

Last Modified: 9-7-2011	6.4 C	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T1E013X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: B2781: Open / Short in Steering Lock ECU (2011 RAV4)		

DTC	B2781	Open / Short in Steering Lock ECU
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DESCRIPTION

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

The steering lock ECU detects the steering lock position through the signals from the lock and unlock position sensors.

The steering lock ECU activates the steering lock motor based on permission signals from the main body ECU and certification ECU.

The diagnosis information of the steering lock ECU is transmitted to the Techstream via the certification ECU as the steering lock ECU is not connected to the CAN communication system.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B2781	When either condition below is met: • There is a steering lock motor drive power circuit malfunction. • The on state of the lock and unlock position sensors is detected.	• Steering lock actuator assembly (steering lock ECU) • ECU aggregation box assembly (certification ECU) • Harness or connector

INSPECTION PROCEDURE

HINT:

When the engine switch is off, the main body ECU may occasionally go into a non-active state called sleep mode. Therefore, before proceeding with the inspection, it is necessary to perform the following steps to wake up the ECU:

With the engine switch off, open the driver door. Then (with the engine switch still off) open and close any door several times at 1.5 second intervals.

PROCEDURE

1.	CHECK FOR DTC OUTPUT (B2785)
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(a) Check for DTCs .

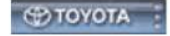
OK:

STEERING COLUMN: STEERING LOCK SYSTEM: B2781: Open / S... <https://techinfo.toyota.com/t3Portal/document/rm/RM16B0U/xhtml/RM...>

DTC B2781 is output, but DTC B2785 is not output.

NG ► **REFER TO B2785**

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



Last Modified: 9-7-2011	6.4 C	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T1F013X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: B2782: Power Source Control ECU Malfunction (2011 RAV4)		

DTC	B2782	Power Source Control ECU Malfunction
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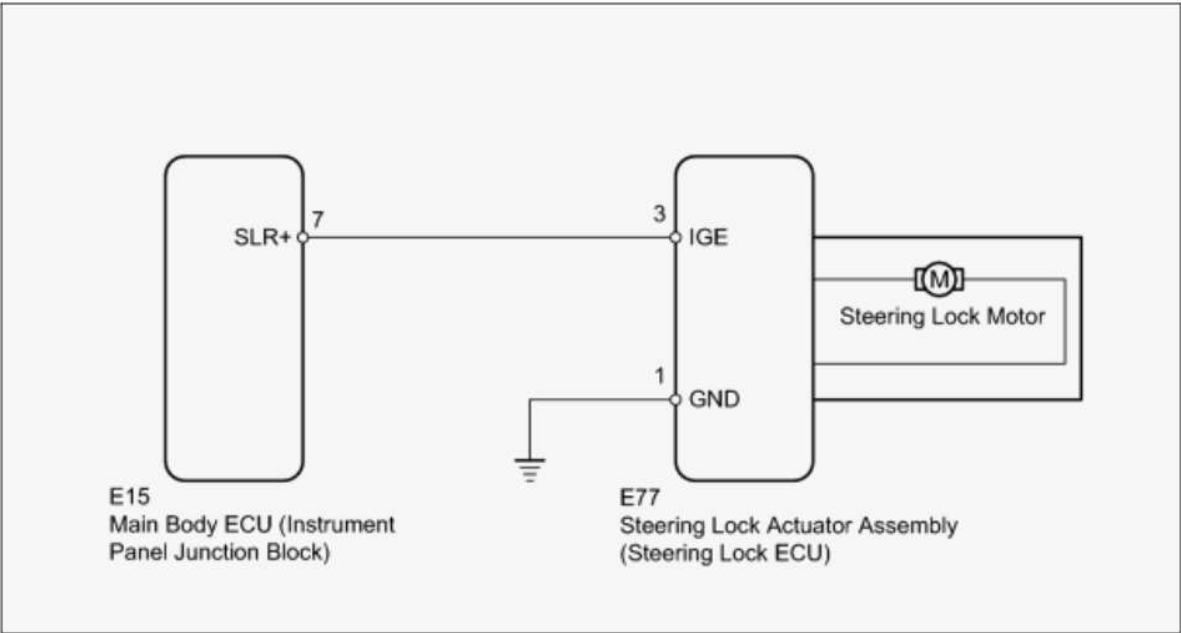
DESCRIPTION

The steering lock ECU activates the steering lock motor using the power received from the main body ECU through the IGE circuit. This prevents the steering from being locked while the vehicle is moving.

The diagnosis information of the steering lock ECU is transmitted to the Techstream via the certification ECU as the steering lock ECU is not connected to the CAN communication system.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B2782	There is an IGE power supply circuit malfunction.	- Steering lock actuator assembly (steering lock ECU) - Main body ECU (instrument panel junction block) - Harness or connector

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

When the engine switch is off, the main body ECU may occasionally go into a non-active state called sleep mode. Therefore, before proceeding with the inspection, it is necessary to perform the following steps to wake up the ECU:

With the engine switch off, open the driver door. Then (with the engine switch still off) open and close any door several times at 1.5 second intervals.

PROCEDURE

1.

CHECK FOR DTC OUTPUT (B2785)

(a) Check for DTCs INFO .

OK:

DTC B2782 is output, but DTC B2785 is not output.

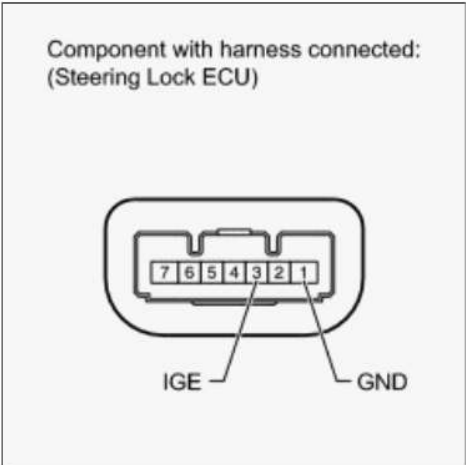
NG ▶ **REFER TO B2785**

OK

▼

2.

INSPECT STEERING LOCK ECU



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

Standard Voltage:

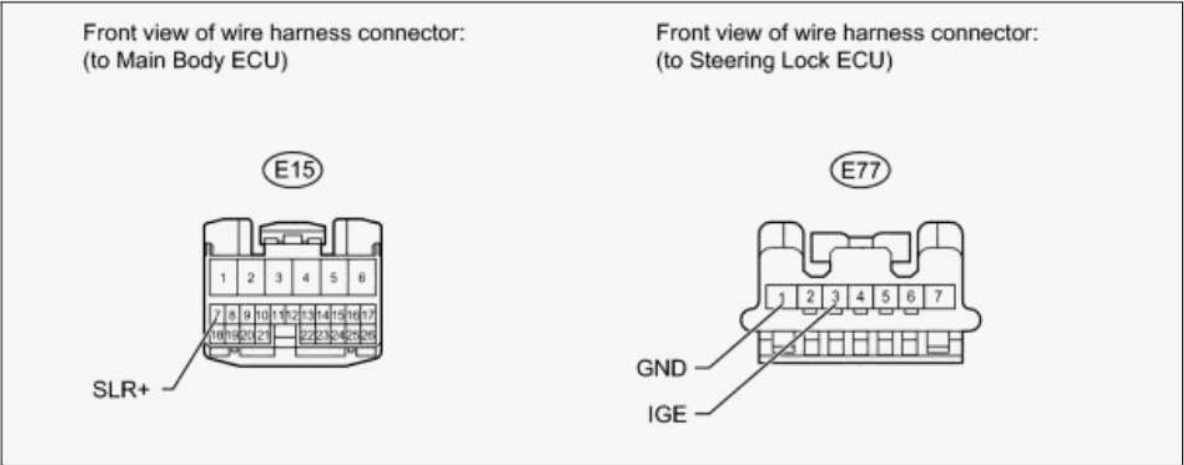
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (IGE) - 1 (GND)	- Engine switch on (IG) - Steering lock motor is operating	Below 1 V
3 (IGE) - 1 (GND)	- Engine switch on (IG) - Steering lock motor is not operating	11 to 14 V

HINT: When the steering lock is engaged and the engine switch is turned on

(IG), the steering lock motor activates to release the steering lock.
The motor operation occurs for 2 to 15 seconds.

- NG▶CHECK HARNESS AND CONNECTOR (STEERING LOCK ECU - MAIN BODY ECU AND BODY GROUND)
- OK▶REPLACE STEERING LOCK ACTUATOR ASSEMBLY (STEERING LOCK ECU)

3.	CHECK HARNESS AND CONNECTOR (STEERING LOCK ECU - MAIN BODY ECU AND BODY GROUND)
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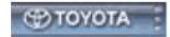


- (a) Disconnect the E77 and E15 ECU connectors.
- (b) Measure the resistance according to the value(s) in the table below.
- Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
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STEERING COLUMN: STEERING LOCK SYSTEM: B2782: Power S... <https://techinfo.toyota.com/t3Portal/document/rm/RM16B0U/xhtml/RM...>

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E77-3 (IGE) - E15-7 (SLR+)	Always	Below 1 Ω
E77-1 (GND) - Body ground	Always	Below 1 Ω
E77-3 (IGE) or E15-7 (SLR+) - Body ground	Always	10 k Ω or higher

NG ► **REPAIR OR REPLACE HARNESS OR CONNECTOR****OK** ► **REPLACE MAIN BODY ECU (INSTRUMENT PANEL JUNCTION BLOCK)**

Last Modified: 9-7-2011	6.4 C	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000002XHV039X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: B2785: Communication Malfunction between ECUs Connected by LIN (2011 RAV4)		

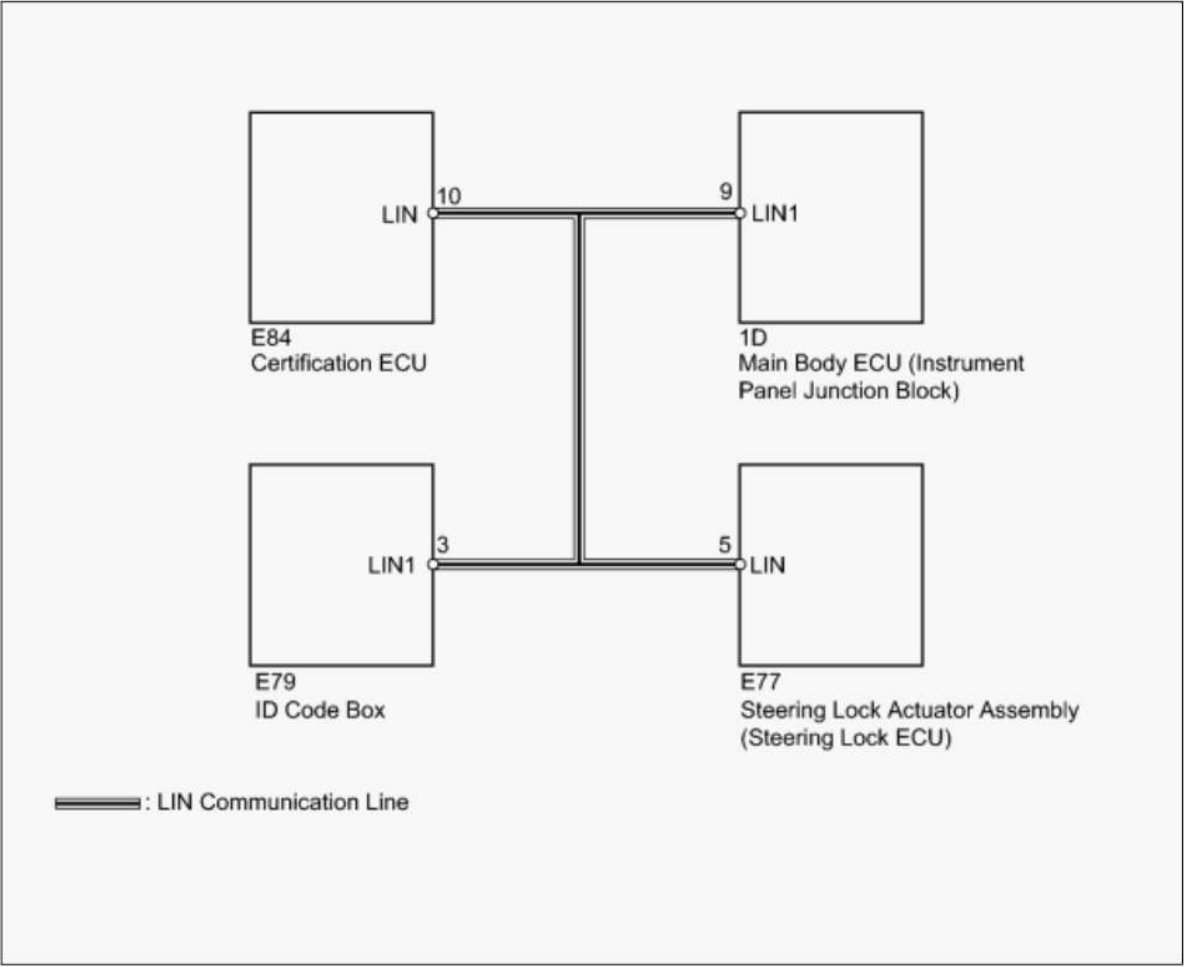
DTC	B2785	Communication Malfunction between ECUs Connected by LIN
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DESCRIPTION

The certification ECU intermittently monitors the LIN communication bus between the components related to certification. DTC B2785 is output when a malfunction in the LIN communication bus between the components related to certification is detected continuously 3 times.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B2785	The certification ECU detects a malfunction in the LIN communication bus between components related to certification continuously 3 times.	• ECU aggregation box assembly (certification ECU) • Main body ECU (instrument panel junction block) • ID code box • Steering lock actuator assembly (steering lock ECU) • Harness or connector

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

When the engine switch is off, the main body ECU may occasionally go into a non-active state called sleep mode. Therefore, before proceeding with the inspection, it is necessary to perform the following steps to wake up the ECU:

With the engine switch off, open the driver door. Then (with the engine switch still off) open and close any door several times at 1.5 second intervals.

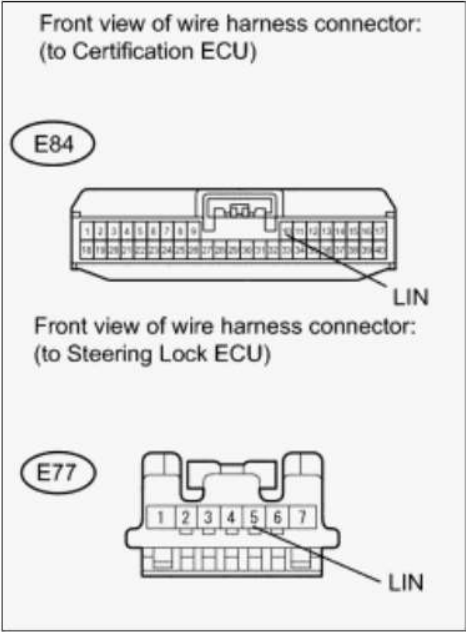
PROCEDURE

1.	CHECK HARNESS AND CONNECTOR (CERTIFICATION ECU - STEERING LOCK ECU)
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- (a) Disconnect the E84 and E77 ECU connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E84-10 (LIN) - E77-5 (LIN)	Always	Below 1 Ω
E84-10 (LIN) - Body ground	Always	10 kΩ or higher



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

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E84-10 (LIN) - Body ground	Always	Below 1 V

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2. CHECK FOR DTC

- (a) Clear the DTC .
- (b) Reconnect the E84 ECU connector.
- (c) Recheck for DTCs.
 - OK:
 - B2785 does not reoccur.

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

OK

3. CHECK FOR DTC

- (a) Clear the DTC  .
- (b) Reconnect the E77 ECU connector.
- (c) Disconnect the 1D ECU connector.
- (d) Recheck for DTCs.

OK:

B2785 does not reoccur.

NG  **REPLACE MAIN BODY ECU (INSTRUMENT PANEL JUNCTION BLOCK)****OK****4. CHECK FOR DTC**

- (a) Clear the DTC  .
- (b) Reconnect the 1D ECU connector.
- (c) Disconnect the E79 ECU connector.
- (d) Recheck for DTCs.

OK:

B2785 does not reoccur.

NG  **REPLACE ID CODE BOX****OK**  **REPLACE ECU AGGREGATION BOX ASSEMBLY (CERTIFICATION ECU)****5. REPLACE STEERING LOCK ACTUATOR ASSEMBLY (STEERING LOCK ECU)**

- (a) Temporarily replace the steering lock ECU with a new one  .

NOTICE:

When replacing the steering lock ECU, registration must be performed according to the "Registration" procedures  .

(b) Clear the DTC INFO .

NEXT

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6.	CHECK FOR DTC
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(a) Recheck for DTCs.

OK:

B2785 does not reoccur.

- NG▶ REPLACE ECU AGGREGATION BOX ASSEMBLY (CERTIFICATION ECU)
- OK▶ END (STEERING LOCK ECU IS DEFECTIVE)

7.	REPLACE MAIN BODY ECU (INSTRUMENT PANEL JUNCTION BLOCK)
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(a) Temporarily replace the main body ECU (instrument panel junction block) with a new or normally functioning one.

(b) Clear the DTC INFO .

NEXT

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8.	CHECK FOR DTC
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(a) Recheck for DTCs.

OK:

B2785 does not reoccur.

- NG▶ REPLACE ECU AGGREGATION BOX ASSEMBLY (CERTIFICATION ECU)
- OK▶ END (MAIN BODY ECU IS DEFECTIVE)

9. REPLACE ID CODE BOX

- (a) Temporarily replace the ID code box with a new one  .

NOTICE:

When replacing the ID code box, registration must be performed according to the "Registration" procedures  .

- (b) Clear the DTC  .

NEXT**10. CHECK FOR DTC**

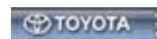
- (a) Recheck for DTCs  .

OK:

B2785 does not reoccur.

NG ► **REPLACE ECU AGGREGATION BOX ASSEMBLY
(CERTIFICATION ECU)**

OK ► **END (ID CODE BOX IS DEFECTIVE)**



STEERING COLUMN: STEERING LOCK SYSTEM: B2786: No Resp... <https://techinfo.toyota.com/t3Portal/document/rm/RM16B0U/xhtml/RM...>

Last Modified: 9-7-2011	6.4 C	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000002SIR013X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: B2786: No Response from Steering Lock ECU (2011 RAV4)		

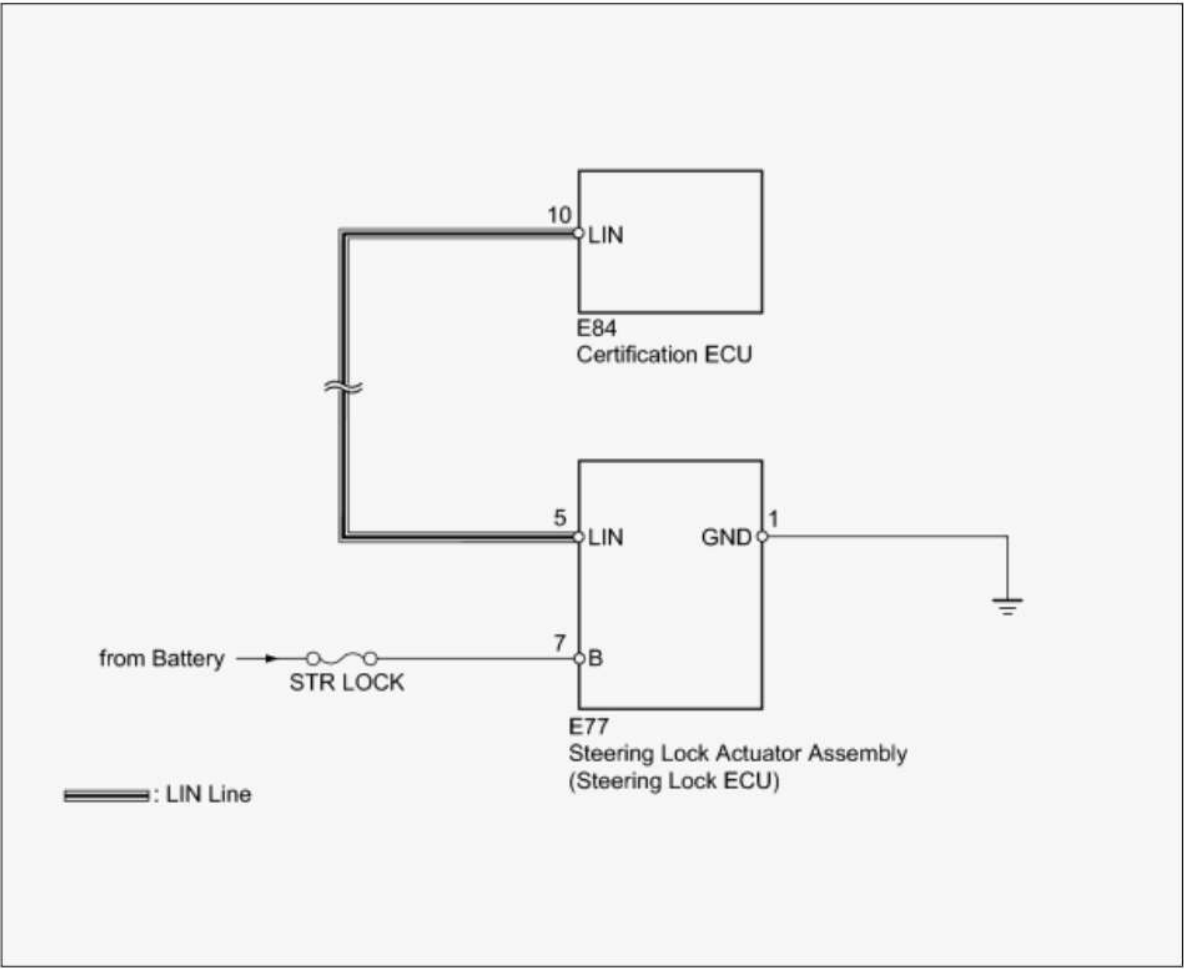
DTC	B2786	No Response from Steering Lock ECU
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DESCRIPTION

This DTC is stored when LIN communication between the certification ECU and steering lock actuator assembly (steering lock ECU) stops for 10 seconds or more.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B2786	Periodic transmission from the steering lock ECU stops for 10 seconds or more.	- Steering lock actuator assembly (steering lock ECU) - ECU aggregation box assembly (certification ECU) - Harness or connector

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

When the engine switch off, the main body ECU may occasionally go into a non-active state called sleep mode. Therefore, before proceeding with the inspection, it is necessary to perform the following steps to wake up the ECU:

With the engine switch off, open the driver door. Then (with the engine switch still off) open and close any door several times at 1.5 second intervals.

DTC B2785 is stored when the communication between the steering lock ECU and certification ECU stops.

PROCEDURE

1.	CLEAR DTC
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(a) Clear the DTC INFO .

NEXT

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2. CHECK FOR DTC

(a) Recheck for DTCs INFO .

OK:

B2786 output does not reoccur.

NG ► CHECK HARNESS AND CONNECTOR
(CERTIFICATION ECU - STEERING LOCK ECU)

OK ► USE SIMULATION METHOD TO CHECK

3. CHECK HARNESS AND CONNECTOR (CERTIFICATION ECU - STEERING LOCK ECU)

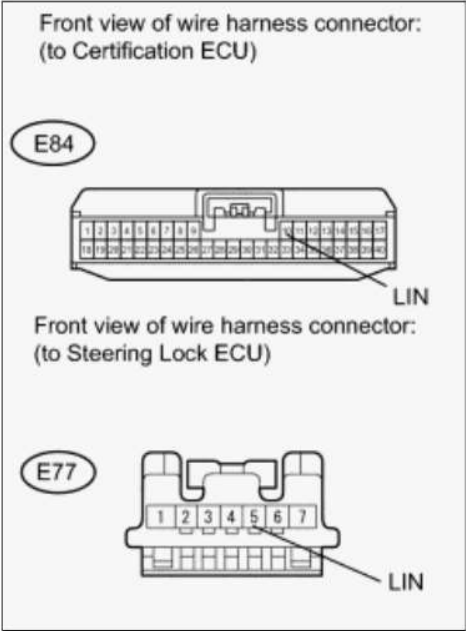
- (a) Disconnect the E84 and E77 ECU connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E84-10 (LIN) - E77-5 (LIN)	Always	Below 1 Ω
E84-10 (LIN) or E77-5 (LIN) - Body ground	Always	10 kΩ or higher

REPAIR OR
REPLACE
HARNESS
OR
CONNECTOR

NG ►

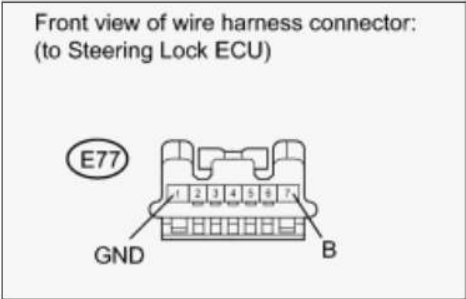


OK

▼

4.

CHECK STEERING LOCK ECU (BATTERY VOLTAGE AND BODY GROUND)



(a) Disconnect the E77 ECU connector.

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

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E77-1 (GND) - Body ground	Always	Below 1 Ω

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E77-7 (B) - Body ground	Always	11 to 14 V

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

5.

REPLACE STEERING LOCK ACTUATOR ASSEMBLY (STEERING LOCK ECU)

(a) Temporarily replace the steering lock ECU with a new one INFO .

NOTICE:

When replacing the steering lock ECU, registration must be performed according to the "Registration" procedures INFO .

(b) Clear the DTC INFO .

NEXT

▼

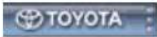
6.	CHECK FOR DTC
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(a) Recheck for DTCs INFO .

OK:
B2786 output does not reoccur.

NG ► REPLACE ECU AGGREGATION BOX ASSEMBLY
(CERTIFICATION ECU)

OK ► END (STEERING LOCK ECU IS DEFECTIVE)



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Last Modified: 9-7-2011	6.4 C	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T1K013X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: B2788: IG2 Signal Malfunction (2011 RAV4)		

DTC	B2788	IG2 Signal Malfunction
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DESCRIPTION

The steering lock ECU determines the on (IG)/off status of the engine switch through the IG2 signal circuit.

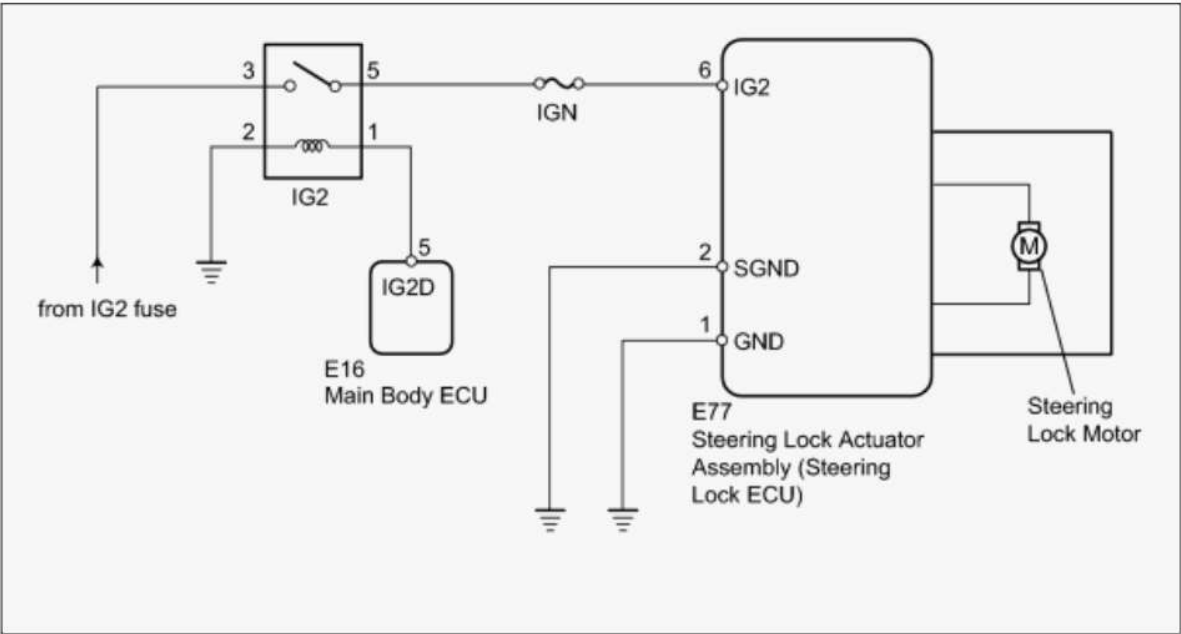
After receiving an integration relay (IG2 relay) on signal, the steering lock ECU determines that the vehicle is moving.

The steering lock ECU does not lock the steering when it receives the integration relay (IG2 relay) on signal. This prevents the steering from being locked while the vehicle is moving.

The diagnosis information of the steering lock ECU is transmitted to the Techstream via the certification ECU as the steering lock ECU is not connected to the CAN communication system.

DTC CODE	DETECTION CONDITION	TROUBLE AREA
B2788	Open or short in the IG2 signal circuit.	- Steering lock actuator assembly (steering lock ECU) - IGN fuse - IG2 MAIN fuse - IG2 relay - Main body ECU - Harness or connector

WIRING DIAGRAM



INSPECTION PROCEDURE

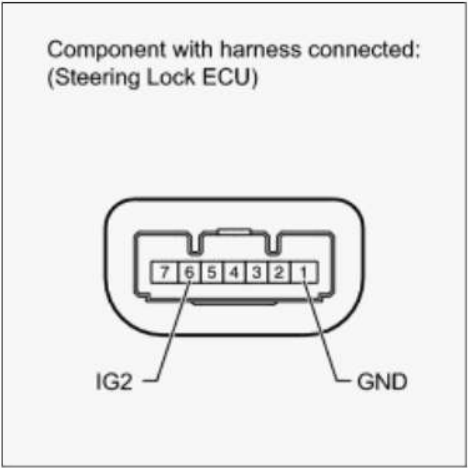
HINT:

When the engine switch is off, the main body ECU may occasionally go into a non-active state called sleep mode. Therefore, before proceeding with the inspection, it is necessary to perform the following steps to wake up the ECU:

With the engine switch off, open the driver door. Then (with the engine switch still off) open and close any door several times at 1.5 second intervals.

PROCEDURE

1.	INSPECT STEERING LOCK ECU
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(a) Measure the voltage according to the value(s) in the table below.

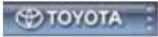
Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
6 (IG2) - 1 (GND)	Engine switch off	Below 1 V
6 (IG2) - 1 (GND)	Engine switch on (IG)	11 to 14 V

INSPECT
NG ► IG2 RELAY
CIRCUIT

STEERING COLUMN: STEERING LOCK SYSTEM: B2788: IG2 Sign... <https://techinfo.toyota.com/t3Portal/document/rm/RM16B0U/xhtml/RM...>

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



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Last Modified: 9-7-2011	6.4 U	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T1D013X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: DATA LIST / ACTIVE TEST (2011 RAV4)		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

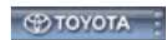
In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- Turn the engine switch off.
- Connect the Techstream to the DLC3.
- Turn the engine switch on (IG).
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Smart Key / Data List.
- According to the display on the Techstream, read the Data List.

Smart Key

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
#Codes	Number of diagnostic trouble codes/0 to 255	-	-
Sensor Value	Sensor malfunction/NG(Past) or OK	NG(Past): Sensor malfunction OK: No malfunction	-
Power Supply Short	Short in ECU/NG(Past) or OK	NG(Past): Short in ECU OK: No malfunction	-
Power Supply Open	Open in ECU/NG(Past) or OK	NG(Past): Open in ECU OK: No malfunction	-
Motor Driver Short	Short in driver ECU/NG(Past) or OK	NG(Past): Short in driver ECU OK: No malfunction	-
Motor Driver Open	Open in driver ECU/NG(Past) or OK	NG(Past): Open in driver ECU OK: No malfunction	-
Lock/Unlock Receive	Steering lock command reception record/Yes or No	Yes: Steering lock/unlock signal received	-

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
		No: Steering lock/unlock signal not received	
Lock Bar Stuck Error	Lock bar stuck malfunction/NG(Past) or OK	NG(Past): Lock bar stuck malfunction OK: No malfunction	-
Push Start Error	Push button start function malfunction/NG(Past) or OK	NG(Past): Malfunction in push button start function OK: No malfunction	-
IG2 Status	IG2 voltage/ON or OFF	ON: 11 to 14 V OFF: Below 1 V	-
IG(Lin)	LIN bus start-up status/ON or OFF	ON: LIN bus started up OFF: LIN bus not started up	-
S Code Check	S code match record/NG or OK	NG: S code not matched OK: S code matched	-
L Code Check	L code match record/NG or OK	NG: L code not matched OK: L code matched	-
Unlock Request Receive	Steering lock unlock command reception status/NG or OK	NG: Unlock request not received OK: Unlock request received	-
Lock Request Receive	Steering lock lock command reception status/NG or OK	NG: Lock request not received OK: Lock request received	-
S Code Check(Past)	S code match record/NG(Past) or OK	NG(Past): S code not matched OK: S code matched	-
L Code Check(Past)	L code match record/NG(Past) or OK	NG(Past): L code not matched OK: L code matched	-
Steering Lock	Steering lock condition/Set or Unset	Set: Steering lock set Unset: Steering lock not set	This status changes depending on the state of various sensors.
Steering Unlock	Steering unlock condition/Set or Unset	Set: Steering lock not set Unset: Steering lock set	This status changes depending on the state of various sensors.



Last Modified: 9-7-2011	6.4 D	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T1A013X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: DIAGNOSIS SYSTEM (2011 RAV4)		

DIAGNOSIS SYSTEM

1. DESCRIPTION

- (a) When troubleshooting a vehicle with a diagnosis system, connect the Techstream to the DLC3 of the vehicle and read various data output from the steering lock ECU.

The steering lock ECU stores DTCs when the ECU detects a malfunction in itself or in its circuits.

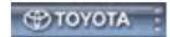
- (b) The diagnosis information of the steering lock ECU is transmitted to the Techstream via the certification ECU as the steering lock ECU is not connected to the CAN communication system.
- (c) The steering lock ECU does not store DTCs regarding past problems.

HINT:

When the engine switch is off, the main body ECU to which the Techstream is connected may be malfunctioning or in sleep mode.

Communication with the Techstream is not possible if the main body ECU is not operating.

- (d) As the steering lock ECU memory data will be cleared, do not remove the fuses or disconnect the battery terminals until the DTCs are checked and noted.
- (e) Malfunctions related to systems other than the steering lock ECU system may cause DTCs to be output. Note any DTCs related to other systems.

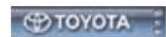


Last Modified: 9-7-2011	6.4 S	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM00000287G00ZX
Title: STEERING COLUMN: STEERING LOCK SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2011 RAV4)		

DIAGNOSTIC TROUBLE CODE CHART

Steering lock system

DTC CODE	DETECTION ITEM	TROUBLE AREA	SEE PAGE
B2781	Open / Short in Steering Lock ECU	- Steering lock actuator assembly (steering lock ECU) - ECU aggregation box assembly (certification ECU) - Harness or connector of LIN bus line	INFO
B2782	Power Source Control ECU Malfunction	- Steering lock actuator assembly (steering lock ECU) - Main body ECU (instrument panel junction block) - Harness or connector	INFO
B2785	Communication Malfunction between ECUs Connected by LIN	- ECU aggregation box assembly (certification ECU) - ID code box - Main body ECU (instrument panel junction block) - Steering lock actuator assembly (steering lock ECU) - Harness or connector	INFO
B2786	No Response from Steering Lock ECU	- ECU aggregation box assembly (certification ECU) - Steering lock actuator assembly (steering lock ECU) - Harness or connector	INFO
B2788	IG2 Signal Malfunction	- Steering lock actuator assembly (steering lock ECU) - IGN fuse - Integration relay (IG2 relay) - Main body ECU (instrument panel junction block) - Harness or connector	INFO



Last Modified: 9-7-2011	6.4 D	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T1B019X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: DTC CHECK / CLEAR (2011 RAV4)		

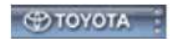
DTC CHECK / CLEAR

1. CHECK FOR DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the engine switch on (IG).
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Smart Key / Trouble Codes.
- (e) Check for DTCs.

2. CLEAR DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the engine switch on (IG).
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Smart Key / Trouble Codes.
- (e) Clear the DTCs.



Last Modified: 9-7-2011	6.4 D	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T13013X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2011 RAV4)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedures to troubleshoot the steering lock system.
- *: Use the Techstream.

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

NEXT



2.	INSPECT BATTERY VOLTAGE
----	-------------------------

Standard voltage:
11 to 14 V

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

NEXT



3.	CHECK FOR DTC*
----	----------------

(a) Check for DTCs INFO .

Result

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

A Go to step 6

B

▼

4. PROBLEM SYMPTOMS TABLE

(a) Refer to the Problem Symptoms Table [INFO](#) .

Result

RESULT	PROCEED TO
Fault is not listed in problem symptoms table	A
Fault is listed in problem symptoms table	B

B ► Go to step 6

A

▼

5. OVERALL ANALYSIS AND TROUBLESHOOTING*

- (a) Terminals of ECU [INFO](#) .
- (b) Data List / Active Test [INFO](#) .

NEXT

▼

6. REPAIR OR REPLACE

NEXT

▼

7.	CONFIRMATION TEST
-----------	--------------------------

NEXT  END

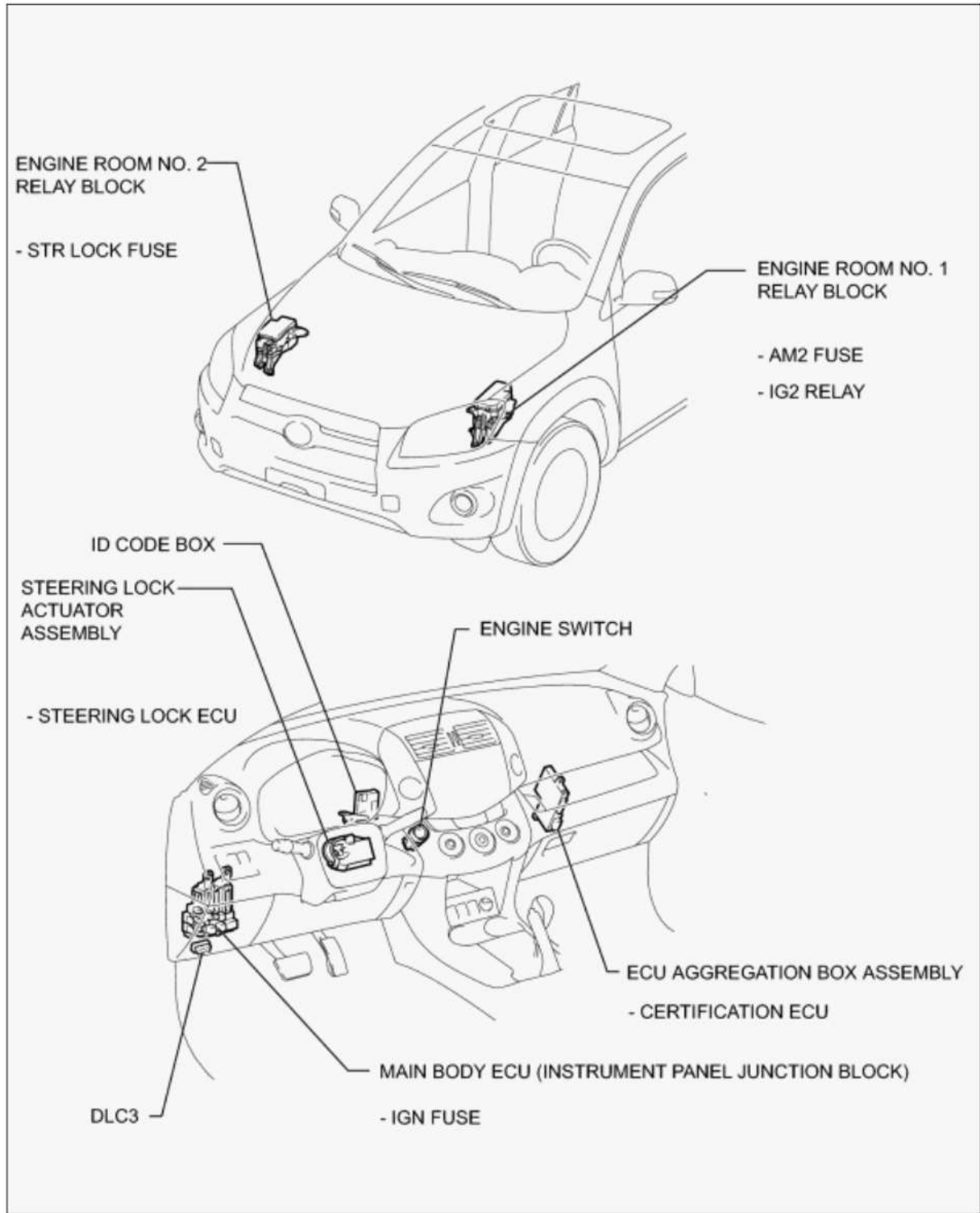


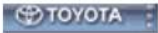
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Last Modified: 9-7-2011	6.4 R	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM00000287H00LX
Title: STEERING COLUMN: STEERING LOCK SYSTEM: PARTS LOCATION (2011 RAV4)		

PARTS LOCATION

ILLUSTRATION





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Last Modified: 9-7-2011	6.4 J	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T18019X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: Power Source Circuit (2011 RAV4)		

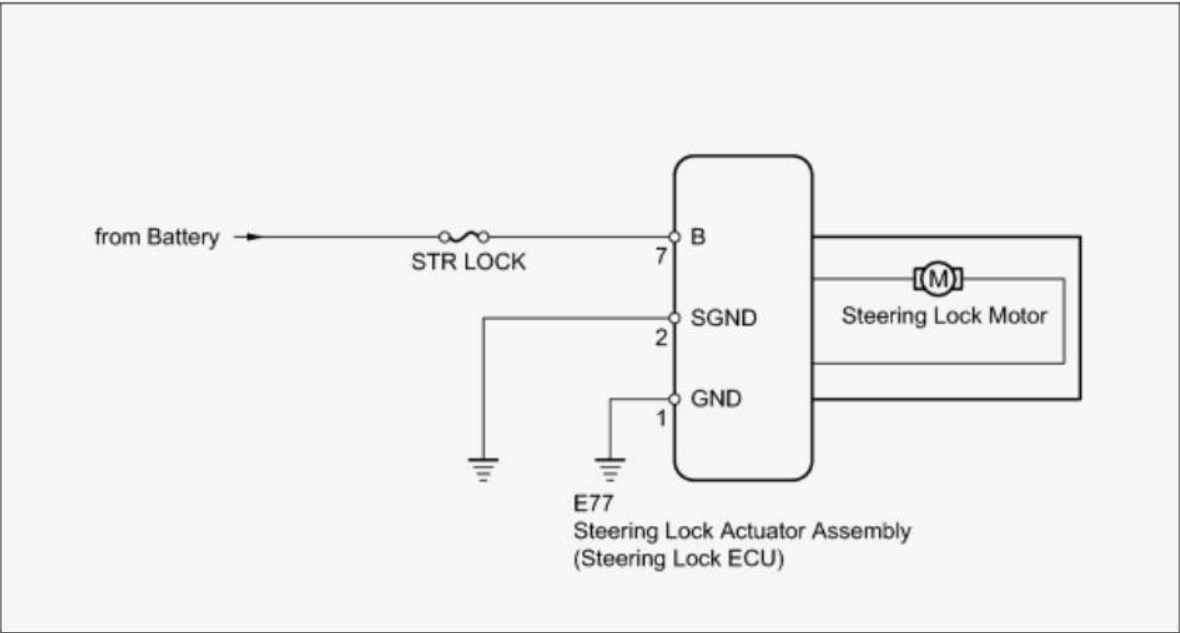
Power Source Circuit

DESCRIPTION

This circuit supplies the power source voltage from the battery to terminal B of the steering lock ECU.

The diagnosis information of the steering lock ECU is transmitted to the Techstream via the certification ECU as the steering lock ECU is not connected to the CAN communication system.

WIRING DIAGRAM



INSPECTION PROCEDURE

- HINT:**
- When the engine switch is off, the main body ECU may occasionally go into a non-active state called sleep mode. Therefore, before proceeding with the inspection, it is necessary to perform the following steps to wake up the ECU:
 - With the engine switch off, open the driver door. Then (with the engine switch still off) open and close any door several times at 1.5 second intervals.

PROCEDURE

1. INSPECT FUSE (STR LOCK)

- (a) Remove the STR LOCK fuse from the engine room relay block.
- (b) Measure the resistance according to the value(s) in the table below.
- Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
STR LOCK fuse	Always	Below 1 Ω

NG ► REPLACE FUSE

OK
▼

2. CHECK HARNESS AND CONNECTOR (STEERING LOCK ECU - BATTERY)

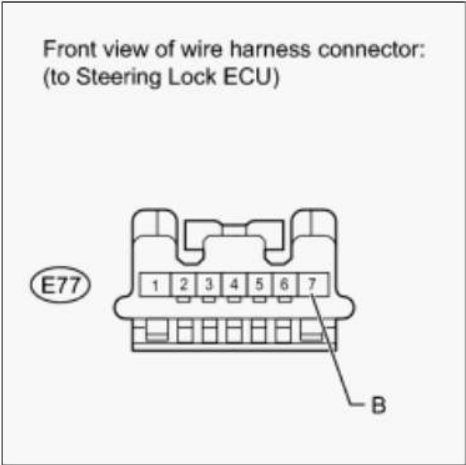
- (a) Disconnect the E77 ECU connector.
- (b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E77-7 (B) - Body ground	Always	11 to 14 V

REPAIR OR
REPLACE
HARNESS
OR
CONNECTOR

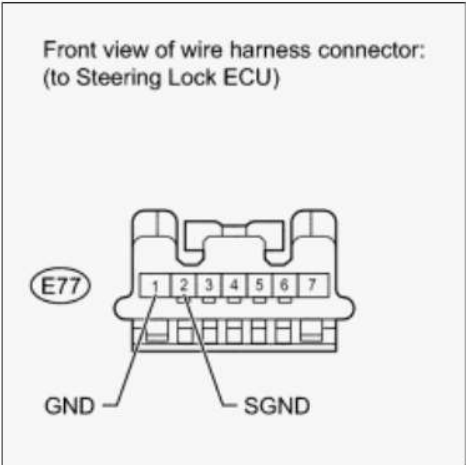
NG ►



OK
▼

3. CHECK HARNESS AND CONNECTOR (STEERING LOCK ECU - BODY GROUND)

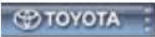
- (a) Disconnect the E77 ECU connector.
- (b) Measure the resistance according to the value(s) in the table below.
- Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E77-1 (GND) - Body ground	Always	Below 1 Ω
E77-2 (SGND) - Body ground	Always	Below 1 Ω

NG▶REPAIR OR REPLACE HARNESS OR CONNECTOR

OK▶GO TO STEERING LOCK SYSTEM (PROBLEM SYMPTOMS TABLE)



Last Modified: 9-7-2011	6.4 L	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000000XWK04LX
Title: STEERING COLUMN: STEERING LOCK SYSTEM: PRECAUTION (2011 RAV4)		

PRECAUTION

1. PRECAUTIONS WHEN WORKING ON ELECTRIC STEERING LOCK

- (a) After replacing the steering lock actuator assembly (steering lock ECU), confirm the lock/unlock operation of the steering lock.

Operation Confirmation

Lock	With the engine switch off, open and close any door.
Unlock	Turn the engine switch from off to on (ACC) or on (IG).

- (b) After replacing the steering lock actuator assembly (steering lock ECU), perform key ID code registration.

- (c) If the steering lock actuator assembly (steering lock ECU) is replaced, open and close the driver door. The engine may not start until the driver door is opened and closed.

HINT:

Opening and closing the driver door causes the steering lock actuator assembly (steering lock ECU) to memorize the correct steering lock bar position.

- (d) When the main body ECU is in sleep mode, it cannot communicate with the Techstream. Therefore, checking for DTCs of the smart key system or checking the Data List with the engine switch off cannot be performed. To exit sleep mode, perform the following steps: 1) open the driver door with the engine switch off, and 2) open and close any door several times at 1.5 second intervals.



Last Modified: 9-7-2011	6.4 T	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM00000287I016X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: PROBLEM SYMPTOMS TABLE (2011 RAV4)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Steering Lock System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Steering wheel cannot unlock (engine cannot start).	Steering lock actuator assembly (Steering lock ECU)	INFO
	Main body ECU	INFO
	ECU aggregation box assembly (certification ECU)	INFO
	Smart key system (for 2GR-FE)	INFO
	Smart key system (for 2AR-FE)	INFO
	Steering lock motor drive power circuit	INFO
	Unlock position sensor signal circuit	INFO
Steering wheel cannot unlock (after connecting the Techstream to DLC3 and starting engine, Data List steering lock system item Lock/Unlock Receive data is read and display of steering lock command reception record is NO).	Main body ECU	INFO
	ECU aggregation box assembly (certification ECU)	INFO
	ID code box	INFO
	LIN communication line	INFO
	Smart key system (for 2GR-FE)	INFO
	Smart key system (for 2AR-FE)	INFO

SYMPTOM	SUSPECTED AREA	SEE PAGE
Steering wheel cannot lock.	Steering lock actuator assembly (Steering lock ECU)	INFO
	Main body ECU	INFO
	ECU aggregation box assembly (certification ECU)	INFO
	Smart key system (for 2GR-FE)	INFO
	Smart key system (for 2AR-FE)	INFO
	Steering lock motor drive power circuit	INFO
	Power source circuit	INFO
Steering wheel cannot lock (after connecting the Techstream to DLC3 and starting engine, Data List steering lock system item Lock/Unlock Receive data is read and display of steering lock command reception record is NO).	Main body ECU	INFO
	ECU aggregation box assembly (certification ECU)	INFO
	ID code box	INFO
	LIN communication line	INFO
	Smart key system (for 2GR-FE)	INFO
	Smart key system (for 2AR-FE)	INFO



Last Modified: 9-7-2011	6.4 J	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T1J01CX
Title: STEERING COLUMN: STEERING LOCK SYSTEM: Steering Lock Motor Drive Power Circuit (2011 RAV4)		

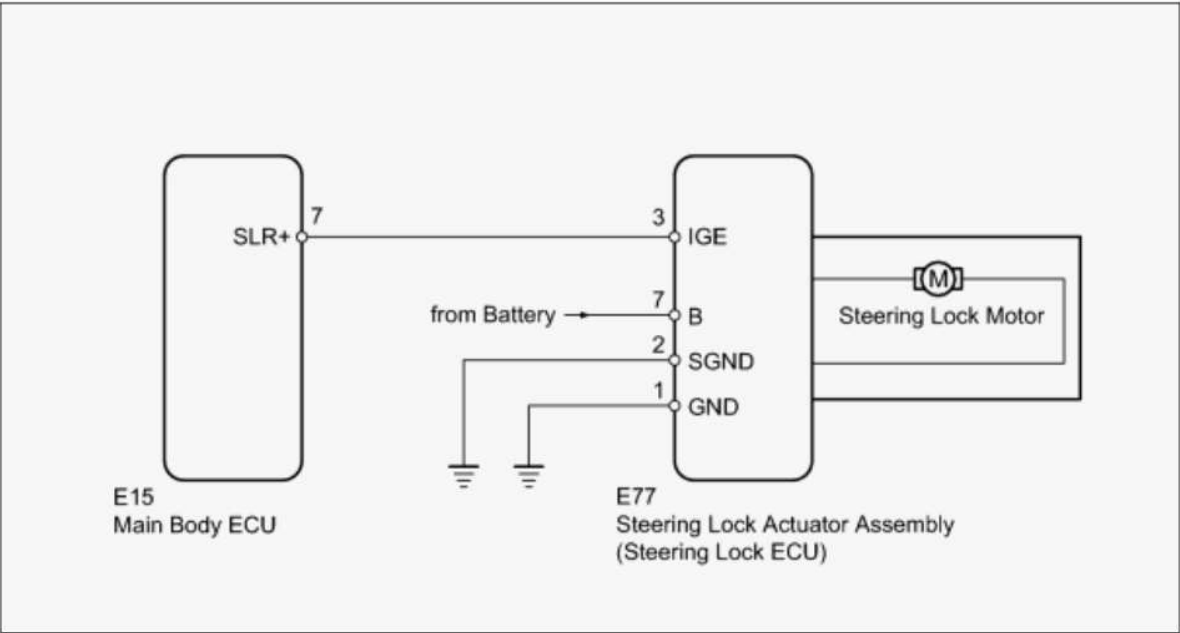
Steering Lock Motor Drive Power Circuit

DESCRIPTION

The main body ECU supplies the power to activate the motor of the steering lock ECU.

The diagnosis information of the steering lock ECU is transmitted to the Techstream via the certification ECU as the steering lock ECU is not connected to the CAN communication system.

WIRING DIAGRAM



INSPECTION PROCEDURE

- HINT:**
- When the engine switch is off, the main body ECU may occasionally go into a non-active state called sleep mode. Therefore, before proceeding with the inspection, it is necessary to perform the following steps to wake up the ECU:
 - With the engine switch off, open the driver door. Then (with the engine switch still off) open and close any door several times at 1.5 second intervals.

PROCEDURE

1. CHECK FOR DTC OUTPUT

(a) Check for DTCs INFO .

OK:
DTC output does not occur.

NG  REFER TO DIAGNOSTIC TROUBLE CODE CHART

OK


2. READ VALUE USING TECHSTREAM

- (a) Connect the Techstream to the DLC3.
- (b) Turn the engine switch on (IG) and turn the Techstream on.
- (c) Select the item "Lock/Unlock Receive" in the Data List within 10 seconds of starting the engine and read the value displayed on the Techstream.

Smart Key

ITEM	MEASUREMENT ITEM / RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Lock/Unlock Receive	Steering lock command reception record / Yes or No	Yes: Steering lock/unlock signal received No: Steering lock/unlock signal not received	-

OK:
Yes is displayed on the Techstream screen.

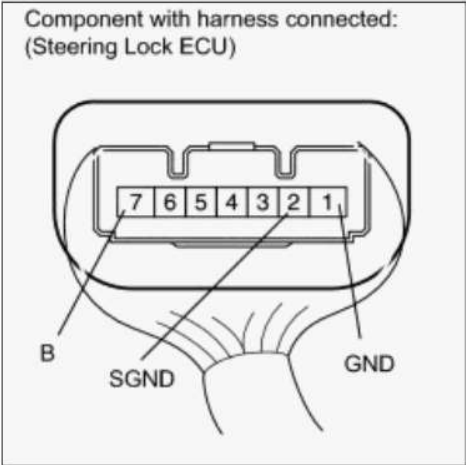
NG  READ VALUE USING TECHSTREAM

OK


3. CHECK STEERING LOCK ECU

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

Standard Resistance:
Standard Voltage



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (GND) - Body ground	Always	Below 1 Ω
2 (SGND) - Body ground	Always	Below 1 Ω

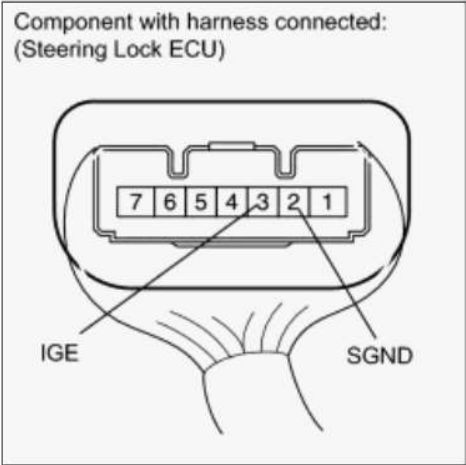
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
7 (B) - 1 (GND)	Always	11 to 14 V
7 (B) - 2 (SGND)	Always	11 to 14 V

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4. CHECK STEERING LOCK ECU

(a) Immediately after turning the engine switch on (IG), inspect the voltage between terminals 3 (IGE) and 2 (SGND) of the steering lock ECU.



Result

RESULT	PROCEED TO
Immediately after turning engine switch on (IG), measurement is below 1 V.	A
Measurement is 11 to 14 V, and measurement never becomes below 1 V.	B

B **REPAIR OR**

REPLACE
HARNESS OR
CONNECTOR

REPLACE
STEERING
LOCK
A ▶ ACTUATOR
ASSEMBLY
(STEERING
LOCK ECU)

5.

READ VALUE USING TECHSTREAM

- (a) Connect the Techstream to the DLC3.
- (b) Turn the engine switch on (IG) and turn the Techstream on.
- (c) Select the item "S Code Check" in the Data List and read the value displayed on the Techstream.

Smart Key

ITEM	MEASUREMENT ITEM / RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
S Code Check	S code match record / NG or OK	NG: S code not matched OK: S code matched	-

Result

RESULT	PROCEED TO
NO is displayed on the Techstream screen.	A
YES is displayed on the Techstream screen.	B

B ▶ READ VALUE USING TECHSTREAM

A
▼

6.

CHECK OPERATION OF ID CODE BOX

- (a) Replace the ID code box with a new one INFO .

NOTICE:

When replacing the ID code box, registration must be performed according to the "Registration" procedures  .

(b) Reconfirm the item "S Code Check" in the Data List and read the value displayed on the Techstream.

Smart Key

ITEM	MEASUREMENT ITEM / RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
S Code Check	S code match record / NG or OK	NG: S code not matched OK: S code matched	-

Result

RESULT	PROCEED TO
NG is displayed on the Techstream screen.	A
OK is displayed on the Techstream screen.	B

B ► REPLACE ID CODE BOX

A ► REPLACE ECU AGGREGATION BOX ASSEMBLY
(CERTIFICATION ECU)

7.	READ VALUE USING TECHSTREAM
-----------	------------------------------------

(a) Connect the Techstream to the DLC3.

(b) Turn the engine switch on (IG) and turn the Techstream on.

(c) Select the item "L Code Check" in the Data List and read the value displayed on the Techstream.

Smart Key

ITEM	MEASUREMENT ITEM / RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
L Code Check	L code match record / NG or OK	NG: L code not matched OK: L code matched	-

Result

RESULT	PROCEED TO
NG is displayed on the Techstream screen.	A
OK is displayed on the Techstream screen.	B

B ► CHECK OPERATION OF STEERING LOCK ECU



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STEERING COLUMN: STEERING LOCK SYSTEM: Steering Lock M... <https://techinfo.toyota.com/t3Portal/document/rm/RM16B0U/xhtml/RM...>

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Last Modified: 9-7-2011	6.4 D	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T19013X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: SYSTEM DESCRIPTION (2011 RAV4)		

SYSTEM DESCRIPTION

1. DESCRIPTION

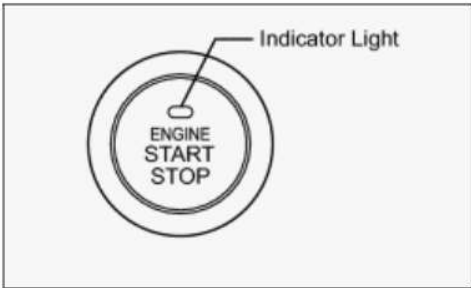
(a) The steering lock system locks and unlocks the steering lock by activating the steering lock bar with a motor. The steering lock ECU activates the motor based on permission signals from the certification ECU and main body ECU.

2. FUNCTIONS OF COMPONENTS

ITEM	FUNCTION
Steering lock actuator assembly	Includes a motor, lock bar, and lock and unlock position sensors. Activated by the steering lock ECU.
Steering lock ECU	Included in the steering lock actuator assembly. Activates the steering lock motor based on permission signals from the main body ECU and certification ECU. Detects steering lock and unlock positions and transmits the status to other ECUs.
Main body ECU	Permits the steering lock ECU to supply power to activate the motor. The main body ECU and certification ECU permit engine start after receiving an unlock signal from the steering lock ECU.
Certification ECU	Orders the steering lock ECU to lock or unlock the steering lock. The main body ECU and certification ECU permit engine start after receiving an unlock signal from the steering lock ECU.
IG2 relay	Controlled by the main body ECU. Sends IG signals to the steering lock ECU.
ID code box	Transmits a command to the ECM to set or cancel the immobiliser based on permission signals from the certification ECU.

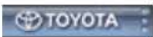
3. WARNING FUNCTION OF ENGINE SWITCH INDICATOR

(a) The main body ECU blinks the LED indicator light of the engine switch when any of the following problems occurs in the system.



DETECTION ITEM	INDICATOR LIGHT BLINKING PATTERN	INDICATION STATUS	COUNTERMEASURE
Steering lock release malfunction	- Blinks in green at 1-second intervals - Goes off 15 seconds after blinking starts	Motor operates to release steering lock, but steering lock cannot be released (e.g. lock bar stuck in steering column)	Push engine switch while turning steering wheel to right and left

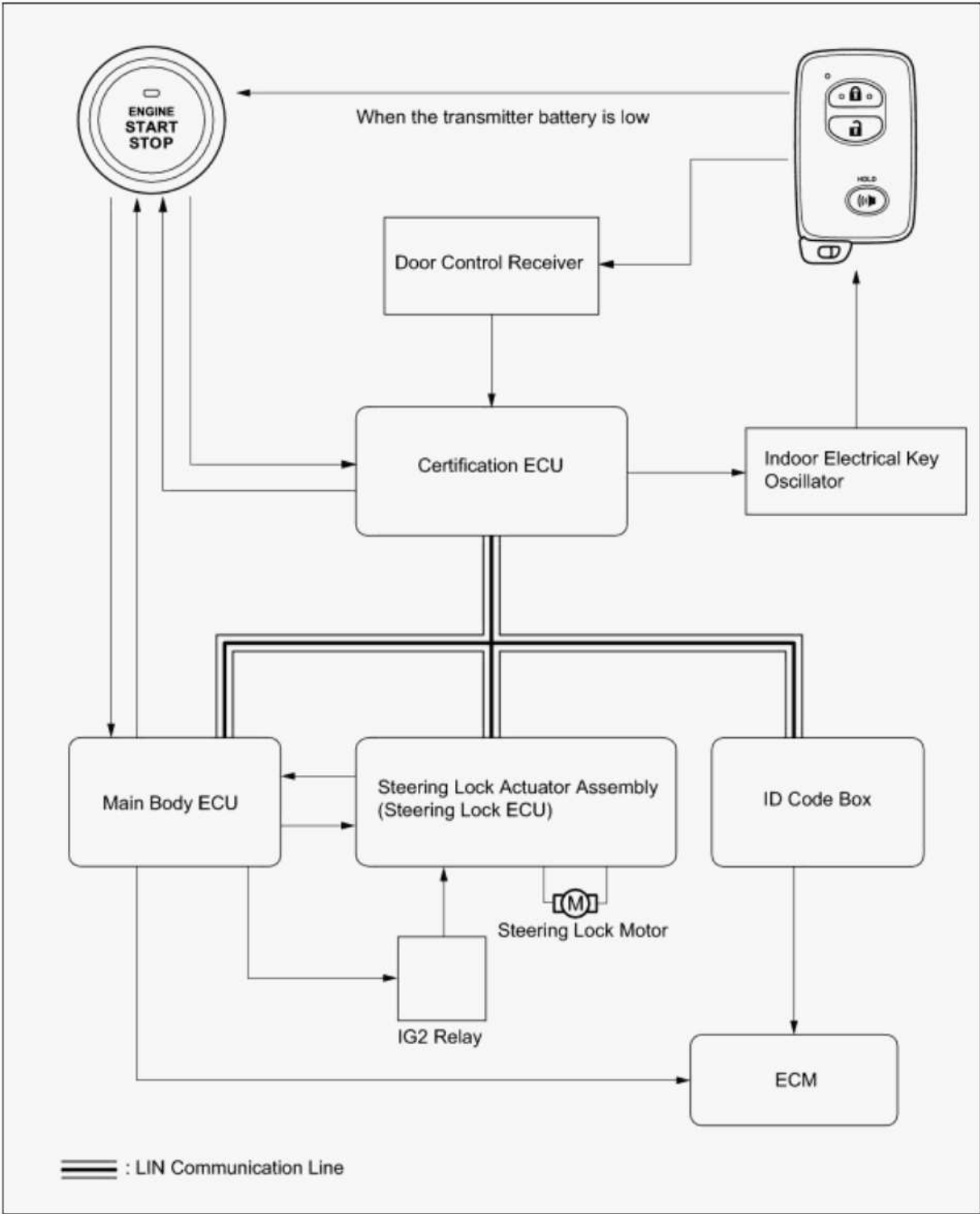
Malfunction in push button start function	• Blinks in amber at 2-second intervals	• Short in devices for activating motor • Problem in steering lock ECU or main body ECU	Troubleshoot by following "How to Proceed with Troubleshooting" INFO
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Last Modified: 9-7-2011	6.4 U	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T1C00QX
Title: STEERING COLUMN: STEERING LOCK SYSTEM: SYSTEM DIAGRAM (2011 RAV4)		

SYSTEM DIAGRAM



Input and Output Signals of Each ECU

TRANSMITTING ECU	RECEIVING ECU	SIGNAL	COMMUNICATION METHOD
Main Body ECU	Steering Lock ECU	Power supply status (to steering lock motor)	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Sleep/available status	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Lock/unlock sensor status	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Steering lock status	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Motor control status	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Diagnostic response status	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Lock/unlock sensor malfunction	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Power supply malfunction (to steering lock motor)	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Motor driver malfunction	LIN
Steering Lock ECU	• Certification ECU	Lock bar stuck status	LIN

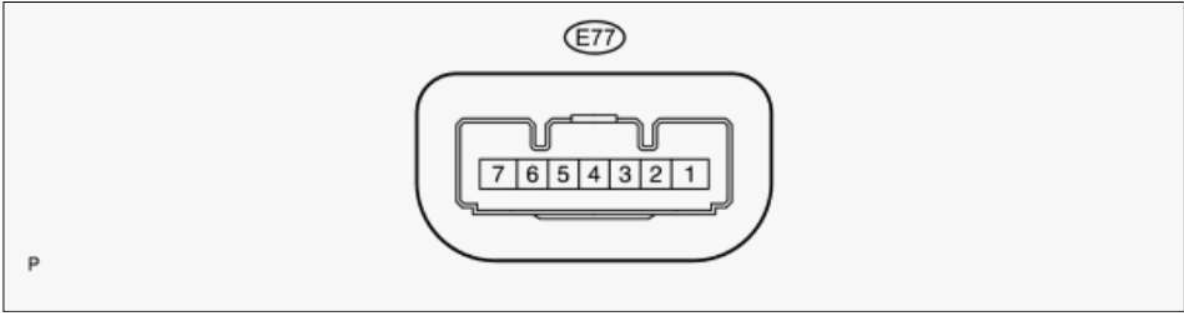
TRANSMITTING ECU	RECEIVING ECU	SIGNAL	COMMUNICATION METHOD
	• Main Body ECU • ID Code Box		
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Push button start function status	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Lock/unlock relay drive status	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Engine start control status	LIN
Certification ECU	Steering Lock ECU	Lock/unlock request	LIN



Last Modified: 9-7-2011	6.4 U	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T15015X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: TERMINALS OF ECU (2011 RAV4)		

TERMINALS OF ECU

1. CHECK STEERING LOCK ECU



- (a) Disconnect the E77 steering lock ECU connector.
- (b) Measure the voltage and resistance according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E77-1 (GND) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
E77-2 (SGND) - Body ground	BR - Body ground	Signal ground	Always	Below 1 Ω
E77-6 (IG2) - E77-1 (GND)	B - W-B	IG signal input	Engine switch on (IG)	11 to 14 V
E77-7 (B) - E77-1 (GND)	L - W-B	Power source	Always	11 to 14 V

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

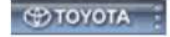
- (c) Reconnect the E77 steering lock ECU connector.
- (d) Measure the voltage according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E77-3 (IGE) - E77-1 (GND)	Y - W-B	Power source for motor drive	Motor operating	Below 1 V
E77-3 (IGE) - E77-1 (GND)	Y - W-B	Power source for motor drive	Motor not operating	11 to 14 V
E77-4 (SLP1) - E77-2 (SGND)	G - BR	Unlock position sensor output signal	Steering lock locked	11 to 14 V

STEERING COLUMN: STEERING LOCK SYSTEM: TERMINALS O... <https://techinfo.toyota.com/t3Portal/document/rm/RM16B0U/xhtml/RM...>

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E77-4 (SLP1) - E77-2 (SGND)	G - BR	Unlock position sensor output signal	Steering lock unlocked	Below 1 V
E77-5 (LIN) - E77-2 (SGND)	V - BR	LIN communication bus	Engine switch on (IG)	Pulse generation

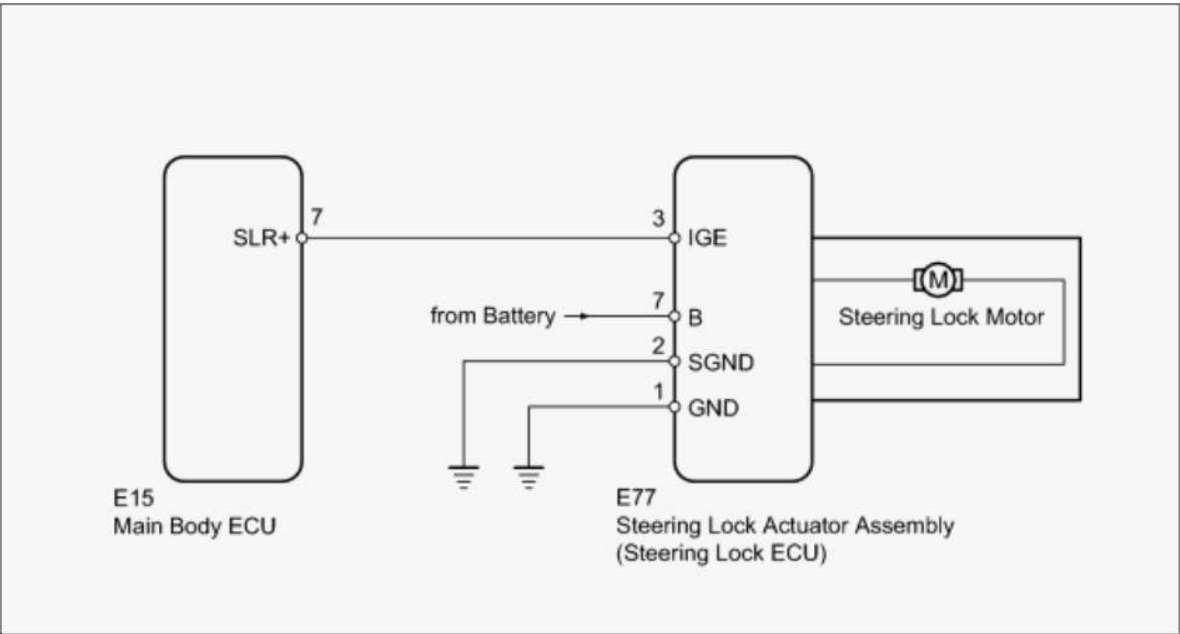
If the result is not as specified, the ECU may have a malfunction.



Last Modified: 9-7-2011	6.4 J	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T1H006X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: Unable to Lock Steering Wheel (2011 RAV4)		

Unable to Lock Steering Wheel

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

When the engine switch is off, the main body ECU may occasionally go into a non-active state called sleep mode. Therefore, before proceeding with the inspection, it is necessary to perform the following steps to wake up the ECU:

With the engine switch off, open the driver door. Then (with the engine switch still off) open and close any door several times at 1.5 second intervals.

PROCEDURE

1.	CHECK FOR DTC (CERTIFICATION ECU)
----	-----------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the engine switch on (IG) and turn the Techstream on.

- (c) Read the DTCs of the certification ECU by following the prompts displayed on the Techstream screen.
- OK:
No DTCs related to the certification ECU are output.

NG  **GO TO RELEVANT DTC**

OK


2.	CHECK FOR DTC (MAIN BODY ECU)
-----------	--------------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the engine switch on (IG) and turn the Techstream on.
- (c) Read the DTCs of the main body ECU by following the prompts displayed on the Techstream screen.
- OK:
No DTCs related to the main body ECU are output.

NG  **GO TO RELEVANT DTC**

OK


3.	READ VALUE USING TECHSTREAM
-----------	------------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the engine switch on (IG) and turn the Techstream on.
- (c) Within 10 seconds after the engine is started, read the Data List menu of the certification ECU, and check the steering lock command reception record.

Smart Key

ITEM	MEASUREMENT ITEM / RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Lock/Unlock Receive	Steering lock command reception record / Yes or No	Yes: Steering lock/unlock signal received No: Steering lock/unlock signal	-

ITEM	MEASUREMENT ITEM / RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
		not received	

OK:
Yes is displayed on the Techstream screen.

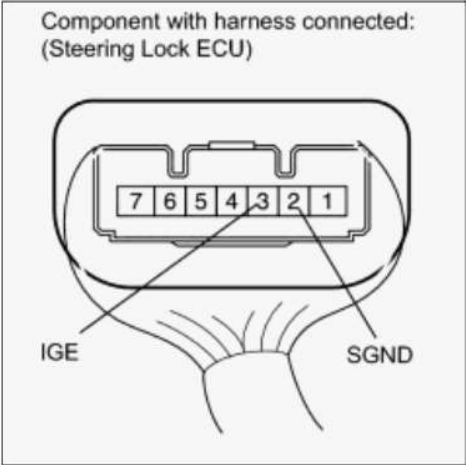
NG ► **CHECK STEERING LOCK FUNCTION**

OK
▼

4. **CHECK STEERING LOCK ECU**

- (a) Turn the engine switch on (IG).
- (b) Turn the engine switch off.
- (c) With the shift lever in P, immediately after opening the driver door, inspect the voltage between terminals 3 (IGE) and 2 (SGND) of the steering lock ECU.

Result



RESULT	PROCEED TO
Immediately after opening door, measurement is below 1 V.	A
Measurement is 11 to 14 V, and measurement never becomes below 1 V.	B

B ► **REPAIR OR REPLACE HARNESS OR CONNECTOR**

A ► **REPLACE STEERING LOCK ACTUATOR ASSEMBLY (STEERING LOCK)**

LOCK ECU)

5. CHECK STEERING LOCK FUNCTION

- (a) Open the front passenger side door.
- (b) Lock the doors using the wireless remote door lock key.
- (c) Check that no doors are locked and the steering lock does not operate.
- OK:
- No doors are locked and steering lock is not locked.

NG▶GO TO LIGHTING SYSTEM (DOOR COURTESY SWITCH CIRCUIT)

OK
▼

6. READ VALUE USING TECHSTREAM

- (a) Connect the Techstream to the DLC3.
- (b) Turn the engine switch on (IG) and turn the Techstream on.
- (c) Check the Data List and read the value displayed on the Techstream screen.

Smart Key

ITEM	MEASUREMENT ITEM / RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
S Code Check	S code match record / NG or OK	NG: S code not matched OK: S code matched	-

Result

RESULT	PROCEED TO
NG is displayed on the Techstream screen.	A
OK is displayed on the Techstream screen.	B

B▶READ VALUE USING TECHSTREAM

STEERING COLUMN: STEERING LOCK SYSTEM: Unable to Lock ... <https://techinfo.toyota.com/t3Portal/document/rm/RM16B0U/xhtml/RM...>



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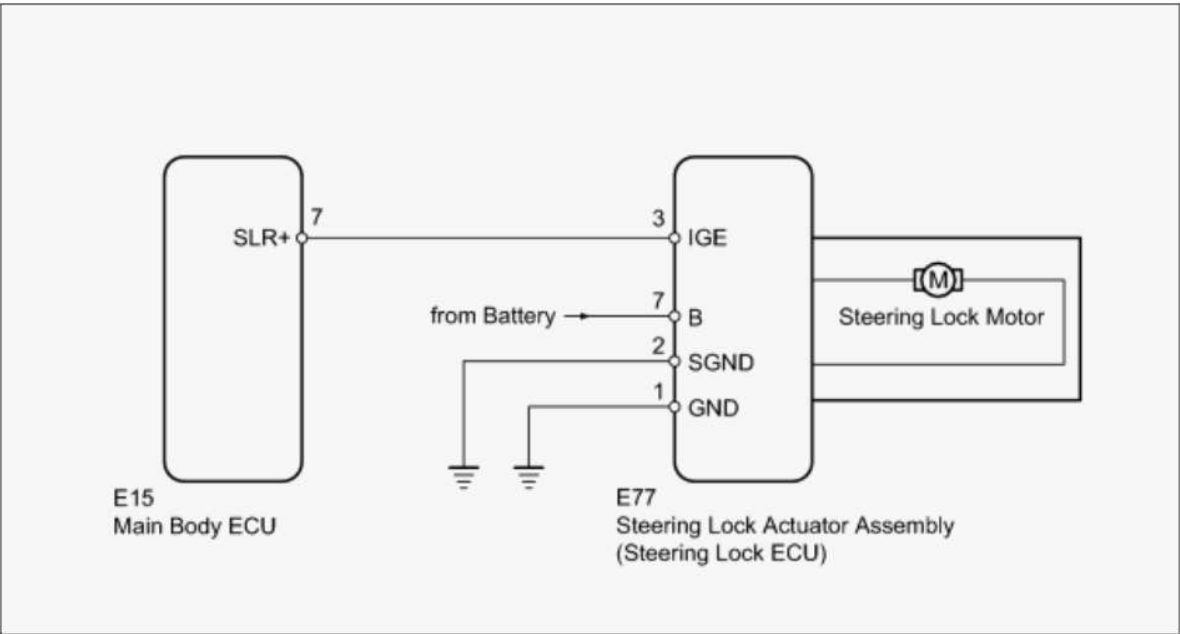
STEERING COLUMN: STEERING LOCK SYSTEM: Unable to Lock ... <https://techinfo.toyota.com/t3Portal/document/rm/RM16B0U/xhtml/RM...>

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Last Modified: 9-7-2011	6.4 J	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T17006X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: Unable to Unlock Steering Wheel (2011 RAV4)		

Unable to Unlock Steering Wheel

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

When the engine switch is off, the main body ECU may occasionally go into a non-active state called sleep mode. Therefore, before proceeding with the inspection, it is necessary to perform the following steps to wake up the ECU:

With the engine switch off, open the driver door. Then (with the engine switch still off) open and close any door several times at 1.5 second intervals.

PROCEDURE

1.	CHECK ENGINE SWITCH
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- (a) Check whether the engine switch can be turned on (IG) when the shift lever is in P and the brake pedal is depressed.
- OK:

Engine switch can be turned on (IG).

NG  **GO TO ENGINE IMMOBILISER SYSTEM (w/ Smart Key System)**

OK


2.	CHECK FOR DTC (MAIN BODY ECU)
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the engine switch on (IG) and turn the Techstream on.
- (c) Check the DTCs of the main body ECU by following the prompts displayed on the Techstream screen.

OK:

No DTCs related to main body ECU are output.

NG  **GO TO RELEVANT DTC**

OK


3.	CHECK FOR DTC (CERTIFICATION ECU)
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the engine switch on (IG) and turn the Techstream on.
- (c) Check the DTCs of the certification ECU by following the prompts displayed on the Techstream screen.

OK:

No DTCs related to certification ECU are output.

NG  **GO TO RELEVANT DTC**

OK


4.

READ VALUE USING TECHSTREAM

- (a) Connect the Techstream to the DLC3.
- (b) Turn the engine switch on (IG) and turn the Techstream on.
- (c) Within 10 seconds of the engine switch being turned on (IG), check the Data List and read the value displayed on the Techstream screen.

Smart Key

ITEM	MEASUREMENT ITEM / RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Lock/Unlock Receive	Steering lock command reception record / Yes or No	Yes: Steering lock/unlock signal received No: Steering lock/unlock signal not received	-

OK:
Yes is displayed on the Techstream screen.

NG▶ READ VALUE USING TECHSTREAM

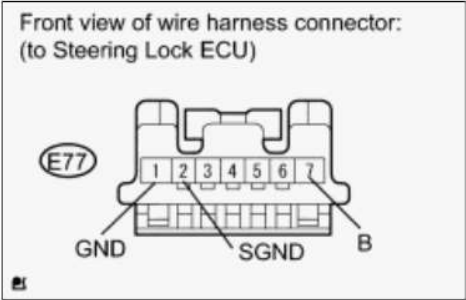
OK
▼

5.

CHECK WIRE HARNESS (STEERING LOCK ECU - BODY GROUND)

- (a) Disconnect the E77 steering lock ECU connector.
- (b) Measure the resistance and voltage according to the value(s) in the table below.

Standard Voltage:
Standard resistance



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E77-7 (B) - E77-1 (GND)	Always	11 to 14 V
E77-7 (B) - E77-2 (SGND)	Always	11 to 14 V

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E77-1 (GND) - Body ground	Always	Below 1 Ω
E77-2 (SGND) - Body ground	Always	Below 1 Ω

NG

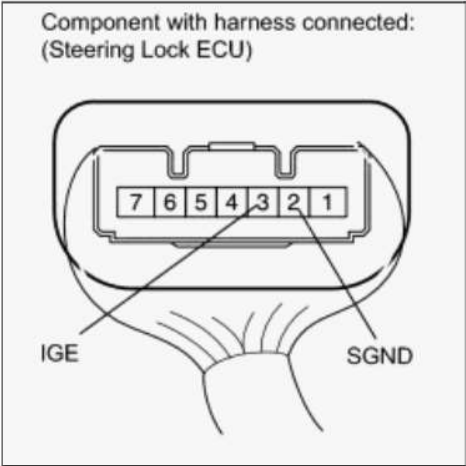
REPAIR OR
REPLACE
HARNESS
OR
CONNECTOR

OK

6. CHECK STEERING LOCK ECU

(a) Immediately after turning the engine switch on (IG), inspect the voltage between terminals 3 (IGE) and 2 (SGND) of the steering lock ECU.

HINT:
When the engine switch is turned on (IG), the steering lock motor activates for 2 to 15 seconds.



Result

RESULT	PROCEED TO
Immediately after turning engine switch on (IG), measurement is 1 V or less	A
Measurement is 11 to 14 V, and measurement never becomes 1 V or less	B

B

REPAIR OR
REPLACE
HARNESS OR
CONNECTOR

A

REPLACE
STEERING

LOCK
ACTUATOR
ASSEMBLY
(STEERING
LOCK ECU)

7.

READ VALUE USING TECHSTREAM

- (a) Connect the Techstream to the DLC3.
- (b) Turn the engine switch on (IG) and turn the Techstream on.
- (c) Check the Data List and read the value displayed on the Techstream screen.

Smart Key

ITEM	MEASUREMENT ITEM / RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
S Code Check	S code match record / NG or OK	NG: S code not matched OK: S code matched	-

Result

RESULT	PROCEED TO
NG is displayed on the Techstream screen.	A
OK is displayed on the Techstream screen.	B

B ▶ READ VALUE USING TECHSTREAM

A
▼

8.

CHECK OPERATION OF ID CODE BOX

- (a) Replace the ID code box with a new one INFO .

NOTICE:
When replacing the ID code box, registration must be performed according to the "Registration" procedures INFO .

- (b) Connect the Techstream to the DLC3.
- (c) Turn the engine switch on (IG) and turn the Techstream ON.

(d) Check the Data List and read the value displayed on the Techstream screen.

Smart Key

ITEM	MEASUREMENT ITEM / RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
S Code Check	S code match record / NG or OK	NG: S code not matched OK: S code matched	-

OK:

OK is displayed on the Techstream screen.

NG ► **REPLACE ECU AGGREGATION BOX ASSEMBLY (CERTIFICATION ECU)**

OK ► **REPLACE ID CODE BOX**

9.	READ VALUE USING TECHSTREAM
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(a) Connect the Techstream to the DLC3.

(b) Turn the engine switch on (IG) and turn the Techstream on.

(c) Check the Data List and read the value displayed on the Techstream screen.

Smart Key

ITEM	MEASUREMENT ITEM / RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
L Code Check	L code match record / NG or OK	NG: L code not matched OK: L code matched	-

Result

RESULT	PROCEED TO
NG is displayed on the Techstream screen.	A
OK is displayed on the Techstream screen.	B

B ► **CHECK OPERATION OF STEERING LOCK ECU**

A



10.	CHECK OPERATION OF ID CODE BOX
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(a) Replace the ID code box with a new one .

NOTICE:
When replacing the ID code box, registration must be performed according to the "Registration" procedures  .

- (b) Connect the Techstream to the DLC3.
- (c) Turn the engine switch on (IG) and turn the Techstream on.
- (d) Check the Data List and read the value displayed on the Techstream screen.

Smart Key

ITEM	MEASUREMENT ITEM / RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
L Code Check	L code match record / NG or OK	NG: L code not matched OK: L code matched	-

OK:
OK is displayed on the Techstream screen.

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

OK ▶ **REPLACE ID CODE BOX**

11.	CHECK OPERATION OF STEERING LOCK ECU
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- (a) Replace the steering lock ECU with a new one  .

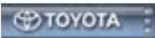
NOTICE:
When replacing the steering lock ECU, registration must be performed according to the "Registration" procedures  .

- (b) With the shift lever in P and the brake pedal depressed, turn the engine switch on (IG).
- (c) Check whether the steering lock can be released by turning the steering wheel, and check that the engine starts.

OK:
Steering lock is released and engine starts.

NG ▶ **REPLACE ECU AGGREGATION BOX ASSEMBLY (CERTIFICATION ECU)**

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



Last Modified: 9-7-2011	6.4 J	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000001T1I016X
Title: STEERING COLUMN: STEERING LOCK SYSTEM: Unlock Position Sensor Signal Circuit (2011 RAV4)		

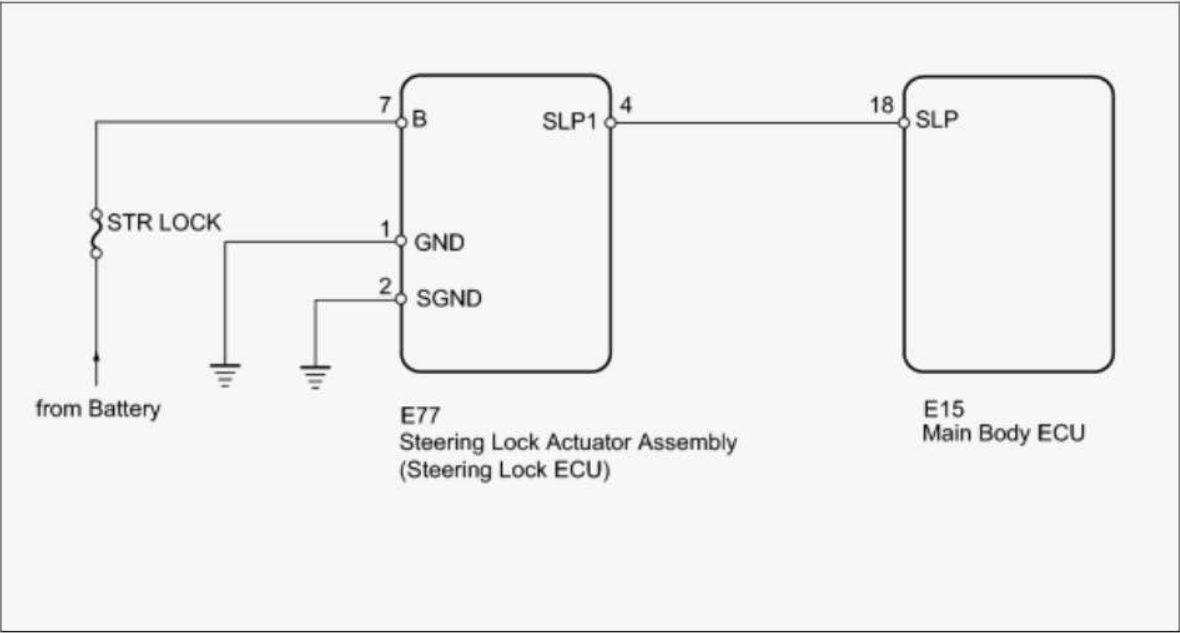
Unlock Position Sensor Signal Circuit

DESCRIPTION

The steering lock ECU sends an unlock position signal to the main body ECU. On receiving the signal, the main body ECU permits engine start. (This prevents the engine from being started with the steering locked.)

The diagnosis information of the steering lock ECU is transmitted to the Techstream via the certification ECU as the steering lock ECU is not connected to the CAN communication system.

WIRING DIAGRAM



INSPECTION PROCEDURE

- HINT:**
- When the engine switch is off, the main body ECU may occasionally go into a non-active state called sleep mode. Therefore, before proceeding with the inspection, it is necessary to perform the following steps to wake up the ECU:
 - With the engine switch off, open the driver door. Then (with the engine switch still off) open and close any door several times at 1.5 second intervals.

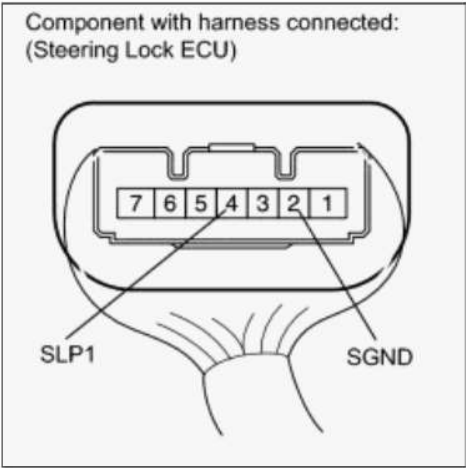
PROCEDURE

1.

CHECK STEERING LOCK ECU

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

Standard Voltage:



TESTER CONNECTION	CONDITION (STEERING LOCK POSITION)	SPECIFIED CONDITION
4 (SLP1) - 2 (SGND)	Locked	11 to 14 V
4 (SLP1) - 2 (SGND)	Unlocked	Below 1.2 V

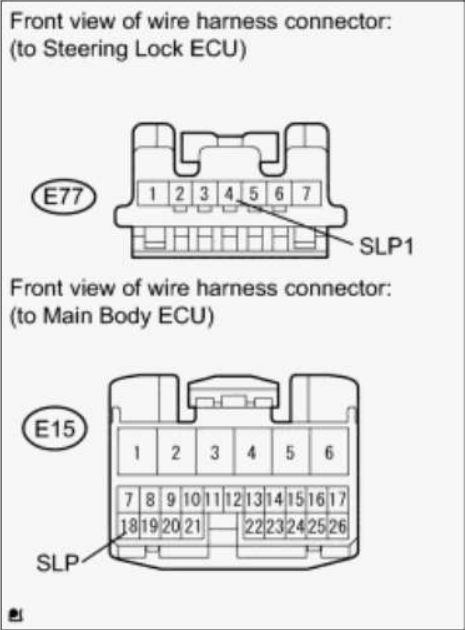
NG **CHECK HARNESS AND CONNECTOR (STEERING LOCK ECU - BODY GROUND)**

OK

2.

CHECK HARNESS AND CONNECTOR (STEERING LOCK ECU - MAIN BODY ECU)

(a) Disconnect the E77 and E15 ECU connectors.



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

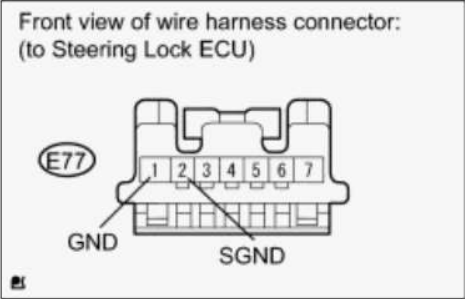
Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E15-18 (SLP) - E77-4 (SLP1)	Always	Below 1 Ω
E77-4 (SLP1) - Body ground	Always	10 k Ω or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ REPLACE STEERING LOCK ACTUATOR ASSEMBLY
(STEERING LOCK ECU)

3. CHECK HARNESS AND CONNECTOR (STEERING LOCK ECU - BODY GROUND)



(a) Disconnect the E77 ECU connector.

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

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E77-1 (GND) - Body ground	Always	Below 1 Ω
E77-2 (SGND) - Body ground	Always	Below 1 Ω

NG

REPAIR OR
REPLACE
HARNESS
OR
CONNECTOR

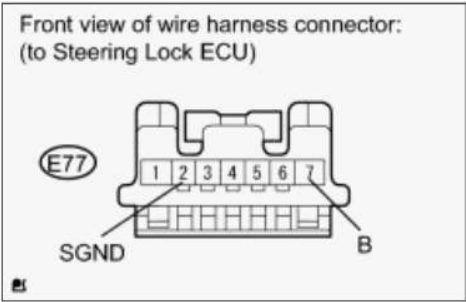
OK

4.

CHECK HARNESS AND CONNECTOR (BATTERY - STEERING LOCK ECU)

- (a) Disconnect the E77 ECU connector.
- (b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E77-7 (B) - E77-2 (SGND)	Always	11 to 14 V

NG

REPAIR OR
REPLACE
HARNESS
OR
CONNECTOR

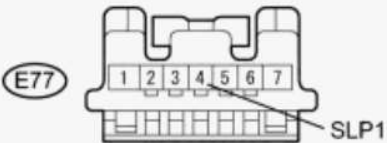
OK

5.

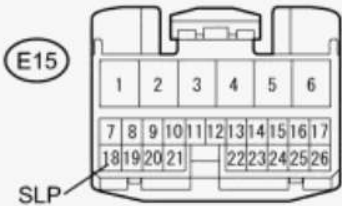
CHECK HARNESS AND CONNECTOR (STEERING LOCK ECU - MAIN BODY ECU)

- (a) Disconnect the E77 and E15 ECU connectors.

Front view of wire harness connector:
(to Steering Lock ECU)



Front view of wire harness connector:
(to Main Body ECU)



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

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E15-18 (SLP) - E77-4 (SLP1)	Always	Below 1 Ω
E77-4 (SLP1) - Body ground	Always	10 k Ω or higher

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ► REPLACE STEERING LOCK ACTUATOR ASSEMBLY
(STEERING LOCK ECU)

