

# MULTIPLEX COMMUNICATION SYSTEM

## PRECAUTION

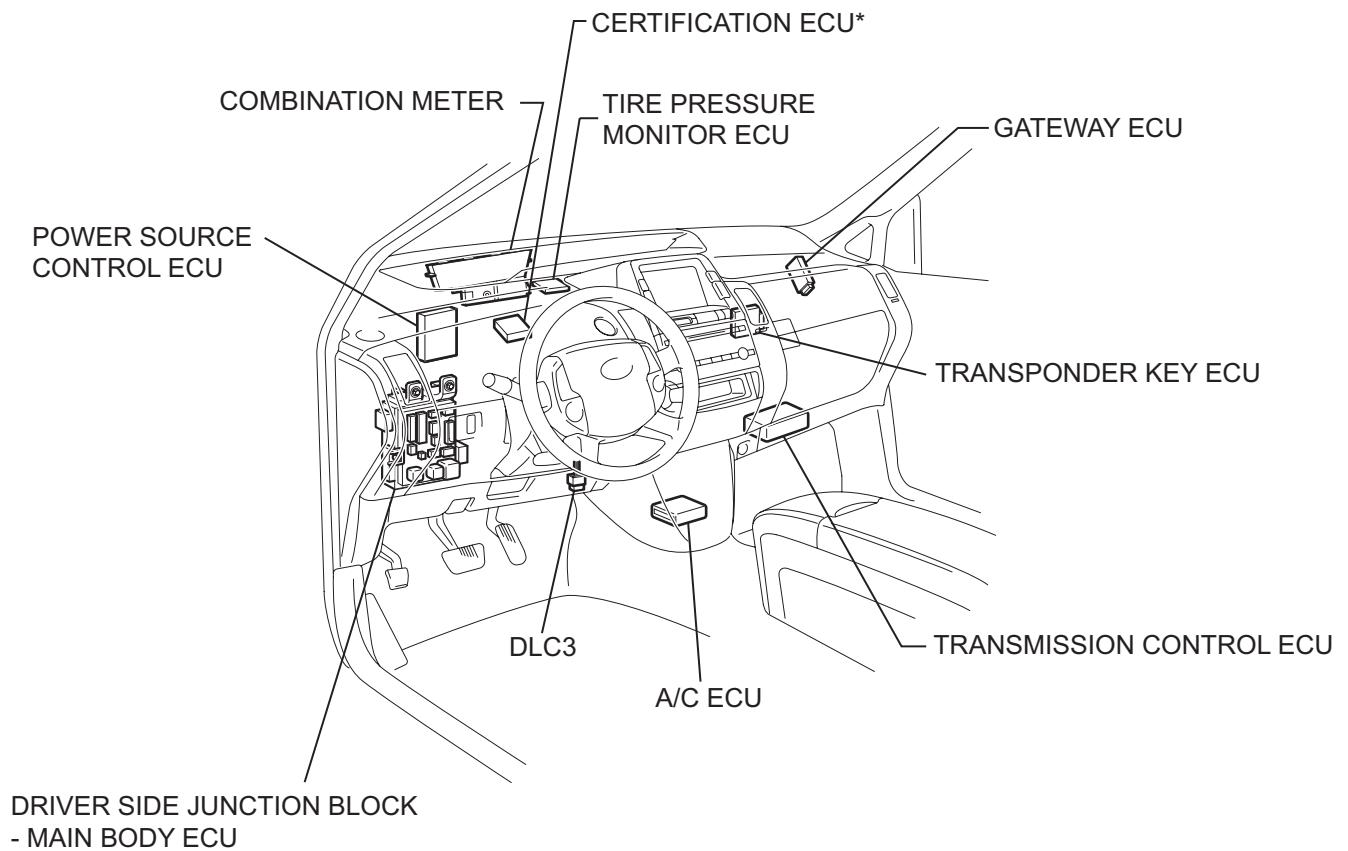
### NOTICE:

- When disconnecting the cable from the negative (-) battery terminal, initialize the following system after the cable is reconnected.
- When the warning light is illuminated or the battery has been disconnected, pressing the power switch may not start the system on the first try. If so, press the power switch again.

System Name	See Procedure
Power Window Control System	<a href="#">IN-32</a>

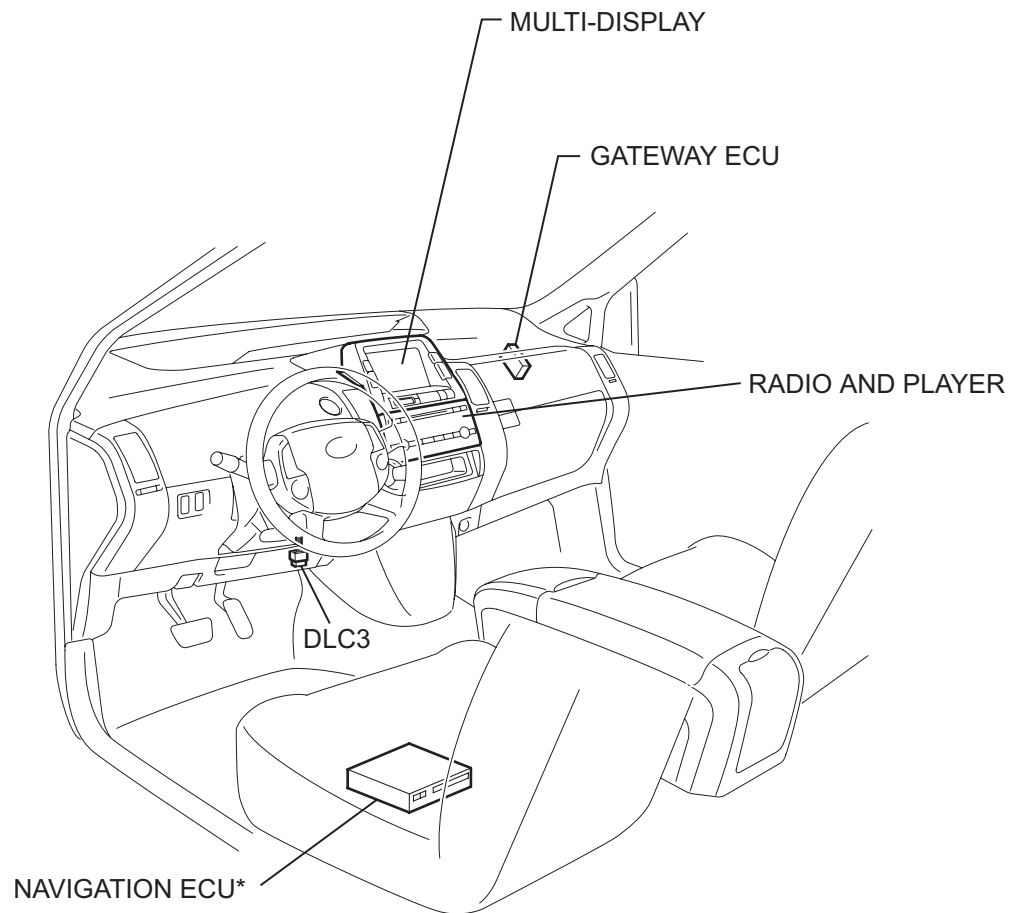
## PARTS LOCATION

BEAN BUS



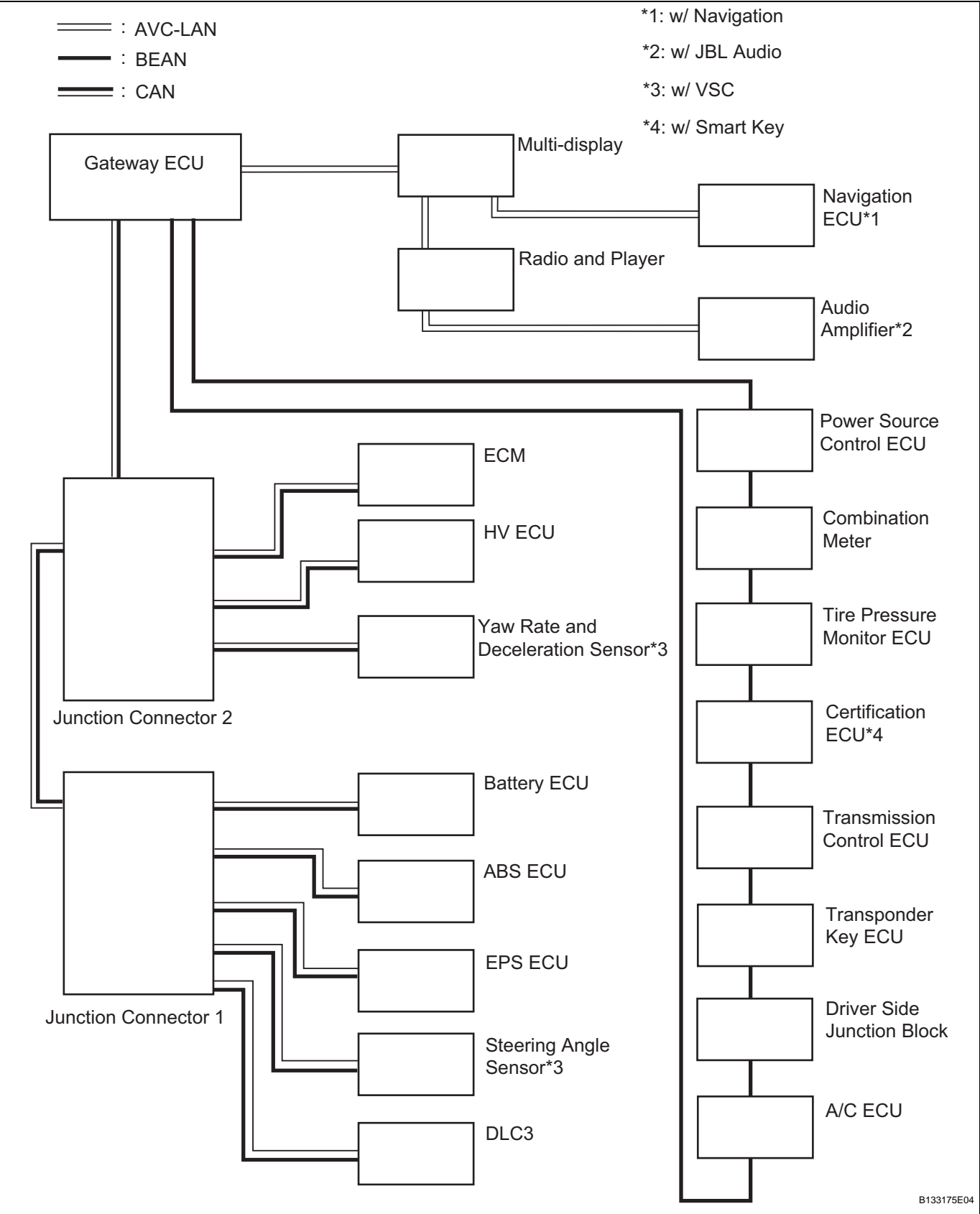
\*: w/ Smart Key

## AVC-LAN BUS



\*: w/ Navigation System

SYSTEM DIAGRAM



## SYSTEM DESCRIPTION

### 1. MPX (MULTIPLEX COMMUNICATION NETWORK)

The MPX connects the ECUs of this vehicle and uses an ON-OFF signal (binary 0 and 1) to communicate with each ECU. The ECU operates the actuator based on the other ECU information. For example, the ECM (PCM) allows the engine to start based on the transponder key ECU information. The MPX consists of 3 networks: AVC-LAN (Audio Visual Communication Local Area Network), BEAN (Body Electronics Area Network) and CAN (Controller Area Network). The gateway ECU is connected to and coordinates communication between the 3 networks.

#### MPX Cross-reference

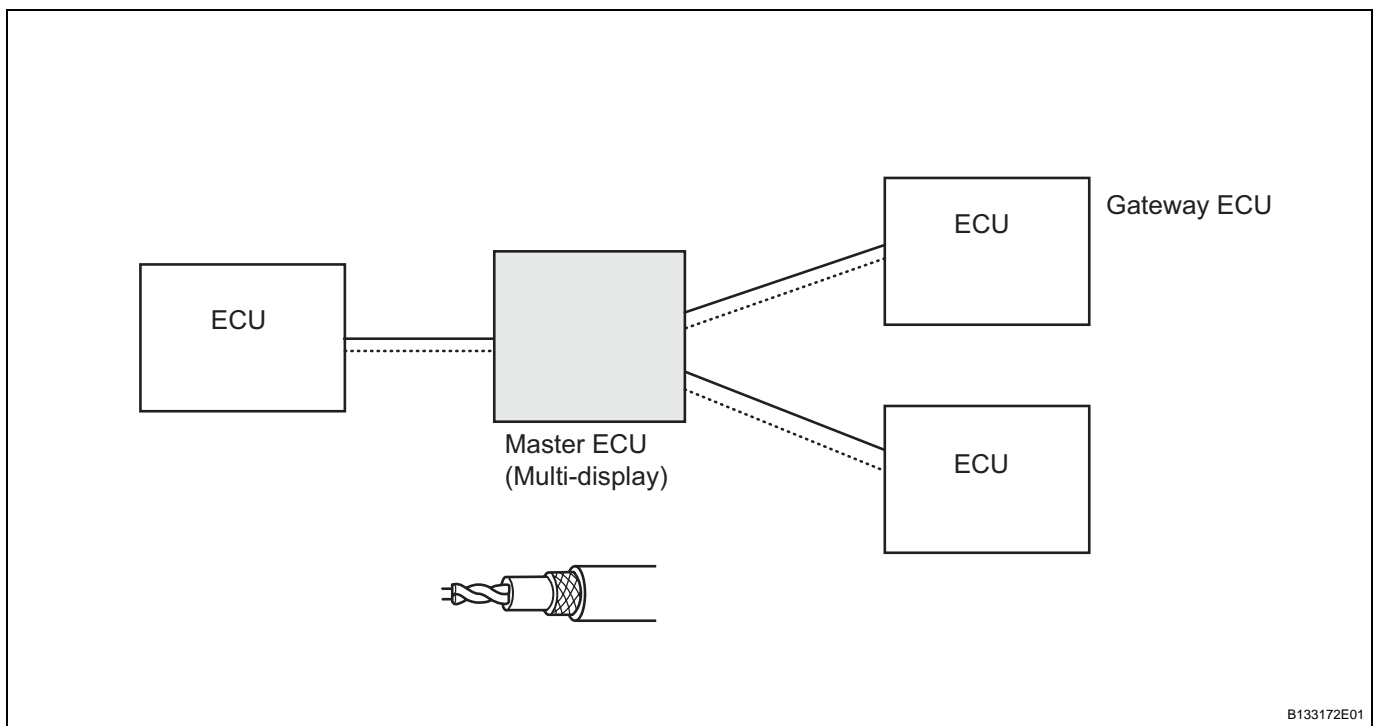
Network	Protocol	Wire Harness	Speed	Data length
AVC-LAN	TOYOTA original	Twisted twin wire	Maximum 17,800 bps*	0 to 32 byte
BEAN	TOYOTA original	Single line	Maximum 10,000 bps*	1 to 11 byte
CAN	ISO 15765-4	Twisted twin wire	500,000 bps* (Maximum 1 Mbps)	1 to 8 byte

HINT:

\*: "bps" indicates bits per second.

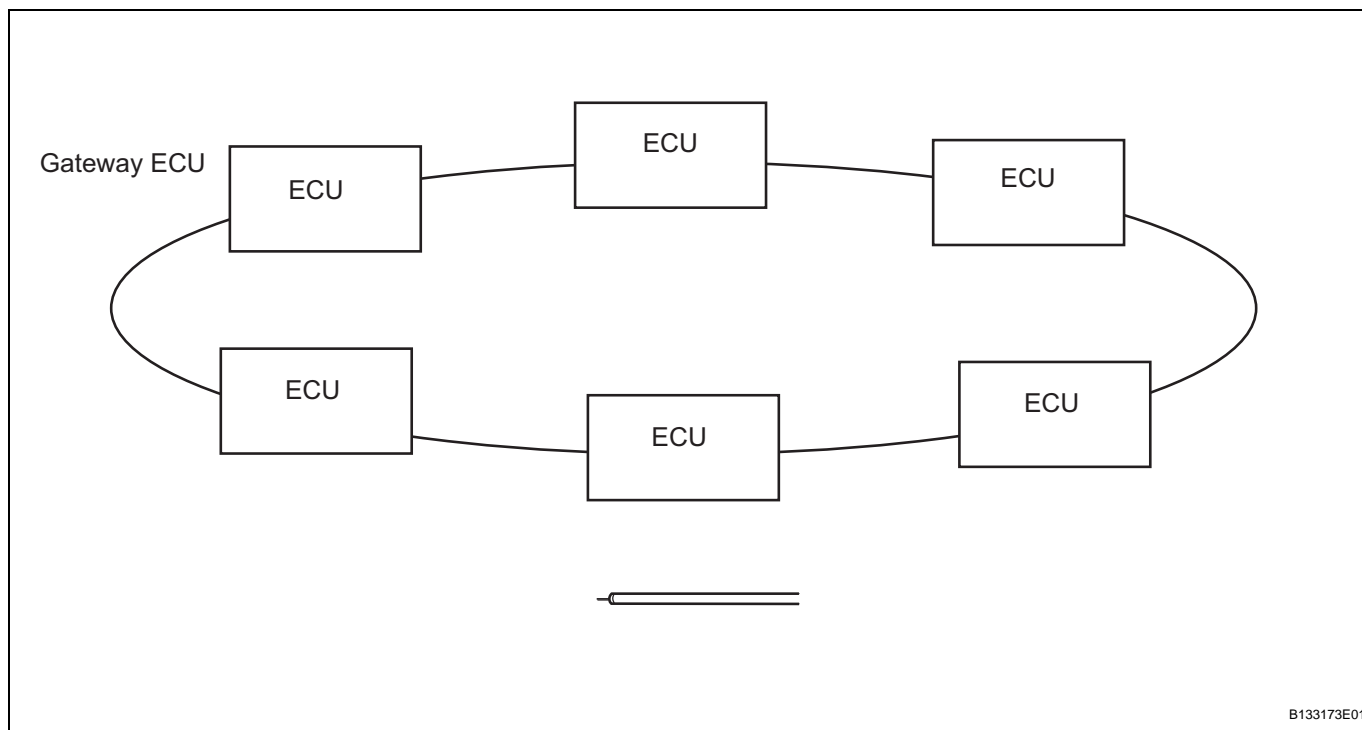
### 2. AVC-LAN (AUDIO VISUAL COMMUNICATION LOCAL AREA NETWORK)

The audio/visual system uses the AVC-LAN. The master ECU is connected to gateway ECU and sends the signal to the other ECUs. The wire harness is a twisted twin wire covered with the insulation. One wire is used for the positive voltage and the other wire is used for the negative voltage.

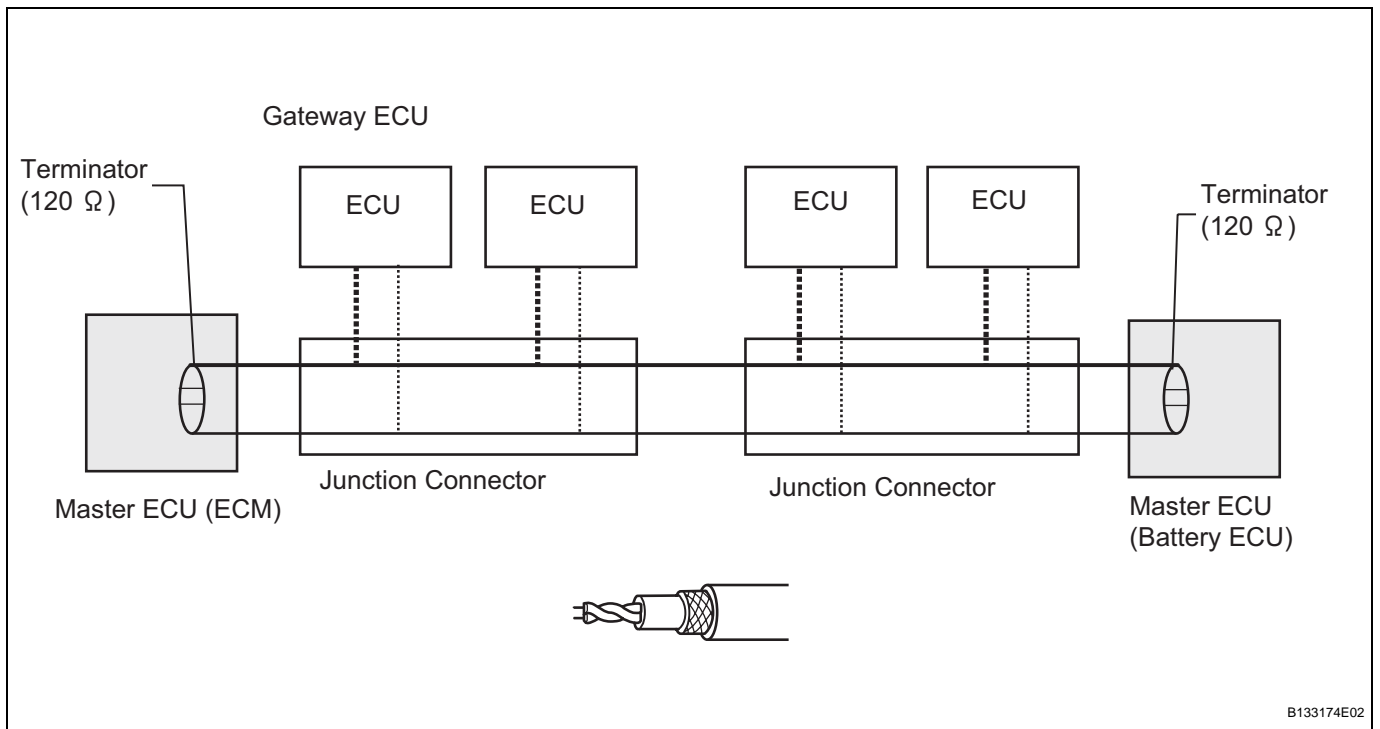


**3. BEAN (BODY ELECTRONICS AREA NETWORK)**

The body electrical system uses the BEAN. The ECUs are connected to the gateway ECU like a daisy chain. This maintains the communication if the wire harness has an open circuit. The wire harness is a signal core line covered with insulation.

**4. CAN (COMMUNICATION AREA NETWORK)**

The powertrain and chassis system use the CAN. The CAN circuit has 2 master ECUs. One master ECU is connected to the other master ECU by the main wire. The gateway ECU and other ECUs are connected to the main wire by the branch wire through the junction connector(s). The wire harness is a twisted twin wire covered with insulation. One wire (CANL) is 1.5 to 2.5 volts and the other wire (CANH) is 2.5 to 3.5 volts.



## HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use this procedure to troubleshoot the multiplex communication system.
- \*: Use the intelligent tester.

### 1 VEHICLE BROUGHT TO WORKSHOP

NEXT

### 2 CHECK BATTERY VOLTAGE

**Standard voltage:**

**11 V or higher**

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

NEXT

### 3 CHECK DTC OF CAN COMMUNICATION SYSTEM

- (a) Using the intelligent tester, check if the CAN is functioning normally.

**Result:**

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output	B

**B**

**Go to CAN COMMUNICATION SYSTEM**

**A**

### 4 CHECK FOR DTC\*

- (a) Check for DTCs and note any codes that are output (see page [MP-16](#)).  
 (b) Delete the DTC.  
 (c) Recheck for DTCs. Try to prompt the DTC by simulating the original activity that the DTC suggests.

**Result:**

Result	Proceed to
DTC does not reoccur	A
DTC reoccurs	B

**B**

**Go to step 6**

**A**



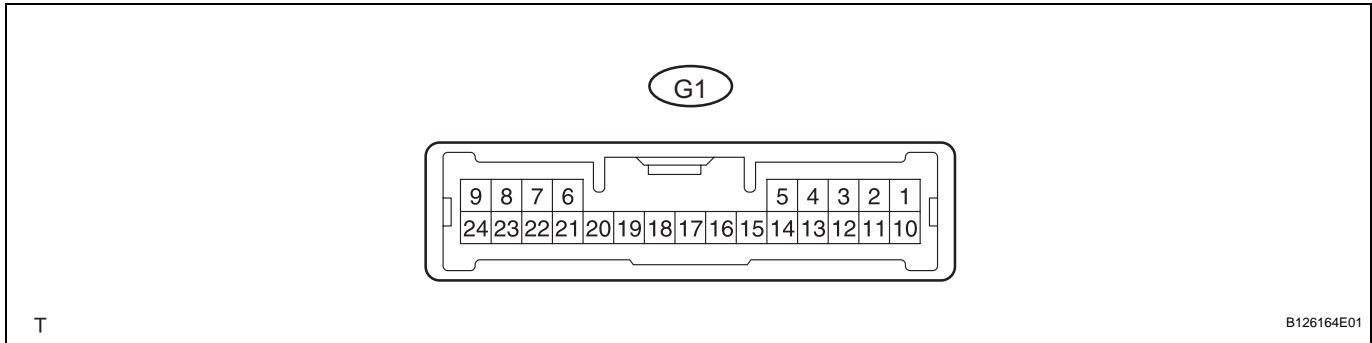
**5 OVERALL ANALYSIS AND TROUBLESHOOTING**

(a) Terminals of ECU (see page [MP-9](#)).

**NEXT****6 ADJUST, REPAIR OR REPLACE****NEXT****7 CONFIRMATION TEST****NEXT****END**

# TERMINALS OF ECU

## 1. CHECK GATEWAY ECU

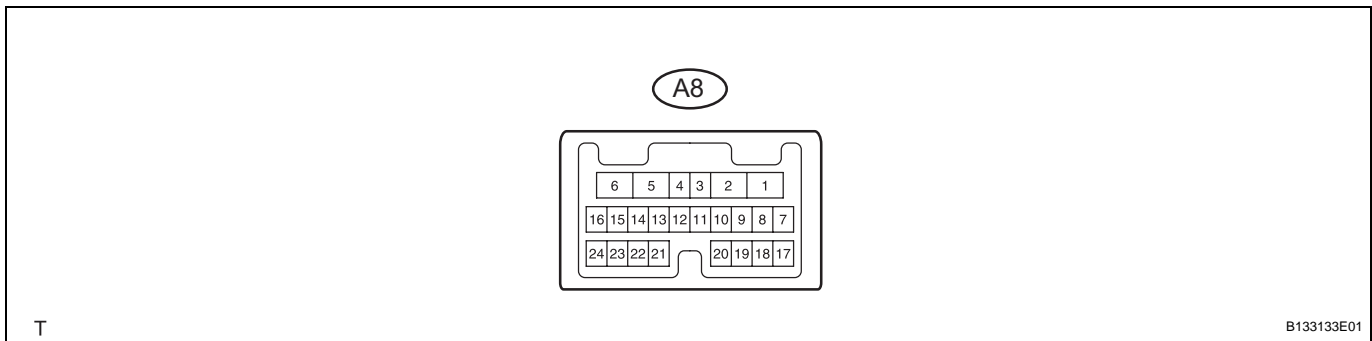


- Disconnect the G1 connector.
- Measure the voltage and resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
BATT (G1-10) - Body ground	Y - Body ground	+B (BATT) power supply	Always	10 to 14 V
IG (G1-1) - Body ground	B - Body ground	Ignition power supply	Power switch ON (IG)	10 to 14 V
ACC (G1-2) - Body ground	P - Body ground	ACC power supply	Power switch ON (ACC)	10 to 14 V
SIL (G1-7) - Body ground	W - Body ground	Bus "+" line	During transmission	Pulse generation
MPD2 (G1-12) - Body ground	GR - Body ground	BEAN line	Always	10 kΩ or higher
MPD1 (G1-3) - Body ground	GR - Body ground	BEAN line	Always	10 kΩ or higher
GTX+ (G1-6) - Body ground	B - Body ground	AVC-LAN line	Always	10 kΩ or higher
GTX- (G1-21) - Body ground	W - Body ground	AVC-LAN line	Always	10 kΩ or higher
GND (G1-24) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω

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

## 2. CHECK A/C ECU



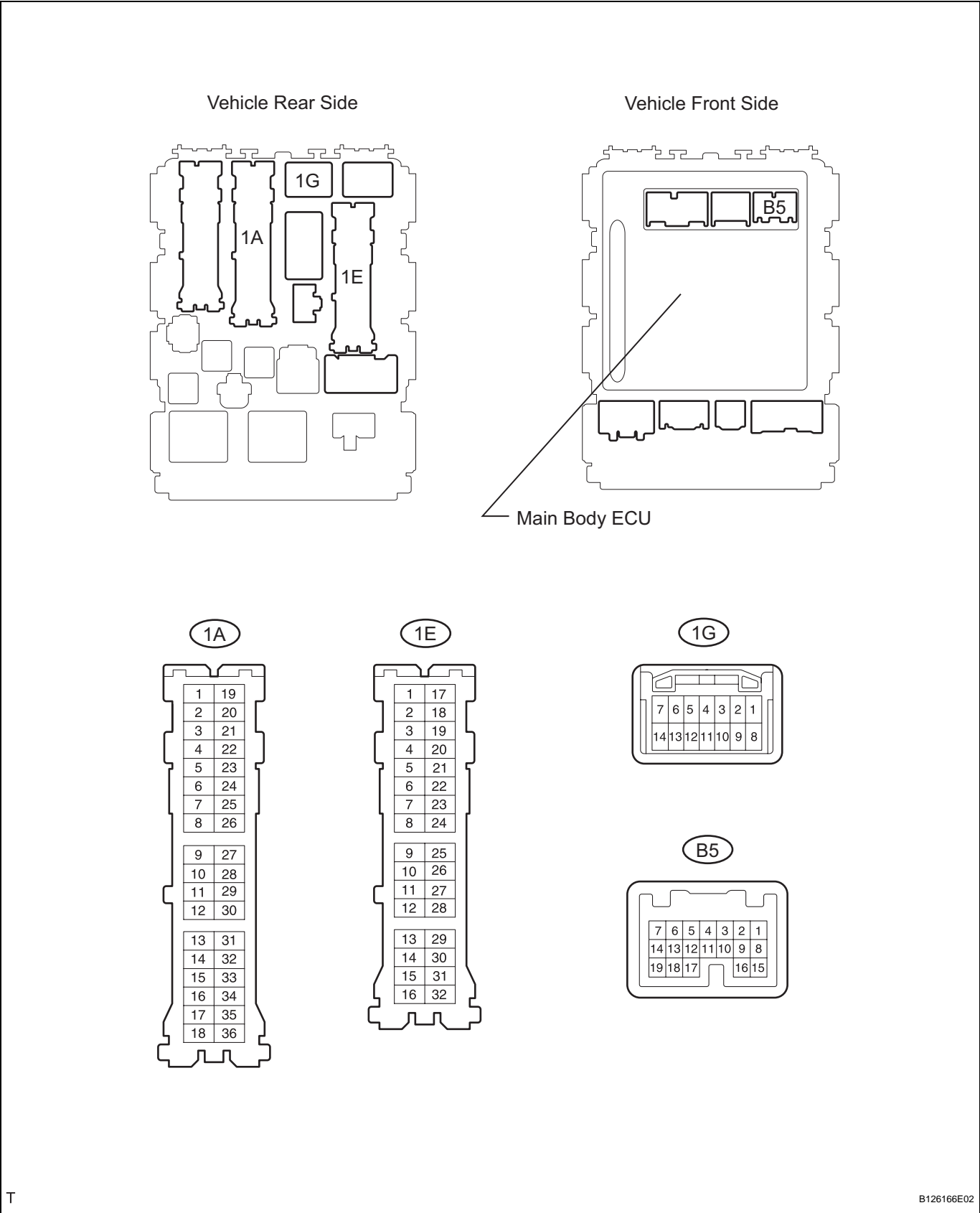
- Disconnect the A8 connector.
- Measure the voltage and resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+B (A8-6) - Body ground	Y - Body ground	+B power supply	Always	10 to 14 V
MPX+ (A8-3) - Body ground	B - Body ground	BEAN line	Always	10 kΩ or higher

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
MPX2+ (A8-11) - Body ground	GR - Body ground	BEAN line	Always	10 k $\Omega$ or higher
GND (A8-1) - Body ground	W-B - Body ground	Ground	Always	Below 1 $\Omega$

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

3. CHECK DRIVER SIDE JUNCTION BLOCK (MAIN BODY ECU)



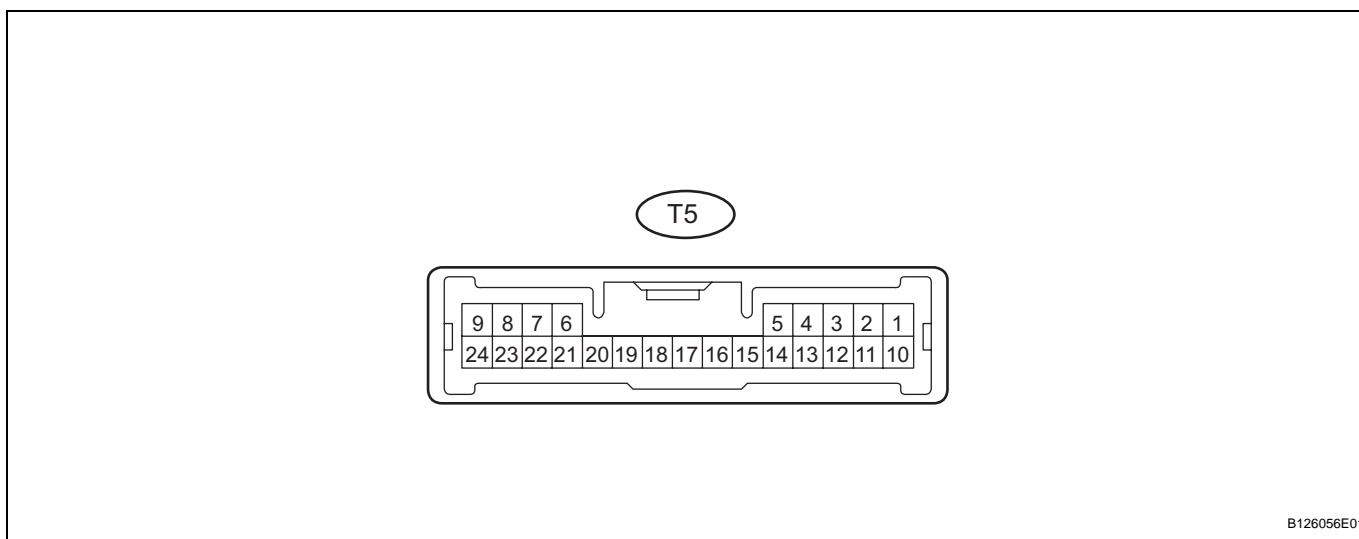
- (a) Disconnect the B5 ECU connector.
- (b) Disconnect the 1A, 1E and 1G junction block connectors.

- (c) Measure the voltage and resistance of the wire harness side connectors.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
ECUB (1A-30) - Body ground	R - Body ground	+B (ECUB) power supply	Always	10 to 14 V
MPX1 (1G-9) - Body ground	GR - Body ground	BEAN line	Always	10 k $\Omega$ or higher
MPX2 (B5-15) - Body ground	B - Body ground	BEAN line	Always	10 k $\Omega$ or higher
GND (1E-17) - Body ground	W-B - Body ground	Ground	Always	Below 1 $\Omega$

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

#### 4. CHECK TRANSPONDER KEY ECU

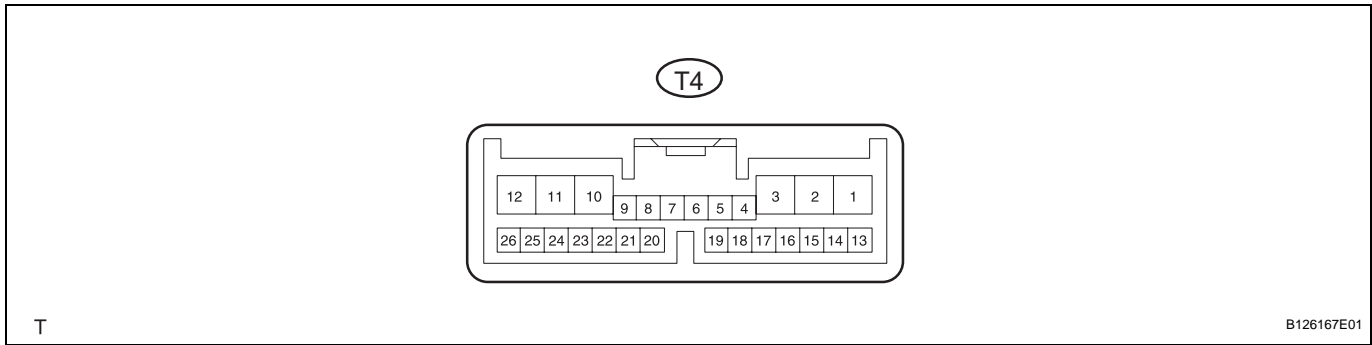


- (a) Disconnect the T5 ECU connector.  
 (b) Measure the voltage and resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
IG (T5-4) - Body ground	O - Body ground	+B (IG) power supply	Always	10 to 14 V
MPX1 (T5-17) - Body ground	B - Body ground	BEAN line	Always	10 k $\Omega$ or higher
MPX2 (T5-16) - Body ground	GR - Body ground	BEAN line	Always	10 k $\Omega$ or higher
GND (T5-22) - Body ground	W-B - Body ground	Ground	Always	Below 1 $\Omega$

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

## 5. CHECK TRANSMISSION CONTROL ECU

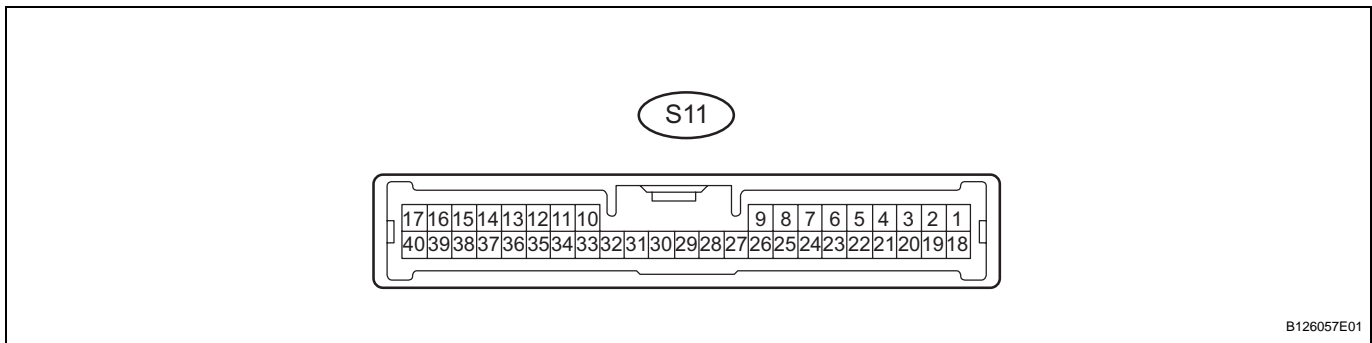


- (a) Disconnect the T4 ECU connector.
- (b) Measure the voltage and resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+B (T4-1) - Body ground	L - Body ground	+B power supply	Always	10 to 14 V
MPX1 (T4-19) - Body ground	GR - Body ground	BEAN line	Always	10 k $\Omega$ or higher
MPX2 (T4-18) - Body ground	B - Body ground	BEAN line	Always	10 k $\Omega$ or higher
E1 (T4-15) - Body ground	W-B - Body ground	Ground	Always	Below 1 $\Omega$

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

## 6. CHECK CERTIFICATION ECU (WITH SMART KEY)

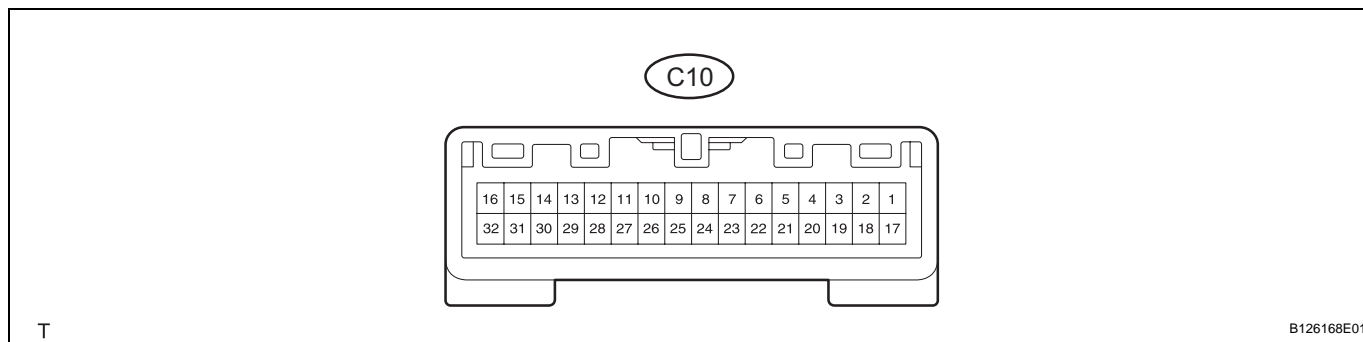


- (a) Disconnect the S11 ECU connector.
- (b) Measure the voltage and resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+B1 (S11-1) - Body ground	R - Body ground	+B power supply	Always	10 to 14 V
MPX1 (S11-31) - Body ground	GR - Body ground	BEAN line	Always	10 k $\Omega$ or higher
MPX2 (S11-32) - Body ground	B - Body ground	BEAN line	Always	10 k $\Omega$ or higher
E (S11-17) - Body ground	W-B - Body ground	Ground	Always	Below 1 $\Omega$

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

## 7. CHECK COMBINATION METER

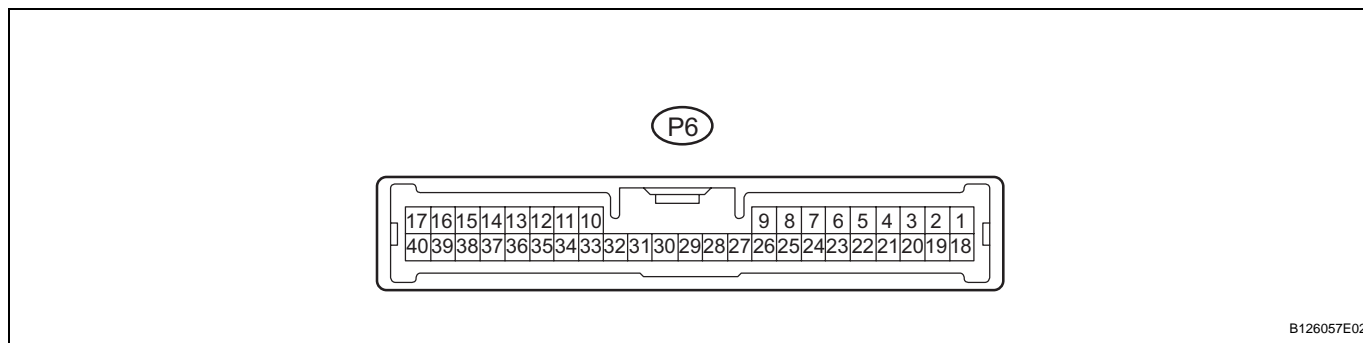


- Disconnect the C10 meter connector.
- Measure the voltage and resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+B (C10-21) - Body ground	Y - Body ground	+B power supply	Always	10 to 14 V
MPX+ (C10-24) - Body ground	B - Body ground	BEAN line	Always	10 k $\Omega$ or higher
MPX- (C10-25) - Body ground	GR - Body ground	BEAN line	Always	10 k $\Omega$ or higher
SE (C10-14) - Body ground	BR - Body ground	Ground	Always	Below 1 $\Omega$

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

## 8. CHECK POWER SOURCE CONTROL ECU

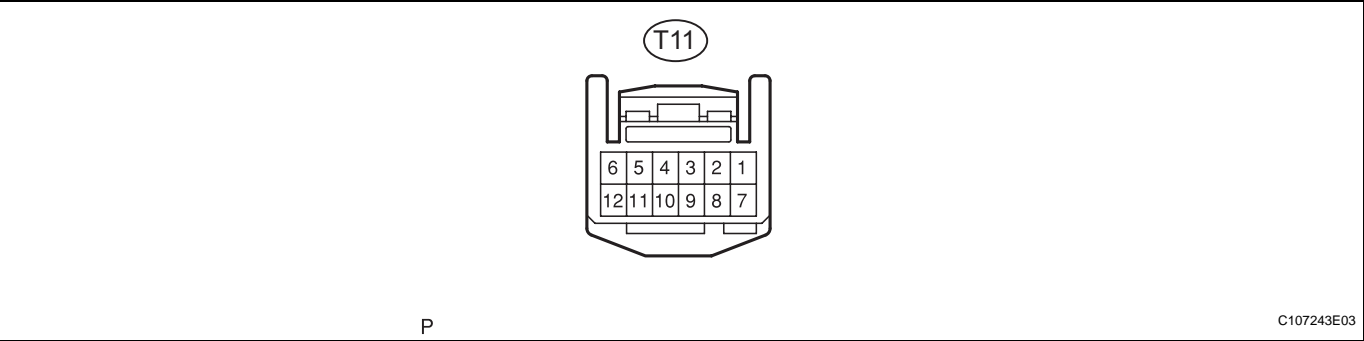


- Disconnect the P6 ECU connector.
- Measure the voltage and resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
AM1 (P6-33) - Body ground	R - Body ground	+B (AM1) power supply	Always	10 to 14 V
MPX1 (P6-7) - Body ground	GR - Body ground	BEAN line	Always	10 k $\Omega$ or higher
MPX2 (P6-24) - Body ground	B - Body ground	BEAN line	Always	10 k $\Omega$ or higher
GND2 (P6-6) - Body ground	W-B - Body ground	Ground	Always	Below 1 $\Omega$

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

9. CHECK TIRE PRESSURE MONITOR ECU



- (a) Disconnect the T11 ECU connector.
- (b) Measure the resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
IG (T11-1) - Body ground	B - Body ground	Power supply	Always	10 to 14 V
MPX1 (T11-6) - Body ground	W - Body ground	BEAN line	Always	10 kΩ or higher
MPX2 (T11-12) - Body ground	B - Body ground	BEAN line	Always	10 kΩ or higher
GND (T11-7) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω

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



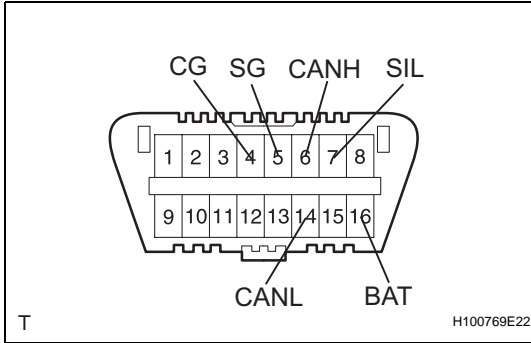
## DIAGNOSIS SYSTEM

### 1. DESCRIPTION

The gateway ECU sets a diagnosis trouble code (DTC) if a malfunction occurs in the multiplex communication network (MPX). The intelligent tester allows the DTC to be displayed when the tester is connected to the DLC3.

### 2. DLC3

The vehicle's ECU uses the ISO 15765-4 communication protocol. The terminal arrangement of the DLC3 complies with ISO 15031-3 and matches the ISO 15765-4 format.



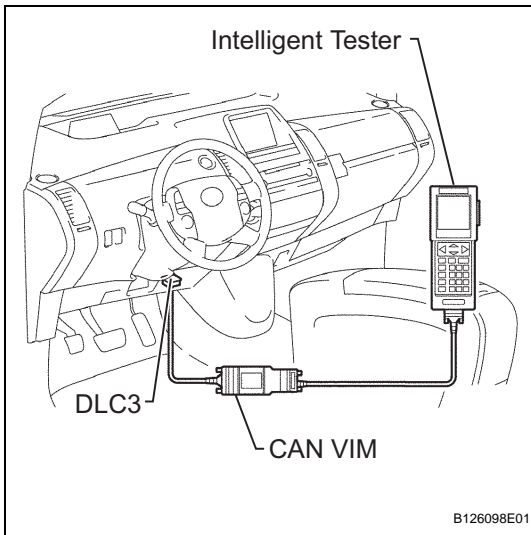
Symbols (Terminal No.)	Terminal Description	Condition	Specified condition
SIL (7) - SG (5)	Bus "+" line	During transmission	Pulse generation
CG (4) - Body ground	Chassis ground	Always	Below 1 $\Omega$
SG (5) - Body ground	Signal ground	Always	Below 1 $\Omega$
BAT (16) - Body ground	Battery positive	Always	11 to 14 V
CANH (6) - CANL (14)	HIGH-level CAN bus line	Power switch OFF	54 to 69 $\Omega$
CANH (6) - Body ground	HIGH-level CAN bus line	Power switch OFF	1 M $\Omega$ or higher
CANH (6) - CG (4)	HIGH-level CAN bus line	Power switch OFF	1 k $\Omega$ or higher
CANL (14) - Body ground	LOW-level CAN bus line	Power switch OFF	1 M $\Omega$ or higher
CANL (14) - CG (4)	LOW-level CAN bus line	Power switch OFF	1 k $\Omega$ or higher

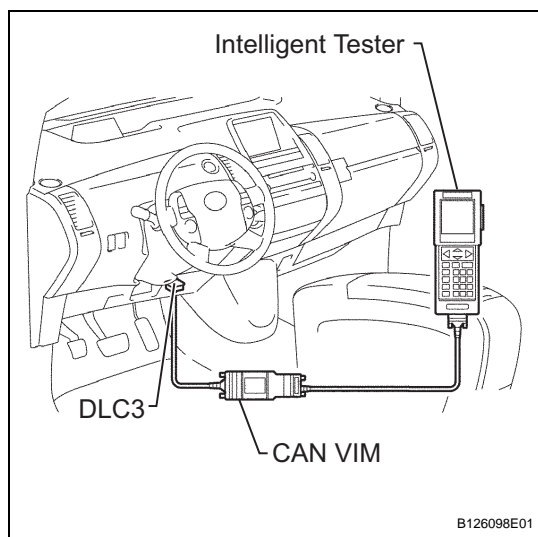
If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.

#### HINT:

Connect the cable of the intelligent tester (with CAN VIM) to the DLC3, turn the power switch ON (IG) and attempt to use the tester. If the screen displays the message UNABLE TO CONNECT TO VEHICLE, there is a problem either with the vehicle or the tester. If communication is normal when the intelligent tester is connected to another vehicle, inspect the DLC3 on the original vehicle.

If communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester itself. Consult the Service Department listed in the tester's instruction manual.





## DTC CHECK / CLEAR

### 1. CHECK DTC

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the power switch ON (IG).
- (c) Read the DTCs by following the prompts on the intelligent tester screen.

HINT:

Refer to the tester operator's manual for further details.

### 2. CLEAR DTC

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the power switch ON (IG).
- (c) Erase the DTCs by following the prompts on the tester screen.

HINT:

Refer to the intelligent tester operator's manual for further details.

## DIAGNOSTIC TROUBLE CODE CHART

DTC No.	Detection Item	Trouble Area	See page
B1200	MPX Body ECU Stop	- Wire harness - Driver side junction block	<a href="#">MP-18</a>
B1207	Smart ECU Stop	- Wire harness - Certification ECU	<a href="#">MP-21</a>
B1210	Power ECU Stop	- Wire harness - Power source control ECU	<a href="#">MP-24</a>
B1214	Short to B+ in Door System Communication Bus Malfunction	- Wire harness and connector in BEAN - A/C ECU - Certification ECU* - Combination meter - Driver side junction block - Gateway ECU - Power source control ECU - Tire pressure monitor ECU - Transmission control ECU - Transponder key ECU	<a href="#">MP-27</a>
B1215	Short to GND in Door System Communication Bus Malfunction	- Wire harness and connector in BEAN - A/C ECU - Certification ECU* - Combination meter - Driver side junction block - Gateway ECU - Power source control ECU - Tire pressure monitor ECU - Transmission control ECU - Transponder key ECU	<a href="#">MP-27</a>
B1247	Tire Pressure Monitor Receiver Communication Stop	- Wire harness - Tire pressure warning ECU	<a href="#">MP-41</a>
B1248	AVC-LAN Communication Impossible	- Wire harness - Multi-display	<a href="#">MP-45</a>
B1260	"P" Position Control ECU Stop	- Wire harness - Transponder control ECU	<a href="#">MP-47</a>
B1262	A/C ECU Communication Stop	- Wire harness - A/C ECU	<a href="#">MP-51</a>
B1271	Combination Meter ECU Communication Stop	- Wire harness - Combination meter	<a href="#">MP-54</a>
B1294	Immobiliser ECU Communication Stop	- Wire harness - Transponder key ECU	<a href="#">MP-57</a>

HINT:

\*: Equipped on smart key vehicles.

DTC

B1200

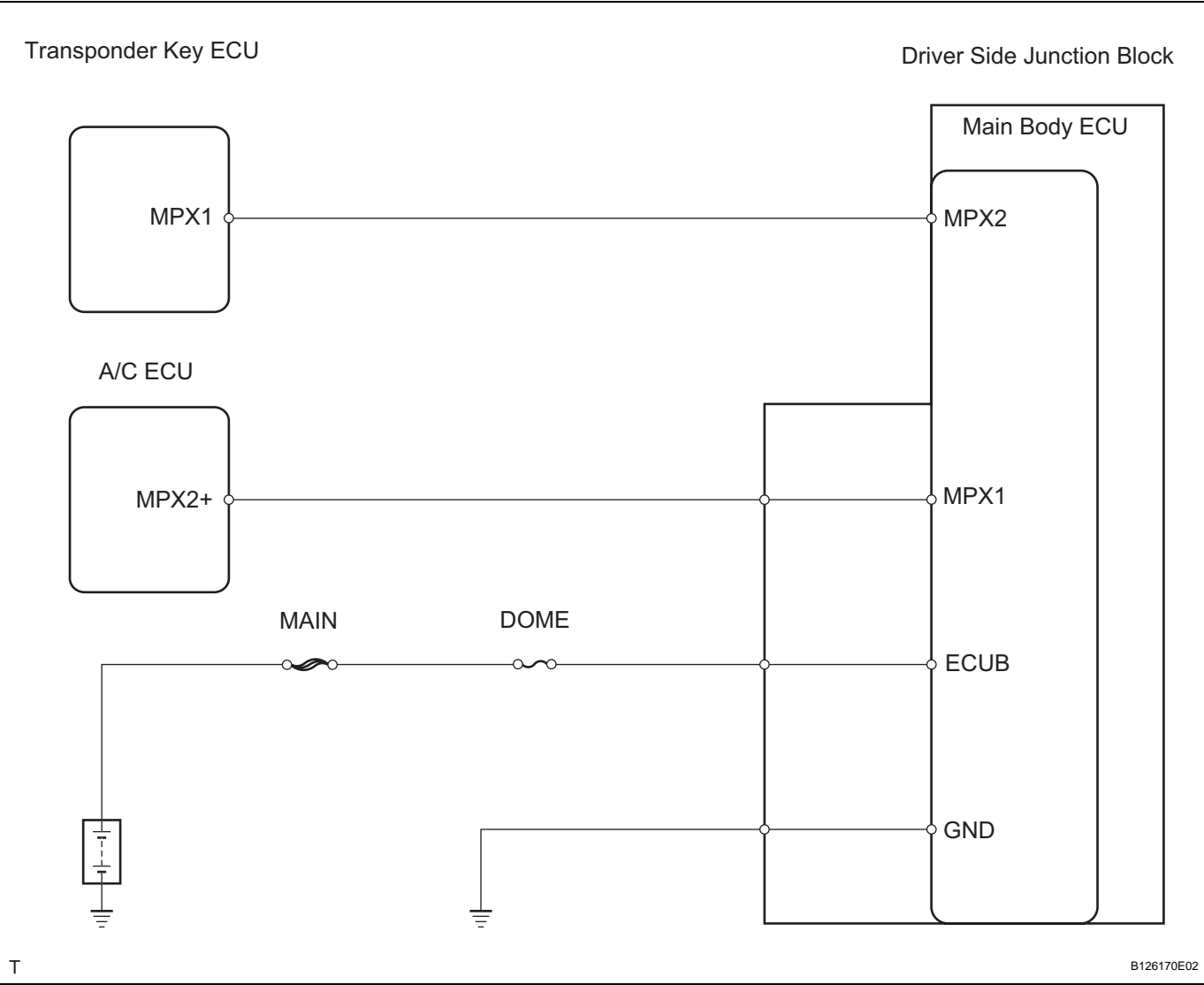
MPX Body ECU Stop

DESCRIPTION

This DTC is detected when communication between the main body ECU and gateway ECU stops for more than 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B1200	Body ECU communication stops	<ul style="list-style-type: none"><li>Driver side junction block</li><li>Wire harness</li></ul>

WIRING DIAGRAM



INSPECTION PROCEDURE

1

INSPECT FUSE (DOME)

- (a) Remove the DOME fuse from the engine room junction block and relay block.
- (b) Measure the resistance of the fuse.

Standard resistance:  
Below 1 Ω

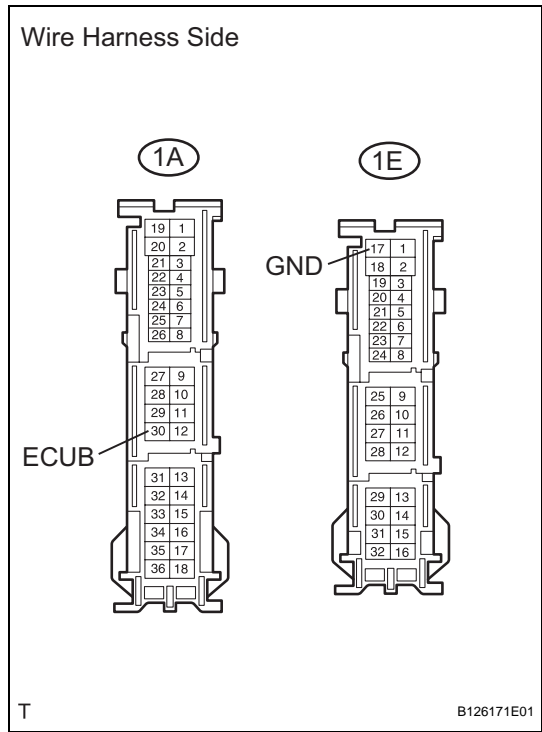
NG

REPLACE FUSE

OK

2

CHECK WIRE HARNESS (DRIVER SIDE JUNCTION BLOCK - BATTERY AND BODY GROUND)



- (a) Disconnect the 1A and 1E junction block connectors.
- (b) Measure the resistance and voltage of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
1E-17 (GND) - Body ground	Below 1 Ω

Standard voltage

Tester Connection	Specified Condition
1A-30 (ECUB) - Body ground	10 to 14 V

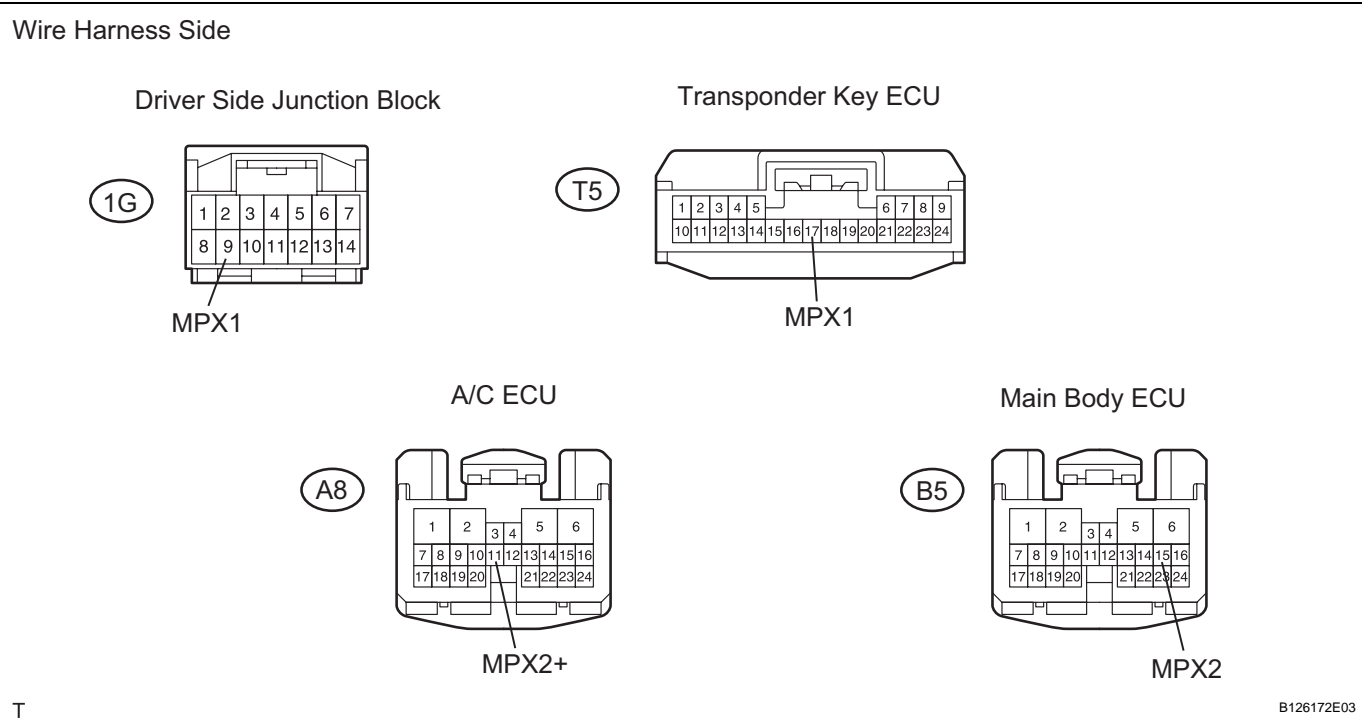
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3

CHECK COMMUNICATION LINE



- (a) Disconnect the 1G junction block connector.
- (b) Disconnect the T5, A8 and B5 ECU connectors.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
T5-17 (MPX1) - B5-15 (MPX2)	Below 1 Ω
A8-11 (MPX2+) - 1G-9 (MPX1)	Below 1 Ω

Result:

Result	Proceed to
Both are OK	A
One is OK	B
Both are NG	C

B

REPLACE DRIVER SIDE JUNCTION BLOCK

C

REPLACE DRIVER SIDE JUNCTION BLOCK AND REPAIR OR REPLACE HARNESS AND CONNECTOR

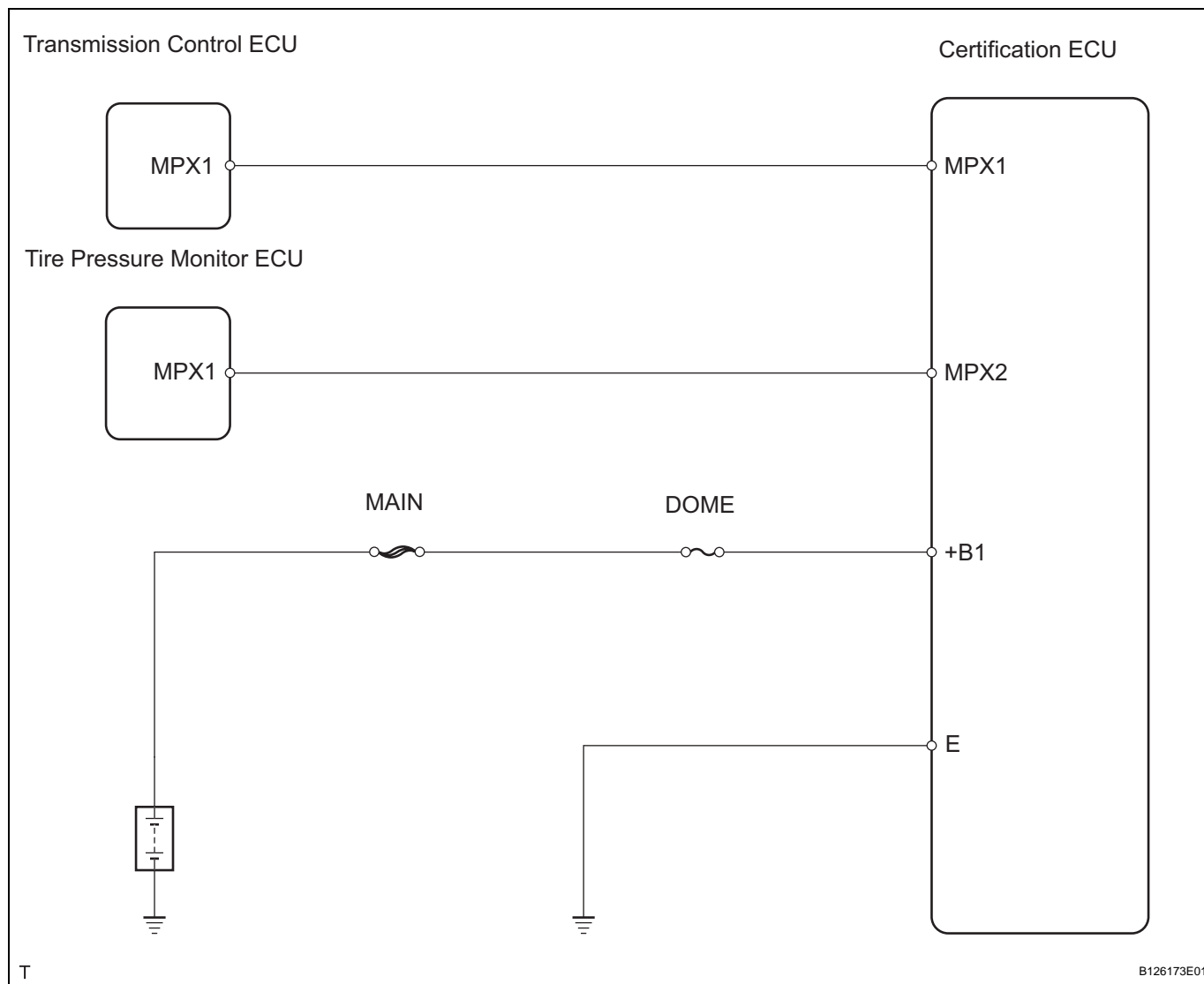
A

REPLACE DRIVER SIDE JUNCTION BLOCK

**DTC****B1207****Smart ECU Stop****DESCRIPTION**

This DTC is detected when communication between the certification ECU and gateway ECU stops for more than 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B1207	Certification ECU communication	<ul style="list-style-type: none"> <li>• Certification ECU</li> <li>• Wire harness</li> </ul>

**WIRING DIAGRAM**

B126173E01

**INSPECTION PROCEDURE****1****CHECK OPERATION**

- (a) With the key in your possession, push the lock button on the door outside handle (entry lock operation). Check that the key warning light illuminates or starts blinking.

**MP**

With the key in your possession, touch the inside of the door outside handle (entry unlock operation). Check that the key warning light illuminates or starts blinking.

**OK:**  
Key warning light illuminates or starts blinking.

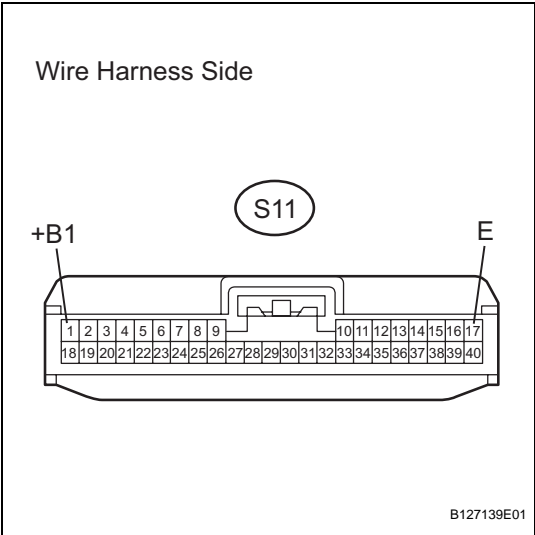
OK

Go to step 3

NG

2

CHECK WIRE HARNESS (CERTIFICATION ECU - BODY GROUND)



- (a) Disconnect the S11 ECU connector.
- (b) Measure the resistance and voltage of the wire harness side connector.

**Standard resistance**

Tester Connection	Specified Condition
S11-17 (E) - Body ground	Below 1 Ω

**Standard voltage**

Tester Connection	Specified Condition
S11-1 (+B1) - Body ground	10 to 14 V

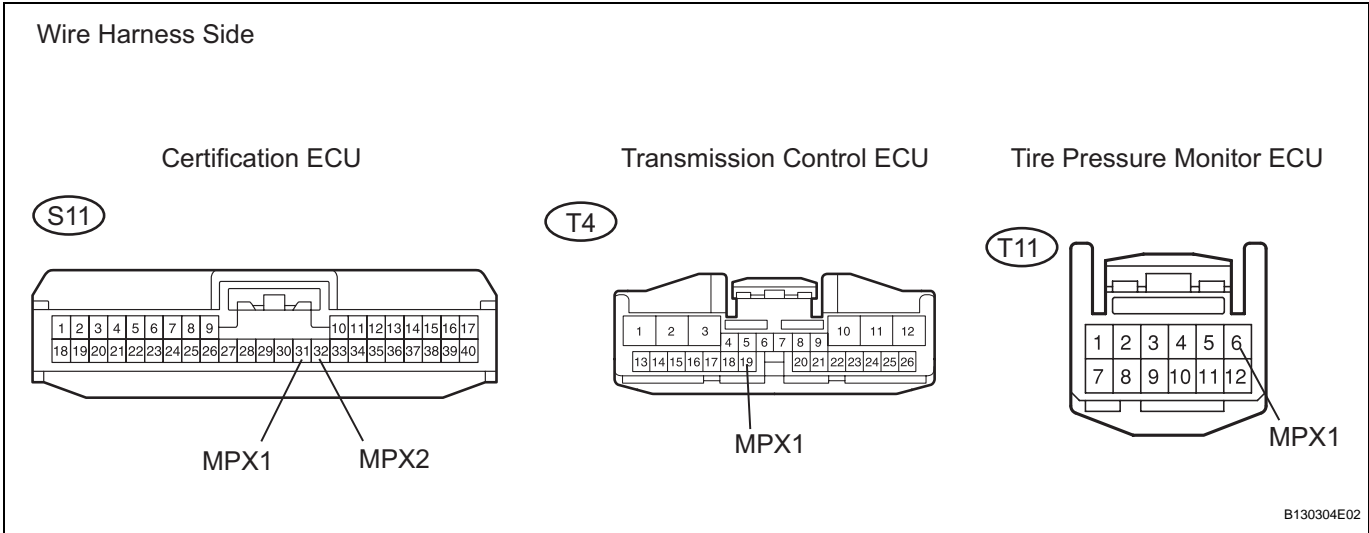
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3

CHECK RESISTANCE OF COMMUNICATION LINE



- (a) Disconnect the S11, T4 and T11 ECU connectors.
- (b) Measure the resistance of the wire harness side connectors.



### Standard resistance

Tester Connection	Specified Condition
S11-31 (MPX1) - T4-19 (MPX1)	Below 1 $\Omega$
S11-32 (MPX2) - T11-6 (MPX1)	Below 1 $\Omega$

### Result:

Result	Proceed to
Both are OK	A
One is OK	B
Both are NG	C

**B**

**REPLACE CERTIFICATION ECU AND  
REPAIR OR REPLACE HARNESS AND  
CONNECTOR**

**C**

**REPAIR OR REPLACE HARNESS AND  
CONNECTOR**

**A**

**REPLACE CERTIFICATION ECU**

DTC

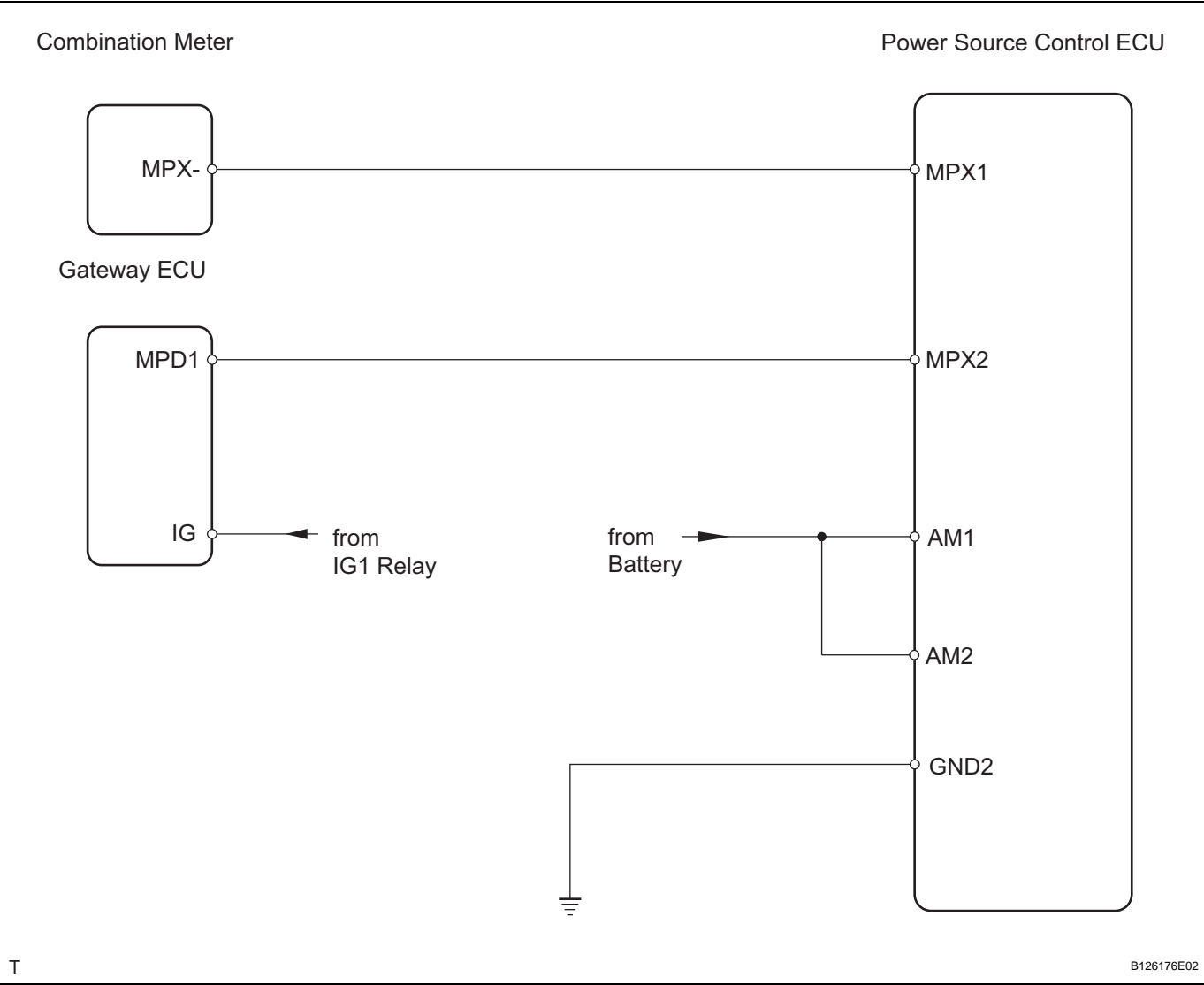
B1210

Power ECU Stop

**DESCRIPTION**  
This DTC is detected when communication between the power source control ECU and gateway ECU stops for more than 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B1210	Power source control communication stops	<ul style="list-style-type: none"><li>Power source control ECU</li><li>Wire harness</li></ul>

WIRING DIAGRAM



INSPECTION PROCEDURE

1

CHECK OPERATION

- (a) Without depressing the brake pedal, push the power switch repeatedly. Check that the power mode changes between OFF, ON (ACC) and ON (IG) alternately.

OK:  
Key warning light illuminates or starts blinking according to power modes.

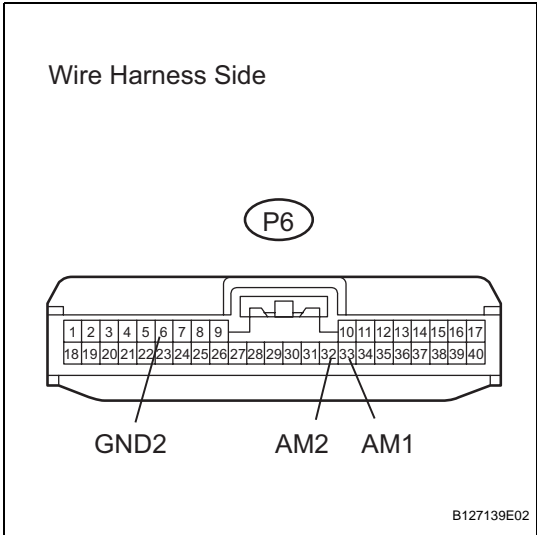
OK

Go to step 3

NG

2

CHECK WIRE HARNESS (POWER SOURCE CONTROL ECU - BODY GROUND)



- (a) Disconnect the P6 ECU connector.
- (b) Measure the resistance and voltage of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
P6-6 (GND2) - Body ground	Below 1 Ω

Standard voltage

Tester Connection	Specified Condition
P6-33 (AM1) - Body ground	10 to 14 V
P6-32 (AM2) - Body ground	10 to 14 V

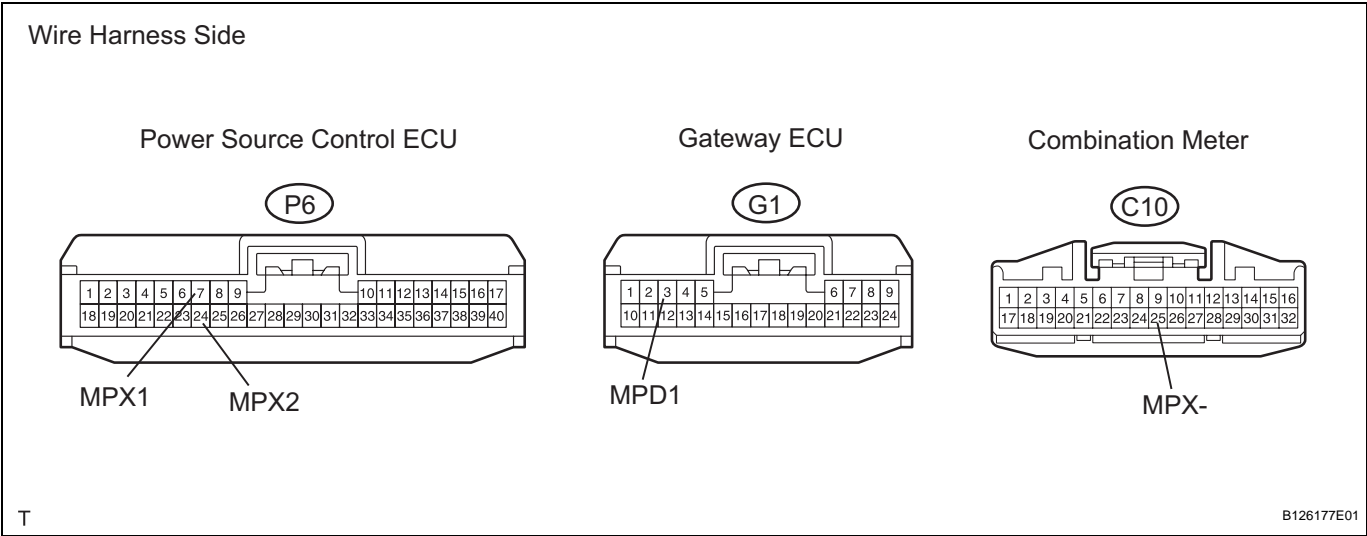
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3

CHECK RESISTANCE OF COMMUNICATION LINE



- (a) Disconnect the P6 and G1 ECU connectors.
- (b) Disconnect the C10 meter connector.
- (c) Measure the resistance between the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
P6-7 (MPX1) - C10-25 (MPX-)	Below 1 Ω
P6-24 (MPX2) - G1-3 (MPD1)	Below 1 Ω

Result:

Result	Proceed to
Both are OK	A
One is OK	B
Both are NG	C

B

REPLACE POWER SOURCE CONTROL ECU AND REPAIR OR REPLACE HARNESS AND CONNECTOR

C

REPAIR OR REPLACE HARNESS AND CONNECTOR

A

REPLACE POWER SOURCE CONTROL ECU

<b>DTC</b>	<b>B1214</b>	<b>Short to B+ in Door System Communication Bus Malfunction</b>
<b>DTC</b>	<b>B1215</b>	<b>Short to GND in Door System Communication Bus Malfunction</b>

**DESCRIPTION**

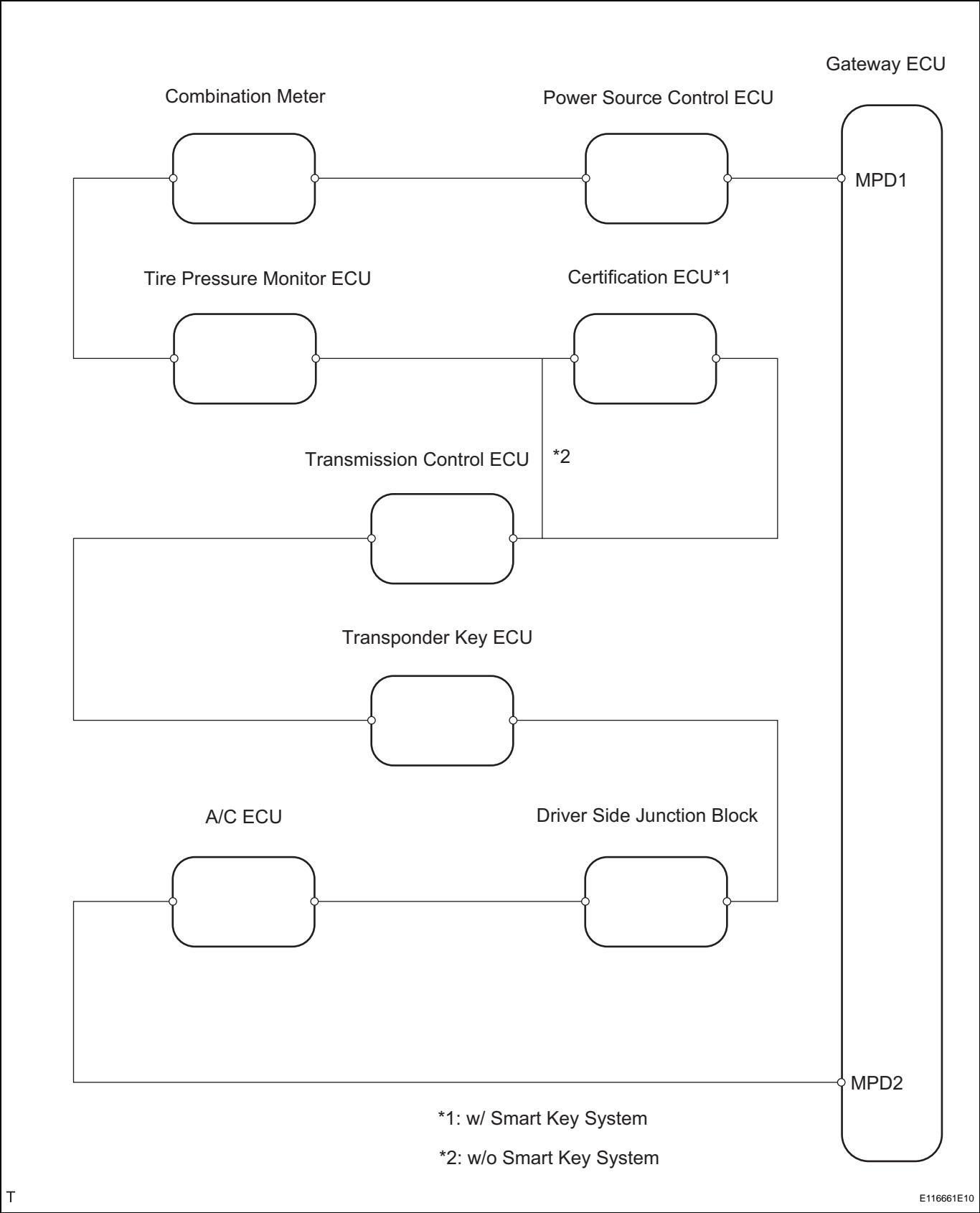
The air conditioning (A/C) ECU, body ECU (built into driver side junction block), combination meter, certification ECU\*, power source control ECU, tire pressure monitor ECU, transmission control ECU, transponder key ECU and gateway ECU are connected to the Body Electronics Area Network (BEAN). The gateway ECU monitors the BEAN. If there is a B+ or GND short in the BEAN, the gateway ECU sets the DTC and the related system(s) do not operate.

<b>DTC</b>	<b>DTC Detection Condition</b>	<b>Trouble Area</b>
B1214	B+ short in BEAN	<ul style="list-style-type: none"> <li>• A/C ECU</li> <li>• Certification ECU*</li> <li>• Combination meter</li> <li>• Driver side junction block</li> <li>• Gateway ECU</li> <li>• Power source control ECU</li> <li>• Tire pressure monitor ECU</li> <li>• Transmission control ECU</li> <li>• Transponder key ECU</li> <li>• Wire harness and connector in BEAN</li> </ul>
B1215	GND short in BEAN	

**HINT:**

\*: Equipped on smart key vehicles.

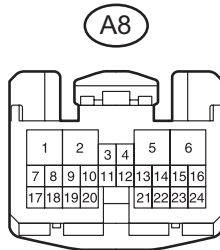
WIRING DIAGRAM



## INSPECTION PROCEDURE

**1 CHECK A/C ECU**

Wire Harness Side



T

B126184E01

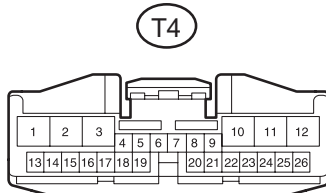
- (a) Turn the power switch OFF.
- (b) Disconnect the A/C ECU connector.
- (c) Connect the intelligent tester to the DLC3.
- (d) Turn the power switch ON (IG).
- (e) Clear and check DTCs.

**Result**

DTC	Conclusion	Proceed to
B1214 or B1215 is present	A/C ECU is OK	A
B1214 and B1215 are not present	A/C ECU is malfunctioning	B

**B****REPLACE A/C ECU****A****2 CHECK TRANSMISSION CONTROL ECU**

Wire Harness Side



T

B126181E01

- (a) Turn the power switch OFF .
- (b) Connect the A/C ECU connector.
- (c) Disconnect the transmission control ECU connector.
- (d) Turn the power switch ON (IG).
- (e) Clear and check DTCs.

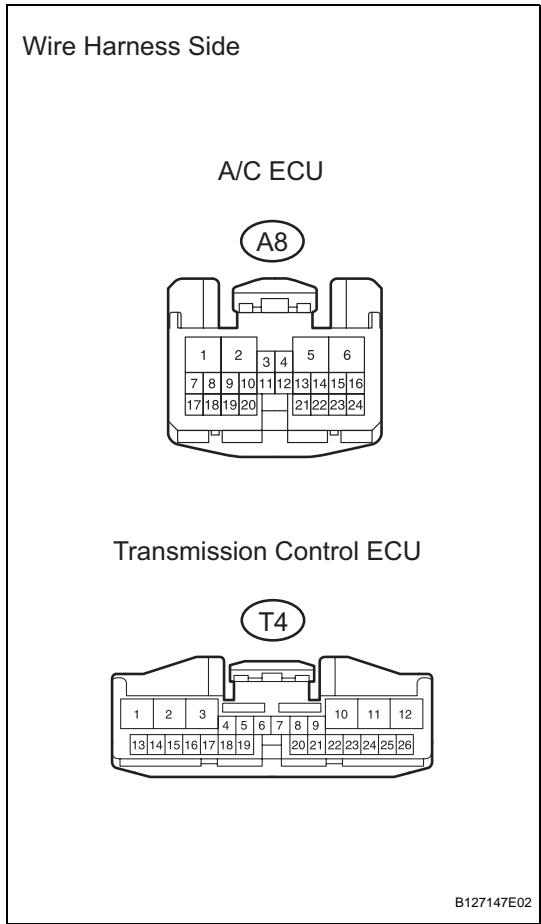
**Result**

DTC	Conclusion	Proceed to
B1214 or B1215 is present	Transmission control ECU is OK	A
B1214 and B1215 are not present	Transmission control ECU is malfunctioning	B

**B****REPLACE TRANSMISSION CONTROL ECU****A**

3

CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - A/C ECU)



- (a) Turn the power switch OFF.
- (b) Disconnect the transmission control ECU connector and A/C ECU connector.
- (c) Turn the power switch ON (IG).
- (d) Clear and check DTCs.

Result

DTC	Conclusion	Proceed to
B1214 or B1215 is present	Wire harness is OK	A
B1214 and B1215 are not present	Wire harness is short circuited	B

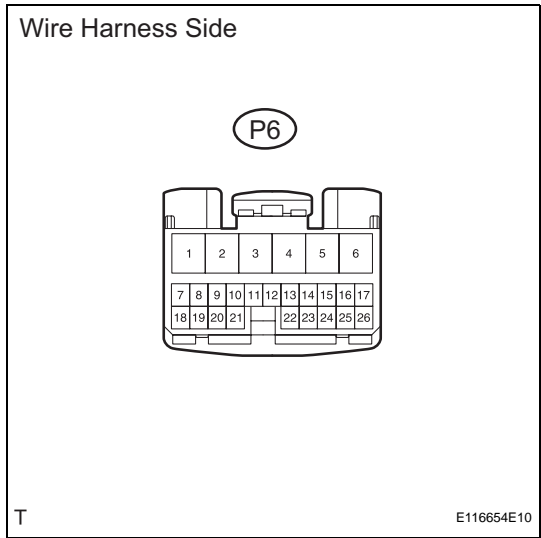
B

Go to step 8

A

4

CHECK POWER SOURCE CONTROL ECU



- (a) Turn the power switch OFF.
- (b) Connect the A/C ECU connector and transmission control ECU connector.
- (c) Disconnect the power source control ECU connector.
- (d) Turn the power switch ON (IG).
- (e) Clear and check DTCs.

Result

DTC	Conclusion	Proceed to
B1214 or B1215 is present	Power source control ECU is OK	A
B1214 and B1215 are not present	Power source control ECU is malfunctioning	B

B

REPLACE POWER SOURCE CONTROL ECU

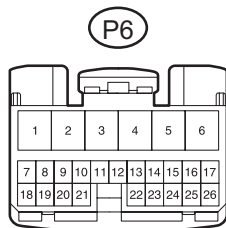
A



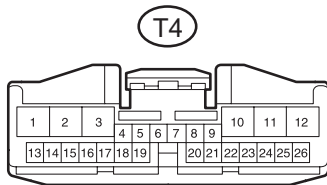
5 CHECK WIRE HARNESS (POWER SOURCE CONTROL ECU - TRANSMISSION CONTROL ECU)

Wire Harness Side

Power Source Control ECU



Transmission Control ECU



B127148E01

- (a) Turn the power switch OFF.
- (b) Disconnect the power source control ECU connector and transmission control ECU connector.
- (c) Turn the power switch ON (IG).
- (d) Clear and check DTCs.

Result

DTC	Conclusion	Proceed to
B1214 or B1215 is present	Wire harness is OK	A
B1214 and B1215 are not present	Wire harness is short circuited	B

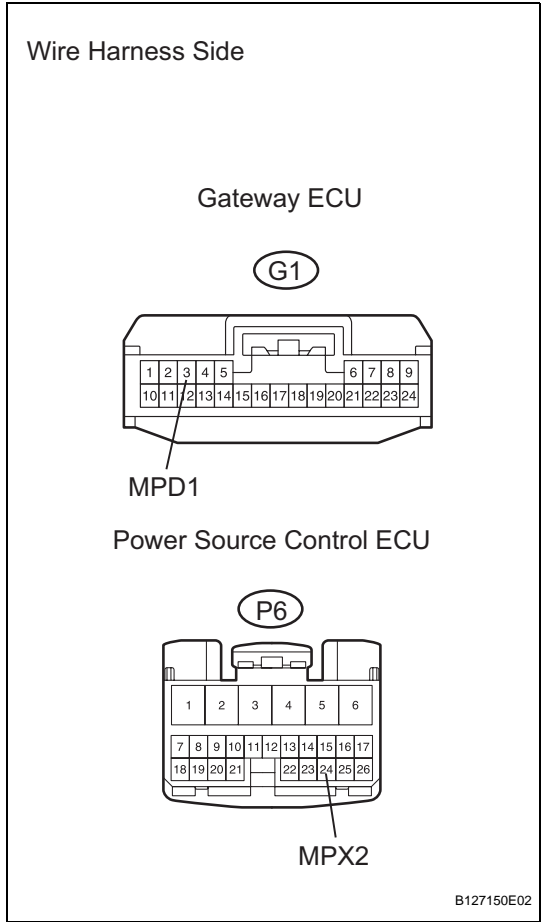
B

Go to step 12

A

6

CHECK WIRE HARNESS (GATEWAY ECU - POWER SOURCE CONTROL ECU)



OK

- (a) Turn the power switch OFF.
- (b) Connect the transmission control ECU connector.
- (c) Disconnect the power source control ECU connector and gateway ECU connector.
- (d) Measure the resistance and voltage of the gateway ECU connector terminal.

Standard resistance

Tester Connection	Specified Condition
G1-3 (MPD1) - Body ground	10 kΩ or higher

Standard voltage

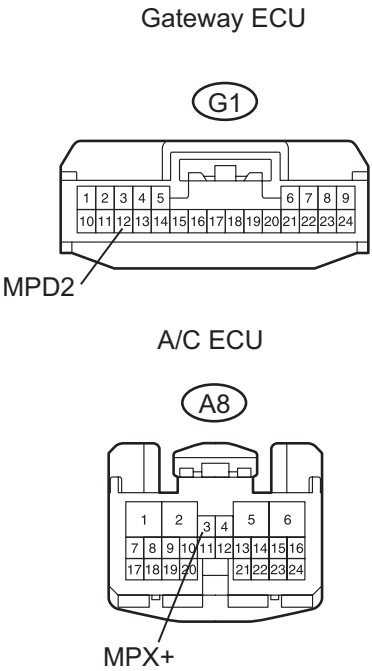
Tester Connection	Condition	Specified Condition
G1-3 (MPD1) - Body ground	Power switch ON (IG)	Below 1 V

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

7 CHECK WIRE HARNESS (GATEWAY ECU - A/C ECU)

Wire Harness Side



B127149E02

- (a) Turn the power switch OFF.
- (b) Connect the power source control ECU connector.
- (c) Disconnect the A/C ECU connector and gateway ECU connector.
- (d) Measure the resistance and voltage of the gateway ECU connector terminal.

Standard resistance

Tester Connection	Specified Condition
G1-12 (MPD2) - Body ground	10 kΩ or higher

Standard voltage

Tester Connection	Condition	Specified Condition
G1-12 (MPD2) - Body ground	Power switch ON (IG)	Below 1 V

NG

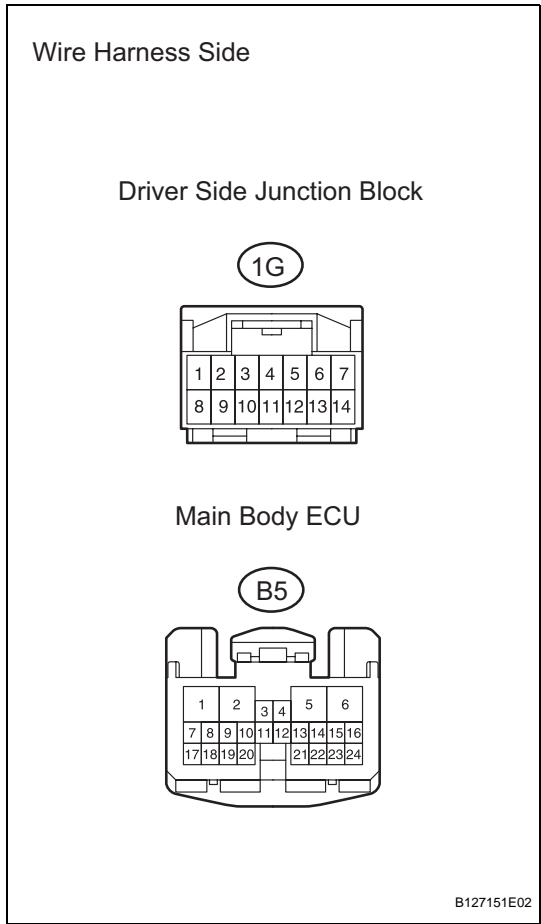
REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE GATEWAY ECU

8

CHECK DRIVER SIDE JUNCTION BLOCK



- (a) Turn the power switch OFF.
- (b) Connect the A/C ECU connector and transmission control ECU connector.
- (c) Disconnect the 1G driver side junction block connector and B5 main body ECU connector.
- (d) Turn the power switch ON (IG).
- (e) Clear and check DTCs.

Result

DTC	Conclusion	Proceed to
B1214 or B1215 is present	Driver side junction block is OK	A
B1214 and B1215 are not present	Driver side junction block is malfunctioning	B

B

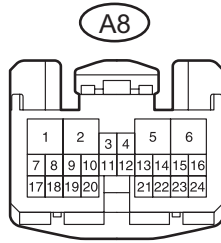
REPLACE DRIVER SIDE JUNCTION BLOCK

A

**9****CHECK WIRE HARNESS (DRIVER SIDE JUNCTION BLOCK - A/C ECU)**

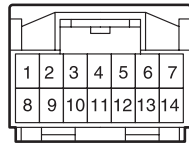
Wire Harness Side

A/C ECU



Driver Side Junction Block

1G



B127152E03

- Turn the power switch OFF.
- Connect the B5 ECU connector.
- Disconnect the 1G driver side junction block connector and A/C ECU connector.
- Turn the power switch ON (IG).
- Clear and check DTCs.

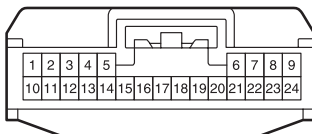
**Result**

DTC	Conclusion	Proceed to
B1214 or B1215 is present	Wire harness is OK	A
B1214 and B1215 are not present	Wire harness is short circuited	B

**B****REPAIR OR REPLACE HARNESS AND CONNECTOR****A****10****CHECK TRANSPONDER KEY ECU**

Wire Harness Side

T5



B127153E01

- Turn the power switch OFF.
- Connect the driver side junction block connector and A/C ECU connector.
- Disconnect the transponder key ECU connector.
- Turn the power switch ON (IG).
- Clear and check DTCs.

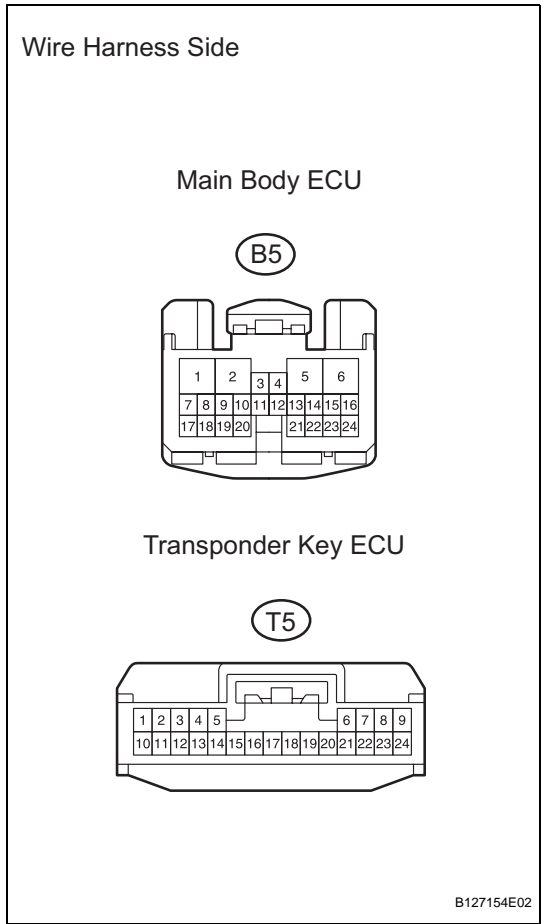
**Result**

DTC	Conclusion	Proceed to
B1214 or B1215 is present	Transponder key ECU is OK	A
B1214 and B1215 are not present	Transponder key ECU is malfunctioning	B

**B****REPLACE TRANSPONDER KEY ECU****A**

11

CHECK WIRE HARNESS (TRANSPONDER KEY ECU - DRIVER SIDE JUNCTION BLOCK)



- (a) Turn the power switch OFF.
- (b) Disconnect the transponder key ECU connector and B5 ECU connector.
- (c) Turn the power switch ON (IG).
- (d) Clear and check DTCs.

DTC	Conclusion	Proceed to
B1214 or B1215 is present	Wire harness is OK	A
B1214 and B1215 are not present	Wire harness is short circuited	B

B

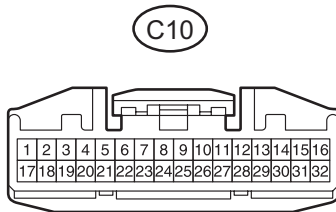
REPAIR OR REPLACE HARNESS AND CONNECTOR (TRANSPONDER KEY ECU - DRIVER SIDE JUNCTION BLOCK)

A

REPAIR OR REPLACE HARNESS AND CONNECTOR (TRANSPONDER KEY ECU - TRANSMISSION CONTROL ECU)

**12 CHECK COMBINATION METER**

Wire Harness Side



B126419E02

- Turn the power switch OFF.
- Connect the power source control ECU connector and transmission control ECU connector.
- Disconnect the C10 meter connector.
- Turn the ignition switch ON (IG).
- Clear and check DTCs.

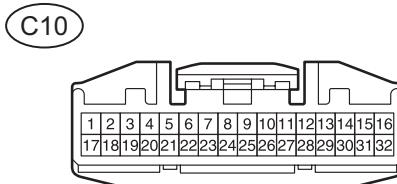
**Result**

DTC	Conclusion	Proceed to
B1214 or B1215 is present	Combination meter is OK	A
B1214 and B1215 are not present	Combination meter is malfunctioning	B

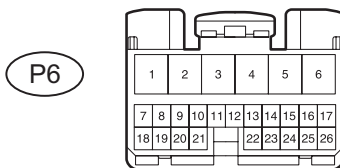
**B****REPLACE COMBINATION METER****A****13 CHECK WIRE HARNESS (COMBINATION METER - POWER SOURCE CONTROL ECU)**

Wire Harness Side

Combination Meter



Power Source Control ECU



B130297E02

- Turn the power switch OFF.
- Disconnect the C10 combination meter and power source control ECU connector.
- Turn the power switch ON (IG).
- Clear and check DTCs.

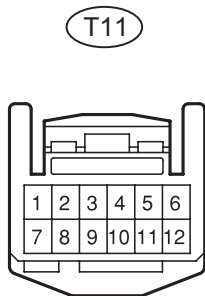
**Result**

DTC	Conclusion	Proceed to
B1214 or B1215 is present	Wire harness is OK	A
B1214 and B1215 are not present	Wire harness is short circuited	B

**B****REPAIR OR REPLACE HARNESS AND CONNECTOR****A**

**14 CHECK TIRE PRESSURE WARNING ECU**

Wire Harness Side



B130300E01

- Turn the power switch OFF.
- Connect the C10 meter connector and power source control ECU connector.
- Disconnect the tire pressure monitor ECU connector.
- Turn the power switch ON (IG).
- Clear and check DTCs.

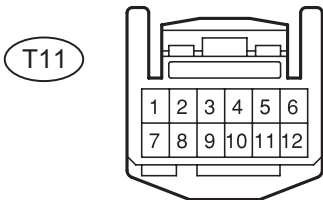
**Result**

DTC	Conclusion	Proceed to
B1214 or B1215 is present	Tire pressure monitor ECU is OK	A
B1214 and B1215 are not present	Tire pressure monitor ECU is malfunctioning	B

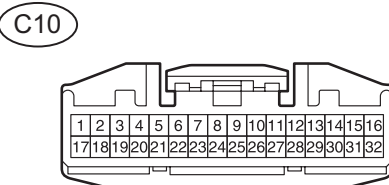
**B****REPLACE TIRE PRESSURE WARNING ECU****A****15 CHECK WIRE HARNESS (TIRE PRESSURE WARNING ECU - COMBINATION METER)**

Wire Harness Side

Tire Pressure Monitor ECU



Combination Meter



B130301E01

- Turn the power switch OFF.
- Disconnect the tire pressure monitor ECU connector and C10 meter connector.
- Turn the power switch ON (IG).
- Clear and check DTCs.

**Result**

DTC	Conclusion	Proceed to
B1214 or B1215 is present	Wire harness is OK	A
B1214 and B1215 are not present	Wire harness is short circuited	B

**B****REPAIR OR REPLACE HARNESS AND CONNECTOR****A**

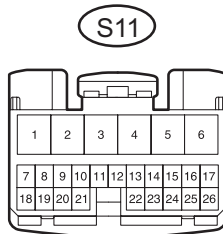


**16 CONFIRM EQUIPMENT****Equipment**

Equipment	Proceed to
With smart key system	A
Without smart key system	B

**B****REPAIR OR REPLACE HARNESS AND CONNECTOR (TIRE PRESSURE MONITOR ECU - TRANSMISSION CONTROL ECU)****A****17 CHECK CERTIFICATION ECU**

Wire Harness Side



T

E116654E11

- (a) Turn the power switch OFF.
- (b) Connect the C10 meter connector and tire pressure monitor ECU connector.
- (c) Disconnect the certification ECU connector.
- (d) Turn the power switch ON (IG).
- (e) Clear and check DTCs.

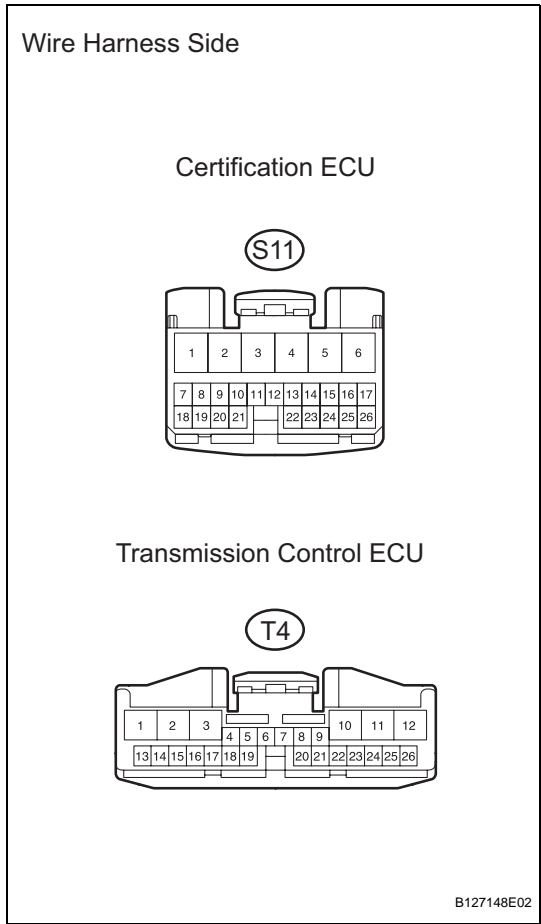
**Result**

DTC	Conclusion	Proceed to
B1214 or B1215 is present	Certification ECU is OK	A
B1214 and B1215 are not present	Certification ECU is malfunctioning	B

**B****REPLACE CERTIFICATION ECU****A**

18

CHECK WIRE HARNESS (CERTIFICATION ECU - TIRE PRESSURE MONITOR ECU)



- (a) Turn the power switch OFF.
- (b) Disconnect the certification ECU connector and tire pressure monitor ECU connector.
- (c) Turn the power switch ON (IG).
- (d) Clear and check DTCs.

Result

DTC	Conclusion	Proceed to
B1214 or B1215 is present	Wire harness is OK	A
B1214 and B1215 are not present	Wire harness is short circuited	B

B

REPAIR OR REPLACE HARNESS AND CONNECTOR (CERTIFICATION ECU - TIRE PRESSURE MONITOR ECU)

A

REPAIR OR REPLACE HARNESS AND CONNECTOR (CERTIFICATION ECU - TRANSMISSION CONTROL ECU)

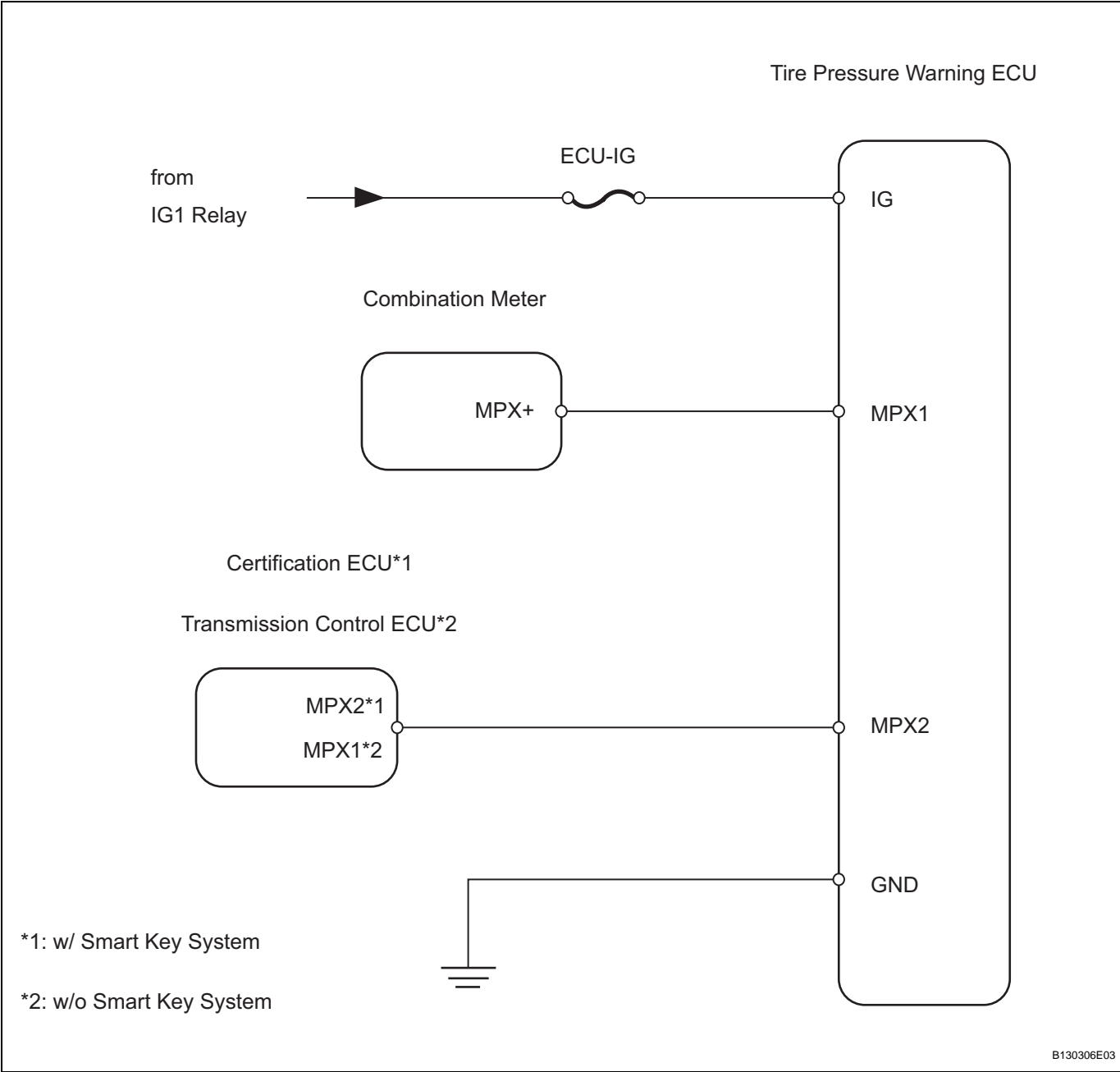
DTC	B1247	Tire Pressure Monitor Receiver Communication Stop
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DESCRIPTION

This DTC is detected when the communication between the tire pressure warning ECU and gateway ECU stops for more than 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B1247	Tire pressure monitor receiver communication stops	<ul style="list-style-type: none"><li>• Tire pressure warning ECU</li><li>• Wire harness</li></ul>

WIRING DIAGRAM



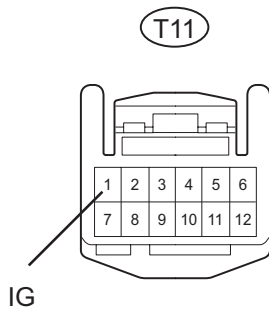
## INSPECTION PROCEDURE

**1 INSPECT FUSE (ECU-IG)**

- (a) Remove the ECU-IG fuse from the driver side junction block.
- (b) Measure the resistance of the fuse.

**Standard resistance:****Below 1  $\Omega$** **NG****REPLACE FUSE****OK****2 CHECK WIRE HARNESS (TIRE PRESSURE WARNING ECU - BATTERY AND BODY GROUND)**

Wire Harness Side



- (a) Disconnect the T11 ECU connector.
- (b) Turn the power switch ON (IG).
- (c) Measure the voltage and resistance of the wire harness side connector.

**Standard voltage**

Tester Connection	Condition	Specified Condition
T11-1 (IG) - Body ground	Power switch ON (IG)	10 to 14 V

**Standard resistance**

Tester Connection	Specified Condition
T11-7 (GND) - Body ground	Below 1 $\Omega$

**NG****REPAIR OR REPLACE HARNESS AND CONNECTOR****OK**

## 3

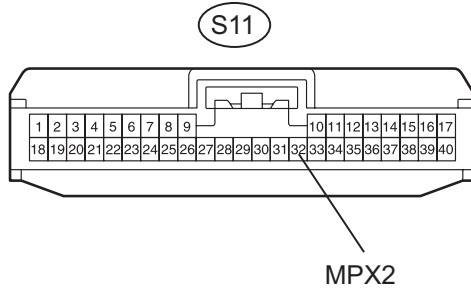
## CHECK RESISTANCE OF COMMUNICATION LINE

Wire Harness Side

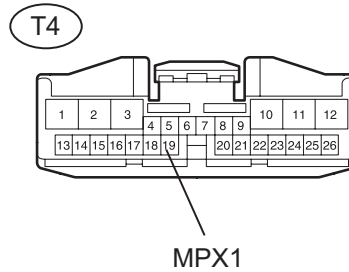
\*1: w/ Smart Key

\*2: w/o Smart Key

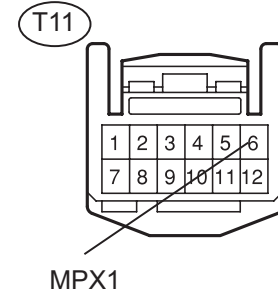
Certification ECU\*1



Transmission Control ECU\*2



Tire Pressure Warning ECU



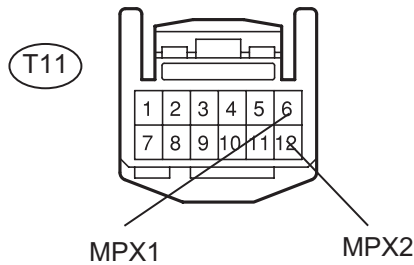
B130304E05

Wire Harness Side

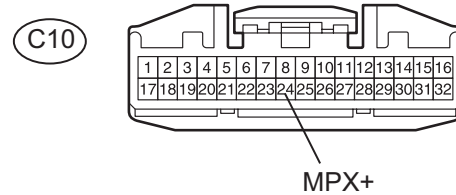
\*1: w/ Smart Key System (for Door Lock)

\*2: w/o Smart Key System (for Door Lock)

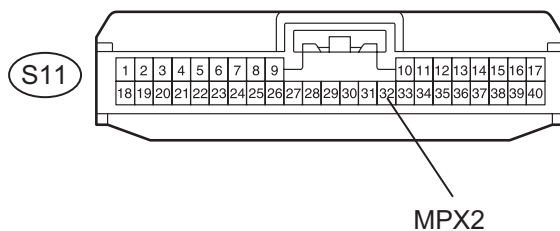
Tire Pressure Warning ECU



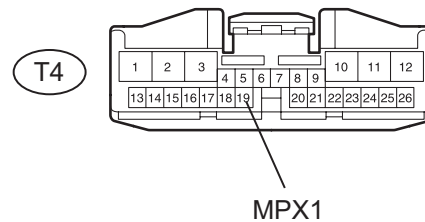
Combination Meter



Certification ECU\*1



Transmission Control ECU\*2



B131912E02

- Disconnect the T11, S11\*1 and T4\*2 ECU connectors.
- Disconnect the C10 meter connector.
- Measure the resistance of the wire harness side connector.

**Standard resistance**

Tester Connection	Specified Condition
T11-6 (MPX1) - S11-32 (MPX2)*1	Below 1 Ω

Tester Connection	Specified Condition
T11-6 (MPX1) - T4-19 (MPX1)*2	Below 1 Ω
T11-12 (MPX2) - C10-24 (MPX+)	Below 1 Ω

HINT:  
\*1: w/ Smart key system (for door lock)  
\*2: w/o Smart key system (for door lock)  
Result:

Result	Proceed to
Both are OK	A
One is OK	B
Both are NG	C

B

REPLACE TIRE PRESSURE WARNING ECU AND REPAIR OR REPLACE HARNESS AND CONNECTOR

C

REPAIR OR REPLACE HARNESS AND CONNECTOR

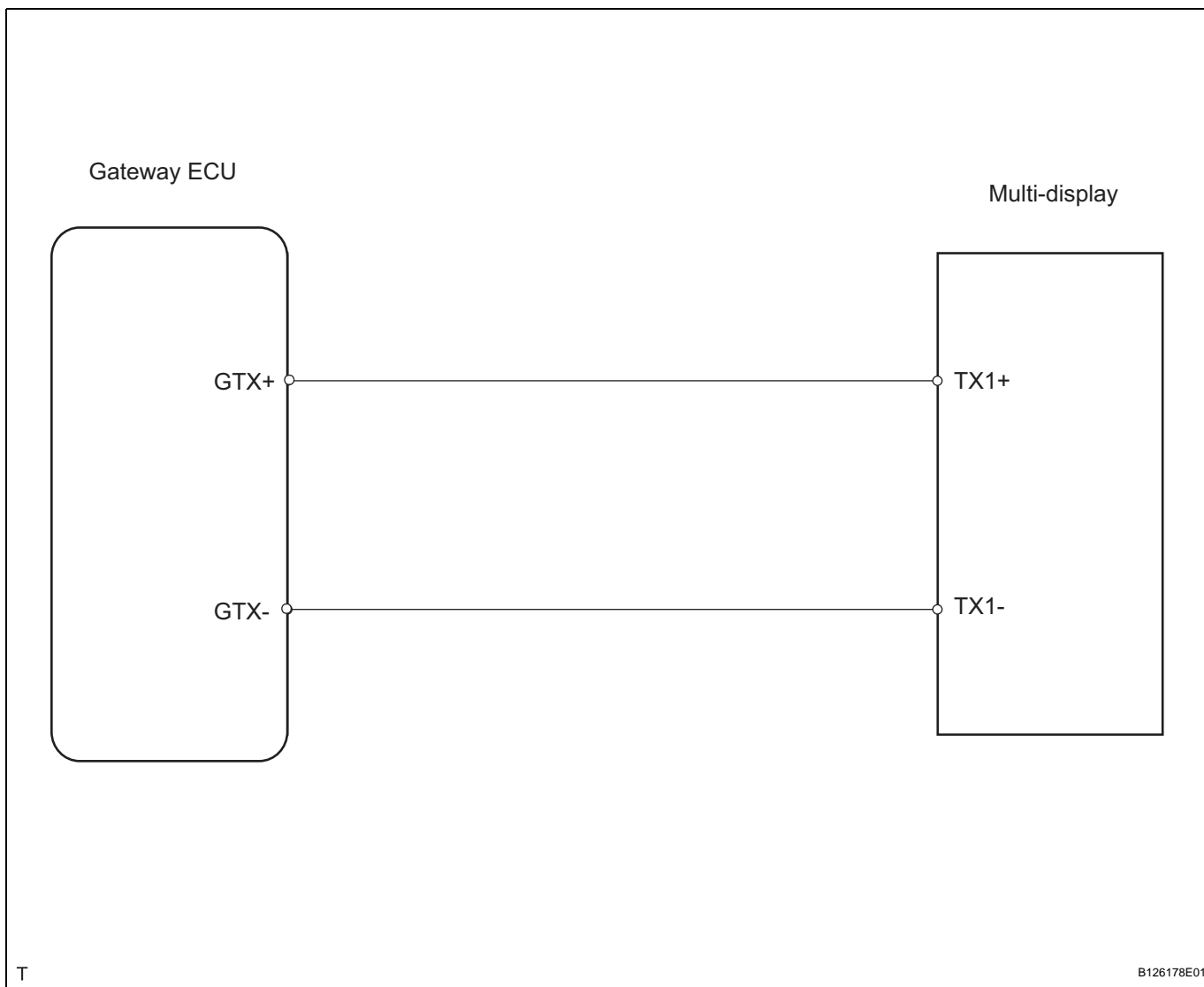
A

REPLACE TIRE PRESSURE WARNING ECU

**DTC****B1248****AVC-LAN Communication Impossible****DESCRIPTION**

This DTC is detected when communication is impossible between the multi-display and gateway ECU.

DTC No.	DTC Detection Condition	Trouble Area
B1248	AVC-LAN communication is impossible	<ul style="list-style-type: none"><li>Multi-display</li><li>Wire harness</li></ul>

**WIRING DIAGRAM****INSPECTION PROCEDURE****1****CHECK OPERATION**

- (a) Check that the radio and player switch can operate normally.

**OK:**

Radio and player switch can operate normally.

**MP**

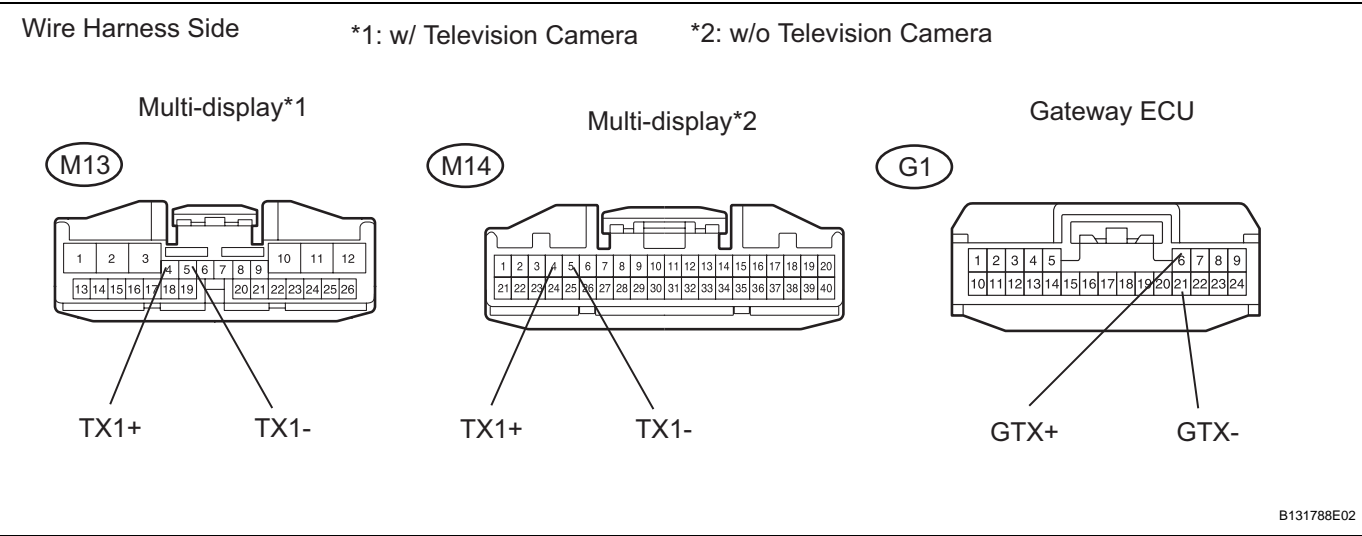
OK

NG

GO TO AUDIO SYSTEM

2

CHECK RESISTANCE OF COMMUNICATION LINE



- (a) Disconnect the G1 ECU connector.
- (b) Disconnect the M13\*1 or M14\*2 display connector.
- (c) Measure the resistance between the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
M13-4 (TX1+)*1 - G1-6 (GTX+)	Below 1 Ω
M13-4 (TX1+)*1 - G1-6 (GTX+)	Below 1 Ω
M14-5 (TX1-)*2 - G1-21 (GTX-)	Below 1 Ω
M14-5 (TX1-)*2 - G1-21 (GTX-)	Below 1 Ω

HINT:  
\*1: w/ Television camera  
\*2: w/o Television camera

OK

NG

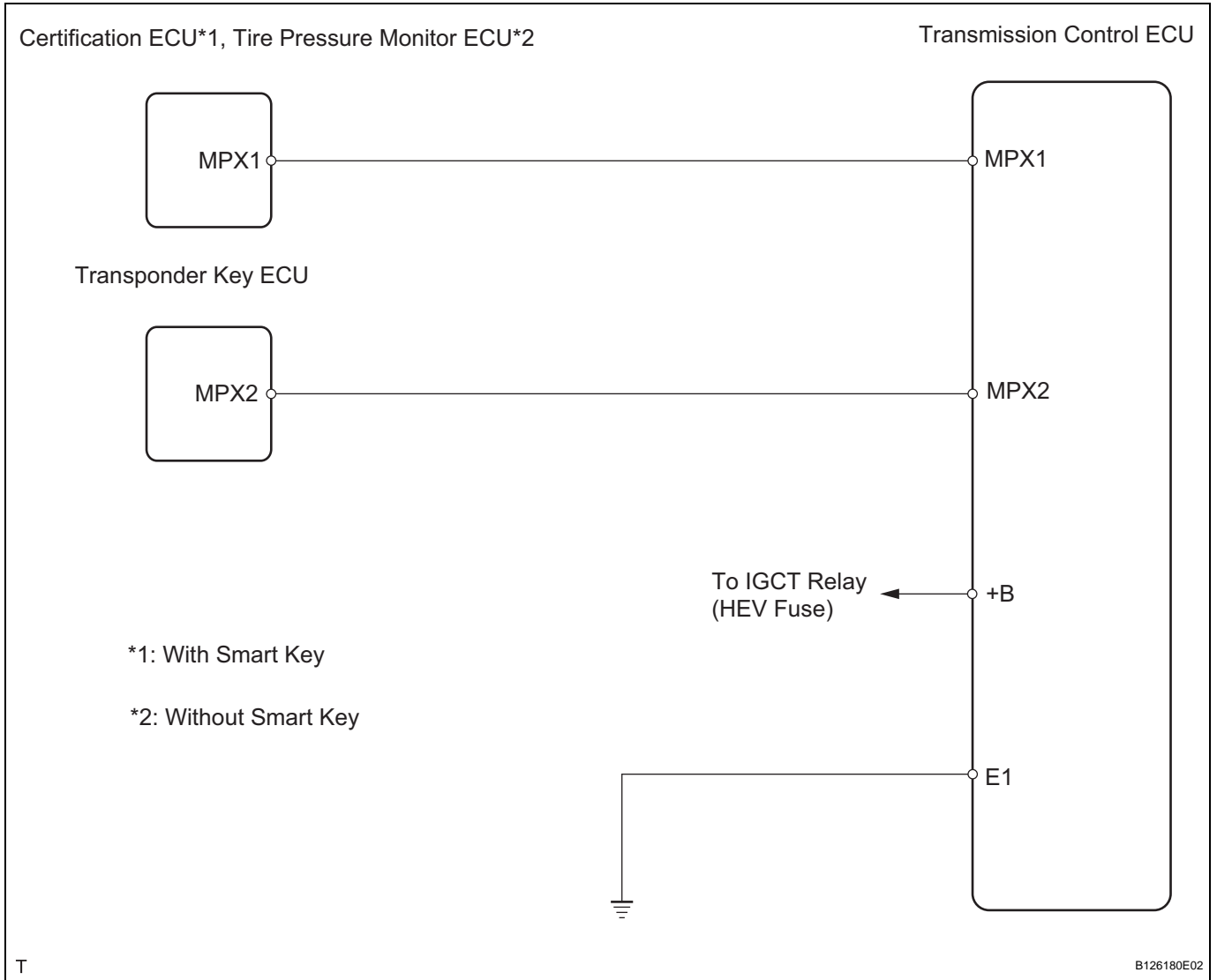
REPAIR OR REPLACE HARNESS AND CONNECTOR



**DTC****B1260****"P" Position Control ECU Stop****DESCRIPTION**

This DTC is detected when communication between the transmission control ECU and gateway ECU stops for more than 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B1260	Transmission control ECU communication stops	<ul style="list-style-type: none"> <li>• Transponder control ECU</li> <li>• Wire harness</li> </ul>

**WIRING DIAGRAM****MP****INSPECTION PROCEDURE****1****INSPECT FUSE (HEV)**

- Remove the HEV fuse from the engine room junction block.
- Measure the resistance.

Standard resistance:  
Below 1 Ω

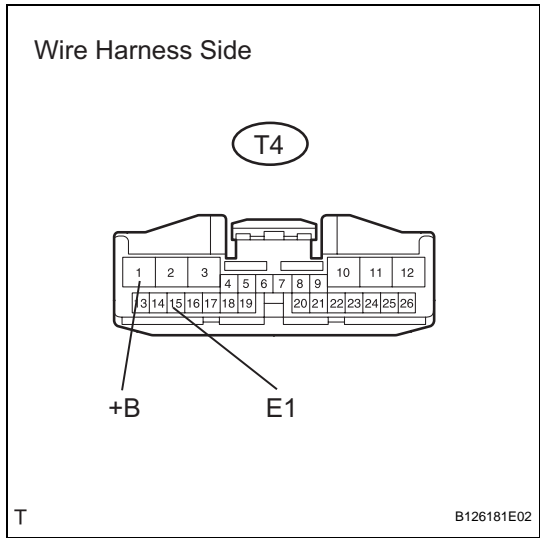
NG

REPLACE FUSE

OK

2

CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - BODY GROUND)



- (a) Disconnect the T4 ECU connector.  
(b) Measure the resistance and voltage between the wire harness side connector.
- Standard resistance**

Tester Connection	Specified Condition
T4-15 (E1) - Body ground	Below 1 Ω

**Standard voltage**

Tester Connection	Condition	Specified Condition
T4-1 (+B) - Body ground	Power switch ON (IG)	10 to 14 V

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

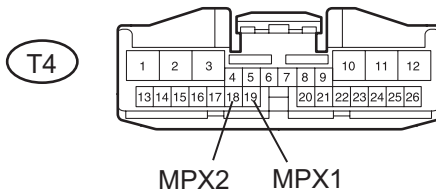
OK

## 3

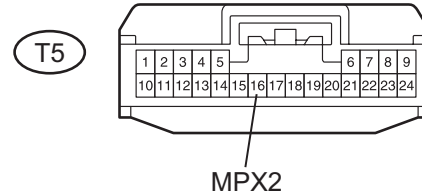
## CHECK RESISTANCE OF COMMUNICATION LINE

Wire Harness Side

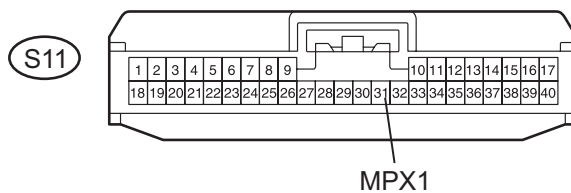
Transmission Control ECU



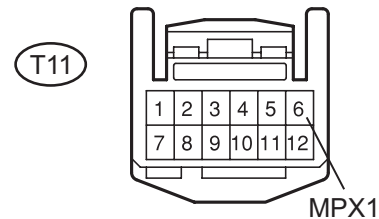
Transponder Key ECU



Certification ECU\*1



Tire Pressure Monitor ECU\*2



\*1: w/ Smart Key System (for Door Lock)

\*2: w/o Smart Key System (for Door Lock)

B131880E01

- Disconnect the T4, T5 and S11\*1 or T11\*2 ECU connectors.
- Measure the resistance of the wire harness side connectors.

**Standard resistance**

Tester Connection	Specified Condition
T4-18 (MPX2) - T5-16 (MPX2)	Below 1 $\Omega$
T4-19 (MPX1) - S11-31 (MPX1)*1	Below 1 $\Omega$
T4-19 (MPX1) - T11-6 (MPX1)*2	Below 1 $\Omega$

**HINT:**

\*1: w/ Smart key system (for door lock)

\*2: w/o Smart key system (for door lock)

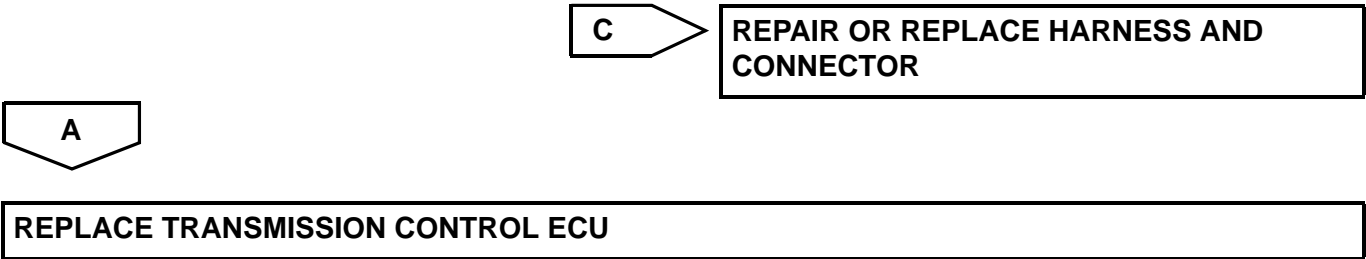
**Result:**

Result	Proceed to
Both are OK	A
One is OK	B
Both are NG	C

**B**

**REPLACE TRANSMISSION CONTROL ECU  
AND REPAIR OR REPLACE HARNESS AND  
CONNECTOR**

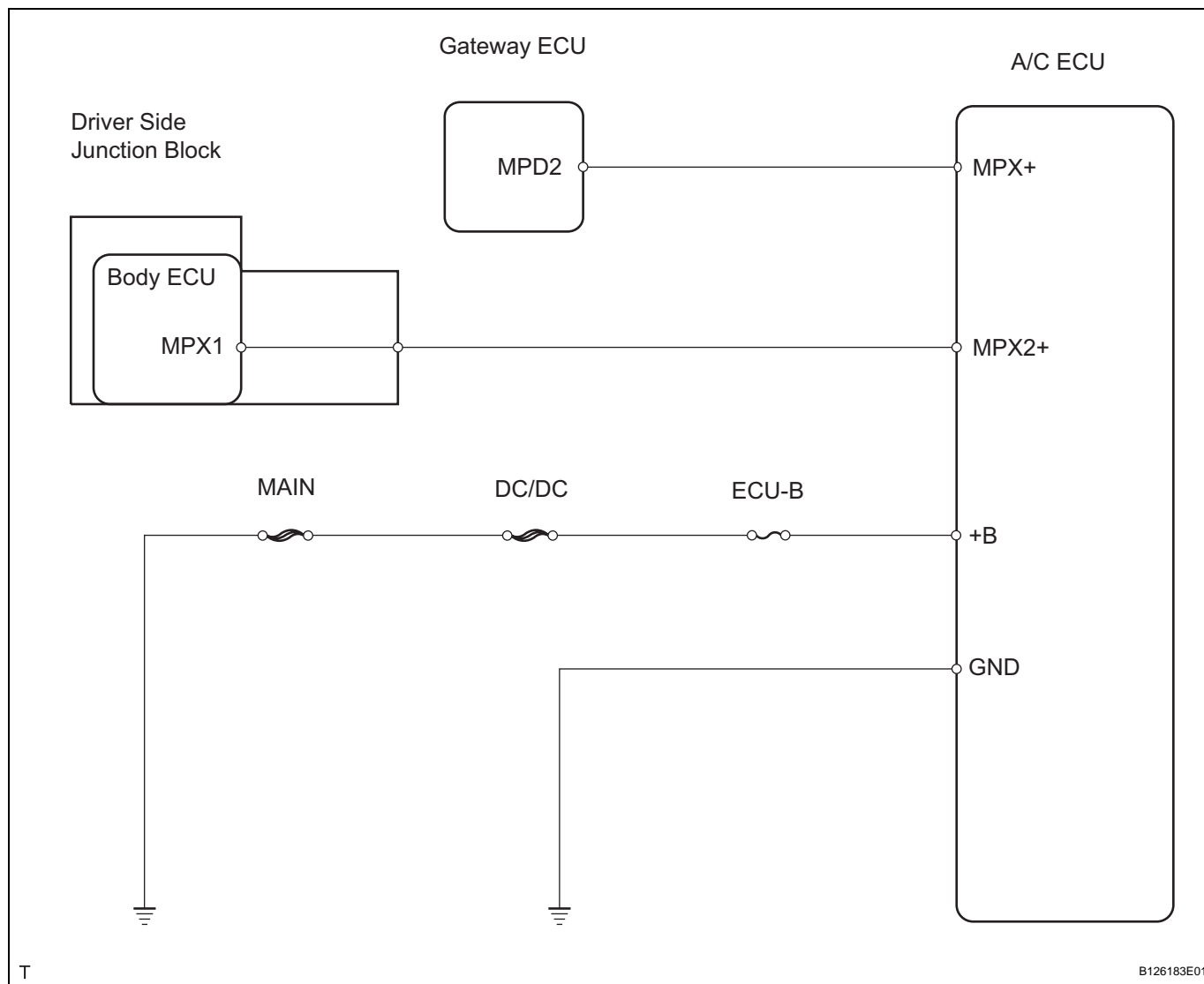
**MP**



**DTC****B1262****A/C ECU Communication Stop****DESCRIPTION**

This DTC is detected when communication between the A/C ECU and gateway ECU stops for more than 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B1262	A/C ECU communication stops	<ul style="list-style-type: none"> <li>A/C ECU</li> <li>Wire harness</li> </ul>

**WIRING DIAGRAM****INSPECTION PROCEDURE****1****CHECK OPERATION**

- (a) Check that the A/C switch can operate the air conditioner normally.

OK:  
A/C switch can operate the air conditioner normally.

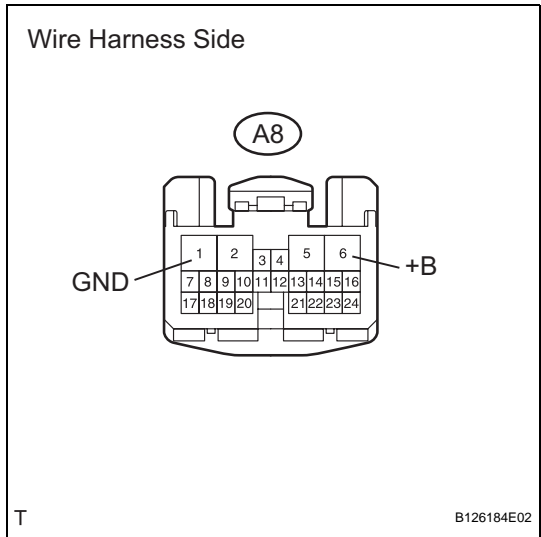
OK

Go to step 3

NG

2

CHECK WIRE HARNESS (A/C ECU - BODY GROUND)



- (a) Disconnect the A8 ECU connector.  
(b) Measure the resistance and voltage of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
A8-1 (GND) - Body ground	Below 1 Ω

Standard voltage

Tester Connection	Specified Condition
A8-6 (+B) - Body ground	10 to 14 V

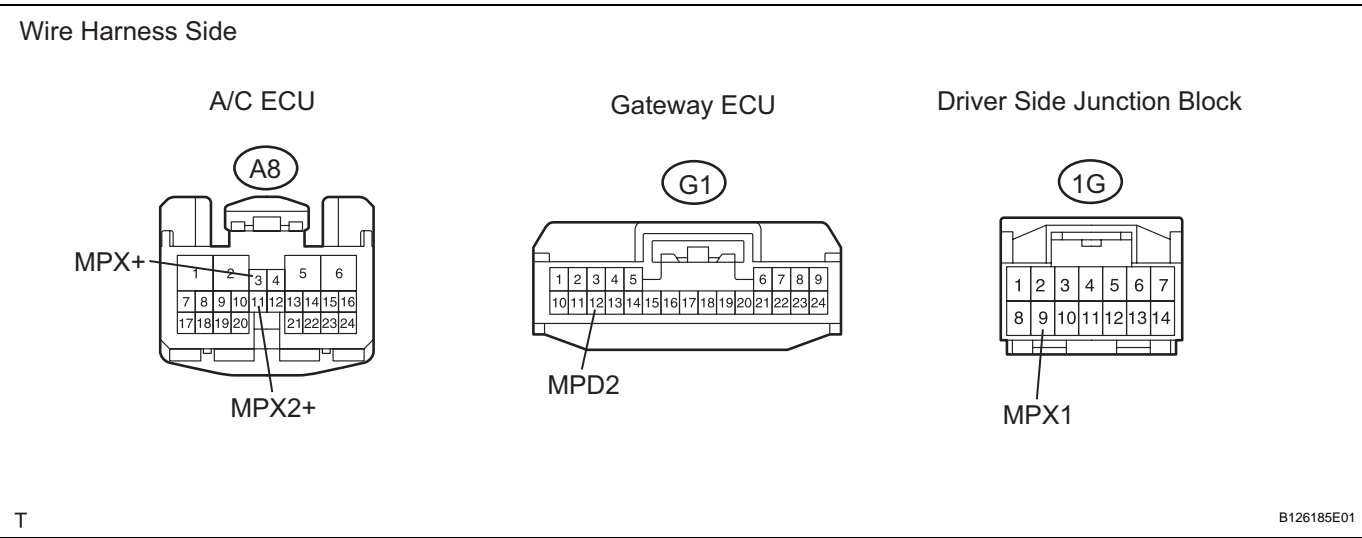
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3

CHECK RESISTANCE OF COMMUNICATION LINE



- (a) Disconnect the A8 and G1 ECU connectors.  
(b) Disconnect the 1G junction block connector.  
(c) Measure the resistance of the wire harness side connectors.

**Standard resistance**

Tester Connection	Specified Condition
A8-3 (MPX+) - G1-12 (MPD2)	Below 1 $\Omega$
A8-11 (MPX2+) - 1G-9 (MPX1)	Below 1 $\Omega$

**Result:**

Result	Proceed to
Both are OK	A
One is OK	B
Both are NG	C

**B**

**REPLACE A/C ECU AND REPAIR OR  
REPLACE HARNESS AND CONNECTOR**

**C**

**REPAIR OR REPLACE HARNESS AND  
CONNECTOR**

**A**

**REPLACE A/C ECU**

DTC

B1271

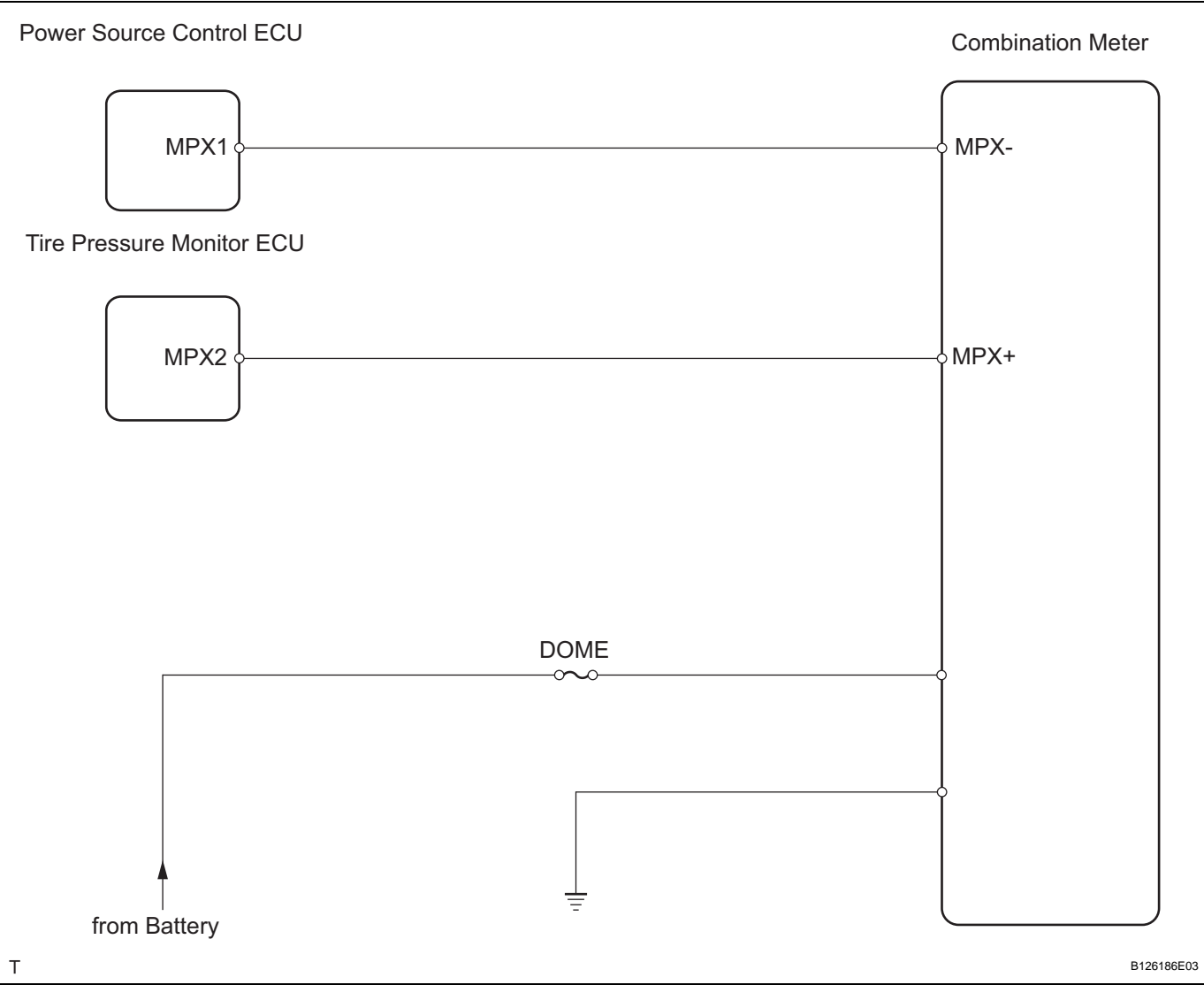
Combination Meter ECU Communication Stop

DESCRIPTION

This DTC is detected when communication between the combination meter and gateway ECU stops for more than 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B1271	Combination meter ECU communication stops	<ul style="list-style-type: none"><li>Combination meter</li><li>Wire harness</li></ul>

WIRING DIAGRAM



INSPECTION PROCEDURE

1

CHECK OPERATION

- (a) Check that the indicator (READY) on the combination meter illuminates when the hybrid vehicle control system is operating (power switch ON (READY)).



OK:

Indicator can operate properly.

OK

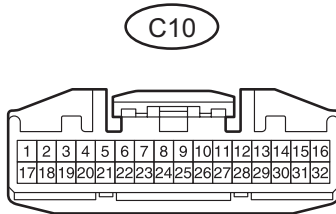
Go to step 3

NG

2

**CHECK WIRE HARNESS (COMBINATION METER - BODY GROUND)**

Wire Harness Side



B126419E03

- Disconnect the C10 meter connector.
- Measure the resistance and voltage of the wire harness side connector.

**Standard resistance**

Tester Connection	Specified Condition
C10-14 - Body ground	Below 1 $\Omega$

**Standard voltage**

Tester Connection	Specified Condition
C10-21 - Body ground	10 to 14 V

NG

**REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

3

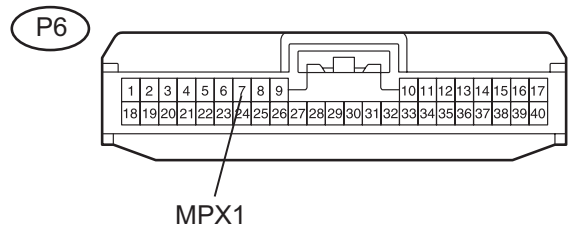
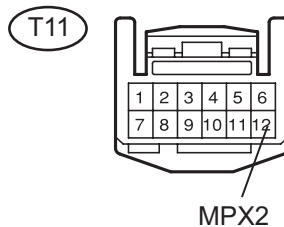
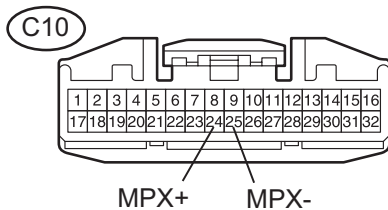
**CHECK RESISTANCE OF COMMUNICATION LINE**

Wire Harness Side

Combination Meter

Tire Pressure Monitor ECU

Power Source Control ECU



B131881E01

- Disconnect the C10 meter connector.
- Disconnect the P6 and T11 ECU connectors.
- Measure the resistance of the wire harness side connectors.

**Standard resistance**

Tester Connection	Specified Condition
C10-24 (MPX+) - T11-12 (MPX2)	Below 1 $\Omega$

MP

Tester Connection	Specified Condition
C10-25 (MPX-) - P6-7 (MPX1)	Below 1 Ω

Result:

Result	Proceed to
Both are OK	A
One is OK	B
Both are NG	C

B

REPLACE COMBINATION METER AND REPAIR OR REPLACE HARNESS AND CONNECTOR

C

REPAIR OR REPLACE HARNESS AND CONNECTOR

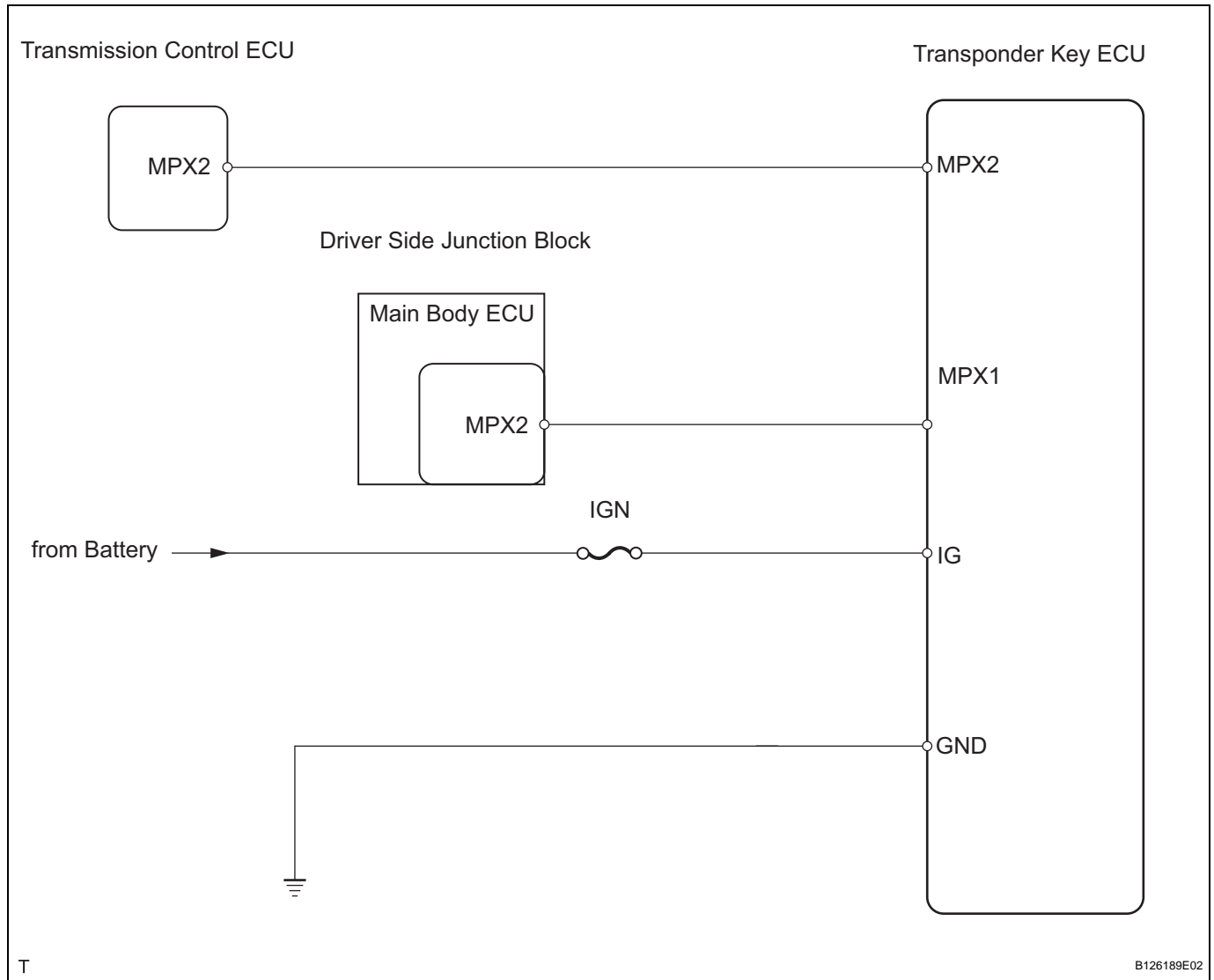
A

REPLACE COMBINATION METER

**DTC****B1294****Immobiliser ECU Communication Stop****DESCRIPTION**

This DTC is detected when communication between the transponder key ECU and gateway ECU stops for more than 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B1294	Transponder key ECU communication stops	<ul style="list-style-type: none"> <li>• Transponder key ECU</li> <li>• Wire harness</li> </ul>

**WIRING DIAGRAM****INSPECTION PROCEDURE****1****INSPECT FUSE (IGN)**

- Remove the IGN fuse from the driver side junction block.
- Measure the resistance of the fuse.

**Standard resistance:****Below 1  $\Omega$**

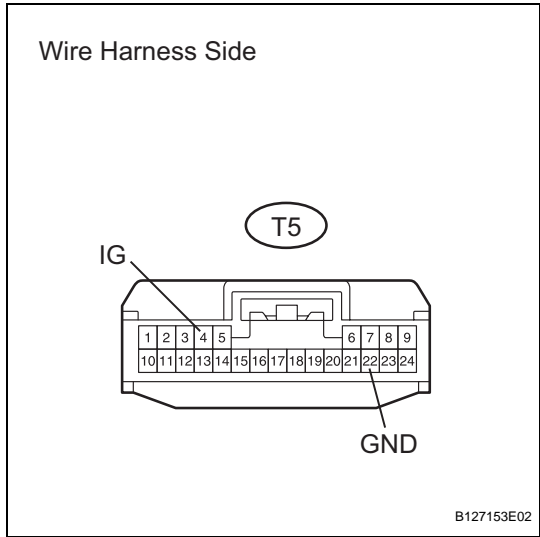
NG

REPLACE FUSE

OK

2

CHECK WIRE HARNESS (TRANSPONDER KEY ECU - BODY GROUND)



- (a) Disconnect the T5 ECU connector.
- (b) Measure the resistance and voltage of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
T5-22 (GND) - Body ground	Below 1 Ω

Standard voltage

Tester Connection	Condition	Specified Condition
T5-4 (IG) - Body ground	Power switch ON (IG)	10 to 14 V

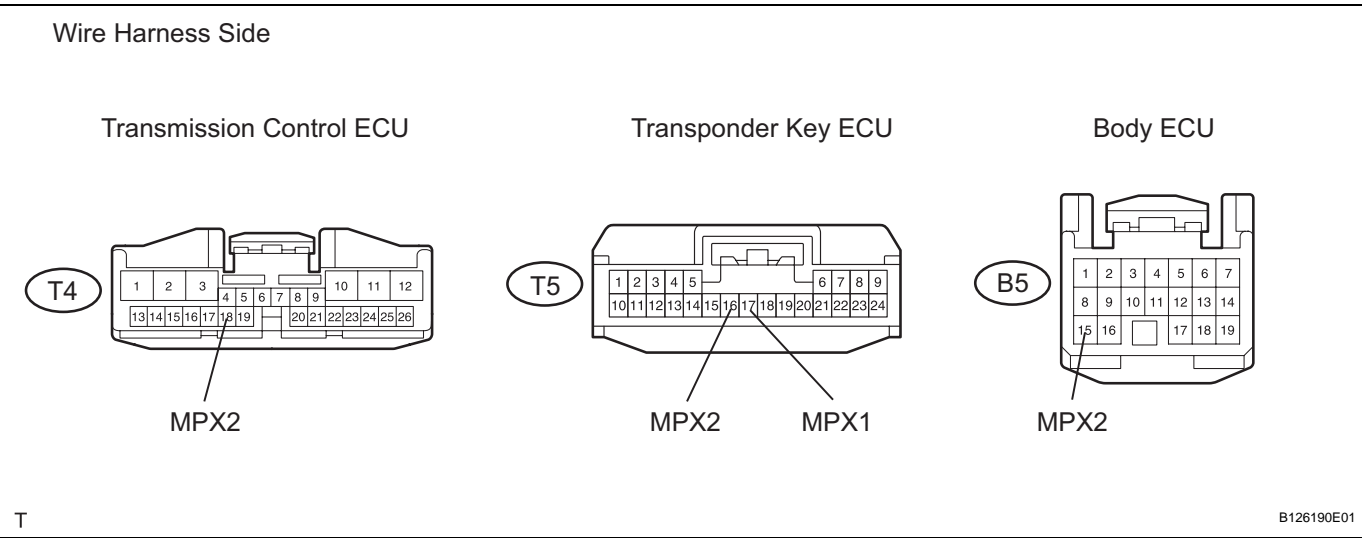
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3

CHECK RESISTANCE OF COMMUNICATION LINE



- (a) Disconnect the T4, T5 and B5 ECU connectors.
- (b) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
T5-17 (MPX1) - B5-15 (MPX2)	Below 1 Ω
T5-16 (MPX2) - T4-18 (MPX2)	Below 1 Ω

**Result:**

Result	Proceed to
Both are OK	A
One is OK	B
Both are NG	C

**B**

**REPLACE TRANSPONDER KEY ECU AND  
REPAIR OR REPLACE HARNESS AND  
CONNECTOR**

**C**

**REPAIR OR REPLACE HARNESS AND  
CONNECTOR**

**A**

**REPLACE TRANSPONDER KEY ECU**