

ABS Warning Light



The Bulb Check: ABS Warning Light

If only the ABS light comes on, that usually indicates there is a fault condition somewhere in the ABS brake system that the ABS computer is detecting. It is usually an electrical fault, such as a defective wheel speed sensor, defective power relay for the ABS module or pump, or, in some cases, a lower than normal fluid level in a dedicated ABS fluid reservoir.

What to Do: ABS Warning Light

If there are no other brake system warning lights on, the vehicle will have a non-operational ABS brake system, but there should be normal operation from the service brake system. The vehicle should be safe to drive to a shop as long as the vehicle owner/operator keeps in mind that in the case of an accident, there will be no ABS brake system operation. With no ABS system, the vehicle can skid out of control in a panic stop, especially on wet or slick pavement.

If there are other brake system lights on with the ABS light, then there could be something wrong with the basic service brake system. It could be something serious, such as a hydraulic problem or a serious brake fluid and/or pressure loss. In this case, it is very likely that the vehicle is not safe to drive to a shop. The safest thing to do would be to have the vehicle towed to a shop. If there is a basic service brake system problem, then there is the real possibility that the vehicle could experience a brake failure that could endanger lives.

Brake Fluid Level Warning Light



The Bulb Check: Brake Fluid Level Warning Light

When you start the vehicle, the brake fluid level warning light will illuminate, but it should go off after 1 to 2 seconds. If it does not, there is a problem with either the brake fluid level or the brake fluid level warning light system.

If the vehicle is equipped with a messaging system, no message will display as long as the brake fluid level is at an acceptable level. The message system is basically a "no news is good news" type of system. When a brake fluid level message is displayed, it means there is a problem with either the brake fluid level or the brake fluid level warning system.

What to Do: Brake Fluid Level Warning Light

If the brake fluid level warning light illuminates or a brake fluid level message is displayed, the red brake hydraulic light is not displayed, and the brake system performance feels normal, then take the vehicle to a qualified repair shop for a complete brake system inspection and diagnosis as soon as possible. The brake fluid level warning light can be an indicator of wear in the brake pads and/or shoes. As the brake linings wear, the brake caliper pistons will be more extended, causing an apparently low fluid level.

Brake Hydraulic System Red Warning Light



The Bulb Check: Brake Hydraulic System Warning Light

When the ignition key is rotated through the phases of Off, Run, Start, a brake systems bulb check is activated. Both the brake hydraulic systems red light and the parking brake light will illuminate. If there are no problems detected in the brake hydraulic system, the red light will go out after 1 to 2 seconds. If there is a problem detected, then the red light will stay on. The [parking brake light](#) will stay on until the parking brake is completely released. On some vehicles, these lights look very similar, so make sure you know where each light is located in the instrument panel and what its purpose is.

It is always a good idea to check your vehicle owner's manual and familiarize yourself with your vehicle's warning lights. Not all vehicles are equipped with this particular warning light.

What to Do: Brake Hydraulic System Warning Light

If the red brake light blinks, or comes on and off intermittently, and there is no change in the feel of the brake pedal, then have the vehicle properly diagnosed by a qualified repair shop as soon as possible. A complete inspection of the brake system should be performed, even if it is discovered that the light was illuminating due to a low [brake fluid](#) level. The cause of the [brake fluid](#) loss must be thoroughly determined. All sections and components of the brake hydraulic system should be verified for integrity. A properly maintained brake system should not set a red light even if the [brake pads](#) or [shoes](#) are worn to the replacement point.

If the red brake light remains illuminated, it means that there is a persistent problem in the brake system. When this occurs, the vehicle should *not* be driven. The vehicle needs to be towed to a qualified repair shop where it can be properly diagnosed and inspected. If the red brake light comes on while driving and stays illuminated, the vehicle should be pulled to the side of the road and towed to a qualified repair shop.

On some vehicles, the anti-lock brake system (ABS) uses some of the service brake hydraulic components to operate. If the yellow ABS light comes on and the red brake light comes on a bit later, this means the service brake system uses some of the ABS components in order to operate.

In all cases, if the red brake light comes on and stays on, there is a serious problem in the brake hydraulics system. Do not drive the vehicle; instead, have it towed immediately.

Parking Brake Warning Light



The Bulb Check: Parking Brake Warning Light

When the ignition key is rotated through the phases of Off, Run, and Start, a brake systems bulb check is activated. Both the brake hydraulic systems red light and the parking brake light will illuminate. If there are no problems detected in the brake hydraulic system, the red light will go out after 1 to 2 seconds. If there is a problem detected, then the red light will stay on.

As long as there are no problems detected in the parking brake system, the parking brake light will stay on until the parking brake is completely released. On some vehicles, these lights look very similar, so make sure you know where each light is located in the instrument panel and what its purpose is.

It is always a good idea to check your vehicle owner's manual and familiarize yourself with your vehicle's warning lights. This way, there is no confusion as to which warning lights should be on and which should not.

What to Do: Parking Brake Warning Light

If the parking brake light does not go off after the parking brake lever has been released, jiggle the handle to make sure that the mechanical part of the parking brake system has been completely relaxed and that there is no tension on the cables or levers. If the light is still on, see if the vehicle moves without any drag. This can be done by moving the vehicle in a forward direction and then putting it in neutral. If the vehicle rolls very freely, then there may be a problem with the parking brake light switch and not with the parking brake mechanism itself. If you feel a pull, there is a problem with the parking brake mechanism.

In any event, if the parking brake light stays on when it should not, have the vehicle properly diagnosed and inspected at a qualified repair shop.

Charging System Warning Light



On most vehicles the light is configured in one of three ways:

- The light is red and displays "BATT" when the key is on and the engine is off (like when you are only playing the radio)
- The light is either red or amber and displays "CHG" or "ALT"
- There is an icon or image that looks like a simple car battery; it can be red or amber

Until the 1990s, the charging systems in vehicles were controlled by some form of a voltage regulator in or near the actual alternator. The light was connected to the battery and when the key was turned, the light would ground through the alternator. When the engine was started and the alternator produced voltage, the voltage would travel throughout the vehicle's electrical system, including back up the wire that lead to the light. When the charging system light had two sources of voltage reaching it, it no longer had any ground and would be turned off. When voltage at either end of the light became too imbalanced—say from the battery being low or high or the alternator putting out too little or too much voltage—it would cause the battery light to illuminate.

As vehicles became more sophisticated and the number of computer systems kept growing, control of the charging system was moved from the alternator to the powertrain computer. This allows for a much finer attenuation in charging system operating range. This is necessary because the newer, networked on-board computer systems needed "cleaner" and "noiseless" operating voltage so that the accuracy of the sensor data and learned adaptation stayed within the specified tolerances. In these newer vehicles, the charging system light is illuminated by a command from the powertrain computer when it sees an irrational difference between the desired system voltage and the actual system voltage.

The Bulb Check: Charging System Warning Light

When the ignition key is cycled from the Off, Run, Start positions, the battery/charging system warning light runs a self-test. When you start the engine, the warning light should stay on for 1 to 2 seconds and then go off and stay off for the entire time the engine is running. This means that the voltage for the charging system is meeting the requirements set either by the voltage regulator or powertrain computer, depending on the design and model year of the vehicle.

If the charging system warning light does not go off or comes on—even intermittently—while the engine is running, there is a problem with the operation of the charging system. Also, if the

charging system light *never* comes on during the self-test procedure described above, there is problem with the charging system and/or warning light.

What to Do: Charging System Warning Light

If the charging system warning light comes on while you are driving at night, you have very little time left before the engine dies. This is because the vehicle is operating in a "total loss" condition, meaning that the battery is not charging so all of the available voltage will drain out of the system. It is best to turn off all the unnecessary electrical devices such as the radio, air conditioning, and heater. The vehicle may only drive for a few miles, so try to find a safe place from where it can be towed to a qualified repair shop.

If the charging system light comes on during the daylight hours, there may be a bit more time because you aren't using your head lights, which are a major drain on the system. Again, turn off all the unnecessary electrical devices and look for a suitable place to stop the vehicle to have it towed to a qualified repair shop.

If during the self-test procedure, the charging system light *never* comes on, then it would be best to have the vehicle towed to a qualified repair shop for a complete charging system inspection and diagnosis. This is because most of the charging systems need to "see" the warning light in the charging system or they will not properly allow charging system voltage into the system. Even though the warning light is out, the charging system could be in a total loss operational condition.

Engine Temperature Warning Light



There are several types of engine overheating warning systems on vehicles.

- A temperature gauge that has a red colored section at the highest end of the temperature range
- A red or yellow light that will come on and even blink when the engine temperature is too high
- A messaging system that will flash an "engine overheating" message in the driver information center. Sometimes the message alternates between a flashing icon of a radiator or radiator fan and then back to the "engine overheating" message.

Regardless of the type of engine temperature warning system, all are tied to a sending unit or sensor that is linked to the temperature gauge and powertrain computer. Later model vehicles may have more than one type of engine temperature sensor deployed because the manufacturers found that an engine could, in some cases, lose all of its coolant and never trigger any type of overheating warning to the driver of the vehicle. To alleviate this problem, the cylinder head temperature sensor was added to the engine coolant temperature sensor, which serves as a layer of protection and a redundant safety measure to the temperature warning system.

When the vehicle is started cold, the temperature gauge needle will stay in the cold section or even below the lowest section of the temperature gauge. If equipped, the overheat light on the gauge should come on and then go off in 1 to 2 seconds or less. The needle should slowly rise to somewhere in the middle range of the gauge as the engine warms up.

Usually, the needle settles a bit lower or higher than the absolute middle of the gauge. This is normal. However, if the needle is higher than $\frac{2}{3}$ or lower than $\frac{1}{3}$ of the entire range, there is a problem. If the needle settles higher than $\frac{2}{3}$, the engine is running too hot and therefore should be checked. If the needle settles below the $\frac{1}{3}$ range, either the gauge is not reading correctly or there is a problem with excessive flow in the cooling system, possibly from a stuck-open thermostat. In either case, the vehicle needs to be inspected and diagnosed by a qualified repair shop.

What to Do: Engine Temperature Warning System

If the engine temperature warning system, either by gauge, light, or message, signals that the engine is overheating, turn the cabin heater to the maximum heat range and set the blower motor to high. Turn off the A/C and any other nonessential systems that are running, including the radio. This is to alleviate as much load from the engine as possible and to circulate the remaining

coolant through the maximum amount of heat transfer surfaces, like the radiator and heater core. Following these steps will release as much heat as possible.

Pull the vehicle over to the closest and safest place on the side of the road. DO NOT open the hood for at least 20 to 30 minutes. A severely overheating engine can rupture a radiator hose and/or shoot coolant steam out of the coolant expansion tank or radiator cap and severely burn and even blind a person. While waiting, call a tow truck and have the vehicle towed to a qualified repair shop for a complete cooling system inspection and diagnosis.

Check Engine Light



When the light comes on, one or more diagnostic trouble codes (DTC) are stored in the engine control module. These DTCs remain even if the light goes out. To address a Check Engine Light problem, the DTCs are retrieved and the appropriate troubleshooting information is followed in order to determine the problem.

Every vehicle manufactured in the U.S. has to first pass an Environmental Protection Agency (EPA) test called the Federal Test Procedure. This sets the acceptable limits of wear and/or failure for the emission control system—i.e., what conditions will ultimately cause a Check Engine Light to illuminate. These standards are closely regulated. If the emission control system is faulty and the vehicle is polluting the air, the Check Engine Light illuminates to alert the driver of this condition. (*Note: A vehicle in this condition would fail an emissions inspection or smog check.*)

Don't confuse the Check Engine Light with the maintenance or service light. These lights illuminate when a routine service is due. They are usually triggered by mileage, gallons of gasoline consumed, or some other type of vehicle-use measurement.

The Four Most Common Check Engine Light Scenarios and What to Do

The Check Engine Light turns on and off or flickers.

If the Check Engine Light comes on in the city but goes off on the freeway, then the fault is present during city driving conditions. Pay attention to whether or not the vehicle runs or drives any differently when the Check Engine Light illuminates. If vehicle performance does change, drive the car as little as possible and take it to be checked by a service professional as soon as possible. If there is no change in vehicle performance, you can drive home, but have it inspected as soon as possible. In this condition, you run a risk of the vehicle dying or not starting.

The Check Engine Light comes on and stays on.

If the Check Engine Light illuminates constantly during driving with no noticeable driving or performance problems, there is a permanent fault in the emission control system. When this happens, the computer that controls the emission system usually has a backup program that runs while the fault is present. (These backup programs are often referred to as "limp home" mode programs.) You should get the vehicle serviced as soon as possible, but in most cases, the vehicle will continue to operate, though you run a risk of it dying or not starting.

The Check Engine Light illuminates, stays on, and there are performance problems.

This means that a vital component of your emission control and engine management system has a serious problem. It usually involves a component or system needed for the vehicle to run at all.

In most cases, drive the vehicle as little as possible. In many cases, the vehicle is not safe to drive at all—it could stop or stall out at any moment. It is best to pull over to a safe place and have the vehicle towed to an automotive diagnostician for a thorough inspection and repair.

The Check Engine Light comes on and blinks in a steady pattern while driving.

Don't confuse this steady pulsing of the Check Engine Light (usually one or more flashes per second) with a flicker (see above). The Check Engine Light may stay on steadily or it may flash when the vehicle is accelerated. **This is very serious.** There is a severe failure of the emission control system that is causing the engine to misfire to the point that the catalytic converter is damaged each time the Check Engine Light flashes. It may mean that the catalytic converter is overheating to the point that it will glow red or, in extreme cases, start a fire on the underside of the vehicle. **Immediately** pull over to a safe place and have your vehicle towed to an automotive diagnostician for repair. Vehicles can be severely damaged and even destroyed by fire if this condition is ignored for too long.

Low Coolant Level Warning Light



The Bulb Check: Low Coolant Level Warning Light

When you start the engine, the low coolant level light should come on for 1 to 2 seconds and then go out. If it doesn't go out, the coolant level is too low or there is a problem with the coolant level sensor system. Vehicles equipped with a messaging system will receive the low oil message only if the coolant level is low or if there is a problem with the oil level system.

What to Do: Low Coolant Level Warning Light

If the low coolant level light comes on, or a low coolant level message appears, the engine coolant level should be checked immediately. If the coolant is lower than the marked minimum level on the coolant expansion tank, coolant should be added (make sure it's the proper amount and type of coolant). The vehicle should also be inspected and diagnosed at a qualified repair shop because the low coolant level indicator should only come on if the engine is either consuming excessive coolant or there is a coolant leak. Check in your owner's manual for the safe and correct method to check your engine's coolant level.

If the low coolant level indicator comes on and the engine coolant level is normal, there is a problem with the low coolant level warning system. Have the vehicle inspected and diagnosed for this problem at a qualified repair shop.

Low Oil Level Warning Light



The Bulb Check: Low Oil Level Warning Light

When you start the engine, the low oil level light should come on for 1 to 2 seconds and then go out. If it doesn't go out, the oil level is too low or there is a problem with the oil level sensor system. Vehicles equipped with a messaging system will receive the low oil message only if the oil level is low or if there is a problem with the oil level system.

It is always advisable to check your owner's manual and familiarize yourself with your vehicle's warning lights. Some vehicles use this light and some use the low oil pressure warning light—some even use both!

What to Do: Low Oil Level Warning Light

If the low oil level light comes on, or a low oil level message appears, the engine oil level should be checked immediately. If the oil is lower than the specified range level on the engine oil dipstick, oil should be added (make sure it's the proper amount and type of oil). The vehicle should also be inspected and diagnosed at a qualified repair shop because the low oil level indicator should only come on if the engine is either consuming excessive oil or there is an oil leak.

If the low oil level indicator comes on and the engine oil level is normal, there is a problem with the low oil level warning system. Have the vehicle inspected and diagnosed at a qualified repair shop.

Low Oil Pressure Warning Light



The Bulb Check: Low Oil Pressure Warning Light

When the ignition key is rotated through the Off, Run, Start positions, the oil pressure warning light will illuminate. The light is usually red and often contains the outline of an oil can. As the engine warms up, the oil pressure light should go out immediately or within 1 to 2 seconds if the oil pressure is above the minimum specification. If the oil pressure is not within specifications, or there is a problem with the oil pressure warning light self-test, the light will stay on, indicating there is a problem in the oil pressure warning system.

It is always advisable to check your owner's manual and familiarize yourself with your vehicle's warning lights. Some vehicles use this light and some use the low oil level warning light—some even use both!

What to Do: Low Oil Pressure Warning Light

Whenever the oil pressure warning light comes on—even intermittently—pull the vehicle over to a safe place and shut off the engine ASAP. An engine with low oil pressure can be ruined in a matter of *seconds*. If the vehicle has truly lost oil pressure, do not attempt to restart the engine. You can check the engine oil level, but it's best to have the vehicle towed to a qualified repair shop. Be sure the shop knows the oil pressure light came on so the technician can take the necessary precautions when diagnosing the problem.

Background Information: Low Oil Pressure Warning Light

To maintain the minimally required flow of oil, there is an oil pumping system with little passages running throughout the engine that distribute the correct amount of oil to the right places at the right time. Keeping the parts that need to be "hydraulically locked"—kept afloat—in oil requires a minimal amount of pressure, usually about 8 to 10 pounds per square inch (PSI). If the pressure goes below this threshold, the metal components will start rubbing against each other, which will cause the engine to fail.

The oil pressure warning light system receives its information from an oil pressure sensor threaded into a major oil passage. Inside the oil pressure sensor is a diaphragm that touches a ground wire when there is little or no oil pressure—this is what causes the warning light to illuminate. When the engine is running, the oil pressure pushes against the diaphragm and disconnects the ground to the warning light, turning it off.

On more modern vehicles, the oil pressure sensor actually sends an oil pressure value to the powertrain computer. If the oil pressure reading goes below a specified level, the powertrain computer triggers the oil pressure warning light and, in some cases, shuts down the engine in order to protect it mechanically.

Oil Change Indicator Light



For many years, the standard oil change interval was 3 months or 3,000 miles, whichever came first. By one of these intervals, engine oil had either broken down from the mechanical wear of the engine components or had been fuel saturated due to the inefficiency of carburetors, which tended to overfuel engines. Much of this fuel wasn't properly burned and would leak down the sides of the cylinder walls and into the oil pan. After about 3,000 miles or 3 months, the engine oil accumulated so much fuel that its ability to provide lubrication protection to the moving components in the engine was severely compromised.

As fuel injection replaced carburetors in vehicles, the amount of wasted fuel began to decrease dramatically. This was accompanied by more sophisticated engine management systems that increased the engine operational temperatures, allowing efficient combustion to occur with ever leaner mixtures (less fuel per portion of air).

And, as the price of crude oil increased over time, most vehicle development focused on smaller engines with fewer cylinders and smaller components (smaller in both size and weight). This meant that the viscosity of the engine oil—its thickness—could be decreased. Manufacturers discovered that these positive changes were having an effect on engine oil life. The typical breakdown of viscosity, usually reached by 3,000 miles or 3 months, wasn't occurring and the oil change intervals recommended by the vehicle manufacturers began to increase from 3,000 miles to 5,000 miles to 10,000 miles and beyond.

When you first start the engine, the "oil change due" light should come on for 1 to 2 seconds and then go out. If the light stays on, the vehicle is due for an oil and filter change.

Vehicles equipped with a messaging system will see an oil life of 10 to 100 percent displayed in the center of the dash that should go off in 1 to 5 seconds. If the oil life is at or near 0 percent, the messaging system will display an "oil change due" message. Typically, until the oil and filter change is performed and the oil life messaging system reset, the light will continue to display.

What to Do: Oil Change Indicator Light

On vehicles with an oil change light, an oil change is needed when the light remains on after startup. It is best to schedule the oil change within one to two weeks, depending on the type of driving that will be done. If it's highway driving, you have a little more breathing room than city driving. If a trip is scheduled, have the oil and filter changed before leaving.

Vehicles with an "oil change due" messaging system will display a message when there is less

than 10 percent oil life remaining. When this message displays, the next oil and filter change should be scheduled within one to two weeks and before any substantial driving trip.

Whichever indicator your vehicle has, always have the repair shop reset the oil change indicator after completing the oil change. You should also request that an oil change reminder sticker be attached somewhere on the vehicle that states when the next oil change is due in terms of mileage and time as well as what type of oil and viscosity to use. The oil change reminder sticker provides technical information to the repair shop performing the oil change and also keeps track of the accuracy of the oil change light system itself.

Note

At a minimum, you should check your oil level at every other fuel fill-up or once a month. If you do not know how to do this, have the repair shop that performs the oil change check it. Even a dealership should be willing to do this for regular customers. This service should not require an appointment, nor should you be charged for it. Vehicle owner's manuals typically have good instructions with diagrams showing how to check the oil level, as well as other fluid levels.

Service Vehicle Soon Warning Light



The Bulb Check: Service Vehicle Soon Light

The service vehicle soon light should come on when the vehicle is started and should go out in 1 to 2 seconds. If it stays on, then look at the instrument panel for another warning light.

What to Do: Service Vehicle Soon Light

What to do when this light comes on depends on what other light also illuminates. If the ABS light is illuminated, the ABS is not working. If the red hydraulic brake light is on, then act accordingly and pull the vehicle to a safe place on the side of the road and have it towed to a repair shop. When in doubt, pull the vehicle to a safe place on the side of the road and read the vehicle owner's manual to determine what system is at fault and what action should be taken.

This should not be confused with the Service Engine Soon Light (SES) equipped on some vehicles. The SES light is the Check Engine Light for many vehicle models. It is a good idea to read your vehicle owner's manual and familiarize yourself with your vehicle's warning lights to prevent any confusion.

Supplemental Restraint System (SRS) Warning Light

The SRS system is also referred to as a passive restraint system because the vehicle occupants do not need to do anything in order to activate the SRS system when the enabling criteria—speed and deceleration—are met. In contrast, seat belts are an active restraint system. The vehicle occupants must proactively latch each seat belt in order for the seat belt to do its job. Even automatic seat belt systems have a lap belt that must be manually latched.



The Bulb Check: SRS Warning Light

When the vehicle is first started, the SRS light should illuminate for 1 to 5 seconds while the system goes through a self-test sequence. If the light goes out, then the system is ready. If the light stays on, there is a fault somewhere in the SRS system. The system is disabled at this point. In the case of a collision, the airbags will not deploy and the seat belts will not tighten, nor will any additional features activate.

What to Do: SRS Warning Light

If the SRS light stays on after the self-test, then you should take the vehicle to a qualified repair shop to be properly diagnosed and inspected. It is a good idea to check your vehicle's potential recalls in our Advice section because some airbag system repairs may be covered under recalls or extended warranties. Don't delay—you may not be properly protected in the case of an accident or collision.

Another point to consider is that auto insurance companies are becoming less comprehensive in their coverage of the medical bills from an accident if they determine that the airbag system was disabled due to a fault condition. Not many people realize that the SRS system contains a "black box" very much like a commercial airplane. It not only records the data from an accident such as the speed, "G" forces, how many seat belts were latched etc., but it also how long the SRS system was disabled due to a fault condition. If the insurance company determines that the SRS system was in a fault mode for what they consider to be a long time, they aren't willing to cover all of the injuries, especially if they determine that a working airbag system would have prevented the injuries.

If the SRS light is blinking or stays on, take it seriously. There is a fault condition and the vehicle's safety systems are compromised, putting you and your passengers at risk.

Background Information: SRS Warning Light

The SRS computer system continuously evaluates the input data sent to it by motion or "G" sensors, vehicle speed sensors, steering system sensors, vehicle angle sensors, and seat belt sensors. When the enabling criteria have been met—such as a vehicle speed above 25 MPH and a highly abnormal rate of deceleration—the SRS system will choose which, if any, airbags to deploy and which seat belts to pull tight. The purpose of the airbags is to cushion or prevent the vehicle occupants from hitting and slamming their body parts, especially the head, into the steering wheel or dashboard. The seat belts tighten in order to restrict the forward movement of the vehicle occupants.

Newer, more enhanced SRS systems recline the front seat backs, lowering the driver and passenger into a prone position to better absorb the whiplash/recoil phase of a collision and hopefully prevent any neck or spinal injury. Many newer vehicles have side airbags to protect the vehicle occupants from hitting the side pillars, especially with their heads. Some new vehicles also have SRS curtains that come down to protect the occupants from breaking glass from windshields and windows.

GM Passlock Security Light Issues

Symptoms and Solutions

Passlock

- Passlock system fault code B2960
- Security light flashing
- Engine starts and dies

If you find yourself stranded, your engine won't start, and the security light is flashing, wait ten minutes. The flashing light should go off or illuminate without flashing. When it does, turn the ignition off, wait twenty seconds, and then try to start the engine. If it starts and runs, you should be able to make it home. Please remember that this is only a temporary fix; the fault will happen again.

The most common repair is to replace the ignition lock cylinder or Passlock sensor and perform a relearn procedure.

VATS

- VATS (Vehicle Anti-Theft System)
- Security light on steady
- Engine won't crank—all other systems functioning normally

If you find yourself stranded and the engine won't crank over, turn the ignition off and wait four minutes. Then, try again. If the engine starts, you should be able to make it home. Please remember that this is only a temporary fix; the fault will happen again.

The most common repair is to replace the ignition lock cylinder due to broken wires inside the steering column.

History

- The Passlock I system was introduced in mid 1990s
- Passlock II and Passlock III (PK3) systems were introduced shortly after
- VATS system were introduced in mid 1980s

Anti-Theft Systems

Depending on the make and model, there are various factory and aftermarket anti-theft systems. In this article, we are concentrating on factory-installed GM starter interrupt systems. This type of anti-theft system is designed to prevent the vehicle from starting unless the correct ignition key is used.

These systems used a dash-mounted "security" or "theft" light which can be yellow or red in color. Depending on the current status of the system, the warning light will be off, on steady, or flashing.

Although they may share the same dash-mounted warning light, these "starter interrupt" anti-theft systems work separately from and independently of the "content theft" systems available from factory and aftermarket suppliers. Content theft refers to anti-theft systems that sound an alarm when a vehicle is broken into.

Two Types of Systems

Passlock

In the mid-1990s, the first Passlock systems were introduced and are still used to this day. The Passlock I and Passlock II systems use a sensor in the ignition lock cylinder, which looks for proper rotation of the lock cylinder with the correct key. Upon successful rotation of the ignition lock cylinder, a code will be sent to the Passlock module.

The Passlock III system uses a transponder located under the plastic covering of the key. In most cases, these keys are stamped "PK3" on the metal blade near the plastic covering. An antenna located at the entry point of the ignition lock cylinder reads the transponder data from the key and sends a code to the Passlock control module. This system is very similar to the immobilizer system used by many other manufactures.

The Passlock III antenna and the Passlock I and Passlock II sensors in the lock cylinder are all commonly referred to as Passlock sensors. Upon receipt of the code from the sensor, the Passlock module will match the code received to previously learned values. If there is a match, the Passlock module will send a signal to the engine control module to allow the engine to start and run. The Passlock module is commonly part of the Body Control Module (BCM) or Instrument Panel Cluster (IPC).

VATS

In the mid-1980s, we first began to see the "VATS" (Vehicle Anti-Theft System). It is easily identifiable by the "resistor" mounted in the metal blade of the ignition key. There are fifteen different resistor values available. In order for the engine to start, the correct "resistor" must be read by the VATS control module via the ignition lock cylinder. Also, the ignition lock cylinder must be rotated to the "crank" position. If the incorrect code is read, the system will not allow the engine to start for four minutes—even if the correct code is received. The security light will remain on or a message will be displayed on the Driver Information Center (depending on the model) when this occurs.

Both of these starter interrupt systems are very effective on their own. If you install an aftermarket alarm system, be advised that the starter interrupt feature can cause problems with the factory-installed systems. If you are considering installing an aftermarket alarm system on a

vehicle equipped with a factory-installed starter interrupt, you should consider not installing the interrupt option.

What Does the Warning Light Mean?



Operating states of the warning light on Passlock systems should be:

- On for bulb check
- Off when engine is running
- On steady if a fault occurs
- Flashing in the learn mode

Under normal operation, you should see the warning light on during bulb check and off when the engine is running—no message displayed on the DIC.

When the system detects a fault, the warning light will illuminate or a message will be displayed on the DIC, depending on the model. If a fault occurs while driving, the engine may or may not start after turning the ignition off. If a fault occurs when trying to start the vehicle, it probably won't start.

The warning light on the VATS system is similar except it does not have the learn mode.

Common Problems

Most common problems related to the Passlock family involve the Passlock sensor. The sensor is part of the ignition lock cylinder on Passlock I and Passlock II systems. The antenna is the Passlock sensor on Passlock III systems. If these sensors fail, the proper repair would be to replace the failed part and perform a theft system relearn procedure.

By far, the most common problem with the VATS system is broken wires in the steering column. These wires connect the ignition lock cylinder to the under-dash wire harness. The proper repair is to replace the ignition lock cylinder, which comes with wires already attached that snake down the steering column. The new lock cylinder will come with a key blank that will only rotate the new lock cylinder—it does not have a resistor in it that will allow the engine to start and run. A new key must be made from the blank because it has the proper resistor value. Normally, the resistor is read from the old key using a tool called an "interrogator." The interrogator is available in the parts department of most GM dealers.

Relearn Procedures

The Passlock family has two basic relearn procedures—a ten-minute procedure and a thirty-minute procedure—and which one you use depends on the system and what components have been replaced.

The ten-minute procedure involves trying to start the engine. If nothing happens or the engine starts and dies, the security light will be flashing. Wait ten minutes. The flashing light should go off or illuminate without flashing. When it does, turn the ignition off, wait twenty seconds, and then try to start the engine. If it starts and runs, everything is okay. If you get the same result as previously—nothing happens or the engine starts and dies with the security light flashing—wait ten more minutes.

You will now begin the thirty-minute relearn procedure, which is just the ten-minute procedure repeated three times. After turning the ignition off for the third time and waiting for twenty seconds, the engine should start and run. If it doesn't, there may still be something wrong with the system.

After the learn procedure is completed and the engine is running, the security light may stay on steady for a few minutes and then go off—this is normal. Depending on the system, replacement of key components will necessitate that a relearn procedure be completed. These include the ignition lock cylinder, Powertrain Control Module (PCM), Body Control Module (BCM), or Instrument Panel Cluster (IPC).

Unless the VATS control module is replaced, there is no relearn procedure for the VATS system. A new VATS module will learn the resistor code the first time it is powered up. Once the module learns its code, there is no way to relearn it. New ignition keys must always be matched to the learned code in the VATS control module. If all keys are lost and the VATS code is unknown, then use trial and error to find the correct VATS code. (In some cases, the VATS code may be available from your local General Motors parts department.) If the incorrect VATS code is read by the control module, the system will not allow the engine to start for four minutes—even if the correct code is received.

Throttle Control Warning Light

The throttle motor opens or closes the actual throttle blade, which increases or decreases the power output of the engine. The throttle control warning light illuminates when a problem is detected in the electronic throttle system.



The Bulb Check: Throttle Control Warning Light

When the engine is first started, the electronic throttle body system does a self-test. While this is occurring, the electronic throttle control system light will be lit. It is usually a yellow icon that will go out in 1 to 3 seconds if everything is normal. If the light does not go out, there is a fault condition in the electronic throttle control system.

What to Do: Throttle Control Warning Light

If the electronic throttle control light comes on during start up or while driving, then there is a fault condition developing in the system. If the vehicle still drives normally, then have the vehicle diagnosed and inspected at a qualified repair shop as soon as possible because, at some point, the vehicle may not be drivable.

If the electronic throttle control system light comes on and the throttle response becomes erratic, have the vehicle towed. It is not safe to drive a vehicle in this condition.

If the vehicle has electronic throttle control and a dead battery, do not jump-start the vehicle. The electronic throttle control light will come on after a jump start because the programming in the electronic throttle control computer can get corrupted by the high voltage and current of a jump start.

Often, the electronic throttle control light will come on after a jump start and the vehicle performance will deteriorate over time, until it becomes un-drivable. When an electronic throttle control vehicle has a dead battery from say, leaving the head lights on, it is recommended to have a slow or medium charge with the key out of the ignition. This will let the computers gather their energy slowly without being shocked back to life.

The computers in a modern vehicle are somewhat active, even when the key is out and the engine is off.

Background Information: Throttle Control Warning Light

The first drive-by-wire systems were introduced to allow multiple throttle body engines, like most V12s, to have precise and coordinated throttle control. Having multiple throttle cables was less efficient and lacked precision. The need for more precision became necessary as emissions standards grew more stringent.

As manufacturers developed traction control systems, it became necessary to actively intervene with the process of opening or closing the throttle blade in the engine throttle body. When a wheel begins to slip, the engine must cut power so that the wheel can regain traction. This process needs to occur several times a second, something that is impossible for the average driver to physically do himself. Therefore, a computerized electronic throttle control system was developed to do this job.

Tire Pressure Warning Light



The Bulb Check: Tire Pressure Warning Light

When the ignition key is cycled from Off-Run-Start and is released back to the Run position after the vehicle starts, the tire pressure warning light should illuminate for 1 to 2 seconds and then go out. If it stays on, there is a problem with the tire pressure in one or more tires—or there is a fault in the tire pressure warning system.

What to Do: Tire Pressure Warning Light

The computer controlled tire warning system—also known as the tire pressure monitoring system (TPMS)—uses several different methods to track the tire pressure. Some use the anti-lock brake sensors (a deflating tire will turn faster than a properly inflated tire and therefore trigger the light). Some systems use sensors in the wheel wells that carefully track the diameter of the tire (a low tire will have a smaller diameter than a properly inflated tire). Other systems use pressure sensors inside the tire itself. When the tire pressure falls below a certain point, the sensor will send a signal to a transducer, which alerts the tire warning system and illuminates the light.

It is important to read the portion of your vehicle owner's manual that covers the tire pressure monitoring system. That way, if or when the tire warning light comes on, you'll know exactly what to do. Not only do vehicles come equipped with the tire pressure monitor, some models also have a flat tire monitor. Flat tire monitors are more common on vehicles equipped with run-flat tires. They alert the driver when the tire pressure drops to 0 PSI (pounds per square inch).

Depending on your tire warning system, "tire low" or the actual tire pressure may be displayed. It is a good idea to keep a tire pressure gauge in the vehicle's tool kit in case you need to inspect the air pressure in your tires or recheck the pressure after adding air. Tire pressure gauges are inexpensive and available at nearly all stores with an automotive section, auto parts stores, and in auto dealers' parts departments.

If the tire warning light comes on while driving—especially on the highway—then it is best to pull the vehicle off the road and find a safe place to stop. If it is possible to do so in a safe manner, get out and observe the condition of all four tires. If any of the tires show signs of sagging due to improper tire pressure, then call for service—driving an under inflated tire will destroy the sidewalls and make the tire unsafe. A tire with a damaged sidewall can fail without warning and be catastrophic at any speed above 25 MPH.

Sometimes it is difficult or impossible to tell if a tire is low simply by looking at it. This is why a

tire pressure gauge is useful. Run-flat tires will not show signs of low pressure and loaded vehicles not equipped with run-flats can often look as though the tires are low. Vehicles parked on a slope can have a tire that appears low on pressure when it might be normal.

If the tire warning light stays on while the vehicle is being started, then shut it off and, if it is safe to do so, walk around the vehicle and observe all four tires. If any of the tires show signs of sagging from improper inflation, then call for service. If you are *sure* that the tire pressure in all four tires looks completely normal, then most likely the problem is in the tire warning system itself. Have the vehicle diagnosed and inspected at a qualified repair shop.

If the tire warning light comes on soon after the vehicle was serviced at a repair shop—for brake system work, a tire rotation, a CV boot/axle replacement, or even an oil and filter change, then it's likely that something was disturbed that tripped one or more of the tire pressure sensors, which triggered the warning light. Even topping off the tire pressure (say during an oil change) in one or more of the tires can require a re-set procedure that must be performed or the tire warning light system may illuminate the warning light.

In some systems, the tire warning light will steadily flash whenever there's a problem within the warning system itself. If this is the case, pull the vehicle to the side of the road in an area where it is safe to walk around and inspect all four tires. If you are *sure* that all of the tires look like they're at normal tire pressure, then have the vehicle tire pressure warning system inspected and diagnosed at a qualified repair shop. If you find that one or more of the tires are sagging and look low, or you are not sure, then call for service.

Background Information: Tire Pressure Warning Light

The National Highway Transportation Safety Administration (NHTSA) required that all four-wheeled vehicles weighing 10,000 pounds or less must be equipped with a tire pressure warning system by 2008. This system alerts the driver if the tire pressure in any of the four tires drops 25 percent or more.

Congress mandated the tire pressure warning system when it enacted the Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act in 2000. Congress took this action because mounting evidence indicated that an increasing number of highway accidents were related to tire problems. The evidence showed that drivers are unaware that one or more of their tires are losing pressure until the tire collapses and the vehicle becomes uncontrollable, which often results in a vehicle rollover situation involving other vehicles on the road, including big rig trucks. Some of the worst multi-vehicle and multi-fatality highway collisions are due to one vehicle experiencing a tire failure that was preceded by a steady loss of tire pressure. In most cases, if the vehicle operators had been warned that one or more of their tires were losing pressure, they could have safely driven their vehicle to a location where they could have fixed the tire pressure problem.

Studies in Europe and other countries have shown that 75 percent of vehicle operators have no idea about the condition of their tires in terms of tread life or if their tires are properly inflated.

Traction Control Warning Light



The Bulb Check: Traction Control Warning Light

As the ignition key is rotated through the phases of Off, Run, and Start, a systems bulb check is activated. The traction control system light should illuminate for 1 to 2 seconds and then go out as the vehicle starts and begins to run. If the light stays on, it either means that the system is deactivated or there is a problem in the traction control system.

What to Do: Traction Control Warning Light

If the traction control light comes on intermittently, there is a problem that may not be "hard coded," meaning it isn't a permanent condition yet. A flickering light could also mean that the system is not fully operational, so use extra caution in adverse road conditions.

Many traction control systems will illuminate the warning light when the system detects a loss of traction, like in snowy or rainy weather. Typically the light is seen when the system intervenes to maintain traction. It's a good idea to read the section in your vehicle owner's manual to familiarize yourself with how your traction or stability system operates.

If the traction control light illuminates and stays lit without blinking, this means that the traction control system has been deactivated and there is no traction control available. There may even be a message broadcast by the driver information center warning that the traction control system is shut down and to use extra caution when driving, especially in water, ice, and snow.

The only way to properly resolve either of the above conditions is to have the vehicle properly diagnosed at a qualified repair shop. Always have the repair shop do a full computer systems scan. It may not necessarily be a fault in the traction control system that is setting the light. Sometimes a fault in the engine management system first shows up in the traction control system, such as an intermittently defective throttle position sensor in the electronic throttle control.

The basic mechanical components of the powertrain system must also be properly inspected. Anything that would cause a rough or jerky application of power can cause wheel slip, which means that worn drivelines, axles, and constant velocity joints are suspect. Even a harsh transmission shift or badly misfiring engine can cause wheel spin and illuminate the traction control light.



Check Engine or Malfunction Indicator Light (MIL): Indicates the engine computer has set a Diagnostic Trouble Code (DTC). Usually requires diagnosis with a professional [scan tool](#). Learn the [top five reasons why your check engine light is](#)

illuminated.

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Battery/Charging Alert: Indicates voltage level is below normal level and the vehicle's [charging system](#) is not functioning properly. Check [battery terminals](#), alternator [belt](#), and [battery](#) condition.

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Coolant Temp Warning: Indicates temperature has exceeded normal limits. Check [coolant level](#), [fan operation](#), [radiator cap](#), [coolant leaks](#).

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Transmission Temperature: Transmission is operating at higher than optimum temperature as [transmission fluid](#) is hotter than normal. Check transmission fluid level and engine coolant level.

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Oil Pressure Warning: If this light stays lit, it indicates loss of [oil pressure](#). Immediately check oil level and pressure.

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Oil Change Reminder: Indicates that [oil life](#) has expired. This is monitored by the ECM; the interval can be mileage or a combination of readings taken by the ECM. The reset procedure is listed in the owner's manual. Some vehicles require the use of special tools to reset the light.

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Service Vehicle Soon: Typically indicates a lighting or other electrical problem that is controlled by the BCM (body control module). Check all lights ([head lights](#), [turn signals](#), [brake lights](#), and hazard lights). This symbol may also be used to warn driver of a traction control problem, or a communication problem between modules.

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TPMS (Tire Pressure Monitoring System): Indicates the tire pressure monitoring system has found a tire with low air pressure or there may be a [sensor](#) malfunction. Check tire pressure. Some vehicles will allow manual reset of TPMS warning light and others will require professional diagnosis. Refer to owner's manual.

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Brake System: Indicates one of three possible conditions: parking brake is on; problem with the [braking system](#)/brake fluid is low, or ABS problem. Check [brake fluid](#) and make sure the parking brake is fully released. If the problem is in the ABS system, it may need a professional diagnosis.

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Reduced Power Warning: Indicates Engine Computer has limited engine power output. The ECM has many levels of reduced power depending on what component has failed in its control system. Usually requires diagnosis with a [professional scan tool](#).

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ABS Light: Indicates that the Anti-lock Brake computer has set a code and needs professional diagnosis.

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Gas Cap: The check [gas cap](#) light indicates that the gas cap is not tightened properly. If not addressed, quite often the Check Engine Light will also illuminate.

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Cruise Control: Indicates that cruise control is set during driving.

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ESP Fault: Indicates that there is a problem with the vehicle's traction control/anti-skid or electronic stability system.

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Security Alert: If the symbol lights momentarily it may mean that the [ignition switch](#) is locked and will need the proper transponder-equipped key to re-start. If the symbol is visible when the vehicle is on, then it typically indicates a malfunction in the security system.

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Lamp Out: Indicates that there is an exterior light on the vehicle that is not functioning properly.

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Traction Control or ESP: Illuminates when the vehicle's traction control/anti-skid or electronic stability system is in use. Usually an indicator that conditions are slippery.

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Door Ajar: Indicates that a door (including hood and trunk) is not closed. Open and close all doors, including hood and trunk. If vehicle is left in this condition overnight it can drain the [battery](#).

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Overdrive Light: This symbol indicates that the vehicle's overdrive system has been manually turned off. Typically the overdrive system is controlled by an on/off switch.

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Airbag Fault: If this light stays illuminated after starting, it indicates that the vehicle has found a fault in the airbag system and the computer has set a code. Professional repair of the supplemental restraint system is highly recommended.

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Washer Fluid Reminder: Indicates [washer fluid](#) is low. Fill washer fluid reservoir. The cap has a symbol that looks like a windshield. Some vehicles have separate reservoirs for front and rear window washers.

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Fog Lamp: Indicates that the vehicle's front [fog lamps](#) are illuminated.

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Diesel Fuel Vehicles Only



Glow Plug (Diesel): On diesel vehicles this light indicates that the engine's glow plugs are warming up and the engine should not be started until this light goes out.

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DPF Light (Diesel): The diesel exhaust particulate filter has failed its test and needs to be serviced.

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DEF Light (Diesel): The [diesel exhaust fluid](#) reservoir is low on fluid.

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