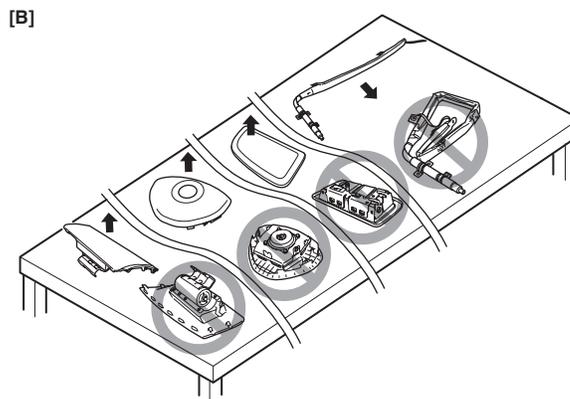
Servicing and Handling

⚠ WARNING

Many of service procedures require disconnection of "A/B" fuse and all air bag (inflator) module(s) from system circuit to avoid an accidental deployment.

Driver, Passenger, Side and Curtain 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. 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.



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[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.

00-3 Precautions:

- Never dispose of live (undeployed) air bag (inflator) modules (driver, passenger, side and curtain). If disposal is necessary, be sure to deploy them according to deployment procedures described in “Air Bag (Inflator) Module and Seat Belt Pretensioner Disposal in Section 8B”.
- 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.

▲ WARNING

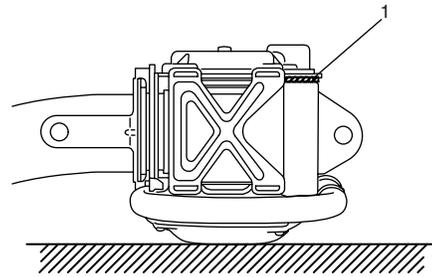
SDM

- 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 (1) 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 (drive and passenger). If disposal is necessary, be sure to activate them according to activation procedures described in “Air Bag (Inflator) Module and Seat Belt Pretensioner Disposal in Section 8B” 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.



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⚠ 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 Accident in Section 8B”.
- 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, passenger, side and curtain), forward sensors, side sensors 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, passenger, side and curtain), wipe off immediately with a dry cloth.
- Air bag wire harness is included in main harness, instrument panel harness, floor harness and seat harness. Air bag wire harness can be identified easily as the part of connector side wire harness 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 requests it, as this will set a DTC.
- 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 in Section 8B”.
- 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 in Section 8B”.

General Precautions

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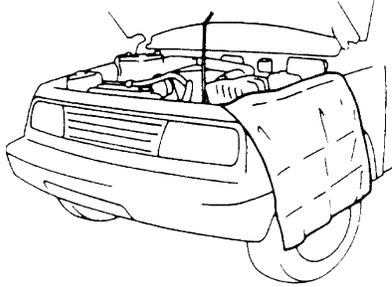
The **WARNING** and **CAUTION** describe some general precautions that you should observe when servicing a vehicle. These general precautions apply to many of the service procedures, and they will not necessarily be repeated with each procedure to which they apply.

⚠ WARNING

- Whenever raising a vehicle for service, be sure to follow the instructions under “Vehicle Lifting Points in 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, tail pipe, 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 dish washing 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.

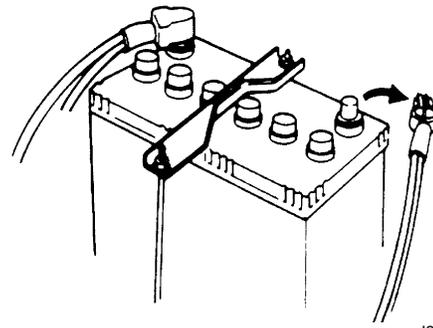
⚠ CAUTION

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



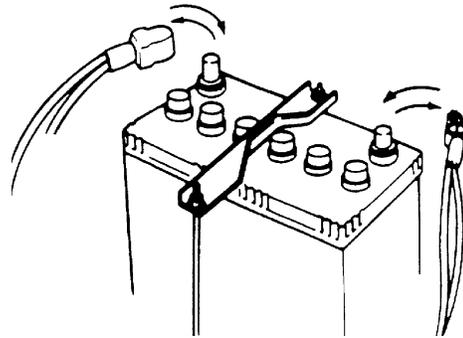
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- When performing service to electrical parts that does not require use of battery power, disconnect the negative cable of the battery.
- When disconnecting the negative cable from the battery, be careful to the following.
 - Check and record DTCs in ECM, PS control module and/or immobilizer control module if necessary before disconnecting.
 - Record displayed contents of the clock and/or audio system, etc. before disconnecting and reset it as before after connecting.
 - For vehicle equipped with electric throttle body system, perform electric throttle body system calibration referring to “Electric Throttle Body System Calibration in Section 1C” after reconnecting the negative cable to the battery.
 - For vehicle equipped with power sliding roof (sunroof), initialize sliding roof position data in motor unit by performing “How to reactivate the system to prevent being pinched by the sunroof” in Sunroof section of Owner’s manual.



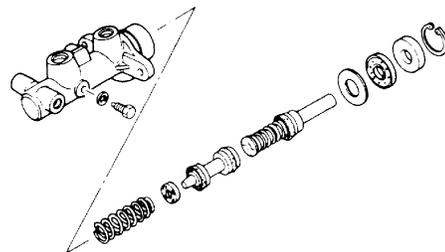
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- When removing the battery, be sure to disconnect the negative cable first and then the positive cable. When reconnecting the battery, connect the positive cable first and then the negative cable, and replace the terminal cover.



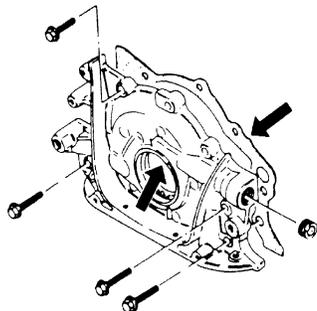
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- When removing parts that are to be reused, be sure to keep them arranged in an orderly manner so that they may be reinstalled in the proper order and position.



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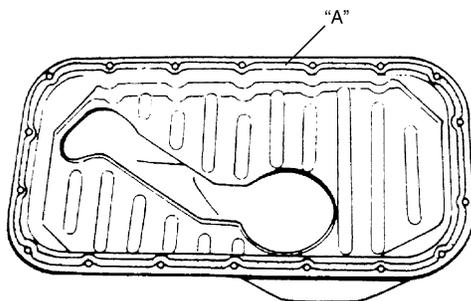
- Whenever you use oil seals, gaskets, packing, O-rings, locking washers, split pins, self-locking nuts, and certain other parts as specified, be sure to use new ones. Also, before installing new gaskets, packing, etc., be sure to remove any residual material from the mating surfaces.



I2RH01010029-01

- 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 remove the old one thoroughly and use the specified type.

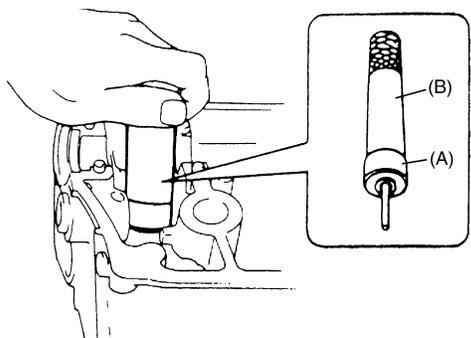
“A”: Sealant 99000-31150 (SUZUKI Bond No.1207C)



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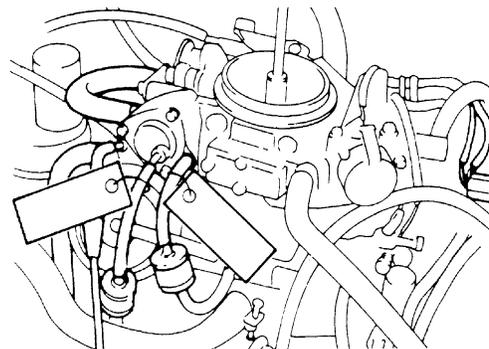
- Be sure to use special tools when instructed.

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



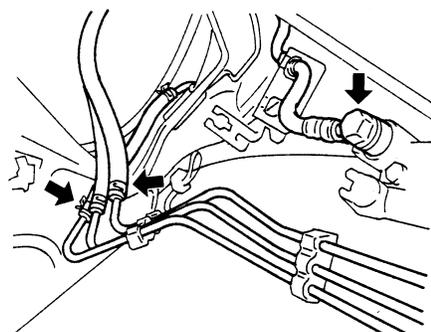
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- When disconnecting vacuum hoses, attach a tag describing the correct installation positions so that the hoses can be reinstalled correctly.



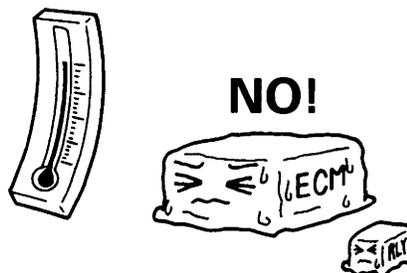
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- After servicing fuel, oil, coolant, vacuum, exhaust or brake systems, check all lines related to the system for leaks.



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- 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.
- 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.



I2RH01010034-01

00-7 Precautions:

- Use care not to expose connectors and electrical parts to water which will be a cause of a trouble.



I2RH01010035-01

- Always be careful not to handle electrical parts (computer, relay, etc.) in a rough manner or drop them.



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Precaution in Servicing Full-Time 4WD Vehicle

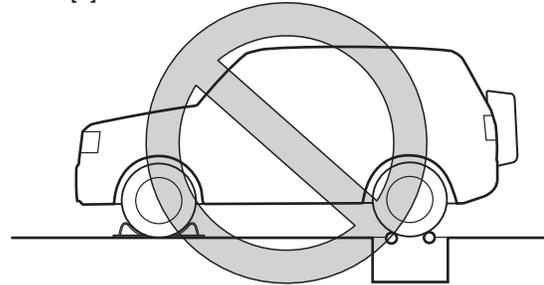
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▲ WARNING

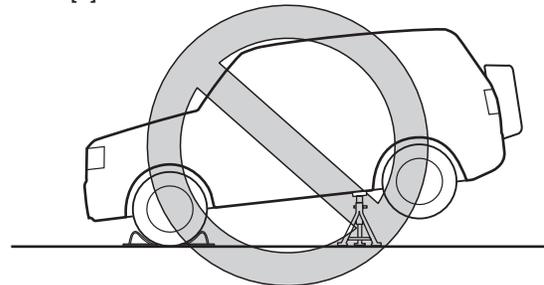
This full-time 4WD vehicle can not be converted to 2WD manually. Observe the following caution in servicing. Otherwise, front wheels drive rear wheels or vice-versa and vehicle accidents, drivetrain damage and personal injury may result.

- Never perform any of the following types of service work.
 - [A]: Testing with 2-wheel chassis dynamometer or speedometer tester (which tester roller is driven by vehicle wheels).
 - [B]: Driving front or rear wheels, which are jacked up.
 - [C]: Towing under the condition where either front or rear wheels can not rotate.

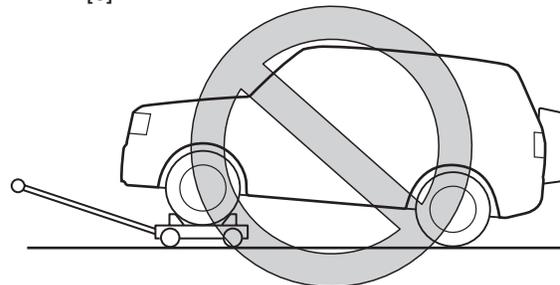
[A]



[B]

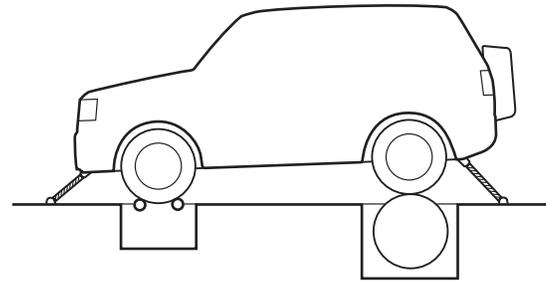


[C]



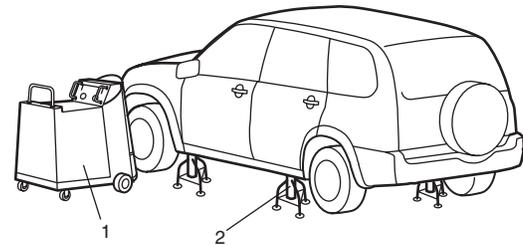
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- When testing with 2-wheel brake tester, be sure to observe the following instructions. Otherwise, drivetrain damage and personal injury may result.
 - Shift transmission to N (Neutral) position.
 - Shift transfer to N (Neutral) position if transfer position is selectable.
 - Run engine at specified idle speed.
 - Rotate wheels (tires) by brake tester at vehicle speed below 5 km/h (3 mile/h).
 - Do not rotate wheels (tires) for 1 min. or more.
- When testing with 2-wheel speedometer tester (which wheels are driven by tester), be sure to observe the following instructions. Otherwise, drivetrain damage and personal injury may result.
 - Set rear wheels on tester roller and front wheels on free roller.
 - Shift transmission to N (Neutral) position.
 - Shift transfer to N (Neutral) position if transfer position is selectable.
 - Rotate wheels (tires) by tester at vehicle speed below 60 km/h (37 mile/h).
 - Do not rotate wheels (tires) for 1 min. or more.
 - Ensure that vehicle does not move using wire ropes or chains.
- When testing with 2-wheel chassis dynamometer, speedometer tester or brake tester, be sure to make the vehicle as rear wheel drive by removing front propeller shaft or as front wheel drive by removing rear propeller shaft, referring to “Transfer Warning: Motor-Shift Type (Transfer with Shift Actuator) in Section 3C” or “Transfer Warning: Non-Shift Type (Transfer without Shift Actuator) in Section 3C”. Note that speedometer of vehicle does not display vehicle speed because rear wheel speed sensor signal is not output if rear propeller shaft is removed.
- When testing with 4-wheel free chassis dynamometer or speedometer tester (which tester roller is driven by vehicle wheels), be sure to shift transfer to 4H-Lock position according to the step 4) in “Transfer Warning: Motor-Shift Type (Transfer with Shift Actuator) in Section 3C”.



I5JB0A000006-01

- When using On-vehicle type wheel balancing equipment (1), be sure to jack up all for wheels, off the ground completely and support vehicle with safety stands (2). Be careful of the other wheels, which will rotate at the same time.



I5JB0A000005-02

⚠ CAUTION

- This vehicle should be towed under one of the following condition:
 - With all wheels on a flatbed truck.
 - With front or rear wheels lifted and a dolly under the other wheels.

Precautions for Catalytic Converter

S5JB0A0000003

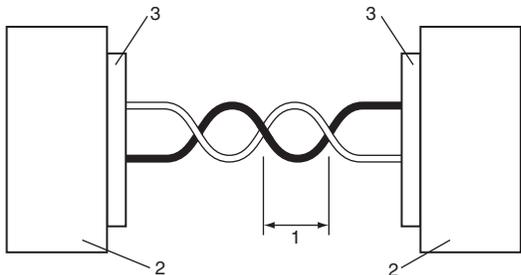
For vehicles equipped with a catalytic converter, use only unleaded gasoline and be careful not to let a large amount of unburned gasoline enter the converter or it can be damaged.

- 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.)

Precaution for CAN Communication System

S5JB0A0000005

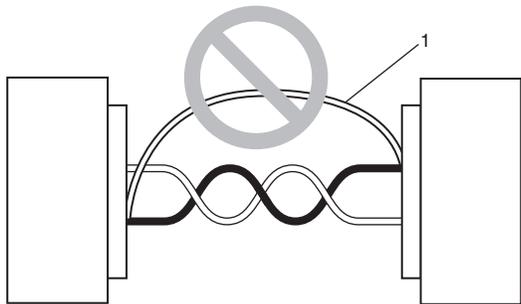
- The loose (1) in the wire harness twist of the CAN lines except around the connector (3) should be within 100 mm (3.9 in.). Refer to the wiring diagram for the CAN lines discrimination. Excessively-loosed lines may be influenced by the electric noise.



I4JA01000002-01

2. Controller

- Do not connect terminals of the CAN line using a bypass wire (1). Otherwise, the CAN line may be influenced by the electric noise.

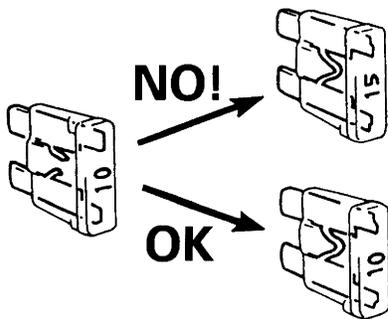


I4JA01000003-01

Precautions for Electrical Circuit Service

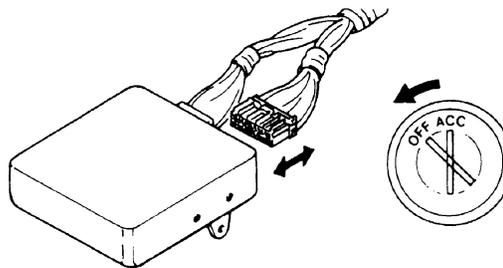
S5JB0A0000006

- 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.



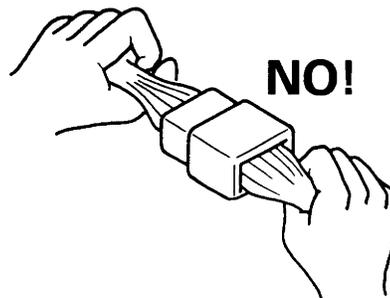
I2RH01010038-01

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



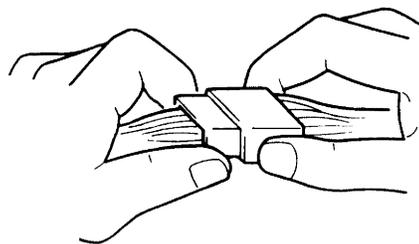
I2RH01010039-01

- When disconnecting connectors, never pull the wiring harness. Unlock the connector lock first and then pull them apart by holding connectors themselves.



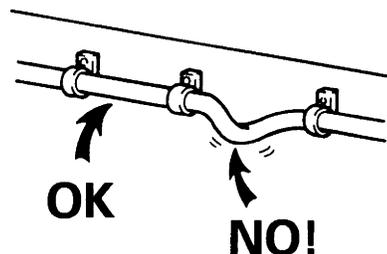
I2RH01010040-01

- When connecting connectors, also hold connectors and put them together until they lock securely (a click is heard).



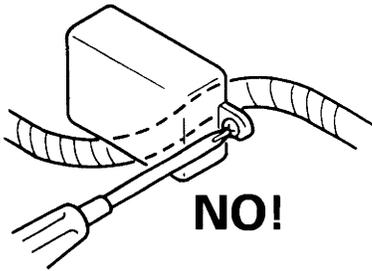
I2RH01010041-01

- When installing the wiring harness, fix it with clamps so that no slack is left.



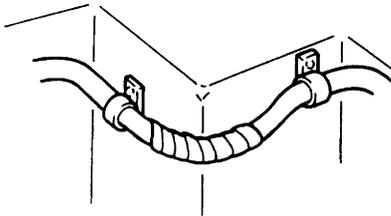
I2RH01010042-01

- When installing vehicle parts, be careful so that the wiring harness is not interfered with or caught by any other part.



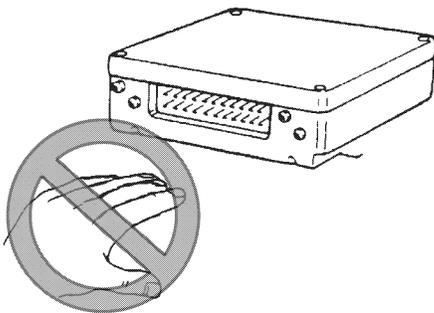
I2RH01010043-01

- 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.



I2RH01010044-01

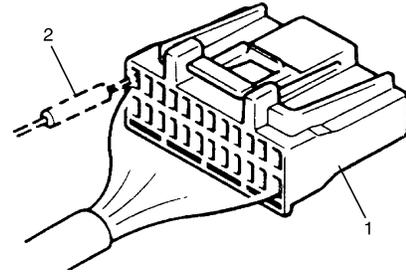
- Be careful not to touch the electrical terminals of parts which use microcomputers (e.g. electronic control unit like as ECM, PCM, P/S controller, etc.). The static electricity from your body can damage these parts.



I3RM0A000004-01

- 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. If not specified, use a voltmeter with high impedance ($M \Omega/V$ minimum) or a digital type voltmeter.

- When taking measurements at electrical connectors using a tester probe, be sure to insert the probe (2) from the wire harness side (backside) of the connector (1).

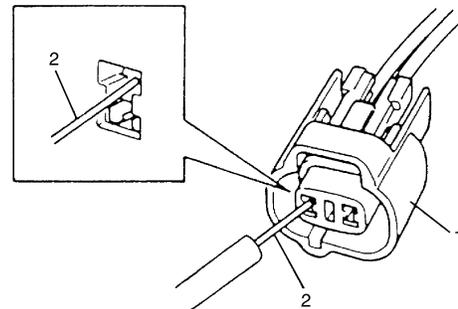


I2RH01010046-01

- When connecting meter probe (2) from terminal side of coupler (1) because it can't be connected from harness side, use extra care not to bend male terminal of coupler or force its female terminal open for connection.

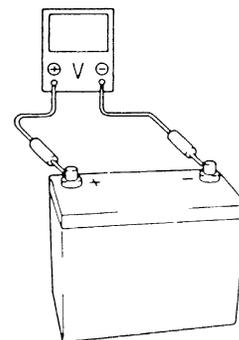
In case of such coupler as shown connect probe as shown to avoid opening female terminal.

Never connect probe where male terminal is supposed to fit.



I2RH01010047-01

- 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.



I2RH01010048-01

Precautions for Installing Mobile Communication Equipment

S5JB0A000004

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.

Air Bag Warning

S5JB0A000007

▲ 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, Wiring and Connectors Location in Section 8B" in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all "WARNING"s and "Precautions on Service and Diagnosis of Air Bag System in Section 8B" before performing service on or around the air bag system components or wiring. Failure to follow "WARNING"s 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).

Discharge Headlight Warning

S5JB0A0000014

▲ WARNING

When performing service on and around the discharge headlight, observe "Precautions for Discharge Headlight Service (If Equipped) in Section 9B". Neglecting the warnings may result in personal injury.

A/C System Caution

S5JB0A0000015

▲ 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 "A/C Refrigerant Type Description in Section 7B".

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.

Fastener Caution

S5JB0A0000009

▲ 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.

Suspension Caution

S5JB0A0000010

⚠ CAUTION

- 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.

Wheels and Tires Caution

S5JB0A0000011

⚠ CAUTION

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.

Brakes Caution and Note

S5JB0A0000012

⚠ CAUTION

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.

NOTE

Before inspecting and servicing brakes for vehicle equipped with ABS, make sure that ABS is in good condition.

Differential Gear Oil Note

S5JB0A0000016

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.

Repair Instructions**Electrical Circuit Inspection Procedure**

S5JB0A0006001

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

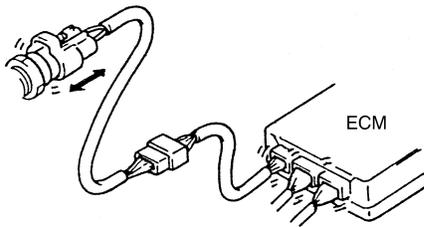
Possible causes for the open circuit are as follows. As the cause is in the connector or terminal in many cases, they need to be checked particularly carefully.

- 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

00-13 Precautions:

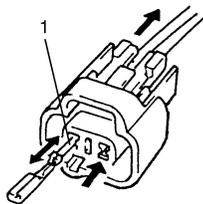
When checking system circuits including an electronic control unit such as ECM, TCM, ABS control module, etc., it is important to perform careful check, starting with items which are easier to check.

- 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.



I2RH01010049-01

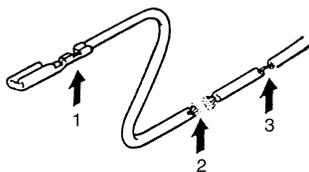
- 3) Using a test male terminal, check both terminals of the circuit being checked for contact tension of its female terminal. Check each terminal visually for poor contact (possibly caused by dirt, corrosion, rust entry of foreign object, etc.). At the same time, check to make sure that each terminal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



I2RH01010050-01

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

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

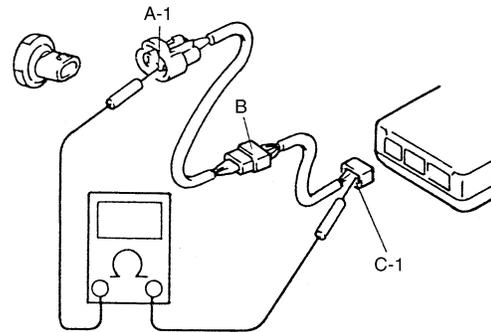


I2RH01010051-01

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

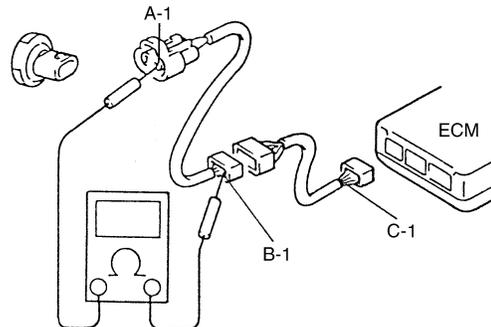
Continuity Check

- 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".



I2RH01010052-01

- 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.



I2RH01010053-01

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 and results were as listed in the following, it means that the circuit is open between terminals "B-1" and "A-1".

Voltage between each terminal and body ground

"C-1" and body ground: Approx. 5 V

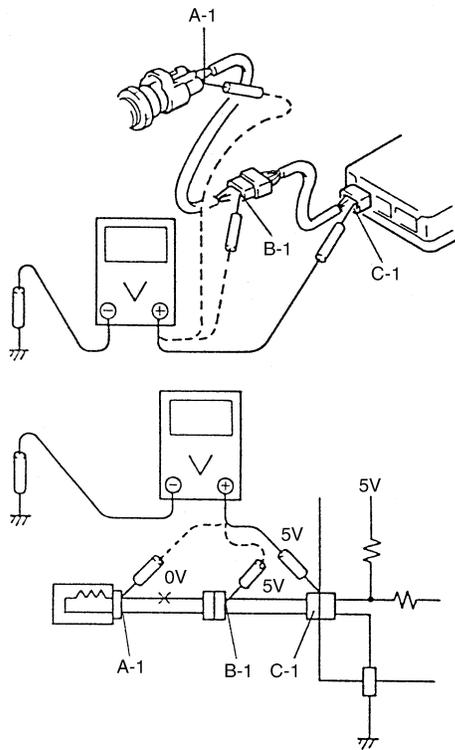
"B-1" and body ground: Approx. 5 V

"A-1" and body ground: 0 V

- b) Also, if measured values were as listed in the following, 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. 5 V
- “B-1” and body ground: Approx. 5 V
- “A-1” and body ground: Approx. 3 V
- “A-1” and “B-1”: 2V voltage drop



I5RH01000005-01

Short Circuit Check (Wire Harness to Ground)

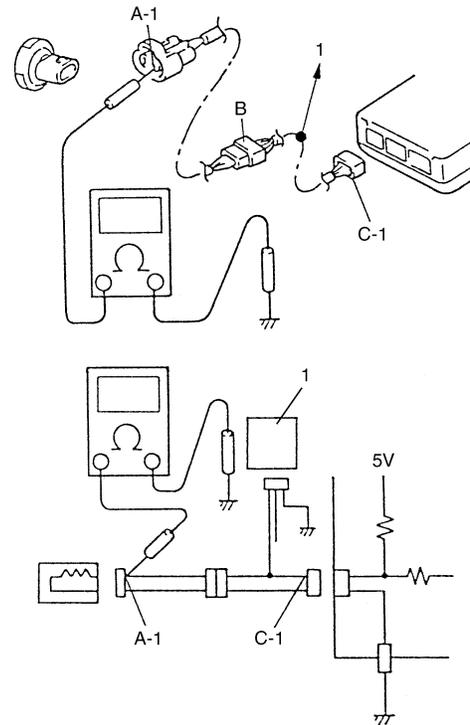
- 1) Disconnect negative cable at battery.
- 2) Disconnect connectors at both ends of the circuit to be checked.

NOTE

If the circuit to be checked is connected to other parts (1), disconnect all connectors of those parts.

Otherwise, diagnosis will be misled.

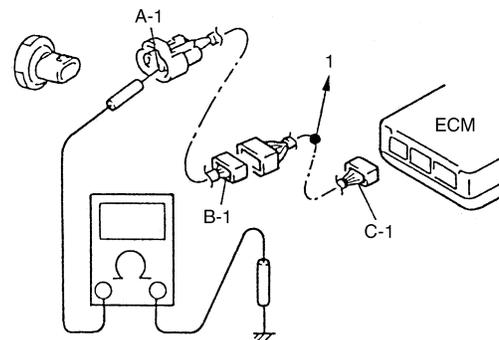
- 3) Measure resistance between terminal at one end of circuit (“A-1” terminal in the figure) and body ground. If continuity is indicated, it means that there is a short to ground between terminals “A-1” and “C-1” of the circuit.



I5RH01000006-01

1. To 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”.



I2RH01010056-01

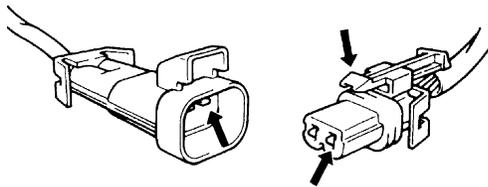
1. To other parts

Intermittent and Poor Connection Inspection

S5JB0A0006002

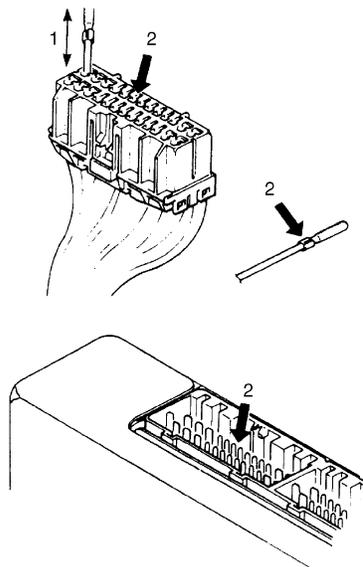
Most intermittent are caused by faulty electrical connections or wiring, although a sticking relay or solenoid can occasionally be at fault. When checking it for proper connection, perform careful check of suspect circuits for:

- 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.



I2RH01010057-01

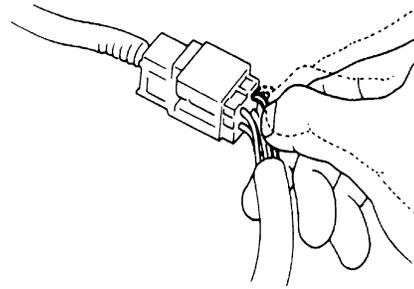
- Improperly formed or damaged terminals. Check each connector terminal in problem circuits carefully to ensure good contact tension by using the corresponding mating terminal. If contact tension is not enough, reform it to increase contact tension or replace.



I5RH01000007-01

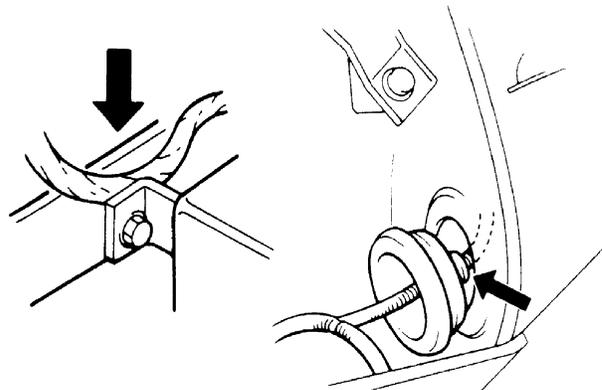
- | |
|---|
| 1. Check contact tension by inserting and removing just once. |
| 2. Check each terminal for bend and proper alignment. |

- 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.



I2RH01010059-01

- 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.



I2RH01010060-01

General Information

General Description

Abbreviations

S5JB0A0101001

A:
ABDC: After Bottom Dead Center
ABS: Anti-lock Brake System
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
ATDC: After Top Dead Center
ATF: Automatic Transmission Fluid
A/T: Automatic Transmission
AWD: All Wheel Drive
B:
BBDC: Before Bottom Dead Center
BCM: Body Electrical Control Module
BTDC: Before Top Dead Center
B+: Battery Positive Voltage
C:
CAN: Controller Area Network
CKP Sensor: Crankshaft Position Sensor
CKT: Circuit
CMP Sensor: Camshaft Position Sensor
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: Electronic 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
EVAP: Evaporative Emission
EVAP Canister: Evaporative Emission Canister (Charcoal Canister)

F:
FWD: Front Wheel Drive
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
IMT: Intake Manifold Tuning
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 ("SERVICE ENGINE SOON" Light)
Min: Minimum
M/T: Manual Transmission
N:
NOx: Nitrogen Oxides
O:
OBD: On-Board Diagnostic System (Self-Diagnosis Function)
OCM: Occupant Classification module
O/D: Overdrive
OHC: Over Head Camshaft
O2S: Oxygen Sensor
P:
PCM: Powertrain Control Module
PCV: Positive Crankcase Ventilation
PNP: Park / Neutral Position
PSP Switch: Power Steering Pressure Switch (P/S Pressure Switch)
P/S: Power Steering
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)**TPMS:** Tire Pressure Monitoring System**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**VVT:** Variable Valve Timing (Camshaft Position Control)**W:****WU-OC:** Warm Up Oxidation Catalytic Converter**WU-TWC:** Warm Up Three Way Catalytic Converter**Symbols**

S5JB0A0101003

Symbol	Definition
	Tightening torque
	Apply oil (engine, transmission, transfer, differential)
	Apply fluid (brake, power steering, automatic fluid)
	Apply SUZUKI SUPER GREASE A 99000-25010
	Apply SUZUKI SUPER GREASE C 99000-25030
	Apply SUZUKI SUPER GREASE E 99000-25050
	Apply SUZUKI SUPER GREASE H 99000-25120
	Apply SUZUKI SUPER GREASE I 99000-25030
	Apply SUZUKI BOND NO. 1215 99000-31110
	Apply SUZUKI BOND NO. 1207F 99000-31250
	Apply SUZUKI BOND NO. 1217G 99000-31260
	Apply SUZUKI BOND NO. 1216B 99000-31230
	Apply SUZUKI SILICONE SEALANT 99000-31120
	Apply SUZUKI SEALING COMPOUND 366E 99000-31090
	Apply THREAD LOCK 1305 99000-32100
	Apply THREAD LOCK 1322 99000-32110
	Apply THREAD LOCK 1342 99000-32050
	Do not reuse.
	Note on reassembly.

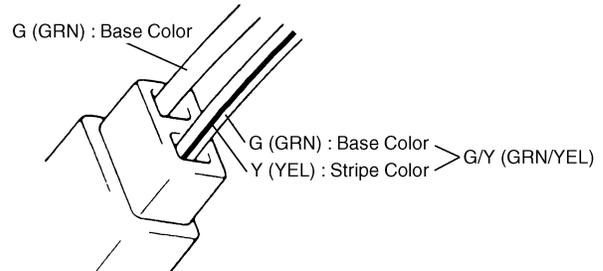
0A-3 General Information:

Wire Color Symbols

S5JB0A0101004

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

There are two kinds of colored wire used in this vehicle. One is single-colored wire and the other is dual-colored (striped) wire. As the color symbol, the single-colored wire uses only one, three or five alphabets (i.e. "G" or "GRN"); the dual-colored wire uses two color symbols combination (i.e. "G/Y" or "GRN/YEL"). The first symbol represents the base color of the wire ("G" or "GRN" in the figure) and the second symbol represents the color of the stripe ("Y" or "YEL" in the figure).



I1SQ01010037-01

Fastener Information

Metric Fasteners

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

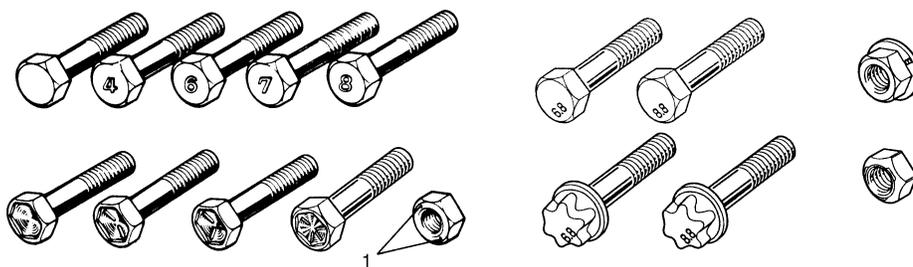
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Fastener Strength Identification

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).



I1SQ01010003-01

1. Nut strength identification

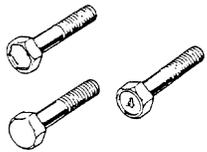
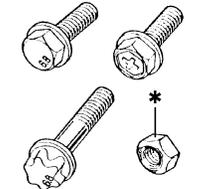
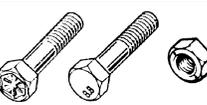
Standard Tightening Torque

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 following chart.
- The following chart is applicable only where the fastened parts are made of steel light alloy.

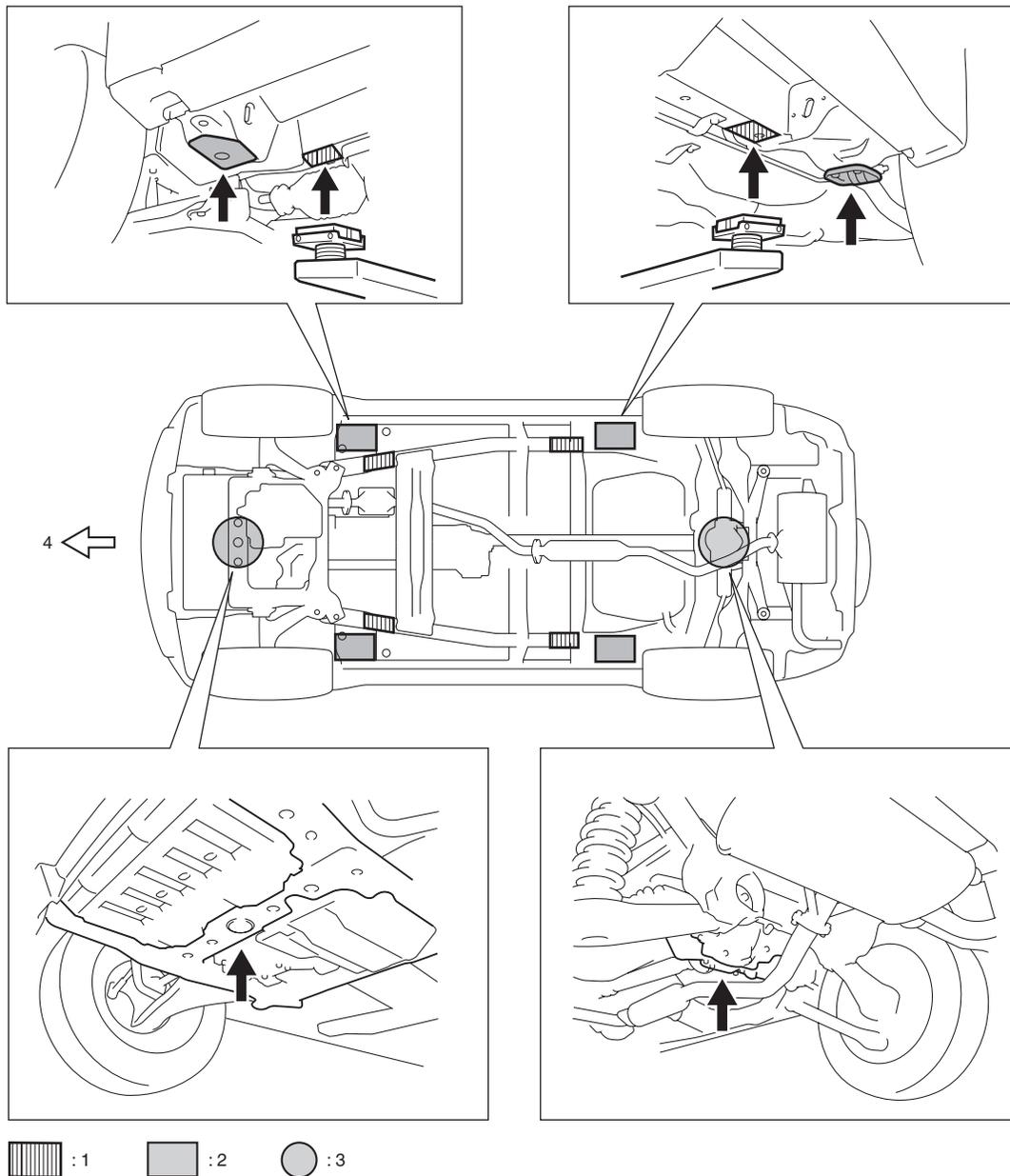
Tightening torque chart

Strength	Unit	Thread Diameter (Nominal Diameter) (mm)								
		4	5	6	8	10	12	14	16	18
A equivalent of 4T strength fastener  I1SQ01010004-01	N-m	1.5	3.0	5.5	13	29	45	65	105	160
	kgf-m	0.15	0.30	0.55	1.3	2.9	4.5	6.5	10.5	16.0
	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  I1SQ01010005-01	N-m	2.4	4.7	8.4	20	42	80	125	193	280
	kgf-m	0.24	0.47	0.84	2.0	4.2	8.0	12.5	19.3	28.0
	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 *: Self-lock nut (6 strength)  I1SQ01010006-01	N-m	2.4	4.9	8.8	21	44	84	133	203	298
	kgf-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  I1SQ01010007-01	N-m	2.3	4.5	10	23	50	85	135	210	240
	kgf-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 bolt (8 strength nut) without flange  I1SQ01010008-01	N-m	3.1	6.3	11	27	56	105	168	258	373
	kgf-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 bolt (8 strength nut) with flange  I1SQ01010009-01	N-m	3.2	6.5	12	29	59	113	175	270	395
	kgf-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

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.



1. Support position for frame contact hoist (when engine assembly is not removed) and safety stand	3. Floor jack position
2. Support position for frame contact hoist (when engine assembly is removed)	4. Vehicle front

When using floor jack

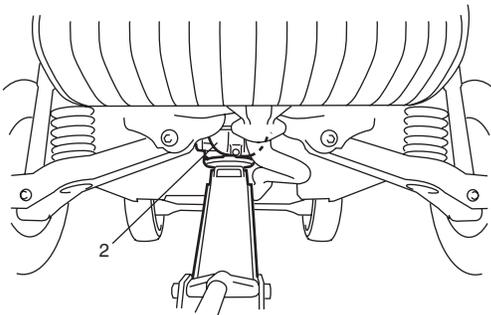
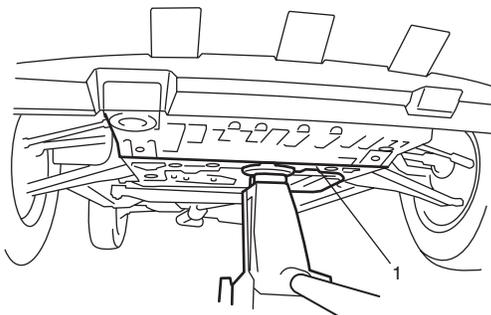
⚠ WARNING

- 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.

⚠ CAUTION

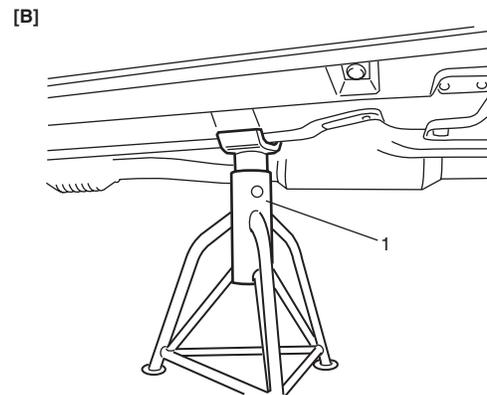
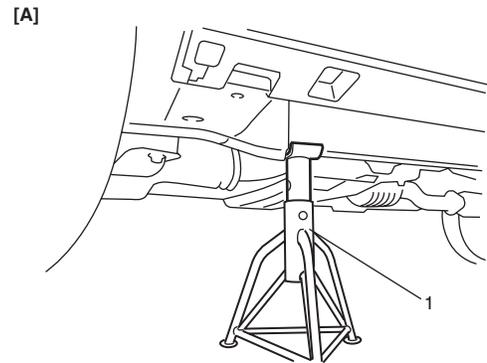
- Never apply jack against engine under cover, suspension parts (i.e., stabilizer, etc.) or vehicle floor, or it may get damaged.

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 (1) or rear differential (2).



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To perform service with either front or rear vehicle end jacked up, be sure to place safety stands (1) under chassis frame so that body is securely supported. And then check to ensure that chassis frame does not slide on safety stands (1) and the vehicle is held stable for safety's sake.



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[A]: Front	[B]: Rear
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0A-7 General Information:

Product: 2005 Suzuki GRAND VITARA JB416/JB420 Car Service Repair Workshop Manual

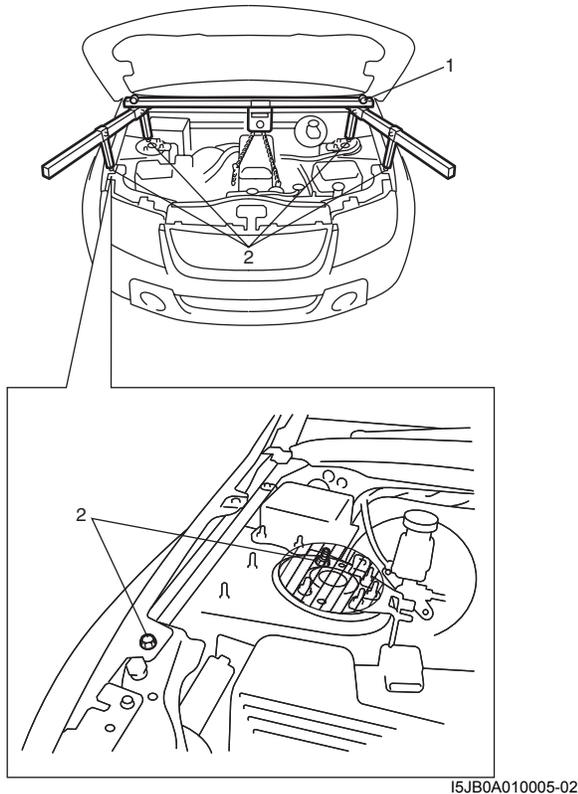
Engine Supporting Points

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⚠ WARNING

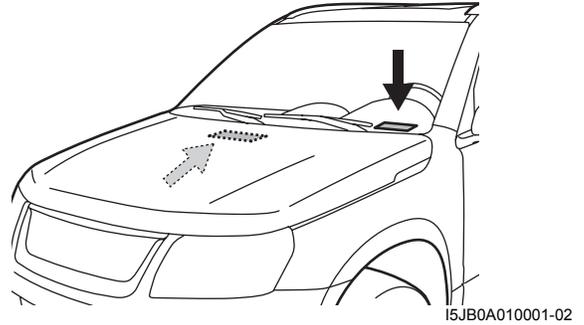
When using engine supporting device (1), be sure to observe the followings. Otherwise, not only deformation of vehicle body and/or engine hook but also personal injury may result.

- Apply supporting device at the specified positions (2) indicated in figure
- Install supporting device taking a well-balanced posture.
- Do not contact supporting device with other parts than specified positions and engine hooks.
- Do not remove engine rear mounting (transfer mounting) while supporting.
- Set support device so that side force applies to hook excessively. Excessive side force will deform hook.



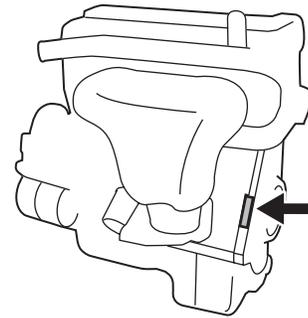
Vehicle Identification Number

The vehicle identification number is punched on the front dash panel in engine room and it is also attached on the left front top of instrument panel depending on vehicle specification.



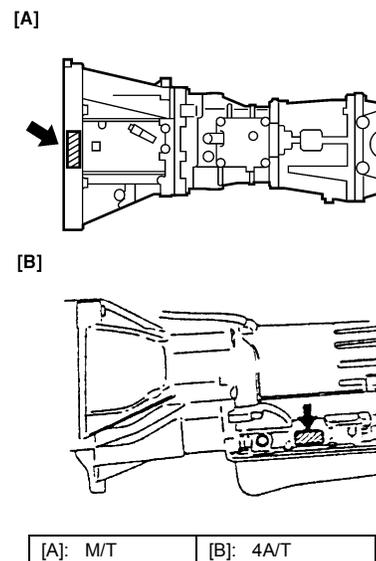
Engine Identification Number

The number is punched on the cylinder block.



Transmission Identification Number

The number is located on the transmission case.



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