GROUP 35C

ACTIVE STABILITY CONTROL SYSTEM (ASC)

CONTENTS

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SERVICE SPECIFICATIONS

M1355008200131

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

DIAGNOSIS

INTRODUCTION TO ASC DIAGNOSIS

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The active stability control system (ASC) operates differently from conventional brake systems. These differences include sounds, sensations, and vehicle performance that owners and service technicians who are not familiar with ASC may not be used to.

Some operational characteristics may seem to be malfunctions, but they are simply signs of normal ASC operation. When diagnosing the ASC system, keep these operational characteristics in mind. Inform the owner of the kind of performance characteristics to expect from an ASC-equipped vehicle.

ASC DIAGNOSTIC TROUBLE CODE DETECTION CONDITIONS

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

When you check if an ASC DTC will be displayed again after the DTC has been erased, you should duplicate the ASC DTC set conditions. Depending on the detection timing and set conditions for the specific ASC 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 "ASC DTC SET CONDITIONS" for each ASC DTC that you are trying to reset.

ASC DIAGNOSTIC TROUBLESHOOTING STRATEGY

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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 ASC 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 ASC DTC.
4. If you cannot verify the condition and there are no ASC 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 ASC 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 Diagnostic troubleshooting strategy P.35A-6.
   - If the basic brake system is operating properly, refer to P.35C-216.
6. If there is an ASC DTC, record the number of the DTC, then erase the DTC from the memory using the scan tool.
7. Recreate the ASC DTC set conditions to see if the same ASC DTC will set again.
   - If the same ASC DTC sets again, perform the diagnostic procedures for the DTC. Refer to P.35C-18.
   - If you cannot get the same ASC 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, ASC WARNING/OPERATION LIGHT AND BRAKE WARNING LIGHT CHECK

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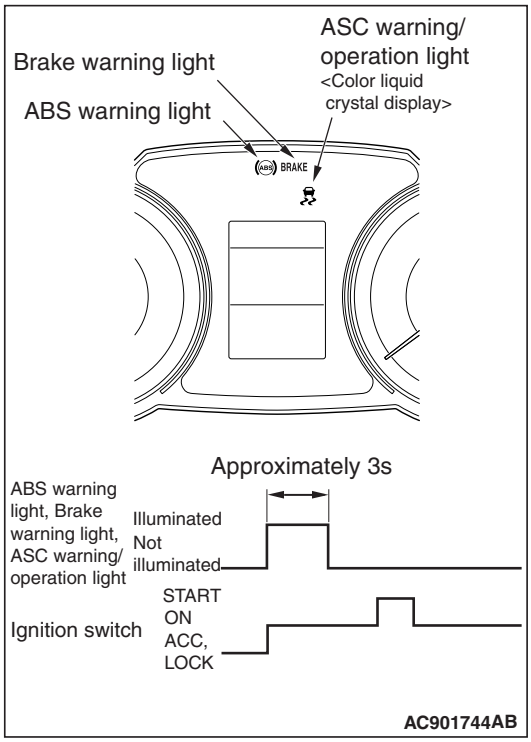
Check that ABS and brake warning light, ASC warning/operation light illuminate as follows.

NOTE: The brake warning light is used as a warning light for parking brake, brake fluid level, and EBD control.

1. When the ignition switch is turned to the ON position, ABS and brake warning light, ASC warning/operation light illuminate.
2. The ABS and brake warning light, ASC warning/operation light 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 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.*



ON-BOARD DIAGNOSTICS

If the ASC-ECU detects any problem in the CAN communication line or the ECUs, which the ASC-ECU is communicating with, it stores a diagnostic trouble code. The DTCs have 73 items. The DTCs can be confirmed by connecting scan tool MB991958 (M.U.T.-III sub assembly.) The stored DTCs are not erased even after the ignition switch has been turned to the LOCK (OFF) position, or the battery has been disconnected. The DTCs can be erased by operating scan tool MB991958 (M.U.T.-III sub assembly.)

DIAGNOSTIC FUNCTION

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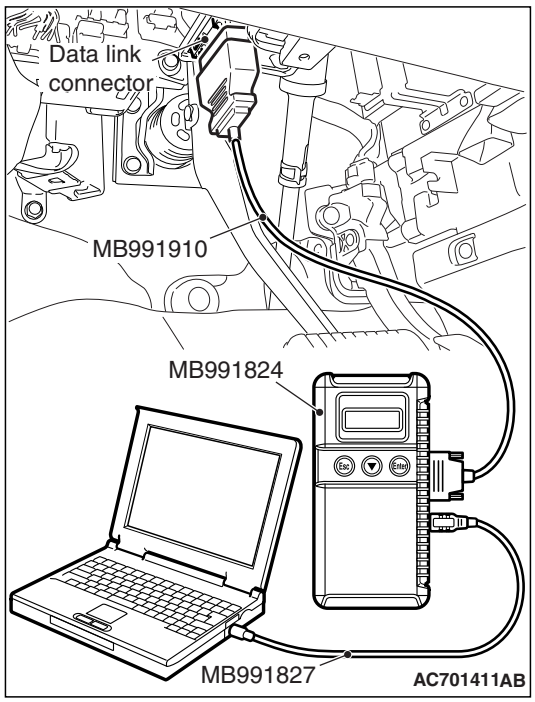
HOW TO CONNECT THE SCAN TOOL (M.U.T.-III)

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.

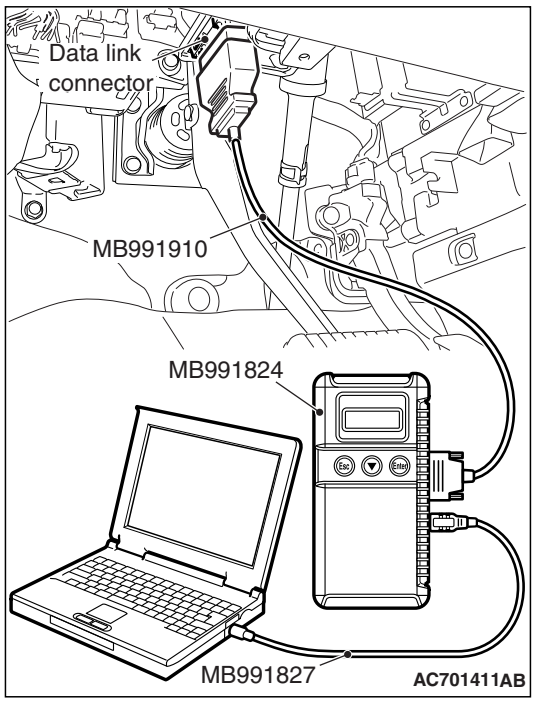
   NOTE: When the special tool MB991824 is energized, the special tool MB991824 indicator light will be illuminated in a green color.
7. Start the M.U.T.-III system on the personal computer.

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.

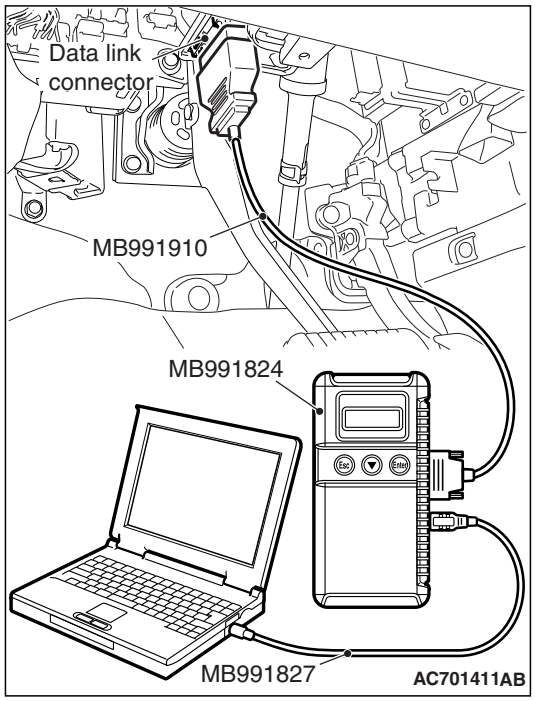
NOTE: If the battery voltage is low, diagnostic trouble codes will not be set. Check the battery if scan tool MB991958 does not display.

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

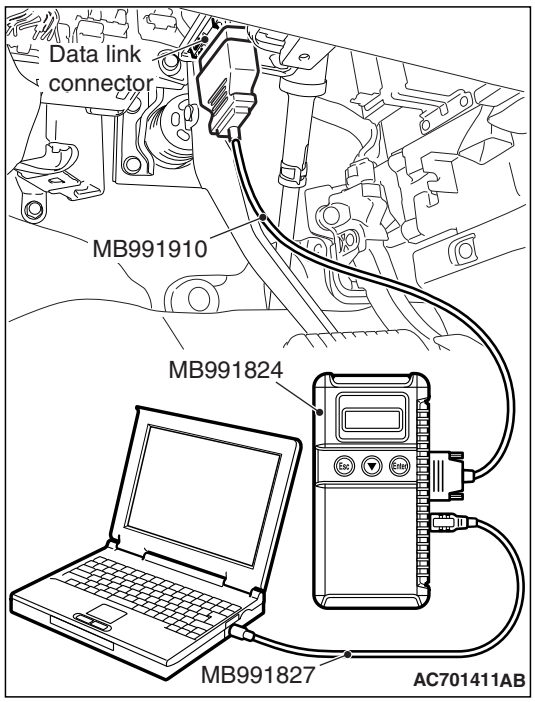
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

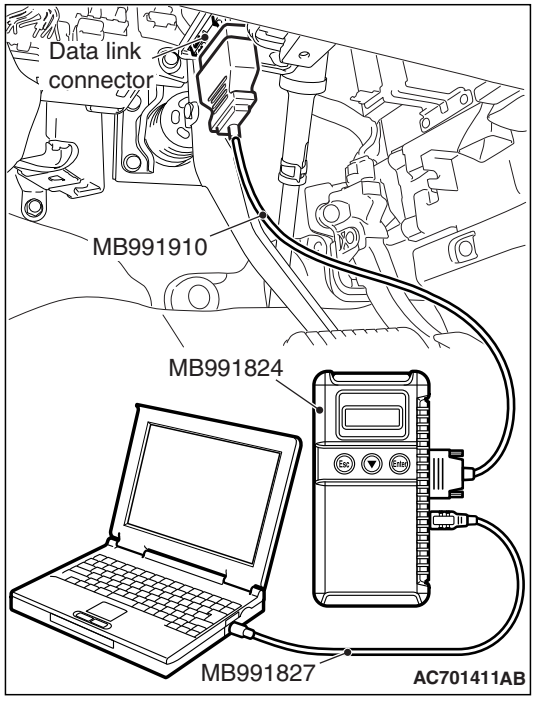
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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.

HOW TO DIAGNOSE THE CAN BUS LINE

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 "CAN bus diagnosis" from the start-up screen.
4. When the vehicle information is displayed, confirm that it matches the vehicle whose CAN bus lines will be diagnosed.
   - If they match, go to step 8.
   - If not, go to step 5.
5. Select "view vehicle information" button.
6. When the vehicle information is displayed, confirm again that it matches the vehicle which is being diagnosed.
   - If they match, go to step 8.
   - If not, go to step 5.
7. Press the "OK" button.
8. When the options are displayed, choose the options (mark the check) and then select "OK".

DIAGNOSTIC FUNCTION

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

- DTC set (Refer to P.35C-18).
- Service data output (Refer to P.35C-270).
- Actuator test (Refer to P.35C-273).
- Freeze frame data output (Refer to P.35C-8).

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 analyzing 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
8	Lateral G sensor	Lateral G of G and yaw rate sensor when the DTC is generated	G
9	G sensor	Longitudinal G of G and yaw rate sensor when the DTC is generated	G
10	Master cylinder pressure	Master cylinder pressure of Master cylinder pressure sensor when the DTC is generated	bar
11	Steering angle	Steering angle of steering wheel sensor when the DTC is generated	deg
12	Yaw rate sensor	Yaw rate of G and yaw rate sensor when the DTC is generated	deg/s
13	Stop light switch	Stop light switch condition when the DTC is generated :OFF/ON	–
21	Pump motor	Pump motor condition when the DTC is generated :OFF/ON	–
28	ASC/TCL off switch	ASC OFF switch condition when the DTC is generated :OFF/ON	–
301	ABS control	ABS control when the DTC is generated :OFF/ON	–
302	Brake TCL control	Traction control (brake control) when the DTC is generated :OFF/ON	–
303	Engine TCL control	Traction control (engine control) when the DTC is generated :OFF/ON	–
304	ASC control	ASC control when the DTC is generated :OFF/ON	–
305	Brake TCL operation	Traction control (brake control) operation when the DTC is generated: Permission/Prohibition	–

Item No.	Item name	Content	Unit
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 FUNCTIONS

ASC-ECU constantly monitors the input and output signals. If an error is detected in the system, ASC-ECU sends a fail signal and the corresponding indicator light is illuminated or blinks. Various controls are processed depending on the cause of malfunction as shown below.

Illumination condition of warning light and display in case of failure

Diagnostic trouble code No.	Item	Brake warning light, brake warning display	ABS warning light, ABS warning display	ASC warning light, ASC warning display	ASC OFF display
C100A	Abnormality in FL wheel speed sensor circuit	OFF*1	ON *2	ON	ON
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	OFF*1	ON *2	ON	ON
C101C	Abnormality in FR wheel speed sensor signal				
C1027	Abnormality in RL wheel speed sensor signal				
C1032	Abnormality in RR wheel speed sensor signal				

Diagnostic trouble code No.	Item	Brake warning light, brake warning display	ABS warning light, ABS warning display	ASC warning light, ASC warning display	ASC OFF display
C1014	Mutual monitoring of FL wheel speed sensor	OFF*1	ON *2	ON	ON
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	OFF*1	ON *2	ON	ON
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	OFF*1	ON *2	ON	ON
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	ON	ON	ON	ON
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	ON	ON	ON	ON
C1063	Abnormality in FR wheel outlet valve system				
C1067	Abnormality in RL wheel outlet valve system				
C105B	Abnormality in RR wheel outlet valve system				

Diagnostic trouble code No.	Item		Brake warning light, brake warning display	ABS warning light, ABS warning display	ASC warning light, ASC warning display	ASC OFF display
C1200	Abnormality in FL/RR wheel cut valve system		ON	ON	ON	ON
C1204	Abnormality in FR/RL wheel cut valve system					
C1208	Abnormality in FL/RR wheel suction valve system					
C120C	Abnormality in FR/RL wheel suction valve system					
C2104	Faulty valve power supply circuit		ON	ON	ON	ON
C1073	Faulty motor drive circuit		OFF	ON *2	ON	ON
C2116	Low or high power supply voltage in pump motor		OFF	ON *2	ON	ON
C121D	Abnormality in brake fluid pressure sensor circuit		OFF	ON	ON	ON
C121E	Abnormality in brake fluid pressure sensor output signal		OFF	ON	ON	ON
C1000	Abnormality in stop light switch circuit		OFF	OFF	ON	ON
C123B	Prolonged operation of ASC		OFF	OFF	ON	ON
C2200	Abnormality in ASC-ECU		ON	ON	ON	ON
C2101	Abnormality in battery voltage (high voltage)	18.0 ± 1.0 V or more	ON	ON	ON	ON
C1395	Brake fluid charging incompletion		OFF	ABS warning light: Flashing (1 Hz) ABS warning display: ON	OFF	OFF
C121C	Torque request signal rejection		OFF	OFF	ON	ON
C1290	CAN time-out error		OFF	OFF	ON	ON
C2203	VIN not recorded		OFF	ON	OFF	OFF
C2206	Re-execution of variant coding		OFF	ON	ON	ON
C1210 *5	Abnormality in G & yaw rate sensor	Abnormality in longitudinal G-sensor output voltage	OFF	ON	ON	ON

Diagnostic trouble code No.	Item		Brake warning light, brake warning display	ABS warning light, ABS warning display	ASC warning light, ASC warning display	ASC OFF display
C1242[*5]	Abnormality in G & yaw rate sensor	Abnormality in longitudinal G-sensor output signal	OFF	ON	ON	ON
C123C	Abnormality in G & yaw rate sensor	Abnormality in lateral G-sensor and yaw rate output value	OFF	OFF	ON	ON
C2204	Internal abnormality in G & yaw rate sensor		OFF	OFF[*4] ON[*5, 7]	ON	ON
C2111	Brake fluid pressure sensor power supply circuit	Low input	OFF	ON	ON	ON
C2112	Brake fluid pressure sensor power supply circuit	High input	OFF	ON	ON	ON
C2114[*3]	Abnormality in G & yaw rate sensor operation voltage	Low voltage (6.5 ± 0.5 V or less)	OFF	OFF[*4] ON[*5]	ON	ON
C2115	Abnormality in G & yaw rate sensor operation voltage	High voltage (18.0 ± 1.0 V or more)	OFF	OFF[*4] ON[*5]	ON	ON
C123A	Abnormality in sensor calibration		OFF	OFF[*4] ON[*5, 7]	ON	ON
C1219	Abnormality in steering wheel sensor signal		OFF	OFF	ON	ON
C121A	Abnormality in steering wheel sensor initialization	Steering wheel sensor neutral point not learned	OFF	ABS warning light: Flashing (2 Hz) ABS warning display: ON	ON	ON
C2205	Internal abnormality in steering wheel sensor		OFF	OFF	ON	ON
C2002	Valve calibration error		ON	ON	ON	ON

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Diagnostic trouble code No.	Item	Brake warning light, brake warning display	ABS warning light, ABS warning display	ASC warning light, ASC warning display	ASC OFF display
C2003	Control parameter not implement	OFF	OFF	OFF	ON
C1608	Implausible diagnosis data	OFF	OFF	OFF	OFF
U0001	Bus-off	OFF	OFF	OFF	OFF
U0100	Engine time-out error	OFF	OFF	OFF	OFF
U0101	A/T or CVT time-out error	OFF	OFF	OFF	OFF
U0114*5	AWD-ECU time-out error	OFF	OFF	OFF	OFF
U0126	Steering wheel sensor time-out error	OFF	OFF	OFF	OFF
U0141	ETACS time-out error	OFF	OFF	OFF*8 ON*9	OFF
U0125	G & yaw rate sensor message time-out error/message error	OFF	OFF*4 ON*5	ON	ON
U0401	Engine malfunction detected	OFF	OFF	ON	ON
U0428	Steering wheel sensor CRC, message error	OFF	OFF	ON	ON
U1003	G & yaw rate sensor bus-off	OFF	OFF*4 ON*5	ON	ON
U1415	Variant coding not implemented	OFF	ON	ON	ON
U1417	Variant coding value invalid (includes faulty installation)	OFF	ON*7	ON	ON

NOTE:

- **1: Turns on when two or more wheels are faulty.*
- **2: Stays on until the vehicle speed reaches 6 mph (10 km/h) when the ignition switch is turned to ON next time.*
- **3: This diagnostic trouble code is not set with the vehicle speed of 12 mph (20 km/h) or less.*
- **4: FWD.*
- **5: AWD.*
- **6: Does not illuminate when there is no effect to the EBD function.*
- **7: Does not illuminate when there is no effect to the ABS function.*
- **8: Except vehicles with HSA.*
- **9: Vehicles with HSA.*

Under EBD, ABS, stability control, HSA and TCL control in case of failure

Diagnostic trouble code No.	Item	EBD	ABS	Stability control	TCL	HSA
C100A	Abnormality in FL wheel speed sensor circuit	Enabled *1	Prohibited	Prohibited	Prohibited	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	Enabled *1	Prohibited	Prohibited	Prohibited	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	Enabled *1	Prohibited	Prohibited	Prohibited	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	Enabled *1	Prohibited	Prohibited	Prohibited	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					

Diagnostic trouble code No.	Item	EBD	ABS	Stability control	TCL	HSA
C1046	FL wheel speed sensor control phase time exceeded	Enabled *1	Prohibited	Prohibited	Prohibited	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					
C104B	Abnormality in FL wheel inlet valve system	Prohibited	Prohibited	Prohibited	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	Prohibited	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					
C1200	Abnormality in FL/RR wheel cut valve system	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited
C1204	Abnormality in FR/RL wheel cut valve system					
C1208	Abnormality in FL/RR wheel suction valve system					
C120C	Abnormality in FR/RL wheel suction valve system					
C2104	Faulty valve power supply circuit	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited
C1073	Faulty motor drive circuit	Enabled	Prohibited	Prohibited	Prohibited	Prohibited
C2116	Low or high power supply voltage in pump motor	Enabled	Prohibited	Prohibited	Prohibited	Prohibited

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Diagnostic trouble code No.	Item		EBD	ABS	Stability control	TCL	HSA
C121D	Abnormality in brake fluid pressure sensor circuit		Enabled	Prohibited	Prohibited	Prohibited	Prohibited
C121E	Abnormality in brake fluid pressure sensor output signal		Enabled	Prohibited	Prohibited	Prohibited	Prohibited
C1000	Abnormality in stop light switch circuit		Enabled	Enabled	Prohibited	Prohibited	Prohibited
C123B	Prolonged operation of ASC		Enabled	Enabled	Prohibited	Prohibited	Prohibited
C2200	Abnormality in ASC-ECU		Prohibited*5	Prohibited*6	Prohibited	Prohibited	Prohibited
C2101	Abnormality in battery voltage (high voltage)	18.0 ± 1.0 V or more	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited
C1395	Brake fluid charging incompletion		Enabled	Prohibited	Prohibited	Prohibited	Prohibited
C121C	Torque request signal rejection		Enabled	Enabled	Prohibited	Prohibited	Prohibited
C1290	CAN time-out error		Enabled	Enabled	Prohibited	Prohibited	Prohibited
C2203	VIN not recorded		Enabled	Enabled	Enabled	Enabled	Enabled
C1210*4	Abnormality in G & yaw rate sensor	Abnormality in longitudinal G-sensor output voltage	Enabled	Prohibited	Prohibited	Prohibited	Prohibited
C1242*4	Abnormality in G & yaw rate sensor	Abnormality in longitudinal G-sensor output signal	Enabled	Prohibited	Prohibited	Prohibited	Prohibited
C123C	Abnormality in G & yaw rate sensor	Abnormality in lateral G and yaw rate output value	Enabled	Enabled	Prohibited	Prohibited	Prohibited
C2204	Internal abnormality in G & yaw rate sensor		Enabled	Enabled*3 Prohibited*4	Prohibited	Prohibited	Prohibited

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Diagnostic trouble code No.	Item		EBD	ABS	Stability control	TCL	HSA
C2111	Brake fluid pressure sensor power supply circuit	Low input	Enabled	Prohibited	Prohibited	Prohibited	Prohibited
C2112	Brake fluid pressure sensor power supply circuit	High input	Enabled	Prohibited	Prohibited	Prohibited	Prohibited
C2114*2	Abnormality in G & yaw rate sensor operation voltage	Low voltage (6.5 ± 0.5 V or less)	Enabled	Enabled*3 Prohibited*4	Prohibited	Prohibited	Prohibited
C2115	Abnormality in G & yaw rate sensor operation voltage	High voltage (18.0 ± 1.0 V or more)	Enabled	Enabled*3 Prohibited*4	Prohibited	Prohibited	Prohibited
C123A	Abnormality in sensor calibration		Enabled	Prohibited	Prohibited	Prohibited	Prohibited
C1219	Abnormality in steering wheel sensor signal		Enabled	Enabled	Prohibited	Prohibited	Prohibited
C121A	Abnormality in steering wheel sensor initialization	Steering wheel sensor neutral point not learned	Enabled	Enabled	Prohibited	Prohibited	Prohibited
C2205	Internal abnormality in steering wheel sensor		Enabled	Enabled	Prohibited	Prohibited	Prohibited
C2002	Valve calibration not completed		Prohibited	Prohibited	Prohibited	Prohibited	Prohibited
C2003	Control parameter not implement		Enabled	Enabled	Prohibited	Prohibited	Prohibited
C1608	Implausible diagnosis data		Enabled	Enabled	Enabled	Enabled	Enabled
U0001	Bus-off		Enabled	Enabled	Enabled	Enabled	Enabled
U0100	Engine time-out error		Enabled	Enabled	Enabled	Enabled	Enabled
U0101	A/T or CVT time-out error		Enabled	Enabled	Enabled	Enabled	Enabled
U0114*4	AWD-ECU time-out error		Enabled	Enabled	Enabled	Enabled	Enabled
U0126	Steering wheel sensor time-out error		Enabled	Enabled	Enabled	Enabled	Enabled

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Diagnostic trouble code No.	Item	EBD	ABS	Stability control	TCL	HSA
U0141	ETACS time-out error	Enabled	Enabled	Enabled	Enabled	Enabled
U0125	G & yaw rate sensor message time-out error/message error	Enabled	Enabled*3 Prohibited*4	Prohibited	Prohibited	Prohibited
U0401	Engine malfunction detected	Enabled	Enabled	Prohibited	Prohibited	Prohibited
U0428	Steering wheel sensor CRC, message error	Enabled	Enabled	Prohibited	Prohibited	Prohibited
U1003	G & yaw rate sensor bus-off	Enabled	Enabled*3 Prohibited*4	Prohibited	Prohibited	Prohibited
U1415	Variant coding not implemented	Enabled	Prohibited	Prohibited	Prohibited	Prohibited
U1417	Variant coding value invalid (includes faulty installation)	Enabled	Prohibited*6	Prohibited	Prohibited	Prohibited

NOTE:

- **1: Prohibited when two or more wheels are faulty.*
- **2: This diagnostic trouble code is not set with the vehicle speed of 12 mph (20 km/h) or less.*
- **3: FWD.*
- **4: AWD.*
- **5: Not prohibited when the brake warning light is not illuminated.*
- **6: Not prohibited when the ABS warning light is not illuminated.*

DIAGNOSTIC TROUBLE CODE CHART

M1355001100906

⚠ CAUTION

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

Diagnosis code No.	Item	Reference page
C100A	Abnormality in FL wheel speed sensor circuit	P.35C-21
C1015	Abnormality in FR wheel speed sensor circuit	P.35C-26
C1020	Abnormality in RL wheel speed sensor circuit	P.35C-32
C102B	Abnormality in RR wheel speed sensor circuit	P.35C-37
C1011	Abnormality in FL wheel speed sensor signal	P.35C-43
C101C	Abnormality in FR wheel speed sensor signal	P.35C-48
C1027	Abnormality in RL wheel speed sensor signal	P.35C-53
C1032	Abnormality in RR wheel speed sensor signal	P.35C-58
C1014	Mutual monitoring of FL wheel speed sensor	P.35C-63
C101F	Mutual monitoring of FR wheel speed sensor	P.35C-67

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Diagnosis code No.	Item		Reference page
C102A	Mutual monitoring of RL wheel speed sensor		P.35C-70
C1035	Mutual monitoring of RR wheel speed sensor		P.35C-74
C1041	Abnormality in periodical signal for FL wheel speed sensor		P.35C-78
C1042	Abnormality in periodical signal for FR wheel speed sensor		P.35C-82
C1043	Abnormality in periodical signal for RL wheel speed sensor		P.35C-85
C1044	Abnormality in periodical signal for RR wheel speed sensor		P.35C-89
C1046	FL wheel speed sensor control phase time exceeded		P.35C-94
C1047	FR wheel speed sensor control phase time exceeded		P.35C-99
C1048	RL wheel speed sensor control phase time exceeded		P.35C-104
C1049	RR wheel speed sensor control phase time exceeded		P.35C-109
C104B	Abnormality in FL wheel inlet valve system		P.35C-114
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		
C1200	Abnormality in FL/RR wheel cut valve system		
C1204	Abnormality in FR/RL wheel cut valve system		
C1208	Abnormality in FL/RR wheel suction valve system		
C120C	Abnormality in FR/RL wheel suction valve system		
C2104	Faulty valve power supply circuit		P.35C-116
C1073	Faulty motor drive circuit		P.35C-121
C2116	Low or high power supply voltage in pump motor		P.35C-126
C121D	Abnormality in brake fluid pressure sensor circuit		P.35C-131
C121E	Abnormality in brake fluid pressure sensor output signal		P.35C-133
C1000	Abnormality in stoplight switch circuit		P.35C-136
C123B	Prolonged operation of ASC		P.35C-140
C2200	Abnormality in ASC-ECU		P.35C-143
C2101	Abnormality in battery voltage (high voltage)	18.0 ± 1.0 V or more	P.35C-144
C1395	Brake fluid filling not completed		P.35C-146
C121C	Torque request signal rejection		P.35C-147
C1290	CAN time-out error		P.35C-149
C2203	VIN not recorded		P.35C-152
C2206	Re-execution of variant coding		P.35C-154

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Diagnosis code No.	Item		Reference page
C1210*	Abnormality in G and yaw rate sensor	Abnormality in longitudinal G-sensor output voltage	P.35C-156
C1242*	Abnormality in G and yaw rate sensor	Abnormality in longitudinal G-sensor output signal	P.35C-159
C123C	Abnormality in G and yaw rate sensor	Abnormality in lateral G sensor output value (incorrect installation)	P.35C-163
C2204	Internal abnormality in G and yaw rate sensor	Communication error	P.35C-167
		Abnormality in lateral G-sensor output voltage	
		Abnormality in yaw rate sensor output voltage	
		Abnormality in G and yaw rate sensor supply voltage	
C2111	Brake fluid pressure sensor power supply circuit	Low input	P.35C-171
C2112	Brake fluid pressure sensor power supply circuit	High input	
C2114	Abnormality in G and yaw rate sensor supply voltage	Low voltage (below 6.5 ± 0.5 V)	P.35C-173
C2115	Abnormality in G and yaw rate sensor supply voltage	High voltage (18.0 ± 1.0 V or more)	
C123A	Abnormality in sensor calibration		P.35C-178
C1219	Abnormality in steering wheel sensor signal		P.35C-180
C121A	Abnormality in steering wheel sensor initialization	Steering wheel sensor neutral point not learned	P.35C-183
C2205	Internal malfunction of steering wheel sensor		P.35C-184
C2003	Control parameter not implement		P.35C-187
C1608	Implausible diagnosis data		P.35C-191
C2002	Valve calibration not completed		P.35C-186
U0001	Bus-off		P.35C-196
U0100	Engine time-out error		P.35C-198
U0101	A/T or CVT time-out error		
U0114*	AWD-ECU time-out error		
U0126	Steering wheel sensor time-out error		
U0141	ETACS time-out error		
U0125	G and yaw rate sensor message time-out error/message error		P.35C-201
U0401	Engine malfunction detected		P.35C-203
U0428	Communication error in steering wheel sensor		P.35C-205
U1003	G and yaw rate sensor bus-off		P.35C-207
U1415	Variant coding not implemented		P.35C-210
U1417	Variant coding value invalid (includes faulty installation)		P.35C-212

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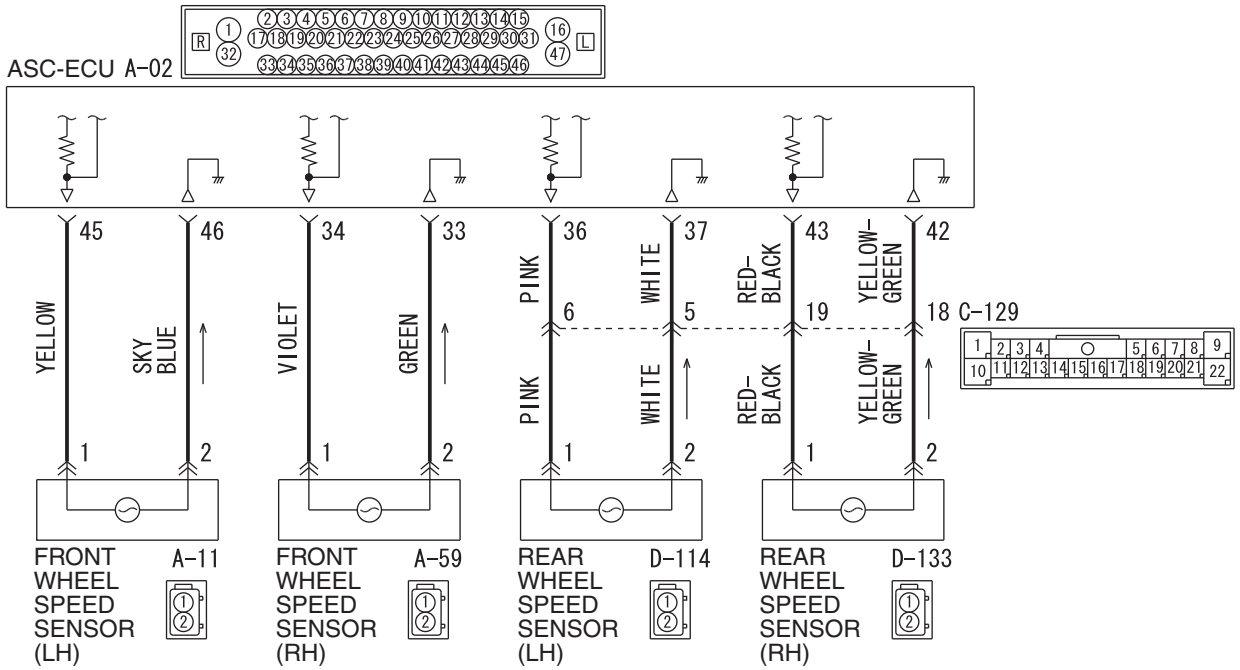
*NOTE: *: When the diagnosis codes relating to the CAN communication error are output, make sure of the vehicle equipment. When the vehicle is not equipped with the system the ASC-ECU communicates to, the diagnosis code is always output. This is not abnormal.*

DIAGNOSTIC TROUBLE CODE PROCEDURES

DTC C100A: Abnormality in FL wheel speed sensor circuit

Wheel Speed Sensor Circuit



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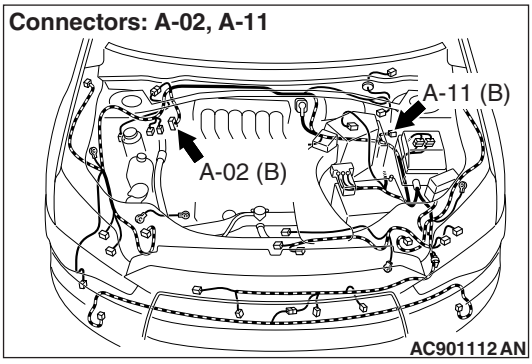


⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect 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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-283, P.35C-282 and P.35C-284).**

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 ASC-ECU. ASC-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ASC-ECU monitors the voltage fluctuation in each wheel speed sensor circuit. If ASC-ECU detects the open or short circuit in the circuit, it will set a diagnostic trouble code.

PROBABLE CAUSES

Current trouble

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

Past trouble

- Carry out diagnosis with particular emphasis on wiring harness and connector failures between ASC-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
- MB991997: ASC check harness

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-10). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C100A set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the data list

Check the following data list (Refer to P.35C-270).

- Item No.01: FL wheel speed sensor

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunction P.00-15).

NO : Go to Step 4.

STEP 4. Voltage measurement at the A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the voltage at the special tool connector side.

NOTE: Do not connect the special tool to ASC-ECU.

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

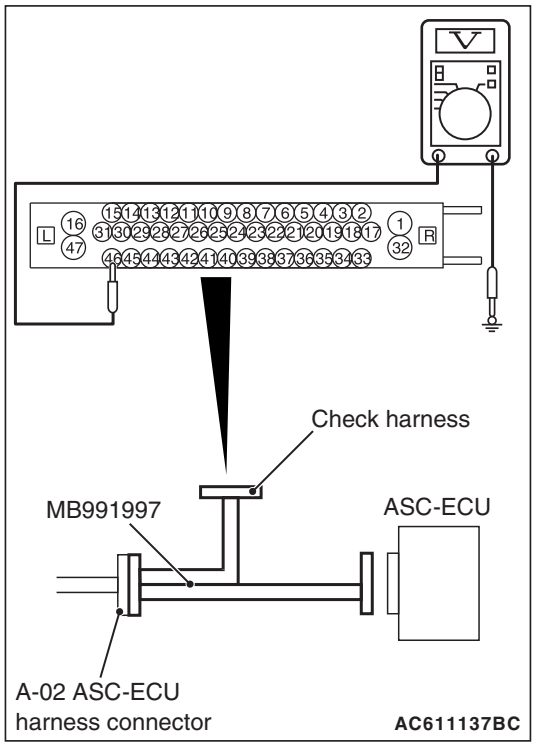
(3) Measure the voltage between the wheel speed sensor power supply terminal (signal terminal) No.45 and the body ground and between the wheel speed sensor ground terminal No.46 and the body ground.

OK: 1Volt or less

Q: Is the check result normal?

YES : Go to Step 5.

NO (Not normal at the terminal No.45 or 46) : Go to Step 6.



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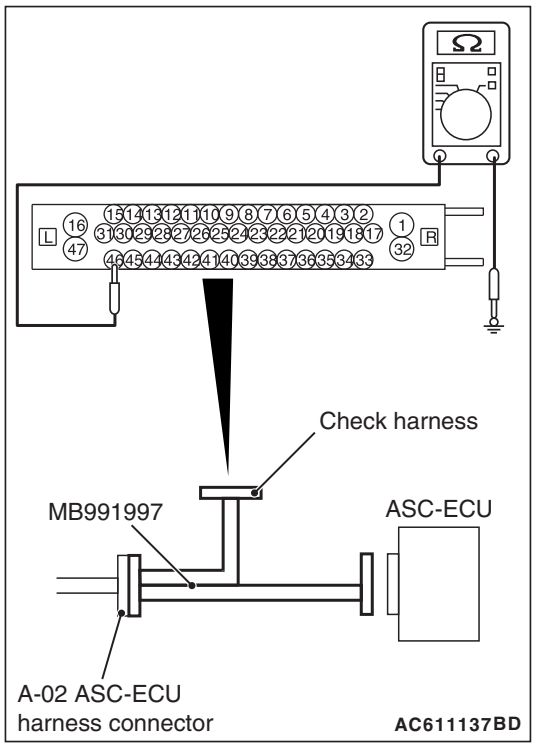


STEP 5. Resistance measurement at A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool to ASC-ECU.

(2) Measure the resistance between the wheel speed sensor power supply terminal (signal terminal) No.45 and the body ground and between the wheel speed sensor ground terminal No.46 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Go to Step 8.

NO (Not normal at the terminal No.45 or 46) : Go to Step 6.

STEP 6. Connector check: A-02 ASC-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.

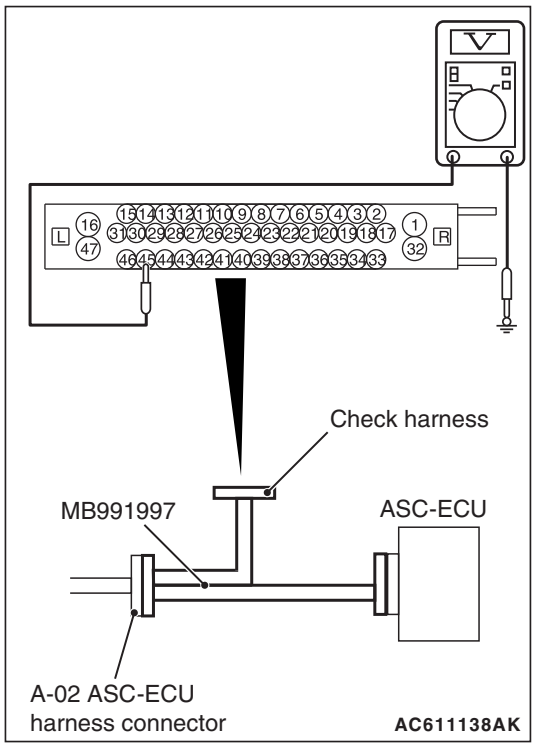
STEP 7. Wiring harness check between A-02 ASC-ECU connector terminal No.45 and A-11 front wheel speed sensor <LH> connector terminal No.1 and between A-02 ASC-ECU connector terminal No.46 and A-11 front wheel speed sensor <LH> connector terminal No.2.

- 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.35C-288).

NO : Repair the wiring harness.



STEP 8. Voltage measurement at the A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the ASC-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 wheel speed sensor power supply terminal (signal terminal) No.45 and body ground, and between the ground terminal No.46 and body ground.

OK:
Terminal No.45 and body ground: Approximately system voltage
Terminal No.46 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-02 ASC-ECU connector terminal No.45 and A-11 front wheel speed sensor <LH> connector terminal No.1 and between A-02 ASC-ECU connector terminal No.46 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.

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

Refer to P.35C-289.

Q: Is the check result normal?

YES : Go to Step 11.
NO : Replace the wheel speed sensor <FL> (Refer to P.35C-288).

STEP 11. Connector check: A-02 ASC-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.

STEP 12. Check whether the diagnostic trouble code is reset.

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

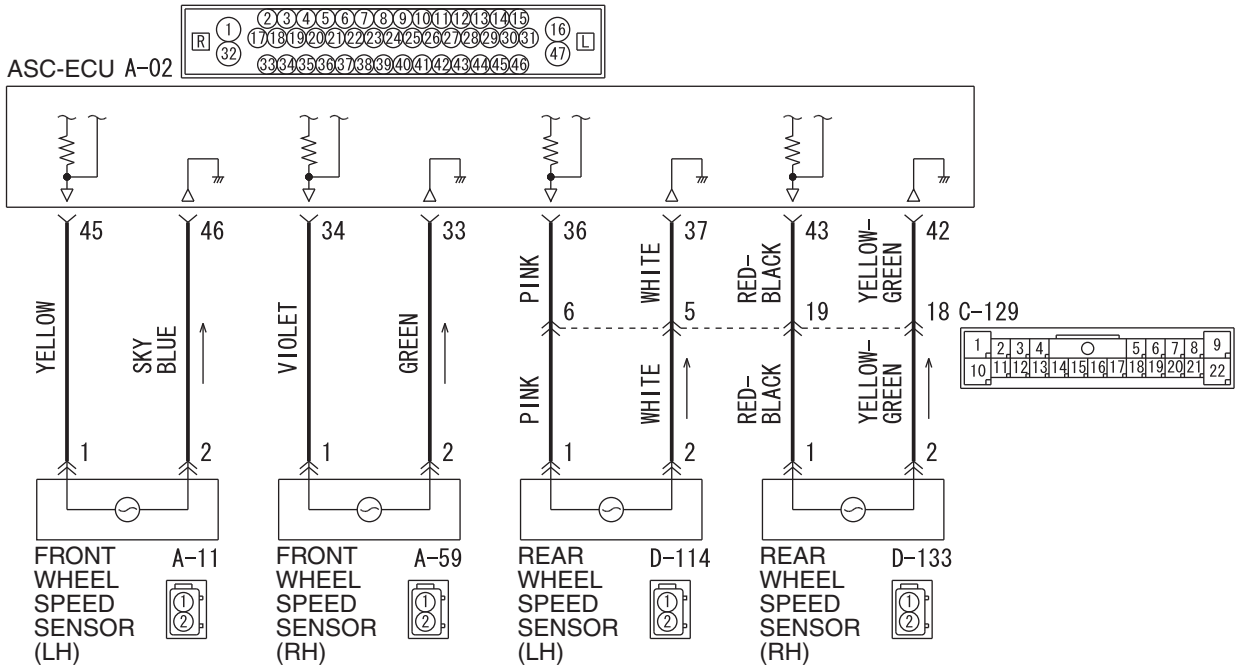
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12 mph (20 km/h) or higher.

Q: Is DTC C100A set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287).
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

DTC C1015 Abnormality in FR wheel speed sensor circuit

Wheel Speed Sensor Circuit



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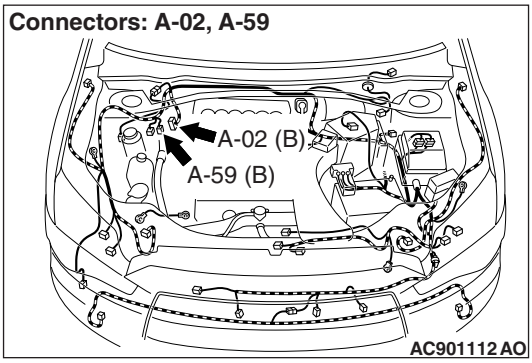


⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect 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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-283, P.35C-282 and P.35C-284).**

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 ASC-ECU. ASC-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ASC-ECU monitors the voltage fluctuation in each wheel speed sensor circuit. If ASC-ECU detects the open or short circuit in the circuit, it will set a diagnostic trouble code.

PROBABLE CAUSES

Current trouble

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

Past trouble

- Carry out diagnosis with particular emphasis on wiring harness and connector failures between ASC-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
- MB991997: ASC check harness

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-10). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1015 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check data list

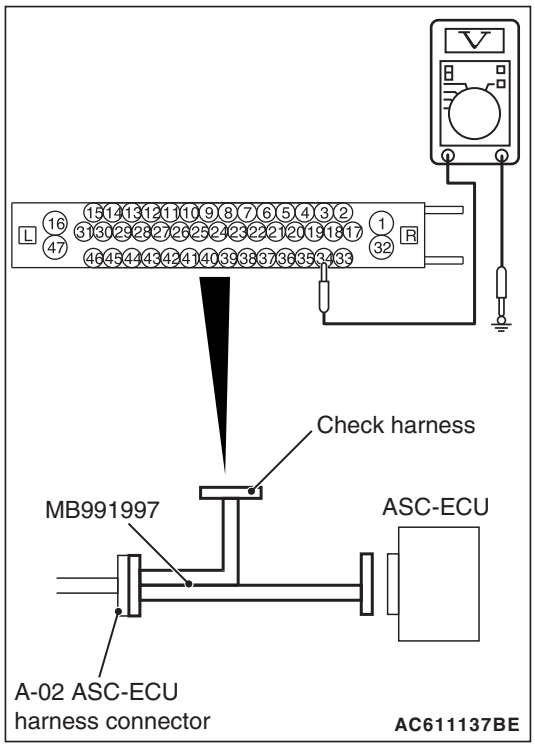
Check the following data list (Refer to P.35C-270).

- Item No.02: FR wheel speed sensor

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 : Go to Step 4.



STEP 4. Voltage measurement at the A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the voltage at the special tool connector side.

NOTE: Do not connect the special tool to ASC-ECU.

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

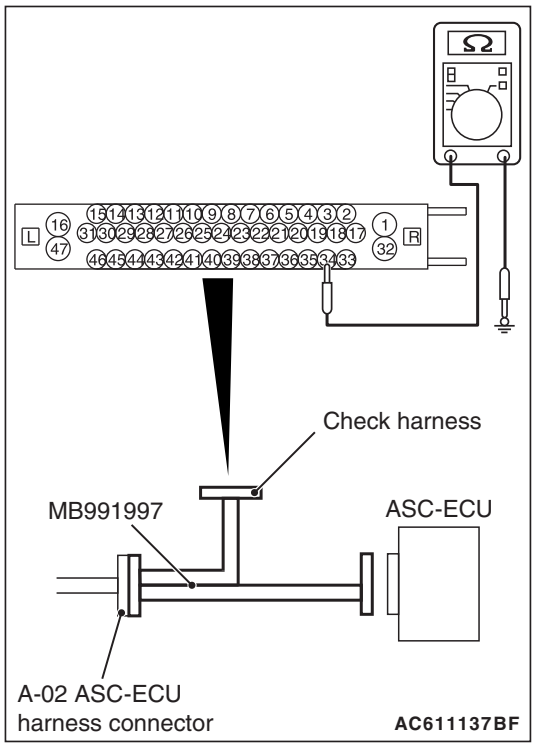
(3) Measure the voltage between the wheel speed sensor power supply terminal (signal terminal) No.34 and the body ground and between the wheel speed sensor ground terminal No.33 and the body ground.

OK: 1 Volt or less

Q: Is the check result normal?

YES : Go to Step 5.

NO (Not normal at the terminal No.34 or 33) : Go to Step 6.



STEP 5. Resistance measurement at A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool to ASC-ECU.

(2) Measure the resistance between the wheel speed sensor power supply terminal (signal terminal) No.34 and the body ground and between the wheel speed sensor ground terminal No.33 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Go to Step 8.

NO (Not normal at the terminal No.34 or 33) : Go to Step 6.

STEP 6. Connector check: A-02 ASC-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-02 ASC-ECU connector terminal No.34 and A-59 front wheel speed sensor <RH> connector terminal No.1 and between A-02 ASC-ECU connector terminal No.33 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.35C-288).
NO : Repair the wiring harness.

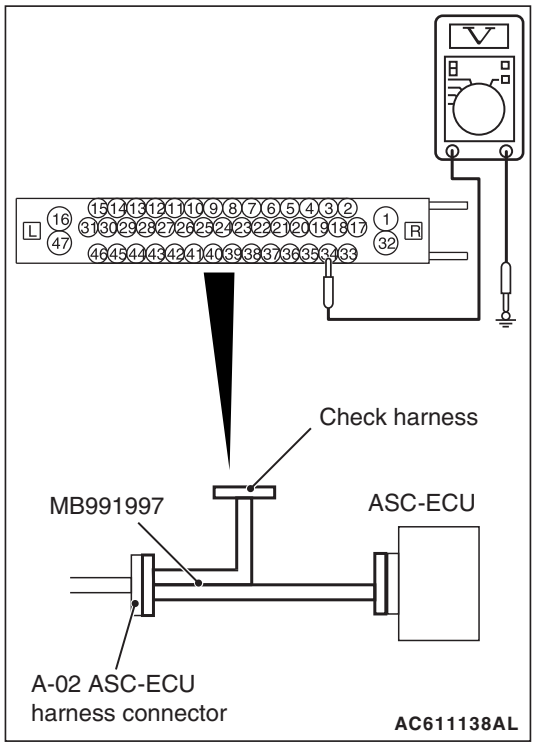
STEP 8. Voltage measurement at the A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the ASC-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 wheel speed sensor power supply terminal (signal terminal) No.34 and body ground, and between the ground terminal No.33 and body ground.

OK:
Terminal No.34 and body ground: Approximately system voltage
Terminal No.33 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-02 ASC-ECU connector terminal No.34 and A-59 front wheel speed sensor <RH> connector terminal No.1 and between A-02 ASC-ECU connector terminal No.33 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.

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

Refer to P.35C-289.

Q: Is the check result normal?

YES : Go to Step 11.
NO : Replace the wheel speed sensor <FR> (Refer to P.35C-288).

STEP 11. Connector check: A-02 ASC-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.

STEP 12. Check whether the diagnostic trouble code is reset.

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

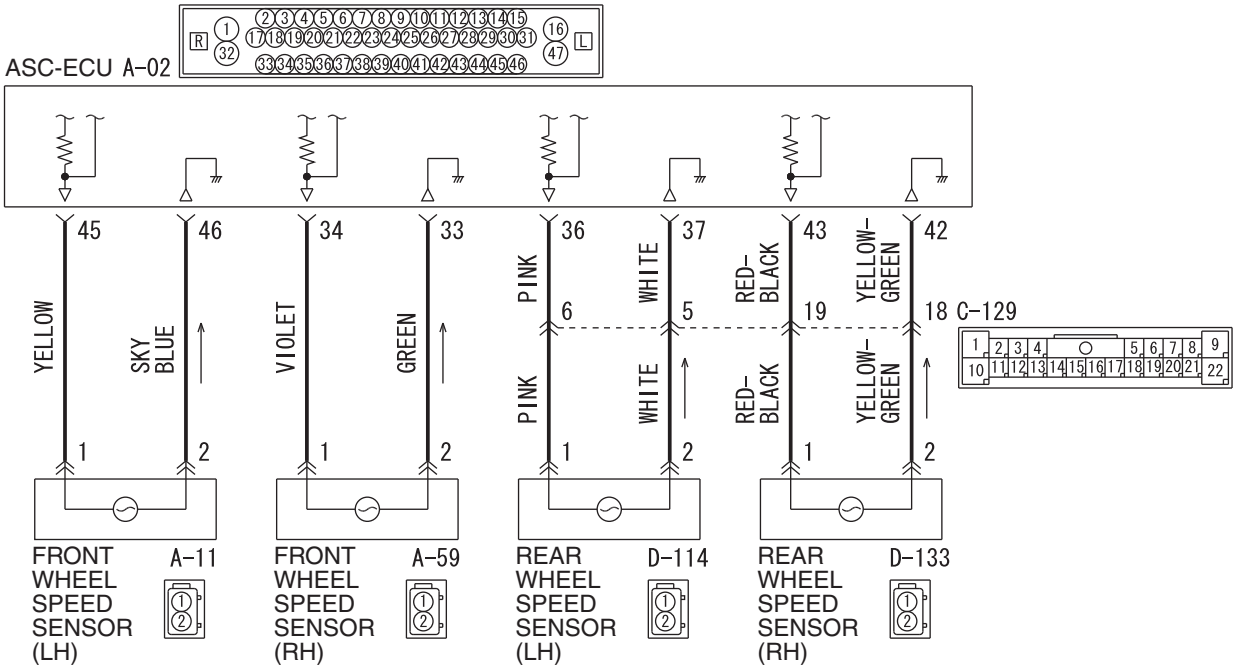
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12 mph (20 km/h) or higher.

Q: Is DTC C1015 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287).
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

DTC C1020 Abnormality in RL wheel speed sensor circuit

Wheel Speed Sensor Circuit



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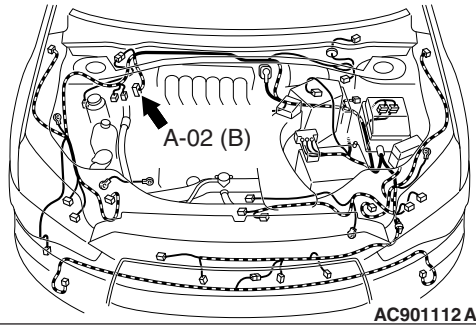
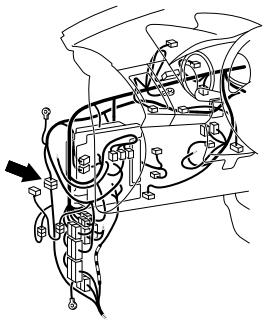
Connector: A-02



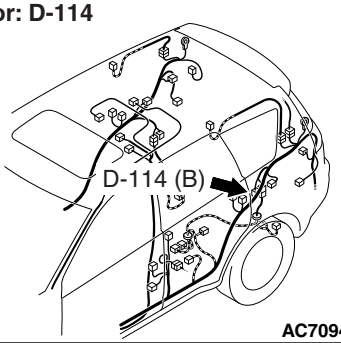
AC901112AF

Connector: C-129



AC901075BC

Connector: D-114



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TSB Revision

⚠ 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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-283, P.35C-282 and P.35C-284).**

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 ASC-ECU. ASC-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ASC-ECU monitors the voltage fluctuation in each wheel speed sensor circuit. If ASC-ECU detects the open or short circuit in the circuit, it will set a diagnostic trouble code.

PROBABLE CAUSES

Current trouble

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

Past trouble

- Carry out diagnosis with particular emphasis on wiring harness and connector failures between ASC-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
- MB991997: ASC check harness

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-10). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C1020 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the data list

Check the following data list (Refer to P.35C-270).

- Item No.03: RL wheel speed sensor

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 : Go to Step 4.

STEP 4. Voltage measurement at the A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the voltage at the special tool connector side.

NOTE: Do not connect the special tool to ASC-ECU.

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

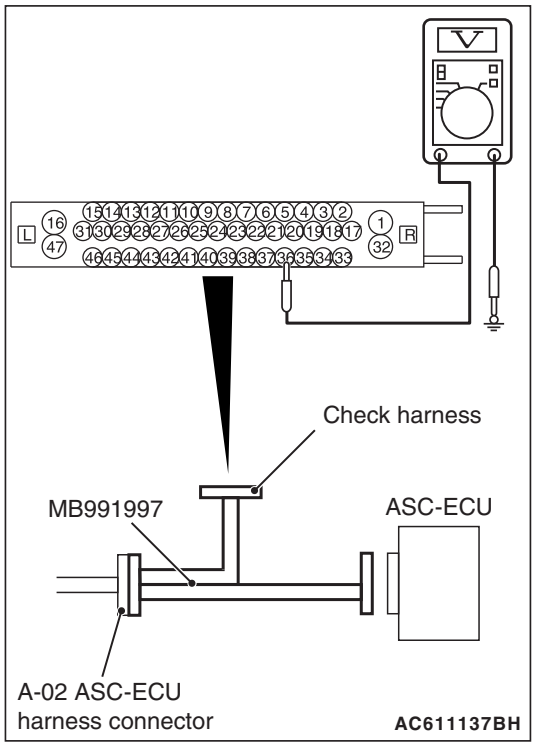
(3) Measure the voltage between the wheel speed sensor power supply terminal (signal terminal) No.36 and the body ground and between the wheel speed sensor ground terminal No.37 and the body ground.

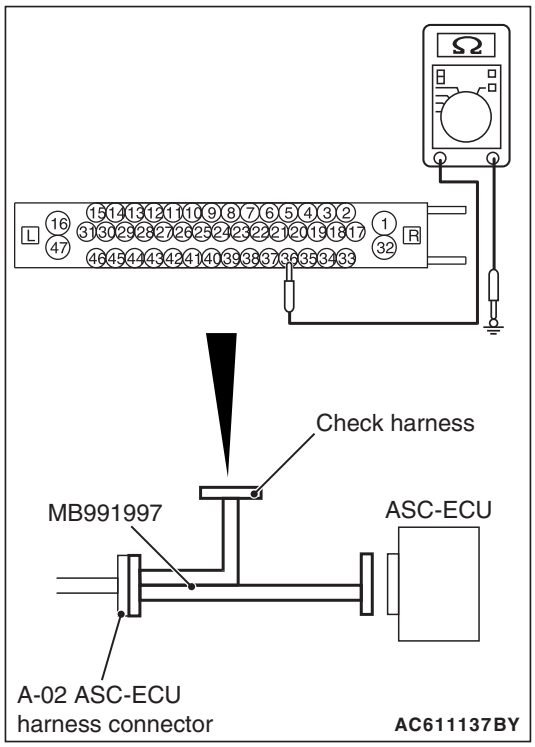
OK: 1 Volt or less

Q: Is the check result normal?

YES : Go to Step 5.

NO (Not normal at the terminal No.36 or 37) : Go to Step 6.





STEP 5. Resistance measurement at A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool to ASC-ECU.

(2) Measure the resistance between the wheel speed sensor power supply terminal (signal terminal) No.36 and the body ground and between the wheel speed sensor ground terminal No.37 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Go to Step 8.

NO (Not normal at the terminal No.36 or 37) : Go to Step 6.

STEP 6. Connector check: A-02 ASC-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.

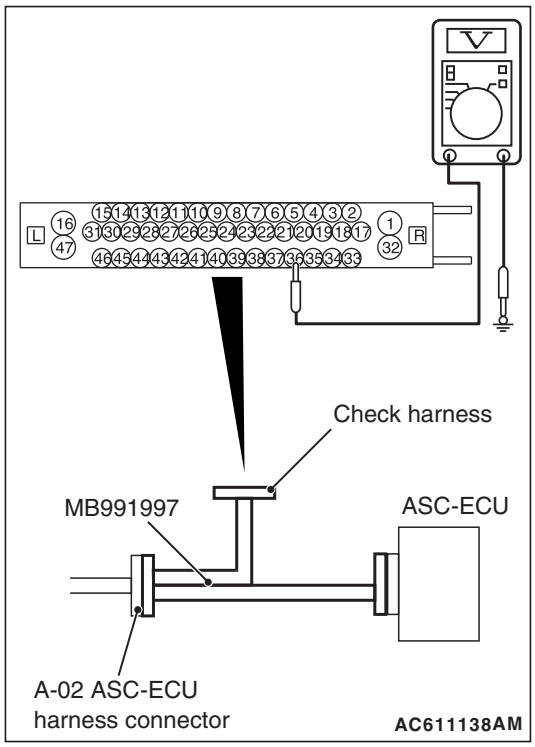
STEP 7. Wiring harness check between A-02 ASC-ECU connector terminal No.36 and D-114 rear wheel speed sensor <LH> connector terminal No.1 and between A-02 ASC-ECU connector terminal No.37 and D-114 rear wheel speed sensor <LH> connector terminal No.2

- 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.35C-288).

NO : Repair the wiring harness.



STEP 8. Voltage measurement at the A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the ASC-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 wheel speed sensor power supply terminal (signal terminal) No.36 and body ground, and between the ground terminal No.37 and body ground.

OK:
Terminal No.36 and body ground: Approximately system voltage
Terminal No.37 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-02 ASC-ECU connector terminal No.36 and D-114 rear wheel speed sensor <LH> connector terminal No.1 and between A-02 ASC-ECU connector terminal No.37 and D-114 rear wheel speed sensor <LH> connector terminal No.2.

- Check for open circuit in wheel speed sensor <RL> 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.35C-289.

Q: Is the check result normal?

YES : Go to Step 11.
NO : Replace the wheel speed sensor <RL> (Refer to P.35C-288).

STEP 11. Connector check: A-02 ASC-ECU 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.

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STEP 12. Check whether the diagnostic trouble code is reset.

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

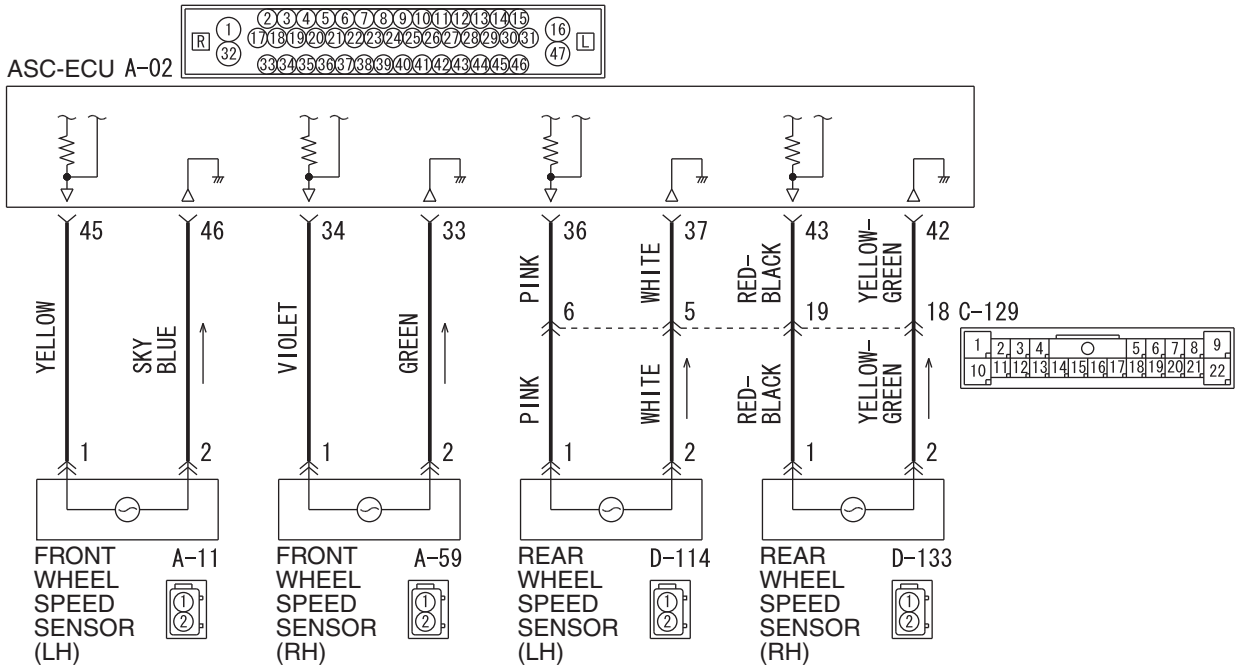
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12 mph (20 km/h) or higher.

Q: Is DTC C1020 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287).
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

DTC C102B Abnormality in RR wheel speed sensor circuit

Wheel Speed Sensor Circuit



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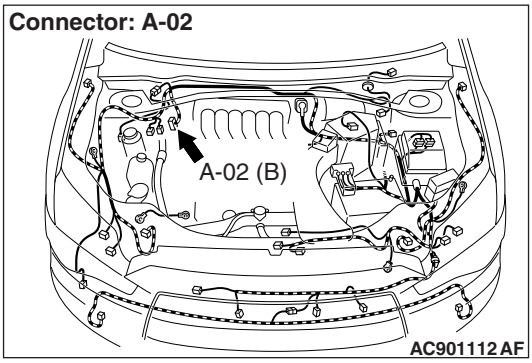
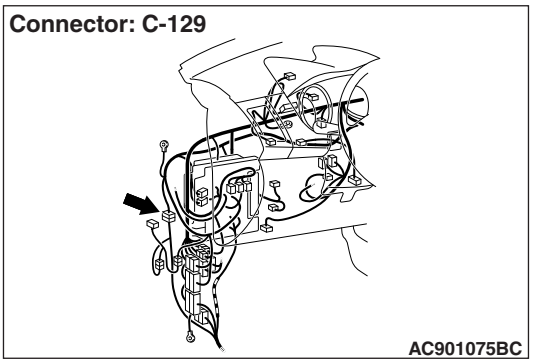
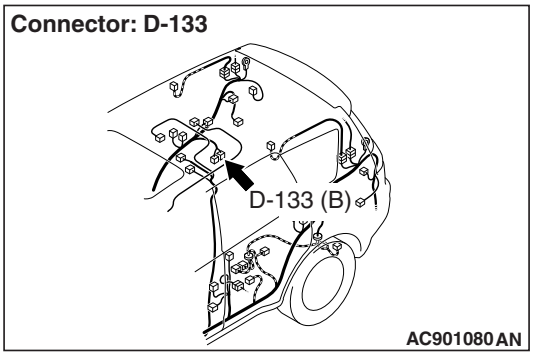
Connector: A-02



Connector: C-129



Connector: D-133



⚠ 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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-283, P.35C-282 and P.35C-284).**

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 ASC-ECU. ASC-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

ASC-ECU monitors the voltage fluctuation in each wheel speed sensor circuit. If ASC-ECU detects the open or short circuit in the circuit, it will set a diagnostic trouble code.

TSB Revision

PROBABLE CAUSES

Current trouble

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

Past trouble

- Carry out diagnosis with particular emphasis on wiring harness and connector failures between ASC-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
- MB991997: ASC check harness

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-10). On completion, go to Step 2.

STEP 2. DTC recheck after resetting CAN bus lines

Q: Is DTC C102B set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check data list

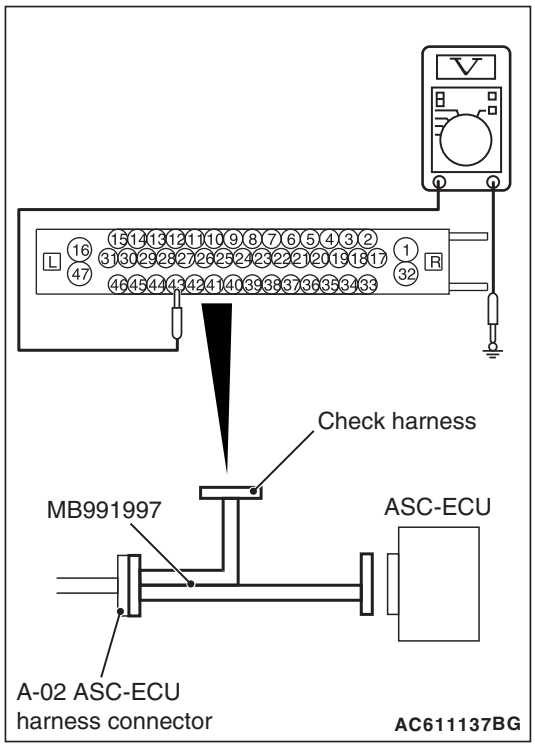
Check the following data list (Refer to P.35C-270).

- Item No.04: RR wheel speed sensor

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunction P.00-15).

NO : Go to Step 4.



STEP 4. Voltage measurement at the A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the voltage at the special tool connector side.

NOTE: Do not connect the special tool to ASC-ECU.

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

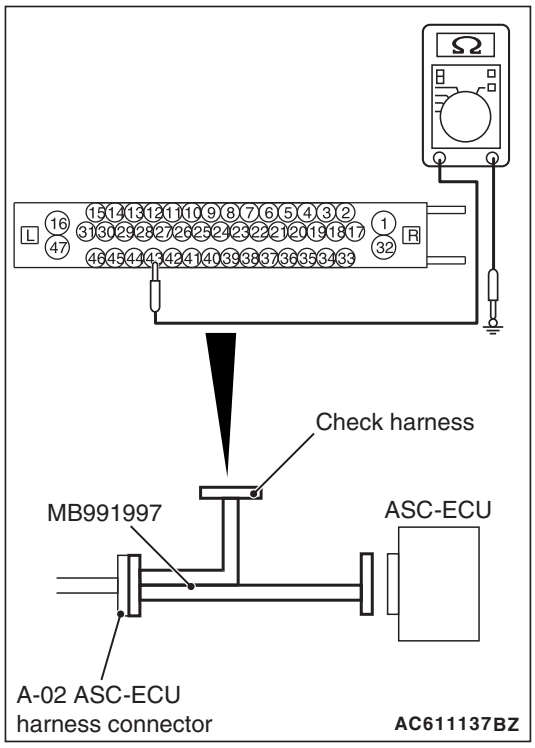
(3) Measure the voltage between the wheel speed sensor power supply terminal (signal terminal) No.43 and the body ground and between the wheel speed sensor ground terminal No.42 and the body ground.

OK: 1 Volt or less

Q: Is the check result normal?

YES : Go to Step 5.

NO (Not normal at the terminal No.43 or 42) : Go to Step 6.



STEP 5. Resistance measurement at A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool to ASC-ECU.

(2) Measure the resistance between the wheel speed sensor power supply terminal (signal terminal) No.43 and the body ground and between the wheel speed sensor ground terminal No.42 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Go to Step 8.

NO (Not normal at the terminal No.43 or 42) : Go to Step 6.

STEP 6. Connector check: A-02 ASC-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.

STEP 7. Wiring harness check between A-02 ASC-ECU connector terminal No.43 and D-133 rear wheel speed sensor <RH> connector terminal No.1 and between A-02 ASC-ECU connector terminal No.42 and D-133 rear wheel speed sensor <RH> connector terminal No.2

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

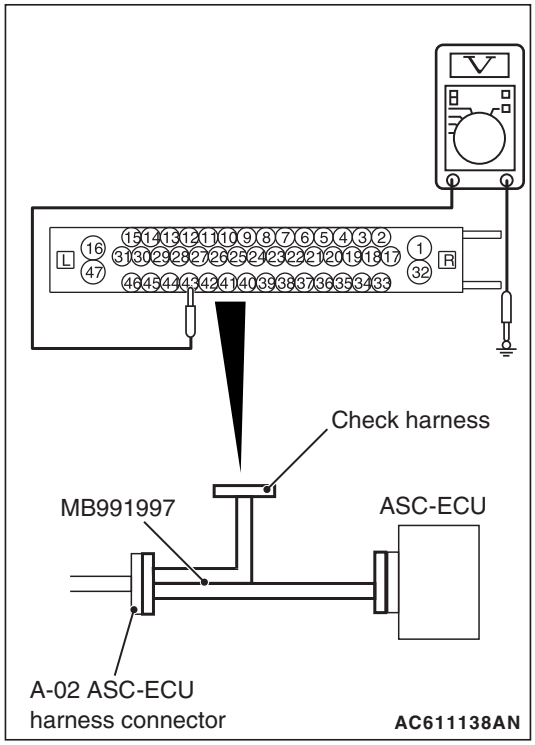
Q: Is the check result normal?

YES : Replace the wheel speed sensor <RR> (Refer to P.35C-288).
NO : Repair the wiring harness.

STEP 8. Voltage measurement at the A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the ASC-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 wheel speed sensor power supply terminal (signal terminal) No.43 and body ground, and between the ground terminal No.42 and body ground.

OK:
Terminal No.43 and body ground: Approximately system voltage
Terminal No.42 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-02 ASC-ECU connector terminal No.43 and D-133 rear wheel speed sensor <RH> connector terminal No.1 and between A-02 ASC-ECU connector terminal No.42 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.35C-289.

Q: Is the check result normal?

YES : Go to Step 11.
NO : Replace the wheel speed sensor <RR> (Refer to P.35C-288).

STEP 11. Connector check: A-02 ASC-ECU 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.

STEP 12. Check whether the diagnostic trouble code is reset.

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

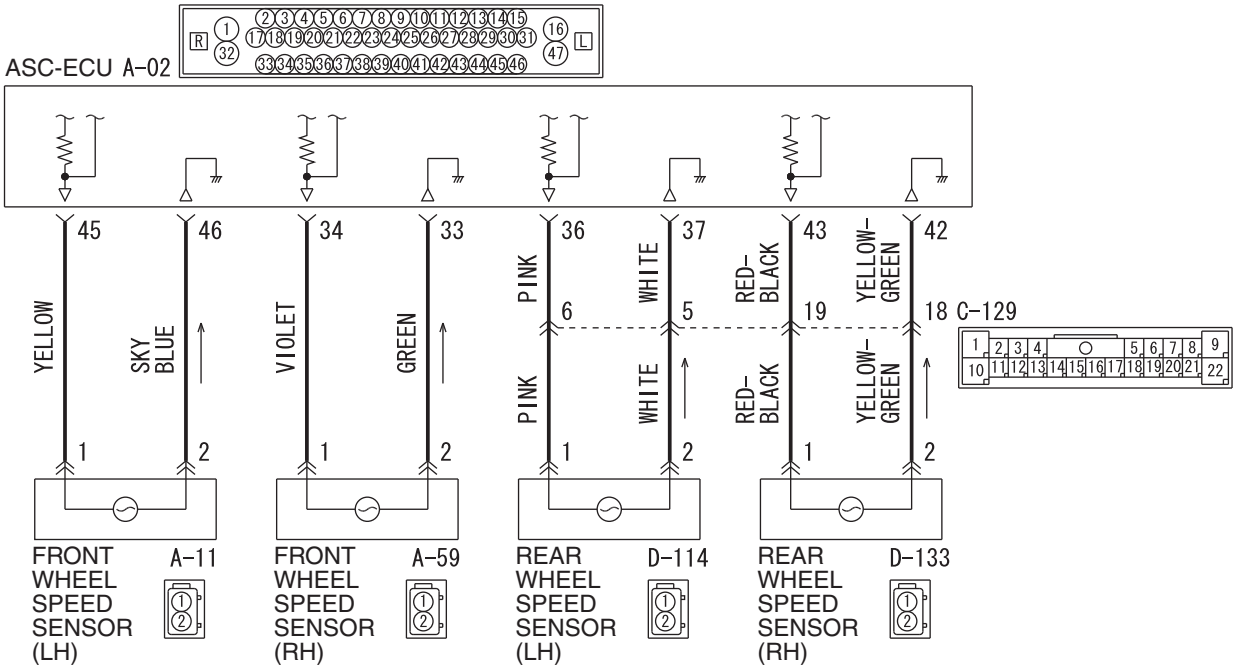
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12 mph (20 km/h) or higher.

Q: Is DTC C102B set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287).
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/How to Cope with Intermittent Malfunctions P.00-15).

DTC C1011: Abnormality in FL wheel speed sensor signal

Wheel Speed Sensor Circuit



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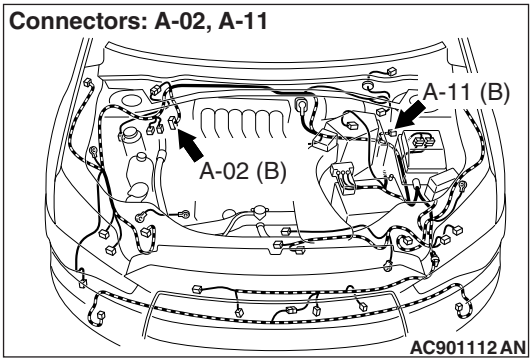

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⚠ CAUTION

- **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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-283, P.35C-282 and P.35C-284).**

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 ASC-ECU. ASC-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 fault below is found in these sensor signals, ASC-ECU will set the relevant diagnostic trouble code.

- 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 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
- 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
- ASC-ECU malfunction
- Disturbance of magnetization pattern for wheel speed detection encoder
- The number of poles on the Magnetic encoder for wheel speed detection (N-pole and S-pole) is changed

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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 ASC-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 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.

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 DTC C100A is also set.

Q: Is DTC C100A also set?

YES : Perform the diagnosis for DTC C100A (Refer to P.35C-21).

NO : Go to Step 4.

STEP 4. Connector check: A-02 ASC-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-02 ASC-ECU connector terminal No.45 and A-11 front wheel speed sensor <LH> connector terminal No.1, and between A-02 ASC-ECU connector terminal No.46 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 for 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> correctly (Refer to P.35C-288). Then go to Step 7.

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

Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 8.
NO : Replace the wheel speed sensor <FL> (Refer to P.35C-288). Then go to Step 11.

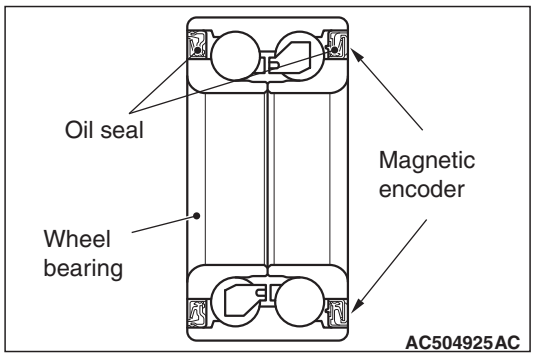
STEP 8. Check for wheel bearing looseness

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.26-18). Then go to Step 12.



STEP 9. 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 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.26-18). 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.35C-288). 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 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 C1011 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 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.

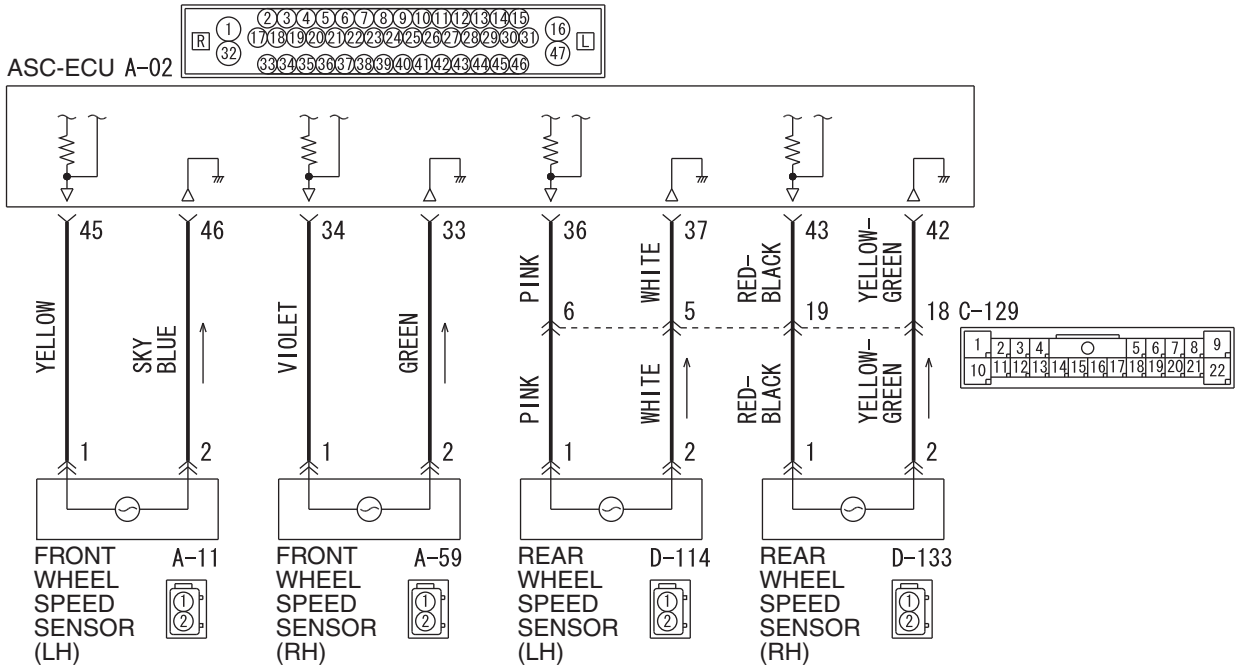
Q: Is DTC C1011 set?

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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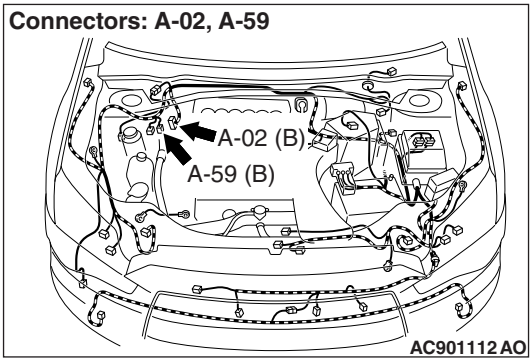

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⚠ CAUTION

- **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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-283, P.35C-282 and P.35C-284).**

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 ASC-ECU. ASC-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 fault below is found in these sensor signals, ASC-ECU will set the relevant diagnostic trouble code.

- 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 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
- 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
- ASC-ECU malfunction
- Disturbance of magnetization pattern for wheel speed detection encoder
- The number of poles on the Magnetic encoder for wheel speed detection (N-pole and S-pole) is changed

TSB Revision

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 ASC-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 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.

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
- MB991997: ASC check harness

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 DTC C1015 is also set.

Q: Is DTC C1015 also set?

YES : Perform the diagnosis for DTC C1015 (Refer to P.35C-26).
NO : Go to Step 4.

STEP 4. Connector check: A-02 ASC-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-02 ASC-ECU connector terminal No.34 and A-59 front wheel speed sensor <RH> connector terminal No.1 and between A-02 ASC-ECU connector terminal No.33 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 for 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.35C-288). Then go to Step 7.

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

Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 8.
NO : Replace the wheel speed sensor <FR> (Refer to P.35C-288). Then go to Step 11.

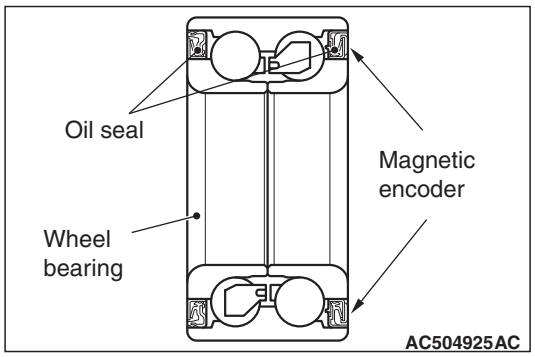
STEP 8. Check for wheel bearing looseness

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.26-18). Then go to Step 12.



STEP 9. 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 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.26-18). 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.35C-288). 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 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 C101C set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 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.

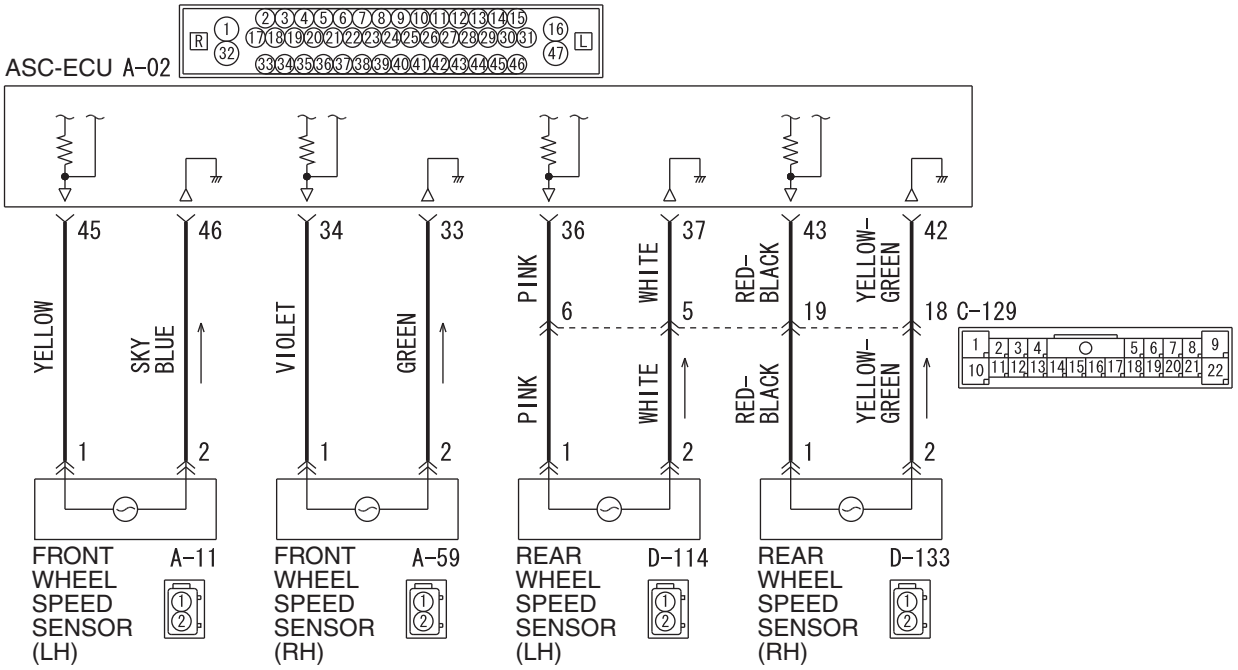
Q: Is DTC C101C set?

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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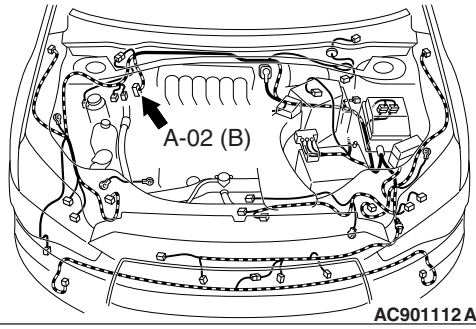
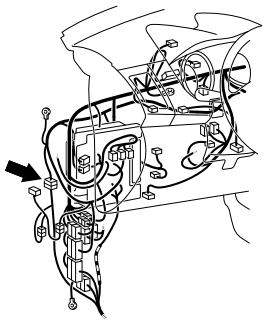
Connector: A-02



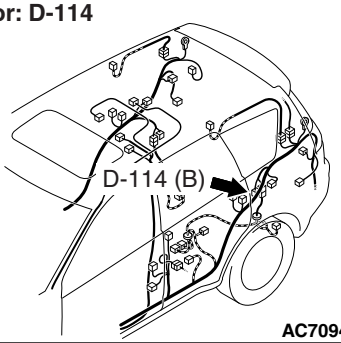
AC901112AF

Connector: C-129



AC901075BC

Connector: D-114



AC709496AM

TSB Revision

⚠ 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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-283, P.35C-282 and P.35C-284).**

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 ASC-ECU. ASC-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 fault below is found in these sensor signals, ASC-ECU will set the relevant diagnostic trouble code.

- 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 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
- 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
- ASC-ECU malfunction
- Disturbance of magnetization pattern for wheel speed detection encoder
- The number of poles on the Magnetic encoder for wheel speed detection (N-pole and S-pole) is changed

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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 ASC-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 diagnostic trouble code No. 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.

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.35C-32).

NO : Go to Step 4.

STEP 4. Connector check: A-02 ASC-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-03 ASC-ECU connector terminal No.36 and D-114 rear wheel speed sensor <LH> connector terminal No.1, and between A-03 ASC-ECU connector terminal No.37 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 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 7.
NO : Reinstall the wheel speed sensor <RL> correctly (Refer to P.35C-288). Then go to Step 7.

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

Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 8.
NO : Replace the wheel speed sensor <RL> (Refer to P.35C-288). Then go to Step 11.

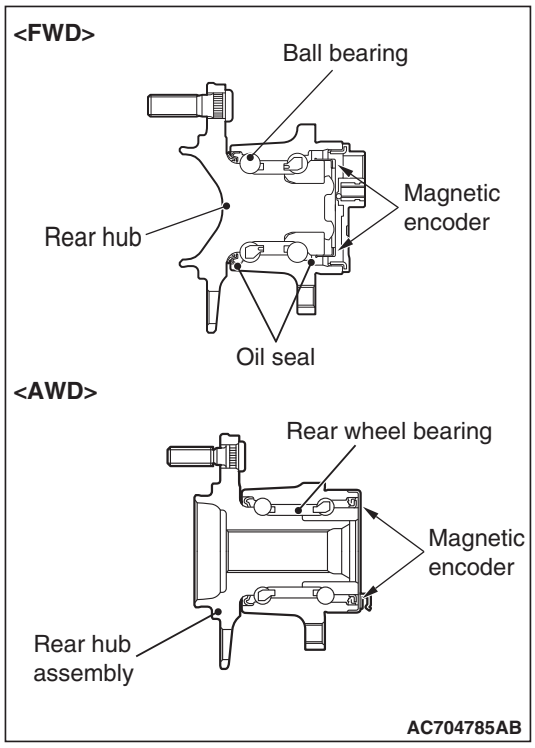
STEP 8. Check for wheel bearing looseness

NOTE:

- *Loose wheel bearing may increase the gap between the wheel speed sensor <RL> and the wheel speed detection magnet encoder.*
- *Check the Rear wheel hub assembly <RL (FWD)> (Refer to GROUP 27A – Wheel Bearing Play Check P.27A-6).*
- *Check the wheel bearing <RL (AWD)> for looseness (Refer to GROUP 27B – Wheel Bearing Play Check P.27B-17).*

Q: Is the check result normal?

YES : Go to Step 9.
NO (FWD) : Replace the rear wheel hub assembly <RL> (Refer to GROUP 27A – Rear axle hub assembly P.27A-8). Then go to Step 12.
NO (AWD) : Replace the wheel bearing <RL> (Refer to GROUP 27B – Rear axle hub assembly P.27B-19). Then go to Step 12.



STEP 9. 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 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 (FWD)> : Replace the rear wheel hub assembly <RL> (Refer to GROUP 27A – Rear axle hub assembly P.27A-8). Then go to Step 12.

NO <Deformation (AWD)> : Replace the wheel bearing <RL> (Refer to GROUP 27B – Rear axle hub assembly P.27B-19). 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.35C-288). 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 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 C1027 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 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.

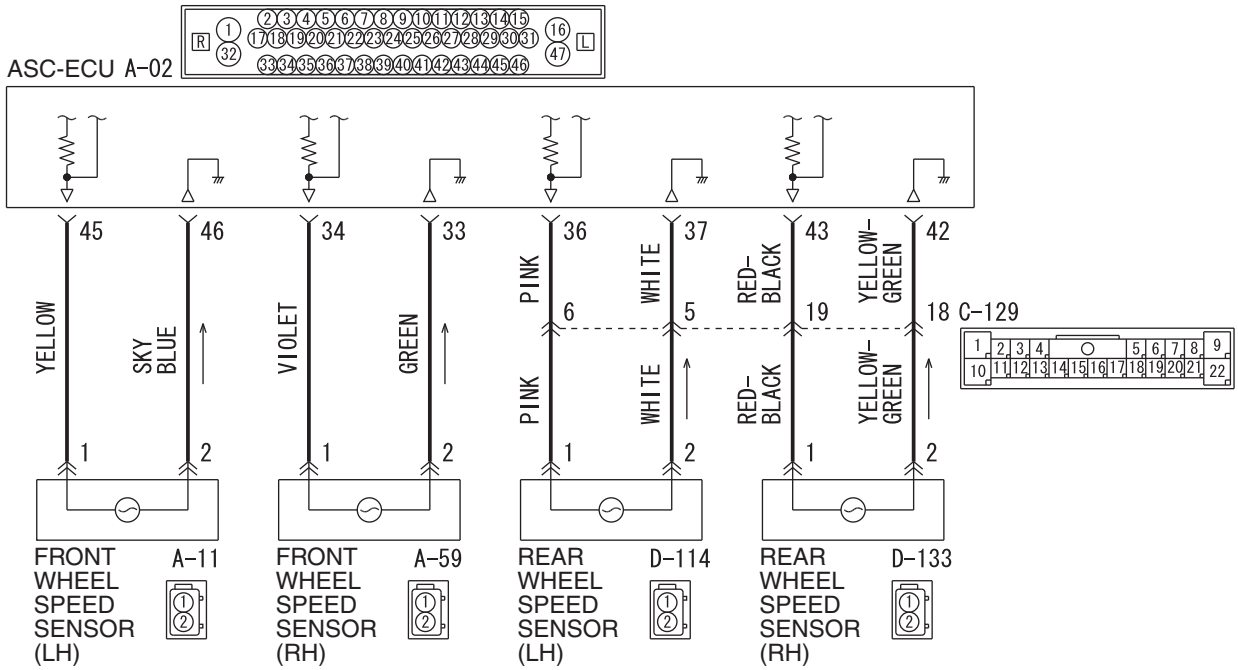
Q: Is DTC C1027 set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC C1032: Abnormality in RR wheel speed sensor signal

Wheel Speed Sensor Circuit



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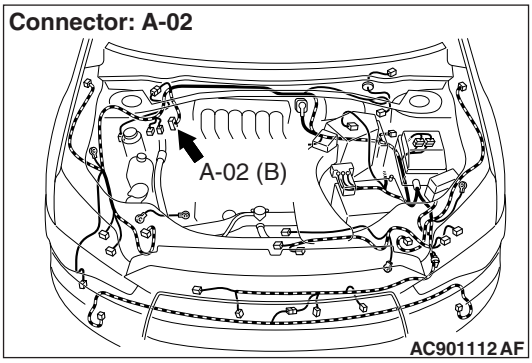
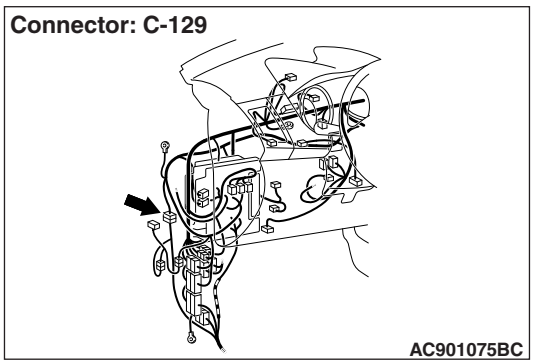
Connector: A-02



Connector: C-129



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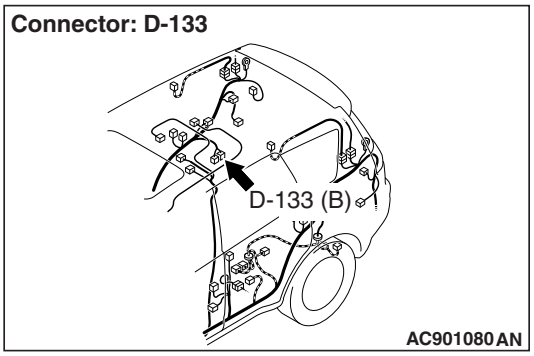

⚠ CAUTION

- **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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-283, P.35C-282 and P.35C-284).**

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 ASC-ECU. ASC-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 fault below is found in these sensor signals, ASC-ECU will set the relevant diagnostic trouble code.

- 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 wheel speed detection encoder
- Adhesion of foreign materials on the wheel speed sensor

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- 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
- ASC-ECU malfunction
- Disturbance of magnetization pattern for wheel speed detection encoder
- The number of poles on the Magnetic encoder for wheel speed detection (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 ASC-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 diagnostic trouble code No. 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.

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.35C-37).
NO : Go to Step 4.

STEP 4. Connector check: A-02 ASC-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-03 ASC-ECU connector terminal No.43 and D-133 rear wheel speed sensor <RH> connector terminal No.1, and between A-03 ASC-ECU connector terminal No.42 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 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 7.
NO : Reinstall the wheel speed sensor <RR> correctly (Refer to P.35C-288). Then go to Step 7.

STEP 7. Check for wheel speed sensor <RR> output current
Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 8.
NO : Replace the wheel speed sensor <RR> (Refer to P.35C-288). 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 Rear wheel hub assembly <RR (FWD)> (Refer to GROUP 27A – Wheel Bearing Play Check P.27A-6).*
- *Check the wheel bearing <RR (AWD)> for looseness (Refer to GROUP 27B – Wheel Bearing Play Check P.27B-17).*

Q: Is the check result normal?

YES : Go to Step 9.

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

NO (AWD) : Replace the wheel bearing <RR> (Refer to GROUP 27B – Rear axle hub assembly P.27B-19). Then go to Step 12.

STEP 9. Check of wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.

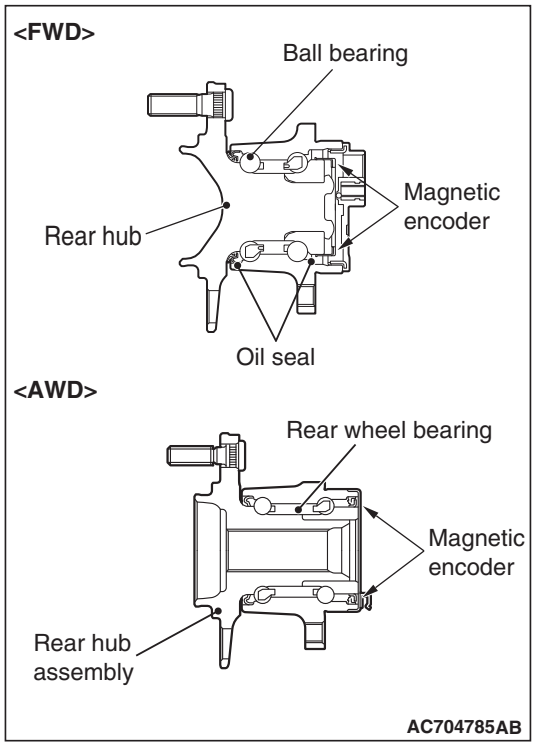
Q: Is the check result normal?

YES : Go to Step 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 (FWD)> : Replace the rear wheel hub assembly <RR> (Refer to GROUP 27A – Rear axle hub assembly P.27A-8). Then go to Step 12.

NO <Deformation (AWD)> : Replace the wheel bearing <RR> (Refer to GROUP 27B – Rear axle hub assembly P.27B-19). 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.35C-288). 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 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 C1032 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 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 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.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**

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OPERATION

- Each wheel speed detecting section is a kind of a pulse generator. It consists of the encoder (plate on which the north and south pole of magnet are arranged alternately) for detecting the wheel speed, which rotates at the same speed of the wheels, and the wheel speed sensor. This detecting section outputs the frequency pulse signals in proportion to the wheel speed.
- The pulse signals generated by the wheel speed detecting section are sent to ASC-ECU. ASC-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 fault below is found in these sensor signals, ASC-ECU will set the relevant DTC.

- Missing wheel speed sensor signal
- Wheel speed sensor signal continuously indicates low value.

PROBABLE CAUSES

Current trouble

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

Past trouble

- When DTC C100A is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ASC-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 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 DTC C100A is also set.

Q: Is DTC C100A also set?

YES : Perform the diagnosis for DTC C100A (Refer to P.35C-21).

NO : Go to Step 4.

STEP 4. Check for 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.35C-288). Then go to Step 5.

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

Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Replace the wheel speed sensor <FL> (Refer to P.35C-288). 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).*

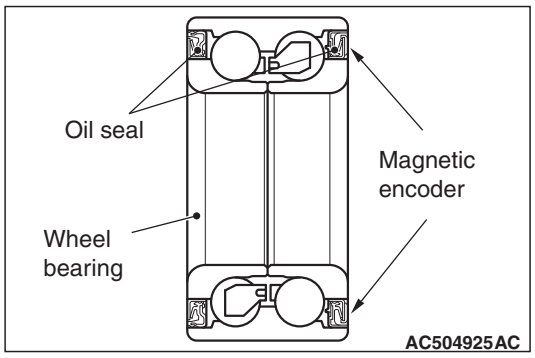
Q: Is the check result normal?

YES : Go to Step 7.

NO : Replace the wheel bearing (Refer to GROUP 26 – Front Axle Hub Assembly P.26-18). Then go to Step 10.

STEP 7. 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 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.26-18). 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.35C-288). 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 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 C1014 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). Then go to Step 10.

NO : The procedure is complete.

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STEP 10. Check whether the DTC is reset.
(1) Erase the DTC.
(2) 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 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-10).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**

OPERATION

- Each wheel speed detecting section is a kind of a pulse generator. It consists of the encoder (plate on which the north and south pole of magnet are arranged alternately) for detecting the wheel speed, which rotates at the same speed of the wheels, and the wheel speed sensor. This detecting section outputs the frequency pulse signals in proportion to the wheel speed.
- The pulse signals generated by the wheel speed detecting section are sent to ASC-ECU. ASC-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 fault below is found in these sensor signals, ASC-ECU will set the relevant DTC.

- Missing wheel speed sensor signal
- Wheel speed sensor signal continuously indicates low value.

PROBABLE CAUSES

Current trouble

- Excessive gap between the wheel speed sensor and the wheel speed detection encoder

TSB Revision

- Wheel bearing malfunction
- Deformation of the wheel speed detection encoder
- Adhesion of foreign materials on the wheel speed sensor
- Adhesion of foreign materials on the wheel speed detection encoder
- Malfunction of wheel speed sensor
- Improper installation of the wheel speed sensor
- ASC-ECU malfunction
- The number of poles on the Magnetic encoder for wheel speed detection (N-pole and S-pole) is changed

Past trouble

- When DTC C1015 is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ASC-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 DTC C1015 is also set.

Q: Is DTC C1015 also set?

YES : Perform the diagnosis for DTC C1015 (Refer to P.35C-26).

NO : Go to Step 4.

TSB Revision

STEP 4. Check for 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.35C-288). Then go to Step 5.

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

Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Replace the wheel speed sensor <FR> (Refer to P.35C-288). 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 – Wheel Bearing Play Check P.26-11).*

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.26-18). Then go to Step 10.

STEP 7. Check of wheel speed detection encoder

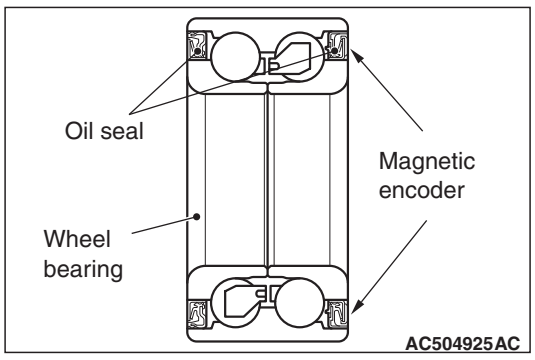
Check the encoder for adhesion of foreign materials or deformation.

Q: Is the check result normal?

YES : Go to Step 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.26-18). 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.35C-288). 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 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 C101F set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 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 C101F set?

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

Code 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.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**

TSB Revision

OPERATION

- Each wheel speed detecting section is a kind of a pulse generator. It consists of the encoder (plate on which the north and south pole of magnet are arranged alternately) for detecting the wheel speed, which rotates at the same speed of the wheels, and the wheel speed sensor. This detecting section outputs the frequency pulse signals in proportion to the wheel speed.
- The pulse signals generated by the wheel speed detecting section are sent to ASC-ECU. ASC-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 fault below is found in these sensor signals, ASC-ECU will set the relevant DTC.

- Missing wheel speed sensor signal
- Wheel speed sensor signal continuously indicates low value.

PROBABLE CAUSES

Current trouble

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

Past trouble

- When DTC C1020 is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ASC-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 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.35C-32).

NO : Go to Step 4.

STEP 4. 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 5.

NO : Reinstall the wheel speed sensor <RL> correctly (Refer to P.35C-288). Then go to Step 5.

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

Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Replace the wheel speed sensor <RL> (Refer to P.35C-288). 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 Rear wheel hub assembly <RL (FWD)> (Refer to GROUP 27A – Wheel Bearing Play Check P.27A-6).*
- *Check the wheel bearing <RL (AWD)> for looseness (Refer to GROUP 27B – Wheel Bearing Play Check P.27B-17).*

Q: Is the check result normal?

YES : Go to Step 7.

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

NO (AWD) : Replace the wheel bearing <RL> (Refer to GROUP 27B – Rear Axle Hub Assembly P.27B-19). Then go to Step 10.

STEP 7. Check of wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.

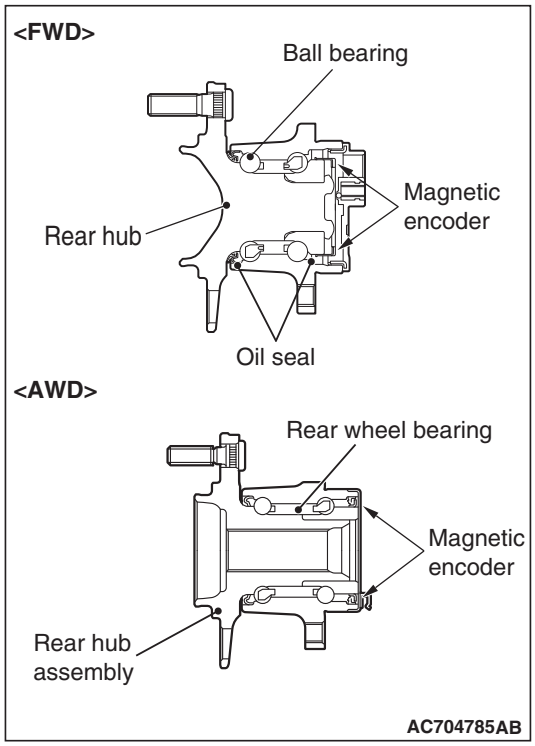
Q: Is the check result normal?

YES : Go to Step 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.

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

NO <Deformation (AWD)> : Replace the wheel bearing <RL> (Refer to GROUP 27B – Rear Axle Hub Assembly P.27B-19). 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.35C-288). 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 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 C102A set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 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 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.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**

TSB Revision

OPERATION

- Each wheel speed detecting section is a kind of a pulse generator. It consists of the encoder (plate on which the north and south pole of magnet are arranged alternately) for detecting the wheel speed, which rotates at the same speed of the wheels, and the wheel speed sensor. This detecting section outputs the frequency pulse signals in proportion to the wheel speed.
- The pulse signals generated by the wheel speed detecting section are sent to ASC-ECU. ASC-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 fault below is found in these sensor signals, ASC-ECU will set the relevant DTC.

- Missing wheel speed sensor signal
- Wheel speed sensor signal continuously indicates low value.

PROBABLE CAUSES

Current trouble

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

Past trouble

- When DTC C102B is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ASC-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 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 the DTC C102B also set?

YES : Perform the diagnosis for the DTC C102B (Refer to P.35C-37).

NO : Go to Step 4.

STEP 4. 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 5.

NO : Reinstall the wheel speed sensor <RR> correctly (Refer to P.35C-288). Then go to Step 5.

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

Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Replace the wheel speed sensor <RR> (Refer to P.35C-288). 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 Rear wheel hub assembly <RR (FWD)> (Refer to GROUP 27A – Wheel Bearing Play Check P.27A-6).*
- *Check the wheel bearing <RR (AWD)> for looseness (Refer to GROUP 27B – Wheel Bearing Play Check P.27B-17).*

Q: Is the check result normal?

YES : Go to Step 7.

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

NO (AWD) : Replace the wheel bearing <RR> (Refer to GROUP 27B – Rear Axle Hub Assembly P.27B-19). Then go to Step 10.

STEP 7. Check of wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.

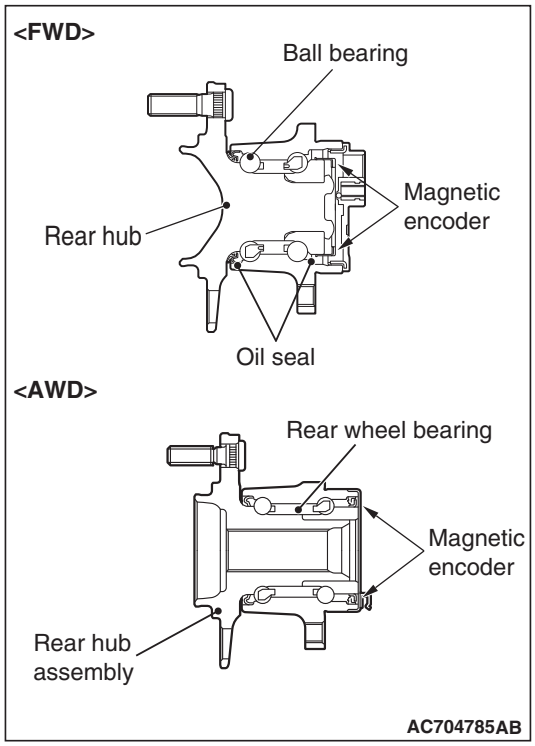
Q: Is the check result normal?

YES : Go to Step 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.

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

NO <Deformation (AWD)> : Replace the wheel bearing <RR> (Refer to GROUP 27B – Rear Axle Hub Assembly P.27B-19). 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.35C-288). 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 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 C1035 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 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 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.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**

TSB Revision

OPERATION

- Each wheel speed detecting section is a kind of a pulse generator. It consists of the encoder (plate on which the north and south pole of magnet are arranged alternately) for detecting the wheel speed, which rotates at the same speed of the wheels, and the wheel speed sensor. This detecting section outputs the frequency pulse signals in proportion to the wheel speed.
- The pulse signals generated by the wheel speed detecting section are sent to ASC-ECU. ASC-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 wheel speed detection encoder
- Wheel bearing malfunction
- Deformation of the wheel speed detection encoder
- Adhesion of foreign materials on the wheel speed sensor
- Adhesion of foreign materials on the wheel speed detection encoder
- Malfunction of wheel speed sensor
- Improper installation of the wheel speed sensor
- ASC-ECU malfunction
- The number of poles on the Magnetic encoder for wheel speed detection (N-pole and S-pole) is changed

Past trouble

- When DTC C100A is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ASC-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 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 C1041 set?

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

STEP 3. Using scan tool MB991958, check the DTC
Check that DTC C100A is also set.

Q: Is DTC C100A also set?

YES : Perform the diagnosis for DTC C100A (Refer to P.35C-21).
NO : Go to Step 4.

STEP 4. Check for 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.35C-288). Then go to Step 5.

STEP 5. Check for wheel speed sensor <FL> output current
Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Replace the wheel speed sensor <FL> (Refer to P.35C-288). 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).*

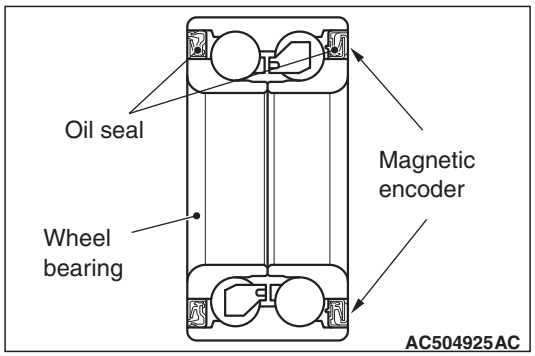
Q: Is the check result normal?

YES : Go to Step 7.

NO : Replace the wheel bearing <FL> (Refer to GROUP 26 – Front Axle Hub Assembly P.26-18). Then go to Step 10.

STEP 7. 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 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.26-18). 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.35C-288). 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 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 C1041 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). Then go to Step 10.

NO : The procedure is complete.

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STEP 10. Check whether the DTC is reset.
(1) Erase the DTC.
(2) 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 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.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**

OPERATION

- Each wheel speed detecting section is a kind of a pulse generator. It consists of the encoder (plate on which the north and south pole of magnet are arranged alternately) for detecting the wheel speed, which rotates at the same speed of the wheels, and the wheel speed sensor. This detecting section outputs the frequency pulse signals in proportion to the wheel speed.
- The pulse signals generated by the wheel speed detecting section are sent to ASC-ECU. ASC-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 wheel speed detection encoder
- Wheel bearing malfunction
- Deformation of the wheel speed detection encoder
- Adhesion of foreign materials on the wheel speed sensor

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- Adhesion of foreign materials on the wheel speed detection encoder
- Malfunction of wheel speed sensor
- Improper installation of the wheel speed sensor
- ASC-ECU malfunction
- The number of poles on the Magnetic encoder for wheel speed detection (N-pole and S-pole) is changed

Past trouble

- When DTC C1015 is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ASC-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 C1042 set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Using scan tool MB991958, check the DTC

Check that DTC C1015 is also set.

Q: Is DTC C1015 also set?

YES : Perform the diagnosis for DTC C1015 (Refer to P.35C-26).

NO : Go to Step 4.

STEP 4. Check for 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.35C-288). Then go to Step 5.

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

Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Replace the wheel speed sensor <FR> (Refer to P.35C-288). 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 – Wheel Bearing Play Check P.26-11).*

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.26-18). Then go to Step 10.

STEP 7. Check of wheel speed detection encoder

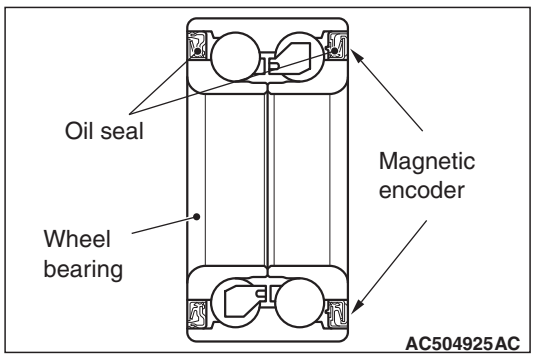
Check the encoder for adhesion of foreign materials or deformation.

Q: Is the check result normal?

YES : Go to Step 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.26-18). 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.35C-288). 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 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 C1042 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 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 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.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**

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OPERATION

- Each wheel speed detecting section is a kind of a pulse generator. It consists of the encoder (plate on which the north and south pole of magnet are arranged alternately) for detecting the wheel speed, which rotates at the same speed of the wheels, and the wheel speed sensor. This detecting section outputs the frequency pulse signals in proportion to the wheel speed.
- The pulse signals generated by the wheel speed detecting section are sent to ASC-ECU. ASC-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 wheel speed detection encoder
- Adhesion of foreign materials on the wheel speed sensor
- Wheel bearing malfunction
- Deformation of the wheel speed detection encoder
- Adhesion of foreign materials on the wheel speed detection encoder
- Malfunction of wheel speed sensor
- Improper installation of the wheel speed sensor
- ASC-ECU malfunction
- The number of poles on the Magnetic encoder for wheel speed detection (N-pole and S-pole) is changed

Past trouble

- When DTC C1020 is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ASC-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 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

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- 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.35C-32).
NO : Go to Step 4.

STEP 4. 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 5.
NO : Reinstall the wheel speed sensor <RL> correctly (Refer to P.35C-288). Then go to Step 5.

STEP 5. Check for wheel speed sensor <RL> output current
Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Replace the wheel speed sensor <RL> (Refer to P.35C-288). 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 Rear wheel hub assembly <RL (FWD)> (Refer to GROUP 27A – Wheel Bearing Play Check P.27A-6).*
- *Check the wheel bearing <RL (AWD)> for looseness (Refer to GROUP 27B – Wheel Bearing Play Check P.27B-17).*

Q: Is the check result normal?

YES : Go to Step 7.

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

NO (AWD) : Replace the wheel bearing <RL> (Refer to GROUP 27B – Rear Axle Hub Assembly P.27B-19). Then go to Step 10.

STEP 7. Check of wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.

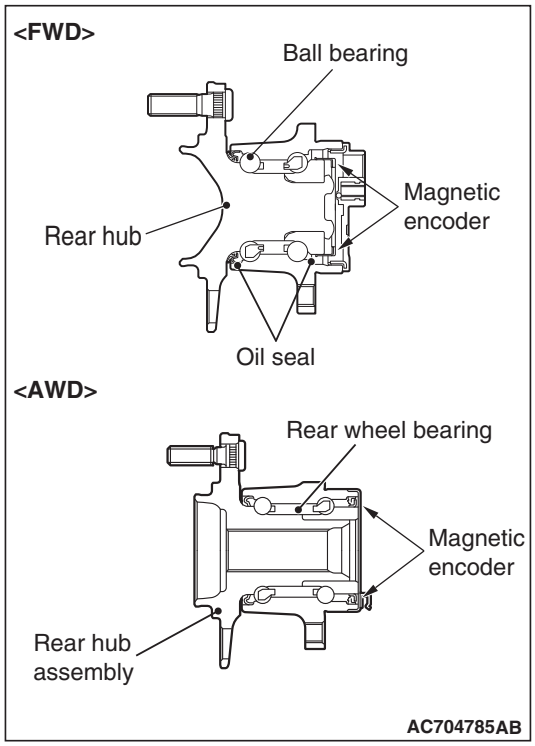
Q: Is the check result normal?

YES : Go to Step 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.

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

NO <Deformation (AWD)> : Replace the wheel bearing <RL> (Refer to GROUP 27B – Rear Axle Hub Assembly P.27B-19). 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.35C-288). 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 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 C1043 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 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 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.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**

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OPERATION

- Each wheel speed detecting section is a kind of a pulse generator. It consists of the encoder (plate on which the north and south pole of magnet are arranged alternately) for detecting the wheel speed, which rotates at the same speed of the wheels, and the wheel speed sensor. This detecting section outputs the frequency pulse signals in proportion to the wheel speed.
- The pulse signals generated by the wheel speed detecting section are sent to ASC-ECU. ASC-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 wheel speed detection encoder
- Adhesion of foreign materials on the wheel speed sensor
- Wheel bearing malfunction
- Deformation of the wheel speed detection encoder
- Adhesion of foreign materials on the wheel speed detection encoder
- Malfunction of wheel speed sensor
- Improper installation of the wheel speed sensor
- ASC-ECU malfunction
- The number of poles on the Magnetic encoder for wheel speed detection (N-pole and S-pole) is changed

Past trouble

- When DTC C102B is also set, carry out diagnosis with particular emphasis on wiring harness and connector failures between ASC-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 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 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 the DTC C102B also set?

YES : Perform the diagnosis for the DTC C102B (Refer to P.35C-37).
NO : Go to Step 4.

STEP 4. 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 5.
NO : Reinstall the wheel speed sensor <RR> correctly (Refer to P.35C-288). Then go to Step 5.

STEP 5. Check for wheel speed sensor <RR> output current
Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Replace the wheel speed sensor <RR> (Refer to P.35C-288). 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 Rear wheel hub assembly <RR (FWD)> (Refer to GROUP 27A – Wheel Bearing Play Check P.27A-6).*
- *Check the wheel bearing <RR (AWD)> for looseness (Refer to GROUP 27B – Wheel Bearing Play Check P.27B-17).*

Q: Is the check result normal?

YES : Go to Step 7.

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

NO (AWD) : Replace the wheel bearing <RR> (Refer to GROUP 27B – Rear Axle Hub Assembly P.27B-19). Then go to Step 10.

STEP 7. Check of wheel speed detection encoder

Check the encoder for adhesion of foreign materials or deformation.

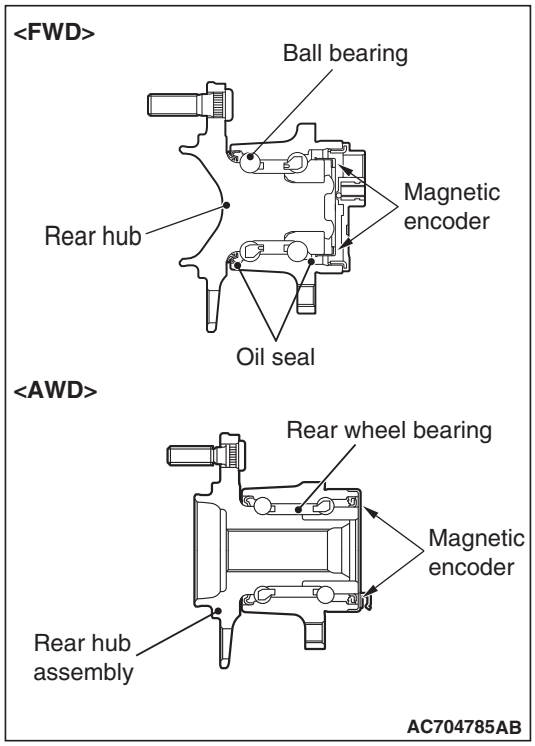
Q: Is the check result normal?

YES : Go to Step 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.

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

NO <Deformation (AWD)> : Replace the wheel bearing <RR> (Refer to GROUP 27B – Rear Axle Hub Assembly P.27B-19). 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.35C-288). 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 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 C1044 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 12 mph (20 km/h) or higher.

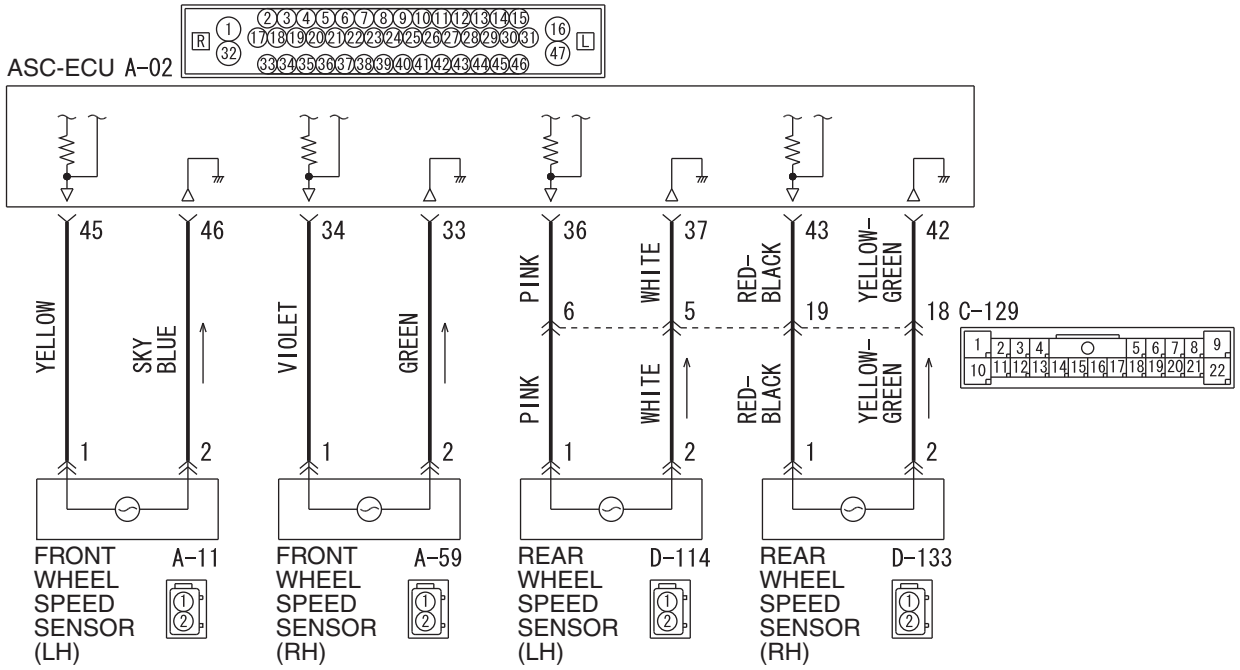
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12 mph (20 km/h) or higher.

Q: Is DTC C1044 set?

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

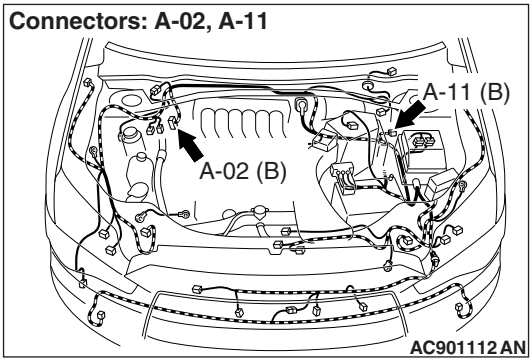
DTC C1046: FL wheel speed sensor control phase time exceeded

Wheel Speed Sensor Circuit



WAG35M002A

Connectors: A-02, A-11



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⚠ 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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.42C-10, P.35C-282 and P.35C-284).**

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 ASC-ECU. ASC-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

This diagnostic trouble code 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
- ASC-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
- MB991997: ASC check harness

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 DTC C100A, C1011, C1014, or C1041 is also set.

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

YES : Carry out the diagnosis for the relevant DTC.

NO : Go to Step 4.

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

Check the following data list (Refer to P.35C-270).

- 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-02 ASC-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-02 ASC-ECU connector terminal No.45 and A-11 front wheel speed sensor <LH> connector terminal No.1 and between A-02 ASC-ECU connector terminal No.46 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 for 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> correctly (Refer to P.35C-288). Then go to Step 8.

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

Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 9.

NO : Replace the wheel speed sensor <FL> (Refer to P.35C-288). Then go to Step 12.

STEP 9. Check for wheel bearing looseness

NOTE:

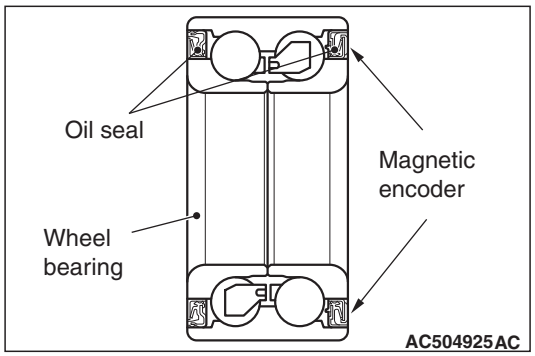
- *Loose wheel bearing may increase the gap between the wheel speed sensor <FL> and the wheel speed detection magnet encoder.*
- *Check the wheel bearing <FL> for looseness (Refer to GROUP 26 – Wheel Bearing Play Check P.26-11).*

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.26-18). 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 wheel bearing <FL> (Refer to GROUP 26 – Front axle hub assembly P.26-18). 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.35C-288). 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 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 C1046 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 12 mph (20 km/h) or higher.

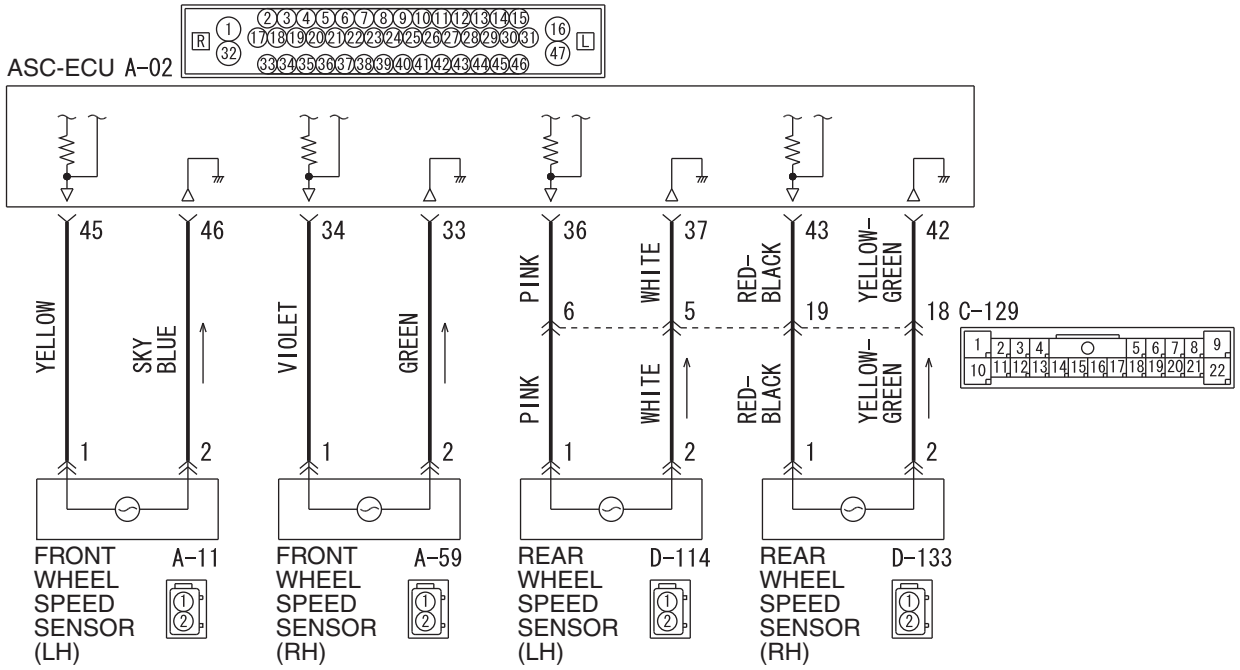
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12 mph (20 km/h) or higher.

Q: Is DTC 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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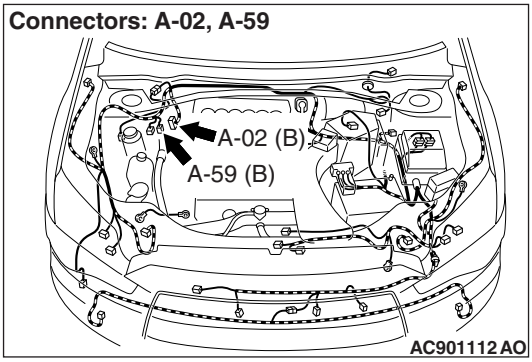

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⚠ CAUTION

- **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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.42C-10, P.35C-282 and P.35C-284).**

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 ASC-ECU. ASC-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

This diagnostic trouble code 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
- ASC-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 C1047 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, C101C, C101F, or C1042 is also set.

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

YES : Carry out the diagnosis for the relevant DTC.

NO : Go to Step 4.

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

Check the following data list (Refer to P.35C-270).

- 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-02 ASC-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-02 ASC-ECU connector terminal No.34 and A-59 front wheel speed sensor <RH> connector terminal No.1 and between A-02 ASC-ECU connector terminal No.33 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 for 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> correctly (Refer to P.35C-288). Then go to Step 8.

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

Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 9.

NO : Replace the wheel speed sensor <FR> (Refer to P.35C-288). Then go to Step 12.

STEP 9. Check for wheel bearing looseness

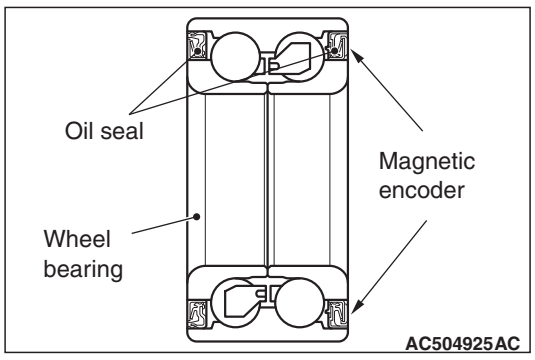
NOTE:

- *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.26-18). 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 wheel bearing <FR> (Refer to GROUP 26 – Front axle hub assembly P.26-18). 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.35C-288). 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 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 C1047 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 12 mph (20 km/h) or higher.

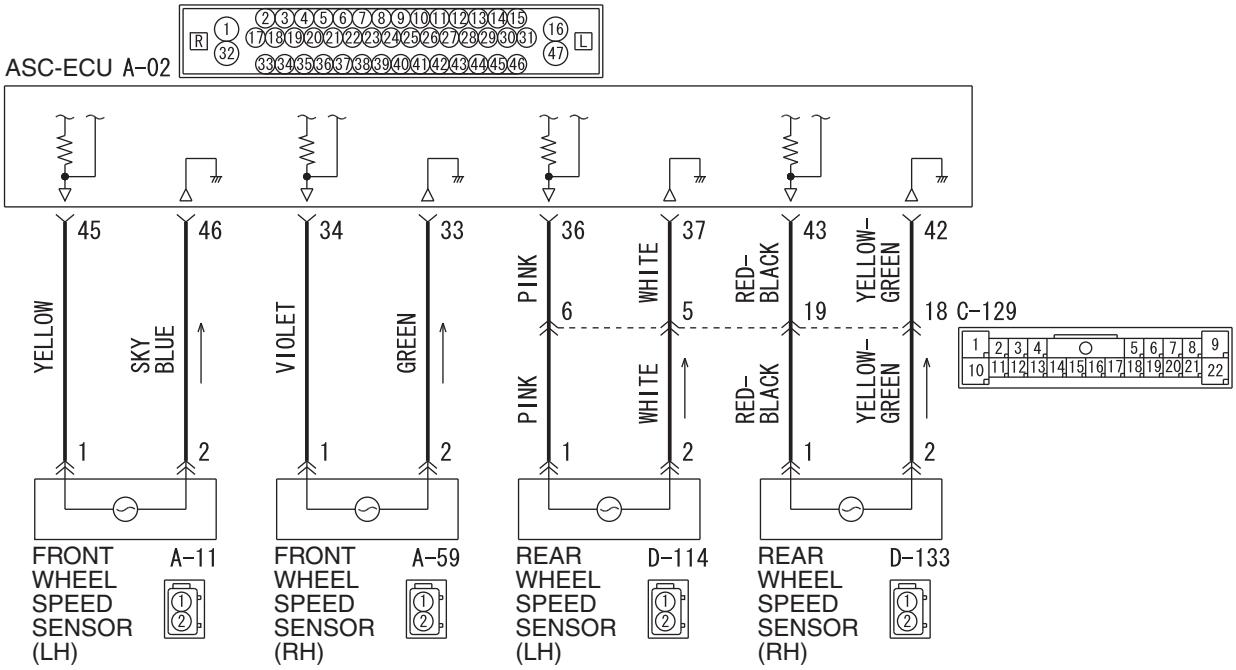
NOTE: The ABS warning light does not turn OFF in some cases unless the vehicle runs at 12 mph (20 km/h) or higher.

Q: Is DTC 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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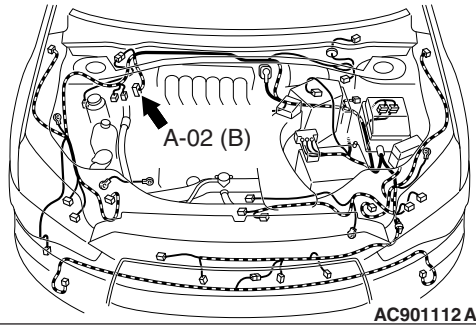
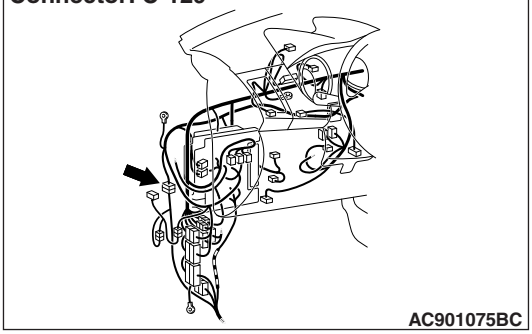
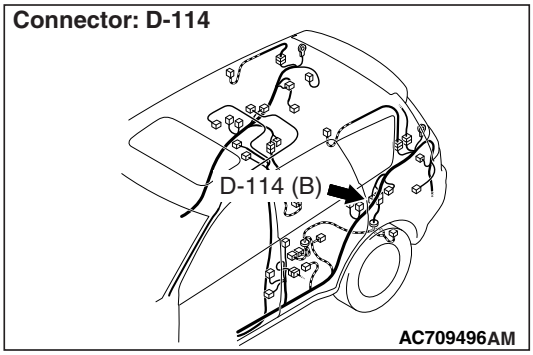
Connector: A-02



Connector: C-129



Connector: D-114



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⚠ 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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-283, P.35C-282 and P.35C-284).**

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 ASC-ECU. ASC-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

This diagnostic trouble code 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
- ASC-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 C1048 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, C1027, C102A, or C1043 is also set.

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

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

STEP 4. Using scan tool MB991958, check the data list
Check the following data list (Refer to P.35C-270).

- 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-02 ASC-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-02 ASC-ECU connector terminal No.36 and D-114 rear wheel speed sensor <LH> connector terminal No.1, and between A-02 ASC-ECU connector terminal No.37 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.35C-288). Then go to Step 8.

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

Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 9.

NO : Replace the wheel speed sensor <RL> (Refer to P.35C-288). Then go to Step 12.

STEP 9. Check for wheel bearing looseness

NOTE:

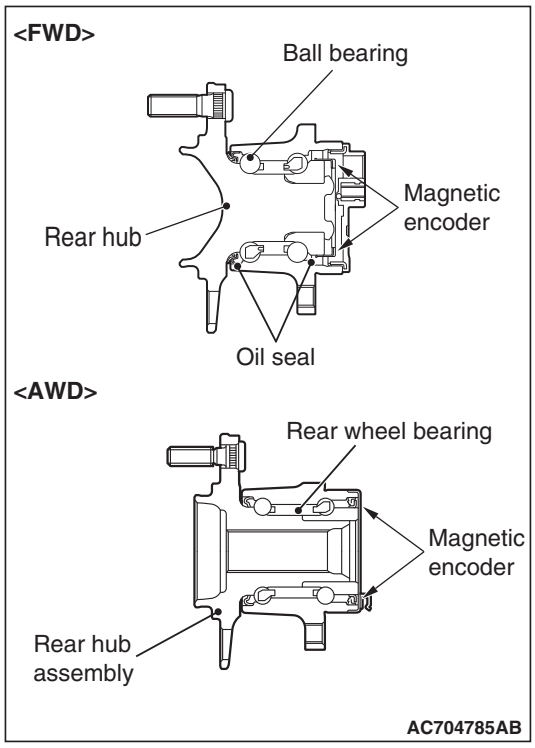
- *Loose wheel bearing may increase the gap between the wheel speed sensor <RL> and the wheel speed detection magnet encoder.*
- *Check the Rear wheel hub assembly <RL (FWD)> (Refer to GROUP 27A – Wheel Bearing Play Check P.27A-6).*
- *Check the wheel bearing <RL (AWD)> for looseness (Refer to GROUP 27B – Wheel Bearing Play Check P.27B-17).*

Q: Is the check result normal?

YES : Go to Step 10.

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

NO (AWD) : Replace the wheel bearing <RL> (Refer to GROUP 27B – Rear axle hub assembly P.27B-19). 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 (FWD)> : Replace the rear wheel hub assembly <RL> (Refer to GROUP 27A – Rear axle hub assembly P.27A-8). Then go to Step 13.

NO <Deformation (AWD)> : Replace the wheel bearing <RL> (Refer to GROUP 27B – Rear axle hub assembly P.27B-19). 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.35C-288). 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 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 C1048 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 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.

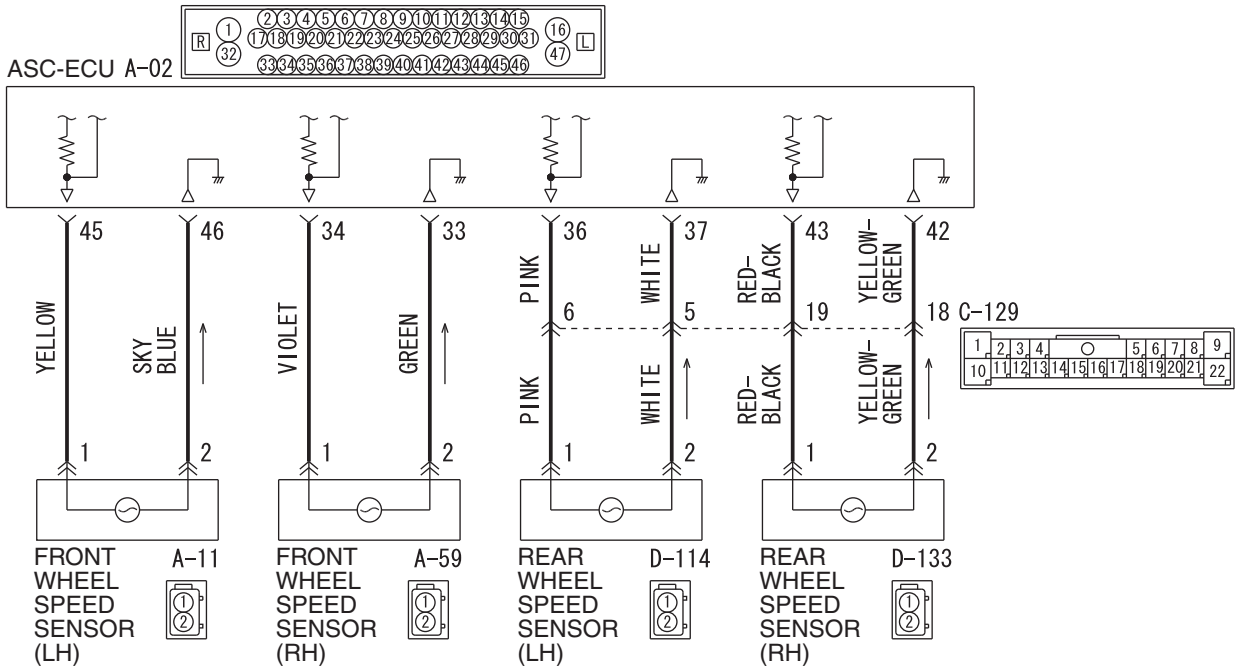
Q: Is DTC C1048 set?

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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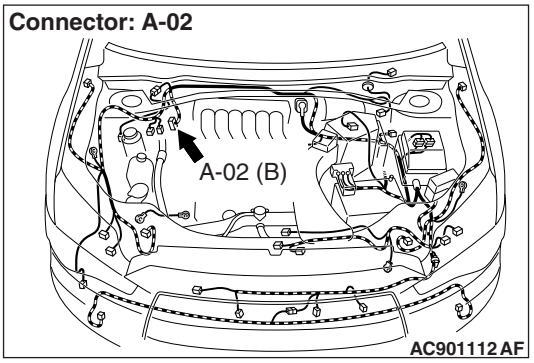
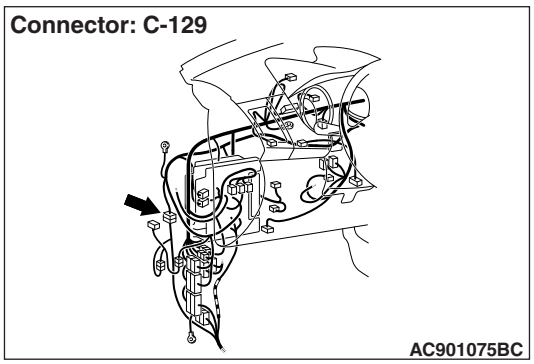
Connector: A-02



Connector: C-129



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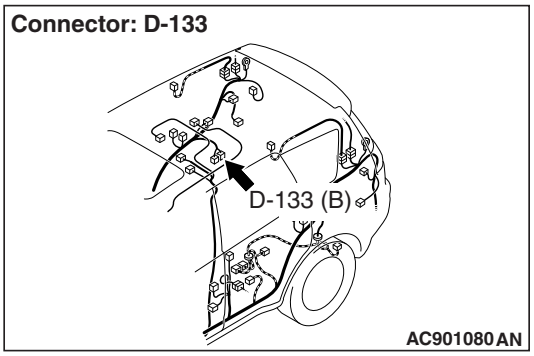

⚠ CAUTION

- **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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-283, P.35C-282 and P.35C-284).**

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 ASC-ECU. ASC-ECU uses the frequency of the pulse signals to determine the wheel speed.

DTC SET CONDITIONS

This diagnostic trouble code 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
- ASC-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

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- 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 C1049 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, C1032, C1035, or C1044 is also set.

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

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

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

Check the following data list (Refer to P.35C-270).

- 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-02 ASC-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-02 ASC-ECU connector terminal No.43 and D-133 rear wheel speed sensor <RH> connector terminal No.1, and between A-02 ASC-ECU connector terminal No.42 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.35C-288). Then go to Step 8.

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

Refer to P.35C-277.

Q: Is the check result normal?

YES : Go to Step 9.
NO : Replace the wheel speed sensor <RR> (Refer to P.35C-288). Then go to Step 12.

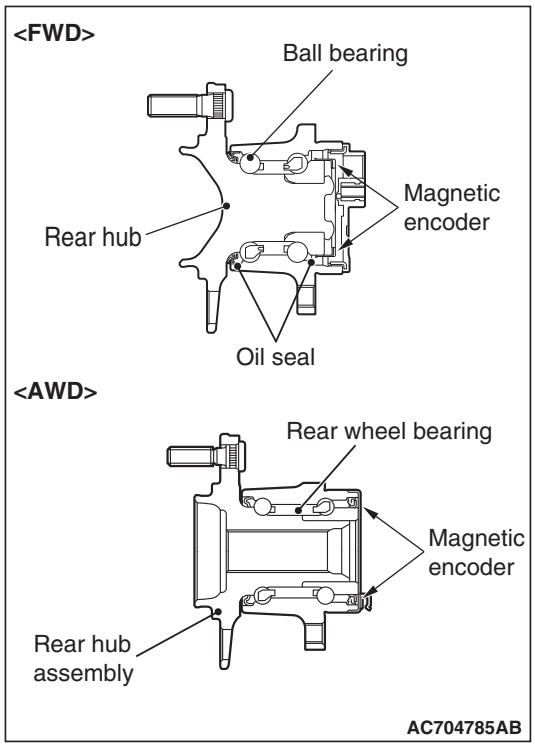
STEP 9. Check for wheel bearing looseness

NOTE:

- *Loose wheel bearing may increase the gap between the wheel speed sensor <RR> and the wheel speed detection magnet encoder.*
- *Check the Rear wheel hub assembly <RR (FWD)> (Refer to GROUP 27A – Wheel Bearing Play Check P.27A-6).*
- *Check the wheel bearing <RR (AWD)> for looseness (Refer to GROUP 27B – Wheel Bearing Play Check P.27B-17).*

Q: Is the check result normal?

YES : Go to Step 10.
NO (FWD) : Replace the rear wheel hub assembly <RR> (Refer to GROUP 27A – Rear axle hub assembly P.27A-8). Then go to Step 13.
NO (AWD) : Replace the wheel bearing <RR> (Refer to GROUP 27B – Rear axle hub assembly P.27B-19). 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 (FWD)> : Replace the rear wheel hub assembly <RR> (Refer to GROUP 27A – Rear axle hub assembly P.27A-8). Then go to Step 13.

NO <Deformation (AWD)> : Replace the wheel bearing <RR> (Refer to GROUP 27B – Rear axle hub assembly P.27B-19). 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.35C-288). 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 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 C1049 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 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 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
DTC C1200 Abnormality in FL/RR wheel cut valve system
DTC C1204 Abnormality in FR/RL wheel cut valve system
DTC C1208 Abnormality in FL/RR wheel suction valve system
DTC C120C Abnormality in FR/RL wheel suction valve system

⚠ 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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**

OPERATION

- ASC-ECU contains the power supply circuit (terminal No. 32) for the solenoid valve. The solenoid valve is energized by the valve relay, which is incorporated in ASC-ECU.
- The valve relay, which is incorporated in ASC-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.
- ASC-ECU activates the solenoid valve by turning on its driving transistor.

DTC SET CONDITIONS

These diagnostic trouble codes will be set under the cases below:

- The solenoid valve is not energized even after ASC-ECU has turned on the valve relay (Open circuit is present in the power supply circuit to the ASC-ECU solenoid valve, or the valve relay has failed).
- The solenoid valve is not activated even after ASC-ECU has turned on the valve relay (Open circuit is present in the solenoid valve circuit in ASC-ECU, or the valve relay has failed).
- After ASC-ECU has turned off the driving transistor, the solenoid valve still remains energized (short in the solenoid valve circuit).
- When a solenoid valve failure is detected

PROBABLE CAUSES

- ASC-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. M.U.T.-III CAN bus diagnostics

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-16). On completion, go to Step 2.

STEP 2. Diagnostic trouble code recheck after resetting CAN bus lines

Erase the DTC.

Q: Are DTC C104B, C104F, C1053, C1057, C105F, C1063, C1067, C105B, C1200, C1204, C1208 or C120C set?

YES : Go to Step 3.

NO : The procedure is complete.

STEP 3. Check whether the diagnostic trouble code is reset.

Erase the DTC.

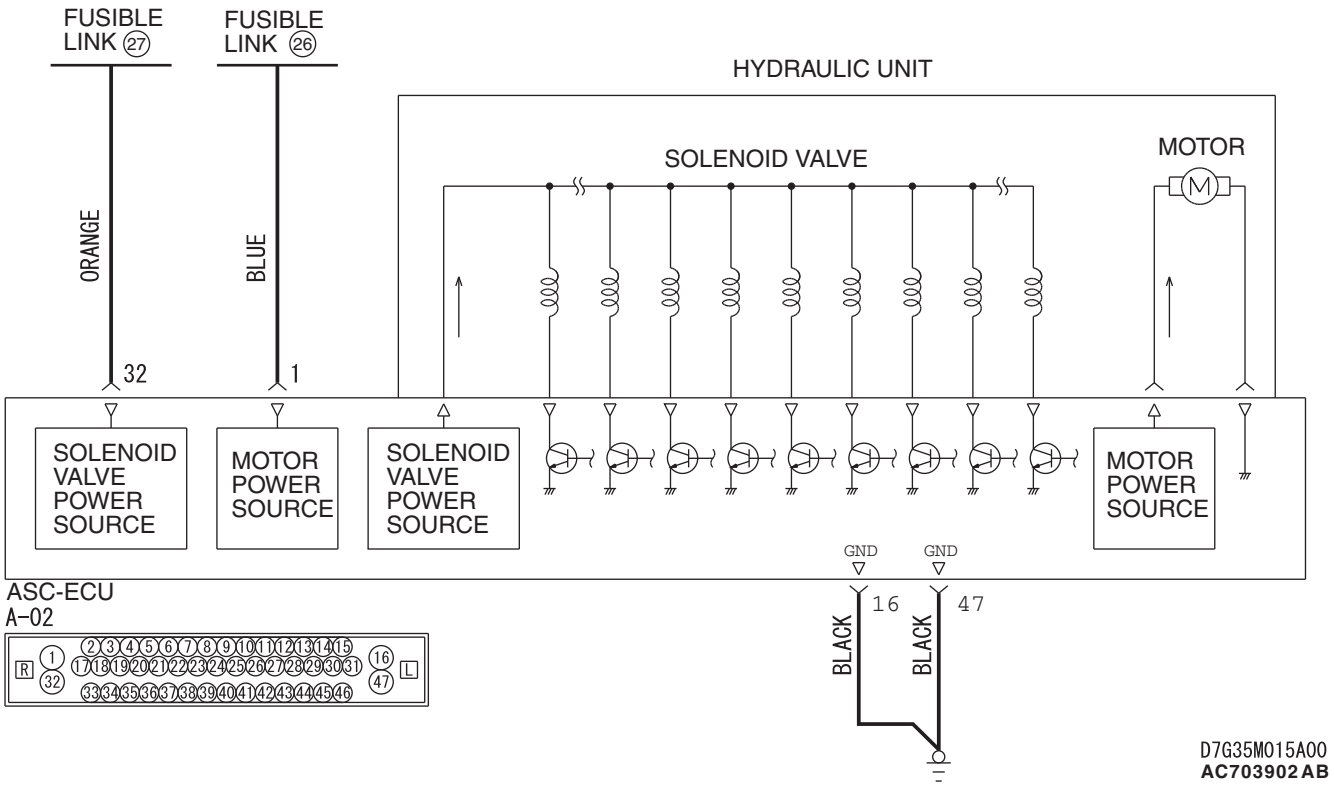
Q: Are DTC C104B, C104F, C1053, C1057, C105F, C1063, C1067, C105B, C1200, C1204, C1208 or C120C set?

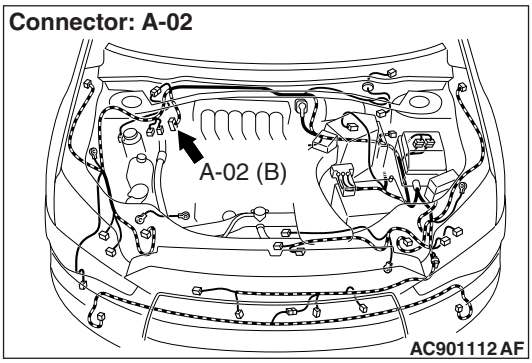
YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287).

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

DTC C2104: Faulty valve power supply circuit

Solenoid Valve and Motor Power Supply Circuit





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⚠ 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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**

OPERATION

- ASC-ECU contains the power supply circuit (terminal No. 32) for the solenoid valve. The solenoid valve is energized by the valve relay, which is incorporated in ASC-ECU.
- The valve relay, which is incorporated in ASC-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 diagnostic trouble codes 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
- ASC-ECU malfunction

Past trouble

- Carry out diagnosis with particular emphasis on wiring harness and connector failures between the power supply circuit (terminal No.32) to ASC-ECU solenoid valve or ground circuit (terminal No.16 and 47). 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
- MB991997: ASC check harness

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 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 5.
NO : 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.

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-02 ASC-ECU connector

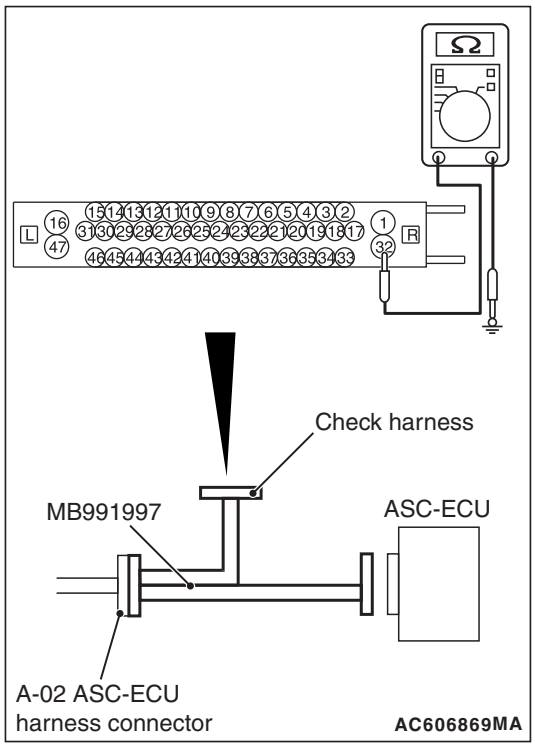
Q: Is the check result normal?

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-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ASC check harness (MB991997) to ASC-ECU.

(2) Disconnect the fusible link No.27.

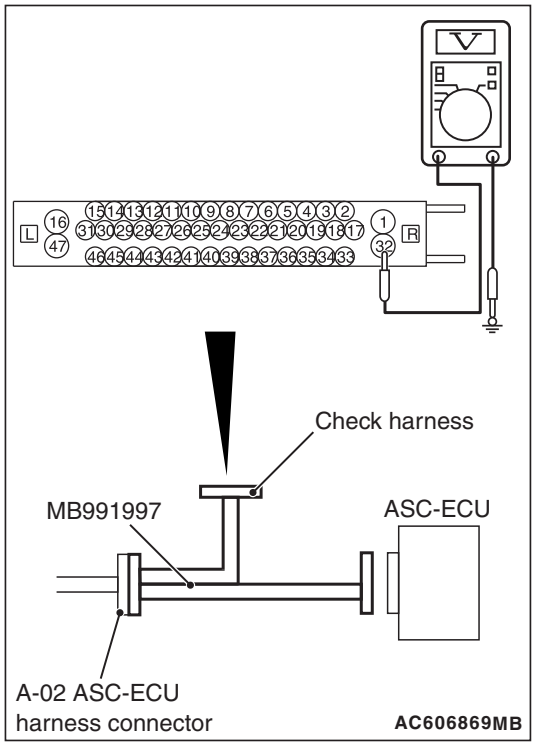
(3) Measure the resistance between the terminal No.32 and the body ground.

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-02 ASC-ECU connector terminal No.32 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-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the voltage at the special tool connector side.

NOTE: Do not connect the special tool ASC check harness (MB991997) to ASC-ECU.

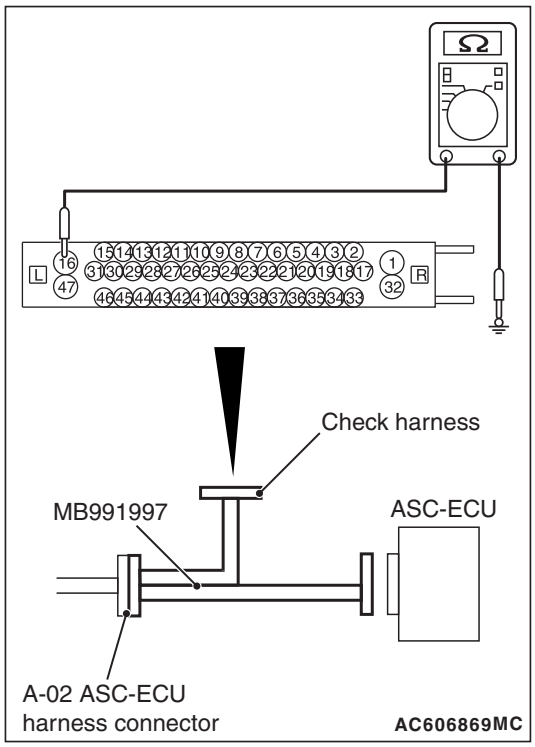
(2) Measure the voltage between the terminal No.32 and the body ground.

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-02 ASC-ECU connector terminal No.32 and the fusible link No.27. Then go to Step 11.



STEP 9. Resistance measurement at A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ASC check harness (MB991997) to ASC-ECU.

(2) Measure the resistance between the terminal No.16 and the body ground, and between the terminal No.47 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-02 ASC-ECU connector terminal No.16 and the body ground, and between the A-02 ASC-ECU connector terminal No.47 and the body ground. Then go to Step 11.

STEP 10. Check whether the DTC is reset.

Erase the DTC.

Q: Is DTC C2104 set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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.

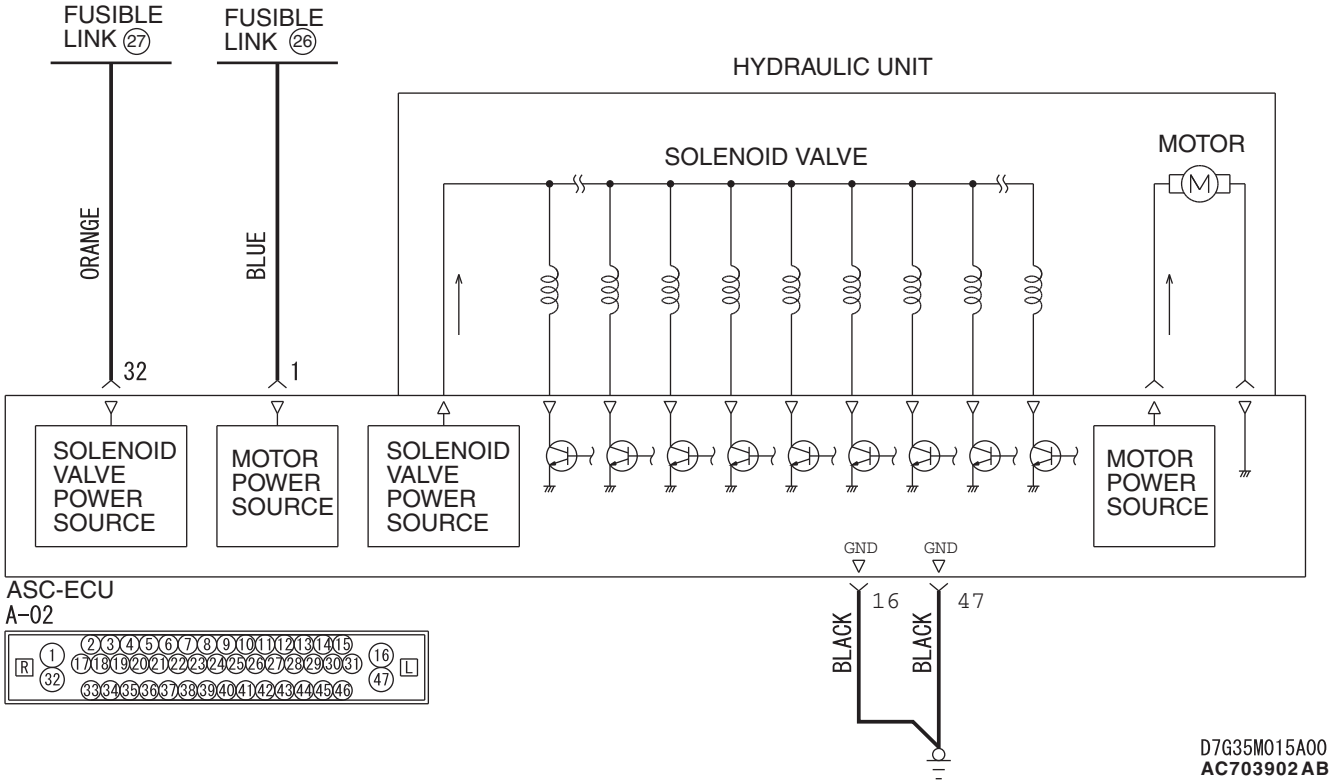
Q: Is DTC C2104 set?

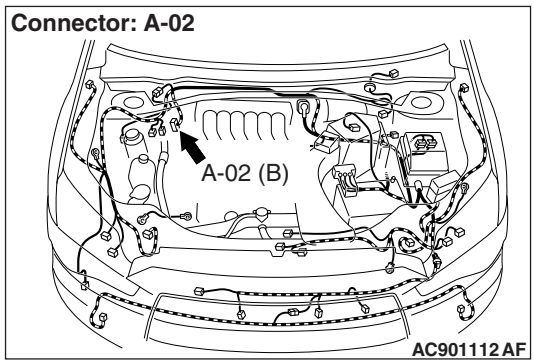
YES : Return to Step 1.

NO : The procedure is complete.

DTC C1073: Faulty motor drive circuit

Solenoid Valve and Motor Power Supply Circuit





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⚠ 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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**

OPERATION

- ASC-ECU contains the power supply circuit (terminal No. 1) for the pump motor. The pump motor is energized by the motor switch, which is incorporated in ASC-ECU.
- The pump motor switch, which is incorporated in ASC-ECU, is always off unless the motor and solenoid valve check is activated when the vehicle is started.
- ASC-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 diagnostic trouble code is set.

PROBABLE CAUSES

Current trouble

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

Past trouble

- Carry out diagnosis with particular emphasis on wiring harness and connector failures between the power supply circuit (A-02 ASC-ECU connector terminal No.1) to the ASC-ECU motor and the ground circuit (A-02 ASC-ECU connector terminal No.47). 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

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- MB991997: ASC check harness

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 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 5.
NO : 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.

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-02 ASC-ECU connector

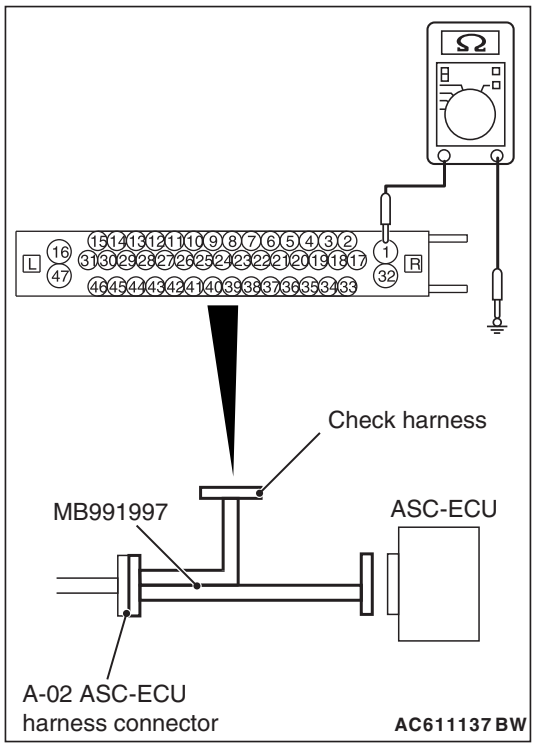
Q: Is the check result normal?

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-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ASC check harness (MB991997) to ASC-ECU.

(2) Disconnect the fusible link No.26.

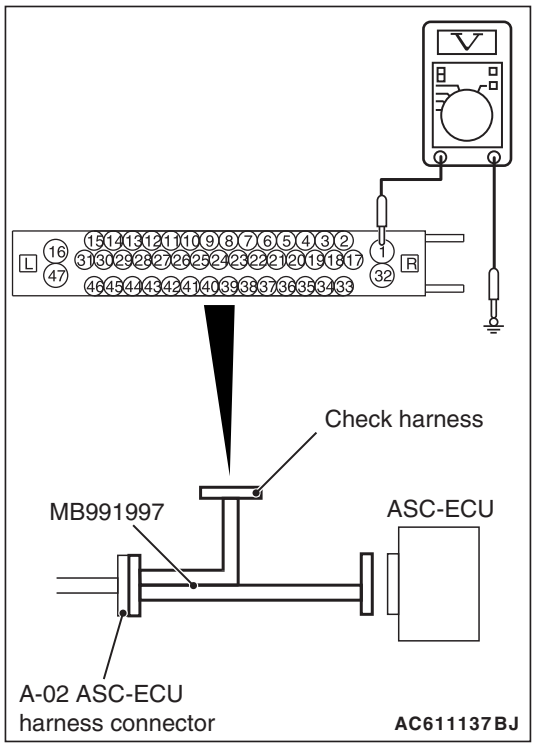
(3) Measure the resistance between the terminal No.1 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Replace the fusible link No.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-02 ASC-ECU connector terminal No.1 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-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the voltage at the special tool connector side.

NOTE: Do not connect the special tool ASC check harness (MB991997) to ASC-ECU.

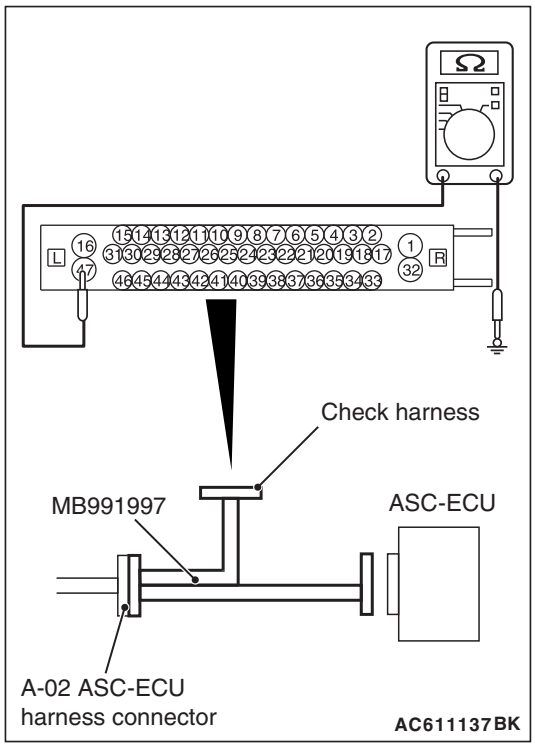
(2) Measure the voltage between the terminal No.1 and the body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 9.

NO : The open circuit may be present in the power supply circuit. Repair the wiring harness between the A-02 ASC-ECU connector terminal No.1 and the fusible link No.26. Then go to Step 11.



STEP 9. Resistance measurement at A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ASC check harness (MB991997) to ASC-ECU.

(2) Measure the resistance between the terminal No.16 and the body ground, and between the terminal No.47 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-02 ASC-ECU connector terminal No.16 and the body ground, and between the A-02 ASC-ECU connector terminal No.47 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 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 C1073?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 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.

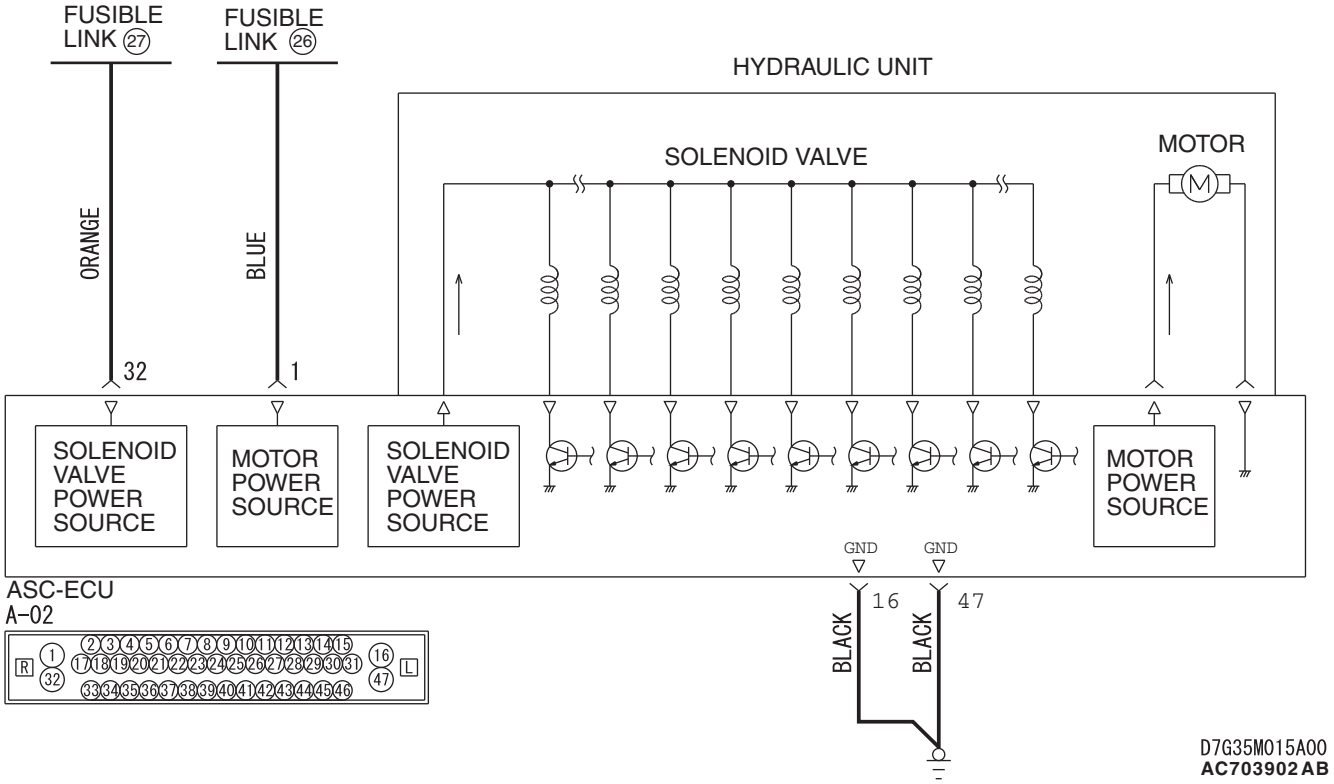
Q: Is DTC C1073?

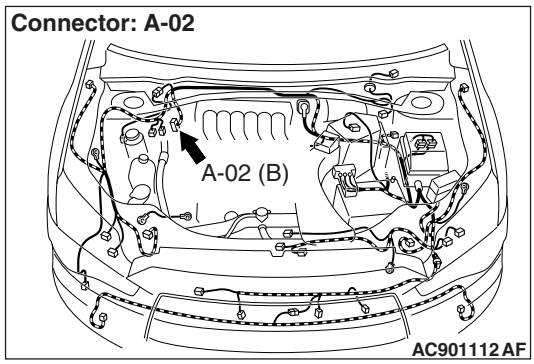
YES : Return to Step 1.

NO : The procedure is complete.

DTC C2116: Low or high power supply voltage in pump motor

Solenoid Valve and Motor Power Supply Circuit





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⚠ 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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**

CIRCUIT OPERATION

- ASC-ECU contains the power supply circuit (terminal No.1) for the pump motor. The pump motor is energized by the motor switch, which is incorporated in ASC-ECU.
- The pump motor switch, which is incorporated in ASC-ECU, is always off unless the motor and solenoid valve check is activated when the vehicle is started.
- ASC-ECU activates the pump motor by turning on the ECU built-in pump motor switch.

DTC SET CONDITIONS

This diagnostic trouble codes 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
- ASC-ECU malfunction

Past trouble

- Carry out diagnosis with particular emphasis on wiring harness and connector failures between the power supply circuit (A-02 ASC-ECU connector terminal No. 1) to the ASC-ECU motor and the ground circuit (A-02 ASC-ECU connector terminal No.16 and 47). 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)

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

- MB991997: ASC check harness

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 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 5.
NO : 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.

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-02 ASC-ECU connector

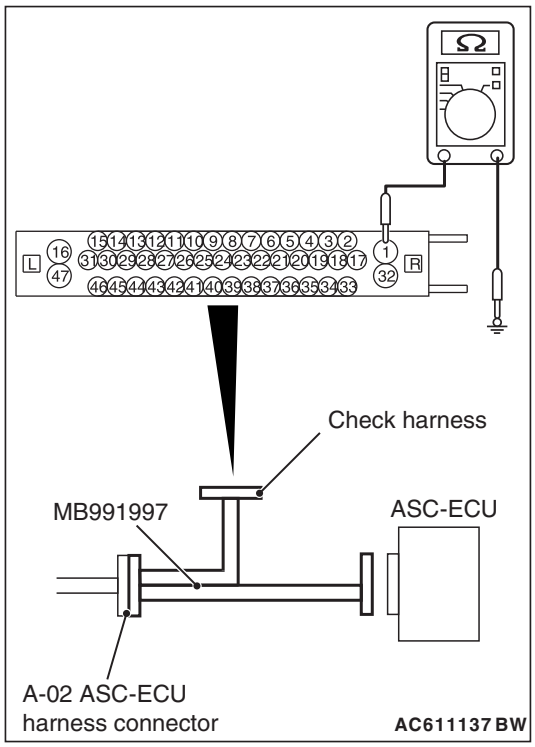
Q: Is the check result normal?

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-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ASC check harness (MB991997) to ASC-ECU.

(2) Disconnect the fusible link No.26.

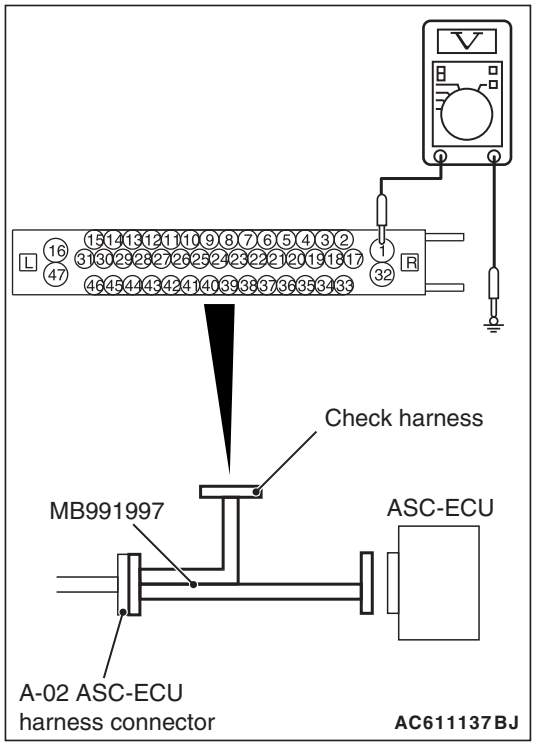
(3) Measure the resistance between the terminal No.1 and the body ground.

OK: No continuity

Q: Is the check result normal?

YES : Replace the fusible link No.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-02 ASC-ECU connector terminal No.1 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-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the voltage at the special tool connector side.

NOTE: Do not connect the special tool ASC check harness (MB991997) to ASC-ECU.

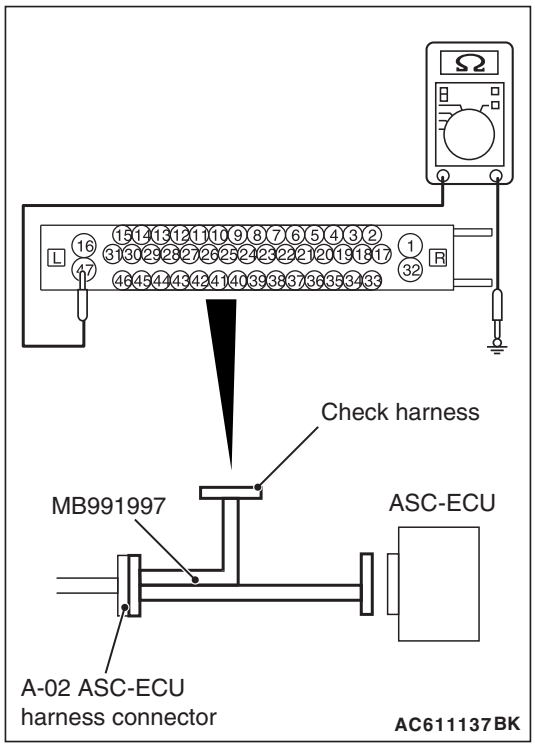
(2) Measure the voltage between the terminal No.1 and the body ground.

OK: Approximately system voltage

Q: Is the check result normal?

YES : Go to Step 9.

NO : The open circuit may be present in the power supply circuit. Repair the wiring harness between the A-02 ASC-ECU connector terminal No.1 and the fusible link No.26. Then go to Step 11.



STEP 9. Resistance measurement at A-02 ASC-ECU connector

(1) Disconnect the ASC-ECU connector, connect special tool ASC check harness (MB991997) to the harness-side connector, and then measure the resistance at the special tool connector side.

NOTE: Do not connect the special tool ASC check harness (MB991997) to ASC-ECU.

(2) Measure the resistance between the terminal No.16 and the body ground, and between the terminal No.47 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-02 ASC-ECU connector terminal No.16 and the body ground, and between the A-02 ASC-ECU connector terminal No.47 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 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 C2116?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). 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 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 C2116?

YES : Return to Step 1.

NO : The procedure is complete.

DTC C121D: Abnormality in brake fluid pressure sensor circuit

⚠ 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 hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**

CIRCUIT OPERATION

The brake fluid pressure sensor is incorporated in the hydraulic unit. When the brake pedal is depressed, the pressure sensor detects the brake pressure applied from the master cylinder, converts this pressure into the voltage signal, and outputs it.

DTC SET CONDITIONS

When the pressure sensor output signal is not within the standard value range, ASC-ECU outputs this diagnostic trouble code.

PROBABLE CAUSES

- Incorrect brake pedal height
- Incorrect adjustment of the stoplight switch
- Master cylinder malfunction
- Brake booster malfunction
- ASC-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 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 C121D set?

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

STEP 3. Brake pedal check

Refer to GROUP 35A – On-vehicle Service/Brake Pedal Inspection P.35A-15.

Q: Is the check result normal?

YES : Go to Step 4.
NO : Go to GROUP 35A – On-vehicle Service/Brake Pedal Inspection P.35A-15.

STEP 4. Check the installation condition of the stoplight switch.

Refer to GROUP 35A – On-vehicle Service/Brake Pedal Inspection P.35A-15.

Q: Is the check result normal?

YES : Go to Step 5.
NO : Install the stop light switch correctly (Refer to GROUP 35A – On-vehicle Service/Brake Pedal Inspection P.35A-15), and then go to Step 7 .

STEP 5. Brake booster check

Refer to GROUP 35A – On-vehicle Service/Brake Booster Operating Check P.35A-17.

Q: Is the check result normal?

YES : Go to Step 6.
NO : After replacing the brake booster (Refer to GROUP 35A – Master Cylinder Assembly and Brake Booster P.35A-30), go to Step 7.

STEP 6. Check whether the diagnostic trouble code is reset.

Erase the DTC.

Q: Is DTC C121D set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287).
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 7. Check whether the diagnostic trouble code is reset.

Erase the DTC.

Q: Is DTC C121D set?

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

DTC C121E: Abnormality in brake fluid pressure sensor output signal

⚠ 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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**

OPERATION

The hydraulic sensor is incorporated in the hydraulic unit. When the brake pedal is depressed, the pressure sensor detects the brake pressure applied from the master cylinder, converts this pressure into the voltage signal, and outputs it.

DTC SET CONDITIONS

This diagnostic trouble codes will be set under the cases below:

- When the pressure sensor offset is not within the standard value range
- When the estimated pressure sensor temperature is not normal

PROBABLE CAUSES

- Incorrect adjustment of brake pedal height
- Master cylinder malfunction
- Brake booster malfunction
- Incorrect installation position of stoplight switch
- Stoplight switch malfunction
- Brake drag
- ASC-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. M.U.T.-III CAN bus diagnostics
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. Diagnostic trouble code recheck after resetting CAN bus lines

Q: Is DTC C121E set?

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

STEP 3. Brake pedal check
Refer to GROUP 35A – On-vehicle Service/Brake Pedal Inspection P.35A-15.

Q: Is the check result normal?

YES : Go to Step 4.
NO : Go to GROUP 35A – On-vehicle Service/Brake Pedal Inspection P.35A-15.

STEP 4. Check whether the other system diagnostic trouble code is set.
Refer to GROUP 54A – Rear Combination Light/Diagnostic Trouble Code chart P.54A-228.

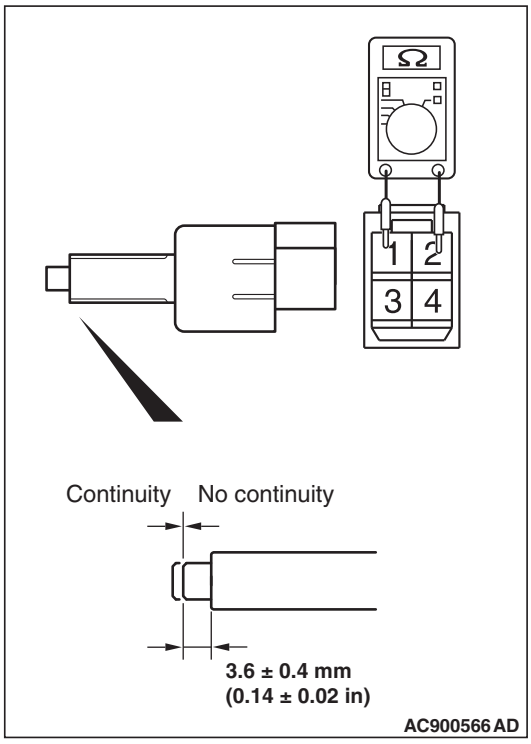
Q: Is any DTC set?

YES : Repair or replace the rear combination light or rear combination light circuit.
NO : Go to Step 5.

STEP 5. Check for stoplight switch installation
Refer to GROUP 35A – On-vehicle Service/Brake Pedal Inspection P.35A-15.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Install the stop light switch correctly (Refer to GROUP 35A – On-vehicle Service/Brake Pedal Inspection P.35A-15), and then go to Step 10 .



STEP 6. Stoplight switch continuity check

(1) Remove the stoplight switch (Refer to GROUP 35A –Brake Pedal P.35A-28).
(2) Connect the circuit tester (Ω range) to the stop light switch connector terminals No.1 and No.2.
(3) When no continuity is detected with the plunger pressed from the edge of the outer case by the dimension shown in the figure and when continuity is detected with the plunger released, the stop light switch is in good condition.

Q: Is the check result normal?

YES : Go to Step 7.
NO : Replace the stop light switch (Refer to GROUP 35A –Brake Pedal P.35A-28), and then go to Step 10.

STEP 7. Brake drag check

Check the brake system for drag (Refer to GROUP 35A – On-vehicle Service/Brake Drag Force Check P.35A-27).

Q: Is the check result normal?

YES : Go to Step 8.
NO : Repair the brake drag, and then go to Step 10.

STEP 8. Brake booster check

Refer to GROUP 35A – On-vehicle Service/Brake Booster Operation Check P.35A-17.

Q: Is the check result normal?

YES : Go to Step 9.
NO : Replace the brake booster (Refer to GROUP 35A – Master Cylinder Assembly and Brake Booster P.35A-30), and then go to Step 10.

STEP 9. Check whether the diagnostic trouble code is reset.

Erase the DTC.

Q: Is DTC C121E set?

YES : Replace the hydraulic unit (integrated with ASC-ECU) (Refer to P.35C-287). Then go to Step 10.
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).

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STEP 10. Check whether the diagnostic trouble code is reset.

Erase the DTC.

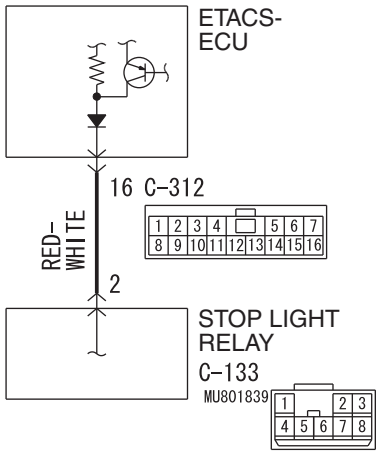
Q: Is DTC C121E set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC C1000: Abnormality in stoplight switch circuit

Stop Light Relay Circuit



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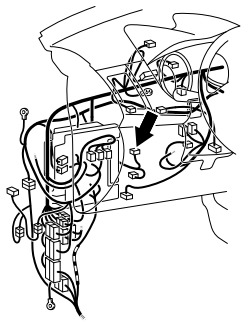
Connector: C-133



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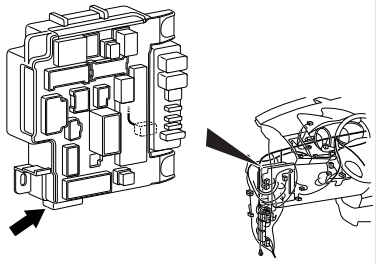
Connector: C-312



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⚠ 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).**
- **Whenever ECU is replaced, ensure that the CAN bus lines are normal.**
- **When the hydraulic unit (integrated with ASC-ECU) is replaced, always carry out the calibration of the steering wheel sensor, the G and yaw rate sensor and brake fluid pressure sensor (Refer to P.35C-282, P.35C-283 and P.35C-284).**

OPERATION

ETACS-ECU sends the ON signal generated when the brake pedal is depressed and OFF signal generated when it is released to ASC-ECU via the CAN bus lines.

DTC SET CONDITIONS

This diagnostic trouble code is set in the following case.

- When the vehicle has run for a long time with the stoplight switch turned ON.
- When there is difference between the stoplight state and the vehicle's behavior

PROBABLE CAUSES

- Malfunction of the stoplight relay
- Malfunction of the stoplight
- Damaged wiring harness and connectors
- ETACS-ECU malfunction
- ASC-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 ASC-ECU) (Refer to P.35C-287). 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.

Next>>