

ENGINE IMMOBILISER SYSTEM

PRECAUTION

NOTICE:

Some systems need to be initialized after reconnecting the negative (-) battery terminal (See page [IN-33](#)).

1. PRECAUTIONS WHEN USING INTELLIGENT TESTER

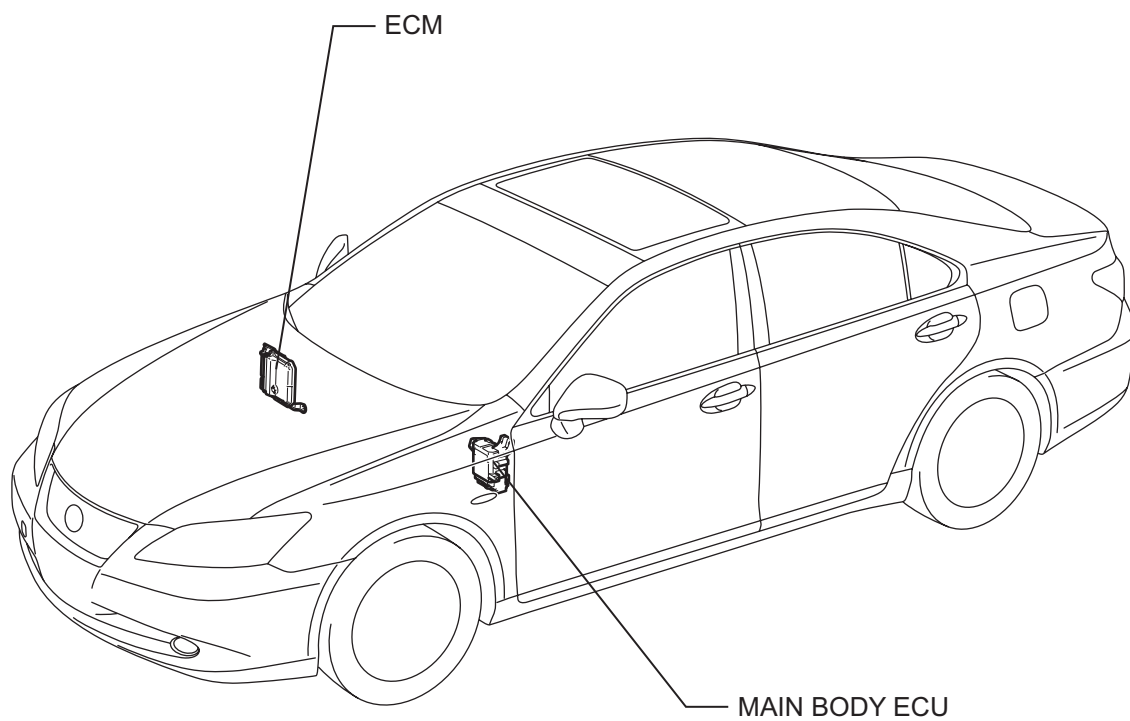
- (a) When using the intelligent tester to troubleshoot the smart access system with push button start:
Connect the intelligent tester to the DLC3 while the engine switch is off, and turn a door courtesy light switch on and off at 1.5-second intervals until communication between the tester and vehicle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

2. 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 engine start function:
 - (1) Before starting the engine, firmly depress the brake pedal until the indicator of the engine switch illuminates in green.
 - (2) Be sure to turn the engine 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 engine may not start immediately after the battery is reinstalled.
- (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 access system with push button start.

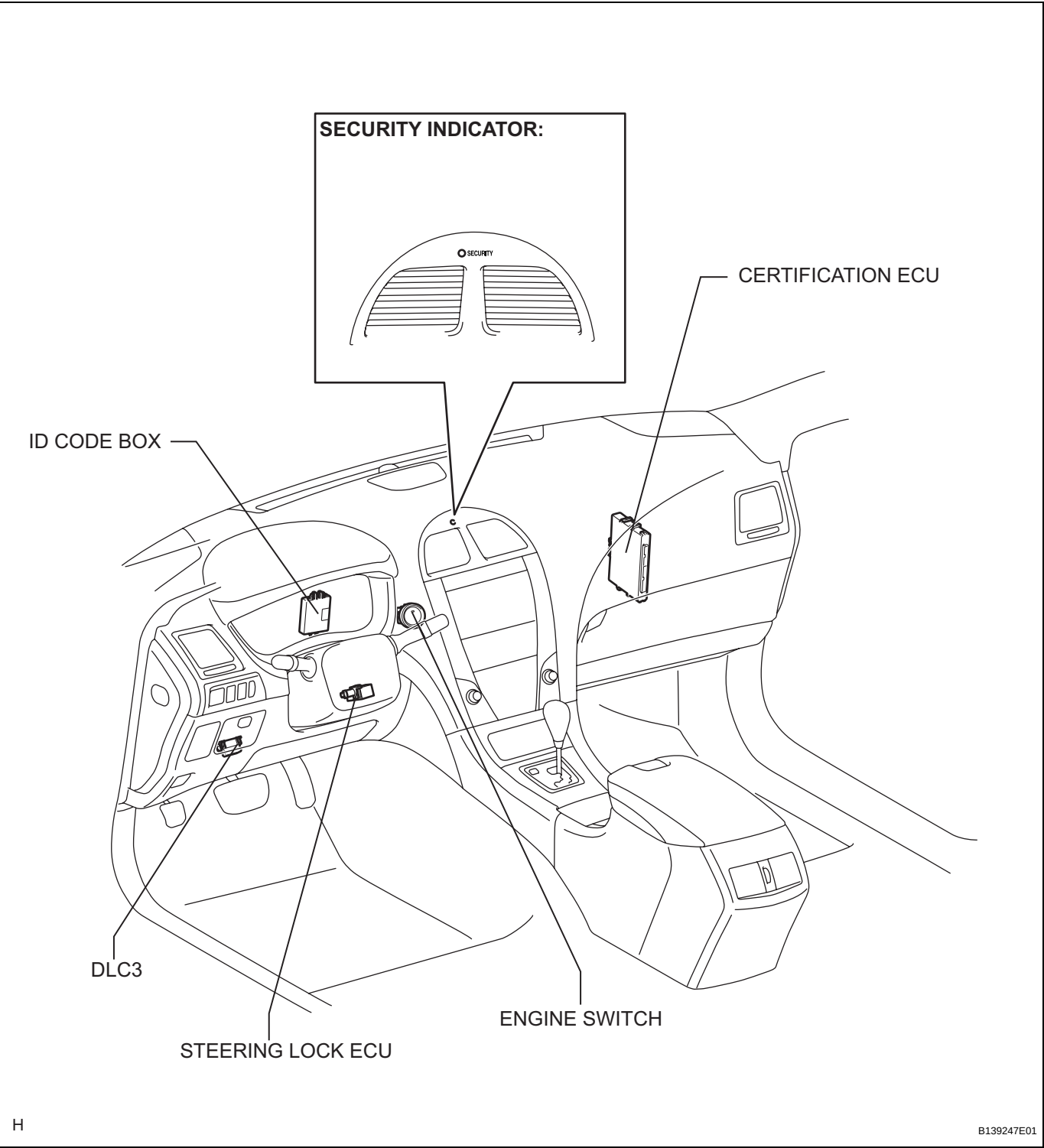
- (2) When the doors are locked (locked state), and the electrical key remains in the door oscillator detection area, the system will maintain periodic communication with the electrical key. If the vehicle remains parked in this state for a long time, the vehicle and key batteries could become discharged. If the vehicle is not being used, keep the electrical key at least 2 m (6.56 ft) from the vehicle.

PARTS LOCATION



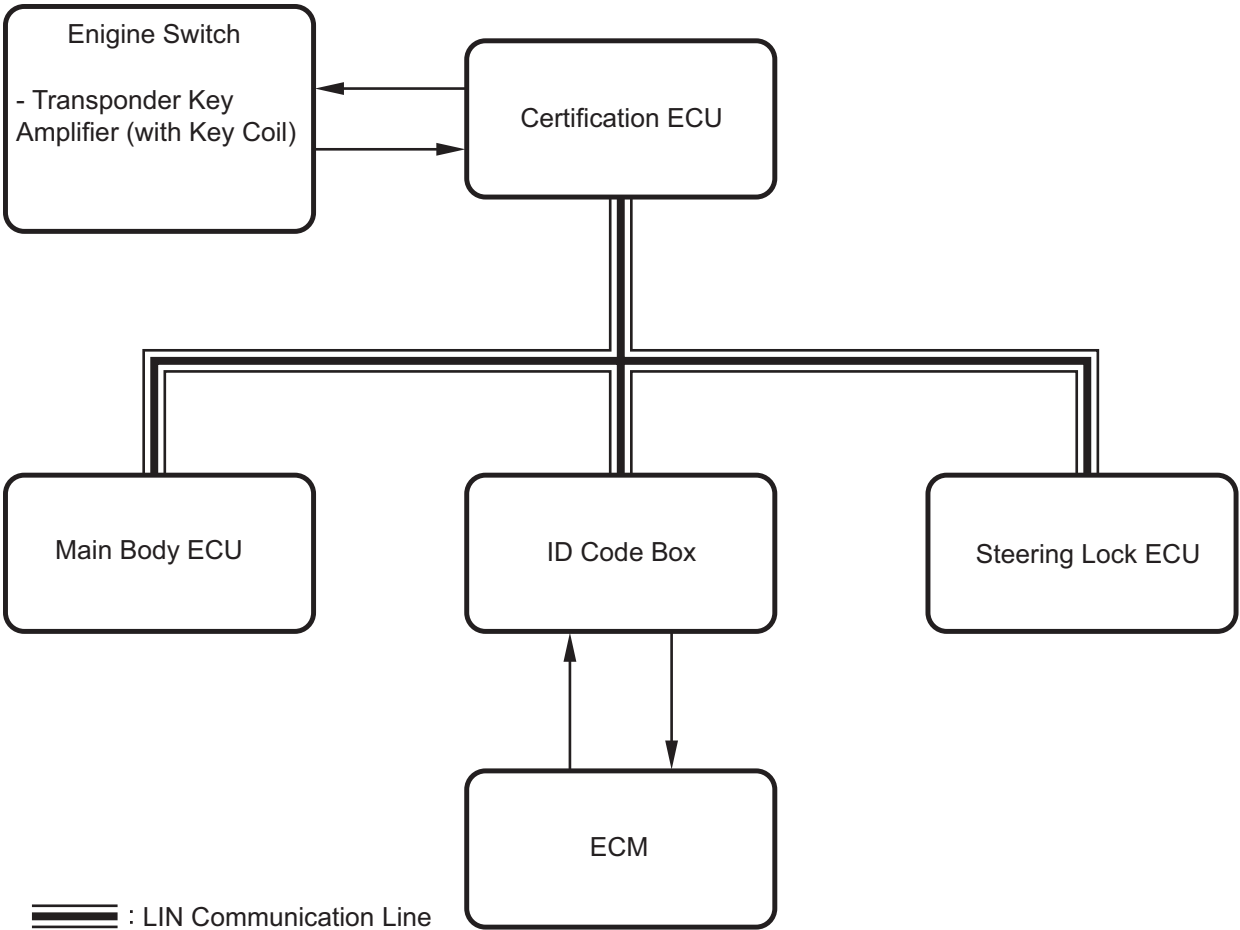
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SYSTEM DIAGRAM

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Communication table:

Transmitting ECU (Transmitter)	Receiving ECU (Receiver)	Signals	Communication method
Main body ECU	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 SFI 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 SFI system cannot be started. The certification ECU manages communication with the ECM, main body ECU, steering lock ECU and ID code box. When the ID codes of the transponder chip and certification ECU match, the certification ECU authorizes the SFI system to start.

2. FUNCTION OF MAIN COMPONENT

Component	Outline
Transponder key coil/amplifier (built into engine 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 engine 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 engine switch is pressed while the brake pedal is depressed, the main body ECU 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 sends a certification pass response signal. When the main body ECU receives this signal, the ACC relay is switched on and the IG1 and IG2 relays are switched on in sequence. At this time, the

engine 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. After receiving this signal, the main body ECU 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 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 engine switch. At this time, the engine switch sends an RF wave communication signal to the immobiliser. If the driver holds the key up to the engine switch at this time, the engine switch receives the immobiliser RF wave signal and responds by sending a radio wave signal. When the engine 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 while simultaneously sending a sound buzzer request signal to the meter ECU. When the main body ECU receives this signal, the ACC relay is switched on and the IG1 and IG2 relays are switched on in sequence. At this time, the engine 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. After receiving this signal, the main body ECU 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.

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 and 5.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CRANK ENGINE FOR MORE THAN 10 SECONDS

NEXT

3 CHECK FOR DTCS

- Check for DTCs and note any codes that are output (See page [EI-25](#)).
- Delete the DTCs.
- Recheck for DTCs. Based on the DTCs output above, try to duplicate the SFI system DTC or engine immobiliser system DTC by simulating the symptoms indicated by the DTC.

Result

Result	Proceed to
DTC output does not reoccur	A
SFI system DTC output reoccurs	B (See page ES-59)
Engine immobiliser system DTC output reoccurs	C (See page EI-27)

B

GO TO SFI SYSTEM

C

GO TO DTC CHART

A

4 PROBLEM SYMPTOMS TABLE

- If the fault is not listed on the problem symptoms table, proceed to A.
- If the fault is listed on the problem symptoms table, proceed to B.

B

GO TO STEP 6

A

5	OVERALL ANALYSIS AND TROUBLESHOOTING
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- (a) DATA LIST/ACTIVE TEST (See page [EI-25](#))
- (b) TERMINALS OF ECU (See page [EI-16](#))

NEXT

6	ADJUST, REPAIR OR REPLACE
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NEXT

7	CONFIRMATION TEST
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NEXT

END

REGISTRATION

1. DESCRIPTION OF CODE REGISTRATION

HINT:

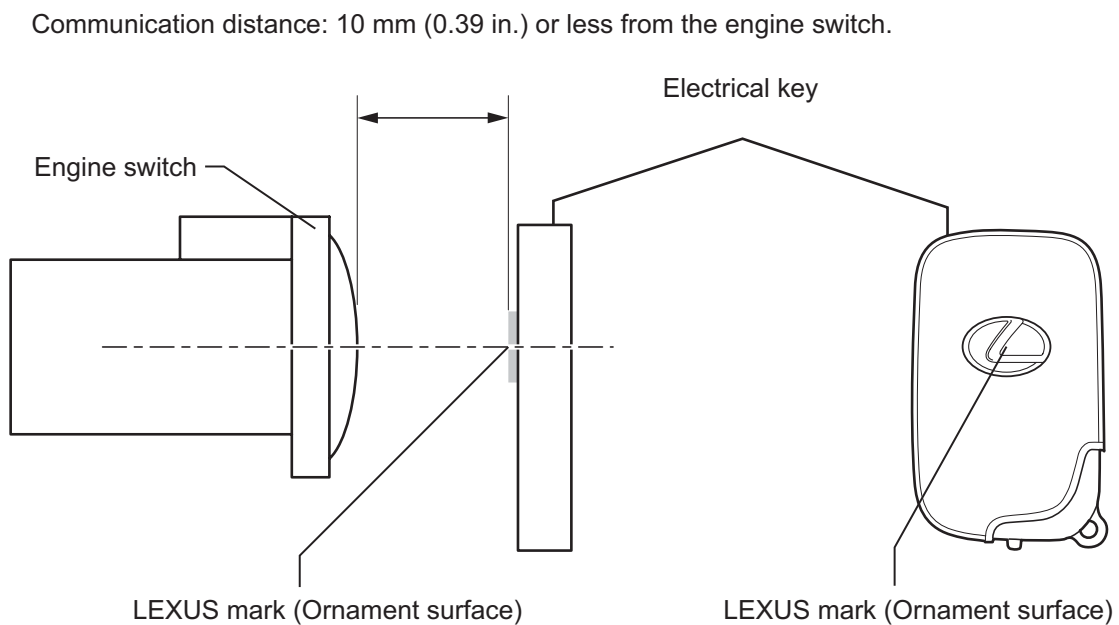
- ID codes are the same as recognition codes for the wireless transmitter and the engine immobiliser function. Registering an ID code enables the smart access system with push-button start, the wireless door lock control function and the engine immobiliser function to be operated.
- Code registration 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 access system with push-button start system does not have a key slot. Therefore, hold the key close to the engine switch to register the key, as shown in the illustration below.

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



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 access system with push-button start.

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.

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"	

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	No condition required	Replace main body ECU	-
ECM	No condition required	1. Replace ECM	-
		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 engine switch on (IG) 3. Select "SMART ACCESS / ID UTILITY / SMART CODE REG" from tester menu HINT: The engine 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 engine 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

*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 engine switch on (IG) 3. Select "SMART ACCESS / ID UTILITY / SMART CODE REG" from tester menu HINT: The engine 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 engine 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 engine 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.

(c) PROCEDURE "C"
Additional key ID registration

Process	Procedure
1. Start of registration	1. Connect intelligent tester (with CAN VIM) to DLC3 2. Turn engine switch on (IG) 3. Select "SMART ACCESS / 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 engine 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 engine 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 engine switch on (IG) 3. Select "SMART ACCESS / 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 engine 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

*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 engine switch on (IG) 3. Select "SMART ACCESS / 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 engine 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

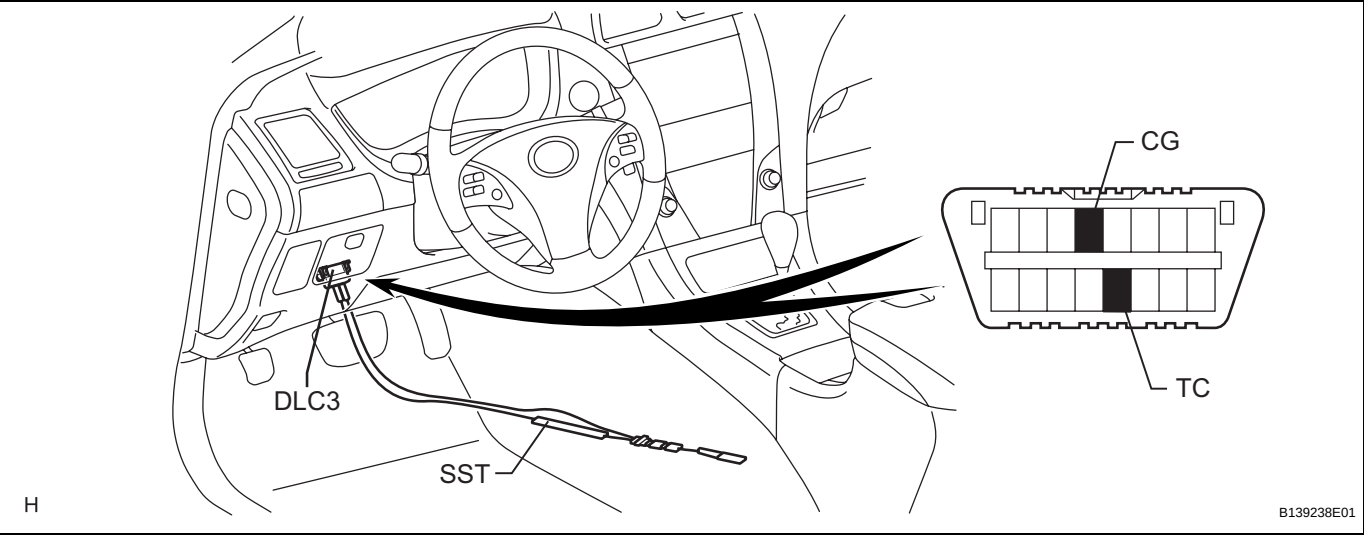
*1: Perform this process for one of the keys registered for the vehicle. Finish the procedure within 30 seconds. If the procedure has not been finished within the specified time, perform erasure procedures from process 1 again.

(f) PROCEDURE "F"
ECU communication ID registration

NOTICE:

- The ECU communication ID should be registered when the ID code box and/or the ECM is replaced in order to match these ECM communication ID.
- The engine cannot be started unless the ECM communication ID matches.

Register the ECU communication ID.



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

SST 09843-18040

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

HINT:

Do not start the engine.

- (3) Turn the engine switch off and disconnect terminals TC and CG.
- (4) Check that the engine starts.

PROBLEM SYMPTOMS TABLE

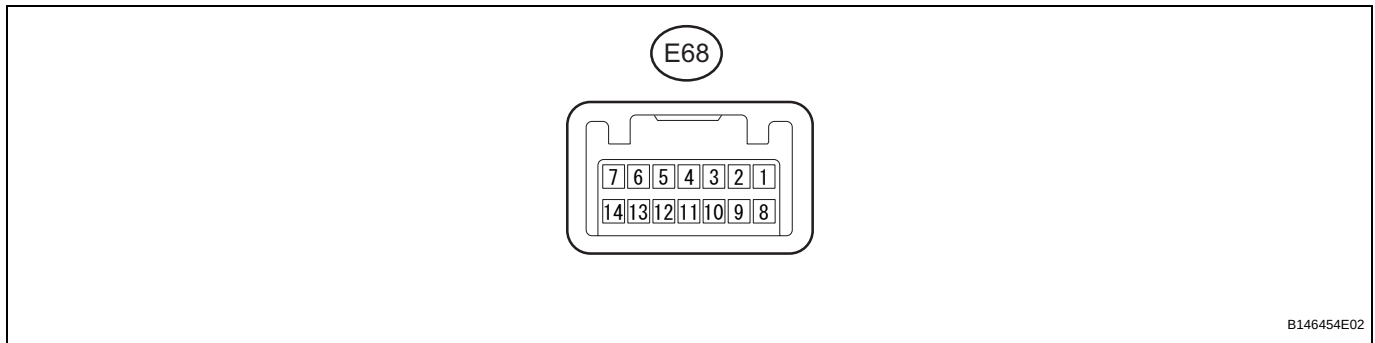
HINT:
Use the table below to help determine the cause of the problem symptom. The potential cases of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected area in the order they are listed. Replace parts as necessary.

ENGINE IMMOBILISER SYSTEM

Symptom	Suspected Area	See page
Engine does not start	1. Key	EI-25
	2. ID code box power source circuit	EI-49
	3. Certification ECU power source circuit	EI-51
	4. Steering lock ECU power source circuit	SR-74
	5. Smart access system with push button start	ST-15
	6. SFI system	ES-10

TERMINALS OF ECU

1. CHECK ENGINE SWITCH



- (a) Disconnect the E68 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 (E68-8) - Body ground	V - 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 E68 switch connector.
- (d) Measure the resistance and voltage according to the value(s) in the table below.

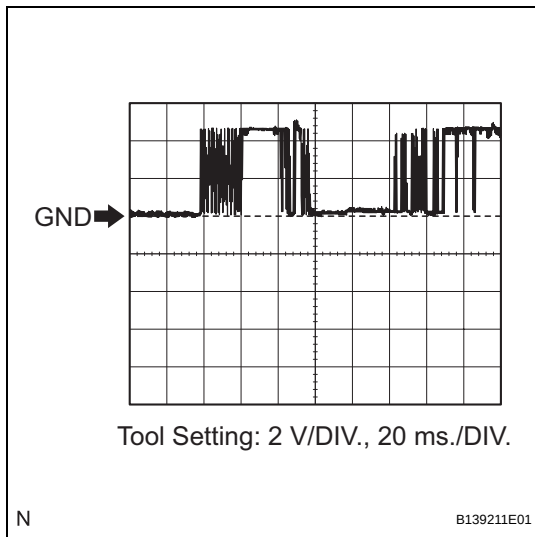
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
AGND (E68-8) - Body ground	V - Body ground	Ground	Always	Below 1 Ω
VC5 (E68-14) - AGND (E68-8)	O - V	Power supply	Key is not in cabin	Below 1 V
			Press engine switch	4.6 to 5.4 V
CODE (E68-10) - AGND (E68-8)	W - V	Demodulated signal of key code data	Key is not in cabin	Below 1 V
			Press engine switch and hold key close to engine switch*	Pulse generation (see waveform 1)
TXCT (E68-9) - AGND (E68-8)	GR - V	Key code output signal	Key is not in cabin	Below 1 V
			Press engine switch and hold key close to engine 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.

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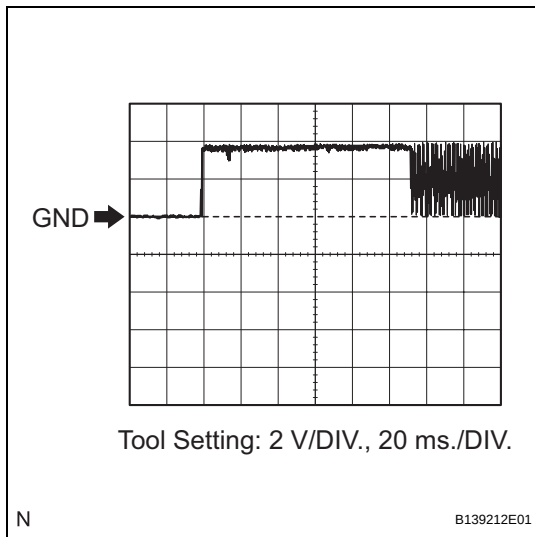


- (e) Inspect using an oscilloscope.
(1) Waveform 1 (Reference)

Item	Content
Symbols (Terminal No.)	CODE (E68-10) - AGND (E68-8)
Tool Setting	2 V/DIV., 20 ms./DIV.
Condition	Press engine switch and hold key close to engine switch*

HINT:

*: Remove the key battery before performing this inspection.



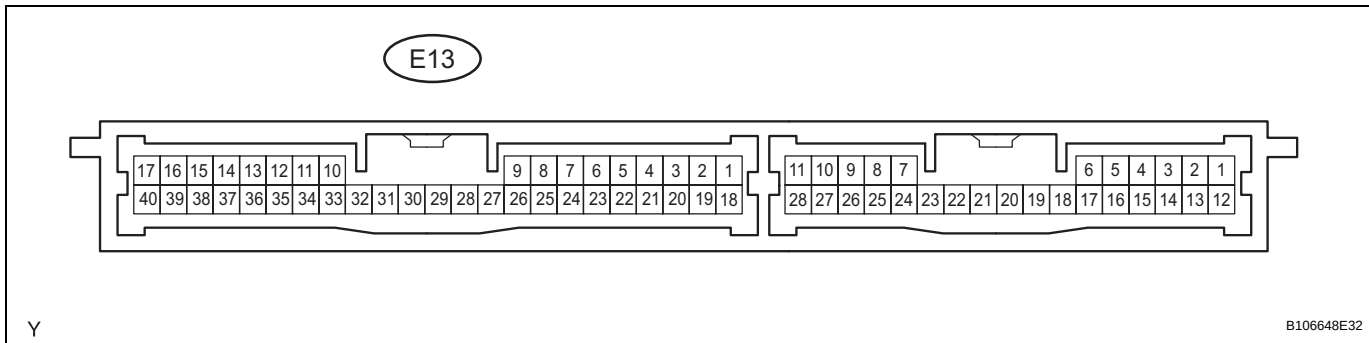
- (2) Waveform 2 (Reference)

Item	Content
Symbols (Terminal No.)	TXCT (E68-9) - AGND (E68-8)
Tool Setting	2 V/DIV., 20 ms./DIV.
Condition	Press engine switch and hold key close to engine switch*

HINT:

*: Remove the key battery before performing this inspection.

2. CHECK CERTIFICATION ECU



- (a) Disconnect the E13 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 (E13-17) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
+B1 (E13-1) - E (E13-17)	W - W-B	+B power supply	Always	10 to 14 V
IG (E13-18) - E (E13-17)	B - 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 E13 ECU 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 (E13-40) - Body ground	V - Body ground	Power switch ground	Always	Below 1 Ω
VC5 (E13-30) - AGND (E13-40)	O - V	Power switch power supply	Key is not in cabin	Below 1 V
			Press engine switch*	4.6 to 5.4 V
CODE (E13-9) - AGND (E13-40)	W - V	Power switch CODE input	Key is not in cabin	Below 1 V
			Press engine switch and hold key close to engine switch*	Pulse generation (see waveform 1)
TXCT (E13-8) - AGND (E13-40)	GR - V	Power switch TXCT output	Key is not in cabin	Below 1 V
			Press engine switch and hold key close to engine 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.

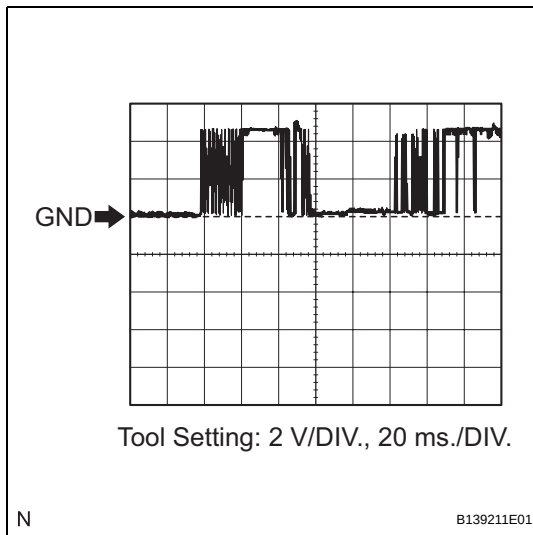
- (e) Inspect using an oscilloscope.

- (1) Waveform 1 (Reference)

Item	Content
Symbols (Terminal No.)	CODE (E13-9) - AGND (E13-40)
Tool Setting	2 V/DIV., 20 ms./DIV.
Condition	Press engine switch and hold key close to engine switch*

HINT:

*: Remove the key battery before performing this inspection.

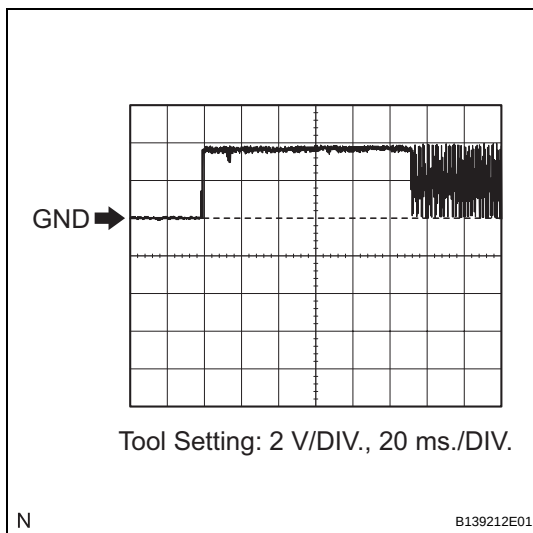


- (2) Waveform 2 (Reference)

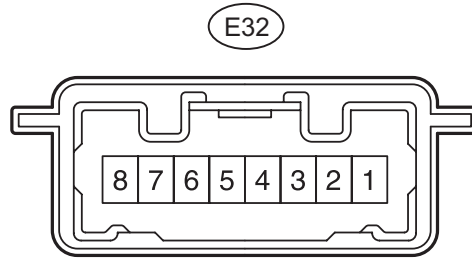
Item	Content
Symbols (Terminal No.)	TXCT (E13-8) - AGND (E13-40)
Tool Setting	2 V/DIV., 20 ms./DIV.
Condition	Press engine switch and hold key close to engine switch*

HINT:

*: Remove the key battery before performing this inspection.



3. CHECK ID CODE BOX



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- (a) Disconnect the E32 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 (E32-8) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
+B (E32-1) - GND (E32-8)	W - W-B	+B power supply	Always	10 to 14 V

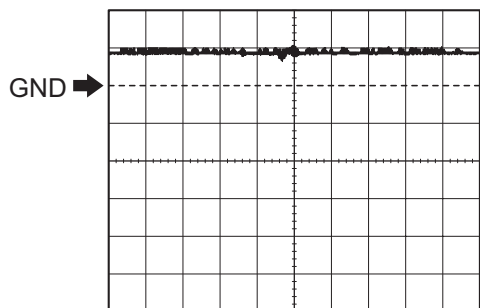
If the result is not as specified, there may be a malfunction on the wire harness side.

- (c) Reconnect the E32 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 (E32-5) - GND (E32-8)	BR - W-B	ECM input signal	Engine switch off	Below 1 V
			Engine switch on (IG)	Pulse generation (see waveform 1)
EFIO (E32-6) - GND (E32-8)	L - W-B	ECM output signal	Engine switch off	Below 1 V
			Engine switch on (IG)	Pulse generation (see waveform 2)

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

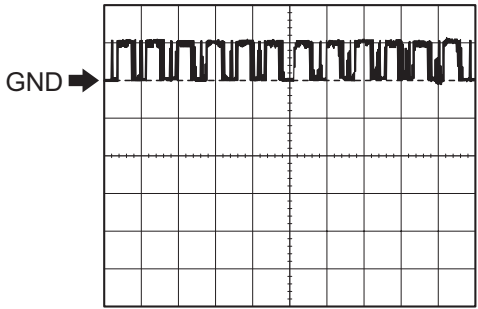
- (e) Inspect using an oscilloscope.
 (1) Waveform 1 (Reference)



Tool Setting: 10 V/DIV., 100 ms./DIV.

Item	Content
Symbols (Terminal No.)	EFII (E32-5) - GND (E32-8)
Tool Setting	10 V/DIV., 100 ms./DIV.
Condition	Engine switch on (IG)

(2) Waveform 2 (Reference)

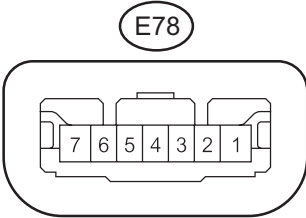


Tool Setting: 10 V/DIV., 100 ms./DIV.

Item	Content
Symbols (Terminal No.)	EFIO (E32-6) - GND (E32-8)
Tool Setting	10 V/DIV., 100 ms./DIV.
Condition	Engine switch on (IG)

4. CHECK STEERING CONTROL ECU

EI



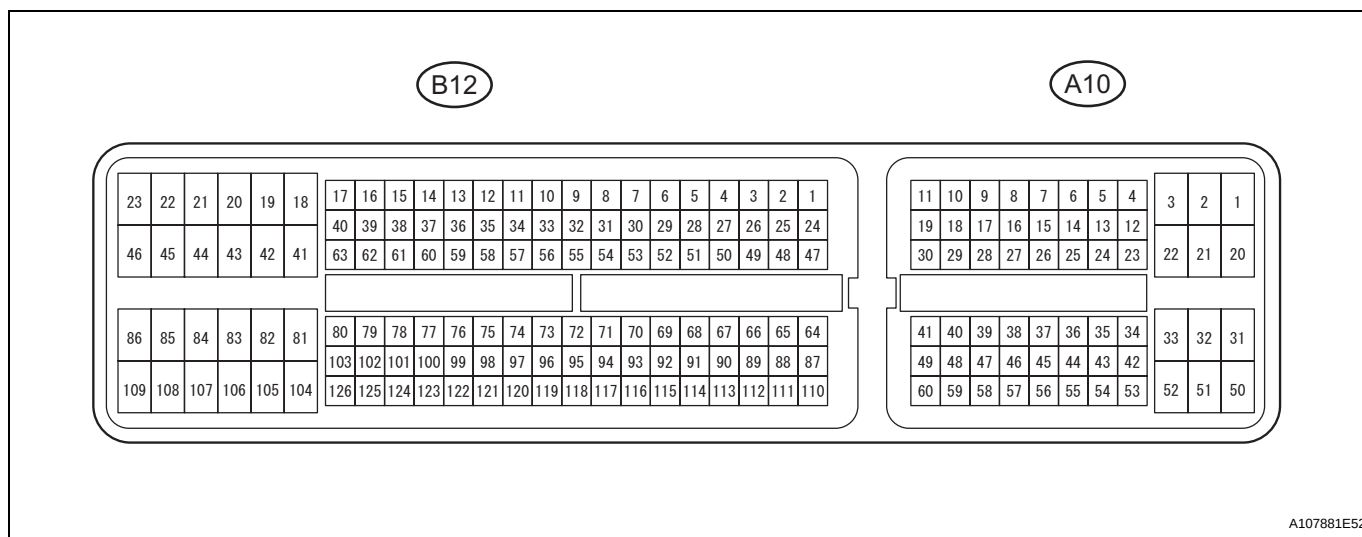
B118684E04

- (a) Disconnect the E78 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 (E78-2) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
GND (E78-1) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
B (E78-7) - Body ground	B - Body ground	+B power supply	Always	10 to 14 V
IG2 (E78-6) - Body ground	B - Body ground	Ignition power supply	Engine switch off	0 V
			Engine 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 ECM

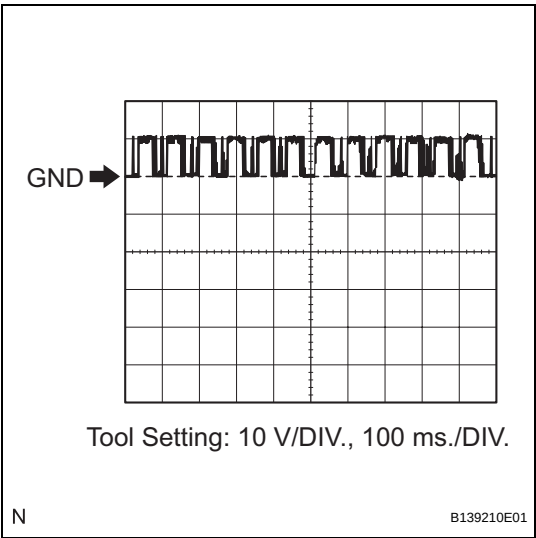


(a) Measure the resistance and voltage according to the value(s) in the table below.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
E1 (B12-81) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
E01 (B12-22) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
E02 (B12-21) - Body ground	B-W - Body ground	Ground	Always	Below 1 Ω
E03 (B12-104) - Body ground	B - Body ground	Ground	Always	Below 1 Ω
E04 (B12-23) - Body ground	W - Body ground	Ground	Always	Below 1 Ω
E05 (B12-46) - Body ground	W - Body ground	Ground	Always	Below 1 Ω
ME01 (B12-20) - Body ground	B - Body ground	Ground	Always	Below 1 Ω
BATT (A10-20) - E1 (B12-81)	Y - W-B	Battery (for measuring battery voltage and for ECM memory)	Always	10 to 14 V
+B (A10-2) - E1 (B12-81)	R - W-B	Power source of ECM	Engine switch off	Below 1 V
			Engine switch on (IG)	10 to 14 V
+B2 (A10-1) - E1 (B12-81)	R - W-B	Power source of ECM	Engine switch off	Below 1 V
			Engine switch on (IG)	10 to 14 V
IMI (A10-11) - E1 (B12-81)	Y - W-B	Immobiliser code ECU input signal	Engine switch off	Below 1 V
			Engine switch on (IG)	Pulse generation (see waveform 1)
IMO (A10-10) - E1 (B12-81)	G - W-B	Immobiliser code ECU output signal	Engine switch off	Below 1 V
			Engine switch on (IG)	Pulse generation (see waveform 2)

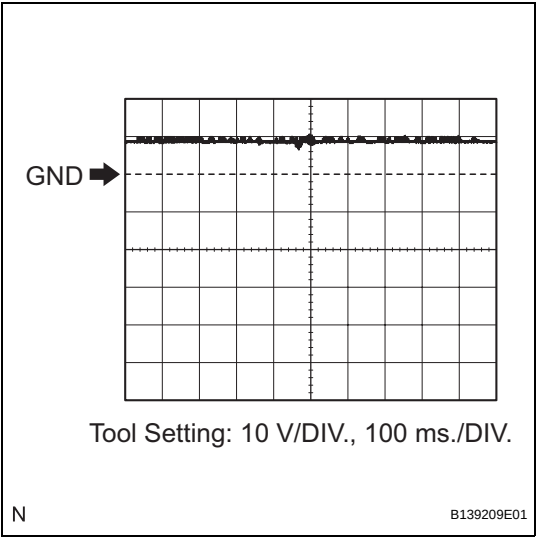
If the result is not as specified, the ECM may have a malfunction.

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



Item	Content
Symbols (Terminal No.)	IMI (A10-11) - E1 (B12-81)
Tool Setting	10 V/DIV., 100 ms./DIV.
Condition	Engine switch on (IG)

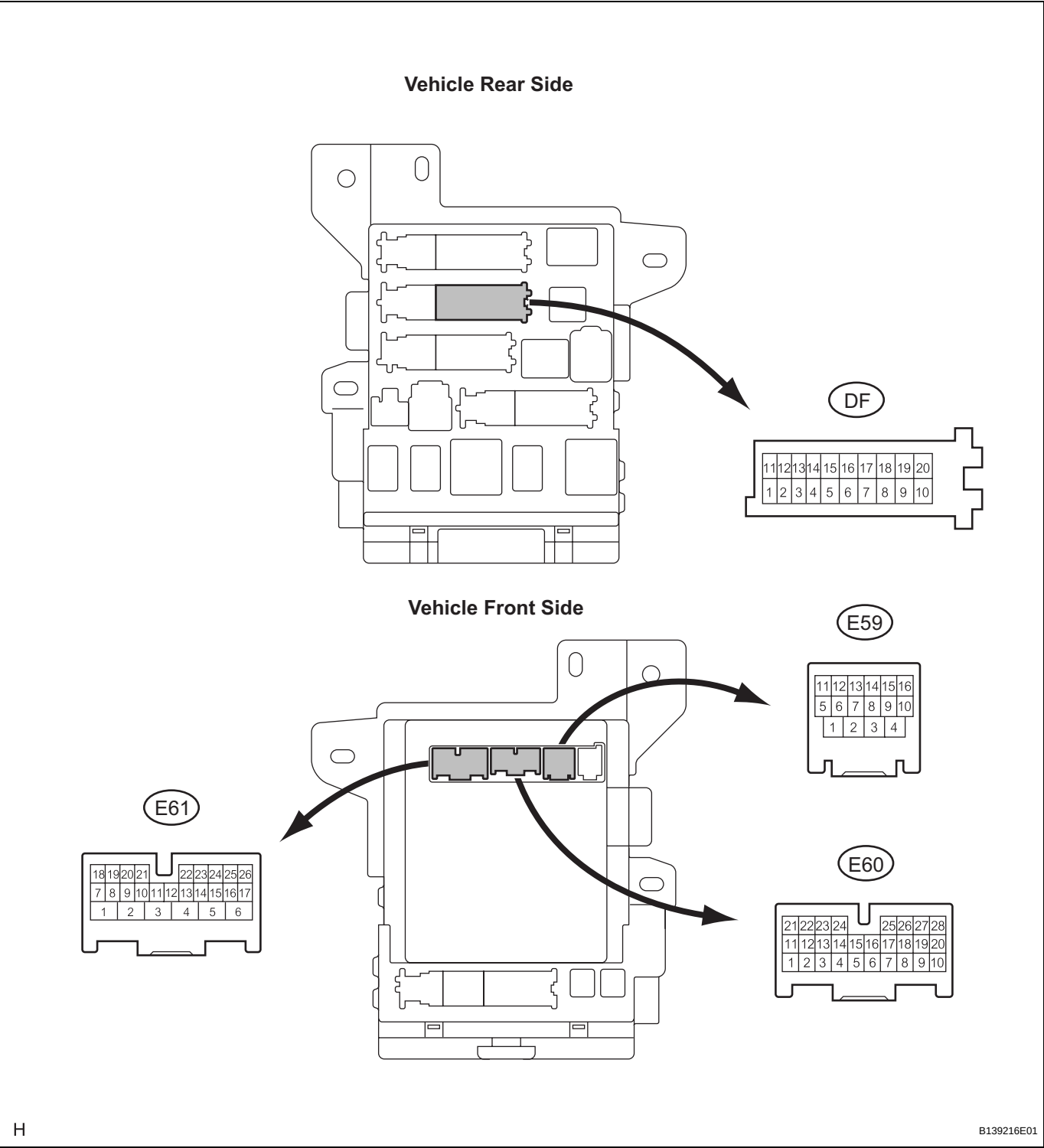
- (2) Waveform 2 (Reference)



Item	Content
Symbols (Terminal No.)	IMO (A10-10) - E1 (B12-81)
Tool Setting	10 V/DIV., 100 ms./DIV.
Condition	Engine switch on (IG)

6. **CHECK MAIN BODY ECU (INSTRUMENT PANEL J/B)**
(a) Disconnect the DF junction block connectors.

(b) Disconnect the E59, E61 and E60 main body ECU connectors.



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

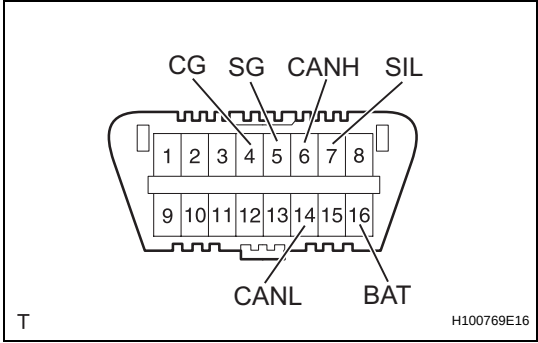
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND1 (DF-10) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
GND3 (E59-1) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
AM1 (E61-6) - Body ground	L - Body ground	+B power supply	Always	10 to 14 V
AM2 (E60-1) - 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.



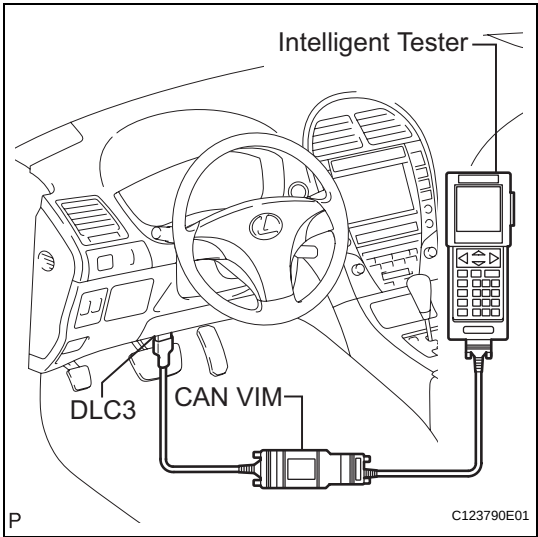
EI

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	Engine switch off*	54 to 69 Ω
CANH (6) - CG (4)	HIGH-level CAN bus line	Engine switch off*	200 Ω or higher
CANL (14) - CG (4)	LOW-level CAN bus line	Engine switch off*	200 Ω or higher
CANH (6) - BAT (16)	HIGH-level CAN bus line	Engine switch off*	6 kΩ or higher
CANL (14) - BAT (16)	LOW-level CAN bus line	Engine 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 engine switch, any other switches or the doors.**

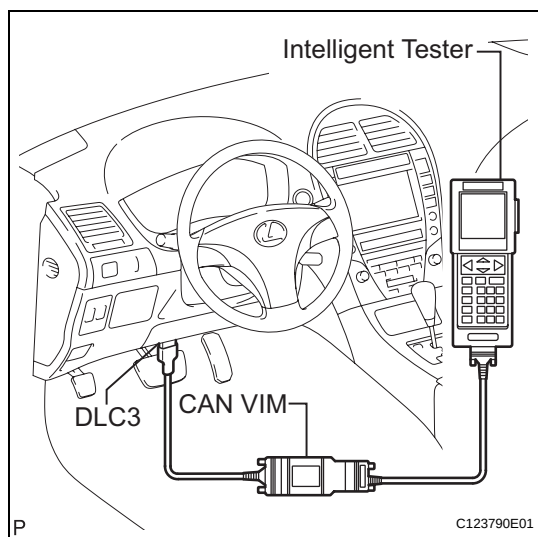
If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.



- (b) Connect the cable of the intelligent tester (with CAN VIM) to the DLC3, turn the engine 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

- (a) Connect the intelligent tester to the Controller Area Network Vehicle Interface Module (CAN VIM). Then connect the CAN VIM to the DLC3.
- (b) Turn the engine switch on (IG).
- (c) 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

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

HINT:

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

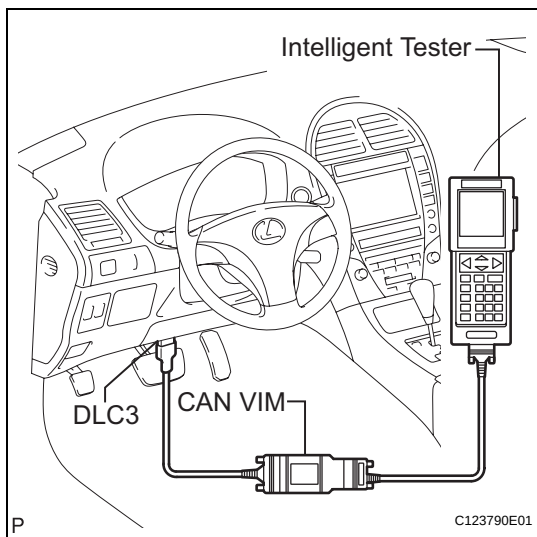
DATA LIST / ACTIVE TEST

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.

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



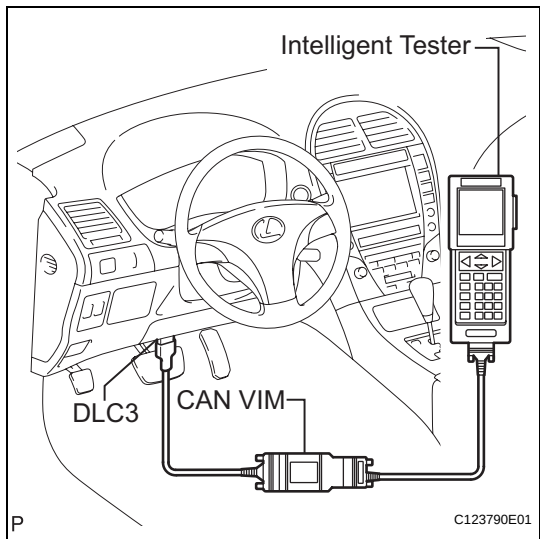
SMART ACCESS:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
IG SW	Engine switch on (IG) signal / ON or OFF	ON: Engine switch on (ACC, IG) or start OFF: Engine switch off	-
ACC SW	Engine switch on (ACC) signal / ON or OFF	ON: Engine switch on (ACC, IG) or start OFF: Engine 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	-
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	-
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	-

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 engine switch on (IG).
- (c) Perform the ACTIVE TEST by following the directions on the tester screen.



SMART ACCESS:

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

DIAGNOSTIC TROUBLE CODE CHART

CERTIFICATION ECU DIAGNOSTIC TROUBLE CODE CHART

DTC Code	Detection Item	Trouble Area	See page
B2784	Antenna Coil Open / Short	1. Wire harness 2. Engine switch 3. Certification ECU	EI-28
B2785	Communication Malfunction between ECUs Connected by LIN	1. Wire harness 2. Certification ECU 3. Main body ECU 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. Engine switch 3. Certification ECU	EI-40
B2790	ID BOX EEPROM Malfunction	ID code box	EI-43
B2791	Communication Condition Failure between ECM	-	EI-44

ECM DIAGNOSTIC TROUBLE CODE CHART

DTC Code	Detection Item	Trouble Area	See page
B2799	Engine Immobiliser System Malfunction	1. Wire harness 2. ECM 3. ID code box	EI-46

HINT:

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

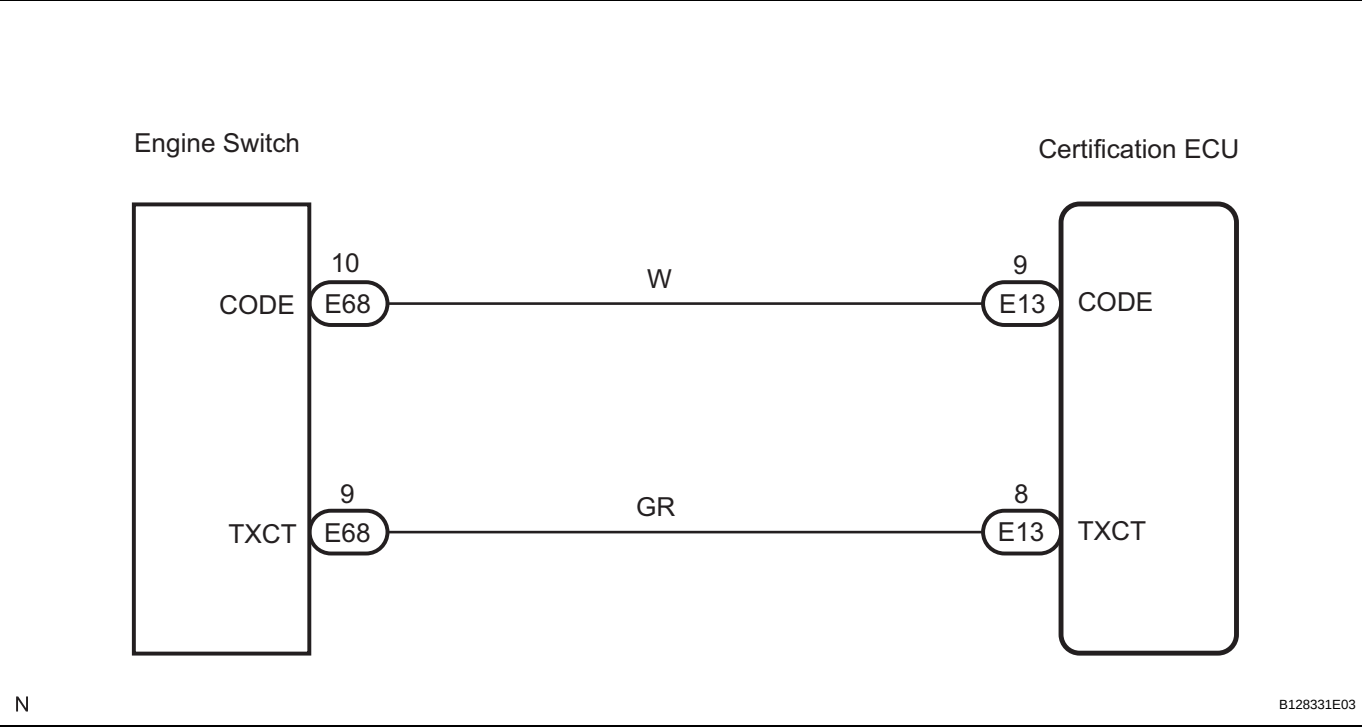
DTC	B2784	Antenna Coil Open / Short
-----	-------	---------------------------

DESCRIPTION

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

DTC No.	DTC Detection Condition	Trouble Area
B2784	Antenna coil is open/shorted	• Wire harness • Engine switch • 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	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 reoccurs	A
B2784 output does not reoccur	B

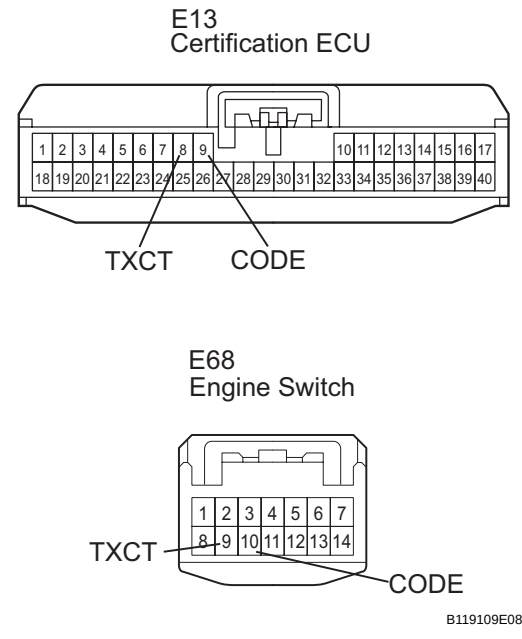
A

B

USE SIMULATION METHOD TO CHECK

2 CHECK HARNESS AND CONNECTOR (CERTIFICATION ECU - ENGINE SWITCH)

Wire Harness Side Connector Front View:



- (a) Disconnect the E13 ECU and E68 switch connectors.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
E13-9 (CODE) - E68-10 (CODE)	Below 1 Ω
E13-8 (TXCT) - E68-9 (TXCT)	
E13-9 (CODE) - Body ground	10 k Ω or higher
E13-8 (TXCT) - Body ground	

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 CHECK ENGINE SWITCH

- (a) After replacing the engine switch (See page [ST-158](#)) with a normal one, check that the engine starts.

OK:

The engine starts.

NG

REPLACE CERTIFICATION ECU

OK

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:

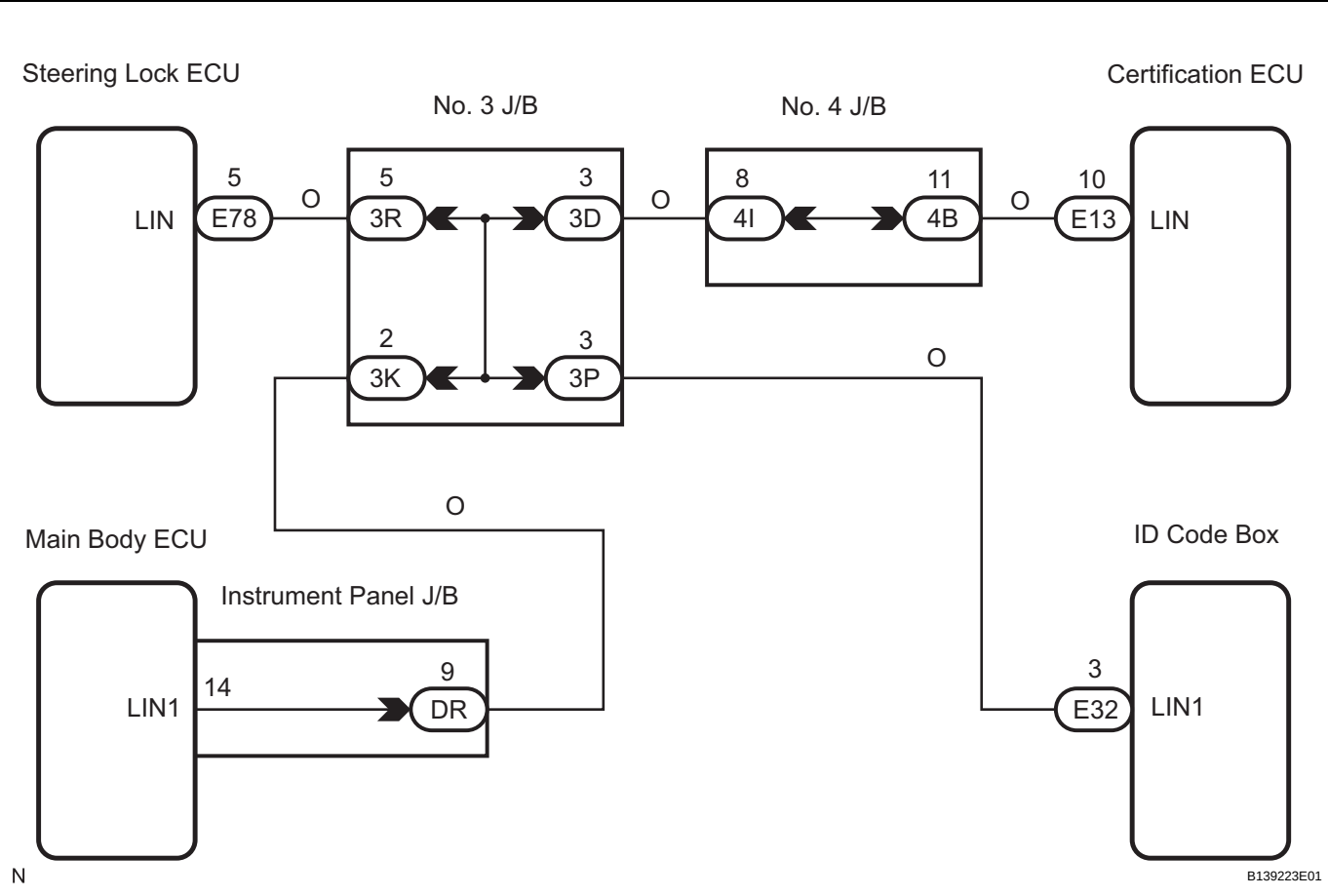
If this DTC B2785 is detected simultaneously with DTC B2786 , B2789 or B2287, troubleshoot DTC B2786, B2789 or B2287 first.

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 - Main body ECU)

○: 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 - Steering lock 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](#)).
- If the steering lock ECU or main body 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
B2785 output reoccurs	A
B2785 output does not reoccur	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 ECU COMMUNICATION ID REGISTRATION

- (a) Register the ECU communication ID between the ID code box and ECM (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 reoccurs	A
B2785 output does not reoccur	B

EI

B

END

A

6

REPLACE MAIN BODY ECU

- (a) Replace the main body ECU.

NEXT

EI

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 reoccurs	A
B2785 output does not reoccur	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 reoccurs	A

Result	Proceed to
B2785 output does not reoccur	B

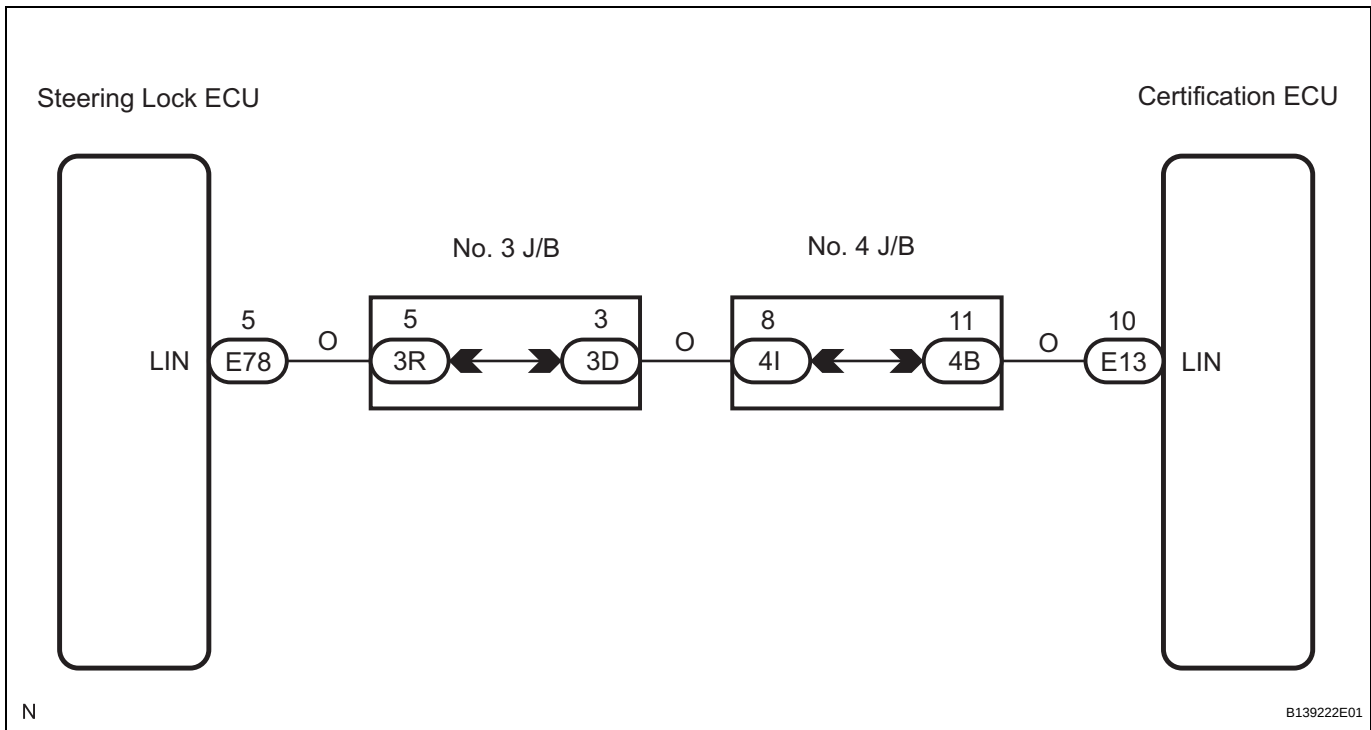


REPLACE ID CODE BOX

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**

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

Result

Result	Proceed to
B2786 output reoccurs	A
B2786 output does not reoccur	B

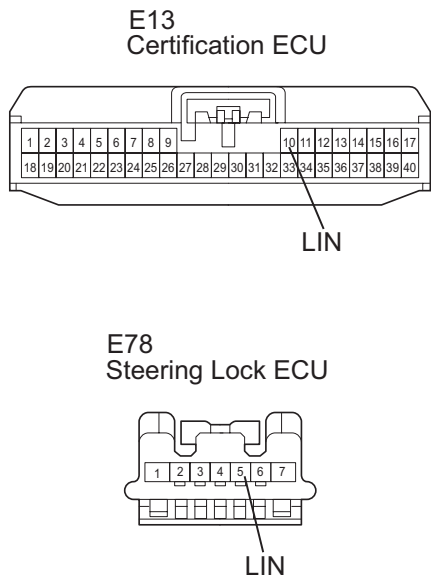
B**USE SIMULATION METHOD TO CHECK**

A

2

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

Wire Harness Side Connector Front View:



B118667E03

- (a) Disconnect the E13 and E78 ECU connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
E13-10 (LIN) - E78-5 (LIN)	Below 1 Ω
E13-10 (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

ECU COMMUNICATION ID REGISTRATION

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

NEXT

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 reoccurs	A
B2786 output does not reoccur	B

B

END

A

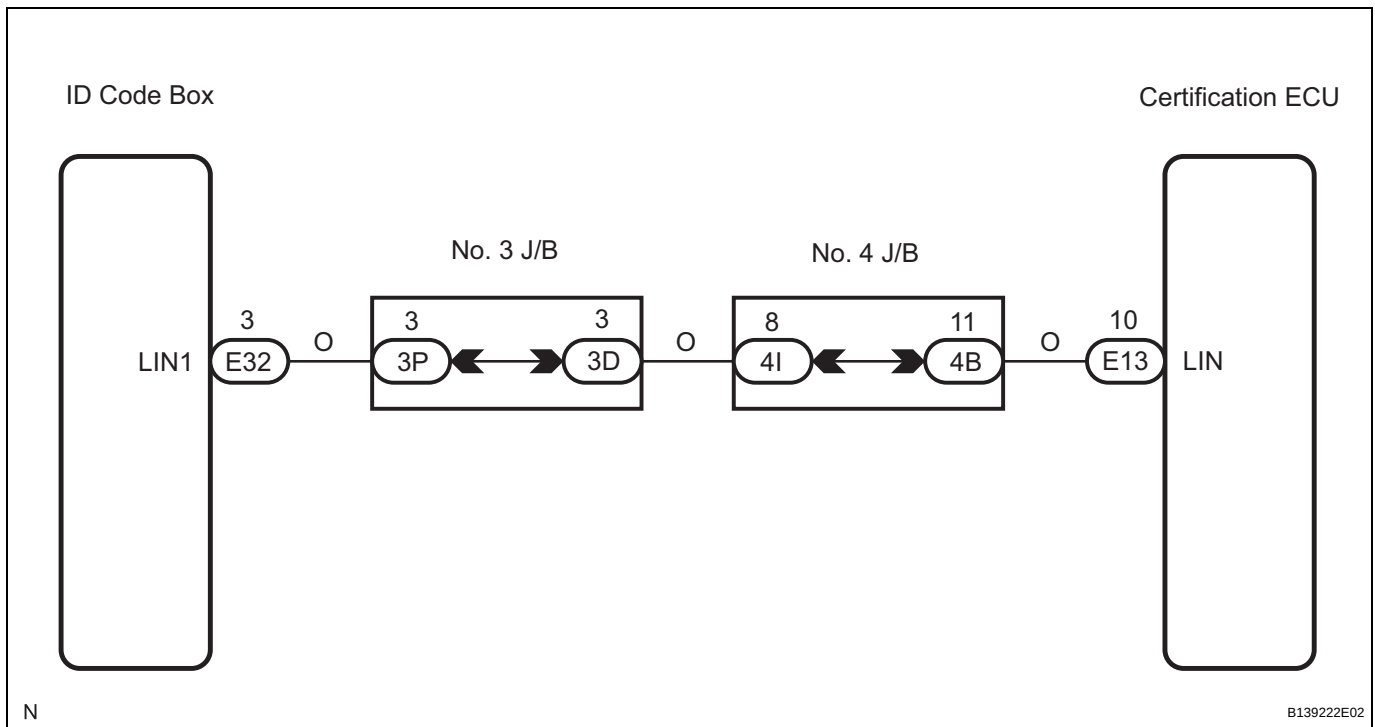
E

REPLACE STEERING LOCK ECU

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**

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

Result

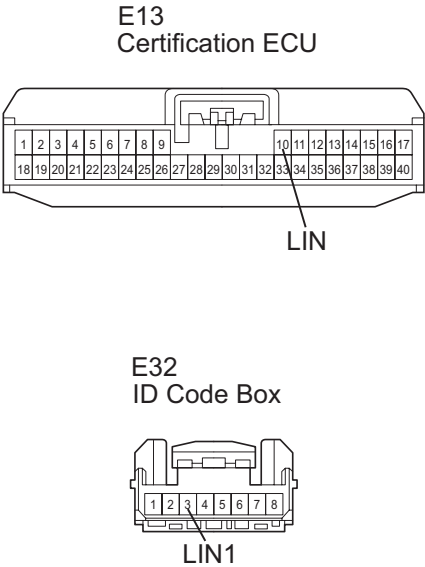
Result	Proceed to
B2789 output reoccurs	A
B2789 output does not reoccur	B

B**USE SIMULATION METHOD TO CHECK**

A

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

Wire Harness Side Connector Front View:



- (a) Disconnect the E13 ECU and E32 ID code box connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
E13-10 (LIN) - E32-3 (LIN1)	Below 1 Ω
E13-10 (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 ECU COMMUNICATION ID REGISTRATION

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

NEXT

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 reoccurs	A
B2789 output does not reoccur	B



REPLACE ID CODE BOX

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

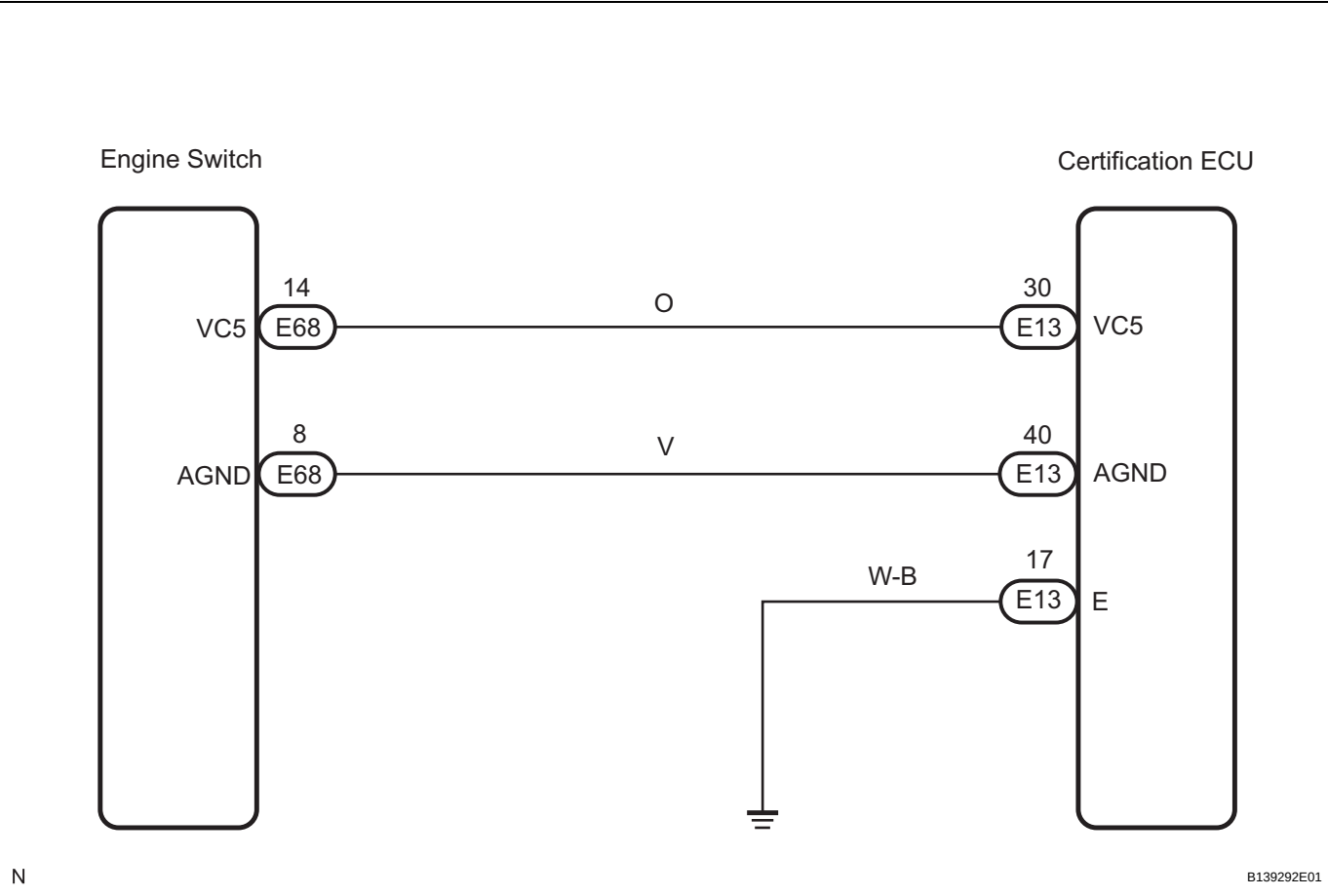
DESCRIPTION

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

DTC No.	DTC Detection Condition	Trouble Area
B278A	Engine switch power source supply line is open or shorted	• Wire harness • Engine 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 reoccurs	A
B278A output does not reoccur	B

B

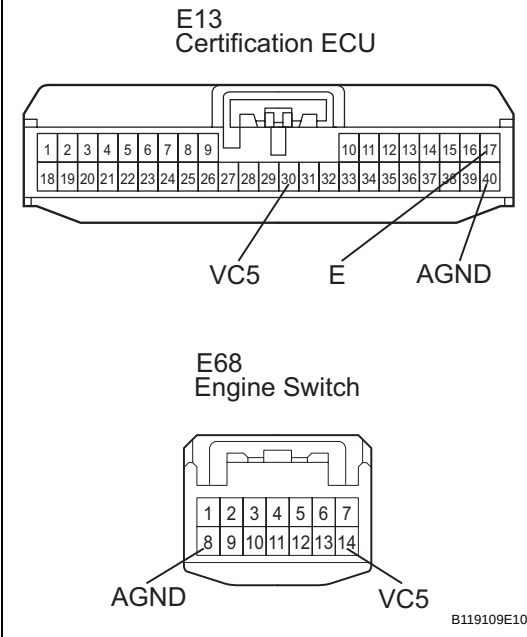
USE SIMULATION METHOD TO CHECK

A

2

CHECK HARNESS AND CONNECTOR (CERTIFICATION ECU - ENGINE SWITCH)

Wire Harness Side Connector Front View:



- (a) Disconnect the E13 ECU and E68 switch connectors.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
E13-30 (VC5) - E68-14 (VC5)	Below 1 Ω
E13-40 (AGND) - E68-8 (AGND)	
E13-17 (E) - Body ground	
E13-30 (VC5) - Body ground	10 k Ω or higher
E13-40 (AGND) - Body ground	

NG

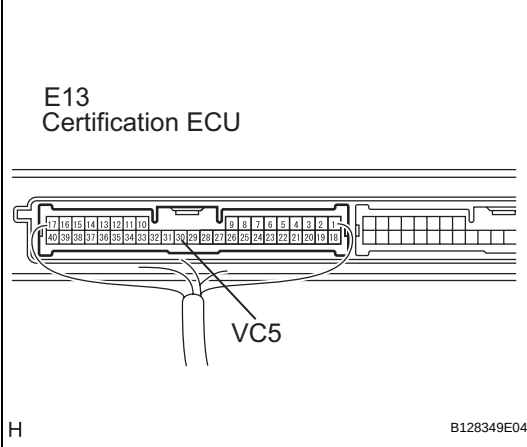
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

CHECK HARNESS AND CONNECTOR (ENGINE SWITCH POWER SOURCE)

Wire Harness Side Connector Rear View:



- (a) Reconnect the E13 ECU and E68 switch connectors.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
E13-30 (VC5) - Body ground	Key is not in cabin	Below 1 V
	Engine switch pressed	4.6 to 5.4 V

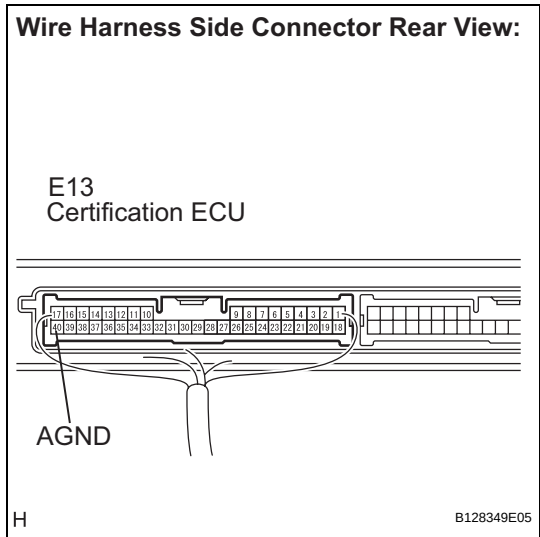
NG

REPLACE CERTIFICATION ECU

OK

4

CHECK HARNESS AND CONNECTOR (ENGINE SWITCH BODY GROUND)



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

Standard resistance

Tester Connection	Specified Condition
E13-40 (AGND) - Body ground	Below 1 Ω

NG

REPLACE CERTIFICATION ECU

OK

REPLACE ENGINE SWITCH (See page [ST-158](#))

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

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****EI**

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

DESCRIPTION

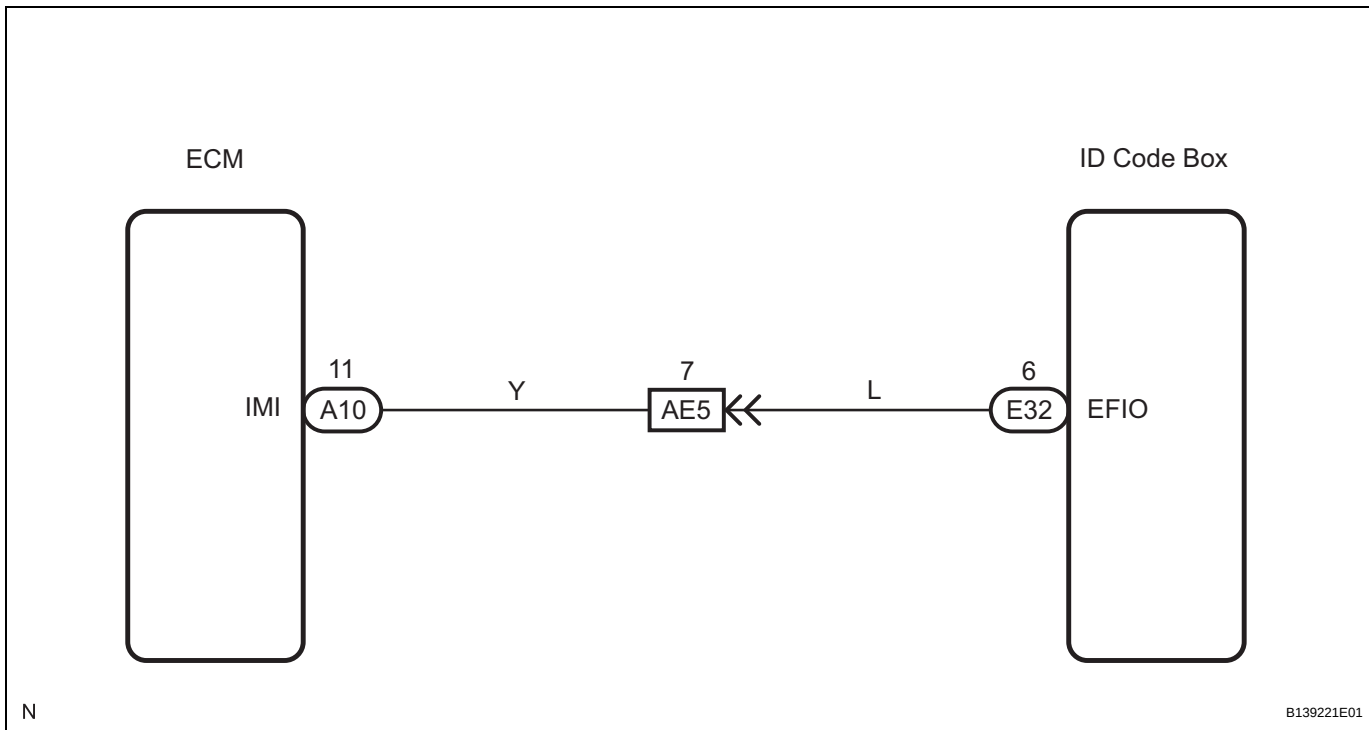
This DTC is output when the ID code box does not respond to a verification request signal from the ECM.

HINT:

- If the engine switch is turned off immediately after the engine starts, DTC B2791 will be detected. If DTC B2791 is cleared, this DTC will not reoccur because it does not indicate a malfunction.
- If this DTC B2791 is detected simultaneously with DTC B2799, troubleshoot B2799 first.

EI

DTC No.	DTC Detection Condition	Trouble Area
B2791	ID code box does not respond to a verification request signal from ECM • Perform this step when the engine switch is turned off immediately after the engine starts.	-

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-25](#)).

1	CHECK ENGINE START
----------	---------------------------

- Delete the DTCs (See page [EI-25](#)).
- Check that the engine starts.

Result

Result	Proceed to
Engine does not start	A

Result	Proceed to
Engine starts	B

HINT:

Perform this step when the engine switch is turned off immediately after the engine starts.

B

END

A

2

CHECK DTC OUTPUT

EI

(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 engine 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.

B

GO TO SMART ACCESS SYSTEM WITH
PUSH-BUTTON START (See page [ST-17](#))

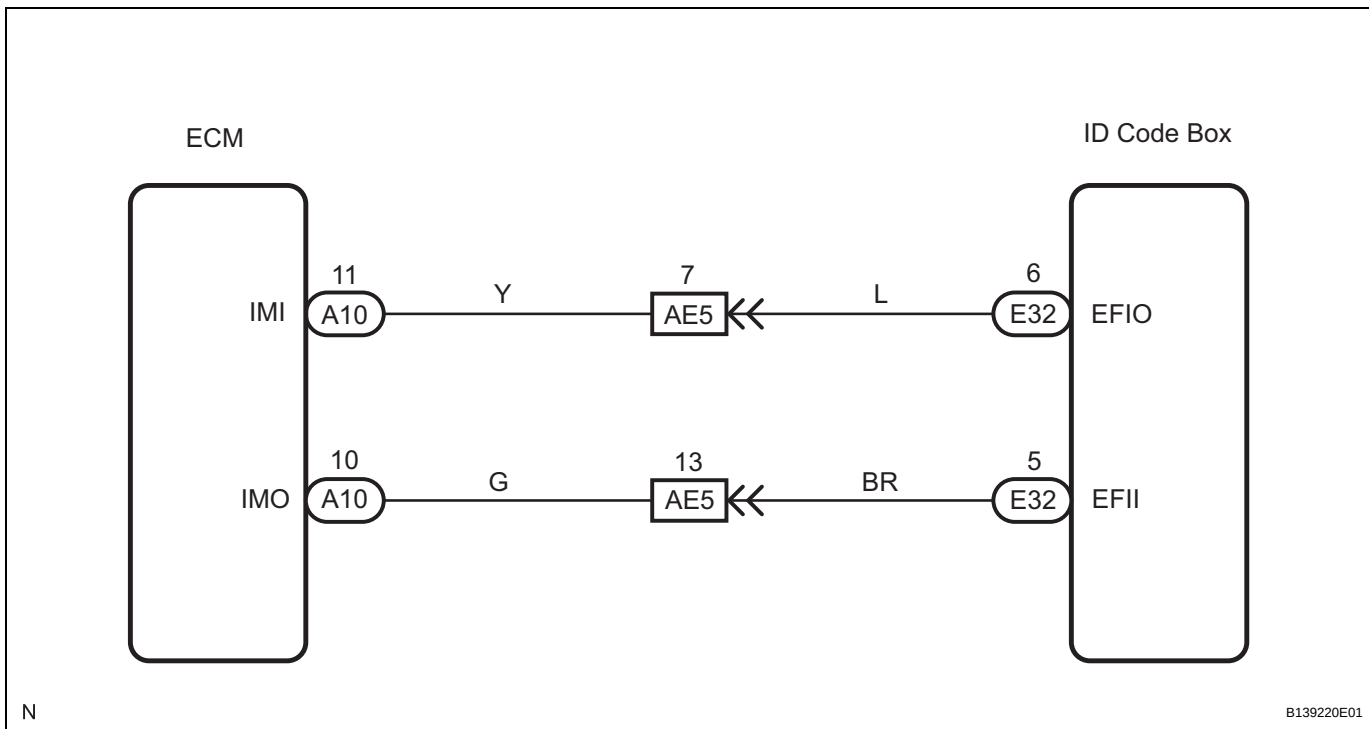
A

REPAIR CIRCUITS INDICATED BY OUTPUT DTCS

DTC**B2799****Engine Immobiliser System Malfunction****DESCRIPTION**

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

DTC No.	DTC Detection Condition	Trouble Area
B2799	One of following conditions is met: - Error in communication between ECM and ID code box - Error in communication lines - Communication ID is different between ID code box and ECM during communication	- Wire harness - ECM - 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 ECM is replaced, register the ECU communication ID (See page EI-9).

1**CHECK DTC OUTPUT**

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

Result

Result	Proceed to
B2799 output reoccurs	A

Result	Proceed to
B2799 output does not reoccur	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 ECM.
- (b) Check that the engine starts.

OK:
The engine starts.

OK

END

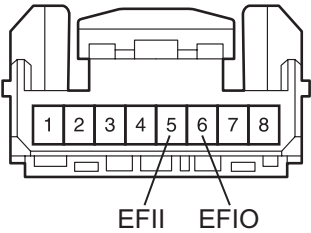
NG

3

CHECK HARNESS AND CONNECTOR (ID CODE BOX - ECM)

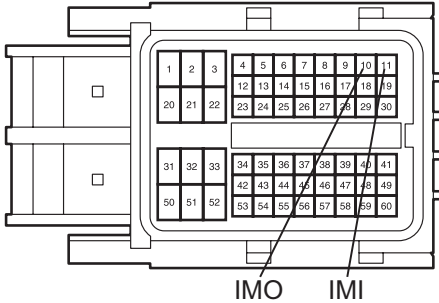
Wire Harness Side Connector Front View:

E32
ID Code Box



EFII EFIO

A10
ECM



IMO IMI

N

B128354E05

- (a) Disconnect the E32 ID code box and A10 ECM connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
E32-5 (EFII) - A10-10 (IMO)	Below 1 Ω
E32-6 (EFIO) - A10-11 (IMI)	
E32-5 (EFII) - Body ground	10 k Ω or higher
E32-6 (EFIO) - Body ground	

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4

REPLACE ECM

(a) Replace the ECM (See page [ES-543](#)).

NEXT

5

ECU COMMUNICATION ID REGISTRATION

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

NEXT

6

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 reoccurs	A
B2799 output does not reoccur	B

B

END

A

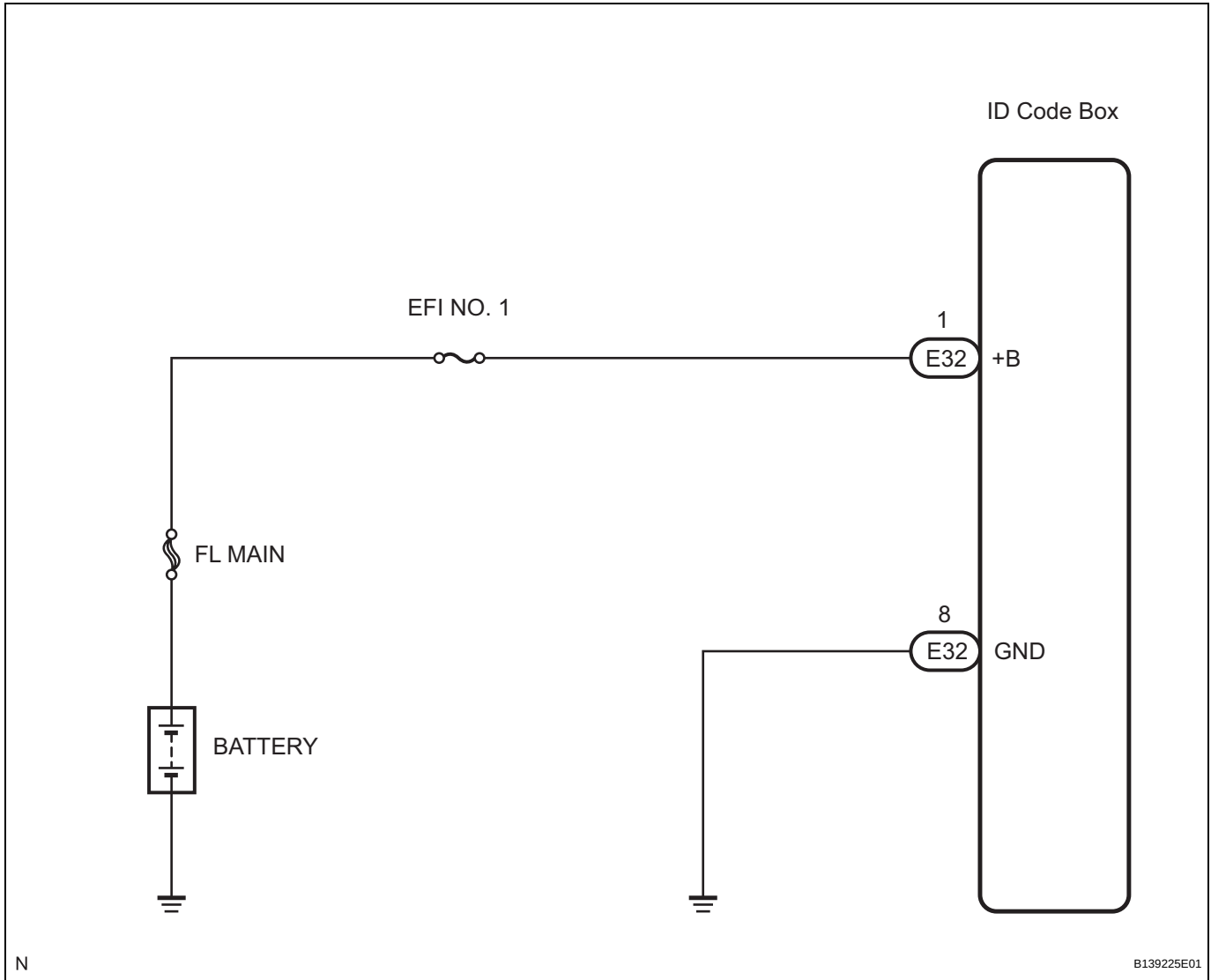
REPLACE ID CODE BOX

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)

- Remove the EFI No. 1 fuse from the No. 1 engine room R/B.
- Measure the resistance of the fuse.

Standard resistance:

Below 1 Ω

NG

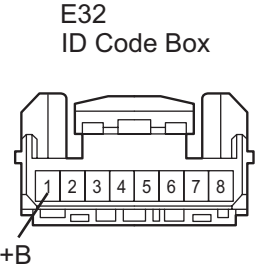
REPLACE FUSE

OK

2

CHECK HARNESS AND CONNECTOR (ID CODE BOX - BATTERY)

Wire Harness Side Connector Front View:



E32
ID Code Box

+B

Y

B107455E24

- (a) Disconnect the E32 ID code box connector.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
E32-1 (+B) - Body ground	10 to 14 V

NG

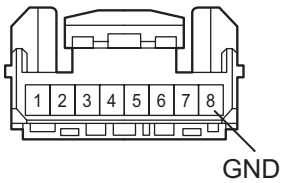
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

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

Wire Harness Side Connector Front View:



E32
ID Code Box

GND

Y

B107455E25

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

Standard resistance

Tester Connection	Specified Condition
E32-8 (GND) - Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

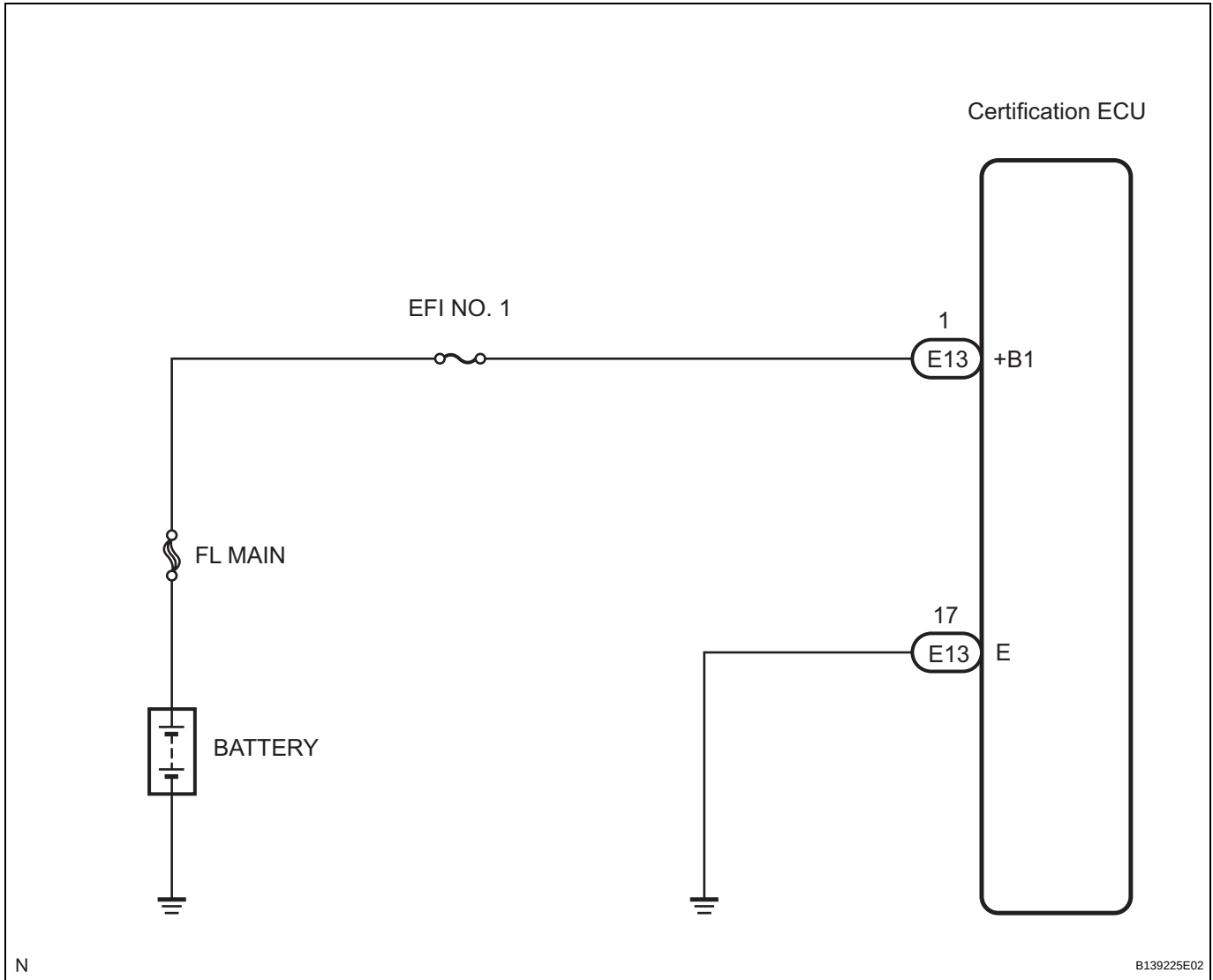
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

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)

- Remove the EFI No. 1 fuse from the No. 1 engine room R/B.
- Measure the resistance of the fuse.

Standard resistance:

Below 1 Ω

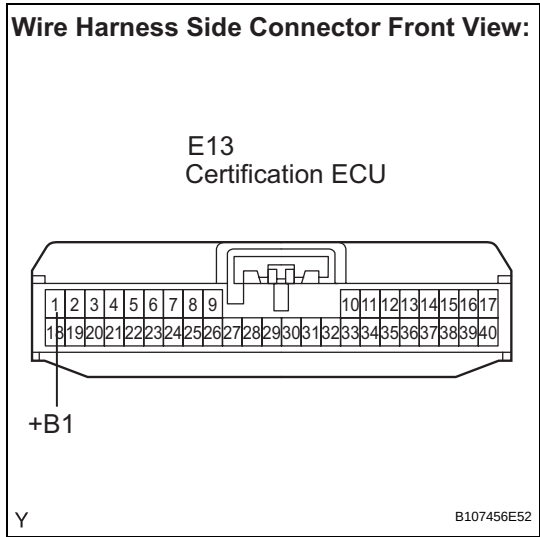
NG

REPLACE FUSE

OK

2

CHECK WIRE HARNESS (CERTIFICATION ECU - BATTERY)



- (a) Disconnect the E13 ECU connector.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
E13-1 (+B1) - Body ground	10 to 14 V

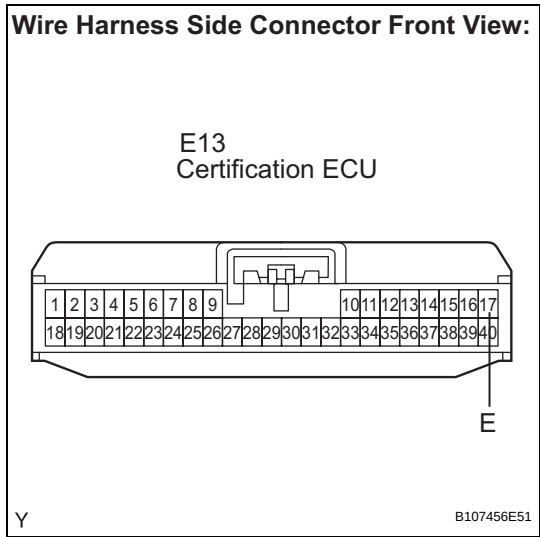
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

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
E13-17 (E) - Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE