

CAN COMMUNICATION SYSTEM

PRECAUTIONS

1. HANDLING PRECAUTIONS FOR SRS AIRBAG SYSTEM (See page RS-164)

NOTICE:

This maintenance operation may affect the SRS air bag. Make sure to read the precautionary items of the SRS air bag before starting work.

2. PRECAUTIONS FOR REPAIRING WIRE HARNESS

- (a) After repairing the bus line with solder, wrap the repaired part with tape.

NOTICE:

- Be sure to twist the bus line (communication line) when installing. Do not allow any space between CAN-H and CAN-L.
- The difference in length of the CAN-L bus line and the CAN-H bus line should be within 100 mm.
- Untwisted parts around the connectors should be within 80 mm.

- (b) Do not perform bypass wiring between the connectors.

NOTICE:

If you perform bypass wiring, the characteristics of the twisted wire harness will be lost.

3. PRECAUTIONS FOR MEASURING RESISTANCE OF CAN BUS

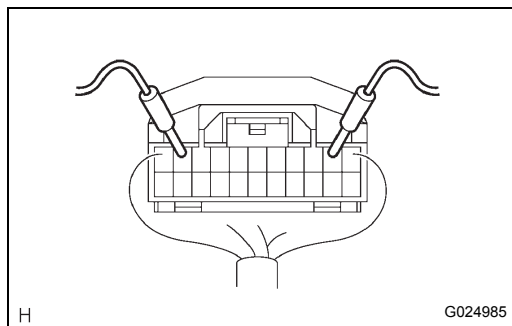
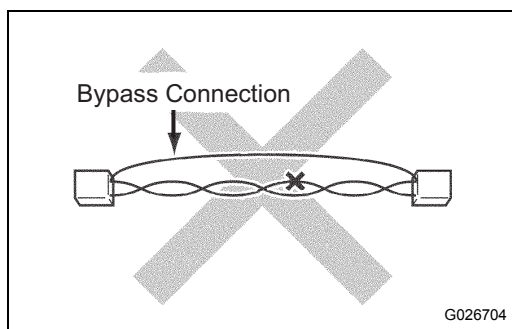
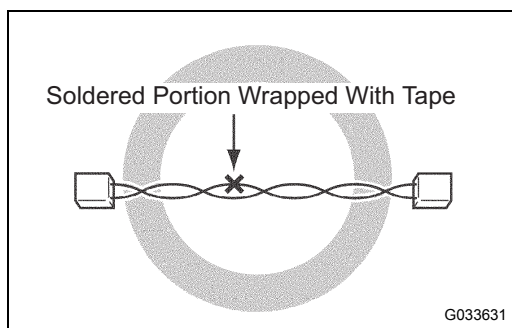
- (a) After turning the ignition off, check that warning functions, such as the key reminder, are not operating. Wait one minute after operating the key and switches or opening and closing the doors before performing the measurement. If a door is required to be opened for inspections of connectors or other items, open the door before starting the inspections.

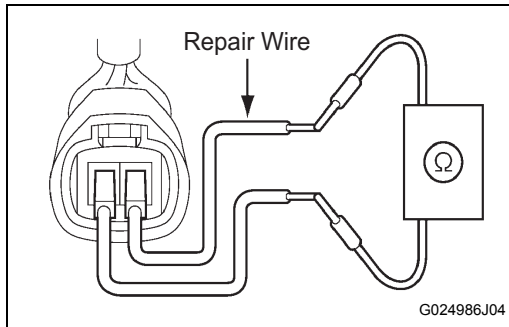
HINT:

Operating the key or switches or opening and closing the doors will cause the ECU to start CAN communication, the resistance will not be stable.

4. CONTINUITY CHECK METHOD

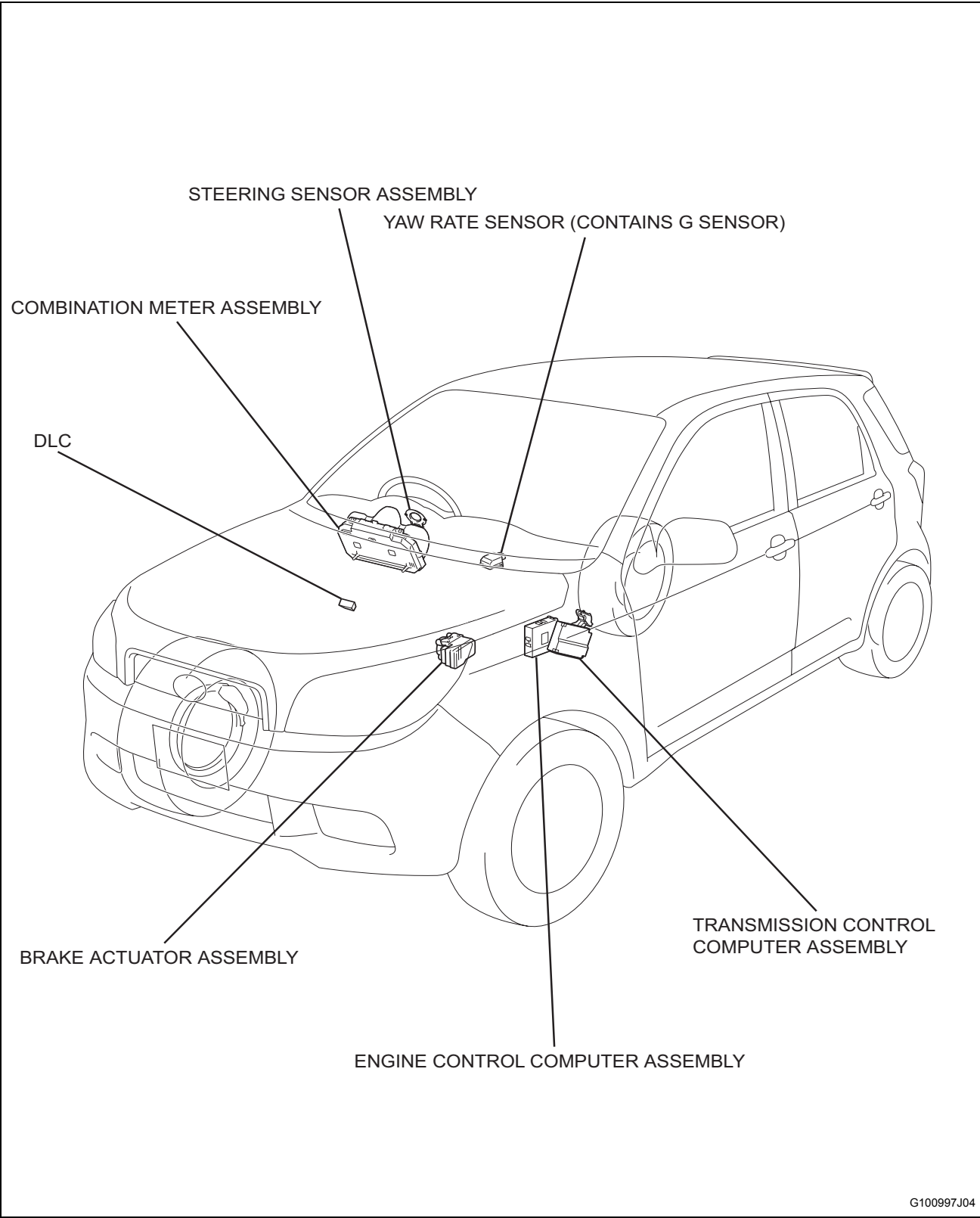
- (a) When inserting tester probes into a connector, insert them from the back of the connector.





- (b) If the tester probes cannot be inserted from the back of the connector, use a repair wire.

LOCATION



PROBLEM SYMPTOMS TABLE

RESULT LIST OF HOW TO PROCEED WITH TROUBLESHOOTING

Symptom	Suspected Area	See Page
The result of HOW TO PROCEED WITH TROUBLESHOOTING indicates that there is an OPEN IN CAN MAIN BUS LINE (DLC BRANCH LINE / MAIN BUS LINE / TERMINATING RESISTOR).	OPEN IN CAN MAIN BUS LINE (DLC BRANCH LINE / MAIN BUS LINE / TERMINATING RESISTOR)	CA-34
The result of HOW TO PROCEED WITH TROUBLESHOOTING indicates that there is a SHORT IN CAN BUS LINES.	SHORT IN CAN BUS LINES	CA-39
The result of HOW TO PROCEED WITH TROUBLESHOOTING indicates that there is a SHORT TO +B IN CAN BUS LINE.	SHORT TO +B IN CAN BUS LINE	CA-48
The result of HOW TO PROCEED WITH TROUBLESHOOTING indicates that there is a SHORT TO GND IN CAN BUS LINE.	SHORT TO GND IN CAN BUS LINE	CA-57
The result of HOW TO PROCEED WITH TROUBLESHOOTING indicates that there is an OPEN IN ONE OF CAN BUS LINES.	OPEN IN ONE OF CAN BUS LINES	CA-66

COMMUNICATION STOP MODE LIST

Symptom	Suspected Area	See Page
ABS, VSC is not displayed on the CHECK ECU CONNECTED TO CAN BUS LINE screen of the DS-II (vehicles with VSC).	VSC ECU COMMUNICATION STOP MODE	CA-22
STEERING SENSOR is not displayed on the CHECK ECU CONNECTED TO CAN BUS LINE screen of the DS-II (vehicles with VSC).	STEERING ANGLE SENSOR COMMUNICATION STOP MODE	CA-26
YAW RATE, G SENSOR is not displayed on the CHECK ECU CONNECTED TO CAN BUS LINE screen of the DS-II (vehicles with VSC).	YAW RATE AND G SENSOR COMMUNICATION STOP MODE	CA-28
EFI is not displayed on the CHECK ECU CONNECTED TO CAN BUS LINE screen of the DS-II.	EFI ECU COMMUNICATION STOP MODE	CA-30
AT is not displayed on the CHECK ECU CONNECTED TO CAN BUS LINE screen of the DS-II.	AT ECU COMMUNICATION STOP MODE	CA-24
Meter is not displayed on the CHECK ECU CONNECTED TO CAN BUS LINE screen of the DS-II.	METER ECU COMMUNICATION STOP MODE	CA-32

SYSTEM DESCRIPTION

1. DESCRIPTION

- The CAN (Controller Area Network) is a serial data communication system for real time applications. It is a vehicle multiplex communication system that has a high communication speed (500 kbps) and the ability to detect malfunctions.
- By pairing the CAN-H and CAN-L bus lines, the CAN performs communication based on differential voltage.
- Vehicles are equipped with many ECUs (sensors). The ECUs (sensors) operate by sharing information and communicating with each other.
- The CAN has two resistors of 120 Ω which are necessary to communicate with the main bus line.

2. DEFINITION OF TERMS

- (a) Main bus line
 - (1) The main bus line is a wire harness between the two terminus circuits on the bus (communication line). This is the main bus in the CAN communication system.
- (b) Branch line
 - (1) The sub bus line is a wire harness which diverges from the main bus line to an ECU or sensor.
- (c) Terminus circuit
 - (1) The terminus circuit, which consists of a resistor and capacitor, is placed to convert communication current of the CAN communication into bus voltage. Two terminus circuits are necessary on the bus.

HOW TO PROCEED WITH TROUBLESHOOTING

1. TROUBLESHOOTING PRECAUTIONS

- (a) CAN communication DTCs are output due to malfunctions in the ECUs, sensors, and power source of the CAN system. Therefore, be aware that codes indicating malfunctions in relevant ECUs, sensors and power source malfunctions can be output and recorded at the same time.
- (b) If a CAN communication DTC is detected or if there is no response to the DS-II from the ECUs that output DTCs via CAN communication, check that the DLC branch line and the CAN main bus line circuits are normal.

HINT:

ECUs that output DTCs via SIL communication can output the DTCs to the DS-II even if the DLC branch line and CAN bus are not normal.

- (c) By checking the DLC terminals using the tester, malfunctions in the DLC branch line and the CAN bus main line circuits can be checked.

NOTICE:

- When checking the DLC connector, do not insert the test probes directly into the terminals. Use a diagnosis check wire for checking.
- Before measuring the resistance of the CAN bus, turn the ignition switch off and check that warning functions, such as the key reminder, are not operating. Wait one minute after operating the key and switches or opening and closing the doors before performing measurement. If a door is required to be opened for inspections of connectors or other items, open the door before starting the inspections.

HINT:

Although the DLC is also connected to the CAN communication line, DTCs indicating a malfunction in the DLC branch cannot be read using the DS-II.

- (d) By checking the CAN BUS CONNECTION ECU using the DS-II, ECUs (sensors) connected to an opened branch line that is

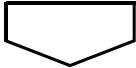
connected to the CAN bus circuit. (When CAN main bus line circuit is normal)

HINT:

- When checking ECUs that are connected to the CAN bus line, ECUs (sensors) ECUs (sensors) connected to an opened branch line will not respond to the DS-II (not displayed on the screen).
 - When checking ECUs connected to the CAN bus line, if a CAN communication DTC is output although all ECUs respond (displayed on the screen), identify the area where the malfunction occurred using the DTC combination table, and confirm the malfunction using the reproduction method.
- (e) If an open circuit is detected, before disconnecting the relevant connectors, push the connector case to check for loose engagement. In addition, check that the connectors are properly connected.

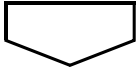
1

VEHICLE BROUGHT TO WORKSHOP



2

CONDUCT CUSTOMER PROBLEM ANALYSIS AND CHECK SYMPTOMS



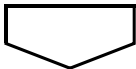
3

CHECK FOR DTCS (ALL DTCS)

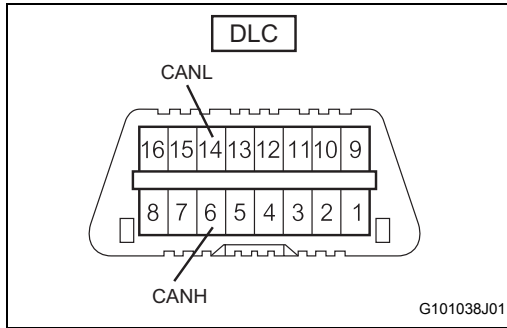
- (a) Using the DS-II, perform (CHECK DTC [ALL]).

NOTICE:

- If DTCs indicating ECUs that show a communication stop, malfunction in the sensor or its power source, it is suspected that there might not be a malfunction in the communication line, but the ECUs and sensors might not be able to send signals. Therefore, troubleshoot the malfunctions in ECUs or sensors first.
- If the connector that includes the CAN communication line is disconnected when the ignition switch is ON, the ECUs of the corresponding systems and also ECUs of the relevant systems record a CAN communication DTC.



4

CHECK DLC (CANH $\leftrightarrow$ CANL)

- (a) Turn the ignition switch off.
 (b) Using the tester, measure the resistance between terminals 6 (CANH) and 14(CANL) of the DLC.

Standard

Result	Proceed to
OK (55 to 65Ω)	A
NG (66Ω or more)	B
NG (54Ω or more)	C

B

GO TO OPEN IN CAN MAIN BUS LINE (DLC BRANCH LINE / MAIN BUS LINE / TERMINATING RESISTOR) (See page CA-34)

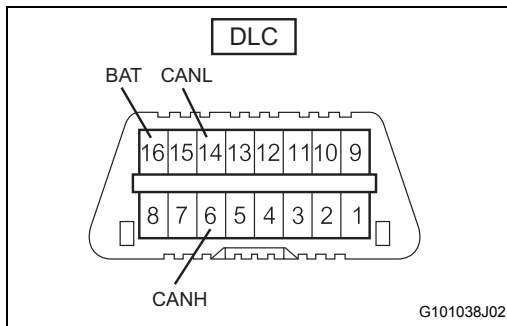
C

GO TO SHORT IN CAN BUS LINES (See page CA-39)

A

5

CHECK DLC (BAT - CANH, CANL)



- (a) Using the tester, measure the resistance between the DLC connector terminals.

Standard

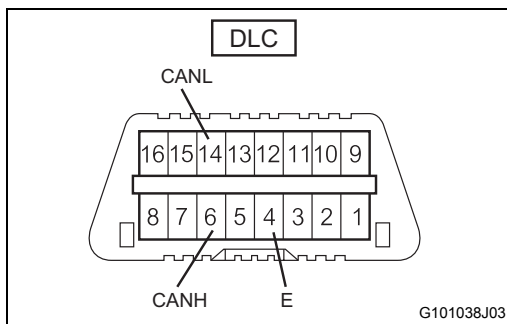
Tester Connection	Measurement Condition	Standard
6 (CANH) $\leftrightarrow$ 16 (IG)	IG OFF	6 kΩ or more
14 (CANL) $\leftrightarrow$ 16 (IG)	IG OFF	6 kΩ or more

NG

GO TO SHORT TO +B IN CAN BUS LINE (See page CA-48)

OK

6

CHECK DLC (E $\leftrightarrow$ CANH, CANL)

- (a) Using the tester, measure the resistance between the DLC connector terminals.

Standard

Tester Connection	Measurement Condition	Standard
6 (CANH) $\leftrightarrow$ 4 (E)	IG OFF	200Ω or more
14 (CANL) $\leftrightarrow$ 4 (E)	IG OFF	200Ω or more

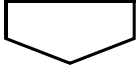
NG

GO TO SHORT TO GND IN CAN BUS LINE (See page CA-57)

OK

7**CHECK FOR INSTALLED SYSTEMS (ECUs AND SENSORS) THAT ADOPT CAN COMMUNICATION**

- (a) Check for the installed systems that adopt CAN communication based on the specification of the vehicle and equipped parts. (See page CA-10.)

**8****PERFORM INSPECTION USING DS-II (CHECK ECUs CONNECTED TO CAN BUS LINE)**

- (a) On the DS-II screen, select the following items: CAN BUS DIAGNOSIS / CHECK ECU CONNECTED TO CAN BUS LINE. (See page CA-10.)
- (b) Check the screen display for approximately one minute and check the ECUs displayed on the screen.

Result

DS-II Screen Display	Proceed to
All ECUs and sensors that are connected to CAN communication will be displayed on the screen.	A
Some of the ECUs and sensors that are connected to CAN communication will not be displayed on the screen.	B
Some of the ECUs and sensors that are connected to CAN communication will not be displayed on the screen, and some that are displayed or not displayed repeatedly when checking the screen.	C

NOTICE:

ECUs or sensors that are not equipped are not displayed. Do not mistake them for being in the communication stop mode.

HINT:

During checking, the connection of ECU that are displayed or not displayed repeatedly should be considered as normal. (Signals from other ECUs that are connected to the branch line that has an open in one side become noise and affect the display and communication with the DS-II.)

B

GO TO COMMUNICATION STOP MODE LIST
(See page CA-4)

C

GO TO OPEN IN ONE OF CAN BUS LINES
(See page CA-66)

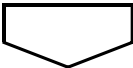
CA**A****9****CHECK COMMUNICATION ERROR DTC**

- (a) On the DS-II screen, select the following items: CAN BUS DIAGNOSIS / CHECK COMMUNICATION ERROR DTC. (See page CA-10.)
- (b) Record all DTCs of the previous diagnosis items.

HINT:

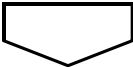
- If a communication error code is stored and all ECUs and sensors connected to the CAN communication are displayed on the CHECK ECU CONNECTED TO CAN BUS LINE screen of the DS-II, there may be previous malfunctions that are not occurring at the moment.

- As communication error codes will be detected by each ECU, identify the malfunctioning area based on the combination of output DTCs.



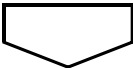
10	GO TO DTC COMBINATION TABLE
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- (a) From the combination of CAN communication system DTCs combination recorded, select the ECUs and sensors that stopped communication. (See page CA-10.)

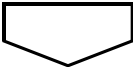


11	SYMPTOM REPRODUCTION TEST
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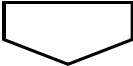
- (a) Clear DTCs using the DS-II.
(b) Perform the symptom reproduction for the ECUs, sensors, their harnesses and connectors selected from the DTC combination table. (See page IN-33)



12	ADJUST, REPAIR OR REPLACE
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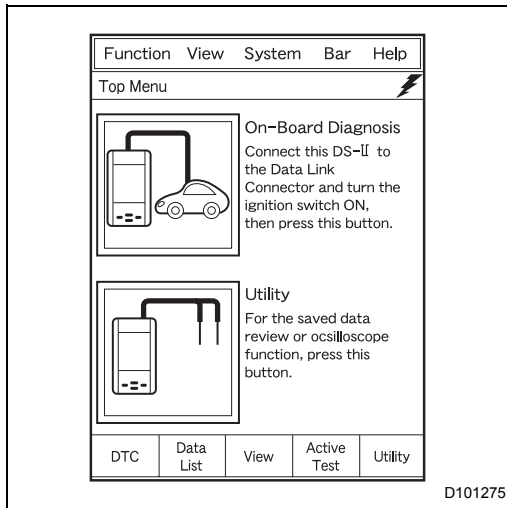


13	CONFIRMATION TEST
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END

DIAGNOSIS SYSTEM

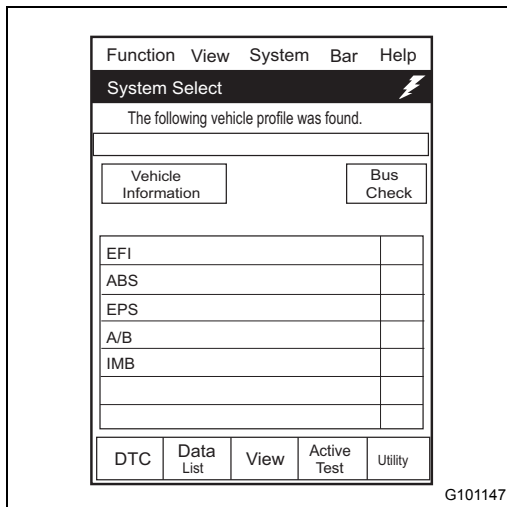


1. CAN BUS DIAGNOSIS (COMMUNICATION ERROR DTC CHECK)

HINT:

The DS-II can display only DTCs regarding CAN communication by ECUs.

- (a) Select [On-Board Diagnosis] from the TOP menu of the DS-II.



- (b) Select [BUS Check] from the On-Board Diagnosis screen.

- (c) Select [Communication Malfunction DTC] from the CAN BUS DIAGNOSIS screen.

- (d) The screen will display DTCs regarding CAN communication by ECUs.

2. CAN BUS DIAGNOSIS (CHECK ECU CONNECTED TO CAN BUS LINE)

HINT:

The DS-II can display the ECUs and sensors connected to CAN communication normally.

- (a) Select [Communication Bus Check] from the Bus Check screen.

- (b) The screen will display the ECUs and sensors currently connected to CAN communication normally.

HINT:

- If ECUs or sensors that are connected are not displayed, there is a communication stop in the system of the ECUs or sensors that are not displayed.(See page CA-4)
- If there are no ECUs or sensors that are connected to the CAN bus, nothing is displayed.

- (c) Check the screen display for about one minute, and check that there are no items that are displayed or not displayed repeatedly.

HINT:

- If there is an open in one side of the branch lines other than the DLC, outputs from the other side of the communication line may become noise which may affect communication (display) of other ECUs and sensors. In this case, the branch lines of the ECUs and sensors that are displayed and not displayed repeatedly should be considered as normal.
- If there are items that are displayed and not displayed repeatedly, repair the open in one side of the branch line of the ECUs or sensors that do not respond (not displayed on the screen).

3. CHECK FOR INSTALLED SYSTEMS (ECUS AND SENSORS) THAT ADOPT CAN COMMUNICATION

- (a) ECUs or sensors that are connected to the CAN bus circuit
- (1) Brake actuator assembly (VSC ECU)
 - (2) STEERING SENSOR (STEERING ANGLE SENSOR)
 - (3) YAW RATE SENSOR (YAW AND G SENSOR)
 - (4) ENGINE CONTROL COMPUTER (EFI ECU)
 - (5) Transmission control computer assembly (AT ECU)
 - (6) COMBINATION METER ASSEMBLY (METER ECU)
- (b) As the CAN communication system (ECUs or sensors) differs depending on model and option settings, check which systems (ECUs or sensors) are installed on the vehicle.
- (1) DS-II display and how to check for ECUs and sensors that are connected to CAN communication

ECU / Sensor Name	DS-II (CHECK ECU CONNECTED TO CAN BUS LINE) Display	How to check for ECUs and sensors
Brake actuator assembly (VSC ECU)	VSC / DVS / ABS	Installed on the vehicle equipped with VSC (when the ignition is ON, the VSC warning light in the combination meter will come on)
Steering sensor (steering angle sensor)*1	Steering angle sensor	Installed on the vehicle equipped with VSC (when the ignition is ON, the VSC warning light in the combination meter will come on)
Yaw rate sensor (yaw and G sensor)*2	Yaw / G sensor	Installed on the vehicle equipped with VSC (when the ignition is ON, the VSC warning light in the combination meter will come on)
ENGINE CONTROL COMPUTER (EFI ECU)	EFI	Installed on all vehicles
Transmission control computer assembly (AT ECU)	AT	Installed on vehicles with A/T
COMBINATION METER ASSEMBLY (METER ECU)	Meter	Installed on all vehicles

HINT:

- *1: If the vehicle is not equipped with VSC, the steering sensor will not be equipped.
- *2: If the vehicle is not equipped with VSC, the yaw rate sensor will not be equipped.

4. DIAGNOSTIC TROUBLE CODE CHART BY ECU

HINT:

- In CAN communication, DS-II can display the CAN communication system DTCs by ECU.
- If a CAN communication system DTC is output, perform troubleshooting according to HOW TO PROCEED WITH TROUBLESHOOTING (see page CA-5) because problems that are occurring cannot be identified by checking only the DTC.

- (a) Engine control computer (EFI ECU)/EFI (DS-II display name)

DTC No.	Diagnosis Item (DS-II Display Name)
U0101	EAT communication (receiving)
U0121	ABS communication (receiving)
U0156	Meter communication (receiving)
U1000	EAT communication (sending)
U1002	CAN COMMUNICATION

HINT:

DTC communication uses the CAN communication system.

- (b) Transmission control computer assembly (EAT ECU)/AT (DS-II display name)

DTC No.	Diagnosis Item (DS-II Display Name)
U0100	EFI communication receiving error
U1001	EFI communication sending error

HINT:

- DTC communication uses the CAN communication system.
- This item applies to vehicles equipped with automatic transmission.

- (c) Brake actuator assembly (VSC ECU) / VSC / DVS / ABS (DS-II Display Name)

DTC No.	Diagnosis Item (DS-II Display Name)
C1231	Open or short circuit, or communication lost in steering angle sensor
C1233	Open or short circuit in yaw rate sensor
C1301	CAN communication error
U0100	EFI communication error

HINT:

- DTC communication uses the CAN communication system.
- This item applies to vehicles equipped with VSC.

- (d) COMBINATION METER ASSEMBLY (METER ECU)

DTC No.	Diagnostic Item
0051	EFI ECU communication error
0052	E-A/T communication error
0053	ABS ECU communication error
0054	Steering angle sensor communication error
0055	Yaw and G sensor communication error

5. DTC COMBINATION TABLE

- (a) For a malfunction in ECUs that are connected to the CAN bus line that is not occurring currently, identify the branch line that caused the malfunction based on the combination table. Perform the problem simulation test and check for DTCs. (See page IN-33 for how to simulate the problem symptom.)

HINT:

An open in the branch line currently occurring can be detected by performing CHECK ECU CONNECTED TO CAN BUS LINE using the DS-II because the ECUs and sensors connected to the opened branch line will not respond (will not be displayed on the screen).

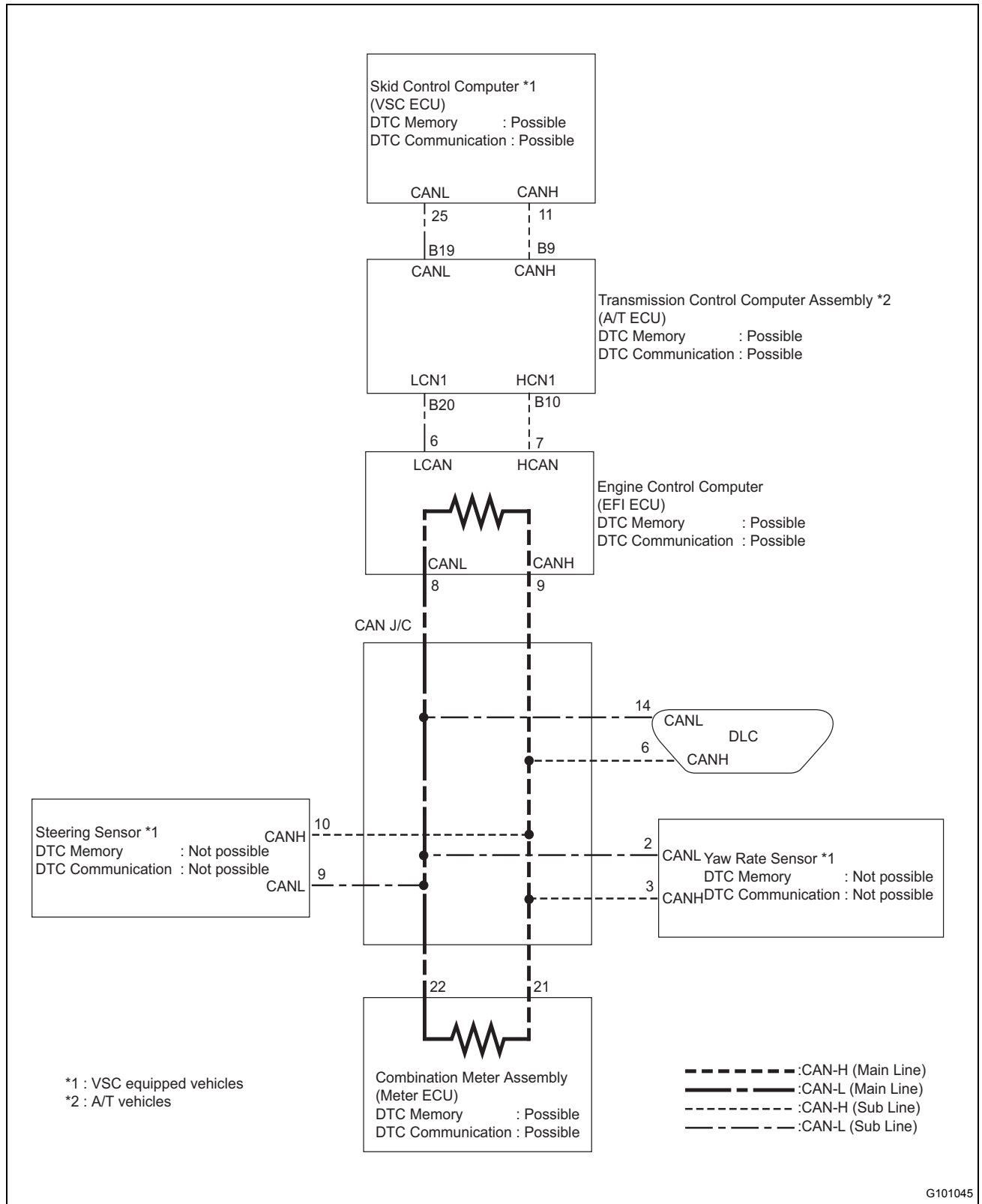
Diagnosis Results		Content Of Trouble					
Origin Of Output	Output DTC	EFI ECU Communication Interruption Mode	AT ECU Communication Interruption Mode	VSC ECU Communication Interruption Mode	Steering Angle Sensor Communication Interruption Mode	Yaw/G Sensor Communication Interruption Mode	Meter ECU Communication Interruption Mode
EFI ECU Outputs	U0101/82 EAT Communication (Receiving)		○				
	U0121/86 ABS Communication (Receiving)			○			
	U0156/87 Meter Communication (Receiving)						○
	U1000/85 EAT Communication (Sending)		○				
VSC ECU Outputs	C1231/19 Steering Angle Sensor Open Short/Communication Interruption				○		
	C1233/36 Yaw Rate Sensor Open/Short					○	
	C1301/79 CAN Communication Error			○			
	U0100/49 EFI Communication Error	○					
AT ECU Outputs	U0100/82 EFI Communication Receiving Error	○					
	U1001/85 EFI Communication Sending Error	○					

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HINT:

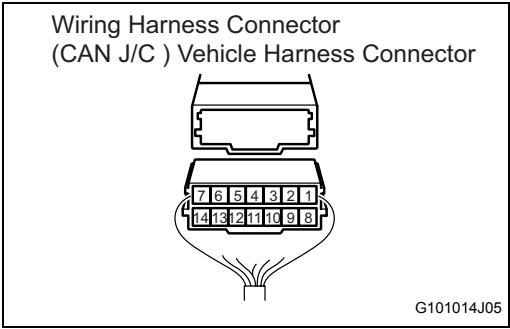
See page CA-4 for PROBLEM SYMPTOMS TABLE
(COMMUNICATION STOP MODE LIST)

CIRCUIT DIAGRAM



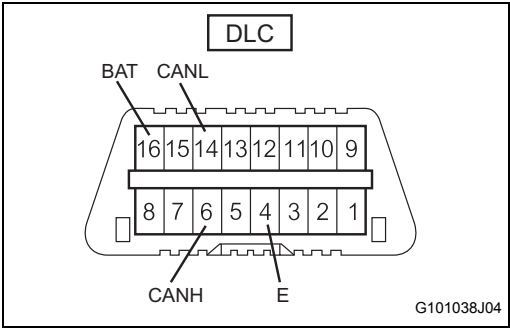
ECU TERMINALS

NOTICE:
Before measuring the resistance of the CAN bus, turn the ignition switch off and check that warning functions, such as the key reminder, are not operating. Wait one minute after operating the key and switches or opening and closing the doors before performing measurement. If a door is required to be opened for inspections of connectors or other items, open the door before starting the inspections.



1. WIRING HARNESS CONNECTOR (CAN J/C)
(a) TERMINAL LAYOUT

Terminal No.	Terminal Symbol	Connected To
11	CANH	Steering angle sensor (CAN-H)
12	CANL	Steering angle sensor (CANL)
3	CANH	Yaw and G sensor (CANH)
6	CANL	Yaw and G sensor (CANL)
10	CANH	DLC (CANH)
13	CANL	DLC (CANL)
9	CANH	Meter ECU (CAN-H)
14	CANL	Meter ECU (CANL)
4	CANH	EFI ECU (CANH)
5	CANL	EFI ECU (CANL)



2. DLC
(a) TERMINAL LAYOUT

Terminal No.	Terminal Symbol
4	E
6	CANH
14	CANL
16	BAT

- (b) INSPECT DTC
(1) Turn the ignition switch off.
(2) Using tester, inspect the resistance between the terminals.

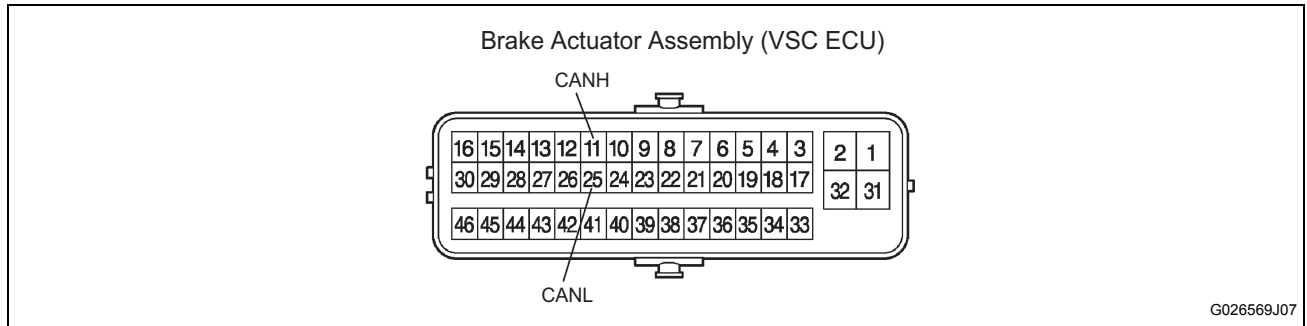
Standard

Terminal No.	Item	Measurement Condition	Standard
6 (CANH) ↔ 14 (CANL)	Resistance	IG OFF	55 to 65Ω
6 (CANH) ↔ 16 (BAT)	Resistance	IG OFF	6 kΩ or more
14 (CANL) ↔ 16 (BAT)	Resistance	IG OFF	6 kΩ or more
6 (CANH) ↔ 4 (E)	Resistance	IG OFF	200Ω or more
14 (CANL) ↔ 4 (G)	Resistance	IG OFF	200Ω or more

3. Brake actuator assembly (VSC ECU)

HINT:

The brake actuator assembly (VSC ECU) is installed on only vehicles equipped with VSC.

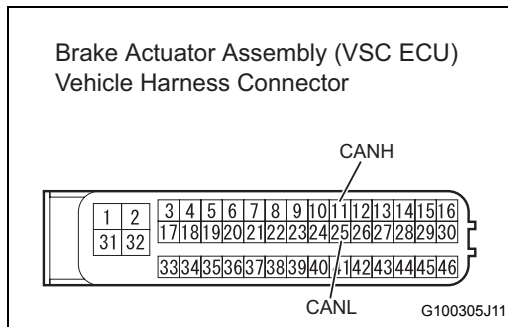


(a) TERMINAL LAYOUT

Terminal No.	Terminal Symbol
11	CANH
25	CANL

(b) Inspect the vehicle side connector of the brake actuator assembly (VSC ECU).

- (1) Turn the ignition switch off and disconnect the brake actuator assembly (VSC ECU) connector.
- (2) Using the tester, inspect the resistance between the terminals of the vehicle side wire harness connector.

**Standard**

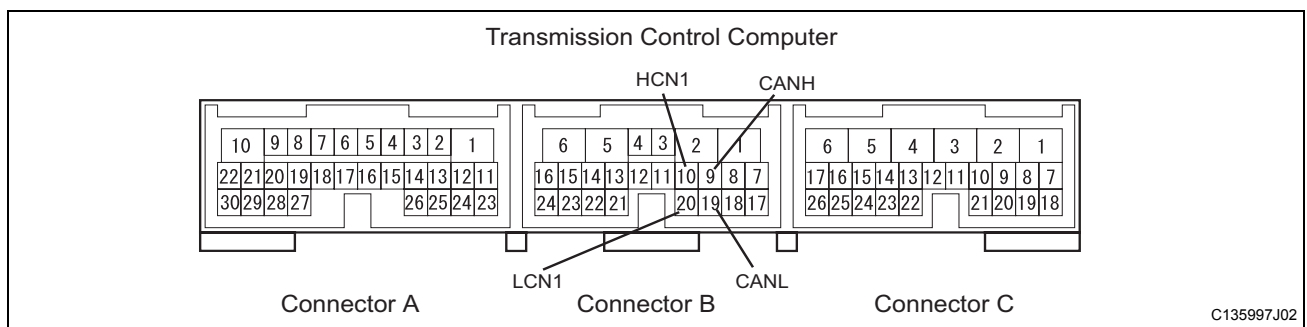
Terminal No.	Item	Measurement Condition	Standard
11 (CANH) ↔ 25 (CANL)	Resistance	IG OFF	55 to 65Ω
11 (CANH) ↔ 32 (GND1)	Resistance	IG OFF	200Ω or more
25 (CANL) ↔ 32 (GND1)	Resistance	IG OFF	200Ω or more
11 (CANH) ↔ 31 (BS+)	Resistance	IG OFF	6 kΩ or more
25 (CANL) ↔ 31 (BS+)	Resistance	IG OFF	6 kΩ or more

CA

4. Transmission control computer assembly (AT ECU)

HINT:

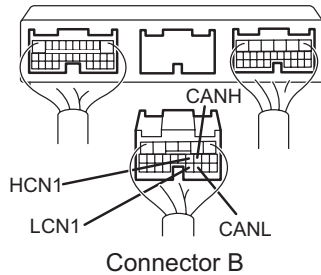
Transmission control computer assembly (AT ECU) is installed only on vehicles equipped with automatic transmission.



(a) TERMINAL LAYOUT

Terminal No.	Terminal Symbol
B9	CANH
B19	CANL
B10	HCN1
B20	LCN1

Transmission Control Computer Assembly
(Vehicle Harness Connector)



G100991

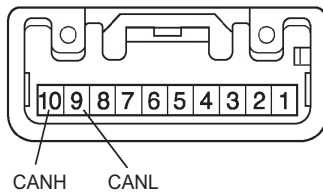
- (b) Inspect the vehicle side wire harness connector of the transmission control computer assembly (AT ECU).
- (1) Turn the ignition switch off and disconnect the transmission control computer assembly (AT ECU) connector.
 - (2) Using the tester, inspect the resistance between the terminals of the vehicle side wire harness connector.

Standard

Terminal No.	Item	Measurement Condition	Standard
B9 (CANH) ↔ B19 (CANL)	Resistance	IG OFF	55 to 65Ω
B9 (CANH) ↔ 6 (GND)	Resistance	IG OFF	200Ω or more
B19 (CANL) ↔ 6 (GND)	Resistance	IG OFF	200Ω or more
B9 (CANH) ↔ 3 (+B)	Resistance	IG OFF	6 kΩ or more
B19 (CANL) ↔ 3 (+B)	Resistance	IG OFF	6 kΩ or more
B10 (HCN1) ↔ B20 (LCN1)	Resistance	IG OFF	55 to 65Ω
B10 (HCN1) ↔ 6 (GND)	Resistance	IG OFF	200Ω or more
B20 (LCN1) ↔ 6 (GND)	Resistance	IG OFF	200Ω or more
B10 (HCN1) ↔ 3 (+B)	Resistance	IG OFF	6 kΩ or more
B20 (LCN1) ↔ 3 (+B)	Resistance	IG OFF	6 kΩ or more

CA

Steering Sensor (Steering Angle Sensor)



G026566J04

5. STEERING SENSOR (STEERING ANGLE SENSOR)

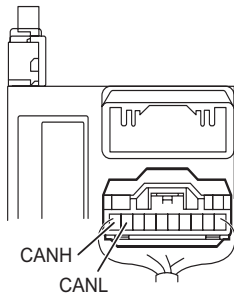
HINT:

The steering sensor (steering angle sensor) is installed on only vehicles equipped with VSC.

(a) TERMINAL LAYOUT

Terminal No.	Terminal Symbol
10	CANH
9	CANL

Steering Sensor (Steering Angle Sensor)
Vehicle Harness Connector



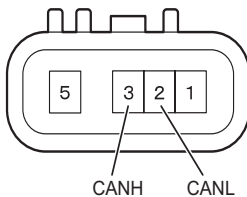
G100307J03

- (b) Inspect the vehicle side wire harness connector of the steering sensor (steering angle sensor).
- (1) Turn the ignition switch off and disconnect the steering sensor (steering angle sensor) connector.
 - (2) Using the tester, inspect the resistance between the terminals of the vehicle side wire harness connector.

Standard

Terminal No.	Item	Measurement Condition	Standard
10 (CANH) ↔ 9 (CANL)	Resistance	IG OFF	55 to 65Ω
10 (CANH) ↔ 2 (-)	Resistance	IG OFF	200Ω or more
9 (CANL) ↔ 2 (-)	Resistance	IG OFF	200Ω or more
10 (CANH) ↔ 1 (+)	Resistance	IG OFF	6 kΩ or more
9 (CANL) ↔ 1 (+)	Resistance	IG OFF	6 kΩ or more

Yaw Rate Sensor (Yaw/G Sensor)



G100311J01

6. YAW RATE SENSOR (YAW AND G SENSOR)

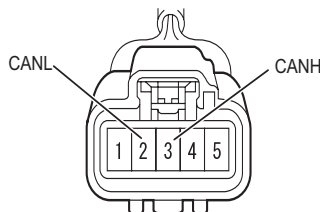
HINT:

The yaw rate sensor (yaw and G sensor) is installed on only vehicles equipped with VSC.

- (a) TERMINAL LAYOUT

Terminal No.	Terminal Symbol
3	CANH
2	CANL

Yaw Rate Sensor (Yaw/G Sensor)
Vehicle Harness Connector



G100306J05

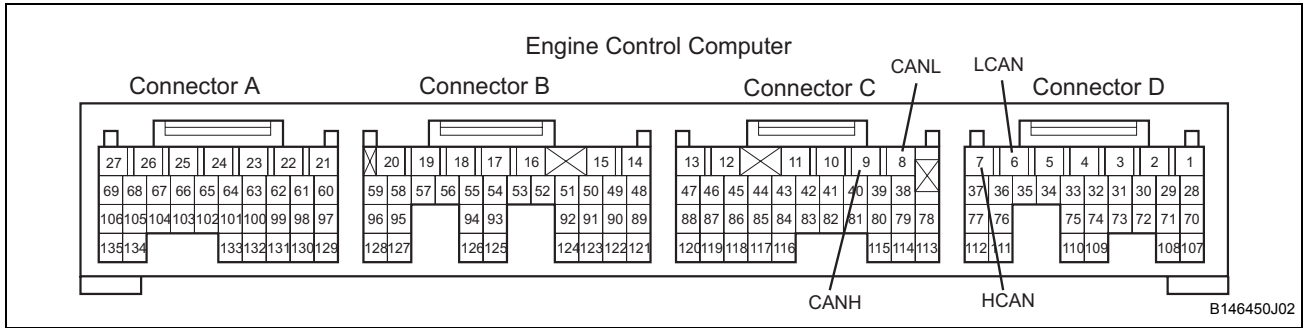
- (b) Inspect the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor).
- (1) Turn the ignition switch off and disconnect the yaw rate sensor (yaw and G sensor) connector.
 - (2) Using the tester, inspect the resistance between the terminals.

CA

Standard

Terminal No.	Item	Measurement Condition	Standard
3 (CANH) ↔ 2 (CANL)	Resistance	IG OFF	55 to 65Ω
3 (CANH) ↔ 1 (-)	Resistance	IG OFF	200Ω or more
2 (CANL) ↔ 1 (-)	Resistance	IG OFF	200Ω or more
3 (CANH) ↔ 5	Resistance	IG OFF	6 kΩ or more
2 (CANL) ↔ 5	Resistance	IG OFF	6 kΩ or more

7. ENGINE CONTROL COMPUTER (EFI ECU)

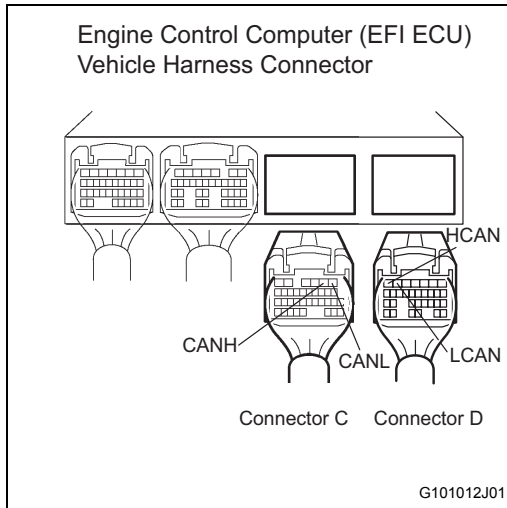


(a) TERMINAL LAYOUT

Terminal No.	Terminal Symbol
7	HCAN
6	LCAN
9	CANH
8	CANL

- (b) Inspect the vehicle side wire harness connector of the engine control computer (EFI ECU).

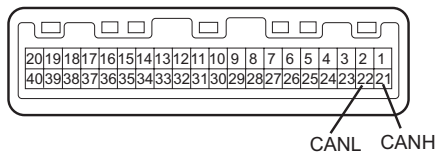
- Turn the ignition switch off and disconnect the connectors C and D of the engine control computer (EFI ECU).
- Using the tester, inspect the resistance between the terminals of the vehicle side wire harness connector.



Standard

Terminal No.	Item	Measurement Condition	Standard (Ω)
9 (CANH) ↔ 8 (CANL)	Resistance	IG OFF	110 to 130
9 (CANH) ↔ 20 (E1)	Resistance	IG OFF	200 or more
8 (CANL) ↔ 20 (E1)	Resistance	IG OFF	200 or more
9 (CANH) ↔ 38 (+B)	Resistance	IG OFF	6 k or more
8 (CANL) ↔ 38 (+B)	Resistance	IG OFF	6 k or more
7 (HCAN) ↔ 6 (LCAN)	Resistance	IG OFF	55 to 65
7 (HCAN) ↔ 20 (E1)	Resistance	IG OFF	200 or more
6 (LCAN) ↔ 20 (E1)	Resistance	IG OFF	200 or more
7 (HCAN) ↔ 38 (+B)	Resistance	IG OFF	6 k or more
6 (LCAN) ↔ 38 (+B)	Resistance	IG OFF	6 k or more

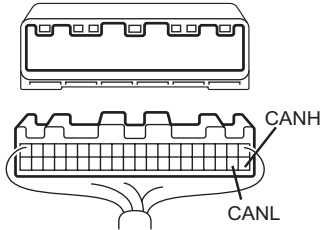
Combination Meter Assembly (Meter ECU)



C133847J01

8. COMBINATION METER ASSEMBLY (METER ECU)**(a) TERMINAL LAYOUT**

Terminal No.	Terminal Symbol
21	CANH
22	CANL

Combination Meter Assembly (Meter ECU)
Vehicle Harness Connector

G100990

- (b) Inspect the vehicle side wire harness connector of the combination meter assembly (meter ECU).

- (1) Turn the ignition switch off and disconnect the combination meter assembly (meter ECU) connector.
- (2) Using the tester, inspect the resistance between the terminals of the vehicle side wire harness connector.

Standard

Terminal No.	Item	Measurement Condition	Standard (Ω)
21 (CANH) $\longleftrightarrow$ 22 (CANL)	Resistance	IG OFF	55 to 65
21 (CANH) $\longleftrightarrow$ 15 (E)	Resistance	IG OFF	200 or more
22 (CANL) $\longleftrightarrow$ 15 (E)	Resistance	IG OFF	200 or more
21 (CANH) $\longleftrightarrow$ 13 (+B)	Resistance	IG OFF	6 k or more
22 (CANL) $\longleftrightarrow$ 13 (+B)	Resistance	IG OFF	6 k or more

FAIL-SAFE CHART**1. FAIL-SAFE FUNCTION**

- (a) The fail-safe function is designed to protect system malfunctions by entering the fail-safe process specified in each system if any bus line (communication line) is defective due to a short circuit or any other reason.
- (b) Effects each system when communication is impossible (For further details, see the pages for each system).

Function	EFI ECU	VSC ECU	Yaw Rate/G Sensor	Steering Angle Sensor	Behavior when unable to communicate	DTC Detection (Driver recognition)
VSC Control (Control of strength of driving force during VSC operation)	○	⊙	○	○	VSC function stops	Possible (light on)
VSC Control (Control of VSC/TRC engine output)	○	⊙	○	○	VSC function stops	Possible (light on)
Meter Display (Display of operation conditions and DTCs)	○	○			Light does not turn on or is always on	Recognizeable from light illumination malfunction

⊙:A system mainly involved in judging control

○:Related system

G101016

VSC ECU COMMUNICATION STOP MODE

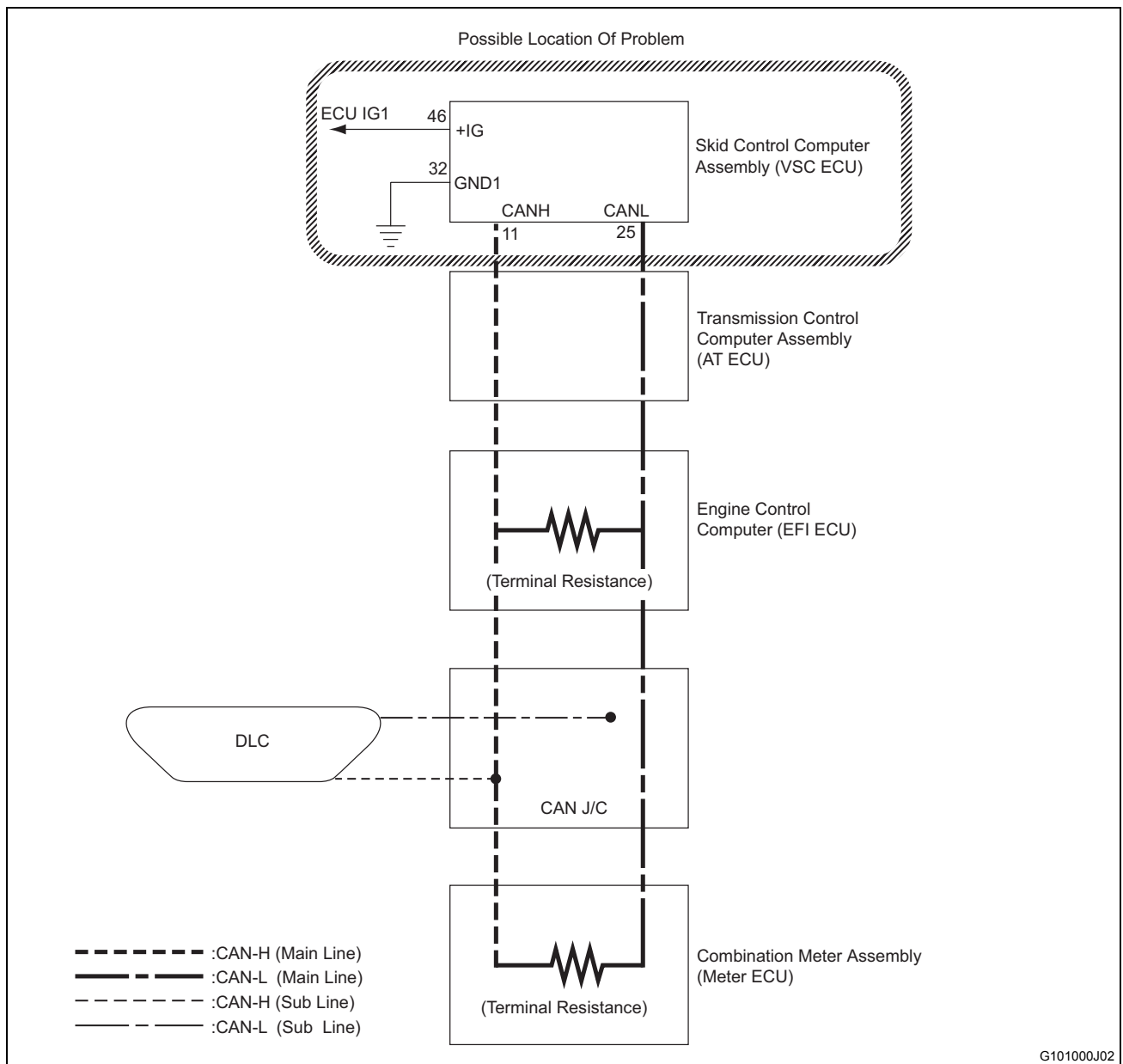
DESCRIPTION

Diagnostic Item	Symptom	Suspected Area
VSC ECU COMMUNICATION STOP MODE	- VSC / DVS / ABS is not displayed on the CHECK ECU CONNECTED TO CAN BUS LINE screen of the DS-II - Applicable to VSC ECU COMMUNICATION STOP MODE in the DTC combination table	- Power source or internal malfunction in the brake actuator assembly (VSC ECU) - Brake actuator assembly (VSC ECU) main line or connector

HINT:

This item applies to vehicles equipped with VSC.

CIRCUIT DIAGRAM



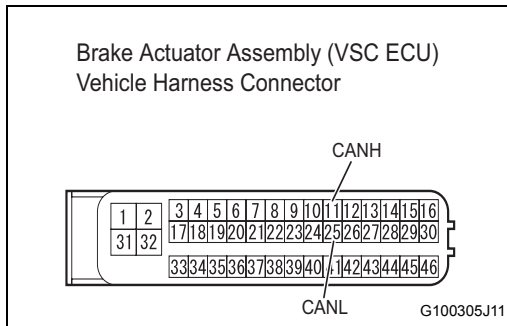
INSPECTION PROCEDURE

NOTICE:

Before measuring the resistance of the CAN bus, turn the ignition switch off and check that warning functions, such as the key reminder, are not operating. Wait one minute after operating the key and switches or opening and closing the doors before performing measurement. If a door is required to be opened for inspections of connectors or other items, open the door before starting the inspections.

1

CHECK CAN BUS LINE FOR OPEN (VSC ECU MAIN LINE)



- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the brake actuator assembly (VSC ECU) from the brake actuator assembly (VSC ECU).
- Using the tester, measure the resistance between terminals 11 (CANH) and 25 (CANL) of the vehicle side wire harness connector of the brake actuator assembly (VSC ECU).

Standard:

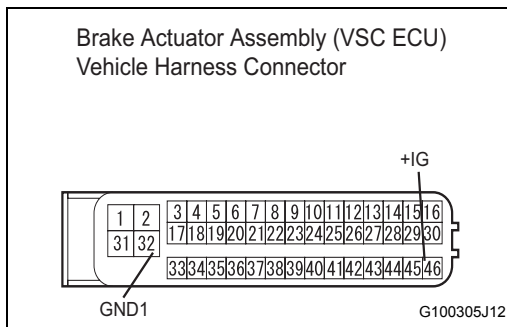
55 to 65 Ω

NG

REPAIR OR REPLACE BRAKE ACTUATOR ASSEMBLY (VSC ECU) BRANCH LINE OR CONNECTOR (CAN-H, CAN-L)

OK
2

INSPECT WIRE HARNESS (+IG VOLTAGE, GND1 CONTINUITY)



- Using the tester, inspect the resistance between the terminals of the vehicle side wire harness connector of the brake actuator assembly (VSC ECU) and the body ground.

Standard

Tester Connection	Measurement Condition	Standard
46 (+IG) $\leftrightarrow$ Body ground	IG ON	10 to 14 V
32 (GND1) $\leftrightarrow$ Body ground	Always	Continuity

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

AT ECU COMMUNICATION STOP MODE

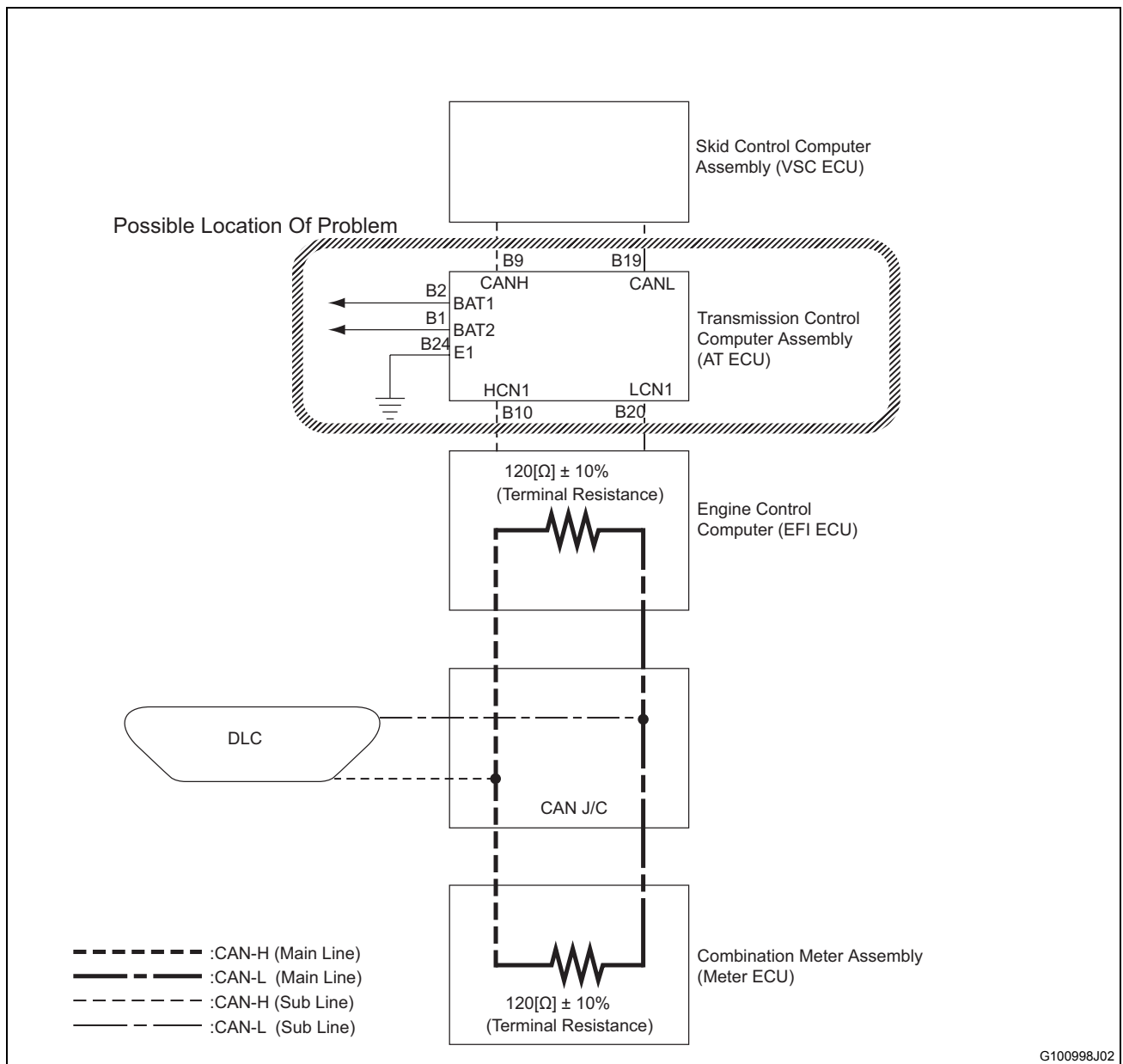
DESCRIPTION

Diagnostic Item	Symptom	Suspected Area
AT ECU COMMUNICATION STOP MODE	- AT is not displayed on the CHECK ECU CONNECTED TO CAN BUS LINE screen of the DS-II - Applicable to AT COMMUNICATION STOP MODE in the DTC combination table	- Power source or internal malfunction in the transmission control computer assembly (AT ECU) - Transmission control computer assembly (AT ECU) main line or connector

HINT:

This item applies to vehicles equipped with automatic transmission.

CIRCUIT DIAGRAM



CA

INSPECTION PROCEDURE

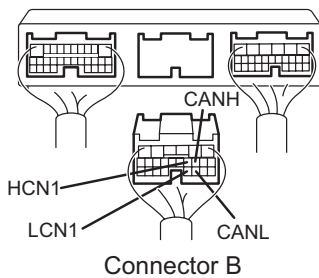
NOTICE:

Before measuring the resistance of the CAN bus, turn the ignition switch off and check that warning functions, such as the key reminder, are not operating. Wait one minute after operating the key and switches or opening and closing the doors before performing measurement. If a door is required to be opened for inspections of connectors or other items, open the door before starting the inspections.

1

CHECK CAN BUS LINE FOR OPEN (AT ECU MAIN LINE)

Transmission Control Computer Assembly
(Vehicle Harness Connector)



G100991

- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the transmission control computer assembly (AT ECU) from the transmission control computer assembly (AT ECU).
- Using the tester, measure the resistance between terminals B9 (CANH) and B19 (CANL) of the vehicle side wire harness connector of the transmission control computer assembly (AT ECU).

Standard:

55 to 65 Ω

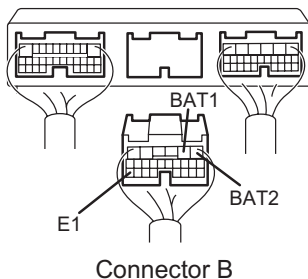
NG

REPAIR OR REPLACE TRANSMISSION CONTROL COMPUTER ASSEMBLY (AT ECU) MAIN LINE OR CONNECTOR (CAN-H, CAN-L)

OK
2

CHECK WIRE HARNESS (BAT1 VOLTAGE, BAT2 VOLTAGE)

Transmission Control Computer Assembly
(Vehicle Harness Connector)



G100991J01

- Using the tester, inspect the resistance between the terminals of the vehicle side wire harness connector of the transmission control computer assembly (AT ECU) and the body ground.

Standard

Tester Connection	Measurement Condition	Standard
B2 (BAT1) $\longleftrightarrow$ Body ground	IG ON	10 to 14 V
B1 (BAT2) $\longleftrightarrow$ Body ground	IG ON	10 to 14 V
B24 (E1) $\longleftrightarrow$ Body ground	Always	Continuity

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

REPLACE TRANSMISSION CONTROL COMPUTER ASSEMBLY

CA

STEERING ANGLE SENSOR COMMUNICATION STOP MODE

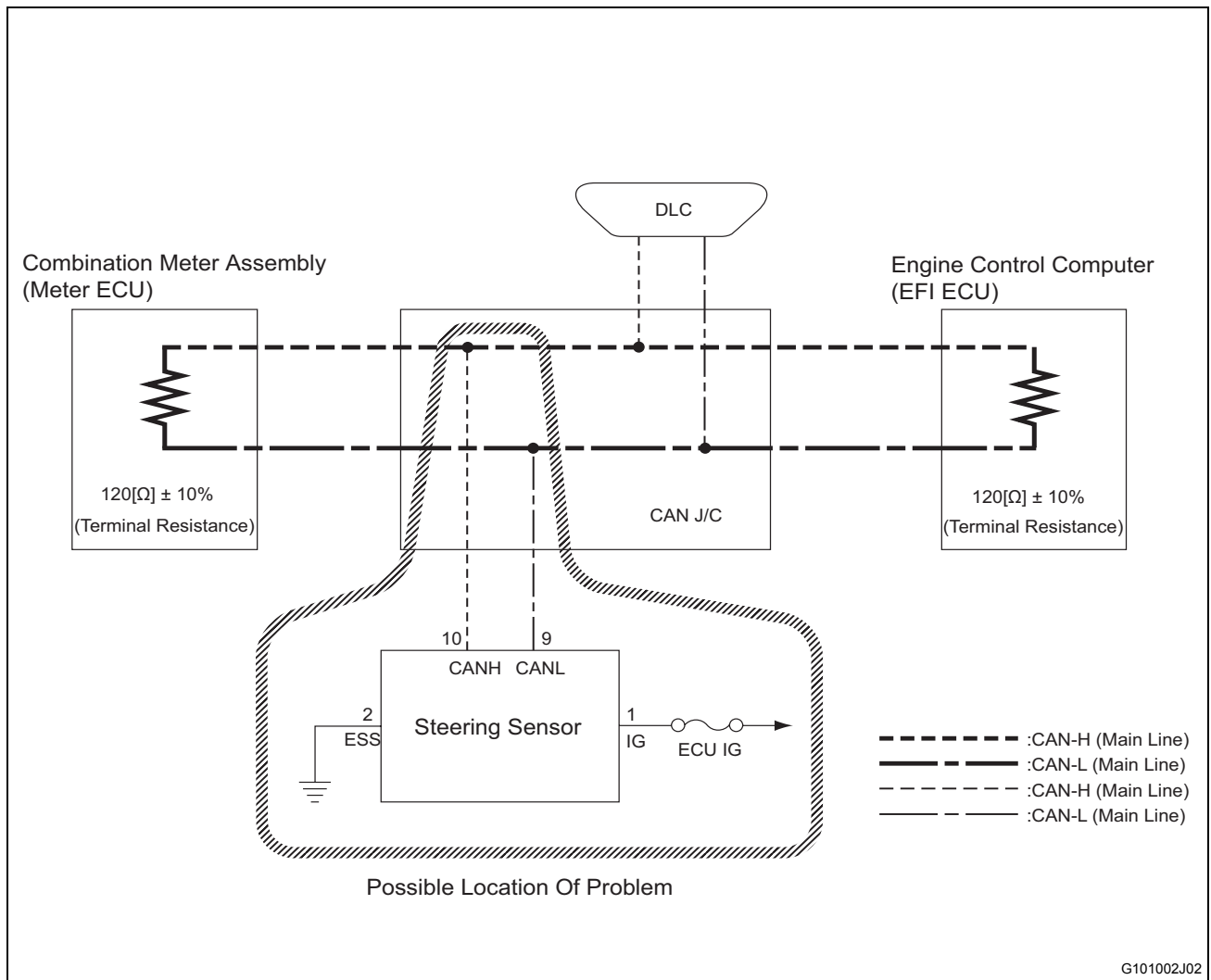
DESCRIPTION

Diagnostic Item	Symptom	Suspected Area
STEERING ANGLE SENSOR COMMUNICATION STOP MODE	- STEERING ANGLE SENSOR is not displayed on the CHECK ECU CONNECTED TO CAN BUS LINE screen of the DS-II - Applicable to STEERING ANGLE SENSOR COMMUNICATION STOP MODE in the DTC combination table	- Power source or internal malfunction in the steering sensor (steering angle sensor) - Steering sensor (steering angle sensor) branch line or connector

HINT:

This item applies to vehicles equipped with VSC.

CIRCUIT DIAGRAM



INSPECTION PROCEDURE

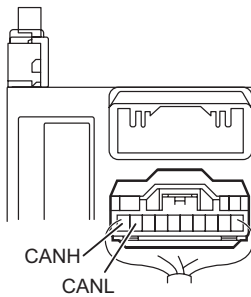
NOTICE:

Before measuring the resistance of the CAN bus, turn the ignition switch off and check that warning functions, such as the key reminder, are not operating. Wait one minute after operating the key and switches or opening and closing the

doors before performing measurement. If a door is required to be opened for inspections of connectors or other items, open the door before starting the inspections.

1**CHECK CAN BUS LINE FOR OPEN (STEERING ANGLE SENSOR BRANCH LINE)**

Steering Sensor (Steering Angle Sensor)
Vehicle Harness Connector



G100307J04

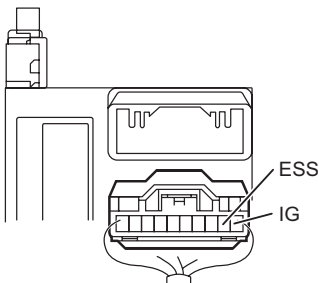
- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector of the steering sensor (steering angle sensor) from the steering sensor (steering angle sensor).
- (b) Using the tester, measure the resistance between terminals 10 (CANH) and 9 (CANL) of the vehicle side wire harness connector of the steering sensor (steering angle sensor).

Standard:**55 to 65 Ω** **NG**

REPAIR OR REPLACE STEERING SENSOR (STEERING ANGLE SENSOR) BRANCH LINE OR CONNECTOR (CAN-H, CAN-L)

OK**2****INSPECT WIRE HARNESS (IG VOLTAGE, ESS CONTINUITY)**

Steering Sensor (Steering Angle Sensor)
Vehicle Harness Connector



G100307J05

- (a) Using the tester, inspect the resistance between the terminals of the vehicle side harness connector of the steering sensor (steering angle sensor) and the body ground.

Standard

Tester Connection	Measurement Condition	Standard
1 (IG) $\longleftrightarrow$ Body ground	IG ON	10 to 14 V
2 (ESS) $\longleftrightarrow$ Body ground	Always	Continuity

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

REPLACE STEERING SENSOR

CA

YAW RATE AND G SENSOR COMMUNICATION STOP MODE

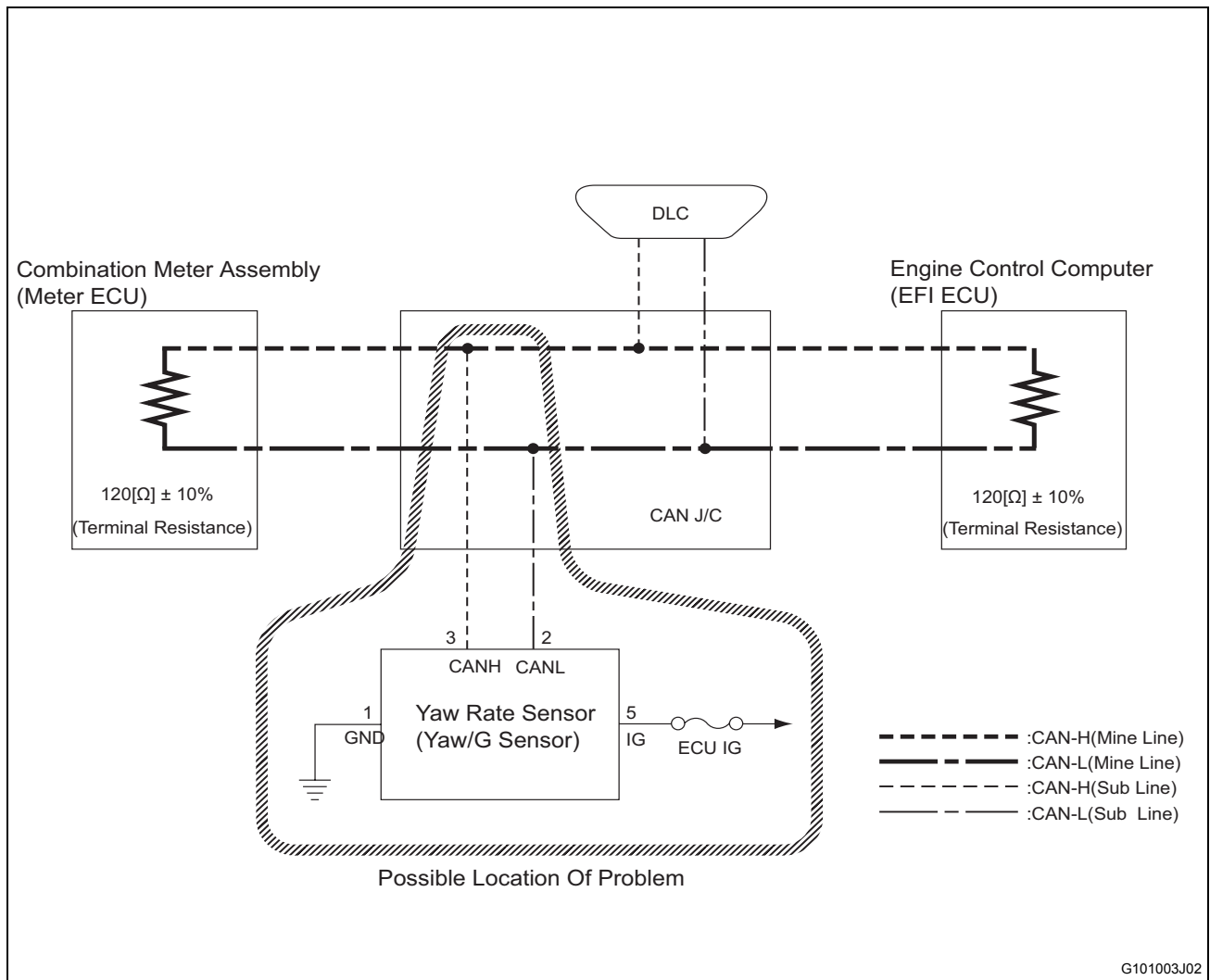
DESCRIPTION

Diagnostic Item	Symptom	Suspected Area
YAW RATE AND G SENSOR COMMUNICATION STOP MODE	- YAW RATE AND G SENSOR is not displayed on the CHECK ECU CONNECTED TO CAN BUS LINE screen of the DS-II - Applicable to YAW RATE AND G SENSOR COMMUNICATION STOP MODE in the DTC combination table	- Power source or internal malfunction in the yaw rate sensor (yaw and G sensor) - Yaw rate sensor (yaw and G sensor) branch line or connector

HINT:

This item applies to vehicles equipped with VSC.

CIRCUIT DIAGRAM



INSPECTION PROCEDURE

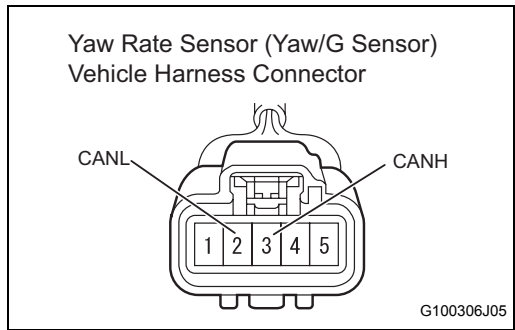
NOTICE:

Before measuring the resistance of the CAN bus, turn the ignition switch off and check that warning functions, such as the key reminder, are not operating. Wait one minute after operating the key and switches or opening and closing the

doors before performing measurement. If a door is required to be opened for inspections of connectors or other items, open the door before starting the inspections.

1

CHECK CAN BUS LINE FOR OPEN (YAW AND G SENSOR BRANCH LINE)



- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor) from the yaw rate sensor (yaw and G sensor).
- (b) Using the tester, measure the resistance between terminals 3 (CANH) and 2(CANL) of the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor).

Standard:
55 to 65Ω

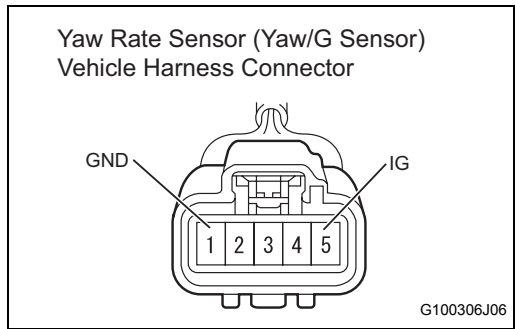
NG

REPAIR OR REPLACE YAW RATE SENSOR (YAW AND G SENSOR) BRANCH LINE OR CONNECTOR (CAN-H, CAN-L)

OK

2

INSPECT WIRE HARNESS (IG VOLTAGE, GND CONTINUITY)



- (a) Using the tester, inspect the resistance between the terminals of the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor) and the body ground.

Standard

Tester Connection	Measurement Condition	Standard
5 (IG) ↔ Body ground	IG ON	10 to 14 V
1 (GND) ↔ Body ground	Always	Continuity

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

CA

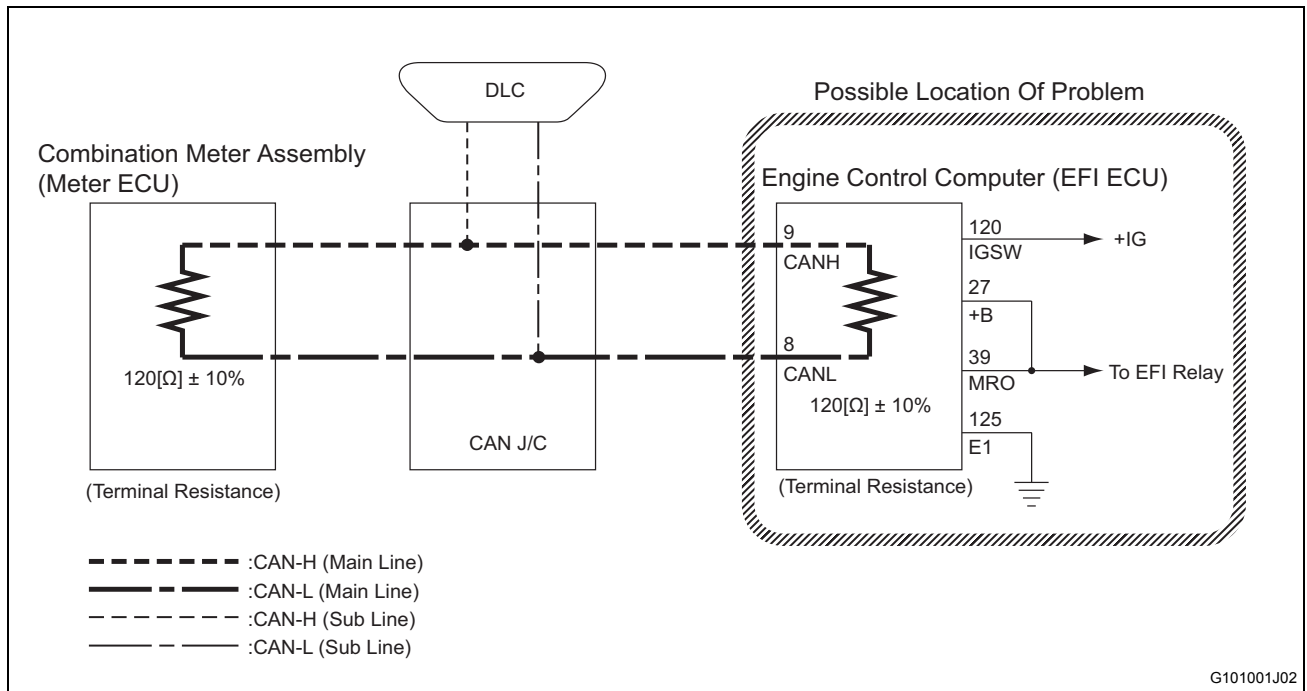
REPLACE YAW RATE SENSOR

EFI ECU COMMUNICATION STOP MODE

DESCRIPTION

Diagnostic Item	Symptom	Suspected Area
EFI ECU COMMUNICATION STOP MODE	- EFI is not displayed on the CHECK ECU CONNECTED TO CAN BUS LINE screen of the DS-II - Applicable to EFI ECU COMMUNICATION STOP MODE in the DTC combination table	- Power source or internal malfunction in the engine control computer (EFI ECU) - Engine control computer (EFI ECU) main line or connector

CIRCUIT DIAGRAM



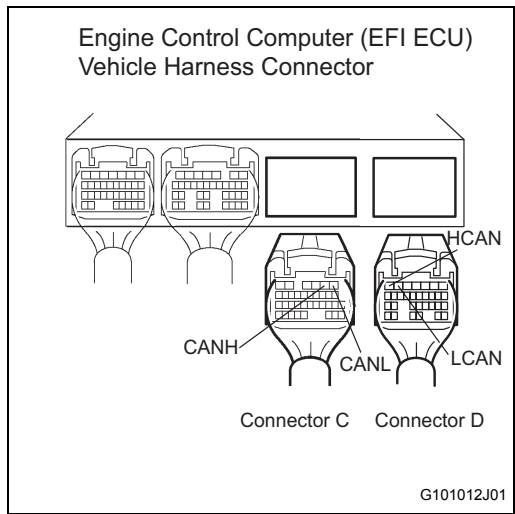
INSPECTION PROCEDURE

NOTICE:

Before measuring the resistance of the CAN bus, turn the ignition switch off and check that warning functions, such as the key reminder, are not operating. Wait one minute after operating the key and switches or opening and closing the doors before performing measurement. If a door is required to be opened for inspections of connectors or other items, open the door before starting the inspections.

1

CHECK CAN BUS LINE FOR OPEN (EFI ECU MAIN LINE)



- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connectors C and D of the engine control computer (EFI ECU) from the engine control computer (EFI ECU).
- (b) Using the tester, measure the resistance between terminals 9 (CANH) and 8 (CANL) of the vehicle side wire harness connector of the engine control computer (EFI ECU).

Standard:

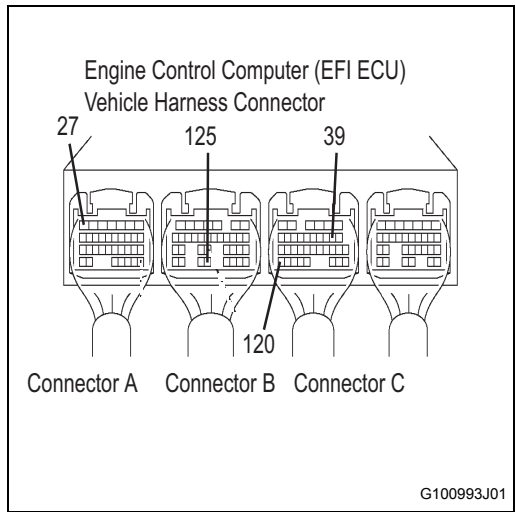
110 to 130 Ω

NG REPAIR OR REPLACE ENGINE CONTROL COMPUTER (EFI ECU) MAIN LINE OR CONNECTOR (CAN-H, CAN-L)

OK

2

INSPECT WIRE HARNESS (IGSW, +B AND MRO VOLTAGE, E1 CONTINUITY)



- (a) Using the tester, inspect the resistance between the terminals of the vehicle side wire harness connector of the engine control computer (EFI ECU) and the body ground.

Standard

Tester Connection	Measurement Condition	Standard
120 (IGSW) ↔ Body ground	IG ON	10 to 14 V
27 (+B) ↔ body ground	IG ON	10 to 14 V
39 (MRO) ↔ Body ground	IG ON	10 to 14 V
125 (E1) ↔ Body ground	Always	Continuity

NG REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

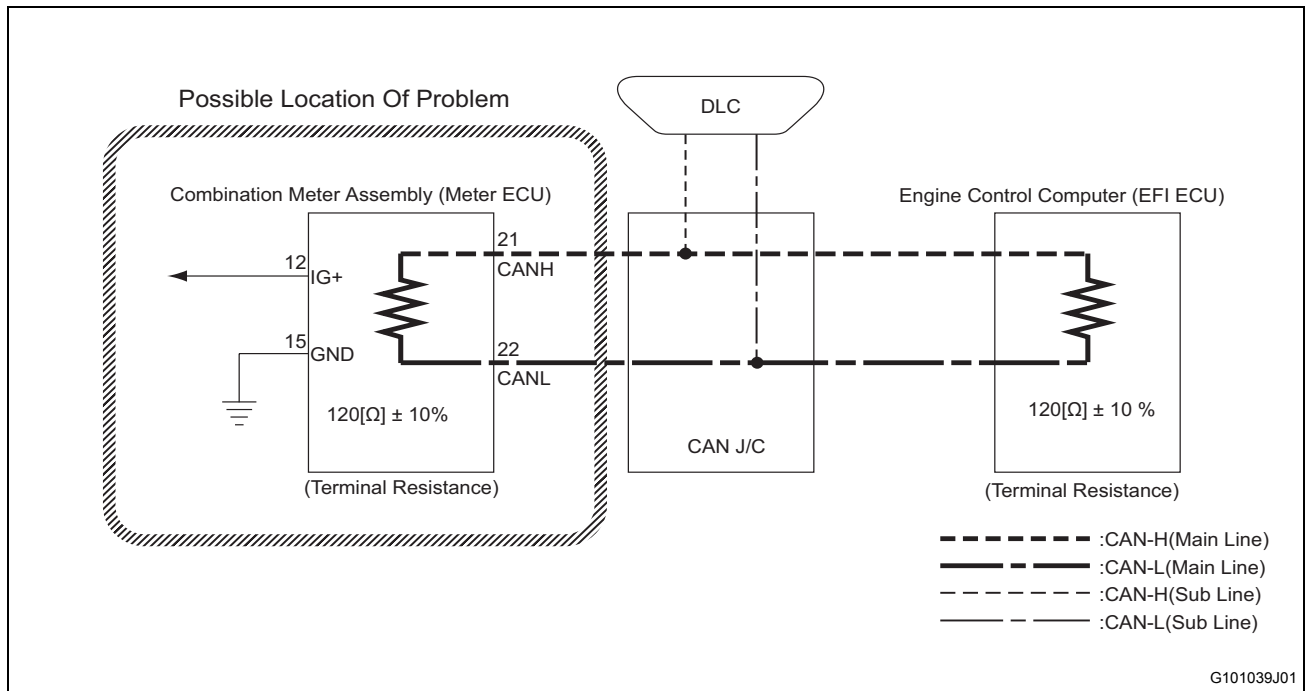
REPLACE ENGINE CONTROL COMPUTER

METER ECU COMMUNICATION STOP MODE

DESCRIPTION

Diagnostic Item	Symptom	Suspected Area
METER ECU COMMUNICATION STOP MODE	METER is not displayed on the CHECK ECU CONNECTED TO CAN BUS LINE screen of the DS-II	- COMBINATION METER ASSEMBLY (METER ECU) POWER SOURCE or INTERNAL MALFUNCTION - COMBINATION METER ASSEMBLY (METER ECU) BRANCH LINE OR CONNECTOR

CIRCUIT DIAGRAM



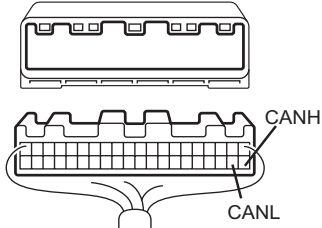
INSPECTION PROCEDURE

NOTICE:

Before measuring the resistance of the CAN bus, turn the ignition switch off and check that warning functions, such as the key reminder, are not operating. Wait one minute after operating the key and switches or opening and closing the doors before performing measurement. During the check, when the door must be opened, open the door in advance and leave it open.

HINT:

- When inspecting each connector, pull the connector case in the connection direction before disconnecting the connector. Check that the connector is not loose and that an opening is not generated.
- When disconnecting the connector, make sure not to damage, deform, corrode or in anyway harm the connector terminal and the connector case.

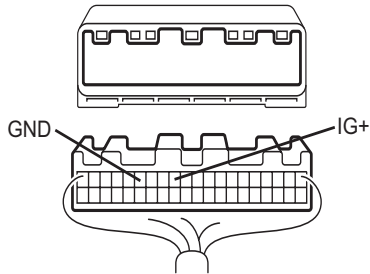
1**CHECK CAN BUS LINE FOR OPEN (METER ECU SUPPORT LINE)**Combination Meter Assembly (Meter ECU)
Vehicle Harness Connector

G100990

- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector of the combination meter assembly (meter ECU) from the combination meter assembly (meter ECU).
- (b) Measure the resistance between terminals 21 (CANH) and 22 (CANL) of the vehicle side wire harness connector of the combination meter assembly (meter ECU).

Standard:**110 to 130****NG**

REPAIR OR REPLACE COMBINATION METER ASSEMBLY (METER ECU) BRANCH LINE OR CONNECTOR

OK**2****INSPECT WIRE HARNESS (IG+ VOLTAGE, GND CONTINUITY)**Combination Meter Assembly (Meter ECU)
Vehicle Harness Connector

G100990J02

- (a) Using the tester, inspect the resistance between the terminals of the vehicle side wire harness connector of the combination meter assembly (meter ECU) and the body ground.

Standard

Tester Connection	Measurement Condition	Standard
12(IG+) ↔ Body ground	When the ignition is ON	10 to 14 V
15 (GND) ↔ Body ground	Always	Continuity

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK**REPLACE COMBINATION METER ASSEMBLY****CA**

**OPEN IN CAN MAIN BUS LINE (DLC BRANCH LINE/MAIN BUS LINE/
TERMINATING RESISTOR)****DESCRIPTION**

If the resistance between terminals 6 (CANH) and 14 (CANL) of the DLC is 70 Ω or more, there may be an open in the CAN main bus line or in the DLC branch line.

Symptom	Suspected Area
The resistance between terminals 6 (CANH) and 14 (CANL) of the DLC is 70 Ω or more.	• Open or connector malfunction (open in the main bus line) in (1), (1'), (2), or (2') • Engine control computer (EFI ECU) malfunction • Combination meter assembly (meter ECU) malfunction • Wire harness connector (CAN J/C) malfunction

CA



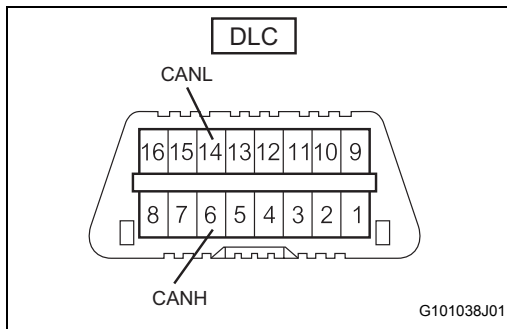
INSPECTION PROCEDURE

NOTICE:

Before measuring the resistance of the CAN bus, turn the ignition switch off and check that warning functions, such as the key reminder, are not operating. Wait one minute after operating the key and switches or opening and closing the doors before performing measurement. If a door is required to be opened for inspections of connectors or other items, open the door before starting the inspections.

1

INSPECT DTC



- (a) Using the tester, measure the resistance between terminals 6 (CANH) and 14 (CANL) of the DLC when the ignition switch is off.

Standard:

A	110 to 130Ω
B	132Ω or more

NOTICE:

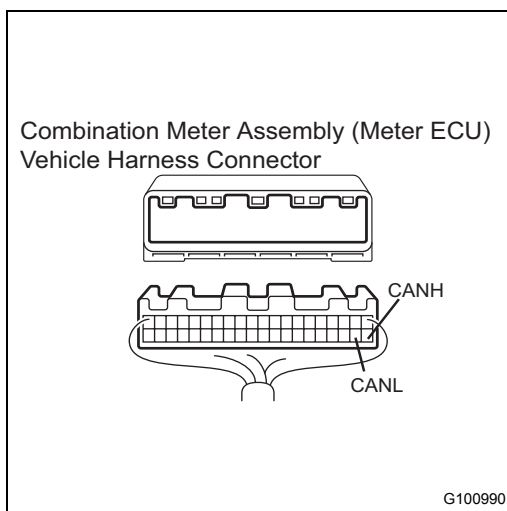
If a CAN communication system DTC is output when the measurement result is 132 Ω or more, there may be another malfunction in addition to an open in the DLC branch line. Troubleshooting should be performed again from HOW TO PROCEED WITH TROUBLESHOOTING (see page CA-5) after repairing the malfunctioning section.

B

REPAIR OR REPLACE DLC BRANCH LINE OR CONNECTOR (CAN-H, CAN-L)

A
2

CHECK CAN BUS LINES FOR OPEN (CAN MAIN BUS LINE (COMBINATION METER ASSEMBLY (METER ECU)))



- (a) Turn the ignition switch off and disconnect the combination meter assembly (meter ECU) connector from the combination meter assembly (meter ECU).
- (b) Using the tester, measure the resistance between terminals 21 (CANH) and 22 (CANL) of the vehicle side wire harness connector of the combination meter assembly (meter ECU).

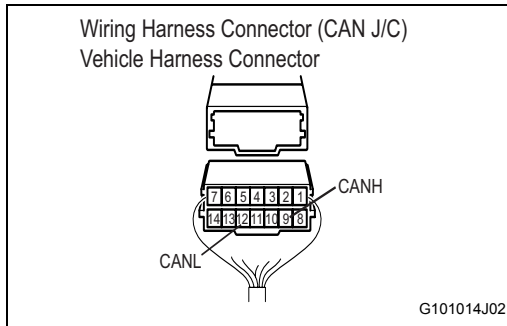
Standard:

110 to 130Ω

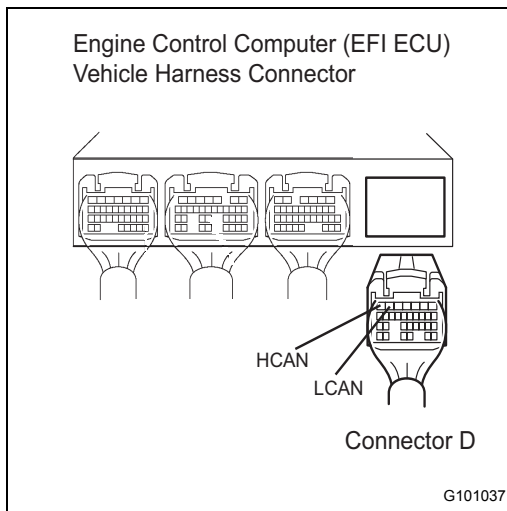
OK

REPLACE COMBINATION METER ASSEMBLY

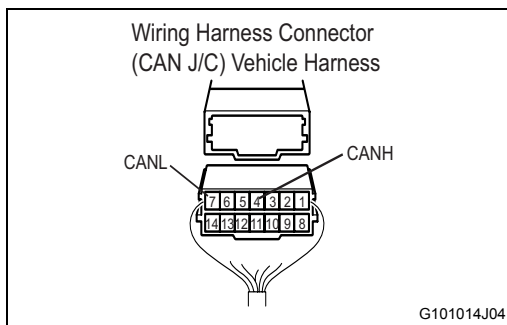
NG
CA

3**CHECK CAN BUS LINES FOR OPEN (CAN MAIN BUS LINE (COMBINATION METER ASSEMBLY (METER ECU) - CAN J/C))**

- Disconnect the CAN main bus line connector of the CAN J/C from the wire harness connector (CAN J/C).
- Using the tester, measure the resistance between terminals 9 (CANH) and 12 (CANL) of the vehicle side wire harness connector of the wire harness connector (CAN J/C).

Standard:**110 to 130 Ω** **OK****REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN-H, CAN-L)****NG****4****CHECK CAN BUS LINES FOR OPEN (CAN MAIN BUS LINE (ENGINE CONTROL COMPUTER (EFI ECU)))**

- Turn the ignition switch off and disconnect connector D of the engine control computer (EFI ECU) from the engine control computer (EFI ECU).
- Using the tester, measure the resistance between terminals 7 (HCAN) and 6 (LCAN) of the vehicle side wire harness connector of the engine control computer (EFI ECU).

Standard:**110 to 130 Ω** **OK****REPLACE ENGINE CONTROL COMPUTER****CA****NG****5****CHECK CAN BUS LINES FOR OPEN (CAN MAIN BUS LINE (ENGINE CONTROL COMPUTER [EFI ECU] - CAN J/C))**

- Disconnect the CAN main bus line connector of the CAN J/C from the wire harness connector (CAN J/C).
- Using the tester, measure the resistance between terminals 4 (CANH) and 7 (CANL) of the vehicle side wire harness connector of the wire harness connector (CAN J/C).

Standard:**110 to 130 Ω** **NG****REPLACE WIRE HARNESS CONNECTOR (CAN J/C)**

A rectangular button with a downward-pointing arrow at the bottom, containing the text "OK".

OK

REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN-H, CAN-L)

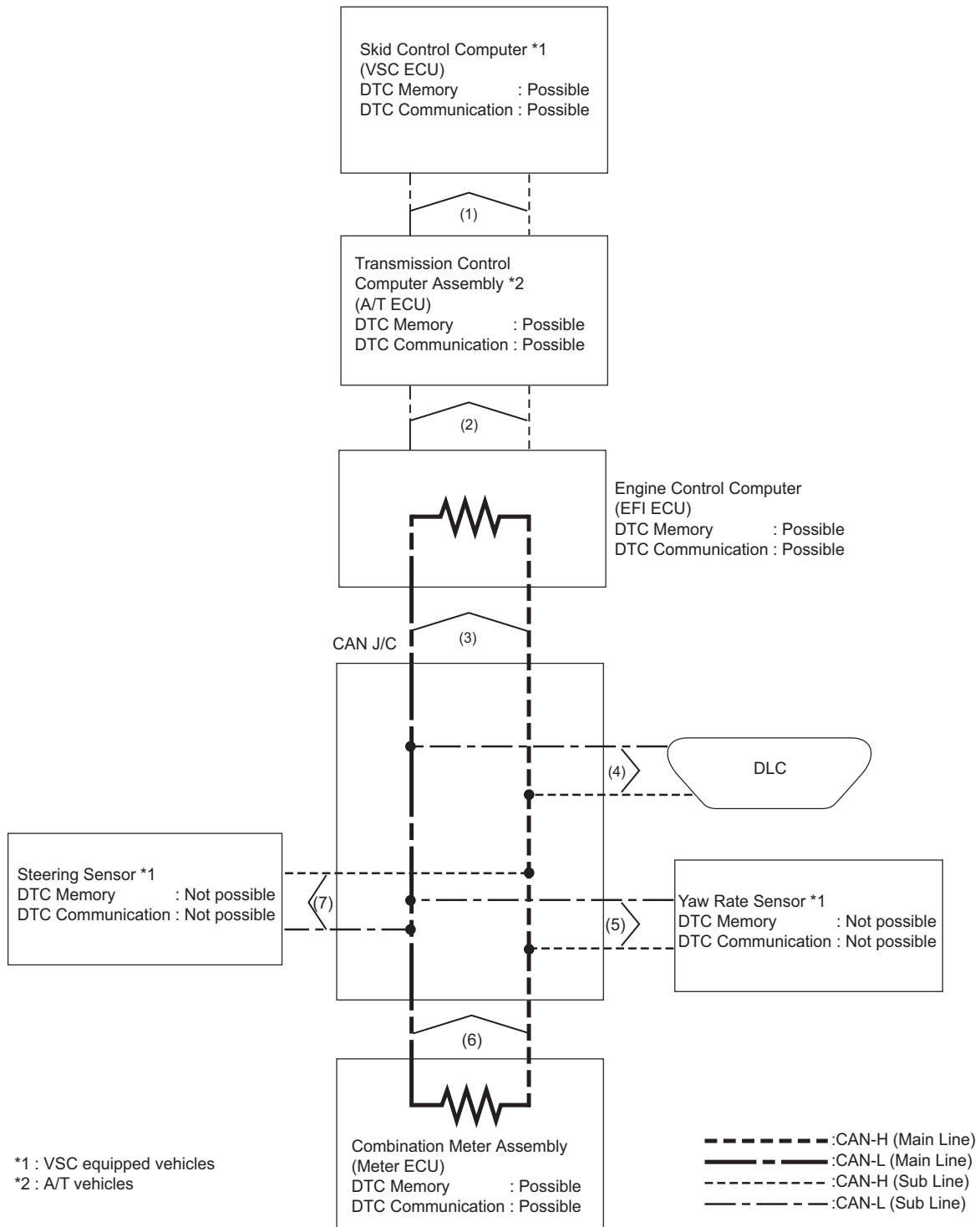
SHORT IN CAN BUS LINES

DESCRIPTION

If the resistance between terminals 6 (CANH) and 14 (CANL) of the DLC is 54 or less, there may be a short in the CAN bus line.

Symptom	Suspected Area
The resistance between terminals 6 (CANH) and 14 (CANL) of the DLC is 54 or less.	• Short circuit among (1), (2), (3), (4), (5), (6) and (7) lines • Engine control computer (EFI ECU) malfunction • Transmission control computer assembly (AT ECU) malfunction • Brake actuator assembly (VSC ECU) malfunction • Steering sensor (steering angle sensor) malfunction • Yaw rate sensor (yaw and G sensor) malfunction • Combination meter assembly (meter ECU) malfunction • Wire harness connector (CAN J/C) malfunction

CIRCUIT DIAGRAM



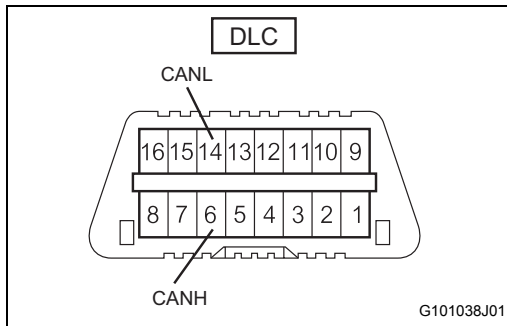
INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and check that warning functions, such as the key reminder, are not operating. Wait one minute after operating the key and switches or opening and closing the doors before performing measurement. If a door is required to be opened for inspections of connectors or other items, open the door before starting the inspections.
- Considering the possibility that there are short circuits in several branch lines, recheck the DLC after repairing malfunctioning areas to see if another malfunction occurs in other areas. If a malfunction is detected, follow the diagnosis flow and continue the inspection.

1

CHECK CAN BUS LINES FOR SHORT CIRCUIT (DLC BRANCH LINE)



- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the wire harness connector (Driver side CAN J/C) from the wire harness connector (Driver side CAN J/C).
- Using the tester, measure the resistance between terminals 6 (CANH) and 14 (CANL) of the DLC.

Standard:

6 kΩ or more

NG

REPAIR OR REPLACE DLC BRANCH LINE OR CONNECTOR (CANH, CANL)

OK

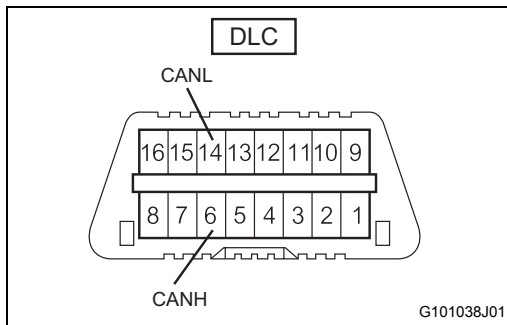
2

CONNECT CONNECTOR

- Connect the DLC branch line connector to the CAN J/C.

3

CHECK CAN BUS LINES FOR SHORT CIRCUIT (METER ECU)



- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the combination meter assembly (meter ECU) from the combination meter assembly (meter ECU).
- Using the tester, measure the resistance between terminals 6 (CANH) and 14 (CANL) of the DLC.

Standard:

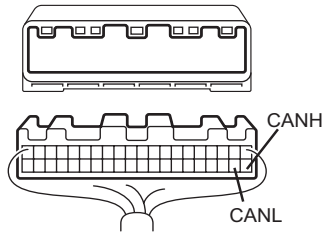
110 to 130 Ω

OK

REPLACE COMBINATION METER ASSEMBLY

NG

CA

4**CHECK CAN BUS LINES FOR SHORT CIRCUIT (CAN J/C - METER ECU)**Combination Meter Assembly (Meter ECU)
Vehicle Harness Connector

- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector of the wire harness connector (CAN J/C) from the wire harness connector (CAN J/C).
- (b) Using the tester, measure the resistance between terminals 21 (CANH) and 22 (CANL) of the vehicle side wire harness connector of the combination meter assembly (meter ECU).

Standard:**6 kΩ or more****HINT:**

Perform this inspection with the vehicle side wire harness connector A of the combination meter assembly (meter ECU) disconnected.

NG

REPAIR OR REPLACE COMBINATION METER ASSEMBLY (METER ECU) MAIN LINE OR CONNECTOR (CANH, CANL)

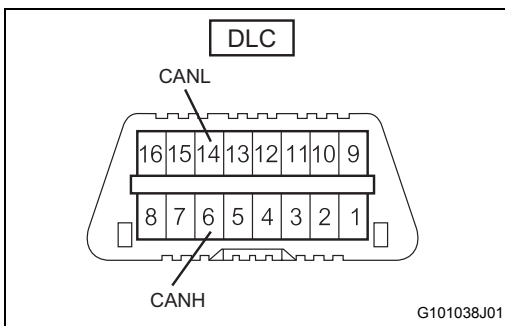
OK**5****CONNECT CONNECTOR**

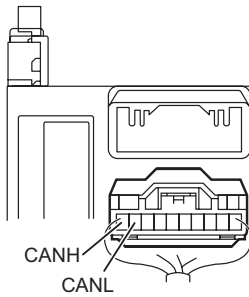
- (a) Connect the vehicle side wire harness connector of the combination meter assembly (meter ECU) and the vehicle side wire harness connector of the wire harness connector (CAN J/C).

6**CHECK CAN BUS LINES FOR SHORT CIRCUIT (STEERING SENSOR)****NOTICE:**

If the vehicle being inspected is not equipped with VSC, go to W/O.

- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector of the steering sensor (steering angle sensor) from the steering sensor (steering angle sensor).
- (b) Using the tester, measure the resistance between terminals 6 (CANH) and 14(CANL) of the DLC.

Standard:**54 to 69 Ω****OK****REPLACE STEERING SENSOR****W/O****GO TO STEP 12****NG****CA**

7**CHECK CAN BUS LINES FOR SHORT CIRCUIT (STEERING SENSOR BRANCH LINE)**Steering Sensor (Steering Angle Sensor)
Vehicle Harness Connector

G100307J04

- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector of the wire harness connector (CAN J/C) from the wire harness connector (CAN J/C).
- (b) Using the tester, measure the resistance between terminals 10 (CANH) and 9 (CANL) of the vehicle side wire harness connector of the steering sensor (steering angle sensor).

Standard:**6 kΩ or more****HINT:**

Perform this inspection with the vehicle side wire harness connector of the steering sensor (steering angle sensor) disconnected.

NG

REPAIR OR REPLACE STEERING SENSOR (STEERING ANGLE SENSOR) BRANCH LINE OR CONNECTOR (CANH, CANL)

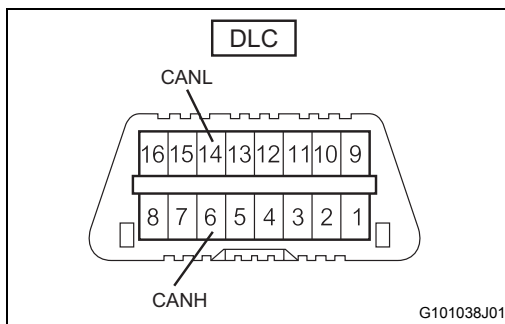
OK**8****CONNECT CONNECTOR**

- (a) Connect the vehicle side wire harness connector of the steering sensor (steering angle sensor) and the vehicle side wire harness connector of the wire harness connector (CAN J/C).

9**CHECK CAN BUS LINES FOR SHORT CIRCUIT (YAW RATE SENSOR)****NOTICE:**

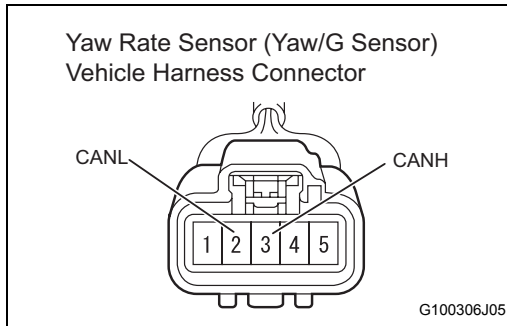
If the vehicle being inspected is not equipped with VSC, go to W/O.

- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor) from the yaw rate sensor (yaw and G sensor).
- (b) Using the tester, measure the resistance between terminals 6 (CANH) and 14(CANL) of the DLC.

Standard:**54 to 69 Ω****OK****REPLACE YAW RATE SENSOR ASSEMBLY****W/O****GO TO STEP 12****CA**

G101038J01

NG

10 CHECK CAN BUS LINES FOR SHORT CIRCUIT (YAW RATE SENSOR BRANCH LINE)

- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector of the wire harness connector (CAN J/C) from the wire harness connector (CAN J/C).
- (b) Using the tester, measure the resistance between terminals 3 (CANH) and 2(CANL) of the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor).

Standard:**6 kΩ or more****HINT:**

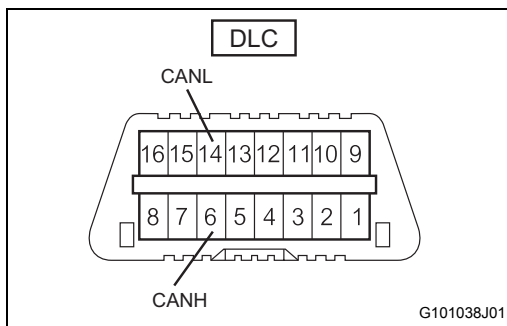
Perform this inspection with the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor) disconnected.

NG

REPAIR OR REPLACE YAW RATE SENSOR (YAW AND G SENSOR) BRANCH LINE OR CONNECTOR (CANH, CANL)

OK**11 CONNECT CONNECTOR**

- (a) Connect the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor) and the vehicle side wire harness connector of the wire harness connector (CAN J/C).

12 CHECK CAN BUS LINES FOR SHORT CIRCUIT (VSC ECU)**NOTICE:**

If the vehicle being inspected is not equipped with VSC, go to W/O.

- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector of the brake actuator assembly (VSC ECU) from the brake actuator assembly (VSC ECU).
- (b) Using the tester, measure the resistance between terminals 6 (CANH) and 14(CANL) of the DLC.

Standard:**55 to 65 Ω****OK**

REPLACE BRAKE ACTUATOR ASSEMBLY

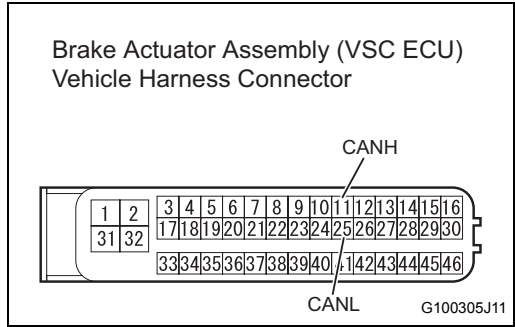
W/O

GO TO STEP 15

NG**CA**

13

CHECK CAN BUS LINES FOR SHORT CIRCUIT (VSC ECU - AT ECU)



- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector B of the transmission control computer assembly (AT ECU) from the transmission control computer assembly (AT ECU).
- (b) Using the tester, measure the resistance between terminals 11 (CANH) and 25 (CANL) of the vehicle side wire harness connector of the brake actuator assembly (VSC ECU).

Standard:

6 kΩ or more

HINT:

Perform this inspection with the vehicle side wire harness connector of the brake actuator assembly (VSC ECU) disconnected.

NG

REPAIR OR REPLACE BRAKE ACTUATOR ASSEMBLY (VSC ECU) MAIN LINE OR CONNECTOR (CANH, CANL)

OK

14

CONNECT CONNECTOR

- (a) Connect the vehicle side wire harness connector of the brake actuator assembly (VSC ECU) and the vehicle side wire harness connector of the transmission control computer assembly (AT ECU).

15

CHECK CAN BUS LINES FOR SHORT CIRCUIT (AT ECU)

NOTICE:

If the vehicle being inspected is equipped with manual transmission, go to W/O.

- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector B of the transmission control computer assembly (AT ECU) from the transmission control computer assembly (AT ECU).
- (b) Using the tester, measure the resistance between terminals 6 (CANH) and 14(CANL) of the DLC.

Standard:

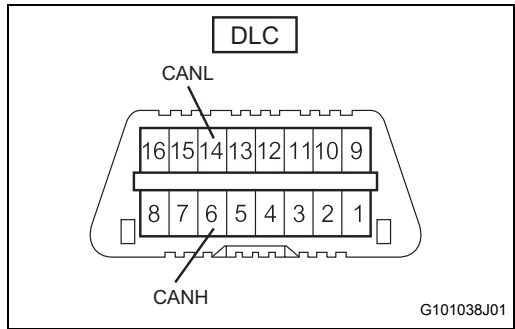
55 to 65 Ω

OK

REPLACE TRANSMISSION CONTROL COMPUTER ASSEMBLY

W/O

GO TO STEP 18

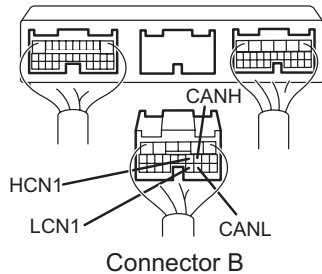


NG

CA

16**CHECK CAN BUS LINES FOR SHORT CIRCUIT (AT ECU - EFI ECU)**

Transmission Control Computer Assembly
(Vehicle Harness Connector)



G100991

OK

- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connectors C of the engine control computer (EFI ECU) from the engine control computer (EFI ECU).
- (b) Using the tester, measure the resistance between terminals B9 (HCN1) and B19 (LCN1) of the vehicle side wire harness connector of the transmission control computer assembly (AT ECU).

Standard:**6 kΩ or more****HINT:**

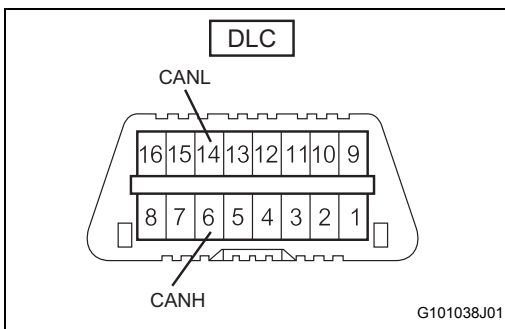
Perform this inspection with the vehicle side wire harness connector of the transmission control computer assembly (AT ECU) disconnected.

NG

**REPAIR OR REPLACE TRANSMISSION
CONTROL COMPUTER ASSEMBLY (AT ECU)
MAIN LINE OR CONNECTOR (CANH, CANL)**

17**CONNECT CONNECTOR**

- (a) Connect the vehicle side wire harness connector D of the transmission control computer assembly (AT ECU) and engine control computer (EFI ECU).

18**CHECK CAN BUS LINES FOR SHORT CIRCUIT (EFI ECU)**

G101038J01

NG

- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connectors C of the engine control computer (EFI ECU) from the engine control computer (EFI ECU).
- (b) Using the tester, measure the resistance between terminals 6 (CANH) and 14 (CANL) of the DLC.

Standard :**110 to 130 Ω****OK**

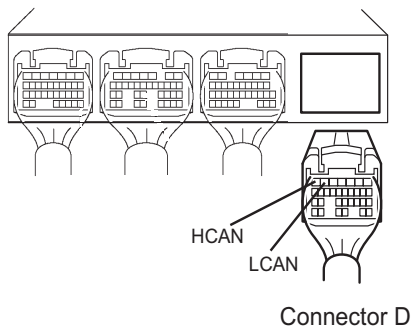
REPLACE ENGINE CONTROL COMPUTER

CA

19

CHECK CAN BUS LINES FOR SHORT CIRCUIT (CAN J/C - EFI ECU)

Engine Control Computer (EFI ECU)
Vehicle Harness Connector



G101037

- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector (CAN J/C) from the wire harness connector (CAN J/C).
- (b) Using the tester, measure the resistance between terminals 7 (HCAN) and 6 (LCAN) of the vehicle side wire harness connector of the engine control computer (EFI ECU).

Standard:

6 kΩ or more

HINT:

Perform this inspection with the vehicle side wire harness connector D of the engine control computer (EFI ECU) disconnected.

NG

**REPAIR OR REPLACE ENGINE CONTROL
COMPUTER (EFI ECU) MAIN LINE OR
CONNECTOR (CANH, CANL)**

OK

REPLACE WIRE HARNESS CONNECTOR

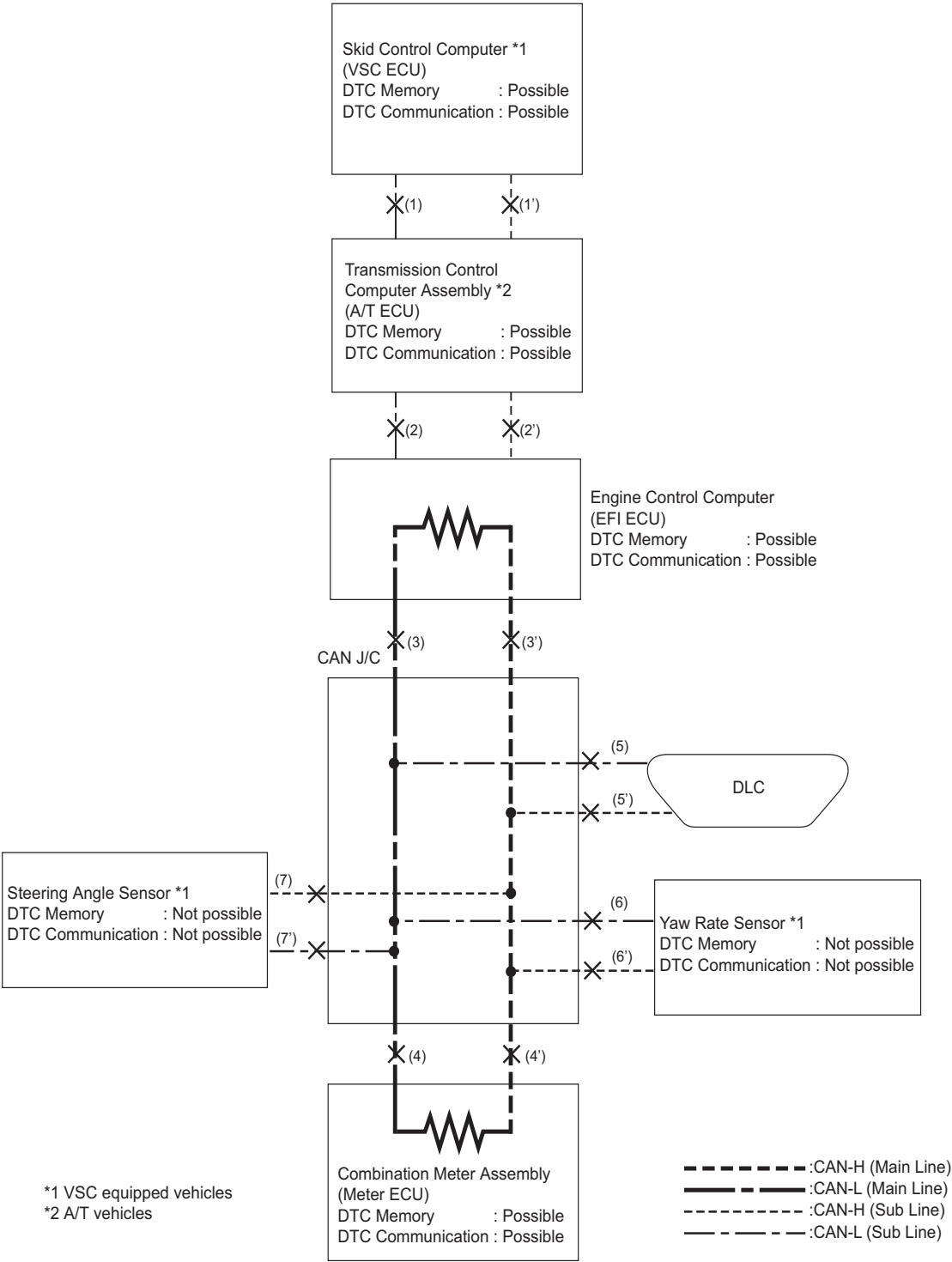
SHORT TO +B IN CAN BUS LINE**DESCRIPTION**

If there is continuity between terminals 6 (CANH), 14 (CANL) and 16 (BAT) of the DLC, there may be a short to +B in the CAN bus line.

Symptom	Suspected Area
There is continuity between terminals 6 (CANH), 14 (CANL) and 16 (BAT) of the DLC.	• Short to +B in (1), (1'), (2), (2'), (3), (3'), (4), (4'), (5), (5'), (6), (6'), (7), (7') • Engine control computer (EFI ECU) malfunction • Transmission control computer assembly (AT ECU) malfunction • Brake actuator assembly (VSC ECU) malfunction • Steering sensor (steering angle sensor) malfunction • Yaw rate sensor (yaw and G sensor) malfunction • Combination meter assembly (meter ECU) malfunction

CIRCUIT DIAGRAM

CA

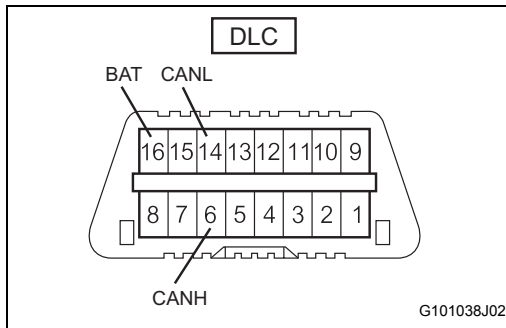


INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and check that warning functions, such as the key reminder, are not operating. Wait one minute after operating the key and switches or opening and closing the doors before performing measurement. If a door is required to be opened for inspections of connectors or other items, open the door before starting the inspections.
- Considering the possibility that there are short circuits in several branch lines, recheck the DLC after repairing malfunctioning areas to see if another malfunction occurs in other areas. If a malfunction is detected, follow the diagnosis flow and continue the inspection.

1 CHECK CAN BUS LINES FOR SHORT TO +B (DLC BRANCH LINE)



- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the wire harness connector (CAN J/C) from the wire harness connector (CAN J/C).
- Using the tester, measure the resistance between the DLC connector terminals.

Standard

Tester Connection	Measurement Condition	Standard
6 (CANH) ↔ 16 (BAT)	IG OFF	6 kΩ or more
14 (CANL) ↔ 16 (BAT)	IG OFF	6 kΩ or more

NG

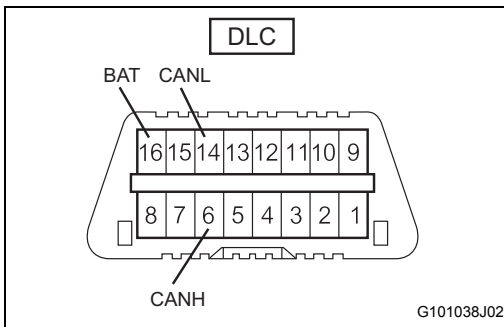
REPAIR OR REPLACE DLC BRANCH LINE OR CONNECTOR (CANH, CANL)

OK

2 CONNECT CONNECTOR

- Connect the vehicle side wire harness connector of the wire harness connector (CAN J/C) to the wire harness connector (CAN J/C).

3 CHECK CAN BUS LINES FOR SHORT TO +B (METER ECU)



- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the combination meter assembly (meter ECU) from the combination meter assembly (meter ECU).
- Using the tester, measure the resistance between the DLC connector terminals.

Standard

Tester Connection	Measurement Condition	Standard
6 (CANH) ↔ 16 (BAT)	IG OFF	6 kΩ or more
14 (CANL) ↔ 16 (BAT)	IG OFF	6 kΩ or more

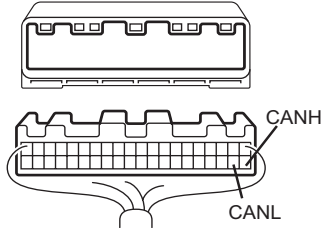
OK

REPLACE COMBINATION METER ASSEMBLY

CA

NG

4

CHECK CAN BUS LINES FOR SHORT TO +B (METER ECU MAIN LINE)Combination Meter Assembly (Meter ECU)
Vehicle Harness Connector

- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the wire harness connector (CAN J/C) from the wire harness connector (CAN J/C).
- Using the tester, measure the resistance between the terminals of the vehicle side wire harness connector of the combination meter assembly (meter ECU) and the terminal of the DLC.

Standard

Tester Connection ECU side ↔ DLC side	Measurement Condition	Standard
21 (CANH) ↔ 16 (BAT)	IG OFF	6 kΩ or more
22 (CANL) ↔ 16 (BAT)	IG OFF	6 kΩ or more

HINT:

Perform this inspection with the vehicle side wire harness connector of the combination meter assembly (meter ECU) disconnected.

NG

REPAIR OR REPLACE COMBINATION METER ASSEMBLY (METER ECU) MAIN LINE OR CONNECTOR (CANH, CANL)

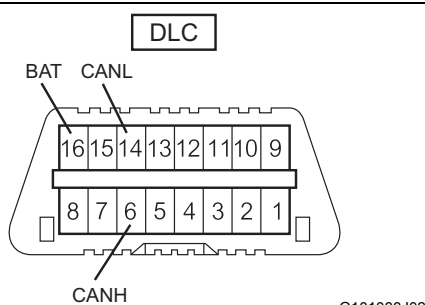
OK

5

CONNECT CONNECTOR

- Connect the vehicle side wire harness connector of the wire harness connector (CAN J/C) and the vehicle side wire harness connector of the combination meter assembly (meter ECU).

6

CHECK CAN BUS LINES FOR SHORT TO +B (YAW AND G SENSOR)**NOTICE:**

If the vehicle being inspected is not equipped with VSC, go to W/O.

- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor) from the yaw rate sensor (yaw and G sensor).
- Using the tester, measure the resistance between the DLC connector terminals.

Standard

Tester Connection	Measurement Condition	Standard
6 (CANH) ↔ 16 (E)	IG OFF	6 kΩ or more
14 (CANL) ↔ 16 (BAT)	IG OFF	6 kΩ or more

W/O

GO TO STEP 12

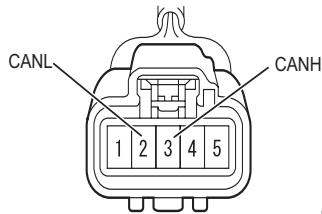
OK

REPLACE YAW RATE SENSOR ASSEMBLY

NG

7

CHECK CAN BUS LINES FOR SHORT TO +B (YAW AND G SENSOR BRANCH LINE)

Yaw Rate Sensor (Yaw/G Sensor)
Vehicle Harness Connector

- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the wire harness connector (CAN J/C) from the wire harness connector (CAN J/C).
- Using the tester, measure the resistance between the terminals of the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor) and the terminal of the DLC.

Standard

Tester Connection ECU side ↔ DLC side	Measurement Condition	Standard
3 (CANH) ↔ 16 (E)	IG OFF	6 kΩ or more
2 (CANL) ↔ 16 (BAT)	IG OFF	6 kΩ or more

HINT:

Perform this inspection with the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor) disconnected.

NG

REPAIR OR REPLACE YAW RATE SENSOR
(YAW AND G SENSOR) BRANCH LINE OR
CONNECTOR (CANH, CANL)

OK

8

CONNECT CONNECTOR

- Connect the vehicle side wire harness connector of the wire harness connector (CAN J/C) and the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor).

9

CHECK CAN BUS LINES FOR SHORT TO +B (STEERING ANGLE SENSOR)

CA

NOTICE:

If the vehicle being inspected is not equipped with VSC, go to W/O.

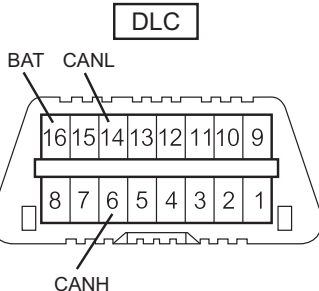
- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the steering sensor (steering angle sensor) from the steering sensor (steering angle sensor).
- Using the tester, measure the resistance between the DLC connector terminals.

Standard

Tester Connection	Measurement Condition	Standard
6 (CANH) ↔ 16 (BAT)	IG OFF	6 kΩ or more
14 (CANL) ↔ 16 (BAT)	IG OFF	6 kΩ or more

W/O

GO TO STEP 12



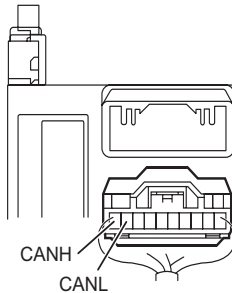
OK

REPLACE STEERING SENSOR

NG

10

CHECK CAN BUS LINES FOR SHORT TO +B (STEERING ANGLE SENSOR BRANCH LINE)

Steering Sensor (Steering Angle Sensor)
Vehicle Harness Connector

G100307J03

- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the wire harness connector (CAN J/C) from the wire harness connector (CAN J/C).
- Using the tester, measure the resistance between the terminals of the vehicle side wire harness connector of the steering sensor (steering angle sensor) and the terminal of the DLC.

Standard

Tester Connection ECU side ↔ DLC side	Measurement Condition	Standard
10 (CANH) ↔ 16 (BAT)	IG OFF	6 kΩ or more
9 (CANL) ↔ 16 (BAT)	IG OFF	6 kΩ or more

HINT:

Perform this inspection with the vehicle side wire harness connector of the steering sensor (steering angle sensor) disconnected.

NG

REPAIR OR REPLACE STEERING SENSOR
(STEERING ANGLE SENSOR) BRANCH LINE
OR CONNECTOR (CANH, CANL)

OK

11

CONNECT CONNECTOR

- Connect the vehicle side wire harness connector of the wire harness connector (CAN J/C) and the vehicle side wire harness connector of the steering sensor (steering angle sensor).

CA

12

CHECK CAN BUS LINES FOR SHORT TO +B (VSC ECU)

NOTICE:

If the vehicle being inspected is not equipped with VSC, go to W/O.

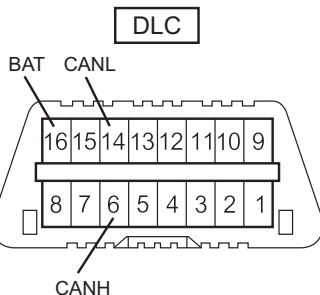
- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the brake actuator assembly (VSC ECU) from the brake actuator assembly (VSC ECU).
- Using the tester, measure the resistance between the DLC connector terminals.

Standard

Tester Connection	Measurement Condition	Standard
6 (CANH) ↔ 16 (BAT)	IG OFF	6 kΩ or more
14 (CANL) ↔ 16 (BAT)	IG OFF	6 kΩ or more

W/O

GO TO STEP 15



G101038J02

OK

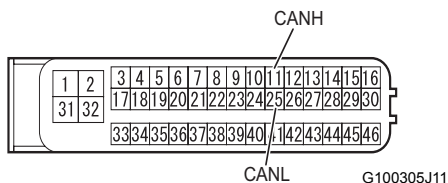
REPLACE BRAKE ACTUATOR ASSEMBLY

NG

13

CHECK CAN BUS LINES FOR SHORT TO +B (VSC ECU - AT ECU)

Brake Actuator Assembly (VSC ECU)
Vehicle Harness Connector



- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the transmission control computer assembly (AT ECU) from the transmission control computer assembly (AT ECU).
- Using the tester, measure the resistance between the terminals of the vehicle side wire harness connector of the brake actuator assembly (VSC ECU) and the terminal of the DLC.

Standard

Tester Connection ECU side ↔ DLC side	Measurement Condition	Standard
11 (CANH) ↔ 16 (BAT)	IG OFF	6 kΩ or more
25 (CANL) ↔ 16 (BAT)	IG OFF	6 kΩ or more

HINT:

Perform this inspection with the vehicle side wire harness connector of the brake actuator assembly (VSC ECU) disconnected.

NG

REPAIR OR REPLACE BRAKE ACTUATOR
ASSEMBLY (VSC ECU) MAIN LINE OR
CONNECTOR (CANH, CANL)

OK

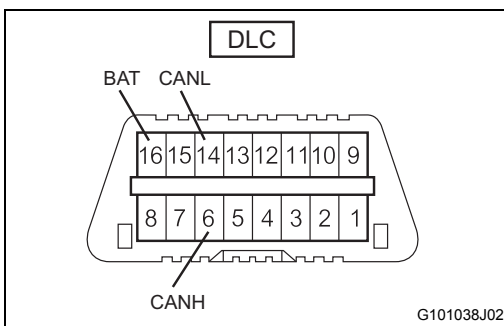
14

CONNECT CONNECTOR

- Connect the vehicle side wire harness connector of the brake actuator assembly (VSC ECU) and the vehicle side wire harness connector of the transmission control computer assembly (AT ECU).

15

CHECK CAN BUS LINES FOR SHORT TO +B (AT ECU)



NOTICE:

If the vehicle being inspected is equipped with manual transmission, go to W/O.

- Turn the ignition switch off and disconnect the vehicle side wire harness connector B of the transmission control computer assembly (AT ECU) from the transmission control computer assembly (AT ECU).
- Using the tester, measure the resistance between the DLC connector terminals.

Standard

Tester Connection	Measurement Condition	Standard
6 (CANH) ↔ 16 (BAT)	IG OFF	6 kΩ or more

CA

Tester Connection	Measurement Condition	Standard
14 (CANL) ↔ 16 (BAT)	IG OFF	6 kΩ or more

W/O

GO TO STEP 18

NG

REPLACE TRANSMISSION CONTROL COMPUTER ASSEMBLY

OK

16**CHECK CAN BUS LINES FOR SHORT TO +B (AT ECU - EFI ECU)**

- Turn the ignition switch off and disconnect the vehicle side wire harness connectors C of the engine control computer (EFI ECU) from the engine control computer (EFI ECU).
- Using the tester, measure the resistance between the terminals of the vehicle side wire harness connector of the transmission control computer assembly (AT ECU) and the terminal of the DLC.

Standard

Tester Connection ECU side ↔ DLC side	Measurement Condition	Standard
B10 (HCN1) ↔ 16 (BAT)	IG OFF	6 kΩ or more
B20 (LCN1) ↔ 16 (BAT)	IG OFF	6 kΩ or more

HINT:

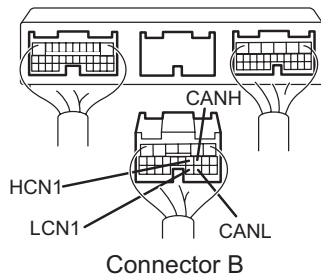
Perform this inspection with the vehicle side wire harness connector B of the transmission control computer assembly (AT ECU) disconnected.

NG

REPAIR OR REPLACE TRANSMISSION CONTROL COMPUTER ASSEMBLY (AT ECU) MAIN LINE OR CONNECTOR (CANH, CANL)

OK

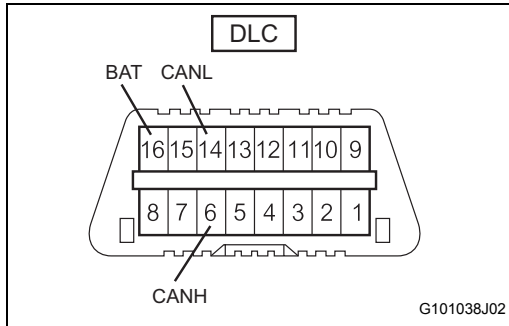
Transmission Control Computer Assembly
(Vehicle Harness Connector)



G100991

CA**17****CONNECT CONNECTOR**

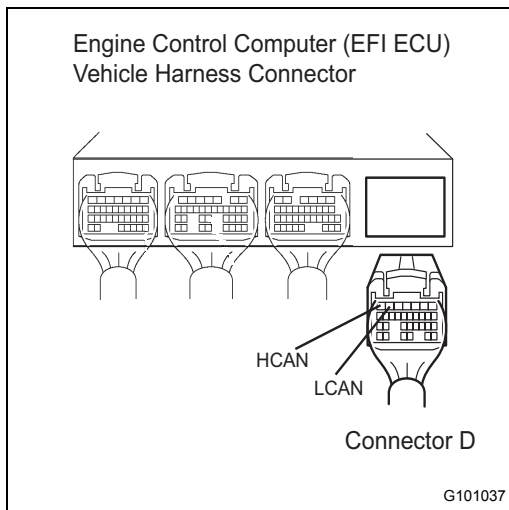
- Connect the vehicle side wire harness connector of the transmission control computer assembly (AT ECU) and the vehicle side wire harness connector D of the engine control computer (EFI ECU).

18 CHECK CAN BUS LINES FOR SHORT TO +B (EFI ECU)

- Turn the ignition switch off and disconnect the vehicle side wire harness connectors C of the engine control computer (EFI ECU) from the engine control computer (EFI ECU).
- Using the tester, measure the resistance between the DLC connector terminals.

Standard

Tester Connection	Measurement Condition	Standard
6 (CANH) ↔ 16 (BAT)	IG OFF	6 kΩ or more
14 (CANL) ↔ 16 (BAT)	IG OFF	6 kΩ or more

OK**REPLACE ENGINE CONTROL COMPUTER****NG****19 CHECK CAN BUS LINES FOR SHORT TO +B (CAN J/C - EFI ECU)**

- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the wire harness connector (CAN J/C) from the wire harness connector (CAN J/C).
- Using the tester, measure the resistance between the terminals of the vehicle side wire harness connector of the engine control computer (EFI ECU) and the terminal of the DLC.

Standard

Tester Connection ECU side ↔ DLC side	Measurement Condition	Standard
7 (HCAN) ↔ 16 (BAT)	IG OFF	6 kΩ or more
6 (LCAN) ↔ 16 (BAT)	IG OFF	6 kΩ or more

HINT:

Perform this inspection with the vehicle side wire harness connector D of the engine control computer (EFI ECU) disconnected.

NG**REPAIR OR REPLACE ENGINE CONTROL COMPUTER (EFI ECU) MAIN LINE OR CONNECTOR (CANH, CANL)****CA****OK****REPLACE WIRE HARNESS CONNECTOR**

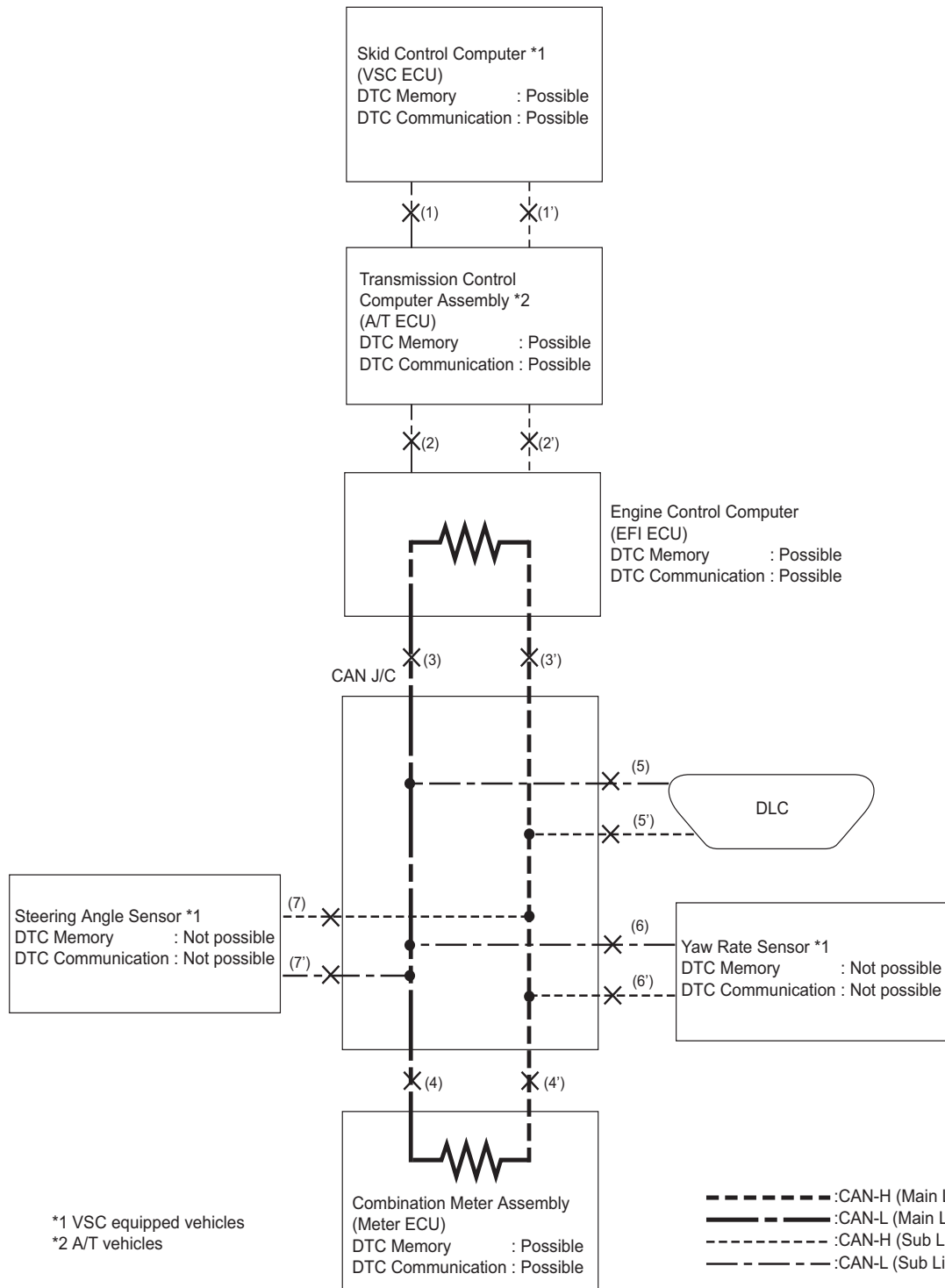
SHORT TO GND IN CAN BUS LINE

DESCRIPTION

If there is continuity between terminals 4 (E), and 6 (CANH), 14 (CANL) of the DLC, there may be a short to GND in the CAN bus line.

Symptom	Suspected Area
There is continuity between terminals 4 (E), and 6 (CANH), 14 (CANL) of the DLC.	• Short to GND in (1), (1'), (2), (2'), (3), (3'), (4), (4'), (5), (5'), (6), (6'), (7), (7') • Engine control computer (EFI ECU) malfunction • Transmission control computer assembly (AT ECU) malfunction • Brake actuator assembly (VSC ECU) malfunction • Steering sensor (steering angle sensor) malfunction • Yaw rate sensor (yaw and G sensor) malfunction • Combination meter assembly (meter ECU) malfunction

CIRCUIT DIAGRAM



CA

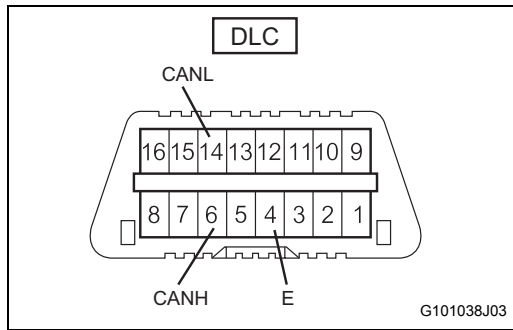
INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and check that warning functions, such as the key reminder, are not operating. Wait one minute after operating the key and switches or opening and closing the doors before performing measurement. If a door is required to be opened for inspections of connectors or other items, open the door before starting the inspections.
- Considering the possibility that there are short circuits in several branch lines, recheck the DLC after repairing malfunctioning areas to see if another malfunction occurs in other areas. If a malfunction is detected, follow the diagnosis flow and continue the inspection.

1

CHECK CAN BUS LINES FOR SHORT TO GND (DLC BRANCH LINE)



- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector of the wire harness connector (CAN J/C) from the wire harness connector (CAN J/C).
- (b) Using the tester, measure the resistance between the DLC connector terminals.

Standard

Tester Connection	Measurement Condition	Standard
4 (E) ↔ 6 (CANH)	IG OFF	200Ω or more
4 (E) ↔ 14 (CANL)	IG OFF	200Ω or more

NG

REPAIR OR REPLACE DLC BRANCH LINE OR CONNECTOR (CANH, CANL)

OK

2

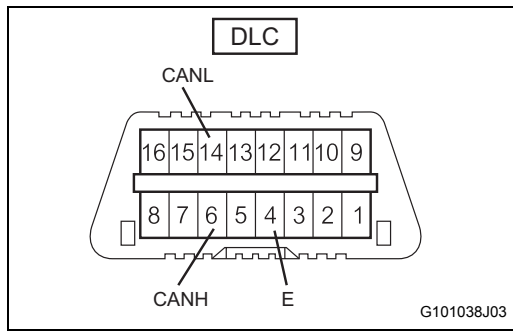
CONNECT CONNECTOR

- (a) Connect the vehicle side wire harness connector of the wire harness connector (CAN J/C) to the wire harness connector (CAN J/C).

CA

3

CHECK CAN BUS LINES FOR SHORT TO GND (METER ECU)



- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector of the combination meter assembly (meter ECU) from the combination meter assembly (meter ECU).
- (b) Using the tester, measure the resistance between the DLC connector terminals.

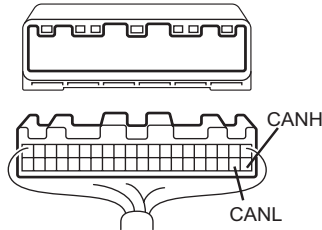
Standard

Tester Connection	Measurement Condition	Standard
4 (E) ↔ 6 (CANH)	IG OFF	200Ω or more
4 (E) ↔ 14 (CANL)	IG OFF	200Ω or more

OK

REPLACE COMBINATION METER ASSEMBLY

NG

4 CHECK CAN BUS LINES FOR SHORT TO GND (METER ECU MAIN LINE)Combination Meter Assembly (Meter ECU)
Vehicle Harness Connector

G100990

- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the wire harness connector (CAN J/C) from the wire harness connector (CAN J/C).
- Using the tester, measure the resistance between the terminals of the vehicle side wire harness connector of the combination meter assembly (meter ECU) and the body ground.

Standard

Tester Connection	Measurement Condition	Standard
21 (CANH) ↔ Body ground	IG OFF	200Ω or more
22 (CANL) ↔ Body ground	IG OFF	200Ω or more

HINT:

Perform this inspection with the vehicle side wire harness connector of the combination meter assembly (meter ECU) disconnected.

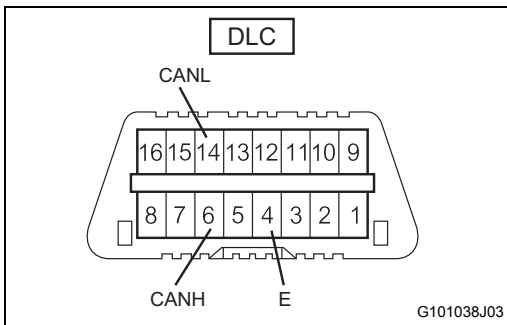
NG

REPAIR OR REPLACE COMBINATION METER ASSEMBLY (METER ECU) MAIN LINE OR CONNECTOR (CANH, CANL)

OK

5 CONNECT CONNECTOR

- Connect the vehicle side wire harness connector of the combination meter assembly (meter ECU) and the vehicle side wire harness connector of the wire harness connector (CAN J/C).

6**CHECK CAN BUS LINES FOR SHORT TO GND (YAW AND G SENSOR)**

G101038J03

NOTICE:

If the vehicle being inspected is not equipped with VSC, go to W/O.

- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor) from the yaw rate sensor (yaw and G sensor).
- Using the tester, measure the resistance between the DLC connector terminals.

Standard

Tester Connection	Measurement Condition	Standard
4 (E) ↔ 6 (CANH)	IG OFF	200Ω or more
4 (E) ↔ 14 (CANL)	IG OFF	200Ω or more

W/O

GO TO STEP 12

OK

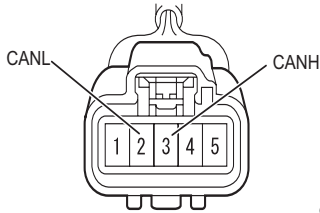
REPLACE YAW RATE SENSOR ASSEMBLY

CA

NG

7

CHECK CAN BUS LINES FOR SHORT TO GND (YAW AND G SENSOR BRANCH LINE)

Yaw Rate Sensor (Yaw/G Sensor)
Vehicle Harness Connector

- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the wire harness connector (CAN J/C) from the wire harness connector (CAN J/C).
- Using the tester, measure the resistance between the terminals of the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor) and the body ground.

Standard

Tester Connection	Measurement Condition	Standard
3 (CANH) ↔ Body ground	IG OFF	200Ω or more
2 (CANL) ↔ Body ground	IG OFF	200Ω or more

HINT:

Perform this inspection with the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor) disconnected.

NG

REPAIR OR REPLACE YAW RATE SENSOR (YAW AND G SENSOR) BRANCH LINE OR CONNECTOR (CANH, CANL)

OK

8

CONNECT CONNECTOR

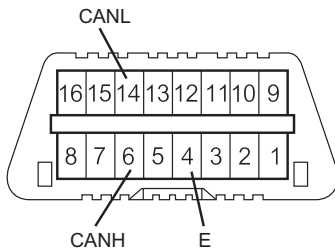
- Connect the vehicle side wire harness connector of the wire harness connector (CAN J/C) and the vehicle side wire harness connector of the yaw rate sensor (yaw and G sensor).

9

CHECK CAN BUS LINES FOR SHORT TO GND (STEERING ANGLE SENSOR)

CA

DLC



NOTICE:

If the vehicle being inspected is not equipped with VSC, go to W/O.

- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the steering sensor (steering angle sensor) from the steering sensor (steering angle sensor).
- Using the tester, measure the resistance between the DLC connector terminals.

Standard

Tester Connection	Measurement Condition	Standard
4 (E) ↔ 6 (CANH)	IG OFF	200Ω or more
4 (E) ↔ 14 (CANL)	IG OFF	200Ω or more

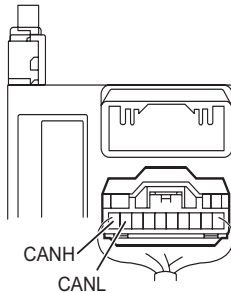
W/O

GO TO STEP 12

OK

REPLACE STEERING SENSOR

NG

10 CHECK CAN BUS LINES FOR SHORT TO GND (STEERING ANGLE SENSOR BRANCH LINE)Steering Sensor (Steering Angle Sensor)
Vehicle Harness Connector

G100307J04

- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the wire harness connector (CAN J/C) from the wire harness connector (CAN J/C).
- Using the tester, measure the resistance between the terminals of the vehicle side wire harness connector of the steering sensor (steering angle sensor) and the body ground.

Standard

Tester Connection	Measurement Condition	Standard
10 (CANH) ↔ Body ground	IG OFF	200Ω or more
9 (CANL) ↔ Body ground	IG OFF	200Ω or more

HINT:

Perform this inspection with the vehicle side wire harness connector of the steering sensor (steering angle sensor) disconnected.

NG

**REPAIR OR REPLACE STEERING SENSOR
(STEERING ANGLE SENSOR) BRANCH LINE
OR CONNECTOR (CANH, CANL)**

OK

11 CONNECT CONNECTOR

- Connect the vehicle side wire harness connector of the wire harness connector (CAN J/C) and the vehicle side wire harness connector of the steering sensor (steering angle sensor).

12 CHECK CAN BUS LINES FOR SHORT TO GND (VSC ECU)

CA

NOTICE:

If the vehicle being inspected is not equipped with VSC, go to W/O.

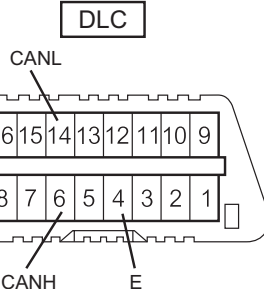
- Turn the ignition switch off and disconnect the vehicle side wire harness connector of the brake actuator assembly (VSC ECU) from the brake actuator assembly (VSC ECU).
- Using the tester, measure the resistance between the DLC connector terminals.

Standard

Tester Connection	Measurement Condition	Standard
4 (E) ↔ 6 (CANH)	IG OFF	200Ω or more
4 (E) ↔ 14 (CANL)	IG OFF	200Ω or more

W/O

GO TO STEP 15



G101038J03

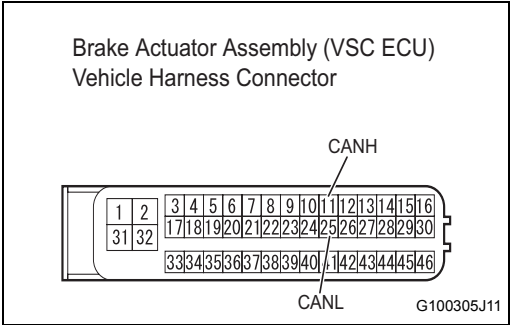
OK

REPLACE BRAKE ACTUATOR ASSEMBLY

NG

13

CHECK CAN BUS LINES FOR SHORT TO GND (VSC ECU - AT ECU)



- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector of the transmission control computer assembly (AT ECU) from the transmission control computer assembly (AT ECU).
- (b) Using the tester, measure the resistance between the terminals of the vehicle side wire harness connector of the brake actuator assembly (VSC ECU) and the terminal of the DLC.

Standard

Tester Connection	Measurement Condition	Standard
11 (CANH) ↔ Body ground	IG OFF	200Ω or more
25 (CANL) ↔ Body ground	IG OFF	200Ω or more

HINT:
Perform this inspection with the vehicle side wire harness connector of the brake actuator assembly (VSC ECU) disconnected.

NG

REPAIR OR REPLACE BRAKE ACTUATOR ASSEMBLY (VSC ECU) MAIN LINE OR CONNECTOR (CANH, CANL)

OK

14

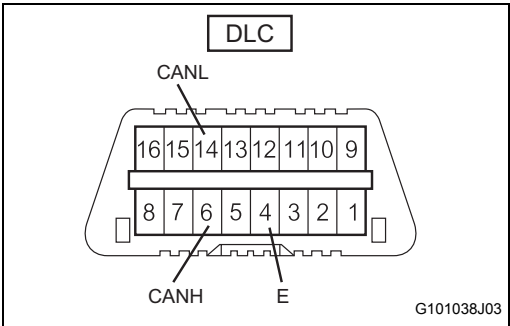
CONNECT CONNECTOR

- (a) Connect the vehicle side wire harness connector of the brake actuator assembly (VSC ECU) and the vehicle side wire harness connector of the transmission control computer assembly (AT ECU).

CA

15

CHECK CAN BUS LINES FOR SHORT TO GND (AT ECU)



NOTICE:
If the vehicle being inspected is equipped with manual transmission, go to W/O.

- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector B of the transmission control computer assembly (AT ECU) from the transmission control computer assembly (AT ECU).
- (b) Using the tester, measure the resistance between the DLC connector terminals.

Standard

Tester Connection	Measurement Condition	Standard
4 (E) ↔ 6 (CANH)	IG OFF	200Ω or more

Tester Connection	Measurement Condition	Standard
4 (E) ↔ 14 (CANL)	IG OFF	200Ω or more

W/O

GO TO STEP 18

OK

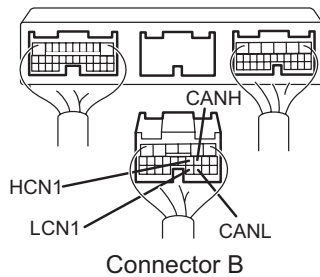
REPLACE TRANSMISSION CONTROL COMPUTER ASSEMBLY

NG

16

CHECK CAN BUS LINES FOR SHORT TO GND (AT ECU - EFI ECU)

Transmission Control Computer Assembly
(Vehicle Harness Connector)



G100991

- Turn the ignition switch off and disconnect the vehicle side wire harness connectors D of the engine control computer (EFI ECU) from the engine control computer (EFI ECU).
- Using the tester, measure the resistance between the terminals of the vehicle side wire harness connector of the transmission control computer assembly (AT ECU) and the terminal of the DLC.

Standard

Tester Connection	Measurement Condition	Standard
B10 (HCN1) ↔ Body ground	IG OFF	200Ω or more
B20 (LCN1) ↔ Body ground	IG OFF	200Ω or more

HINT:

Perform this inspection with the vehicle side wire harness connector B of the transmission control computer assembly (AT ECU) disconnected.

NG

REPAIR OR REPLACE TRANSMISSION CONTROL COMPUTER ASSEMBLY (AT ECU) MAIN LINE OR CONNECTOR (CANH, CANL)

OK

17

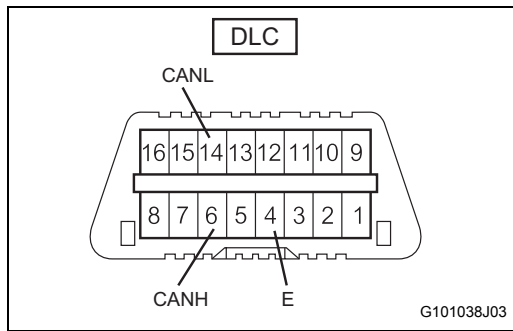
CONNECT CONNECTOR

- Connect the vehicle side wire harness connector of the transmission control computer assembly (AT ECU) and the vehicle side wire harness connector D of the engine control computer (EFI ECU).

CA

18

CHECK CAN BUS LINES FOR SHORT TO GND (EFI ECU)



- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connectors of the engine control computer (EFI ECU) from the engine control computer (EFI ECU).
- (b) Using the tester, measure the resistance between the DLC connector terminals.

Standard

Tester Connection	Measurement Condition	Standard
4 (E) ↔ 6 (CANH)	IG OFF	200Ω or more
4 (E) ↔ 14 (CANL)	IG OFF	200Ω or more

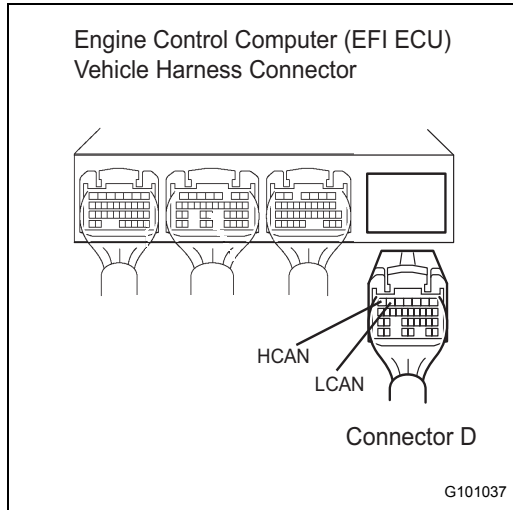
OK

REPLACE ENGINE CONTROL COMPUTER

NG

19

CHECK CAN BUS LINES FOR SHORT TO GND (CAN J/C - EFI ECU)



- (a) Turn the ignition switch off and disconnect the vehicle side wire harness connector of the wire harness connector (CAN J/C) from the wire harness connector (CAN J/C).
- (b) Using the tester, measure the resistance between the terminals of the vehicle side wire harness connector of the engine control computer (EFI ECU) and the body ground.

Standard

Tester Connection	Measurement Condition	Standard
7 (HCAN) ↔ Body ground	IG OFF	200Ω or more
6 (LCAN) ↔ Body ground	IG OFF	200Ω or more

HINT:
Perform this inspection with the vehicle side wire harness connector D of the engine control computer (EFI ECU) disconnected.

NG

REPAIR OR REPLACE ENGINE CONTROL COMPUTER (EFI ECU) MAIN LINE OR CONNECTOR (CANH, CANL)

OK

REPLACE WIRE HARNESS CONNECTOR

OPEN IN ONE OF CAN BUS LINES**DESCRIPTION**

When the CAN main bus line is normal (open in the main line, short between bus lines, short to +B, and short to GND are not present), and if there are some ECUs (sensors) that are not displayed on CHECK ECU CONNECTED TO CAN BUS LINE screen on the DS-II, and if there are ECUs (sensors) that are displayed and not displayed repeatedly, there may be an open in one side of CAN bus line.

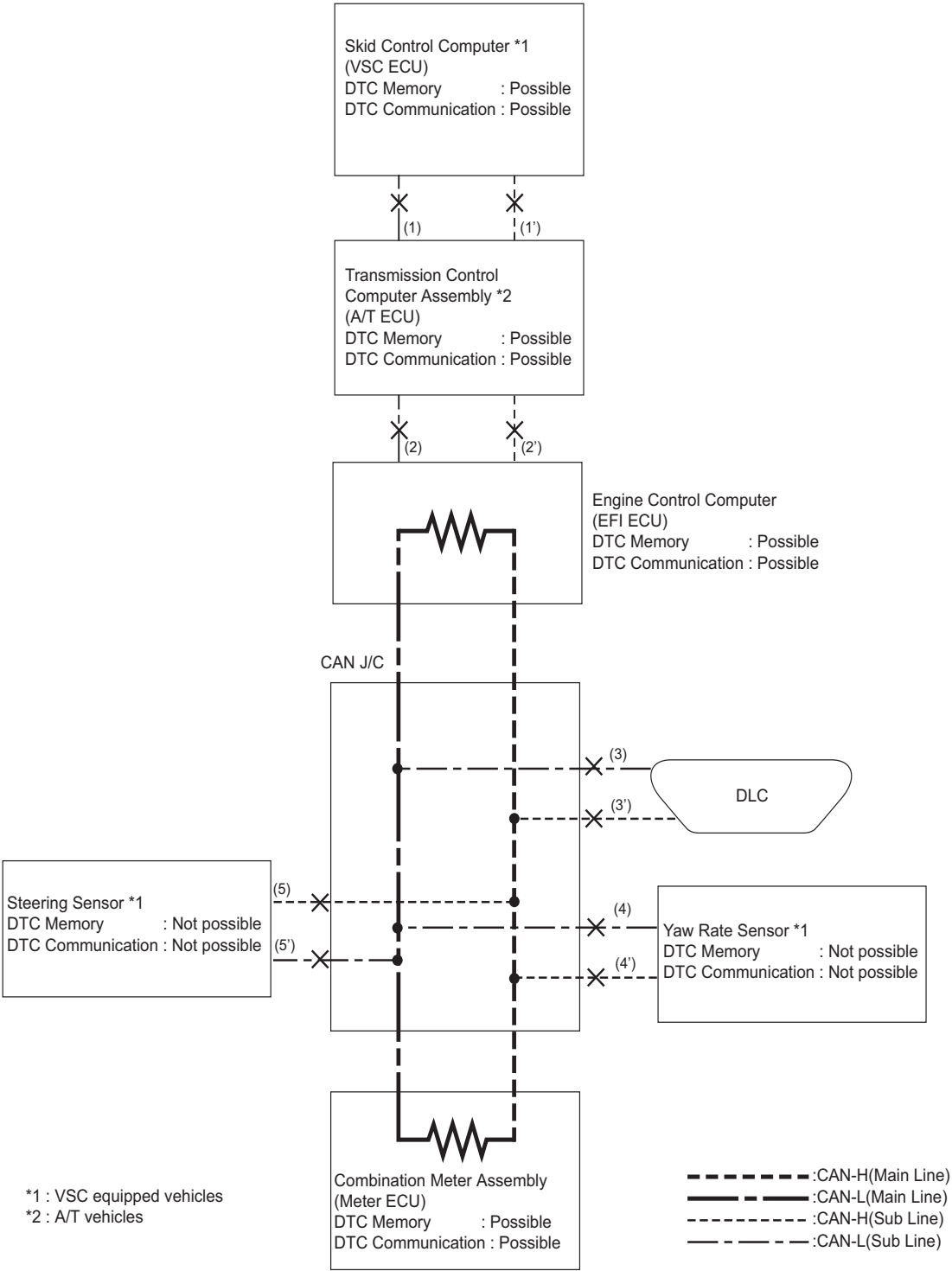
HINT:

When performing CHECK ECU CONNECTED TO CAN BUS LINE using the DS-II, if there are ECUs (sensors) that are displayed and not displayed repeatedly DS-II screen, the signals from ECUs (sensors) that has an open in one side of the bus branch become noise and affect communication between the normal ECUs (sensors) and the DS-II. In this case, the branch lines of the ECUs (sensors) that are displayed and not displayed repeatedly should be considered as normal. The ECUs (sensors) that are not displayed on the screen are considered as the main cause (there is an open in one side of CAN bus line).

Symptom	Suspected Area
There are a ECUs (sensors) that are not displayed on the CHECK ECU CONNECTED TO CAN BUS LINE screen of the DS-II, and there are ECUs (sensors) that are displayed and not displayed repeatedly.	• Open in one side of the CAN bus line (1), (1'), (2), (2'), (3), (3'), (4), (4'), (5) or (5') • Engine control computer (EFI ECU) malfunction • Transmission control computer assembly (AT ECU) malfunction • Brake actuator assembly (VSC ECU) malfunction • Steering sensor (steering angle sensor) malfunction • Yaw rate sensor (yaw and G sensor) malfunction • Combination meter assembly (meter ECU) malfunction

CIRCUIT DIAGRAM

CA



INSPECTION PROCEDURE

NOTICE:

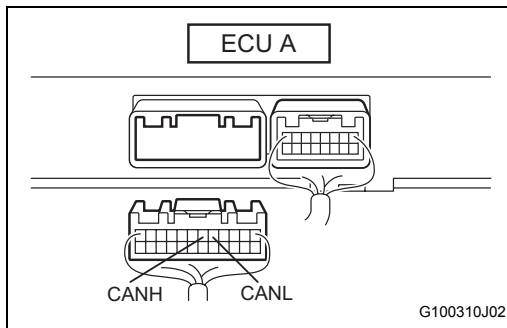
Before measuring the resistance of the CAN bus, turn the ignition switch off and check that warning functions, such as the key reminder, are not operating. Wait one minute after operating the key and switches or opening and closing the doors before performing measurement. If a door is required to be opened for inspections of connectors or other items, open the door before starting the inspections.

HINT:

- For troubleshooting an open in one side of CAN bus lines, ECU A is presented as a representative value.
- Perform the following inspection for the ECUs (sensors) that are not displayed on the DS-II first. If the malfunction cannot be identified, perform the following inspection for all of the ECUs (sensors) connected to CAN communication.

1

CHECK FOR OPEN IN ONE OF CAN BUS LINES (ECU (SENSOR) A BRANCH LINE)



- Turn the ignition switch off and disconnect the connector that the CANL terminal is connected to.
- Turn the ignition switch to the ON position and display the CHECK ECU CONNECTED TO CAN BUS LINE screen.

Standard

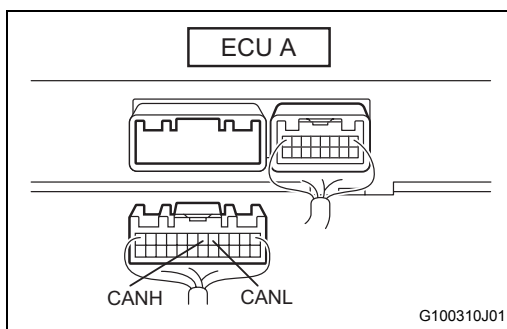
A	Only ECU A is not displayed on the DS-II.
B	There are several ECUs and sensors that are not displayed on the DS-II.

B

CONNECT ECU A CONNECTOR TO ECU (SENSOR) AND CHECK OTHER ECUs (SENSORS) UNTIL STANDARD A IS SATISFIED

A
2

CHECK FOR OPEN IN ONE OF CAN BUS LINES (ECU (SENSOR) A BRANCH LINE)



- Turn the ignition switch off. Using the tester, measure the resistance between terminals CANH and CANL of the vehicle side wire harness connector of ECU A.

Standard

ECU (sensor) Name	Standard
Engine control computer	110 to 130Ω
Combination meter assembly	110 to 130Ω
Other ECUs (sensors)	55 to 65Ω

HINT:

Perform this inspection with the connector disconnected.

NG

REPAIR OR REPLACE ECU A BRANCH LINE OR CONNECTOR

OK
REPLACE ECU A
TO INDEX
TO NEXT SECTION
CA