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ENGINE IMMOBILISER SYSTEM (W/ SMART KEY SYSTEM)

PRECAUTION

1. **PRECAUTION FOR DISCONNECTING THE BATTERY CABLE**

NOTE: **When disconnecting the battery negative(-) terminal, initialize the following systems after the terminal is reconnected:**

SYSTEM REFERENCE

System Name	See Procedure
Power back door system	INITIALIZATION

2. **PRECAUTIONS WHEN USING TECHSTREAM**
   a. When using Techstream to troubleshoot the smart key system: Connect Techstream 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.
3. **PRECAUTIONS FOR EACH FUNCTION**
   a. Precautions for the electrical key:

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

      1. Do not drop or strike the electrical key.
      2. Do not keep the electrical key in a high temperature area 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 light 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. If 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 starting the engine. 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 predetermined intervals. If the vehicle remains parked for a long time, the battery may become discharged.

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To prevent this, periodically charge the vehicle battery, or disable the smart key system.

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

PARTS LOCATION

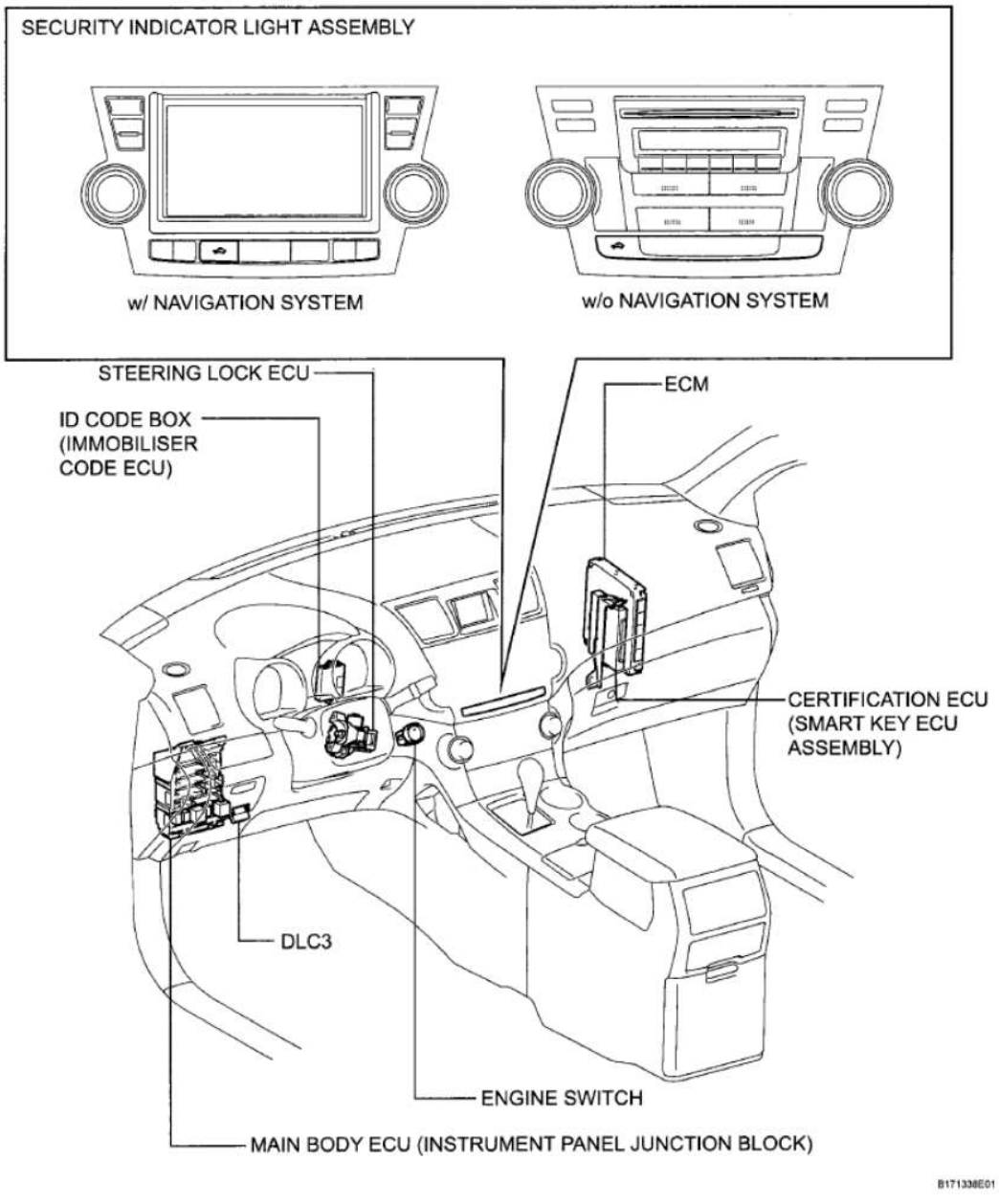


Fig. 1: Identifying Engine Immobiliser System Components
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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SYSTEM DIAGRAM

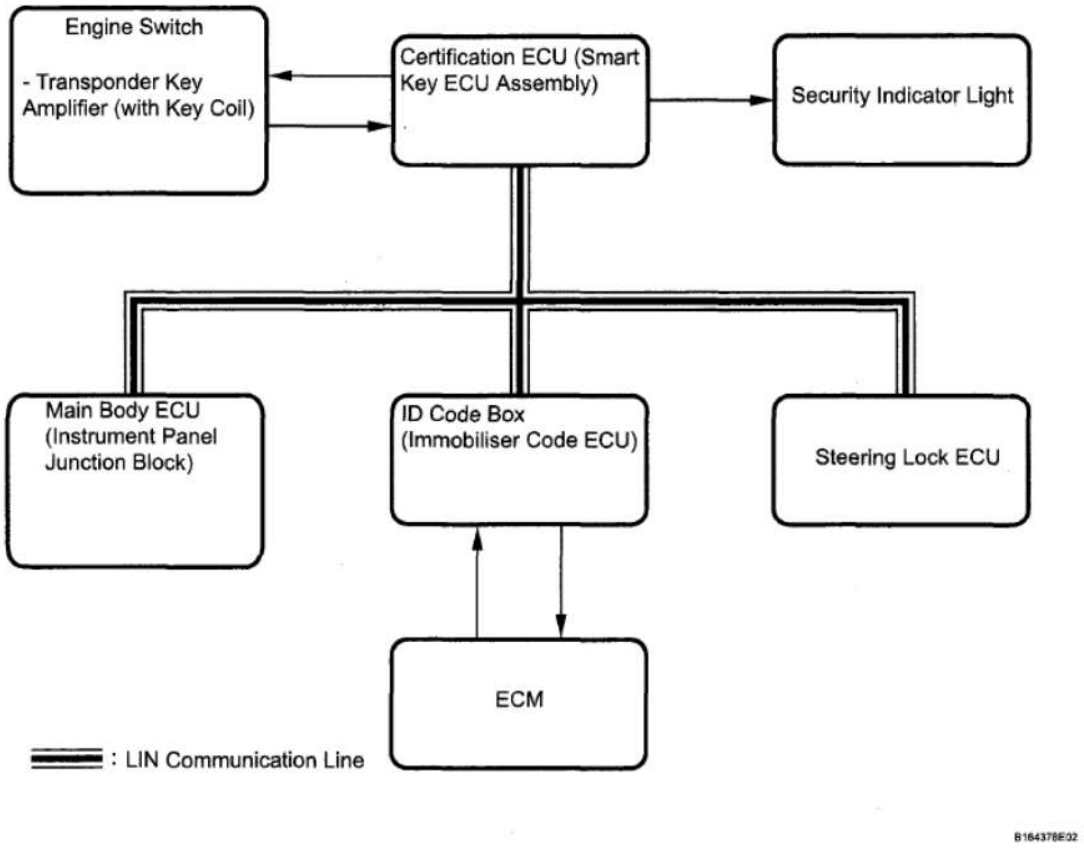


Fig. 2: Engine Immobiliser System Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Communication table:

COMMUNICATION CHART

Transmitting ECU (Transmitter)	Receiving ECU (Receiver)	Signals	Communication method
Steering lock ECU	• Certification ECU (Smart key ECU assembly) • ID code box (Immobiliser code ECU)	Steering lock request signal	LIN
		Steering unlock signal	
		Steering lock confirmation signal	
		Steering unlock confirmation signal	
		Diagnosis response signal	
		Steering unlock drive relay signal	

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		Steering lock drive relay signal	
		Steering lock motor operation signal	
ID code box (Immobiliser code ECU)	Certification ECU (Smart key ECU assembly)	Matching request random number signal	LIN
		EEPROM access malfunction signal	
		Model code matching signal	
		Model code mismatching signal	
		ECM code receiving status signal	
		Engine start permission request signal	
		Engine start permission response signal	
		S code matching result signal	
		S code registration status signal	
		S code registration mode signal	
		L code matching result signal	
		ECM communication signal	
		Registered key number response signal	
		Diagnosis mode switching signal	
		DTC(B2791) signal	
		Registered key number signal	
ID code box (Immobiliser code ECU)	Steering lock ECU	Steering lock release signal	LIN
		Matching request random number signal	
Certification ECU (Smart key ECU assembly)	ID code box (Immobiliser code ECU)	3 bit code request signal	LIN
		ID code matching result signal	
		Registered key number signal	

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		Vehicle type handle signal	
Certification ECU (Smart key ECU assembly)	• ID code box (Immobiliser code ECU) • Steering lock ECU	L code registration mode signal	LIN
		Diagnosis mode request signal	
		DTC clear request signal	
		L code registration status signal	
Main body ECU (Instrument panel junction block)	Certification ECU (Smart key ECU assembly)	Key code recognition 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 is activated and the SFI system cannot be started. The certification ECU (smart key ECU assembly) manages communication with the ECM, main body ECU (instrument panel junction block), steering lock ECU and ID code box (immobiliser code ECU). When the ID codes of the transponder chip and certification ECU (smart key ECU assembly) match, the certification ECU (smart key ECU assembly) authorizes the SFI system to start.
2. **FUNCTION OF MAIN COMPONENT**

COMPONENT OUTLINE CHART

Component	Outline
Transponder key coil/amplifier (built into the engine switch)	Receives a key ID code, amplifies and outputs the code to the certification ECU (smart key ECU assembly).
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 (smart key ECU assembly). A certification ECU (smart key ECU assembly) 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 (smart key ECU assembly).
Security indicator light	Illuminates or flashes. Illumination is controlled by the certification ECU (smart key ECU assembly).

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3. **SYSTEM FUNCTION**
   a. Using the 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 (instrument panel junction block) recognizes that the engine start operation has occurred and sends a certification request signal to the certification ECU (smart key ECU assembly). Upon receipt of the certification request signal, the certification ECU (smart key ECU assembly) 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 (smart key ECU assembly) analyzes the code. If the interior certification passes, then the main body ECU (instrument panel junction block) sends a certification pass response signal. When the main body ECU (instrument panel junction block) 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 light illuminates in green. Then the certification ECU (smart key ECU assembly) checks that the power source mode has been changed and sends a steering lock command signal to the main body ECU (instrument panel junction block). After receiving this signal, the main body ECU (instrument panel junction block) supplies power to the steering lock actuator. Then the steering lock ECU confirms that the certification ECU (smart key ECU assembly) is certified (via the ID code box (immobiliser code ECU)) 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 (smart key ECU assembly). Upon receipt of this signal, the certification ECU (smart key ECU assembly) sends an unset command signal to the ID code box (immobiliser code ECU). Once this signal is received, the ID code box (immobiliser code ECU) confirms that the certification ECU (smart key ECU assembly) is certified, sends an immobiliser unset command signal to the ECM, and sends a security indicator light off signal to the certification ECU (smart key ECU assembly).
   b. Not using the entry function (when the key battery is depleted)
      1. When the driver is sitting in the vehicle while carrying the key and the brake pedal is depressed, the main body ECU (instrument panel junction block) recognizes that the stop light switch is on and sends a key confirmation request signal to the certification ECU (smart key ECU assembly). Upon receipt of this signal, the certification ECU (smart key ECU assembly) 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 (smart key ECU assembly). Upon receipt of the ID code, the code is analyzed. If the certification passes, a key certification pass response signal is sent to the main body ECU (instrument panel junction block) while simultaneously sending a sound buzzer request signal to the meter ECU. When the main body ECU (instrument panel junction block) 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 light illuminates in green. Then the certification ECU (smart key ECU assembly) checks that the power source mode has been changed and sends a steering lock command signal to the main body ECU

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(instrument panel junction block). After receiving this signal, the main body ECU (instrument panel junction block) supplies power to the steering lock actuator. Then the steering lock ECU confirms that the certification ECU (smart key ECU assembly) is certified (via the ID code box (immobiliser code ECU)) 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 (smart key ECU assembly). Upon receipt of this signal, the certification ECU (smart key ECU assembly) sends an unset command signal to the ID code box (immobiliser code ECU). Once this signal is received, the ID code box (immobiliser code ECU) confirms that the certification ECU (smart key ECU assembly) is certified, sends an immobiliser unset command signal to the ECM, and sends a security indicator light off signal to the certification ECU (smart key ECU assembly).

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedures to troubleshoot the engine immobiliser system.
- Techstream should be used in steps 5 and 7.

1. **VEHICLE BROUGHT TO WORKSHOP**
2. **CUSTOMER PROBLEM ANALYSIS CHECK**

   HINT:

   - In troubleshooting, confirm that the problem symptoms have been accurately identified. Preconceptions should be discarded in order to make an accurate judgment. To clearly understand what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time the malfunction occurred.
   - Gather as much information as possible for reference. Past problems that seem unrelated may also help in some cases.
   - The following 5 items are important points in the problem analysis:

   PROBLEM ANALYSIS CHART

What	Vehicle model, system name
When	Date, time, occurrence frequency
Where	Road conditions
Under what conditions?	Driving conditions, weather conditions
How did it happen?	Problem symptoms

3. **INSPECT BATTERY VOLTAGE**
   a. Measure the battery voltage.

   Standard voltage:

   11 to 14 V

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

4. **CRANK ENGINE FOR MORE THAN 10 SECONDS**
5. **CHECK FOR DTCS**
   a. Check for DTCs and note any codes that are output (See **DTC CHECK/CLEAR**).
   b. Delete the DTCs.
   c. Recheck for DTCs. Based on the DTCs output above, try to duplicate the SFI system DTC, engine immobiliser system DTC, steering lock system DTC, or smart key system (starting) DTC by simulating the symptoms indicated by the DTCs.

Result

RESULT CHART

Result	Proceed to
SFI system DTC output recurs	A (See **DATA LIST/ACTIVE TEST**)
Engine immobiliser system DTC output recurs	B (See **DIAGNOSTIC TROUBLE CODE CHART**)
Steering lock system DTC output recurs	C (See **DIAGNOSTIC TROUBLE CODE CHART**)
Smart key system (starting) DTC output recurs	D (See **DIAGNOSTIC TROUBLE CODE CHART**)
DTC output does not recur	E

A: GO TO SFI SYSTEM (DTC CHART)

B: GO TO **ENGINE IMMOBILISER SYSTEM (DTC CHART)**

C: GO TO STEERING LOCK SYSTEM (DTC CHART)

D: GO TO SMART KEY SYSTEM (STARTING) (DTC CHART)

E: Go to next step

6. **PROBLEM SYMPTOMS TABLE**

Result

RESULT CHART

Result	Proceed to
Fault is listed in problem symptoms table	A
Fault is not listed in problem symptoms table	B

A: GO TO STEP 8

B: Go to next step

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7. **OVERALL ANALYSIS AND TROUBLESHOOTING**
   a. DATA LIST/ACTIVE TEST (See **DATA LIST/ACTIVE TEST**)
   b. TERMINALS OF ECU (See **TERMINALS OF ECU**)
8. **ADJUST, REPAIR OR REPLACE**
9. **CONFIRMATION TEST**

NEXT: END

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 (smart key ECU assembly), ID code box (immobiliser code ECU), steering lock ECU, or key is replaced with a new one.

a. Vehicles with the smart key system do not have a key slot. Therefore, hold the key close to the engine switch to register the key, as shown in the illustration below.

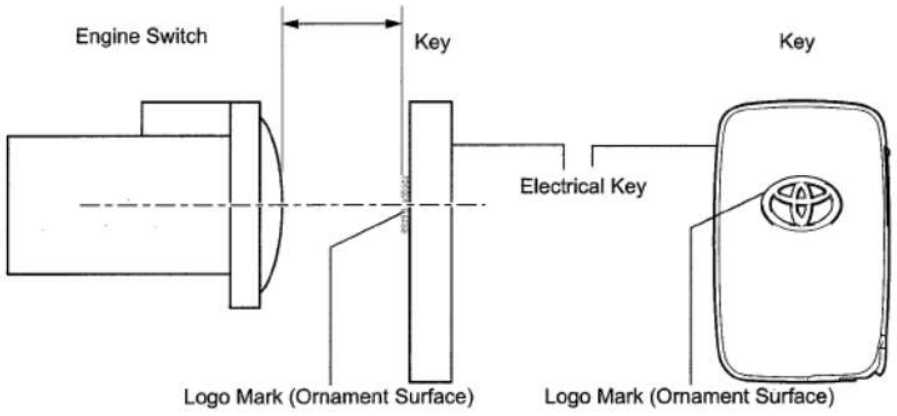
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Hold the key with its ornament surface within a range of 10 mm (0.39 in.) or less from the engine switch.

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



P B139204E05

Fig. 3: Identifying Communication Distance Between Engine Switch And Key
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. PART REPLACEMENT AND KEY REGISTRATION

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

  ECU code registration

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- If the customer has not brought all the registered keys, replacement of the ID code box (immobiliser code ECU) is also required.
- A maximum of 7 keys can be registered.

ECU REPLACEMENT AND KEY REGISTRATION PROCEDURE REFERENCE

Patr to be replaced	Condition		Procedure	Reference
Certification ECU (Smart key ECU assembly)	Customer has brought all keys		1. Replace certification ECU (smart key ECU assembly)	-
			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 (smart key ECU assembly)	-
			4. 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 "B"
		Key ID codes cannot be either registered or erased	1. Replace certification ECU (smart key ECU assembly)	-
			2. Replace ID code box (immobiliser code 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 (smart key ECU assembly), replace the ID code box (immobiliser code ECU) and certification ECU (smart key ECU assembly). If some keys are not registered during the above steps, they will be disabled because they cannot be registered later.	PROCEDURE "A"
			4. ECU communication ID registration	PROCEDURE "G"
			1. Replace certification ECU (smart key ECU assembly)	-
			2. Replace ID code box (immobiliser code ECU)	-

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	All keys are lost	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 (smart key ECU assembly), replace the ID code box (immobiliser code ECU) and certification ECU (smart key ECU assembly). If some keys are not registered during the above steps, they will be disabled because they cannot be registered later.	PROCEDURE "A"
		4. ECU communication ID registration	PROCEDURE "G"
ID code box (Immobiliser code ECU)	Customer has brought at least 1 key	1. Replace ID code box (immobiliser code ECU)	-
		2. Register recognition codes in ECUs (ECU code registration)	PROCEDURE "F"
		3. ECU communication ID registration	PROCEDURE "G"
	All keys are lost	1. Replace ID code box (immobiliser code ECU)	-
		2. Replace certification ECU (smart key ECU assembly)	-
		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. ECU communication ID registration	PROCEDURE "G"
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 "F"
	All keys are lost	1. Replace steering lock ECU	-
		2. Replace certification ECU (smart key ECU assembly)	-
		3. Replace ID code box (immobiliser code ECU)	-
		4. 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"

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		5. ECU communication ID registration	PROCEDURE "G"
Main body ECU (Instrument panel junction block)	No condition required	Replace main body ECU (instrument panel junction block)	-
ECM	No condition required	1. Replace ECM	-
		2. ECU communication ID registration	PROCEDURE "H"
Key (for replacement)	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 "C"
	All keys are lost	1. Erase all key codes (All key ID erasure)	PROCEDURE "E"
		2. Register all keys (New key ID registration) HINT: If the customer brings lost keys at a later date, they can be registered using the additional key ID registration function.	PROCEDURE "A"
Key (for addition)	Customer has brought at least 1 key HINT: When adding keys (Additional registration)	1. Register additional keys as necessary (Additional key ID registration)	PROCEDURE "C"

3. **KEY REGISTRATION**

a. PROCEDURE "A"

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

KEY REGISTRATION - PROCEDURE A

Process	Procedure
1. Start of registration	1. Connect Techstream to DLC3 2. Turn engine switch on (IG) 3. Select "Body Electrical/Smart Key/Utility/Smart Code Registration" from the Techstream menu

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	HINT: The engine switch cannot be turned on (IG) more than 10 times. After connecting Techstream, turn Techstream on while turning the 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 the Techstream screen HINT: Mode is automatically selected by Techstream (new registration mode or add mode).
3. Verification of unregistered key (1)	1. Hold unregistered key close to engine switch (For details, refer to "1 DESCRIPTION OF CODE REGISTRATION") 2. Confirm that wireless door lock buzzer sounds once (short beep) 3. Place unregistered key on driver's seat 4. Confirm that 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 (smart key ECU assembly))

KEY REGISTRATION - PROCEDURE B

Process	Procedure
1. Start of registration	1. Connect Techstream to DLC3 2. Turn engine switch on (IG) 3. Select "Body Electrical/Smart Key/Utility/Smart Code Registration" from the Techstream menu HINT: The engine switch cannot be turned on (IG) more than 10 times. After connecting Techstream, turn Techstream on while turning the 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	Perform operation according to prompts on the Techstream screen HINT:

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ECU code	Mode is automatically selected by Techstream (new registration mode or add mode).
3. Confirmation of all registered keys (1)	1. Hold unregistered key close to engine switch (For details, refer to "1 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 unregistered key close to engine switch (For details, refer to "1 DESCRIPTION OF CODE REGISTRATION") 2. Confirm that wireless door lock buzzer sounds once (short beep) 3. Place unregistered key on driver's seat 4. Confirm that 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 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 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 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

KEY REGISTRATION - PROCEDURE C

Process	Procedure
1. Start of registration	1. Connect Techstream to DLC3 2. Turn engine switch on (IG) 3. Select "Body Electrical/Smart Key/Utility/Smart Code Registration" from the Techstream menu
2. Confirmation of	1. Perform operation according to prompts on the Techstream screen HINT:

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registered key (1)	Mode is automatically selected by Techstream (new registration mode or add mode) 2. Hold unregistered key close to engine switch (For details, refer to "1 DESCRIPTION OF CODE REGISTRATION") 3. Confirm that 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 unregistered key close to engine switch (For details, refer to "1 DESCRIPTION OF CODE REGISTRATION") 2. Confirm that wireless door lock buzzer sounds once (short beep) 3. Place unregistered key on driver's seat 4. Confirm that 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 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:

Erase all registered key codes except one.

KEY REGISTRATION - PROCEDURE D

Process	Procedure
1. Start of erasure	1. Connect Techstream to DLC3 2. Turn engine switch on (IG) 3. Select "Body Electrical/Smart Key/Utility/Smart Code Erasure" from the Techstream menu
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 registered key close to engine switch (For details, refer to "1 DESCRIPTION OF CODE REGISTRATION") 3. Confirm that wireless door lock buzzer sounds once (short beep)

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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
(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:

All the key codes registered in the vehicle are erased.

KEY REGISTRATION - PROCEDURE E

Process	Procedure
1. Start of erasure	1. Connect Techstream to DLC3 2. Turn engine switch on (IG) 3. Turn Techstream on while turning driver side door courtesy light switch on and off repeatedly at 1,5-second intervals or less 4. Select "Body Electrical/Smart Key/Utility/Smart Code Erasure" from the Techstream menu
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

f. PROCEDURE "F"

ECU code registration

KEY REGISTRATION - PROCEDURE F

Process	Procedure
1. Start of registration	1. Connect Techstream to DLC3 2. Turn engine switch on (IG) 3. Select "Body Electrical/Smart Key/Utility/ECU Communication ID Registration" from the Techstream menu
2. Confirmation of registered key (1)	1. Hold registered key close to engine switch (For details, refer to "1 DESCRIPTION OF CODE REGISTRATION") 2. Confirm that wireless door lock buzzer sounds once (short beep)

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3. Registration of ECU code	Perform operation according to prompts on the Techstream 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 the erasure procedures again from process 1.	

g. PROCEDURE "G"

ECU communication ID registration

NOTE:

- **The ECU communication ID should be registered when the ID code box (immobiliser code 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.**
- **Erase DTC B2799 (code for ECM's immobiliser communication error) by either of the following:**
  - **Use Techstream.**
  - **Disconnect the battery for 30 seconds.**

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

SST 09843-18040

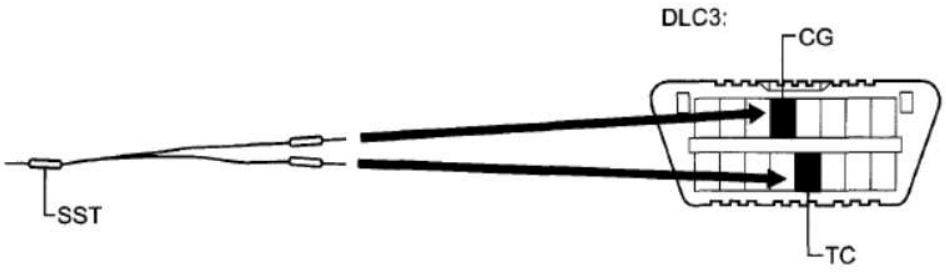


Fig. 4: Identifying Terminals TC And CG Of DLC3
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

HINT:

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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 on for more than 3 seconds.

h. PROCEDURE "H"

ECU communication ID registration

NOTE: The ECU communication ID should be registered when the ECM is replaced in order to match the ECU communication IDs.

KEY REGISTRATION - PROCEDURE H

Procedure	Security Indicator Light Condition
1. Start	OFF
2. Hold an already registered key close to the engine switch and turn the engine switch on (IG) with the brake pedal depressed	
3. Check that the engine starts and stays on for more than 3 seconds	
4. Next	
5. End	

PROBLEM SYMPTOMS TABLE

HINT:

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

ENGINE IMMOBILISER SYSTEM:

PROBLEM SYMPTOMS REFERENCE

Symptom	Suspected Area	Refer to
Engine does not start.	Key	DATA LIST/ACTIVE TEST
	ID code box power source circuit	ID CODE BOX POWER SOURCE CIRCUIT
	Certification ECU power source circuit	CERTIFICATION ECU POWER SOURCE CIRCUIT
	Steering lock ECU power source circuit	POWER SOURCE CIRCUIT
	Smart key system (Starting)	INSTALLATION
	SFI system	HOW TO PROCEED WITH TROUBLESHOOTING
	Security indicator light	SECURITY INDICATOR LIGHT

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		CIRCUIT
Security indicator light is always ON.	Wire harness or connector	-
	Certification ECU (Smart key ECU assembly)	-
Security indicator light is OFF.	Security indicator light	**SECURITY INDICATOR LIGHT CIRCUIT**
	Wire harness or connector	-
	Certification ECU (Smart key ECU assembly)	-

TERMINALS OF ECU

1. **CHECK ENGINE SWITCH**
   a. Disconnect the D25 engine switch connector.



B146454E04

Fig. 5: Identifying D25 Engine Switch Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

ECU TERMINAL REFERENCE

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D25-8 (AGND) - Body ground	V - Body ground	Ground	Always	Below 1 ohms

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

   c. Reconnect the D25 engine switch connector.
   d. Measure the resistance and voltage according to the value(s) in the table below.

ECU TERMINAL REFERENCE

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D25-8 (AGND) -	V - Body	Ground	Always	Below 1 ohms

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Body ground	ground			
D25-9 (TXCT) - D25-8 (AGND)	O-V	Key code output signal	Key is not in cabin	Below 1 V
D25-9 (TXCT) - D25-8 (AGND)	O-V	Key code output signal	Press engine switch and hold key close to engine switch*	Pulse generation (See waveform 1 1)
D25-10 (CODE) - D25-8 (AGND)	GR-V	Demodulated signal of key code data	Key is not in cabin	Below 1 V
D25-10 (CODE) - D25-8 (AGND)	GR-V	Demodulated signal of key code data	Press engine switch and hold key close to engine switch*	Pulse generation (see waveform 2 2)
D25-14 (VC5) - D25-8 (AGND)	G-V	Power supply	Key is not in cabin	Below 1 V
D25-14 (VC5) - D25-8 (AGND)	G-V	Power supply	Press engine switch	4.6 to 5.4 V
HINT: *: Remove the key battery before performing this inspection.				

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

e. Inspect using an oscilloscope.

1. Waveform 1 (Reference)

WAVEFORM REFERENCE

Item	Content
Tester Connection	D25-9 (TXCT) - D25-8 (AGND)
Tool Setting	2V/DIV., 50ms./DIV.
Condition	Press engine switch and hold key close to engine switch*
HINT: *: Remove the key battery before performing this inspection.	

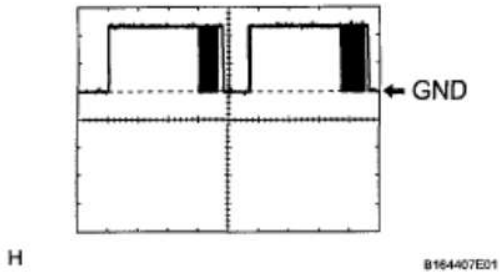


Fig. 6: Waveform 1 Graph
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2. Waveform 2 (Reference)

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WAVEFORM REFERENCE

Item	Content
Tester Connection	D25-10 (CODE) - D25-8 (AGND)
Tool Setting	2V/DIV., 50ms./DIV.
Condition	Press engine switch and hold key close to engine switch*
HINT: *: Remove the key battery before performing this inspection.	

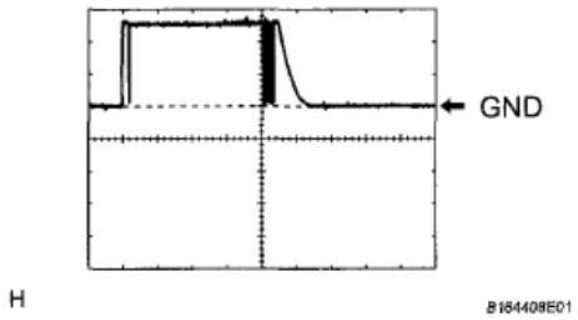


Fig. 7: Waveform 2 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. **CHECK CERTIFICATION ECU (SMART KEY ECU ASSEMBLY)**
   a. Disconnect the D40 certification ECU (smart key ECU assembly) connector.

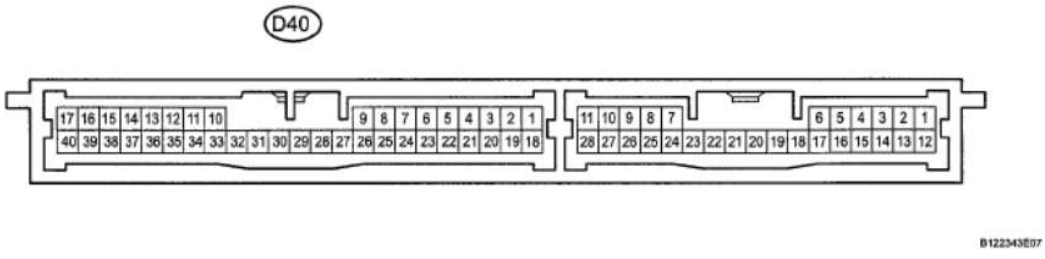


Fig. 8: Identifying D40 Certification ECU (Smart Key ECU Assembly) Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

ECU TERMINAL REFERENCE

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D40-1 (+B) - D40-17 (E)	B-B	+B power supply	Always	11 to 14 V
D40-17 (E) - Body ground	B - Body ground	Ground	Always	Below 1 ohms
D40-18 (IG) - D40-17 (E)	G-B	Ignition power supply	Engine switch off	Below 1 V

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D40-18 (IG) - D40-17 (E)	G-B	Ignition power supply	Engine switch on (IG)	11 to 14 V

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

c. Reconnect the D40 certification ECU (smart key ECU assembly) connector.

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

ECU TERMINAL REFERENCE

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D40-8 (TXCT) - D40-40 (AGND)	O-V	Engine switch TXCT output	Key is not in cabin	Below 1 V
D40-8 (TXCT) - D40-40 (AGND)	O-V	Engine switch TXCT output	Press engine switch and hold key close to engine switch*	Pulse generation (See waveform 1 1)
D40-9 (CODE) - D40-40 (AGND)	GR-V	Engine switch CODE input	Key is not in cabin	Below 1 V
D40-9 (CODE) - D40-40 (AGND)	GR-V	Engine switch CODE input	Press engine switch and hold key close to engine switch*	Pulse generation (See waveform 2 2)
D40-30 (VC5) - D40-40 (AGND)	G-V	Engine switch power supply	Key is not in cabin	Below 1 V
D40-30 (VC5) - D40-40 (AGND)	G-V	Engine switch power supply	Press engine switch	4.6 to 5.4 V
D40-40 (AGND) - Body ground	V - Body ground	Engine switch ground	Always	Below 1 ohms
HINT: *: Remove the key battery before performing this inspection.				

If the result is not as specified, the certification ECU (smart key ECU assembly) may have a malfunction.

e. Inspect using an oscilloscope.

1. Waveform 1 (Reference)

WAVEFORM REFERENCE

Item	Content
Tester Connection	D40-8 (TXCT) - D40-40 (AGND)
Tool Setting	2V/DIV., 50ms./DIV.
Condition	Press engine switch and hold key close to engine switch*
HINT: *: Remove the key battery before performing this inspection.	

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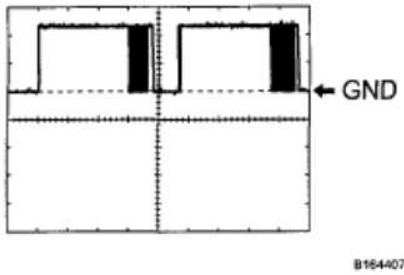


Fig. 9: Waveform 1 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Waveform 2 (Reference)

WAVEFORM REFERENCE

Item	Content
Tester Connection	D40-9 (CODE) - D40-40 (AGND)
Tool Setting	2V/DIV., 50ms./DIV.
Condition	Press engine switch and hold key close to engine switch*
HINT: *: Remove the key battery before performing this inspection.	

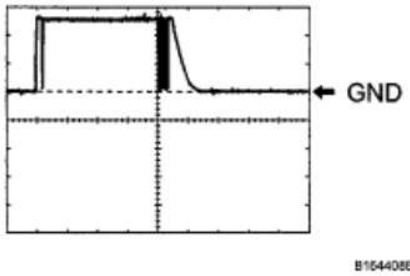


Fig. 10: Waveform 2 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. **CHECK ID CODE BOX (IMMOBILISER CODE ECU)**
   a. Disconnect the D31 ID code box (immobiliser code ECU) connector.

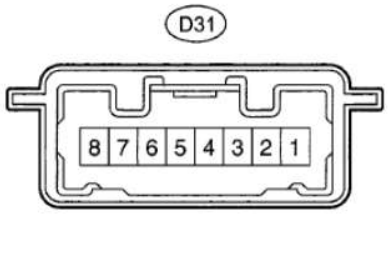


Fig. 11: Identifying D31 ID Code Box (Immobiliser Code ECU) Connector

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

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

ECU TERMINAL REFERENCE

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D31-1 (+B) - D31-8 (GND)	W-V	+B power supply	Always	11 to 14 V
D31-8 (GND) - Body ground	V - Body ground	Ground	Always	Below 1 ohms

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

c. Reconnect the D31 ID code box (immobiliser code ECU) connector.
d. Measure the voltage according to the value (s) in the table below.

ECU TERMINAL REFERENCE

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D31-5 (EFII) - D31-8 (GND)	BR-V	ECM input signal	Engine switch off	Below 1 V
D31-5 (EFII) - D31-8 (GND)	BR-V	ECM input signal	Engine switch on (IG)	Pulse generation (see waveform 1 1)
D31-6 (EFIO) - D31-8 (GND)	L-V	ECM output signal	Engine switch off	Below 1 V
D31-6 (EFIO) - D31-8 (GND)	L-V	ECM output signal	Engine switch on (IG)	Pulse generation (see waveform 2 2)

If the result is not as specified, the ID code box (immobiliser code ECU) may have a malfunction.

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

WAVEFORM REFERENCE

Item	Content
Tester Connection	D31-5 (EFII) - D31-8 (GND)
Tool Setting	10 V/DIV., 100 ms./DIV.
Condition	Engine switch on (IG)

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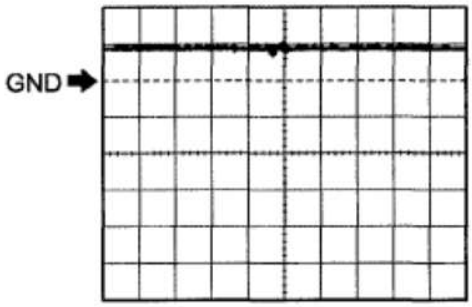


Fig. 12: Waveform 1 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Waveform 2 (Reference)

WAVEFORM REFERENCE

Item	Content
Tester Connection	D31-6 (EFIO) - D31-8 (GND)
Tool Setting	10 V/DIV., 100 ms./DIV.
Condition	Engine switch on (IG)

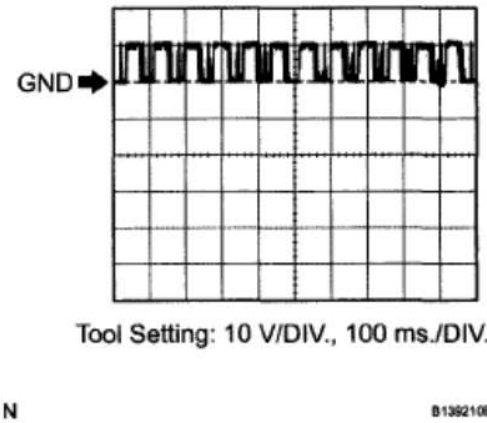


Fig. 13: Waveform 2 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. **CHECK STEERING LOCK ECU**
   a. Disconnect the D11 steering lock ECU connector.

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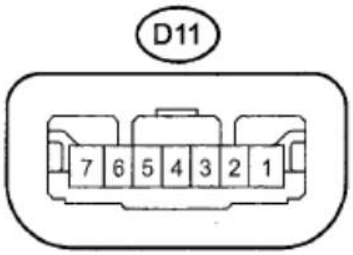


Fig. 14: Identifying D11 Steering Lock ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

ECU TERMINAL REFERENCE

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D11-1 (GND) - Body ground	W-B - Body ground	Ground	Always	Below 1 ohms
D11-2 (SGND) - Body ground	W - Body ground	Ground	Always	Below 1 ohms
D11-6 (IG2) - Body ground	V - Body ground	Ignition power supply	Engine switch off	Below 1 V
D11-6 (IG2) - Body ground	V - Body ground	Ignition power supply	Engine switch on (IG)	11 to 14 V
D11-7 (B) - Body ground	G - Body ground	+B power supply	Always	11 to 14V

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

5. **CHECK ECM**

a. Disconnect the B3 ECM connector and measure the resistance according to the value (s) in the table below.

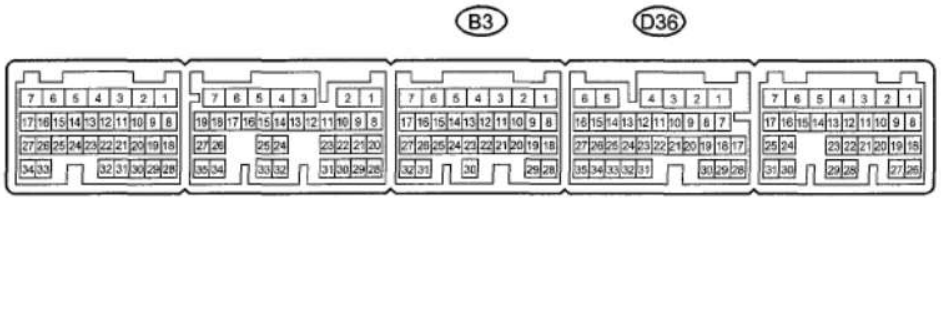


Fig. 15: Identifying B3 ECM Connector
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ECU TERMINAL REFERENCE

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
B3-1 (E1) - Body ground	W-B - Body ground	Ground	Always	Below 1 ohms

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

b. Reconnect the B3 ECM connector. Measure the voltage according to the value (s) in the table below.

ECU TERMINAL REFERENCE

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D36-15 (IMO) - B3-1 (E1)	BR - W-B	Transponder key ECU output signal	Engine switch off	Below 1 V
D36-15 (IMO) - B3-1 (E1)	BR - W-B	Transponder key ECU output signal	Engine switch on (IG)	Waveform 1
D36-16 (IMI) - B3-1 (E1)	L - W-B	Transponder key ECU input signal	Engine switch off	Below 1 V
D36-16 (IMI) - B3-1 (E1)	L - W-B	Transponder key ECU input signal	Engine switch on (IG)	Waveform 2

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

c. Inspect using an oscilloscope.

1. Waveform 1 (Reference)

WAVEFORM REFERENCE

Item	Content
Tester Connection	D36-15 (IMO) - B3-1 (E1)
Tool Setting	10 V/DIV., 100 ms./DIV.
Condition	Engine switch on (IG)

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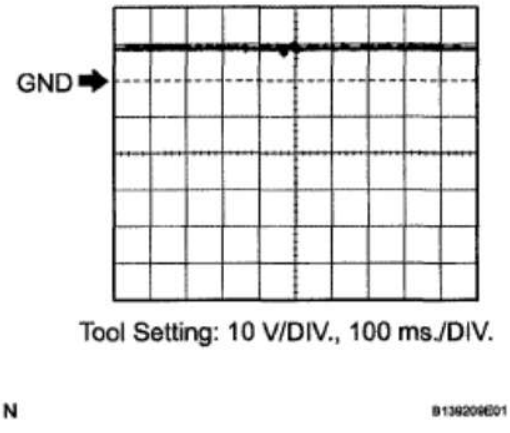


Fig. 16: Waveform 1 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Waveform 2 (Reference)

WAVEFORM REFERENCE

Item	Content
Tester Connection	D36-16 (IMI) - B3-1 (E1)
Tool Setting	10 V/DIV., 100 ms./DIV.
Condition	Engine switch on (IG)

6. **CHECK MAIN BODY ECU (INSTRUMENT PANEL JUNCTION BLOCK)**
   a. Disconnect the 1M and 1F junction block connectors.

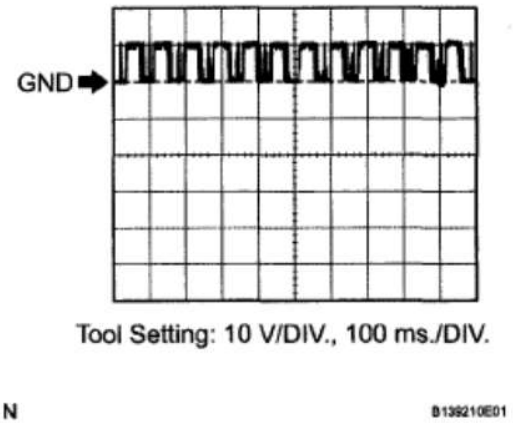


Fig. 17: Waveform 2 Graph
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   b. Disconnect the D7, D8 and D9 main body ECU (instrument panel junction block) connectors.

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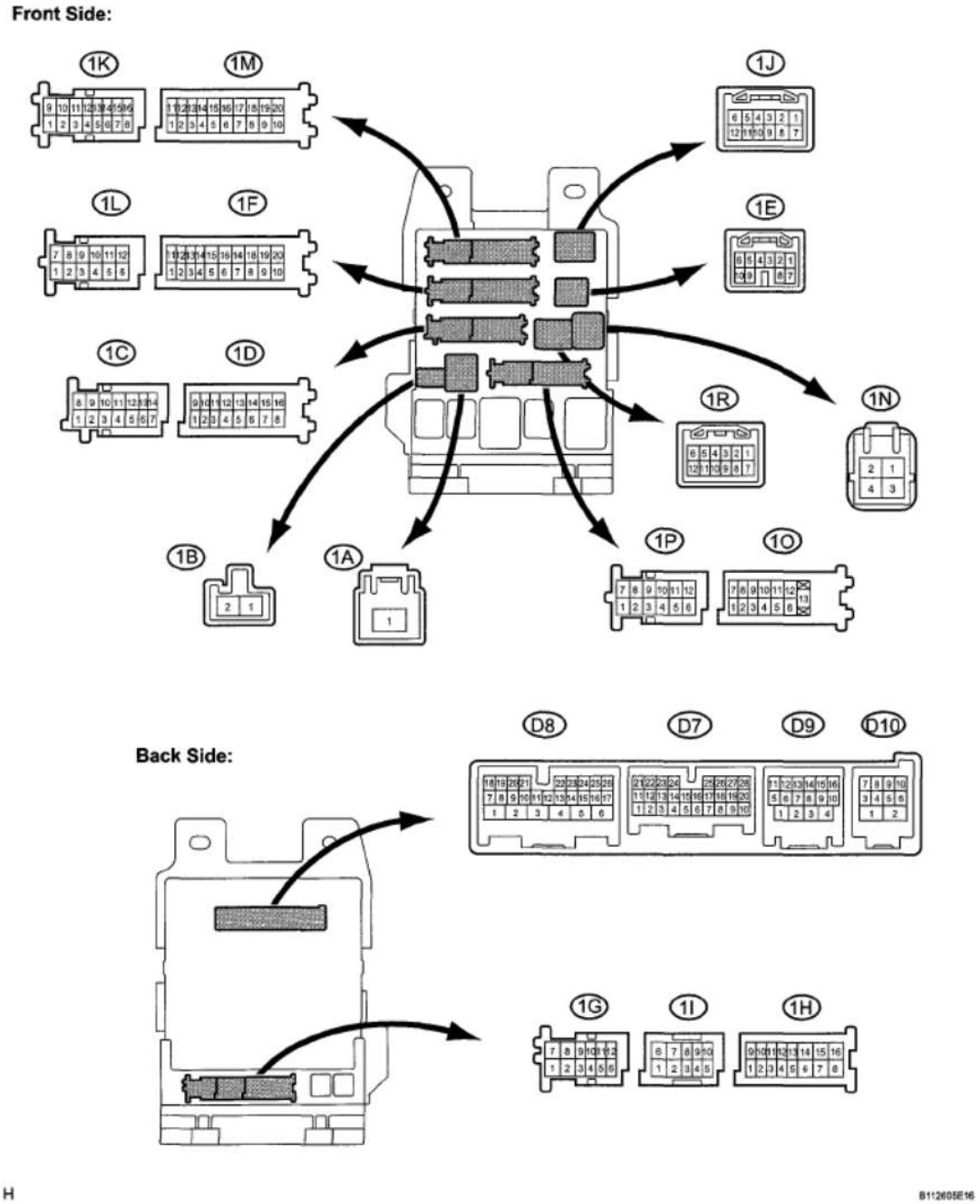


Fig. 18: Identifying D7, D8 And D9 Main Body ECU (Instrument Panel Junction Block) Connectors
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

ECU TERMINAL REFERENCE

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition

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D7-1 (AM2) - Body ground	G - Body ground	+B power supply	Always	11 to 14 V
D8-6 (AM1) - Body ground	GR - Body ground	+B power supply	Always	11 to 14 V
D9-1 (GND3) - Body ground	W-B - Body ground	Ground	Always	Below 1 ohms
1M-9 (GND2) - Body ground	W-B - Body ground	Ground	Always	Below 1 ohms
1F-10 (GND1) - Body ground	W-B - Body ground	Ground	Always	Below 1 ohms

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

DIAGNOSIS SYSTEM

1. **DESCRIPTION**
   a. The certification ECU (smart key ECU assembly) controls the vehicle's engine immobiliser system functions. Engine immobiliser system data and Diagnostic Trouble Codes (DTCs) can be read through the vehicle's 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 Techstream to check for malfunctions and perform repairs.
2. **CHECK DLC3**
   a. Check the DLC3 (See **HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS**).
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.

DTC CHECK/CLEAR

1. **CHECK DTC**
   a. Connect Techstream to the DLC3.
   b. Turn the engine switch on (IG).
   c. Turn the tester on.
   d. Select the following menu items: Body Electrical/Smart Key/Trouble Codes.
   e. Check the details of the DTC (s) (See **DIAGNOSTIC TROUBLE CODE CHART**).
2. **CLEAR DTC**
   a. Connect Techstream to the DLC3.

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b. Turn the engine switch on (IG).
c. Turn the tester on.
d. Select the following menu items: Body Electrical/Smart Key/Trouble Codes.
e. Erase the DTCs.

DATA LIST/ACTIVE TEST

1. **READ DATA LIST**

HINT:

Using 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.

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

Smart Key (Certification ECU (Smart Key ECU Assembly)):

DATA LIST

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	-
ACC Switch	Engine switch on (ACC) signal/ON or OFF	ON: Engine switch on (ACC, IG) or engine started 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	OK: Correct data sent	-

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Malfunction	NG	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	-

2. **PERFORM ACTIVE TEST**

HINT:

Using 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.

a. Connect Techstream to the DLC3.
b. Turn the engine switch on (IG).
c. Turn the tester on.
d. Select the following menu items: Body Electrical/Smart Key/Active Test.
e. Perform the Active Test by following the directions on the tester screen.

Smart Key (Certification ECU (Smart Key ECU Assembly)):

ACTIVE TEST CHART

Tester Display	Test Part	Control Range	Diagnostic Note
Security Indic	Security indicator light	ON/OFF	-

DIAGNOSTIC TROUBLE CODE CHART

1. **CERTIFICATION ECU (SMART KEY ECU ASSEMBLY) DIAGNOSTIC TROUBLE CODE CHART**

CERTIFICATION ECU (SMART KEY ECU ASSEMBLY)

DIAGNOSTIC TROUBLE CODE CHART

DTC Code	Detection Item	Trouble Area
B2784	Antenna Coil Open/Short	1. Wire harness or connector

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		2. Engine switch 3. Certification ECU (Smart key ECU assembly)
B2785	Communication Malfunction between ECUs Connected by LIN	1. Certification ECU (Smart key ECU assembly) 2. Main body ECU (instrument panel junction block) 3. Steering lock ECU 4. ID code box (Immobiliser code ECU) 5. Wire harness or connector
B2786	No Response from Steering Lock ECU	1. Steering lock ECU 2. Certification ECU (Smart key ECU assembly) 3. Wire harness
B2789	No Response from ID BOX	1. ID code box (Immobiliser code ECU) 2. Certification ECU (Smart key ECU assembly) 3. Wire harness or connector
B278A	Short to GND in Immobiliser System Power Source Circuit	1. Wire harness or connector 2. Engine switch 3. Certification ECU (Smart key ECU assembly)
B2790	ID BOX EEPROM Malfunction	ID code box (Immobiliser code ECU)

2. **ECM DIAGNOSTIC TROUBLE CODE CHART**

HINT:

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

ECM

DIAGNOSTIC TROUBLE CODE CHART

DTC Code	Detection Item	Trouble Area
B2799	Engine Immobiliser System Malfunction	1. Wire harness or connector 2. ECM

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		3. ID code box (Immobiliser code ECU)

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 TROUBLE DETECTION CONDITION CHART

DTC No.	DTC Detection Condition	Trouble Area
B2784	Antenna coil is open/shorted	• Wire harness or connector • Certification ECU (Smart key ECU assembly) • Engine switch

WIRING DIAGRAM

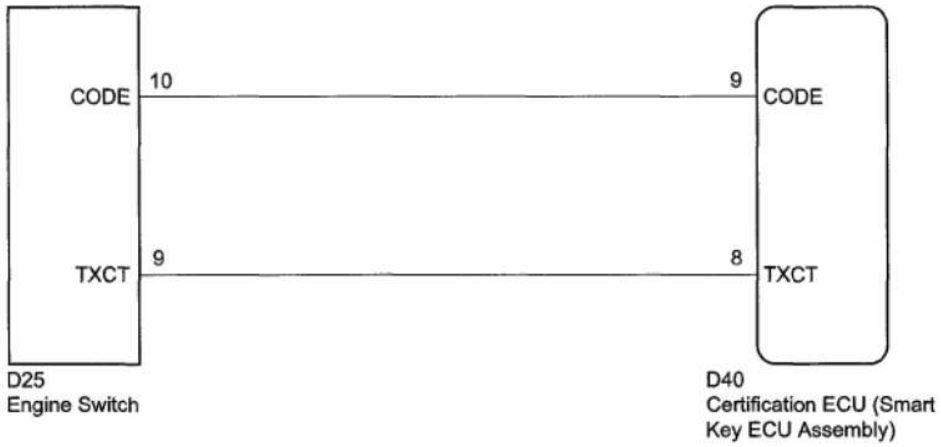


Fig. 19: Antenna Coil Open/Short - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: If the certification ECU (smart key ECU assembly) is replaced, register the key and ECU communication ID (See REGISTRATION).

1. **CHECK DTC OUTPUT**
   a. Delete the DTCs (See **DTC CHECK/CLEAR**).
   b. Recheck for DTCs.

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OK:

B2784 output does not recur.

NG: Go to step 2

OK: USE SIMULATION METHOD TO CHECK (See **HOW TO PROCEED WITH TROUBLESHOOTING**)

2. **CHECK HARNESS AND CONNECTOR (CERTIFICATION ECU - ENGINE SWITCH)**
   a. Disconnect the certification ECU (smart key ECU assembly) and engine switch connectors.
   b. Measure the resistance according to the value (s) in the table below.

Standard resistance

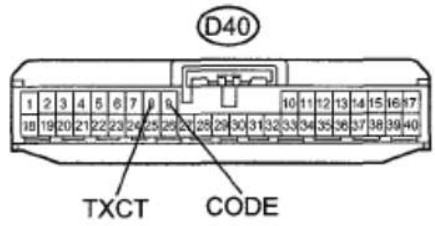
TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D40-9 (CODE) - D25-10 (CODE)	Always	Below 1 ohms
D40-8 (TXCT) - D25-9 (TXCT)	Always	Below 1 ohms
D40-9 (CODE) - Body ground	Always	10 kohms or higher
D40-8 (TXCT) - Body ground	Always	10 kohms or higher

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

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Front view of wire harness connector:
(to Certification ECU (Smart Key ECU Assembly))



Front view of wire harness connector:
(to Engine Switch)

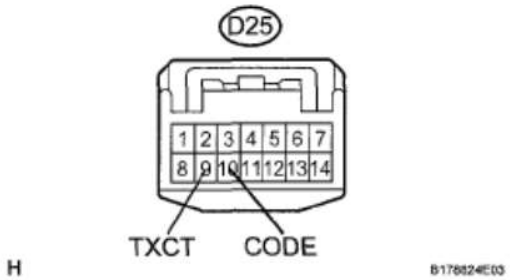


Fig. 20: Identifying Certification ECU And Engine Switch Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

3. **REPLACE ENGINE SWITCH**
   a. Replace the engine switch (See **REMOVAL**).
4. **CHECK DTC OUTPUT**
   a. Delete the DTCs (See **DTC CHECK/CLEAR**).
   b. Recheck for DTCs.

OK:

B2784 output does not recur.

NG: REPLACE CERTIFICATION ECU (SMART KEY ECU ASSEMBLY) (See **REMOVAL**)

OK: END (ENGINE SWITCH IS DEFECTIVE)

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DTC B2785 COMMUNICATION MALFUNCTION BETWEEN ECUS CONNECTED BY LIN

DESCRIPTION

Refer to DTC B2785 (LIN communication system) (See **DTC B2785 COMMUNICATION MALFUNCTION BETWEEN ECUS CONNECTED BY LIN**).

DTC TROUBLE DETECTION CONDITION CHART

DTC No.	DTC Detection Condition	Trouble Area
B2785	• Error in LIN communication between ECUs and an open or short in communication lines • LIN communication from certification ECU (smart key ECU assembly) stops for a set amount of time or more	• Certification ECU (Smart key ECU assembly) • Main body ECU (Instrument panel junction block) • Steering lock ECU • ID code box (Immobiliser code ECU) • Wire harness or connector

WIRING DIAGRAM

Refer to DTC B2785 (LIN communication system) (See **DTC B2785 COMMUNICATION MALFUNCTION BETWEEN ECUS CONNECTED BY LIN**).

INSPECTION PROCEDURE

Refer to DTC B2785 (LIN communication system) (See **DTC B2785 COMMUNICATION MALFUNCTION BETWEEN ECUS CONNECTED BY LIN**).

DTC B2786 NO RESPONSE FROM STEERING LOCK ECU

DESCRIPTION

Refer to DTC B2786 (LIN communication system) (See **DTC B2786 NO RESPONSE FROM STEERING LOCK ECU**).

DTC TROUBLE DETECTION CONDITION CHART

DTC No.	DTC Detection Condition	Trouble Area
B2786	No communication between steering lock ECU and main body ECU (instrument panel junction block) for more than 10 seconds	• Steering lock ECU • Certification ECU (Smart key ECU assembly) • Wire harness or connector

WIRING DIAGRAM

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Refer to DTC B2786 (LIN communication system) (See **DTC B2786 NO RESPONSE FROM STEERING LOCK ECU**).

INSPECTION PROCEDURE

Refer to DTC B2786 (LIN communication system) (See **DTC B2786 NO RESPONSE FROM STEERING LOCK ECU**).

DTC B2789 NO RESPONSE FROM ID BOX

DESCRIPTION

Refer to DTC B2789 (LIN communication system) (See **DTC B2789 NO RESPONSE FROM ID BOX**).

DTC TROUBLE DETECTION CONDITION CHART

DTC No.	DTC Detection Condition	Trouble Area
B2789	No communication between certification ECU (smart key ECU assembly) and ID code box (immobiliser code ECU) for more than 10 seconds	• ID code box (Immobiliser code ECU) • Certification ECU (Smart key ECU assembly) • Wire harness or connector

WIRING DIAGRAM

Refer to DTC B2789 (LIN communication system) (See **DTC B2789 NO RESPONSE FROM ID BOX**).

INSPECTION PROCEDURE

Refer to DTC B2789 (LIN communication system) (See **DTC B2789 NO RESPONSE FROM ID 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 TROUBLE DETECTION CONDITION CHART

DTC No.	DTC Detection Condition	Trouble Area
B278A	Engine switch power source supply line is open or shorted	• Wire harness or connector • Engine switch • Certification ECU (Smart key ECU assembly)

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WIRING DIAGRAM

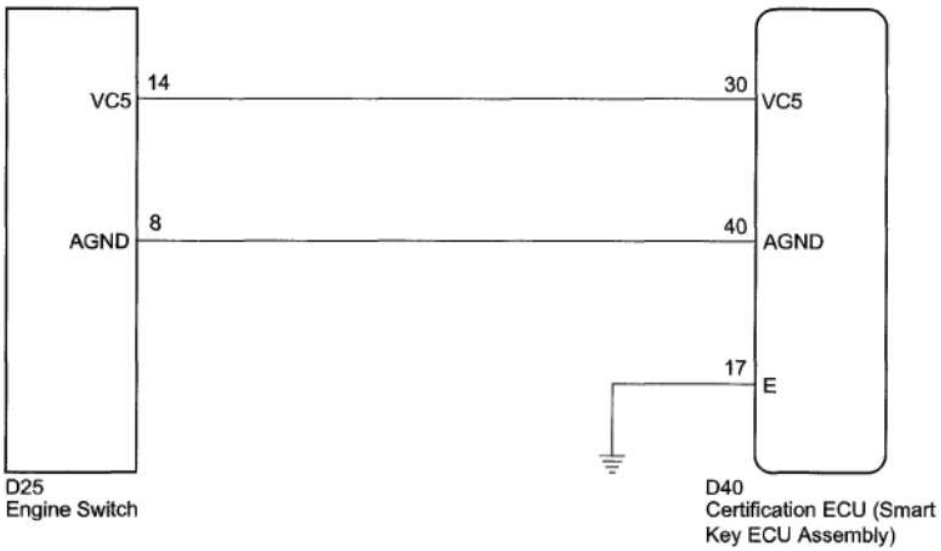


Fig. 21: Short To GND In Immobiliser System Power Source Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: If the certification ECU (smart key ECU assembly) is replaced, register the key and ECU communication ID (See REGISTRATION).

1. **CHECK DTC OUTPUT**
   a. Delete the DTCs (See **DTC CHECK/CLEAR**).
   b. Recheck for DTCs.

   OK:

   B278A output does not recur.

   NG: Go to step 2

   OK: USE SIMULATION METHOD TO CHECK (See **HOW TO PROCEED WITH TROUBLESHOOTING**)

2. **CHECK HARNESS AND CONNECTOR (CERTIFICATION ECU - ENGINE SWITCH)**
   a. Disconnect the certification ECU (smart key ECU assembly) and engine switch connectors.
   b. Measure the resistance according to the value (s) in the table below.

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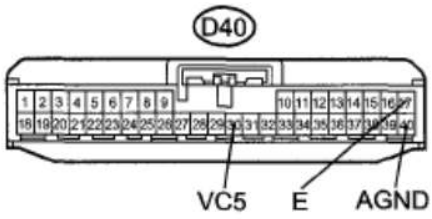
Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D40-30 (VC5) - D25-14 (VC5)	Always	Below 1 ohms
D40-40 (AGND) - D25-8 (AGND)	Always	Below 1 ohms
D40-17 (E) - Body ground	Always	Below 1 ohms
D40-30 (VC5) - Body ground	Always	10 kohms or higher
D40-40 (AGND) - Body ground	Always	10 kohms or higher

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

Front view of wire harness connector:
(to Certification ECU (Smart Key ECU Assembly))



Front view of wire harness connector:
(to Engine Switch)

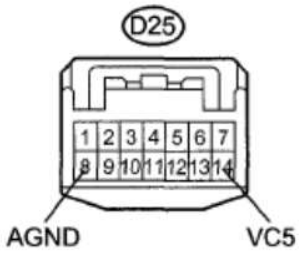


Fig. 22: Identifying Certification ECU And Engine Switch Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

3. **CHECK HARNESS AND CONNECTOR (ENGINE SWITCH POWER SOURCE)**
   a. Reconnect the certification ECU (smart key ECU assembly) and engine switch connectors.
   b. Measure the voltage according to the value (s) in the table below.

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Standard voltage

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D40-30 (VC5) - Body ground	Key is not in cabin	Below 1 V
D40-30 (VC5) - Body ground	Engine switch pressed	4.6 to 5.4 V

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

Component with harness connected:
(Certification ECU (Smart Key ECU Assembly))

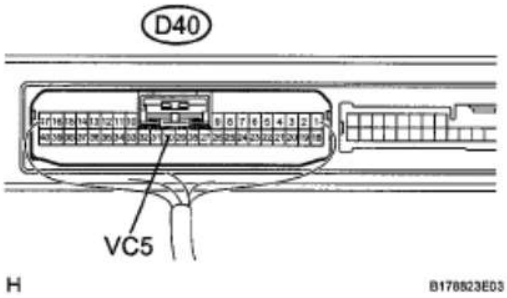


Fig. 23: Identifying Certification ECU (Smart Key ECU Assembly) Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

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

Tester Connection	Condition	Specified Condition
D40-40 (AGND) - Body ground	Always	Below 1 ohms

NG: REPLACE CERTIFICATION ECU (SMART KEY ECU ASSEMBLY) (See REMOVAL)

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Component with harness connected:
(Certification ECU (Smart Key ECU Assembly))

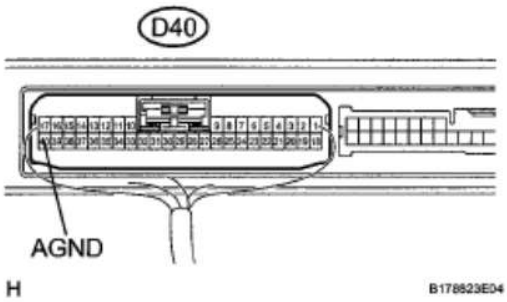


Fig. 24: Identifying Certification ECU (Smart Key ECU Assembly) Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: REPLACE ENGINE SWITCH (See **REMOVAL**)

DTC B2790 ID BOX EEPROM MALFUNCTION

DESCRIPTION

This DTC is output when the ID code box (immobiliser code ECU) detects an internal malfunction.

DTC TROUBLE DETECTION CONDITION CHART

DTC No.	DTC Detection Condition	Trouble Area
B2790	ID code box (Immobiliser code ECU) detects internal malfunction	ID code box (Immobiliser code ECU)

INSPECTION PROCEDURE

NOTE: If the ID code box (immobiliser code ECU) is replaced, register the ECU code and ECU communication ID (See REGISTRATION).

1. **REPLACE ID CODE BOX (IMMOBILISER CODE ECU)**
   a. Replace the ID code box (immobiliser code ECU) (See **REMOVAL**).
2. **ECU CODE REGISTRATION**
   a. Register the ECU code (See **REGISTRATION**).
3. **ECU COMMUNICATION ID REGISTRATION**
   a. Register the ECU communication ID (See **REGISTRATION**).

NEXT: END (ID CODE BOX (IMMOBILISER CODE ECU) IS DEFECTIVE)

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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 (immobiliser code box); 2) the ECM detects errors in the communication lines; or 3) the ECU communication ID between the ID code box (immobiliser code box) and ECM is different and an engine start is attempted. Before troubleshooting this DTC, make sure no certification ECU DTCs are present. If present, troubleshoot the certification ECU (smart key ECU assembly) DTCs first.

DTC TROUBLE DETECTION CONDITION CHART

DTC No.	DTC Detection Condition	Trouble Area
B2799	One of following conditions is met: • Error in communication between ECM and ID code box (immobiliser code box) • Error in communication lines • Communication ID is different between ID code box (immobiliser code box) and ECM during communication	• Wire harness or connector • ECM • ID code box (immobiliser code box)

WIRING DIAGRAM

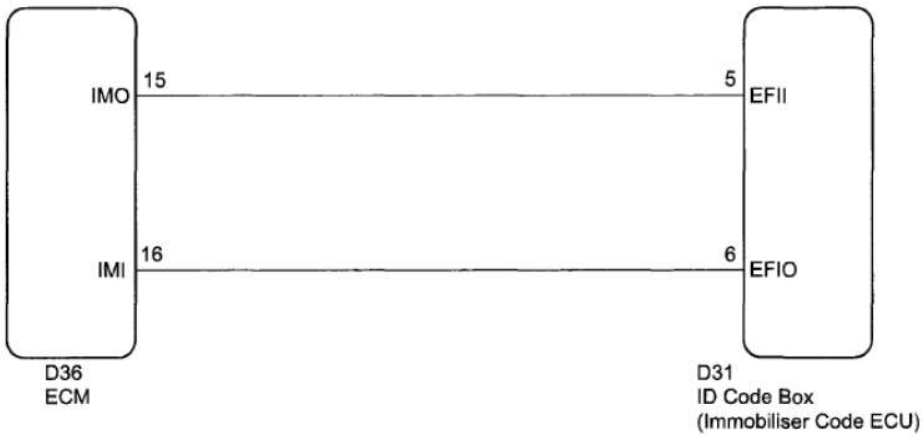


Fig. 25: Engine Immobiliser System Malfunction - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- **If the ID code box (immobiliser code box) is replaced, register the ECU code and ECU communication ID (See REGISTRATION).**
- **If the ECM is replaced, register the ECU communication ID (See**

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REGISTRATION).

1. **CHECK DTC OUTPUT**
   a. Delete the DTCs (See **DTC CHECK/CLEAR**).
   b. Recheck for DTCs.

   OK:

   B2799 output does not recur.

   NG: Go to step 2

   OK: USE SIMULATION METHOD TO CHECK (See **HOW TO PROCEED WITH TROUBLESHOOTING**)

2. **RE-REGISTER ECU COMMUNICATION ID**
   a. Re-register the ECU communication ID (See **REGISTRATION**).
3. **CHECK DTC OUTPUT**
   a. Delete the DTCs (See **DTC CHECK/CLEAR**).
   b. Recheck for DTCs.

   OK:

   B2799 output does not recur.

   NG: Go to step 4

   OK: END (ECU COMMUNICATION ID IS DEFECTIVE)

4. **CHECK CONNECTION OF CONNECTOR**
   a. Turn the engine switch off.
   b. Check that the connectors are properly connected to the ECM and the ID code box (immobiliser code box).

   OK:

   Connectors are properly connected.

   NG: CONNECT CONNECTORS PROPERLY

   OK: Go to next step

5. **CHECK HARNESS AND CONNECTOR (ID CODE BOX - ECM)**
   a. Disconnect the ID code box (immobiliser code box) and ECM connectors.

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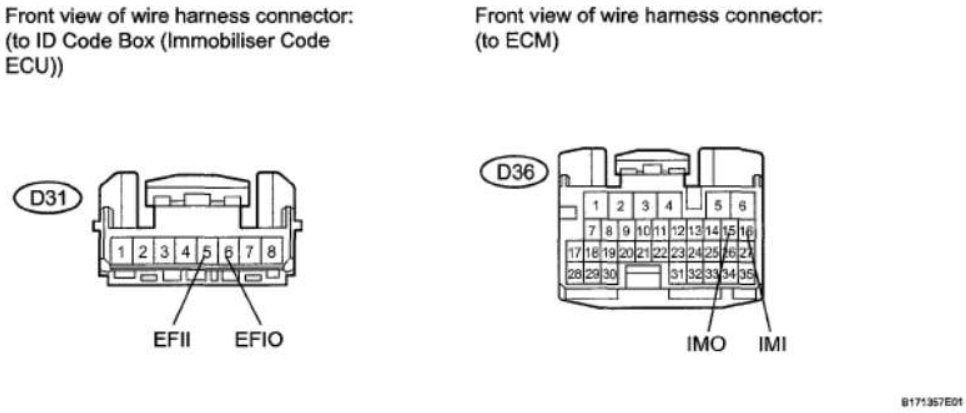


Fig. 26: Identifying ID Code Box And ECM Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D31-5 (EFII) - D36-15 (IMO)	Always	Below 1 ohms
D31-6 (EFIO) - D36-16 (IMI)	Always	Below 1 ohms
D31-5 (EFII) - Body ground	Always	10 kohms or higher
D31-6 (EFIO) - Body ground	Always	10 kohms or higher

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

6. **REPLACE ECM**
   a. Replace the ECM (See **FUEL INJECTOR CIRCUIT**).
7. **REGISTER ECU COMMUNICATION ID**
   a. Re-register the ECU communication ID (See **REGISTRATION**).
8. **CHECK DTC OUTPUT**
   a. Delete the DTCs (See **DTC CHECK/CLEAR**).
   b. Recheck for DTCs.

OK:

B2799 output does not recur.

NG: REPLACE ID CODE BOX (IMMOBILISER CODE ECU) (See **REMOVAL**)

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OK: END (ECM IS DEFECTIVE)

SECURITY INDICATOR LIGHT CIRCUIT

DESCRIPTION

The security indicator light blinks continuously due to a continuous signal received from the certification ECU (smart key ECU assembly) while in the armed state.

WIRING DIAGRAM

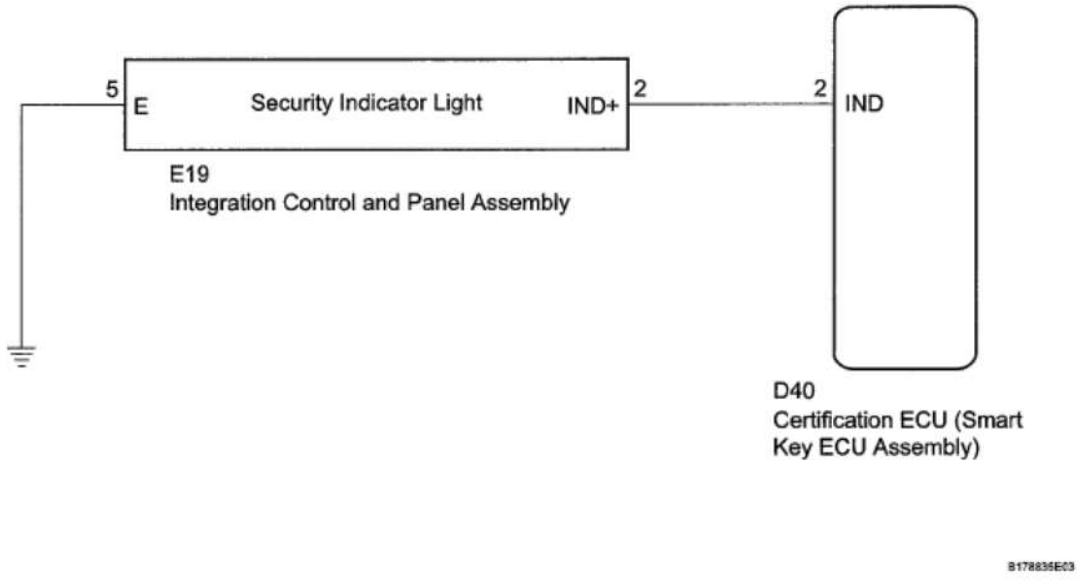


Fig. 27: Security Indicator Light Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: If the certification ECU (smart key ECU assembly) is replaced, register the key and ECU communication ID (See CAMSHAFT).

1. **PERFORM ACTIVE TEST USING TECHSTREAM (SECURITY INDICATOR LIGHT)**
   a. Connect Techstream to the DLC3.
   b. Turn the engine switch on (IG).
   c. Turn the tester on.
   d. Select the following menu items: Body Electrical/Smart Key/Active Test.
   e. Perform the Active Test according to the display on the tester.

   Smart Key (Certification ECU (Smart Key ECU Assembly)):

   ACTIVE TEST CHART

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Tester Display	Test Part	Control Range	Diagnostic Note
Security Indic	Security indicator light	ON/OFF	-

OK:

The security indicator light turns on and off according to the tester operation.

NG: Go to step 2

OK: REPLACE CERTIFICATION ECU (SMART KEY ECU ASSEMBLY) (See **REMOVAL**)

2. **CHECK HARNESS AND CONNECTOR (CERTIFICATION ECU - SECURITY INDICATOR LIGHT)**
   a. Disconnect the certification ECU (smart key ECU assembly) and security indicator light connectors.
   b. Measure the resistance according to the value (s) in the table below.

Standard resistance

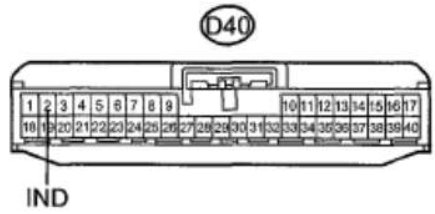
TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D40-2 (IND) - E19-2 (IND+)	Always	Below 1 ohms
D40-2 (IND) - Body ground	Always	10 kohms or higher

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

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Front view of wire harness connector:
(to Certification ECU (Smart Key ECU Assembly))



Front view of wire harness connector:
(to Integration Control and Panel)

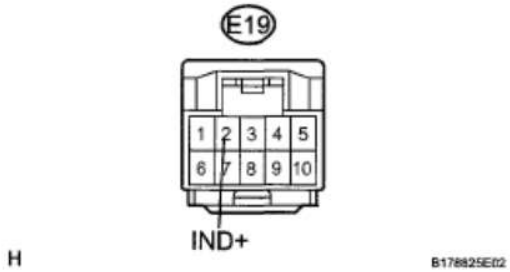


Fig. 28: Identifying Certification ECU And Security Indicator Light Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

3. **CHECK HARNESS AND CONNECTOR (SECURITY INDICATOR LIGHT - BODY GROUND)**
   a. Measure the resistance according to the value (s) in the table below.

Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
E19-5 (E) - Body ground	Always	Below 1 ohms

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

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Front view of wire harness connector:
(to Integration Control and Panel)



H B164265E05

Fig. 29: Identifying Security Indicator Light Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: REPLACE SECURITY INDICATOR LIGHT (See **REMOVAL**)

ID CODE BOX POWER SOURCE CIRCUIT

DESCRIPTION

This circuit provides power to operate the ID code box (immobiliser code ECU).

WIRING DIAGRAM

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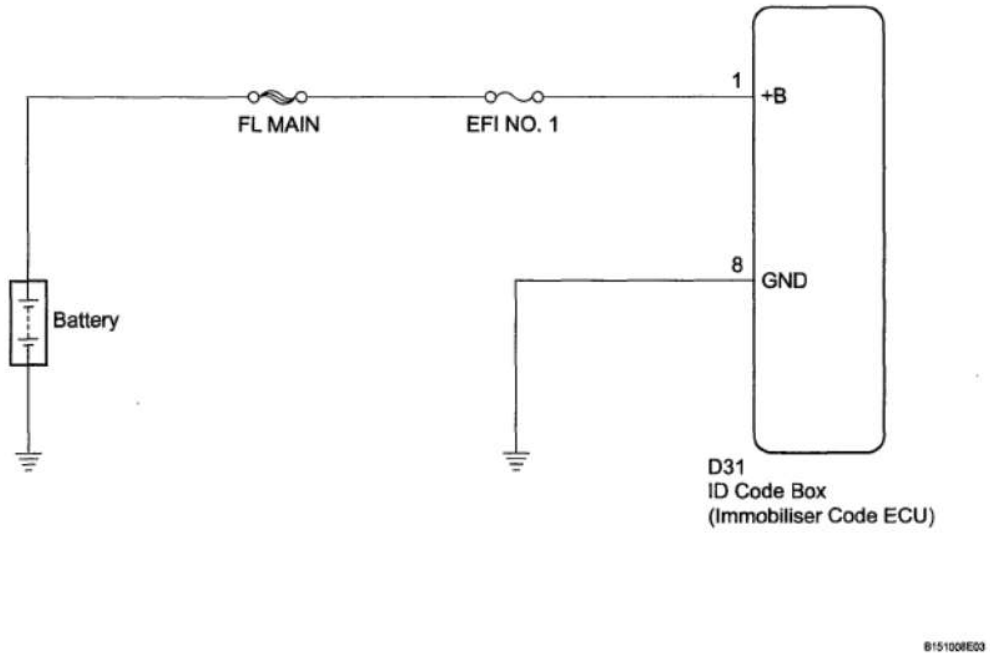


Fig. 30: ID Code Box Power Source Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: If the ID code box (immobiliser code ECU) is replaced, register the ECU code and ECU communication ID (See REGISTRATION).

1. **CHECK HARNESS AND CONNECTOR (ID CODE BOX - BATTERY)**
   a. Disconnect the ID code box (immobiliser code ECU) connector.
   b. Measure the voltage according to the value (s) in the table below.

Standard voltage

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D31-1 (+B) - Body ground	Always	11 to 14 V

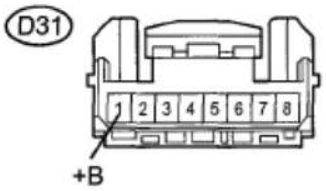
NG: REPAIR OR REPLACE HARNESS OR CONNECTOR, OR REPLACE FUSE

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Front view of wire harness connector:
(to ID Code Box (Immobiliser Code ECU))



Y B107455E34

Fig. 31: Identifying ID Code Box Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

2. **CHECK HARNESS AND CONNECTOR (ID CODE BOX - BODY GROUND)**
   a. Measure the resistance according to the value (s) in the table below.

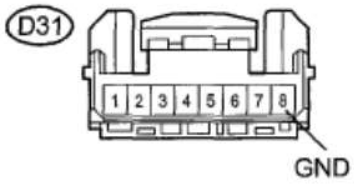
Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D31-8 (GND) -Body ground	Always	Below 1 ohms

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

Front view of wire harness connector:
(to ID Code Box (Immobiliser Code ECU))



Y B107455E35

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Fig. 32: Identifying ID Code Box Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: REPLACE ID CODE BOX (IMMOBILISER CODE ECU) (See **REMOVAL**)

CERTIFICATION ECU POWER SOURCE CIRCUIT

DESCRIPTION

This is the power source circuit of the certification ECU (smart key ECU assembly). The certification ECU (smart key ECU assembly) controls the following:

- Electrical key verification confirmation
- Indoor, outside and door oscillator control
- Entry door LOCK/UNLOCK request to the main body ECU (instrument panel junction block)
- Steering LOCK/UNLOCK request
- Immobiliser SET/UNSET request to the ID code box (immobiliser code ECU)

WIRING DIAGRAM

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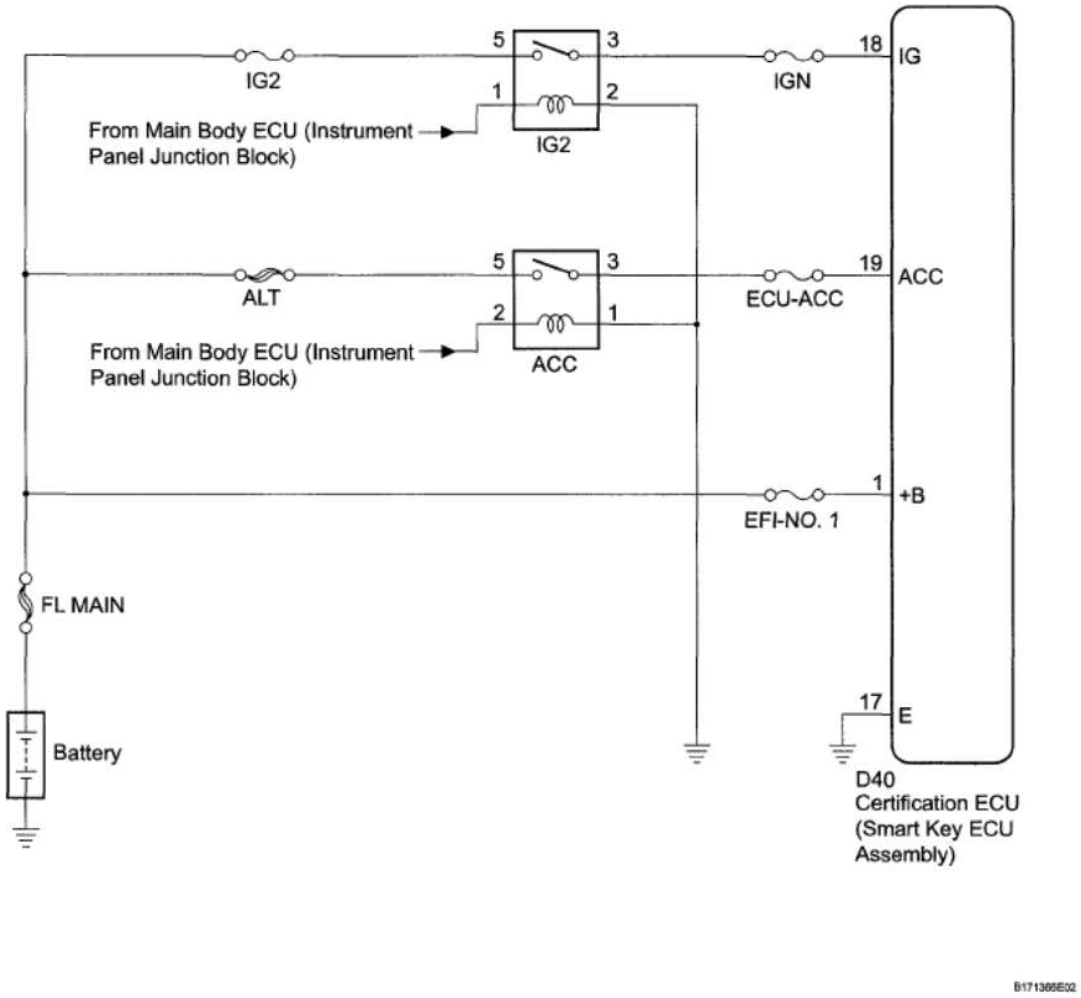


Fig. 33: Certification ECU Power Source Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: If the certification ECU (smart key ECU assembly) is replaced, register the key and ECU communication ID (See REGISTRATION).

1. **CHECK HARNESS AND CONNECTOR (CERTIFICATION ECU - BATTERY)**
   a. Disconnect the certification ECU (smart key ECU assembly) connector.
   b. Measure the voltage according to the value (s) in the table below.

Standard voltage

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D40-1 (+B) - Body ground	Always	11 to 14 V

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D40-18 (IG) - Body ground	Engine switch off	Below 1 V
D40-18 (IG) - Body ground	Engine switch on (IG)	11 to 14 V
D40-19 (ACC) - Body ground	Engine switch off	Below 1 V
D40-19 (ACC) - Body ground	Engine switch on (ACC)	11 to 14 V

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR, OR REPLACE FUSE

Front view of wire harness connector:
(to Certification ECU (Smart Key ECU Assembly))

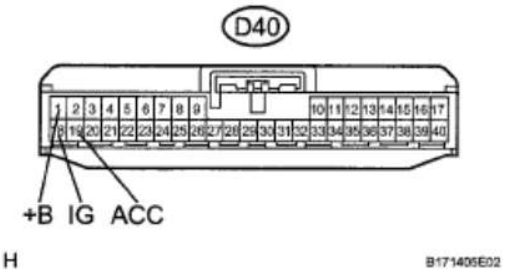


Fig. 34: Identifying Certification ECU (Smart Key ECU Assembly) Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

2. **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

Tester Connection	Condition	Specified Condition
D40-17 (E) - Body ground	Always	Below 1 ohms

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

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Front view of wire harness connector:
(to Certification ECU (Smart Key ECU Assembly))

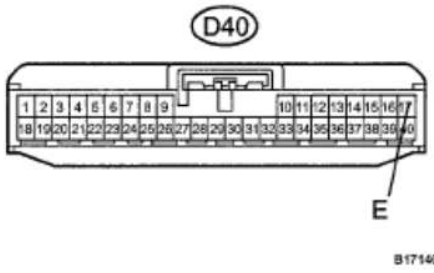


Fig. 35: Identifying Certification ECU (Smart Key ECU Assembly) Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: REPLACE CERTIFICATION ECU (SMART KEY ECU ASSEMBLY) (See **REMOVAL**)

ENGINE IMMOBILISER SYSTEM (W/O SMART KEY SYSTEM)

PRECAUTION

1. **PRECAUTION FOR DISCONNECTING THE BATTERY CABLE**

NOTE: **When disconnecting the battery negative (-) terminal, initialize the following systems after the terminal is reconnected:**

SYSTEM REFERENCE

System Name	See Procedure
Power back door system	INITIALIZATION

2. **PRECAUTIONS FOR THE KEY**
   a. 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.

PARTS LOCATION

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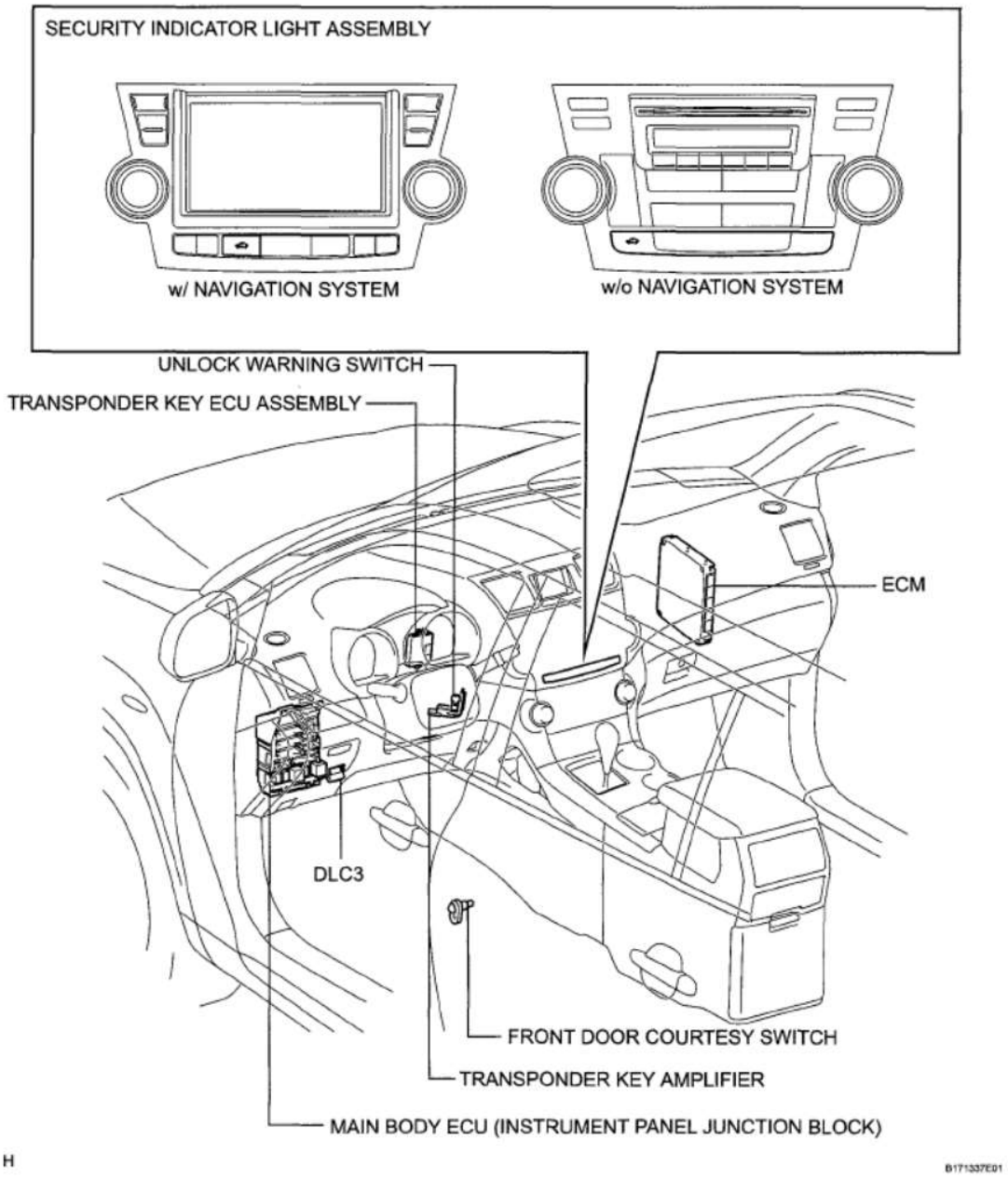


Fig. 36: Identifying Engine Immobiliser System Components
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

SYSTEM DIAGRAM

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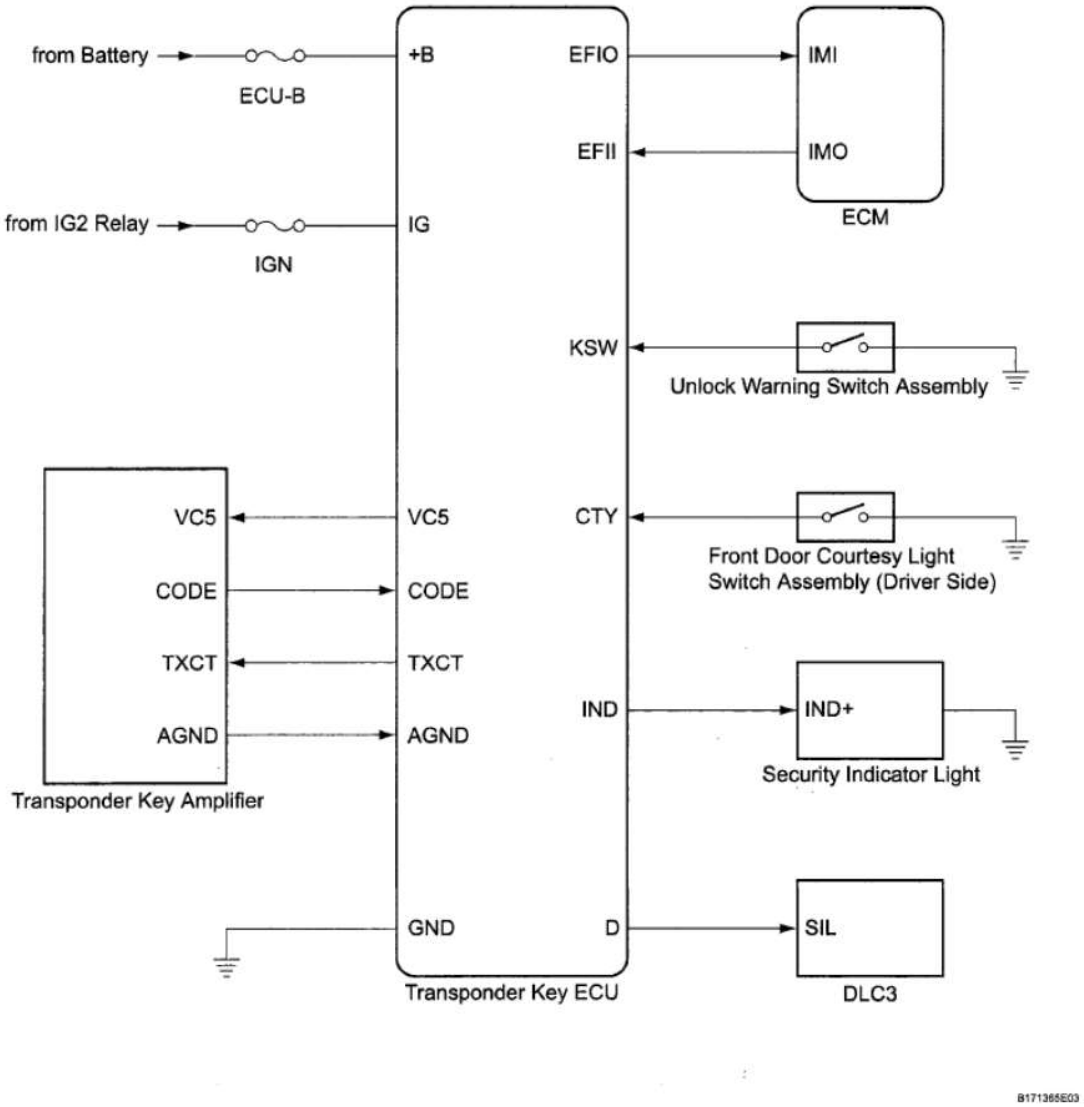


Fig. 37: Engine Immobiliser System Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

SYSTEM DESCRIPTION

1. ENGINE IMMOBILISER SYSTEM DESCRIPTION

The engine immobiliser system is designed to prevent the vehicle from being stolen. This system uses the transponder key ECU assembly that stores the key codes of authorized ignition keys. If an attempt is made to start the engine using an unauthorized key, the ECU sends a signal to the ECM to prohibit fuel delivery and ignition, effectively disabling the engine.

2. FUNCTION OF MAIN COMPONENT

COMPONENT OUTLINE CHART

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Component	Outline
Transponder key coil/amplifier	When key is inserted in ignition key cylinder, key coil receives key code. Then amplifier amplifies ID code and outputs it to transponder key ECU assembly.
Unlock warning switch assembly	Detects if key is in ignition key cylinder and outputs results to transponder key ECU assembly.
ECM	Receives ID verification results from transponder key ECU assembly. ECM also verifies ECUs. Then judgement of whether to immobiliser engine is made.
Security indicator light	Come on or blinks depending on operation of transponder key ECU assembly.

3. **SYSTEM FUNCTION**

a. When the transponder key ECU assembly detects that the key unlock warning switch is on, the ECU provides current to the transponder key coil and produces an electric wave. A transponder chip in the key grip receives the electric wave. Upon receiving the electric wave, the transponder chip outputs a key ID code signal. The transponder key coil receives this signal, which is amplified by the transponder key amplifier, and the signal is transmitted to the ECU.

The ECU matches the key's ID code with the vehicle's ID code, which was previously registered in the ECU, and communicates the results to the ECM.

After the identification results show that the key's ID code matches the vehicle's ID code and the ECU has confirmed their match: 1) the immobiliser system does not immobilise the engine and the engine starting controls (fuel injection control and ignition control) enter standby mode; and 2) the ECU transmits a security indicator light signal that communicates "indicator light off' to the clock. Then, the clock turns off the security indicator light.

b. The security indicator light pattern is as shown below (when changing from the immobiliser set status to the unset status):

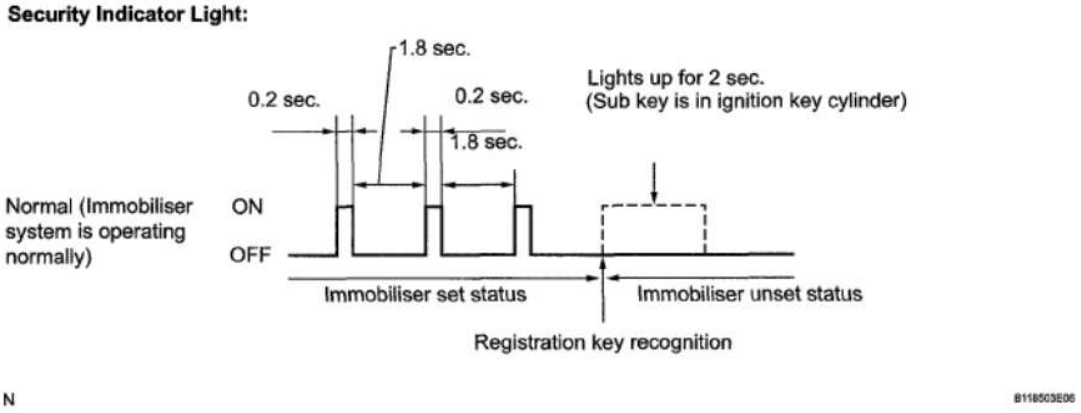


Fig. 38: Identifying Security Indicator Light Blinking Pattern
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

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- Use the following procedure to troubleshoot the engine immobiliser system.
- Techstream should be used in steps 5, 6, and 8.

1. **VEHICLE BROUGHT TO WORKSHOP**
2. **CUSTOMER PROBLEM ANALYSIS CHECK**

HINT:

- In troubleshooting, confirm that the problem symptoms have been accurately identified. Preconceptions should be discarded in order to make an accurate judgment. To clearly understand what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time the malfunction occurred.
- Gather as much information as possible for reference. Past problems that seem unrelated may also help in some cases.
- The following 5 items are important points in the problem analysis:

PROBLEM ANALYSIS CHART

What	Vehicle model, system name
When	Date, time, occurrence frequency
Where	Road conditions
Under what conditions?	Driving conditions, weather conditions
How did it happen?	Problem symptoms

3. **INSPECT BATTERY VOLTAGE**
   a. Measure the battery voltage.

   Standard voltage:

   11 to 14 V

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

4. **CRANK ENGINE FOR MORE THAN 10 SECONDS**
5. **CHECK FOR DTCS**
   a. Check for DTCs and note any codes that are output (See **DTC CHECK/CLEAR**).
   b. Delete the DTCs.
   c. Recheck for DTCs. Try to duplicate the DTCs (SFI system and engine immobiliser system) by simulating the symptoms indicated by the DTCs.

   Result

RESULT CHART

Result	Proceed to

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DTC (SFI system) recurs	A (See **DIAGNOSTIC TROUBLE CODE CHART** for 2GR-FE) (See **DIAGNOSTIC TROUBLE CODE CHART** for 1AR-FE)
DTC (engine immobiliser system) recurs	B (See **DIAGNOSTIC TROUBLE CODE CHART**)
DTC does not recur	C

A: GO TO SFI SYSTEM (DTC CHART)

B: GO TO **ENGINE IMMOBILISER SYSTEM (DTC CHART)**

C: Go to next step

6. **READ VALUE ON TECHSTREAM**
   a. Connect Techstream to the DLC3.
   b. Turn the ignition switch to the ON position.
   c. Turn the tester on.
   d. Select the following menu items: Body Electrical/Immobiliser/Data List.
   e. Select Key SW in the Data List and read the tester display.

Immobiliser (Transponder Key ECU):

DATA LIST

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Key SW	Unlock warning switch signal/ON or OFF	ON: Key is in ignition key cylinder OFF: No key is in ignition key cylinder	-

OK:

ON (Key is in ignition key cylinder) appears on the screen.

NG: GO TO **DTC B2780**

OK: Go to next step

7. **PROBLEM SYMPTOMS TABLE**

Result

RESULT CHART

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Result	Proceed to
Fault is listed in problem symptoms table	A
Fault is not listed in problem symptoms table	B

A: GO TO STEP 9

B: Go to next step

8. **OVERALL ANALYSIS AND TROUBLESHOOTING**
   a. DATA LIST/ACTIVE TEST (See **DATA LIST/ACTIVE TEST**)
   b. TERMINALS OF ECU (See **TERMINALS OF ECU**)
9. **ADJUST, REPAIR OR REPLACE**
10. **CONFIRMATION TEST**

NEXT: END

REGISTRATION

1. **DESCRIPTION OF CODE REGISTRATION**

HINT:

The key has 2 codes: the key code (immobiliser code) and the wireless code. Both of these codes need to be registered. Refer to the page for the wireless code registration procedures.

a. When adding master keys or sub keys (Additional registration):
   1. Register the key code (immobiliser code) in the transponder key ECU.

TRANSPONDER KEY ECU REFERENCE

Target ECU	Refer to
Transponder key ECU	Procedure "B"

b. When replacing the transponder key ECU (New registration):
   1. Register the key code (immobiliser code) in the transponder key ECU.

TRANSPONDER KEY ECU REFERENCE

Target ECU	Refer to
Transponder key ECU	Procedure "A"

   2. Register the ECU communication ID between the new transponder key ECU and the ECM.

TRANSPONDER KEY ECU REFERENCE

Target ECU	Refer to
ECM	Procedure "D"

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c. When replacing the ECM:

1. Register the ECU communication ID between the transponder key ECU and the new ECM.

TRANSPONDER KEY ECU REFERENCE

Target ECU	Refer to
Transponder key ECU	Procedure "E"

d. When replacing the transponder key ECU and the ECM:

1. Register the key codes (immobiliser codes) in the new transponder key ECU.

TRANSPONDER KEY ECU REFERENCE

Target ECU	Refer to
Transponder key ECU	Procedure "A"

2. Register the ECU communication ID between the new transponder key ECU and the new ECM.

TRANSPONDER KEY ECU REFERENCE

Target ECU	Refer to
Transponder key ECU	Procedure "E"

e. When erasing the key code (s):

1. Erase the key code (s) of lost key (s).

TRANSPONDER KEY ECU REFERENCE

Target ECU	Refer to
Transponder key ECU	Procedure "C"

2. **KEY REGISTRATION**

a. New key code registration (Procedure "A"):

NOTE: No key codes are registered in the transponder key ECU.

HINT:

- In this mode, a maximum of 3 key codes for 2 master keys and 1 sub-key can be registered. The master keys and sub-key can be registered in any order because the transponder key ECU can distinguish between different types of keys.
- New key codes must be registered with the battery connected. The ignition switch can be either on or off.
- When a new transponder key ECU is installed, key codes must be registered in the transponder key ECU.

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Automatic Key Code Registration (New Registration):

AUTOMATIC KEY CODE REGISTRATION (NEW REGISTRATION) PROCEDURE

Procedure	Security Indicator Light Condition
1. Start	Blinking HINT: Until first key is inserted
2. Insert the master key into the ignition key cylinder.	ON
3. Techstream operation 1. Select Body Electrical 2. Select Immobiliser 3. Select Utility 4. Select Key Registration HINT: After completing the above operation, proceed to the next step in accordance with the prompts on the Techstream screen.	OFF for 1 second and then ON
4. Remove the key and then push the Next button on the tester.	ON
5. Insert the master key to be registered and then push the Next button on the tester.	OFF for 1 second and then ON
6. Remove the key and then push the Next button on the tester.	ON
5. Insert the sub-key to be registered and then push the Next button on the tester.	OFF for 1 second and then ON for 0.5 seconds and then OFF
8. Remove the key.	Blinking
7. End (Procedure "E")	

HINT:

- When the engine immobiliser system is operating normally and the key is pulled out, the security indicator light blinks continuously.
- If the new key code registration fails, code 2-1 will be output through the security indicator light. Trying to re-register an already registered key will cause code 2-2 to be output when the key is inserted. If the number of registered key codes exceeds the maximum limit, code 2-3 will be output through the security indicator light. The output details are shown below.

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Security Indicator Light:

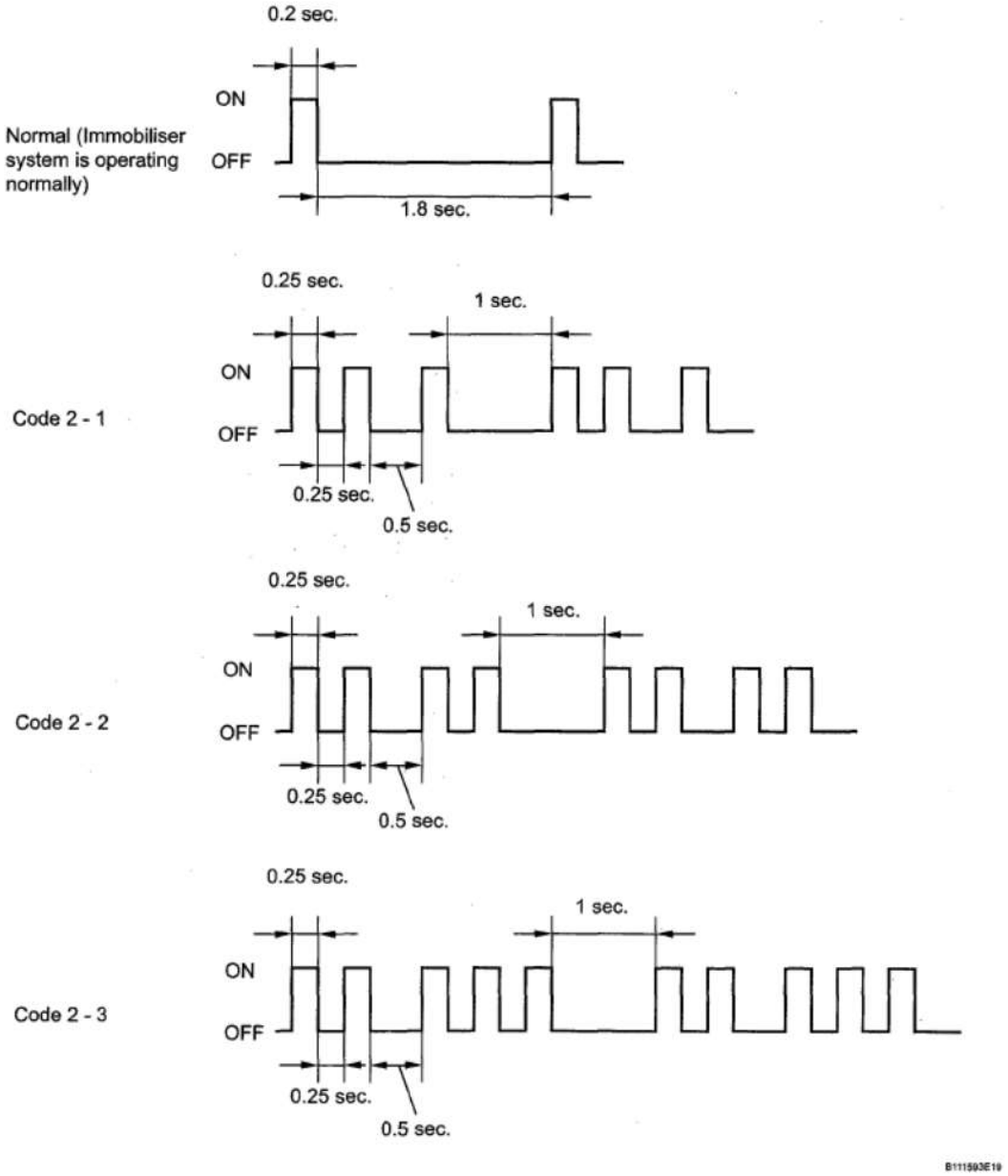


Fig. 39: Identifying Security Indicator Light Blinking Pattern
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Finish the automatic key code registration mode. The automatic key code registration mode can be forced to end when at least 1 key code (immobiliser code) for the master key has been registered.

HINT:

- w/o Techstream:

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Turn the ignition switch on and off 5 times within 10 seconds using the master key that has already been registered.

- w/ Techstream:

  Follow the instruction on the Techstream screen to end new key code registration mode.

3. **REGISTRATION OF ADDITIONAL KEY**

   a. Additional registration (Procedure "B"):

   HINT:

   - A maximum of 5 key codes and 3 sub-key codes can be registered.
   - Registration mode will end if any step is not completed within the specified time.
   - When the ignition cylinder or the key cylinder set is replaced, remove the transmitter module from the original master key. Then install this transmitter module to a new key and use the new key as the master key. If necessary, use this master key to register other keys.

NOTE: **When the ignition key cylinder has been replaced, locking and unlocking doors are possible with the new master key's transmitter module (removed from the original master key). However, the new master key will not be able to lock and unlock doors through the door key cylinder. Keep the original master key. If the battery in the new master key's transmitter module fails, the original master key can be used to lock and unlock doors through the door key cylinder.**

Additional Registration:

ADDITIONAL REGISTRATION PROCEDURE

Procedure	Time to Complete Operation	Security Indicator Light Condition
1. Start	-	Blinking HINT: Until first key is inserted
2. Insert the already registered master key into the ignition key cylinder and turn the ignition switch on.	-	OFF
3. Techstream operation 1. Select Body Electrical 2. Select Immobiliser 3. Select Utility 4. Select Key Registration	Within 120 sec.	ON

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HINT: After completing the above operation, proceed to the next step in accordance with the prompts on the Techstream screen.		
4. Remove the master key.	Within 20 sec. HINT: After tester instruction	ON
5. Insert the key to be registered in the ignition key cylinder.	Within 10 sec.	Blinking
6. Wait for 60 sec. after the key is registered. HINT: The security indicator light goes off.	-	OFF
7. Remove the key.	-	Blinking
8. End		

HINT:

- A brief outline of key code registration procedures is shown above. For detailed information, refer to the Techstream screen.
- When the engine immobiliser system is operating normally and the key is pulled out, the security indicator light blinks continuously.
- If the key code registration has failed in automatic key code registration mode, code 2-1 will be output through the security indicator light. Trying to re-register an already registered key will cause code 2-2 to be output when the key is inserted. If the number of registered key codes exceeds the maximum limit, code 2-3 will be output through the security indicator light. The details are shown in procedure "A".

4. **ERASURE OF KEY CODE**

a. Erase key codes (Procedure "C").

HINT:

- Performing this procedure will erase all key codes except for the master key, which is used for erasing the key codes. In order to use a key whose code has been erased, a new key code must be registered.
- This procedure will be canceled if each step is not completed within the specified time.

Erasing Key Code:

ERASING KEY CODE PROCEDURE

Procedure	Time to Complete Operation	Security Indicator Light Condition
		Blinking

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1. Start	-	HINT: Until first key is inserted
2. Insert the already registered master key in the ignition key cylinder and turn the ignition switch on.	-	OFF
3. Techstream operation 1. Select Body Electrical 2. Select Immobiliser 3. Select Utility 4. Select Transponder Code Erasure HINT: After completing the above operation, proceed to the next step in accordance with the prompts on the Techstream screen.	Within 120 sec.	ON for 1 sec. then OFF
4. Remove the master key.	Within 10 sec. HINT: After tester instruction	ON
5. End		

HINT:

- A brief outline of key code registration procedures is shown above. For detailed information, refer to the Techstream screen.
- When the engine immobiliser system is operating normally and the key is pulled out, the security indicator light blinks continuously.

5. **ECU COMMUNICATION ID REGISTRATION**

a. ECU communication ID registration (Procedure "D"):

NOTE:

- **When the transponder key ECU is replaced, the ECU communication ID of the ECM must be registered into the transponder key ECU to match their ECU communication IDs.**
- **The engine cannot be started unless the ECU communication IDs match.**
- **Do not turn the ignition switch from on to off 20 times or more before setting the ECU communication ID. If this operation is likely to be performed 20 times or more, disconnect the cable from the negative battery terminal in order to avoid disabling engine start. Failure to do so will result in the engine not starting unless the transponder key ECU is replaced with a new one.**

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- **After the registration, turning the ignition switch to the START position may not start the engine on the first try. If so, turn the ignition switch to the START position again.**
- **After the engine is started, erase DTC B2799 (code for ECM's immobiliser communication error) by either of the following:**
  - **Using Techstream.**
  - **Disconnecting the battery for 30 seconds.**

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

   SST 09843-18040

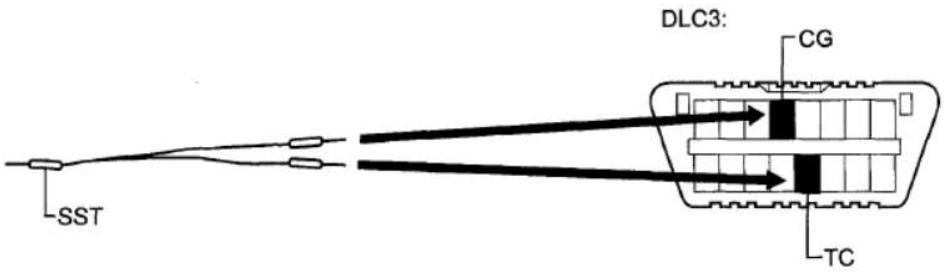


Fig. 40: Identifying Terminals TC And CG Of DLC3
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Turn the ignition switch to the ON position and leave the vehicle as is for 30 minutes.

   HINT:

   Do not start the engine.

3. Check that the engine starts.

b. ECU communication ID registration (Procedure "E"):

NOTE: The ECU communication ID should be registered when the ECM and transponder key ECU are replaced or when the ECM only is replaced in order to match the ECU communication ID.

ECU COMMUNICATION ID REGISTRATION PROCEDURE

Procedure	Security Indicator Light Condition
1. Start	
2. Insert an already registered key into the ignition key	

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cylinder.	OFF
3. Engine start	
4. Check that the engine starts and stays on for more than 3 seconds.	
5. Next	
6. End	

PROBLEM SYMPTOMS TABLE

HINT:

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

ENGINE IMMOBILISER SYSTEM:

PROBLEM SYMPTOMS REFERENCE

Symptom	Suspected Area	Refer to
Unable to register the key.	Front door courtesy switch	**DOOR COURTESY SWITCH CIRCUIT**
	Wire harness or connector	-
	Transponder key ECU assembly	-
Engine does not start.	Key	**DATA LIST/ACTIVE TEST**
	ECU power source circuit	**ECU POWER SOURCE CIRCUIT**
	SFI system (for 2GR-FE)	**HOW TO PROCEED WITH TROUBLESHOOTING**
	SFI system (for 1AR-FE)	**HOW TO PROCEED WITH TROUBLESHOOTING**
	Transponder key ECU assembly	**TRANSPONDER KEY ECU (W/O SMART KEY SYSTEM)**
Security indicator light is always ON.	Security indicator light circuit	**SECURITY INDICATOR LIGHT CIRCUIT**
	Wire harness or connector	-
	Transponder key ECU assembly	-
Security indicator light is OFF.	Security indicator light circuit	**SECURITY INDICATOR LIGHT CIRCUIT**
	Wire harness or connector	-

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	Transponder key ECU assembly	-
Security indicator light is blinking abnormally.	Transponder key ECU assembly	**TRANSPONDER KEY ECU (W/O SMART KEY SYSTEM)**
Engine immobiliser system DTCs are not output.	Wire harness or connector	**DIAGNOSIS CIRCUIT**
	Transponder key ECU assembly	-

TERMINALS OF ECU

1. **CHECK TRANSPONDER KEY AMPLIFIER**
   a. Disconnect the D27 transponder key amplifier connector and measure the resistance according to the value (s) in the table below.



B265593E36

Fig. 41: Identifying D27 Transponder Key Amplifier Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D27-7 (AGND) - Body ground	G - Body ground	Ground	Always	Below 1 ohms

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

   b. Reconnect the D27 transponder key amplifier connector and measure the voltage according to the value (s) in the table below.

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D27-1 (VC5) - D27-7 (AGND)	P-G	Power source	No key is in ignition key cylinder	Below 1 V
D27-1 (VC5) - D27-7 (AGND)	P-G	Power source	Key is in ignition key cylinder	4.6 to 5.4 V

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D27-4 (CODE) - D27-7 (AGND)	R-G	Demodulated signal of key code data	No key is in ignition key cylinder	Below 1 V
D27-4 (CODE) - D27-7 (AGND)	R-G	Demodulated signal of key code data	Key is in ignition key cylinder	Waveform 1
D27-5 (TXCT) - D27-7 (AGND)	SB-G	Key code output signal	No key is in ignition key cylinder	Below 1 V
D27-5 (TXCT) - D27-7 (AGND)	SB-G	Key code output signal	Key is in ignition key cylinder	Waveform 2

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

c. Inspect using an oscilloscope.

1. Waveform 1 (Reference)

TESTER CONNECTION SPECIFIED CONDITION

Item	Content
Tester Connection	D27-4 (CODE) - D27-7 (AGND)
Tool Setting	2 V/DIV., 20 ms./DIV.
Condition	Key is in ignition key cylinder

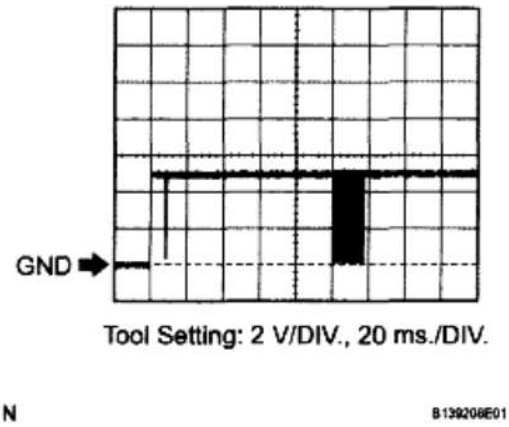


Fig. 42: Waveform 1 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Waveform 2 (Reference)

WAVEFORM REFERENCE

Item	Content
Tester Connection	D27-5 (TXCT) - D27-7 (AGND)
Tool Setting	2 V/DIV., 10 ms./DIV.
Condition	Key is in ignition key cylinder

2. **CHECK TRANSPONDER KEY ECU ASSEMBLY**

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a. Disconnect the D41 transponder key ECU connector and measure the resistance and voltage according to the value (s) in the table below.

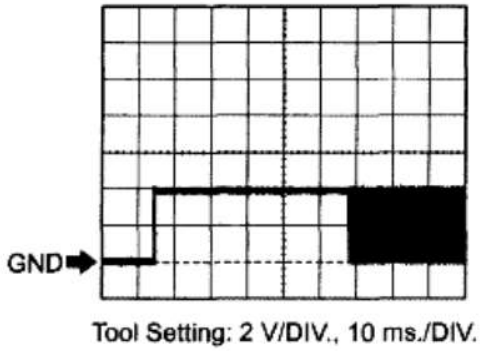


Fig. 43: Waveform 2 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

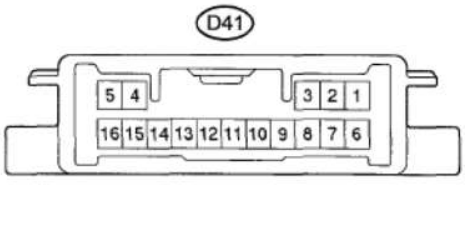


Fig. 44: Identifying D41 Transponder Key ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ECU TERMINAL REFERENCE

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D41-1 (+B) - D41-16 (GND)	GR-V	Battery	Always	11 to 14 V
D41-2 (IG) - D41-16 (GND)	P-V	Ignition switch signal	Ignition switch OFF	Below 1 V
D41-2 (IG) - D41-16 (GND)	P-V	Ignition switch signal	Ignition switch ON	11 to 14 V
D41-3 (KSW) - D41-16 (GND)	O-V	Unlock warning switch signal	No key is in ignition key cylinder	10 kohms or higher
D41-3 (KSW) - D41-16 (GND)	O-V	Unlock warning switch signal	Key is in ignition key cylinder	Below 1
D41-16 (GND) - Body ground	V - Body ground	Ground	Always	Below 1 ohms

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

b. Reconnect the D41 transponder key ECU connector and measure the resistance and voltage according to the value (s) in the table below.

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D41-3 (KSW) - D41-16 (GND)	O-V	Unlock warning switch signal	No key is in ignition key cylinder	11 to 14 V
D41-3 (KSW) - D41-16 (GND)	O-V	Unlock warning switch signal	Key is in ignition key cylinder	Below 1 V
D41-4 (TXCT) - D41-5 (AGND)	SB-G	Transponder key amplifier communication signal	No key is in ignition key cylinder	Below 1 V
D41-4 (TXCT) - D41-5 (AGND)	SB-G	Transponder key amplifier communication signal	Key is in ignition key cylinder	Waveform 1
D41-5 (AGND) - Body ground	G - Body ground	Ground	Always	Below 1 ohms
D41-7 (CTY) - D41-16 (GND)	LG-V	Door courtesy signal	Switch pushed	11 to 14 V
D41-7 (CTY) - D41-16 (GND)	LG-V	Door courtesy signal	Switch free	Below 1 V
D41-8 (IND) - D41-16 (GND)	Y-V	Security indicator light signal	Security indicator light is on	11 to 14 V
D41-8 (IND) - D41-16 (GND)	Y-V	Security indicator light signal	Security indicator light is off	Below 1 V
D41-9 (D) - D41-16 (GND)	B-V	Diagnostic tester communication	Without communication	Below 1 V
D41-9 (D) - D41-16 (GND)	B-V	Diagnostic tester communication	During communication	Pulse generation
D41-12 (EFII) - D41-16 (GND)	BR-V	ECM input signal	Ignition switch OFF	Below 1 V
D41-12 (EFII) - D41-16 (GND)	BR-V	ECM input signal	Ignition switch ON	Waveform 2
D41-13 (EFIO) - D41-16 (GND)	L-V	ECM output signal	Ignition switch OFF	Below 1 V
D41-13 (EFIO) - D41-16 (GND)	L-V	ECM output signal	Ignition switch ON	Waveform 3
D41-14 (VC5) - D41-5 (AGND)	P-G	Power source	No key is in ignition key cylinder	Below 1 V
D41-14 (VC5) - D41-5 (AGND)	P-G	Power source	Key is in ignition key cylinder	4.6 to 5.4 V
D41-15 (CODE) - D41-5 (AGND)	R-G	Transponder key amplifier communication signal	No key is in ignition key cylinder	Below 1 V
D41-15 (CODE) -		Transponder key amplifier	Key is in ignition key	

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D41-5 (AGND)	R-G	communication signal	cylinder	Waveform 4

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

c. Inspect using an oscilloscope.

1. Waveform 1 (Reference)

TESTER CONNECTION SPECIFIED CONDITION

Item	Content
Tester Connection	D41-4 (TXCT) - D41-5 (AGND)
Tool Setting	2 V/DIV., 10 ms./DIV.
Condition	Key is in ignition key cylinder

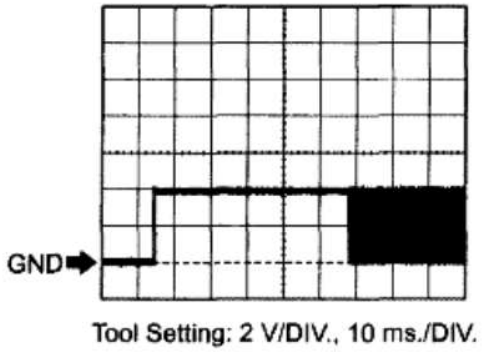


Fig. 45: Waveform 1 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Waveform 2 (Reference)

WAVEFORM REFERENCE

Item	Content
Tester Connection	D41-12 (EFII) - D41-16 (GND)
Tool Setting	2 V/DIV., 1 s./DIV.
Condition	Ignition switch ON

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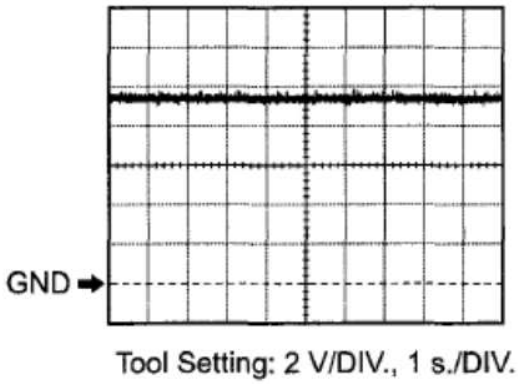


Fig. 46: Waveform 2 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. Waveform 3 (Reference)

WAVEFORM REFERENCE

Item	Content
Tester Connection	D41-13 (EFIO) - D41-16 (GND)
Tool Setting	2 V/DIV., 1 s./DIV.
Condition	Ignition switch ON

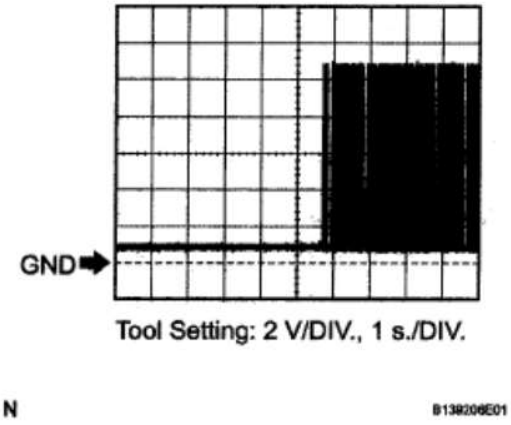


Fig. 47: Waveform 3 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. Waveform 4 (Reference)

WAVEFORM REFERENCE

Item	Content
Tester Connection	D41-15 (CODE) - D41-5 (AGND)

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Tool Setting	2 V/DIV., 20 ms./DIV.
Condition	Key is in ignition key cylinder

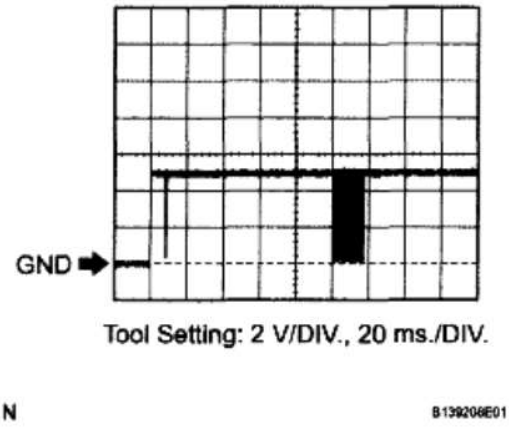


Fig. 48: Waveform 4 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. **CHECK ECM (for 2GR-FE)**
   a. Disconnect the B3 ECM connector and measure the resistance according to the value (s) in the table below.

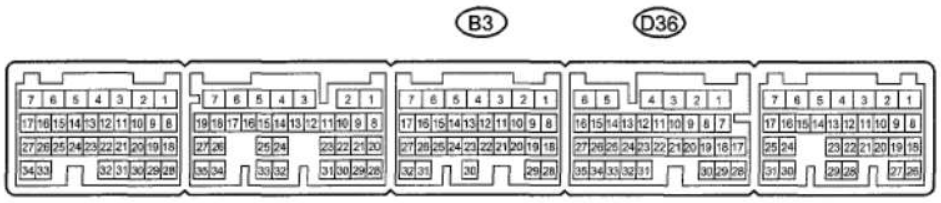


Fig. 49: Identifying B3 ECM Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ECU TERMINAL REFERENCE

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
B3-1 (E1) - Body ground	W-B - Body ground	Ground	Always	Below 1 ohms

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

   b. Reconnect the B3 ECM connector. Measure the voltage according to the value (s) in the table below.

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TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D36-15 (IMO) - B3-1 (E1)	BR - W-B	Transponder key ECU output signal	Ignition switch OFF	Below 1 V
D36-15 (IMO) - B3-1 (E1)	BR - W-B	Transponder key ECU output signal	Ignition switch ON	Waveform 1
D36-16 (IMI) - B3-1 (E1)	L - W-B	Transponder key ECU input signal	Ignition switch OFF	Below 1 V
D36-16 (IMI) - B3-1 (E1)	L - W-B	Transponder key ECU input signal	Ignition switch ON	Waveform 2

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

c. Inspect using an oscilloscope.

1. Waveform 1 (Reference)

TESTER CONNECTION SPECIFIED CONDITION

Item	Content
Tester Connection	D36-15 (IMO) - B3-1 (E1)
Tool Setting	2 V/DIV., 1 s./DIV.
Condition	Ignition switch ON

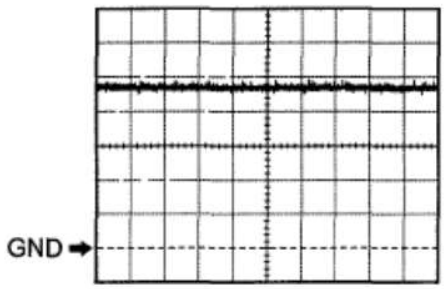


Fig. 50: Waveform 1 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Waveform 2 (Reference)

WAVEFORM REFERENCE

Item	Content
Tester Connection	D36-16 (IMI) - B3-1 (E1)
Tool Setting	2 V/DIV., 1 s./DIV.

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Condition	Ignition switch ON

4. **CHECK ECM (for 1AR-FE)**

   a. Disconnect the B49 ECM connector and measure the resistance according to the value (s) in the table below.

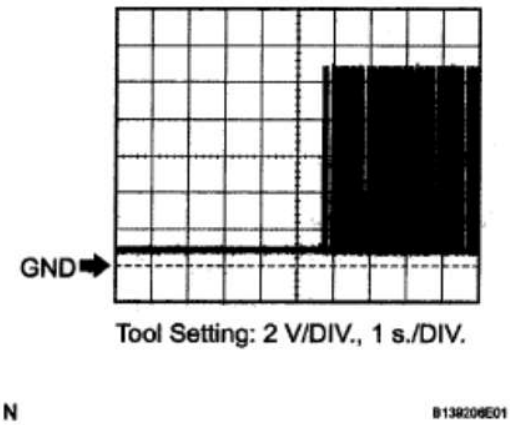


Fig. 51: Waveform 2 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

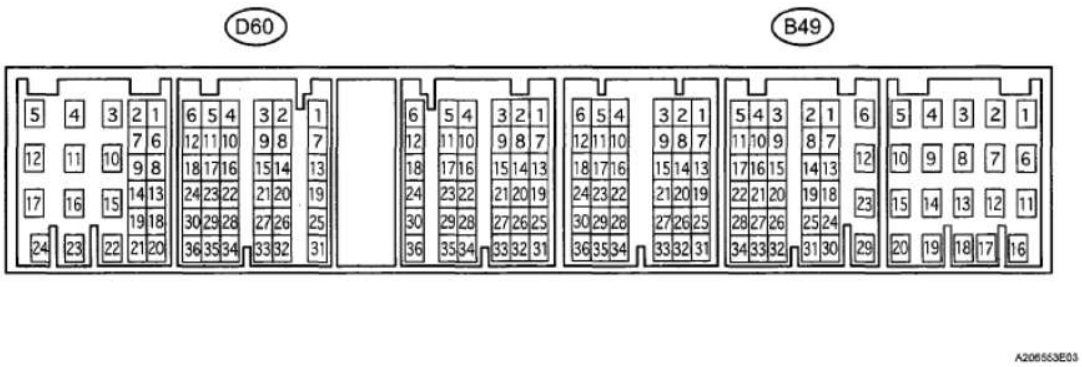


Fig. 52: Identifying B49 ECM Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ECU TERMINAL REFERENCE

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
B49-1 (E1) - Body ground	W-B - Body ground	Ground	Always	Below 1 ohms

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

   b. Reconnect the B49 ECM connector. Measure the voltage according to the value (s) in the table below.

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TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D60-32 (IMO) - B49-1 (E1)	BR - W-B	Transponder key ECU output signal	Ignition switch OFF	Below 1 V
D60-32 (IMO) - B49-1 (E1)	BR - W-B	Transponder key ECU output signal	Ignition switch ON	Waveform 1
D60-31 (IMI) - B49-1 (E1)	L - W-B	Transponder key ECU input signal	Ignition switch OFF	Below 1 V
D60-31 (IMI) - B49-1 (E1)	L - W-B	Transponder key ECU input signal	Ignition switch ON	Waveform 2

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

c. Inspect using an oscilloscope.

1. Waveform 1 (Reference)

TESTER CONNECTION SPECIFIED CONDITION

Item	Content
Tester Connection	D60-32 (IMO) - B49-1 (E1)
Tool Setting	2 V/DIV., 1 s./DIV.
Condition	Ignition switch ON

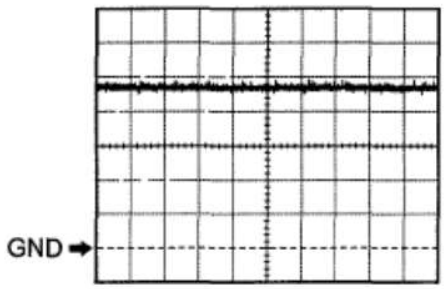


Fig. 53: Waveform 1 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Waveform 2 (Reference)

WAVEFORM REFERENCE

Item	Content
Tester Connection	D60-31 (IMI) - B49-1 (E1)
Tool Setting	2 V/DIV., 1 s./DIV.

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Condition	Ignition switch ON

DIAGNOSIS SYSTEM

1. **DESCRIPTION**
   a. The transponder key ECU controls the vehicle's engine immobiliser system functions. Engine immobiliser system data and Diagnostic Trouble Codes (DTCs) can be read through the vehicle's Data Link Connector 3 (DLC3).

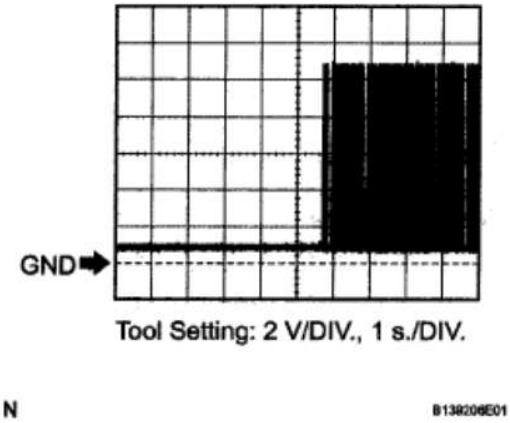


Fig. 54: Waveform 2 Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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 Techstream to check for malfunctions and perform repairs.

2. **CHECK DLC3**
   a. Check the DLC3 (See **HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS**).
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.

DTC CHECK/CLEAR

1. **CHECK DTC**
   a. Connect Techstream to the DLC3.
   b. Turn the ignition switch to the ON position.

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c. Turn the tester on.
d. Select the following menu items: Body Electrical/Immobiliser/Trouble Codes.
e. Check the details of the DTC (s) (See **DIAGNOSTIC TROUBLE CODE CHART**).

2. **CLEAR DTC**
   a. Connect Techstream to the DLC3.
   b. Turn the ignition switch to the ON position.
   c. Turn the tester on.
   d. Select the following menu items: Body Electrical/Immobiliser/Trouble Codes.
   e. Erase the DTCs.

DATA LIST/ACTIVE TEST

1. **READ DATA LIST**

HINT:

Using 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.

a. Connect Techstream to the DLC3.
b. Turn the ignition switch to the ON position.
c. Turn the tester on.
d. Select the following menu items: Body Electrical/Immobiliser/Data List.
e. Read the Data List according to the display on the tester.

Immobiliser (Transponder Key ECU):

DATA LIST

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Key SW	Unlock warning switch signal/ON or OFF	ON: Key is in ignition key cylinder OFF: No key is in ignition key cylinder	-
IG SW	Ignition switch signal/ON or OFF	ON: Ignition switch ON or START OFF: Ignition switch ACC or OFF	-
Immobiliser	Immobiliser system status/SET or UNSET	UNSET: Ignition switch ON SET: Without key	-
		NG: No permission for	

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Permit (Start)	Permit (Start) signal/OK or NG	engine start OK: Engine start permission	-
Response	Transponder chip data/NG or OK	NG: Data error OK: Data OK	-
Frame Error	Transponder chip data/NG or OK	NG: Data error OK: Data OK	-
Different Serial Number	Transponder chip data/NG or OK	NG: Data error OK: Data OK	-
Different Encrypt Code	Transponder chip data/NG or OK	NG: Data error OK: Data OK	-
Abnormal Status	Transponder chip data/NG or OK	NG: Data error OK: Data OK	-
Bcc Malfunction	Transponder chip data/NG or OK	NG: Incorrect data being sent OK: Correct data being sent	-
Sub Key	Sub key code signal/Unreg or Reg	Unreg: Non-matching sub-key code is sent Reg: Sub-key code is sent	-
Master Key	Master key code signal/Unreg or Reg	Unreg: Non-matching master key code is sent Reg: Master key code is sent	-
Transponder S-Code	Number of registered sub key/ min. 0, max. 15	Number of registered sub-key	-
Transponder M-Code	Number of registered master key/ min. 0, max. 15	Number of registered master key	-
Reg Code Space Full	Memory space for key codes registration/NOT FULL or FULL	NOT FULL: More key code registration possible FULL: No more key code registration possible	-
+B	Power source/BRAKE or NORMAL	BRAKE: Power source open NORMAL: Power source normal	-
Antenna Coil Status	Transponder key amplifier coil condition/NORMAL or FAIL	NORMAL: Antenna coil is normal FAIL: Antenna coil is malfunctioning	-
The Number of DTCs	Number of DTC recorded/min.: 0, max.: 255	Min.:0 Max.: 255	-

2. **PERFORM ACTIVE TEST**

HINT:

Using 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

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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.

a. Connect Techstream to the DLC3.
b. Turn the ignition switch to the ON position.
c. Turn the tester on.
d. Select the following menu items: Body Electrical/Immobiliser/Active Test.
e. Perform the Active Test according to the display on the tester.

immobiliser (Transponder Key ECU):

ACTIVE TEST CHART

Tester Display	Test Part	Control Range	Diagnostic Note
Security Indicicator	Security indicator light	ON/OFF	-

DIAGNOSTIC TROUBLE CODE CHART

1. **TRANSPONDER KEY ECU DIAGNOSTIC TROUBLE CODE CHART**

TRANSPONDER KEY ECU

DIAGNOSTIC TROUBLE CODE CHART

DTC Code	Detection Item	Trouble Area
B2780	Push Switch/Key Unlock Warning Switch Malfunction	1. Wire harness or connector 2. Unlock warning switch assembly 3. Transponder key ECU assembly
B2784	Antenna Coil Open/Short	1. Wire harness or connector 2. Transponder key amplifier 3. Transponder key ECU assembly
B2793	Transponder Chip Malfunction	Key
B2794	Unmatched Encryption Code	Key
B2795	Unmatched Key Code	Key
B2796	No Communication in Immobiliser System	1. Key 2. Transponder key amplifier 3. Transponder key ECU assembly
B2797	Communication Malfunction No. 1	1. Key 2. Transponder key amplifier

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		3. Transponder key ECU assembly
B2798	Communication Malfunction No. 2	1. Key 2. Transponder key amplifier 3. Transponder key ECU assembly

2. **ECM DIAGNOSTIC TROUBLE CODE CHART**

HINT:

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

ECM

ECM DIAGNOSTIC TROUBLE CODE CHART

DTC Code	Detection Item	Trouble Area
B2799	Engine Immobiliser System Malfunction	1. Wire harness or connector 2. ECM 3. Transponder key ECU assembly

DTC B2780 PUSH SWITCH/KEY UNLOCK WARNING SWITCH MALFUNCTION

DESCRIPTION

This DTC will be output if the transponder key ECU assembly does not detect that the unlock warning switch is on even when the ignition switch is in the ON position. Under normal conditions, the unlock warning switch is on when the ignition switch is in the ON position.

DTC TROUBLE DETECTION CONDITION CHART

DTC No.	DTC Detection Condition	Trouble Area
B2780	"Unlock warning switch ON" is not detected when ignition switch is ON	• Wire harness or connector • Unlock warning switch assembly • Transponder key ECU assembly

WIRING DIAGRAM

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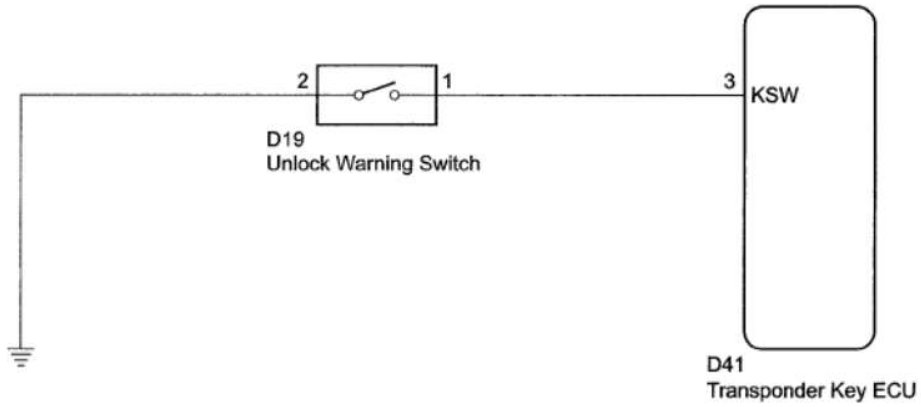


Fig. 55: Push Switch/Key Unlock Warning Switch Malfunction - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: If the transponder key ECU is replaced, register the key and ECU communication ID (See REGISTRATION).

1. **READ VALUE ON TECHSTREAM (UNLOCK WARNING SWITCH)**
   a. Connect Techstream to the DLC3.
   b. Turn the ignition switch to the ON position.
   c. Turn the tester on.
   d. Select the following menu items: Body Electrical/Immobiliser/ Data List.
   e. Select Key SW in the Data List and read the tester display.

Immobiliser (Transponder Key ECU):

DATA LIST

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Key SW	Unlock warning switch signal/ON or OFF	ON: Key is in ignition key cylinder OFF: No key is in ignition key cylinder	-

OK:

ON (Key is in ignition key cylinder) appears on the screen.

NG: Go to step 2

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OK: REPLACE TRANSPONDER KEY ECU ASSEMBLY (See **REMOVAL**)

2. **INSPECT UNLOCK WARNING SWITCH ASSEMBLY**
   a. Remove the unlock warning switch assembly (See **REMOVAL**).
   b. Measure the resistance according to the value (s) in the table below.

Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Switch Position	Specified Condition
1-2	Switch pushed (Key inserted)	Below 1 ohms
1-2	Switch free (Key removed)	10 kohms or higher

NG: REPLACE UNLOCK WARNING SWITCH ASSEMBLY (See **REMOVAL**)

Component without harness connected:
(Unlock Warning Switch)

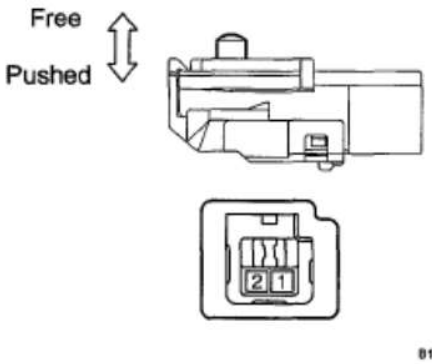


Fig. 56: Checking Unlock Warning Switch Assembly Operation
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

3. **CHECK HARNESS AND CONNECTOR (UNLOCK WARNING SWITCH - BODY GROUND)**
   a. Measure the resistance according to the value (s) in the table below.

Standard resistance

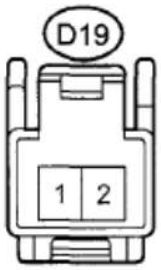
TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D19-2 - Body ground	Always	Below 1 ohms

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

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Front view of wire harness connector:
(to Unlock Warning Switch)



H B151010E04

Fig. 57: Identifying Unlock Warning Switch Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

4. **CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY ECU - UNLOCK WARNING SWITCH)**
   a. Disconnect the transponder key ECU connector.
   b. Measure the resistance according to the value (s) in the table below.

Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D41-3 (KSW) - D19-1	Always	Below 1 ohms
D19-1 - Body ground.	Always	10 kohms or higher

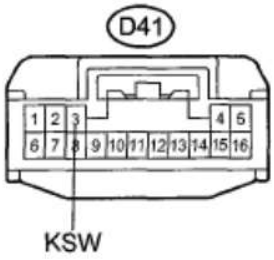
NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

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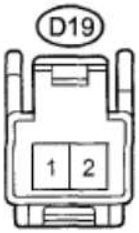
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Front view of wire harness connector:
(to Transponder Key ECU)



Front view of wire harness connector:
(to Unlock Warning Switch)



H B151011E03

Fig. 58: Identifying Transponder Key ECU And Unlock Warning Switch Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: REPLACE TRANSPONDER KEY ECU ASSEMBLY (See **REMOVAL**)

DTC B2784 ANTENNA COIL OPEN/SHORT

DESCRIPTION

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

DTC TROUBLE DETECTION CONDITION CHART

DTC No.	DTC Detection Condition	Trouble Area
B2784	Antenna coil is open/shorted	• Wire harness or connector • Transponder key amplifier • Transponder key ECU assembly

WIRING DIAGRAM

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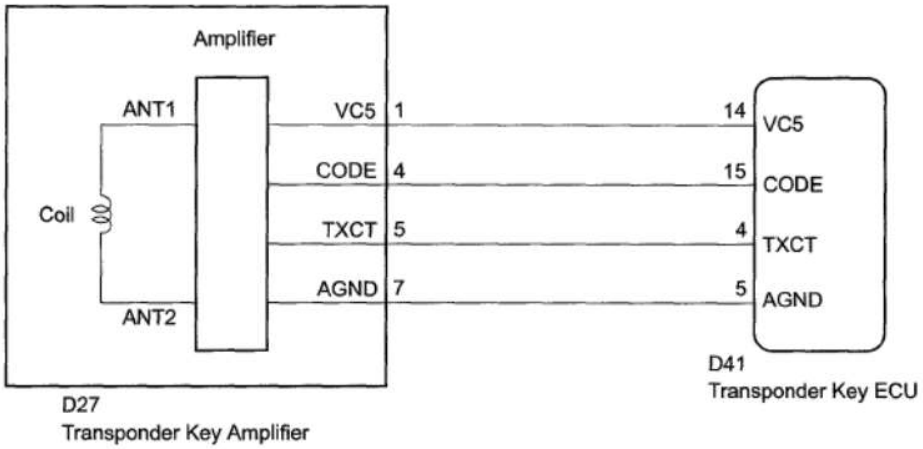


Fig. 59: Antenna Coil Open/Short - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: If the transponder key ECU is replaced, register the key and ECU communication ID (See REGISTRATION).

1. **READ VALUE ON TECHSTREAM (TRANSPONDER KEY AMPLIFIER)**
   a. Connect Techstream to the DLC3.
   b. Turn the ignition switch to the ON position.
   c. Turn the tester on.
   d. Select the following menu items: Body Electrical/Immobiliser/ Data List.
   e. Select Antenna Coil Status in the Data List and read the tester display.

Immobiliser (Transponder Key ECU):

DATA LIST

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Antenna Coil Status	Transponder key amplifier coil condition/NORMAL or FAIL	NORMAL: Antenna coil is normal FAIL: Antenna coil is malfunctioning	-

OK:

NORMAL (Antenna coil is normal) appears on the screen.

NG: Go to step 2

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OK: REPLACE TRANSPONDER KEY ECU ASSEMBLY (See **REMOVAL**)

2. **CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY ECU - TRANSPONDER KEY AMPLIFIER)**
   a. Disconnect the transponder key ECU and transponder key amplifier connectors.
   b. Measure the resistance according to the value (s) in the table below.

Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D41-4 (TXCT) - D27-5 (TXCT)	Always	Below 1 ohms
D41-5 (AGND) - D27-7 (AGND)	Always	Below 1 ohms
D41-14 (VC5) - D27-1 (VC5)	Always	Below 1 ohms
D41-15 (CODE) - D27-4 (CODE)	Always	Below 1 ohms
D41-4 (TXCT) - Body ground	Always	10 kohms or higher
D41-5 (AGND) - Body ground	Always	10 kohms or higher
D41-14 (VC5) - Body ground	Always	10 kohms or higher
D41-15 (CODE) - Body ground	Always	10 kohms or higher

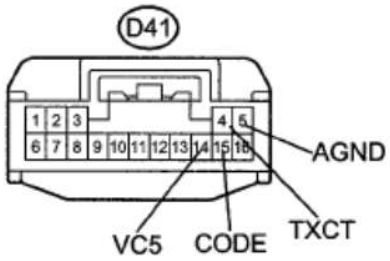
NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

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Front view of wire harness connector:
(to Transponder Key ECU)



Front view of wire harness connector:
(to Transponder Key Amplifier)

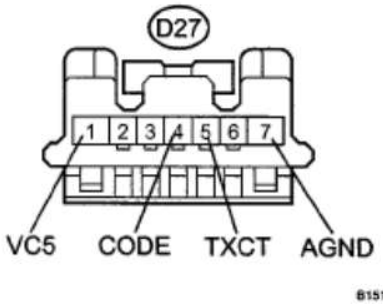


Fig. 60: Identifying Transponder Key ECU And Transponder Key Amplifier Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

3. **INSPECT TRANSPONDER KEY ECU ASSEMBLY (TRANSPONDER KEY AMPLIFIER POWER SOURCE)**
   a. Reconnect the transponder key ECU and transponder key amplifier connectors.
   b. Measure the voltage according to the value (s) in the table below.

Standard voltage

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D41-14 (VC5) - Body ground	No key is in ignition key cylinder	Below 1 V
D41-14 (VC5) - Body ground	Key is in ignition key cylinder	4.6 to 5.4 V

NG: REPLACE TRANSPONDER KEY ECU ASSEMBLY (See **REMOVAL**)

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Component with harness connected:
(Transponder Key ECU)

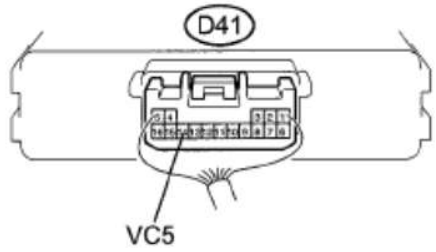


Fig. 61: Identifying Transponder Key ECU Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

4. **INSPECT TRANSPONDER KEY ECU ASSEMBLY (TRANSPONDER KEY AMPLIFIER GROUND)**
   a. Measure the resistance according to the value (s) in the table below.

Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D41-5 (AGND) - Body ground	Always	Below 1 ohms

NG: REPLACE TRANSPONDER KEY ECU ASSEMBLY (See **REMOVAL**)

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Component with harness connected:
(Transponder Key ECU)

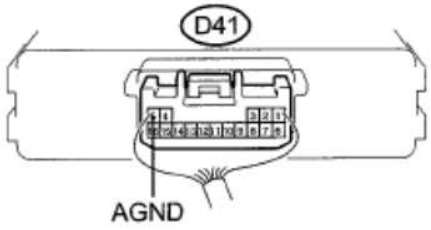


Fig. 62: Identifying Transponder Key ECU Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: REPLACE TRANSPONDER KEY AMPLIFIER (See **REMOVAL**)

DTC B2793 TRANSPONDER CHIP MALFUNCTION

DESCRIPTION

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

DTC TROUBLE DETECTION CONDITION CHART

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

INSPECTION PROCEDURE

NOTE: If the key is replaced, register the key (See REGISTRATION).

1. **CLEAR DTC**
   a. Delete the DTCs (See **DTC CHECK/CLEAR**).
2. **RE-REGISTER KEY**
   a. Re-register the key (See **REGISTRATION**).
3. **CHECK ENGINE START**
   a. Check that the engine starts.

OK:

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The engine starts.

NG: REPLACE KEY

OK: END (PROBLEM WITH KEY REGISTRATION IS DEFECTIVE)

DTC B2794 UNMATCHED ENCRYPTION CODE

DESCRIPTION

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

DTC TROUBLE DETECTION CONDITION CHART

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

INSPECTION PROCEDURE

NOTE: If the key is replaced, register the key (See REGISTRATION).

1. **REPLACE KEY**
   a. Replace the key.
2. **KEY REGISTRATION**
   a. Register the key (See **REGISTRATION**).

NEXT: END (KEY IS DEFECTIVE)

DTC B2795 UNMATCHED KEY CODE

DESCRIPTION

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

DTC TROUBLE DETECTION CONDITION CHART

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

INSPECTION PROCEDURE

NOTE: If the key is replaced, register the key (See REGISTRATION).

1. **CLEAR DTC**
   a. Delete the DTCs (See **DTC CHECK/CLEAR**).
2. **RE-REGISTER KEY**

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a. Re-register the key (See **REGISTRATION**).

3. **CHECK ENGINE START**

a. Check that the engine starts.

OK:

The engine starts.

NG: REPLACE KEY

OK: END (PROBLEM WITH KEY REGISTRATION IS DEFECTIVE)

DTC B2796 NO COMMUNICATION IN IMMOBILISER SYSTEM; DTC B2798 COMMUNICATION MALFUNCTION NO. 2

DESCRIPTION

These DTCs are output if a key that does not have a transponder chip is inserted into the ignition key cylinder or if communication between the key and transponder key ECU assembly is impossible.

DTC TROUBLE DETECTION CONDITION CHART

DTC No.	DTC Detection Condition	Trouble Area
B2796	The key code cannot be transmitted	• Key • Transponder key amplifier • Transponder key ECU assembly
B2798	Key code identification cannot be completed within the specified time (0.15 to 0.5 sec.)	• Key • Transponder key amplifier • Transponder key ECU assembly

WIRING DIAGRAM

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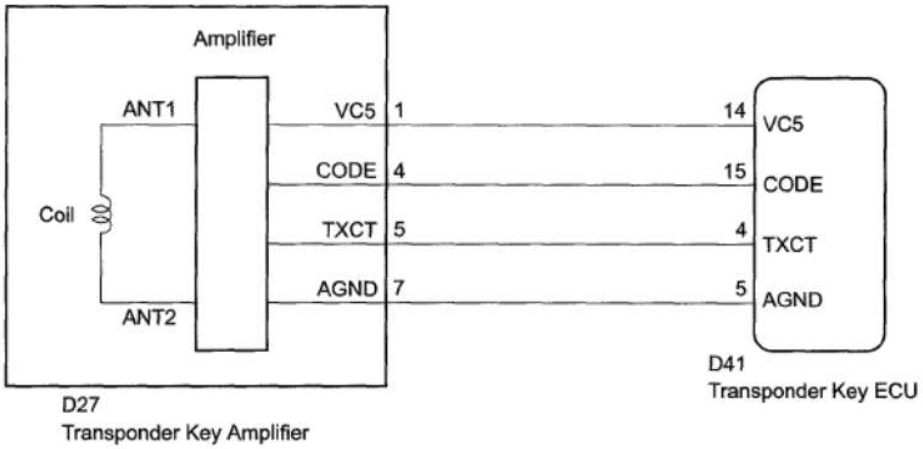


Fig. 63: No Communication In Immobiliser System - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- **If the transponder key ECU is replaced, register the key and ECU communication ID (See REGISTRATION).**
- **If the key is replaced, register the key (See REGISTRATION).**

1. **READ VALUE ON TECHSTREAM (IMMOBILISER SYSTEM STATUS)**
   a. Connect Techstream to the DLC3.
   b. Turn the ignition switch to the ON position.
   c. Turn the tester on.
   d. Select the following menu items: Body Electrical/Immobiliser/Data List.
   e. Select Immobiliser in the Data List and read the tester display.

Immobiliser (Transponder Key ECU):

DATA LIST

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Immobiliser	Immobiliser system status/SET or UNSET	UNSET: Ignition switch ON SET: Without key	-

OK:

UNSET (Ignition switch ON) appears on the screen.

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NG: Go to step 2

OK: REPLACE TRANSPONDER KEY ECU ASSEMBLY (See **REMOVAL**)

2. **CHECK KEYS**
   a. Insert the vehicle's other key into the ignition key cylinder.
   b. Check that the engine starts with this key.

OK:

The engine starts.

NG: Go to step 5

OK: Go to next step

3. **RE-REGISTER KEY**
   a. Re-register the key (See **REGISTRATION**).
4. **CHECK ENGINE START**
   a. Check that the engine starts.

OK:

The engine starts.

NG: REPLACE KEY

OK: END (PROBLEM WITH KEY REGISTRATION IS DEFECTIVE)

5. **REPLACE TRANSPONDER KEY AMPLIFIER**
   a. Replace the transponder key amplifier (See **TRANSPONDER KEY AMPLIFIER (W/O SMART KEY SYSTEM)**).
6. **CHECK ENGINE START**
   a. Check that the engine starts.

OK:

The engine starts.

NG: REPLACE TRANSPONDER KEY ECU ASSEMBLY (See **REMOVAL**)

OK: END (TRANSPONDER KEY AMPLIFIER IS DEFECTIVE)

DTC B2797 COMMUNICATION MALFUNCTION NO. 1

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DESCRIPTION

This DTC is output when an error occurs in communication between the transponder key amplifier and the transponder key ECU.

HINT:

Some noise is found in the communication line.

DTC TROUBLE DETECTION CONDITION CHART

DTC No.	DTC Detection Condition	Trouble Area
B2797	Keys are positioned too close to each other, or noise occurs in communication line	• Key • Transponder key amplifier • Transponder key ECU assembly

WIRING DIAGRAM

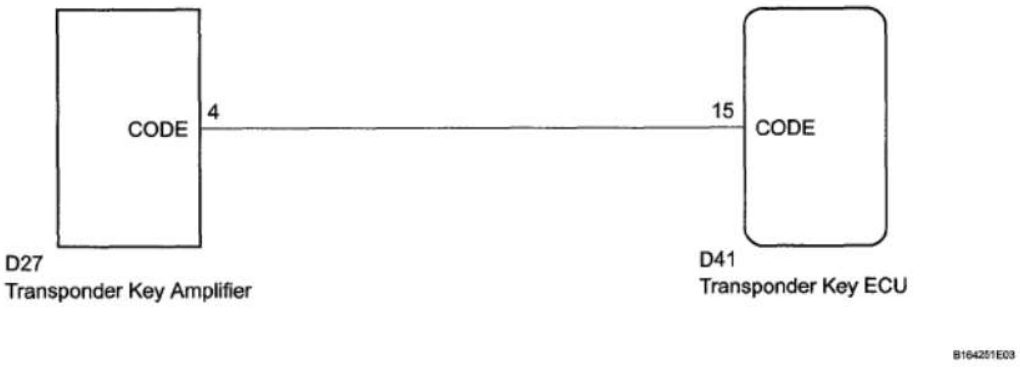


Fig. 64: Communication Malfunction No. 1 - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: If the transponder key ECU is replaced, register the key and ECU communication ID (See REGISTRATION).

1. **CHECK KEYS**
   a. Check whether the ignition key being used is near other ignition keys, as shown in the illustration. Also, check whether the key ring is in contact with the key grip.

      Result

      RESULT CHART

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Result	Proceed to
Key is not near other keys and key ring is not in contact with key grip.	A
Key is near other keys and/or key ring is in contact with key grip.	B

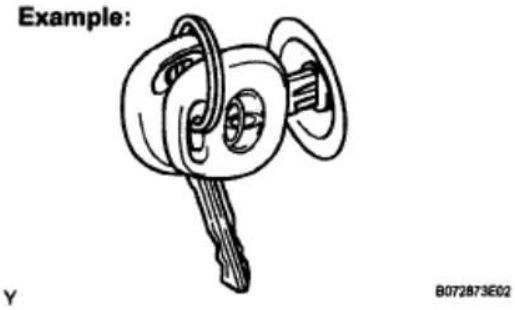


Fig. 65: Identifying Ignition Key
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

A: Go to step 3

B: Go to next step

2. **CHECK DTC OUTPUT**
   a. Separate the keys from each other, or remove the key ring.
   b. Delete the DTCs (See **DTC CHECK/CLEAR**).
   c. Insert a key into the ignition key cylinder and remove the key. Repeat for all the other keys of the vehicle.

   OK:

   B2797 output does not recur.

   NG: Go to step 3

   OK: END (KEYS ARE POSITIONED TOO CLOSE TO EACH OTHER)

3. **REPLACE TRANSPONDER KEY AMPLIFIER**
   a. Replace the transponder key amplifier (See **TRANSPONDER KEY AMPLIFIER (W/O SMART KEY SYSTEM)**).
4. **CHECK DTC OUTPUT**
   a. Delete the DTCs (See **DTC CHECK/CLEAR**).
   b. Recheck for DTCs.

   OK:

   B2797 output does not recur.

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NG: REPLACE TRANSPONDER KEY ECU ASSEMBLY (See **REMOVAL**)

OK: END (TRANSPONDER KEY AMPLIFIER IS DEFECTIVE)

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 transponder key ECU; 2) the ECM detects errors in the communication lines; or 3) the ECU communication ID between the transponder key ECU and ECM is different and an engine start is attempted. Before troubleshooting for this DTC, make sure no transponder key ECU DTCs are present. If present, troubleshoot the transponder key ECU DTCs first.

DTC TROUBLE DETECTION CONDITION CHART

DTC No.	DTC Detection Condition	Trouble Area
B2799	One of following conditions is met: • Error in communication between ECM and transponder key ECU • Error in communication lines • Communication ID is different during communication with transponder key ECU	• Wire harness or connector • ECM • Transponder key ECU assembly

WIRING DIAGRAM

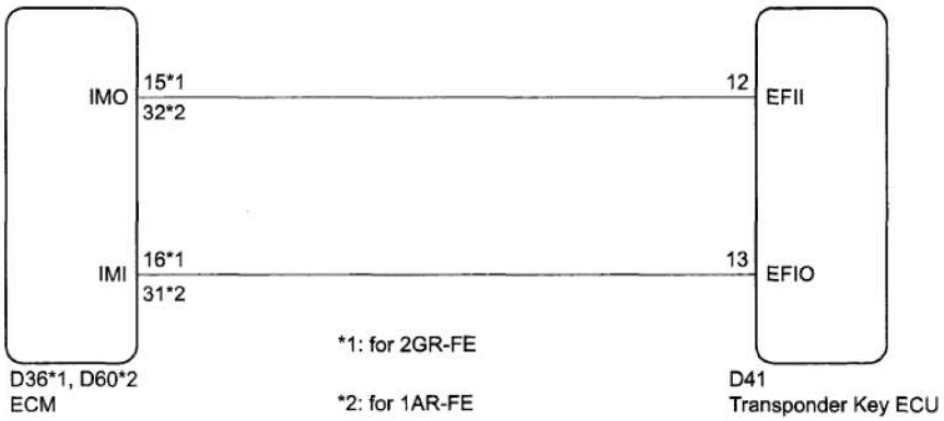


Fig. 66: Engine Immobiliser System Malfunction - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

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NOTE:

- **If the transponder key ECU is replaced, register the key and ECU communication ID (See REGISTRATION).**
- **If the ECM is replaced, register the ECU communication ID (See REGISTRATION).**

1. **CHECK DTC OUTPUT**
   a. Delete the DTCs (See **DTC CHECK/CLEAR**).
   b. Recheck for DTCs.

   OK:

   B2799 output does not recur.

   NG: Go to step 2

   OK: USE SIMULATION METHOD TO CHECK (See **HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS**)

2. **RE-REGISTER ECU COMMUNICATION ID**
   a. Re-register the ECU communication ID (See **REGISTRATION**).
3. **CHECK DTC OUTPUT**
   a. Delete the DTCs (See **DTC CHECK/CLEAR**).
   b. Recheck for DTCs.

   OK:

   B2799 output does not recur.

   NG: Go to step 4

   OK: END (PROBLEM WITH ECU COMMUNICATION ID IS DEFECTIVE)

4. **CHECK CONNECTION OF CONNECTOR**
   a. Turn the ignition switch off.
   b. Check that the connectors are properly connected to the ECM and the transponder key ECU.

   OK:

   Connectors are properly connected.

   NG: CONNECT CONNECTORS PROPERLY

   OK: Go to next step

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5. **CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY ECU - ECM)**
   a. Disconnect the transponder key ECU and ECM connectors.

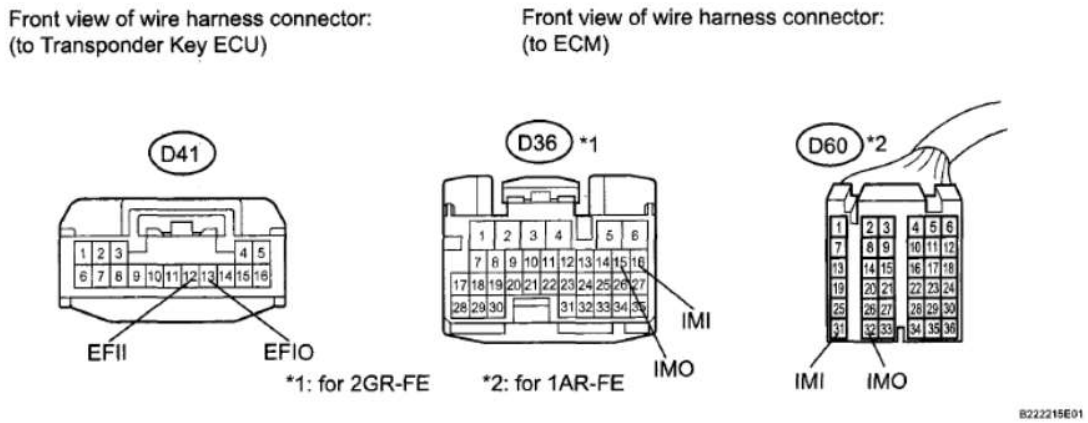


Fig. 67: Identifying Transponder Key ECU And ECM Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D41-12 (EFII) - D36-15 (IMO)(1)	Always	Below 1 ohms
D41-13 (EFIO) - D36-16 (IMI)(1)	Always	Below 1 ohms
D41-12 (EFII) - D60-32 (IMO)(2)	Always	Below 1 ohms
D41-13 (EFIO) - D6031 (IMI)(2)	Always	Below 1 ohms
D41-12 (EFII) - Body ground	Always	10 kohms or higher
D41-13 (EFIO) - Body ground	Always	10 kohms or higher
(1) for 2GR-FE (2) for 1AR-FE		

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

6. **REPLACE ECM**
   a. Replace the ECM (See **REMOVAL** for 2GR-FE, See **REMOVAL** for 1AR-FE).
7. **REGISTER ECU COMMUNICATION ID**
   a. Register the ECU communication ID (See **REGISTRATION**).
8. **CHECK DTC OUTPUT**

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a. Delete the DTCs (See **DTC CHECK/CLEAR**).
b. Recheck for DTCs.

OK:

B2799 output does not recur.

NG: REPLACE TRANSPONDER KEY ECU ASSEMBLY (See **REMOVAL**)

OK: END (ECM IS DEFECTIVE)

SECURITY INDICATOR LIGHT CIRCUIT

DESCRIPTION

When the transponder key is registered, the transponder key ECU assembly outputs the key registration condition by lighting up, blinking or turning off the security indicator light.

WIRING DIAGRAM

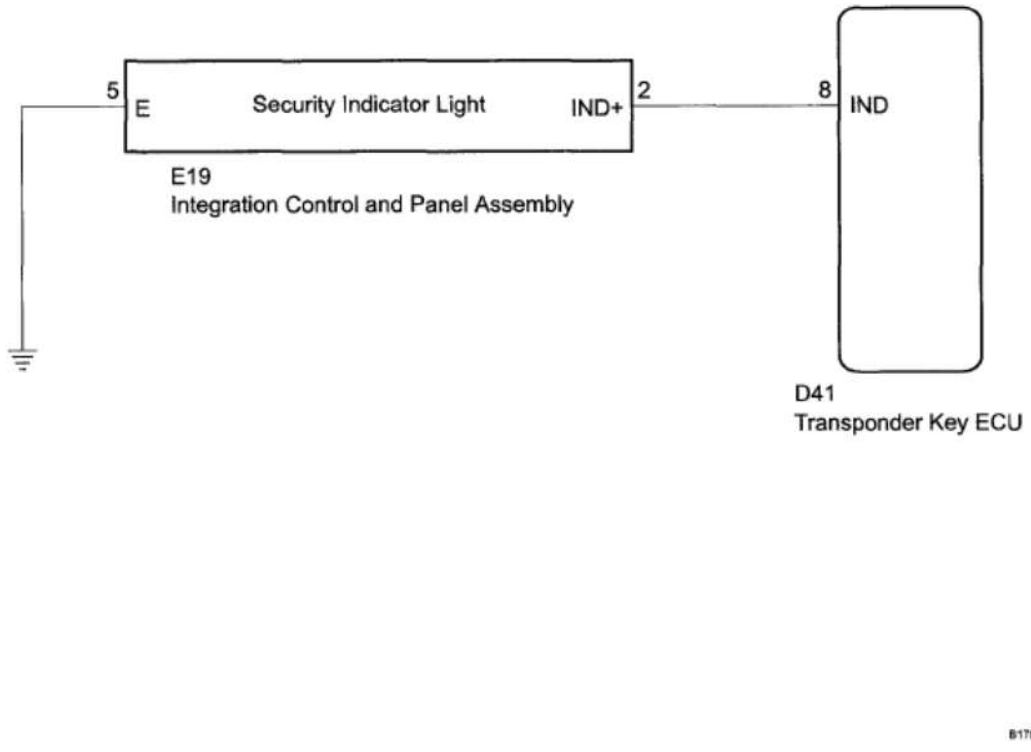


Fig. 68: Security Indicator Light Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

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NOTE: If the transponder key ECU is replaced, register the key and ECU communication ID (See REGISTRATION).

1. **PERFORM ACTIVE TEST USING TECHSTREAM (SECURITY INDICATOR LIGHT)**
   a. Connect Techstream to the DLC3.
   b. Turn the ignition switch to the ON position.
   c. Turn the tester on.
   d. Select the following menu items: Body Electrical/Immobiliser/Active Test.
   e. Perform the Active Test according to the display on the tester.

   Immobiliser:

   ACTIVE TEST CHART

Tester Display	Test Part	Control Range	Diagnostic Note
Security Indic	Security indicator light	ON/OFF	-

   OK:

   The security indicator light turns on and off according to the tester operation.

   NG: Go to step 2

   OK: REPLACE TRANSPONDER KEY ECU ASSEMBLY (See **REMOVAL**)

2. **CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY ECU - SECURITY INDICATOR LIGHT)**
   a. Disconnect the transponder key ECU and security indicator light connectors.
   b. Measure the resistance according to the value (s) in the table below.

   Standard resistance

   TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D41-8 (IND) - E19-2 (IND+)	Always	Below 1 ohms
D41-8 (IND) - Body ground	Always	10 kohms or higher

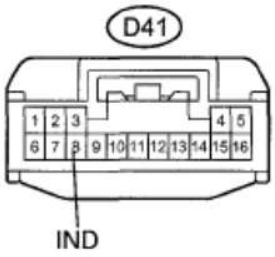
   NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

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Front view of wire harness connector:
(to Transponder Key ECU)



Front view of wire harness connector:
(to Integration Control and Panel)



H B164264E04

Fig. 69: Identifying Transponder Key ECU And Security Indicator Light Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

3. **CHECK HARNESS AND CONNECTOR (SECURITY INDICATOR LIGHT - BODY GROUND)**
   a. Measure the resistance according to the value (s) in the table below.

Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
E19-5 (E) - Body ground	Always	Below 1 ohms

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

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Front view of wire harness connector:
(to Integration Control and Panel)



H B164255E05

Fig. 70: Identifying Security Indicator Light Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

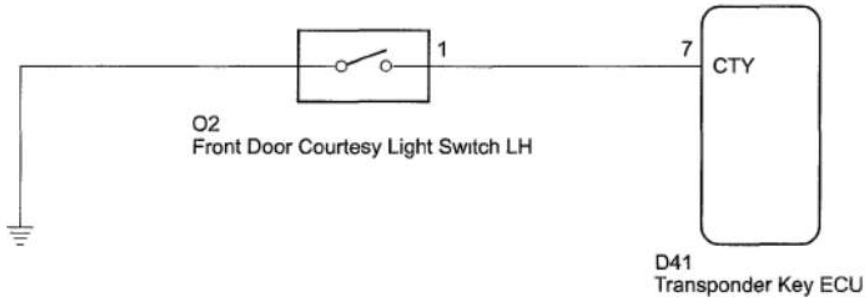
OK: REPLACE SECURITY INDICATOR LIGHT (See **REMOVAL**)

DOOR COURTESY SWITCH CIRCUIT

DESCRIPTION

When an additional transponder key is registered, the transponder key ECU assembly detects the front door courtesy light switch open/closed condition, and enters the key registration mode.

WIRING DIAGRAM



H B171320E02

Fig. 71: Door Courtesy Switch Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: If the transponder key ECU is replaced, register the key and ECU communication ID (See REGISTRATION).

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1. **CHECK HARNESS AND CONNECTOR (FRONT DOOR COURTESY LIGHT SWITCH CIRCUIT)**
   a. Disconnect the transponder key ECU connector.
   b. Measure the resistance according to the value (s) in the table below.

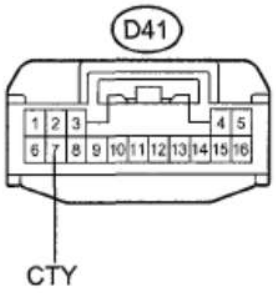
Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D41-7 (CTY) - Body ground	Courtesy switch pushed (Door closed)	10 kohms or higher
D41-7 (CTY) - Body ground	Courtesy switch free (Door open)	Below 1 ohms

NG: Go to step 2

Front view of wire harness connector:
(to Transponder Key ECU)



H B184266E09

Fig. 72: Identifying Transponder Key ECU Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: REPLACE TRANSPONDER KEY ECU ASSEMBLY (See **REMOVAL**)

2. **INSPECT FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY**
   a. Remove the driver side front door courtesy light switch (See **FRONT DOOR COURTESY SWITCH**).
   b. Measure the resistance according to the value (s) in the table below.

Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
1 - Switch body	Courtesy switch pushed (Door closed)	10 kohms or higher
1 - Switch body	Courtesy switch free (Door open)	Below 1 ohms

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NG: REPLACE FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY (See **FRONT DOOR COURTESY SWITCH**)

Component without harness connected:
(Door Courtesy Light Switch)

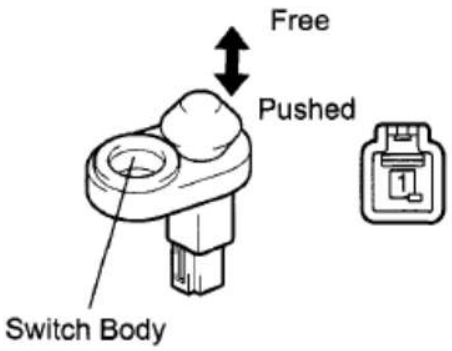


Fig. 73: Checking Door Courtesy Light Switch Assembly Operation
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: REPAIR OR REPLACE HARNESS OR CONNECTOR (TRANSPONDER KEY ECU - FRONT DOOR COURTESY LIGHT SWITCH)

ECU POWER SOURCE CIRCUIT

DESCRIPTION

This circuit provides power to operate the transponder key ECU assembly.

WIRING DIAGRAM

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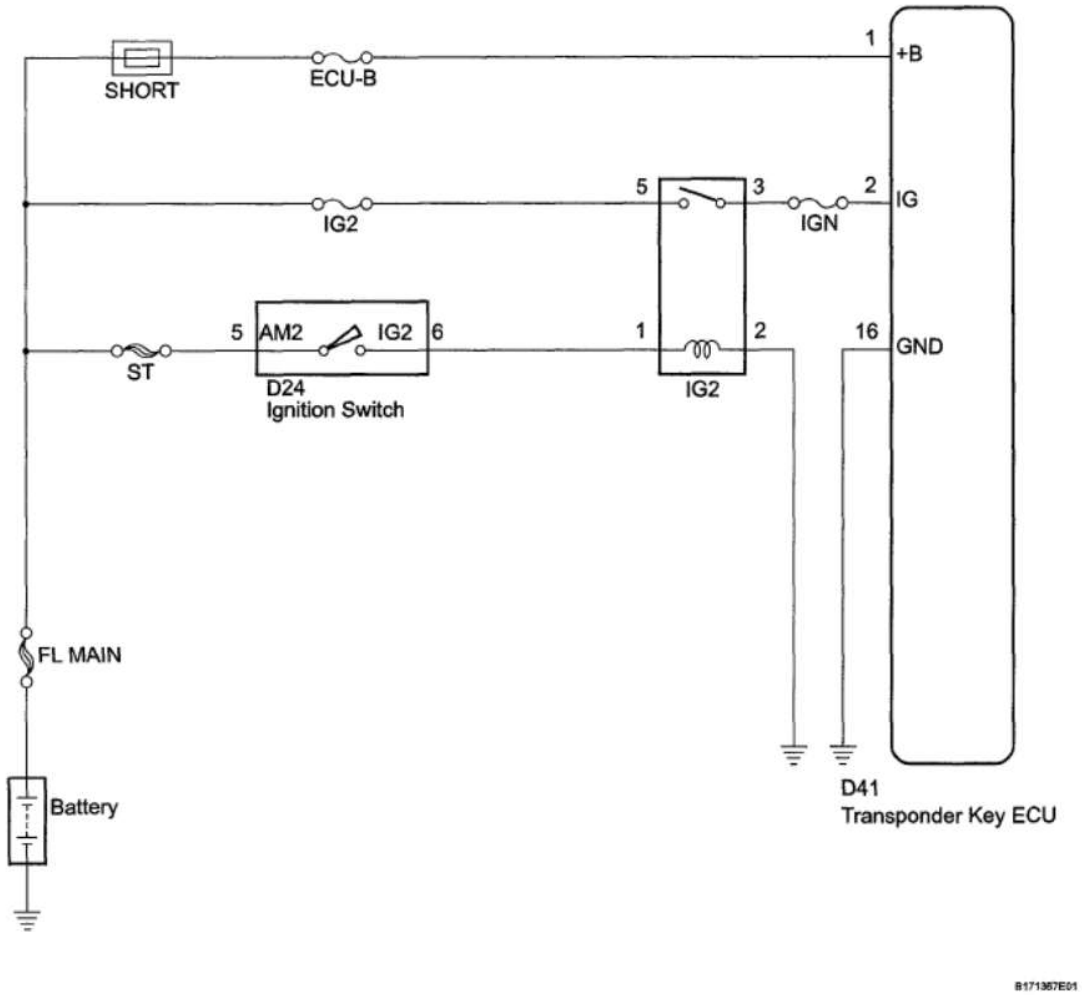


Fig. 74: ECU Power Source Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: If the transponder key ECU is replaced, register the key and ECU communication ID (See REGISTRATION).

1. **CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY ECU - BATTERY)**
   a. Disconnect the transponder key ECU connector.
   b. Measure the voltage according to the value (s) in the table below.

Standard voltage

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D41-1 (+B) - Body ground	Always	11 to 14 V

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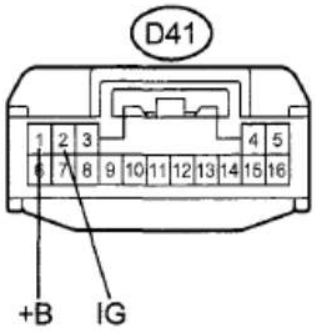
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D41-2 (IG) - Body ground	Ignition switch OFF	Below 1 V
D41-2 (IG) - Body ground	Ignition switch ON	11 to 14 V

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR, OR REPLACE FUSE

Front view of wire harness connector:
(to Transponder Key ECU)



H B164256E10

Fig. 75: Identifying Transponder Key ECU Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

2. **CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY ECU - BODY GROUND)**
   a. Measure the resistance according to the value (s) in the table below.

Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D41-16 (GND) - Body ground	Always	Below 1 ohms

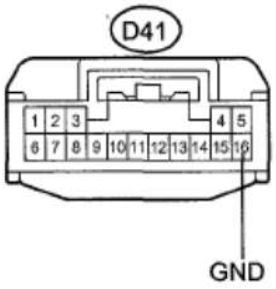
NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

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Front view of wire harness connector:
(to Transponder Key ECU)



H B164266E11

Fig. 76: Identifying Transponder Key ECU Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

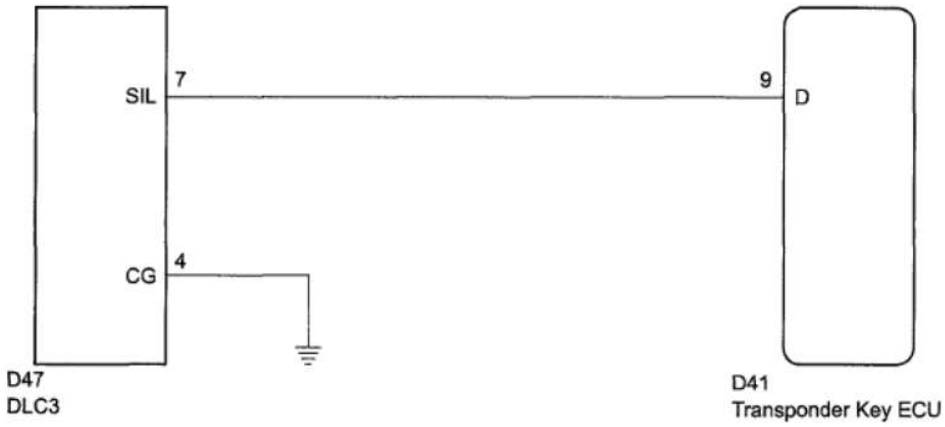
OK: REPLACE TRANSPONDER KEY ECU ASSEMBLY (See **REMOVAL**)

DIAGNOSIS CIRCUIT

DESCRIPTION

This circuit is used to read the DTCs that are output from the transponder key ECU assembly with Techstream.

WIRING DIAGRAM



H B164248E03

Fig. 77: Diagnosis Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

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NOTE: If the transponder key ECU is replaced, register the key and ECU communication ID (See REGISTRATION).

1. **CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY ECU - DLC3)**
   a. Disconnect the transponder key ECU connector.
   b. Measure the resistance according to the value (s) in the table below.

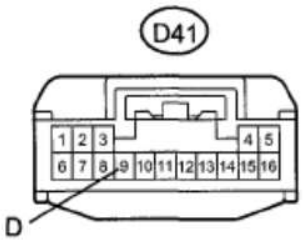
Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D41-9 (D) - D47-7 (SIL)	Always	Below 1 ohms
D41-9 (D) - Body ground	Always	10 kohms or higher

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

Front view of wire harness connector:
(to Transponder Key ECU)



Front view of wire harness connector:
(to DLC3)

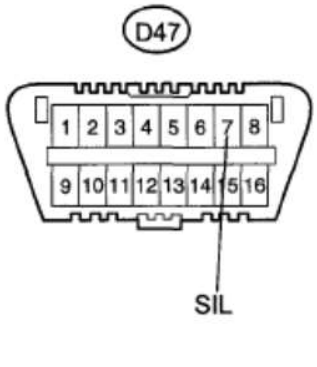


Fig. 78: Identifying Transponder Key ECU And DLC3 Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

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2. **CHECK HARNESS AND CONNECTOR (DLC3 - BODY GROUND)**
   a. Measure the resistance according to the value (s) in the table below.

Standard resistance

TESTER CONNECTION SPECIFIED CONDITION

Tester Connection	Condition	Specified Condition
D47-4 (CG) - Body ground	Always	Below 1 ohms

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

Front view of wire harness connector:
(to DLC3)

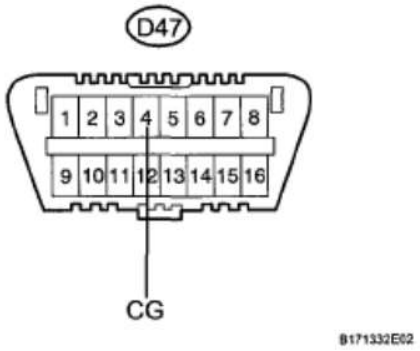


Fig. 79: Identifying DLC3 Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: REPLACE TRANSPONDER KEY ECU ASSEMBLY (See **REMOVAL**)

ID CODE BOX (W/ SMART KEY SYSTEM)

COMPONENTS

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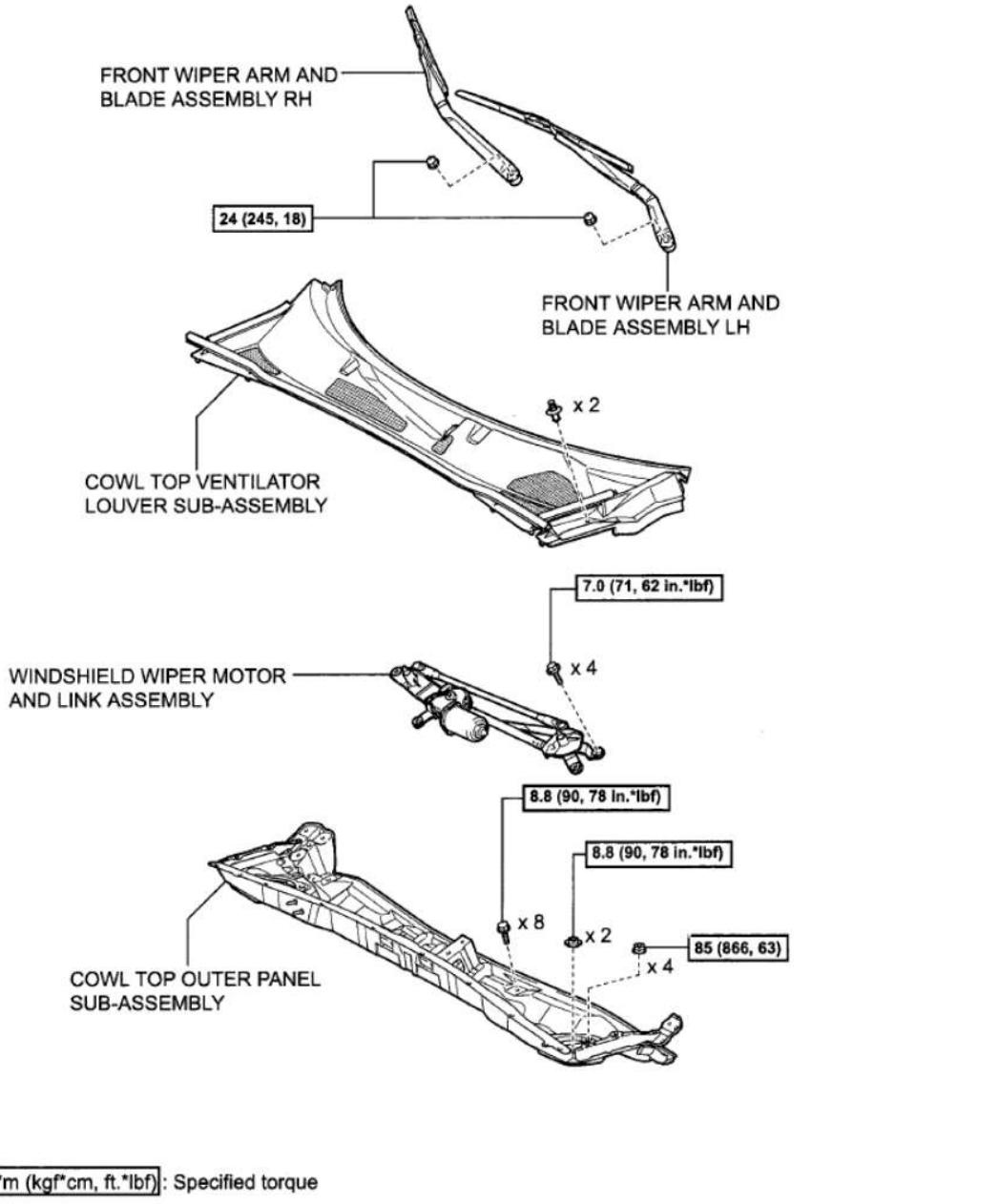
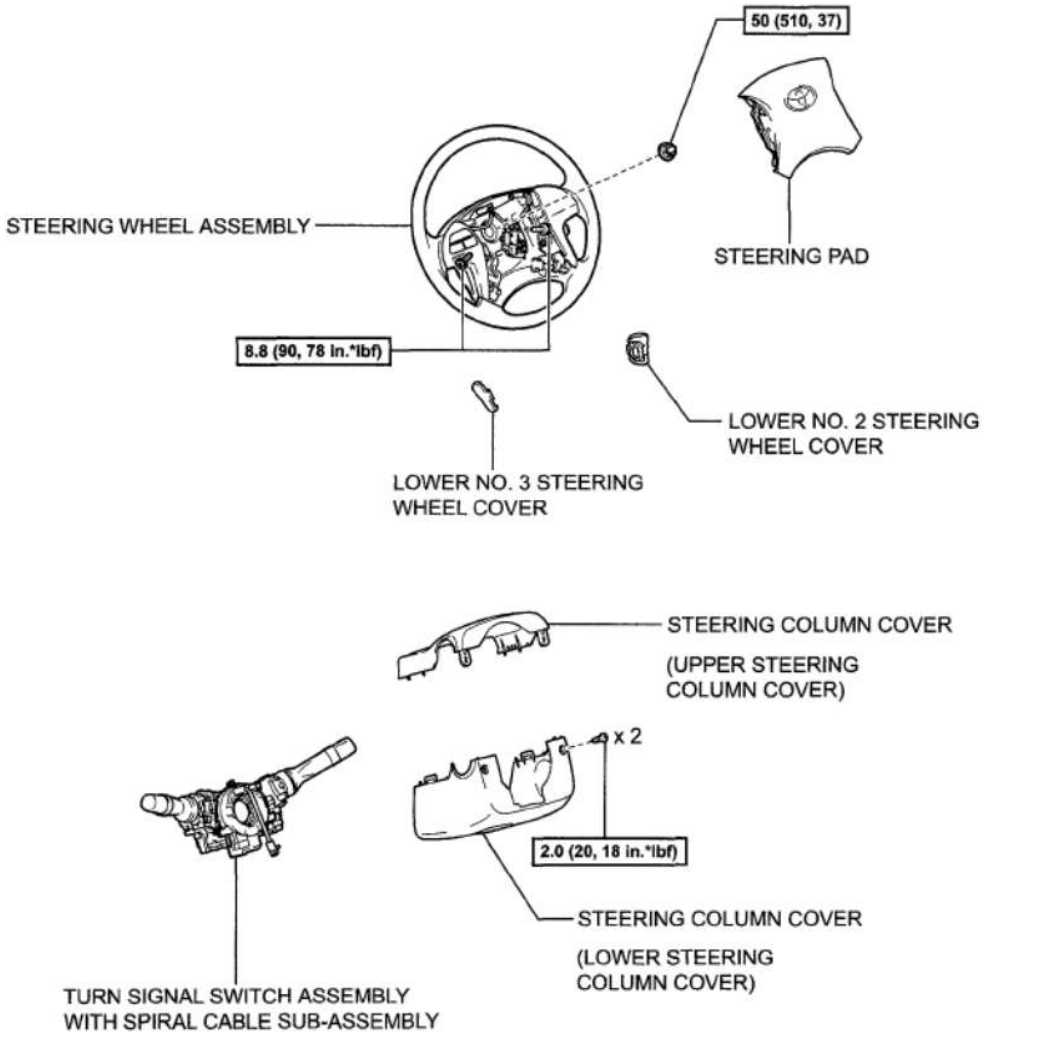


Fig. 80: Identifying ID Code Box Components With Torque Specification (1 Of 14)
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N*m (kgf*cm, ft.*lbf): Specified torque

P B173043E01

Fig. 81: Identifying ID Code Box Components With Torque Specification (2 Of 14)
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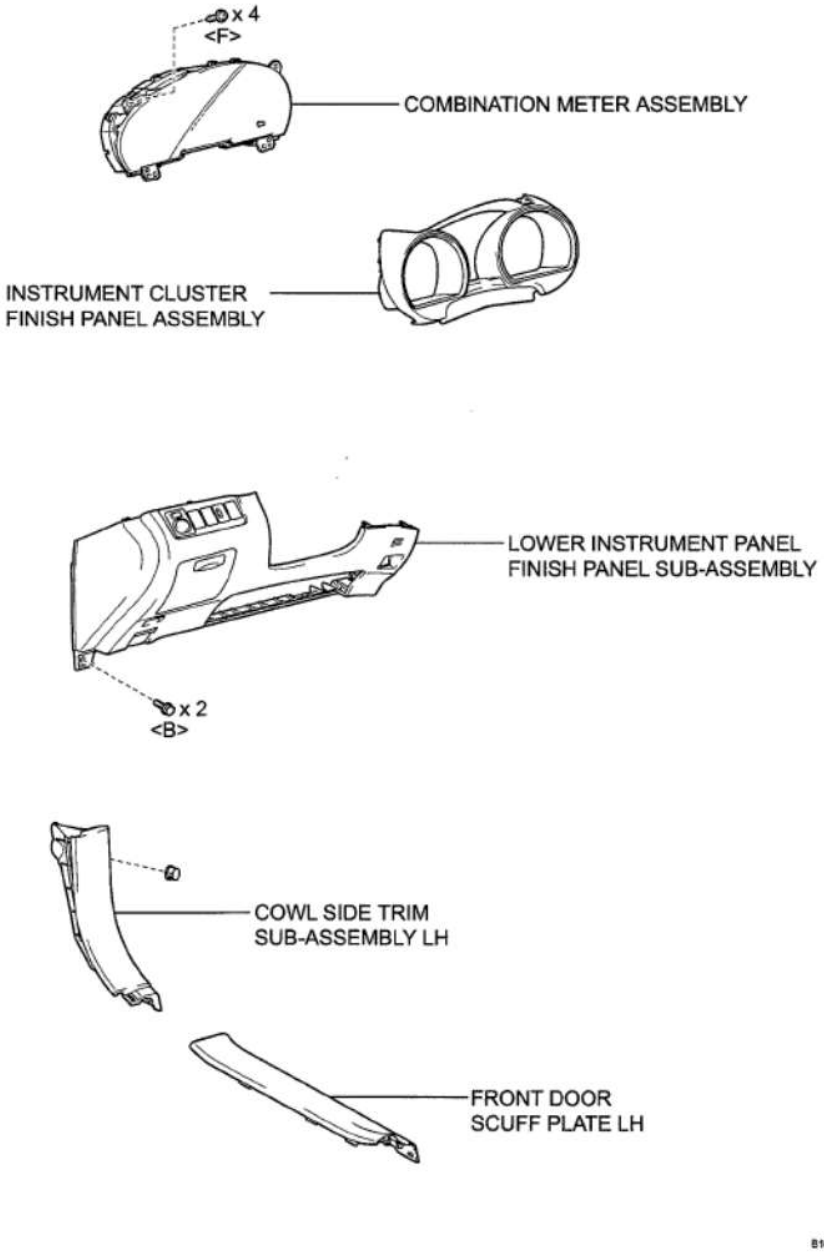


Fig. 82: Identifying ID Code Box Components With Torque Specification (3 Of 14)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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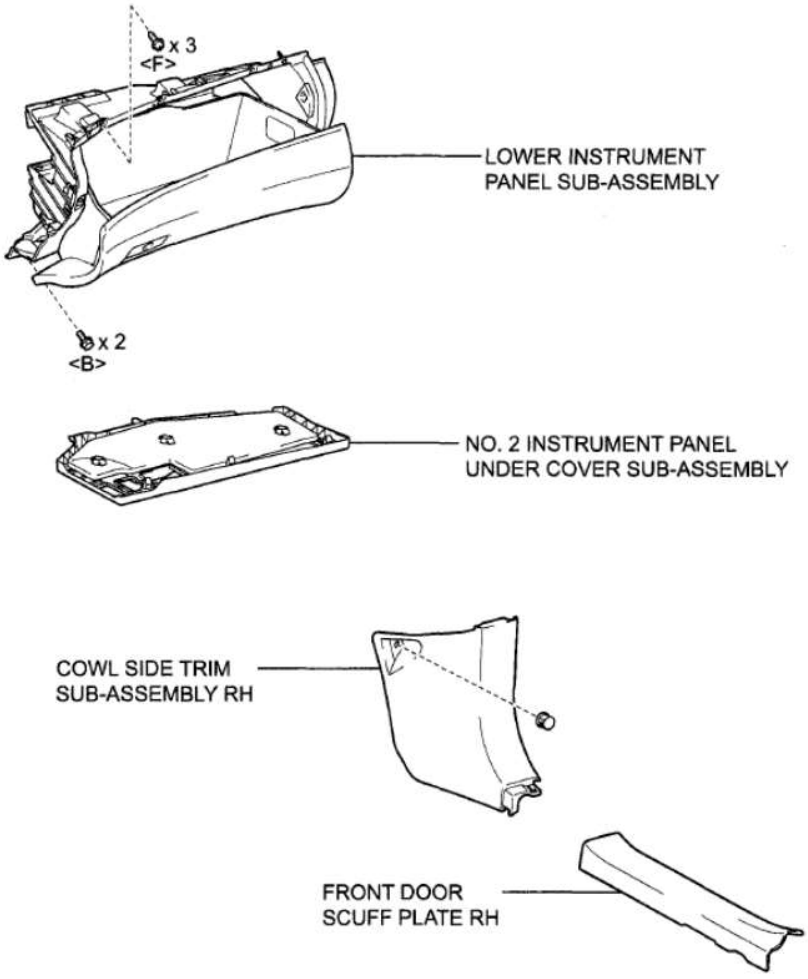


Fig. 83: Identifying ID Code Box Components With Torque Specification (4 Of 14)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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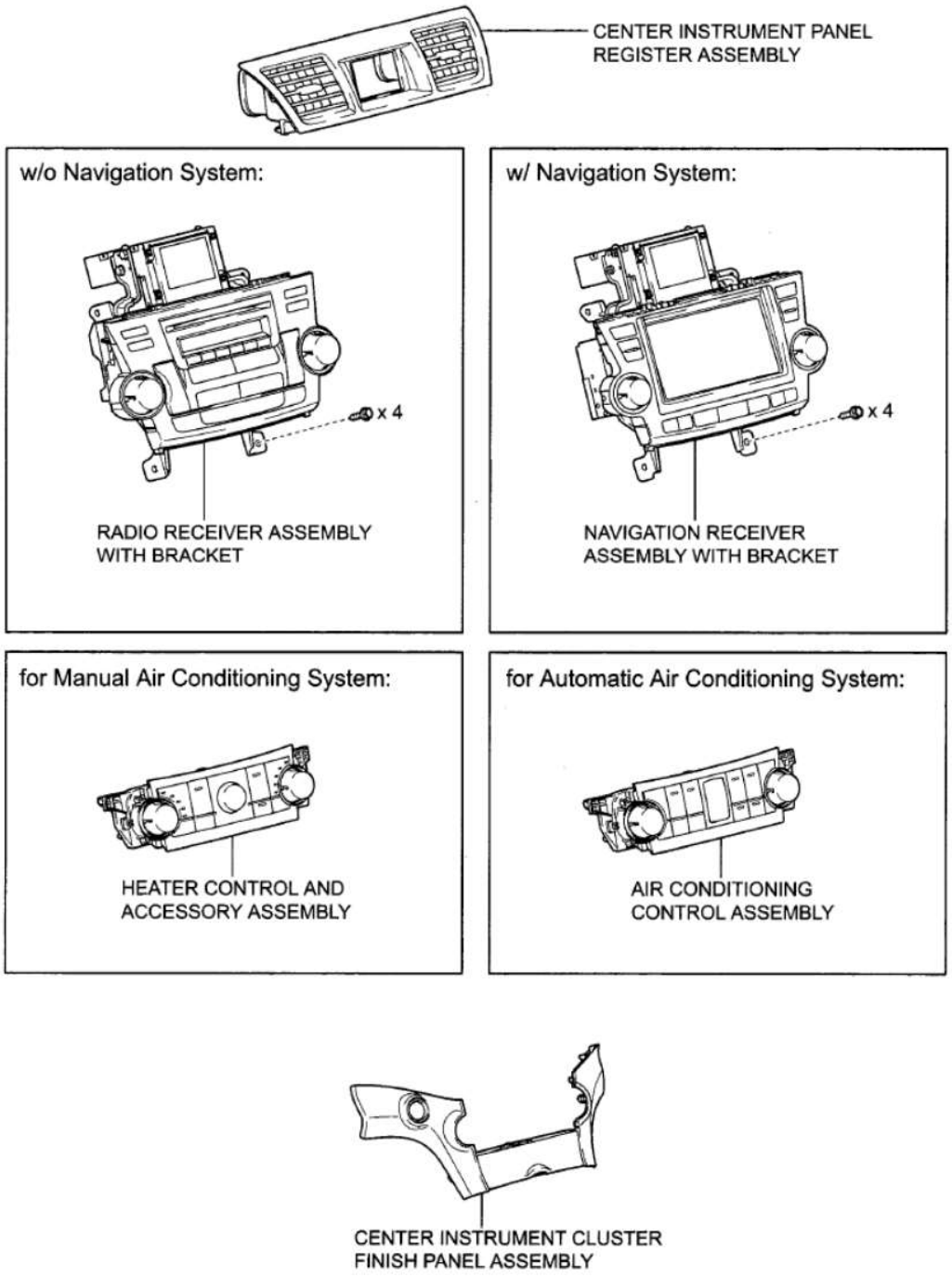


Fig. 84: Identifying ID Code Box Components With Torque Specification (5 Of 14)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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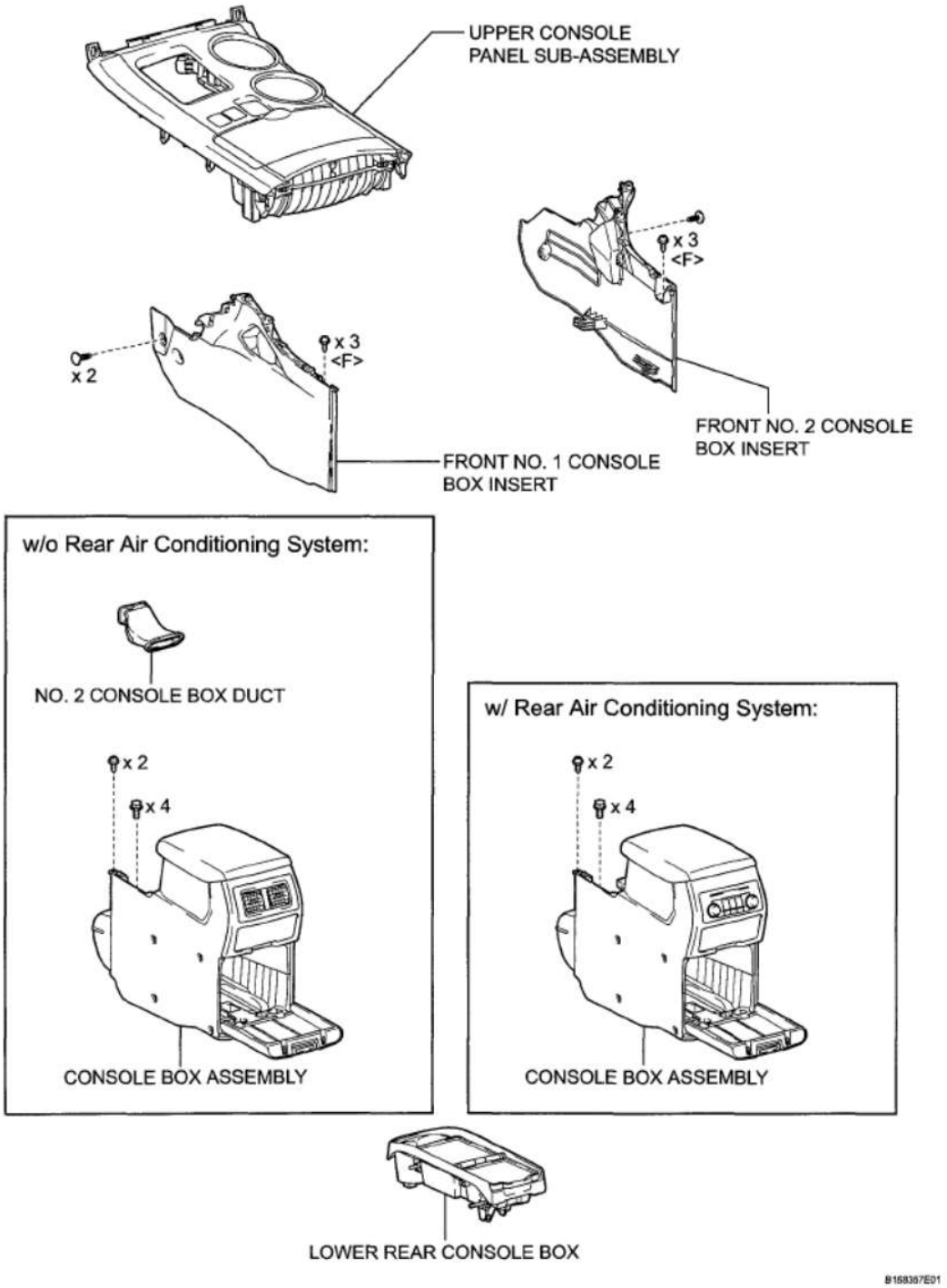


Fig. 85: Identifying ID Code Box Components With Torque Specification (6 Of 14)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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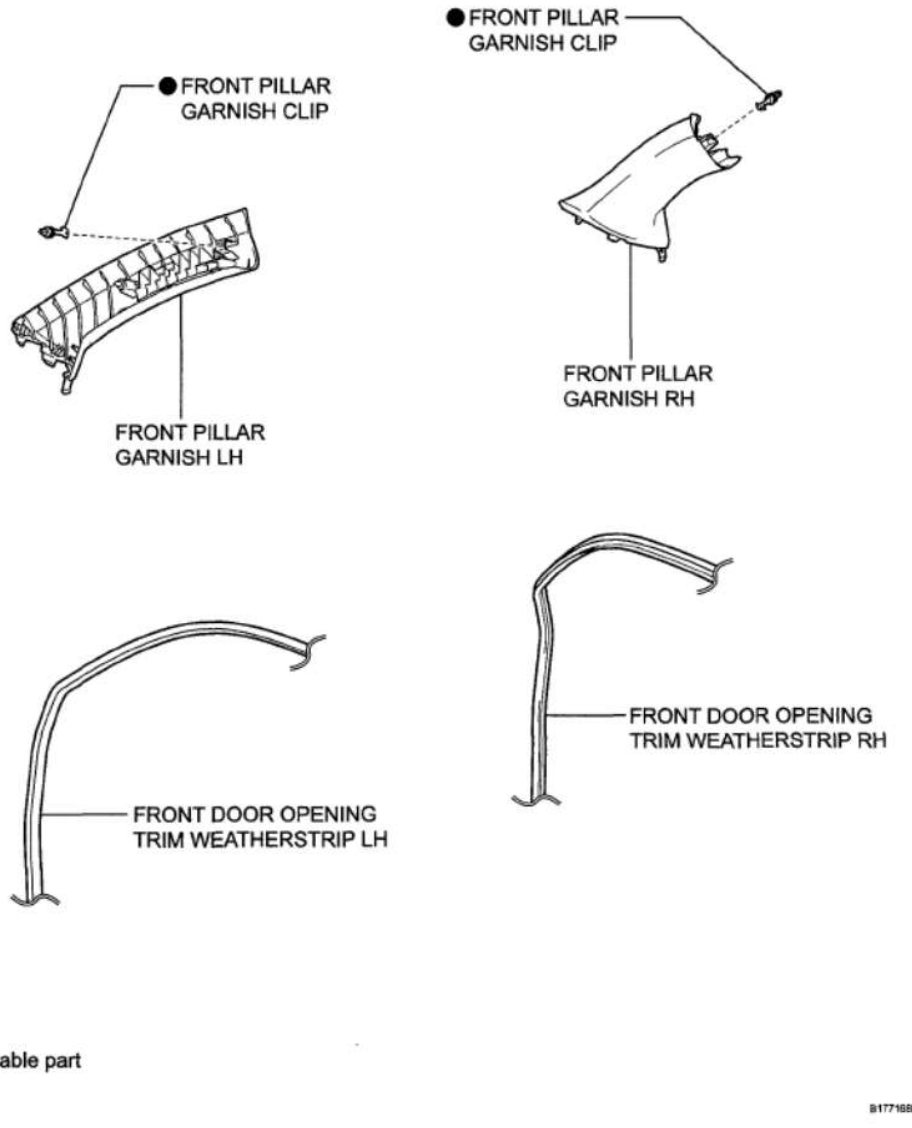


Fig. 86: Identifying ID Code Box Components With Torque Specification (7 Of 14)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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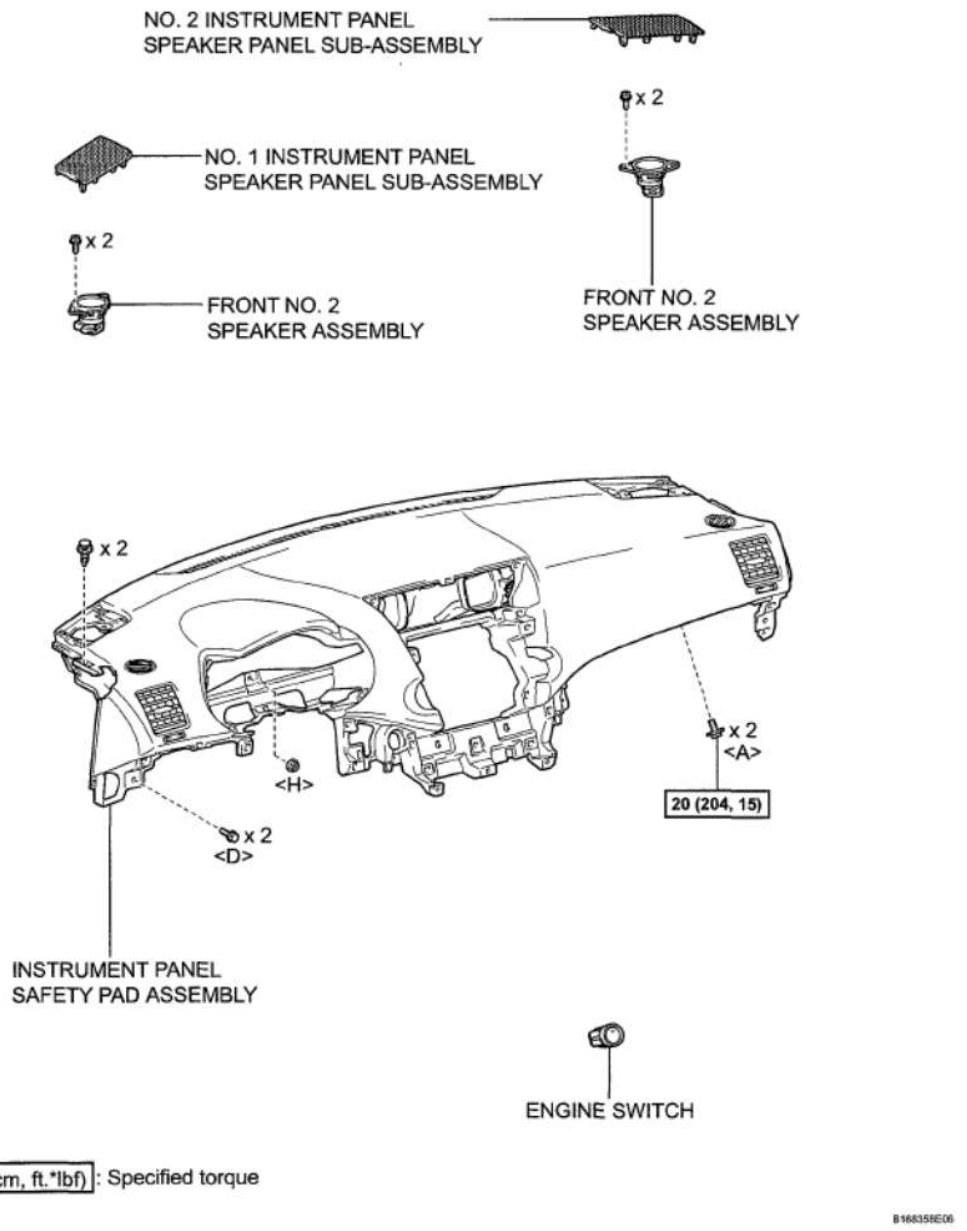


Fig. 87: Identifying ID Code Box Components With Torque Specification (8 Of 14)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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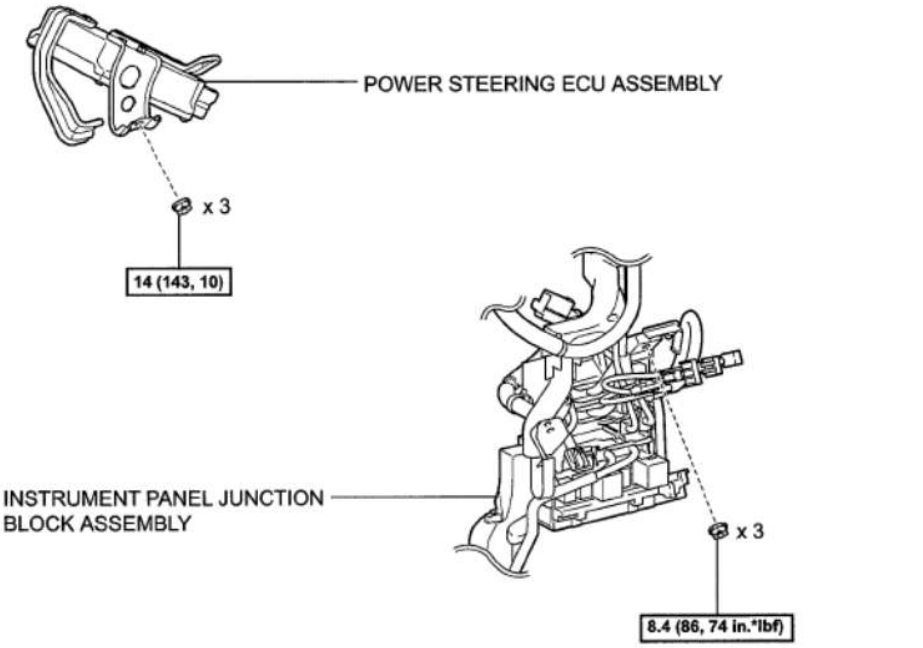


Fig. 88: Identifying ID Code Box Components With Torque Specification (9 Of 14)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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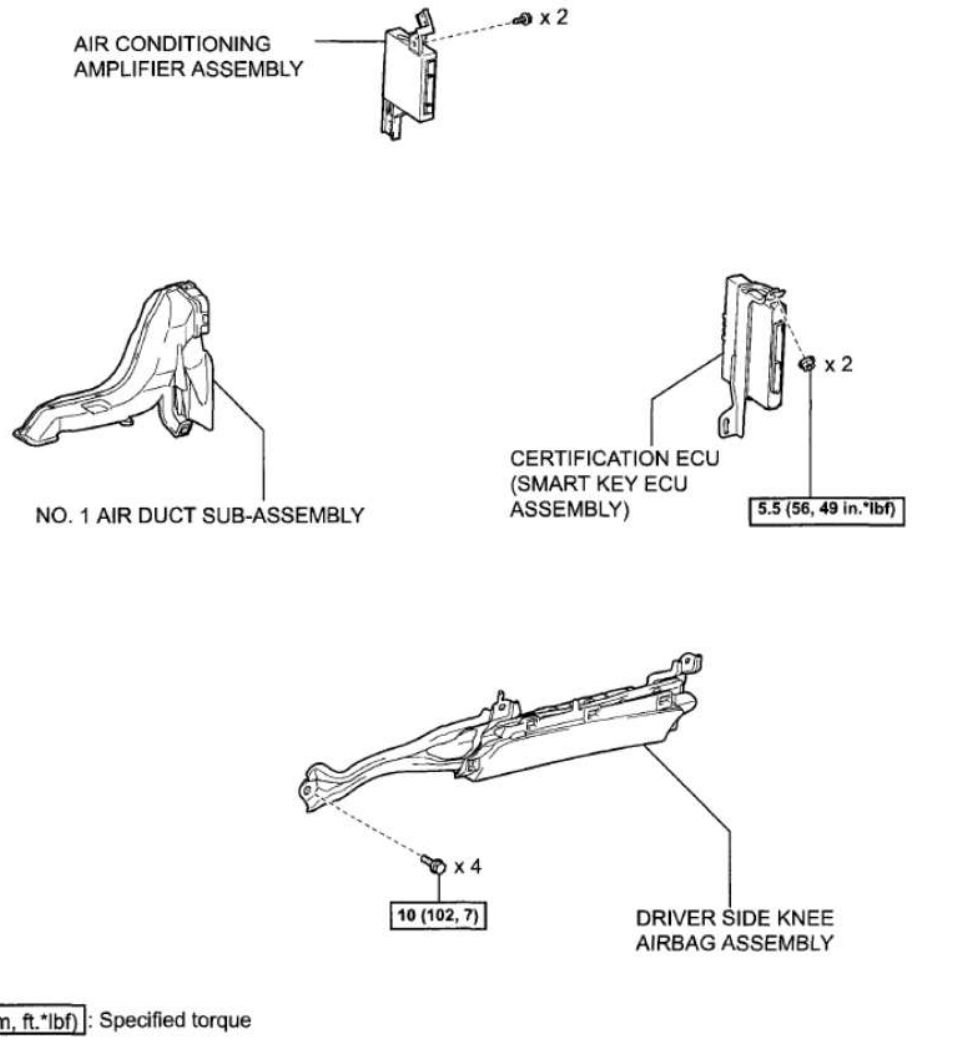


Fig. 89: Identifying ID Code Box Components With Torque Specification (10 Of 14)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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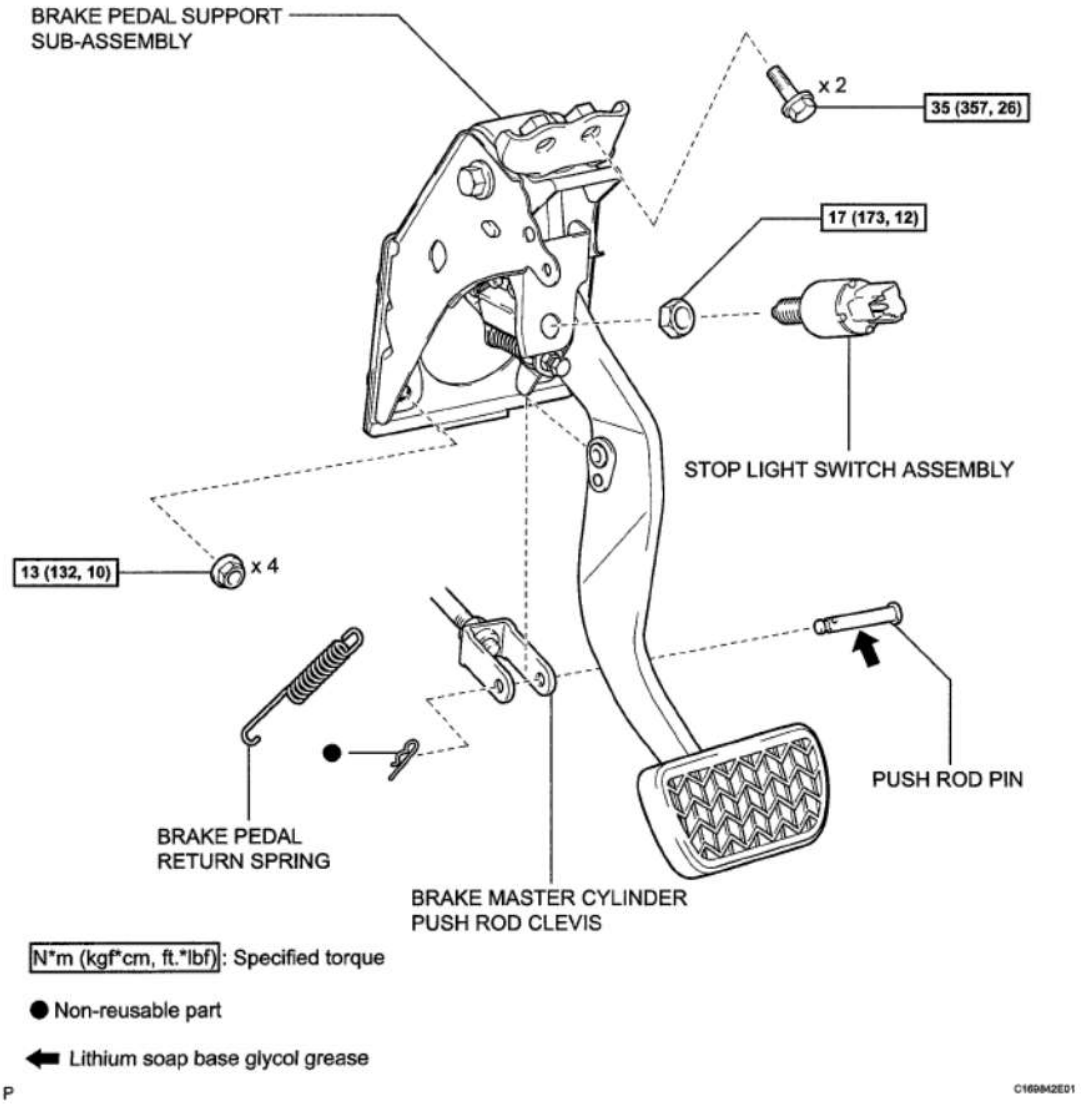


Fig. 90: Identifying ID Code Box Components With Torque Specification (11 Of 14)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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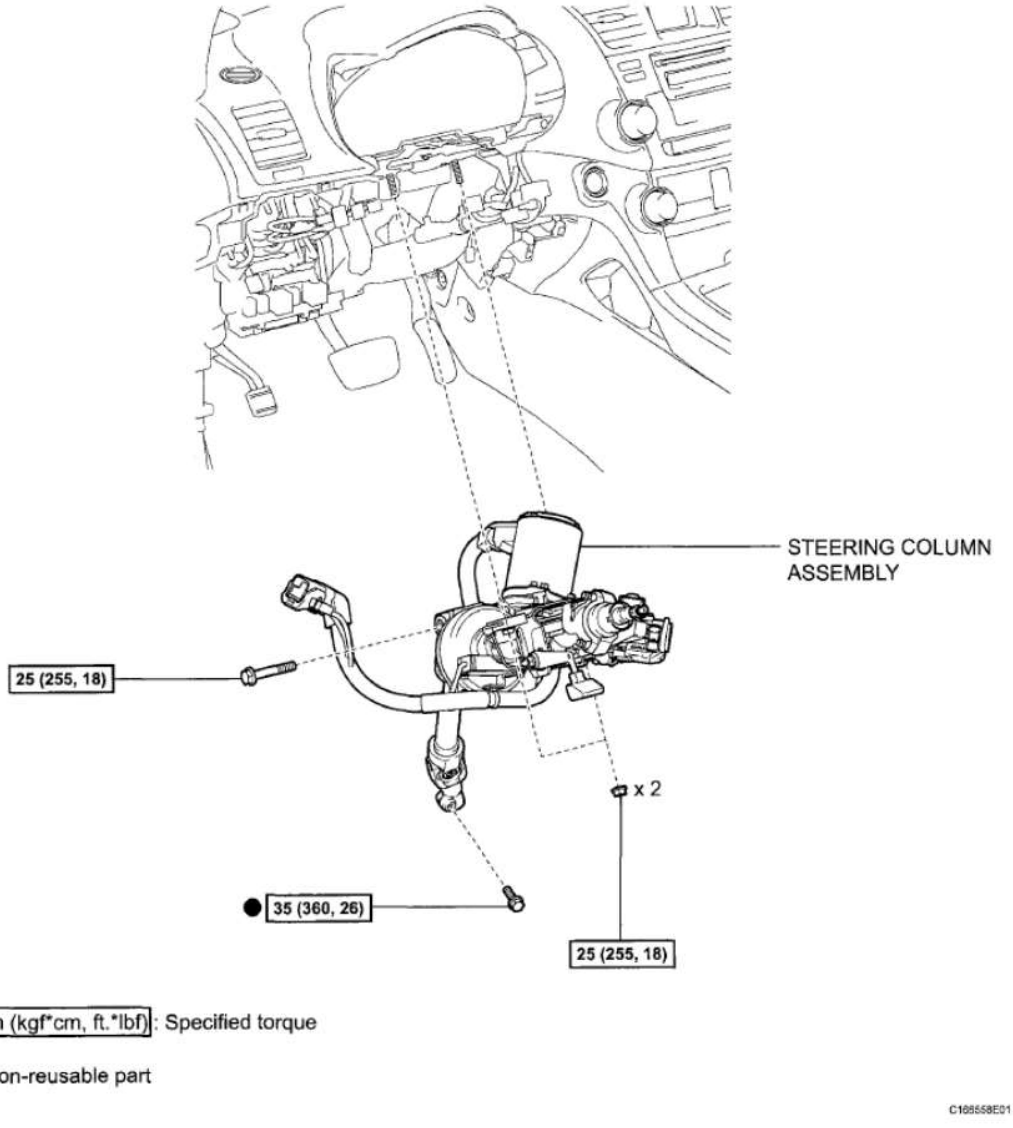


Fig. 91: Identifying ID Code Box Components With Torque Specification (12 Of 14)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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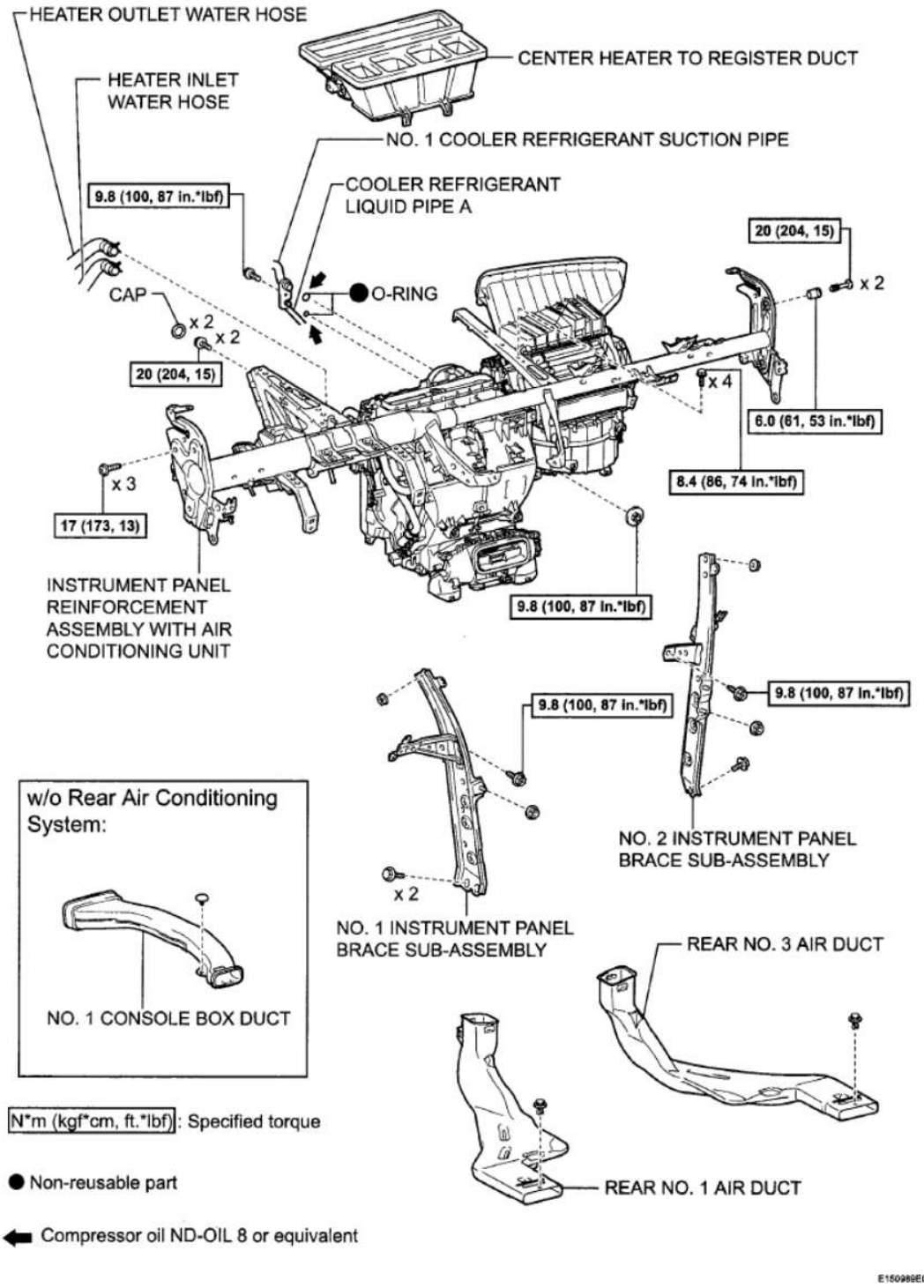


Fig. 92: Identifying ID Code Box Components With Torque Specification (13 Of 14)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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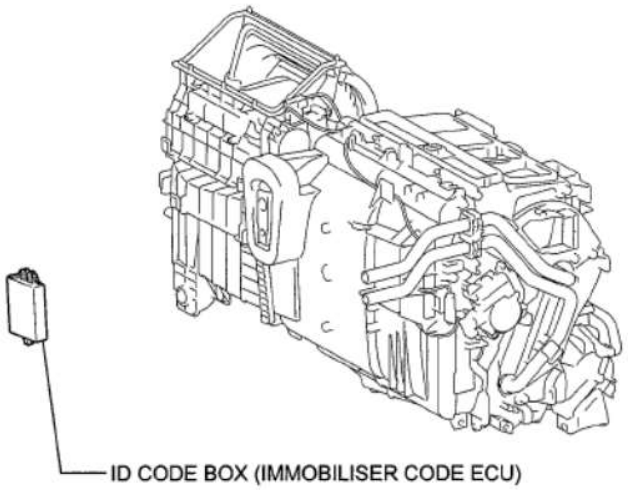


Fig. 93: Identifying ID Code Box Components With Torque Specification (14 Of 14)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

1. **PRECAUTION**

   (See **INSTRUMENT PANEL SAFETY PAD**)

2. **RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM** (See **REPLACEMENT**)
3. **POSITION FRONT WHEELS STRAIGHT AHEAD**
4. **REMOVE FRONT WHEEL LH**
5. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**

CAUTION: Wait for 90 seconds after disconnecting the terminal to prevent the airbag from deploying (See AIRBAG SYSTEM).

NOTE: When disconnecting the cable, some systems need to be initialized after the cable is reconnected (See INITIALIZATION).

6. **REMOVE FRONT WIPER ARM AND BLADE ASSEMBLY LH** (See **REMOVAL**)
7. **REMOVE FRONT WIPER ARM AND BLADE ASSEMBLY RH** (See **REMOVAL**)
8. **REMOVE COWL TOP VENTILATOR LOUVER SUB-ASSEMBLY** (See **REMOVAL**)
9. **REMOVE WINDSHIELD WIPER MOTOR AND LINK ASSEMBLY** (See **REMOVAL**)

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10. **REMOVE COWL TOP OUTER PANEL SUB-ASSEMBLY** (See **REMOVAL**)
11. **DISCONNECT HEATER WATER HOSE OUTLET** (See **REMOVAL**)
12. **DISCONNECT HEATER WATER HOSE INLET** (See **REMOVAL**)
13. **DISCONNECT COOLER REFRIGERANT LIQUID PIPE A** (See **REMOVAL**)
14. **DISCONNECT NO. 1 COOLER REFRIGERANT SUCTION PIPE** (See **REMOVAL**)
15. **REMOVE LOWER NO. 3 STEERING WHEEL COVER** (See **REMOVAL**)
16. **REMOVE LOWER NO. 2 STEERING WHEEL COVER** (See **REMOVAL**)
17. **REMOVE STEERING PAD** (See **REMOVAL**)
18. **REMOVE STEERING WHEEL ASSEMBLY** (See **DISASSEMBLY**)
19. **REMOVE STEERING COLUMN COVER** (See **REMOVAL**)
20. **REMOVE TURN SIGNAL SWITCH ASSEMBLY WITH SPIRAL CABLE SUB-ASSEMBLY** (See **REMOVAL**)
21. **REMOVE INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY** (See **REMOVAL**)
22. **REMOVE COMBINATION METER ASSEMBLY** (See **REMOVAL**)
23. **REMOVE CENTER INSTRUMENT PANEL REGISTER ASSEMBLY** (See **REMOVAL**)
24. **REMOVE CENTER INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY** (See **REMOVAL**)
25. **REMOVE HEATER CONTROL AND ACCESSORY ASSEMBLY (for Manual Air Conditioning System)** (See **AIR CONDITIONING PANEL (FOR MANUAL AIR CONDITIONING SYSTEM)**)
26. **REMOVE AIR CONDITIONING CONTROL ASSEMBLY (for Automatic Air Conditioning System)** (See **REMOVAL**)
27. **REMOVE RADIO RECEIVER ASSEMBLY WITH BRACKET (w/o Navigation System)** (See **REMOVAL**)
28. **REMOVE NAVIGATION RECEIVER ASSEMBLY WITH BRACKET (w/ Navigation System)** (See **REMOVAL**)
29. **REMOVE FRONT DOOR SCUFF PLATE LH** (See **REMOVAL**)
30. **REMOVE COWL SIDE TRIM SUB-ASSEMBLY LH** (See **REMOVAL**)
31. **REMOVE LOWER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (for Manual Air Conditioning System)** (See **REMOVAL**)
32. **REMOVE LOWER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (for Automatic Air Conditioning System)** (See **REMOVAL**)
33. **REMOVE FRONT DOOR SCUFF PLATE RH** (See **REMOVAL**)
34. **REMOVE COWL SIDE TRIM SUB-ASSEMBLY RH** (See **REMOVAL**)
35. **REMOVE NO. 2 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY** (See **REMOVAL**)
36. **REMOVE LOWER INSTRUMENT PANEL SUB-ASSEMBLY** (See **REMOVAL**)
37. **REMOVE UPPER CONSOLE PANEL SUB-ASSEMBLY** (See **REMOVAL**)
38. **REMOVE NO. 2 CONSOLE BOX DUCT (w/o Rear Air Conditioning System)** (See **REMOVAL**)
39. **REMOVE LOWER REAR CONSOLE BOX** (See **REMOVAL**)
40. **REMOVE CONSOLE BOX ASSEMBLY (w/o Rear Air Conditioning System)** (See **REMOVAL**)
41. **REMOVE CONSOLE BOX ASSEMBLY (w/ Rear Air Conditioning System)** (See

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DISASSEMBLY)

42. **REMOVE FRONT NO. 1 CONSOLE BOX INSERT** (See REMOVAL)
43. **REMOVE FRONT NO. 2 CONSOLE BOX INSERT** (See REMOVAL)
44. **REMOVE ENGINE SWITCH** (See INSPECTION)
45. **DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP LH** (See REMOVAL)
46. **REMOVE FRONT PILLAR GARNISH LH** (See REMOVAL)
47. **DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP RH** (See REMOVAL)
48. **REMOVE FRONT PILLAR GARNISH RH** (See REMOVAL)
49. **REMOVE NO. 1 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY** (See REMOVAL)
50. **REMOVE FRONT NO. 2 SPEAKER ASSEMBLY (for LH Side)** (See REMOVAL)
51. **REMOVE NO. 2 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY** (See REMOVAL)
52. **REMOVE FRONT NO. 2 SPEAKER ASSEMBLY (for RH Side)** (See REMOVAL)
53. **DISCONNECT INSTRUMENT PANEL WIRE ASSEMBLY** (See REMOVAL)
54. **REMOVE INSTRUMENT PANEL SAFETY PAD ASSEMBLY (for Pole Antenna Type)** (See REMOVAL)
55. **REMOVE INSTRUMENT PANEL SAFETY PAD ASSEMBLY (for Glass Antenna Type)** (See REMOVAL)
56. **REMOVE BRAKE PEDAL RETURN SPRING** (See REMOVAL)
57. **REMOVE STOP LIGHT SWITCH ASSEMBLY** (See INSPECTION)
58. **SEPARATE BRAKE MASTER CYLINDER PUSH ROD CLEVIS** (See REMOVAL)
59. **REMOVE BRAKE PEDAL SUPPORT SUB-ASSEMBLY** (See REMOVAL)
60. **REMOVE DRIVER SIDE KNEE AIRBAG ASSEMBLY** (See REMOVAL)
61. **REMOVE NO. 1 AIR DUCT SUB-ASSEMBLY** (See REMOVAL)
62. **SEPARATE STEERING INTERMEDIATE SHAFT SUB-ASSEMBLY** (See REMOVAL)
63. **REMOVE STEERING COLUMN ASSEMBLY** (See REMOVAL)
64. **DISCONNECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY** (See REMOVAL)
65. **REMOVE POWER STEERING ECU ASSEMBLY** (See INSTALLATION)
66. **REMOVE CERTIFICATION ECU (SMART KEY ECU ASSEMBLY)** (See REMOVAL)
67. **REMOVE AIR CONDITIONING AMPLIFIER ASSEMBLY** (See REMOVAL)
68. **REMOVE REAR NO. 1 AIR DUCT** (See REMOVAL)
69. **REMOVE REAR NO. 3 AIR DUCT** (See REMOVAL)
70. **REMOVE NO. 1 CONSOLE BOX DUCT (w/o Rear Air Conditioning System)** (See REMOVAL)
71. **REMOVE CENTER HEATER TO REGISTER DUCT** (See REMOVAL)
72. **REMOVE NO. 1 INSTRUMENT PANEL BRACE SUB-ASSEMBLY** (See REMOVAL)
73. **REMOVE NO. 2 INSTRUMENT PANEL BRACE SUB-ASSEMBLY** (See REMOVAL)
74. **REMOVE INSTRUMENT PANEL REINFORCEMENT ASSEMBLY WITH AIR CONDITIONING UNIT (w/o PTC Heater)** (See REMOVAL)

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75. **REMOVE INSTRUMENT PANEL REINFORCEMENT ASSEMBLY WITH AIR CONDITIONING UNIT (w/ PTC Heater)** (See **REMOVAL**)
76. **REMOVE ID CODE BOX (IMMOBILISER CODE ECU)**
    a. Disengage the 3 claws and remove the ID code box (Immobiliser Code ECU) as shown in the illustration.

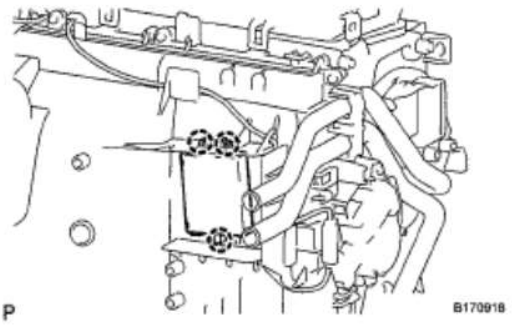


Fig. 94: Identifying ID Code Box (Immobiliser Code ECU) Claws
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSTALLATION

1. **INSTALL ID CODE BOX (IMMOBILISER CODE ECU)**
    a. Engage the 3 claws and install the ID code box (immobiliser code ECU) as shown in the illustration.
2. **INSTALL INSTRUMENT PANEL REINFORCEMENT ASSEMBLY WITH AIR CONDITIONING UNIT (w/o PTC Heater)** (See **INSTALLATION**)
3. **INSTALL INSTRUMENT PANEL REINFORCEMENT ASSEMBLY WITH AIR CONDITIONING UNIT (w/ PTC Heater)** (See **INSTALLATION**)
4. **INSTALL NO. 1 INSTRUMENT PANEL BRACE SUB-ASSEMBLY** (See **INSTALLATION**)

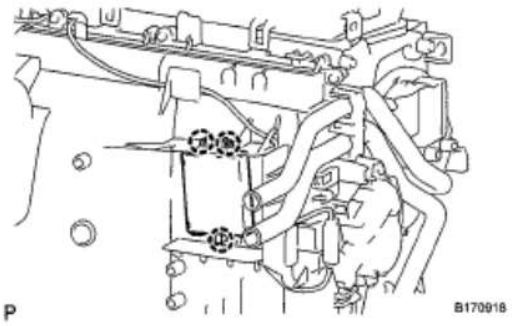


Fig. 95: Identifying ID Code Box (Immobiliser Code ECU) Claws
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

5. **INSTALL NO. 2 INSTRUMENT PANEL BRACE SUB-ASSEMBLY** (See **INSTALLATION**)
6. **INSTALL CENTER HEATER TO REGISTER DUCT** (See **INSTALLATION**)

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7. **INSTALL NO. 1 CONSOLE BOX DUCT (w/o Rear Air Conditioning System)** (See **INSTALLATION**)
8. **INSTALL REAR NO. 3 AIR DUCT** (See **INSTALLATION**)
9. **INSTALL REAR NO. 1 AIR DUCT** (See **INSTALLATION**)
10. **INSTALL AIR CONDITIONING AMPLIFIER ASSEMBLY** (See **REMOVAL**)
11. **INSTALL CERTIFICATION ECU (SMART KEY ECU ASSEMBLY)** (See **REMOVAL**)
12. **INSTALL POWER STEERING ECU ASSEMBLY** (See **INSTALLATION**)
13. **CONNECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY** (See **INSTALLATION**)
14. **INSTALL STEERING COLUMN ASSEMBLY** (See **INSTALLATION**)
15. **CONNECT STEERING INTERMEDIATE SHAFT SUB-ASSEMBLY** (See **INSTALLATION**)
16. **INSTALL NO. 1 AIR DUCT SUB-ASSEMBLY** (See **INSTALLATION**)
17. **INSTALL DRIVER SIDE KNEE AIRBAG ASSEMBLY** (See **INSTALLATION**)
18. **INSTALL BRAKE PEDAL SUPPORT SUB-ASSEMBLY** (See **INSTALLATION**)
19. **CONNECT BRAKE MASTER CYLINDER PUSH ROD CLEVIS** (See **INSTALLATION**)
20. **INSTALL BRAKE PEDAL RETURN SPRING** (See **INSTALLATION**)
21. **INSTALL STOP LIGHT SWITCH ASSEMBLY** (See **INSTALLATION**)
22. **INSPECT AND ADJUST BRAKE PEDAL HEIGHT** (See **ADJUSTMENT**)
23. **INSPECT BRAKE PEDAL FREE PLAY** (See **ADJUSTMENT**)
24. **INSPECT BRAKE PEDAL RESERVE DISTANCE** (See **ADJUSTMENT**)
25. **INSTALL INSTRUMENT PANEL SAFETY PAD ASSEMBLY (for Pole Antenna Type)** (See **INSTALLATION**)
26. **INSTALL INSTRUMENT PANEL SAFETY PAD ASSEMBLY (for Glass Antenna Type)** (See **INSTALLATION**)
27. **CONNECT INSTRUMENT PANEL WIRE ASSEMBLY** (See **INSTALLATION**)
28. **INSTALL FRONT NO. 2 SPEAKER ASSEMBLY (for RH Side)** (See **REMOVAL**)
29. **INSTALL NO. 2 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY** (See **INSTALLATION**)
30. **INSTALL FRONT NO. 2 SPEAKER ASSEMBLY (for LH Side)** (See **REMOVAL**)
31. **INSTALL NO. 1 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY** (See **INSTALLATION**)
32. **INSTALL FRONT PILLAR GARNISH RH** (See **INSTALLATION**)
33. **CONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP RH** (See **INSTALLATION**)
34. **INSTALL FRONT PILLAR GARNISH LH** (See **INSTALLATION**)
35. **CONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP LH** (See **INSTALLATION**)
36. **INSTALL ENGINE SWITCH** (See **INSTALLATION**)
37. **INSTALL FRONT NO. 2 CONSOLE BOX INSERT** (See **INSTALLATION**)
38. **INSTALL FRONT NO. 1 CONSOLE BOX INSERT** (See **INSTALLATION**)
39. **INSTALL CONSOLE BOX ASSEMBLY (w/o Rear Air Conditioning System)** (See **INSTALLATION**)

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40. **INSTALL CONSOLE BOX ASSEMBLY (w/ Rear Air Conditioning System)** (See **INSTALLATION**)
41. **INSTALL LOWER REAR CONSOLE BOX** (See **INSTALLATION**)
42. **INSTALL NO. 2 CONSOLE BOX DUCT (w/o Rear Air Conditioning System)** (See **INSTALLATION**)
43. **INSTALL UPPER CONSOLE PANEL SUB-ASSEMBLY** (See **INSTALLATION**)
44. **INSTALL LOWER INSTRUMENT PANEL SUB-ASSEMBLY** (See **INSTALLATION**)
45. **INSTALL NO. 2 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY** (See **INSTALLATION**)
46. **INSTALL COWL SIDE TRIM SUB-ASSEMBLY RH** (See **INSTALLATION**)
47. **INSTALL FRONT DOOR SCUFF PLATE RH** (See **INSTALLATION**)
48. **INSTALL LOWER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (for Manual Air Conditioning System)** (See **INSTALLATION**)
49. **INSTALL LOWER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (for Automatic Air Conditioning System)** (See **INSTALLATION**)
50. **INSTALL COWL SIDE TRIM SUB-ASSEMBLY LH** (See **INSTALLATION**)
51. **INSTALL FRONT DOOR SCUFF PLATE LH** (See **INSTALLATION**)
52. **INSTALL RADIO RECEIVER ASSEMBLY WITH BRACKET (w/o Navigation System)** (See **INSTALLATION**)
53. **INSTALL NAVIGATION RECEIVER ASSEMBLY WITH BRACKET (w/ Navigation System)** (See **INSTALLATION**)
54. **INSTALL HEATER CONTROL AND ACCESSORY ASSEMBLY (for Manual Air Conditioning System)** (See **AIR CONDITIONING PANEL (FOR MANUAL AIR CONDITIONING SYSTEM)**)
55. **INSTALL AIR CONDITIONING CONTROL ASSEMBLY (for Automatic Air Conditioning System)** (See **REMOVAL**)
56. **INSTALL CENTER INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY** (See **INSTALLATION**)
57. **INSTALL CENTER INSTRUMENT PANEL REGISTER ASSEMBLY** (See **INSTALLATION**)
58. **INSTALL COMBINATION METER ASSEMBLY** (See **REASSEMBLY**)
59. **INSTALL INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY** (See **REASSEMBLY**)
60. **POSITION FRONT WHEELS STRAIGHT AHEAD**
61. **INSTALL TURN SIGNAL SWITCH ASSEMBLY WITH SPIRAL CABLE SUB-ASSEMBLY** (See **INSTALLATION**)
62. **INSTALL STEERING COLUMN COVER** (See **INSTALLATION**)
63. **ADJUST SPIRAL CABLE** (See **INSTALLATION**)
64. **INSTALL STEERING WHEEL ASSEMBLY** (See **INSTALLATION**)
65. **INSPECT STEERING WHEEL CENTER POINT**
66. **INSTALL STEERING PAD** (See **INSTALLATION**)
67. **INSTALL LOWER NO. 2 STEERING WHEEL COVER** (See **INSTALLATION**)
68. **INSTALL LOWER NO. 3 STEERING WHEEL COVER** (See **INSTALLATION**)

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69. **INSTALL FRONT WHEEL LH** (See **INSTALLATION**)
70. **CONNECT COOLER REFRIGERANT LIQUID PIPE A** (See **INSTALLATION**)
71. **CONNECT NO. 1 COOLER REFRIGERANT SUCTION PIPE** (See **INSTALLATION**)
72. **CONNECT HEATER WATER HOSE INLET** (See **INSTALLATION**)
73. **CONNECT HEATER WATER HOSE OUTLET** (See **INSTALLATION**)
74. **INSTALL COWL TOP OUTER PANEL SUB-ASSEMBLY** (See **INSTALLATION**)
75. **INSTALL WINDSHIELD WIPER MOTOR AND LINK ASSEMBLY** (See **INSTALLATION**)
76. **INSTALL COWL TOP VENTILATOR LOUVER SUB-ASSEMBLY** (See **INSTALLATION**)
77. **INSTALL FRONT WIPER ARM AND BLADE ASSEMBLY RH** (See **INSTALLATION**)
78. **INSTALL FRONT WIPER ARM AND BLADE ASSEMBLY LH** (See **INSTALLATION**)
79. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

NOTE: **When disconnecting the cable, some systems need to be initialized after the cable is reconnected (See INITIALIZATION).**

80. **INSPECT STEERING PAD** (See **INSTALLATION**)
81. **INSPECT SRS WARNING LIGHT**

(See **DIAGNOSIS SYSTEM**)

82. **ADD ENGINE COOLANT** (See **REMOVAL**)
83. **INSPECT FOR COOLANT LEAK** (See **COOLING SYSTEM**)
84. **CHARGE WITH REFRIGERANT** (See **REPLACEMENT**)
85. **WARM UP ENGINE** (See **REPLACEMENT**)
86. **INSPECT FOR REFRIGERANT LEAK** (See **REPLACEMENT**)
87. **REGISTER ECU COMMUNICATION ID**

NOTE: **When replacing the ID code box (immobiliser code ECU), perform initialization (See REGISTRATION).**

88. **REGISTER KEY**

NOTE: **When replacing the ID code box (immobiliser code ECU), perform initialization (See REGISTRATION).**

TRANSPONDER KEY ECU (W/O SMART KEY SYSTEM)

COMPONENTS

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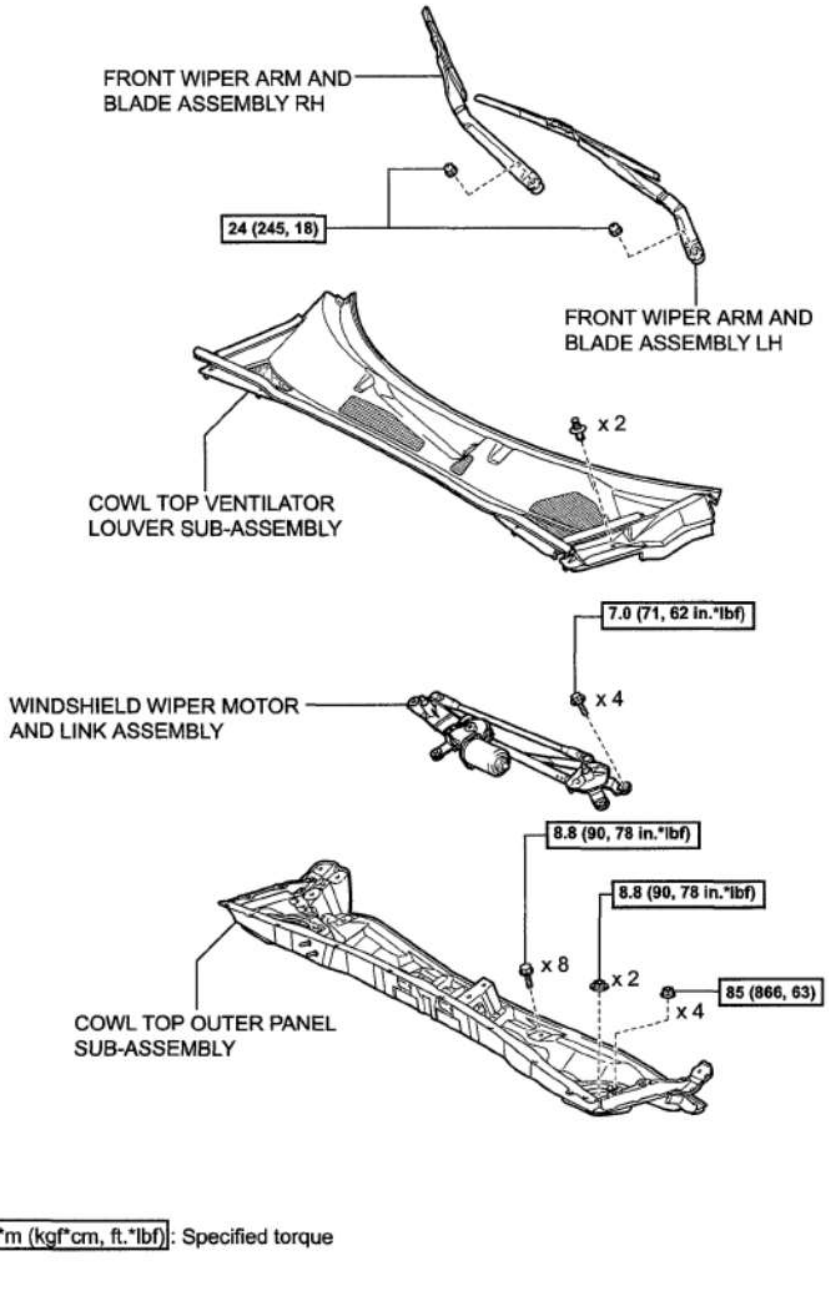


Fig. 96: Identifying Transponder Key ECU Components With Torque Specification (1 Of 14)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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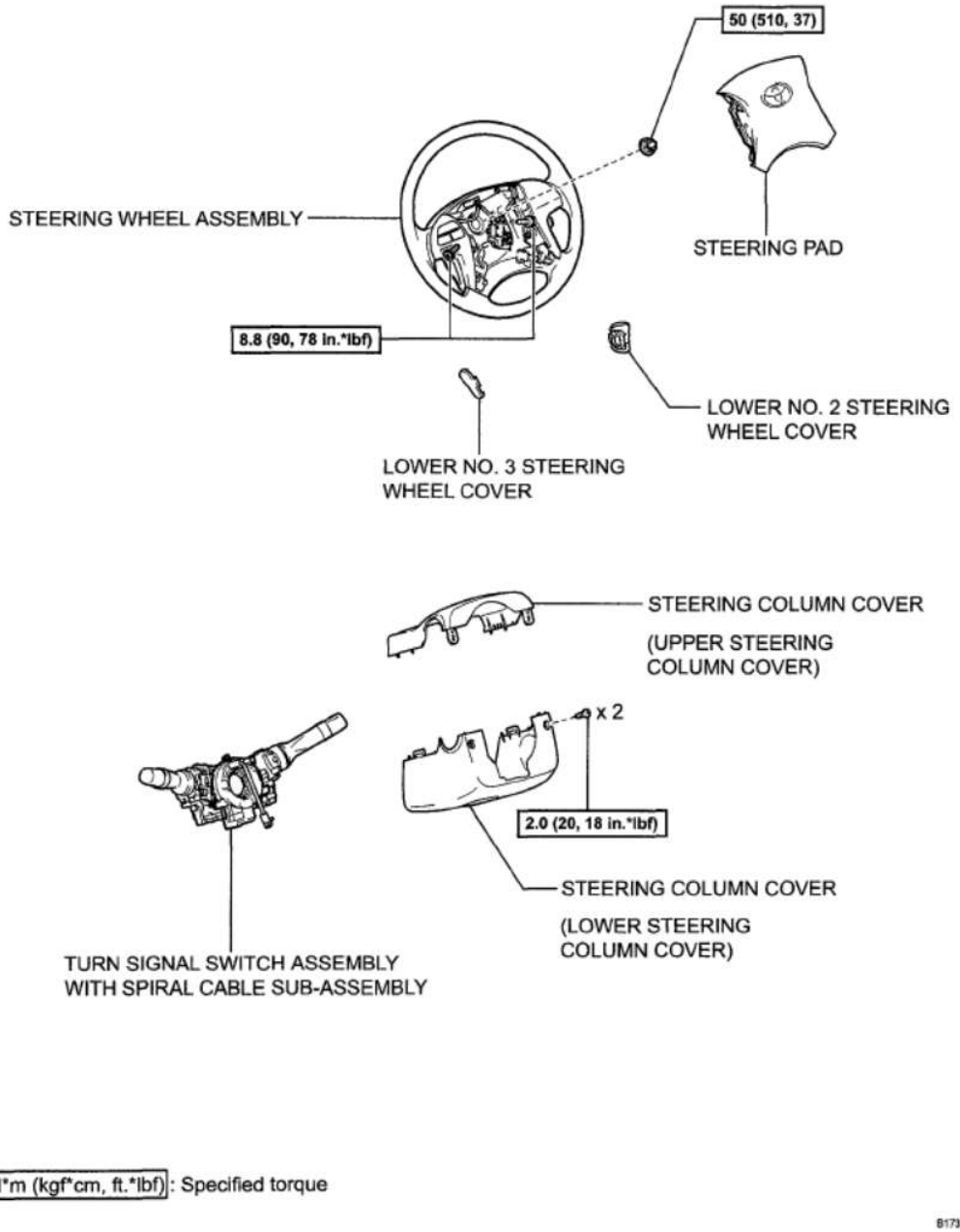


Fig. 97: Identifying Transponder Key ECU Components With Torque Specification (2 Of 14)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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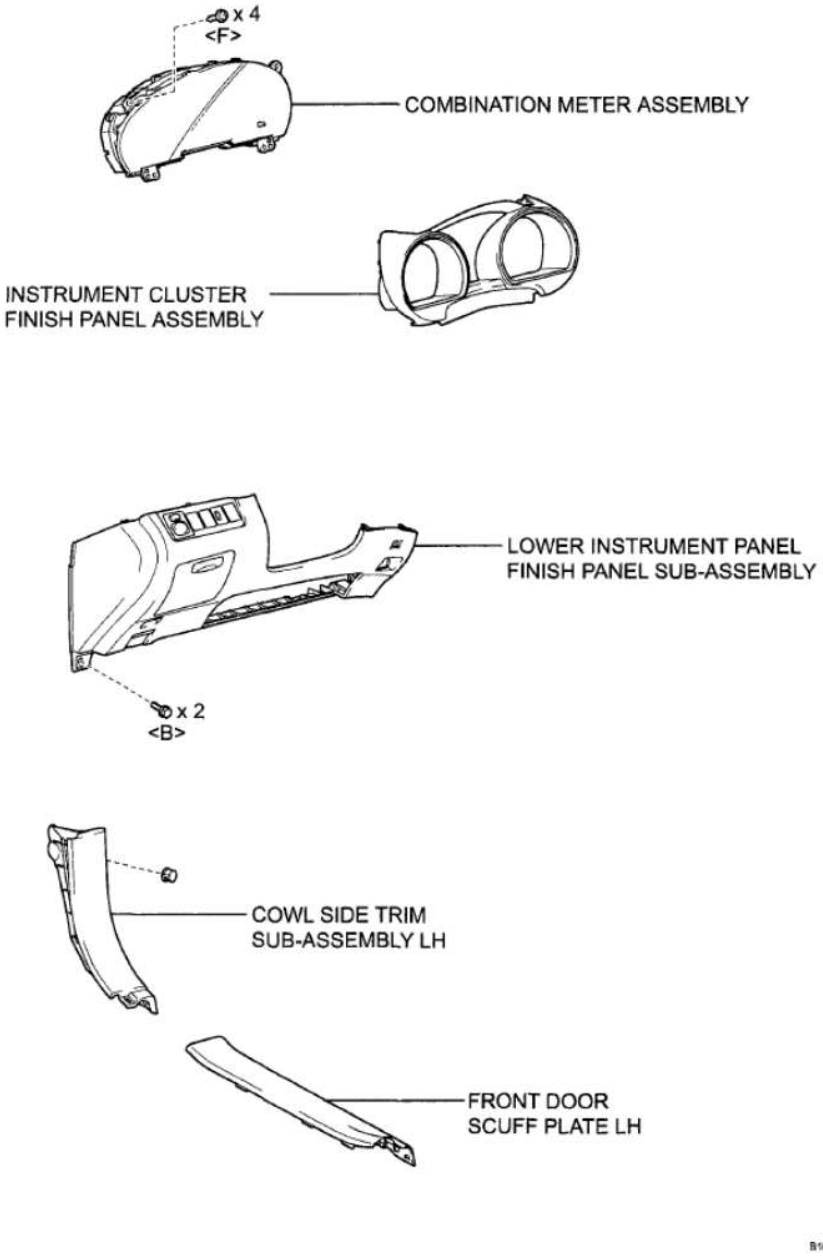


Fig. 98: Identifying Transponder Key ECU Components With Torque Specification (3 Of 14)
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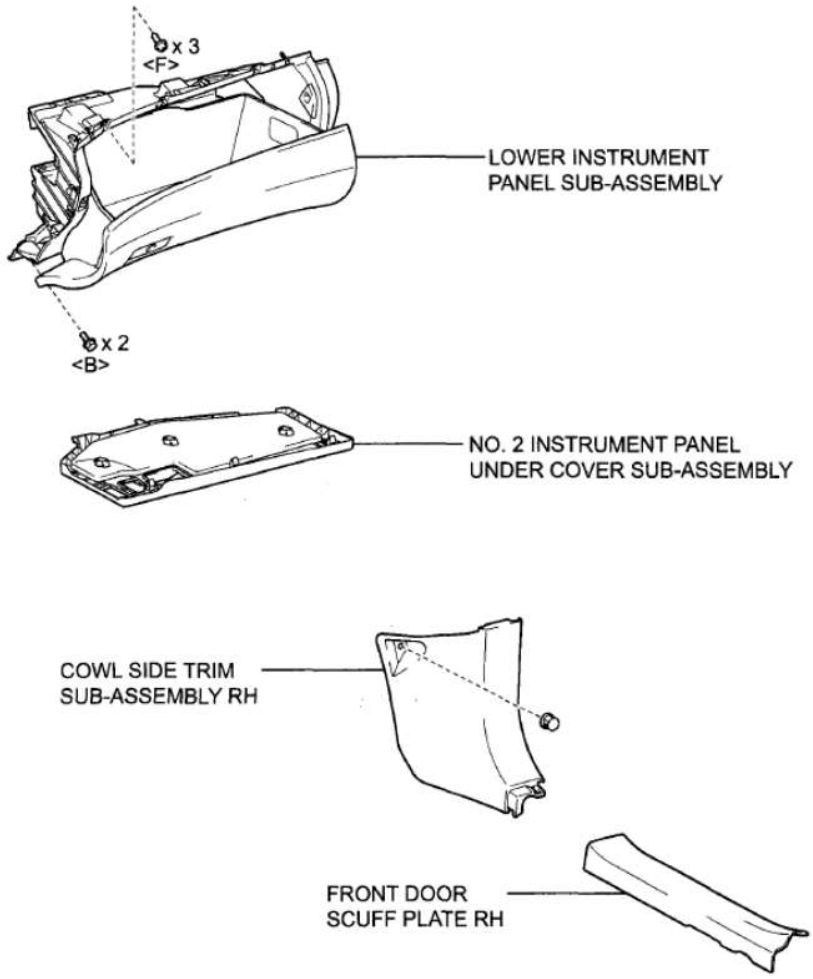


Fig. 99: Identifying Transponder Key ECU Components With Torque Specification (4 Of 14)
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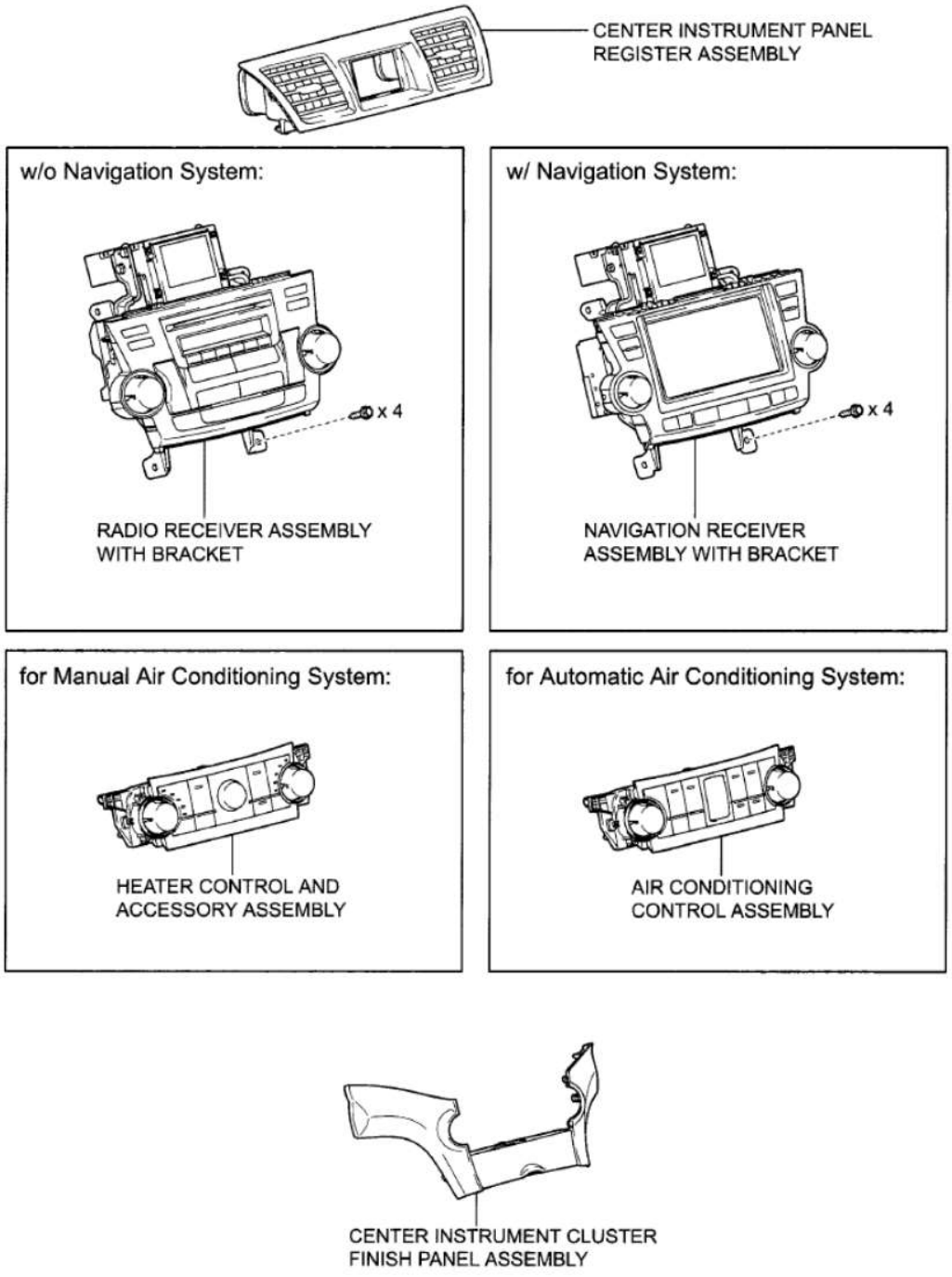


Fig. 100: Identifying Transponder Key ECU Components With Torque Specification (5 Of 14)
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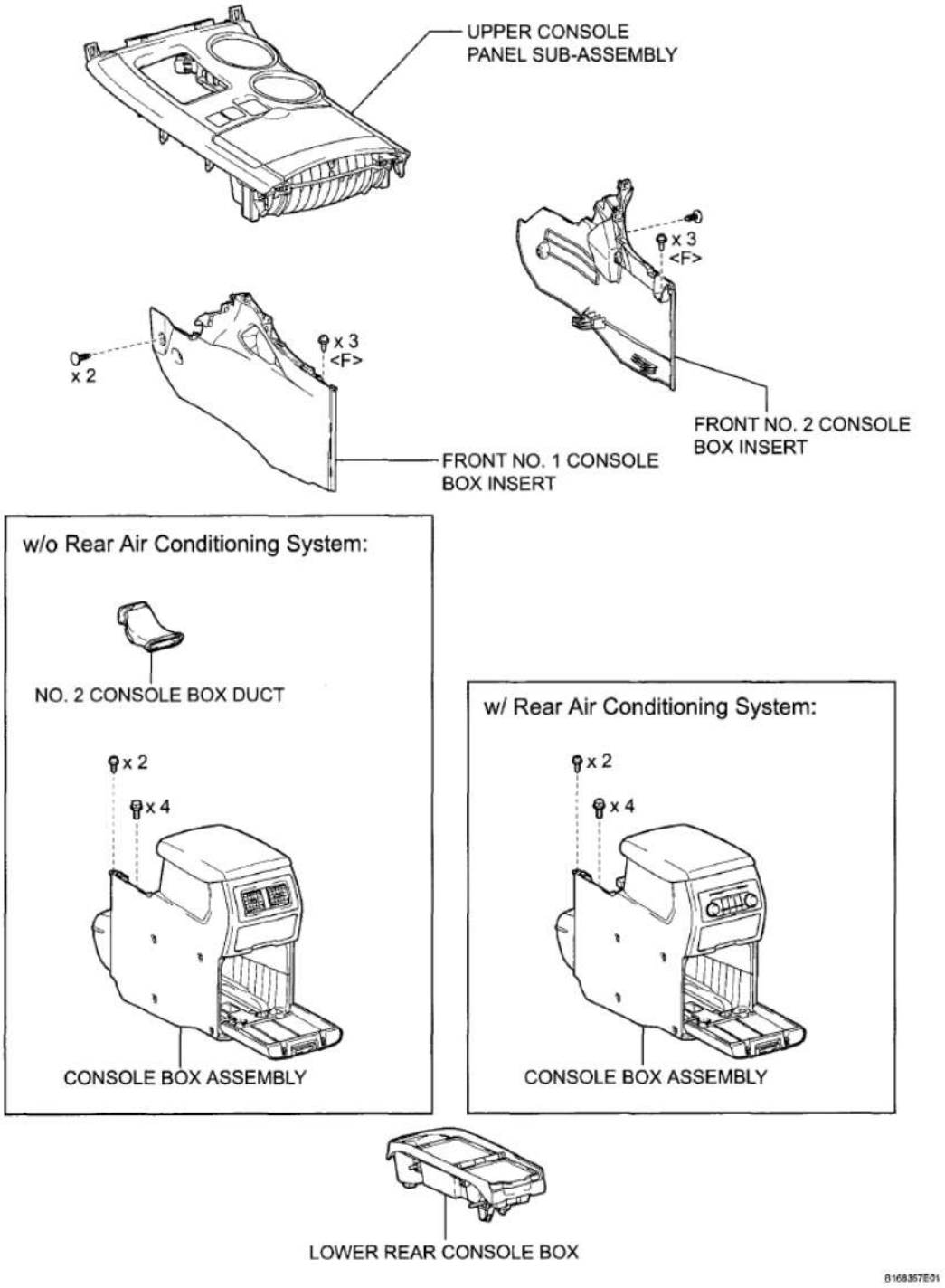


Fig. 101: Identifying Transponder Key ECU Components With Torque Specification (6 Of 14)
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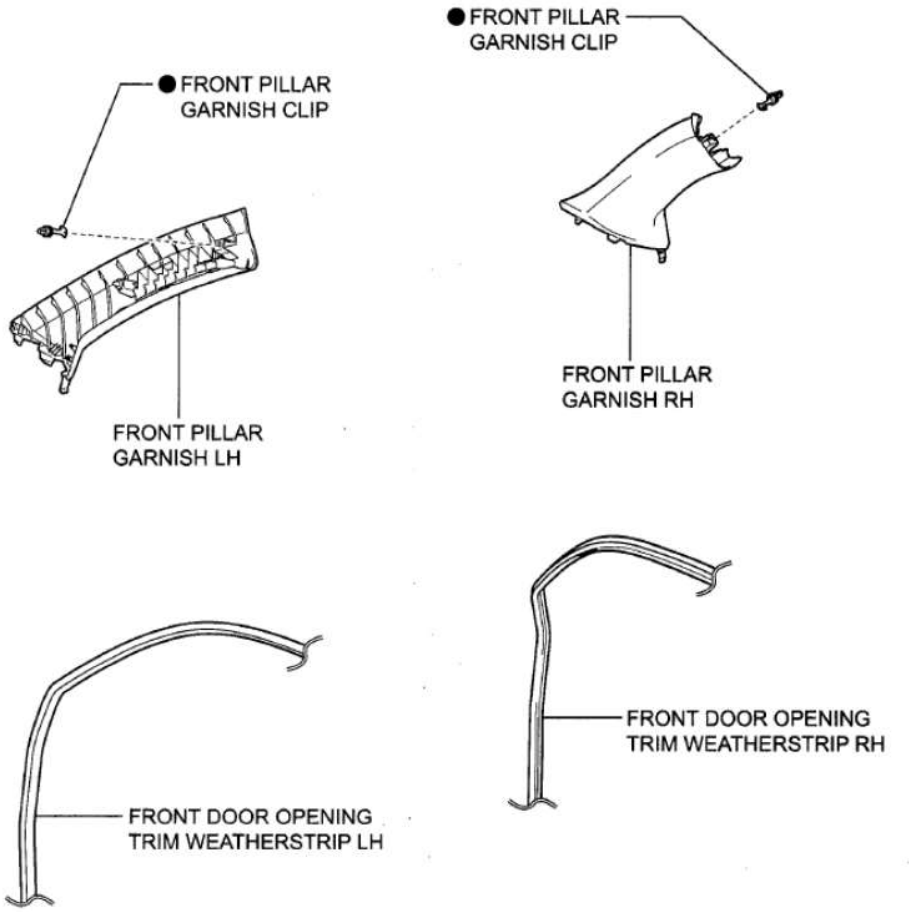
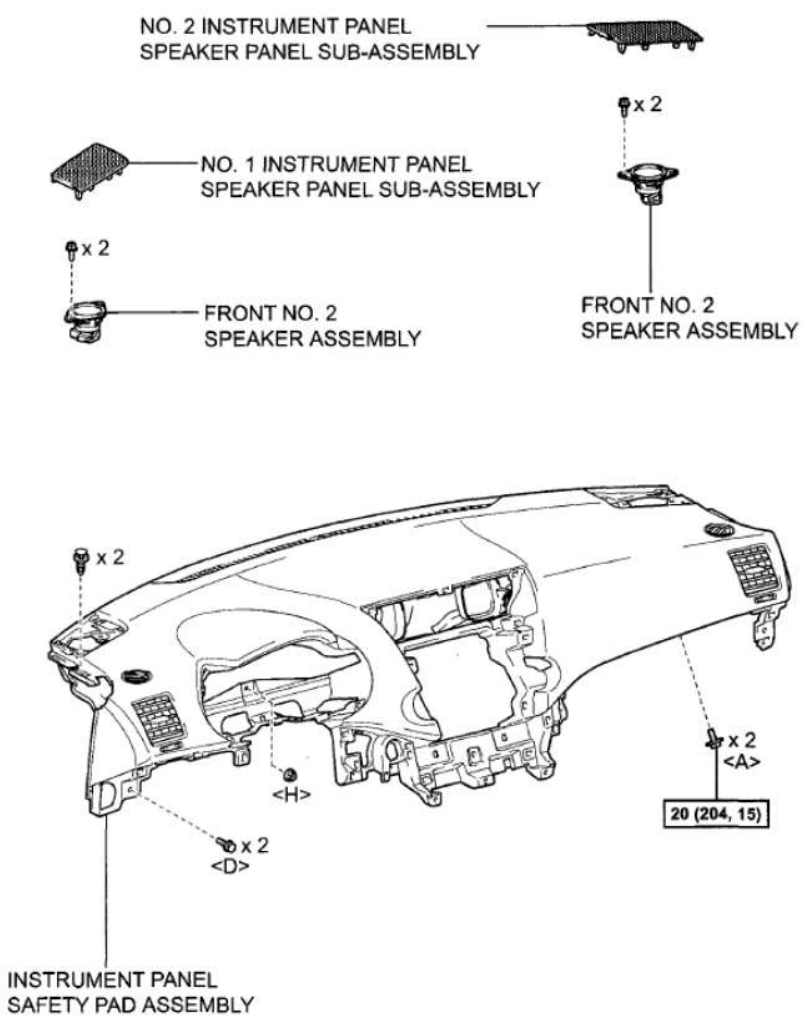


Fig. 102: Identifying Transponder Key ECU Components With Torque Specification (7 Of 14)
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N*m (kgf*cm, ft.*lbf): Specified torque

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Fig. 103: Identifying Transponder Key ECU Components With Torque Specification (8 Of 14)
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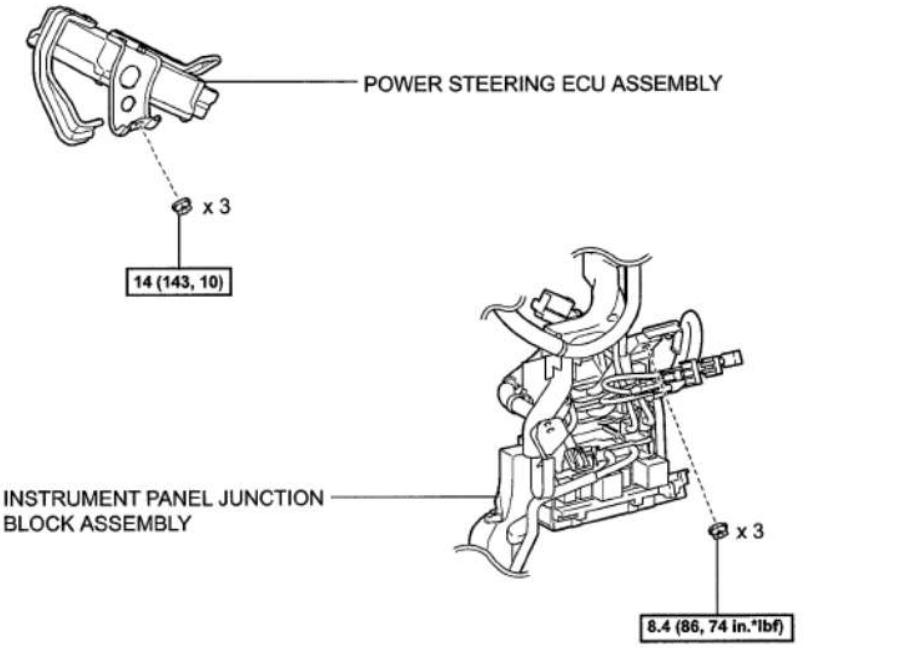


Fig. 104: Identifying Transponder Key ECU Components With Torque Specification (9 Of 14)
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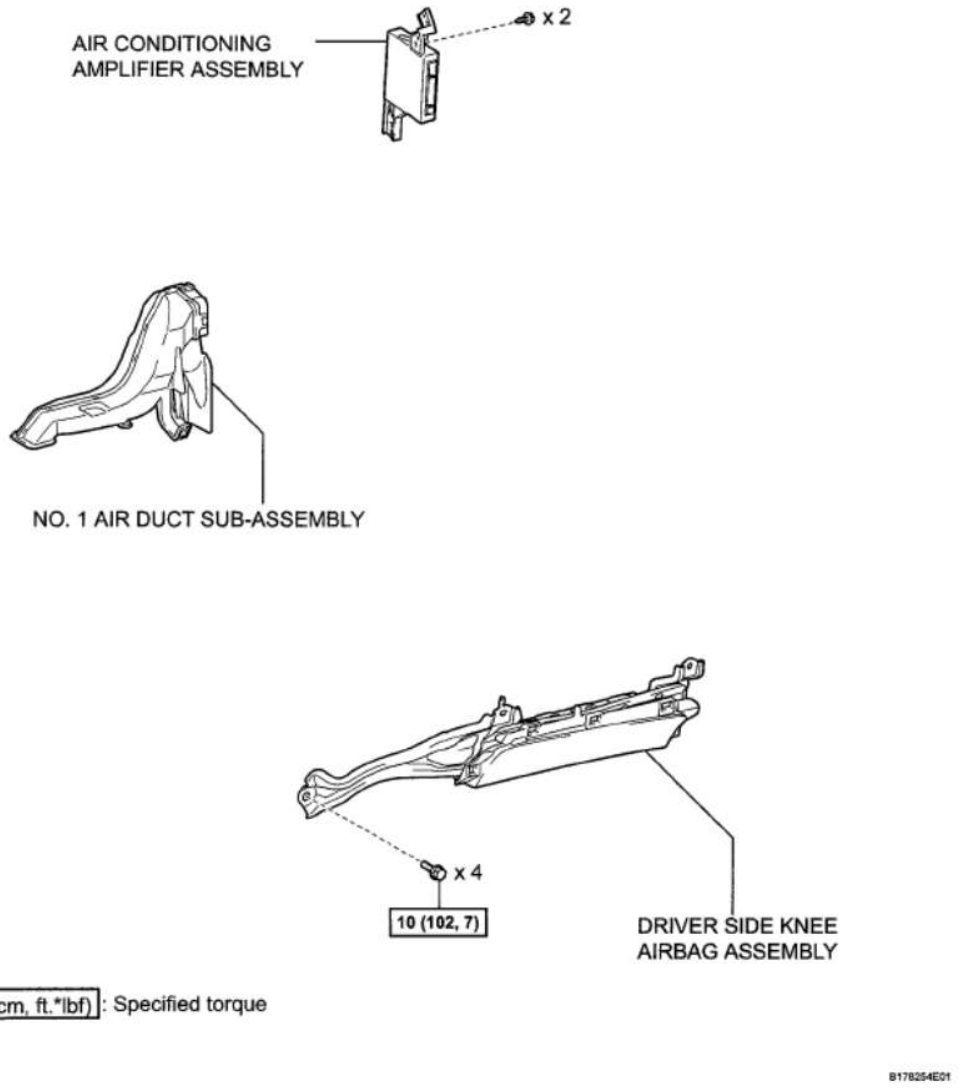


Fig. 105: Identifying Transponder Key ECU Components With Torque Specification (10 Of 14)
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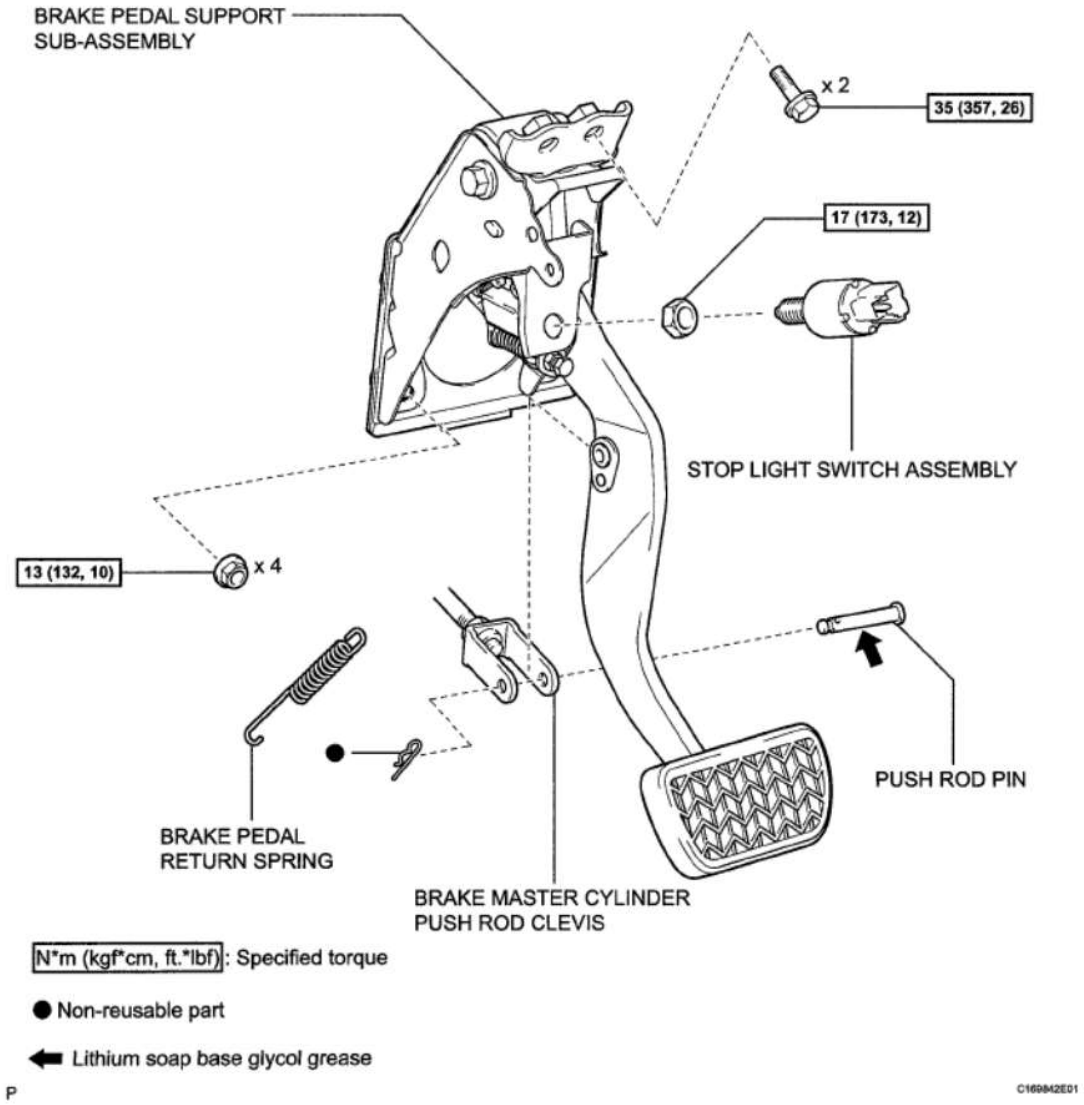


Fig. 106: Identifying Transponder Key ECU Components With Torque Specification (11 Of 14)
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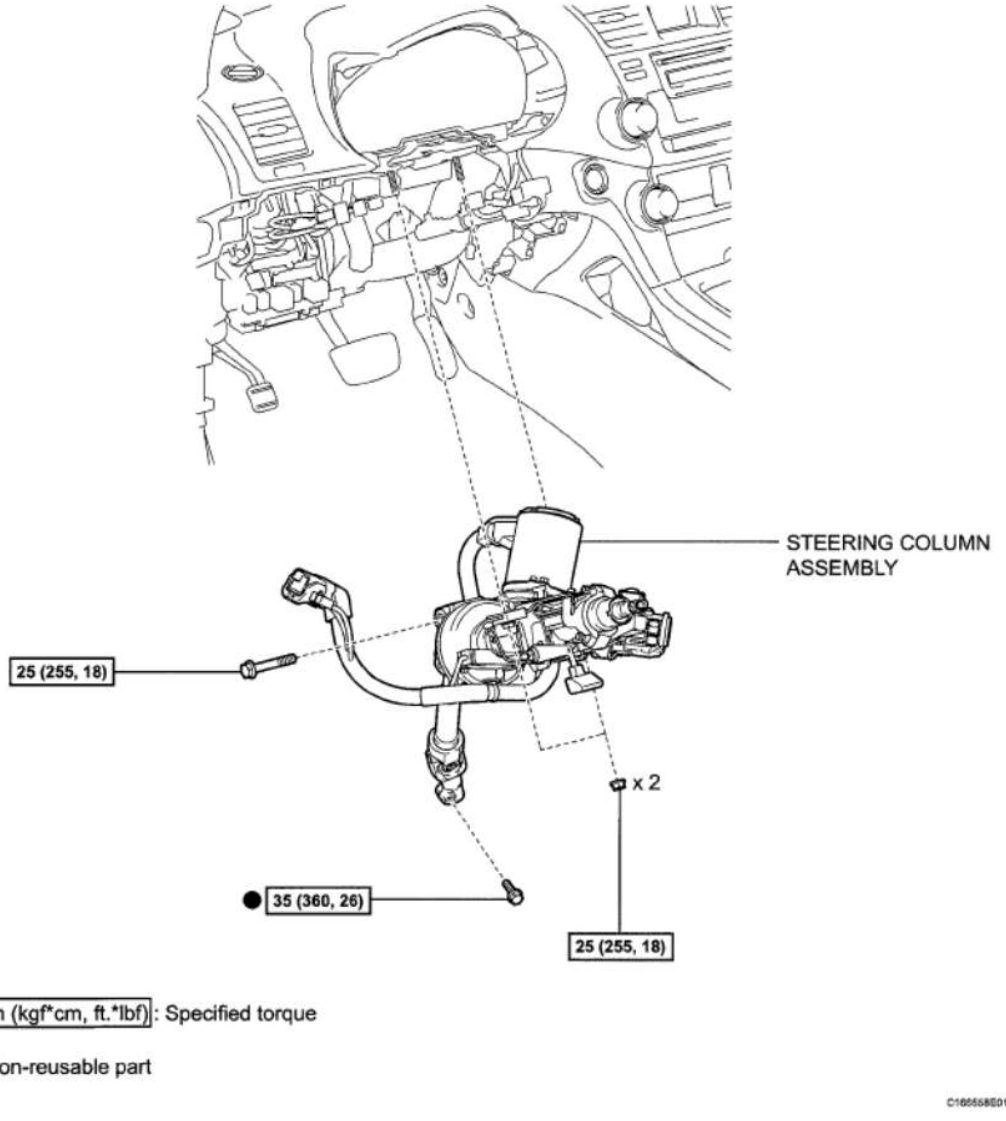


Fig. 107: Identifying Transponder Key ECU Components With Torque Specification (12 Of 14)
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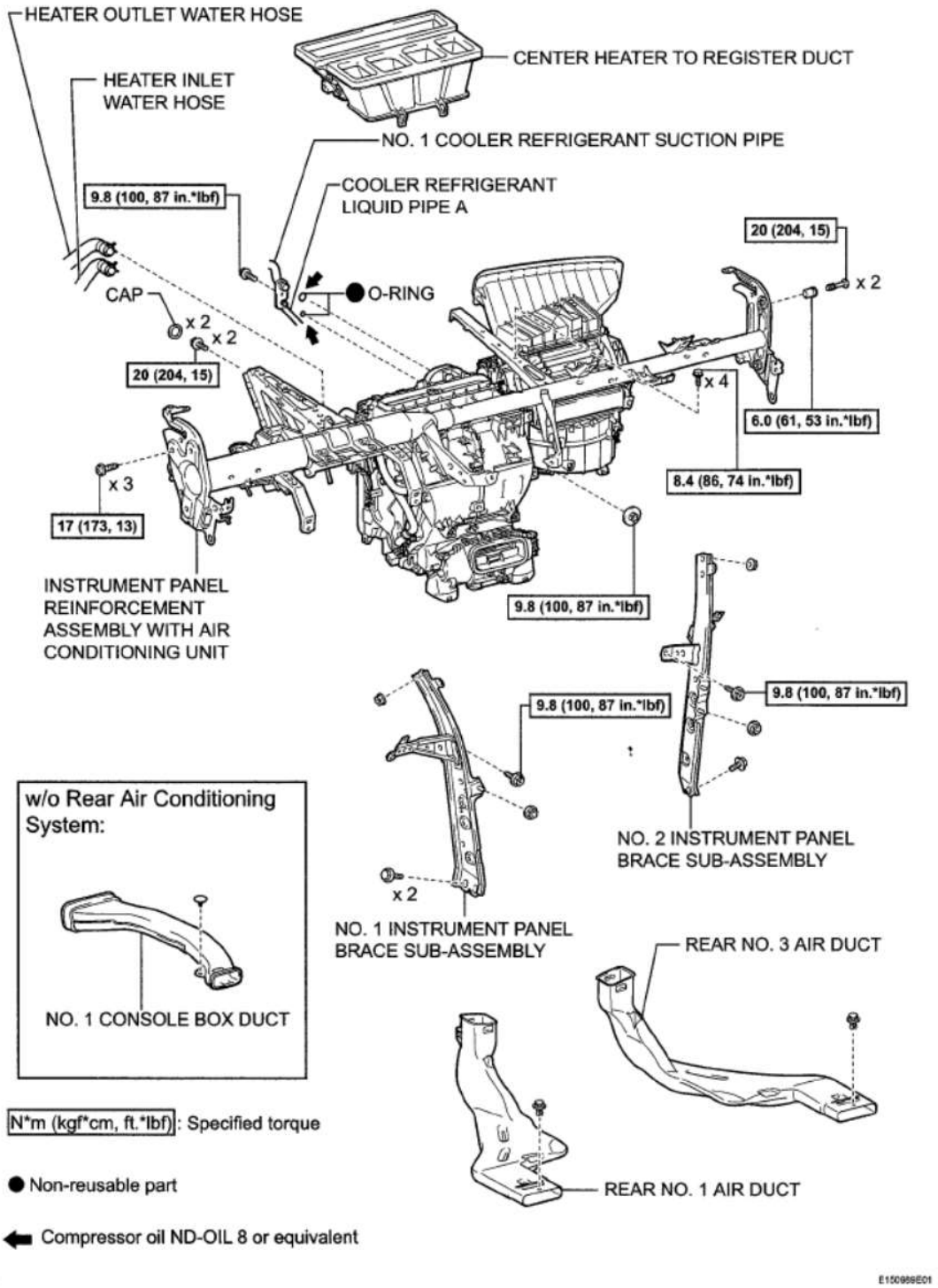
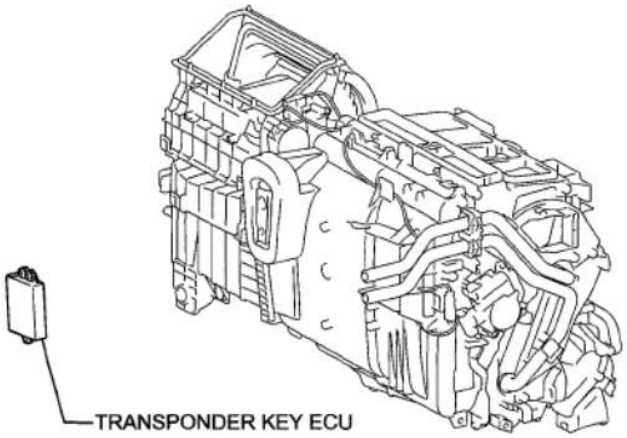


Fig. 108: Identifying Transponder Key ECU Components With Torque Specification (13 Of 14)
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Fig. 109: Identifying Transponder Key ECU Components With Torque Specification (14 Of 14)
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REMOVAL

1. **PRECAUTION**

   (See **INSTRUMENT PANEL SAFETY PAD**)

2. **RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM** (See **REPLACEMENT**)
3. **POSITION FRONT WHEELS STRAIGHT AHEAD**
4. **REMOVE FRONT WHEEL LH**
5. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**

CAUTION: Wait for 90 seconds after disconnecting the terminal to prevent the airbag from deploying (See AIRBAG SYSTEM).

NOTE: When disconnecting the cable, some systems need to be initialized after the cable is reconnected (See INITIALIZATION).

6. **REMOVE FRONT WIPER ARM AND BLADE ASSEMBLY LH** (See **REMOVAL**)
7. **REMOVE FRONT WIPER ARM AND BLADE ASSEMBLY RH** (See **REMOVAL**)
8. **REMOVE COWL TOP VENTILATOR LOUVER SUB-ASSEMBLY** (See **REMOVAL**)
9. **REMOVE WINDSHIELD WIPER MOTOR AND LINK ASSEMBLY** (See **REMOVAL**)

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10. **REMOVE COWL TOP OUTER PANEL SUB-ASSEMBLY** (See **REMOVAL**)
11. **DISCONNECT HEATER WATER HOSE OUTLET** (See **REMOVAL**)
12. **DISCONNECT HEATER WATER HOSE INLET** (See **REMOVAL**)
13. **DISCONNECT COOLER REFRIGERANT LIQUID PIPE A** (See **REMOVAL**)
14. **DISCONNECT NO. 1 COOLER REFRIGERANT SUCTION PIPE** (See **REMOVAL**)
15. **REMOVE LOWER NO. 3 STEERING WHEEL COVER** (See **REMOVAL**)
16. **REMOVE LOWER NO. 2 STEERING WHEEL COVER** (See **REMOVAL**)
17. **REMOVE STEERING PAD** (See **REMOVAL**)
18. **REMOVE STEERING WHEEL ASSEMBLY** (See **DISASSEMBLY**)
19. **REMOVE STEERING COLUMN COVER** (See **REMOVAL**)
20. **REMOVE TURN SIGNAL SWITCH ASSEMBLY WITH SPIRAL CABLE SUB-ASSEMBLY** (See **REMOVAL**)
21. **REMOVE INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY** (See **REMOVAL**)
22. **REMOVE COMBINATION METER ASSEMBLY** (See **REMOVAL**)
23. **REMOVE CENTER INSTRUMENT PANEL REGISTER ASSEMBLY** (See **REMOVAL**)
24. **REMOVE CENTER INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY** (See **REMOVAL**)
25. **REMOVE HEATER CONTROL AND ACCESSORY ASSEMBLY (for Manual Air Conditioning System)** (See **AIR CONDITIONING PANEL (FOR MANUAL AIR CONDITIONING SYSTEM)**)
26. **REMOVE AIR CONDITIONING CONTROL ASSEMBLY (for Automatic Air Conditioning System)** (See **REMOVAL**)
27. **REMOVE RADIO RECEIVER ASSEMBLY WITH BRACKET (w/o Navigation System)** (See **REMOVAL**)
28. **REMOVE NAVIGATION RECEIVER ASSEMBLY WITH BRACKET (w/ Navigation System)** (See **REMOVAL**)
29. **REMOVE FRONT DOOR SCUFF PLATE LH** (See **REMOVAL**)
30. **REMOVE COWL SIDE TRIM SUB-ASSEMBLY LH** (See **REMOVAL**)
31. **REMOVE LOWER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (for Manual Air Conditioning System)** (See **REMOVAL**)
32. **REMOVE LOWER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (for Automatic Air Conditioning System)** (See **REMOVAL**)
33. **REMOVE FRONT DOOR SCUFF PLATE RH** (See **REMOVAL**)
34. **REMOVE COWL SIDE TRIM SUB-ASSEMBLY RH** (See **REMOVAL**)
35. **REMOVE NO. 2 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY** (See **REMOVAL**)
36. **REMOVE LOWER INSTRUMENT PANEL SUB-ASSEMBLY** (See **REMOVAL**)
37. **REMOVE UPPER CONSOLE PANEL SUB-ASSEMBLY** (See **REMOVAL**)
38. **REMOVE NO. 2 CONSOLE BOX DUCT (w/o Rear Air Conditioning System)** (See **REMOVAL**)
39. **REMOVE LOWER REAR CONSOLE BOX** (See **REMOVAL**)
40. **REMOVE CONSOLE BOX ASSEMBLY (w/o Rear Air Conditioning System)** (See **REMOVAL**)
41. **REMOVE CONSOLE BOX ASSEMBLY (w/ Rear Air Conditioning System)** (See

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DISASSEMBLY)

42. **REMOVE FRONT NO. 1 CONSOLE BOX INSERT** (See **REMOVAL**)
43. **REMOVE FRONT NO. 2 CONSOLE BOX INSERT** (See **REMOVAL**)
44. **DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP LH** (See **REMOVAL**)
45. **REMOVE FRONT PILLAR GARNISH LH** (See **REMOVAL**)
46. **DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP RH** (See **REMOVAL**)
47. **REMOVE FRONT PILLAR GARNISH RH** (See **REMOVAL**)
48. **REMOVE NO. 1 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY** (See **REMOVAL**)
49. **REMOVE FRONT NO. 2 SPEAKER ASSEMBLY (for LH Side)** (See **REMOVAL**)
50. **REMOVE NO. 2 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY** (See **REMOVAL**)
51. **REMOVE FRONT NO. 2 SPEAKER ASSEMBLY (for RH Side)** (See **REMOVAL**)
52. **DISCONNECT INSTRUMENT PANEL WIRE ASSEMBLY** (See **REMOVAL**)
53. **REMOVE INSTRUMENT PANEL SAFETY PAD ASSEMBLY (for Pole Antenna Type)** (See **REMOVAL**)
54. **REMOVE INSTRUMENT PANEL SAFETY PAD ASSEMBLY (for Glass Antenna Type)** (See **REMOVAL**)
55. **REMOVE BRAKE PEDAL RETURN SPRING** (See **REMOVAL**)
56. **REMOVE STOP LIGHT SWITCH ASSEMBLY** (See **INSPECTION**)
57. **SEPARATE BRAKE MASTER CYLINDER PUSH ROD CLEVIS** (See **REMOVAL**)
58. **REMOVE BRAKE PEDAL SUPPORT SUB-ASSEMBLY** (See **REMOVAL**)
59. **REMOVE DRIVER SIDE KNEE AIRBAG ASSEMBLY** (See **REMOVAL**)
60. **REMOVE NO. 1 AIR DUCT SUB-ASSEMBLY** (See **REMOVAL**)
61. **SEPARATE STEERING INTERMEDIATE SHAFT SUB-ASSEMBLY** (See **REMOVAL**)
62. **REMOVE STEERING COLUMN ASSEMBLY** (See **REMOVAL**)
63. **DISCONNECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY** (See **REMOVAL**)
64. **REMOVE POWER STEERING ECU ASSEMBLY** (See **INSTALLATION**)
65. **REMOVE AIR CONDITIONING AMPLIFIER ASSEMBLY** (See **REMOVAL**)
66. **REMOVE REAR NO. 1 AIR DUCT** (See **REMOVAL**)
67. **REMOVE REAR NO. 3 AIR DUCT** (See **REMOVAL**)
68. **REMOVE NO. 1 CONSOLE BOX DUCT (w/o Rear Air Conditioning System)** (See **REMOVAL**)
69. **REMOVE CENTER HEATER TO REGISTER DUCT** (See **REMOVAL**)
70. **REMOVE NO. 1 INSTRUMENT PANEL BRACE SUB-ASSEMBLY** (See **REMOVAL**)
71. **REMOVE NO. 2 INSTRUMENT PANEL BRACE SUB-ASSEMBLY** (See **REMOVAL**)
72. **REMOVE INSTRUMENT PANEL REINFORCEMENT ASSEMBLY WITH AIR CONDITIONING UNIT (w/o PTC Heater)** (See **REMOVAL**)
73. **REMOVE INSTRUMENT PANEL REINFORCEMENT ASSEMBLY WITH AIR CONDITIONING UNIT (w/ PTC Heater)** (See **REMOVAL**)

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74. **REMOVE TRANSPONDER KEY ECU**
    a. Disengage the 3 claws and remove the transponder key ECU as shown in the illustration.

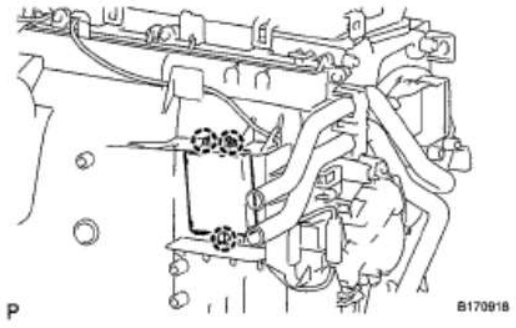


Fig. 110: Identifying Transponder Key ECU Claws
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSTALLATION

1. **INSTALL TRANSPONDER KEY ECU**
    a. Engage the 3 claws and install the transponder key ECU as shown in the illustration.
2. **INSTALL INSTRUMENT PANEL REINFORCEMENT ASSEMBLY WITH AIR CONDITIONING UNIT (w/o PTC Heater)** (See **INSTALLATION**)
3. **INSTALL INSTRUMENT PANEL REINFORCEMENT ASSEMBLY WITH AIR CONDITIONING UNIT (w/ PTC Heater)** (See **INSTALLATION**)

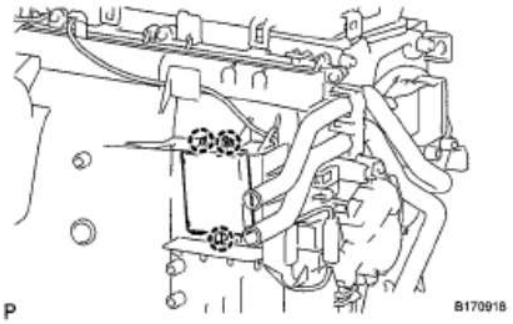


Fig. 111: Identifying Transponder Key ECU Claws
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. **INSTALL NO. 1 INSTRUMENT PANEL BRACE SUB-ASSEMBLY** (See **INSTALLATION**)
5. **INSTALL NO. 2 INSTRUMENT PANEL BRACE SUB-ASSEMBLY** (See **INSTALLATION**)
6. **INSTALL CENTER HEATER TO REGISTER DUCT** (See **INSTALLATION**)
7. **INSTALL NO. 1 CONSOLE BOX DUCT (w/o Rear Air Conditioning System)** (See **INSTALLATION**)
8. **INSTALL REAR NO. 3 AIR DUCT** (See **INSTALLATION**)
9. **INSTALL REAR NO. 1 AIR DUCT** (See **INSTALLATION**)

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10. **INSTALL AIR CONDITIONING AMPLIFIER ASSEMBLY** (See **REMOVAL**)
11. **INSTALL POWER STEERING ECU ASSEMBLY** (See **INSTALLATION**)
12. **CONNECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY** (See **INSTALLATION**)
13. **INSTALL STEERING COLUMN ASSEMBLY** (See **INSTALLATION**)
14. **CONNECT STEERING INTERMEDIATE SHAFT SUB-ASSEMBLY** (See **INSTALLATION**)
15. **INSTALL NO. 1 AIR DUCT SUB-ASSEMBLY** (See **INSTALLATION**)
16. **INSTALL DRIVER SIDE KNEE AIRBAG ASSEMBLY** (See **INSTALLATION**)
17. **INSTALL BRAKE PEDAL SUPPORT SUB-ASSEMBLY** (See **INSTALLATION**)
18. **CONNECT BRAKE MASTER CYLINDER PUSH ROD CLEVIS** (See **INSTALLATION**)
19. **INSTALL BRAKE PEDAL RETURN SPRING** (See **INSTALLATION**)
20. **INSTALL STOP LIGHT SWITCH ASSEMBLY** (See **INSTALLATION**)
21. **INSPECT AND ADJUST BRAKE PEDAL HEIGHT** (See **ADJUSTMENT**)
22. **INSPECT BRAKE PEDAL FREE PLAY** (See **ADJUSTMENT**)
23. **INSPECT BRAKE PEDAL RESERVE DISTANCE** (See **ADJUSTMENT**)
24. **INSTALL INSTRUMENT PANEL SAFETY PAD ASSEMBLY (for Pole Antenna Type)** (See **INSTALLATION**)
25. **INSTALL INSTRUMENT PANEL SAFETY PAD ASSEMBLY (for Glass Antenna Type)** (See **INSTALLATION**)
26. **CONNECT INSTRUMENT PANEL WIRE ASSEMBLY** (See **INSTALLATION**)
27. **INSTALL FRONT NO. 2 SPEAKER ASSEMBLY (for RH Side)** (See **REMOVAL**)
28. **INSTALL NO. 2 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY** (See **INSTALLATION**)
29. **INSTALL FRONT NO. 2 SPEAKER ASSEMBLY (for LH Side)** (See **REMOVAL**)
30. **INSTALL NO. 1 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY** (See **INSTALLATION**)
31. **INSTALL FRONT PILLAR GARNISH RH** (See **INSTALLATION**)
32. **CONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP RH** (See **INSTALLATION**)
33. **INSTALL FRONT PILLAR GARNISH LH** (See **INSTALLATION**)
34. **CONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP LH** (See **INSTALLATION**)
35. **INSTALL FRONT NO. 2 CONSOLE BOX INSERT** (See **INSTALLATION**)
36. **INSTALL FRONT NO. 1 CONSOLE BOX INSERT** (See **INSTALLATION**)
37. **INSTALL CONSOLE BOX ASSEMBLY (w/o Rear Air Conditioning System)** (See **INSTALLATION**)
38. **INSTALL CONSOLE BOX ASSEMBLY (w/ Rear Air Conditioning System)** (See **INSTALLATION**)
39. **INSTALL LOWER REAR CONSOLE BOX** (See **INSTALLATION**)
40. **INSTALL NO. 2 CONSOLE BOX DUCT (w/o Rear Air Conditioning System)** (See **INSTALLATION**)
41. **INSTALL UPPER CONSOLE PANEL SUB-ASSEMBLY** (See **INSTALLATION**)

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42. **INSTALL LOWER INSTRUMENT PANEL SUB-ASSEMBLY** (See **INSTALLATION**)
43. **INSTALL NO. 2 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY** (See **INSTALLATION**)
44. **INSTALL COWL SIDE TRIM SUB-ASSEMBLY RH** (See **INSTALLATION**)
45. **INSTALL FRONT DOOR SCUFF PLATE RH** (See **INSTALLATION**)
46. **INSTALL LOWER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (for Manual Air Conditioning System)** (See **INSTALLATION**)
47. **INSTALL LOWER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (for Automatic Air Conditioning System)** (See **INSTALLATION**)
48. **INSTALL COWL SIDE TRIM SUB-ASSEMBLY LH** (See **INSTALLATION**)
49. **INSTALL FRONT DOOR SCUFF PLATE LH** (See **INSTALLATION**)
50. **INSTALL RADIO RECEIVER ASSEMBLY WITH BRACKET (w/o Navigation System)** (See **INSTALLATION**)
51. **INSTALL NAVIGATION RECEIVER ASSEMBLY WITH BRACKET (w/ Navigation System)** (See **INSTALLATION**)
52. **INSTALL HEATER CONTROL AND ACCESSORY ASSEMBLY (for Manual Air Conditioning System)** (See **AIR CONDITIONING PANEL (FOR MANUAL AIR CONDITIONING SYSTEM)**)
53. **INSTALL AIR CONDITIONING CONTROL ASSEMBLY (for Automatic Air Conditioning System)** (See **REMOVAL**)
54. **INSTALL CENTER INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY** (See **INSTALLATION**)
55. **INSTALL CENTER INSTRUMENT PANEL REGISTER ASSEMBLY** (See **INSTALLATION**)
56. **INSTALL COMBINATION METER ASSEMBLY** (See **REASSEMBLY**)
57. **INSTALL INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY** (See **REASSEMBLY**)
58. **POSITION FRONT WHEELS STRAIGHT AHEAD**
59. **INSTALL TURN SIGNAL SWITCH ASSEMBLY WITH SPIRAL CABLE SUB-ASSEMBLY** (See **INSTALLATION**)
60. **INSTALL STEERING COLUMN COVER** (See **INSTALLATION**)
61. **ADJUST SPIRAL CABLE** (See **INSTALLATION**)
62. **INSTALL STEERING WHEEL ASSEMBLY** (See **INSTALLATION**)
63. **INSPECT STEERING WHEEL CENTER POINT**
64. **INSTALL STEERING PAD** (See **INSTALLATION**)
65. **INSTALL LOWER NO. 2 STEERING WHEEL COVER** (See **INSTALLATION**)
66. **INSTALL LOWER NO. 3 STEERING WHEEL COVER** (See **INSTALLATION**)
67. **INSTALL FRONT WHEEL LH** (See **INSTALLATION**)
68. **CONNECT COOLER REFRIGERANT LIQUID PIPE A** (See **INSTALLATION**)
69. **CONNECT NO. 1 COOLER REFRIGERANT SUCTION PIPE** (See **INSTALLATION**)
70. **CONNECT HEATER WATER HOSE INLET** (See **INSTALLATION**)
71. **CONNECT HEATER WATER HOSE OUTLET** (See **INSTALLATION**)
72. **INSTALL COWL TOP OUTER PANEL SUB-ASSEMBLY** (See **INSTALLATION**)

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73. **INSTALL WINDSHIELD WIPER MOTOR AND LINK ASSEMBLY** (See **INSTALLATION**)
74. **INSTALL COWL TOP VENTILATOR LOUVER SUB-ASSEMBLY** (See **INSTALLATION**)
75. **INSTALL FRONT WIPER ARM AND BLADE ASSEMBLY RH** (See **INSTALLATION**)
76. **INSTALL FRONT WIPER ARM AND BLADE ASSEMBLY LH** (See **INSTALLATION**)
77. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

NOTE: **When disconnecting the cable, some systems need to be initialized after the cable is reconnected (See INITIALIZATION).**

78. **INSPECT STEERING PAD** (See **INSTALLATION**)
79. **INSPECT SRS WARNING LIGHT**

(See **DIAGNOSIS SYSTEM**)

80. **ADD ENGINE COOLANT** (See **REMOVAL**)
81. **INSPECT FOR COOLANT LEAK** (See **COOLING SYSTEM**)
82. **CHARGE WITH REFRIGERANT** (See **REPLACEMENT**)
83. **WARM UP ENGINE** (See **REPLACEMENT**)
84. **INSPECT FOR REFRIGERANT LEAK** (See **REPLACEMENT**)
85. **REGISTER ECU COMMUNICATION ID**

NOTE: **When replacing the transponder key ECU, perform initialization (See REGISTRATION).**

86. **REGISTER KEY**

NOTE: **When replacing the transponder key ECU, perform initialization (See REGISTRATION).**

CERTIFICATION ECU (W/ SMART KEY SYSTEM)

COMPONENTS

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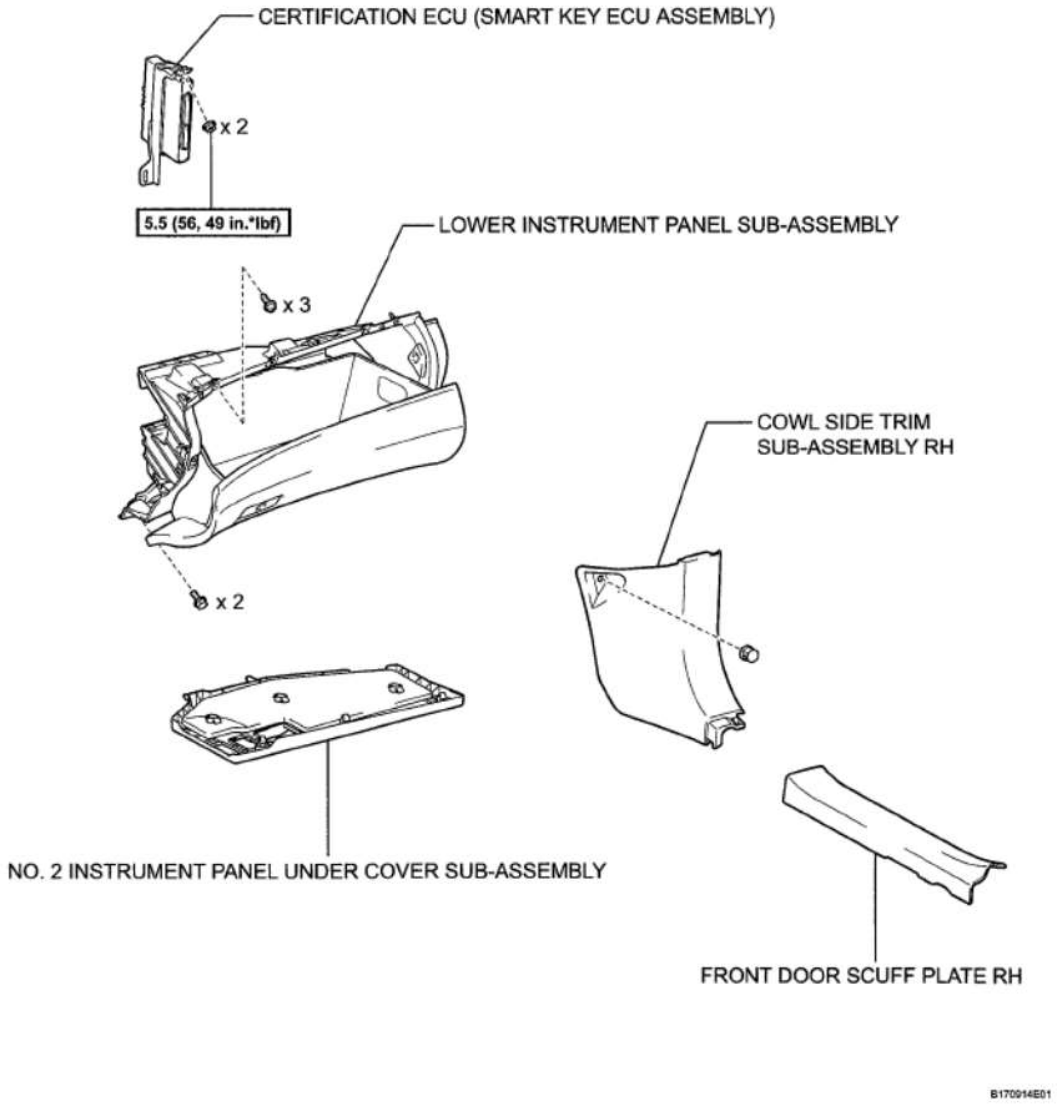


Fig. 112: Identifying Certification ECU Components With Torque Specification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

1. **REMOVE FRONT DOOR SCUFF PLATE RH** (See **REMOVAL**)
2. **REMOVE COWL SIDE TRIM SUB-ASSEMBLY RH** (See **REMOVAL**)
3. **REMOVE NO. 2 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY** (See **REMOVAL**)
4. **REMOVE LOWER INSTRUMENT PANEL SUB-ASSEMBLY** (See **REMOVAL**)
5. **REMOVE CERTIFICATION ECU (SMART KEY ECU ASSEMBLY)**
   a. Disconnect the connectors.
   b. Remove the 2 nuts and the certification ECU (smart key ECU assembly).

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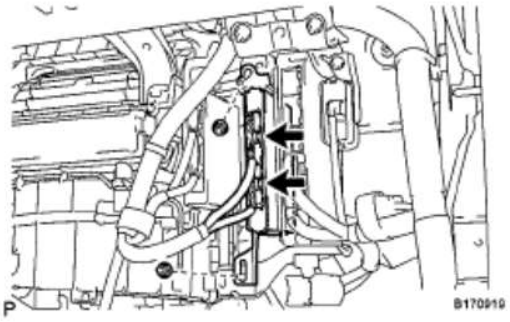


Fig. 113: Locating Certification ECU Connectors
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSTALLATION

1. **INSTALL CERTIFICATION ECU (SMART KEY ECU ASSEMBLY)**
   a. Install the certification ECU (smart key ECU assembly) with the 2 nuts.

      Torque: 5.5 N*m (56 kgf*cm, 49 in.*lbf)

   b. Connect the connectors.

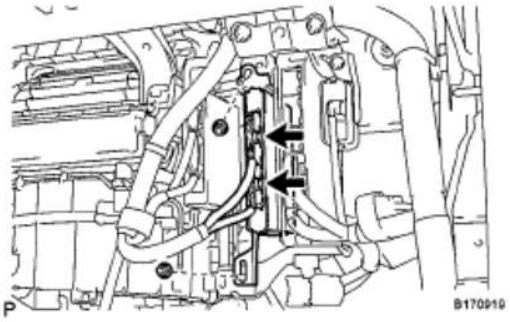


Fig. 114: Locating Certification ECU Connectors
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. **INSTALL LOWER INSTRUMENT PANEL SUB-ASSEMBLY** (See **INSTALLATION**)
3. **INSTALL NO. 2 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY** (See **INSTALLATION**)
4. **INSTALL COWL SIDE TRIM SUB-ASSEMBLY RH** (See **INSTALLATION**)
5. **INSTALL FRONT DOOR SCUFF PLATE RH** (See **INSTALLATION**)
6. **REGISTER ECU COMMUNICATION ID**

   NOTE: When replacing the certification ECU (smart key ECU assembly), perform initialization (See REGISTRATION).

7. **REGISTER KEY**

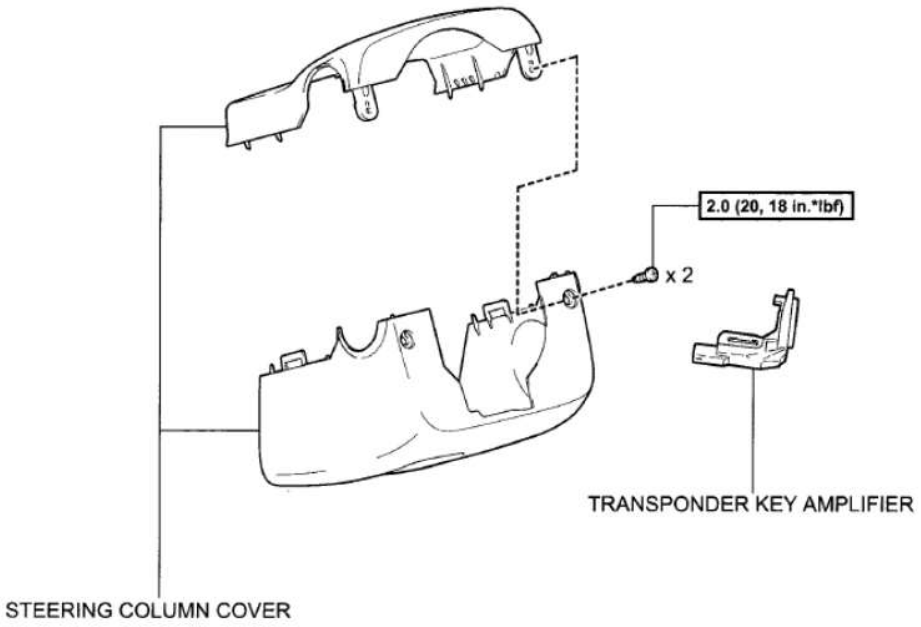
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NOTE: **When replacing the certification ECU (smart key ECU assembly), perform initialization (See REGISTRATION).**

TRANSPONDER KEY AMPLIFIER (W/O SMART KEY SYSTEM)

COMPONENTS



N*m (kgf*cm, ft.*lbf): Specified torque

P B170816E01

Fig. 115: Identifying Transponder Key Amplifier Components With Torque Specification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

1. **REMOVE STEERING COLUMN COVER** (See **REMOVAL**)
2. **REMOVE TRANSPONDER KEY AMPLIFIER** (See **DISASSEMBLY**)

INSTALLATION

1. **INSTALL TRANSPONDER KEY AMPLIFIER** (See **INSTALLATION**)
2. **INSTALL STEERING COLUMN COVER** (See **INSTALLATION**)

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