

**Step 3: DTC Check**

Recheck DTC referring to "DTC Check: ".

**Step 4: ABS Check**

According to ABS Check for the DTC confirmation in Step 3, locate the cause of the trouble, namely in a sensor, switch, wire harness, connector, actuator assembly or other part and repair or replace faulty parts.

**Step 5: Brakes Diagnosis**

Check the parts or system suspected as a possible cause referring to "Brakes Symptom Diagnosis: in Section 4A" and based on symptoms appearing on the vehicle (symptom obtained through Steps 1 and 2 and repair or replace faulty parts, if any).

**Step 6: Check for Intermittent Problem**

Check parts where an intermittent trouble is easy to occur (e.g., wire harness, connector, etc.), referring to "Intermittent and Poor Connection Inspection: in Section 00" and related circuit of trouble code recorded in Step 1 to 3.

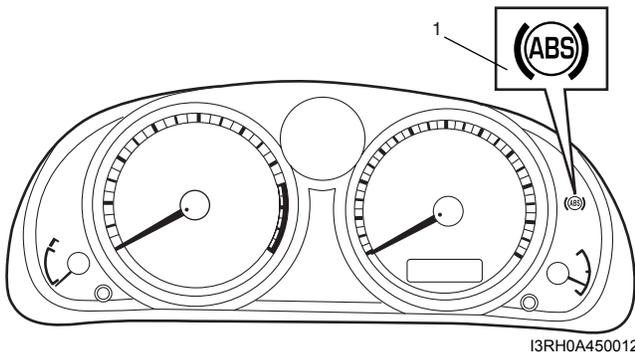
**Step 7: Final Confirmation Test**

Confirm that the problem symptom has gone and the ABS is free from any abnormal conditions. If what has been repaired is related to the malfunction DTC, clear the DTC once and perform test driving and confirm that no DTC is indicated.

**ABS Warning Lamp Check**

S3RH0A4504002

- 1) Turn ignition switch ON.
- 2) Check that ABS warning lamp (1) comes ON for about 2 seconds and then goes off.  
If any faulty condition is found, advance to "ABS Warning Lamp Does Not Come ON at Ignition Switch ON:", "ABS Warning Lamp Comes ON Steady:" or "ABS Warning Lamp Flashes Continuously while Ignition Switch Is ON:".

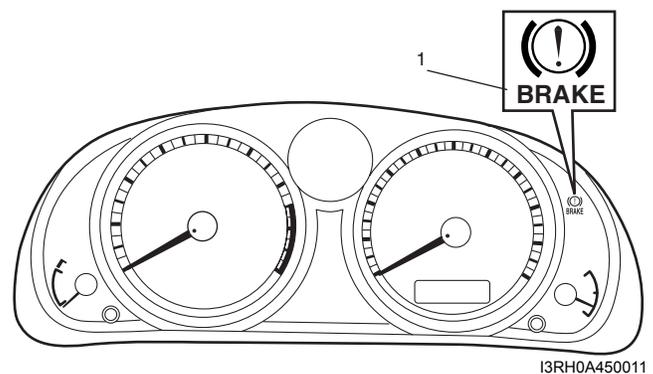
**EBD Warning Lamp (Brake Warning Lamp) Check**

S3RH0A4504003

**NOTE:**

**Perform this check on a level place.**

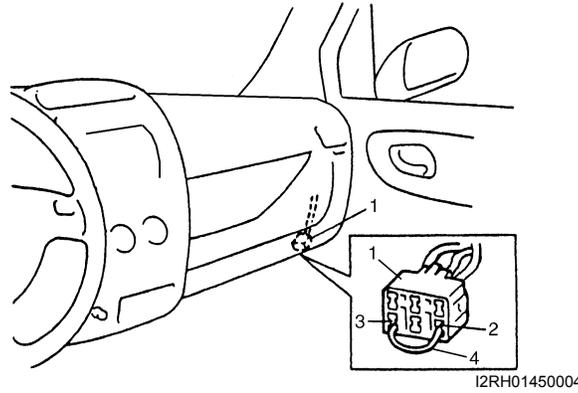
- 1) Turn ignition switch ON with parking brake applied.
- 2) Check that EBD warning lamp (brake warning lamp) (1) is turned ON.
- 3) Release parking brake with ignition switch ON and check that EBD warning lamp (brake warning lamp) goes off.  
If it doesn't go off, go to "EBD Warning Lamp (Brake Warning Lamp) Comes ON Steady:".



**DTC Check**

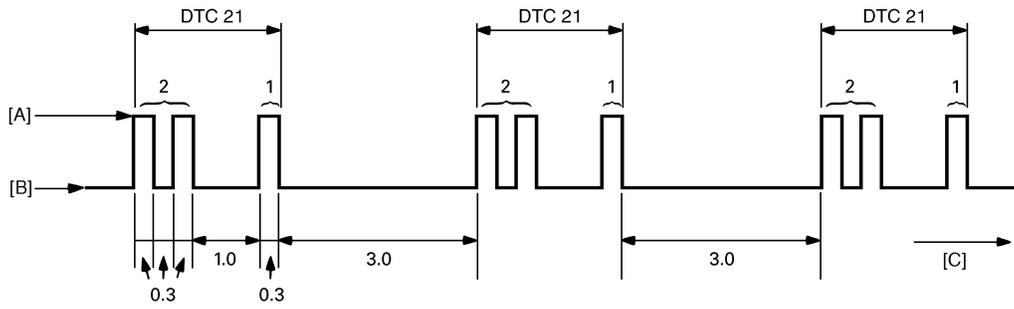
**Using ABS Warning Lamp**

- 1) Perform "ABS Warning Lamp Check: ".
- 2) Using service wire (4), connect diagnosis switch terminal (2) of monitor connector (blue) (1) to ground (3).



- 3) Turn ignition switch to ON position.
- 4) Read flashing of ABS warning lamp which represents DTC as shown in the following example and write it down. When more than 2 DTCs are stored in memory, flashing for each DTC is repeated three times starting with the smallest DTC number in increasing order. For details of DTC, refer to "DTC Table: ". If DTC is not indicated at ABS warning lamp, go to "Code (DTC) Is Not Outputted Even with Diagnosis Switch Terminal Connected to Ground: ".

**Example: When right-front wheel speed sensor circuit opens (DTC 21)**



[A]:	ABS warning lamp turned ON
[B]:	ABS warning lamp turned OFF
[C]:	Unit (Seconds)

I3RH0A450002

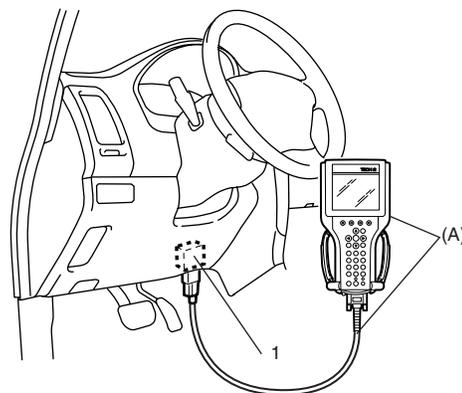
- 5) After completing the check, turn ignition switch off, disconnect service wire from monitor coupler.

**Using SUZUKI Scan Tool**

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

**Special tool**

**(A): SUZUKI scan tool**



I3RH0A450013

- 3) Turn ignition switch to ON position.
- 4) Read DTC according to instructions displayed on SUZUKI scan tool and print it or write it down. Refer to SUZUKI scan tool operator's manual for further details.

**NOTE:**

If SUZUKI scan tool can not communicate ABS hydraulic unit / control module, perform "Serial Data Link Circuit Check: ".

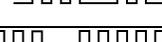
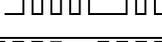
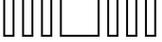
- 5) After completing the check, turn ignition switch off and disconnect SUZUKI scan tool from DLC.

**DTC Table**

S3RH0A4504005

**CAUTION:**

Be sure to perform "ABS Check: " before starting diagnosis.

DTC (displayed on SUZUKI scan tool)	DTC (indicated by ABS warning lamp)	ABS warning lamp flashing pattern	Diagnostic Items	
NO DTC	12	 MCODE00012-0	Normal	
C1015	15	 MCODE00015-0	G sensor circuit	
C1021	21	 MCODE00021-0	RF	Wheel speed sensor circuit
C1025	25	 MCODE00025-0	LF	
C1031	31	 MCODE00031-0	RR	
C1035	35	 MCODE00035-0	LR	
C1022	22	 MCODE00022-0	RF	
C1026	26	 MCODE00026-0	LF	
C1032	32	 MCODE00032-0	RR	
C1036	36	 MCODE00036-0	LR	
C1041	41	 MCODE00041-0	RF	Inlet solenoid valve circuit
C1042	42	 MCODE00042-0		Outlet solenoid valve circuit
C1045	45	 MCODE00045-0	LF	Inlet solenoid valve circuit
C1046	46	 MCODE00046-0		Outlet solenoid valve circuit
C1051	51	 MCODE00051-0	RR	Inlet solenoid valve circuit
C1052	52	 MCODE00052-0		Outlet solenoid valve circuit
C1055	55	 MCODE00055-0	LR	Inlet solenoid valve circuit
C1056	56	 MCODE00056-0		Outlet solenoid valve circuit
C1057	57	 MCODE00057-0	Power source	
C1061	61	 MCODE00061-0	ABS pump motor and/or motor relay circuit	

## 4E-14 ABS:

DTC (displayed on SUZUKI scan tool)	DTC (indicated by ABS warning lamp)	ABS warning lamp flashing pattern	Diagnostic Items
C1063	63		Fail-safe relay
C1071	71		ABS control module

### DTC Clearance

S3RH0A4504006

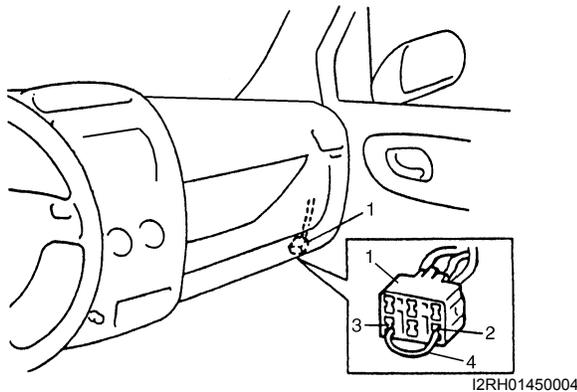
#### WARNING:

**When performing a driving test, select a safe place where there is neither any traffic nor any traffic accident possibility and be very careful during testing to avoid occurrence of an accident.**

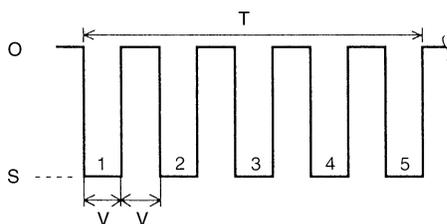
After repair or replace malfunction part(s), clear all DTCs by performing the following procedure or using SUZUKI scan tool.

#### Not Using SUZUKI Scan Tool

- 1) Turn ignition switch OFF.
- 2) Using service wire (4), connect diagnosis switch terminal (2) of monitor connector (blue) (1) to ground terminal (3).



- 3) With connection described in Step 2) maintained, turn ignition switch ON.
- 4) Repeat disconnecting and reconnecting of service wire between diagnosis and ground terminals 5 times or more at about 1 sec. interval within 10 seconds.



I3RH0A450003

O: Open	T: About 10 seconds
S: Short	V: About 1 seconds

- 5) Turn ignition switch OFF and disconnect service wire from monitor coupler.
- 6) Perform "Driving Test" (Step 2 of "ABS Check: ") and "DTC Check: " and confirm that normal DTC (DTC 12) is displayed not malfunction DTC.

#### Using SUZUKI Scan Tool

- 1) Connect SUZUKI scan tool to data link connector in the same manner as when making this connection for DTC check.
- 2) Turn ignition switch to ON position.
- 3) Erase DTC according to instructions displayed on scan tool. Refer to scan tool operator's manual for further details.
- 4) After completing the clearance, turn ignition switch OFF and disconnect scan tool from data link connector.
- 5) Perform "Driving Test" (Step 2 of "ABS Check: ") and "DTC Check: " and confirm that NO DTC is displayed on scan tool.

#### Scan Tool Data

S3RH0A4504007

The parameter data below are values measured with the scan tool when the normally operating vehicle is under the following conditions. When taking measurements for comparison by using the scan tool, be sure to check that the vehicle is under the following conditions.

- Apply parking brake and block wheels.
- Ignition switch ON.
- Turn OFF air conditioner (if equipped).
- Apply no load to power steering (if equipped). (Don't turn it)
- Turn OFF all electric loads (except ignition).
- No DTC.
- ABS is not operated. (Normal braking operation)

Scan Tool Data	Standards	Condition
Battery Voltage	10.0 – 16.0 V	—
Pump Motor Relay	0.0 V	—
RF Wheel Speed	0 km/h, 0.0 MPH	Vehicle stop
LF Wheel Speed	0 km/h, 0.0 MPH	Vehicle stop
RR Wheel Speed	0 km/h, 0.0 MPH	Vehicle stop

Scan Tool Data	Standards	Condition
LR Wheel Speed	0 km/h, 0.0 MPH	Vehicle stop
Brake Switch	ON	Brake pedal depressed
	OFF	Brake pedal released
G Sensor	0.00 G (4WD vehicle)	Place vehicle on the level
	-2.5 G (2WD vehicle)	Place vehicle on the level

**Scan Tool Data Definition**

**Battery Volt (V):** Battery Voltage is an analog input signal read by the ABS control module. Certain ABS control module functions will be modified if the battery voltage falls below or rises above programmed thresholds.

**Pump Motor Relay (V):** This parameter indicates the operational condition of the pump motor relay (transistor).

**RF Wheel Speed, LF Wheel Speed, RR Wheel Speed and LF Wheel Speed (km/h, MPH):** Wheel speed is an ABS control module internal parameter. It is computed by reference pulses from the wheel speed sensor.

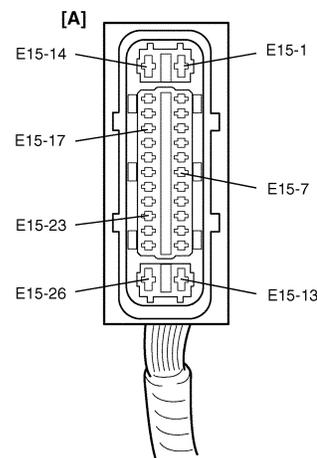
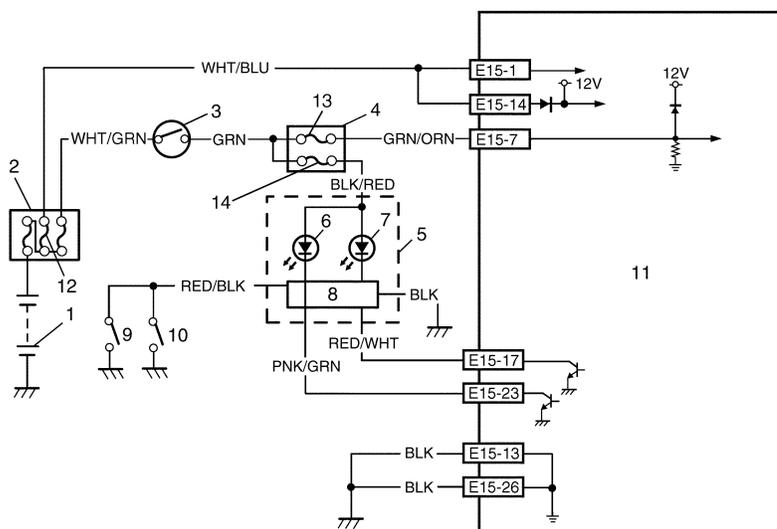
**Brake Switch (ON, OFF):** This switch signal informs the ABS control module whether the brake is active or not.

**G Sensor (G):** The G-Sensor converts gravity during the vehicle acceleration / deceleration in to a voltage conditions and controls the ABS for 4WD vehicle.

**ABS Warning Lamp Does Not Come ON at Ignition Switch ON**

S3RH0A4504008

**Wiring Diagram**



I3RH0A450004

[A]: ABS hydraulic unit / control module connector E15	5. Combination meter	10. Parking brake switch
1. Battery	6. EBD warning lamp (Brake warning lamp)	11. ABS hydraulic unit / control module assembly
2. Main fuse box	7. ABS warning lamp	12. "ABS" fuse (60 A)
3. Ignition switch	8. Lamp driver module	13. "ABS" fuse (10 A)
4. Circuit fuse box	9. Brake fluid level switch	14. "METER" fuse

**Circuit Description**

Operation (ON/OFF) of ABS warning lamp is controlled by ABS control module through lamp driver module in combination meter.

If the antilock brake system is in good condition, ABS control module turns ABS warning lamp ON at the ignition switch ON, keeps it ON for 2 seconds and then turns it OFF. If an abnormality in the system is detected, ABS warning lamp is turned ON continuously by ABS control module. Also, it is turned ON continuously by lamp driver module when the connector of ABS control module is disconnected.

## 4E-16 ABS:

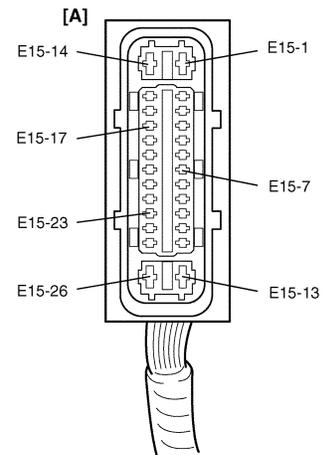
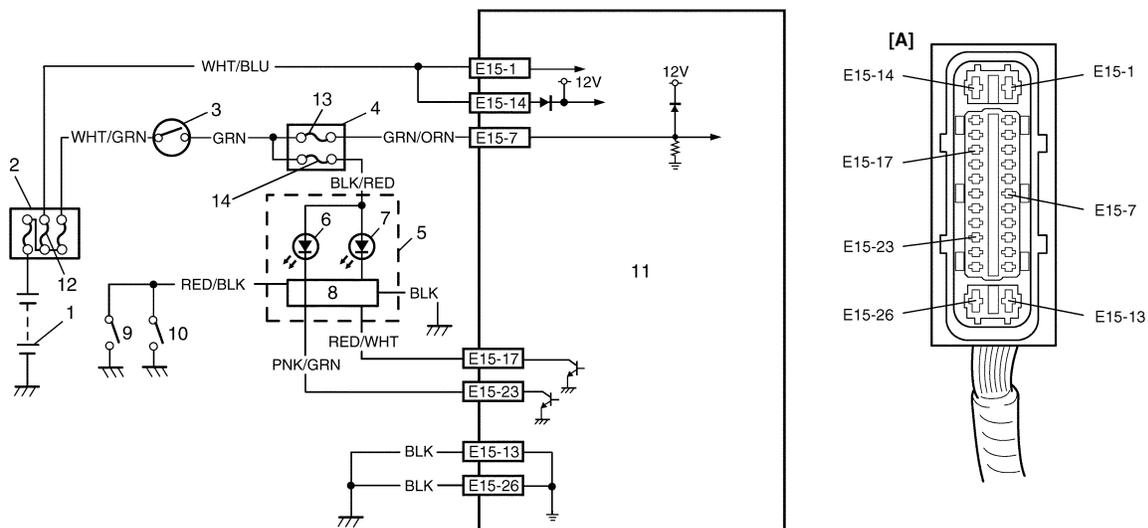
### Troubleshooting

Step	Action	Yes	No
1	1) Turn ignition switch to ON position.  <i>Do other warning lamps come ON?</i>	Go to Step 2.	Go to Step 4.
2	1) Turn OFF ignition switch. 2) Disconnect ABS hydraulic unit / control module connector. 3) Turn ON ignition switch.  <i>Does ABS warning lamp light with ignition switch ON?</i>	Replace ABS hydraulic unit / control module assembly.	Go to Step 3.
3	1) Remove combination meter with ignition switch turned OFF. 2) Measure resistance between "RED/WHT" wire of combination meter connector and ground.  <i>Is it infinite (<math>\infty</math>)?</i>	Go to Step 6.	"RED/WHT" circuit shorted to ground.
4	<i>Is "METER" fuse in good condition?</i>	Go to Step 5.	Replace fuse and check for short circuit to ground.
5	1) Remove combination meter with ignition switch turned OFF. 2) Check for proper connection to "BLK/RED" wire of combination meter connector. 3) If OK, turn ON ignition switch and measure voltage at "BLK/RED" wire of combination meter connector.  <i>Is it 10 – 14 V?</i>	Go to Step 6.	"BLK/RED" circuit open.
6	1) Measure resistance between "BLK" wire of combination meter connector and ground.  <i>Is resistance below 5 <math>\Omega</math>?</i>	Replace combination meter.	"BLK" circuit open or high resistance.

### ABS Warning Lamp Comes ON Steady

S3RH0A4504009

#### Wiring Diagram



I3RH0A450004

[A]: ABS hydraulic unit / control module connector E15	5. Combination meter	10. Parking brake switch
1. Battery	6. EBD warning lamp (Brake warning lamp)	11. ABS hydraulic unit / control module assembly
2. Main fuse box	7. ABS warning lamp	12. "ABS" fuse (60 A)
3. Ignition switch	8. Lamp driver module	13. "ABS" fuse (10 A)
4. Circuit fuse box	9. Brake fluid level switch	14. "METER" fuse

**Circuit Description**

Operation (ON/OFF) of ABS warning lamp is controlled by ABS control module through lamp driver module in combination meter.

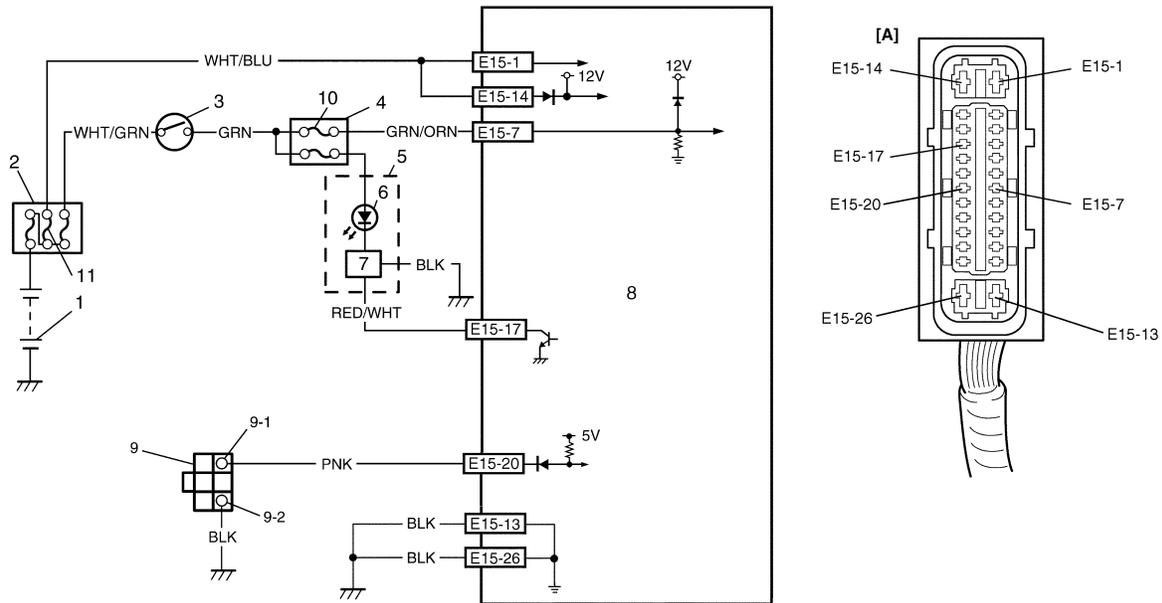
If the Antilock brake system is in good condition, ABS control module turns ABS warning lamp ON at the ignition switch ON, keeps it ON for 2 seconds and then turns it OFF. If an abnormality in the system is detected, ABS warning lamp is turned ON continuously by ABS control module. Also, it is turned ON continuously by lamp driver module when the connector of ABS control module is disconnected.

**Troubleshooting**

Step	Action	Yes	No
1	1) Perform diagnostic trouble code check. <i>Is there any DTC(s)?</i>	Go to Step 7 of "ABS Check: ".	Go to Step 2.
2	<i>Is "ABS" fuses (60 A and 10 A) in good condition?</i>	Go to Step 3.	Replace fuse and check circuit for short to ground.
3	1) Turn ignition switch to OFF. 2) Disconnect ABS hydraulic unit / control module connector. 3) Check for proper connection to ABS hydraulic unit / control module connector at terminals "E15-7", "E15-17" and "E15-13". 4) If OK then turn ignition switch to ON position and measure voltage between terminal "E15-7" and vehicle body ground. <i>Is it 10 – 14 V?</i>	Go to Step 4.	"GRN/ORN" circuit open.
4	1) Turn ignition switch to OFF position. 2) Check for proper connection to ABS hydraulic unit / control module connector at terminals "E15-1" and "E15-14". 3) If OK then turn ignition switch to ON position and measure voltage between each terminal of "E15-1", "E15-14" and vehicle body ground. <i>Are they 10 – 14 V?</i>	Go to Step 5.	"WHT/BLU" circuit open.
5	1) Turn ignition switch to ON and light the ABS warning lamp. 2) Connect terminal "E15-17" of disconnected connector to vehicle body ground using service wire. <i>Does ABS warning lamp turn off?</i>	Go to Step 6.	"RED/WHT" circuit open. If wire and connection are OK, replace combination meter.
6	1) Turn ignition switch to OFF and measure resistance between each terminal of "E15-13", "E15-26" and vehicle body ground. <i>Is resistance less than 2 <math>\Omega</math>?</i>	Substitute a known-good ABS hydraulic unite / control module assembly and recheck.	"BLK" wire circuit in open or high resistance.

ABS Warning Lamp Flashes Continuously while Ignition Switch Is ON

Wiring Diagram



I3RH0A450005

[A]: ABS hydraulic unit / control module connector E15	5. Combination meter	9-1. Diagnosis switch terminal
1. Battery	6. ABS warning lamp	9-2. Diagnosis ground terminal
2. Main fuse box	7. Lamp driver module	10. "ABS" fuse (10A)
3. Ignition switch	8. ABS hydraulic unit / control module assembly	11. "ABS" fuse (60A)
4. Circuit fuse box	9. Monitor connector	

Circuit Description

When diagnosis switch terminal is shorted or connected to the ground with ignition switch ON, diagnosis trouble code (DTC) is indicated by flashing of ABS warning lamp only in the following cases.

- Normal DTC 12 is indicated if no malfunction DTC is detected in the ABS.
- A history malfunction DTC is indicated by flashing of the lamp if a current malfunction DTC is not detected at that point although a history malfunction DTC is stored in memory.

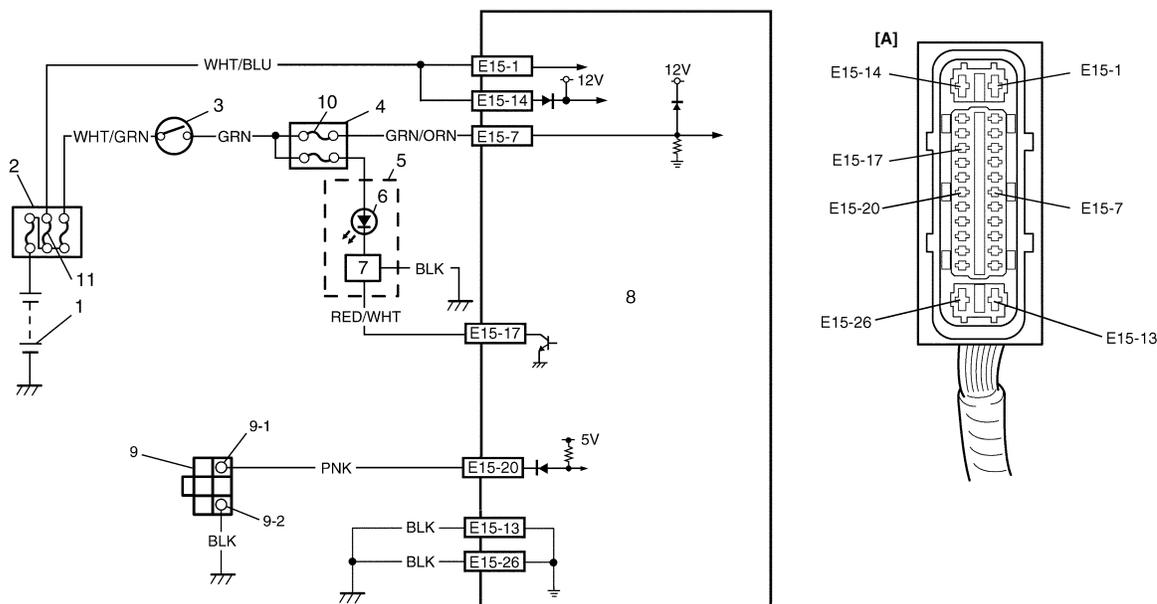
Troubleshooting

Step	Action	Yes	No
1	Is diagnosis switch terminal connected to ground via service wire?	Go to Step 3.	Go to Step 2.
2	1) Ignition switch ON. 2) Measure voltage between diagnosis switch terminal and ground.  Is it 10 – 14 V?	Substitute a known-good ABS hydraulic unit / control module assembly and recheck.	"PNK" wire circuit shorted to ground.
3	1) Ignition switch ON.  Does flashing of ABS warning lamp indicate DTC?	Go to Step 7 of "ABS Check: ".	Substitute a known-good ABS hydraulic unit / control module assembly and recheck.

### Code (DTC) Is Not Outputted Even with Diagnosis Switch Terminal Connected to Ground

S3RH0A4504011

#### Wiring Diagram



I3RH0A450005

[A]: ABS hydraulic unit / control module connector E15	5. Combination meter	9-1. Diagnosis switch terminal
1. Battery	6. ABS warning lamp	9-2. Diagnosis ground terminal
2. Main fuse box	7. Lamp driver module	10. "ABS" fuse (10A)
3. Ignition switch	8. ABS hydraulic unit / control module assembly	11. "ABS" fuse (60A)
4. Circuit fuse box	9. Monitor connector	

#### Circuit Description

When diagnosis switch terminal is connected to ground with ignition switch turned ON, the ABS control module outputs diagnostic trouble code by flashing ABS warning lamp.

#### Troubleshooting

Step	Action	Yes	No
1	<i>Is it shorted diagnosis switch terminal and ground terminal by service wire properly?</i>	Go to Step 2.	Connect service wire securely.
2	1) Disconnect service wire. 2) Check the ABS lamp operation. Refer to "ABS Warning Lamp Check: ".  <i>Does ABS lamp operate properly?</i>	Go to Step 3.	Check ABS warning lamp circuit referring to "ABS Warning Lamp Does Not Come ON at Ignition Switch ON: ", "ABS Warning Lamp Comes ON Steady: " or "ABS Warning Lamp Flashes Continuously while Ignition Switch Is ON: ".
3	1) Disconnect ABS hydraulic unit / control module connector. 2) Check for proper connection to ABS hydraulic unit / control module at terminal "E15-20". 3) If OK, then measure resistance between diagnosis switch terminal and connector terminal "E15-20".  <i>Is resistance less than 1 Ω?</i>	Go to Step 4.	"PNK" circuit open or in high resistance.

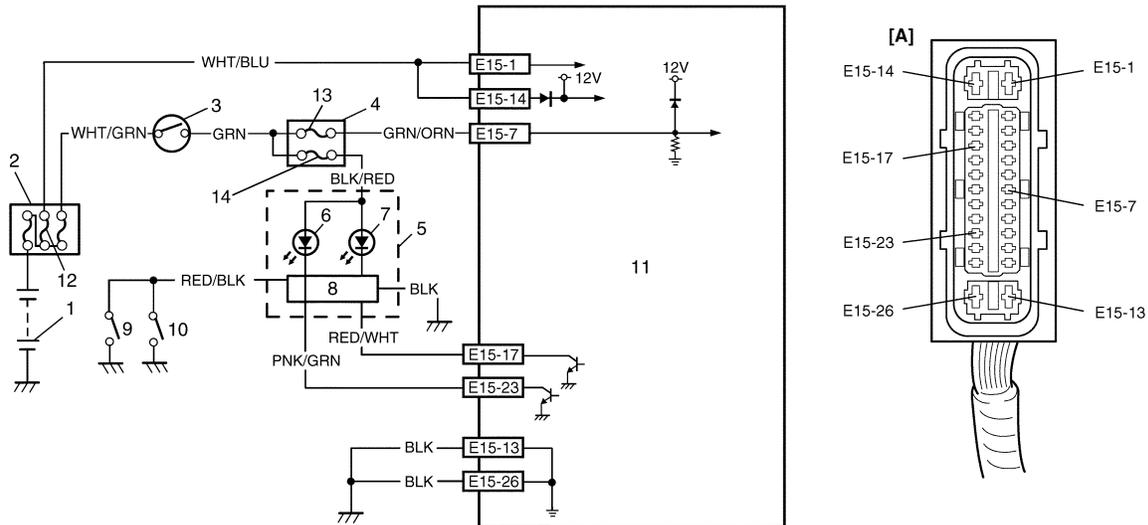
## 4E-20 ABS:

Step	Action	Yes	No
4	1) Measure resistance between ground terminal of monitor coupler and body ground.  <i>Is resistance less than 2 Ω?</i>	Substitute a known-good ABS hydraulic unit / control module assembly and recheck.	"BLK" circuit open or in high resistance.

## EBD Warning Lamp (Brake Warning Lamp) Comes ON Steady

S3RH0A4504012

### Wiring Diagram



I3RH0A450004

[A]: ABS hydraulic unit / control module connector E15	5. Combination meter	10. Parking brake switch
1. Battery	6. EBD warning lamp (Brake warning lamp)	11. ABS hydraulic unit / control module assembly
2. Main fuse box	7. ABS warning lamp	12. "ABS" fuse (60 A)
3. Ignition switch	8. Lamp driver module	13. "ABS" fuse (10 A)
4. Circuit fuse box	9. Brake fluid level switch	14. "METER" fuse

### Circuit Description

EBD warning lamp (brake warning lamp) is controlled by parking brake switch, brake fluid level switch and ABS control module / hydraulic unit assembly through lamp driver module in combination meter.

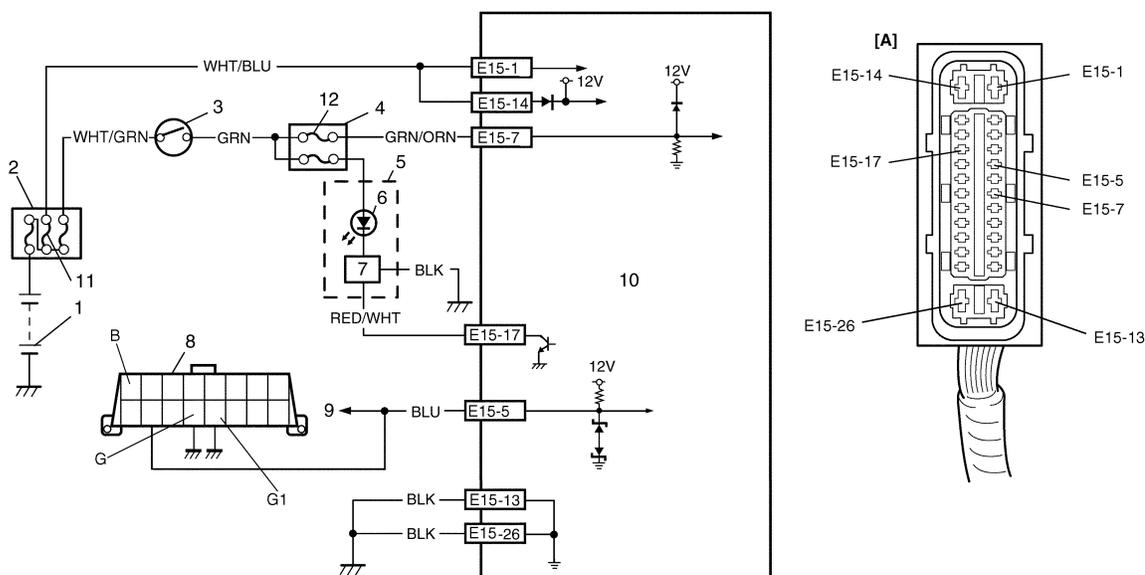
### Troubleshooting

Step	Action	Yes	No
1	1) Make sure that: <ul style="list-style-type: none"> <li>• Parking brake is completely released.</li> <li>• Brake fluid level is upper than the minimum level.</li> </ul> <i>Are the check results OK?</i>	Go to Step 2.	Release parking brake completely and/or replenish brake fluid.
2	1) Turn ignition switch to ON position.  <i>Does "ABS" warning lamp come on steady?</i>	Perform "ABS Warning Lamp Comes ON Steady:" previously outlined.	Go to Step 3.

Step	Action	Yes	No
3	1) Disconnect ABS hydraulic unit / control module connector. 2) Check for proper connection to ABS hydraulic unit / control module connector at terminals "E15-23". 3) If OK, apply chocks to wheels and select gear in neutral position. 4) Keep brake pedal depressed and start engine. Release parking brake. 5) Connect terminal "E15-23" of disconnected connector to ground using service wire. Does brake warning lamp turn off?	Substitute a known-good ABS hydraulic unit / control module assembly and recheck.	"PNK/GRN" circuit open. If wire and connection are OK, replace combination meter.

**Serial Data Link Circuit Check**

S3RH0A4504013



I3RH0A450006

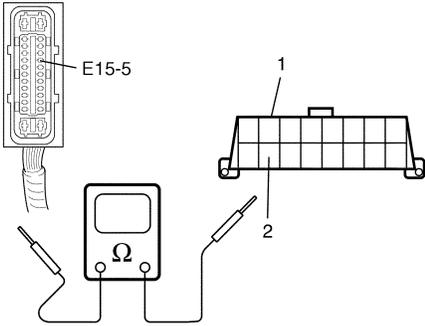
[A]: ABS hydraulic unit / control module connector E15			
1. Battery	4. Circuit fuse box	7. Lamp driver module	10. ABS hydraulic unit / control module assembly
2. Main fuse box	5. Combination meter	8. Data link connector (DLC)	11. "ABS" fuse (60 A)
3. Ignition switch	6. ABS warning lamp	9. To ECM, TCM control module and SDM	12. "ABS" fuse (10 A)

**Inspection**

Step	Action	Yes	No
1	1) Turn ignition switch to ON position. Does ABS warning lamp come ON?	Go to Step 2.	Go to Step 6.
2	Is "ABS" fuses (60 A and 10 A) in good condition?	Go to Step 3.	Replace fuse and check for short.
3	1) Turn ignition switch to OFF position. 2) Disconnect ABS hydraulic unit / control module connector. 3) Check for proper connection to ABS hydraulic unit / control module connector at terminal "E15-7". 4) If OK then turn ignition switch to ON position and measure voltage between terminal "E15-7" and vehicle body ground. Is it 10 – 14 V?	Go to Step 4.	"GRN/ORN" wire circuit open.

**4E-22 ABS:**

Step	Action	Yes	No
4	1) Turn ignition switch to OFF position. 2) Check for proper connection to ABS hydraulic unit / control module connector at terminals "E15-1" and "E15-14". 3) If OK then turn ignition switch to ON position and measure voltage between each terminal of "E15-1", "E15-14" and vehicle body ground.  <i>Are they 10 – 14 V?</i>	Go to Step 5.	"WHT/BLU" wire circuit open.
5	1) Turn ignition switch to OFF position. 2) Check for proper connection to ABS hydraulic unit / control module connector at terminals "E15-13" and "E15-26". 3) If OK, measure resistance between each terminal of "E15-13", "E15-26" and vehicle body ground.  <i>Are resistance less than 2 Ω?</i>	Go to Step 6.	"BLK" wire circuit in open or in high resistance.
6	1) Check if communication is possible by trying communication with other controller (ECM, TCM or SDM).  <i>Is it possible to communicate with other controller?</i>	Go to Step 7.	Repair open in common section of serial data circuit ("BLU" wire circuit) used by all controllers or short to ground or power circuit which has occurred somewhere in serial data circuit ("BLU" wire circuit).
7	1) Turn ignition switch to ON position. 2) Measure voltage between terminal B of data link connector and vehicle body ground.  <i>Is voltage 10 – 12 V?</i>	Go to step 8.	Terminal B circuit open or shorted to ground.
8	1) Turn ignition switch to OFF position. 2) Measure resistance between the following terminals; <ul style="list-style-type: none"> <li>• Terminal G of data link connector and vehicle body ground.</li> <li>• Terminal G1 of data link connector and vehicle body ground.</li> </ul> <i>Is each resistance 1Ω or less?</i>	Go to step 9.	Terminal G and/or G1 circuit open or high resistance.

Step	Action	Yes	No
9	<p>1) Turn ignition switch to OFF position.</p> <p>2) Check proper connection at "E15-5" ("BLU" wire) terminal for serial data circuit.</p> <p>3) If OK, then check resistance between "E15-5" ("BLU" wire) terminal and "BLU" wire terminal (2) for serial data circuit in DLC (1).</p> <p><i>Is resistance 1 Ω or less?</i></p> 	<p>Substitute a known-good ABS hydraulic unit / control module and recheck.</p>	<p>Repair high resistance or open in "BLU" wire circuit for anti lock brake system.</p>

I3RH0A450016

### DTC C1015 (No. 15): G Sensor Circuit

S3RH0A4504014

#### DTC Detecting Condition

If the signal voltage of G sensor while at a stop does not vary from that while running, this DTC is set. Therefore, this DTC may be set when a vehicle is lifted up and its wheel(s) is turned. In such case, clear the DTC and check again.

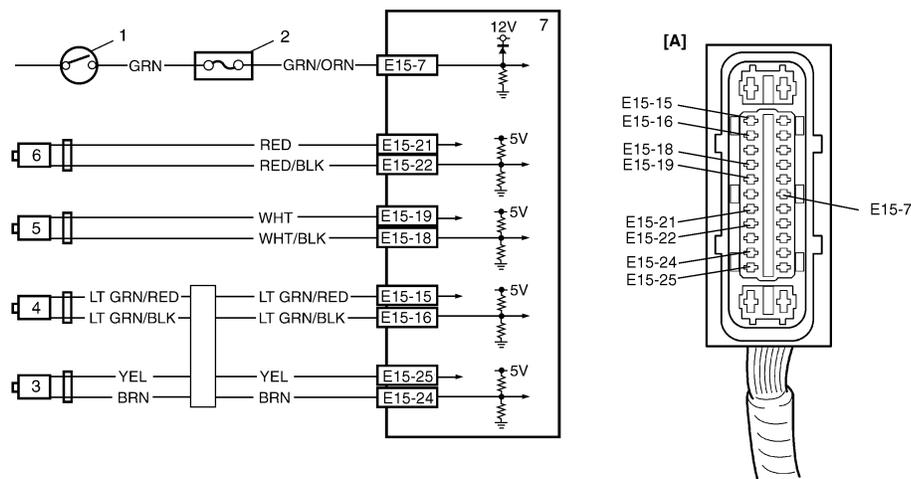
#### DTC Troubleshooting

- 1) Ignition switch OFF.
- 2) Check for proper installation of ABS hydraulic unit / control module assembly.
- 3) If OK, substitute an ABS hydraulic unit / control module assembly with correct part number.
- 4) Recheck system.

### DTC C1021, C1022 / C1025, C1026 / C1031, C1032 / C1035, C1036 / (No. 21, 22 / 25, 26 / 31, 32 / 35, 36): Right-Front / Left-Front / Right-Rear / Left-Rear Wheel Speed Sensor Circuit or Sensor Ring

S3RH0A4504015

#### Wiring Diagram



I3RH0A450017

## 4E-24 ABS:

[A]: ABS hydraulic unit / control module connector E15	3. Right-rear wheel speed sensor	6. Left-front wheel speed sensor
1. Ignition switch	4. Left-rear wheel speed sensor	7. ABS hydraulic unit / control module assembly
2. Circuit fuse box	5. Right-front wheel speed sensor	

### DTC Detecting Condition

The ABS control module monitors the voltage at the terminal of each sensor while the ignition switch is ON. When the voltage is not within the specified range, an applicable DTC will be set. Also, when no sensor signal is inputted at running, an applicable DTC will be set.

#### NOTE:

When the vehicle was operated in any of the following ways, one of these DTCs may be set even when the sensor is in good condition. If such possibility is suspected, repair the trouble (dragging of brake, etc.) of the vehicle, clear DTC once and then after performing the driving test as described in Step 2 of "ABS Check: ", check whether or not any abnormality exists.

- The vehicle was driven with parking brake pulled.
- The vehicle was driven with brake dragging.
- Wheel spin occurred while driving.
- Wheel(s) was turned while the vehicle was jacked up.
- The vehicle was stuck.

### DTC Troubleshooting

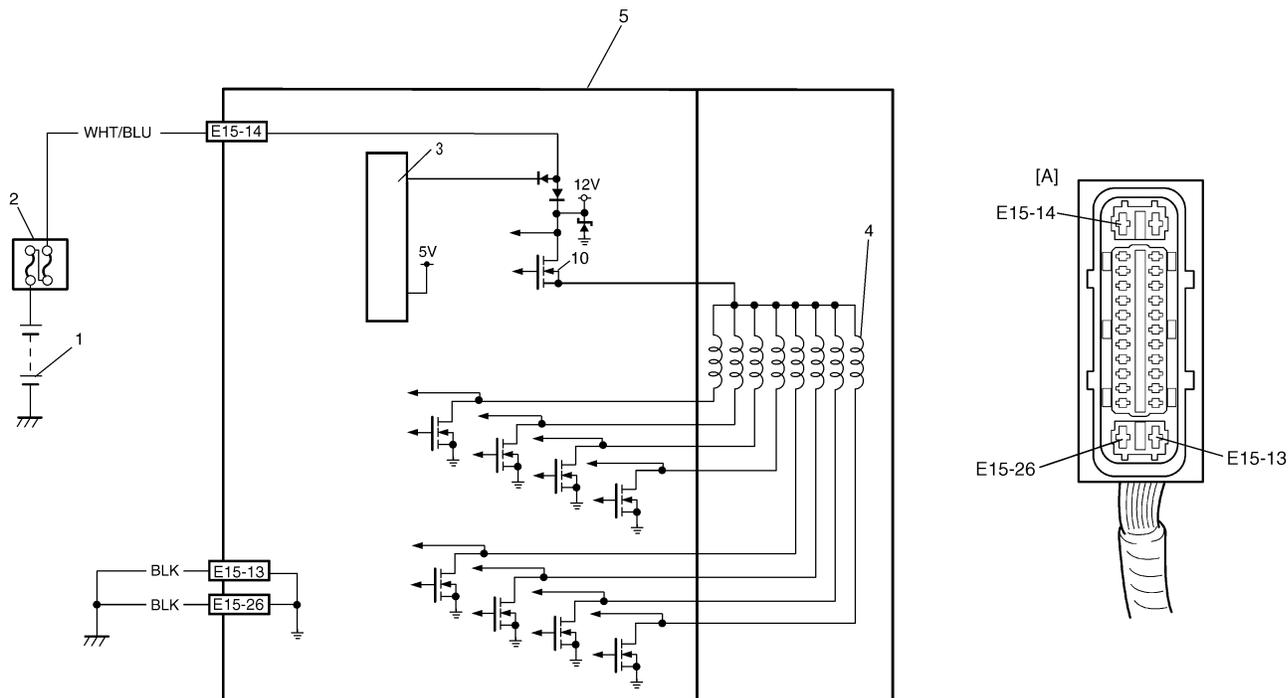
Step	Action	Yes	No
1	<i>Was "ABS Check" performed?</i>	Go to Step 2.	Go to "ABS Check: ".
2	1) Disconnect applicable ABS wheel speed sensor coupler with ignition switch OFF. 2) Measure resistance between terminals of ABS wheel speed sensor. Refer to "Front Wheel Speed Sensor Inspection: " and/or "Rear Wheel Speed Sensor Inspection: ".  <i>Is measured resistance value as specified?</i>	Go to Step 3.	Replace ABS wheel speed sensor assembly.
3	1) Turn ignition switch OFF. 2) Connect applicable ABS wheel speed sensor coupler. 3) Disconnect ABS hydraulic unit / control module connector. 4) Check for proper connection to ABS control module at each sensor terminal. 5) If OK, then turn ignition switch ON and measure voltage between applicable sensor terminal of module connector and body ground.  <i>Is it 0 V?</i>	Go to Step 4.	ABS wheel speed sensor circuit shorted to power.
4	1) Turn ignition switch OFF. 2) Measure resistance between the following points. <ul style="list-style-type: none"> <li>• Both ABS hydraulic unit / control module connector terminals of the corresponding sensor. This check result should be the same as Step 2).</li> <li>• Either terminal of wheel speed sensor coupler and body ground. This check result should be no continuity.</li> </ul> <i>Are both check results OK?</i>	Go to Step 5.	Circuit open or shorted to ground.
5	1) Remove applicable ABS wheel speed sensor. 2) Check sensor for damage or foreign material attached.  <i>Is it in good condition?</i>	Go to Step 6.	Clean, repair or replace.

Step	Action	Yes	No
6	Check front and/or rear sensor ring for the following (remove rear drum as necessary): <ul style="list-style-type: none"> <li>• Rotor serration (teeth) neither missing nor damaged.</li> <li>• No foreign material being attached.</li> <li>• Rotor not being eccentric.</li> <li>• Wheel bearing free from excessive play.</li> </ul> Are they in good condition?	Go to Step 7.	Clean, repair or replace.
7	1) Install ABS wheel speed sensor to knuckle. 2) Tighten sensor bolt to specified torque and check that there is no clearance between sensor and knuckle. Is it OK?	Go to Step 8.	Replace ABS wheel speed sensor.
8	Refer to "Front Wheel Speed Sensor On-Vehicle Inspection:" and/or "Rear Wheel Speed Sensor On-Vehicle Inspection:", check output voltage or waveform. Is specified voltage and/or waveform obtained?	Substitute a known-good ABS hydraulic unit / control module assembly and recheck.	Replace sensor and recheck.

**DTC C1041 / C1045 / C1051 / C1055, DTC C1042 / C1046 / C1052 / C1056 (No. 41 / 45 / 51 / 55, No. 42 / 46 / 52 / 56): Right-Front / Left-Front / Right-Rear / Left-Rear Inlet Solenoid Circuit, Right-Front / Left-Front / Right-Rear / Left-Rear Outlet Solenoid Circuit**

S3RH0A4504016

**Wiring Diagram**



I3RH0A450018

[A]: ABS hydraulic unit / control module assembly connector E15	2. Main fuse box	4. Solenoid valve
1. Battery	3. ABS power control module	5. ABS hydraulic unit / control module assembly

**DTC Detecting Condition**

The ABS control module monitors the output from the valve.

When the output of each valve exceeds the specified value compared with the signal sent from ABS control module, this DTC is set.

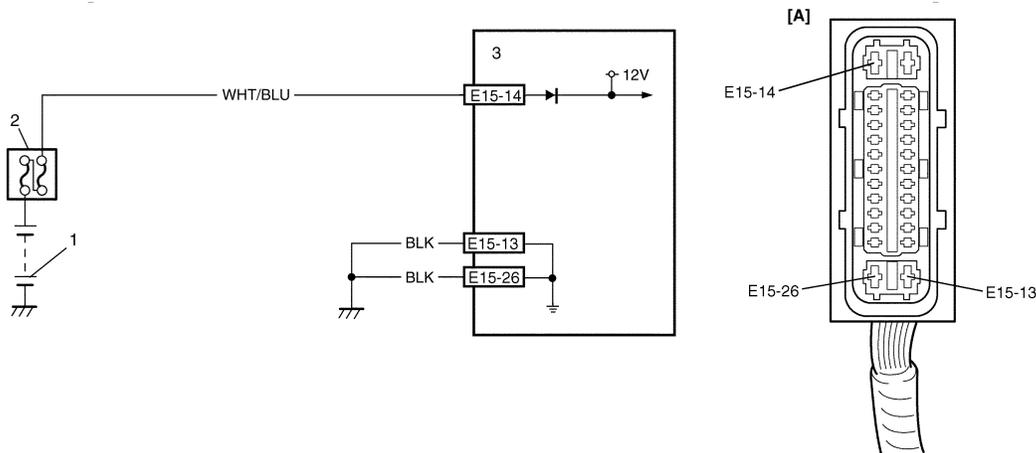
DTC Troubleshooting

Step	Action	Yes	No
1	Was "ABS Check" performed?	Go to Step 2.	Go to "ABS Check: "
2	1) Check solenoid operation referring to item "ABS Hydraulic Unit Operation Check: ".  <i>Is it in good condition?</i>	Check terminal "E15-14" connection. If connection is OK, substitute a known-good ABS hydraulic unit / control module assembly and recheck.	Go to Step 3.
3	1) Turn ignition switch to OFF position. 2) Disconnect ABS hydraulic unit / control module connector. 3) Check for proper connection to ABS hydraulic unit / control module connector at terminal "E15-14". 4) If OK, then measure voltage between terminal "E15-14" of module connector and "E15-26".  <i>Is it 10 – 14 V?</i>	Substitute a known-good ABS hydraulic unit / control module assembly and recheck.	"WHT/BLU" or "BLK" circuit open.

DTC C1057 (No. 57): Power Source Circuit

S3RH0A4504017

Wiring Diagram



I3RH0A450019

[A]: ABS hydraulic unit / control module connector E15	2. Main fuse box
1. Battery	3. ABS hydraulic unit / control module assembly

DTC Detecting Condition

The ABS control module monitors the power source voltage at terminal "E15-14". When the power source voltage becomes extremely high or low while vehicle is running at more than 20 km/h (13 MPH), this DTC will be set. As soon as the power source voltage becomes normal, the ABS warning lamp will be turned off and the ABS control module will return to normal operation, but the set DTC will be remain.

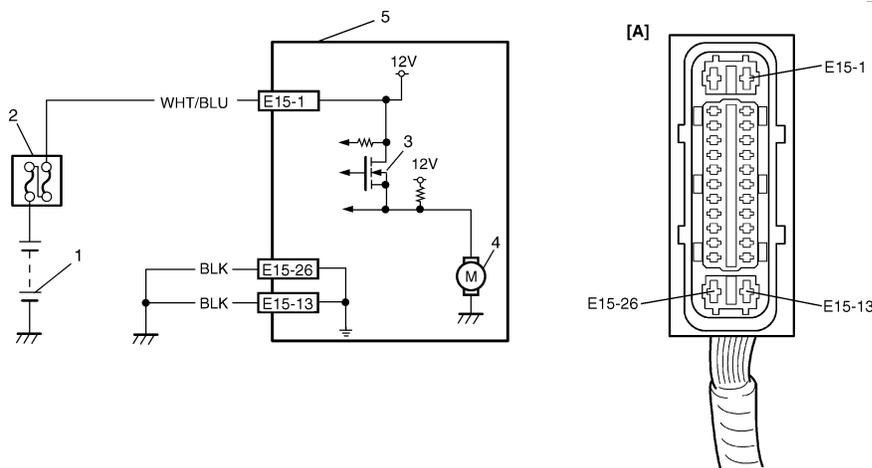
DTC Troubleshooting

Step	Action	Yes	No
1	Was "ABS Check" performed?	Go to Step 2.	Go to "ABS Check: "
2	1) Disconnect ABS hydraulic unit / control module connector with ignition switch turned OFF. 2) Check for proper connection to ABS hydraulic unit / control module connector at terminals "E15-14" and "E15-13". 3) If OK, then turn ignition switch to ON position and measure voltage between terminals "E15-14" and "E15-13".  <i>Is voltage 9 V or more?</i>	Go to Step 5.	Go to Step 3.
3	1) Turn ignition switch to OFF. 2) Check for proper connection to ABS hydraulic unit / control module connector at terminals "E15-13" and "E15-26". 3) If OK then turn ignition switch to ON and measure resistance between each terminal of "E15-13" and "E15-26" and vehicle body ground.  <i>Is resistance less than 2 Ω?</i>	Go to Step 4.	"BLK" wire circuit in open or high resistance.
4	1) Measure voltage between positive battery terminal and vehicle body ground with engine running.  <i>Is voltage 9 V or more?</i>	Imperfect short between "WHT/BLU" wire circuit and body ground.	Check charging system referring to "Generator Test (Undercharged Battery Check): in Section 1J".
5	1) Measure voltage between terminals "E15-14" and "E15-13" with engine running.  <i>Is voltage 18 V or less?</i>	Poor connection of "E15-14" and/or "E15-13" terminals. If the terminals are in good condition, substitute a known-good ABS hydraulic unit / control module and recheck.	Check charging system referring to "Generator Test (Overcharged Battery Check): in Section 1J".

DTC C1061 (No. 61): ABS Pump Motor and/or Motor Relay Circuit

S3RH0A4504018

Wiring Diagram



I3RH0A450020

[A]: ABS hydraulic unit / control module connector E15	2. Main fuse box	4. ABS pump motor
1. Battery	3. Pump motor relay (transistor)	5. ABS hydraulic unit / control module assembly

**DTC Detecting Condition**

The ABS control module monitors the voltage at monitor terminal of pump motor circuit constantly with the ignition switch turned ON. It sets this DTC when the voltage at the monitor terminal does not become high / low according to ON/OFF commands to the motor relay (transistor) of the module (does not follow these commands).

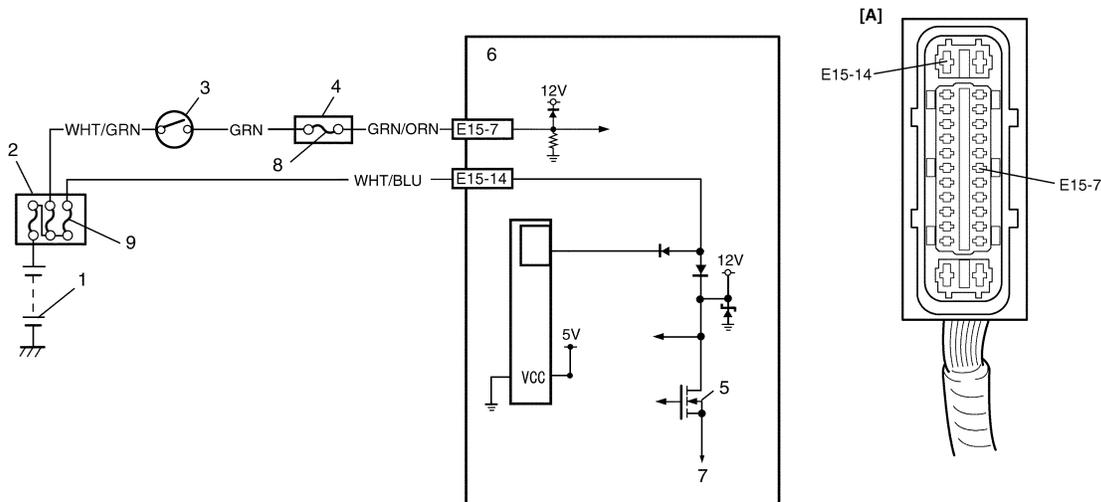
**DTC Troubleshooting**

Step	Action	Yes	No
1	Was "ABS Check" performed?	Go to Step 2.	Go to "ABS Check: "
2	1) Check pump motor referring to "ABS Hydraulic Unit Operation Check: ".  <i>Is it in good condition?</i>	Check terminals "E15-1", "E15-13" and "E15-26" connection. If connections OK, substitute a known-good ABS hydraulic unit / control module assembly and recheck.	Go to Step 3.
3	1) Turn Ignition switch to OFF position. 2) Disconnect ABS hydraulic unit / control module connector. 3) Check for proper connection to ABS hydraulic unit / control module connector at terminal "E15-1". 4) If OK, then measure voltage between terminal "E15-1" of module connector and body ground.  <i>Is it 10 – 14 V?</i>	Go to Step 4.	"WHT/BLU" circuit open.
4	Measure resistance between terminal "E15-13" and "E15-26" of ABS hydraulic unit / control module connector and body ground.  <i>Is resistance less than 1 Ω?</i>	Substitute a known-good ABS hydraulic unit / control module assembly and recheck.	"BLK" circuit in open or high resistance.

**DTC C1063 (No. 63): ABS Fail-Safe Relay Circuit**

S3RH0A4504019

**Wiring Diagram**



I3RH0A450007

[A]: ABS hydraulic unit / control module connector E15	4. Circuit fuse box	8. ABS (10 A) fuse
1. Battery	5. Fail-safe relay (transistor)	9. ABS (60 A) fuse
2. Main fuse box	6. ABS hydraulic unit / control module assembly	
3. Ignition switch	7. To solenoid valve	

**DTC Detecting Condition**

ABS control module monitors the voltage at the terminal of solenoid circuit constantly with ignition switch turned ON. Also, immediately after ignition switch is turned ON, perform initial check as follows. Switch fail-safe relay (transistor) in the order of OFF → ON and check if voltage changes to Low → High. If anything faulty is found in the initial check and when the voltage is low with ignition switch turned ON, this DTC will be set.

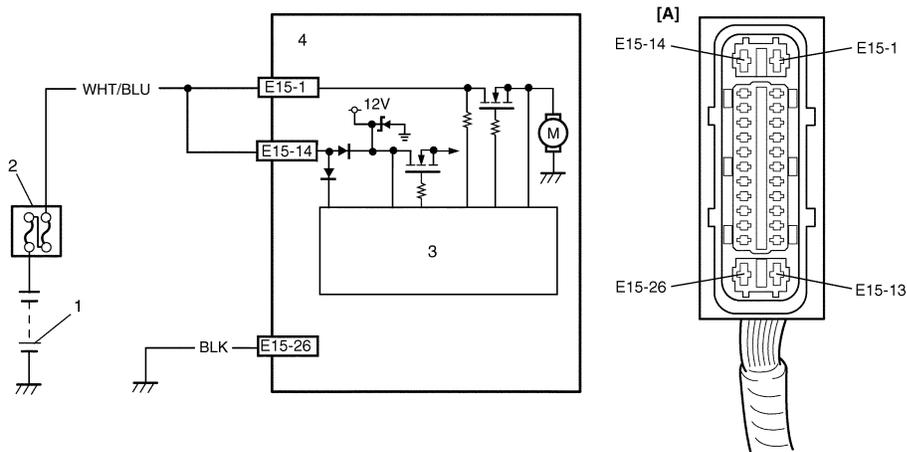
**DTC Troubleshooting**

Step	Action	Yes	No
1	Was "ABS Check" performed?	Go to Step 2.	Go to "ABS Check: "
2	Check battery voltage. <i>Is it about 11 V or higher?</i>	Go to Step 3.	Check charging system referring to "Battery Inspection: in Section 1J" and "Generator Test (Undercharged Battery Check): in Section 1J".
3	Check ABS (60 A) main fuse and its terminal. <i>Is it in good condition?</i>	Go to Step 4.	Replace fuse and check for short circuit to ground.
4	1) Turn ignition switch to OFF position. 2) Disconnect ABS hydraulic unit / control module connector. 3) Check for proper connection to ABS hydraulic unit / control module at terminal "E15-14". 4) If OK, then measure voltage between connector terminal "E15-14" and body ground. <i>Is it 10 – 14 V?</i>	Substitute a known-good ABS hydraulic unit / control module assembly and recheck.	"WHT/BLU" circuit imperfect short to ground.

**DTC C1071 (No. 71): ABS Control Module**

S3RH0A4504020

**Wiring Diagram**



I3RH0A450021

[A]: ABS hydraulic unit / control module connector E15	2. Main fuse box	4. ABS hydraulic unit / control module assembly
1. Battery	3. ABS power control module	

**DTC Detecting Condition**

This DTC will be set when an internal malfunction is detected in the ABS control module.

**DTC Troubleshooting**

Step	Action	Yes	No
1	Was "ABS Check" performed?	Go to Step 2.	Go to "ABS Check: "

Step	Action	Yes	No
2	Clear all DTCs and check DTC. <i>Is it DTC C1071 (No.71)?</i>	Go to Step 3.	Could be a temporary malfunction of the ABS control module.
3	1) Check for proper connection of ABS hydraulic unit / control module connector. 2) If OK, disconnect ABS hydraulic unit / control module connector and check the following. <ul style="list-style-type: none"> <li>• Voltage “E15-1” terminal: 10 – 14 V</li> <li>• Resistance between “E15-26” and body ground: Continuity</li> </ul> <i>Are the check result as specified?</i>	Replace ABS hydraulic unit / control module assembly.	Repair “WHT/BLU” and/or “BLK” circuit and recheck.

## Repair Instructions

### ABS Hydraulic Unit Operation Check

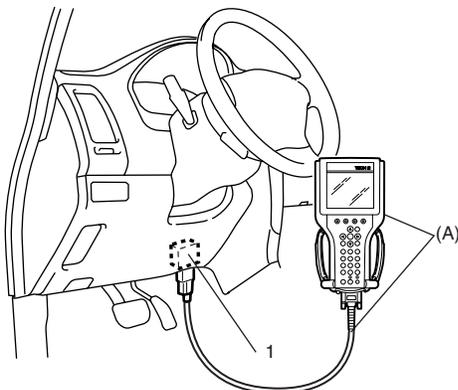
S3RH0A4506001

#### Using SUZUKI Scan Tool

- 1) Check that basic brake system other than ABS is in good condition.
- 2) Check that battery voltage is 11 V or higher.
- 3) Lift up vehicle.
- 4) Set transmission to neutral and release parking brake.
- 5) Turn each wheel gradually by hand to check if brake dragging occurs. If it does, correct.
- 6) Connect SUZUKI scan tool to data link connector (DLC) (1) with ignition switch OFF.

#### Special tool

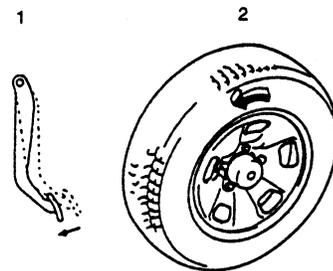
(A): SUZUKI scan tool



I3RH0A450013

- 7) Turn ignition switch to ON position and select menu to “HYDRAULIC CONTROL TEST” under “miscellaneous test” (“MISC. TEST”) mode of SUZUKI scan tool.
- 8) Perform the following checks with help of another person.  
Brake pedal (1) should be depressed and then select testing wheel by SUZUKI scan tool and the wheel (2) should be turned by another person’s hand. At this time, check that:

- Operation sound of solenoid is heard and the wheel turns only about 0.5 sec. (Brake force is depressurized).
- Operation sound of pump motor is heard and pulsation is felt at brake pedal.

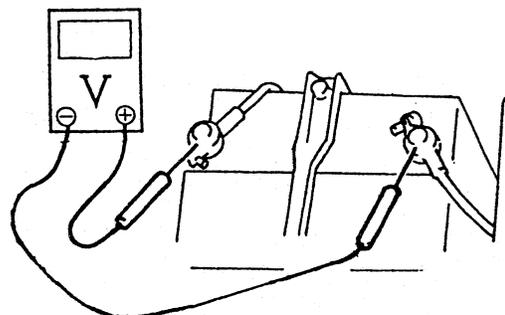


I4RH01450021

- 9) Check for all 4-wheels condition respectively. If a faulty condition is found, replace hydraulic unit / control module assembly.
- 10) After completing the check, turn ignition switch to OFF position and disconnect SUZUKI scan tool from DLC.

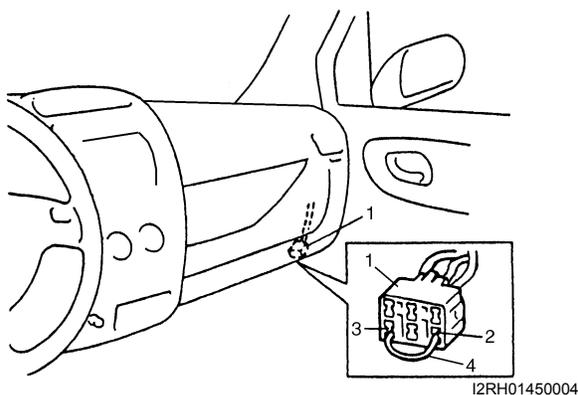
#### Not Using SUZUKI Scan Tool

- 1) Check that basic brake system other than ABS is in good condition.
- 2) Check that battery voltage is 11 V or higher.

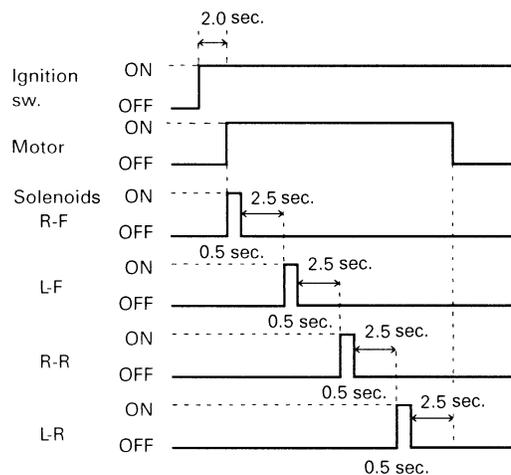
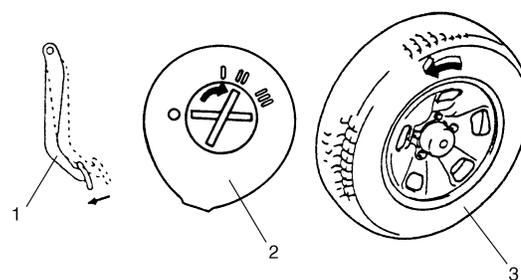


I2RH01450042

- 3) With ABS warning lamp, check that no abnormality is detected in ABS. Refer to "DTC Check: ".
- 4) Lift up vehicle.
- 5) Set transmission to neutral and release parking brake.
- 6) Turn each wheel gradually by hand to check if brake dragging occurs. If it does, correct.
- 7) With diagnosis switch terminal (2) of monitor connector (blue) (1) connected to ground terminal (3) using service wire (4), turn ignition switch ON and check if ABS warning lamp indicates DTC 12 referring to "DTC Table: ".  
If malfunction DTC is indicated, repair it first.



- 8) Turn ignition switch OFF.
- 9) Perform the following checks with help of another person. Brake pedal (1) should be depressed and then ignition switch (2) turned ON by one person and wheel (3) should be turned by another person's hand. At this time, check that:
  - Operation sound of solenoid is heard and wheel turns only about 0.5 sec. (Brake force is depressurized).
  - Operation sound of pump motor is heard and pulsation is felt at brake pedal.



- 10) If all 4-wheels cannot be checked during one ignition cycle (OFF → ON), repeat Steps 8) and 9) till all 4 wheels are checked.  
If a faulty condition is found in Steps 9) and 10), replace hydraulic unit / control module assembly.
- 11) Turn ignition switch OFF and remove service wire from monitor coupler.