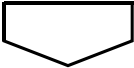


MULTIPLEX BODY COMMUNICATION SYSTEM (LIN)

HOW TO PROCEED WITH TROUBLESHOOTING

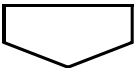
1

VEHICLE BROUGHT TO WORKSHOP



2

CHECK SYMPTOMS



3

CHECK FOR DTCs

- (a) Check for DTCs and note any codes that are output. (See page MP-2.)
- (b) Clear the DTCs.
- (c) Reproduce the symptoms based on the recorded code, and check if the same DTC is output.

(1) If the code does not reoccur, go to A.

(2) If the code reoccurs, go to B.

B

GO TO INSPECTION PROCEDURE 6



4

PROBLEM SYMPTOMS TABLE (SEE PAGE MP-3)

- (a) For unrelated problem systems, go to A.
- (b) For related problem systems, go to B.

B

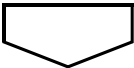
GO TO INSPECTION PROCEDURE 6



5

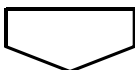
TROUBLESHOOT BASED ON THE SYMPTOM

- (a) ECU terminals (See page MP-5.)

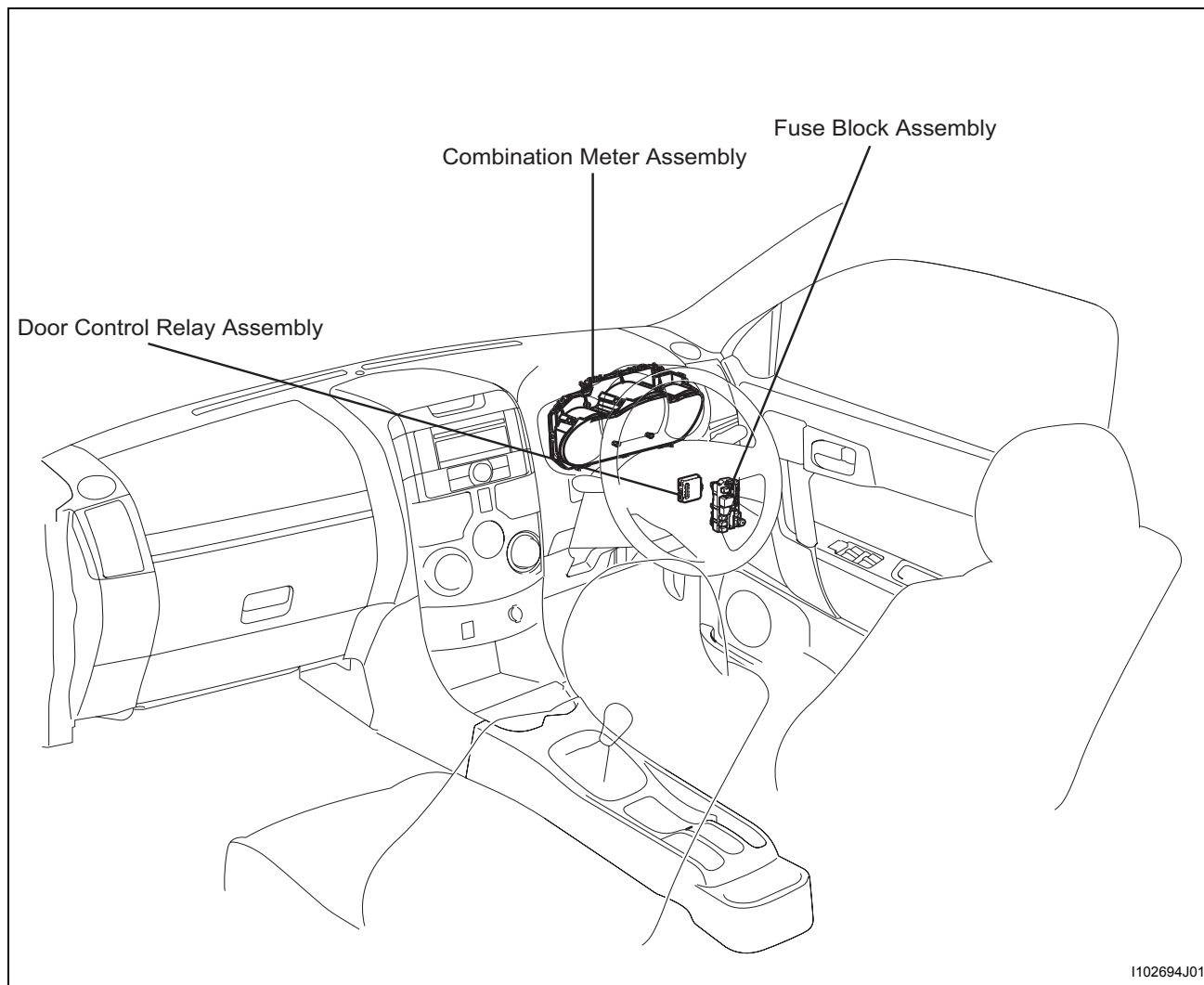


MP



6**ADJUST, REPAIR OR REPLACE****END**

LOCATION



I102694J01

MP

DIAGNOSTIC TROUBLE CODE CHART

DTC No.	Diagnostic Item	HINT	See Page
11	ITC COMMUNICATION MALFUNCTION (EXCLUDING SHORT)	Door control relay assembly malfunction	MP-8

DTC No.	Diagnostic Item	HINT	See Page
21	SHORT TO COMMUNICATION LINE / SHORT TO COMMUNICATION CIRCUIT INSIDE ECU	Combination meter assembly malfunction	MP-12

PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
Door control relay assembly communication malfunction	Door control relay assembly	MP-8
	Fuse block assembly	-
	Wire harness	-
Short to communication line short / Short to communication circuit inside ECU	Combination meter assembly	MP-12
	Fuse block assembly	-
	Wire harness	-

DESCRIPTION

1. MULTIPLEX BODY COMMUNICATION SYSTEM (LIN) DESCRIPTION

- (a) The LIN communication line is used to control the computer connected to the combination meter assembly. When the communication line is unable to communicate for any reason, the system DTC is output on the LCD (Liquid Crystal Display) in the combination meter assembly.

CHECK / CLEAR DTCs

NOTICE:

The communication malfunction system for DTCs is displayed as long as the communication malfunction continues. When communication returns to normal, the communication malfunction system is cleared. When the negative battery terminal is disconnected during a communication malfunction, the DTCs for the communication malfunction, excluding shorts, are not output again. Therefore, it is important to record the DTCs before disconnecting the negative battery terminal.

1. DTC CHECK (read from meter LCD display)

- (a) With the ignition switch off, short the circuit between terminals 13 (ECUT) and 4 (E) of the DLC using a diagnosis check wire.

NOTICE:

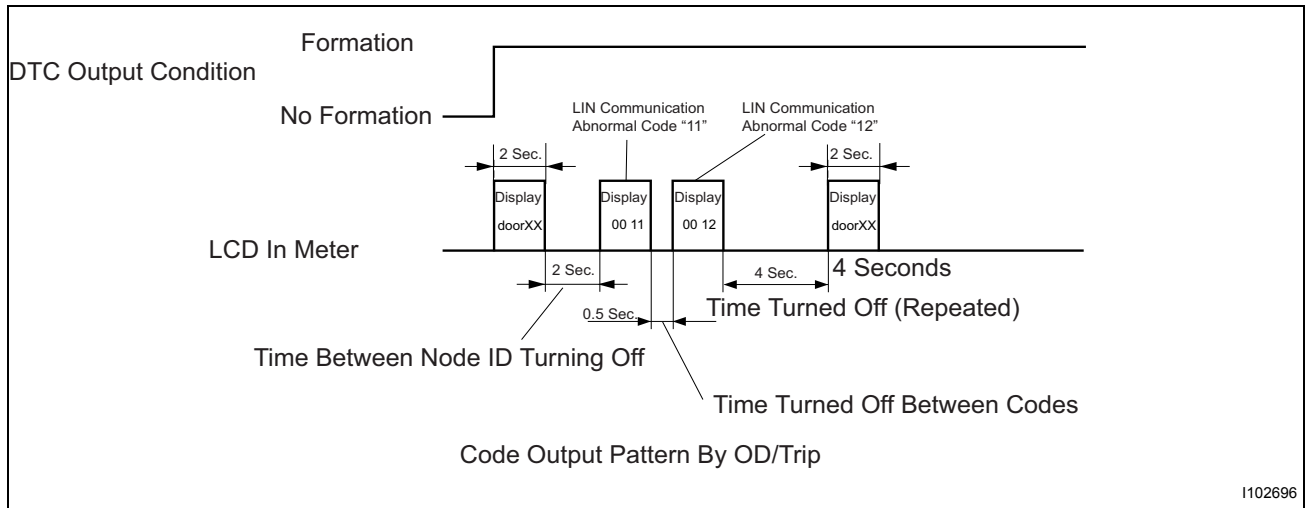
- Do not confuse the connection location of the connector. If the connection location is wrong, it may cause a failure.
 - Use only dedicated diagnosis check wire.
- (b) Turn the ignition switch to the ON position and read the DTCs displayed on the LCD in the meter.

NOTICE:

- If the battery power supply is restored when the ECU is in a malfunctioning communication state, or if the battery power source is restored when the door control relay assembly is disconnected, the failure code will not be displayed. The normal code, 00 00, will be displayed.

HINT:

- In addition to DTCs related to the LIN communication system, meter and CAN communication system DTCs are also displayed on the LCD in the meter.
- When the ignition switch is turned to the ON position, DOOR XX (XX is a number) is displayed on the LCD in the meter for 2 seconds. The DTCs for each system are displayed for a 2 second interval.
- Multiple codes are output from lowest to highest code number. Moreover, if the codes cycle, they will be output again in intervals of 4 seconds.
- The display pattern is as follows:



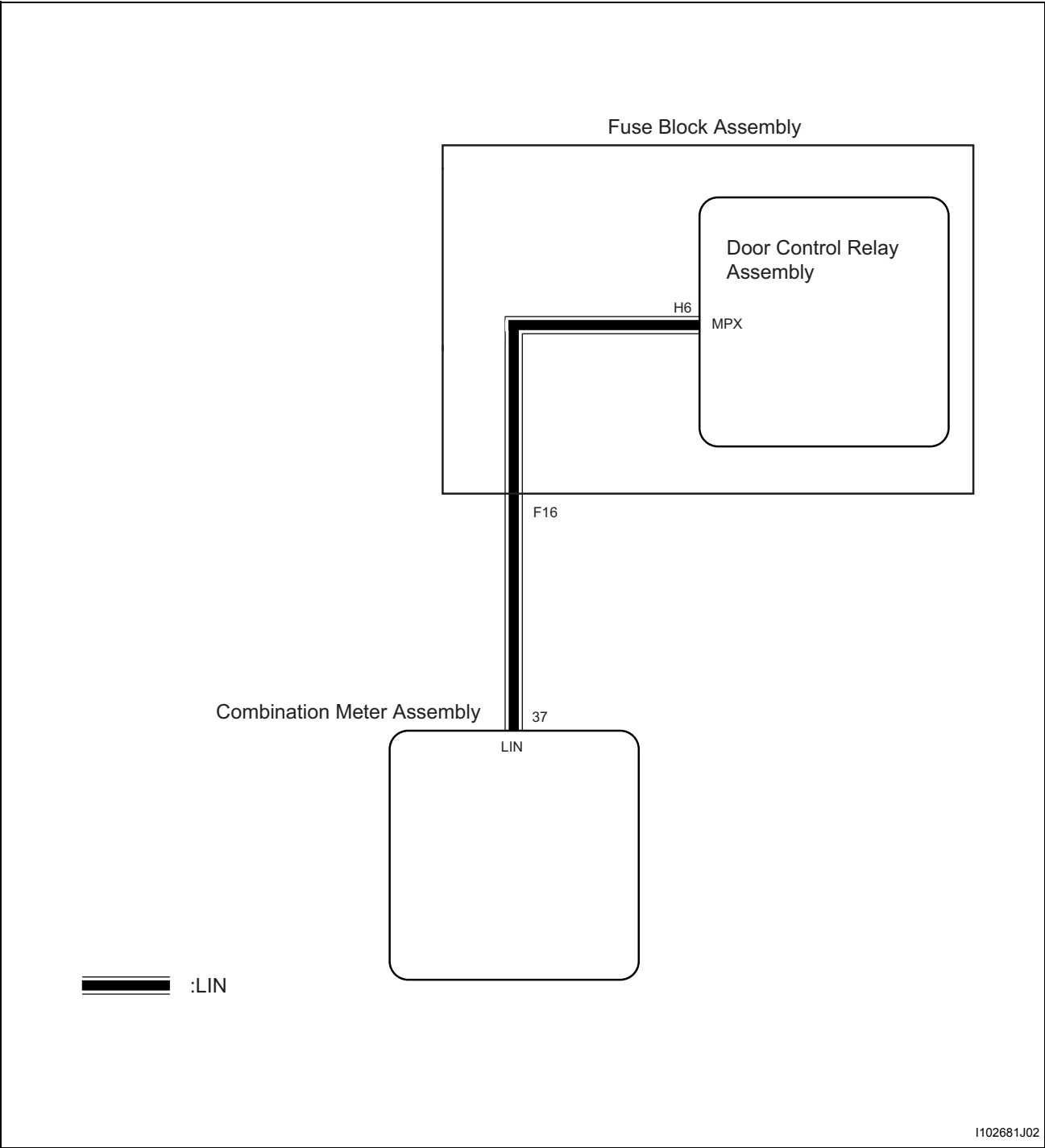
2. CLEAR RECORDED DTCs

- (a) The 2 procedures for clearing DTCs are as follows:
- (1) The communication malfunction is resolved. The codes are automatically cleared after system status returns to normal.
 - (2) Turn the ignition switch off and disconnect the negative battery terminal.

NOTICE:

While repairing communication malfunctions other than shorts, do not conduct the repair without disconnecting the negative battery terminal. Do not disconnect the negative battery terminal until completing inspection of the connector's connection status. (Object code No. 00 11)

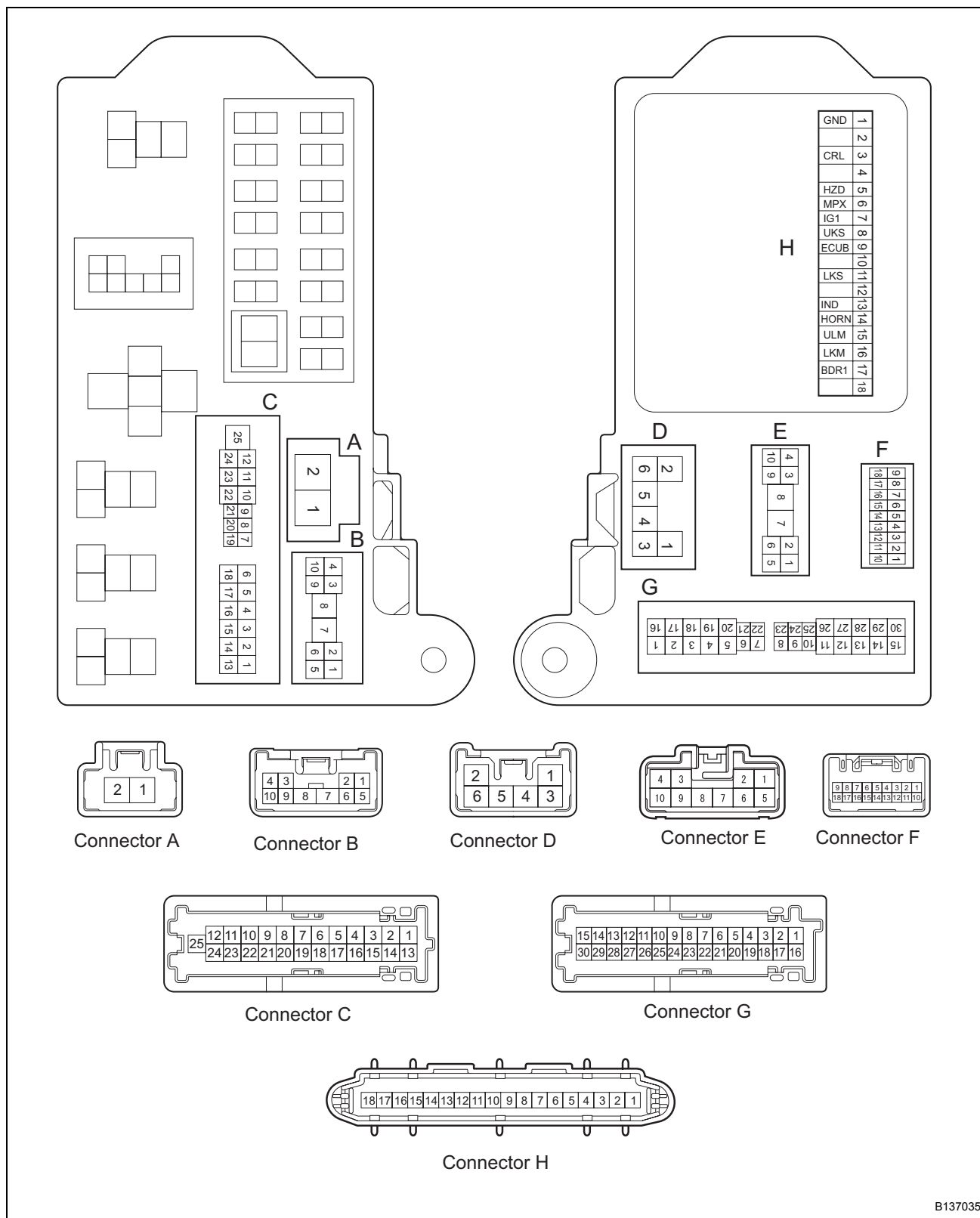
CIRCUIT DIAGRAM



ECU TERMINALS

- 1. Fuse block assembly (door control relay assembly)
 - (a) Check that the following fuses are normal: ACC 7.5A, IG1 BACK 7.5A, D/LOCK 15A, ECU IG2 7.5A.

(b) Check the fuse block assembly (door control relay assembly).



B137035

(1) Disconnect fuse block assembly connectors C, D, F, G

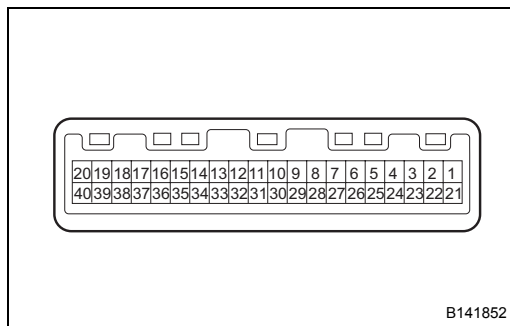
- (2) Using the tester, check the voltage and continuity between each terminal of the vehicle side wire harness connector.

Standard

Terminal No.	Item	Measurement Condition	Standard
G29 (GND) ↔ Body ground	Continuity	Always	Continuity
C10 (ECUB) ↔ G29 (GND)	Voltage	Always	10 to 14 V
D4 (IG1) ↔ G29 (GND)	Voltage	IG OFF → IG ON	0 V → 10 to 14 V
F17 (LIN) ↔ G29 (GND)	Continuity	Always	No continuity
F16 (LIN) ↔ G29 (GND)	Continuity	Always	No continuity

HINT:

If the results are not as specified, the problem is on the vehicle side.



2. Combination meter assembly

- (a) Inspect the combination meter assembly.
- (1) Disconnect the connectors of the combination meter assembly.
 - (2) Using the tester, check the voltage and continuity between each terminal of the vehicle side wire harness connector.

Standard

Terminal No.	Item	Measurement Condition	Standard
15 (GND) ↔ Body ground	Continuity	Always	Continuity
13 (+B) ↔ 15 (GND)	Voltage	Always	10 to 14 V
12 (IG+) ↔ 15 (GND)	Voltage	IG OFF → IG ON	0 V → 10 to 14 V
37 (LIN) ↔ 15 (GND)	Continuity	Always	No continuity

HINT:

If the results are not as specified, the problem is on the vehicle side.

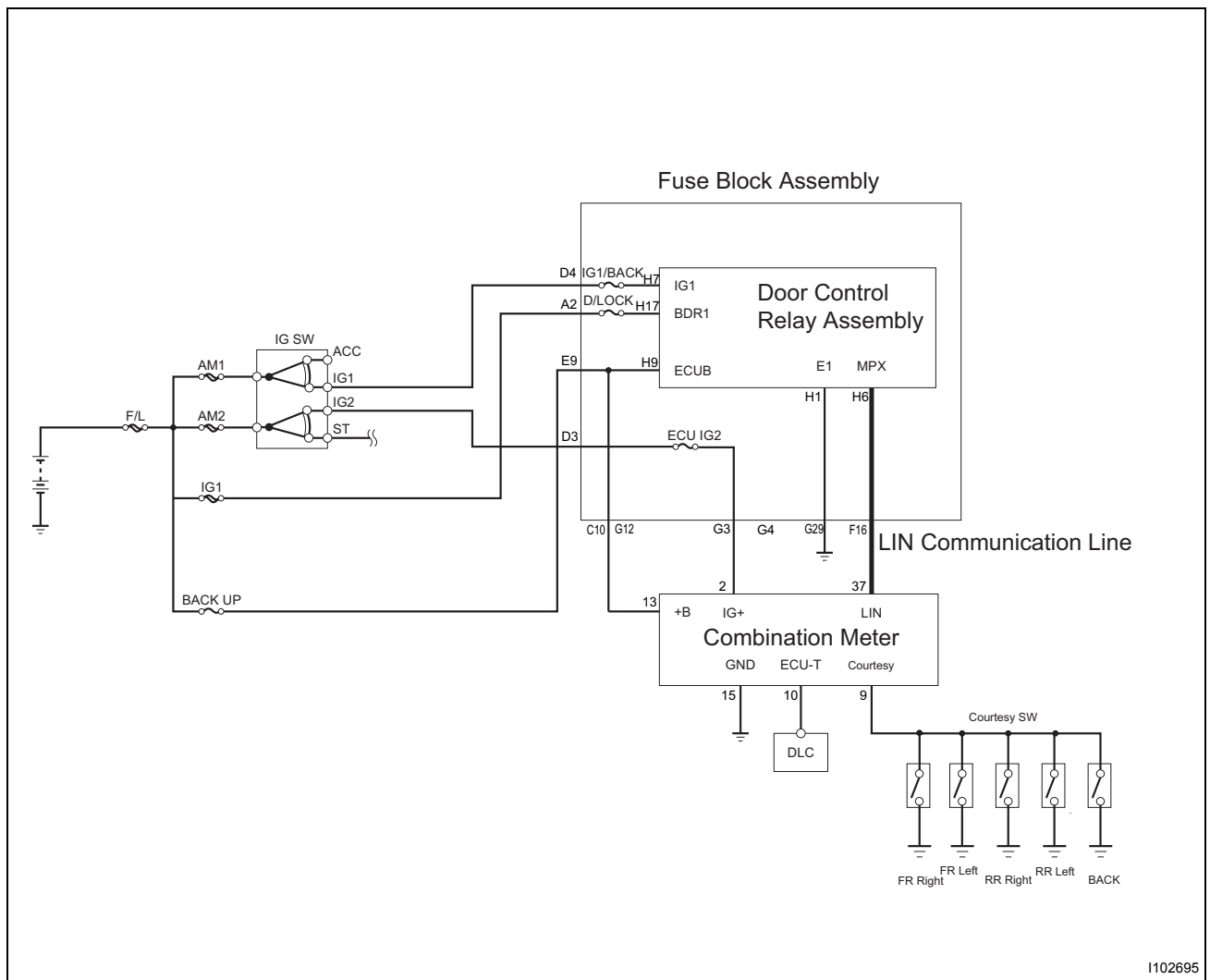
DTC	11	ITC COMMUNICATION (EXCLUDING SHORT)	MALFUNCTION
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DESCRIPTION

- The door control relay assembly communicates with the combination meter assembly via LIN.
- 0011 is output when a malfunction occurs in communication between the door control relay assembly and the combination meter assembly.

DTC No.	DTC Detection Condition	Suspected Area
0011	Communication malfunction between the door control relay assembly and the combination meter assembly and communication wire malfunction (door control relay assembly malfunction)	- Door control relay assembly - Combination meter assembly - Wire harness

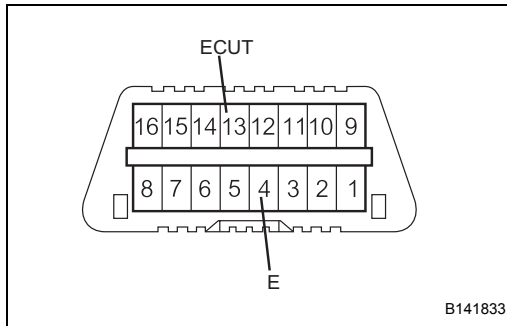
CIRCUIT DIAGRAM



INSPECTION PROCEDURE

1

CHECK FOR DTCs



SST 09843-18020

- Using a diagnosis check wire, short the circuit between terminals 13 (ECUT) and 4 (E) of the DLC.
- With the negative battery terminal connected, move the connectors for the door control relay assembly, the combination meter assembly and the fuse block assembly up and down and back and forth. Check if a DTC was output.

Result	Proceed to
0011 is output	A
0011 is not output	B

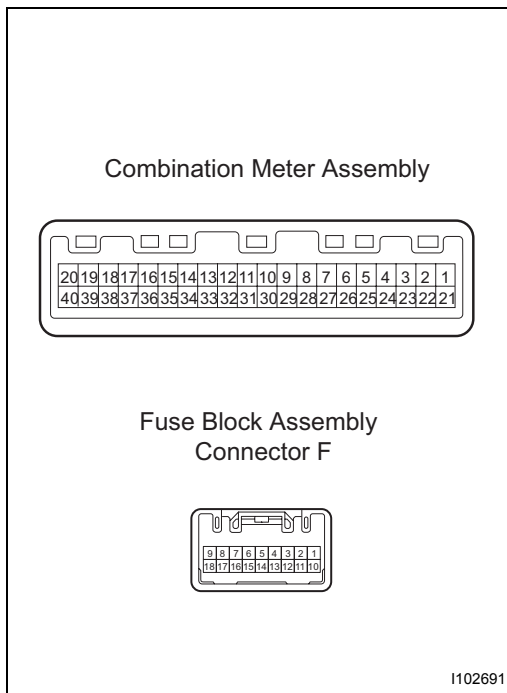
B

SYSTEM RETURNS TO NORMAL

A

2

INSPECT WIRE HARNESS (BETWEEN FUSE BLOCK ASSEMBLY AND COMBINATION METER ASSEMBLY)



- Disconnect fuse block assembly connector F and combination meter assembly connector F.
- Using the tester, inspect the continuity between each terminal of the vehicle side wire harness connector between the fuse block assembly and the combination meter assembly.

Standard:

Terminal No. (Fuse block assembly ↔ Combination meter assembly)	Standard
F16 (ITC-) ↔ 37 (LIN)	Continuity

NG

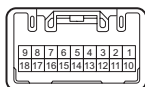
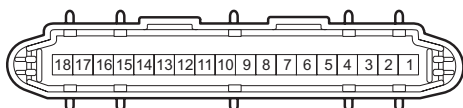
REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

3

INSPECT FUSE BLOCK ASSEMBLY

- Remove door control assembly connector F and fuse block assembly connector F from the fuse block assembly.

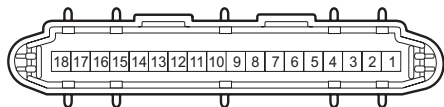
Fuse Block Assembly
Connector FFuse Block Assembly
Connector H

I102689

- (b) Using the tester, inspect the continuity between each terminal of the fuse block assembly.

Standard:

Terminal No. (Fuse Block Assembly Connector F ↔ Fuse Block Assembly Connector H)	Standard
F16 (ITC-) ↔ H6 (MPX)	Continuity

NG**REPLACE FUSE BLOCK ASSEMBLY****OK****4****INSPECT DOOR CONTROL RELAY ASSEMBLY (POWER SYSTEM, GROUND SYSTEM)**Fuse Block Assembly
Connector H

I102690

- (a) Using the tester, inspect the voltage between each terminal of fuse block assembly connector H.

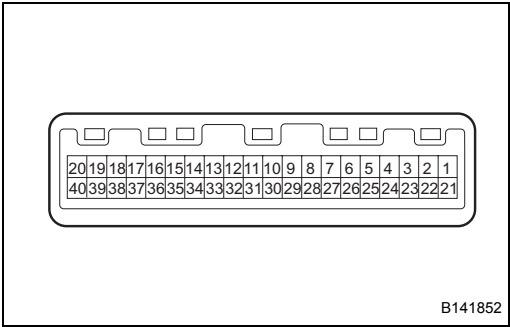
Standard:

Terminal No. (Fuse Block Assembly Connector H)	Measurement Condition	Standard
H1 (E1) ↔ Body ground	Always	Continuity
H17 (BDR1) ↔ H1 (E1)	Always	10 to 14 V
H7 (IG1) ↔ H1 (E1)	Ignition switch OFF → ON	Below 1 V → 10 V to 14 V
H9 (ECUB) ↔ H1 (E1)	Always	10 to 14 V

NG**REPAIR OR REPLACE WIRE HARNESS OR
CONNECTION (ALSO REPLACE FUSE
BLOCK ASSEMBLY IF PROBLEM IS NOT
SOLVED)****OK****5****INSPECT COMBINATION METER ASSEMBLY (POWER SYSTEM, GROUND SYSTEM)**

- (a) Disconnect the connectors of the combination meter assembly.

MP



(b) Using the tester, inspect the voltage between each terminal of the vehicle wire harness side connectors.

Standard:

Terminal No. (Combination Meter Assembly)	Measurement Condition	Standard
15 (GND) ↔ Body ground	Always	Continuity
13 (+B) ↔ 15 (GND)	Always	10 to 14 V
12 (IG+) ↔ 15 (GND)	Ignition switch OFF → ON	Below 1 V → 10 V to 14 V

NG **REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR**

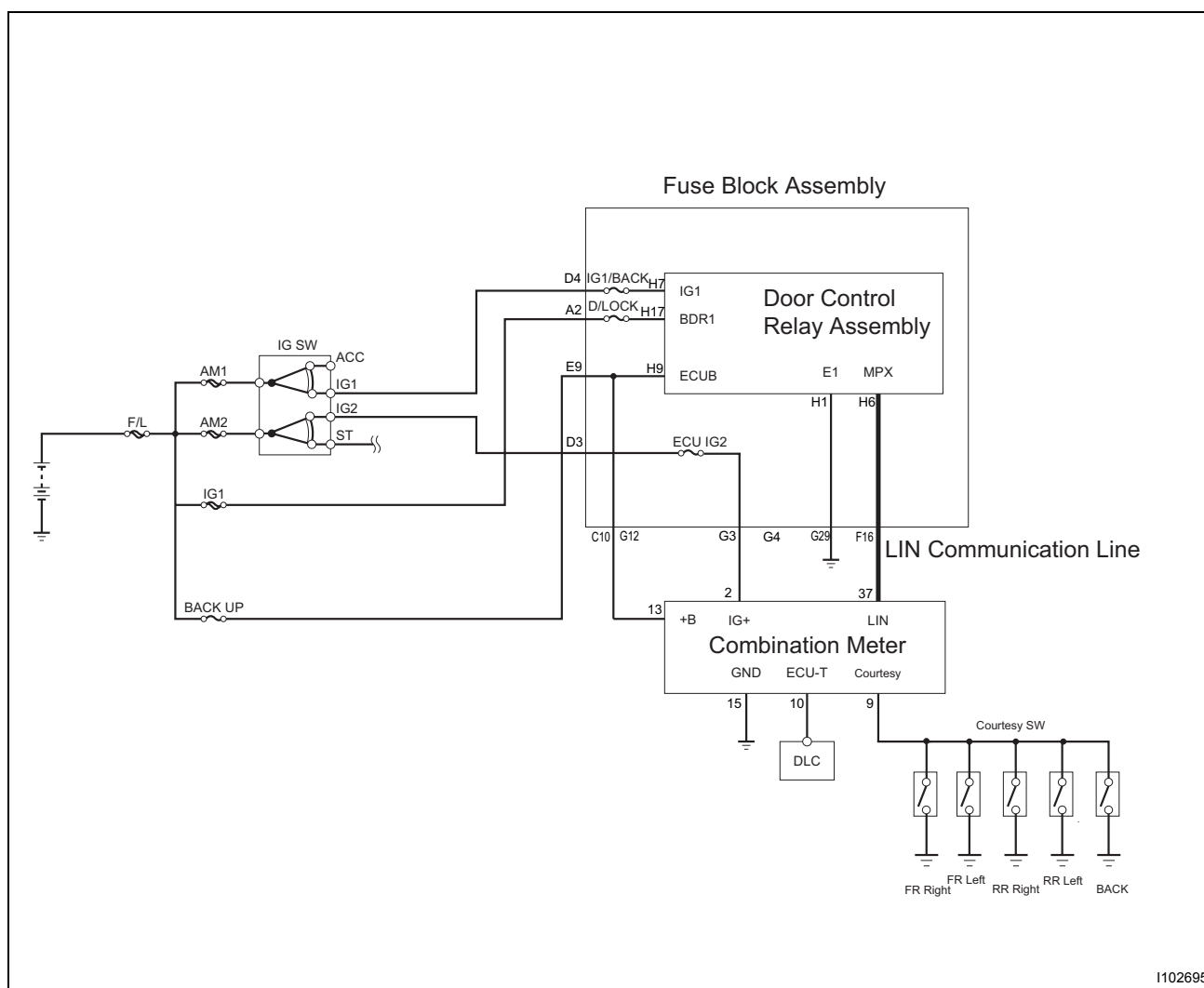
OK

REPLACE DOOR CONTROL RELAY ASSEMBLY (ALSO REPLACE FUSE BLOCK ASSEMBLY IF PROBLEM IS NOT SOLVED)

DTC**21****SHORT TO COMMUNICATION LINE / SHORT TO COMMUNICATION CIRCUIT INSIDE ECU****DESCRIPTION**

- The combination meter assembly communicates with the door control relay assembly via LIN communication.
- 0021 is output when the communication line and power source are shorted in the circuits or wire harnesses of the combination meter assembly or the door control relay assembly.

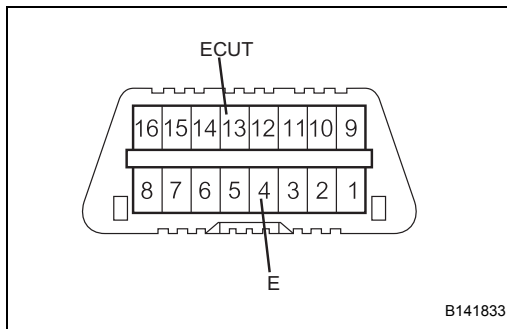
DTC No.	DTC Detection Condition	Suspected Area
0021	When the communication line and power source are shorted in the circuits of the combination meter assembly and the door control relay assembly and when the communication wire and power source are shorted in the wire harness.	- Door control relay assembly - Wire harness - Combination meter assembly

CIRCUIT DIAGRAM**MP**

INSPECTION PROCEDURE

1**CHECK FOR DTCs (WHEN REMOVING DOOR CONTROL RELAY ASSEMBLY)****SST 09843-18020**

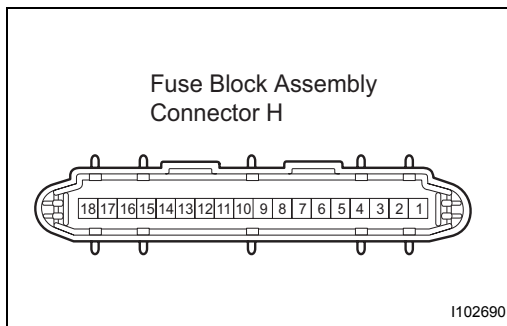
- (a) Disconnect the negative battery terminal.
- (b) Remove the door control relay assembly from the fuse block assembly.
- (c) Connect the negative battery terminal.
- (d) Using the diagnosis check wire, short the circuit between terminals 13 (ECUT) and 4 (E) of the DLC.
- (e) Turn the ignition switch to the ON position, then check for DTCs.



Result	Proceed to
0021 is not output	A
0021 is output	B

B**Go to step 3****A****2****INSPECT DOOR CONTROL RELAY ASSEMBLY (POWER SYSTEM, GROUND SYSTEM)****SST 09843-18020**

- (a) Using the tester, inspect the voltage between each terminal of fuse block assembly connector H.



Terminal No.	Measurement Condition	Standard
H1 (E1) ↔ Body ground	Always	Continuity
H7 (IG1) ↔ Body ground	Ignition switch OFF ↔ ignition switch ON	Below 1 V → 10 V to 14 V
H17 (BDR1) ↔ Body ground	Always	10 to 14 V
H9 (ECUB) ↔ Body ground	Always	10 to 14 V

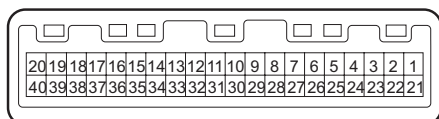
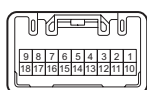
NG

**REPLACE FUSE BLOCK ASSEMBLY
(REPAIR OR REPLACE WIRE HARNESS OR
CONNECTOR IF PROBLEM IS NOT SOLVED)**

OK**REPLACE DOOR CONTROL RELAY ASSEMBLY****3****INSPECT WIRE HARNESS (FUSE BLOCK ASSEMBLY - COMBINATION METER ASSEMBLY)**

- (a) Disconnect fuse block assembly connector F and the combination meter assembly connector.

Combination Meter Assembly

Fuse Block Assembly
Connector F

I102691

OK

- (b) Using the tester, inspect the continuity between each terminal of the vehicle wire harness side connectors.

Standard:

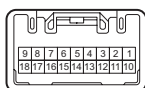
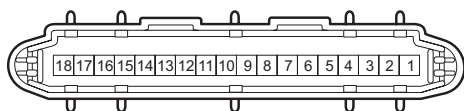
Terminal No. (Fuse block assembly - combination meter assembly)	Standard
F16 (ITC-) ↔ Body ground	No continuity
37 (LIN) ↔ Body ground	No continuity

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

4

INSPECT FUSE BLOCK ASSEMBLY

Fuse Block Assembly
Connector FFuse Block Assembly
Connector H

I102689

OK

- (a) Remove the door control relay assembly from the fuse block assembly.
- (b) Using the tester, inspect the continuity between each terminal of the vehicle wire harness side connectors.

Standard:

Terminal No.	Standard
H6 (MPX) ↔ Body ground	No continuity
F16 (ITC-) ↔ Body ground	No continuity

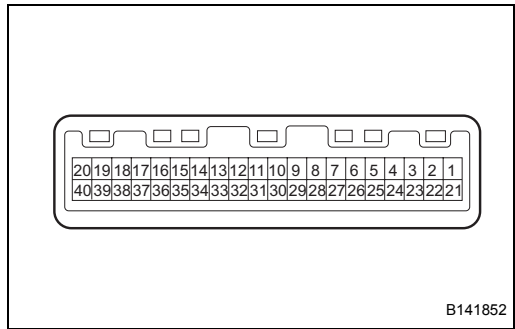
NG

REPLACE FUSE BLOCK ASSEMBLY

MP

5

INSPECT COMBINATION METER ASSEMBLY (POWER SYSTEM, GROUND SYSTEM)



- (a) Disconnect the connectors of the combination meter assembly.
- (b) Using the tester, inspect the continuity between each terminal of the vehicle wire harness side connectors.

Standard:

Terminal No.	Measurement Condition	Standard
15 (GND) ↔ Body ground	Always	Continuity
1 (IG+) ↔ Body ground	Ignition switch OFF ↔ ignition switch ON	Below 1 V → 10 V to 14 V
13 (+B) ↔ body ground	Always	10 to 14 V

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

REPLACE COMBINATION METER ASSEMBLY