

DIAGNOSIS SYSTEM

1. DESCRIPTION

- (a) When troubleshooting a vehicle with the diagnostic system, the only difference from the usual troubleshooting procedure is connecting the intelligent tester to the vehicle and reading various data output from the vehicle's multiplex tilt and telescopic ECU.

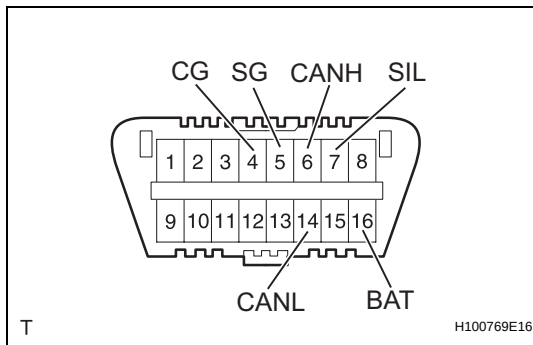
The multiplex tilt and telescopic ECU records DTCs when the ECU detects a malfunction in the computer itself or in its circuits.

To check the DTCs, connect the intelligent tester to the DLC3 on the vehicle. The intelligent tester enables you to erase the DTCs, activate several actuators, and check the freeze frame data and various forms of steering data.

2. DLC3 CHECK

- (a) Check the DLC3.

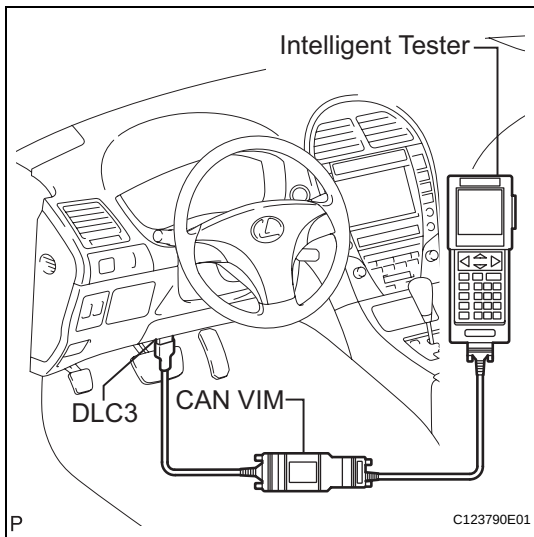
- (1) The multiplex tilt and telescopic ECU uses ISO 15765-4 for communication. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.



Symbols (Terminal 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)	CAN bus line	Engine switch off*	54 to 69 Ω
CANH (6) - CG (4)	HIGH-level CAN bus line	Engine switch off*	200 Ω or higher
CANL (14) - CG (4)	LOW-level CAN bus line	Engine switch off*	200 Ω or higher
CANH (6) - BAT (16)	HIGH-level CAN bus line	Engine switch off*	6 k Ω or higher
CANL (14) - BAT (16)	LOW-level CAN bus line	Engine switch off*	6 k Ω or higher

NOTICE:

Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the engine switch, any other switches or the doors.



- (b) Connect the cable of the intelligent tester to the DLC3, turn the engine switch on (IG) and attempt to use the tester. If the display indicates a communication error, there may be a problem either with the vehicle or with the tester.
- If communication is normal when the 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 may be in the tester itself. Consult the Service Department listed in the tester's instruction manual.

DTC CHECK / CLEAR

1. CHECK FOR DTCS

- Prepare the intelligent tester.
- Connect the intelligent tester to the DLC3 at the lower part of the instrument panel.
- Turn the engine switch on (IG) and turn the intelligent tester on.
- Use the intelligent tester to check for DTCs and the freeze frame data, and note or print the result (see the operator's manual for operating instructions).
- Confirm the details of the DTCs (See page [SR-20](#)).

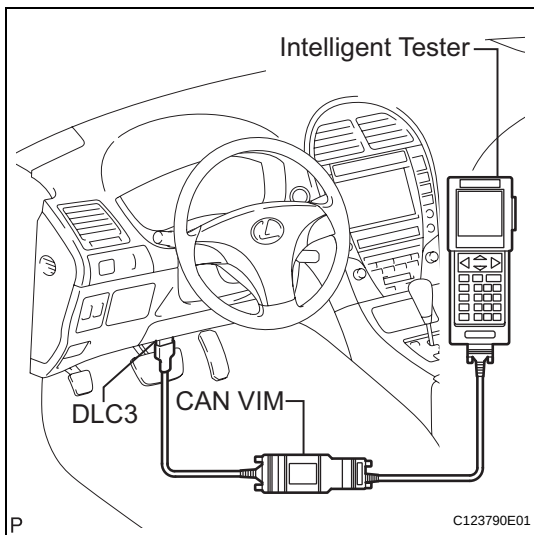
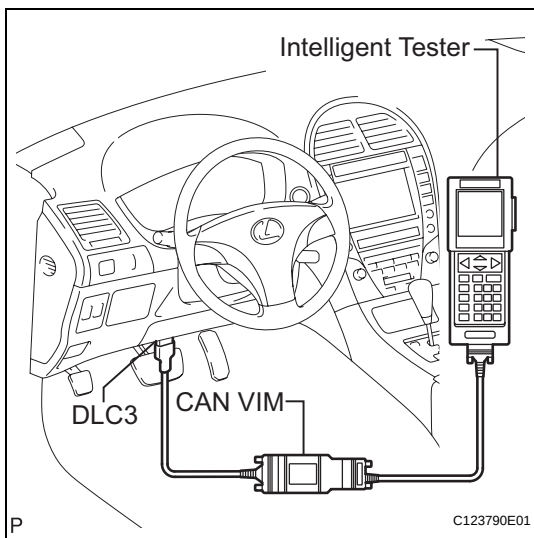
2. CLEAR DTCS

- Operate the intelligent tester to clear the DTCs and freeze frame data (see the operator's manual for operating instructions).

FREEZE FRAME DATA

1. FREEZE FRAME DATA

- Connect the intelligent tester to the DLC3.
- Turn the engine switch on (IG) and check the freeze frame data by following the prompts on the intelligent tester screen.



SR

TILT & TELESCO:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
T&T AUTOAWAY	Auto away and return function / ON or OFF	ON: Auto away and return function is allowed OFF: Auto away and return function is restrained	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TILT POS	Current tilt position data / min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 to 9000 H (28672 to 36864 edge)	-
TELSC POS	Current telescopic position data / min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 to 9000 H (28672 to 36864 edge)	-
TILT RETURN POS	Memorized tilt return position data / min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 to 9000 H (28672 to 36864 edge)	-
TELSC RETRN POS	Memorized telescopic return position data / min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 to 9000 H (28672 to 36864 edge)	-
T&T MEM 1	Tilt & telescopic memory position 1 / NOT MEM or MEM	NOT MEM: Position is not memorized MEM: Position is memorized	-
TILT MEM 1 POS	Tilt data of memory position 1 / min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 to 9000 H (28672 to 36864 edge)	-
TELSC MEM 1 POS	Telescopic data of memory position 1 / min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 to 9000 H (28672 to 36864 edge)	-
T&T MEM 2	Tilt & telescopic memory position 2 / NOT MEM or MEM	NOT MEM: Position is not memorized MEM: Position is memorized	-
TILT MEM 2 POS	Tilt data of memory position 2 / min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 to 9000 H (28672 to 36864 edge)	-
TELSC MEM 2 POS	Telescopic data of memory position 2 / min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 to 9000 H (28672 to 36864 edge)	-
UP LIMIT	Uppermost tilt position / NOT MEM or MEM	NOT MEM: Position is not memorized MEM: Position is memorized	-
UP LIMIT POS	Uppermost tilt position data / min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 to 9000 H (28672 to 36864 edge)	-
DOWN LIMIT	Lowermost tilt position / NOT MEM or MEM	NOT MEM: Position is not memorized MEM: Position is memorized	-
DOWN LIMIT POS	Lowermost tilt position data / min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 to 9000 H (28672 to 36864 edge)	-
SHORT LIMIT	Shortest telescopic position / NOT MEM or MEM	NOT MEM: Position is not memorized MEM: Position is memorized	-
SHORT LIMIT POS	Shortest telescopic position data / min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 to 9000 H (28672 to 36864 edge)	-
LONG LIMIT	Longest telescopic position / NOT MEM or MEM	NOT MEM: Position is not memorized MEM: Position is memorized	-
LONG LIMIT POS	Longest telescopic position data / min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 to 9000 H (28672 to 36864 edge)	-
UP SW	Input state of tilt up by manual switch / ON or OFF	ON: Tilt up is activated by manual switch OFF: Tilt up is not activated by manual switch	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
DOWN SW	Input state of tilt down by manual switch / ON or OFF	ON: Tilt down is activated by manual switch OFF: Tilt down is not activated by manual switch	-
SHORT SW	Input state of telescopic short by manual switch / ON or OFF	ON: Telescopic short is activated by manual switch OFF: Telescopic short is not activated by manual switch	-
LONG SW	Input state of telescopic long by manual switch / ON or OFF	ON: telescopic long is activated by manual switch OFF: Telescopic long is not activated by manual switch	-
POWER VOLTAGE	Voltage data of power supply / min.: 0 V, max.: 20 V	Actual power supply voltage 10 to 14 V	-
FREEZ SPD INFO	Vehicle speed data / 0 km/h (0 mph), max.: 255 km/h (158 mph)	Actual vehicle speed	-
IG SW	Input state of engine switch / ON or OFF	ON: Input signal is normal OFF: Input signal is interrupted	-
IG SW (CAN)	Communication state of engine switch / ON or OFF	ON: Communication is normal OFF: Communication is interrupted	-
T&T MANUAL SW	Voltage data of manual switch / min.: 0 V, max.: 5 V	Neutral position: Below 0.2 V Tilt up: 1.67 to 2.13 V Tilt down: 0.54 to 0.74 V Telescopic contract: 1.08 to 1.40 V Telescopic extend: 2.22 to 2.77 V	-
KEYSW (CAN)	Communication state of key switch confirmation signal / ON or OFF	ON: Communication is normal OFF: Communication is interrupted	-
KEYSW	Input state of key switch / ON or OFF	ON: Input signal is normal OFF: Input signal is interrupted	-
KEY CODE (CAN)	Communication state of key code confirmation signal / ON or OFF	ON: Communication is normal OFF: Communication is interrupted	-
J/B	Communication state of main body ECU signal / OK or Interruption	OK: Communication is normal Interruption: Communication is interrupted	-
SEAT ECU INFO	Communication state of seat ECU signal / OK or Interruption	OK: Communication is normal Interruption: Communication is interrupted	-
METER ECU INFO	Communication state of combination meter signal / OK or Interruption	OK: Communication is normal Interruption: Communication is interrupted	-

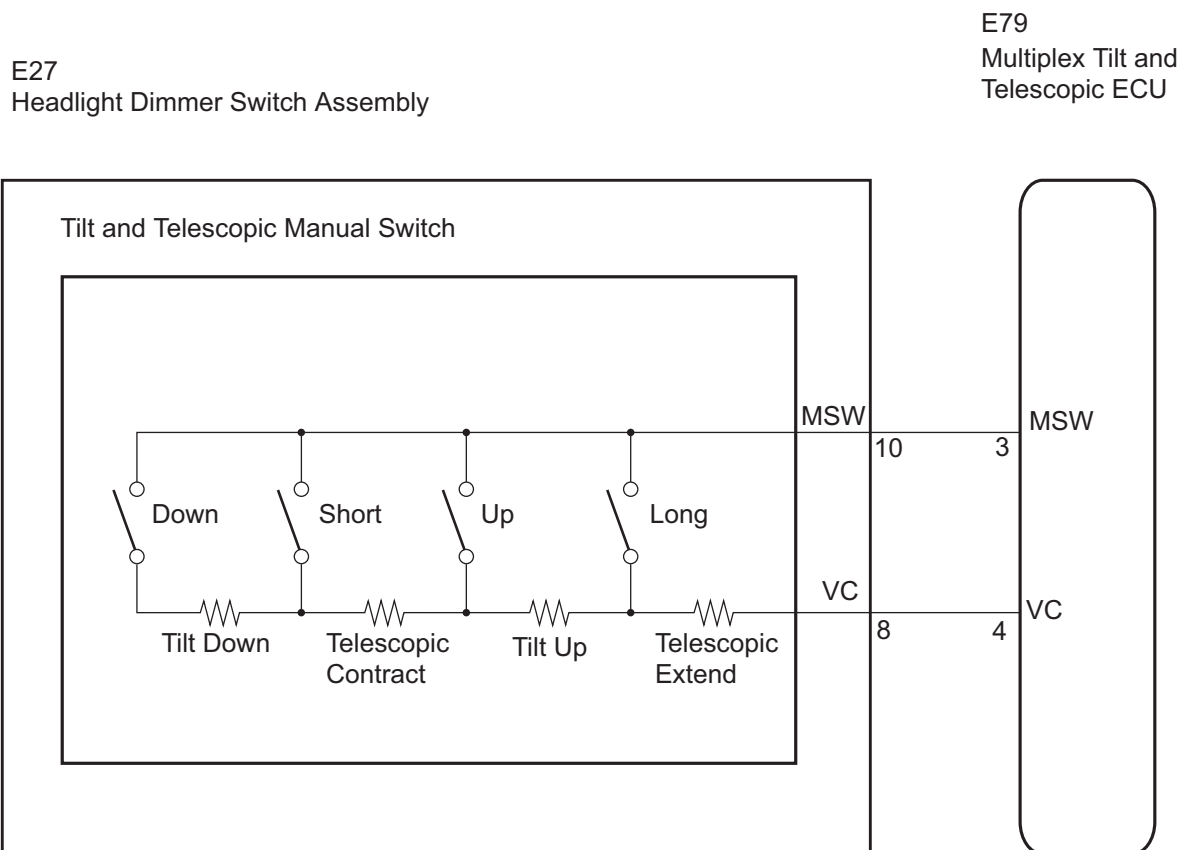
DTC

B2603

Tilt and Telescopic Manual Switch Circuit Malfunction**DESCRIPTION**

Different voltage values are input to the multiplex tilt and telescopic ECU by operating the manual switch. The multiplex tilt and telescopic ECU then judges which motor and in which direction that the motor should rotate based on the voltage value.

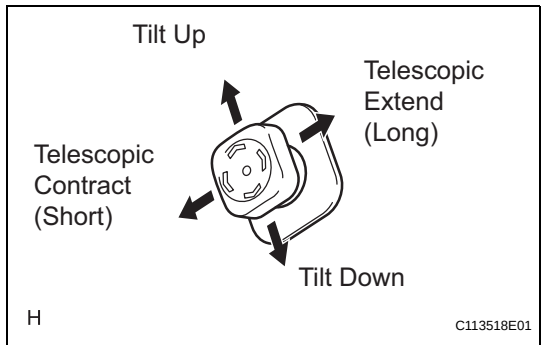
DTC No.	Detection Item	Trouble Area
B2603	Abnormal voltage value, which is not within the specification, is input to the multiplex tilt and telescopic ECU when the manual switch is operated.	• Tilt and telescopic manual switch • Tilt and telescopic manual switch circuit • Multiplex tilt and telescopic ECU

WIRING DIAGRAM

INSPECTION PROCEDURE

1

READ VALUE OF INTELLIGENT TESTER



- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the engine switch on (IG) and turn the intelligent tester on.
- (c) Select "T&T MANUAL SW" from the DATA LIST.
- (d) Read voltages on the tester screen when operating the manual switch.

Standard voltage

Manual Switch Position	Specified Condition
Neutral	Below 0.2 V
Tilt up	1.67 to 2.13 V
Tilt down	0.54 to 0.74 V
Telescopic contract (Short)	1.08 to 1.40 V
Telescopic extend (Long)	2.22 to 2.77 V

Result

Result	Proceed to
Switch voltages in all directions are within the standard.	A
Switch voltages in certain directions are outside the standard.	B
Switch voltages in all directions are outside the standard.	C

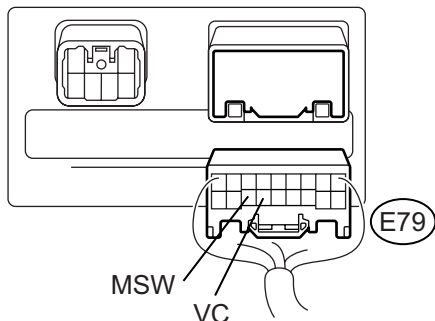
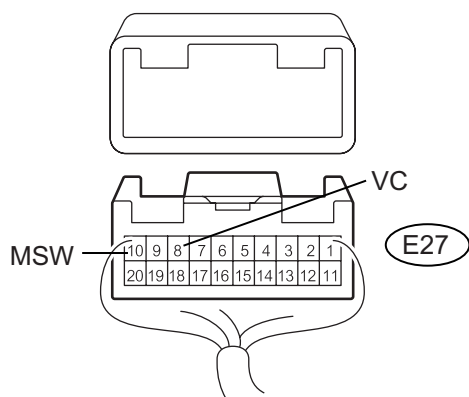
A

REPLACE MULTIPLEX TILT AND TELESCOPIC ECU

B

REPLACE HEADLIGHT DIMMER SWITCH ASSEMBLY

C

**2 CHECK HARNESS AND CONNECTOR (MULTIPLEX TILT AND TELESCOPIC ECU -
HEADLIGHT DIMMER SWITCH)****Multiplex Tilt and Telescopic ECU:****Headlight Dimmer Switch Assembly:**

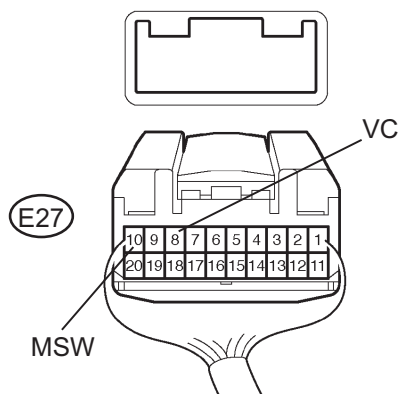
H

C104131E04

- Disconnect the E79 connector from the multiplex tilt and telescopic ECU.
- Disconnect the E27 connector from the headlight dimmer switch assembly.
- Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
VC (E79-4) - VC (E27-8)	Always	Below 1 Ω
MSW (E79-3) - MSW (E27-10)	Always	Below 1 Ω
VC (E27-8) - Body ground	Always	10 k Ω or higher
MSW (E27-10) - Body ground	Always	10 k Ω or higher

NG**REPAIR OR REPLACE HARNESS OR
CONNECTOR****OK****3 INSPECT MULTIPLEX TILT AND TELESCOPIC ECU (VC TERMINAL VOLTAGE)****Headlight Dimmer Switch Assembly:**

F044885E04

- Reconnect the E79 connector to the multiplex tilt and telescopic ECU.
- Measure the voltage according to the value(s) in the table below.

Standard voltage

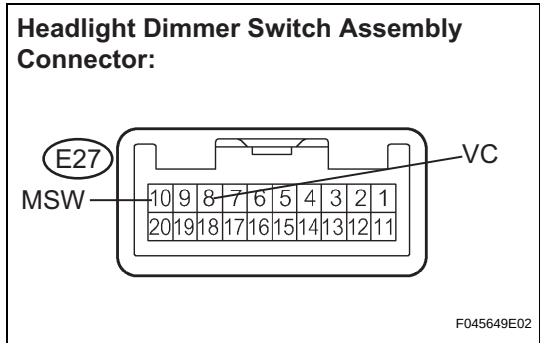
Tester Connection	Condition	Specified Condition
VC (E27-8) - MSW (E27-10)	Engine switch on (IG)	4.9 to 5.1 V

NG**REPLACE MULTIPLEX TILT AND
TELESCOPIC ECU****SR**

OK

4

INSPECT HEADLIGHT DIMMER SWITCH ASSEMBLY (TILT AND TELESCOPIC MANUAL SWITCH)



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

Standard resistance

Tester Connection	Condition (Manual switch position)	Specified Condition
VC (E27-8) - MSW (E27-10)	Tilt up	360 Ω
	Tilt down	1,990 Ω
	Telescopic contract	790 Ω
	Telescopic extend	160 Ω

NG

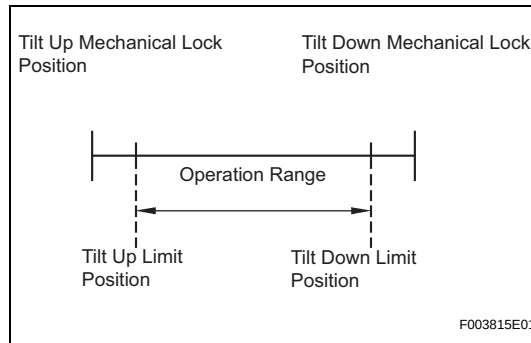
REPLACE HEADLIGHT DIMMER SWITCH ASSEMBLY

OK

REPLACE MULTIPLEX TILT AND TELESCOPIC ECU

DTC**B2610****Tilt Position Sensor or Tilt Motor Circuit Mal-
function****DESCRIPTION**

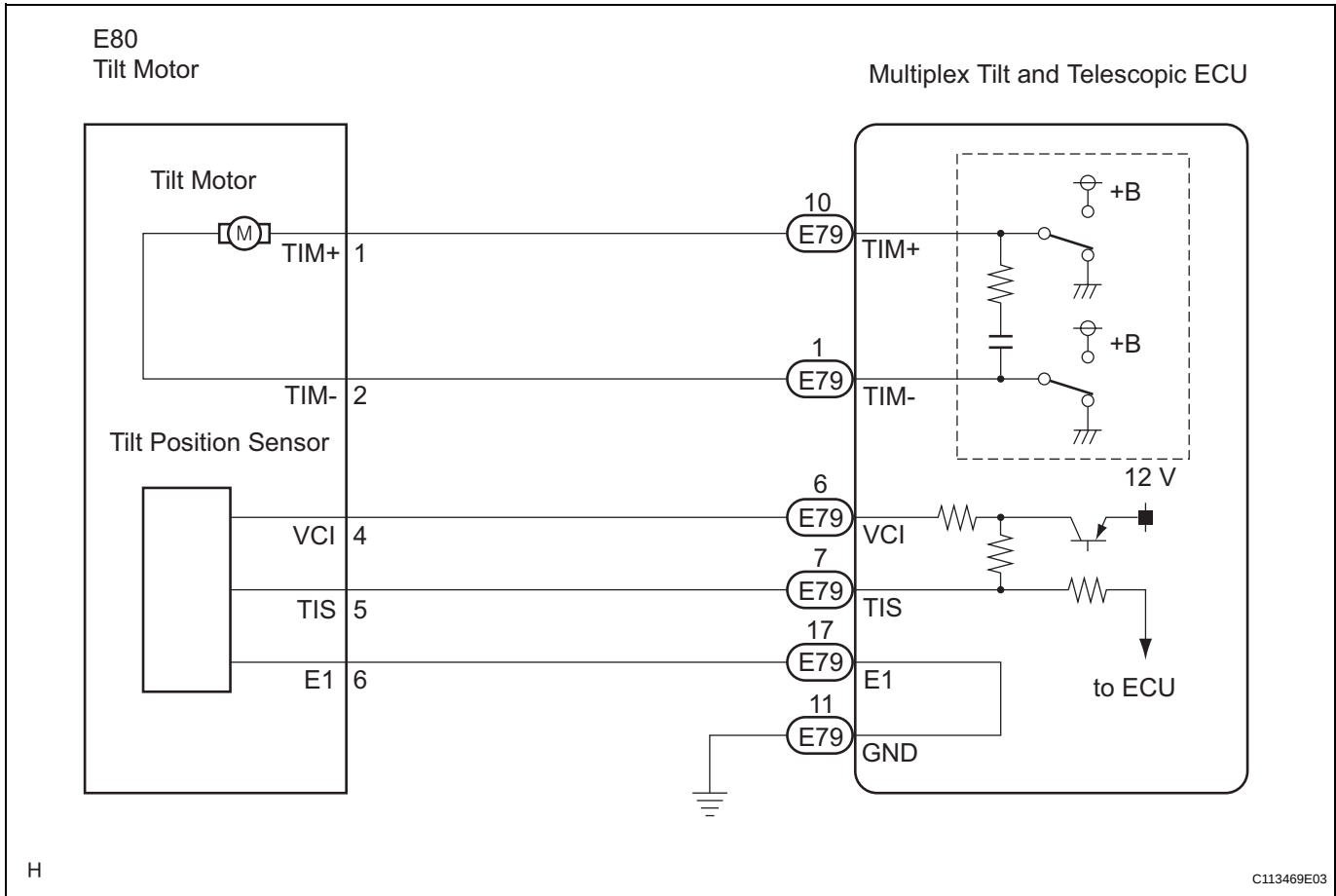
The tilt motor is operated by the power source voltage supplied from the multiplex tilt and telescopic ECU and tilts the steering column up and down. The tilt position sensor (hall IC) in the tilt motor detects the tilt angle of the steering column and outputs a signal to the CPU based on that tilt.

**HINT:**

Limit positions can be confirmed on the screen of the intelligent tester.

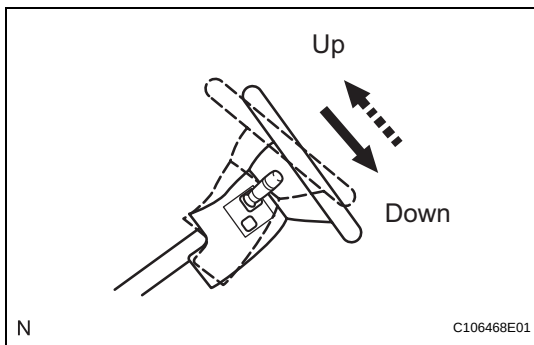
DTC No.	Detection Item	Trouble Area
B2610	Tilt operation stops within the operation range while operating.	• Wire harness or connector • Tilt position sensor or tilt motor • Multiplex tilt and telescopic ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1 PERFORM ACTIVE TEST BY INTELLIGENT TESTER



- Connect the intelligent tester to the DLC3.
- Turn the engine switch on (IG) and turn the intelligent tester on.
- Select "TILT & TELESCO".
- Select "TILT", and perform the ACTIVE TEST using the intelligent tester.
- Check that the steering wheel tilts up (down) when the ACTIVE TEST is carried out.

OK:

Steering wheel tilts up (down).

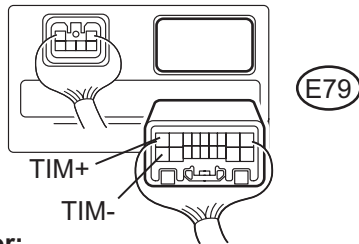
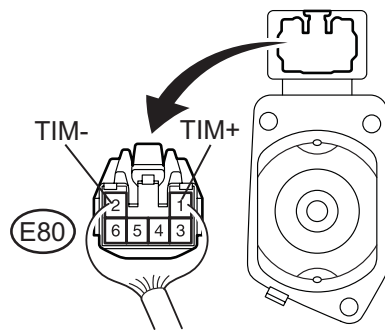
OK

Go to step 4

SR

NG

2

CHECK HARNESS AND CONNECTOR (MULTIPLEX TILT AND TELESCOPIC ECU - TILT MOTOR)**Multiplex Tilt and Telescopic ECU:****Tilt Motor:**

N

C106478E16

- Disconnect the E79 connector from the multiplex tilt and telescopic ECU.
- Disconnect the E80 connector from the tilt motor.
- Measure the resistance according to the value(s) in the table below.

Standard resistance

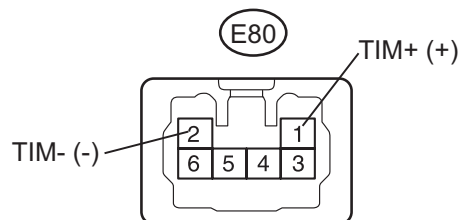
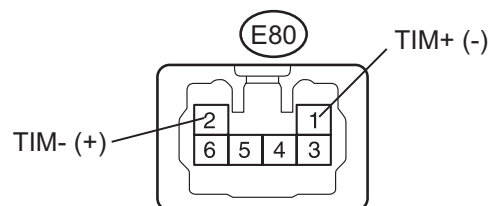
Tester Connection	Condition	Specified Condition
TIM+ (E79-10) - TIM+ (E80-1)	Always	Below 1 Ω
TIM- (E79-1) - TIM- (E80-2)	Always	Below 1 Ω
TIM+ (E79-10) - Body ground	Always	10 k Ω or higher
TIM- (E79-1) - Body ground	Always	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

INSPECT TILT MOTOR**Tilt Motor Connector:****Tilt Motor Connector:**

N

C106479E03

- Connect the positive battery terminal to terminal TIM+ (E80-1) and the negative battery terminal to terminal TIM- (E80-2) of the tilt motor connector. Then confirm that the steering wheel tilts up.

OK:**The steering wheel tilts up.**

- Connect the negative battery terminal to terminal TIM+ (E80-1) and the positive battery terminal to terminal TIM- (E80-2) of the tilt motor connector. Then confirm that the steering wheel tilts down.

OK:**The steering wheel tilts down.**

NG

REPLACE STEERING COLUMN ASSEMBLY

SR

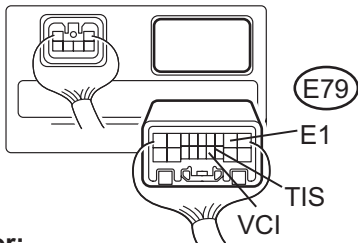
OK

REPLACE MULTIPLEX TILT AND TELESCOPIC ECU

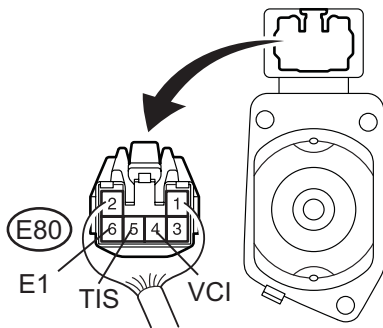
4

CHECK HARNESS AND CONNECTOR (MULTIPLEX TILT AND TELESCOPIC ECU - TILT
POSITION SENSOR)

Multiplex Tilt and Telescopic ECU:



Tilt Motor:



N

C106478E20

- Disconnect the E79 connector from the multiplex tilt and telescopic ECU.
- Disconnect the E80 connector from the tilt motor.
- Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
VCI (E79-6) - VCI (E80-4)	Always	Below 1 Ω
TIS (E79-7) - TIS (E80-5)	Always	Below 1 Ω
E1 (E79-17) - E1 (E80-6)	Always	Below 1 Ω
VCI (E79-6) - Body ground	Always	10 k Ω or higher
TIS (E79-7) - Body ground	Always	10 k Ω or higher
E1 (E79-17) - Body ground	Always	10 k Ω or higher

NG

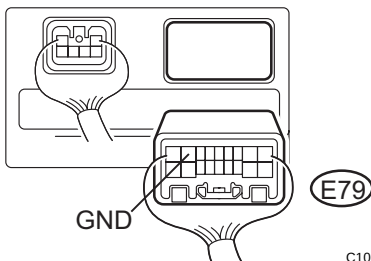
REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK

5

CHECK HARNESS AND CONNECTOR (MULTIPLEX TILT AND TELESCOPIC ECU - BODY
GROUND)

Multiplex Tilt and Telescopic ECU:



N

C106463E61

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

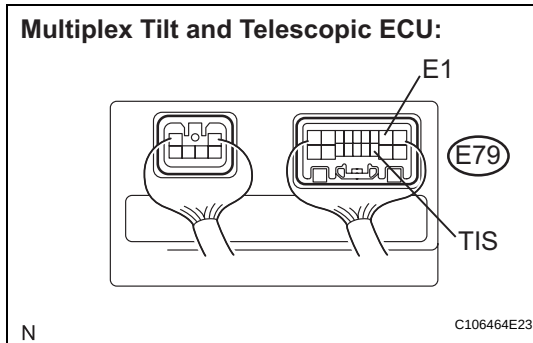
Standard resistance

Tester Connection	Condition	Specified Condition
GND (E79-11) - Body ground	Always	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR
CONNECTOR

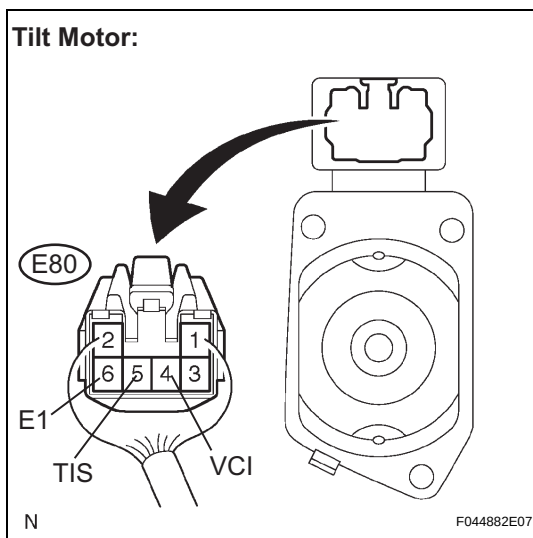
OK

6 INSPECT MULTIPLEX TILT AND TELESCOPIC ECU (VCI, TIS TERMINAL VOLTAGE)

- (a) Reconnect the E79 connector to the multiplex tilt and telescopic ECU.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
TIS (E79-7) - E1 (E79-17)	Steering tilts up or tilts down	8 to 16 V (Pulse HI)
		Below 1 V (Pulse LOW)

NG**REPLACE MULTIPLEX TILT AND TELESCOPIC ECU****OK****7 INSPECT TILT POSITION SENSOR**

- (a) Reconnect the E80 connector to the tilt motor.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

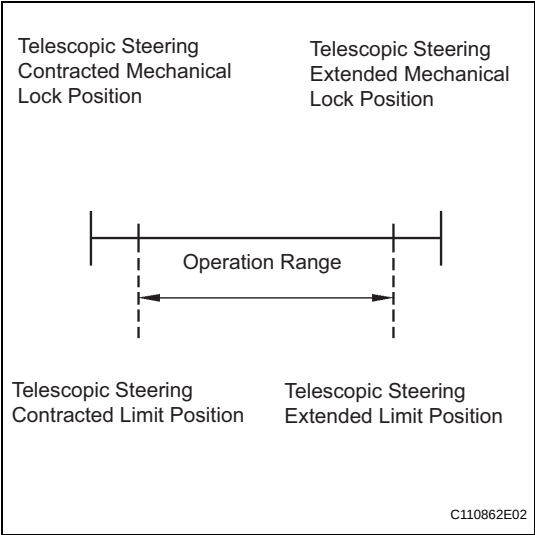
Tester Connection	Condition	Specified Condition
VCI (E80-4) - E1 (E80-6)	Engine switch on (IG)	8 to 16 V
TIS (E80-5) - E1 (E80-6)	Engine switch on (IG)	8 to 16 V

NG**REPLACE STEERING COLUMN ASSEMBLY****OK****REPLACE MULTIPLEX TILT AND TELESCOPIC ECU**

DTC	B2611	Telescopic Position Sensor or Telescopic Motor Circuit Malfunction
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DESCRIPTION

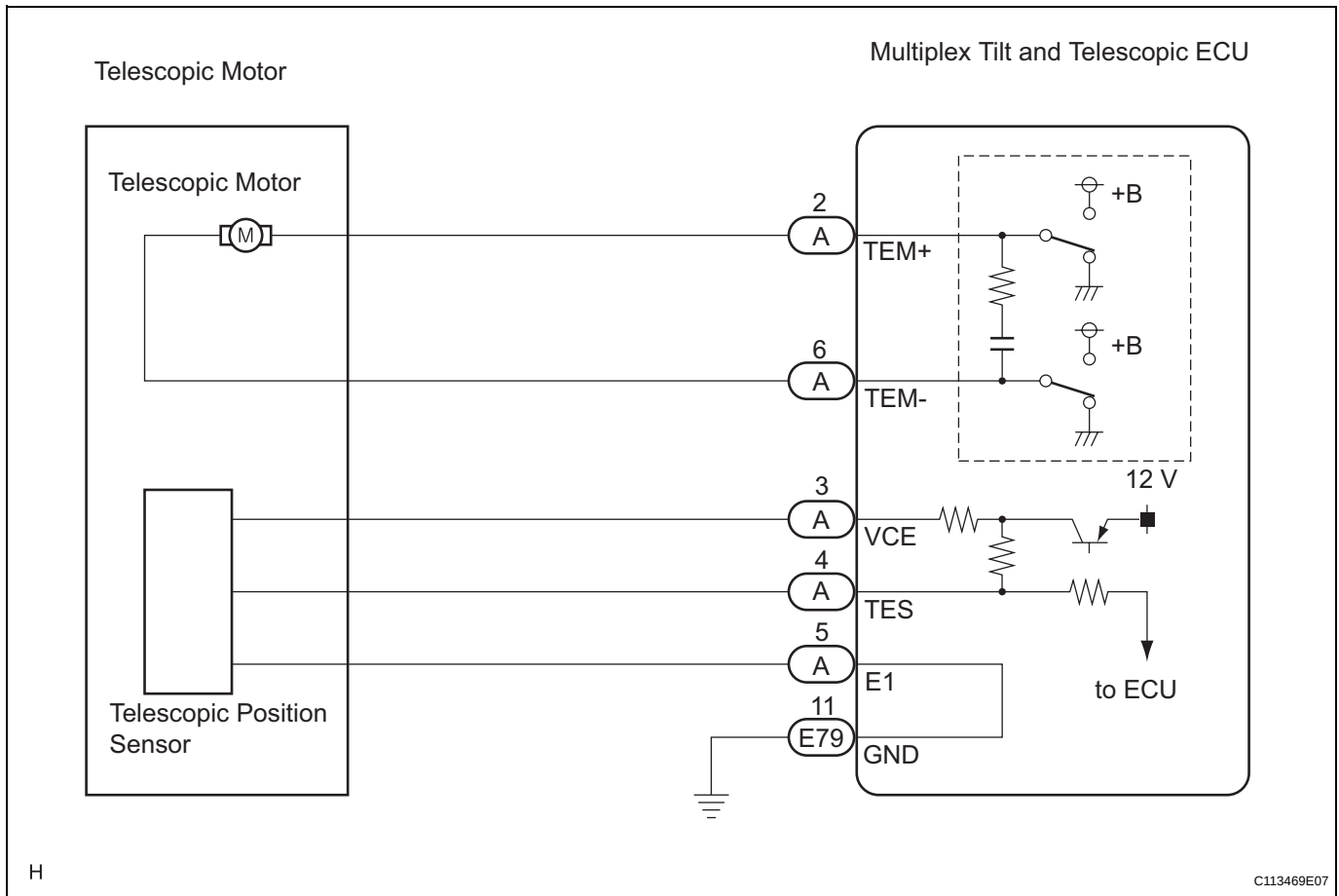
The telescopic motor is operated by the power source voltage supplied from the multiplex tilt and telescopic ECU and slides the steering column forward and backward. The telescopic position sensor (hall IC) in the telescopic motor detects the sliding position in the forward and backward directions of the steering column and outputs a signal to the based on that sliding amount.



HINT:
Limit positions can be confirmed on the screen of the intelligent tester.

DTC No.	Detection Item	Trouble Area
B2611	Telescopic operation stops within the operation range while operating.	• Wire harness or connector • Telescopic position sensor or telescopic motor • Multiplex tilt and telescopic ECU

WIRING DIAGRAM

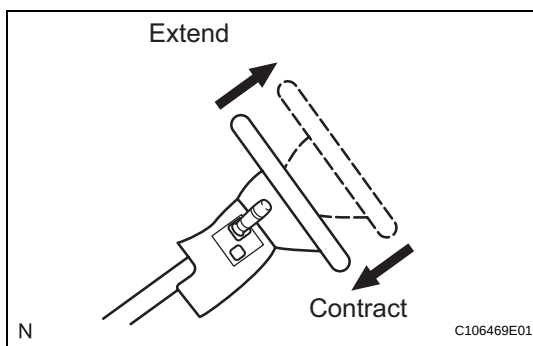


INSPECTION PROCEDURE

HINT:

The wire harness between the multiplex tilt and telescopic ECU and telescopic motor is provided with the steering column assembly.

1 PERFORM ACTIVE TEST BY INTELLIGENT TESTER



- Connect the intelligent tester to the DLC3.
- Turn the engine switch on (IG) and turn the intelligent tester on.
- Select "TILT & TELESKO".
- Select "TELESKO", and perform the ACTIVE TEST using the intelligent tester.
- Check that the steering column contracts (extends) when the ACTIVE TEST is carried out.

OK:

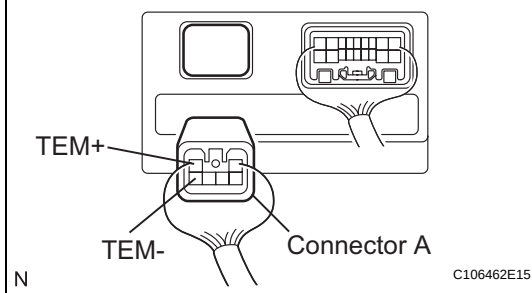
The steering column contracts (extends).

OK

Go to step 3

NG

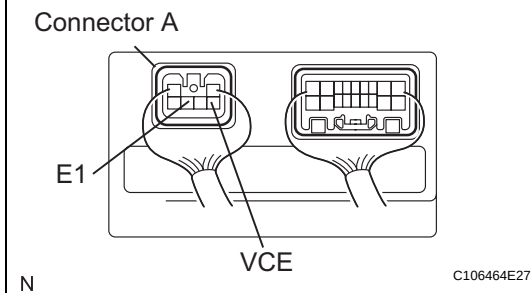
SR

2 INSPECT TELESCOPIC MOTOR**Multiplex Tilt and Telescopic ECU:**

- (a) Disconnect connector A from the multiplex tilt and telescopic ECU.
- (b) Connect the positive battery terminal to terminal TEM+ (A-2) and the negative battery terminal to terminal TEM- (A-6) of the telescopic motor connector. Then confirm that the steering column contracts.

OK:**The steering column contracts.**

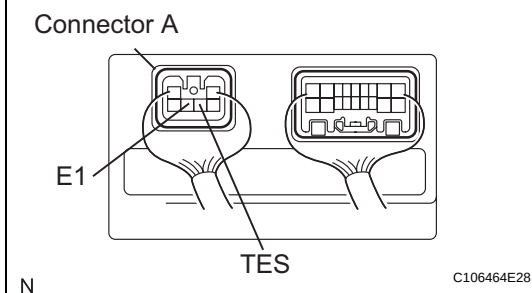
- (c) Connect the negative battery terminal to terminal TEM+ (A-2) and the positive battery terminal to terminal TEM- (A-6) of the telescopic motor connector. Then confirm that the steering column extends.

OK:**The steering column extends.****NG****REPLACE STEERING COLUMN ASSEMBLY****OK****REPLACE MULTIPLEX TILT AND TELESCOPIC ECU****3 INSPECT MULTIPLEX TILT AND TELESCOPIC ECU (VCE TERMINAL VOLTAGE)****Multiplex Tilt and Telescopic ECU:**

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

Standard voltage

Tester Connection	Condition	Specified Condition
VCE (A-3) - E1 (A-5)	Engine switch on (IG)	8 to 16 V

NG**Go to step 5****OK****4 INSPECT TELESCOPIC POSITION SENSOR****Multiplex Tilt and Telescopic ECU:**

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

Standard voltage

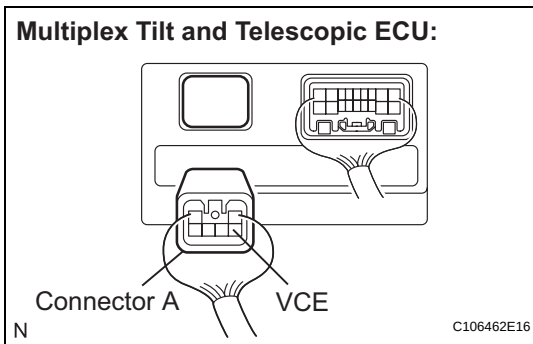
Tester Connection	Condition	Specified Condition
TES (A-4) - E1 (A-5)	Telescopic steering contracted or extended	8 to 16 V (Pulse HI)
		Below 1 V (Pulse LOW)

NG**REPLACE STEERING COLUMN ASSEMBLY**

OK

REPLACE MULTIPLEX TILT AND TELESCOPIC ECU

5 CHECK HARNESS AND CONNECTOR (ECU - BODY GROUND (VCE CIRCUIT))



- (a) Disconnect connector A from the multiplex tilt and telescopic ECU.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

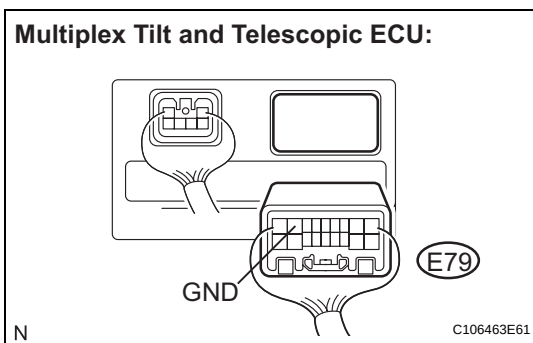
Tester Connection	Condition	Specified Condition
VCE (A-3) - Body ground	Always	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK

6 CHECK HARNESS AND CONNECTOR (ECU - BODY GROUND (GND CIRCUIT))



- (a) Disconnect the E79 connector from the multiplex tilt and telescopic ECU.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
GND (E79-11) - Body ground	Always	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK

REPLACE MULTIPLEX TILT AND TELESCOPIC ECU

DTC

B2620

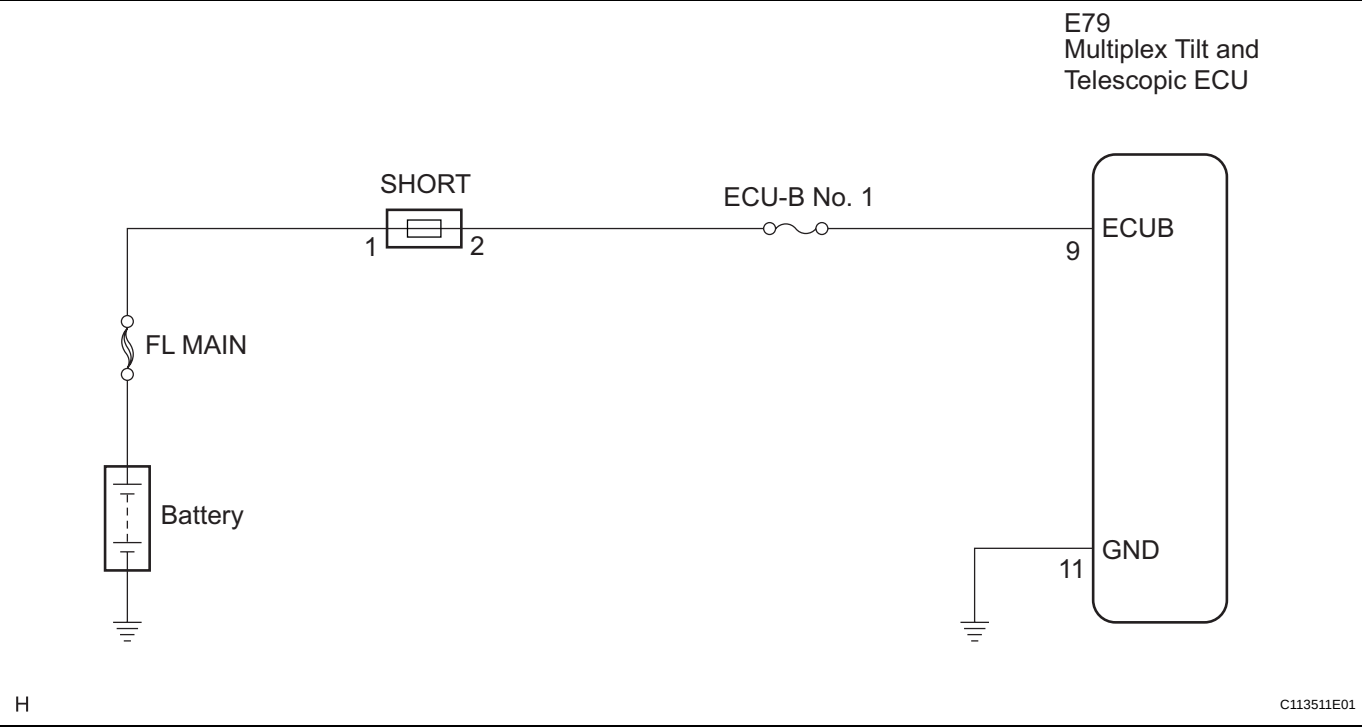
ECU Power Source Circuit Malfunction

DESCRIPTION

The ECU power source circuit supplies positive voltage to the multiplex tilt and telescopic ECU.

DTC No.	Detection Item	Trouble Area
B2620	The voltage of the ECU power source drops to 8 V or less and this condition continues for 10 secs. or more.	- Battery - Wire harness or connector - Multiplex tilt and telescopic ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

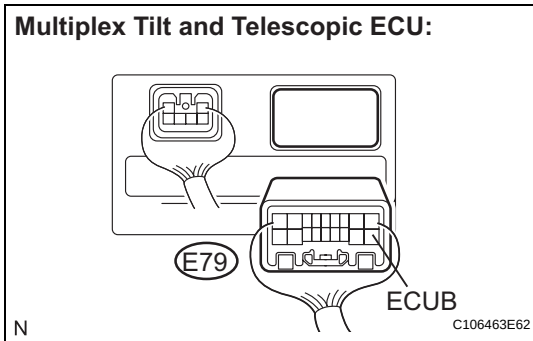
1

INSPECT FUSE

- (a) Remove the ECU-B No. 1 fuse from the engine room J/ B.
- (b) Measure the resistance of the ECU-B No. 1 fuse.
Standard resistance:
Below 1 Ω

NG

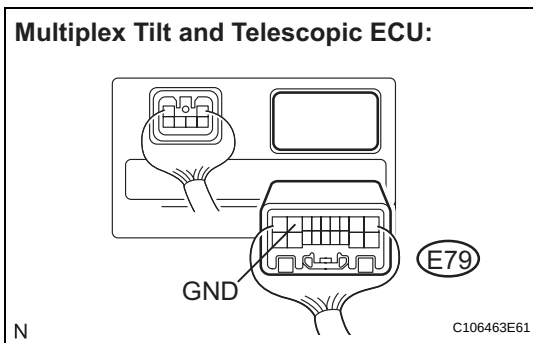
REPLACE FUSE

2 CHECK HARNESS AND CONNECTOR (MULTIPLEX TILT AND TELESCOPIC ECU - BATTERY)**Multiplex Tilt and Telescopic ECU:**

- (a) Disconnect the E79 connector from the multiplex tilt and telescopic ECU.
- (b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
ECUB (E79-9) - Body ground	Always	10 to 14 V

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****3 CHECK HARNESS AND CONNECTOR (MULTIPLEX TILT AND TELESCOPIC ECU - BODY GROUND)****Multiplex Tilt and Telescopic ECU:**

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

Standard resistance

Tester Connection	Condition	Specified Condition
GND (E79-11) - Body ground	Always	Below 1 Ω

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****REPLACE MULTIPLEX TILT AND TELESCOPIC ECU**

DTC**B2621****Communication Interruption****DESCRIPTION**

The multiplex tilt and telescopic ECU forms a network with the ECUs of other systems through the communication bus. Each ECU informs the other ECUs that they are connected to the network by outputting a specified signal (periodical signal) onto the communication bus on a regular schedule. The multiplex tilt and telescopic ECU detects the connection of each ECU based on the signal.

DTC No.	Detection Item	Trouble Area
B2621	Periodical signal from the specified ECU has stopped.	- CAN communication system - Main body ECU - Front power seat switch LH (Position control ECU) - Combination meter assembly - Multiplex tilt and telescopic ECU

INSPECTION PROCEDURE**1****CHECK DTC (CAN COMMUNICATION SYSTEM)**

- (a) Check the DTC of the CAN communication system (See page [CA-49](#)).

Result

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

B**GO TO CAN COMMUNICATION SYSTEM****A****2****READ VALUE OF INTELLIGENT TESTER (MAIN BODY ECU COMMUNICATION SIGNAL)**

- (a) Connect the intelligent tester to the DLC3.
 (b) Turn the engine switch on (IG) and turn the intelligent tester on.
 (c) Select "J/B" from DATA LIST.
 (d) Check the signal communication state of the main body ECU on the tester screen.

TILT & TELESKO:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
J/B	Communication state of body ECU signal / OK or Interruption	OK: Communication is normal Interruption: Communication is interrupted	-

OK:**"OK" is displayed.****NG****REPLACE MAIN BODY ECU****OK****SR**

3 READ VALUE OF INTELLIGENT TESTER (DRIVER SEAT ECU COMMUNICATION SIGNAL)

- (a) Select "SEAT ECU INFO" from DATA LIST.
- (b) Check the signal communication state of the front power seat switch LH (position control ECU) on the tester screen.

TILT & TELESKO:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
SEAT ECU INFO	Communication state of seat ECU signal / OK or Interruption	OK: Communication is normal Interruption: Communication is interrupted	-

OK:**"OK" is displayed.****NG****REPLACE FRONT POWER SEAT SWITCH
(DRIVER SEAT ECU)****OK****4 READ VALUE OF INTELLIGENT TESTER (COMBINATION METER ECU COMMUNICATION SIGNAL)**

- (a) Select "METER ECU INFO" from DATA LIST.
- (b) Check the signal communication state of the power source control ECU on the tester screen.

TILT & TELESKO:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
METER ECU INFO	Communication state of power source control ECU signal / OK or Interruption	OK: Communication is normal Interruption: Communication is interrupted	-

OK:**"OK" is displayed.****NG****REPLACE COMBINATION METER
ASSEMBLY (COMBINATION METER ECU)****OK****REPLACE MULTIPLEX TILT AND TELESCOPIC ECU**

DTC**B2624****Vehicles Speed Malfunction****DESCRIPTION**

The multiplex tilt and telescopic ECU forms a network with the ECUs of other systems through the communication bus. Each ECU informs the other ECUs that they are connected to the network by outputting a specified signal (periodic signal) onto the communication bus on a regular basis. The multiplex tilt and telescopic ECU receives vehicle speed signals from the combination meter via the communication bus to prevent improper operation of the auto away/return function during driving.

DTC No.	Detection Item	Trouble Area
B2624	- The auto away function is disabled with the last vehicle speed signal (*1) of 10 km/h (6 mph) or more. - Vehicle speed signal is lost for 5 seconds or more and the auto away/return function is disabled.	- CAN communication system - Combination meter assembly - Multiplex tilt and telescopic ECU

HINT:

*1: If the engine switch is turned off immediately after the vehicle comes to a sudden stop, the last vehicle speed signal may not be 0 km/h (0 mph).

INSPECTION PROCEDURE**1****CHECK CAN COMMUNICATION SYSTEM**

- (a) Check the "COMMUNICATION STOP MODE TABLE" of the CAN communication system (See page [CA-15](#)).

Result

Tester Display	Proceed to
"Meter" is displayed.	A
"Meter" is not displayed.	B

B**GO TO CAN COMMUNICATION SYSTEM****A****2****READ VALUE OF INTELLIGENT TESTER (SPEED SIGNAL)**

- (a) Connect the intelligent tester to the DLC3.
 (b) Turn the engine switch on (IG) and turn the intelligent tester on.
 (c) Select "FREEZ SPD INFO" from DATA LIST.
 (d) Check the vehicle speed signal on the tester screen.

TILT & TELESCO:

Tester Display	Measurement Item/Range	Inspection Condition	Standard
FREEZ SPD INFO	Vehicle speed data / min.: 0 km/h (0 mph), max.: 255 km/h (158 mph)	Stop → Drive → Stop	0 km/h (0 mph) → Same speed as indicated on speedometer → 0 km/h (0 mph)

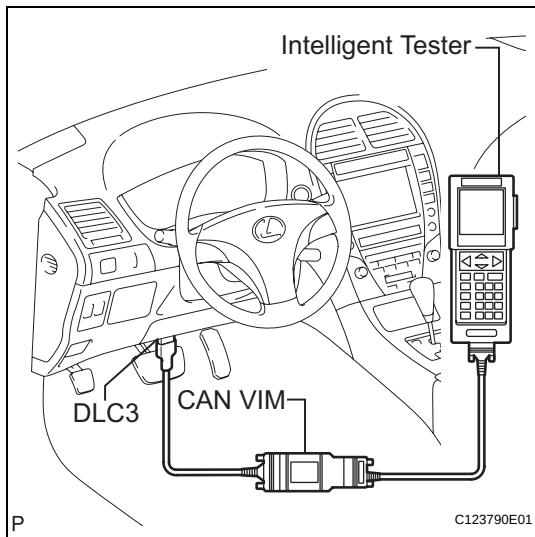
Result

Result	Proceed to
OK	A
NG (Tester indication is abnormal)	B
NG (Meter indication is abnormal)	C

HINT:

Vehicle speed of 3 km/h (2 mph) or more may be displayed on the tester screen immediately after the vehicle comes to a sudden stop. This is caused by a delay in vehicle signal input via the communication bus and not a malfunction.

B**REPLACE MULTIPLEX TILT AND
TELESCOPIC ECU****C****CHECK COMBINATION METER SYSTEM****A****REPLACE MULTIPLEX TILT AND TELESCOPIC ECU**



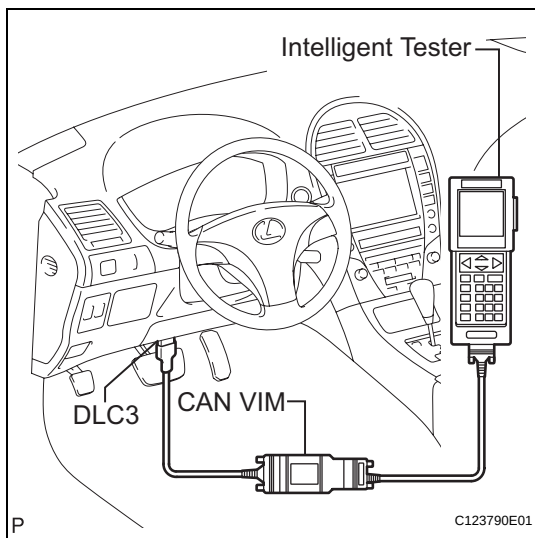
DTC CHECK / CLEAR

1. CHECK FOR DTCs

- Prepare the intelligent tester.
- Connect the intelligent tester to the DLC3 at the lower part of the instrument panel.
- Turn the engine switch on (IG) and turn the intelligent tester on.
- Use the intelligent tester to check for DTCs, and note or print the result (see the operator's manual for operating instructions).
- Confirm the details of the DTCs (See page [SR-59](#)).

2. CLEAR DTCs

- Operate the intelligent tester to clear the DTCs (see the operator's manual for operating instructions).



DATA LIST / ACTIVE TEST

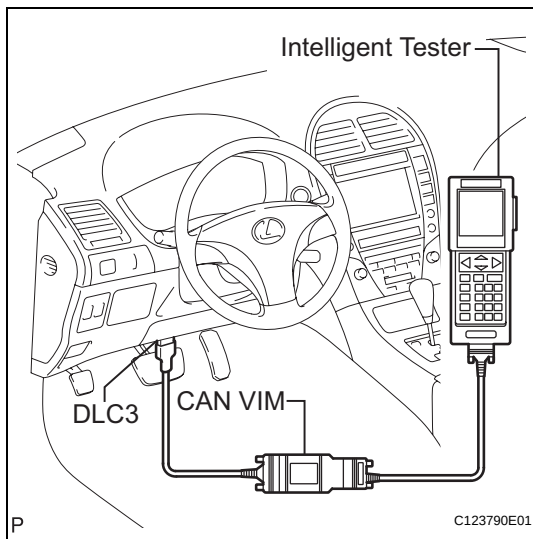
1. DATA LIST

- Connect the intelligent tester to the DLC3.
HINT:
By accessing the DATA LIST displayed on the intelligent tester, it is possible to perform such functions as reading the values of switches and sensors without removing any parts. Reading the DATA LIST is the first step in troubleshooting and is one method to save diagnostic time.
- Turn the engine switch on (IG) and turn the intelligent tester on.
- Operate the intelligent tester according to the steps on the display and select DATA LIST.

SMART:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
SLCK SLEEP COND	Steering lock ECU sleep condition / YES or NO	YES: Steering lock ECU sleep mode can be entered NO: Steering lock ECU sleep mode cannot be entered	-
SLCK START COND	Steering lock ECU start signal / YES or NO	YES: Steering lock ECU sent a start signal NO: Steering lock ECU did not send a start signal	-
ENG START COND	Engine start condition / OK or NG	OK: Engine is allowed to start NG: Engine is not allowed to start	-
SENSOR VALUE	Sensor malfunction / NG (PAST) or OK	NG (PAST): Sensor malfunction OK: No malfunction	-
PWR SUPPLY SHRT	Short in ECU / NG (PAST) or OK	NG (PAST): Short in ECU OK: No malfunction	-
PWR SUPPLY OPEN	Open in ECU / NG (PAST) or OK	NG (PAST): Open in ECU OK: No malfunction	-
MTR DRIVER SHRT	Short in driver ECU / NG (PAST) or OK	NG (PAST): Short in driver ECU OK: No malfunction	-
MTR DRIVER OPEN	Open in driver ECU / NG (PAST) or OK	NG (PAST): Open in driver ECU OK: No malfunction	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
LCK/UNLCK REC	Steering lock command reception record / YES or NO	YES: Steering lock / unlock signal received NO: Steering lock / unlock signal no received	-
LCK BAR STUCK	Lock bar stuck malfunction / NG (PAST) or OK	NG (PAST): Lock bar stuck malfunction OK: No malfunction	-
PUSH START ERR	Push button start function malfunction / NG (PAST) or OK	NG (PAST): Malfunction in push button start OK: No malfunction	-
IG2	IG2 voltage / ON or OFF	ON: 10 to 14 V OFF: Below 1 V	-
IG (LIN)	LIN bus IG status / ON or OFF	ON: LIN bus IG ON status OFF: LIN bus IG OFF status	-



2. ACTIVE TEST

- (a) Connect the intelligent tester to the DLC3.

HINT:

Performing the ACTIVE TEST is one of the methods to save diagnostic time. It is possible to display the DATA LIST during the ACTIVE TEST.

- (b) Turn the engine switch on (IG) and turn the intelligent tester on.
- (c) Following the display on the intelligent tester, perform the ACTIVE TEST.

MAIN BODY:

Tester Display	Test Part	Control Range	Diagnostic Note
STR LOCK PWR	Steering Lock Power Source	ON / OFF	-

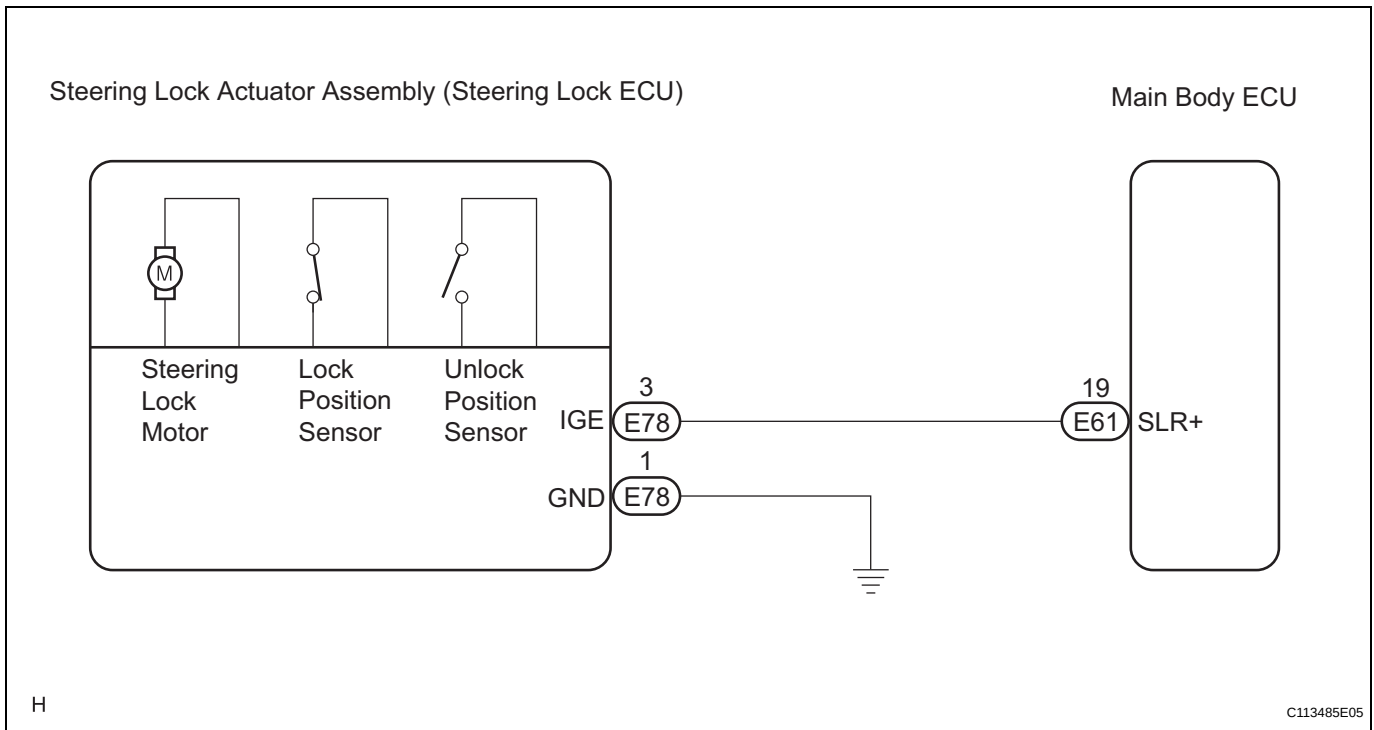
DTC**B2782****Power Source Control ECU Malfunction****DESCRIPTION**

The main body ECU (*) controls the power supply to activate the steering lock motor. This prevents the steering from being locked while the vehicle is moving.

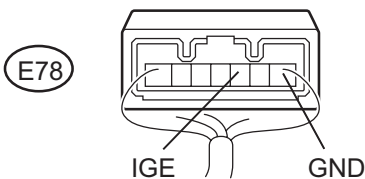
HINT:

*: The power source control ECU is not a physical part. This code refers to the power source control function performed by the main body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B2782	Steering lock motor drive control circuit is defective.	- Wire harness - Steering lock actuator assembly (Steering lock ECU) - Main body ECU

WIRING DIAGRAM**INSPECTION PROCEDURE****1****INSPECT STEERING LOCK ACTUATOR ASSEMBLY (STEERING LOCK ECU)**

Steering Lock Actuator Assembly:



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

Standard voltage

Tester Connection	Condition	Specified Condition
E78-3 (IGE) - E78-1 (GND)	The specified condition should be checked after performing the following: - Turn the engine switch off - Turn the engine switch on (ACC or IG)	- Motor activated: Below 1 V - Motor not activated: 10 to 12 V

SR

Tester Connection	Condition	Specified Condition
E78-3 (IGE) - E78-1 (GND)	The specified condition should be checked after performing the following: 1. Move the shift lever to the P position 2. Turn the engine switch off 3. Open the driver's door	- Motor activated: Below 1 V - Motor not activated: 10 to 12 V

HINT:

The steering lock ECU and steering lock actuator assembly are supplied as a unit.

OK

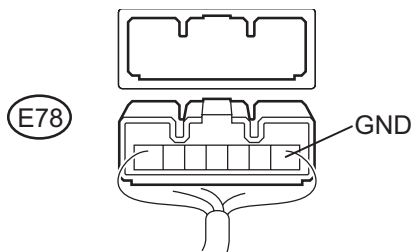
REPLACE STEERING LOCK ACTUATOR ASSEMBLY (STEERING LOCK ECU)

NG

2

CHECK HARNESS AND CONNECTOR (STEERING LOCK ACTUATOR ASSEMBLY - BODY GROUND)

Steering Lock Actuator Assembly:



H

C106484E40

- Disconnect the E78 connector from the steering lock actuator assembly.
- Measure the resistance according to the value(s) in the table below.

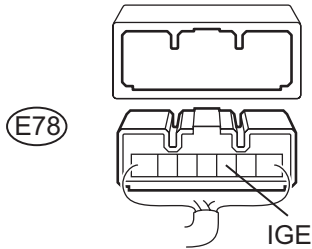
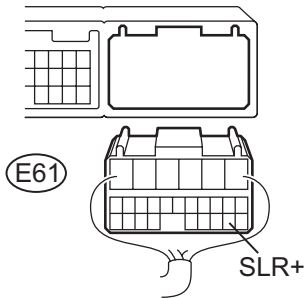
Standard resistance

Tester Connection	Condition	Specified Condition
E78-1 (GND) - Body ground	Always	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3**CHECK HARNESS AND CONNECTOR (STEERING LOCK ACTUATOR ASSEMBLY - MAIN BODY ECU)****Steering Lock Actuator Assembly:****Main Body ECU:**

H

C113502E03

- (a) Disconnect the E61 connector from the main body ECU.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
E78-3 (IGE) - E61-19 (SLR+)	Always	Below 1 Ω
E78-3 (IGE) - Body ground	Always	10 k Ω or higher

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****REPLACE MAIN BODY ECU**

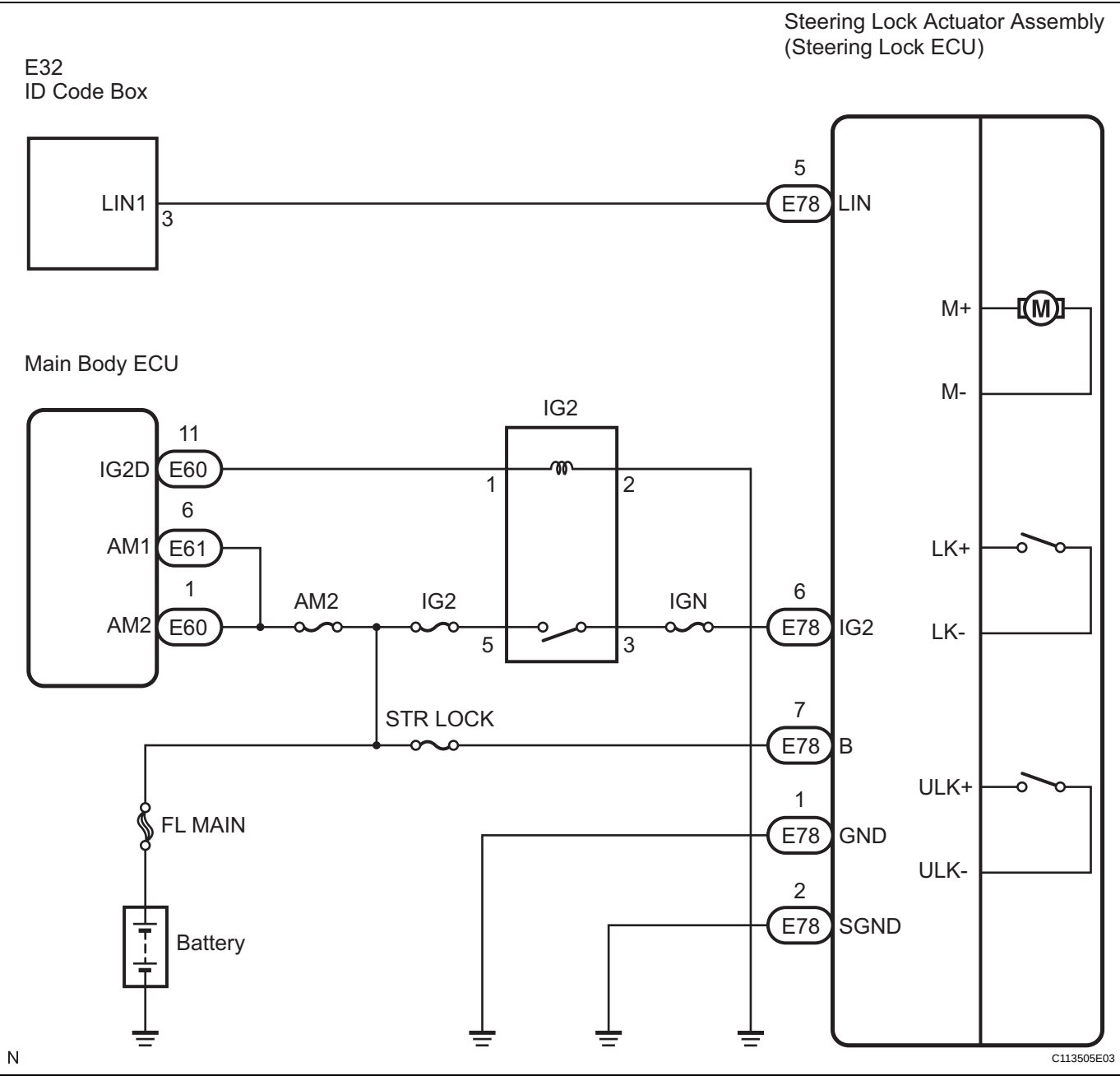
DTC	B2788	IG2 Signal Malfunction
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DESCRIPTION

The steering lock ECU receives power from the IG2 relay. When the digital signal from the certification ECU and the voltage from the IG2 relay are received by the steering lock ECU, the steering will be unlocked. The steering lock ECU will not lock the steering when power from the IG2 relay is present (this prevents the steering from being locked while the vehicle is moving).

DTC No.	DTC Detecting Condition	Trouble Area
B2788	Different information is obtained from IG2 signals received directly from the IG2 circuit, and from IG2 signals sent via LIN communication for a period of 1 second.	- IG2 relay - Wire harness - Main body ECU - Steering lock actuator assembly (Steering lock ECU)

WIRING DIAGRAM

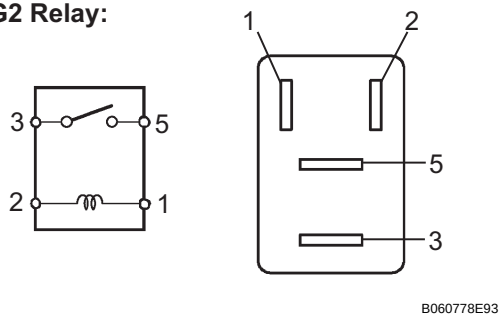


SR

INSPECTION PROCEDURE

1 INSPECT IG2 RELAY

IG2 Relay:



- (a) Remove the IG2 relay from the engine room R/B.
 (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
3 - 5	Always	10 k Ω or higher
3 - 5	When battery voltage is applied to terminals 1 and 2	Below 1 Ω

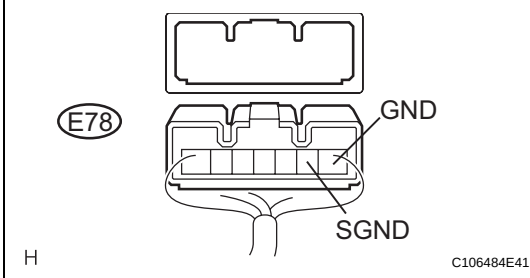
NG

REPLACE IG2 RELAY

OK

2 CHECK HARNESS AND CONNECTOR (STEERING LOCK ACTUATOR ASSEMBLY - BODY GROUND)

Steering Lock Actuator Assembly:



- (a) Disconnect the E78 connector from the steering lock actuator assembly.
 (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
E78-1 (GND) - Body ground	Always	Below 1 Ω
E78-2 (SGND) - Body ground	Always	Below 1 Ω

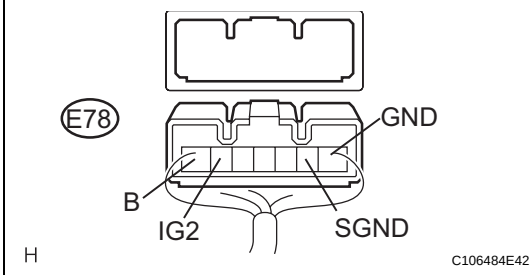
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 CHECK HARNESS AND CONNECTOR (STEERING LOCK ACTUATOR ASSEMBLY - BATTERY)

Steering Lock Actuator Assembly:



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

Standard voltage

Tester Connection	Condition	Specified Condition
E78-6 (IG2) - E78-1 (GND)	Engine switch on (IG)	10 to 14 V
E78-6 (IG2) - E78-2 (SGND)	Engine switch on (IG)	10 to 14 V

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

Standard resistance

Tester Connection	Condition	Specified Condition
*E78-6 (IG2) - E78-7 (B)	Engine switch off	10 k Ω or higher

SR

*: This measurement is performed with the engine switch off to check for a short between IG2 and battery voltage.

OK

**REPLACE STEERING LOCK ACTUATOR
ASSEMBLY (STEERING LOCK ECU)**

NG

**REPAIR OR REPLACE HARNESS OR CONNECTOR (STEERING LOCK ACTUATOR ASSEMBLY -
BATTERY)**