

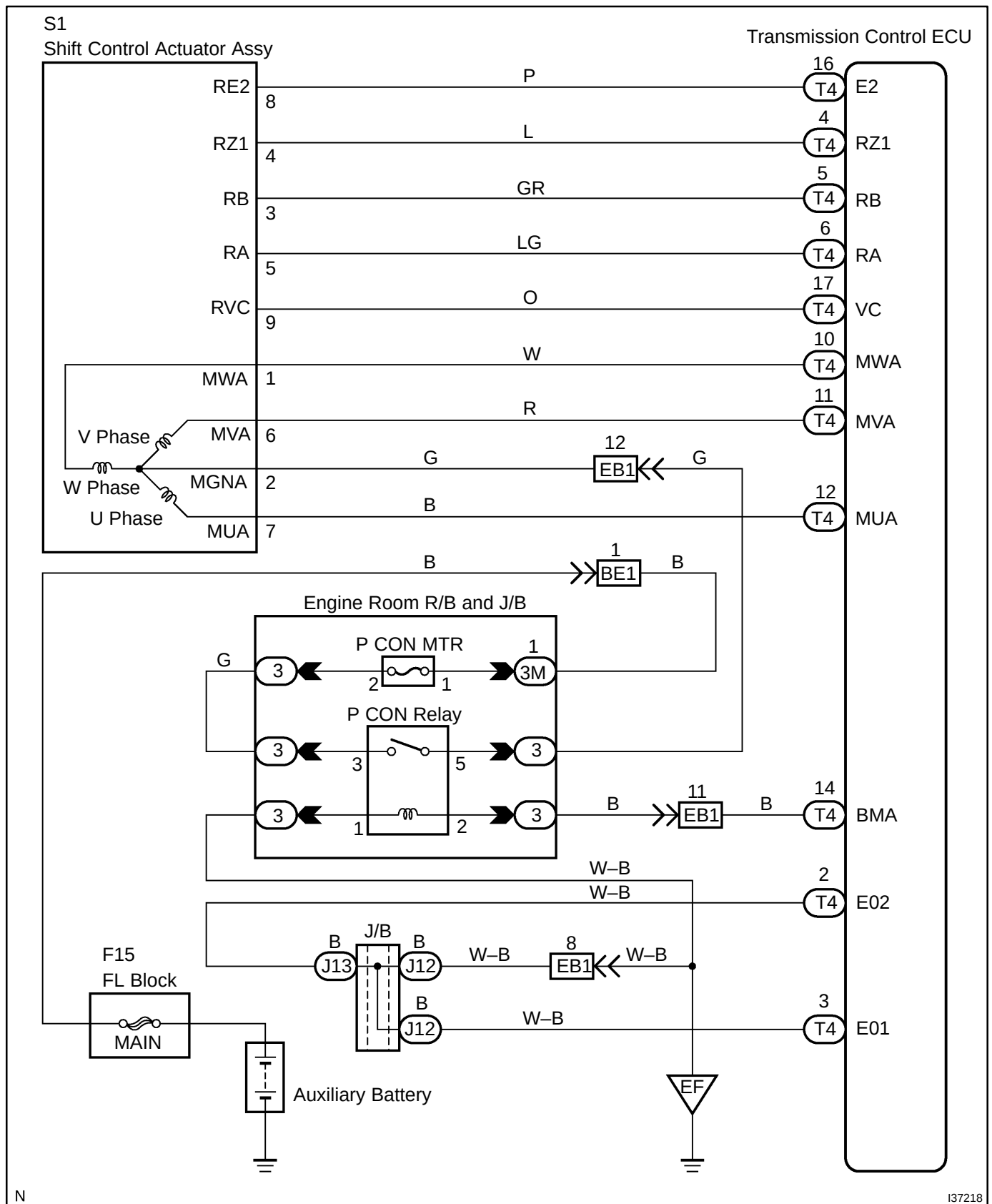
DTC	C2300	ACT SYSTEM MALFUNCTION
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CIRCUIT DESCRIPTION

The shift control actuator assy consists of the parking lock motor and the rotation angle sensor. The transmission control ECU receives a P position switch signal from the hybrid vehicle control ECU and activates the parking lock motor by controlling current, causing the parking lock mechanism to switch. The transmission control ECU also detects the rotor rotation angle through the rotation angle sensor to control timing of current application to the coils. The transmission control ECU outputs this DTC when it detects a malfunction in the shift control actuator assy system.

DTC No.	DTC detecting condition	Trouble area
C2300	• Power switch on (IG). • There is an open or short circuit in the transaxle parking lock control relay and/or shift control actuator assy, or an internal abnormality in the shift control actuator assy.	• Shift control actuator assy • Transaxle parking lock control relay • Transmission control ECU assy • Wire harness or connector

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK OTHER DTC OUTPUT(BESIDES DTC C2300)

- Connect the hand-held tester to the DLC3.
- Turn the power switch on (IG).
- Turn the hand-held tester on.
- Read the DTCs.

Result:

Display (DTC output)	Proceed to
No output	A
C2304, C2305, C2306 and C2318	B

HINT:

If any other codes besides C2300 are output, perform the troubleshooting for those DTCs first.

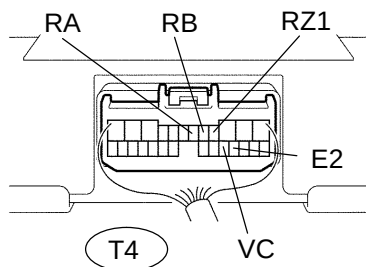
B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

2 INSPECT TRANSMISSION CONTROL ECU ASSY(VC, RA, RB, RZ1, E2 TERMINAL)

Transmission Control ECU Assy:



F44944

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

Standard:

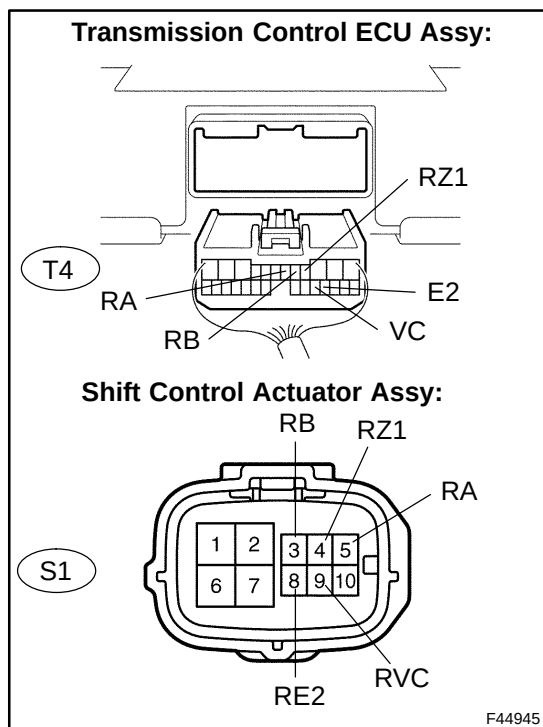
Tester connection (Symbols)	Condition	Specified condition
T4-4 (RZ1) – T4-16 (E2)	Power switch on (IG)	4 to 5.5 V
T4-5 (RB) – T4-16 (E2)	Power switch on (IG)	4 to 5.5 V
T4-6 (RA) – T4-16 (E2)	Power switch on (IG)	4 to 5.5 V
T4-17 (VC) – T4-16 (E2)	Power switch on (IG)	4 to 5.5 V

OK

Go to step 5

NG

3 CHECK HARNESS AND CONNECTOR(SHIFT CONTROL ACTUATOR ASSY – TRANSMISSION CONTROL ECU ASSY)



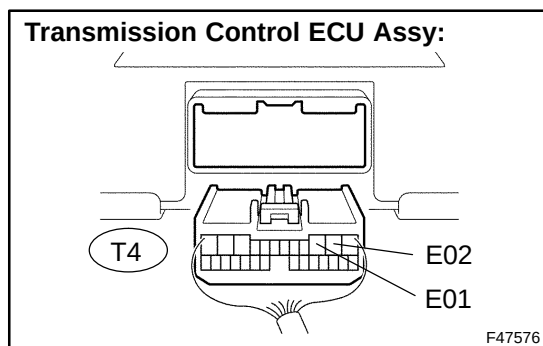
- Disconnect the T4 connector from the transmission control ECU assy.
- Disconnect the S1 connector from the shift control actuator assy.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
T4-17 (VC) – S1-9 (RVC)	Always	Below 1 Ω
T4-5 (RB) – S1-3 (RB)	Always	Below 1 Ω
T4-6 (RA) – S1-5 (RA)	Always	Below 1 Ω
T4-4 (RZ1) – S1-4 (RZ1)	Always	Below 1 Ω
T4-16 (E2) – S1-8 (RE2)	Always	Below 1 Ω
T4-4 (RZ1) – Body ground	Always	10 k Ω or higher
T4-5 (RB) – Body ground	Always	10 k Ω or higher
T4-6 (RA) – Body ground	Always	10 k Ω or higher
T4-17 (VC) – Body ground	Always	10 k Ω or higher

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

4 INSPECT TRANSMISSION CONTROL ECU ASSY(E01, E02 TERMINAL)



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

Standard:

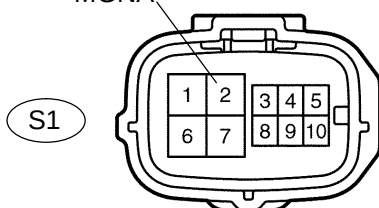
Tester connection (Symbols)	Condition	Specified condition
T4-2 (E02) – Body ground	Always	Below 1 Ω
T4-3 (E01) – Body ground	Always	Below 1 Ω

OK**Go to step 14****NG****REPAIR OR REPLACE HARNESS OR CONNECTOR**

5 INSPECT SHIFT CONTROL ACTUATOR ASSY(MGNA TERMINAL)

Shift Control actuator Assy (Wire Harness Side):

MGNA



F47577

- Disconnect the S1 connector from the shift control actuator assy.
- Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
S1-2 (MGNA) – Body ground	Power switch on (IG)	9 to 14 V

NG**Go to step 7****OK****6 READ VALUE ON HAND-HELD TESTER**

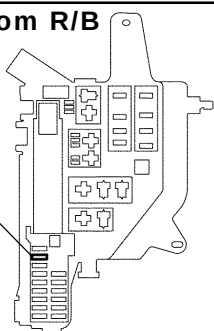
- Connect the hand-held tester to the DLC3.
- Turn the power switch on (IG).
- Turn the hand-held tester on.
- Select the item below in the DATA LIST, and read its value displayed on the hand-held tester.

Item	Measurement Item/ Range (Display)	Normal Condition
U VOL VAL	U phase voltage value/min: 0 V, max: 20 V	Actual U phase voltage 9 to 14 V
V VOL VAL	V phase voltage value/min: 0 V, max: 20 V	Actual V phase voltage 9 to 14 V
W VOL VAL	W phase voltage value/min: 0 V, max: 20 V	Actual W phase voltage 9 to 14 V

Standard:**Voltage: 9 to 14 V****NG****Go to step 13****OK****REPLACE TRANSMISSION CONTROL ECU ASSY****7 INSPECT FUSE(P CON MTR FUSE)**

Engine Room R/B and J/B:

P CON MTR Fuse

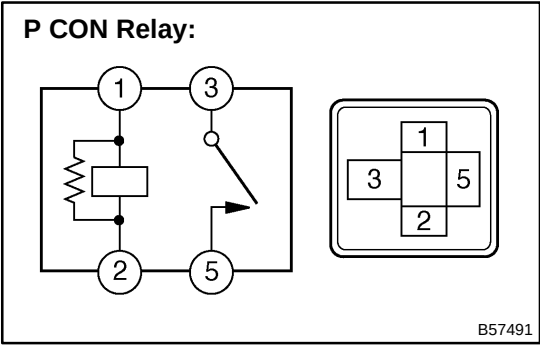


F47578

- Remove the P CON MTR fuse from the engine room R/B and J/B.
- Check for continuity of the P CON MTR fuse.

Standard: Continuity**NG****INSPECT FOR SHORT IN ALL COMPONENTS CONNECTED TO FUSE AND REPAIR OR REPLACE THEM IF NEEDED, AND REPLACE FUSE****OK**

8 INSPECT TRANSAXLE PARKING LOCK CONTROL RELAY



- (a) Remove the P CON relay from the engine room R/B and J/B.
- (b) Measure the resistance according to the value(s) in the table below.

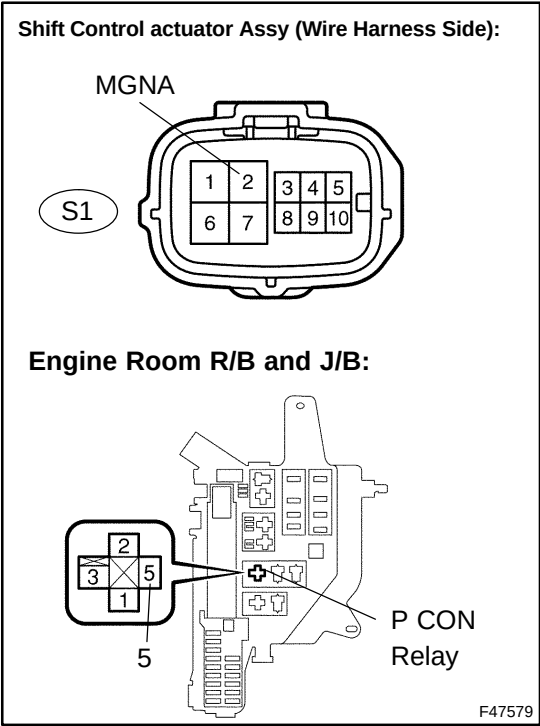
Standard:

Tester Connection	Specified Condition
3 – 5	10 kΩ or higher
3 – 5	Below 1 Ω (When battery voltage is applied to terminals 1 and 2)

NG REPLACE TRANSAXLE PARKING LOCK CONTROL RELAY

OK

9 CHECK HARNESS AND CONNECTOR(SHIFT CONTROL ACTUATOR ASSY – TRANSAXLE PARKING LOCK CONTROL RELAY)



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

Standard:

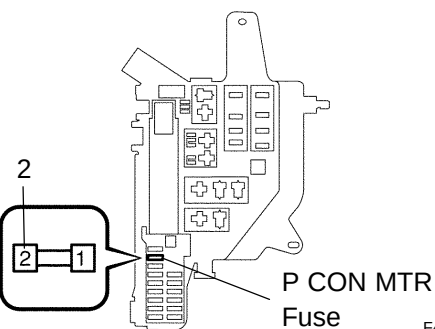
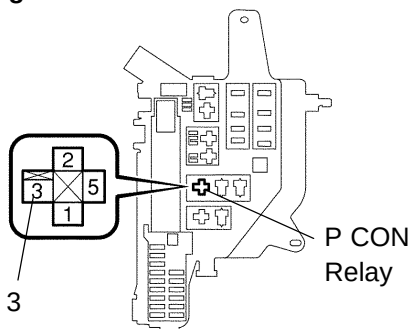
Tester connection (Symbols)	Condition	Specified condition
S1-2 (MGNA) – 5 (P CON Relay)	Always	Below 1 Ω
S1-2 (MGNA) – Body ground	Always	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

10 CHECK HARNESS AND CONNECTOR(TRANSAXLE PARKING LOCK CONTROL RELAY – P CON MTR FUSE)

Engine Room R/B and J/B:



F47580

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

Standard:

Tester connection (Symbols)	Condition	Specified condition
3 (P CON Relay) – 2 (P CON MTR Fuse)	Always	Below 1 Ω
3 (P CON Relay) – Body ground	Always	10 k Ω or higher

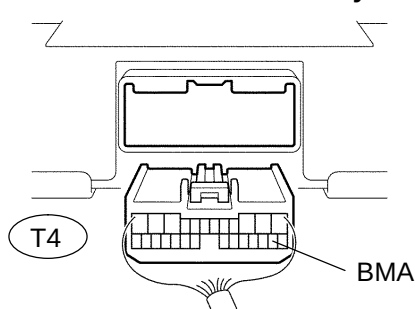
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

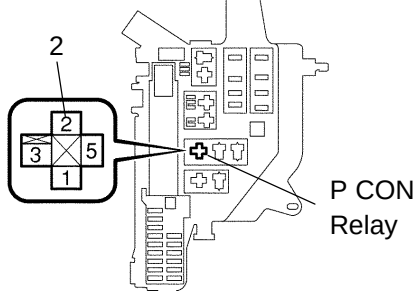
OK

11 CHECK HARNESS AND CONNECTOR(TRANSMISSION CONTROL ECU ASSY – TRANSAXLE PARKING LOCK CONTROL RELAY)

Transmission Control ECU Assy:



Engine Room R/B
and J/B:



F47581

- (a) Disconnect the T4 connector from the transmission control ECU assy.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
T4-14 (BMA) – 2 (P CON MTR Fuse)	Always	Below 1 Ω
T4-14 (BMA) – Body ground	Always	10 k Ω or higher

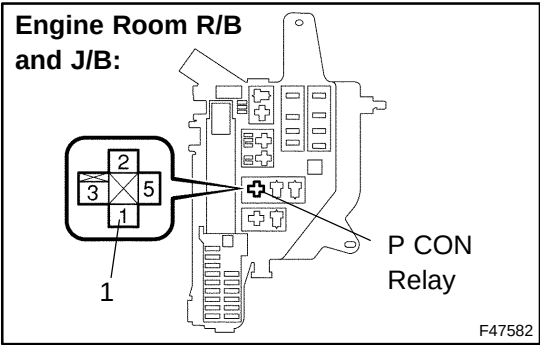
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

12

CHECK HARNESS AND CONNECTOR(TRANSAXLE PARKING LOCK CONTROL RELAY – BODY GROUND)



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

Standard:

Tester connection (Symbols)	Condition	Specified condition
1 (P CON Relay) – Body ground	Always	Below 1 Ω

NG

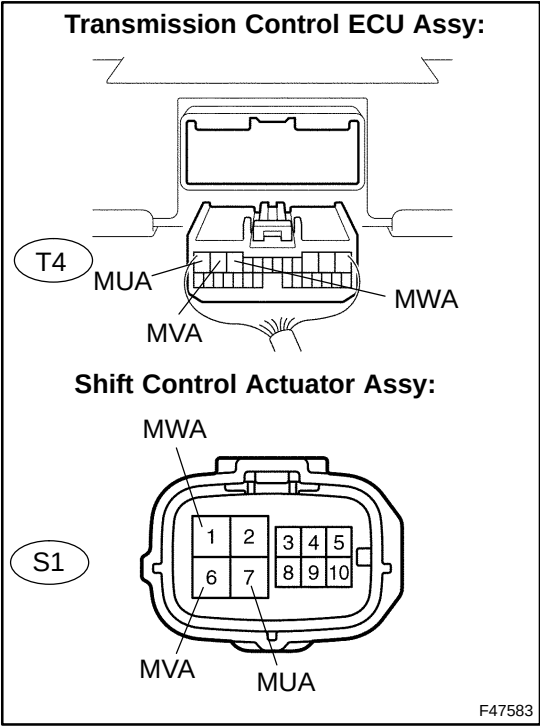
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR(P CON MTR FUSE – BATTERY)

13

CHECK HARNESS AND CONNECTOR(TRANSMISSION CONTROL ECU ASSY – SHIFT CONTROL ACTUATOR ASSY)



- (a) Disconnect the T4 connector from the transmission control ECU assy.

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

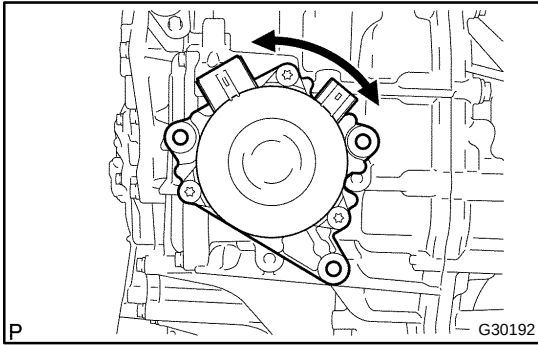
Standard:

Tester connection (Symbols)	Condition	Specified condition
T4-10 (MWA) – S1-1 (MWA)	Always	Below 1 Ω
T4-11 (MVA) – S1-6 (MVA)	Always	Below 1 Ω
T4-12 (MUA) – S1-7 (MUA)	Always	Below 1 Ω
T4-10 (MWA) – Body ground	Always	10 kΩ or higher
T4-11 (MVA) – Body ground	Always	10 kΩ or higher
T4-12 (MUA) – Body ground	Always	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

14 INSPECT SHIFT CONTROL ACTUATOR ASSY

- (a) Remove the 3 bolts and transmission case cover.
- (b) Remove the 3 bolts.
- (c) Slightly pull the shift control actuator assy from the hybrid vehicle transaxle so that the shift control actuator assy can be turned.
- (d) Turn the shift control actuator assy.

OK: The shift control actuator turns smoothly.

HINT:

There may be an internal actuator abnormality if the actuator does not turn smoothly.

NG

**REPLACE SHIFT CONTROL ACTUATOR ASSY
(SEE PAGE 22-6)**

OK

REPLACE TRANSMISSION CONTROL ECU ASSY

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DTC	C2301	SHIFT CHANGING TIME MALFUNCTION
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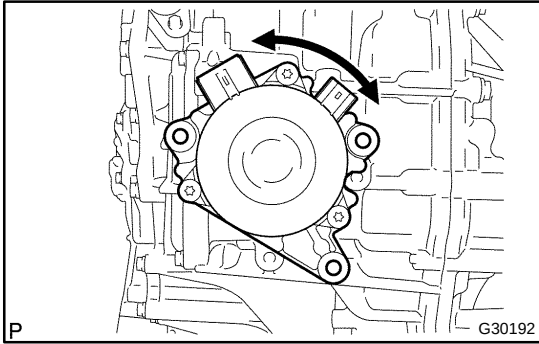
CIRCUIT DESCRIPTION

The transmission control ECU receives a P position switch signal from the hybrid vehicle control ECU and then activates the shift control actuator. At the same time, the transmission control ECU detects length of time it takes for the parking lock mechanism to switch. The transmission control ECU outputs this DTC when this length of time is longer than specification.

DTC No.	DTC detecting condition	Trouble area
C2301	• Power switch on (IG). • There is an internal abnormality in the shift control actuator assy for 2 sec. or more (the parking lock motor runs idle).	• Shift control actuator assy • Transmission control ECU assy

INSPECTION PROCEDURE

1 INSPECT SHIFT CONTROL ACTUATOR ASSY



- (a) Remove the 3 bolts and transmission case cover.
- (b) Remove the 3 bolts.
- (c) Slightly pull the shift control actuator assy from the hybrid vehicle transaxle so that the shift control actuator assy can be turned.
- (d) Turn the shift control actuator assy.

OK: The shift control actuator turns smoothly.

HINT:

There may be an internal actuator abnormality if the actuator does not turn smoothly.

NG

**REPLACE SHIFT CONTROL ACTUATOR ASSY
(SEE PAGE 22-6)**

OK

REPLACE TRANSMISSION CONTROL ECU ASSY

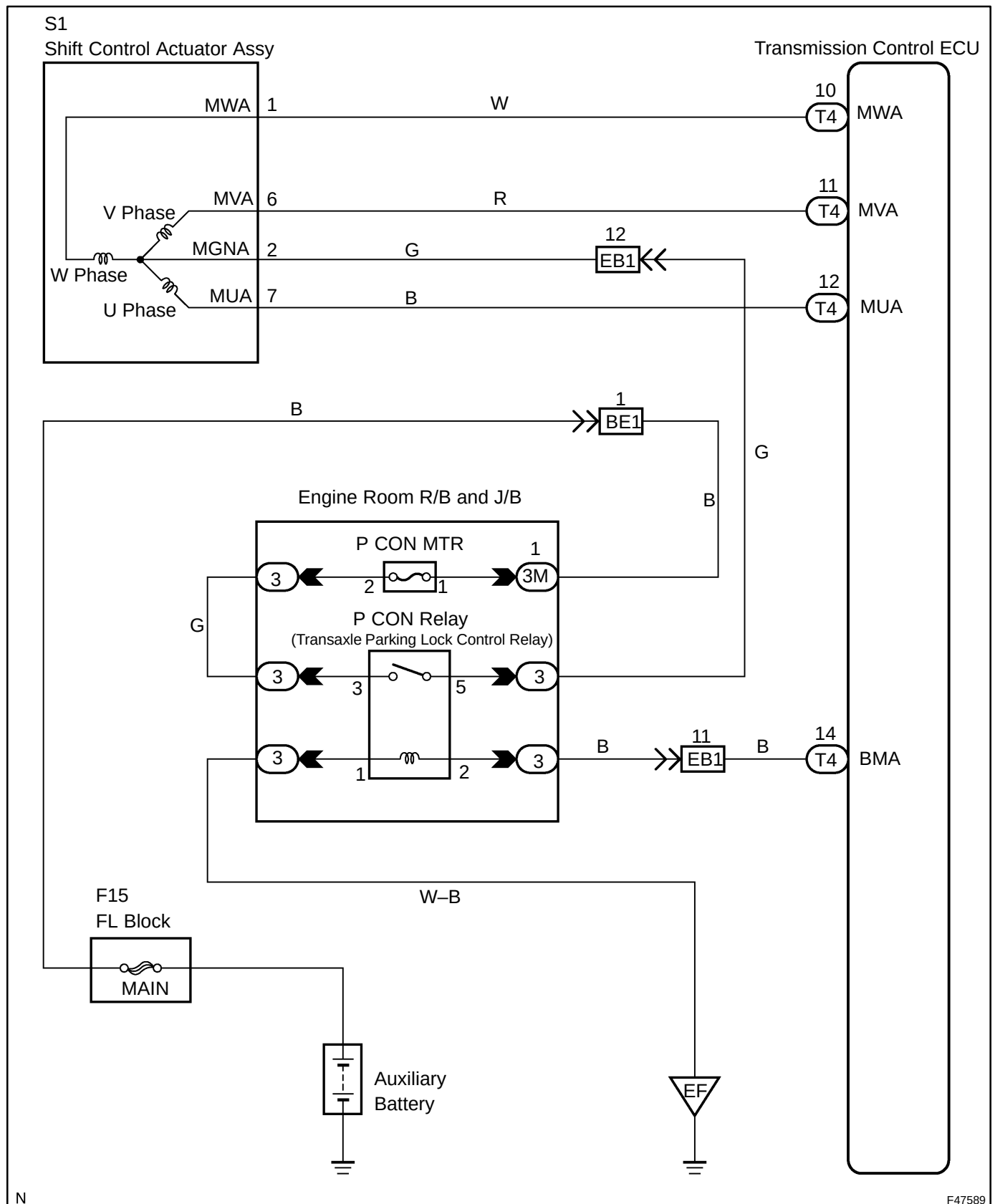
DTC	C2303	RELAY MALFUNCTION (+B SHORT)
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CIRCUIT DESCRIPTION

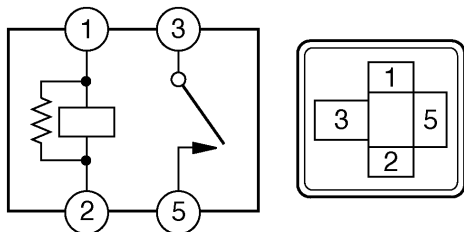
The transaxle parking lock control relay is activated by output voltage from the transmission control ECU and supplies power to the shift control actuator assy. The transmission control ECU outputs this DTC when it detects a malfunction in the transaxle parking lock control relay.

DTC No.	DTC detecting condition	Trouble area
C2303	• The transaxle parking lock control relay is off. • Voltage of the transmission control ECU terminals MUA, MVA, and MWA is 6 V or more for 64 ms or more.	• Transaxle parking lock control relay (P CON Relay) • Transmission control ECU assy • Wire harness or connector

WIRING DIAGRAM



INSPECTION PROCEDURE

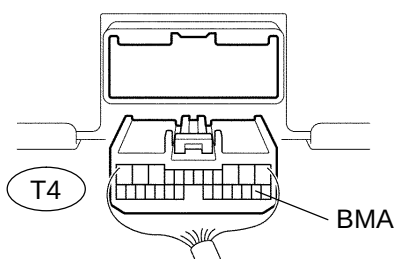
1 INSPECT TRANSAXLE PARKING LOCK CONTROL RELAY(P CON RELAY)**P CON Relay:**

B57491

- (a) Remove the P CON relay from the engine room R/B and J/B.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
3 – 5	10 kΩ or higher
3 – 5	Below 1 Ω (When battery voltage is applied to terminals 1 and 2)

NG**REPLACE TRANSAXLE PARKING LOCK CONTROL RELAY****OK****2 CHECK HARNESS AND CONNECTOR(TRANSMISSION CONTROL ECU ASSY – TRANSAXLE PARKING LOCK CONTROL RELAY)****Transmission Control ECU Assy:**

F47584

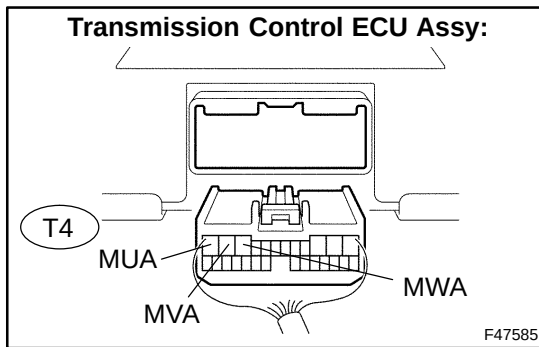
- (a) Disconnect the T4 connector from the transmission control ECU Assy.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
T4-14 (BMA) – Body ground	Always	Below 1 V

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

3 CHECK HARNESS AND CONNECTOR(TRANSMISSION CONTROL ECU ASSY – SHIFT CONTROL ACTUATOR ASSY)



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

Standard:

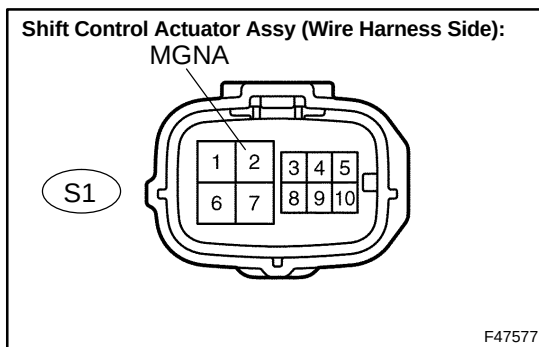
Tester connection (Symbols)	Condition	Specified condition
T4-10 (MWA) – Body ground	Always	Below 1 V
T4-11 (MVA) – Body ground	Always	Below 1 V
T4-12 (MUA) – Body ground	Always	Below 1 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR(SHIFT CONTROL ACTUATOR ASSY – TRANSAXLE PARKING LOCK CONTROL RELAY)



- (a) Disconnect the S1 connector from the shift control actuator assy.
 (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
S1-2 (MGNA) – Body ground	Always	Below 1 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE TRANSMISSION CONTROL ECU ASSY

DTC	C2304	OPEN OR SHORT CIRCUIT IN U PHASE
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DTC	C2305	OPEN OR SHORT CIRCUIT IN V PHASE
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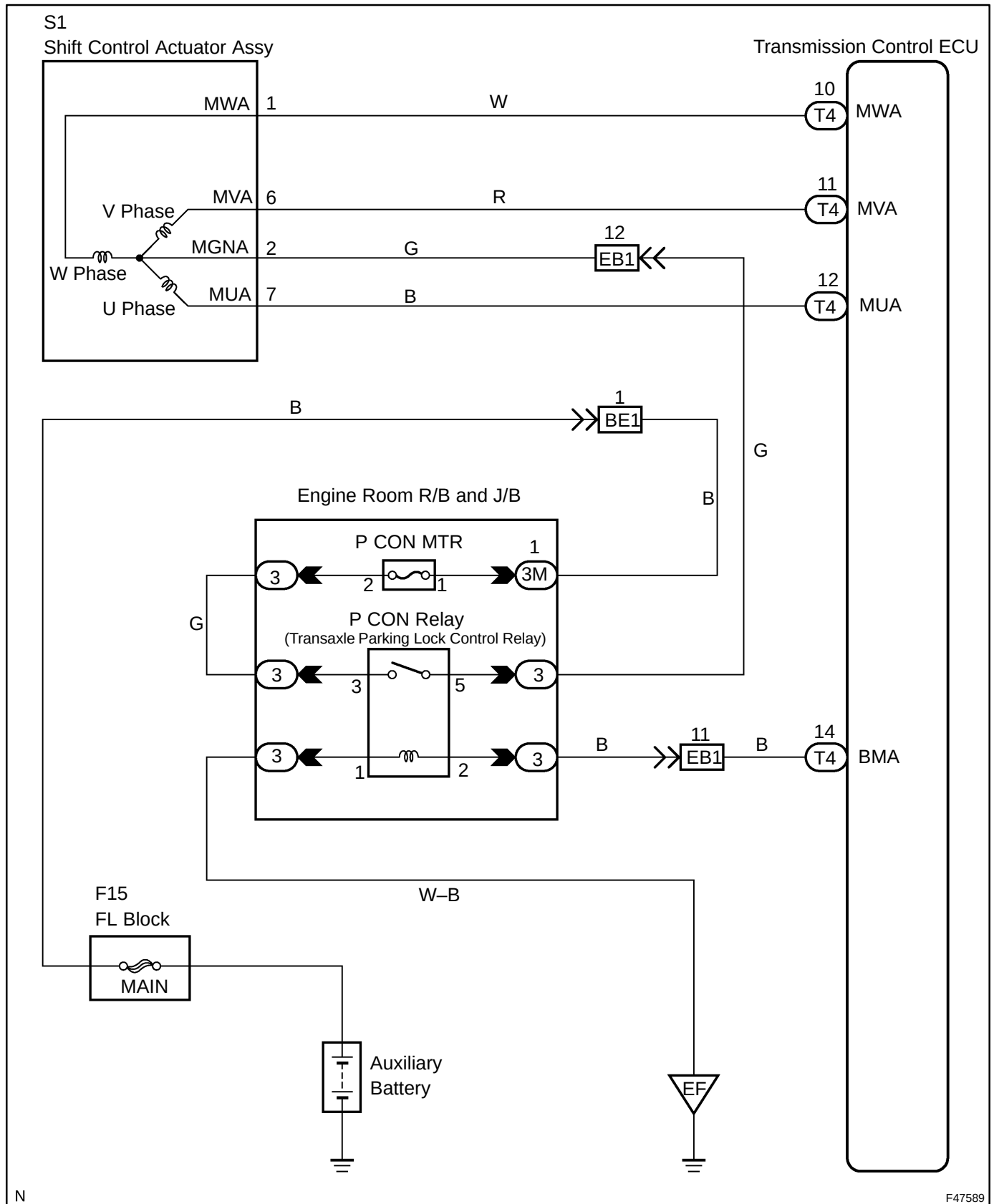
DTC	C2306	OPEN OR SHORT CIRCUIT IN W PHASE
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CIRCUIT DESCRIPTION

The shift control actuator assy consists of the parking lock motor and the rotation angle sensor. The transmission control ECU receives a P position switch signal from the hybrid vehicle control ECU and activates the parking lock motor by controlling current, causing the parking lock mechanism to switch. The transmission control ECU outputs this DTC when it detects a malfunction in the parking lock motor system.

DTC No.	DTC detecting condition	Trouble area
C2304	• Power switch on (IG). (Battery voltage is 8 V or more) • Voltage of transmission control ECU terminal MUA is 6 V or less for 1 sec. or more.	• Shift control actuator assy • Transmission control ECU assy • Transaxle parking lock control relay • Wire harness or connector
C2305	• Power switch on (IG). (Battery voltage is 8 V or more) • Voltage of transmission control ECU terminal MVA is 6 V or less for 1 sec. or more.	• Shift control actuator assy • Transmission control ECU assy • Transaxle parking lock control relay • Wire harness or connector
C2306	• Power switch on (IG). (Battery voltage is 8 V or more) • Voltage of transmission control ECU terminal MWA is 6 V or less for 1 sec. or more.	• Shift control actuator assy • Transmission control ECU assy • Transaxle parking lock control relay • Wire harness or connector

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK DTC

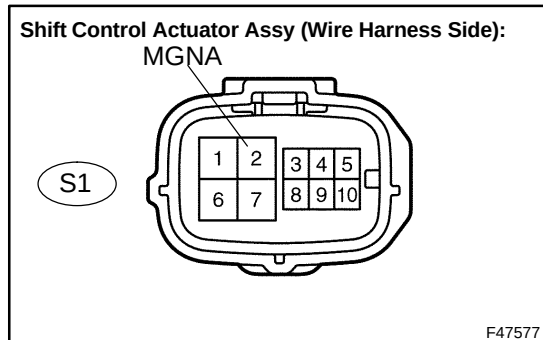
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch on (IG).
- (c) Turn the hand-held tester on.
- (d) Read the DTCs.

Result:

Display (DTC output)	Proceed to
C2304, C2305, and C2306 are detected simultaneously	A
C2304, C2305, and C2306 are not detected simultaneously	B

HINT:

- When DTCs C2304, C2305, and C2306 are detected simultaneously, there may be an open or short circuit between the shift control actuator and the battery.
- When DTCs C2304, C2305, and C2306 are not detected simultaneously, there may be an open or short circuit in the shift control actuator or between the actuator and the ECU.

B**Go to step 7****A****2 INSPECT SHIFT CONTROL ACTUATOR ASSY(MGNA TERMINAL)**

- (a) Disconnect the S1 connector from the shift control actuator assy.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

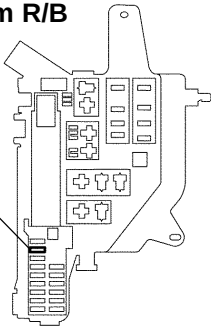
Tester connection (Symbols)	Condition	Specified condition
S1-2 (MGNA) – Body ground	Power switch on (IG)	9 to 14 V

OK**Go to step 7****NG**

3 INSPECT FUSE(P CON MTR FUSE)

Engine Room R/B and J/B:

P CON MTR Fuse



F47578

- Remove the P CON MTR fuse from the engine room R/B and J/B.
- Check for continuity of the P CON MTR fuse.

Standard: Continuity

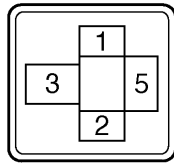
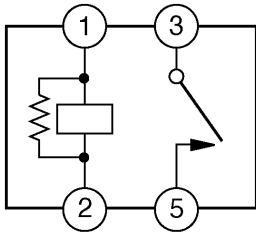
NG

INSPECT FOR SHORT IN ALL COMPONENTS CONNECTED TO FUSE AND REPAIR OR REPLACE THEM IF NEEDED, AND REPLACE FUSE

OK

4 INSPECT TRANSAXLE PARKING LOCK CONTROL RELAY(P CON RELAY)

P CON Relay:



B57491

- Remove the P CON relay from the engine room R/B and J/B.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
3 – 5	10 kΩ or higher
3 – 5	Below 1 Ω (When battery voltage is applied to terminals 1 and 2)

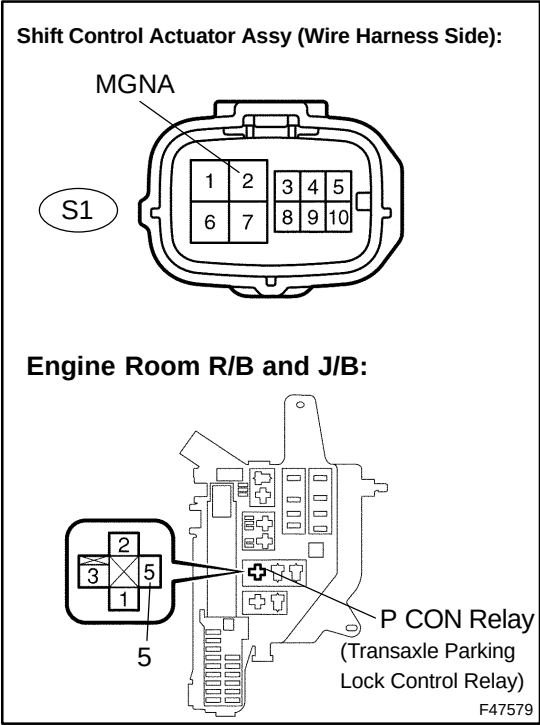
NG

REPLACE TRANSAXLE PARKING LOCK CONTROL RELAY

OK

5

CHECK HARNESS AND CONNECTOR(SHIFT CONTROL ACTUATOR ASSY – TRANSAXLE PARKING LOCK CONTROL RELAY)



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

Standard:

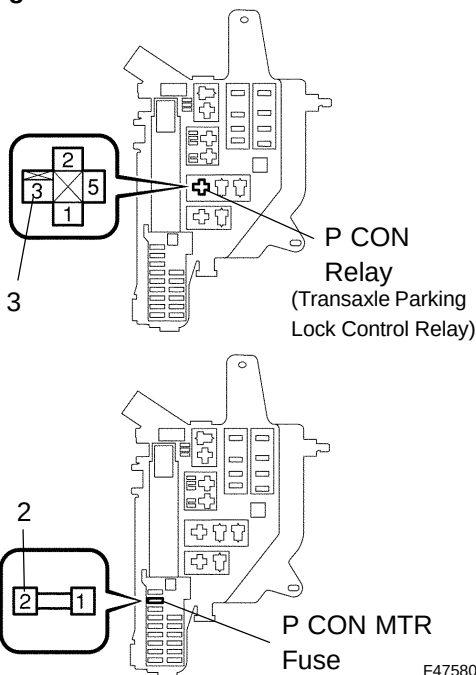
Tester connection (Symbols)	Condition	Specified condition
S1-2 (MGNA) – 5 (P CON Relay)	Always	Below 1 Ω
S1-2 (MGNA) – Body ground	Always	10 kΩ or higher

OK

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

6 CHECK HARNESS AND CONNECTOR(TRANSAXLE PARKING LOCK CONTROL RELAY – P CON MTR FUSE)

Engine Room R/B and J/B:



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

Standard:

Tester connection (Symbols)	Condition	Specified condition
3 (P CON Relay) – 2 (P CON MTR Fuse)	Always	Below 1 Ω
3 (P CON Relay) – Body ground	Always	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR(P CON MTR FUSE – BATTERY)

7 READ VALUE ON HAND-HELD TESTER

- Connect the S1 connector to the shift control actuator assy.
- Connect the hand-held tester to the DLC3.
- Turn the power switch on (IG).
- Turn the hand-held tester on.
- Select the item below in the DATA LIST, and read its value displayed on the hand-held tester.

Item	Measurement Item/Range (Display)	Normal Condition
U VOL VAL	U phase voltage value/min: 0 V, max: 20 V	Actual U phase voltage 9 to 14 V
V VOL VAL	V phase voltage value/min: 0 V, max: 20 V	Actual V phase voltage 9 to 14 V
W VOL VAL	W phase voltage value/min: 0 V, max: 20 V	Actual W phase voltage 9 to 14 V

Standard:

Voltage: 9 to 14 V

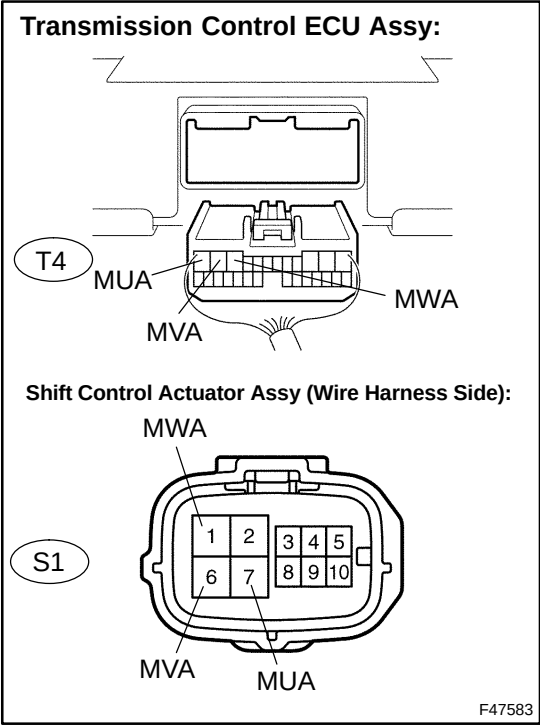
OK

REPLACE TRANSMISSION CONTROL ECU ASSY

NG

8

CHECK HARNESS AND CONNECTOR(TRANSMISSION CONTROL ECU ASSY – SHIFT CONTROL ACTUATOR ASSY)



- (a) Disconnect the T4 connector from the transmission control ECU Assy.
- (b) Disconnect the S1 connector from the shift control actuator Assy.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
T4-10 (MWA) – S1-1 (MWA)	Always	Below 1 Ω
T4-11 (MVA) – S1-6 (MVA)	Always	Below 1 Ω
T4-12 (MUA) – S1-7 (MUA)	Always	Below 1 Ω
T4-10 (MWA) – Body ground	Always	10 kΩ or higher
T4-11 (MVA) – Body ground	Always	10 kΩ or higher
T4-12 (MUA) – Body ground	Always	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE SHIFT CONTROL ACTUATOR ASSY (SEE PAGE 22-6)

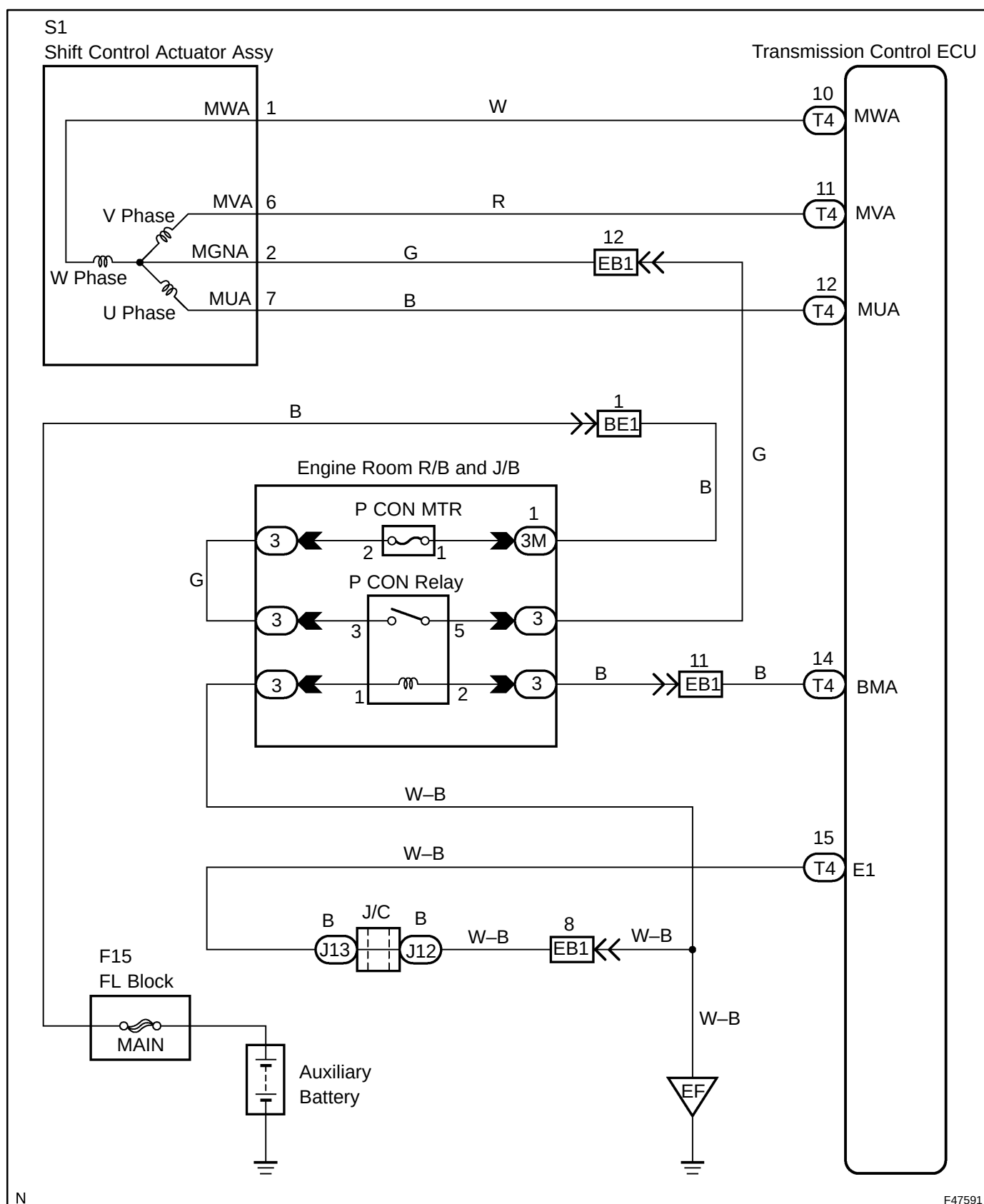
DTC	C2307	POWER SOURCE MALFUNCTION
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CIRCUIT DESCRIPTION

The shift control actuator assy consists of the parking lock motor and the rotation angle sensor. The transmission control ECU receives a P position switch signal from the hybrid vehicle control ECU and activates the parking lock motor by controlling current, causing the parking lock mechanism to switch. The transmission control ECU outputs this DTC when it detects a malfunction in the parking lock motor system and/or the ground circuit.

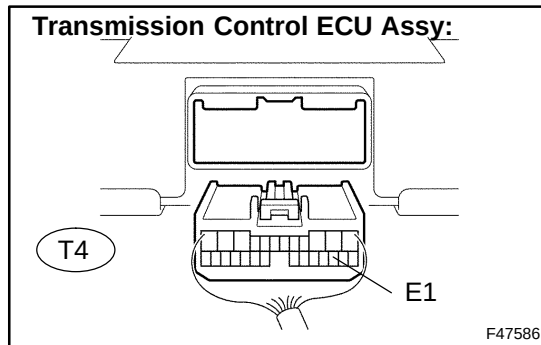
DTC No.	DTC detecting condition	Trouble area
C2307	• Power switch on (IG) • The parking lock motor current is 50 A or more, or there is an open in the terminal E1 circuit of the transmission control ECU for 0.1 sec. or more.	• Transmission control ECU assy • Wire harness or connector • Parking lock motor (Shift control actuator assy)

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT TRANSMISSION CONTROL ECU ASSY(E1 TERMINAL)



- Disconnect the T4 connector from the transmission control ECU assy.
- Measure the resistance according to the value(s) in the table below.

Standard:

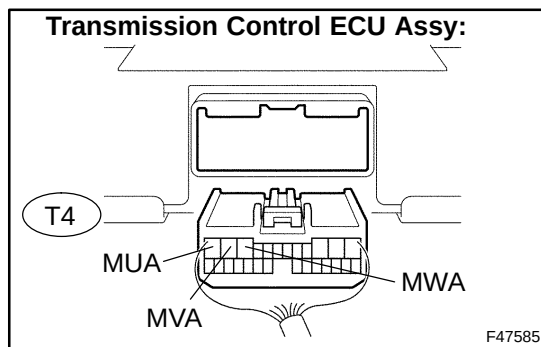
Tester connection (Symbols)	Condition	Specified condition
T4-15 (E1) – Body ground	Always	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION CONTROL ECU ASSY – SHIFT CONTROL ACTUATOR ASSY)



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

Standard:

Tester connection (Symbols)	Condition	Specified condition
T4-10 (MWA) – Body ground	Always	Below 1 V
T4-11 (MVA) – Body ground	Always	Below 1 V
T4-12 (MUA) – Body ground	Always	Below 1 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE TRANSMISSION CONTROL ECU ASSY

DTC	C2310	OPEN OR SHORT CIRCUIT IN BATT
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CIRCUIT DESCRIPTION

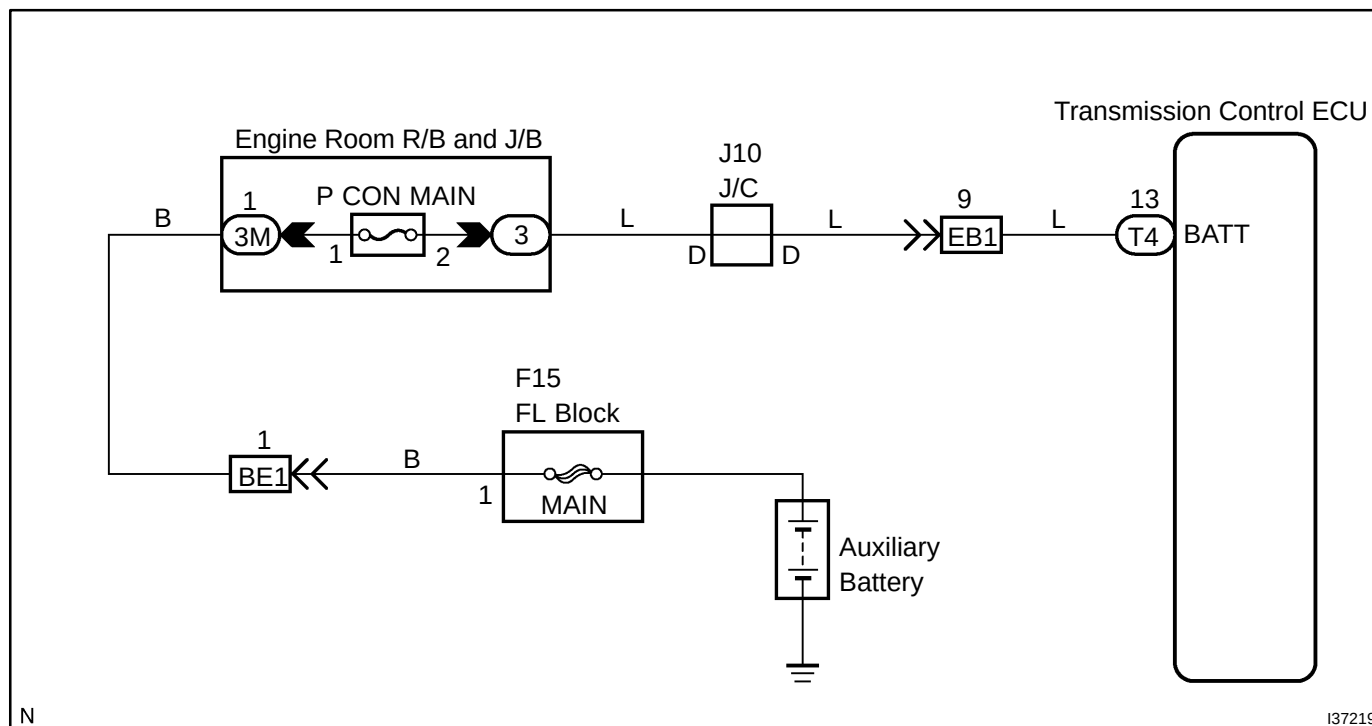
The auxiliary battery voltage is constantly applied to terminal BATT. The terminal BATT voltage is used to power the transmission control ECU memory. The transmission control ECU outputs this DTC when it detects a malfunction related to terminal BATT.

DTC No.	DTC detecting condition	Trouble area
C2310	• Power switch on (IG) • Terminal BATT voltage of the transmission control ECU is 10 V or less for 1 sec. or more.	• P CON MAIN fuse • Transmission control ECU assy • Wire harness or connector

HINT:

When there is an open or short in the BATT circuit, information on the actuator position ("P position" or "non-P position") stored in the ECU is cleared every time the power switch is turned off. Therefore, the ECU works to recognize the position each time the power switch is turned on. As a result, time from when the power switch is turned on until "READY ON" is indicated may become longer than normal.

WIRING DIAGRAM

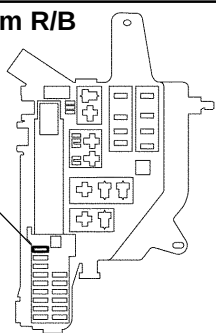


INSPECTION PROCEDURE

1 INSPECT FUSE(P CON MAIN)

Engine Room R/B
and J/B:

P CON
MAIN Fuse



F47675

- (a) Remove the P CON MAIN fuse from the engine room R/B and J/B.
- (b) Check for continuity of the P CON MAIN fuse.

Standard: Continuity

NG

INSPECT FOR SHORT IN ALL COMPONENTS CONNECTED TO FUSE AND REPAIR OR REPLACE THEM IF NEEDED, AND REPLACE FUSE

OK

2 READ VALUE ON HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch on (IG).
- (c) Turn the hand-held tester on.
- (d) Select the item below in the DATA LIST, and read its value displayed on the hand-held tester.

Item	Measurement Item/ Range (Display)	Normal Condition
BATT VOL VAL	BATT voltage value/min: 0 V, max: 20 V	Actual power supply voltage 9 to 14 V

Standard:

Voltage: 9 to 14 V

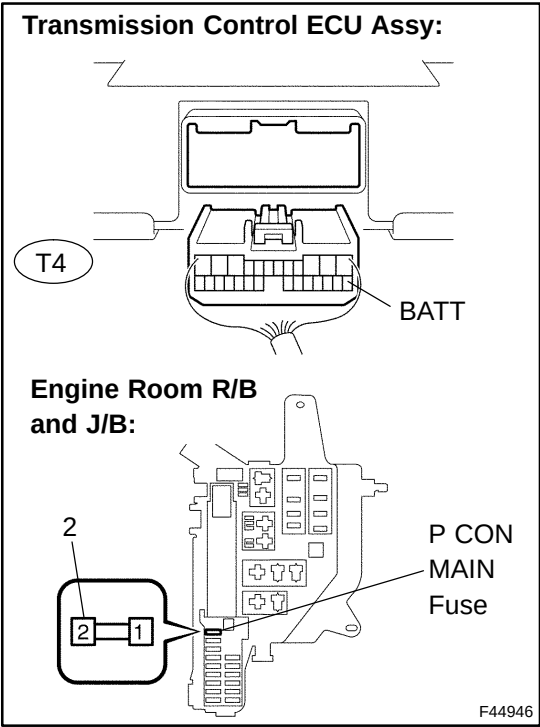
OK

REPLACE TRANSMISSION CONTROL ECU ASSY

NG

3

CHECK HARNESS AND CONNECTOR(TRANSMISSION CONTROL ECU ASSY – P CON MAIN FUSE)



- (a) Disconnect the T4 connector from the transmission control ECU assy.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
T4-13 (BATT) – 2 (P CON MAIN Fuse)	Always	Below 1 Ω
T4-13 (BATT) – Body ground	Always	10 kΩ or higher

OK

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

REPAIR OR REPLACE HARNESS OR CONNECTOR(P CON MAIN FUSE – BATTERY)

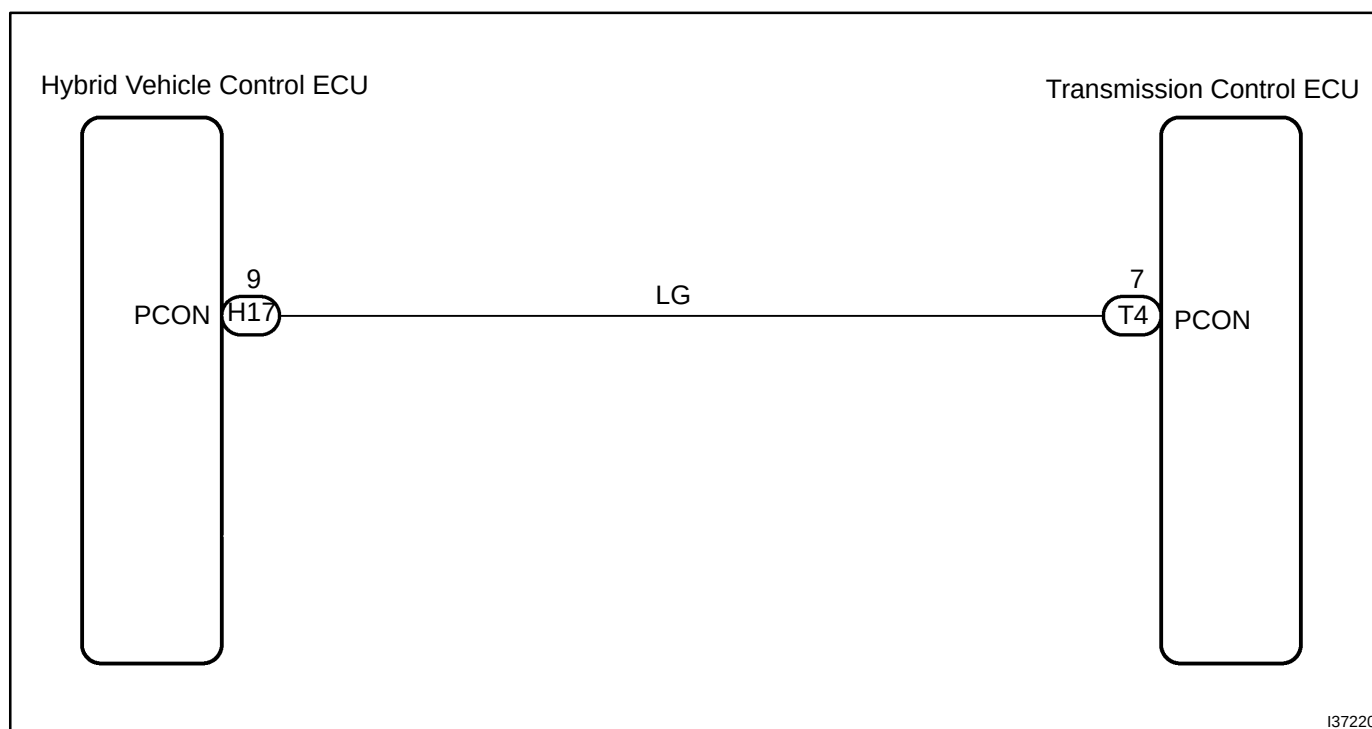
DTC	C2311	HV COMMUNICATION LINE MALFUNCTION
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CIRCUIT DESCRIPTION

The transmission control ECU receives a P position switch signal from the hybrid vehicle control ECU and activates the parking lock motor by controlling current, causing the parking lock mechanism to switch. The transmission control ECU outputs this DTC when it detects a communication error between the hybrid vehicle control ECU and the transmission control ECU.

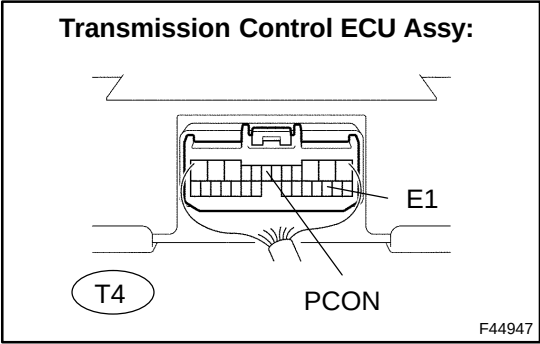
DTC No.	DTC detecting condition	Trouble area
C2311	• Power switch on (IG) • Signals from the hybrid control ECU cannot be received, or there is a problem with a pulse signal from the hybrid vehicle control ECU for 1 sec. or more.	• Transmission control ECU assy • Hybrid vehicle control ECU • Wire harness or connector

WIRING DIAGRAM



INSPECTION PROCEDURE

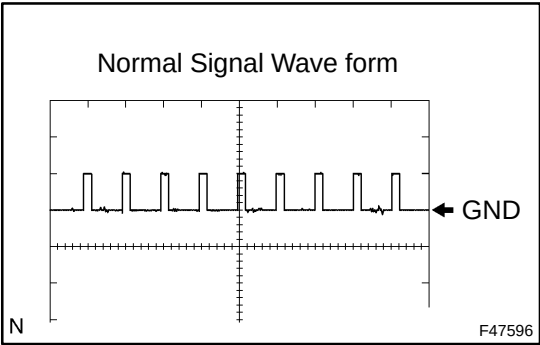
1 INSPECT TRANSMISSION CONTROL ECU ASSY(P CON TERMINAL)



- (a) Check output wave form.
- (1) Turn the power switch on (IG).
 - (2) Using an oscilloscope, check the output wave form between terminals PCON (7) and E1 (15) transmission control ECU assy T4 connector.

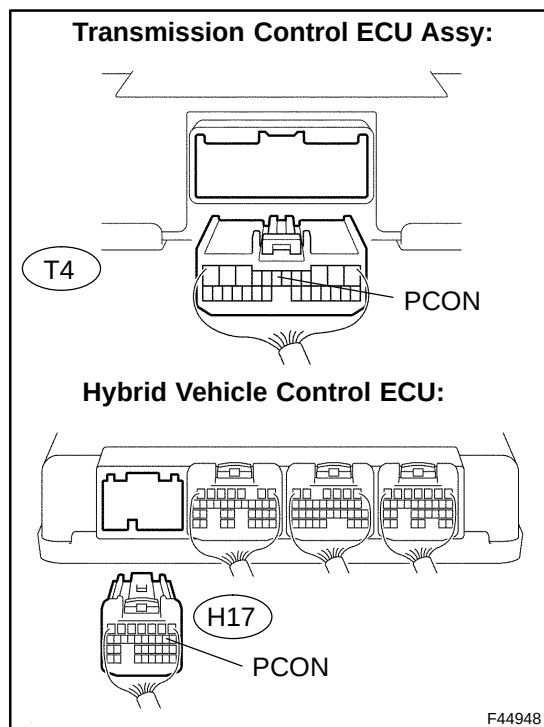
OK:
The output wave form appears as shown in the illustration.

Item	Contents
Tool setting	5V / DIV, 20 ms / DIV
Vehicle condition	Power switch on (IG)



OK REPLACE TRANSMISSION CONTROL ECU ASSY

NG

2 CHECK HARNESS AND CONNECTOR(HYBRID VEHICLE CONTROL ECU – TRANSMISSION CONTROL ECU ASSY)

- (a) Disconnect the T4 connector from the transmission control ECU assy.
- (b) Disconnect the H17 connector from the hybrid vehicle control ECU.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
T4-7 (PCON) – H17-9 (PCON)	Always	Below 1 Ω
T4-7 (PCON) – Body ground	Always	10 k Ω or higher

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****REPLACE HYBRID VEHICLE CONTROL ECU (SEE PAGE 21-124)**

DTC	C2312	POWER SOURCE CONTROL ECU COMMUNICATION LINE MALFUNCTION
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CIRCUIT DESCRIPTION

The transmission control ECU assy receives power switch condition signals (OFF / ACC / IG) from the power source control ECU. The transmission control ECU assy outputs this DTC when it does not receive the signals.

DTC No.	DTC detecting condition	Trouble area
C2312	• Power switch on (IG) • Signals from the power source control ECU cannot be received for 10 sec. or more.	• Transmission control ECU assy • Power source control ECU

WIRING DIAGRAM

(SEE PAGE [05-2581](#))

INSPECTION PROCEDURE**1 READ VALUE ON HAND-HELD TESTER**

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch on (IG).
- (c) Turn the hand-held tester on.
- (d) Select the item below in the FREEZE FRAME DATA, and read its value displayed on the hand-held tester.

Item	Measurement Item/ Range (Display)	Normal Condition
P SPLY OFF SIG	power supply off preparation request signal/ON or OFF	ON: Power is turned off by power source control ECU after receiving power switch off signal OFF: Any other condition

OK: ON is displayed.**NG****REPLACE POWER SOURCE CONTROL ECU****OK****REPLACE TRANSMISSION CONTROL ECU ASSY**

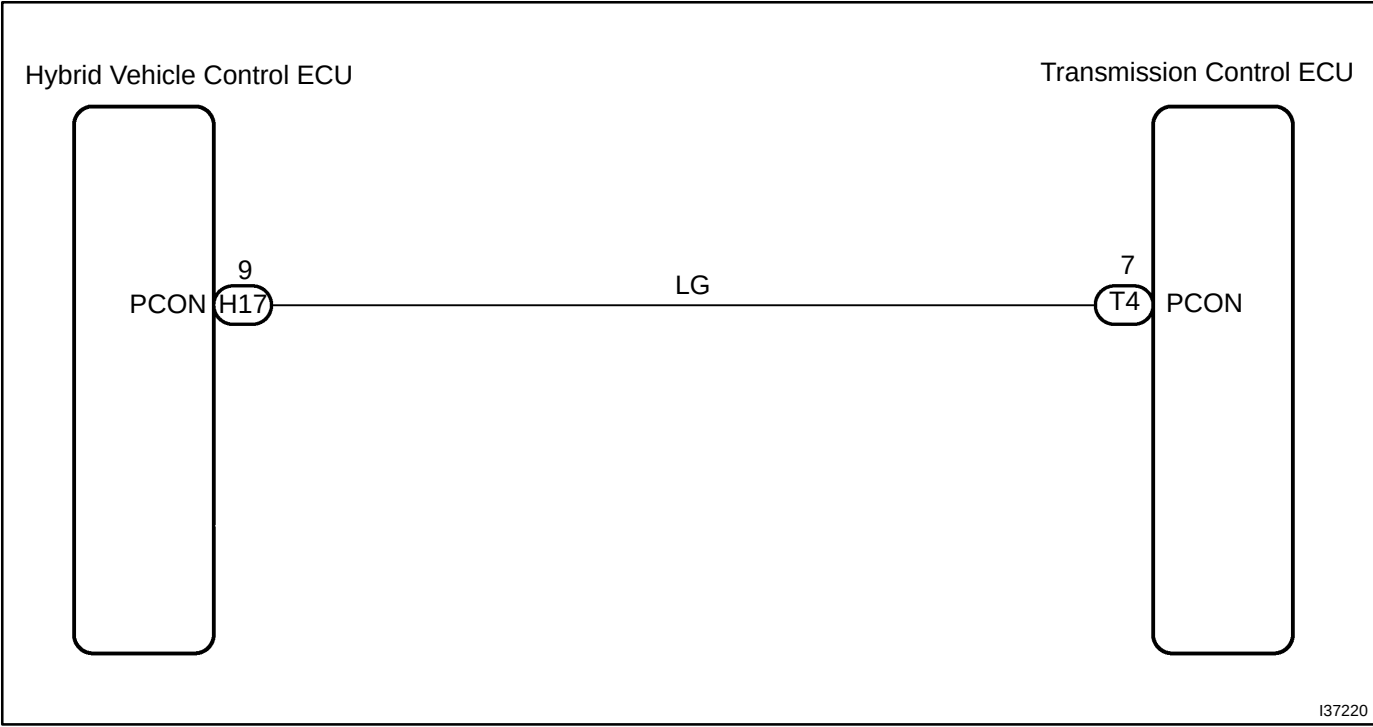
DTC	C2315	HV SYSTEM MALFUNCTION
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CIRCUIT DESCRIPTION

The transmission control ECU receives a P position switch signal from the hybrid vehicle control ECU and activates the parking lock motor by controlling current, causing the parking lock mechanism to switch. When the hybrid control ECU detects a malfunction with the P position switch or P position signal, it sends an information signal to the transmission control ECU. Receiving this signal, the transmission control ECU outputs this DTC.

DTC No.	DTC detecting condition	Trouble area
C2315	• Power switch on (IG) • A malfunction signal from the hybrid control ECU is received for 1 sec. or more.	• Hybrid vehicle control ECU • P position switch • Transmission control ECU assy • Wire harness or connector

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK OTHER DTC OUTPUT(BESIDES DTC C2315)

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch on (IG).
- (c) Turn the hand-held tester on.
- (d) Read the DTCs.

Result:

Display (DTC output)	Proceed to
No output	A
P0851-579, P0852-580, P3102-597, 598, and 599	B

HINT:

- DTCs P0851 and P0852 indicate P position switch malfunctions: DTC P0851-579 indicates "short to ground" and P0852-580 indicates "open" or "short to +B".
- DTC P3102 indicates a P position signal error: DTC P3102-597 indicates "short to ground", P3102-598 indicates "short to +B", and P3102-599 indicates "duty ratio error".

B REPAIR CIRCUIT INDICATED BY OUTPUT CODE (SEE PAGE 05-479, 05-815)

A

REPLACE HYBRID VEHICLE CONTROL ECU (SEE PAGE 21-124)

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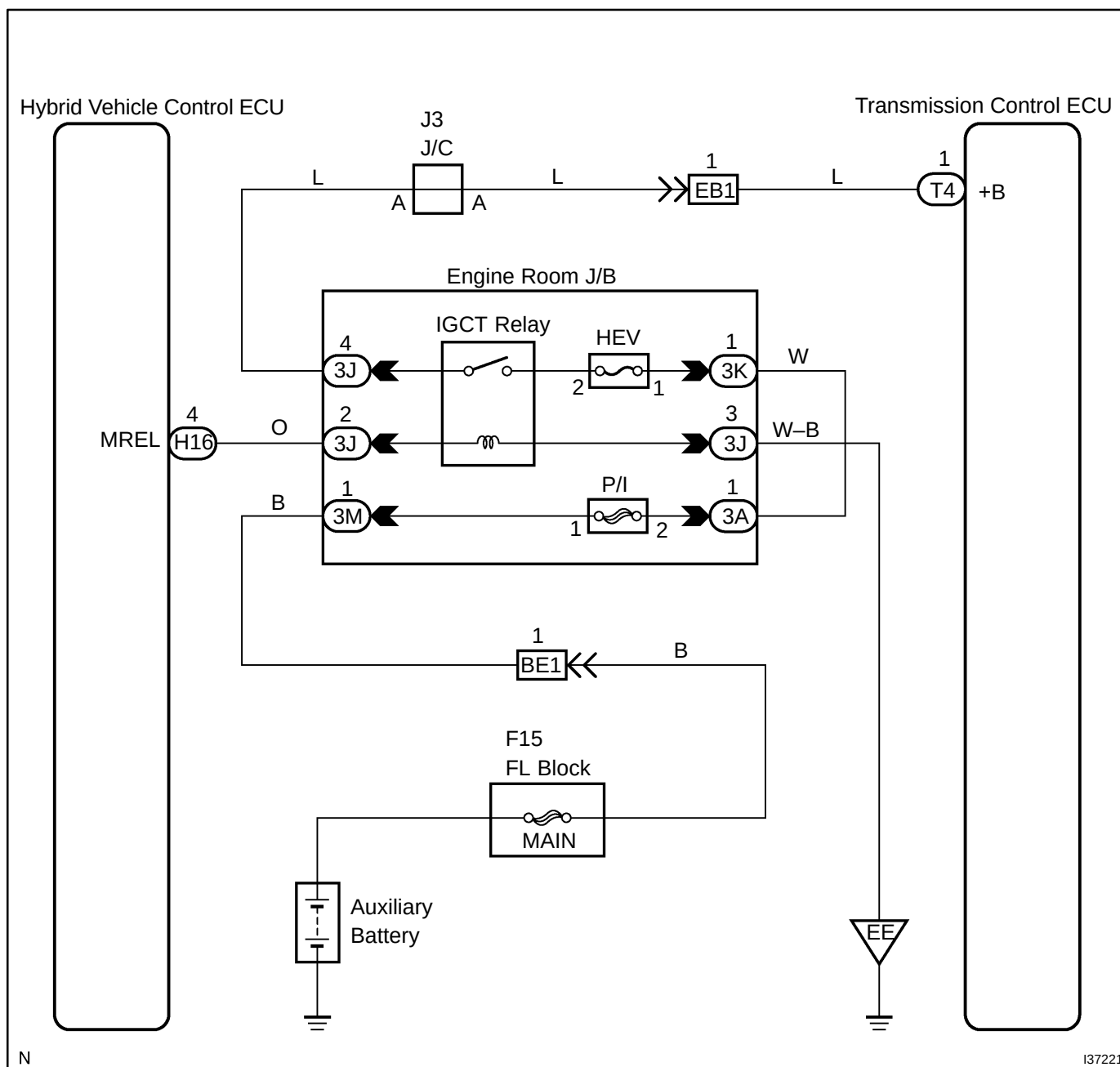
DTC	C2318	LOW VOLTAGE ERROR (POWER SUPPLY MALFUNCTION)
-----	-------	---

CIRCUIT DESCRIPTION

The auxiliary battery voltage is applied to terminal +B when the power switch is on (IG). The transmission control ECU outputs this DTC when the input voltage drops.

DTC No.	DTC detecting condition	Trouble area
C2318	- Power switch on (IG) - Terminal +B voltage of the transmission control ECU is 9.3 V or less for 1 sec. or more.	- HEV fuse - IGCT relay - Wire harness or connector - Auxiliary battery

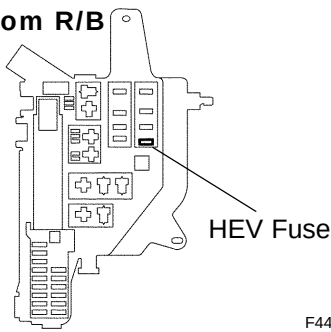
WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT FUSE(HEV FUSE)

Engine Room R/B and J/B:



- Remove the HEV fuse from the engine room R/B and J/B.
- Check for continuity of the HEV fuse.

Standard: Continuity

NG

INSPECT FOR SHORT IN ALL COMPONENTS CONNECTED TO FUSE AND REPAIR OR REPLACE THEM IF NEEDED, AND REPLACE FUSE

OK

2 CHECK OTHER DTC OUTPUT(BESIDE C2318)

- Connect the hand-held tester to the DLC3.
- Turn the power switch on (IG).
- Turn the hand-held tester on.
- Read the DTCs.

Result:

Display (DTC output)	Proceed to
No output	A
P3110-223	B

HINT:

DTC P3110 indicates HV main relay malfunction: DTC P3110-223 indicates "IGCT relay malfunction".

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE (SEE PAGE 05-824)

A

3 READ VALUE ON HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
(b) Turn the power switch on (IG).
(c) Turn the hand-held tester on.
(d) Select the item below in the DATA LIST, and read its value displayed on the hand-held tester.

Item	Measurement Item/ Range (Display)	Normal Condition
IG (+B) VOL VAL	IG (+B) voltage value/min: 0 V, max: 20 V	Actual power supply voltage 9 to 14 V

Standard:**Voltage: 9 to 14 V****OK****REPLACE TRANSMISSION CONTROL ECU
ASSY****NG****REPAIR OR REPLACE HARNESS OR CONNECTOR
(ENGINE ROOM R/B AND J/B – TRANSMISSION CONTROL ECU ASSY)**

DIAGNOSIS SYSTEM

1. DESCRIPTION

(a) DIAGNOSTIC SYSTEM

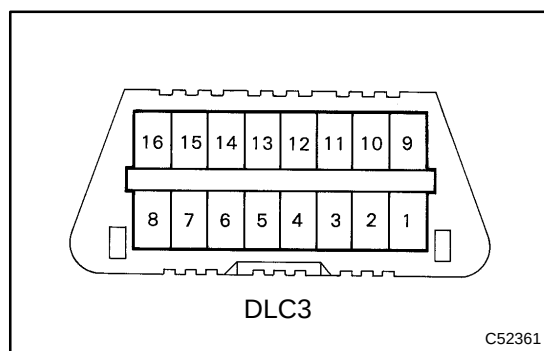
When troubleshooting a vehicle with a diagnostic system, the only difference from the usual troubleshooting procedure is connecting the hand-held tester to the vehicle and reading various data output from the vehicle's transmission control ECU Assy.

The transmission control ECU Assy records DTCs when the computer detects a malfunction in the computer itself or in its circuits.

To check the DTCs, connect the hand-held tester to the DLC3 on the vehicle. The hand-held tester enables you to erase the DTCs, activate the several actuators and check freeze frame data and data list.

(b) Check the DLC3.

The transmission control ECU Assy follows the CAN and ISO 9141-2 communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.



Symbols (Terminals No.)	Terminal Description	Condition	Specified Condition
SIL(7) – SG(5)	Bus "+" line	During communication	Pulse generation
CG(4) – Body ground	Chassis ground	Always	Below 1 Ω
SG(5) – Body ground	Signal ground	Always	Below 1 Ω
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 67 Ω
CANH(6) – Battery positive	HIGH-level CAN bus line	Power switch off	1 M Ω or higher
CANH(6) – CG(4)	HIGH-level CAN bus line	Power switch off	3 K Ω or higher
CANL(14) – Battery positive	LOW-level CAN bus line	Power switch off	1 M Ω or higher
CANL(14) – CG(4)	LOW-level CAN bus line	Power switch off	3 K Ω or higher

HINT:

If the display shows "UNABLE TO CONNECT TO VEHICLE" after connecting the hand-held tester cable to the DLC3 and turning the power switch on (IG), there is a problem with either the vehicle or tester.

- If communication is normal when connecting the tester to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still not possible when connecting the tester to another vehicle, the problem is probably on the tester itself, so consult the Service Department listed in the tester's operator's manual.

DATA LIST/ACTIVE TEST

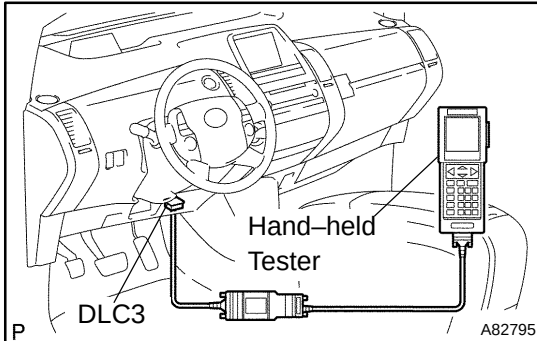
1. DATA LIST

- Connect the hand-held tester to the DLC3.
- Turn the power switch on (IG) and turn the hand-held tester on.
- Operate the hand-held tester according to the steps on the display and select "DATA LIST".

Item	Measurement Item/ Range (Display)	Normal Condition	Diagnostic Note
SHFT POS P	shift position display (P)/ON or OFF	ON: Parking lock is in P position OFF: Parking lock is in non-P position	–
SHFT POS N-P	shift position display (not P)/ON or OFF	ON: Parking lock is in non-P position OFF: Parking lock is in P position	–
MAS CAUTION	master caution display/DISP or NONDISP	DISP: Malfunction occurs in this system NONDISP: Malfunction does not occur in this system	–
PSW INDICATOR	PSW indicator mode/OFF, ON, FAST, or SLOW	OFF: Parking lock is in non-P position ON: Parking lock is in P position FAST: Actuator takes long to switch between the P position and non-P position SLOW: Malfunction occurs in this system	–
U VOL VAL	U phase voltage value/min: 0 V, max: 20 V	Actual U phase voltage 9 to 14 V	–
V VOL VAL	V phase voltage value/min: 0 V, max: 20 V	Actual V phase voltage 9 to 14 V	–
W VOL VAL	W phase voltage value/min: 0 V, max: 20 V	Actual W phase voltage 9 to 14 V	–
BATT VOL VAL	BATT voltage value/min: 0 V, max: 20 V	Actual power supply voltage 9 to 14 V	–
IG (+B) VOL VAL	IG (+B) voltage value/min: 0 V, max: 20 V	Actual power supply voltage 9 to 14 V	–
P SPLY OFF SIG	power supply off preparation request signal/ON or OFF	ON: Power is turned off by power source control ECU after receiving power switch off signal OFF: Any other condition	–
LRN LOCK POS	completion of learning lock position/OK or NG	OK: Lock position learning is complete NG: Lock position learning is not complete	–
LRN UNLOCK POS	completion of learning unlock position/OK or NG	OK: Unlock position learning is complete NG: Unlock position learning is not complete	–
TRIP CNTR	number of trip counter after learning/min: 0, max: 65535	Actual number of trip counter	Reset the trip counter after 1,000 times
MTR MAIN RELAY	main relay for motor drive/ON or OFF	ON: Motor drive main relay on OFF: Motor drive main relay off	–
ELCTRCL KEY SIG	signal of electrical key condition/ON or OFF	ON: Electrical key is recognized OFF: Electrical key is not recognized	–
#CODE	Number of diagnosis code/min: 0, max: 255	Actual number of diagnosis code	–

Item	Measurement Item/ Range (Display)	Normal Condition	Diagnostic Note
CURRENT U	U phase current-carrying status/ ON or OFF	ON: U phase current flows OFF: U phase current does not flow	—
CURRENT V	V phase current-carrying status/ ON or OFF	ON: V phase current flows OFF: V phase current does not flow	—
CURRENT W	W phase current-carrying status/ ON or OFF	ON: W phase current flows OFF: W phase current does not flow	—
U VOL	U phase voltage status/ON or OFF	ON: U phase voltage is 6 V or more OFF: U phase voltage is less than 6 V	—
V VOL	V phase voltage status/ON or OFF	ON: V phase voltage is 6 V or more OFF: V phase voltage is less than 6 V	—
W VOL	W phase voltage status/ON or OFF	ON: W phase voltage is 6 V or more OFF: W phase voltage is less than 6 V	—
BATT VOL	BATT voltage status/ON or OFF	ON: BATT voltage is more than 10 V OFF: BATT voltage is 10 V or less	—
IG VOL	IG (+B) phase voltage status/ON or OFF	ON: +B voltage is more than 10 V OFF: +B voltage is 10 V or less	—
ACC SIG	ACC condition signal/ON or OFF	ON: ACC condition signal is nor- mal OFF: ACC condition signal is inter- rupted	—
INIT CNTRL	initial drive control completed/OK or NG	OK: Initial drive control is complete NG: Initial drive control is not com- plete	—
DTCT LOCK POS	completion of detecting lock posi- tion/OK or NG	OK: Detection of lock position is complete NG: Detection of lock position is not complete	—
DTCT UNLOCK POS	completion of detecting unlock position/OK or NG	OK: Detection of unlock position is complete NG: Detection of unlock position is not complete	—
SHFT RANGE	P/Not P movable shift range/SET or UNSET	SET: P/Not P movable shift range is set UNSET: P/Not P movable shift range is unset	—
MAIN RELAY	main relay/NORMAL or ABNOML	NORMAL: Main relay is normal ABNOML: Main relay is fault	—
VHCL COND	vehicle condition/STOP or MOVE	STOP: Vehicle is stopped MOVE: Vehicle is running	—
ECU TYPE	Type of ECU/min: 0, max: 65535	Actual type of ECU	—

DTC CHECK/CLEAR



1. CHECK FOR DTCs

- Prepare the hand-held tester.
- Connect the hand-held tester to the DLC3 at the lower part of the instrument panel.
- Turn the power switch on (IG) and turn the hand-held tester on.
- Use the hand-held tester to check for DTCs and the freeze frame data, and note or print the result (see the operator's manual for operating instructions).
- See page [05-1159](#) to confirm the details of the DTCs.

2. CLEAR DTCs

HINT:

The following procedures clear the DTCs and freeze frame data.

- When using the hand-held tester:
Operate the hand-held tester to clear the DTCs (see the operator's manual for operating instructions).
- When not using the hand-held tester:

HINT:

Remove the P CON MAIN fuse to erase DTCs C2300, C2301, C2303, C2304, C2305, C2306, and C2307 because they cannot be erased with the hand-held tester.

- Turn the power switch off.
- Remove the P CON MAIN fuse (7.5 A) for 60 seconds or more, and then reconnect it.
- Turn the power switch on (IG).
- Check that no DTCs are output.

FREEZE FRAME DATA

- (c) The vehicle status, stored during system operation or at the time of an error code detection, can be displayed by the hand-held tester.
- (d) Only one record of freeze frame data is stored and the freeze frame data generated during system operation are updated whenever the vehicle status is changed. After storing the DTC, the freeze frame data is not updated.

Tester display	Measurement Item	Reference Value
SHFT POS P	shift position display (P)	ON or OFF
SHFT POS N-P	shift position display (not P)	ON or OFF
MAS CAUTION	master caution display	DISP or NONDISP
PSW INDICATOR	PSW indicator mode	OFF, ON, FAST, or SLOW
U VOL VAL	U phase voltage value	min: 0 V, max: 20 V
V VOL VAL	V phase voltage value	min: 0 V, max: 20 V
W VOL VAL	W phase voltage value	min: 0 V, max: 20 V
BATT VOL VAL	BATT voltage value	min: 0 V, max: 20 V
IG (+B) VOL VAL	IG (+B) voltage value	min: 0 V, max: 20 V
P SPLY OFF SIG	power supply off preparation request signal	ON or OFF
LRN LOCK POS	completion of learning lock position	OK or NG
LRN UNLOCK POS	completion of learning unlock position	OK or NG
TRIP CNTR	number of trip counter after learning	min: 0, max: 65535
MTR MAIN RELAY	main relay for motor drive	ON or OFF
ELCTRCL KEY SIG	signal of electrical key condition	ON or OFF
CURRENT U	U phase current-carrying status	ON or OFF
CURRENT V	V phase current-carrying status	ON or OFF
CURRENT W	W phase current-carrying status	ON or OFF
U VOL	U phase voltage status	ON or OFF
V VOL	V phase voltage status	ON or OFF
W VOL	W phase voltage status	ON or OFF
BATT VOL	BATT voltage status	ON or OFF
IG VOL	IG (+B) phase voltage status	ON or OFF
ACC SIG	ACC condition signal	ON or OFF
INIT CNTRL	initial drive control completed	OK or NG
DTCT LOCK POS	completion of detecting lock position	OK or NG
DTCT UNLOCK POS	completion of detecting unlock position	OK or NG
SHFT RANGE	P/Not P movable shift range	SET or UNSET
MAIN RELAY	main relay	NORMAL or ABNOML
VHCL COND	vehicle condition	STOP or MOVE
FAIL RANK	fail rank	min: 0, max: 255
ECU TYPE	Type of ECU	min: 0, max: 65535
DETAIL INFO1	detail information 1	Failure information is displayed in hexadecimal
DETAIL INFO2	detail information 2	Failure information is displayed in hexadecimal
DETAIL INFO3	detail information 3	Failure information is displayed in hexadecimal

FAIL-SAFE CHART

If the transmission control ECU Assy detects a malfunction, the fail safe functions shown in the table below are activated.

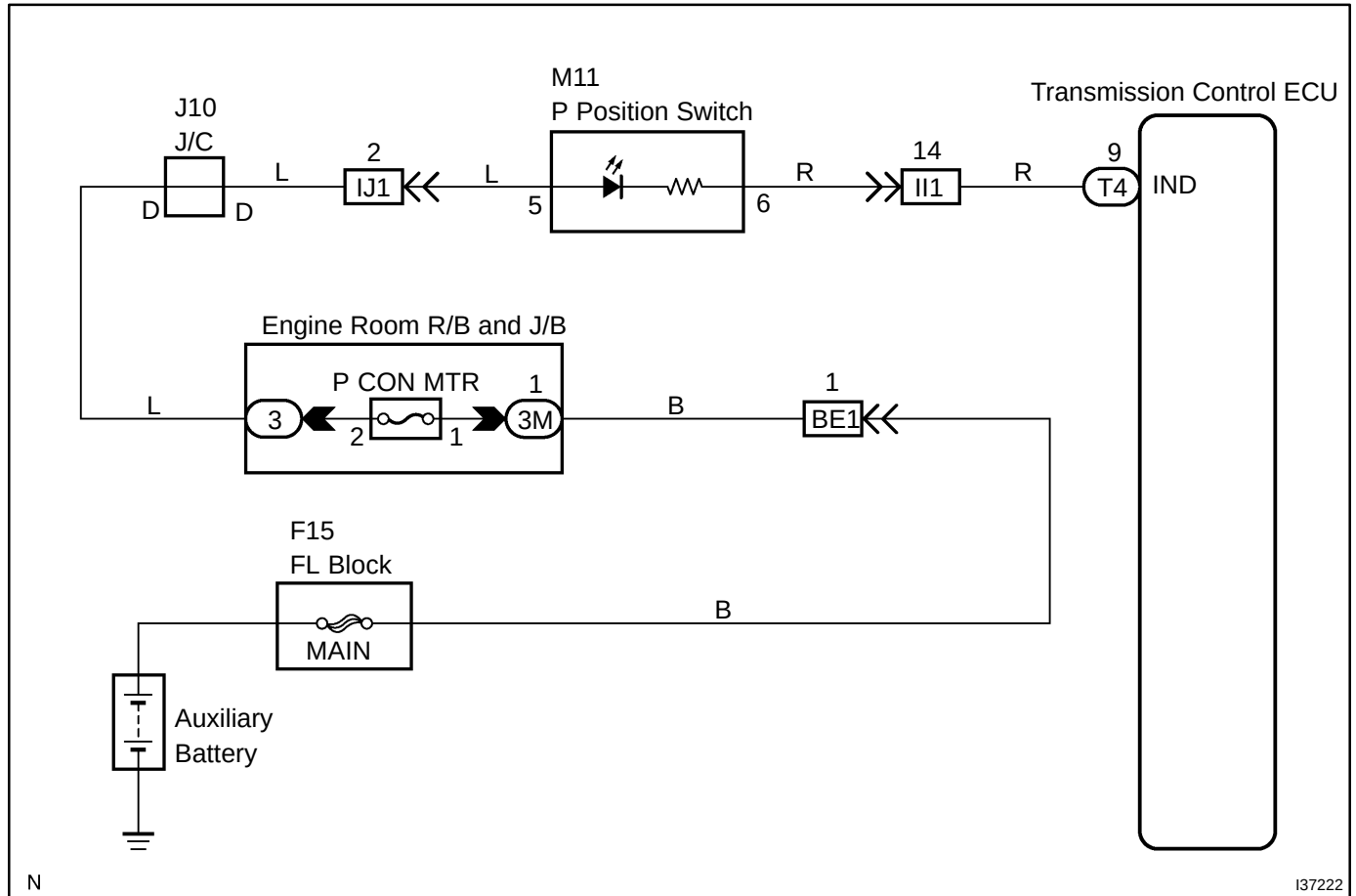
DTC No.	Fail-safe function	Problem symptoms
C2300 C2301	Only the P position release operation is possible and the shift control actuator Assy is activated.	• The shift position is not indicated on the meter. • Although the shift position is indicated on the meter, the vehicle cannot be driven.
C2303	–	The battery is dead.
C2304 C2305 C2306	The transaxle parking lock control relay is turned off.	The parking lock mechanism cannot be switched.
C2307	The transaxle parking lock control relay is turned off.	• The shift position is not indicated on the meter. • Although the shift position is indicated on the meter, the vehicle cannot be driven.
C2311	–	The parking lock mechanism cannot be switched.
C2312	–	The hybrid system does not start up.
C2318	–	The parking lock mechanism cannot be switched on a hill.

P POSITION SWITCH INDICATOR LIGHT CIRCUIT

CIRCUIT DESCRIPTION

The parking lock switch indicator light comes on or goes off to indicate the on/off status of the P position switch and blinks to indicate malfunction conditions of the system.

WIRING DIAGRAM



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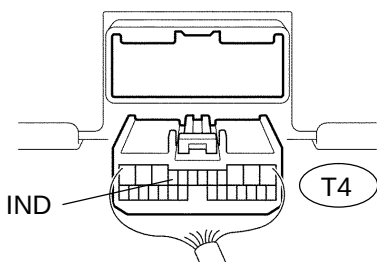
INSPECTION PROCEDURE

1 CHECK INDICATOR LAMP

- (a) Inspect the indicator light condition by operating the P position switch.

Result:

Condition	Proceed to
Indicator light does not go off.	A
Indicator light does not come on.	B

B**Go to step 3****A****2 CHECK HARNESS AND CONNECTOR(TRANSMISSION CONTROL ECU ASSY – P
POSITION SWITCH)****Transmission Control ECU Assy:**

- (a) Disconnect the T4 connector from the transmission control ECU Assy.
(b) Disconnect the M11 connector from the P position switch.
(c) Measure the resistance according to the value(s) in the table below.

Standard:

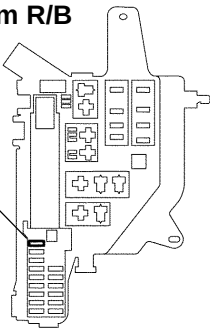
Tester connection (Symbols)	Condition	Specified condition
T4-9 (IND) – Body ground	Always	10 kΩ or higher

NG**REPAIR OR REPLACE HARNESS OR
CONNECTOR****OK****REPLACE TRANSMISSION CONTROL ECU ASSY**

3 INSPECT FUSE

Engine Room R/B
and J/B:

P CON
MAIN Fuse



F47675

- Remove the P CON MAIN fuse from the engine room R/B and J/B.
- Check for continuity of the P CON MAIN fuse.

Standard: Continuity

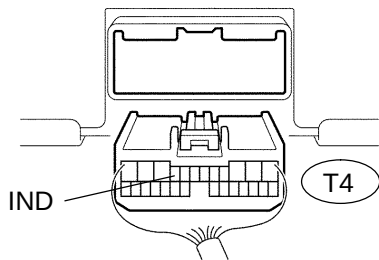
NG

INSPECT FOR SHORT IN ALL COMPONENTS CONNECTED TO FUSE AND REPAIR OR REPLACE THEM IF NEEDED, AND REPLACE FUSE

OK

4 INSPECT COMPUTER, TRANSMISSION CONTROL(IND TERMINAL)

Transmission Control ECU Assy:



F47573

- Disconnect the T4 connector from the transmission control ECU Assy.
- Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
T4-9 (IND) – Body ground	Always	9 to 14 V

OK

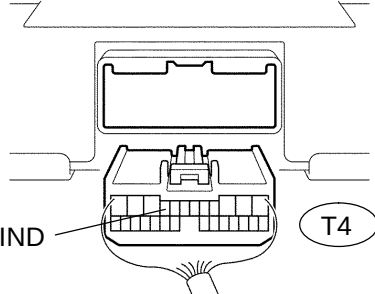
REPLACE TRANSMISSION CONTROL ECU ASSY

NG

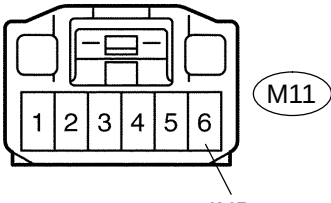
5

CHECK HARNESS AND CONNECTOR(TRANSMISSION CONTROL ECU ASSY – P POSITION SWITCH)

Transmission Control ECU Assy:



P Position Switch (Wire Harness Side):



F47574

- (a)
- Disconnect the M11 connector from the P position switch.
- (b)
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
T4-9 (IND) – M11-6 (IND-)	Always	Below 1 Ω

NG

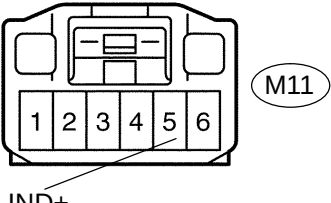
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6

INSPECT P POSITION SWITCH

P Position Switch (Wire Harness Side):



F47575

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

Standard:

Tester connection (Symbols)	Condition	Specified condition
M11-5 (IND+) – Body ground	Always	9 to 14 V

OK

REPLACE P POSITION SWITCH

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (P POSITION SWITCH – BATTERY)

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

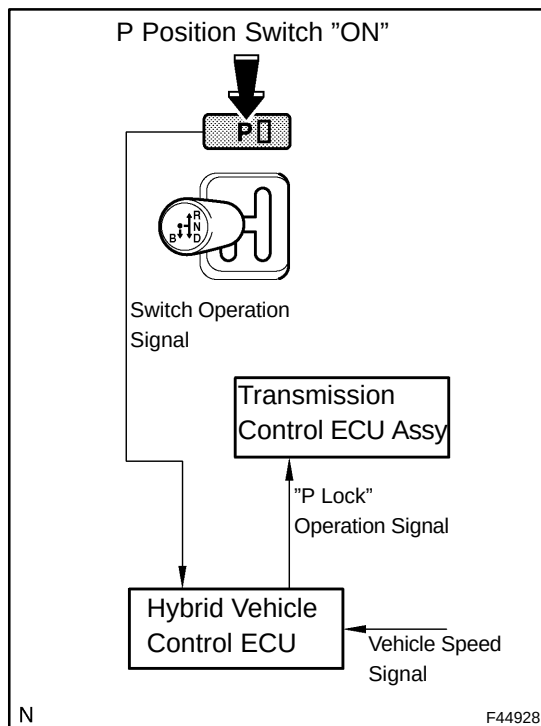
The shift control system (parking lock control) electrically controls the parking lock mechanism, conventionally operated by cable, by using the actuator.

The transmission control ECU controls the shift control actuator assy, and also controls the entire system based on information from the hybrid vehicle control ECU.

The transmission control ECU detects DTCs when there are any malfunction in the system, and informs the driver of the malfunction by illuminating the P position switch indicator light and the master caution light and indicating an error message on the multi-display.

2. FUNCTION OF EACH COMPONENT

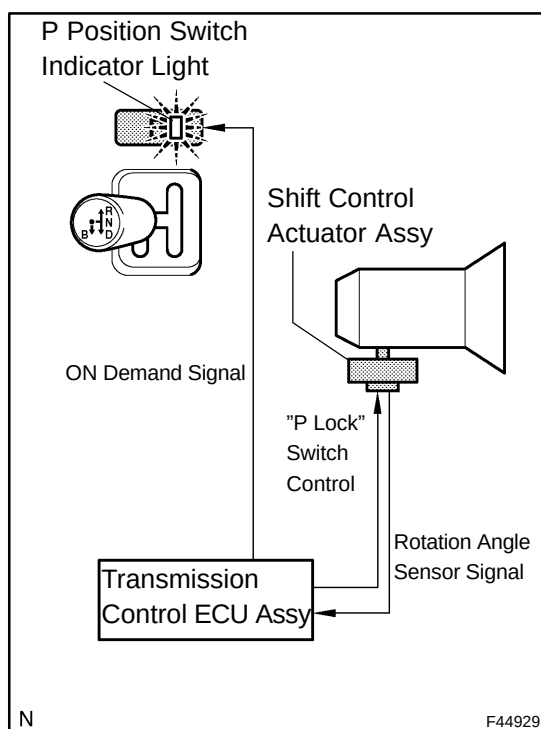
Parts name	Function
Shift Control Actuator Assy	• Composed of the parking lock motor and the rotation angle sensor. The motor is activated by electric current from the transmission control ECU assy. • Motor rotation is reduced by the cycloid reduction mechanism in the shift control actuator assy and then output. • The rotation angle sensor detects the motor rotation angle with the three hole ICs.
Transmission Control ECU Assy	• This ECU activates the shift control actuator assy based on signals from the hybrid vehicle control ECU and the power source control ECU. • This ECU controls the application timing of current to the parking lock motor based on signals from the rotation angle sensor.
Parking Lock Mechanism	• The parking lock pawl rotates according to the movement of the parking lock rod when the parking lock motor rotates, and engages with the parking gear on the transaxle side, causing the parking lock mechanism to lock or unlock.
Hybrid Vehicle Control ECU	• This ECU sends a P lock or P unlock demand signal to the transmission control ECU based on information from the selector lever and the P position switch.
Power Source Control ECU	• This ECU sends a signal with power off information to the transmission control ECU. The transmission control ECU then sends the signal to the hybrid vehicle control ECU.
P Position Switch Indicator Light	• This light comes on/goes off to indicate the P lock/unlock status and blinks to indicate a malfunction in the shift control system (parking lock control).
Combination Meter	• A malfunction in the transmission control ECU is indicated by the master caution light on the combination meter.
Multi-display	• A malfunction in the transmission control ECU is indicated on the multi-display.



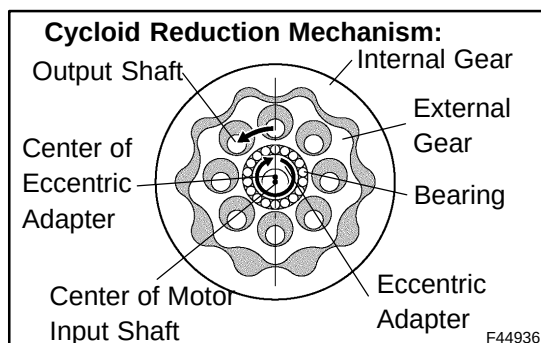
3. OPERATION DESCRIPTION

(a) Operation to switch to the P position:

- (1) When the P position switch is turned on to activate parking lock, a signal is sent to the hybrid vehicle control ECU.
- (2) The hybrid vehicle control ECU determines whether "P lock" is possible or not based on this signal and other vehicle information.
- (3) If the hybrid vehicle control ECU determines that "P lock" is possible, it sends a "P lock" operation demand signal to the transmission control ECU.

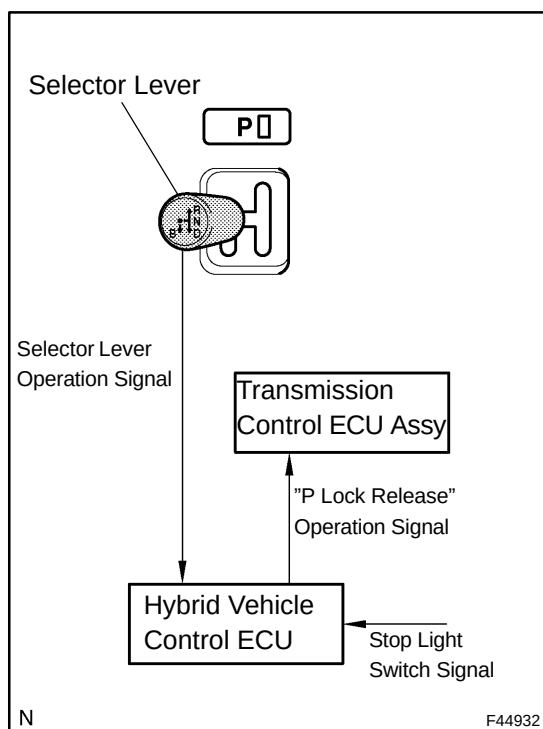


- (4) Receiving the signal, the transmission control ECU activates the shift control actuator assy in order to lock the parking lock mechanism and turns on the P position switch indicator light.
- (5) At that time, the transmission control ECU controls motor rotation angle based on signals from the rotation angle sensor in the shift control actuator assy.

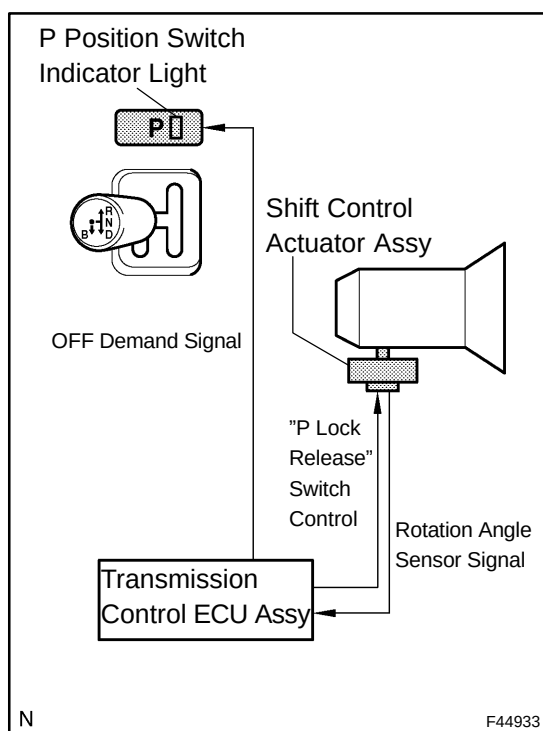


HINT:

In the cycloid reduction mechanism, the output shaft is linked to the external gear. Together, they rotate only a single tooth when the eccentric adapter, which is linked to the motor, rotates once. Driving force is increased like this so that the parking lock mechanism can be switched even when high output is required for parking on a hill, etc.



- (b) Operation to switch to a non-P position:
- (1) When the hybrid system is started (the vehicle is ready to be driven) and the selector lever is moved to the R, N, or the D position with the brake pedal depressed, a signal is sent to the hybrid vehicle control ECU.
 - (2) This signal is then sent from the hybrid vehicle control ECU to the transmission control ECU as a "P lock release" operation demand signal.



- (3) Receiving the signal, the transmission control ECU activates the shift control actuator assy in order to unlock the parking lock mechanism and turns off the P position switch indicator light.
- (4) At that time, the transmission control ECU controls motor rotation angle based on signals from the rotation angle sensor in the shift control actuator assy.

4. SHIFT POSITION CHANGE FUNCTION

- (a) The shift control system (parking lock control) comprehensively determines vehicle conditions and changes the shift position, as shown in the following chart, by cooperating with the shift control function of the hybrid system (except when the reject function, described later, is in operation).
- (b) Other than indicated in the following chart, when the power switch is turned off with the vehicle stopped, the shift position is automatically changed to the P position.

[illegible]

*: The vehicle cannot be driven because the hybrid system has not been started.

● : Current position → : Positions to which the shift position can be changed

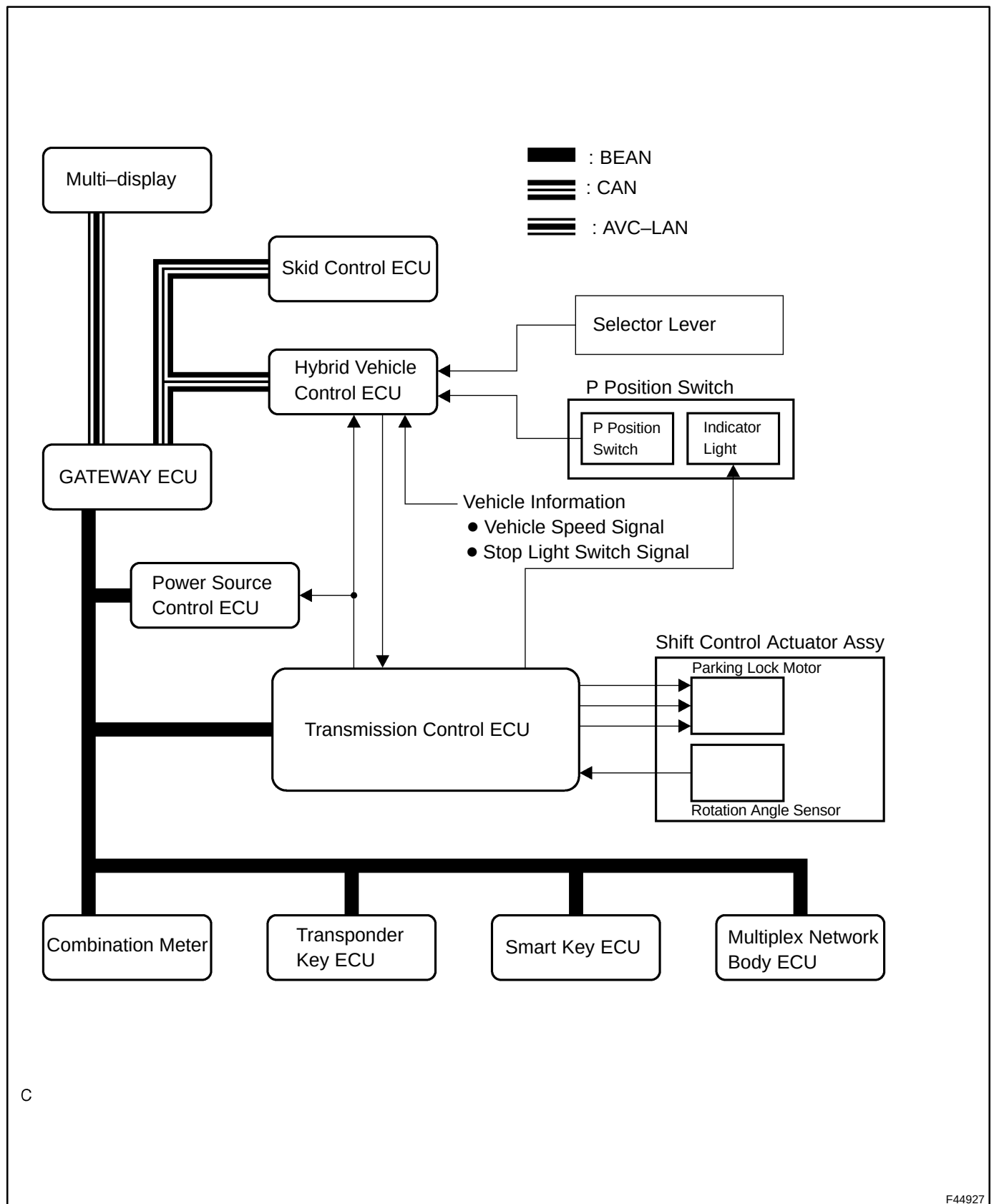
N

5. REJECT FUNCTION

In the shift control system (parking lock control), there may be a situation in which a shift change cannot be done for safety reasons. When attempting to move the selector lever in such a situation, the system sounds a reject buzzer inside the meter and changes the shift position as shown in the following table.

Shift operation which causes the reject function to operate	Shift position after rejection
Shifting from the P position without depressing the brake pedal	Held in the P position
Shifting to the P position while driving	Changed to the N position
Shifting between forward and reverse positions while driving	Changed to the N position
Shifting to the B position from the position other than D	Changed to the N position

SYSTEM DIAGRAM



C

F44927

Input and output signals of each ECU.

Transmitting ECU (transmitter)	Receiving ECU	Signals	Communication method
Skid Control ECU	Transmission Control ECU Assy	• PKB switch signal	CAN, BEAN
Power Source Control ECU	Transmission Control ECU Assy	• Power off preparation signal	BEAN
Multiplex Network Body ECU	Transmission Control ECU Assy	• Ignition switch signal • ACC switch signal	BEAN
Transmission Control ECU Assy	Ignition Control ECU	• P position state signal • Transmission control ECU trouble condition signal • Auto P cancel signal • Non-P position state signal • Auto P permit signal	BEAN
Transmission Control ECU Assy	Multi-display	• Transmission control ECU trouble signal	AVC-LAN, BEAN
Transmission Control ECU Assy	Combination Meter	• Transmission control ECU trouble signal	BEAN
Transmission Control ECU Assy	Transponder Key Amplifier	• P position state signal • Key condition signal	BEAN
Transmission Control ECU Assy	Smart Key ECU	• P position state signal	BEAN

CUSTOMER PROBLEM ANALYSIS CHECK

SHIFT CONTROL SYSTEM (PARKING LOCK CONTROL) CHECK SHEET

Inspector's
Name :

Customer's Name		VIN	
		Production Date	/ /
		Licence Plate No.	
Date Vehicle Brought In	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ Parking lock mechanism cannot be switched
	☐ Vehicle cannot be driven
	☐ The shift position is not indicated on the meter
	☐ Shift position display (meter) and actual selector lever position are different

Check Item	Waring light status	☐ ON () ☐ OFF
	Error message on the multi-display	☐ Displayed ☐ Not displayed
	P position switch indicator light status	☐ Comes on ⇔ Goes off ☐ Blinks quickly ☐ Blinks slowly

DTC Check	1st Time	☐ Normal System Code ☐ Trouble Code (Code)
	2nd Time	☐ Normal System Code ☐ Trouble Code (Code)

DIAGNOSTIC TROUBLE CODE CHART

If a trouble code is displayed during the DTC check, check the circuit listed for that code in the table below and proceed to the appropriate page.

HINT:

- When the DTC C2300, C2301, C2304, C2305, C2306, C2307, C2311, and C2312 are detected, DTC P3102 indicating the shift control system (parking lock control) malfunctions are detected for the hybrid system as well. Because of this, the hybrid system DTCs must be cleared after clearing the shift control system (parking lock control) DTCs.
- Remove the P CON MAIN fuse to erase DTCs C2300, C2301, C2303, C2304, C2305, C2306, and C2307 because they cannot be erased with the hand-held tester (see page 05-1154).
- When a DTC is detected, the master caution light comes on and an error message is indicated on the multi-display.
- The indicator blinks quickly when it takes long to switch between the P position status and the P position release status.

DTC No. (See Page)	Circuit Inspection	Trouble Area	P Position Switch Indicator Light Condition
C2300 (*1) (05-1161)	ACT System Malfunction	- Shift control actuator assy - Transaxle parking lock control relay - Transmission control ECU assy - Wire harness or connector	Blinks slowly
C2301 (*1) (05-1170)	Shift Changing Time Malfunction	- Shift control actuator assy - Transmission control ECU assy	Blinks slowly
C2303 (*1) (05-1172)	Relay Malfunction (+B Short)	- Transaxle parking lock control relay - Transmission control ECU assy - Wire harness or connector	Normal (*2)
C2304 (*1) (05-1176)	Open or Short Circuit in U Phase	- Shift control actuator assy - Transmission control ECU assy - Transaxle parking lock control relay - Wire harness or connector	Blinks slowly
C2305 (*1) (05-1176)	Open or Short Circuit in V Phase	- Shift control actuator assy - Transmission control ECU assy - Transaxle parking lock control relay - Wire harness or connector	Blinks slowly
C2306 (*1) (05-1176)	Open or Short Circuit in W Phase	- Shift control actuator assy - Transmission control ECU assy - Transaxle parking lock control relay - Wire harness or connector	Blinks slowly
C2307 (*1) (05-1183)	Power Source Malfunction	- Transmission control ECU assy - Wire harness or connector - Parking lock motor (Shift control actuator assy)	Blinks slowly
C2310 (05-1186)	Open or Short Circuit in BATT	- P CON MAIN fuse - Transmission control ECU assy - Wire harness or connector	Normal (*2)
C2311 (05-1189)	HV Communication Line Malfunction	- Transmission control ECU assy - Hybrid vehicle control ECU - Wire harness or connector	Blinks slowly
C2312 (05-1192)	Power Source Control ECU Communication Line Malfunction	- Transmission control ECU assy - Power source control ECU	Normal (*2)

C2315 (05-1194)	HV System Malfunction	• Hybrid vehicle control ECU • P position switch • Transmission control ECU assy • Wire harness or connector	Normal (*2)
C2318 (05-1196)	Low Voltage Error (Power Supply Malfunction)	• HEV fuse • IGCT relay • Wire harness or connector • Auxiliary battery	Normal (*2)

*1: If DTC C2318 is output simultaneously, perform troubleshooting for DTC C2318 first.

*2: P position status: the P position switch indicator light is on.

P position release status: the P position switch indicator light is off.

HOW TO PROCEED WITH TROUBLESHOOTING

The hand-held tester can be used during steps 3, 8 and 11.

1 VEHICLE BROUGHT TO WORKSHOP



2 CUSTOMER PROBLEM ANALYSIS (SEE PAGE 05-1149)

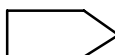


3 CHECK AND CLEAR DTCs (SEE PAGE 05-1154)

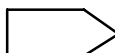


4 PROBLEM SYMPTOM CONFIRMATION

- (a) Turn the power switch on (IG).
- (b) Turn the P position switch on, or move the selector lever to the R, N, or D position with the brake pedal depressed to see if any problem symptom occurs.



SYMPTOM DOES NOT OCCUR (Go to step 5)



SYMPTOM OCCURS (Go to step 6)

5 SYMPTOM SIMULATION (SEE PAGE 01-37)



6 CHECK MULTIPLEX COMMUNICATION SYSTEM (SEE PAGE 05-2549)

HINT:

The steering lock ECU is connected to the multiplex communication system. Therefore, be sure to check that there are no problems in the multiplex communication system before performing troubleshooting.



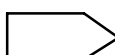
7 CHECK CAN COMMUNICATION SYSTEM (SEE PAGE 05-2602)

HINT:

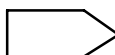
This ECU is connected to the CAN communication system. Therefore, be sure to check that there are no troubles in the CAN communication system before performing troubleshooting.



8 DTC CHECK (SEE PAGE 05-1154)



DTC IS NOT OUTPUT (Go to step 9)



DTC IS OUTPUT (Go to step 10)

9	PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1150)
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Go to step 11

10	DTC CHART (SEE PAGE 05-1159)
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11	CIRCUIT INSPECTION (SEE PAGE 05-1161 to 05-1199)
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12	PROBLEM IDENTIFICATION
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13	REPAIR OR REPLACEMENT
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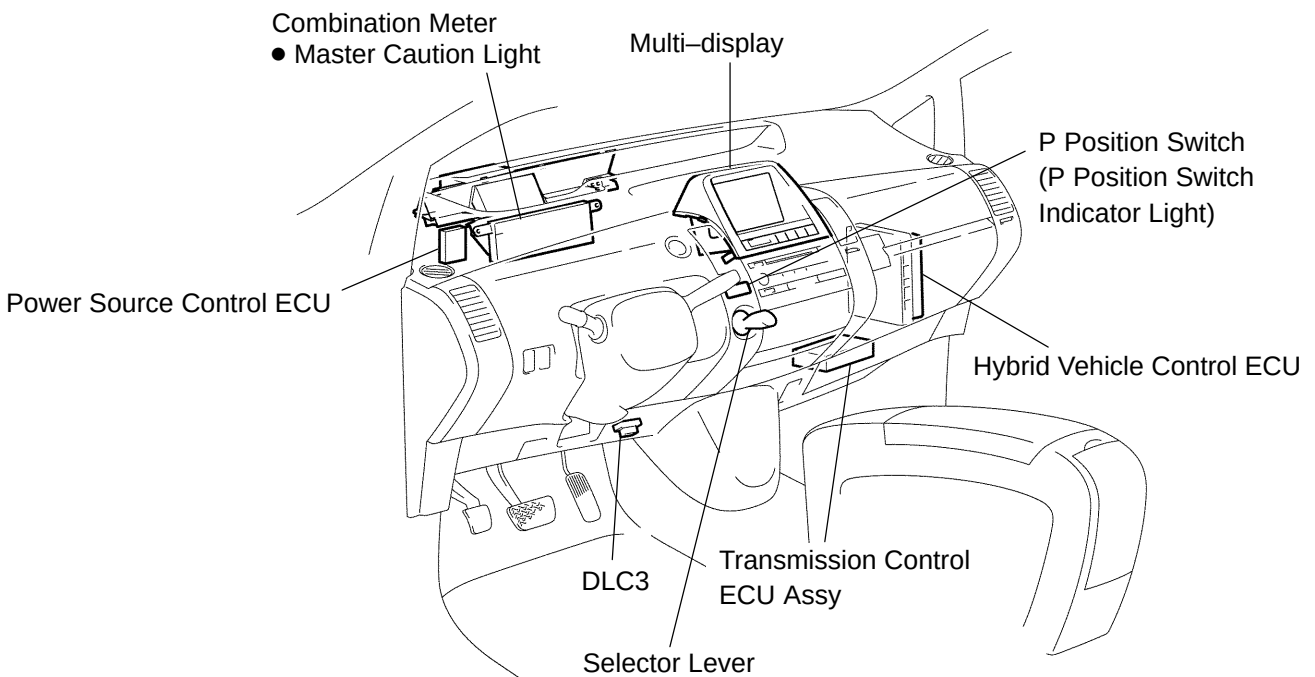
14	CONFIRMATION TEST
----	-------------------



END

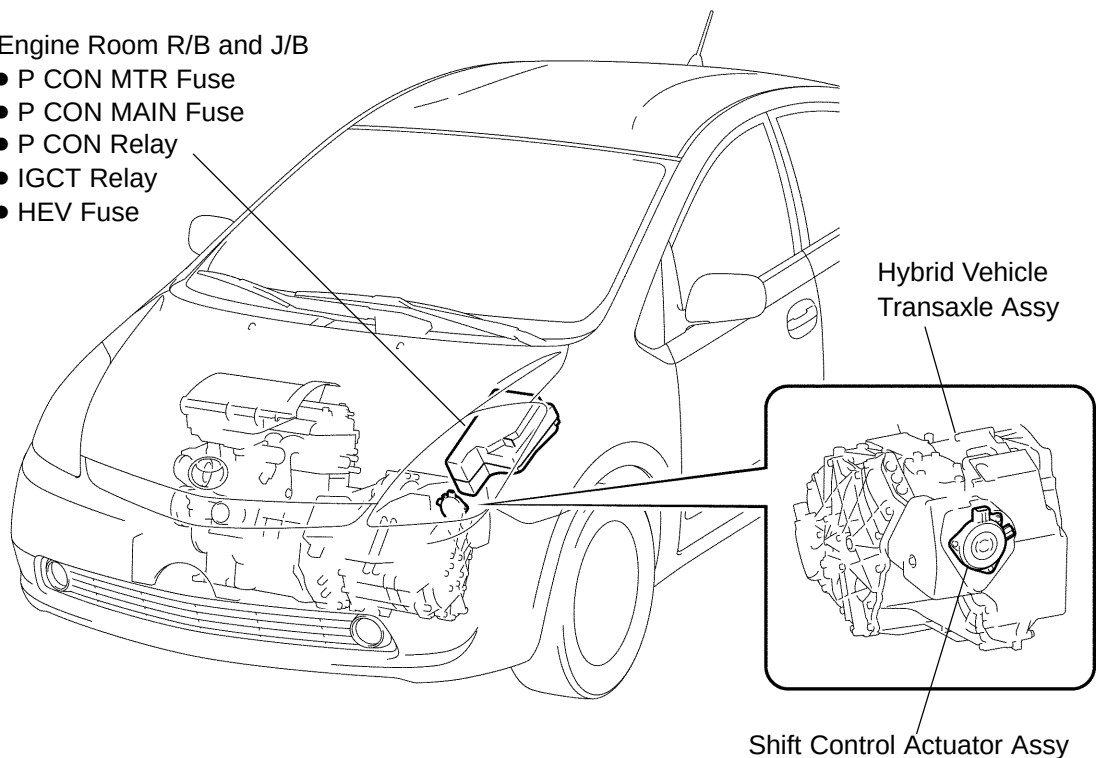
cardiagn.com

LOCATION



Engine Room R/B and J/B

- P CON MTR Fuse
- P CON MAIN Fuse
- P CON Relay
- IGCT Relay
- HEV Fuse



SHIFT CONTROL SYSTEM (PARKING LOCK CONTROL)

05IUB-01

PRECAUTION

NOTICE:

When the negative (–) battery terminal is disconnected, initialize the following systems after the terminal is reconnected.

System Name	See page
Power Window Control System	01-28

NOTICES FOR HYBRID SYSTEM ACTIVATION:

- When the warning lamp is illuminated or the battery has been disconnected and reconnected, pressing the power switch may not start the system on the first try. If so, press the power switch again.
- With the power switch's power mode changed to ON (IG), disconnect the battery. If the key is not in the key slot during reconnection, DTC B2799 may be output.

PROBLEM SYMPTOMS TABLE

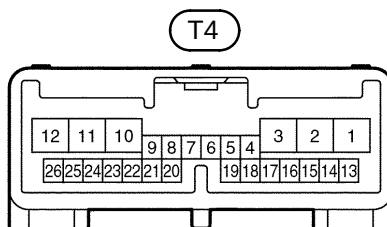
Symptom	Suspected Area	See page
P position switch indicator light does not come on.	1. P position switch indicator light circuit 2. Transmission control ECU assy	05-1199 –
P position switch indicator light does not go off.	1. P position switch indicator light circuit 2. Transmission control ECU assy	05-1199 –

TERMINALS OF ECU

1. TRANSMISSION CONTROL ECU ASSY

HINT:

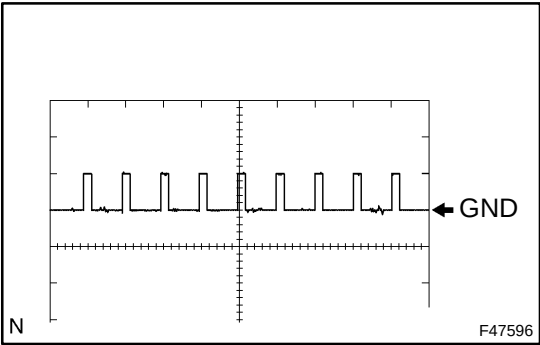
Inspect the connectors from the back side while the connector is connected.



P

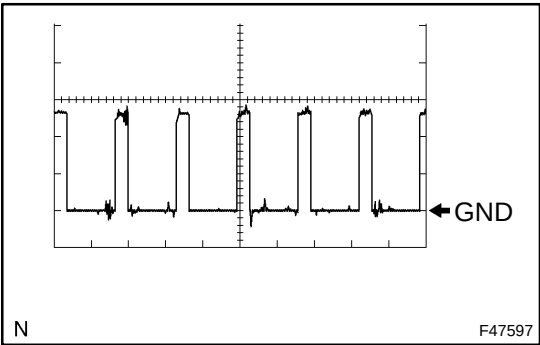
G27319

Terminal No. (Symbols)	Wiring color	Terminal description	Condition	Specified value
T4-1 – T4-15 (+B – E1)	L – W-B	Power source	Power switch on (IG)	9 to 14 V
T4-2 (E02) – Body ground	W-B – Body ground	Ground	Always	Below 1 V
T4-3 (E01) – Body ground	W-B – Body ground	Ground	Always	Below 1 V
T4-4 – T4-16 (RZ1 – E2)	L – P	Rotation angle sensor signal	Power switch on (IG)	4 to 5.5 V
T4-5 – T4-16 (RB – E2)	GR – P	Rotation angle sensor signal	Power switch on (IG)	4 to 5.5 V
T4-6 – T4-16 (RA – E2)	LG – P	Rotation angle sensor signal	Power switch on (IG)	4 to 5.5 V
T4-7 – T4-15 (PCON – E1)	LG – W-B	Communication Bus	Power switch on (IG)	Pulse generation (see wave form 1)
T4-8 – T4-15 (PPOS – E1)	W – W-B	Communication Bus	Power switch on (IG)	Pulse generation (see wave form 2)
T4-9 – T4-15 (IND – E1)	R – W-B	P position switch indicator light	P position switch on	Below 1 V
T4-10 – T4-15 (MWA – E1)	W – W-B	Parking lock motor	Power switch on (IG)	9 to 14 V
T4-11 – T4-15 (MVA – E1)	R – W-B	Parking lock motor	Power switch on (IG)	9 to 14 V
T4-12 – T4-15 (MUA – E1)	B – W-B	Parking lock motor	Power switch on (IG)	9 to 14 V
T4-13 – T4-15 (BATT – E1)	L – W-B	Power source (RAM)	Always	9 to 14 V
T4-14 – T4-15 (BMA – E1)	B – W-B	P CON relay	Power switch on (IG)	9 to 14 V
T4-15 (E1) – Body ground	W-B – Body ground	Ground	Always	Below 1 V
T4-16 (E2) – Body ground	P – Body ground	Ground	Always	Below 1 V
T4-17 – T4-16 (VC – E2)	O – P	Power source (Rotation angle sensor)	Power switch on (IG)	4.5 to 5.5 V
T4-18 – T4-15 (MPX2 – E1)	B – W-B	Multiplex communication	Power switch off Power switch on (IG)	Below 1 V Pulse generation
T4-19 – T4-15 (MPX1 – E1)	GR – W-B	Multiplex communication	Power switch off Power switch on (IG)	Below 1 V Pulse generation
T4-20 – T4-15 (SIL – E1)	W – W-B	Diagnosis tester communication	Power switch on (IG)	8 V or higher



(a) Wave form 1

Item	Content
Measure terminal	PCON – E1
Measure set	5V/DIV, 20 ms/DIV
Condition	Power switch on (IG)



(b) Wave form 2

Item	Content
Measure terminal	PPOS – E1
Measure set	5V/DIV, 20 ms/DIV
Condition	Power switch on (IG)