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General Precautions

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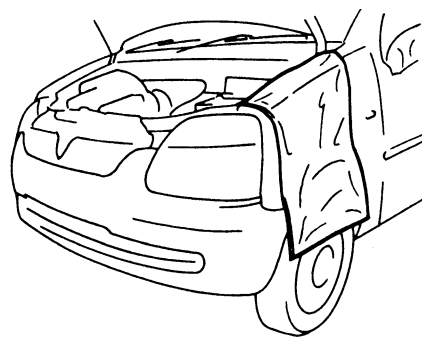
The WARNING and CAUTION describe some general precautions that you should observe when servicing a vehicle. These general precautions apply to many of the service procedures, and they will not necessarily be repeated with each procedure to which they apply.

▲ 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.

- Be sure to observe following instructions when handling service materials such as fuel, oil, fluid, coolant, grease, sealant, thread lock cement, etc. Otherwise, your health may be ruined.
 - Whenever handling any of these service materials, wear safety glasses to protect your eyes. If it gets into your eye, it may cause inflammation.
 - Whenever handling any of these service materials, wear moisture-proof gloves to protect your skin. If it adheres to your skin, it may cause inflammation.
 - Do not swallow any of these service materials. It would cause diarrhea or nausea.
 - Keep all these materials out of children’s reach.
- 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.



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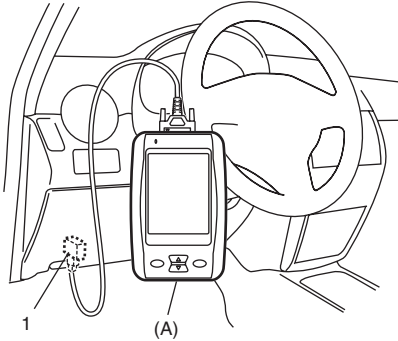
1A-26 Engine General Information and Diagnosis:

- 1) Prepare CAN communication OBD generic scan tool or SUZUKI scan tool.

Special tool

(A): SUZUKI scan tool (SUZUKI-SDT)

- 2) With ignition switch OFF, connect it to DLC (1) located on underside of instrument panel at driver's seat side.



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- 3) Turn ignition switch ON and confirm that MIL lights.
- 4) Read DTC and freeze frame data according to instructions displayed on scan tool and print them or write them down. Refer to scan tool operator's manual for details.
If communication between scan tool and ECM is not possible, go to "Troubleshooting for Communication Error with Scan Tool Using CAN".
- 5) After completing the check, turn ignition switch off and disconnect scan tool from DLC.

DTC Clearance

S7RW0A1104004

NOTE

There are two types of OBD system depending on the vehicle specification. For identification, refer to "Precaution on On-Board Diagnostic (OBD) System".

- 1) Connect SUZUKI scan tool or CAN communication OBD generic scan tool to data link connector in the same manner as when making this connection for DTC check.
- 2) Turn ignition switch OFF and then ON.
- 3) Erase DTC and pending DTC according to instructions displayed on scan tool. Freeze frame data is cleared with the DTC. Refer to scan tool operator's manual for further details.
If communication between scan tool and ECM is not possible, go to "Troubleshooting for Communication Error with Scan Tool Using CAN".
- 4) After completing the clearance, turn ignition switch OFF and disconnect scan tool from data link connector.

NOTE

DTC and freeze frame data stored in ECM memory are also cleared in the following cases. Be careful not to clear them before keeping their record.

- When power to ECM is cut off (by disconnecting battery cable, removing fuse or disconnecting ECM connectors).
- When the same malfunction (DTC) is not detected again during 40 engine warm-up cycles. (See "Warm-Up Cycle" of "On-Board Diagnostic System Description".)

Troubleshooting for Communication Error with Scan Tool Using CAN

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Perform this troubleshooting when it is not possible to communicate between scan tool and ECM/TCM.

NOTE

- When performing this troubleshooting, be sure to have full understanding of "Precaution on CAN Troubleshooting" and observe it.
- It may be possible that CAN system has trouble because of fuse blown or low battery voltage. Before troubleshooting, check to make sure that fuse, battery voltage and generator status are normal.
- When disconnecting each control module connector in this troubleshooting, various DTCs will be detected. Be sure to clear DTCs in the following control modules after completing this troubleshooting.
 - ECM
 - BCM
 - TCM
 - Keyless start control module
 - ESP® control module
 - 4WD control module
 - HVAC control module (Auto A/C model)
 - P/S control module

DTC P0134: O2 Sensor (HO2S) Circuit No Activity Detected (Sensor-1)

S7RW0A1104035

Wiring Diagram

Refer to "DTC P0131 / P0132: O2 Sensor (HO2S) Circuit Low Voltage / High Voltage (Sensor-1)".

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
HO2S voltage is higher than specified value for 1 min. after warming up engine or HO2S voltage is lower than specified value for 1 min. after warming up engine. (2 driving cycle detection logic)	<ul style="list-style-type: none"> • HO2S-1 • HO2S-1 circuit • Exhaust gas leakage • ECM • Air intake system

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 by 2 persons, a driver and a tester, on a level road.

NOTE

Check to make sure that following conditions are satisfied when using this "DTC Confirmation Procedure".

- Intake air temperature at engine start: $-10\text{ }^{\circ}\text{C}$ ($14\text{ }^{\circ}\text{F}$) to $80\text{ }^{\circ}\text{C}$ ($176\text{ }^{\circ}\text{F}$)
- Intake air temperature: $-10\text{ }^{\circ}\text{C}$ ($14\text{ }^{\circ}\text{F}$) to $70\text{ }^{\circ}\text{C}$ ($158\text{ }^{\circ}\text{F}$)
- Engine Coolant temperature: $70\text{ }^{\circ}\text{C}$ ($158\text{ }^{\circ}\text{F}$) or more
- Altitude (barometric pressure): 2500 m, 8200 ft or less (560 mmHg, 74.4 kPa or more)

- 1) With ignition switch turned OFF, connect scan tool.
- 2) Turn ON ignition switch and clear DTC using scan tool.
- 3) Start engine and warm up to normal operating temperature.
- 4) Drive vehicle at 40 mph (60 km/h) or higher. (engine speed: 2500 – 3000 r/min.)
- 5) Keep above vehicle speed for 6 min. or more. (Throttle valve opening is kept constant in this step.)
- 6) Release accelerator pedal and with engine brake applied, keep vehicle coasting (with fuel cut for 3 sec. or more) and then stop vehicle.
- 7) Check DTC and pending DTC.

DTC Troubleshooting**NOTE**

Before this troubleshooting is performed, read the precautions for DTC troubleshooting referring to "Precautions for DTC Troubleshooting".

Step	Action	Yes	No
3	<p>CAN line check</p> <ol style="list-style-type: none"> 1) Turn ignition switch to OFF position. 2) Disconnect connectors of all control module / sensor communicated by CAN. 3) Check all the following CAN lines for open, short to power circuit, short to ground circuit, short to other CAN line and high resistance. <ul style="list-style-type: none"> • Between BCM connector and DLC • Between BCM connector and ABS / ESP® control module connector • Between ABS / ESP® control module connector and ECM connector • Between ECM connector and TCM connector • Between BCM connector and keyless start control module connector • Between combination meter connector and 4WD control module connector • Between BCM connector and combination meter connector • Between BCM connector and yaw rate / G sensor connector • Between combination meter connector and steering angle sensor connector <p><i>Are all CAN lines in good condition?</i></p>	Go to Step 4.	Repair CAN line.
4	<p>Power and ground circuits check of BCM, ECM, ABS / ESP® control module and combination meter</p> <ol style="list-style-type: none"> 1) Check power and ground circuits of the following control module. <ul style="list-style-type: none"> • ECM: Refer to “ECM Power and Ground Circuit Check”. • BCM: Refer to “BCM Power Circuit and Ground Circuit Check in Section 10B”. • Combination meter: Refer to “Combination Meter Circuit Diagram in Section 9C”. • ABS / ESP® control module: Refer to “ABS Hydraulic Unit / Control Module Assembly Power and Ground Circuit Check in Section 4E” or “ESP® Hydraulic Unit / Control Module Assembly Power and Ground Circuit Check in Section 4F”. <p><i>Are they in good condition?</i></p>	Go to Step 5.	Repair power and/or ground circuit.

Installation

NOTE

- Use new bearing cap No.1 bolts. They are deformed once they are used because they are plastic deformation tightening bolts.
- All parts to be installed must be perfectly clean.
- Be sure to oil crankshaft journals, journal bearings, thrust bearings, crankpins, connecting rod bearings, pistons, piston rings and cylinder bores.
- Journal bearings, bearing caps, connecting rods, rod bearings, rod bearing caps, pistons and piston rings are in combination sets. Do not disturb such combination and make sure that each part goes back to where it came from, when installing.

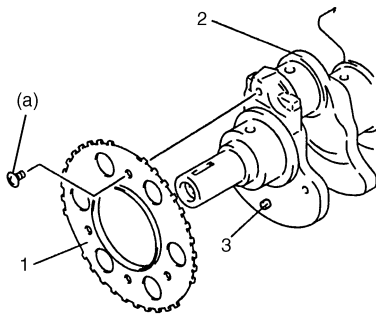
1) Install sensor plate (1) to crankshaft (2) and tighten bolts to specified torque.

NOTE

When installing sensor plate, align spring pin (3) on crankshaft and hole of sensor plate.

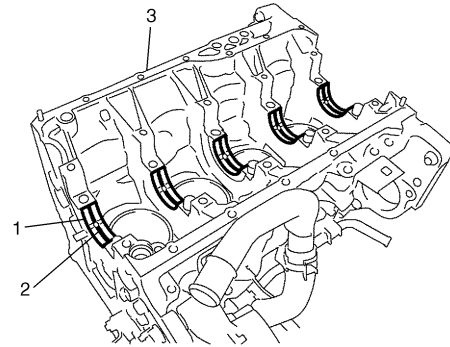
Tightening torque

Sensor plate bolt (a): 11 N·m (1.1 kgf-m, 8.0 lb-ft)



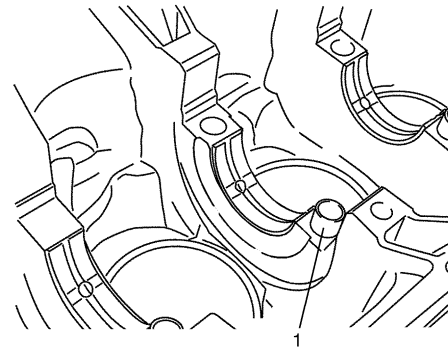
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2) Install main bearings to cylinder block. Upper half of bearing (1), has an oil groove (2). Install it to cylinder block (3), and the other half without oil groove to bearing cap. Make sure that two halves are painted in the same color.



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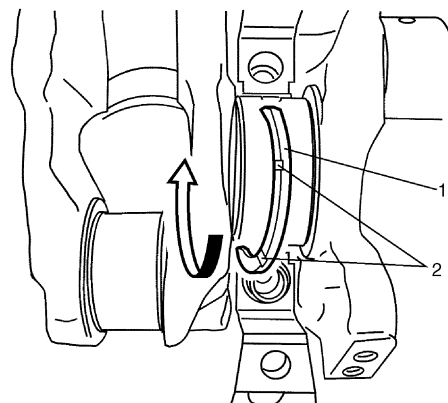
3) Confirm that dowel pins (1) are installed to intake side of each journal.



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4) Install crankshaft to cylinder block.

5) Install thrust bearings (1) to cylinder block between No.2 and No.3 cylinders. Face oil groove (2) sides to crank webs.

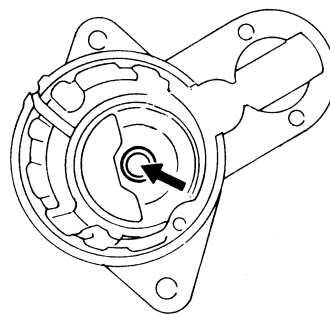


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11-9 Starting System:

Front Housing Bush

Inspect the bush for wear or damage. Replace if necessary.



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Specifications

Cranking System Specifications

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Voltage	12 volts		
Output	1.2 kW		
Rating	30 seconds		
Direction of rotation	Clockwise as viewed from pinion side		
Brush length	Standard: 12.3 mm (0.48 in.)		Limit: 7.0 mm (0.28 in.)
Number of pinion teeth	8		
	Performance	Condition	Guarantee
Around at 20 °C (68 °F)	No load characteristic	11.0 V	90 A maximum 2370 r/min minimum
	Load characteristic	7.5 V 300 A	10.65 N·m (1.065 kgf·m, 7.70 lb-ft) minimum 840 r/min minimum
	Locked characteristic	4.0 V	780 A maximum 20 N·m (2.0 kgf·m, 14.5 lb-ft) minimum
	Magnetic switch operating voltage		8 volts maximum

Tightening Torque Specifications

S7RW0A1907002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb-ft	
Starting motor battery cable nut	9.8	0.98	7.0	⚙

NOTE

The specified tightening torque is also described in the following.

“Starting Motor Dismounting and Remounting”

“Starting Motor Components”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Fasteners Information in Section 0A”.

Special Tools and Equipment

Recommended Service Material

S7RW0A1908001

NOTE

Required service material is also described in the following.

“Starting Motor Components”

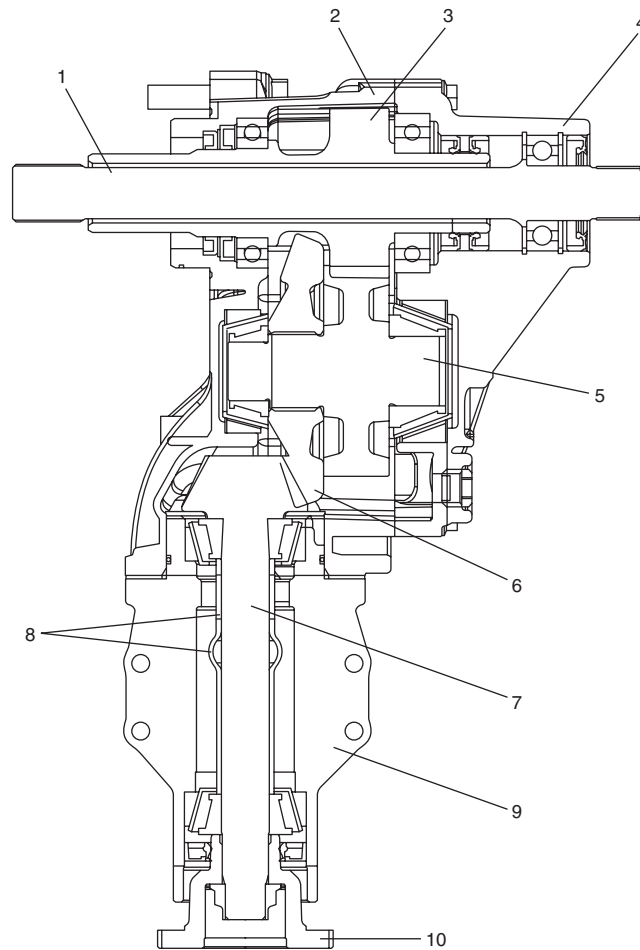
Transfer

General Description

Transfer Description

S7RW0A3301001

The transfer is mounted on transaxle case by fastening bolt with reduction drive gear in transfer and differential case in transaxle coupled by involute spline. Driving force from transaxle is transmitted to propeller shaft through reduction drive gear, reduction driven gear and bevel gear of transfer. As bevel gears, which change the direction of driving torque axis to the direction of the angle with 90 degrees, hypoid gears are provided. Hypoid gears have an advantage of preventing gear noise, at the same time, they require accurate adjustment of tooth contact and backlash.



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1. Intermediate shaft	5. Reduction driven gear	9. Transfer output retainer
2. Left case	6. Bevel gear	10. Transfer output flange
3. Reduction drive gear	7. Bevel pinion	
4. Right case	8. Spacer	

Diagnostic Information and Procedures

Transfer Symptom Diagnosis

S7RW0A3304001

Condition	Possible cause	Correction / Reference Item
Noise	Inadequate or insufficient lubricant	<i>Replenish.</i>
	Damaged or worn bearing(s)	<i>Replace.</i>
	Damaged or worn gear(s)	<i>Replace.</i>
	Preload of taper roller bearing is reduced	<i>Adjust.</i>

EBD Warning Light (Brake Warning Light) Comes ON Steady

S7RW0A4504010

Wiring Diagram

Referring to “Wiring Diagram” under “ABS Warning Light Does Not Come ON at Ignition Switch ON”.

Circuit Description

EBD warning light (brake warning light) is controlled by ABS control module and BCM through light driver module in combination meter.

If EBD system is in good condition, ABS control module turns EBD warning light ON at the ignition switch ON, keeps it ON for 2 seconds and then turns it OFF.

EBD warning light is turned ON continuously at the following conditions.

- EBD system is an abnormality
- Connector of ABS control module is disconnected
- Parking brake switch is ON
- Brake fluid level is lower than minimum level

The information of parking brake switch and brake fluid level are transmitted from BCM to light driver module in combination meter through CAN communication line.

Troubleshooting

Step	Action	Yes	No
1	Parking brake and brake fluid level check 1) Make sure that: <ul style="list-style-type: none"> • Parking brake is completely released. • Brake fluid level is upper than the minimum level. <i>Are the check results OK?</i>	Go to Step 2.	Release parking brake completely and/or replenish brake fluid.
2	ABS warning light operation check 1) Turn ignition switch to ON position. <i>Does ABS warning light come on steady?</i>	Perform “ABS Warning Light Comes ON Steady” previously outlined.	Go to Step 3.
3	Parking brake switch circuit and brake fluid level switch circuit check 1) Release parking brake completely, and replenish brake fluid. 2) Disconnect BCM connectors with ignition switch turned OFF. 3) Measure resistance between each parking brake switch circuit, brake fluid level switch circuit and vehicle body ground. <i>Are resistance $\infty\Omega$?</i>	Go to Step 4.	Check each applicable circuit for short to vehicle body ground. If OK then check parking brake switch and/or brake fluid level switch.
4	DTC check of BCM 1) Connect scan tool to data link connector with ignition switch turned OFF. 2) Turn ignition switch to ON position and check DTC of BCM. <i>Is there DTC U0073?</i>	Go to “DTC U0073 (No. 0073): Control Module Communication Bus Off in Section 10B”.	Go to Step 5.

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 in TCM memory and start engine.
- 3) Increase engine coolant temperature to about 50 °C (122 °F) and more.
- 4) Start vehicle and increase vehicle speed to about 20 km/h (12 mile/h) for 10 minutes or more.
- 5) Stop vehicle and check DTC.

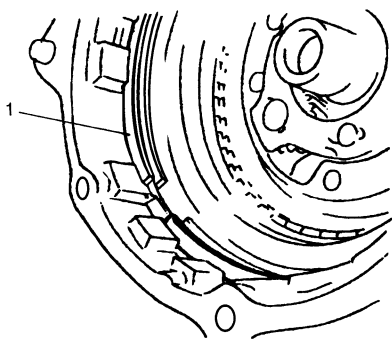
DTC Troubleshooting

Step	Action	Yes	No
1	Was "A/T System Check" performed?	Go to Step 2.	Go to "A/T System Check".
2	Check transmission fluid temperature circuit for open <ol style="list-style-type: none"> 1) Turn ignition switch OFF. 2) Disconnect TCM connectors from TCM. 3) Check for proper connection to transmission fluid temperature sensor at terminals "C06-11" and "C06-12". 4) If OK, check continuity between terminals "C06-11" and "C06-12" of disconnected harness side TCM connector. <p><i>Is continuity indicated?</i></p>	Go to Step 3.	"LT GRN" or "ORN" circuit open.
3	Check transmission fluid temperature circuit for IG short <ol style="list-style-type: none"> 1) Cool down A/T fluid temperature under ambient temperature. 2) Connect TCM connectors to TCM with ignition switch OFF. 3) Turn ignition switch ON. 4) Measure voltage between terminal "C06-11" of TCM connector and ground. <p><i>Is it 4.6 V or more?</i></p>	"LT GRN" circuit shorted to power circuit. If circuit is OK, go to Step 4.	Intermittent trouble or faulty TCM. Check for intermittent referring to "Intermittent and Poor Connection Inspection in Section 00". If OK, substitute a known-good TCM and recheck.
4	Inspect transmission fluid temperature sensor <ol style="list-style-type: none"> 1) Inspect transmission fluid temperature sensor referring to "Transmission Fluid Temperature Sensor Inspection". <p><i>Is result satisfactory?</i></p>	Intermittent trouble or faulty TCM. Check for intermittent referring to "Intermittent and Poor Connection Inspection in Section 00". If OK, substitute a known-good TCM and recheck.	Replace transmission fluid temperature sensor.

31) Install O/D and 2nd coast brake retaining plate snap ring (1).

CAUTION

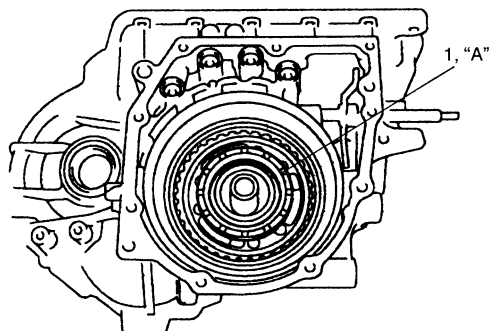
Be sure to install O/D and 2nd coast brake retaining plate snap ring correctly in groove of transaxle case.



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32) After applying grease to slide contact face of planetary carrier thrust washer (1), install it to planetary gear assembly.

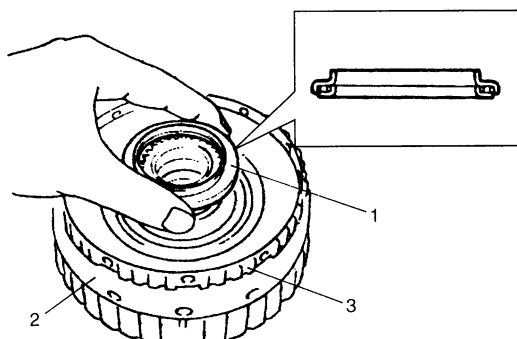
"A": Grease 99000-25030 (SUZUKI Super Grease C)



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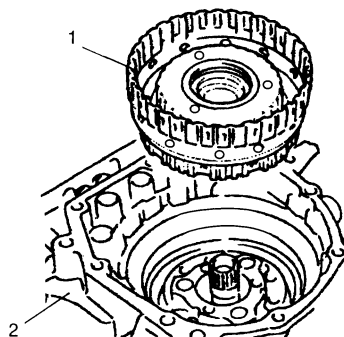
33) Apply A/T fluid to one-way clutch No.1 assembly (3) and install one-way clutch No.1 assembly (3) to rear planetary sun gear subassembly (2).

34) Apply A/T fluid to planetary gear thrust bearing (1), then install it to one-way clutch No.1 assembly (3).



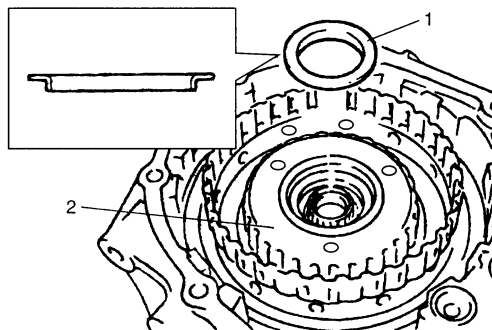
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35) After applying A/T fluid to rear planetary sun gear subassembly and one-way clutch No.1 assembly (1), install them in transaxle case (2).



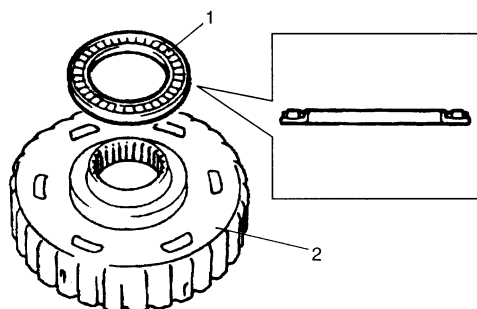
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36) After applying A/T fluid to rear sun gear thrust bearing race (1), install it to rear planetary sun gear (2).



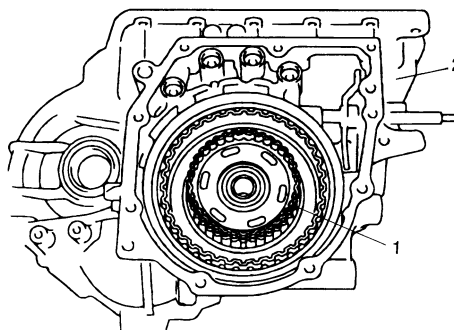
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37) After applying A/T fluid to rear sun gear thrust bearing (1), install it to forward clutch hub (2).



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38) After applying A/T fluid to forward clutch hub (1), install it in transaxle case (2).

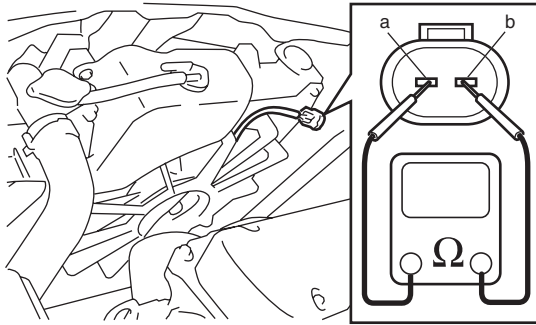


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Condenser Cooling Fan Inspection

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- 1) Check condenser cooling fan motor for resistance between terminal "a" and "b" as shown. If there is no continuity, replace condenser cooling fan motor.

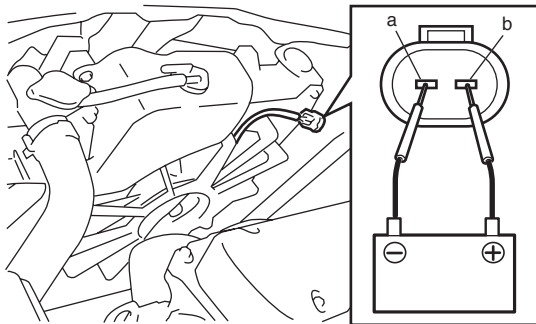


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- 2) Connect battery to condenser cooling fan motor terminal "a" and "b" as shown in figure, and then check if the condenser cooling fan motor operates smoothly.

Reference

Condenser cooling fan specified current at 12 V:
7 A maximum



I5RW0A721019-02

Condenser Assembly On-Vehicle Inspection

S7RW0A7216004

Check the followings.

- Clog of condenser fins
If any clog is found, condenser fins should be washed with water and should be dried with compressed air.
- Condenser fins for leakage and breakage
If any defects are found, repair or replace condenser.
- Condenser fittings for leakage.
If any defects are found, repair or replace condenser.

Condenser Assembly Removal and Installation

S7RW0A7216005

⚠ CAUTION

Do not damage condenser fins. If condenser fin is bent, straighten it by using flat head screwdriver or pair of pliers.

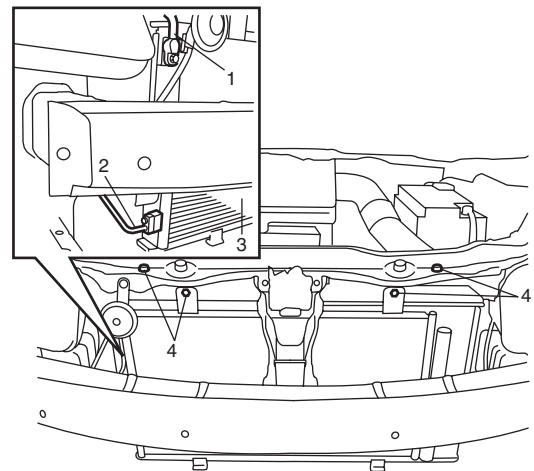
Removal

- 1) Recover refrigerant from A/C system referring to "Operation Procedure for Refrigerant Charge: Manual Type".

NOTE

The amount of removed compressor oil must be measured for replenishing compressor oil.

- 2) Remove front bumper referring to "Front Bumper and Rear Bumper Components in Section 9K".
- 3) Disconnect discharge hose (1) and liquid pipe (2) from condenser assembly (3).
- 4) Remove radiator assembly and condenser assembly mounting bolts (4).



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DTC B1043: Passenger Air Bag Circuit Shorted to Ground

S7RW0A8204024

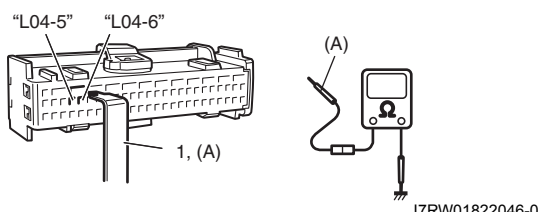
Wiring Diagram

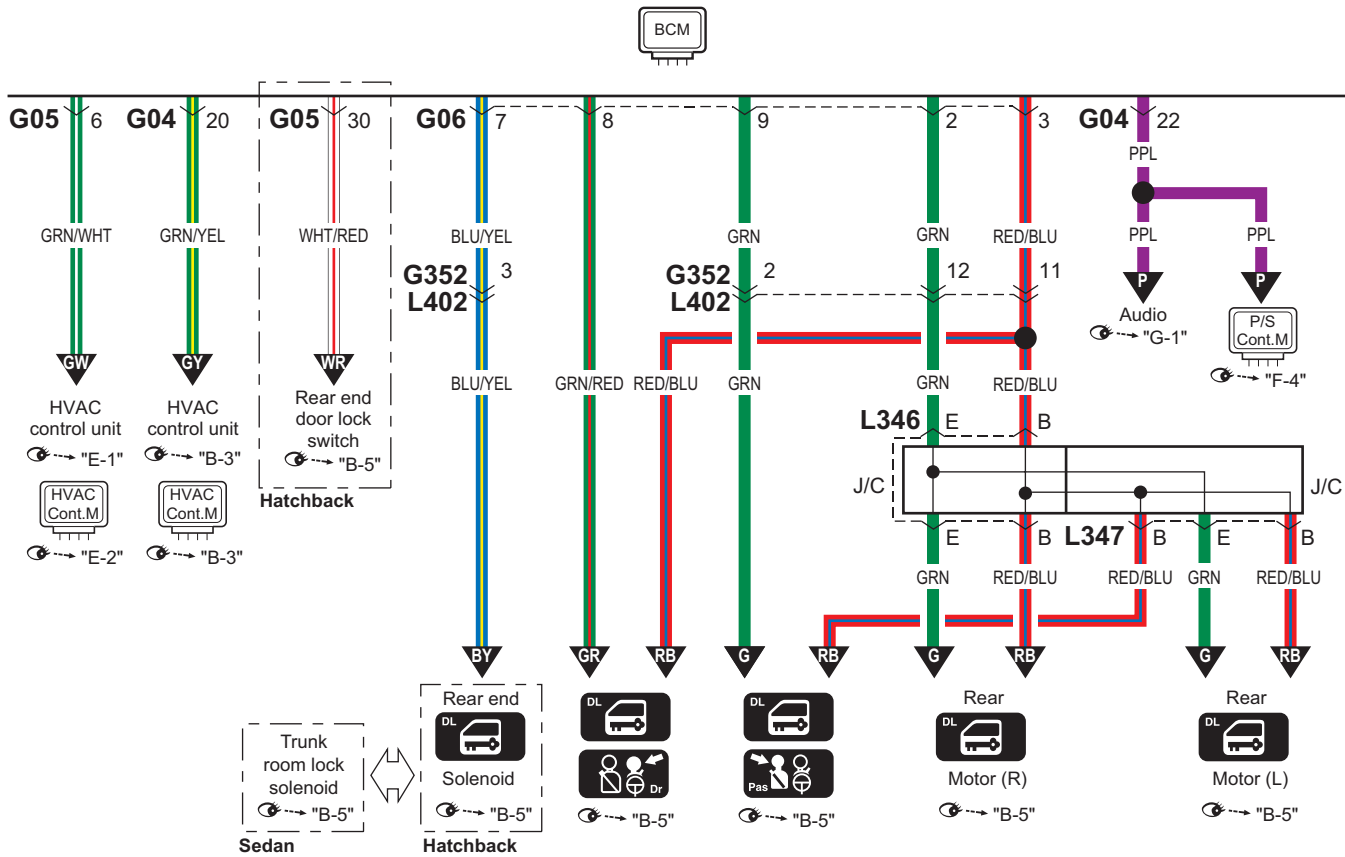
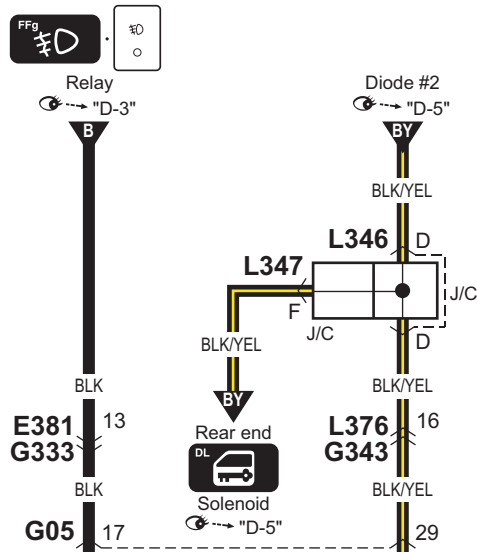
Refer to "DTC B1041: Passenger Air Bag Circuit High Resistance".

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
Passenger air bag circuit has been shorted to ground for more than 4 sec.	<ul style="list-style-type: none"> • Passenger air bag circuit • SDM

DTC Troubleshooting

Step	Action	Yes	No
1	Was "Air Bag Diagnostic System Check Flow" performed?	Go to Step 2.	Go to "Air Bag Diagnostic System Check Flow".
2	<p>Passenger air bag circuit check</p> <ol style="list-style-type: none"> 1) Remove passenger air bag (inflator) module from steering column referring to "Passenger Air Bag (Inflator) Module Removal and Installation". 2) Disconnect SDM connector "L04". 3) Check for proper connection to SDM connector at terminal "L04-5" and "L04-6". 4) Check for proper connection to passenger air bag (inflator) module at terminals in "G259" connector. 5) If OK, release shorting bar in SDM connector inserting release tool (1) included in special tool (A). <p>Special tool (A): 09932-76010</p> <ol style="list-style-type: none"> 6) Measure resistance between "L04-5" terminal and body ground, and between "L04-6" terminal and body ground. <div style="text-align: center;">  <p>17RW01822046-01</p> </div> <p><i>Is each measured resistance infinity?</i></p>	Substitute a known-good SDM and recheck.	Go to Step 3.



Low Fuel Warning Light Symptom Diagnosis

NOTE

- Confirm that fuel meter is in good condition before referring to the following possible causes.
- When fuel level sensor circuit is open or short, fuel level meter indicates empty even if fuel tank does not empty.
- The low fuel warning light comes ON when fuel level is lower than specification below.

Low fuel warning light operation:

Low fuel warning light operation:	Fuel amount:	Resistance of fuel level sensor:
ON (2WD)	Approx. 7.5 liter	Approx. 261 Ω
ON (4WD)	Approx. 6.8 liter	Approx. 261 Ω

Condition	Possible cause	Correction / Reference Item
Low fuel warning light does not come ON when fuel level is lower than specification	Circuit fuse blown	Replace fuse and check for short circuit.
	Fuel level sensor faulty	Check fuel level sensor referring to "Fuel Level Sensor Inspection".
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	ECM faulty	Replace after making sure that none of above parts is faulty.
Low fuel warning light comes ON steady	Low fuel	Refill fuel.
	Fuel level sensor faulty	Check fuel level sensor referring to "Fuel Level Sensor Inspection".
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	ECM faulty	Replace after making sure that none of above parts is faulty.

Oil Pressure Warning Light Symptom Diagnosis

Condition	Possible cause	Correction / Reference Item
Oil pressure warning light does not light up when ignition switch is turned to ON position at engine off	Circuit fuse blown	Replace fuse and check for short circuit.
	Oil pressure switch faulty	Check oil pressure switch referring to "Oil Pressure Switch Inspection".
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	BCM faulty	Replace after making sure that none of above parts is faulty.
Oil pressure warning light stays ON	Oil pressure switch faulty	Check oil pressure switch referring to "Oil Pressure Switch Inspection".
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.
	BCM faulty	Replace after making sure that none of above parts is faulty.