

SECTION 419-01B: Anti-Theft — Passive Anti-Theft System (PATS)
DIAGNOSIS AND TESTING

2014 F-150 Workshop Manual
Procedure revision date: 10/25/2013

Anti-Theft

Special Tool(s)

 ST3093-A	Fluke 77-IV Digital Multimeter FLU77-4 or equivalent
 ST2834-A	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool
 ST2574-A	Flex Probe Kit NUD105-R025D or equivalent

Principles of Operation

Passive Anti-Theft System (PATS) Operation

The Passive Anti-Theft System (PATS) is controlled by the Body Control Module (BCM). There are 2 main checks that PATS carries out before allowing the engine to start. If either of these checks fail, PATS does not allow the engine to start and STARTING SYSTEM FAULT is displayed in the message center. These two checks are the BCM verifying the PCM ID to make sure it matches the PCM ID stored in memory and to verify that a programmed key was used to turn the ignition to the RUN or START position.

The first check is initiated by the BCM waking up the PCM by supplying voltage on the wake up control circuit. The BCM activates the wake up control circuit when:

- the driver door is opened.
- a remote start request is received (if equipped with factory remote start).
- the brake pedal is pressed.
- a key is inserted into the ignition.
- or when the ignition is in the RUN or START position.

Once the PCM is awake, the BCM sends the PCM a challenge message over the High Speed Controller Area Network (HS-CAN). When the PCM receives the challenge message, it generates a response and sends it back to the BCM. If the response from the PCM does not match the response in the BCM memory, this first check fails and the engine will not start.

Once the PCM ID has been verified, PATS performs the second check to make sure a programmed key is in the ignition. When the BCM determines the ignition has been turned to the RUN or START position, it generates a challenge message. It sends the challenge message to the PATS transceiver on the transmit (TX) circuit. The transceiver in turn reads the key and generates a response message that is sent back to the BCM on the receive (RX) circuit. If the message received from the transceiver does not match a key stored in the BCM memory, the engine will not start.

If both the PCM ID and key verification pass, PATS is enabled and allows the engine to start. PATS cannot disable an engine that has already been started.

Spare Key Programming

The customer spare key programming allows spare keys to be programmed (up to a maximum of 8) to the BCM without having to use a scan tool. Two programmed keys are required to carry out the procedure. This procedure can be disabled so that spare keys can only be programmed to the vehicle using a scan tool. Refer to [Key Programming — Program a Key Using Two Programmed Keys](#) in this section for the customer spare key programming procedure or [Key Programming — Enable/Disable Spare Key Programming](#) in this section for the enable/disable procedure.

Unlimited Key Mode

Passive Anti-Theft System (PATS) contains a feature called unlimited key mode. This feature allows a customer to program more than 8 keys to their vehicle if they request it. Each vehicle in unlimited key mode is set up with a special unlimited transponder security key code. This allows all of the customer vehicles to share the same mechanically cut keys. For an individual customer, any randomly selected security key that has been previously mechanically cut and electronically programmed to the vehicle is acceptable. Refer to [Key Programming — Unlimited Key Mode](#) in this section.

Passive Anti-Theft System (PATS) PIDs

The PATS PIDs are a useful tool when diagnosing a PATS concerns. They can also be used to determine if unlimited key mode or customer spare key programming are enabled/disabled.

<u>BCM PATS</u> PID	PID Description	PID reading required for <u>PATS</u> to be enabled
PROGRMD_KEY	Determines if the key in the ignition lock cylinder is a programmed key.	Present
MIN_KEYS_RQD	Minimum number of programmed keys required. This PID always reads 2.	—
KEYS_PROGMD	Number of keys currently programmed into the <u>BCM</u> (If unlimited key mode is enabled, this PID will only read 2 regardless of how many keys are programmed).	2 to 8
START_ENABLD	Indicates if <u>PATS</u> will allow the engine to start	Enabled
PCM_ID	Indicates if there is a PCM ID currently stored into the <u>BCM</u>	Stored
PCM_VERIFY	Indicates if the PCM ID received by the <u>BCM</u> matches the PCM ID stored in the <u>BCM</u> memory	Yes
UNL_KEY_ID	Displays the unlimited key code 8 digit keycode (this PID is not available when unlimited key mode is enabled).	—
UNL_KEY_MODE	Indicates if unlimited key mode is enabled/disabled.	—

Field-Effect Transistor (FET) Protection

A Field-Effect Transistor (FET) is a type of transistor that when used with module software can be used to monitor and control current flow on module outputs. The FET protection strategy is used to prevent module damage in the event of excessive current flow.

The BCM utilizes an FET protective circuit strategy for many of its outputs (for example, a headlamp output circuit). Output loads (current level) are monitored for excessive current (typically short circuits) and are shut down (turns off the voltage or ground provided by the module) when a fault event is detected. A short circuit DTC is stored at the fault event and a cumulative counter is started.

When the demand for the output is no longer present, the module resets the FET circuit protection to allow the circuit to function. The next time the driver requests a circuit to activate that has been shut down by a previous short (FET protection) and the circuit is still shorted, the FET protection shuts off the circuit again and the cumulative counter advances.

When the excessive circuit load occurs often enough, the module shuts down the output until a repair procedure is carried out. Each FET protected circuit has 3 predefined levels of short circuit tolerance based on the harmful effect of each circuit fault on the FET and the ability of the FET to withstand it. A module lifetime level of fault events is established based upon the durability of the FET. If the total tolerance level is determined to be 600 fault events, the 3 predefined levels would be 200, 400 and 600 fault events.

When each tolerance level is reached, the short circuit DTC that was stored on the first failure cannot be cleared by a command to clear the continuous DTCs. The module does not allow this code to be cleared or the circuit restored to normal operation until a successful self-test proves that the fault has been repaired. After the self-test has successfully completed (no on-demand DTCs present), DTC U1000:00 and the associated DTC (the DTC related to the shorted circuit) automatically clears and the circuit function returns.

When each level is reached, the DTC associated with the short circuit sets along with DTC U1000:00. These DTCs can be cleared using the module on-demand self-test, then the Clear DTC operation on the scan tool (if the on-demand test shows the fault corrected). The module never resets the fault event counter to zero and continues to advance the fault event counter as short circuit fault events occur.

If the number of short circuit fault events reach the third level, then DTCs U1000:00 and U3000:49 set along with the associated short circuit DTC. DTC U3000:49 cannot be cleared and the module must be replaced after the repair.

The BCM FET protected output circuit for PATS is the wake up control output.

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
Large metallic objects or electronic devices on the key ring that can be used to purchase gasoline or similar items	Body Control Module (BCM) fuse 18 (10A)

- | | |
|--|---|
| <ul style="list-style-type: none"> • Passive Anti-Theft System (PATS) key • Use of a non- <u>PATS</u> key or incorrect <u>PATS</u> key • More than one <u>PATS</u> key on key ring • Aftermarket remote start system installed | <ul style="list-style-type: none"> • Wiring, terminals or connectors • <u>BCM</u> • <u>PCM</u> |
|--|---|

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4. **NOTE:** Make sure to use the latest scan tool software release.

If the cause is not visually evident, connect the scan tool to the Data Link Connector (DLC).

5. **NOTE:** The Vehicle Communication Module (VCM) LED prove-out confirms power and ground from the DLC are provided to the VCM.

If the scan tool does not communicate with the VCM :

- check the VCM connection to the vehicle.
- check the scan tool connection to the VCM.
- refer to [Section 418-00](#), No Power To The Scan Tool, to diagnose no power to the scan tool.

6. If the scan tool does not communicate with the vehicle:

- verify the ignition key is in the ON position.
- verify the scan tool operation with a known good vehicle.
- refer to [Section 418-00](#) to diagnose no response from the PCM.

7. Carry out the network test.

- If the scan tool responds with no communication for one or more modules, refer to [Section 418-00](#).
- If the network test passes, retrieve and record the continuous memory DTCs.

8. Clear the continuous DTCs and carry out the self-test diagnostics for the BCM and PCM.

9. If the DTCs retrieved are related to the concern, go to the BCM DTC Chart or the PCM DTC Chart. For all other BCM DTCs, refer to [Section 419-10](#). For all other PCM DTCs, refer to [Section 303-14](#).

10. If no DTCs related to the concern are retrieved, GO to [Symptom Chart](#).

DTC Charts

Body Control Module (BCM) DTC Chart

DTC	Description	Action
B10D5:13	<u>PATS</u> Antenna: Circuit Open	The Body Control Module (BCM) received an incomplete or corrupt response from the transceiver. INSTALL a new transceiver. REFER to Passive Anti-Theft System (PATS) Transceiver in this section.
B10D7:05	<u>PATS</u> Key: System Programming Failure	GO to Pinpoint Test A .
B10D7:51	<u>PATS</u> Key: Not Programmed	There is an unprogrammed Passive Anti-Theft System (PATS) key. PROGRAM the <u>PATS</u> key. REFER to Key Programming —

		Program a Key Using Two Programmed Keys or Key Programming Using Diagnostic Equipment in this section.
B10D7:55	PATS Key: Not Configured	NOTE: Once the BCM Programmable Module Installation (PMI) is complete, follow the scan tool on-screen instructions for carrying out the Configurable Engine Immobilizer (CEI) Lock Configuration. The BCM (CEI) was not configured after Programmable Module Installation (PMI). CARRY OUT the BCM PMI. REFER to Section 418-01.
B10D7:87	PATS Key: Missing Message	GO to Pinpoint Test B .
B10D7:8F	PATS Key: Erratic	GO to Pinpoint Test B .
B10D8:00	PATS Key Less Than Minimum Programmed: No Sub Type Information	Less than 2 keys are programmed into the BCM. CYCLE the customer's second key in the ignition to program (when less than 2 keys are programmed, the BCM automatically programs the first 2 keys that are cycled in the ignition).
B10D9:87	PATS Transponder: Missing Message	GO to Pinpoint Test C .
B10DA:51	PATS Target Identifier: Not Programmed	There is no PCM ID stored in the BCM. CARRY OUT a parameter reset. REFER to Passive Anti-Theft System (PATS) Parameter Reset in this section. CLEAR the DTCs. REPEAT the self-test.
C113A:11	Wakeup Control: Circuit Short to Ground	GO to Pinpoint Test D .
C113A:15	Wakeup Control: Circuit Short to Battery or Open	GO to Pinpoint Test D .
U1000:00	Solid State Driver Protection Activated - Driver Disabled: No Sub Type Information	The BCM has temporarily disabled an output because an excessive current draw exists (such as a short to ground). The BCM cannot enable the output until the cause of the short is corrected. ADDRESS all other DTCs first. After the cause of the concern is corrected, CLEAR the DTCs. REPEAT the self-test.
All other DTCs	—	REFER to the Diagnostic Trouble Code (DTC) Chart in Section 419-10 .

PCM DTC Chart

DTC	Description	Action
P161A	Incorrect Response from Immobilizer Control Module	The BCM ID received by the PCM does not match the ID stored in the PCM memory. CARRY OUT a parameter reset. REFER to Passive Anti-Theft System (PATS) Parameter Reset in this section. CLEAR the DTCs. REPEAT the self-test.
All other DTCs	—	REFER to Section 303-14 .

Symptom Chart

Symptom Chart

Condition	Possible Sources	Action
The engine does not start	- Driveability concern - Passive Anti-Theft System (PATS) concern - Starting system concern	GO to Pinpoint Test E.
All keys/ <u>RKE</u> transmitters lost, perimeter alarm activated, and unable to program new keys	Customer lost all keys/ <u>RKE</u> transmitters	PROGRAM an <u>RKE</u> transmitter. REFER to Section 501-14. UNLOCK the doors with the programmed RKE transmitter. ERASE all keys and PROGRAM two keys. REFER to Key Programming Using Diagnostic Equipment.

Pinpoint Tests**Pinpoint Test A: DTC B10D7:05****Normal Operation**

When the Body Control Module (BCM) enters a key programming state, it activates the transceiver to read the key in the ignition. If a valid Passive Anti-Theft System (PATS) key is used and there are no concerns with the PATS the key is programmed into the BCM memory.

- DTC B10D7:05 (PATS Key: System Programming Failure) — sets when a Passive Anti-Theft System (PATS) key is unsuccessfully programmed into the BCM.

This pinpoint test is intended to diagnose the following:

- PATS key

PINPOINT TEST A: DTC B10D7:05

Test Step	Result / Action to Take
A1 CHECK THE <u>BCM</u> DTCs FROM THE SELF-TEST	
- Check the recorded results from the <u>BCM</u> self-test. - Is DTC B10D5:13, B10D7:87, B10D7:8F, or B10D9:87 retrieved?	Yes REFER to the <u>BCM</u> DTC Chart in this section. RESOLVE these DTCs first. No GO to A2.

A2 CHECK THE <u>PATS</u> KEY	
• NOTE: The keys must have "HA" or "SA" stamped on the key blade. • Check that the correct <u>PATS</u> keys are used with the vehicle. Compare the Integrated Keyhead Transmitters (IKTs) with the one shown in Anti-Theft in the Description and Operation portion of this section. • Are the correct keys being used?	Yes ATTEMPT to program the key again. If key programming fails, DISCARD the damaged key and PROGRAM a new key. REFER to Key Programming — Program a Key Using Two Programmed Keys or Key Programming Using Diagnostic Equipment in this section. CLEAR the DTCs. REPEAT the self-test. No OBTAIN the correct key(s) for the vehicle. PROGRAM the new key(s). REFER to Key Programming — Program a Key Using Two Programmed Keys or Key Programming Using Diagnostic Equipment in this section. CLEAR the DTCs. REPEAT the self-test.

Pinpoint Test B: DTC B10D7:87 or B10D7:8F

Normal Operation

When the ignition is turned to the RUN or START position, the Body Control Module (BCM) activates the transceiver to read the key in the ignition. If the BCM does not receive a Passive Anti-Theft System (PATS) key code or if the code is invalid, PATS is disabled and the engine does not start.

- DTC B10D7:87 (PATS Key: Missing Message) — sets when there is no Passive Anti-Theft System (PATS) key read. This DTC sets if a non- PATS key is used to turn the ignition on.
- DTC B10D7:8F (PATS Key: Erratic) — sets when there is a partial or corrupt PATS key read.

This pinpoint test is intended to diagnose the following:

- PATS key
- PATS transceiver

PINPOINT TEST B: DTC B10D7:87 OR B10D7:8F

NOTE: Large metallic objects or electronic devices on the key ring that can be used to purchase gasoline or similar items, or a second key on the same key ring as the PATS key can cause vehicle starting concerns and record DTCs under certain conditions. If a fault cannot be identified, examine the customer key ring for such objects or devices. If present, inform the customer that they need to keep these objects from touching the PATS key while starting the engine. These objects and devices cannot damage the PATS key, but can cause a momentary concern if they are too close to the key during engine start. If a concern occurs, turn the ignition switch off and restart the engine with all other objects on the key ring held away from the ignition key.

NOTE: Aftermarket or dealer-installed remote start systems may adversely affect the PATS operation. Disconnect these systems before diagnosing any PATS concerns.

Test Step	Result / Action to Take
B1 CHECK THE <u>PATS</u> KEYS	
• NOTE: The keys must have "HA" or "SA"	Yes

stamped on the key blade. • Check that the correct <u>PATS</u> keys are used with the vehicle. Compare the Integrated Keyhead Transmitters (IKTs) with the one shown in Anti-Theft in the Description and Operation portion of this section. • Are the correct keys being used?	GO to B2. No OBTAIN the correct key(s) for the vehicle. PROGRAM the new key(s). REFER to Key Programming — Program a Key Using Two Programmed Keys or Key Programming Using Diagnostic Equipment in this section. CLEAR the DTCs. REPEAT the self-test.
B2 ISOLATE THE <u>PATS</u> KEYS • NOTE: Follow this procedure using both <u>PATS</u> keys (using one at a time). • Place a <u>PATS</u> key in the ignition and turn to the RUN position. • Enter the following diagnostic mode on the scan tool: Clear <u>BCM</u> Continuous DTCs. • Cycle the ignition from RUN to OFF and then back to the RUN position. • Enter the following diagnostic mode on the scan tool: <u>BCM</u> Self-Test. • Is DTC B10D7:87 or B10D7:8F retrieved for both keys?	Yes INSTALL a new <u>PATS</u> transceiver. REFER to Passive Anti-Theft System (PATS) Transceiver in this section. CLEAR the DTCs. REPEAT the self-test. No DISCARD the key in question and PROGRAM a new key. REFER to Key Programming — Program a Key Using Two Programmed Keys or Key Programming Using Diagnostic Equipment in this section. CLEAR the DTCs. REPEAT the self-test.

Pinpoint Test C: DTC B10D9:87

Refer to Wiring Diagrams Cell [112](#), Passive Anti-Theft System for schematic and connector information.

Normal Operation

The Body Control Module (BCM) fuse 18 (10A) supplies voltage to the Passive Anti-Theft System (PATS) transceiver. When the ignition is turned to the RUN or START positions, the BCM initiates the key interrogation sequence. The BCM starts the interrogation sequence by generating a signal and sending that signal to the transceiver on the transmit (TX) circuit. When the transceiver receives the signal from the BCM, it reads the PATS key and generates a challenge response to the BCM signal. The transceiver sends the challenge response back to the BCM on the receive (RX) circuit.

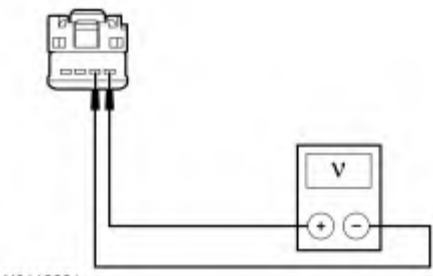
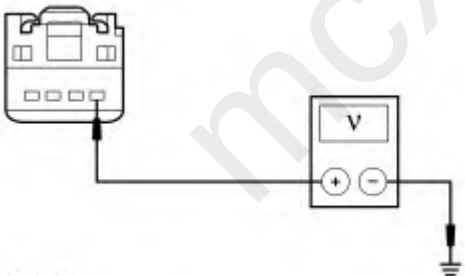
- DTC B10D9:87 (PATS Transponder: Missing Message) — sets when the BCM does not receive a response from the PATS transceiver

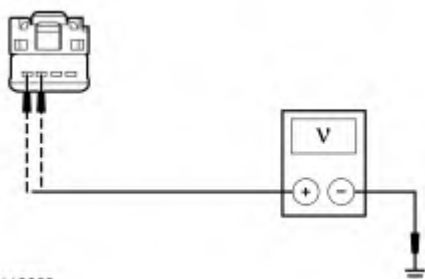
This pinpoint test is intended to diagnose the following:

- Fuse
- Wiring, terminals or connectors
- PATS transceiver
- BCM

PINPOINT TEST C: DTC B10D9:87

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

Test Step	Result / Action to Take
C1 RETRIEVE THE <u>BCM</u> DTCs FROM THE SELF-TEST - Check the recorded results from the <u>BCM</u> self-test. - Is DTC C113A:11 or DTC C113A:15 recorded?	Yes GO to Pinpoint Test D. No GO to C2 .
C2 CHECK FOR VOLTAGE TO THE <u>PATS</u> TRANSCEIVER - Disconnect: <u>PATS</u> Transceiver C252. - Ignition ON. - Measure the voltage between the <u>PATS</u> transceiver C252-1, circuit CE436 (VT/OG), harness side and the <u>PATS</u> transceiver C252-2, circuit GD133 (BK).  N0113061 - Is the voltage greater than 10 volts?	Yes GO to C4 . No GO to C3 .
C3 CHECK THE <u>PATS</u> TRANSCEIVER VOLTAGE SUPPLY CIRCUIT - Measure the voltage between the <u>PATS</u> transceiver C252-1, circuit CE436 (VT/OG), harness side and ground.  N0002393 - Is the voltage greater than 10 volts?	Yes REPAIR circuit GD133 (BK) for an open. CLEAR the DTCs. REPEAT the self-test. No VERIFY the <u>BCM</u> fuse 18 (10A) is OK. If OK, REPAIR circuit CE436 (VT/OG) for an open. If not OK, REFER to the Wiring Diagrams Manual to identify the possible causes of the circuit short. CLEAR the DTCs. REPEAT the self-test.
C4 CHECK THE <u>PATS</u> TRANSCEIVER CIRCUITS FOR A SHORT TO VOLTAGE - Ignition OFF. - Disconnect: <u>BCM</u> C2280B. - Ignition ON. - Measure the voltage between the <u>PATS</u> transceiver C252-3, circuit VRT24 (YE/OG), harness side and ground; and between the <u>PATS</u> transceiver C252-4, circuit VRT23 (VT/GY), harness side and ground.	Yes REPAIR the circuit in question for a short to voltage. CLEAR the DTCs. REPEAT the self-test. No GO to C5 .

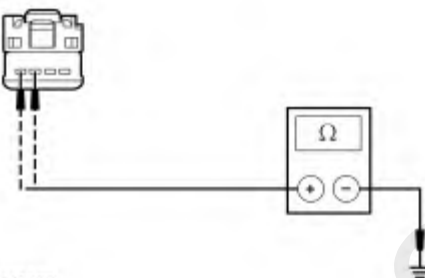


N0113062

- Is any voltage present?

C5 CHECK THE PATS TRANSCEIVER CIRCUITS FOR A SHORT TO GROUND

- Ignition OFF.
- Measure the resistance between the PATS transceiver C252-3, circuit VRT24 (YE/OG), harness side and ground; and between the PATS transceiver C252-4, circuit VRT23 (VT/GY), harness side and ground.



N0113063

- Are the resistances greater than 10,000 ohms?

C6 CHECK THE PATS TRANSCEIVER CIRCUITS FOR AN OPEN

- Measure the resistance between the BCM, harness side and the PATS transceiver, harness side as follows:

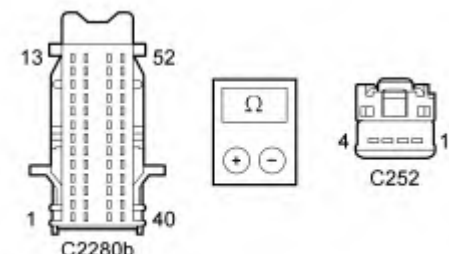
<u>BCM</u> Connector-Pin	Circuit	<u>PATS</u> Transceiver Connector-Pin
C2280B-36	VRT23 (VT/GY)	C252-4
C2280B-37	VRT24 (YE/OG)	C252-3

Yes
GO to [C6](#).

No
REPAIR the circuit in question for a short to ground. CLEAR the DTCs. REPEAT the self-test.

Yes
INSTALL a new PATS transceiver. REFER to [Passive Anti-Theft System \(PATS\) Transceiver](#) in this section. CLEAR the DTCs. REPEAT the self-test. If DTC B10D9:87 is retrieved again, GO to [C7](#).

No
REPAIR the circuit in question for an open. CLEAR the DTCs. REPEAT the self-test.

 N0113064 • Are the resistances less than 5 ohms?	
C7 CHECK FOR CORRECT BCM OPERATION • Disconnect the <u>BCM</u> connectors. • Check for: ■ corrosion ■ damaged pins ■ pushed-out pins • Connect the <u>BCM</u> connectors and make sure it seats correctly. • Operate the system and verify the concern is still present. • Is the concern still present?	Yes INSTALL a new <u>BCM</u>. REFER to Section 419-10. TEST the system for normal operation. No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

Pinpoint Test D: DTC C113A:11 or C113A:15

Refer to Wiring Diagrams Cell [112](#), Passive Anti-Theft System for schematic and connector information.

Normal Operation

The wake up control circuit is used to wake up the PCM prior to engine cranking. The PCM needs to wake up prior to a crank request so that it has time to go through its initialization. The wake up control circuit is also used to power the Passive Anti-Theft System (PATS) transceiver. The wake up control circuit is controlled by the Body Control Module (BCM) and receives voltage from fuse 18 (10A).

The BCM activates the wake up control circuit when:

- the driver door is opened.
 - a remote start request is received (if equipped with factory remote start).
 - the brake pedal is pressed.
 - a key is inserted into the ignition.
 - or when the ignition is in the RUN or START position.
-
- DTC C113A:11 (Wakeup Control: Circuit Short To Ground) — sets when the BCM detects a short to ground on the wake up control circuit.
 - DTC C113A:15 (Wakeup Control: Circuit Short To Battery or Open) — sets when the BCM detects a short to voltage or an open on the wake up control circuit.
 - DTC U1000:00 (Solid State Driver Protection Activated - Driver Disabled: No Sub Type Information) — sets when the BCM has temporarily shut down the output driver. The module has temporarily disabled the wake up control circuit because an excessive current draw exists (such as a short to ground). The BCM cannot enable the wake up control circuit until the cause of the short is corrected, the DTCs have been cleared and a successful self-test is run.

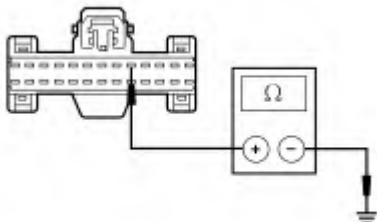
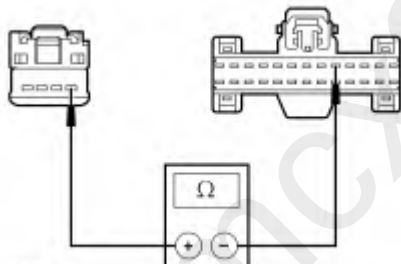
This pinpoint test is intended to diagnose the following:

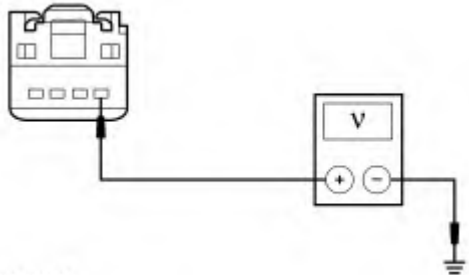
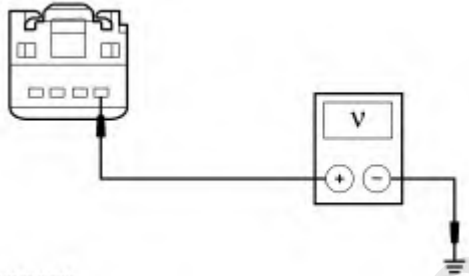
- Wiring, terminals or connectors
- PATS transceiver
- PCM
- BCM

PINPOINT TEST D: DTC C113A:11 or C113A:15

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

Test Step	Result / Action to Take
D1 RETRIEVE THE <u>BCM</u> DTCs FROM THE SELF-TEST	
• Check the recorded results from the <u>BCM</u> self-test. • Is DTC C113A:11 recorded?	Yes GO to D2. No For DTC C113A:15, GO to D5.
D2 CHECK THE PCM FOR A SHORT TO GROUND	
• Ignition OFF. • Disconnect: PCM C175B (3.7L) or C1381B (5.0/6.2L). • Ignition ON. • Enter the following diagnostic mode on the scan tool: Clear <u>BCM</u> Continuous DTCs. • Enter the following diagnostic mode on the scan tool: <u>BCM</u> Self-Test. • Is DTC C113A:11 retrieved?	Yes GO to D3. No GO to D9.
D3 CHECK THE <u>PATS</u> TRANSCEIVER FOR A SHORT TO GROUND	
• Disconnect: <u>PATS</u> Transceiver C252. • Enter the following diagnostic mode on the scan tool: Clear <u>BCM</u> Continuous DTCs. • Enter the following diagnostic mode on the scan tool: <u>BCM</u> Self-Test. • Is DTC C113A:11 retrieved?	Yes GO to D4. No INSTALL a new <u>PATS</u> transceiver. REFER to Passive Anti-Theft System (PATS) Transceiver in this section. TEST the system for normal operation.
D4 CHECK THE WAKEUP CONTROL CIRCUIT FOR A SHORT TO GROUND	
• Ignition OFF. • Disconnect: <u>BCM</u> C2280F. • Measure the resistance between the <u>BCM</u> C2280F-5, circuit CE436 (VT/OG), harness side and ground.	Yes GO to D10. No REPAIR circuit CE436 (VT/OG) for a short to ground. CLEAR the DTCs. REPEAT the self-test.

 N0099635 Is the resistance greater than 10,000 ohms?	
D5 CHECK THE WAKEUP CONTROL CIRCUIT FOR AN OPEN OR SHORT TO VOLTAGE - Start the engine. - Does the engine start?	Yes GO to D7. No GO to D6.
D6 CHECK THE WAKEUP CONTROL CIRCUIT FOR AN OPEN - Ignition OFF. - Disconnect: <u>PATS</u> Transceiver C252. - Disconnect: <u>BCM</u> C2280F. - Measure the resistance between the <u>PATS</u> transceiver C252-1, circuit CE436 (VT/OG), harness side and the <u>BCM</u> C2280F-5, circuit CE436 (VT/OG), harness side.  N0113065 - Is the resistance less than 5 ohms?	Yes GO to D10. No REPAIR circuit CE436 (VT/OG) for an open. CLEAR the DTCs. REPEAT the self-test.
D7 CHECK THE WAKEUP CONTROL CIRCUIT FOR A SHORT TO VOLTAGE - Ignition OFF. - Disconnect: <u>PATS</u> Transceiver C252. - Disconnect: <u>BCM</u> C2280F. - Ignition ON. - Measure the voltage between the <u>PATS</u> transceiver C252-1, circuit CE436 (VT/OG), harness side and ground.	Yes GO to D8. No GO to D10.

 N0002393 • Is any voltage present?	
D8 CHECK THE PCM FOR A SHORT TO VOLTAGE • Ignition OFF. • Disconnect: PCM C175B (3.7L) or C1381B (5.0/6.2L). • Ignition ON. • Measure the voltage between the <u>PATS</u> transceiver C252-1, circuit CE436 (VT/OG), harness side and ground.  N0002393 • Is any voltage present?	Yes REPAIR circuit CE436 (VT/OG) for a short to voltage. CLEAR the DTCs. REPEAT the self-test. No GO to D9.
D9 CHECK FOR CORRECT PCM OPERATION • Disconnect the PCM connectors. • Check for: ■ corrosion ■ damaged pins ■ pushed-out pins • Connect the PCM connectors and make sure it seats correctly. • Operate the system and verify the concern is still present. • Is the concern still present?	Yes INSTALL a new PCM. REFER to Section 303-14. TEST the system for normal operation. No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.
D10 CHECK FOR CORRECT <u>BCM</u> OPERATION • Disconnect the <u>BCM</u> connectors. • Check for: ■ corrosion ■ damaged pins ■ pushed-out pins • Connect the <u>BCM</u> connectors and make sure it seats correctly. • Operate the system and verify the concern is still present. • Is the concern still present?	Yes INSTALL a new <u>BCM</u>. REFER to Section 419-10. TEST the system for normal operation. No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

Pinpoint Test E: The Engine Does Not Start

Normal Operation

The Passive Anti-Theft System (PATS) disables the engine from starting by disabling the fuel injectors and starter. When the ignition is turned to the RUN or START position, the PATS reads the PATS key and checks the PCM ID. If an unprogrammed PATS key is used or an invalid PCM ID is received, the PATS disables the engine. If there is a PATS concern that caused the engine to be disabled, "STARTING SYSTEM FAULT" is displayed in the message center.

This pinpoint test is intended to diagnose the following:

- Driveability concern
- PATS concern
- Starting system concern

PINPOINT TEST E: THE ENGINE DOES NOT START

Test Step	Result / Action to Take
E1 CHECK FOR COMMUNICATION WITH THE PCM AND THE <u>BCM</u>	
• Carry out the network test using the scan tool. • Does the scan tool establish communication with the PCM and the Body Control Module (BCM)?	Yes GO to E2. No REFER to Section 418-00 to diagnose the module that is not communicating with the scan tool.
E2 CHECK FOR <u>BCM</u> DTCs	
• Enter the following diagnostic mode on the scan tool: <u>BCM</u> Self-Test. • Are any <u>BCM</u> DTCs present?	Yes REFER to the <u>BCM</u> DTC Chart in this section. No The no-start condition is not caused by <u>PATS</u>. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual to diagnose the cause of the no-start condition.

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