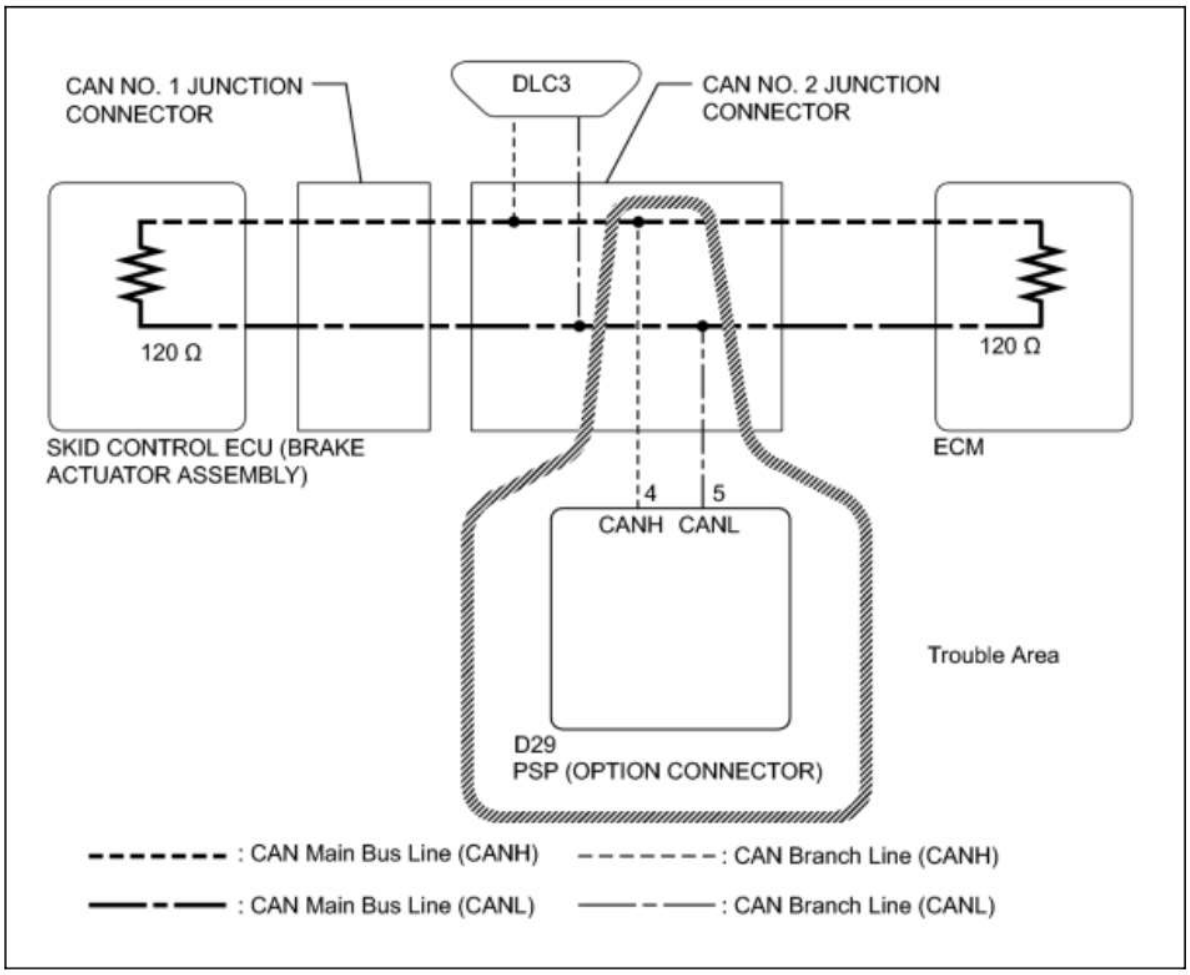
| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 J | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM00000109K06OX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: Bus Buffer ECU Communication Stop Mode (2013 FR-S) | | |

**Bus Buffer ECU Communication Stop Mode**

## DESCRIPTION

| DETECTION ITEM | SYMPTOM | TROUBLE AREA |
|---|---|---|
| Bus Buffer ECU Communication Stop Mode | Communication system DTCs (DTCs that start with U) that are output correspond to "Bus Buffer ECU Communication Stop Mode" in "DTC Combination Table" INFO | PSP (option connector) branch line or connector |

## WIRING DIAGRAM




## INSPECTION PROCEDURE

**NOTICE:**

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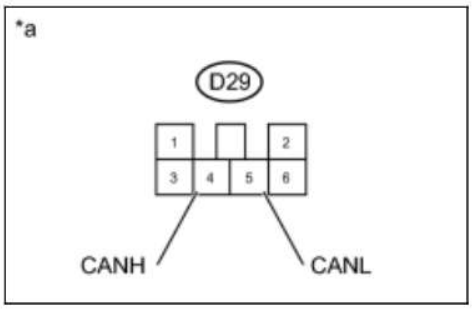
- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON and wait at least 10 seconds.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO .

**HINT:**

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

## PROCEDURE

| | |
|---|---|
| 1. | **CHECK FOR OPEN IN CAN BUS LINES (PSP (OPTION CONNECTOR) BRANCH LINE)** |




(a) Disconnect the cable from the negative (-) battery terminal.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D29-4 (CANH) - D29-5 (CANL) | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |

**Text in Illustration**

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| | |
|---|---|
| *a | Front view of wire harness connector<br>(to PSP (Option Connector)) |

NG ▶ **REPAIR OR REPLACE CAN BRANCH LINE OR CONNECTOR (PSP (OPTION CONNECTOR))**

OK ▶ **END**

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 J | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000001WG905CX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: Center Airbag Sensor Communication Stop Mode (2013 FR-S) | | |

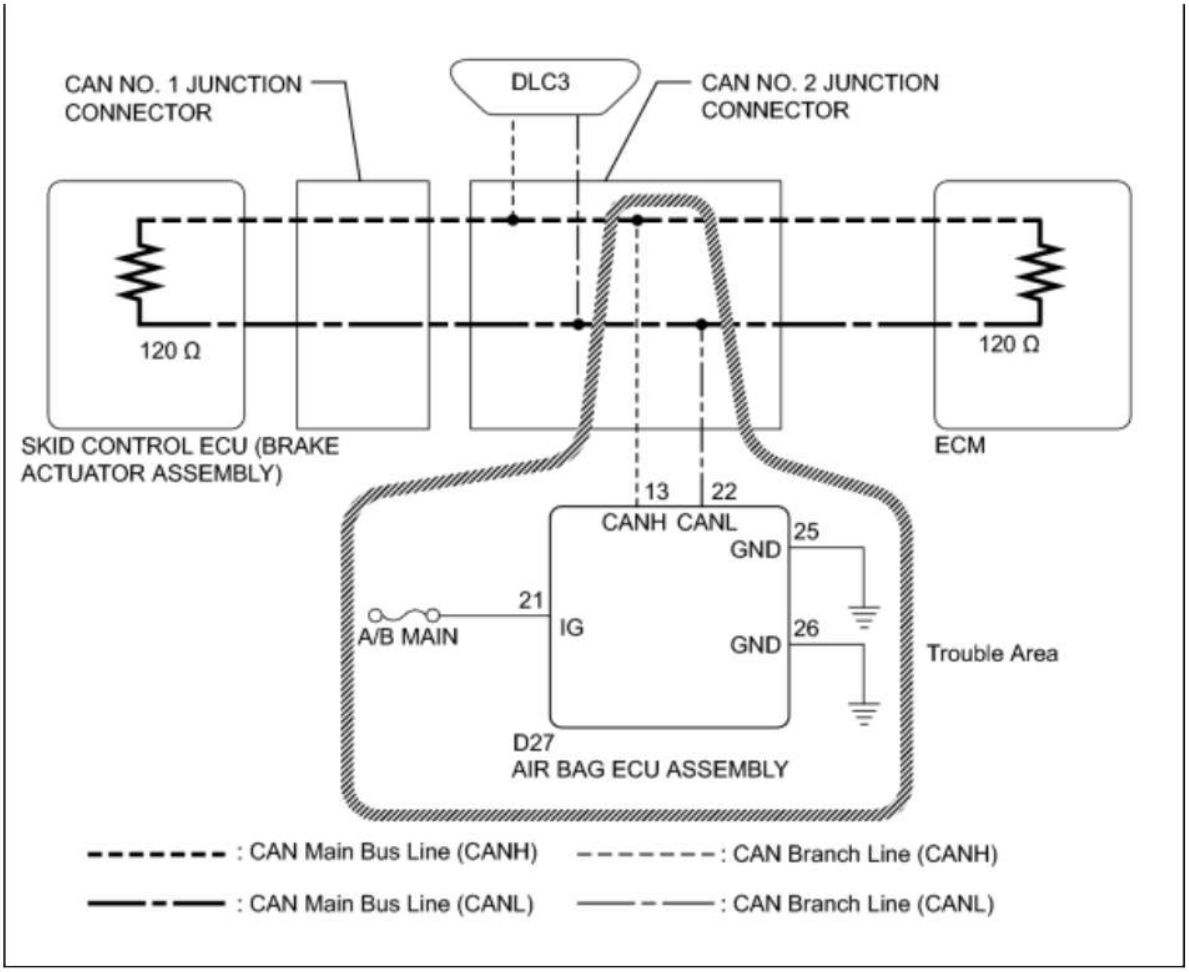
**Center Airbag Sensor Communication Stop Mode**

## DESCRIPTION

| DETECTION ITEM | SYMPTOM | TROUBLE AREA |
|---|---|---|
| Center Airbag Sensor Communication Stop Mode | Either condition is met:<br>• "Airbag" is not displayed on the "CAN Bus Check" screen of the Techstream INFO<br>• Communication system DTCs (DTCs that start with U) that are output correspond to "Center Airbag Sensor Communication Stop Mode" in "DTC Combination Table" INFO | • Air bag ECU assembly branch line or connector<br>• Power source circuit of air bag ECU assembly<br>• Air bag ECU assembly ground circuit<br>• Air bag ECU assembly |

## WIRING DIAGRAM

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# INSPECTION PROCEDURE

**NOTICE:**

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON and wait at least 60 seconds.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO .

**HINT:**

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or

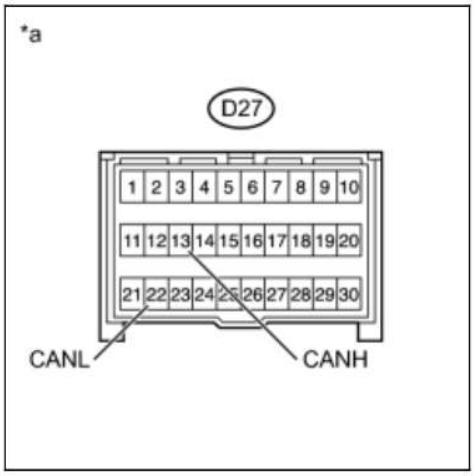
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wire harness while performing the inspection below may help determine the cause of the malfunction.

## PROCEDURE

| | |
|---|---|
| 1. | CHECK FOR OPEN IN CAN BUS LINES (AIR BAG ECU ASSEMBLY BRANCH LINE) |

(a) Disconnect the cable from the negative (-) battery terminal.




(b) Disconnect the D27 air bag ECU assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D27-13 (CANH) - D27-22 (CANL) | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |

**Text in Illustration**

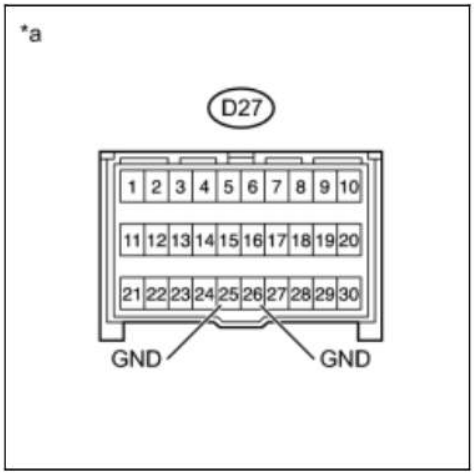
| | |
|---|---|
| *a | Front view of wire harness connector (to Air Bag ECU Assembly) |

NG ▶ **REPAIR OR REPLACE CAN BRANCH LINE OR CONNECTOR (AIR BAG ECU ASSEMBLY)**

**OK** ▼

| | |
|---|---|
| 2. | CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT) |

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(a) Measure the resistance according to the value(s) in the table below.

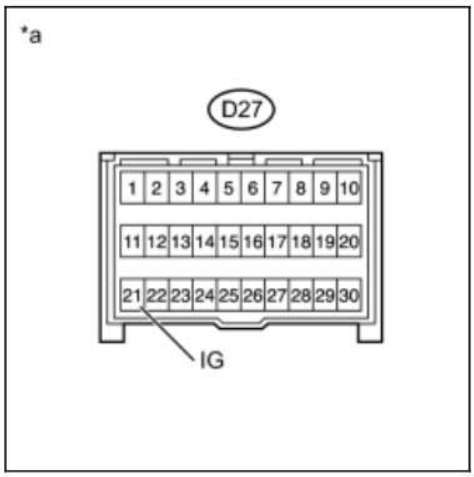
Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D27-25 (GND) - Body ground | Cable disconnected from negative (-) battery terminal | Below 1 Ω |
| D27-26 (GND) - Body ground | Cable disconnected from negative (-) battery terminal | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Air Bag ECU Assembly) |

(b) Connect the cable to the negative (-) battery terminal.




(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D27-21 (IG) - Body ground | Ignition switch ON | 11 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Air Bag ECU Assembly) |

**NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

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OK ▶ REPLACE AIR BAG ECU ASSEMBLY




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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 J | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000001FAD05LX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: Check CAN Bus Line for Short to +B (2013 FR-S) | | |

**Check CAN Bus Line for Short to +B**

## DESCRIPTION

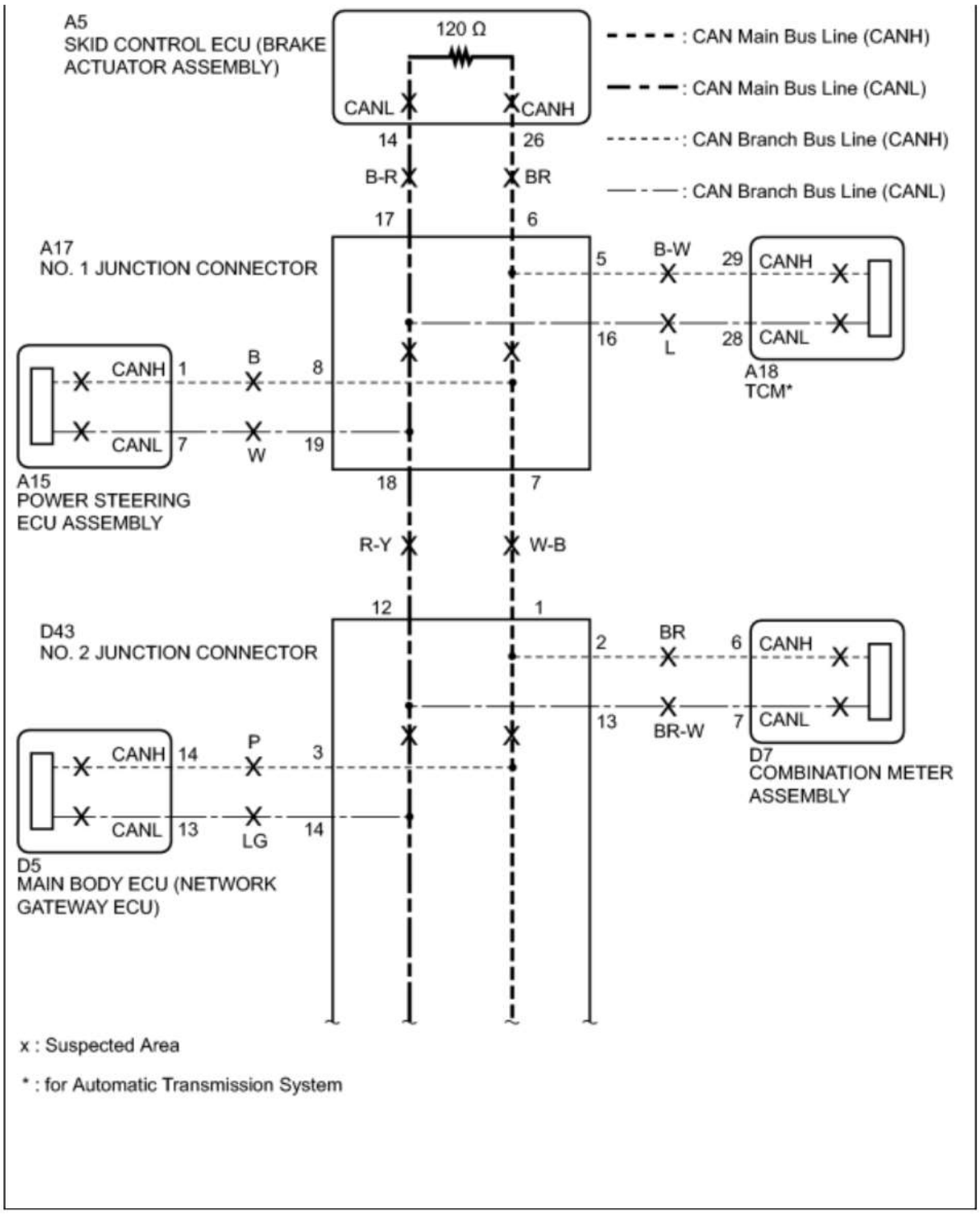
There may be a short circuit between one of the CAN bus lines and +B when no resistance exists between terminals 6 (CANH) and 16 (BAT) or 14 (CANL) and 16 (BAT) of the DLC3.

| SYMPTOM | TROUBLE AREA |
|---|---|
| No resistance exists between terminals 6 (CANH) and 16 (BAT) or 14 (CANL) and 16 (BAT) of DLC3. | • Short to +B in CAN main bus line<br>• Short to +B in CAN branch line<br>• Main body ECU (network gateway ECU)<br>• Combination meter assembly<br>• ECM<br>• TCM*<br>• Skid control ECU (brake actuator assembly)<br>• Steering angle sensor (spiral cable sub-assembly)<br>• Power steering ECU assembly<br>• Air bag ECU assembly<br>• CAN No. 1 junction connector<br>• CAN No. 2 junction connector |

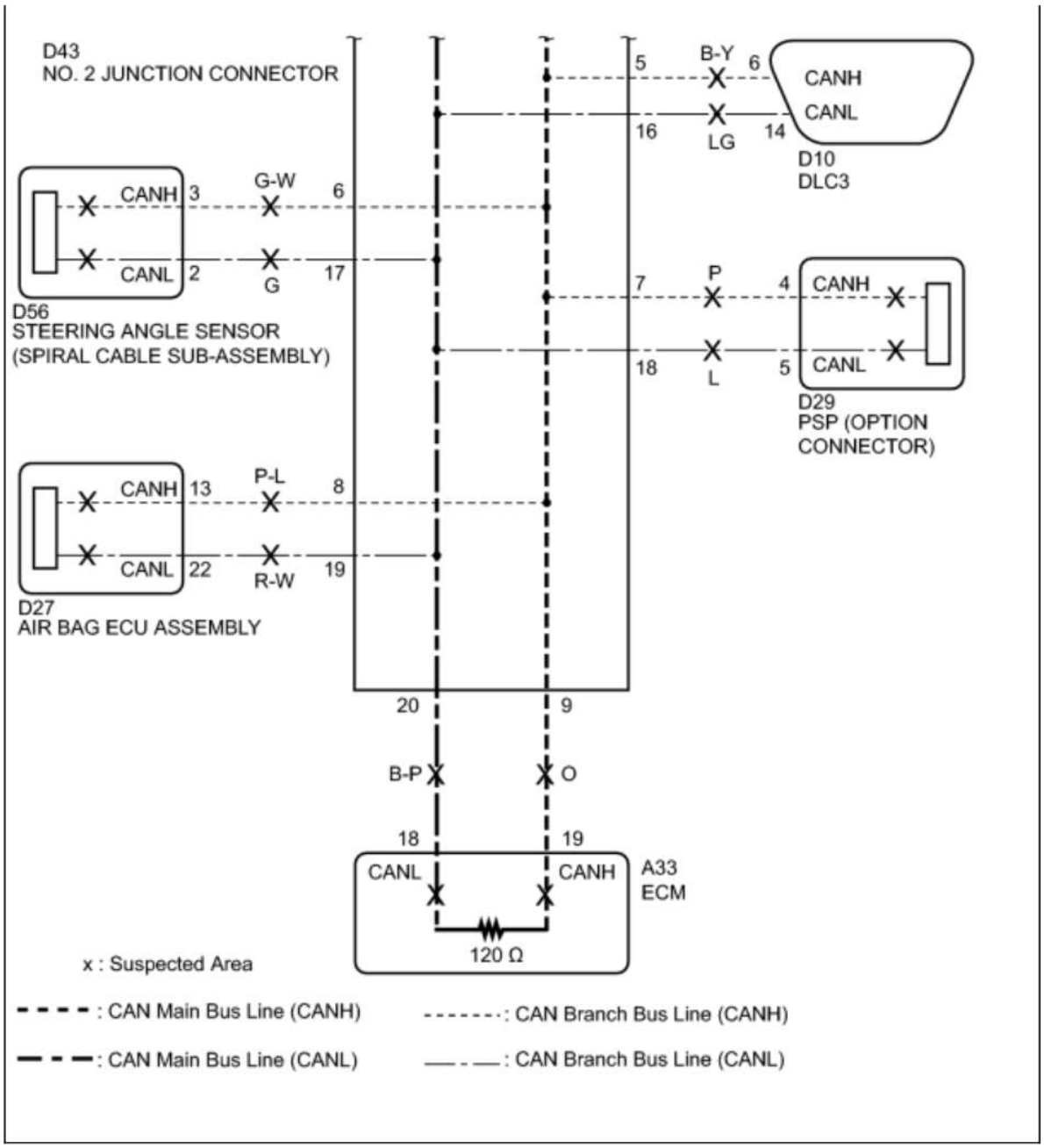
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## WIRING DIAGRAM

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# INSPECTION PROCEDURE

**NOTICE:**

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.

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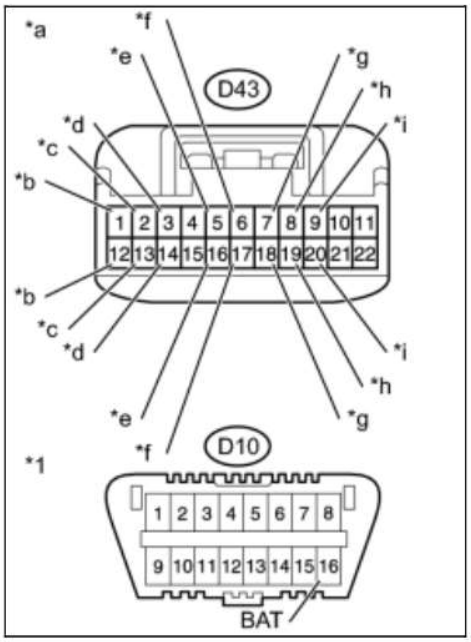
- DTC check procedure: Turn the ignition switch to ON, wait at least 60 seconds,
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO .

**HINT:**

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

## PROCEDURE

| | |
|---|---|
| 1. | **CHECK FOR SHORT TO +B IN CAN BUS LINE (CAN NO. 2 J/C)** |




(a) Disconnect the wire harness connector from the D43 CAN No. 2 junction connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION | CONNECTED TO |
|---|---|---|---|
| D43-1 - D10-16 (BAT) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher | CAN No. 1 junction connector |
| D43-12 - D10-16 (BAT) | | | |
| D43-2 - D10-16 (BAT) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher | Combination meter assembly |
| D43-13 - D10- | | | |

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| | | | |
|---|---|---|---|
| 16 (BAT) | | | |
| D43-3 - D10-16 (BAT)<br>D43-14 - D10-16 (BAT) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher | Main body ECU (network gateway ECU) |
| D43-5 - D10-16 (BAT)<br>D43-16 - D10-16 (BAT) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher | DLC3 |
| D43-6 - D10-16 (BAT)<br>D43-17 - D10-16 (BAT) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher | Steering angle sensor (spiral cable sub-assembly) |
| D43-7 - D10-16 (BAT)<br>D43-18 - D10-16 (BAT) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher | PSP (option connector) |
| D43-8 - D10-16 (BAT)<br>D43-19 - D10-16 (BAT) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher | Air bag ECU assembly |
| D43-9 - D10-16 (BAT)<br>D43-20 - D10-16 (BAT) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher | ECM |

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |
| *a | Front view of wire harness connector<br>(to CAN No. 2 Junction Connector) |
| *b | to CAN No. 1 Junction Connector |
| *c | to Combination Meter Assembly |
| *d | to Main Body ECU (Network Gateway ECU) |
| *e | to DLC3 |
| *f | to Steering Angle Sensor (Spiral Cable Sub-assembly) |
| *g | to PSP (Option Connector) |
| *h | to Air Bag ECU Assembly |
| *i | to ECM |

Result:

| RESULT | PROCEED TO |
|---|---|
| | |

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| | |
|---|---|
| OK | A |
| NG (CAN No. 1 junction connector main line) | B |
| NG (ECM main line) | C |
| NG (ECU or sensor branch line) | D |
| NG (DLC3 branch line or PSP (option connector) branch line) | E |

B ▶ **CHECK FOR SHORT TO +B IN CAN BUS LINE (CAN NO. 1 J/C)**

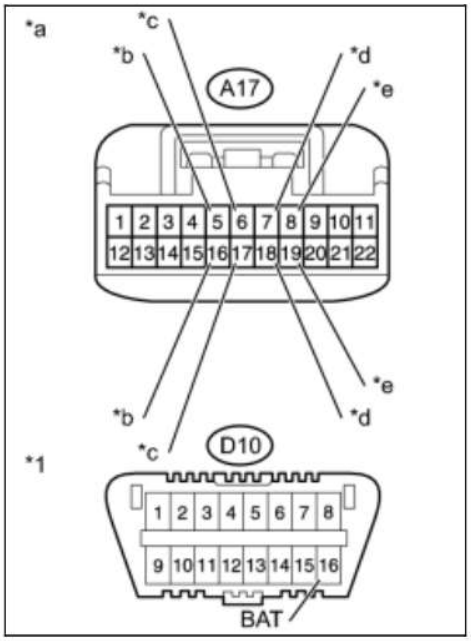
C ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 2 J/C - ECM)**

D ▶ **CHECK FOR SHORT TO +B IN CONNECTED COMPONENT (ECU, SENSOR)**

E ▶ **REPAIR OR REPLACE CAN BRANCH LINE CONNECTED TO DLC3 OR PSP (OPTION CONNECTOR)**

A ▶ **REPLACE CAN NO. 2 JUNCTION CONNECTOR**

| | |
|---|---|
| **2.** | **CHECK FOR SHORT TO +B IN CAN BUS LINE (CAN NO. 1 J/C)** |




(a) Disconnect the wire harness connector from the A17 CAN No. 1 junction connector.

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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION | CONNECTED TO |
|---|---|---|---|
| A17-5 - D10-16 (BAT)<br>A17-16 - D10-16 (BAT) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher | TCM |
| A17-6 - D10-16 (BAT)<br>A17-17 - D10-16 (BAT) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher | Skid control ECU (brake actuator assembly) |
| A17-7 - D10-16 (BAT)<br>A17-18 - D10-16 (BAT) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher | CAN No. 2 junction connector |
| A17-8 - D10-16 (BAT)<br>A17-19 - D10-16 (BAT) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher | Power steering ECU assembly |

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |
| *a | Front view of wire harness connector<br>(to CAN No. 1 Junction Connector) |
| *b | to TCM |
| *c | to Skid Control ECU (Brake Actuator Assembly) |
| *d | to CAN No. 2 Junction Connector |
| *e | to Power Steering ECU Assembly |

Result:

| RESULT | PROCEED TO |
|---|---|
| OK | A |
| NG (CAN No. 2 junction connector main line) | B |
| NG (skid control ECU (brake actuator assembly) main line) | C |
| NG (ECU or sensor branch line) | D |

B ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 2 J/C - CAN NO. 1 J/C)**

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C ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 1 J/C - SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))**

D ▶ **CHECK FOR SHORT TO +B IN CONNECTED COMPONENT (ECU, SENSOR)**

A ▶ **REPLACE CAN NO. 1 JUNCTION CONNECTOR**

| 3. | CHECK FOR SHORT TO +B IN CONNECTED COMPONENT (ECU, SENSOR) |
|---|---|

(a) Reconnect all the wire harness connectors (the A17 CAN No. 1 junction connector and D43 CAN No. 2 junction connector).

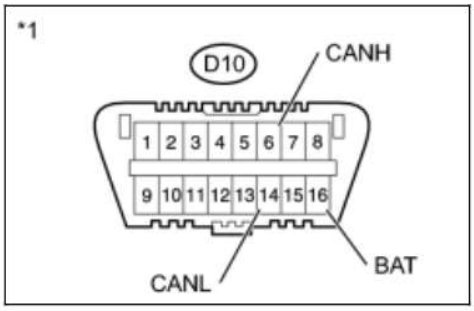
(b) Disconnect the ECU or sensor connected to the CAN bus line that is shorted to +B.

**HINT:**

**If the ECU or sensor has multiple connectors, disconnect the connector that includes the CAN bus lines. To determine the ECU or sensor that is connected to the shorted bus line, refer to the terminals of ECU tables** INFO **.**

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:




| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D10-6 (CANH) - D10-16 (BAT) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |
| D10-14 (CANL) - D10-16 (BAT) | | |

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |

**HINT:**

**If the resistance changes to 6 kΩ or higher when the connector is disconnected from the ECU (or sensor), there may be a short in the ECU (or sensor).**

NG ▶ **REPAIR OR REPLACE REPAIR OR REPLACE CORRESPONDING ECU/SENSOR WIRE OR CONNECTOR**

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OK ▶ REPLACE CORRESPONDING ECU OR SENSOR




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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 J | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000001FAD05PX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: Check CAN Bus Line for Short to GND (2013 FR-S) | | |

**Check CAN Bus Line for Short to GND**

## DESCRIPTION

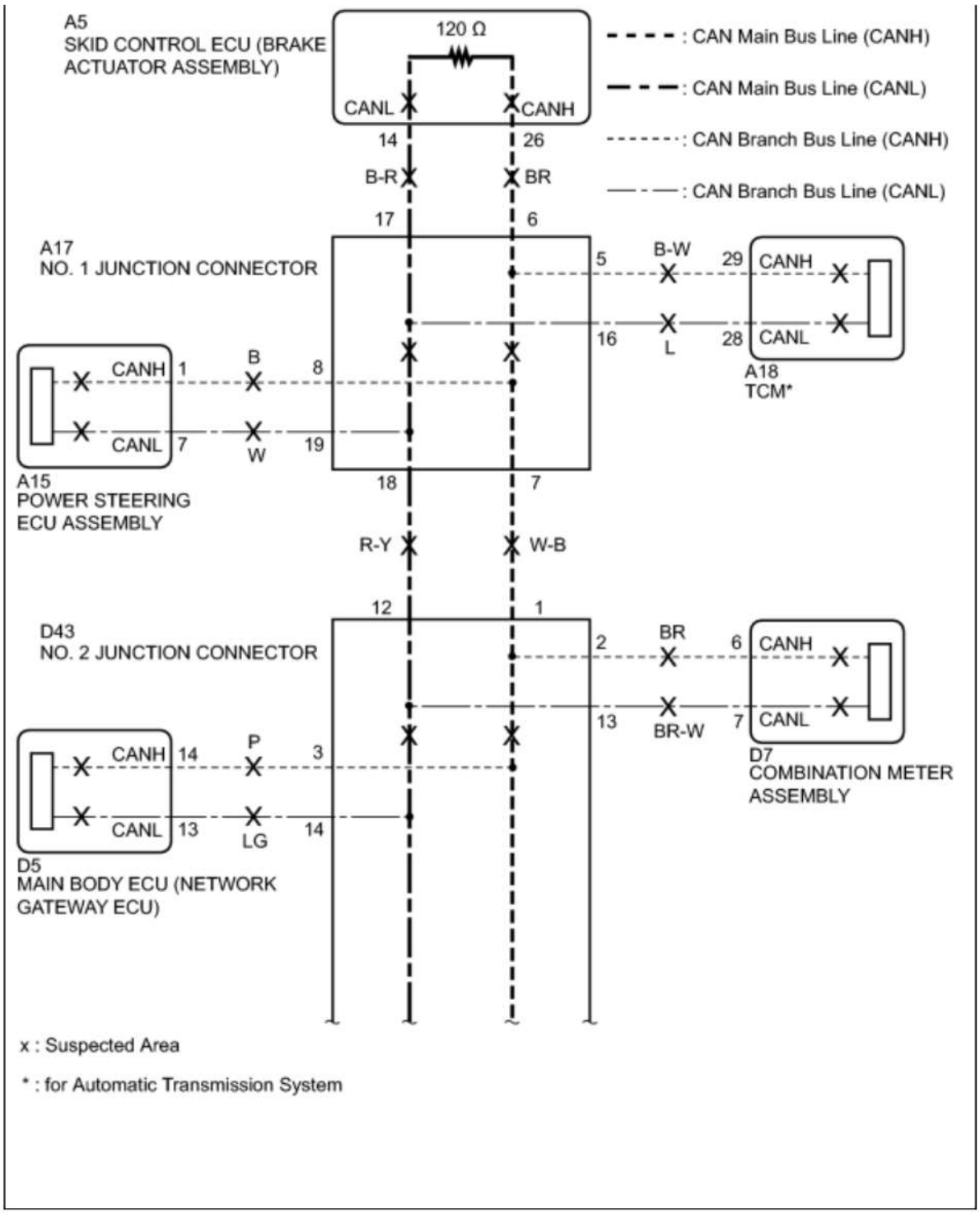
There may be a short circuit between one of the CAN bus lines and GND when there is no resistance between terminals 6 (CANH) and 4 (CG) or 14 (CANL) and 4 (CG) of the DLC3.

| SYMPTOM | TROUBLE AREA |
|---|---|
| No resistance exists between terminals 6 (CANH) and 4 (CG) or 14 (CANL) and 4 (CG) of DLC3. | • Short to ground in CAN main bus line<br>• Short to ground in CAN branch line<br>• Main body ECU (network gateway ECU)<br>• Combination meter assembly<br>• ECM<br>• TCM*<br>• Skid control ECU (brake actuator assembly)<br>• Steering angle sensor (spiral cable sub-assembly)<br>• Power steering ECU assembly<br>• Air bag ECU assembly<br>• CAN No. 1 junction connector<br>• CAN No. 2 junction connector |

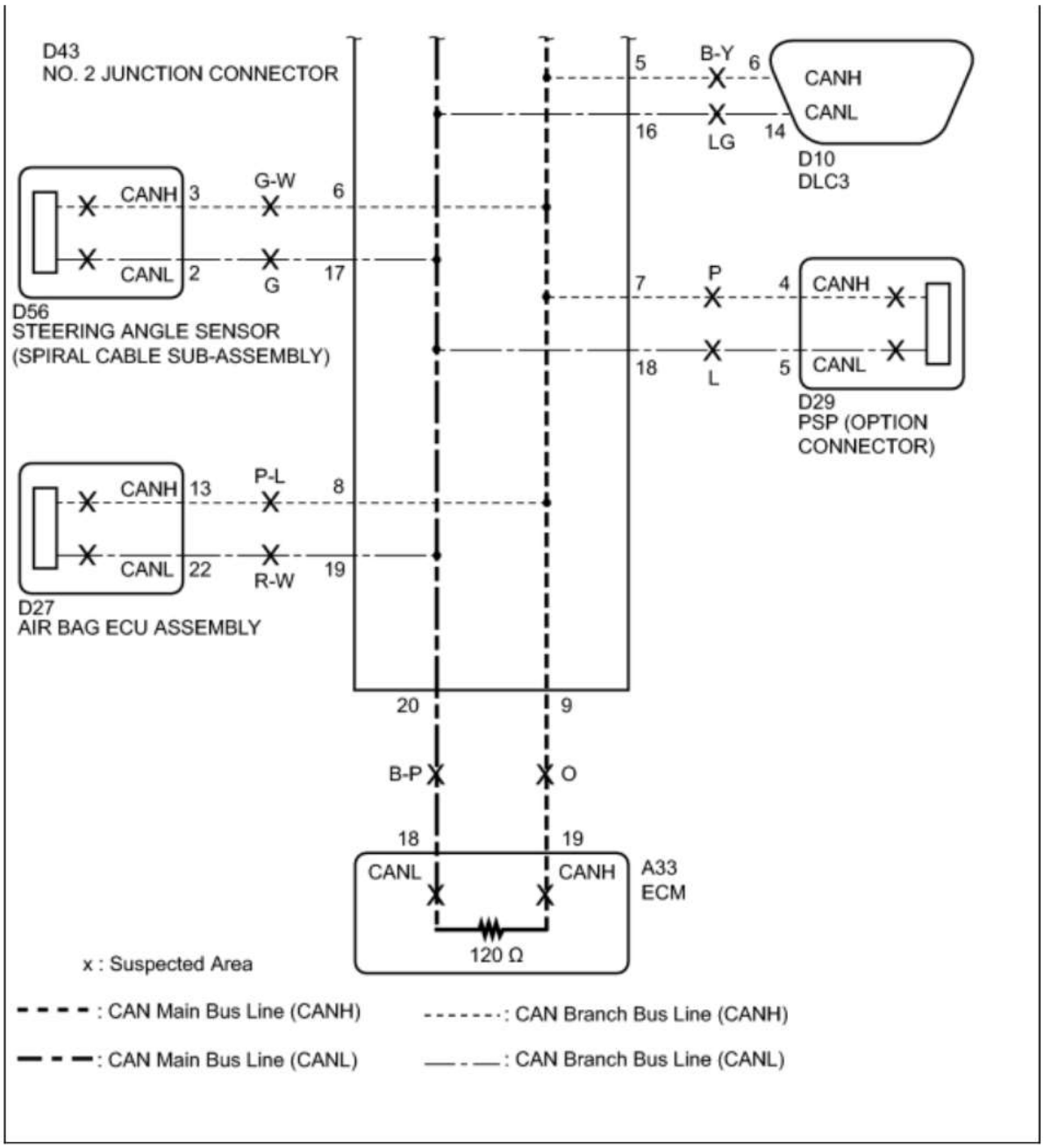
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## WIRING DIAGRAM

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# INSPECTION PROCEDURE

**NOTICE:**

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.

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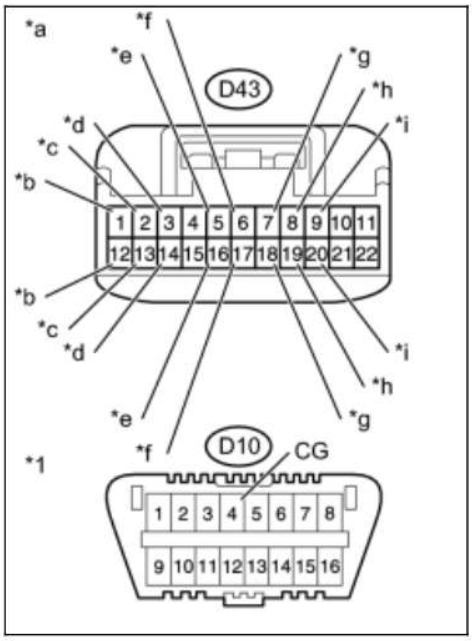
- DTC check procedure: Turn the ignition switch to ON, wait at least 60 seconds,
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO .

**HINT:**

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

## PROCEDURE

| | |
|---|---|
| 1. | **CHECK FOR SHORT TO GND IN CAN BUS LINE (CAN NO. 2 J/C)** |




(a) Disconnect the wire harness connector from the D43 CAN No. 2 junction connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION | CONNECTED TO |
|---|---|---|---|
| D43-1 - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | CAN No. 1 junction connector |
| D43-12 - D10-4 (CG) | | | |
| D43-2 - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | Combination meter assembly |
| D43-13 - | | | |

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| | | | |
|---|---|---|---|
| D10-4 (CG) | | | |
| D43-3 - D10-4 (CG)<br>D43-14 - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | Main body ECU (network gateway ECU) |
| D43-5 - D10-4 (CG)<br>D43-16 - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | DLC3 |
| D43-6 - D10-4 (CG)<br>D43-17 - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | Steering angle sensor (spiral cable sub-assembly) |
| D43-7 - D10-4 (CG)<br>D43-18 - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | PSP (option connector) |
| D43-8 - D10-4 (CG)<br>D43-19 - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | Air bag ECU assembly |
| D43-9 - D10-4 (CG)<br>D43-20 - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | ECM |

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |
| *a | Front view of wire harness connector<br>(to CAN No. 2 Junction Connector) |
| *b | to CAN No. 1 Junction Connector |
| *c | to Combination Meter Assembly |
| *d | to Main Body ECU (Network Gateway ECU) |
| *e | to DLC3 |
| *f | to Steering Angle Sensor (Spiral Cable Sub-assembly) |
| *g | to PSP (Option Connector) |
| *h | to Air Bag ECU Assembly |
| *i | to ECM |

Result:

| RESULT | PROCEED TO |
|---|---|
| | |

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| | |
|---|---|
| OK | A |
| NG (CAN No. 1 junction connector main line) | B |
| NG (ECM main line) | C |
| NG (ECU or sensor branch line) | D |
| NG (DLC3 branch line or PSP (option connector) branch line) | E |

B ▶ **CHECK FOR SHORT TO GND IN CAN BUS LINE (CAN NO. 1 J/C)**

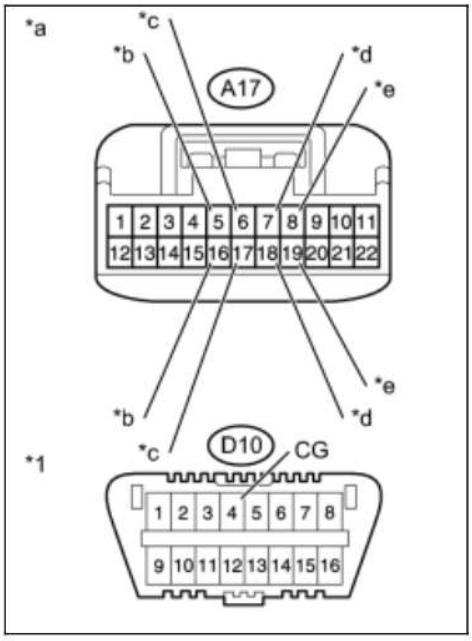
C ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 2 J/C - ECM)**

D ▶ **CHECK FOR SHORT TO GND IN CONNECTED COMPONENT (ECU, SENSOR)**

E ▶ **REPAIR OR REPLACE CAN BRANCH LINE CONNECTED TO DLC3 OR PSP (OPTION CONNECTOR)**

A ▶ **REPLACE CAN NO. 2 JUNCTION CONNECTOR**

| | |
|---|---|
| **2.** | **CHECK FOR SHORT TO GND IN CAN BUS LINE (CAN NO. 1 J/C)** |




(a) Disconnect the wire harness connector from the A17 CAN No. 1 junction connector.

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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION | CONNECTED TO |
|---|---|---|---|
| A17-5 - D10-4 (CG)<br>A17-16 - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | TCM |
| A17-6 - D10-4 (CG)<br>A17-17 - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | Skid control ECU (brake actuator assembly) |
| A17-7 - D10-4 (CG)<br>A17-18 - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | CAN No. 2 junction connector |
| A17-8 - D10-4 (CG)<br>A17-19 - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | Power steering ECU assembly |

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |
| *a | Front view of wire harness connector<br>(to CAN No. 1 Junction Connector) |
| *b | to TCM |
| *c | to Skid Control ECU (Brake Actuator Assembly) |
| *d | to CAN No. 2 Junction Connector |
| *e | to Power Steering ECU Assembly |

Result:

| RESULT | PROCEED TO |
|---|---|
| OK | A |
| NG (CAN No. 2 junction connector main line) | B |
| NG (skid control ECU (brake actuator assembly) main line) | C |
| NG (ECU or sensor branch line) | D |

B ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 2 J/C - CAN NO. 1 J/C)**

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C ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 1 J/C - SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))**

D ▶ **CHECK FOR SHORT TO GND IN CONNECTED COMPONENT (ECU, SENSOR)**

A ▶ **REPLACE CAN NO. 1 JUNCTION CONNECTOR**

| 3. | CHECK FOR SHORT TO GND IN CONNECTED COMPONENT (ECU, SENSOR) |
|---|---|

(a) Reconnect all the wire harness connectors (the A17 CAN No. 1 junction connector and D43 CAN No. 2 junction connector).

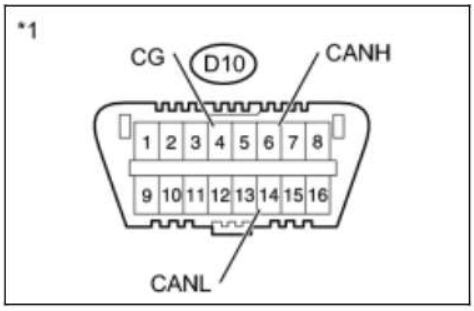
(b) Disconnect the ECU or sensor connected to the CAN bus line that is shorted to ground.

**HINT:**

**If the ECU or sensor has multiple connectors, disconnect the connector that includes the CAN bus lines. To determine the ECU or sensor that is connected to the shorted bus line, refer to the terminals of ECU tables** INFO **.**

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:




| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D10-6 (CANH) - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| D10-14 (CANL) - D10-4 (CG) | | |

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |

**HINT:**

**If the resistance changes to 200 Ω or higher when the connector is disconnected from the ECU (or sensor), there may be a short in the ECU (or sensor).**

NG ▶ **REPAIR OR REPLACE REPAIR OR REPLACE CORRESPONDING ECU/SENSOR WIRE OR CONNECTOR**

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OK ▶ REPLACE CORRESPONDING ECU OR SENSOR




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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 J | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000001FAD05IX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: Check CAN Bus Lines for Short Circuit (2013 FR-S) | | |

**Check CAN Bus Lines for Short Circuit**

## DESCRIPTION

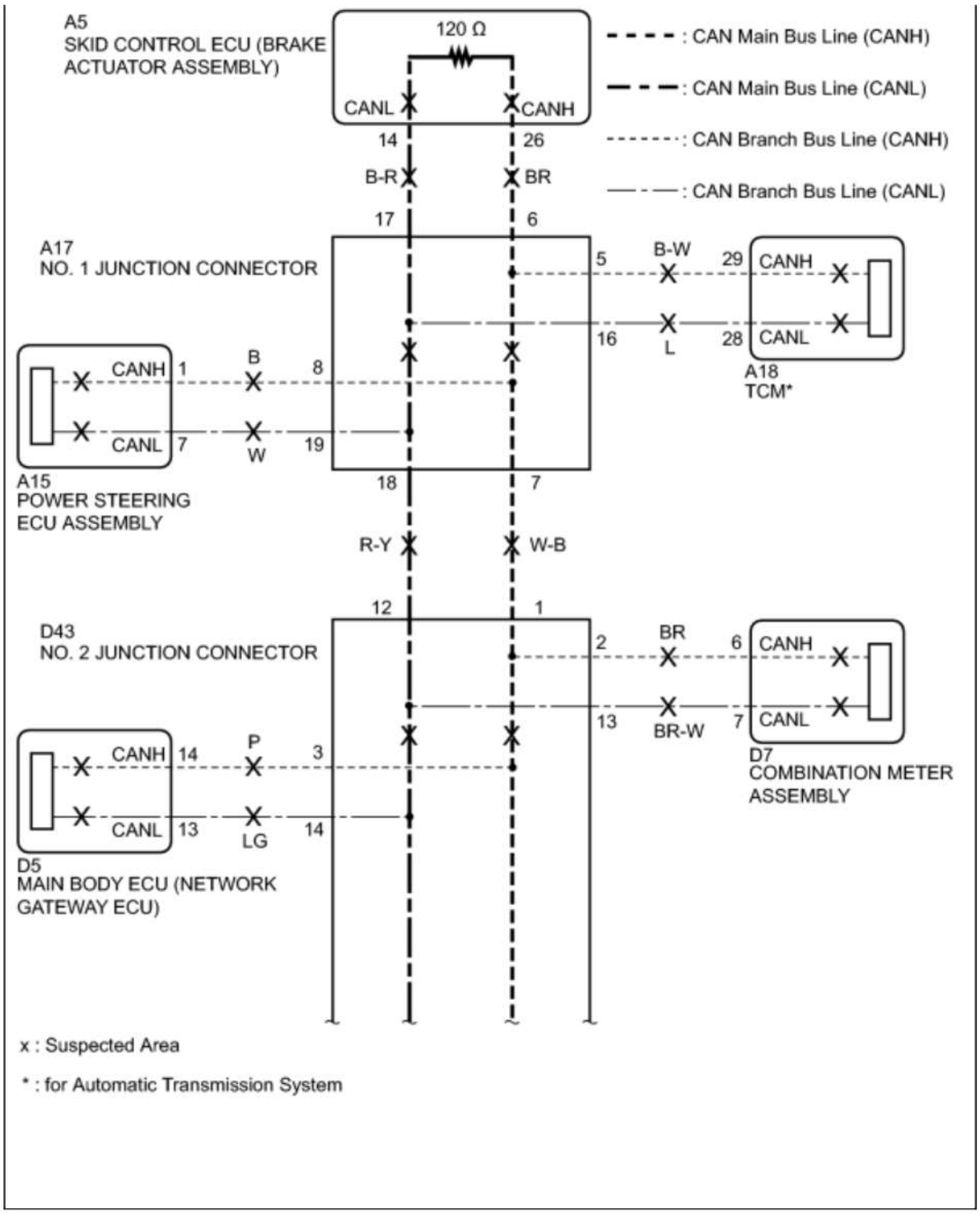
There may be a short circuit between the V bus main lines and/or CAN branch lines when the resistance between terminals 6 (CANH) and 14 (CANL) of the DLC3 is below 57 Ω.

| SYMPTOM | TROUBLE AREA |
|---|---|
| Resistance between terminals 6 (CANH) and 14 (CANL) of DLC3 is below 57 Ω. | • Short in CAN main bus line<br>• Short in CAN branch line<br>• Main body ECU (network gateway ECU)<br>• Combination meter assembly<br>• ECM<br>• TCM*<br>• Skid control ECU (brake actuator assembly)<br>• Steering angle sensor (spiral cable sub-assembly)<br>• Power steering ECU assembly<br>• Air bag ECU assembly<br>• CAN No. 1 junction connector<br>• CAN No. 2 junction connector |

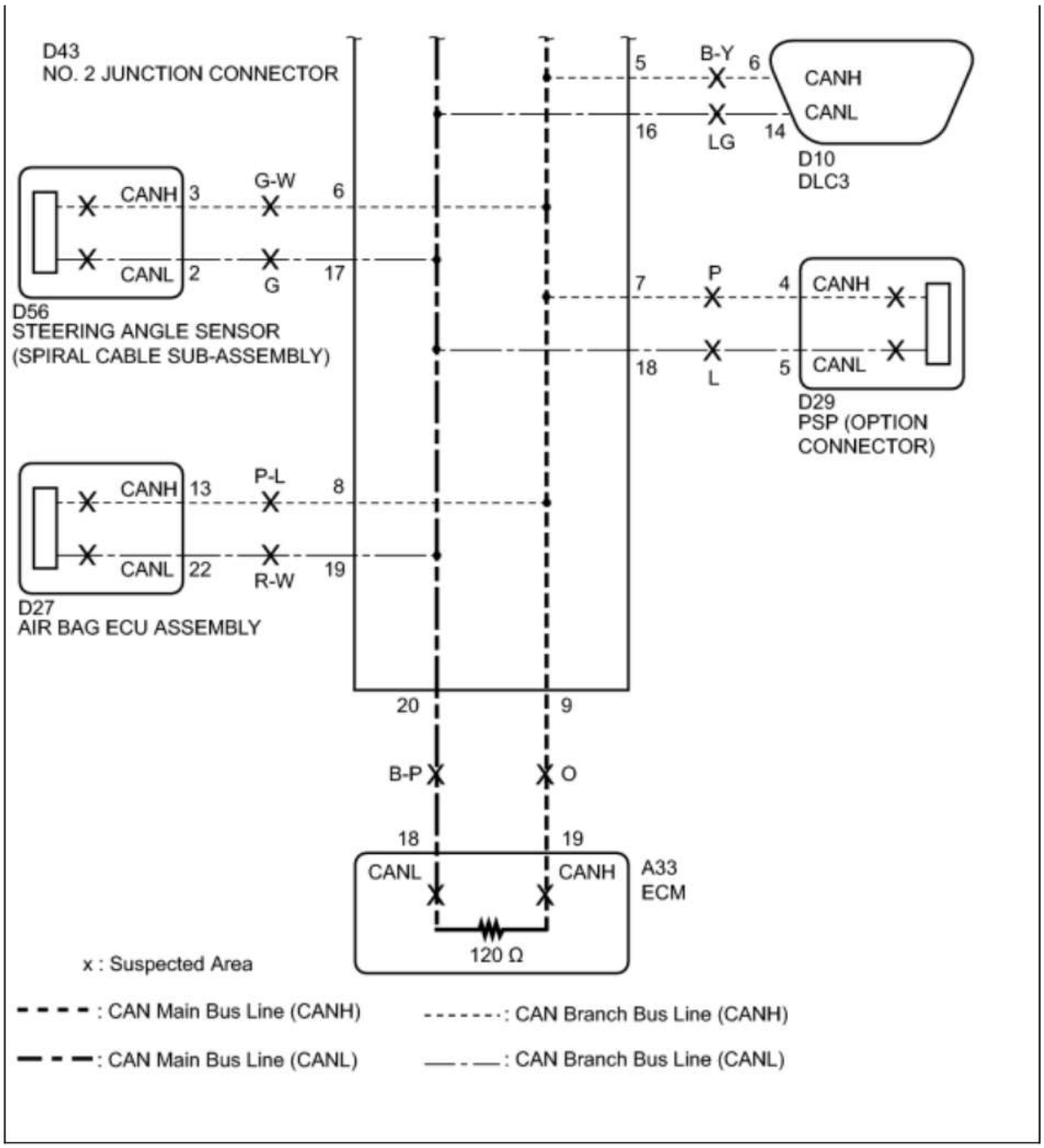
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## WIRING DIAGRAM

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# INSPECTION PROCEDURE

**NOTICE:**

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.

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- DTC check procedure: Turn the ignition switch to ON, wait at least 60 seconds,
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO .

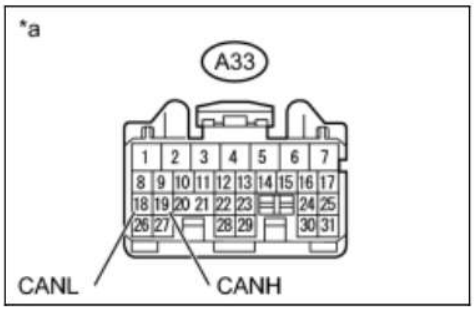
**HINT:**

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

## PROCEDURE

| | |
|---|---|
| 1. | **CHECK FOR SHORT IN CAN BUS LINES (ECM)** |

(a) Disconnect the cable from the negative (-) battery terminal.




(b) Disconnect the A33 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A33-19 (CANH) - A33-18 (CANL) | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to ECM) |

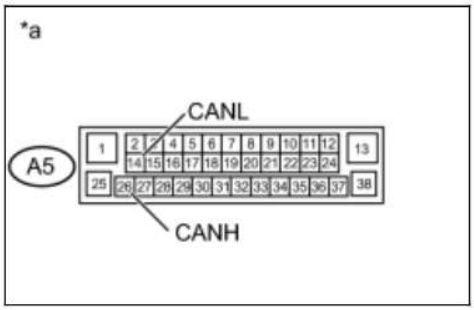
**NG** ▶ **CHECK FOR SHORT IN CAN BUS LINES (SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))**

**OK** ▶ **REPLACE ECM**

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| | |
|---|---|
| **2.** | **CHECK FOR SHORT IN CAN BUS LINES (SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))** |

(a) Reconnect the A33 ECM connector.




(b) Disconnect the A5 skid control ECU (brake actuator assembly) connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A5-26 (CANH) - A5-14 (CANL) | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly)) |

**NG** ▶ **CHECK FOR SHORT IN CAN BUS LINES (CAN NO. 2 J/C)**

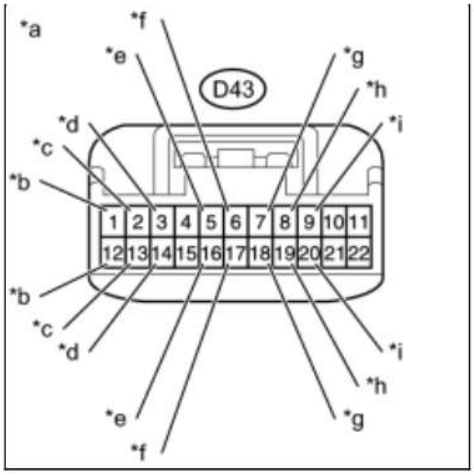
**OK** ▶ **REPLACE SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY)**

| | |
|---|---|
| **3.** | **CHECK FOR SHORT IN CAN BUS LINES (CAN NO. 2 J/C)** |

(a) Reconnect the A5 skid control ECU (brake actuator assembly) connector.

(b) Disconnect the wire harness connector from the D43 CAN No. 2 junction connector.

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(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION | CONNECTED TO |
|---|---|---|---|
| D43-1 - D43-12 | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω | CAN No. 1 junction connector |
| D43-2 - D43-13 | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | Combination meter assembly |
| D43-3 - D43-14 | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | Main body ECU (network gateway ECU) |
| D43-5 - D43-16 | Cable disconnected from negative (-) battery terminal | 1 MΩ or higher | DLC3 |
| D43-6 - D43-17 | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | Steering angle sensor (spiral cable sub-assembly) |
| D43-7 - D43-18 | Cable disconnected from negative (-) battery terminal | 1 MΩ or higher | PSP (option connector) |
| D43-8 - D43-19 | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | Air bag ECU assembly |
| D43-9 - D43-20 | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω | ECM |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to CAN No. 2 Junction Connector) |
| *b | to CAN No. 1 Junction Connector |
| *c | to Combination Meter Assembly |
| *d | to Main Body ECU (Network Gateway ECU) |
| *e | to DLC3 |
| *f | to Steering Angle Sensor (Spiral Cable Sub-assembly) |

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| | |
|---|---|
| *g | to PSP (Option Connector) |
| *h | to Air Bag ECU Assembly |
| *i | to ECM |

Result:

| RESULT | PROCEED TO |
|---|---|
| OK | A |
| NG (CAN No. 1 junction connector main line) | B |
| NG (ECM main line) | C |
| NG (ECU or sensor branch line) | D |
| NG (DLC3 branch line or PSP (option connector) branch line) | E |

B ▶ **CHECK FOR SHORT IN CAN BUS LINES (CAN NO. 1 J/C)**

C ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 2 J/C - ECM)**

D ▶ **CHECK FOR SHORT IN CONNECTED COMPONENT (ECU, SENSOR)**

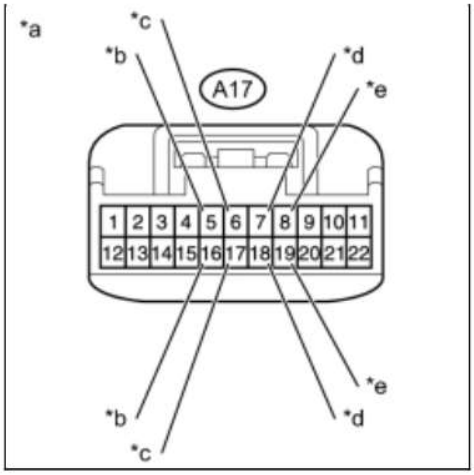
E ▶ **REPAIR OR REPLACE CAN BRANCH LINE CONNECTED TO DLC3 OR PSP (OPTION CONNECTOR)**

A ▶ **REPLACE CAN NO. 2 JUNCTION CONNECTOR**

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| | |
|---|---|
| **4.** | **CHECK FOR SHORT IN CAN BUS LINES (CAN NO. 1 J/C)** |

(a) Disconnect the wire harness connector from the A17 CAN No. 1 junction connector.




(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION | CONNECTED TO |
|---|---|---|---|
| A17-5 - A17-16 | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | TCM |
| A17-6 - A17-17 | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω | Skid control ECU (brake actuator assembly) |
| A17-7 - A17-18 | Cable disconnected from negative (-) battery terminal | 1 MΩ or higher | CAN No. 2 junction connector |
| A17-8 - A17-19 | Cable disconnected from negative (-) battery terminal | 200 Ω or higher | Power steering ECU assembly |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to CAN No. 1 Junction Connector) |
| *b | to TCM |
| *c | to Skid Control ECU (Brake Actuator Assembly) |
| *d | to CAN No. 2 Junction Connector |
| *e | to Power Steering ECU Assembly |

Result:

| RESULT | PROCEED TO |
|---|---|
| OK | A |
| NG (CAN No. 2 junction connector main line) | B |
| NG (skid control ECU (brake actuator assembly) main line) | C |
| NG (ECU or sensor branch line) | D |

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B ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 2 J/C - CAN NO. 1 J/C)**

C ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 1 J/C - SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))**

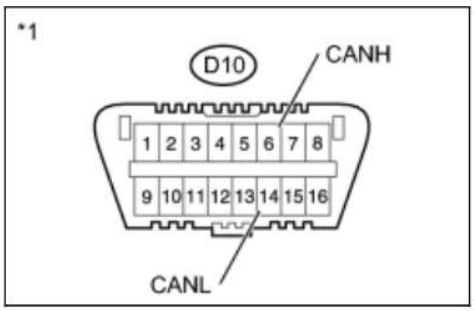
D ▶ **CHECK FOR SHORT IN CONNECTED COMPONENT (ECU, SENSOR)**

A ▶ **REPLACE CAN NO. 1 JUNCTION CONNECTOR**

| 5. | CHECK FOR SHORT IN CONNECTED COMPONENT (ECU, SENSOR) |
|---|---|

(a) Reconnect all the wire harness connectors (the A17 CAN No. 1 junction connector and D43 CAN No. 2 junction connector).

(b) Disconnect the connector that includes terminals CANH and CANL from the ECU (or sensor) to which the short circuited branch line is connected INFO .




(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D10-6 (CANH) - D10-14 (CANL) | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |

**HINT:**

- If the resistance becomes normal (between 57 and 63 Ω) when the connector is disconnected from the ECU (or sensor), there may be a short in the ECU (or sensor).
- If the resistance does not become normal (between 57 and 63 Ω) when the connector is disconnected from the ECU (or sensor), repair or replace the short circuited branch line or connector.

NG ▶ **REPAIR OR REPLACE CORRESPONDING ECU OR SENSOR BUS LINE OR CONNECTOR**

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OK ▶ REPLACE CORRESPONDING ECU OR SENSOR




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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 J | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000001F1S06SX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: Combination Meter ECU Communication Stop Mode (2013 FR-S) | | |

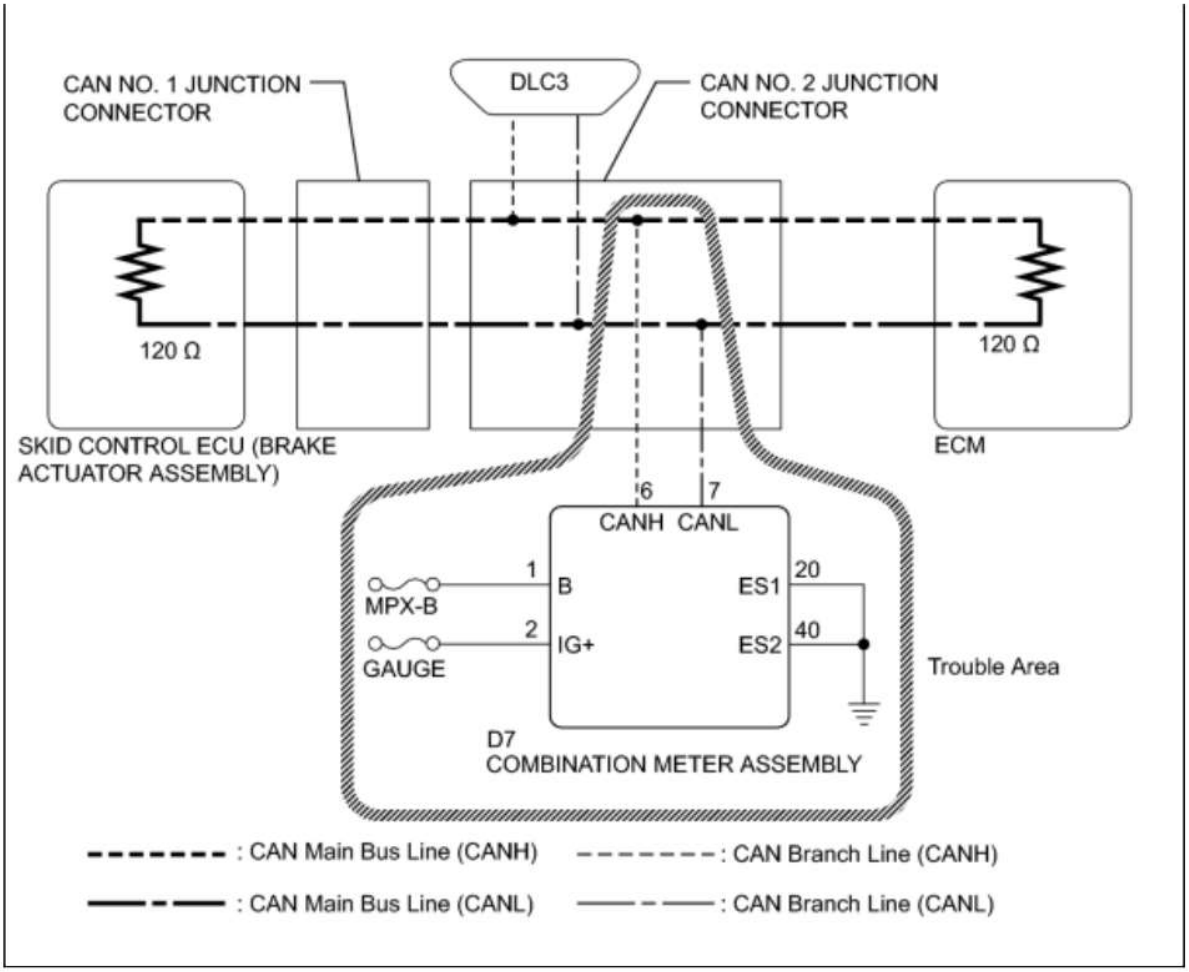
**Combination Meter ECU Communication Stop Mode**

## DESCRIPTION

| DETECTION ITEM | SYMPTOM | TROUBLE AREA |
|---|---|---|
| Combination Meter ECU Communication Stop Mode | Either condition is met:<br>• "Combination Meter" is not displayed on the "CAN Bus Check" screen of the Techstream INFO<br>• Communication system DTCs (DTCs that start with U) that are output correspond to "Combination Meter ECU Communication Stop Mode" in "DTC Combination Table" INFO | • Combination meter assembly branch line or connector<br>• Power source circuit of combination meter assembly<br>• Combination meter assembly ground circuit<br>• Combination meter assembly |

## WIRING DIAGRAM

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# INSPECTION PROCEDURE

**NOTICE:**

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON and wait at least 10 seconds.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO .

**HINT:**

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or

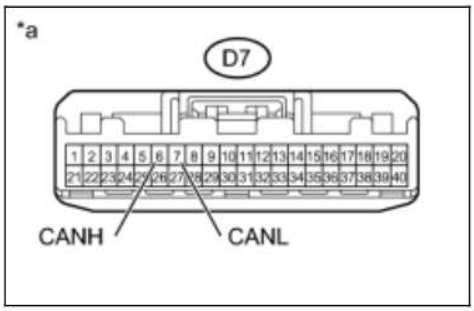
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wire harness while performing the inspection below may help determine the cause of the malfunction.

## PROCEDURE

| | |
|---|---|
| 1. | **CHECK FOR OPEN IN CAN BUS LINES (COMBINATION METER ASSEMBLY BRANCH LINE)** |

(a) Disconnect the cable from the negative (-) battery terminal.




(b) Disconnect the D7 combination meter assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D7-6 (CANH) - D7-7 (CANL) | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Combination Meter Assembly) |

NG ▶ **REPAIR OR REPLACE CAN BRANCH LINE OR CONNECTOR (COMBINATION METER ASSEMBLY)**

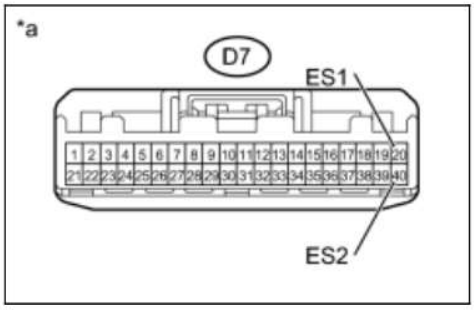
**OK** ▼

| | |
|---|---|
| 2. | **CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)** |

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(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

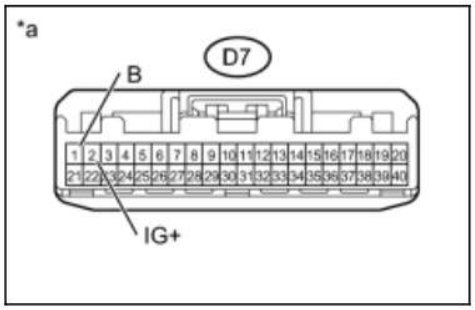



| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D7-20 (ES1) - Body ground | Cable disconnected from negative (-) battery terminal | Below 1 Ω |
| D7-40 (ES2) - Body ground | Cable disconnected from negative (-) battery terminal | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Combination Meter Assembly) |

(b) Connect the cable to the negative (-) battery terminal.




(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D7-1 (B) - Body ground | Ignition switch off | 11 to 14 V |
| D7-2 (IG+) - Body ground | Ignition switch ON | 11 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Combination Meter Assembly) |

**NG** ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

**OK** ▶ **REPLACE COMBINATION METER ASSEMBLY**

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 D | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000004UCE002X |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: DIAGNOSIS SYSTEM (2013 FR-S) | | |

# DIAGNOSIS SYSTEM

### 1. ECUS OR SENSORS WHICH COMMUNICATE THROUGH CAN COMMUNICATION SYSTEM

(a) V Bus

(1) Main body ECU (network gateway ECU)

(2) Combination meter assembly

(3) ECM

(4) TCM*

(5) Skid control ECU (brake actuator assembly)

(6) Steering angle sensor (spiral cable sub-assembly)

(7) Power steering ECU assembly

(8) Air bag ECU assembly

(9) PSP (option connector)

*: for Automatic Transmission System

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

(a) The systems (ECUs and sensors) that adopt CAN communication vary depending on the vehicle and optional equipment. Check which systems (ECUs and sensors) are installed on the vehicle.

**HINT:**

**The names of ECUs and sensors shown on the Techstream display may differ from those shown in the DTC Table by ECU section that follows.**

| ECU/SENSOR NAME | TECHSTREAM DISPLAY | APPLICABILITY |
|---|---|---|
| Main body ECU (network gateway ECU) | Main Body | Installed on all vehicles |
| Combination meter assembly | Combination Meter | Installed on all vehicles |
| ECM | ECM (Engine) | Installed on all vehicles |
| TCM | TCM | for Automatic Transmission System |
| Skid control ECU (brake actuator assembly) | Skid Control (ABS/VSC/TRAC) | Installed on all vehicles |
| Steering angle sensor (spiral cable sub-assembly) | Spiral cable (Steering Angle Sensor) | Installed on all vehicles |
| Power steering ECU assembly | Power Steering (EPS) | Installed on all vehicles |
| Air bag ECU assembly | Airbag | Installed on all vehicles |
| PSP (option connector) | - | Installed on all vehicles |

### 3. CAN BUS CHECK

**HINT:**

**The ECUs and sensors that are properly connected to the CAN communication system can be displayed using the Techstream.**

(a) Using the Techstream, select "CAN Bus Check" from "System Select".

**NOTICE:**

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- It may be possible to select buses that do not have ECUs or sensors from the bus selection pull-down menu. This is not a malfunction. (This occurs when optional devices are not on a sub bus that is monitored by a gateway function equipped ECU.)
- In the bus selection pull down menu, all buses applicable to the model are displayed (e.g. LIN communication buses are also displayed). Therefore, refer to the wiring diagrams to check the names of the sub buses for CAN communication INFO .

**HINT:**

**Different connection statuses are indicated by the background color of the ECUs and sensors that are displayed.**

**Explanation of CAN Bus Check (Communication Bus Check) screen**

| BUS TYPE | BACKGROUND COLOR | CONNECTION STATUS |
|---|---|---|
| V Bus | White | Communication has been normal since the start of the CAN bus check. |
| | Yellow | Communication stop occurred at least once since the start of the CAN bus check, but communication is currently occurring (unstable communication). |
| | Red | Communication was established at least once since the start of the CAN bus check, but communication is currently not occurring (unstable communication). |
| | Not displayed | Communication stop has continued since the start of the CAN bus check.*1 |
| Sub bus (gateway function equipped ECU that does not have history of connected ECUs)*2 | White | Communication has been normal since the start of the CAN bus check. |
| | Yellow | Communication stop occurred at least once since the start of the CAN bus check, but communication is currently occurring (unstable communication). |
| | Red | Communication was established at least once since the start of the CAN bus check, but communication is currently not occurring (unstable communication). |
| | Not displayed | Communication stop has continued since the start of the CAN bus check.*1 |
| Sub bus (gateway function equipped ECU that has history of connected ECUs)*3 | White | Communication has been normal since the start of the CAN bus check. |
| | Yellow | Communication stop occurred at least once since the start of the CAN bus check, but communication is currently occurring (unstable communication). |
| | Red | Currently not communicating (either of the following):<br>• Communication stop has continued since the start of the CAN bus check<br>• Communication was established at least once since the start of the CAN bus check, but communication is currently not occurring |
| | Not displayed | Either of the following:<br>• If a gateway function equipped ECU cannot communicate, the sub bus and ECUs connected to the sub bus will not be displayed.<br>• If no ECUs are connected to the sub bus, "There is no system found on the Communication Bus" will be |

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| | | |
|---|---|---|
| | | displayed. |

**HINT:**

- Gateway function equipped ECUs relay signals between the ECUs connected to the different buses.
- *1: ECUs that are present in the vehicle but are not displayed on the CAN Bus Check.
- *2: Gateway function equipped ECU that does not memorize the sub bus ECUs that are connected to it.
- *3: Gateway function equipped ECU that memorizes the sub bus ECUs that are connected to it.
- If none of the connected ECUs are displayed, or there is no response from the vehicle to the Techstream, check the DLC3 branch and the V bus main bus lines for a malfunction.

(b) Observe the connection response screen for approximately 2 minutes to check for a change in connection status of the connected ECUs and sensors.

**HINT:**

- If an open occurs in one of the lines of a CAN branch (except DLC3), output from the other branch line (the line that is not open) will be unstable and it may interfere the response (display) of other ECUs and sensors.
- If the connection status changes during the inspection, repair the open in the branch line of the ECU or sensor that does not respond (is not detected) and then perform the CAN bus check again.

### 4. HOW TO INTERPRET CAN BUS CHECK (COMMUNICATION BUS CHECK) SCREEN

(a) When a communication stop is currently occurring, the probable malfunctioning part can be determined from the CAN bus check and by using the following methods.

**NOTICE:**

**The following CAN bus wiring diagram is provided only as an example. This wiring diagram is different from the actual wiring diagram for this vehicle.**

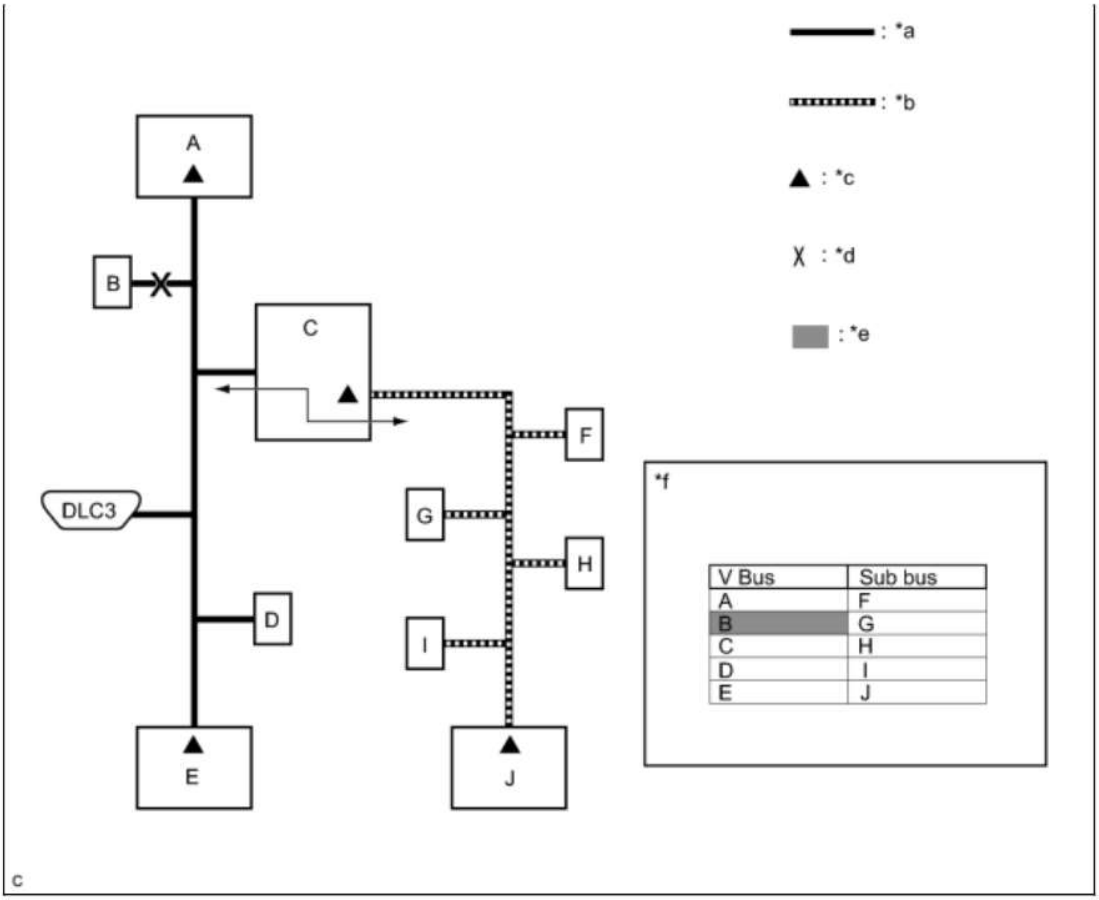
**HINT:**

- When a communication stop is currently occurring, it is easier to determine the probable malfunctioning part from the CAN bus check rather than from communication DTCs.
- Wait for approximately 2 minutes after turning the Ignition switch ON (or simulate the driving conditions that enable the malfunction to be reproduced) and select the CAN bus check. Then observe the communication status of each ECU on the screen.

(b) If a communication error of only 1 ECU or sensor is indicated on the CAN Bus Check screen, a communication stop of the ECU or sensor is suspected.

Example: Open in both CAN branch lines of ECU B on the V bus

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**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | V Bus | *b | Sub bus |
| *c | Terminating Resistor | *d | Location of malfunction |
| *e | Not displayed or background color changes to red or yellow | *f | CAN Bus Check screen |

**HINT:**

**When there are communication stops, ECUs are present in the vehicle even though they are not displayed on the CAN Bus Check screen.**

(c) If communication errors for multiple ECUs or sensors are indicated on the CAN Bus Check screen, then a communication stop of the ECU or sensor that shows a more serious communication stop (an ECU or a sensor which is not displayed) is suspected.

Example: Open in a CAN branch line for ECU D on the V bus

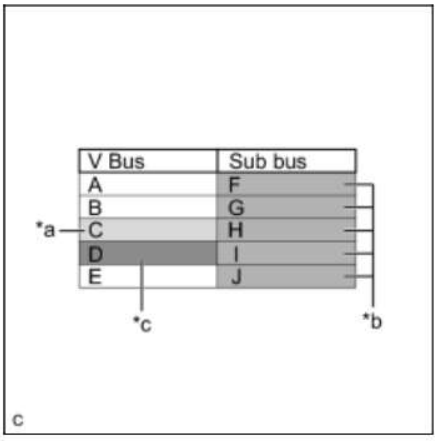
**Text in Illustration**

| | |
|---|---|
| *a | Background color periodically changes to yellow or red |
| *b | Not displayed or background color is yellow or red |
| *c | Not displayed |

**Explanation of CAN Bus Check (Communication Bus Check) screen**

| BUS TYPE | BACKGROUND COLOR | CONNECTION STATUS |
|---|---|---|
| | | Communication has been normal |

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| | | |
|---|---|---|
| V Bus | White | since the start of the CAN bus check. |
| | Yellow | Communication stop occurred at least once since the start of the CAN bus check, but communication is currently occurring (unstable communication). |
| | Red | Communication was established at least once since the start of the CAN bus check, but communication is currently not occurring (unstable communication). |
| | Not displayed | Communication stop has continued since the start of the CAN bus check.*1 |
| Sub bus (gateway function equipped ECU that does not have history of connected ECUs)*2 | White | Communication has been normal since the start of the CAN bus check. |
| | Yellow | Communication stop occurred at least once since the start of the CAN bus check, but communication is currently occurring (unstable communication). |
| | Red | Communication was established at least once since the start of the CAN bus check, but communication is currently not occurring (unstable communication). |
| | Not displayed | Communication stop has continued since the start of the CAN bus check.*1 |
| Sub bus (gateway function equipped ECU that has history of connected ECUs)*3 | White | Communication has been normal since the start of the CAN bus check. |
| | Yellow | Communication stop occurred at least once since the start of the CAN bus check, but communication is currently occurring (unstable communication). |
| | Red | Currently not communicating (either of the following):<br>• Communication stop has continued since the start of the CAN bus check<br>• Communication was established at least once since the start of the CAN bus check, but communication is currently not occurring |
| | | Either of the following:<br>• If a gateway function |

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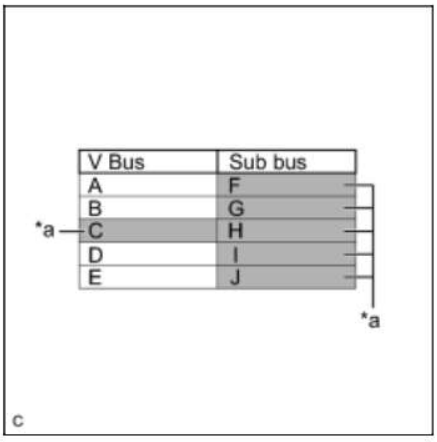
| | | |
|---|---|---|
| | Not displayed | equipped ECU cannot communicate, the sub bus and ECUs connected to the sub bus will not be displayed.<br>• If no ECUs are connected to the sub bus, "There is no system found on the Communication Bus" will be displayed. |

**HINT:**

- Gateway function equipped ECUs relay signals between the ECUs connected to the different buses.
- *1: ECUs that are present in the vehicle but are not displayed on the CAN Bus Check screen.
- *2: Gateway function equipped ECU that does not memorize the sub bus ECUs that are connected to it.
- *3: Gateway function equipped ECU that memorizes the sub bus ECUs that are connected to it.
- The example of the CAN Bus Check screen in the illustration shows the result of electrical noise on the CAN bus which is caused by an open in a CAN branch line of ECU D (output from the other branch line is unstable) and the communication of ECU C is also unstable. In addition, in this example, ECU C is equipped with a gateway function. Therefore, communication is also unstable between the sub bus ECUs of ECU C and the V bus.
- The example in the illustration shows that ECU D is not displayed on the CAN Bus Check screen. This indicates a more significant communication stop. In this case, a communication stop of ECU D is suspected.

(d) If a communication error is indicated on both the V bus and sub bus on the CAN Bus Check screen, suspect any communication stop displayed for the V bus first.

Example: Open in both CAN branch lines of ECU C on the V bus




**Text in Illustration**

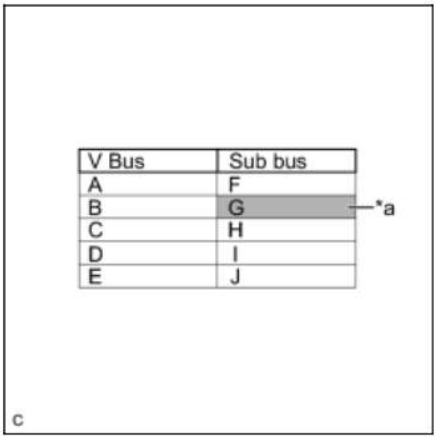
| | |
|---|---|
| *a | Not displayed or background color changes to red |

**HINT:**

- In the CAN bus check, it is possible to confirm the communication status of ECUs connected to the V bus after connecting the Techstream to the DLC3. As for the sub buses, it is possible to confirm which sub bus connected ECUs can communicate with a gateway function equipped ECU on the V bus.
- If a gateway function equipped ECU has a communication error, ECUs connected to the gateway function equipped ECU are also affected, and communication stops will be indicated.
- The CAN Bus Check screen in the illustration shows that ECU C has a gateway function and a communication stop in ECU C is suspected.

(e) If the CAN Bus Check screen indicates a communication stop only in

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the sub bus, a communication stop in the sub bus is suspected.

Example: Open in both CAN branch lines of ECU G on the sub bus

**Text in Illustration**

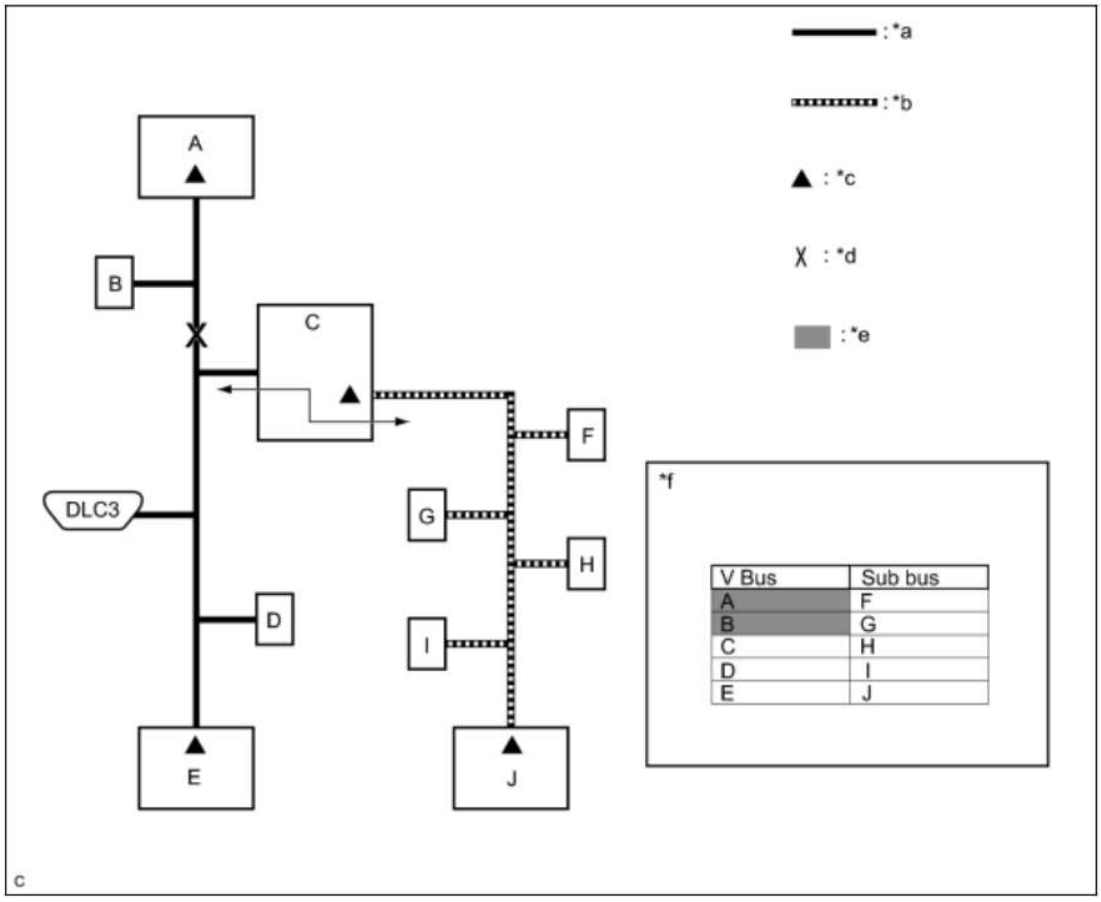
| | |
|---|---|
| *a | Background color changes to red |

**HINT:**

- A communication error in a sub bus does not affect the V bus or other buses.
- When a gateway function equipped ECU has memorized the ECUs that are connected to the sub bus, if any of the ECUs connected to the gateway function equipped ECU has a communication error, the background color changes to yellow or red. (The displayed name will not disappear.)

(f) If both of the V bus main bus lines are open, ECUs or sensors that are located farther away from the DLC3 than the open part will be displayed as a communication stop on the CAN Bus Check screen.

(In this case, ECU A and B are not displayed or their background color changes to red.)




**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | V Bus | *b | Sub Bus |
| *c | Terminating Resistor | *d | Location of malfunction |
| *e | Not displayed or background color is red | *f | CAN Bus Check screen |

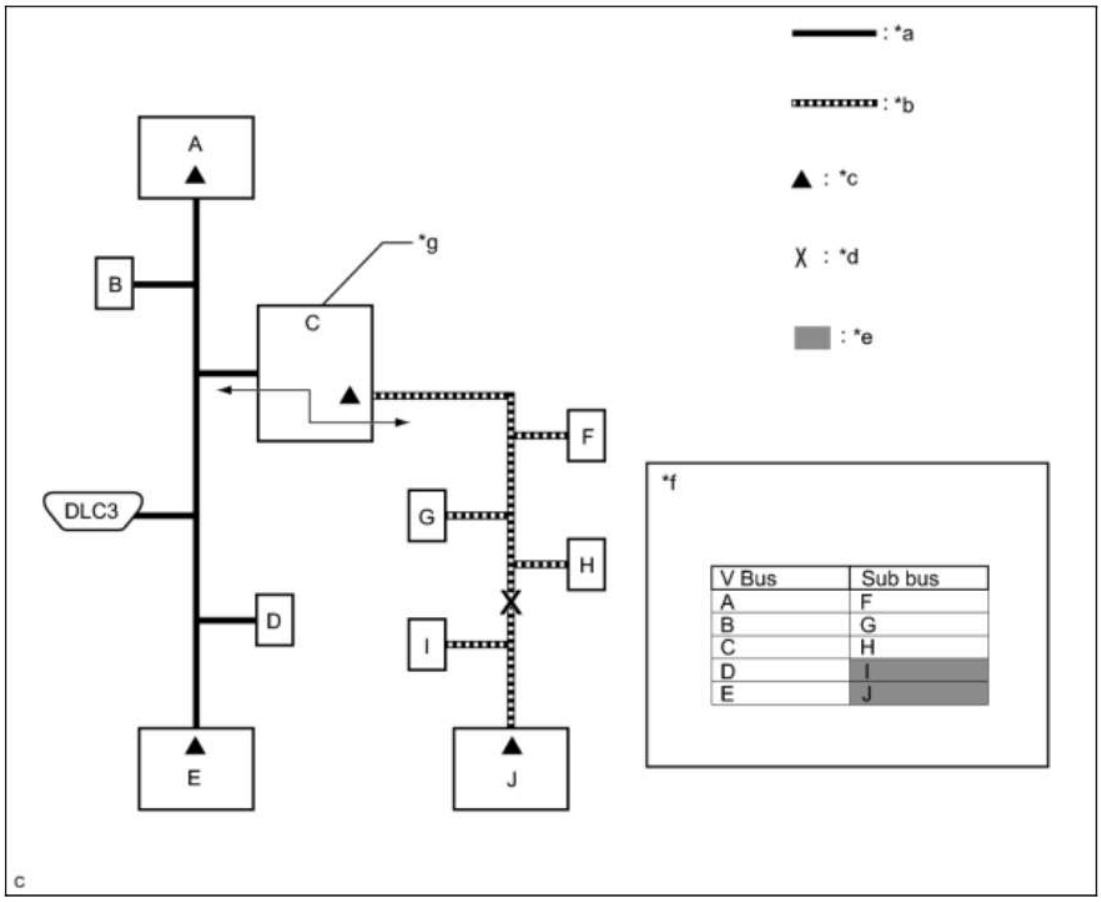
**HINT:**

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**If a communication error occurs in an ECU, it is not displayed on the CAN Bus Check screen even though the ECU is present.**

(g) If both of the sub bus main bus lines are open, the ECUs that are located farther away from the gateway function equipped ECU than the open part will be displayed as a communication stop on the CAN Bus Check screen.

(In this case, ECU I and J are not displayed or their background color changes to red.)




**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | V Bus | *b | Sub Bus |
| *c | Terminating Resistor | *d | Location of malfunction |
| *e | Not displayed or background color is red | *f | CAN Bus Check screen |
| *g | Gateway function equipped ECU | - | - |

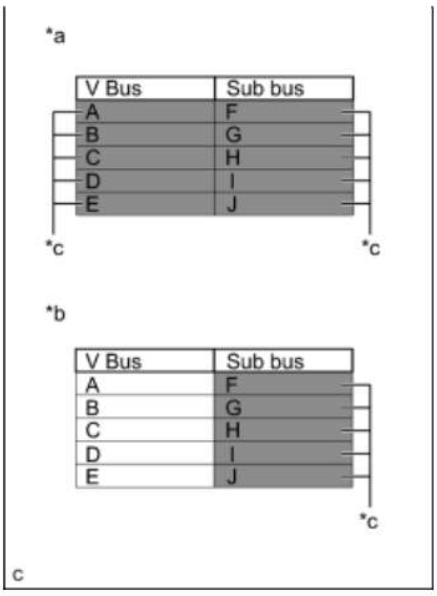
(h) When any of the following malfunctions occurs, CAN communication cannot be established and almost all ECUs and sensors on the bus show a communication error on the CAN Bus Check screen.

**Text in Illustration**

| | |
|---|---|
| *a | When any of the following malfunctions occurs on the V bus |
| *b | When any of the following malfunctions occurs on a sub bus |
| *c | Not displayed |

**Details of Malfunction**

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| | |
|---|---|
| | |

| |
|---|
| Short between CAN lines (CANH and CANL) |
| Short between a CAN line (CANH or CANL) and +B |
| Short between a CAN line (CANH or CANL) and ground |
| Open in a CAN main bus line |

**HINT:**

- When a malfunction occurs on the V bus, almost all ECUs and sensors on the V bus and sub bus indicate a communication error (almost all ECUs are not displayed). As communication with the gateway function equipped ECU that is connected to the V bus stops, communication from the ECUs connected to the sub bus that is monitored by the gateway function equipped ECU also stops (these ECUs are not displayed).
- When a malfunction occurs in a sub bus, almost all ECUs connected to the sub bus indicate a communication error.
- A communication error in a sub bus does not affect the V bus or other buses.
- The malfunctioning part can be determined by checking for a short circuit between CAN bus lines or between a CAN bus line and ground or +B short using an electrical tester.

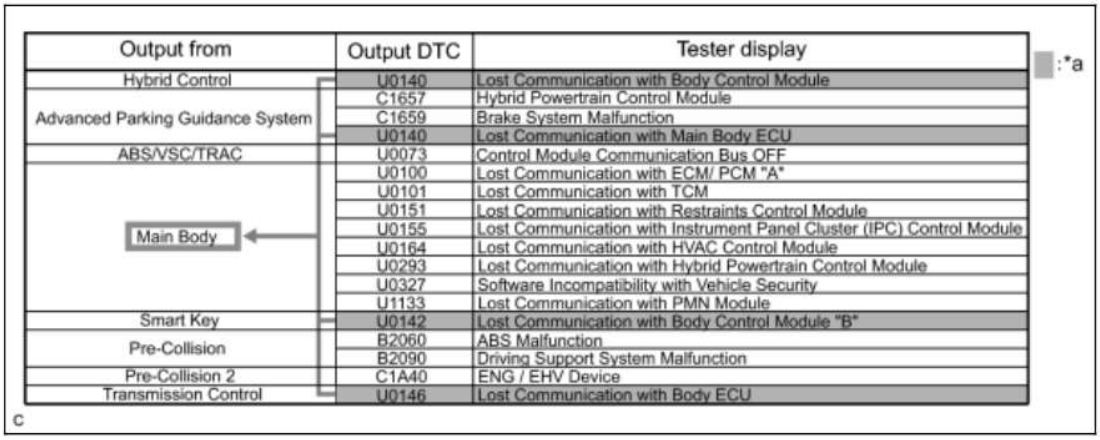
## 5. HOW TO INTERPRET COMMUNICATION DTCS (DTCS THAT START WITH U)

(a) If a CAN communication error cannot be reproduced, determine the suspected malfunctioning part using the DTCs stored in ECUs that are connected to the CAN buses by following the procedure below.

**HINT:**

**Communication DTCs (DTCs that start with U) indicate a communication error between the ECU that stores the DTC and the ECU that is indicated by the DTC.**

(1) If multiple ECUs store a communication DTC for a particular ECU, a communication stop of the ECU is suspected.




**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | Items to be checked | - | - |

**NOTICE:**

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- This DTC table is from another model, and is only used here to show an example of DTCs that are output when there is an open in a CAN branch line for the main body ECU. This table does not show DTCs applicable to this vehicle.
- Even though a DTC title may indicate a communication error with a specific ECU, the ECU name used in the DTC name on the Techstream may differ depending on the ECU that stores the DTC. (Regarding output DTCs, refer to step 6 and the DTC chart for each ECU.)

**HINT:**

**As multiple ECUs indicate a communication stop with the main body ECU, the possibility of a communication stop of the main body ECU is high.**

(2) If almost all of the communication DTCs of an ECU are stored, a communication stop of the ECU is suspected.

| Output from | Output DTC | Tester display |
|---|---|---|
| Hybrid Control | U0140 | Lost Communication with Body Control Module |
| Advanced Parking Guidance System | C1657 | Hybrid Powertrain Control Module |
| | C1659 | Brake System Malfunction |
| | U0140 | Lost Communication with Main Body ECU |
| ABS/VSC/TRAC | U0073 | Control Module Communication Bus OFF |
| Main Body | U0100 | Lost Communication with ECM/ PCM "A" |
| | U0101 | Lost Communication with TCM |
| | U0151 | Lost Communication with Restraints Control Module |
| | U0155 | Lost Communication with Instrument Panel Cluster (IPC) Control Module |
| | U0164 | Lost Communication with HVAC Control Module |
| | U0293 | Lost Communication with Hybrid Powertrain Control Module |
| | U0327 | Software Incompatibility with Vehicle Security |
| | U1133 | Lost Communication with PMN Module |
| Smart Key | U0142 | Lost Communication with Body Control Module "B" |
| Pre-Collision | B2060 | ABS Malfunction |
| | B2090 | Driving Support System Malfunction |
| Pre-Collision 2 | C1A40 | ENG / EHV Device |
| Transmission Control | U0146 | Lost Communication with Body ECU |

: *a

C

**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | Items to be checked | - | - |

**NOTICE:**

**This DTC table is from another model, and is only used here to show an example of DTCs that are output when there is an open in a CAN branch line for the main body ECU. This table does not show DTCs applicable to this vehicle.**

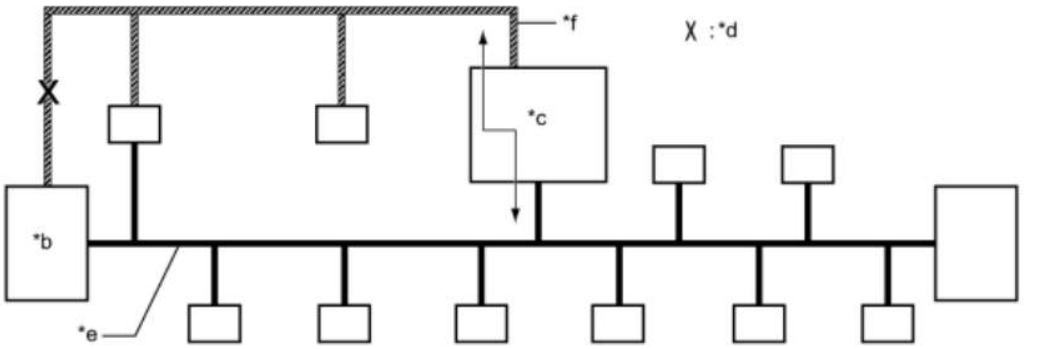
**HINT:**

**If almost all of the DTCs of the main body ECU are stored, the possibility of a communication stop of the main body ECU is high.**

(3) When a CAN communication error occurs, many DTCs are output. DTCs other than communication error DTCs (such as DTCs that start with C or B) and communication DTCs for the ABS system are important DTCs, however it may be easier to determine the malfunctioning part by examining the overall situation without considering these DTCs.

(b) To help determine the part of the sub bus that has a communication error, prioritize the communication stop DTCs stored in the gateway function equipped ECU.

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| Output from | Output DTC | Tester display |
|---|---|---|
| Engine and ECT | U0293 | Lost Communication with HV ECU |
| Hybrid Control | U0100 | Lost Communication with ECM/ PCM "A" |
| | U0129 | Lost Communication with Brake System Control Module |
| | U0164 | Lost Communication with A/C ECU |
| ABS/VSC/TRAC | U0073 | Control Module Communication Bus OFF |
| | U0293 | Communication Error from HV ECU |
| Pre-Collision | B2090 | Driving Support System Malfunction |
| Gateway | U0100 | Lost Communication with ECM/ PCM "A" |
| Pre-Collision 2 | C1A40 | ENG / EHV Device |

: *a

c

**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | Items to be checked | *b | ECM |
| *c | Gateway function equipped ECU | *d | Location of malfunction |
| *e | V Bus | *f | Sub Bus |

**NOTICE:**

**This DTC table is from another model, and is only used here to show the ECUs connected to both a V bus and a sub bus. It shows DTCs output when there is an open in the main bus lines for the ECM on the sub bus. This table does not show DTCs applicable to this vehicle.**

**HINT:**

- As gateway function equipped ECUs (sub bus monitor ECU) monitor signals from all ECUs that are connected to sub buses, gateway function equipped ECUs can detect ECUs with a communication stop more accurately.
- When there is a communication stop for the gateway function equipped ECU (gateway), communication with ECUs connected to other buses such as the V bus stops. Therefore, communication DTCs for ECUs connected to other buses are also stored.

(c) When any of the following malfunctions occurs, many DTCs are likely to be output from many ECUs. Because of this, it may be difficult to determine the probable malfunctioning part.

- Short between CAN lines (CANH and CANL)
- Short between a CAN line (CANH or CANL) and ground
- Short between a CAN line (CANH or CANL) and +B
- Open in a CAN branch line (CANH or CANL) of an ECU or sensor
- Open in a CAN main bus line (CANH or CANL) between 2 ECUs that have a terminating resistor

### 6. DTC TABLE BY ECU

**HINT:**

- In the CAN communication system, the CAN communication DTCs of each ECU can be displayed using the Techstream.
- If CAN communication system DTCs are output, trouble cannot be determined only by the DTCs. Perform troubleshooting according to How to Proceed with Troubleshooting INFO .
- If system function temporarily returns to normal, DTCs may not be output again even though the following DTC

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check procedures are used.

(a) Main Body ECU (Network Gateway ECU) / Techstream Display "Main Body"

| DTC | DETECTION ITEM | DTC DETECTION CONDITION | DTC DETECTION PRE-CONDITION | DTC CHECK PROCEDURE | WARNING INDICATION IN METER | DTC STORAGE METHOD |
|---|---|---|---|---|---|---|
| U0073 | Control Module Communication Bus "A" Off | Main body ECU (network gateway computer) communications stopped because of an error with high-speed CAN. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. | Turn the ignition switch to ON and wait for at least 15 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| U0100 | Lost Communication With ECM/PCM "A" | The main body ECU (network gateway ECU) does not receive data from the ECM. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. | Turn the ignition switch to ON and wait for at least 15 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| U0101 | Lost Communication with TCM | The main body ECU (network gateway ECU) does not receive data from the TCM. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the main body ECU (network | Turn the ignition switch to ON and wait for at least 15 seconds. | - | DTC is stored until it is cleared using the Techstream. |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | | | gateway ECU) is 10 V or more. | | | |
| U0122 | Lost Communication with Vehicle Dynamics Control Module | The main body ECU (network gateway ECU) does not receive data from the skid control ECU (brake actuator assembly). | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. | Turn the ignition switch to ON and wait for at least 15 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| U0155 | Lost Communication with Instrument Panel Cluster (IPC) Control Module | The main body ECU (network gateway ECU) does not receive data from the combination meter assembly. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. | Turn the ignition switch to ON and wait for at least 15 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| U0401 | Invalid Data Received From ECM/PCM "A" | The main body ECU (network gateway computer) detects abnormal data from the ECM. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. | Turn the ignition switch to ON and wait for at least 15 seconds. | - | DTC is stored until it is cleared using the Techstream. |

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| | | | | | | |
|---|---|---|---|---|---|---|
| U0402 | Invalid Data Received From TCM | The main body ECU (network gateway computer) detects abnormal data from the TCM. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. | Turn the ignition switch to ON and wait for at least 15 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| U0416 | Invalid Data Received From Vehicle Dynamics Control Module | The main body ECU (network gateway computer) detects abnormal data from the skid control ECU (brake actuator assembly). | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. | Turn the ignition switch to ON and wait for at least 15 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| U0423 | Invalid Data Received From Instrument Panel Cluster Control Module | The main body ECU (network gateway computer) detects abnormal data from the combination meter assembly. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. | Turn the ignition switch to ON and wait for at least 15 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| | | | Both conditions are met: | | | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| U1201 | CAN Fail/Error Counter Circuit | Unstable communications because of an error with high-speed CAN. | • The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. | Turn the ignition switch to ON and wait for at least 15 seconds. | - | DTC is stored until it is cleared using the Techstream. |

**HINT:**

**This ECU uses the CAN communication system for DTC communication.**

(b) Combination Meter Assembly / Techstream Display "Combination Meter"

| DTC | DETECTION ITEM | DTC DETECTION CONDITION | DTC DETECTION PRE-CONDITION | DTC CHECK PROCEDURE | WARNING INDICATION IN METER | DTC STORAGE METHOD |
|---|---|---|---|---|---|---|
| U0073 | Control Module Communication Bus "A" Off | The combination meter assembly communications stopped because of an error with high-speed CAN. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the combination meter assembly is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| U0100 | Lost Communication with ECM/PCM "A" | The combination meter assembly does not receive data from the ECM. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the combination | Turn the ignition switch to ON and wait for at least 10 seconds. | - | DTC is stored until it is cleared using the Techstream. |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | | | meter assembly is 10 V or more. | | | |
| U0122 | Lost Communication with Vehicle Dynamics Control Module | The combination meter assembly does not receive data from the skid control ECU (brake actuator assembly). | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the combination meter assembly is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| U0131 | Lost Communication with Power Steering Control Module | The combination meter assembly does not receive data from the power steering ECU assembly. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the combination meter assembly is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| U0140 | Lost Communication with Body Control Module | The combination meter assembly does not receive data from the main body ECU (network gateway ECU). | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the combination meter assembly is 10 V or | Turn the ignition switch to ON and wait for at least 10 seconds. | - | DTC is stored until it is cleared using the Techstream. |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | | | more. | | | |
| U0151 | Lost Communication with Restraints Control Module | The combination meter assembly does not receive data from the air bag ECU assembly. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the combination meter assembly is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | - | DTC is stored until it is cleared using the Techstream. |

**HINT:**

**This ECU uses the CAN communication system for DTC communication.**

(c) ECM / Techstream Display "Engine"

| DTC | DETECTION ITEM | DTC DETECTION CONDITION | DTC DETECTION PRE-CONDITION | DTC CHECK PROCEDURE | WARNING INDICATION IN METER | DTC STORAGE METHOD |
|---|---|---|---|---|---|---|
| U0073 | Control Module Communication Bus "A" Off | The ECM communications stopped because of an error with high-speed CAN. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the ECM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | MIL warning light illuminates. | DTC is stored until it is cleared using the Techstream. |
| | | | Both conditions are met:<br>• The ignition switch is turned | | | |

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|---|---|---|---|---|---|---|
| U0101 | Lost Communication with TCM | The ECM does not receive data from the TCM. | to ON and 1 second elapses.<br>• The power source voltage of the ECM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | MIL warning light illuminates. | DTC is stored until it is cleared using the Techstream. |
| U0122 | Lost Communication with Vehicle Dynamics Control Module | The ECM does not receive data from the skid control ECU (brake actuator assembly). | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the ECM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | MIL warning light illuminates. | DTC is stored until it is cleared using the Techstream. |
| U0155 | Lost Communication With Instrument Panel Cluster (IPC) Control Module | The ECM does not receive data from the combination meter assembly. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the ECM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | MIL warning light illuminates. | DTC is stored until it is cleared using the Techstream. |
| | | | Both conditions are met:<br>• The ignition | | | |

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|---|---|---|---|---|---|---|
| U0402 | Invalid Data Received from TCM | The ECM detects abnormal data from the TCM. | switch is turned to ON and 1 second elapses.<br>• The power source voltage of the ECM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | MIL warning light illuminates. | DTC is stored until it is cleared using the Techstream. |
| U0416 | Invalid Data Received from Vehicle Dynamics Control Module | The ECM detects abnormal data from the skid control ECU (brake actuator assembly). | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the ECM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | MIL warning light illuminates. | DTC is stored until it is cleared using the Techstream. |
| U0423 | Invalid Data Received from Instrument Panel Cluster Control Module | The ECM detects abnormal data from the combination meter assembly. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the ECM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | MIL warning light illuminates. | DTC is stored until it is cleared using the Techstream. |

**HINT:**

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**This ECU uses the CAN communication system for DTC communication.**

(d) TCM / Techstream Display "ECT"

| DTC | DETECTION ITEM | DTC DETECTION CONDITION | DTC DETECTION PRE-CONDITION | DTC CHECK PROCEDURE | WARNING INDICATION IN METER | DTC STORAGE METHOD |
|---|---|---|---|---|---|---|
| U0073 | Control Module Communication Bus "A" Off | The TCM communications stopped because of an error with high-speed CAN. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the TCM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| U0100 | Lost Communication with ECM/PCM "A" | The TCM does not receive data from the ECM. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the TCM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| | Lost Communication | The TCM does not | Both conditions are met:<br>• The ignition switch is turned to ON and 1 | Turn the ignition switch to ON | | DTC is stored until |

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| U0122 | with Vehicle Dynamics Control Module | receive data from the skid control ECU (brake actuator assembly). | second elapses.<br>• The power source voltage of the TCM is 10 V or more. | and wait for at least 10 seconds. | - | it is cleared using the Techstream. |
| U0140 | Lost Communication with Body Control Module | The TCM does not receive data from the main body ECU (network gateway ECU). | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the TCM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| U0155 | Lost Communication With Instrument Panel Cluster (IPC) Control Module | The TCM does not receive data from the combination meter assembly. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the TCM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| | | | Both conditions are met:<br>• The ignition switch | | | |

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| U0401 | Invalid Data Received from ECM/PCM "A" | The TCM detects abnormal data from the ECM. | is turned to ON and 1 second elapses.<br>• The power source voltage of the TCM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| U0416 | Invalid Data Received from Vehicle Dynamics Control Module | The TCM detects abnormal data from the skid control ECU (brake actuator assembly). | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the TCM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| U0422 | Invalid Data Received from Body Control Module | The TCM detects abnormal data from the main body ECU (network gateway computer). | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the TCM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | - | DTC is stored until it is cleared using the Techstream. |
| | | | Both conditions are met: | | | |

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|---|---|---|---|---|---|---|
| U0423 | Invalid Data Received from Instrument Panel Cluster Control Module | The TCM detects abnormal data from the combination meter assembly. | • The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the TCM is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | - | DTC is stored until it is cleared using the Techstream. |

**HINT:**

**This ECU uses the CAN communication system for DTC communication.**

(e) Skid Control ECU (Brake Actuator Assembly) / Techstream Display "ABS/VSC/TRAC"

| DTC | DETECTION ITEM | DTC DETECTION CONDITION | DTC DETECTION PRE-CONDITION | DTC CHECK PROCEDURE | WARNING INDICATION IN METER | DTC STORAGE METHOD |
|---|---|---|---|---|---|---|
| U0073 | Control Module Communication Bus OFF | The skid control ECU (brake actuator assembly) communications stopped because of an error with high-speed CAN. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the skid control ECU (brake actuator assembly) is 10 V or more. | Turn the ignition switch to ON and wait for at least 60 seconds. | ABS warning light illuminates. | DTC is stored until it is cleared using the Techstream. |
| U0100 | Lost Communication With ECM/PCM "A" | The skid control ECU (brake actuator assembly) does not receive data from the ECM. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of | Turn the ignition switch to ON and wait for at least 10 | ABS warning light illuminates. | DTC is stored until it is cleared using the |

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| | | | the skid control ECU (brake actuator assembly) is 10 V or more. | seconds. | | Techstream. |
| U0101 | Lost Communication with TCM | The skid control ECU (brake actuator assembly) does not receive data from the TCM. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the skid control ECU (brake actuator assembly) is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | ABS warning light illuminates. | DTC is stored until it is cleared using the Techstream. |
| U0126 | Lost Communication With Steering Angle Sensor Module | The skid control ECU (brake actuator assembly) does not receive data from the steering angle sensor (spiral cable sub-assembly). | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the skid control ECU (brake actuator assembly) is 10 V or more. | Turn the ignition switch to ON and wait for at least 60 seconds. | ABS warning light illuminates. | DTC is stored until it is cleared using the Techstream. |

**HINT:**

**This ECU uses the CAN communication system for DTC communication.**

(f) Steering Angle Sensor (Spiral Cable Sub-assembly) / Techstream Display "-"

**HINT:**

**The steering angle sensor is connected to the CAN communication system, but CAN communication DTCs are not output.**

(g) Power Steering ECU Assembly / Techstream Display "EMPS"

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| DTC | DETECTION ITEM | DTC DETECTION CONDITION | DTC DETECTION PRE-CONDITION | DTC CHECK PROCEDURE | WARNING INDICATION IN METER | DTC STORAGE METHOD |
|---|---|---|---|---|---|---|
| U0100 | Lost Communication with ECM/PCM "A" | The power steering ECU assembly does not receive data from the ECM. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the power steering ECU assembly is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | EPS warning light illuminates. | DTC is stored until it is cleared using the Techstream. |
| U0122 | Lost Communication with Vehicle Dynamics Control Module | The power steering ECU assembly does not receive data from the skid control ECU (brake actuator assembly). | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the power steering ECU assembly is 10 V or more. | Turn the ignition switch to ON and wait for at least 10 seconds. | EPS warning light illuminates. | DTC is stored until it is cleared using the Techstream. |
| U0416 | Invalid Data Received from Vehicle Dynamics Control Module | The power steering ECU assembly does not send data to the skid control ECU (brake actuator assembly). | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the power steering ECU assembly is 10 V or | Turn the ignition switch to ON and wait for at least 10 seconds. | EPS warning light illuminates. | DTC is stored until it is cleared using the Techstream. |

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| | | | more. | | | |

**HINT:**

**This ECU uses the CAN communication system for DTC communication.**

(h) Air Bag ECU Assembly / Techstream Display "SRS Airbag"

| DTC | DETECTION ITEM | DTC DETECTION CONDITION | DTC DETECTION PRE-CONDITION | DTC CHECK PROCEDURE | WARNING INDICATION IN METER | DTC STORAGE METHOD |
|---|---|---|---|---|---|---|
| U0073 | Control Module Communication Bus "A" Off | Air bag ECU assembly communications stopped because of an error with high-speed CAN. | Both conditions are met:<br>• The ignition switch is turned to ON and 1 second elapses.<br>• The power source voltage of the air bag ECU assembly is 10 V or more. | Turn the ignition switch to ON and wait for at least 60 seconds. | - | DTC is stored until it is cleared using the Techstream. |

**HINT:**

**This ECU uses the CAN communication system for DTC communication.**

(i) PSP (Option Connector) / Techstream Display "-"

**HINT:**

**The PSP (option connector) is connected to the CAN communication system, but CAN communication DTCs are not output.**

### 7. DTC COMBINATION TABLE (OPEN IN CAN BRANCH OF V BUS, PAST COMMUNICATION ERROR)

(a) Regarding the past communication error of ECUs and sensors connected to the V bus (in this case, normal was displayed when performing the CAN bus check, but communication DTCs are output), the probable CAN branch that had a malfunction can be determined based on the following DTC combination table.

**HINT:**

- Based on the table below and DTCs output from ECUs connected via CAN communication, the probable part for which communication stop occurred can be determined.
- Regarding an open in a CAN branch and a communication stop that is currently occurring, the malfunctioning part can be confirmed easily by performing the CAN bus check using the Techstream because the ECU or sensor connected to the CAN branch does not respond (the ECU or sensor name will not be displayed on the screen).
- If an open in a CAN main bus line, a short between the CAN bus lines (CANH and CANL) or a +B or ground short in the CAN bus occurs, DTCs of almost all ECUs (or sensors) on the CAN bus may be output, or a message indicating a communication error may be displayed on the Techstream screen. In this case, check the resistance of the CAN bus (steps 7 to 9) first.
- If an open occurs in just one of the lines of a CAN branch, DTCs which are not related to malfunctioning parts may be output (DTCs may be displayed randomly), or a message indicating a communication error may be displayed.

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| DTC | | TROUBLE MODE | | | | |
|---|---|---|---|---|---|---|
| OUTPUT ECU | OUTPUT DTC | SKID CONTROL ECU COMMUNICATION STOP MODE INFO | POWER STEERING ECU COMMUNICATION STOP MODE INFO | STEERING ANGLE SENSOR COMMUNICATION STOP MODE INFO | ECM COMMUNICATION STOP MODE INFO | TRANSMISSION CONTROL ECU COMMUNICATION STOP MODE INFO |
| Skid Control ECU (Brake Actuator Assembly) | U0073 | ○*1 | X | X | X | X |
| | U0100 | ○*1 | X | X | ○ | X |
| | U0101 | ○*1 | X | X | X | ○ |
| | U0126 | ○*1 | X | ○ | X | X |
| Power Steering ECU Assembly | U0100 | X | ○*1 | X | ○ | X |
| | U0122 | ○ | ○*1 | X | X | X |
| | U0416 | X | X*1 | X | X | X |
| ECM | U0073 | X | X | X | ○*1 | X |
| | U0101 | X | X | X | ○*1 | ○ |
| | U0122 | ○ | X | X | ○*1 | X |
| | U0155 | X | X | X | ○*1 | X |
| | U0402 | X | X | X | ○*1 | ○ |
| | U0416 | ○ | X | X | ○*1 | X |
| | U0423 | X | X | X | X*1 | X |
| TCM | U0073 | X | X | X | X | ○*1 |
| | U0100 | X | X | X | ○ | ○*1 |
| | U0122 | ○ | X | X | X | ○*1 |
| | U0140 | X | X | X | X | ○*1 |
| | U0155 | X | X | X | X | ○*1 |
| | U0416 | X | X | X | X | X*1 |
| | U0422 | X | X | X | X | X*1 |
| | U0423 | X | X | X | X | X*1 |
| Main Body ECU (Network Gateway ECU) | U0073 | X | X | X | X | X |
| | U0100 | X | X | X | ○ | X |
| | U0101 | X | X | X | X | ○ |
| | U0122 | ○ | X | X | X | X |
| | U0155 | X | X | X | X | X |
| | U0401 | X | X | X | X*2 | X |
| | U0402 | X | X | X | X | X*2 |
| | U0416 | X*2 | X | X | X | X |
| | U0423 | X | X | X | X | X |
| | U1201 | X | X | X | X | X |
| Combination | U0073 | X | X | X | X | X |
| | U0100 | X | X | X | ○ | X |
| | U0122 | ○ | X | X | X | X |

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|---|---|---|---|---|---|---|
| Meter Assembly | U0131 | X | X | X | X | X |
| | U0140 | X | X | X | X | X |
| | U0151 | X | X | X | X | X |
| Air Bag ECU Assembly | U0073 | X | X | X | X | X |

| DTC | | TROUBLE MODE | | | |
|---|---|---|---|---|---|
| OUTPUT ECU | OUTPUT DTC | MAIN BODY ECU COMMUNICATION STOP MODE INFO | COMBINATION METER ECU COMMUNICATION STOP MODE INFO | CENTER AIRBAG SENSOR COMMUNICATION STOP MODE INFO | BUS BUFFER ECU COMMUNICATION STOP MODE INFO |
| Skid Control ECU (Brake Actuator Assembly) | U0073 | X | X | X | X |
| | U0100 | X | X | X | X |
| | U0101 | X | X | X | X |
| | U0126 | X | X | X | X |
| Power Steering ECU Assembly | U0100 | X | X | X | X |
| | U0122 | X | X | X | X |
| | U0416 | X | X | X | X |
| ECM | U0073 | X | X | X | X |
| | U0101 | X | X | X | X |
| | U0122 | X | X | X | X |
| | U0155 | X | ○ | X | X |
| | U0402 | X | X | X | X |
| | U0416 | X | X | X | X |
| | U0423 | X | X | X | X |
| TCM | U0073 | X | X | X | X |
| | U0100 | X | X | X | X |
| | U0122 | X | X | X | X |
| | U0140 | ○ | X | X | X |
| | U0155 | X | ○ | X | X |
| | U0401 | X | X | X | X |
| | U0416 | X | X | X | X |
| | U0422 | X | X | X | X |
| | U0423 | X | X | X | X |
| Main Body ECU (Network Gateway ECU) | U0073 | ○*1 | X | X | X |
| | U0100 | ○*1 | X | X | X |
| | U0101 | ○*1 | X | X | X |
| | U0122 | ○*1 | X | X | X |
| | U0155 | ○*1 | ○ | X | X |
| | U0401 | X*1 | X | X | X |
| | U0402 | X*1 | X | X | X |

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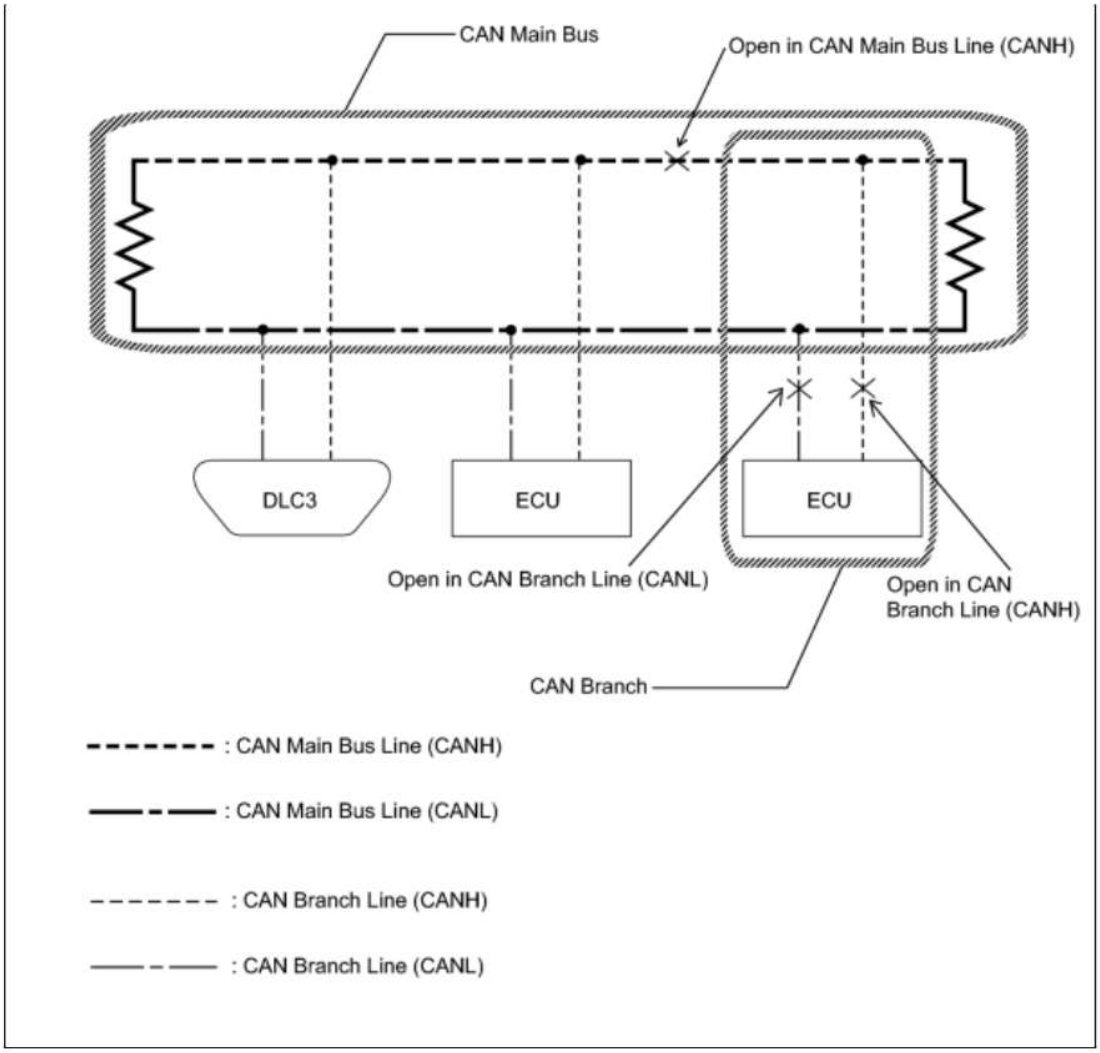
| | | | | | |
|---|---|---|---|---|---|
| | U0416 | X*1 | X | X | X |
| | U0423 | X*1 | X*2 | X | X |
| | U1201 | ○*1 | X | X | X |
| Combination Meter Assembly | U0073 | X | ○*1 | X | X |
| | U0100 | X | ○*1 | X | X |
| | U0122 | X | ○*1 | X | X |
| | U0131 | X | ○*1 | X | X |
| | U0140 | ○ | ○*1 | X | X |
| | U0151 | X | ○*1 | ○ | X |
| Air Bag ECU Assembly | U0073 | X | X | ○*1 | X |

**HINT:**

- ○: Set
- X: Not set or may be set according to the malfunctioning part when one line of a CAN branch is open.
- -: DTC is not output.
- *:1 DTC is not output during communication error, but will be output as a history DTC (past DTC) when communication returns to normal.
- *:2 DTC may not be stored depending on conditions.

### 8. CAN BUS WAVEFORMS

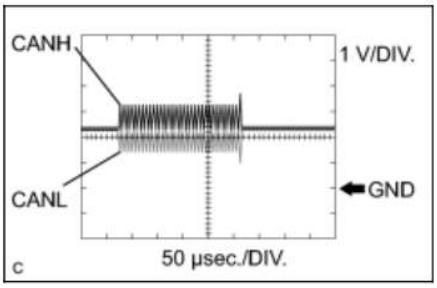
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**HINT:**

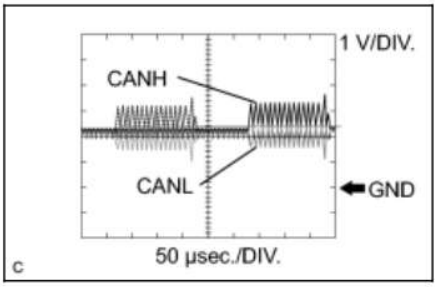
- This waveform is measured between terminals CANH and GND, and terminals CANL and GND of the DLC3. (Use this as a reference for diagnosis of CAN communication lines.)
- When malfunctions in multiple ECUs are suspected based on CAN Bus Check and DTCs checked using the Techstream, check the resistance of the CAN bus using an ohmmeter first INFO . If no problems are found, check the following waveforms.
- If a waveform is not similar to one of the following 3 patterns (Group 1), then an open in a CAN main bus line, an open in a CAN branch line, or a short between a CAN line (CANH or CANL) and ground is suspected (Group 2).
- Wiggle the connector and wire harness to check if the waveform changes.

(a) CAN bus waveforms (Group 1)




(1) Normal waveform

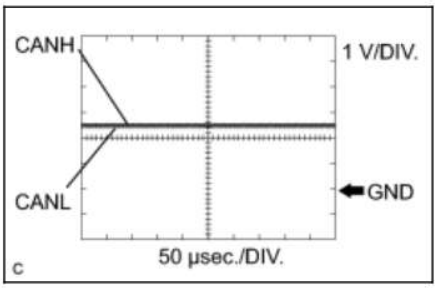
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(2) Open in both of the lines (CANH and CANL) of a CAN branch

**HINT:**

- Waveforms (waveforms shown using dotted lines) are not present from an ECU or sensor connected to a CAN branch with an open circuit in both lines. (Waveforms from other ECUs or sensors are normal.)
- Because this waveform is similar to a normal waveform, instead of using the waveform, the malfunctioning part can be narrowed down by performing a CAN bus check.




(3) Short between the CAN bus lines (CANH and CANL)

**HINT:**

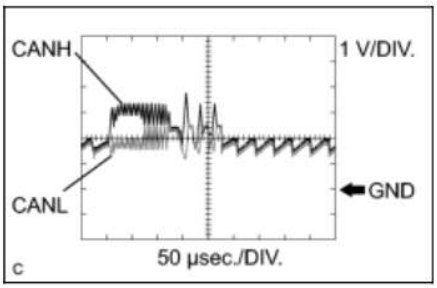
- Waveforms disappear.
- If the malfunction is in an ECU, disconnecting the ECU will change the waveform. If the waveform does not change, a malfunction in the wire harness is suspected.

(b) CAN bus waveforms (reference) (Group 2)

**NOTICE:**

**The following CAN bus waveforms can be used only as reference. The actual measured waveform may differ significantly depending on the location of the open or short circuit.**

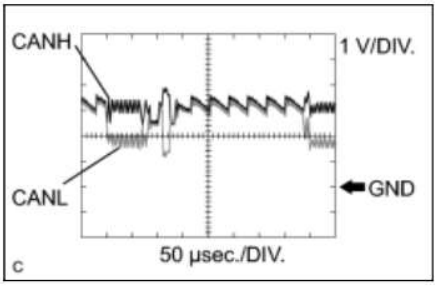
(1) Open in a CAN branch line (CANH)




**HINT:**

- An abnormal waveform is output from an ECU with an open in one of its CAN branch lines. Because this abnormal output interferes with the signals from other ECUs, the output of other ECUs will also appear abnormal.
- Narrow down the malfunctioning part by checking DTCs or performing a CAN bus check, or by checking waveform changes when ECUs or sensors are disconnected. The waveform will change to one for an open in both sides of a CAN branch when the ECU or sensor with an open CAN branch line is disconnected.

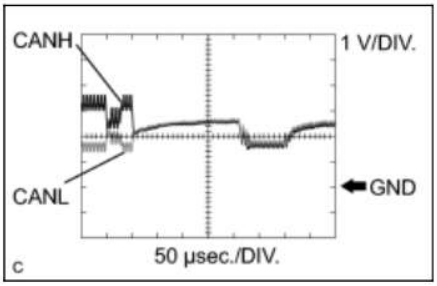
(2) Open in a CAN branch line (CANL)




**HINT:**

- An abnormal waveform is output from an ECU with an open in one of its CAN branch lines. Because this abnormal output interferes with the signals from other ECUs, the output of other ECUs will also appear abnormal.
- Narrow down the malfunctioning part by checking DTCs or performing a CAN bus check, or by checking waveform changes when ECUs or sensors are disconnected. The waveform will change to one for an open in both sides of a CAN branch when the ECU or sensor with an open CAN branch line is disconnected.

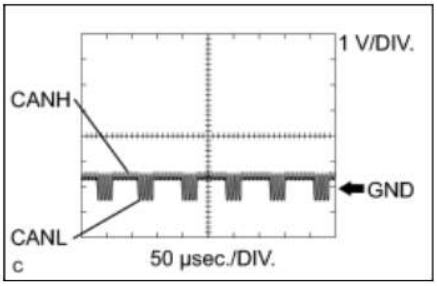
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(3) Open in a CAN main bus line (CANH)

**HINT:**

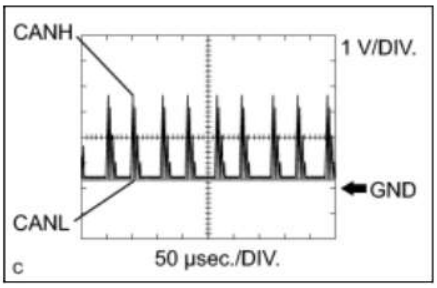
- Waveforms of ECUs or sensors that are nearer to the DLC3 than the open part are almost normal.
- Waveforms of ECUs or sensors that are on the opposite side of the DLC3 from the open part are abnormal.
- An open in a CAN main bus line can be confirmed by measuring the resistance between the CANH and CANL terminals of any CAN branch.




(4) Short between a CAN bus line (CANH) and ground

**HINT:**

- Narrow down the shorted part by checking for waveform changes when disconnecting connectors from the CAN junction connector or when disconnecting ECUs or sensors.
- A short to ground in the CANH line can be confirmed by measuring the resistance between CANH and ground using an ohmmeter.




(5) Short between a CAN bus line (CANL) and ground

**HINT:**

- Narrow down the shorted part by checking for waveform changes when disconnecting connectors from the CAN junction connector or when disconnecting ECUs or sensors.
- A short to ground in the CANL line can be confirmed by measuring the resistance between CANL and ground using an ohmmeter.

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|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 J | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000000WIP0B6X |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: ECM Communication Stop Mode (2013 FR-S) | | |

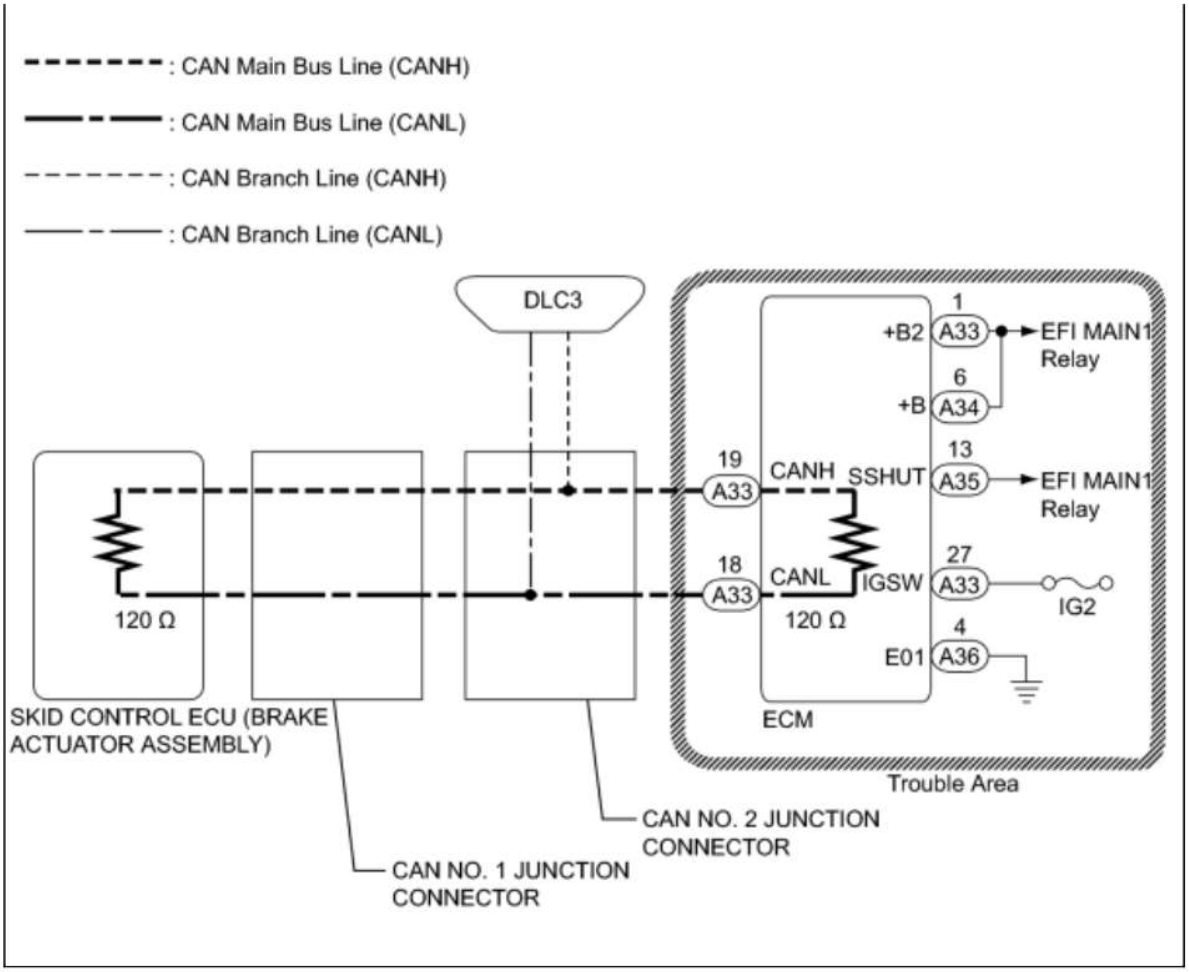
**ECM Communication Stop Mode**

## DESCRIPTION

| DETECTION ITEM | SYMPTOM | TROUBLE AREA |
|---|---|---|
| ECM Communication Stop Mode | Either condition is met:<br>• "ECM (Engine)" is not displayed on the "CAN Bus Check" screen of the Techstream INFO<br>• Communication system DTCs (DTCs that start with U) that are output correspond to "ECM Communication Stop Mode" in "DTC Combination Table" INFO | • Power source circuit of ECM<br>• ECM main line or connector<br>• ECM ground circuit<br>• ECM |

## WIRING DIAGRAM

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# INSPECTION PROCEDURE

**NOTICE:**

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON and wait at least 10 seconds.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO .

**HINT:**

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or

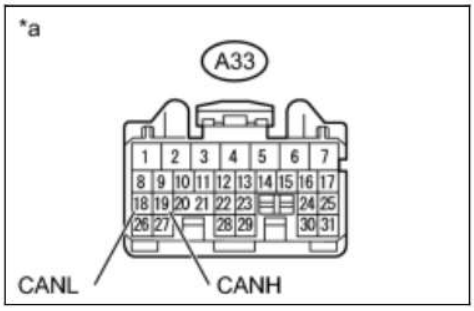
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wire harness while performing the inspection below may help determine the cause of the malfunction.

## PROCEDURE

| | |
|---|---|
| 1. | **CHECK FOR OPEN IN CAN BUS LINES (ECM MAIN LINE)** |

(a) Disconnect the cable from the negative (-) battery terminal.




(b) Disconnect the A33 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A33-19 (CANH) - A33-18 (CANL) | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to ECM) |

NG ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (ECM MAIN LINE)**

**OK** ▼

| | |
|---|---|
| 2. | **CHECK ECM POWER SOURCE CIRCUIT** |

(a) Check the ECM power source circuit INFO .

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

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OK ▶ REPLACE ECM

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 D | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000000WI60A6X |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S) | | |

# HOW TO PROCEED WITH TROUBLESHOOTING

## 1. PRECAUTIONS WHEN TROUBLESHOOTING

**NOTICE:**

- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output.
- If the CAN communication system is malfunctioning, check the contact pressure of the terminals in connectors, as insufficient terminal contact pressure may be the cause INFO .
- Refer to Diagnosis System for the DTCs for the CAN communication system.
- Refer to troubleshooting of each system if DTCs regarding the CAN communication system are not output.
- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .

(a) CAN communication DTCs are output for CAN main bus and CAN branch malfunctions as well as for internal malfunctions or power source malfunctions of ECUs or sensors for systems using CAN communication. Therefore, when DTCs for internal malfunctions or power source malfunctions of corresponding systems are output at the same time as CAN communication DTCs, troubleshoot according to the internal malfunction and power source malfunction DTCs.

(b) The DLC3 branch and V bus main bus circuits can be checked for malfunctions by inspecting at the DLC3 terminals using an electrical tester.

**NOTICE:**

- When inspecting at the DLC3 connector, do not connect the tester directly to the terminals. Instead, connect using service wires.
- Inspections for an open in an ECU or sensor branch, or inspections for buses other than the V bus cannot be performed from the DLC3.

(c) An open in a branch for ECUs or sensors that are connected to the CAN main bus can be checked by performing a CAN bus check using the Techstream. (This inspection is possible when the DLC3 branch and V bus main bus lines are normal.)

(d) If the V bus had a communication error, the probable ECU or sensor for which communication stopped can be determined using the combination of communication DTCs (DTCs that start with U) that are output.

(e) When an open circuit is detected, before disconnecting the related connectors for inspection, push in on the connector body to check that the connector is not loose or disconnected.

(f) When a connector is disconnected, check that the terminals and the connector body are not cracked, deformed or corroded.

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| 1. | VEHICLE BROUGHT TO WORKSHOP |
|---|---|

**HINT:**

- If the ignition switch can be turned to ON when the vehicle is brought in for repair, check for DTCs and check the illumination condition of the indicators in the combination meter assembly and the basic operation of the vehicle (such as steering operation) promptly.
- Do not turn the ignition switch off until the inspection of the vehicle is finished, as some fail-safe functions are canceled when the ignition switch is turned off.
- If the ignition switch cannot be turned to ON when the vehicle is brought in, measure the voltage of the battery. If the voltage is below 11 V, recharge or replace the battery before performing troubleshooting.

**NEXT**

| 2. | CUSTOMER PROBLEM ANALYSIS |
|---|---|

**HINT:**

- When troubleshooting, confirm that the problem symptoms have been accurately identified. Preconceptions should be discarded in order to make an accurate judgment. To clearly understand what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time the malfunction occurred.
- Ask the customer if the vehicle is/was equipped with additional devices such as a theft deterrent device or monitor. (If equipped, explain the customer that the additional devices will be removed before performing troubleshooting as the malfunction cannot be checked properly.)

(a) It is useful to confirm the symptoms and the conditions in which the vehicle was operating at the time when a malfunction occurred. This helps to narrow down the malfunctioning part.

**HINT:**

- What was affected (system, part or meter warning indicators)
- What happened (details of the malfunction)
- When (occurrence date and time, frequency and if it recurs or not)
- Under what kind of situation did the problem occur (driving and operating condition at the occurrence and weather)
- Road type or condition (city, suburb, paved road, unpaved road, highway, etc.)
- Return conditions (what made the vehicle return to normal. Example: ignition switch was turned off)

**Points to be Confirmed**

| | |
|---|---|
| Symptom | • Electric power steering<br>- Normal<br>- A little heavier than usual<br>- There was no assist<br>• Multi-information display<br>- Whether each display has stopped updating<br>• Others |

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| | |
|---|---|
| Meter warning lights | • Illumination of warning lights and the order in which they illuminated<br>- Slip indicator light<br>- ABS warning light<br>- Check Engine warning light<br>- Brake warning light<br>- SRS warning light<br>- Others<br>• Meter display<br>- Shift indicator<br>- Speedometer<br>- Tachometer (if it is fixed at 0 rpm)<br>- Engine coolant temperature gauge (if it is fixed at COLD) |

**NEXT**

| | |
|---|---|
| **3.** | **CHECK TECHSTREAM OPERATION** |

**HINT:**

**Read the Techstream operators manual before use** INFO .

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Check that the Techstream and ECUs can communicate with the ignition switch ON.

**HINT:**

- If communication is impossible, the Techstream screen will indicate an error.
- If communication between the Techstream and ECUs is impossible, either the Techstream or vehicle has a malfunction.
- When communication between the Techstream and the vehicle is impossible, but communication is possible when the Techstream is connected to another vehicle, the vehicle has the malfunction. Inspect the CANH and CANL branch lines of the DLC3 and the ECU power source circuits (in this case perform steps 7 to 9 first). In addition, check that the BAT terminal of the DLC3 receives battery voltage (11 V or more).
- If communication between the Techstream and ECUs is still impossible even when the Techstream is connected to another vehicle, the Techstream has a malfunction. Perform the self tests described in the Techstream operators manual. (The Techstream may be malfunctioning or its battery may be discharged.)

| RESULT | PROCEED TO |
|---|---|
| OK (Communication between the Techstream and the vehicle is possible.) | A |
| OK (Communication between the Techstream and the vehicle is impossible but communication | B |

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| | |
|---|---|
| is possible when connected to another vehicle.) | |
| NG (Communication is not possible between the Techstream and the vehicle, nor between the Techstream and another vehicle.) | C |

**B** ▶ **Go to step 7**

**C** ▶ **Refer to Techstream operator's manual**

**A**

▼

| | |
|---|---|
| **4.** | **CHECK DTC** |

(a) Using the Techstream, perform Health Check to read current and history DTCs and record them.

**NOTICE:**

- CAN communication DTCs are output when there is an open or short in any of the communication lines. Any problems with the power source of a corresponding ECU or sensor, or problems in the ECU, the sensor itself also cause these DTCs to be output.
- If a CAN communication line connector is disconnected with the ignition switch ON, the ECUs of the corresponding system and related systems store a DTC.

**HINT:**

- If an open in a CAN main bus line, a short between the CAN bus lines (CANH and CANL) or a +B or ground short in a CAN bus occurs, DTCs of almost all ECUs and sensors on the CAN bus may be output (or a message indicating a communication error may be displayed on the Techstream screen). In this case, check the resistance of the CAN bus (steps 7 to 9) first.
- If an open occurs in just one of the lines of a CAN branch, DTCs which are not related to malfunctioning parts may be output (DTCs may be displayed randomly), or a message indicating a communication error may be displayed on the Techstream.

(b) Read the freeze frame data using the Techstream and record it.

**NEXT**

▼

| | |
|---|---|
| **5.** | **CHECK COMMUNICATION MALFUNCTION CHECK (CONNECTION STATUS CHECK USING TECHSTREAM)** |

(a) Select "CAN Bus Check" from the screen on the Techstream.

(b) Record all the DTCs stored for ECUs and sensors.

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**NEXT**

| 6. | CHECK CAN BUS CHECK (CONNECTION STATUS CHECK USING TECHSTREAM) |
|---|---|

(a) Based on the vehicle equipment and specifications, confirm the systems that use CAN communication INFO .

(b) Select "CAN Bus Check" from the screen on the Techstream.

(c) Observe the screen for approximately 2 minutes to check the ECUs and sensors displayed on the screen.

**NEXT**

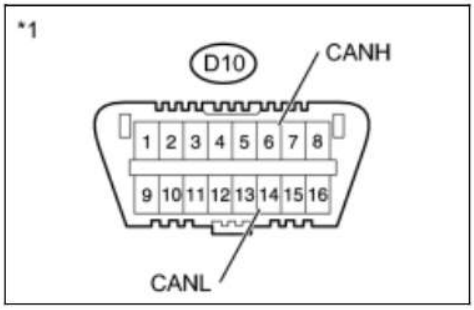
| 7. | CHECK DLC3 BRANCH LINE AND V BUS MAIN LINE (CANH - CANL) |
|---|---|

**NOTICE:**

**Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.**

**HINT:**

**Operating the ignition switch, any other switches or a door triggers the related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.**




(a) Disconnect the cable from the negative (-) battery terminal.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D10-6 (CANH) - D10-14 (CANL) | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |

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**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |

Result:

| RESULT | PROCEED TO |
|---|---|
| OK | A |
| NG (64 Ω or higher) | B |
| NG (Below 57 Ω) | C |

**B** ▶ **GO TO OPEN IN CAN MAIN BUS LINE**

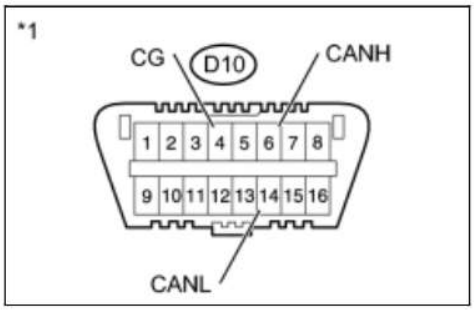
**C** ▶ **GO TO SHORT IN CAN BUS LINES**

**A**

| | |
|---|---|
| **8.** | **CHECK FOR SHORT TO GND IN V BUS (CANH, CANL - CG)** |

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:




| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D10-6 (CANH) - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| D10-14 (CANL) - D10-4 (CG) | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |

**NG** ▶ **GO TO SHORT TO GND IN CAN BUS LINE**

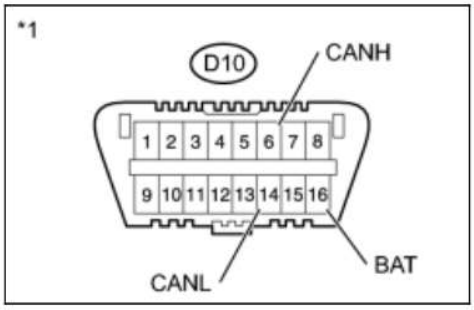
**OK**

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| 9. | CHECK FOR SHORT TO +B IN V BUS (CANH, CANL - BAT) |
|---|---|

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:




| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D10-6 (CANH) - D10-16 (BAT) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |
| D10-14 (CANL) - D10-16 (BAT | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |

**NG** ▶ **GO TO SHORT TO +B IN CAN BUS LINE**

**OK** ▼

| 10. | CHECK RESULT OF CAN BUS CHECK (CONNECTION STATUS CHECK USING TECHSTREAM) |
|---|---|

(a) Inspect or repair the probable malfunctioning part based on the check result of step 6 (the step in which CAN Bus Check was performed).

Result of CAN Bus Check (Connection Status Check Using Techstream):

| RESULT | PROCEED TO |
|---|---|
| All ECUs and sensors connected to the CAN communication system are displayed on the screen.<br>(CAN bus circuit is currently normal.) | A |
| One of the ECUs and sensors connected to the V Bus is not displayed on the screen.<br>(Open in ECU or sensor branch lines, or communication interrupted.) | B |
| In addition to the ECUs and sensors which are connected to the CAN communication system but are not displayed on the screen, there are ECUs or sensors for which the detection status changes (changes between detected and not detected) during the inspection.<br>(Open in one side of ECU or sensor branch lines.) | C |

**NOTICE:**

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Non-installed ECUs or sensors will not be displayed. Do not mistake them for being in communication stop mode.

- It may be possible to select buses that do not have ECUs or sensors from the bus selection pull-down menu on the Techstream. This is not a malfunction.

**HINT:**

- Regarding CAN Bus Check, refer to How to Interpret CAN Bus Diagnosis (CAN Bus Check) Screen INFO .
- If the detection status of ECUs changes during the inspection, one of the branch lines of a connected ECU or sensor may be open. (Signals from the ECU or sensor that has an open in one of its branch lines create electrical noise, affecting response to the Techstream and the ECUs and whether or not sensors displayed.)

B ▶ **GO TO COMMUNICATION STOP MODE TABLE**

C ▶ **GO TO OPEN IN ONE SIDE OF CAN BRANCH LINE**

**A**

▼

| | |
|---|---|
| **11.** | **CHECK RESULT OF COMMUNICATION MALFUNCTION CHECK (SELECT THE MALFUNCTIONING BUS)** |

(a) Inspect or repair the probable malfunctioning part based on the check result of step 5 (the step in which checking for communication malfunction DTCs was performed).

**HINT:**

- When checking for communication DTCs, refer to How to Interpret Communication DTCs (DTCs that start with U) INFO .
- If communication DTCs are stored, and all ECUs and sensors connected to the CAN communication system are displayed on the Communication Bus Check (CAN bus check) screen of the Techstream, a past malfunction that is currently not occurring is suspected.
- When a CAN branch of the V bus is malfunctioning, because the ECUs and sensors related to it detect the malfunction, the problem area can be determined using the combination of DTCs that are output.

**NEXT**

▼

| | |
|---|---|
| **12.** | **DTC COMBINATION TABLE** |

(a) Confirm the problem according to the combination of output DTCs regarding the CAN communication system INFO .

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| RESULT | PROCEED TO |
|---|---|
| Combination of DTCs is not in DTC Combination Table | A |
| Combination of DTCs is in DTC Combination Table | B |

**HINT:**

**CAN communication system history DTCs may indicate the problem if CAN communication system DTCs are output and all ECUs and sensors connected to the CAN communication system are displayed on "CAN Bus Check" of the Techstream.**

B ▶ GO TO COMMUNICATION STOP MODE TABLE

A ▼

| | |
|---|---|
| 13. | IDENTIFICATION OF PROBLEM (PAST MALFUNCTION IN MAIN BUS OF V BUS) |

(a) Connect the cable to the negative (-) battery terminal.

(b) Clear the DTCs using the Techstream.

(c) Perform the tests in Symptom Simulation to check the wire harnesses and connectors including those for V bus main bus lines INFO .

(d) Based on the results of the check, inspect the parts that output DTCs to determine the malfunctioning part.

**HINT:**

**If DTCs are output, do not turn the ignition switch off.**

NEXT ▼

| | |
|---|---|
| 14. | REPAIR OR REPLACEMENT |

NEXT ▼

| | |
|---|---|
| 15. | CONFIRMATION TEST* |

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NEXT END

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 J | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000001F1V05UX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: Main Body ECU Communication Stop Mode (2013 FR-S) | | |

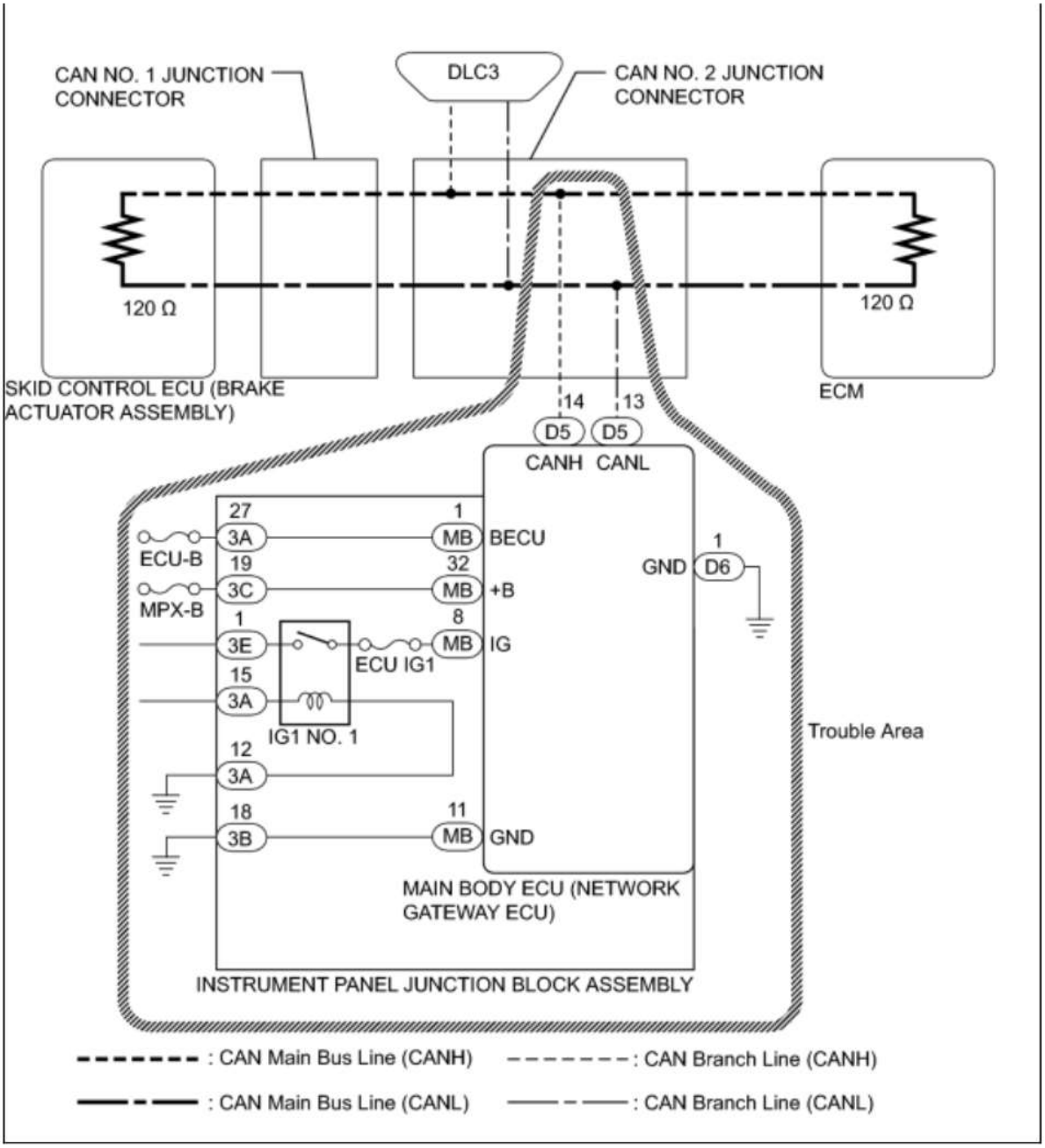
**Main Body ECU Communication Stop Mode**

## DESCRIPTION

| DETECTION ITEM | SYMPTOM | TROUBLE AREA |
|---|---|---|
| Main Body ECU Communication Stop Mode | Either condition is met:<br>• "Main Body" is not displayed on the "CAN Bus Check" screen of the Techstream INFO<br>• Communication system DTCs (DTCs that start with U) that are output correspond to "Main Body ECU Communication Stop Mode" in "DTC Combination Table" INFO | • Main body ECU (network gateway ECU) branch line or connector<br>• Power source circuit of main body ECU (network gateway ECU)<br>• Main body ECU (network gateway ECU) ground circuit<br>• Main body ECU (network gateway ECU) |

## WIRING DIAGRAM

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# INSPECTION PROCEDURE

**NOTICE:**

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.

- DTC check procedure: Turn the ignition switch to ON and wait at least 15 seconds.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO .

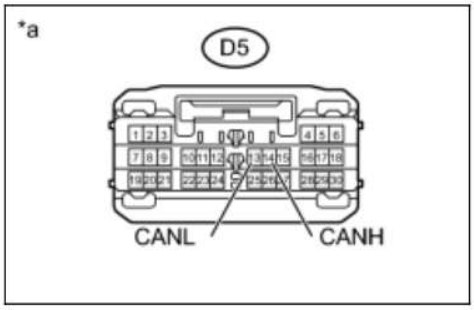
**HINT:**

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

## PROCEDURE

| | |
|---|---|
| 1. | **CHECK FOR OPEN IN CAN BUS LINES (MAIN BODY ECU (NETWORK GATEWAY ECU) BRANCH LINE)** |

(a) Disconnect the cable from the negative (-) battery terminal.




(b) Disconnect the D5 main body ECU (network gateway ECU) connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D5-14 (CANH) - D5-13 (CANL) | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Main Body ECU (Network Gateway ECU)) |

NG ▶ **REPAIR OR REPLACE CAN BRANCH LINE OR CONNECTOR (MAIN BODY ECU (NETWORK GATEWAY ECU))**

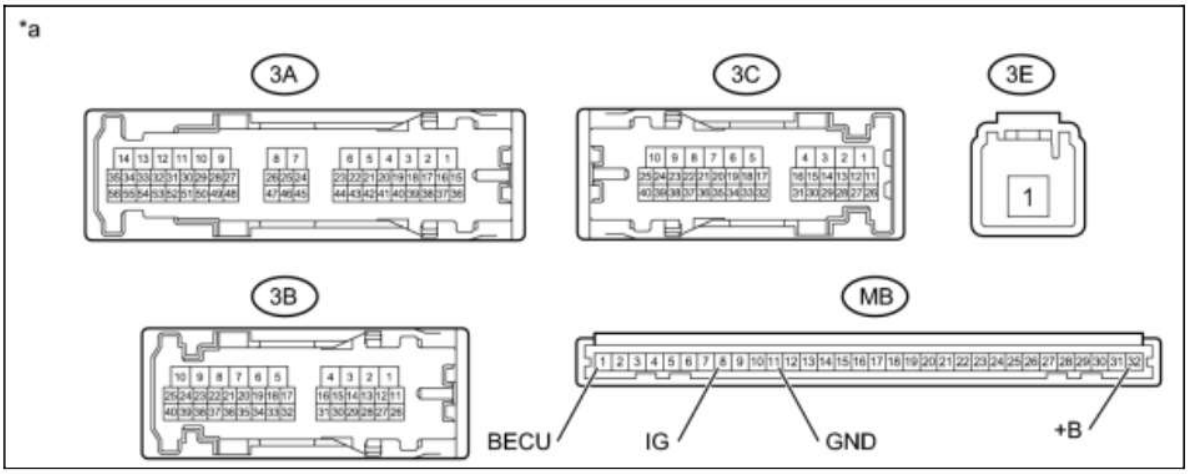
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**OK**

| 2. | CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY |
|---|---|

(a) Remove the main body ECU (network gateway ECU) INFO .

(b) Remove the instrument panel junction block assembly INFO .




**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | Component without harness connected<br>(Instrument Panel Junction Block Assembly) | - | - |

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| 3E-1 - MB-8 (IG) | Battery voltage is applied to terminals 3A-15 and 3A-12 | Below 1 Ω |
| MB-1 (BECU) - 3A-27 | Always | Below 1 Ω |
| MB-11 (GND) - 3B-18 | Always | Below 1 Ω |
| MB-32 (+B) - 3C-19 | Always | Below 1 Ω |

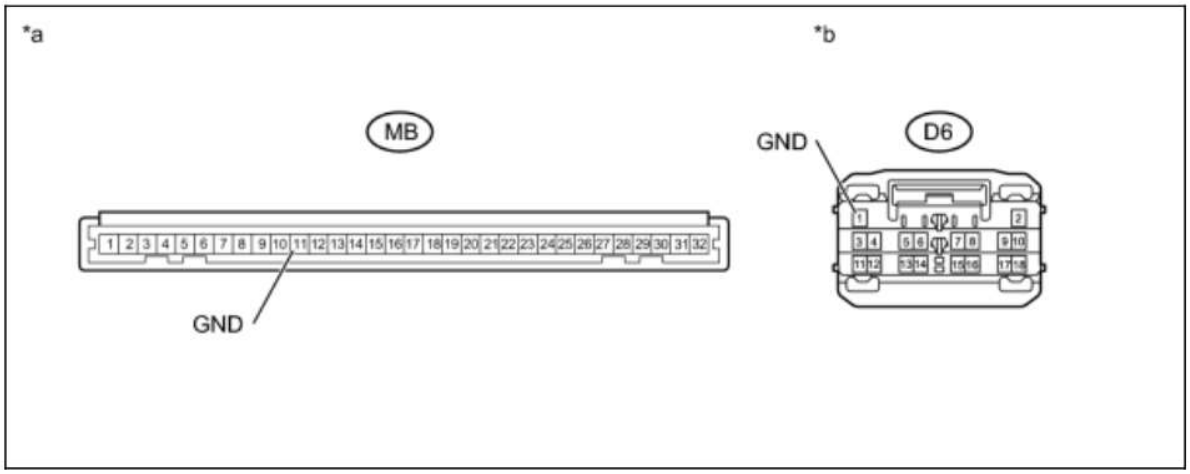
**NG** ▶ **REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY**

**OK**

| 3. | CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT) |
|---|---|

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(a) Install the instrument panel junction block assembly.




**Text in Illustration**

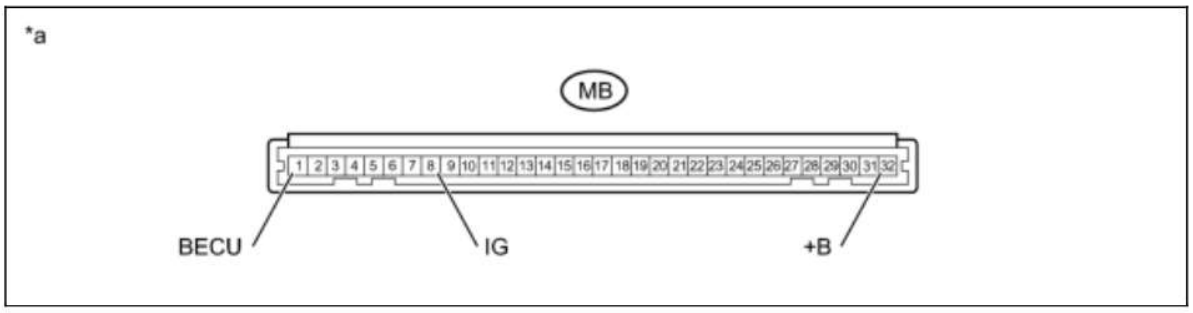
| | | | |
|---|---|---|---|
| *a | Component without harness connected (Instrument Panel Junction Block Assembly) | *b | Front view of wire harness connector (to Instrument Panel Junction Block Assembly) |

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D6-1 (GND) - Body ground | Cable disconnected from negative (-) battery terminal | Below 1 Ω |
| MB-11 (GND) - Body ground | Cable disconnected from negative (-) battery terminal | Below 1 Ω |

(c) Connect the cable to the negative (-) battery terminal.




**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | Component without harness connected (Instrument Panel Junction Block Assembly) | - | - |

(d) Measure the voltage according to the value(s) in the table below.

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Standard Voltage:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| MB-1 (BECU) - Body ground | Ignition switch off | 11 to 14 V |
| MB-8 (IG) - Body ground | Ignition switch ON | 11 to 14 V |
| MB-32 (+B) - Body ground | Ignition switch off | 11 to 14 V |

**NG** ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

**OK** ▶ **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 J | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000001V9P06AX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: Open in CAN Main Bus Line (2013 FR-S) | | |

**Open in CAN Main Bus Line**

## DESCRIPTION

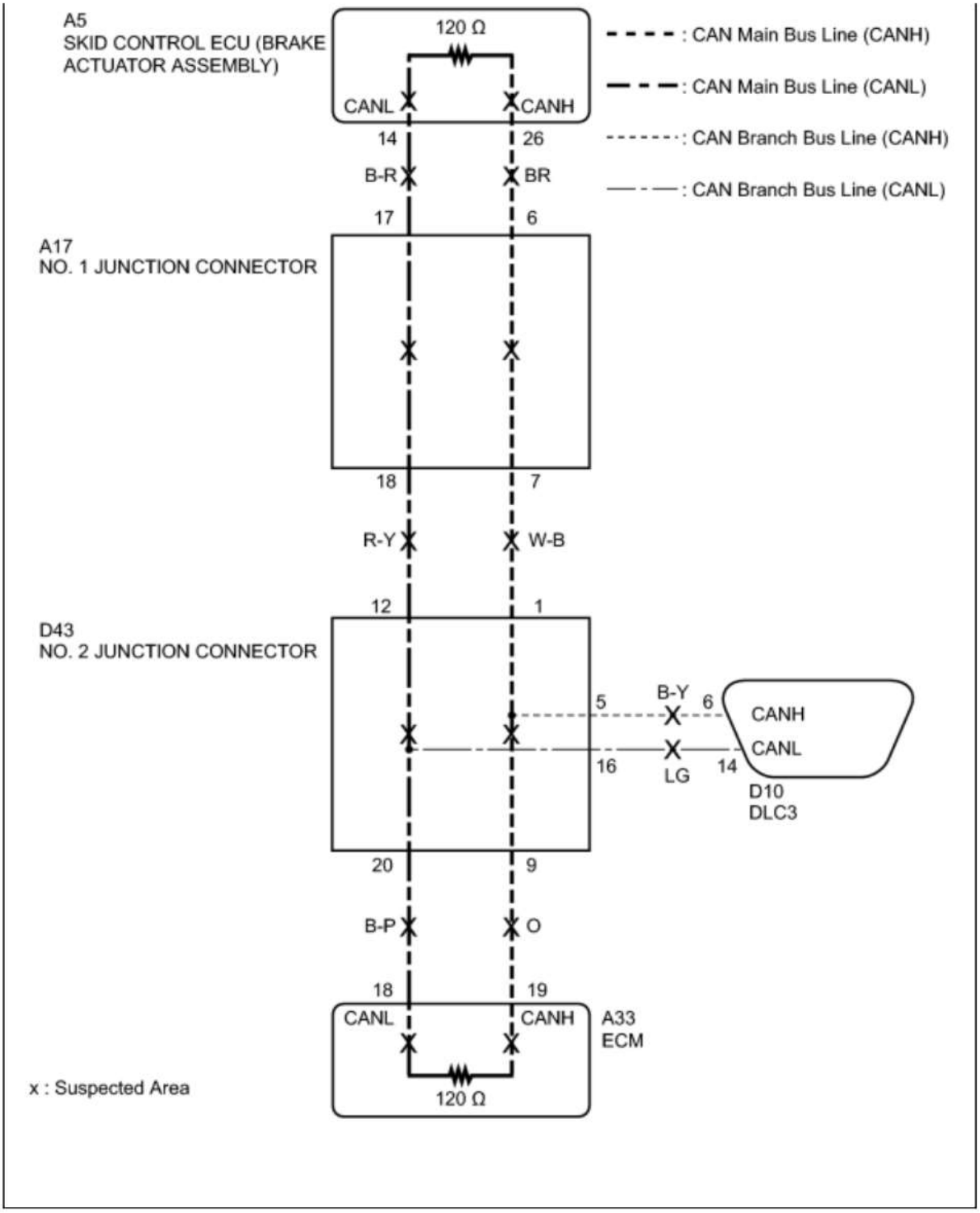
There may be an open circuit one of the V bus main lines and/or a DLC3 branch line when the resistance between terminals 6 (CANH) and 14 (CANL) of the DLC3 is 64 Ω or higher.

| SYMPTOM | TROUBLE AREA |
|---|---|
| Resistance between terminals 6 (CANH) and 14 (CANL) of DLC3 is 64 Ω or higher. | • DLC3 branch line or connector<br>• CAN main bus line or connector<br>• ECM<br>• Skid control ECU (brake actuator assembly)<br>• CAN No. 1 junction connector<br>• CAN No. 2 junction connector |

This malfunction is not related to the lines of a CAN main bus branch or to ECUs or sensor connected a CAN main bus branch.

## WIRING DIAGRAM

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## INSPECTION PROCEDURE

**NOTICE:**

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .

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Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .

- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON, wait at least 60 seconds,
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO .

**HINT:**

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

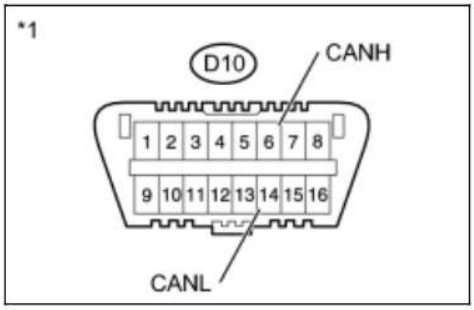
## PROCEDURE

| | |
|---|---|
| 1. | CHECK FOR OPEN IN CAN BUS LINES (DLC3 BRANCH LINE) |

(a) Disconnect the cable from the negative (-) battery terminal.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:




| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D10-6 (CANH) - D10-14 (CANL) | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |

**NOTICE:**

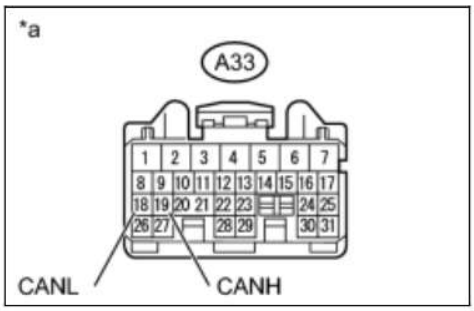
**When the measured value is 127 Ω or higher and a CAN communication system DTC is output, there may be a fault besides disconnection of the DLC3 branch line. For that reason, troubleshooting should be performed again from How to Proceed with Troubleshooting after repairing the trouble area INFO .**

**NG** ▶ **REPAIR OR REPLACE CAN BRANCH LINE CONNECTED TO DLC3**

**OK** ▼

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| 2. | CHECK FOR OPEN IN CAN BUS LINES (ECM) |
|---|---|




(a) Disconnect the A33 ECM connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A33-19 (CANH) - A33-18 (CANL) | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to ECM) |

**NG** ▶ **CHECK FOR OPEN IN CAN BUS LINES (SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))**

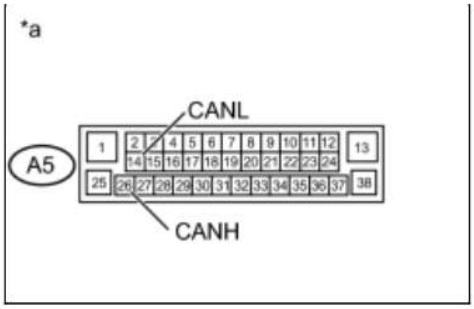
**OK** ▶ **REPLACE ECM**

| 3. | CHECK FOR OPEN IN CAN BUS LINES (SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY)) |
|---|---|

(a) Reconnect the A33 ECM connector.

(b) Disconnect the A5 skid control ECU (brake actuator assembly) connector.

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(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A5-26 (CANH) - A5-14 (CANL) | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω |

**Text in Illustration**

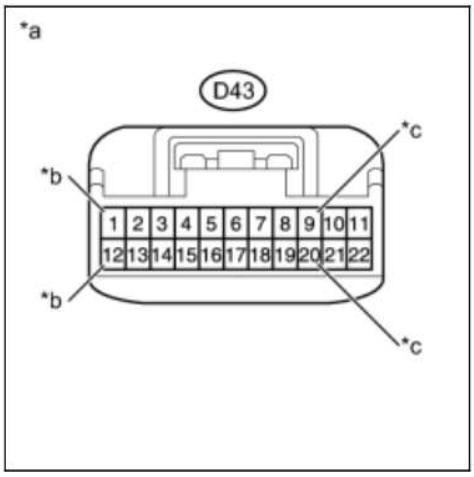
| | |
|---|---|
| *a | Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly)) |

NG ▶ **CHECK FOR OPEN IN CAN BUS LINES (CAN NO. 2 J/C)**

OK ▶ **REPLACE SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY)**

| | |
|---|---|
| **4.** | **CHECK FOR OPEN IN CAN BUS LINES (CAN NO. 2 J/C)** |

(a) Reconnect the A5 skid control ECU (brake actuator assembly) connector.




(b) Disconnect the wire harness connector from the D43 CAN No. 2 junction connector.

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(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION | CONNECTED TO |
|---|---|---|---|
| D43-1 - D43-12 | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω | CAN No. 1 junction connector |
| D43-9 - D43-20 | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω | ECM |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to CAN No. 2 Junction Connector) |
| *b | to CAN No. 1 Junction Connector |
| *c | to ECM |

Result:

| RESULT | PROCEED TO |
|---|---|
| OK | A |
| NG (CAN No. 1 junction connector main line) | B |
| NG (ECM main line) | C |

B ▶ **CHECK FOR OPEN IN CAN BUS LINES (CAN NO. 2 J/C - CAN NO. 1 J/C)**

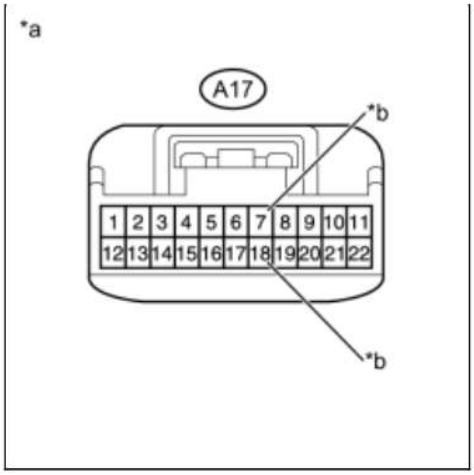
C ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 1 J/C - ECM)**

A ▶ **REPLACE CAN NO. 2 JUNCTION CONNECTOR**

| | |
|---|---|
| **5.** | **CHECK FOR OPEN IN CAN BUS LINES (CAN NO. 2 J/C - CAN NO. 1 J/C)** |

(a) Reconnect the wire harness connector to the D43 CAN No. 2 junction connector.

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(b) Disconnect the wire harness connector from the A17 CAN No. 1 junction connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A17-7 - A17-18 | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to CAN No. 1 Junction Connector) |
| *b | to CAN No. 2 Junction Connector |

**NG** ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 1 J/C - CAN NO. 2 J/C)**

**OK** ▼

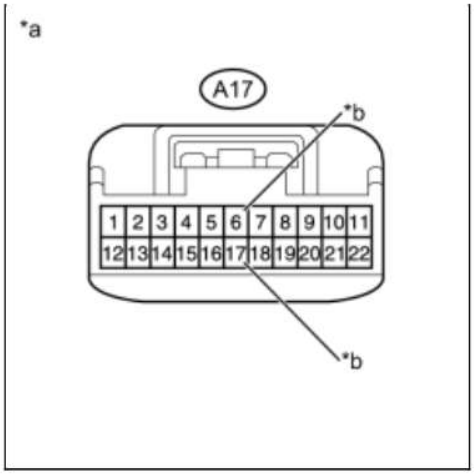
| | |
|---|---|
| **6.** | **CHECK FOR OPEN IN CAN BUS LINES (CAN NO. 1 J/C - SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))** |

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| | | |

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| | | |
|---|---|---|
| A17-6 - A17-17 | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to CAN No. 1 Junction Connector) |
| *b | to Skid Control ECU (Brake Actuator Assembly) |

**NG** ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 1 J/C - SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))**

**OK** ▶ **REPLACE CAN NO. 1 JUNCTION CONNECTOR**

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 J | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000001ZUR06GX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: Open in One Side of CAN Branch Line (2013 FR-S) | | |

**Open in One Side of CAN Branch Line**

# DESCRIPTION

If an ECU or sensor is not displayed on the CAN Bus Check screen of the Techstream and some ECUs and sensors repeatedly appear and disappear from the screen when the CAN main bus lines are normal (there is no open, short, short to +B or short to GND in the main bus lines), there may be an open circuit in either of one pair of CAN branch lines.

**HINT:**

**If some ECUs and sensors repeatedly appear and disappear from the CAN Bus Check screen, communication between the normal ECUs (sensors) and the Techstream may be affected by the incomplete signals that are output from the ECU that has an open circuit in either of its CAN branch lines. In this case, the CAN branch lines for the ECUs and sensors that repeatedly appear and disappear from the screen are normal and the ECU that is not displayed on the screen may be the main cause of the problem (this ECU may have an open circuit in either of its CAN branch lines).**

| SYMPTOM | TROUBLE AREA |
|---|---|
| 2 or more ECUs and/or sensors do not appear on the Techstream "CAN Bus Check" screen. | One side of CAN branch line is open, or output signals are incomplete.<br>• Short in CAN main bus line<br>• Short in CAN branch line<br>• Main body ECU (network gateway ECU)<br>• Combination meter assembly<br>• ECM<br>• TCM*<br>• Skid control ECU (brake actuator assembly)<br>• Steering angle sensor (spiral cable sub-assembly)<br>• Power steering ECU assembly<br>• Air bag ECU assembly |

*: for Automatic Transmission System

# INSPECTION PROCEDURE

**NOTICE:**

- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.

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DTC check procedure: Turn the ignition switch to ON, wait at least 60 seconds,

- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO .

**HINT:**

**Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.**

## PROCEDURE

| | |
|---|---|
| 1. | **CHECK FOR OPEN IN ONE SIDE OF V BUS BRANCH LINE** |

(a) Based on the vehicle equipment and specifications, confirm the systems that use CAN communication INFO .

(b) Using the Techstream, select and perform the CAN bus check INFO .

(c) Observe the screen for approximately 2 minutes to check the ECUs and sensors that are not displayed on the screen and also those that repeatedly appear and disappear from the screen.

(d) Check the applicable communication stop mode for the ECU or sensor that is not displayed on the screen.

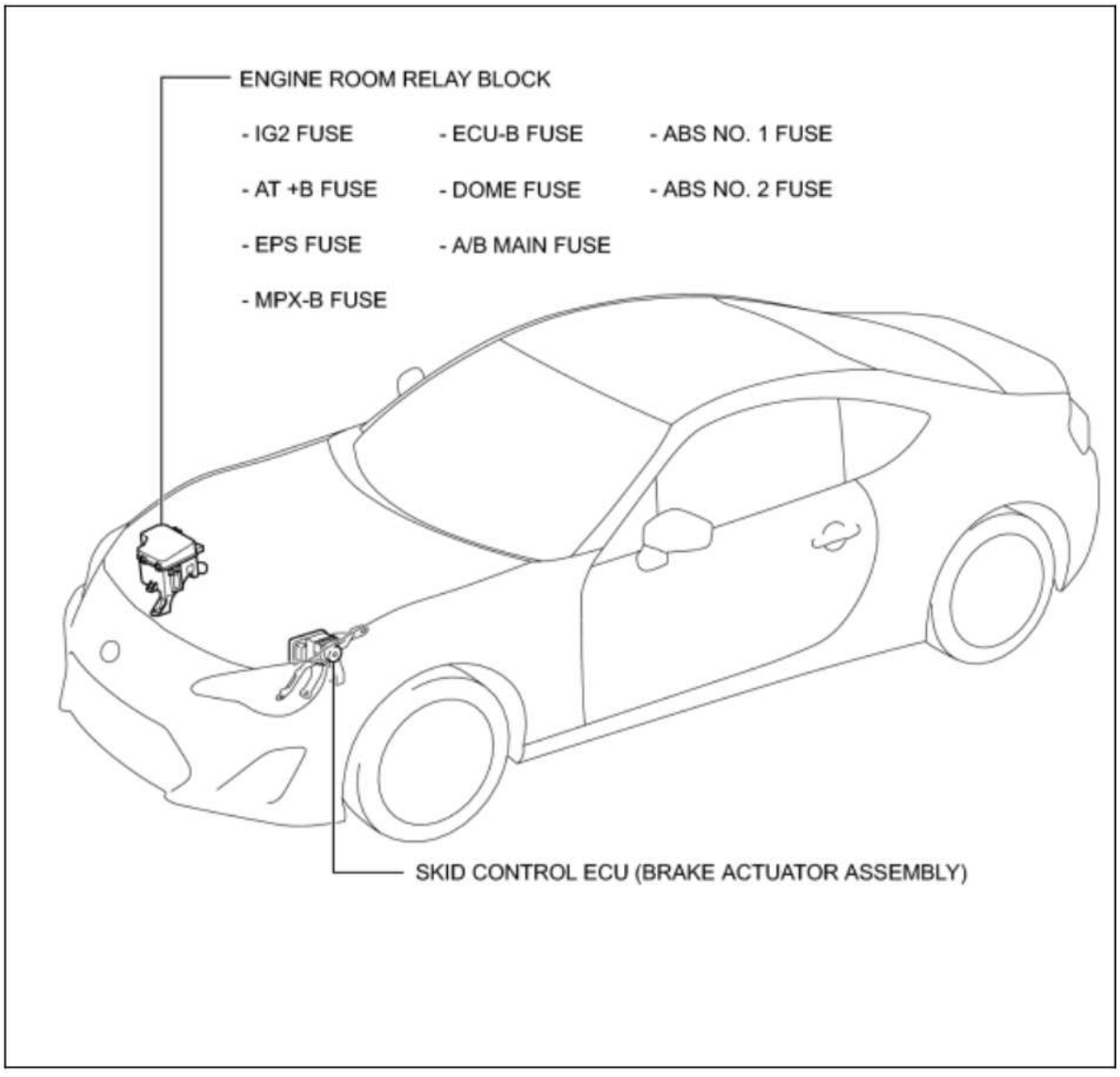
NEXT ▶ **GO TO CORRESPONDING COMMUNICATION STOP MODE**

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 R | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM0000044OW00BX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: PARTS LOCATION (2013 FR-S) | | |

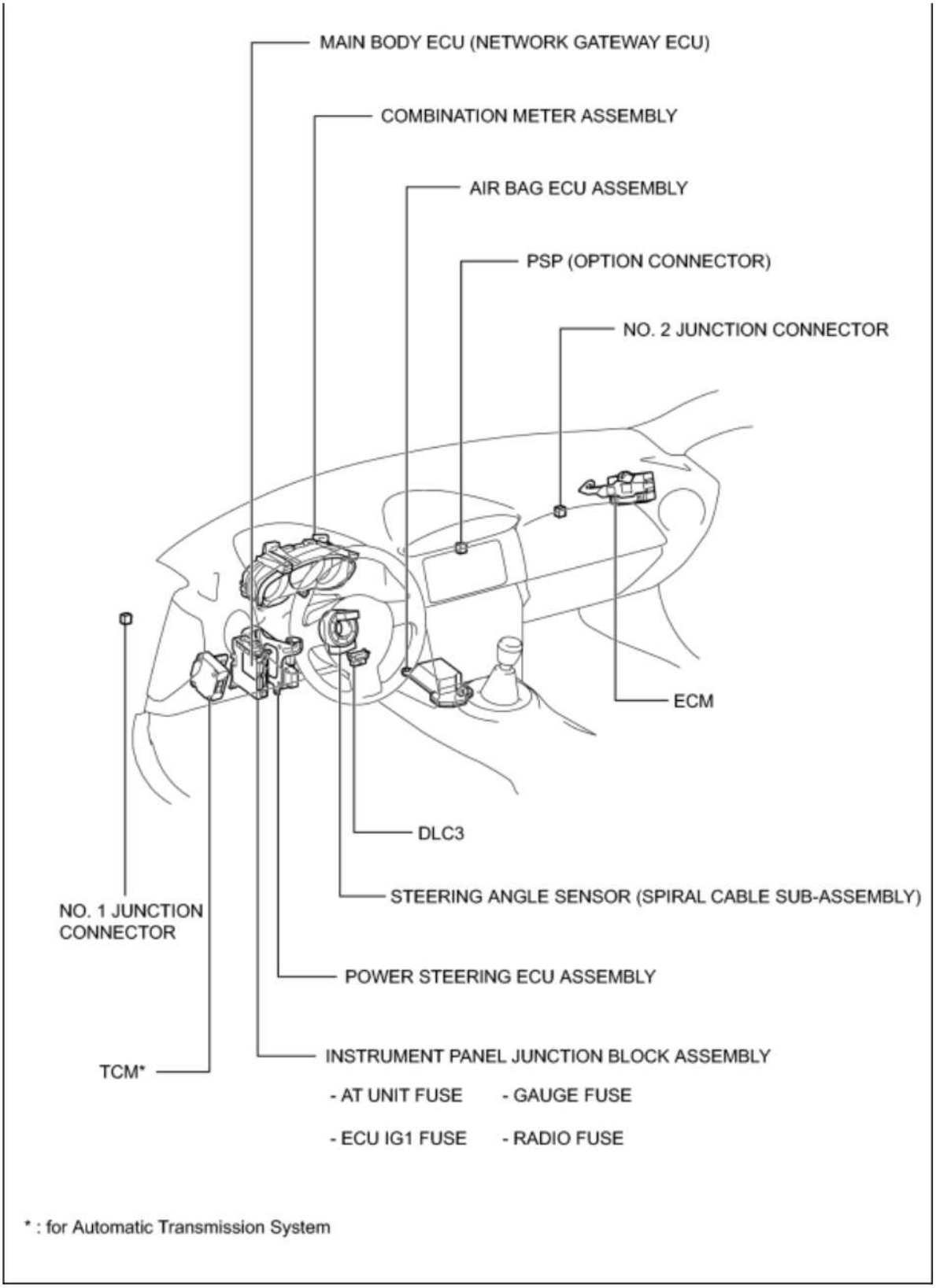
## PARTS LOCATION

## ILLUSTRATION




## ILLUSTRATION

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 J | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000001RT004DX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: Power Steering ECU Communication Stop Mode (2013 FR-S) | | |

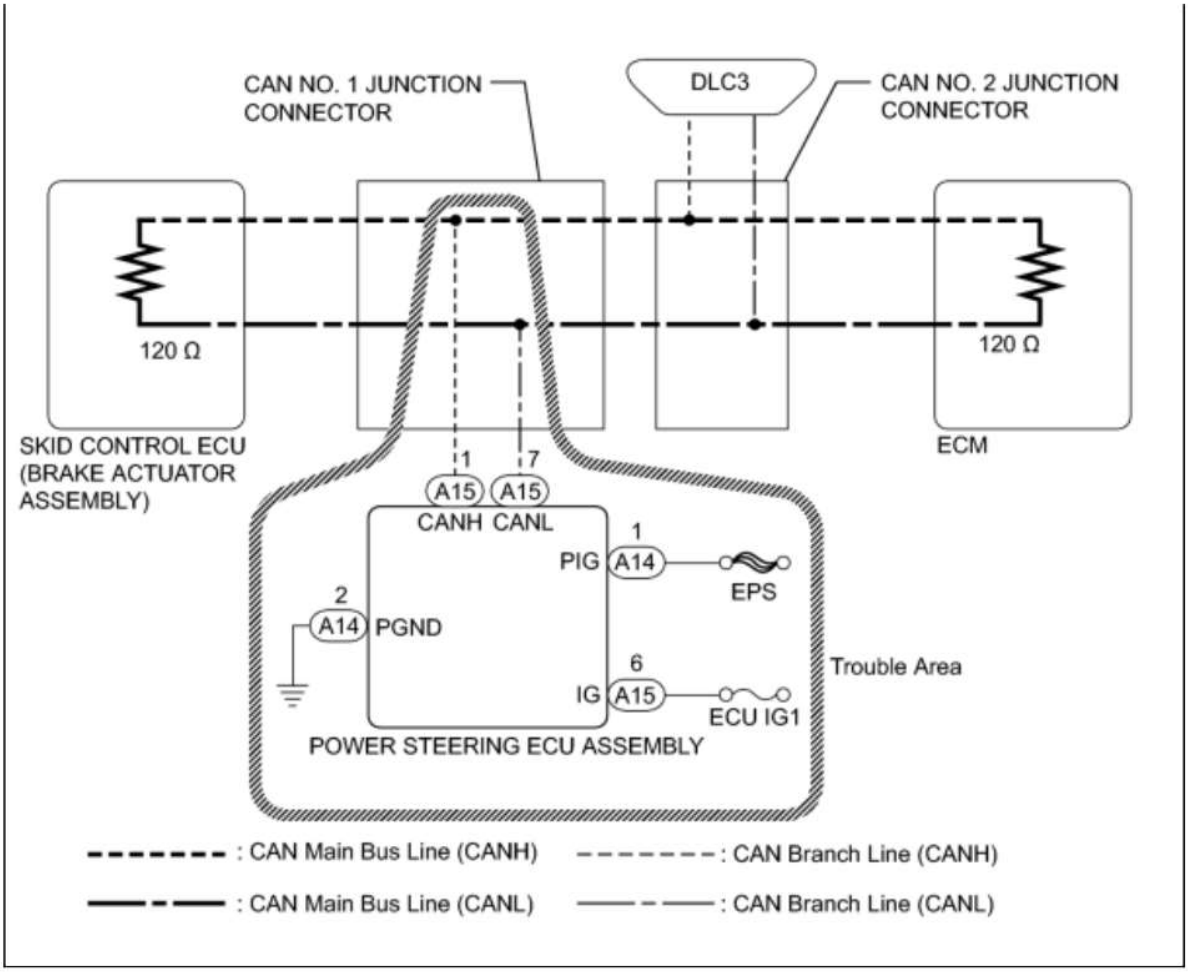
**Power Steering ECU Communication Stop Mode**

## DESCRIPTION

| DETECTION ITEM | SYMPTOM | TROUBLE AREA |
|---|---|---|
| Power Steering ECU Communication Stop Mode | Either condition is met:<br>• "Power Steering (EPS)" is not displayed on the "CAN Bus Check" screen of the Techstream INFO<br>• Communication system DTCs (DTCs that start with U) that are output correspond to "Power Steering ECU Communication Stop Mode" in "DTC Combination Table" INFO | • Power steering ECU assembly branch line or connector<br>• Power source circuit of power steering ECU assembly<br>• Power steering ECU assembly ground circuit<br>• Power steering ECU assembly |

## WIRING DIAGRAM

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# INSPECTION PROCEDURE

**NOTICE:**

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON and wait at least 10 seconds.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO .

**HINT:**

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or

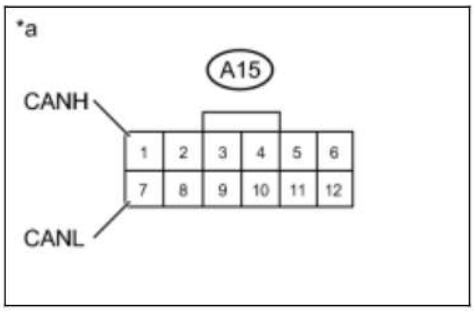
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wire harness while performing the inspection below may help determine the cause of the malfunction.

## PROCEDURE

| | |
|---|---|
| 1. | **CHECK FOR OPEN IN CAN BUS LINES (POWER STEERING ECU ASSEMBLY BRANCH LINE)** |

(a) Disconnect the cable from the negative (-) battery terminal.




(b) Disconnect the A14 and A15 power steering ECU assembly connectors.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A15-1 (CANH) - A15-7 (CANL) | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Power Steering ECU Assembly) |

NG ▶ **REPAIR OR REPLACE CAN BRANCH LINE OR CONNECTOR (POWER STEERING ECU ASSEMBLY)**

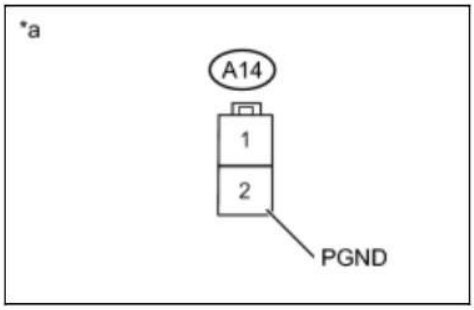
**OK** ▼

| | |
|---|---|
| 2. | **CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)** |

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(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

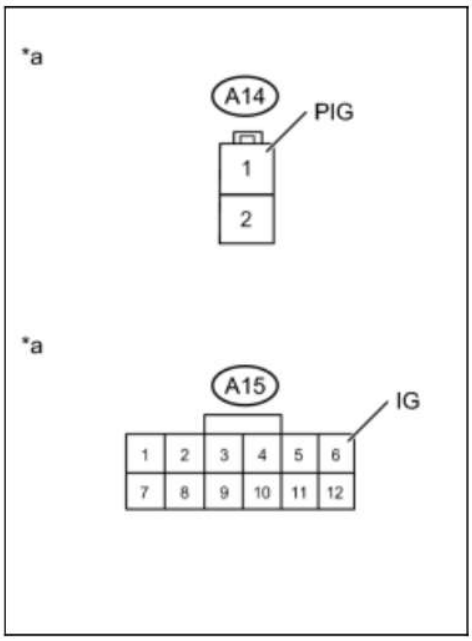



| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A14-2 (PGND) - Body ground | Cable disconnected from negative (-) battery terminal | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Power Steering ECU Assembly) |

(b) Connect the cable to the negative (-) battery terminal.




(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A14-1 (PIG) - Body ground | Ignition switch off | 11 to 14 V |
| A15-6 (IG) - Body ground | Ignition switch ON | 11 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Power Steering ECU Assembly) |

**NG** ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

**OK** ▶ **REPLACE POWER STEERING ECU ASSEMBLY**

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 L | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000000WI50CRX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: PRECAUTION (2013 FR-S) | | |

# PRECAUTION

### 1. CAN COMMUNICATION SYSTEM TROUBLESHOOTING

(a) Because the order of diagnosis is important to allow a correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .

### 2. PRECAUTIONS FOR STEERING SYSTEM HANDLING

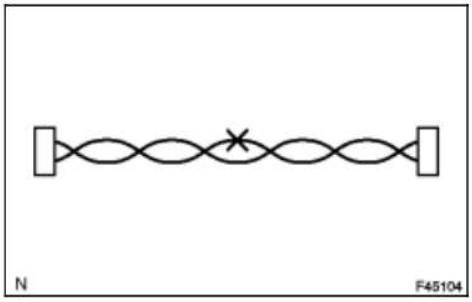
(a) Be careful when replacing parts. Incorrect replacement could affect the performance of the steering system and result in hazardous driving.

### 3. PRECAUTIONS FOR SRS AIRBAG SYSTEM HANDLING

(a) This vehicle is equipped with a Supplemental Restraint System (SRS) which includes parts such as airbags for the driver and the front passenger. Failure to carry out service operations in the correct sequence could cause unexpected SRS deployment during servicing and may cause a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read Precaution for SRS INFO .

### 4. BUS LINE REPAIR

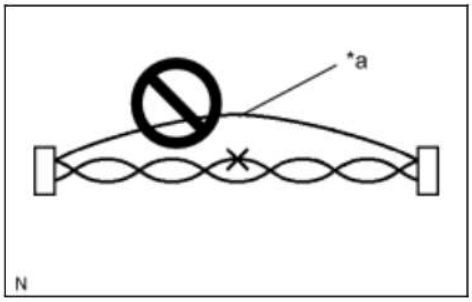
(a) After repairing a bus line with solder, wrap the repaired part with electrical tape.




**NOTICE:**

- The CANL bus line and CANH bus line must be installed together at all times.
- When installing, make sure that these lines are twisted, because CAN bus lines are likely to be influenced by electrical noise if the bus lines are not twisted.
- Leave approximately 80 mm (3.150 in.) loose in the twisted wires around the connector.
- When repairing the CAN bus lines, do not change the length of the lines. (Make sure that the length of the CANH bus line and CANL bus line are the same.)

(b) Do not use bypass wiring between connectors.




**Text in Illustration**

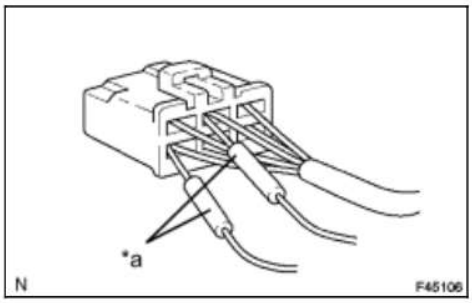
| | |
|---|---|
| *a | Bypass Wire |

**NOTICE:**

- The ability of the twisted bus lines to resist interference will be lost if bypass wiring is used.
- Do not use a twisted pair of wires for bypass wiring.

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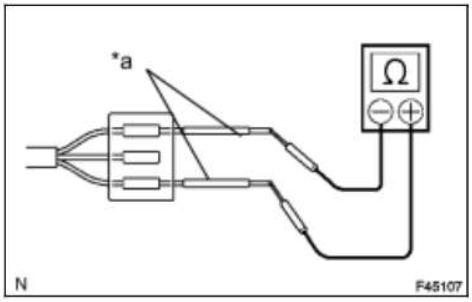
## 5. CONNECTOR HANDLING




(a) When checking resistance with a tester, insert the tester probes from the backside (harness side) of the connector.

**Text in Illustration**

| | |
|---|---|
| *a | Tester Probe |




(b) Use service wires to check the connector if it is impossible to check continuity from the rear of the connector.

**Text in Illustration**

| | |
|---|---|
| *a | Service Wire |

## 6. PRECAUTIONS FOR INSPECTING OR REPLACING CAN JUNCTION CONNECTOR

(a) If the CAN junction connector is removed from the vehicle for inspection or replacement, make sure to install the CAN junction connector and all wire harnesses to their original locations with tape and the clamps.

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 T | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000000WI80AVX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S) | | |

# PROBLEM SYMPTOMS TABLE

**HINT:**

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.
- Because the order of diagnosis is important to allow a correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .

**Result List of How to Proceed with Troubleshooting**

| SYMPTOM | SUSPECTED AREA | SEE PAGE |
|---|---|---|
| The result of "How to Proceed with Troubleshooting" is "Open in CAN Main Bus Line". | Open in CAN Main Bus Line (Includes DLC3 branch lines and terminating resistors) | INFO |
| The result of "How to Proceed with Troubleshooting" is "Short in CAN Bus Lines". | Short in CAN Bus Lines | INFO |
| The result of "How to Proceed with Troubleshooting" is "Short to +B in CAN Bus Line". | Short to +B in CAN Bus Line | INFO |
| The result of "How to Proceed with Troubleshooting" is "Short to GND in CAN Bus Line". | Short to GND in CAN Bus Line | INFO |
| The result of "How to Proceed with Troubleshooting" is "Open in One Side of CAN Branch Line". | Open in One Side of CAN Branch Line | INFO |

**HINT:**

**Refer to How to Proceed with Troubleshooting for the V Bus Check procedure.**

**Communication Stop Mode Table**

The suspected communication stop area can be determined based on the ECU or sensor that was not displayed in CAN Bus Check and by referring to the table below.

| SYMPTOM | SUSPECTED AREA | SEE PAGE |
|---|---|---|
| "Skid Control (ABS/VSC/TRAC)" is not displayed on the Techstream. | Skid Control ECU Communication Stop Mode | INFO |
| "Power Steering (EPS)" is not displayed on the Techstream. | Power Steering ECU Communication Stop Mode | INFO |
| "Spiral cable (Steering Angle Sensor)" is not displayed on the Techstream. | Steering Angle Sensor Communication Stop Mode | INFO |

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| | | |
|---|---|---|
| "ECM (Engine)" is not displayed on the Techstream. | ECM Communication Stop Mode | INFO |
| "TCM" is not displayed on the Techstream. | Transmission Control ECU Communication Stop Mode | INFO |
| "Main Body" is not displayed on the Techstream. | Main Body ECU Communication Stop Mode | INFO |
| "Combination Meter" is not displayed on the Techstream. | Combination Meter ECU Communication Stop Mode | INFO |
| "Airbag" is not displayed on the Techstream. | Center Airbag Sensor Communication Stop Mode | INFO |

**DTC Combination Table**

| SYMPTOM | SUSPECTED AREA | SEE PAGE |
|---|---|---|
| Although CAN communication (V bus) is currently normal, ECUs connected to the V bus store CAN communication DTCs. | The probable part for which communication is interrupted can be determined using DTC Combination Table and comparing the DTCs output from ECUs connected to the CAN communication system | INFO |




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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 J | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000001V2C056X |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: Skid Control ECU Communication Stop Mode (2013 FR-S) | | |

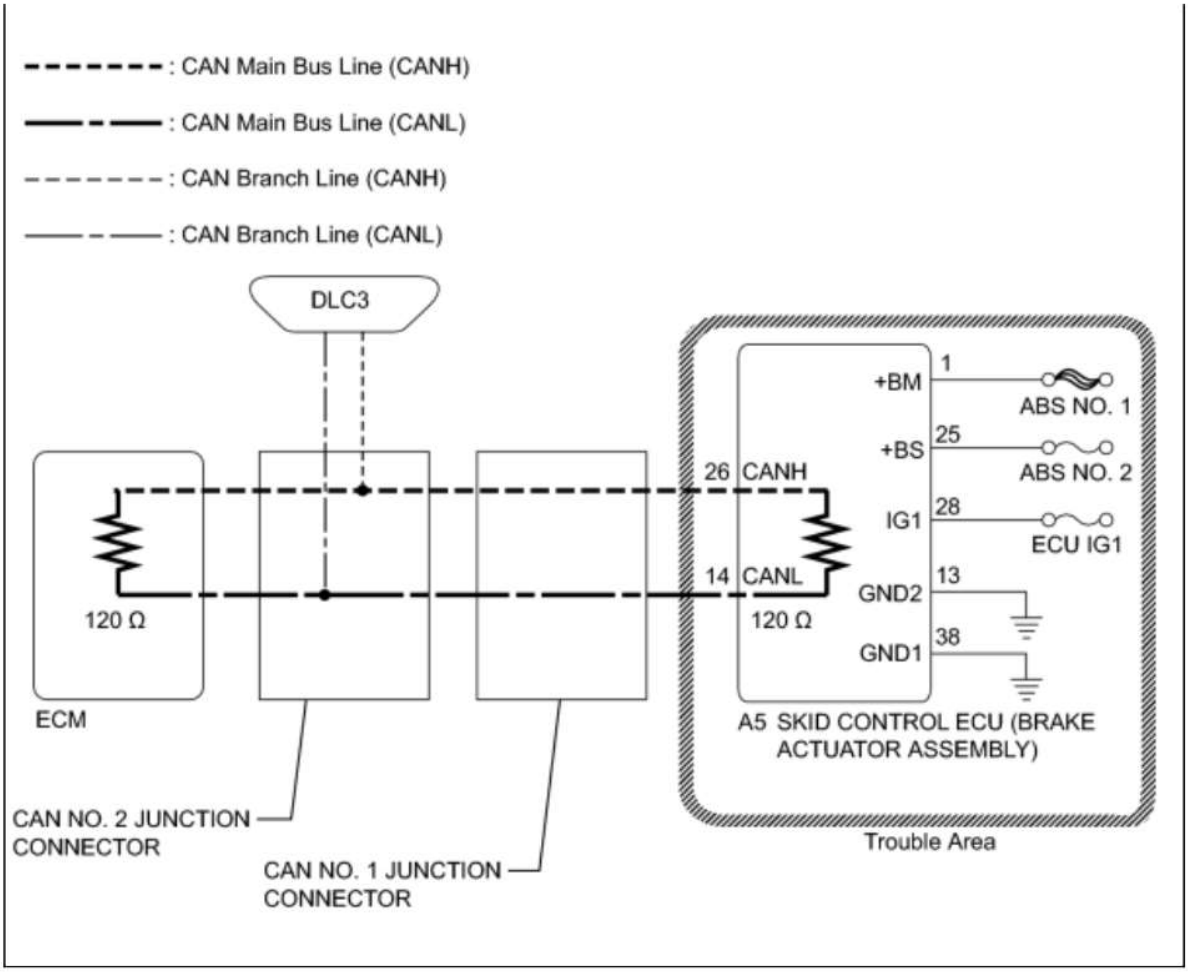
**Skid Control ECU Communication Stop Mode**

## DESCRIPTION

| DETECTION ITEM | SYMPTOM | TROUBLE AREA |
|---|---|---|
| Skid Control ECU Communication Stop Mode | Either condition is met:<br>• "Skid Control (ABS/VSC/TRAC)" is not displayed on the "CAN Bus Check" screen of the Techstream INFO<br>• Communication system DTCs (DTCs that start with U) that are output correspond to "Skid Control ECU Communication Stop Mode" in "DTC Combination Table" INFO | • Skid control ECU (brake actuator assembly) main line or connector<br>• Power source circuit of skid control ECU (brake actuator assembly)<br>• Skid control ECU (brake actuator assembly) ground circuit<br>• Skid control ECU (brake actuator assembly) |

## WIRING DIAGRAM

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# INSPECTION PROCEDURE

**NOTICE:**

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON, wait at least 60 seconds,.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO .

**HINT:**

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or

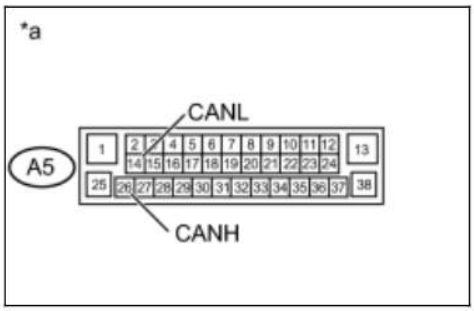
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wire harness while performing the inspection below may help determine the cause of the malfunction.

## PROCEDURE

| | |
|---|---|
| 1. | **CHECK FOR OPEN IN CAN BUS LINES (SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY) MAIN LINE)** |

(a) Disconnect the cable from the negative (-) battery terminal.




(b) Disconnect the A5 skid control ECU (brake actuator assembly) connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A5-26 (CANH) - A5-14 (CANL) | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly)) |

NG ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY) MAIN LINE)**

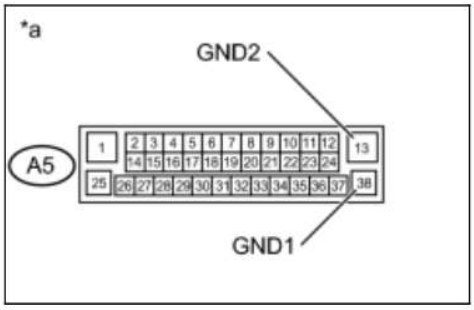
**OK** ▼

| | |
|---|---|
| 2. | **CHECK FOR OPEN IN CAN BUS LINES (POWER SOURCE CIRCUIT)** |

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(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:




| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A5-13 (GND2) - Body ground | Cable disconnected from negative (-) battery terminal | Below 1 Ω |
| A5-38 (GND1) - Body ground | Cable disconnected from negative (-) battery terminal | Below 1 Ω |

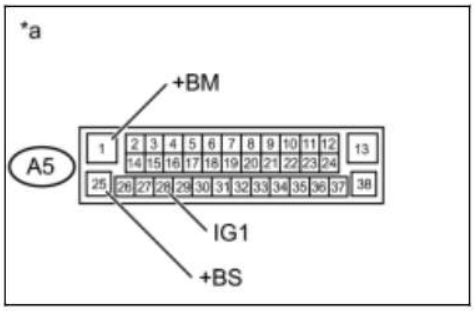
**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly)) |

(b) Connect the cable to the negative (-) battery terminal.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:




| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A5-1 (+BM) - Body ground | Ignition switch off | 11 to 14 V |
| A5-25 (+BS) - Body ground | Ignition switch off | 11 to 14 V |
| A5-28 (IG1) - Body ground | Ignition switch ON | 11 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly)) |

**NG** ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

**OK** ▶ **REPLACE SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY)**

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 J | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000000WIH07PX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: Steering Angle Sensor Communication Stop Mode (2013 FR-S) | | |

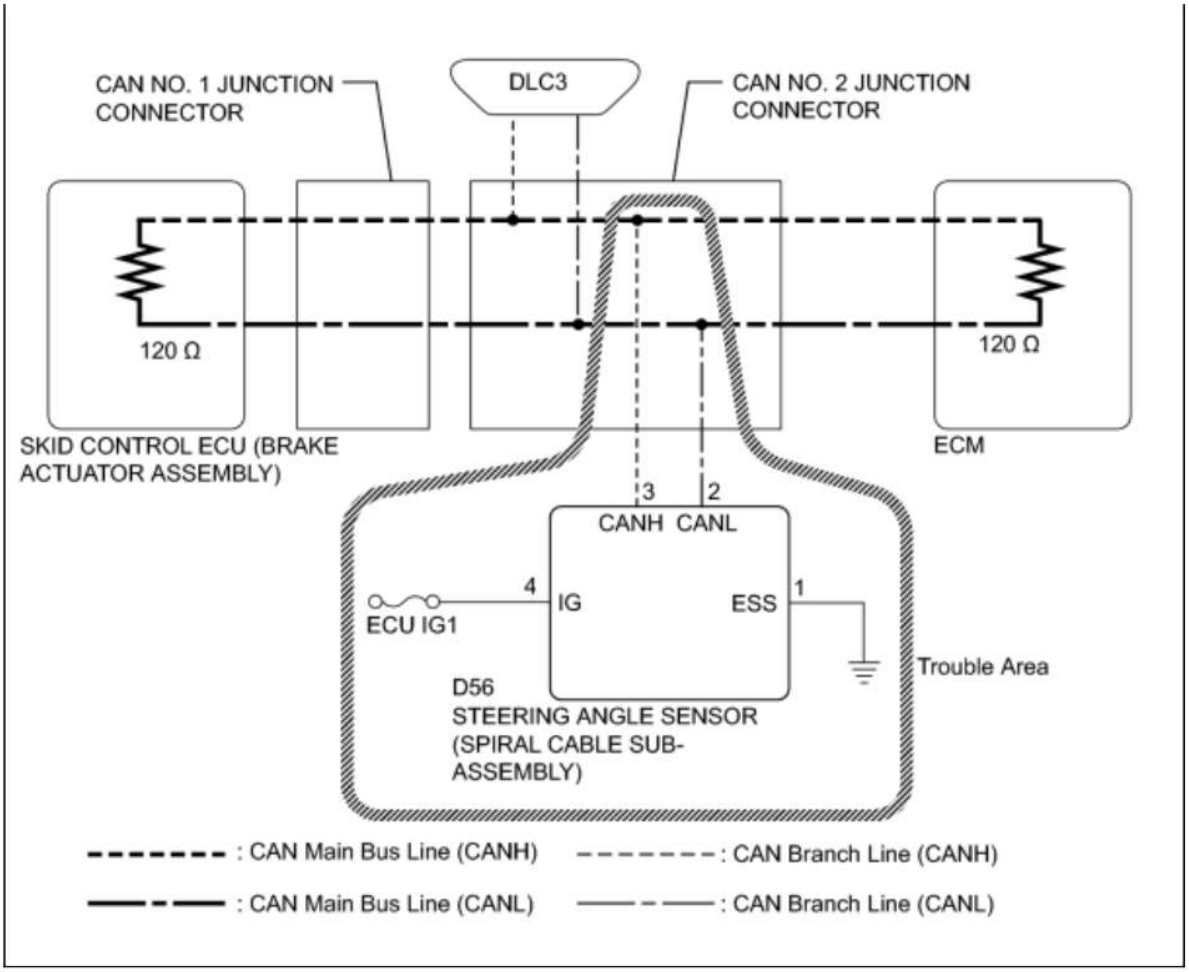
**Steering Angle Sensor Communication Stop Mode**

## DESCRIPTION

| DETECTION ITEM | SYMPTOM | TROUBLE AREA |
|---|---|---|
| Steering Angle Sensor Communication Stop Mode | Either condition is met:<br>• "Spiral cable (Steering Angle Sensor)" is not displayed on the "CAN Bus Check" screen of the Techstream INFO<br>• Communication system DTCs (DTCs that start with U) that are output correspond to "Steering Angle Sensor Communication Stop Mode" in "DTC Combination Table" INFO | • Steering angle sensor (spiral cable sub-assembly) branch line or connector<br>• Power source circuit of steering angle sensor (spiral cable sub-assembly)<br>• Steering angle sensor (spiral cable sub-assembly) ground circuit<br>• Steering angle sensor (spiral cable sub-assembly) |

## WIRING DIAGRAM

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# INSPECTION PROCEDURE

**NOTICE:**

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON, wait at least 10 seconds,
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO .

**HINT:**

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or

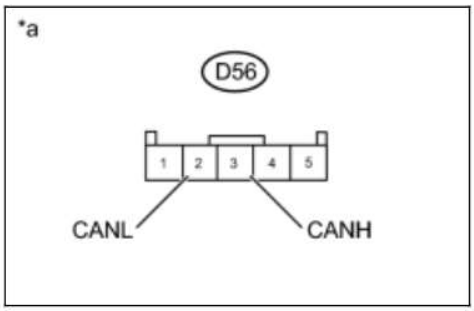
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wire harness while performing the inspection below may help determine the cause of the malfunction.

## PROCEDURE

| | |
|---|---|
| 1. | **CHECK FOR OPEN IN CAN BUS LINES (STEERING ANGLE SENSOR (SPIRAL CABLE SUB-ASSEMBLY) BRANCH WIRE)** |

(a) Disconnect the cable from the negative (-) battery terminal.




(b) Disconnect the D56 steering angle sensor (spiral cable sub-assembly) connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D56-3 (CANH) - D56-2 (CANL) | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Steering Angle Sensor (Spiral Cable Sub-assembly)) |

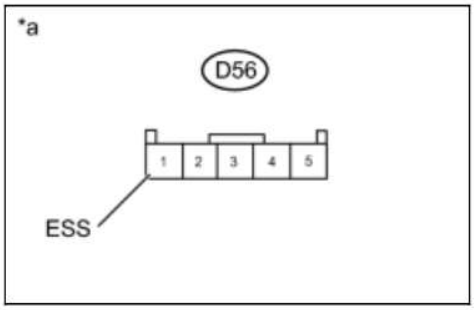
NG ▶ **REPAIR OR REPLACE CAN BRANCH LINE OR CONNECTOR (SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY)**

**OK** ▼

| | |
|---|---|
| 2. | **CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)** |

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(a) Measure the resistance according to the value(s) in the table below.




Standard Resistance:

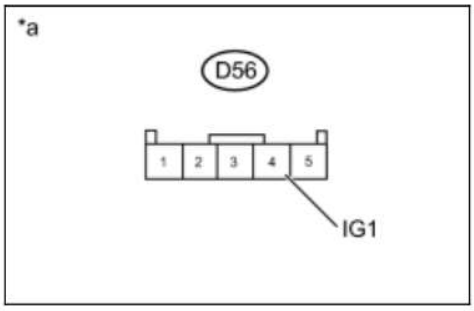
| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D56-1 (ESS) - Body ground | Cable disconnected from negative (-) battery terminal | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Steering Angle Sensor (Spiral Cable Sub-assembly)) |

(b) Connect the cable to the negative (-) battery terminal.

(c) Measure the voltage according to the value(s) in the table below.




Standard Voltage:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D56-4 (IG1) - Body ground | Ignition switch ON | 11 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Steering Angle Sensor (Spiral Cable Sub-assembly)) |

**NG** ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

**OK** ▶ **REPLACE STEERING ANGLE SENSOR (SPIRAL CABLE SUB-ASSEMBLY)**

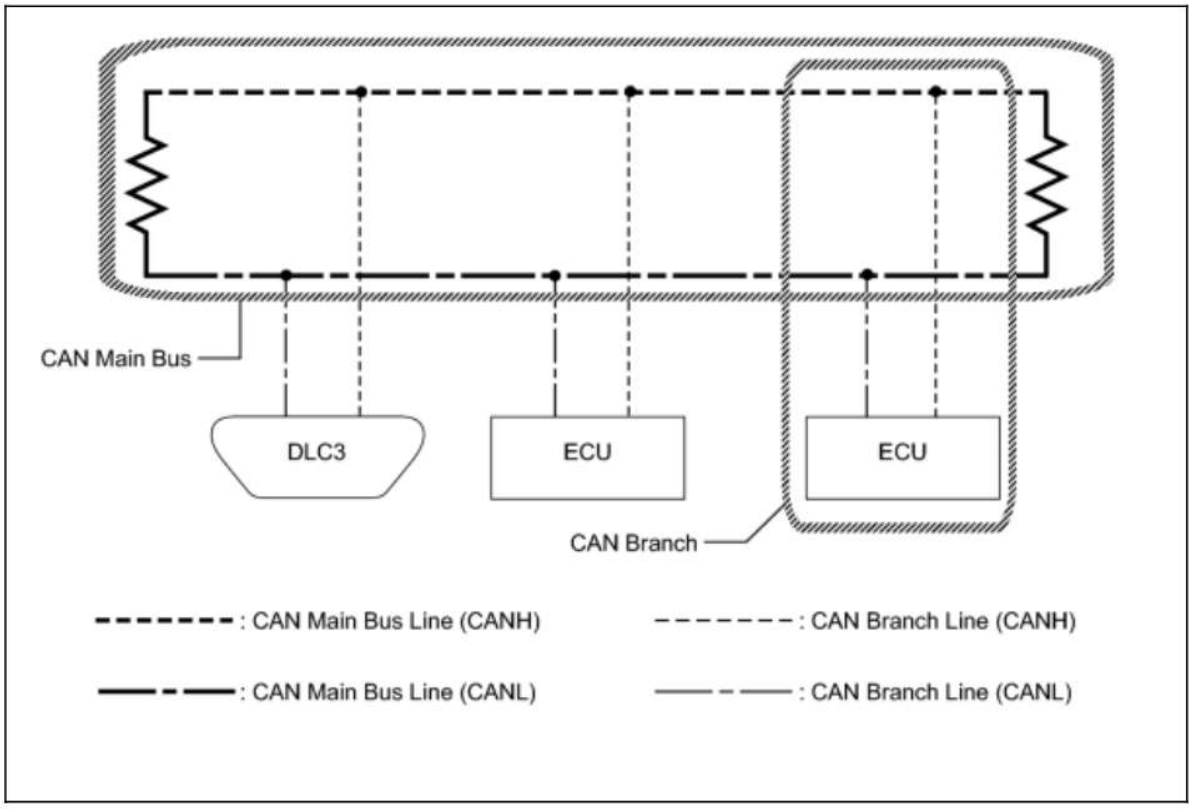
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|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 D | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000000YDW0B4X |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: SYSTEM DESCRIPTION (2013 FR-S) | | |

# SYSTEM DESCRIPTION

## 1. BRIEF DESCRIPTION

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




(b) Using the CANH and CANL bus lines as a pair, CAN communication is performed using a voltage differential. (A base voltage is applied to the pair of lines and a voltage differential is created when communicating.)

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

(d) The CAN has two resistors of 120 Ω which are necessary to enable communication.

(e) Control system CAN is composed of 1 bus.

## 2. DEFINITION OF TERMS

(a) Main bus

(1) The main bus is a wire harness between the two terminating resistors on the bus. This is the main bus in the CAN communication system.

(b) Branch

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

(c) Terminating resistors

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(1) Two resistors of 120 Ω are installed in parallel across the ends of the CAN main bus lines. They are called terminating resistors. These resistors allow the changes of the voltage differential between the CAN bus lines to be accurately judged. To allow proper function of CAN communication, it is necessary to have both terminating resistors installed. Since the two resistors are installed in parallel, this results in a measurement of approximately 60 Ω.

### 3. ECUS OR SENSORS WHICH COMMUNICATE THROUGH CAN COMMUNICATION SYSTEM

(a) V Bus

(1) Main body ECU (network gateway ECU)

(2) Combination meter assembly

(3) ECM

(4) TCM*

(5) Skid control ECU (brake actuator assembly)

(6) Steering angle sensor (spiral cable sub-assembly)

(7) Power steering ECU assembly

(8) Air bag ECU assembly

* : for Automatic Transmission System

### 4. CIRCUIT DESCRIPTION

(a) The V bus has termination circuits with two resistors of 120 Ω.

### 5. TROUBLESHOOTING REMARKS

(a) DTCs for the CAN communication system can be checked using the Techstream. The DLC3 is connected to the CAN communication system, but no DTCs exist regarding problems in the DLC3 or the DLC3 branch lines. If there is any trouble in the DLC3 or the DLC3 branch lines, ECUs on the CAN cannot output DTCs to the Techstream.

(b) Troubles in the CAN V bus (communication lines) can be checked by measuring the resistance between the terminals of the DLC3. However, an open circuit in a branch line other than the DLC3 branch lines cannot be checked from the DLC3 (except branch line of the DLC3).

**NOTICE:**

**Do not insert the tester probes directly into the DLC3. Be sure to use service wires.**

### 6. DIAGNOSTIC TROUBLE CODES FOR CAN COMMUNICATION SYSTEM

**HINT:**

**See Diagnosis System** INFO .

### 7. HOW TO DISTINGUISH CONNECTOR OF CAN JUNCTION CONNECTOR

(a) In the CAN communication system, the shape of the connectors connected to the CAN junction connector which has an earth terminal is the same. The connectors connected to the CAN junction connector can be distinguished by the colors of the bus lines and the connecting side of the junction connector.

**HINT:**

**See Terminals of ECU for bus line color or the shape of connecting surface** INFO .

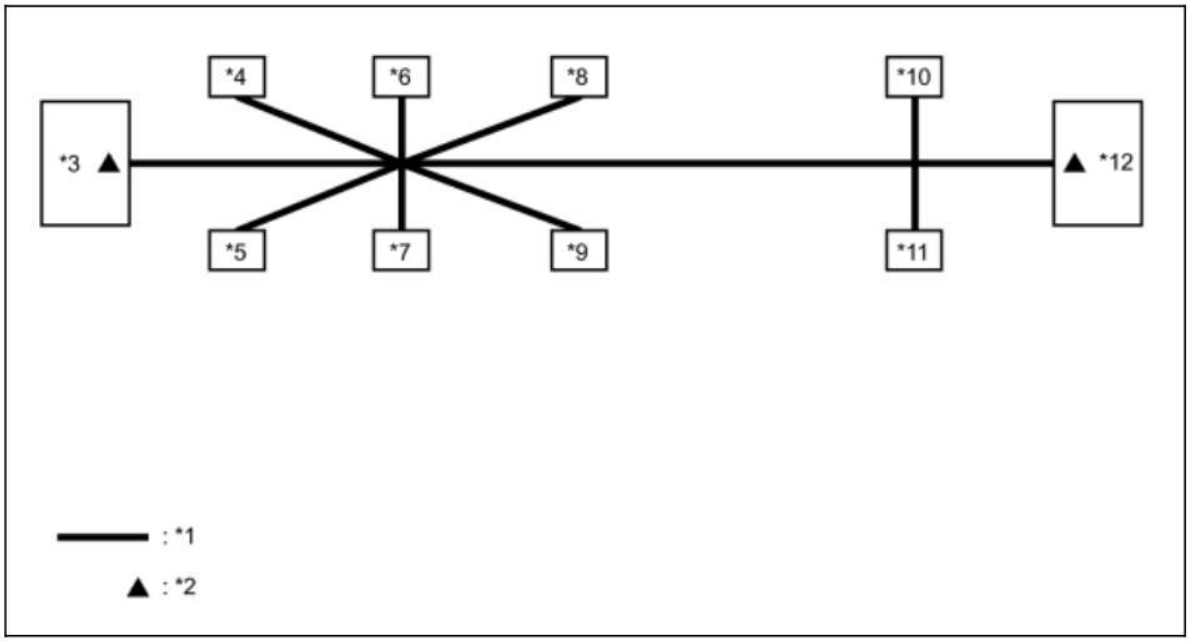
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| **Last Modified:** 3-27-2012 | 6.4 U | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000002DX504TX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: SYSTEM DIAGRAM (2013 FR-S) | | |

# SYSTEM DIAGRAM

### 1. OVERALL CAN BUS DIAGRAM

(a) Control system CAN is composed of 1 bus.

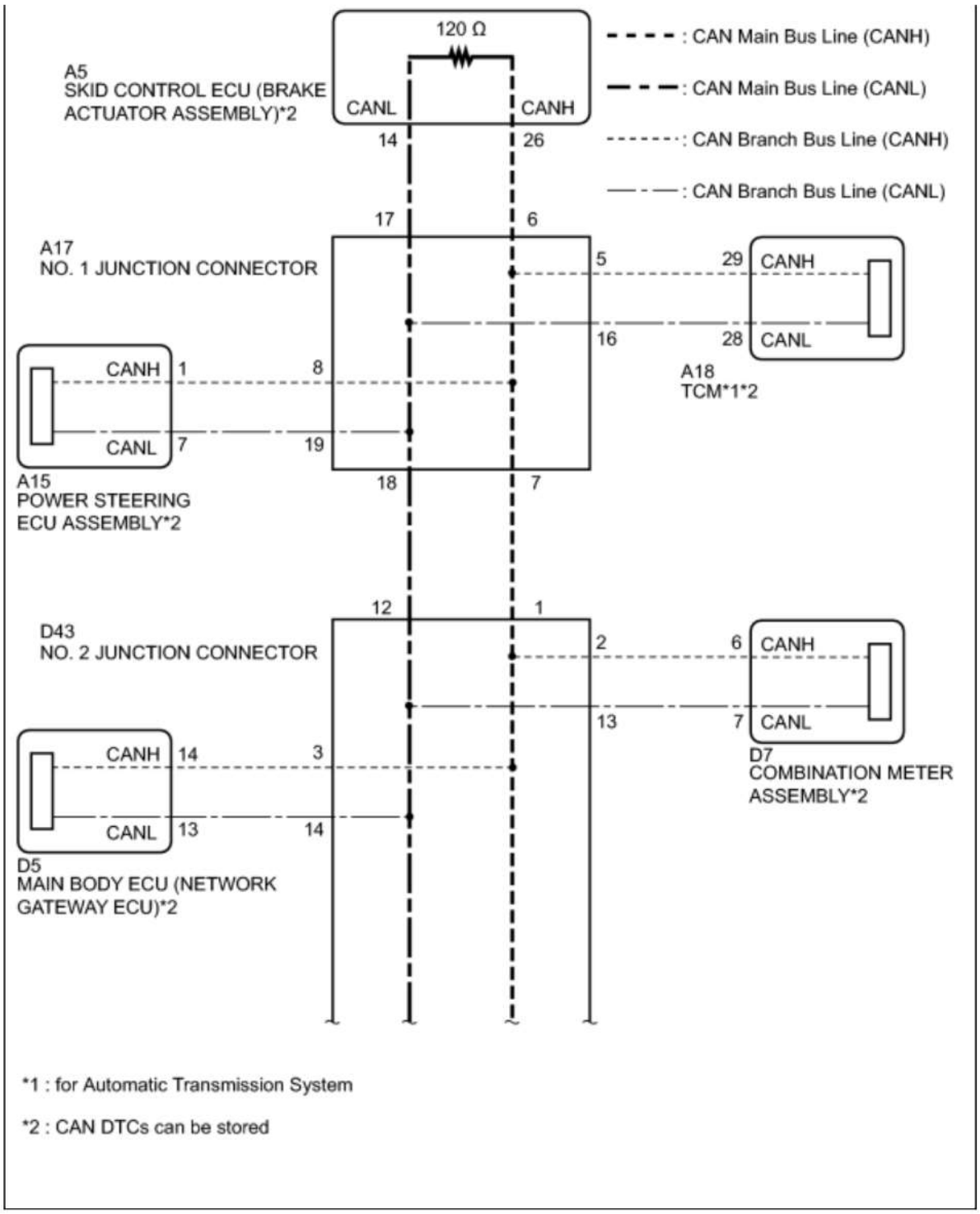



**Text in Illustration**

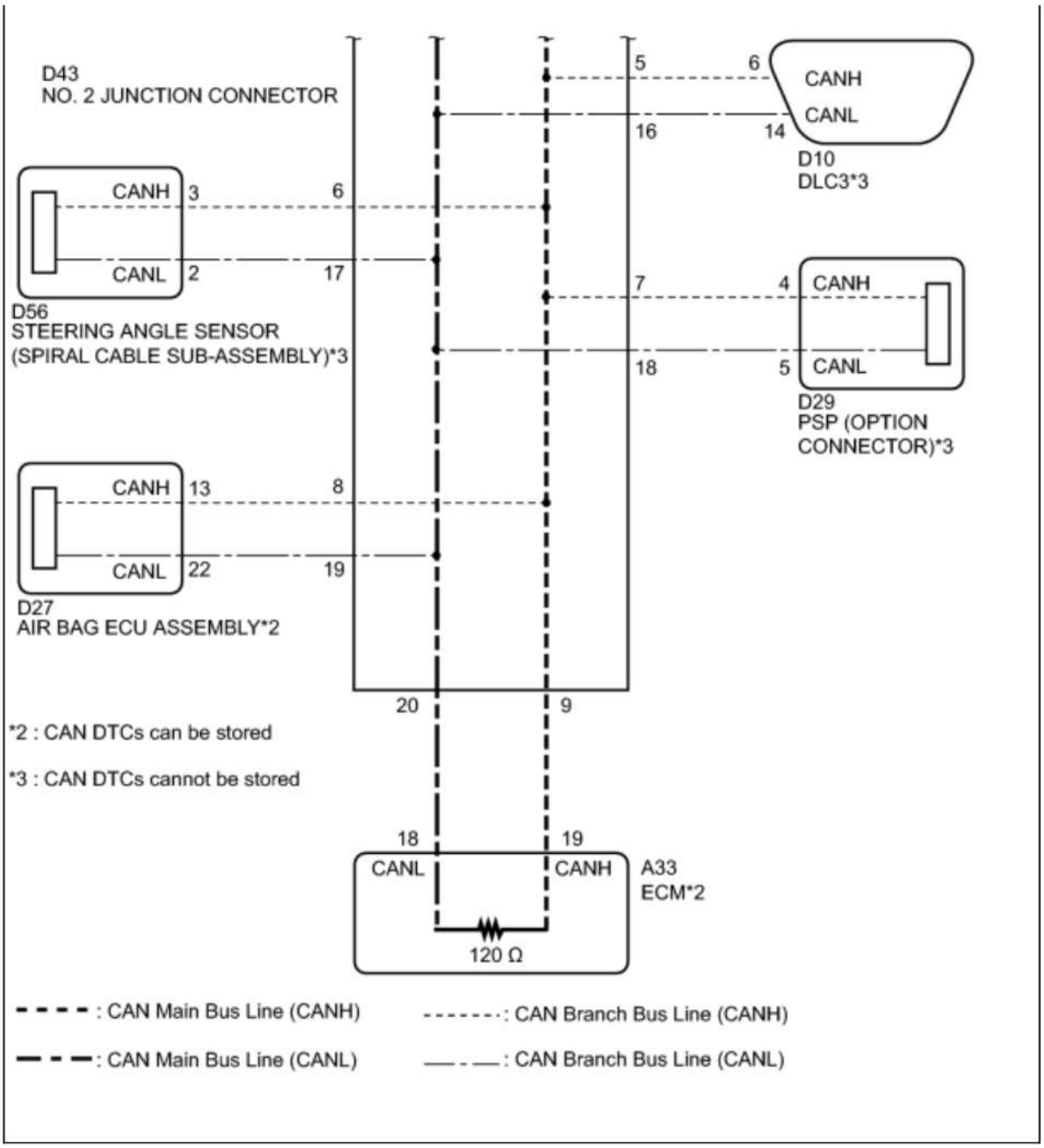
| | | | |
|---|---|---|---|
| *1 | V Bus | *2 | V Bus Terminating Resistor |
| *3 | ECM (for V Bus) | *4 | Combination Meter Assembly (for V Bus) |
| *5 | Main Body ECU (Network Gateway ECU) (for V Bus) | *6 | DLC3 (for V Bus) |
| *7 | Steering Angle Sensor (Spiral Cable Sub-assembly) (for V Bus) | *8 | PSP (Option Connector) (for V Bus) |
| *9 | Air Bag ECU Assembly (for V Bus) | *10 | TCM (for V Bus) |
| *11 | Power Steering ECU Assembly (for V Bus) | *12 | Skid Control ECU (Brake Actuator Assembly) (for V Bus) |

### 2. V BUS

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**HINT:**

**The CAN communication system connects to other networks via ECUs that function as a gateway** INFO

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| | | |
|---|---|---|
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| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000000XVK0AOX |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: TERMINALS OF ECU (2013 FR-S) | | |

# TERMINALS OF ECU

**NOTICE:**

- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .
- Turn the ignition switch off before measuring the resistances between CAN main bus lines and between CAN branch lines.
- Turn the ignition switch off before inspecting CAN bus lines for a ground short.
- 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 any doors need to be opened in order to check connectors, open the doors and leave them open.
- This section describes the standard values for all CAN related components.

**HINT:**

- Operating the ignition switch, any other switches or a door triggers the related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

* : for Automatic Transmission System

* : for Automatic Transmission System

### 1. CAN NO. 1 JUNCTION CONNECTOR

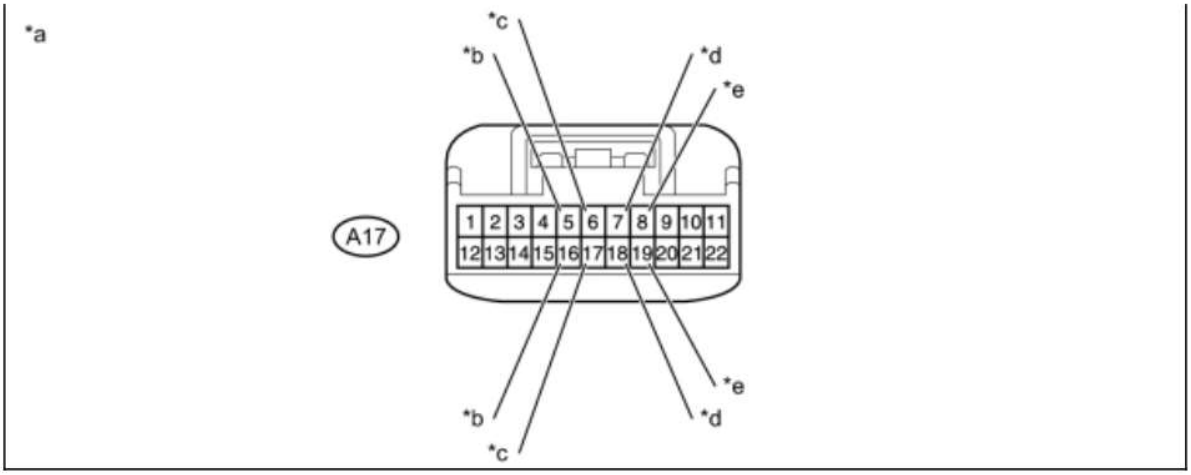
(a) Check the CAN No. 1 junction connector.

**HINT:**

**The following tables contain information about the items and buses connected via junction connectors. The junction connector may be used for multiple separate buses. In this case, the name of the bus will be shown below the name of the item that terminals are connected to. The bus name will be shown in brackets (example: (for V bus)).**

(1) Connection diagram

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**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | Front view of wire harness connector (to CAN No. 1 Junction Connector) | *b | to TCM (for V bus)* |
| *c | to Skid Control ECU (Brake Actuator Assembly) (for V bus) | *d | to CAN No. 2 Junction Connector (for V bus) |
| *e | to Power Steering ECU Assembly (for V bus) | - | - |

(2) Check the connection diagram of the components which are connected to the CAN No. 1 junction connector.

| TERMINAL NO. | WIRING COLOR | CONNECTED TO |
|---|---|---|
| A17-5 | B-W | TCM (for V bus)* |
| A17-16 | L | |
| A17-6 | BR | Skid Control ECU (Brake Actuator Assembly) (for V bus) |
| A17-17 | B-R | |
| A17-7 | W-B | CAN No. 2 Junction Connector (for V bus) |
| A17-18 | R-Y | |
| A17-8 | B | Power Steering ECU Assembly (for V bus) |
| A17-19 | W | |

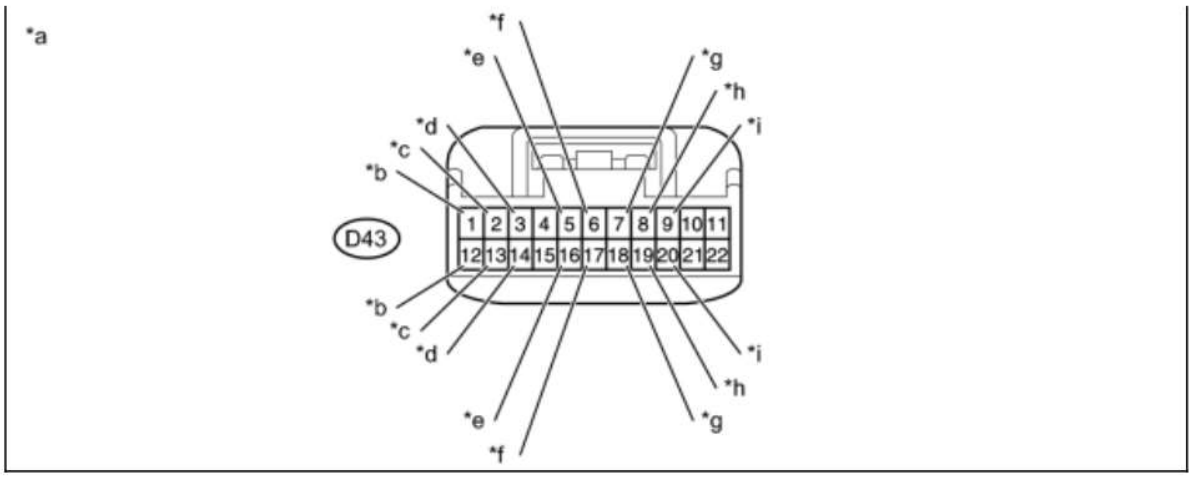
* : for Automatic Transmission System

### 2. CAN NO. 2 JUNCTION CONNECTOR

(a) Check the CAN No. 2 junction connector.

(1) Connection diagram

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**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | Front view of wire harness connector (to CAN No. 2 Junction Connector) | *b | to CAN No. 1 Junction Connector (for V bus) |
| *c | to Combination Meter Assembly (for V bus) | *d | to Main Body ECU (Network Gateway ECU) (for V bus) |
| *e | to DLC3 (for V bus) | *f | to Steering Angle Sensor (Spiral Cable Sub-assembly) (for V bus) |
| *g | to PSP (Option Connector) (for V bus) | *h | to Air Bag ECU Assembly (for V bus) |
| *i | to ECM (for V bus) | - | - |

(2) Check the connection diagram of the components which are connected to the CAN No. 2 junction connector.

| TERMINAL NO. | WIRING COLOR | CONNECTED TO |
|---|---|---|
| D43-1 | W-B | CAN No. 1 Junction Connector (for V bus) |
| D43-12 | R-Y | |
| D43-2 | BR | Combination Meter Assembly (for V bus) |
| D43-13 | BR-W | |
| D43-3 | P | Main Body ECU (Network Gateway ECU) (for V bus) |
| D43-14 | LG | |
| D43-5 | B-Y | DLC3 (for V bus) |
| D43-16 | LG | |
| D43-6 | G-W | Steering Angle Sensor (Spiral Cable Sub-assembly) (for V bus) |
| D43-17 | G | |
| D43-7 | P | PSP (Option Connector) (for V bus) |
| D43-18 | L | |
| D43-8 | P-L | Air Bag ECU Assembly (for V bus) |
| D43-19 | R-W | |

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| | | |
|---|---|---|
| D43-9 | O | ECM (for V bus) |
| D43-20 | B-P | |

**3. DLC3**

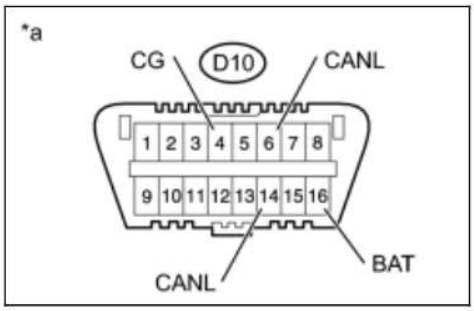
(a) Measure the resistance according to the value(s) in the table below.

**Text in Illustration**

| | |
|---|---|
| *a | DLC3 |

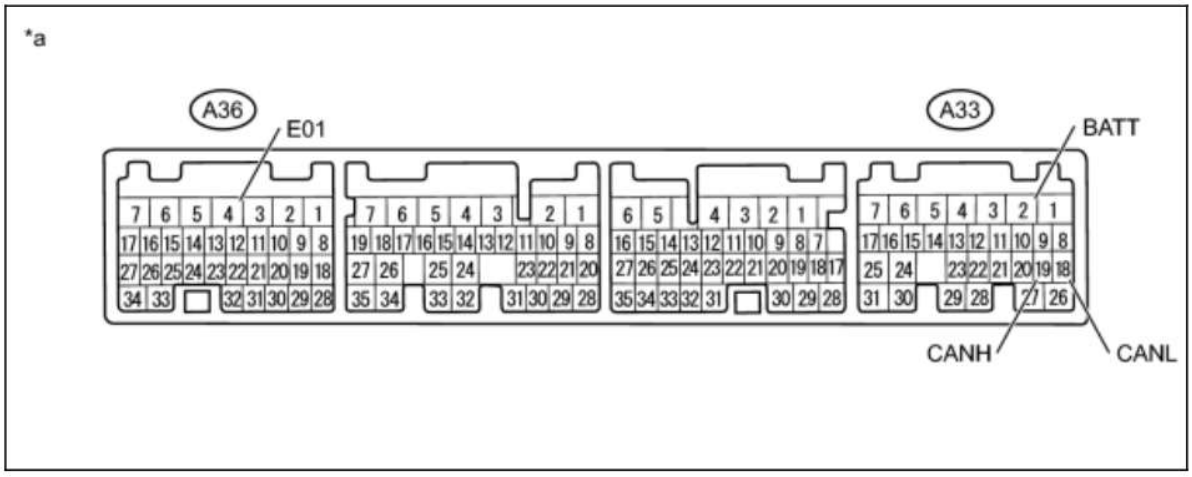
Standard Resistance:

| TERMINAL NO. (SYMBOL) | WIRING COLOR | TERMINAL DESCRIPTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|---|---|
| D10-6 (CANH) - D10-14 (CANL) | B-Y - LG | HIGH-level CAN bus line - LOW-level CAN bus line | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |
| D10-6 (CANH) - D10-4 (CG) | B-Y - B-Y | HIGH-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| D10-14 (CANL) - D10-4 (CG) | LG - B-Y | LOW-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| D10-6 (CANH) - D10-16 (BAT) | B-Y - W-B | HIGH-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |
| D10-14 (CANL) - D10-16 (BAT) | LG - W-B | LOW-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |



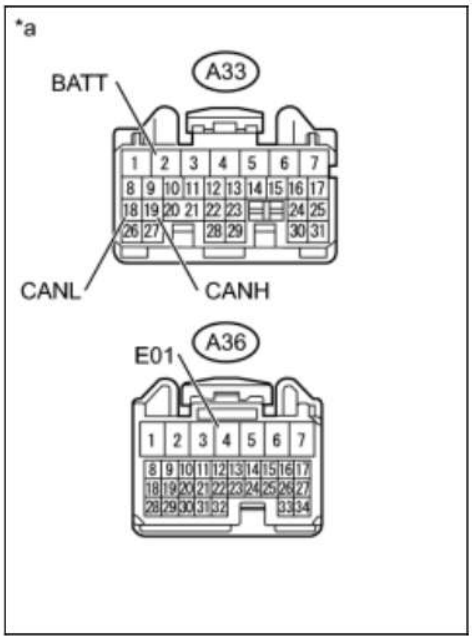

**4. ECM**

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**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | Component without harness connected (ECM) | - | - |




(a) Disconnect the A33 and A36 ECM connectors.

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to ECM) |

(b) Measure the resistance according to the value(s) in the table below.

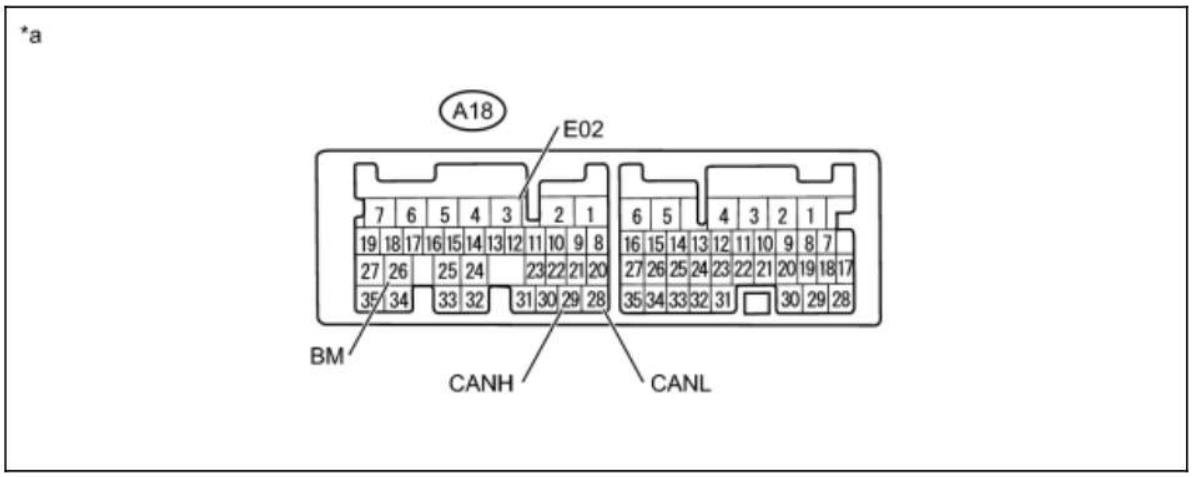
Standard Resistance:

| TERMINAL NO. (SYMBOL) | WIRING COLOR | TERMINAL DESCRIPTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|---|---|
| A33-19 (CANH) - A33-18 (CANL) | O - B-P | HIGH-level CAN bus line - LOW-level CAN bus line | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω |
| A33-19 (CANH) - A36-4 (E01) | O - B-L | HIGH-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| A33-18 (CANL) - A36-4 (E01) | B-P - B-L | LOW-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |

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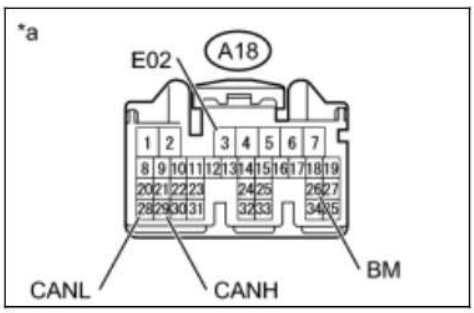
| | | | | |
|---|---|---|---|---|
| A33-19 (CANH) - A33-2 (BATT) | O - W | HIGH-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |
| A33-18 (CANL) - A33-2 (BATT) | B-P - W | LOW-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |

**5. TCM (for Automatic Transmission System)**




**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | Component without harness connected (TCM) | - | - |




(a) Disconnect the A18 TCM connector.

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to TCM) |

(b) Measure the resistance according to the value(s) in the table below.

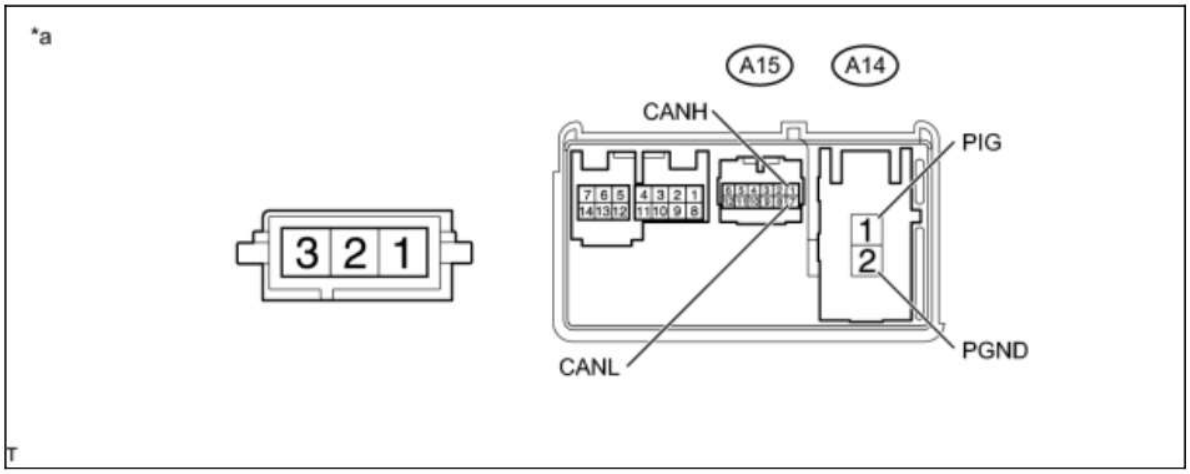
Standard Resistance:

| TERMINAL NO. (SYMBOL) | WIRING COLOR | TERMINAL DESCRIPTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|---|---|
| A18-29 (CANH) - A18-28 (CANL) | B-W - L | HIGH-level CAN bus line - LOW-level CAN bus line | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |
| A18-29 (CANH) - A18-3 (E02) | B-W - B-Y | HIGH-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| A18-28 (CANL) - A18-3 (E02) | L - B-Y | LOW-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| A18-29 (CANH) - A18-26 (BM) | B-W - Y-R | HIGH-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |

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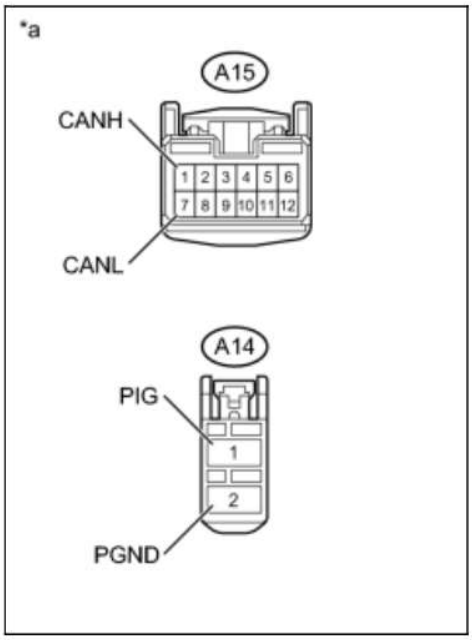
| | | | | |
|---|---|---|---|---|
| A18-28 (CANL) - A18-26 (BM) | L - Y-R | LOW-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |

**6. POWER STEERING ECU ASSEMBLY**




**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | Component without harness connected (Power Steering ECU Assembly) | - | - |




(a) Disconnect the A14 and A15 power steering ECU assembly connectors.

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Power Steering ECU Assembly) |

(b) Measure the resistance according to the value(s) in the table below.

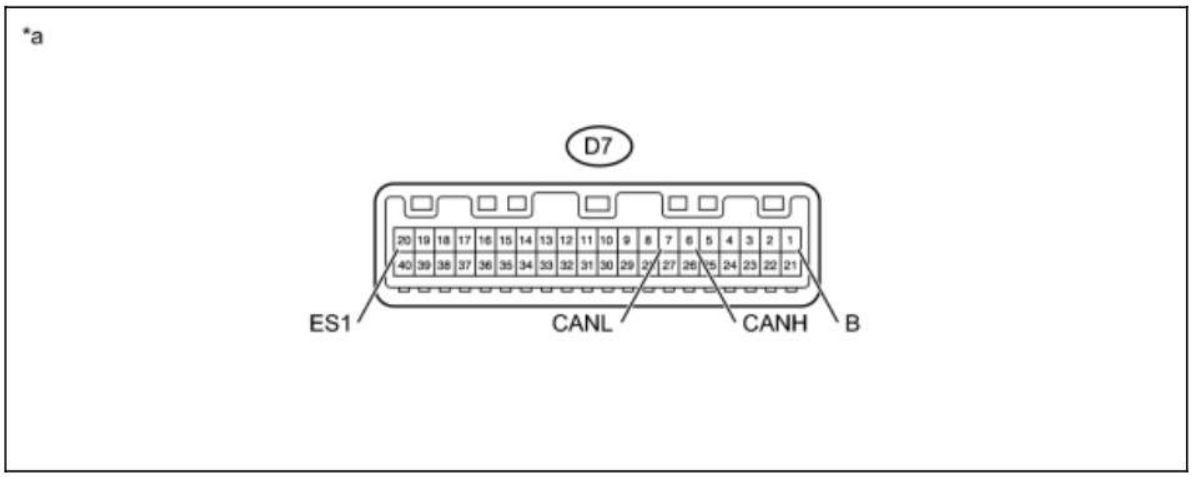
Standard Resistance:

| TERMINAL NO. (SYMBOL) | WIRING COLOR | TERMINAL DESCRIPTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|---|---|
| A15-1 (CANH) - | B - W | HIGH-level CAN bus line - | Cable disconnected from | 57 to 63 Ω |

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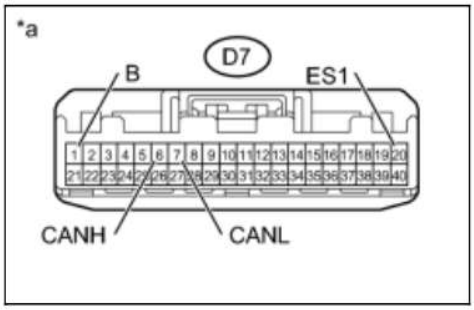
| | | | | |
|---|---|---|---|---|
| A15-7 (CANL) | | LOW-level CAN bus line | negative (-) battery terminal | |
| A15-1 (CANH) - A14-2 (PGND) | B - B | HIGH-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| A15-7 (CANL) - A14-2 (PGND) | W - B | LOW-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| A15-1 (CANH) - A14-1 (PIG) | B - W | HIGH-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |
| A15-7 (CANL) - A14-1 (PIG) | W - W | LOW-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |

**7. COMBINATION METER ASSEMBLY**




**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | Component without harness connected (Combination Meter Assembly) | - | - |




(a) Disconnect the D7 combination meter assembly connector.

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Combination Meter Assembly) |

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

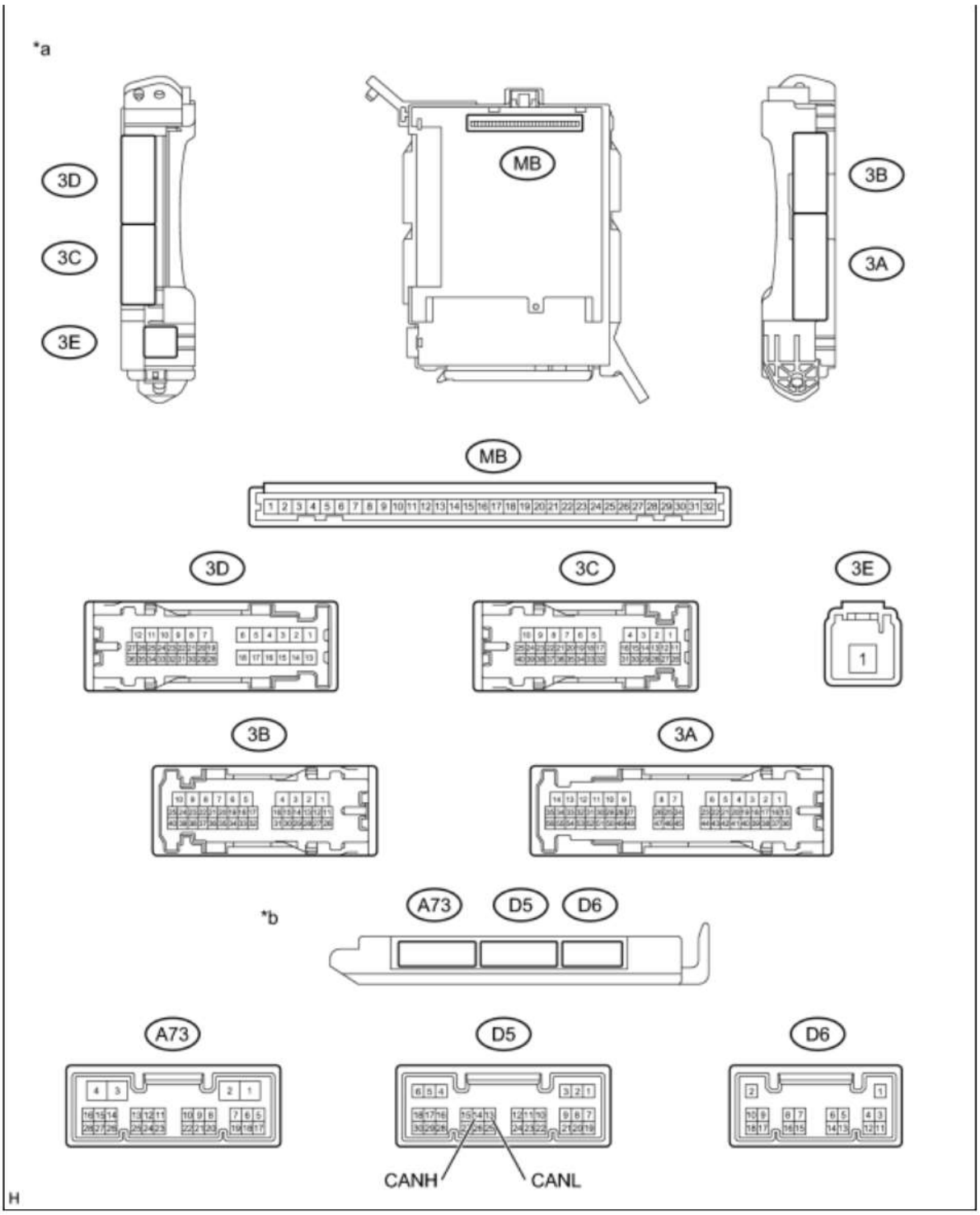
| TERMINAL NO. (SYMBOL) | WIRING COLOR | TERMINAL DESCRIPTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|---|---|
| D7-6 (CANH) - D7-7 (CANL) | BR - BR-W | HIGH-level CAN bus line - LOW-level CAN bus line | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |

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| | | | | |
|---|---|---|---|---|
| D7-6 (CANH) - D7-20 (ES1) | BR - B-Y | HIGH-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| D7-7 (CANL) - D7-20 (ES1) | BR-W - B-Y | LOW-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| D7-6 (CANH) - D7-1 (B | BR - R-W | HIGH-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |
| D7-7 (CANL) - D7-1 (B | BR-W - R-W | LOW-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |

**8. INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY AND MAIN BODY ECU (NETWORK GATEWAY ECU)**

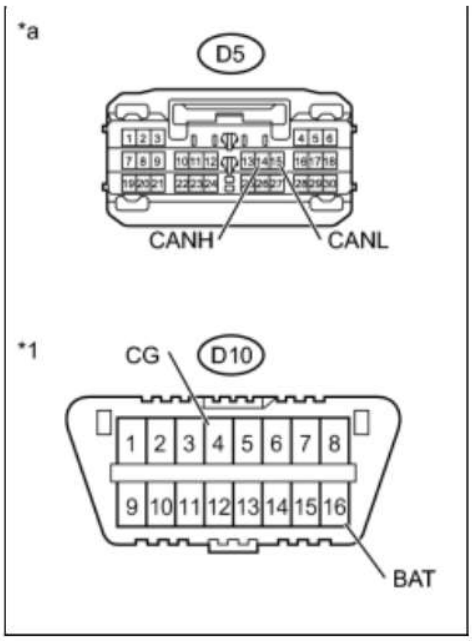
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**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | Component without harness connected (Instrument Panel Junction Block Assembly) | *b | Component without harness connected (Main Body ECU (Network Gateway ECU)) |

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(a) Disconnect the D5 main body ECU (network gateway ECU) connector.

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |
| *a | Front view of wire harness connector (to Main Body ECU (Network Gateway ECU)) |

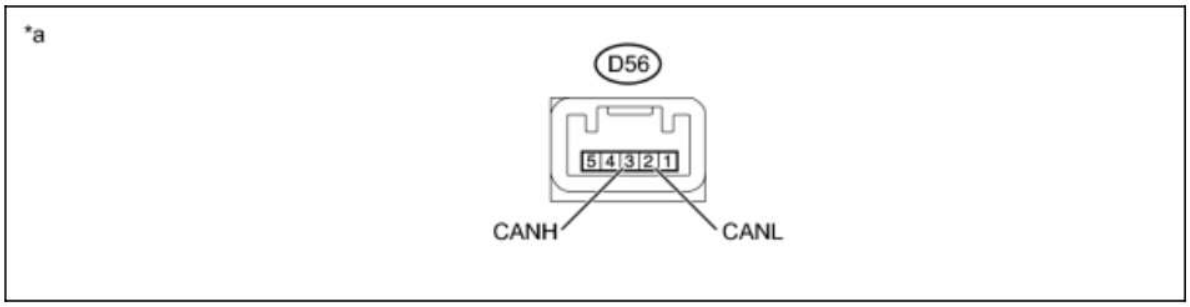
(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TERMINAL NO. (SYMBOL) | WIRING COLOR | TERMINAL DESCRIPTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|---|---|
| D5-14 (CANH) - D5-13 (CANL) | P - LG | HIGH-level CAN bus line - LOW-level CAN bus line | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |
| D5-14 (CANH) - D10-4 (CG) | P - B-Y | HIGH-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| D5-13 (CANL) - D10-4 (CG) | LG - B-Y | LOW-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| D5-14 (CANH) - D10-16 (BAT) | P - W-B | HIGH-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |
| D5-13 (CANL) - D10-16 (BAT) | LG - W-B | LOW-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |

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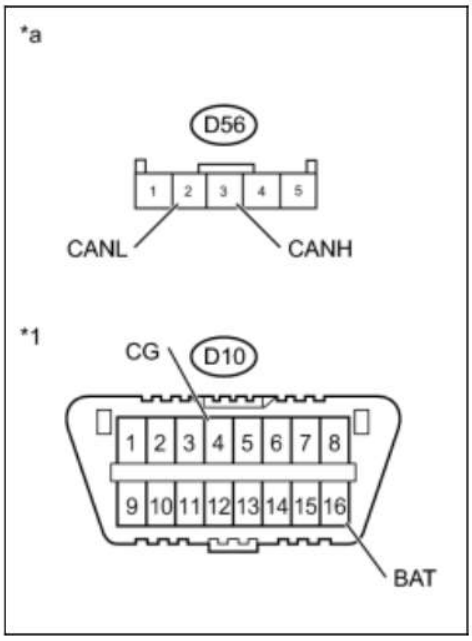
### 9. STEERING ANGLE SENSOR (SPIRAL CABLE SUB-ASSEMBLY)




**Text in Illustration**

| | |
|---|---|
| | Component without harness connected |

| | | | |
|---|---|---|---|
| *a | (Steering Angle Sensor (Spiral Cable Sub-assembly)) | - | - |




(a) Disconnect the D56 steering angle sensor (spiral cable sub-assembly) connector.

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |
| *a | Front view of wire harness connector (to Steering Angle Sensor (Spiral Cable Sub-assembly)) |

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TERMINAL NO. (SYMBOL) | WIRING COLOR | TERMINAL DESCRIPTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|---|---|
| D56-3 (CANH) - D56-2 (CANL) | G-W - G | HIGH-level CAN bus line - LOW-level CAN bus line | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |
| D56-3 (CANH) - D10-4 (CG) | G-W - B-Y | HIGH-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| D56-2 (CANL) - D10-4 (CG) | G - B-Y | LOW-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| D56-3 (CANH) - D10-16 (BAT) | G-W - W-B | HIGH-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |
| D56-2 (CANL) - D10-16 (BAT) | G - W-B | LOW-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |

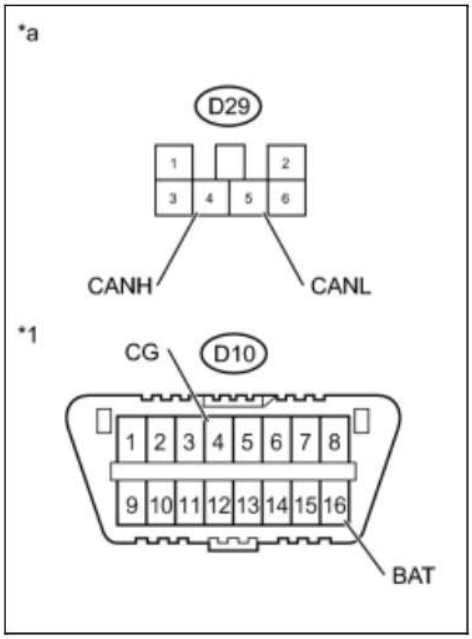
### 10. PSP (OPTION CONNECTOR)

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |
| *a | Front view of wire harness connector (to PSP (Option Connector)) |

(a) Measure the resistance according to the value(s) in the table below.

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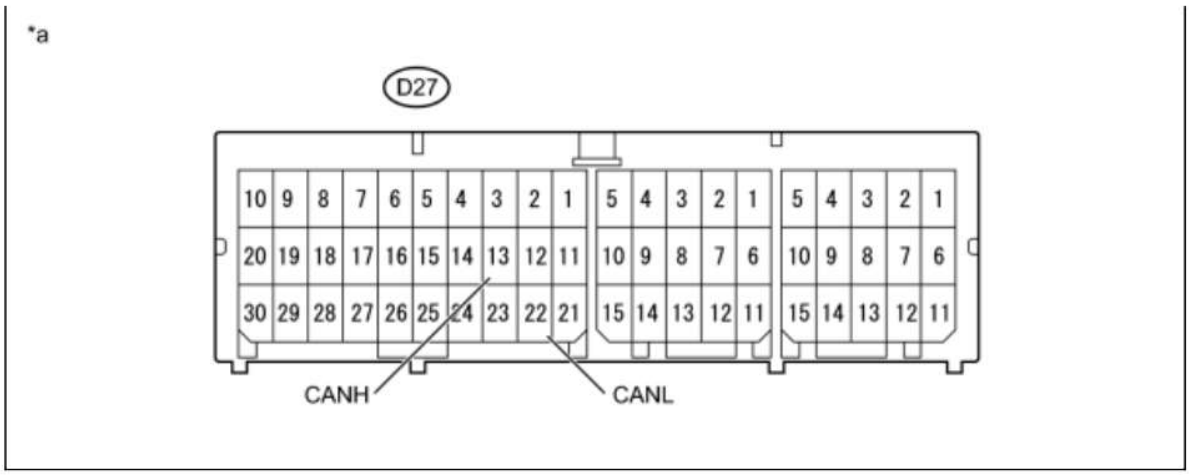



Standard Resistance:

| TERMINAL NO. (SYMBOL) | WIRING COLOR | TERMINAL DESCRIPTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|---|---|
| D29-4 (CANH) - D29-5 (CANL) | P - L | HIGH-level CAN bus line - LOW-level CAN bus line | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |
| D29-4 (CANH) - D10-4 (CG) | P - B-Y | HIGH-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| D29-5 (CANL) - D10-4 (CG) | L - B-Y | LOW-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| D29-4 (CANH) - D10-16 (BAT) | P - W-B | HIGH-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |
| D29-5 (CANL) - D10-16 (BAT) | L - W-B | LOW-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |

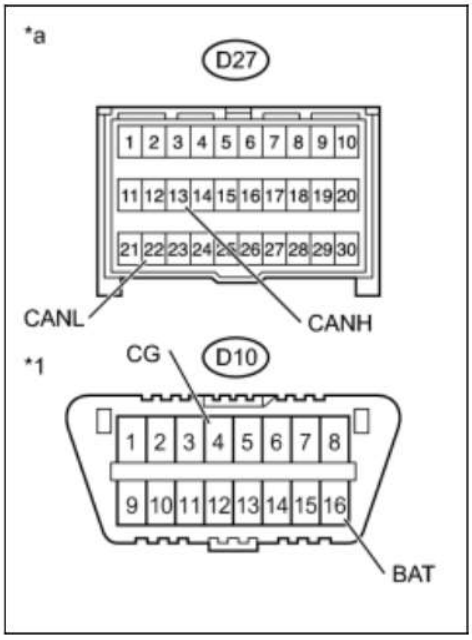
**11. AIR BAG ECU ASSEMBLY**

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**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | Component without harness connected<br>(Air Bag ECU Assembly) | - | - |




(a) Disconnect the D27 air bag ECU assembly connector.

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |
| *a | Front view of wire harness connector<br>(to Air Bag ECU Assembly) |

(b) Measure the resistance according to the value(s) in the table below.

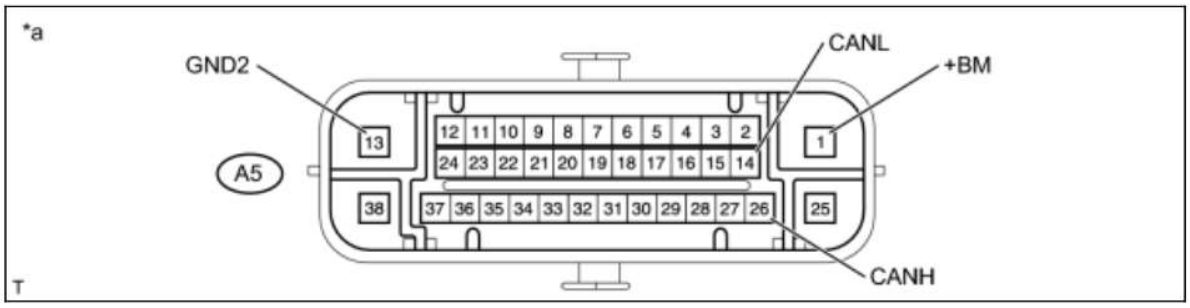
Standard Resistance:

| TERMINAL NO. (SYMBOL) | WIRING COLOR | TERMINAL DESCRIPTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|---|---|
| D27-13 (CANH) - D27-22 (CANL) | P-L - R-W | HIGH-level CAN bus line - LOW-level CAN bus line | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |
| D27-13 (CANH) - D10-4 (CG) | P-L - B-Y | HIGH-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| D27-22 (CANL) - D10-4 (CG) | R-W - B-Y | LOW-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| D27-13 (CANH) - | P-L - | HIGH-level CAN bus line - | Cable disconnected from | 6 kΩ or |

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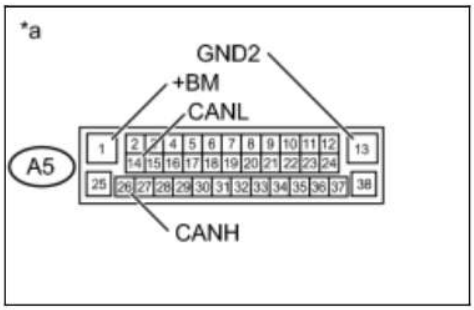
| | | | | |
|---|---|---|---|---|
| D10-16 (BAT) | W-B | Battery positive (+) | negative (-) battery terminal | higher |
| D27-22 (CANL) - D10-16 (BAT) | R-W - W-B | LOW-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |

## 12. SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY)




**Text in Illustration**

| | | | |
|---|---|---|---|
| *a | Component without harness connected (Skid Control ECU (Brake Actuator Assembly)) | - | - |




(a) Disconnect the A5 skid control ECU (brake actuator assembly) connector.

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly)) |

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TERMINAL NO. (SYMBOL) | WIRING COLOR | TERMINAL DESCRIPTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|---|---|
| A5-26 (CANH) - A5-14 (CANL) | BR - B-R | HIGH-level CAN bus line - LOW-level CAN bus line | Cable disconnected from negative (-) battery terminal | 114 to 126 Ω |
| A5-26 (CANH) - A5-13 (GND2) | BR - B | HIGH-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| A5-14 (CANL) - A5-13 (GND2) | B-R - B | LOW-level CAN bus line - Ground | Cable disconnected from negative (-) battery terminal | 200 Ω or higher |
| A5-26 (CANH) - A5-1 (+BM) | BR - W | HIGH-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |
| A5-14 (CAN_L) - A5-1 (+BM) | B-R - W | LOW-level CAN bus line - Battery positive (+) | Cable disconnected from negative (-) battery terminal | 6 kΩ or higher |

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 J | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000000WIP0B7X |
| **Title:** NETWORKING: CAN COMMUNICATION SYSTEM: Transmission Control ECU Communication Stop Mode (2013 FR-S) | | |

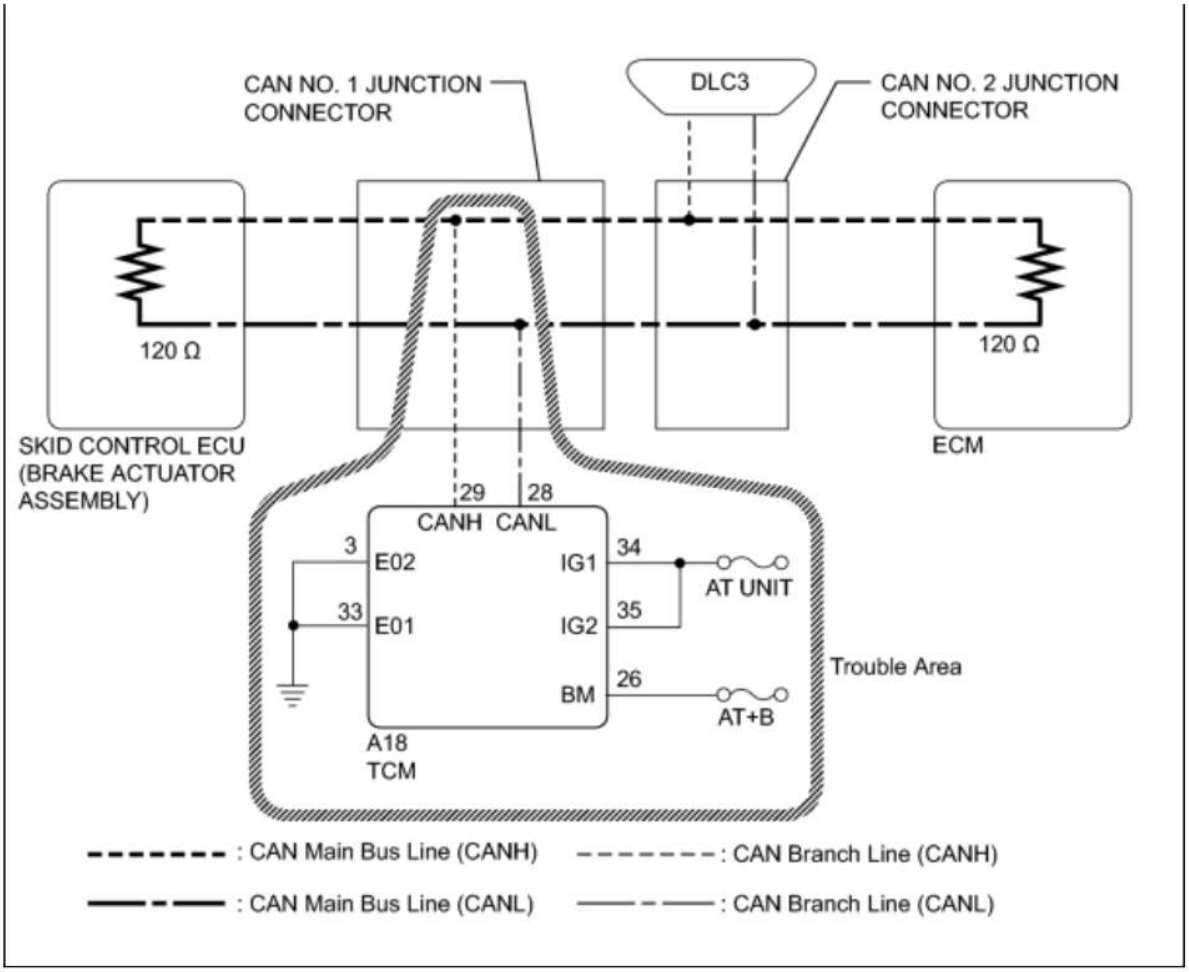
**Transmission Control ECU Communication Stop Mode**

## DESCRIPTION

| DETECTION ITEM | SYMPTOM | TROUBLE AREA |
|---|---|---|
| Transmission Control ECU Communication Stop Mode | Either condition is met:<br>• "TCM" is not displayed on the "CAN Bus Check" screen of the Techstream INFO<br>• Communication system DTCs (DTCs that start with U) that are output correspond to "Transmission Control ECU Communication Stop Mode" in "DTC Combination Table" INFO | • TCM branch line or connector<br>• Power source circuit of TCM<br>• Transmission control ECU assembly ground circuit<br>• TCM |

## WIRING DIAGRAM

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# INSPECTION PROCEDURE

**NOTICE:**

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output INFO .
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON and wait at least 10 seconds.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO .

**HINT:**

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or

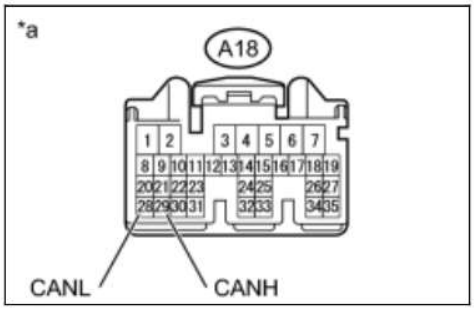
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wire harness while performing the inspection below may help determine the cause of the malfunction.

## PROCEDURE

| | |
|---|---|
| 1. | **CHECK FOR OPEN IN CAN BUS LINES (TCM BRANCH LINE)** |

(a) Disconnect the cable from the negative (-) battery terminal.




(b) Disconnect the A18 TCM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A18-29 (CANH) - A18-28 (CANL) | Cable disconnected from negative (-) battery terminal | 57 to 63 Ω |

**Text in Illustration**

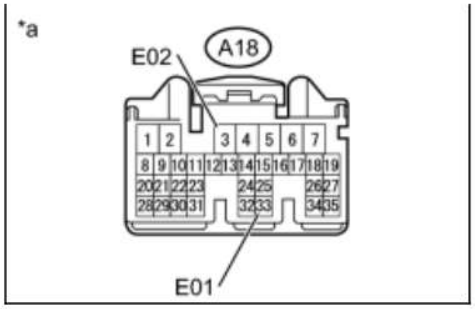
| | |
|---|---|
| *a | Front view of wire harness connector (to TCM) |

**NG** ▶ **REPAIR OR REPLACE CAN BRANCH LINE OR CONNECTOR (TCM)**

**OK** ▼

| | |
|---|---|
| 2. | **CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)** |

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(a) Measure the resistance according to the value(s) in the table below.

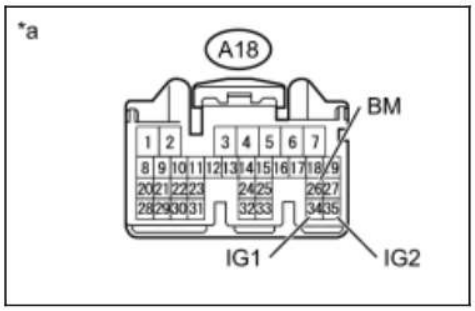
Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A18-3 (E02) - Body ground | Cable disconnected from negative (-) battery terminal | Below 1 Ω |
| A18-33 (E01) - Body ground | Cable disconnected from negative (-) battery terminal | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to TCM) |

(b) Connect the cable to the negative (-) battery terminal.




(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| A18-26 (BM) - Body ground | Ignition switch off | 11 to 14 V |
| A18-34 (IG1) - Body ground | Ignition switch ON | 11 to 14 V |
| A18-35 (IG2) - Body ground | Ignition switch ON | 11 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to TCM) |

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NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK ▶ REPLACE TCM

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 C | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000002S8B02AX |
| **Title:** NETWORKING: LIN COMMUNICATION SYSTEM: B2321,B2325: Lost Communication with Driver Door Power Window ECU (2013 FR-S) | | |

| | | |
|---|---|---|
| **DTC** | **B2321** | **Lost Communication with Driver Door Power Window ECU** |

| | | |
|---|---|---|
| **DTC** | **B2325** | **LIN Communication Bus Malfunction** |

# DESCRIPTION

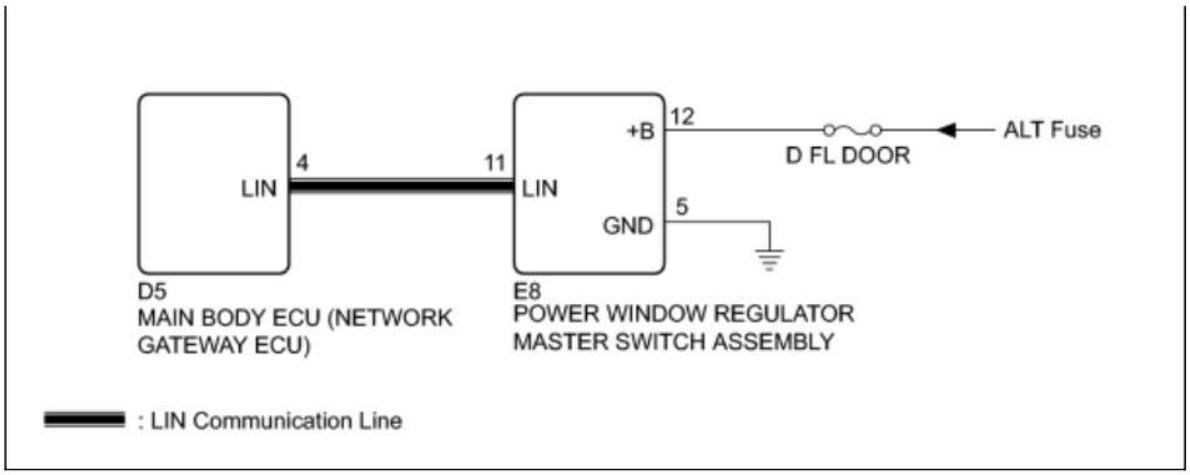
B2321 is stored when the communication between the power window regulator master switch assembly and the main body ECU (network gateway computer) stops for 10 seconds or more.

The main body ECU (network gateway computer) monitors communication between all the ECUs connected to the door LIN bus. When the main body ECU (network gateway computer) detects errors in communication with all the ECUs connected to the door LIN bus at 2.6-second intervals and 3 times in a row, DTC B2325 will be stored.

| DTC NO. | DTC DETECTION CONDITION | TROUBLE AREA |
|---|---|---|
| B2321 | Lost communication between the multiplex network master switch assembly and the main body ECU (network gateway computer). | • Power window regulator master switch assembly<br>• Main body ECU (network gateway ECU)<br>• Harness or connector |
| B2325 | The main body ECU (network gateway computer) detects errors in door LIN bus communication lines at 2.6-second intervals and 3 times in a row. | • Power window regulator master switch assembly<br>• Main body ECU (network gateway ECU)<br>• Harness or connector |

# WIRING DIAGRAM

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# INSPECTION PROCEDURE

**NOTICE:**

- When using the Techstream with the ignition switch off to troubleshoot:

  Connect the Techstream to the vehicle and turn a courtesy light switch on and off at 1.5 second intervals until communication between the Techstream and vehicle begins.
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

**HINT:**

**When communication between the power window regulator master switch assembly and the main body ECU (network gateway ECU) stops, DTC B2325 is also stored.**

# PROCEDURE

| | |
|---|---|
| 1. | **CLEAR DTC** |

(a) Clear the DTCs INFO .

**NEXT**

| | |
|---|---|
| 2. | **CHECK FOR DTC** |

(a) Check for DTCs INFO .

**Result**

| RESULT | PROCEED TO |
|---|---|
| DTC B2321 or B2325 is output | A |
| DTC B2321 or B235 is not output | B |

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B ▶ **USE SIMULATION METHOD TO CHECK**

A ▼

| | |
|---|---|
| 3. | **CHECK HARNESS AND CONNECTOR (MAIN BODY ECU (NETWORK GATEWAY ECU) - POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY)** |

(a) Disconnect the D5 main body ECU (network gateway ECU) connector.

(b) Disconnect the E8 power window regulator master switch assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D5-4 (LIN) - E8-11 (LIN) | Always | Below 1 Ω |

Standard Resistance (Check for Short):

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| D5-4 (LIN) or E8-11 (LIN) - Body ground | Always | 10 kΩ or higher |

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

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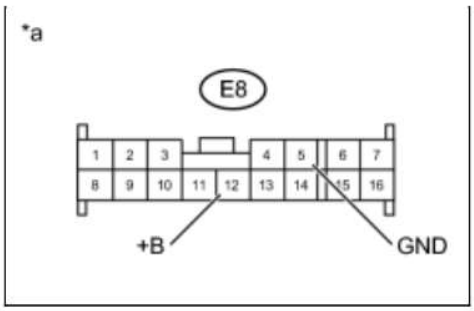
OK ▼

| | |
|---|---|
| 4. | **CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)** |

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| E8-5 (GND) - Body ground | Always | Below 1 Ω |




(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|
| E8-12 (+B) - Body ground | Always | 11 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *a | Front view of wire harness connector (to Power Window Regulator Master Switch Assembly) |

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

**OK**
▼

| 5. | REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY |
|---|---|

(a) Temporarily replace the power window regulator master switch assembly with a new or normally functioning one INFO .

**NEXT**
▼

| 6. | CLEAR DTC |
|---|---|

(a) Clear the DTCs INFO .

**NEXT**
▼

| 7. | CHECK FOR DTC |
|---|---|

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(a) Check for DTCs INFO .

OK:
DTC B2321 or B2325 is not output.

NG ▶ **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

OK ▶ **END (POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY WAS DEFECTIVE)**

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 S | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000003YZK012X |
| **Title:** NETWORKING: LIN COMMUNICATION SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S) | | |

# DIAGNOSTIC TROUBLE CODE CHART

| DTC CODE | DETECTION ITEM | SEE PAGE |
|---|---|---|
| B2321 | Lost Communication with Driver Door Power Window ECU | INFO |
| B2325 | LIN Communication Bus Malfunction | INFO |

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 D | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000002S8D02IX |
| **Title:** NETWORKING: LIN COMMUNICATION SYSTEM: DTC CHECK / CLEAR (2013 FR-S) | | |

# DTC CHECK / CLEAR

### 1. CHECK DTC

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Body Electrical / (desired system) / DTC.

(e) Read the DTCs.

### 2. CLEAR DTC

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Body Electrical / (desired system) / DTC.

(e) Clear the DTCs.

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 D | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000002XHI066X |
| **Title:** NETWORKING: LIN COMMUNICATION SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S) | | |

# HOW TO PROCEED WITH TROUBLESHOOTING

**HINT:**

- Use the following procedure to troubleshoot the LIN communication system.
- *: Use the Techstream.

| | |
|---|---|
| **1.** | **VEHICLE BROUGHT TO WORKSHOP** |

**NEXT**

| | |
|---|---|
| **2.** | **CUSTOMER PROBLEM ANALYSIS** |

- When troubleshooting, confirm that the problem symptoms have been accurately identified. Preconceptions should be discarded in order to make an accurate judgment. To clearly understand what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time when the malfunction occurred.
- Gather as much information as possible for reference. Past problems that seem unrelated may also help in some cases.
- The following 5 items are important points in problem analysis:

| | |
|---|---|
| What | Vehicle model, system name |
| When | Date, time, occurrence frequency |
| Where | Road conditions |
| Under what conditions? | Driving conditions, weather conditions |
| How did it happen? | Problem symptoms |

**NEXT**

| | |
|---|---|
| **3.** | **INSPECT BATTERY VOLTAGE** |

(a) Measure the battery voltage with the ignition switch off.

Standard Voltage:
11 to 14 V

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If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

**NEXT**

| | |
|---|---|
| **4.** | **CHECK COMMUNICATION FUNCTION OF LIN COMMUNICATION SYSTEM*** |

(a) Using the Techstream, inspect the LIN communication function to ensure there are no malfunctions in the communication system INFO .

Result:

| RESULT | PROCEED TO |
|---|---|
| DTC is not output | A |
| DTC is output | B |

**B** ▶ **GO TO DIAGNOSTIC TROUBLE CODE CHART**

**A**

| | |
|---|---|
| **5.** | **OVERALL ANALYSIS AND TROUBLESHOOTING*** |

(a) Terminals of ECU INFO .

**NEXT**

| | |
|---|---|
| **6.** | **REPAIR OR REPLACE** |

**NEXT**

| | |
|---|---|
| **7.** | **CONFIRMATION TEST** |

**NEXT** ▶ **END**

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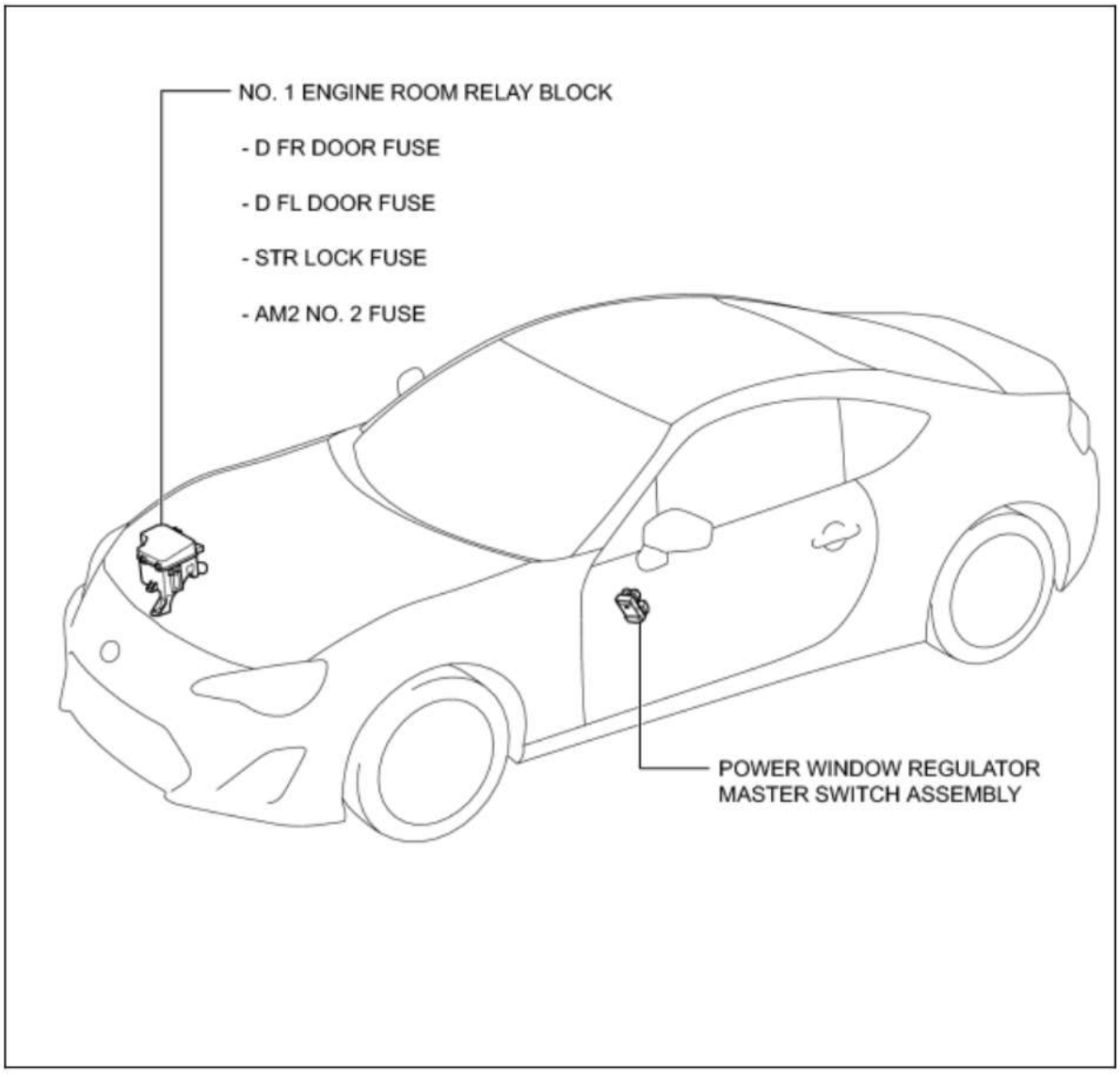



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| | | |
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| **Last Modified:** 3-27-2012 | 6.4 R | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000002XHK044X |
| **Title:** NETWORKING: LIN COMMUNICATION SYSTEM: PARTS LOCATION (2013 FR-S) | | |

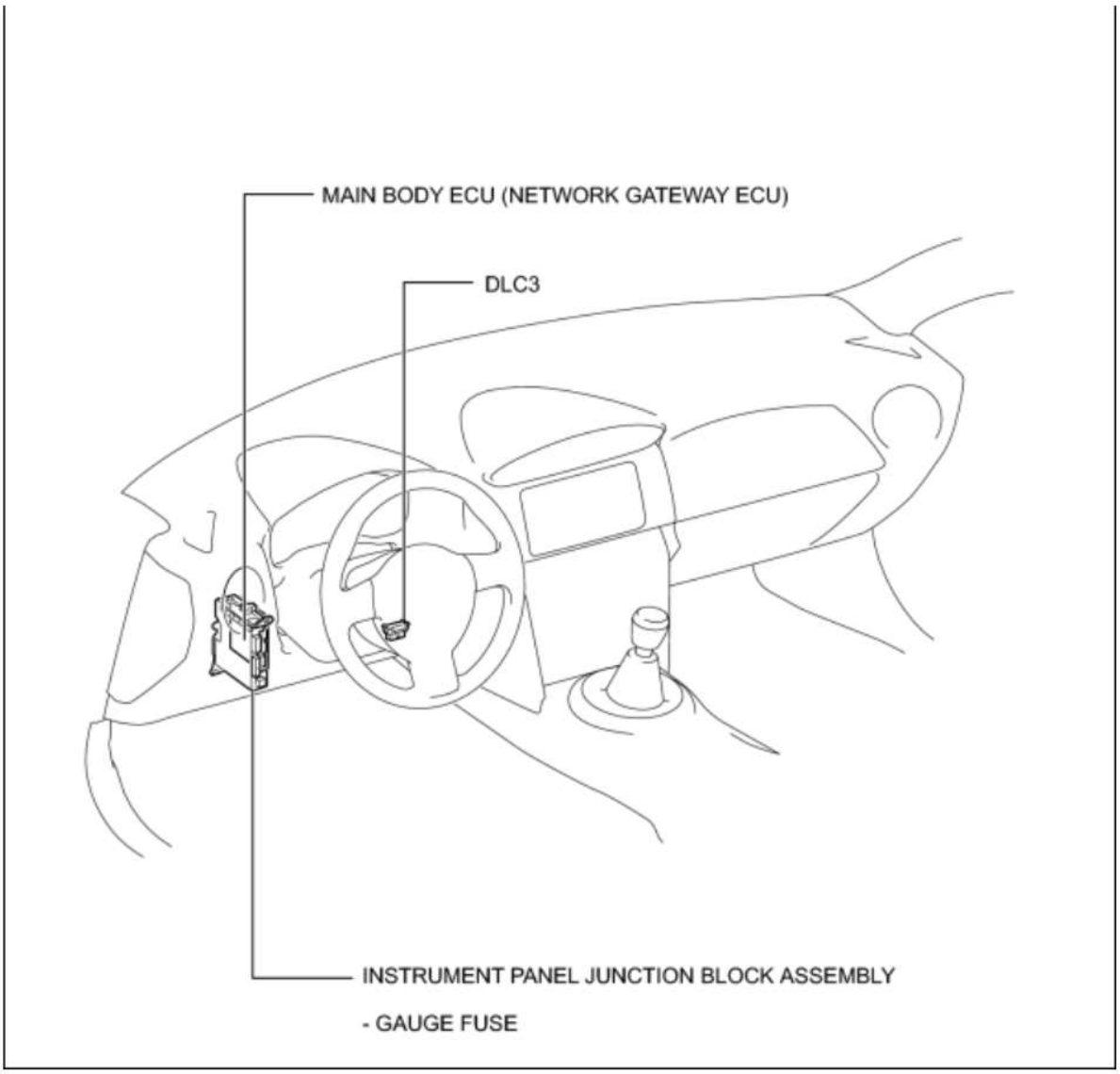
## PARTS LOCATION

## ILLUSTRATION




## ILLUSTRATION

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 L | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000002XHH05AX |
| **Title:** NETWORKING: LIN COMMUNICATION SYSTEM: PRECAUTION (2013 FR-S) | | |

# PRECAUTION

**NOTICE:**

**After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work** INFO **.**

### 1. PRECAUTIONS WHEN USING TECHSTREAM

(a) When using the Techstream to troubleshoot with the ignition switch off:

Connect the Techstream to the DLC3, and turn the courtesy light switch on and off at 1.5-second intervals until communication between the Techstream and vehicle begins.

(b) After all DTCs are cleared, check if the trouble occurs again 6 seconds after the ignition switch to ON.

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 D | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000002XHQ04KX |
| **Title:** NETWORKING: LIN COMMUNICATION SYSTEM: SYSTEM DESCRIPTION (2013 FR-S) | | |

# SYSTEM DESCRIPTION

## 1. LIN COMMUNICATION SYSTEM DESCRIPTION

The LIN communication system is used for the communication between the components in the tables below. If the communication cannot be performed through the LIN communication because of an open in the communication lines or other reasons, the master control ECU of the relevant system will store a DTC. Refer to the table below about the communication bus lines and connected components.

**HINT:**

- Each component has a fail-safe function which activates to maintain the minimum performance of the system and protect the system.
- In the following table, "○" indicates that the function applies, and "-" indicates that it does not.

**Door Bus Lines**

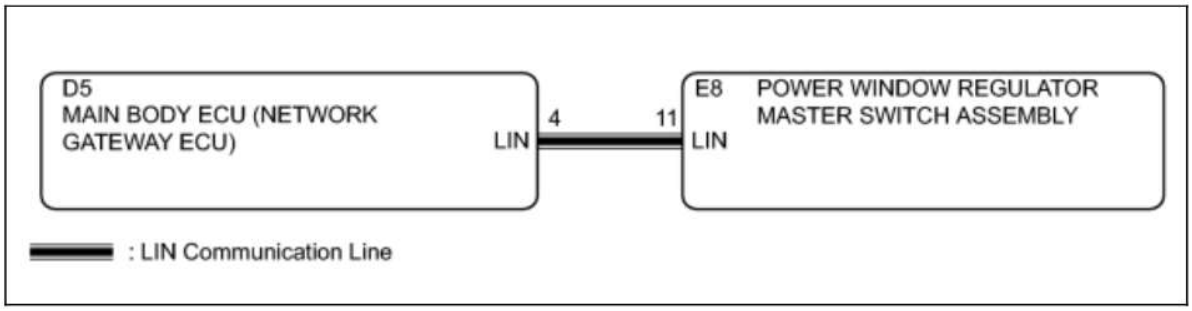
| COMPONENT | MASTER CONTROL | LIN COMMUNICATION DTC OUTPUT FUNCTION |
|---|---|---|
| Main Body ECU (Network Gateway ECU) | ○ | ○ |
| Power Window Regulator Master Switch Assembly | - | - |

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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 U | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000002XHT04LX |
| **Title:** NETWORKING: LIN COMMUNICATION SYSTEM: SYSTEM DIAGRAM (2013 FR-S) | | |

# SYSTEM DIAGRAM

### 1. DOOR BUS LINES

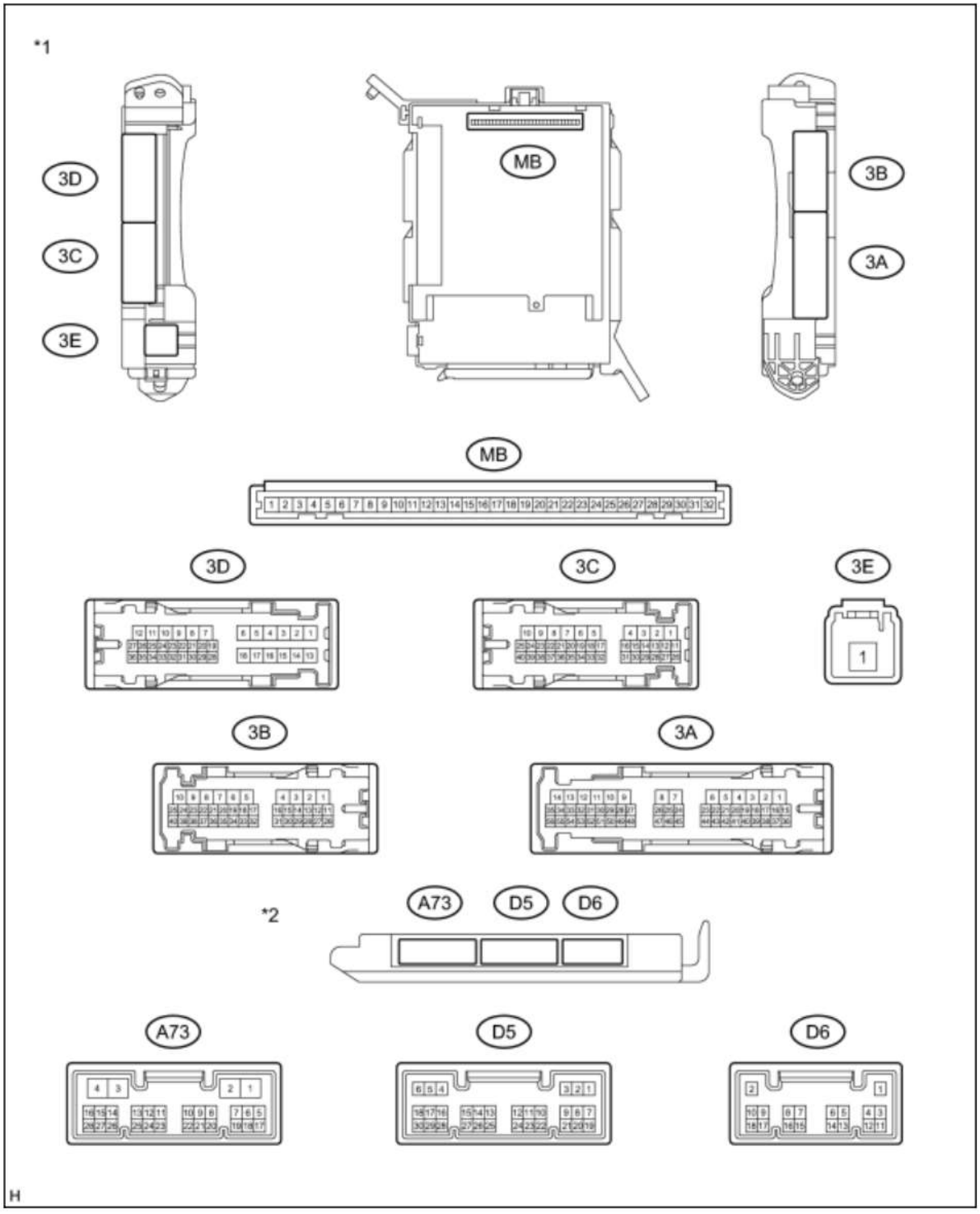



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| | | |
|---|---|---|
| **Last Modified:** 3-27-2012 | 6.4 U | **From:** 201203 |
| **Model Year:** 2013 | **Model:** FR-S | **Doc ID:** RM000002XHL04RX |
| **Title:** NETWORKING: LIN COMMUNICATION SYSTEM: TERMINALS OF ECU (2013 FR-S) | | |

# TERMINALS OF ECU

**1. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY AND MAIN BODY ECU (NETWORK GATEWAY ECU)**




**Text in Illustration**

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| | | | |
|---|---|---|---|
| *1 | Instrument Panel Junction Block Assembly | *2 | Main Body ECU (Network Gateway ECU) |

(a) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly INFO .

(b) Measure the voltage and resistance according to the value(s) in the table below.

| TERMINAL NO. (SYMBOL) | WIRING COLOR | TERMINAL DESCRIPTION | SWITCH CONDITION | SPECIFIED CONDITION |
|---|---|---|---|---|
| MB-1 (BECU) - Body ground | None - Body ground | Battery power supply | Always | 11 to 14 V |
| MB-8 (IG) - Body ground | None - Body ground | Battery power supply | Ignition switch ON | 11 to 14 V |
| MB-11 (GND) - Body ground | None - Body ground | Ground | Always | Below 1 Ω |
| MB-32 (+B) - Body ground | None - Body ground | Battery power supply | Always | 11 to 14 V |

If the result is not as specified, there may be a malfunction in the wire harness.

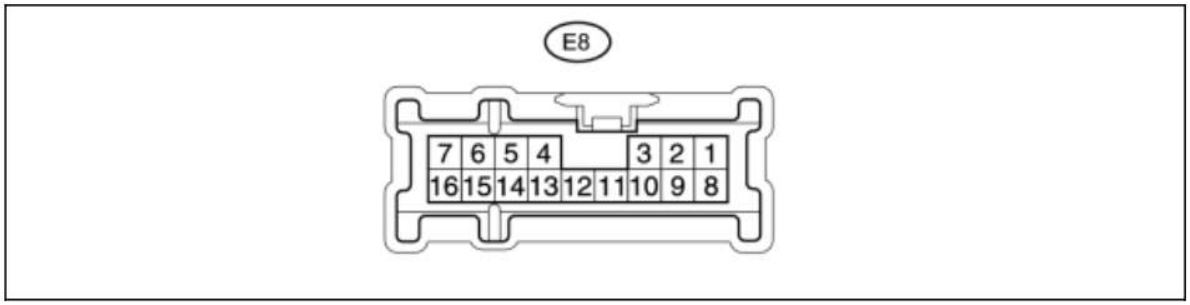
(c) Install the main body ECU (network gateway ECU) onto the instrument panel junction block assembly.

(d) Measure the pulses according to the value(s) in the table below.

| TERMINAL NO. (SYMBOL) | WIRING COLOR | TERMINAL DESCRIPTION | SWITCH CONDITION | SPECIFIED CONDITION |
|---|---|---|---|---|
| D5-4 (LIN) - D6-1 (GND) | LG - B | LIN Communication line | Ignition switch ON | Pulse generation |

If the result is not as specified, the main body ECU (network gateway ECU) or instrument panel junction block assembly may have a malfunction.

**2. CHECK POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY**




(a) Disconnect the E8 power window regulator master switch assembly connector.

(b) Measure the voltage and resistance according to the value(s) in the table below.

| TERMINAL NO. (SYMBOL) | WIRING COLOR | TERMINAL DESCRIPTION | CONDITION | SPECIFIED CONDITION |
|---|---|---|---|---|
| E8-5 (GND) - Body | | | | |

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| | | | | |
|---|---|---|---|---|
| ground | B - Body ground | Ground | Always | Below 1 Ω |
| E8-12 (+B) - Body ground | SB - Body ground | Battery power supply | Always | 11 to 14 V |

If the result is not as specified, there may be a malfunction in the wire harness.




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