

2006 ACCESSORIES & EQUIPMENT

Theft Deterrent - Equinox & Torrent

SCHEMATIC AND ROUTING DIAGRAMS

THEFT DETERRENT SYSTEM SCHEMATICS

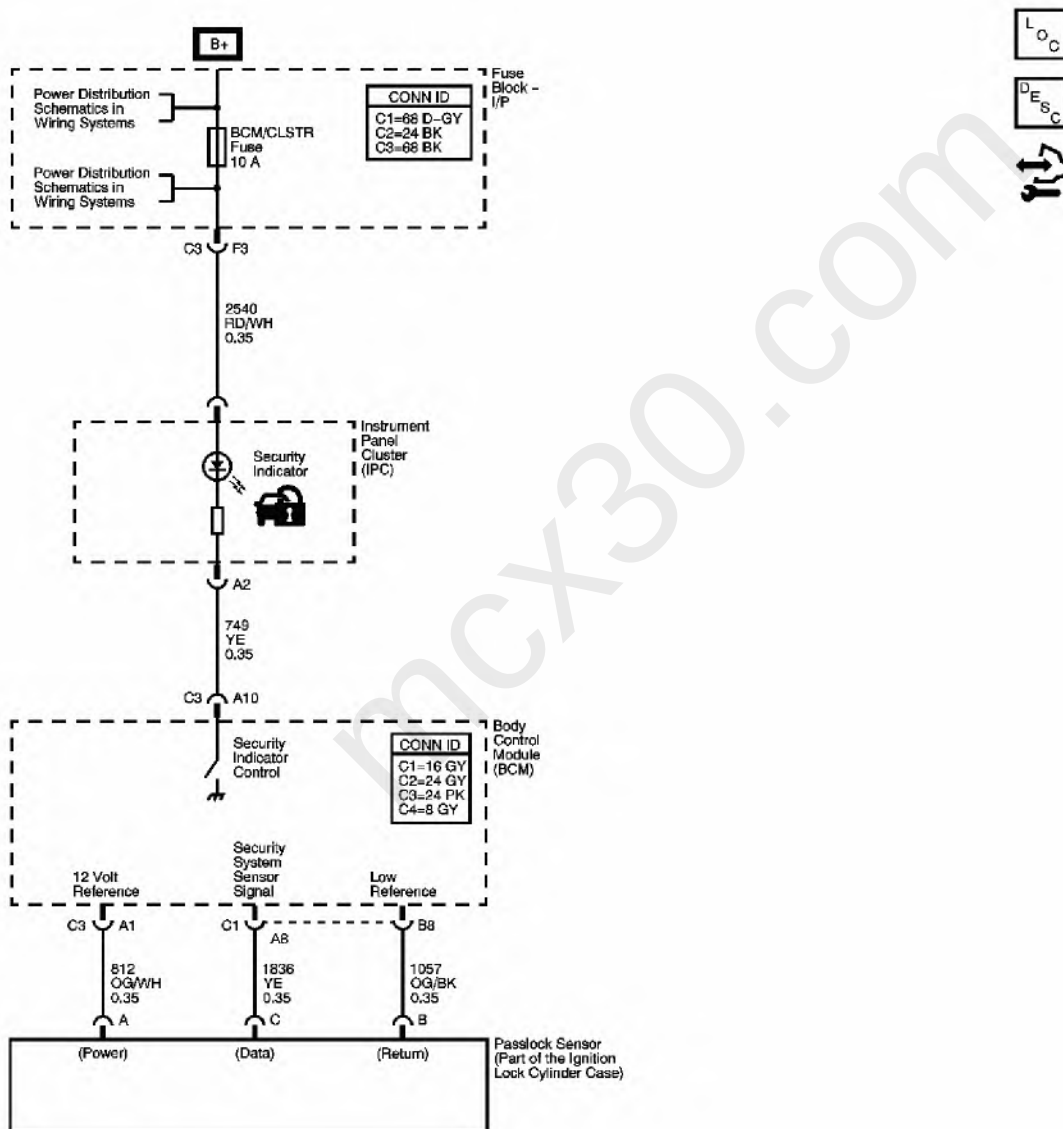


Fig. 1: Theft Deterrent System Schematics
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

THEFT DETERRENT SYSTEM COMPONENT VIEWS

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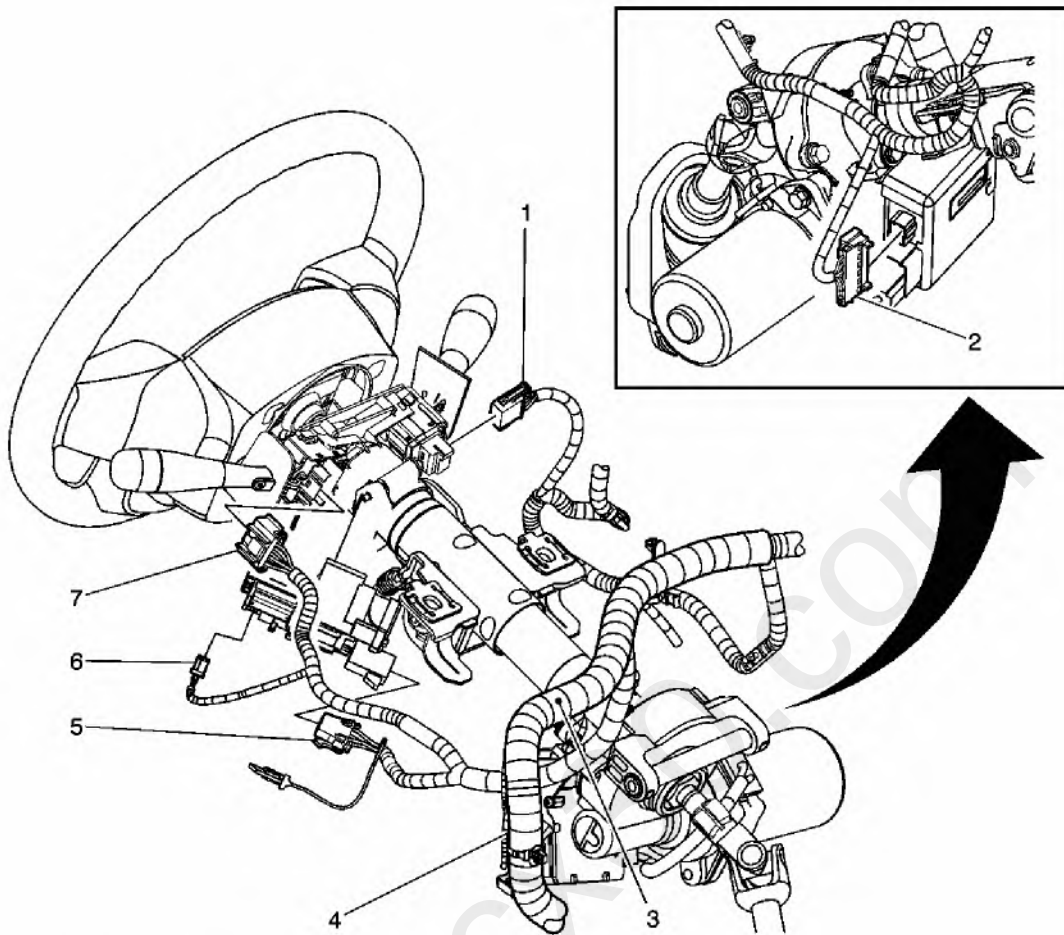


Fig. 2: View of Left Side of the I/P, Steering Column Connections Harness Routing
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Headlamp Switch
2	Power Steering Control Module (PSCM) C2
3	S200
4	I/P Harness
5	Ignition Switch
6	Passlock Sensor
7	Windshield Wiper/Washer Switch

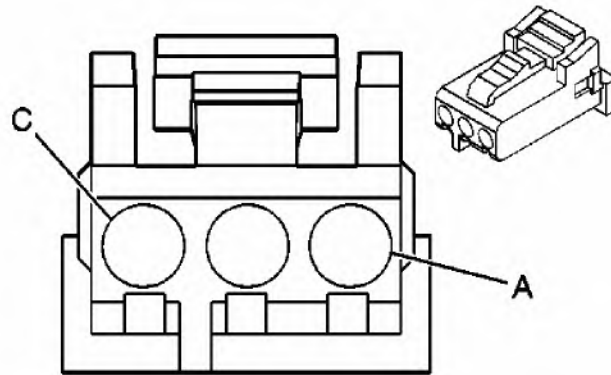
THEFT DETERRENT SYSTEM CONNECTOR END VIEWS

Passlock Sensor



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Connector Part Information

- OEM: 15326747
- Service: 15306385
- 3-Way F Micro-Pack 064 (BK)

Pin	Wire Color	Circuit No.	Function
A	OG/WH	812	12-Volt Reference
B	OG/BK	1057	Sensor Low Reference
C	YE	1836	Security System Sensor Signal

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B0688	Security System Indicator Circuit High
DTC B0689	Security System Indicator Circuit Open
DTC B2947	Security System Sensor Power Circuit Low
DTC B2948	Security System Sensor Power Circuit High
DTC B2957	Security System Sensor Data Circuit Low
DTC B2958	Security System Sensor Data Circuit High
DTC B2960	Security System Sensor Data Incorrect But Valid
DTC B3031	Security System Controller In Learn Mode
DTC B3033	Security System Indicates Tamper
DTC P1626	Theft Deterrent Fuel Enable Signal Lost
DTC P1630	Theft Deterrent Learn Mode Active
DTC P1631	Theft Deterrent Start Enable Signal Not Correct

DIAGNOSTIC STARTING POINT - THEFT DETERRENT

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Begin the system diagnosis with the **Diagnostic System Check - Vehicle** in Vehicle DTC Information. The Diagnostic System Check will provide the following information:

- The identification of the control modules which command the system
- The ability of the control modules to communicate through the serial data circuit
- The identification of any stored diagnostic trouble codes (DTCs) and their status

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

SCAN TOOL OUTPUT CONTROLS

Scan Tool Output Controls

Scan Tool Output Control	Additional Menu Selection (s)	Description
Daytime Running Lamps	Lamp Test	The BCM actuates the DRL relay when you select ON. The headlamps should illuminate until commanded OFF.
Horn Relay	Miscellaneous Test	The BCM actuates the horn relay for 5 seconds when you select ON. The horn should sound for 5 seconds.
Security LED	Miscellaneous Test	The BCM actuates the security LED when you select ON. The security LED should illuminate until commanded OFF.

SCAN TOOL DATA LIST

Body Control Module (BCM)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Ignition ON/Engine OFF/Vehicle in PARK			
Auto Learn Timer	Security Data	Seconds	0-600
Battery 1	Security Data	Volts	Varies
Driver Door Switch	Switch Inputs	Active/Inactive	Inactive (door closed)
Horn Relay Command	Security Data	Active/Inactive	Inactive
Horn Relay Feedback	Security Data	Active/Inactive	Inactive
Ignition 1 Input	Security Data	Active/Inactive	Active
Ignition 2 Input	Security Data	Active/Inactive	Active
Key Learned	Security Data	Numerical	Varies
Key Learn Enable	Security Data	Active/Inactive	Inactive

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Passenger Door Switches	Switch Inputs	Active/Inactive	Inactive (Door Closed)
Passlock Input	Security Data	Volts	0.86-5 Volts
Passlock Power Feedback	Security Data	Ignition Off/Tamper/Fail Enable/Fail Enable Dec/Seedkey Lrn Pend/Seedkey Learn/Auto Learn Pend/Learn Passlock/Monitor Passlock/Normal Decision/Auto Learn	Monitor Passlock
Passlock Timer	Security Data	Seconds	Varies
Security LED	Security Data	On/Off/Flashing	Off

Powertrain Control Module (PCM)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Ignition ON/Engine OFF/Vehicle in PARK			
VTD Auto Learn Timer	Engine Data 3	Active/Inactive	Inactive
VTD Fuel Disable	Engine Data 3	Active/Inactive	Inactive
VTD Fuel Disable Until	Engine Data 3	Yes/No	No
VTD Password Learn Enable	Engine Data 3	Yes/No	No

SCAN TOOL DATA DEFINITIONS**Auto Learn Timer**

The scan tool displays the seconds used by the BCM to learn valid code from the Passlock(tm) sensor. The learn procedure consists of 3 consecutive periods.

Battery 1

The scan tool displays the battery system voltage.

Drivers Door Switch

The scan tool displays the position of the drivers door switch. The scan tool displays ACTIVE when the drivers door is open and INACTIVE when the drivers door is closed.

Horn Relay Command

The scan tool displays the horn relay command input. The scan tool displays ACTIVE when the horn relay is commanded on.

Horn Relay Feedback

The scan tool displays the status of the horn relay feedback circuit. The scan tool displays ACTIVE when a feedback signal is present during a horn relay on condition.

Ignition 1 Input

The scan tool displays the state of the ignition switch. The scan tool displays ACTIVE when the ignition switch is in the RUN or CRANK position.

Ignition 2 Input

The scan tool displays the state of the ignition switch. The scan tool displays ACTIVE when the ignition switch is in the RUN position.

Key Learned

The scan tool displays the number of learned keys.

Key Learn Enable

The scan tool displays the key learn enable status. The scan tool displays ACTIVE during key learn.

Passlock Input

The scan tool displays the voltage code from the Passlock sensor to the Body Control Module (BCM). A valid Passlock sensor voltage of 5 volts will be displayed on the scan tool when the ignition cylinder is turned to the on position. Once the ignition cylinder has been rotated to the crank position the Passlock voltage will drop from 5 to 0.86-4.28 volts depending on which of the 10 possible Passlock sensors the vehicle is equipped with. The BCM then determines if the voltage received is a valid or invalid code. The scan tool will continue to display the Passlock voltage code (0.86-4.28 volts) received by the BCM when the ignition cylinder returns to the on/run position.

Passlock Power Feedback

The scan tool displays the state of the Passlock(tm) system.

Passlock Timer

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The scan tool displays the time remaining when in the tamper mode. The timer starts when the ignition switch is turned to the RUN position and the BCM receives a Passlock(tm) data voltage different from the last learned voltage. The timer has a delay of 10 minutes and will stay active even if the ignition switch is cycled from the RUN to the OFF position.

Security LED

The scan tool displays the state of the SECURITY lamp. The scan tool displays ON, OFF or FLASHING.

VTD Auto Learn Timer

The scan tool displays the state of the VTD learn timer. The scan tool displays INACTIVE when the BCM is not in a learn mode.

VTD Fuel Disable

The scan tool displays the state of the VTD fuel disable mode. The scan tool displays INACTIVE when the Passlock(tm) system verifies a valid password.

VTD Fuel Disable Until

The scan tool displays the state of the VTD fuel disable until Ignition off mode. The scan tool displays NO when the Passlock(tm) system verifies a valid password.

VTD Password Learn Enable

The scan tool displays the state of the VTD password learn mode. The scan tool displays NO when the Passlock(tm) system is not in a learn mode.

DTC B0688

Circuit Description

The security indicator is used by both the vehicle theft deterrent (VTD) system and the content theft deterrent (CTD) system. The security indicator is controlled by the body control module (BCM) via the security indicator control circuit. When VTD or CTD requests the security indicator be illuminated, the BCM grounds the security indicator control circuit, illuminating the security indicator.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B0688 Security System Indicator Circuit High

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Conditions for Setting the DTC

The BCM detects a short to battery in the security indicator control circuit.

Action Taken When the DTC Sets

The BCM will set and store DTC B0688.

Conditions for Clearing the MIL/DTC

- The BCM no longer detects a short to battery in the security indicator control circuit.
- A scan tool is used to clear the DTC.

DTC B0688

Step	Action	Yes	No
Schematic Reference: Theft Deterrent System Schematics			
Connector End View Reference: Theft Deterrent System Connector End Views			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Turn ON the ignition, with the engine OFF. 2. With the scan tool, command the security indicator ON and OFF. Does the security indicator turn ON and OFF with each command?	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
3	Test for a short to battery in the security indicator control circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 6	Go to Step 4
4	Inspect for poor connections at the harness connector of the body control module (BCM). Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 6	Go to Step 5
	Replace the BCM. Refer to Control Module References in		

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5	Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 6	-
6	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 1

DTC B0689**Circuit Description**

The security indicator is used by both the vehicle theft deterrent (VTD) system and the content theft deterrent (CTD) system. The security indicator is controlled by the body control module (BCM) via the security indicator control circuit. When VTD or CTD requests the security indicator be illuminated, the BCM grounds the security indicator control circuit, illuminating the security indicator.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B0689 Security System Indicator Circuit Open

Conditions for Setting the DTC

The BCM detects an open in the security indicator control circuit when the security indicator is commanded ON.

Action Taken When the DTC Sets

The BCM will set and store DTC B0689.

Conditions for Clearing the MIL/DTC

- The BCM no longer detects an open in the security indicator control circuit.
- A scan tool is used to clear the DTC.

DTC B0689

Step	Action	Yes	No
Schematic Reference: Theft Deterrent System Schematics			
Connector End View Reference: Theft Deterrent System Connector End Views			
1	Did you perform the Diagnostic System Check - Vehicle?		Go to Diagnostic System Check - Vehicle in

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		Go to Step 2	Vehicle DTC Information
2	1. Turn ON the ignition, with the engine OFF. 2. With the scan tool, command the security indicator ON and OFF. Does the security indicator turn ON and OFF with each command?	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
3	1. Disconnect the body control module (BCM) connector containing the security indicator control circuit. 2. Using a fused jumper wire and the appropriate terminal adapter, ground the security indicator control circuit. Does the security indicator illuminate?	Go to Step 6	Go to Step 4
4	Test for an open or short to ground in the security indicator control circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 9	Go to Step 5
5	Inspect for poor connections at the harness connector of the instrument panel cluster (IPC). Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 9	Go to Step 7
6	Inspect for poor connections at the harness connector of the BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 9	Go to Step 8
7	Replace the IPC. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 9	-
8	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for		

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	replacement, setup, and programming. Did you complete the replacement?	Go to Step 9	-
9	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 1

DTC B2947

Circuit Description

The Passlock(tm) system is provided in order to prevent vehicle theft if the ignition lock cylinder is forced to rotate or the ignition switch is operated while separated from the ignition lock cylinder case. The body control module (BCM) provides security system sensor power and low reference for the Passlock(tm) sensor. The BCM also measures the security system sensor voltage.

When the correct key is used to start the vehicle, a magnet on the lock cylinder passes close to the Passlock(tm) sensor within the ignition lock cylinder case. The magnet activates the security hall effect sensor in the Passlock(tm) sensor which completes a circuit from the security sensor signal circuit through a resistor to the security sensor low reference circuit. The resistance value will vary from vehicle to vehicle. The BCM will measure the voltage on the security sensor signal circuit and compare this voltage to a previously learned voltage. If the voltage measured is within the valid range, the BCM will send a serial data message to the powertrain control module (PCM) to enable vehicle starting. If the voltage measured is not within the valid range, a serial data message will be sent to the PCM to disable starting of the vehicle.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B2947 Security System Sensor Power Circuit Low

Conditions for Setting the DTC

The BCM detects a short to ground on the Passlock(tm) sensor power circuit for 1 second, with the ignition switch in the ACCESSORY, ON, or START position.

Action Taken When the DTC Sets

- The BCM stores DTC B2947 in memory.
- The BCM sends a message to the instrument cluster to turn the SECURITY indicator ON.
- In addition, the BCM will take one of 2 actions:
 - If the Passlock(tm) sensor power circuit is shorted to ground when attempting to

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start the engine, the BCM will NOT send a message to the PCM to enable fuel delivery to the engine. The vehicle will exhibit an engine no start or starts then stalls condition.

- If the Passlock(tm) sensor power circuit is shorted to ground after the engine has started, the BCM enters a fail-enable mode. Upon subsequent engine start attempts, the BCM will send a password message to the PCM via the class 2 serial data link to enable fuel delivery to the engine. The engine will start.

Conditions for Clearing the DTC

- The BCM no longer detects a short to ground in the Passlock(tm) sensor power circuit.
- When a short to ground is no longer present on the Passlock(tm) sensor power circuit, the ignition switch must be cycled from OFF to ON before this DTC can change from a current DTC to a history DTC.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.

Diagnostic Aids

Inspect for a short between the Passlock(tm) sensor power circuit and the Passlock(tm) sensor ground circuit, or a short to ground on the Passlock(tm) sensor power circuit.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step verifies that DTC B2947 is a current DTC.

3: This step tests for a short to ground in the Passlock(tm) sensor or the pigtail harness.

DTC B2947

Step	Action	Yes	No
Schematic Reference: Theft Deterrent System Schematics			
Connector End View Reference: Theft Deterrent System Connector End Views			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. Select the body control module display DTCs function on the scan tool.		Go to Testing for Intermittent Conditions and

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	Does the scan tool display DTC B2947 as a current DTC?	Go to Step 3	Poor Connections in Wiring Systems
3	1. Disconnect the Passlock(tm) sensor connector. 2. Measure the voltage between the Passlock(tm) 12-volt reference circuit and a good ground. Does the voltage measure approximately battery voltage?	Go to Step 6	Go to Step 4
4	Test the Passlock(tm) battery voltage circuit for a short to ground. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 10	Go to Step 5
5	Inspect for poor connections at the body control module (BCM). Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 10	Go to Step 7
6	Inspect for poor connections at the Passlock (tm) sensor. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 10	Go to Step 8
7	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 10	-
8	Replace the Passlock(tm) sensor. Refer to Ignition Lock Cylinder Case Replacement in Steering Wheel and Column. Did you complete the replacement?	Go to Step 9	-
9	Perform the Passlock(tm) learn procedure. Refer to Programming Theft Deterrent System Components . Did you complete the procedure?	Go to Step 10	-
	1. Use the scan tool in order to clear the DTCs.		

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10	2. Operate the vehicle within the Conditions for Running the DTC, as specified in the supporting text.		
	Does the DTC reset?	Go to Step 3	System OK

DTC B2948

Circuit Description

The Passlock(tm) system is provided in order to prevent vehicle theft if the ignition lock cylinder is forced to rotate or the ignition switch is operated while separated from the ignition lock cylinder case. The body control module (BCM) provides security system sensor power and low reference for the Passlock(tm) sensor. The BCM also measures the security system sensor voltage.

When the correct key is used to start the vehicle, a magnet on the lock cylinder passes close to the Passlock(tm) sensor within the ignition lock cylinder case. The magnet activates the security hall effect sensor in the Passlock(tm) sensor which completes a circuit from the security sensor signal circuit through a resistor to the security sensor low reference circuit. The resistance value will vary from vehicle to vehicle. The BCM will measure the voltage on the security sensor signal circuit and compare this voltage to a previously learned voltage. If the voltage measured is within the valid range, the BCM will send a serial data message to the powertrain control module (PCM) to enable vehicle starting. If the voltage measured is not within the valid range, a serial data message will be sent to the PCM to disable starting of the vehicle.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B2948 Security System Sensor Power Circuit High

Conditions for Running the DTC

The ignition switch is cycled to CRANK, released to ON, and then cycled to OFF.

Conditions for Setting the DTC

- The BCM turns the Passlock(tm) sensor power OFF after the ignition switch is turned OFF.
- If the BCM still senses battery voltage for 1 second after the shut down of voltage, DTC B2948 will set.

Action Taken When the DTC Sets

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- The BCM stores DTC B2948 in memory.
- The vehicle will start and run.
- The SECURITY indicator remains illuminated.

Conditions for Clearing the DTC

- The BCM no longer detects a short to battery in the Passlock(tm) 12-volt reference circuit.
- When a short to battery is no longer present on the Passlock(tm) 12-volt reference circuit, the ignition switch must be cycled from OFF to ON before this DTC can change from a current DTC to a history DTC.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.

Diagnostic Aids

Inspect for a short to battery on the Passlock(tm) 12-volt reference circuit with the ignition switch OFF.

Test Description

The number below refers to the step number on the diagnostic table.

3: This step tests for a short to battery positive on the Passlock(tm) 12-volt reference circuit.

DTC B2948

Step	Action	Yes	No
Schematic Reference: Theft Deterrent System Schematics			
Connector End View Reference: Theft Deterrent System Connector End Views			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. Select the body control module display DTCs function on the scan tool. Does the scan tool display DTC B2948 as a current DTC?	Go to Step 3	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems

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3	IMPORTANT: The use of a DMM is crucial in this step because voltage may be measured for 10 milliseconds. 1. Disconnect the Passlock(tm) sensor connector. 2. Connect a DMM between the Passlock (tm) 12-volt reference circuit and a good ground. 3. Set the "MIN MAX" mode to the 1-millisecond peak and start to record. 4. Turn OFF the ignition. 5. Stop recording and review the recorded "MIN" value. Does the voltage measure near zero volts?	Go to Step 7	Go to Step 4
4	Test the Passlock(tm) 12-volt reference circuit for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 10	Go to Step 5
5	Inspect for poor connections at the body control module (BCM). Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 10	Go to Step 6
6	Inspect for poor connections at the Passlock (tm) sensor. Refer to Testing for Intermittent Conditions and Poor Connections in Wiring Systems. Did you find and correct the condition?	Go to Step 10	Go to Step 8
7	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 10	-
8	Replace the Passlock(tm) sensor. Refer to Ignition Lock Cylinder Case Replacement in Steering Wheel and Column. Did you complete the replacement?	Go to Step 9	-
9	Perform the Passlock(tm) learn procedure. Refer to Programming Theft Deterrent		

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	<u>System Components.</u> Did you complete the repair?	Go to Step 10	-
10	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC, as specified in the supporting text.		
	Does the DTC reset?	Go to Step 3	System OK

DTC B2957

Circuit Description

The Passlock(tm) system is provided in order to prevent vehicle theft if the ignition lock cylinder is forced to rotate or the ignition switch is operated while separated from the ignition lock cylinder case. The body control module (BCM) provides security system sensor power and low reference for the Passlock(tm) sensor. The BCM also measures the security system sensor voltage.

When the correct key is used to start the vehicle, a magnet on the lock cylinder passes close to the Passlock(tm) sensor within the ignition lock cylinder case. The magnet activates the security hall effect sensor in the Passlock(tm) sensor which completes a circuit from the security sensor signal circuit through a resistor to the security sensor low reference circuit. The resistance value will vary from vehicle to vehicle. The BCM will measure the voltage on the security sensor signal circuit and compare this voltage to a previously learned voltage. If the voltage measured is within the valid range, the BCM will send a serial data message to the powertrain control module (PCM) to enable vehicle starting. If the voltage measured is not within the valid range, a serial data message will be sent to the PCM to disable starting of the vehicle.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B2957 Security System Sensor Data Circuit Low

Conditions for Setting the DTC

- The ignition switch is ON.
- The BCM signal input is less than 0.4 volts for 1 second after turning the ignition switch to the CRANK position.

Action Taken When the DTC Sets

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- The vehicle will not start if the fault occurs before you start the vehicle. The security indicator will flash for 10 minutes then turn ON steady.
- If the vehicle is running when the fault occurs, the BCM will be put in fail enable mode, allowing the vehicle to start and run. The security indicator will be ON.

Conditions for Clearing the DTC

- The DTC will clear once the ignition cycle has occurred without the fault recurring.
- The BCM history codes will clear once 100 concurrent ignition cycles occur without the fault recurring.
- Using a scan tool.

Diagnostic Aids

- Use a scan tool in order to inspect the Passlock(tm) data voltage and the Passlock(tm) code.
- Inspect the Passlock(tm) sensor harness for an intermittent or a short to ground. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.
- Following a repair, the tamper timer requires 10 minutes in order to expire.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

3: Tests for proper operation of the circuit in the high voltage range.

4: Tests for a short to ground in the Passlock(tm) Security System Sensor Signal circuit.

DTC B2957

Step	Action	Values	Yes	No
Schematic Reference: Theft Deterrent System Schematics				
Connector End View Reference: Theft Deterrent System Connector End Views				
1	Did you perform the Diagnostic System Check - Vehicle?	-	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
	1. Install a scan tool. 2. Momentarily rotate the ignition switch to CRANK. Do not start the vehicle.			

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2	3. Release the ignition switch to ON. 4. With a scan tool, observe the Passlock(tm) data voltage in the body control module (BCM) security data list. Does the scan tool indicate that the Passlock(tm) data voltage is within the specified range?	0.4-4.9 V	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
3	1. Turn OFF the ignition. 2. Disconnect the Passlock(tm) sensor connector. 3. Turn ON the ignition, with the engine OFF. 4. With a scan tool, observe the Passlock(tm) data voltage in the BCM security data list. Does the scan tool indicate that the Passlock(tm) data voltage is greater than the specified value?	4.9 V	Go to Step 7	Go to Step 4
4	Test the Passlock(tm) security system sensor signal circuit for a short to ground. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 10	Go to Step 5
5	Inspect for poor connections at the BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 10	Go to Step 6
6	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup and programming. Did you complete the replacement?	-	Go to Step 10	-
	Inspect for poor connections at the Passlock(tm) sensor. Refer to Testing			

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7	for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 10	Go to Step 8
8	Replace the Passlock(tm) sensor in the electronic column lock module assembly. Refer to Ignition Lock Cylinder Case Replacement in Steering Wheel and Column. Did you complete the replacement?	-	Go to Step 9	-
9	Perform the Programming Theft Deterrent System Components procedure. Is the repair complete?	-	Go to Step 10	-
10	1. Use the scan tool in order to clear the DTCs. 2. Turn OFF the ignition. 3. Turn ON the ignition, with the engine OFF. 4. Select the body control module display DTCs function on the scan tool. Does the DTC reset?	-	Go to Step 3	System OK

DTC B2958

Circuit Description

The Passlock(tm) system is provided in order to prevent vehicle theft if the ignition lock cylinder is forced to rotate or the ignition switch is operated while separated from the ignition lock cylinder case. The body control module (BCM) provides security system sensor power and low reference for the Passlock(tm) sensor. The BCM also measures the security system sensor voltage.

When the correct key is used to start the vehicle, a magnet on the lock cylinder passes close to the Passlock(tm) sensor within the ignition lock cylinder case. The magnet activates the security hall effect sensor in the Passlock(tm) sensor which completes a circuit from the security sensor signal circuit through a resistor to the security sensor low reference circuit. The resistance value will vary from vehicle to vehicle. The BCM will measure the voltage on the security sensor signal circuit and compare this voltage to a previously learned voltage. If the voltage measured is within the valid range, the BCM will send a serial data message to

the powertrain control module (PCM) to enable vehicle starting. If the voltage measured is not within the valid range, a serial data message will be sent to the PCM to disable starting of the vehicle.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B2958 Security System Sensor Data Circuit High**Conditions for Setting the DTC**

- The ignition switch is ON.
- The BCM signal input is greater than 4.9 volts for 1 second, after turning the ignition switch to the CRANK position.

Action Taken When the DTC Sets

- The DTC will set only when the engine is running.
- The BCM will be in the fail enable mode allowing the vehicle to start and run.
- The SECURITY indicator will be ON.

Conditions for Clearing the DTC

- The current DTC will clear once an ignition cycle has occurred without the fault recurring.
- After 100 concurrent ignition cycles occur without the fault recurring, a history DTC clears.
- Using a scan tool

Diagnostic Aids

- Use a scan tool in order to inspect the Passlock(tm) data voltage and the Passlock(tm) code.
- Inspect the Passlock(tm) sensor harness for an intermittent or a short to battery. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.
- You may be directed to this table from the vehicle theft deterrent (VTD) Diagnostic System Check without a DTC B2958 being set. If you were directed to this table, follow all of the steps in this diagnostic table.
- When directed to this table, DTC B2958 may have a history status.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

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3: This step tests for proper operation of the circuit in the high voltage range.

4: This step tests for proper operation of the circuit in the low voltage range.

5: This step tests for high resistance or an open in the 12-volt reference circuit.

7: This step tests for a short to voltage, a high resistance, or an open in the Security System Sensor Signal circuit.

8: This step tests for high resistance or an open in the Low Reference circuit.

DTC B2958

Step	Action	Values	Yes	No
Schematic Reference: Theft Deterrent System Schematics Connector End Reference: Theft Deterrent System Connector End Views				
1	Did you perform the Diagnostic System Check - Vehicle?	-	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Install a scan tool. 2. Momentarily rotate the ignition switch to CRANK, do not start the vehicle. 3. Release the ignition switch to ON. 4. With a scan tool, observe the Passlock(tm) Data Voltage in the body control module (BCM) security data list. Does the scan tool indicate that the Passlock(tm) data voltage is within the specified range?	0.4-4.9 V	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
3	1. Turn OFF the ignition. 2. Disconnect the Passlock(tm) sensor. 3. Turn ON the ignition, with the engine OFF. 4. With a scan tool observe the Passlock(tm) data voltage in the BCM security data list.	4.9 V		

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	Does the scan tool indicate that the Passlock(tm) data voltage is greater than the specified value?		Go to Step 4	Go to Step 9
4	1. Turn OFF the ignition. 2. Connect a 3-amp fused jumper wire between the Passlock(tm) security system sensor signal circuit and the Passlock(tm) low reference circuit. 3. Turn ON the ignition, with the engine OFF. 4. With a scan tool observe the Passlock(tm) data voltage in the BCM security data list. Does the scan tool indicate that the Passlock(tm) data voltage is less than the specified value?	0.4 V	Go to Step 5	Go to Step 7
5	1. Disconnect the fused jumper wire. 2. Measure the voltage between the Passlock(tm) 12-volt reference circuit and the Passlock(tm) low reference circuit. Does the voltage measure less than the specified value?	12 V	Go to Step 6	Go to Step 11
6	Test the 12-volt reference circuit of the Passlock(tm) sensor for a high resistance or an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 14	Go to Step 9
7	Test the security system sensor signal circuit of the Passlock(tm) sensor for the following: • A short to voltage • A high resistance • An open	-		

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	Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?		Go to Step 14	Go to Step 8
8	Test the low reference circuit of the Passlock(tm) sensor for a high resistance or an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 14	Go to Step 9
9	Inspect for poor connections at the BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 14	Go to Step 10
10	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	-	Go to Step 14	-
11	Inspect for poor connections at the Passlock(tm) sensor. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 14	Go to Step 12
12	Replace the Passlock(tm) sensor. Refer to Ignition Lock Cylinder Case Replacement in Steering Wheel and Column. Did you complete the replacement?	-	Go to Step 13	-
13	Perform the Programming Theft Deterrent System Components procedure. Is the repair complete?	-	Go to Step 14	-
	1. Use the scan tool in order to clear the DTCs.			

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14	2. Turn OFF the ignition. 3. Momentarily rotate the ignition switch to CRANK. Do not start the vehicle. 4. Release the ignition switch to ON. 5. Select the body control module display DTCs function on the scan tool.	-		
	Does the DTC reset?			
			Go to Step 3	Go to Step 15
15	Attempt to start the vehicle. Does the engine start and run?	-	System OK	Go to Step 3

DTC B2960**Circuit Description**

The Passlock(tm) system is provided in order to prevent vehicle theft if the ignition lock cylinder is forced to rotate or the ignition switch is operated while separated from the ignition lock cylinder case. The body control module (BCM) provides security system sensor power and low reference for the Passlock(tm) sensor. The BCM also measures the security system sensor voltage.

When the correct key is used to start the vehicle, a magnet on the lock cylinder passes close to the Passlock(tm) sensor within the ignition lock cylinder case. The magnet activates the security hall effect sensor in the Passlock(tm) sensor which completes a circuit from the security sensor signal circuit through a resistor to the security sensor low reference circuit. The resistance value will vary from vehicle to vehicle. The BCM will measure the voltage on the security sensor signal circuit and compare this voltage to a previously learned voltage. If the voltage measured is within the valid range, the BCM will send a serial data message to the powertrain control module (PCM) to enable vehicle starting. If the voltage measured is not within the valid range, a serial data message will be sent to the PCM to disable starting of the vehicle.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B2960 Security System Sensor Data Incorrect But Valid

Conditions for Setting the DTC

- The BCM will inspect for a valid code when the ignition is rotated from ON to

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CRANK and will continue to monitor the signal during the engine running period.

- The BCM is reading a valid but different code value than previously learned from the Passlock(tm) sensor.

Action Taken When the DTC Sets

- The vehicle will not start if the fault occurs before you start the vehicle. The security indicator will be FLASHING.
- If the vehicle is running when the fault occurs, the BCM will be put into fail enable mode allowing the vehicle to start and run. The security indicator will be ON.

Conditions for Clearing the DTC

- The DTC will clear once an ignition cycle occurs without the fault recurring.
- The BCM history codes will clear once 100 concurrent ignition cycles occur without the fault recurring.
- Using a scan tool.

Diagnostic Aids

- Use a scan tool in order to inspect the Passlock(tm) data voltage and the Passlock(tm) code.
- Inspect for poor connections at the Passlock(tm) sensor. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

6: Tests for the proper operation of the circuit in the normal voltage range.

DTC B2960

Step	Action	Values	Yes	No
Schematic Reference: Theft Deterrent System Schematics				
Connector End View Reference: Theft Deterrent System Connector End Views				
1	Did you perform the Diagnostic System Check - Vehicle?	-	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
	1. Install a scan tool.			

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2	2. Momentarily rotate the ignition switch to CRANK. Do not start the vehicle. 3. Release the ignition switch to ON. 4. Select the body control module (BCM) display DTCs function on the scan tool. Does the scan tool display DTC B2960 as a current DTC?	-	Go to Step 3	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems
3	Does the scan tool display DTC B2947, B2948, B2957, or B2958?	-	Go to Diagnostic Trouble Code (DTC) List - Vehicle in Vehicle DTC Information	Go to Step 4
4	Have you replaced the Passlock(tm) sensor on this vehicle?	-	Go to Step 5	Go to Step 6
5	Have you performed a Passlock(tm) learn procedure after replacing the Passlock(tm) sensor?	-	Go to Step 6	Go to Step 9
6	With a scan tool, observe the Passlock (tm) data voltage for one minute. Does the scan tool indicate that the Passlock(tm) data voltage is changing more than the specified value?	+/- 0.02 V	Go to Step 7	Go to Step 9
7	Inspect for poor connections at the Passlock(tm) sensor. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 10	Go to Step 8
8	Replace the Passlock(tm) sensor. Refer to Ignition Lock Cylinder Case Replacement in Steering Wheel and Column. Did you complete the replacement?	-	Go to Step 9	-
	Perform the Programming Theft			

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9	Deterrent System Components procedure. Is the repair complete?	-	Go to Step 10	-
10	1. Use the scan tool in order to clear the DTCs. 2. Turn OFF the ignition. IMPORTANT: Do not start the vehicle. 3. Momentarily rotate the ignition switch to CRANK. 4. Release the ignition switch to ON. 5. Select the body control module display DTCs function on the scan tool.	-		
	Does the DTC reset?		Go to Step 3	System OK

DTC B3031

Circuit Description

The Passlock(tm) system is provided in order to prevent vehicle theft if the ignition lock cylinder is forced to rotate or the ignition switch is operated while separated from the ignition lock cylinder case. The body control module (BCM) provides security system sensor power and a low reference for the Passlock(tm) sensor. The BCM also measures the security system sensor voltage.

When the correct key is used to start the vehicle, a magnet on the lock cylinder passes close to the Passlock(tm) sensor within the ignition lock cylinder case. The magnet activates the security hall effect sensor in the Passlock(tm) sensor which completes a circuit from the security system sensor signal circuit through a resistor to the low reference circuit. The resistance value will vary from vehicle to vehicle. The BCM will measure the voltage on the security system sensor signal circuit and compare this voltage to a previously learned voltage. If the voltage measured is within the valid range, the BCM will send a serial data message to the powertrain control module (PCM) to enable vehicle starting. If the voltage measured is not within the valid range, a serial data message will be sent to the PCM to disable starting of the vehicle.

DTC Descriptor

This diagnostic procedure supports the following DTC:

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DTC B3031 Security System Controller In Learn Mode

Conditions for Setting the DTC

- A new BCM has been installed and the ignition is turned to the ON position but not rotated to the CRANK position. Once the ignition switch has been rotated to the CRANK position, the BCM will learn the Passlock(tm) code. The theft relearn procedure will need to be run in order to make the powertrain/vehicle control module (PCM/VCM) receive the correct fuel enable password.
- The BCM is in the learn mode but does not see a valid Passlock(tm) sensor code because of a sensor or a wiring problem.

Action Taken When the DTC Sets

The vehicle will not run. The security indicator will be ON.

Conditions for Clearing the MIL/DTC

- The DTC will clear after an ignition cycle with the BCM having learned a valid code.
- Using a scan tool.

Diagnostic Aids

- Prior to replacing a BCM, ensure that all of the diagnostics have been completed. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** in Vehicle DTC Information.
- Inspect the Passlock(tm) sensor harness for intermittent or poor connections. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

3: Tests for the proper operation of the 12-volt reference Security Sensor Power circuit, sensor ground circuit, and Passlock(tm) sensor signal data circuit. Troubleshoot the appropriate DTC prior to diagnosing DTC B3031.

DTC B3031

Step	Action	Yes	No
Schematic Reference: Theft Deterrent System Schematics			
Connector End View Reference: Theft Deterrent System Connector End Views			
1	Did you perform the Diagnostic System Check - Vehicle?		Go to <u>Diagnostic System Check - Vehicle</u> in Vehicle DTC

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		Go to Step 2	Information
2	1. Install a scan tool. 2. Momentarily rotate the ignition switch to CRANK. Do not start the vehicle. 3. Release the ignition switch to ON. 4. Select the body control module (BCM) display DTCs function on the scan tool. Does the scan tool display DTC B3031 as a current DTC?	Go to Step 3	Go to Step 4
3	Does the scan tool display DTC B2947, B2948, B2957, B2958, B2960, or B3033?	Go to Diagnostic Trouble Code (DTC) List - Vehicle in Vehicle DTC Information	Go to Step 4
4	1. Use the scan tool in order to clear the DTCs. 2. Turn OFF the ignition. 3. Start the vehicle. 4. Select the body control module display DTCs function on the scan tool. Does the DTC reset?	Go to Step 3	System OK

DTC B3033**Circuit Description**

The Passlock(tm) system is provided in order to prevent vehicle theft if the ignition lock cylinder is forced to rotate or the ignition switch is operated while separated from the ignition lock cylinder case. The body control module (BCM) provides security system sensor power and low reference for the Passlock(tm) sensor. The BCM also measures the security system sensor voltage.

When the correct key is used to start the vehicle, a magnet on the lock cylinder passes close to the Passlock(tm) sensor within the ignition lock cylinder case. The magnet activates the security hall effect sensor in the Passlock(tm) sensor which completes a circuit from the security sensor signal circuit through a resistor to the security sensor low reference circuit.

The resistance value will vary from vehicle to vehicle. The BCM will measure the voltage on the security sensor signal circuit and compare this voltage to a previously learned voltage. If the voltage measured is within the valid range, the BCM will send a serial data message to the powertrain control module (PCM) to enable vehicle starting. If the voltage measured is not within the valid range, a serial data message will be sent to the PCM to disable starting of the vehicle.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B3033 Security System Indicates Tamper**Conditions for Setting the DTC**

- The BCM will inspect for a tamper code when the ignition switch rotates from ON to CRANK and will continue to monitor the signal during the engine running period.
- The BCM is reading a tamper code from the Passlock(tm) sensor for longer than 1.0 seconds.

Action Taken When the DTC Sets

- The vehicle will not run. The security indicator will be flashing.
- The Passlock(tm) state is Tamper.

Conditions for Clearing the DTC

- The DTC will clear once an ignition cycle occurs without the fault recurring.
- The BCM history codes will clear after 100 ignition cycles occur without the fault recurring.
- Use a scan tool.

Diagnostic Aids

- Prior to replacing a BCM, ensure that all of the diagnostics have been completed. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** in Vehicle DTC Information.
- Inspect the Passlock(tm) sensor harness for intermittent or poor connections. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.
- The vehicle theft deterrent (VTD) internal diagnostics are not run while the tamper timer is active.

Test Description

The number below refers to the step number on the diagnostic table.

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3: Tests for a magnetic field near the ignition lock cylinder.

DTC B3033

Step	Action	Yes	No
Schematic Reference: <u>Theft Deterrent System Schematics</u> Connector End View Reference: <u>Theft Deterrent System Connector End Views</u>			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u> in Vehicle DTC Information
2	1. Install a scan tool. IMPORTANT: Do not start the vehicle. 2. Momentarily rotate the ignition switch to CRANK. 3. Release the ignition switch to ON. 4. Select the body control module (BCM) display DTCs function on the scan tool. Does the scan tool display DTC B3033 as a current DTC?	Go to Step 3	Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems
3	Inspect the area around the ignition lock cylinder for any device which could create a magnetic field such as an audio speaker, magnet, etc. Is there a magnetic device near the ignition lock cylinder?	Go to Step 4	Go to Step 5
4	Remove the device creating the magnetic force. Did you complete the repair?	Go to Step 8	-
5	Inspect for poor connections at the Passlock (tm) sensor. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	Go to Step 8	Go to Step 6
6	Replace the Passlock(tm) sensor. Refer to <u>Ignition Lock Cylinder Case Replacement</u> in Steering Wheel and Column.		

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	Did you complete the replacement?	Go to Step 7	-
7	Perform the Programming Theft Deterrent System Components procedure. Is the repair complete?	Go to Step 8	-
8	IMPORTANT: You may have to wait up to 10 minutes in order to reset the BCM and synchronize all of the Passlock(tm) components. 1. Use the scan tool in order to clear the DTCs. 2. Turn OFF the ignition. IMPORTANT: Do not start the vehicle. 3. Momentarily rotate the ignition switch to CRANK. 4. Release the ignition switch to ON. 5. Select the body control module display DTCs function on the scan tool. Does the DTC reset?	Go to Step 3	System OK

DTC P1626

Circuit Description

The control module communicates with other modules using the serial data circuit. The vehicle theft deterrent (VTD) body control module (BCM) sends a vehicle security password to the powertrain control module (PCM), via the serial data circuit, after the BCM has sensed the proper operation of the ignition switch and lock, and determined that the switch and lock have not been tampered with. If this password matches the password stored in the PCM, fuel will be enabled. If the BCM does not send a password, or if the PCM does not receive it, the vehicle will not start, or it may start and stall. This will set a DTC P1626 in the PCM memory. If communication is lost after receiving the password, the VTD Passlock(tm) system will go into Fail Enable, set a U1192 in the PCM memory, and the engine will continue to run. This will allow the engine to restart on future ignition cycles, but may set a DTC P1626 as the engine is started. If the battery is disconnected or the codes are cleared, the vehicle will lose its Fail Enable status and will not start until communication is re-established.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC P1626 Theft Deterrent Fuel Enable Signal Lost

Conditions for Running the DTC

- The VTD System is enabled.
- The fuel enable decision point has been reached, or the engine is cranking.

Conditions for Setting the DTC

The PCM has not established communications with the BCM and has not received a valid password before the fuel disable decision point was reached.

Action Taken When the DTC Sets

- The PCM stores the DTC in history after the first failure but will not illuminate the malfunction indicator lamp (MIL).
- The PCM records the operating conditions at the time the diagnostic fails. The PCM stores the failure information in the scan tools Freeze Frame/Failure Records.

Conditions for Clearing the MIL/DTC

- A history DTC will clear if no fault conditions have been detected for 40 warm-up cycles.
- A warm-up cycle occurs when the coolant temperature has risen 22°C (40°F) from the start-up coolant temperature and the engine coolant temperature exceeds 70°C (160°F) during the same ignition cycle.
- Use the scan tool Clear Information function.

Diagnostic Aids

IMPORTANT: Do not clear DTCs unless directed by a diagnostic procedure. Clearing DTCs will also clear valuable Freeze Frame and Failure Records data.

- Check for published service bulletins relating to exhibited symptoms or component operation.
- Inspect all related wiring and connections including the PCM and BCM connections. These may cause an intermittent malfunction.
- If the serial data circuit is shorted to ground or shorted to voltage, then all systems connected to the serial data circuit will not be able to communicate properly. Systems capable of storing loss of communications DTCs, or the DTCs with the letter "U" as a prefix, will have these codes stored in their memory. If a DTC U1192 is stored in the PCM memory along with the P1626, then a fault occurred at some point after the PCM received the correct password. The BCM must also be checked for intermittent

operation due to a loss of power or ground to the module itself. After repairing the cause of DTC P1626, clear all DTCs from the systems capable of storing this DTC and DTC U1192.

- The VTD Passlock(tm) parameters can be monitored in the PCM in the Engine Data 2 display with a scan tool.
- The scan tool Diagnostic Circuit Check can be used to:
 - Monitor the serial data circuit for modules which have been or are communicating.
 - Monitor for loss of communications DTCs with the letter "U" as a prefix: U1001-U1199.
 - Clear loss of communication DTCs. When a Clear Codes command is issued, all codes, Freeze Frame and Failure Records information is cleared.
- The scan tool Message Monitor will show the status of each module on the serial data circuit. A status of Active indicates that the module is communicating with the scan tool. An inactive status indicates that the module previously communicated with the scan tool, but is not communicating currently. The inactive status will only appear if the loss of communication occurs while on the message monitor screen. If a module is not listed at all, then the missing module never successfully established communications with the scan tool or lost communication while on another screen. Refer to **Scan Tool Does Not Communicate with Class 2 Device** in Computer/Integrating Systems for the complete serial data link to determine if there are any unlisted modules.

An intermittent may be caused by any of the following conditions:

- A poor connection
- Rubbed through wire insulation
- A broken wire inside the insulation

Thoroughly inspect any circuitry that is suspected of causing the intermittent complaint. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

If a repair is necessary, refer to **Wiring Repairs** or **Connector Repairs** in Wiring Systems.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This test checks if communications can be established between the scan tool and the BCM.

3: This test checks for any opens in the serial data circuit between the PCM and the BCM. This also checks for any intermittent malfunctions associated with the serial data circuit.

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4: This step is to determine if the condition that set the DTC is still present. The engine must be cranked in order to set this DTC. If the condition is present, the engine will start and then stall, indicating the PCM is disabling fuel.

7: Use a scan tool to clear and check for any DTCs in all the modules connected to the class 2 serial data circuit, such as the PCM, BCM, and automatic temperature control (ATC).

DTC P1626

Step	Action	Yes	No
Schematic Reference: Data Link Connector (DLC) Schematics in Computer/Integrating Systems			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u> in Vehicle DTC Information
2	IMPORTANT: You must diagnose the Bxxxx codes prior to diagnosing any Pxxxx code. 1. Install a scan tool. IMPORTANT: Do not start the vehicle. 2. Momentarily rotate the ignition switch to CRANK. 3. Release the ignition switch to ON. 4. Select the powertrain control module display DTCs function on the scan tool. Does the scan tool display DTC P1626 as a current DTC?	Go to Step 3	Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems
3	Check the serial data circuit for the following intermittent conditions: • An open in the serial data circuit between the powertrain control module (PCM) and the body control module (BCM) • A short to ground		

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	• A short to voltage • Loose or damaged terminals at the data link connector (DLC), PCM, or the BCM		
	Did you find a problem?	Go to Step 6	Go to Step 4
4	1. Turn OFF the ignition. 2. Connect or install any connectors or components that were disconnected or removed. 3. Clear all DTCs using a scan tool. 4. Turn OFF the ignition for 15 seconds. 5. Attempt to start the engine.		
	Does DTC P1626 reset?	Go to Step 8	Go to Step 5
5	This DTC is intermittent. Are any additional DTCs stored?	Go to the applicable DTC table	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems
6	Repair the circuit as necessary. Refer to Wiring Repairs or Connector Repairs in Wiring Systems. Is the action complete?	Go to Step 9	-
7	Inspect for poor connections at the BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 9	Go to Step 8
8	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 9	-
	IMPORTANT: Before clearing DTCs, monitor all DTC status parameters and note any additional DTCs. 1. Turn OFF the ignition.		

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9	2. Connect or install any connectors or components that were disconnected or removed.		
	3. Clear all PCM DTCs using a scan tool.		
	4. Turn OFF the ignition for 15 seconds.		
	5. Start the engine and allow it to run.		
	Does the DTC reset?	Go to Step 2	System OK

DTC P1630

Circuit Description

The vehicle theft deterrent (VTD) system is incorporated within the body control module (BCM). If the BCM has been replaced, the password must be relearned. If the powertrain control module (PCM) is replaced, the replacement PCM should learn the password within a few seconds after the ignition is turned ON. This is an information code indicating that the PCM is ready to learn the VTD password.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC P1630 Theft Deterrent Learn Mode Active

Conditions for Running the DTC

- The VTD system has allowed fuel delivery.
- The PCM is in the theft deterrent password learn mode.

Conditions for Setting the DTC

The PCM remains in theft deterrent password learn mode for more than 2 seconds.

Action Taken When the DTC Sets

- The PCM will not illuminate the malfunction indicator lamp (MIL).
- The PCM will store conditions which were present when the DTC set as Failure Records data only. This information will not be stored as Freeze Frame data.
- The Service Vehicle Soon (SVS) light may be illuminated.

Conditions for Clearing the DTC/MIL

- A history DTC will clear after 40 consecutive warm-up cycles have occurred without a malfunction.

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- The DTC can be cleared by using a scan tool.

Diagnostic Aids

A new replacement PCM will be in a functional state to learn the password from the BCM. If the BCM is replaced, the PCM must be placed in password learning mode to relearn a new password. Once learned, the password becomes permanent information that remains with the vehicle. The loss of PCM battery or ignition voltage will not affect the programmed password information.

DTC P1630

Step	Action	Yes	No
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Programming Theft Deterrent System Components	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information

DTC P1631

Circuit Description

The serial data circuit is used in order to communicate between the powertrain control module (PCM) and the vehicle theft deterrent body control module (BCM) systems.

When the Passlock(tm) portion of the Vehicle Theft Deterrent (VTD) System has sensed the proper operation of the ignition switch and lock, or determined that the switch and lock have not been tampered with, the BCM transmits a password to the PCM. Fuel delivery is enabled if this password matches the password stored in the modules memory. If a component in the theft deterrent system has been replaced, the modules need to relearn the password of the new components. If the relearn procedure was not performed, this diagnostic trouble code (DTC) will set.

If a VTD failure occurs during an ignition cycle that the PCM has enabled fuel, then the BCM will enter a fail-safe mode: Fail Enable VTD System Failure with Fuel Enabled. The BCM remains in Fail Enable Mode, for the current and future ignition cycles, until the fault is corrected and a valid password is received, or until battery power is removed. If the battery is disconnected or the codes are cleared, the vehicle will lose its Fail Enable status and will not start until the fault is corrected, the ten minute timer expires, and the PCM receives the correct fuel delivery password.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC P1631 Theft Deterrent Start Enable Signal Not Correct

Conditions for Running the DTC

- DTC P1626 is not active.
- The PCM is not in password learn mode.
- The VTD Passlock(tm) System is enabled.
- The fuel enable decision point has been reached, or the engine is cranking.

Conditions for Setting the DTC

The PCM did not receive a valid password before the fuel disable decision point was reached.

Action Taken When the DTC Sets

- The PCM stores the DTC in history after the first failure but will not illuminate the malfunction indicator lamp (MIL).
- The PCM records the operating conditions at the time the diagnostic fails. The PCM stores the failure information in the scan tools Freeze Frame/Failure Records.
- The Service Vehicle Soon (SVS) light may be illuminated.

Conditions for Clearing the MIL/DTC

- A history DTC will clear if no fault conditions have been detected for 40 warm-up cycles.
- A warm-up cycle occurs when the coolant temperature has risen 22°C (40°F) from the startup coolant temperature and the engine coolant temperature exceeds 70°C (160°F) during the same ignition cycle.
- Use the scan tool Clear Information function.

Diagnostic Aids

IMPORTANT: Do not clear DTCs unless directed by a diagnostic procedure. Clearing DTCs will also clear valuable Freeze Frame and Failure Records data.

- If the PCM is replaced, the PCM must re-learn a valid password and crankshaft variation.
- If the BCM is replaced, the PCM must re-learn a valid password.
- Check for published service bulletins relating to exhibited symptoms or component operation.
- If the vehicle does not start, or starts and stalls:

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- Turn OFF the ignition and wait at least 5 seconds before trying to restart.
- If a fault or tamper has been detected, the BCM will not forward the correct password to the PCM for a period of ten minutes, even if the condition is corrected during that time period. This may cause a DTC P1631 to set in the PCM. This timer can be monitored in the Passlock(tm) Data parameter of the scan tool. Once the time has elapsed, the BCM will determine if the condition is still present.
- The PCM and BCM parameters can be monitored with a scan tool.
- The Passlock(tm) state and the auto learn timer can be viewed in the Passlock(tm) Data parameter of the scan tool.
- Check the following for preventing the Passlock(tm) sensor from communicating with the BCM:
 - Passlock sensor
 - Ignition switch assembly
 - Passlock sensor circuitry
 - Bent pins at the small Passlock(tm) sensor
- If this DTC sets along with a DTC B2960, then the problem was caused by malfunctioning Passlock(tm) components or circuitry, not the PCM.
- Inspect all related wiring and connections including the PCM and BCM connections. These may cause an intermittent malfunction.
- An intermittent may be caused by any of the following conditions:
 - A poor connection
 - Rubbed through wire insulation
 - A broken wire inside the insulation
- Thoroughly inspect any circuitry that is suspected of causing the intermittent complaint. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

If a repair is necessary, refer to **Wiring Repairs** or **Connector Repairs** in Wiring Systems.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This DTC may set as a result of other Passlock(tm) System problems. Diagnose any BCM DTCs prior to continuing with this diagnostic.

3: A DTC B3031 may set in the BCM during the Password Learn Procedure.

DTC P1631

Step	Action	Yes	No

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Schematic Reference: Data Link Connector (DLC) Schematics in Computer/Integrating Systems

Connector End view Reference: Computer/Integrating Systems Connector End Views in Computer/Integrating Systems

1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	IMPORTANT: You must diagnose the Bxxxx codes prior to diagnosing any Pxxxx code. 1. Install a scan tool. 2. Momentarily rotate the ignition switch to CRANK. Do not start the vehicle. 3. Release the ignition switch to ON. 4. Select the powertrain control module display DTCs function on the scan tool. Does the scan tool display DTC P1631 as a current DTC?	Go to Step 3	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems
3	Perform the Passlock(tm) Programming procedure. Refer to Programming Theft Deterrent System Components . Did the powertrain control module (PCM) successfully learn the password?	Go to Step 4	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
4	IMPORTANT: Before clearing DTCs, monitor all DTC status parameters and note any additional DTCs. 1. Clear the PCM DTCs. 2. Turn OFF the ignition for 30 seconds. 3. Attempt to start the engine. Does the engine start and operate normally?	System OK	Go to Step 2

SYMPTOMS - THEFT DETERRENT

Important Preliminary Checks Before Starting

1. Perform the **Diagnostic System Check - Vehicle** in Vehicle DTC Information before

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using the Symptom Tables in order to verify that all of the following are true:

- There are no DTCs set.
 - The control modules can communicate via the serial data link.
2. Review the vehicle theft deterrent description and operation in order to familiarize yourself with the system functions. Refer to **Vehicle Theft Deterrent (VTD) Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Passlock(tm) system. Refer to **Checking Aftermarket Accessories** in Wiring Systems.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Content Theft Deterrent (CTD) Alarm Mode Inoperative**
- **Horn Inoperative in Content Theft Deterrent (CTD) Alarm Mode**
- **Lights Inoperative in Content Theft Deterrent (CTD) Alarm Mode**
- **Security Indicator Always On or Flashing**
- **Security Indicator Inoperative**

CONTENT THEFT DETERRENT (CTD) ALARM MODE INOPERATIVE

Content Theft Deterrent (CTD) Alarm Mode Inoperative

Step	Action	Yes	No
Schematic Reference: <u>Theft Deterrent System Schematics</u> Connector End View Reference: <u>Theft Deterrent System Connector End Views</u>			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u> in Vehicle DTC Information
	1. Open the driver and passenger		

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2	windows. - Unlock the doors using the keyless entry transmitter. - Remove the key from the ignition. - Open the driver door. - Observe the courtesy lamps. Do the courtesy lamps illuminate?	Go to Step 3	Go to <u>Courtesy Lamps Inoperative</u> in Lighting Systems
3	- Unlock the doors using the keyless entry transmitter. - Remove the key from the ignition. - Open the driver door. - Observe the security indicator. Is the security indicator on steady or flashing?	Go to <u>Security Indicator Always On or Flashing</u>	Go to Step 4
4	- Lock the vehicle using the power door lock switches or the keyless entry transmitter. - Observe the security indicator. After 30 seconds, does the security indicator change from OFF to flashing?	Go to Step 5	Go to <u>Power Door Locks Inoperative - All Doors and Switches</u> in Doors
5	- Close all of the doors. IMPORTANT: Ensure that all the doors are closed. The content theft deterrent (CTD) system will not arm if all of the doors are not closed. - Observe the security indicator. Does the security indicator begin to flash slowly after 10 seconds?	Go to Step 6	Go to <u>Courtesy Lamps Always On</u> in Lighting Systems
6	- Reach in and unlock the driver door manually. - Open the driver door. After approximately 10 seconds, do all of the alarm mode functions activate parking lights flash and horn pulses?	Go to Step 7	Go to Step 8

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7	Disarm the CTD system by using the keyless entry transmitter. Do all of the alarm mode functions stop?	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Keyless Entry System Inoperative in Keyless Entry
8	Do any of the alarm functions activate?	Go to Step 9	Go to Courtesy Lamps Inoperative in Lighting Systems
9	Do the horns pulse only?	Go to Lights Inoperative in Content Theft Deterrent (CTD) Alarm Mode	Go to Horn Inoperative in Content Theft Deterrent (CTD) Alarm Mode

HORN INOPERATIVE IN CONTENT THEFT DETERRENT (CTD) ALARM MODE

Horn Inoperative in Content Theft Deterrent (CTD) Alarm Mode

Step	Action	Yes	No
Schematic Reference: Theft Deterrent System Schematics Connector End View Reference: Theft Deterrent System Connector End Views			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Install a scan tool. 2. Turn ON the ignition with the engine OFF. 3. With the scan tool, command the horn relay ON. Does the horn sound?	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
3	Press the horn switch on the steering wheel. Does the horn sound?	Go to Step 4	Go to SYMPTOMS - HORNS in Horns
	1. Disconnect the body control module (BCM) connector containing the horn		

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4	relay control circuit. 2. With a fused jumper wire and appropriate terminal adapter, ground the horn relay control circuit. Does the horn sound?	Go to Step 6	Go to Step 5
5	Test the horn relay control circuit for an open or short to battery. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 8	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems
6	Inspect for poor connections at the harness connector of the BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 8	Go to Step 7
7	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 8	-
8	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

LIGHTS INOPERATIVE IN CONTENT THEFT DETERRENT (CTD) ALARM MODE

Lights Inoperative in Content Theft Deterrent (CTD) Alarm Mode

Step	Action	Yes	No
Schematic Reference: Theft Deterrent System Schematics Connector End View Reference: Theft Deterrent System Connector End Views			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
	Perform one of the following to activate the content theft deterrent (CTD) alarm mode: Operate the PANIC button on the		

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2	keyless entry transmitter. - Complete the following steps: - Open the driver window. - Lock the vehicle using the power door lock switch. - Close all of the doors and wait at least 30 seconds. - Reach in and unlock the driver door manually. - Open the driver door. Do all of the alarm mode functions activate lamp flash and horn pulse?	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
3	Are only the headlamps inoperative?	Go to Headlamps Inoperative - Low and High Beams in Lighting Systems	Go to Content Theft Deterrent (CTD) Alarm Mode Inoperative

SECURITY INDICATOR ALWAYS ON OR FLASHING

Security Indicator Always On or Flashing

Step	Action	Yes	No
Schematic Reference: Theft Deterrent System Schematics Connector End View Reference: Theft Deterrent System Connector End Views			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	- Turn ON the ignition, with the engine OFF. - With the scan tool, command the Security indicator ON and OFF. Does the Security indicator turn ON and OFF with each command?	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3

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3	Disconnect the body control module (BCM) connector containing the security indicator control circuit. Does the Security indicator remain illuminated?	Go to Step 4	Go to Step 5
4	Test the security indicator control circuit for a short to ground. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 9	Go to Step 6
5	Inspect for poor connections at the harness connector of the instrument panel cluster (IPC). Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 9	Go to Step 7
6	Inspect for poor connections at the harness connector of the BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 9	Go to Step 8
7	Replace the IPC. Refer to Instrument Panel Cluster (IPC) Replacement in Instrument Panel, Gages, and Console. Did you complete the repair?	Go to Step 9	-
8	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 9	-
9	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 1

SECURITY INDICATOR INOPERATIVE

Security Indicator Inoperative

Step	Action	Yes	No
Schematic Reference: Theft Deterrent System Schematics Connector End View Reference: Theft Deterrent System Connector End Views			
	Did you perform the Diagnostic System Check - Vehicle?		Go to Diagnostic System Check -

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1		Go to Step 2	Vehicle in Vehicle DTC Information
2	1. Turn ON the ignition, with the engine OFF. 2. With the scan tool, command the Security indicator ON and OFF. Does the Security indicator turn ON and OFF with each command?	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
3	1. Disconnect the body control module (BCM) connector containing the security indicator control circuit. 2. Using a fused jumper wire and the appropriate terminal adapter, ground the security indicator control circuit. Does the Security indicator illuminate?	Go to Step 6	Go to Step 4
4	Test for an open or short to battery in the security indicator control circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 9	Go to Step 5
5	Inspect for poor connections at the harness connector of the instrument panel cluster (IPC). Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 9	Go to Step 7
6	Inspect for poor connections at the harness connector of the BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 9	Go to Step 8
7	Replace the IPC. Refer to Instrument Panel Cluster (IPC) Replacement in Instrument Panel, Gages, and Console. Did you complete the replacement?	Go to Step 9	-
8	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for		

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	replacement, setup, and programming. Did you complete the replacement?	Go to Step 9	-
9	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 1

REPAIR INSTRUCTIONS

REPLACING KEYS

When the correct number of learned master keys are not available to perform adding keys procedure the 10 minute re-learn procedure or 30 minute re-learn procedure must be performed. Refer to **Programming Theft Deterrent System Components**.

ADDING KEYS

IMPORTANT: When adding or replacing a key, be sure to use the correct key for the vehicle. An incorrect key may be of a different size than the key intended for the vehicle. This difference in size could damage the vehicles ignition components.

The ignition lock cylinder and keys do not contain any coded electronic components. The lock cylinder housing contains the coded electronic components. Changing an ignition lock cylinder or adding a key is a purely mechanical process which does not affect the vehicle theft deterrent system. To add a key, simply cut a new key to match the existing one. To change the lock cylinder, simply replace the existing lock cylinder with one of the same type.

PROGRAMMING THEFT DETERRENT SYSTEM COMPONENTS

- IMPORTANT:**
- The body control module (BCM) must be programmed with the proper regular production option (RPO) configurations before performing learn procedures. See **Body Control Module (BCM) Programming/RPO Configuration in Computer/Integrating Systems**.
 - If replacing the BCM with a GM Service Parts Operations (SPO) replacement part, the module will learn Passlock(tm) sensor data code immediately. The existing PCM however, must learn the new fuel continue password when the BCM is replaced.
 - If replacing a PCM with a GM SPO replacement part, after programming, these modules will learn the incoming fuel continue password immediately upon receipt of a

password message. Once a password message is received, and a password is learned, a learn procedure must be performed to change this password again. A PCM which has been previously installed in another vehicle will have learned the other vehicle's fuel continue password, and will require a learn procedure after programming to learn the current vehicle's password.

Conditions

Use this procedure after replacing:

- Passlock(tm) Sensor
- BCM
- PCM

Learn Procedures

There are 2 available methods to perform the programming procedure:

- A 10-minute procedure which requires a Tech 2 and a techline terminal.
- A 30-minute procedure which does not require the use of any tools.

10-Minute Learn Procedure

Tools Required

- Tech 2
 - Techline terminal with current Service Programming System (SPS) software
1. Connect the Tech 2 to the vehicle.
 2. Select "Request Information" under "Service Programming".
 3. Disconnect the Tech 2 from the vehicle and connect it to a techline terminal.
 4. On the techline terminal, select "Theft Module Re-Learn" under "Service Programming".
 5. Disconnect the Tech 2 from the techline terminal and connect it to the vehicle.
 6. Turn ON the ignition, with the engine OFF.
 7. Select "VTD Re-Learn" under "Service Programming".
 8. Attempt to start the engine, then release the key to ON. The vehicle will not start.
 9. Observe the SECURITY telltale. After approximately 10 minutes, the telltale will turn OFF. The vehicle is now ready to relearn the Passlock(tm) Sensor Data Code and/or password on the next ignition switch transition from OFF to CRANK.

10. Turn OFF the ignition, and wait 5 seconds.
11. Start the engine. The vehicle has now learned the password.
12. With the Tech 2 (scan tool), clear any DTCs.

30-Minute Learn Procedure

1. Turn ON the ignition, with the engine OFF.
2. Attempt to start the engine, then release the key to ON. The vehicle will not start.
3. Observe the SECURITY telltale. After approximately 10 minutes, the telltale will turn OFF.
4. Turn OFF the ignition, and wait 5 seconds.
5. Repeat steps 1-4 two more times for a total of 3 cycles/30 minutes. The vehicle is now ready to relearn the Passlock(tm) Sensor Data Code and/or passwords on the next ignition switch transition from OFF to CRANK.

IMPORTANT: The vehicle learns the Passlock(tm) Sensor Data Code and/or password on the next ignition switch transition from OFF to CRANK. You must turn the ignition OFF before attempting to start the vehicle.

6. Start the engine. The vehicle has now learned the Passlock(tm) Sensor Data Code and/or password.
7. With a scan tool, clear any DTCs if needed. History DTCs will self clear after 100 ignition cycles.

DESCRIPTION AND OPERATION**THEFT SYSTEMS DESCRIPTION AND OPERATION**

The theft deterrent system on this vehicle is comprised of 2 separate systems, the Vehicle Theft Deterrent (VTD) System and the Content Theft Deterrent (CTD) System. The VTD prevents drive away theft by preventing the vehicle from starting. The CTD is the vehicle alarm system which discourages unauthorized entry into the vehicle. These systems are described and diagnosed separately within this section.

SECURITY Indicator

The SECURITY indicator on the instrument panel cluster (IPC) is controlled by the body control module (BCM) through the security indicator control circuit.

- The Vehicle Theft Deterrent (VTD) System contained in the BCM commands the instrument cluster to control the SECURITY indicator only when the ignition switch is ON. The VTD System uses the telltale as a malfunction indicator.

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- The Content Theft Deterrent (CTD) System also contained in the BCM commands the instrument cluster to control the indicator only when the ignition switch is OFF. The CTD System uses the SECURITY indicator to identify system status.

Theft Lock Radio (if applicable)

Refer to **Diagnostic Starting Point - Entertainment** in Entertainment.

CTD/VTD Description and Operation

Refer to the following for the appropriate description and operation:

- **Content Theft Deterrent (CTD) Description and Operation**
- **Vehicle Theft Deterrent (VTD) Description and Operation**

CONTENT THEFT DETERRENT (CTD) DESCRIPTION AND OPERATION

The Content Theft Deterrent (CTD) System, when armed, is designed to deter vehicle content theft by pulsing the horns and exterior lamps for approximately 2 minutes when an unauthorized vehicle entry is detected. However, the CTD System does not affect engine starting.

An unauthorized entry can be any of the following with the CTD System armed:

- When any door is opened without being unlocked by using the keyless entry transmitter to unlock the doors.
- When opening a door or the trunk with the correct key without disarming the CTD System.

The components of the system are:

- Body control module
- Door ajar switches

Arming the CTD System

IMPORTANT: The content theft deterrent (CTD) System can be armed with the windows or sunroof open.

Use the following procedure in order to arm the system:

1. Place the shift lever in P (park).
2. Turn OFF the ignition.
3. Open any door.

IMPORTANT: The system is not armed if the doors are locked manually, the remote keyless entry transmitter must be used to arm the CTD System.

4. Lock the doors with the LOCK button on the transmitter. The system is in arm pending mode and will not start the arming timer until all doors are closed. The security indicator will remain OFF, until the CTD System is armed. The CTD System will arm after the last door is closed.
5. The system will arm approximately 30 seconds from the time that the last door is closed. During this delay the THEFT SYSTEM indicator will be OFF. When the indicator transitions to FLASHING, the system is armed.

Locking The Vehicle Without Arming The CTD System

Locking the vehicle may be accomplished without arming the Content Theft Deterrent (CTD) System. Use of the manual door locks or using the key to lock the doors will lock the vehicle but will not arm the CTD System.

Disarming an Armed System/Silencing an Alarm

If system arming has been requested by the keyless entry transmitter, it must be disarmed.

IMPORTANT: Using the power door unlock switch or manually unlocking the doors does not disable the Content Theft Deterrent (CTD) armed mode. Also, disconnecting the battery or pulling fuses does not disable the armed mode, since the body control module (BCM) stores the CTD mode status in memory.

- To disarm the CTD System in arm pending mode, SECURITY indicator flashing and doors open, perform one of the following:
 - Press the UNLOCK button on the keyless entry transmitter.
 - Insert a valid key into the ignition and start the vehicle.
- To disarm the CTD System in the armed mode:
 - Press the UNLOCK button on the keyless entry transmitter.
 - Insert a valid key into the ignition and start the vehicle.
- To disarm the CTD System when activated, alarming mode.
 - Press the UNLOCK button on the keyless entry transmitter.
 - Insert a valid key into the ignition and start the vehicle.

CTD Circuit Description

The following is a description of each component used in the Content Theft Deterrent (CTD) System:

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Body Control Module (BCM)

The CTD system is an internal function of the body control module (BCM) which utilizes class 2 serial data and various switch input information to perform CTD functions. When the BCM detects an unauthorized entry, it activates the horns and exterior lamps.

When the BCM detects an unauthorized entry, the BCM enters the alarm mode. The BCM activates the horns and exterior lamps for 2 minutes. This is followed by a three minute time-out with the horn no longer active. If no new intrusions are detected after the time-out, the horn is not active. The system must be disarmed or the intrusion condition removed after the time-out for the system to exit alarm mode.

Door Ajar Switches

The CTD system uses the door ajar switches in the door jambs as one method to activate the alarm. The BCM monitors all door ajar switches via a discrete input from each door ajar switch, including the rear compartment. If the BCM receives a ground signal from a door ajar switch when the CTD system is armed, the BCM activates the alarm.

Inputs

The BCM monitors the following inputs:

- Driver and passenger door ajar switches
- Rear compartment ajar switch
- Transmitter LOCK/UNLOCK buttons, internal function of the BCM
- Passlock(tm) Status-the BCM uses the passlock(tm) status for disarming the system or silencing and alarm when the correct key is used.

Outputs

The BCM controls the following:

- The horn relay
- The exterior lights

VEHICLE THEFT DETERRENT (VTD) DESCRIPTION AND OPERATION

Passlock(tm) System

The theft deterrent system has been incorporated into the body control module (BCM). The theft deterrent system is provided in order to prevent the vehicle operation if the correct key is not used in order to start the vehicle. The ignition key allows the lock cylinder to rotate. The cylinder rotation produces an analog voltage code in the Passlock(tm) sensor. This voltage code is received by the BCM. The BCM compares the voltage code to the previously learned voltage code. If the codes match, a serial data message is sent from the BCM to the

powertrain control module (PCM). The message enables the fuel injector operation.

The design of the Passlock(tm) system is to prevent vehicle theft by disabling the engine unless the ignition lock cylinder rotates properly by engaging the correct ignition key. The system is similar in concept to the Passkey system. However, the Passlock(tm) system eliminates the need for any key mounted components. The components of the Passlock(tm) system are as follows:

- The ignition lock cylinder
- The ignition switch
- The Passlock(tm) sensor
- The BCM
- The security indicator
- The PCM

Ignition Lock Cylinder and Housing

The ignition lock cylinder is located at the upper right side of the steering column. The Passlock(tm) sensor is in the steering column. The Passlock(tm) sensor is separate from the key and lock cylinder. The key and the lock cylinder work together in order to determine if the proper ignition key was used to start the vehicle.

In the event of an open Class 2 serial data line between the body control module (BCM) and the powertrain control module (PCM), the vehicle will become fail-enabled if the PCM has already received the password from the BCM for that ignition cycle. In this event, the following conditions occur:

- The security telltale will be ON continuously.
- The PCM will remain fail-enabled for future ignition cycles.

If a failure in the Class 2 serial data line occurs before the ignition cycle, when the PCM is not fail-enabled, the following conditions occur:

- The VCM/PCM will not receive a valid password in order to enable the fuel injectors.
- The vehicle will not start.

Ignition Switch

The lock cylinder and the visible key insert portion of the ignition switch are located at the upper right side of the steering column. The electrical switching portion of the assembly is separate from the key and lock cylinder. The electrical switch portion is hidden inside the steering column. The electrical switch portion and the key and lock cylinder synchronize and work in conjunction through the action of the mechanical assembly between the two parts.

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Passlock(tm) Sensor

The Passlock(tm) sensor is inside the ignition cylinder lock housing. The Passlock(tm) sensor contains two hall effect sensors. The tamper hall effect sensor is on the top. The security hall effect sensor is under the tamper hall effect sensor. Both of the hall effect sensors monitor the magnet of the lock cylinder through an opening. Placing the tamper sensor above the security sensor enables the tamper sensor to engage first if an intruder attempts to bypass the Passlock(tm) sensor by placing a large magnet around that area of the steering column. Passlock(tm) equipped vehicles have a selection of ten different security resistors ranging from 0.5K ohms up to 13.6K ohms. Installing one of the security resistors inside the Passlock(tm) sensor will generate a unique Passlock(tm) code.

Body Control Module

The body control module (BCM) contains the theft deterrent system logic. The BCM reads the Passlock(tm) data from the Passlock(tm) sensor. If the Passlock(tm) data is correct, the BCM will pass theft. The BCM will then transmit the fuel continue password to the PCM.

During tamper mode the vehicle may start momentarily, then stall. If the BCM receives incorrect Passlock(tm) data, the VTD will immediately go into the tamper mode. The tamper mode will lock-out the vehicle fuel injectors for 10 minutes. The SECURITY indicator will flash while the VTD is in the tamper mode.

If the Passlock(tm) sensor sends a correct password to the BCM when the ignition is in the ON position, the BCM will send a fuel enable signal to the PCM. This fuel enable signal will allow proper operation of the fuel injectors and vehicle start.

SECURITY Indicator

The SECURITY indicator appears on the instrument cluster and is designed to report security system status. If the SECURITY indicator flashes or if the SECURITY indicator illuminates continuously during vehicle operation, refer to the system diagnosis.

Powertrain Control Module

The powertrain control module (PCM) communicates with the body control module (BCM) over the serial data line. When the BCM receives an incorrect VTD password from the Passlock(tm) sensor, it will send a serial data password to the PCM in order to disable the fuel injection system. If the BCM receives the expected voltage from the Passlock(tm) sensor, the BCM sends a serial data password to the PCM in order to enable the fuel injection system. The PCM then allows the vehicle to start correctly. If the PCM does not receive the expected message from the BCM, the vehicle will start and then stalls due to fuel lockout.

Fuel Lockout Cycle

The Passlock(tm) system has a lockout cycle of approximately 10 minutes. Once the vehicle is in the lockout cycle, the vehicle remains in the lockout cycle for 10 minutes regardless of ignition position.

The Passlock(tm) system uses the lockout cycle in order to synchronize all of the Passlock (tm) components when any Passlock(tm) related part is changed. The Passlock(tm) system requires 3 consecutive lockout cycles in order to complete the 30 minute learn procedure for a changed component.

Changing the Passlock(tm) Components

The design of the Passlock(tm) system is to prevent theft even if the various theft deterrent parts are changed. The parts that can no longer be replaced without the possibility of going into a tamper mode are:

- The Passlock(tm) sensor
- The body control module (BCM)
- The powertrain control module (PCM)

If you replace any of these parts the vehicle may start and stall for 10 minutes. This is the long tamper mode. If this occurs, the system must go through a long tamper mode cycle. During this time the SECURITY telltale will be flashing for the full 10 minutes and the DTC B3031 will be set. The BCM and the PCM requires the full 10 minutes in order to complete a learn cycle. The ignition switch must remain in the RUN position until the SECURITY indicator stops flashing. You will need to repeat the cycle if the ignition switch does not remain in the RUN position. When replacing any of the above parts it is recommended to perform the **Programming Theft Deterrent System Components** procedure.