GROUP 35B

ANTI-LOCK BRAKING SYSTEM (ABS)

CONTENTS

GENERAL INFORMATION

M1352000101220

The 4ABS ensures directional skid and control during hard braking.
This ABS uses a 4-sensor system that controls all four wheels independently of each other.

- EBD [*1]control can obtain ideal rear wheel brake force.
- The magnetic encoder for wheel speed detection has been installed instead of the rotor as the wheel speed sensor.
- For wiring harness saving and secure data communication, CAN [*2] bus has been adopted as a tool of communication with another ECU.
- Fail-safe function which ensures that safety is maintained.
- Diagnostic function which provides improved serviceability.

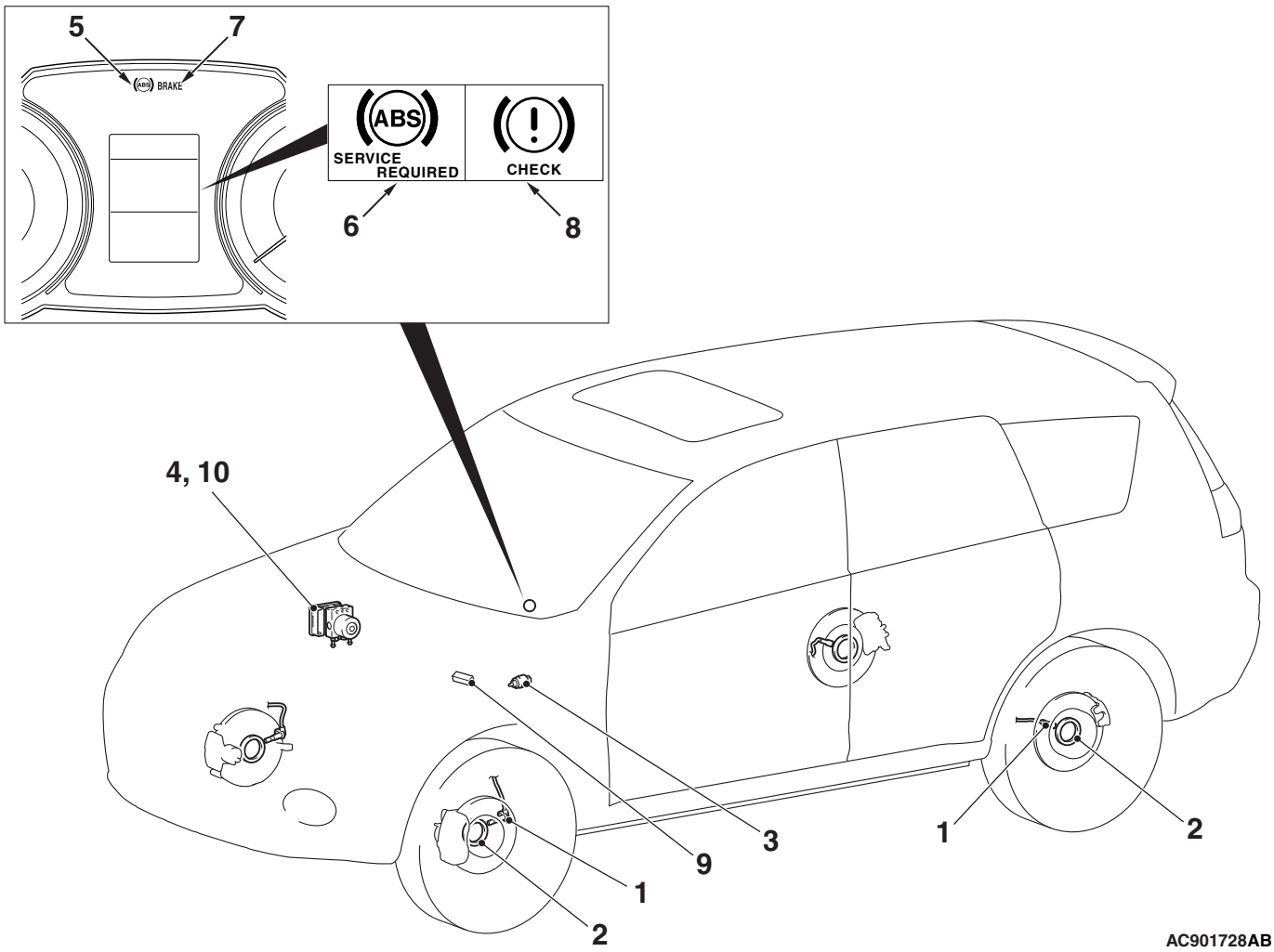
NOTE:

- *[*1]: EBD (Electronic Brake-force Distribution)*
- *[*2]: For more details about CAN (Controller Area Network), refer to GROUP 54C P.54C-2.*

Specifications

Item			Specification
ABS control type			4 sensors
Wheel speed sensor	Magnetic encoder	Front	86 (N pole: 43, S pole: 43)
		Rear	86 (N pole: 43, S pole: 43)
	Type		Semiconductor

CONSTRUCTION DIAGRAM



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MAIN COMPONENTS AND FUNCTIONS

Name of part		Number	Outline of function
Sensor	Wheel speed sensor	1	Outputs the frequency signal in proportion to the rotation speed of each wheel to ABS-ECU.
	Magnetic encoder for wheel speed detection	2	When the magnetic encoder for wheel speed detection (a plate on which north and south pole sides of the magnets are arranged alternately) rotates, the wheel speed sensor outputs frequency pulse signal in proportion to each wheel speed.
	Stoplight switch	3	Outputs the signal indicating whether the brake pedal is depressed or not to ABS-ECU.
Actuator	Hydraulic unit	4	Drives the solenoid valve using the signal from ABS-ECU, and controls the brake fluid pressure for each wheel.
	ABS warning light	5	Informs the driver of the system status by illuminating, flashing, or turning off the warning light according to the signal from ABS-ECU.
	ABS warning display	6	Informs the driver of the system status by illuminating or turning off the warning light according to the signal from ABS-ECU.
	Brake warning light	7	Used as the warning light for the parking brake, brake fluid level, and EBD control. Informs the driver of the system status by illuminating or turning off the warning light according to the signal from ABS-ECU.
	Brake warning display	8	Used as the warning light for the parking brake, brake fluid level, and EBD control. Informs the driver of the system status by illuminating or turning off the warning light according to the signal from ABS-ECU.
Data link connector		9	Outputs the diagnostic trouble code and establishes the communication with scan tool.
ABS-ECU		10	Controls actuators (described above) based on the signals coming from each sensor.
			Controls the self-diagnosis and fail-safe functions.
			Controls the diagnosis function (scan tool compatible).

SERVICE SPECIFICATIONS

M1352000300997

Item	Standard value
Wheel speed sensor current mA	5.9 – 8.4 or 11.8 – 16.8
Wheel speed sensor insulation resistance MΩ	5 or more

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ABS DIAGNOSIS

INTRODUCTION

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The anti-lock brake system (ABS) operates differently from conventional brake systems. These differences include sounds, sensations, and vehicle performance that owners and service technicians who are not familiar with ABS may not be used to. Some operational characteristics may seem to be malfunctions, but they are simply signs of normal ABS operation. When diagnosing the ABS system, keep these operational characteristics in mind. Inform the owner of the kind of performance characteristics to expect from an ABS-equipped vehicle.

ABS DIAGNOSTIC TROUBLE CODE DETECTION CONDITIONS

ABS diagnostic trouble codes (ABS DTCs) are set under different conditions, depending on the malfunction detected. Most ABS DTCs will only be set during vehicle operation. Some ABS DTCs will also be set during the ABS self-check immediately after the engine is started.

When you check if an ABS DTC will be displayed again after the DTC has been erased, you should duplicate the ABS DTC set conditions. Depending on the detection timing and set conditions for the specific ABS DTC, you must either drive the vehicle or turn the engine off and restart it. To set the proper conditions for that DTC again, refer to "ABS DTC SET CONDITIONS" for each ABS DTC that you are trying to reset.

ABS DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1352011101020

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure that you have exhausted most of the possible ways to find an ABS fault.

1. Gather information about the problem from the customer.
2. Verify that the condition described by the customer exists.
3. Check the vehicle for any ABS DTC.
4. If you cannot verify the condition and there are no ABS DTCs, the malfunction is intermittent. Refer to GROUP 00, How to use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-15.
5. If you can verify the condition but there are no ABS DTCs, or the system cannot communicate with the scan tool, check that the basic brake system is operating properly.
   - If the basic brake system is not operating properly, refer to the GROUP 35A, Basic Brake System Diagnosis P.35A-6.
   - If the basic brake system is operating properly, refer to GROUP 35A, Brake Booster Operating Check P.35A-17.
6. If there is an ABS DTC, record the number of the DTC, then erase the DTC from the memory using the scan tool.
7. Recreate the ABS DTC set conditions to see if the same ABS DTC will set again.
   - If the same ABS DTC sets again, perform the diagnostic procedures for the DTC. Refer to P.35B-15.
   - If you cannot get the same ABS DTC to set again, the malfunction is intermittent. Refer to GROUP 00, How to use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-15.

ABS WARNING LIGHT AND BRAKE WARNING LIGHT CHECK

M1352012001004

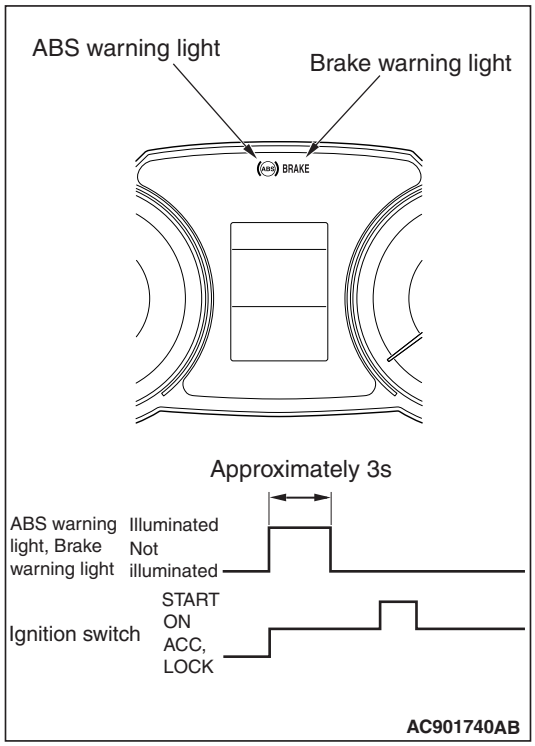
Check that ABS and brake warning lights illuminate as follows.

NOTE: The EBD warning light is also used as the brake warning light.

1. When the ignition switch is turned to the ON position, ABS and brake warning lights illuminate.
2. The ABS and brake warning lights illuminate for three seconds[*1] and then turn OFF[*2].
3. Otherwise, check the diagnostic trouble code.

NOTE:

- *[*1]: The ABS warning light may stay ON until the vehicle speed reaches 6 mph (10 km/h). As far as ABS-ECU stores any diagnostic trouble code related to the wheel speed sensor malfunction or the motor malfunction as past trouble, ABS-ECU continues illuminating the ABS warning light until it verifies that the malfunction for that code is resolved (start-up check).*
- *[*2]: The brake warning light does not turn OFF when the parking brake is applied or the brake fluid level is lowered.*



DIAGNOSIS FUNCTION

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ABS-ECU has the following functions for easier system checks. The following items can be diagnosed using scan tool.

- Diagnostic trouble code set (Refer to P.35B-15).
- Service data output (Refer to P.35B-179).
- Actuator test (Refer to P.35B-179).
- Freeze frame data output (Refer to P.35B-6).

CHECK OF FREEZE FRAME DATA

The freeze frame data can be checked by using the scan tool.

When detecting fault and storing the DTC, the ECU connected to CAN bus line obtains the data before the determination of the DTC and the data when the DTC is determined, and then stores the ECU status of that time. By analysing each data from scan tool, the troubleshooting can be performed more efficiently. The displayed items are as the table below.

Display item list

Item No.	Item name	Content	Unit
1	Odometer	Total driving distance after the DTC is generated	mile
2	Ignition cycle	Number of times the ignition switch is turned "ON" or "LOCK (OFF)" after the past failure transition	Number of counts is displayed.
4	Accumulated minute	Cumulative time for current malfunction of DTC	min
5	Power supply voltage	Voltage of power supply when the DTC is generated	V
13	Stop light switch	Stop light switch condition when the DTC is generated :OFF/ON	–
301	ABS control	ABS control when the DTC is generated :OFF/ON	–
401	FL wheel speed sensor	Wheel speed (FL) when the DTC is generated	mph
402	FR wheel speed sensor	Wheel speed (FR) when the DTC is generated	mph
403	RL wheel speed sensor	Wheel speed (RL) when the DTC is generated	mph
404	RR wheel speed sensor	Wheel speed (RR) when the DTC is generated	mph

FAIL-SAFE FUNCTION

If any malfunction is detected by the self-diagnostic function, ABS-ECU illuminates the ABS warning light and brake warning light*, and it disables ABS and EBD control.

*NOTE: *: The brake warning light and display are used as EBD control warning light.*

Illumination condition of warning light and display in case of failure

DTC	Item	Countermeasures for failure			
		Brake warning light	Brake warning display	ABS warning light	ABS warning display
C100A	Abnormality in FL wheel speed sensor circuit	Extinguished*2	Extinguished*2	Illuminated*3	Illuminated*3
C1015	Abnormality in FR wheel speed sensor circuit				
C1020	Abnormality in RL wheel speed sensor circuit				
C102B	Abnormality in RR wheel speed sensor circuit				
C1011	Abnormality in FL wheel speed sensor signal	Extinguished*2	Extinguished*2	Illuminated*3	Illuminated*3
C101C	Abnormality in FR wheel speed sensor signal				
C1027	Abnormality in RL wheel speed sensor signal				
C1032	Abnormality in RR wheel speed sensor signal				
C1014	Mutual monitoring of FL wheel speed sensor	Extinguished*2	Extinguished*2	Illuminated*3	Illuminated*3
C101F	Mutual monitoring of FR wheel speed sensor				
C102A	Mutual monitoring of RL wheel speed sensor				
C1035	Mutual monitoring of RR wheel speed sensor				
C1041	Abnormality in periodical signal for FL wheel speed sensor	Extinguished*2	Extinguished*2	Illuminated*3	Illuminated*3
C1042	Abnormality in periodical signal for FR wheel speed sensor				
C1043	Abnormality in periodical signal for RL wheel speed sensor				
C1044	Abnormality in periodical signal for RR wheel speed sensor				

DTC	Item		Countermeasures for failure			
			Brake warning light	Brake warning display	ABS warning light	ABS warning display
C1046	FL wheel speed sensor control phase time exceeded		Extinguished*2	Extinguished*2	Illuminated*3	Illuminated*3
C1047	FR wheel speed sensor control phase time exceeded					
C1048	RL wheel speed sensor control phase time exceeded					
C1049	RR wheel speed sensor control phase time exceeded					
C104B	Abnormality in FL wheel inlet valve system		Illuminates	Illuminates	Illuminates	Illuminates
C104F	Abnormality in FR wheel inlet valve system					
C1053	Abnormality in RL wheel inlet valve system					
C1057	Abnormality in RR wheel inlet valve system					
C105F	Abnormality in FL wheel outlet valve system		Illuminates	Illuminates	Illuminates	Illuminates
C1063	Abnormality in FR wheel outlet valve system					
C1067	Abnormality in RL wheel outlet valve system					
C105B	Abnormality in RR wheel outlet valve system					
C2104	Malfunction of valve power supply circuit		Illuminates	Illuminates	Illuminates	Illuminates
C1073	Malfunction of motor drive circuit		Extinguished	Extinguished	Illuminated*3	Illuminated*3
C2116	Abnormality in pump motor power supply voltage		Extinguished	Extinguished	Illuminated*3	Illuminated*3
C1000	Abnormality in stop light switch circuit		Extinguished	Extinguished	Extinguished	Extinguished
C2200	Trouble in ABS-ECU		Illuminates*4	Illuminates*4	Illuminates*4	Illuminates*4
C2100*1	Battery voltage problem (low voltage)	9.7 ± 0.3 V or less	Extinguished	Extinguished	Illuminates	Illuminates
		8.0 ± 0.5 V or less	Illuminates	Illuminates	Illuminates	Illuminates

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DTC	Item		Countermeasures for failure			
			Brake warning light	Brake warning display	ABS warning light	ABS warning display
C2101	Battery voltage problem (high voltage)	18.0 ± 1.0 V or more	Illuminates	Illuminates	Illuminates	Illuminates
C1395	Brake fluid charging incompletion		Extinguished	Extinguished	Flashes (1 Hz)	Illuminates
C2203	VIN not written		Extinguished	Extinguished	Illuminates	Illuminates
C1608	Implausible diagnosis data		Extinguished	Extinguished	Extinguished	Extinguished
U0001	Bus off		Extinguished	Extinguished	Extinguished	Extinguished
U0100	Engine time-out error		Extinguished	Extinguished	Extinguished	Extinguished
U0141	ETACS time-out error		Extinguished	Extinguished	Extinguished	Extinguished
U1415	Variant coding not implemented		Extinguished	Extinguished	Illuminates	Illuminates
U1417	Invalid variant coding value (including wrong assembly)		Extinguished	Extinguished	Illuminates	Illuminates

NOTE:

- *[*1] This DTC is not set within the vehicle speed of 12 mph (20 km/h) or less.*
- *[*2] Turns ON when two or more wheels are faulty.*
- *[*3] Stays ON until the vehicle speed reaches 6 mph (10 km/h) when the ignition switch is turned to ON next time, even if the malfunction is repaired and returns to normal condition.*
- *[*4] May not illuminate depending on the trouble cause.*

Under EBD and ABS control in case of failure

DTC	Item	Countermeasures for failure	
		EBD control	ABS control
C100A	Abnormality in FL wheel speed sensor circuit	Executed*2	Prohibited
C1015	Abnormality in FR wheel speed sensor circuit		
C1020	Abnormality in RL wheel speed sensor circuit		
C102B	Abnormality in RR wheel speed sensor circuit		
C1011	Abnormality in FL wheel speed sensor signal	Executed*2	Prohibited
C101C	Abnormality in FR wheel speed sensor signal		
C1027	Abnormality in RL wheel speed sensor signal		
C1032	Abnormality in RR wheel speed sensor signal		
C1014	Mutual monitoring of FL wheel speed sensor	Executed*2	Prohibited
C101F	Mutual monitoring of FR wheel speed sensor		
C102A	Mutual monitoring of RL wheel speed sensor		
C1035	Mutual monitoring of RR wheel speed sensor		
C1041	Abnormality in periodical signal for FL wheel speed sensor	Executed*2	Prohibited
C1042	Abnormality in periodical signal for FR wheel speed sensor		
C1043	Abnormality in periodical signal for RL wheel speed sensor		
C1044	Abnormality in periodical signal for RR wheel speed sensor		
C1046	FL wheel speed sensor control phase time exceeded	Executed*2	Prohibited
C1047	FR wheel speed sensor control phase time exceeded		
C1048	RL wheel speed sensor control phase time exceeded		
C1049	RR wheel speed sensor control phase time exceeded		

DTC	Item		Countermeasures for failure	
			EBD control	ABS control
C104B	Abnormality in FL wheel inlet valve system		Prohibited	Prohibited
C104F	Abnormality in FR wheel inlet valve system			
C1053	Abnormality in RL wheel inlet valve system			
C1057	Abnormality in RR wheel inlet valve system			
C105F	Abnormality in FL wheel outlet valve system		Prohibited	Prohibited
C1063	Abnormality in FR wheel outlet valve system			
C1067	Abnormality in RL wheel outlet valve system			
C105B	Abnormality in RR wheel outlet valve system			
C2104	Malfunction of valve power supply circuit		Prohibited	Prohibited
C1073	Malfunction of motor drive circuit		Executed	Prohibited
C2116	Abnormality in pump motor power supply voltage		Executed	Prohibited
C1000	Abnormality in stop light switch circuit		Executed	Executed
C2200	Trouble in ABS-ECU		Prohibited*3	Prohibited*3
C2100 *1	Battery voltage problem (low voltage)	9.7 ± 0.3 V or less	Executed	Prohibited
		8.0 ± 0.5 V or less	Prohibited	Prohibited
C2101	Battery voltage problem (high voltage)	18.0 ± 1.0 V or more	Prohibited	Prohibited
C1395	Brake fluid charging incompletion		Executed	Prohibited
C2203	VIN not written		Executed	Executed
C1608	Implausible diagnosis data		Executed	Executed
U0001	Bus off		Executed	Executed
U0100	Engine time-out error		Executed	Executed
U0141	ETACS time-out error		Executed	Executed
U1415	Variant coding not implemented		Executed	Prohibited
U1417	Invalid variant coding value (including wrong assembly)		Executed	Prohibited

NOTE:

- **1 This DTC is not set within the vehicle speed of 12 mph (20 km/h) or less.*
- **2: Prohibited when two or more wheels are faulty.*
- **3: Not prohibited when the brake warning lamp is not illuminated.*

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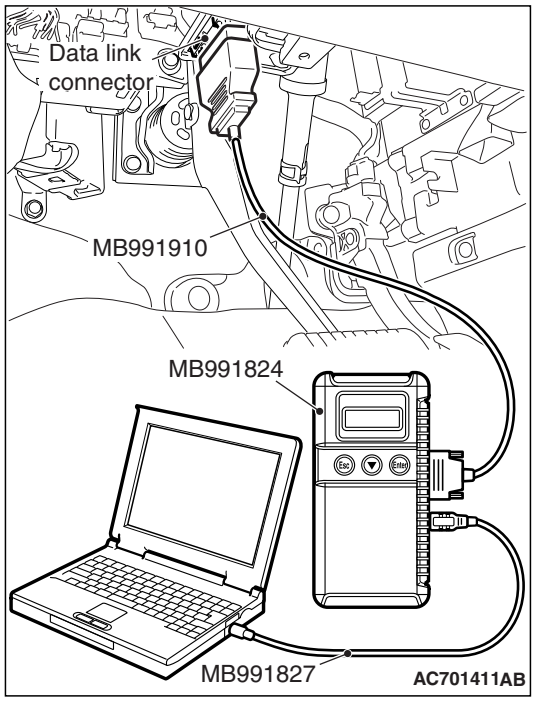
HOW TO CONNECT THE SCAN TOOL (M.U.T.-III)

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A



⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

1. Ensure that the ignition switch is at the "LOCK" (OFF) position.
2. Start up the personal computer.
3. Connect special tool MB991827 to special tool MB991824 and the personal computer.
4. Connect special tool MB991910 to the special tool MB991824.
5. Connect special tool MB991910 to the data link connector.
6. Turn the power switch special tool MB991824 to the "ON" position.

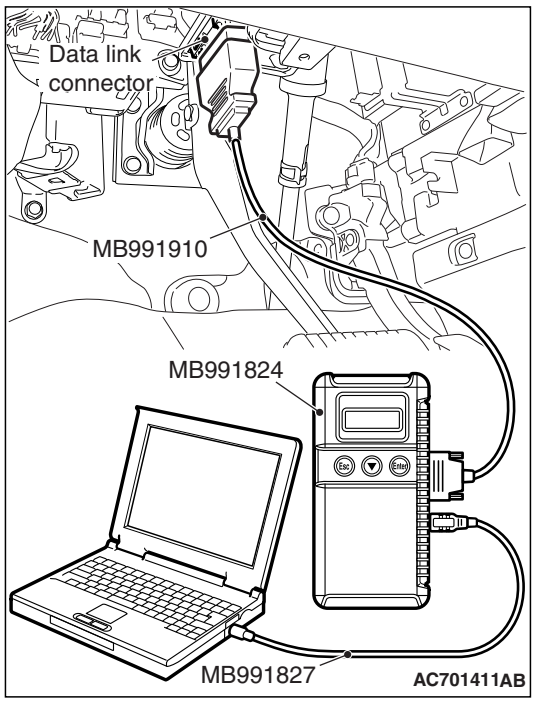
   NOTE: When the special tool MB991824 is energized, the special tool MB991824 indicator light will be illuminated in a green color.
7. Start the M.U.T.-III system on the personal computer.

NOTE: Disconnect the scan tool MB991958 in the reverse order of the connecting sequence, making sure that the ignition switch is at the "LOCK" (OFF) position.

HOW TO READ AND ERASE DIAGNOSTIC TROUBLE CODES

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A



⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

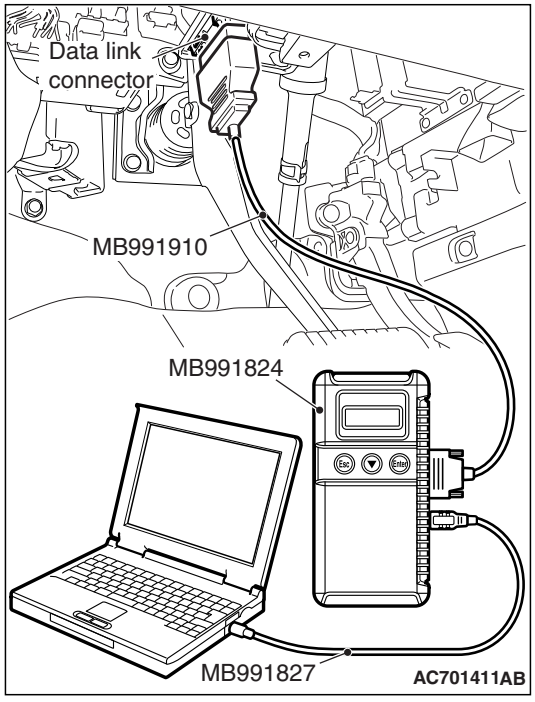
NOTE: If the battery voltage is low, DTCs will not be set. Check the battery if scan tool MB991958 does not display.

1. Connect scan tool MB991958 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Select "System Select."
4. Select "ABS/ASC/ASTC" from the system list, and select the "OK" button.
5. Select "Diagnostic Trouble Code." to read the DTC.
6. If a DTC is set, it is shown.
7. Choose "DTC erase" to erase the DTC.

HOW TO READ DATA LIST

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A



⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

1. Connect scan tool MB991958 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Select "System Select."
4. Select "ABS/ASC/ASTC" from the system list, and select the "OK" button.
5. Select "Data List."

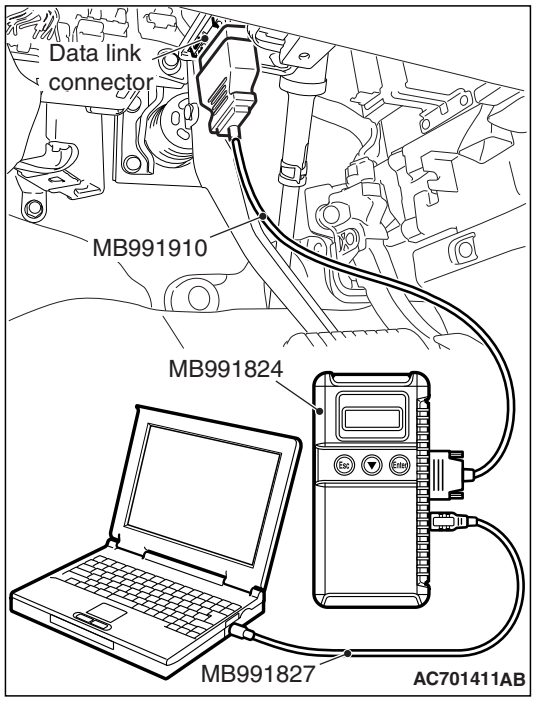
HOW TO PERFORM ACTUATOR TEST

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.



1. Connect scan tool MB991958 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Select "System Select."
4. Select "ABS/ASC/ASTC" from the system list, and select the "OK" button.
5. Choose "Actuator Test" from "ABS" screen.
6. Choose an appropriate item and select the "OK" button.

DIAGNOSTIC TROUBLE CODE CHART

M1352011301701

⚠ CAUTION

During diagnosis, a DTC code associated with other systems may be set when the ignition switch is turned on with connector(s) disconnected. On completion, check all systems for DTCs. If DTC code(s) are set, erase them all.

DTC	Inspection item	Reference page
C100A	Abnormality in FL wheel speed sensor circuit	P.35B-17
C1015	Abnormality in FR wheel speed sensor circuit	P.35B-22
C1020	Abnormality in RL wheel speed sensor circuit	P.35B-28
C102B	Abnormality in RR wheel speed sensor circuit	P.35B-33
C1011	Abnormality in FL wheel speed sensor signal	P.35B-39
C101C	Abnormality in FR wheel speed sensor signal	P.35B-43
C1027	Abnormality in RL wheel speed sensor signal	P.35B-48
C1032	Abnormality in RR wheel speed sensor signal	P.35B-53
C1014	Mutual monitoring of FL wheel speed sensor	P.35B-58
C101F	Mutual monitoring of FR wheel speed sensor	P.35B-61
C102A	Mutual monitoring of RL wheel speed sensor	P.35B-65
C1035	Mutual monitoring of RR wheel speed sensor	P.35B-68
C1041	Abnormality in periodical signal for FL wheel speed sensor	P.35B-72
C1042	Abnormality in periodical signal for FR wheel speed sensor	P.35B-75
C1043	Abnormality in periodical signal for RL wheel speed sensor	P.35B-79
C1044	Abnormality in periodical signal for RR wheel speed sensor	P.35B-82
C1046	FL wheel speed sensor control phase time exceeded	P.35B-86
C1047	FR wheel speed sensor control phase time exceeded	P.35B-90
C1048	RL wheel speed sensor control phase time exceeded	P.35B-95
C1049	RR wheel speed sensor control phase time exceeded	P.35B-99
C104B	Abnormality in FL wheel inlet valve system	P.35B-104
C104F	Abnormality in FR wheel inlet valve system	
C1053	Abnormality in RL wheel inlet valve system	
C1057	Abnormality in RR wheel inlet valve system	
C105F	Abnormality in FL wheel outlet valve system	
C1063	Abnormality in FR wheel outlet valve system	
C1067	Abnormality in RL wheel outlet valve system	
C105B	Abnormality in RR wheel outlet valve system	
C2104	Malfunction of valve power supply circuit	P.35B-106
C1073	Malfunction of motor drive circuit	P.35B-111
C2116	Abnormality in pump motor power supply voltage	P.35B-116

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DTC	Inspection item		Reference page
C1000	Abnormality in stop light switch circuit		P.35B-121
C2200	Abnormality in ABS-ECU		P.35B-124
C2100*	Abnormality in battery voltage (low voltage)	9.7 ± 0.3 V or less	P.35B-125
C2101	Abnormality in battery voltage (high voltage)	18.0 ± 1.0 V or more	P.35B-133
C1395	Brake fluid filling not completed		P.35B-134
C2203	VIN not written		P.35B-135
C1608	Implausible diagnosis data		P.35B-137
U0001	Bus-off		P.35B-143
U0100	Engine time-out error		P.35B-143
U0141	ETACS time-out error		
U1415	Variant coding not implemented		P.35B-145
U1417	Invalid variant coding value (including wrong assembly)		P.35B-146

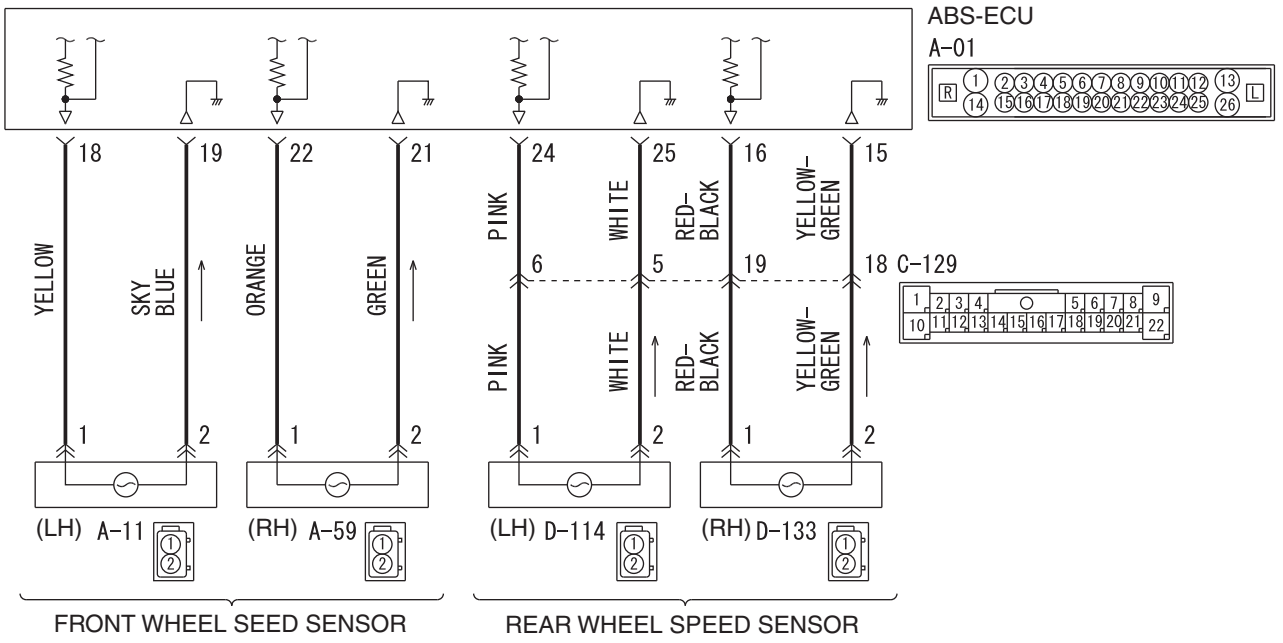
NOTE:

- **: This DTC is not set within the vehicle speed of 12 mph (20 km/h) or less.*

DIAGNOSTIC TROUBLE CODE PROCEDURES

DTC C100A: Abnormality in FL wheel speed sensor circuit

Wheel Speed Sensor Circuit



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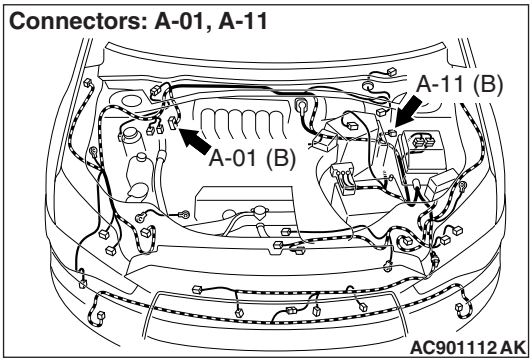

⚠ CAUTION

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

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CIRCUIT OPERATION

- The wheel speed sensor is a type of pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ABS-ECU monitors the voltage fluctuation in each wheel speed sensor circuit. If ABS-ECU detects the open or short circuit in the circuit, it will set a DTC.

PROBABLE CAUSES

Current trouble

- Damaged wiring harness and connectors
- Noise interference
- Malfunction of wheel speed sensor
- ABS-ECU malfunction

Past trouble

- Carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A
- MB991974: ABS check harness

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-10). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is the DTC C100A set?

YES : Go to Step 3.

NO : The procedure is complete.

TSB Revision

STEP 3. Scan tool data list

Check the following data list (Refer to P.35B-179).

- Item No.01: FL wheel speed sensor

Q: Is the check result normal?

YES : Go to Step 12.
NO : Go to Step 4.

STEP 4. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the voltage at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

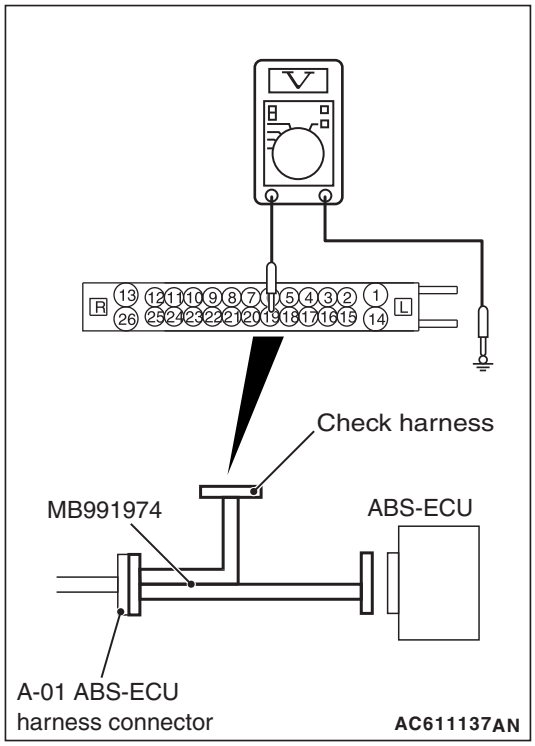
(2) Turn the ignition switch to the ON position.

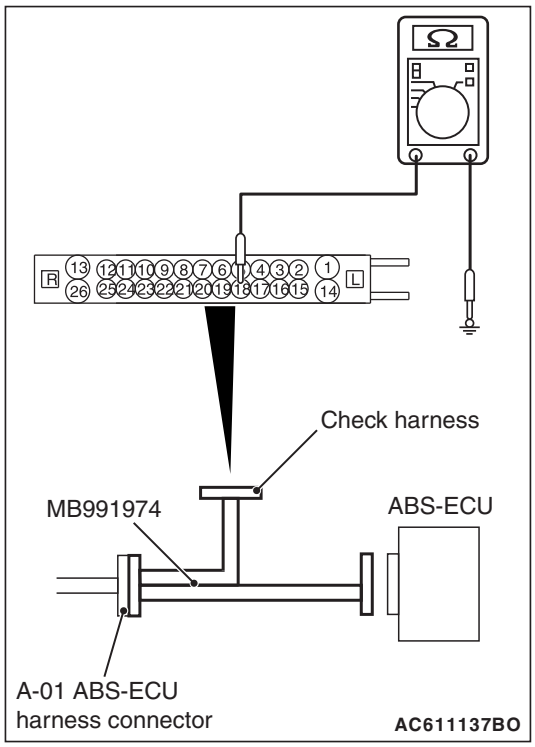
(3) Measure the voltage between the front wheel speed sensor <LH> power supply terminal (signal terminal) No.18 and body ground, and between the ground terminal No.19 and body ground.

OK: 1 volt or less

Q: Is the check result normal?

YES : Go to Step 5.
NO (Not normal at the terminal No.18 or 19) : Go to Step 6.





STEP 5. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Measure the resistance between the front wheel speed sensor <LH> power supply terminal (signal terminal) No.18 and body ground, and between the ground terminal No.19 and body ground.

OK: No continuity

Q: Is the check result normal?

YES : Go to Step 8.

NO (Not normal at the terminal No.18 or 19) : Go to Step 6.

STEP 6. Connector check: A-01 ABS-ECU connector, A-11 front wheel speed sensor <LH> connector

Q: Is the check result normal?

YES : Go to Step 7.

NO : Repair the defective connector. Then go to Step 13.

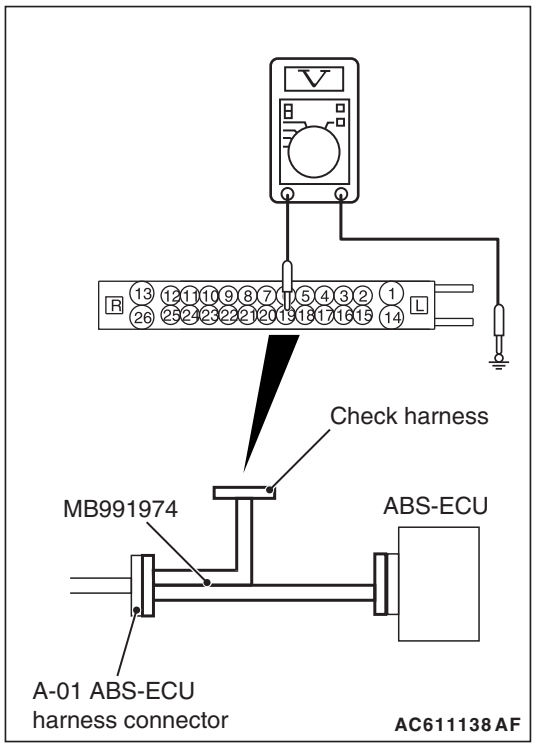
STEP 7. Wiring harness check between A-01 ABS-ECU connector terminal No.18 and A-11 front wheel speed sensor <LH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.19 and A-11 front wheel speed sensor <LH> connector terminal No.2.

- Check for short circuit in front wheel speed sensor <LH> circuit

Q: Is the check result normal?

YES : Replace the wheel speed sensor <FL> (Refer to P.35B-189). Then go to Step 13.

NO : Repair the wiring harness. Then go to Step 13.



STEP 8. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the ABS-ECU-side connector and harness-side connector, and then measure the voltage at the special tool connector side.
(2) Turn the ignition switch to the ON position.
(3) Measure the voltage between the front wheel speed sensor <LH> power supply terminal (signal terminal) No.18 and body ground, and between the ground terminal No.19 and body ground.

OK:
Terminal No.18 and body ground: Approximately system voltage
Terminal No.19 and body ground: 1 volt or less

Q: Is the check result normal?

YES : Go to Step 9.
NO : Go to Step 11.

STEP 9. Wiring harness check between A-01 ABS-ECU connector terminal No.18 and A-11 front wheel speed sensor <LH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.19 and A-11 front wheel speed sensor <LH> connector terminal No.2.

- Check for open circuit in front wheel speed sensor <LH> circuit

Q: Is the check result normal?

YES : Go to Step 10.
NO : Repair the wiring harness. Then go to Step 13.

STEP 10. Check for wheel speed sensor <FL> as a single unit

Refer to P.35B-193.

Q: Is the check result normal?

YES : Go to Step 11.
NO : Replace the wheel speed sensor <FL> (Refer to P.35B-189). Then go to Step 13.

STEP 11. Connector check: A-01 ABS-ECU connector, A-11 front wheel speed sensor <LH> connector

Q: Is the check result normal?

YES : Go to Step 12.
NO : Repair the defective connector. Then go to Step 13.

STEP 12. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C100A set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 13.
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 13. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

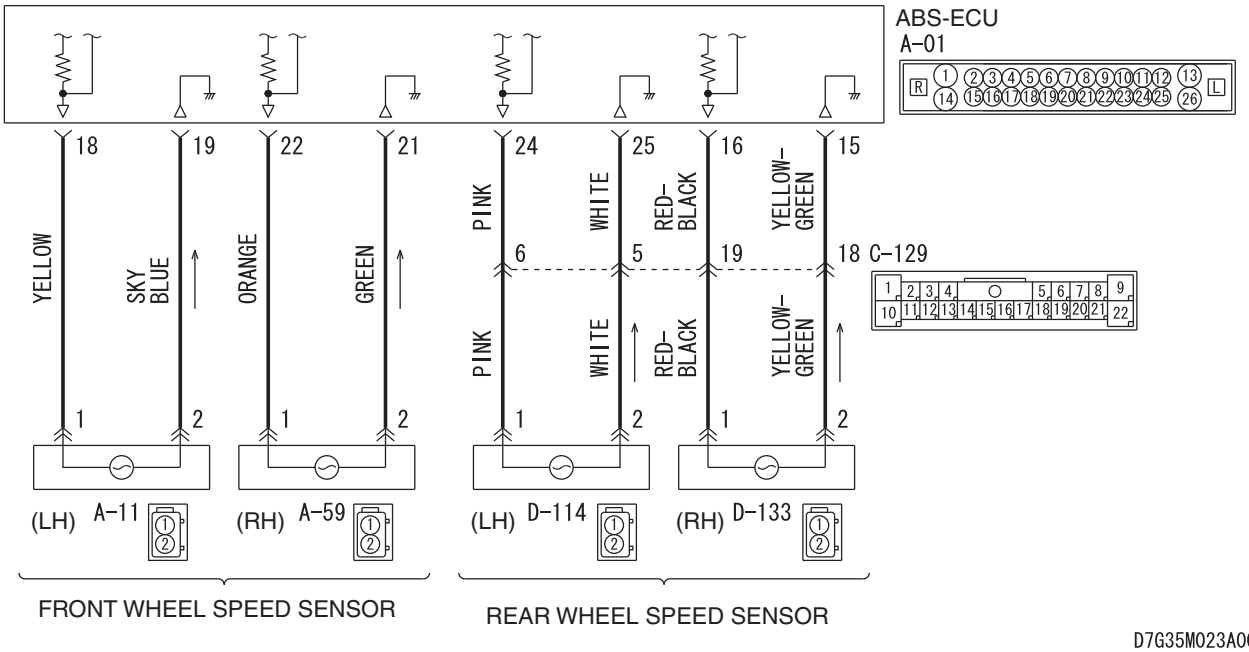
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C100A set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC C1015: Abnormality in FR wheel speed sensor circuit

Wheel Speed Sensor Circuit



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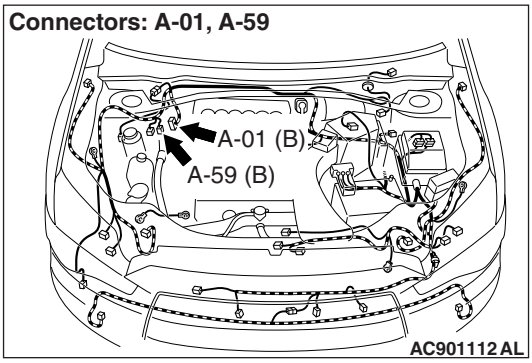

⚠ CAUTION
If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

CIRCUIT OPERATION

- The wheel speed sensor is a type of pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ABS-ECU monitors the voltage fluctuation in each wheel speed sensor circuit. If ABS-ECU detects the open or short circuit in the circuit, it will set a DTC.

PROBABLE CAUSES

Current trouble

- Damaged wiring harness and connectors
- Noise interference
- Malfunction of wheel speed sensor
- ABS-ECU malfunction

Past trouble

- Carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).

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DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A
- MB991974: ABS check harness

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-10). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is the DTC C1015 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Scan tool data list

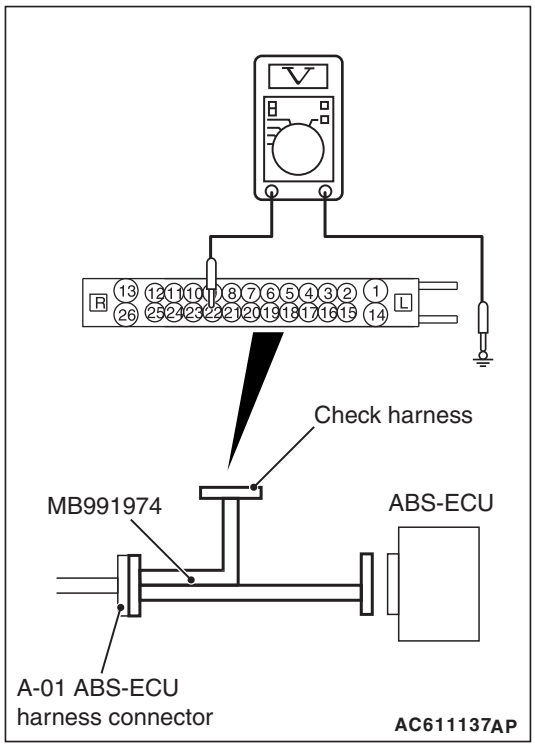
Check the following data list (Refer to P.35B-179).

- Item No.02: FR wheel speed sensor

Q: Is the check result normal?

YES : Go to Step 12.

NO : Go to Step 4.



STEP 4. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the voltage at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Turn the ignition switch to the ON position.

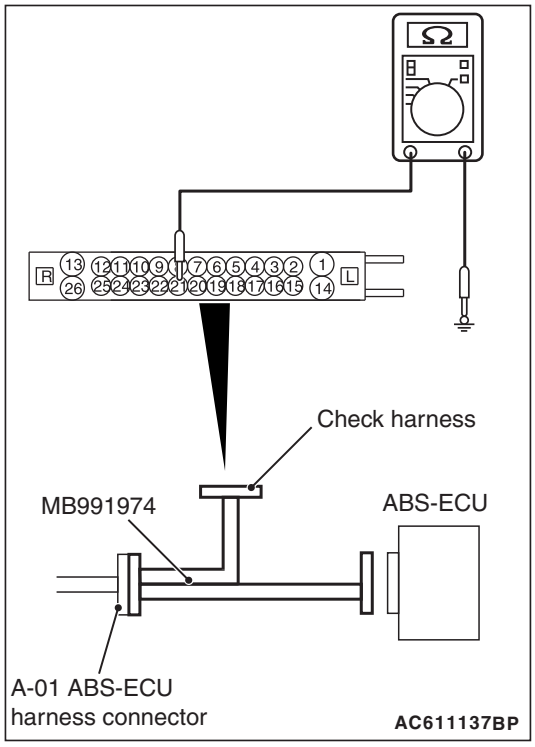
(3) Measure the voltage between the front wheel speed sensor <RH> power supply terminal (signal terminal) No.22 and body ground, and between the ground terminal No.21 and body ground.

OK: 1 volt or less

Q: Is the check result normal?

YES : Go to Step 5.

NO (Not normal at the terminal No.22 or 21) : Go to Step 6.



STEP 5. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Measure the resistance between the front wheel speed sensor <RH> power supply terminal (signal terminal) No.22 and body ground, and between the wheel speed sensor ground terminal No.21 and body ground.

OK: No continuity

Q: Is the check result normal?

YES : Go to Step 8.

NO (Not normal at the terminal No.22 or 21) : Go to Step 6.

STEP 6. Connector check: A-01 ABS-ECU connector, A-59 front wheel speed sensor <RH> connector

Q: Is the check result normal?

YES : Go to Step 7.
NO : Repair the defective connector.

STEP 7. Wiring harness check between A-01 ABS-ECU connector terminal No.22 and A-59 front wheel speed sensor <RH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.21 and A-59 front wheel speed sensor <RH> connector terminal No.2.

- Check for short circuit in front wheel speed sensor <RH> circuit

Q: Is the check result normal?

YES : Replace the wheel speed sensor <FR> (Refer to P.35B-189). Then go to Step 13.
NO : Repair the wiring harness. Then go to Step 13.

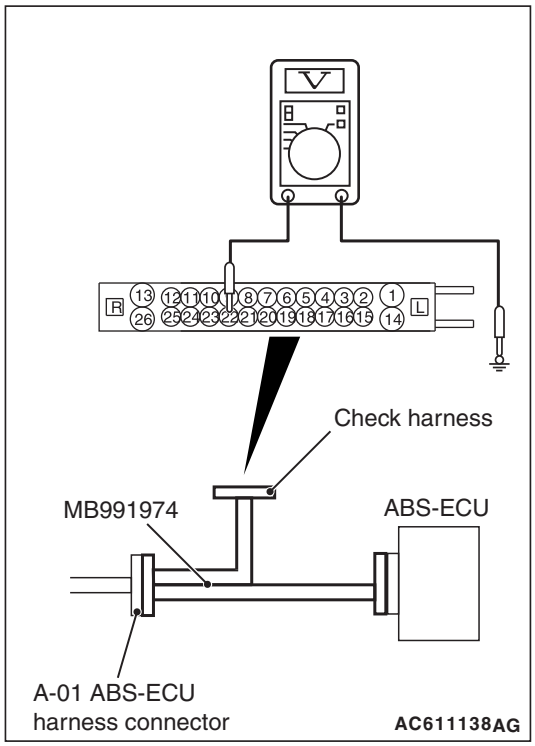
STEP 8. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the ABS-ECU-side connector and harness-side connector, and then measure the voltage at the special tool connector side.
(2) Turn the ignition switch to the ON position.
(3) Measure the voltage between the front wheel speed sensor <RH> power supply terminal (signal terminal) No.22 and body ground, and between the ground terminal No.21 and body ground.

OK:
Terminal No.22 and body ground: Approximately system voltage
Terminal No.21 and body ground: 1 volt or less

Q: Is the check result normal?

YES : Go to Step 9.
NO : Go to Step 11.



STEP 9. Wiring harness check between A-01 ABS-ECU connector terminal No.22 and A-59 front wheel speed sensor <RH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.21 and A-59 front wheel speed sensor <RH> connector terminal No.2.

- Check for open circuit in front wheel speed sensor <RH> circuit

Q: Is the check result normal?

YES : Go to Step 10.
NO : Repair the wiring harness. Then go to Step 13.

STEP 10. Check for wheel speed sensor <FR> as a single unit

Refer to P.35B-193.

Q: Is the check result normal?

YES : Go to Step 11.
NO : Replace the wheel speed sensor <FR> (Refer to P.35B-189). Then go to Step 13.

STEP 11. Connector check: A-01 ABS-ECU connector, A-59 front wheel speed sensor <RH> connector

Q: Is the check result normal?

YES : Go to Step 12.
NO : Repair the defective connector. Then go to Step 13.

STEP 12. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1015 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 13.
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 13. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

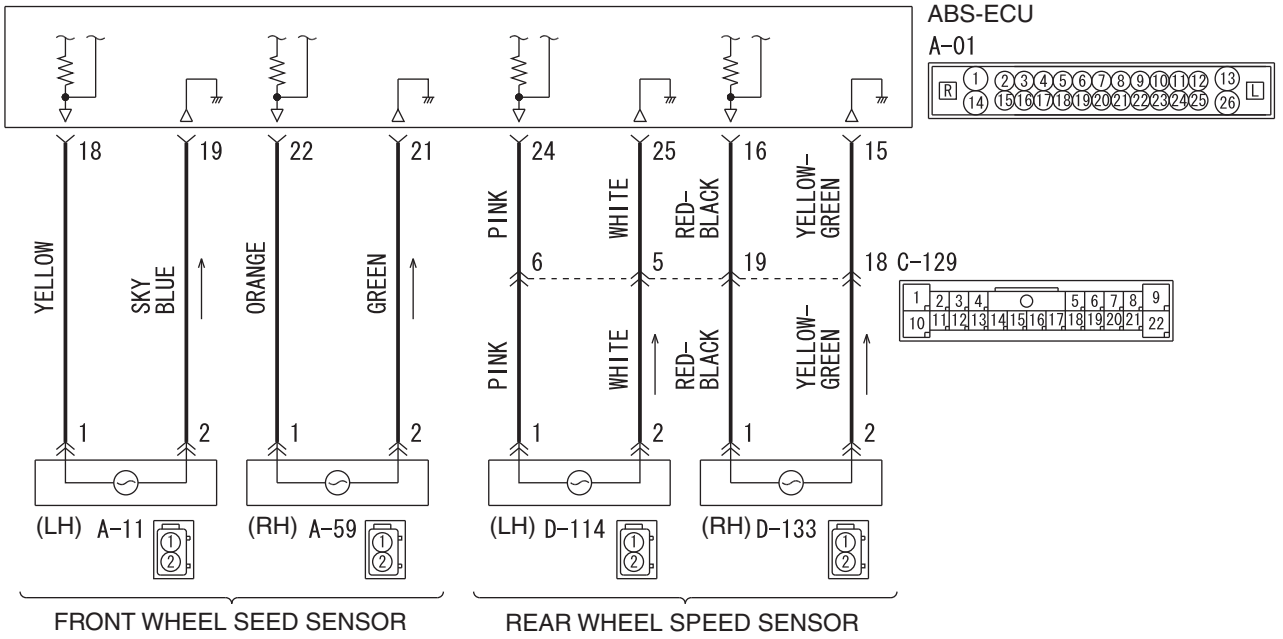
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1015 set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC C1020: Abnormality in RL wheel speed sensor circuit

Wheel Speed Sensor Circuit



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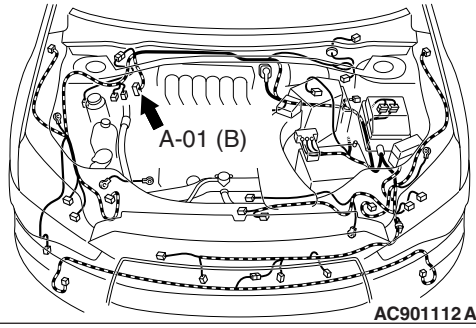
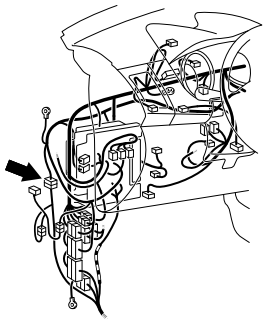
Connector: A-01



AC901112 AE

Connector: C-129



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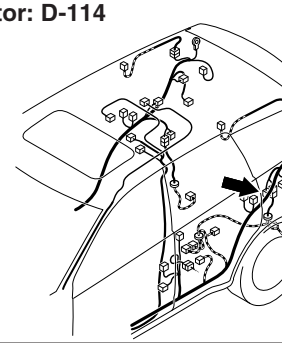
Connector: D-114



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⚠ CAUTION

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

TSB Revision

CIRCUIT OPERATION

- The wheel speed sensor is a type of pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ABS-ECU monitors the voltage fluctuation in each wheel speed sensor circuit. If ABS-ECU detects the open or short circuit in the circuit, it will set a DTC.

PROBABLE CAUSES

Current trouble

- Damaged wiring harness and connectors
- Noise interference
- Malfunction of wheel speed sensor
- ABS-ECU malfunction

Past trouble

- Carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (Refer to GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A
- MB991974: ABS check harness

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-10). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is the DTC C1020 set?

YES : Go to Step 3.

NO : The procedure is complete.

TSB Revision

STEP 3. Scan tool data list

Check the following data list (Refer to P.35B-179).

- Item No.03: RL wheel speed sensor

Q: Is the check result normal?

YES : Go to Step 12.
NO : Go to Step 4.

STEP 4. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the voltage at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

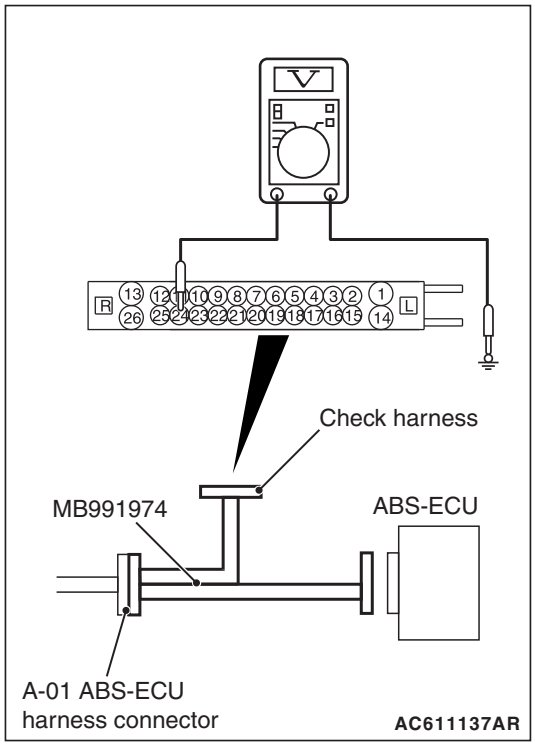
(2) Turn the ignition switch to the ON position.

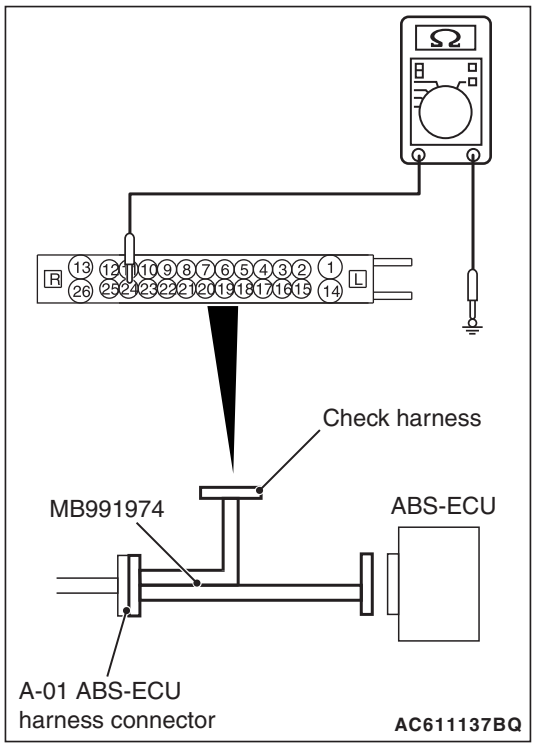
(3) Measure the voltage between the rear wheel speed sensor <LH> power supply terminal (signal terminal) No.24 and body ground, and between the wheel speed sensor ground terminal No.25 and body ground.

OK: 1 volt or less

Q: Is the check result normal?

YES : Go to Step 5.
NO (Not normal at the terminal No.24 or No.25) : Go to Step 6.





STEP 5. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Measure the resistance between the rear wheel speed sensor <LH> power supply terminal (signal terminal) No.24 and body ground, and between the ground terminal No.25 and body ground.

OK: No continuity

Q: Is the check result normal?

YES : Go to Step 8.

NO (Not normal at the terminal No.24 or No.25) : Go to Step 6.

STEP 6. Connector check: A-01 ABS-ECU connector, C-129 intermediate connector, D-114 rear wheel speed sensor <LH> connector

Q: Is the check result normal?

YES : Go to Step 7.

NO : Repair the defective connector. Then go to Step 13.

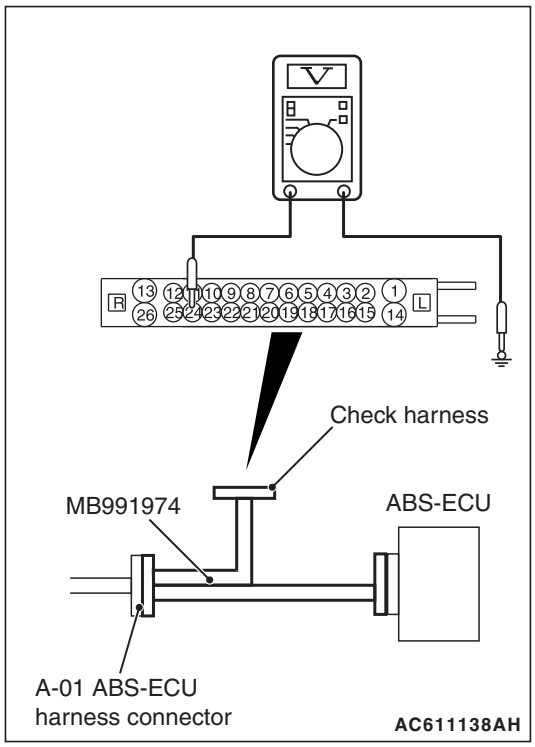
STEP 7. Wiring harness check between A-01 ABS-ECU connector terminal No.24 and D-114 rear wheel speed sensor <LH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.25 and D-114 rear wheel speed sensor <LH> connector terminal No.2.

- Check for short circuit in rear wheel speed sensor <LH> circuit

Q: Is the check result normal?

YES : Replace the wheel speed sensor <RL> (Refer to P.35B-189). Then go to Step 13.

NO : Repair the wiring harness. Then go to Step 13.



STEP 8. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the ABS-ECU-side connector and harness-side connector, and then measure the voltage at the special tool connector side.
(2) Turn the ignition switch to the ON position.
(3) Measure the voltage between the rear wheel speed sensor <LH> power supply terminal (signal terminal) No.24 and body ground, and between the ground terminal No.25 and body ground.

OK:
Terminal No.24 and body ground: Approximately system voltage
Terminal No.25 and body ground: 1 volt or less

Q: Is the check result normal?

YES : Go to Step 9.
NO : Go to Step 11.

STEP 9. Wiring harness check between A-01 ABS-ECU connector terminal No.24 and D-114 rear wheel speed sensor <LH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.25 and D-114 rear wheel speed sensor <LH> connector terminal No.2.

- Check for open circuit in rear wheel speed sensor <LH> circuit

Q: Is the check result normal?

YES : Go to Step 10.
NO : Repair the wiring harness.

STEP 10. Check for wheel speed sensor <RL> as a single unit

Refer to P.35B-193.

Q: Is the check result normal?

YES : Go to Step 11.
NO : Replace the wheel speed sensor <RL> (Refer to P.35B-189). Then go to Step 13.

STEP 11. Connector check: A-01 ABS-ECU connector, C-129 intermediate connector, D-114 rear wheel speed sensor <LH> connector

Q: Is the check result normal?

YES : Go to Step 12.
NO : Repair the defective connector. Then go to Step 13.

TSB Revision

STEP 12. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1020 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 13.
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 13. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

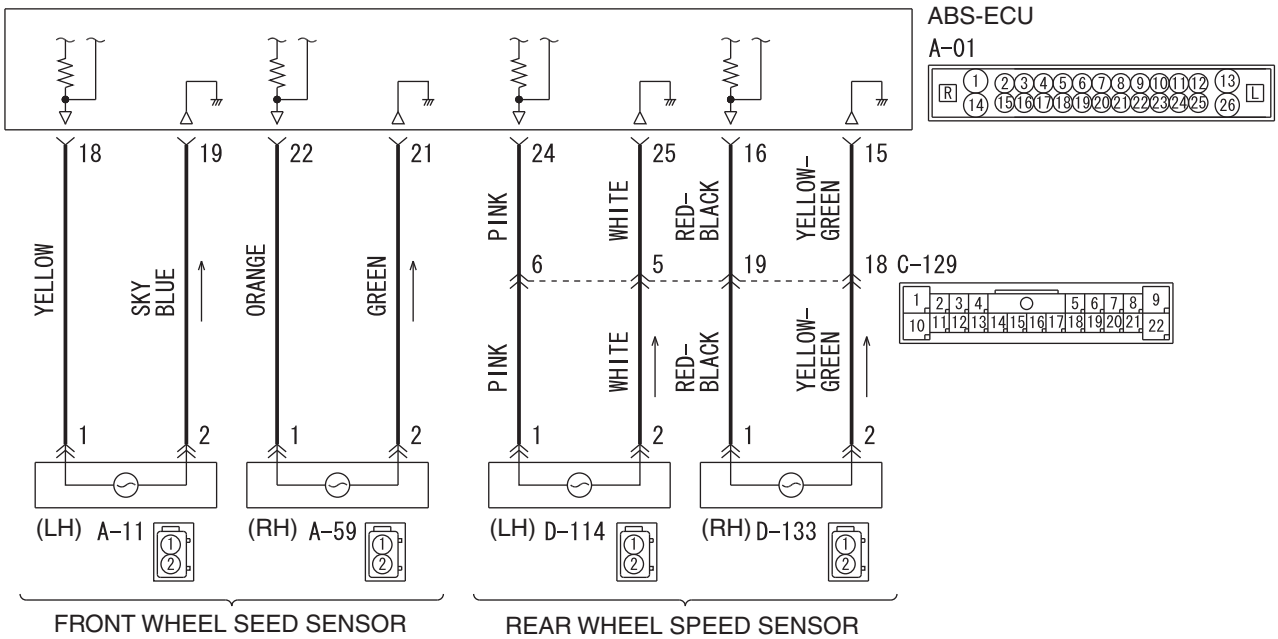
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1020 set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC C102B: Abnormality in RR wheel speed sensor circuit

Wheel Speed Sensor Circuit



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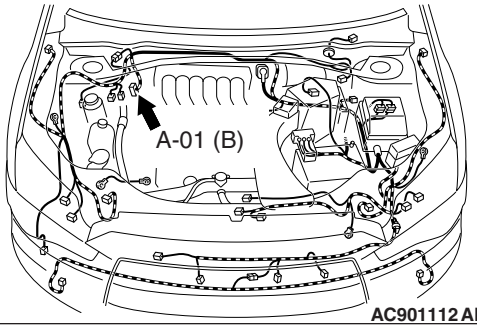
TSB Revision

Connector: A-01



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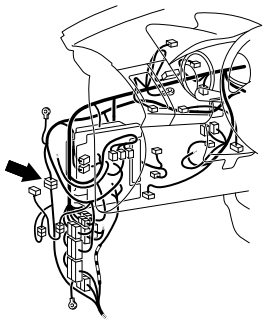
Connector: C-129



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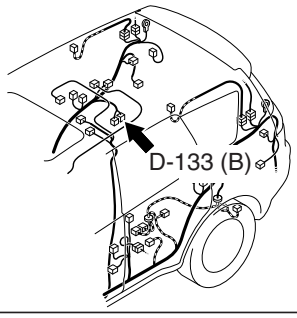
Connector: D-133



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⚠ CAUTION

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

CIRCUIT OPERATION

- The wheel speed sensor is a type of pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ABS-ECU monitors the voltage fluctuation in each wheel speed sensor circuit. If ABS-ECU detects the open or short circuit in the circuit, it will set a DTC.

TSB Revision

PROBABLE CAUSES

Current trouble

- Damaged wiring harness and connectors
- Noise interference
- Malfunction of wheel speed sensor
- ABS-ECU malfunction

Past trouble

- Carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (Refer to GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A
- MB991974: ABS check harness

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-10). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is the DTC C102B set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Scan tool data list

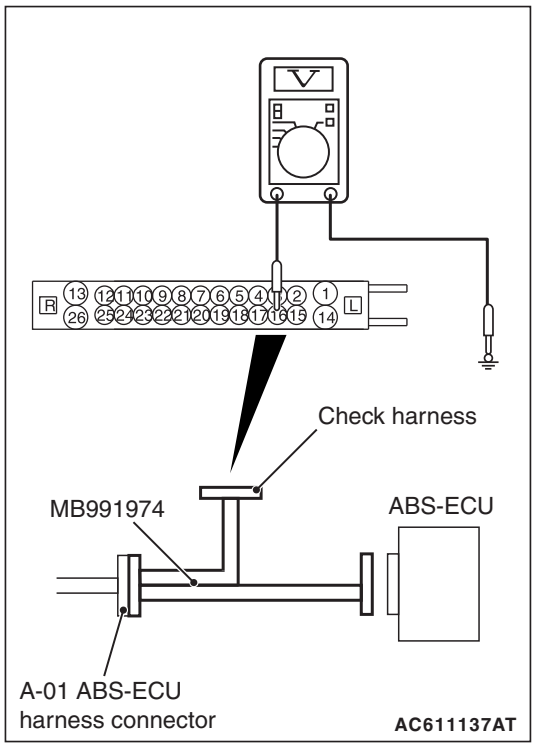
Check the following data list (Refer to P.35B-179).

- Item No.04: RR wheel speed sensor

Q: Is the check result normal?

YES : Go to Step 12.

NO : Go to Step 4.



STEP 4. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the voltage at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Turn the ignition switch to the ON position.

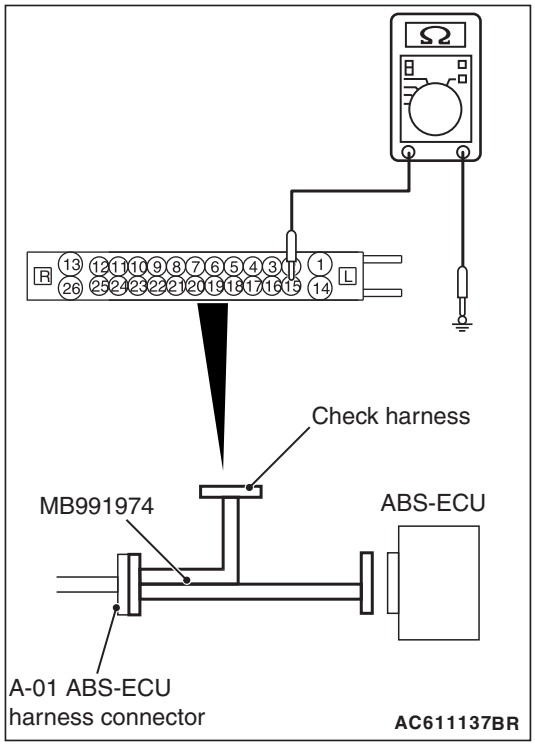
(3) Measure the voltage between the rear wheel speed sensor <RH> power supply terminal (signal terminal) No.16 and body ground, and between the wheel speed sensor ground terminal No.15 and body ground.

OK: 1 volt or less

Q: Is the check result normal?

YES : Go to Step 5.

NO (Not normal at the terminal No.16 or 15) : Go to Step 6.



STEP 5. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Measure the resistance between the rear wheel speed sensor <RH> power supply terminal (signal terminal) No.16 and body ground, and between the ground terminal No.15 and body ground.

OK: No continuity

Q: Is the check result normal?

YES : Go to Step 8.

NO (Not normal at the terminal No.16 or 15) : Go to Step 6.

STEP 6. Connector check: A-01 ABS-ECU connector, C-129 intermediate connector, D-133 rear wheel speed sensor <RH> connector

Q: Is the check result normal?

YES : Go to Step 7.
NO : Repair the defective connector. Then go to Step 13.

STEP 7. Wiring harness check between A-01 ABS-ECU connector terminal No.16 and D-133 rear wheel speed sensor <RH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.15 and D-133 rear wheel speed sensor <RH> connector terminal No.2.

- Check for short circuit in rear wheel speed sensor <RH> circuit

Q: Is the check result normal?

YES : Replace the wheel speed sensor <RR> (Refer to P.35B-189). Then go to Step 13.
NO : Repair the wiring harness. Then go to Step 13.

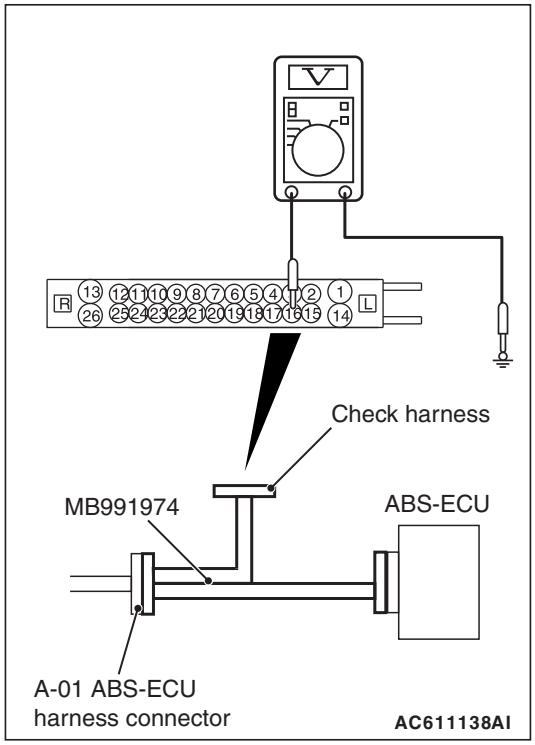
STEP 8. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the ABS-ECU-side connector and harness-side connector, and then measure the voltage at the special tool connector side.
(2) Turn the ignition switch to the ON position.
(3) Measure the voltage between the rear wheel speed sensor <RH> power supply terminal (signal terminal) No.16 and body ground, and between the ground terminal No.15 and body ground.

OK:
Terminal No.16 and body ground: Approximately system voltage
Terminal No.15 and body ground: 1 volt or less

Q: Is the check result normal?

YES : Go to Step 9.
NO : Go to Step 11.



STEP 9. Wiring harness check between A-01 ABS-ECU connector terminal No.16 and D-133 rear wheel speed sensor <RH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.15 and D-133 rear wheel speed sensor <RH> connector terminal No.2.

- Check for open circuit in rear wheel speed sensor <RH> circuit

Q: Is the check result normal?

YES : Go to Step 10.
NO : Repair the wiring harness.

STEP 10. Check for wheel speed sensor <RR> as a single unit

Refer to P.35B-193.

Q: Is the check result normal?

YES : Go to Step 11.
NO : Replace the wheel speed sensor <RR> (Refer to P.35B-189). Then go to Step 13.

STEP 11. Connector check: A-01 ABS-ECU connector, C-129 intermediate connector, D-133 rear wheel speed sensor <RH> connector

Q: Is the check result normal?

YES : Go to Step 12.
NO : Repair the defective connector. Then go to Step 13.

STEP 12. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C102B set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 13.
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 13. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

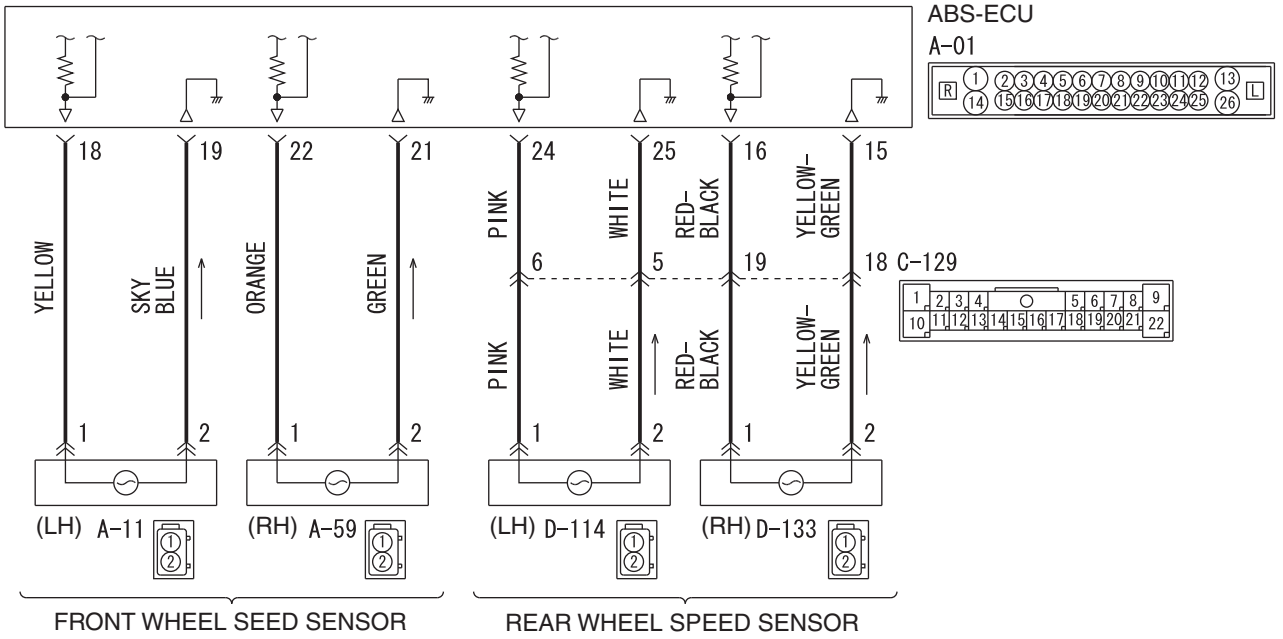
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C102B set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC C1011: Abnormality in FL wheel speed sensor signal

Wheel Speed Sensor Circuit



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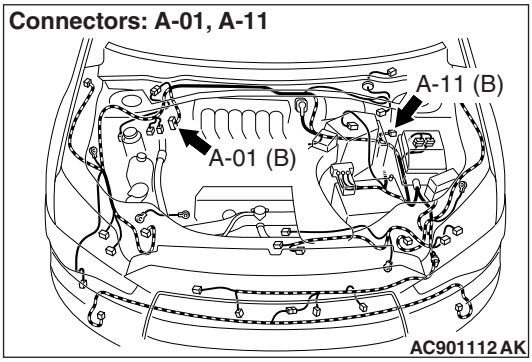

⚠ CAUTION
If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

CIRCUIT OPERATION

- The wheel speed sensor is a type of pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

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DTC SET CONDITIONS

ABS-ECU monitors the signals from each wheel speed sensor while the vehicle is being driven. If any fault below is found in these sensor signals, ABS-ECU will set the relevant DTC.

- Irregular change in the wheel speed sensor signal
- Wheel speed sensor signal continuously indicates high value.

PROBABLE CAUSES

Current trouble

- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Adhesion of foreign materials on the wheel speed detection encoder
- Wheel bearing malfunction
- Malfunction of wheel speed sensor
- Damaged wiring harness and connectors
- External noise interference
- Improper installation of the wheel speed sensor
- Deformation of the wheel speed detection encoder
- ABS-ECU malfunction
- Disturbance of magnetization pattern for magnetic encoder for wheel speed detection
- The number of poles on the magnetic encoder for wheel speed detection (the number of N-pole and S-pole) is changed.

Past trouble

- When the DTC No.C100A is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (Refer to GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).
- When the DTC No.C100A is not set, the following conditions may be present:
  - Some wheels slip
  - Unstable vehicle attitude
  - External noise interference
  - Vehicle ran with the parking brake applied.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1011 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTC C100A is also set.

Q: Is DTC C100A also set?

YES : Perform the diagnosis for the DTC C100A (Refer to P.35B-17).

NO : Go to Step 4.

STEP 4. Connector check: A-01 ABS-ECU connector, A-11 front wheel speed sensor <LH> connector

Q: Is the check result normal?

YES : Go to Step 5.

NO : Repair the defective connector. Then go to Step 12.

STEP 5. Wiring harness check between A-01 ABS-ECU connector terminal No.18 and A-11 front wheel speed sensor <LH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.19 and A-11 front wheel speed sensor <LH> connector terminal No.2.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Repair the wiring harness. Then go to Step 12.

STEP 6. Check wheel speed sensor <FL> installation

Check how the wheel speed sensor <FL> is installed (Disconnection of wheel speed sensor <FL>, loose mounting bolt, etc.).

Q: Is the check result normal?

YES : Go to Step 7.

NO : Reinstall the wheel speed sensor <FL> (Refer to P.35B-189). Then go to Step 7.

STEP 7. Check for wheel speed sensor <FL> output current

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 8.

NO : Replace the wheel speed sensor <FL> (Refer to P.35B-189). Then go to Step 11.

STEP 8. Check for wheel bearing looseness

NOTE:

- *Loose wheel bearing may increase the gap between the wheel speed sensor <FL> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <FL> for looseness (Refer to GROUP 26 – Wheel Bearing Play Check P.26-11).*

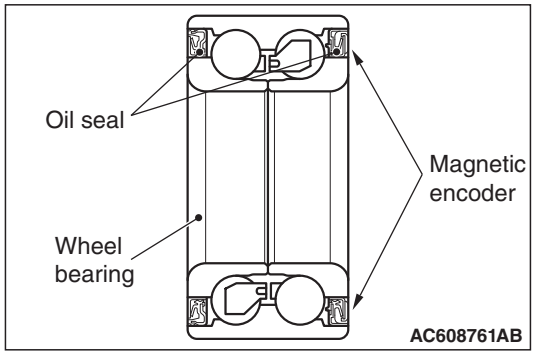
Q: Is the check result normal?

YES : Go to Step 9.

NO : Replace the wheel bearing <FL> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 12.

STEP 9. Check wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.



Q: Is the check result normal?

YES : Go to Step 10.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 12.

NO (Deformation) : Replace the wheel bearing <FL> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 12.

STEP 10. Check whether the DTC is reset.

(1) Erase the DTC.

(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1011 set?

YES : Replace the wheel speed sensor <FL> (Refer to P.35B-189). Then go to Step 11.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 11. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1011 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 12.
NO : The procedure is complete.

STEP 12. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

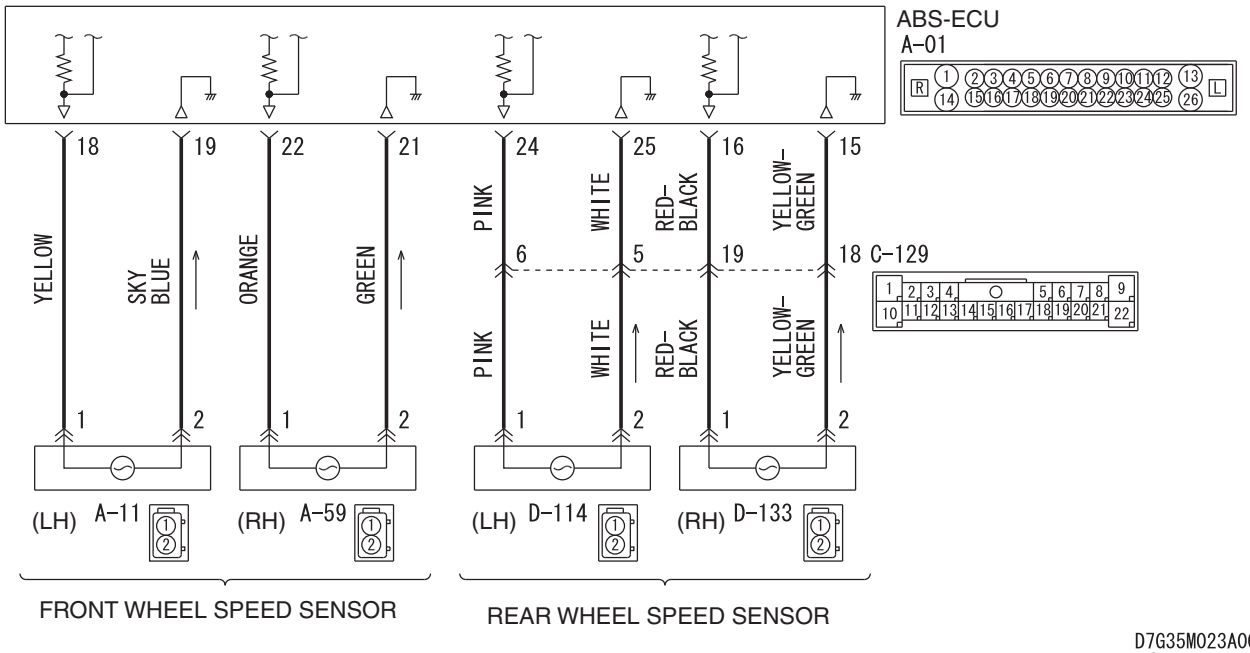
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1011 set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC C101C Abnormality in FR wheel speed sensor signal

Wheel Speed Sensor Circuit



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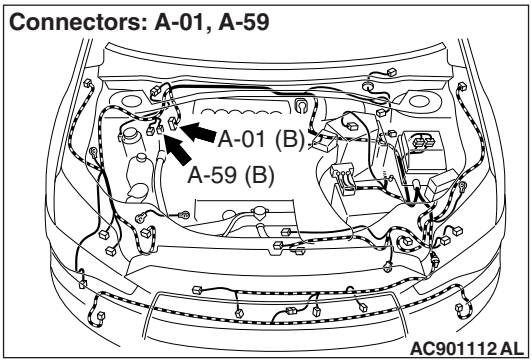


⚠ CAUTION
If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

CIRCUIT OPERATION

- The wheel speed sensor is a type of pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ABS-ECU monitors the signals from each wheel speed sensor while the vehicle is being driven. If any fault below is found in these sensor signals, ABS-ECU will set the relevant DTC.

- Irregular change in the wheel speed sensor signal
- Wheel speed sensor signal continuously indicates high value.

PROBABLE CAUSES

Current trouble

- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Adhesion of foreign materials on the wheel speed detection encoder
- Wheel bearing malfunction
- Malfunction of wheel speed sensor
- Damaged wiring harness and connectors
- External noise interference
- Improper installation of the wheel speed sensor
- Deformation of the wheel speed detection encoder
- ABS-ECU malfunction

TSB Revision

- Disturbance of magnetization pattern for wheel speed detection encoder
- The number of poles on the magnetic encoder for wheel speed detection (the number of N-pole and S-pole) is changed.

Past trouble

- When the DTC C1015 is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (Refer to GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).
- When DTC C1015 is not set, the following conditions may be present:
  - Some wheels slip
  - Unstable vehicle attitude
  - External noise interference
  - Vehicle ran with the parking brake applied.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C101C set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTC C1015 is also set.

Q: Is DTC C1015 also set?

YES : Perform the diagnosis for the DTC C1015 (Refer to P.35B-22).

NO : Go to Step 4.

STEP 4. Connector check: A-01 ABS-ECU connector, A-59 front wheel speed sensor <RH> connector

Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair the defective connector. Then go to Step 12.

STEP 5. Wiring harness check between A-01 ABS-ECU connector terminal No.22 and A-59 front wheel speed sensor <RH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.21 and A-59 front wheel speed sensor <RH> connector terminal No.2.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Repair the wiring harness. Then go to Step 12.

STEP 6. Check wheel speed sensor <FR> installation

Check how the wheel speed sensor <FR> is installed (Disconnection of wheel speed sensor <FR>, loose mounting bolt, etc.).

Q: Is the check result normal?

YES : Go to Step 7.
NO : Reinstall the wheel speed sensor <FR> correctly (Refer to P.35B-189). Then go to Step 7.

STEP 7. Check for wheel speed sensor <FR> output current

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 8.
NO : Replace the wheel speed sensor <FR> (Refer to P.35B-189). Then go to Step 11.

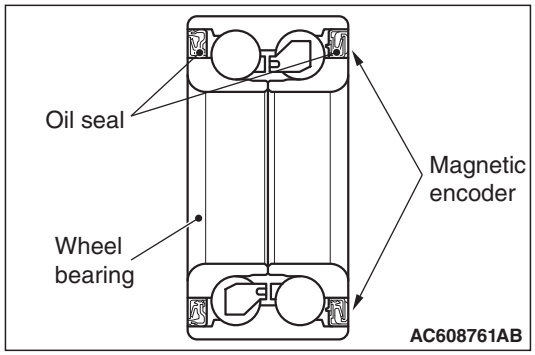
STEP 8. Check for wheel bearing looseness

NOTE:

- *Loose wheel bearing may increase the gap between the wheel speed sensor <FR> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <FR> for looseness (Refer to GROUP 26 – Wheel Bearing Play Check P.26-11).*

Q: Is the check result normal?

YES : Go to Step 9.
NO : Replace the wheel bearing <FR> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 12.



STEP 9. Check wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.

Q: Is the check result normal?

YES : Go to Step 10.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 12.

NO (Deformation) : Replace the wheel bearing <FR> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 12.

STEP 10. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C101C set?

YES : Replace the wheel speed sensor <FR> (Refer to P.35B-189). Then go to Step 11.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 11. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C101C set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 12.

NO : The procedure is complete.

STEP 12. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

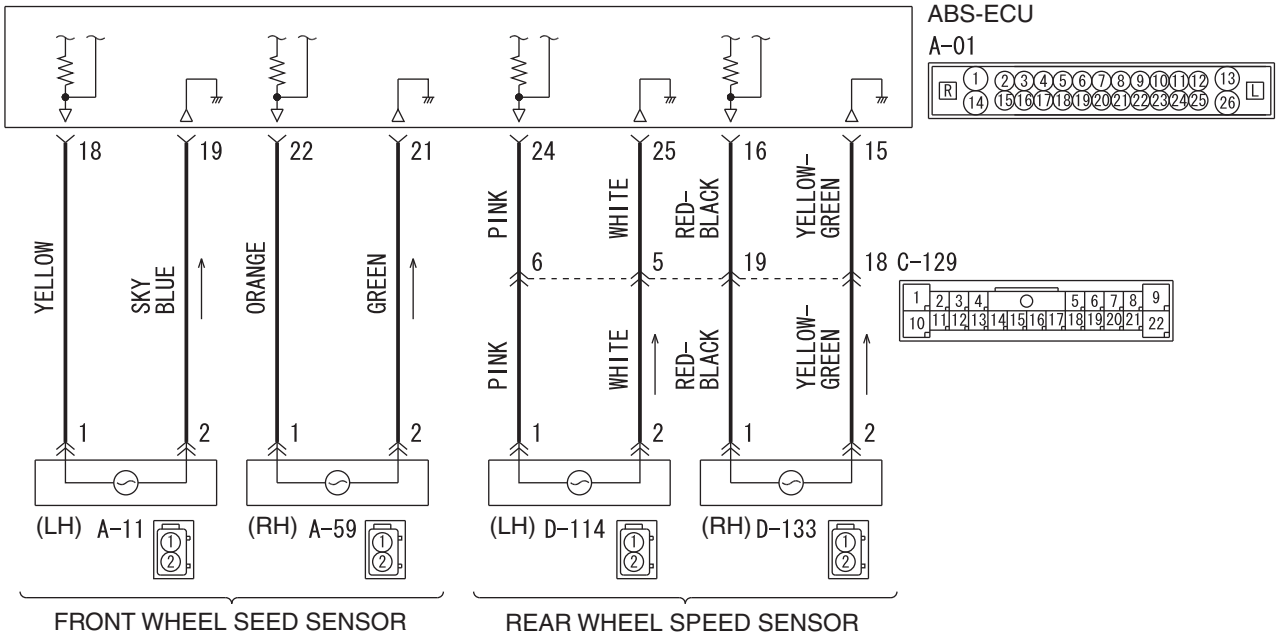
Q: Is DTC C101C set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC C1027: Abnormality in RL wheel speed sensor signal

Wheel Speed Sensor Circuit



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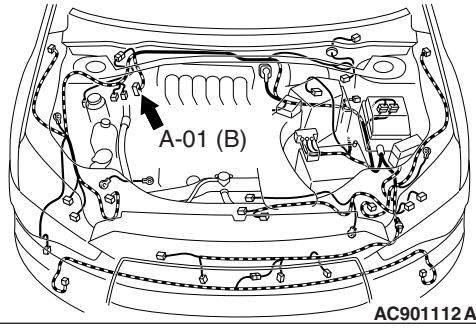
Connector: A-01



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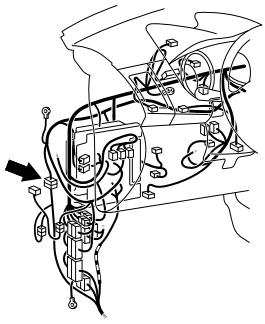
Connector: C-129



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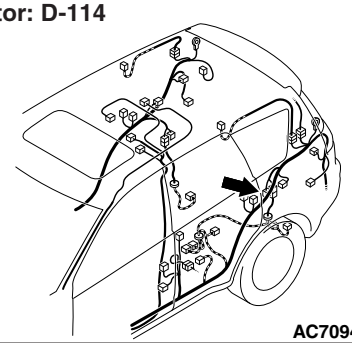
Connector: D-114



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⚠ CAUTION

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

TSB Revision

CIRCUIT OPERATION

- The wheel speed sensor is a type of pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ABS-ECU monitors the signals from each wheel speed sensor while the vehicle is being driven. If any fault below is found in these sensor signals, ABS-ECU will set the relevant DTC.

- Irregular change in the wheel speed sensor signal
- Wheel speed sensor signal continuously indicates higher value than the values of other wheel speed sensors.

PROBABLE CAUSES

Current trouble

- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Adhesion of foreign materials on the magnetic encoder for wheel speed detection
- Wheel bearing malfunction
- Malfunction of wheel speed sensor
- Damaged wiring harness and connectors
- External noise interference
- Improper installation of the wheel speed sensor
- Deformation of the magnetic encoder for wheel speed detection
- ABS-ECU malfunction
- Disturbance of magnetization pattern for magnetic encoder for wheel speed detection
- The number of poles on the magnetic encoder for wheel speed detection (the number of N-pole and S-pole) is changed.

Past trouble

- When the DTC C1020 is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (Refer to GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).
- When the DTC C1020 is not set, the following conditions may be present:
  - Right or/and left wheels are rotated.
  - Unstable vehicle attitude
  - External noise interference
  - Vehicle ran with the parking brake applied.

TSB Revision

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1027 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTC C1020 is also set.

Q: Is DTC C1020 also set?

YES : Perform the diagnosis for the DTC C1020 (Refer to P.35B-28).

NO : Go to Step 4.

STEP 4. Connector check: A-01 ABS-ECU connector, C-129 intermediate connector, D-114 rear wheel speed sensor <LH> connector

Q: Is the check result normal?

YES : Go to Step 5.

NO : Repair the defective connector. Then go to Step 12.

STEP 5. Wiring harness check between A-01 ABS-ECU connector terminal No.24 and D-114 rear wheel speed sensor <LH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.25 and D-114 rear wheel speed sensor <LH> connector terminal No.2.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Repair the wiring harness. Then go to Step 12.

STEP 6. Check wheel speed sensor <RL> installation

Check how the wheel speed sensor <RL> is installed (Disconnection of wheel speed sensor <RL>, loose mounting bolt, etc.).

Q: Is the check result normal?

YES : Go to Step 7.

NO : Reinstall the wheel speed sensor <RL> correctly (Refer to P.35B-189). Then go to Step 7.

STEP 7. Check for wheel speed sensor <RL> output current

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 8.

NO : Replace the wheel speed sensor <RL> (Refer to P.35B-189). Then go to Step 11.

STEP 8. Check for wheel bearing looseness

NOTE:

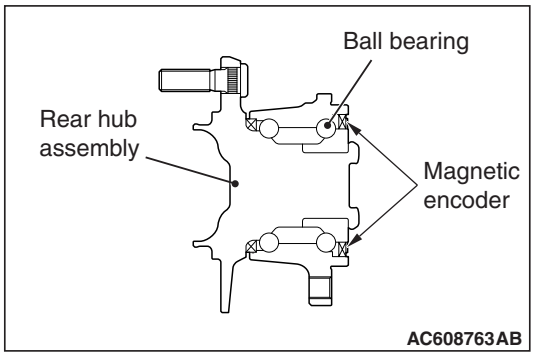
- *Loose wheel bearing may increase the gap between the wheel speed sensor <RL>and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <RL> for looseness (Refer to GROUP 27A – On-vehicle Service P.27A-6).*

Q: Is the check result normal?

YES : Go to Step 9.

NO : Replace the rear wheel hub assembly <RL> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 12.

STEP 9. Check wheel speed detection encoder



Check the encoder for adhesion of foreign materials or deformation.

Q: Is the check result normal?

YES : Go to Step 10.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 12.

NO (Deformation) : Replace the rear wheel hub assembly <RL> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 12.

STEP 10. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1027 set?

YES : Replace the wheel speed sensor <RL> (Refer to P.35B-189). Then go to Step 11.
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 11. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1027 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 12.
NO : The procedure is complete.

STEP 12. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

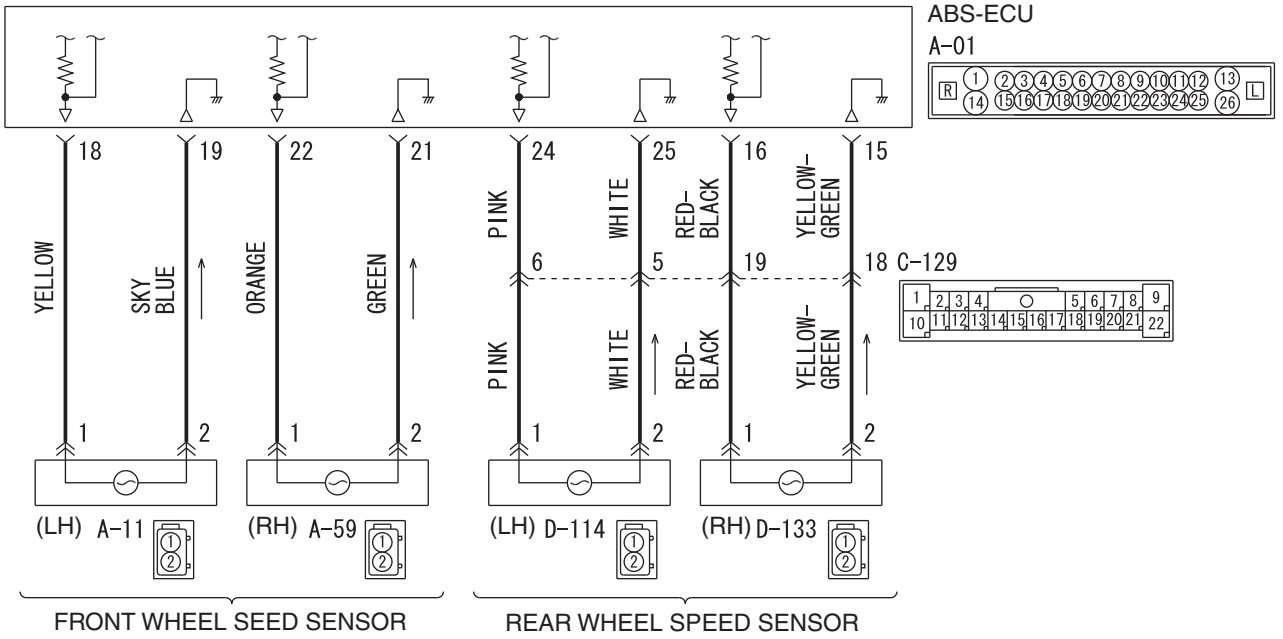
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1027 set?

YES : Return to Step 1.
NO : The procedure is complete.

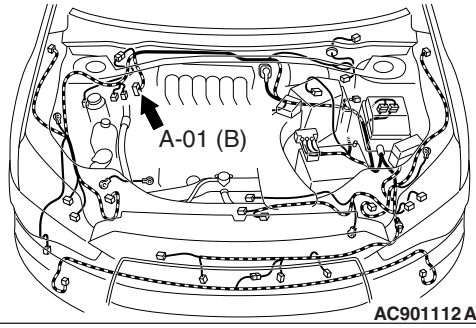
DTC C1032: Abnormality in RR wheel speed sensor signal

Wheel Speed Sensor Circuit



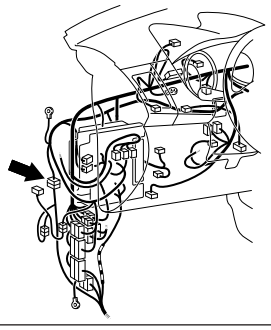
D7G35M023A00
AC703729 AB

Connector: A-01



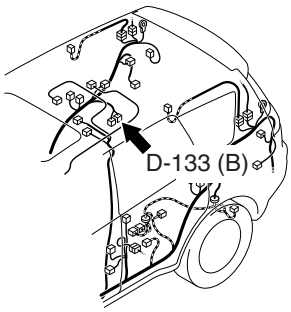
AC901112 AE

Connector: C-129



AC901075BC

Connector: D-133



AC901080 AN

⚠ CAUTION

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

TSB Revision

CIRCUIT OPERATION

- The wheel speed sensor is a type of pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ABS-ECU monitors the signals from each wheel speed sensor while the vehicle is being driven. If any fault below is found in these sensor signals, ABS-ECU will set the relevant DTC.

- Irregular change in the wheel speed sensor signal
- Wheel speed sensor signal continuously indicates higher value than the values of other wheel speed sensors.

PROBABLE CAUSES

Current trouble

- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Adhesion of foreign materials on the magnetic encoder for wheel speed detection
- Wheel bearing malfunction
- Malfunction of wheel speed sensor
- Damaged wiring harness and connectors
- External noise interference
- Improper installation of the wheel speed sensor
- Deformation of the magnetic encoder for wheel speed detection
- ABS-ECU malfunction
- Disturbance of magnetization pattern for magnetic encoder for wheel speed detection
- The number of poles on the magnetic encoder for wheel speed detection (the number of N-pole and S-pole) is changed.

Past trouble

- When the DTC C102B is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (Refer to GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).
- When the DTC C102B is not set, the following conditions may be present:
  - Right or/and left wheels are rotated.
  - Unstable vehicle attitude
  - External noise interference
  - Vehicle ran with the parking brake applied.

TSB Revision

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1032 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTC C102B is also set.

Q: Is DTC C102B also set?

YES : Perform the diagnosis for the DTC C102B (Refer to P.35B-33).

NO : Go to Step 4.

STEP 4. Connector check: A-01 ABS-ECU connector, C-129 intermediate connector, D-133 rear wheel speed sensor <RH> connector

Q: Is the check result normal?

YES : Go to Step 5.

NO : Repair the defective connector. Then go to Step 12.

STEP 5. Wiring harness check between A-01 ABS-ECU connector terminal No.16 and D-133 rear wheel speed sensor <RH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.15 and D-133 rear wheel speed sensor <RH> connector terminal No.2.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Repair the wiring harness. Then go to Step 12.

STEP 6. Check wheel speed sensor <RR> installation

Check how the wheel speed sensor <RR> is installed (Disconnection of wheel speed sensor <RR>, loose mounting bolt, etc.).

Q: Is the check result normal?

YES : Go to Step 7.

NO : Reinstall the wheel speed sensor <RR> correctly (Refer to P.35B-189). Then go to Step 7.

STEP 7. Check for wheel speed sensor <RR> output current

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 8.

NO : Replace the wheel speed sensor <RR> (Refer to P.35B-189). Then go to Step 11.

STEP 8. Check for wheel bearing looseness

NOTE:

- *Loose wheel bearing may increase the gap between the wheel speed sensor <RR> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <RR> for looseness (Refer to GROUP 27A – On-vehicle Service P.27A-6).*

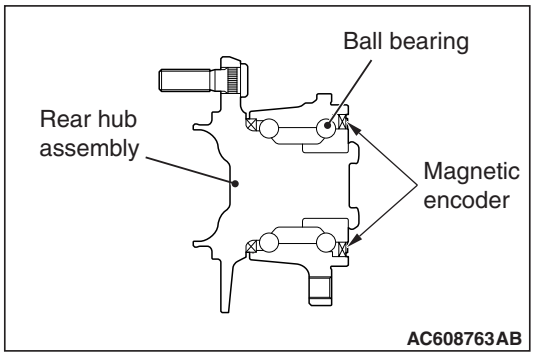
Q: Is the check result normal?

YES : Go to Step 9.

NO : Replace the rear wheel hub assembly <RR> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 12.

STEP 9. Check wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.



Q: Is the check result normal?

YES : Go to Step 10.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 12.

NO (Deformation) : Replace the rear wheel hub assembly <RR> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 12.

STEP 10. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1032 set?

YES : Replace the wheel speed sensor <RR> (Refer to P.35B-189). Then go to Step 11.
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 11. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1032 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 12.
NO : The procedure is complete.

STEP 12. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1032 set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC C1014: Mutual monitoring of FL wheel speed sensor

⚠ CAUTION
- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

CIRCUIT OPERATION
- The wheel speed sensor is a kind of a pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS
ABS-ECU monitors the signals from each wheel speed sensor while the vehicle is being driven. If any fault below is found in these sensor signals, ABS-ECU will set the relevant DTC.
- Missing wheel speed sensor signal
- Wheel speed sensor signal continuously indicates lower value than the values of other wheel speed sensors.

PROBABLE CAUSES
Current trouble
- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Wheel bearing malfunction
- Deformation of the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Adhesion of foreign materials on the magnetic encoder for wheel speed detection
- Malfunction of wheel speed sensor
- Improper installation of the wheel speed sensor
- ABS-ECU malfunction
- Disturbance of magnetization pattern for magnetic encoder for wheel speed detection
- The number of poles on the magnetic encoder for wheel speed detection (the number of N-pole and S-pole) is changed.

Past trouble

- When the DTC C100A is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (Refer to GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).
- When the DTC C100A is not set, the following conditions may be present:
  - Some wheels slip.
  - Unstable vehicle attitude
  - External noise interference
  - Vehicle ran with the parking brake applied.
  - Rotate only two wheels with drum tester

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1014 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTC C100A is also set.

Q: Is DTC C100A also set?

YES : Perform the diagnosis for the DTC C100A (Refer to P.35B-17).

NO : Go to Step 4.

STEP 4. Check wheel speed sensor <FL> installation

Check how the wheel speed sensor <FL> is installed (Disconnection of wheel speed sensor <FL>, loose mounting bolt, etc.).

Q: Is the check result normal?

YES : Go to Step 5.

NO : Reinstall the wheel speed sensor <FL> correctly (Refer to P.35B-189). Then go to Step 5.

TSB Revision

STEP 5. Check for wheel speed sensor <FL> output current

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Replace the wheel speed sensor <FL> (Refer to P.35B-189). Then go to Step 9.

STEP 6. Check for wheel bearing looseness

NOTE:

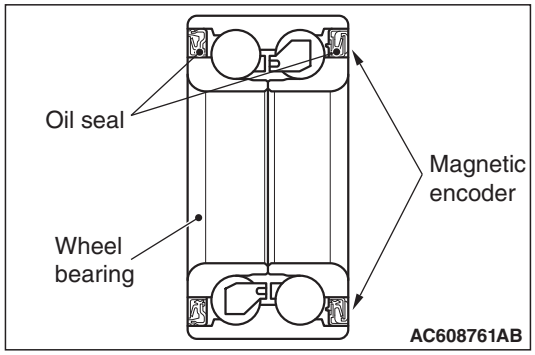
- *Loose wheel bearing may increase the gap between the wheel speed sensor <FL> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <FL> for looseness (Refer to GROUP 26 – Wheel Bearing Play Check P.26-11).*

Q: Is the check result normal?

YES : Go to Step 7.

NO : Replace the wheel bearing <FL> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 10.

STEP 7. Check wheel speed detection encoder



Check the encoder for adhesion of foreign materials or deformation.

Q: Is the check result normal?

YES : Go to Step 8.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 10.

NO (Deformation) : Replace the wheel bearing <FL> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 10.

STEP 8. Check whether the DTC is reset.

(1) Erase the DTC.

(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1014 set?

YES : Replace the wheel speed sensor <FL> (Refer to P.35B-189). Then go to Step 9.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 9. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1014 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 10.
NO : The procedure is complete.

STEP 10. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1014 set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC C101F Mutual monitoring of FR wheel speed sensor

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-17).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

CIRCUIT OPERATION

- The wheel speed sensor is a kind of a pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ABS-ECU monitors the signals from each wheel speed sensor while the vehicle is being driven. If any fault below is found in these sensor signals, ABS-ECU will set the relevant DTC.

- Missing wheel speed sensor signal
- Wheel speed sensor signal continuously indicates lower value than the values of other wheel speed sensors.

PROBABLE CAUSES

Current trouble

- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Wheel bearing malfunction
- Deformation of the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Adhesion of foreign materials on the magnetic encoder for wheel speed detection
- Malfunction of wheel speed sensor
- Improper installation of the wheel speed sensor
- ABS-ECU malfunction
- Disturbance of magnetization pattern for magnetic encoder for wheel speed detection
- The number of poles on the magnetic encoder for wheel speed detection (the number of N-pole and S-pole) is changed.

Past trouble

- When the DTC C1015 is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (Refer to GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).
- When DTC C1015 is not set, the following conditions may be present:
  - Some wheels slip.
  - Unstable vehicle attitude
  - External noise interference
  - Vehicle ran with the parking brake applied.
  - Rotate only two wheels with drum tester

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C101F set?

YES : Go to Step 3.
NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTC C1015 is also set.

Q: Is DTC C1015 also set?

YES : Perform the diagnosis for the DTC C1015 (Refer to P.35B-22).
NO : Go to Step 4.

STEP 4. Check wheel speed sensor <FR> installation

Check how the wheel speed sensor <FR> is installed (Disconnection of wheel speed sensor <FR>, loose mounting bolt, etc.).

Q: Is the check result normal?

YES : Go to Step 5.
NO : Reinstall the wheel speed sensor <FR> correctly (Refer to P.35B-189). Then go to Step 5.

STEP 5. Check for wheel speed sensor <FR> output current

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Replace the wheel speed sensor <FR> (Refer to P.35B-189). Then go to Step 9.

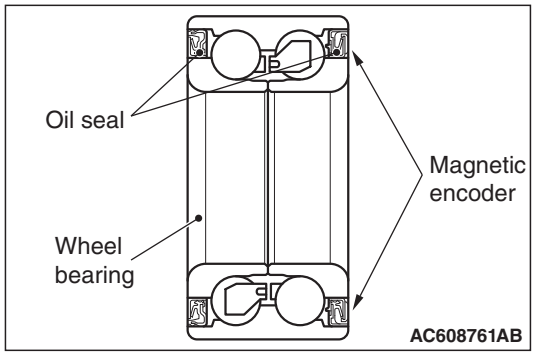
STEP 6. Check for wheel bearing looseness

NOTE:

- *Loose wheel bearing may increase the gap between the wheel speed sensor <FR> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <FR> for looseness (Refer to GROUP 26 – On-vehicle Service).*

Q: Is the check result normal?

YES : Go to Step 7.
NO : Replace the wheel bearing <FR> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 10.



STEP 7. Check wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.

Q: Is the check result normal?

YES : Go to Step 8.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 10.

NO (Deformation) : Replace the wheel bearing <FR> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 10.

STEP 8. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C101F set?

YES : Replace the wheel speed sensor <FR> (Refer to P.35B-189). Then go to Step 9.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 9. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C101F set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 10.

NO : The procedure is complete.

STEP 10. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C101F set?

YES : Return to Step 1.

NO : The procedure is complete.

TSB Revision

DTC No. C102A: Mutual monitoring of RL wheel speed sensor

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

CIRCUIT OPERATION

- The wheel speed sensor is a kind of a pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ABS-ECU monitors the signals from each wheel speed sensor while the vehicle is being driven. If any fault below is found in these sensor signals, ABS-ECU will set the relevant DTC.

- Missing wheel speed sensor signal
- Wheel speed sensor signal continuously indicates lower value than the values of other wheel speed sensors.

PROBABLE CAUSES

Current trouble

- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Wheel bearing malfunction
- Deformation of the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the magnetic encoder for wheel speed detection
- Malfunction of wheel speed sensor
- Improper installation of the wheel speed sensor
- ABS-ECU malfunction
- Disturbance of magnetization pattern for magnetic encoder for wheel speed detection
- The number of poles on the magnetic encoder for wheel speed detection (the number of N-pole and S-pole) is changed.

Past trouble

- When the DTC C1020 is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (Refer to GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).
- When the DTC C1020 is not set, the following conditions may be present:
  - Some wheels slip.
  - Unstable vehicle attitude
  - External noise interference
  - Vehicle ran with the parking brake applied.
  - Rotate only two wheels with drum tester

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C102A set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTC C1020 is also set.

Q: Is DTC C1020 also set?

YES : Perform the diagnosis for the DTC C1020 (Refer to P.35B-28).

NO : Go to Step 4.

STEP 4. Check wheel speed sensor <RL> installation

Check how the wheel speed sensor <RL> is installed (Disconnection of wheel speed sensor <RL>, loose mounting bolt, etc.).

Q: Is the check result normal?

YES : Go to Step 5.

NO : Reinstall the wheel speed sensor <RL> correctly (Refer to P.35B-189). Then go to Step 5.

TSB Revision

STEP 5. Check for wheel speed sensor <RL> output current

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Replace the wheel speed sensor <RL> (Refer to P.35B-189). Then go to Step 9.

STEP 6. Check for wheel bearing looseness

NOTE:

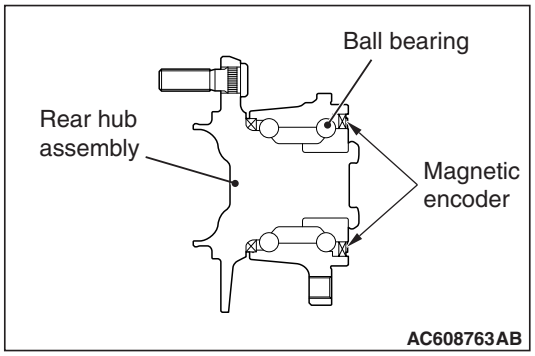
- *Loose wheel bearing may increase the gap between the wheel speed sensor <RL> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <RL> for looseness (Refer to GROUP 27A – On-vehicle Service P.27A-6).*

Q: Is the check result normal?

YES : Go to Step 7.

NO : Replace the rear wheel hub assembly <RL> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 10.

STEP 7. Check wheel speed detection encoder



Check the encoder for adhesion of foreign materials or deformation.

Q: Is the check result normal?

YES : Go to Step 8.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 10.

NO (Deformation) : Replace the rear wheel hub assembly <RL> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 10

STEP 8. Check whether the DTC is reset.

(1) Erase the DTC.

(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C102A set?

YES : Replace the wheel speed sensor <RL> (Refer to P.35B-189). Then go to Step 9.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 9. Check whether the DTC is reset.
(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C102A set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 10.
NO : The procedure is complete.

STEP 10. Check whether the DTC is reset.
(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C102A set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC C1035: Mutual monitoring of RR wheel speed sensor

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

CIRCUIT OPERATION

- The wheel speed sensor is a kind of a pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ABS-ECU monitors the signals from each wheel speed sensor while the vehicle is being driven. If any fault below is found in these sensor signals, ABS-ECU will set the relevant DTC.

- Missing wheel speed sensor signal
- Wheel speed sensor signal continuously indicates lower value than the values of other wheel speed sensors.

PROBABLE CAUSES

Current trouble

- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Wheel bearing malfunction
- Deformation of the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the magnetic encoder for wheel speed detection
- Malfunction of wheel speed sensor
- Improper installation of the wheel speed sensor
- ABS-ECU malfunction
- Disturbance of magnetization pattern for magnetic encoder for wheel speed detection
- The number of poles on the magnetic encoder for wheel speed detection (the number of N-pole and S-pole) is changed.

Past trouble

- When the DTC C102B is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (Refer to GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).
- When the DTC C102B is not set, the following conditions may be present:
  - Some wheels slip.
  - Unstable vehicle attitude
  - External noise interference
  - Vehicle ran with the parking brake applied.
  - Rotate only two wheels with drum tester

DIAGNOSIS

Required Special Tools:

- MB991958 Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827 M.U.T.-III USB Cable
  - MB991910 M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1035 set?

YES : Go to Step 3.
NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTC C102B is also set.

Q: Is DTC C102B also set?

YES : Perform the diagnosis for the DTC C102B (Refer to P.35B-33).
NO : Go to Step 4.

STEP 4. Check wheel speed sensor <RR> installation

Check how the wheel speed sensor <RR> is installed (Disconnection of wheel speed sensor <RR>, loose mounting bolt, etc.).

Q: Is the check result normal?

YES : Go to Step 5.
NO : Reinstall the wheel speed sensor <RR> correctly (Refer to P.35B-189). Then go to Step 5.

STEP 5. Check for wheel speed sensor <RR> output current

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Replace the wheel speed sensor <RR> (Refer to P.35B-189). Then go to Step 9.

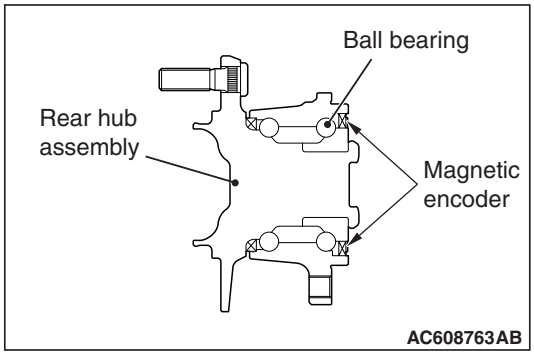
STEP 6. Check for wheel bearing looseness

NOTE:

- *Loose wheel bearing may increase the gap between the wheel speed sensor <RR> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <RR> for looseness (Refer to GROUP 27A – On-vehicle Service P.27A-6).*

Q: Is the check result normal?

YES : Go to Step 7.
NO : Replace the rear wheel hub assembly <RR> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 10.



STEP 7. Check wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.

Q: Is the check result normal?

YES : Go to Step 8.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 10.

NO (Deformation) : Replace the rear wheel hub assembly <RR> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 10.

STEP 8. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1035 set?

YES : Replace the wheel speed sensor <RR> (Refer to P.35B-189). Then go to Step 9.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 9. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1035 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 10.

NO : The procedure is complete.

STEP 10. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1035 set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC C1041: Abnormality in periodical signal for FL wheel speed sensor

⚠ CAUTION
- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

CIRCUIT OPERATION
- The wheel speed sensor is a kind of a pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS
ABS-ECU monitors the signals from each wheel speed sensor while the vehicle is being driven. If any periodical drop is found in these sensor signals, ABS-ECU will set the relevant DTC.

PROBABLE CAUSES
Current trouble
- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Wheel bearing malfunction
- Deformation of the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Adhesion of foreign materials on the magnetic encoder for wheel speed detection
- Malfunction of wheel speed sensor
- Improper installation of the wheel speed sensor
- ABS-ECU malfunction
- Disturbance of magnetization pattern for magnetic encoder for wheel speed detection
- The number of poles on the magnetic encoder for wheel speed detection (the number of N-pole and S-pole) is changed.

Past trouble

- When the diagnostic trouble code No. C100A is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).
- When the diagnostic trouble code No. C100A is not set, the following conditions may be present:
  - Some wheels slip.
  - Unstable vehicle attitude
  - External noise interference
  - Vehicle ran with the parking brake applied.
  - Only two wheels are rotated on a drum tester.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1041 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTC C100A is also set.

Q: Is DTC C100A also set?

YES : Perform the diagnosis for the DTC C100A (Refer to P.35B-17).

NO : Go to Step 4.

STEP 4. Check wheel speed sensor <FL> installation

Check how the wheel speed sensor <FL> is installed (Disconnection of wheel speed sensor <FL>, loose mounting bolt, etc.).

Q: Is the check result normal?

YES : Go to Step 5.

NO : Reinstall the wheel speed sensor <FL> correctly (Refer to P.35B-189). Then go to Step 5.

TSB Revision

STEP 5. Check for wheel speed sensor <FL> output current

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Replace the wheel speed sensor <FL> (Refer to P.35B-189). Then go to Step 9.

STEP 6. Check for wheel bearing looseness

NOTE:

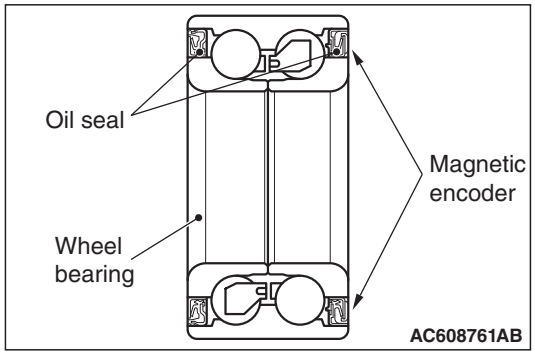
- *Loose wheel bearing may increase the gap between the wheel speed sensor <FL> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <FL> for looseness (Refer to GROUP 26 – Wheel Bearing Play Check P.26-11).*

Q: Is the check result normal?

YES : Go to Step 7.

NO : Replace the wheel bearing <FL> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 10.

STEP 7. Check wheel speed detection encoder



Check the encoder for adhesion of foreign materials or deformation.

Q: Is the check result normal?

YES : Go to Step 8.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 10.

NO (Deformation) : Replace the wheel bearing <FL> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 10.

STEP 8. Check whether the DTC is reset.

(1) Erase the DTC.

(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1041 set?

YES : Replace the wheel speed sensor <FL> (Refer to P.35B-189). Then go to Step 9.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 9. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1041 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 10.
NO : The procedure is complete.

STEP 10. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1041 set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC C1042: Abnormality in periodical signal for FR wheel speed sensor

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

CIRCUIT OPERATION

- The wheel speed sensor is a kind of a pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ASC-ECU monitors the signals from each wheel speed sensor while the vehicle is being driven. If any periodical drop is found in these sensor signals, ASC-ECU will set the relevant DTC.

PROBABLE CAUSES

Current trouble

- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Wheel bearing malfunction
- Deformation of the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Adhesion of foreign materials on the magnetic encoder for wheel speed detection
- Malfunction of wheel speed sensor
- Improper installation of the wheel speed sensor
- ABS-ECU malfunction
- Disturbance of magnetization pattern for magnetic encoder for wheel speed detection
- The number of poles on the magnetic encoder for wheel speed detection (the number of N-pole and S-pole) is changed.

Past trouble

- When the diagnostic trouble code No. C1015 is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).
- When diagnostic trouble code No. C1015 is not set, the following conditions may be present:
  - Some wheels slip.
  - Unstable vehicle attitude
  - External noise interference
  - Vehicle ran with the parking brake applied.
  - Only two wheels are rotated on a drum tester.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1042 set?

YES : Go to Step 3.
NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTC C1015 is also set.

Q: Is DTC C1015 also set?

YES : Perform the diagnosis for the DTC C1015 (Refer to P.35B-22).
NO : Go to Step 4.

STEP 4. Check wheel speed sensor <FR> installation

Check how the wheel speed sensor <FR> is installed (Disconnection of wheel speed sensor <FR>, loose mounting bolt, etc.).

Q: Is the check result normal?

YES : Go to Step 5.
NO : Reinstall the wheel speed sensor <FR> correctly (Refer to P.35B-189). Then go to Step 5.

STEP 5. Check for wheel speed sensor <FR> output current

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Replace the wheel speed sensor <FR> (Refer to P.35B-189). Then go to Step 9.

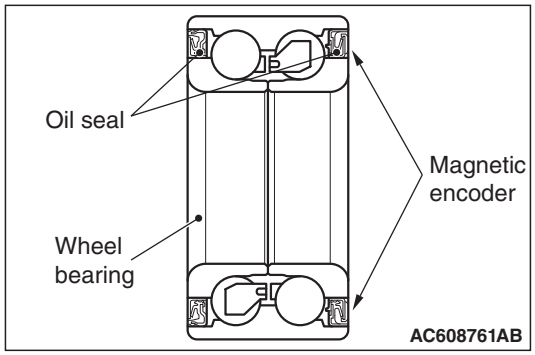
STEP 6. Check for wheel bearing looseness

NOTE:

- *Loose wheel bearing may increase the gap between the wheel speed sensor <FR> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <FR> for looseness (Refer to GROUP 26 – On-vehicle Service).*

Q: Is the check result normal?

YES : Go to Step 7.
NO : Replace the wheel bearing <FR> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 10.



STEP 7. Check wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.

Q: Is the check result normal?

YES : Go to Step 8.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 10.

NO (Deformation) : Replace the wheel bearing <FR> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 10.

STEP 8. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1042 set?

YES : Replace the wheel speed sensor <FR> (Refer to P.35B-189). Then go to Step 9.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 9. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1042 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 10.

NO : The procedure is complete.

STEP 10. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1042 set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC C1043: Abnormality in periodical signal for RL wheel speed sensor

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

CIRCUIT OPERATION

- The wheel speed sensor is a kind of a pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ABS-ECU monitors the signals from each wheel speed sensor while the vehicle is being driven. If any periodical drop is found in these sensor signals, ABS-ECU will set the relevant DTC.

PROBABLE CAUSES

Current trouble

- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Wheel bearing malfunction
- Deformation of the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the magnetic encoder for wheel speed detection
- Malfunction of wheel speed sensor
- Improper installation of the wheel speed sensor
- ABS-ECU malfunction
- Disturbance of magnetization pattern for magnetic encoder for wheel speed detection
- The number of poles on the magnetic encoder for wheel speed detection (the number of N-pole and S-pole) is changed.

Past trouble

- When the diagnostic trouble code No. C1020 is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).
- When the diagnostic trouble code No. C1020 is not set, the following conditions may be present:
  - Right or left wheels are rotated.
  - Unstable vehicle attitude
  - External noise interference
  - Vehicle ran with the parking brake applied.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1043 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTC C1020 is also set.

Q: Is DTC C1020 also set?

YES : Perform the diagnosis for the DTC C1020 (Refer to P.35B-28).

NO : Go to Step 4.

STEP 4. Check wheel speed sensor <RL> installation

Check how the wheel speed sensor <RL> is installed (Disconnection of wheel speed sensor <RL>, loose mounting bolt, etc.).

Q: Is the check result normal?

YES : Go to Step 5.

NO : Reinstall the wheel speed sensor <RL> correctly (Refer to P.35B-189). Then go to Step 5.

STEP 5. Check for wheel speed sensor <RL> output current

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Replace the wheel speed sensor <RL> (Refer to P.35B-189). Then go to Step 9.

STEP 6. Check for wheel bearing looseness

NOTE:

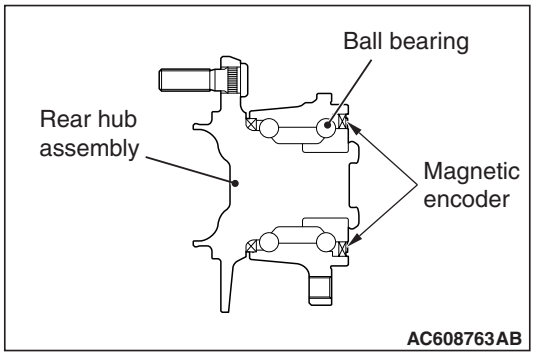
- *Loose wheel bearing may increase the gap between the wheel speed sensor <RL> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <RL> for looseness (Refer to GROUP 27A – On-vehicle Service P.27A-6).*

Q: Is the check result normal?

YES : Go to Step 7.

NO : Replace the rear wheel hub assembly <RL> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 10.

STEP 7. Check wheel speed detection encoder



Check the encoder for adhesion of foreign materials or deformation.

Q: Is the check result normal?

YES : Go to Step 8.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 10.

NO (Deformation) : Replace the rear wheel hub assembly <RL> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 10.

STEP 8. Check whether the DTC is reset.

(1) Erase the DTC.

(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1043 set?

YES : Replace the wheel speed sensor <RL> (Refer to P.35B-189). Then go to Step 9.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 9. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1043 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 10.
NO : The procedure is complete.

STEP 10. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1043 set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC C1044: Abnormality in periodical signal for RR wheel speed sensor

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

CIRCUIT OPERATION

- The wheel speed sensor is a kind of a pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ABS-ECU monitors the signals from each wheel speed sensor while the vehicle is being driven. If any periodical drop is found in these sensor signals, ABS-ECU will set the relevant DTC.

PROBABLE CAUSES

Current trouble

- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Wheel bearing malfunction
- Deformation of the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the magnetic encoder for wheel speed detection
- Malfunction of wheel speed sensor
- Improper installation of the wheel speed sensor
- ABS-ECU malfunction
- Disturbance of magnetization pattern for magnetic encoder for wheel speed detection
- The number of poles on the magnetic encoder for wheel speed detection (the number of N-pole and S-pole) is changed.

Past trouble

- When the diagnostic trouble code No.C102B is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ABS-ECU and the wheel speed sensor. For diagnosis procedures, refer to How to treat past trouble (GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).
- When the diagnostic trouble code No.C102B is not set, the following conditions may be present:
  - Right or left wheels are rotated.
  - Unstable vehicle attitude
  - External noise interference
  - Vehicle ran with the parking brake applied.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1044 set?

YES : Go to Step 3.
NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTC C102B is also set.

Q: Is DTC C102B also set?

YES : Perform the diagnosis for the DTC C102B (Refer to P.35B-33).
NO : Go to Step 4.

STEP 4. Check wheel speed sensor <RR> installation

Check how the wheel speed sensor <RR> is installed (Disconnection of wheel speed sensor <RR>, loose mounting bolt, etc.).

Q: Is the check result normal?

YES : Go to Step 5.
NO : Reinstall the wheel speed sensor <RR> correctly (Refer to P.35B-189). Then go to Step 5.

STEP 5. Check for wheel speed sensor <RR> output current

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Replace the wheel speed sensor <RR> (Refer to P.35B-189). Then go to Step 9.

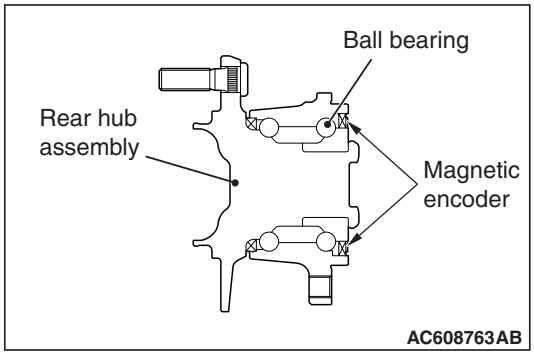
STEP 6. Check for wheel bearing looseness

NOTE:

- *Loose wheel bearing may increase the gap between the wheel speed sensor <RR> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <RR> for looseness (Refer to GROUP 27A – On-vehicle Service P.27A-6).*

Q: Is the check result normal?

YES : Go to Step 7.
NO : Replace the rear wheel hub assembly <RR> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 10.



STEP 7. Check wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.

Q: Is the check result normal?

YES : Go to Step 8.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 10.

NO (Deformation) : Replace the rear wheel hub assembly <RR> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 10.

STEP 8. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1044 set?

YES : Replace the wheel speed sensor <RR> (Refer to P.35B-189). Then go to Step 9.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 9. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1044 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 10.

NO : The procedure is complete.

STEP 10. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

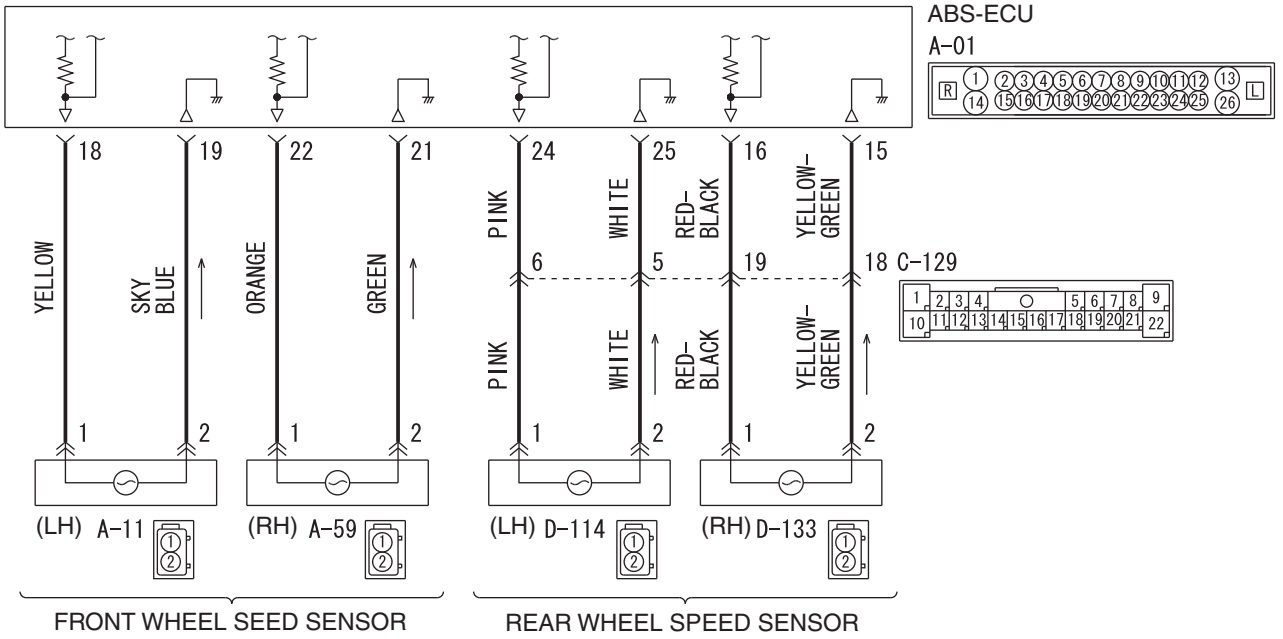
Q: Is DTC C1044 set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC C1046: FL wheel speed sensor control phase time exceeded

Wheel Speed Sensor Circuit



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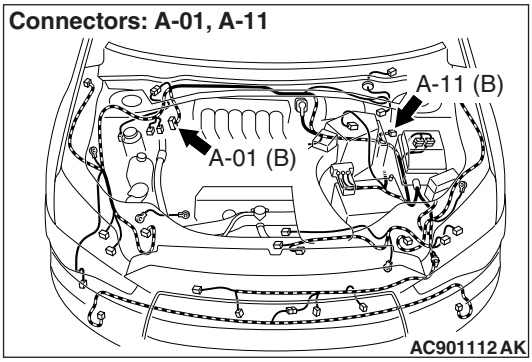

⚠ CAUTION
If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

CIRCUIT OPERATION

- The wheel speed sensor is a type of pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

TSB Revision

DTC SET CONDITIONS

This DTC is set if any malfunction below is found:

- When the brake fluid pressure is decreased for a long time.
- When the brake fluid pressure is held for a long time.

PROBABLE CAUSES

- Damaged wiring harness and connectors
- External noise interference
- Malfunction of wheel speed sensor
- ABS-ECU malfunction
- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Adhesion of foreign materials on the magnetic encoder for wheel speed detection
- Wheel bearing malfunction
- Improper installation of the wheel speed sensor
- Deformation of the magnetic encoder for wheel speed detection
- Disturbance of magnetization pattern for magnetic encoder for wheel speed detection
- Missing teeth of the magnetic encoder for wheel speed detection

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1046 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTCs C100A, C1011, C1014, or C1041 are also set.

Q: Are DTC C100A, C1011, C1014, or C1041 also set?

YES : Carry out the diagnosis for the relevant DTCs.

NO : Go to Step 4.

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STEP 4. Using scan tool MB991958, check the data list
Check the following data list (Refer to P.35B-179).
- Item No.01: FL wheel speed sensor

Q: Is the check result normal?
YES : Go to Step 11.
NO : Go to Step 5.

STEP 5. Connector check: A-01 ABS-ECU connector, A-11 front wheel speed sensor <LH> connector

Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the defective connector. Then go to Step 13.

STEP 6. Wiring harness check between A-01 ABS-ECU connector terminal No.18 and A-11 front wheel speed sensor <LH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.19 and A-11 front wheel speed sensor <LH> connector terminal No.2.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the wiring harness. Then go to Step 13.

STEP 7. Check wheel speed sensor <FL> installation
Check how the wheel speed sensor <FL> is installed (Disconnection of wheel speed sensor <FL>, loose mounting bolt, etc.).

Q: Is the check result normal?
YES : Go to Step 8.
NO : Reinstall the wheel speed sensor <FL> (Refer to P.35B-189). Then go to Step 8.

STEP 8. Check for wheel speed sensor <FL> output current
Refer to P.35B-184.

Q: Is the check result normal?
YES : Go to Step 9.
NO : Replace the wheel speed sensor <FL> (Refer to P.35B-189). Then go to Step 12.

STEP 9. Check for wheel bearing looseness

NOTE:

- *Loose wheel bearing may increase the gap between the wheel speed sensor <FL> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <FL> for looseness (Refer to GROUP 26 – Wheel Bearing Play Check P.26-11).*

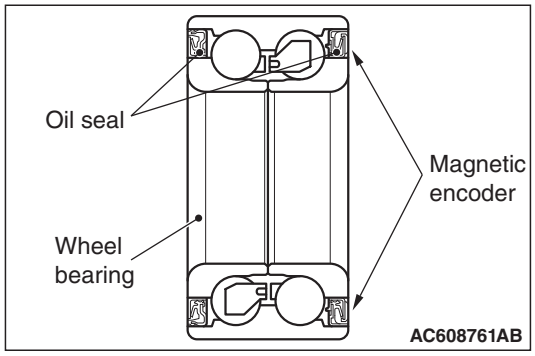
Q: Is the check result normal?

YES : Go to Step 10.

NO : Replace the wheel bearing <FL> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 13.

STEP 10. Check wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.



Q: Is the check result normal?

YES : Go to Step 11.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 13.

NO (Deformation) : Replace the wheel bearing <FL> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 13.

STEP 11. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1046 set?

YES : Replace the wheel speed sensor <FL> (Refer to P.35B-189). Then go to Step 12.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 12. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1046 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 13.

NO : The procedure is complete.

STEP 13. Check whether the DTC is reset.

(1) Erase the DTC.

(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

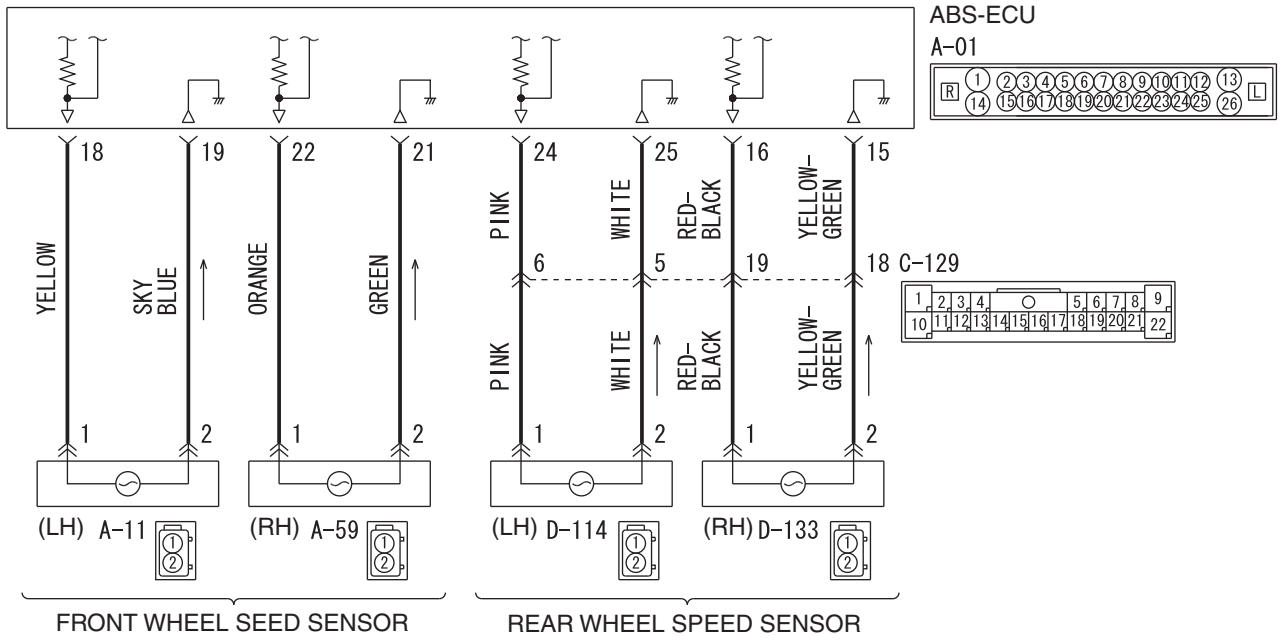
Q: Is DTC C1046 set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC C1047: FR wheel speed sensor control phase time exceeded

Wheel Speed Sensor Circuit



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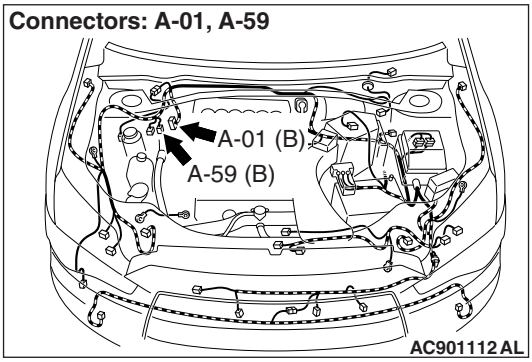


TSB Revision

⚠ CAUTION

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

CIRCUIT OPERATION

- The wheel speed sensor is a type of pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

This DTC is set if any malfunction below is found:

- When the brake fluid pressure is decreased for a long time.
- When the brake fluid pressure is held for a long time.

PROBABLE CAUSES

- Damaged wiring harness and connectors
- External noise interference
- Malfunction of wheel speed sensor
- ABS-ECU malfunction
- Excessive gap between the wheel speed sensor and the wheel speed detection encoder
- Adhesion of foreign materials on the wheel speed sensor
- Adhesion of foreign materials on the wheel speed detection encoder
- Wheel bearing malfunction
- Improper installation of the wheel speed sensor
- Deformation of the wheel speed detection encoder
- Disturbance of magnetization pattern for wheel speed detection encoder
- Missing teeth of the wheel speed detection encoder

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.
Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1047 set?

YES : Go to Step 3.
NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC
Check that the DTCs C1015, C101C, C101F, or C1042 are also set.

Q: Are DTC C1015, C101C, C101F, or C1042 also set?

YES : Carry out the diagnosis for the relevant DTCs.
NO : Go to Step 4.

STEP 4. Using scan tool MB991958, check the data list
Check the following data list (Refer to P.35B-179).

- Item No.02: FR wheel speed sensor

Q: Is the check result normal?

YES : Go to Step 11.
NO : Go to Step 5.

STEP 5. Connector check: A-01 ABS-ECU connector, A-59 front wheel speed sensor <RH> connector

Q: Is the check result normal?

YES : Go to Step 6.
NO : Repair the defective connector. Then go to Step 13.

STEP 6. Wiring harness check between A-01 ABS-ECU connector terminal No.22 and A-59 front wheel speed sensor <RH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.21 and A-59 front wheel speed sensor <RH> connector terminal No.2.

Q: Is the check result normal?

YES : Go to Step 7.
NO : Repair the wiring harness. Then go to Step 13.

STEP 7. Check wheel speed sensor <FR> installation

Check how the wheel speed sensor <FR> is installed (Disconnection of wheel speed sensor <FR>, loose mounting bolt, etc.).

Q: Is the check result normal?

YES : Go to Step 8.

NO : Reinstall the wheel speed sensor <FR> (Refer to P.35B-189). Then go to Step 8.

STEP 8. Check for wheel speed sensor <FR> output current

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 9.

NO : Replace the wheel speed sensor <FR> (Refer to P.35B-189). Then go to Step 12.

STEP 9. Check for wheel bearing looseness

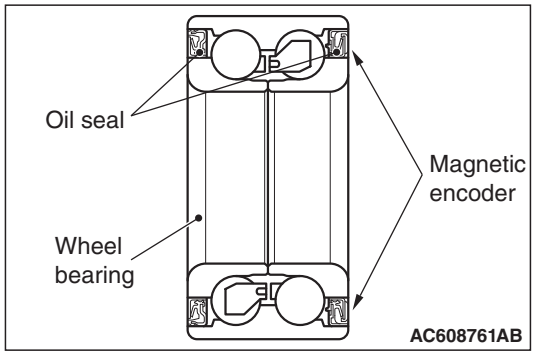
NOTE:

- *Loose wheel bearing may increase the gap between the wheel speed sensor <FR> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <FR> for looseness (Refer to GROUP 26 – Wheel Bearing Play Check P.26-11).*

Q: Is the check result normal?

YES : Go to Step 10.

NO : Replace the wheel bearing <FR> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 13.



STEP 10. Check wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.

Q: Is the check result normal?

YES : Go to Step 11.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 13.

NO (Deformation) : Replace the wheel bearing <FR> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-13). Then go to Step 13.

STEP 11. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1047 set?

YES : Replace the wheel speed sensor <FR> (Refer to P.35B-189). Then go to Step 12.
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 12. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1047 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 13.
NO : The procedure is complete.

STEP 13. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

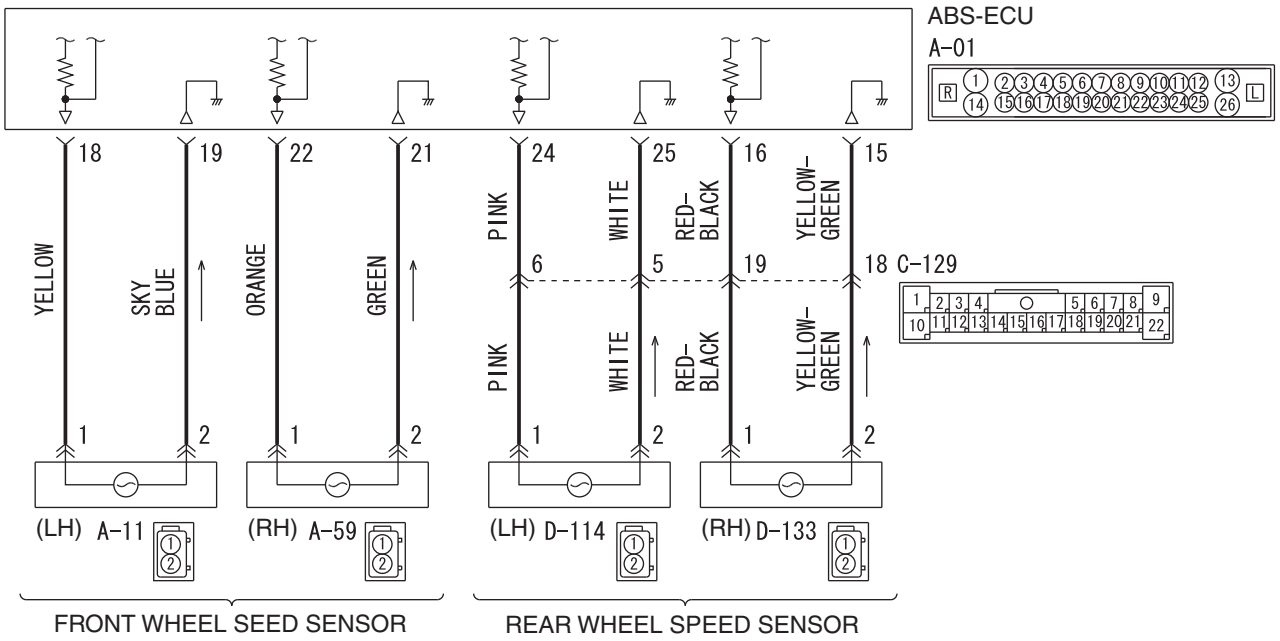
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1047 set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC C1048: RL wheel speed sensor control phase time exceeded

Wheel Speed Sensor Circuit



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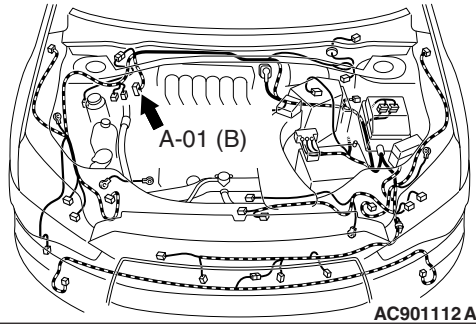
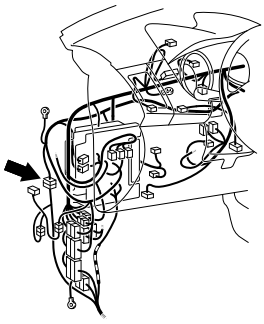
Connector: A-01



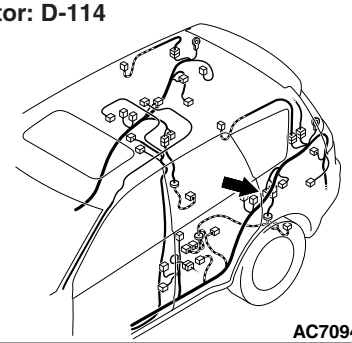
AC901112 AE

Connector: C-129



AC901075BC

Connector: D-114



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⚠ CAUTION

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

TSB Revision

CIRCUIT OPERATION

- The wheel speed sensor is a type of pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

This DTC is set if any malfunction below is found:

- When the brake fluid pressure is decreased for a long time.
- When the brake fluid pressure is held for a long time.

PROBABLE CAUSES

- Damaged wiring harness and connectors
- External noise interference
- Malfunction of wheel speed sensor
- ABS-ECU malfunction
- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Adhesion of foreign materials on the magnetic encoder for wheel speed detection
- Wheel bearing malfunction
- Improper installation of the wheel speed sensor
- Deformation of the magnetic encoder for wheel speed detection
- Disturbance of magnetization pattern for magnetic encoder for wheel speed detection
- Missing teeth of the magnetic encoder for wheel speed detection

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991816: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1048 set?

YES : Go to Step 3.
NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTCs C1020, C1027, C102A, or C1043 are also set.

Q: Are DTC C1020, C1027, C102A, or C1043 also set?

YES : Carry out the diagnosis for the relevant DTCs.
NO : Go to Step 4.

STEP 4. Using scan tool MB991958, check the data list

Check the following data list (Refer to P.35B-179).

- Item No.03: RL wheel speed sensor

Q: Is the check result normal?

YES : Go to Step 11.
NO : Go to Step 5.

STEP 5. Connector check: A-01 ABS-ECU connector, C-129 intermediate connector, D-114 rear wheel speed sensor <LH> connector

Q: Is the check result normal?

YES : Go to Step 6.
NO : Repair the defective connector. Then go to Step 13.

STEP 6. Wiring harness check between A-01 ABS-ECU connector terminal No.24 and D-114 rear wheel speed sensor <LH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.25 and D-114 rear wheel speed sensor <LH> connector terminal No.2.

Q: Is the check result normal?

YES : Go to Step 7.
NO : Repair the wiring harness. Then go to Step 13.

STEP 7. Check for wheel speed sensor <RL> installation

Check how the wheel speed sensor <RL> is installed (Disconnection of wheel speed sensor <RL>, loose mounting bolt, etc.).

Q: Is the check result normal?

YES : Go to Step 8.
NO : Reinstall the wheel speed sensor <RL> correctly (Refer to P.35B-189). Then go to Step 8.

STEP 8. Check for wheel speed sensor <RL> output current

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 9.

NO : Replace the wheel speed sensor <RL> (Refer to P.35B-189). Then go to Step 12.

STEP 9. Check for wheel bearing looseness

NOTE:

- *Loose wheel bearing may increase the gap between the wheel speed sensor<RL> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <RL> for looseness (Refer to GROUP 27A – On-vehicle Service P.27A-6).*

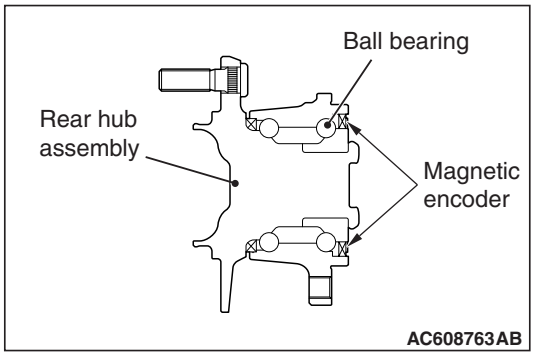
Q: Is the check result normal?

YES : Go to Step 10.

NO : Replace the rear wheel hub assembly <RL> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 13.

STEP 10. Check of wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.



Q: Is the check result normal?

YES : Go to Step 11.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 13.

NO (Deformation) : Replace the rear wheel hub assembly <RL> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 13.

STEP 11. Check whether the DTC is reset.

(1) Erase the DTC.

(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1048 set?

YES : Replace the wheel speed sensor <RL> (Refer to P.35B-189). Then go to Step 12.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 12. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1048 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 13.
NO : The procedure is complete.

STEP 13. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

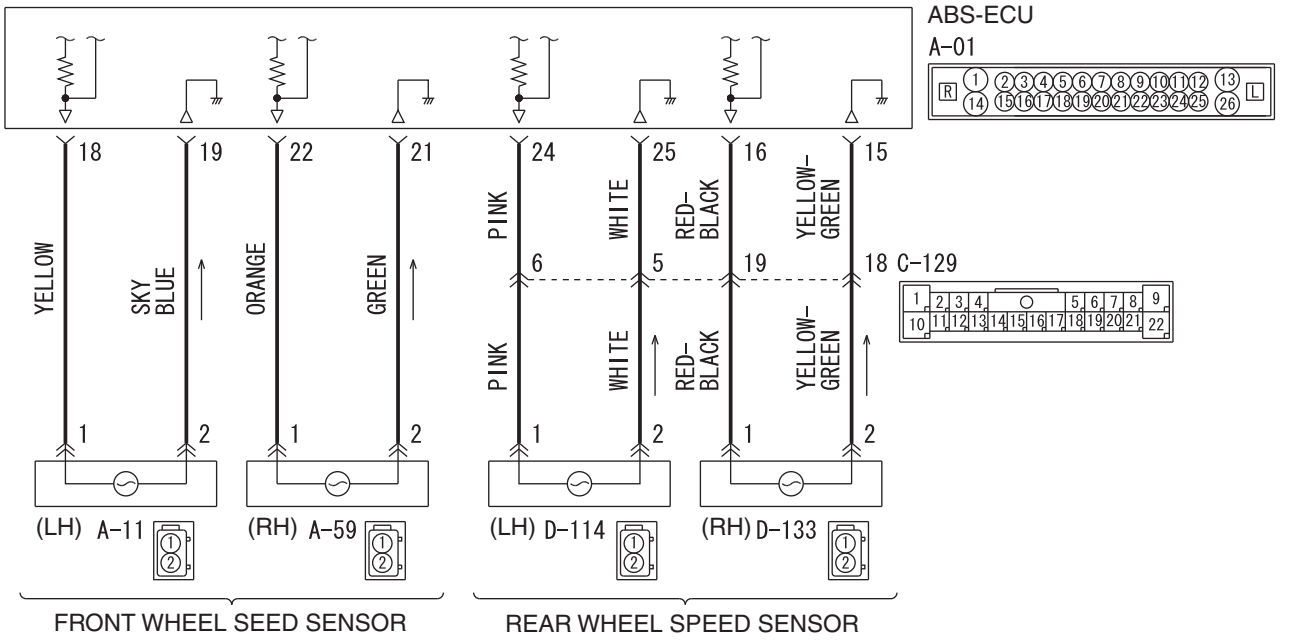
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1048 set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC C1049: RR wheel speed sensor control phase time exceeded

Wheel Speed Sensor Circuit



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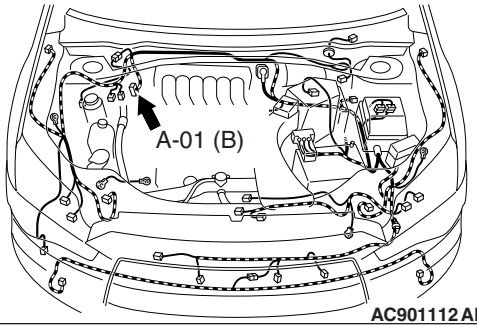
Connector: A-01



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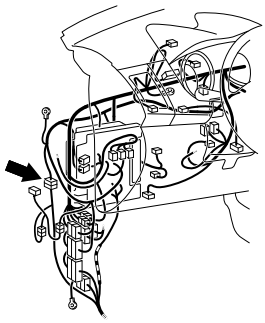
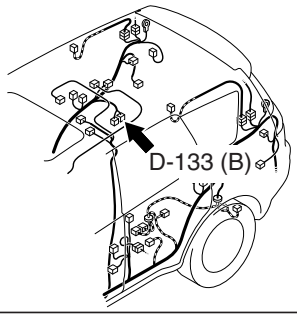
Connector: C-129



AC901075BC

Connector: D-133



AC901080 AN

⚠ CAUTION

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

CIRCUIT OPERATION

- The wheel speed sensor is a type of pulse generator. It consists of encoders (a plate on which north and south pole sides of the magnets are arranged alternately) for detecting the wheel speed which rotates at the same speed of the wheels and wheel speed sensors. This sensor outputs frequency pulse signals in proportion to the wheel speed.
- The pulse signals, which the wheel speed sensor creates, are sent to ABS-ECU. ABS-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

This DTC is set if any malfunction below is found:

- When the brake fluid pressure is decreased for a long time.
- When the brake fluid pressure is held for a long time.

PROBABLE CAUSES

- Damaged wiring harness and connectors
- External noise interference
- Malfunction of wheel speed sensor
- ABS-ECU malfunction
- Excessive gap between the wheel speed sensor and the magnetic encoder for wheel speed detection
- Adhesion of foreign materials on the wheel speed sensor
- Adhesion of foreign materials on the magnetic encoder for wheel speed detection
- Wheel bearing malfunction
- Improper installation of the wheel speed sensor
- Deformation of the magnetic encoder for wheel speed detection
- Disturbance of magnetization pattern for magnetic encoder for wheel speed detection
- Missing teeth of the magnetic encoder for wheel speed detection

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991816: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus lines.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1049 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that the DTCs C102B, C1032, C1035, or C1044 are also set.

Q: Are DTC C102B, C1032, C1035, or C1044 also set?

YES : Carry out the diagnosis for the relevant DTCs.

NO : Go to Step 4.

STEP 4. Using scan tool MB991958, check the data list
Check the following data list (Refer to P.35B-179).
- Item No.04: RR wheel speed sensor

Q: Is the check result normal?
YES : Go to Step 11.
NO : Go to Step 5.

STEP 5. Connector check: A-01 ABS-ECU connector, C-129 intermediate connector, D-133 rear wheel speed sensor <RH> connector

Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the defective connector. Then go to Step 13.

STEP 6. Wiring harness check between A-01 ABS-ECU connector terminal No.16 and D-133 rear wheel speed sensor <RH> connector terminal No.1, and between A-01 ABS-ECU connector terminal No.15 and D-133 rear wheel speed sensor <RH> connector terminal No.2.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the wiring harness. Then go to Step 13.

STEP 7. Check for wheel speed sensor <RR> installation
Check how the wheel speed sensor <RR> is installed (Disconnection of wheel speed sensor <RR>, loose mounting bolt, etc.).

Q: Is the check result normal?
YES : Go to Step 8.
NO : Reinstall the wheel speed sensor <RR> correctly (Refer to P.35B-189). Then go to Step 8.

STEP 8. Check for wheel speed sensor <RR> output current
Refer to P.35B-184.

Q: Is the check result normal?
YES : Go to Step 9.
NO : Replace the wheel speed sensor <RR> (Refer to P.35B-189). Then go to Step 12.

STEP 9. Check for wheel bearing looseness

NOTE:
- *Loose wheel bearing may increase the gap between the wheel speed sensor and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <RR> for looseness (Refer to GROUP 27A – On-vehicle Service P.27A-6).*

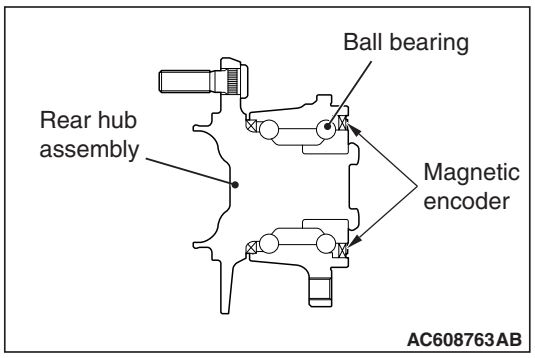
Q: Is the check result normal?

YES : Go to Step 10.

NO : Replace the rear wheel hub assembly (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 13.

STEP 10. Check of wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.



Q: Is the check result normal?

YES : Go to Step 11.

NO (Adhesion of foreign materials) : Remove the foreign materials and clean the encoder so as not to disturb the magnetization pattern on it while taking care of the magnet, magnetic substance, and magnetic attraction. Then go to Step 13.

NO (Deformation) : Replace the rear wheel hub assembly <RR> (Refer to GROUP 27A – Rear Axle Hub Assembly P.27A-8). Then go to Step 13.

STEP 11. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1049 set?

YES : Replace the wheel speed sensor <RR> (Refer to P.35B-189). Then go to Step 12.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 12. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1049 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 13.

NO : The procedure is complete.

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STEP 13. Check whether the DTC is reset.
(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is DTC C1049 set?
YES : Return to Step 1.
NO : The procedure is complete.

DTC C104B: Abnormality in FL wheel inlet valve system
DTC C104F: Abnormality in FR wheel inlet valve system
DTC C1053: Abnormality in RL wheel inlet valve system
DTC C1057: Abnormality in RR wheel inlet valve system
DTC C105F: Abnormality in FL wheel outlet valve system
DTC C1063: Abnormality in FR wheel outlet valve system
DTC C1067: Abnormality in RL wheel outlet valve system
DTC C105B: Abnormality in RR wheel outlet valve system

⚠ CAUTION
If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

CIRCUIT OPERATION
- ABS-ECU contains the power supply circuit (terminal No.26) for the solenoid valve. The solenoid valve is energized by the valve relay, which is incorporated in ABS-ECU.
- The valve relay, which is incorporated in ABS-ECU, is always energizing the solenoid valve unless the initial check is in progress when the ignition switch is turned on, and the recurrent system check is in progress.
- ABS-ECU activates the solenoid valve by turning on its driving transistor.

DTC SET CONDITIONS
These DTCs will be set under the conditions below:
- The solenoid valve is not energized even after ABS-ECU has turned on the driving transistor (Open circuit is present in the power supply circuit to the ABS-ECU solenoid valve, or the valve relay has failed).
- The solenoid valve is not activated even after ABS-ECU has turned on the driving transistor (Open circuit is present in the solenoid valve circuit in ABS-ECU, or the valve relay has failed).
- After ABS-ECU has turned off the valve relay, the solenoid valve still remains energized (short in the solenoid valve circuit).
- When a solenoid valve failure is detected

PROBABLE CAUSES

- ABS-ECU malfunction

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17).On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is the relevant DTC set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Check whether the DTC is reset.

Erase the DTC.

Q: Is the relevant DTC set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 4.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 4. Check whether the DTC is reset.

Erase the DTC.

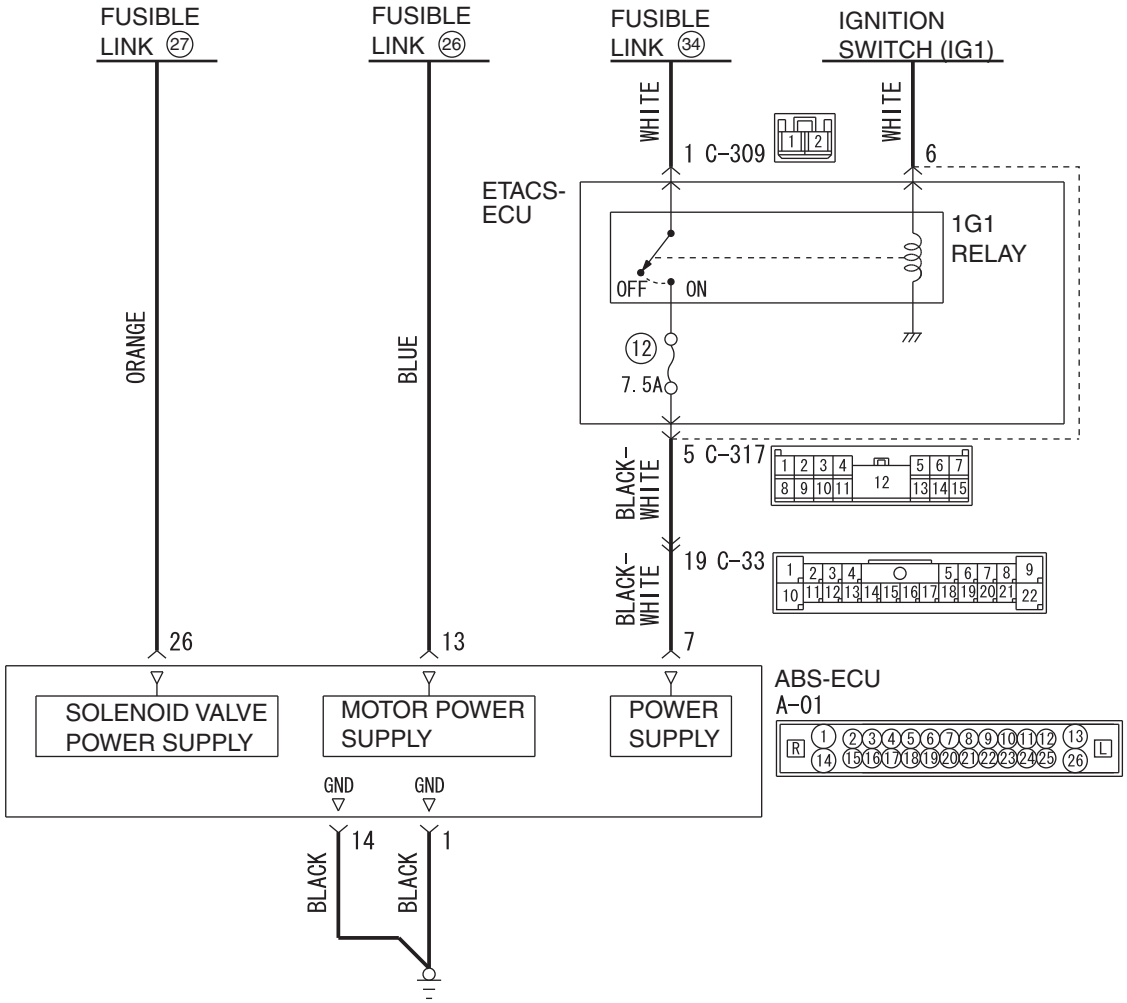
Q: Is the relevant DTC set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC C2104 Faulty valve power supply circuit

Power Supply Circuit



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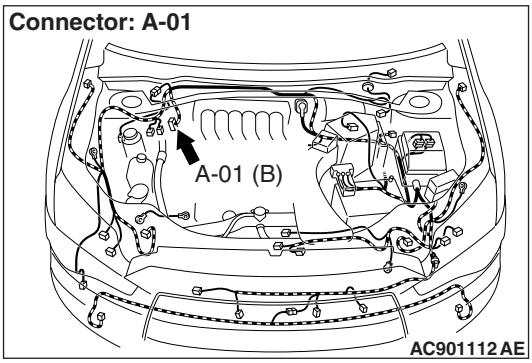

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⚠ CAUTION
If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

OPERATION

- ABS-ECU contains the power supply circuit (terminal No. 26) for the solenoid valve. The solenoid valve is energized by the valve relay, which is incorporated in ABS-ECU.
- The valve relay, which is incorporated in ABS-ECU, is always energizing the solenoid valve unless the initial check is in progress when the ignition switch is turned on, or the recurrent system check is in progress.

DTC SET CONDITIONS

This DTC will be set when the solenoid valve supply voltage is not within the standard value.

PROBABLE CAUSES

Current trouble

- Fusible link malfunction
- Damaged wiring harness and connectors
- Abnormality in battery or generator
- ABS-ECU malfunction

Past trouble

- Carry out diagnosis with particular emphasis on wiring harness and connector failures between the power supply circuit (terminal No.26) to ABS-ECU solenoid valve or ground circuit (terminal No.14). For diagnosis procedures, refer to How to treat past trouble (GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A
- MB991974: ABS check harness

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.
Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is the DTC C2104 set?

YES : Go to Step 3.
NO : The procedure is complete.

STEP 3. Battery check

Refer to GROUP 54A – Battery Test P.54A-9.

Q: Is the battery in good condition?

YES : Go to Step 4.
NO : Replace the battery. Then go to Step 11.

STEP 4. Charging system check

Refer to GROUP 16 – On–vehicle Service/Output Current Test P.16-9 (3.0L engine).

Q: Is the charging system in good condition?

YES : Go to Step 5.
NO : Repair or replace the charging system component(s). Then go to Step 11.

STEP 5. Connector check: A-01 ABS-ECU connector

Q: Is the check result normal?

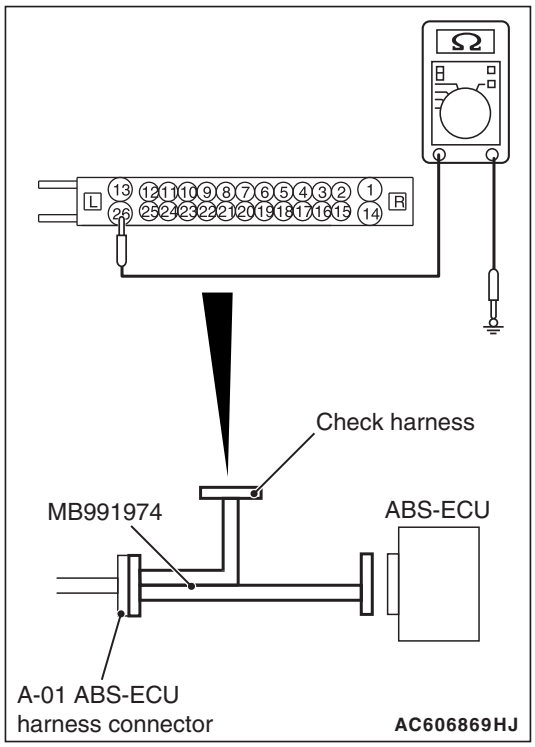
YES : Go to Step 6.
NO : Repair the defective connector. Then go to Step 11.

STEP 6. Fusible link check: Check the fusible link No.27.

Visually check for open circuit in the fusible link No.27.

Q: Is the check result normal?

YES : Go to Step 8.
NO : Go to Step 7.



STEP 7. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Disconnect the fusible link No.27.

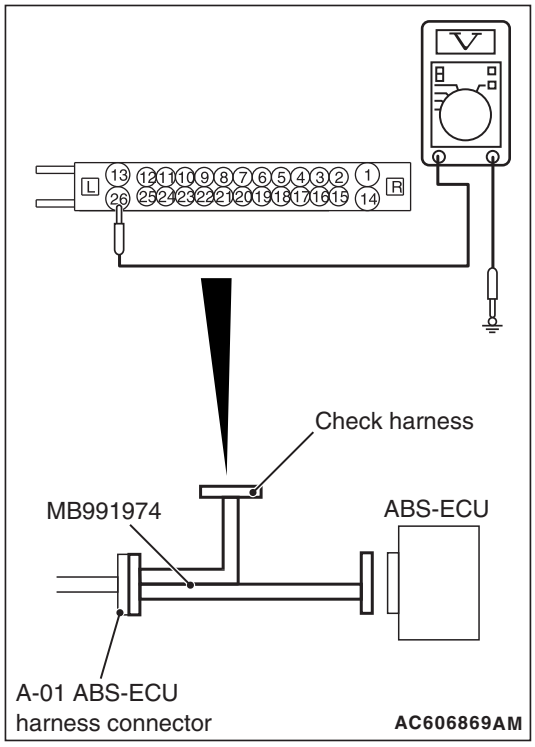
(3) Measure the resistance between the terminal No.26 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Replace the fusible link No.27. Then go to Step 11.

NO : The short circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.26 and the fusible link No.27, and then replace the fusible link No.27. Then go to Step 11.



STEP 8. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

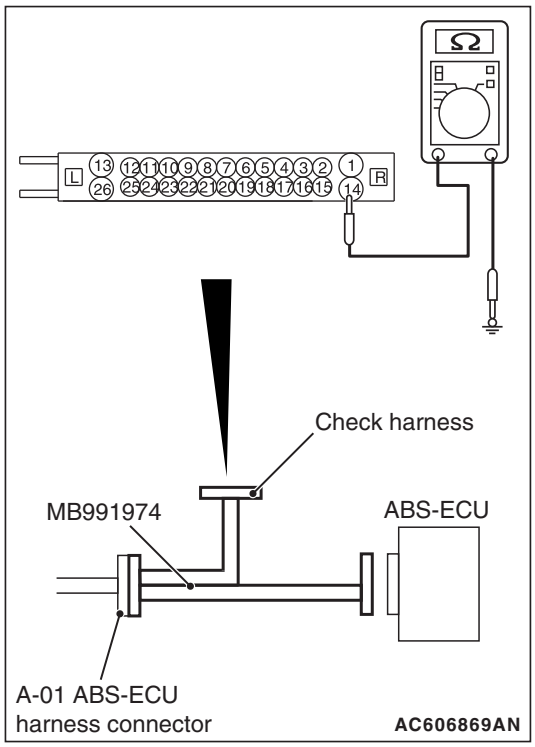
(2) Measure the voltage between the terminal No.26 and the body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 9.

NO : The open circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.26 and the fusible link No.27. Then go to Step 11.



STEP 9. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Measure the resistance between the terminal No.1 and the body ground, and between the terminal No.14 and the body ground

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 10.

NO : An open circuit may be present in the ground circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.1 and the body ground, and between the A-01 ABS-ECU connector terminal No.14 and the body ground. Then go to Step 11.

STEP 10. Check whether the DTC is reset.

Erase the DTC.

Q: Is the DTC C2104 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 11.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 11. Check whether the DTC is reset.

Erase the DTC.

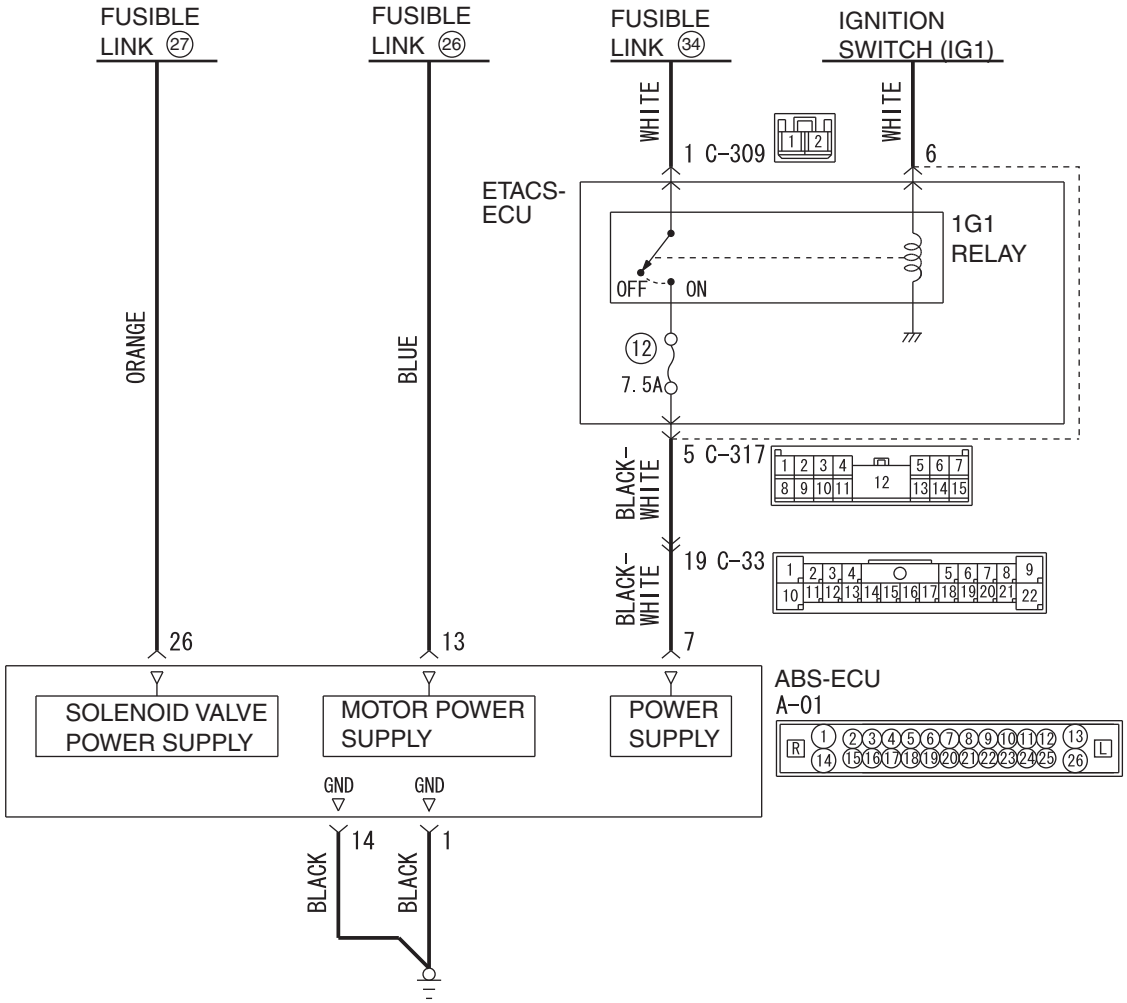
Q: Is the DTC C2104 set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC C1073 Faulty motor drive circuit

Power Supply Circuit



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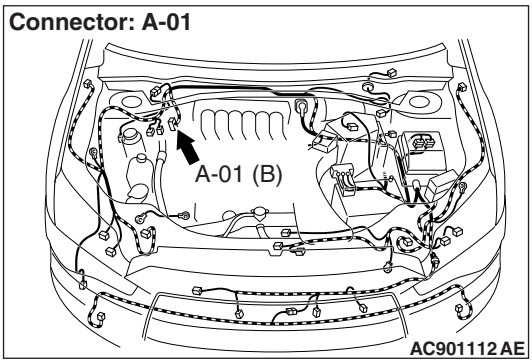

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⚠ CAUTION
If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

OPERATION

- ABS-ECU contains the power supply circuit (terminal No.13) for the pump motor. The pump motor is energized by the motor switch, which is incorporated in ABS-ECU.
- The pump motor switch, which is incorporated in ABS-ECU, is always off unless the ABS operating or the motor solenoid valve check is activated when the vehicle is started.
- ABS-ECU activates the pump motor by turning on the ECU built-in pump motor switch.

DTC SET CONDITIONS

If the pump motor switch voltage drop indicates high value when the pump motor operates or after the operation, the pump motor operation is stopped and this DTC is set.

PROBABLE CAUSES

Current trouble

- Fusible link malfunction
- Damaged wiring harness and connectors
- Abnormality in battery or generator
- ABS-ECU malfunction

Past trouble

- Carry out diagnosis with particular emphasis on wiring harness and connector failures between the power supply circuit (A-01 ABS-ECU connector terminal No.13) to the ABS-ECU motor and the ground circuit (A-01 ABS-ECU connector terminal No.1). For diagnosis procedures, refer to How to treat past trouble (GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A
- MB991974: ABS check harness

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. Check whether the DTC is reset.

Q: Is the DTC C1073 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Battery check

Refer to GROUP 54A – Battery Test P.54A-9.

Q: Is the battery in good condition?

YES : Go to Step 4.

NO : Replace the battery. Then go to Step 11.

STEP 4. Charging system check

Refer to GROUP 16 – On–vehicle Service/Output Current Test P.16-9 (3.0L engine).

Q: Is the charging system in good condition?

YES : Go to Step 5.

NO : Repair or replace the charging system component(s). Then go to Step 11.

STEP 5. Connector check: A-01 ABS-ECU connector

Q: Is the check result normal?

YES : Go to Step 6.

NO : Repair the defective connector. Then go to Step 11.

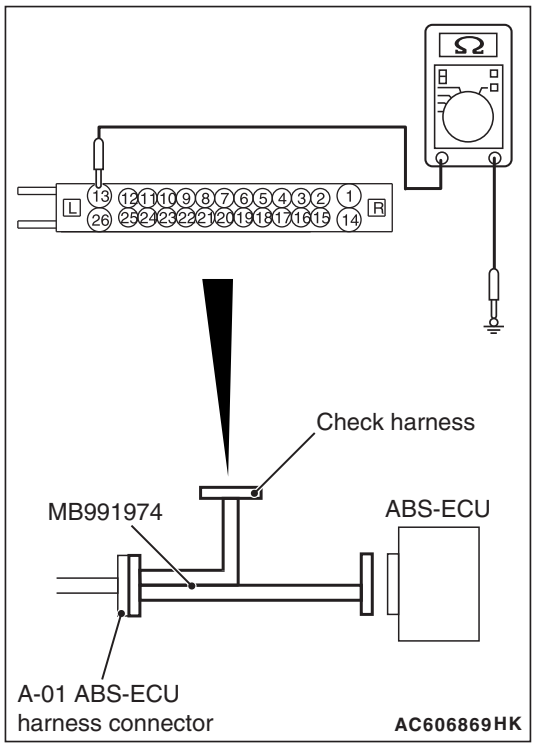
STEP 6. Fusible link check: Check the fusible link No.26.

Visually check for open circuit in the fusible link No.26.

Q: Is the check result normal?

YES : Go to Step 8.

NO : Go to Step 7.



STEP 7. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

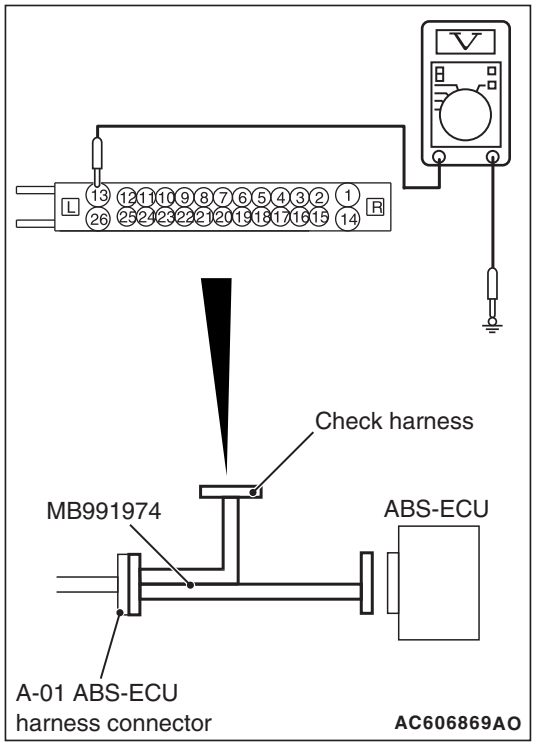
(2) Measure the resistance between the terminal No.13 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Replace the fusible link No.26. Then go to Step 11.

NO : The short circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.13 and the fusible link No.26, and then replace the fusible link No.26. Then go to Step 11.



STEP 8. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Measure the voltage between the terminal No.13 and the body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 9.

NO : The open circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.13 and the fusible link No.26. Then go to Step 11.

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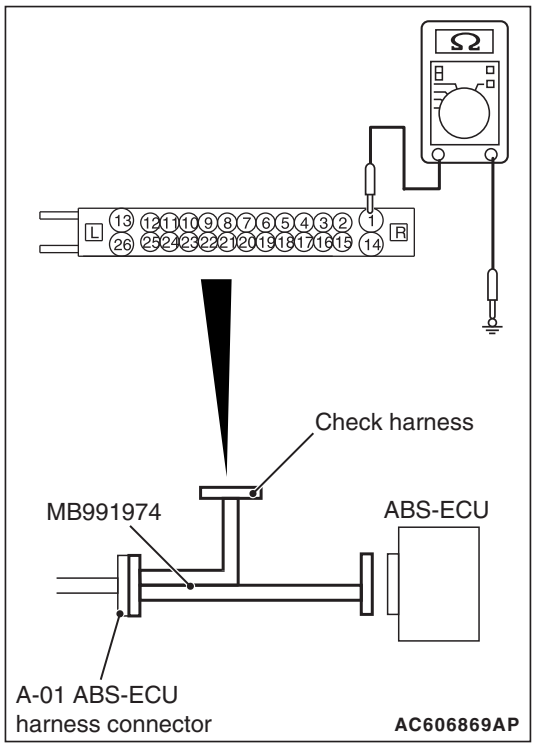


STEP 9. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Measure the resistance between the terminal No.1 and the body ground, and between the terminal No.14 and the body ground

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 10.

NO : An open circuit may be present in the ground circuit. Repair the wiring harness between the A-01 ASC-ECU connector terminal No.1 and the body ground, and between the A-01 ASC-ECU connector terminal No.14 and the body ground. Then go to Step 11.

STEP 10. Check whether the DTC is reset.

(1) Erase the DTC.

(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is the DTC C1073 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 11.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 11. Check whether the DTC is reset.

(1) Erase the DTC.

(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

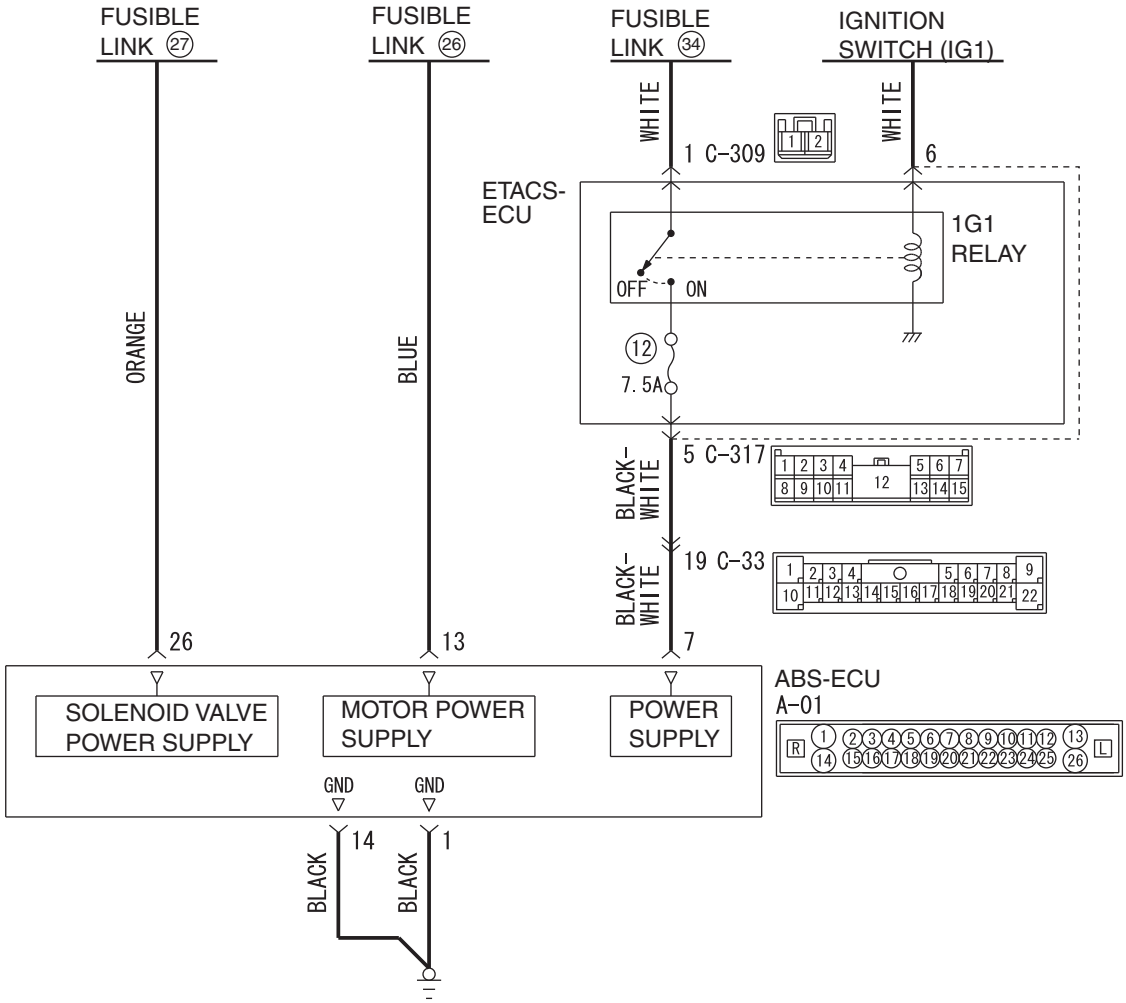
Q: Is the DTC C1073 set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC C2116 Abnormality in power supply voltage in pump motor

Power Supply Circuit



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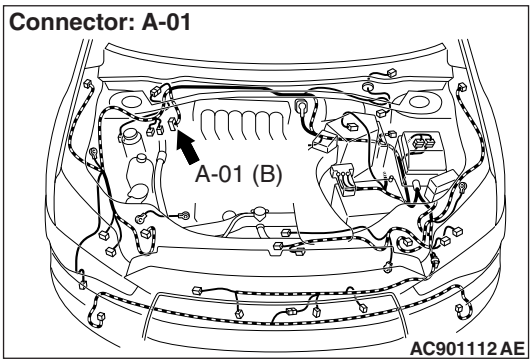

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⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

OPERATION

- ABS-ECU contains the power supply circuit (terminal No.13) for the pump motor. The pump motor is energized by the motor switch, which is incorporated in ABS-ECU.
- The pump motor switch, which is incorporated in ABS-ECU, is always off unless the motor solenoid valve check is activated when the vehicle is started.
- ABS-ECU activates the pump motor by turning on the ECU built-in pump motor switch.

DTC SET CONDITIONS

This DTCs will be set under the cases below:

- When the power supply voltage of the pump motor, which is not in operation, is abnormally low for a prolonged period
- When the power supply voltage of the pump motor, which is not in operation, is abnormally high for a prolonged period

PROBABLE CAUSES

Current trouble

- Fusible link malfunction
- Damaged wiring harness and connectors
- Abnormality in battery or generator
- ABS-ECU malfunction

Past trouble

- Carry out diagnosis with particular emphasis on wiring harness and connector failures between the power supply circuit (A-01 ABS-ECU connector terminal No.13) to the ABS-ECU motor and the ground circuit (A-01 ABS-ECU connector terminal No.1). For diagnosis procedures, refer to How to treat past trouble (GROUP 00 – How to Use Troubleshooting/How to Treat Past Trouble P.00-17).

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A
- MB991974: ABS check harness

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.
Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is the DTC C2116 set?
YES : Go to Step 3.
NO : The procedure is complete.

STEP 3. Battery check
Refer to GROUP 54A – Battery Test P.54A-9.

Q: Is the battery in good condition?
YES : Go to Step 4.
NO : Replace the battery. Then go to Step 11.

STEP 4. Charging system check
Refer to GROUP 16 – On–vehicle Service/Output Current Test P.16-9 (3.0L engine).

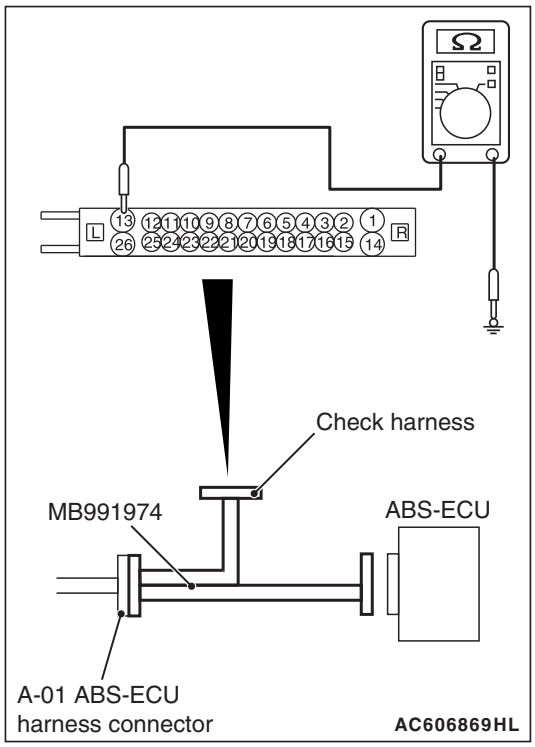
Q: Is the charging system in good condition?
YES : Go to Step 5.
NO : Repair or replace the charging system component(s). Then go to Step 11.

STEP 5. Connector check: A-01 ABS-ECU connector

Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the defective connector. Then go to Step 11.

STEP 6. Fusible link check: Check the fusible link No.26.
Visually check for open circuit in the fusible link No.26.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Go to Step 7.



STEP 7. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Disconnect the fusible link No.26.

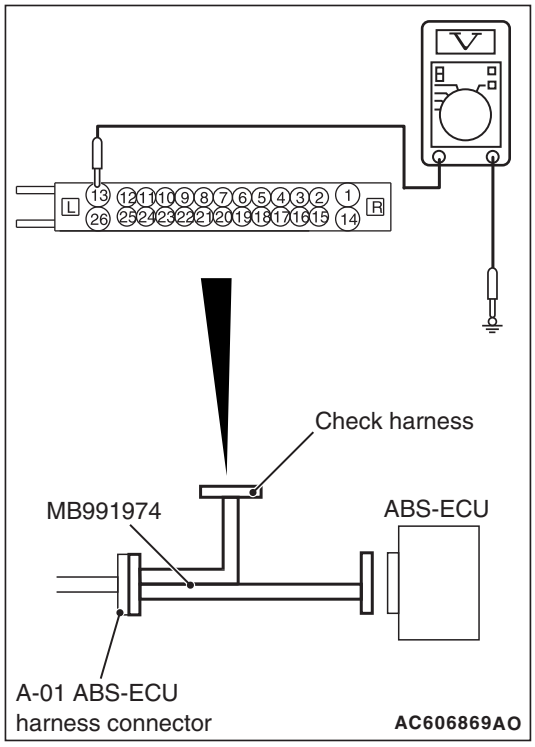
(3) Measure the resistance between the terminal No.13 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Replace the fusible link No.26. Then go to Step 11.

NO : The short circuit may be present in the power supply circuit. Repair the wiring harness between the A-08 ABS-ECU connector terminal No.13 and the fusible link No.26, and then replace the fusible link No.26. Then go to Step 11.



STEP 8. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

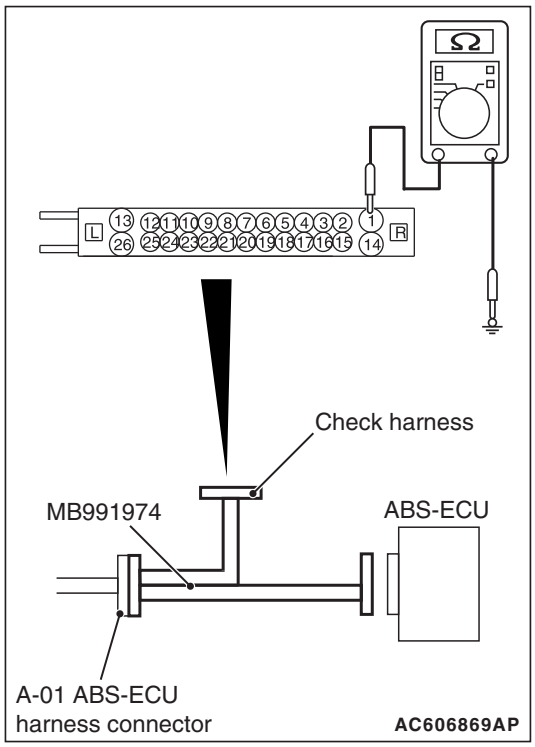
(2) Measure the voltage between the terminal No.13 and the body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 9.

NO : The open circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.13 and the fusible link No.26. Then go to Step 11.



STEP 9. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Measure the resistance between the terminal No.1 and the body ground, and between the terminal No.14 and the body ground.

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 10.

NO : An open circuit may be present in the ground circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.1 and the body ground, and between the A-01 ABS-ECU connector terminal No.14 and the body ground. Then go to Step 11.

STEP 10. Check whether the DTC is reset.

(1) Erase the DTC.

(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

Q: Is the DTC C2116 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 11.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 11. Check whether the DTC is reset.

(1) Erase the DTC.

(2) Drive the vehicle at 12mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12mph (20 km/h) or higher.

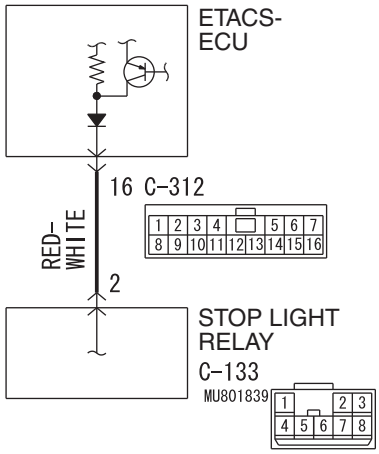
Q: Is the DTC C2116 set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC C1000 Abnormality in stop light switch circuit

Stop Light Relay Circuit



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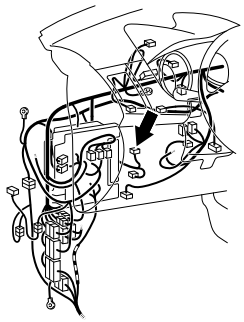
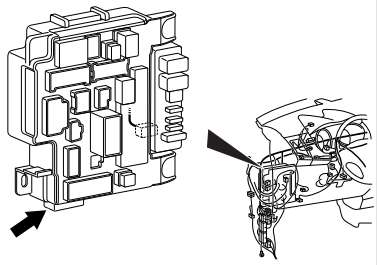
Connector: C-133



AC901075BD

Connector: C-312



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⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

OPERATION

ETACS-ECU sends the ON signal generated when the brake pedal is depressed and OFF signal generated when it is released to ABS-ECU via the CAN bus lines.

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DTC SET CONDITIONS

This DTC is set in the following case.

- When the vehicle has run for a long time with the stoplight switch turned ON.
- When the OFF status of the stoplight switch does not match the vehicle attitude

PROBABLE CAUSES

- Malfunction of the stoplight relay
- Damaged wiring harness and connectors
- ETACS-ECU malfunction
- ABC-ECU malfunction

DIAGNOSIS

Required Special Tools:

- MB991958 Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827 M.U.T.-III USB Cable
  - MB991910 M.U.T.-III Main Harness A

STEP 1. Check that the stoplight of the rear combination light illuminates normally.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Diagnose the rear combination light (Refer to GROUP 54A – Rear Combination light/Trouble Symptom Chart P.54A-243). On completion, go to Step 2 .

STEP 2. Using scan tool MB991958, diagnose the CAN bus lines.

Use M.U.T.-III to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 4.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 3.

STEP 3. DTC recheck after resetting CAN bus lines

Q: Is DTC C1000 set?

YES : Go to Step 4.

NO : The procedure is complete.

STEP 4. Battery check

Refer to GROUP 54A – Battery Test P.54A-9.

Q: Is the battery in good condition?

YES : Go to Step 5.

NO : Charge or replace the battery, and go to Step 10.

STEP 5. Connector check: C-312 ETACS-ECU connector

Q: Is the check result normal?

YES : Go to Step 6.
NO : Repair the damaged connector.

STEP 6. Measure the voltage at the C-312 ETACS-ECU connector.

(1) Measure by backprobing without disconnecting the ETACS-ECU connector and stoplight switch connector.
(2) Disconnecting the C-133 stoplight relay connector.
(3) Measure the voltage between the C-312 ETACS-ECU connector terminal No.16 and the body ground.

OK:
When the brake pedal is released: Approximately 0 V – 5 V (pulse)
When the brake pedal is depressed: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 9.
NO : Go to Step 7.

STEP 7. Connector check: C-312 ETACS-ECU connector

Q: Is the check result normal?

YES : Go to Step 8.
NO : Repair the damaged connector.

STEP 8. Check the wiring harness between C-312 ETACS-ECU connector terminal No.16 and C-133 stoplight relay connector terminal No.2

- Check the signal line for open circuit.

Q: Is the check result normal?

YES : Go to Step 9.
NO : Replace the wiring harness.

STEP 9. Diagnostic trouble code recheck

Erase the DTC.

Q: Is diagnostic trouble code No.C1000 set?

YES : Replace the hydraulic unit (integrated with ABC-ECU) (Refer to P.35C-282). Then go to Step 10.
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 10. Diagnostic trouble code recheck

Erase the DTC.

Q: Is diagnostic trouble code No.C1000 set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC C2200 Abnormality in ABS-ECU

⚠ CAUTION
- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

OPERATION
ABS-ECU controls ABS by calculating the data sent from the wheel speed sensor and the G sensor.

DTC SET CONDITIONS
This DTC is set when ABS-ECU has malfunction.

PROBABLE CAUSES
ABS-ECU malfunction

DIAGNOSIS
Required Special Tools:
- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.
Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines
Erase the DTC.

Q: Is the DTC C2200 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 3.
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 3. DTC recheck after resetting CAN bus lines
Erase the DTC.

Q: Is the DTC C2200 set?

YES : Return to Step 1.
NO : This diagnosis is complete.

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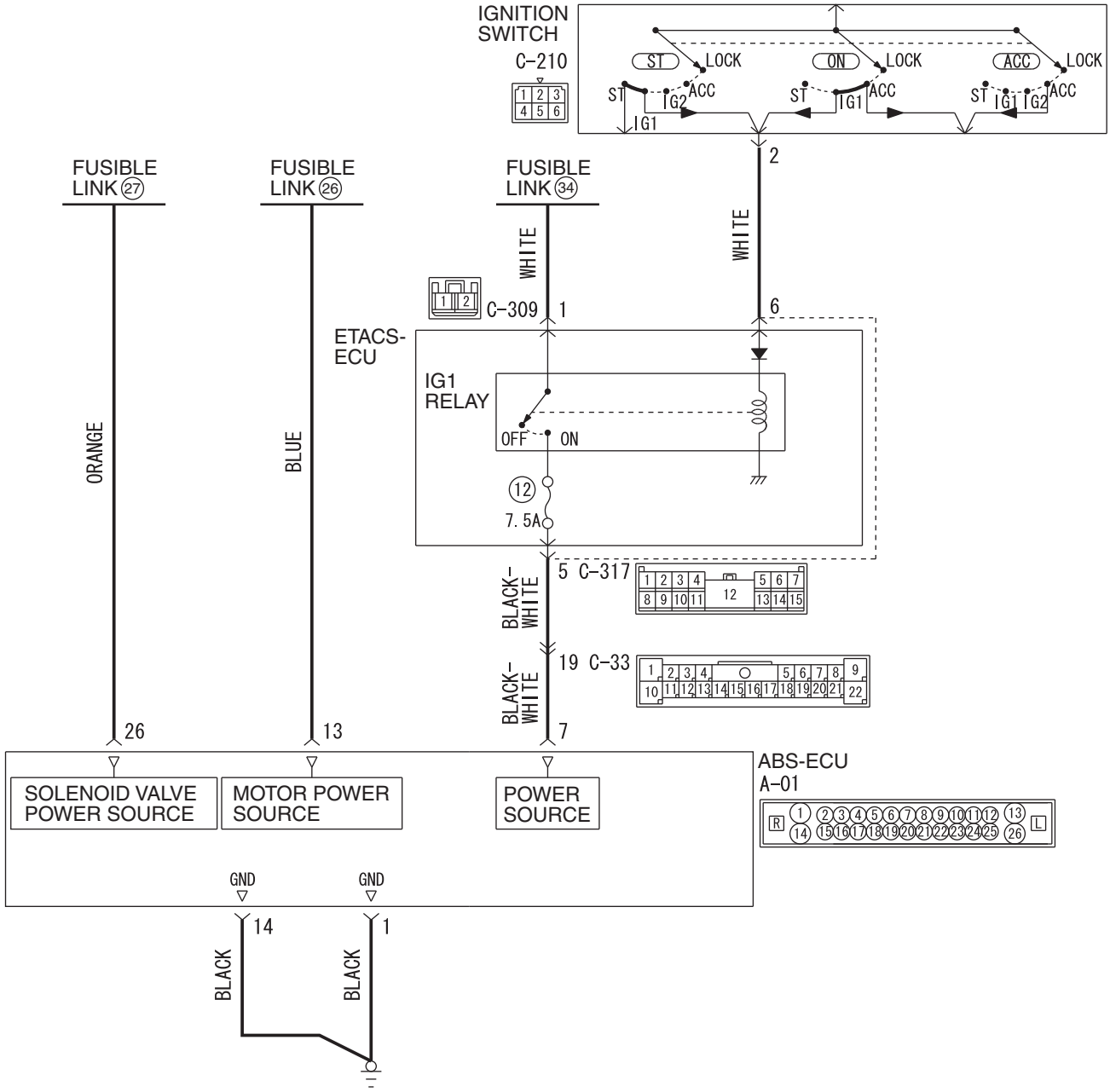
DTC C2100 Abnormality in battery voltage (low voltage)

ABS-ECU Power Supply Circuit



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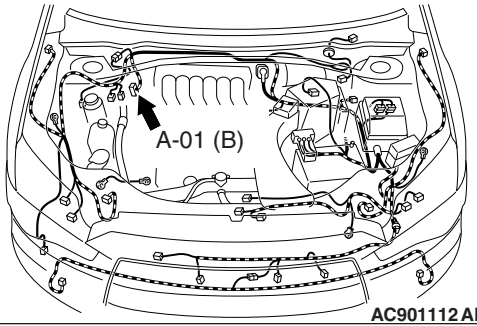
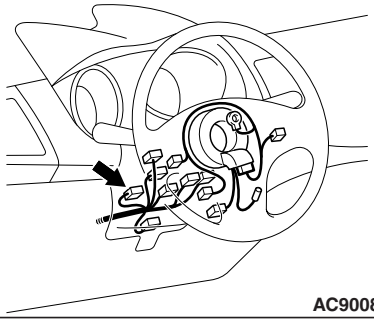
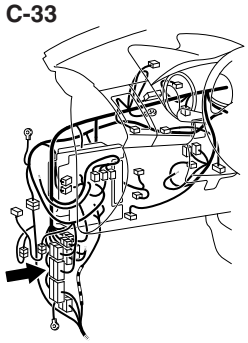
Connector: A-01



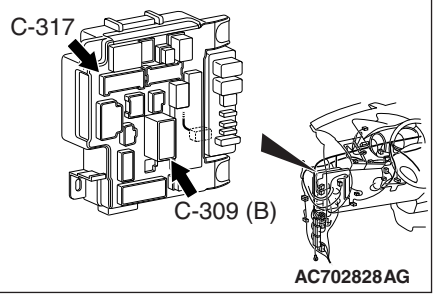
Connector: C-210



Connector: C-33



Connectors: C-309, C-317



⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

OPERATION

The ABS-ECU is energized by the valve power supply circuit (terminal No.26). When the power is supplied from the ignition switch (IG1) to the IG1 relay in ETACS-ECU, IG1 relay is turned on. At this time, the valve power supply circuit (terminal No.7) energizes the ABS-ECU.

DTC SET CONDITIONS

This DTC is set when the ABS-ECU power supply voltage drops below 9.7 ± 0.3 V during driving

PROBABLE CAUSES

- Battery failure
- Battery terminal loose
- Fusible link malfunction
- Damaged wiring harness and connectors
- ABS-ECU malfunction
- Charging system failed

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DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A
- MB991974: ABS check harness

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the CAN bus lines. (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17.) On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C2100 set?

YES : Go to Step 3.
NO : The procedure is complete.

STEP 3. Battery check

Refer to GROUP 54A – Battery Test P.54A-9.

Q: Is the battery in good condition?

YES : Go to Step 5.
NO : Charge or replace the battery. Then go to Step 4.

STEP 4. Charging system check

Refer to GROUP 16 – On–vehicle Service/Output Current Test P.16-9 (3.0L engine).

Q: Is the charging system in good condition?

YES : Go to Step 5.
NO : Repair or replace the charging system component(s).

STEP 5. Connector check: A-01 ABS-ECU connector, C-33 intermediate connector, C-210 ignition switch connector, C-309 ETACS-ECU connector, C-317 ETACS-ECU connector

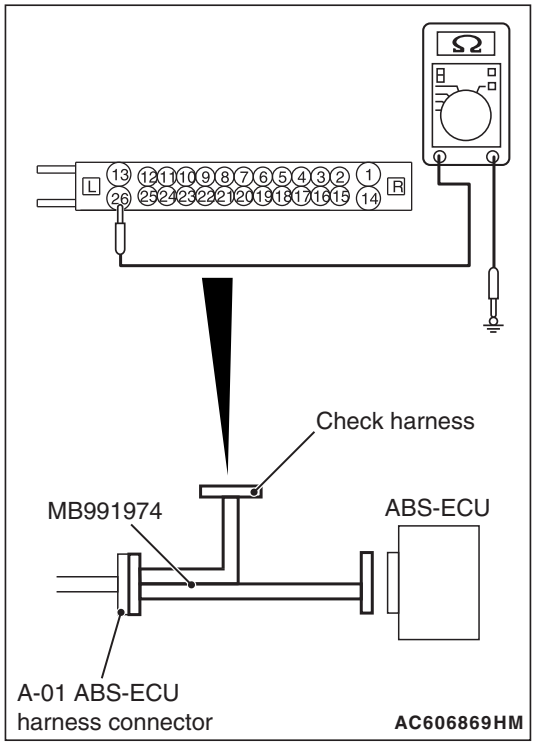
Q: Is the check result normal?

YES : Go to Step 6.
NO : Repair the damaged connector.

STEP 6. Fusible link check: Check the fusible link No.27.

Q: Is the check result normal?

YES : Go to Step 8.
NO : Go to Step 7.



STEP 7. Resistance measurement at A-01 ABS-ECU connector

(1) Removal the fusible link No.27.
(2) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

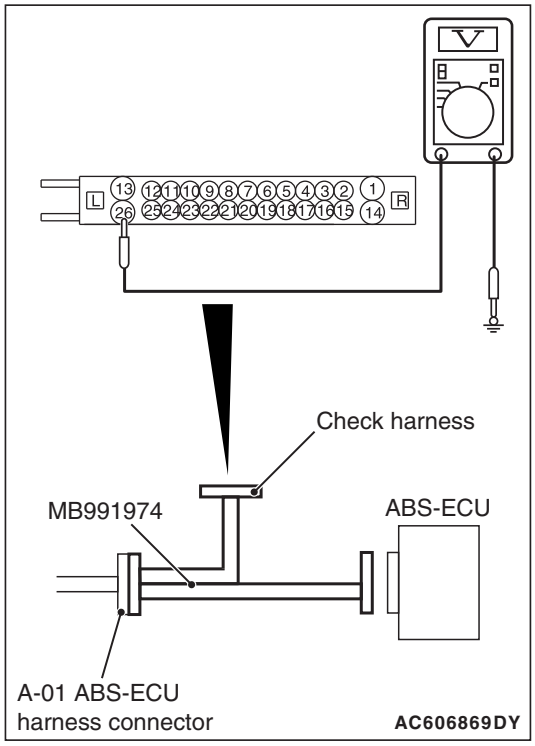
NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(3) Measure the resistance between the terminal No.26 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Replace the fusible link No.27. Then go to Step 20.
NO : The short circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.26 and the fusible link No.27, and then replace the fusible link No.27. Then go to Step 20.



STEP 8. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the voltage at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ASC-ECU.

(2) Measure the voltage between terminal No.26 and body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 9.
NO : The open circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.26 and the fusible link No.27. Then go to Step 20.

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STEP 9. Check the fuse No.12.

Visually check for open circuit in fuse No.12.

Q: Is the check result normal?

YES : Go to Step 11.
NO : Go to Step 10.

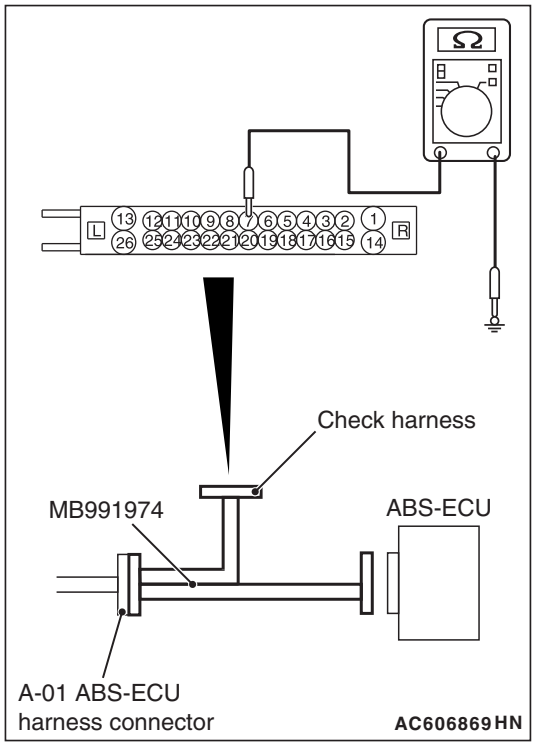
STEP 10. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the C-317 ETACS-ECU connector.
(2) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(3) Measure the resistance between the terminal No.7 and the body ground.

OK: No continuity



Q: Is the check result normal?

YES : Replace the fuse No.12. Then go to Step 20.
NO : The short circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.7 and the C-317 ETACS-ECU connector terminal No.5, and then replace the fuse No.12. Then go to Step 20.

STEP 11. Measure the voltage at the C-309 ETACS-ECU connector.

(1) Disconnect the connector, and measure at the wiring harness-side connector.
(2) Measure the voltage between the terminal No.1 and the body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 14.
NO : Go to Step 12.

STEP 12. Fusible link check: Check the fusible link No.34.

Q: Is the check result normal?

YES : Go to Step 14.
NO : Go to Step 13.

STEP 13. Resistance measurement at C-309 ETACS-ECU connector

(1) Removal the fusible link No.34.
(2) Disconnect the C-309 ETACS-ECU connector, and then measure the resistance at the harness connector side.
(3) Measure the resistance between the terminal No.1 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Replace the fusible link No.34. Then go to Step 20.
NO : The short circuit may be present in the power supply circuit. Repair the wiring harness between the C-309 ETACS-ECU connector terminal No.1 and the fusible link No.34, and then replace the fusible link No.34. Then go to Step 20.

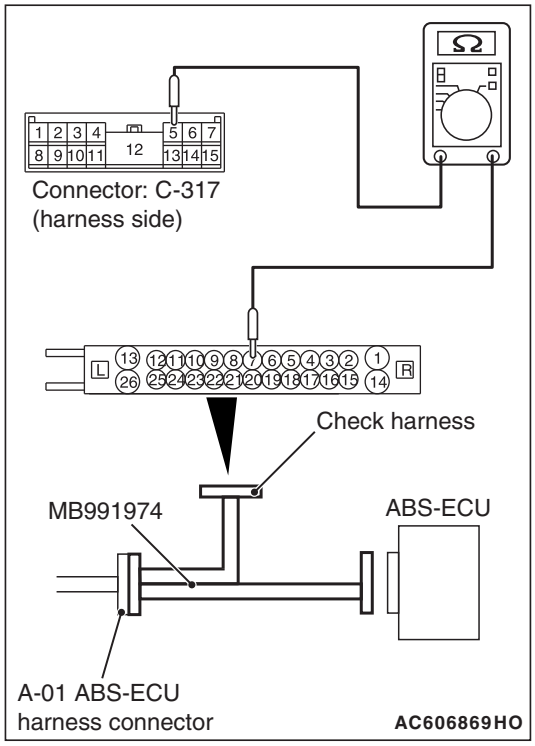
STEP 14. Resistance measurement at fusible link No.34 and C-309 ETACS-ECU connector

(1) Disconnect the C-309 ETACS-ECU connector and fusible link No.34, and then measure the resistance at the harness connector side.
(2) Measure the resistance between the fusible link No.34 and C-309 ETACS-ECU connector terminal No.1.

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 15.
NO : The open circuit may be present in the power supply circuit. Repair the wiring harness between the fusible link No.34 and C-309 ETACS-ECU connector terminal No.1. Then go to Step 20.



STEP 15. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the C-317 ETACS-ECU connector.
(2) Disconnect the A-01 ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(3) Measure the resistance between the A-01 ABS-ECU connector terminal No.7 and the C-317 ETACS-ECU connector terminal No.5.

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 16.
NO : The open circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.7 and the C-317 ETACS-ECU connector terminal No.5. Then go to Step 20.

STEP 16. Measure the voltage at the C-317 ETACS-ECU connector.

(1) Measure by backprobing without disconnecting the connector.
(2) Turn the ignition switch to the ON position.
(3) Measure the voltage between the terminal No.6 and the body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 18.
NO : Go to Step 17.

STEP 17. Resistance measurement at C-317 ETACS-ECU connector and the C-210 ignition switch connector

(1) Disconnect the C-317 ETACS-ECU connector and C-210 ignition switch connector, and then measure the resistance at the harness connector side.
(2) Measure the resistance between the C-317 ETACS-ECU connector terminal No.6 and C-210 ignition switch connector terminal No.2.

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 18.
NO : The open circuit may be present in the power supply circuit. Repair the wiring harness between the C-317 ETACS-ECU connector terminal No.6 and C-210 ignition switch connector terminal No.2. Then go to Step 20.

STEP 18. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

Q: Is the DTC C2100 set?

YES : Replace the ETACS-ECU (Refer to GROUP 54A – ETACS-ECU P.54A-825). Then go to Step 19.
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 19. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

Q: Is the DTC C2100 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 20.
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 20. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

Q: Is the DTC C2100 set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC C2101 Abnormality in battery voltage (high voltage)

⚠ CAUTION
If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

OPERATION
The ABS-ECU is energized by the valve power supply circuit (terminal No.26). When the power is supplied from the ignition switch (IG1) to the IG1 relay in ETACS-ECU, IG1 relay is turned on. At this time, the valve power supply circuit (terminal No.7) energizes the ABS-ECU.

DTC SET CONDITIONS
This DTC is set when the ABS-ECU power supply voltage is more than 18.0 ± 1.0 V.

PROBABLE CAUSES
- Battery failure
- ABS-ECU malfunction
- Charging system failed

DIAGNOSIS
Required Special Tools:
- MB991958 Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827 M.U.T.-III USB Cable
  - MB991910 M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.
Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C2101 set?
YES : Go to Step 3.
NO : The procedure is complete.

STEP 3. Battery check
Refer to GROUP 54A – Battery Test P.54A-9.

Q: Is the battery in good condition?
YES : Go to Step 5.
NO : Charge or replace the battery. Then go to Step 4.

STEP 4. Charging system check
Refer to GROUP 16 – On–vehicle Service/Output Current Test P.16-9 (3.0L engine).

Q: Is the charging system in good condition?
YES : Go to Step 5.
NO : Repair or replace the charging system component(s).

STEP 5. Check whether the DTC is reset.
(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

Q: Is DTC C2101 set?
YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 6.
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunction P.00-15).

STEP 6. Check whether the DTC is reset.
(1) Erase the DTC.
(2) Drive the vehicle at 12mph (20 km/h) or higher.

Q: Is DTC C2101 set?
YES : Return to Step 1.
NO : The procedure is complete.

DTC C1395 Brake fluid filling not complete

⚠ CAUTION
If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

DTC SET CONDITIONS
This DTC is set when the brake fluid is not filled in the hydraulic unit.

PROBABLE CAUSES
- Different hydraulic unit (For delivery to factory)
- ABS-ECU malfunction

DIAGNOSIS
Required Special Tools:
- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.
Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. Check whether the DTC is reset.
Erase the DTC.

Q: Is the DTC C1395 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188).
NO : This diagnosis is complete.

DTC C2203 VIN not recorded

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **When other DTC for ABS-ECU is set, troubleshoot that DTC first.**

OPERATION
ABS-ECU receives vehicle information from the engine control module and stores it.

DTC SET CONDITIONS
This DTC is set when ABS-ECU cannot receive the vehicle information from the engine control module.

PROBABLE CAUSES
- Malfunction of the CAN bus
- Engine control module malfunction
- ABS-ECU malfunction
- When the ignition switch is turned to the "ON" position for the first time after the ABS-ECU is replaced.

DIAGNOSIS
Required Special Tools:
- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is the DTC C2203 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Scan tool DTC

Check that the engine control module sets a DTC.

Q: Is the DTC set?

YES (3.0L engine) : Troubleshoot the engine control module DTC (Refer to GROUP 13B – Diagnostic Trouble Code Chart P.13B-50). Then go to Step 5.

NO : Go to Step 4.

STEP 4. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Ignition switch: "LOCK" (OFF) position
(3) Ignition switch: "ON" position

Q: Is the DTC C2203 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 5.

NO : If a trouble is solved, it is determined that there is an intermittent malfunction such as poor engaged connector(s) or open circuit (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 5. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Ignition switch: "LOCK" (OFF) position
(3) Ignition switch: "ON" position

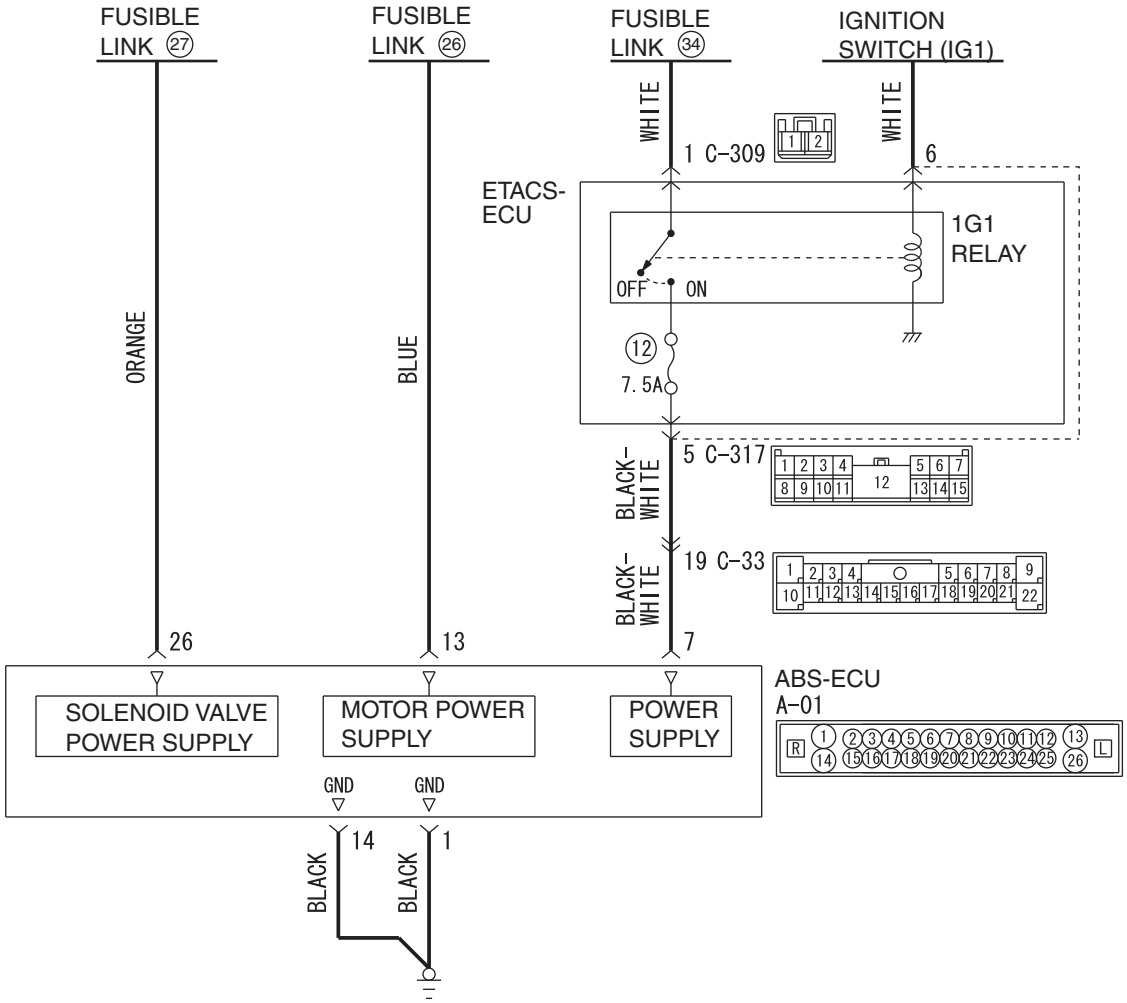
Q: Is the DTC C2203 set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC C1608 Implausible diagnosis data

Power Supply Circuit



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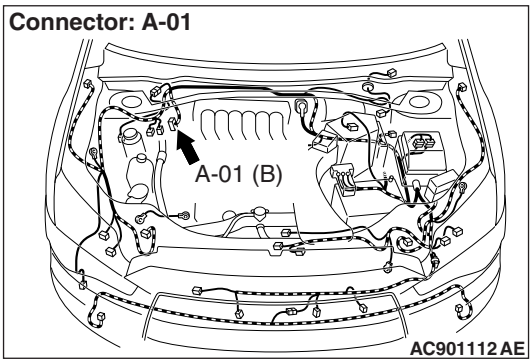

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⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **If the ABS-ECU connector is disconnected or the battery terminal is disconnected when the ignition switch is ON, this DTC may be set.**
- **Since the failure information stored in the past is erased after this diagnosis is carried out, reproduce the state of malfunction.**

OPERATION

The ABS-ECU stores DTCs and failure information in the EEPROM*.
The ABS-ECU is energized by the solenoid valve power supply circuit (terminal No.26).

*NOTE: *:EEPROM (Electrical Erasable and Programmable ROM)*

DTC SET CONDITIONS

- This DTC is set when the failure information stored in the EEPROM is not reliable. The failure information stored in the past is not output, and only this DTC is set.
- This DTC may occur when ABS-ECU power supply shutdown or drop between ABS-ECU is writing a data to the EEPROM.

PROBABLE CAUSES

- Disconnection of the ABS-ECU connector or the battery terminal when the ignition switch is ON
- Loose battery terminal
- Abnormality in battery
- Damaged wiring harness and connectors
- ABS-ECU malfunction

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A
- MB991974: ABS check harness

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is the DTC C1608 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Battery check

Refer to GROUP 54A – Battery Test P.54A-9.

Q: Is the battery in good condition?

YES : Go to Step 5.

NO : Go to Step 4.

STEP 4. Charging system check

Refer to GROUP 16 – On–vehicle Service/Output Current Test P.16-9 (3.0L engine).

Q: Is the charging system in good condition?

YES : Replace the battery. Then go to Step 9.

NO : Repair or replace the charging system component(s).

STEP 5. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

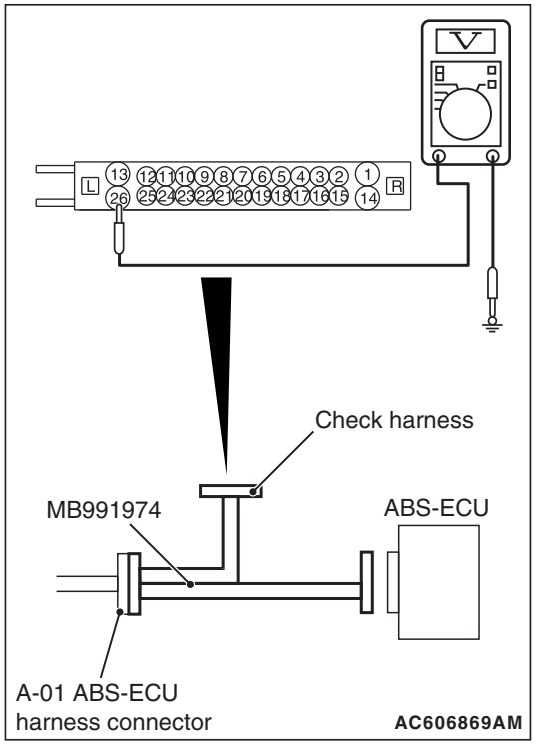
(2) Measure the voltage between the terminal No.26 and the body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 7.

NO : Go to Step 6.



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STEP 6. Connector check: A-01 ABS-ECU connector

Q: Is the check result normal?

YES : The open or short circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.26 and the fusible link No.27.

NO : Repair the defective connector.

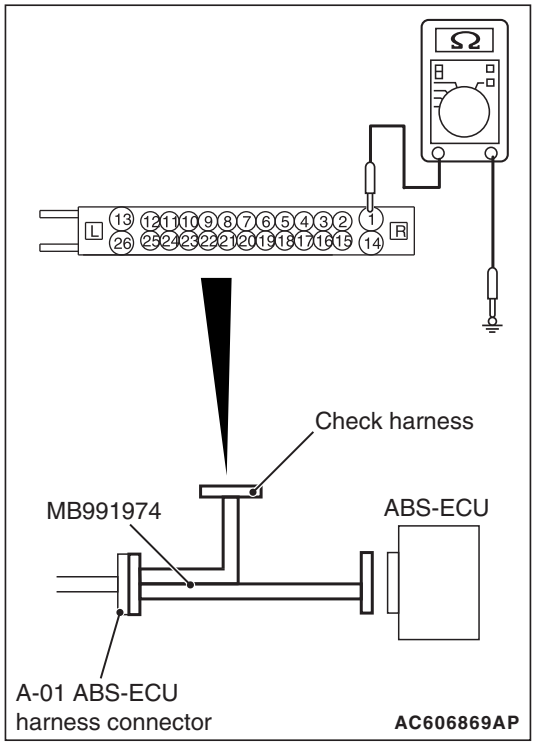
STEP 7. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Measure the resistance between the terminal No.1 and the body ground, and between the terminal No.14 and the body ground.

OK: Continuity exists (2 Ω or less)



Q: Is the check result normal?

YES : Go to Step 9.

NO : Go to Step 8.

STEP 8. Connector check: A-01 ABS-ECU connector

Q: Is the check result normal?

YES : An open circuit may be present in the ground circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.1 and the body ground, and between the A-01 ABS-ECU connector terminal No.14 and the body ground.

NO : Repair the defective connector.

STEP 9. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Turn the ignition switch to the "LOCK" (OFF) position.
(3) Turn the ignition switch to the "ON" position.
(4) Drive the vehicle at 12 mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12 mph (20 km/h) or higher.

Q: Is any DTC set?

YES (DTC C1608 is set) : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188).
YES (DTC other than C1608 is set) : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35C-282). Then go to step 10.
NO : Go to step 11.

STEP 10. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Turn the ignition switch to the "LOCK" (OFF) position.
(3) Turn the ignition switch to the "ON" position.
(4) Drive the vehicle at 12 mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12 mph (20 km/h) or higher.

Q: Is DTC C1608 set?

YES : Return to Step 1.
NO : Go to step 11.

STEP 11. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Turn the ignition switch to the "LOCK" (OFF) position.
(3) Turn the ignition switch to the "ON" position.
(4) Drive the vehicle at 12 mph (20 km/h) or higher.

NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12 mph (20 km/h) or higher.

Q: Is any DTC set?

YES : Carry out the applicable troubleshooting for the diagnostic trouble code (Refer to P.35B-15).
NO : The procedure is complete.

DTC U0001 Bus off

⚠ CAUTION
- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **If DTC U0001 is set in ABS-ECU, always diagnose the CAN bus line. If there is any fault in the CAN bus lines, an incorrect DTC may be set. In this case, the set DTC is not highly reliable.**
- **Before replacing the ECU, ensure that the communication circuit is normal.**

DTC SET CONDITIONS
This DTC is set when ABS-ECU has ceased the CAN communication (bus off).

COMMENTS ON TROUBLE SYMPTOM
Malfunction of wiring harness, connector (s), or ABS-ECU may be present.

PROBABLE CAUSES
- Wiring harness or connector failure of CAN bus line
- ABS-ECU malfunction
- Other ECU malfunction

DIAGNOSIS
Required Special Tools:
- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.
Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 3.

STEP 2. Check whether the DTC is reset.
Erase the DTC.

Q: Is the DTC U0001 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188).

NO : If the trouble symptom is resolved, an intermittent malfunction such as poorly engaged connector(s) or wiring harness is suspected (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 3. Check whether the DTC is reset.
Erase the DTC.

Q: Is the DTC U0001 set?

YES : Return to Step 1.

NO : This diagnosis is complete.

DTC U0100 Engine time-out error
DTC U0141 ETACS time-out error

⚠ CAUTION

- **If the DTCs U0100 and U0141 are set in ABS-ECU, always diagnose the CAN bus line. If there is any fault in the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10), an incorrect DTC may be set. In this case, the set DTC is not highly reliable.**
- **Before replacing the ECU, ensure that the communication circuit is normal.**

OPERATION

ABS-ECU communicates with the engine control module (ECM), AWD-ECU and ETACS-ECU via the CAN bus lines.

DTC SET CONDITIONS

This DTC is set if ABS-ECU cannot receive the signal sent from other ECU for a certain period.

PROBABLE CAUSES

DTC U0100

- Wiring harness or connector failure of CAN bus line
- Engine control module (ECM) malfunction
- ABS-ECU malfunction
- Connector disconnected or improperly connected
- Stretched or broken wires

DTC U0141

- Wiring harness or connector failure of CAN bus line
- Malfunction of ETACS-ECU
- ABS-ECU malfunction
- Connector disconnected or improperly connected
- Stretched or broken wires

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 4.

STEP 2. Check whether the DTC is reset.

Q: Is DTC U0100 or U0141 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Scan tool other system DTC

Use scan tool MB991958 to check that other DTC is set in the ECU corresponding to the relevant diagnosis.

Q: Is other DTC set?

YES : Troubleshoot for the relevant DTC.

NO : Go to Step 4.

STEP 4. Connector check: ABS-ECU connector

Q: Is the check result normal?

YES : Go to Step 5.

NO : Repair the defective connector. Then go to Step 5.

STEP 5. ETACS-ECU coding data check

Check the following coding data stored in ETACS-ECU (Refer to GROUP 00 – Precautions before Service/Coding List P.00-44).

Q: Is the check result normal?

YES : Go to Step 6.

NO : Replace the ETACS-ECU (Refer to GROUP 54A – ETACS-ECU P.54A-825). Then go to Step 6.

STEP 6. Check whether the DTC is reset.
Erase the DTCs.

Q: Is DTC U0100 or U0141 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188).
NO : The procedure is complete.

DTC U1415 Variant coding not completed

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect diagnostic trouble code may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **When the DTC U1415 is set in ABS-ECU, the DTC may also be set in ETACS-ECU. When the DTC is set in ETACS-ECU, carry out the diagnosis of the DTC for ETACS-ECU first.**

OPERATION

- ABS-ECU receives the vehicle information stored in the ETACS-ECU via CAN bus lines.
- The ABS-ECU stores the tire size information sent from the ETACS.

DTC SET CONDITIONS

This DTC is set when the tire size information is not coded to the ABS-ECU.

PROBABLE CAUSES

- Variant coding for ETACS-ECU has not been implemented.
- Malfunction of ABS-ECU.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.
Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 4.

TSB Revision

STEP 2. Scan tool other system DTC

Use scan tool MB991958 to check that the DTC B222C is set in the ETACS-ECU.

Q: Is any DTC set?

YES : Troubleshoot the relevant DTC, and then go to Step 4.

NO : Go to Step 3.

STEP 3. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Turn the ignition switch to the "ON" position.
(3) Turn the ignition switch to the "OFF" position.
(4) Check that the ABS warning light goes out when the ignition switch is turned to the "ON" position.

Q: Is the DTC U1415 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 4.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 4. Check whether the DTC is reset.

(1) Erase the DTC.
(2) Turn the ignition switch to the "ON" position.
(3) Turn the ignition switch to the "OFF" position.
(4) Check that the ABS warning light goes out when the ignition switch is turned to the "ON" position.

Q: Is the DTC U1415 set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC U1417 Variant coding value invalid (includes faulty installation)

⚠ CAUTION

- **If DTC U1417 is set in ABS-ECU, always diagnose the CAN bus lines. If there is any fault in the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10), an incorrect DTC may be set. In this case, the set DTC is not highly reliable.**
- **Before replacing the ECU, ensure that the communication circuit is normal.**
- **When the DTC U1417 is set in ABS-ECU, the DTC may also be set in ETACS-ECU. When the DTC is set in ETACS-ECU, carry out the diagnosis of the DTC for ETACS-ECU first.**

OPERATION

ABS-ECU receives the vehicle information stored in the ETACS-ECU via CAN bus lines.

TSB Revision

DTC SET CONDITIONS

ABS-ECU communicates with ETACS-ECU via CAN bus lines. This DTC is set when there is difference between the vehicle information from the ETACS-ECU and the vehicle information stored in the ABS-ECU.

PROBABLE CAUSES

- Malfunction of ETACS-ECU
- ETACS-ECUs have been interchanged between two vehicles.
- ABS-ECU malfunction
- External noise interference
- ABS-ECUs have been interchanged between two vehicles.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is the DTC U1417 set?

YES : Go to Step 3.
NO : The procedure is complete.

STEP 3. Scan tool other system DTC

Use scan tool MB991958 to check whether the ETACS-ECU-related or engine control module-related DTC is set or not.

Q: Is any DTC set?

YES : Troubleshoot for the relevant DTC.
NO : Go to Step 4.

STEP 4. Check ETACS coding data

Refer to GROUP 00 – Precautions before Service/Coding List P.00-44.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Go to Step 5.

STEP 5. ETACS-ECU variant coding
Perform the variant coding to the ETACS-ECU.

Q: Dose variant coding succeed?

YES : Go to Step 7.
NO : Replace the ETACS-ECU (Refer to GROUP 54A – ETACS-ECU P.54A-825), and then go to Step 7.

STEP 6. Check part number of ABS-ECU
Check the part number of ABS-ECU.

Q: Is the check result normal?

YES : Go to Step 7.
NO : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 8.

STEP 7. Check whether the DTC is reset.
Erase the DTC.

Q: Is the DTC U1417 set?

YES : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 8.
NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

STEP 8. Check whether the DTC is reset.
Erase the DTC.

Q: Is the DTC U1417 set?

YES : Return to Step 1.
NO : The procedure is complete.

SYMPTOM CHART

M1352011401582

⚠ CAUTION

- **ABS may operate in the following conditions without hard braking: Slippery road surface, high-speed turn, and bumpy road surface. When asking the customers, confirm that they have/have not encountered ABS operation in corresponding conditions.**
- **During ABS operation, the brake pedal is pulled forward gradually, and noise occurs at the same time. This is because the brake line pressure varies intermittently to prevent the wheel lock, and not a system malfunction.**
- **During diagnosis, a diagnostic trouble code associated with other system may be set when the ignition switch is turned on with connector(s) disconnected. On completion, check all systems for diagnostic trouble code(s). If diagnostic trouble code(s) are set, erase them all.**

Symptoms	Inspection procedure No.	Reference page
Scan tool cannot communicate only with ABS-ECU.	1	P.35B-150
Brake warning light stays ON with the parking brake lever released.	2	P.35B-151
ABS warning light does not illuminate when ignition switch is turned to the ON position (Engine stopped).	3	P.35B-157
Brake warning light does not illuminate when the ignition switch is turned to ON position (Engine stopped).	4	P.35B-159
ABS warning light stays ON after the engine is started.	5	P.35B-161
Abnormality in brake operation	6	P.35B-163
ABS system inoperative	7	P.35B-163
ABS-ECU power supply circuit system	8	P.35B-165
ABS operate too frequently.	9	P.35B-175
The initial check sound of hydraulic unit is loud.	10	P.35B-178

SYMPTOM PROCEDURES

Inspection Procedure 1: Scan tool cannot communicate only with ABS-ECU.

⚠ CAUTION
If there is any problem in the CAN bus lines, an incorrect diagnostic trouble code may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

TECHNICAL DESCRIPTION (COMMENT)

When scan tool cannot communicate with the ABS system, the CAN bus line, ABS-ECU power supply circuit system, or ABS-ECU may be faulty.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CASE:)

- Damaged wiring harness and connectors
- ABS-ECU malfunction
- Wrong routing of M.U.T.-III harness
- Abnormality in battery or generator
- Abnormality in power supply voltage to ABS-ECU
- ECU malfunction of other system

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool to diagnose the CAN bus lines.

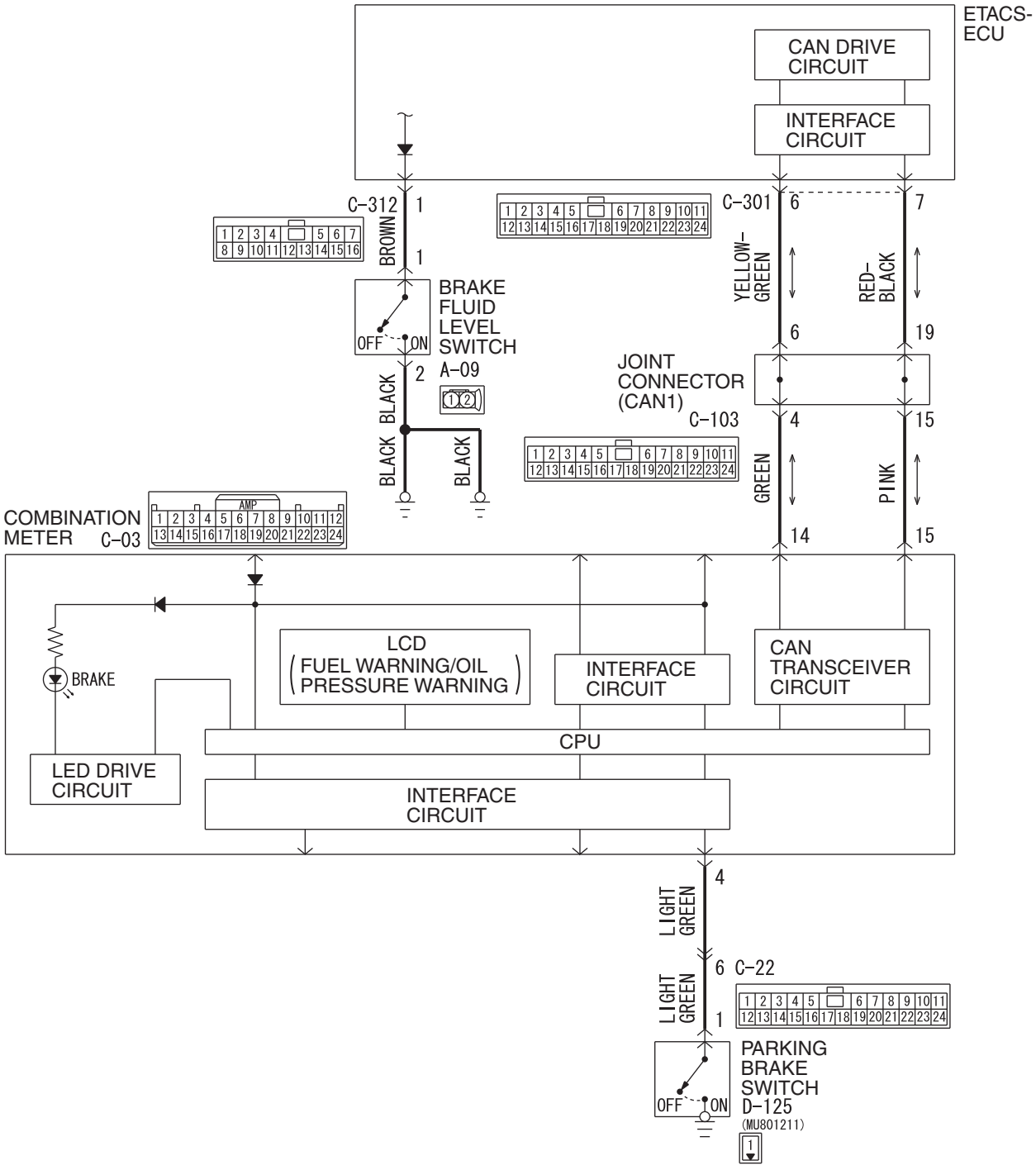
Q: Is the check result normal?

YES : Check and repair the power supply circuit system (Refer to P.35B-165).

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-10).

Inspection Procedure 2: Brake warning light stays ON with the parking brake lever released.

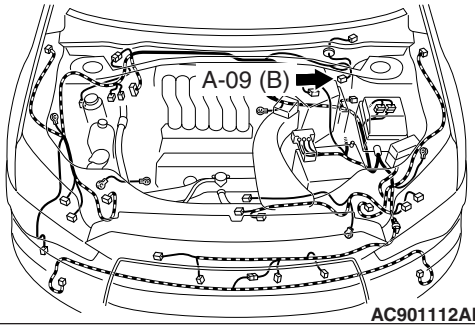
Brake Warning Light Circuit



ACA02742

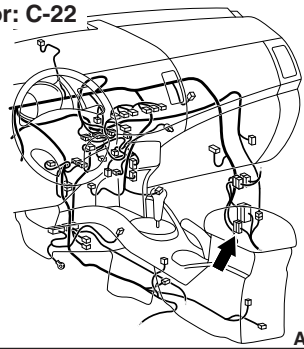
TSB Revision

Connector: A-09



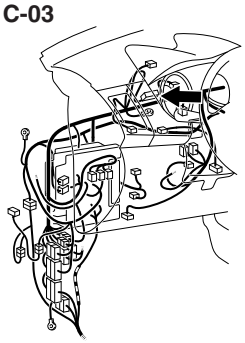
AC901112AM

Connector: C-22



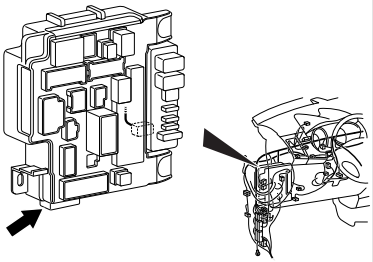
AC901076AG

Connector: C-03



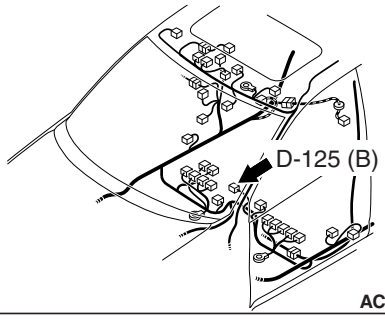
AC901075AC

Connector: C-312



AC702828AE

Connector: D-125



AC901079AY

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

OPERATION

- When the parking brake switch is turned ON, the combination meter terminal No. 4 is grounded, and then the brake warning light illuminates.
- When reduction of the brake fluid amount is detected, the brake fluid level switch is turned from ON to OFF. ETACS-ECU monitors the brake fluid level switch, and instructs the combination meter via the CAN bus line to illuminate the brake warning light.

TSB Revision

COMMENTS ON TROUBLE SYMPTOM

This may be caused by ground fault in the parking brake switch circuit.

PROBABLE CAUSES

- The brake pad thickness is at the limit value or less.
- The brake fluid amount is at the "LOWER" level or lower.
- Poor adjustment of the parking brake lever
- Damaged wiring harness and connectors
- Parking brake switch malfunction
- Brake fluid level switch malfunction
- Combination meter malfunction
- Malfunction of ETACS-ECU

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-17).

STEP 2. Scan tool DTC.

Use scan tool MB991958 to check the diagnostic trouble code for the ABS system.

Q: Is the DTC set?

YES : Carry out the diagnosis for the DTC.
NO : Go to Step 3.

STEP 3. Scan tool DTC for other systems.

Use scan tool MB991958 to check that the DTC is set in the combination meter and ETACS-ECU.

Q: Is the DTC set?

YES : Carry out the diagnosis for the DTC.
NO : Go to Step 4.

STEP 4. Brake fluid level check

Check that the brake fluid is filled up to the "MIN" level or higher.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Go to Step 5.

STEP 5. Brake pad check

Refer to GROUP 35A – On-vehicle Service/Brake Pad Check P.35A-21.

Q: Is the check result normal?

YES : Fill the brake fluid up to the "MAX" level. Then go to Step 18.

NO : Replace the brake pad (Refer to GROUP 35A – On-vehicle Service/Brake Pad Replacement P.35A-21). Then go to Step 18.

STEP 6. Brake fluid level switch check

Refer to GROUP 35A – On-vehicle Service/Brake Fluid Level Switch Check P.35A-20.

Q: Is the check result normal?

YES : Go to Step 7.

NO : Replace the reservoir tank assembly (Refer to GROUP 35A – Master Cylinder Assembly and Brake Booster Assembly P.35A-30). Then go to Step 18.

STEP 7. Connector check: A-09 brake fluid level switch connector, C-312 ETACS-ECU connector

Q: Is the check result normal?

YES : Go to Step 8.

NO : Repair the damaged connector.

STEP 8. Measure the voltage at A-09 brake fluid level switch connector.

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the ON position.
(3) Measure the voltage between the terminal No.1 and the body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 10.

NO : Go to Step 9.

STEP 9. Measure the voltage at the C-312 ETACS-ECU connector.

⚠ CAUTION

With the C-312 ETACS-ECU connector kept connected, disconnect the A-09 brake fluid level switch connector.

(1) Turn the ignition switch to the ON position.
(2) Measure the voltage between terminal No. 1 and the body ground by backprobing.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Check the wiring harness between the C-312 ETACS-ECU connector terminal No.1 and the A-09 brake fluid level switch connector terminal No.1.
NO : Replace the ETACS-ECU (Refer to GROUP 54A – ETACS-ECU P.54A-825). Then go to Step 18.

STEP 10. Wiring harness check: between A-09 brake fluid level switch connector and body ground

Check for open circuit in the harness wire between A-09 brake fluid level switch connector terminal No.2 and body ground.

Q: Is the check result normal?

YES : Go to Step 11.
NO : Repair the wiring harness.

STEP 11. Parking brake lever stroke check

Refer to GROUP 36 – On-vehicle Service/Parking Brake Lever Stroke Check and Adjustment P.36-9.

Q: Is the check result normal?

YES : Go to Step 12.
NO : Adjust the parking brake lever stroke (Refer to GROUP 36 – On-vehicle Service/Parking Brake Lever Stroke Check and Adjustment P.36-9). Then go to Step 18.

STEP 12. Parking brake switch check

Refer to GROUP 36 – On-vehicle Service/Parking Brake Switch Check P.36-10.

Q: Is the check result normal?

YES : Go to Step 13.
NO : Replace the parking brake switch (Refer to GROUP 36 – Parking Brake Lever P.36-11). Then go to Step 18.

STEP 13. Connector check: D-125 parking brake switch connector

Q: Is the check result normal?

YES : Go to Step 14.
NO : Repair the damaged connector.

STEP 14. Measure the voltage at D-125 parking brake switch connector.

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the "ON" position.
(3) Measure the voltage between the terminal No.1 and the body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 17.
NO : Go to Step 15.

STEP 15. Connector check: C-03 combination meter connector, C-22 intermediate connector

Q: Is the check result normal?

YES : Go to Step 16.
NO : Repair the damaged connector.

STEP 16. Voltage measurement with C-03 combination meter connector

(1) Release the parking brake lever (status that the lever is not operated).
(2) Turn the ignition switch to the "ON" position.
(3) Measure the voltage between terminal No.4 and the body ground by backprobing without disconnecting the connector.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Repair the wiring harness between the C-03 combination meter connector terminal No.4 and the D-125 parking brake switch connector terminal No.1.
NO : Go to Step 17.

STEP 17. Retest the system.

Q: Does the brake warning light turn ON and OFF normally according to the parking brake lever operation?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).
NO : Replace the combination meter assembly (Refer to GROUP 54A – Combination Meter P.54A-118). Then go to Step 18.

STEP 18. Retest the system.

Q: Does the brake warning light turn ON and OFF normally according to the parking brake lever operation?

YES : The procedure is complete.
NO : Return to Step 1.

Inspection Procedure 3: ABS warning light does not illuminate when ignition switch is turned to the ON position (engine stopped).

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

SYSTEM OPERATION

- ABS-ECU sends the illumination request signal of the ABS warning light to the combination meter through ETACS-ECU via CAN communication.
- ABS-ECU illuminates the ABS warning light via ETACS-ECU for approximately 3 seconds for valve check with the ignition switch turned to the ON position.

TECHNICAL DESCRIPTION (COMMENT)

This may be caused by faults in the CAN bus line, ETACS-ECU, combination meter or ABS-ECU.

PROBABLE CAUSES

- Damaged wiring harness and connectors
- Malfunction of ETACS-ECU
- Combination meter malfunction
- ABS-ECU malfunction
- Malfunction of coding data for ETACS-ECU

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-10). Then go to Step 9.

STEP 2. M.U.T.-III diagnostic trouble code
Use M.U.T.-III to check the diagnostic trouble code for the ABS system.

Q: Is the diagnostic trouble code set?
YES : Carry out the diagnosis for the diagnostic trouble code (Refer to P.35B-15).
NO : Go to Step 3.

STEP 3. Scan tool actuator test
Perform the actuator test No.07 of the combination meter system, and check if the ABS warning light illuminates.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Troubleshoot the combination meter, then go to Step 4.

STEP 4. Check coding data
Refer to GROUP 00 – Precautions before Service/Coding List P.00-44.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Go to Step 5.

STEP 5. ETACS-ECU variant coding
Perform the variant coding to the ETACS-ECU.

Q: Dose variant coding succeed?
YES : Go to Step 9.
NO : Replace the ETACS-ECU (Refer to GROUP 54A – ETACS-ECU P.54A-825), and then go to Step 9.

STEP 6. Scan tool other system diagnostic trouble code
Using scan tool, check that the diagnostic trouble code No.U0141 is not set by the combination meter system.

Q: Is the diagnostic trouble code set?
YES : Troubleshoot the combination meter, then go to Step 9.
NO : Go to Step 7.

STEP 7. Scan tool other system diagnostic trouble code
Using scan tool, check that the diagnostic trouble code No.U0121 is not set by the ETACS system.

Q: Is the diagnostic trouble code set?
YES : Troubleshoot the ETACS-ECU (Refer to GROUP 54A – ETACS/DTC P.54A-741), then go to Step 9.
NO : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188), then go to Step 8.

STEP 8. Retest the system.

Q: Does the ABS warning light turn ON and OFF normally?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

NO : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 9.

STEP 9. Retest the system.

Q: Does the ABS warning light turn ON and OFF normally?

YES : The procedure is complete.

NO : Return to Step 1.

Inspection Procedure 4: Brake warning light does not illuminate when the ignition switch is turned to ON position (engine stopped).

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

CIRCUIT OPERATION

ABS-ECU sends the illumination request signal of the brake warning light to the combination meter through ETACS-ECU via the CAN communication.

TECHNICAL DESCRIPTION (COMMENT)

This may be caused by faults in the CAN bus line, ETACS-ECU, combination meter or ABS-ECU.

PROBABLE CAUSES

- Damaged wiring harness and connectors
- Malfunction of ETACS-ECU
- Combination meter malfunction
- ABS-ECU malfunction

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-10).

STEP 2. Scan tool diagnostic trouble code

Use scan tool to check the diagnostic trouble code for the ABS system.

Q: Is the diagnostic trouble code set?

YES : Carry out the diagnosis for the diagnostic trouble code (Refer to P.35B-15).

NO : Go to Step 3.

STEP 3. Scan tool other system diagnostic trouble code

Using scan tool, check that the diagnostic trouble code No.U0141 is not set by the combination meter system.

Q: Is the diagnostic trouble code set?

YES : Troubleshoot the combination meter, then go to Step 5.

NO : Go to Step 4.

STEP 4. Scan tool other system diagnostic trouble code

Using scan tool, check that the diagnostic trouble code No.U0121 is not set by the ETACS system.

Q: Is the diagnostic trouble code set?

YES : Troubleshoot the ETACS (Refer to GROUP 54A – ETACS/DTC P.54A-741), then go to Step 5.

NO : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188), then go to Step 5.

STEP 5. Retest the system.

Q: Does the brake warning light turn ON and OFF normally?

YES : The procedure is complete.

NO : Return to Step 1.

Inspection Procedure 5: ABS warning light stays ON after the engine is started.

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

SYSTEM OPERATION

- ABS-ECU sends the illumination request signal of the ABS warning light to the combination meter through ETACS-ECU via CAN communication.
- ABS-ECU illuminates the ABS warning light via ETACS-ECU for approximately 3 seconds for valve check with the ignition switch turned to the ON position.

TECHNICAL DESCRIPTION (COMMENT)

This may be caused by faults in the CAN bus line, ETACS-ECU, combination meter or ABS-ECU.

PROBABLE CAUSES

- Damaged wiring harness and connectors
- Malfunction of ETACS-ECU
- Combination meter malfunction
- ABS-ECU malfunction

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-10). Then go to Step 6.

STEP 2. Scan tool diagnostic trouble code

Use scan tool to check the diagnostic trouble code for the ABS system.

Q: Is the diagnostic trouble code set?

YES : Carry out the diagnosis for the diagnostic trouble code (Refer to P.35B-15).

NO : Go to Step 3.

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STEP 3. Scan tool other system diagnostic trouble code
Using scan tool, check that the diagnostic trouble code U0141 is not set by the combination meter system.

Q: Is any DTC set?

YES : Troubleshoot the combination meter (Refer to GROUP 54A – Combination Meter/DTC P.54A-53), then go to Step 6.
NO : Go to Step 4.

STEP 4. Scan tool other system diagnostic trouble code
Using scan tool, check that the diagnostic trouble code U0121 is not set by the ETACS system.

Q: Is any DTC set?

YES : Perform troubleshooting on ETACS-ECU (Refer to GROUP 54A – ETACS/DTC P.54A-741). Then go to Step 6.
NO : Go to Step 5.

STEP 5. Retest the system.
Drive the vehicle more at 6 mph (10 km/h) or high.

Q: Does the ABS warning light turn ON and OFF normally?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).
NO : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 6.

STEP 6. Retest the system.
Drive the vehicle more at 6 mph (10 km/h) or high.

Q: Does the ABS warning light turn ON and OFF normally?

YES : The procedure is complete.
NO : Return to Step 1.

Inspection Procedure 6: Abnormality in brake operation

TECHNICAL DESCRIPTION (COMMENT)

- Although the cause of the trouble cannot be clearly resolved since it depends on the running status and road surface condition, the malfunction of the hydraulic circuit may occur if any diagnostic trouble code is not detected.

PROBABLE CAUSES

- Hydraulic unit (HU) malfunction

DIAGNOSIS

STEP 1. Hydraulic unit (HU) check

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Connect the brake tubes correctly, repair the external brake lines, or replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188).

STEP 2. Retest the system.

Q: Can any fault be found with the brake operation?

YES : Check the brake system related components except ABS.

NO : The procedure is complete.

Inspection Procedure 7: ABS system inoperative.

⚠ CAUTION

If there is any problem in the CAN bus lines, an incorrect diagnostic trouble code may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

TECHNICAL DESCRIPTION (COMMENT)

In case of this trouble symptom, ABS system operation may be disabled. Diagnostic trouble code may be set by the ABS system using scan tool.

PROBABLE CAUSES

- Low battery voltage
- Wiring harness or connector failure of CAN bus line
- ABS-ECU malfunction

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

Use scan tool to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C – CAN Bus Diagnostics Table P.54C-10). On completion, go to Step 2.

STEP 2. Diagnostic trouble code check after resetting CAN bus lines

Q: Is any DTC set?

YES : Carry out the relevant troubleshooting (Refer to P.35B-15).

NO : Go to Step 3.

STEP 3. Hydraulic unit (HU) check

Refer to P.35B-184.

Q: Is the check result normal?

YES : Go to Step 4.

NO : Repair the brake pipe or replace hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188).

STEP 4. Operation check

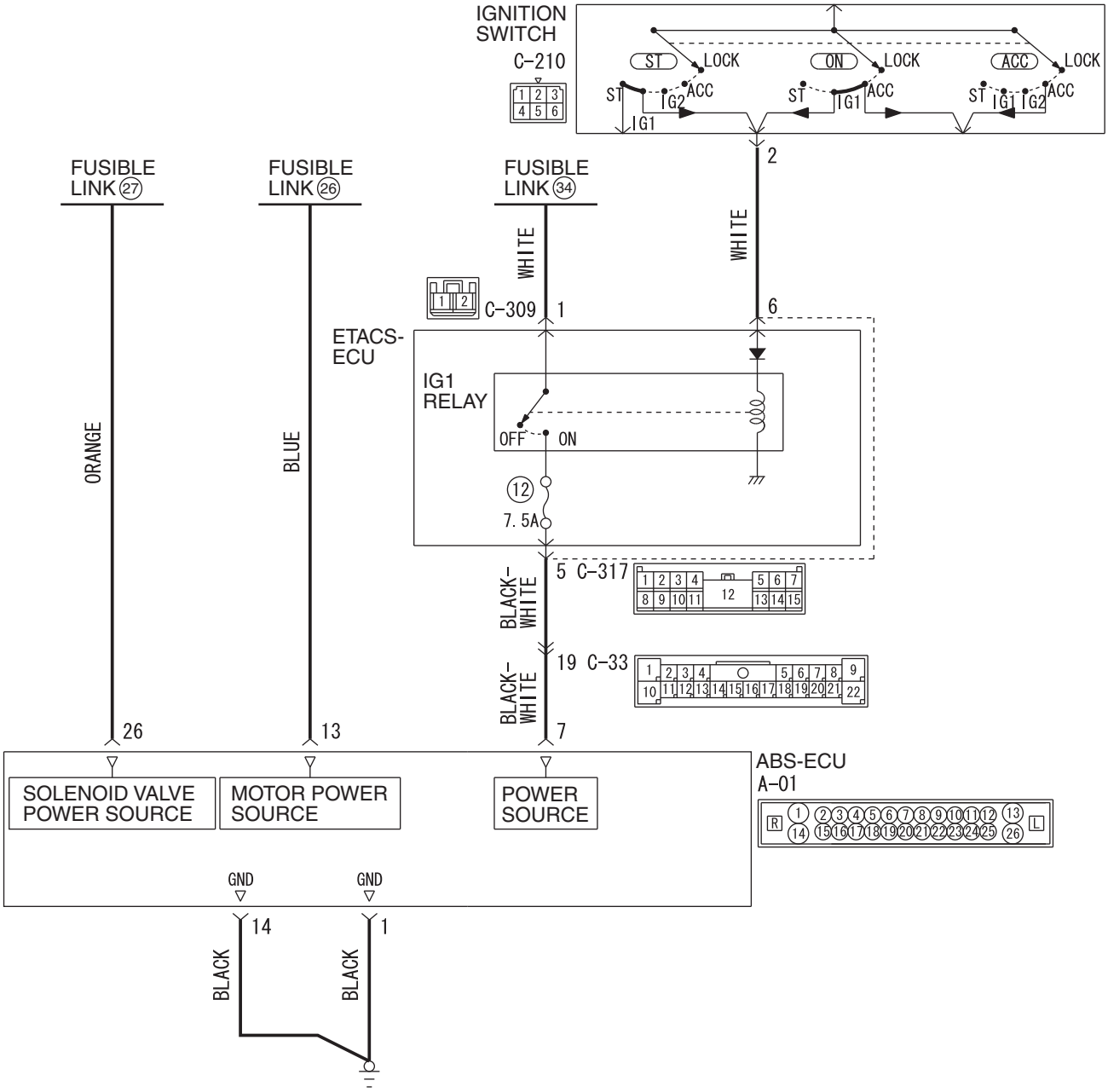
Q: Does ABS operate normally?

YES : The procedure is complete.

NO : Check the brake system related components except the ABS system.

Inspection Procedure 8: ABS-ECU power supply circuit system

ABS-ECU Power Supply Circuit



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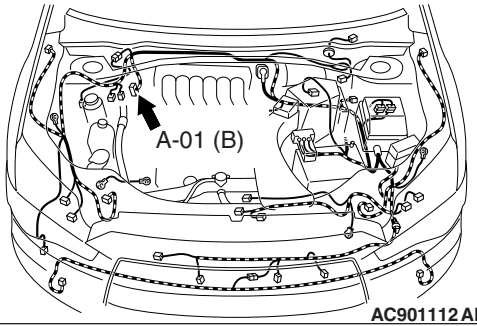
Connector: A-01



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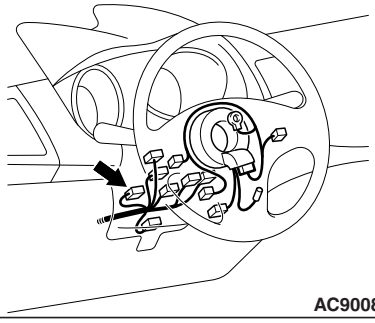
Connector: C-210



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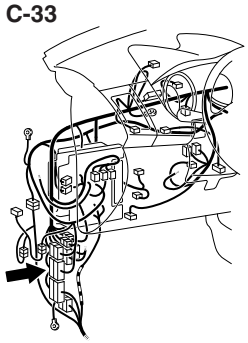
Connector: C-33



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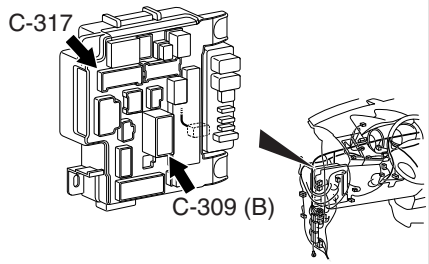
Connectors: C-309, C-317



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⚠ CAUTION

- **When the ABS-ECU power supply voltage becomes 9.7 ± 0.3 V or less, the ABS warning light illuminate, and the ABS control is prohibited.**
- **If the battery terminal is not tightened properly, a dump surge may occur and the power supply voltage may become abnormally high for a short time.**

OPERATION

- ABS-ECU contains the power supply circuit (terminal No.26) for the solenoid valve. The solenoid valve is energized by the valve relay, which is incorporated in ABS-ECU.
- ABS-ECU contains the power supply circuit (terminal No. 13) for the pump motor. The pump motor is energized by the motor relay, which is incorporated in ABS-ECU.
- ABS-ECU contains the power supply circuit (terminal No.7) for ABS-ECU. When the ignition switch (IG1) is turned ON, the voltage is applied to the relay incorporated in ETACS-ECU to turn ON the relay, and the power is supplied from fusible link No.34 through multi-purpose fuse No.12.
- When malfunction occurs in ABS-ECU power supply, the communication with scan tool becomes unavailable.

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PROBABLE CAUSES

- Damaged wiring harness and connectors
- Malfunction of fuse and fusible link
- Improper tightening of battery terminal
- Improper tightening of ground bolt
- Battery failure
- Charging system failed
- Malfunction of ABS-ECU

DIAGNOSIS

Required Special Tools:

- MB991958 Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827 M.U.T.-III USB Cable
  - MB991910 M.U.T.-III Main Harness A
- MB991974: ABS check harness

STEP 1. Battery check

Refer to GROUP 54A – Battery Test P.54A-9.

Q: Is the battery in good condition?

YES : Go to Step 3.
NO : Charge or replace the battery. Then go to Step 2.

STEP 2. Charging system check

Refer to GROUP 16 – On–vehicle Service/Output Current Test P.16-9 (3.0L engine).

Q: Is the charging system in good condition?

YES : Go to Step 3.
NO : Repair or replace the charging system component(s).

STEP 3. Connector check: A-01 ABS-ECU connector

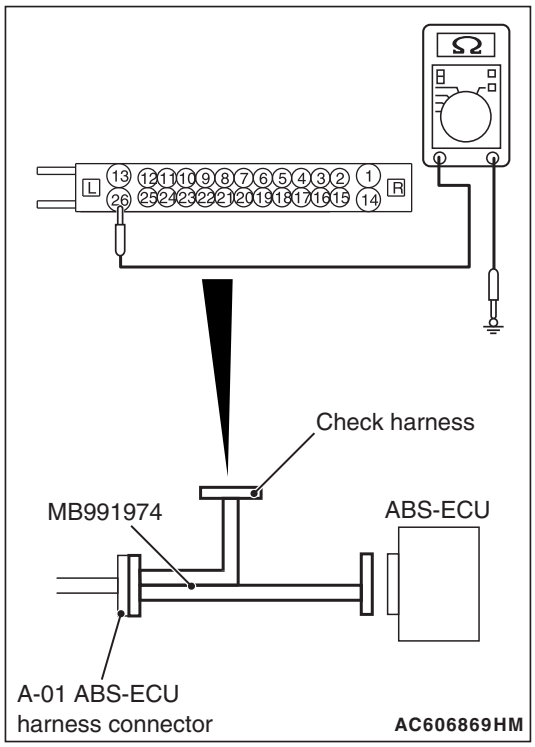
Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the damaged connector.

STEP 4. Fusible link check: Check the fusible link No.27.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Go to Step 5.



STEP 5. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Disconnect the fusible link No.27.

(3) Measure the resistance between the terminal No.26 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Replace the fusible link No.27. Then go to Step 27.

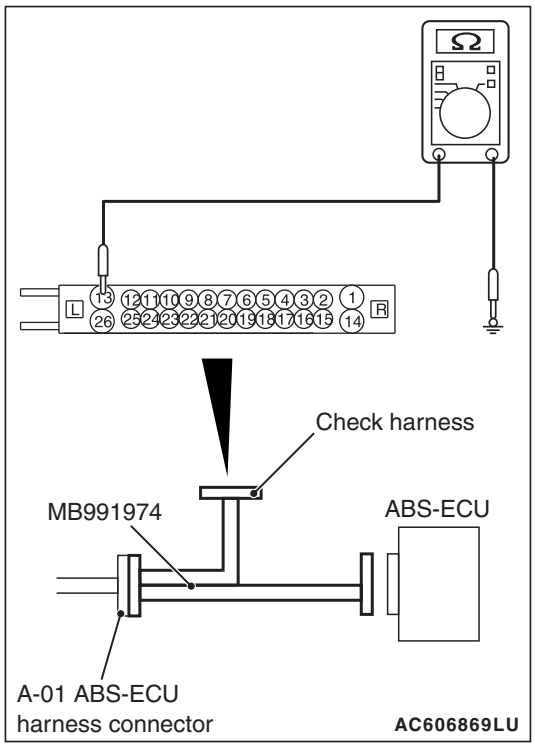
NO : The short circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.26 and the fusible link No.27, and then replace the fusible link No.27. Then go to Step 27.

STEP 6. Check the fusible link No.26.

Q: Is the check result normal?

YES : Go to Step 8.

NO : Go to Step 7.



STEP 7. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Measure the resistance between the terminal No.13 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Replace the fusible link No.26. Then go to Step 27.

NO : The short circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.13 and the fusible link No.26, and then replace the fusible link No.26. Then go to Step 27.

STEP 8. Check the fuse No.12

Visually check for open circuit in the fuse No.12.

Q: Is the check result normal?

YES : Go to Step 11.

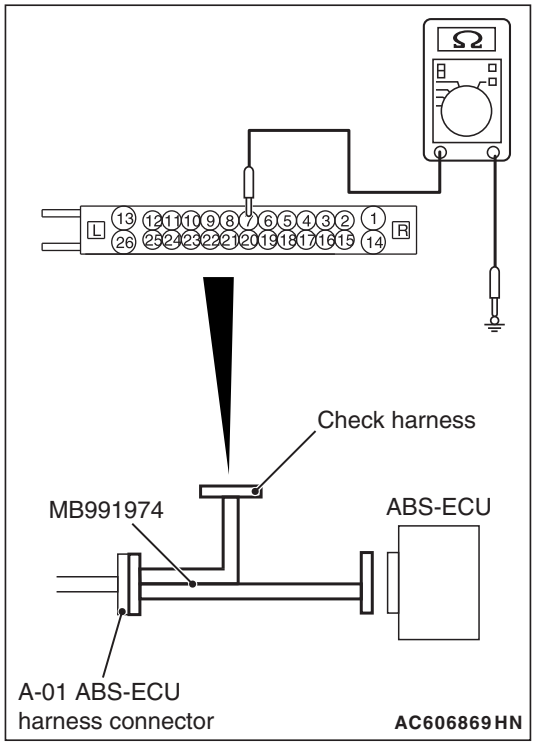
NO : Go to Step 9.

STEP 9. Connector check: C-33 intermediate connector, C-317 ETACS-ECU connector

Q: Is the check result normal?

YES : Go to Step 10.

NO : Repair the defective connector.



STEP 10. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the C-317 ETACS-ECU connector.
(2) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(3) Measure the resistance between the terminal No.7 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Replace the fuse No.12. Then go to Step 27.
NO : The short circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.7 and the C-317 ETACS-ECU connector terminal No.5, and then replace the fuse No.12. Then go to Step 27.

STEP 11. Fusible link check: Check the fusible link No.34.

Q: Is the check result normal?

YES : Go to Step 14.
NO : Go to Step 12.

STEP 12. Connector check: C-309 ETACS-ECU connector

Q: Is the check result normal?

YES : Go to Step 13.
NO : Repair the damaged connector.

STEP 13. Resistance measurement at C-309 ETACS-ECU connector

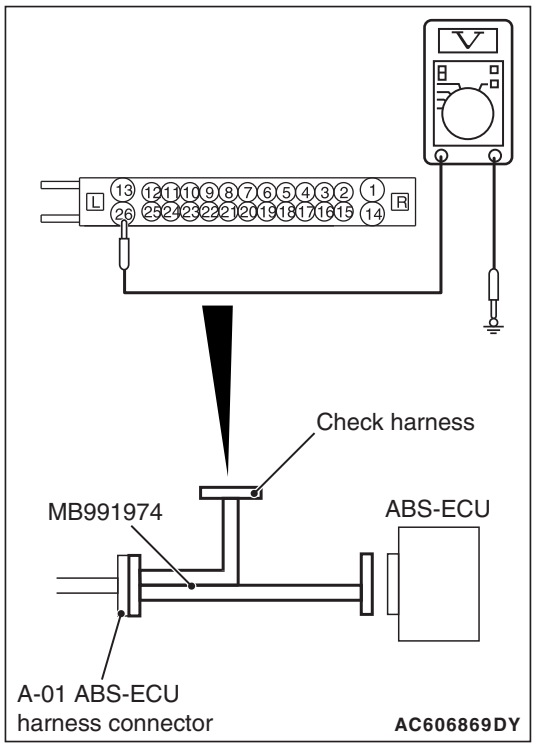
(1) Removal the fusible link No.34.
(2) Disconnect the C-309 ETACS-ECU connector, and then measure the resistance at the connector side.
(3) Measure the resistance between the terminal No.1 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Replace the fusible link No.34. Then go to Step 27.
NO : The short circuit may be present in the power supply circuit. Repair the wiring harness between the C-309 ETACS-ECU connector terminal No.1 and the fusible link No.34, and then replace the fusible link No.34. Then go to Step 27.

TSB Revision



STEP 14. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the voltage at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ASC-ECU.

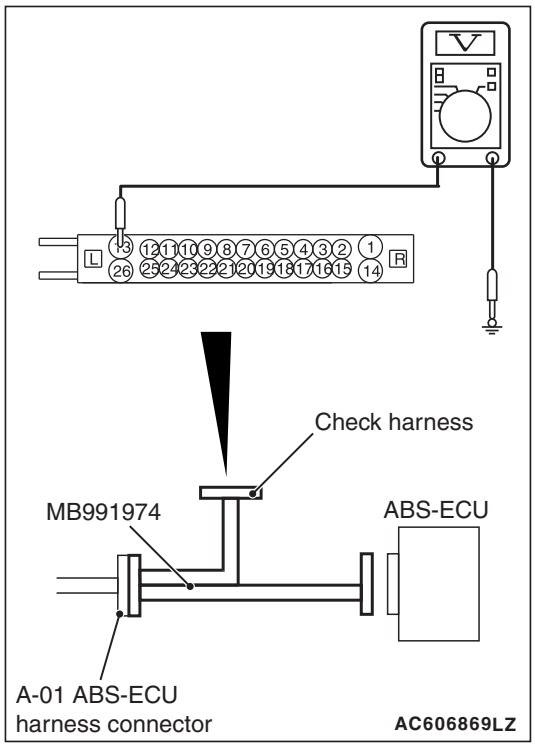
(2) Measure the voltage between terminal No.26 and body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 15.

NO : The open circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.26 and the fusible link No.27. Then go to Step 27.



STEP 15. Voltage measurement at the A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the voltage at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Measure the voltage between terminal No.13 and body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 16.

NO : The open circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.13 and the fusible link No.26. Then go to Step 27.

STEP 16. Measure the voltage at the C-309 ETACS-ECU connector.

(1) Disconnect the connector, and measure at the wiring harness-side connector.
(2) Measure the voltage between the terminal No.1 and the body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 17.
NO : The open circuit may be present in the power supply circuit. Repair the wiring harness between the C-309 ETACS-ECU connector terminal No.1 and fusible link No.34. Then go to Step 27.

STEP 17. Connector check: C-317 ETACS-ECU connector

Q: Is the check result normal?

YES : Go to Step 18.
NO : Repair the damaged connector.

STEP 18. Measure the voltage at the C-317 ETACS-ECU connector.

(1) Measure by backprobing without disconnecting the connector.
(2) Turn the ignition switch to the "ON" position.
(3) Measure the voltage between the terminal No.6 and the body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 21.
NO : Go to Step 19.

STEP 19. Connector check: C-210 ignition switch connector

Q: Is the check result normal?

YES : Go to Step 20.
NO : Repair the damaged connector.

STEP 20. Check the harness wire between C-210 ignition switch connector terminal No.2 and C-317 ETACS-ECU connector terminal No.6.

- Check the communication lines for open circuit and short circuit.

Q: Is the check result normal?

YES : Troubleshooting the ignition switch (Refer to GROUP 54A – Ignition Switch/Trouble Symptom Chart P.54A-16).
NO : Repair the wiring harness, and then go to Step 27.

STEP 21. Measure the voltage at the C-317 ETACS-ECU connector.

(1) Measure at ETACS-ECU side connector.

NOTE: Do not disconnect the connector.

(2) Turn the ignition switch to the "ON" position.

(3) Measure the voltage between terminal No.5 and the body ground by backprobing.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 23.

NO : Go to Step 22.

STEP 22. Check the harness wire between A-01 ABS-ECU connector terminal No.7 and C-317 ETACS-ECU connector terminal No.5.

- Check the harness wire for short circuit.

NOTE: Prior to the wiring harness inspection, check intermediate connector C-33, and repair if necessary.

Q: Is the check result normal?

YES : Replace the ETACS-ECU (Refer to GROUP 54A – ETACS-ECU P.54A-825), and then go to Step 27.

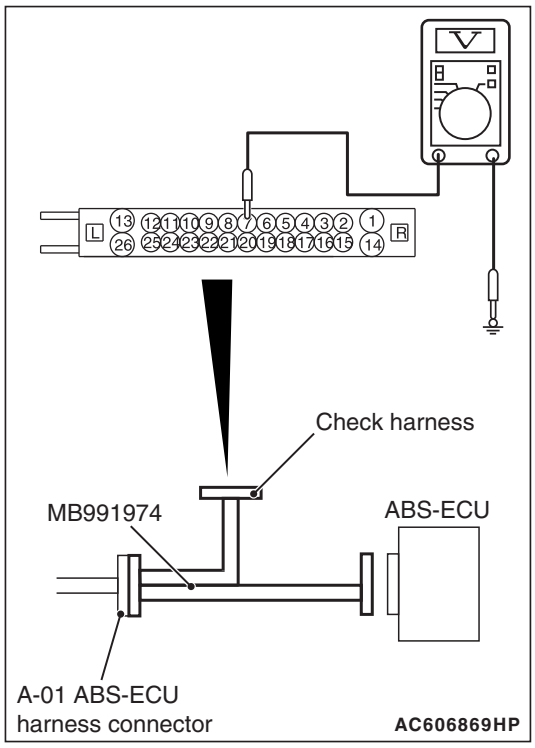
NO : Repair the wiring harness, and then go to Step 27.

STEP 23. Connector check: C-33 intermediate connector

Q: Is the check result normal?

YES : Go to Step 24.

NO : Repair the damaged connector.



STEP 24. Voltage measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Turn the ignition switch to the "ON" position.

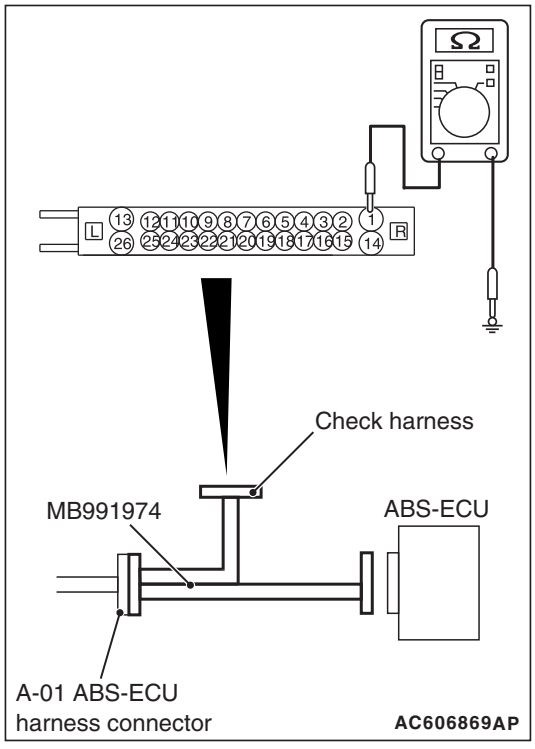
(3) Measure the voltage between terminal No.7 and body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 25.

NO : The open circuit may be present in the power supply circuit. Repair the wiring harness between the A-01 ABS-ECU connector terminal No.7 and the C-317 ETACS-ECU connector terminal No.5. Then go to Step 27.



STEP 25. Resistance measurement at A-01 ABS-ECU connector

(1) Disconnect the ABS-ECU connector, connect special tool ABS check harness (MB991974) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ABS check harness (MB991974) to ABS-ECU.

(2) Measure the resistance between the terminal No.1 and the body ground, and between the terminal No.14 and the body ground

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 26.

NO : An open circuit may be present in the ground circuit. Repair the wiring harness between the A-01 ASC-ECU connector terminal No.1 and the body ground, and between the A-01 ASC-ECU connector terminal No.14 and the body ground. Then go to Step 27.

STEP 26. Retest the system.

Make sure that the M.U.T.-III cable is properly connected and the V.C.I. switch is ON,

Q: Is the communication with scan tool possible?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

NO : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 27.

STEP 27. Retest the system.

Q: Is the communication with scan tool possible?

YES : Return to Step 1.

NO : The procedure is complete.

Inspection Procedure 9: ABS operates too frequently.

⚠ CAUTION

If there is any problem in the CAN bus lines, an incorrect diagnostic trouble code may be set. Prior to this diagnosis, diagnose the CAN bus lines (Refer to GROUP 54C – CAN Bus Line Diagnostic Flow P.54C-10).

COMMENTS ON TROUBLE SYMPTOM

- Although the cause of the trouble cannot be clearly resolved since it depends on the running status and road surface condition, the malfunction of the hydraulic circuit may occur if any DTC is not detected.
- If wheels and tires other than the ones with genuine specified size are mounted, the ABS may be activated prematurely.
- If a non-genuine braking device or non-genuine impact reduction device is mounted, the ABS may be activated prematurely.

PROBABLE CAUSES

- Mounting of wheels and tires other than with genuine specified size
- Tire pressure abnormality
- Tire wear and deterioration
- Mounting of non-genuine braking device or impact reduction device
- Wheel alignment abnormality
- Malfunction of brake related parts
- ABS-ECU malfunction
- Malfunction of hydraulic circuit
- External radio wave noise interference

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827 M.U.T.-III USB Cable
  - MB991910 M.U.T.-III Main Harness A

STEP 1. Check the wheels and the tires.

Carry out the following check.

- Size check of wheels and tires
- Tire wear and deterioration statuses
- Check the tire pressure.

NOTE: For the tire pressure, refer to the tire pressure label attached to the lower section of driver's side door striker.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Correct the wheels and tires in good condition. Then go to Step 9.

STEP 2. DTC check

Use scan tool MB991958 to check the DTC for the ABS system (Refer to P.35B-15).

Q: Is the check result normal?

YES : Go to Step 3.

NO : Carry out the diagnosis for the DTC (Refer to P.35B-15). Then go to Step 9.

STEP 3. Check of brake system related components other than hydraulic unit (integrated with ABS-ECU)

At the same time with the following checks, also check that no parts other than the genuine parts are mounted.

- Brake pad check (Refer to GROUP 35A – On-vehicle Service/Brake Pad Check P.35A-21.)
- Brake disk run-out check (Refer to GROUP 35A – On-vehicle Service/Brake Disk Check P.35A-24.)
- Brake drag force check (Refer to GROUP 35A – On-vehicle Service/Brake Drag Force Check P.35A-27)

Q: Is the check result normal?

YES : Go to Step 4.

NO : Repair or replace the part(s) having damage or other problems. Then go to Step 9.

STEP 4. Wheel alignment check

At the same time with the following checks, also check that no parts other than the genuine parts are mounted.

- Front wheel alignment check (Refer to GROUP 33 – On-vehicle Service/Front Wheel Alignment Check and Adjustment P.33-8.)
- Rear wheel alignment check (Refer to GROUP 34 – On-vehicle Service/Rear Wheel Alignment Check and Adjustment P.34-10.)

Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair or replace the part(s) having damage or other problems. Then go to Step 9.

STEP 5. Scan tool data list

Check the following data list (Refer to P.35B-179).

- Item No. 01: FL wheel speed sensor
- Item No.02: FR wheel speed sensor
- Item No.03: RL wheel speed sensor
- Item No.04: RR wheel speed sensor

Q: Is the check result normal?

YES : Go to Step 7.
NO : Go to Step 6.

STEP 6. Wheel speed sensor check

Check that no non-genuine electronic device or no wiring harness of other than genuine electronic device is mounted near the wheel speed sensor (at wheel speed detection section and wiring harness section) (Refer to P.35B-189).

Q: Is the check result normal?

YES : Go to Step 7.
NO : Remove the non-genuine electronic device or the wiring harness of non-genuine electronic device. Then go to Step 9.

STEP 7. Hydraulic unit check

Carry out the following actuator tests, and check if they work normally (Refer to P.35B-179).

- Item No. 01: FL wheel ABS
- Item No.02: FR wheel ABS
- Item No.03: RL wheel ABS
- Item No.04: RR wheel ABS

Q: Is the check result normal?

YES : Go to Step 8.
NO : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 9.

STEP 8. ABS operation check

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

NO : Replace the hydraulic unit (integrated with ABS-ECU) (Refer to P.35B-188). Then go to Step 9.

STEP 9. ABS operation check

Q: Is the check result normal?

YES : This diagnosis is complete.

NO : Return to Step 1.

Inspection Procedure 10: The initial check sound of hydraulic unit is loud.

⚠ CAUTION

When installing brake tube, match the axial center of flare nut and brake tube with the center of hole at the hydraulic unit side, and check that the fluid does not leak.

COMMENT ON TROUBLE SYMPTOM

The operation sound may be decreased by reducing the load at the rubber mount portion of the brake tube and hydraulic unit.

PROBABLE CAUSES

- Improper installation of the hydraulic unit
- Improper installation of the brake tube

DIAGNOSIS

DRIVING CHECK

(1) Turn the ignition switch from the "LOCK" (OFF) position to the "ON" position.

(2) When vehicle speed reaches 6 mph (10 km/h), check the operating sound volume and compare it with that of the same model.

OK: The operating sound is the same volume or less by comparing with that of the same model.

Q: Is the check result normal?

YES : This diagnosis is complete.

NO : Carry out adjustment for hydraulic unit installation. (Refer to P.35B-184).

DATA LIST REFERENCE TABLE

M1352011501385

The following items can be read by the scan tool from the ABS-ECU input data.

The following items of ECU input data can be read using scan tool.

1. The system is normal.

Item No.	Check item	Check conditions	Normal conditions
01	FL wheel speed sensor	Perform a test run of the vehicle.	The speedometer display and the scan tool display almost agree with each other. <During stop: approximately 0.4 mph (0.7km/h)>
02	FR wheel speed sensor		
03	RL wheel speed sensor		
04	RR wheel speed sensor		
05	Power supply voltage		Battery positive voltage (10 to 18 V ABS operatable range)
07	Brake switch (input)	The brake pedal is released.	OFF
		The brake pedal is depressed.	ON
14	Brake switch (Stop light switch)	The brake pedal is depressed.	ON
		The brake pedal is released.	OFF
87	Ignition switch (input)	Ignition switch is "ON" position	ON
88	Vehicle speed	Perform a test run of the vehicle.	The speedometer display and the scan tool display almost agree with each other.
105	Power supply voltage (input)		Battery positive voltage (10 to 18 V ABS operatable range)

2. System shutdown by ECU
   While ABS-ECU is disabled by the diagnostic function, the scan tool displayed data is different from the actual measurement.

ACTUATOR TEST REFERENCE TABLE

M1352011601100

Using scan tool, the following actuators can be forcibly operated:

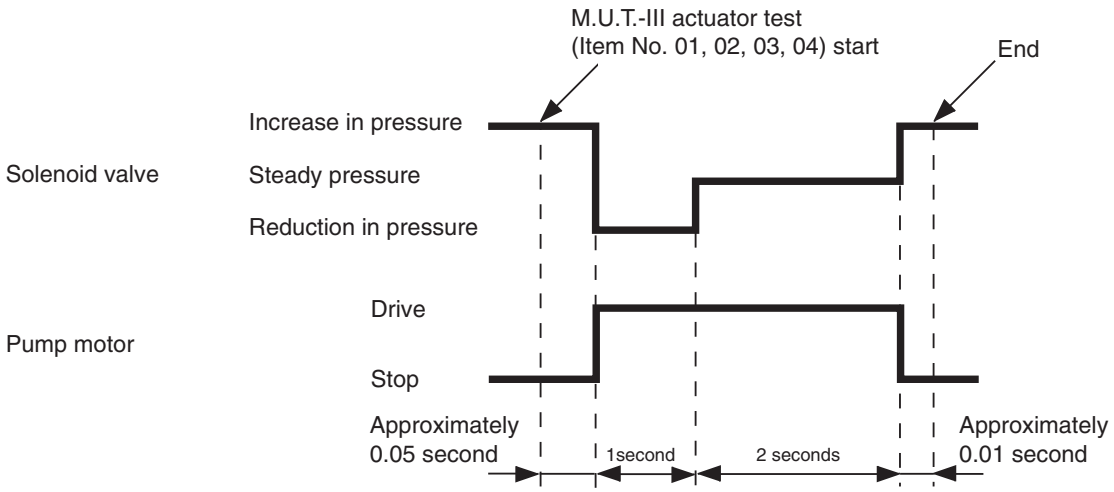
NOTE:

- *ABS is operated by ABS-ECU.*
- *When ABS-ECU is disabled due to the fail-safe function, the actuator test cannot be performed.*
- *The actuator test can be performed only when the vehicle is stationary.*
- *While the actuator test is performed, the ABS warning light flashes at a rate of 2 Hz.*
- *After the actuator test has been performed, the brake warning light and ABS warning light illuminate until the ignition switch is turned to ON again or the communication between scan tool and ABS-ECU is terminated.*

Actuator test specifications

Item No.	Check item	Driven component
01	FR wheel ABS drive	Solenoid valve for the corresponding wheel of the hydraulic unit and pump motor (simplified inspection mode)
02	FL wheel ABS drive	
03	RR wheel ABS drive	
04	RL wheel ABS drive	

Operation pattern of items 01 to 04



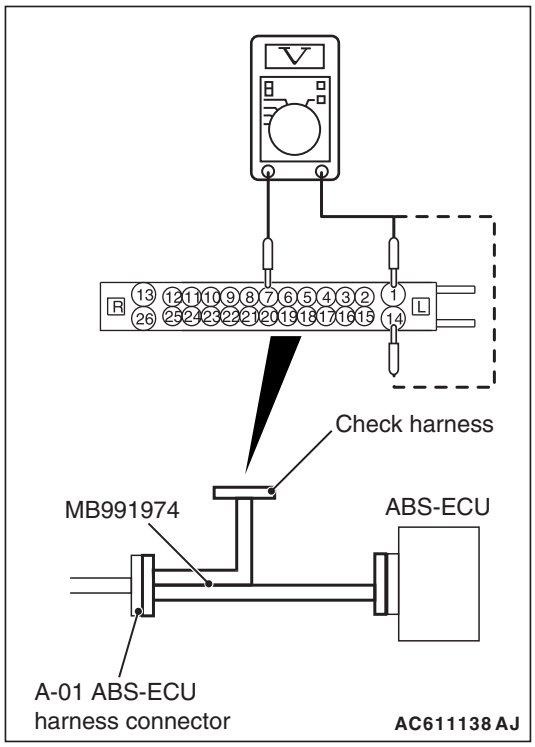
AC608796 AB

CHECK AT ECU TERMINALS

M1352011801427

TERMINAL VOLTAGE CHECK

Required Special Tool:
MB991974: ABS Check Harness
Connect the special tool ABS check harness (MB991974) to measure the voltage between each check connector terminal and the ground terminal (No.1 or 14).



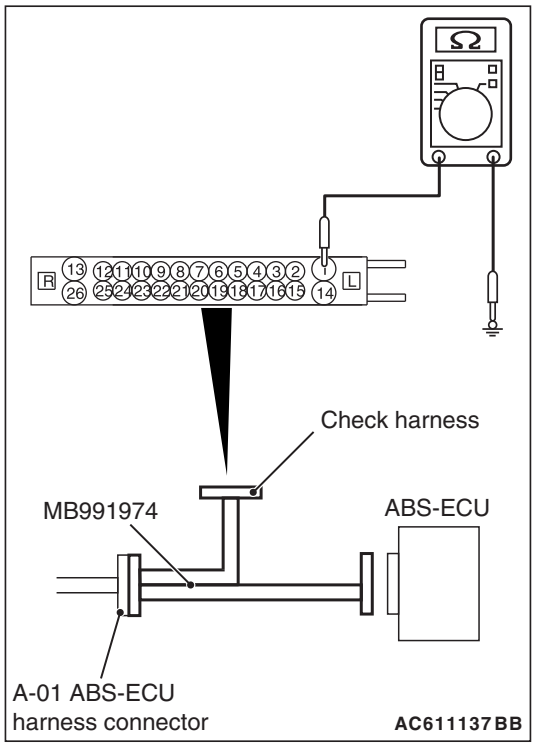
AC611138 AJ

Terminal No.	Check item	Check conditions	Normal condition
7	ABS-ECU power supply	Ignition switch: ON	Approximately system voltage
		Ignition switch: OFF	1Volt or less
13	Motor power supply	Ignition switch: ON (OFF)	Approximately system voltage
16	Wheel speed sensor (RR) power supply	Ignition switch: ON	Approximately system voltage
18	Wheel speed sensor (FL) power supply	Ignition switch: ON	Approximately system voltage
22	Wheel speed sensor (FR) power supply	Ignition switch: ON	Approximately system voltage
24	Wheel speed sensor (RL) power supply	Ignition switch: ON	Approximately system voltage
26	Solenoid valve power supply	Ignition switch: ON (OFF)	Approximately system voltage

RESISTANCE AND CONTINUITY BETWEEN HARNESS-SIDE CONNECTOR TERMINALS

Required Special Tool:
MB991974: ABS Check Harness

1. When performing the continuity check, turn the ignition switch to LOCK (OFF) position, connect the special tool ABS check harness (MB991974) as shown in the figure, and disconnect the ABS-ECU connector.
2. Check for continuity between terminals shown in the chart below.
3. Terminal layout is shown in the figure.



Terminal No.	Signal	Normal conditions
1 – body ground	Ground	Continuity exists (2 Ω or less)
14 – body ground	Ground	Continuity exists (2 Ω or less)

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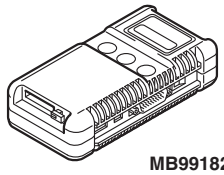
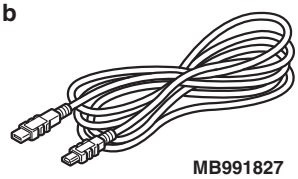
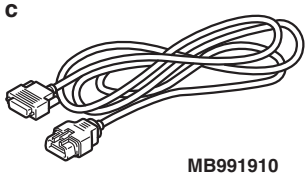
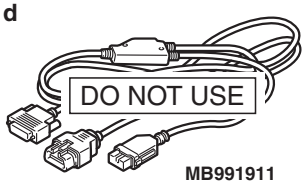
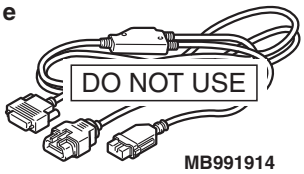
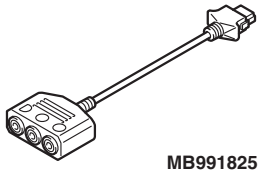
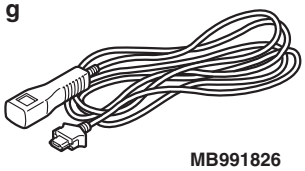
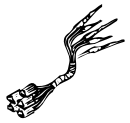
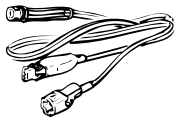
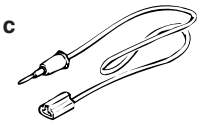
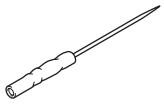
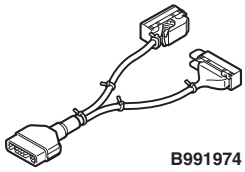
SPECIAL TOOLS

M1352000601797

Tool	Tool number and name	Supersession	Application
a  MB991824 b  MB991827 c  MB991910 d  MB991911 e  MB991914 f  MB991825 g  MB991826 MB991958	MB991958 a. MB991824 b. MB991827 c. MB991910 d. MB991911 e. MB991914 f. MB991825 g. MB991826 M.U.T.-III sub assembly a. Vehicle communication interface (V.C.I.) b. M.U.T.-III USB cable c. M.U.T.-III main harness A (Vehicles with CAN communication system) d. M.U.T.-III main harness B (Vehicles without CAN communication system) e. M.U.T.-III main harness C (for Daimler Chrysler models only) f. M.U.T.-III measurement adapter g. M.U.T.-III trigger harness	MB991824-KIT *NOTE: G: MB991826 M.U.T.-III Trigger Harness is not necessary when pushing V.C.I. ENTER key.*	**⚠ CAUTION** **M.U.T.-III main harness A (MB991910) should be used. M.U.T.-III main harness B and C should not be used for this vehicle.** ABS system diagnostics

Tool	Tool number and name	Supersession	Application
a  b  c  d  MB991223	MB991223 a. MB991219 b. MB991220 c. MB991221 d. MB991222 Harness set a. Test harness b. LED harness c. LED harness adaptor d. Probe	General service tools	Continuity check and voltage measurement at harness wire or connector for loose, corroded or damaged terminals, or terminals pushed back in the connector. a. Connector pin contact pressure inspection b. Power circuit inspection c. Power circuit inspection d. Commercial tester connection
 MB992006	MB992006 Extra fine probe	–	Continuity check and voltage measurement at harness wire or connector for loose, corroded or damaged terminals, or terminals pushed back in the connector.
 B991974	MB991974 ABS check harness	–	Measure the voltage and resistance at the ABS-ECU
	MB991709 Wiring harness set	–	Output current measure at the wheel speed sensor

ON-VEHICLE SERVICE

WHEEL SPEED SENSOR OUTPUT CURRENT MEASUREMENT

M1352032800032

Required Special Tools:

- MB991709: Wiring harness set

The relevant wheel, on which the wheel speed sensor is fitted, should be free to run.

1. Remove the wheel speed sensor connector to be checked.

⚠ CAUTION

For precise measurement, do not connect to the wheel speed sensor-side connector and the wiring harness side connector terminal No.1.

2. Use the special tool test harness (MB991709) to connect a multimeter between the wheel speed sensor-side connector and the wiring harness connector terminal No.2.
3. Turn the ignition switch to the "ON" position.

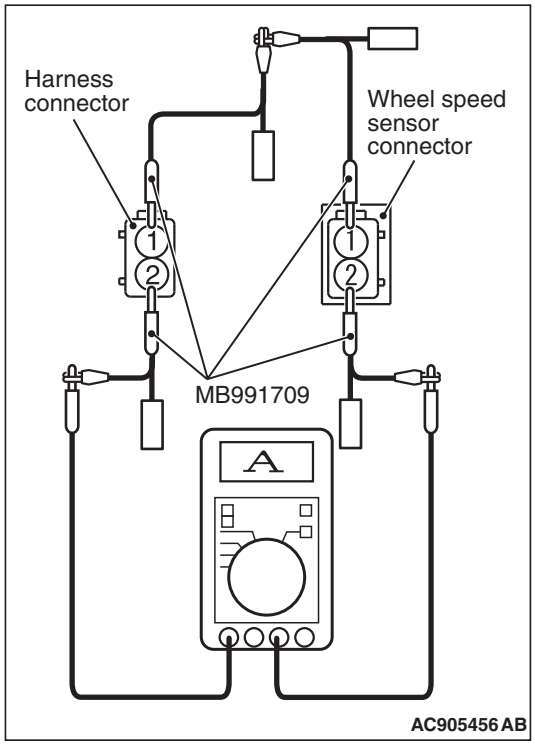
⚠ CAUTION

Do not rotate the wheel too quickly. Output current changes significantly as the wheel speed detection magnetic encoder comes near or goes away from the wheel speed sensor.

4. Rotate the wheel, on which the wheel speed sensor is fitted, quite slowly to measure the output current with the multimeter.

   Standard value: 5.9 to 8.4 mA or 11.8 to 16.8 mA

5. If the measurement is not within the standard value, or the output current does not change in proportion to the wheel rotation, replace the wheel speed sensor (Refer to P.35B-189).



HYDRAULIC UNIT CHECK

M1352001701139

Required Special Tools:

- MB991958: M.U.T.-III Sub Assembly
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A (Vehicles with CAN communication system)

1. Raise the vehicle using a jack and support the specified points with a rigid rack.

⚠ CAUTION

Before connecting or disconnecting scan tool, always turn the ignition switch to the LOCK (OFF) position.

2. Before setting scan tool, turn the ignition key to the LOCK (OFF) position.

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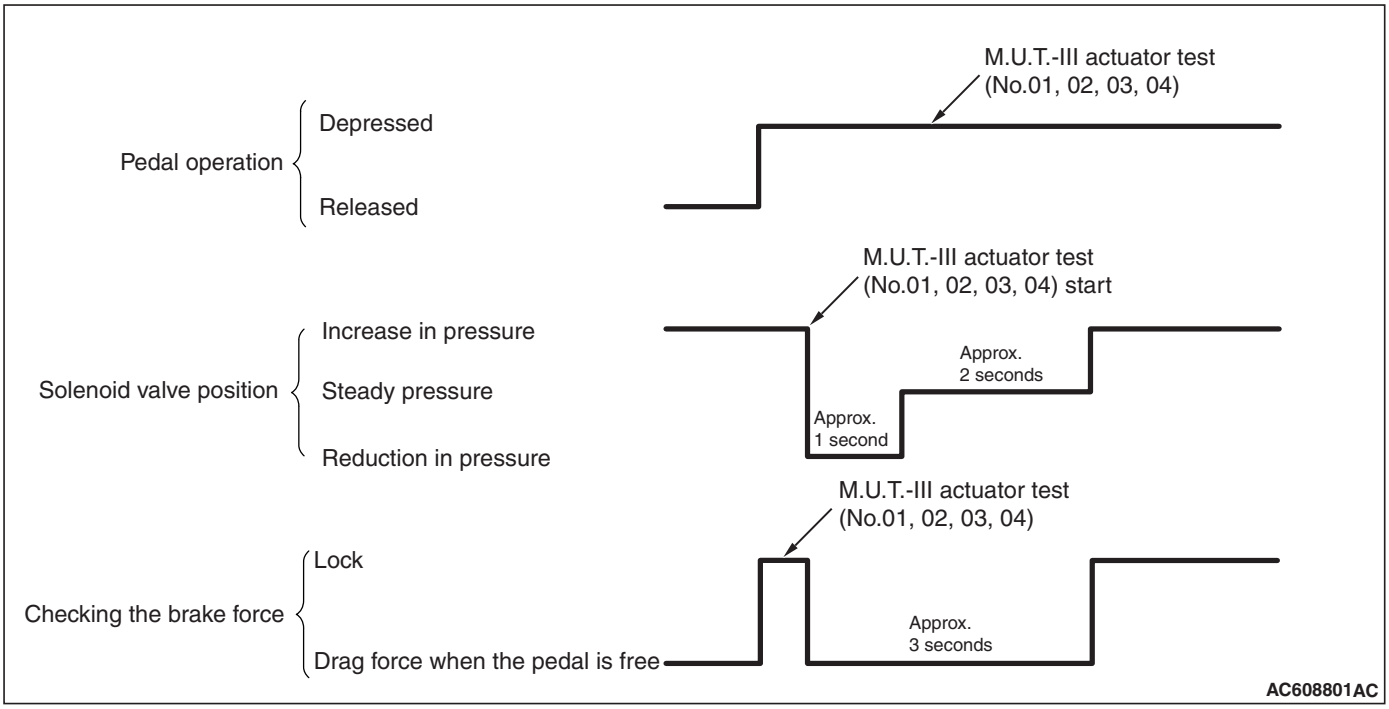
3. Confirm that the selector lever is in the "N" position, and then start the engine.
4. When carrying out the actuator tests No. 01 to 04, perform the actuator tests using scan tool while depressing the brake pedal. When carrying out the actuator tests, rotate the wheel by hands to confirm that the braking force changes.

   NOTE:
   - *While performing the actuator test, the ABS warning light flashes at a rate of 2 Hz.*
   - *When ABS-ECU is disabled due to the fail-safe function, the scan tool actuator test cannot be performed.*
   - *After the actuator test has been performed, the ABS warning light and brake waning light illuminate until the ignition switch is turned to ON again or the communication between scan tool and ABS-ECU is terminated.*



5. This is indicated as shown in the above.
6. When any malfunction has been found, take a necessary action according to the "Judgment Table."

Judgment Table

Display on scan tool	Operation	Inspection result	Judgment	Probable cause	Remedy
01 FR wheel ABS 02 FL wheel ABS 03 RR wheel ABS 04 RL wheel ABS	• Depress the brake pedal to lock the vehicle. • Select the vehicle to be inspected using scan tool, perform the actuator test. • Rotate the selected wheel by hands to confirm the braking force.	Braking force decreases for 3 seconds from the lock status.	Normal	–	–
		The wheel does not lock even if the brake pedal is depressed.	Error	Clogged brake line other than hydraulic unit	Check and clean the brake line.
				Clogged hydraulic circuit in the hydraulic unit	Replace the hydraulic unit assembly.
		Braking force does not decrease.		Faulty routing of hydraulic unit brake tube	Route the brake tube correctly.
				Malfunction of hydraulic unit solenoid valve operation	Replace the hydraulic unit assembly.

7. After the inspection, turn the ignition switch to the LOCK (OFF) position, and then disconnect scan tool.

Hydraulic unit installation adjustment

Refer to P.35B-188.

1. Operate the pre-removal steps for the hydraulic unit.
2. Remove all brake tubes.
3. Remove the protector.
4. Loosen the mounting bolt and nut of the hydraulic unit bracket.
5. Install all brake tubes temporarily.
6. Shake hydraulic unit to all directions with both hands to make the hydraulic unit bracket insulator fit with the unit.
7. Install the hydraulic unit bracket with mounting bolt and nut not to load the brake tube.
8. Install the protector.
9. Install all brake tubes securely.

   NOTE: Install the flare nut taking care not to let the brake tube turn together.
10. Operate the post-installation steps of the hydraulic unit.

IN THE EVENT OF A DISCHARGED BATTERY

M1352003500804

⚠ ***WARNING***

If the ABS is not operating, the vehicle will be unstable during braking, Do not drive the vehicle with the ABS-ECU connector disconnected or with the ABS not operating.

If the engine is started using a booster cable when the battery is completely flat, and the vehicle is then driven without waiting for the battery to be recharged, the engine may misfire and it may not be possible to drive the vehicle. This is because the ABS consumes a large amount of current when carrying out its initial checks. If this happens, recharge the battery fully.

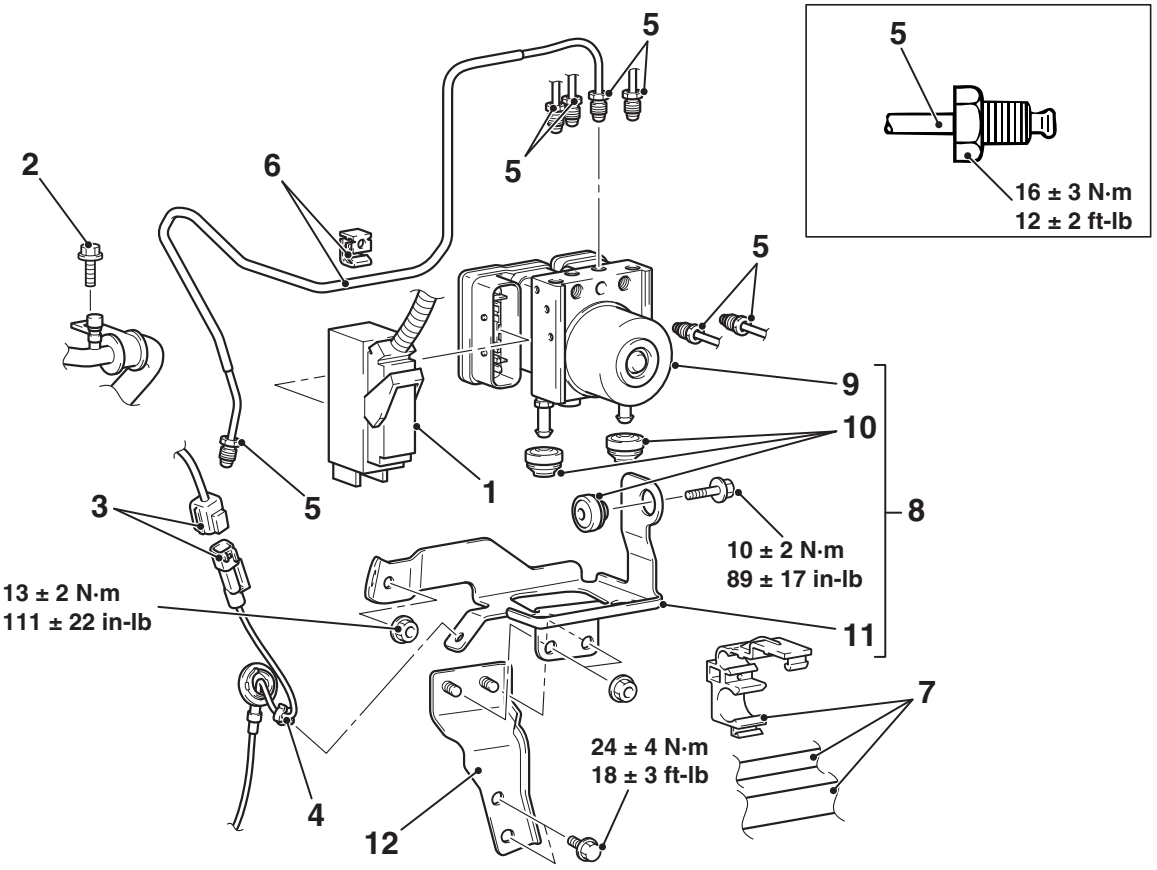
HYDRAULIC UNIT

REMOVAL AND INSTALLATION

M1352008601069

NOTE: ABS-ECU is located in the hydraulic unit.

Pre-removal operation	Post-installation operation
• Strut tower bar removal (Refer to GROUP 42A – Strut Tower Bar P.42A-13.) • Brake fluid draining • Intake manifold plenum removal (Refer to GROUP 15 – Intake Manifold Plenum P.15-6.)	• Intake manifold plenum installation (Refer to GROUP 15 – Intake Manifold Plenum P.15-6.) • Brake fluid refilling and air bleeding (Refer to GROUP 35A – On-vehicle Service, Brake Fluid Level Inspection and Bleeding P.35A-20.) • Strut tower bar installation (Refer to GROUP 42A – Strut Tower Bar P.42A-13.) • Hydraulic unit check (Refer to P.35B-184.)



AC703833 AB

Removal steps

1. ABS-ECU harness connector
2. Suction pipe installation bolt
3. Wheel speed sensor harness connector connection
4. Wheel speed sensor harness clip connection

>>A<< 5. Brake tube connection

6. Brake tube and clip connection

Removal steps (Continued)

7. Suction pipe, liquid pipe and clip connection
8. Hydraulic unit (ABS-ECU) and hydraulic unit bracket

<<A>> 9. Hydraulic unit (ABS-ECU)

10. Hydraulic unit bracket insulator
11. Hydraulic unit bracket B
12. Hydraulic unit bracket A

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REMOVAL SERVICE POINT

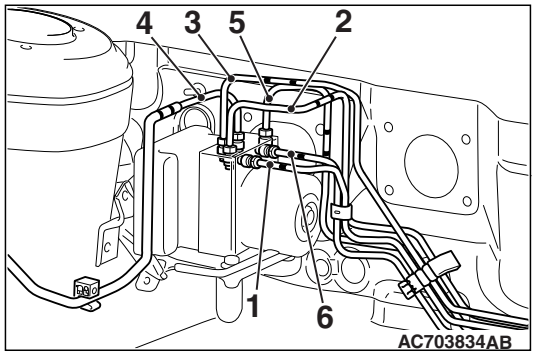
<<A>> HYDRAULIC UNIT (ABS-ECU) REMOVAL

⚠ CAUTION

- **Be careful when removing the hydraulic unit because it is heavy.**
- **Never loosen the nuts and the bolts because the hydraulic unit cannot be disassembled.**
- **Do not drop or shock the hydraulic unit.**
- **Do not turn the hydraulic unit upside down or lay down the unit because the inner air becomes difficult to be bled.**

INSTALLATION SERVICE POINT

>>A<< BRAKE TUBE CONNECTION



Install the brake pipe to the hydraulic unit as shown in the figure.

1. To rear brake (RH) <Marking color: White>
2. From master cylinder (secondary) <Marking color: Yellow>
3. To front brake (LH) <Marking color: Red and white>
4. To front brake (RH) <Marking color: Orange and white>
5. From master cylinder (primary) <Marking color: Blue>
6. To rear brake (LH) <Marking color: Pink>

WHEEL SPEED SENSOR

REMOVAL AND INSTALLATION

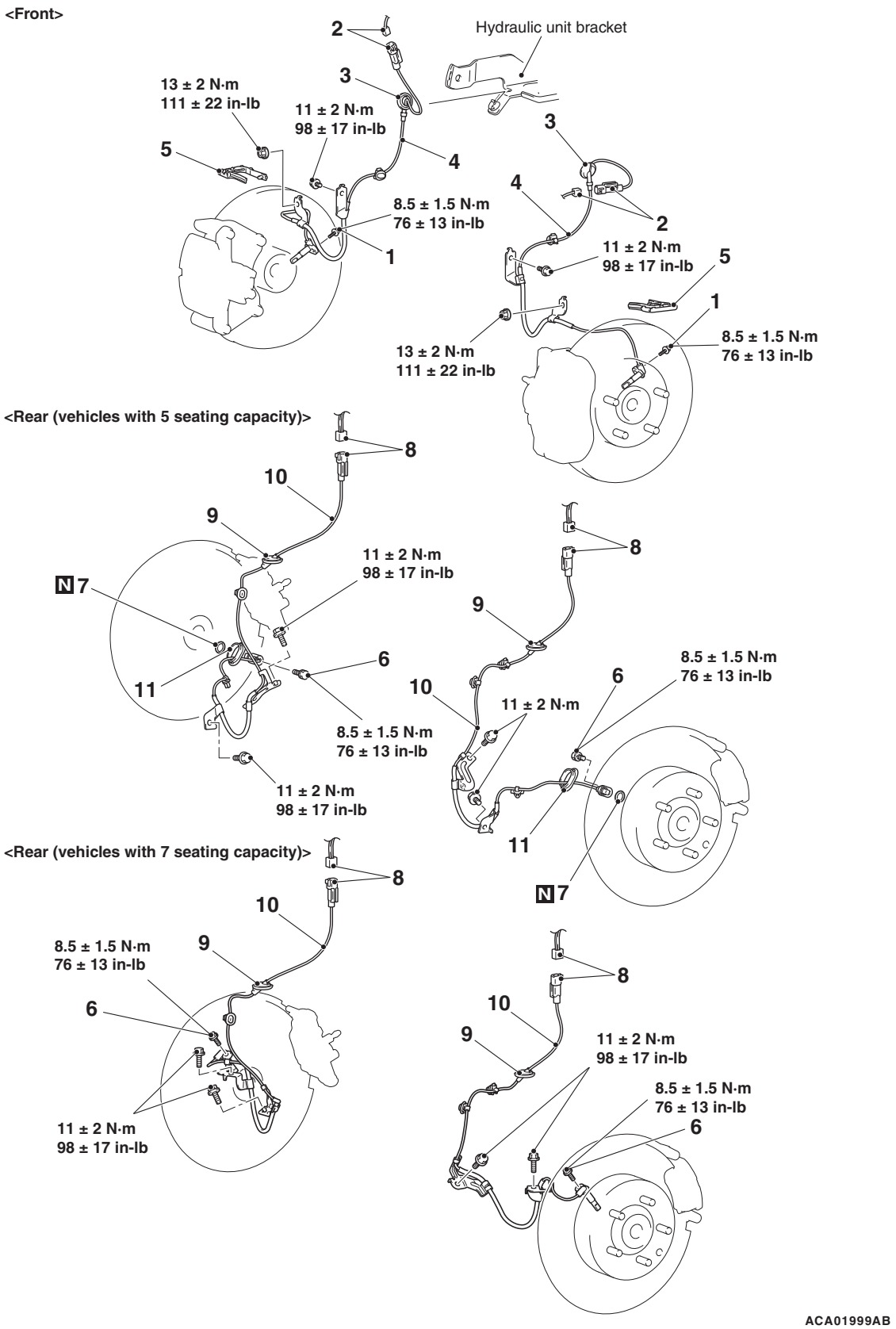
M1352008301574

⚠ CAUTION

The vehicle speed detection encoder collects any metallic particle easily, because it is magnetized. Make sure that the encoder should not collect any metallic particle. Check that there is not any trouble prior to reassembling it.

Pre-removal and post-installation operation

- Air cleaner body assembly removal and installation <Refer to GROUP 15 – Air Cleaner P.15-5 (3000)>. Front wheel speed sensor (LH)
- Quarter trim removal and installation (Refer to GROUP 52A – Trim P.52A-10). Rear wheel speed sensor



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Front wheel speed sensor removal steps

1. Bolt (front wheel speed sensor and knuckle connection)
2. Front wheel speed sensor connector
- >>**C**<< 3. Front wheel speed sensor grommet
4. Front wheel speed sensor
- >>**B**<< 5. Harness clip

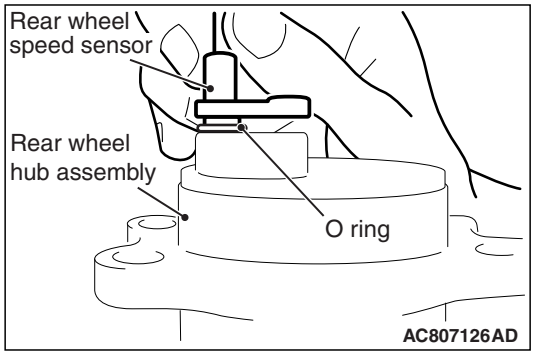
Rear wheel speed sensor removal steps

- >>**A**<< 6. Bolt (rear wheel speed sensor and rear wheel hub assembly connection)
- >>**A**<< 7. O-ring
8. Rear wheel speed sensor connector
- >>**C**<< 9. Rear wheel speed sensor grommet
- >>**A**<< 10. Rear wheel speed sensor
11. Protector

NOTE: The vehicle speed detection encoder is integrated with the front wheel bearing and the rear hub assembly, which cannot be disassembled.

INSTALLATION SERVICE POINTS

>>A<< REAR WHEEL SPEED SENSOR, O-RING, AND BOLT (CONNECTION OF REAR WHEEL SPEED SENSOR WITH REAR WHEEL HUB ASSEMBLY) INSTALLATION <VEHICLES WITH 5 SEATING CAPACITY>

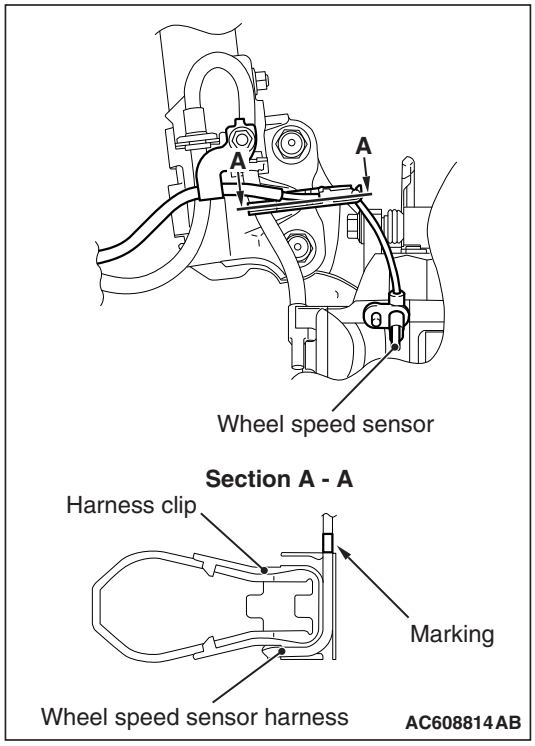


1. Align the mounting bolt hole position of rear wheel speed sensor with the mounting bolt hole position of rear wheel hub assembly.

⚠ CAUTION

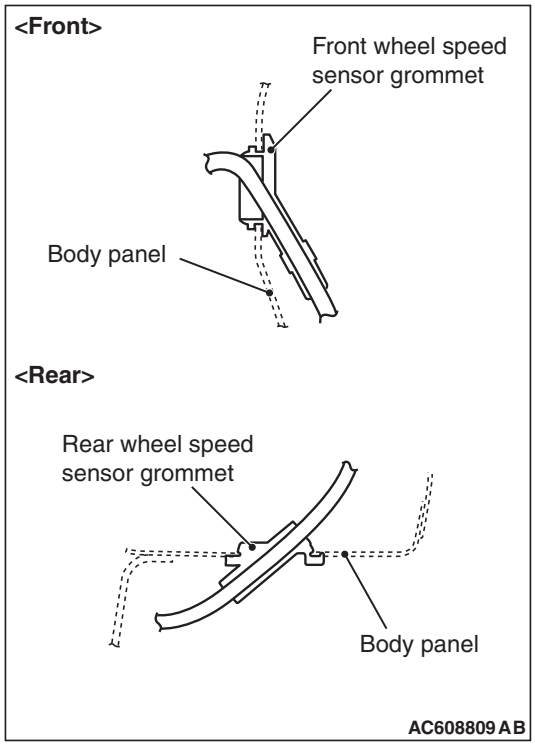
- **Do not insert the rear wheel speed sensor at an angle or by prying the sensor because it may be possible that the O-ring of rear wheel speed sensor cannot be mounted properly.**
- **After the insertion, do not perform an alignment of mounting bolt hole positions by rotating the rear wheel speed sensor.**

2. As shown in the figure, mount the rear wheel speed sensor while keeping the sensor perpendicular to the rear wheel hub assembly.



>>B<< HARNESS CLIP INSTALLATION

Install the front wheel speed sensor to the harness clip as shown in the figure.



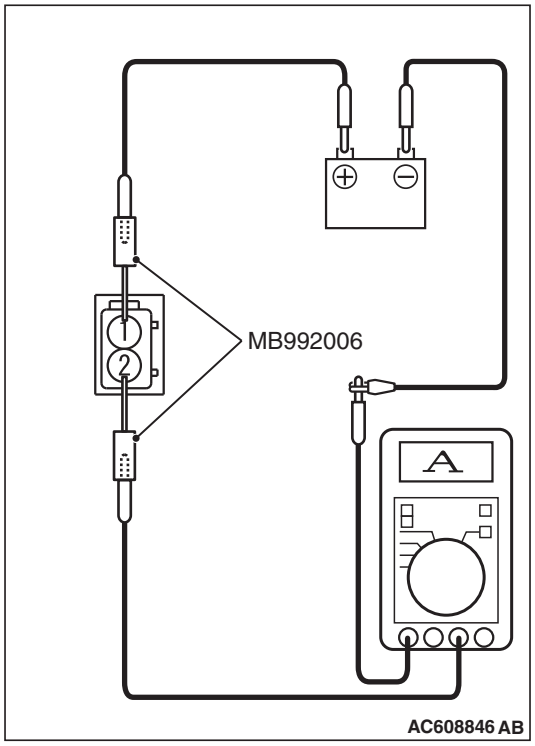
>>C<< FRONT WHEEL SPEED SENSOR GROMMET/REAR WHEEL SPEED SENSOR GROMMET INSTALLATION

Install the front wheel speed sensor grommet and the rear wheel speed sensor grommet to the body panel snugly as shown in the figure.

INSPECTION

M1352008400783

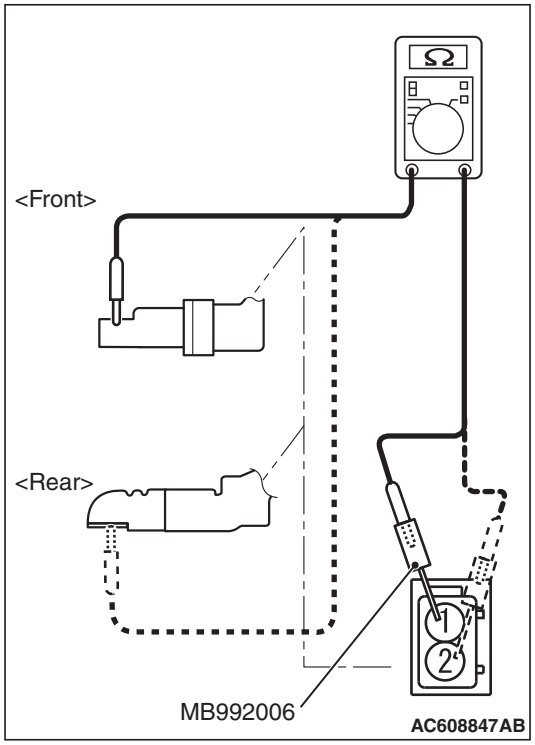
WHEEL SPEED SENSOR CURRENT CHECK



⚠ CAUTION
Do not connect the battery terminals in reverse as the wheel speed sensor may be damaged.

1. Connect the circuit tester to the wheel speed sensor using the special tool extra fine probe (MB992006), and measure the sensor current as a single unit.
   Standard value: 5.9 to 8.4 mA or 11.8 to 16.8 mA
2. If the measurement value is not within the standard value range, replace the wheel speed sensor with a new one.

WHEEL SPEED SENSOR INSULATION CHECK



1. Connect the circuit tester to the wheel speed sensor using the special tool extra fine probe (MB992006), and measure the insulation resistance between terminal No. 1/2 and the wheel speed sensor body as a single unit.
   Standard value: 5 MΩ or more
2. If the insulation resistance is not within the standard value range, replace the wheel speed sensor with a new one.

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NOTES