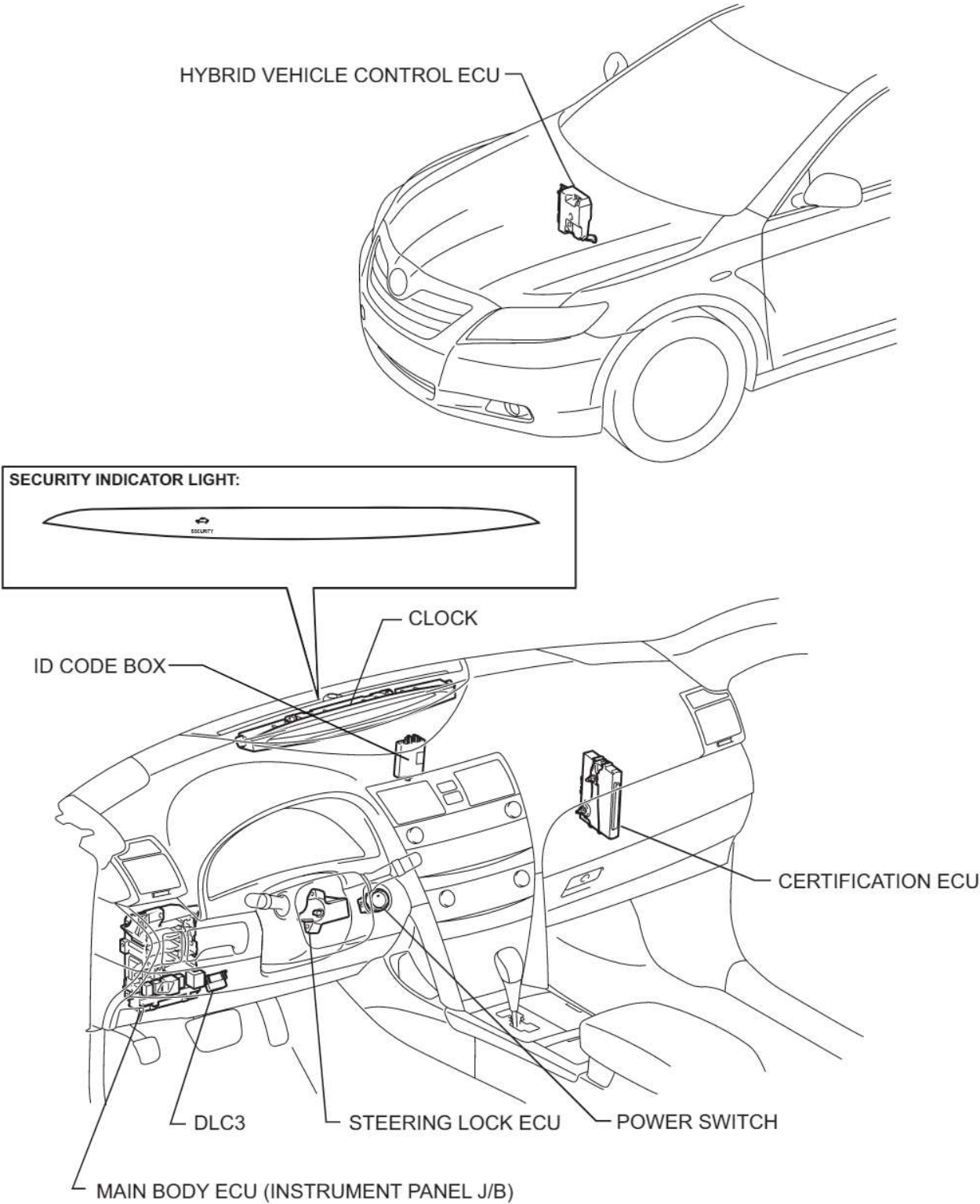


PARTS LOCATION



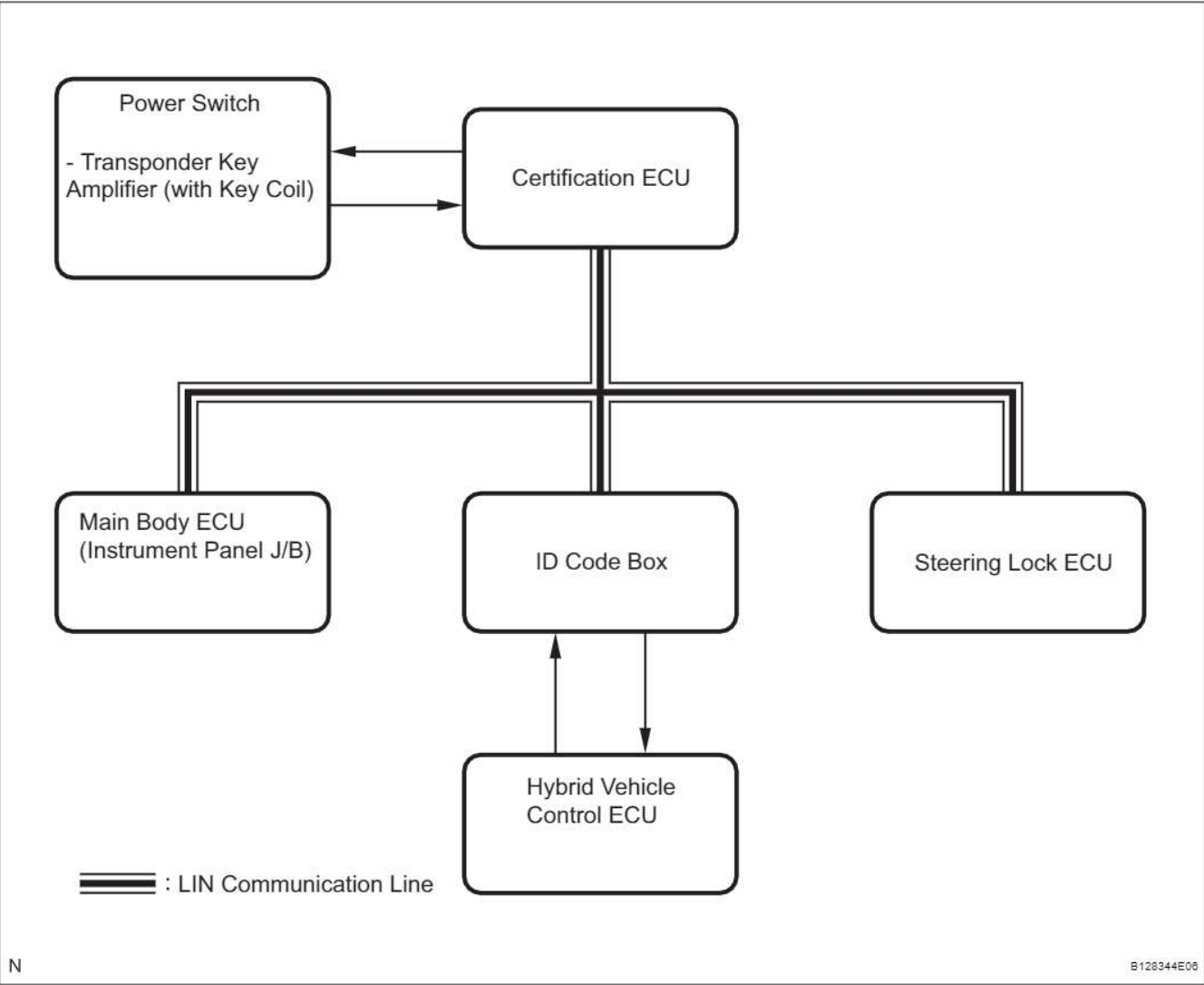
H

B150821E01

EI-4

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

SYSTEM DIAGRAM



Communication table:

Transmitting ECU (Transmitter)	Receiving ECU (Receiver)	Signals	Communication method
Main body ECU (Instrument panel J/B)	Certification ECU	Key code recognition signal	LIN
ID code box	Certification ECU	DTC (B2791) signal	LIN
ID code box	Steering lock ECU	- Steering lock release signal - Matching request random number signal	LIN
ID code box	Certification ECU	Matching request random number signal	LIN

SYSTEM DESCRIPTION

1. ENGINE IMMOBILISER SYSTEM DESCRIPTION

- (a) The immobiliser system is a theft deterrent system that determines whether to disable starting of the hybrid control system based on a comparison of the key's ID codes and the vehicle's pre-registered code. The immobiliser system compares the vehicle certification ECU's pre-registered ID code with the ID of the key-embedded transponder chip. If the ID codes do not match, the immobiliser system activates and the hybrid control system cannot be started. The certification ECU manages communication with the ECM, main body ECU (instrument panel J/B), steering lock ECU and ID code box. When the ID codes of the transponder chip and certification ECU match, the certification ECU authorizes the hybrid control system to start.

EI

2. FUNCTION OF MAIN COMPONENT

Component	Outline
Transponder key coil/amplifier (built into power switch)	Receives key ID code, amplifies ID code and outputs the code to the certification ECU.
Indoor electrical key oscillator	Transmits key detection signals within the detection area in the vehicle interior upon receiving a transmission request signal from the certification ECU. Certification ECU request signal is activated when the key is brought into the vehicle interior and the power switch is pushed.
Door control receiver	Receives an ID code from the key in the actuation area and transmits it to the certification ECU.
Security indicator	Illuminates or starts flashing. Illumination is controlled by the certification ECU.

3. SYSTEM FUNCTION

- (a) Using entry function
- (1) When the driver (or passenger) is sitting in the vehicle while carrying the key, and the power switch is pressed while the brake pedal is depressed, the main body ECU (instrument panel J/B) recognizes that the engine start operation has occurred and sends a certification request signal to the certification ECU. Upon receipt of the certification request signal, the certification ECU sends a request signal to the indoor electrical key oscillator. Upon receipt of the request signal, the indoor electrical key oscillator sends a request signal to detect if the key is inside the vehicle. When the key receives this request signal, it answers by sending an ID code containing a response code through the glass antenna to the door control receiver. Upon receipt of the ID code, the certification ECU analyzes the code. If the interior certification passes, then the main body ECU (instrument panel J/B) sends a certification pass response signal. When the main body ECU (instrument panel J/B) receives this signal, the ACC relay is

EI-6

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

EI

switched on and the IG1 and IG2 relays are switched on in sequence. At this time, the power switch indicator illuminates in green. Then the certification ECU checks that the power source mode has been changed and sends a steering lock command signal to the main body ECU (instrument panel J/B). After receiving this signal, the main body ECU (instrument panel J/B) supplies power to the steering lock actuator. Then (via the ID code box) the steering lock ECU confirms that the certification ECU is certified and drives the steering actuator motor until the steering lock is unlocked. After unlocking the steering lock, an unlock completed signal is sent to the certification ECU. Upon receipt of this signal, the certification ECU sends an unset command signal to the ID code box. Once this signal is received, the ID code box confirms that the certification ECU is certified, sends an immobiliser unset command signal to the ECM and sends a security indicator light off signal to the certification ECU.

- (b) Not using the entry function (when key battery is depleted)
 - (1) When the driver is sitting in the vehicle while carrying the key and the brake pedal is depressed, the main body ECU (instrument panel J/B) recognizes that the stop light switch is on and sends a key confirmation request signal to the certification ECU. Upon receipt of this signal, the certification ECU drives the immobiliser amplifier built in the power switch. At this time, the power switch sends an RF wave communication signal to the immobiliser. If the driver holds the key up to the power switch at this time, the power switch receives the immobiliser RF wave signal and responds by sending a radio wave signal. When the power switch receives the radio wave signal from the key, it duplicates the signal and sends an ID code to the certification ECU. Upon receipt of the ID code, the code is analyzed. If the certification passes, a key certification pass response signal is sent to the main body ECU (instrument panel J/B) while simultaneously sending a sound buzzer request signal to the meter ECU. When the main body ECU (instrument panel J/B) receives this signal, the ACC relay is switched on and the IG1 and IG2 relays are switched on in sequence. At this time, the power switch indicator illuminates in green. Then the certification ECU checks that the power source mode has been changed and sends a steering lock command signal to the

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM**EI-7**

main body ECU (instrument panel J/B). After receiving this signal, the main body ECU (instrument panel J/B) supplies power to the steering lock actuator. Then (via the ID code box) the steering lock ECU confirms that the certification ECU is certified and drives the steering actuator motor until the steering lock is unlocked. After unlocking the steering lock, an unlock completed signal is sent to the certification ECU. Upon receipt of this signal, the certification ECU sends an unset command signal to the ID code box. Once this signal is received, the ID code box confirms that the certification ECU is certified, sends an immobiliser unset command signal to the hybrid control system and sends a security indicator light off signal to the certification ECU.

EI

EI-8

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedures to troubleshoot the engine immobiliser system.
- The intelligent tester should be used in steps 3, 4 and 6.

EI

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 INSPECT BATTERY VOLTAGE

- (a) Inspect the battery voltage.

Standard voltage:**11 to 14 V**

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

NEXT

3 INSPECT COMMUNICATION FUNCTION OF MULTIPLEX COMMUNICATION SYSTEM (CAN)

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

Result

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output	B (See page CA-7)

B

GO TO CAN COMMUNICATION SYSTEM

A

4 CHECK FOR DTCs

- (a) Check for DTCs and note any codes that are output (see page EI-25).
- (b) Delete the DTCs.
- (c) Recheck for DTCs. Based on the DTCs output above, try to duplicate the hybrid control system DTC or engine immobiliser system DTC by simulating the symptoms indicated by the DTCs.

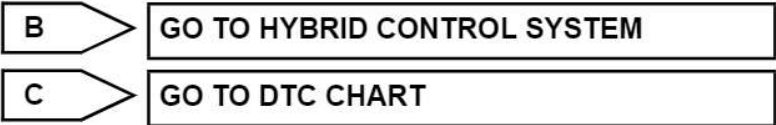
Result

Result	Proceed to
DTC output does not reoccur	A
Hybrid control system DTC output reoccurs	B (See page HV-46)

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

EI-9

Result	Proceed to
Engine immobiliser system DTC output reoccurs	C (See page EI-27)



EI

5

PROBLEM SYMPTOMS TABLE

- (a) If the fault is not listed in the problem symptoms table, proceed to A.
- (b) If the fault is listed in the problem symptoms table, proceed to B.



6

OVERALL ANALYSIS AND TROUBLESHOOTING

- (a) DATA LIST/ACTIVE TEST (See page EI-25)
- (b) TERMINALS OF ECU (See page EI-16)



7

ADJUST, REPAIR OR REPLACE



8

CONFIRMATION TEST



END

EI-10

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

REGISTRATION

1. DESCRIPTION OF CODE REGISTRATION

HINT:

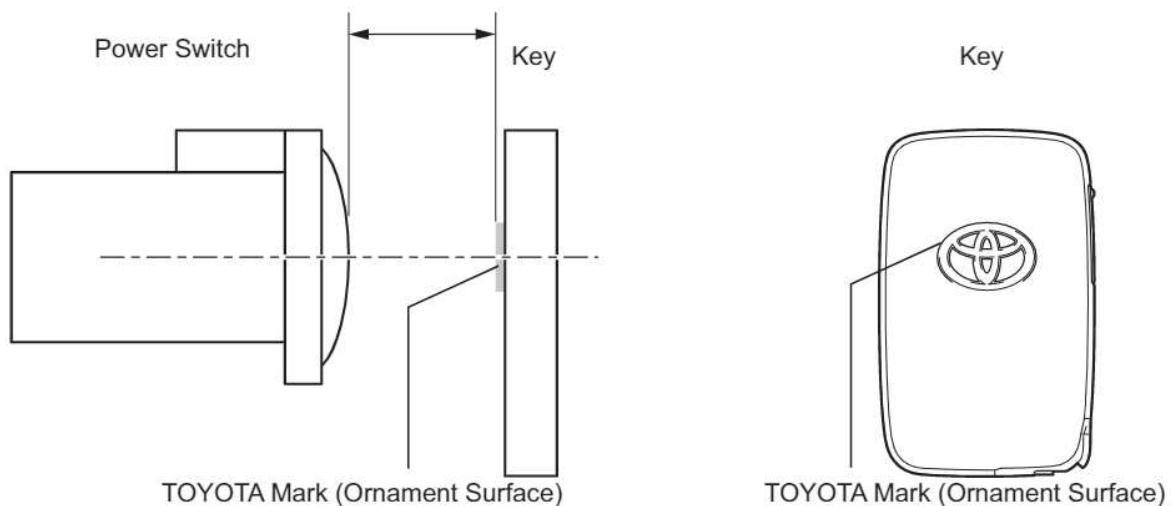
- ID codes are the same as recognition codes for the wireless transmitter and the engine immobiliser function. Registering an ID code enables the smart key system, the wireless door lock control function and the engine immobiliser function to be operated.
- Code registration is needed when the certification ECU, ID code box, steering lock ECU or key is replaced with a new one.

(a) PROCEDURE "1"

The vehicle with the smart key system does not have a key slot. Therefore, hold the key close to the power switch to register the key, as shown in the illustration below.

Hold the key with its ornament surface within a range of 10 mm (0.39 in.) or less from the power switch.

Communication distance: 10 mm (0.39 in.) or less from the power switch.



ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

EI-11

2. PART REPLACEMENT KEY REGISTRATION

(a) The following table shows ECU replacement and key registration procedures in case the malfunctioning ECU has been identified after troubleshooting the smart key system.

HINT:

- The following procedures indicated in the table below require the use of the intelligent tester:
 - New key ID registration
 - Additional key ID registration
 - Key ID erasure
 - ECU code registration
- If all of the registered keys are not available, replacement of the ID code box is also required.
- A maximum of 7 keys can be registered.

EI

Part to be replaced	Condition		Procedure	Reference
Certification ECU	Customer has brought all keys		1. Replace certification ECU	-
			2. Reregister all keys (new key ID registration)	PROCEDURE "B"
	Some keys are lost	Key ID codes can be registered and erased	1. Erase key codes (key ID erasure)	PROCEDURE "D"
			2. Perform additional key registration procedure (additional key ID registration)	PROCEDURE "C"
			3. Replace certification ECU	-
			4. Reregister all keys (new key ID registration) HINT: If some keys are not registered during above steps, they will be disabled because they cannot be registered later.	PROCEDURE "B"
		Key ID codes cannot be either registered or erased	1. Replace certification ECU	-
			2. Replace ID code box	-
			3. Reregister all keys (new key ID registration) HINT: If key codes cannot be erased or additional keys cannot be registered due to a malfunction in certification ECU, replace ID code box and certification ECU. If some keys are not registered during above steps, they will be disabled because they cannot be registered later.	PROCEDURE "A"
			4. ECU communication ID registration	PROCEDURE "F"
ID code box	At least 1 key is available		1. Replace ID code box	-
			2. Register recognition codes in ECUs (ECU code registration)	PROCEDURE "E"
			3. ECU communication ID registration	PROCEDURE "F"
	All keys are lost		1. Replace ID code box	-
			2. Replace certification ECU	-
			3. Reregister all keys (new key ID registration) HINT: If some keys are not registered during above steps, they will be disabled because they cannot be registered later.	PROCEDURE "A"
		4. ECU communication ID registration	PROCEDURE "F"	

EI-12

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

Part to be replaced	Condition	Procedure	Reference
Steering lock ECU	Customer has brought at least 1 key	1. Replace steering lock ECU	-
		2. Register recognition codes in ECUs (ECU code registration)	PROCEDURE "E"
	All keys are lost	1. Replace steering lock ECU	-
		2. Replace certification ECU	-
		3. Replace ID code box	-
		4. Reregister all keys (new key ID registration) HINT: If some keys are not registered during above steps, they will be disabled because they cannot be registered later.	PROCEDURE "A"
		5. ECU communication ID registration	PROCEDURE "F"
Main body ECU (Instrument panel J/ B)	No condition required	Replace main body ECU (Instrument panel J/ B)	-
Hybrid vehicle control ECU	No condition required	1. Replace hybrid vehicle control ECU	-
		2. ECU communication ID registration	PROCEDURE "F"
Key	Customer has brought at least 1 key	1. Using remaining key, erase lost key code (key ID erasure)	PROCEDURE "D"
		2. Register additional keys as necessary (additional key ID registration)	PROCEDURE "E"
	All keys are lost	1. Replace certification ECU	-
		2. Replace ID code box	-
		3. Register all keys (new key ID registration) HINT: If customer brings lost keys at later date, they can be registered using additional key ID registration function.	PROCEDURE "A"
		4. ECU communication ID registration	PROCEDURE "F"

3. KEY REGISTRATION

(a) PROCEDURE "A"

New key ID registration (when replacing certification ECU and ID code box, or certification ECU, ID code box and steering lock ECU)

Process	Procedure
1. Start of registration	1. Connect intelligent tester (with CAN VIM) to DLC3 2. Turn power switch on (IG) 3. Select "SMART KEY / ID UTILITY / SMART CODE REG" from tester menu HINT: The power switch cannot be turned on (IG) more than 10 times. After connecting tester, turn tester on while turning driver's side door courtesy light switch on and off repeatedly at 1.5-second intervals or less to continue key registration procedure.
2. Confirmation of ECU code	Perform operation according to prompts on tester screen HINT: The mode is automatically selected by tester, new registration mode or add mode.
3. Verification of unregistered key *1	Hold unregistered key close to power switch (For details, refer to PROCEDURE "1")
	Confirm that wireless door lock buzzer sounds. Place unregistered key on front passenger's side seat.
	Confirm that wireless door lock buzzer sounds
4. Registration of ID code	Perform operation according to prompts on tester screen
5. End of registration	Finish new key ID code registration

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

EI-13

*1: Repeat this process for each key which is to be registered for the vehicle. Finish the procedure for each key within 30 seconds. If the procedure for any of the keys has not been finished within the specified time, perform registration procedures from process 1 again. Make sure that only 1 key is in the cabin during registration procedures. If 2 or more keys are in the cabin simultaneously, electric waves will interfere with each other, preventing normal registration.

(b) PROCEDURE "B"

New key ID registration (when replacing certification ECU)

Process	Procedure
1. Start of registration	1. Connect intelligent tester (with CAN VIM) to DLC3 2. Turn power switch on (IG) 3. Select "SMART KEY / ID UTILITY / SMART CODE REG" from tester menu HINT: The power switch cannot be turned on (IG) more than 10 times. After connecting tester, turn tester on while turning driver's side door courtesy light switch on and off repeatedly at 1.5-second intervals or less to continue key registration procedure.
2. Confirmation of ECU code	Perform operation according to prompts on tester screen HINT: The mode is automatically selected by tester, new registration mode or add mode.
3. Confirmation of all registered keys *1	Hold unregistered key close to power switch (For details, refer to PROCEDURE "1") Confirm that wireless door lock buzzer sounds
4. Confirmation of ECU code	Perform operation according to prompts on tester screen
5. Verification of unregistered key *2	Hold unregistered key close to power switch (For details, refer to PROCEDURE "1") Confirm that wireless door lock buzzer sounds. Place unregistered key on front passenger side seat. Confirm that wireless door lock buzzer sounds
5. Registration of ID code	Perform operation according to prompts on tester screen
6. End of registration	Finish new key ID code registration

*1: Repeat this process for each key registered for the vehicle. Finish the procedure for each key within 30 seconds. If the procedure for any of the keys has not been finished within the specified time, perform registration procedures from process 1 again. If performing the key confirmation procedure for a key, the security indicator comes on and remains on until all the keys are confirmed.

*2: Repeat this process for each key which is to be registered for the vehicle. Finish the procedure for each key within 30 seconds. If the procedure for any of the keys has not been finished within the specified time, perform registration procedures from 1 again. Make sure that only 1 key is in the cabin during registration procedures. If 2 or more keys are in the cabin simultaneously, electric waves will interfere with each other, preventing normal registration.

EI-14

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

(c) PROCEDURE "C"
Additional key ID registration

Process	Procedure
1. Start of registration	1. Connect intelligent tester (with CAN VIM) to DLC3 2. Turn power switch on (IG) 3. Select "SMART KEY / ID UTILITY / SMART CODE REG" from tester menu
2. Confirmation of registered key *1	Perform operation according to prompts on intelligent tester screen HINT: The mode is automatically selected by tester, new registration mode or add mode. Hold unregistered key close to power switch (For details, refer to PROCEDURE "1") Confirm that wireless door lock buzzer sounds once
3. Confirmation of ECU code	Perform operation according to prompts on tester screen
4. Verification of unregistered key *2	Hold unregistered key close to power switch (For details, refer to PROCEDURE "1") Confirm that wireless door lock buzzer sounds. Place unregistered key on front passenger's side seat. Confirm that wireless door lock buzzer sounds
5. Registration of ID code	Perform operation according to prompts on tester screen
6. End of registration	Finish key ID code registration

*1: Perform this process for one of the keys registered for the vehicle. Finish the procedure within 30 seconds. If the procedure has not been finished within the specified time, perform registration procedures from process 1 again.

*2: Repeat this process for each key which is to be registered for the vehicle. Finish the procedure for each key within 30 seconds. If the procedure for any of the keys has not been finished within the specified time, perform registration procedures from 1 again. Make sure that only 1 key is in the cabin during registration procedures. If 2 or more keys are in the cabin simultaneously, electric waves will interfere with each other, preventing normal registration.

(d) PROCEDURE "D"

Key ID erasure

HINT:

Erase all registered key codes except one.

Process	Procedure
1. Start of erasure	1. Connect intelligent tester (with CAN VIM) to DLC3 2. Turn power switch on (IG) 3. Select "SMART KEY / ID UTILITY / SMART CODE ERS" from tester menu
2. Confirmation of registered key *1	Perform operation according to prompts on intelligent tester screen Hold unregistered key close to power switch (For details, refer to PROCEDURE "1") Confirm that wireless door lock buzzer sounds once
3. Confirmation of ECU code	Perform operation according to prompts on tester screen
4. Erasure of ID code	Perform operation according to prompts on tester screen
5. End of erasure	Finish key ID code erasure

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

EI-15

*1: Perform this process for one of the keys registered for the vehicle. Finish the procedure within 30 seconds. If the procedure has not been finished within the specified time, perform erasure procedures from process 1 again.

(e) PROCEDURE "E"
ECU code registration

Process	Procedure
1. Start of registration	1. Connect intelligent tester (with CAN VIM) to DLC3 2. Turn power switch on (IG) 3. Select "SMART KEY / ID UTILITY / ECU COMM ID REG / ID Code Box and Steering Lock" from tester menu
2. Confirmation of registered key *1	Hold unregistered key close to power switch (For details, refer to PROCEDURE "1") Confirm that wireless door lock buzzer sounds once
3. Registration of ECU code	Perform operation according to prompts on tester screen
4. End of registration	Finish ECU code registration

*1: Perform this process for one of the keys registered for the vehicle. Finish the procedure within 30 seconds. If the procedure has not been finished within the specified time, perform erasure procedures from process 1 again.

(f) PROCEDURE "F"
ECU communication ID registration

NOTICE:

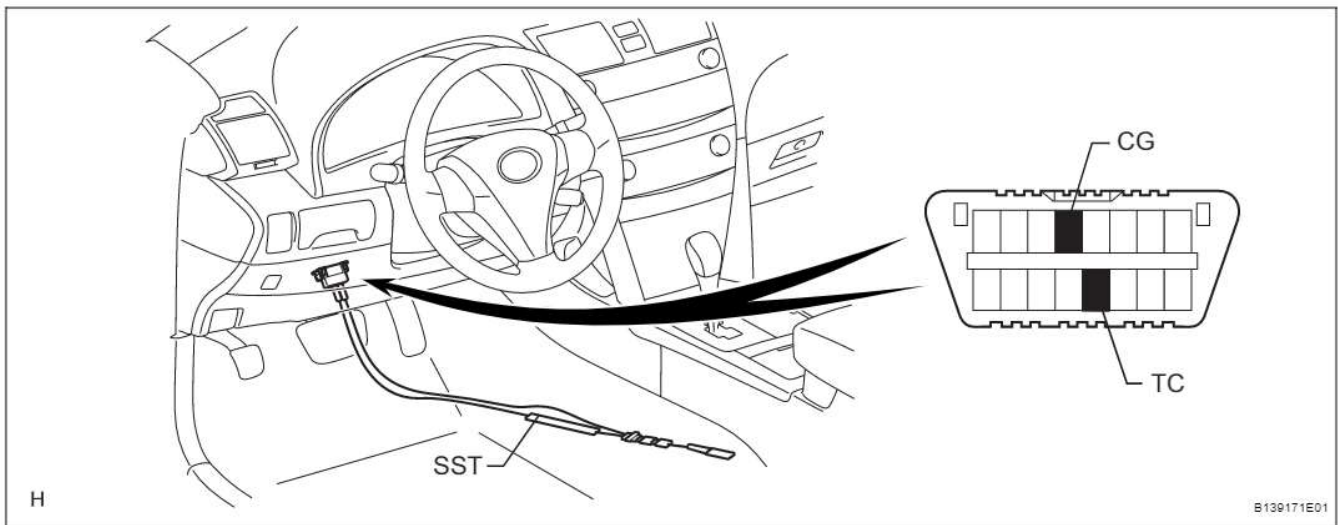
- The ECU communication ID should be registered when the ID code box and/or the hybrid vehicle control ECU is replaced in order to match these ECU communication ID.
- The engine cannot be started unless the ECU communication ID matches.
- After the registration, pressing the power switch may not start the hybrid control system on the first try. If so, press the power switch again.
- After the hybrid control system is started, erase DTC B2799-542, 790 (code for hybrid vehicle control ECU's immobiliser communication error).

Register the ECU communication ID.

EI

EI-16

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM



- (1) Using SST, connect terminals TC and CG of the DLC3.

SST 09843-18040

- (2) Turn the power switch on (IG) and leave it for 30 minutes.

HINT:

Do not start the engine.

- (3) Turn the power switch off and disconnect terminals TC and CG.
- (4) Check that the hybrid control system.

OK:

Hybrid control system starts and stays on for more than 3 seconds.

HINT:

Using an already registered key, turn the power switch on (IG) with the brake pedal depressed.

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM**EI-17****PROBLEM SYMPTOMS TABLE****HINT:**

Use the table below to help determine the cause of the problem symptom. 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 area in the order they are listed. Replace parts as necessary.

ENGINE IMMOBILISER SYSTEM:

Symptom	Suspected Area	See page
Engine does not start	1. Key	EI-25
	2. ID code box power source circuit	EI-50
	3. Certification ECU power source circuit	EI-52
	4. Steering lock ECU power source circuit	SR-30
	5. Smart key system	ST-10
	6. Hybrid control system	HV-15

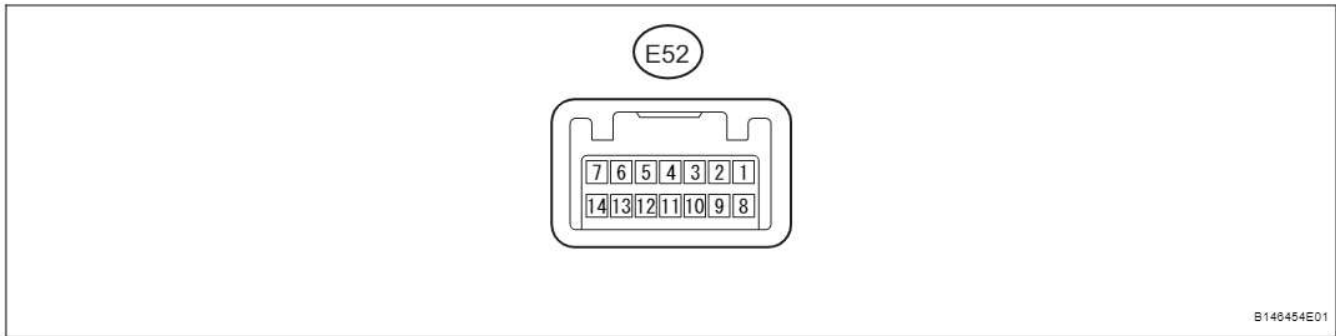
EI

EI-18

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

TERMINALS OF ECU

1. CHECK POWER SWITCH



- (a) Disconnect the E52 switch connector.
 (b) Measure the resistance according to the value(s) in the table below.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
AGND (E52-8) - Body ground	G - Body ground	Ground	Always	Below 1 Ω

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

- (c) Reconnect the E52 switch connector.
 (d) Measure the resistance and voltage according to the value(s) in the table below.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
AGND (E52-8) - Body ground	G - Body ground	Ground	Always	Below 1 Ω
VC5 (E52-14) - AGND (E52-8)	R - G	Power supply	Key is not in cabin	Below 1 V
			Press power switch	4.6 to 5.4 V
CODE (E52-10) - AGND (E52-8)	W - G	Demodulated signal of key code data	Key is not in cabin	Below 1 V
			Press power switch and hold key close to power switch*	Pulse generation (see waveform 1)
TXCT (E52-9) - AGND (E52-8)	GR - G	Key code output signal	Key is not in cabin	Below 1 V
			Press power switch and hold key close to power switch*	Pulse generation (see waveform 2)

HINT:

*: Remove the key battery before performing this inspection.

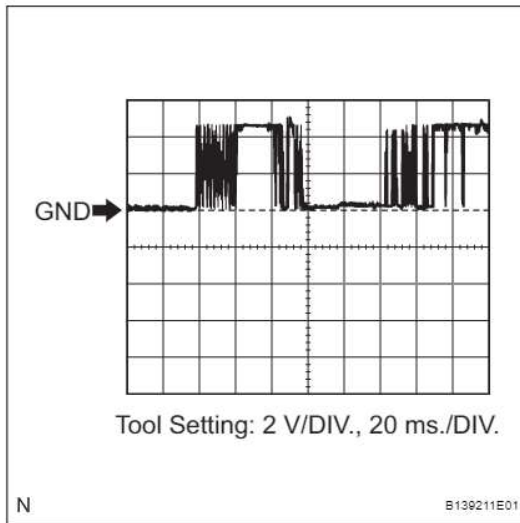
If the result is not as specified, the switch may have a malfunction.

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

EI-19

(e) Inspect using an oscilloscope.

(1) Waveform 1 (Reference)



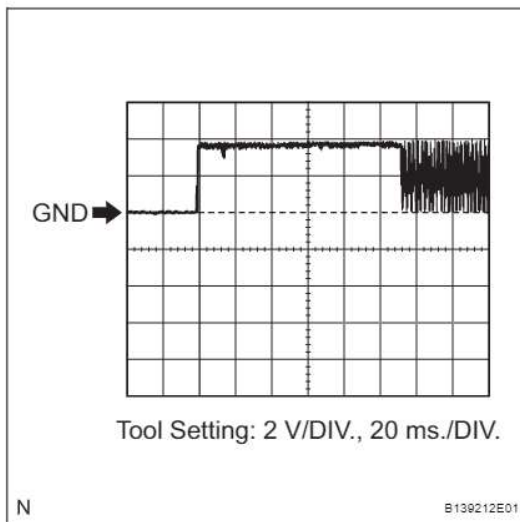
Item	Content
Symbols (Terminal No.)	CODE (E52-10) - AGND (E52-8)
Tool Setting	2 V/DIV., 20 ms./DIV.
Condition	Press power switch and hold key close to power switch*

HINT:

*: Remove the key battery before performing this inspection.

EI

(2) Waveform 2 (Reference)

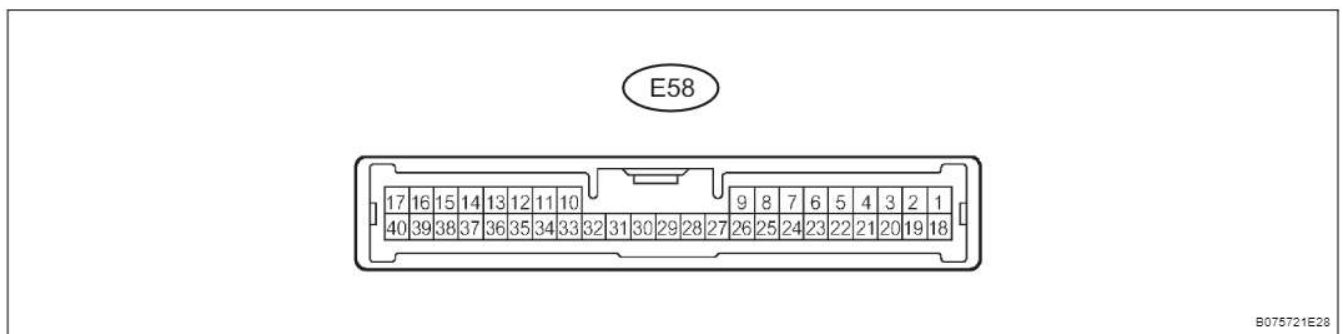


Item	Content
Symbols (Terminal No.)	TXCT (E52-9) - AGND (E52-8)
Tool Setting	2 V/DIV., 20 ms./DIV.
Condition	Press power switch and hold key close to power switch*

HINT:

*: Remove the key battery before performing this inspection.

2. CHECK CERTIFICATION ECU



(a) Disconnect the E58 ECU connector.

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

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
E (E58-17) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
+B (E58-1) - E (E58-17)	W - W-B	+B power supply	Always	10 to 14 V
IG (E58-18) - E (E58-17)	LG - W-B	Ignition power supply	Power switch off	Below 1 V

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

(c) Reconnect the E58 ECU connector.

EI-20

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

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

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
AGND (E58-40) - Body ground	G - Body ground	Power switch ground	Always	Below 1 Ω
VC5 (E58-30) - AGND (E58-40)	R - G	Power switch power supply	Key is not in cabin	Below 1 V
			Press power switch*	4.6 to 5.4 V
CODE (E58-9) - AGND (E58-40)	W - G	Power switch CODE input	Key is not in cabin	Below 1 V
			Press power switch and hold key close to power switch*	Pulse generation (see waveform 1)
TXCT (E58-8) - AGND (E58-40)	GR - G	Power switch TXCT output	Key is not in cabin	Below 1 V
			Press power switch and hold key close to power switch*	Pulse generation (see waveform 2)

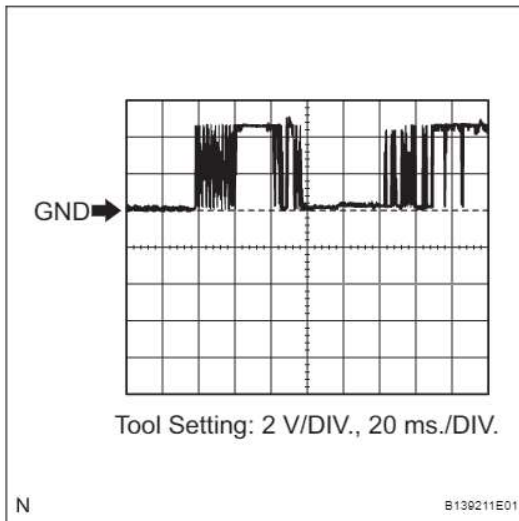
HINT:

*: Remove the key battery before performing this inspection.

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

- (e) Inspect using an oscilloscope.

(1) Waveform 1 (Reference)

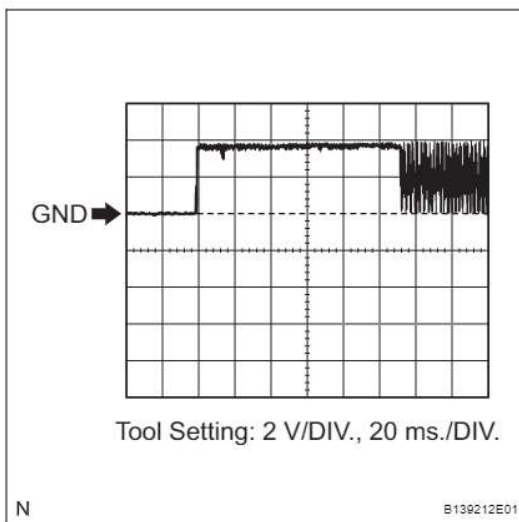


Item	Content
Symbols (Terminal No.)	CODE (E58-9) - AGND (E58-40)
Tool Setting	2 V/DIV., 20 ms./DIV.
Condition	Press power switch and hold key close to power switch*

HINT:

*: Remove the key battery before performing this inspection.

(2) Waveform 2 (Reference)

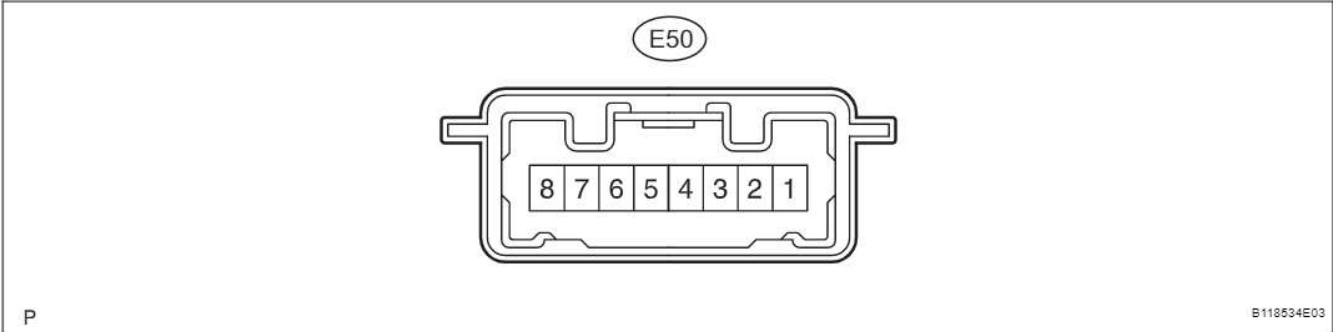


Item	Content
Symbols (Terminal No.)	TXCT (E58-8) - AGND (E58-40)
Tool Setting	2 V/DIV., 20 ms./DIV.
Condition	Press power switch and hold key close to power switch*

HINT:

*: Remove the key battery before performing this inspection.

3. CHECK ID CODE BOX



- (a) Disconnect the E50 ECU connector.
- (b) Measure the resistance and voltage according to the value(s) in the table below.

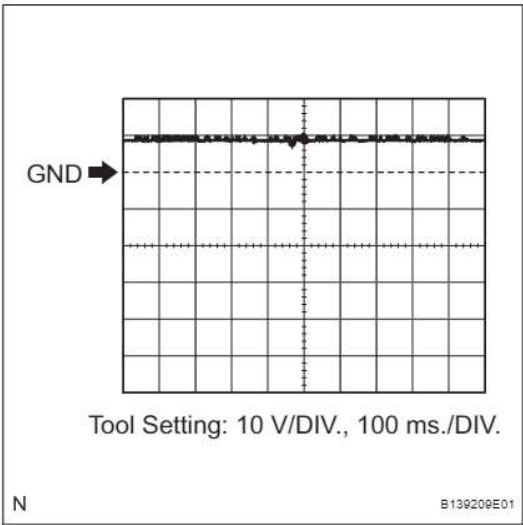
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND (E50-8) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
+B (E50-1) - GND (E50-8)	W - W-B	+B power supply	Always	10 to 14 V

- If the result is not as specified, there may be a malfunction on the wire harness side.
- (c) Reconnect the E50 ECU connector.
- (d) Measure the voltage according to the value(s) in the table below.

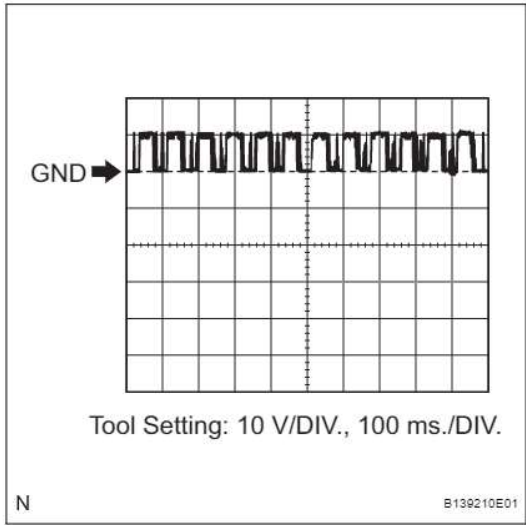
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
EFII (E50-5) - GND (E50-8)	G - W-B	Hybrid vehicle control ECU input signal	Power switch off	Below 1 V
			Power switch on (IG)	Pulse generation (see waveform 1)
EFIO (E50-6) - GND (E50-8)	L - W-B	Hybrid vehicle control ECU output signal	Power switch off	Below 1 V
			Power switch on (IG)	Pulse generation (see waveform 2)

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

- (e) Inspect using an oscilloscope.
- (1) Waveform 1 (Reference)



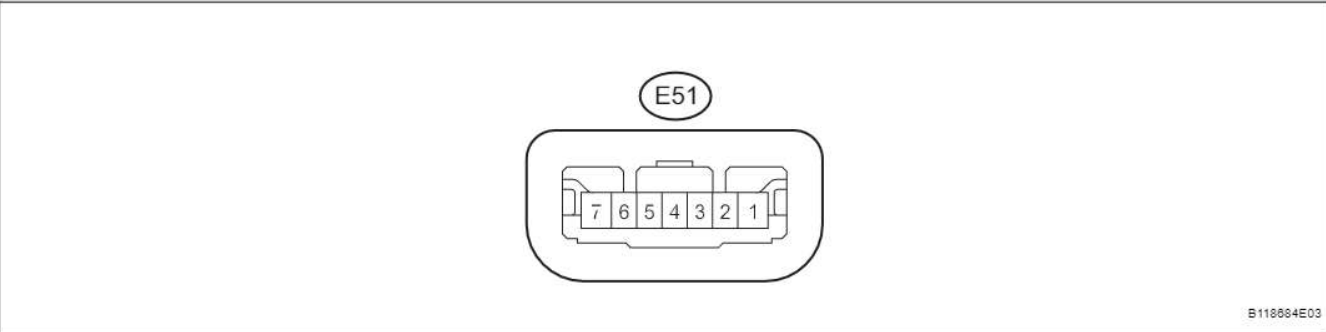
Item	Content
Symbols (Terminal No.)	EFII (E50-5) - GND (E50-8)
Tool Setting	10 V/DIV., 100 ms./DIV.
Condition	Power switch on (IG)



(2) Waveform 2 (Reference)

Item	Content
Symbols (Terminal No.)	EFIO (E50-6) - GND (E50-8)
Tool Setting	10 V/DIV., 100 ms./DIV.
Condition	Power switch on (IG)

4. CHECK STEERING CONTROL ECU

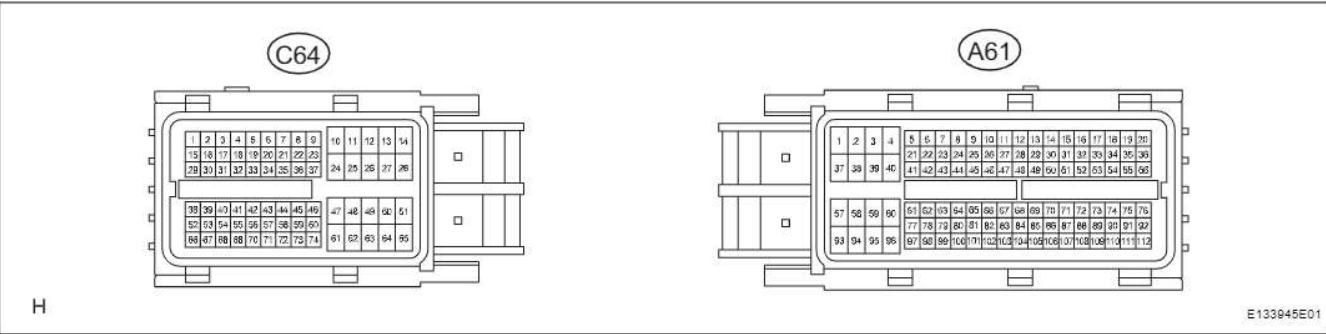


- (a) Disconnect the E51 ECU connector.
- (b) Measure the resistance and voltage according to the value(s) in the table below.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
SGND (E51-2) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
GND (E51-1) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
B (E51-7) - Body ground	P - Body ground	+B power supply	Always	10 to 14 V
IG2 (E51-6) - Body ground	B - Body ground	Ignition power supply	Power switch off	0 V
			Power switch on (IG)	10 to 14 V

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

5. CHECK HYBRID VEHICLE CONTROL ECU



ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

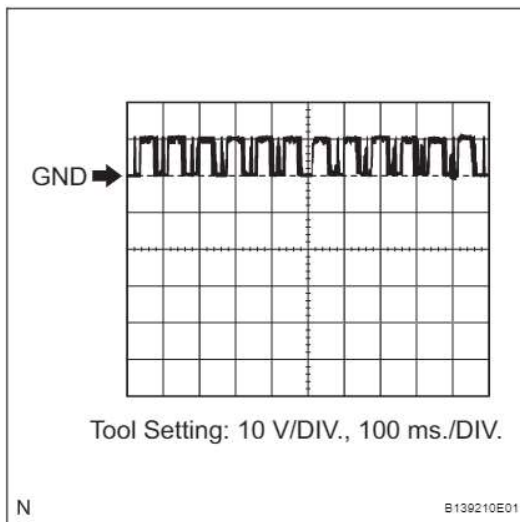
EI-23

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

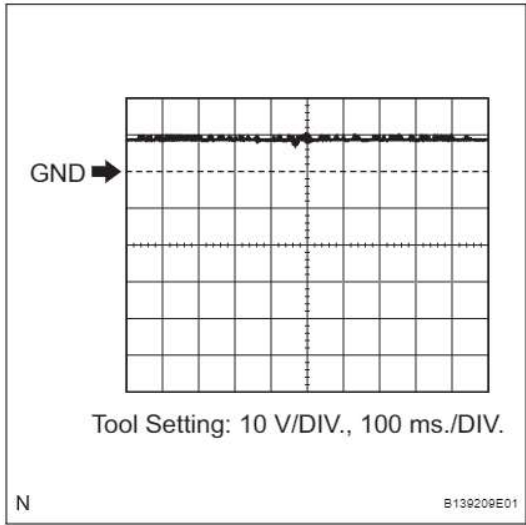
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
E1 (C64-14) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
E01 (C64-51) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
E02 (C64-65) - Body ground	B-W - Body ground	Ground	Always	Below 1 Ω
E03 (C64-25) - Body ground	B - Body ground	Ground	Always	Below 1 Ω
E04 (C64-48) - Body ground	W - Body ground	Ground	Always	Below 1 Ω
ME01 (C64-13) - Body ground	B - Body ground	Ground	Always	Below 1 Ω
BATT (A61-4) - E1 (C64-14)	W - W-B	Battery (for measuring battery voltage and for hybrid vehicle control ECU memory)	Always	10 to 14 V
+B1 (A61-2) - E1 (C64-14)	Y - W-B	Power source of hybrid vehicle control ECU	Power switch off	Below 1 V
			Power switch on (IG)	10 to 14 V
IMI (A61-42) - E1 (C64-14)	Y - W-B	Immobiliser code ECU input signal	Power switch off	Below 1 V
			Power switch on (IG)	Pulse generation (see waveform 1)
IMO (A61-41) - E1 (C64-14)	G - W-B	Immobiliser code ECU output signal	Power switch off	Below 1 V
			Power switch on (IG)	Pulse generation (see waveform 2)

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

- (b) Inspect using an oscilloscope.
(1) Waveform 1 (Reference)



Item	Content
Symbols (Terminal No.)	IMI (A61-42) - E1 (C64-14)
Tool Setting	10 V/DIV., 100 ms./DIV.
Condition	Power switch on (IG)



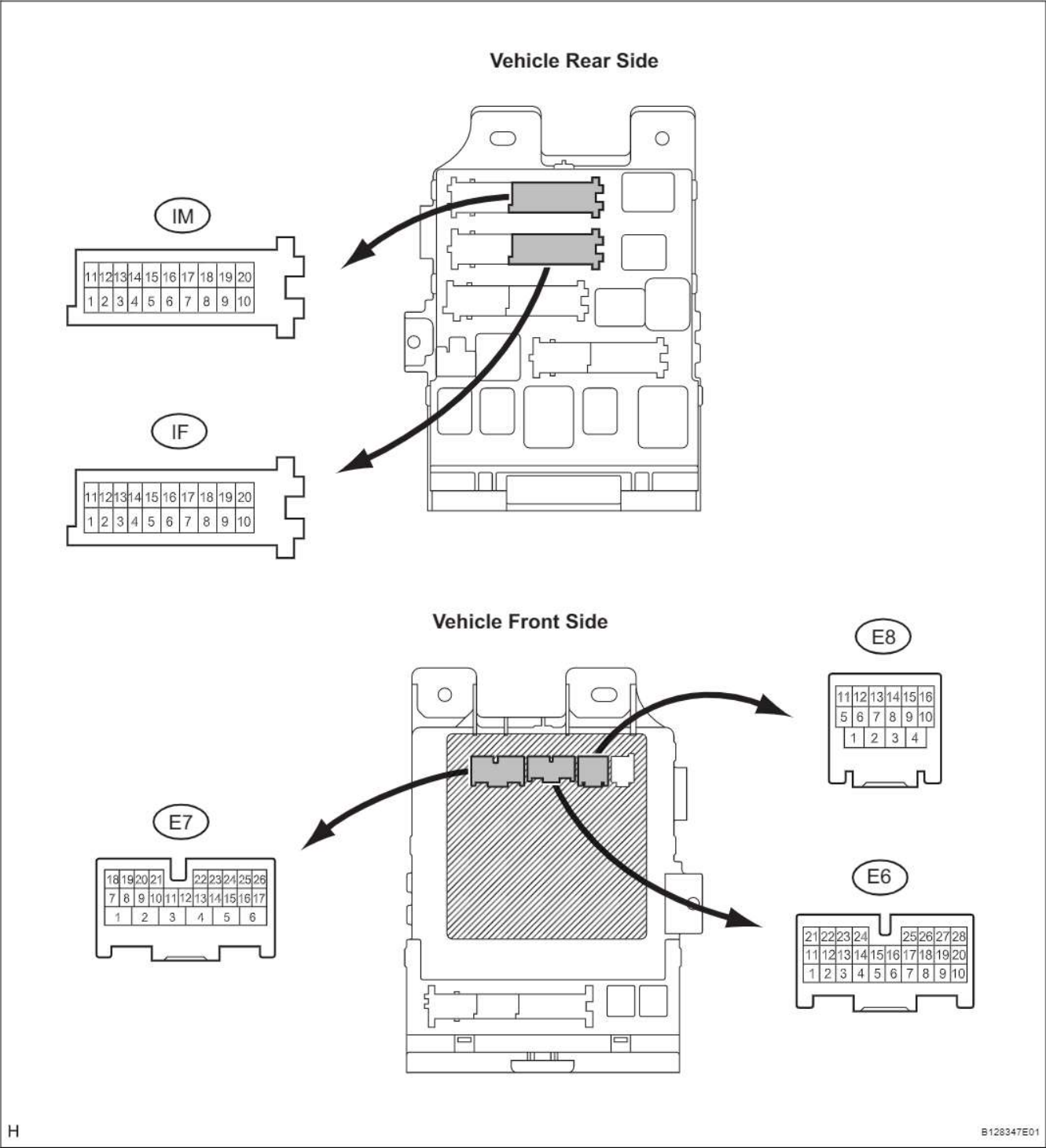
(2) Waveform 2 (Reference)

Item	Content
Symbols (Terminal No.)	IMO (A61-41) - E1 (C64-14)
Tool Setting	10 V/DIV., 100 ms./DIV.
Condition	Power switch on (IG)

6. CHECK MAIN BODY ECU (INSTRUMENT PANEL J/B)
- (a) Disconnect the IF and IM junction block connectors.

(b) Disconnect the E8, E7 and E6 main body ECU (Instrument panel J/B) connectors.

EI



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

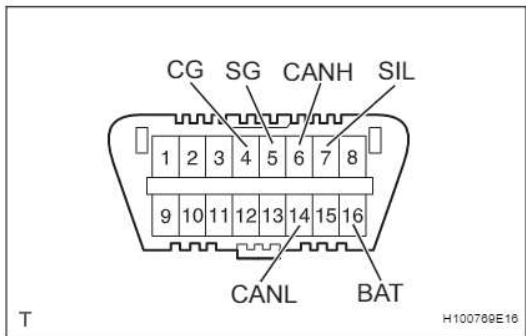
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND1 (IF-10) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
GND2 (IM-9) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
GND3 (E8-1) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
AM1 (E7-6) - Body ground	L - Body ground	+B power supply	Always	10 to 14 V
AM2 (E6-1) - Body ground	L - Body ground	+B power supply	Always	10 to 14 V

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

DIAGNOSIS SYSTEM

1. CHECK DLC3

- (a) The vehicle's ECU uses ISO 15765-4 for communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.



Symbols (Terminal No.)	Terminal Description	Condition	Specified Condition
SIL (7) - SG (5)	Bus "+" line	During transmission	Pulse generation
CG (4) - Body ground	Chassis ground	Always	Below 1 Ω
SG (5) - Body ground	Signal ground	Always	Below 1 Ω
BAT (16) - Body ground	Battery positive	Always	10 to 14 V
CANH (6) - CANL (14)	CAN bus line	Power switch off*	54 to 69 Ω
CANH (6) - CG (4)	HIGH-level CAN bus line	Power switch off*	200 Ω or higher
CANL (14) - CG (4)	LOW-level CAN bus line	Power switch off*	200 Ω or higher
CANH (6) - BAT (16)	HIGH-level CAN bus line	Power switch off*	6 kΩ or higher
CANL (14) - BAT (16)	LOW-level CAN bus line	Power switch off*	6 kΩ or higher

NOTICE:

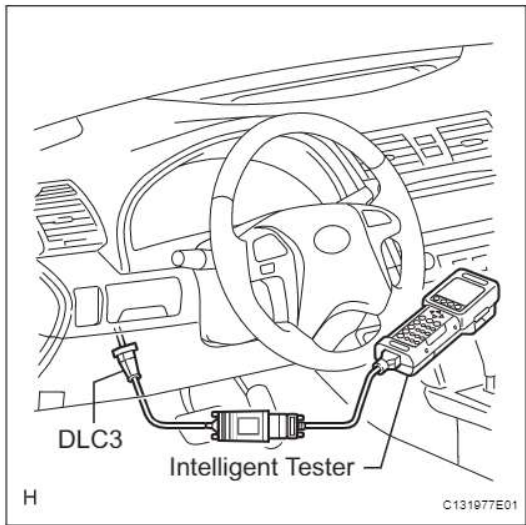
*: Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the power switch, any other switches or the doors.

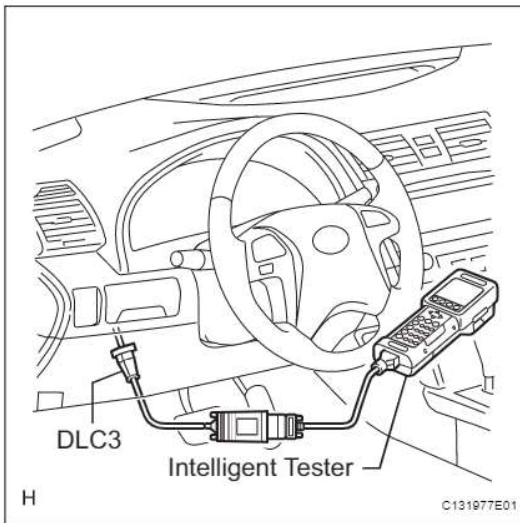
If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.

- (b) Connect the cable of the intelligent tester (with CAN VIM) to the DLC3, turn the power switch on (IG) and attempt to use the intelligent tester. If the screen displays a communication error message, a problem exists in the vehicle side or tester side.

HINT:

- If communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself. Consult the Service Department listed in the tool's instruction manual.





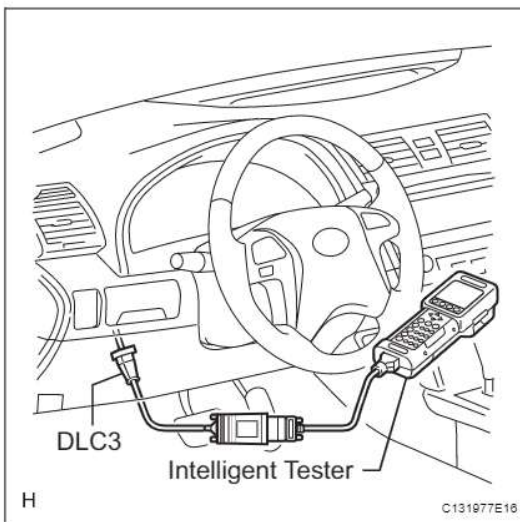
DTC CHECK / CLEAR

1. CHECK DTC

- Connect the intelligent tester to the Controller Area Network Vehicle Interface Module (CAN VIM). Then connect the CAN VIM to the DLC3.
- Turn the power switch on (IG).
- Read the DTCs by following the directions on the tester screen.

HINT:

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



2. CLEAR DTC

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the power switch on (IG).
- Erase the DTCs by following the directions on the tester's screen.

HINT:

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

EI

EI-28

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

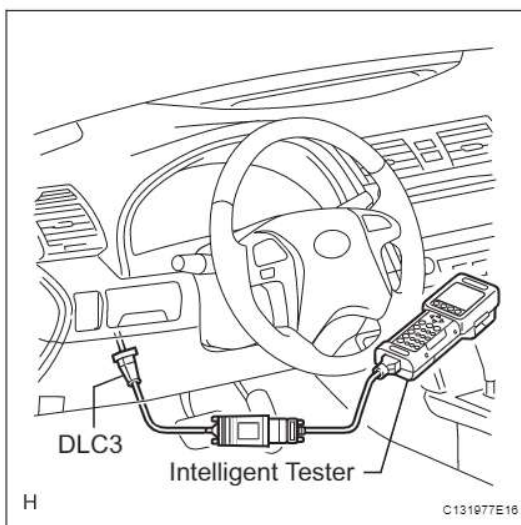
DATA LIST / ACTIVE TEST

1. READ DATA LIST

HINT:

Using the intelligent tester 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 as 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.

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the power switch on (IG).
- (c) Read the DATA LIST.



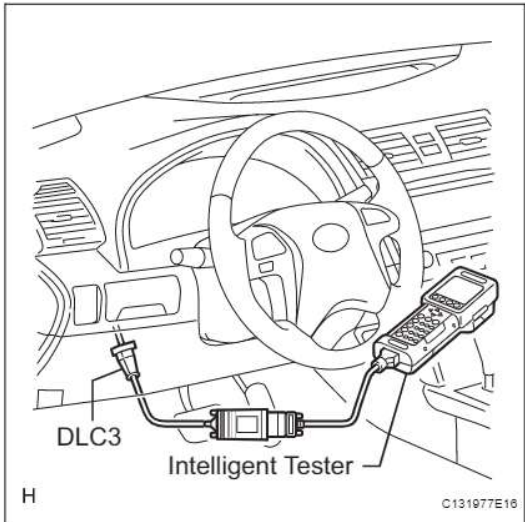
SMART KEY:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
IG SW	Power switch on (IG) signal / ON or OFF	ON: Power switch on (ACC, IG) or start OFF: Power switch off	-
ACC SW	Power switch on (ACC) signal / ON or OFF	ON: Power switch on (ACC, IG) or start OFF: Power switch off	-
IMMOBILISER	Immobiliser system status / SET or UNSET	SET: Key is not in cabin UNSET: Key is in cabin	-
MASTER KEY	Master key code signal / MATCH or NO MATCH	MATCH: Master key code is sent NO MATCH: Unmatched master key code is sent	-
SUB KEY	Sub-key (Master key) code signal / MATCH or NO MATCH	MATCH: Sub-key (master key) code is sent NO MATCH: Unmatched sub-key (master key) code is sent	-
ENCRYPT CODE	Transponder chip signal / OK or NG	OK: Correct data sent NG: Incorrect data sent	-
SERIAL NUMBER	Transponder chip signal / OK or NG	OK: Correct data sent NG: Incorrect data sent	-
FRAME	Transponder chip signal / OK or NG	OK: Correct data sent NG: Incorrect data sent	-
RESPONSE	Transponder chip signal / OK or NG	OK: Correct data sent NG: Incorrect data sent	-
BCC	Transponder chip signal / OK or NG	OK: Correct data sent NG: Incorrect data sent	-
STATUS	Transponder chip data / OK or NG	OK: Data OK NG: Data error	-

2. PERFORM ACTIVE TEST

HINT:
Performing the intelligent tester's ACTIVE TEST allows relay, VSV, actuator and other items to be operated without removing any parts. Performing the ACTIVE TEST early in troubleshooting is one way to save time. The DATA LIST can be displayed during the ACTIVE TEST.

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the power switch on (IG).
- (c) Perform the ACTIVE TEST by following the directions on the tester screen.



EI

MAIN BODY:

Tester Display	Test Part	Control Range	Diagnostic Note
SECURITY INDIC	Turn security indicator	ON/OFF	-

EI-30

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

DIAGNOSTIC TROUBLE CODE CHART**1. CERTIFICATION ECU DIAGNOSTIC TROUBLE CODE CHART****CERTIFICATION ECU**

DTC Code	Detection Item	Trouble Area	See page
B2784	Antenna Coil Open / Short	1. Wire harness 2. Power switch 3. Certification ECU	EI-28
B2785	Communication Malfunction between ECUs Connected by LIN	1. Wire harness 2. Certification ECU 3. Main body ECU (Instrument panel J/B) 4. Steering lock ECU 5. ID code box	EI-30
B2786	No Response from Steering Lock ECU	1. Wire harness 2. Certification ECU 3. Steering lock ECU	EI-34
B2789	No Response from ID BOX	1. Wire harness 2. Certification ECU 3. ID code box	EI-37
B278A	Short to GND in Immobiliser System Power Source Circuit	1. Wire harness 2. Power switch 3. Certification ECU	EI-40
B2790	ID BOX EEPROM Malfunction	ID code box	EI-43
B2791	Communication Condition Failure between ECM	-	EI-44

2. HYBRID VEHICLE CONTROL ECU DIAGNOSTIC TROUBLE CODE CHART**HINT:**

The DTCs for the engine immobiliser system are specified above. If other codes are output, check the DTC chart for the hybrid control system.

HYBRID VEHICLE CONTROL ECU

DTC Code	Detection Item	Trouble Area	See page
B2799-542	Engine Immobiliser System Malfunction	1. Wire harness 2. Hybrid vehicle control ECU 3. ID code box	EI-46
B2799-790	Engine Immobiliser System Malfunction	1. Wire harness 2. Hybrid vehicle control ECU 3. ID code box	EI-46

DTC	B2784	Antenna Coil Open / Short
-----	-------	---------------------------

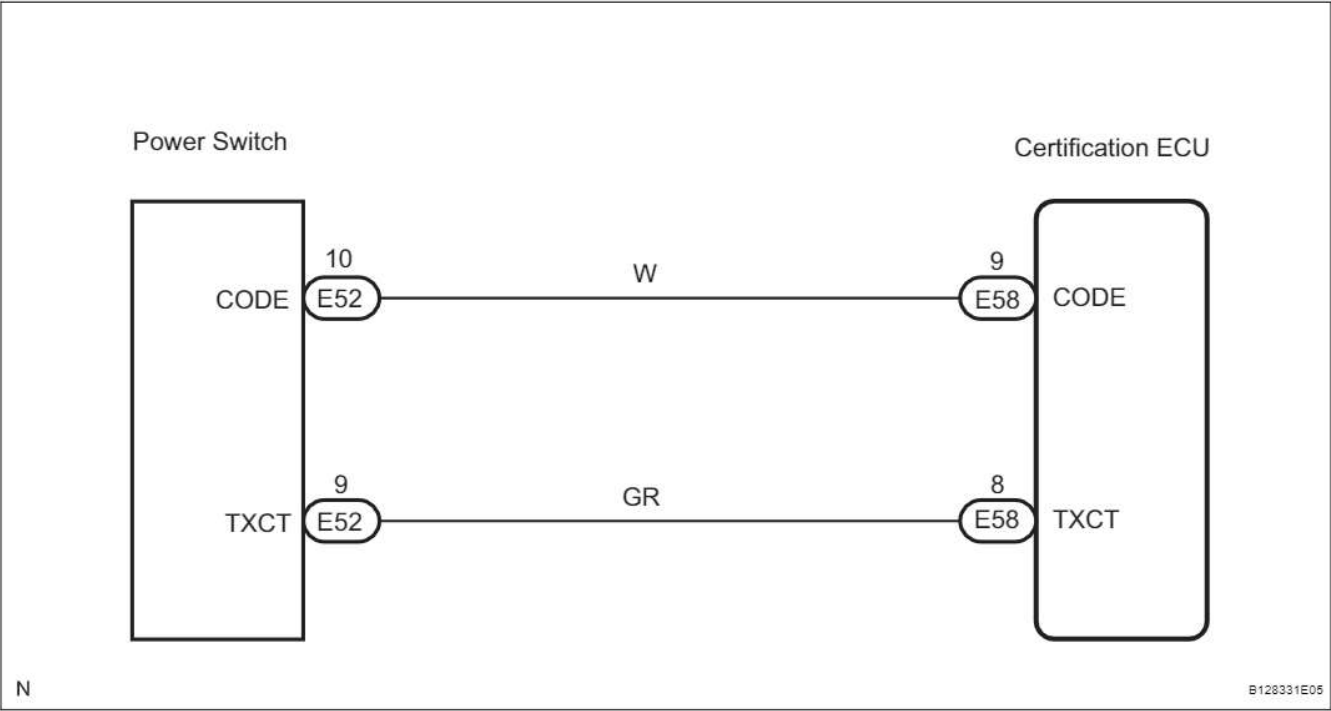
DESCRIPTION

This DTC is output when there is an open or short in the key coil (built into power switch).

DTC No.	DTC Detection Condition	Trouble Area
B2784	Antenna coil is open/shorted	- Wire harness - Power switch - Certification ECU

EI

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

If the certification ECU is replaced, register the key and ECU communication ID (See page EI-9).

1	CHECK DTC OUTPUT
---	------------------

- (a) Delete the DTCs (See page EI-25).
- (b) Recheck for DTCs (See page EI-25).

Result

Result	Proceed to
B2784 output recurs	A
B2784 output does not recur	B

B	USE SIMULATION METHOD TO CHECK
---	--------------------------------

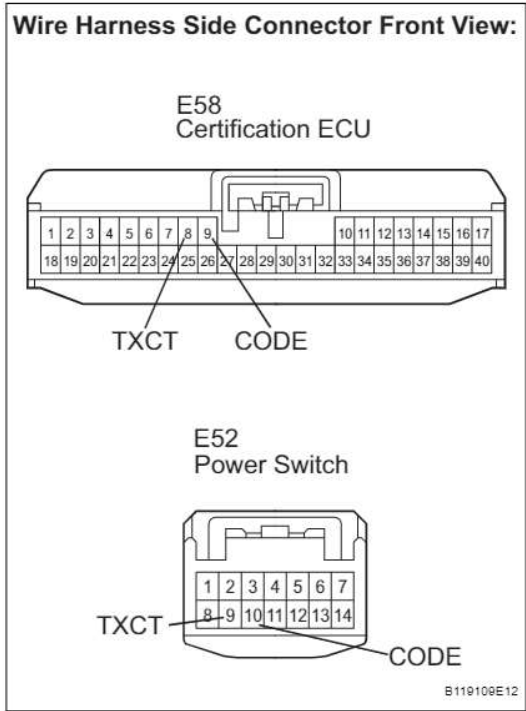


EI-32

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

2

CHECK HARNESS AND CONNECTOR (CERTIFICATION ECU - POWER SWITCH)



- (a) Disconnect the E58 ECU and E52 switch connectors.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
E58-9 (CODE) - E52-10 (CODE)	Below 1 Ω
E58-8 (TXCT) - E52-9 (TXCT)	
E58-9 (CODE) - Body ground	10 kΩ or higher
E58-8 (TXCT) - Body ground	

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

REPLACE POWER SWITCH

- (a) Replace the power switch (See page [ST-126](#)).

NEXT

4

CHECK DTC OUTPUT

- (a) Delete the DTCs (See page [EI-25](#)).
(b) Recheck for DTCs (See page [EI-25](#)).

Result

Result	Proceed to
B2784 output does not recurs	A
B2784 output recur	B

B

REPLACE CERTIFICATION ECU

A

END

DTC	B2785	Communication Malfunction between ECUs Connected by LIN
-----	-------	---

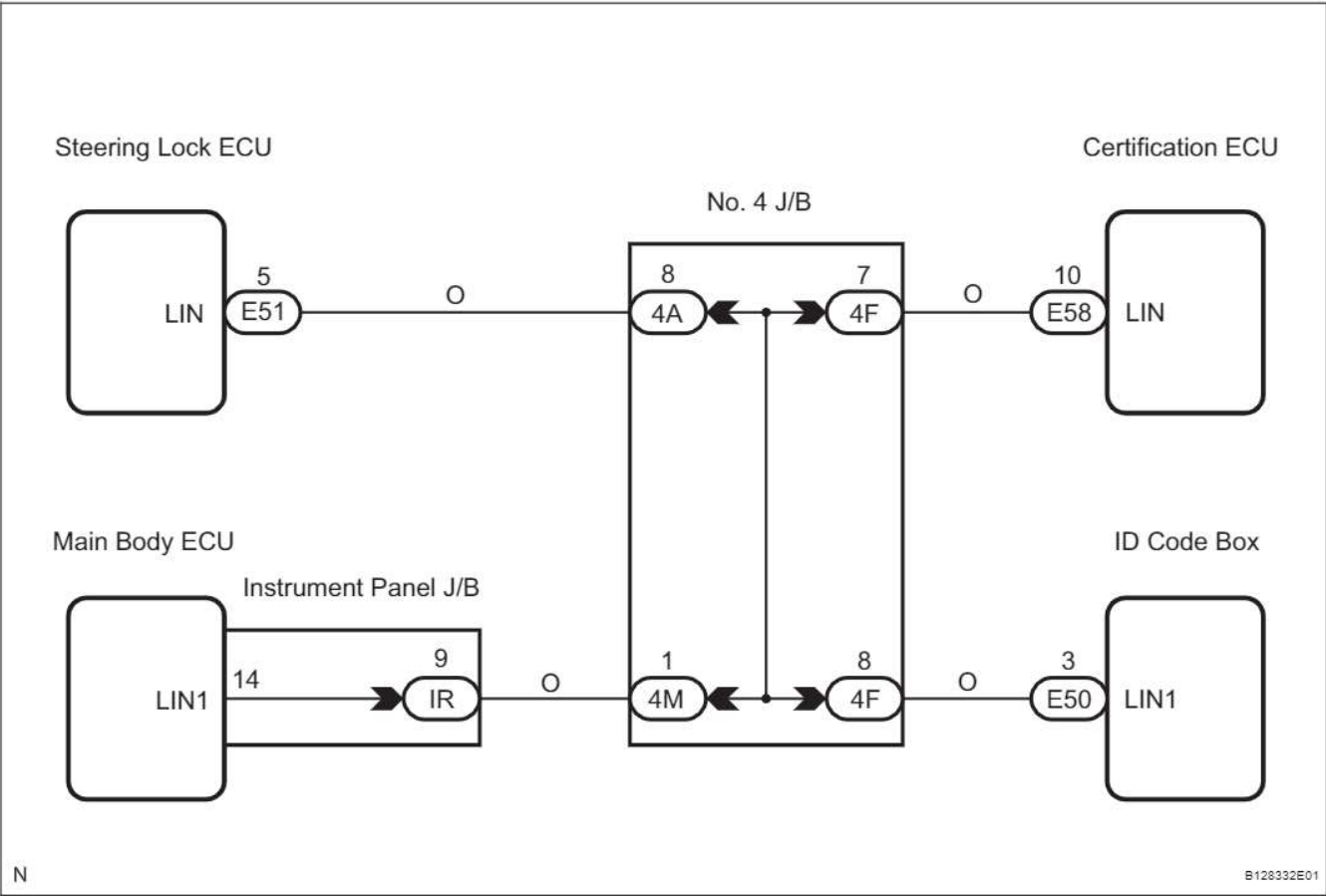
DESCRIPTION
This DTC is output when LIN communication from the certification ECU stops for a certain amount of time.
HINT:
If this DTC B2785 is detected simultaneously with DTC B2786 , B2789 or B2287, troubleshoot DTC B2786, B2789 or B2287 first.

DTC No.	B2785	B2786	B2789	B2287	Trouble Area
DTC Output	○	○	-	-	Wire harness (Certification ECU - Steering lock ECU)
	○	-	○	-	Wire harness (Certification ECU - ID code box)
	○	-	-	○	Wire harness (Certification ECU - Main body ECU (Instrument panel J/B))

○: DTC is output
-: DTC is not output

DTC No.	DTC Detection Condition	Trouble Area
B2785	- LIN communication from certification ECU stops for a certain amount of time - Open or short in wire harness between ECUs	- Wire harness - Certification ECU - Main body ECU (Instrument panel J/B) - Steering lock ECU - ID code box

WIRING DIAGRAM



EI-34

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

INSPECTION PROCEDURE

NOTICE:

- If the certification ECU or ID code box is replaced, register the key and ECU communication ID (See page EI-9).
- If the steering lock ECU or main body ECU is replaced, register the ECU code and ECU communication ID (See page EI-9).

EI**1 CHECK DTC OUTPUT**

- (a) Delete the DTCs (See page EI-25).
 (b) Recheck for DTCs (See page EI-25).

Result

Result	Proceed to
B2785 output recurs	A
B2785 output does not recur	B

B**USE SIMULATION METHOD TO CHECK****A****2 REPLACE CERTIFICATION ECU**

- (a) Replace the certification ECU.

NEXT**3 ELECTRICAL KEY REGISTRATION**

- (a) Register the electrical key code in the certification ECU (See page EI-9).

NEXT**4 REGISTER ECU COMMUNICATION ID**

- (a) Register the ECU communication ID between the ID code box and hybrid vehicle control ECU (See page EI-9).

NEXT**5 CHECK DTC OUTPUT**

- (a) Delete the DTCs (See page EI-25).
 (b) Recheck for DTCs (See page EI-25).

Result

Result	Proceed to
B2785 output recurs	A
B2785 output does not recur	B

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

EI-35

B

END

A

6

REPLACE MAIN BODY ECU (INSTRUMENT PANEL J/B)

- (a) Replace the main body ECU (Instrument panel J/B).

NEXT

7

ECU CODE REGISTRATION

- (a) Register the ECU code between the ECUs connected by LIN communication (See page EI-9).

NEXT

8

CHECK DTC OUTPUT

- (a) Delete the DTCs (See page EI-25).
 (b) Recheck for DTCs (See page EI-25).

Result

Result	Proceed to
B2785 output recurs	A
B2785 output does not recur	B

B

END

A

9

REPLACE STEERING LOCK ECU

- (a) Replace the steering lock ECU.

NEXT

10

ECU CODE REGISTRATION

- (a) Register the ECU code between the ECUs connected by LIN communication (See page EI-9).

NEXT

11

CHECK DTC OUTPUT

- (a) Delete the DTCs (See page EI-25).
 (b) Recheck for DTCs (See page EI-25).

Result

Result	Proceed to
B2785 output recurs	A

EI

EI-36

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

Result	Proceed to
B2785 output does not recur	B



EI

REPLACE ID CODE BOX

DTC	B2786	No Response from Steering Lock ECU
-----	-------	------------------------------------

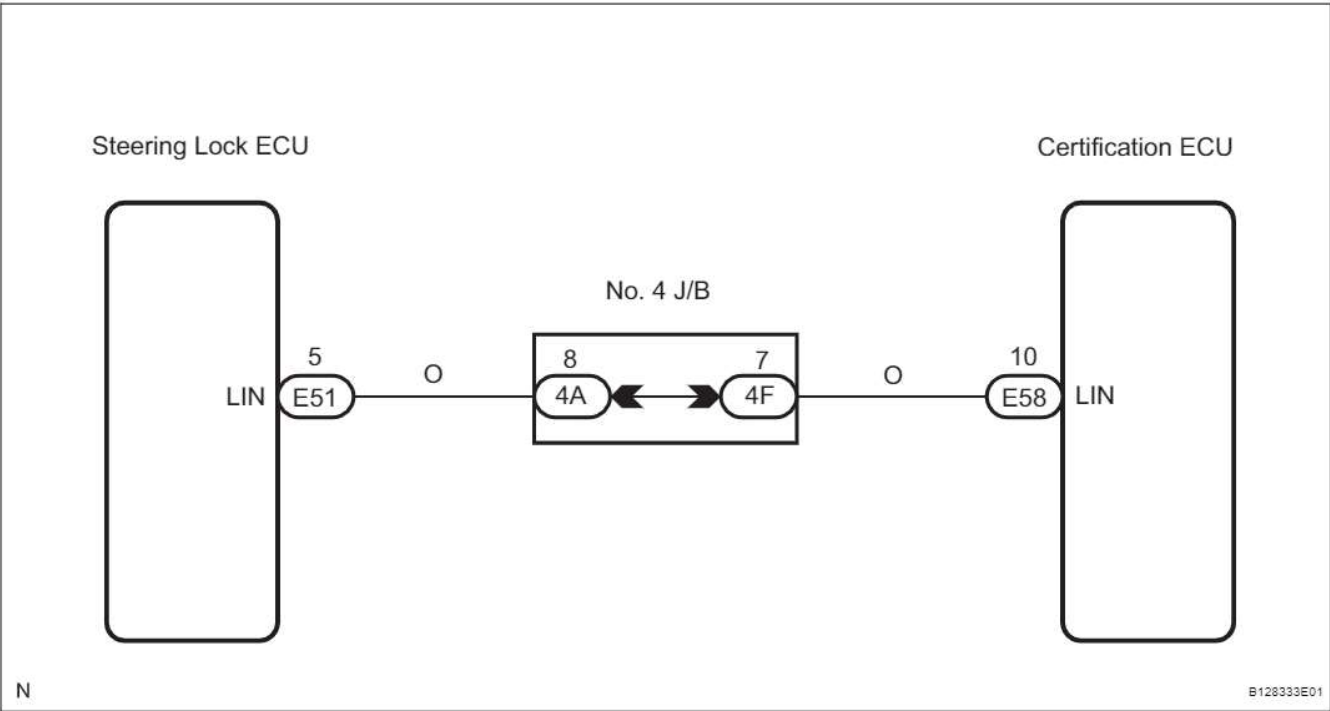
DESCRIPTION

This DTC is output when the certification ECU does not receive LIN communication from the steering lock ECU for 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B2786	- Certification ECU does not receive LIN communication from steering lock ECU for 10 seconds - Open or short in wire harness between ECUs	- Wire harness - Certification ECU - Steering lock ECU

EI

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- If the certification ECU is replaced, register the key and ECU communication ID (See page EI-9).
- If the steering lock ECU is replaced, register the ECU code and ECU communication ID (See page EI-9).

1	CHECK DTC OUTPUT
---	------------------

- (a) Delete the DTCs (See page EI-25).
- (b) Recheck for DTCs (See page EI-25).

Result

Result	Proceed to
B2786 output recurs	A
B2786 output does not recur	B

B

USE SIMULATION METHOD TO CHECK

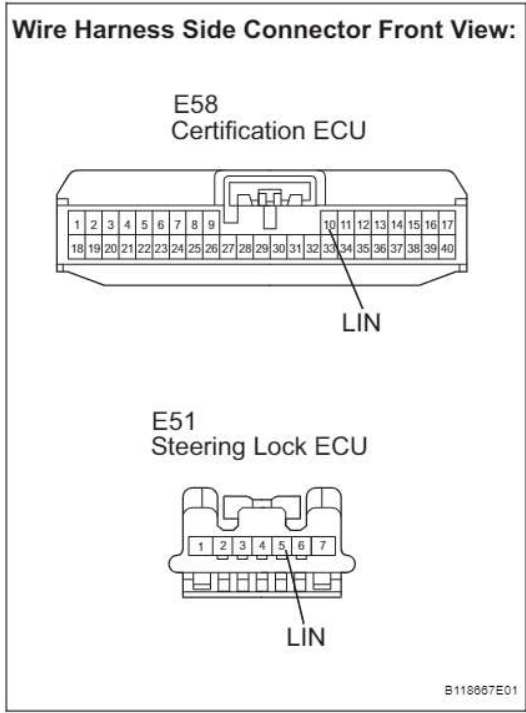
EI-38

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

A

2

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



- (a) Disconnect the E58 and E51 ECU connectors.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
E58-10 (LIN) - E51-5 (LIN)	Below 1 Ω
E58-10 (LIN) - Body ground	10 k Ω or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

REPLACE CERTIFICATION ECU

- (a) Replace the certification ECU.

NEXT

4

ELECTRICAL KEY REGISTRATION

- (a) Register the electrical key code in the certification ECU (See page EI-9).

NEXT

5

REGISTER ECU COMMUNICATION ID

- (a) Register the ECU communication ID between the ID code box and hybrid vehicle control ECU (See page EI-9).

NEXT

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

6 CHECK DTC OUTPUT

- (a) Delete the DTCs (See page EI-25).
- (b) Recheck for DTCs (See page EI-25).

Result

Result	Proceed to
B2786 output recurs	A
B2786 output does not recur	B

EI

A

B END

REPLACE STEERING LOCK ECU

EI-40

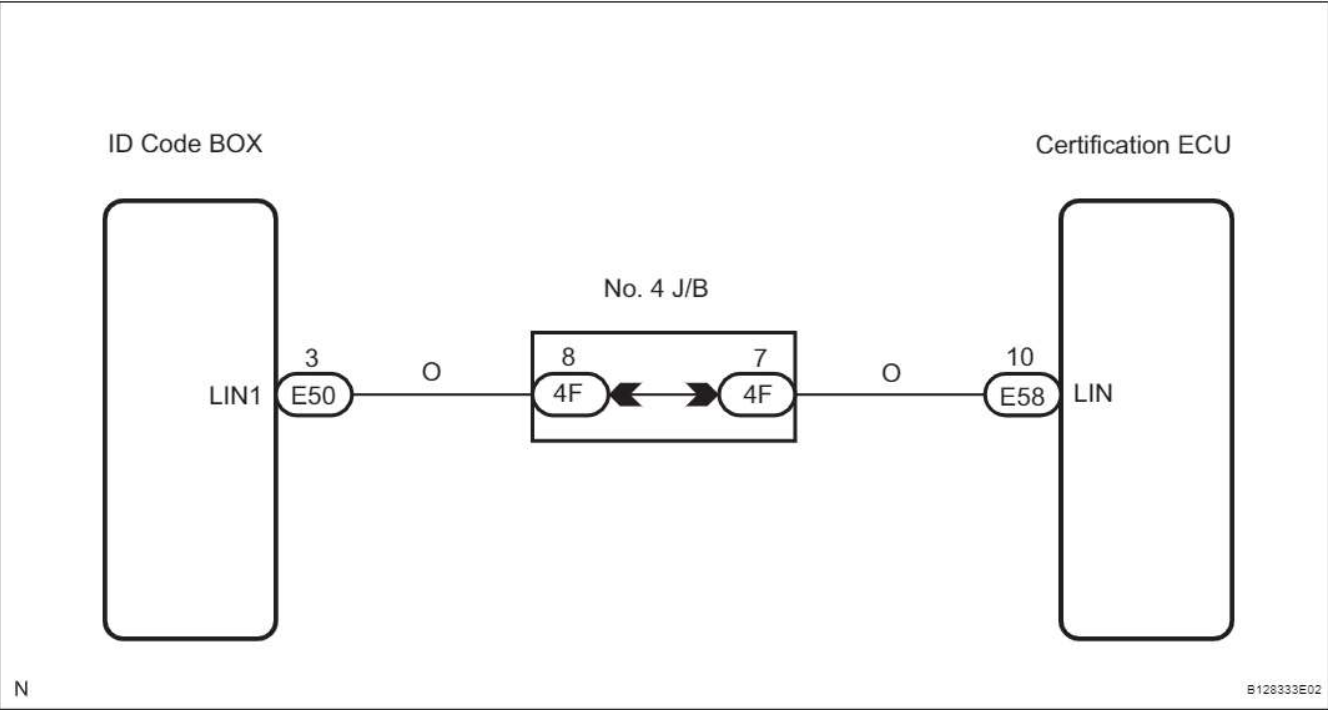
ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

DTC	B2789	No Response from ID BOX
-----	-------	-------------------------

DESCRIPTION
This DTC is output when the certification ECU does not receive LIN communication from the ID code box for 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B2789	- Certification ECU does not receive LIN communication from ID code box for 10 seconds - Open or short in wire harness between ECUs	- Wire harness - Certification ECU - ID code box

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:
If the certification ECU or ID code box is replaced, register the key and ECU communication ID (See page EI-9).

1	CHECK DTC OUTPUT
---	------------------

- (a) Delete the DTCs (See page EI-25).
- (b) Recheck for DTCs (See page EI-25).

Result

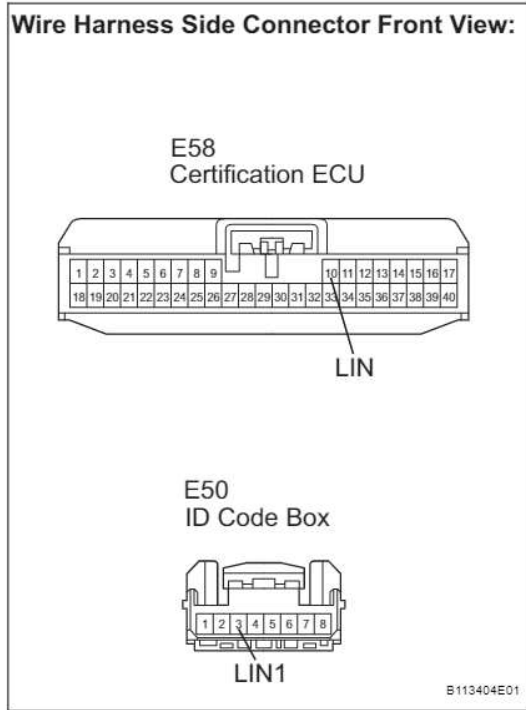
Result	Proceed to
B2789 output recurs	A
B2789 output does not recur	B

B

USE SIMULATION METHOD TO CHECK

A

2 CHECK HARNESS AND CONNECTOR (CERTIFICATION ECU - ID CODE BOX)



- (a) Disconnect the E58 ECU and E50 ID code box connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
E58-10 (LIN) - E50-3 (LIN1)	Below 1 Ω
E58-10 (LIN) - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 REPLACE CERTIFICATION ECU

- (a) Replace the certification ECU.

NEXT

4 ELECTRICAL KEY REGISTRATION

- (a) Register the electrical key code in the certification ECU (See page EI-9).

NEXT

5 REGISTER ECU COMMUNICATION ID

- (a) Register the ECU communication ID between the ID code box and hybrid vehicle control ECU (See page EI-9).

NEXT

EI-42

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

6

CHECK DTC OUTPUT

- (a) Delete the DTCs (See page [EI-25](#)).
- (b) Recheck for DTCs (See page [EI-25](#)).

Result

Result	Proceed to
B2789 output recurs	A
B2789 output does not recur	B

B

END

A

REPLACE ID CODE BOX

DTC	B278A	Short to GND in Immobiliser System Power Source Circuit
-----	-------	---

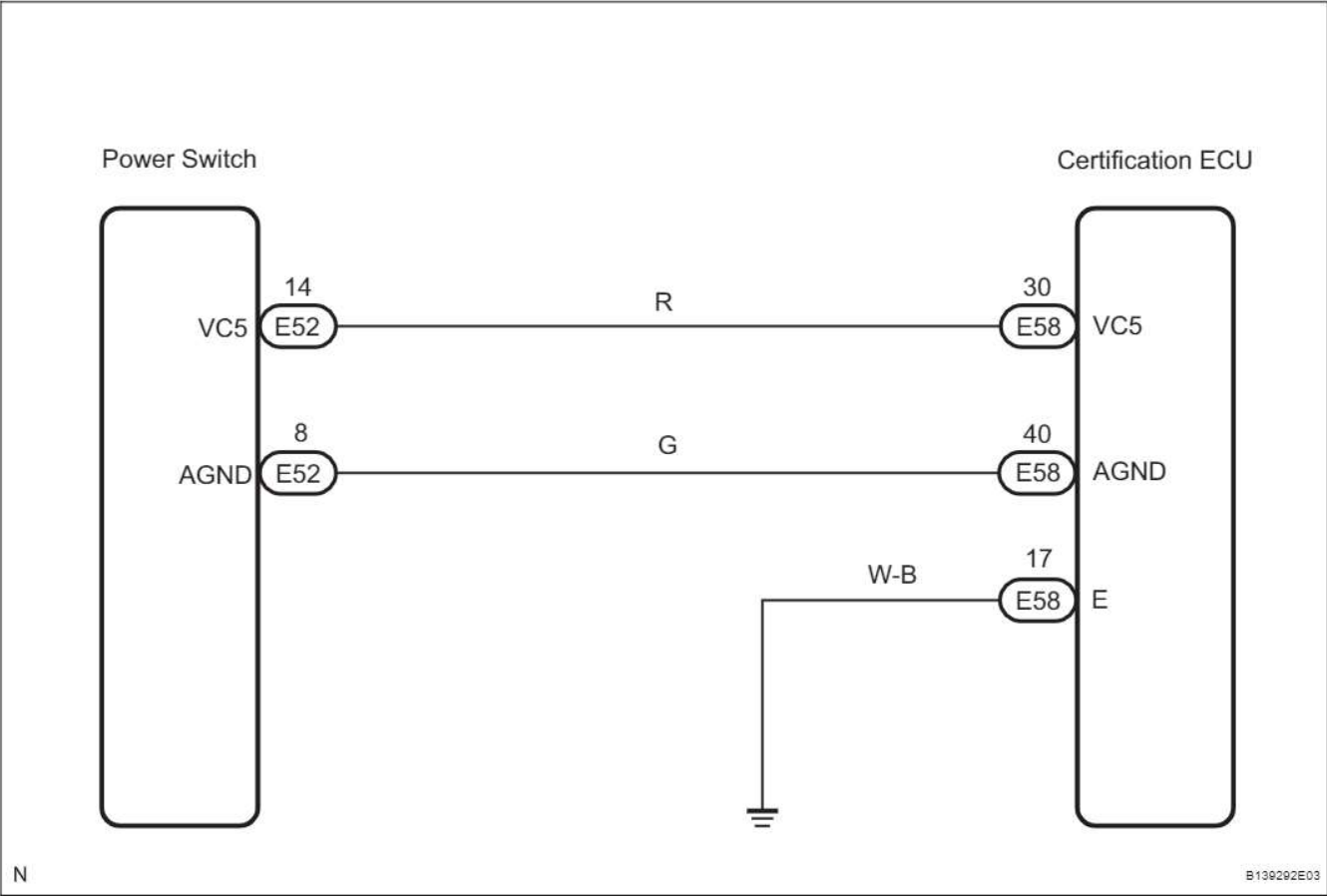
DESCRIPTION

This DTC is output when the power switch power source supply line is open or shorted.

DTC No.	DTC Detection Condition	Trouble Area
B278A	Power switch power source supply line is open or shorted	- Wire harness - Power switch - Certification ECU

EI

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

If the certification ECU is replaced, register the key and ECU communication ID (See page EI-9).

1	CHECK DTC OUTPUT
---	------------------

- (a) Delete the DTCs (See page EI-25).
- (b) Recheck for DTCs (See page EI-25).

Result

Result	Proceed to
B278A output recurs	A
B278A output does not recur	B

EI-44

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

A

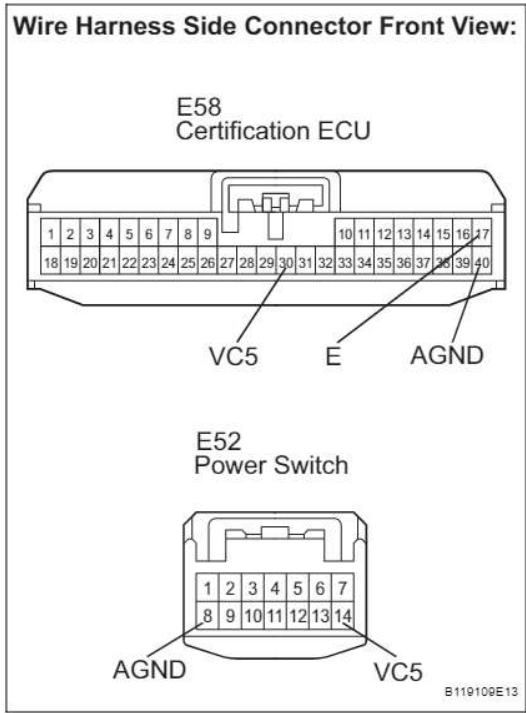
B

USE SIMULATION METHOD TO CHECK

2

CHECK HARNESS AND CONNECTOR (CERTIFICATION ECU - POWER SWITCH)

EI



- (a) Disconnect the E58 ECU and E52 switch connectors.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
E58-30 (VC5) - E52-14 (VC5)	Below 1 Ω
E58-40 (AGND) - E52-8 (AGND)	
E58-30 (VC5) - Body ground	10 kΩ or higher
E58-40 (AGND) - Body ground	

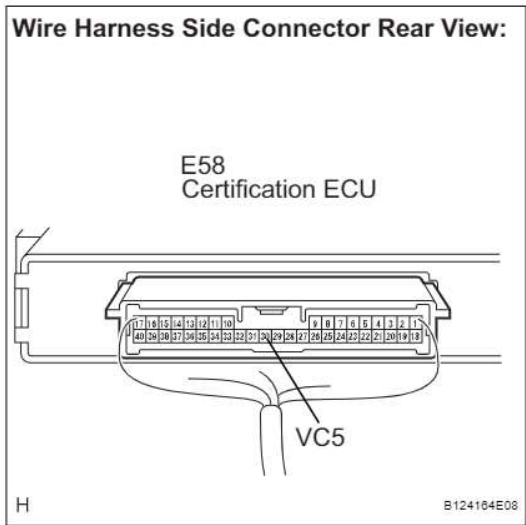
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

CHECK HARNESS AND CONNECTOR (POWER SWITCH POWER SOURCE)



- (a) Reconnect the E58 ECU and E52 switch connectors.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
E58-30 (VC5) - Body ground	Key is not in cabin	Below 1 V
	Power switch pressed	4.6 to 5.4 V

NG

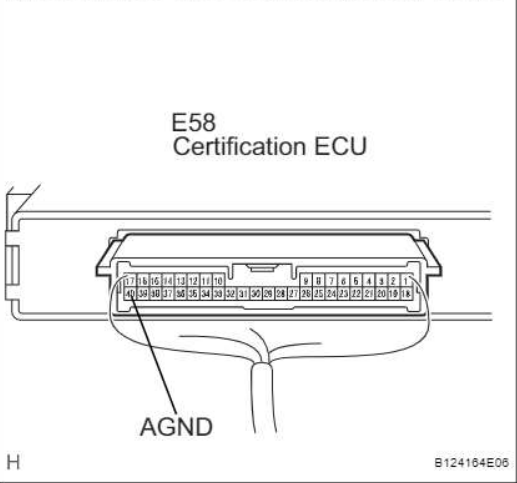
REPLACE CERTIFICATION ECU

OK

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

4 CHECK HARNESS AND CONNECTOR (POWER SWITCH BODY GROUND)

Wire Harness Side Connector Rear View:



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

Standard resistance

Tester Connection	Specified Condition
E58-40 (AGND) - Body ground	Below 1 Ω

NG → REPLACE CERTIFICATION ECU

EI

OK

REPLACE POWER SWITCH (See page ST-126)

EI-46

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

DTC	B2790	ID BOX EEPROM Malfunction
-----	-------	---------------------------

DESCRIPTION

This DTC is output when the ID code box detects an internal malfunction.

DTC No.	DTC Detection Condition	Trouble Area
B2790	ID code box detects internal malfunction	ID code box

EI

INSPECTION PROCEDURE

NOTICE:

If the ID code box is replaced, register the key and ECU communication ID (See page EI-9).

1	REPLACE ID CODE BOX
---	---------------------

NEXT

END

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

DTC	B2791	Communication Condition Failure between ECM
-----	-------	---

DESCRIPTION

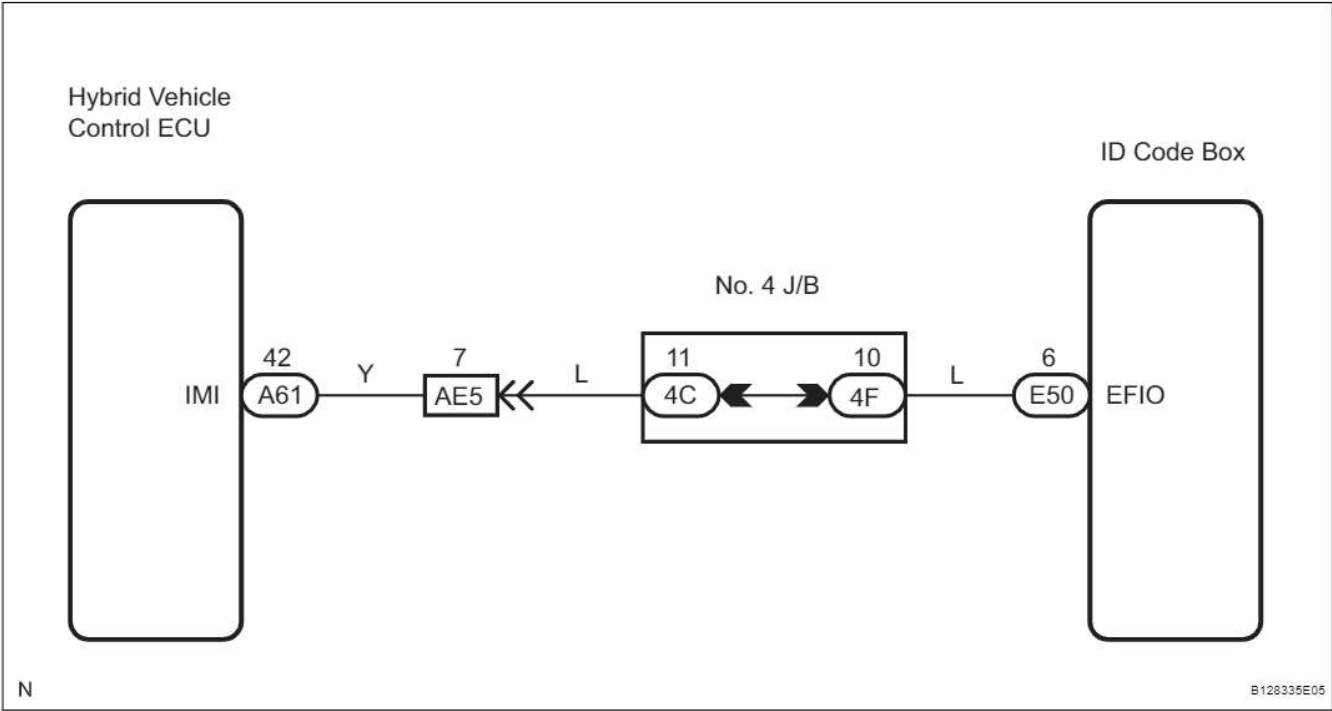
This DTC is output when the ID code box does not respond to a verification request signal from the hybrid vehicle control ECU.

HINT:

- If the power switch is turned off immediately after the hybrid control system starts, DTC B2791 will be detected. If DTC B2791 is cleared, this DTC will not recur because it does not indicate a malfunction.
- If this DTC B2791 is detected simultaneously with DTC B2799-542 or B2799-790, troubleshoot DTC B2799-542 or B2799-790 first.

DTC No.	DTC Detection Condition	Trouble Area
B2791	ID code box does not respond to a verification request signal from hybrid vehicle control ECU	-

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

If the engine can be started even when DTC B2791 is output, the ID code box can be considered normal. Be sure to recheck for DTCs after clearing the DTCs (See page EI-9).

1	CHECK HYBRID CONTROL SYSTEM
---	-----------------------------

- (a) Delete the DTCs (See page EI-25).
- (b) Check that the hybrid control system starts.

Result

Result	Proceed to
Hybrid control system does not start	A

EI-48

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

Result	Proceed to
Hybrid control system starts	B

HINT:
Perform this step when the is turned off immediately after the hybrid control system starts.



2

CHECK DTC OUTPUT

- (a) Recheck for DTCs (See page EI-25).
Result

Result	Proceed to
B2791 and other DTC output	A
No DTC output	B

HINT:
If the hybrid control system does not start, DTC B2791 will not be detected separately from other DTCs because DTC B2791 will be output together with other DTCs. Troubleshoot DTCs other than DTC B2791.



REPAIR CIRCUITS INDICATED BY OUTPUT DTCS

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

DTC	B2799-542	Engine Immobiliser System Malfunction
DTC	B2799-790	Engine Immobiliser System Malfunction

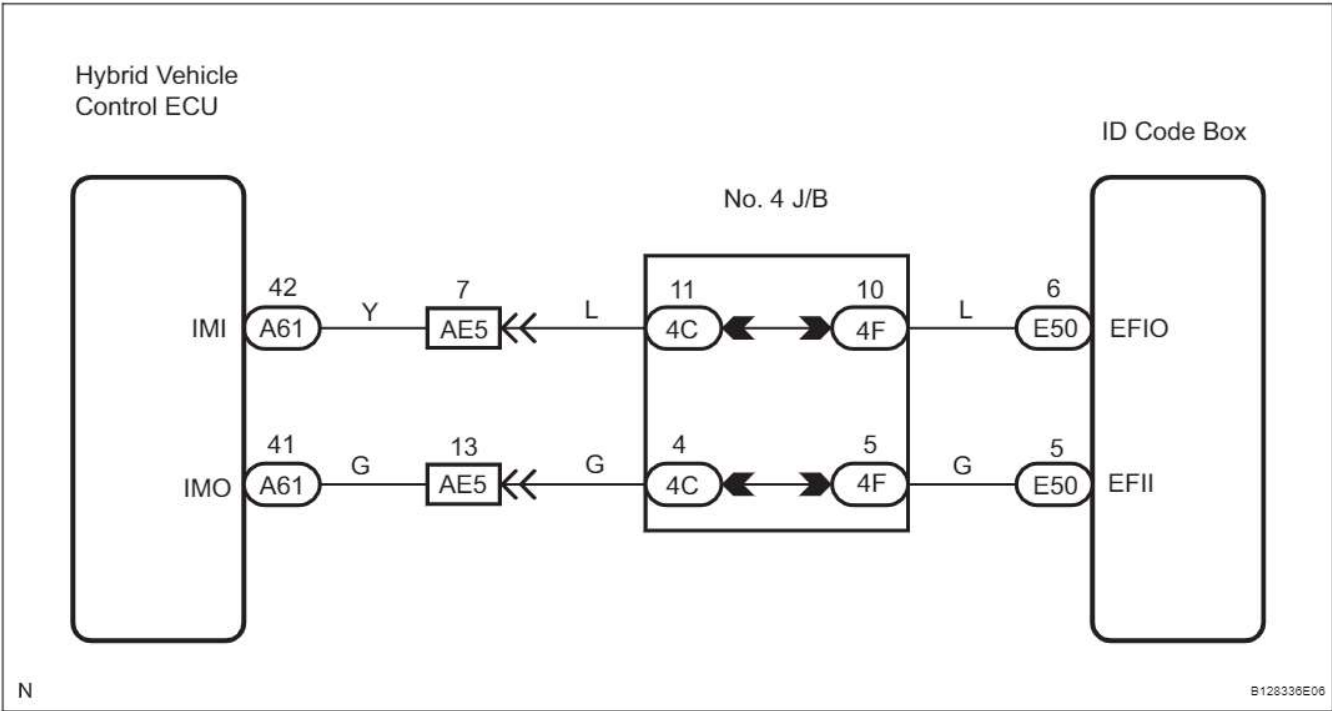
DESCRIPTION

This DTC is output when one of the following occurs: 1) the hybrid vehicle control ECU detects errors in its own communications with the ID code box; 2) the hybrid vehicle control ECU detects errors in the communication lines; or 3) the ECU communication ID between the ID code box and hybrid vehicle control ECU is different and an hybrid control system start is attempted. Before troubleshooting for this DTC, make sure no certification ECU DTCs are present. If present, troubleshoot the certification ECU DTCs first.

EI

DTC No.	DTC Detection Condition	Trouble Area
B2799 - 542 E2799 - 790	One of following conditions is met: - Error in communication between hybrid vehicle control ECU and ID code box - Error in communication lines - Communication ID is different between ID code box and hybrid vehicle control ECU during communication	- Wire harness - Hybrid vehicle control ECU - ID code box

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- If the ID code box is replaced, register the key and ECU communication ID (See page EI-9).
- If the hybrid vehicle control ECU is replaced, register the ECU communication ID (See page EI-9).

EI-50

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

1

CHECK DTC OUTPUT

- (a) Delete the DTCs (See page [EI-25](#)).
- (b) Recheck for DTCs (See page [EI-25](#)).

Result

Result	Proceed to
B2799 output recurs	A
B2799 output does not recur	B

B

USE SIMULATION METHOD TO CHECK

A

2

RE-REGISTER ECU COMMUNICATION ID

- (a) Re-register the ECU communication ID (See page [EI-9](#)) between the ID code box and hybrid vehicle control ECU.

NEXT

3

CHECK DTC OUTPUT

- (a) Delete the DTCs (See page [EI-25](#)).
- (b) Recheck for DTCs (See page [EI-25](#)).

Result

Result	Proceed to
B2799 output recurs	A
B2799 output does not recur	B

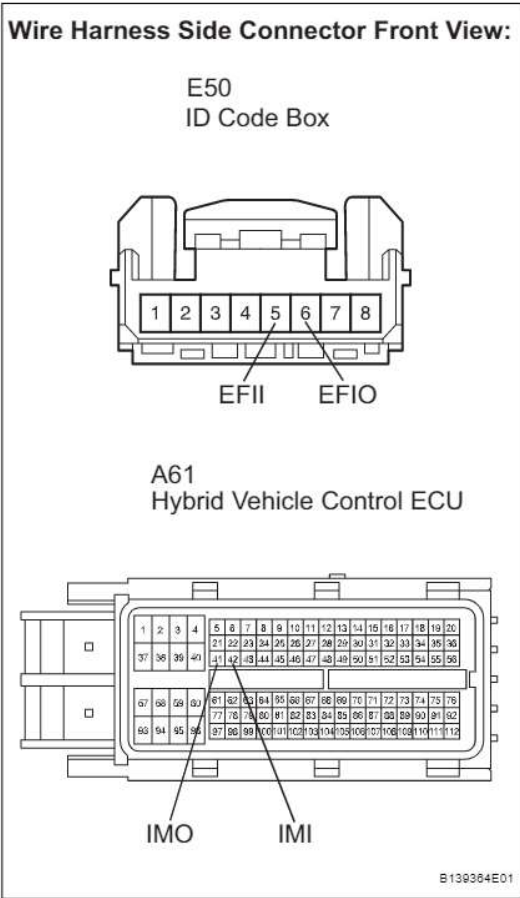
B

END

A

4

CHECK HARNESS AND CONNECTOR (ID CODE BOX - HYBRID VEHICLE CONTROL ECU)



- (a) Disconnect the E50 ID code box and A61 hybrid vehicle control ECU connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
E50-5 (EFII) - A61-41 (IMO)	Below 1 Ω
E50-6 (EFIO) - A61-42 (IMI)	
E50-5 (EFII) - Body ground	10 kΩ or higher
E50-6 (EFIO) - Body ground	

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5

REPLACE HYBRID VEHICLE CONTROL ECU

- (a) Replace the hybrid vehicle control ECU (See page [HV-570](#)).

NEXT

6

REGISTER ECU COMMUNICATION ID

- (a) Register the ECU communication ID between the ID code box and hybrid vehicle control ECU (See page [EI-9](#)).

NEXT

7

CHECK DTC OUTPUT

- (a) Delete the DTCs (See page [EI-25](#)).
- (b) Recheck for DTCs (See page [EI-25](#)).

EI-52

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

Result

Result	Proceed to
B2799 output recurs	A
B2799 output does not recur	B

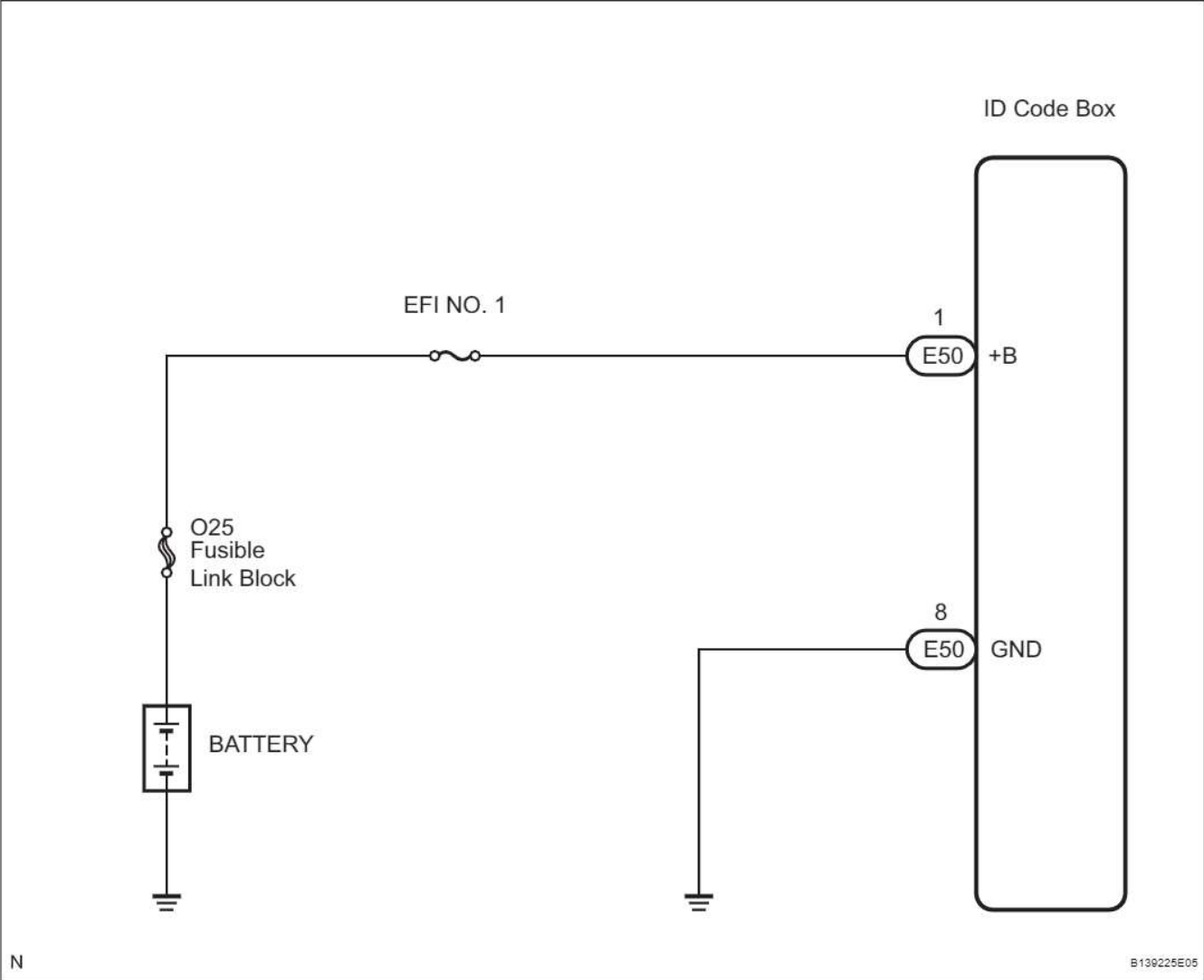


REPLACE ID CODE BOX

ID Code Box Power Source Circuit

DESCRIPTION
This circuit provides power to operate the ID code box.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:
If the ID code box is replaced, register the key and ECU communication ID (See page [EI-9](#)).

1	INSPECT FUSE (EFI NO. 1)
---	--------------------------

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

EI-54

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

OK

NG

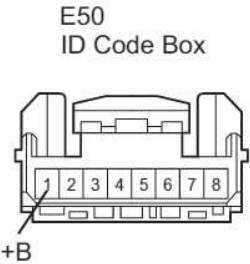
REPLACE FUSE

2

CHECK HARNESS AND CONNECTOR (ID CODE BOX - BATTERY)

EI

Wire Harness Side Connector Front View:



E50
ID Code Box

+B

Y

B107455E17

(a) Disconnect the E50 ID code box connector.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
E50-1 (+B) - Body ground	10 to 14 V

NG

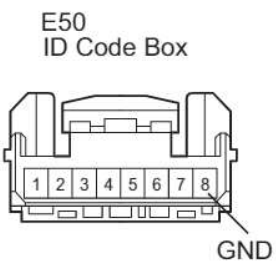
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

CHECK HARNESS AND CONNECTOR (ID CODE BOX - BODY GROUND)

Wire Harness Side Connector Front View:



E50
ID Code Box

GND

Y

B107455E18

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

Standard resistance

Tester Connection	Specified Condition
E50-8 (GND) - Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

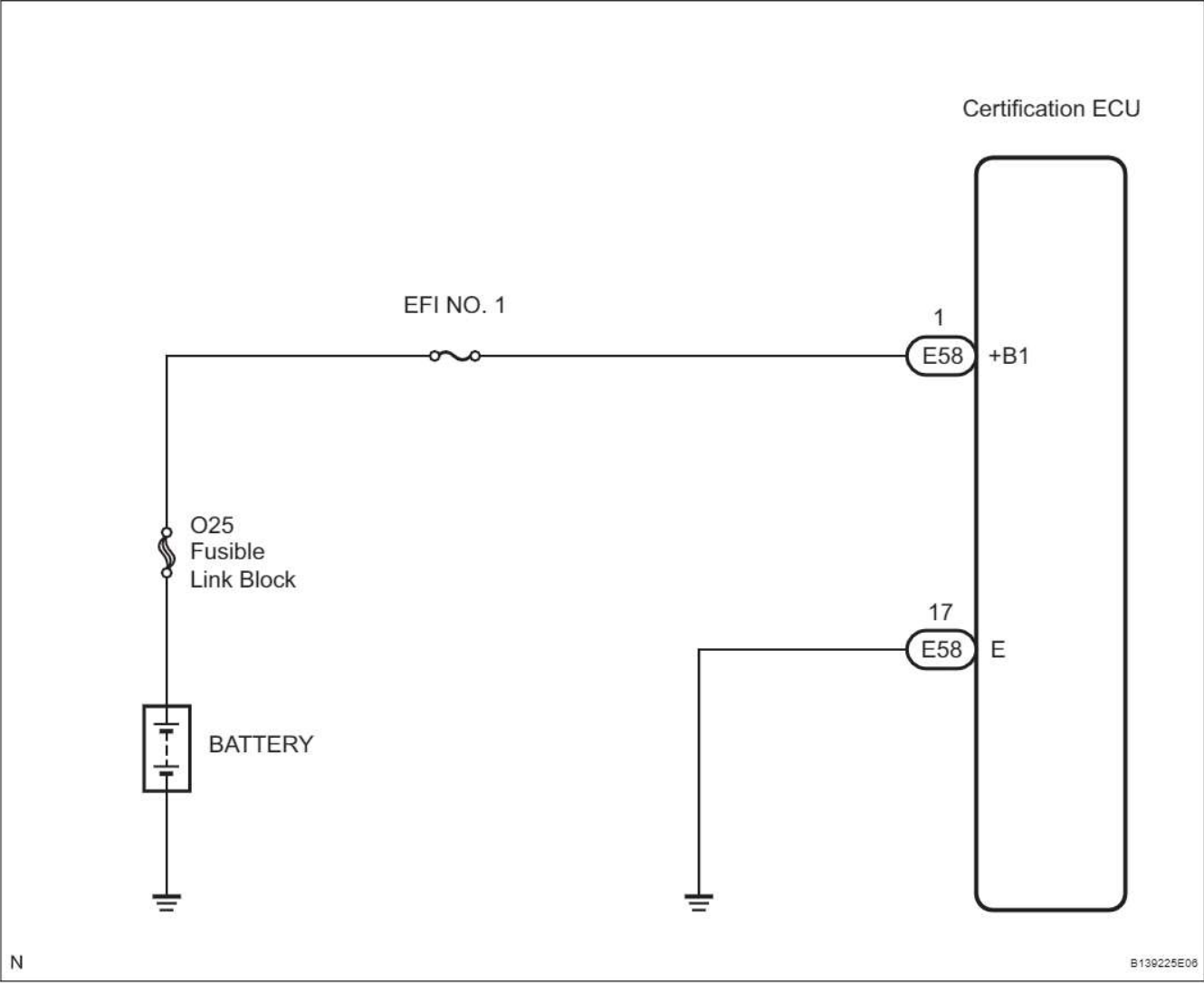
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See page EI-16)

Certification ECU Power Source Circuit

DESCRIPTION
This circuit provides power to operate the certification ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:
If the certification ECU is replaced, register the key and ECU communication ID (See page [EI-9](#)).

1	INSPECT FUSE (EFI NO. 1)
---	--------------------------

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

EI-56

ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM

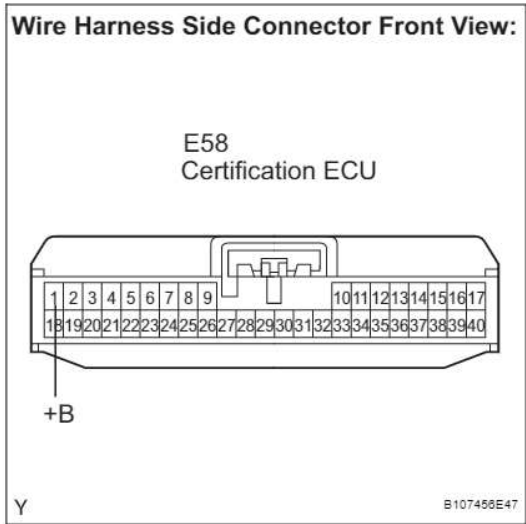
NG

REPLACE FUSE

OK

2

CHECK WIRE HARNESS (CERTIFICATION ECU - BATTERY)



- (a) Disconnect the E58 ECU connector.
(b) Measure the voltage according to the value(s) in the table below.
- Standard voltage**

Tester Connection	Specified Condition
E58-1 (+B) - Body ground	10 to 14 V

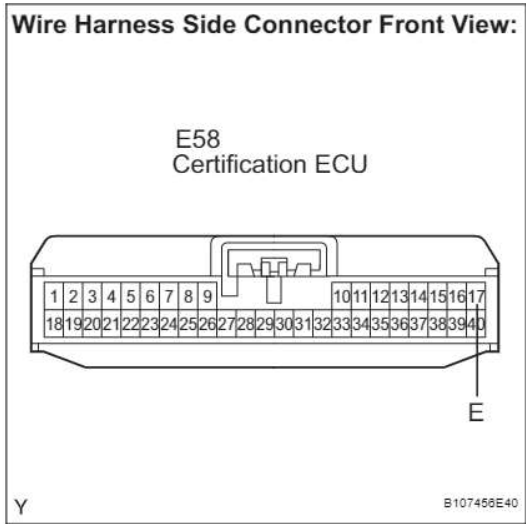
OK

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

3

CHECK HARNESS AND CONNECTOR (CERTIFICATION ECU - BODY GROUND)



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

Tester Connection	Specified Condition
E58-17 (E) - Body ground	Below 1 Ω

OK

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See page EI-16)

ENGINE IMMOBILISER SYSTEM

PRECAUTION

1. NOTICE FOR INITIALIZATION

- (a) When disconnecting the negative (-) battery terminal, initialize the following systems after the terminal is reconnected.

System Name	See procedure
SFI System	(See page IN-43)

EI

2. PRECAUTIONS WHEN USING INTELLIGENT TESTER

- (a) When using the intelligent tester to troubleshoot the smart key system: Connect the intelligent tester to the DLC3 while the power switch is off, and turn a door courtesy light switch on and off at 1.5-second intervals until communication between the tester and vehicle begins.

3. PRECAUTIONS FOR EACH FUNCTION

- (a) Precautions for the electrical key:
The electrical key is a precision instrument. Be sure to observe the following:
- (1) Do not drop or strike the electrical key.
 - (2) Do not allow the electrical key to be kept in a high temperature place for a long time.
 - (3) Do not use an ultrasonic washing machine to clean the electrical key.
 - (4) Keep the electrical key away from magnets or magnetized items during use.
 - (5) Do not attach any stickers to the electrical key.
- (b) Precautions for the hybrid vehicle control system start function:
- (1) Before starting the hybrid vehicle control system, firmly depress the brake pedal until the indicator of the power switch illuminates in green.
 - (2) Be sure to turn the power switch off before disconnecting the negative (-) battery terminal. When the battery terminal is disconnected, the power source mode (off, on (ACC), on (IG)) will remain in memory. When the vehicle's battery becomes discharged, be careful to remember the power source mode.
 - (3) After the battery is removed and reinstalled, be sure to wait 10 seconds or more before the next engine start. The hybrid vehicle control system may not start immediately after the battery is reinstalled.

EI-2**ENGINE IMMOBILISER – ENGINE IMMOBILISER SYSTEM**

- (c) Precautions for the battery built into the electrical key and the vehicle battery:
- (1) When the doors are locked (locked state), signals are emitted by the vehicle at a predetermined interval. If the vehicle were to remain parked for a long time, the vehicle battery could become discharged. To prevent this, periodically charge the vehicle battery, or disable the smart key system.
 - (2) When the doors are locked (locked state), and the electrical key remains in the door oscillator detection area, the system will maintain periodic communication with the electrical key. If the vehicle remains parked in this state for a long time, the vehicle and key batteries could become discharged. If the vehicle is not being used, keep the electrical key at least 2 m (6.56 ft) away from the vehicle.

EI