

ACCESSORIES & EQUIPMENT

Engine Immobiliser System (w/Smart Key) (Diagnostics - Introduction) - Sienna

ENGINE IMMOBILISER SYSTEM (W/ SMART KEY SYSTEM)

PRECAUTION

PRECAUTION

1. PRECAUTIONS WHEN USING TECHSTREAM

- a. When using the Techstream with the engine switch off to troubleshoot: Connect the Techstream to the vehicle, and turn a courtesy light switch on and off at 1.5 second intervals until communication between the Techstream and vehicle begins.
- b. After all DTCs are cleared, check if the trouble occurs again 6 seconds after turning the engine switch on (IG).

2. PRECAUTIONS FOR EACH FUNCTION

- a. Precautions for the key:

The key is a precision instrument. Be sure to observe the following:

1. Do not drop or strike the key.
2. Do not keep the key in a high temperature area for a long time.
3. Do not use an ultrasonic washing machine to clean the key.
4. Keep the key away from magnets or magnetized items during use.
5. Do not attach any stickers to the 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 cable from the negative (-) battery terminal. When the battery cable is disconnected, the power source mode [off, on (ACC), on (IG)] is memorized. When battery depletion causes the vehicle power to be cut, be
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 on the first attempt. If this occurs, turn the engine switch off. The engine will start normally from the second time onward.
4. When the key battery is depleted or the key is affected by wave noise, and the key is held close to the engine switch to start the engine, etc., several warnings may sound. However, the warnings most likely sound because the vehicle cannot determine if the key is in the vehicle or not, and not because there is an actual malfunction. The following warnings may sound:

- a. The driver side door is opened and closed:

- A warning to inform the driver that the shift lever is not in P, and the power source mode is not off.
- A warning to inform the driver that the shift lever is in P but the power source mode is not off.

- b. A door other than the driver side door is opened and closed:
 - A warning to inform the driver that a passenger is carrying the key out of the vehicle.
- c. Precautions for the battery built into the key and the vehicle battery:
 - 1. When the doors are locked, the vehicle battery is used to transmit a radio wave. The battery may be fully depleted if the vehicle remains stopped for a long time. If the vehicle is not used for a long time, recharge or replace the battery or cancel the smart key system (for Entry Function). Refer to **CUSTOMIZE PARAMETERS**.
 - 2. When the door is locked with the key in the detection area of the door oscillator, the battery is used to regulate communication between the key and vehicle. If the vehicle is not used, keep the key away from the vehicle (more than 2 m [6.56 ft.]).

3. PRECAUTION FOR REGISTRATION

- a. If replacing any of the following parts, Refer to **REGISTRATION**.
 - 1. Certification ECU
 - 2. Steering lock ECU
 - 3. ECM
 - 4. Electrical key transmitter (key)

4. PRECAUTIONS FOR BATTERY

- a. Immediately after disconnecting and reconnecting the battery cable, the entry unlock function may not operate. If this occurs, the entry unlock function can be restored by performing a wireless door lock and unlock operation.
- b. After disconnecting and reconnecting the battery cable, the engine may not start on the first attempt. If this occurs, turn the engine switch off. The engine will start normally from the second time onward.
- c. The vehicle continually records the power source mode. When the battery cable is disconnected and reconnected, the power source mode returns to the mode it was in before the battery cable was disconnected. Always turn the engine switch off before disconnecting the battery cable.

NOTE: **If the vehicle battery is fully depleted and the previous power source mode is unknown, be extremely careful when reconnecting the battery cable.**

PARTS LOCATION

ILLUSTRATION

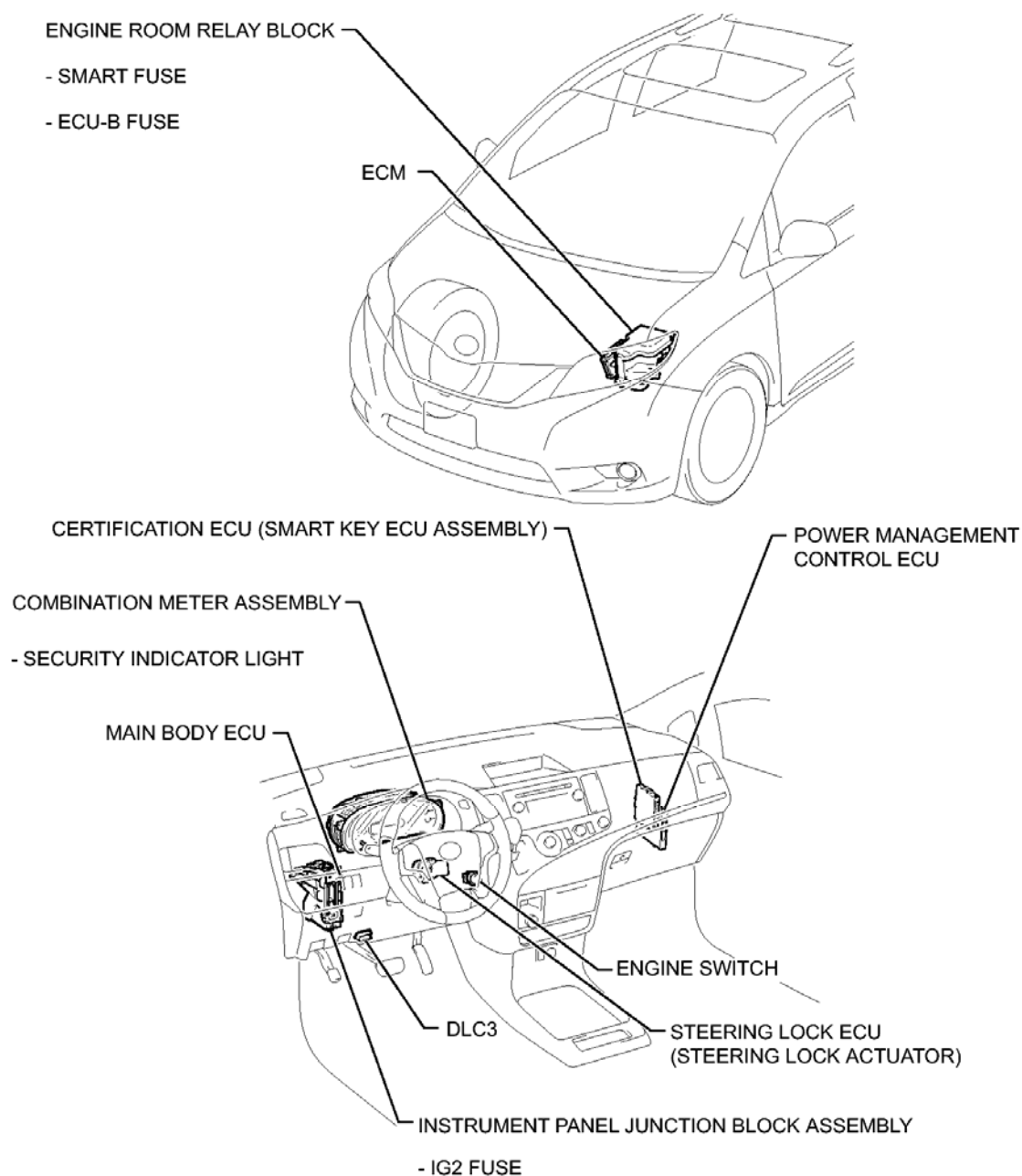


Fig. 1: Engine Immobilizer System (w/ Smart Key System) Components Location
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

SYSTEM DIAGRAM

SYSTEM DIAGRAM

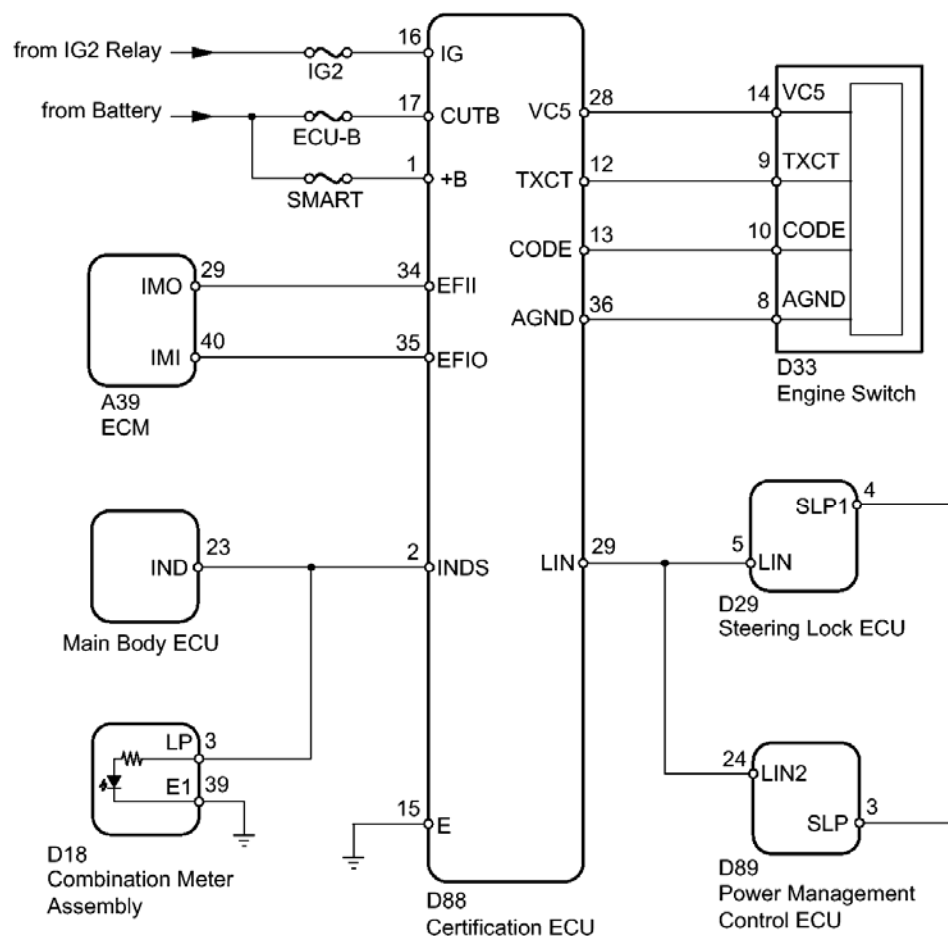


Fig. 2: Engine Immobiliser System Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

COMMUNICATION TABLE

Transmitting ECU (Transmitter)	Receiving ECU (Receiver)	Signal	Line
Certification ECU	Power management	- Engine immobiliser system set/unset signal - Engine start signal - Transponder valid signal	

	control ECU	- Steering unlock demand signal - Steering lock demand signal	LIN
Power management control ECU	Certification ECU	- Key code recognition signal - Engine start operation signal - ACC relay activation signal - IG relay activation signal	
Certification ECU	Steering lock ECU	- Steering lock release signal - Matching request random number signal	
Steering lock ECU	Certification ECU	L code verification signal	

SYSTEM DESCRIPTION

SYSTEM DESCRIPTION

1. ENGINE IMMOBILISER SYSTEM DESCRIPTION

The engine immobiliser system determines whether or not to enable starting of the SFI system based on a comparison of the key ID code and the vehicle pre-registered code. The engine immobiliser system compares the vehicle certification ECU preregistered ID code with the key-embedded transponder chip ID code. If the ID codes do not match, the engine immobiliser system activates and the SFI system cannot be started. The certification ECU manages communication with the SFI system, power management control 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 starting of the SFI system.

2. FUNCTION OF MAIN COMPONENTS

Component	Outline
Transponder key coil/amplifier (built into the engine switch)	• Transmits the engine switch signal to the power management ECU. • Informs the driver of any power source or system abnormality through the illumination stage of the indicator light. • Receives the ID code and transmits it to the certification ECU assembly when the key battery is too weak to respond to the tuner based on signals from the room oscillators.
Key	Receives the signals from the oscillators and returns the ID code to the door control receiver.
	Receives the steering unlock/lock signal

Steering lock ECU	from the certification ECU, and activates the steering lock motor.
Power management control ECU	• Switches the power source among four modes (off, on (ACC), on (IG), start) in accordance with the shift position and the state of the stop light switch. • Turns on the ST relay, and starts the engine when the engine switch is pushed once with the brake pedal depressed.
Certification ECU	• Certifies the ID code received from the door control receiver and transmits the certification results to the steering lock ECU. • Transmits the steering lock/unlock

	signals. • Transmits the engine immobiliser set/unset request signals.
ECM	Receives the signal from the certification ECU, and performs engine ignition and injection.
Indoor electrical key oscillator • Front, Center, Rear	Transmits key detection signals within the detection area in the vehicle cabin upon receiving a transmission request signal from the certification ECU. A certification ECU request signal is activated when the key is brought into the vehicle cabin and the engine switch is pushed.
Combination meter assembly • Security indicator light	Illuminates or flashes. Illumination is controlled by the certification ECU.

3. SYSTEM FUNCTION

a. Using the entry function

1. When the driver (or an occupant) gets in the vehicle and depresses the brake pedal while carrying the key, the power management control ECU recognizes that the brake pedal is depressed and sends a key certification request signal to the certification ECU. Then the certification ECU generates a request signal and sends it to the indoor electrical key oscillator. When the request signal is received, the indoor electrical key oscillator sends

another request signal in order to detect whether the key is inside the vehicle. When the key receives this request signal, it sends back an ID code which includes a response code. The ID code sent from the key is sent to the certification ECU via the door control receiver. When the ID code is received, the certification ECU analyzes the code. If the certification result is normal, the certification ECU sends a key certification compatible response signal to the power management control ECU. At this time, the engine switch indicator illuminates in green. When the indicator illuminates in green and the driver presses the engine switch, the power management control ECU recognizes the engine start signal, turns the ACC relay on and turns the IG1 and IG2 relays on in that order after 0.025 seconds. At this time, the certification ECU confirms that the power source mode has changed, and sends a steering unlock command signal to the power management control ECU. After this signal is received, the power management control ECU supplies the steering lock actuator with power. Then the steering lock ECU confirms that the certification ECU is the proper ECU and drives the steering actuator motor until the steering lock is unlocked. After the steering lock is unlocked, the steering lock ECU sends an unlock completion signal to the certification ECU and power management control ECU. When this signal is received, the certification ECU sends an immobiliser unset command signal to the SFI system after confirming that the certification ECU is the proper ECU. Then the certification ECU sends a security indicator light off signal to the telltale light assembly.

- b. Not using the entry function (when the battery is depleted, the transmitter is affected by wave noise, etc.)
 - 1. When the driver is sitting in the vehicle while carrying the key and the brake pedal is depressed, the power management control 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 activates the transponder key amplifier built into the engine switch. At this time, the engine switch outputs a wave communication signal. If the driver holds the key up to the engine switch at this time, the key receives the immobiliser wave signal and responds by sending a wave signal. When the engine switch receives the 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 power management control ECU while simultaneously sending a sound buzzer request signal to the meter ECU. When the power management control ECU receives this signal, the ACC relay is switched on and the IG1 and IG2 relays are switched on in sequence after 0.025 seconds. 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 power management control ECU. After receiving this signal, the power management control ECU supplies power to the steering lock actuator. Then 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. The certification ECU is certified, sends an immobiliser unset command signal to the SFI system, and then the certification ECU sends a security indicator light off signal to the telltale light assembly.

HOW TO PROCEED WITH TROUBLESHOOTING

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the engine immobiliser system.
- *: Using the Techstream.

1. VEHICLE BROUGHT TO WORKSHOP

NEXT: Go to next step

2. CUSTOMER PROBLEM ANALYSIS

- a. Interview the customer to confirm the trouble. Refer to **HOW TO PROCEED WITH TROUBLESHOOTING** .

NEXT: Go to next step

3. INSPECT BATTERY VOLTAGE

- a. Measure 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: Go to next step

4. ENGINE SWITCH ON (IG)**HINT:**

If the engine switch cannot be turned on (IG), communication with the Techstream can be confirmed by connecting the Techstream to the vehicle and turning a courtesy light switch on and off at intervals of 1.5 seconds or less until communication between the Techstream and vehicle begins.

NEXT: Go to next step

5. INSPECT COMMUNICATION FUNCTION OF CAN COMMUNICATION SYSTEM*

- a. Use the Techstream to check if the CAN communication system is functioning normally.

RESULT

Result	Proceed to
ECU is connected, communication	A

is normal	
ECU is connected, communication is malfunctioning	B

B --> GO TO CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING

A: Go to next step

6. INSPECT COMMUNICATION FUNCTION OF LIN COMMUNICATION SYSTEM*

- Use the Techstream to check if the LIN communication system is functioning normally.

RESULT

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

B --> GO TO LIN COMMUNICATION SYSTEM. Refer to DIAGNOSTIC TROUBLE CODE CHART

A: Go to next step

7. CHECK FOR DTCS (SMART KEY SYSTEM)*

- Check for DTCs and note any codes that are output.
- Clear the DTCs. Refer to **DTC CHECK / CLEAR**.
- Recheck for DTCs. Refer to **DTC CHECK / CLEAR** . Based on the DTCs output above, try to cause the output of the same SFI system, steering lock system or engine immobiliser system DTC by reproducing the symptoms indicated by the DTC.

RESULT

Result	Proceed to
DTC is not output	A
SFI system	

DTC is output	B
Steering lock system DTC is output	C
Engine immobiliser system DTC is output	D

B --> GO TO DIAGNOSTIC TROUBLE CODE CHART. Refer to DIAGNOSTIC TROUBLE CODE CHART

C --> GO TO DIAGNOSTIC TROUBLE CODE CHART. Refer to DIAGNOSTIC TROUBLE CODE CHART

D --> GO TO DIAGNOSTIC TROUBLE CODE CHART. Refer to DIAGNOSTIC TROUBLE CODE CHART

A: Go to next step

8. PROBLEM SYMPTOMS TABLE

- Refer to **PROBLEM SYMPTOMS TABLE**.

RESULT

Result	Proceed to
Fault is not listed in Problem Symptoms Table	A
Fault is listed in Problem Symptoms Table	B

B --> Go to step 11

A: Go to next step

9. OVERALL ANALYSIS AND TROUBLESHOOTING*

- a. Data List / Active Test. Refer to **DATA LIST / ACTIVE TEST**
- b. Terminals of ECU. Refer to **TERMINALS OF ECU**

NEXT: Go to next step

10. ADJUST, REPAIR OR REPLACE

NEXT: Go to next step

11. CHECK FOR DTC*

- a. Clear the DTCs. Refer to **DTC CHECK / CLEAR**.
- b. Recheck for DTCs. Refer to **DTC CHECK / CLEAR**. Based on the DTCs output above, try to cause the output of the same SFI system, steering lock system or engine immobiliser system DTC by reproducing the symptoms indicated by the DTC.

HINT:

Before checking for DTCs, perform the "DTC Output Confirmation Operation" procedure. Refer to **DIAGNOSTIC TROUBLE CODE CHART**.

RESULT

Result	Proceed to
DTC is not output	A
SFI system DTC is output	B
Steering lock system DTC is output	C
Engine immobiliser system DTC is output	D

B --> GO TO DIAGNOSTIC TROUBLE CODE CHART. Refer to DIAGNOSTIC TROUBLE CODE CHART

C --> GO TO DIAGNOSTIC TROUBLE CODE CHART. Refer to DIAGNOSTIC TROUBLE CODE CHART

D --> GO TO DIAGNOSTIC TROUBLE CODE CHART. Refer to DIAGNOSTIC TROUBLE CODE CHART

A --> END

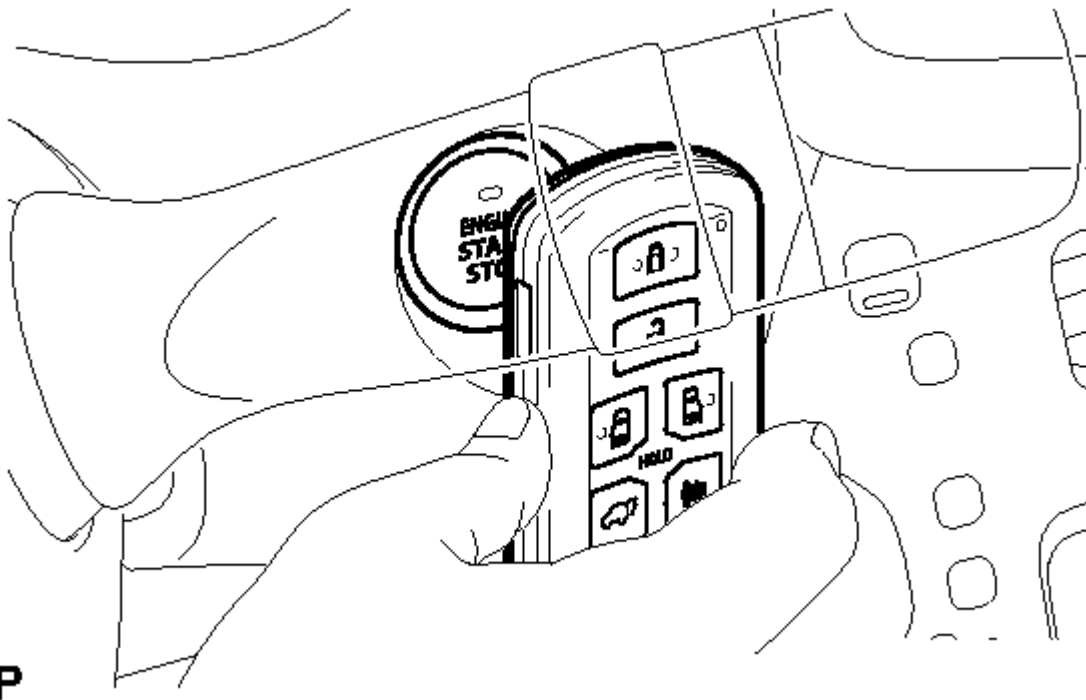
REGISTRATION

REGISTRATION

1. DESCRIPTION OF CODE REGISTRATION

HINT:

- The 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 necessary when the certification ECU, steering lock ECU, or key is replaced with a new one.
- This vehicle does not have a key slot. Therefore, touch the logo of the key to the engine switch when registering the key, as shown in the illustration.



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Fig. 3: Checking Smart Key System (For Start Function)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. KEY REGISTRATION PROCEDURES WHEN ADDING OR REPLACING KEY OR WHEN KEY IS LOST

HINT:

- The following procedures require the use of the Techstream:

- New key ID registration
- Additional key ID registration
- Key ID erasure
- All key ID erasure
- A maximum of 7 keys can be registered.

Customer Request/Condition	Registration Procedure Condition	Procedure	Refer to
Registering an additional key	Customer must bring at least 1 key	Register additional keys as necessary (additional key ID registration)	PROCEDURE "C"
• Replacing a key • Making a lost key unusable HINT: After key ID erasure, any remaining keys that are not registered at this time cannot be used. Therefore, after key ID erasure, register all remaining keys.	Customer must bring at least 1 key	1. Using remaining key, clear all registered keys except one (key ID erasure) 2. Register additional keys as necessary (additional key ID registration)	PROCEDURE "D" PROCEDURE "C"
All keys are lost	-	1. Reset all keys (all keys ID erasure (key code reset))	PROCEDURE "E"
		2. Register all keys (new key ID registration)	PROCEDURE "A"

3. PART REPLACEMENT AND KEY REGISTRATION PROCEDURES

- a. The following table shows ECU replacement and key registration procedures for cases in which a

malfunctioning ECU has been identified through the troubleshooting of the smart key system.

HINT:

- The following procedures can be performed:
 - New key ID registration
 - Additional key ID registration
 - Key ID erasure
 - All key ID erasure
- If the customer has not brought all the registered keys, replacement of the steering lock ECU is also required.
- A maximum of 7 keys can be registered.

Malfunctioning ECU	Condition		Procedure	Reference
	Customer has brought all keys		1. Replace certification ECU	CERTIFICATION ECU / REMOVAL
			2. Reregister all keys (New key ID registration)	PROCEDURE "B"
		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	CERTIFICATION ECU / REMOVAL
			4. Reregister all keys (New key ID registration) HINT: If some keys are not registered during the above steps,	PROCEDURE "B"

Certification ECU	Some keys are lost		they will be disabled because they cannot be registered later.	
		Key ID codes cannot be either registered or erased	1. Replace certification ECU	CERTIFICATION ECU / REMOVAL
			2. Replace steering lock ECU	-
			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 the certification ECU, replace the steering lock ECU and certification ECU. If some keys are not registered during the above steps, they will be disabled because they cannot be registered later.	PROCEDURE "A"
			4. Register ECU communication ID	PROCEDURE "F"
			1. Replace certification ECU	CERTIFICATION ECU / REMOVAL

Certification ECU	All keys are lost	2. Replace steering lock ECU	-
		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 the certification ECU, replace the steering lock ECU and certification ECU. If some keys are not registered during the above steps, they will be disabled because they cannot be registered later.	PROCEDURE "A"
		4. Register ECU communication ID	PROCEDURE "F"
		1. Replace steering lock ECU	-
	Customer has brought at least 1 key	2. Perform additional key registration procedure (Additional key ID registration)	PROCEDURE "C"
		1. Replace	

Steering lock ECU	All keys are lost	steering lock ECU	-
		2. Replace certification ECU	CERTIFICATION ECU / REMOVAL
		3. Reregister all keys (New key ID registration) HINT: If some keys are not registered during the above steps, they will be disabled because they cannot be registered later.	PROCEDURE "A"
		4. Register ECU communication ID	PROCEDURE "F"
Power management control ECU	No condition required	Replace power management control ECU	-
ECM	No condition required	Replace ECM	-

4. KEY REGISTRATION

a. PROCEDURE "A"

New key ID registration (when replacing the certification ECU and steering lock ECU)

Process	Procedure
	1. Connect the Techstream to DLC3 2. Turn the engine switch on (IG) 3. Enter the following menus: Body

	Electrical / Smart Key / Utility / Smart Code Registration HINT: The engine switch cannot be turned on (IG) more than 10 times. After connecting the Techstream, turn the Techstream on while turning the driver side door courtesy light switch on and off repeatedly at 1.5-second intervals or less to continue key registration procedure.
1. Start of registration	
2. Confirmation of ECU code	Perform operation according to prompts on the Techstream screen HINT: Mode is automatically selected by the Techstream (new registration mode or add mode).
	1. Hold the unregistered key close to the engine switch (for details, refer to "Description of Code Registration") 2. Confirm that

3. Verification of unregistered key*1	the wireless door lock buzzer sounds once (short beep) 3. Place the unregistered key on the driver seat 4. Confirm that the wireless door lock buzzer sounds once (short beep)
4. Registration of ID code	Perform operation according to prompts on the Techstream 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 the registration procedures again from process 1. Make sure that only 1 key is in the cabin during the 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 the certification ECU)

Process	Procedure
	1. Connect the Techstream to DLC3 2. Turn the engine switch on (IG) 3. Enter the following

1. Start of registration	menus: Body Electrical / Smart Key / Utility / Smart Code Registration HINT: The engine switch cannot be turned on (IG) more than 10 times. After connecting the Techstream, turn the Techstream on while turning the driver 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 the Techstream screen HINT: Mode is automatically selected by the Techstream (new registration mode or add mode).
3. Confirmation of all registered keys*1	1. Hold the registered key close to the engine switch (for details, refer to "Description of Code Registration")

	2. Confirm that wireless door lock buzzer sounds once (short beep)
4. Confirmation of ECU code	Perform operation according to prompts on the Techstream screen
5. Verification of unregistered key*2	1. Hold the unregistered key close to the engine switch (for details, refer to "Description of Code Registration") 2. Confirm that wireless door lock buzzer sounds once (short beep) 3. Place the unregistered key on the driver seat 4. Confirm that the wireless door lock buzzer sounds once (short beep)
6. Registration of ID code	Perform operation according to prompts on the Techstream screen
7. End of	Finish new

registration	key ID code registration
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*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 the registration procedures again from process 1. If the key confirmation procedure for a key is performed, the security indicator light 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 is not finished within the specified time, perform the registration procedures again from process 1. Make sure that only 1 key is in the cabin during the 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 the Techstream to DLC3 2. Turn the engine switch on (IG) 3. Enter the following menus: Body Electrical / Smart Key / Utility / Smart Code Registration
	1. Perform operation according to prompts on the Techstream screen HINT: Mode is automatically

2. Confirmation of registered key*1	selected by the Techstream (new registration mode or add mode) 2. Hold the registered key close to the engine switch (for details, refer to "Description of Code Registration") 3. Confirm that the wireless door lock buzzer sounds once (short beep)
3. Confirmation of ECU code	Perform operation according to prompts on the Techstream screen
4. Verification of unregistered key*2	1. Hold the unregistered key close to the engine switch (for details, refer to "Description of Code Registration") 2. Confirm that the wireless door lock buzzer sounds once

	(short beep) 3. Place the unregistered key on the driver seat 4. Confirm that the wireless door lock buzzer sounds once (short beep)
5. Registration of ID code	Perform operation according to prompts on the Techstream screen
6. End of registration	Finish additional 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 the registration procedures again from process 1.

*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 is not finished within the specified time, perform the registration procedures again from process 1. Make sure that only 1 key is in the cabin during the 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:

Procedure "D" erases all registered key codes except one.

Process	Procedure
	1. Connect the Techstream to DLC3 2. Turn the

1. Start of erasure	engine switch on (IG) 3. Enter the following menus: Body Electrical / Smart Key / Utility / Smart Code Erasure
2. Confirmation of registered key*1 HINT: Select the key that will not be erased.	1. Perform operation according to prompts on the Techstream screen 2. Hold the registered key close to engine switch (For details, refer to "Description of Code Registration") 3. Confirm that the wireless door lock buzzer sounds once (short beep)
3. Confirmation of ECU code	Perform operation according to prompts on the Techstream screen
4. Erasure of ID code	Perform operation according to prompts on the Techstream screen

5. End of erasure	Finish key ID code erasure
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*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 the erasure procedures again from process 1.

e. PROCEDURE "E"

All key ID erasure

HINT:

Procedure "E" erases all the key codes registered in the vehicle.

Process	Procedure
1. Start of erasure	1. Connect the Techstream to DLC3 2. Turn the engine switch on (IG) 3. Turn the Techstream on while turning driver side door courtesy light switch on and off repeatedly at 1.5-second intervals or less 4. Enter the following menus: Body Electrical / Smart Key /

	Utility / Smart Code Reset
2. Confirmation of ECU code	Perform operation according to prompts on the Techstream screen
3. Erasure of ID code	Perform operation according to prompts on the Techstream screen
4. End of erasure	Finish key ID code erasure

f. PROCEDURE "F"

ECU communication ID registration

NOTE:

- The ECU communication ID should be registered when the certification ECU is replaced in order to match these ECU communication IDs.
- The engine cannot be started unless the ECU communication IDs match.
- After the registration, pressing the engine switch may not start the engine on the first try. If so, press the engine switch again.
- Clear DTC B2799 (code for ECM immobiliser communication error) by either of the following:
 - Use the Techstream.
 - Disconnect the cable from the negative (-) battery terminal for 30 seconds.

1. Using SST, connect terminals TC and CG of the DLC3.
 - SST: 09843-18040

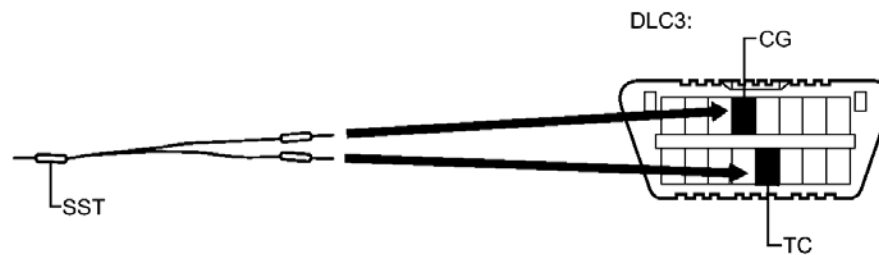


Fig. 4: Connecting Terminals TC And CG Of DLC3
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Turn the engine switch on (IG) and leave it as is 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 and stays running for more than 3 seconds.

PROBLEM SYMPTOMS TABLE

PROBLEM SYMPTOMS TABLE

HINT:

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

ENGINE IMMOBILISER SYSTEM

Symptom	Suspected Area	See
Engine does not start.	Key	Refer to <u>DATA LIST / ACTIVE TEST</u>
	Unable to Unlock Steering Wheel (Engine cannot Start)	Refer to <u>Unable to Unlock Steering Wheel (Engine cannot Start)</u>
	Smart key system (for start function)	Refer to <u>HOW TO PROCEED WITH TROUBLESHOOTING</u>
	SFI system	Refer to <u>HOW TO PROCEED WITH TROUBLESHOOTING</u>

Security indicator light is always on.	Certification ECU	Refer to <u>Security Indicator Light Circuit</u>
	Wire harness or connector	-
	Combination meter assembly	-
Security indicator light is off.	Certification ECU	Refer to <u>Security Indicator Light Circuit</u>
	Wire harness or connector	-
	Combination meter assembly	-

TERMINALS OF ECU

TERMINALS OF ECU

1. CHECK ENGINE SWITCH

- Disconnect the D33 engine switch connector.



Fig. 5: D33 Engine Switch Connector Terminal Identification

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

HINT:

Measure the values on the wire harness side with the connector disconnected.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
D33-8 (AGND) - Body ground	R - Body ground	Ground	Always	Below 1 ohms

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

- Reconnect the D33 engine switch connector.
- Measure the voltage according to the value(s) in the table below.

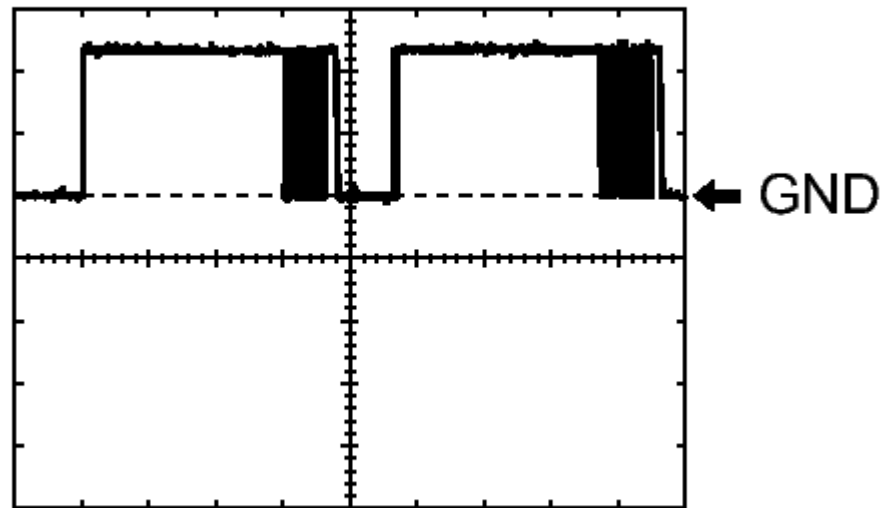
Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
D33-9 (TXCT) - D33-8 (AGND)	V - R	Key code output signal	• Engine switch off • 30 seconds after door opened and closed • Brake pedal not depressed	Below 1 V
D33-9 (TXCT) - D33-8 (AGND)	V - R	Key code output signal	• Engine switch off • Key not in cabin • Engine switch pressed within 30 seconds	Pulse generation (See Fig. 6)
D33-10 (CODE) - D33-8 (AGND)	L - R	Demodulated signal of key code data	• Engine switch off • 30 seconds after door opened and closed • Brake pedal not depressed	Below 1 V
D33-10 (CODE) - D33-8	L - R	Demodulated signal of key code data	• Engine switch off • Key battery removed • Engine	Pulse generation (See Fig.

(AGND)			switch touched with key and pressed	<u>7</u>)
D33-14 (VC5) - D33-8 (AGND)	G - R	Power supply	• Engine switch off • 30 seconds after door opened and closed • Brake pedal not depressed	Below 1 V
D33-14 (VC5) - D33-8 (AGND)	G - R	Power supply	• Engine switch off • Key not in cabin • Engine switch pressed within 30 seconds	Pulse generation (See <u>Fig. 8</u>)

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

e. Inspect using an oscilloscope.

1. Waveform 1

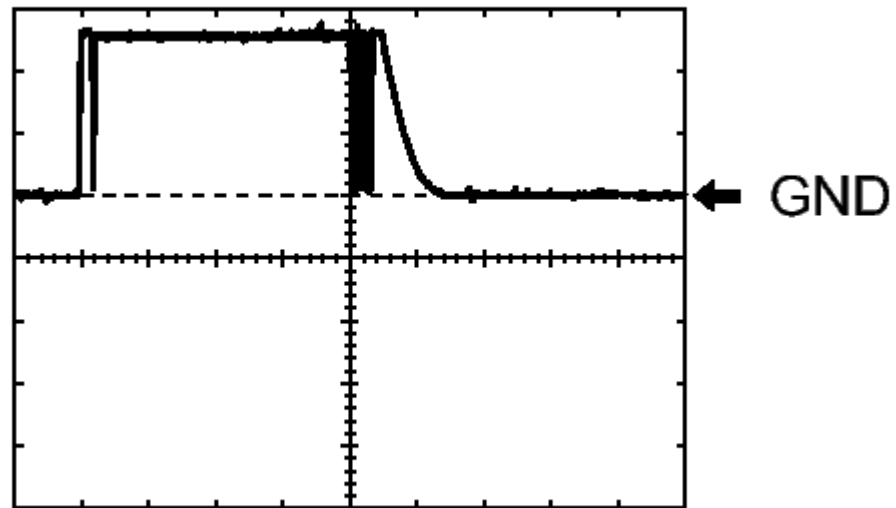


H

Fig. 6: Identifying Waveform 1
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Item	Content
Tester Connection	D33-9 (TXCT) - D33-8 (AGND)
Tool Setting	2 V/DIV., 50 ms./DIV.
Condition	• Engine switch off • Key not in cabin • Engine switch pressed within 30 seconds

2. Waveform 2



H

Fig. 7: Identifying Waveform Graph 2
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Item	Content
Tester Connection	D33-10 (CODE) - D33-8 (AGND)
Tool Setting	2 V/DIV., 50 ms./DIV.
Condition	• Engine switch off • Key battery removed • Engine switch touched with key and pressed

3. Waveform 3

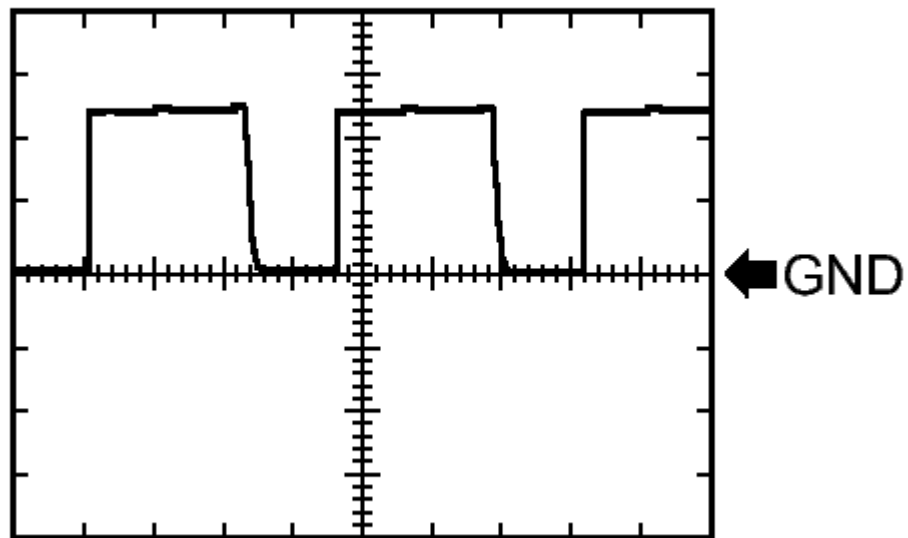


Fig. 8: Identifying Waveform 3

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Item	Content
Tester Connection	D33-14 (VC5) - D33-8 (AGND)
Tool Setting	2 V/DIV., 200 ms./DIV.
Condition	• Engine switch off • Key not in cabin • Engine switch pressed within 30 seconds

2. CHECK CERTIFICATION ECU

- Disconnect the D88 certification ECU connector.

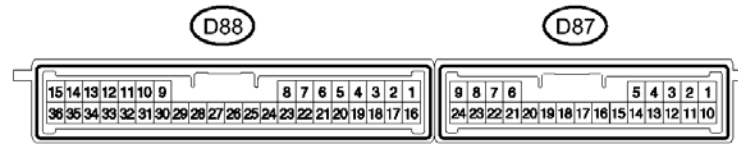


Fig. 9: Certification ECU (Smart Key ECU Assembly) Connector Terminal Identification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

HINT:

Measure the values on the wire harness side with the connector disconnected.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
D88-1 (+B) - D88-15 (E)	G - W - B	+B power supply	Always	11 to 14 V
D88-15 (E) - Body ground	W-B - Body ground	Ground	Always	Below 1 ohms

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

- c. Reconnect the D88 certification ECU connector.
d. Measure the resistance and voltage according to the value(s) in the table below.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
D88-2 (INDS) - Body ground	B - Body ground	Security indicator light signal	Engine switch on (IG), security indicator light off	Below 2 V
D88-2 (INDS) - Body ground	B - Body ground	Security indicator light signal	Engine switch off, security indicator light blinks	Pulse generation

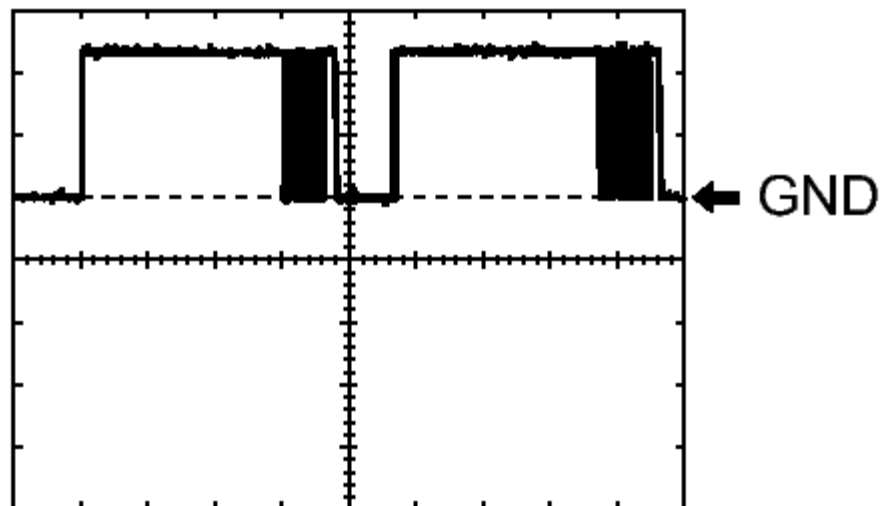
D88-12 (TXCT) - D88-36 (AGND)	V - R	Engine switch TXCT output	• Engine switch off • 30 seconds after door opened and closed • Brake pedal not depressed	Below 1 V
D88-12 (TXCT) - D88-36 (AGND)	V - R	Engine switch TXCT output	• Engine switch off • Key not in cabin • Engine switch pressed within 30 seconds	Pulse generation (See Fig. 10)
D88-13 (CODE) - D88-36 (AGND)	L - R	Engine switch CODE input	• Engine switch off • 30 seconds after door opened and closed • Brake pedal not depressed	Below 1 V
D88-13 (CODE) - D88-36 (AGND)	L - R	Engine switch CODE input	• Engine switch off • Key battery removed • Engine switch touched with key	Pulse generation (See Fig. 11)

			and pressed	
D88-16 (IG) - D88-15 (E)	B - W- B	Ignition power supply	Engine switch off	Below 1 V
D88-16 (IG) - D88-15 (E)	B - W- B	Ignition power supply	Engine switch on (IG)	11 to 14 V
D88-28 (VC5) - D88-36 (AGND)	G - R	Engine switch power supply	• Engine switch off • 30 seconds after door opened and closed • Brake pedal not depressed	Below 1 V
D88-28 (VC5) - D88-36 (AGND)	G - R	Engine switch power supply	• Engine switch off • Key not in cabin • Engine switch pressed within 30 seconds	Pulse generation (See Fig. 12)
D88-34 (EFII) - D88-15 (E)	G - W- B	ECM input signal	Engine switch off	11 to 14 V
D88-34 (EFII) - D88-15 (E)	G - W- B	ECM input signal	Within 3 seconds after the starter operates and initial combustion occurs, or within 3 seconds after	Pulse generation (See Fig. 13)

			engine switch first turned on (IG) after battery disconnected and connected	
D88-35 (EFIO) - D88-15 (E)	V - W- B	ECM output signal	Engine switch off	11 to 14 V
D88-35 (EFIO) - D88-15 (E)	V - W- B	ECM output signal	Engine switch on (IG)	Pulse generation (See Fig. 14)
D88-36 (AGND) - Body ground	R - Body ground	Engine switch ground	Always	Below 1 ohms

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

- e. Inspect using an oscilloscope.
 1. Waveform 1

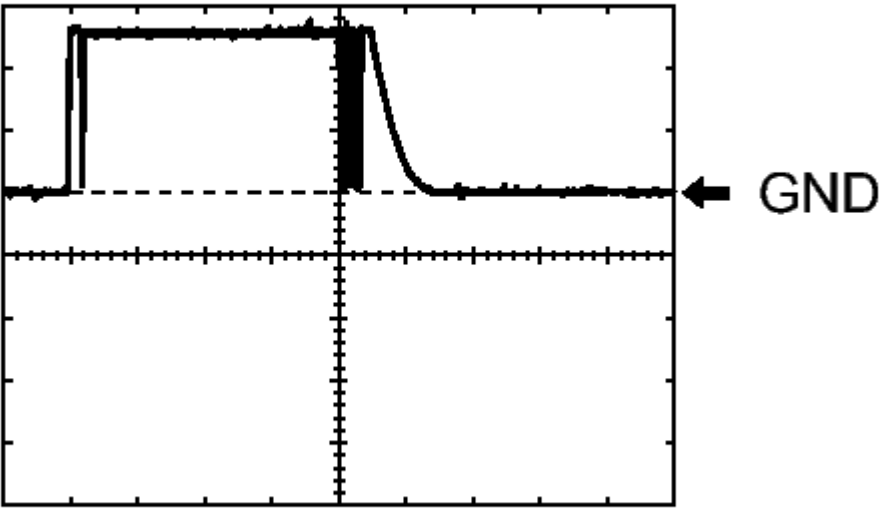


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Fig. 10: Identifying Waveform 1
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Item	Content
Tester Connection	D88-12 (TXCT) - D88-36 (AGND)
Tool Setting	2 V/DIV., 50 ms./DIV.
Condition	• Engine switch off • Key not in cabin • Engine switch pressed within 30 seconds

2. Waveform 2



H

Fig. 11: Identifying Waveform Graph 2
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Item	Content
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Tester Connection	D88-13 (CODE) - D88-36 (AGND)
Tool Setting	2 V/DIV., 50 ms./DIV.
Condition	• Engine switch off • Key battery removed • Engine switch touched with key and pressed

3. Waveform 3

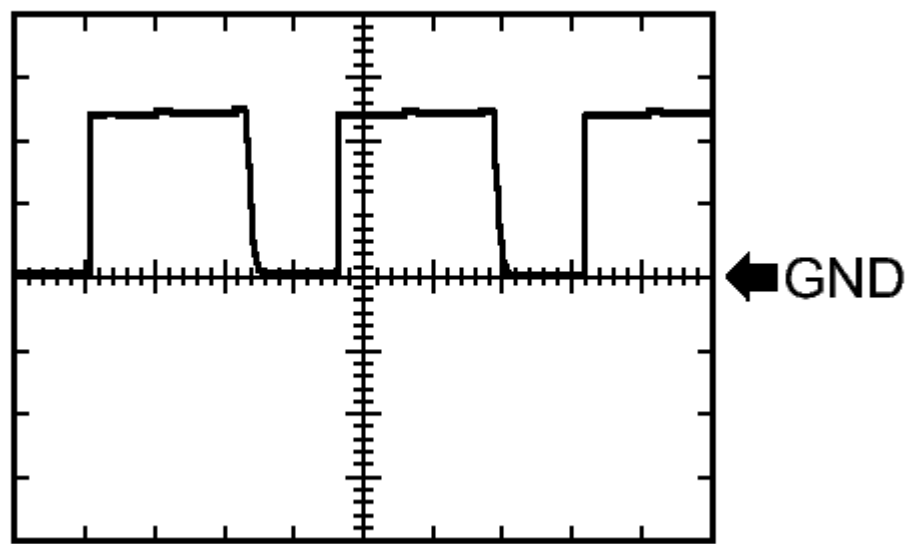
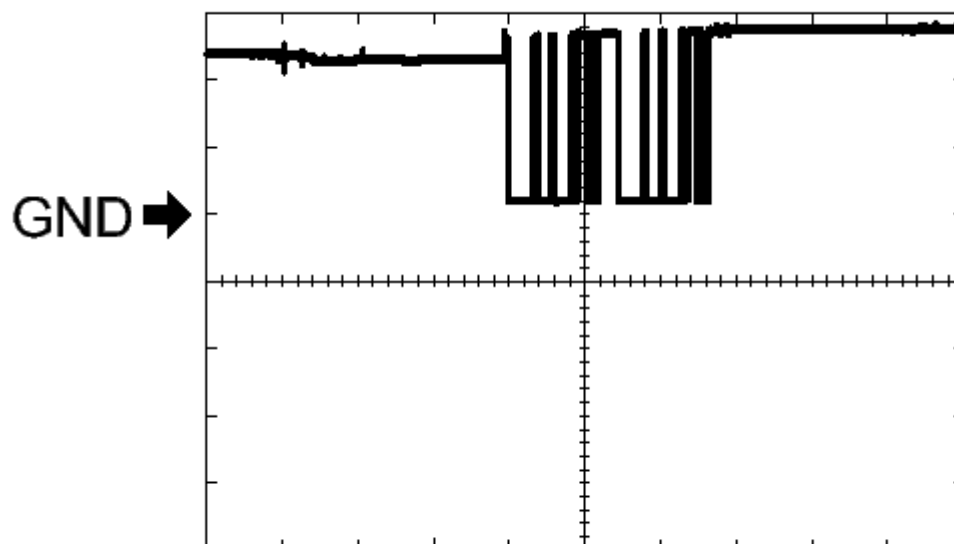


Fig. 12: Identifying Waveform 3
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Item	Content
	D88-28

Tester Connection	(VC5) - D88-36 (AGND)
Tool Setting	2 V/DIV., 200 ms./DIV.
Condition	• Engine switch off • Key not in cabin • Engine switch pressed within 30 seconds

4. Waveform 4



H

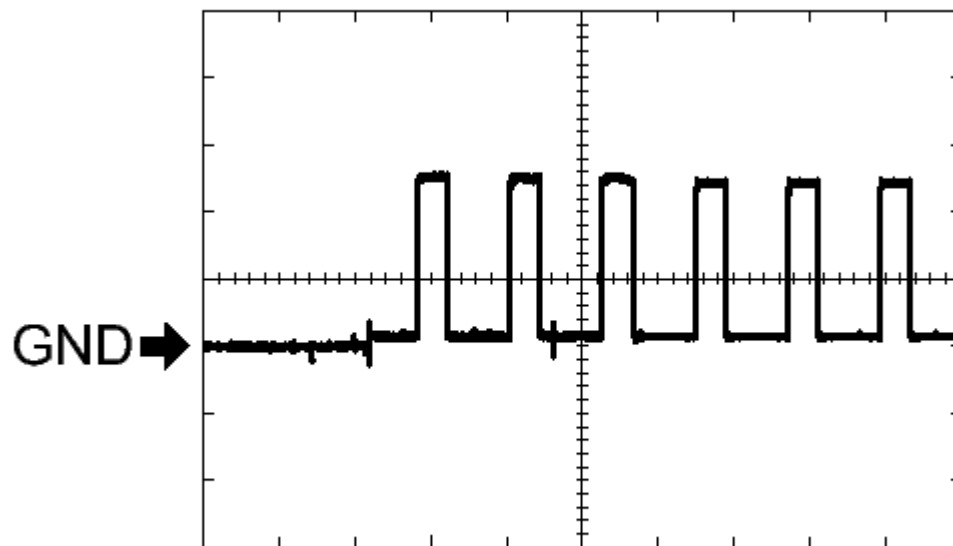
Fig. 13: Identifying Waveform 4

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Item	Content
Tester Connection	D88-34 (EFII) - D88-15 (E)

Tool Setting	5 V/DIV., 500 ms/DIV.
Condition	Within 3 seconds after the starter operates and initial combustion occurs, or within 3 seconds after engine switch first turned on (IG) after battery disconnected and connected

5. Waveform 5



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Fig. 14: Identifying Waveform 5

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



Item	Content
Tester Connection	D88-35 (EFIO) - D88-15 (E)
Tool Setting	5 V/DIV., 50 ms./DIV.
Condition	Engine switch on (IG)

3. CHECK STEERING LOCK ECU

- a. Disconnect the D29 steering lock ECU connector.

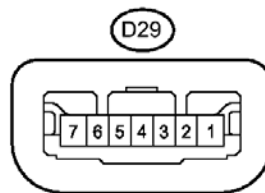


Fig. 15: Steering Lock ECU Connector Terminal Identification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

HINT:

Measure the values on the wire harness side with the connector disconnected.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
D29-1 (GND) - Body ground	W-B - Body ground	Ground	Always	Below 1 ohms
D29-6 (IG2) - Body ground	B - Body ground	Ignition power supply	Engine switch off	Below 1 V
D29-6 (IG2) -	B -	Ignition	Engine	

Body ground	Body ground	power supply	switch on (IG)	11 to 14 V
D29-7 (B) - Body ground	R - Body ground	+B power supply	Always	11 to 14 V

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

4. CHECK ECM

- The values listed under "Specified Condition" are reference values. Because waterproof connectors are used for ECM, inspections can not be performed with the connectors connected.

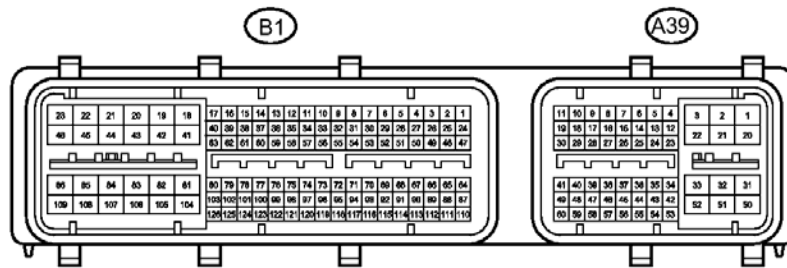


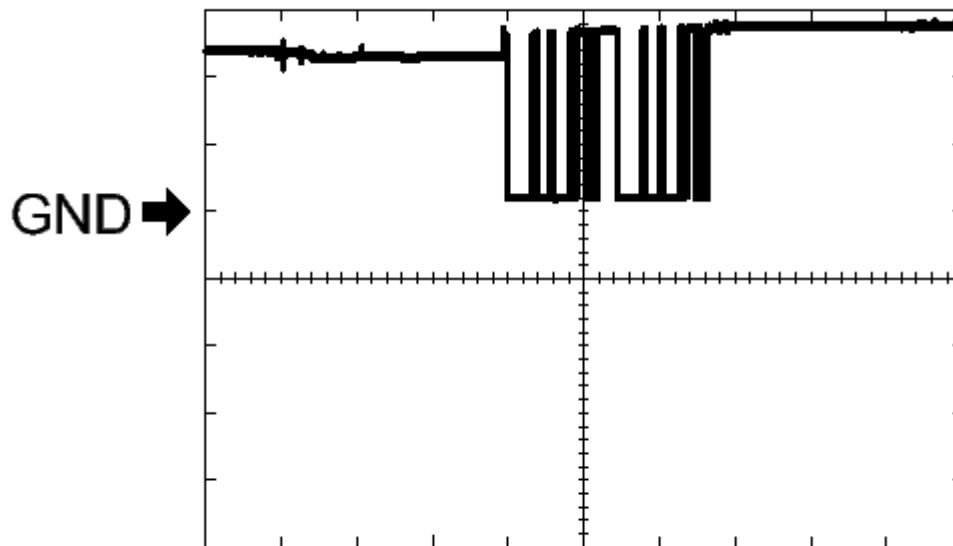
Fig. 16: ECM Connector Terminal Identification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
B1-81 (E1) - Body ground	B-R - Body ground	Ground	Always	Below 1 ohms
A39-29 (IMO) - B1-81 (E1)	G - B-R	Certification ECU output signal	Engine switch off	11 to 14 V
A39-29 (IMO) - B1-81 (E1)	G - B-R	Certification ECU output signal	Within 3 seconds after the starter operates and initial combustion occurs, or within 3 seconds after engine	Pulse generation (See Fig. 17)

			switch first turned on (IG) after battery disconnected and connected	
A39-40 (IMI) - B1-81 (E1)	V - B- R	Certification ECU input signal	Engine switch off	11 to 14 V
A39-40 (IMI) - B1-81 (E1)	V - B- R	Certification ECU input signal	Engine switch on (IG)	Pulse generation (See Fig. 18)

b. Waveform:

1. Waveform 1



H

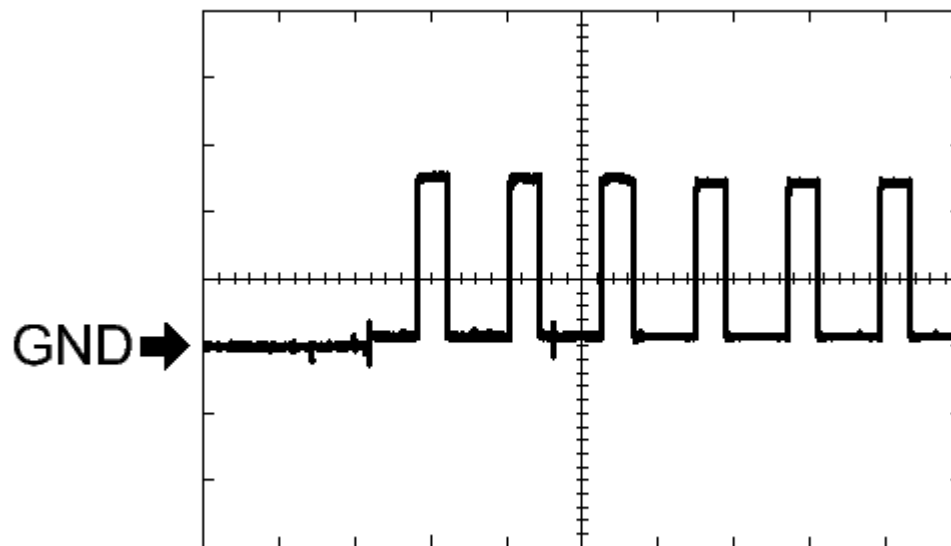
Fig. 17: Identifying Waveform 1

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Item	Content
Tester Connection	A39-29 (IMO) - B1- 81 (E1)

Tool Setting	5 V/DIV., 500 ms./DIV.
Condition	Within 3 seconds after the starter operates and initial combustion occurs, or within 3 seconds after engine switch first turned on (IG) after battery disconnected and connected

2. Waveform 2



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Fig. 18: Identifying Waveform 2 (Reference)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



Item	Content
Tester Connection	A39-40 (IMI) - B1-81 (E1)
Tool Setting	5 V/DIV., 50 ms./DIV.
Condition	Engine switch on (IG)

5. CHECK POWER MANAGEMENT CONTROL ECU

- Disconnect the D89 power management control ECU connector.

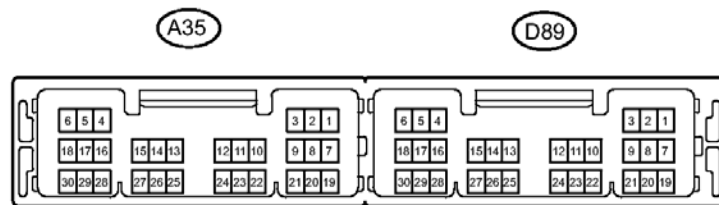


Fig. 19: Power Management Control ECU Connector Terminal Identification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

HINT:

Measure the values on the wire harness side with the connector disconnected.

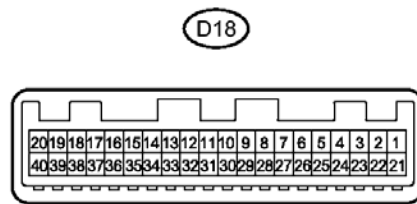
Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
D89-1 (AM22) - Body ground	R - Body ground	Battery	Always	11 to 14 V
D89-2 (AM21) - Body ground	R - Body ground	Battery	Always	11 to 14 V
D89-5 (GND2) -	W-B -			Below 1

Body ground	Body ground	Ground	Always	ohms
D89-6 (GND) - Body ground	W-B - Body ground	Ground	Always	Below 1 ohms

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

6. COMBINATION METER ASSEMBLY

- Disconnect the D18 combination meter assembly connector.



H

Fig. 20: Combination Meter Assembly Connector Terminal Identification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

HINT:

Measure the values on the wire harness side with the connector disconnected.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
D18-1 (B) - Body ground	W - Body ground	Battery	Always	11 to 14 V
D18-39 (E1) - Body ground	W-B - Body ground	Ground	Always	Below 1 ohms

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

- Reconnect the D18 combination meter assembly connector.
- Measure the voltage and resistance according to the value(s) in the table below.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
D18-3 (LP) - Body ground	B - Body ground	Security indicator light signal	Engine switch on (IG), security indicator light off	Below 2 V
D18-3 (LP) - Body ground	B - Body ground	Security indicator light signal	Engine switch off, security indicator light blinks	Pulse generation

If the result is not as specified, the combination meter assembly may have a malfunction.

DIAGNOSIS SYSTEM

DIAGNOSIS SYSTEM

1. DESCRIPTION

- The certification ECU and ECM control the vehicle engine immobiliser system functions. Engine immobiliser system data and Diagnostic Trouble Codes (DTCs) can be read through the vehicle Data Link Connector 3 (DLC3).

In some cases, a malfunction may be occurring in the engine immobiliser system even though the security indicator light is not illuminated.

When the system seems to be malfunctioning, use the Techstream to check for malfunctions and perform repairs.

2. CHECK DLC3

- Check the DLC3. Refer to **GENERAL INFORMATION** .

3. INSPECT BATTERY VOLTAGE

- Measure the battery voltage.

Standard voltage

11 to 14 V

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

DTC CHECK / CLEAR

DTC CHECK / CLEAR

1. CHECK FOR CERTIFICATION ECU DTC

- a. Connect the Techstream to the DLC3.
- b. Turn the engine switch on (IG).
- c. Turn the Techstream on.
- d. Enter the following menus: Body Electrical / Smart Key / Trouble Codes.
- e. Check the details of the DTC(s). Refer to **DIAGNOSTIC TROUBLE CODE CHART**.

2. CHECK FOR ECM DTC

- a. Connect the Techstream to the DLC3.
- b. Turn the engine switch on (IG).
- c. Turn the Techstream on.
- d. Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.
- e. Check the details of the DTC(s). Refer to **DIAGNOSTIC TROUBLE CODE CHART** for engine immobiliser system. Refer to **DIAGNOSTIC TROUBLE CODE CHART** for SFI system).

3. CLEAR FOR CERTIFICATION ECU DTC

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

4. CLEAR FOR ECM DTC

- a. Connect the Techstream to the DLC3.
- b. Turn the engine switch on (IG).
- c. Turn the Techstream on.
- d. Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.
- e. Clear the DTCs.

DATA LIST / ACTIVE TEST

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

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

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

- a. Connect the Techstream to the DLC3.
- b. Turn the engine switch on (IG).
- c. Turn the Techstream on.
- d. Enter the following menus: Body Electrical / Smart Key / Data List.
- e. Read the Data List according to the display on the Techstream.

SMART KEY

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Ignition Switch	Engine switch on (IG) signal/ON or OFF	ON: Engine switch on (ACC, IG) or engine started OFF: Engine switch off	-
Immobilizer when IG=ON	Immobiliser system status when Engine Switch on (IG) / Set or Unset	Set: Key not in cabin Unset: Key in cabin when Engine Switch on (IG)	-
# Codes	Number of trouble codes/Min.: 0 or Max.: 255	Number of DTCs will be displayed	-
Immobiliser	Immobiliser system status/Set or Unset	Set: Key not in cabin Unset: Key in cabin	-
Master Key	Master key code signal/Match or NoMatch	Match: Master key code sent NoMatch: Unmatched master key code sent	-
Sub Key	Sub-key (Master key) code signal/Match or NoMatch	Match: Sub-key (master key) code sent NoMatch: Unmatched sub-key (master key)	-

		code sent	
BCC Malfunction	Transponder chip signal/OK or NG	OK: Correct data sent NG: Incorrect data sent	-
Abnormal Status	Transponder chip data/OK or NG	OK: Data OK NG: Data error	-
Different Encrypt Code	Transponder chip signal/OK or NG	OK: Correct data sent NG: Incorrect data sent	-
Different Serial Number	Transponder chip signal/OK or NG	OK: Correct data sent NG: Incorrect data sent	-
Frame Error	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	-
Wireless Starter Com ID	Wireless starter communication ID / No Regd or Regd	No Regd: Wireless C code not registered Regd: Wireless C code registered	-
Wireless C Code	Wireless C code / No Regd or Regd	No Regd: Wireless C code not registered Regd: Wireless C code registered	-
ID-BOX Sleep Condition	ID code box condition/Yes or No	Yes: ID code box in sleep condition No: ID code box not in sleep condition	-
ID-BOX Start	ID code box	Yes: ID code box sends wake up signal	

Condition	condition/Yes or No	No: ID code box does not send wake up signal	-
Engine Start Request	Certification ECU start request condition/OK or NG	OK: Start request condition signal received (past) NG: Start request condition signal not received (past)	-
3bit Code Request	3-bit code request condition / OK or NG	OK: 3-bit code request condition signal received (past) NG: 3-bit code request condition signal not received (past)	-
S Code Check	S code verification result/OK or NG	OK: Verification confirmed NG: Verification not confirmed	-
L Code Check	L code verification result/OK or NG	OK: Verification confirmed NG: Verification not confirmed	-
Unlock Request Receive	Steering unlock command reception status/OK or NG	OK: Steering unlock request received NG: Steering unlock request not received	-
Lock Request Receive	Steering lock command reception status/OK or NG	OK: Steering lock request received NG: Steering lock request	-

		not received	
S Code Check (Past)	S code verification result (past)/OK or NG(Past)	OK: Verification confirmed (past) NG(Past): Verification not confirmed (past)	-
L Code Check (Past)	L code verification result (past)/OK or NG(Past)	OK: Verification confirmed (past) NG(Past): Verification not confirmed (past)	-
EFI Code Receive	SFI code receive (when DTC stored)/OK or NG	OK: SFI code received NG: SFI code not received	-
EFI Communication	SFI communication/OK or NG	OK: SFI communication normal NG: SFI communication abnormal	-

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- Connect the Techstream to the DLC3.
- Turn the engine switch on (IG).
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Smart Key / Active Test.
- Perform the Active Test according to the display on the Techstream.

SMART KEY

Tester		Control	
--------	--	---------	--

Display	Test Part	Range	Diagnostic Note
Immobiliser Indicator	Immobiliser Indicator light	ON or OFF	-

DIAGNOSTIC TROUBLE CODE CHART

DIAGNOSTIC TROUBLE CODE CHART

HINT:

If a trouble code is stored during the DTC check, inspect the trouble areas listed for that code. For details of the code, refer to the appropriate information below.

1. CERTIFICATION ECU DIAGNOSTIC TROUBLE CODE CHART

CERTIFICATION ECU

DTC Code	Detection Item	Trouble Area	See
B2784	Antenna Coil Open / Short	- Engine switch - Certification ECU	Refer to <u>DTC B2784: Antenna Coil Open / Short</u>
B278A	Short to GND in Immobiliser System Power Source Circuit	- Wire harness or connector - Engine switch - Certification ECU	Refer to <u>DTC B278A: Short to GND in Immobiliser System Power Source Circuit</u>

2. ECM DIAGNOSTIC TROUBLE CODE CHART

HINT:

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

ECM

DTC Code	Detection Item	Trouble Area	See

B2799	Engine Immobiliser System Malfunction	- Wire harness or connector - ECM - Certification ECU	Refer to <u>DTC B2799: Engine Immobiliser System Malfunction</u>
B279A	Theft Deterrent System Communication Line High Fixation	- Wire harness or connector - ECM - Certification ECU	Refer to <u>DTC B279A: Theft Deterrent System Communication Line High Fixation</u>
B279C	Theft Deterrent System Presence Detection	ECM	Refer to <u>DTC B279C: Theft Deterrent System Presence Detection</u>