

ENGINE IMMOBILISER SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

0521A-04

HINT:

Troubleshoot in accordance with the procedures on the following pages.

1 VEHICLE BROUGHT TO WORKSHOP



2 CUSTOMER PROBLEM ANALYSIS CHECK AND SYMPTOM CHECK (See page 05-1833)



3 CRANK ENGINE FOR MORE THAN 10 SECONDS



4 CHECK DTC

- (a) Check for DTCs and note any codes that are output.
- (b) Delete the DTC.
- (c) Recheck for DTCs. Try to prompt the DTC (SFI system and engine immobiliser system) by simulating the original activity that the DTC suggested.
 - (1) If the DTC does not reoccur, proceed to A.
 - (2) If the DTC (SFI system) reoccurs, proceed to B.
 - (3) If the DTC (engine immobiliser system) reoccur, proceed to C.

B

Go to SFI SYSTEM
(See page 05-5)

C

Go to step 8

A

5 READ VALUE OF HAND-HELD TESTER (IMMOBILISER ECU (TRANSPONDER KEY ECU ASSY) (SWITCH CONDITION))

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the item KEY SW in the DATA LIST and read its value displayed on the hand-held tester.

Transponder key ECU assy:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
KEY SW	Un-lock warning switch signal /ON or OFF	ON: Key is in ignition key cylinder OFF: No key is in ignition key cylinder	-

NG

Go to DTC B2780 (See page 05-1844)

OK

6 **PROBLEM SYMPTOMS TABLE (See page 05-1843)**

- (a) When problem is not listed on problem symptoms table, proceed to A.
(b) When problem is listed on problem symptoms table, proceed to B.

B**Go to step 8****A****7** **PERFORM TROUBLESHOOTING ACCORDING TO MALFUNCTION SYMPTOM**

- (a) Pre-check (See page 05-1834)
(1) Inspect with the hand-held tester (ECU data monitor).
(2) Inspect with the hand-held tester (ACTIVE TEST).
(b) Terminals of ECU (See page 05-1839)

8 **ADJUST, REPAIR OR REPLACE****END**

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE IMMOBILISER SYSTEM Check Sheet

 Inspector's
Name :

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

Date Problem First Occurred		/ /
Frequency Problem Occurs		<input type="checkbox"/> Constant <input type="checkbox"/> Intermittent (times a day) <input type="checkbox"/> Only once
Weather Conditions When Problem Occurred	Weather	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	Outdoor Temperature	<input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx. $\blacktriangleright^{\circ}\text{F}$ ($\blacktriangleright^{\circ}\text{C}$)

Symptoms	<input type="checkbox"/> Immobiliser is not set <input type="checkbox"/> (Engine starts with key codes other than registered key code)
	<input type="checkbox"/> Engine does not start

DTC Check	1st Time	<input type="checkbox"/> Normal code <input type="checkbox"/> Malfunction code (Code)
	2nd Time	<input type="checkbox"/> Normal code <input type="checkbox"/> Malfunction code (Code)

PRE-CHECK

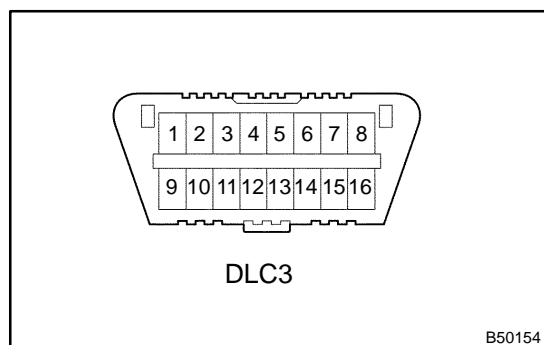
1. DIAGNOSIS SYSTEM

(a) Description

- (1) The ECM controls the function of the immobiliser system on the vehicle.

Data of the immobiliser system and the Diagnostic Trouble Code (DTC) can be read in the Data Link Connector 3 (DLC3) of the vehicle. When trouble occurs in the immobiliser system, even though the security Indicator lamp does not come on, DTCs can be checked.

Therefore, when the immobiliser system seems to be malfunctioning, use the hand-held tester to check for a malfunction and repair it.



- (b) Inspect the DLC3.

The vehicle's ECM uses the ISO 9141-2 communication protocol. The terminal arrangement of the DLC3 complies with the SAE J1962 and matches the ISO 9141-2 format.

Standard:

Terminal No.	Condition	Specified Condition
7 (Bus + Line) - 5 (Signal ground)	During communication	Pulse generation
4 (Chassis Ground) - Body ground	Always	Below 1 Ω
5 (Signal Ground) - Body ground	Always	Below 1 Ω
16 (B+) - Body ground	Always	10 to 14 V

HINT:

If the screen displays UNABLE TO CONNECT TO VEHICLE after you have connected the cable of the hand-held tester to the DLC3, turned the ignition switch ON and used the hand-held tester, the problem may be on the vehicle side or the tester side.

- ▶ If communication is normal when the tester is connected to other vehicle, inspect the DLC3 of the original vehicle.
- ▶ If communication is still impossible when the tester is connected to another vehicle, the problem may be in the tester itself, so consult the Service Department listed in the tester's instruction manual.

2. Using hand-held tester:

CHECK DTC

(a) Checking DTCs.

- (1) Connect the hand-held tester to DLC3.
- (2) Turn the ignition switch ON.
- (3) Read DTCs by following the prompts on the tester screen.

HINT:

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

(b) Clear the DTCs from memory.

- (1) Connect the hand-held tester to DLC 3.
- (2) Turn the ignition switch ON.
- (3) Erase DTCs by following the prompts on the tester screen.

HINT:

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

3. CHECK DIAGNOSIS

- (a) Using the hand-held tester, check for DTCs.

NOTICE:

Hand-held tester only:

When the diagnosis system is switched from normal mode to check mode, all the DTCs and freeze frame data recorded in the normal mode are erased. So before switching modes, always check the DTCs and freeze frame data, and make a note of them.

- (1) Prepare the hand-held tester.
 - (2) Connect the hand-held tester to the DLC3 under the instrument panel lower pad.
 - (3) Turn the ignition switch ON and push the hand-held tester switch ON.
 - (4) Use the hand-held tester to check for DTCs and freeze frame data, and make a note of them (For operating instructions, see the hand-held tester instruction book).
 - (5) Confirm the details of the DTCs.
- (b) Either of the following procedures will erase the DTCs and freeze frame data.
- (1) Operating the hand-held tester to erase the codes (See the hand-held tester instruction book for operating instructions).
 - (2) Disconnecting the battery terminals or ECU-B fuse.

4. DATA LIST

HINT:

Using to the DATA LIST displayed on the hand-held tester, you can read the value of the switch, sensor, actuator, etc. without parts removal. Reading the DATA LIST as the first step of troubleshooting is one way to shorten the labor time.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) Read the DATA LIST, according to the display on the tester.

Transponder key ECU assay:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
KEY SW	Un-lock warning SW signal/ ON or OFF	OFF: Key is in IG key cylinder ON: No key is in IG key cylinder	-
IG SW	IG SW signal/ ON or OFF	OFF: IG SW is ON or START position ON: IG SW is OFF or ON position	-
IMMOBILISER	Immobiliser system status/ SET or UNSET	UNSET: Without key SET: Ignition switch ON	-
RESPONSE	Transponder chip data/ NG or OK	NG: Data error OK: Data OK	-
FRAME	Transponder chip data/ NG or OK	NG: Data error OK: Data OK	-
SERIAL NUMBER	Transponder chip data/ NG or OK	NG: Data error OK: Data OK	-
ENCRYPT CODE	Transponder chip data/ NG or OK	NG: Data error OK: Data OK	-
STATUS	Transponder chip data/ NG or OK	NG: Data error OK: Data OK	-
BCC	Transponder chip signal/ NG or OK	NG: Incorrect data sending OK: Correct data sending	-
SUB KEY	Sub key code signal/ NOMATCH or MATCH	NOMATCH: Nomatch sub key code is sent MATCH: Sub key code is sent	-
MASTER KEY	Master key code signal/ NOMATCH or MATCH	NOMATCH: Nomatch Master key code is sent MATCH: Master key code is sent	-

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
REGIST SUB CODE	Number of registered sub-key/ min. 0, max. 15	Number of registered sub-key	-
REGIST MAS CODE	Number of registered master key/ min. 0, max. 15	Number of registered master key	-
REG CODE SPACE	Memory space for key codes registration/ NOT FUL or FULL	NOT FUL: Possible to register more key code FULL: Impossible to register key code any more	-
ANTENNA COIL	Antenna coil condition/ NORMAL or FAIL	Normal: Antenna coil is normal FAIL: Antenna coil is abnormal	-

5. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the hand-held tester allows you to operate the relay, VSV, actuator, etc. without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one way to shorten the labor time.

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON.
- Perform the ACTIVE TEST, according to the display on the tester.

Transponder key ECU assy:

Item	Test Details	Diagnostic Note
SECURITY INDIC	Turn security indicator ON/OFF	-

DIAGNOSTIC TROUBLE CODE CHART

1. TRANSPONDER KEY ECU DIAGNOSTIC TROUBLE CODE CHART

DTC No. (See Page)	Detection Item	Trouble Area
B2780 (05-1844)	Push Switch/Key Unlock Warning Switch Malfunction	<ul style="list-style-type: none"> ▶Un-lock warning switch ▶Wire harness ▶Transponder key ECU assy
B2784 (05-1847)	Antenna Coil Open/Short	<ul style="list-style-type: none"> ▶Wire harness ▶Transponder key amplifier ▶Transponder key ECU assy
B2793 (05-1849)	Transponder Chip Malfunction	▶Key
B2794 (05-1850)	Unmatched Encryption Code	▶Key
B2795 (05-1851)	Unmatched Key Code	▶Key
B2796 (05-1852)	No Communication in Immobiliser System	<ul style="list-style-type: none"> ▶Key ▶Transponder key amplifier ▶Wire harness ▶Transponder key ECU assy
B2797 (05-1855)	Communication Malfunction No.1	<ul style="list-style-type: none"> ▶Key ▶Wire harness ▶Transponder key amplifier ▶Transponder key ECU assy
B2798 (05-1852)	Communication Malfunction No.2	▶Key

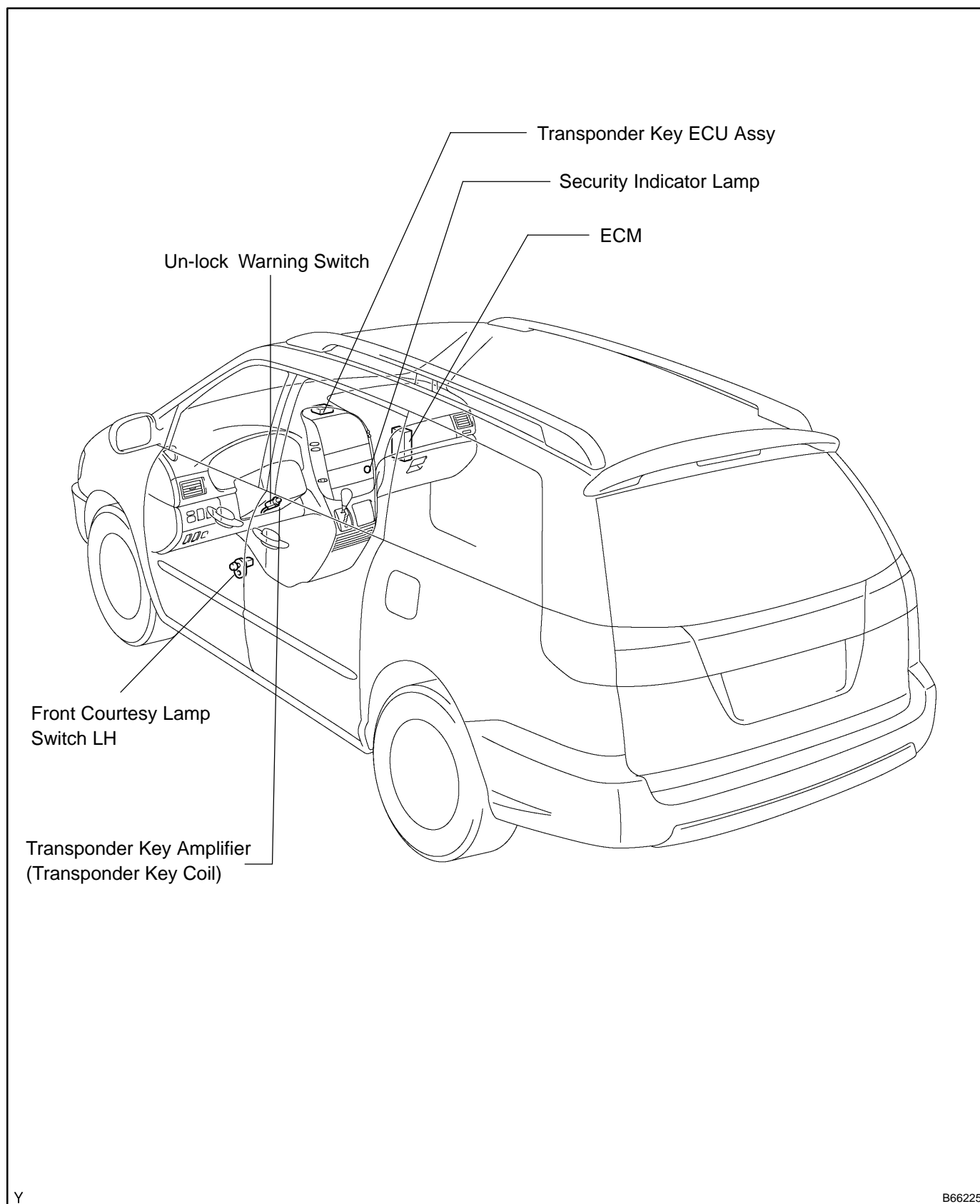
2. ECM DIAGNOSTIC TROUBLE CODE CHART

NOTICE:

The DTC for the immobiliser system is specified. If the other codes are output, check the DTC chart of the engine control system.

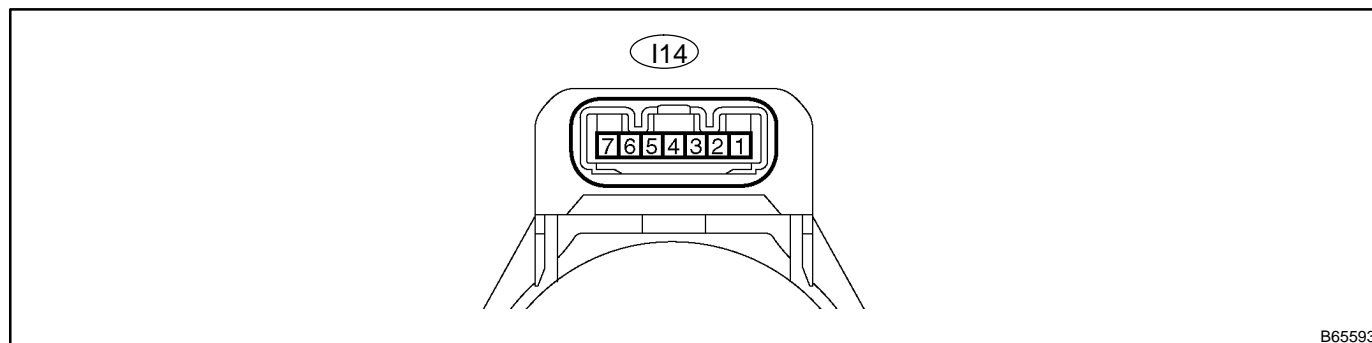
DTC No. (See Page)	Detection Item	Trouble Area
B2799 (05-1856)	Engine Immobiliser System Malfunction	<ul style="list-style-type: none"> ▶Wire harness ▶Key ▶Transponder key ECU assy ▶Transponder key amplifier ▶ECM

LOCATION



TERMINALS OF ECU

1. CHECK TRANSPONDER KEY AMPLIFIER (COIL)



- (a) Disconnect the I14 amplifier connector, and check the resistance between the terminal of the wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
GND (I14-7) - Body ground	BR-R - Body ground	Constant	Below 1 Ω

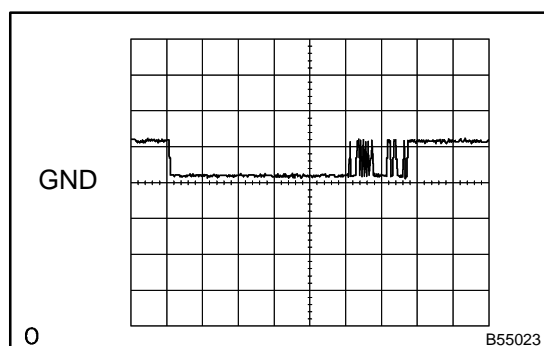
If the result is not as specified, there may be a malfunction on the wire harness side.

- (b) Reconnect the I14 amplifier connector, and check the resistance or voltage of each terminal of the connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
VC5 (I14-1) - GND (I14-7)	Y-B - BR-R	No key in ignition key cylinder → With key	0 V → 10 to 14 V
CODE(I14-4) - GND (I14-7)	Y - BR-R	No key in ignition key cylinder → With key	Waveform 1
TXCT (I14-5) - GND (I14-7)	Y-R - BR-R	No key in ignition key cylinder → With key	Waveform 2
GND (I14-7) - Body ground	BR-R - Body ground	Constant	Below 1 Ω

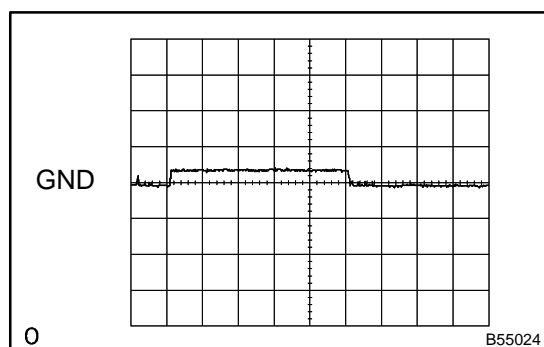
If the result is not as specified, the amplifier may have a malfunction.



- (c) Inspect using an oscilloscope.

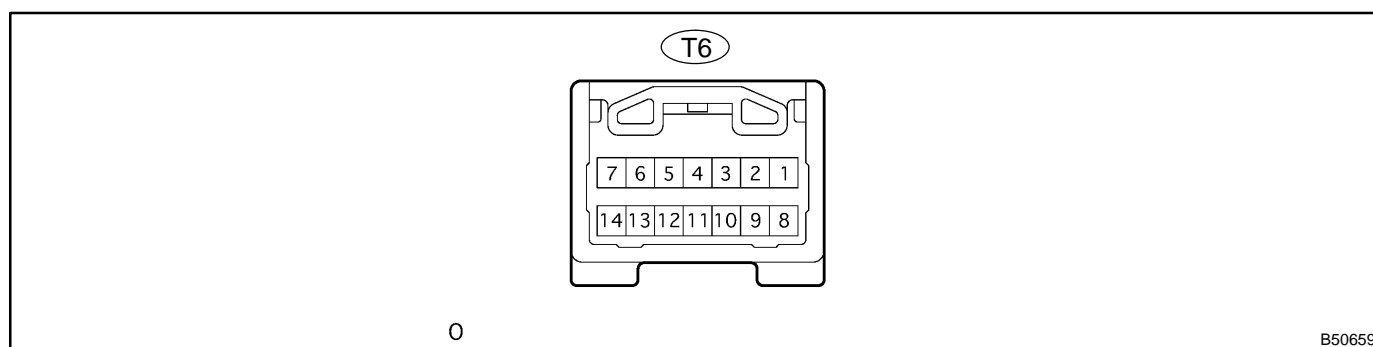
Waveform 1 (Reference):

Terminal	CODE - GND
Tool Setting	10 V/DIV., 10 ms/DIV.
Condition	Ignition switch ON

**Waveform 2 (Reference):**

Terminal	TXCT - GND
Tool Setting	10 V/DIV., 10 ms/DIV.
Condition	Ignition switch ON

2. CHECK TRANSPONDER KEY ECU ASSY



- (a) Disconnect the T6 ECU connector, and check the voltage and resistance between each terminal of the wire harness side connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
AGND (T6-13) - Body ground	BR-R - Body ground	Constant	Below 1 Ω
+B (T6-1) - GND (T6-14)	W-L - W-B	Constant	10 to 14 V
IG (T6-2) - AGND (T6-13)	B-O - BR-R	Ignition switch OFF \rightarrow ON	0 V \rightarrow 10 to 14 V
KSW (T6-10) - AGND (T6-13)	L-W - BR-R	No key in ignition key cylinder \rightarrow With key	10 k Ω or higher \rightarrow Below 1 Ω

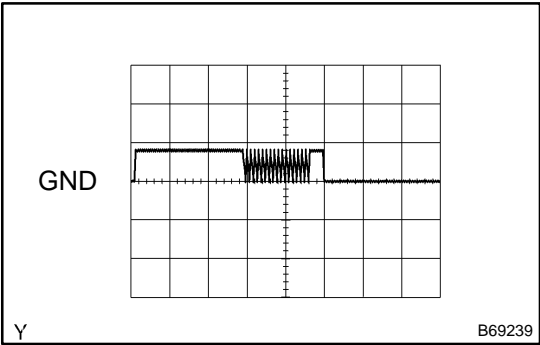
If the result is not as specified, there may be a malfunction on the wire harness side.

- (b) Reconnect the T6 ECU connector, and check the voltage between each terminal of the connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
KSW (T6-10) - AGND (T6-13)	L-W - BR-R	No key in ignition key cylinder \rightarrow With key	10 to 14 V \rightarrow 0 V
VC5 (T6-8) - AGND (T6-13)	Y-B - BR-R	Ignition switch OFF \rightarrow ON	0 V \rightarrow 4.6 to 5.4 V
TXCT (T6-12) - AGND (T6-13)	Y-R - BR-R	Ignition switch OFF \rightarrow ON	Waveform 1
CODE (T6-11) - AGND (T6-13)	Y - BR-R	Ignition switch OFF \rightarrow ON	Waveform 2
EFIO (T6-6) - AGND (T6-13)	BR-R - BR-R	Ignition switch OFF \rightarrow ON	Waveform 3
EFII (T6-7) - AGND (T6-13)	BR-W - BR-R	Ignition switch OFF \rightarrow ON	Waveform 4

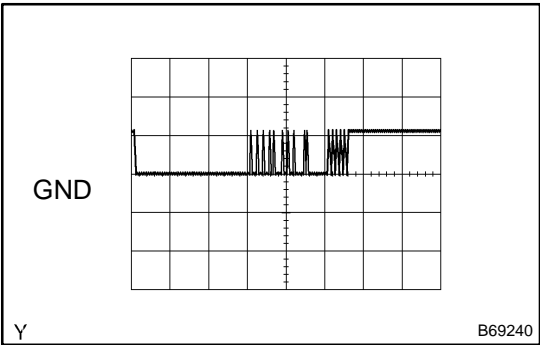
If the result is not as specified, the ECU may have a malfunction.



(c) Inspect using an oscilloscope.

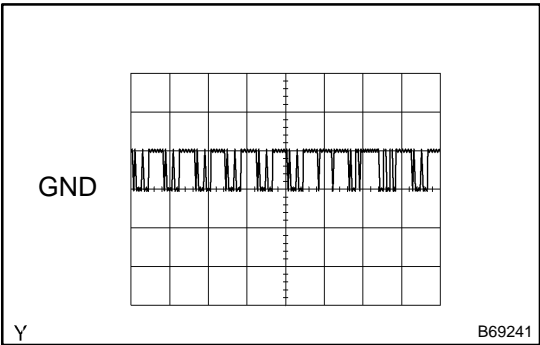
Waveform 1 (Reference):

Terminal	TXCT - GND
Tool Setting	5 V/DIV., 20 ms/DIV.
Condition	Ignition switch ON



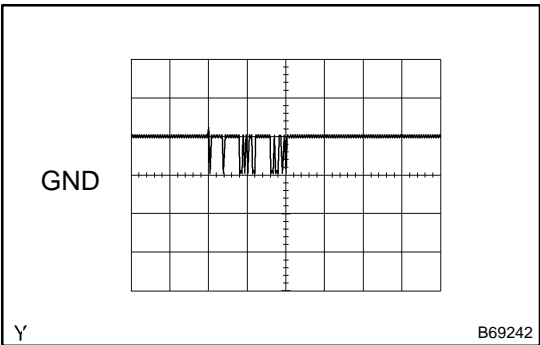
Waveform 2 (Reference):

Terminal	CODE - GND
Tool Setting	10 V/DIV., 20 ms/DIV.
Condition	Ignition switch ON



Waveform 3 (Reference):

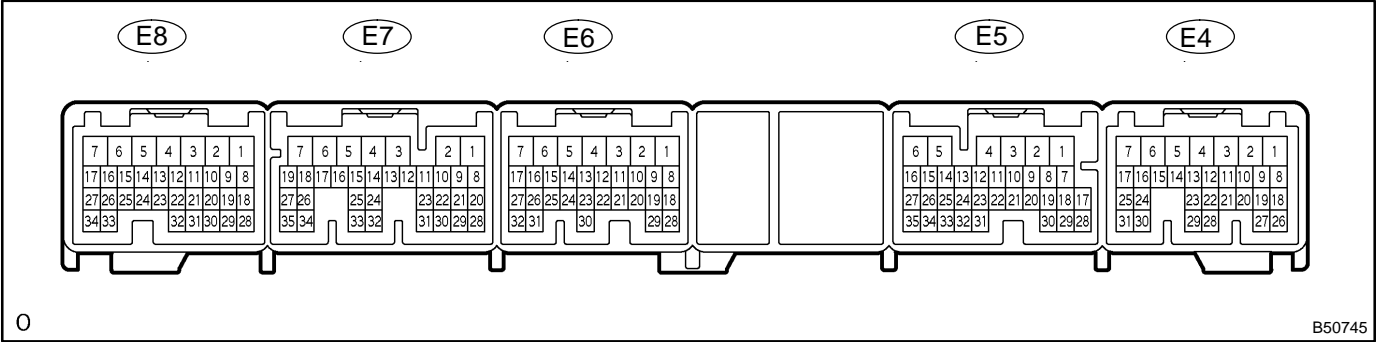
Terminal	EFIO - GND
Tool Setting	5 V/DIV., 50 ms/DIV.
Condition	Ignition switch ON



Waveform 4 (Reference):

Terminal	EFII - GND
Tool Setting	5 V/DIV., 50 ms/DIV.
Condition	Constant

3. CHECK ECM

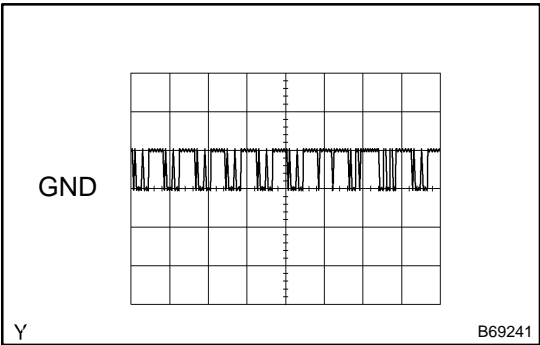


- (a) Disconnect the E6 and E7 ECM connectors, and check the voltage or resistance between each terminal of the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
IMI (E5-27) - E1 (E6-1)	BR-R - BR	No key in ignition key cylinder → With key	Waveform 1
IMO (E5-26) - E1 (E6-1)	BR-W - BR	No key in ignition key cylinder → With key	Waveform 2
E1 (E6-1) - Body ground	BR - Body ground	Constant	Below 1 Ω

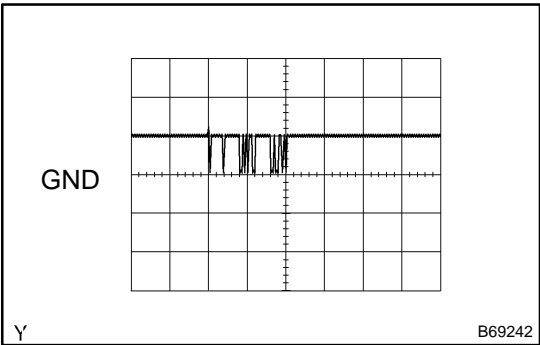
If the result is not as specified, there may be a malfunction on the wire harness side.



- (b) Inspect using an oscilloscope.

Waveform 1 (Reference):

Terminal	IMI - GND
Tool Setting	5 V/DIV., 50 ms/DIV.
Condition	Ignition switch ON



Waveform 2 (Reference):

Terminal	IMO - GND
Tool Setting	5 V/DIV., 50 ms/DIV.
Condition	Constant

PROBLEM SYMPTOMS TABLE

Problem Symptom	Suspected Area	See Page
Engine does not start	1. Key	05-1849
		05-1850
		05-1851
		05-1852
		05-1855
	2. Transponder key amplifier	05-1856
		05-1847
		05-1852
		05-1855
		05-1856
	3. Transponder key ECU assy	05-1844
		05-1847
		05-1852
		05-1855
		05-1856

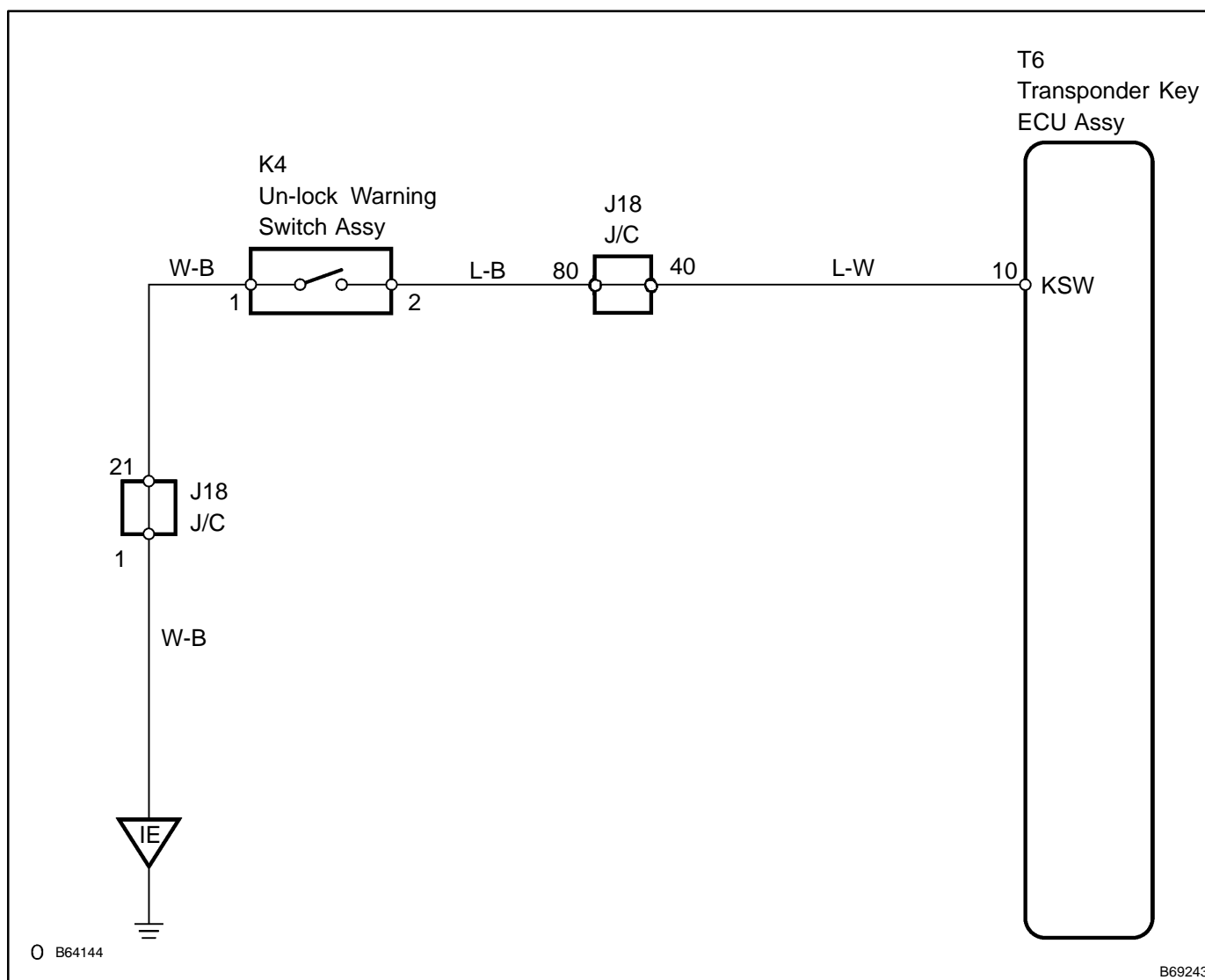
DTC	B2780	PUSH SWITCH/KEY UNLOCK WARNING SWITCH MALFUNCTION
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CIRCUIT DESCRIPTION

This DTC will be output if the transponder key ECU does not detect that the un-lock warning switch is ON even when the ignition switch is ON (Under the normal condition, the un-lock warning switch is ON when the ignition switch is ON).

DTC No.	DTC Detection Condition	Trouble Area
B2780	Un-lock warning switch ON is not detected when ignition switch is ON	<ul style="list-style-type: none"> ▶ Un-lock warning switch assy ▶ Wire harness ▶ Transponder key ECU assy

WIRING DIAGRAM



B69243

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester and start from step 2 when not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER (TRANSPONDER KEY ECU (SWITCH CONDITION))

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON with the key that will not start the engine.
- (c) Select the item KEY SW on the hand-held tester.

OK:

ON → Key is in IG key cylinder

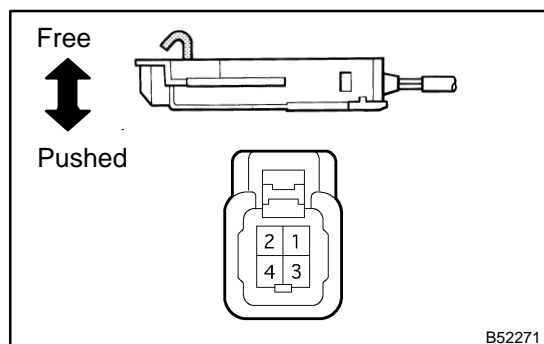
OFF → No key is in IG key cylinder

OK

REPLACE TRANSPONDER KEY ECU ASSY

NG

2 INSPECT UN-LOCK WARNING SWITCH ASSY



- (a) Remove the un-lock warning switch.
- (b) Inspect the un-lock warning switch resistance.

Standard:

Terminal No.	Condition	Specified Condition
1 - 2	Switch pushed (Key set)	Below 1 Ω
	Switch free (Key removed)	10 k Ω or higher

NG

REPLACE UN-LOCK WARNING SWITCH ASSY

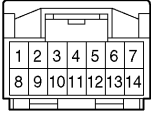
OK

3

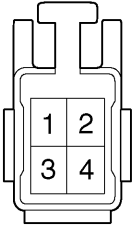
CHECK WIRE HARNESS
(TRANSPONDER KEY ECU ASSY - UN-LOCK WARNING SWITCH ASSY)

Wire Harness Side

T6
Transponder Key ECU Assy



K4
Un-lock Warning Switch Assy



B63404
B69245

B64973

- (a) Disconnect the T6 ECU and K4 switch connectors.
- (b) Check the resistance between the wire harness side connectors.

Standard:

Terminal No.	Specified Condition
T6-10 (KSW) - K4-2	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE TRANSPONDER KEY ECU ASSY

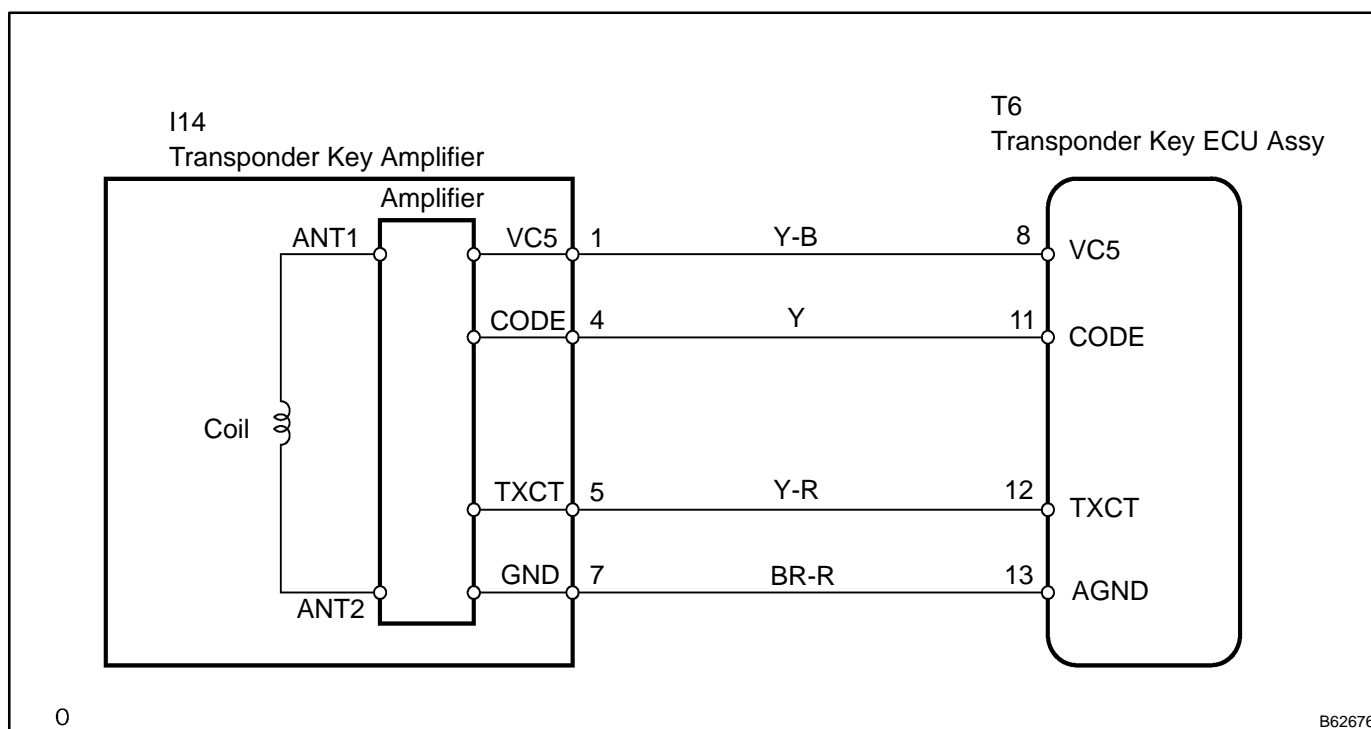
DTC	B2784	ANTENNA COIL OPEN/SHORT
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CIRCUIT DESCRIPTION

The transponder key coil is built into the transponder key amplifier and receives a key code signal from the transponder chip in the key. This signal is amplified by the amplifier, then it is output to the transponder key ECU.

DTC No.	DTC Detection Condition	Trouble Area
B2784	Antenna coil is open/short	<ul style="list-style-type: none"> ▶Wire harness ▶Transponder key amplifier ▶Transponder key ECU assy

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester and start from step 2 when not using the hand-held tester.

1	READ VALUE OF HAND-HELD TESTER (IMMOBILISER ECU (TRANSPONDER KEY ECU ASSY) (SWITCH CONDITION))
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- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON with the key that will not start the engine.
- (c) Select the item ANTENNA COIL on the hand-held tester.

OK: NORMAL

NG: FAIL

OK

REPLACE TRANSPONDER KEY ECU ASSY

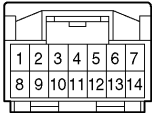
NG

2

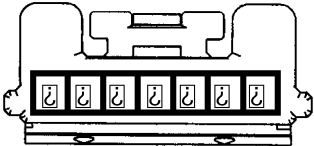
CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSY - TRANSPONDER KEY AMPLIFIER) (TRANSPONDER KEY ECU ASSY OR TRANSPONDER KEY AMPLIFIER - BODY GROUND)

Wire Harness Side

T6
Transponder Key ECU Assy



I14
Transponder Key Amplifier



B63404
B55013

B64974

- (a) Disconnect the T6 ECU and I14 amplifier connectors.
- (b) Check the resistance between the wire harness side connectors.

Standard:

Terminal No.	Specified Condition
T6-8 (VC5) - I14-1 (VC5)	Below 1 Ω
T6-11 (CODE) - I14-4 (CODE)	Below 1 Ω
T6-12 (TXCT) - I14-5 (TXCT)	Below 1 Ω
T6-13 (AGND) - I14-7 (GND)	Below 1 Ω

- (c) Check the resistance between the T6 ECU or I14 amplifier wire harness side connector and the body ground.

Standard:

Terminal No.	Specified Condition
T6-8 (VC5) or I14-1 (VC5) - Body ground	10 kΩ or higher
T6-11 (CODE) or I14-4 (CODE) - Body ground	10 kΩ or higher
T6-12 (TXCT) or I14-5 (TXCT) - Body ground	10 kΩ or higher
T6-13 (AGND) or I14-7 (GND) - Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE TRANSPONDER KEY AMPLIFIER

DTC	B2793	TRANSPONDER CHIP MALFUNCTION
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CIRCUIT DESCRIPTION

This DTC is output when a malfunction is found in a key during the key code registration or the key code is not registered normally. Replace the key when the key code registration is not performed normally and this DTC is detected.

DTC No.	DTC Detection Condition	Trouble Area
B2793	Transponder chip malfunction	►Key

INSPECTION PROCEDURE

1	CHECK DTC
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- (a) Delete the DTC (See page [05-1834](#)).
- (b) Insert the key into the ignition key cylinder.
- (c) Check that no code is output.

OK

NO PROBLEM

NG

2	RE-REGISTER KEY
----------	------------------------

- (a) Delete the DTC (See page [05-1834](#)).
- (b) Re-register the key, and check that the engine starts with the key.

OK

NORMAL

NG

REPLACE KEY

DTC	B2794	UNMATCHED ENCRYPTION CODE
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CIRCUIT DESCRIPTION

This DTC is output when a key with an incomplete key code is inserted into the ignition key cylinder.

DTC No.	DTC Detection Condition	Trouble Area
B2794	Key with incomplete key code is inserted	►Key

INSPECTION PROCEDURE

1	REPLACE KEY
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DTC	B2795	UNMATCHED KEY CODE
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CIRCUIT DESCRIPTION

This DTC is output when a key with a key code that has not been registered in the ECU is inserted into the ignition key cylinder.

DTC No.	DTC Detection Condition	Trouble Area
B2795	Key with unregistered key code is inserted	►Key

INSPECTION PROCEDURE

1	DELETE DTC AND INSERT ALL PRESENTLY AVAILABLE KEYS TO CHECK WHETHER ENGINE STARTS OR NOT
----------	---

OK

**NO PROBLEM
(BECAUSE OF KEY RE-REGISTRATION)**

NG

REPLACE KEY THAT WILL NOT START ENGINE

DTC	B2796	NO COMMUNICATION IN IMMOBILISER SYSTEM
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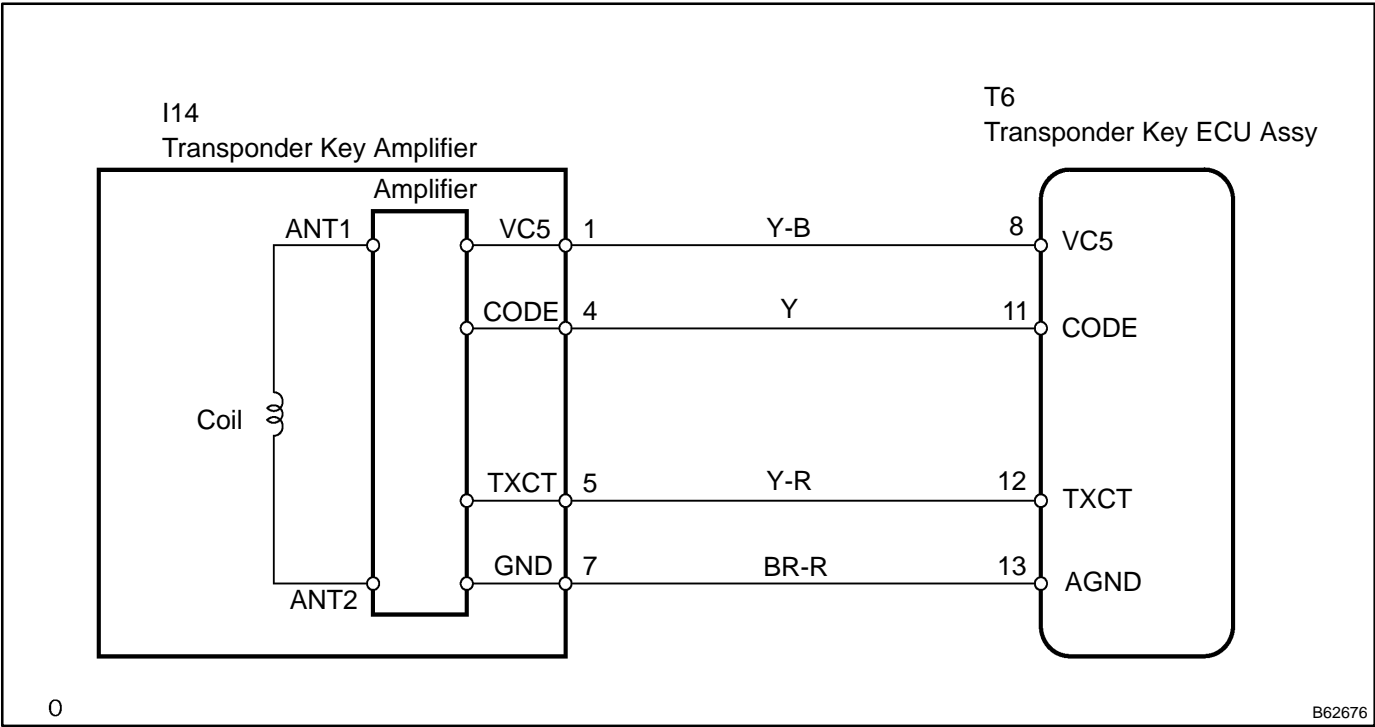
DTC	B2798	COMMUNICATION MALFUNCTION NO.2
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CIRCUIT DESCRIPTION

This code is stored in the memory when a key that does not have a transponder chip is inserted or if communication between the key and transponder key ECU is impossible.

DTC No.	DTC Detection Condition	Trouble Area
B2796	No communication	▶Key ▶Wire harness ▶Transponder key amplifier ▶Transponder key ECU assy
B2798	Communication error	▶Key

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester and start from step 2 when not using the hand-held tester.

1	READ VALUE OF HAND-HELD TESTER (IMMOBILISER ECU (TRANSPONDER KEY ECU ASSY) (SWITCH CONDITION))
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- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON with the key that will not start the engine.
- (c) Select IMMOBILISER on the hand-held tester.

OK:

SET → Ignition switch ON

UNSET → Without key

OK → **NORMAL**

NG

2	CHECK WHETHER ENGINE STARTS WITH OTHER KEYS
----------	--

- (a) Check whether the engine starts with the other keys for the vehicle.

OK → **RE-REGISTER OR REPLACE KEY THAT WILL NOT START ENGINE**

NG

HINT:

Start the inspection from step 3 when using the hand-held tester and start from step 4 when not using the hand-held tester.

3	READ VALUE OF HAND-HELD TESTER (IMMOBILISER ECU (TRANSPONDER KEY ECU ASSY) (SWITCH CONDITION))
----------	---

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON with the key that will not start the engine.
- (c) Select the item ANTENNA COIL on the hand-held tester.

OK: NORMAL

NG: FAIL

NG → **REPLACE TRANSPONDER KEY ECU ASSY**

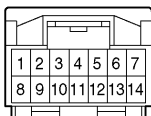
OK

4 CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSY - TRANSPONDER KEY AMPLIFIER) (TRANSPONDER KEY ECU ASSY OR TRANSPONDER KEY AMPLIFIER - BODY GROUND)

Wire Harness Side

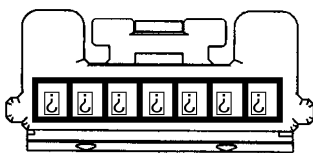
T6

Transponder Key ECU Assy



I14

Transponder Key Amplifier

B63404
B55013

B64974

- (a) Disconnect the T6 ECU and I14 amplifier connectors.
- (b) Check the resistance between the wire harness side connectors.

Standard:

Terminal No.	Specified Condition
T6-8 (VC5) - I14-1 (VC5)	Below 1 Ω
T6-11 (CODE) - I14-4 (CODE)	Below 1 Ω
T6-12 (TXCT) - I14-5 (TXCT)	Below 1 Ω
T6-13 (AGND) - I14-7 (GND)	Below 1 Ω

- (c) Check the resistance between the T6 ECU or I14 amplifier wire harness side connector and the body ground.

Standard:

Terminal No.	Specified Condition
T6-8 (VC5) or I14-1 (VC5) - Body ground	10 k Ω or higher
T6-11 (CODE) or I14-4 (CODE) - Body ground	10 k Ω or higher
T6-12 (TXCT) or I14-5 (TXCT) - Body ground	10 k Ω or higher
T6-13 (AGND) or I14-7 (GND) - Body ground	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5 CHECK OPERATION OF TRANSPONDER KEY AMPLIFIER

- (a) After replacing the transponder key amplifier, check that the engine starts.

NG

REPLACE TRANSPONDER KEY ECU ASSY

OK

NORMAL (TRANSPONDER KEY AMPLIFIER DEFECTIVE)

DTC	B2797	COMMUNICATION MALFUNCTION NO.1
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CIRCUIT DESCRIPTION

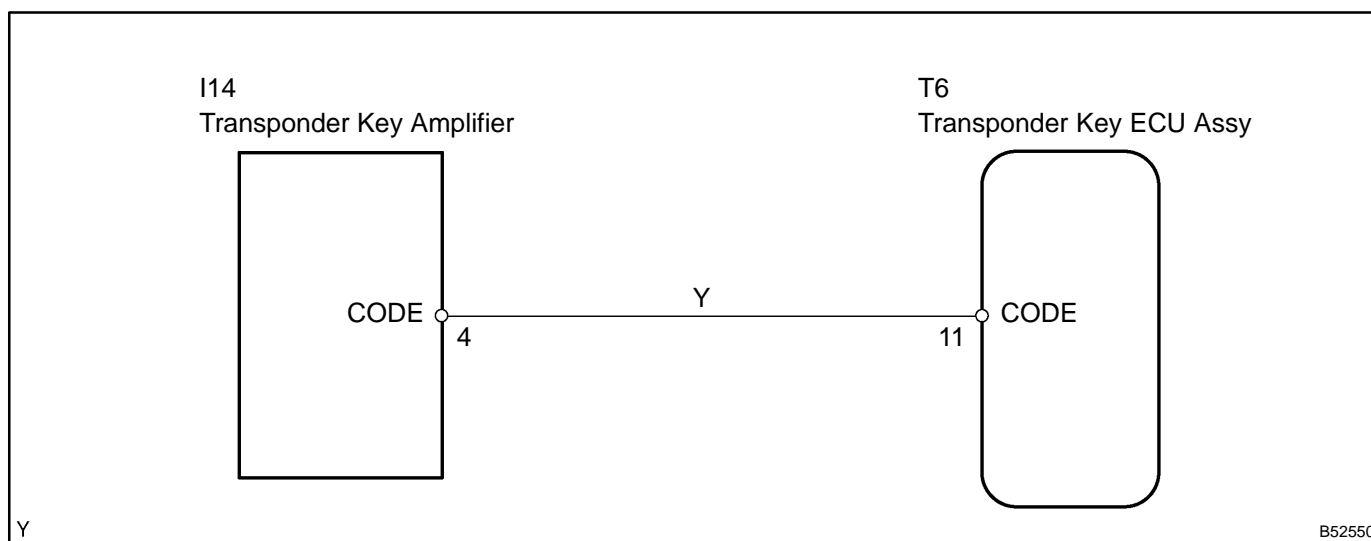
This DTC is output when an error occurs in normal communication.

HINT:

Some noise is found in the communication line.

DTC No.	DTC Detection Condition	Trouble Area
B2797	Keys are positioned too close to each other, or noise occurred in communication line	<ul style="list-style-type: none"> ▶Key ▶Wire harness ▶Transponder key amplifier ▶Transponder key ECU assy

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK OPERATION OF TRANSPONDER KEY AMPLIFIER
----------	---

(a) After replacing the transponder key amplifier, check that the engine starts.

OK

**NORMAL
(TRANSPONDER KEY AMPLIFIER DEFECTIVE)**

NG

REPLACE TRANSPONDER KEY ECU ASSY

DTC	B2799	ENGINE IMMOBILISER SYSTEM MALFUNCTION
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CIRCUIT DESCRIPTION

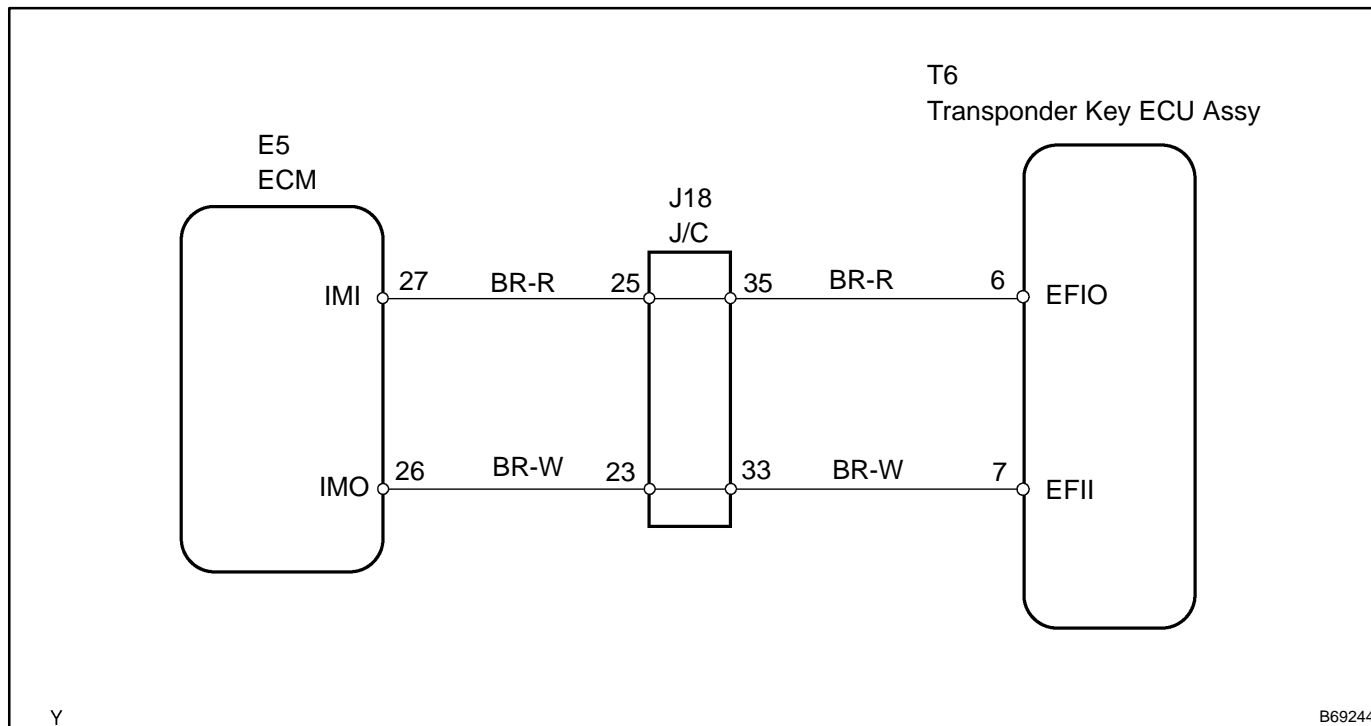
This DTC is output when the ECM detects errors in communication between the transponder key ECU and the ECM, or in the communication lines.

This DTC is also output when an engine start is attempted while the ECU communication ID between the transponder key ECU and the ECM are different.

Before troubleshooting for this DTC, make sure that there is no DTC detected in the transponder key ECU. If there is key code-related DTC detected in the transponder key ECU, repair it first.

DTC No.	DTC Detection Condition	Trouble Area
B2799	<ul style="list-style-type: none"> ▶ Error in communication between ECM and transponder key ECU, and in communication line ▶ Communication ID is different during communication with transponder key ECU 	<ul style="list-style-type: none"> ▶ Wire harness ▶ Key ▶ Transponder key ECU assy ▶ Transponder key amplifier ▶ ECM

WIRING DIAGRAM

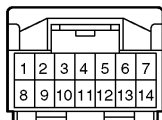
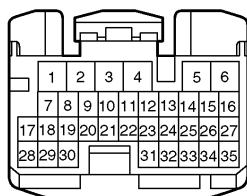


INSPECTION PROCEDURE

**1 CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSY - ECM)
(TRANSPONDER KEY ECU ASSY OR ECM - BODY GROUND)**
Wire Harness Side

T6

Transponder Key ECU Assy

E5
ECM

Y B66220

B66229

- (a) Disconnect the T6 ECU and E5 ECM connectors.
 (b) Check the resistance between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
T6-6 (EFIO) - E5-27 (IMI)	Below 1 Ω
T6-7 (EFII) - E5-26 (IMO)	Below 1 Ω

- (c) Check the resistance between the T6 or E5 wire harness side connector and body ground.

Standard:

Terminal No.	Specified Condition
T6-6 (EFIO) or E5-27 (IMI) - Body ground	10 k Ω or higher
T6-7 (EFII) or E5-26 (IMO) - Body ground	10 k Ω or higher

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK**
2 CHECK OPERATION OF TRANSPONDER KEY AMPLIFIER

- (a) After replacing the transponder key amplifier, check that the engine starts.

NG**NORMAL
(TRANSPONDER KEY AMPLIFIER DEFECTIVE)****OK****REPLACE TRANSPONDER KEY ECU ASSY**