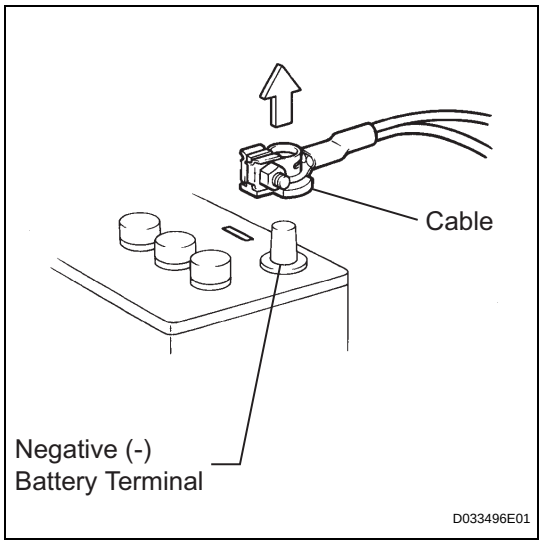


CAN COMMUNICATION SYSTEM

PRECAUTION

1. DISCONNECT AND RECONNECT CABLE OF NEGATIVE BATTERY TERMINAL

(a) Before performing electronic work, disconnect the cable from the negative (-) battery terminal in order to prevent it from shorting and burning out.

(b) When disconnecting and reconnecting the battery cable, turn the ignition switch OFF and headlight dimmer switch OFF. Then loosen the terminal nut completely. Be careful not to damage the cable or terminal.

(c) When the battery cable is disconnected, the settings of the clock and radio, memory of DTCs, etc. are erased. Before disconnecting the battery cable, take notes of the settings and memory.

NOTICE:

When disconnecting the cable from the negative (-) battery terminal, initialize the following system(s) after the cable is reconnected.

System Name	See procedure
Meter / gauge system	See page ME-10

2. PRECAUTION

(a) Turn the ignition switch OFF before measuring the resistances of the CAN main wire and the CAN branch wire.

(b) After the ignition switch is turned off, check that the key reminder warning system is not in operation.

(c) Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors. If doors need to be opened in order to check connectors, open the doors and leave them open.

HINT:

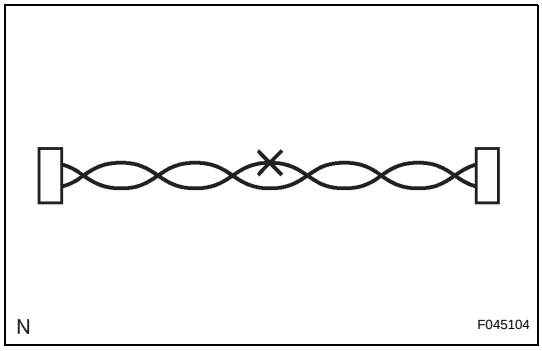
Operating the ignition switch, any switches or any doors triggers related ECU and sensor communication with the CAN, which causes resistance variation.

3. STEERING SYSTEM HANDLING PRECAUTIONS

(a) Care must be taken when replacing parts. Incorrect replacement could affect the performance of the steering system and result in hazards when driving.

4. SRS AIRBAG SYSTEM HANDLING PRECAUTIONS

(a) This vehicle is equipped with an SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operations in the correct sequence could cause unexpected SRS deployment during servicing and may lead to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notice for the Supplemental Restraint System (See page RS-1).

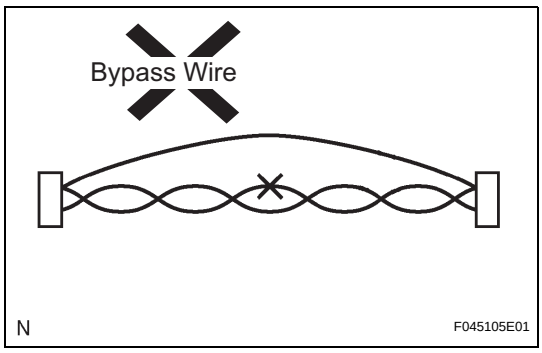


5. BUS LINE REPAIR

(a) After repairing the bus line with solder, wrap the repaired part with vinyl tape (See page IN-44).

NOTICE:

- **The CANL bus line and CANH bus line must always be installed together.**
- **When installing, twist them together.**
- **CAN bus lines are likely to be influenced by noise if the bus lines are not twisted together.**
- **The difference in length between the CANL bus line and CANH bus line should be less than 100 mm (3.937 in.).**
- **Leave approximately 80 mm (3.150 in.) loose in the twisted wires around the connectors.**



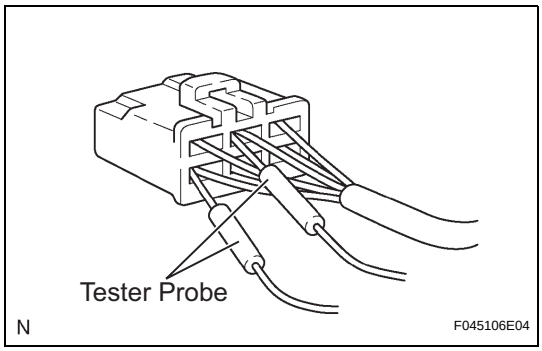
(b) Do not use bypass wiring between the connectors.

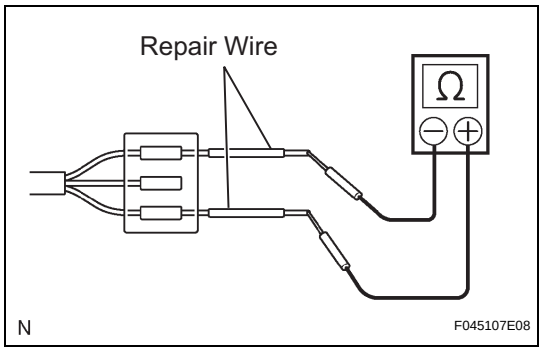
NOTICE:

The feature of the twisted wire harness will be lost if bypass wiring is used.

6. CONNECTOR HANDLING

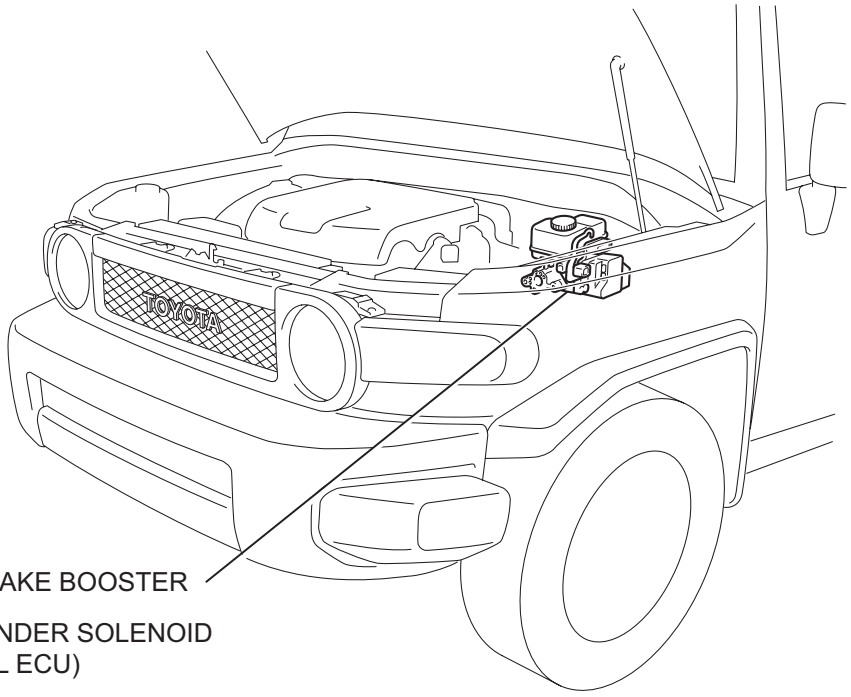
(a) When inserting tester probes into a connector, insert them from the rear of the connector.





(b) Use a repair wire to check the connector if it is impossible to check the resistance from the rear of the connector.

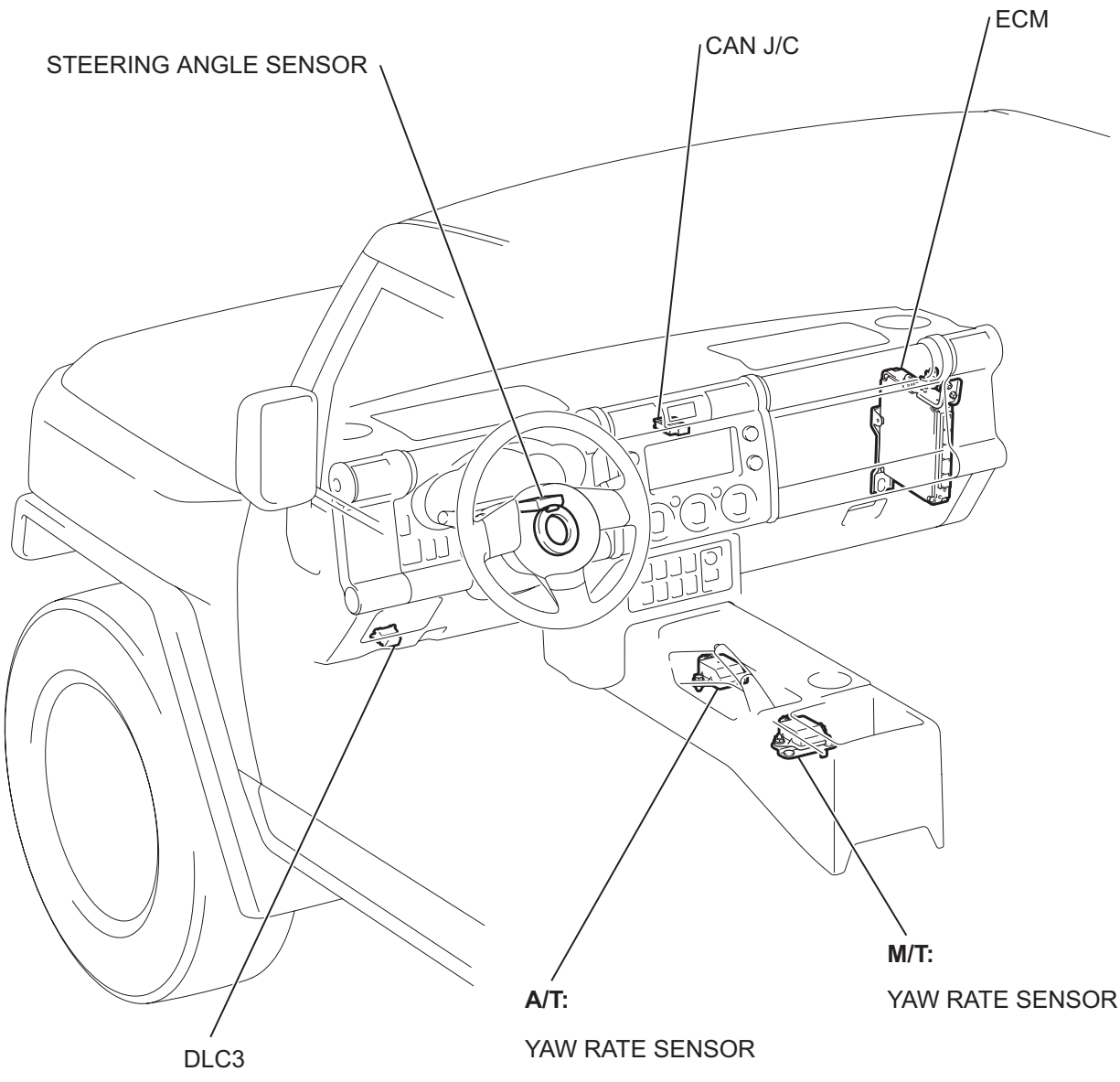
PARTS LOCATION



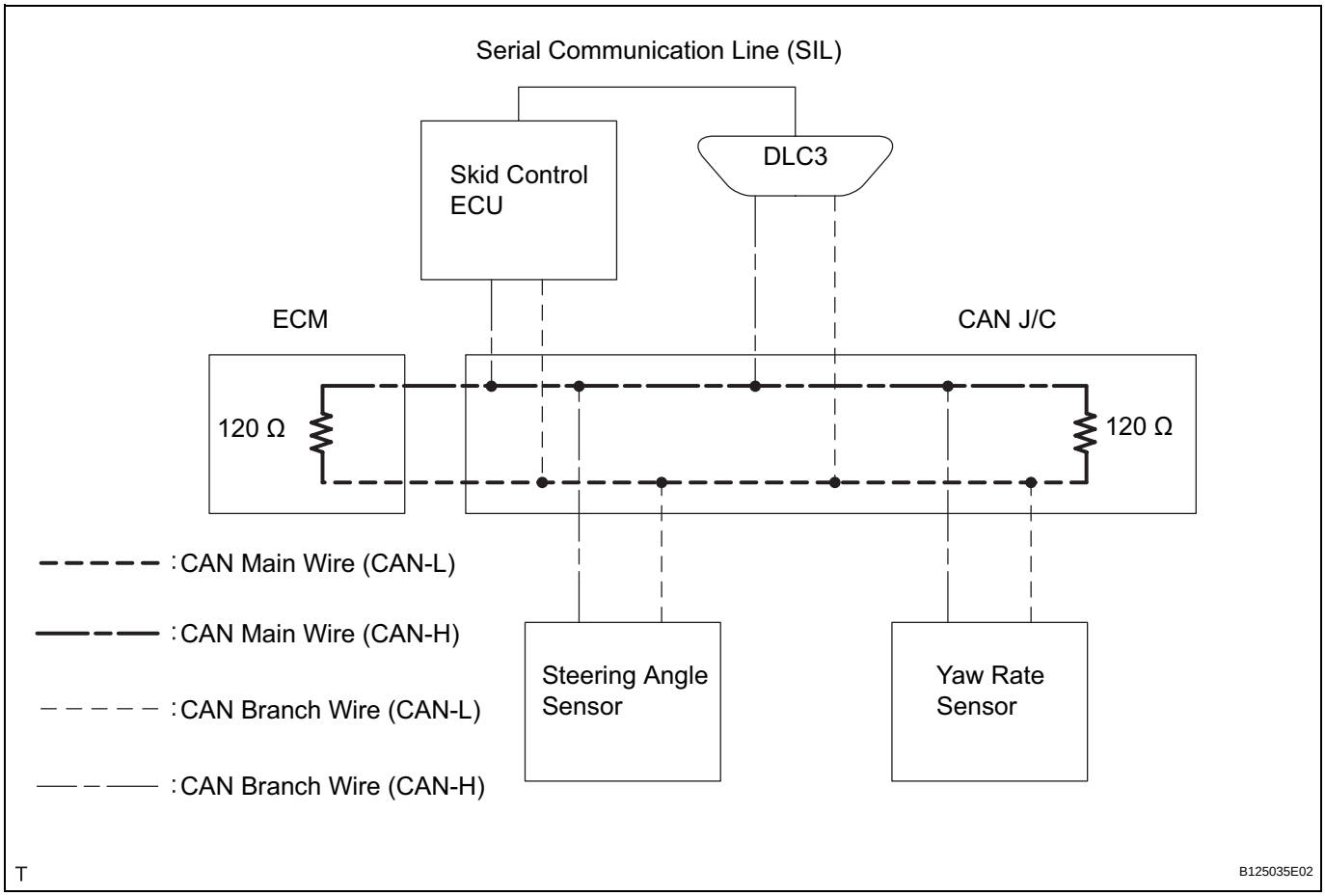
HYDRAULIC BRAKE BOOSTER

- MASTER CYLINDER SOLENOID
(SKID CONTROL ECU)

C136075E01


STEERING ANGLE SENSOR
CAN J/C
ECM
DLC3
A/T:
YAW RATE SENSOR
M/T:
YAW RATE SENSOR
C136845E01

SYSTEM DIAGRAM



HINT:
The skid control ECU stores DTCs and performs DTC communication by receiving information from the steering sensor and yaw rate sensor. These sensors cannot store DTCs or perform DTC communication.

SYSTEM DESCRIPTION

1. BRIEF DESCRIPTION

(a) The CAN (Control Area Network) is a serial data communication system for real time application. It is a vehicle multiplex communication system which has a high communication speed (500 kbps) and the ability to detect malfunctions.

(b) By pairing the CANH and CANL bus lines, the CAN performs communication based on differential voltages.

(c) Many ECUs (sensors) installed on the vehicle operate by sharing information and communicating with each other.

(d) The CAN has two 120 Ω resistors which are necessary to communicate with the main wire.

2. DEFINITION OF TERMS

(a) Main wire

(1) The main wire 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 wire

(1) The branch wire is a wire harness which diverges from the main wire to an ECU or a sensor.

(c) Terminus circuit

(1) The terminus circuit is a circuit which converts the communication current of the CAN communication into the bus voltage. It consists of a resistor and condenser. Two terminus circuits are necessary on a bus.

(d) CAN J/C

(1) The CAN J/C is a junction designed for CAN communication, which contains terminus circuits.

3. ECUs OR SENSORS WHICH COMMUNICATE VIA CAN COMMUNICATION SYSTEM

(a) Skid control ECU

(b) ECM

(c) Steering angle sensor

(d) Yaw rate sensor

4. DIAGNOSTIC CODES FOR CAN COMMUNICATION SYSTEM

(a) DTCs for the CAN communication system are as follows: U0073, U0100, U0123, U0124 and U0126.

5. NOTES REGARDING TROUBLESHOOTING

(a) Trouble in the CAN bus (communication line) can be checked through the DLC3 (except when there is a wire break other than in the branch wire of the DLC3).

NOTICE:

Do not connect the tester directly to the DLC3 connector. Be sure to use a service wire.

(b) DTCs regarding the CAN communication system can be checked using the intelligent tester via the CAN VIM.

(c) The CAN communication system cannot detect trouble in the branch wire of the DLC3 even though the DLC3 is also connected to the CAN communication system.

HOW TO PROCEED WITH TROUBLESHOOTING

NOTICE:

- **DTCs for the CAN communication system are as follows: U0073, U0100, U0123, U0124 and U0126.**
- **Refer to the troubleshooting section for each system if DTCs regarding the CAN communication system are not output.**
- **Turn the ignition switch off before measuring the resistances of the CAN main wire and the CAN branch wire.**
- **After the ignition switch is turned off, check that the key reminder warning system is not in operation.**
- **Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors. If doors need to be opened in order to check connectors, open the doors and leave them open.**
  HINT:
  Operating the ignition switch, any switches or any doors triggers related ECU and sensor communication with the CAN, which causes resistance variation.

1	**CHECK CAN BUS LINE**

(a) Check CAN bus line (See page CA-25).

NEXT

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

NEXT

3	**CHECK AND CLEAR DTCs**

NEXT

4	**CHECK CAN COMMUNICATION USING INTELLIGENT TESTER VIA CAN VIM**

(a) Select "BUS CHECK" (See page CA-14).

Result

All ECUs and sensors connected to CAN communication system displayed on screen.	A
One ECU or sensor connected to CAN communication system not displayed on screen.	B
2 or more ECUs and sensors connected to CAN communication system not displayed on screen.	C

NOTICE:

- **The systems (ECUs and sensors) that adopt CAN communication vary depending on the vehicle and option settings. Check which systems (ECUs and sensors) are installed on the vehicle (See page CA-14).**
- **Non-installed ECUs or sensors are not displayed. Do not mistake them for being in communication stop mode.**
- **If 2 or more ECUs or sensors are not displayed on the intelligent tester via the CAN VIM, perform troubleshooting for an open in one side of the CAN bus line for each undisplayed ECU or sensor.**

B	GO TO COMMUNICATION STOP MODE TABLE
C	GO TO OPEN IN ONE SIDE OF CAN BRANCH WIRE

A

5	DTC COMBINATION TABLE

(a) Confirm trouble according to the combination of output DTCs regarding the CAN communication system.
HINT:
Previous CAN communication system DTCs may be the cause if CAN communication system DTCs are output and all ECUs and sensors connected to the CAN communication system are displayed on the intelligent tester's "BUS CHECK" screen via the CAN VIM.

NEXT

6	INSPECT CIRCUIT

NEXT

7	IDENTIFY PROBLEM

NEXT

8	REPAIR OR REPLACE

NEXT

9	**PERFORM CONFIRMATION TEST**

NEXT

END

PROBLEM SYMPTOMS TABLE

RESULT LIST OF CHECK CAN BUS LINE

Symptom	Suspected area	See page
Open in CAN Main Wire	Check CAN Main Wire for Disconnection	CA-28
Short in CAN Bus Line	Check CAN Bus Lines for Short Circuit	CA-31
Short to +B in CAN Bus Line	Check CAN Bus line for Short to +B	CA-41
Short to GND in CAN Bus Line	Check CAN Bus line for Short to GND	CA-50
Open in One Side of CAN Branch Wire	Check for an Open in One Side of the CAN Branch Wire	CA-60

COMMUNICATION STOP MODE TABLE

Symptom	Suspected area	See page
"ENGINE" not displayed on intelligent tester via CAN VIM	ECM Communication Stop Mode	CA-23
"ABS/VSC/TRAC" not displayed on intelligent tester via CAN VIM	Skid Control ECU Communication Stop Mode	CA-17
"STEERING_SENSOR" not displayed on intelligent tester via CAN VIM	Steering Angle Sensor Communication Stop Mode	CA-19
"YAW DECELERATE" not displayed on intelligent tester via CAN VIM	Yaw Rate Sensor Communication Stop Mode	CA-21

TERMINALS OF ECU

NOTICE:

- **Turn the ignition switch off before measuring the resistances of the CAN main wire and the CAN branch wire.**
- **After the ignition switch is turned off, check that the key reminder warning system is not in operation.**
- **Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors. If doors need to be opened in order to check connectors, open the doors and leave them open.**

  HINT:

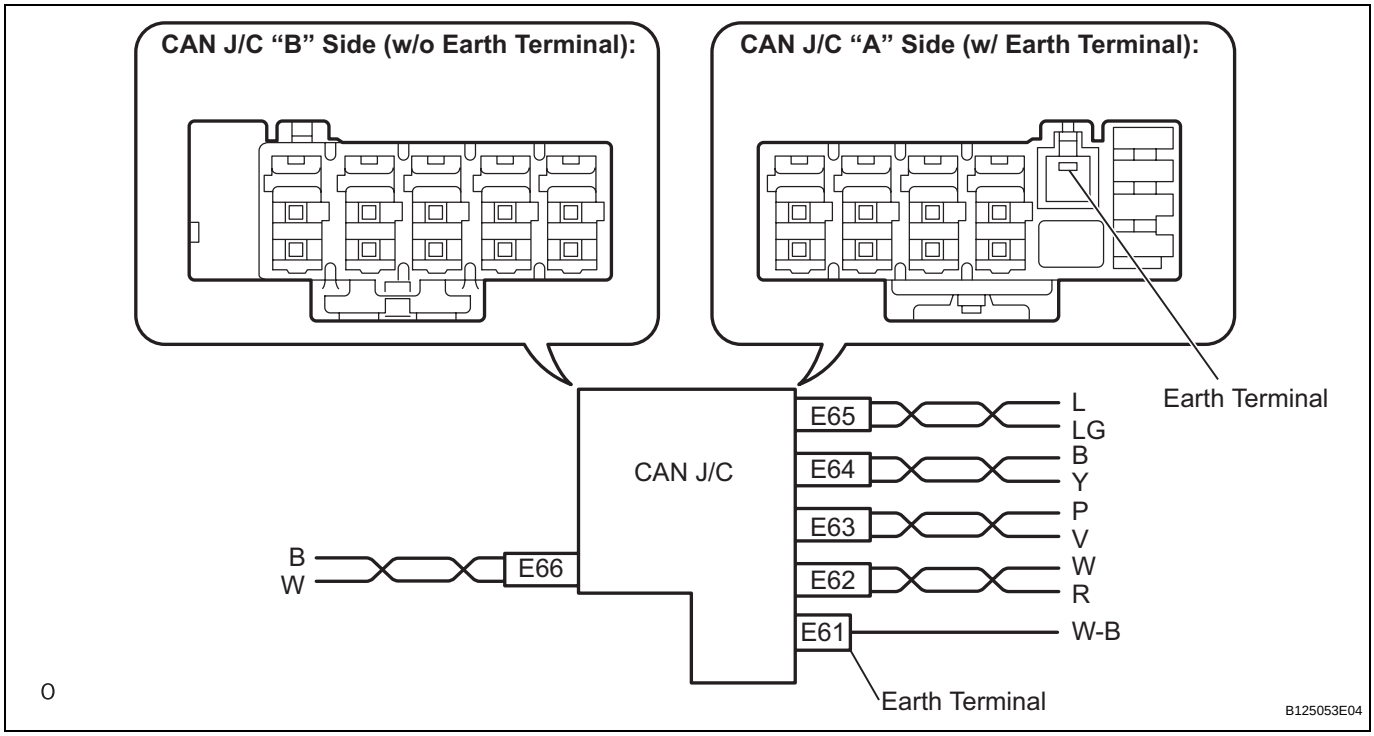
  Operating the ignition switch, any switches or any doors triggers related ECU and sensor communication with the CAN, which causes resistance variation.

1. CAN JUNCTION CONNECTOR

(a) CAN J/C connectors.

HINT:

- The connectors connected to the CAN J/C can be distinguished by the colors of the bus lines and the connecting side of the connector.
- E62, E63, E64 and E65 are interchangeable.



Wiring color

CAN J/C connectors ("A" side, w/ earth terminal)	Color (CAN-H Side)	Color (CAN-L Side)
ECM (E62)	W	R
DLC3 (E63)	P	V
Steering angle sensor (E64)	B	Y

CA

CAN J/C connectors ("A" side, w/ earth terminal)	Color (CAN-H Side)	Color (CAN-L Side)
Yaw rate sensor (E65)	L	LG

Wiring color

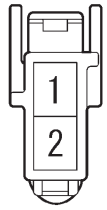
CAN J/C connectors ("B" side, w/o earth terminal)	Color (CAN-H Side)	Color (CAN-L Side)
Skid control ECU (E66)	B	W

(b) The terminals of the CAN J/C connectors.

Terminal	Terminal symbol
1	CAN-H
2	CAN-L

Wire Harness Side:

CAN J/C Connector



Front View

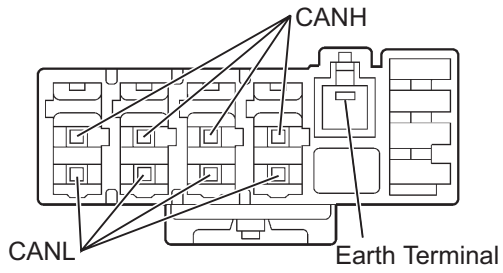
C133723E01

(c) Measure the resistance.

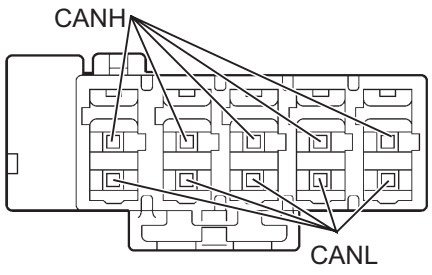
Standard resistance

Terminal	Specified Condition
CANH - CANL	**108 to 132 Ω**

CAN J/C "A" Side (w/ Earth Terminal):



CAN J/C "B" Side (w/o Earth Terminal):



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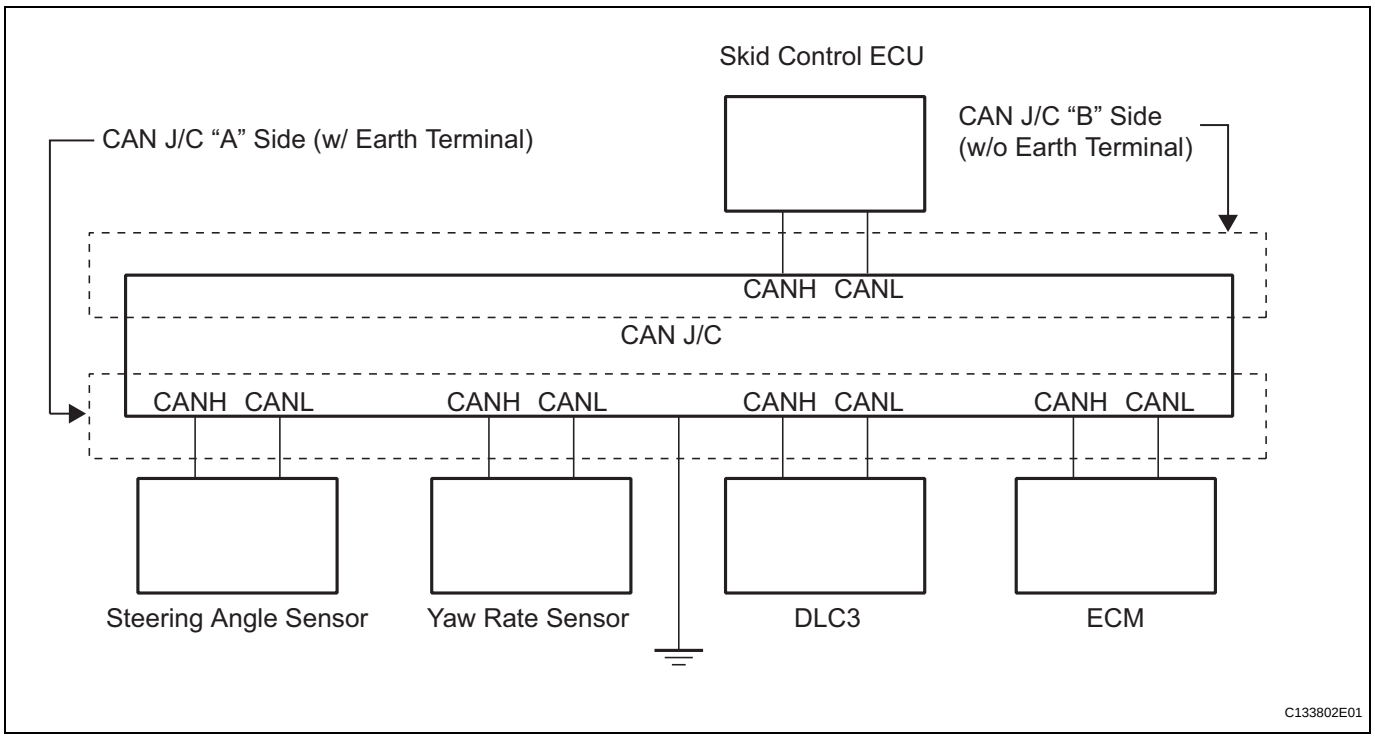
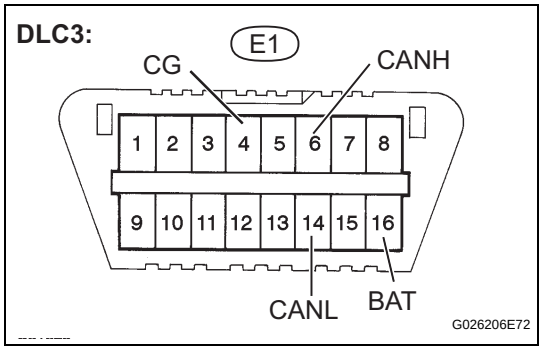
(d) Wiring diagram for identifying CAN J/C connectors.





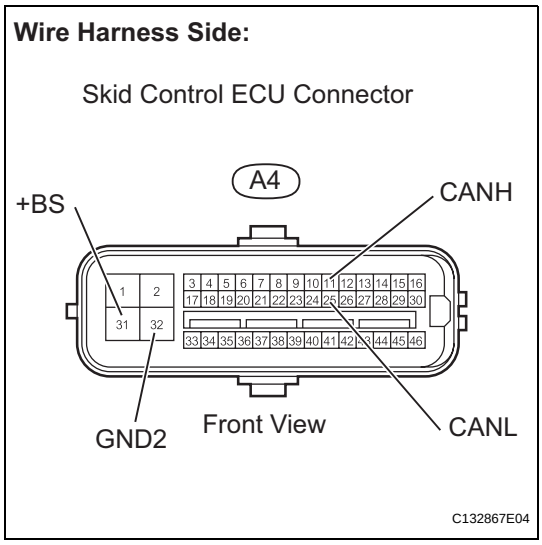
2. DLC3

(a) Turn the ignition switch OFF.

(b) Measure the resistance.

Standard resistance

Terminals	Wiring Color	Condition	Specified Condition
E1-6 (CANH) - E1-14 (CANL)	P - V	Ignition Switch OFF	54 to 69 Ω
E1-6 (CANH) - E1-4 (CG)	P - W-B	Ignition Switch OFF	200 Ω or more
E1-14 (CANL) - E1-4 (CG)	V - W-B	Ignition Switch OFF	200 Ω or more
E1-6 (CANH) - E1-16 (BAT)	P - O	Ignition Switch OFF	6 kΩ or more
E1-14 (CANL) - E1-16 (BAT)	V - O	Ignition Switch OFF	6k Ω or more

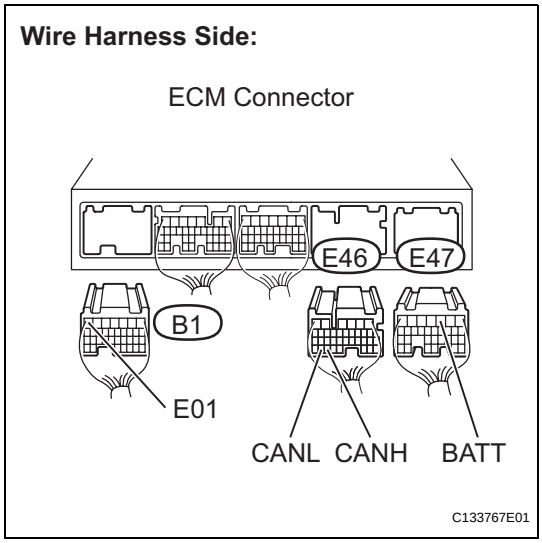


3. SKID CONTROL ECU

(a) Turn the ignition switch OFF.
(b) Disconnect the A4 skid control ECU connector.
(c) Measure the resistance.

Standard resistance

Terminals	Wiring Color	Condition	Specified Condition
A4-11 (CANH) - A4-25 (CANL)	B - W	Ignition Switch OFF	54 to 69 Ω
A4-11 (CANH) - A4-32 (GND2)	B - W-B	Ignition Switch OFF	200 Ω or more
A4-25 (CANL) - A4-32 (GND2)	W - W-B	Ignition Switch OFF	200 Ω or more
A4-11 (CANH) - A4-31 (+BS)	B - Y	Ignition Switch OFF	6 kΩ or more
A4-25 (CANL) - A4-31 (+BS)	W - Y	Ignition Switch OFF	6 kΩ or more



4. ECM

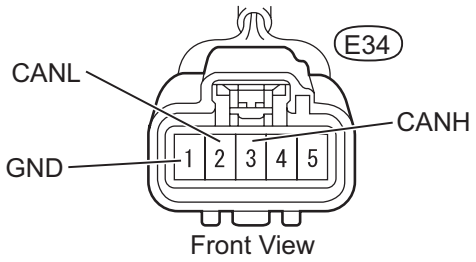
(a) Turn the ignition switch OFF.
(b) Disconnect the B1, E46 and E47 ECM connectors.
(c) Measure the resistance.

Standard resistance

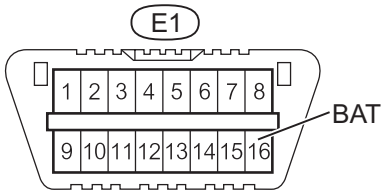
Terminals	Wiring Color	Condition	Specified Condition
E46-33 (CANH) - E46-34 (CANL)	W - R	Ignition switch OFF	108 to 132 Ω
E46-33 (CANH) - B1-7 (E01)	W - BR	Ignition switch OFF	200 Ω or more
E46-34 (CANL) - B1-7 (E01)	R - BR	Ignition switch OFF	200 Ω or more
E46-33 (CANH) - E47-3 (BATT)	W - L	Ignition switch OFF	6 kΩ or more
E46-34 (CANL) - E47-3 (BATT)	R - L	Ignition switch OFF	6 kΩ or more

Wire Harness Side:

Yaw Rate Sensor Connector



DLC3:



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5. YAW RATE SENSOR

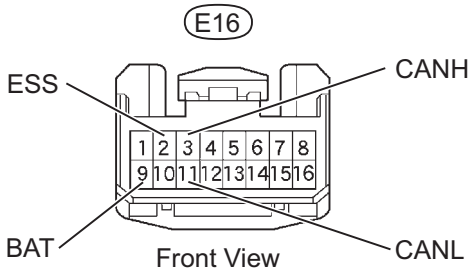
(a) Turn the ignition switch OFF.
(b) Disconnect the E34 yaw rate sensor connector.
(c) Measure the resistance.

Standard resistance

Terminals	Wiring Color	Condition	Specified Condition
E34-3 (CANH) - E34-2 (CANL)	L - LG	Ignition switch OFF	54 to 69 Ω
E34-3 (CANH) - E34-1 (GND)	L - W-B	Ignition switch OFF	200 Ω or more
E34-2 (CANL) - E34-1 (GND)	LG - W-B	Ignition switch OFF	200 Ω or more
E34-3 (CANH) - E1-16 (BAT)	L - O	Ignition switch OFF	6 kΩ or more
E34-2 (CANL) - E1-16 (BAT)	LG - O	Ignition switch OFF	6 kΩ or more

Wire Harness Side:

Steering Angle Sensor Connector



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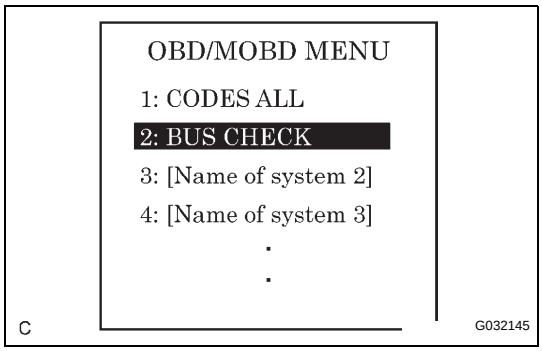
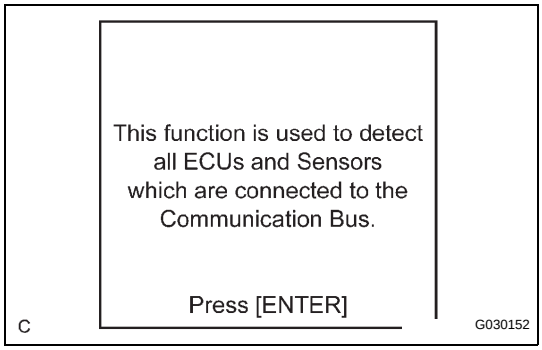
6. STEERING ANGLE SENSOR

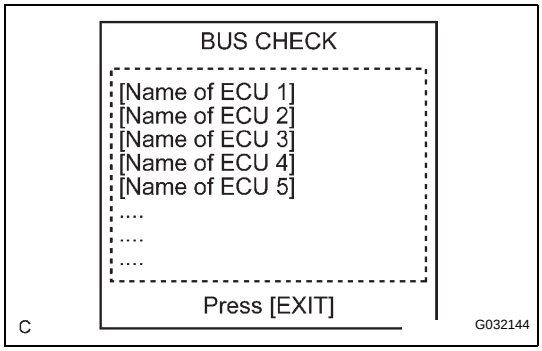
(a) Turn the ignition switch OFF.
(b) Disconnect the E16 steering angle sensor connector.
(c) Measure the resistance.

Standard resistance

Terminals	Wiring Color	Condition	Specified Condition
E16-3 (CANH) - E16-11 (CANL)	B - Y	Ignition switch OFF	54 to 69 Ω
E16-3 (CANH) - E16-2 (ESS)	B - W-B	Ignition switch OFF	200 Ω or more
E16-11 (CANL) - E16-2 (ESS)	Y - W-B	Ignition switch OFF	200 Ω or more
E16-3 (CANH) - E16-9 (BAT)	B - W-R	Ignition switch OFF	6 kΩ or more
E16-11 (CANL) - E16-9 (BAT)	Y - W-R	Ignition switch OFF	6 kΩ or more







DIAGNOSIS SYSTEM

1. BUS CHECK

(a) Select "BUS CHECK" from the "OBD/MOBD MENU" screen.
HINT:
The ECUs and sensors that are properly connected to the CAN communication system can be displayed using the intelligent tester via the CAN VIM.

(b) Press "ENTER" on the intelligent tester via the CAN VIM.

(c) The screen displays the ECUs and sensors that are properly connected to the CAN communication system.
HINT:
If any properly connected ECUs or sensors are not displayed, there is a communication stop in the system.

2. CHECK INSTALLED SYSTEMS (ECUs AND SENSORS) THAT ADOPT CAN COMMUNICATION

(a) Systems (ECUs and sensors) that adopt CAN communication vary depending on the vehicle's optional settings. Check which systems (ECUs and sensors) are installed on the vehicle.

ECU/Sensor name	Check method
Skid control ECU	Installed on all vehicles
ECM	Installed on all vehicles
Yaw rate sensor	Installed on all vehicles
Steering angle sensor	Installed on all vehicles

3. DTC TABLE BY ECU

HINT:
- In the CAN communication system, CAN communication system DTCs output by the ECU can be displayed by using the intelligent tester.
- If CAN communication system DTCs are output, trouble cannot be determined solely from the DTCs. Perform troubleshooting according to "HOW TO PROCEED WITH TROUBLESHOOTING" (See page CA-6).

(a) SKID CONTROL ECU
HINT:
DTC communication uses the SIL Line.

DTC No.	Detection Item
U0073/94	Control Module Communication Bus OFF
U0100/65	Lost Communication with ECM/PCM
U0123/62	Lost Communication with Yaw Rate Sensor Module
U0124/95	Lost Communication with Lateral Acceleration Sensor Module
U0126/63	Lost Communication with Steering Angle Sensor Module

(b) YAW RATE SENSOR
HINT:
- The yaw rate sensor is connected to the CAN communication system but CAN communication DTCs are not output.
- If "YAW/DECELERATE" is not displayed on the "BUS CHECK" screen on the intelligent tester, proceed to "Yaw Rate Sensor Communication Stop Mode." (See page CA-21)

(c) STEERING ANGLE SENSOR
HINT:
- The steering sensor is connected to the CAN communication system but CAN communication DTCs are not output.
- If "STEERING_SENSOR" is not displayed on the "BUS CHECK" screen on the intelligent tester, proceed to "Steering Angle Sensor Communication Stop Mode." (See page CA-19)

(d) ECM
HINT:
- The ECM is connected to the CAN communication system but CAN communication DTCs are not output.
- If "ENGINE" is not displayed on the "BUS CHECK" screen on the intelligent tester, proceed to "ECM Communication Stop Mode." (See page CA-23)

4. DTC COMBINATION TABLE

DTC		Trouble Mode			
Output from	Output DTC	ECM Communication Stop Mode	Skid Control ECU Communication Stop Mode	Yaw Rate Sensor Communication Stop Mode	Steering Angle Sensor Communication Stop Mode
Skid Control ECU	U0073/94	X	X	X	X
	U0100/65	O	X	X	X
	U0123/62	X	X	O	X
	U0124/95	X	X	O	X
	U0126/63	X	X	X	O

HINT:
- O: It is necessary to check for the trouble mode.
- X: Not output

(a) Perform troubleshooting according to the combination of DTCs output.
HINT:
- Skid Control ECU Communication Stop Mode: (See page CA-17)

CA

- ECM Communication Stop Mode: (See page CA-23)
- Yaw Rate Sensor Communication Stop Mode: (See page CA-21)
- Steering Angle Sensor Communication Stop Mode: (See page CA-19)

FAIL-SAFE CHART

1. FAIL-SAFE FUNCTION

(a) When communication fails in any of the CAN bus lines (communication lines) due to a short circuit or other causes, the fail-safe function, which is specified for each system, operates to prevent the system from malfunctioning.

(b) Relationships between components and system functions and effects of communication failure on these functions. (For further details, see the pages for each system.)

Function	ECM	Skid control ECU	Yaw rate sensor	Steering Angle Sensor	Condition when communication impossible	DTC detection (Driver detectable)
VSC Control (Controls VSC/ TRAC engine output)	○	●	○	○	VSC function stops	Detectable (Light comes on)

HINT:

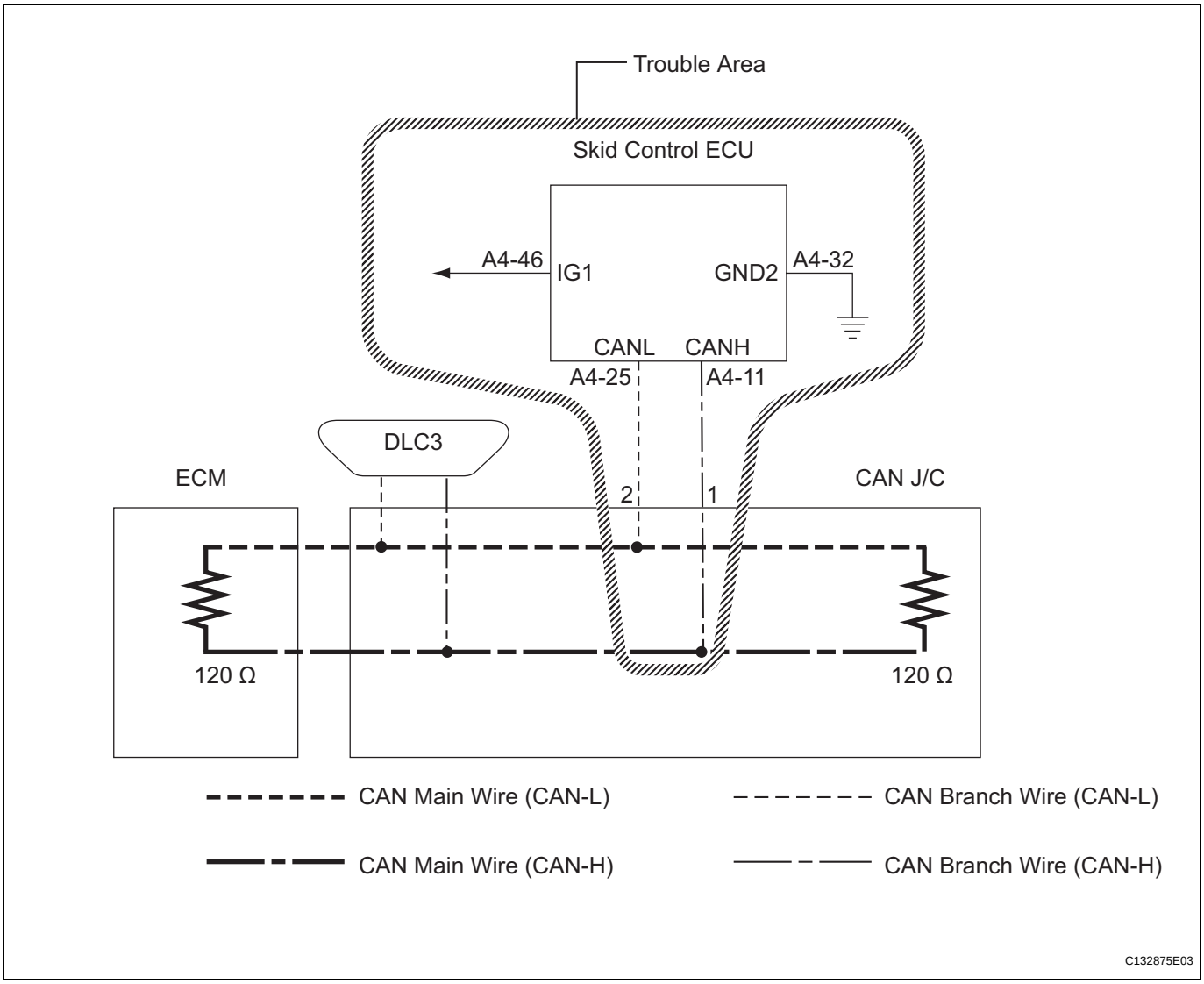
- ●: Control master
- ○: System related

Skid Control ECU Communication Stop Mode

DESCRIPTION

Detection Item	Symptom	Trouble Area
Skid Control ECU Communication Stop Mode	• "ABS/VSC/TRAC" not displayed on "BUS CHECK" screen of intelligent tester via CAN VIM • Applies to "Skid Control ECU Communication Stop Mode" in "DTC combination table"	• Power source circuit of skid control ECU • Skid control ECU branch wire or connector • Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **Turn the ignition switch off before measuring the resistances of the CAN main wire and the CAN branch wire.**
- **After the ignition switch is turned off, check that the key reminder warning system is not in operation.**

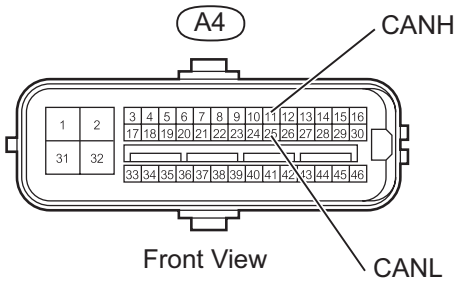
CA

- **Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors. If doors need to be opened in order to check connectors, open the doors and leave them open.**
  HINT:
  Operating the ignition switch, any switches or any doors triggers related ECU and sensor communication with the CAN, which causes resistance variation.

1	CHECK CAN BUS LINE FOR DISCONNECTION (SKID CONTROL ECU BRANCH WIRE)

Wire Harness Side:

Skid Control ECU Connector



(a) Turn the ignition switch OFF.
(b) Disconnect the A4 skid control ECU connector.
(c) Measure the resistance.
Standard resistance

Tester connection	Condition	Specified Condition
A4-11 (CANH) - A4-25 (CANL)	Ignition switch OFF	54 to 69 Ω

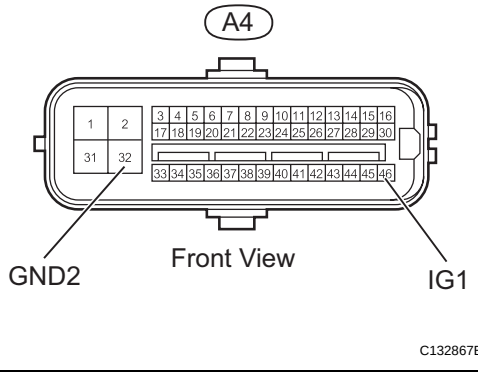
NG → **REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO SKID CONTROL ECU (CAN-H, CAN-L)**

OK

2	CHECK HARNESS AND CONNECTOR (IG1, GND2)

Wire Harness Side:

Skid Control ECU Connector



(a) Disconnect the A4 skid control ECU connector.
(b) Measure the resistance.
Standard resistance

Tester connection	Condition	Specified Condition
A4-32 (GND2) - Body ground	Always	Below 1 Ω

(c) Measure the voltage.
Standard voltage

Tester connection	Condition	Specified Condition
A4-46 (IG1) - Body ground	Ignition switch ON	11 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

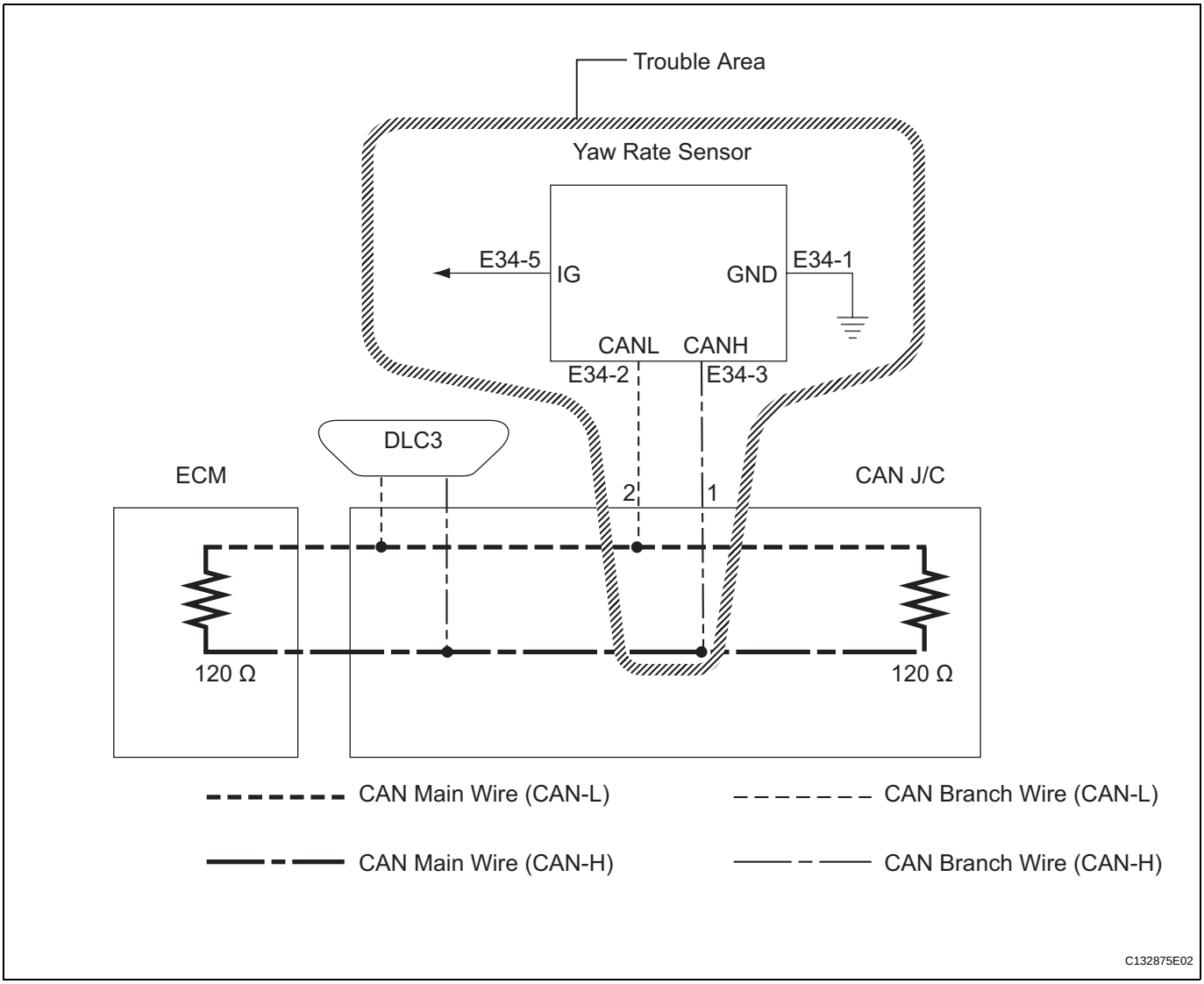
REPLACE MASTER CYLINDER SOLENOID

Yaw Rate Sensor Communication Stop Mode

DESCRIPTION

Detection Item	Symptom	Trouble Area
Yaw Rate Sensor Communication Stop Mode	• "YAW/DECELERATE" not displayed on "BUS CHECK" screen of intelligent tester via CAN VIM • Applies to "Yaw Rate Sensor Communication Stop Mode" in "DTC combination table"	• Power source circuit of yaw rate sensor • Yaw rate sensor branch wire or connector • Yaw rate sensor

WIRING DIAGRAM



INSPECTION PROCEDURE

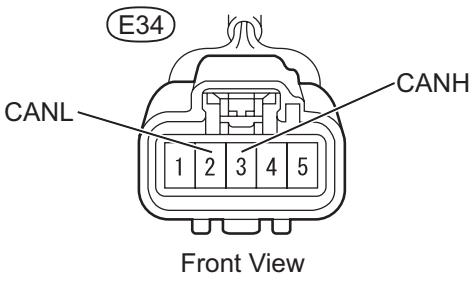
NOTICE:

- **Turn the ignition switch off before measuring the resistances of the CAN main wire and the CAN branch wire.**
- **After the ignition switch is turned off, check that the key reminder warning system is not in operation.**

- **Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors. If doors need to be opened in order to check connectors, open the doors and leave them open.**
  HINT:
  Operating the ignition switch, any switches or any doors triggers related ECU and sensor communication with the CAN, which causes resistance variation.

1	CHECK CAN BUS LINE FOR DISCONNECTION

Wire Harness Side:



(a) Turn the ignition switch OFF.
(b) Disconnect the E34 yaw rate sensor connector.
(c) Measure the resistance.
Standard resistance

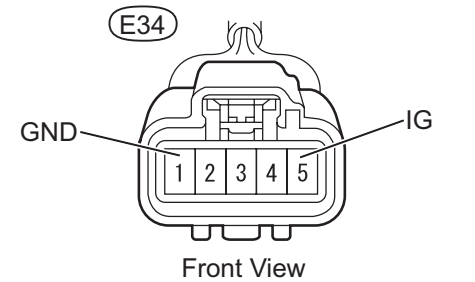
Tester Connection	Condition	Specified Condition
E34-3 (CANH) - E34-2 (CANL)	Ignition switch OFF	54 to 69 Ω

NG → **REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO YAW RATE SENSOR (CAN-H, CAN-L)**

OK

2	CHECK HARNESS AND CONNECTOR

Wire Harness Side:



(a) Disconnect the E34 yaw rate sensor connector.
(b) Measure the resistance.
Standard resistance

Tester Connection	Condition	Specified Condition
E34-1 (GND) - Body ground	Ignition switch OFF	Below 1 Ω

(c) Measure the voltage.
Standard voltage

Tester Connection	Condition	Specified Condition
E34-5 (IG) - Body ground	Ignition switch ON	11 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE YAW RATE SENSOR

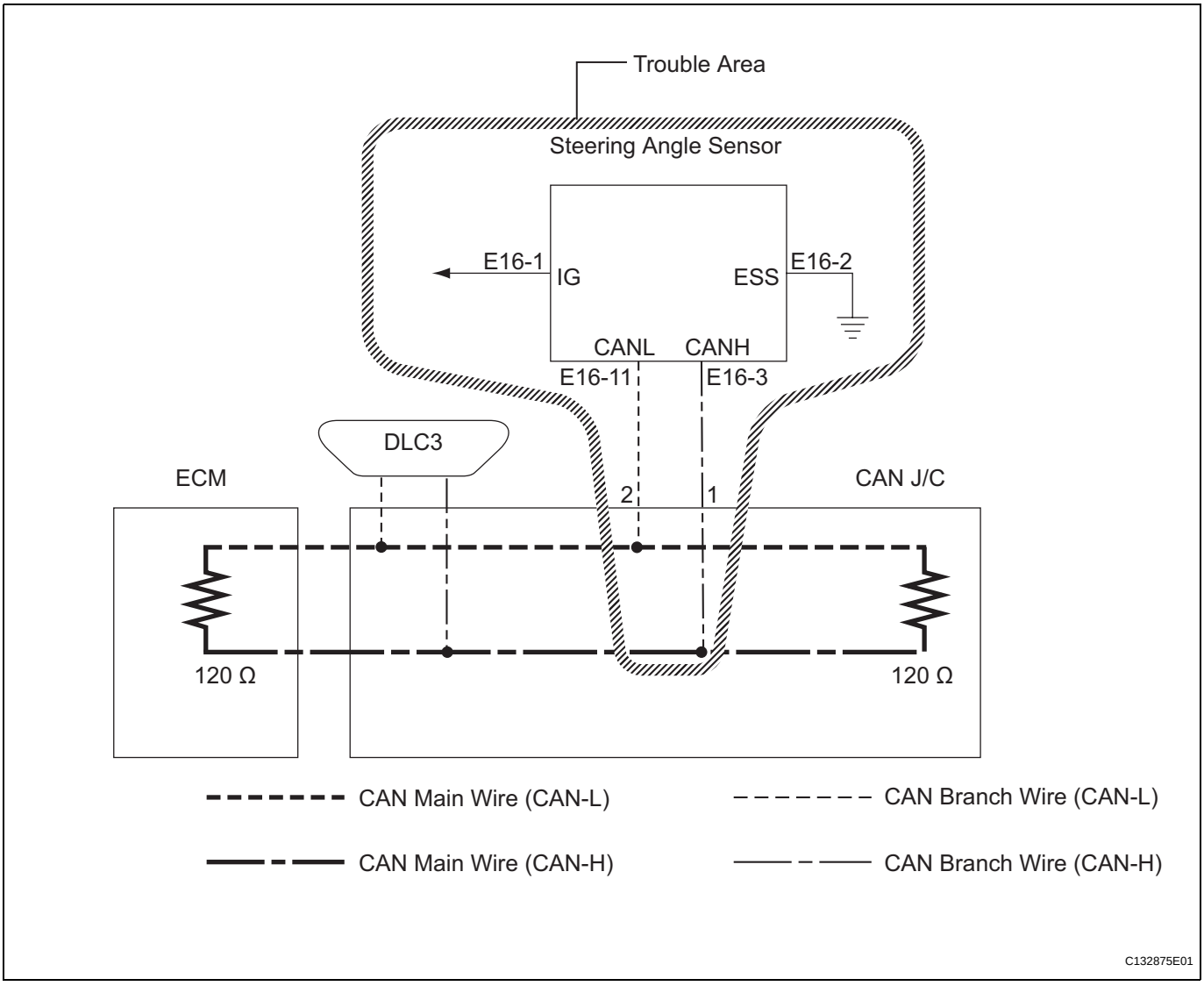
CA

Steering Angle Sensor Communication Stop Mode

DESCRIPTION

Detection Item	Symptom	Trouble Area
Steering Angle Sensor Communication Stop Mode	• "STEERING_SENSOR" not displayed on "BUS CHECK" screen of intelligent tester via CAN VIM • Applies to "Steering Angle Sensor Communication Stop Mode" in "DTC combination table"	• Power source circuit of steering angle sensor • Steering angle sensor branch wire or connector • Steering angle sensor

WIRING DIAGRAM



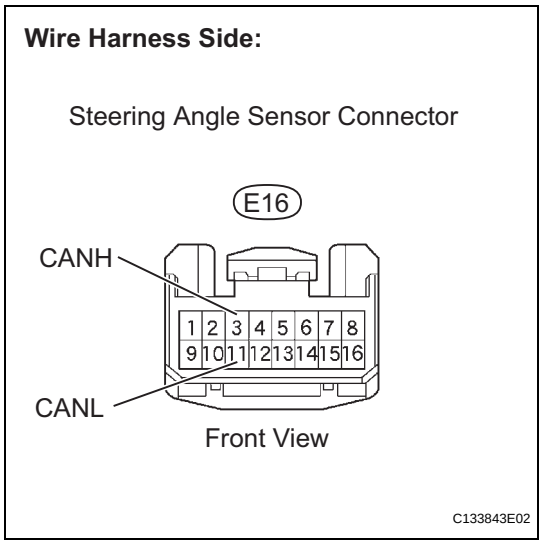
INSPECTION PROCEDURE

NOTICE:

- **Turn the ignition switch off before measuring the resistances of the CAN main wire and the CAN branch wire.**
- **After the ignition switch is turned off, check that the key reminder warning system is not in operation.**

- **Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors. If doors need to be opened in order to check connectors, open the doors and leave them open.**
  HINT:
  Operating the ignition switch, any switches or any doors triggers related ECU and sensor communication with the CAN, which causes resistance variation.

1 CHECK CAN BUS LINE FOR DISCONNECTION



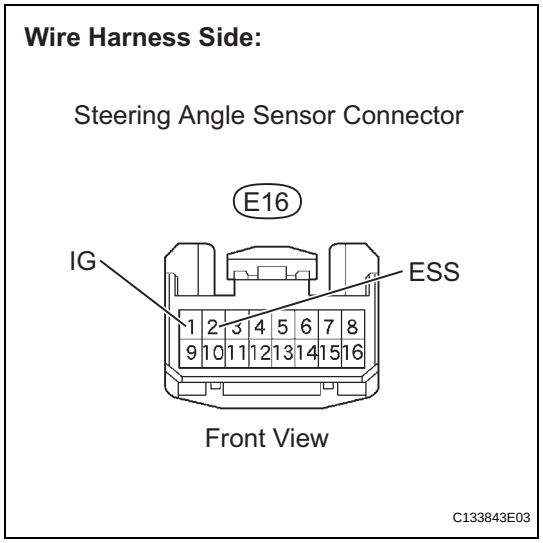
(a) Turn the ignition switch OFF.
(b) Disconnect the E16 steering angle sensor connector.
(c) Measure the resistance.
Standard resistance

Tester Connection	Condition	Specified Condition
E16-3 (CANH) - E16-11 (CANL)	Ignition switch OFF	54 to 69 Ω

NG → **REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO STEERING ANGLE SENSOR (CAN-H, CAN-L)**

OK

2 CHECK HARNESS AND CONNECTOR



(a) Disconnect the E16 steering angle sensor connector.
(b) Measure the resistance.
Standard resistance

Tester Connection	Condition	Specified Condition
E16-2 (ESS) - Body ground	Always	Below 1 Ω

(c) Measure the voltage.
Standard voltage

Tester Connection	Condition	Specified Condition
E16-1 (IG) - Body ground	Ignition switch ON	11 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

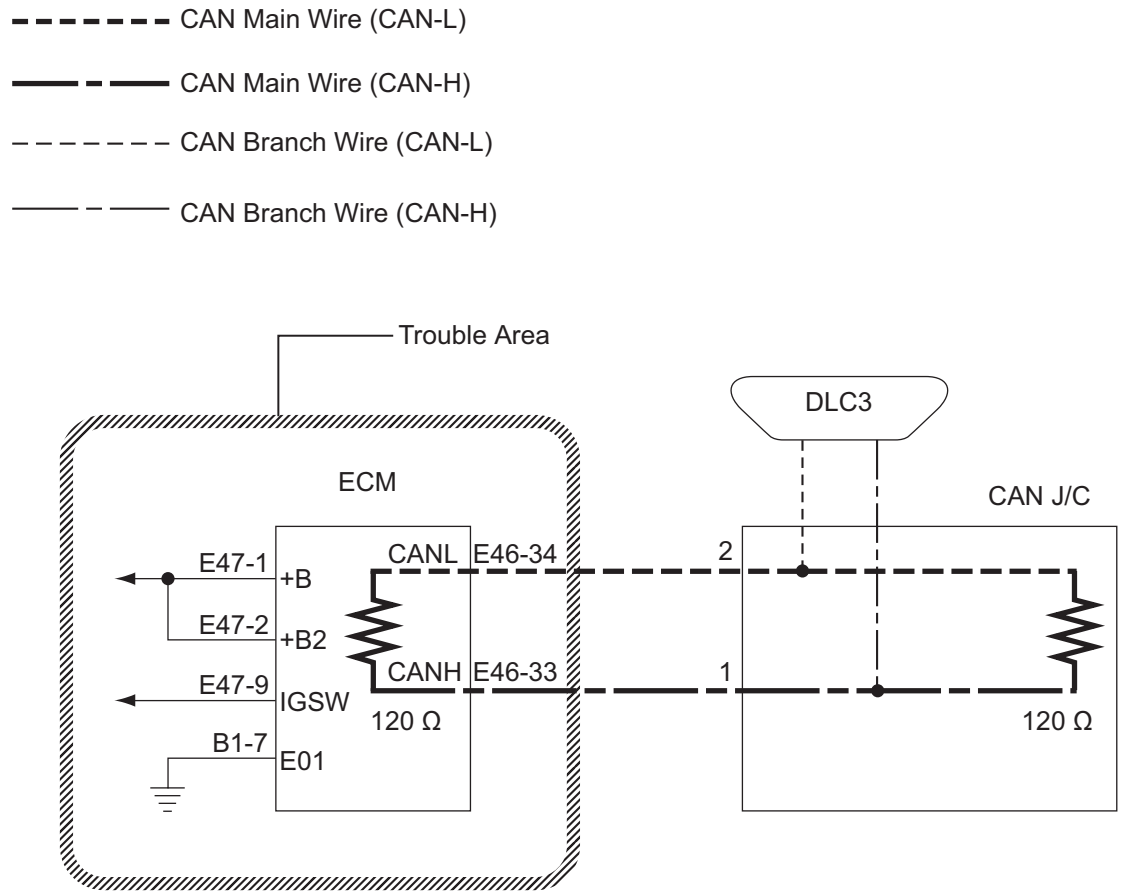
REPLACE STEERING ANGLE SENSOR

ECM Communication Stop Mode

DESCRIPTION

Detection Item	Symptom	Trouble Area
ECM Communication Stop Mode	• "ENGINE" not displayed on "BUS CHECK" screen of intelligent tester via CAN VIM • Applies to "ECM COMMUNICATION STOP MODE" in "DTC combination table"	• Power source circuit of ECM • ECM main wire or connector • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

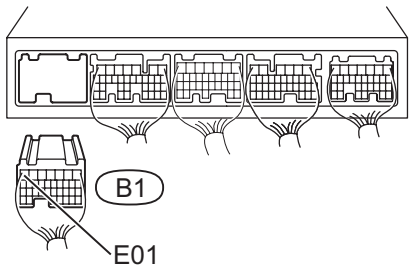
- **Turn the ignition switch off before measuring the resistances of the CAN main wire and the CAN branch wire.**
- **After the ignition switch is turned off, check that the key reminder warning system is not in operation.**

- **Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors. If doors need to be opened in order to check connectors, open the doors and leave them open.**
  HINT:
  Operating the ignition switch, any switches or any doors triggers related ECU and sensor communication with the CAN, which causes resistance variation.

1	CHECK HARNESS AND CONNECTOR (+B2, +B, IGSW, E01)

Wire Harness Side:

ECM Connector



C140798E01

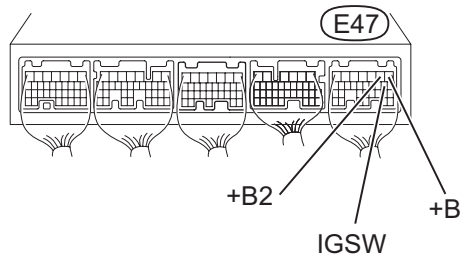
(a) Turn the ignition switch OFF.
(b) Disconnect the B1 ECM connector.
(c) Measure the resistance.
Standard resistance

Tester Connection	Condition	Specified Condition
B1-7 (E01) - Body ground	Always	Below 1 Ω

(d) Reconnect the ECM connector.

Wire Harness Side:

ECM Connector



C140797E01

(e) Turn the ignition switch ON.
(f) Measure the voltage
Standard voltage

Tester Connection	Condition	Specified Condition
E47-1 (+B) - Body ground	Ignition switch ON	11 to 14 V
E47-2 (+B2) - Body ground	Ignition switch ON	11 to 14 V
E47-9 (IGSW) - Body ground	Ignition switch ON	11 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

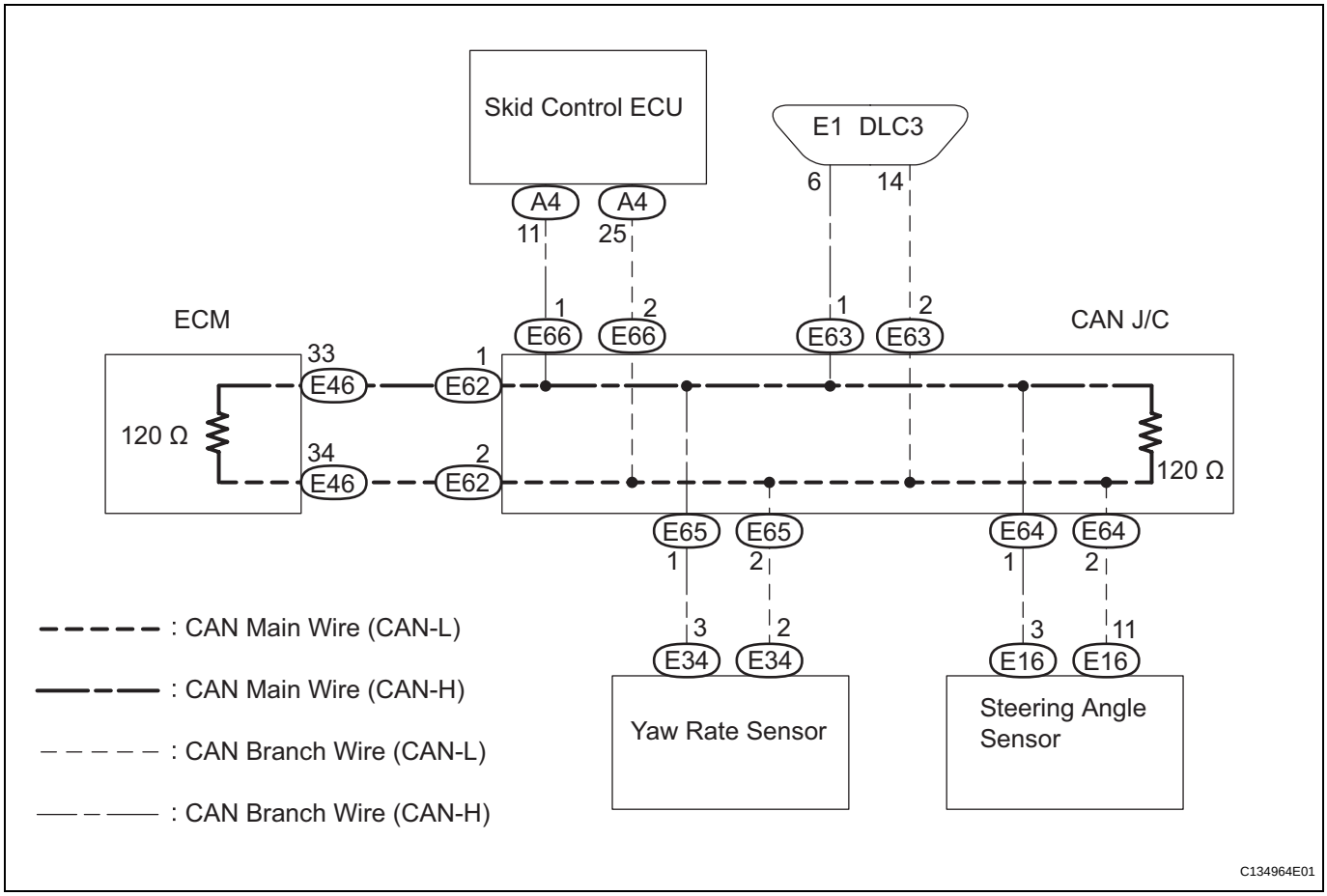
REPLACE ECM

CAN Bus Line

DESCRIPTION

When any DTC for the CAN communication system is output, first measure the resistance between the terminals of the DLC3 to specify the trouble area, and check that there is no short in the CAN main wire, between the CAN bus lines, to +B, or to GND.

WIRING DIAGRAM



INSPECTION PROCEDURE

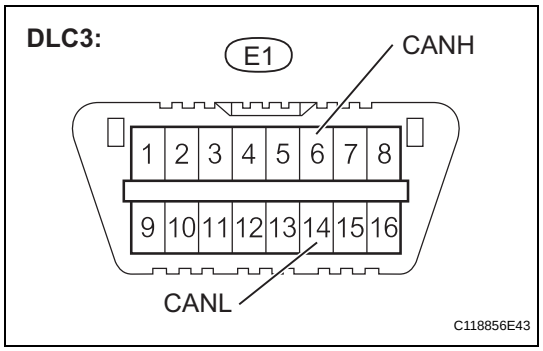
NOTICE:

- **Turn the ignition switch off before measuring the resistances of the CAN main wire and the CAN branch wire.**
- **After the ignition switch is turned off, check that the key reminder warning system is not in operation.**
- **Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors. If doors need to be opened in order to check connectors, open the doors and leave them open.**

  HINT:

  Operating the ignition switch, any switches or any doors triggers related ECU and sensor communication with the CAN, which causes resistance variation.

1	**CHECK CAN BUS LINE (MAIN WIRE FOR DISCONNECTION, BUS LINES FOR SHORT CIRCUIT)**



(a) Turn the ignition switch OFF.
(b) Measure the resistance.
Standard resistance

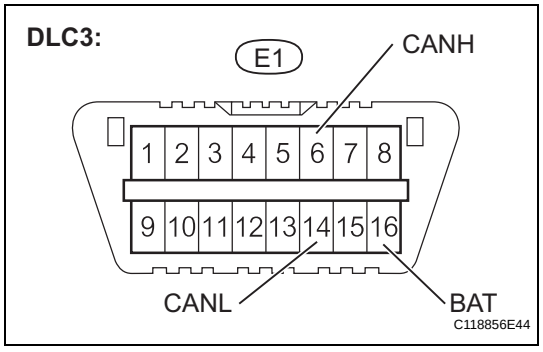
Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	54 to 69 Ω	OK
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	69 Ω or more	NG-A
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	54 Ω or less	NG-B

NG-A → **CHECK CAN MAIN WIRE (FOR OPEN CIRCUIT)**

NG-B → **CHECK CAN BUS LINE (FOR SHORT CIRCUIT)**

OK

2	**CHECK CAN BUS LINE (FOR SHORT TO +B)**



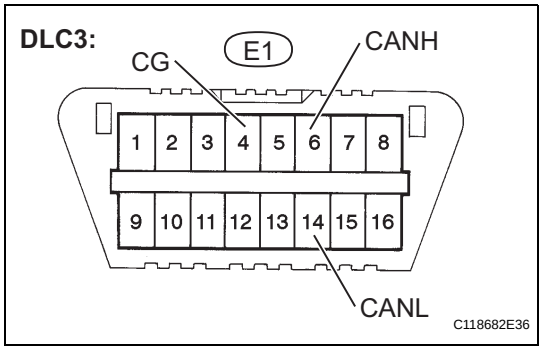
(a) Turn the ignition switch OFF.
(b) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG

NG → **CHECK CAN BUS LINE (FOR SHORT TO +B)**

OK

3	CHECK CAN BUS LINE (FOR SHORT TO GND)



(a) Turn the ignition switch OFF.
(b) Measure the resistance.

Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG

NG → CHECK CAN BUS LINE (FOR SHORT TO GND)

OK

HOW TO PROCEED WITH TROUBLESHOOTING

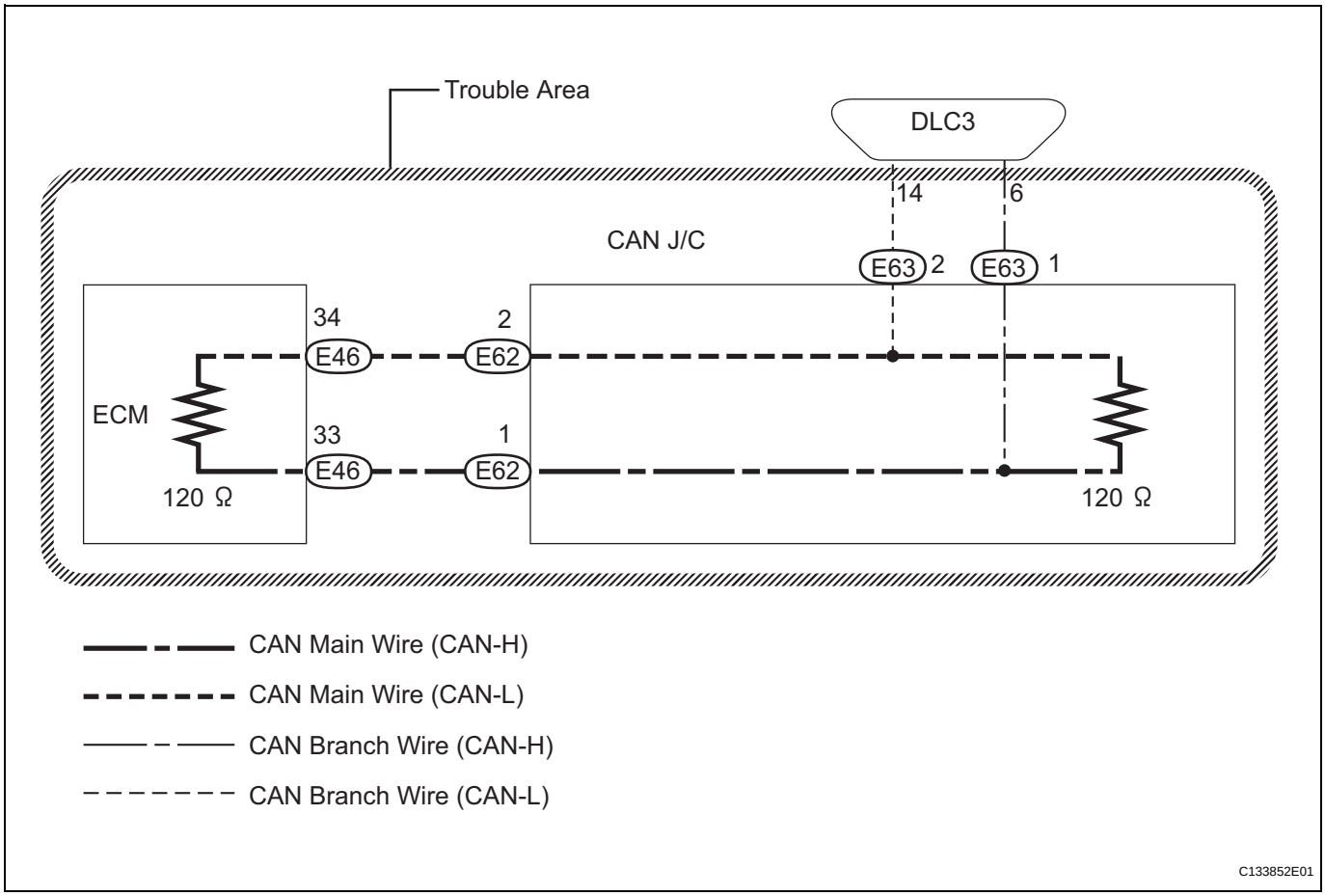
Open in CAN Main Wire

DESCRIPTION

There may be an open circuit in the CAN main wire and/or the DLC3 branch wire when the resistance between terminals 6 (CANH) and 14 (CANL) of the DLC3 is 69 Ω or more.

Symptom	Trouble Area
Resistance between terminals 6 (CANH) and 14 (CANL) of DLC3 is 69 Ω or more.	• CAN main wire or connector • ECM • CAN J/C

WIRING DIAGRAM



INSPECTION PROCEDURE

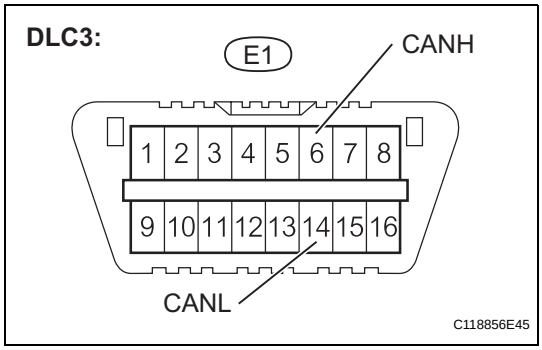
NOTICE:

- **Turn the ignition switch off before measuring the resistances of the CAN main wire and the CAN branch wire.**
- **After the ignition switch is turned off, check that the key reminder warning system is not in operation.**
- **Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors. If doors need to be opened in order to check connectors, open the doors and leave them open.**

  HINT:

  Operating the ignition switch, any switches or any doors triggers related ECU and sensor communication with the CAN, which causes resistance variation.

1 CHECK DLC3



(a) Turn the ignition switch OFF.
(b) Measure the resistance.
Standard resistance

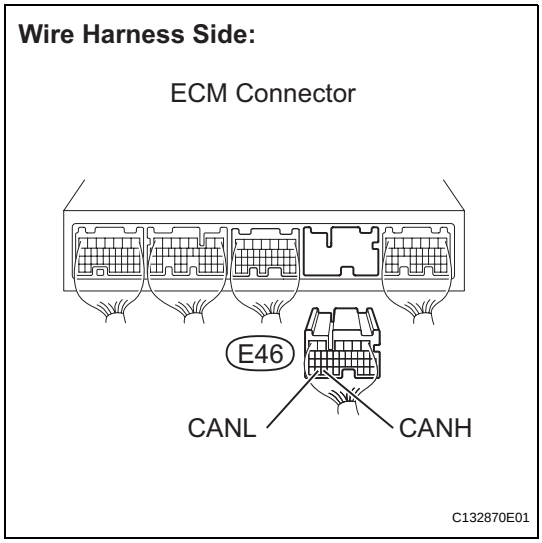
Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	108 to 132 Ω	A
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	132 Ω or higher	B

NOTICE:
When the measured value is 132 Ω or more and a CAN communication system diagnostic trouble code is output, there may be a fault besides disconnection of the DLC3 branch wire. For that reason, troubleshooting should be performed again from "HOW TO PROCEED WITH TROUBLESHOOTING" (See page CA-6) after repairing the trouble area.

B → **REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO DLC3 (CAN-H, CAN-L)**

A

2 CHECK CAN MAIN WIRE FOR DISCONNECTION (ECM)



(a) Disconnect the E46 ECM connector.
(b) Measure the resistance.
Standard resistance

Tester Connection	Condition	Specified Condition
E46-33 (CANH) - E46-34 (CANL)	Ignition switch OFF	108 to 132 Ω

OK → **REPLACE ECM**

NG

3 CONNECT CONNECTOR

(a) Reconnect the ECM connector.

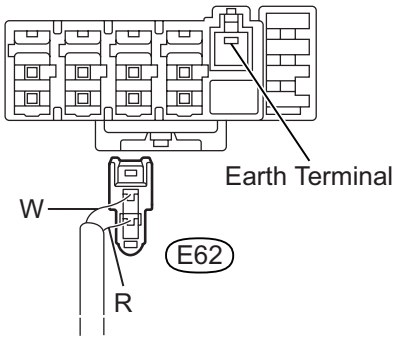
NEXT

CA

4	**INSPECT CAN J/C**

CAN J/C "A" Side (w/ Earth Terminal):

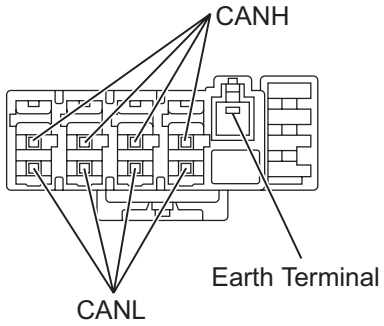
Wire Harness Side:



C133849E01

(a) Disconnect the E62 CAN main wire connector.
NOTICE:
- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

CAN J/C "A" Side (w/ Earth Terminal):



C133851E01

(b) Measure the resistance.
Standard resistance

Tester Connection	Condition	Specified Condition
CANH - CANL	Ignition switch OFF	108 to 132 Ω

NG → **REPLACE CAN J/C**

OK

REPAIR OR REPLACE CAN MAIN WIRE OR CONNECTOR (ECM - CAN J/C (CAN-H, CAN-L))

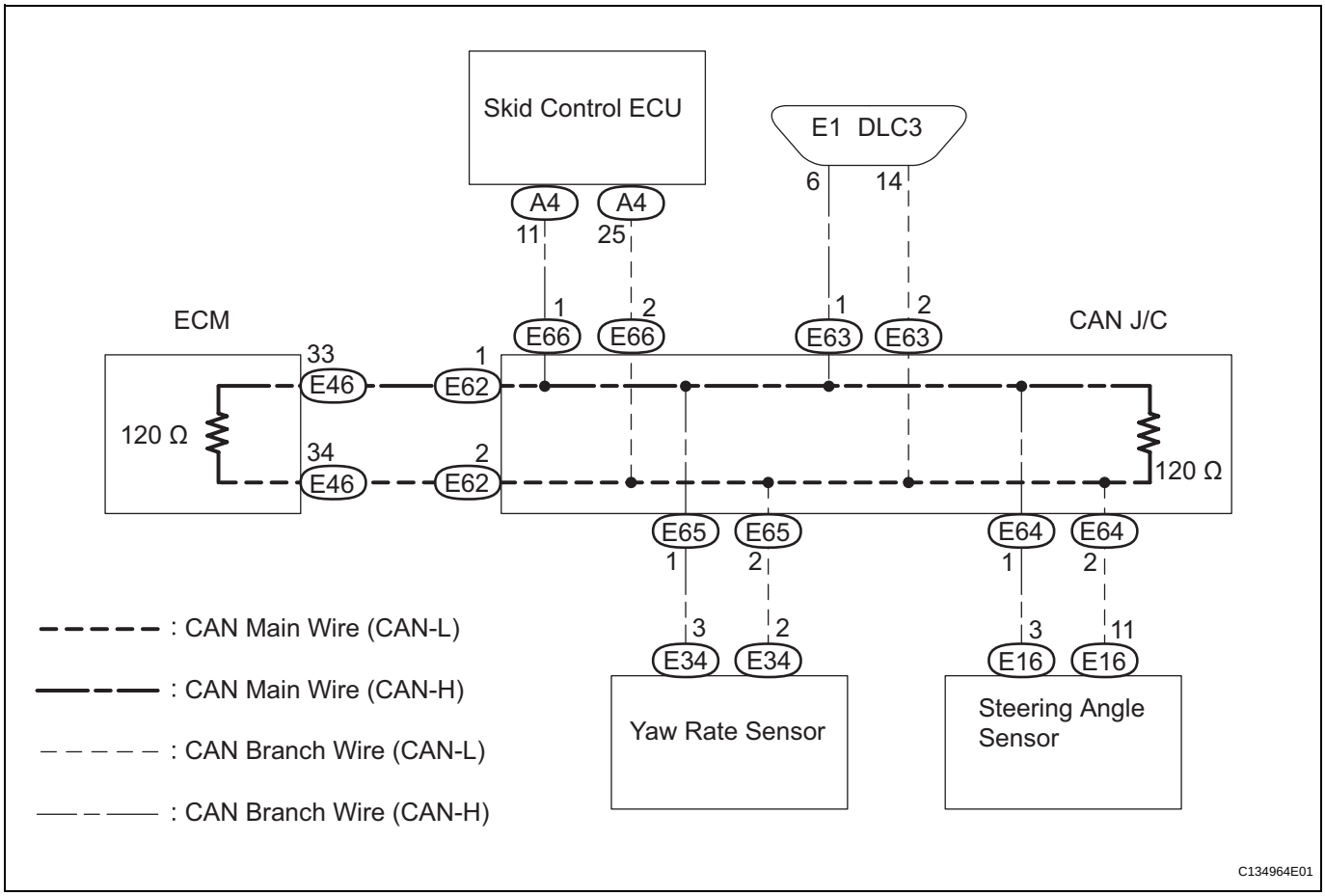
Short in CAN Bus Lines

DESCRIPTION

The CAN bus lines are considered to be shorted when the resistance between terminals 6 (CANH) and 14 (CANL) of the DLC3 is below 54 Ω.

Symptom	Trouble Area
Resistance between terminals 6 (CANH) and 14 (CANL) of DLC3 is below 54 Ω.	• Short in CAN bus lines • ECM • Skid control ECU • Yaw rate sensor • Steering angle sensor • CAN J/C

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

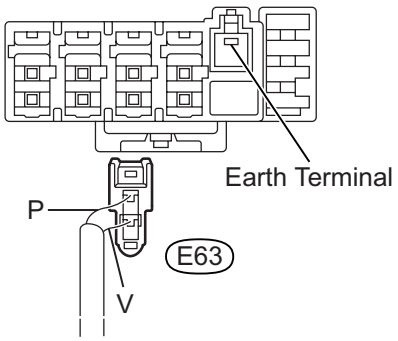
- **Turn the ignition switch off before measuring the resistances of the CAN main wire and the CAN branch wire.**
- **After the ignition switch is turned off, check that the key reminder warning system is not in operation.**

- **Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors. If doors need to be opened in order to check connectors, open the doors and leave them open.**
  HINT:
  Operating the ignition switch, any switches or any doors triggers related ECU and sensor communication with the CAN, which causes resistance variation.

1	CHECK CAN BUS LINES FOR SHORT CIRCUIT (DLC3 BRANCH WIRE)

CAN J/C "A" Side (w/ Earth Terminal):

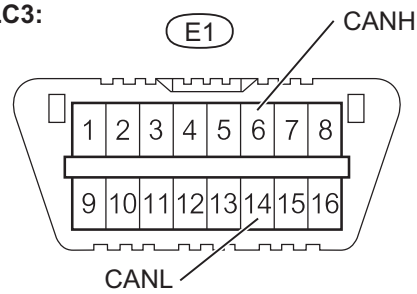
Wire Harness Side:



C133849E02

(a) Turn the ignition switch OFF.
(b) Disconnect the E63 DLC3 branch wire connector.
NOTICE:
- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

DLC3:



C118856E45

(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	Below 1 Ω	NG

NG → **REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO DLC3 (CAN-H, CAN-L)**

OK

2	CONNECT CONNECTOR

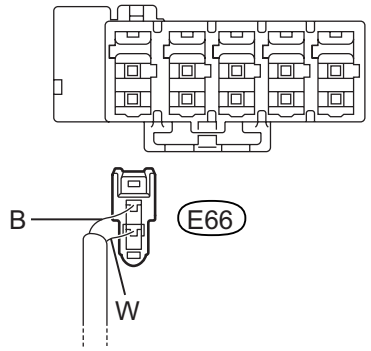
(a) Reconnect the DLC3 branch wire connector.

NEXT

3	CHECK CAN BUS LINES FOR SHORT CIRCUIT (SKID CONTROL ECU BRANCH WIRE)

CAN J/C "B" Side (w/o Earth Terminal):

Wire Harness Side:



C133850E01

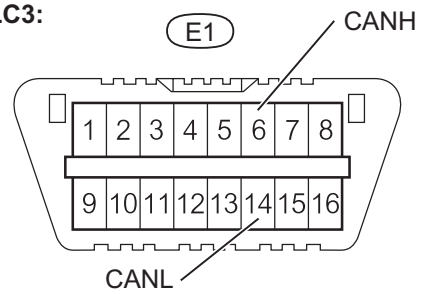
(a) Turn the ignition switch OFF.

(b) Disconnect the E66 skid control ECU branch wire connector.

NOTICE:

- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

DLC3:



C118856E45

(c) Measure the resistance.

Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	Below 1 Ω	NG

OK → **Go to step 10**

NG

4	CONNECT CONNECTOR

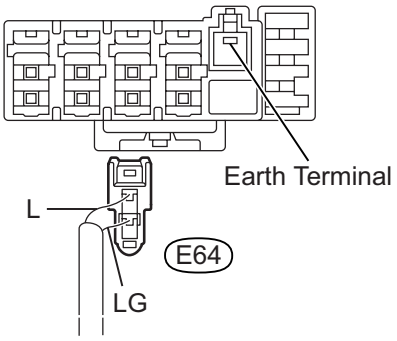
(a) Reconnect the skid control ECU branch wire connector.

NEXT

5 CHECK CAN BUS LINES FOR SHORT CIRCUIT (YAW RATE SENSOR BRANCH WIRE)

CAN J/C "A" Side (w/ Earth Terminal):

Wire Harness Side:



C133849E03

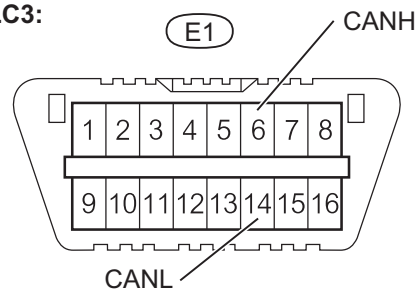
(a) Turn the ignition switch OFF.

(b) Disconnect the E64 yaw rate sensor branch wire connector.

NOTICE:

- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

DLC3:



C118856E45

(c) Measure the resistance.

Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	Below 1 Ω	NG

OK → **Go to step 12**

NG

6 CONNECT CONNECTOR

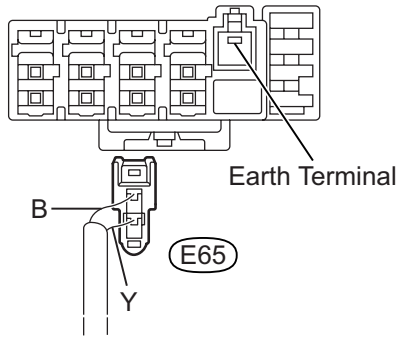
(a) Reconnect the yaw rate sensor branch wire connector.

NEXT

7	CHECK CAN BUS LINES FOR SHORT CIRCUIT (STEERING ANGLE SENSOR BRANCH WIRE)

CAN J/C "A" Side (w/ Earth Terminal):

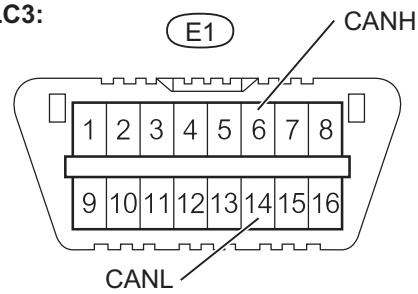
Wire Harness Side:



C133849E04

(a) Turn the ignition switch OFF.
(b) Disconnect the E65 steering angle sensor branch wire connector.
NOTICE:
- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

DLC3:



C118856E45

(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	Below 1 Ω	NG

OK → **Go to step 14**

NG

8	CONNECT CONNECTOR

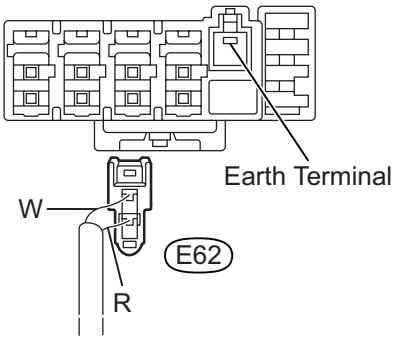
(a) Reconnect the steering angle sensor branch wire connector.

NEXT

9 CHECK CAN BUS LINES FOR SHORT CIRCUIT (ECM MAIN WIRE)

CAN J/C "A" Side (w/ Earth Terminal):

Wire Harness Side:



C133849E01

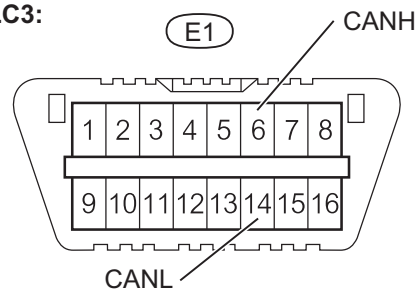
(a) Turn the ignition switch OFF.

(b) Disconnect the E62 ECM main wire connector.

NOTICE:

- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

DLC3:



C118856E45

(c) Measure the resistance.

Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	Below 1 Ω	NG

OK → **Go to step 16**

NG

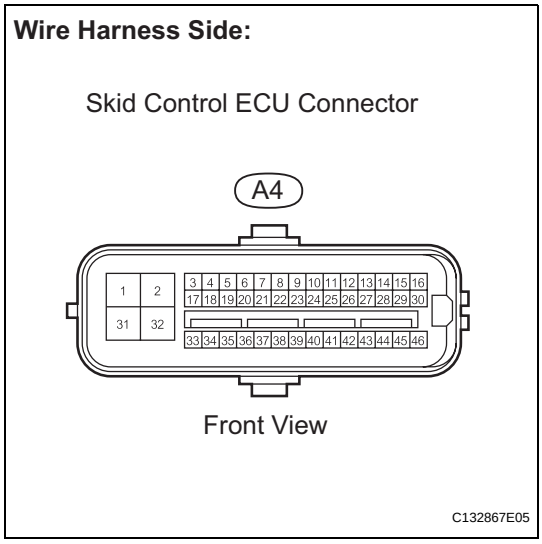
REPLACE CAN J/C

10 CONNECT CONNECTOR

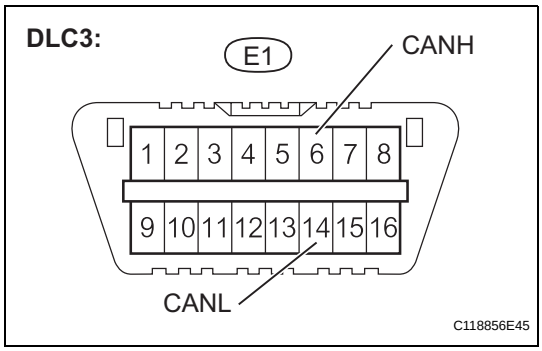
(a) Reconnect the skid control ECU branch wire connector.

NEXT

11	CHECK CAN BUS LINES FOR SHORT CIRCUIT (SKID CONTROL ECU BRANCH WIRE)



(a) Turn the ignition switch OFF.
(b) Disconnect the A4 skid control ECU connector.



(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	Below 1 Ω	NG

OK → REPLACE MASTER CYLINDER SOLENOID

NG → REPLACE CAN BRANCH WIRE CONNECTED TO SKID CONTROL ECU (CAN-H, CAN-L)

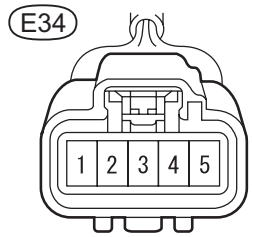
12	CONNECT CONNECTOR

(a) Reconnect the yaw rate sensor branch wire connector.

NEXT

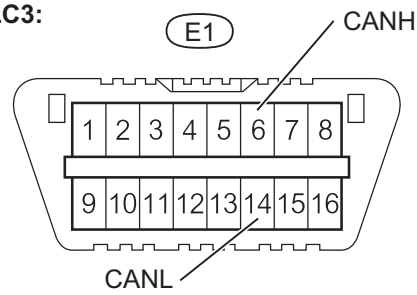
13	CHECK CAN BUS LINES FOR SHORT CIRCUIT (YAW RATE SENSOR BRANCH WIRE)

Wire Harness Side:



(a) Turn the ignition switch OFF.
(b) Disconnect the E34 yaw rate sensor connector.

DLC3:



(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	Below 1 Ω	NG

OK → **REPLACE YAW RATE SENSOR**

NG

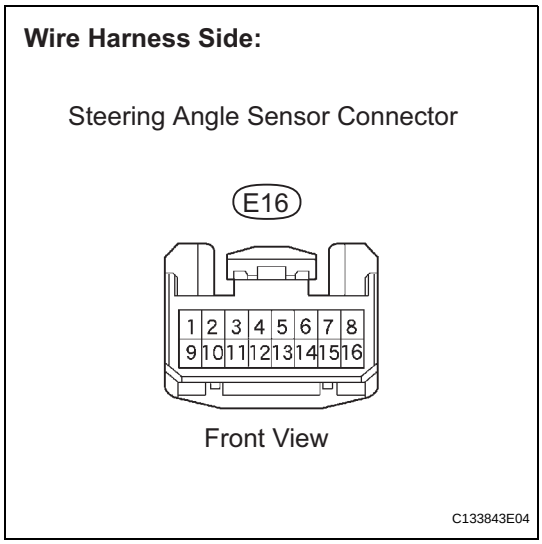
REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO YAW RATE SENSOR (CAN-H, CAN-L)

14	CONNECT CONNECTOR

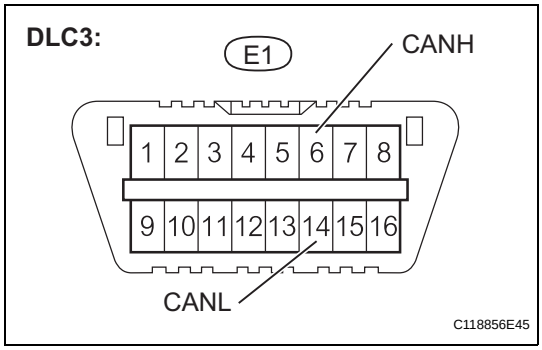
(a) Reconnect the steering angle sensor branch wire connector.

NEXT

15	CHECK CAN BUS LINES FOR SHORT CIRCUIT (STEERING ANGLE SENSOR BRANCH WIRE)



(a) Turn the ignition switch OFF.
(b) Disconnect the E16 steering angle sensor connector.



(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	Below 1 Ω	NG

OK → REPLACE STEERING ANGLE SENSOR

NG

REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO STEERING ANGLE SENSOR (CAN-H, CAN-L)

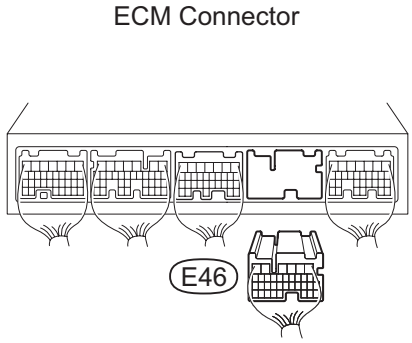
16	CONNECT CONNECTOR

(a) Reconnect the ECM main wire connector.

NEXT

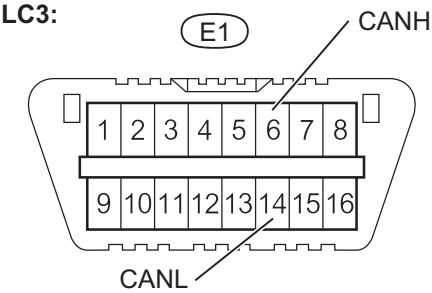
17	CHECK CAN BUS LINES FOR SHORT CIRCUIT (ECM MAIN WIRE)

Wire Harness Side:



(a) Turn the ignition switch OFF.
(b) Disconnect the E46 ECM connector.

DLC3:



(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-14 (CANL)	Ignition switch OFF	Below 1 Ω	NG

OK → **REPLACE ECM**

NG

REPAIR OR REPLACE CAN MAIN WIRE CONNECTED TO ECM (CAN-H, CAN-L)

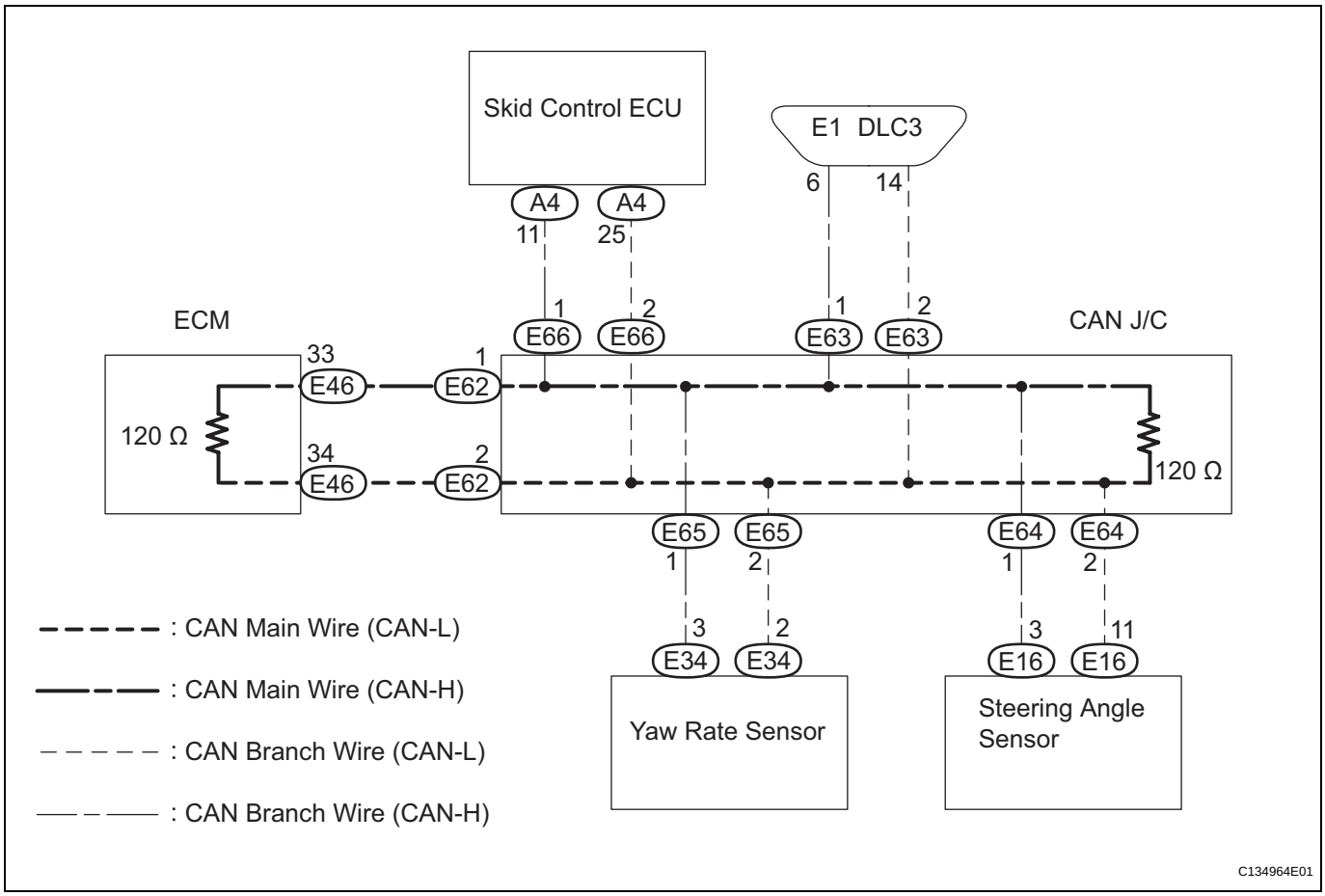
Short to B+ in CAN Bus Line

DESCRIPTION

A short to +B is suspected in the CAN bus line when there is continuity between terminals 16 (BAT) and 6 (CANH) or terminals 16 (BAT) and 14 (CANL) of the DLC3.

Symptom	Trouble Area
There is continuity between terminals 16 (BAT) and 6 (CANH) or 16 (BAT) and 14 (CANL) of the DLC3.	• Short to +B in CAN bus line • ECM • Skid control ECU • Yaw rate sensor • Steering angle sensor

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **Turn the ignition switch off before measuring the resistances of the CAN main wire and the CAN branch wire.**
- **After the ignition switch is turned off, check that the key reminder warning system is not in operation.**
- **Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors. If doors need to be opened in order to check connectors, open the doors and leave them open.**

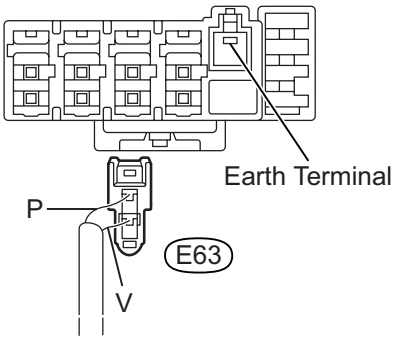
  HINT:

  Operating the ignition switch, any switches or any doors triggers related ECU and sensor communication with the CAN, which causes resistance variation.

1	CHECK CAN BUS LINE FOR SHORT TO +B (DLC3 BRANCH WIRE)

CAN J/C "A" Side (w/ Earth Terminal):

Wire Harness Side:



C133849E02

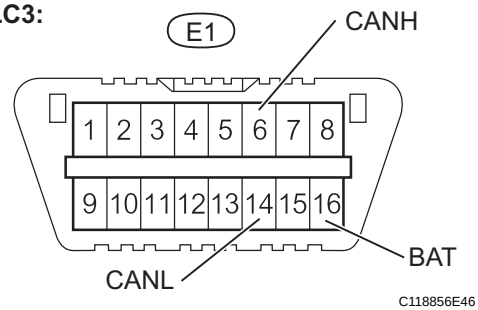
(a) Turn the ignition switch OFF.

(b) Disconnect the E63 DLC3 branch wire connector.

NOTICE:

- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

DLC3:



C118856E46

(c) Measure the resistance.

Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG

NG → **REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO DLC3 (CAN-H, CAN-L)**

OK

2	CONNECT CONNECTOR

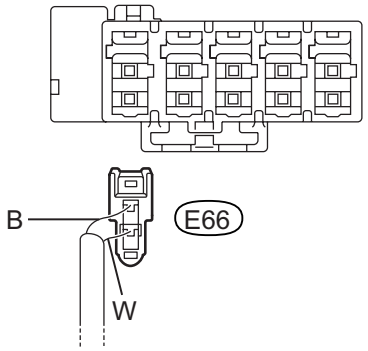
(a) Reconnect the DLC3 branch wire connector.

NEXT

3	CHECK CAN BUS LINE FOR SHORT TO +B (SKID CONTROL ECU BRANCH WIRE)

CAN J/C "B" Side (w/o Earth Terminal):

Wire Harness Side:



C133850E01

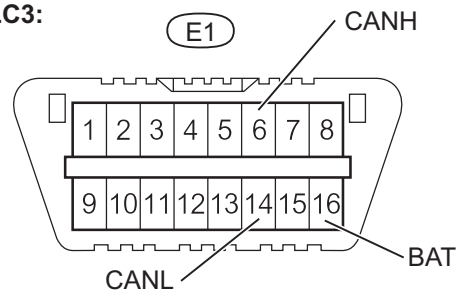
(a) Turn the ignition switch OFF.

(b) Disconnect the E66 skid control ECU branch wire connector.

NOTICE:

- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

DLC3:



C118856E46

(c) Measure the resistance.

Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG

OK → **Go to step 10**

NG

4	CONNECT CONNECTOR

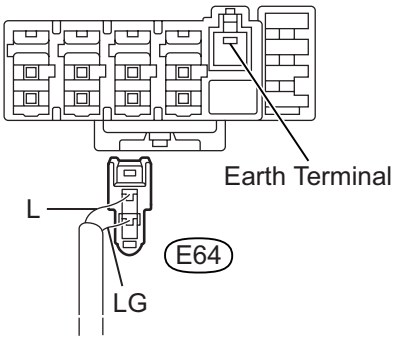
(a) Reconnect the skid control ECU branch wire connector.

NEXT

5 CHECK CAN BUS LINE FOR SHORT TO +B (YAW RATE SENSOR BRANCH WIRE)

CAN J/C "A" Side (w/ Earth Terminal):

Wire Harness Side:



C133849E03

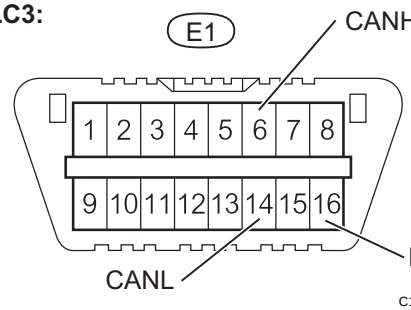
(a) Turn the ignition switch OFF.

(b) Disconnect the E64 yaw rate sensor branch wire connector.

NOTICE:

- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

DLC3:



C118856E46

(c) Measure the resistance.

Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG

OK → **Go to step 12**

NG

6 CONNECT CONNECTOR

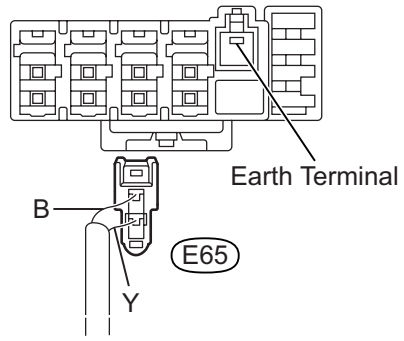
(a) Reconnect the yaw rate sensor branch wire connector.

NEXT

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

CAN J/C "A" Side (w/ Earth Terminal):

Wire Harness Side:



C133849E04

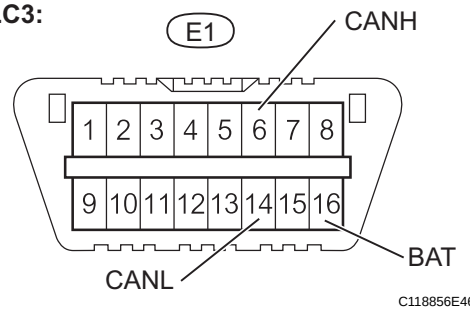
(a) Turn the ignition switch OFF.

(b) Disconnect the E65 steering angle sensor branch wire connector.

NOTICE:

- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

DLC3:



C118856E46

(c) Measure the resistance.

Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG

OK → **Go to step 14**

NG

8	CONNECT CONNECTOR

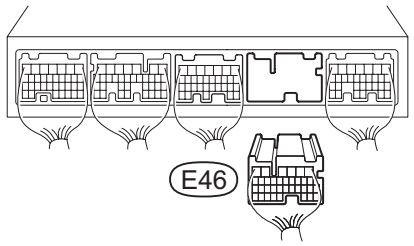
(a) Reconnect the steering angle sensor branch wire connector.

NEXT

9	CHECK CAN BUS LINE FOR SHORT TO +B (ECM MAIN WIRE)

Wire Harness Side:

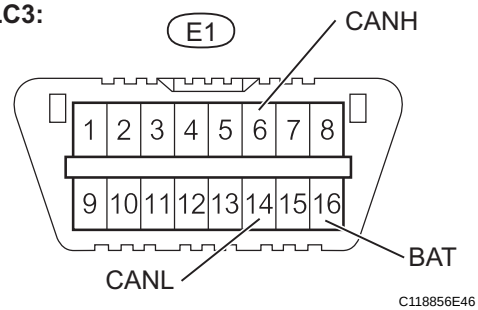
ECM Connector



C132870E02

(a) Turn the ignition switch OFF.
(b) Disconnect the E46 ECM connector.

DLC3:



C118856E46

(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG

OK → **REPLACE ECM**

NG

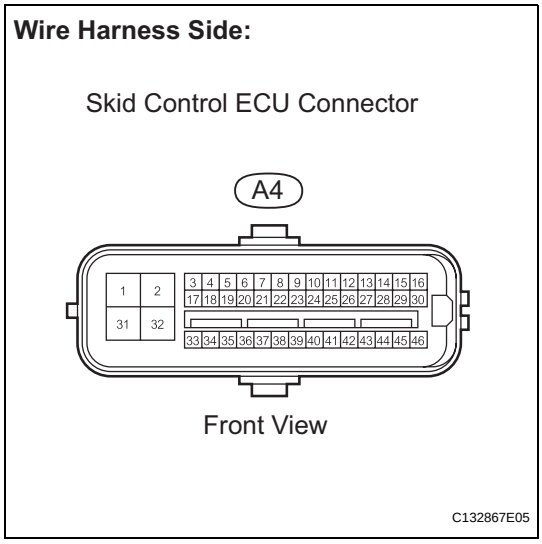
REPAIR OR REPLACE CAN MAIN WIRE OR CONNECTOR (ECM - CAN J/C (CAN-H, CAN-L))

10	CONNECT CONNECTOR

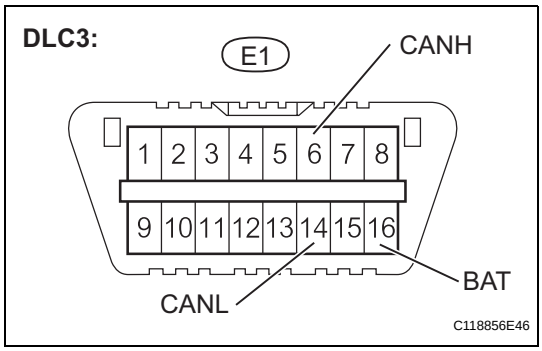
(a) Reconnect the skid control ECU branch wire connector.

NEXT

11	CHECK CAN BUS LINE FOR SHORT TO +B (SKID CONTROL ECU BRANCH WIRE)



(a) Turn the ignition switch OFF.
(b) Disconnect the A4 skid control ECU connector.



(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG

OK → REPLACE MASTER CYLINDER SOLENOID

NG

REPAIR OR REPLACE SKID CONTROL ECU BRANCH LINE OR CONNECTOR (CAN-H, CAN-L)

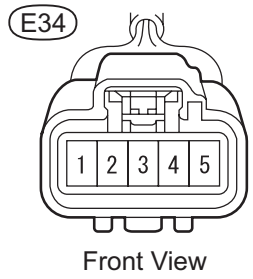
12	CONNECT CONNECTOR

(a) Reconnect the yaw rate sensor branch wire connector.

NEXT

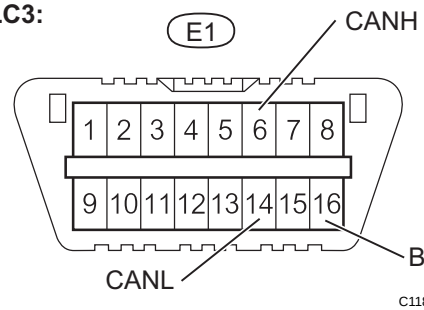
13 CHECK CAN BUS LINE FOR SHORT TO +B (YAW RATE SENSOR BRANCH WIRE)

Wire Harness Side:



(a) Turn the ignition switch OFF.
(b) Disconnect the E34 yaw rate sensor connector.

DLC3:



(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG

OK → **REPLACE YAW RATE SENSOR**

NG

REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO YAW RATE SENSOR (CAN-H, CAN-L)

14 CONNECT CONNECTOR

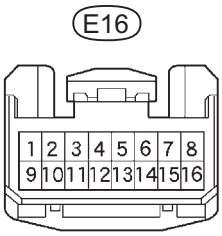
(a) Reconnect the steering angle sensor branch wire connector.

NEXT

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

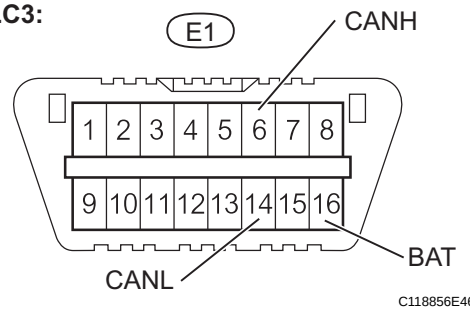
Wire Harness Side:

Steering Angle Sensor Connector



(a) Turn the ignition switch OFF.
(b) Disconnect the E16 steering angle sensor connector.

DLC3:



(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-16 (BAT)	Ignition switch OFF	Below 1 Ω	NG

OK → REPLACE STEERING ANGLE SENSOR

NG

REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO STEERING ANGLE SENSOR (CAN-H, CAN-L)

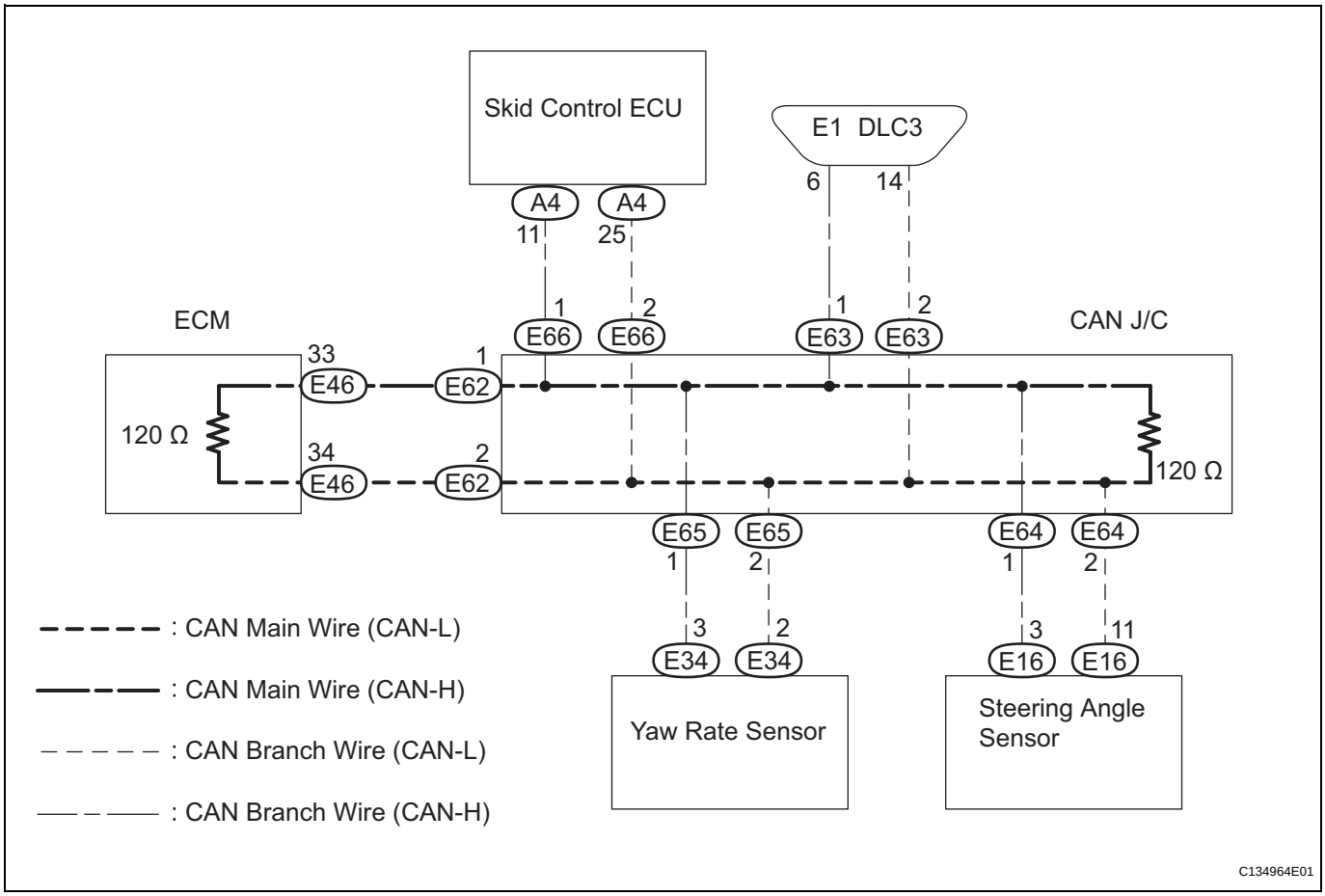
Short to GND in CAN Bus Line

DESCRIPTION

A short to GND is suspected in the CAN bus line when there is continuity between terminals 4 (CG) and 6 (CANH) or terminals 4 (CG) and 14 (CANL) of the DLC3.

Symptoms	Trouble Area
There is continuity between terminals 4 (CG) and 6 (CANH) or terminals 4 (CG) and 14 (CANL) of the DLC3.	• Short to GND in CAN bus line • ECM • Skid control ECU • Yaw rate sensor • Steering angle sensor • CAN J/C

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

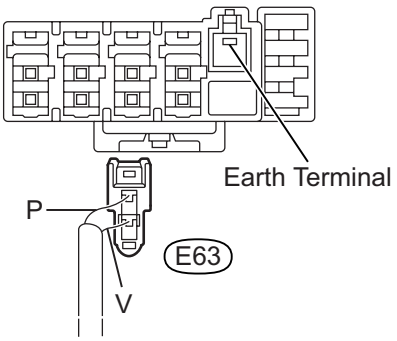
- **Turn the ignition switch off before measuring the resistances of the CAN main wire and the CAN branch wire.**
- **After the ignition switch is turned off, check that the key reminder warning system is not in operation.**

- **Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors. If doors need to be opened in order to check connectors, open the doors and leave them open.**
  HINT:
  Operating the ignition switch, any switches or any doors triggers related ECU and sensor communication with the CAN, which causes resistance variation.

1	CHECK CAN BUS LINE FOR SHORT TO GND (DLC3 BRANCH WIRE)

CAN J/C "A" Side (w/ Earth Terminal):

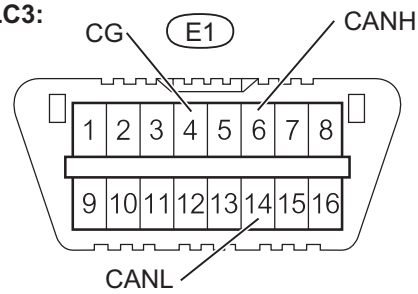
Wire Harness Side:



C133849E02

(a) Turn the ignition switch OFF.
(b) Disconnect the E63 DLC3 branch wire connector.
NOTICE:
- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

DLC3:



C118856E47

(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG

NG → **REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO DLC3 (CAN-H, CAN-L)**

OK

2	CONNECT CONNECTOR

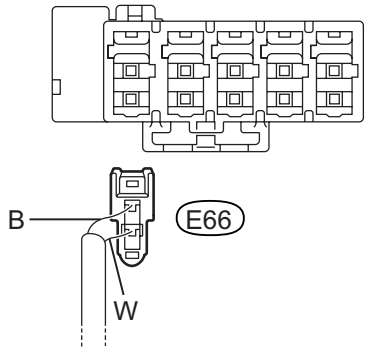
(a) Reconnect the DLC3 branch wire connector.

NEXT

3 CHECK CAN BUS LINE FOR SHORT TO GND (SKID CONTROL ECU BRANCH WIRE)

CAN J/C "B" Side (w/o Earth Terminal):

Wire Harness Side:



C133850E01

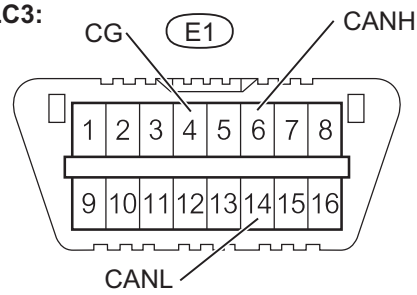
(a) Turn the ignition switch OFF.

(b) Disconnect the E66 skid control ECU branch wire connector.

NOTICE:

- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

DLC3:



C118856E47

(c) Measure the resistance.

Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG

OK → **Go to step 10**

NG

4 CONNECT CONNECTOR

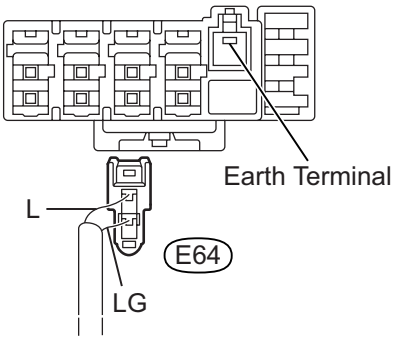
(a) Reconnect the skid control ECU branch wire connector.

NEXT

5 CHECK CAN BUS LINE FOR SHORT TO GND (YAW RATE SENSOR BRANCH WIRE)

CAN J/C "A" Side (w/ Earth Terminal):

Wire Harness Side:



C133849E03

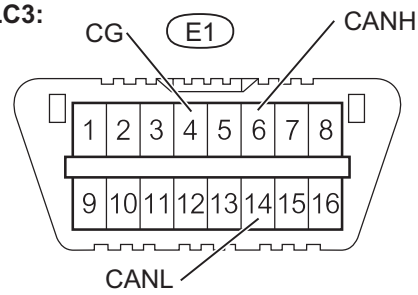
(a) Turn the ignition switch OFF.

(b) Disconnect the E64 yaw rate sensor branch wire connector.

NOTICE:

- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

DLC3:



C118856E47

(c) Measure the resistance.

Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG

NG → **Go to step 12**

OK

6 CONNECT CONNECTOR

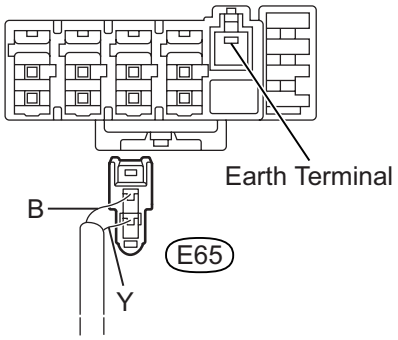
(a) Reconnect the yaw rate sensor branch wire connector.

NEXT

7	CHECK CAN BUS LINE FOR SHORT TO GND (STEERING ANGLE SENSOR BRANCH WIRE)

CAN J/C "A" Side (w/ Earth Terminal):

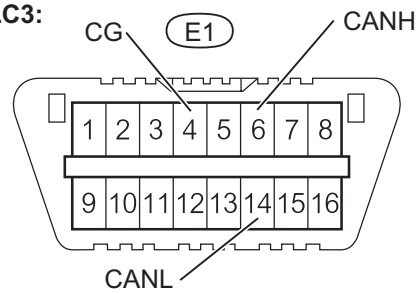
Wire Harness Side:



C133849E04

(a) Turn the ignition switch OFF.
(b) Disconnect the E65 steering angle sensor branch wire connector.
NOTICE:
- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

DLC3:



C118856E47

(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG

OK → **Go to step 14**

NG

8	CONNECT CONNECTOR

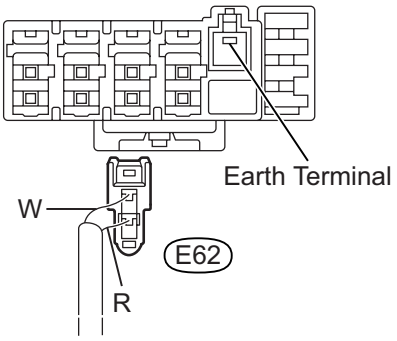
(a) Reconnect the steering angle sensor branch wire connector.

NEXT

9	CHECK CAN BUS LINE FOR SHORT TO GND (ECM MAIN WIRE)

CAN J/C "A" Side (w/ Earth Terminal):

Wire Harness Side:



C133849E01

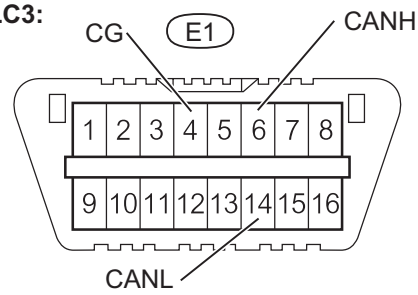
(a) Turn the ignition switch OFF.

(b) Disconnect the E62 ECM main wire connector.

NOTICE:

- **Before disconnecting the connector, make a note of where it is connected.**
- **Reconnect the connector to its original position.**

DLC3:



C118856E47

(c) Measure the resistance.

Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG

OK → **Go to step 16**

NG

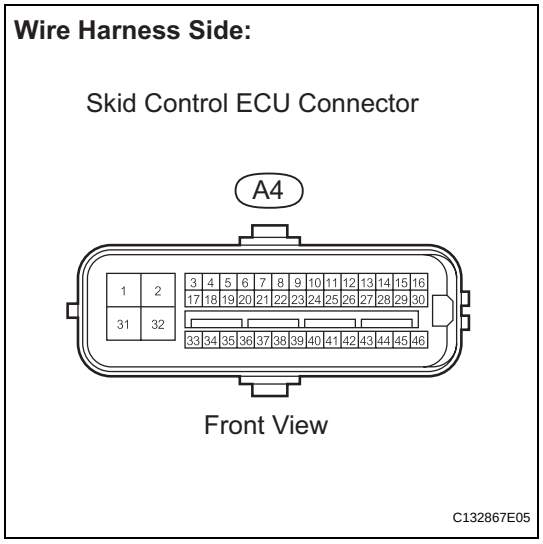
REPLACE CAN J/C

10	CONNECT CONNECTOR

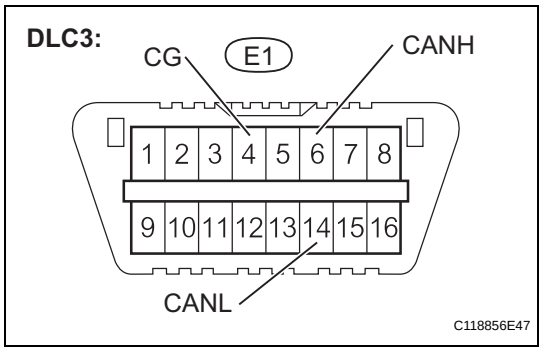
(a) Reconnect the skid control ECU connector.

NEXT

11 CHECK CAN BUS LINE FOR SHORT TO GND (SKID CONTROL ECU BRANCH WIRE)



(a) Turn the ignition switch OFF.
(b) Disconnect the A4 skid control ECU connector.



(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG

OK → **REPLACE MASTER CYLINDER SOLENOID**

NG

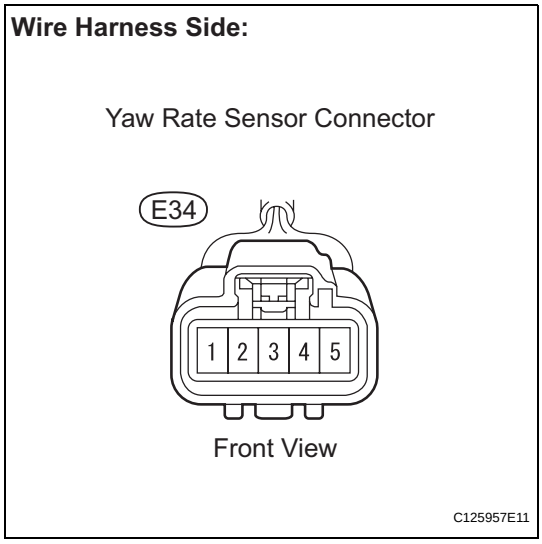
REPAIR OR REPLACE SKID CONTROL ECU BRANCH LINE OR CONNECTOR (CAN-H, CAN-L)

12 CONNECT CONNECTOR

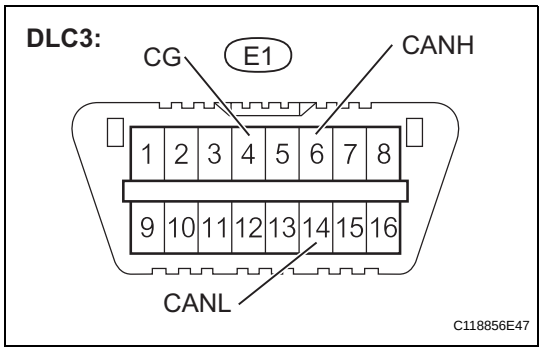
(a) Reconnect the yaw rate sensor branch wire connector.

NEXT

13	CHECK CAN BUS LINE FOR SHORT TO GND (YAW RATE SENSOR BRANCH WIRE)



(a) Turn the ignition switch OFF.
(b) Disconnect the E34 yaw rate sensor connector.



(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG

OK → REPLACE YAW RATE SENSOR

NG

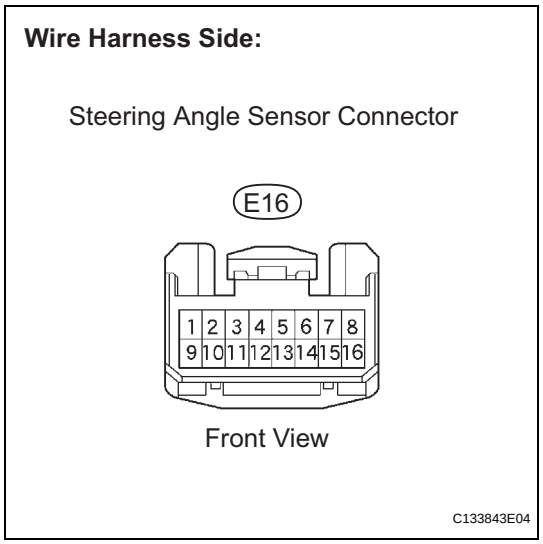
REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO YAW RATE SENSOR (CAN-H, CAN-L)

14	CONNECT CONNECTOR

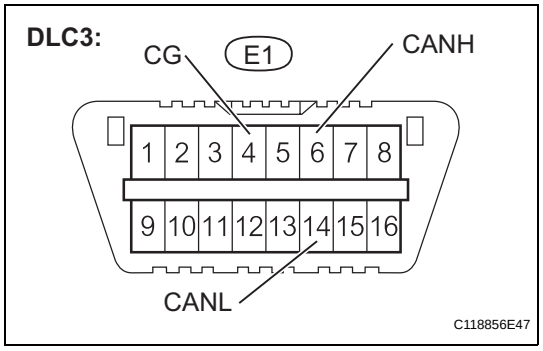
(a) Reconnect the steering angle sensor branch wire connector.

NEXT

15	CHECK CAN BUS LINE FOR SHORT TO GND (STEERING ANGLE SENSOR BRANCH WIRE)



(a) Turn the ignition switch OFF.
(b) Disconnect the E16 steering angle sensor connector.



(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG

OK → REPLACE STEERING ANGLE SENSOR

NG

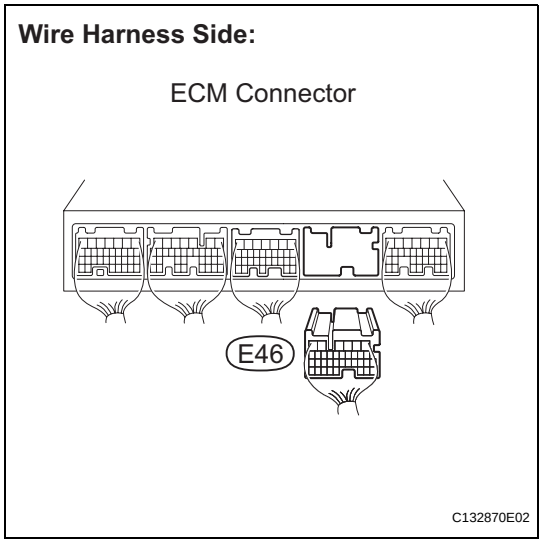
REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO STEERING ANGLE SENSOR (CAN-H, CAN-L)

16	CONNECT CONNECTOR

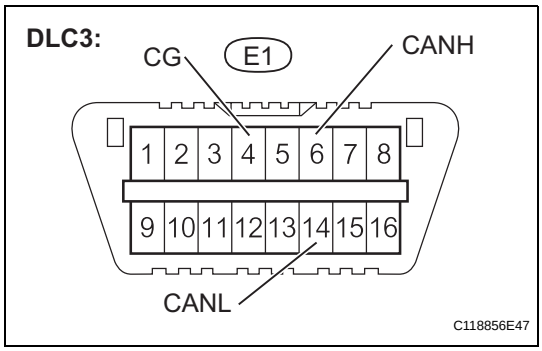
(a) Reconnect the ECM main wire connector.

NEXT

17	CHECK CAN BUS LINE FOR SHORT TO GND (ECM MAIN WIRE)



(a) Turn the ignition switch OFF.
(b) Disconnect the E46 ECM connector.



(c) Measure the resistance.
Result

Tester Connection	Condition	Specified Condition	Proceed to
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	1 Ω or more	OK
E1-6 (CANH) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG
E1-14 (CANL) - E1-4 (CG)	Ignition switch OFF	Below 1 Ω	NG

OK → REPLACE ECM

NG

REPAIR OR REPLACE CAN MAIN WIRE CONNECTED TO ECM (CAN-H, CAN-L)

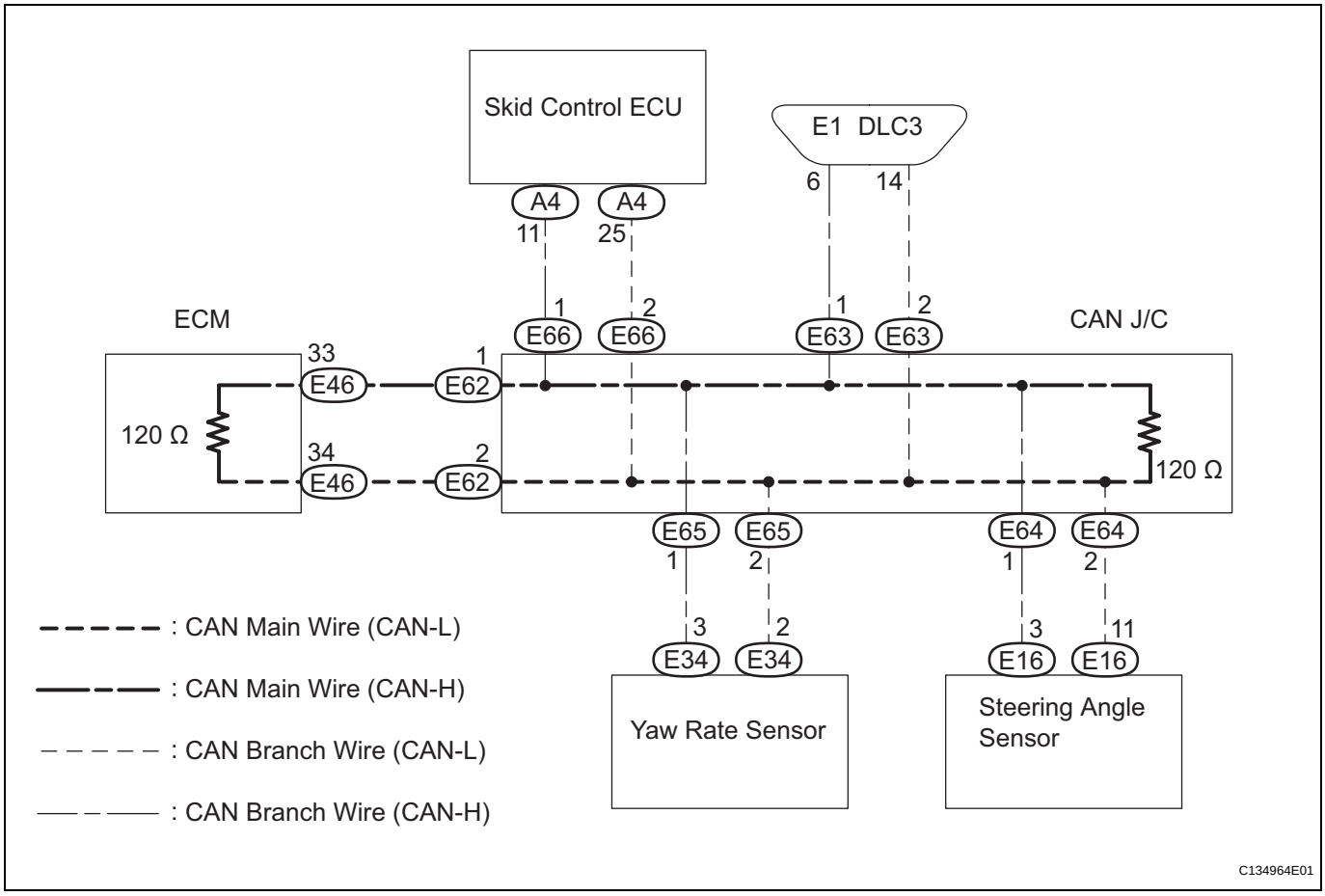
Open in One Side of CAN Branch Line

DESCRIPTION

If 2 or more ECUs and/or sensors do not appear on the intelligent tester "BUS CHECK" screen via the CAN VIM, one side of the CAN branch wire may be open. (one side of the CAN-H [branch wire] / CANL [branch wire] of the ECU and/or sensor is open.)

Symptom	Trouble Area
2 or more ECUs and/or sensors do not appear on intelligent tester "BUS CHECK" screen via CAN VIM.	• Open in one side of CAN branch wire • Skid control ECU • Yaw rate sensor • Steering angle sensor

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **Turn the ignition switch off before measuring the resistances of the CAN main wire and the CAN branch wire.**
- **After the ignition switch is turned off, check that the key reminder warning system is not in operation.**

- **Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors. If doors need to be opened in order to check connectors, open the doors and leave them open.**
  HINT:
  Operating the ignition switch, any switches or any doors triggers related ECU and sensor communication with the CAN, which causes resistance variation.

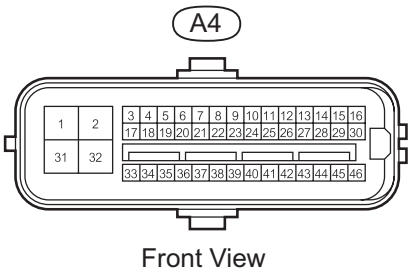
HINT:

- The following is the troubleshooting procedure of an open in either CANH or CANL of the ECU A (SENSOR A).
- Perform the following inspection for the ECUs (sensors) which are not displayed on the intelligent tester. If malfunctions cannot be identified, then perform the following inspection for the ECUs (sensors) connected to CAN communication.

1	CHECK OPEN IN ONE SIDE OF CAN BRANCH LINE (SKID CONTROL ECU)

Wire Harness Side:

Skid Control ECU Connector



C132867E05

(a) Disconnect the skid control ECU connector.
(b) Select "BUS CHECK" on the intelligent tester via the CAN VIM (See page CA-14).
Result

Result	Proceed to
ABS/VSC/TRAC not displayed on the intelligent tester.	A
Several ECUs and sensors other than ABS/VSC/TRAC not displayed on intelligent tester.	B

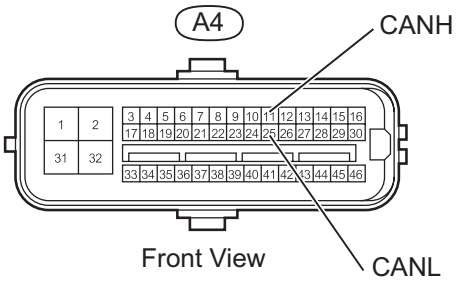
B → **Go to step 3**

A

2	CHECK OPEN IN ONE SIDE OF CAN BRANCH LINE (SKID CONTROL ECU BRANCH WIRE)

Wire Harness Side:

Skid Control ECU Connector



C132867E01

(a) Measure the resistance.
Standard resistance.

Tester Connection	Condition	Specified Condition
A4-11 (CANH) - A4-25 (CANL)	Ignition switch OFF	54 to 69 Ω

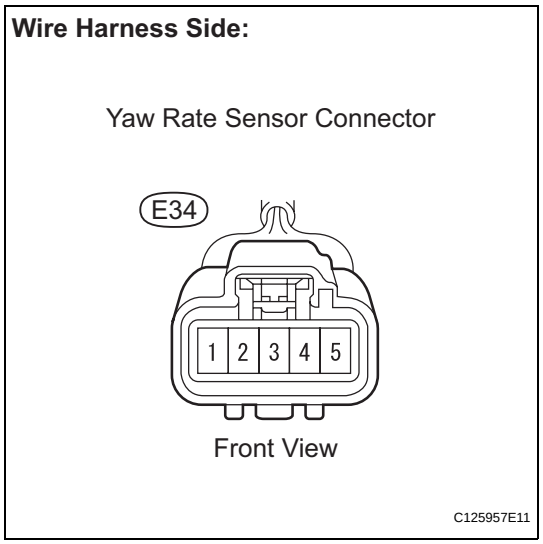
NG → **REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO SKID CONTROL ECU (CAN-H, CAN-L)**

CA

OK

REPLACE MASTER CYLINDER SOLENOID

3 CHECK OPEN IN ONE SIDE OF CAN BRANCH LINE (YAW RATE SENSOR)



(a) Disconnect the yaw rate sensor connector.
(b) Select "BUS CHECK" on the intelligent tester via the CAN VIM (See page CA-14).

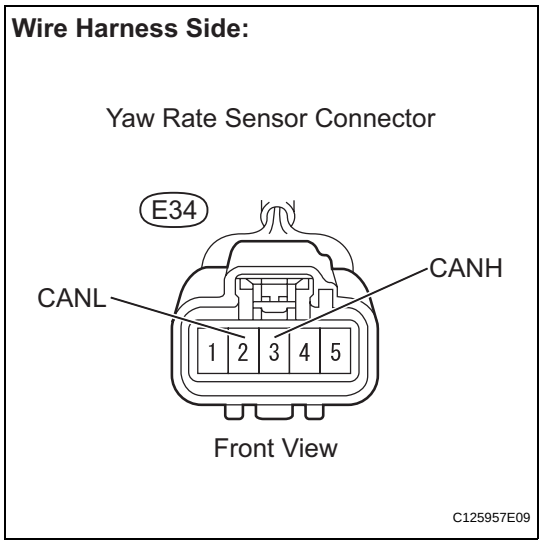
Result

Result	Proceed to
YAW/DECELERATE not displayed on the intelligent tester.	A
Several ECUs and sensors other than YAW/DECELERATE not displayed on intelligent tester.	B

B → **Go to step 5**

A

4 CHECK OPEN IN ONE SIDE OF CAN BRANCH LINE (YAW RATE SENSOR BRANCH WIRE)



(a) Measure the resistance.

Standard resistance.

Tester Connection	Condition	Specified Condition
E34-3 (CANH) - E34-2 (CANL)	Ignition switch OFF	54 to 69 Ω

NG → **REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO YAW RATE SENSOR (CAN-H, CAN-L)**

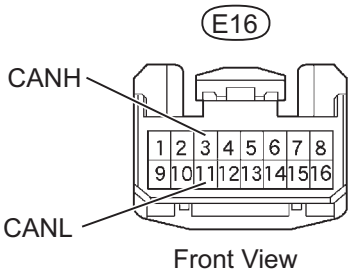
OK

REPLACE YAW RATE SENSOR

5	CHECK OPEN IN ONE SIDE OF CAN BRANCH LINE (STEERING ANGLE SENSOR BRANCH WIRE)

Wire Harness Side:

Steering Angle Sensor Connector



C133843E02

(a) Disconnect the steering angle sensor connector.
(b) Measure the resistance.
Standard resistance.

Tester Connection	Condition	Specified Condition
E16-3 (CANH) - E16-11 (CANL)	Ignition switch OFF	54 to 69 Ω

NG → **REPAIR OR REPLACE CAN BRANCH WIRE CONNECTED TO STEERING ANGLE SENSOR (CAN-H, CAN-L)**

OK

REPLACE STEERING ANGLE SENSOR