

2002 Chevy Truck K Tahoe 4WD V8-5.3L VIN Z Flex Fuel

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THEFT DETERENT - IMMOBILIZER

THEFT SYSTEMS DESCRIPTION AND OPERATION

The theft deterrent system on this vehicle is comprised of the vehicle theft deterrent (**VTD**) system. The VTD system prevents drive away theft by keeping the vehicle from starting.

SECURITY INDICATOR

The instrument panel cluster (**IPC**) illuminates the SECURITY indicator as determined by the vehicle theft deterrent (VTD) system. The IPC receives a message via the serial data circuit from the theft deterrent control module requesting illumination. The VTD system requests the IPC to illuminate the indicator only when the ignition is ON. The VTD system uses the indicator as a malfunction indicator. For vehicle theft deterrent (VTD) information, refer to Vehicle Theft Deterrent (VTD) Description and Operation.

RADIO WITH THEFTLOCK

The vehicle theft deterrent (VTD) system does not interact with radio theft lock equipped vehicles. Radio theft lock is diagnosed as a stand-alone system. Refer to Radio/Audio System Description and Operation in Radio, Stereo and Compact Disc.

VEHICLE THEFT DETERRENT (VTD) DESCRIPTION AND OPERATION

The vehicle theft deterrent (VTD) system functions are provided by the theft deterrent control module. When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the transponder embedded in the head of the key is energized by the exciter coils surrounding the ignition lock cylinder. The energized transponder transmits a signal that contains its unique value, which is received by the theft deterrent control module. The theft deterrent control module then compares this value to a value stored in memory, learned key code. If the value is correct the theft deterrent control module sends a random generated number to the transponder, this is called a challenge. Both the transponder and the theft deterrent control module perform a calculation on the challenge, if the calculations match the theft deterrent control module sends the fuel enable password via the serial data circuit to the powertrain control module (**PCM**). If either the transponders unique value or the calculation to the challenge is incorrect the theft deterrent control module will send the fuel disable password to the PCM via the serial data circuit. The components of the VTD system are as follows:

- ^ Theft deterrent control module
- ^ Powertrain control module (PCM)
- ^ Ignition key (Transponder)
- ^ Ignition lock cylinder
- ^ Security indicator

THEFT DETERRENT CONTROL MODULE

Vehicles with steering column mounted ignition switches have the exciter integral with the theft deterrent control module which is located within the steering column. Vehicles with instrument panel mounted ignition switches have exciter modules separate from the theft deterrent control module with the vehicle wiring harness connecting the two. The theft deterrent control module for vehicles with instrument panel mounted ignition switches is located within the instrument panel. The theft deterrent control module can learn up to ten keys (transponder values).

The theft deterrent control module uses the following inputs, battery voltage, ignition switched voltage and ground circuit. The theft deterrent control module uses the following outputs, password exchange with the PCM, fuel enable/disable via the serial data circuit.

When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the transponder embedded in the head of the key is energized by the exciter coils surrounding the ignition lock cylinder. The energized transponder transmits a signal that contains its unique value, which is received by the theft deterrent control module. The theft deterrent control module then compares this value to a value stored in memory, learned key code.

If the value is correct the theft deterrent control module sends a random generated number to the transponder, this is called a challenge. Both the transponder and the theft deterrent control module perform a calculation on the challenge. The theft deterrent control module then performs one of the following functions:

- ^ If both the transponder value and the calculation to the challenge are correct, the theft deterrent control module will send the fuel continue password to the PCM via the serial data circuit.
- ^ If either the transponders unique value or the calculation to the challenge is incorrect the theft deterrent control module will send the fuel disable password to the PCM via the serial data circuit.
- ^ If the theft deterrent control module is unable to measure the ignition key transponder value for **one second** due to a damaged or missing pellet or a damaged exciter, the theft deterrent control module will send the fuel disable password to the PCM via the serial data circuit.

POWERTRAIN CONTROL MODULE (PCM)

The PCM verifies that the password received from the theft deterrent control module via the serial data circuit is correct. The PCM can learn only one fuel continue password. If the fuel continue password is correct, the PCM enables the starting and fuel delivery systems.

The PCM disables the starting and fuel delivery systems if any of the following conditions occur:

- ^ The fuel continue password is incorrect.
- ^ The fuel disable password is sent by the theft deterrent control module.
- ^ No passwords are received - there is no communication with the theft deterrent control module.

THE IGNITION KEY (TRANSPONDER)

The ignition key on vehicles equipped with the passkey III+ system is a typical locking ignition key with a transponder located in the plastic end of the key. The transponder value is fixed and unable to be changed. The VTD system uses the ignition key transponder value to determine if a valid ignition key is being used to start the vehicle. There are approximately three trillion possible transponder values. There are no visible electrical contacts. The keys may be identified by the letters PK3+ stamped into the steel shank of the key. The VTD systems use the following types of ignition keys:

MASTER KEYS

Master keys have a black plastic end are for full access operation of the vehicle. Master keys may perform the following functions:

- ^ Start the vehicle.
- ^ Lock/unlock all of the door locks.
- ^ Lock/unlock all of the storage compartments.

IGNITION LOCK CYLINDER

The ignition lock cylinder performs all of the functions of a lock cylinder on a non PK3+ equipped vehicle. The ignition lock cylinder for vehicles with PK3+ may be located on the steering column or on the instrument panel. In either location the exciter coils surround the ignition lock cylinder such that they are very close to the head of the key which contains the transponder pellet.

If an ignition lock cylinder is replaced, the PK3+ keys must match the mechanical coding of the new lock cylinder. When replacing an ignition lock cylinder, and new PK3+ keys are required, refer to Programming Theft Deterrent System Components.

SECURITY INDICATOR OPERATION

The theft deterrent control module can command the instrument cluster to illuminate the SECURITY indicator only when the ignition key is in the ON position. If the PCM loses communication with the theft deterrent control module, the instrument cluster will also detect the loss of communication and will illuminate the SECURITY indicator. The SECURITY indicator can indicate both malfunctions, Indicator on steady and tamper, Indicator flashing. A flashing indicator indicates unauthorized operation. Under the following conditions the SECURITY indicator may be commanded to illuminate.

SECURITY INDICATOR ILLUMINATES WHEN ENGINE IS RUNNING

If the theft deterrent control module is unable to measure the ignition key transponder value or the PCM loses communication with the theft deterrent control module while the engine is running, the indicator will be illuminated.

SECURITY INDICATOR ILLUMINATED AND ENGINE DOES NOT START

If the theft deterrent control module was unable to measure the ignition key transponder value or the PCM has detected a problem with the theft deterrent system. The VTD system is in Learn Mode. Refer to Programming Theft Deterrent System Components.

SECURITY INDICATOR FLASHES AND ENGINE DOES NOT START

The theft deterrent control module has measured an incorrect transponder value, the calculation to the challenge is incorrect or the PCM has lost communication with the theft deterrent control module, The VTD system considers this a tamper condition. The VTD indicator will flash.