

Vehicle Theft Deterrent (VTD) Description and Operation

Passlock™ 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™ 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™ 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® system. However, the Passlock™ system eliminates the need for a key mounted resistor pellet. The components of the Passlock™ system are as follows:

- The ignition lock cylinder
- The ignition switch
- The Passlock™ 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™ sensor is in the steering column. The Passlock™ 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™ Sensor

The Passlock™ sensor is inside the ignition cylinder lock housing. The Passlock™ 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™ sensor by placing a large magnet around that area of the steering column. There is a tamper resistor inside the Passlock™ sensor in order to help prevent tamper to the system. Passlock™ 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™ sensor will generate a unique Passlock™ code. All 10 combinations of the Passlock™ sensor have the same part number. However, you cannot simply replace the Passlock™ 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™ data from the Passlock™ sensor. If the Passlock™ 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™ 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™ 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™ 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™ 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™ system uses the lockout cycle in order to synchronize all of the Passlock™ components when any Passlock™ related part is changed. The Passlock™ system requires 3 consecutive lockout cycles in order to complete the 30 minute learn procedure for a changed component.

Changing the Passlock™ Components

The design of the Passlock™ 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™ 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™ 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™ sensor monitoring the position of the lock cylinder will relay the Passlock™ data to the body control module (BCM). The BCM will determine the validity of the Passlock™ 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™ 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.
