Antitheft and Alarm Systems: Testing and Inspection
Anti-Theft - Passive

Initial Inspection
INSPECTION AND VERIFICATION

1. Verify the customer concern.

Visual Inspection Chart

Mechanical	Electrical
• Large metallic objects or electronic devices on the key chain that can be used to purchase gasoline or similar items • Ignition lock cylinder • PATS key • Use of a non-PATS key • More than one PATS key on the key chain	• Smart junction box (SJB) fuse 18 (10A) • PATS transceiver module • Powertrain control module (PCM) • Ignition switch • Loose or corroded connection(s)

Visual Inspection Chart

2. Visually inspect for obvious signs of mechanical or electrical damage.
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. If the cause is not visually evident, connect the diagnostic tool to the data link connector (DLC) and select the vehicle to be tested from the diagnostic tool menu. If the diagnostic tool does not communicate with the vehicle:
   - check that the program card is correctly installed.
   - check the connections to the vehicle.
   - check the ignition switch position.

5. If the diagnostic tool still does not communicate with the vehicle, refer to the diagnostic tool operating manual.
6. Carry out the diagnostic tool data link test. If the diagnostic tool responds with:
   - CAN circuits fault; all electronic control units no response/not equipped, refer to Information Bus (Module Communications Network).
   - No response/not equipped for the PCM, refer to Information Bus (Module Communications Network).
   - System passed, retrieve and record the continuous diagnostic trouble codes (DTCs), erase the continuous DTCs, and carry out self-test diagnostics for the PCM.

7. If the DTCs retrieved are related to the concern, go to the Passive Anti-Theft System (PATS) Diagnostic Trouble Codes (DTC) Index to continue diagnosis. See: Trouble Code Diagnostic Charts/Powertrain Control Module (PCM) Diagnostic Trouble Code (DTC) Index
8. If no DTCs related to the concern are retrieved, refer to Passive Anti-Theft System (PATS) Symptom Chart. See: Diagnosis By Symptom

DIAGNOSIS AND TESTING (Continued)

Expanded Diagnostic Trouble Codes (DTC) Descriptions

DTC	Expanded Description
B1213	Less than 2 keys programmed to the PATS control. ERASE the continuous codes, CYCLE the ignition, then CARRY OUT the self-test again. If DTC B1232, B1600, B1601, B1602 or B1681 are present, they must be serviced first. If DTC B1213 is the only self-test DTC, then cycle the second PATS key in the ignition to program the key.
B1232	Transceiver module antenna failure. Memory failure in the PCM.
B1600	No PATS key read by the PCM. This can be caused by the PATS key, PATS transceiver, circuits between the PATS transceiver and the PCM and/or the PCM.
B1601	Unprogrammed PATS key. There is no issue with the PATS key itself, but the key must be programmed into the PATS memory (unless the maximum number of keys are already programmed). REFER to Spare Key Programming. No parts need to be replaced for this DTC.
B1602	A partial PATS key was read. Make sure an approved PATS key (Ford, Rotunda or Strattec) is being used. Large metal objects, additional PATS keys, or devices used to purchase gasoline located on the customer's key ring can cause interference. Instruct the customer to keep such items from touching the ignition key during engine start. It is not necessary to remove the objects from the customer's key ring. Aftermarket remote starter equipment can also cause this DTC. Remove any remote starter equipment close to the transceiver before conducting further diagnosis. This DTC can be caused by the PATS key or the PATS transceiver.
B1681	The PATS transceiver module signal is not received by the PCM. This DTC can be caused by circuits between the PATS transceiver and the PCM, the PATS transceiver or the PCM. Follow the pinpoint tests for diagnosis. This can also be caused by using the incorrect transceiver part number. Make sure the correct transceiver part number is being used.
B2103	Transceiver module antenna failure. Make sure the PATS transceiver is connected and installed correctly. Replace the transceiver module.
B2431	The ignition key was not programmed. Make sure the correct key is being used.

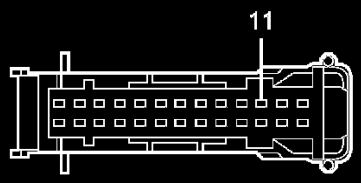
DIAGNOSIS AND TESTING (Continued)

Powertrain Control Module (PCM) Diagnostic Trouble Code (DTC) Index

DTC	Description	Source	Action
B1213	Anti-Theft Number of Programmed Keys Is Below Minimum	PCM	GO to Pinpoint Test F.
B1342	ECU Defective (EEPROM in PCM not working)	PCM	INSTALL a new PCM.
B1600	PATS Ignition Key Transponder Signal Is Not Received	PCM	GO to Pinpoint Test B.
B1601	PATS Received Incorrect Key-Code From Ignition Key Transponder	PCM	GO to Pinpoint Test C.
B1602	PATS Received Invalid Format of Key-Code From Ignition Key Transponder	PCM	GO to Pinpoint Test D.
B1681	PATS Transceiver Module Signal Is Not Received	PCM	GO to Pinpoint Test E.
B2103	Antenna Not Connected	PCM	GO to Pinpoint Test A.
B2431	Key Program Failure (Defective Key or Transceiver)	PCM	VERIFY if the correct PATS key is being used. If the PATS key is defective, use a new key for programming.

B1213-B2431

Instrument Cluster C220

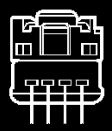


A0096379

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
11	1768 (OG/RD) voltage for anti-theft indicator	0 volts, 5 ohms or less between the instrument cluster and the powertrain control module (PCM). Greater than 10,000 ohms to ground with the PCM and the instrument cluster disconnected.

Instrument Cluster C220

Passive Anti-Theft System (PATS) Transceiver C252

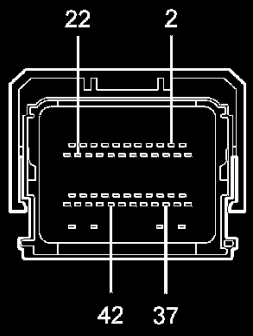


A0096380

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1	1266 (RD/YE) voltage	Greater than 10 volts with the key in the START or RUN position.
2	1203 (BK/LB) ground	0 volts, less than 5 ohms resistance between the PATS transceiver and ground.
3	1215 (WH/LG) transmits signal to the powertrain control module (PCM)	0 volts, 5 ohms or less between the PCM and the PATS transceiver. Greater than 10,000 ohms to ground with the PCM and the PATS transceiver disconnected.
4	1216 (GY/OG) transmits signal from the PCM	0 volts, 5 ohms or less between the PCM and the PATS transceiver. Greater than 10,000 ohms to ground with the PCM and the PATS transceiver disconnected.

Passive Anti-Theft System (PATS) Transceiver C252

Powertrain Control Module (PCM) C175b



A0096378

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
2	329 (PK) starter enable circuit	0 volts, 5 ohms or less between the PCM and the starter. Greater than 10,000 ohms to ground with the PCM and the starter disconnected.
22	1215 (WH/LG) transmits the signal to the passive anti-theft system (PATS) transceiver	0 volts, 5 ohms or less between the PCM and the PATS transceiver. Greater than 10,000 ohms to ground with the PCM and the PATS transceiver disconnected.
37	1768 (OG/RD) voltage to the anti-theft indicator	12 volts, 5 ohms or less between the instrument cluster and the PCM. Greater than 10,000 ohms to ground with the PCM and the instrument cluster disconnected.
42	1216 (GY/OG) receives signal from PATS transceiver	0 volts, 5 ohms or less between the PCM and the PATS transceiver. Greater than 10,000 ohms to ground with the PCM and the PATS transceiver disconnected.

Power Control Module (PCM) C175b

Test A: Antenna Not Connected

PINPOINT TEST A: ANTENNA NOT CONNECTED

PINPOINT TEST A: ANTENNA NOT CONNECTED

	Test Step	Result / Action to Take
A1	**INSPECT THE PASSIVE ANTI-THEFT (PATS) TRANSCEIVER MODULE FOR CORRECT INSTALLATION AND PHYSICAL DAMAGE**	
	• Key in OFF position. • Verify the PATS transceiver module is correctly installed. Refer to Alarm System Transponder. • Clear the continuous diagnostic trouble codes (DTCs). • Key in OFF position. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: Retrieve the DTCs. • **Is DTC B2103 retrieved?**	**Yes** INSTALL a new PATS transceiver module. CLEAR the DTCs. REPEAT the self-test. TURN the ignition switch OFF then back to RUN. **No** The system is OK.

A1

Normal Operation

During each vehicle start sequence, the powertrain control module (PCM) queries the encoded key and compares the information with the key information stored in the PCM memory. The PCM then enables the starting functions of the engine. The transceiver provides the interface between the encoded ignition key and the PCM.

Possible Causes

- passive anti-theft system (PATS) transceiver
- PCM
- PATS key

Test B: PATS Ignition Key Transponder Signal Is Not Received

PINPOINT TEST B: PATS IGNITION KEY TRANSPONDER SIGNAL IS NOT RECEIVED

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B: PATS IGNITION KEY TRANSPONDER SIGNAL IS NOT RECEIVED

NOTE: Large metallic objects, electronic devices on the key chain that can be used to purchase gasoline or similar items, or a second key on the same key ring as the passive anti-theft system (PATS) key may 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 OFF and restart the engine with all other objects on the key ring held away from the ignition key. Check to make sure the PATS key used by the customer is an approved Ford PATS key. PATS keys from Rotunda or Strattec are approved Ford PATS keys.

Test Step		Result / Action to Take
B1	**RETRIEVE THE DIAGNOSTIC TROUBLE CODES (DTCS)**	
	• Enter the following diagnostic mode on the diagnostic tool: Clear the DTCs. • Key in OFF position. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: Retrieve the DTCs. • **Is DTC B1600 retrieved?**	**Yes** GO to **B2.** **No** If other than PATS powertrain control module (PCM) DTCs are retrieved, REFER to Computers and Control Systems. If no PATS DTCs are retrieved, the system is OK.
B2	**CHECK WITH A NEW PATS KEY**	
	NOTE: Check to make sure the customer keys and new PATS keys are approved Ford encoded PATS keys. Unapproved PATS keys do not always operate correctly over different temperature ranges. PATS keys from Rotunda or Strattec are approved Ford PATS keys. • Cut a new PATS key. • Program the new PATS key. Refer to Key Programming Using Diagnostic Equipment. • Enter the following diagnostic mode on the diagnostic tool: Clear the DTCs. • Key in OFF position. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: Retrieve the DTCs. • **Is DTC B1600 present?**	**Yes** GO to **B3.** **No** If other than PATS PCM DTCs are retrieved, REFER to Computers and Control Systems. If no PATS DTCs are retrieved, the system is OK.
B3	**INSTALL A NEW PATS TRANSCEIVER**	
	NOTE: When a new PCM is installed, the PATS keys must be reprogrammed. • Key in OFF position. • Install a new PATS transceiver. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: Clear the DTCs. • Key in OFF position. • Key in ON position. **NOTE:** Do not use the PATS key that was programmed in Step B2. Turn the ignition switch to ON using an existing customer PATS key. • Enter the following diagnostic mode on the diagnostic tool: Retrieve the DTCs. • **Is DTC B1600 retrieved?**	**Yes** INSTALL a new PCM. REPROGRAM the PATS keys. REFER to Key Programming Using Diagnostic Equipment. TEST the system for normal operation. **No** The system is OK.

B1-B3

Normal Operation

During each vehicle start sequence, the powertrain control module (PCM) queries the encoded key and compares the information with the key information stored in the PCM memory. The PCM then enables the starting functions of the engine. The transceiver provides the interface between the encoded ignition key and the PCM.

Possible Causes

- passive anti-theft system (PATS) transceiver
- PCM
- PATS key

Test C: PATS Received Incorrect Key-Code From Ignition Key Transponder

PINPOINT TEST C: PATS RECEIVED INCORRECT KEY-CODE FROM IGNITION KEY TRANSPONDER

PINPOINT TEST C: PATS RECEIVED INCORRECT KEY-CODE FROM IGNITION KEY TRANSPONDER

NOTE: If DTC B1601 is set, the ignition switch must remain in RUN for at least one second before attempting to start the vehicle with another PATS key.

NOTE: Large metallic objects, electronic devices on the key chain that can be used to purchase gasoline or similar items, or a second key on the same key ring as the PATS key may 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 ignition switch OFF and restart the engine with all other objects on the key ring held away from the ignition key. Check to make sure the PATS key used by the customer is an approved Ford PATS key. PATS keys from Rotunda or Strattec are approved Ford PATS keys.

Test Step		Result / Action to Take
C1	**RETRIEVE THE DIAGNOSTIC TROUBLE CODES (DTCS)**	**Yes** GO to **C2**. **No** The system is OK. CHECK all customer PATS keys by attempting to start the vehicle with each key to verify all other PATS keys are programmed.
	• Enter the following diagnostic mode on the diagnostic tool: Clear the DTCs. • Key in OFF position. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: Retrieve the DTCs. • **Is DTC B1601 retrieved?**	
C2	**CHECK THE NUMBER OF PROGRAMMED PATS KEYS AVAILABLE**	**Yes** GO to **C3**. **No** CUT a new PATS key so that at least 2 PATS keys are available. PROGRAM the PATS keys. REFER to Key Programming Using Diagnostic Equipment. GO to **C5**.
	• Verify there are at least 2 currently programmed PATS keys available with the vehicle. • **Are at least 2 currently programmed PATS keys available with the vehicle?**	
C3	**MONITOR THE PCM PID NUMKEYS TO CHECK FOR PROGRAMMED PATS KEYS**	**Yes** ERASE and REPROGRAM the key codes. REFER to Key Programming Using Diagnostic Equipment. CLEAR the DTCs. REPEAT the self-test. **No** GO to **C4**.
	• Monitor the PCM PID NUMKEYS. • **Does the PCM PID NUMKEYS display 8?**	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST C: PATS RECEIVED INCORRECT KEY-CODE FROM IGNITION KEY TRANSPONDER (Continued)

Test Step		Result / Action to Take
C4	VERIFY THE PCM PID SPARE_KY INDICATES YES	
	• Monitor the PCM PID SPARE_KY • **Does the PCM PID SPARE_KY indicate ENABLE?**	**Yes** Spare key programming is enabled. REFER to Key Programming Using Two Programmed Keys. CLEAR the DTCs. REPEAT the self-test. **No** ENABLE the PCM PID SPARE_KEY. REFER to Key Programming Switch State Control. CLEAR the DTCs. REPEAT the self-test.
C5	CHECK THE PATS KEYS FOR CORRECT OPERATION	
	• Key in OFF position. • Key in ON position. Leave the ignition key in the ON position for 3 seconds using the first PATS key. • Key in OFF position. • Key in ON position. Leave the ignition key in the ON position for 3 seconds using the second PATS key. • Key in START position. Start the vehicle using the second PATS key. • **Does the vehicle start?**	**Yes** The system is OK. If there are additional keys that need to be programmed, REFER to Key Programming Using Two Programmed Keys. **No** GO to **C6**.
C6	CHECK FOR DTC B1601	
	NOTE: When a new PCM is installed, the PATS keys must be reprogrammed. • Enter the following diagnostic mode on the diagnostic tool: Clear the DTCs. • Key in OFF position. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: Retrieve the DTCs. • **Is DTC B1601 retrieved?**	**Yes** INSTALL a new PCM. REPROGRAM the encoded keys.REFER to Key Programming Using Diagnostic Equipment. TEST the system for normal operation. **No** If other than PATS PCM DTCs are retrieved. REFER to Computers and Control Systems. If no PATS DTCs are retrieved, the system is OK.

Test C4-C6

Normal Operation

During each vehicle start sequence, the powertrain control module (PCM) queries the encoded key and compares the information with the key information stored in the PCM memory. The PCM then enables the starting functions of the engine. The transceiver provides the interface between the encoded ignition key and the PCM.

Possible Causes

- passive anti-theft system (PATS) transceiver
- PCM
- PATS key

Test D: PATS Received Invalid Format Of Key-Code From Ignition Key Transponder

PINPOINT TEST D: PATS RECEIVED INVALID FORMAT OF KEY-CODE FROM IGNITION KEY TRANSPONDER

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST D: PATS RECEIVED INVALID FORMAT OF KEY-CODE FROM IGNITION KEY TRANSPONDER

NOTE: Large metallic objects, electronic devices on the key chain that can be used to purchase gasoline or similar items, or a second key on the same key ring as the passive anti-theft system (PATS) key may cause vehicle starting concern 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 ignition OFF and restart the engine with all other objects on the key ring held away from the ignition key. Check to make sure the PATS key used by the customer is an approved Ford PATS key. PATS keys from Rotunda or Strattec are approved Ford PATS keys.

	Test Step	Result / Action to Take
D1	**RETRIEVE THE DIAGNOSTIC TROUBLE CODES (DTCS)**	
	• Enter the following diagnostic mode on the diagnostic tool: Clear the DTCs. • Key in OFF position. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: Retrieve the DTCs. • **Is DTC B1602 retrieved?**	**Yes** GO to **D2**. **No** The system is OK. CHECK all the customer PATS keys by cycling them in the ignition switch and determining if the vehicle starts.
D2	**CHECK PROGRAMMING WITH A NEW PATS KEY**	
	NOTE: Check to make sure the customer keys and new PATS keys are approved Ford encoded PATS keys. Unapproved PATS keys do not always operate correctly over different temperature ranges. PATS keys from Rotunda or Strattec are approved Ford PATS keys. • Cut a new PATS key. • Program a new PATS key. Refer to Key Programming Using Diagnostic Equipment. • Key in OFF position. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: Retrieve the DTCs. • **Is DTC B1602 retrieved?**	**Yes** GO to **D3**. **No** If other than PATS PCM DTCs are retrieved, REFER to Computers and Control Systems. If no PATS DTCs are retrieved, system is OK.
D3	**INSTALL A NEW PATS TRANSCEIVER**	
	• Enter the following diagnostic mode on the diagnostic tool: Clear the DTCs. • Key in OFF position. • Install a new PATS transceiver module. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: Retrieve the DTCs. • **Are any PATS DTCs retrieved?**	**Yes** REFER to the Passive Anti-Theft System (PATS) — Diagnostic Trouble Codes (DTC) Index. **No** The system is OK.

Test D1-D3

Normal Operation

During each vehicle start sequence, the powertrain control module (PCM) queries the encoded key and compares the information with the key information stored in the PCM memory. The PCM then enables the starting functions of the engine. The transceiver provides the interface between the encoded ignition key and the PCM.

Possible Causes

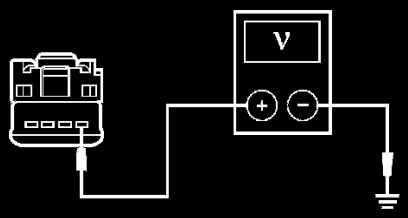
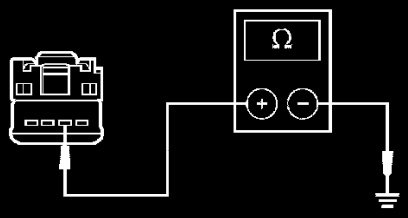
- passive anti-theft system (PATS) transceiver
- PCM
- PATS key

Test E: PATS Transceiver Module Signal Is Not Received

PINPOINT TEST E: PATS TRANSCEIVER MODULE SIGNAL IS NOT RECEIVED

DIAGNOSIS AND TESTING (Continued)

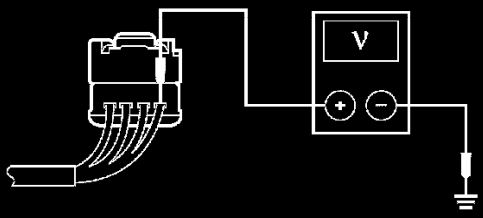
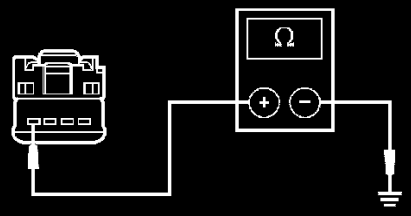
PINPOINT TEST E: PATS TRANSCEIVER MODULE SIGNAL IS NOT RECEIVED

Test Step		Result / Action to Take
E1	**RETRIEVE THE DIAGNOSTIC TROUBLE CODES (DTCS)**	
	• Enter the following diagnostic mode on the diagnostic tool: Clear the DTCs. • Key in OFF position. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: Retrieve the DTCs. • **Is DTC B1681 retrieved?**	**Yes** GO to **E2**. **No** The system is OK.
E2	**CHECK THE PASSIVE ANTI-THEFT SYSTEM (PATS) TRANSCEIVER CIRCUIT 1266 (RD/YE) FOR VOLTAGE**	
	• Key in OFF position. • Disconnect: PATS Transceiver C252. • Key in ON position. • Measure the voltage between the PATS transceiver C252-1, circuit 1266 (RD/YE), harness side and ground.  A0096368 • **Is the voltage greater than 10 volts?**	**Yes** GO to **E3**. **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
E3	**CHECK THE PATS TRANSCEIVER GROUND CIRCUIT 1203 (BK/LB)**	
	• Key in OFF position. • Measure the resistance between the PATS transceiver C252-2, circuit 1203 (BK/LB), harness side and ground.  A0096369 • **Is the resistance less than 5 ohms?**	**Yes** GO to **E4**. **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
E4	**CHECK THE PATS TRANSCEIVER RECEIVE CIRCUIT 1216 (GY/OG) FOR VOLTAGE**	
	• Connect: PATS Transceiver C252. • Key in ON position.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST E: PATS TRANSCEIVER MODULE SIGNAL IS NOT RECEIVED (Continued)

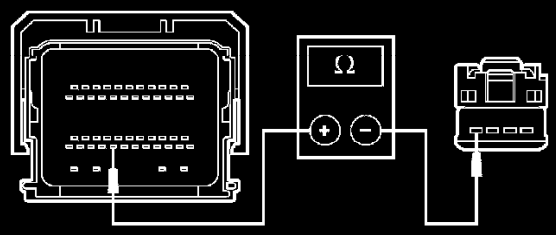
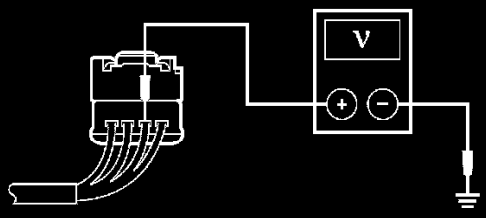
Test Step		Result / Action to Take
E4	**CHECK THE PATS TRANSCEIVER RECEIVE CIRCUIT 1216 (GY/OG) FOR VOLTAGE (Continued)**	
	• Measure the voltage by back probing between the PATS transceiver C252-4, circuit 1216 (GY/OG), harness side and ground.  A0096370 • **Is the voltage greater than 9 volts?**	**Yes** GO to **E6**. **No** GO to **E5**.
E5	**CHECK THE PATS TRANSCEIVER RECEIVE CIRCUIT 1216 (GY/OG) FOR SHORT TO GROUND**	
	• Key in OFF position. • Disconnect: PATS Transceiver C252. • Measure the resistance between the PATS transceiver C252-4, circuit 1216 (GY/OG), harness side and ground.  A0096371 • **Is the resistance greater than 10,000 ohms?**	**Yes** GO to **E6**. **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test. If the system fails again, GO to **E13**.
E6	**CHECK CIRCUIT 1216 (GY/OG) FOR AN OPEN**	
	• Key in OFF position. • Disconnect: PATS Transceiver C252. • Disconnect: Powertrain Control Module (PCM) C175b.	

(Continued)

Test E4-E6

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST E: PATS TRANSCEIVER MODULE SIGNAL IS NOT RECEIVED (Continued)

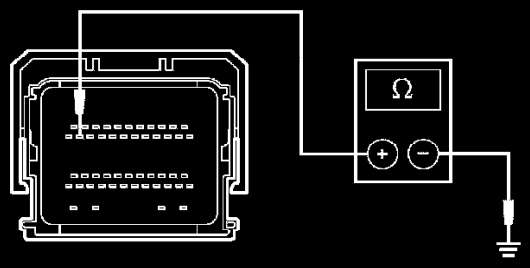
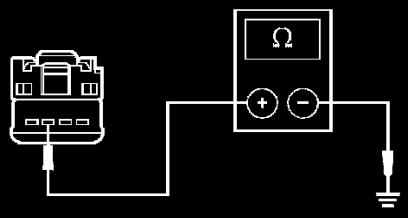
Test Step		Result / Action to Take
E6	CHECK CIRCUIT 1216 (GY/OG) FOR AN OPEN (Continued)	
	• Measure the resistance between the PATS transceiver C252-4, circuit 1216 (GY/OG), harness side and the PCM C175b-42, circuit 1216 (GY/OG), harness side.  A0096372 • **Is the resistance less than 5 ohms?**	**Yes** GO to **E7**. **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
E7	CHECK THE PATS TRANSCEIVER TRANSMIT CIRCUIT 1215 (WH/LG) FOR VOLTAGE	
	• Key in OFF position. • Connect: PATS Transceiver C252. • Connect: PCM C175b. • Key in ON position. • Measure the voltage by back-probing between the PATS transceiver C252-3, circuit 1215 (WH/LG), harness side and ground.  A0096373 • **Is the voltage greater than 9 volts?**	**Yes** GO to **E11**. **No** GO to **E8**.
E8	CHECK THE PATS TRANSCEIVER TRANSMIT CIRCUIT FOR A SHORT TO GROUND IN CIRCUIT 1215 (WH/LG) WITH THE TRANSCEIVER CONNECTED	
	• Key in OFF position. • Disconnect: PCM C175b.	

(Continued)

Test E6-E8

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST E: PATS TRANSCEIVER MODULE SIGNAL IS NOT RECEIVED (Continued)

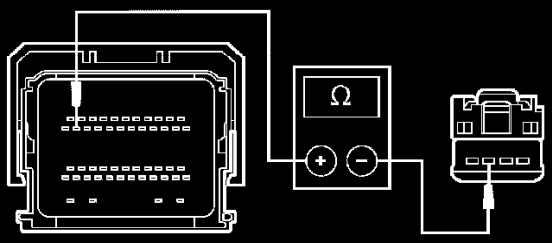
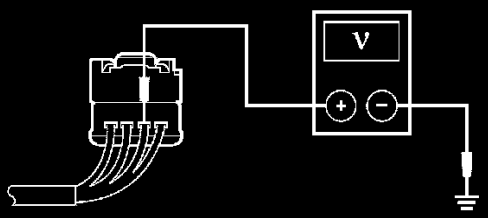
Test Step		Result / Action to Take
E8	**CHECK THE PATS TRANSCEIVER TRANSMIT CIRCUIT FOR A SHORT TO GROUND IN CIRCUIT 1215 (WH/LG) WITH THE TRANSCEIVER CONNECTED (Continued)**	
	• Measure the resistance between the PCM C175b-22, circuit 1215 (WH/LG), harness side and ground.  A0096374 • **Is the resistance greater than 10,000 ohms?**	**Yes** GO to **E10**. **No** GO to **E9**.
E9	**CHECK THE PATS TRANSCEIVER TRANSMIT CIRCUIT FOR A SHORT TO GROUND IN CIRCUIT 1215 (WH/LG) WITH THE TRANSCEIVER DISCONNECTED**	
	• Disconnect: PATS Transceiver C252. • Measure the resistance between the PATS transceiver C252-3, circuit 1215 (WH/LG), harness side and ground.  A0096375 • **Is the resistance greater than 10,000 ohms?**	**Yes** INSTALL a new PATS transceiver. CLEAR the DTCs. REPEAT the self-test. **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
E10	**CHECK THE PATS TRANSMIT CIRCUIT 1215 (WH/LG) FOR AN OPEN**	
	• Disconnect: PATS Transceiver C252.	

(Continued)

Test E8-E10

DIAGNOSIS AND TESTING (Continued)

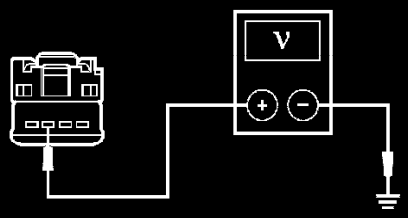
PINPOINT TEST E: PATS TRANSCEIVER MODULE SIGNAL IS NOT RECEIVED (Continued)

Test Step		Result / Action to Take
E10	**CHECK THE PATS TRANSMIT CIRCUIT 1215 (WH/LG) FOR AN OPEN (Continued)**	
	• Measure the resistance between the PATS transceiver C252-3, circuit 1215 (WH/LG), harness side and the PCM C175b-22, circuit 1215 (WH/LG), harness side.  A0096376 • **Is the resistance less than 5 ohms?**	**Yes** GO to **E13**. **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
E11	**CHECK THE TRANSCEIVER TRANSMIT CIRCUIT 1215 (WH/LG) FOR VOLTAGE**	
	• Key in ON position. • Use the diagnostic tool to access the active command TRANSMIT SIGNAL COMMAND. • Enter the following diagnostic mode on the diagnostic tool: Trigger TRANSMIT to ON. •  A0096373 • Measure the voltage by back-probing between the PATS transceiver C252-3, circuit 1215 (WH/LG), harness side and ground. • **Is the voltage less than 5 volts?**	**Yes** INSTALL a new PATS transceiver. CLEAR the DTCs. REPEAT the self-test. **No** GO to **E12**.
E12	**CHECK THE PATS TRANSCEIVER TRANSMIT CIRCUIT FOR A SHORT TO BATTERY**	
	• Key in OFF position. • Disconnect: PCM C175b. • Disconnect: PATS Transceiver C252. • Key in ON position.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST E: PATS TRANSCEIVER MODULE SIGNAL IS NOT RECEIVED (Continued)

Test Step		Result / Action to Take
E12	CHECK THE PATS TRANSCEIVER TRANSMIT CIRCUIT FOR A SHORT TO BATTERY (Continued)	
	• Measure the voltage between the PATS C252-3, circuit 1215 (WH/LG), harness side and ground.  A0096377 • **Is any voltage present?**	**Yes** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test. **No** GO to **E13**.
E13	CHECK FOR CORRECT PCM OPERATION	

	• Disconnect all of the PCM connectors.
	• Check for:
	  • corrosion
	  • pushed-out pins
	• Connect all of the PCM connectors and make sure they seat correctly.
	• Operate the system and verify the concern is still present.
	• **Is the concern still present?**
		Yes
		INSTALL a new PCM. REPROGRAM the encoded keys REFER to Key Programming Using Diagnostic Equipment. 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. CLEAR the DTCs. REPEAT the self-test.

Test E12-E13

Normal Operation

During each vehicle start sequence, the powertrain control module (PCM) queries the encoded key and compares the information with the key information stored in the PCM memory. The PCM then enables the starting functions of the engine. The transceiver provides the interface between the encoded ignition key and the PCM.

Possible Causes

- passive anti-theft system (PATS) transceiver
- PCM
- PATS key
- circuit 1203 (BK/LB) open
- circuit 1215 (WH/LG) open or short to power
- circuit 1216 (GY/OG) open or short to power
- circuit 1266 (RD/YE) open or short to ground

Test F: Anti-Theft Number Of Programmed Keys Is Below Minimum

PINPOINT TEST F: ANTI-THEFT NUMBER OF PROGRAMMED KEYS IS BELOW MINIMUM

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST F: ANTI-THEFT NUMBER OF PROGRAMMED KEYS IS BELOW MINIMUM

Test Step		Result / Action to Take
F1	RETRIEVE THE DIAGNOSTIC TROUBLE CODES (DTCS)	
	• Key in OFF position. • Enter the following diagnostic mode on the diagnostic tool: Retrieve the DTCs. • Enter the following diagnostic mode on the diagnostic tool: Clear the DTCs. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: Retrieve the DTCs. • **Is DTC B1213 retrieved?**	**Yes** GO to **F2**. **No** If other than PATS PCM DTCs are retrieved, REFER to Computers and Control Systems. If no PATS DTCs are retrieved, the system is OK.
F2	MONITOR THE PCM PID NUMKEYS	
	• Enter the following diagnostic mode on the diagnostic tool: Monitor PIDs. Monitor the PCM PID NUMKEYS. • **Does the PCM PID NUMKEYS display less than 2 PATS keys programmed?**	**Yes** GO to **F3**. **No** The system is OK.
F3	PROGRAM THE PATS KEYS	
	• **NOTE:** Two programmed PATS keys must be available to start the vehicle. Cut a new PATS key. • Program the new PATS key. Refer to Key Programming Using Diagnostic Equipment. • **Does the anti-theft indicator illuminate for 3 seconds and then go out?**	**Yes** CLEAR the DTCs. CYCLE the ignition switch OFF then back to RUN to verify all codes have been cleared. CLEAR the DTCs. REPEAT the self-test. **No** GO to **F4**.
F4	CHECK FOR SERV_MOD PID — MONITOR THE PCM PID SERV_MOD	
	• Enter the following diagnostic mode on the diagnostic tool: Retrieve the DTCs. • Monitor the PCM PID SERV_MOD. • **Does the PCM PID SERV_MOD indicate YES?**	**Yes** PROGRAM the PATS keys. REFER to Key Programming Using Diagnostic Equipment. CLEAR the DTCs. REPEAT the self-test. **No** If the anti-theft indicator is illuminated continuously, REPEAT Step F3 using a new PATS key. If the anti-theft indicator is flashing, RETRIEVE the PCM DTC stored for the new PATS fault. REFER to the Passive Anti-Theft System (PATS) — Diagnostic Trouble Codes (DTC) Index.

Test F1-F4

Normal Operation

The transceiver module communicates with the passive anti-theft system (PATS) key. During each vehicle start sequence, the transceiver module reads the PATS key identification code and circuit 1216 (GY/OG) sends the data to the powertrain control module (PCM). The control functions are contained in the PCM. This module carries out all of the PATS functions, such as receiving the identification code from the PATS key and controlling engine enable. The PCM initiates the key interrogation sequence when the key is turned to ON or START.

Possible Causes

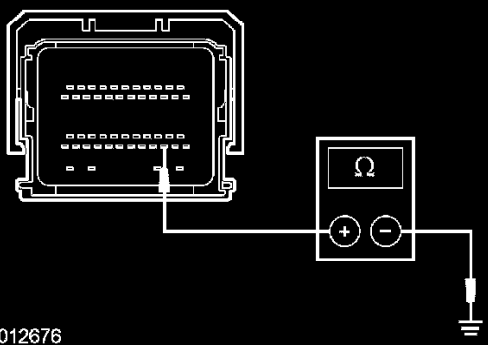
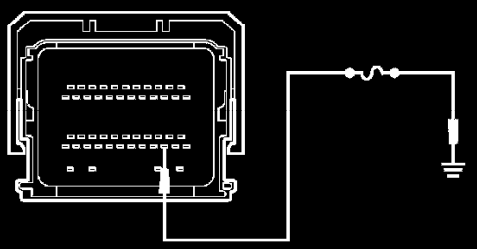
- less than 2 keys programmed to the system
- PATS transceiver
- unprogrammed PATS key
- PCM

Test G: The Anti-Theft Indicator Is Always/Never On - No Three Second Anti-Theft Indicator Prove Out

PINPOINT TEST G: THE ANTI-THEFT INDICATOR IS ALWAYS/NEVER ON NO THREE SECOND ANTI-THEFT INDICATOR PROVE OUT

DIAGNOSIS AND TESTING (Continued)

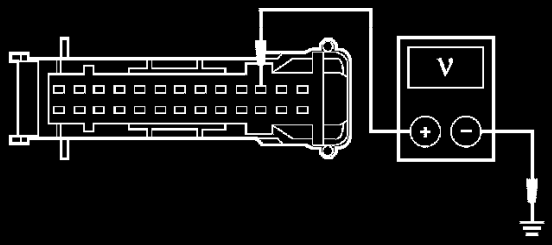
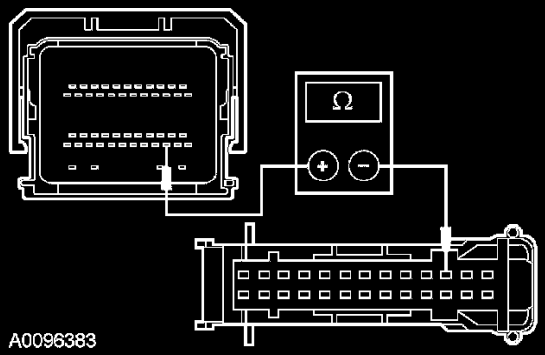
PINPOINT TEST G: THE ANTI-THEFT INDICATOR IS ALWAYS/NEVER ON — NO THREE SECOND ANTI-THEFT INDICATOR PROVE OUT

Test Step		Result / Action to Take
G1	CHECK ANTI-THEFT INDICATOR STATUS	
	• Observe the anti-theft indicator. • **Is the anti-theft indicator always on?**	**Yes** GO to **G2**. **No** GO to **G4**.
G2	CHECK THE PCM FOR A SHORT TO GROUND	
	• Key in OFF position. • Disconnect: PCM C175b. • **Is the anti-theft indicator on?**	**Yes** GO to **G3**. **No** GO to **G7**.
G3	CHECK CIRCUIT 1768 (OG/RD) FOR A SHORT TO GROUND	
	• Measure the resistance between the PCM C175b-37, circuit 1768 (OG/RD), harness side and ground.  N0012676 • **Is the resistance less than 5 ohms?**	**Yes** REPAIR the circuit. TEST the system for normal operation. **No** GO to **G8**.
G4	CHECK THE ANTI-THEFT INDICATOR FOR CORRECT OPERATION	
	• Key in OFF position. • Disconnect: PCM C175b. • Connect a fused (5A) jumper wire between the PCM C175b-37, circuit 1768 (OG/RD), harness side and ground.  A0096381 • **Does the anti-theft indicator illuminate?**	**Yes** GO to **G7**. **No** GO to **G5**.
G5	CHECK THE CIRCUIT 1768 (OG/RD) FOR A SHORT TO VOLTAGE	
	• Disconnect: Instrument Cluster C220.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST G: THE ANTI-THEFT INDICATOR IS ALWAYS/NEVER ON — NO THREE SECOND ANTI-THEFT INDICATOR PROVE OUT (Continued)

Test Step		Result / Action to Take
G5	**CHECK THE CIRCUIT 1768 (OG/RD) FOR A SHORT TO VOLTAGE (Continued)**	
	• Measure the voltage between the instrument cluster C220-11, circuit 1768 (OG/RD), harness side and ground.  A0096382 • **Is any voltage present?**	**Yes** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test. **No** GO to **G6**.
G6	**CHECK CIRCUIT 1768 (OG/RD) FOR AN OPEN BETWEEN THE PCM AND INSTRUMENT CLUSTER**	
	• Measure the resistance between the PCM C175b-37, circuit 1768 (OG/RD), harness side and the instrument cluster C220-11, circuit 1768 (OG/RD), harness side.  A0096383 • **Is the resistance less than 5 ohms?**	**Yes** GO to **G8**. **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
G7	**CHECK FOR CORRECT PCM OPERATION**	

	• Disconnect all of the PCM connectors.
	• Check for:
	  • corrosion
	  • pushed-out pins
	• Connect all of the PCM connectors and make sure they seat correctly.
	• Operate the system and verify the concern is still present.
	• **Is the concern still present?**
		Yes
		INSTALL a new PCM. REPROGRAM the encoded keys.REFER to Key Programming Using Diagnostic Equipment. 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. CLEAR the DTCs. REPEAT the self-test.

G8	**CHECK FOR CORRECT INSTRUMENT CLUSTER OPERATION**	

	• Disconnect all of the instrument cluster connectors.
	• Check for:
	  • corrosion
	  • pushed-out pins
	• Connect all of the instrument cluster connectors and make sure they seat correctly.
	• Operate the system and verify the concern is still present.
	• **Is the concern still present?**
		Yes
		INSTALL a new instrument cluster. CLEAR the DTCs. REPEAT the self-test.
		No
		The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.

Test G5-G8

Normal Operation

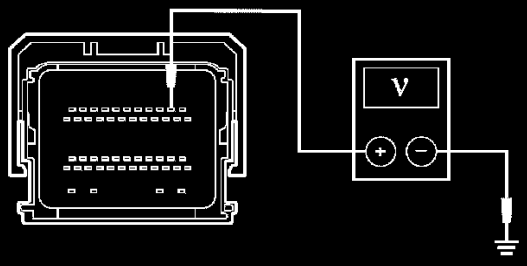
The passive anti-theft system (PATS) uses an anti-theft indicator. This indicator proves out for **3 seconds** when the ignition switch is in the ON or START position. If there is a PATS concern, this indicator either flashes rapidly or glows steadily (for more than **3 seconds**) when the ignition switch is in the ON or START position. The PATS also flashes the anti-theft indicator every **2 seconds** at key OFF to act as a visual theft deterrent.

Possible Causes
- instrument cluster
- anti-theft indicator is inoperative
- powertrain control module (PCM)
- circuit 1768 (OG/RD) open, short to ground, or short to voltage

Test H: The Anti-theft System Does Not Operate Correctly - The Engine Does Not Crank And The Anti-Theft Indicator Proves Out

PINPOINT TEST H: THE ANTI-THEFT SYSTEM DOES NOT OPERATE CORRECTLY - THE ENGINE DOES NOT CRANK AND THE ANTI-THEFT INDICATOR PROVES OUT NORMALLY

PINPOINT TEST H: THE ANTI-THEFT SYSTEM DOES NOT OPERATE CORRECTLY — THE ENGINE DOES NOT CRANK AND THE ANTI-THEFT INDICATOR PROVES OUT NORMALLY

Test Step		Result / Action to Take
H1	CHECK THE STARTING SYSTEM FOR CORRECT VOLTAGE	
	• Key in OFF position. • Disconnect: PCM C175b. • Key in ON position. • Measure the voltage between the PCM C175b-2, circuit 329 (PK), harness side and ground.  A0096384 • **Is the voltage less than 8 volts?**	**Yes** DIAGNOSE the starting system. REFER to Starting System. **No** GO to **H2.**
H2	CHECK FOR CORRECT PCM OPERATION	

	• Disconnect all of the PCM connectors.
	• Check for:
	  • corrosion
	  • pushed-out pins
	• Connect all of the PCM connectors and make sure they seat correctly.
	• Operate the system and verify the concern is still present.
	• **Is the concern still present?**
		Yes
		INSTALL a new PCM. REPROGRAM the encoded keys. REFER to Key Programming Using Diagnostic Equipment. 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.

Test H1-H2

Normal Operation

During each vehicle start sequence, the powertrain control module (PCM) queries the encoded key and compares the information with the key information stored in the PCM memory. The PCM then enables the starting functions of the engine. The transceiver provides the interface between the encoded ignition key and the PCM.

Possible Causes
- PCM
- circuit 329 (PK) open or short to ground
- starting system

DIAGNOSIS AND TESTING (Continued)

Symptom Chart

Condition	Possible Sources	Action
• No communication with the smart junction box (SJB)	• Fuse(s) • Circuitry • SJB	• REFER to Body Control Systems (Multifunction Electronic Control Module).
• The anti-theft indicator is always/never on — no three-second anti-theft indicator prove-out	• Smart junction box (SJB) fuse 18 (10A) • Circuitry • Instrument cluster • Powertrain control module (PCM)	• GO to Pinpoint Test G.
• The anti-theft system does not operate correctly — engine does not crank and the anti-theft indicator proves out normally	• Starter relay • Starter • Powertrain control module (PCM) • Circuitry	• GO to Pinpoint Test H.

Symptom Chart