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GM Vehicle Theft Deterrent (VTD) Relearn Procedures

Application GM vehicles produced after 1995

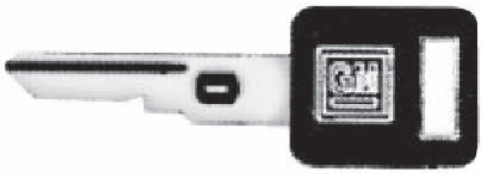
Problem Engine will not start after replacing a faulty Powertrain Control Module (PCM).

Cause Proper relearn procedure was not conducted during replacement PCM installation.

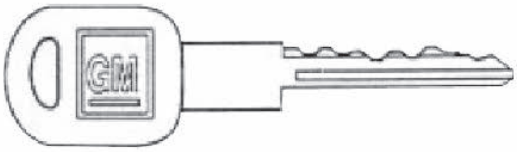
Solution There are three possible types of Vehicle Thief Deterrent (VTD) systems that require specific relearn procedures when replacing the PCM. These procedures must be completed before the engine starts or even cranks. The three systems are:

1. Vehicle Anti-Theft System (VATS), Passkey, & Passkey II – resistive chip ignition key
2. Passlock – coded lock cylinder
3. Passkey III – transponder ignition key

The ignition key type can be used to determine what system the vehicle has and what relearn procedure is required.

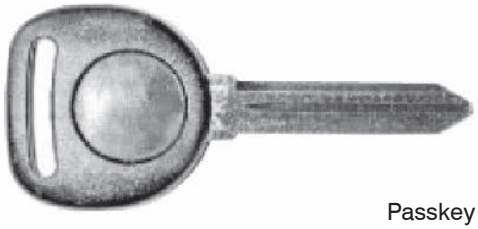


Passkey, Passkey II (PK2)



Passklock

Note



Passkey III (PK3), III+ (PK3+)

VATS and Passkey – No relearn is required on a VATS or Passkey-equipped vehicle when replacing the PCM. If the engine will not start it is not a security issue.

Passkey II (Resistive Chip Ignition Key) – In the Passkey II system, the Theft Deterrent Module (TDM) function is stored in the Body Control Module (BCM) and validates the resistive chip in the ignition key. If the resistance value read by the BCM is valid, the BCM will send a message over serial data to the PCM, enabling it to start the vehicle.

To perform a relearn on a Passkey II system, make sure there is a fully charged battery in the vehicle. The battery will be used for 30 minutes without the alternator for charging. Connect a battery charger to the battery to ensure steady power while programming. **Both the BCM and PCM must be working and communicating with each other to successfully complete the procedure.**

Relearn procedure:

1. Insert ignition key and turn to the ON position. **Do not** attempt to start the engine. Leave the key in the ON position for approximately 11 minutes. The security light will be on or flashing for the 11-minute period. Do not proceed to Step 2 until the security light turns off or stops flashing.
2. Turn the ignition switch to the OFF position for 30 seconds.
3. Turn the ignition switch to the ON position as in Step 1 for 11 minutes.
4. Turn the ignition switch to the OFF position for 30 seconds.
5. Turn the ignition switch to the ON position as in Step 1 for 11 minutes for a third time.
6. Turn the ignition switch to the OFF position for 30 seconds for a third time.
7. Turn the ignition switch to the ON position for 30 seconds.
8. Turn the ignition switch to the OFF position.
9. Attempt to start the engine. If the engine starts and runs, the relearn is complete.

   NOTE: If the theft deterrent relearn procedure does not work, please try the procedure again.

Passlock (Coded Lock Cylinder) – The Passlock Anti-Theft system requires the presence of a key in the lock cylinder to enable starting. The lock cylinder contains a stationary Hall effect sensor and a rotating magnet. When the key is turned in the lock cylinder, the magnet creates a signal pulse in the Hall effect sensor. The cylinder then sends a coded signal to the Instrument Panel Cluster (IPC) or BCM. If the IPC/BCM receives the expected coded signal, the IPC/BCM will send a message over serial data to inform the PCM that the vehicle may be started.

To perform a Passlock system relearn, make sure the vehicle battery is fully charged, as it will be used for 30 minutes without the alternator for charging. Connect a battery charger to the battery to ensure steady power while programming. **Both the IPC/BCM and PCM must be working and communicating with each other to successfully complete the relearn.**

Relearn procedure:

1. Turn ignition on.
2. **Attempt to start the engine**, and then release the key to the ON position.
3. Observe the security indicator light. After 10 minutes, the security indicator light will turn off.
4. Turn ignition to the OFF position, and wait 10 seconds.

5. Attempt to start the engine, and then release the key to the ON position.
6. Observe the security indicator light. After 10 minutes, the security indicator light will turn off.
7. Turn ignition to the OFF position, and wait 10 seconds.
8. Attempt to start the engine, and then release the key to the ON position.
9. Observe the security indicator light. After 10 minutes, the security indicator light will turn off.
10. Turn ignition to the OFF position, and wait 10 seconds.
11. Vehicle has now learned the new password. Start the engine.
12. With a scan tool, clear any trouble codes.

    NOTE: For most cars, one 10-minute cycle will be enough for the vehicle to learn the new password. Perform all 3 cycles if the car will not start after 1 cycle. Most trucks will require all 3 cycles in order to learn the new password. If the theft deterrent relearn procedure does not work, please try the procedure again.

Passkey III (Transponder Ignition Key) – The Passkey III Anti-Theft System uses a transponder inside the head of the ignition key. The exciter inside the ignition lock cylinder energizes this transponder when the ignition switch is on. The transponder transmits a unique signature to the Theft Deterrent Control Module (TDCM). If the key signature transmitted is valid, the TDCM will transmit a "fuel enable" password to the PCM. If the "fuel enable" password is correct, the PCM will start the vehicle.

To perform a Passkey III system relearn, make sure there is a fully charged battery in the vehicle. The battery will be used for 30 minutes without the alternator for charging. Connect a battery charger to the battery to ensure steady power while programming.

When performing this relearn, all previously learned keys will be erased. Additional keys may be relearned immediately after the first key has been learned. Simply insert the additional key and turn the ignition switch ON within 10 seconds of removing the previously learned key.

Relearn procedure:

1. Insert a master key (black head) into the ignition switch.
2. Turn key to ON position **without starting** the engine. Security light should turn on and stay on.

NOTE: Certain vehicles are equipped with a Driver Information Center (DIC) display. The DIC will display a "Start disabled due to theft" message instead of a security light.

3. Wait for 10 minutes or until the security light or DIC message turns off.
4. Turn key to OFF position for 5 seconds.
5. Turn key to ON **without starting** the engine. Security light or DIC message should turn on and stay on.
6. Wait for 10 minutes or until the security light or DIC message turns off.
7. Turn key to OFF for 5 seconds.
8. Turn key to ON **without starting** the engine. Security light or DIC message should turn on and stay on.
9. Wait for 10 minutes or until the security light or DIC message turns off.
10. Turn key to OFF. The key transponder information will be learned on the next start cycle.
11. Start the vehicle. If the vehicle starts and runs, the relearn is complete.

NOTE: If the theft deterrent relearn procedure does not work, please try the procedure again.

If additional keys need to be relearned:

1. Turn the master key to the OFF position and remove key.
2. Insert the next key to be learned. Turn the key to the ON position **within 10 seconds** of removing the previously used key.
3. Wait for security light to turn off, it should happen fairly quickly. You may not notice the lamp, as the transponder value will be learned immediately. Remove key.
4. Repeat steps 2 and 3 for any additional keys.

GM Crankshaft Position Sensor Relearn

The replacement PCM needs to learn the variability of the Crankshaft Position Sensor to better detect misfire conditions. A scan tool capable of performing this learn procedure is required. Refer to the scan tool and vehicle service manual for specific procedures, but typical steps expected are:

- Block drive wheels.
- Apply parking brakes.
- Cycle ignition on and off.
- Apply and hold brake pedal.

  NOTE: Some applications require that you NOT hold the brake pedal. Follow instructions on scan tool.
- Start engine.
- Turn off A/C.
- Place transmission in Park (automatic) or Neutral (manual).
- Increase engine RPM to value indicated on scan tool.
- Release throttle when fuel cut-off occurs, or if RPM value is exceeded. Procedure is complete.

NOTE: This ProTech® bulletin is supplied as technical information only and is not an authorization for repair.