

Theft Deterrent - Hummer H2

SCHEMATIC AND ROUTING DIAGRAMS

THEFT DETERRENT SYSTEM SCHEMATICS

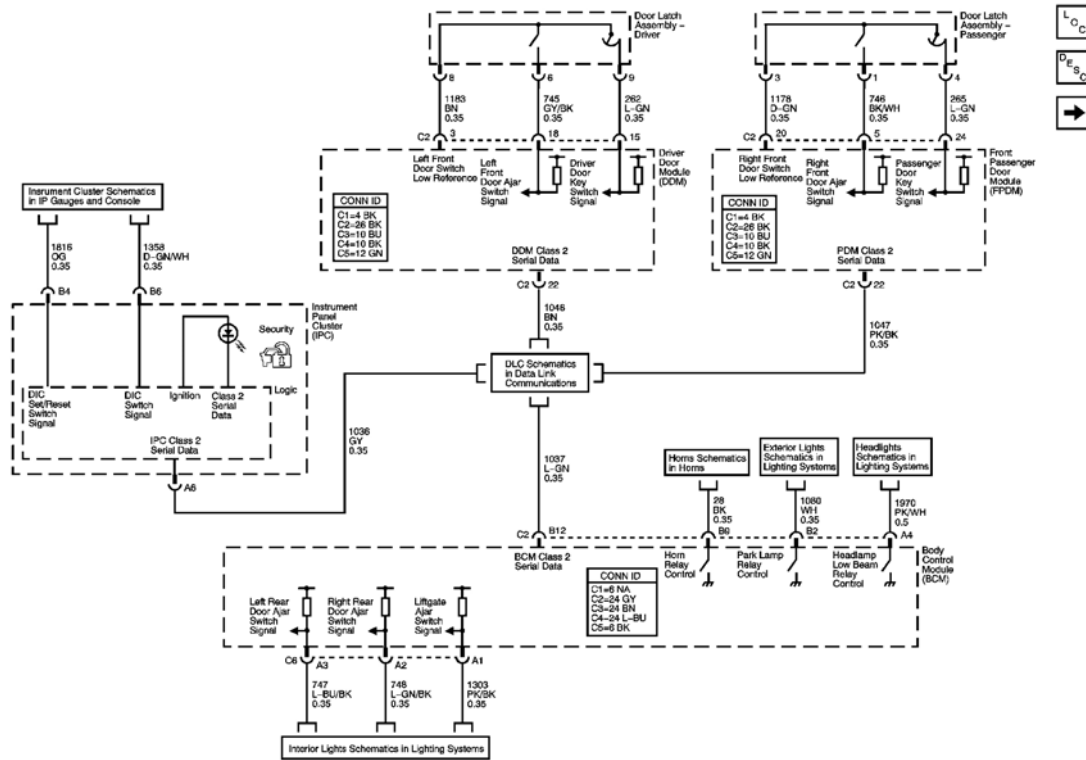


Fig. 1: Content Theft Deterrent
 Courtesy of GENERAL MOTORS CORP.

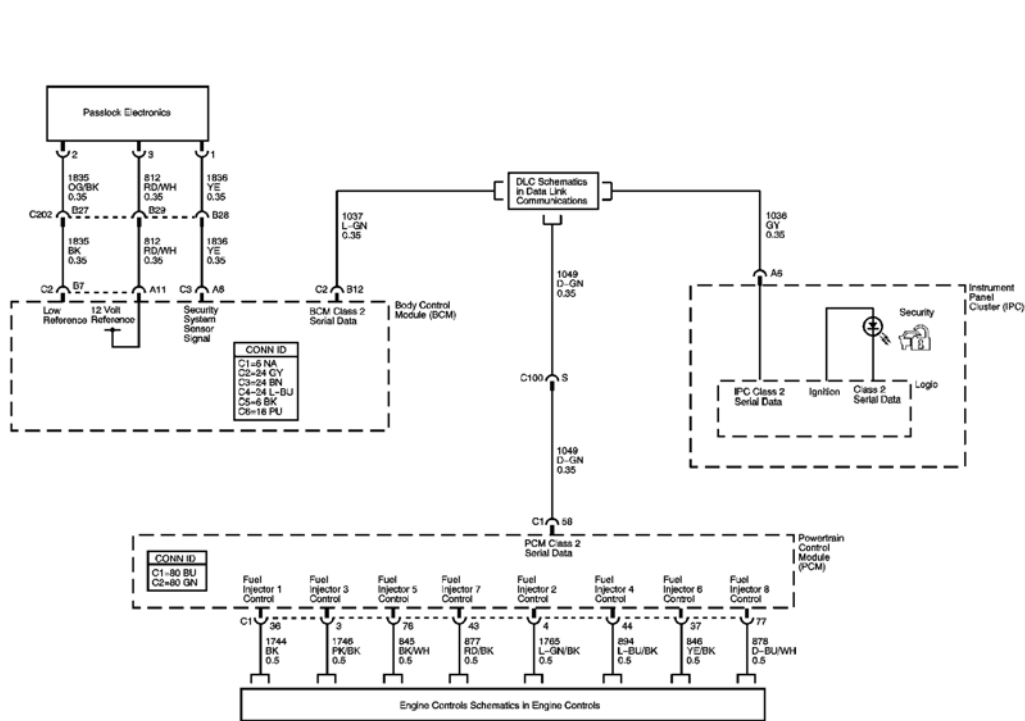


Fig. 2: Vehicle Theft Deterrent
 Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

THEFT DETERRENT SYSTEM COMPONENT VIEWS

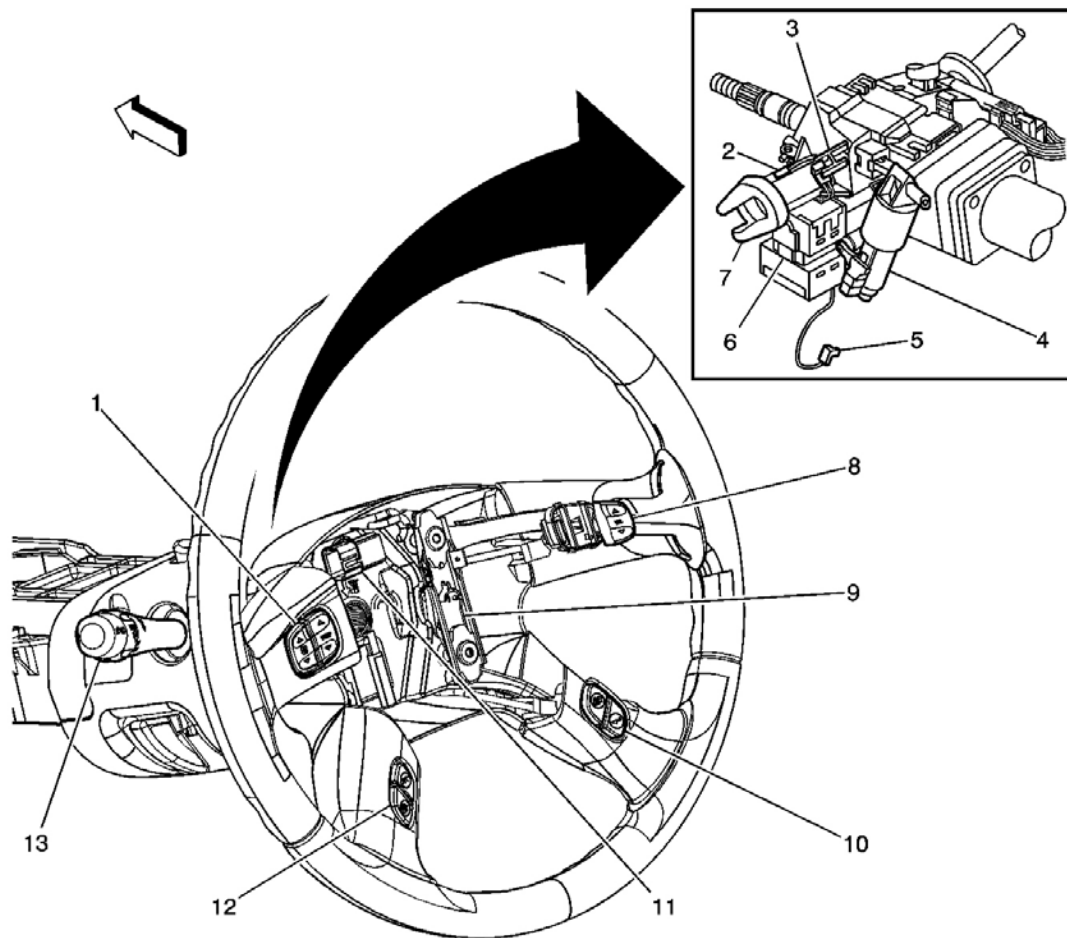


Fig. 3: Passlock Sensor Component Views
 Courtesy of GENERAL MOTORS CORP.

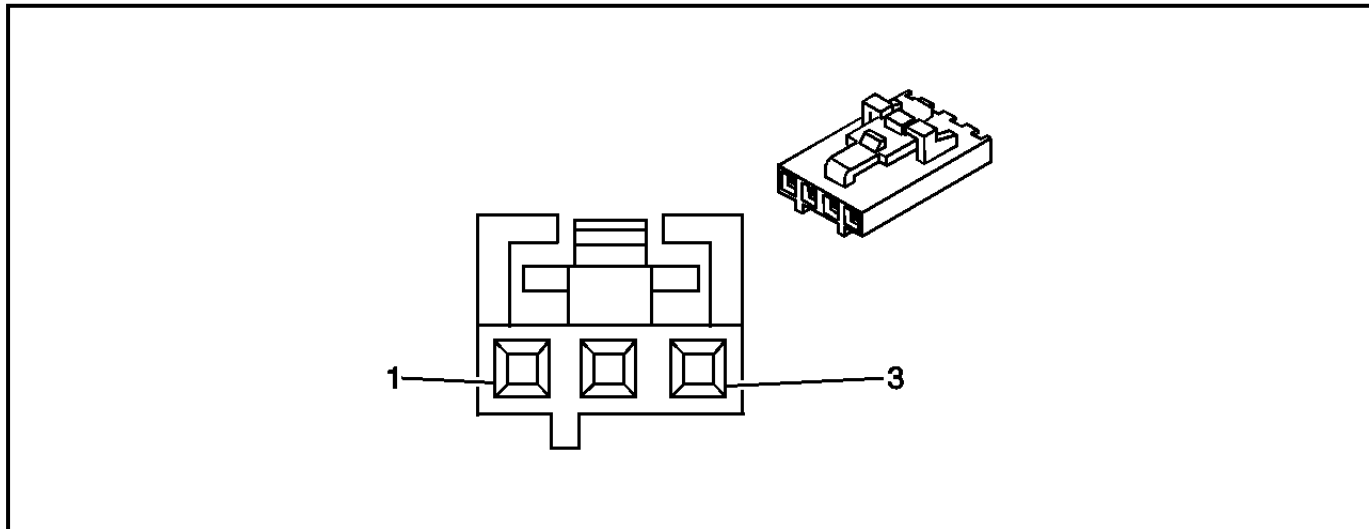
Callouts For Fig. 3

Callout	Component Name
1	Steering Wheel Audio Controls - Left
2	Passlock Sensor Connector
3	Ignition Key Alarm Switch
4	Ignition Lock Cylinder Control Actuator
5	Ignition Lock Cylinder Control Actuator Connector
6	Ignition Switch
7	Ignition Key Cylinder
8	Steering Wheel Audio Controls - Right
9	Horn Switch
10	Steering Wheel Driver Information (DIC) Controls - Right
11	C277

12	Steering Wheel Driver Information Center (DIC) Controls - Left
13	Turn Signal/Multifunction Switch

THEFT DETERRENT SYSTEM CONNECTOR END VIEWS

Passlock Terminal Identification Sensor



Connector Part Information		<ul style="list-style-type: none"> • 50579403 • 3-Way F Molex 70066 Series (BK) 	
Pin	Wire Color	Circuit No.	Function
1	YE	1836	Magnetic Rotation Detection Sensor - Signal
2	OG/BK	1835	Magnetic Rotation Detection Sensor - Return
3	RD/WH	812	12 Volt Reference

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - THEFT DETERRENT

Begin the system diagnosis with the **Diagnostic System Check - Theft Deterrent** . The Diagnostic System Check will provide the following information:

- The identification of the control module(s) which command the system
- The ability of the control module(s) 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.

DIAGNOSTIC SYSTEM CHECK - THEFT DETERRENT

Test Description

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

2: Lack of communication may be due to a partial malfunction of the class 2 serial data circuit or due to a total malfunction of the class 2 serial data circuit. The specified procedure will determine the particular condition.

5: Tests for an open in the passlock sensor signal circuit which may not set a DTC B2958 under certain conditions.

6: The presence of DTCs which begin with "U" indicate some other module is not communicating. The specified procedure will compile all the available information before tests are performed.

7: The presence of DTC P0601, P0602, P0604, or P0606 indicates an internal fault in the PCM.

8: The presence of DTC B1000 indicates an internal module fault.

9: The Presence of DTC P1637, P1638, P0562 or P0563 indicates a low or high voltage condition.

Diagnostic System Check - Theft Deterrent

Step	Action	Yes	No
Schematic Reference: Theft Deterrent System Schematics			
1	Install a scan tool. Does the scan tool power up?	Go to Step 2	Go to Scan Tool Does Not Power Up in Data Link Communications
2	1. Turn ON the ignition, with the engine OFF. 2. Attempt to establish communication with the following control modules: <ul style="list-style-type: none">• Powertrain Control Module (PCM)• Body Control Module (BCM)• Instrument Panel Cluster (IPC) Does the scan tool communicate with the all the listed control modules?	Go to Step 3	Go to Scan Tool Does Not Communicate with Class 2 Device in Data Link Communications
	IMPORTANT: Important: The engine may start during the following step. Turn OFF the engine as soon as you have observed the Crank power mode. 1. Access the Class 2 Power Mode parameter in the Diagnostic Circuit Check menu on the scan		

3	<p>tool.</p> <p>IMPORTANT: Insure that all ignition switch positions are observed including the OFF position.</p> <p>2. Rotate the ignition switch through all positions while observing the Class 2 Power Mode parameter.</p> <p>Does the Class 2 Power Mode parameter reading match the ignition switch position for all switch positions?</p>	Go to Step 4	Go to Power Mode Mismatch in Body Control System
4	<p>Select the display DTCs function on the scan tool for the following control modules:</p> <ul style="list-style-type: none"> • Powertrain Control Module (PCM) • Body Control Module (BCM) • Instrument Panel Cluster (IPC) <p>Does the scan tool display any DTCs?</p>	Go to Step 6	Go to Step 5
5	<p>1. Momentarily rotate the ignition switch to CRANK. Do not start the vehicle.</p> <p>2. Release the ignition switch to ON.</p> <p>3. With a scan tool, observe the Passlock Code in the Body Control Module Security Data list.</p> <p>Does the scan tool display OPEN?</p>	Go to DTC B2958	Go to Symptoms - Theft Deterrent
6	Does the scan tool display any DTCs which begin with a "U"?	Go to Scan Tool Does Not Communicate with Class 2 Device in Data Link Communications	Go to Step 7
7	Does the scan tool display DTC P0601, P0602, P0604, or P0606?	Go to Diagnostic Trouble Code (DTC) List in Engine Controls - 6.0L	Go to Step 8
8	Does the scan tool display DTC B1000?	Go to DTC B1000 in Body Control System	Go to Step 9
	Does the scan tool display DTC P1637,	Go to Diagnostic Trouble	

9	P1638, P0562 or P0563?	<u>Code (DTC) List</u> in Engine Electrical	Go to <u>Diagnostic Trouble Code (DTC) List</u>
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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/Headlamps in AUTO			
Auto Learn Timer	Security Data	Seconds	0-600
Battery Voltage	Data	Volts	Varies
Content Theft Lamp	Security Data	ON/OFF	OFF
Content Theft State	Security Data	ON/OFF	OFF
Door Unlock Switch	Inputs	ACTIVE/INACTIVE	ACTIVE
Driver Door Ajar Switch	Inputs	ACTIVE/INACTIVE	ACTIVE (door open)
Ignition 1	Inputs	ACTIVE/INACTIVE	ACTIVE
Ignition 3	Inputs	ACTIVE/INACTIVE	ACTIVE
Module Part Number	ID Information	Numeric	Varies
Passlock Code	Security Data	Open/Short/Tamper/Numeric	Valid Code 1-10
Passlock Data Voltage	Security Data	Volts	0.86-5 Volts
Passlock Ignition Cycles	Security Data	Cycles	Varies
Passlock Power	Security Data	On/Off	On
Passlock State	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
Security Calibration Number	ID Information	Numeric	Varies
Security Lamp State	Security Data	ON/OFF/FLASHING	OFF
Security Suffix	ID Information	Two Letters	Varies
Seed and Key	Security		

Timer	Data	Seconds	0 Seconds
Tamper Timer	Security Data	Seconds	0-600

Powertrain Control Module (PCM)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Ignition ON/Engine OFF/Vehicle in PARK/Headlamps in AUto			
PCM/VCM in VTD Fail Enable	Engine Data 1	Yes/No	No
VTD Auto Learn Timer	Engine Data 1	Active/Inactive	Inactive
VTD Fuel Disable	Engine Data 1	Active/Inactive	Inactive
VTD Fuel Disable Until Ign. OFF	Engine Data 1	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 Voltage

The scan tool displays the battery system voltage.

Content Theft Lamp

The scan tool displays the state of the SECURITY lamp. The scan tool displays ON when activated by an unauthorized entry.

Content Theft State

The scan tool displays the state of the content theft feature. The scan tool displays ON when activated by an unauthorized entry.

Door Unlock Switch

The scan tool displays the state of the door key switch. The scan tool displays ACTIVE when the switch is activated in either door key cylinder.

Drivers Door Ajar Switch

The scan tool displays the position of the drivers door. The scan tool displays ACTIVE when the drivers door is open.

Ignition 1

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 3

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

Module Part Number

The scan tool displays the part number assigned to the BCM that is currently in the vehicle.

Passlock(tm) Code

The scan tool displays the validity of the Passlock(tm) code received by the BCM. The scan tool displays OPEN, SHORTED, TAMPER and a valid code as a numeric value (1-10).

Passlock(tm) Data Voltage

The scan tool displays the voltage code from the Passlock(tm) sensor to the body control module (BCM). A valid Passlock(tm) 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(tm) voltage will drop from 5 to 0.86-4.28 volts depending on which of the 10 possible Passlock (tm) 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(tm) voltage code (0.86-4.28 volts) received by the BCM when the ignition cylinder returns to the on/run position.

Passlock(tm) Ignition Cycles

The scan tool displays the amount of times the ignition switch has been cycled.

Passlock(tm) Power

The scan tool displays the state of the Passlock(tm) 12-volt power supply from the BCM.

Passlock(tm) State

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

Seed and Key Timer

The scan tool displays 0-2550 seconds. The scan tool displays the current state of the Seed and Key Timer, which must time out in order for the relearn procedure to be complete.

PCM/VCM in VTD Fail Enable

The scan tool displays which state the Powertrain Control Module (PCM) is currently in for the Vehicle Theft Deterrent (VTD).

Security Calibration Number

The scan tool displays the security calibration part number in the BCM.

Security Lamp State

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

Security Suffix

The scan tool displays the security identification number in the BCM.

Tamper Timer

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.

VCM/PCM Fail Enable

The scan tool displays the state of the VCM/PCM fail enable mode. The scan tool displays YES when the Passlock(tm) system transitions from the Monitor Passlock(tm) Data state to the VCM/PCM Fail Enable state.

VTD Auto Learn Timer

The scan tool displays which state the learn timer for the VTD is currently in.

VTD Fuel Disable

The scan tool displays the state of which the fuel delivery system is in.

VTD Fuel Disable Until Ign. OFF

The scan tool display the state of which the fuel delivery system is in according to the ignition switch position.

DIAGNOSTIC TROUBLE CODE (DTC) LIST

Diagnostic Trouble Code (DTC) List

DTC	Diagnostic Procedure	Module
IMPORTANT:		

Before you use this table, diagnose P0601, P0602, P0604, and P0606. Refer to Diagnostic System Check - Theft Deterrent .

B2947	<u>DTC B2947</u>	BCM
B2948	<u>DTC B2948</u>	BCM
B2957	<u>DTC B2957</u>	BCM
B2958	<u>DTC B2958</u>	BCM
B2960	<u>DTC B2960</u>	BCM
B2973	<u>Content Theft Deterrent (CTD) Does Not Disarm with Key Lock</u>	BCM
B3031	<u>DTC B3031</u>	BCM
B3033	<u>DTC B3033</u>	BCM
P1626	<u>DTC P1626</u>	PCM
P1631	<u>DTC P1631</u>	PCM
PXXXX Other PCM DTCs Refer to <u>Diagnostic System Check - Engine Controls</u> in Engine Controls - 6.0L (LQ4).		

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 class 2 message to the powertrain control module (PCM) to enable vehicle starting. If the voltage measured is not within the valid range, a class 2 message will be sent to the PCM to disable starting of the vehicle.

Conditions for Setting the DTC

The BCM detects a short to ground on the Passlock sensor power circuit for one 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 two actions:
 - If the Passlock sensor power circuit is shorted to ground when attempting to 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 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 sensor power circuit.
- When a short to ground is no longer present on the Passlock 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 sensor power circuit and the Passlock sensor ground circuit, or a short to ground on the Passlock sensor power circuit.

Test Description

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

2: Verifies that DTC B2947 is a current DTC.

3: 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 Theft Deterrent Diagnostic System Check?	Go to Step 2	Go to Diagnostic System Check - Theft Deterrent
2	<ol style="list-style-type: none"> 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 B2947 as a current DTC?	Go to Step 3	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems
3	<ol style="list-style-type: none"> 1. Disconnect the Passlock(tm) sensor connector. 2. Measure the voltage between the Passlock(tm) battery voltage 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	IMPORTANT: When replacing the BCM refer to <u>Body Control Module (BCM) Programming/RPO Configuration in Body Control System</u>. Replace the BCM. Refer to Body Control Module Replacement in Body Control System. 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	-
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 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 class 2 message to the powertrain control module (PCM) to enable vehicle starting. If the voltage measured is not within the valid range, a class 2 message will be sent to the PCM to disable starting of the vehicle.

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, this DTC will set.

Action Taken When the DTC Sets

- 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 sensor power circuit.
- When a short to battery is no longer present on the Passlock 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 battery on the Passlock sensor power circuit with the ignition switch OFF.

Test Description

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

3: Tests for a short to battery positive on the Passlock battery voltage 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 Theft Deterrent Diagnostic System	Go to	Go to Diagnostic System Check

	Check?	Step 2	<u>- Theft Deterrent</u>
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
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) battery voltage 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 battery voltage 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 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	IMPORTANT: When replacing the BCM, refer to <u>Body Control Module (BCM) Programming/RPO Configuration in Body Control System.</u> Replace the body control module. Refer to Body Control Module Replacement in Body Control System. Did you complete the replacement?	Go to Step 10	-
	Replace the Passlock(tm) sensor. Refer to Ignition Lock		

8	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 repair?	Go to Step 10	-
10	<ol style="list-style-type: none"> 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 class 2 message to the powertrain control module (PCM) to enable vehicle starting. If the voltage measured is not within the valid range, a class 2 message will be sent to the PCM to disable starting of the vehicle.

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

- 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 in the 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 needs 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) sensor signal circuit.

DTC B2957

Step	Action	Value (s)	Yes	No
Schematic Reference: Theft Deterrent System Schematics				
Connector End View Reference: Theft Deterrent System Connector End Views				
1	Did you perform the Theft Deterrent (VTD) Diagnostic System Check?	-	Go to Step 2	Go to Diagnostic System Check - Theft Deterrent
2	<ol style="list-style-type: none"> 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 data voltage in the Body Control Module Security Data list. <p>Does the scan tool indicate that the Passlock (tm) data voltage is within the specified range?</p>	0.4-4.9 V	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the Passlock (tm) sensor connector. 3. Turn ON the ignition, with the engine OFF. 			

3	<p>4. With a scan tool, observe the Passlock (tm) data voltage in the Body Control Module Security Data list.</p> <p>Does the scan tool indicate that the Passlock (tm) data voltage is greater than the specified value?</p>	4.9 V	Go to Step 7	Go to Step 4
4	<p>Test the Passlock(tm) 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?</p>	-	Go to Step 10	Go to Step 5
5	<p>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?</p>	-	Go to Step 10	Go to Step 6
6	<p>IMPORTANT: When replacing the BCM, refer to Body Control Module (BCM) Programming/RPO Configuration in Body Control System.</p> <p>Replace the body control module. Refer to Body Control Module Replacement in Body Control System. Did you complete the replacement?</p>	-	Go to Step 10	-
7	<p>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?</p>	-	Go to Step 10	Go to Step 8
8	<p>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?</p>	-	Go to Step 9	-
9	<p>Perform the Programming Theft Deterrent System Components procedure. Is the repair complete?</p>	-	Go to Step 10	-
10	<ol style="list-style-type: none"> 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 class 2 message to the powertrain control module (PCM) to enable vehicle starting. If the voltage measured is not within the valid range, a class 2 message will be sent to the PCM to disable starting of the vehicle.

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 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.

- 3:** Tests for proper operation of the circuit in the high voltage range.
- 4:** Tests for proper operation of the circuit in the low voltage range.
- 5:** Tests for high resistance or an open in the 12V reference circuit.
- 7:** Tests for a short to voltage, a high resistance, or an open in the signal circuit.
- 8:** Tests for high resistance or an open in the ground circuit.

DTC B2958

Step	Action	Value (s)	Yes	No
Schematic Reference: Theft Deterrent System Schematics				
Connector End View Reference: Theft Deterrent System Connector End Views				
1	Did you perform the Vehicle Theft Deterrent (VTD) Diagnostic System Check?	-	Go to Step 2	Go to Diagnostic System Check - Theft Deterrent
2	<ol style="list-style-type: none"> 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 Security Data list. <p>Does the scan tool indicate that the Passlock Data Voltage is within the specified range?</p>	0.4-4.9 V	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
3	<ol style="list-style-type: none"> 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 Body Control Module Security Data list. <p>Does the scan tool indicate that the Passlock (tm) Data Voltage is greater than the specified</p>	4.9 V		

	value?		Go to Step 4	Go to Step 9
4	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Connect a 3 amp fused jumper wire between the signal circuit of the Passlock(tm) sensor and the ground circuit of 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 Body Control Module Security Data list. <p>Does the scan tool indicate that the Passlock (tm) Data Voltage is less than the specified value?</p>	0.4 V	Go to Step 5	Go to Step 7
5	<ol style="list-style-type: none"> 1. Disconnect the fused jumper wire. 2. Measure the voltage between the 12V reference circuit of the Passlock(tm) sensor and the ground circuit of the Passlock(tm) sensor. <p>Does the voltage measure less than the specified value?</p>	12.0 V	Go to Step 6	Go to Step 11
6	<p>Test the 12V reference circuit of the Passlock (tm) sensor for a high resistance or an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	-	Go to Step 14	Go to Step 9
7	<p>Test the signal circuit of the Passlock(tm) sensor for a short to voltage, a high resistance, or an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	-	Go to Step 14	Go to Step 8
8	<p>Test the ground circuit of the Passlock(tm) sensor for a high resistance or an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	-	Go to Step 14	Go to Step 9
9	<p>Inspect for poor connections at the BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	-	Go to Step 14	Go to Step 10
	IMPORTANT:			

	When replacing the BCM, refer to <u>Body Control Module (BCM) Programming/RPO Configuration</u> in Body Control System.			
10	Replace the body control module. Refer to <u>Body Control Module Replacement</u> in Body Control System. Did you complete the replacement?	-	Go to Step 14	-
11	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 14	Go to Step 12
12	Replace the Passlock(tm) sensor in the electronic column lock module assembly. Refer to <u>Ignition Lock Cylinder Case Replacement</u> in Steering Wheel and Column. Did you complete the replacement?	-	Go to Step 13	-
13	Perform the <u>Programming Theft Deterrent System Components</u> procedure. Is the repair complete?	-	Go to Step 14	-
14	<ol style="list-style-type: none"> 1. Use the scan tool in order to clear the DTCs. 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. <p>Does the DTC reset?</p>	-	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 class 2 message to the powertrain control module (PCM) to enable vehicle starting. If the voltage measured is not within the valid range, a class 2 message will be sent to the PCM to disable starting of the vehicle.

Conditions for Setting the DTC

- The BCM will inspect for a valid code when the ignition is rotated from ON to 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 in the 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	Value (s)	Yes	No
Schematic Reference: Theft Deterrent System Schematics				
Connector End View Reference: Theft Deterrent System Connector End Views				

1	Did you perform the Vehicle Theft Deterrent (VTD) Diagnostic System Check?	-	Go to Step 2	Go to Diagnostic System Check - Theft Deterrent
2	<ol style="list-style-type: none"> 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. <p>Does the scan tool display DTC B2960 as a current DTC?</p>	-	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	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 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	-
	<ol style="list-style-type: none"> 1. Use the scan tool in order to clear the DTCs. 2. Turn OFF the ignition. <p>IMPORTANT: Do not start the vehicle.</p>			

10	<ol style="list-style-type: none"> 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. <p>Does the DTC reset?</p>	-	Go to Step 3	System OK
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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 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 class 2 message to the powertrain control module (PCM) to enable vehicle starting. If the voltage measured is not within the valid range, a class 2 message will be sent to the PCM to disable starting of the vehicle.

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 has occurred after the BCM has 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** .
- 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: <u>Theft Deterrent System Schematics</u>			
1	Did you perform the Vehicle Theft Deterrent (VTD) Diagnostic System Check?	Go to Step 2	Go to Diagnostic System Check - Theft Deterrent
2	<ol style="list-style-type: none"> 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 display DTCs function on the scan tool. <p>Does the scan tool display DTC B3031 as a current DTC?</p>	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	Go to Step 4
4	<ol style="list-style-type: none"> 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. <p>Does the DTC reset?</p>	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 class 2 message to the powertrain control module (PCM) to enable vehicle starting. If the voltage measured is not within the valid range, a class 2 message will be sent to the PCM to disable starting of the vehicle.

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** .
- Inspect the Passlock(tm) sensor harness for intermittent or poor connections. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.
- The 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:

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 Vehicle Theft Deterrent (VTD) Diagnostic System Check?	Go to Step 2	Go to Diagnostic System Check - Theft Deterrent
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 display DTCs function on the scan tool. Does the scan tool display DTC B3033 as a current DTC?	Go to Step 3	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems
3	Inspect the area around the ignition lock cylinder for any device which could create a magnetic field 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 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 6
6	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 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 Class 2 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 Class 2 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 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.

Conditions for Running the DTC

- The vehicle theft deterrent (VTD) system is enabled.
- The fuel enable decision point has been reached, or the engine is cranking.

Conditions for Setting the DTC

The powertrain control module (PCM) has not established communications with the body control module (BCM) and has not received a valid password before the fuel disable decision point was reached.

Action Taken When the DTC Sets

- The powertrain control module (PCM) stores the DTC in history after the first failure but will not illuminate the malfunction indicator lamp (MIL).
- The powertrain control module (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.

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 powertrain control module (PCM) and body control module (BCM) connections. These may cause an intermittent malfunction.
- If the Class 2 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 1626, clear all DTCs from the systems capable of storing this DTC and DTC U1192.
- The VTD Passlock parameters can be monitored in the PCM under engine data 2, display with a scan tool.
- The scan tool Diagnostic Circuit Check can be used to:
 - Monitor the Class 2 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 Class 2 Message Monitor will show the status of each module on the Class 2 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 Data Link Communications for the complete Class 2 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.

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 body control module (BCM). If the scan tool cannot communicate with the BCM, refer to **Diagnostic System Check - Theft Deterrent** in Theft Deterrent.

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

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, automatic temperature control (ATC), and body control module (BCM).

DTC P1626 Loss of Serial Communication with VTD

Step	Action	Yes	No
Schematic Reference: Data Link Connector (DLC) Schematics			
1	Did you perform the Vehicle Theft Deterrent Diagnostic System Check?	Go to Step 2	Go to <u>Diagnostic System Check - Theft Deterrent</u>
2	<p>IMPORTANT: You must diagnose the Bxxxx codes prior to diagnosing any Pxxxx code.</p> <ol style="list-style-type: none"> 1. Install a scan tool. <p>IMPORTANT: Do not start the vehicle.</p> <ol style="list-style-type: none"> 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. <p>Does the scan tool display DTC P1626 as a current DTC?</p>	Go to Step 3	Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems
3	<p>Check the Class 2 Serial Data circuit for the following intermittent conditions:</p> <ul style="list-style-type: none"> • An open in the Class 2 Serial Data circuit between the PCM and the BCM • A short to ground • A short to voltage • Loose or damaged terminals at the DLC, 		

	PCM, or the BCM		
	Did you find a problem?	Go to Step 6	Go to Step 4
4	<ol style="list-style-type: none"> 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 <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems
6	Repair the circuit as necessary. Refer to <u>Wiring Repairs</u> or <u>Connector Repairs</u> in Wiring Systems. Is the action complete?	Go to Step 7	-
7	<p>IMPORTANT: Before Clearing DTCs, monitor all DTC status parameters and note any additional DTCs.</p> <ol style="list-style-type: none"> 1. Turn OFF the ignition. 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
8	Inspect for poor connections at the BCM. 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 7	Go to Step 9
9	<p>IMPORTANT: When replacing the BCM refer to <u>Body Control Module (BCM) Programming/RPO Configuration in Body Control System.</u></p>		-

Replace the body control module. Refer to Body Control Module Replacement in Body Control System. Did you complete the replacement?	Go to Step 7
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DTC P1631

Circuit Description

The Class 2 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 portion of the 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.

Conditions for Running the DTC

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

Conditions for Setting the DTC

The powertrain control module (PCM) did not receive a valid password before the fuel disable decision point was reached.

Action Taken When the DTC Sets

- The powertrain control module (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.

- If the powertrain control module (PCM) is replaced, the PCM must re-learn a valid password and crankshaft variation.
- If the body control module (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:
 - 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 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 state and the auto learn timer can be viewed in the Passlock Data parameter of the scan tool.
- Check the following for preventing the Passlock sensor from communicating with the BCM:
 - Passlock sensor
 - Ignition switch assembly
 - Passlock sensor circuitry
 - Bent pins at the small Passlock sensor
- If this DTC sets along with a DTC B2960, then the problem was caused by malfunctioning Passlock 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 System problems. Diagnose any BCM DTCs prior to continuing with this diagnostic.

3: A DTC B3031 may set in the body control module (BCM) during the Password Learn Procedure.

DTC P1631

Step	Action	Yes	No
Schematic Reference: <u>Data Link Connector (DLC) Schematics</u>			
1	Did you perform the Vehicle Theft Deterrent (VTD) Diagnostic System Check?	Go to Step 2	Go to <u>Diagnostic System Check - Theft Deterrent</u>
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 <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems
3	Perform the Passlock Programming procedure. Refer to <u>Programming Theft Deterrent System Components</u> . Did the PCM successfully learn the password?	Go to Step 4	Go to <u>Diagnostic System Check - Theft Deterrent</u>
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 - Theft Deterrent** before 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** .
3. Review the content theft deterrent description and operation in order to familiarize yourself with the system functions. Refer to **Content Theft Deterrent (CTD) 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:

- **Security Indicator Always On or Flashing**
- **Security Indicator Inoperative**
- **Content Theft Deterrent (CTD) Alarm Mode Inoperative**
- **Content Theft Deterrent (CTD) Does Not Disarm with Key Lock**
- **Horn Inoperative in Content Theft Deterrent (CTD) Alarm Mode**
- **Lights Inoperative in Content Theft Deterrent (CTD) Alarm Mode**
- The engine Cranks and will not Start, No Security light on. Refer to **DTC B2958**

CONTENT THEFT DETERRENT (CTD) ALARM MODE INOPERATIVE

Content Theft Deterrent (CTD) Alarm Mode Inoperative

Step	Action	Yes	No
Schematic Reference: Theft Deterrent System Schematics Connector End View Reference: Theft Deterrent System Connector End Views DEFINITION: The CTD system will not ARM or DISARM properly.			
1	Did you perform A Diagnostic System Check - Theft Deterrent?	Go to Step 2	Go to <u>Diagnostic System Check - Theft Deterrent</u>
	1. Open the driver's window.		

2	<ol style="list-style-type: none"> 2. Unlock the doors using the power door lock switch or the keyless entry transmitter. 3. Remove the keys from the ignition. 4. Open the driver's door. 5. Observe the courtesy lamps. <p>Do the courtesy lamps illuminate?or</p>	Go to Step 3	Go to <u>Courtesy Lamps Inoperative</u> in Lighting Systems
3	<ol style="list-style-type: none"> 1. Open the driver's window. 2. Unlock the doors using the power door lock switch or the keyless entry transmitter. 3. Remove the keys from the ignition. 4. Open the driver's door. 5. Observe the SECURITY telltale. <p>Does the SECURITY telltale flash?or</p>	Go to Step 4	Go to <u>Security Indicator Inoperative</u>
4	<ol style="list-style-type: none"> 1. Lock the vehicle using the power door lock switches or the keyless entry transmitter. 2. Observe the SECURITY telltale. <p>Does the SECURITY telltale change from flashing to on steady?</p>	Go to Step 5	Go to <u>Power Door Locks Inoperative (Front Door(s))</u> or <u>Power Door Locks Inoperative (Rear Door(s))</u> in Doors
5	<ol style="list-style-type: none"> 1. Close all of the doors. <p>IMPORTANT: Ensure that all the doors are closed. The content theft deterrent system will not arm itself without all of the doors being closed.</p> <ol style="list-style-type: none"> 2. Observe the SECURITY telltale. <p>Does the SECURITY telltale turn off in about 15 seconds?</p>	Go to Step 6	Go to <u>Courtesy Lamps Always On</u> in Lighting Systems
6	<ol style="list-style-type: none"> 1. Reach in and manually unlock the driver's door. 2. Open the driver's door. <p>Do all of the alarm mode functions</p>		

	activate, parking lights flash and horn pulses?	Go to Step 7	Go to Step 8
7	Disarm the CTD system by inserting the door key into the driver or the passenger door lock cylinder and rotate the key to the unlock position. Do all of the alarm mode functions stop?	Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems	Go to <u>Content Theft Deterrent (CTD) Does Not Disarm with Key Lock</u>
8	Do any of the alarm functions activate?	Go to Step 9	Go to <u>Courtesy Lamps Inoperative</u> in Lighting Systems
9	Do the horns pulse only?	Go to <u>Lights Inoperative in Content Theft Deterrent (CTD) Alarm Mode</u>	Go to <u>Horn Inoperative in Content Theft Deterrent (CTD) Alarm Mode</u>

CONTENT THEFT DETERRENT (CTD) DOES NOT DISARM WITH KEY LOCK

Content Theft Deterrent (CTD) Does Not Disarm with Key Lock

Step	Action	Value(s)	Yes	No
Schematic Reference: Theft Deterrent System Schematics				
Connector End View Reference: Theft Deterrent System Connector End Views				
DEFINITION: The CTD system does not disarm when the vehicle is unlocked with the key.				
1	Did you perform the Theft Deterrent Diagnostic System Check?	-	Go to Step 2	Go to <u>Diagnostic System Check - Theft Deterrent</u>
2	<ol style="list-style-type: none"> Turn ON the ignition with the engine OFF. With a scan tool, observe the door key switch parameter in the Body Control Module (BCM) security data list. Does the scan tool display INACTIVE?	INACTIVE	Go to Step 3	Go to Step 11
3	<ol style="list-style-type: none"> Turn OFF the ignition. With a scan tool, observe the door key switch parameter in the BCM data list. Insert the ignition key into the drivers door lock cylinder. Turn and hold the door lock cylinder to the UNLOCK position. Does the scan tool display ACTIVE?	ACTIVE	Go to Step 6	Go to Step 4
	<ol style="list-style-type: none"> Insert the ignition key into the passenger door lock cylinder. With a scan tool, observe the door key switch 			

4	<p>parameter in the BCM data list.</p> <p>3. Turn and hold the door lock cylinder to the UNLOCK position.</p> <p>Does the scan tool display ACTIVE?</p>	ACTIVE	Go to Step 9	Go to Step 5
5	<p>1. Connect a 3 amp fused jumper wire between the signal circuit of the door key switch and ground.</p> <p>2. With a scan tool, observe the door key switch parameter in the BCM data list.</p> <p>Does the scan tool display ACTIVE?</p>	ACTIVE	Go to Step 8	Go to Step 18
6	<p>1. Insert the ignition key into the passenger door lock cylinder.</p> <p>2. With a scan tool, observe the door key switch parameter in the BCM data list.</p> <p>3. Turn and hold the door lock cylinder to the UNLOCK position.</p> <p>Does the scan tool display ACTIVE?</p>	ACTIVE	System OK	Go to Step 7
7	<p>1. Disconnect the RH door key switch connector.</p> <p>2. With a scan tool, observe the Door Key Switch parameter.</p> <p>3. Connect a 3 amp fused jumper wire between the signal circuit of the door key switch and ground.</p> <p>Does the scan tool display ACTIVE?</p>	ACTIVE	Go to Step 8	Go to Step 20
8	<p>1. Connect a 3 amp fused jumper wire between the signal circuit of the door key switch and the ground circuit at the RH door key switch connector.</p> <p>2. With the scan tool, observe the Door Key Switch parameter.</p> <p>Does the scan tool display ACTIVE?</p>	ACTIVE	Go to Step 19	Go to Step 21
9	<p>1. Disconnect the LH door key switch connector.</p> <p>2. With a scan tool, observe the Door Key Switch parameter.</p> <p>3. Connect a 3 amp fused jumper wire between the signal circuit of the door key switch and ground.</p> <p>Does the scan tool display the specified ACTIVE?</p>	ACTIVE	Go to Step 10	Go to Step 15
	<p>1. Connect a 3 amp fused jumper wire between the</p>			

10	<p>signal circuit of the door key switch and the ground circuit at the LH door key switch connector.</p> <p>2. With the scan tool, observe the Door Key Switch parameter.</p> <p>Does the scan tool display ACTIVE?</p>	ACTIVE	Go to Step 17	Go to Step 16
11	<p>1. With a scan tool observe the Door Key Switch parameter.</p> <p>2. Disconnect the BCM connector containing the circuits to the door key switch.</p> <p>Does the scan tool display INACTIVE?</p>	INACTIVE	Go to Step 12	Go to Step 22
12	<p>1. Reconnect the BCM connector.</p> <p>2. Disconnect the LH door key switch connector.</p> <p>3. With a scan tool observe the Door Key Switch parameter.</p> <p>Does the scan tool display INACTIVE?</p>	INACTIVE	Go to Step 17	Go to Step 13
13	<p>1. Disconnect the RH door key switch connector.</p> <p>2. With a scan tool observe the Door Key Switch parameter.</p> <p>Does the scan tool display INACTIVE?</p>	INACTIVE	Go to Step 19	Go to Step 14
14	<p>Repair the short to ground in the signal circuit of the door key switch between the BCM and either door latch.</p> <p>Did you complete the repair?</p>	-	Go to Step 23	-
15	<p>Repair the open in the signal circuit of the door key switch between the LH door latch and C200.</p> <p>Did you complete the repair?</p>	-	Go to Step 23	-
16	<p>Repair the open in the ground circuit of the door key switch between the LH door key switch connector and G203.</p> <p>Did you complete the repair?</p>	-	Go to Step 23	-
17	<p>Replace the LH door latch. Refer to Latch Replacement - Front Door in Doors.</p> <p>Did you complete the replacement?</p>	-	Go to Step 23	-
18	<p>Repair the open in the signal circuit of the door key switch between the BCM and C200.</p> <p>Did you complete the repair?</p>	-	Go to Step 23	Go to Step 22
19	<p>Replace the RH door latch. Refer to Latch Replacement - Front Door in Doors.</p>	-	Go to	-

	Did you complete the replacement?		Step 23	
20	Repair the open in the signal circuit of the door key switch between the RH door key switch connector and C200. Did you complete the repair?	-	Go to Step 23	-
21	Repair the open in the ground circuit between the door key switch connector and G200. Did you complete the repair?	-	Go to Step 23	-
22	<ol style="list-style-type: none"> 1. Replace the BCM. Refer to <u>Body Control Module Replacement</u> in Body Control System. 2. Program the BCM with the proper calibrations. Refer to <u>Body Control Module (BCM) Programming/RPO Configuration</u> in Body Control System. 3. Perform the learn procedure. Did you complete the replacement?	-	Go to Step 23	-
23	<ol style="list-style-type: none"> 1. Reconnect any connectors that were removed for testing. 2. Clear any DTCs that may have been set during this procedure. 3. Attempt to set the CTD system. Refer to <u>Content Theft Deterrent (CTD) Description and Operation</u> . Does the system work as described?	-	System OK	Go to <u>Diagnostic System Check - Theft Deterrent</u>

HORN INOPERATIVE IN CONTENT THEFT DETERRENT (CTD) ALARM MODE

Horn Inoperative in Content Theft Deterrent (CTD) Alarm Mode

Step	Action	Yes	No
Schematic Reference: <u>Theft Deterrent System Schematics</u> Connector End View Reference: <u>Theft Deterrent System Connector End Views</u> DEFINITION: The horn does not sound when the CTD system is in alarm mode.			
1	Did you perform A Diagnostic System Check - Theft Deterrent?	Go to Step 2	Go to <u>Diagnostic System Check - Theft Deterrent</u>
	Perform one of the following to activate the CTD Alarm Mode: <ul style="list-style-type: none"> • Operate the PANIC button on the keyless entry transmitter. • Complete the following steps: 		

2	<ol style="list-style-type: none"> 1. Open the driver's window. 2. Lock the vehicle using the power door lock switches. 3. Wait for the SECURITY telltale to turn off. 4. Reach in and unlock the driver's door. 5. Open the driver's door. <p>Do all of the alarm mode functions activate, lights flash and horn pulses?</p>	<p>Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems</p>	<p>Go to Step 3</p>
3	<p>Are only the horns inoperative?</p>	<p>Go to Step 4</p>	<p>Go to Content Theft Deterrent (CTD) Alarm Mode Inoperative</p>
4	<p>Operate the horns from the horn pad. Do the horns operate properly?</p>	<p>Go to Step 5</p>	<p>Go to Horns Inoperative in Horns</p>
5	<p>Test the control circuit of the horn relay for an open between the body control module (BCM) and the horn relay. Refer to Circuit Testing in Wiring Systems. Did you find and correct the condition?</p>	<p>Go to Step 8</p>	<p>Go to Step 6</p>
6	<p>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?</p>	<p>Go to Step 8</p>	<p>Go to Step 7</p>
7	<p>Replace the BCM. Refer to Body Control Module Replacement in Body Control System. Did you complete the replacement?</p>	<p>Go to Step 8</p>	<p>-</p>
8	<p>Operate the system in order to verify the repair. Did you correct the condition?</p>	<p>System OK</p>	<p>Go to Step 3</p>

LIGHTS INOPERATIVE IN CONTENT THEFT DETERRENT (CTD) ALARM MODE

Lights Inoperative in Content Theft Deterrent (CTD) Alarm Mode

Step	Action	Yes	No
<p>Schematic Reference: <u>Theft Deterrent System Schematics</u> Connector End View Reference: <u>Theft Deterrent System Connector End Views</u> DEFINITION: The vehicle lights do not flash when the CTD system is in alarm mode.</p>			
1	<p>Did you perform A Diagnostic System Check - Theft Deterrent?</p>	<p>Go to Step 2</p>	<p>Go to Diagnostic System Check - Theft Deterrent</p>
	<p>Perform one of the following to</p>		

2	<p>activate the CTD alarm mode:</p> <ul style="list-style-type: none"> • Operate the PANIC button on the keyless entry transmitter. • Complete the following steps: <ol style="list-style-type: none"> 1. Open the driver's window. 2. Lock the vehicle using the power door lock switch. 3. Wait for the SECURITY telltale to turn off. 4. Reach in and unlock the driver's door. 5. Open the driver's door. <p>Do all of the alarm mode functions activate, lights flash and horn pulses?</p>	<p>Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems</p>	<p>Go to Step 3</p>
3	<p>Are only the parking lamps inoperative?</p>	<p>Go to <u>Park, License, and Tail Lamps Always On</u> in Lighting Systems</p>	<p>Go to <u>Content Theft Deterrent (CTD) Alarm Mode Inoperative</u></p>

SECURITY INDICATOR ALWAYS ON OR FLASHING

Security Indicator Always On or Flashing

Step	Action	Yes	No
<p>Schematic Reference:<u>Theft Deterrent System Schematics</u> Connector End View Reference:<u>Theft Deterrent System Connector End Views</u></p>			
1	<p>Did you perform the Theft Deterrent Diagnostic System Check?</p>	<p>Go to Step 2</p>	<p>Go to <u>Diagnostic System Check - Theft Deterrent</u></p>
2	<p>1. Turn ON the ignition with the engine OFF. 2. With the scan tool, command the Security indicator ON and OFF.</p> <p>Does the Security indicator turn ON and OFF with each command?</p>	<p>Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems</p>	<p>Go to Step 3</p>
3	<p>Replace the Instrument Cluster. Refer to <u>Instrument Panel Cluster (IPC) Replacement</u> in Instrument Panel, Gauges and Console.</p> <p>Did you complete the replacement?</p>	<p>Go to <u>Diagnostic System Check - Instrument Cluster</u></p>	<p>-</p>

SECURITY INDICATOR INOPERATIVE

Security Indicator 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 Theft Deterrent Diagnostic System Check?	Go to Step 2	Go to Diagnostic System Check - Theft Deterrent
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	Replace the Instrument Cluster. Refer to Instrument Panel Cluster (IPC) Replacement in Instrument Panel, Gauges and Console. Did you complete the replacement?	Go to Diagnostic System Check - Instrument Cluster	-

REPAIR INSTRUCTIONS

REPLACING KEYS

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.

ADDING KEYS

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

Programming Replacement Passlock(tm) Sensor, BCM, or PCM

IMPORTANT: • The body control module (BCM) must be programmed with the proper

RPO configurations before performing learn procedures. See Body Control Module (BCM) Programming/RPO Configuration .

- **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 Service Parts Operations (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 two available methods to perform the programming procedure:

- A 10 minutes procedure which requires a Tech 2 and a techline terminal.
- A 30 minutes 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, 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, 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 through 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

Theft System Description and Operation

The theft deterrent system on this vehicle is comprised of two separate systems, the vehicle theft deterrent (VTD) system and the content theft deterrent (CTD) system. VTD prevents drive away theft by keeping the vehicle from starting. CTD is the vehicle alarm system which discourages unauthorized entry into the vehicle. These system are described and diagnosed separately within this section.

SECURITY Telltale

The SECURITY Telltale on the message center is controlled by both the VTD system and the CTD system. The SECURITY telltale is a part of the reconfigurable message center on the instrument cluster. The SECURITY telltale is controlled by the body control module through the class 2 data line.

- The VTD system contained in the BCM commands the instrument cluster to control the SECURITY

telltale only when the ignition switch is ON. The VTD system uses the telltale as a malfunction indicator.

- The 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 telltale 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

Content Theft Deterrent (CTD) System

The Content Theft Deterrent function provides the theft deterrent by sounding the horn and flashing the headlamps and the park lamps when there is an unauthorized vehicle entry or there is tampering detected.

SECURITY Telltale

The SECURITY telltale on the instrument cluster is controlled by both the VTD system and the CTD system.

- The VTD system commands the instrument cluster to control the telltale only when the ignition switch is ON. The VTD system uses the telltale as a malfunction indicator. If a DTC is present in the VTD system when the ignition is ON, the telltale will be illuminated.
- The CTD system commands the instrument cluster to control the telltale only when the ignition switch is OFF. The CTD system uses the telltale to identify system status.
 - Telltale FLASHING - The system is in standby mode. The system is not ready to arm (a door is open).
 - Telltale ON STEADY - The system is in delay mode. The system is ready to arm and is executing a time delay of 15 seconds before turning the lamp OFF and transitioning to armed mode.
 - Telltale OFF - The system may or may not be armed.

Body Control Module (BCM)

The body control module (BCM) monitors several inputs in order to arm and disarm the CTD system. The BCM controls the alarm function outputs. When the BCM detects an unauthorized entry (any door opened), the BCM applies ground to the horn, the park lamp and the headlamp relays. The BCM will send messages to the security telltale in the instrument cluster through the Class 2 serial data link. The BCM has the following 8 basic modes for operating the CTD system. The more detailed descriptions are below.

- Off state
- Idle state
- Disarmed state
- Ready-to-arm state
- Arm initiated state
- Arm delay state
- Armed state
- Alarm state

The BCM has the following 6 discrete inputs in order to monitor the CTD system:

- Ignition 1
- Driver door latch (door jamb) switch
- Passenger door latch (door jamb) switch
- Door lock relay
- Door key switch
- Passenger door unlock relay

The BCM applies ground once per second for approximately 2 minutes, or until a valid input to disarm the system is received by the BCM.

Door Latch (Door Jamb) Switches

The theft deterrent system uses the door key switch as one method in order to activate the alarm. If the BCM detects any door opening before the BCM receives a disarm input, the alarm mode activates.

Door Key Switch

The BCM monitors the door key switches in order to disarm the CTD system. When the lock cylinder turns in order to unlock the door, the switch grounds the disarm input to the BCM.

Remote Control Door Lock Receiver Module System

The remote control door lock receiver module system may also arm and disarm the CTD system. When the remote control door lock receiver receives a door lock or an unlock signal from the key fob, the remote control door lock receiver sends a message to the BCM. The message orders the BCM to perform the appropriate door lock/unlock command. The BCM detects the message and performs one of the following functions:

- Locks the doors and enters the armed initiated mode
- Unlocks the doors and enters the ready-to-arm mode

Off State

The CTD system will be in the off state when the ignition switch is in the RUN position and all the doors are

closed. The BCM will request the security telltale to remain OFF.

Idle State

The CTD system will be in the idle state when the ignition switch is in the RUN position and any door is open. The BCM will request the security telltale to remain OFF.

Disarmed State

The CTD system will be in the disarmed state when the ignition switch is in the LOCK off position and all the doors are closed. The BCM will request the security telltale to remain OFF.

Ready-To-Arm State

The CTD system will be in the ready-to-arm state when the ignition switch is in the LOCK off position and any door opens. The BCM will request the security telltale to flash.

Arm Initiated State

The CTD system will be in the arm initiated state when the ignition switch is in the LOCK off position, any door opens, and the BCM detects a lock command from either the power door lock switch or the remote control door lock receiver. The BCM will request the security telltale to remain ON.

Arm Delay State

The CTD system will enter the arm delay state when the ignition switch is in the LOCK off position, the BCM receives a LOCK command from either the power door lock switch or the remote control door lock receiver and all the doors are closed. The BCM will request the security telltale to remain ON for 15 seconds.

Armed State

The CTD system will enter the armed state after the 15 second delay of the arm delay state, unless the BCM detects any door opening within that time. The BCM monitors the inputs (listed above) in order to determine whether to activate the alarm or to disarm the system. The BCM will request the security telltale to remain OFF.

Alarmed State

The CTD system will enter the alarmed state from the armed state if any door opens. The horns and the exterior lights will alternate off and on for approximately two minutes or until an unlock command is received by the BCM. If the BCM does not receive an unlock command, the CTD system will go back to the armed state. The BCM will request the security telltale to remain off. The CTD system will change from the alarm state to the off state if the vehicle control module (VCM)/powertrain control module (PCM) receives a valid Passlock(tm) ignition key rotation.

Remote Panic Alarm/Vehicle Locator State

The CTD system will enter the remote panic alarm/vehicle locator state when the panic button on the key fob is pressed. When the panic button is pressed, the remote control door lock receiver sends a message to the BCM.

The BCM will sound the horns and flash the headlamps and the parklamps. You can disable the remote panic alarm/vehicle locator state by pressing the panic button on the key fob again or the system will time out after 30 seconds.

Locking the Vehicle Without Arming the System

Use one of the following procedures in order to lock the vehicle without arming the system:

- Procedure A - Lock the vehicle using the manual door lock knobs. Close all the doors.
- Procedure B - Close all the doors. Use the key or the power door lock switch in order to lock the door. The doors must be closed prior to locking the doors for this procedure.

Disarming the System

In the arm initiated mode, the following conditions are true:

- The security telltale is ON.
- The doors are open.

In order to disarm a system in the arm initiated mode, perform one of the following procedures:

- Press the power door lock switch to the UNLOCK position.
- Press the door unlock button on the key fob.

In order to disarm a system in the arm delay or the armed mode, perform one of the following procedures:

- Use the key in order to unlock one of the doors.
- Press the door unlock button on the key fob.

Deactivating the Alarm

In the alarm mode, the following conditions are true:

- The horns sound intermittently.
- The headlights and the parklamps are flashing.

In order to deactivate a system in the alarm mode, perform one of the following procedures:

- Use the key in order to unlock one of the doors.
- Press the door unlock button on the key fob.
- If the vehicle control module (VCM)/powertrain control module (PCM) receives a valid Passlock(R) ignition key rotation.

Alarm State Activation

Perform the following steps in order to verify that the system activates the alarm state:

1. Open a window. Opening the window ensures that you will be able to open the door from the outside using the manual door lock knob.
2. Place the system in the armed state.
3. Reach through the window and unlock the door using the manual door lock knob.
4. Open the door.

The system enters the alarm state. The following actions occur for approximately 2 minutes:

- The horns sound intermittently.
- The exterior lamps flash.
- After 2 minutes and all the doors closed, the system automatically returns back to the armed state.

Return System to Arm Initiated State

Perform the following steps in order to verify that the system returns to the armed initiated mode:

1. Place the system in the armed mode.
2. Use the key in order to unlock the door.
3. Open the door.
4. The system does not enter the alarm mode. The SECURITY telltale flashes. The flashing telltale indicates that the system has entered the ready-to-arm state.
5. Press the power door lock switch to the LOCK position or the key fob LOCK button.

Ignition Switch Disarm Function

Perform the following steps in order to verify that the ignition disarm function operates:

1. Stay in the vehicle.
2. Place the system in the armed state.
3. Wait for the SECURITY telltale to turn off. The system is armed when the SECURITY telltale turns off.
4. Cycle the ignition switch from the LOCK position to the RUN position. Return the ignition switch to the LOCK position.
5. Open any door.

The system does not enter the alarm mode. The SECURITY telltale flashes. The flashing telltale indicates that the system has entered the ready-to-arm state.

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 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 turns the lock cylinder. 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 class 2 message is sent from the BCM to the powertrain control module (PCM)/vehicle control module (VCM). The message enables the fuel injectors.

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 PASS-Key(R) system. However, the Passlock(tm) system eliminates the need for a key mounted resistor pellet. The components of the Passlock(tm) system are as follows:

- The ignition lock cylinder
- The ignition switch
- The Passlock(tm) sensor
- The Body control module (BCM)
- The security telltale
- The vehicle/powertrain control module (VCM/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 BCM and the VCM/PCM, the vehicle will become fail-enabled if the VCM/PCM has already received the password from the BCM for that ignition cycle, the engine is running. In this event, the following conditions occur:

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

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

- The VCM/PCM will never 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 2 parts.

Passlock(tm) Sensor

The Passlock(tm) sensor is inside the ignition cylinder lock housing. The Passlock(tm) sensor contains 2 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. The tamper hall effect sensor is physically placed on top of the security hall effect sensor. This arrangement enables the tamper hall effect 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. There is a tamper resistor inside the Passlock (tm) sensor in order to help prevent tamper to the system. Passlock(tm) equipped vehicles have a selection of 10 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. All 10 combinations of the Passlock (tm) sensor have the same part number. However, you cannot simply replace the Passlock(tm) sensor and expect the system to operate properly. Always start by performing the Diagnostic System Check first and following the instructions.

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 VCM/PCM.

During the tamper mode the vehicle may start. The vehicle will then stall. If the BCM receives the wrong 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 VCM/PCM. The VCM/PCM will not disable the fuel due to any BCM message for the remainder of the ignition cycle.

SECURITY Telltale

The SECURITY telltale appears on the message center inside the instrument cluster. If the SECURITY telltale flashes or if the SECURITY telltale lights continuously during the vehicle operation, refer to the system diagnosis.

Vehicle/Powertrain Control Module

The VCM/PCM communicates with the BCM over the Class 2 serial data line. When the BCM determines a no start condition, it sends a Class 2 serial data password to the VCM/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 class 2 serial data password to the VCM/PCM in order to enable the fuel injection system. The VCM/PCM then allows the vehicle to start correctly. If the Class 2 serial data password from the BCM to the VCM/PCM is not within the Vehicle Security Status Message, the fuel injectors will shut OFF during a start attempt. The SECURITY telltale will be illuminated for 10 minutes. If the VCM/PCM does not receive the same password from the BCM as the last learned one, the vehicle will start and then stalls due to the 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, even if the ignition switch is turned from the RUN position to the OFF 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 change. The parts that can no longer be changed without the possibility of going into a tamper mode are:

- The Passlock(tm) sensor
- The BCM
- The VCM/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 VCM/PCM require the full 10 minutes in order to complete a learn cycle. The ignition switch must remain in the RUN position until the SECURITY telltale 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.

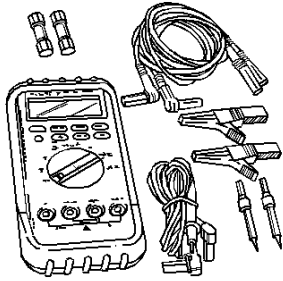
The design of the Passlock(tm) system is to prevent the vehicle operation if the proper ignition key is not used in order to start the vehicle. The mechanical key, in normal operation, will turn the ignition lock cylinder. The Passlock(tm) sensor monitoring the position of the lock cylinder will relay the Passlock(tm) data to the body control module (BCM). The BCM will determine the validity of the Passlock(tm) data. The BCM will send a fuel continue password to the vehicle/powertrain control module (VCM/PCM). When the VCM/PCM receives the correct password the VCM/PCM allows the fuel injectors to operate normally. The Passlock(tm) system requires the VCM/PCM and the BCM to communicate the various functions in order to operate. These functions transmit over the class 2 serial data line. For an explanation of the class 2 serial data description and operation, refer to **Data Link Communications Description and Operation** in Data Link Communications.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Special Tools

Illustration	Tool Number/Description



J 39200
Digital Multimeter